FOR THE TRANSMISSION REBUILDING INDUSTRY

6T70/6T75 Updates and Changes

A Penny Saved Can Cost You Big...

ATRA's 2012 Powertrain Expo
The Push is on...See details inside

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JULY 2012
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SPECIAL INTEREST & TECHNICAL

4  CHANGING TIMES: 6T70/6T75 Updates and Changes  
   — by Steve Garrett

8  STREET SMART: A Penny Saved Can Cost You Big… If You Cut Costs on the Fluid! — by Mike Brown

14  Transtar Industries, Inc.,® The Marriage of Art and Science  
   — by Stephanie Cargill

18  Field Testing Hybrid and Electric Vehicle Motor/Generators:  
   A GM Study that Finally Separates Fact from Fiction —  
   Part One — by Dr. Mark Quarto

26  THE WORD ON THE STREET: Don't Let the Piston put a Damper on Your Day — by Mike Souza

34  What Noise? — by Thom Tschetter

38  MANAGEMENT MATTERS: Can't Find a Tech? Ask the Right Question… — by Steve Bodofsky

42  SHOP PROFILE: Knudson Transmission Service  
   Des Moines, Iowa — by Steve Bodofsky

47  ATRA on Hand for Another Successful TCRA Event!

48  Magneto-Restrictive Sensors: A Cross between Two Sensors  
   — by Steve Bodofsky

52  Sound Advice to Sleep On — by State Compensation Insurance Fund

53  ATRA's 2012 Powertrain Expo, October 25th-29th: Read All About The Event!

57  Jim Jennings: …a Life Well Lived

DEPARTMENTS

2  FROM THE CEO: Being the Customer — by Dennis Madden

59  Powertrain Industry News

65  Shoppers and Classified

72  List of Advertisers

Be sure to read our Feature Story, Transtar Industries, Inc., pg 14, The Marriage of Art and Science  
(Paid Advertisement)
In the March 2008 issue of GEARS, we talked about going to the dealer and experiencing their service. The idea was to view things from the customer’s perspective and see if there was anything you experienced that you might be able to use to improve the service at your shop.

I know shop owners who’ve done this, and even taken it a step further, going to retail chain stores (like Sears) and general-repair shops to see how their service stacks up. It’s a really good idea and can give you a better sense of how a customer feels with the treatment they receive.

As useful as this is though, there are a couple flaws in it. Probably the most important is that you aren’t really without transportation for any length of time. The shop is local and it’s a planned service. You aren’t dealing with an unplanned interruption in your schedule… or your life.

It’s still a great exercise to see how they interact with you. But you’re not in a desperate situation where getting your car back quickly matters all that much. Recently though, I got a chance to find out what that’s like.

This past May, my daughter finished her first year of college. She’s attending UNLV in Las Vegas, about 330 miles away. On her final day she had to move out of her dorm by 3:00 PM, so the plan was to leave bright and early to get there around 10:00 AM and get her packed up. I headed out around 4:30 that morning.

I’d been on the road for close to two hours when I happened to look down and saw the Check Engine light was on. “What the…” Then I looked over and the temperature warning light was on. “Huh?” I quickly turned to the temperature gauge and it was buried; as hot as it could go!

I was in the middle of nowhere, so pulling over wasn’t a problem. As I got out, the steam started pouring out from under the hood and as I reached the front I could see water everywhere. The problem was a cracked radiator.

I quickly went from being a mechanic to a customer… I needed help. After letting it cool down for a while, I managed to coax it to a gas station about a quarter-mile up the road. I called AAA and the truck got there in about 10 minutes.

I had no idea where to go (and there wasn’t an ATRA Member shop nearby) so I got a recommendation from the driver. He knew a shop just down the road so he called to let ‘em know we were coming. It was close to 7:00 by this time.

We got there and they were already working on cars; the lot was packed. I anticipated having to rent a car to finish the trip, leave my truck for the weekend, and then having to take time from work the following week to go pick up the truck; what a mess. Then the shop owner said “We should have you back on the road in a couple hours.” “What?” I’m thinking.

I was instantly put at ease; they understood my predicament and got me right in. In about an hour, a delivery car stopped by with my radiator. The place was so busy there were a couple traffic jams in the parking lot while I was waiting. Yet, in a little over 3 hours I was back on the road.

They were able to turn a disaster into little more than an inconvenience. The waiting area was clean and comfortable. Everyone was polite and friendly; I received five-star service and it was awesome.

This gave me an even greater appreciation for something I already knew: The time it takes to make the repairs is one of the top factors in creating a satisfied customer. Think of the things you can do to minimize the time it takes to get your customers back on the road. And remember, a transmission failure isn’t planned; it’s not like having your oil changed on a day that’s convenient.

As a mechanic, I understand the time it takes to fix a car. As an association leader and business advisor, I recognize the importance of time to the customer. As a customer, I discovered a real appreciation for keeping that time to a minimum.
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*See dealer for limited-warranty details. Remanufactured diesel engines are covered by a two-year/unlimited-mileage warranty.
As we conduct the seminars each year, we try to focus on product issues you’ll likely see in your shop and on the updates to each of those transmissions. The logic of focusing on those areas is to help you quickly diagnose and repair common product issues that you might face and avoid issues that were addressed by updates and product changes.

With that said, the 6T70 and 6T75 are becoming a more common sight in many shops. Product changes have occurred to the 6T70/75 to address specific problems; others were designed to improve the performance and longevity of the unit.

Let’s look at some of the more common changes this unit has undergone:

- 2007-and-later models have eliminated one bolt from the torque converter housing area. The updated transaxle uses a 9-bolt support. The updated converter housing isn’t tapped for the bolt, so it isn’t necessary for you to do any modifications to interchange parts.

  The updated support will retrofit previous models; just eliminate the bolt. When installing the updated support on an earlier application, follow the torque sequence for the 9-bolt system (figure 1).

  An updated cooler line was developed to reduce the chance of leaks from the cooler circuit. The updated lines have longer snouts and the cooler line holes in the case were modified to accept the longer snouts. This update was designed for 2008-and-later applications; it won’t retrofit earlier cases.

  The lube trough design was updated on 2008 applications. The updated design uses only one bolt to retain the trough in the case. In later case designs only one bolt hole is drilled in the case. The updated trough will fit earlier applications.

  An update to the output and reaction carriers occurred for the 2009 model year. The output carrier bearing pocket has been machined 0.01” (0.3mm) deeper to accept a thicker sun gear bearing design.

  The reaction carrier sun gear bearing has also been modified. The bearing pocket on the updated carrier has been machined 0.009” (0.25mm) deeper to allow for a more robust bearing design. The updated carriers will retrofit earlier units when used with the updated bearings (figure 2).

  An update to the manufacturing process for the reaction sun shell occurred in the 2009 model year. The sun gear weld was subject to fatigue and could fail, leaving you with no reverse and multiple codes. A revised
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The reaction carrier sun gear bearing has also been modified. The bearing pocket on the updated carrier has been machined 0.009” (0.25mm) deeper to allow for a more robust bearing design.

A new tool was released to help prevent damage to the axle shaft seals during service. The seals were often damaged while installing the axle shafts; tool J-44394A prevents this.

Updated wave plates were recently released for many clutches in 6T70. The old design wave plates weren’t stress relieved and can break with use. The most common wave plate to break is the 3-5-Reverse.

If the 3-5-R plate breaks, it can damage the case and the planetary. This is a very common issue with 2009-and-earlier applications. The updated wave plates are available under the following part numbers:

<table>
<thead>
<tr>
<th>Clutch</th>
<th>Part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1234</td>
<td>24259063</td>
</tr>
<tr>
<td>2-6</td>
<td>24259816</td>
</tr>
<tr>
<td>3-5-Rev</td>
<td>24254103</td>
</tr>
<tr>
<td>Low-Rev</td>
<td>24259817</td>
</tr>
</tbody>
</table>

Many questions arise related to the color of the 6T70/75 converters. A manufacturing process leads to discoloration of the converter. Many technicians question whether the converter is damaged or not because it may appear blue.

The blue tint is due to the release agent used on the stampings for the converters. This updated process may lead you to condemn a converter that’s okay. If no other evidence is present — such as burned fluid or other symptoms — assume the converter color is normal.

Well that’s about it for the updates to the 6T70/6T75 applications. Until next time, remember: “We’re never told to cross a bridge till we come to it, but the world is owned by men who have crossed bridges in their imagination far ahead of the crowd.”
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A Penny Saved Can Cost You Big...

You’ve been building transmissions for years. You keep up with the latest tools and equipment. You attend all the ATRA seminars and go to EXPO every year. You can count the number of comebacks you saw this year on one hand. Life is good; it’s a pleasure to go to work. You enjoy what you do because you’re good at it.

Then one bright, sunny day a Toyota Tacoma pulls into the parking lot. Looking closer you recognize the diver. It’s Chris; you rebuilt his transmission last month. Chances are he just wants to tell you how well it’s working.

Walking out to his truck to greet him you sense something isn’t right. After shaking his hand you ask how his truck is doing. Chris says, “I have a little problem. I’m getting this shudder on the highway.” “Well, let’s take it for a road test, but first we need to check the transmission oil to make sure it’s full, and check for leaks.”

This is a 2005 Tacoma with an A750 transmission with no dipstick. It needs to go up on the lift to pull the plug in the pan to check the level (figure 1). You’ll be able to check for leaks at the same time.

It’s dry as a bone and the oil is bright red.

So now you’re ready to take it for a test ride. The shifts feel good but then as lockup applies, you feel the shudder. After a couple of times there’s no question that it’s the converter clutch.

You get back to the shop and scan the vehicle for codes. None, so you inform Chris that you’ll have to pull the transmission back out to replace the converter. Chris is very understanding; he calls his wife for a ride while you go to work.

In a couple of hours the unit’s out. Looks like a simple fix: Just replace the torque converter and reinstall.

To be on the safe side, you decide to have the converter opened to see what the problem was. Everything looks perfect; now what? You can’t just put it back in without finding something wrong, so you take a closer look at the valve body.

You remember reading an article in GEARS Magazine about the Toyota A750E valve body. It said that there’s no factory preset specification for the primary regulator valve (figure 2).
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The tallest step will provide the highest base pressure; the shortest will provide the lowest base pressure.

This should be simple enough: Just turn up the pressure and that should take care of the problem.

Once you have the unit is back in and full of oil, time for the moment of truth. You head out to give it a nice long road test to make sure it’s working right.

Forty five miles and it seems to be working perfectly. So you call Chris to have him come and pick up his truck.

When Chris shows up you ask him to keep a close eye on it and if he has any problems to bring it back right away. A handshake with a smile and Chris is on the road again.

Two weeks later:
Chris pulls into the parking lot, walks into the waiting room, and sits down. When you enter the waiting room Chris is shaking his head, saying “sorry, it doing it again.”

You tell Chris not to worry about it; you’ll take care of it, and if he needs a car you’ll get a rental for him. Chris says thanks, but he has a ride coming.

Back in your office you start thinking of all the things you’ve checked and done. What could you have done wrong or overlooked? Time to make a call to the ATRA Technical HotLine. That’s when I get the call.

You explain the problem and the things you’ve checked and done.

The first question I ask is whether you were using Toyota’s World Standard (WS) Automatic Transmission Fluid (figure 3).

No, the fluid you used was recommended as a replacement for DEXRON, DEXRON II, III, and VI; Toyota T-IV and WS; MERCON®, MERCON® SP, and LV; Allison TES 389; Nissan Matic-D, Matic-J, and Matic-K; Honda Z-1 (except CVT); Mercedes NAG-1; Mitsubishi Diamond SP-II and SP-III; and many others.

“This fluid takes the place of over twenty different types of fluid. It’s great! And the price is right!”

“Yeah,” I say. “That may be your problem. You should be using the WS ATF in this unit, but if you’re sure that isn’t the problem, let’s move on. Did you replace any of the solenoids?”

“No I had no codes for solenoids.”

“Okay, but a solenoid can fail without setting a code,” I explain. “You should look closer at the SLT and the SLU solenoids (figure 4). We get a lot of calls involving an SLT failure.”

So you remove the valve body — this time without having to remove the transmission from the vehicle, thank goodness! — and inspect the SLT and the SLU solenoids. You discover the bore in the SLU solenoid is worn. That has to be the problem.

But with the trouble that ATRA’s seen with the SLT solenoid, you replace both. Then you put the unit back together, fill it with fluid, and head out for another road test.

This time you drive the truck all day, to get parts, to lunch, everywhere you can think of. Works perfectly every time, so you call Chris and tell him the good news and to come get his truck.

When Chris arrives you apologize for the inconvenience and promise him that he won’t have any more problems with his transmission. Of course, if he does, you remind him not to hesitate to call or bring it back. A handshake and a smile, and Chris is on the road again.

Two weeks later:
You have to be kidding! No it’s Chris pulling into the parking lot. Maybe he’s just stopping by to say how good it’s working.

“Hi Chris how’s the Tacoma doing?”

“Well you’re not going to want to hear this, but it’s doing it again.”

“Are you going to need a rental car?”

“No, my wife’s on her way to pick me up. We’ll be out of town for a couple weeks, so take your time.”

On your way home that night you notice a Toyota Tacoma that a tree had fallen on during last week’s high winds.
You stop by and talk to the owners. The insurance company totaled it out; they’ll sell it to you for $1200.

The odometer only had 45k on it, so you buy it.

You bring it back to the shop and remove the complete transmission and converter — including the TCM — and install it into Chris’s Tacoma. Then you fill it with new transmission fluid.

You drive it for the rest of the week; it seems to work perfectly.

All week long it works like a champ; no problems. The moment of truth arrives: Chris shows up and you explain what you did, and that it should be the end of the problem. Time will tell…

Two weeks go by and no sign of Chris; the suspense is killing you. So you give Chris a call, only to learn that Chris was just getting ready to come by because it’s doing it again. Dumbfounded, you ask Chris to drop it off.

What could you possibly be missing?

Time to call the ATRA HotLine again. Once again I get the call. You explain the problem, so I pull the ticket from the original call. We go over the things you did.

“You replaced the transmission and converter?” “Yes.”

“The TCM?” “Yes.”

“And you have the exact same problem?” “Yes.”

“I see you aren’t using Toyota’s W/S fluid.” “I don’t see how that can be the problem. I’ve been using this oil for years.”

It took a bit of convincing, but I finally get you to agree to replace the fluid you’re using with the Toyota W/S fluid.

So you flush out the old oil and replace it with the factory fill. You drive the car and it seems fine, but you’ve been fooled before. So you call Chris, explain the situation, and ask him to drive it. It’s going to take some time to know for sure whether this takes care of the problem.

A month goes by and I call to ask how the Toyota with the A750 was doing. You haven’t heard from Chris, so you give him a call. He’s thrilled: The transmission is working perfectly!

After spending all that time and money, the problem was the fluid; the first thing I mentioned. Well, at least it’s fixed and the customer’s happy.

I understand: with today’s economy, you need to save anywhere you can. But when it comes to transmission fluid, use the type that’s recommended by the manufacturer. It may seem a little pricey, but it’s only a few dollars… and that few dollars can save you a bundle later. That’s not just smart… that’s street smart!

Figure 4
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Building a quality torque converter is an art.

Building a quality torque converter precisely the same way every time is a science.

Although art and science, at their roots, seem in opposition, there are a few instances when art and science truly do intersect. When one walks in the doors of Recon Manufacturing, Transtar’s remanufacturing facilities, one will actually witness the marriage of art and science firsthand.

THE MYSTERY OF ART

Because the torque converter is often considered a sub-assembly, it may remain a mystery to many transmission repair technicians. But it’s not a mystery to our experts at Recon. Our builders have decades of experience rebuilding quality torque converters. They are each artists, in their own right.

As we know, specs on torque converters are often calculated to the thousandth of an inch – and that miniscule measure can make a measurable difference in the height of the torque converter, which can ultimately compromise the fit and function of the converter. Each rebuild has their own catalog of converter specs in the complex catalog of their brain.

The challenge, then, becomes how do we replicate this exceptional expertise and quality in each of the hundreds of thousands of converters that we build annually, so that our customers can continue to receive the highest quality product available?

That’s where science comes in.

MEET AN ARTIST

TIM CHESS IS ONE OF OUR MANY EXPERT REBUILDERS AT MCKEES ROCKS, PENNSYLVANIA, ONE OF OUR TWO REBUILDING FACILITIES. TIM HAS BEEN WITH TRANSTAR FOR 28 YEARS, AND HAS PERSONALLY BUILT THOUSANDS OF CONVERTERS. HIS JOB IS TO BUILD THE SAME CONVERTER, PRECISELY THE SAME WAY, EVERY SINGLE DAY.
“OE converters contain inherent problems,” Brett Dickson, Transtar’s Vice President of Manufacturing reports. “In many instances, the torque converters that come off the line at Recon contain fixes that make them far superior to the OEM equivalent.”

Take, for example, the GM55, found in Chevy Trailblazers and GMC Envoy’s built from 2002-2007. Factory hubs on these units were 0.050” too short, and this defect caused premature pump failure. The Recon team installs new hubs on all GM55 rebuilt converters to the correct length in order to prevent this failure.

Most rebuilders are familiar with the problem of GM turbine splines stripping. At Recon, all heavy-duty 4L60E-family converters are upgraded with heat-treated splines, and the same process will be used on regular-duty converters also. Another heavy-duty upgrade is that most Recon heavy-duty converters are rebuilt with a multi-disk clutch rather than the single clutch used in the OE applications.

In addition, Recon uses rigid, heat-absorbing billet covers extensively throughout their product offering. Most heavy-duty converters are offered with a billet cover, and most regular-duty applications are offered with that option (denoted by S1 in the part number, e.g. FM1603-S1 for the 5R110W Ford F-Series Superduty, 2003-2010). This offers a much more robust converter without adding considerable cost to the job.

This list could go on, but you get the picture. The robust process that Recon utilizes ensures a rebuild that is equivalent to – or in many instances better than – the OE equivalent. That is repeatable success that helps to ensure your customers’ satisfaction and eliminates comebacks.
MEET THE SCIENTIST

Greg Cherry, our Director of Engineering, has a passion for quality. “Customer confidence is our goal – every day,” Cherry states. “We work hard to ensure that the quality of our torque converters is at the excellent level expected by our customers.”

It’s fair to say that Greg has been tearing apart transmissions for as long as he can remember. Although his expertise is a recent addition to the Recon team, Greg is no stranger to this industry. Cherry started his career in the transmission industry 30 years ago, and along the way he was director of engineering with ATC in their OEM division, and spent several years leading the torque converter line. Greg leads the engineering teams at both rebuilding facilities, in Rancho Cucamonga, California and McKees Rocks Pennsylvania.

One might say that Greg is a true blue engineer.

"CUSTOMER CONFIDENCE IS OUR GOAL – EVERY DAY. WE WORK HARD TO ENSURE THAT THE QUALITY OF OUR TORQUE CONVERTERS IS AT THE EXCELLENT LEVEL EXPECTED BY OUR CUSTOMERS.”

Solutions. They’re In Our DNA.
It’s In Our DNA

It’s said that ‘cleanliness is next to godliness,’ and that is definitely true in the converter world. That’s why we go the extra mile when it comes to testing our converters. While it is normal and acceptable for there to be a miniscule amount of metal in the converter fluid, how much is too much?

To answer that question, we visit our expert analyst, Nathan Ferguson in the sediment testing lab at our McKees Rocks rebuilding center. Much like the building specs, Nathan has specifications for each converter, and his microscopic equipment evaluates the amount and type of metal in each converter he tests. His equipment can even tell us whether the metal found is from the converter or not.

So, what happens when the metal found in the converter fluid is not from the converter? “Often when we examine converters that have a suspected defect, it doesn’t take us long to determine that the trouble may not be with the converter,” stated Mike Cargill, Transtar’s Product Manager of the torque converter line. “We have to take a step back and evaluate what the real problem might be.”

“OUR JOB IS TO CONNECT THE ARTIST – THE TRANSMISSION REBUILDER – TO THE SCIENCE OF TRANSMISSION SOLUTIONS. THAT’S WHERE DNA COMES IN TO PLAY.”

Transtar’s DNA – Driveline Needs Assessment – is a completely new philosophy of torque converter analysis. Drawn from both OE and Aftermarket information, Transtar’s DNA information takes the symptoms that you may be seeing in the transmission (such as overheating, shudder, poor lock up, slippage and NVA), and produces all known solutions to improve torque converter performance. Transtar’s DNA information covers both domestic and import transmissions through 2012.

What does this mean to you? It means that when you open your 2012 Transtar Torque Converter Catalog (available this month from your Transtar sales representative), you will have access to this information at your fingertips, steering you away from symptoms and toward a true solution for many transmission malfunctions.

Solutions
They’re In Our DNA.

Nathan has specifications for each converter, and his microscopic equipment evaluates the amount and type of metal in each converter he tests. His equipment can even tell us whether the metal found is from the converter or not.

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Historically, when new technologies emerge into the automotive service market, it typically passes through cycles of skepticism, learning, discovery, and finally acceptance by automotive instructors and technicians. This cycle then breeds the period of theories regarding optimum methods to analyze, diagnose, and repair the new technology based on limited experiences and “tinkering.”

After the technology is immersed in the field long enough, it becomes mainstream. During this period, test data from qualified suppliers or organizations is developed to help mature the technology. This data and experiential information will either support or debunk the theories or ideas developed in the field, and ultimately provide sanity and order to the process.

Theories and ideas initially thought to be “acceptable” slowly fade away, while the field embraces more technically sound and repeatable diagnostic methods. These theories and ideas were replaced by good science, coupled with maturing vehicle systems. Electric propulsion systems are no exception to these cycles. Currently, there’s heavy emphasis on discovering and developing theories and ideas on how to use scan tools, DVOMs, and service information to analyze and diagnose hybrid and electric vehicle transmission and transaxle motor-generator units.

Unfortunately, there are instructors teaching their motor diagnostic test methods as fact, when their methods aren’t sound or based in a solid technical foundation.

The goal of this two-part series is to review the test equipment and associated methods currently being used in the automotive field to analyze and diagnose a Permanent Magnet (PM) and Induction Motor (IM) motor/generator unit (MGU). This will help move the automotive field from the theory and idea (reverse engineering) realm into solid science and mature information, by providing the results of comparative evaluation studies.

The hope is that you’ll use this information to select the optimum hybrid and electric vehicle MGU diagnostic test instrument and methods for your business. Additionally, information provided can also help you determine where to seek (and not to seek) training on how to field-test MGU systems, based on the tools, equipment, and methods the training company uses for diagnosing MGU systems.

Why Not Just Use a Scan Tool?

Although the serial data (scan) tool is a wonderful tool for many diagnostic applications, it isn’t reliable for determining MGU operational state-of-health (SOH) or functionality (figure 1). This is due to the limited number of Data Parameter Identifiers (DPID or PID) and Control Packet Identifiers (CPID) available on the Controller Area Network (CAN) bus associated with motor control and diagnostics, and special functions tests.

As a controls and diagnostics engineer, I rely heavily on CAN data, PIDs, diagnostic PIDs, and CPIDs to develop hybrid and electric vehicle propulsion systems controls and diagnostic routines (figure 2).

But I also know that MGU low- and mid-symptom behaviors, and some of the more chronic operational problems, can’t be detected through scan tool data.

For example, the scan tool can provide RPM and motor current (amperage) data. But at the rate the MGU controls switch motor current and RPM to control torque and speed values (that
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can change from negative to positive values and vice-versa), scan data may not be of much use in determining actual SOH or level of condition.

The rate at which the scan tool can provide information is limited by the time required for a controller to “pack” the requested data messages and then transmit this data to the scan tool. The data message pack time plus the loop time for the message to be transmitted, received, and displayed is significantly longer than a low or intermediate intermittent electric machine problem. The scan tool simply can’t keep up with the speed of the problem, so the problem gets lost between the gaps.

**It’s About Time…**

A more detailed example of data messaging is how the motor controller switching time is created. To create a 5% PWM signal within a sine wave necessary to rotate the electric machine is ≈100μs. If the data message pack and loop times are between 100 and 200ms (or longer depending on message byte length), the data messaging would be three orders of magnitude slower when comparing the PWM switching time to the data messaging packing and loop timing.

Using track-and-field terms as an example, three orders of magnitude would be the difference between two, 100-meter runners — one runner finishing the race in 0.009 seconds while the other finishes in 9.0 seconds. So, if there were any electric machine operational symptoms, it would be virtually impossible to see them displayed as a Diagnostic Trouble Code (DTC) or data on the scan tool display unless the problems were near or at catastrophic levels.

When the symptom occurs for very long periods, there will be enough data message packing and loop time to determine there is a problem, latch a DTC, and display the PID (data) on the scan tool screen.

The other area to consider is how the results of CAN data are filtered in the diagnostic software. Diagnostic software filtering must be in place to make sure a torque event (based on current and RPM) is within an operational parameter (or not) for hundreds of powertrain scenarios caused by vehicle noise (i.e., mechanical, hydraulic, electrically induced driveline operational abnormalities, or abnormalities that are operator induced).

So it’s likely that diagnostics won’t light the Malfunction Indicator Light (MIL) for sporadic, soft, or even medium level MGU failures to minimize MIL opportunities. But the diagnostics are very adept at flagging a fault when the problem is chronic or nearly chronic and latch a DTC. Why? Because, when the problem is chronic (e.g., too high or too low levels of current or RPM for a given operating torque) the diagnostic software won’t filter the data due to an elevated magnitude of the signal combined with an extended period of the deviation.

This would result in the MIL lighting, and the problem most likely could be seen in a scan tool snapshot capture. Lower levels of deviation or more layers of software filtering would result in a more difficult operational cycle for the diagnostic software to discern if the problem is real or it is an anomaly when the software is comparing the data to a normal driveline condition.

A simple example would be if the wheels on a hybrid vehicle were bouncing along a very bumpy road. The MGU current and RPM (negative and positive
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torque) would be extremely erratic. If the diagnostic software were calibrated to light the MIL anytime MGU current or RPM operation were out of range, the MIL would be lit constantly.

So software filters (algorithms) are designed to determine if the MGU operation is within operating parameters or not. There can be hundreds of vehicle operations that will place MGU current and RPM well out of the normal operating range for a given input. So the algorithm and its calibrations are set to values that ensure that operating or performance problems actually exist and aren’t a false alarm.

That’s why many diagnostic thresholds are set at much higher levels and longer periods: to reduce the false alarms and a nonessential MIL. This is especially true with electric propulsion systems that have waveform switching times in microseconds and torque values that change from positive to negative (or vice-versa) within milliseconds.

In some modes, the diagnostics may be turned off for a short period (to eliminate false triggering of a DTC/MIL) due to the aggressive nature of the data being acquired from the system. But the scan tool does provide highly dependable results for slower, analog CAN data such as air temperature, stator temperature, coolant temperature, etc.

There are instructors currently teaching electric motor diagnostics to technicians that contend “95% of MGU problems can be found using scan tool.” These instructors are misinformed in how diagnostic systems function and are doing a great disservice to their students with these statements and associated diagnostic methods.

A scan tool can find 95% of the chronic, extremely chronic, or symptoms and problems on very slow analog circuits to locate MGU problems using PID and DTC data. How would a technician eliminate the electric propulsion system as a possible cause of a driveability complaint, or locate the root problem in an electric propulsion system that hasn’t been identified by the vehicle diagnostic software as a chronic (no DTC and no evident PID data or MIL) symptom?

There’s one additional important point in this discussion: The scan tool is of no use for electric machine diagnostics if the MGU has been removed from the vehicle (e.g., technicians that are transmission bench rebuilders or remanufacturers).

Finally, if the scan tool has limited capability of detecting low or medium level electric machine operational problems and it can’t assist in diagnostics when an MGU has been removed from the vehicle, then what can be done in the field to determine MGU SOH? The answer is that instructors and technicians will need to become acquainted with off-board MGU testing processes and test tools.

Separating Theories and Tinkering with Data and Evaluation

After reading the previous paragraphs you may now have some ideas of why scan tools are wonderful for some diagnostic scenarios and not others. Additionally, the scan tool isn’t an option when there’s a need to test an MGU that’s been removed from the vehicle. General Motors has just completed a two-year study evaluating tools, equipment, and methods for testing and diagnosing MGUs in the field.

The study had two parts: Part one was an internal evaluation of MGU
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Field testing equipment and associated methods on its own hybrid fleet and on competitive hybrid vehicles. For part two, GM commissioned an external, 2nd party study to determine if the findings in part one could be replicated.

The testing supplier performed scores of tests on random MGUs; both permanent magnet and induction electric machines. The primary reason for the study was to determine what tools, equipment and testing methods would best augment or replace vehicle controller diagnostic systems, or augment or replace the scan tool in testing MGU (hybrid and electric vehicle transmission) systems on and off the vehicle in the field.

An additional benefit of the study has been to provide the aftermarket with the results so they could make a more informed decision about MGU testing and diagnostics.

**MGU Tools and Methods Evaluated in the Study**

The data that will be used in this article series will be derived from the evaluation provided to GM by the 2nd party motor test vendor. This will ensure that OEM data, bias, and opinions have been removed. The 2nd party commissioned study targeted MGU testing and diagnostics currently used by automotive and industrial motor OEMs, and those being promoted or instructed by individuals or businesses engaged in aftermarket hybrid course instruction.

There are five categories of test equipment and associated methods that were evaluated as part of this study. The equipment and methods range from...
extremely simple to complex. As you may expect, the cost of the test equipment categories and the associated methods to use each technology have a broad range. Listed in order of cost are the five categories of MGU test equipment as part of this study, including a high level guide of capabilities:

1. 12-volt 194 Light Bulb (figure 3):
   - Manufacturer – any automotive electrical component supplier.
   - All testing is manual; No automated testing
   - Cost as tested: ≈$5

2. Combination milliohmmeter, inductance, capacitance, resistance (LCR), and insulation resistance meters; all tests are manual with no automated testing or software data manipulation; won’t perform PM or IM rotor testing (figure 4):
   - Manufacturers: Milliohmmeter – AEMC Model 5600 (2nd party evaluation study) or Milliohmmeter – Hioki Model 3540 (GM evaluation study); LCR Meter – Agilent Model U1733C; Insulation Resistance Meter – Fluke 1587 (GM evaluation study) or Fluke 1507 (2nd party evaluation study)
   - Total combination cost as tested: Range of ≈$1200 - $2000 (depending on Milli / Microohmmeter model)

3. ALL-TEST Pro® AT33EV - Performs automated resistance, impedance, inductance, capacitance, phase angle, current-to-Hz ratio, dissipation factor (tan delta), static and dynamic stator and rotor MGU tests; insulation meter testing is performed manually; test reports can be stored and printed; rotor tests can be performed (figure 5):
   - Manufacturer: ALL-TEST Pro®, LLC
   - Cost as tested (w/software): ≈$5,990.00

4. ALL-TEST Pro® ATIV 2000 – Performs automated resistance, impedance, inductance, capacitance, phase angle, and current-to-Hz ratio tests; insulation meter tests are performed manually; won’t perform rotor testing; test reports can be stored and printed (figure 6):
   - Manufacturer: ALL-TEST Pro®, LLC
   - Cost as tested (w/software): ≈$10,000

5. SKF Baker AWA-IV – automated testing of resistance, DC hi-pot, surge, and polarization index; won’t perform rotor testing (figure 7):
   - Manufacturer: SKF Baker
   - Cost as tested (w/software): ≈$20,000.00

In part 2 of this article, you’ll receive additional information relating to the tests performed using each of the 5 categories shown above and the results for each test and each test method.

At the conclusion of part 2 you’ll be equipped to make your own informed decision regarding the proper test methods and test instrument and equipment you need for testing hybrid and electric vehicle motor/generators that will support the requirements of your business and overall customer satisfaction.

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THE WORD ON THE STREET

Don’t Let the Piston put a Damper on Your Day

ZF transmissions use a couple different accumulator configurations. It’s critical to assemble them correctly during your rebuild.

The biggest problem in today’s technical market is often finding accurate information. This is especially true when it comes to valve body information. To get manufacturer information (referred to as OE; Original Equipment) can be very difficult.

Some OE manuals don’t include any valve body information or exploded views. One reason for this is later model valve bodies at the OE level are considered a replacement part; not a rebuild or repair item. It kind of makes you wonder, with later model valve bodies failing with as little as 40,000 miles or less.
If you’re working on a ZF5HP series valve body and need information on valve identification or exploded views, they are available. They can be found in some aftermarket repair manuals and in ZF valve body parts catalogs. Part numbers are listed for every valve, spring, and orifice in the ZF catalog. Complete recalibration valve body kits are available for some models and strongly recommended.

The main issue that I want to focus on is with the ZF5HP18 and 19 rear wheel drive models (figure 1). These models seem to reach the ATRA Technical HotLine more than the others as far as the damper piston installation.

The damper systems (commonly referred to as accumulators) come in two varieties: those with a regulator valve and those without.

The confusion happens when there’s a damper of each type on the same side of the valve body (figure 2). As rebuilders, we sometimes become creatures of habit. In this particular case, if you become interrupted while reassembling the valve body, you may forget which way the damper goes into the valve body.

When you compare the damper without the regulator valve to those with the valve, it’s only natural to install them in the same direction. That’s when the fun begins. The first thing you hear from the office is “it wasn’t doing that before.”

If you install the A clutch damper (without the valve) backward (figure 3), you’ll be faced with a harsh forward engagement and a harsh coast or forced downshift from 5th to 4th gear.

The A clutch is applied in 1st through 4th gear and released in 5th gear. Whenever I hear a complaint of a harsh shift when only one clutch is being applied, my first thought is the damper that controls that clutch.

Here’s how I found out about this problem: When I sent the tech an exploded view of the valve body and asked him to check the A clutch damper, he said that the one he had didn’t have the regulator valve in the lineup. That’s when the hunting for information began.

Most of the information at hand was on the ZF5HP19FL/GLA front wheel drive and he had a Volkswagen...
Don’t Let the Piston put a Damper on Your Day

with a ZF5HP19 rear wheel drive. Once I compared the two valve bodies, I could see how easy it would be to make this mistake.

If you look at the hydraulics, it’s easy to understand why this will occur (figure 4). With the damper installed correctly, regulated oil enters on the spring side. When the A clutch applies, line pressure enters on the apply side of the damper, then goes on to the clutch. The clutch apply is cushioned by damper spring tension and regulated pressure on the spring side.

Figure 4
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If you install the damper incorrectly then the damper moves too quickly and bottoms out before the clutch engages, causing a firm shift.

The accompanying illustrations show the correct assembly of the damper pistons found in most ZF transmissions according to the ZF valve body parts catalog. A quick comparison of the ZF5HP18 (figure 5) and ZF5HP19 (figure 6) show damper A is on the opposite side of the valve body.

Figure 5

Figure 6
Remember that Old-Time Service?

Whatever It Takes Does!!!
Don’t Let the Piston put a Damper on Your Day

In figure 7, all of the accumulator pistons in the ZF5HP19FL/FLA front wheel and all-wheel drive transmissions have a regulator valve included in the valve lineup.

As shown at the top of figure 8, the EDS5 accumulator valve is only found in the ZF5HP24A all-wheel drive and ZF5HP30 rear wheel drive transmissions; not the ZF5HP24 rear wheel drive.

I hope this information will prevent this mistake and not put a damper on your day.
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This column is a new, exclusive feature in GEARS Magazine. I’ll present real stories, ripped from the files of cases I arbitrated over the past 17 years. Due to confidentiality constraints, the names of the parties won’t be mentioned, and some of the stories will be slightly modified.

In each article, I’ll present the evidence and testimony given by the parties in the hearing. I’ll also incorporate comments from members of the What’s Working forum who participated in a discussion of the case. And finally, I’ll tell you what the ruling was and why.

Thanks to each of you who shared your perspective, provided your input, and offered your feedback through your comments on the What’s Working forum.

For this case, I’ve purposely left out details such as the year, make, and model of the vehicle, and the amount of money involved in the dispute. In this case, those facts aren’t important because it’s more about how the situation occurred and what the shop did — and failed to do — to avoid the dispute in the first place.

1. The customer called the shop and asked if they’d finish removing a partially removed transmission from his vehicle and reinstall a wrecking yard unit, which he was getting under warranty from the wrecking yard because this one was defective. The service advisor and the customer agreed to a price over the phone.

2. He explained to the service advisor that he had previously removed the original transmission and installed this wrecking yard unit because it was making a low-pitched, whining noise. But the replacement transmission didn’t correct the problem. He said that he reused the original torque converter because the bolt pattern was different, and now suspected that to be the problem.

3. The service advisor explained to the customer that the price to R&R the wrecking yard unit included no warranty, and if the next unit didn’t work right, the customer would have to pay to have it removed and reinstalled again.

4. He fully intended to do it himself, but his work schedule had changed and now he wasn’t going to have time to finish it.

5. The service advisor agreed to finish the removal and install the replacement unit.

6. The service advisor explained to the customer that the price to R&R the wrecking yard unit included no warranty, and if the next unit didn’t work right, the customer would have to pay to have it removed and reinstalled again.

8. The service advisor suggested that it might be smarter to authorize the shop to rebuild or recondition the unit before installing it. The shop would...
be willing to do either unit: the one already in the vehicle or the one the customer would get when he returns this one.

9. The customer decided to have the shop rebuild the one in the vehicle because it worked well other than the noise, so it might cost less to fix and he would avoid the risk of additional expenses associated with getting another bad unit from the wrecking yard.

10. When the rebuilder did the teardown inspection of the unit, he found relatively light wear, primarily isolated to the clutches and front pump bushing. But he didn’t see anything that he could confirm to be the source or potential source of the noise.

11. As a precaution, the shop recommended — and the customer approved — a soft parts overhaul plus the torque converter, and, as an extra precaution, a complete front pump assembly.

12. They also offered an ATRA, 12-month, 12,000-mile Golden Rule Warranty.

13. After the unit was installed, it worked great and there was no noise in the transmission.

14. The customer picked up the vehicle at the end of the day. The next morning he called stating that the car was still making the original noise, and he was bringing it back in.
What Noise?

15. The customer demonstrated the noise, which turned out to be the typical noise a tired power steering pump makes. The service advisor explained that they didn’t notice it, since it’s so common and there were most likely many more miles left in it.

16. The customer wanted a partial refund because he still had the noise; the shop felt they deserved to be paid because the customer authorized all the work they did. The shop offered to provide free labor to install a replacement power steering pump if the customer would pay for the pump. But the service advisor already said the noise was common for older pumps, and it most likely had many more miles in it. The customer didn’t feel that this addressed the issue of having to pay for a transmission rebuild he didn’t need.

17. The dispute ensued and the customer ultimately decided to take the matter to arbitration.

18. The customer’s complaint in the arbitration was that the shop rebuilt his transmission when it didn’t need to be rebuilt. He wanted his money back for the rebuild portion of the bill. He was willing to pay for the R&R because that was what he asked for, and the shop sold him on the idea of doing a rebuild.

19. He was willing to accept responsibility for paying for the service he asked for (remove and install the wrecking yard units), since the rebuild wasn’t needed. Then, when the real source of the noise was discovered to be the power steering pump, he would have decided what to do about it at that time.

20. He asked for a refund for parts and labor on the rebuild portion of the bill.

21. The shop contended that they acted in good faith and that the customer got what he authorized. They want the case dismissed. Here are three questions for you to ponder before I reveal the arbitrated decision:

1. What do you think the shop should have done differently from the beginning?

2. What do you think the shop should have done after the customer came back reporting that the noise was still present?

3. What do you think the shop should or could have done if they discovered the power steering pump noise and suspected that it could be the noise in question, before telling the customer his vehicle is ready for pickup?

Here’s what the What’s Working forum feedback was on these questions:

With respect to question #1 — The clear consensus of the participants in the What’s Working forum was, while hindsight is always 20/20, the biggest mistake the service advisor made had to do with getting information, fully disclosing and documenting the circumstances and possible unforeseen outcome, and diagnosing the actual problem. He should have thoroughly questioned and recorded the customer’s answers regarding what the vehicle was doing. There were several comments to the effect that the shop should have reinstalled the partially removed unit to test drive it and hear the noise firsthand.

The service advisor never told the customer he “needed” a rebuild: He presented it as a precautionary or preemptive strategy, and the customer agreed to it. But even though it makes sense to put new parts in while the unit’s apart, the fact is, the shop replaced parts that didn’t need replacing. On the other hand, the shop performed the labor with authorization and in good faith, and the shop is entitled to payment.

The interesting thing to me in this case was that the customer seemed to be very reasonable in his approach to resolving the matter; the shop seemed to be stuck on getting paid simply because the customer authorized it. Offering to replace a power steering pump with no labor didn’t address the customer’s concern, because once he was informed that it still had more life in it and that the noise was normal for an older pump, in his eyes, replacing it was just more of the same “throwing-parts-at-the-problem” solution the shop used with the transmission rebuild.

About the Author
Thom Tschetter has served our industry for more than three decades as a management and sales educator. He owned a chain of award-winning transmission centers in Washington State for over 25 years. In 1996, his business was honored as the #1 small business in the state and ranked in the top 10 nationally.

He has also served the Better Business Bureau as a Certified Arbitrator for over 15 years and is using that experience for topics in this feature column.

Thom is always eager to help members of our industry and continues to be active in his retirement. You can contact him by phone at (480) 773-3131 or e-mail to coachthom@gmail.com.
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Can’t Find a Tech? Ask the Right Question…

In the fourth *Karate Kid* movie (the one that introduced us to a young Hillary Swank), Mr. Miyagi explained, in his warm, enigmatic manner, that “the answer only matters when you ask the right question.”

That was the case at a *What’s Working* seminar a few years ago when someone asked, “What do you do if the customer can’t afford the repairs?” The natural impulse was to recommend alternate credit sources or offer lower-cost alternatives. All valid answers, but none of the choices would have been particularly satisfying.

The problem was they were asking the wrong question. After a bit of thought we realized the more appropriate question was, “How do we attract better customers; customers who can afford repairs?” That got us thinking about where those more affluent customers took their cars, which led to the whole *Dealer Alternative* concept.

By asking the right question, we were able to provide an answer that was far more useful to the shops and had a much better potential for improving their profits.

I started thinking about that when a new question popped up recently on the *What’s Working* forum: “Where can we find qualified technicians? Ones who’ll show up on time and aren’t loaded with bad habits?”

My first thought was to offer suggestions about how to word an ad or whom to call for a referral. But then I started to wonder whether we were trying to answer the wrong question. Maybe the question they should have been asking was, “Why do we need to look for new help in the first place?”

Not everyone does: Over the years I’ve had the pleasure of speaking with shop owners all across the U.S. and Canada. And many of those shops — often the more successful ones — have employees who’ve been with them for 10… 15… 20 years and longer. Some employees worked for the previous owners, and remained there when the new owners bought the company. They’re happy where they are and have no plans to go anywhere.

Then there are the shops with what seems like a revolving door. Employees come and go with the seasons. A person who’s been there for a year-and-a-half is a longtimer.

What’s the difference? Is it about money? Or something more?

The fact is, most people don’t leave a job over money. If they want more money, they’ll ask for a raise. Or they’ll find something to do in their spare time to earn a few extra bucks. No, when people leave a job, it’s usually because they aren’t happy where they are.

We’re creatures of habit. We like routine… regular conditions that we
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can count on. We generally try to avoid change. And few changes are more intense than changing jobs. So when an employee switches jobs, it’s rarely for a single issue; they’re usually genuinely unhappy where they are, and are looking to make a major change in their lives.

This isn’t a secret or something I just made up to fill a few pages in GEARS: The business community has known about it for years. That’s why most companies request an exit interview when an employee leaves. They want to know why someone would consider such a profound change in their routine. And they know that there’s a good chance they’ll get an honest evaluation from an employee who’s leaving to go somewhere else.

Worse yet, if your shop isn’t a great place to work, word gets around. Every other technician in town knows which shops have good reputations and which don’t. They know which ones are busy and which aren’t. They know which shops have terrific working environments and which ones to avoid. And if your reputation maybe isn’t so great, well, you might be hard pressed to attract those top performers.

So, if your employees aren’t sticking around, maybe it’s time to take a long, hard look at your shop and see how it appears from their point of view.

Start with you: How do you feel about your employees? Do you like them? More importantly, do you respect them? And do you show them that? In the January/February 2012 issue of GEARS, I presented the importance of respect and what it means to your employees.

For example, when was the last time you sent them to training? We all know that the technology is changing constantly; your technicians need regular training to remain up to speed on the cars that they’re faced with on a daily basis. Good training makes their jobs easier and makes them more profitable for you.

What’s that? You won’t send your technicians to training because they’ll just go out and get a better job? Yeah, you’ve got a bigger problem than finding qualified technicians. You don’t respect them and they know it. Not much wonder you’re looking for help.

What about working conditions? Does your shop look clean and bright, or dark and dank? Is it someplace you’d like to go every day? Remember, your technicians spend more of their waking hours at your shop than they do anywhere else in the world; they need to be comfortable.

How about the amenities, like heat and hot water? Believe it or not, I once worked in a shop where they expected us to wash our hands in cold water… in the dead of winter! It didn’t take long before I headed up the road.

In this issue, we’re profiling Knudson Transmission Service, in Des Moines, Iowa. Jim, the owner, actually air conditions his shop. In Iowa! Sure, if your shop is in Arizona or New Mexico, you have to have air conditioning. But Iowa?

According to Jim, his technicians are only too happy to come to work in the summer. They’re comfortable, and they’re far more productive than they’d be if they were working through the summer heat. The additional work they
do more than pays for air conditioning the shop.
And you can bet they’re not in any hurry to look for a job somewhere else… at least, not in the summer!

What about a lunchroom? Do you give your employees a place to sit down and enjoy lunch in comfort? Or are they forced to go out, or find a spot in the shop where they can clear away the rubble and sit down?

Then again, what about their paychecks? Just because they don’t want to leave over pay doesn’t mean they won’t. Are your pay levels comparable to other shops in your area? And what about benefits? Do you supply uniforms? Medical insurance? Paid vacations? These days, those things aren’t extras; they’re pretty standard. And if the difference is big enough, they’ll go, even if they don’t really want to.

Of course, even if you run the most employee-friendly shop in town, sometimes employees leave. Maybe they’ve been with you so long they reached retirement age; or maybe they decided to take the next step and open their own shop. Or maybe changes in their family situation required them to move out of your area.

Whatever the reason, there are times when even the most inviting shop may have to look for qualified help. Finding experienced technicians isn’t easy: Maybe you should think about planning ahead and educating your next crop of technicians. Check out the March 2011 issue of GEARs for the article Growing Your Own, which offers ideas on where to find good prospects to help build your technician base for the future. And we’ll talk more about ways to find experienced technicians in a later issue.

But if you find yourself in a situation where you’re looking for help too often, maybe the question isn’t “where can I find qualified help?” Maybe you should reevaluate the question, and ask, “Why do I have to look for help in the first place?”

Mr. Miyagi would be so proud.
C. E. (Knute) Knudson passed away in 1995, just a couple years before his son, Bill, and grandson, Jim, broke ground for their new location for Knudson Transmission Service in Des Moines, Iowa. “We’d been trying to figure out what to do with his ashes,” explains Jim.

Knute was a huge outdoorsman; he loved fishing. “We’d go to Canada every year, and he’d winter in the Florida Keys. So we always thought about splitting his ashes… taking some to Canada and some to Florida.

“One day we were sitting in the old shop while construction was beginning on the new shop. There were huge holes for the foundation, and we both thought, ‘we know where grandpa should be!’ He started all this, and he’d be so proud of what we’ve done with his name and the family tradition.

“So when the concrete trucks pulled up, we put his ashes into the concrete. He’s right in the corner, under one of the main posts that runs through our office. That wall is kind of a shrine to his memory. There’s his picture, the plaque from ATRA, and some news clippings about us, including a few from when he was still with us.”

Today Knute is always there, keeping an eye on his legacy. “He’d probably raise a real stink about how spoiled we are, with hoists and air tools,” Jim laughed. “And especially the electronics… he’d be amazed at what we’ve gotten into, and what it takes to build a transmission today.

A Little History

Knute Knudson started working at dealerships as a general mechanic specializing in transmissions. He began doing a little work at home; soon he had more work there than at the dealer. So, in 1951, he rented a small shop and opened Knudson Transmission Service.

Knute’s son Ben started working for his father while he was still in high school. Later, Jim did the same thing; working after school, weekends, and on summer breaks. He worked a few other jobs after high school, but it wasn’t long before he came back to work in the family business.

“When I returned, I had to get back up to speed on all the changes that had taken place to transmissions over the last few years and become versed in electrical systems and diagnosis. Finally, I supervised construction of our new building.”

Their old shop is still right next door. It changed hands several times since they moved; today it’s a tire store.

A 4th Generation?

While Knudson’s is technically a 3rd generation shop, the 4th generation is knocking at the door: Jim’s 15-year-old son, Kamden, is beginning to come in after school and on weekends to help out and learn the business from his dad and granddad.

“I’m not pushing him to come into the family business,” says Jim. “But he wanted some extra money, and I want him to learn the value of a dollar by working for it. Mainly he’s doing cleanup… that’s how I started, and it’s how my dad started. And that’s how he’s going to start.

“First he learned that the shop had to be kept spotless and where everything went. Then he started learning...
some basic tasks, like how to set a car on the hoist… which caused some interesting moments!

“Now he’s starting to learn some smaller service tasks. I schedule them for a Saturday so he can do them. Weekends, summers, spring break… I try to schedule work for him and he’s been learning how to do it. That’s how we all started.”

Jim also has a daughter: Abby. She’s 11, and when she’s ready and wants to start earning some extra money, it’ll be her turn to help out and start learning in the shop. Both kids help out around the house to earn extra spending money. “I’m not handing out money,” says Jim. “They’re going to earn it.”

**Knudson’s Philosophy**

“I like to treat every car as if it were our own. The most important thing is to take care of the customer’s needs… making sure every car that goes out is safe and sound. That’s how we’ve always done things, and I’m proud to continue that tradition.

“One thing we try to do is make sure that everything else on the car is okay, even if we don’t do that type of work. It’s our job to take care of the car.”

Even though Knudson’s is primarily a transmission shop, they’ll still offer to help a customer if they find something wrong while the car’s in their bays. “It’s not something we advertise, but if the car’s here for work, there’s no sense tying it up again for a simple service or repair when we can take care of it for them.”

If they find something beyond their scope or they don’t want to get involved with, they have other shops they recommend. “If the customer wants, we’ll take the car to a local shop and have them fix it so the customer doesn’t have to worry about running back and forth.

“It’s not about making a buck; it’s about serving our customers.”

**The Shop**

Knudson’s is basically a five-person shop. They have two, fulltime R&R technicians, a rebuilder, and Bill and Jim. Bill comes in when he’s needed, and is planning to retire soon.

They’re almost exclusively a custom rebuild shop. They’ll buy CVTs and some manual transmissions and transfer cases, but they prefer to build the rest themselves.

“We build some stock units… the 4L60Es and 4L65Es… and we have some 350s and 700s for our street rods… I don’t know how much space you’d need to stock every transmission. That’s one reason we custom build. We like to take the transmission apart and see what happened, so we know if there’s another problem we should be looking for.

“Sure, sometimes it’d be nice to be able to turn a unit in a day, but these
Jim handles most of the diagnosis. “I’m the one who talks to the customer and I drive the car, so I have a better idea of what I’m looking for. But everyone steps in: my dad, our rebuilders... even the R&R guys... we all put our heads together when it comes to finding the problem and fixing it. Sometimes it’s just nice to have those different perspectives.”

With such a small crew, sometimes teamwork takes on a whole new meaning: “Occasionally we’ll have to share the rebuild responsibilities. One guy will build the subassemblies, another will assemble the transmission, while a third will service the valve body.”

While the shop is fully computerized, Knudson’s still writes their repair orders by hand. “We get a lot of compliments from customers, who like the personal touch and feel they get from those handwritten repair orders. “Even some of our competition has commented that ‘that looks pretty neat, instead of a typed-out, corporate form.’ There’s a certain warmth to those forms, and a continuity to our roots. It’s the way my grandfather did business... the way my father did it... it’s our way. Change isn’t always better.”

Heated... and Air Conditioned

It’s no great surprise that Knudson’s is fully heated: They have cold winters in Des Moines. But they also have their shop completely air conditioned. That’s not something you see in every shop in the northern half of the country.

“It was something my dad and I talked about while we were in the old shop,” says Jim. “It’d be 4:15, and we’d be completely drained... it was so hot and we were miserable. “So while we were building the new shop, we brought in the A/C company, and they made some recommendations for an insulation package to keep our costs down. The cost to keep the place cool is nothing compared to the work we get out the door. “Everybody comes into work with a smile. They’re very good at getting cars in and out real quickly... doors up, car in, doors down... they try to get the smaller jobs done in the morning; then the bigger jobs come in and those doors don’t open for the rest of the day. “But you check the shop at 5PM, and everyone’s still working; they’re not dragging, dead tired and sweating. It makes the work environment so much nicer. And their work quality and speed are so much better. The work they’re doing at 4:30 is just as good as the work first thing in the morning.”

Prices over the Phone

One thing Jim isn’t afraid to do is give prices over the phone. “When a customer calls, we find out what kind of car it is and what it’s doing. That usually gives us a pretty good idea of what’s wrong. So working out a price range isn’t difficult. “Thanks to remans, we can always provide a ‘worst-case scenario.’ I can tell the customer, ‘If there’s nothing left for me to rebuild, here’s the most
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it’ll cost you.’ That’s a nice fallback to have.”

“The big thing is taking the time to explain it to the customer. Tell them what the problem is, what it’s going to cost, and how long it’s going to take. They’re usually very reasonable if you take the time to explain the situation to them.”

“I love those shops that won’t give a price or a timeframe for the job. Because those customers are coming to me, and I’m going to sell the job. “I want to drive over to their shops; I’m not sure if I should shake their hand or smack them. They’re hurting our industry, but they sure help me!”

Longtime ATRA Members

Knudson’s is a longtime ATRA Member. How long? “I’m not really sure when we first joined. But a few years ago I called to sign up for a seminar, and the woman at ATRA had never even heard of our membership number format; that’s how old it is.”

The biggest reason they’re a Member is the technical support. “You can never have enough technical information in this business. And lately, as the cars have become more complex, that’s been more valuable than ever.

“Of course, it’s always great to be able to offer ATRA’s Golden Rule Warranty to our customers.

“The new management training and seminars have been terrific. Learning new ways to market and advertise our shop… how to approach different customers… they’ve really done a nice job.

“Even if you don’t use everything they recommend, if it just changes your train of thought a little, it’s well worth the effort. It’s too easy to get into a rut; those ideas keep things fresh.”

So what does Jim attribute their success to?

“Our customers aren’t just dollar signs. We take fixing our customer’s cars very personally. When they bring their cars in, we want to take care of their family just like we’d take care of our own.

“This is what we do… and we do it because we love it.” It’s hard to argue with that.
The Torque Converter Rebuilders Association (TCRA) held its annual seminar program on April 20 and 21 in Knoxville, Tennessee. GEARS Managing Editor Rodger Bland and ATRA Technical Advisor Mike Souza were in attendance.

The program began on Friday, April 20, with a tour of the EXEDY Globalparts Corporation plant in nearby Mascot, TN. EXEDY is the new name of the more familiar Dalkin Clutch Corporation, which just celebrated 60 years building clutches and clutch parts. Everyone who attended was hugely impressed with EXEDY’s processes and procedures.

After the plant tour, the seminar program began in earnest with two kick-off programs: One from Transmission Digest Publisher Bobby Mace, and a technical presentation from ATRA’s Mike Souza.

Saturday, things fired up early with a presentation from Rodger Bland, designed to get everyone cranked up and ready to learn. He was followed by a variety of industry speakers on a wide range of topics. Don Randolph from DACCO Transmission Parts was the program MC, and he kept things hopping.

Later that afternoon, the TCRA Board of Directors presented a plaque to TCRA Executive Director Len Wack in recognition and appreciation of his tireless efforts on behalf of the Association. The plaque was presented by TCRA President Jeff Stuck.

The event concluded Saturday evening with a reception; everyone in attendance was invited to enjoy an evening of drinks, hors d’oeuvres, and spirited revelry.

As of this date, TCRA hasn’t announced where next year’s event will be held. For more information about TCRA, visit them online at www.tcraonline.com.
Consider the duck-bill platypus: It has the bill of a duck, and lays eggs like a duck. But it has the tail of a beaver, fur, and secretes milk to feed its young. Is it a bird or a mammal? One thing for sure: It’s weird.

Behold the magneto-restrictive sensor: the duck-bill platypus of the automotive electrical world. It has a magnetic pickup and creates a signal using a reluctor or tone ring, just like an AC sensor. But it has three wires, requires voltage and ground, and creates a digital, on-off signal like a Hall Effect sensor. Also weird… duckbill platypus weird.

Where are you likely to see magneto-restrictive sensors? Chrysler began using them for wheel speed sensors on some cars back in 1999. But the place you’re more likely to run into them is the cam and crank sensors on 2004-and-later Nissans (figure 1).

Why would these sensors be important to transmission technicians? Because, if the Nissan camshaft sensor (CMP) fails, it can put the transmission into failsafe — without setting any transmission codes. It may set a performance code in the engine computer system; probably a P0340 or P0345, depending on whether the system has one or two sensors.

In addition, if the cam sensor fails, the engine will be hard to start or may not start at all, since the computer won’t be able to adjust ignition and injector timing accurately. If the crank sensor (CKP) fails, the system may create a replacement signal using the camshaft sensor signal. And it may set code P0335.

So, while these very strange sensors aren’t in use directly in the transmission, they can have a dramatic effect on the cars you’re diagnosing.

The problem is, the information that’s out there is sort of confusing, to say the least. So let’s take a closer look at them, and see how to test their operation.

**Sensor Construction and Operation**

At first blush, magneto-restrictive sensors look very much like a simple AC-generating, magnetic pickup sensor (figure 2). They include a magnet that sits near a reluctor or tone ring on the
LOCATIONS
8/4/12  Los Angeles, CA
8/11/12  Albuquerque, NM
8/18/12  Cincinnati, OH
9/8/12  Atlanta, GA
9/15/12  Chicago, IL
9/22/12  Billings, MT
10/6/12  Portland, OR
11/17/12  Baltimore, MD

Check http://members.atra.com for more dates and locations to come!

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6T40/45/50
6T70/75
AF40/TF80SC
4L60E, 6L50/80/90
LCT 1000
Magna 3023/3024
Magna 1222/1225/1226
NV 236/NV 136
4L30E

CHRYSLER:
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68RFE
545RFE
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41TE
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48RE
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camshaft. The reluctor passes the sensor to create a signal.

Here’s where these sensors get different: Inside the sensor there’s an integrated circuit, or IC. The IC receives power and ground from the computer — how much depends on the specific vehicle. Some early versions receive 12 volts; later vehicles apply five volts. The break comes around 2008, but it varies by model.

As the teeth on the reluctor pass the magnetic tip of the sensor, they interrupt the sensor’s magnetic field. The IC chip picks up that interruption, turning the signal circuit on and off. What outputs is a digital signal, much like the signal from a Hall Effect sensor.

So why use this type of sensor in the first place? Why not just use an AC-generating sensor, and let the computer translate the signal using an analog-to-digital (AD) converter?

One of the problems with an AC-generating magnetic sensor is that the frequency isn’t the only thing that changes with the speed of the reluctor. The voltage amplitude — the difference between the high and low peaks — also drops. At some speeds, that drop can affect whether the system can read the signal accurately.

A magneto-restrictive sensor doesn’t have that limitation. If the signal is supposed to be between zero and five volts, it’s always going to range between zero and five volts. Same with a signal that switches between zero and 12 volts: It’ll always remain constant, so the system should have no problem reading it, regardless of engine RPM.

Testing the Sensor

CAUTION — Nissan is recalling some of these cam and crank sensors, and they recommend replacing them as a set. They also recommend reflashing the computer. Always check with your local Nissan dealer before replacing these sensors.

Before you start diagnosing the cam or crank sensors, you should know that the factory manuals include some confusing information about them. According to some of those Nissan manuals, sensors that receive system voltage will create a digital signal that switches between one and 4 volts.
This isn’t quite true: In every example checked, the digital signal switches between zero and system voltage (figure 3).

What they were trying to say is that, if you connect a digital voltmeter to the signal, the average signal voltage would be between one and four volts (figure 4). But that won’t really show you what’s going on with the sensor; a scope is a better choice for diagnosis.

On the later sensors that receive five volts, Nissan offers a signal spec between zero and one volt. Again, this is the average voltage as displayed with a voltmeter. A scope proves that the signal switches between zero and five volts (figure 5).

So what’s the best way to check these sensors? Start by connecting a scope or graphing meter to the sensor wire. Then check the signal. If you have a good signal, you know:

- There’s adequate voltage to the sensor.
- The sensor ground is good.
- The reluctor is rotating properly.
- The sensor is working the way it should.

The only thing left to do is make sure the signal is reaching the computer. If not, look for a problem in the wire from the sensor to the computer. If the signal’s reaching the computer, the problem has to be the computer itself.

But what if you aren’t receiving a signal from the cam sensor?

1. Check for power and ground. Use your shop manual to verify the circuits to the sensor for the vehicle you’re working on.

   - On sensors that operate on system voltage:
     - Terminal 1 — Ground
     - Terminal 2 — Signal
     - Terminal 3 — Power
   - On sensors that operate on 5 volts:
     - Terminal 1 — Power
     - Terminal 2 — Ground
     - Terminal 3 — Signal

2. Examine the sensor. Make sure the sensor isn’t damaged on the tip (figure 6).

3. Check the sensor resistance (figure 7). Use your ohmmeter to check the resistance between these terminals:
   
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   What are you looking for? Well, there’s no particular spec. In each case, you should see a resistance of something other than zero or infinity ohms. If you see zero or infinity, replace the sensor; otherwise it’s probably okay.

The Nissan cam and crank sensors: They’re more properly called magneto-restrictive sensors. A cross between an AC magnetic pickup and a Hall Effect sensor, they’re the duckbill platypus of the automotive sensor. Kinda weird.

But, like the platypus, kinda interesting, too.
New research shows that workers are not only getting less sleep than they should, they’re getting less than they used to. In 2005, the National Sleep Foundation (NSF) estimated that overall U.S. adults are sleeping an average of 6.9 hours a night.

Sleep deprivation is becoming more prevalent due to the ever-increasing demands of personal and professional work life. People work all day and in the evening, they take more time to enjoy television, watch movies, or participate in other social activities. The downside is that many people try to pack in too many activities, and end up feeling fatigued or sleep-deprived at work. And depending on the workplace, a lack of sleep can be dangerous - affecting judgment, health, and safety.

Some short term effects of sleep deprivation include:
• a decrease in daytime alertness by 32 percent due to a reduction of 1.5 hours of sleep for one night.
• a twofold risk of sustaining an occupational injury.
• decreased alertness, and impaired memory and cognitive ability.
• drowsy drivers responsible for at least 100,000 crashes, 71,000 injuries, and 1500 fatalities annually according to the National Highway Traffic Safety Administration (NHTSA).

Some of the long term effects of sleep deprivation are:
• high blood pressure.
• heart attack.
• heart failure.
• stroke.
• obesity
• psychiatric problems.

Workers must assess how much sleep they need to perform optimally. If they haven’t gotten enough sleep to function well at work, they should probably take the needed time to recuperate. Workers should pay attention for signs of lost concentration, and nodding off. A quick fix is to get up and stretch or walk around, or get a drink of water or grab a light snack.

Although workers’ sleep habits are largely out of an employer’s control, employers should educate workers on the effects of inadequate sleep and the resulting fatigue. Also, having an employee who is tired and works beyond a regular shift may increase the risk for injury.

The (NSF) suggests that individuals establish a regular sleep schedule, exercise during the day, and relax before bedtime. And for several hours before bedtime adhere to the following tips:
• Avoid heavy meals and caffeine.
• Consume less or avoid alcohol and nicotine.
• Drink fewer fluids that may disrupt sleep.
• Use caution with certain drugs or sleep aids as they can sometimes interfere with natural sleep.

Remember that worker fatigue due to inadequate rest is everyone’s problem because it can affect more than the individual involved. Worker fatigue can have catastrophic safety or financial effects on families, businesses and even, depending on the job, the general public.

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#### thursday, october 25

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
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<tbody>
<tr>
<td>12:00pm - 6:00pm</td>
<td>Attendee Registration</td>
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<tr>
<td><strong>Management Seminars</strong></td>
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<tr>
<td>2:00pm - 6:00pm</td>
<td>What’s Working Kick-off Seminar - Hosted by Rodger Bland (ATRA)</td>
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<tr>
<td><strong>Technical Seminars</strong></td>
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<tr>
<td>2:00pm - 3:30pm</td>
<td>ATF: What’s Beneath the Cap? - Scott Halley, Ed Konzman (The Lubrizol Corporation)</td>
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<tr>
<td>4:00pm - 5:30pm</td>
<td>What Are You Doing to Reduce Comebacks? - Bill Brayton (ATRA)</td>
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<tr>
<td>5:30pm - 6:00pm</td>
<td>Let’s Talk About Excitement, Drive &amp; Devotion! - Lance Wiggins (ATRA)</td>
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#### friday, october 26

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<thead>
<tr>
<th>Time</th>
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<tr>
<td>8:00am - 3:00pm</td>
<td>Attendee Registration</td>
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<tr>
<td><strong>Management Seminars</strong></td>
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<tr>
<td>8:30am - 10:00am</td>
<td>The Dealer Alternative - Dennis Madden (ATRA)</td>
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<tr>
<td>10:30am - 12:00pm</td>
<td>Attracting the Dealer Customer - Danny Sanchez (Autoshop Solutions)</td>
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<tr>
<td><strong>Technical Seminars</strong></td>
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<td>8:30am - 10:00am</td>
<td>2012-2013 Chrysler Automatic Transmission Update - Alan McAvoy (Chrysler Group LLC)</td>
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<tr>
<td>8:30am - 10:00am</td>
<td>Essential Oscilloscope Know-How Part 1 - Dan Marinucci (Communique)</td>
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<tr>
<td>10:30am - 12:00pm</td>
<td>Essential Oscilloscope Know-How Part 2 - Dan Marinucci (Communique)</td>
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<tr>
<td>10:30am - 12:00pm</td>
<td>Top Ten Ways to Botch a Diagnosis - Sean Boyle (Southern Illinois University)</td>
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<tr>
<td>12:00pm - 1:00pm</td>
<td>ATRA Member Meeting</td>
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<td><strong>Technical Seminars</strong></td>
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<td>1:00pm - 2:30pm</td>
<td>Tips &amp; Tricks from the Builders Bench - John Parmenter (Precision International)</td>
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<tr>
<td>2:45pm - 4:15pm</td>
<td>Word on the Street Jatco JF613E 6Speed - Mike Souza (ATRA)</td>
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<td>2:45pm - 4:15pm</td>
<td>Mechatronic Communications - Dr William (Bill) Henney (F.I.M.I.)</td>
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<tr>
<td>4:30pm - 6:00pm</td>
<td>Fixing It Right the First Time - Stevie Lavallee (TEST Research)</td>
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<tr>
<td>4:30pm - 6:00pm</td>
<td>Keeping Your Shop Safe Makes You Money - Carl Mustari (Chattahoochee Tech College)</td>
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<tr>
<td>1:00pm - 2:30pm</td>
<td>First Impressions - Bob Spitz (Management Success)</td>
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<td>2:45pm - 4:30pm</td>
<td>It’s Not Just Service - Maylan Newton (ESi)</td>
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#### saturday, october 27

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<tr>
<td>7:00am - 10:00am</td>
<td>ATRA Chapter President’s Meeting</td>
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<tr>
<td>8:00am - 3:00pm</td>
<td>Attendee Registration</td>
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<tr>
<td><strong>Technical Seminars</strong></td>
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<tr>
<td>7:45am - 9:15am</td>
<td>6T40-6T45 Updates &amp; Product Issues - Steve Garrett (ATRA)</td>
</tr>
<tr>
<td>9:15am - 10:45am</td>
<td>The Road Less Traveled - Bob Warnke (Sonnax Industries)</td>
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<tr>
<td><strong>Management Seminars</strong></td>
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<tr>
<td>8:00am - 9:00am</td>
<td>Eye on the Prize - Art Eastman (Trans Shop Consultants)</td>
</tr>
<tr>
<td>9:00am - 10:30am</td>
<td>Attitude Adjustment - Maylan Newton (ESi)</td>
</tr>
<tr>
<td>11:00am - 1:00pm</td>
<td>ATRA Luncheon featuring Larry Winget Sponsored by Raybestos</td>
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<tr>
<td>2:00pm - 5:00pm</td>
<td>Trade Show</td>
</tr>
<tr>
<td>5:00pm - 7:00pm</td>
<td>Cocktail Reception hosted by PRESTON TRACTOR INDUSTRIES</td>
</tr>
</tbody>
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#### sunday, october 28

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
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<tbody>
<tr>
<td>11:00am - 2:00pm</td>
<td>Attendee Registration</td>
</tr>
<tr>
<td><strong>Management Seminars</strong></td>
<td></td>
</tr>
<tr>
<td>8:00am - 10:30am</td>
<td>Then &amp; Now - Scott Johnson (Profit Boost) (Breakfast sponsored by CARFAX and profitboost)</td>
</tr>
<tr>
<td>11:00am - 12:00pm</td>
<td>Ready, Set, Action! - Dennis Madden (ATRA)</td>
</tr>
<tr>
<td><strong>Technical Seminars</strong></td>
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<tr>
<td>9:00am - 10:30am</td>
<td>Hands-On Hybrid Transaxle Diagnosis - Jack Rosebro (Perfect Sky)</td>
</tr>
<tr>
<td>9:00am - 10:30am</td>
<td>Testing Hybrid Electric Motor-Generators (MGU) in the Field: What Works &amp; What Doesn’t - Mark Quarto (Automotive Research &amp; Design)</td>
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<td><strong>ENCORE:</strong></td>
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<tr>
<td>11:00am - 12:30pm</td>
<td>Hands-On Hybrid Transaxle Diagnosis - Jack Rosebro (Perfect Sky)</td>
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<tr>
<td>11:00am - 12:30pm</td>
<td>Testing Hybrid Electric Motor-Generators (MGU) in the Field: What Works &amp; What Doesn’t - Mark Quarto (Automotive Research &amp; Design)</td>
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<tr>
<td>12:00pm - 5:00pm</td>
<td>Trade Show</td>
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#### monday, october 29

<table>
<thead>
<tr>
<th>Time</th>
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<tbody>
<tr>
<td>9:00am - 2:00pm</td>
<td>Trade Show</td>
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# Registration Form

October 25th - 29th, 2012 • Las Vegas, NV

<table>
<thead>
<tr>
<th>Company Name</th>
<th>ATRA Account Number</th>
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<tbody>
<tr>
<td>Contact Person: (will receive all correspondence)</td>
<td></td>
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<tr>
<td>Address</td>
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<tr>
<td>City</td>
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<td>Country</td>
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<td>Area Code Phone No.</td>
<td>Fax No.</td>
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<td>Email Address</td>
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**TO REGISTER:** Call toll free 1-800-428-8489 or FAX this completed form to 805-988-6761

**Badges will be issued from this list. Use a separate sheet for additional registrations.**

**PLEASE PRINT CLEARLY**

<table>
<thead>
<tr>
<th>NAME</th>
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<tbody>
<tr>
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**CONFERENCE FEES**

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<thead>
<tr>
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<th>Qty</th>
<th>Before Sept. 1st</th>
<th>Sept. 1st - Oct. 10th</th>
<th>ALL ON-SITE</th>
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<tr>
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<td>Technical or Management Conference*</td>
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<td>Extra Luncheon Ticket (Included with Complete, Tech &amp; Management Conferences)</td>
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**TOP RIGHT CORNER**

Every 5th Conference attendee is free!

Call ATRA for details

**PAYMENT INFORMATION**

- Check enclosed payable and mail to: ATRA, 2400 Latigo Avenue, Oxnard, CA 93030 Check # ______________
- Charge to: □ MasterCard □ Visa □ AMEX □ Discover
- Card Number ___________________________________________ Expiration Date: ____________ Security Code: ____________
- Print Name on Card ____________________________________ Signature: ________________

*Conference Registrants may be eligible to receive Trade Show Badges for spouse and/or children by contacting ATRA Registration at 1-800-428-8489.

I do not wish to receive any advertising or promotional material from Exhibitors.
Jim Jennings, owner of Jim Jennings Transmissions in Essex, Maryland, died on February 23, 2012. He was 82 years old. He’s survived by his wife, Virginia; sons Gary, Ken, and Bill; five grandchildren, and five great-grandchildren.

You may not have known Jim, but if you’re an ATRA Member, you no doubt know his son, Gary. Gary Jennings was a longtime ATRA board member and a multi-term Association president. Gary runs the business that Jim began, more than half a century ago.

It’s always sad to see someone pass, but there’s great comfort in recognizing that Jim’s was a life well lived. As Gary said about his father, “Everyone liked him. You’d like to have known him, and liked to have had him as a friend.”

The Beginnings

James A. (Jim) Jennings was born and raised in North Wilkesboro, North Carolina, in the foothills of the Blue Ridge Mountains. In 1950, he took a trip to Baltimore with a friend to deliver a load of Christmas Trees. While he was there, he heard about an opening at the Glenn L. Martin Aircraft Company, where he took a job as a machinist. A typical farm boy, Jim was versed in equipment repair. One day one of his friends at work mentioned he was having a problem with his car’s automatic transmission. The two of them pulled the transmission out and fixed the problem. Then another friend had a transmission problem; Jim fixed that one, too. Word quickly spread through the company that if you had a transmission problem, call Jim.

Then, in 1958, one of Jim’s friends, Joe Eichenberg, Sr., invited him to the Orioles’ opening day. At the game, Jim struck up a conversation with Bill Kidd, sales manager for K. D. Anderson Oldsmobile, then the largest dealership in Baltimore.

Bill mentioned they were having a problem with a 1957 Packard transmission that their technicians couldn’t fix. So he asked Jim whether he could handle it. At the time, Jim had never worked on a Packard transmission. But he didn’t miss a beat: “Sure, I can fix it,” he said. Bill made Jim a promise: “If you can fix it, you’ll never want for work as long as you live.”

Jim fixed the Packard, and Bill was true to his word. Bill left the dealership and opened several used car lots, and a Volvo/Toyota dealership. And he sent Jim an almost endless supply of transmission work.

Jim rented a bay at a nearby Mobil gas station — his rent was that he purchase all his oil and transmission fluid from the station owners — and he was in the transmission business. It wasn’t long before Jim had two employees working for him, all in that single bay.

A couple years later, Jim moved into the back of a used car lot where he had room to bring three cars indoors. A couple more years went by and he rented a building with room for four cars.
By the late '70s, all three of Jim’s sons were working with him. That year they bought a closed BP gas station at their current location. Two years later they added a huge, two-story addition to the back. By the time they got things in full swing they had 23 employees.

Living Life to the Fullest

Jim loved his business and worked hard. And at the end of the workday, he played hard. When Gary and his brothers were kids, they had go-carts, and every Sunday, Jim took his sons go-cart racing. When they weren’t racing go-carts, they’d be out boating on the Chesapeake.

Later, as the boys got a little older, their interests turned to drag racing, and Jim was right there with them. They started out with a 1959 Impala with a 409 engine that Gary used to drive to school in the off-season.

They later got a 1941 Willys coupe. “A ’41 Willys coupe was the car to have back then, and we ultimately ended up with three of them,” says Gary.

Jim was also an avid pilot; he owned a 250 Piper Comanche, with retractable gear and variable-pitch propeller. “He’d take advantage of every opportunity to fly,” explains Gary. “If one of our customers had a problem out of town, he’d load a rebuilt transmission in the luggage compartment and fly out and deliver it.”

And Jim wasn’t the only pilot in the family: His wife, Virginia, was also a pilot, and she bought her own airplane. They bought a house right next to the airport so they could fly as often as possible.

Jim enjoyed snowmobiling, as did a number of his friends. Several of them bought vacation homes together, creating a kind of camp where they could get together and enjoy driving their snowmobiles.

Jim also owned a classic 1976 GMC Motorhome, which he took across the country several times, and once on a group trip down Baja California.

After retiring from the shop, Jim took a trip to Greenland, where he spent two months helping a friend raise a radar site back to its proper height above the rising icecap.

A Philosophy of Integrity and Honesty

Jim’s business model was a simple one: Do the job right, and treat customers the way you’d like to be treated. Sounds familiar: Much like the attitude that we’ve spent the last several years proposing through the What’s Working program.

When asked what he’d learned from his father, Gary said, “Integrity and honesty. He used to say, ‘It’s easier to remember the truth than to remember something you thought up.’”

And the message wasn’t lost on his sons. “We do whatever it takes to take care of our customers,” says Gary.

There’s no question about it: Jim Jennings was a man ahead of his time. And few who knew him would doubt that his was a life well lived.
JASPER Revamps Transmission Converter Balancing

Jasper Engines & Transmissions, the nation’s leader in remanufactured drivetrain products, has updated their process for balancing torque converters.

In the past, JASPER has used balancers that are typically the standard across the automotive industry. A converter balancer spins the entire converter as one assembly, balancing the internal components along with the outside housing.

“But when the converter operates inside the transmission, the internal parts and housing rotate at different speeds,” says Matt Lindauer, JASPER Converter Department Team Leader. “For this reason, this method of balancing has become inferior and unreliable.”

JASPER has switched to a new balancer made by Hines Industries. “As a converter is being balanced, special tooling floats and holds the converter’s internal components separately from the outside housing,” says Lindauer. “The new balancer gives JASPER product repeatability, reduces warranty claims, and a quality product every time.”

For more information on the JASPER line of remanufactured transmissions, please call 800-827-7455, or log onto www.jasperengines.com

Transtar Industries Inc. Hires Chief Human Resources Officer

Transtar Industries, Inc., the premier provider of world-class driveline solutions, is pleased to announce the addition of Ben DePompei as Chief Human Resources Officer and Vice President of Corporate Human Resources.

Most recently with E.P. Management Corporation, DePompei has more than 20 years’ experience in the field of human resources. “I’m excited to be a part of this growing company,” DePompei relates. “I see this as an opportunity to leverage the proud history of Transtar’s entrepreneurship and industry excellence and contribute to the company’s next chapter of growth.”

Ben DePompei, Chief Human Resources Officer and Vice President of Corporate Human Resources

G-TEC Introduces New Solenoid Service Tool Kit

G-TEC Inc. is now offering the AW SL solenoid cleaning and remanufacturing tool kit. This tool kit allows you to completely disassemble the AW SL solenoid, clean or repair it, and then reassemble it with factory precision and ease.

The kit comes with an easy-to-use demonstration DVD. When you combine the tool kit with our replacement bushings and drill plate, the kit becomes a solenoid remanufacturing center.

Now you can remanufacture those troublesome solenoids, such as the VW 09D, 09G, K, M, TR60, AF40, TF80, 55-50SN… and more.

For more, contact G-TEC at 417-725-6400; toll free at 800-725-6499, or visit them online at www.g-tec.com.

Sonax Adds Honda TC Check Valve Kit

Worn or sticking TC check valves frequently cause converter overheating, TCC failures and TCC codes in 4- and 5-speed Honda/Acura units. Sonnax previously released TC check valve kit 98892-06K, allowing rebuilders to correct these problems in any of 22 different applications. A second TC check valve kit, 98892-10K, now expands unit coverage by adding...
POWER INDUSTRY NEWS

25 additional 5-speed applications. For charts with Model, year and transmission code detail, refer to the part summary sheets for each valve kit at www.sonnax.com.

Sonnax Expands Engineering Team

Sonnax Industries, Inc., is pleased to announce two new engineers recently joined the company, enhancing its team of specialists dedicated to industry-leading product development.

Project Engineer Lee Audet is assigned to the Sonnax torque converter group. A graduate of Vermont Technical College with a degree in mechanical engineering technology, Audet brings to Sonnax more than 30 years of experience in the machine tool and high-speed assembly industries.

Past projects have included design and project engineering on machine tools for producing valve bodies, shafts, carriers, and oil pans. He’s also experienced in design engineering the automated assembly of input carrier assemblies, clutch plates, clutch housings, and rocker arms.

Also joining Sonnax is Manufacturing Engineer Jonathan Bialek, who’s working closely with the company’s driveline group as part of the Manufacturing Engineering Department.

Previously with Timken, Bialek has more than 14 years of experience in the bearing manufacturing industry, primarily in grinding/finishing, and holds a degree in mechanical engineering from Clarkson University in New York.

His focus at Sonnax is to develop effective manufacturing processes in support of initiatives to diversify the company’s product offerings.

Sonnax is a diversified supplier of specialized drivetrain products to the automotive and commercial vehicle industries, and to industrial sectors using drivetrain technology. Sonnax is an employee-owned company; www.sonnax.com.

Sonnax Hosts International TASC Force™ Meeting

Forty-seven members of the Sonnax TASC Force gathered May 7 and 8 in Vermont to discuss current and future challenges facing the aftermarket transmission industry. Sonnax was pleased to host the meeting for the first time in many years at its company headquarters in Bellows Falls.

“This year’s TASC meeting was very exciting for all of us here at Sonnax,” said Mark Kaplan, Sonnax transmission specialties product line manager. “It gave us the opportunity to showcase all of the improvements that we have made at our facilities in Vermont.”

Sonnax Hosts International TASC Force™ Meeting

The Sonnax TASC Force™ met in May at Sonnax headquarters in Bellows Falls, VT. The event kicked off with a tour of the company’s facilities, including the Sonnax Distribution and Technical Center where TASC members got a firsthand look at recent improvements to the warehouse and product development areas.

The Sonnax TASC Force™ met in May at Sonnax headquarters in Bellows Falls, VT. The event kicked off with a tour of the company’s facilities, including the Sonnax Distribution and Technical Center where TASC members got a firsthand look at recent improvements to the warehouse and product development areas.

The Sonnax Technical Automotive Specialties Committee (TASC) Force is an international group of expert transmission rebuilders and technicians with a hands-on understanding of the latest units and industry developments.

Working closely with Sonnax design engineers and technicians, TASC Force members contribute product ideas, test new designs, and trouble-shoot results, then meet on a regular basis to compare findings. Members play an invaluable role in identifying the root causes of transmission problems and supporting the development of Sonnax transmission products for the automotive aftermarket.

The two-day meeting started with tours of the Sonnax Distribution and Technical Center and nearby corporate headquarters, which includes office, manufacturing, and quality control facilities. Technical roundtable discussions followed, during which TASC members from 18 shops shared feedback from the field.

“We continue to get new product ideas from the group, which includes the need for electronics and solutions for late-model transmissions as well as a host of converter items,” said Kaplan.

Save Time and Earn More with Bulletin Filter!

 Wouldn’t it be nice to put your finger on the exact tech bulletin you need right away — without having to dig through stacks of ‘em that have nothing to do with the problem at hand?

Well, the new Bulletin Filter online service puts you in complete control of the big bulletin swirl — you save research time and rack up more billable hours. Ka-ching!

Bulletin Filter wades through thousands of transmission bulletins and seminar books from a variety of sources. It blocks anything that doesn’t apply, and returns only the information to address your specific situation.

It’s easy; just enter the transmission model and click on the problems you’ve identified. Click “Search,” and just like that, Bulletin Filter delivers only the bulletins that help you find the problem and fix it right… the first time.

Bulletin Filter works with your ATRA membership, to sort through ATRA bulletins, GEARS articles, and seminar books, instantly returning only the ones you’re looking for. And now it’s available exclusively for ATRA Members.

Bulletin Filter subscriptions list for $39.95 per month: a small price for the time you’ll save each day. But now, for a limited time, we’re rolling it back for ATRA Members to just $19.95 — more than half off our regular price! And
that’s not just an introductory price: We’re locking it in for as long as you maintain your subscription!

To learn more or to sign up, visit www.BulletinFilter.com or call 1-480-688-6774.

Sign up today, and turn research time into paycheck time, with Bulletin Filter!

**Precision Introduces Ford 6F35 Kits**

Precision International now offers overhaul kits, banner kits, and master kits for these 2007-11 Ford 6F35 (front wheel drive):
- Ford Edge 2007-11 (2.0L)
- Ford Escape 2007-11 (2.0L, 2.3L, 2.5L, 3.0L)
- Ford Flex 2011 (2.0L)
- Ford Focus 2011 (2.0L)
- Ford Fusion 2009-11 (2.5L, 3.0L)
- Mazda Tribute 2008-11 (2.0L, 2.5L, 3.0L)
- Mercury Mariner 2007-11 (1.6L, 2.1L, 2.5L, 3.0L)
- Mercury Milan 2009-11 (2.5L, 3.0L, 3.5L)
- Overhaul Kits with Pistons
  - KP59900Z
- Overhaul Kits without Pistons
  - KP59900ZX
  - Banner and master kits are also available with and without pistons.

For more information visit Precision International on line at www.transmissionkits.com.

**Precision Introduces New Honda/Acura Kits**

Precision International now has overhaul kits, banner kits, and master kits available for these Honda/Acura 5-speed transaxles:
- 2007-11 Honda Element (2WD)
  - BZKA, MNZA
- 2011-11 Honda Element (4WD)

**Deluxe Transaxle Rebuild Kit from Rancho Performance**

Feel like you’re up to the task of rebuilding your own transaxle? If so, Rancho Performance Transaxles is now offering a rebuild kit that includes all of the absolute basic components required to freshen’ up your Swing or IRS VW
With existing branches in Caguas, Bayamon, and Mayaguez, Transtar operates in Puerto Rico as “Transmart, A Transtar Company.” The Transtar team is constantly evaluating potential markets for expansion. Contact the home office in Cleveland, Ohio, if you’d like to be part of Transtar’s growing team.

For more, visit Transtar on line at www.transtar1.com.

Corteco Introduces New Kits for ZF5HP19FL, AUDI 01V

Now available from Corteco: TransTec® overhaul kit 2599. This kit repairs the front wheel drive, five-speed ZF5HP19FL transmission. This unit is found in these Audi and Volkswagen applications:

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<tr>
<td>A4</td>
<td>L4 1.8L V6 2.4L 2.8L 3.0L</td>
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<td>Volkswagen/Skoda</td>
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<tr>
<td>Passat</td>
<td>L4 1.8L 1.9L 2.0L L5 2.3L V6 2.8L</td>
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<tr>
<td>Phaeton</td>
<td>V6 3.2L</td>
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<tr>
<td>Superb</td>
<td>L4 1.8L V6 2.8L</td>
<td>02-09</td>
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</tbody>
</table>

This kit contains premium valve body paper, Gold Stripe® sealing rings along with OEM Teflon® and Torlon® sealing rings.

Kit number 2599 is in stock and available for immediate shipment.

Gold Stripe is a registered trademark of Filtran LLC, Teflon is a registered trademark of DuPont, Torlon is a registered trademark of Solvay Advanced Polymers, L.L.C.

For more, visit www.transtec.com.

New Lightweight Billet Aluminum Poweglide Valvebody

ATI Performance Products has developed an all new Lightweight Billet Aluminum Transbrake Valvebody (part # 203051) for Poweglide transmissions. This direct replacement, forward pattern valvebody is fully CNC-machined from billet aluminum, saving 7 lbs over the stock unit! In addition to its light weight, it’s also ultra fast, thanks to minimum restriction, high flow passages and patented ATI adjustable pressure regulator. Available as a $449 transmission upgrade option or as part of ATI’s Superglide Lightweight Options Package.

ATI Performance Products, Inc. is located in Baltimore, MD, and specializes in producing and maintaining high performance products for street and strip applications. Over the years ATI has earned a reputation for its cutting edge technology, attention to detail and

Transtar Industries Inc. Expands Puerto Rico Locations

Transtar Industries Inc., the premier provider of world-class drive-line solutions, announced that it has opened a new location in Ponce, Puerto Rico. This new location marks Transtar’s fourth in Puerto Rico, and brings Transtar’s North American locations to more than 70.

“We are always looking for opportunities for more customers to have better access to our world-class customer service and comprehensive product line,” states Kevin Rozsa, vice president of international sales. “This new branch gives access to customers in Puerto Rico who previously couldn’t conveniently benefit from Transtar’s experience and expertise.”
TransTec Expands Coverage to Include 2010-11 Honda Accord Crosstour

Corteco is pleased to announce expanded coverage on these Honda 5-speed transmission kits:

TransTec® overhaul kit number 2539 has been updated to include coverage for the 2WD 2010-2011 Honda Accord Crosstour with a transmission case code of BBBSA.

TransTec® overhaul kit number 2540 has been updated to include coverage for the AWD 2010-2011 Honda Accord Crosstour with a transmission case code of BBSA.

Additions to these kits include the 10 mm pressure switch washers and the 6 mm lock washer.

Transfer Case Kit

Additionally, TransTec® kit number 4758 contains sealing components for the Crosstour transfer case.

For more, visit www.transtec.com.

Jasper Innovative Solutions Receives 2011 USPS Supplier Excellence Award

Jasper Innovative Solutions has been selected as a winner in the Supplier Excellence Award Category of the 2011 USPS Supplier Performance Award Program.

Postal professionals presented JIS with this award based on customer service rating, fill rate, and innovative ideas.

“I am extremely honored to receive this award with my fellow associates. Through hard work and dedication, we have set ourselves apart from the competition… and our largest customer has taken notice,” said Scott Figiel, JIS sales and marketing manager.

The staff of Jasper Innovative Solutions thanks all of the fleet managers, supervisors, and storekeeper personnel. Their continued support has made Jasper Innovative Solutions what it is today.

JDS Worldwide Corp Receives 2012 Award

For the second consecutive year, JDS Worldwide Corporation has been selected for the 2012 Miami Award in the Auto Parts Manufacture & Private Packager category by the U.S. Commerce Association (USCA).

The USCA Best of Local Business Award Program recognizes outstanding local businesses throughout the country. Each year, the USCA identifies companies that they believe have achieved exceptional marketing success in their local community and business category. These are local companies that enhance the positive image of small business through service to their customers and community.

Nationwide, only one in 70 (1.4%) 2012 Award recipients qualified as two-time award winners. Various sources of information were gathered and analyzed to choose the winners in each category. The 2012 USCA Award Program focuses on quality, not quantity. Winners are determined based on the information gathered both internally by the USCA and data provided by third parties.

About U.S. Commerce Association (USCA)

U.S. Commerce Association (USCA) is a New York City-based organization funded by local businesses operating in towns across America. The purpose of USCA is to promote local business through public relations, marketing and advertising.

For more, visit www.uscaaward.com.

INA Expands Tensioner Coverage for Asian Applications

Schaeffler Group USA Inc. is pleased to announce the addition of 23 new accessory drive tensioners, idlers, and timing belt tensioners under its well-respected INA brand name. The new products cover a wide range of popular Asian nameplate applications, and reinforces Schaeffler’s commitment to offering an expanding line of high quality products to the import specialist market.

Doug Henshaw, director of product management for the Schaeffler Group USA, said, “We want INA to be the brand of choice for the Import Specialists. Schaeffler is continually...
adding breadth of coverage for all our brands — INA, FAG, and LuK — and strive to be a system solution provider to our distributors in the import specialist marketplace.”

INA is a worldwide OE supplier to all major car manufacturers. They offer the industry’s most extensive belt tensioner coverage for European vehicles, broad U.S. domestic coverage, and an increasing product line for Asian applications.

Contact your INA distributor for a copy of the 2012 Tensioner Range Extension brochure or send a request to customer.service@schaeflifter.com. Visit www.Schaeffler-Aftermarket.us to receive the most up-to-date catalog and product information.

Schaeflifter Group USA Inc. is a leading partner to the automotive and commercial vehicle replacement parts markets in North America. The group, which includes the LuK, INA and FAG brands, offers a broad range of technologies for engine, transmission and chassis applications.

**FAST FAB V-Gate Transaxle Nose Cone from Rancho Performance**

If you’re really serious about getting your air cooled VW or VW/Mendeola transaxle-equipped machine down the strip in prime time, one of the best ways to shave those fractions is to install a vertical gate shifter like this FAST FAB unit from Rancho Performance Transaxles.

Essentially the V-gate mechanism converts the traditional H-shift pattern to a straight-up-and-back layout. Not really the hot ticket for street cars, as downshifting requires a couple extra movements, but the straight-up gear transition is fast, positive, and extremely effective in cutting your times at the track.

Machined from solid billet and pre-fit with HP seals, Rancho offers the FAST FAB nose cones, anodized in clear or black, with applications for both VW Type 1 and Mendeola 2D transaxles.

Each kit ships complete with all installation hardware and retails for just $295. Transaxle disassembly is required to drill and tap the shift rails.

Call your order direct to Rancho at 714-680-6737 or check out their Super Store on line at www.ranchotransaxles.com.

-Alto Products Corp. is pleased to announce their Hi-Performance line of 6L80E/90E PowerPack®. Alto’s PowerPack® offer extended durability, superior coefficient of friction and elevated heat management. Featured is the newly designed 3-5-Reverse clutch with anti-drag externally splined friction plates. The anti-drag plate eliminates drag in the clutch by creating a clearance between the friction and steel plate allowing the friction to turn freely from the steel. The 6L80E/90E PowerPack® line also consists of the 4-5-6 and 2-6 clutch packs.

“These plates are a great addition to our Hi-Performance OEI® product offering” stated Robbie Ferguson, Vice-President of the Performance Division of Alto Products Corp. “While adding torque capacity, we have greatly improved performance and durability with these PowerPack®” added Ferguson.

Alto Products is the oldest and largest independently owned and operated clutch manufacturer in the world.

-Alto has manufactured over a billion clutches over the last 60 years for automotive, high performance, heavy duty, marine, and motorcycle applications. Corporate headquarters are located in Alabama, USA and the company operates three US manufacturing plants, four North American distribution facilities and international operations in Mexico, Europe, Dubai, India, Australia and China.

For more information please visit www.altoUSA.com

**VBX Announces Its Newly Designed Web Site**

VBX is proud to announce the official launch of its newly redesigned product information web site. Their goal has always been to provide you with the perfect tool to help take some of the guesswork out of the valve body identification process.

VBX’s redesigned web site is filled with photographs, product descriptions, technical information, and timesaving tips on how to recognize the confusing and subtle changes that have occurred in valve bodies over the years.

One important new feature is the presence of technical information for each and every valve body VBX remanufactures. Simply click on the VB-Xpert link on the top of every product page to be directed to a complete listing of technical information available for that particular valve body.

All technical information for each individual valve body is in one place. Depending on application, you’ll find everything from product identification, to checkball locations, to torque specs, to solenoid resistances.

Please visit VBX’s new web site today at www.vbxus.com and let them know what you think.
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For our Canadian Subscribers
Some of the 800- toll free numbers listed in the shopper ad section do not work in Canada. Therefore, as a service to you we have listed direct line phone numbers to our shopper advertisers:

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<thead>
<tr>
<th>Name</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atra Seminar</td>
<td>49</td>
</tr>
<tr>
<td>ATRA's Powertrain EXPO</td>
<td>53–56</td>
</tr>
<tr>
<td>Certified Transmission</td>
<td>13</td>
</tr>
<tr>
<td>Cincinnati Gearing Systems Inc.</td>
<td>35</td>
</tr>
<tr>
<td>Dartco Transmission</td>
<td>41</td>
</tr>
<tr>
<td>EVT Parts</td>
<td>5</td>
</tr>
<tr>
<td>Ford Customer Service Division</td>
<td>3</td>
</tr>
<tr>
<td>GEAR Magazine</td>
<td>39</td>
</tr>
<tr>
<td>GFX, Inc</td>
<td>21</td>
</tr>
<tr>
<td>Jasper Engines &amp; Transmissions</td>
<td>IBC</td>
</tr>
<tr>
<td>Life Automotive Products Inc.</td>
<td>11, 41</td>
</tr>
<tr>
<td>Lubegard® by International Lubricants, Inc.</td>
<td>OBC</td>
</tr>
<tr>
<td>Plue’s Transmission Parts</td>
<td>40</td>
</tr>
<tr>
<td>Precision European Inc</td>
<td>Insert, 71</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Name</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Precision International</td>
<td>29</td>
</tr>
<tr>
<td>Raybestos Powertrain</td>
<td>7</td>
</tr>
<tr>
<td>RMP Powertrain Solutions Inc.</td>
<td>37</td>
</tr>
<tr>
<td>Schaeffler Group USA Inc.</td>
<td>25</td>
</tr>
<tr>
<td>Seal Aftermarket Products</td>
<td>9</td>
</tr>
<tr>
<td>Slauson Transmission Parts</td>
<td>35</td>
</tr>
<tr>
<td>Sonnax Industries</td>
<td>IFC</td>
</tr>
<tr>
<td>Superior Transmission Parts</td>
<td>33</td>
</tr>
<tr>
<td>Toledo Driveline, Llc</td>
<td>40</td>
</tr>
<tr>
<td>Transmission Specialties</td>
<td>27</td>
</tr>
<tr>
<td>Transtar Industries, Inc.</td>
<td>23</td>
</tr>
<tr>
<td>TransTec By CORTECO</td>
<td>19</td>
</tr>
<tr>
<td>VBX - ValveBody Xpress, Inc.</td>
<td>24</td>
</tr>
<tr>
<td>Whatever It Takes Transmission Parts, Inc.</td>
<td>31</td>
</tr>
</tbody>
</table>

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