

Performance Pack

Part No. **SC-4R100HD**

Boost Valve & Sleeve Kit

36424-01K

- Valve • Sleeve • O-Rings (2)

Line-to-Lube Pressure

Regulator Valve† 36424-04K

TCC Control Sleeve Assembly

36424-08K

Front Lube/Drainback Valve Kit

36425-01K

- Front Lube/Drainback Valve Assembly
- Cup Plug

Line Pressure Modulator Plunger

Valve & Sleeve Kit 96948-01K

- Valve • Sleeve • O-Ring

1-2 & 2-3 Accumulator

Control Valve Kits* 36948-13K

- Valves (2) • Retaining Clips (2)
- Spring Shims (8)

3-4 Accum. Control Valve Kit*

36948-09K

- Valve • Retaining Clip
- Spring Shims (4)

Performance Rated Accumulator

Spring Kit 36948-18K

- Non-Painted Springs (3)
- Red Springs (3) • Yellow Spring
- Green Springs (2)

One-Piece Rear Case Bushing**

36008D

Center Support Gasket 36743G

Sure Lock Overdrive

Spiral Snap Ring 36744-01

Center Support Seal Kit

36424-24K

- Intermediate Clutch Seal
- Intermediate Seal Adapter Tube
- Direct Clutch Seal
- Direct Seal Adapter Tube
- Springs (2)

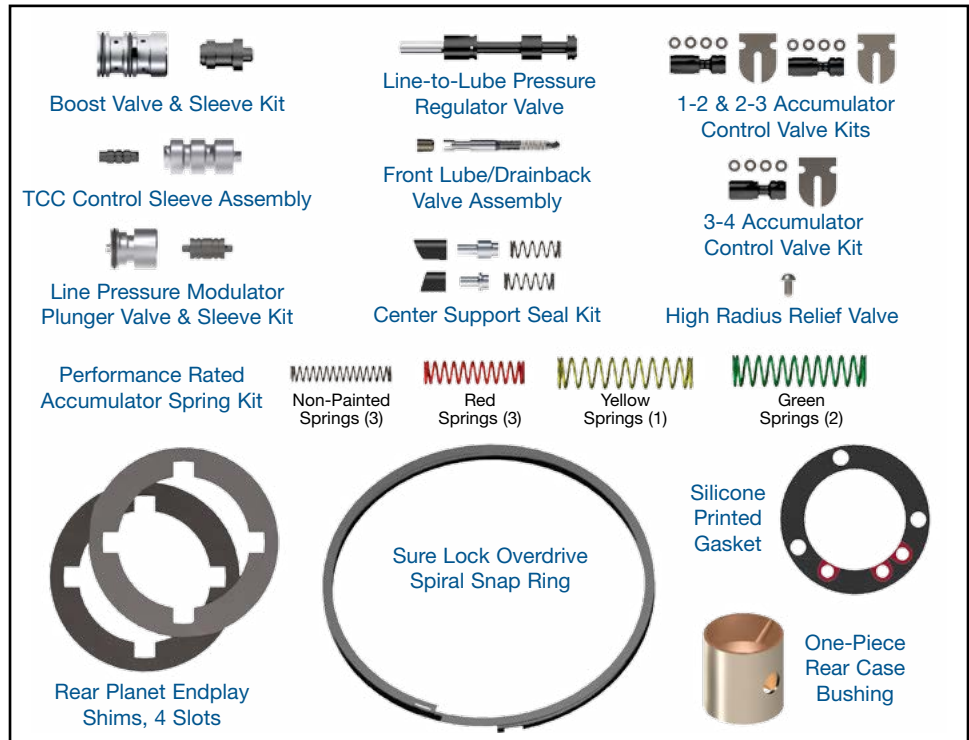
High Radius Relief Valve 10000-02

Rear Planet Endplay Shims (2)

36402-Z

†NOTE: This part is protected under patent number 6,826,908.

Ford 4R100



Torque Specifications

Pump to Stator & Case

18 to 23 ft-lb

Low Roller Clutch Race

25 ft-lb

3 Center Support Bolts

2, M12 bolts = 8 to 12 ft-lb

Valve Body & Solenoid Body Bolts & Nuts

80 to 100 in-lb

1, M10 bolt = 6 to 10 ft-lb

Clearance & Endplay

Front/Overdrive Unit Endplay

There is no OEM adjustment for endplay. Check endplay to make sure assembly is correct. Typical endplay is .005" to .020".

Rear Endplay

Rear unit endplay can be checked through hole in center support; should be .032" to .055".

Pump Clearance

- Pump pocket: .001" to .002"
- Outer rotor to pump body: .004" max
- Lobe to lobe: .004" to .006"

Note: Excess lobe-to-lobe clearance = low pump volume and cooler flow, causing converter failure.

The following tools are highly recommended for installing this Performance Pack:

*Bore Sizing Tool

36948-12



**Bushings Installation Tool

T36008A



Clutch Clearance

Overdrive

- 2 Plate = .027" to .052" (selective snap rings)
- 3 Plate = .032" to .058" (selective snap rings)

Direct

- 4 Friction = .045" to .081" (selective snap rings)

Coast Clutch

- .030" to .050" (selective snap rings)

Forward

- .030" to .055" (selective snap rings)

Intermediate/2nd Gear

Not adjustable

Low Reverse

Not adjustable

To Reduce Delays in Reverse, tighten up these clutch packs to: • Coast: .020" • Direct: .010" to .020" • Low/Reverse: .010" to .020"

Note: Alto[®] makes a kit for reverse delay with thicker steels so you can tighten up all three clutch packs.

Tech Tips

Cooler Return Line = Rear Line

PTO gear backlash does not need to be adjusted when using OE gasket. Replacement gasket is Ford #3C3Z-7223-AA or Muncie #13T37386.

There are two different length input speed sensors:

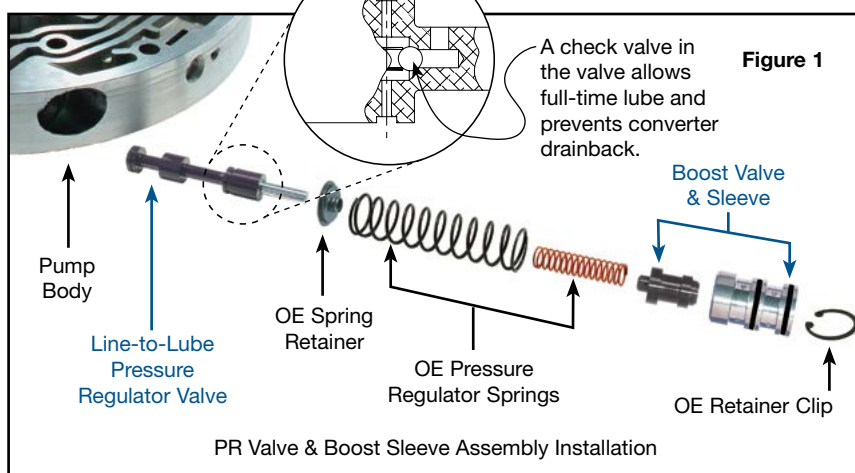
- With PTO gear use shorter sensor
- Without PTO gear use longer sensor

Always remove cooler bypass tube and fittings. Debris can plug fittings causing NO cooler flow. Cooler bypass tube has internal check valve that should open at 50–60 psi. Debris can cause bypass to stick open.

- Stuck Open = no flow through cooler and unit overheat.
- Stuck Closed = no cooler/lube when cold or if cooler is restricted.

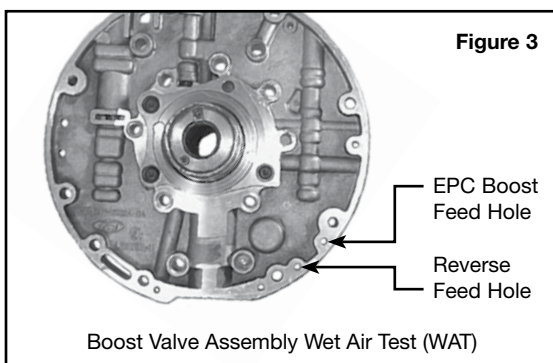
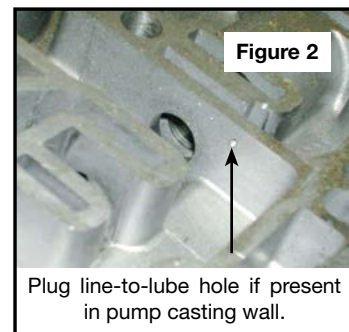
There are two different styles of cooler bypass tubes, depending on model.

Pump Body



1. Boost Valve & Sleeve Kit and Line-to-Lube Pressure Regulator Valve Installation

- Remove OE boost valve, pressure regulator springs, spring retainer and pressure regulator valve.
- If a line-to-lube orifice has been drilled into the pump casting wall, it should be plugged (**Figure 2**).
- Install the Sonnax line-to-lube pressure regulator valve with OE spring retainer and two OE springs (**Figure 1**).
- Place the two Sonnax O-rings into the grooves on the Sonnax boost sleeve.
- Insert the Sonnax boost valve into the Sonnax boost sleeve with the nubbed end facing out.
- Lubricate the assembly.
- Carefully push the Sonnax boost sleeve assembly into the pump body, open end toward the OE springs, only deep enough to reinstall the OE retaining clip.
- After installation, perform a Wet Air Test (WAT) by checking for excessive leakage with the pump halves torqued together. If cross leakage is still evident after the Sonnax O-ringed boost sleeve assembly is installed, the pump halves may be warped. Resurface and use Loctite[®] #518 gasket eliminator on the circuit from feed to the boost sleeve assembly.

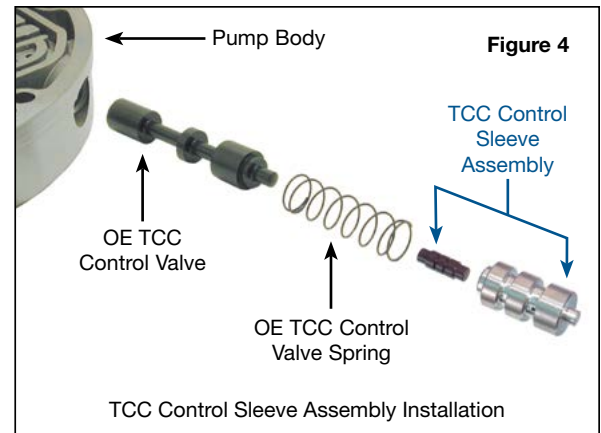


NOTE: To perform a WAT, put a small amount of oil into either the reverse boost feed hole or the EPC feed hole. Force low air pressure into the hole. There should be minimal leakage between the reverse boost/EPC feed circuit (**Figure 3**).

Pump Body (continued)

2. TCC Control Sleeve Assembly Installation

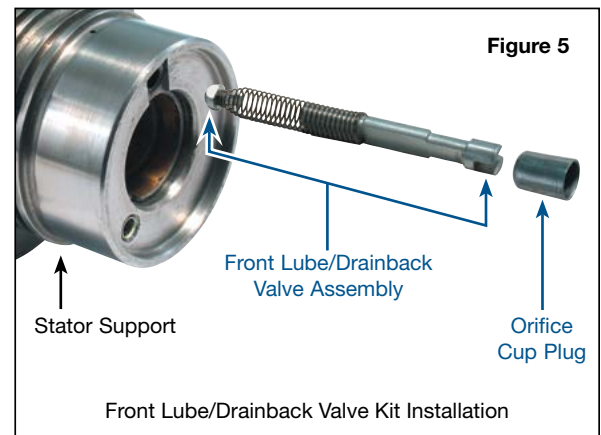
- Remove the OE TCC control valve train. Discard the TCC control sleeve assembly, while saving the TCC control valve, spring and clip for reuse.
- Reassemble and install the TCC control valve train with the Sonnax TCC control sleeve assembly (**Figure 4**).



Stator Support

Front Lube/Drainback Valve Kit Installation

- Thread a small screw into the OE orifice cup plug hole.
- Remove and discard the OE orifice cup plug (the screw is only used for removing the OE orifice cup plug).
- Remove the OE front lube/drainback valve, spring and ball seat.
- Make sure to remove the OE ball seat as it may be separated from the spring.
- Clean and inspect the bore, making sure it is clear of any debris.
- Place the Sonnax front lube/drainback valve assembly into the cleaned bore as shown (**Figure 5**).
- Install the Sonnax orifice cup plug into the bore. The orifice cup plug should be .030" to .060" below flush.
- Lightly stake bore to prevent orifice cup plug from backing out of the bore.



Accumulator Body

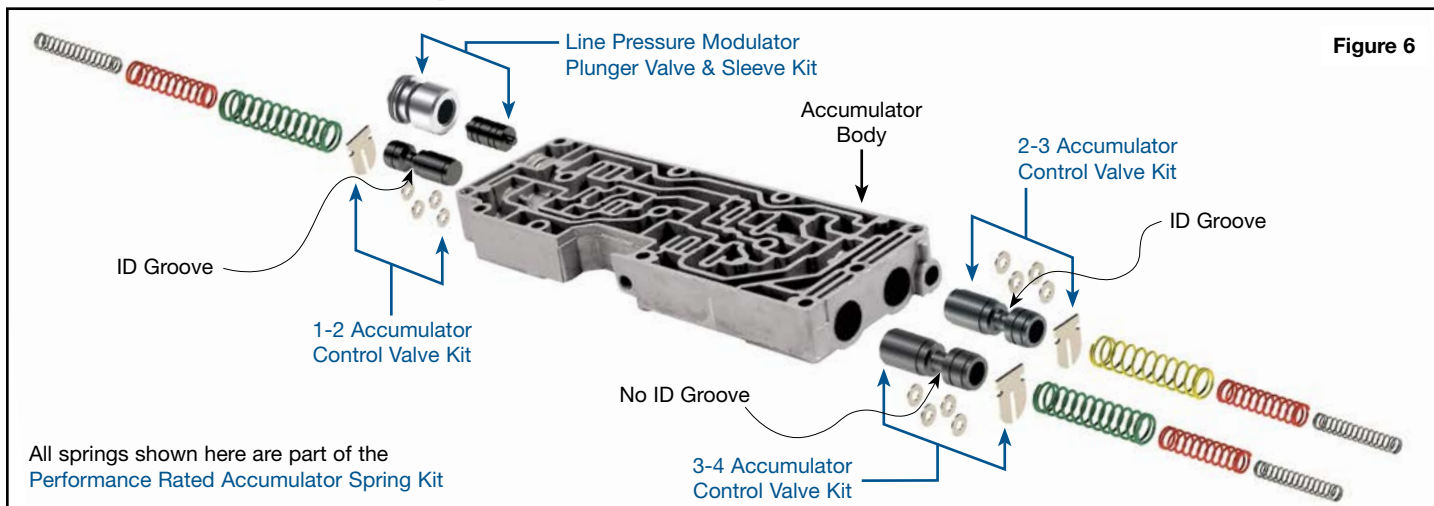


Figure 6

This 4R100 Performance Pack will increase shift firmness due to a larger diameter line pressure modulator boost valve and stiffer accumulator springs. Assemble without shims and then road test vehicle. If desired, shims can be added to increase firmness of a specific shift. Shift firmness also can be increased by making a “V” notch in the accumulator body deeper using a .120” drill bit, or by drilling the appropriate accumulator feed hole in the separator plate to .072”.

1. 1-2, 2-3 & 3-4 Accumulator Control Valve & Performance Rated Accumulator Spring Kits Installation

- a. Remove all components from the accumulator control bore. Discard the OE accumulator springs and the OE accumulator control valve. Keep the OE valve spring, retaining clip, accumulator piston, end plug and end plug clip for reuse.

NOTE: If the OE control valve was stuck or if the new Sonnax valve sticks, use the Sonnax bore sizing tool **36948-12** (not included in this Performance Pack) to smooth the accumulator control valve bore (**Figure 9**). Instructions for this procedure are on page 5.

- b. Install the Sonnax accumulator control valve with groove or no-groove (see illustration (**Figure 6**) or chart (**Figure 7**) for correct locations). It is recommended that the accumulator valves be assembled without shims and the vehicle road tested. For performance applications, shims can be added to the spring pocket in the accumulator valve to increase firmness of a specific shift. The more shims used, the firmer the shift.
- c. Place the OE accumulator control valve spring into pocket on Sonnax valve and install both the OE and Sonnax retainer clips as shown (**Figure 8**). Sonnax bore sizing tool **36948-12** (not included in this Performance Pack) can be used to compress this spring.
- d. Install the OE accumulator piston and Sonnax performance rated accumulator springs. Install either a large green or a large yellow accumulator spring into the OE accumulator piston pocket, followed by a medium-sized red spring and a small, non-painted spring. See illustration (**Figure 6**) or chart (**Figure 7**) for correct spring selection.
- e. Install OE end plug and secure with OE end plug clip.

Figure 7

Accumulator Bore Location	Sonnax Accumulator Control Valve	Sonnax Large Performance Rated Spring
1-2 Accum Bore	I.D. Groove	Green
2-3 Accum Bore	I.D. Groove	Yellow
3-4 Accum Bore	No I.D. Groove	Green

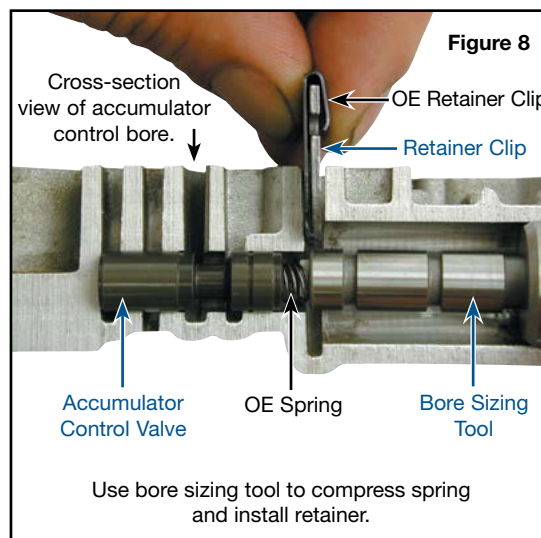


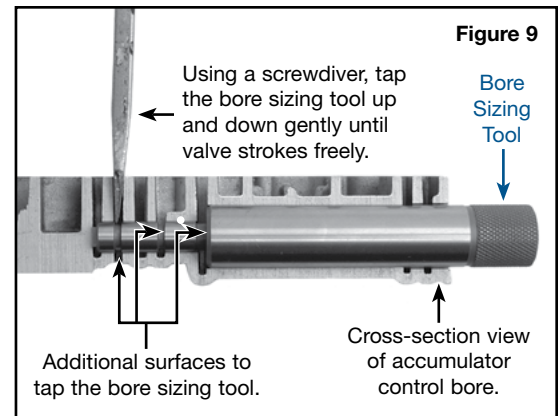
Figure 8

Accumulator Body (continued)

1-2, 2-3 & 3-4 Accumulator Control Bore Sizing Instructions

NOTE: Sonnax bore sizing tool **36948-12** is highly recommended, but not included in this 4R100 Performance Pack. This bore sizing tool is used to properly resize and smooth the accumulator control bore to eliminate valve hang-ups and sticking.

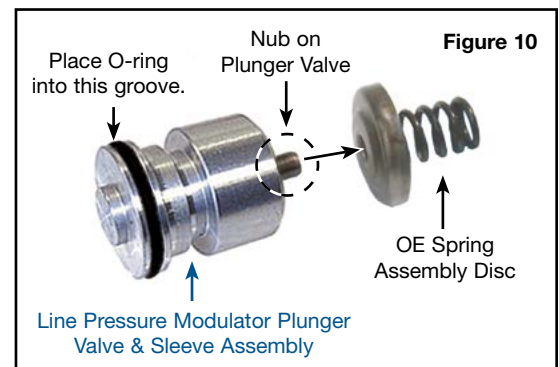
- After removing OE components from the bore, insert the end of the Sonnax bore sizing tool into the accumulator control bore until it bottoms out.
- Remove the bore sizing tool and check to see if the Sonnax accumulator control valve moves freely within the bore.
- If the valve does not move freely, reinstall the bore sizing tool and tap the sizing tool up and down using a hammer and screwdriver (**Figure 9**). Repeat process until the valve strokes freely.



2. Line Pressure Modulator Plunger Valve & Sleeve Kit Installation

See photo overview on previous page (**Figure 6**).

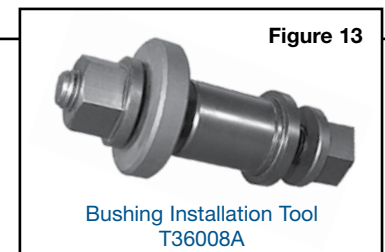
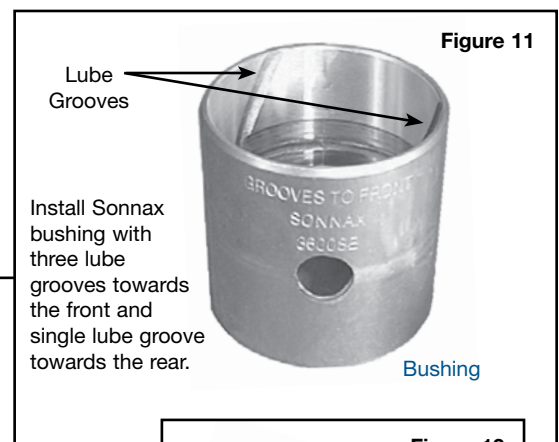
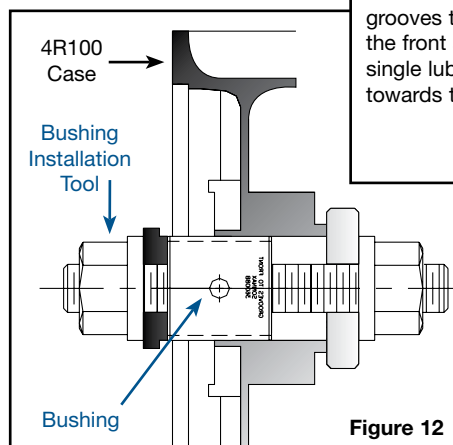
- Remove and retain the OE retaining clip.
- Remove and discard the OE line pressure modulator sleeve and plunger valve.
- Insert the Sonnax plunger valve into the Sonnax sleeve.
- Put the Sonnax O-ring into the groove on the outside diameter of the sleeve.
- Place the nub on the end of the plunger valve into the hole in the spring assembly disc (**Figure 10**). Push the sleeve/spring assembly into the accumulator body, open end toward the springs, only deep enough to reinstall the OE retaining clip.



Reassembly Parts

1. One-Piece Rear Case Bushing Installation (Figures 11, 12 & 13)

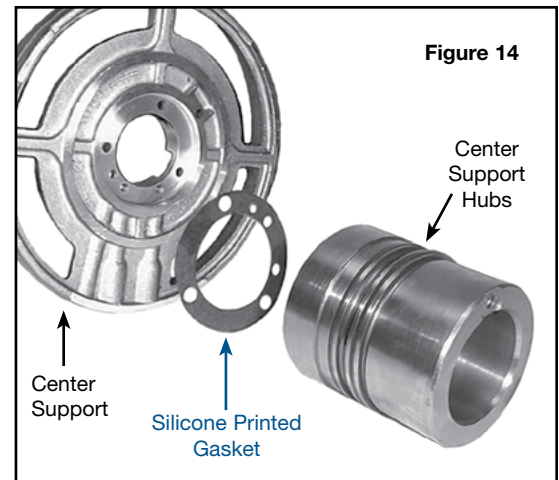
- Remove worn or damaged OE bushings from the transmission case.
- Remove any ridge or case material with a hone if the bore I.D. is irregular.
- Apply Loctite[®] 609 sealant to case bore.
- Align the lubrication hole of the Sonnax bushing with the hole in the transmission case.
- It is important to use the Sonnax bushing installation tool **T36008A** (not included in this Performance Pack) to prevent deformation of the long, thin-walled bushing. The bushing installation tool shoulder also is designed to seat the bushing at the proper depth.
- After installing the Sonnax bushing, confirm the lubrication holes are properly lined up and that the correct clearance has been maintained between the bushing and output shaft.



Reassembly Parts (continued)

2. Center Support Gasket Installation (Figure 14)

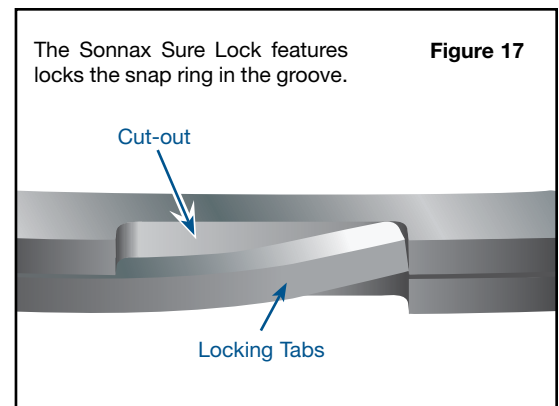
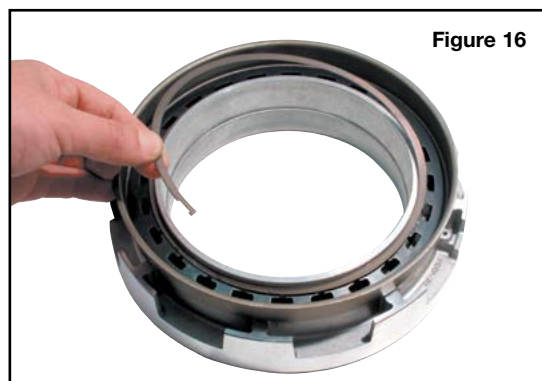
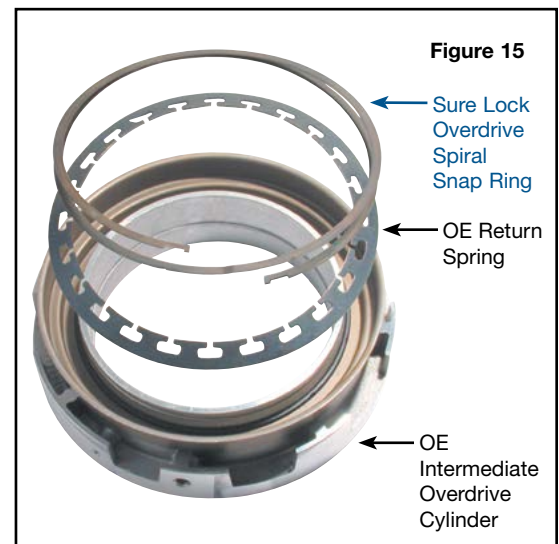
- Remove any burrs and break sharp edges on the aluminum center support contact surface.
- Using a medium grit oil stone, smooth the mating hub surface.
- Clean both parts, including the tapped holes, with solvent.
- Lightly coat gasket surface with TransJel™ and place it in the center support counter-bore with beaded gasket surface against center support.
- Align gasket holes with center support and set hub in place.
- Apply Loctite® 242 Threadlocker on the three M6 mounting screws, following the Loctite® instructions.
- Install screws and progressively torque to 75 to 85 in-lb initially, then torque to 100 to 120 in-lb.



3. Sure Lock Overdrive Spiral Snap Ring Installation (Figure 15)

WARNING: Be sure that the snap ring is installed correctly. Failure to install correctly may result in unit failure.

- Using a spring compressor, compress the OE overdrive return spring retaining ring.
- Remove and discard the OE overdrive return spring retaining ring.
- Install one end of the Sonnax Sure Lock overdrive spiral snap ring into the OE retaining ring groove.
- With the Sonnax snap ring end installed in the groove, work the ring into the groove one wrap at a time (Figure 16).
- After the Sonnax snap ring is fully installed, make sure that the locking tabs are engaged with the cutouts in the retaining ring as shown. It may be necessary to bend the locking tabs up to get a secure lock (Figure 17). Do NOT bend the cut-out ends.



Reassembly Parts (continued)

4. Center Support Seal Kit Installation (Figure 18)

IMPORTANT NOTE: These intermediate and direct clutch feed seals are installed after internal parts are assembled and before valve body is installed.

Intermediate Clutch

- Coat rubber seal with assembly lube.
- Align locator guide nub with slot in case and insert Sonnax rubber seal into the intermediate feed port (Figure 19).
- Install the Sonnax aluminum seal adapter tube and then the spring.

Direct Clutch

- Due to variations in castings on late 4R100 units, the alignment nub *may* need to be cut off of the direct clutch seal.
 - If the distance from the valve body gasket surface to the cast passage (Figure 20) is more than (.625"), install the seal as-is.
 - If the distance from the valve body gasket surface to the cast passage (Figure 20) is less than (.625"), cut the nub off of the side of the direct clutch seal (Figure 21).
- Coat Sonnax rubber seal with assembly lube.
- Align locator guide nub with slot in case and insert rubber seal, flush with inside of case.
- Install the Sonnax aluminum seal adapter tube and then the spring.

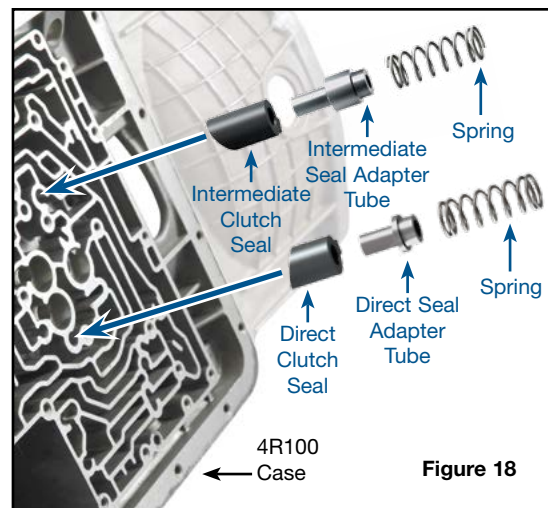


Figure 18

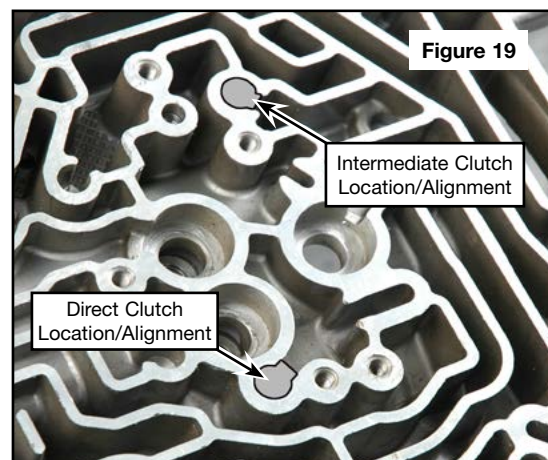


Figure 19

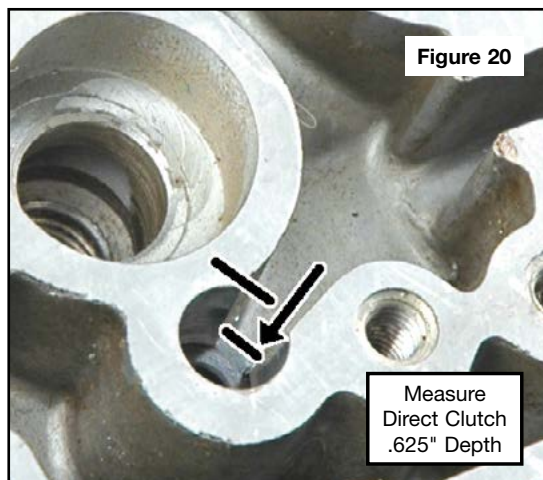


Figure 20

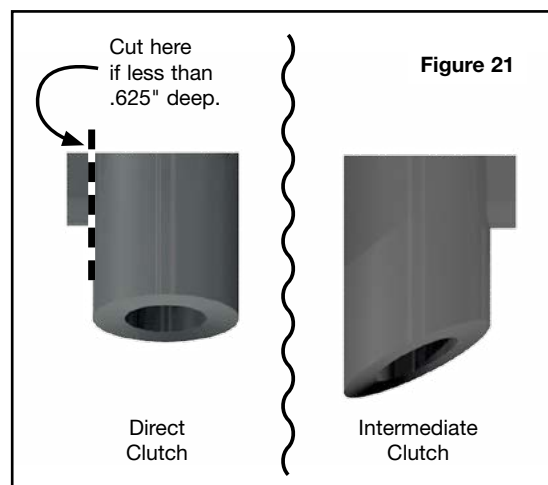


Figure 21

Reassembly Parts (continued)

5. High Radius Relief Valve Installation (Figure 22)

- Remove OE EPC relief "blow-off" checkball from the 4R100 case.
- Replace with the improved, stemmed Sonnax high radius relief valve.

6. Rear Planet Endplay Shim Installation (Figure 23)

When visible spline or driveline wear is evident, it is beneficial to install .010" shim(s) during lower unit assembly. The Sonnax rear planet endplay shims should be installed under the four-tanged thrust washer, located between the reverse planetary carrier and input shell. When final assembly is completed, total endplay should be inspected with an H gauge, depth micrometer or dial caliper. The OE endplay specification is .075". The recommended endplay is .040" or less. This shim does not reduce output shaft free play.

NOTE: The Sonnax rear planet endplay shims will not fit in late-model applications with six pinion carriers.

Figure 22

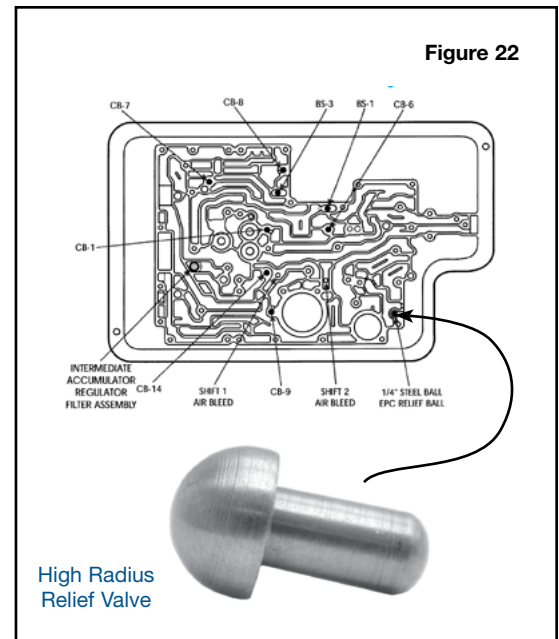


Figure 23

