

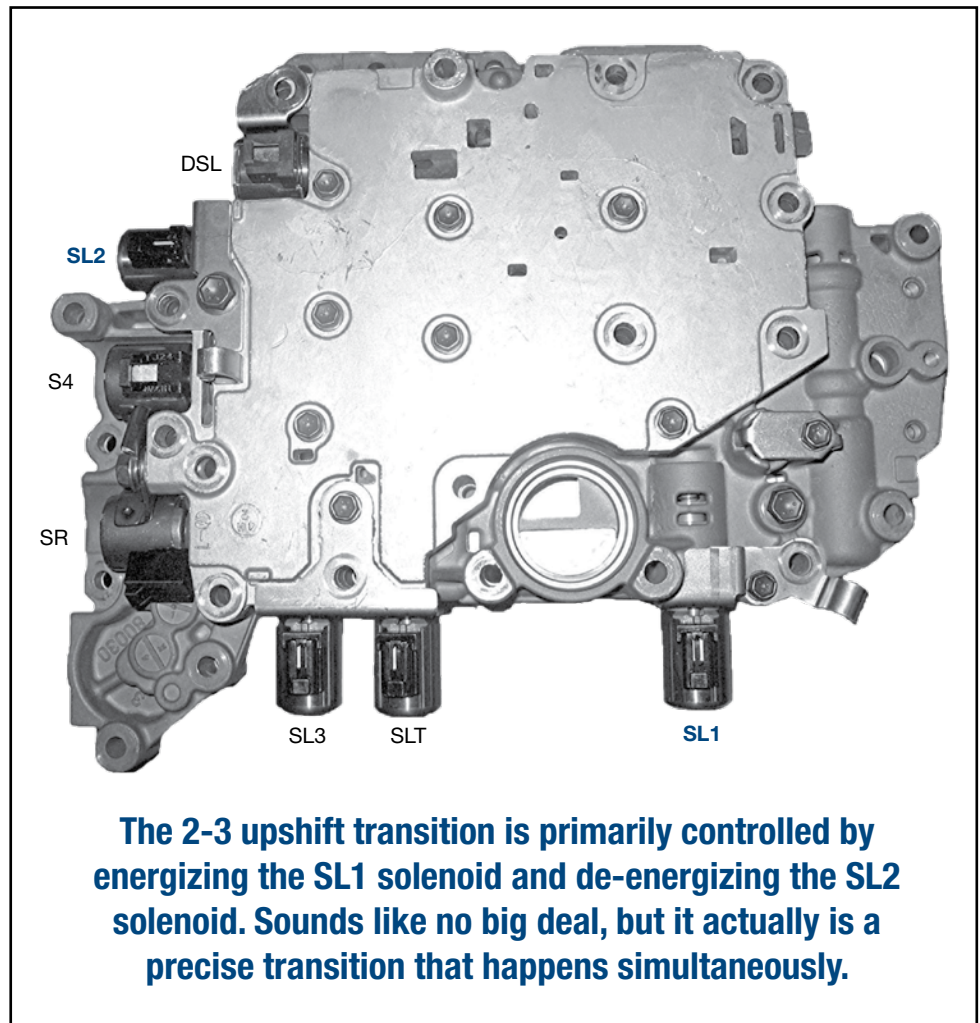
U150 2-3 Upshift Complaints & Solutions

One of the biggest complaints on the Toyota U150 family of transmissions has always been related to the transition from 2nd to 3rd Gear, and this problem can turn into a real nightmare for shops and their customers.

The first and most common complaint is a binding sensation or tie-up on the 2-3 upshift. This problem typically occurs after overhaul, during the initial road test, and can be remedied by doing a transmission memory reset. When the unit came into the shop, it was most likely burnt to the ground, so performing what's basically an adaptive reset is extremely important. It's the only way to clear adaptive data from compromised clutch clearances and poor hydraulic integrity. This allows the TCM/PCM to adapt to the proper clutch clearances and restored hydraulics of the rebuilt transmission.

If the solenoids are functioning correctly, the reset typically restores shift quality within a quick, 10- to 15-minute road test, which includes numerous upshifts and downshifts from 1st to 5th. There are instances when the reset doesn't help, though, or it does, but then the problem (and the customer) comes back within a few days. Maybe you try the reset again, and off it goes...until it's back again a third time. At this point, it's clear something else is wrong — the

Figure 1 – U150 Solenoid Locations



The 2-3 upshift transition is primarily controlled by energizing the SL1 solenoid and de-energizing the SL2 solenoid. Sounds like no big deal, but it actually is a precise transition that happens simultaneously.

reset just isn't "taking" — and you need to turn your attention to other culprits. It could be something as simple as a PCM ground providing a poor connection, causing the PCM to keep adjusting adaptives, or it could be the solenoids themselves.

The 2-3 upshift transition is primarily controlled by energizing the SL1 solenoid and de-energizing the SL2 solenoid (locations on the valve body in **Figure 1**). Sounds like no big deal, but it actually is a precise transition that happens simultaneously.

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Figure 2 — Good Shift Quality
(A sequential shift from 2nd to 3rd Gear.)

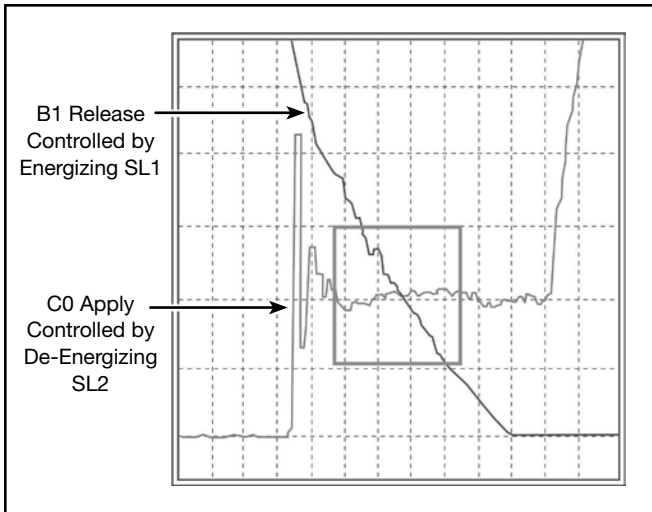
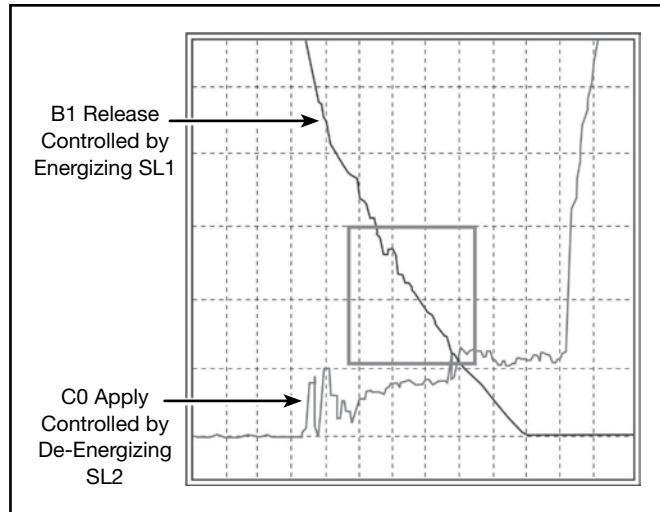


Figure 3 — Poor Shift Quality
(A flared upshift from 2nd to 3rd Gear.)



Continued from page 1

Figure 2 shows a graph of the B1 brake pressure releasing and C0 clutch pressure increasing during the 2-3 upshift. Note that, as B1 pressure is released, C0 Clutch comes on at low pressure at the beginning of the transition to bridge the gap, then goes to full pressure when the transition is complete. This is an example of a good-quality shift with the correct amount of overlap on the 2-3 upshift.

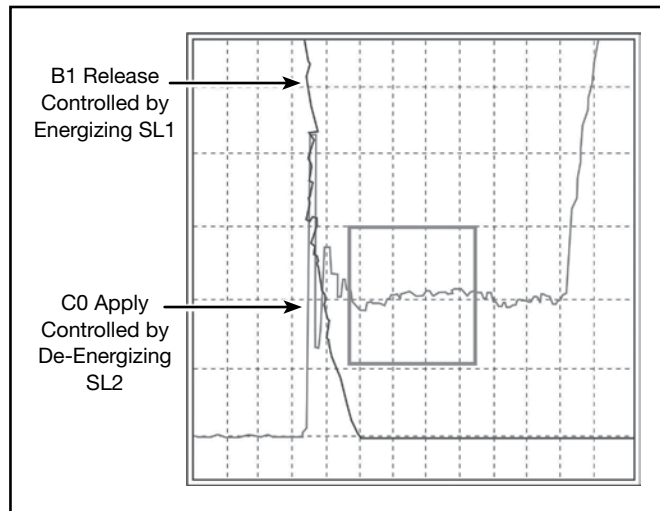
There are other complaints related to the 2-3 upshift that can also be related to solenoid malfunction, including a flare during the 2-3. **Figure 3** shows a graph of the SL2 as the root cause of this complaint. The C0 clutch pressure is slow to increase, which allows a flare or engine RPM rise during the upshift.

A 2-3 slide bump is another common complaint. **Figure 4** shows a graph that points to SL1 as being the root cause. B1 pressure drops too quickly, which triggers a quick slide; the bump comes from the C0 clutch engaging at the end of the slide.

The PCM will try to adjust for these type of solenoid timing issues, but it can only do so much. Flares and slide bumps typically show up when transmission fluid is cold or high temp., so it is important to road test first thing in the morning after the vehicle was sitting overnight as well as after a long drive.

It is safe to say that if malfunctioning solenoids get out the door, the third time the vehicle comes back, it may be on the back of a wrecker. Swapping out SL1 and SL2 solenoids when you run into 2-3 upshift problems can help head off a bad day for you and your customers. ◀

Figure 4 — Poor Shift Quality
(A slide bump shift from 2nd to 3rd Gear.)



Sonnax Offers Remanufactured Valve Bodies for U150E/F & U250E

Solenoids are individually repaired, cleaned and then tested on state-of-the-art equipment to verify that output matches the OE pressure curve and shift overlap timing is correct.

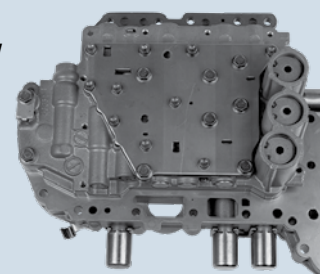
Remanufactured Valve Body

Part No. TOY181 (Shown)

Fits '04-'16

Part No. TOY182

Fits '01-'03

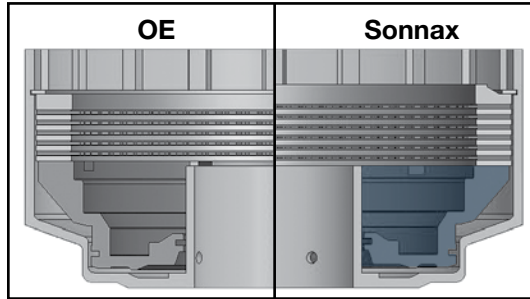


Must-Have Upgrades for Aisin Seiki AS68RC

High Capacity K2 Clutch Piston Kit Part No. 99582-01K Fits Dodge only.



Drop-In Kit Increases Clutch Count for 20% More K2 Capacity



- Increases K2 clutch capacity by 20%
- Adds one additional friction & steel for increased capacity & heat dissipation
- Thinner backing plate is reinforced for improved stiffness & reduced flex
- No drum or piston machining required

AS68RC transmissions often suffer failure of the K2 clutch assembly due to limited capacity. The Sonnax K2 clutch piston kit combines a thinner billet aluminum K2 piston with a thinner-yet-stiffer backing plate that together allow for one extra OE-thickness friction and steel, increasing the number of frictions from five to six. This improves the K2 clutch capacity by 20% for more torque capacity in 4th, 5th and 6th Gears while also significantly increasing steel mass in clutch pack for improved heat dissipation and resistance to burning.

Included in the kit is a backing plate retaining ring that allows clutch clearance adjustment. Get added durability with this easy-to-install kit that does not require machining of the drum or other components.



Backing Plate Kit Also Sold Separately K2 Clutch Backing Plate Kit

Part No. 99582-02K

Use of this kit requires machining the OE piston to fully accommodate an extra OE friction and steel plate. See www.sonnax.com for details.

Manual Shaft Kits

Unbeatable Protection from Corrosion & Breakage

- Direct replacement shafts feature added corrosion protection to prevent rust at threads
- Upgraded, stronger material for added durability over OE

Part No. 99740-08K
Fits Mitsubishi & Isuzu only.

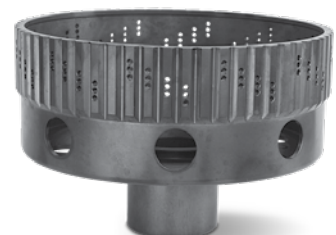


Part No. 99740-07K *Fits Dodge only.*

Heavy Duty K2 Clutch Hub Part No. 99572-01 Fits Dodge only.

Hardened Hub Splines Prevent Repeat 4-5-6 Failure

- One-piece hub is crafted from forged steel for increased strength
- Unique heat treatment builds in unbeatable durability
- Added oil control lip provides improved K2 clutch cooling



A New 4-3 Sequence Valve Option for Tackling 2nd & 4th Gear Problems in the 4L60-E

As with most moving parts, age and repetition can affect quality. The 3-4 relay and 4-3 sequence valves in the GM 4L60-E family of transmissions are no exception. Since its introduction in the market in 1992, this unit has been a workhorse for many vehicles — and a profit center for many shops. Twenty-six years later, these are still common trannies coming in for repair, but generally they require a bit more TLC and components in order to complete the job successfully. Sonnax is keeping up with the times by offering a new valve kit to fully restore 4th Gear operation in even the most heavily worn units.

In 2002, Sonnax developed an oversized valve train **77964-04K** to address bore wear that was causing complaints like no 4th Gear, burnt 2-4 bands and low 4th Gear pressure. At the time, the significant areas of wear were at the 3-4 relay valve and the large outboard spools on the 4-3 sequence valve. To oversize the mating casting bores, Sonnax developed bench-style reamer **77964-RM2** that aligned and self-guided from the original bore. This approach was very successful, fixing thousands of castings over the years.

With the recent release of 4L60-E series vacuum test plate kit **77754-VTP**, a number of shops reported that they were getting low vacuum readings at port 205A, both before repairs and after reaming and installing the **77964-04K**. This port is the servo feed circuit. When vacuum is checked with the valve in rest position, it will indicate loss of this critical fluid pressure that could lead to poor 2nd Gear shifts and a burnt 2-4 band. In analyzing numerous cores, we found that — 16 years later and likely many tens of thousands of additional miles and as many shifts — this inboard portion of the bore needed to be refurbished as well.

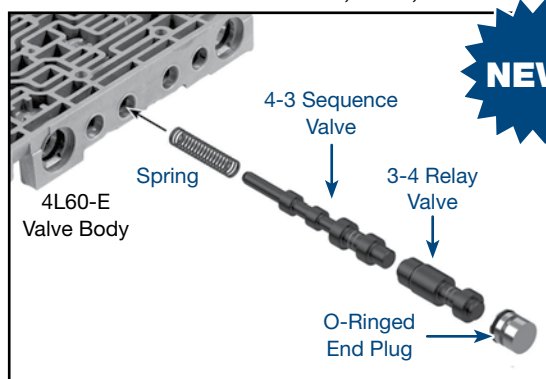
To address wear found throughout the bore in high-mileage units, Sonnax recently released a “completely” oversized 3-4 and 4-3 sequence valve kit **77964-14K**. By using this kit and tool **F-77964-TL14** and the **VB-FIX**, all critical bore-to-valve clearances can be made hydraulically sound for improved 2nd and 4th Gear operation and prevention of 2-4 band failure. It’s important to note that this new kit can only be used to replace OE steel valves in bores that have not been previously reamed for **77964-04K**.

Find Valve Body Problems 2X Faster with a Sonnax Vacuum Test Plate

Part No. 77754-VTP Fits 4L60-E, 4L65-E, 4L70-E

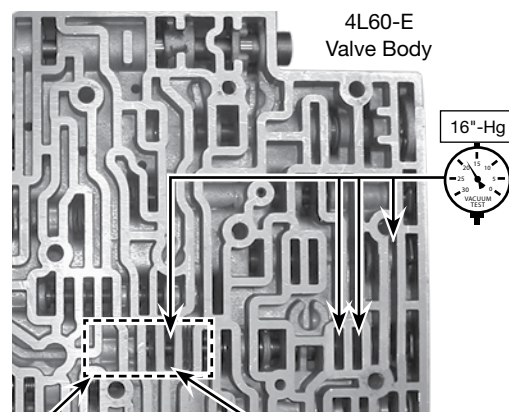
- Clear test plate and silicone pad seal casting for quick, easy testing
- Open ports at key areas identify recommended test locations
- Instruction booklet identifies ports, valves, symptoms of wear and the right Sonnax parts for repair

‘Completely’ Oversized 4-3 Sequence Valve Kit
Part No. **77964-14K** Fits 4L60-E, 4L65-E, 4L75-E



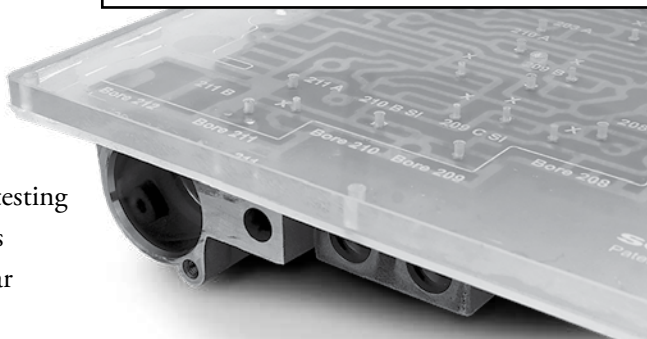
What 4-3 Kit is Right for Your Rebuild?

Vacuum testing is the best way to decide what type of repair is needed to restore valve function. Use a small test plate or the complete Sonnax vacuum test plate with Sonnax test stand kit **VACTEST-01K** to test the locations shown here.



F-77964-TL14 reams this bore. **77964-RM2** does NOT ream this bore.

If low vacuum test results here, use **77964-14K**. If acceptable vacuum test results here, use either **77964-14K** or **77964-04K**



Outsmart 4L80-E Overdrive Roller Clutch Failure with Sonnax

Build In Unrivaled Durability or Let Sonnax Do it For You

The next time you have a GM 4L80-E or 4L85-E in the shop, improve transmission performance and protect your warranty with Sonnax. Install the Smart-Tech® overrun clutch valve kit, OR get the kit pre-installed on a Sonnax premium remanufactured valve body. Choose the kit or the valve body — no transmission removal needed — to help keep your customers' trucks working hard all year long.

- Improve OD roller clutch holding power in D4 & Reverse ranges
- Extend the life of workhorse transmissions while preventing warranty claims & comebacks
- Quick & easy to install — no transmission removal needed

A Simple Hydraulic Solution to a Complex Mechanical Problem

Chronic OD roller clutch failure is due to insufficient holding capacity of the OD roller clutch. The 4L80-E overdrive roller clutch faces the tough challenge of holding the overrun clutch housing and preventing it from rotating faster than the overdrive carrier assembly in 1st, 2nd, 3rd and Reverse gears. The only way to radically increase OD roller clutch holding capacity is to bring on the overrun clutch in OD 1st-3rd Gears. Thanks to Sonnax, this is easy to do.

Via an external manifold that bolts to the valve body, the Smart-Tech kit hydraulically applies overrun clutch as soon as the engine is started. The overrun clutch can now share the load the OD roller clutch otherwise struggles with on its own. The manifold releases the overrun clutch only in OD 4th Gear enabling maximum holding capacity in 1st, 2nd and 3rd Gears.

Improved Holding in Reverse

With the Smart-Tech kit, the overrun clutch is applied in ALL manual valve positions, including Reverse. That's a big help for drivers trying to back up a goose-neck trailer loaded down with a huge tractor.

Protect your warranty and improve transmission performance by installing Sonnax **34200-40K**, **GM033** or **GM030** in your next 4L80-E, 4L85-E rebuild. Learn more about gear function by reading "Outsmarting 4L80-E Overdrive Roller Clutch Failure" in the tech resources section at www.sonnax.com.

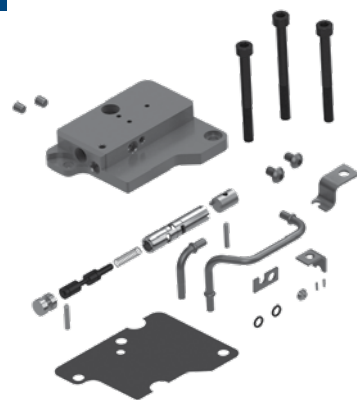
INSTALL IT YOURSELF

Smart-Tech® Overrun Clutch Valve Kit

Part No. 34200-40K

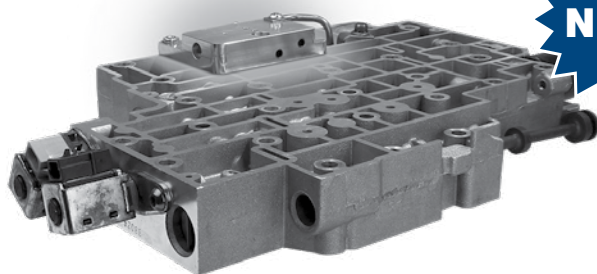
Patent Pending

Fits '97-Later 4L80-E
& 4L85-E Units



See how easy it is to install! Watch the step-by-step video at www.sonnax.com/34200-40K-install.

LET SONNAX DO IT



Smart-Tech® Overrun Clutch Valve Kit Pre-Installed on a Premium Rebuilt Valve Body

Overrun Clutch Protection Right Out of the Box

Remanufactured Valve Body Part No. GM033

Fits '97-'03 4L80-E & 4L85-E Units

Remanufactured Valve Body Part No. GM030

Fits '04-Later 4L80-E & 4L85-E Units



Take a Tour of the **Sonnax Research & Development Center**

At Sonnax, innovation is at the heart of everything we do. And much of that innovation happens at our new Research and Development Center that was opened at our Vermont headquarters in 2016. Let's take a tour around the facility to show you some of the capabilities and functionalities we're using to ensure the absolute best-of-the-best product every time.

Above you can see our expansive test fleet. Primarily — but not limited to — valve body research, these

vehicles are used to test our parts. And, boy, do we test them. We don't do theoretical engineering; we're loading these cars up with Sonnax parts and driving them around town — and even cross-country! These vehicles are important to Sonnax because they're essential for producing top-quality products. If we need a vehicle for testing, we'll invest in one to ensure that, by the time the part leaves our doors and is delivered to yours, you know it has been thoroughly tested and is up to Sonnax standards.



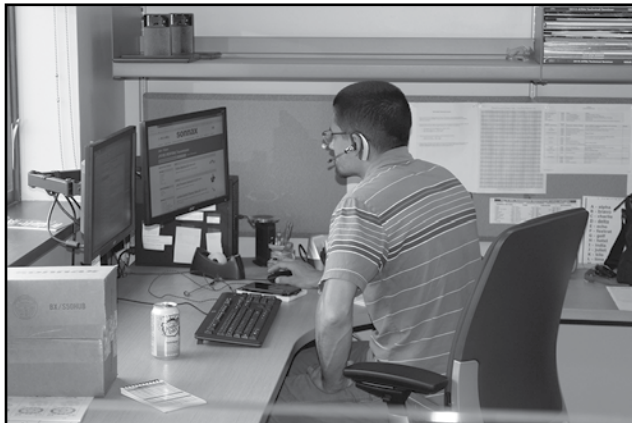
Above, two Sonnax engineers test a couple of valve bodies. On the left, Zach is utilizing one of the valve body testing machines. On the right, John is prepping a valve body for test.



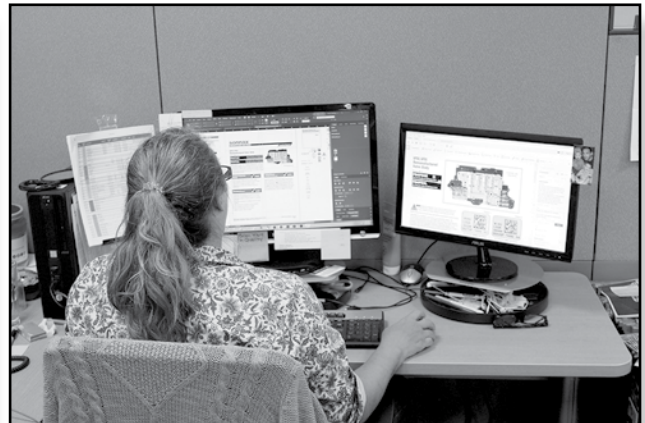
The facility features several testing rooms where our engineers can test and retest every necessary measurement on a new product. Here, Neal gets precision measurements on a valve body casting.



The building also boasts our prized converter core library. The expansive collection allows for comprehensive product development, analysis and research.



Customer support is one of our top priorities. Our Vermont tech support reps Tory and Jason (shown here) have a dedicated office at the facility. And if our tech guys aren't able to give you the answer you're seeking, they're only a few steps away from our stable of engineers.



The part instruction sheets that are included with many products are created here, right down the hall from the tech support office and engineers. Keeping product information up-to-date is much easier with everyone working closely together in the same facility.

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Transmission Report

Volume 9, No. 3

November 2018

Featured in this Issue

- U150 2-3 Upshift Complaints & Solutions
- Must-Have Upgrades for AS68RC
- A New 4-3 Sequence Valve Option for the 4L60-E
- Introducing the Sonnax Research & Development Center

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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.

Take 4L80-E Performance to the Next Level with a Sonnax Extreme Duty Forward Clutch Hub

Hardened Splines & Added Bearing, No Machining Required

- Forged 4140 steel, nitrited & case-hardened splines eliminate spline wear in extreme applications
- Case-hardening at bearing surface is cut back to make further mods easier
- .025" Thicker than OE to slightly tighten endplay

Sonnax heavy duty forward clutch hub **34322-01** has been a popular upgrade for years. Many shops like adding a bearing between the hub and direct drum, and some high-power, off-road racers have seen clutches wear into the hub splines. Sonnax extreme duty forward clutch hub kit **34322-02K** is a convenient, drop-in upgrade that handles big power without breaking a sweat.

Inside: Two Ways to Outsmart 4L80-E Overdrive Roller Clutch Failure with Sonnax



Part No.
34322-02K

Part No.
34322-01