

Transmission Report

Volume 8, No. 1

March 2017

Sonnax Voted Tops for Parts & Tools!

Every year, *Transmission Digest* accepts nominations for the top 10 products and tools in the powertrain aftermarket. Readers vote for their favorites to determine the winners. Thanks to you, Sonnax won seven top product awards and four top tool awards!

7 Top 10 Products

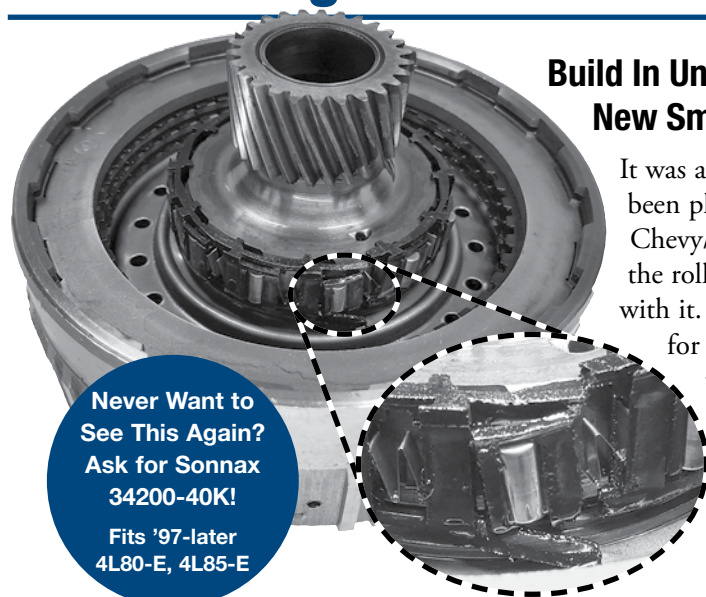
- **Line Pressure Booster Kit RFE-LB1**
Chrysler 45RFE, 545RFE, 65RFE, 66RFE & 68RFE
- **Extreme Duty Intermediate Shaft 22171B-HD**
Chrysler 47RE, 47RH, 48RE
- **Converted Valve Body CHR135**
Chrysler 48RE
- **2.84 Ratio Input Carrier Kit 77284-K**
GM 4L60/E Series
- **1-2-3-4 Piston 104984-01** GM 6L80 & 6L90
- **Zip Kit® 6T70-ZIP** GM 6T70 & 6T75 (Gen. 1)
- **Smart-Tech® High Capacity Forward Clutch Drum Kit 76655-01K**
Ford 4R70W, 4R75W & AOD/E



4 Top 10 Tools

- **3-Part Vacuum Testing Video Series**
What is Vacuum Testing?
Vacuum Test Stand Setup and Calibration
How to Vacuum Test
- **Valve Body Layouts**
- **Webinars**
- **Solenoid Test Manifold Kit 95430-VTK**
ZF6 Gen. 1 & 2

Outsmarting 4L80-E Overdrive Roller Clutch Failure



Build In Unrivaled Durability with the New Smart-Tech® Overrun Clutch Valve Kit

It was a harsh winter this year and many transmission rebuilders have been plagued with blown-up 4L80-E overdrive roller clutches in Chevy/GMC snow plow trucks and salt spreaders. Unfortunately, once the roller clutch starts to go, it takes a number of other parts out along with it. This includes the overrun clutch drum, as it is the inner race for the roller clutch and is part of this drum. The OD planetary is usually wiped out, as the outer race for the roller clutch is on the inner diameter of this planetary. Sometimes the planetary gears also are chipped up when pieces of the rollers are ground up in them...which means the ring gear — which is part of the forward drum — needs to be replaced as well.

Continued on page 2...

Never Want to See This Again? Ask for Sonnax 34200-40K! Fits '97-later 4L80-E, 4L85-E

Continued from page 1

The sum of these parts is a big chunk of change and hopefully the customer is paying this time. We all know the old saying, that the customer pays the first time and the shop pays the next. To help cure everyone's winter woes — at least where the 4L80-E OD roller clutch is concerned — Sonnax offers Smart-Tech overrun clutch valve kit 34200-40K for '97-later 4L80-E and 4L85-E units. This patent-pending kit delivers exceptional protection against failure by applying the overrun clutch in all ranges other than 4th Gear, allowing the clutch to share a load the OD roller clutch otherwise struggles with on its own.

Driving in the manual ranges while pushing snow will definitely help back up the roller clutch with the overrun clutch. Unfortunately for 4L80-E drivers, if they select the OD range when they are plowing, the overrun clutch can't come on to provide better holding power. In the OD range 1st through 3rd Gears of a factory 4L80-E, the OD roller clutch transmits torque to the ring gear of the forward drum, through the turbine shaft, OD planetary and sun gear of the overrun clutch drum (Figure 1). When Manual 3, 2 or 1 is

selected, the overrun clutch drum is applied through a passage connected by the manual valve, which provides engine braking and also backs up the roller clutch, providing a stronger connection to the OD planetary driving the forward drum (Figure 2).

Up until now, there's been no way to get around this basic weakness of the 4L80-E transmission: the OD roller clutch in the OD range is holding by itself and the overrun clutch is only on in the manual ranges, D, 2 and 1. But what if you could, literally, get AROUND it? That's the question Sonnax asked and how the Smart-Tech overrun clutch valve kit tackles the problem. Via an external manifold that bolts to the valve body, the Smart-Tech kit establishes a hydraulic connection to the overrun clutch as soon as the engine is started (Figure 3). With line pressure provided to the clutch, it can now be applied in ALL manual valve positions, including Reverse. The latter is a big bonus never available in the stock transmission. Think about the benefits when — for example — a driver is trying to back up a goose-neck

Figure 1 – OE Overdrive 1st Gear Manual Valve Partial Hydraulic Circuit

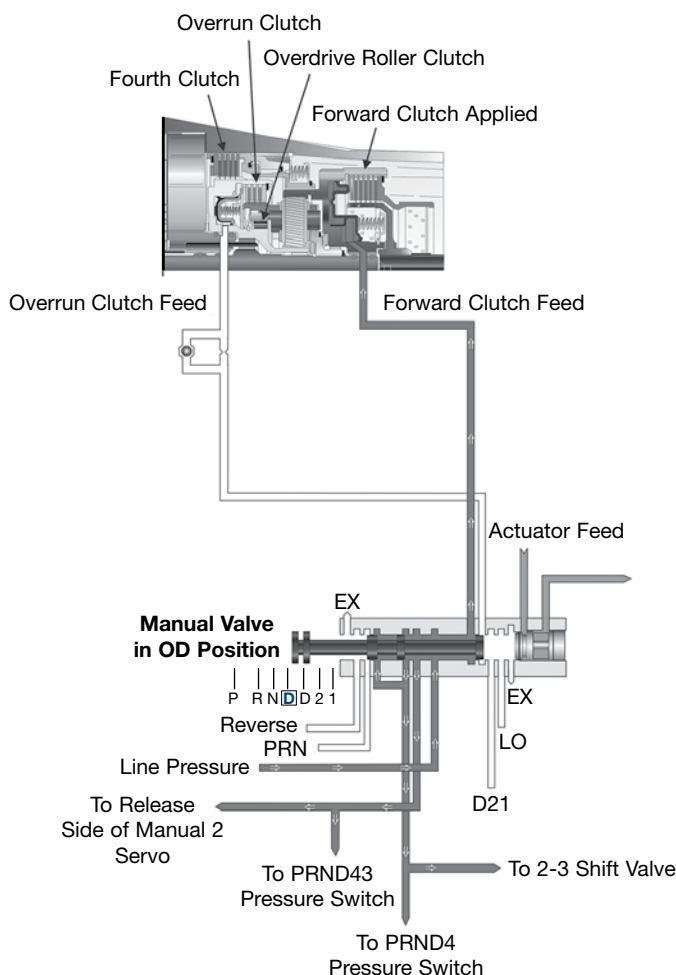
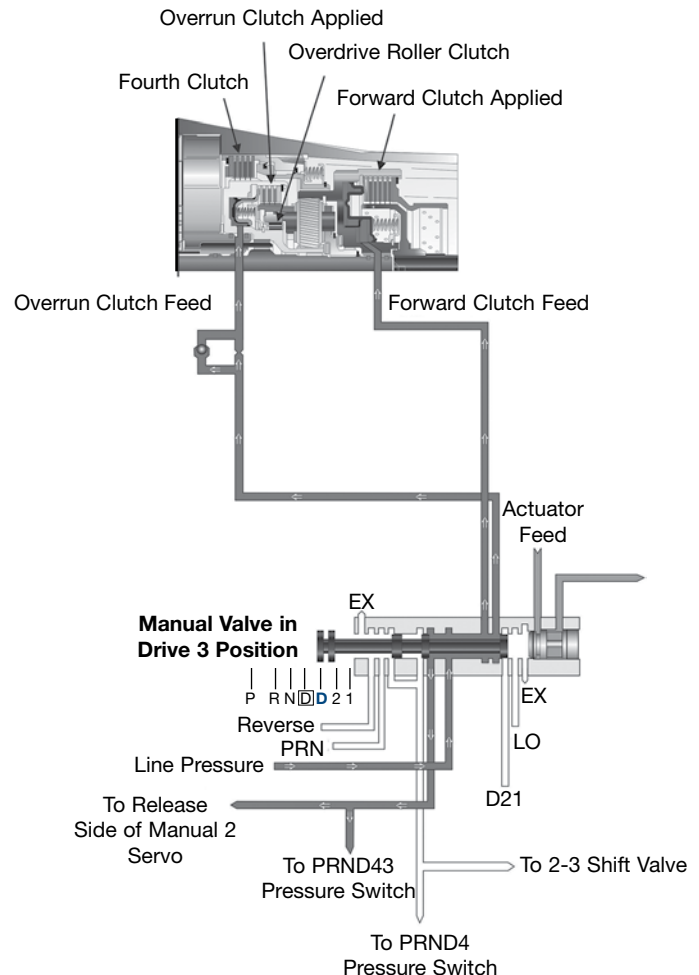


Figure 2 – OE Drive 3 1st Gear Manual Valve Partial Hydraulic Circuit



trailer loaded down with a huge front-loader tractor. That's an extra feature your customers will really appreciate.

With the Smart-Tech kit installed, the overrun clutch is applied in the OD position in 1st through 3rd Gears as well, so it is not necessary to pull the manual valve to a manual position for extra pulling power. **Figure 4** shows the hydraulic function of the kit when the overrun clutch is on and when the overrun clutch is off. Note that the valve position is controlled by the presence of 4th clutch pressure; so in essence, the overrun clutch is on in every gear other than 4th Gear. Fourth clutch pressure strokes the valve to the right and exhausts the overrun clutch. This provides a stronger connection to the forward drum through the OD planetary assembly that helps prevent OD roller clutch failure.

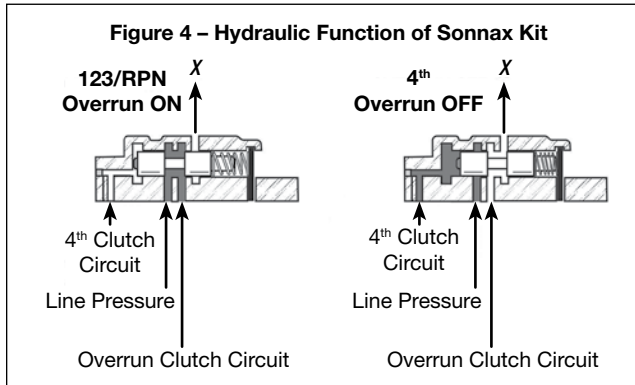
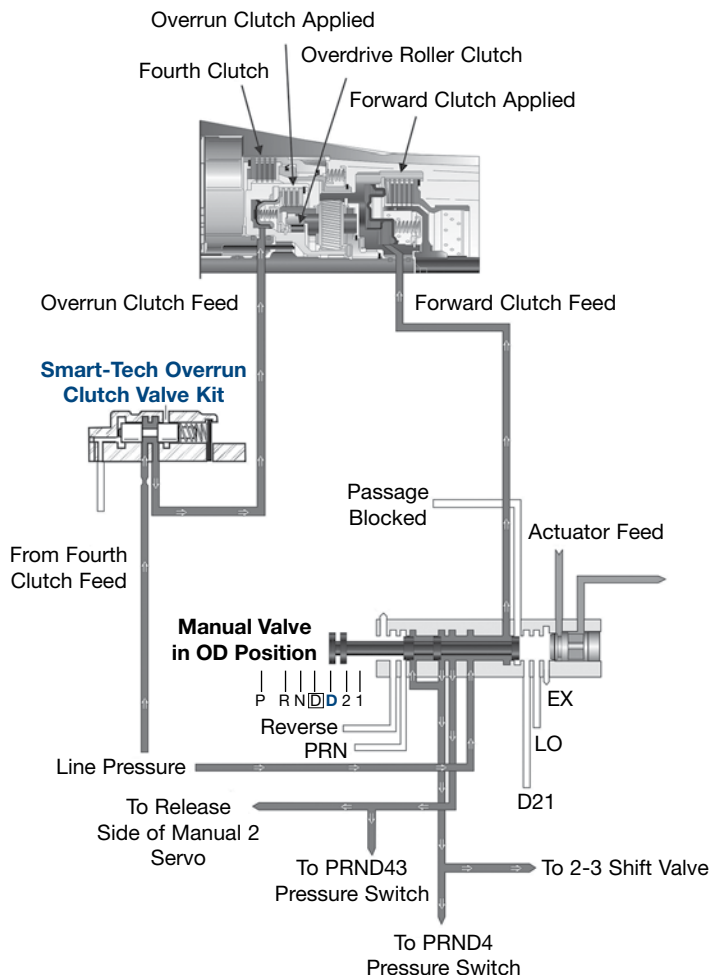
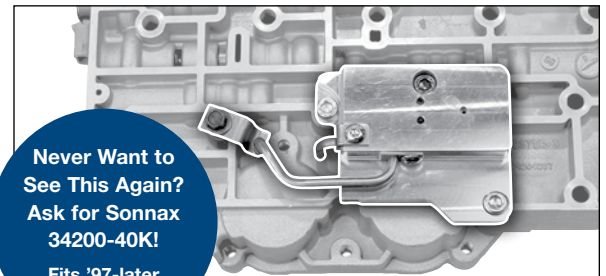


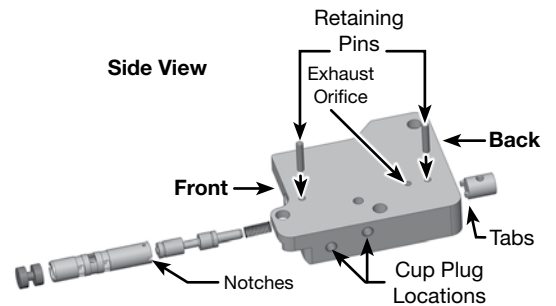
Figure 3 - Overdrive Range 1st Gear Manual Valve Partial Hydraulic Circuit with Smart-Tech Overrun Clutch Valve Kit



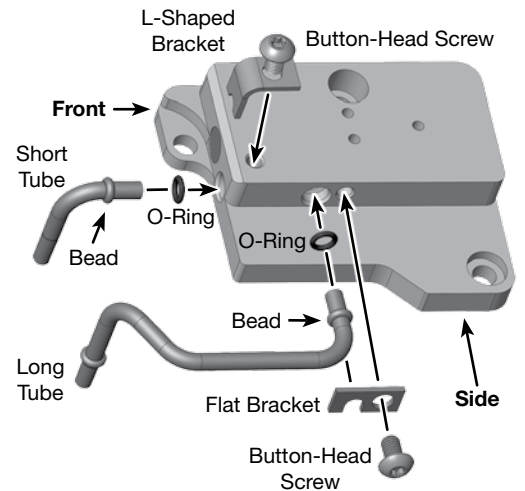
The next time you have a 4L80-E in the shop, build in unrivaled OD roller clutch durability and protect your warranty with the Smart-Tech overrun clutch valve kit. Components install easily onto the valve body — no transmission removal required — and will help keep your customers' trucks working hard all season long. ◀



Kit Installs Easily Onto the Valve Body

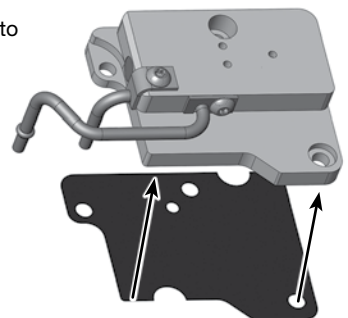


Tube Installation into Valve Manifold



Gasket Installation onto Manifold

Install gasket onto bottom of valve manifold. Hold in place with TransJel Assembly Lube.



Guard Against 4L60/E Clutch & Shift Concerns

Seal the 3rd Accumulator Checkball & Synchronize Band/Clutch Apply

Durability of the 3-4 clutch and 2-3 shift feel in GM 4L60-E, 4L65-E and 4L70-E units is a chronic concern. While there are many culprits to blame, Sonnax offers a dynamic duo that prevents a primary source of robbed 3-4 clutch apply pressure and restores proper timing to 2-3 shift control.

Ensuring the sealing integrity of the OE 3rd accumulator checkball is critical, as it seals 3rd accumulator/3-4 clutch apply pressure from exhausting into the case. **Figure 1** shows the 2-4 servo being released in 3rd Gear. Unwanted leakage past the 3rd accumulator checkball means loss of 2-3 accumulator pressure, which allows the band to drag (2-3 bind-up, 2-3 flare, 2-4 burnt band issues) and loss of 3-4 clutch apply pressure (3-4 clutch burned, no 3rd Gear issues). Accumulator pressure is present here in 4th Gear as well, and leakage will continue to result in diminished 3-4 clutch apply pressure.

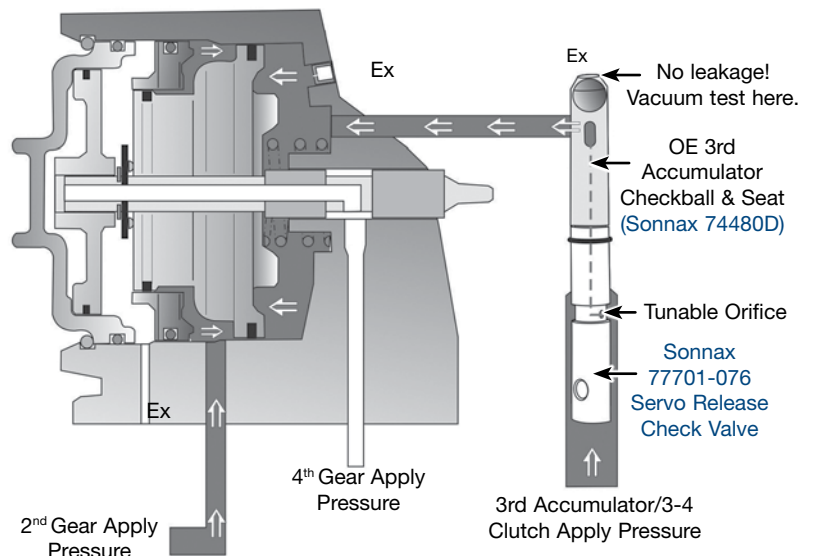
A simple vacuum test using a rubber tip at the exhaust passage inside the case (**Figure 2**) will help you determine if this 3rd accumulator checkball and seat should be replaced with Sonnax 74480D. Test with the transmission case on its back (worm tracks up) to allow gravity to seat the checkball. Look for a near

Servo Release Check Valve Kit 77701-076

3rd Accumulator Checkball & Seat 74480D



Figure 1 – 3rd Accumulator Oil Circuit

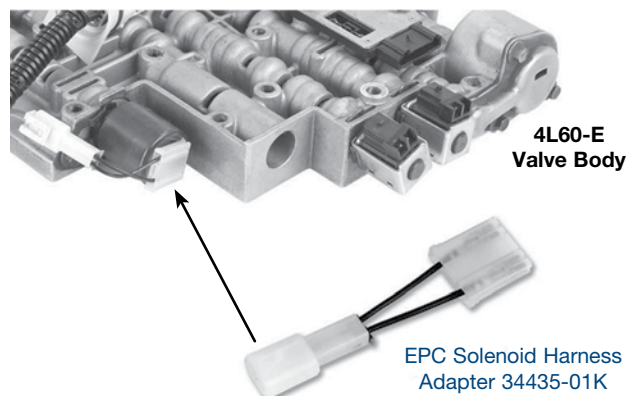


New! 4L60-E Series EPC Solenoid Harness Adapter

Convert early-style ('92-'02) EPC solenoids for use in late-style ('03-later) units.

GM 4L60-E, 4L65-E, 4L70-E transmissions have both early- and late-style EPC solenoids. The early-style ('92-'02) proved to be more reliable than the late ('03-later), but different pin/connector configurations prevented the use of early solenoids in late units.

Sonnax EPC solenoid harness adapter 34435-01K allows plug-and-play installation of early-style solenoids into late-style units (note: solenoid not included).



perfect seal (23 in-Hg or higher) to prevent unwanted oil pressure loss.

The patented Sonnax servo release check valve kit 77701-076 provides better synchronization of the 2-4 band release and the 3-4 clutch apply, helping to prevent 2-3, 3-2 shift complaints. **Figure 1** shows how the 3rd accumulator oil is now metered through an orifice in the servo release check valve, reducing flow to the release side of the 2nd apply piston, which provides better timing between release of the 2-4 band and apply of the 3-4 clutch. This orifice can be tuned to a specific size best suited to the particular servo piston size variation in the transmission. During a 3-2 downshift, full flow of 3rd accumulator oil is allowed out of the servo release check valve as its internal checkball unseats, allowing proper timing for the 3-4 clutch release and the 2-4 band apply.

Because these two parts serve different functions, it is always mandatory to have a fully functioning 3rd accumulator checkball and seat in the transmission. For best results, though, Sonnax recommends that this dynamic duo (74480D and 77701-076) be used together. The components installed in series in the same case passage as illustrated in **Figure 3**. With this team working on your side, those dreaded 3-4 clutch failures and 2-3, 3-2 shift concerns will be held further at bay. ◀

Figure 2 – Vacuum Test Location for 3rd Accumulator Checkball

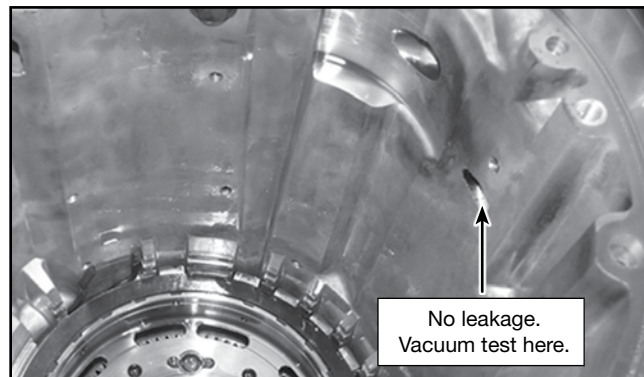
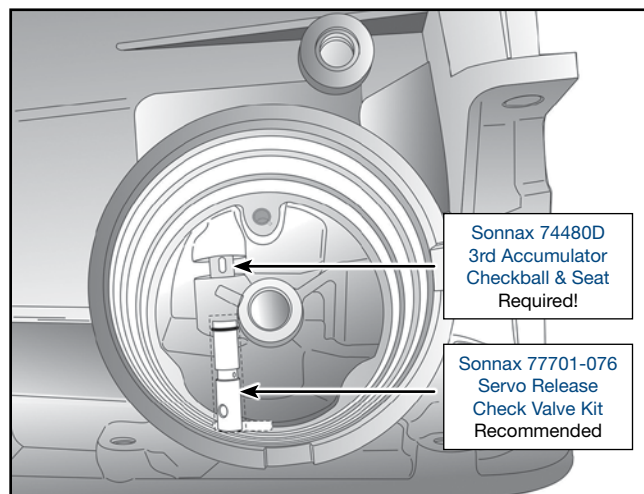


Figure 3 – Sonnax Parts Installed in Case

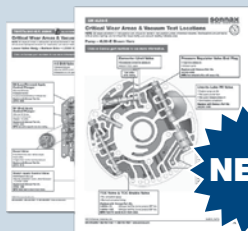


sonnax® YOUR #1 SOURCE for Vacuum Testing Tools & Guides!

Vacuum Test Plates

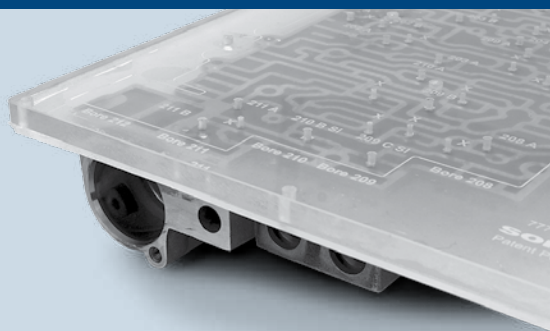
Each plate seals over the entire valve body, leaving ports open at key test areas. Easy-to-follow instruction guides identify valves, symptoms of wear and the right Sonnax parts for repair.

- GM 4L60-E, 4L65-E, 4L70-E **Part No. 77754-VTP**
- ZF6HP19/26/32 (Gen.1), Ford 6R60/80 **Part No. 95740-VTP1**
- Ford 5R55S/W **Part No. 56947J-VTP**



FREE Vacuum Test Guides

- **New Guides Include:**
 - Ford 4R70E/W, 4R75E/W, AODE
 - ZF8HP45/70
 - Chrysler 46-47RE, 46-47RH



- Download/Print from www.sonnax.com
- Learn Locations to Test on 40+ Units
- Identify Common Problems
- Select Parts for Repairs

GM 400, 4L80-E, 4L85-E

Extreme Duty Main Shaft

Part No. 34672-05

OE and aftermarket shafts simply don't hold up in extreme horsepower applications, leading to spline twist and shaft breakage. This new, extreme duty shaft is the most durable 1" main shaft available, proven by extensive in-vehicle and lab testing with unbroken results run after run.

- Top-notch engineering and precision manufacturing deliver unrivaled performance and durability in the 1" stock size
- Rear spline prevents the rear internal gear journal-end from twisting off by engaging the full internal spline of the gear
- Extensive in-vehicle and lab testing with unbroken performance

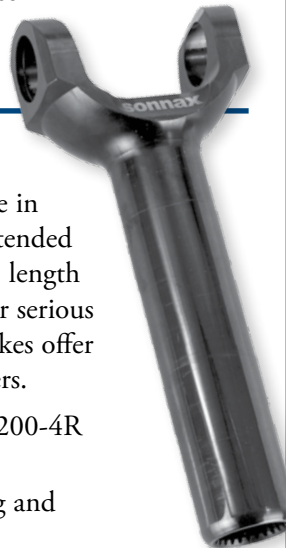


Extended Length Slip Yoke

Part No. T2-3-6081HP8XL

At the dirt track, extreme suspension travel is a given. To compete in this environment, a long, tough slip yoke is needed. This new, extended length slip yoke is forged from a chromoly billet and sports an 8" length from the 1310 U-joint centerline, making it the perfect choice for serious dirt track competitors. The high quality and value Sonnax slip yokes offer is a winning combination for you and your performance customers.

- Fits bushing tailshafts in Powerglide, 4L60-E, 4L60, TH350, 200-4R and Muncie & Brinn units
- Precision-machined and finished barrel ensures optimal sealing and minimizes drag
- Black oxide finish delivers excellent corrosion protection by inhibiting rust and pitting



Flange Yoke

Part No. T3-2-949A

Upgrades Driveline & Lowers Build Cost — No Adapter Required!

For many years, owners of Mustangs that wanted to upgrade from a 1330 U-joint to a 1350 U-joint didn't have the best options. No 1350 flange yoke would fit the Ford 3.5" differential bolt circle, forcing people to buy and install — or have installed for them — an adapter pinion flange.

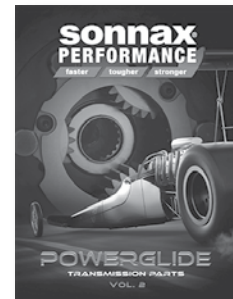
Sonnax is proud to introduce the first 1350 series yoke for Mustang applications that bolts right up to the stock final drive. Forged and precision machined from a 6061-T6 aluminum billet, Sonnax T3-2-949A delivers unbeatable strength in a lightweight package. This one-of-a-kind adapter yoke is a great way to give customers the upgrade they want while saving them money and adding to your shop's bottom line.



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CATALOGS!

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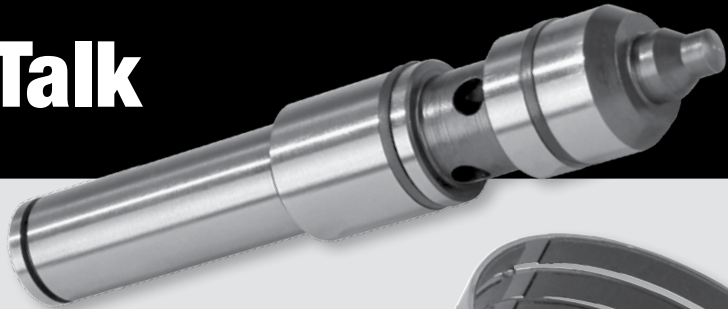
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to request a FREE copy!



Sonnax Powerglide Catalog Vol. 2 features the innovative big shaft system, the only big input shaft upgrade with custom components designed to work together for reliable performance in the most extreme applications.



Sonnax Driveline Catalog Vol. 4 offers an array of powerhouse parts that deliver the drivetrain strength, performance and durability you need to get power down to the ground.



Sonnax Servo Pin
84571-01K



Jim Dial

Stop 4T60-E, 4T65-E Case Wear, Band Slippage & Breakage with a Longer Servo Pin



A broken or burnt-up forward band on the GM 4T65-E transmission is not an uncommon thing to see during the teardown process. Most rebuilders have seen bulletins and tech articles pointing out common failures with the EPC having intermittent problems with pressure rise causing a slip or chatter on takeoff, which is probably the biggest contributor to forward band failure.

I previously owned a '08 Grand Prix and, when hot, the EPC would hang up and cause intermittent no-pressure-rise conditions. I would always know that if I parked the vehicle after a long drive, then got back into the vehicle after a 20-minute set and put it in Reverse to back out of a parking spot, that I needed to wait for a 1,001...1,002 count when selecting Drive for the forward band to fully engage. If I did not give it the 2-second count and stepped on the gas before it was engaged into Drive, engine RPM would race up, the forward band would shudder then slam in, almost like a Neutral drop!

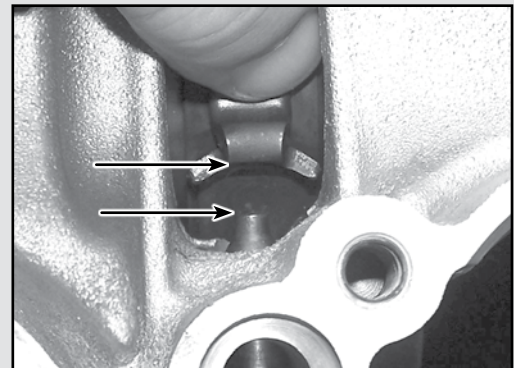
What was happening here, was that the TCM was trying to raise pressure as the selector was placed in Drive, but the vehicle was in a neutral state of sorts. Once the malfunctioning EPC solenoid caught up, pressure would be almost maxed out, causing the harshness when the forward band finally engaged, causing the slam into Forward. Slamming into Drive from a neutral state a number of times like that could definitely break a band. Replacing the EPC during overhaul and verifying or repairing the pressure regulator and torque signal bores would handle this concern.

There is one other area that needs attention, though, and that is the forward servo pin length. I am sure that many rebuilders have looked at the band clearance after installing a new band and noticed that it was quite large. To help close this gap, Sonnax now offers an extended length forward band servo pin, Part No. 84571-01K, for use in both 4T60-E and 4T65-E applications. Typical servo pin stroke is approximately .400", so the Sonnax servo pin (coming in at approximately .200" longer) will cut this in half, greatly helping to take up the extra band clearance.

Since the bore in the case for the servo pin can wear as well, the Sonnax pin also incorporates two sealing rings to prevent leakage past the servo pin.

Addressing pressure control issues and installing the new Sonnax servo pin will help speed up the engagement into Drive, as there will be much less travel for the forward servo to fully apply the band. Focusing on these two areas will help prevent customer complaints and repeat broken or burnt-up forward band issues.

Typical Forward Band Clearance



More Recommended EPC Solutions

Part Name	Details	Part No.
EPC Solenoid	Direct replacement AC Delco solenoid, fits 4T65-E '97-02	84431G
EPC Solenoid	Direct replacement AC Delco solenoid, fits 4T65-E '03-later	84431H
Oversized PR Valve Kit	Fits 4T60, 4T60-E, 4T65-E, requires tool kit 84754-TL46	84754-46K
Boost Valve Kit	Fits 4T65-E	84754-30K
Oversized Torque Signal Valve	Fits 4T65-E '97-later, requires tool kit 84754-TL44	84754-44
Oversized AFL Valve Kit	Fits 4T65-E, requires tool kit F-84596-TL & the VB-FIX	84596-02K

Jim Dial is a Sonnax technical specialist and a member of the Sonnax TASC Force (Technical Automotive Specialties Committee), a group of recognized industry technical specialists, transmission rebuilders and Sonnax Industries Inc. technicians.

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Featured in this Issue

- Top Products/Tools as Voted by YOU
- Outsmart 4L80-E Overdrive Roller Clutch Failure
- Two Simple Parts Help Guard Against 4L60/E Clutch & Shift Concerns
- Protect Against 4T60/65-E Comebacks
- New Performance Parts & Catalogs

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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

Build In Unrivaled 4L80-E Durability

Introducing the Smart-Tech[®] Overrun Clutch Valve Kit

Part No. 34200-40K Patent Pending

- Improves OD roller clutch holding power in lower gears
- Extends the life of workhorse transmissions while preventing warranty claims and comebacks
- Installs quickly onto the valve body — no transmission removal needed

Find out more on Page 1!

