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FOR THE TRANSMISSION REBUILDING INDUSTRY

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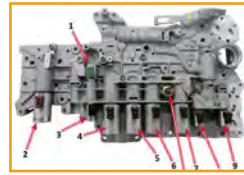
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TABLE OF CONTENTS



FUN WITH TRANSMISSIONS:
Chrysler's 948TE Goes to the Dogs...
BUT in a Good Way!
Page 4



STREET SMART:
Toyota/Lexus 8-Speed
Transmission Is Here!
Page 24



SHOP PROFILE:
Hixson Transmission and Total Car
Care: Attributing Success
to Divine Providence
Page 50

SPECIAL INTEREST & TECHNICAL

- 4 FUN WITH TRANSMISSIONS: Chrysler's 948TE Goes to the Dogs... BUT in a Good Way!**
— by *Bill Brayton*
- 14 THE WORD ON THE STREET: Want or Need? It's Time to Make Your List!**
— by *Mike Souza*
- 20 ETE REMAN — It Was a Very Good Year**
PAID ADVERTORIAL
- 24 STREET SMART: Toyota/Lexus 8-Speed Transmission Is Here!**
— by *Mike Brown*
- 30 Engine or Transmission Part III: Engine and Transmission?**
— by *Scott Shotton*
- 36 UP YOUR BUSINESS: He Quit but Didn't Leave... and He Couldn't Be Fired**
— by *Thom Tschetter*
- 40 What Happens in Vegas...**
— by *Jim Cathcart*
- 42 THE REVENUE GROWTH HABIT: How To Add New Customers Through Powerful Marketing**
— by *Alex Goldfayn*
- 44 HEAVY METAL: Multiple 6R60E/6R80E Problems Traced to Bulkhead Connector**
— by *Rolly Alvarez*
- 46 SHOW WRAP: Powertrain 2015 An Expo To Remember**
— by *Steve Bodofsky*
- 50 SHOP PROFILE: Hixson Transmission and Total Car Care: Attributing Success to Divine Providence**
— by *ATRA Staff*

DEPARTMENTS

- 2 FROM THE CEO:**
Reflecting on Our Past Successes
and Identifying Tomorrow's Goals!
— by *Dennis Madden*
- 54 POWERTRAIN INDUSTRY NEWS**
- 58 SHOPPERS AND CLASSIFIED**
- 64 LIST OF ADVERTISERS**



Be sure to read our Feature Story,
ETE Reman
It Was a Very Good Year
on page 20.
(Paid Advertorial)



by Dennis Madden
members.atra.com

Reflecting on Our Past Successes and Identifying Tomorrow's Goals

This is my final From the CEO for 2015; the next time you'll get a chance to argue with one of my published rants, another year will have past into history.

The end of the year is always my time to reflect on the last 12 months. It's when I get to bask in our successes and to reevaluate where we need to redouble our efforts in the coming year.

As I'm writing this, we're just getting back from the 2015 Expo. This year's event was an amazing success; attendance was terrific and we received tremendous feedback from those who joined us. I don't know if it was, as ATRA President Jim Rodd predicted, the best ever — to be honest I'm not sure how to judge that — but it had to be right up there.

Expo provides a lot for those who attend, but one thing we rarely discuss is how valuable it is to us here at ATRA. It gives us a chance to meet with our audience, face to face, and receive instant feedback about what we've been doing to help steer our industry. And that feedback helps us target our approach for the year ahead.

Which means that the people who joined us at this year's Expo had a hand in charting our course for the future. If you were among those who came to Expo and made your thoughts known, thank you. If you didn't make it this year, well, the 2016 Expo is just

a few months away; maybe next year will be your year to help plan our industry's future.

No doubt about it, we have a lot to reflect on this year. And nothing gives us more pause than the fact that the issue you're reading right now — the December 2015 issue — is our 200th issue of *GEARS Magazine*.

200 issues — it simply boggles the mind.

The first issue came out in the summer of 1992. Back then we published four issues a year: summer, fall, winter, and spring. And, for those who were wondering, yes: I wrote three articles for that very first issue.

GEARS was originally created to give us a vehicle to advertise our new trade show, the 1993 Expo. We needed to market that event and we needed a way to reach out to the industry on a regular basis.

Back then, *GEARS* was very different from the professional, finely tuned magazine you're paging through. To begin with, it was tabloid sized instead of the standard magazine size, which made it a lot more expensive to print and a lot more difficult to keep on your bookshelves. No doubt about it: We had a lot to learn.

And learn we did. Since then, we've tightened up our creative development, streamlined our editorial process, brought in regular and guest

contributors to diversify our subject matter, and redesigned our appearance.

Today, *GEARS Magazine* is arguably the world's leading publication specifically targeted for the transmission repair industry, and has won numerous awards for writing and design.

That doesn't mean we're planning to sit back and rest on our laurels. For 2016, we're working to expand into a global market, to share our knowledge with folks all around the world... and to help bring their knowledge to our side of the ocean.

The reason for that is diversification: Over the last few years, we've taken part in events in Frankfurt, Amsterdam, and the United Arab Emirates. The one thing that's stood out is that a lot of what we struggle with in the U.S. is business-as-usual for them. A Mercedes is as familiar there as a Chevy is to us.

They have the tools... they have the services... and they have the knowledge that we need. And we have a lot to share with them. It's the ultimate win-win, and it's ours for the taking. All we need to do is expand our borders. It's a move that has us all excited.

As the year draws to a close, it's a great time to reflect on where we've been... and to plan where we're headed. In this, our 200th issue of *GEARS*, I can honestly say, I like where we're headed.



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FUN WITH TRANSMISSIONS

CHRYSLER'S 948TE



by Bill Brayton
members.atra.com

GOES TO THE DOGS... BUT IN A GOOD WAY!



We've been talking a lot lately about the new, 9-speed offering from Chrysler: the 948TE. Back in the May, 2015 issue of *GEARS Magazine*, Mike Souza explained how the A and F dog clutches worked inside this unit.

In this edition of *Fun with Transmissions*, we're going to check out how the A and F dog clutches are *hydraulically* controlled by the valve body and TCM.

As Mike explained, dog clutches are "any two components that are coupled by interference instead of friction." The A dog clutch attaches to the input shaft, and is a driving dog clutch (figure 1).

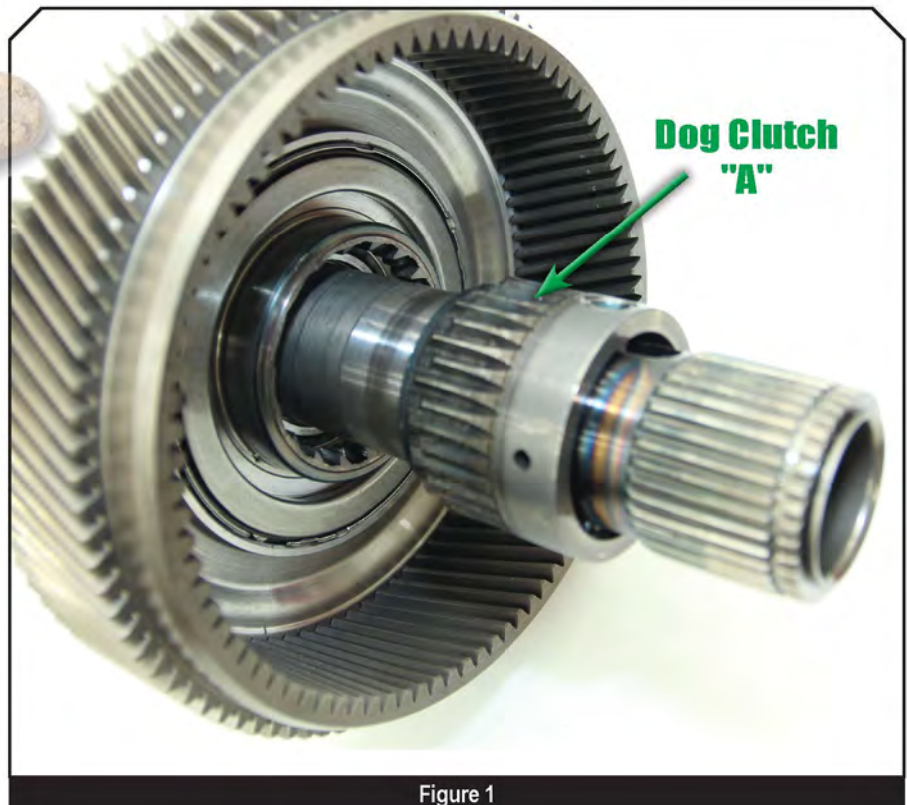


Figure 1

Automatic Transmission Parts

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- Transfer Cases
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Clutch Parts

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- Forks
- Pilot Bushings & Bearings
- Clutch Alignment Tools

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- Overhaul Kits
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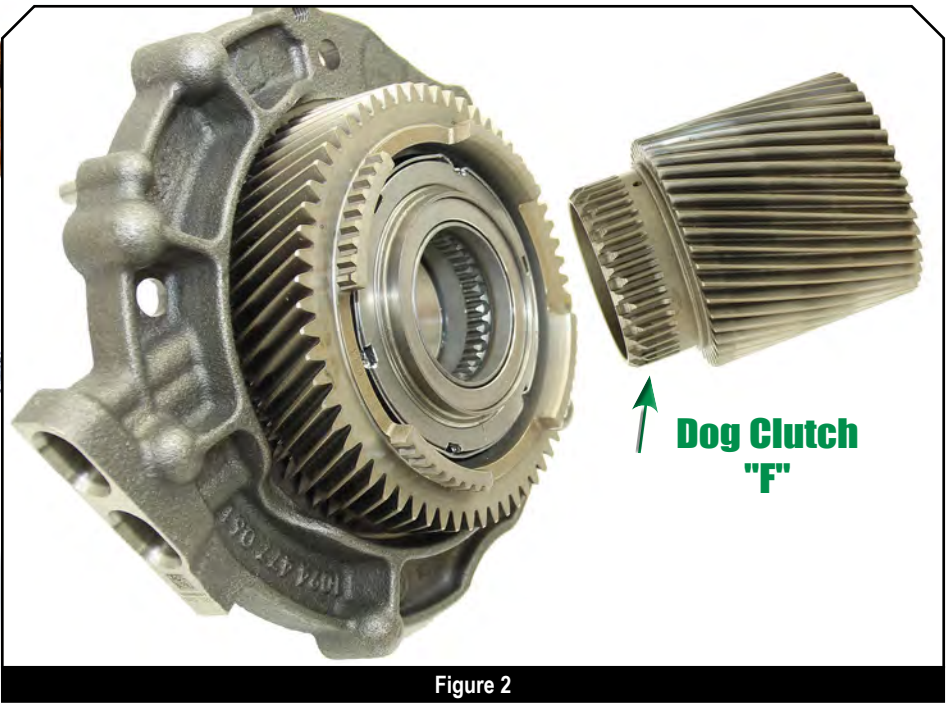


Figure 2

The F dog clutch is part of the driven gear support that is bolted to the case (figure 2), and is a holding/braking dog clutch. The valve body uses two on/off solenoids to apply and release these two dog clutches (figure 3).

Dog Clutch Hydraulics

Both the A and F dog clutches use similar hydraulic circuits (figure 4). An on/off solenoid controls a switching valve that directs fluid to position the clutch valve.

The clutch valves are biased by the solenoid pressure circuit. This moves the valve all the way to the release position when the solenoid's off.

The release circuits always have some pressure from the solenoid pressure circuit. This prevents shift delays resulting from drained clutch apply circuits.

B, C, D, and E Clutches

The B, C, D, and E clutches all have similar hydraulic circuits (figure 5). A pressure regulating solenoid and valve control a clutch valve. The clutch valve directs full system pressure to the clutch.

To release the clutch, the switching valve moves to connect the clutch apply circuit to the release circuit. The release circuit always has some pressure from the lubrication circuit.

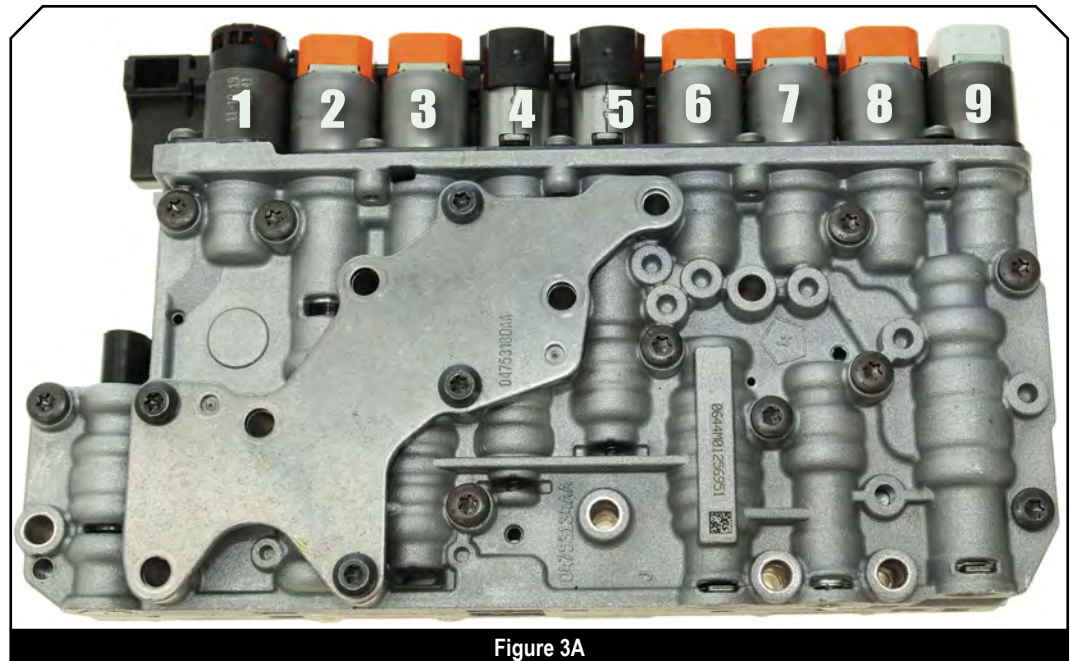


Figure 3A

Solenoid Identification -- Park-By-Cable	
Number	Function
1	Limp Home Mode
2	C Clutch
3	D Clutch
4	F Dog Clutch
5	A Dog Clutch
6	E Clutch
7	B Clutch
8	TCC Apply
9	Line Pressure Control

Figure 3B

8:32 P.M.

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To release the clutch, the switching valve moves to connect the clutch apply circuit to the release circuit.

This prevents shift delays caused by drained clutch apply circuits. Some of the clutch valves have an additional circuit to support limp home mode or park-by-wire.

It's important to recognize that the computer is constantly applying and releasing the clutches to synchronize the shift timing of the A and F dog clutches.

Unfortunately the clutch apply chart doesn't include the "in-between" clutch applications (figure 6). Chrysler hasn't identified which clutches are partially applied, yet. We'll probably see that before too long, because it'll be a critical diagnostic tool when it comes to diagnosing shift problems.

The Controls

Electronically controlled transmissions have been on the road for some time now and we're all familiar with the controls or inputs that go to the TCM: the MAF, TPS, RPM sensor and so on.

The 948TE has all the usual inputs to the TCM for transmission control, plus a pressure transducer and the speed sensors; sensors that operate a bit differently than the ones you're probably familiar with.

Pressure Transducer

The pressure transducer is mounted on the valve body. It monitors release pressure of both dog clutches.

Dog Clutch Pressure Sensor	
1	Regulated Solenoid Pressure
2	System Pressure
3	A Dog Clutch Solenoid
4	A Dog Clutch Valve
5	A Dog Clutch (Applied)
6	F Dog Clutch Solenoid
7	F Dog Clutch Valve
8	F Dog Clutch (Released)

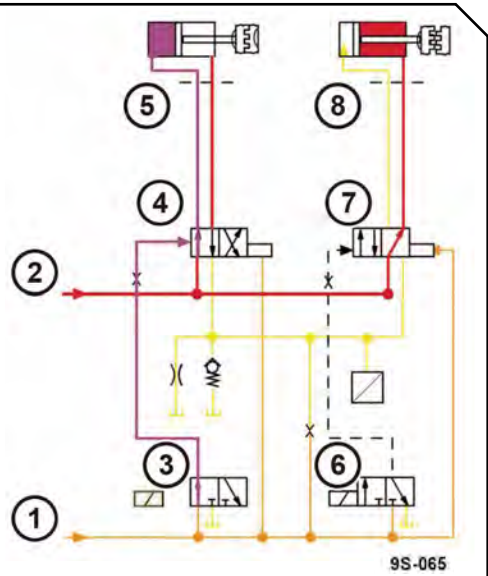


Figure 4

1	System Pressure
2	Lubrication Valve
3	From Pressure Solenoid
4	To Converter and Lubrication Circuits
5	Regulated Solenoid Pressure
6	E Clutch Solenoid
7	E Clutch Valve
8	E Clutch

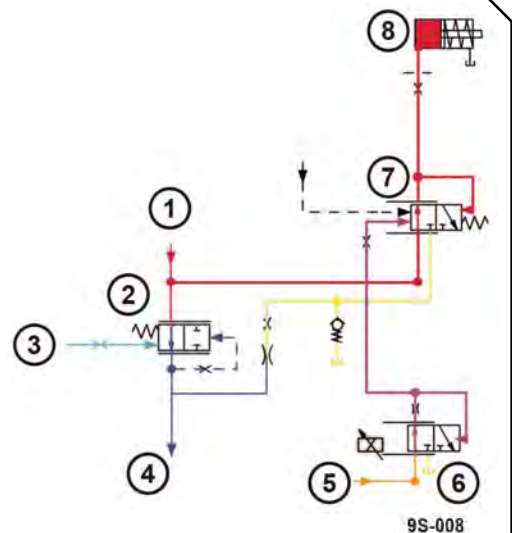


Figure 5

Gear	Ratio	A Dog	B	C	D	E	F Dog
		Driving	Driving	Braking	Braking	Driving	Braking
P/N					X		X
R	3.80		X		X		X
1	4.70	X			X		X
2	2.84	X		X			X
3	1.91	X	X				X
4	1.38	X				X	X
5	1.00	X	X			X	
6	0.81	X		X		X	
7	0.70	X			X	X	
8	0.58			X	X	X	
9	0.48		X		X	X	
4 Default*						X	X
Rock Cycle**	Braking			X	X		X
	N-1 Transition	Delayed Apply			X	Slipping	X
	N-2 Transition	Delayed Apply		Applied	Released	Slipping	X

* Default is only available on park-by-cable systems.

** These modes are only used during a R-D rocking cycle

Figure 6



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Figure 7



When one of the dog clutches releases, there's a momentary increase in the dog clutch release circuit pressure.



Figure 8

When one of the dog clutches releases, there's a momentary increase in the dog clutch release circuit pressure. The Transmission Control Module (TCM) uses the signal from the sensor for control and diagnostics.

This pressure sensor is very different from pressure sensors of the past. It's a 3-wire sensor like its predecessor, but that's where the similarities end.

This transducer receives a 5-volt reference from the TCM, and it sends a variable voltage signal back to the TCM. The transducer is a modified *piezoelectric* (pronounced "pee-ay-zo" electric) pressure sensor.

According to the manufacturer, it has an integrated circuit board inside the sensor that receives the signal from the piezo crystal, and then it creates a signal to send to the TCM.

This means that you can't test

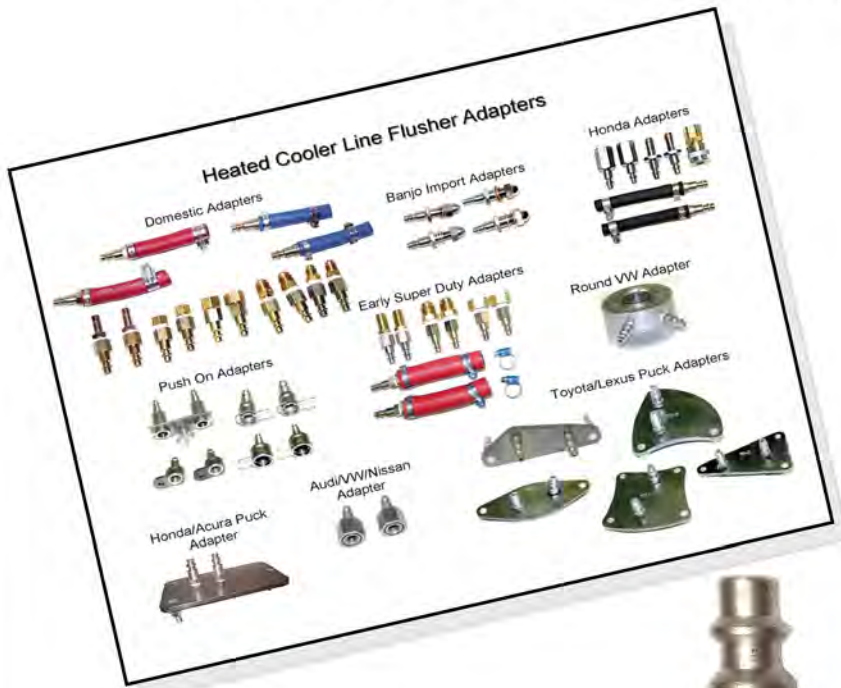
the sensor the normal way with an ohmmeter. The resistance across the terminals is extremely high (figure 7). If you look closely at the meter, it says 9.86 M ohms. That's well over 9 million ohms resistance!

To bench test the transducer, you'll need to power it up using a 5-volt power source (figure 8). Once the transducer is powered up, it'll vary the voltage based on the pressure applied to it.



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Chrysler's 948TE Goes to the Dogs... BUT in a Good Way!

The tested pressure transducer reads about half a volt with 0 PSI applied and 1.86V with about 110 PSI of shop air applied (figures 9A and B).

Speed Sensors

Because the dog clutches are coupled by interference instead of friction, the timing to engage and disengage them must be precise. The computer uses the speed sensors, engine RPM, and the pressure sensor to transition the dog clutches smoothly between engaged and disengaged. To do this, the TCM slips the remaining clutches, to make sure that the rest of the transmission components are spinning at the same speed.

The speed sensors are two wire sensors that are built into a common housing (figure 10). They share a common ground. But these aren't your typical, two-wire, pulse generator-type sensors.

These sensors receive a 9-volt reference signal from the TCM. The voltage energizes a chip inside the sensor, which then sends a signal to the TCM. This is called a *magneto-resistive* sensor. The advantage of this type of speed sensor is a cleaner signal at slower speeds.

For a complete explanation of the magneto-resistive speed sensor, check out Steve Bodofsky's article in the July 2012 issue of *GEARS*.

The use of the A and F dog clutches is a new concept for us. It allows the transmission to be built in a smaller package, which saves weight... and we all know that's about saving at the gas pump.

When you understand how the 948TE* works and what the TCM is using to control the shifts, the easier it'll be to diagnose it. And when our jobs are easier, we all have *Fun With Transmissions!*

***Pick up the Chrysler 948TE Rebuild Procedures from our Bookstore today! Call 1-800-428-8489.**

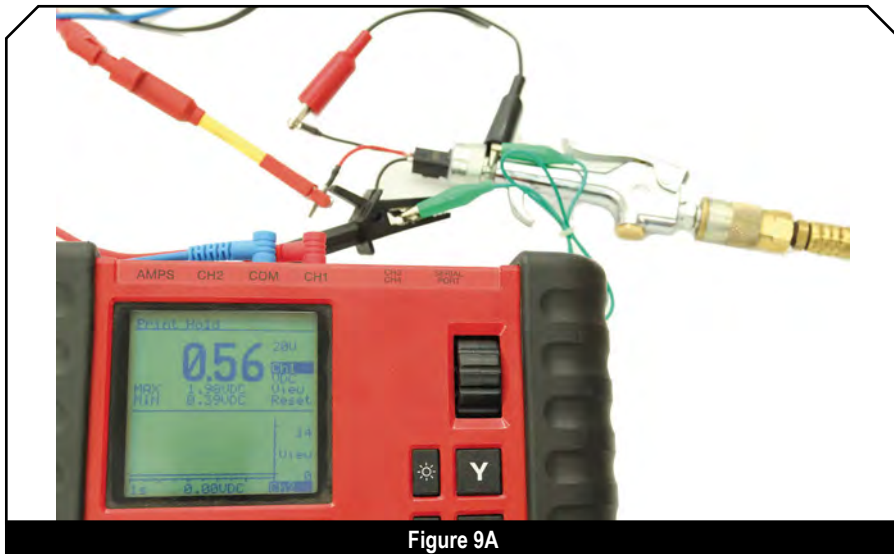
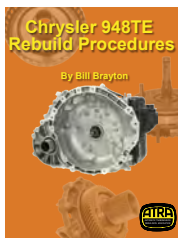


Figure 9A

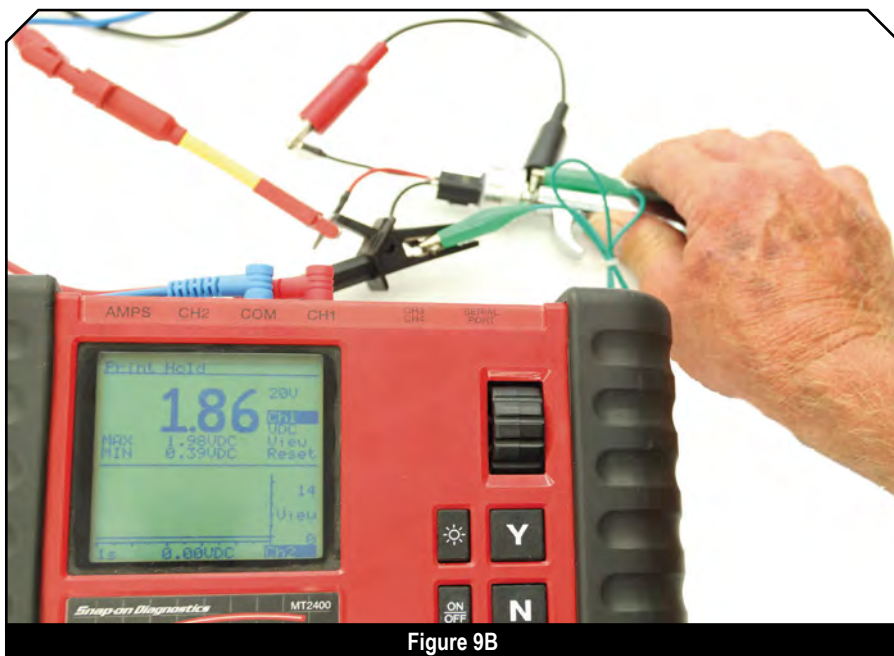


Figure 9B

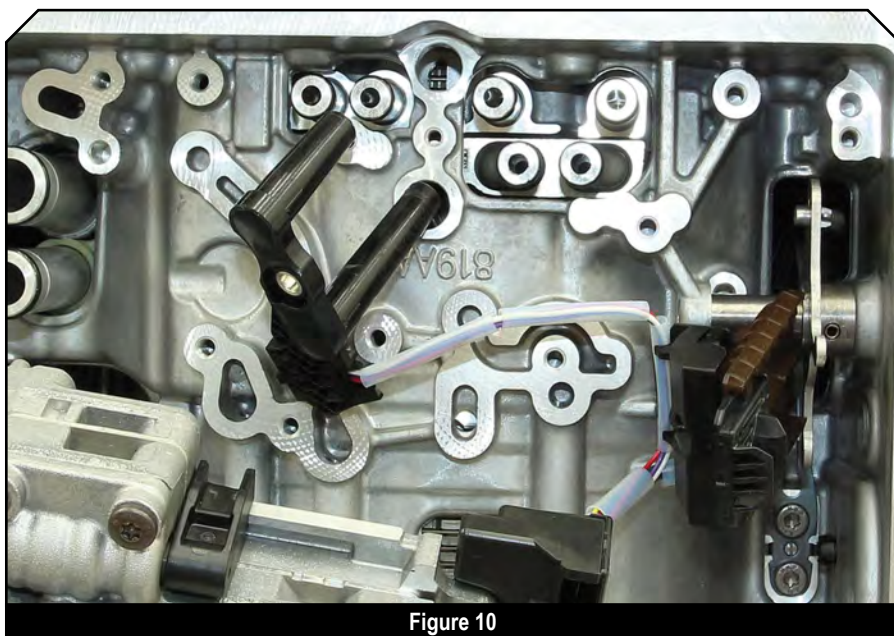


Figure 10

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Want or Need?

It's Time to Make Your List!

With the holidays just around the corner, it'd be nice to have all the tools you want. But it's more cost effective and efficient to make sure you have the tools you need. Time is money, so spending your money wisely to save time is much more profitable. Buying the proper tools will save you time, and they'll pay for themselves in the long run.

As a technician, I want the tools with all the bells and whistles to make my job easier and faster. But sometimes that just isn't practical. At times, you may find yourself purchasing a tool that you'll only use once or twice a year. That's when you need to decide if it's more of a want than a need; from there you'll need to decide whether you should get one with all the bells and whistles.

Here are some ideas of what every shop should have in today's market. These are definitely needs and not wants. For now, we'll stick with tools rather than shop equipment; that could be an entire article all by itself.

Nearly all the vehicles that roll into your shop today have multiple computers, so you need a scan tool that can retrieve codes, and, more important, supply you with useful data (figure 1). Today it may be more practical to have a scan tool or software for a laptop that can also handle reflashing and adapt resets (figure 2); that depends on what you're



by Mike Souza
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Figure 1



Figure 2

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working on and how much of that work you're sending to the dealer or outside sources.

Sending work to the dealer can be troublesome, especially when the dealer tries to sell your customer a transmission... after you just installed one. And even if the dealer isn't trying to bypass you, there's still the wait as they put your customers' cars at the back of the line.

Outside sources are fine if you don't have enough time to do the reflashes. And that can be substantial: On some vehicles, such as BMWs, reflashes may take as long as four hours! Having the necessary equipment allows you to pick and choose whether you want to handle this reflashing or send it out.

As you can see, the decision depends upon the types of vehicles your shop is working on and how much of that work you're seeing.

Nearly all the vehicles you work on today are electronic, so a quality multimeter is necessary to check everything from the battery to solenoids (figure 3). The type of meter is important: It has to be able to do several jobs beyond simply checking the voltage at the battery.

The sensor signals you need to be able to check include variable frequency DC or AC, and solenoids that are pulse width modulated. So you'll want a multimeter with features such as RPM, frequency, AC, and amperage, to name a few.

When it comes to measuring amperage with a meter, you have to cut into the wiring. To avoid that, a quality current clamp may be a great choice (figure 4). But remember, some current clamps may be a little confusing to read. Your meter may not display the signal in amps: it may display the current in volts. So a standalone current clamp may be a better choice.



No one scan tool can do it all, but several of the aftermarket scan tools do quite well.



Figure 3



Figure 4

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Seasons Greetings from all of us at Superior Transmission Parts, Inc.

An oscilloscope is often the best way to check a voltage signal. But many techs aren't familiar or comfortable working with scopes (figure 5). A quality graphing meter can provide some of the advantages of a scope, but are often easier to set up and read than a scope (figure 6).

If your scan tool has a graphing mode with a snapshot or movie feature, it may help take the place of a graphing meter or scope.

Some manufacturers offer a multi-tool that has a scan tool, scope, and digital multimeter all built into one unit. Generally speaking, these aren't a good choice. The cost is usually more than the individual tools would be, and buying them as one tool limits you: You can only use one tool at a time, so there's no way to compare scan data to the actual circuit measurement with your meter.

And don't even think about what's going to happen if your multi-tool breaks: You'll be out of business unless they provide you with a loaner or they get yours fixed!

The most common question asked is which scan tool to buy. If Santa's listening, most of us would like to see a single scan tool that can diagnose all vehicles, foreign and domestic. That would be nice if it were possible. No one scan tool can do it all, but several of the aftermarket scan tools do quite well.

If you're doing fleet work or seeing a lot of the same make of vehicle, you may want to purchase a factory tool. Those units often provide a lot more information than anything available through the aftermarket.

The important thing is not to have a scan tool that will only retrieve codes. Codes are valuable, but they're only a small part of your diagnostic strategy. Make sure the scan tool you buy has capabilities that take you through a complete diagnosis.

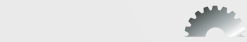
Remember, Christmas is just around the corner, so start working on your list to send to Santa, to let him know what you want!



Figure 5



Figure 6



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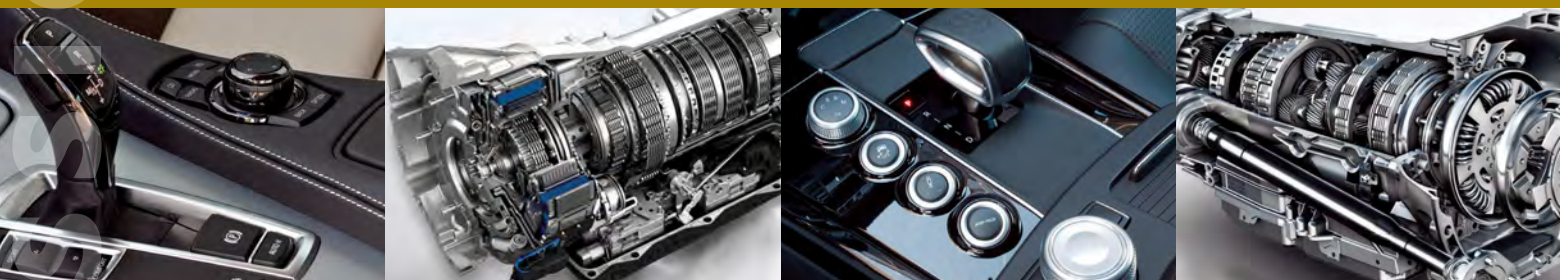
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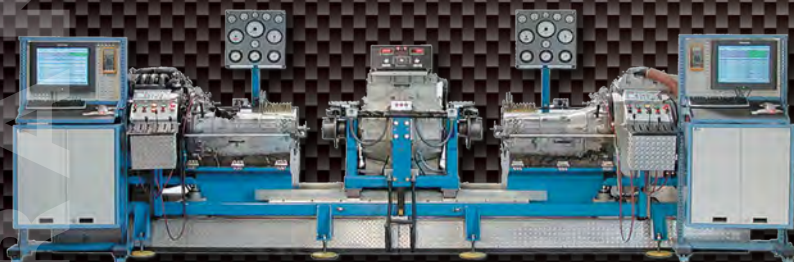
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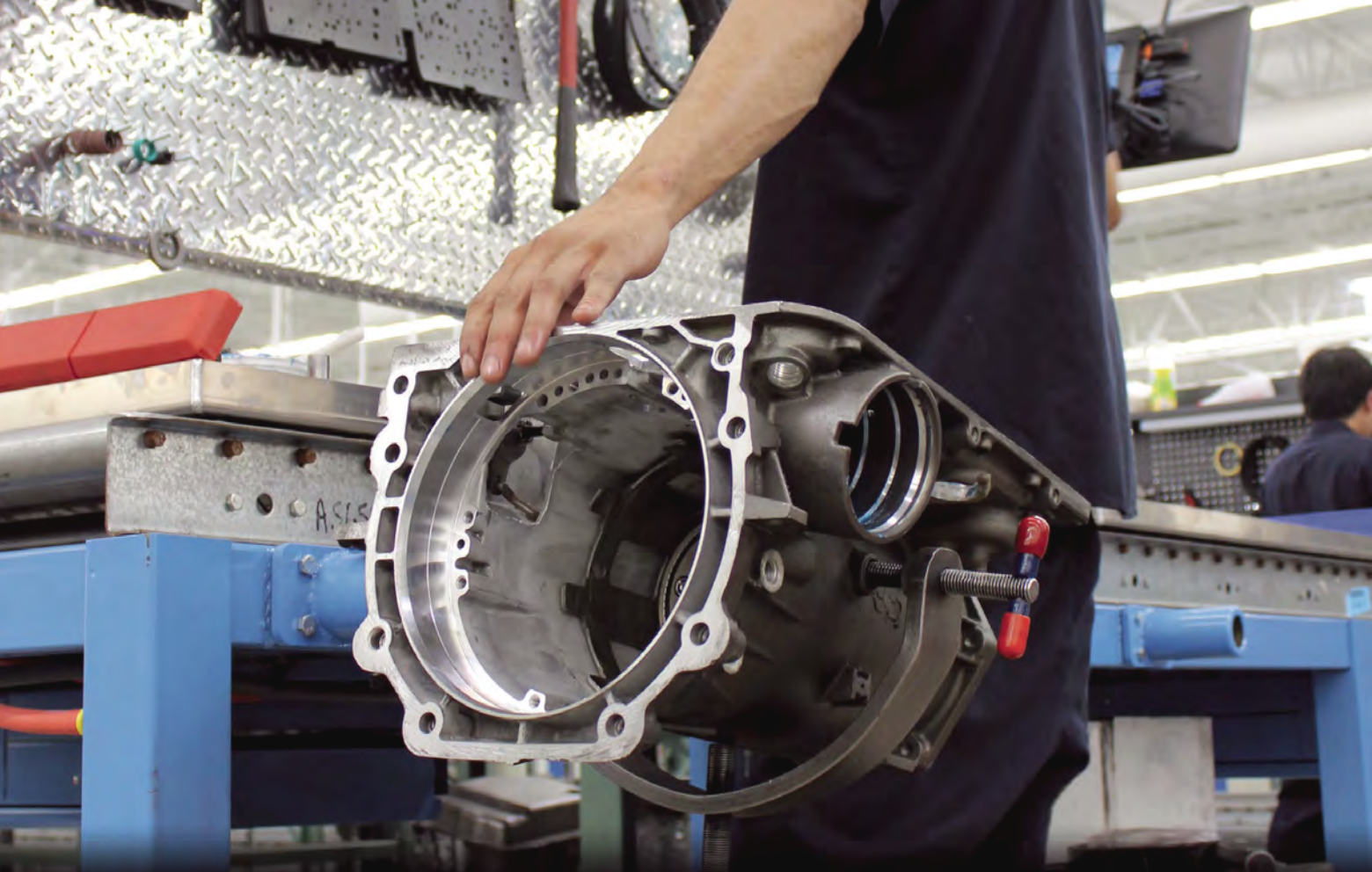
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A shot of the very first transmission remanufactured at 8700 N. Servite Drive.

ETE REMAN It was a very good year.

As Frank Sinatra used to sing, “It was a very good year.” If you know the song, you know Ol’ Blue Eyes said that about every year of his life. Looking back, there’s always something to be proud of, always something to point to and say, “We did that.”

But if there were ever a year for us to sing about, this was it.

2015 was the year ETE REMAN:

Began operating in our new 160,000 square foot plant. While not yet fully operational, the new space has allowed us to increase core inventory to just over 7,000 transmissions and to grow our remanufacturing output by nearly 25% year over year. At full capacity, ETE REMAN will produce 75,000 transmissions each year in our new space.

Hired nearly 100 additional employees. We’re 400 strong today. We’re proud to be creating jobs for Wisconsin and especially for an economically-depressed area of Milwaukee.

Increased inventory in all six of our warehouses.

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Designed, fabricated, and installed six new dynos.

Our fully automatic software puts each transmission through a battery of tests to ensure plug and play installation. Nobody has a more sophisticated or a more thorough transmission test.



Meet the newest kids on the block - our six dynos. They're a little quiet at first, but boy are they smart. And, they love being put to the test.



Invested \$2 million in additional equipment for the Machining Department. To meet our strict quality standards, we manufacture bushings, valves, and end plugs in-house. We ream valve bodies on CNC machines, cut and resurface pumps, grind and lap pump slides and rotors, and perform countless operations on drums, pressure plates, cases, and pretty much anything and everything that goes in a transmission.

Purchased a new phone system. When you call, you'll reach the right person quickly, without navigating pre-recorded phone prompts or having to wait on hold.

Launched cloud-based customer support software. With complete visibility to all technical questions, troubleshooting, and warranty claims via phone, web, and mobile devices, you won't have to call to find out the status of anything. (Though we're always happy to talk anytime.)

Hired a new freight and transportation management software company. This system will soon provide customers with real time updates and tracking via SMS or email about the location

and arrival of orders. You'll know when to put the car on the lift - with more certainty than ever before.

Doubled the size of our Catalog Department. We're making it easier to order the right transmission. And, we're making it fast.

So it was a good year. A very good year.

Near the end of Frank's ballad, he compares himself to vintage wine, almost to say, "I better drink this up now while I can...because my days are numbered." That's a beautiful sentiment, but it's where the comparison between the song and our company ends. Unlike Sinatra, we're not looking back and saying, "We're in the autumn of our years." In fact, now would be a great time to play another of Sinatra's tunes:

"The best is yet to come."

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Reason #52

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TOYOTA/LEXUS 8-SPEED TRANSMISSION IS HERE!



by Mike Brown
members.atra.com

Toyota and Lexus 8-speed transmissions are on the road and are already showing up in shops.

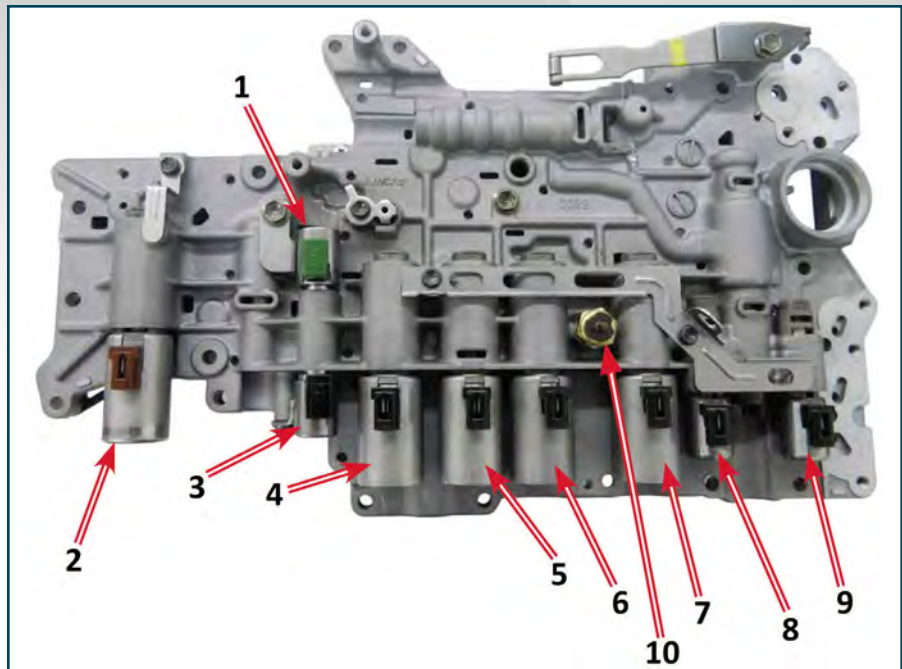
The first to be introduced was the AA80E, which appeared in the Lexus GS 460 2008-11, Lexus IS F 2008-14, and Lexus LS 460 2007-14.

That was followed by the AA81E, which showed up in the Lexus GS 350 2011-14, Lexus IS350/350C, and Lexus IS250/250C 2014-up.

Use the chart to identify the difference between the gear ratios in the A760H 6-speed, used in AWD models, versus the AA81E 8-speed, used in the 2WD models (Figure 1).

GEAR RATIO		
	AA81E	A760H
1st	4.596	3.520
2nd	2.724	2.042
3rd	1.863	1.400
4th	1.464	1.000
5th	1.231	0.716
6th	1.000	0.586
7th	0.824	—
8th	0.685	—
Reverse	4.056	3.224

Figure 1



1	"Shift Solenoid Valve SR (Shift Solenoid Valve DSL)"	6	Shift Solenoid Valve SL4
2	"Shift Solenoid Valve SLT (Line Pressure Control Solenoid Assembly)"	7	Shift Solenoid Valve SL3
3	"Shift Solenoid Valve SLU (Lock Up Control Solenoid Assembly)"	8	"Shift Solenoid Valve SL (Transmission 3-Way Lock Up Solenoid Assembly)"
4	Shift Solenoid Valve SL1	9	Shift Solenoid Valve SL2
5	Shift Solenoid Valve SL5	10	Temp Sensor

Figure 2

The transmission valve body assembly consists of the upper and lower valve bodies and nine shift solenoids. Here are the solenoid locations and functions: (figure 2)

If you need to remove the valve body, remove the 17 bolts shown (figure 3). Once the valve body is on the bench use Figure 4, 5 and 6 for Valve identification and check ball locations.

These transmissions use two planetary gear units to achieve eight speeds.

The rear planetary is a Ravigneaux-type gear unit, which consists of pairs of sun gears (middle and rear) and planetary pinion gears (long and short) with different diameters within a single planetary assembly.

The solenoid operation and clutch application charts (figure 7) show what's happening to achieve each gear range, and can help you identify where to look for a problem.

Once you've determined which clutch or brake is at fault, you can air check that component. (figure 8) Regulate your air pressure to 25-30 PSI so you don't get a fault reading. Listen for the clutch to engage while applying air to the piston hole.

If the clutches pass the air check, examine the valve body for wear or stuck shift valves. If the shift valves are free and there are no signs of excessive bore wear, you're probably looking at replacing solenoids.

But if you find excessive leaking during your air check, you'll probably be going inside. In that case, plan on replacing the molded pistons, even if they feel soft, because they tend to shrink and leak.

This unit has only one sprag; refer to the illustration (figure 9) for proper rotation. Hold the rear planetary gear assembly and turn the one-way clutch.

The one-way clutch should freely counterclockwise and lock when you try to turn it clockwise.

Use the clutch clearance specs (figure 10) to check the clearance for all clutch and brake packs.

It's a good idea to use genuine Toyota ATF-WS. Additives or after-market fluids identified as compatible may result in shift problems or internal damage. ATF-WS isn't compatible with T-IV or Dexron ATF.

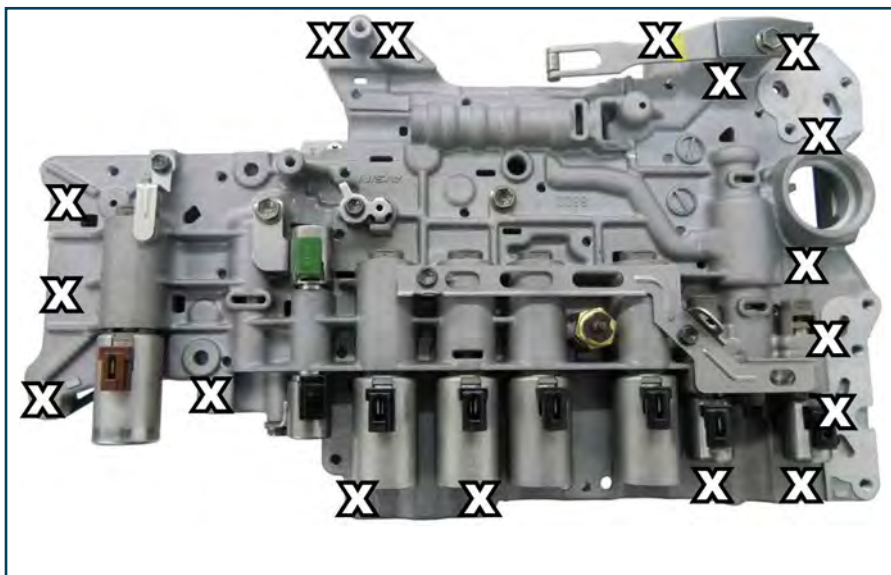
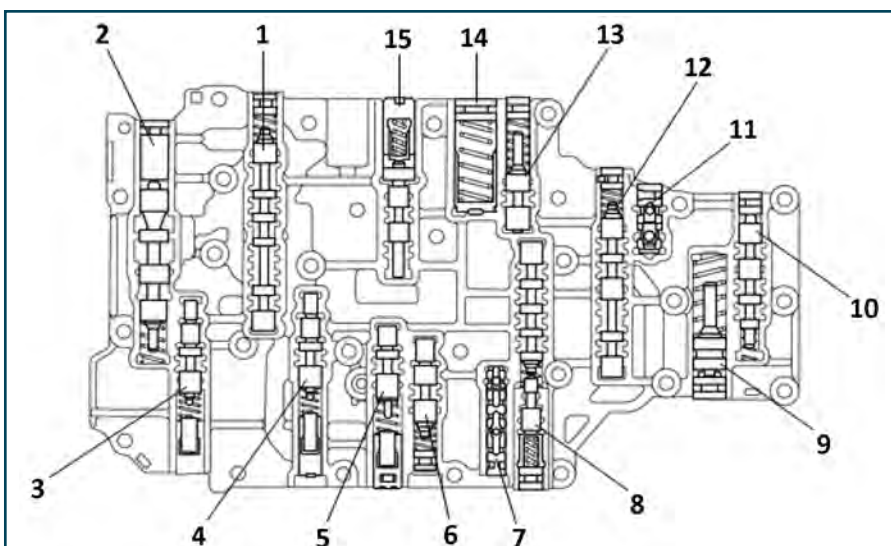


Figure 3



1	Lock-Up Relay Valve	2	Solenoid Regulator Valve
3	No. 1 Clutch Apply Control Valve	4	No. 1 B1 Apply Control Valve
5	No. 2 Clutch Apply Control Valve	6	C4 Relay Valve
7	Signal Check Valve	8	No. 2 Clutch Apply Reelay Valve
9	C2 Damper	10	B2 Control Valve
11	B2 Check Valve	12	No 1 Clutch Apply Relay Valve
13	Solenoid Modulator Valve	14	C1 Accumulator Valve
15	Lock-Up Control Valve	—	—

Figure 4

REGISTRATION

After you've replaced or repaired the transmission, you'll need to input the transmission compensation code (figure 11) into the TCM (refer to Procedure 1).

With the transmission installed, the Quick Response (QR) code label will be positioned where you won't be

able to read the code. So always record the transmission compensation code or input it using the Techstream before installing the automatic transmission.

If you're replacing the TCM, you'll have to input the existing transmission compensation code into the new TCM (refer to Procedure 2).

PROCEDURE 1 Set Transmission Compensation Code into TCM

Transmission compensation codes are unique, 60-digit alphanumeric values printed on a QR label on the transmission. If you input an incorrect transmission compensation code, it may cause shift shock.

1. Record the transmission compensation code specified on the QR label.
2. Move the shift lever to N or P.
3. Connect the Techstream to the DLC3.
4. Key on, engine off.
5. Turn the Techstream on.
6. Enter the following menus: Powertrain/ECT/Utility/A/T Code Registration.
7. Select "Set Compensation Code."
8. Register the compensation code.
9. Manually input the transmission compensation code.
10. Check that the compensation code displayed on the screen is correct by comparing it with the 60-digit alphanumeric value on the QR label.
11. Set the compensation code into the TCM.

PROCEDURE 2 Transfer Transmission Compensation Code

Transmission compensation codes are unique, 60-digit alphanumeric values printed on a QR label on the transmission. If you input an incorrect transmission compensation code, it may cause shift shock.

You can use this procedure when the TCM you're replacing can still transmit its registered transmission compensation code to the Techstream.

1. Read the transmission compensation code.
 - a. Move the shift lever to N or P.
 - b. Connect the Techstream to the DLC3.
 - c. Key on, engine off.
 - d. Turn the Techstream on.
 - e. Enter the following menus: Powertrain/ECT/Utility/A/T Code Registration.
 - f. Select "Read Compensation Code."

IMPORTANT: Never use the code printed on the transmission QR label,

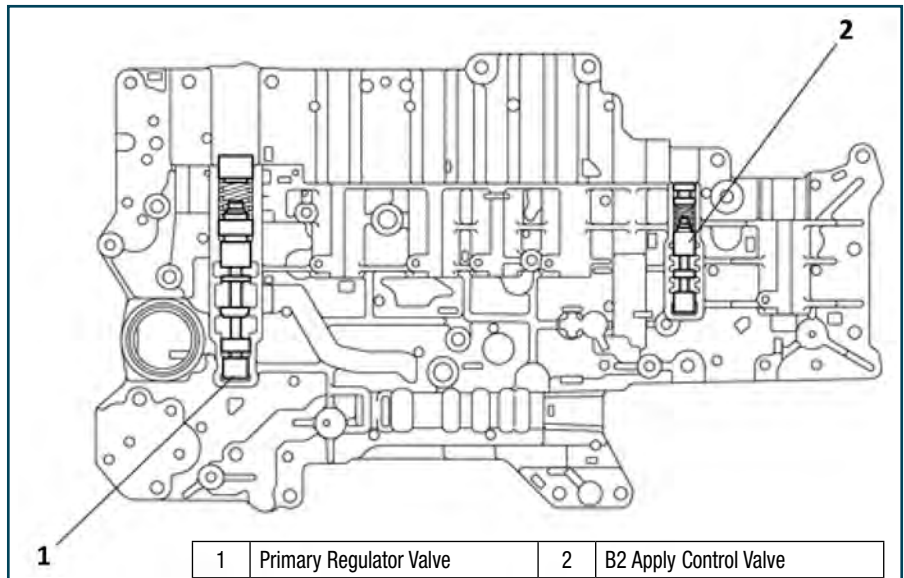


Figure 5

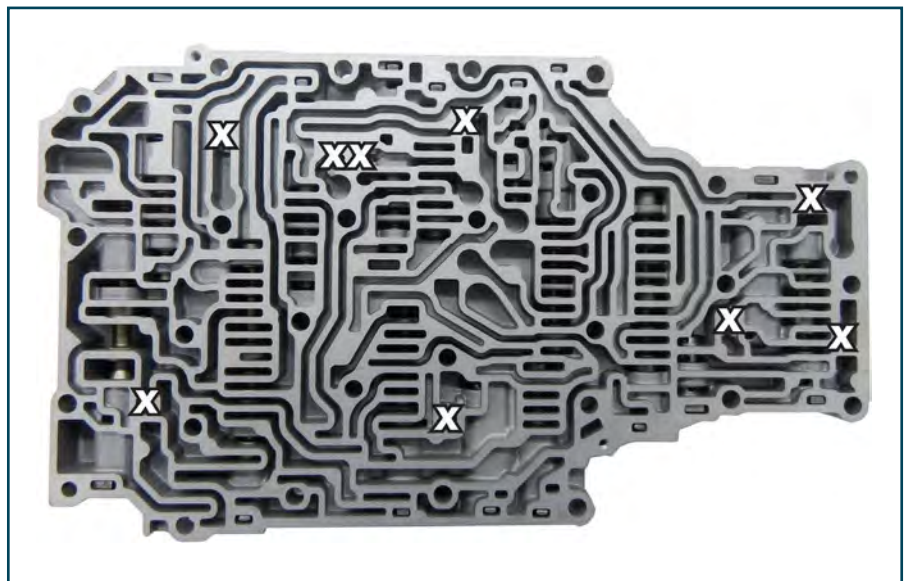


Figure 6

even if you can't read the transmission compensation code with the Techstream. The code printed on an in-service transmission may not match its current characteristics. Replace the TCM with a new one and perform a road test to allow the TCM to learn the transmission characteristics.

- g. Key off.
- h. Replace the TCM.
2. Set the transmission compensation code.
 - a. Key on, engine off.
 - b. Turn the Techstream on.
 - c. Enter the following menus: Powertrain/ECT/Utility/A/T Code Registration.
 - d. Select "Set Compensation Code."

- e. Press "Open."
- f. Select "Open."
- g. Set the compensation code to the TCM.

Once you've Set Compensation Code into the TCM, it's time for the Initialization.

Perform Reset Memory (AT initialization) when replacing automatic transmission assembly, TCM, valve body assembly, or solenoids.

This is only possible with the Techstream; you can't perform a Reset Memory simply by disconnecting and reconnecting the battery.

3. Reset Memory procedure
 - a. Key off.
 - b. Connect the Techstream to the DLC3.



Reason #62

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Shift Position, Shift Range and Gear Position									
		SL1	SL2	SL3	SL4	SL5	SR	SL	SLU
P		○	X	X	X	X	○	X	X
R		X	X	○	X	X	○	○	X
N		○	X	X	X	X	○	X	X
D D8	1st	○	X	X	X	X	○	X	X
	2nd	○	X	X	X	○	○	X	X
	3rd	○	X	○	X	X	○	X	X
	4th	○	X	X	○	X	○	○	△
	5th	○	○	X	X	X	○	○	△
	6th	X	○	X	○	X	○	○	△
	7th	X	○	○	X	X	○	○	△
	8th	X	○	X	X	○	○	○	△

Shift Position, Shift Range and Gear Position								
		Clutch				Brake		1-Way Clutch
		C1	C2	C3	C4	B1	B2	F1
P		—	—	—	—	—	—	—
R		—	—	○	—	—	○	—
N		—	—	—	—	—	—	—
D D8	1st	○	—	—	—	—	—	○
	2nd	○	—	—	—	○	—	—
	3rd	○	—	○	—	—	—	—
	4th	○	—	—	○	—	—	—
	5th	○	○	—	—	—	—	—
	6th	—	○	—	○	—	—	—
	7th	—	○	○	—	—	—	—
	8th	—	○	○	—	○	—	—

Figure 7

- c. Key on, engine off.
- d. Turn the Techstream on.
- e. Enter the following menus:
Powertrain/ECT/Utility/Reset Memory.

After performing Reset Memory, be sure to warm up the engine. Then perform a road test to allow the TCM to learn.

Refer to (figure 12) for road test pattern.

Pattern 1: With the shift lever in D, gradually accelerate to 31 MPH or more; then gradually decelerate to about 19 MPH.

Pattern 2: Drive at about 31 MPH in D4 range. Release the accelerator to allow the vehicle to decelerate gradually to about 6 MPH.

Pattern 3: Accelerate above 31 MPH. Gradually decelerate with the shift lever in M and 5th gear selected.

When you reach 31 MPH, downshift to 4th gear.

At about 25 MPH, downshift to 3rd gear.

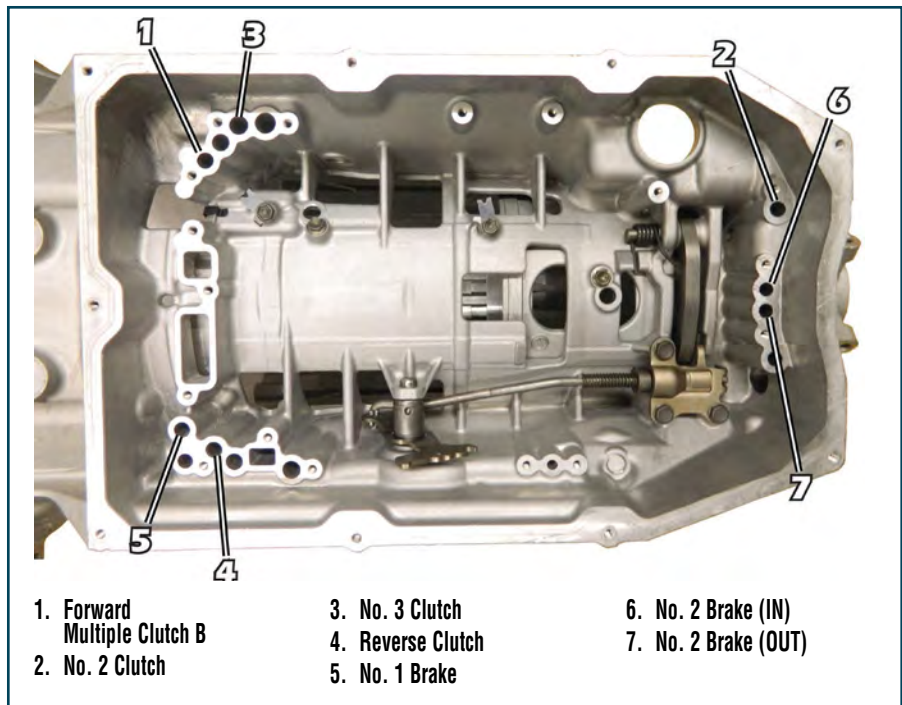
At about 19 MPH, downshift to 2nd gear.

LEARNING TIPS

Pattern 1: After gradually accelerating for a distance of about 425 feet for about 15 seconds, gradually decelerate for a distance of about 150 ft. for about 5 seconds.

Pattern 3: Accelerate slightly above 31 MPH. Move the shift lever to M and select 5th gear.

Release the accelerator pedal



- 1. Forward Multiple Clutch B
- 2. No. 2 Clutch
- 3. No. 3 Clutch
- 4. Reverse Clutch
- 5. No. 1 Brake
- 6. No. 2 Brake (IN)
- 7. No. 2 Brake (OUT)

Figure 8

and allow the vehicle to decelerate gradually. When the vehicle decelerates to about 31 MPH, downshift to 4th gear. Continue decelerating and follow the steps listed in procedure 3.

When decelerating, apply the brakes as necessary to adjust vehicle speed.

*1: The speed, time, and distance values are approximate.

*2: After accelerating, you don't need to decelerate immediately.

*3: There's no specific time or distance.

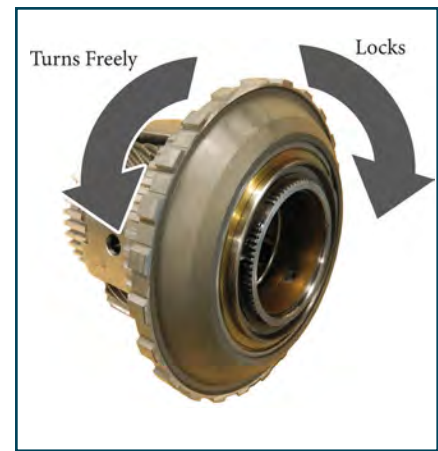


Figure 9

C1 Clutch	.035"-.047"
C2 Clutch	.035"-.047"
C3 Clutch	.015"-.027"
C4 Clutch	.019"-.031"
B1 Brake	.029"-.041"
B2 Brake	.020"-.032"

Figure 10

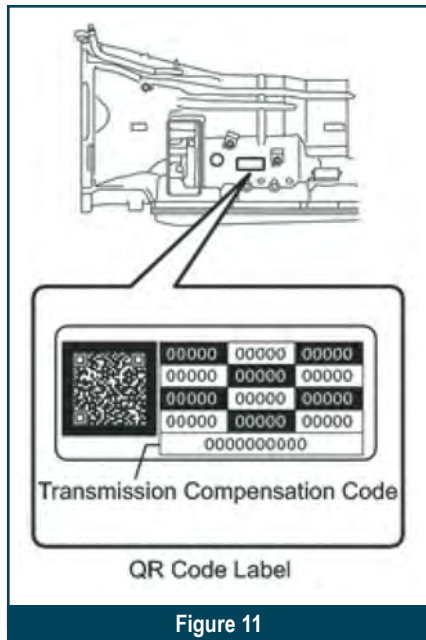


Figure 11

Repeat the road test patterns until the shift shock and engine speed overrun (shift flare) reach an acceptable level.

When repeating the acceleration/deceleration cycle of a road test pattern, bring the vehicle to a complete stop before accelerating again.

Now you know how to learn the TCM, and that's not just smart, that's street smart!

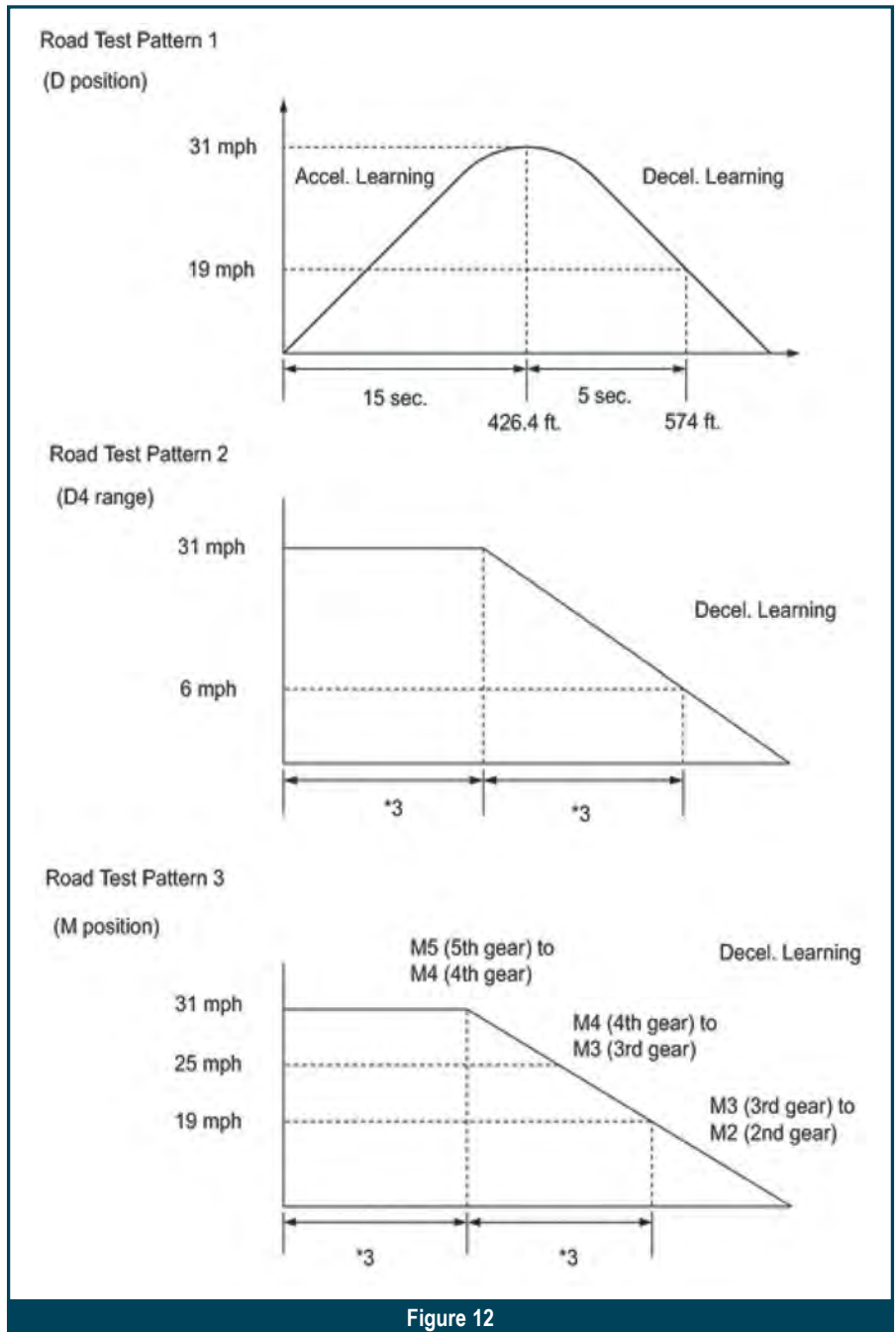


Figure 12

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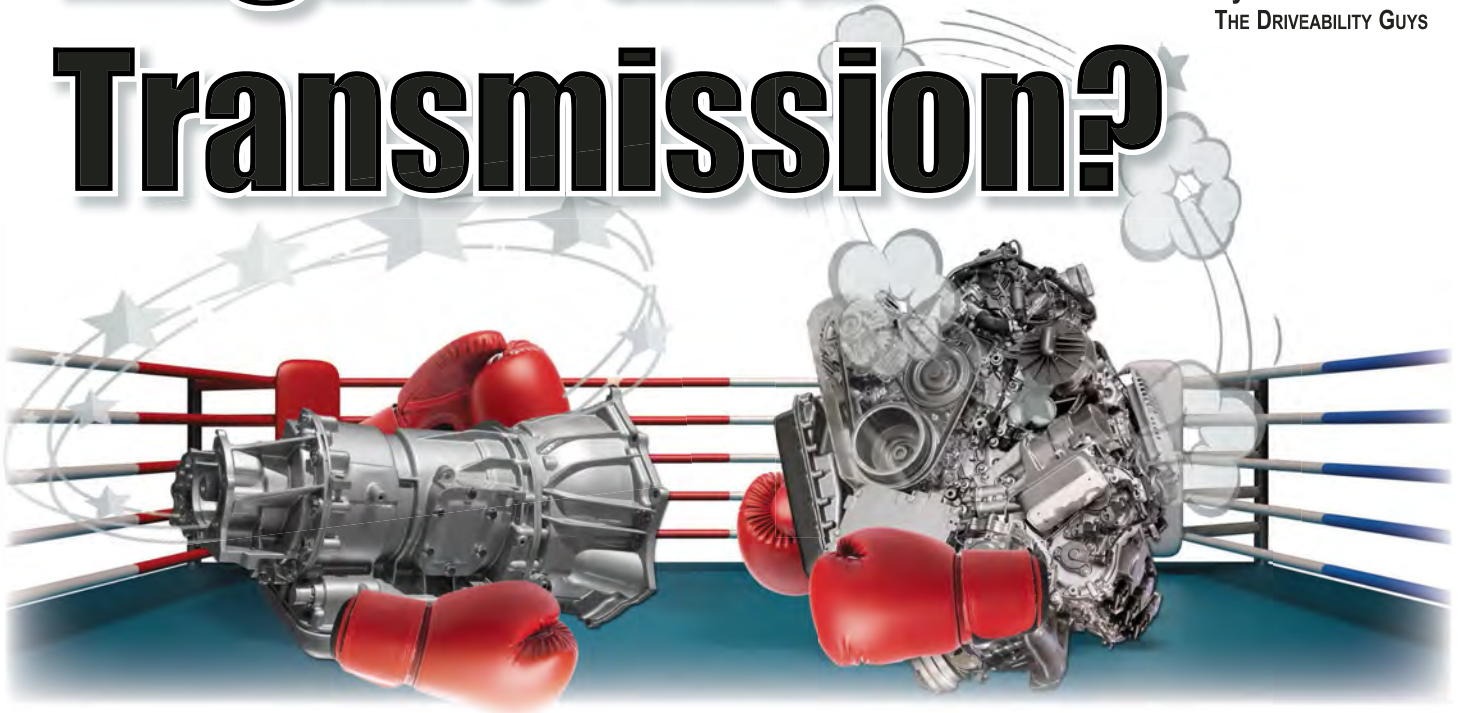
TRANSFER CASES

Engine or Transmission Part III:



by Scott Shotton
THE DRIVEABILITY GUYS

Engine and Transmission?



Shift solenoid A changes from “ON” to “OFF” for the 1–2 shift to happen.

Shift solenoid valve	Gear position				
	D1, 21, 11	D2, 22, 12	D3	D4 (O/D)	N-P
A	ON (Closed)	OFF (Open)	OFF (Open)	ON (Closed)	ON (Closed)
B	ON (Closed)	ON (Closed)	OFF (Open)	OFF (Open)	ON (Closed)

Figure 1

In part 1 of this series, we explored how to use fuel trim to help determine whether a problem is in the engine or transmission. In part 2 we focused on engine breathing and associated engine implications.

In part 3 we’ll “shift gears” and examine a testing technique that’s useful for both engine and transmission issues: solenoid testing.

Solenoids, regardless of what automotive system they’re used in, share some common testing techniques. Of course you can listen for a “click”

when the solenoid turns on and off. You can also measure their resistance if you have its specifications.

Each of these tests only provides minimal information to analyze. The resistance test, for example, is a static test that can only indicate whether a solenoid is definitely bad. If it passes, you still don’t know if the solenoid is good. A much better test would be to energize the solenoid and view voltage and current on an oscilloscope.

That being said, let’s explore a scope technique you may already be

using for transmission solenoids that also applies to fuel injectors and other engine-related solenoids. We’ll start by analyzing a shift solenoid in a 2004 Nissan Maxima that has a late, and sometimes harsh, 1-2 shift.

The first step is to check the solenoid chart (figure 1) to see which solenoid changes state to shift the transmission into 2nd gear. In this application, shift solenoid A is energized in first gear and de-energizes to shift the transmission into 2nd. So we’ll focus on shift solenoid A.



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	221 41TE Accum. Cover low and reverse 24 clutch 2004Up	3	OE
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	4859 5-45RFE 2004Up	5	OE/AM
	4856 62TE 2007up	6	Hi-Per/OE
	4860 68RFE 2007Up	5	OE/AM
Ford	32388D 4F27E 2000Up	7	OE/AM
	788 5R110W 2003Up	8	OE
	45188 5R55N 199902	3	Hi-Per/OE
	4863 6F35 2009Up	5	OE
	4867 6T40 6T45 6T50 2008Up (Generation 1)	5	OE
	46388B AX4N 199498	5	OE
	4850 AX4N 4F50N 1999Up	5	OE
	4850 AX4S AX4N 1999Up	5	Hi-Per/OE
	765A CD4E 1994Up	3	OE
	765B CD4E 2003Up	3	OE
	32388E FN4AE 1999Up	7	OE/AM
	32388F FNR5 200509	9	AM/Hi-Per
	Ford/GM	4861 6F50 6F55 6T70 6T75 2007Up	5
798 1000/2000 Allison 2006Up		4	OE
General Motors	732 4L60E 1997Up	3	OE
	34088 4L80 4L85E 1997Up	3	OE
	310 4T40E 1995Up	7	OE
	4864 5L40E 2002Up	9	Hi-Per
	247 5L40E 2002Up	9	OE
	4869 5L40E 2nd Clutch Set 199901	3	Hi-Per
	4857 6L45 6L50 2007Up	5	OE
	4858 6L80 6L90 2006Up	5	Hi-Per
	764 Saturn 1991Up	4	OE
	20588 V120 V125 2002Up	2	AM
	796 Allison1000/2000 200005	4	OE
Mazda	32388G F55AE 200509	9	AM/Hi-Per
	4855 RC4AE JR405E 200011	2	Hi-Per
Mitsubishi	21110 A6M1/2 2009Up		OE
Nissan	17388 RESR05A 2002Up	3	Hi-Per
	29080C AR4 1988Up	5	AM
Renault	252088 DPO AL4 1998Up	7	Hi-Per
	252088A DPO AL4 1998Up w/o Servo Pistons	5	Hi-Per
	26288A U140E U140F 1998Up		Hi-Per/OE
Toyota	26288C U151E U151F 2002Up		Hi-Per/OE
	26288C-1 U151E U151F 2002Up	6	Hi-Per/OE
	26288B U240E U241E 2000Up		
	26288F U250E 2005Up including Direct Clutch Piston	7	AM/Hi-Per
	4865 U340E U341E U341F 1999Up	3	Hi-Per/OE
Volkswagen	8404 01M 01N 01P 1995Up	7	AM
	8403 095/096/097/098 89-94	5	AM
	8404 095/096/097/098 89-94	7	AM
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ZF	4862 ZF4HP16 2002Up	2	Hi-Per

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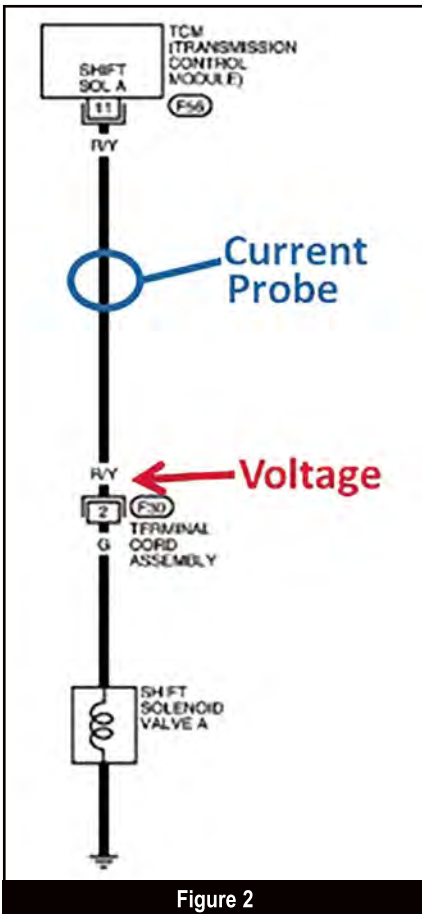


Figure 2

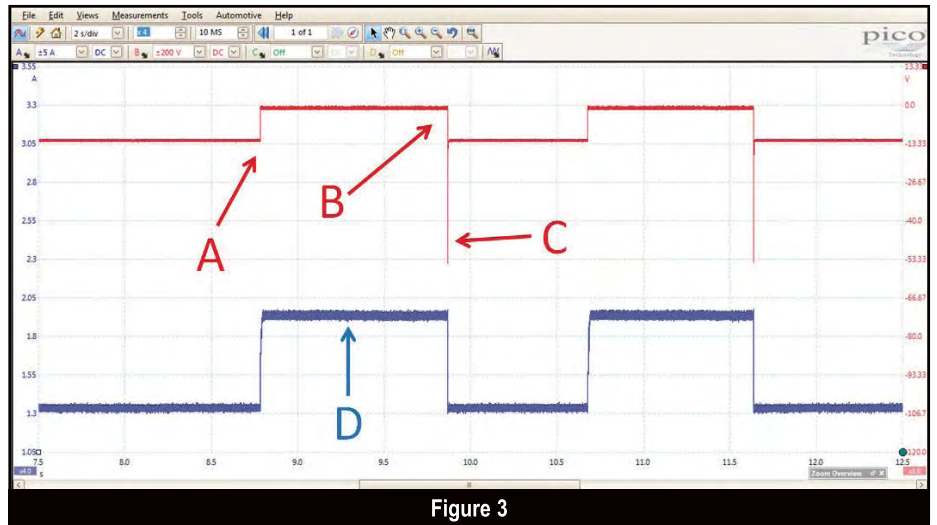


Figure 3

The second step is to use the wiring diagram (figure 2) and make the proper scope connections. To check a solenoid, connect your scope lead between the load and the switch. In this case the load is shift solenoid A and the switch is in the transmission control module (TCM). You can probe for voltage anywhere on the red wire with the yellow stripe.

To measure current, clamp a low

current probe around any wire in the shift solenoid A circuit. Because current is the same everywhere in the circuit, it doesn't matter where you connect the clamp. On this vehicle, we made both connections at the TCM connector in the passenger side kickpanel.

The scope capture (figure 3) shows voltage as the red trace at the top of the screen. Because this solenoid is power-side switched, the image may

“Some times it’s not just about the Free Stuff”

A Special Thank You to everyone who was part of the Superior / Fairbanks “Pink Tee Shirt” Breast Cancer Awareness campaign at the 2015 ATRA Powertrain Expo in Las Vegas. The show floor was “a sea” of Pink Superior/Fairbanks Breast Cancer Awareness shirts being worn by attendees from around the globe!

Dennis Erickson Jr. (co-owner and V.P.) and Robert “Bob” White (GSM) were on hand to announce the total donation on the Expo Floor. Bob explains, with Cancer of all types affecting us, our colleagues and loved ones... we all need to step up and help where we can... it meant so much to see so many that were touched by this effort. The Superior Team stepped up and made it happen and we all feel it was a great success. We tallied 150 shirts (With the Company donating \$10.00 per shirt) being worn on the show floor Saturday Oct. 31st 2015. We also tallied a total of \$170.00 in cash donations with a special shout out to Lance Wiggins, Troy Lamauro & Steve and Brenda Jones @ Transmission Clinics of Broken Arrow, Ok.

The TOTAL Donation to Susan G. Komen -FOR THE CURE- Foundation was \$1670.00 Again, THANK YOU!



Superior Transmission Parts, Inc. Booth Staff as pictured:
Cindy & Robert “Bob” White, Dennis Erickson Jr. & Elizabeth Erickson
and Jim & Ginger Brookshire

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appear upside down compared to other solenoids. This is completely normal and you can identify the same information as if it were ground-side switched.

Point A shows the transistor in the TCM turning on. The corners should be nice and clean. This indicates the switch or transistor is turning on as designed.

Point B shows the transistor turning off; the signal corners should also be clean. In addition you can see the inductive spike at point C. A solenoid builds a magnetic field when energized. When current in the solenoid turns off, the magnetic field collapses and induces a high voltage, just like an ignition coil. The presence of a strong inductive spike indicates that a magnetic field did build while the solenoid was energized.

The scope capture also shows solenoid current represented by the blue trace at the bottom of the image. This also shows when the transistor turns on and off. But the current capture provides some additional

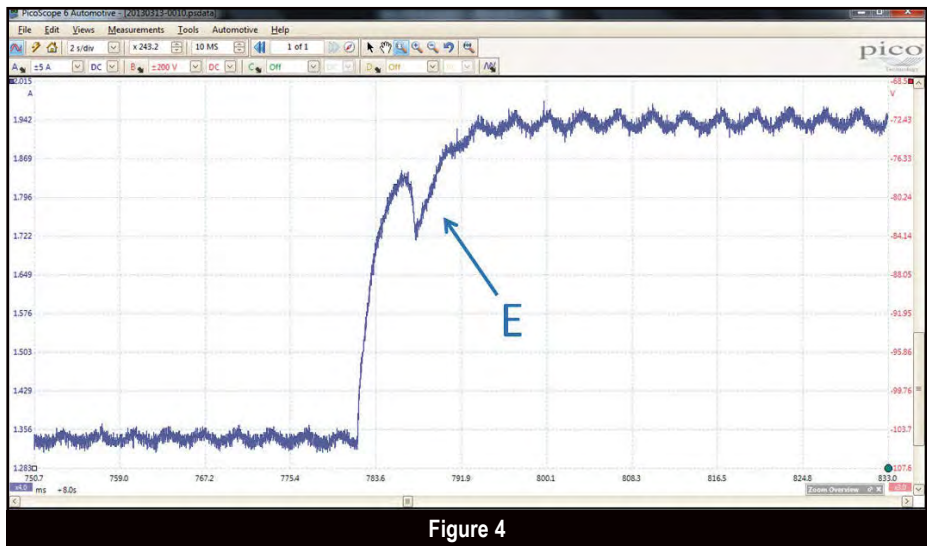


Figure 4

information that the voltage capture doesn't.

For example, look at where the current peaks (point D). When the capture levels out, current is 2 amps. Now you can use Ohm's Law to calculate solenoid circuit resistance accurately while the solenoid is actually doing its job.

This is a great dynamic test, as opposed to the inferior static test

of measuring resistance with an ohmmeter. Using Ohm's Law, you can use peak current and system voltage to calculate resistance while the solenoid was loaded.

An additional advantage to observing solenoid current is a mechanical indicator. By zooming in where the transistor turns on (figure 4), you can see the current ramp up, with a dip near the top (point E).

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This dip is known as the *pintle bump*.

This current fluctuation is generated by the pintle moving

through the coil when the solenoid opens. Because the pintle bump appears in the waveform, you know the solenoid opened.

Sometimes you can see the pintle bump in the voltage waveform, just after the transistor turns off, when the inductive spike bleeds back to nothing and the solenoid closes. The current capture is a better place to look for the pintle bump because it's more obvious and you don't need both to be visible. If the solenoid opens repeatedly, it must be closing, and vice versa.

In our Maxima, we now know that the solenoid, its wiring, and the TCM are good electrically and the solenoid is operating mechanically. By process of elimination, the late shift has to be either a plugged solenoid (that can't be determined with a scope) or an internal transmission problem.

These principles apply to engine-related solenoids, too. Figure 5 is a scope capture of a saturated driver fuel injector. To measure voltage (blue trace), the same rule applies: connect between the load and the switch.

Most fuel injectors are ground-side switched, so the voltage starts at system voltage and pulls down to zero when the transistor turns on. When the transistor turns off, you again see the inductive spike. In this example the pintle bump (point F) appears in the voltage capture when the pintle actually closes.

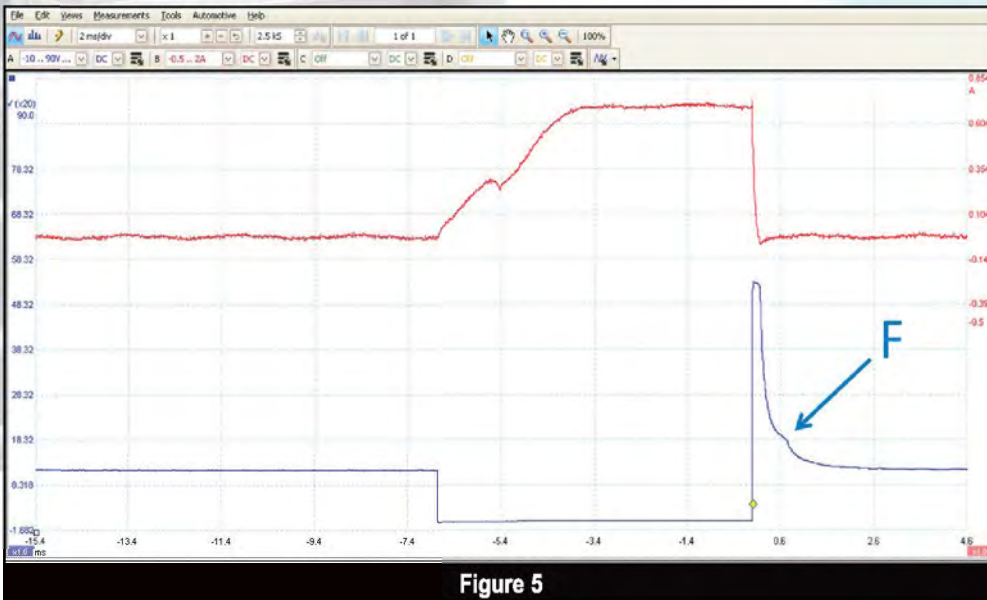


Figure 5

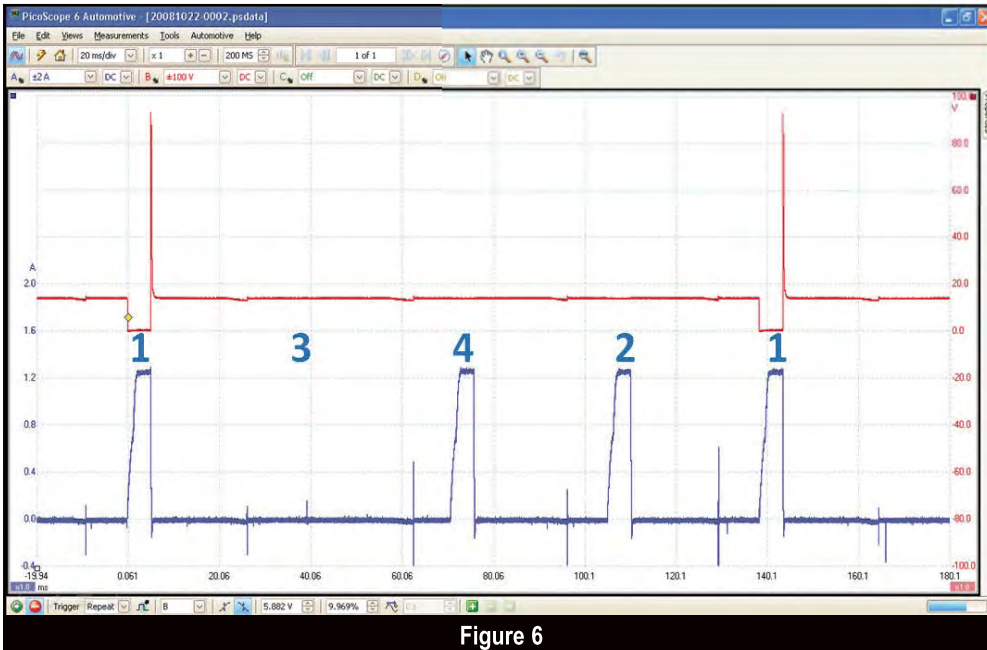


Figure 6

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You measure injector current (red trace) the same way, too. This allows you to calculate resistance and see the pintle bumps. But, since most vehicles today are sequentially injected, the current check provides additional information.

Because you can connect a current probe anywhere in the circuit, and usually all of the injectors receive power from one or two fuses, you have an easy access point to all of the injectors without having to probe each one. This can be a major advantage when injectors are nearly impossible to reach without some disassembly.

Figure 6 shows a voltage and current capture from a 4-cylinder Kia with a misfire and a P0303 misfire DTC. We connected the scope to the cylinder number one injector (red trace). The engine firing order is 1-3-4-2.

The blue trace is the current from all four fuel injectors, captured by replacing the injector fuse with a fused jumper wire. If you use injector number one voltage as your sync and plug in the engine firing order, you can see all of the injectors on the display at once.

For reference, point G is the number one injector voltage and point H is number one injector current. Note how voltage and current align with each other on the time scale, from left to right. In this example, notice there's no current flowing through injector number three.

Zooming in on the other injectors would show pintle bumps and, even without zooming, injector resistance. In this case, a broken fuel injector driver wire caused the misfire.

Regardless of what solenoid you're testing, engine or transmission, the same basic electrical laws apply. Whether you're a seasoned transmission technician trying to expand into the realm of engine diagnostics, or a longtime driveability technician expanding into transmission diagnosis, you still play by the same rules and can use the same diagnostic techniques.



Most fuel injectors are ground-side switched, so the voltage starts at system voltage and pulls down to zero when the transistor turns on.

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by Thom Tschetter

HE QUIT BUT DIDN'T LEAVE... AND HE COULDN'T BE FIRED

Up Your Business is an exclusive GEARs Magazine feature in which I share stories, insights, and reflections about real business and life challenges. The names of individuals and businesses in the following story have been changed to honor their request to remain anonymous.

A few years ago, I attended Bob Cooper's Expo presentation about hiring superstars. One of Bob's points was that employees quit before they actually leave. As Bob put it, "First the employee's heart goes and, finally, the toolbox." I remember saying to myself, "Well said, Bob!"

Have you ever had an employee who quit but didn't leave? To make matters worse, what if you couldn't fire him? You're probably wondering how an owner could find himself in such a pickle, but it does happen and it happens more often than you might think. Here's one such case from my archives:

Over the years I've consulted with hundreds of shop owners. The owners described the symptoms they wanted me to help them fix. But the cause had to be eradicated as well, or the problems would recur and continue to have a significant negative impact on the overall performance of the team and the business.

In this case, my client, Bob, described the circumstances of his business, Bob's Transmissions, as being so far out of whack that the situation was most likely hopeless.

He claimed that, in the last two years, the business had gone from thriving and clicking on all cylinders to what he described as crashed and about to burn. He went on to say that bringing me in was his last resort before throwing in the towel. I recall thinking, "Wow; what a starting point!"

I have to confess, as Bob and I progressed through the pre-consultation questionnaire, and as

Bob proceeded to detail the things that were going on in his business, I wasn't feeling all that positive either.

Bob's overview on the phone included high employee turnover, low morale, sagging profits that had spun into consistent losses, increasing customer complaints, low productivity, and higher-than-normal comebacks. He was understandably frustrated and I could see why he felt things were hopeless.

Being very curious about how a business could spiral into such a mess in just two years, and not wanting to abandon him in the middle of this storm, I agreed to go to Bob's shop and do a "ground-zero analysis" of the business. I told him the analysis would include a physical inspection of the premises, confidential interviews with employees, a financial/profitability review, and a sales and productivity evaluation.

I warned him that he might not like the results, and that I wouldn't pull any punches... I'd give him my honest opinions and recommendations.



GROUND-ZERO ANALYSIS

When I arrived at Bob's shop, the first thing I did was have a brief team meeting with all the employees, Bob, and me. So they wouldn't be left to wonder what I was up to, I explained that I'd be inspecting the facilities and interviewing each of them to get their ideas on how to improve the company's overall performance and their work environment.

I started by saying the following: "I believe that all employees want to be part of a great company. But the biggest enemy of great is good. Too many companies and their teams settle for good when great is within reach.

"My objective is to identify the things that separate Bob's and you from greatness. I've helped hundreds of companies and their teams transform from good businesses to great businesses and there's no reason you can't do the same.

"I'm going to invite each of you to sit down with me privately to discuss how things are going for you. I want to emphasize that whatever you tell me will be strictly confidential between you and me. While nothing is off limits, I'm primarily looking for things that can improve your job satisfaction, your work environment, and overall company performance.



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"I want to identify problem areas with the facilities and within the team, so I can make recommendations on how to fix them. My goal is to help you transform this company and your work environment into a place that makes you proud and happy.

"To do this, it's essential that you be brutally honest and brutally accurate with what you share with me. Again, I promise to keep the things we discuss absolutely confidential."

THE FACILITIES

As is commonly the case in automotive shops that are dealing with low morale and low profits, the facilities were unacceptably dirty, unsafe, and disorderly. Much of the equipment was in disrepair and suffering from neglect.

In addition, there was a small fortune in unreturned cores and new parts that had been mistakenly ordered and never returned for credit. Small parts inventories like nut-and-bolt bins, gaskets, filters, seals, etc., were totally disorganized.

The rebuilders' area was like a cave, with partially disassembled units in boxes stashed in the corners and sitting in piles on workbenches, rendering the benches unusable.

The facilities were simply oppressive. It was hard to say whether the dirty facilities caused low employee morale or vice versa.

EMPLOYEE INTERVIEWS

For the sake of time and space, here's a composite of the comments I received from the employee interviews:

1. The R&R technicians and the rebuilders all reported that they were totally frustrated by the lack of properly functioning equipment and shop tools. They said that, even though they reported broken and unsafe equipment, nothing was being done to fix anything. They asserted that Bob was too cheap to fix anything.
2. Regarding obstacles to productivity, they said they spent a lot of time waiting for the right parts to complete jobs. Often, when parts came in, they were the wrong ones. They blamed Bob for making the service adviser buy the cheapest parts he could find.
3. The three R&R techs felt that the rebuilders and the service adviser were both great guys and were doing the best they

could under the circumstances. They felt that Bob blamed them for anything that went wrong, and if the service adviser and rebuilders didn't protect them, they'd be fired.

4. Privately all three R&R technicians and the rebuilders told me they'd go to another shop if they got an offer.
5. The service adviser said he felt he was fighting a losing battle. He wanted nothing but the best for the shop, but Bob seemed to be bent on sabotaging his efforts.
6. He said that Bob would come and go without letting him know when or if he'd be back. Some days Bob wouldn't show up until late in the morning or would call to say he wouldn't be in at all.
7. Bob made him buy the cheapest parts he could find, even if it took extra time to get them. And Bob insisted on taking care of the inventory and return of parts. Addressing the disorganized inventory and pile of unreturned cores and new parts, the service adviser gestured toward the shop area and said, "You probably noticed how well that's working."
8. He felt that Bob interfered with the sales process, often interrupting sales and making promises that couldn't be kept, just to save jobs. Then Bob would leave him to deal with the customer heat.
9. He said Bob had also developed a short fuse with customers in general, so he dreaded whenever Bob got involved in a comeback or customer complaint.
10. He admitted that he was actually beginning to feel fearful about selling jobs because it was just going to turn into a new problem.
11. The consensus of the team was that the service adviser and rebuilders cared more about the business than Bob did.
12. They felt Bob was the problem and, if he'd just get out of the way and let the service adviser and rebuilders run the business, things would improve dramatically for the business, for the team, and for Bob.



13. They feared for their jobs. They felt that Bob had given up on the business and was only buying time to either sell it or close it.

He quit but didn't leave, and he couldn't be fired.

DIAGNOSIS AND PRESCRIPTION

To cut to the chase, my diagnosis was consistent with that of the team: Bob needed to make some changes if he really wanted to see his business thrive again. He either needed to start paying attention to the business and acting like an interested owner with a plan for success, or he needed to find someone who would.

When I met with Bob, to get his attention, I told him that I believed he had a capable sales and production team, but he needed to fire his general manager or he was going to lose his entire team and, most likely, his business. I added that it appeared as though the general manager had already quit and just hadn't left yet.

Bob more or less got my drift right away, but he wanted to confirm with a rhetorical question, "I don't actually have a general manager, and since my service adviser isn't actually a GM, I'm guessing you're referring to me, right?"

I smiled and replied that he was correct and suggested that, as I saw it, because he owned the building and land free and clear, he had four reasonable alternatives:

1. He could simply close the business and liquidate the physical assets. Then he could sell or lease the building and land.
2. He could put the business up for sale and get as much as possible for a business in its present, diminished condition. He could sell just the business and become the landlord, or sell everything, real estate and all.

3. He could lease the business as an operating transmission or auto repair shop. He might not have to look any further than his current service adviser or rebuilder to find a taker.

4. We could design a strategic remediation and ongoing operation plan to revitalize the business and restore it to the success it once enjoyed. Bob could be the point man, leading the implementation and managing the process, but that would require a major change of attitude. Or he could hire a general manager to do it with Bob stepping aside and assuming some other supportive role or no role at all.

With this scenario, once the business began thriving again, he could still consider other options like selling or leasing it, but he'd be in a better bargaining position to get top dollar.

WHAT BOB DID

Bob went with alternative number 4. We started by designing a strategic remediation and operation plan, beginning with a \$10,000 investment for cleanup, renovations, and repairs. What's interesting is that he made back 20% of that investment immediately, just by selling old scrap and returning cores and unused parts.

Next, he hired a general manager who did a great job of implementing the plan and restoring Bob's Transmissions to its former glory.

Bob learned to let go of control and limited his direct involvement to maintaining financial records and creating business reports to help the general manager. The shop never had an outside sales program, so Bob took on that role as well, calling on shops and businesses about 20 hours a week.

After about three years of continuous improvement, the rebuilder and the new general manager purchased the company for top dollar, and they purchased the building from Bob on a land contract. The income from the land sale provides Bob with added income as he enjoys his retirement today.

WHAT CAN WE LEARN FROM THIS STORY?

The key lesson in this story is that it isn't just employees that quit but don't leave. Even for owners, the heart goes first and then the toolbox.

You can see some great examples of this type of business failure on the TV show *Bar Rescue*, which airs on Spike TV; a show I was introduced to by *GEARS* Senior Editor Steve Bodofsky. It's an interesting look at some business owners who've given up on their businesses without actually closing their doors. Check it out when you have the time.



Share Your Stories

If you've personally experienced a weird or unusual customer dispute and wouldn't mind sharing it to help your industry, please contact me. You just tell me the story and I'll do all the heavy lifting to write it.

We can make it an article about you, or you may remain anonymous. The main thing is we want to share stories that will help others avoid similar problems. Call me at 480-773-3131 or email me at coachthom@gmail.com.

About the Author

Thom Tschetter has served our industry for nearly four decades as a management and sales educator. He owned a chain of award-winning transmission centers in Washington State for over 25 years.

He calls on over 15 years of experience as a certified arbitrator for topics for this feature column.

Thom is always eager to help members of our industry and continues to be proactive in pursuing ways to improve your business and your life.

WHAT HAPPENS IN VEGAS...



by Jim Cathcart

“**W**hat Happens in Vegas Stays in Vegas!”

That’s the slogan that the city of Las Vegas, Nevada embraced as a brand message. It seems that they had very little success with the marketing idea that preceded it, so they wanted to return to their earlier success and they decided to “dance with what brung ya” (stick with the concept that brought you to success).

Las Vegas has, since its inception, been a naughty town. With the Mob involvement, and gambling, drinking, and partying as their main tourist attractions, they were destined to be the “bad boy” of travel and tourism.

But many of the city leaders became uncomfortable with that image and they wanted to soften their appeal by becoming a family-friendly resort. I guess they were getting jealous of Anaheim, San Diego, and Orlando in that respect. They changed their marketing to emphasize their softer side; it’s just a resort town, nothing to worry about, so have fun and bring the kids.

The problem is, it didn’t work.

Whether it was the result of overall economic cycles or just poor marketing concepts, it didn’t matter. The gamblers and spenders weren’t coming to Vegas in large enough numbers. So they offered a new appeal: “What happens in Las Vegas stays in Las Vegas.”

In other words, come here for fun and don’t worry about folks back home finding out what you did here, as long as it’s mostly legal... wink, wink. And the whales came back to the sea. Vegas thrived again. Casinos grew, fabulous

shows increased, and the crowds returned to the betting windows.

Okay, I’ve just spent half a dozen paragraphs telling you what I *don’t* want you to do. Please don’t let what happened in Vegas at Expo stay in Vegas. We need to bring the learning home to our own businesses.

Let’s embrace a different mantra:

What Begins at Expo Grows from Expo!

On returning to your shop, everyone’s eager to hear your stories. They want to know what shows you saw, whether you won at the tables, and where you went.

But that’s just the surface appeal. What they also want to know — but may not realize it yet — is: What did you learn or discover in Vegas? What new products did you see? What systems or processes did you encounter? What stories did you hear from other operators that we can use here? Who did you meet? How can our existing business be better by adopting what you learned at Expo?

After Expo each year, *GEARS* does a recap of the show’s highlights: innovative products, systems, and solutions that advance our trade, powerful ideas shared by the keynote speakers and workshop leaders, and photos of the social events and show floor. We share the best-of-the-best thinking about how to succeed in this business and in today’s marketplace.

It’s our sincere wish that you use *GEARS* as a discussion tool with your team.

Read each issue and highlight the ideas that stick with you. Then show

those highlights to your team. Ask for their observations, and get them thinking and talking about them. Do this in an actual meeting: Sit down and devote an hour to making your business better once each month. Get everyone’s input.

And tell them stories, too. Put some fun in the meeting: Tell them about the amazing resorts, Fremont Street, the Mob Museum, the shows, and the gaming.

But show them the value of being on the Expo floor, speaking with industry leaders and innovators. Let them feel some of the energy you felt on the show floor. Quote the speakers you heard and post the best ideas on the wall for a few weeks for all to see. Make everyone want to go to next year’s Expo, even if they have to pay their own way!

And don’t let what happens at Expo stay in Vegas.

Jim Cathcart is a member of the Sales & Marketing Hall of Fame, a strategic advisor to ATRA, and regular contributor to GEARs Magazine. To see some of Jim’s 110 short video lessons for free, go to Thrive15.com and enter the code “Acorn”. Contact Jim directly at info@Cathcart.com.



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HOW TO ADD NEW CUSTOMERS THROUGH POWERFUL MARKETING



by Alex Goldfayn
CEO, Evangelist Marketing Institute

There are two basic ways to grow your company: expanding business with existing customers, or bringing on brand new customers.

This piece focuses on bringing in large numbers of new customers. My next column will focus on selling more to your current customers.

When I ask clients and audience members how much of their business is made up of existing customers re-ordering, the percentages are extraordinarily high – often north of 80 percent.

This is a positive, of course, because your customers love your work. But it's also dangerous, because if some of your larger repeat customers leave, you'll be dealing with a big hole. That's why a steady flow of new customers is so important to small businesses.

Here are three simple techniques to turn on your new customer hose, and keep it flowing at high pressure:

SEEK REFERRALS

Your existing customers are a golden and oft overlooked source

of new customers. We don't ask for enough referrals. Often, in my speeches and workshops, I ask participants why they don't ask for referrals more. Here are some of the answers:

- *Fear.*
- *What if they don't like us as much I think?*
- *Don't want to impose.*
- *Don't want to take clients' time.*
- *Not sure how.*
- *It's not a part of my process.*
- *Never really asked before.*

Essentially not asking for enough referrals is a mindset issue. We lack the confidence and self-esteem to do so. It's as simple as that. The tragedy here is that your happy customers would be thrilled to recommend you to their peers and colleagues. All you have to do is ask.

I'll take it one step further: *it is your responsibility to ask for referrals.* You owe it to your family, your staff, and your children to make your company as healthy and successful as it can be.

Instead of simply asking, I've been implementing a two-step process for my clients, and it has been working beautifully:

First, at the time of every new order – on the phone, in person, and

even online – we must simply inform our customers that we will be asking them for a referral at the time that we deliver this order. “If you’re pleased, I would love to help somebody you know, in a similar position as yourself, with the same kind of value and service. If it’s okay with you, I’ll ask you for this referral in a week or so, when I deliver the order. Sound fair?”

Then, when the time comes, simply say so. “Remember we talked about a referral if you were pleased. Here we are!” You’re laughing as you say it of course, but there’s no point in tip-toeing here. They’ve already agreed to help you.

A two-step process like this hold the customer accountable to providing the referral, and, just as critically, it holds *you* accountable to asking for it.

Alan Weiss taught me his version of this process years ago, and the modified approach I’ve outlined here works well. If you do this for just some of your new orders, you’ll quickly add a significant number of new customers by referral.

SPECIALIZE IN VERTICAL MARKETS:

Next, take a look at the types of industries your customers belong to. Perhaps you deal with many manufacturers? Or people in a certain region? Identify your top current markets and make it a point to exploit your success there. Some of my most successful clients have conquered just one or two vertical markets. Become a specialist. Visit the conferences and conventions. Create a good list...

BUILD LISTS:

If you do not currently have a good list of people who can buy from you, this is probably the most important activity in this article. Right now, start a simple spreadsheet. You want names, titles, companies and full contact info, online and offline. Gather all of the people you’ve ever done business with, and add them to the spreadsheet. Do the same with people you’ve talked about business with, but have not worked with. *Have every salesperson in the organization do this.*

Finally, you might think about having lists built for you professionally. For about .20 cents per name, you can have a list builder create spreadsheets filled with your ideal prospective buyers. Head to elance.com and search for “list builder” and you’ll see how this works.

When you have your list, send value: case studies. Testimonials. Advice from you. How-tos. Tools, techniques and interesting insights. Briefly profile a product in every communication you send.

To grow, you need to build a nice funnel of new incoming business. Any one of these techniques can get you there. Pick one, and try it for 15 minutes tomorrow.

*These approaches are described in depth in Alex Goldfayn’s new book from John Wiley & Sons, **The Revenue Growth Habit: The Simple Art of Growing Your Business by 15% in 15 Minutes a Day**. Alex is the CEO of the revenue growth consulting firm **The Evangelist Marketing Institute**. Visit his website at www.evangelistmktg.com.*

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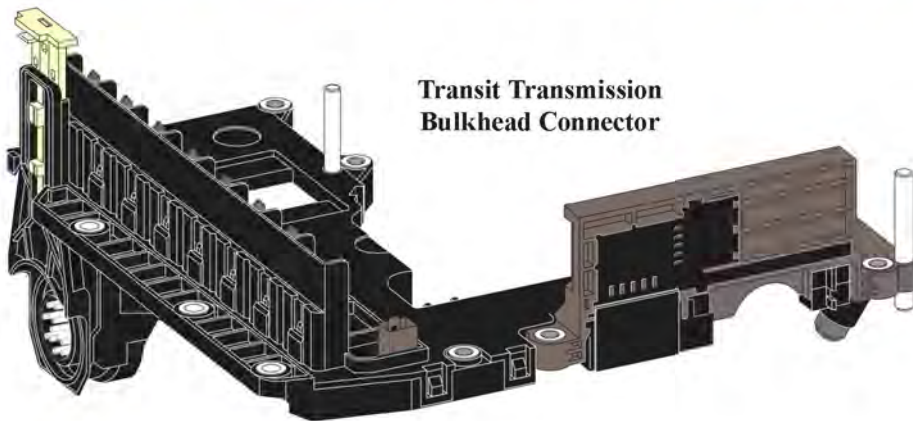
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Multiple 6R60E/6R80E Problems Traced to Bulkhead Connector



by Rolly Alvarez
members.atra.com



Transit Transmission
Bulkhead Connector

When dealing with electrical problems, it's always important to remember that a single fault can create multiple problems in seemingly unrelated systems. But at the same time, it's also possible to have more than one fault!

This situation started with a friend of mine who owns a body shop. He purchased a 2012 Expedition with a 5.4 liter engine for his wife and five kids that he planned to use as his family school bus.

But he was having a few problems with it, so he brought it to me to check. According to him, the fuel light would flash while the tank was between quarter and half full. At the same time, the odometer would intermittently display dashes across the numbers.

We took the truck for a long drive and, sure enough, it behaved exactly as he described it. So the first thing I did was to scan codes in the OE protocol part of the computer. I came up with two codes:

- P0720 — output speed sensor insufficient input
- P0722 — output speed sensor no signal

Interesting; where's the connection between fuel gauge and odometer?

It turned out the speedometer dropped to zero at the same time, which put the truck into failsafe. Cycling the key reset the transmission to normal operation... until the problem occurred again.

I also notice that the A/C blower was shutting off intermittently; it seemed to coincide with the speedometer and odometer problems. Once again I had to wonder about the connection between the problems.

Next I scanned the OBD global side of the computer. As expected, the output speed sensor codes were in memory and history. Since it can be a little difficult to test the speed sensors, I decided to perform a bulletin search and save a little time.

And there it was: Ford TSB 13-4-9, which supersedes TSB 13-2-3. According to Ford, some 2011-2013 Mustangs, and 2012-2013 F-150s, Expeditions, and Navigators



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equipped with the 6R80 may exhibit this condition.

The transmission will go into failsafe and start in a higher gear until you cycle the ignition. The wrench light will come on and odometer will display dashes while driving. The only symptoms it didn't mention was the fuel gauge and the blower motor.

The bulletin also mentions that these codes may not be stored in the powertrain control module (PCM), probably because the condition is intermittent, so when the computer looks for the signal again and it's back, it has no reason to set a code.

If you cycle the key, it clears the codes and restores normal operation and functionality of the transmission.

The bulletin points to a part Ford calls the Transit Transmission Bulkhead Connector; a big name for

what's basically a complex connector that connects the harness to the transmission. The original part number for the connector was AL3Z-7G276-A; it's been superseded to AL3Z-7G276-B.

Surprisingly enough, while researching this problem, I ran into compliance recall #12C23-S1, regarding the Internal Mode Switch (IMS).

The symptoms for a faulty IMS are no digital display in the dash or transmission won't engage in any gear or reverse, and the backup lamps or rear video camera may not work. The IMS is part of the Transit Transmission Bulkhead Connector — the very part we replaced. Replacing the connector updated the IMS at the same time.

The one thing the bulletin didn't explain was why the A/C blower was dropping out. Turns out it was a completely unrelated problem that

seemed to coincide with the transmission problem. The dropout in the blower motor turned out to be caused by a bad connection at the A/C fan relay in the fusebox, inside the engine compartment.

So when dealing with a number of issues that seem to coincide with one another, remember it's possible to simply have two unrelated problems that happen to occur at roughly the same time. Never assume that fixing one will take care of the others; always check that all the symptoms are gone before attempting to deliver the vehicle.




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POWERTRAIN 2015: An Expo To Remember



by Steve Bodofsky
members.atra.com

Just before this year's Expo kicked off, ATRA President Jim Rodd predicted that the 2015 Expo would be the best one ever.

Was he right? Was Powertrain 2015 really the best one ever? I suppose that depends on how you measure it.

If your gauge is about attendance, it was certainly a terrific year. According to ATRA Event Coordinator Vanessa Velasquez, "Last year's program had the highest attendance in about 10 years, and this year's numbers are awfully close... if not slightly higher." The count is ongoing, but the numbers are looking impressive.

If you're basing your judgment on the show floor exhibitors, there were more there this year than last year. And every exhibitor we talked to claimed this year's attendance numbers exceeded their expectations.

The stories don't end there: From the seminars to the BookStore, the numbers kept on growing. According to ATRA Technical Director Lance Wiggins, this year's BookStore sales were the highest in recent memory. And the seminars were well represented on both sides of the aisle.

So was Jim right? Was Powertrain 2015 the best ever? The consensus





seems to be a resounding “Yes!” And it was an Expo that’ll be hard to beat next year.

The program began early Thursday morning with the first technical seminars. You might think that the audience would be sparse that early in the day, but a quick count revealed attendance was nearly 80% of total registration. That’s pretty impressive for beginning so early, and on a Thursday, no less. And it wasn’t long before they reached full attendance.

The programs were well received; you couldn’t go more than a few steps without hearing someone talking about how much they were learning. Some didn’t even have to wait to get home to put what they were learning to work!

“I overheard one technician talking about having learned about the solution to a 6L80 they were fighting with back at the shop,” says Lance. “He called the shop to share what he’d just learned, and sure enough, that fixed it.”

On the management side, the early part of the day was open, allowing attendees to assemble an impromptu golf outing at the Badlands golf course. According to GEARS Managing Editor Rodger Bland, the name of the course was highly appropriate: “It was a terrific afternoon, but the real winners are the guys who collect used golf balls. We prob-

ably ‘donated’ 60 balls on that course; I think it must be sponsored by Titleist!”

But regardless of the terrain, golf is a game, and the high spirits and camaraderie exhibited afterward in the show halls proved that the golf outing was a terrific way to kick things off before the management seminars began at 3 PM.

The seminars ended at 6 PM, just in time for the doors to open for ATRA’s encore pizza-and-ice cream Welcome Reception. And, just like last year, the event was met with warmth and goodwill from everyone in attendance.

The celebration ended early so everyone could get a good night’s rest for what was sure to be a busy Friday.

And “busy” is an understatement: The ATRA Member Meeting began promptly at 7 AM, and the tech seminars began at 7:30. Management started at 8. Both seminar programs kept a tight pace until noon, when the doors opened for the ATRA Luncheon, sponsored by Raybestos Powertrain.

This year’s luncheon was something special... something that had the whole program restless in anticipation. This year’s luncheon was packed to the rafters, with the highest number of individually purchased tickets in recent memory: double what was purchased last year.



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The program began with a brief presentation from Raybestos. Then ATRA's CEO Dennis Madden presented the Distinguished Supplier Award to Precision International for their support and dedication to the industry and the training they've provided over the years. Frank Miller, VP of sales for Precision, accepted the award.



Then the moment everyone was waiting for... the one that had every seat in the house filled. Dennis Madden introduced the keynote speaker for the event: John Ratzenberger, star of TV show Cheers and every Pixar film every made.



John's presence had created an air of anticipation since it was announced that he'd be there, and he didn't disappoint. The audience was transfixed as John shared his take on the situation we're all facing, as more and more young people are being shepherded toward college degrees instead of a career in skilled labor.



He shared his personal experiences — sometimes somber, sometimes humorous, but always engaging — and afterward he was gracious about allowing folks to come by for a picture with him. He didn't have time for the beer he promised, but he and I did get a few minutes to talk before the doors opened, and he made it a point to pose for a photo with me.

After a sumptuous luncheon, courtesy of Raybestos, it was off to the ribbon cutting ceremony to open

the trade show floor. Before cutting the ribbon, Dennis Madden honored Transtar Industries for 40 years of supplying the industry. Transtar CEO Ed Orzetti accepted the award, flanked by his entire staff.

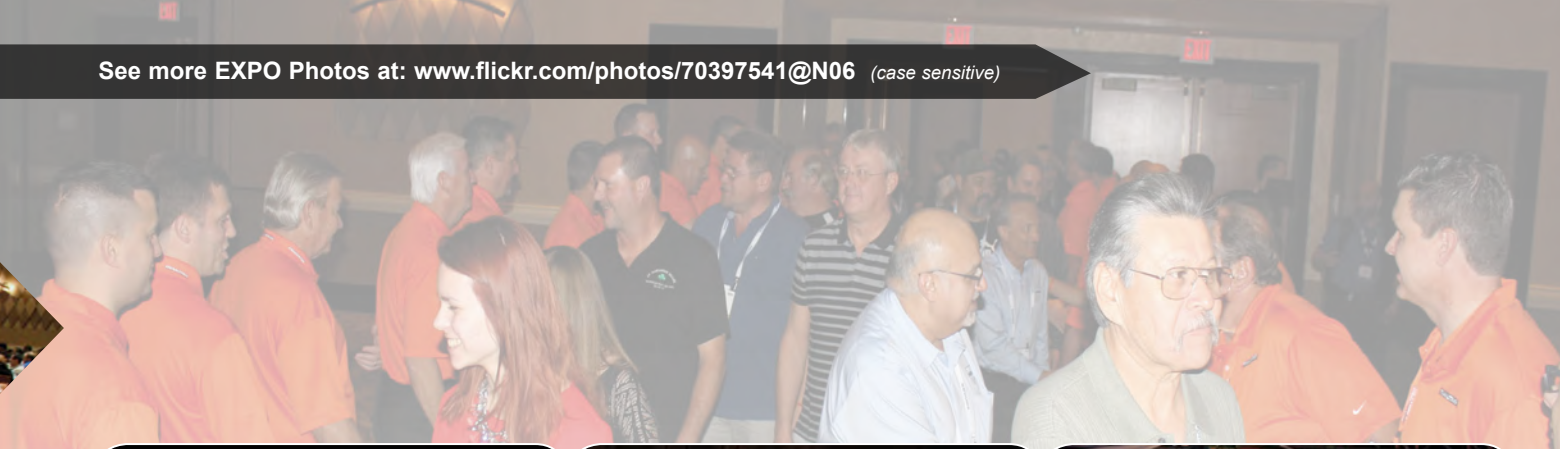
As always, the crowds were heavy right after lunch, but this year the numbers never really dropped off. Things stayed pretty busy all day, till just before the doors closed at 7.

Of course, as 7 PM approached, a lot of attendees ran back to their rooms to deposit their swag, change clothes, and get ready for the Friday evening reception hosted by Transtar. This year's reception had to be moved indoors due to forecasts of high winds. But you'd never have known about the last minute changeup, as the event began without a hiccup.

The reception included a complete buffet, open bar, and terrific music by an outstanding Eagles cover band. The mood was one of family, and ran late into the evening.

Saturday's seminars went on smoothly, providing exceptional training that was well received by all those in attendance. The trade show doors reopened at noon and remained busy as many local attendees showed up later in the afternoon.

As the show was winding down, the entire ATRA staff got together to share stories, and Dennis Madden let everyone know how proud he was of the job they did. According to Dennis, "the results speak for themselves."



Then a number of folks headed off to the Strip or Fremont Street to wander about and enjoy the atmosphere of Halloween in Las Vegas, as normally rational folks step out of themselves and dress up for an evening of gaiety and abandon. It was a memorable night for all.

Sunday morning things kicked off again for those who remained. Scott Johnson from ProfitBoost hosted a breakfast meeting for the management seminar attendees.

Then Maylon Newton shared his experiences over the last year as he cheated death and discovered the necessity of preparing for the day when you suddenly aren't there to run your business. There wasn't a dry eye in the house.

So, yeah, Powertrain 2015 may well have been the "best Expo ever"... at least until next year. If you didn't make it to Vegas, it's too late for this year. But then again, it's only about 11 months until Powertrain 2016, October 27-30 at the Paris Hotel and Casino, right on the world-famous Las Vegas Strip.

Now's your chance to start making plans for what may well become "the best Expo ever." Don't miss out: Begin making plans to attend today, and we'll look for you in Vegas in 2016!



HIXSON TRANSMISSION AND TOTAL CAR CARE:

Attributing Success to Divine Providence

If you ask Chuck Miller, owner of Hixson Transmission and Total Car Care, in Hixson, Tennessee, to explain the secret of his success, he's quick to credit the intervention of the Almighty.

He might be right. But a close, objective assessment reveals that there may be a more worldly explanation to his business achievement.

For example, when asked about his business philosophy, here's what Chuck had to say: "It's 100% about your customers. We don't sell price; we sell service! Our job is to make our customers comfortable when they come in. I treat my customers' cars the

same way I would my mother's or my wife's or my daughter's."

"Every car that comes in — if it's been over 5,000 miles since the last time it was here — gets a complete inspection. We look at the brakes, we look at the tires, we look at the hoses and air filters... everything on the car to verify that it's going to be safe and that they aren't going to have any issues with it."

"Cars are fixed in the back of the shop and that's the way you earn your money, but that's not where you build your business. Being the best technician in town isn't going to make you successful. It's about how you treat your customers."

Sounds like a familiar message; one we've discussed at length in *GEARS* and focused on through the management seminars at Expo. That's another reasonable explanation for Hixson Transmission's success.

Of course anyone can talk the talk. But Chuck works hard to walk the walk. His waiting room is immaculate, with comfortable furniture and a nice area rug, a 42" flat-screen TV and DVD. There's no doubt ATRA CEO Dennis Madden would be pleased to discover that their restrooms are spotless.

Apparently their attention to detail is getting them noticed: Hixson Transmission was nominated for Best of the Best this year by the



Chattanooga Times Free Press. “It was phenomenal because the companies we were competing against had been in business for 30 or 40 years,” says Chuck. Hixson Transmission finished in the top three.

A REMARKABLE BEGINNING

As a young man, Chuck never intended to open an auto repair shop. In fact he went to college and earned an associates degree in industrial technology, focusing on electronics.

So how did he go from those beginnings to become a repair shop owner? “I answered an ad,” says Chuck, by way of explanation.

“I was working in what I considered to be a dead-end job when I came across an ad from a nearby transmission shop looking for an R&R tech. At the time I knew very little about cars — I worked on my own cars and my friends’ cars, but that’s about it.”

His education in electronics turned out to become an incredible asset when faced with today’s cars. “I got into this business in 1994 when electronics were just beginning to take over, and even though I didn’t understand a lot about cars, I did understand the electrical side of things. It turned out to be a great fit.”

He enjoyed what he was doing so much that when his boss asked him

to move into the office and become a service writer, Chuck made him promise that he’d be able to move back into the shop if it didn’t work out.

But things worked out so well that the owner decided to open additional locations. Chuck was supposed to take over the second shop, get it up and running, and then move on to a third location.

But when they opened the second shop, the economy took a tumble. The owner wanted Chuck to come back to the original shop, but Chuck was ready to move on. So they worked out an arrangement for Chuck to buy the Hixson shop, which was the beginning of God’s plan for Chuck’s success. He opened Hixson Transmission and Total Car Care in March, 2005.

SPEEDY’S OIL AND AUTO

In addition to his main repair shop, Chuck also owns three quick lube shops, operating under the name Speedy’s Oil and Auto. Owning these shops works out really well for him because the quick lube stores have a high car count, and that provides them with the opportunity to refer work to the Hixson repair shop.

While the quick lubes have turned into a valuable marketing tool, Chuck didn’t plan on opening them originally, and certainly not as an in-house referral service. How he got involved in this part of the business is an interesting story in itself.

“The first quick lube store I took over was right next door to my transmission shop. It was closed, and the owners came to me in 2009 and asked me to take it. I wasn’t really interested, but they offered to lease it to me for a deal I just couldn’t refuse!”

“We’re located on a good street with a lot of traffic, and I started getting the car count up. About a year later, a guy with a quick



lube shop in Soddy Daisy came to me. He didn't want to operate his shop any more, and when he tried to sell it, everyone told him to 'go see Chuck.'"

"He came to me and I looked over the store and the numbers. I ended up buying the shop and the business for considerably less than the property appraisal. I looked at the numbers and said, 'how do you not?'"

"So I got that store up and running well. Then, right up the street from my transmission shop there was another quick lube store that had been closed for about seven years. The bank owned it and they came to me and asked me to buy it."

"I told them 'I'm not in the quick lube business. These other stores just happened.'" Chuck feels as though God laid out the stepping stones, and all he had to do was have faith to take the path.

Today all three of Chuck's Speedy's Oil and Auto locations are doing great, and they're sending additional customers to Hixson Transmission. It's a business model that works for him.

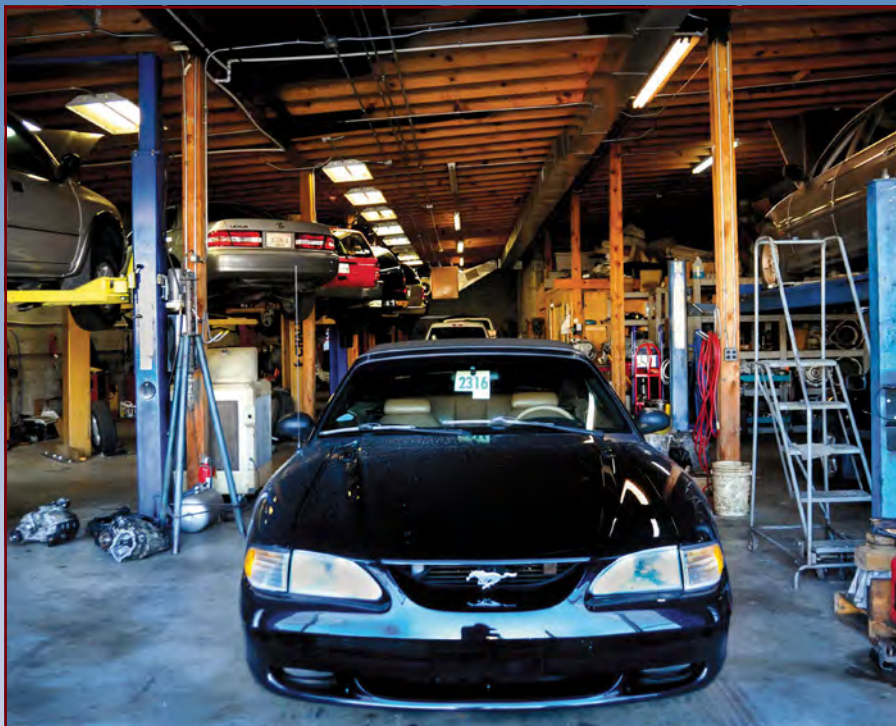
MARKETING 101

"When the economy tanked in 2008, a lot of shops cut back on their advertising budget; I doubled mine," explains Chuck.

Of course that budget includes their web site —www.hixsontransmission.com — where they proudly display their catchphrase: "If your car needs fixin', go to Hixson!" Maybe not Shakespeare, but it's memorable and probably sounds right at home in Tennessee.

According to Chuck, the timing was great to advertise, because no one else was buying, so he could negotiate some terrific deals. "We were seeing tremendous gains — 25%... 30% a year — and I think a lot of that was because every time you turned on the radio... every time you opened the newspaper... we were there."

Chuck also gets some great publicity through several local TV stations. "Channel 3 and channel 9 will have me on one of their morning shows about every five weeks or so to provide some advice for car owners."



The shop is over 12,000 sq.ft. with 16 lifts.



Comfort is king at Hixson Transmission and Total Car Care. Customers enjoy a clean and well-appointed waiting area.

"Come winter, they'll bring a crew to my shop and do a live shoot where we can explain about tires and tread depths, and how to prepare your car for the winter. Around the 4th of July, we'll do a show on how to get your car ready for a long trip."

Another way Chuck gets his shop name out is through his weekly radio program, The Car Clinic, which airs every Saturday morning from 8 to 9AM, on WGOW, FM. There,

Professor Overdrive (Chuck) sits down with Doctor Diesel (Mike Perkins) and answers callers' questions on the air.

Of course, some of those questions require more than a quick answer over the phone; in that case the shows hosts will recommend the caller take his or her car in for service. If it's nearby, they'll recommend bringing it to Hixson; otherwise, they'll recommend a shop that's closer to the caller's location.

“The show gives us credibility,” says Chuck. “When I’m on the radio, talking about cars in a personal sense, people think, ‘hey, this guy cares about me, he cares about my car, and he cares about my business.’” And that’s the kind of message that attracts customers to a shop.

COMMUNITY INVOLVEMENT

Chuck is a big believer in working within his community to give back and to help get his name out there: “Twice a year we’ll have a free Safety Inspection Day in the parking lot of the church across the street. We’ll get started at 8AM and broadcast the radio show live from there.”

“From 8 till about noon or one o’clock — depending on the time of the year — my guys will be there with scan tools and pressure gauges. People will come by and we’ll check their cars. And we’ll hand them a report indicating what we found.”

“There’s no charge; we’re not trying to sell anything. It’s like I tell them on the radio: ‘If you have a mechanic you know and trust, go back to him and show him the report; let him fix your car.’ It’s just my way of giving back to this area that’s given so much to me.”

“And sure, we get new customers from it. Customers come by, they talk to us, we start to build a relationship, and it builds business for us.”

Chuck also delivers a meal to the firemen at the station behind his shop on holidays when everybody else is enjoying time at home with family, and they can’t because they’re at work to protect our families. It’s just a simple way to give back!

They offer a ladies’ clinic; a program for women to learn about their cars. “When we first started it, we were doing a program about every six weeks; these days it’s only about three times a year. We’ll get up to 10 women who come in on a Saturday morning.”

“We’ll discuss some of the basics about their cars, then we’ll go out to their cars, raise their hoods, and show them how to check their engine oil, how to check their transmission fluid, coolant, and brake fluid, how to look at their belts, check their tread depth...



Service Advisors Alan Lee (red shirt) and Part Clarkson.



Chuck Miller, owner of Hixson Transmission and Total Car Care.

so they have a basic understanding of their cars.”

“We give everyone who attends a free, pink T-shirt that says ‘I know what’s under my hood!’”

All of which seems to have made a real difference for Hixson Transmission: “When I opened this shop, there were about five other transmission shops within five miles of us,” says Chuck. “Today, we’re the only one left.”

Chuck attributes his success to a higher power, and we’re in no position to dispute that. But there is little doubt that his business model lends a lot of credence to the expression that the Lord “helps those who help themselves”.



GEARS does not endorse new products but makes this new information available to readers. If you have a new product, please email the press release information with applicable digital photo or drawing to fpasley@atra.com or send by mail to GEARS, 2400 Latigo Avenue, Oxnard, CA 93030.

Precision International Honored by ATRA with 2015 Distinguished Supplier Award



Atra's CEO Dennis Madden and Seminar Coordinator, Kim Paris present the ATRA Distinguished Supplier Award to Frank Miller, VP/General Manager of Sales for Precision International.

Oxnard, CA — November 9, 2015 — Precision International, a world leader for supplying transmission rebuild kits to the automotive aftermarket, was honored at Powertrain 2015 in Las Vegas — the world's largest trade show specifically for the automatic transmission repair industry — with the 2015 Distinguished Supplier award.

The award recognizes exceptional effort and support for the automatic transmission industry, and is awarded by the Automatic Transmission Rebuilders Association (ATRA): the largest and most respected association of automatic transmission rebuilders and suppliers in the world.

The award was announced at this year's Powertrain Expo, held at the Rio Hotel and Casino in Las Vegas. Frank Miller, VP/General Manager of sales for Precision, accepted the award from ATRA CEO Dennis Madden.

"It's been my honor to get to know the team at Precision International over the years," says Madden. "Their dedication to the industry has helped provide technicians with critical support for the rapidly changing technology they face every day. They were the obvious choice for this year's Distinguished Supplier award."

In addition to supplying the industry with cutting edge transmission rebuild kits, Precision is also committed to providing the industry with training and information through their web site, www.transmissionkits.com. And their

technical specialist, John Parmenter, presented a technical seminar at this year's Expo, providing real world fixes for the industry.

Visit www.transmissionkits.com for more information about Precision International, or to view some of their world class training materials.

Custom Car Builder George Barris Dies

by Dennis Madden



George Barris, the man behind such iconic vehicles as TV's original Batmobile, the Munster Koach, and the fictitious 1928 Porter on My Mother the Car, passed away on November 5, 2015, at the age of 89.

I had the opportunity to meet George and even drive one of his cars. It was 2004: "Landspeed" Louise Noeth was a contributor to GEARS Magazine, and she'd made arrangements to interview George. So she gave me a call and invited me to join her. How could I refuse?

We met George at an event nearby where he was showing some of his cars, including the original Batmobile; a car he built in just 15 days at a cost of \$15,000. He sold it a couple years ago for \$4.6 million dollars. After his interview with Louise, he promised to let me take it for a road test.

I also got a look at another Barris creation: the Monkee Mobile. It was more of a set piece than a driving car, with a lot of phony appointments to make it look flashy on camera, but it was still pretty cool to see it in real life.

George was a nice, personable guy who just seemed glad to know you.

While we were there, he invited us to join him for lunch at a nearby Italian restaurant that he liked to frequent. We had a great time getting to know one another.

Unfortunately, by the time Louise finished her interview, George's staff had loaded the Batmobile onto their car carrier to take back to their shop, so I wasn't able to drive it.

But the day wasn't a total loss: George lent me a Thunderbird for the weekend... the Thunderbird he customized for Halley Berry in the James Bond pic, *Die Another Day*. The movie had just come out, so the car was instantly recognizable. It doesn't happen often, but that Monday I got to be a hero to my daughter as I drove her to school in the famous T-bird. She was the envy of all her friends that day!

George lived a long life, passing just a few days before his 90th birthday. And over the years he made a mark on our industry and the world that few others can emulate. He will be missed, but his legacy will live on.

AMSOIL Introduces New Synthetic Air Tool Oil

AMSOIL Synthetic Air Tool Oil is specially formulated to provide exceptional lubricity for pneumatic equipment commonly used by automotive enthusiasts, mechanics and craftsmen. It promotes equipment longevity, smooth operation, and reduced wear for a variety of common air tools, including grinders, impact wrenches, ratchet wrenches, chisels, drills, sanders, hammers and nail guns. It effectively lubricates rotary and piston-type air tool bearings and motors, while managing moisture and conditioning rubber and plastic seals & O-rings.

AMSOIL Synthetic Air Tool Oil helps prevent corrosion and deposits while reducing wear and extending tool life. It allows air tools to run cleanly and reliably for years, even



generations. Convenient packaging design allows for easy dispensing of products. AMSOIL Synthetic Air Tool Oil offers equipment owners premium protection for lasting performance.

AMSOIL has been the recognized leader in synthetic lubrication since 1972. For more information about AMSOIL synthetic lubricants and performance products contact your nearest AMSOIL distributor, or call AMSOIL at 715-392-7101 or 1-800-777-8491 or visit www.amsoil.com

Precision Introduces New Kits for 9HP48



Precision International now offers overhaul kits, banner kits, and master kits for 9HP48, which appears in the 2015 Land Rover Evoque.

Here's a list of the kits and their part numbers:

- Overhaul Kit: K82900Y
(with piston)
K82900YX
(without piston)
- Banner Kit: K8200YW/O
(with piston)
K8200YXW/O
(without piston)
- Master Kit: K8200Y
(with piston)
K8200YX
(without piston)

For more, visit Precision on line at www.transmissionkits.com

Drivetrain Technology and Trans Repair Cost Guide Certified Shop Program

Drivetrain Technology and the Transmission Repair Cost Guide are now offering a Certified Repair Shop Program to transmission shops who

want 1st page placement on Google.

Google "transmission repair" to visit the Cost Guide, which receives over a million unique visitors per year looking for transmission repair pricing.

Visit www.drivetraintech.com or call 813-530-8433 for more details.

Raybestos Powertrain Releases New Applications for ZPAK® Single-Sided Clutch System



At ATRA's Powertrain EXPO in Las Vegas, Raybestos Powertrain announced that new ZPAK® applications are now available for the GM 6L80/6L90 3-5-Reverse clutch and the Getrag 6DCT450/6DCT470 transmissions. The patented, single-sided ZPAK clutch system is best known for its ability to reduce hot spotting, eliminate coning, and increase heat transfer to outperform the OE.

"These newest Raybestos Powertrain ZPAK applications can outperform OE by increasing heat capacity and reducing temperatures by more than 30 percent," said Reinhard Brinkmeier, vice president of sales and marketing for Raybestos Powertrain. "Our ZPAK also reduces stresses within the clutch pack, which reduces core temperatures for a more durable transmission with outstanding performance, even in high-stress applications."

Transmission shops should expect to see more dual-clutch transmissions, such as the 6DCT450/6DCT470, in the near future. "If you haven't seen one of these in your shop yet, we're confident that you will see them soon," noted Brinkmeier.

To learn more about the Raybestos Powertrain ZPAK, visit them on line at www.raybestospowertrain.com or call (800) 729-7763..

Updates from TransTec

TransTec is pleased to introduce several new products and updates to their product lineup.

First is overhaul kit DP2630, which services the 2006-up K310 CVT. This is in addition to their overhaul kit without pistons DP2629.

These transmissions are in use in several Subaru and Toyota vehicles built between 2006 to the present.

Next up is overhaul kit 2675, which services the HF35 EVT unit in several Ford and Lincoln vehicles from 2011-up.

Then there's the overhaul kit DP2665, for servicing the TR580 CVT units in a variety of Subaru models from 2009-up.

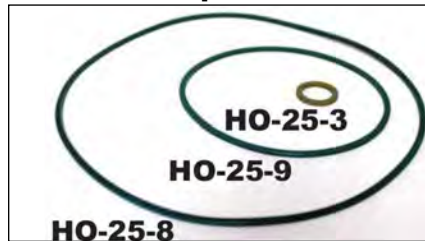
TransTec has also announced the following updates to the coverage for these existing kits:

P/N	Vehicle	Years
8542	Cadillac CTS	2004-07
8968	Hyundai Sante Fe 2.4L & 3.0L	2010-12
83P003	Land Rover Range Rover Cadillac CTS	2003-05 2008-13

All of these kits are in stock and available for immediate delivery.

For more, visit TransTec on line at www.TransTec.com.

New Seals from Tri Component



Tri Component announces availability of the three seals required to rebuild the late model

Mercedes 722.9, 7G-Tronic converter. The seals are part numbers HO-25-8, HO-25-9 and HO-25-3.

These seals are designed to complement the friction and steel plates manufactured by Tri that are required to complete the rebuild. These are additional examples of how Tri Component applies latest technology to assist the rebuilder in providing OE level product for the latest and most critical converters.

“Some times it’s not just about the Free Stuff”



A Special Thank You to everyone who was part of the Superior / Fairbanks “Pink Tee Shirt” Breast Cancer Awareness campaign at the 2015 ATRA Powertrain Expo in Las Vegas. We tallied 150 shirts (With the Company donating \$10.00 per shirt) being worn on the show floor Saturday Oct. 31st 2015. We also tallied a total of \$170.00 in cash donations with a special shout out to Lance Wiggins, Troy Lamauro & Steve and Brenda Jones @ Transmission Clinics of Broken Arrow, Ok. because every bit helps Find the Cure! The TOTAL Donation to Susan G. Komen -FOR THE CURE- Foundation was \$1670.00 Again, THANK YOU! WE MADE A DIFFERENCE!

Sonnax Introduces U341E/F Boost Valve Kit



Wear in the boost valve sleeve of Toyota/Lexus U341E/F units often results in drivability problems due to insufficient line rise.

Symptoms of a worn sleeve include delayed engagement, slipping in reverse, poor shift quality, and burnt clutches, among other issues.

New from Sonnax, boost valve kit 37740-01K requires no reaming to install and revives line rise and shift quality in all ranges.

Visit www.sonnax.com for details.

Alto Introduces New Bi-Metal Bushing Kit for ZF Transmission



Alto Products Corp now offers a bi-metal bushing kit for the ZF6HP26 transmission. These bushings are offered in a kit as Alto #183625B or can be ordered individually.

For more information on this series of bushings and other Alto products, visit www.altousa.com to view their online catalog.

Sonnax Debuts Reman Valve Bodies



Sonnax Industries is pleased to announce the full integration of remanufactured valve bodies into its product line offerings. Valve bodies are now conveniently listed alongside transmission parts at www.sonnax.com, and are available from distributors under the same part numbers previously used by Valve Body Xpress (VBX).

Following the August 2014 acquisition of VBX, Sonnax worked hand in hand with the VBX team to successfully combine the resources of the two companies.

The New Jersey facility remains the base of operations for the entire line of 200-plus remanufactured valve bodies, every one fully refurbished with Sonnax parts and backed by a limited lifetime warranty.

“We’ve not only retained the VBX employees, we’ve grown,” said Tim LaCerra, Sonnax vice president of remanufacturing and VBX founder. “Becoming part of the Sonnax family

has been a great opportunity to bring more people on board and take on new challenges.”

“When Sonnax acquired VBX, an expected benefit was the synergies and new discoveries we could make together,” said Sonnax President & CEO Tommy Harmon. “It was the hands-on remanufacturing expertise of our New Jersey team that enabled us to provide the aftermarket with an innovative solution to the 48RE valve body shortage.”

Whether a shop chooses to make repairs on the bench or save time and money with a rebuilt valve body, Sonnax is committed to offering time-tested, industry-trusted solutions to fit every job. Visit www.sonnax.com for product information, technical resources, and easy ways to connect with Sonnax.

Raybestos Powertrain’s HT Clutches Cover More than 37 Million Cars



At ATRA’s Powertrain EXPO in Las Vegas, Raybestos Powertrain announced the latest expansion of the company’s Hybrid Technology (HT) friction clutch plates. With this newest phase in development, HT friction clutch plates are now available for more than 37 million U.S. vehicles currently in use.

“The Raybestos HT friction clutch plate is now available for more than 20% of the automatic transmission cars on U.S. roads today,” said Reinhard Brinkmeier, vice president of sales and marketing for Raybestos Powertrain. “We’re excited to offer this unique, hybrid technology to even more domestic and import vehicles. We created HT with every rebuild in mind — not just a few limited applications.”

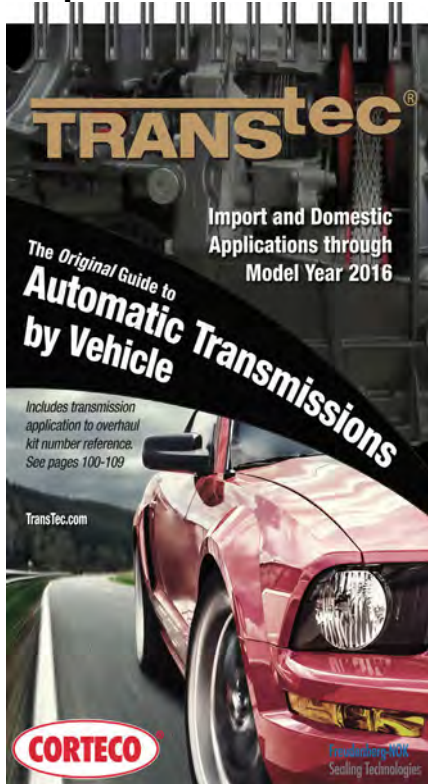
The patented Raybestos HT design integrates a unique groove pattern and a proprietary blend of premium, high-energy friction material to create a new generation of friction clutches that seamlessly combine the fluid dynamics of segmented friction lining with the strength and durability of a full friction ring.

Brinkmeier noted that, as the average age of American vehicles continues to increase, the HT's advanced technology becomes critical to transmission rebuilders. "It's our job to provide excellent performance and extend the life of the rebuild — which is exactly what the Raybestos HT friction clutch plate is designed to do."

Raybestos Powertrain HT friction clutch plates are offered separately or as part of a clutch pack module.

To learn more about the Raybestos HT friction clutch plate, visit them on line at www.raybestospowertrain.com or call 800-729-7763.

2016 TransTec Guide Simplifies Trans ID



Transmission professionals can identify automatic transmissions in virtually any vehicle in the world, including models as current as 2016, with a new global edition Transmission Guide now available from Corteco,

the supplier of TransTec® brand transmission and power steering kits.

Developed to eliminate confusion over look-alike transmissions, the convenient reference identifies transmissions by vehicle make, model, year, and engine. You can select Hyundai, for example, to determine that a 2011 Genesis with a V6 3.3L engine has a 6-speed, rear wheel drive transmission (model TB-65SV).

"Corteco published the original Transmission-by-Vehicle Guide in 1996 and has continuously expanded this convenient reference to make it more useful to transmission professionals," said Patty Richards, senior marketing manager for Freudenberg-NOK Sealing Technologies. "Our goal is to assist shop owners and technicians across the world by making the complicated process of identifying transmissions a little easier."

The 112-page Transmission Guide is a compact, spiral-bound reference and includes an overhaul kit reference chart that simplifies identifying and ordering overhaul kits by transmission application.

Contact any authorized TransTec distributor for copies of the guide. The Transmission-by-Vehicle Guide can also be viewed on the web or as a mobile app, both continually updated so users always have access to the most current and comprehensive vehicle listings. Download the TransTec Transmission-by-Vehicle app from the Google Play store (Android devices), Amazon.com (Kindle Fire), and the App Store (iPhone, iPad, or iPod touch).

Photo caption: New, 112-Page TransTec global edition transmission guide now available.

ATRA Safety Group 273 Cancelled

The California State Fund has decided to cancel all Safety Groups, including ATRA Group 273, effective December 31, 2015. ATRA's Group has been a part of the State Fund for well over 30 years. The relationship has helped hundreds of transmission shops reduce injuries and save money on Workers Compensation cost.

One of the most important jobs performed by the State Fund was

research into contamination by transmission fluid that was significantly affecting the physical well being of people who work in our industry. Thirty years ago, no one wore protective gloves to keep fluid from entering their body. Nor did they realize the health problem being exposed came from fluid contamination. Today everyone knows you need to "Glove Up" before touching automotive fluids of any type.

The good news is Transmission Shops can still buy insurance from the State Fund and ATRA is still interested in the safety of transmission people.

To contact the State Fund for Workers Comp Insurance or see safety bulletins for your shop on a regular basis please visit: www.statefundca.com.

Your "Buddy" is back!!



After many requests Adapt-A-Case has brought back the "Seal Buddy" axle and front seal installation kits.

The FWD Seal Buddy kit (T-0069SAC) installs many of your common domestic axle and pump seals.

There is also the RWD Seal Buddy kit (T-0069SRAC) which installs your most common domestic front seals.

Visit www.adapt-a-case.com for more details on these kits.

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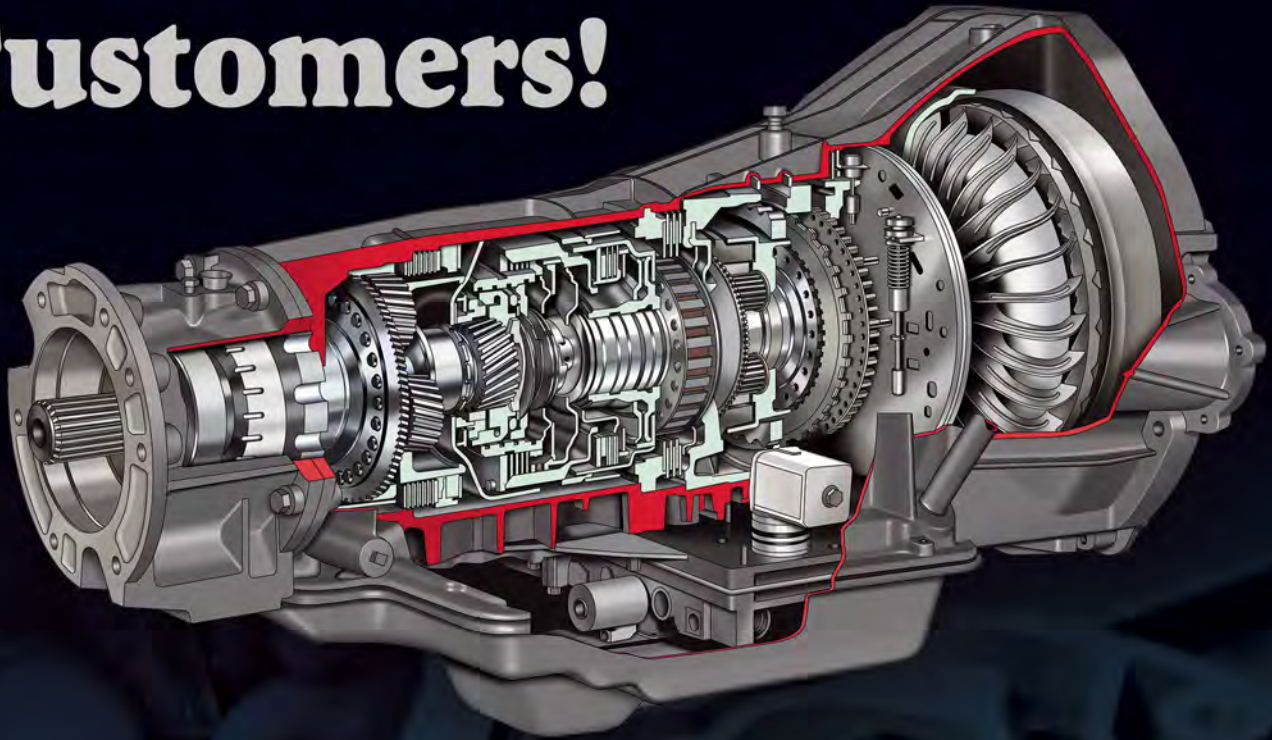
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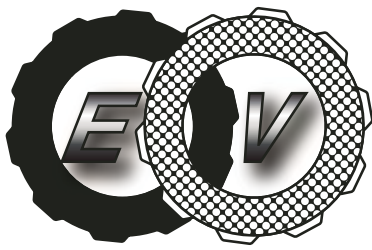
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