THE SURE CURE®

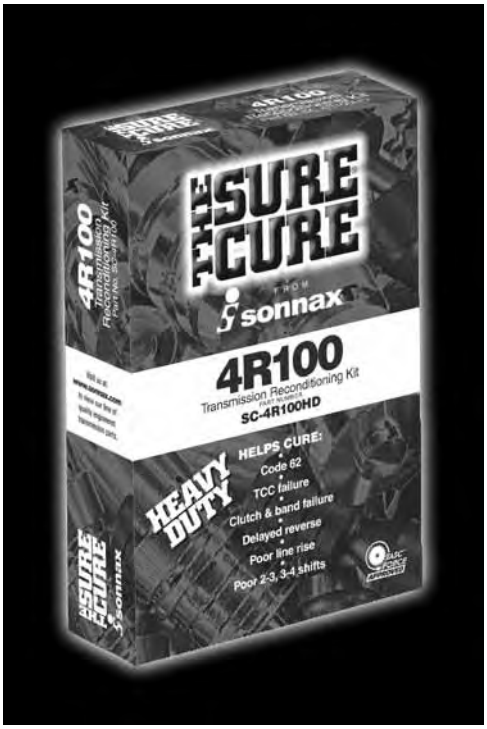
HEAVY DUTY

4R100

Transmission Reconditioning Kit

sonnax®

Part No. SC-4R100



FULL COMPATIBILITY

Full compatibility 1998 and up PWM units. **Recommended for HP and heavy duty/towing applications only.**

REASSEMBLY PARTS

- Center support gasket **(36743G)** U.S. Patent Nos. 6,325,388 and 6,588,766
- One-piece case bushing **(36008D)**
- 2 endplay shims **(36402-Z)**
- Overdrive piston return spring retaining ring **(36744-01)**
- EPC relief valve **(10000-02K)**

VALVE BODY PARTS

- Line pressure modulator valve kit **(96948-01K)** (.427" heavy duty)
- 1-2 and 2-3 accumulator control valve kit **(36948-13K)**
- 3-4 accumulator control valve kit **(36948-09K)**
- 9 accumulator piston springs

PUMP BODY PARTS

- Boost valve assembly **(36424-01K)**
- Line-to-lube pressure regulator valve **(36424-04K)** Patent Pending
- Front lube / drainback valve **(36425-01K)**
- TCC control sleeve assembly **(36424-08K)**

RECOMMENDED TOOLS

The following tools are not required but are highly recommended for proper installation:

36948-12 Bore sizing tool for accumulator control valves

T36008A Case bushing installation tool

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TORQUE SPECIFICATIONS

Pump to stator
18 to 23 ft. lbs.

Pump to case
18 to 23 ft. lbs.

3 center support bolts
2, M12 bolts = 8 to 12 ft. lbs
1, M10 bolt = 6 to 10 ft. lbs.

All valve body, solenoid and stiffener plate bolts
100 in. lbs.

3 valve body stud nuts
120 in. lbs.

Accumulator body
80 in lbs.

Sprag race
25 ft. lbs.

Oil Pan
12 ft. lbs.

Extension housing
25 ft. lbs.

Important: Use the impact for teardown, but keep it away from those 3 center support bolts on reassembly. Speed handle and torque wrench can prevent lots of unwanted after-overhaul problems.

CLEARANCE AND ENDPLAY

Front/overdrive unit endplay
There is no check or adjustment for endplay. Check endplay anyway just to make sure that all the washers and bearings are in place and that everything is indexed. Use your H gauge; you should have .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 clearance is .001" to .002"
* Outer rotor to pump body .004" max.
* Lobe to Lobe .004" to .006" max

NOTE: Excessive lobe to lobe clearance = low pump volume and cooler flow, which kills converter

CLUTCH CLEARANCE

Overdrive
2 plate = .027" to .052" (selective snap rings)
3 plate = .032" to .058" (selective snap rings)

Coast clutch
.030" to .050" (selective snap rings)

Intermediate / 2nd Gear
Not adjustable

Direct
4 friction - .045" to .081" (selective snap rings)

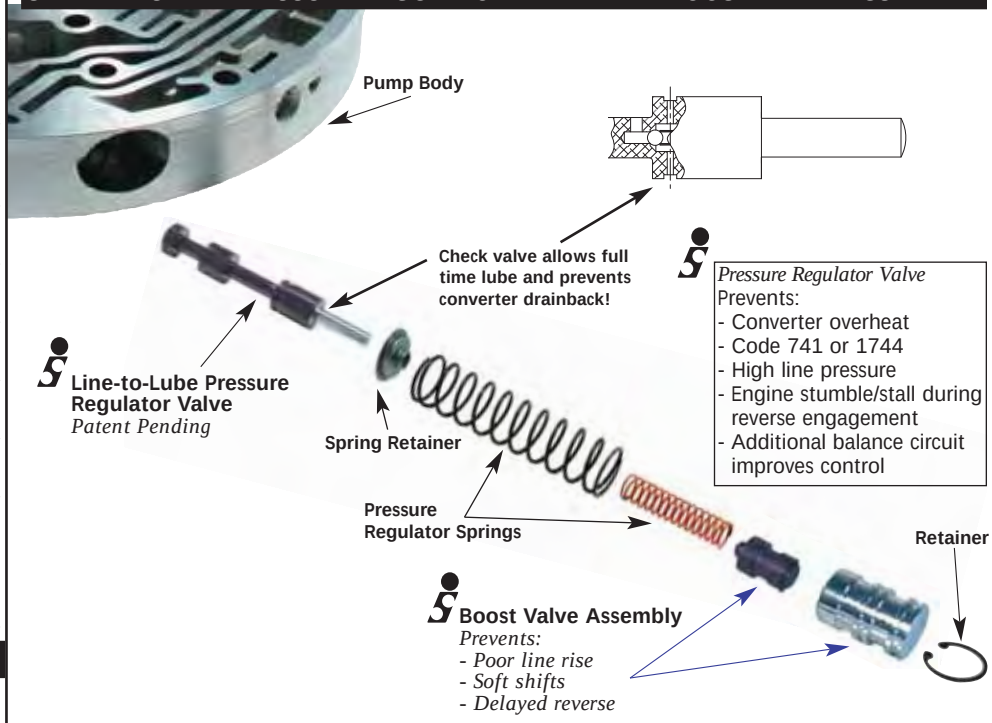
Forward
.030" to .055" (selective snap rings)

Low Reverse
Not adjustable

To reduce delays into 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 3 clutch packs.

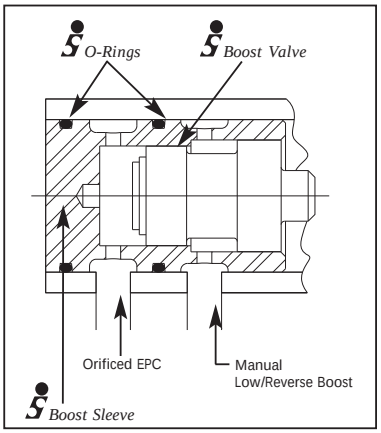
PUMP PARTS INSTRUCTIONS

STEP 1 INSTALL PRESSURE REGULATOR VALVE AND BOOST VALVE ASSEMBLY



PR VALVE AND BOOST VALVE INSTRUCTIONS

1. Remove OEM boost valve, PR springs, spring retainer and PR valve. Discard both the OEM boost valve and sleeve and PR valve.
2. If a line-to-lube orifice has been drilled into the pump casting wall, it should be plugged (refer to photo).
3. Install Sonnax PR valve with original spring retainer and 2 OEM springs as illustrated. This is a drop-in replacement part, requiring no reaming or bore sizing.
4. Place the two O-rings into the grooves on the boost sleeve.
5. Insert the valve into the sleeve with the nubbed end facing out.
6. Lubricate the assembly.
7. Carefully push the sleeve into the valve body, open end toward the springs, only deep enough to reinstall the retaining clip.
8. WAT after installation. If cross leakage is still evident after a new O-ringed sleeve is installed, the pump halves may be warped. Resurface and use Loctite® #518 gasket eliminator on the circuit from feed to boost sleeve.



TECH TIP

* Cooler return line = Rear line

* It is common for the pressure regulator valve to wear on the backside of the valve. Make sure to remove the valve to check for wear.

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

* There are 2 different length input speed sensors. With PTO gear uses shorter sensor. Without PTO gear uses longer sensor.

* Loose splines on output speed sensor can cause erratic speed signal to computer.

* 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 2 different styles of cooler bypass tubes, depending on model.

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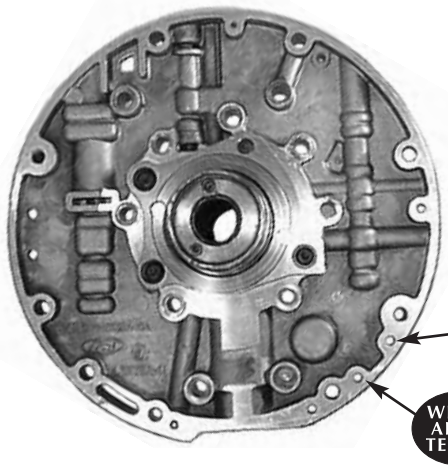
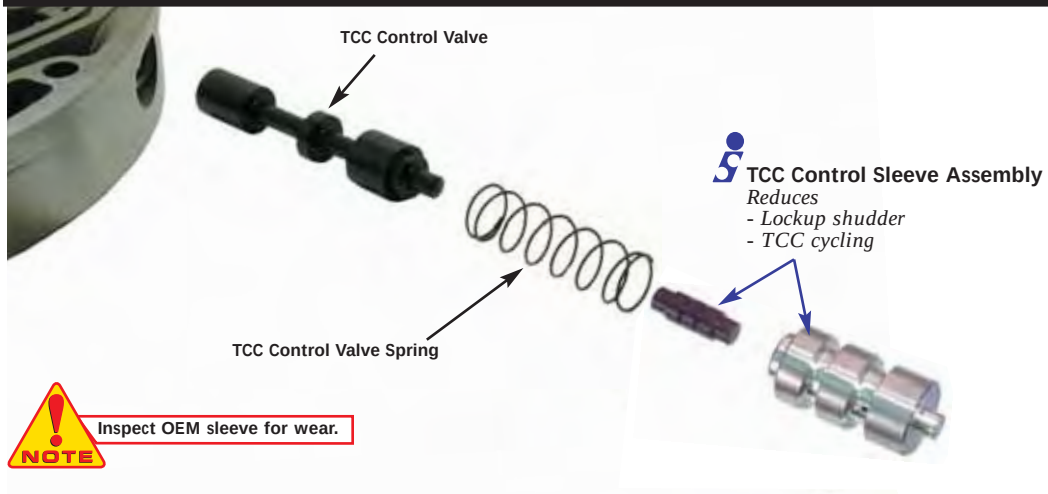
WAT INSTRUCTIONS

To check for excessive leakage with the pump halves torqued together, perform a Wet Air Test. 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. If cross leakage is evident after new o-ring sleeve is installed, pump halves may be warped.



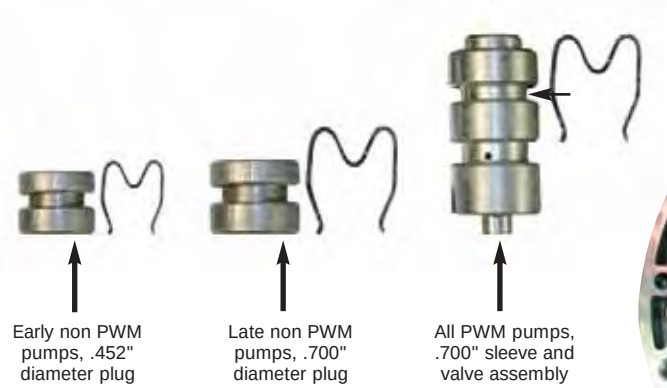
Boost Valve Assembly WAT: *Wet Air Tests can be done either way for this particular application. No cross leaks from either port into neighboring circuits.*

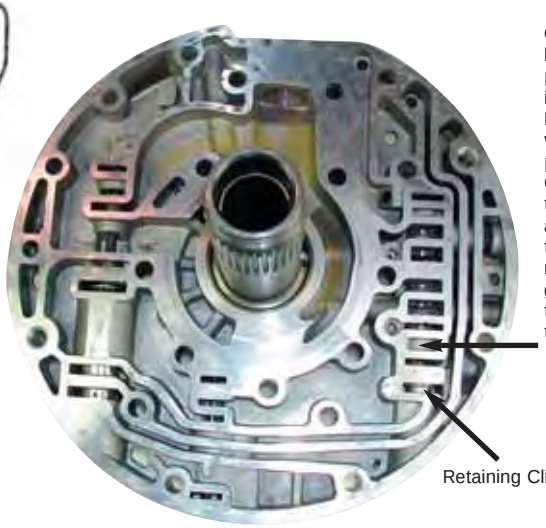
STEP 2 INSTALL TCC CONTROL SLEEVE ASSEMBLY



INSTALLATION INSTRUCTIONS

1. Remove and discard the OEM TCC control sleeve assembly. Save the TCC control valve, spring and clip.
2. Reassemble the valve train with the Sonnax TCC control sleeve assembly **36424-08K**.





On-Off TCC valve line-up with end plug cannot be interchanged with PWM valve line-up with sleeve and plunger valve. Castings used with the PWM sleeve and plunger have the .700" bore machined to a greater depth than the on/off type casting.

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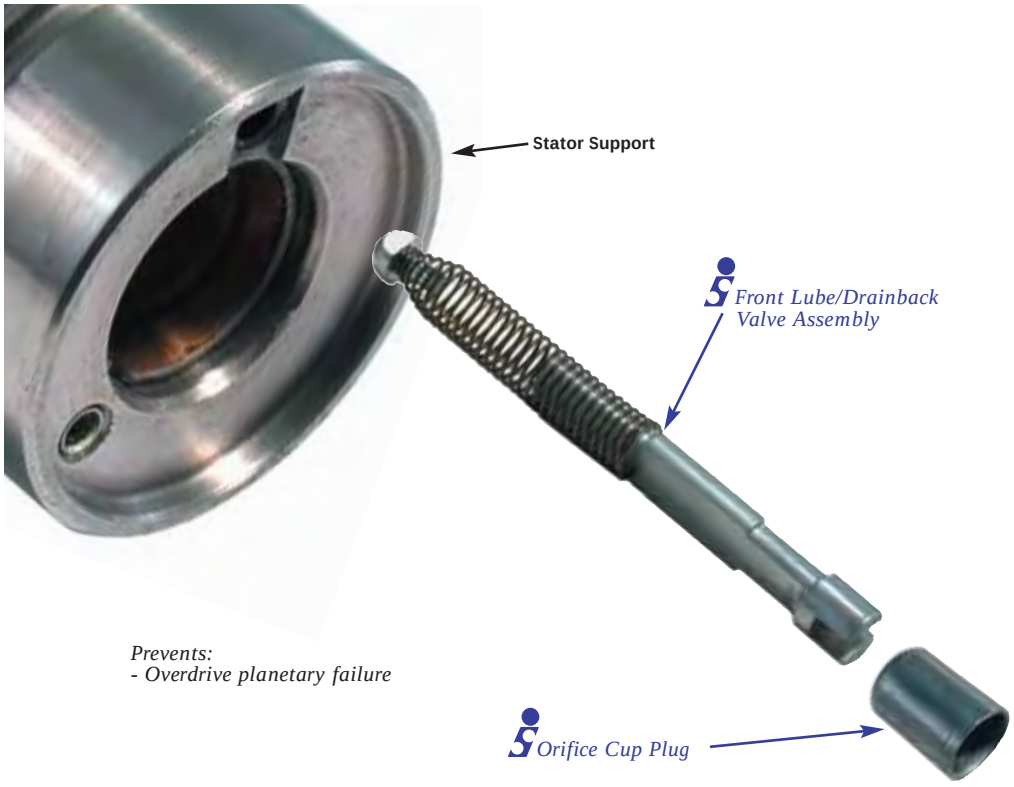
STEP 3 INSTALL THE FRONT/LUBE DRAINBACK VALVE



Prevents:
- Overdrive planetary failure

INSTALLATION INSTRUCTIONS:

1. Thread a small screw into the orifice cup plug hole.
2. Remove and discard the old orifice cup plug (the screw is only used for removing the orifice cup plug).
3. Remove the existing front lube / drainback valve.
4. Make sure to remove the ball seat; it may be separated from the spring.
5. Clean and inspect bore, making sure bore is clear of any debris.
6. Place the new assembly into the cleaned bore as shown in the above photo.
7. Install the new orifice cup plug into bore: Orifice cup plug should be .030" to .060" below flush.
8. Lightly stake bore to prevent orifice cup plug from backing out of bore.

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Accumulator Control Body

The 4R100HD Sure Cure® kit will increase shift firmness over the OEM calibration. Recommended for performance and heavy towing applications only.

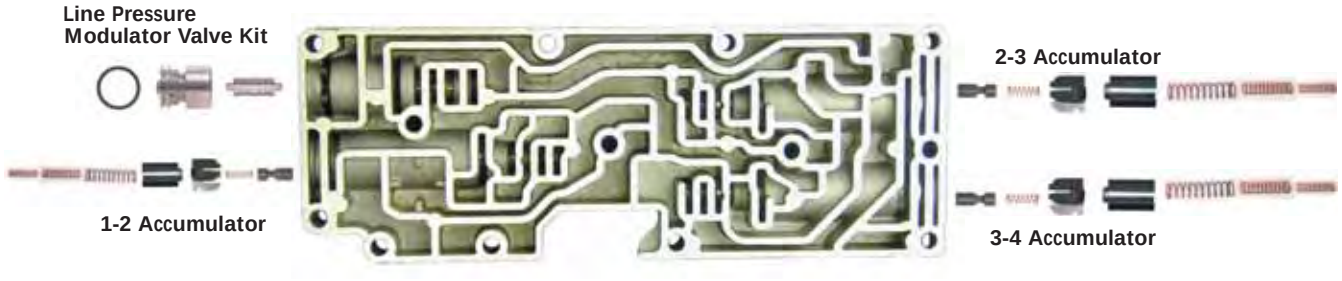
A large-diameter line pressure modulator boost valve and stiffer accumulator springs are included with this kit. These components increase shift firmness over OEM calibration.

It is recommended that the accumulator body be assembled without shims and the vehicle road tested.

If desired, shims can then be added to increase firmness of a specific shift. Two or more shims should be used for high performance applications only.

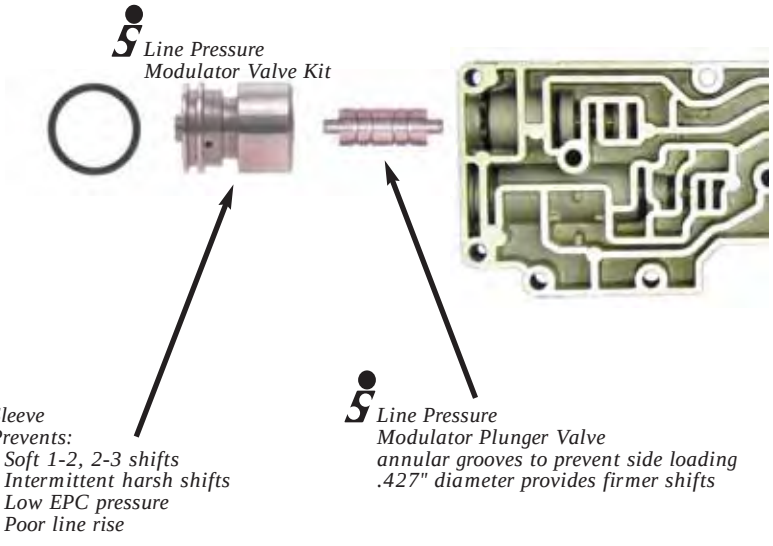
Shift firmness can also be increased by:

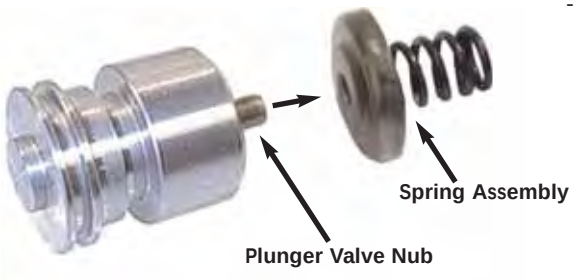
Making the “V” notch in the accumulator body deeper using a .120" drill bit or drilling the appropriate accumulator feed hole in the separator plate to .072".



STEP 4 INSTALL LINE PRESSURE MODULATOR VALVE & SLEEVE

1. To install the Sonnax replacement assembly, remove the retaining clip from the line pressure modulator valve bore in the 4R100 accumulator valve body.
2. Remove and discard both the worn line pressure modulator sleeve and plunger valve.
3. Insert the new plunger valve into the new sleeve. The plunger valve is completely symmetrical, so orientation is not an issue. Lubricate the assembly.
4. Put the O-ring into the groove on the outside diameter of the sleeve.
5. Place the nub on the end of the plunger valve into the hole in the spring-assembly disc (see below). Push the sleeve/spring-assembly into the valve body, open end toward the springs, only deep enough to reinstall the retaining clip.

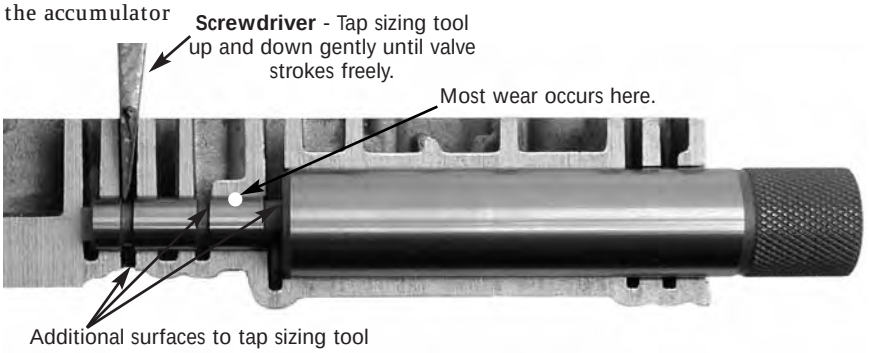




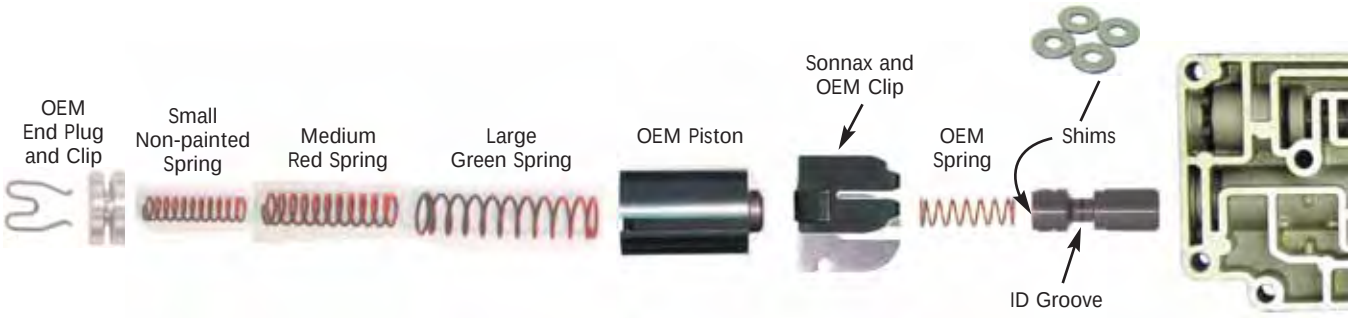
BORE SIZING INSTRUCTIONS

Use the Sonnax bore sizing tool to smooth bore to eliminate valve sticking.

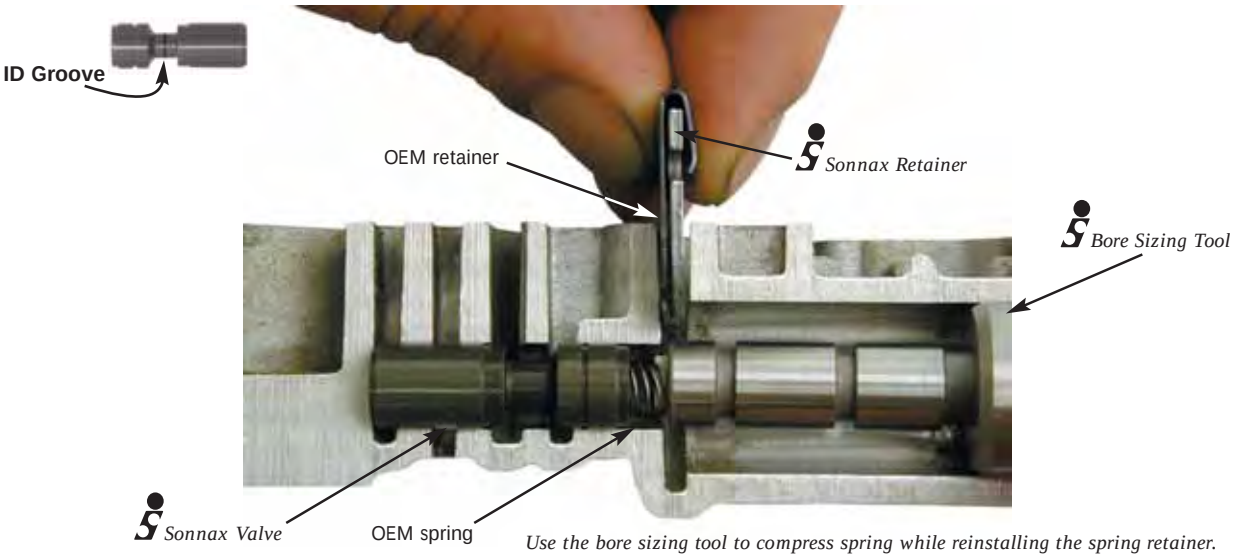
1. Insert the end of the bore sizing tool into the accumulator control bore. Press it into the bore until it bottoms out.
2. Remove the sizing tool and check to see if the valve moves freely within the bore.
3. If the valve does not move freely, reinstall the bore sizing tool and tap the sizing tool up and down using a hammer and screwdriver. This will smooth out any ridges in the bore. Repeat process until the valve strokes freely.



STEP 5 INSTALL 1-2 ACCUMULATOR



1. Remove all components from the 1-2 accumulator.
2. Discard the OEM accumulator springs and the OEM accumulator control valve.
3. If the OEM control valve was stuck or if the new Sonnax valve sticks, use the Sonnax bore sizing tool to smooth the accumulator control valve bore.



Use the bore sizing tool to compress spring while reinstalling the spring retainer.

4. Install the Sonnax accumulator control valve with the desired number of shims; the more shims used, the firmer the shift. Note: The Sonnax 1-2 accumulator control valve has an ID groove.
5. Place the OEM accumulator control valve spring into pocket on valve. Compress spring using the Sonnax bore sizing tool and install both the OEM retainer and Sonnax retainer as shown below.
6. Install a large green accumulator spring, a medium-sized red spring and a nonpainted small spring into the OEM accumulator piston pocket.
7. Install the accumulator piston and springs into the accumulator body.
8. Install the OEM end plug and clip.

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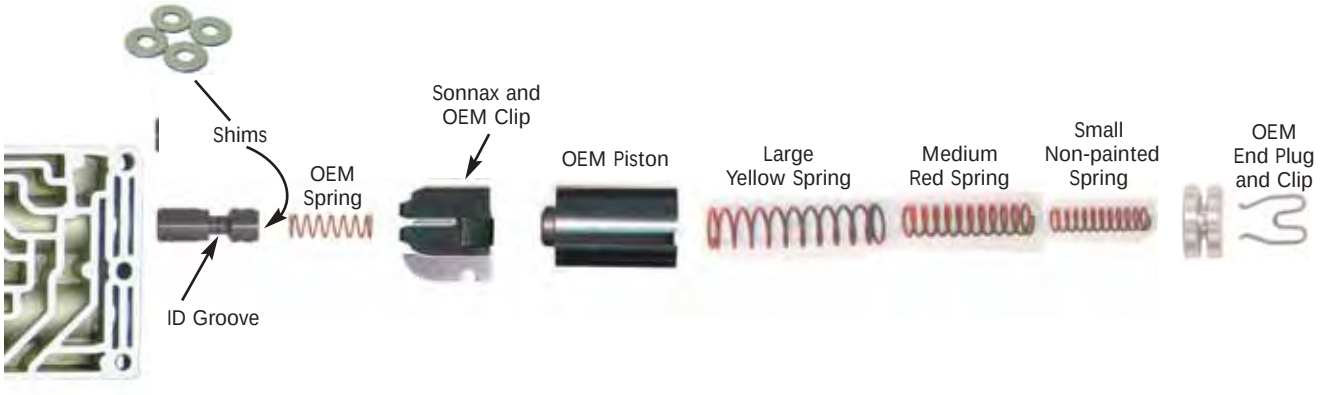
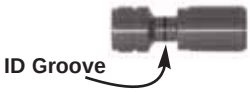
STEP 6 INSTALL 2-3 ACCUMULATOR



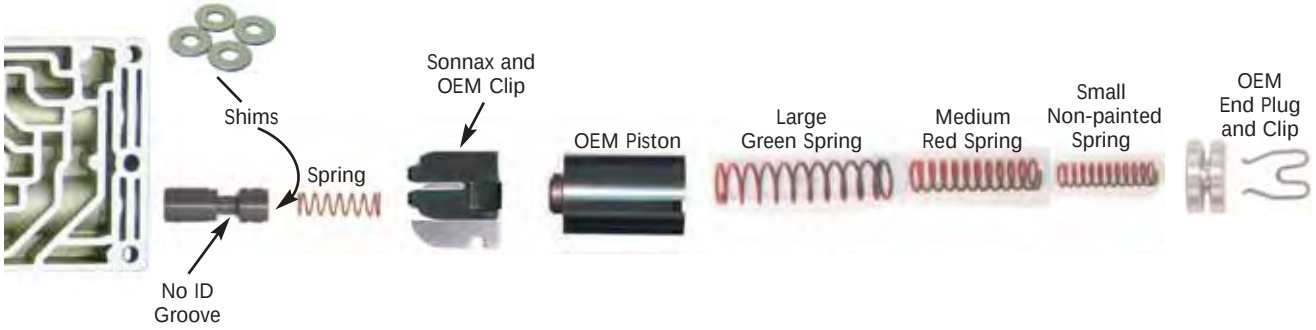
1. Remove all components from the 2-3 accumulator.
2. Discard the OEM accumulator springs and the OEM accumulator control valve.
3. If the OEM control valve was stuck or if the new Sonnax valve sticks, use the Sonnax bore sizing tool to smooth the accumulator control valve bore.
4. Install the Sonnax accumulator control valve with the desired number of shims; the more shims used, the firmer the shift.

   Note: The Sonnax 2-3 accumulator control valve has an ID groove.



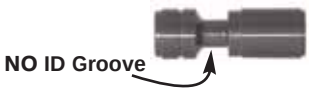
5. Place the OEM accumulator control valve spring into pocket on valve. Compress spring using the Sonnax bore sizing tool and install both the OEM retainer and Sonnax retainer as shown previously.
6. Install a large yellow accumulator spring, a medium-sized red spring and a nonpainted small spring into the OEM accumulator piston pocket.
7. Install the accumulator piston and springs into the accumulator body.
8. Install the OEM end plug and clip.

STEP 7 INSTALL 3-4 ACCUMULATOR



1. Remove all components from the 3-4 accumulator.
2. Discard the OEM accumulator springs and the OEM accumulator control valve.
3. If the OEM control valve was stuck or if the new Sonnax valve sticks, use the Sonnax bore sizing tool to smooth the accumulator control valve bore.
4. Install the Sonnax accumulator control valve with the desired number of shims; the more shims used, the firmer the shift.

Note: The Sonnax 3-4 accumulator control valve does not have an ID groove.



5. Place the OEM accumulator control valve spring into pocket on valve. Compress spring using the Sonnax bore sizing tool and install both the OEM retainer and Sonnax retainer as shown previously.
6. Install a large green accumulator spring, a medium-sized red spring and a nonpainted small spring into the OEM accumulator piston pocket.
7. Install the accumulator piston and springs into the accumulator body.
8. Install the OEM end plug and clip.

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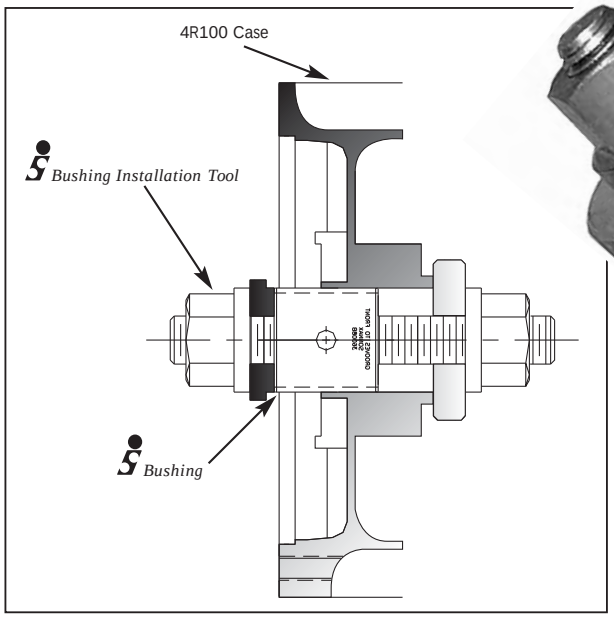
STEP 8 INSTALL REAR CASE BUSHING

1. Remove worn or damaged OEM bushings from the transmission case.
2. Remove any ridge or case material with a hone if the bore I.D. is irregular.
3. Apply Loctite® 609 sealant to case bore.
4. Align the lubrication hole of the replacement bushing with the hole in the transmission case.
5. It is important to use the Sonnax installation tool **T36008A** to prevent deformation of the long, thin-walled bushing. In addition, the tool shoulder is designed to seat the bushing at the proper depth.
6. After installing the bushing, confirm that the lubrication holes are properly lined up and that the correct clearance has been maintained between the bushing and output shaft.

Bushing

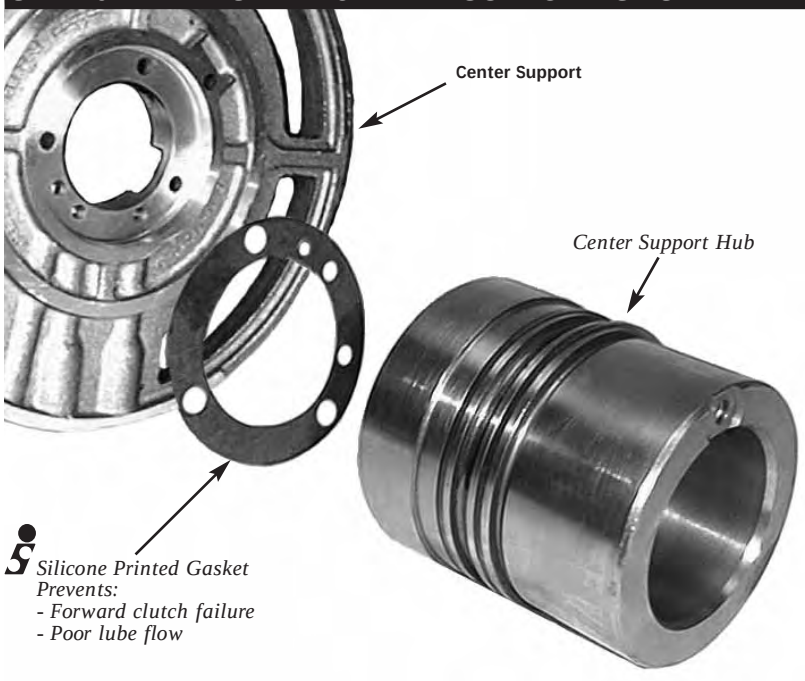
hardened, steel-backed

Install the Sonnax bushing with 3 lube grooves toward front, single groove toward rear.



Bushing Installation Tool (T36008A) (Not included with SC-4R100HD-IN kit)

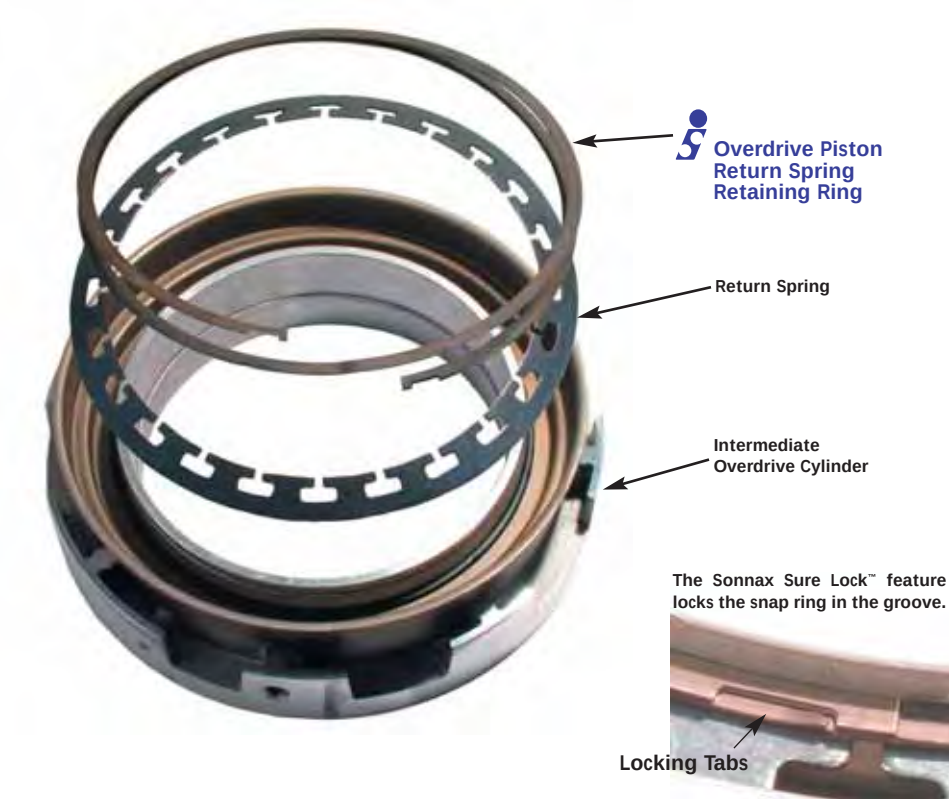
STEP 9 INSTALL CENTER SUPPORT GASKET



1. Remove any burrs and break sharp edges on the aluminum center support contact surface.
2. Using a medium grit oil stone, smooth the mating hub surface.
3. Clean both parts, including the tapped holes, with solvent.
4. Lightly coat gasket surface with TransJel™ and place it in the center support counterbore with beaded gasket surface against center support.
5. Align gasket holes with center support and set hub in place.
6. Apply Loctite® 242 thread locker on the (3) M6 mounting screws, following the Loctite® instructions.
7. Install screws and progressively torque to 75-85 in-lbs initially, then torque to 100-120 in-lbs.

Note: *Sonnax Part No.* **36743G** *has U.S. patent numbers 6,325,388 & 6,588,766. Patent infringement will not be tolerated.*

STEP 10 INSTALL OVERDRIVE PISTON RETURN SPRING RETAINING RING



INSTALLATION INSTRUCTIONS

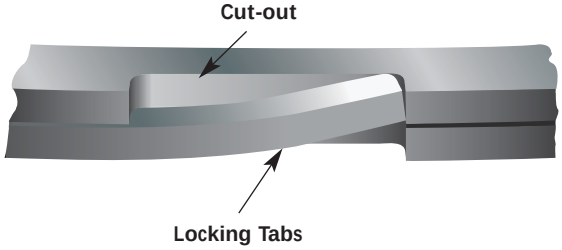
1. Using a spring compressor, compress the overdrive return spring.
2. Remove and discard the OEM return spring retaining ring.
3. Install one end of the Sonnax Sure Lock™ ring into the retaining ring groove.
4. With the ring end fully installed in the groove, work the ring into the groove one wrap at a time (see photo at right).
5. After the ring is fully installed, make sure that the locking tabs are engaged with the cut-outs in the retaining ring as shown. It may be necessary to bend the locking tabs up to get a secure lock (see Figure 2). DO NOT bend the cut-out ends.

Figure 1

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

Figure 2

The Sonnax Sure Lock™ feature locks the snap ring in the groove.



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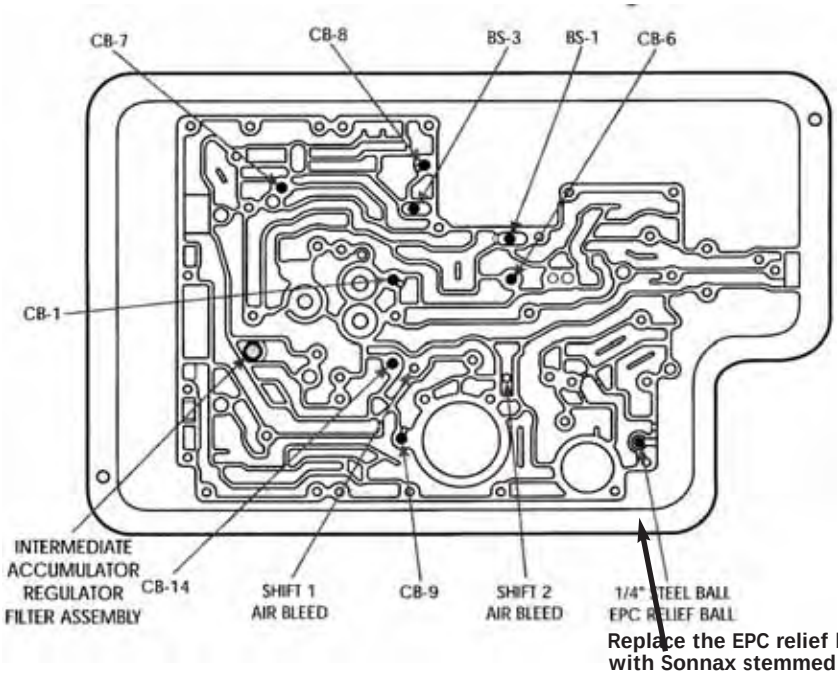
STEP 11 INSTALL EPC RELIEF VALVE

Relief Valve
High Radius

Replace the EPC blow off checkball (in the case) with the improved design Sonnax relief valve.



Replace the EPC relief ball with Sonnax stemmed relief valve.

STEP 12 INSTALL UNIT ENDPLAY SHIMS

When visible spline or driveline wear is evident, it is beneficial to install .010" shim(s) during lower unit assembly. The Sonnax shims should be installed under the 4-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 OEM endplay specification is .075". The recommended endplay is .040" or less. This shim does not reduce output shaft free play.

Note: The Sonnax shims will not fit in late-model applications with 6 pinion carriers.