

sonnax[®] **PERFORMANCE**

faster

tougher

stronger



4L60/E

**PERFORMANCE & HEAVY-DUTY
TRANSMISSION PARTS**

VOL.6

sonnax® PERFORMANCE

faster tougher stronger

4L60/E

If you think the 4L60/E on your bench can't be faster, tougher, stronger, think again. This versatile transmission family is the most popular performance platform in the world, thanks in large part to Sonnax components that allow HD/HP vehicles to run reliably at extreme power levels.

— START YOUR KILLER BUILD WITH GUIDES ON PAGE 10 —

4L75-E

LEVEL UPGRADES

In 2016, Chevrolet Performance introduced a new member of the 4L60/E family with greatly enhanced torque capacity: the 4L75-E. This transmission was never installed in a production vehicle. It is available exclusively over the counter from GM dealers and their distributors.

Sonnax components are the foundation of the 4L75-E. When installed in a 4L65-E or 4L70-E, these and other upgrades found in this catalog allow any shop to offer customers a top-tier transmission that meets or EXCEEDS the capabilities of the 4L75-E. See page 10 for details.



WHERE TO BUY

Ready to order? Find out where to purchase genuine Sonnax products from an online listing of authorized distributors in the U.S. and beyond.

GET YOUR GEARHEAD ON • WWW.SONNAX.COM

CONTACT SONNAX

8:30 a.m. to 5 p.m. ET
(800) 843-2600 TOLL-FREE
+1 (802) 463-9722 INTERNATIONAL
info@sonnax.com



"The best working performance units we have done, and that's not from me, but my customers."

B. Bastedo • Advanced Transmission Care

Fits 4L60-E ('94-Later), 4L65-E, 4L70-E

Part No. HP-4L60E-01



Pump Parts

- Pressure Regulator Spring
- Boost Valve, .490"
- Pump Slide Spring

4L60-E Performance Pack

The Best Sonnax Parts for Performance & Heavy-Duty Recalibration

- **Firmer shifts under load without sacrificing low-speed drivability**
- **Durable parts target commonly worn areas in the transmission & prevent future damage**
- **The only way to eliminate PWM function without over-pressurizing converters (optional)**

The Sonnax Performance Pack is a must-have for any heavy-duty vehicle and the very best foundation for high-performance racing. All components work together to carefully tune line pressure, accumulator pressure and shift calibration. It's the ULTIMATE way to get an impressive transmission that responds to throttle and increased load with quick, firm shifts.



Valve Body Parts

- Forward Pinless Accumulator Piston Kit
- Accumulator Valve Shim
- Torlon® Checkballs
- Separator Plate Drills
- TCC Spring & Valve (optional for eliminating PWM function)



Servo Parts

- 4th Servo Return Spring
- Servo Cushion Spring
- Servo Piston D-Ring Kit



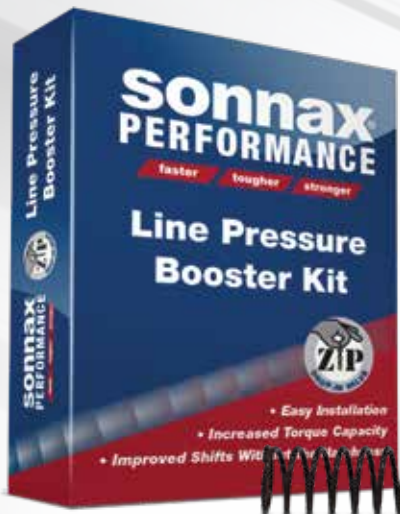
Case Parts

- 3-4 Accumulator Piston Kit
- 3-4 Accumulator Spring
- Servo Release Check Valve



Accumulator Parts

- 1-2 Pinless Piston Kit
- 1-2 Piston Springs
- 1-2 Waved Spring



"It doesn't give harsh shifts, just a little something extra. Very nice product and I highly recommend it."

D. Tucker • Tucker's Transmission



Line Pressure Booster Kits

Crisp, Clean Shifts without Low-Speed Harshness

- Classic large-ratio boost valve action
- Easy, effective upgrade for heavy-duty & modified vehicles or hard-working daily drivers
- Improved shift feel & durability reduce comebacks & complaints
- Drop-in Zip Valve™ installs quickly & easily

These booster kits are uniquely designed for precision pressure control. At low-end pressures, they deliver normal engagements, normal light throttle shifts and smooth coastdown shifts. When vehicles are pushed harder, components progressively increase pressure for improved clutch holding capacity and increased durability.

Fits 4L60-E, 4L65-E, 4L70-E

- Anodized Aluminum Boost Valve Assembly
- Pressure Regulator Spring
- O-Rings (2)

1.907" Sleeve Kit for Early-Style Pumps
Part No. 4L60E-LB1



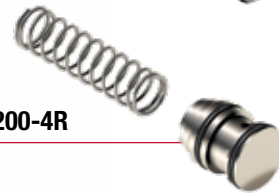
1.810" Sleeve Kit for Late-Style Pumps
Part No. 4L60E-LB2



Fits 4L60 (700-R4), 200-4R

Part No. 700R4-LB1

- Steel Boost Valve Assembly
- Pressure Regulator Spring
- O-Rings (2)



Heavy Duty 2-3 Shift Valve

Improve Input Sprag & Forward Clutch Durability

- Critical upgrade for all heavy-duty & performance vehicles
- Drop-in Zip Valve™ installs quickly & easily

The OE 2-3 shift valve only applies the overrun clutch in D3 3rd Gear. For greatly improved durability, the redesigned Sonnax valve applies the clutch in D3 1st, 2nd and 3rd Gears.

Fits 4L60-E, 4L65-E, 4L70-E
Found in Stock 4L75-E



Part No. 77754-41

Clutch Application Comparison

Range	Gear	OE Valve	Sonnax Valve
OD	1 st	OFF	OFF
	2 nd	OFF	OFF
	3 rd	OFF	OFF
	4 th	OFF	OFF
D3	1 st	OFF	APPLIED
	2 nd	OFF	APPLIED
	3 rd	APPLIED	APPLIED
D2	1 st	APPLIED	APPLIED
	2 nd	APPLIED	APPLIED
D1	1 st	APPLIED	APPLIED
	2 nd	APPLIED	APPLIED

SmartShell® Heavy Duty Reaction Shell Kit

Solves Multiple Problems in All Performance Applications

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

Bulky aftermarket shells always fall short when splines continue to strip and the shells break under stress. A chronic problem with both OE and thicker aftermarket shells is failure of the rear planetary bearing. From your daily jobs to extreme builds, the patented SmartShell is the only way to prevent shell failure AND protect the bearing.

Learn More About Shell Failure

www.sonnax.com/smartshell

This Sonnax video takes you inside the sun gear shell to see the source of common failures and learn how only the SmartShell can stop them all.

Heat-treated splines and lugs deliver outstanding durability.

Reinforced hub area prevents breakage.

Slightly thicker shell adds strength while avoiding excessive weight.



Fits 4L60, 4L60-E, 4L65-E, 4L70-E

Part No. 77749-02K

- Sun Gear Shell
- Large Bearing
- Custom Roller Clutch Race

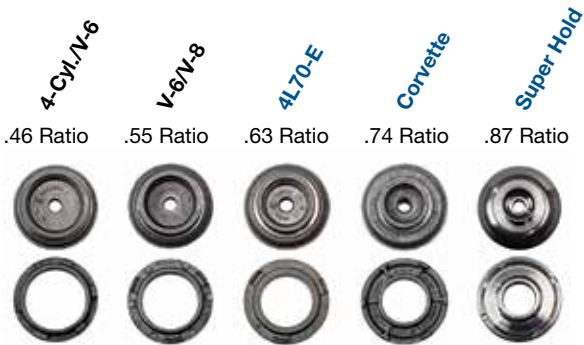


Unbeatable Bearing Protection

To prevent thrust loads from overwhelming the captured planetary bearing, the SmartShell features a larger bearing and custom roller clutch race. These parts re-route thrust loads through the carrier, completely bypassing the delicate bearing.

BUILD THE **KILLER 4L60/E**
WITH **sonnax**®

Balance Durability with Drivability
When Upgrading the 2nd Gear Servo



There are plenty of 2nd Gear servo sizes available for the 4L60/E, but going for the biggest isn't always best. Some large-ratio servos are not ideal for daily drivers because they change shift feel TOO much. Sonnax offers three servo upgrades to give builders a great range of choices for improved performance.

Choose the 4L70-E (.63 ratio) servo to:

Add "a little extra" to a heavy-duty rebuild. It's an ideal first option when you need a little more 2nd band apply area, but the Corvette or Sonnax super hold servo is just too much for a daily driver.

Choose the "Corvette" (.73 ratio) servo to:

Upgrade from a smaller-ratio stock servo and add holding power in many street applications.

Choose the super hold servo (.87 ratio) to:

Upgrade from a stock "Corvette" servo or add max holding power in extreme applications.

Learn more about OE and aftermarket 2nd Gear servo options by reading "A New Trick in the Bag" in the Sonnax online tech library.

2nd Gear Servo Kits

Improved Holding Power for a Wide Range of Street Applications

.63 Ratio

Fits 4L60, 4L60-E, 4L65-E, 4L70-E

Part No. 77701-02K

Direct replacement 4L70-E servo with Viton® D-ring seals is an ideal first option for improving 4L60, 4L60-E and 4L65-E shift feel and durability without harshness.



"Corvette" Ratio

Fits 4L60, 4L60-E, 4L65-E, 4L70-E

Part No. 77701-04K

Available exclusively from Sonnax, this .74 ratio servo with Viton® D-ring seals delivers firmer 1-2 and 2-3 shifts than smaller servos.



Extra Wide Intermediate Bands

Fits 4L60, 4L60-E, 4L65-E, 4L70-E
Kevlar Band Found in Stock 4L75-E

15% More Holding Capacity for High-Torque Applications

- Ideal for 4x4, heavy-duty & commercial use
- 60% Thicker case anchor design reduces band failure
- Drop-in replacements, no drum modifications required

Red Band Part No. 77700-01

Firmer shifts than OE, high-energy bands.

Kevlar® Band Part No. 77700-01K

Performs like later-model, OE bands with high-energy material. While the shifts may not be as firm as with a red-lined band, overall durability is often better, including in extreme applications.



SUPER HOLD SERVOS

MAXIMUM APPLY AREA • IN-VEHICLE INSTALL • DURABLE BILLET ALUMINUM

COMBINE FOR UNMATCHED HOLDING POWER & SHIFT PERFORMANCE



2nd Gear Super Hold Servo Kit

18% More Apply Area than "Corvette" Servo

- Maximizes holding power in 2nd Gear with more positive 1-2 & 2-3 shifts
- .87 Ratio servo avoids the timing flaws & excessive shock loads found in other aftermarket servos
- Dual Viton® seals ensure positive band apply/release & eliminate cross leaks
- Apply pin seals reduce leakage of 3rd Gear pressure



Fits 4L60, 4L60-E, 4L65-E, 4L70-E
Found in Stock 4L75-E

Part No. 77911-03K

- Piston w/ D-Rings
- Separator w/ D-Rings & O-Rings
- Apply Pin w/ PTFE & O-Ring Seals

4th Gear Super Hold Dual Servo Kit

40% More Apply Area

- Patented dual-piston design delivers greater holding power than stock servo
- Viton® D-ring seals prevent pressure loss
- Use with OE, "Corvette" or Sonnax 2nd Gear servo assemblies



Fits 4L60, 4L60-E,
4L65-E, 4L70-E
Found in Stock 4L75-E

Part No. 77767K

- Servo Assembly
- Steel Washer

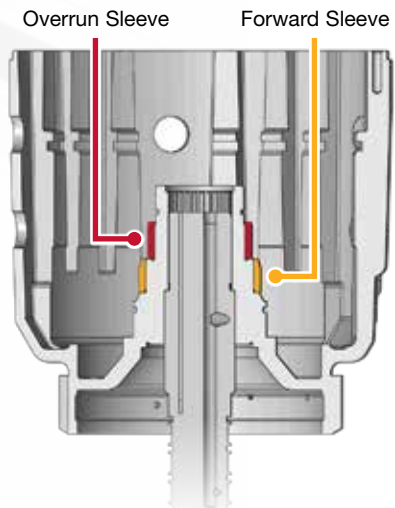
Input Housing Sleeve Kits

Fits 4L60, 4L60-E, 4L65-E, 4L70-E

Prevent Housing Failure in High-Torque Builds

Installing a Sonnax sleeve kit is a must to tackle the chronic problems of cracked input housings and stripped splines, especially in high-torque builds. The overrun sleeve is an industry-standard upgrade for preventing failure at moderate power levels. Combining it with the forward sleeve nearly doubles support, adding more fracture resistance for maximum strength in the highest power builds.

NOTE: The 77733-51KA overrun sleeve and an overrun piston compatible with the forward sleeve kit come pre-installed in the current generation of Sonnax Smart-Tech® input housing kits. If you're refreshing an old build that already has an overrun sleeve installed, it's critical to verify you have the correct style overrun piston. See part instructions at www.sonnax.com for details.



Overrun Sleeve Kit Part No. 77733-51KA

Requires '97-later stamped steel forward piston or aluminum piston in Sonnax forward sleeve kit 77733-52K. Cannot be used with '96-earlier OE cast aluminum forward piston or older Sonnax billet forward piston 77764-01.

- **High-strength, chromoly steel sleeve protects the shaft & overrun piston areas**
- **Custom overrun piston works with steel forward piston**
- **Universal design fits early- & late-style units**



Forward Sleeve Kit Part No. 77733-52K

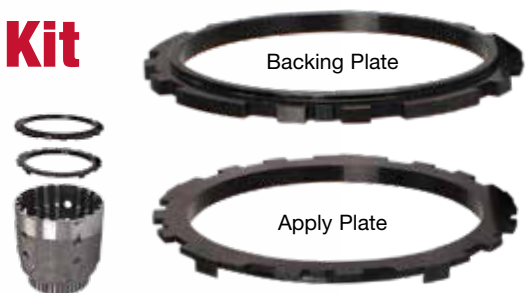
Requires Sonnax overrun sleeve and compatible overrun piston.

- **High-strength, chromoly steel sleeve protects the shaft & forward piston areas**
- **Maintains OE forward piston apply area**
- **Combine with overrun sleeve for easy upgrades of older builds or new HD/HP builds**

Heavy Duty 3-4 Backing Plate Kit

Affordable, Drop-in Upgrade Guards Against 3-4 Comebacks

- **Thicker backing plate is stiffer than any other option on the market to stop heat build-up from clutch pack flex**
- **Ideal for daily drivers & mild street/strip applications**
- **Upgrades OE 4L60 (700-R4) & 4L60-E to seven frictions**



Fits 4L60, 4L60-E, 4L65-E, 4L70-E

Part No. 74140-01K

Requires '91-later 3-4 apply ring stamped with number "7", measuring 3.671" to 3.682" in height.

Smart-Tech® Input Housing Kit

Upgraded Housing Eliminates 3-4 Clutch Failure

- Increases 3-4 clutch capacity
- Stops 3-4 backing plate flexing & distortion
- Protects against fatigue failure
- Prevents housing breakage
- Ends 3-4 retaining ring blow-out

"The Smart-Tech input housing kit is the best in the business. Have it in my 4L65-E putting down over 700rwhp. Zero issues, no slippage and low temps."

N. Rodriguez • Konzept Motorwurks



Fits 4L60, 4L60-E, 4L65-E, 4L70-E 300mm Reluctor-Style Kit Found in Stock 4L75-E

Key Housing Components:

- 3-4 Clutch Anchor Plate
- Input Housing
- Input Housing Overrun Sleeve Kit
- 3-4 Clutch Apply Plate
- 3-4 Clutch Return Springs
- Socket Head Cap Screws
- Seals (5)
- Rear Stator Support Bushing

Housing Kit Only Part No. 77733-06KA

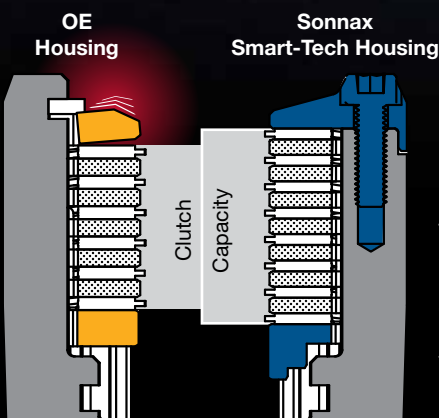
Housing Kits with Heavy Duty Input Shafts

300mm Non-Reluctor Part No. 77733-11KB

300mm Reluctor Part No. 77733-12KB

298mm Part No. 77733-10KB

Limitations of the OE input housing are the root cause of 3-4 burn up in performance applications. The patented Sonnax Smart-Tech housing design makes room for a taller clutch pack anchored in place by a stronger backing plate. Get the most out of your favorite clutches — the Smart-Tech housing is the only way to increase clutch capacity AND protect against destructive heat.



SMOKE THE TIRES, NOT THE CLUTCHES!

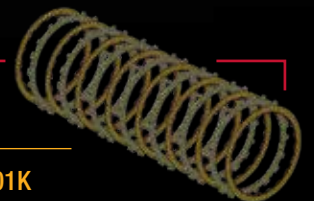
Track-proven to 1,000 HP, the Smart-Tech housing stops backing plate flex AND expands clutch capacity for max protection against burn up. Learn more about upgrading the 3-4 clutch on page 12.

These kits require use of a '91-later 3-4 apply ring, '97-later ring gear, '97-later stamped steel forward piston and dual-cage return spring. 298mm shaft may require converter/stator modifications. See part instructions at www.sonnax.com for details.

Smart-Tech® Clutch Kit

Part No. 77734-01K

Recommended BorgWarner high energy frictions (8) and Lined steels for use with the Smart-Tech input housing kit.



“The Sonnax six-pinion 2.84 planet is exactly what 60E transmissions need to further evolve their spot in the performance world.”

B. Alley • Revolution Race Works

2.84 Input Carrier Kit

Ramp Up from OE Wide Ratio to Race-Ready Close Ratio

- Keeps engine in power band on 1-2 & 2-3 shifts
- Delivers longer pull in 1st & 2nd Gears
- Reduces stress on internal parts
- Six-pinion planet loaded with advanced durability features

The shift from 3.06 ratio (1st Gear) to 1.63 ratio (2nd Gear) is a dramatic RPM drop that causes performance engines to fall out of their power band. Sonnax’s 2.84 input carrier transforms the popular 4L60 series from an OE “wide ratio” 3.06/1.63 to a “close ratio” 2.84/1.55 for game-changing acceleration on the track.



Fits 4L60, 4L60-E, 4L65-E, 4L70-E

Part No. 77284-K

Cannot be used with '07-later reaction shaft. For these applications, source an '06-earlier reaction shaft or use Sonnax 74602-01K. See part instructions at www.sonnax.com for details.

Heavy Duty Reaction Shaft Kit

Supreme Strength for Extreme Builds

- High-strength, chromoly steel alloy outperforms all other OE & aftermarket shaft materials
- Prevents spline twist & wear in high-torque applications
- Universal fit for all years & all input carrier styles

OE and aftermarket reaction shafts made from plain carbon steel often exhibit spline twist and fretting/wear in high-torque applications, especially when used in heavy vehicles. To eliminate these problems, the Sonnax shaft is made from a high-strength, chromoly alloy that guarantees the ultimate in performance and durability. Its unique design — plus the bearings and shim included in the kit — allow easy assembly with any style input carrier, including the Sonnax 2.84 ratio, six-pinion carrier.



Fits 4L60, 4L60-E, 4L65-E, 4L70-E

Part No. 74602-01K

- Reaction Shaft with Bushings
- Bearings (2)
- Shim



↑ Bearing & Shim Allow Shaft to Fit All Carrier Styles

HEAVY-DUTY SHAFTS

#1 CHOICE FOR HIGH-HORSEPOWER STREET/STRIP BUILDS

Input Shafts

- High-strength 300M steel shafts are more than 2X stronger than OE
- Shot peened for extreme durability
- Unique design protects against failure from stress cracks

Fits 4L60-E, 4L65-E, 4L70-E (300mm Converter)
77733-12SB Found in Stock 4L75-E

Non-Reluctor Style Shaft Part No. 77733-11SB
Reluctor-Style Shaft Part No. 77733-12SB

Fits 4L60, 4L60-E (298mm Converter)

Part No. 77733-10SB

For '85-later units with 298mm converter, 30-spline input shaft. For '82-'84 units with 27-spline input shaft, converter and stator shaft will need to be updated to '85-later design.



Input shafts also available pre-installed in a Smart-Tech® input housing. See page 7.

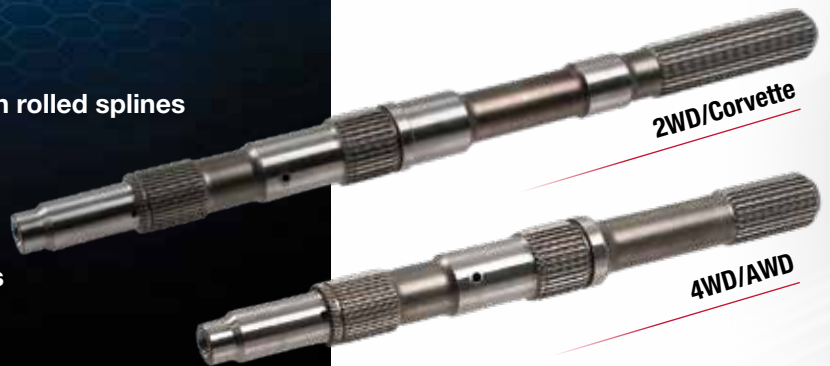


Output Shafts

- High-strength 300M steel shafts with rolled splines
- Specially heat-treated & processed for maximum toughness
- Torsional design absorbs energy, reducing peak loads to critical areas

Fits 4L60-E, 4L65-E, 4L70-E

For 2WD & Corvette Units Part No. 74678L-HD
For 4WD/AWD Units Part No. 74678S-HD



Heavy Duty Overrun Clutch Hub

Stop Hub Failure During Deceleration
Engine Braking in D3, D2 & D1

Fits 4L60, 4L60-E,
4L65-E, 4L70-E

Part No. 74574-HD

- 2X Thicker than OE clutch hubs to prevent cracking & breaking
- Manufactured from high-strength 4140 chromoly steel
- Direct replacement for '95-later hubs



BUILD THE **KILLER** 4L60/E WITH **sonnax**®

Yes, 4-Speeds are All You Need

Do you have a project where you are considering a 6-, 8- or 10-speed transmission? There's a lot of interest in putting these transmissions into powerful street rods, but are all the extra gears really needed? A strong case can be made for "no."

There will be reasons to use these newer units. Some simply like the challenge, others think "more" is better, and in new OEM vehicles, clicking through gear after gear indeed can be fun. Unfortunately, more gears do come with significant challenges.

It's especially difficult to get good programming that results in decent overall drivability, for example. With so many shift combinations, it's very challenging to get all the light throttle, part throttle, WOT, upshifts and then forced and coastdown shifts working seamlessly under all conditions.

More importantly, the trend towards more gears coincides with smaller displacement engines with less torque. Ultra-steep 1st Gear ratios as low as 4.8:1 and then three Overdrive ratios are just not needed with the higher power and torque of a typical muscle car/street rod build. It doesn't make any sense to put in a transmission with lots of gears, only to then be unable to use them when driving it hard. Even with the 4L60/E, the OE 3.06 1st Gear ratio is too steep for most builds. (That's why Sonnax offers 2.84 ratio gear set **77284-K**: it makes street rods more drivable by taking away torque multiplication in 1st Gear.)

For these reasons, the 4-speed 4L60/E remains the most versatile and popular performance transmission of all time. It's easily built and upgraded to various power levels, plus is comparably light and compact for easy installation in a wide variety of applications. With special aftermarket bell housings, the 4L60/E is even being adapted into older Chrysler applications behind both small and big blocks. These cars have cross members and tunnels that are not easily modified, but the 4L60/E tucks right into the OE location. It's a great example of how cutting-edge builds tap the sweet spot you get from a 4-speed transmission.

So while there will always be fringe applications to showcase a later-model transmission, for the vast majority of 400+ HP hot rods, the 4L60/E will remain the go-to unit for years to come.

The 700-R4/4L60/E family of transmissions is the most popular performance platform in the world, thanks in large part to Sonnax components that allow them to run reliably at extreme power levels. The following key areas **MUST** be addressed to realize the full potential of these units.

Improve Transmission Torque Capacity

Whether we're speaking in terms of torque capacity or horsepower, what we're really talking about is modifying the transmission to withstand the stress it's being put under. Sonnax upgrades allow drivers to take full advantage of any vehicle's torque/HP, far beyond what stock transmissions can handle

In 2016, Chevrolet Performance introduced a new member of the 4L60/E family with greatly enhanced torque capacity: the 650 ft-lb 4L75-E. Its jump in torque rating over the 495 ft-lb 4L70-E is largely thanks to Sonnax upgrades, the same ones featured in this catalog:

4L75-E

LEVEL UPGRADES

2nd & 4th Gear Super Hold Servos



Heavy Duty 2-3 Shift Valve

Smart-Tech® Input Housing & Heavy Duty Input Shaft



Kevlar® Extra Wide Intermediate Band

When these Sonnax parts are installed in a 4L65-E or 4L70-E, you've landed at the torque capacity of a 4L75-E.

With a few more Sonnax upgrades to enhance performance and durability — a Sonnax Level 3 build — now you've got a big power tranny that not only EXCEEDS 4L75-E capabilities, but is moving well into 4L80-E territory. For those on the fence about swapping transmissions, it's a great way to avoid the complications and inefficiencies of converting to a 4L80-E.

Continued on Page 12

4L60-E | 4L65-E | 4L70-E BUILD GUIDES

Don't risk throwing products from different manufacturers into the same tranny when there's no guarantee they're all going to play nice. Installing Sonnax parts designed to work together is the best and safest way to upgrade a transmission. Key upgrades for different 4L60-E series build levels are shown here.

4L60 (700-R4) BUILD GUIDE

While it's an older transmission, the 700-R4 is no slouch and still very capable in many applications up to about 750HP. Check out the performance build guide in the tech resources area at www.sonnax.com.

HEAVY DUTY PICKUP

OPTION A Quick upgrades for big performance without a big price tag.

OPTION B Best parts for heavy-duty recalibration and durability.

OPTION A
Line Pressure Booster Kit <i>See Page 2</i>
SmartShell® HD Reaction Shell Kit 77749-02K
Rear Stator Support Bushing 77002BT-01
4 th Gear Super Hold Dual Servo Kit 77767K
HD 2-3 Shift Valve 77754-41

OPTION B
Performance Pack HP-4L60E-01
SmartShell® HD Reaction Shell Kit 77749-02K
HD 3-4 Clutch Backing Plate Kit 74140-01K
Rear Stator Support Bushing 77002BT-01
4 th Gear Super Hold Dual Servo Kit 77767K
2 nd Gear Servo Kit 77701-02K
HD 2-3 Shift Valve 77754-41

STREET/STRIP PERFORMANCE

LEVEL 1

For lightly modified performance/enthusiast vehicles.

OPTION A
Line Pressure Booster Kit <i>See Page 2</i>
4 th Gear Super Hold Dual Servo Kit 77767K
2 nd Gear Super Hold Servo Kit 77911-03K
2 nd Gear "Corvette" Ratio Servo Kit 77701-04K

Choose 2nd Gear Servo

OPTION B
Performance Pack HP-4L60E-01
SmartShell® HD Reaction Shell Kit 77749-02K
HD 3-4 Clutch Backing Plate Kit 74140-01K
Rear Stator Support Bushing 77002BT-01

LEVEL 2

For moderately modified performance vehicles (up to 450HP).

Performance Pack HP-4L60E-01
SmartShell® HD Reaction Shell Kit 77749-02K
HD 3-4 Clutch Backing Plate Kit 74140-01K
Rear Stator Support Bushing 77002BT-01
HD 2-3 Shift Valve 77754-41
4 th Gear Super Hold Dual Servo Kit 77767K
2 nd Gear "Corvette" Ratio Servo Kit 77701-04K
Kevlar® Extra Wide Intermediate Band 77700-01K
Input Housing Overrun Sleeve Kit 77733-51KA

LEVEL 3

For all extreme performance applications (above 450HP).

Performance Pack HP-4L60E-01
SmartShell® HD Reaction Shell Kit 77749-02K
HD 2-3 Shift Valve 77754-41
4 th Gear Super Hold Dual Servo Kit 77767K
2 nd Gear Super Hold Servo Kit 77911-03K
Kevlar® Extra Wide Intermediate Band 77700-01K
Smart-Tech® Input Housing & HD Input Shaft Kit <i>See Page 7</i>
Input Housing Forward Sleeve Kit 77733-52K
4WD/AWD HD Output Shaft 74678S-HD
2WD & Corvette HD Output Shaft 74678L-HD
HD Reaction Shaft Kit 74602-01K
2.84 Input Carrier Kit 77284-K

Choose Output Shaft

OPTION A Upgrades for performance recalibration and durability, no trans removal required. Most change in shift feel comes from the servos.

OPTION B Best parts for performance recalibration and durability. Most change in shift feel comes from the Performance Pack.



Continued from Page 10

Hunt Down Unstable Pressure, the Real Pump Killer

When running at higher average pressures, the whole hydraulic system MUST be in top condition to minimize the risk to the pump vane rings. Pressure pulsation from poor PR valve control is the real danger, and a sure sign of this problem is gauge needle bounce when testing line pressure.

Stabilizing pressure starts with precise valve-to-bore clearances (PR valve bore wear is common in 4L60/E units) and a quality, leak-free boost valve. It's also essential to feed the boost valve with a properly working (clean) EPC solenoid and steady AFL pressure to the EPC solenoid.

Installing Sonnax oversized PR valve ([77917-06](#) or [77917-07](#)), boost valve with O-rings (multiple options) and AFL valve kit ([77754-09K](#)) is highly recommended for resolving pump pressure problems.

Take Care of the Servo Band

Switching to a wider band (Sonnax [77700-01](#) or [77000-01K](#)) is an ideal capacity/durability upgrade, but NEVER install a wider band on a used drum. The old band will have compressed the drum and created a subtle dish on its surface. When used with a wider band, this dish leads to slipping in 2nd Gear, glazing and burning, and will eventually throw off the band adjustment.

Always check band/pin adjustment to prevent band release problems. Sonnax servo kits include instructions for setting servo travel between .075" and .125" using a dial indicator. Never shim the servo, as this moves the piston deeper into the bore where it's more prone to bottoming out and causing band failure.

Don't Get Burned When Expanding 3-4 Clutch Capacity

Guarding against 3-4 clutch failure has traditionally meant working within the limited space of the OE input housing. Squeezing in more frictions requires installing a thinner backing plate with thinner clutches and steels, BUT:

- Adding friction surfaces reduces the amount of steel
- Steel in the clutch pack helps dissipate heat
- Without enough steel, heat builds up and clutches burn

Adding more, thinner plates increases static holding capacity by sacrificing engaging capacity. Durability suffers in higher-load applications where more energy goes into the clutch during the shift.

The ONLY way to expand clutch capacity without sacrificing steel mass is by replacing the OE input housing with the Sonnax Smart-Tech® housing (see page 7). Its custom design holds a physically larger clutch pack to eliminate 3-4 clutch burn up while also guarding against other common problems.

Stop 3rd Accumulator Checkball Leakage

It's crucial to prevent even minor leaks in the 3rd accumulator checkball capsule, as these are directly related to band and 3-4 clutch failure. Vacuum testing the capsule (located in the servo area of the case) with Sonnax vacuum test stand kit VACTEST-01K is a quick and reliable way to check for leaks.

Reduce Harsh 1-2 Shift Damage

Damage to the band, input/output shafts, sprag, etc. can be reduced by properly cushioning the large ratio change on the 1-2 shift:

- Never use a 1-2 servo that eliminates the cushion spring
- Never reduce the 1-2 accumulator piston stroke
- Never leave out the 1-2 checkball
- Never over-drill the 1-2 feed hole

Reduce ratio change by converting 1st Gear from 3.06 to 2.84 with Sonnax input carrier kit [77284-K](#) (see page 8).

Pursue Input Sprag Perfection

You don't move when the input sprag fails, a critical link often overlooked during transmission upgrades.

- Install a new sprag assembly that includes new inner/outer races. Used races may be worn or manufactured out of spec.
- Easily strengthen and reinforce the sprag by installing Sonnax heavy duty 2-3 shift valve **77754-41** (see page 2).
- Clean fluid is essential for maximum sprag durability. Make sure the transmission pan has a drain plug, and change the fluid often to prevent micron-sized debris from undermining sprag engagement.

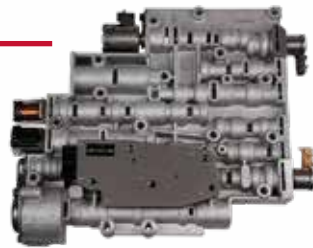
Help the Rear Ring Survive by Moving Up to Five Pinions

Increasing the number of planet pinions from four to five distributes load more evenly on the sun gear and around the ring gear. At high torque, this reduces stress/flexing of the ring gear and improves durability.

Control Valve Body Bleeding

The foundation of a good unit is a tight, leak-free valve body that prevents pressure loss and conserves pump volume. Since bore wear is common in the 4L60-E series, ALL circuits should be vacuum tested to identify leaks.

Use Sonnax vacuum test stand kit **VACTEST-01K** along with valve body vacuum test plate **77754-VTP**, or test without plate using free vacuum test guides found at www.sonnax.com/vactest.



Stabilize Transmission Pressure with a Better Oil Pan

The best deep pan to use is an aftermarket model with a filter extension to place the filter lower into the oil sump. It helps prevent air ingestion during hard acceleration, which can destabilize transmission pressure and lead to slipping.

Optimize Computer Programming & Tuning with Care

No matter how well-built the unit, poor computer programming will quickly kill the transmission. It's vital to be informed about the many modification options available and how they affect performance and durability. Here are a few examples of classic programming pitfalls:

Pressure Control Optimization

Setting incorrect parameters allows line pressure to drop "off the mapping table" to a minimum range when maximum pressure is required. It's a well-intended tuning mistake that can lead to clutch-roasting pressure drops.

"Torque Management" Mods

This feature often is completely disabled, even though leaving a little "on" will help maximize driveline durability without slowing the vehicle. Figuring out the best balance requires tuning experience and a solid understanding of a particular vehicle's setup.

Continuous Slip (EC3) TCC Control

Since higher-stall aftermarket converters aren't designed for continuous slip, it might seem reasonable to eliminate this function. Simple on-off operation can be excessively harsh, though, especially when the converter is damperless.

A better programming option is disabling the EC3 continuous slip, while keeping the pulse-width modulated (PWM) TCC apply so that the converter clutch comes on in a ramped, controlled manner.

Remanufactured Valve Bodies

Keep the comebacks away with valve bodies that EXCEED OE performance standards. Upgraded Sonnax components improve function, prevent wear and add extra protection against the most common transmission failures in hardworking vehicles.

Heavy Duty FWD Sprag & Clutch Protection

These unique valve bodies apply the overrun clutch in D, OD ranges for added holding power in work trucks and muscle cars. They come pre-installed with some parts listed separately on Sonnax build guides, so you will need to carefully spec out the rest of your build if you choose to use one.

Scan code to learn more about these valve body options explained in the 4L60/E performance and heavy-duty transmission build guide at www.sonnax.com.



OE Calibration

Fits 4L60-E, 4L65-E, 4L70-E

'03-'08	GM051
'01-'02 Annular Lockup	GM049
'96-'01	GM048
'95	GM047
'93-'94	GM046


Fits '96-'08 4L60-E, 4L65-E

Applies the overrun clutch in D4 1st-3rd Gears & D3 1st, 2nd Gears. Includes fluid rerouting for additional D4 protection and new servo cushion spring to reduce downshift clunk.	GM054-HD
Applies the overrun clutch in D3 1st, 2nd Gears. Includes Sonnax heavy-duty 2-3 shift valve for enhanced protection.	GM053-HD

MORE Sonnax Components for Top-Quality Builds

On the street and on the track, Sonnax parts are trusted by top shops to work harder, last longer and deliver the absolute best in transmission performance. For the 4L60/E series alone, more than 200 top-of-the-line components are available for repairs and upgrades — see full listing at www.sonnax.com.

Components listed in RED below should always be considered for racing or heavy-duty builds.

Unit	Part Name	Description	 Part No.	Tool Required
Valve Body				
60	60E 65E 70E	1-2 or 3-4 Accumulator Spring	5/Bag 74926	
	60E 65E 70E	3-2 Control Valve Spring	'96-Later on/off style 3-2 control 77754-23	
	60E 65E 70E	3-4 Relay O-Ringed End Plug Kit	ZIP Fits 2 locations, includes 5 end plugs 77964-08K	
	60E 65E 70E	Oversized 3-4 Shift Valve Kit	77754-42K	Yes*
	60E 65E 70E	Oversized 4-3 Sequence Valve Kit	Does not address wear at inboard 2 spools 77964-04K	Yes
60	60E 65E 70E	Pinless Accumulator Piston Kit	1-2 or 3-4 accumulator bores 77998-03K	
	60E 65E 70E	Pinless Forward Accumulator Piston Kit	Dual-seal design 77987-01K	
60	60E 65E 70E	Enhanced Performance Accumulator Spring	Produces firmer, quicker shifts, 5/bag 77704S	
60	60E	Accumulator Valve Train Kit	ZIP "L" version valve train in light/medium vehicles, .330" dia. 77777L-K	
60	60E	Accumulator Valve Train Kit	ZIP "M" version valve train in heavy vehicles, .341" dia. 77777M-K	
	60E 65E 70E	Accumulator Valve Train Kit	ZIP For valve trains with sleeve stamp codes CX, DX or YZ only 77754-10K	
	60E 65E 70E	Actuator Feed Limit Valve Kit	77754-09K	Yes
60	60E 65E 70E	Checkball	Imidized plastic, .250" dia., 10/bag 10000-08	
	60E 65E 70E	EPC Solenoid Harness Adapter	For use w/ early-style ('92-'02) EPC solenoid in late-style ('03-later) units 34435-01K	
	60E 65E 70E	Forward & Reverse Abuse Bore Plug	ZIP Fits either of 2 locations 77754-21	
	60E 65E 70E	Forward & Reverse Abuse Valve Kit	ZIP Fits either of 2 locations 77754-35K	
	60E 65E 70E	Oversized Fwd. & Rev. Abuse Valve Kit	Fits either of 2 locations 77754-58K	Yes*
	60E 65E 70E	Isolator Sleeve Kit	For worn isolator bore in unserviced valve body or for any factory-reman. valve body 77754-IS0	Yes*
	60E 65E 70E	Oversized Low Overrun Valve Kit	77754-62K	Yes*
	60E 65E 70E	TCC Regulator & Isolator Valve Kit	Fits non-EC3 & '97-earlier only in 4L60-E 77754-03K	Yes*
	60E 65E 70E	TCC Regulator & Isolator Valve Kit	Fits all years & '98-later EC3 units 77754-04K	Yes*
60		Throttle Valve Plunger Kit	ZIP Prevents forced 4-3 kickdown below ¾ throttle 77966-94MK	
60		Throttle Valve Plunger Valve Kit	ZIP OE plungers with code 94 77966-94K	
60		TV Plunger Spring	5/Bag 77968-01K	
Case				
60	60E 65E 70E	3-4 Accumulator Sleeve Kit	77998-01K	
60	60E 65E 70E	3rd Accumulator Checkball & Seat	74480D	
60		Governor	Gas, OE 8642730, 8647041 730	
60		Governor	Gas, 250, 305 & 350 engines, OE 8642731 731	
60	60E 65E 70E	Servo Release Check Valve Kit	ZIP 2nd Gear servo release, requires properly functioning OE capsule 77701-076	
Servo				
60	60E 65E 70E	Servo Pin Kit	Upgraded servo pin material, sealing & length 77787-02K	
60	60E 65E 70E	Oversized Servo Pin Kit	77787-03K	Yes

*Installation tooling requires the Sonnax VB-FIX reaming fixture.

Unit	Part Name	Description	 Part No.	Tool Required			
Linkage or Park Mechanism							
60E		Shift Cable Mount Bracket	Allows early cases without shifter bracket bosses to be used in '96-'97 vehicles	34913-01			
60		Carburetor TV Linkage Corrector Kit	Holley® aftermarket-style throttle arm	AS4-04K			
60		Carburetor TV Linkage Corrector Kit	Edlebrock®-style throttle arm	AS4-05K			
60		TV Cable Corrector Kit	Includes 5 springs & stops	AS1-01K			
Pump							
60E	65E	Boost Valve Kit	ZIP Early style, .470" dia., OE ratio, O-ring style	77898E-4K			
60E	65E	Boost Valve Kit	ZIP Early style, .490" dia., increased ratio, O-ring style	77898E-K			
60E	65E	70E	Boost Valve Kit	ZIP Late style, .421" dia. OE ratio, O-ring style	77898E-14K		
60E	65E	70E	Boost Valve Kit	ZIP Late style, .472" dia., OE ratio, O-ring style	77898E-16K		
60	60E	65E	70E	Bushing	Fits pump, precision, PTFE-lined	77005T	
60				Elevated Pressure Main PR Spring		77917-08	
60E	65E	70E		High Performance PR Spring	Increased line pressure & firmer shifts	77917-10	
60				Oversized Pressure Regulator Valve		77917-06	Yes
60E	65E	70E		Oversized Pressure Regulator Valve		77917-07	Yes
60	60E	65E	70E	Pump Slide Pivot Pin	5/Bag	65797	
60	60E	65E	70E	Pump Slide Spring	Maintains high volume slide position at high RPM, replaces 2 OE springs, 5/bag	77722-01K	
60	60E	65E	70E	Pump Spring Spacer	10/Bag	77917-RV	
60	60E	65E	70E	Pump Vane	Koyo® (OE), 100/bag	1280	
60	60E	65E	70E	Rear Stator Support Bushing	Wider with improved fit, precision, PTFE-lined	77002BT-01	
60				Reverse Boost Valve Kit	ZIP Large ratio, O-ring style	K77898	
60E	65E	70E		Stator Support Shaft Assembly	280mm or 300mm Converter, reductor style, bushing installed	77918S-09K	
60E	65E	70E		Stator Support Shaft Assembly	280mm or 300mm Converter, non-reductor style, bushing installed	77918S-1K	
60E	65E	70E		Stator Support Shaft Assembly	298mm Converter, reductor style, bushing installed	77918S-08K	
60	60E			Stator Support Shaft Kit	'83-'04 only, 6.830" long, includes 3 bushings	77918S-K	
60	60E			TCC Apply Valve Kit	ZIP Non-PWM, steel with PTFE seal	77805-K	
60E	65E	70E		TCC Apply Valve Kit	ZIP PWM, aluminum with PTFE seal	77805E-K	
60	60E			TCC Solenoid Snout Kit	Fits '96-earlier only in 4L60-E	77942-01K	
60				TV Boost Valve Kit	ZIP .471" Bore dia., O-ring style	77917-471	
60				TV Boost Valve Kit	ZIP Highest TV boost ratio for maximum line rise, .500" bore dia., O-ring style	77917-500	
Internal Transmission							
60	60E	65E	70E	3-4 Clutch Boost Spring	'88-Later, 10/bag	77763-01	
60	60E	65E	70E	Bearing Kit	'82-Later, includes 5 bearings	SBK-G12	
60E	65E	70E		Captured Front Planetary Bearing	'99-Later, .199" thick	77747-01	
60	60E	65E	70E	Input Drum Reinforcement Kit	Requires '96-earlier aluminum forward piston	77733-02K	†
60	60E			Planetary Rebuild Kit	4-Pinion rear planetary	77731-RK	
60	60E	65E	70E	Rear Planetary Pinion Pin	4- & 5-Pinion rear planetary, solid, 5/bag	77732-02	
60	60E	65E	70E	Shim	.015" Thick, front bearing, 10/bag	77409-15	
60	60E	65E	70E	Shim	.010" Thick, rear bearing, 10/bag	77406-10	
60	60E	65E	70E	Wide Reaction Sun Gear Bushing	Precision, 1.5X wider than OE	77010-01	

*Installation tooling requires the Sonnax VB-FIX reaming fixture. †Machining required.

TORQUE CONVERTER

From popular OE replacement parts to unique performance upgrades, Sonnax is the world's leading, full product line supplier of aftermarket converter components for domestic, import, industrial, racing and heavy-duty converters.

Where to Buy Talk to your local converter shop or performance specialist about a build with Sonnax components. Contact Sonnax anytime for product assistance.

Performance Converter Kits

Engineered to Deliver Builds that Last

- **Widest variety of kits available**
- **Designed for ease of assembly**
- **Improve acceleration & durability with confidence**

A performance torque converter is highly specialized based on the performance characteristics of the specific vehicle. From the weekend enthusiast to the hardcore competitor, Sonnax performance converter kits improve acceleration and durability for long-lasting, trouble-free builds.



Additional components may be required when using these kits, see details at www.sonnax.com.

Transmission Unit	Converter Core	Spline Count	Details	Dampered	Part No.
200-4R, 4L60, 4L60-E	GM 245mm	27	Non-Lockup, 298mm	No	GM-RK-9
	GM 245mm	27	Single-Plate Lockup, 298mm, Mounting Ring	Yes	GM-RK-12
4L60-E	GM 245mm	30	Single-Plate Lockup, 298mm	Yes	GM-RK-18
	GM 245mm	30	Single-Plate Lockup, 300mm Mounting Ring	Yes	GM-RK-13
	GM 245mm	30	Single-Plate Lockup, 300mm	Yes	GM-RK-17
4L60, 4L60-E	GM 258mm	30	Multi-Plate Lockup, 298mm	No	GM-RK-498
	GM 265mm	30	Multi-Plate Lockup, 298mm	No	GM-RK-495
	GM 245mm	30	Non-Lockup, 298mm	No	GM-RK-10
	GM 245mm	30	Single-Plate Lockup, 298mm, Mounting Ring	Yes	GM-RK-11
4L60-E, 4L65-E, 4L75-E	GM 258mm	30	Multi-Plate Lockup, 300mm	No	GM-RK-408
	GM 265mm	30	Multi-Plate Lockup, 300mm	No	GM-RK-405

Woven Carbon Converter Kits Exclusively from Sonnax!

Multi-plates with authentic, OE-quality woven carbon frictions deliver the ultimate in performance and durability, and they're available only from Sonnax. Woven carbon rings also sold separately.

4L60, 4L60-E	GM 258mm	30	Multi-Plate Lockup, Woven Carbon, 298mm	No	GM-RK-498WC
	GM 265mm	30	Multi-Plate Lockup, Woven Carbon, 298mm	No	GM-RK-495WC
4L60-E, 4L65-E, 4L75-E	GM 258mm	30	Multi-Plate Lockup, Woven Carbon, 300mm	No	GM-RK-408WC
	GM 265mm	30	Multi-Plate Lockup, Woven Carbon, 300mm	No	GM-RK-405WC

DRIVELINE

Sonnax offers a range of top-quality components for assembling a one-piece driveshaft that gets the power down to the ground in heavy-duty and street/strip performance vehicles.

Where to Buy These components or, more commonly, a driveshaft built with Sonnax parts are most readily available from driveshaft shops. Contact Sonnax anytime for product assistance.



Performance Slip Yokes

Increase Strength & Durability Without the Premium Cost

Jaw-Dropping Performance Builds

Setting the industry standard for incredible performance AND value, Sonnax bushing-style yokes deliver a winning combination you won't find anywhere else. It's the best way to optimize the driveline in high horsepower and torque capacity vehicles running on the street, drag strip or dirt oval track.

Extra Security for Everyday Drivers

Installing Sonnax yokes in routine transmission builds helps prevent comeback complaints like:

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

Yokes listed here will fit a variety of 4L60/E and other GM transmissions. Visit www.sonnax.com to check out dozens more slip yokes for a wide range of performance driveshaft builds.

Part No.	Spline Count	Journal Dia.	Centerline to End Length	Spline Type	U-Joint Series		
					1310	1330	1350
T2-3-4911HP	27	1.503"	4.88"	Full	✓		
T2-3-6081HP	27	1.503"	5.47"	Full	✓		
T2-3-12081HP 4140 CHROMOLY	27	1.503"	5.47"	Full		✓	
T2-3-12051HP 4140 CHROMOLY	27	1.503"	6.76"	CB		✓	
T3-3-6081HP 4140 CHROMOLY	27	1.503"	5.47"	Full			✓
T3-3-4281HP 4140 CHROMOLY	27	1.503"	6.94"	CB			✓
T2-3-6081HP8XL	27	1.503"	8.00"	Full	✓		

CB = Counterbore, a short lead without spline in the end of some yokes.



Performance Aluminum Components

Sonnax is America's #1 source for aluminum aftermarket driveshaft components, every piece made to exacting quality standards you can trust.

- **6061-T6 Aluminum** enhances drivetrain strength, performance & durability
- **Uniquely engineered** for fast, easy assembly & welding
- **Precision-machined** to deliver long-lasting, trouble-free performance

- ▶ TUBING
- ▶ WELD YOKES
- ▶ FLANGE YOKES
- ▶ ADAPTER FLANGE YOKES
- ▶ SPLINED STUB & SLEEVE KITS
- ▶ BONDABLE YOKES

Run **BIG POWER** all season long with a **TRANSMISSION** built for track time, not downtime.

A transmission built to handle modern power levels
is **CRITICAL** when you can't risk downtime.

The trusted choice of today's top performance specialists,
Sonnax upgrades help vehicles pushed to the limit by
huge horsepower and massive torque work harder
and last longer than ever before.

POWERGLIDE | TH400 | 4L80-E | 4L60/E
6L80/90 | 4R70W | 48RE & MORE

sonnax[®] **PERFORMANCE**

faster | **tougher** | **stronger**

GET YOUR GEARHEAD ON
WWW.SONNAX.COM

4L60/E Performance & Heavy-Duty Product Guide Vol. 6

Sonnax • 2 Imtec Lane, Bellows Falls, VT 05101 USA

Contact Sonnax 8:30 a.m. to 5 p.m. ET • (800) 843-2600 • (802) 463-9722 • fax (802) 463-4059 • www.sonnax.com

©2024 Sonnax Transmission Company, Inc.  A Marron |
Berkshire Hathaway
Company

CAT-HP-4L60E6