

Transmission Report

Volume 7, No. 2

July 2016

“See” More, Spend Less with Vacuum Testing

Diagnosing problem areas in transmissions seems to be a never-ending battle. Just when you think you have everything nailed down on a particular unit, an unexpected surprise sends you back to square one. The most frustrating part is that these surprises crop up in places where you never had problems before. To make it worse, stuck valves and leaky bores are usually difficult, if not impossible, to see with your own eyes. Wouldn't it be nice if the X-ray glasses in the Cracker Jack box really worked? It sure would make life easier!

Sonnax has long advocated the practice of vacuum testing because it's an easy, proven method to “see” inside the valve bore and diagnose issues while the transmission is still on your bench. Catching problems that easily could have turned into comebacks protects your reputation, keeps your customers happy and, of course, brings big savings in time and money to your shop.

If vacuum testing is new to you, check out the three-part video series on the Sonnax website. In just 15 minutes, you'll learn how easy it is to put vacuum testing to work and why it's the only pair of X-ray specs you'll ever need.

Find Valve Body Problems 2X Faster with Vacuum Test Plates

The Sonnax vacuum test stand kit, **VACTEST-01K**, includes a small test plate and mating rubber pad designed to be moved from port to port to test the hydraulic integrity of



individual bores and valves. This is highly effective at sealing passages, but the plate's small size requires taking time to reposition at every test location.

To help speed up testing in common applications, Sonnax is introducing valve body test plates that fit over the entire casting to seal all the critical hydraulic passages at once. Test ports and exhaust holes are strategically located in the test plate and seal to allow all appropriate casting ports to be vacuum tested quickly by just moving the vacuum test tip.

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Get Started with Sonnax Vacuum Testing Videos

Learn how easy it is to put vacuum testing to work in your shop with these informative, how-to videos. Check out this free, three-part series anytime at www.sonnax.com/vactest.

All About Vacuum Testing

- How valve body wear leads to transmission problems
- What vacuum testing tells you about a valve body
- Vacuum testing tools and equipment

Setup & Calibration

- Assembling the Sonnax vacuum test stand kit
- Step-by-step stand calibration
- Proper usage of kit components for reliable test results

How to Vacuum Test

- Matching common transmission symptoms to problem areas in the valve body
- Using Sonnax vacuum test guides
- Establishing pass/fail standards

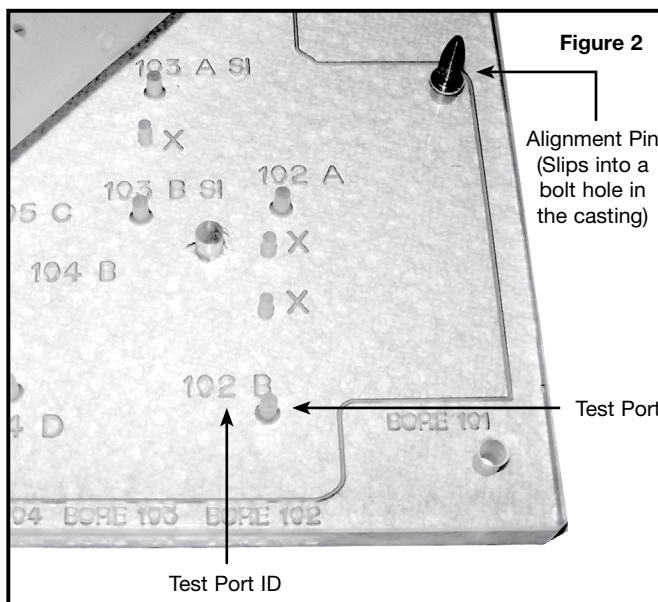
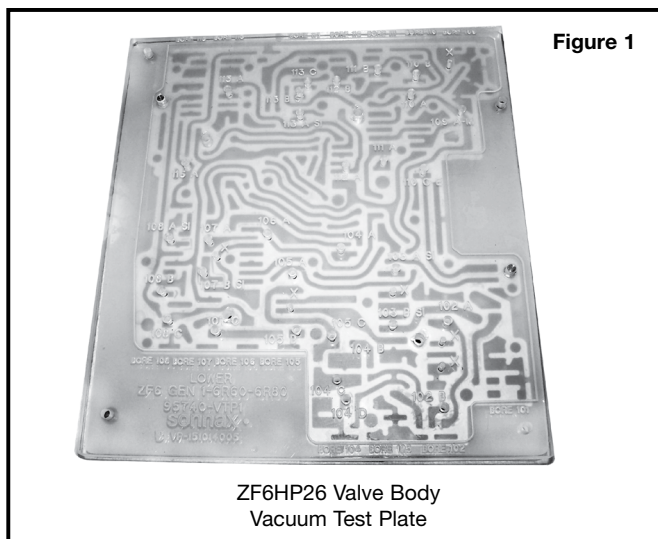
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Each transparent valve body test plate is backed with a rubberized gasket held in place by plastic retainers (**Figure 1**). The plate is engraved with the outline of the valve body casting and fitted with guide pins for proper alignment with the casting. Bolt holes and hardware for clamping the plate to the casting are included to provide extra insurance of a good seal. The test port ID numbers engraved on the plate correspond to recommended test locations (**Figure 2**). Charts for cross-referencing the numbers, plus complete vacuum test guides, OE exploded views and sheets for recording test measurements are included with the plate instructions.

Vacuum Testing Outside of the Valve Body

If you're familiar with Sonnax vacuum test guides for GM 6L45/50/80/90, 4L80-E and 4L60-E units, then you've seen that critical wear areas mapped for testing also can include the pump. Sonnax recently discovered that it's also possible to vacuum test some solenoids. While researching drivability concerns that can stem from ZF6 solenoid failure, Sonnax found the leading cause of this problem is an inability to maintain an internal mechanical seal. That's something you can easily diagnose with a vacuum test.

For quick, easy, cost-effective pass/fail verification of ZF6 blue-, yellow-, and orange-cap solenoids, Sonnax offers solenoid test manifold kit **95430-VTK**. Wear in the sealing components of these solenoids can cause slide bump shifts, partial bind-up shifts and harsh downshifts, plus a host of gear ratio errors and solenoid performance



sonnax® YOUR #1 SOURCE for Vacuum Testing Tools & Guides!

Vacuum Test Stand Kit Part No. VACTEST-01K

- Quick & Easy Setup
- Accurate, Repeatable Tests
- Guaranteed Sonnax Quality



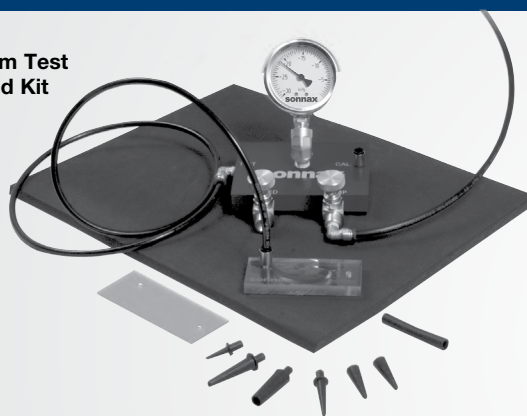
Start your rebuild right with the Sonnax vacuum test stand kit. It's essential equipment for accurate, repeatable diagnosis of valve bore wear, and verifying the effectiveness of repairs.

Solenoid Test Manifold Kit Part No. 95430-VTK

Identify Problem Solenoids Quickly & Cost-Effectively

For use with the Sonnax vacuum test stand, this test kit is a quick, easy and affordable way to verify the internal sealing integrity of ZF6 Gen. 1 and Gen. 2 and some Ford 6R60, 6R75 and 6R80 solenoids.

Vacuum Test Stand Kit



Solenoid Test Manifold Kit

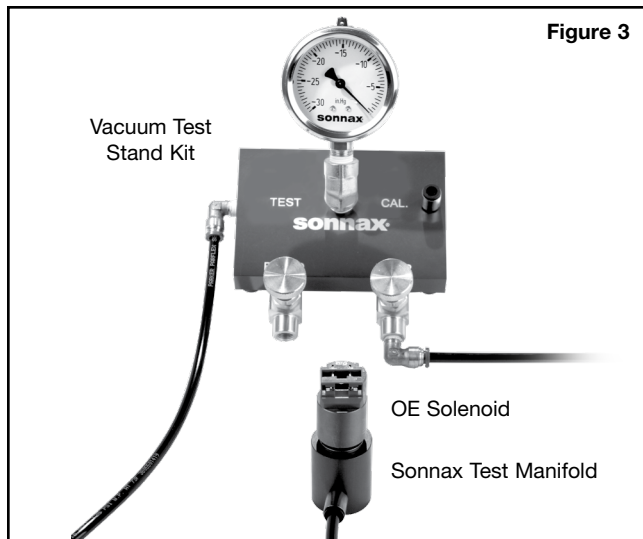


Figure 3

diagnostic trouble codes that accompany these complaints.

Testing ZF6 solenoids starts with matching the Sonnax test manifold color (orange, blue or yellow) to that of the solenoid connector color. The solenoid is then inserted into the manifold, which attaches to the vacuum tube via a special fitting (Figure 3). A good solenoid will vacuum test at 21" or more. This test often is a real eye opener, especially when dealing with small shift overlap complaints that can be directly related to solenoid performance problems.

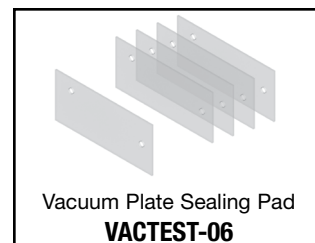
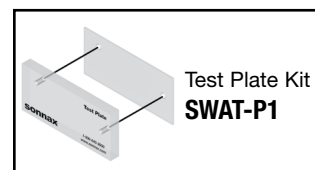
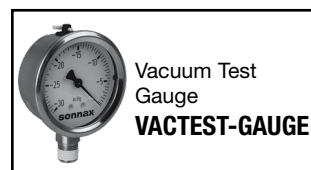
ZF6 Gen. 1 and Gen. 2 solenoid function is similar to that found in Ford 6R60, 6R75 and 6R80 units, so the Sonnax test kit can be used to check those as well. Brown-capped 6R60/75 and brown-snouted 6R80 solenoids use the yellow manifold. Black-capped 6R60/75 and black-snouted 6R80 solenoids use the blue

manifold. While not as prone to internal seal failure as the ZFs, it's still good practice to test these Ford solenoids as extra protection against comebacks.

Vacuum testing with the help of Sonnax valve body test plates and solenoid test manifolds, can save you time and money while reducing your shop's comeback rate.

Vacuum Testing Accessories

Frequent, proper vacuum testing can put money in the bank, improve turnaround time in your bays and prevent comebacks. To help keep your vacuum tester in tip-top shape, Sonnax now offers individual replacement parts:

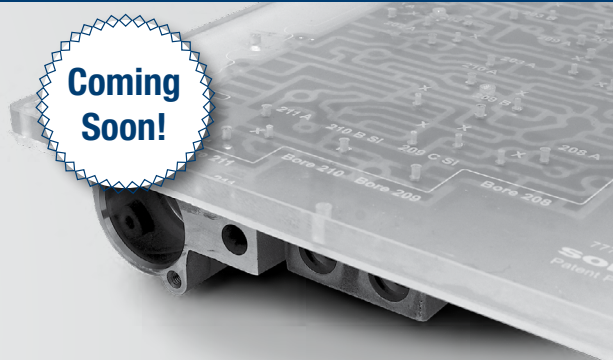
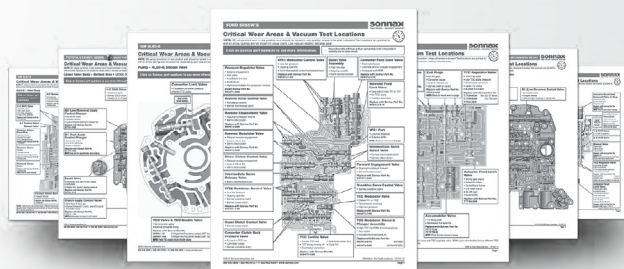


Visit www.sonnax.com/vactest for test equipment, how-to videos, guides & more!

Vacuum Test Plates

Each plate seals over the entire valve body, leaving ports open at key test areas. Easy-to-follow instruction guides identify valves, symptoms of wear and the right Sonnax parts for repair.

- GM 4L60-E, 4L65-E, 4L70-E **Part No. 77754-VTP**
- ZF6HP19/24/26 (Gen.1), Ford 6R60/80 **Part No. 95740-VTP**
- Ford 5R55S/W **Part No. 56947J-VTP**



FREE Vacuum Test Guides

- Download/Print from www.sonnax.com
- Learn Locations to Test on 25+ Units
- Identify Common Problems
- Select Parts for Repairs

sonnax® SMART-TECH® PERFORMANCE UPGRADES

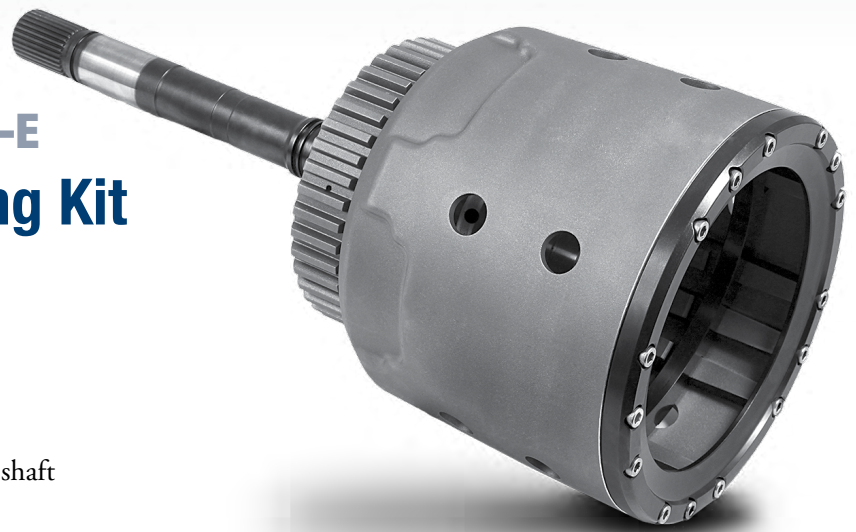
Sonnax Smart-Tech products deliver the ultimate in transmission performance. Through a fusion of top-notch expertise, innovative engineering, and precision manufacturing, these groundbreaking parts overcome OE limitations and take your build leaps and bounds above the rest.

Protect your customer's upgrade investment.
Ask your distributor about
Sonnax Smart-Tech products today!

GM 4L60, 4L60-E, 4L65-E, 4L70-E Smart-Tech Input Housing Kit

Upgraded Housing Eliminates 3-4 Clutch Failure

- Increase 3-4 clutch capacity
- Stop 3-4 backing plate flexing & distortion
- Protect against fatigue failure
- End 3-4 retaining ring blow-out
- Available with or without high strength steel input shaft



Smoke the Tires, Not the Clutches



The OE input housing will always let you down with another burnt 3-4 clutch. The weak backing plate flexes during clutch apply, allowing heat to build up unevenly within the clutch pack's limited space. Burnup is the common result.

Stop the flex and you stop 3-4 clutch failure! See the flex for yourself - watch the demo video at www.sonnax.com/smart-tech-input-housing.

Without Shaft

Input Housing Kit
Part No. 77733-06K

With Shaft

**300mm Shaft Kit for
Non-Reluctor Units**
Part No. 77733-11K

**300mm Shaft Kit for
Reluctor Units**
Part No. 77733-12K

298mm Shaft Kit
Part No. 77733-10K

GM 4L60, 4L60-E, 4L65-E, 4L70-E SmartShell® Heavy-Duty Reaction Shell Kit

Part No. 77749-02K

Solves Multiple Problems in All Performance Applications

- Stops spline stripping
- Prevents hub breakage
- Eliminates planetary bearing failure



Go inside the sun gear shell to see the source of common failures and learn how only the SmartShell can stop them all. Visit www.sonnax.com/smartshell and check out this informative video!



Chrysler 48RE, 47RH/RE Smart-Tech High Capacity Input Shaft & Piston Kit

Part No. 22121B-02K

20% More Direct Clutch Torque Capacity, No Modifications Required

- Thinner billet aluminum direct piston
- Longer direct (front) clutch hub
- Holds one extra, OE-thickness friction plate



See how the original one-piece input shaft and the newer Smart-Tech kit with 20% more clutch capacity are designed from the ground up to deliver the absolute best in transmission performance. Check out this video online!

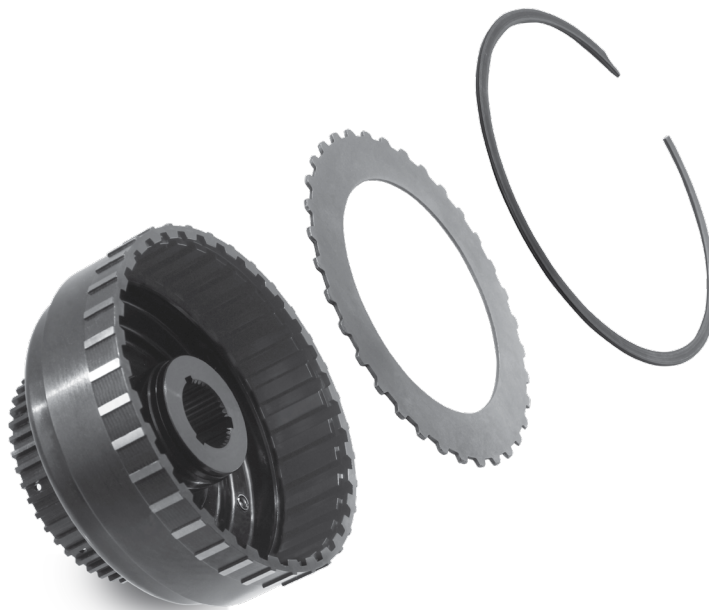


Ford 4R70E/W, 4R75E/W, AOD, AODE Smart-Tech High Capacity Forward Clutch Drum Kit

Part No. 76655-01K

**Tackle Chronic Forward Clutch Drum Breakage
& Increase Clutch Capacity, No Modifications Required**

- Increase clutch capacity by 20% or 40% without removing the wave plate
- One-piece, forged drum design prevents cracking
- Optional thinner bottom steel plate and retaining ring allow a broad range of clutch clearance adjustments



GM Powerglide Smart-Tech 10-Clutch Drum Kit

Part No. 28756-25K

Best Drum on the Track

- 35% More apply area
- The larger piston increases engaging capacity and holding capacity
- Reduced rotating mass
- 6061 Forged aluminum piston will not crack at high operating pressure like cast pistons





sonnax® ROADSHOW



Sonnax Tech Specialist Randall Schroeder



Belarus



Ventura, CA



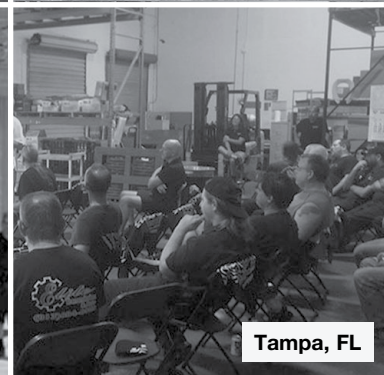
Portland, OR



Tampa, FL



Monroe, GA



Tampa, FL



Orlando, FL



Fort Meyers, FL



Sonnax Tech Specialist Randall Schroeder is busy racking up the miles on the Sonnax tech van to train rebuilders in the field!

Roadshow training sessions are FREE for shops, thanks to generous support from Sonnax distributor partners. Want to see the Roadshow roll into your area? Contact your distributor sales rep today to request a visit.

"Randall Schroeder did a fantastic job! I must have had at least 60 people tell me personally this was the BEST training ever!! His formal presentation coupled with his hands-on experience was a huge hit!"

John N. Ferritto, Region Manager Florida, Transtar

Give 'Em the Slip Avoid Comebacks with Sonnax Slip Yokes

During transmission overhaul, it often becomes necessary to fix problems outside of the transmission in order to ensure your customer gets maximum satisfaction out of your build. For instance, in rear-wheel drive models you may sometimes find it necessary to replace the slip yoke. This could be because of a failed yoke, or maybe the U-joint was thrashed and the yoke was so rusty that simple joint replacement was impossible. As far as slip yoke choice, there are quite a few, and they are not all equal in price or quality.

When the need for a new slip yoke comes around, it can be tempting to throw the least expensive yoke available at the problem. After all, most customers are not going to race around in their daily drivers, so it is clearly overkill to sell them on a yoke that was built solely for high speed or torque conditions. But often the poorly made, cheap yokes that glut the market can bring unintended problems, for both the customer and the shop's reputation.

Imagine completing the perfect transmission rebuild. Everything went back together well and the original problem was addressed, but soon after delivery the customer returns with one of several possible concerns such as:

- Leaking from the back of the transmission
- Noise, vibration and harshness (NVH)
- Clunking
- Shudder

These are problems often associated with poorly made slip yokes. Manufacturing processes for slip yokes are quite different from one supplier to the next, so even though many look the same, they are not. It is imperative that a yoke have the following characteristics:

- Concentricity
- U-Joint cross holes perfectly aligned
- High strength
- Balanced weight distribution
- Close tolerance to the output shaft, seal and U-joint

Because it is difficult to manufacture yokes with these characteristics, it is not surprising to find that many of the bargain-basement yokes on the market have impermissibly wide tolerance and often cause more problems than they solve. Yokes made this way place undue stress on the output shaft, seal, U-joint and driveshaft, not to mention excess stress on the yoke itself. This unnecessary and unplanned stress labors the components in a way they were not designed to work, rapidly fatiguing them and causing various failures. A well-built yoke avoids placing these stresses

on the driveline, preventing excessive angles that cause premature wear and repeat joint failures.

It's tempting to install a cheap yoke to trim cost during rebuild, but if that yoke induces NVH, your customer is unconcerned about the why; in their mind, it's a shortcoming with the skills of the builder. As previously mentioned, it is very inexpensive to manufacture wide-tolerance pieces, so there are some cheap ones out there. But they are far more likely to cause problems, and most ruffled customers will tell you they prefer to spend a few more bucks up front to avoid a universal customer nightmare: bringing their vehicle back for a recheck.

Slip yokes from Sonnax are specifically designed to avoid these negative issues. The same characteristics that make them desirable for racing performance also make them a perfect fit for daily-driving grocery chasers. Using Sonnax slip yokes ensures the companion piece for your perfect build doesn't end up spoiling all the hard work you invest in your reputation every day.



Sonnax Slip Yokes

- Fully machined from billet steel for enhanced strength & durability
- Leak-free plug tested to 40 psi for optimum sealing
- 1330 & 1350 U-Joint series yokes are chromoly steel

NEW TH400 Slip Yoke

Part No. T3-3-2431CBHP

- Fits 1350 U-joints
- Chromoly
- This slip yoke is designed specifically for TH400 transmission output shafts that are internally threaded on the end, allowing conversion of truck-style, bolt-on yokes to slip-style.

NEW A727, A833 & 30-Spline T56 Slip Yoke

Part No. T3-3-3931HP

- Fits 1350 U-joints
- Chromoly

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Featured in this issue

- “See” More, Spend Less with Vacuum Testing
- Smart-Tech[®] Performance Upgrades
- Roadshow Recap
- Give ‘Em the Slip: Avoid Comebacks with Sonnax Slip Yokes

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Sonnax designs, manufactures, tests and distributes a wide variety of components used to remanufacture torque converters, rebuild automatic transmissions, upgrade driveshafts and protect the driveline from over-torque damage.

Sonnax is a 100% Employee-Owned Company

New Free Webinars Focus on the TorqueFlite[®] 8 (ZF8)

Get to know the Dodge TorqueFlite 8 – before it shows up in your shop – at this two-part webinar with Sonnax Technical Specialist Jim Dial.

Space is limited — register today:
www.sonnax.com/webinars

The TorqueFlite 8, a ZF8HP transmission used in the Chrysler 300 and Dodge Challenger, Charger, Durango and 1500 is coming off warranty in the near future. Most shops have not yet seen this unit, and these programs are designed to prepare your diagnostician and bench tech.

Part I looks at the features and controls of the 2015 Dodge Challenger SXT Plus and what to look for on a test drive. Part II explores the torque converter, valve body, case, pump, planetary and apply component details, identification and problem areas.

Did you know?

You can watch previous Sonnax webinars online at www.sonnax.com/webinars.

PART I

Tues., August 9, noon EDT or MDT

Wed., August 10, 7 a.m. AEDT (Australia)

Dodge TorqueFlite 8 (ZF8): Features & 2015 Challenger Test Drive

- 2015 Dodge Challenger SXT Plus features
- Test drive in automatic and manual modes
- Torque converter application strategy and pressure specs
- Transmission theory of operation and clutch and brake application charts
- Solenoid and valve body theory of operation and component breakdown

PART II

Tues., August 23, noon EDT or MDT

Wed., August 24, 7 a.m. AEDT (Australia)

A Look Inside Dodge TorqueFlite 8 (ZF8) Transmission & Torque Converter

- Torque converter disassembly and component ID, including the torque converter clutch components
- Transmission valve body removal
- Transmission case passage identification for clutch and brake application and lube circuits
- Pump and planetary gear train disassembly, including special tools and where they are used
- Clutch and brake disassembly