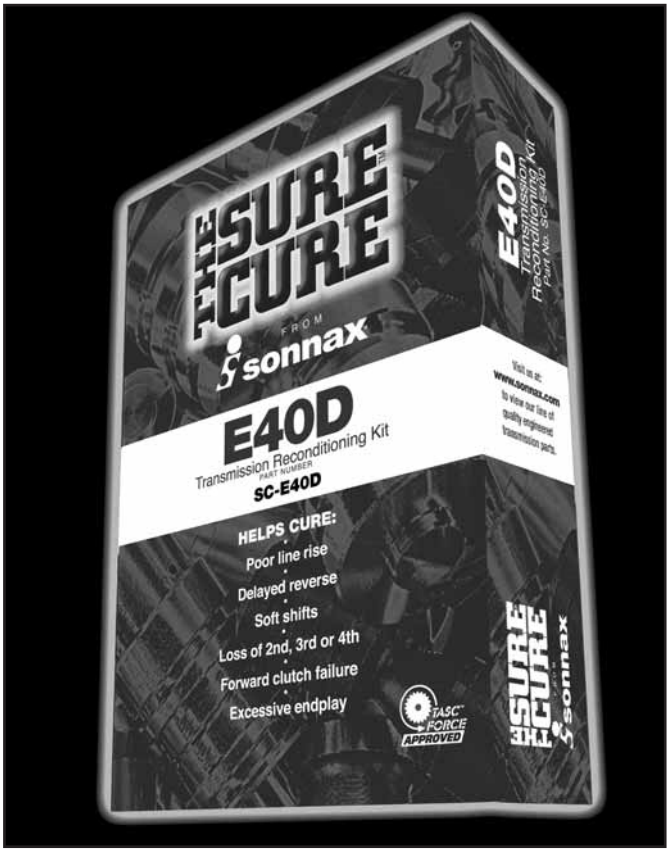
THE SURE CURE®

E4OD

Transmission Reconditioning Kit

sonnax®

SC-E4OD



FULL COMPATIBILITY

- **Full compatibility with 1989 and up units.**

REASSEMBLY PARTS

- Center support gasket **(36743G)** U.S. Patent Nos. 6,325,388 & 6,588,766
- One-piece case bushing **(36008B)**
- 2 endplay shims **(36402-Z)**
- 1 Sure Lock™ overdrive piston return spring retaining ring **(36744-01)**
- Front lube / drainback valve **(36425-01K)**

VALVE BODY / PUMP PARTS

- Boost valve assembly **(36424-01K)**
- Line pressure modulator valve kit **(36948-05K)**
- 1-2 & 2-3 accumulator control valve kit **(36948-13K)**
- 3-4 accumulator control valve kit **(36948-09K)**
- Relief valve **(10000-01K)**

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 ft. lbs.
Pump to case 20 ft. lbs.
3 center support bolts 72 in. 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.

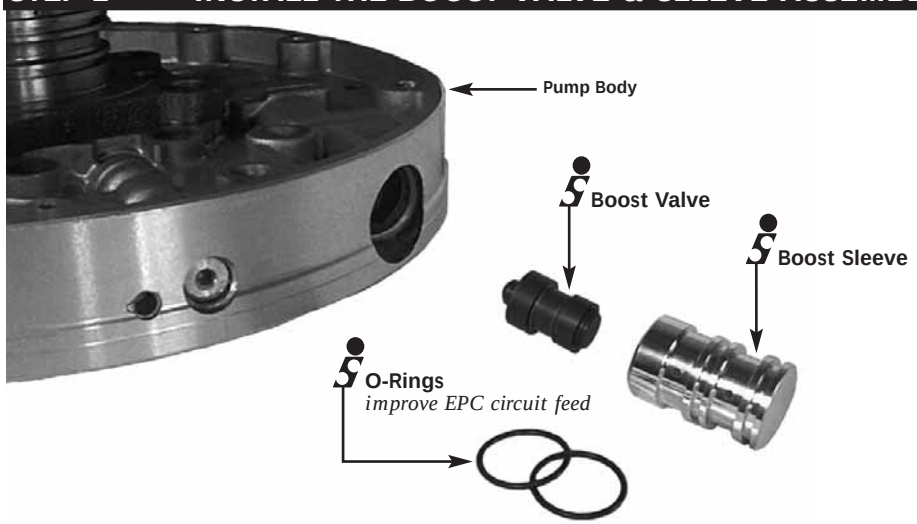
CLEARANCE AND ENDPLAY

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 .022" to .047" (selective snap rings)
Coast clutch .025" to .045" (selective snap rings)
Intermediate/2nd Gear Not adjustable
Direct (selective snap rings) 3 friction - .030" to .045" 4 friction - .045" to .060"
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.

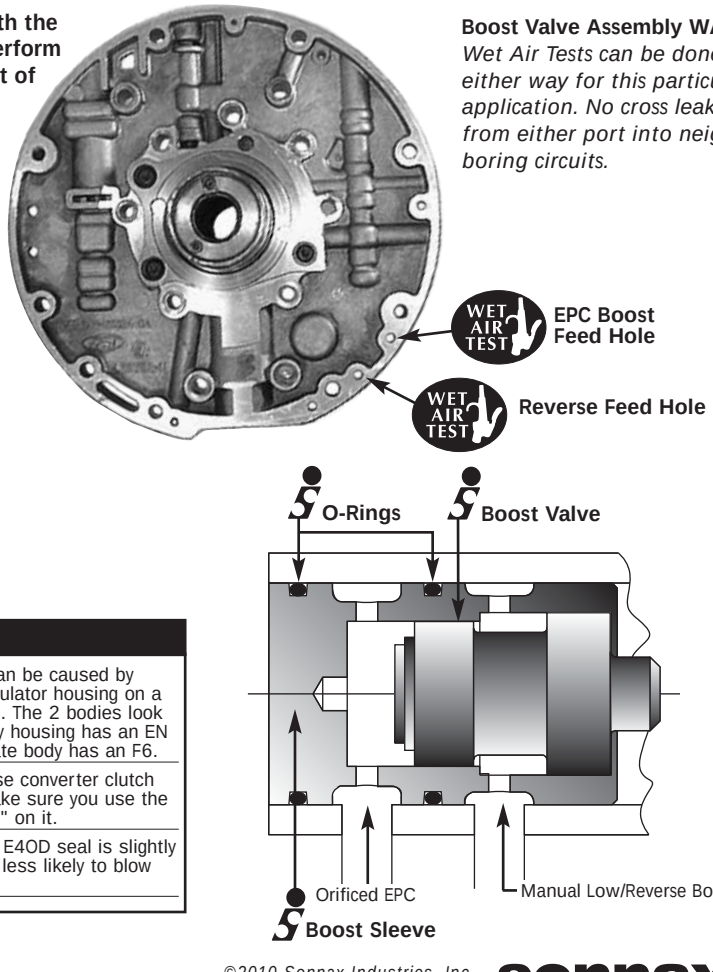
STEP 1 INSTALL THE BOOST VALVE & SLEEVE ASSEMBLY



1. Remove OEM retainer and boost valve and sleeve assembly. Caution: Do not allow PR valve, spring retainer and two PR springs to fall out of pump.
2. Discard both the OEM sleeve and valve.
3. Place the two o-rings into the grooves on the sleeve.
4. Insert the valve into the sleeve with the nubbed end, facing out.
5. Lubricate the assembly.
6. Carefully push the sleeve into the valve body, open end toward the springs, only deep enough to reinstall the retaining clip.
7. Wet Air Test (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 valve.

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.



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.*

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.

* Diesel applications have, a harness connector under the drivers side battery. Make sure to check it for corrosion. A corroded connector harness will often short the brake switch wire to the O.D. cancel wire. This cycles the O.D. cancel circuit each time you press the brake pedal.

* A slip in reverse condition can be caused by using a 1996 and later accumulator housing on a 1995 and earlier transmission. The 2 bodies look very similar, however, the early housing has an EN rough forge number and the late body has an F6.

* A loose fitting filter can cause converter clutch apply in reverse at an idle. Make sure you use the late-style filter with three "feet" on it.

* Never use a C-6 pump seal. E4OD seal is slightly taller than the C-6 seal and is less likely to blow out during use.

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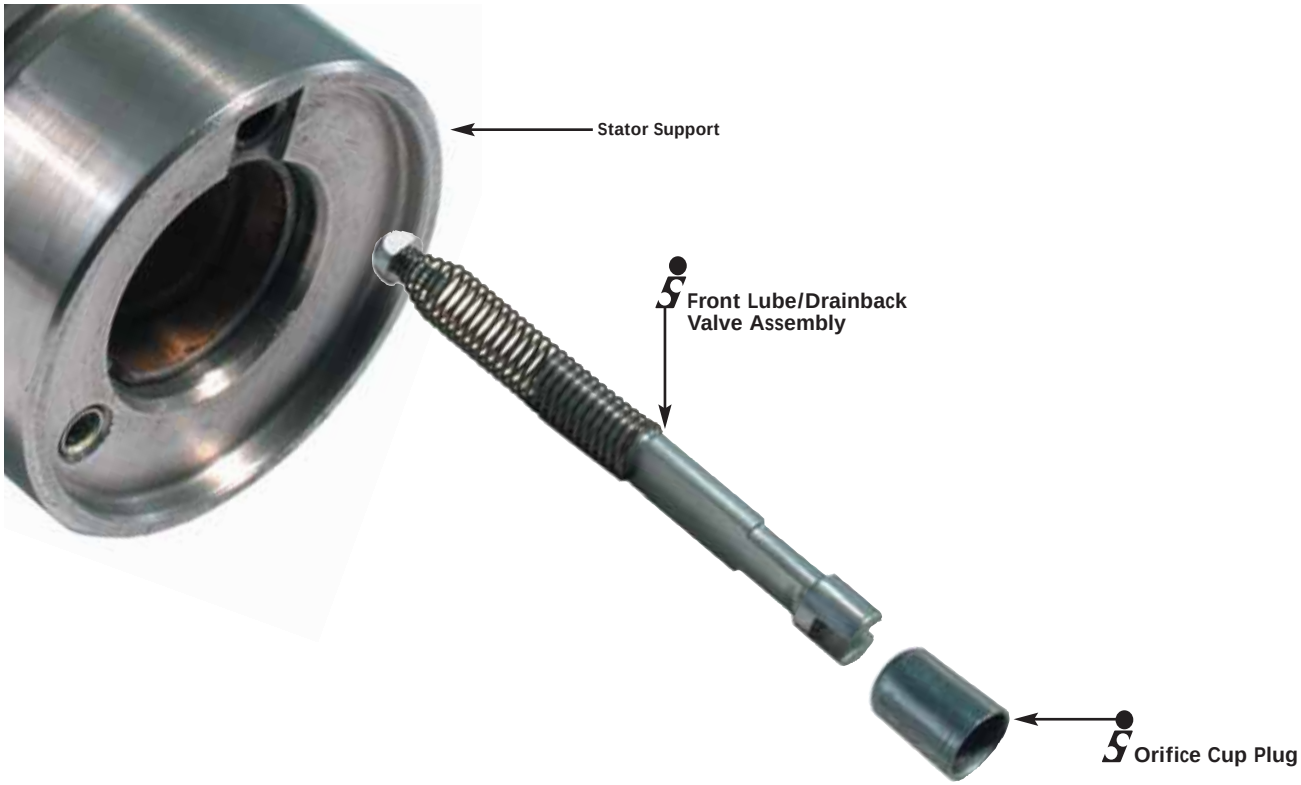
STEP 2 INSTALL FRONT LUBE/DRAINBACK VALVE

1. Thread a small screw into the orifice cup plug hole.
2. Remove and discard the old 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 photo below.
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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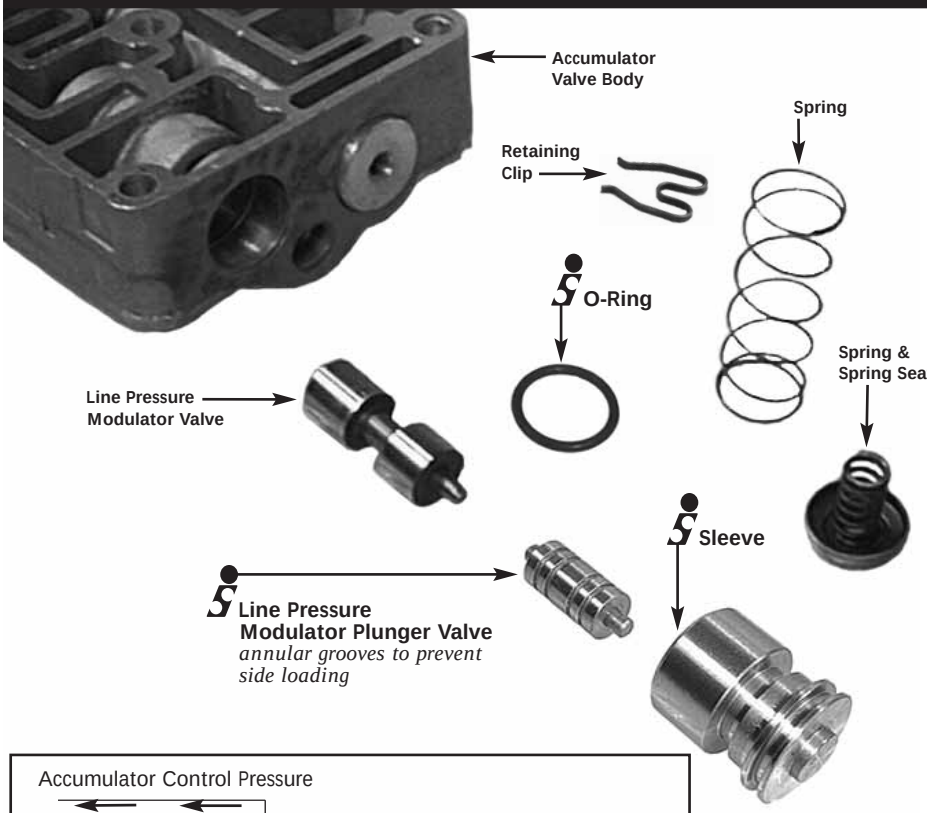
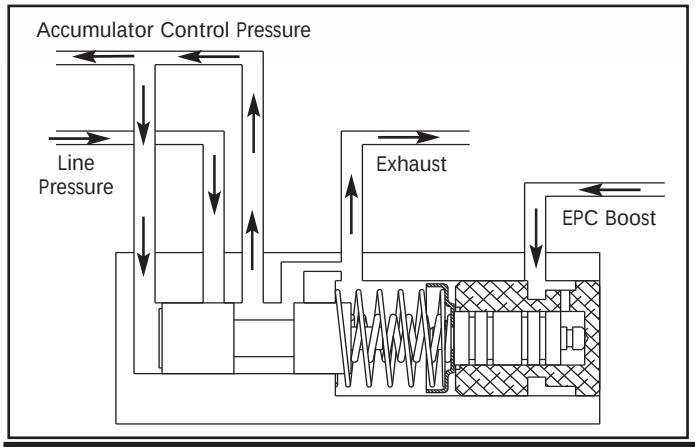
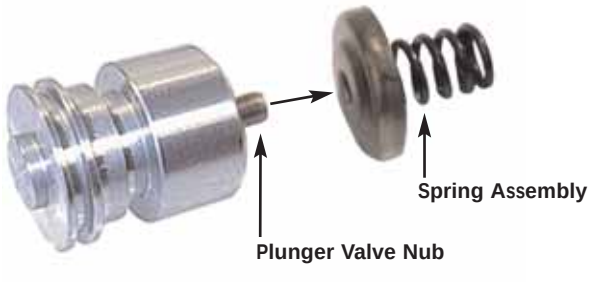
STEP 3 INSTALL LINE PRESSURE MODULATOR VALVE & SLEEVE



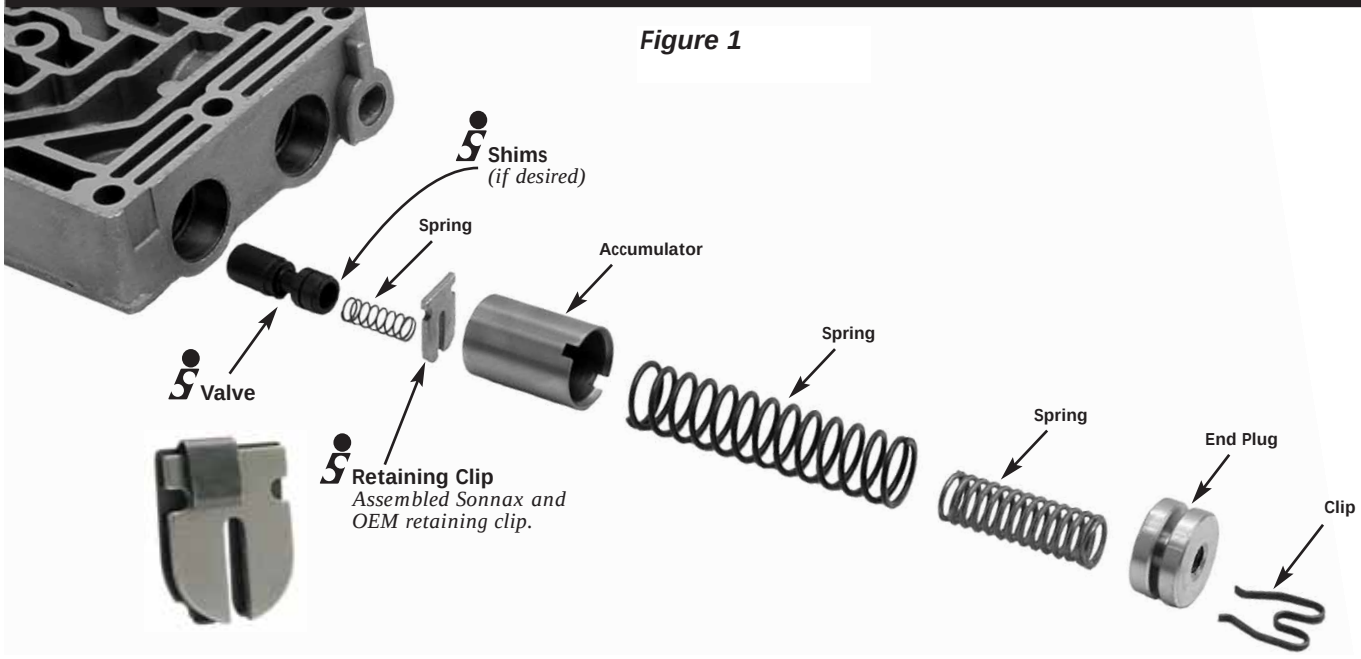
1. To install the Sonnax replacement assembly, remove the retaining clip from the line pressure modulator valve bore in the E4OD accumulator valve body.
2. Remove and discard both the worn line pressure modulator sleeve and plunger valve.
3. Insert the new plunger valve into the new sleeve. The plunger 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. Push the sleeve into the valve body, open end toward the springs, only deep enough to reinstall the retaining clip. Ensure that the nub on the end of the plunger valve fits into the hole in the spring-assembly disc.





STEP 4 INSTALL ACCUMULATOR CONTROL VALVES

Figure 1



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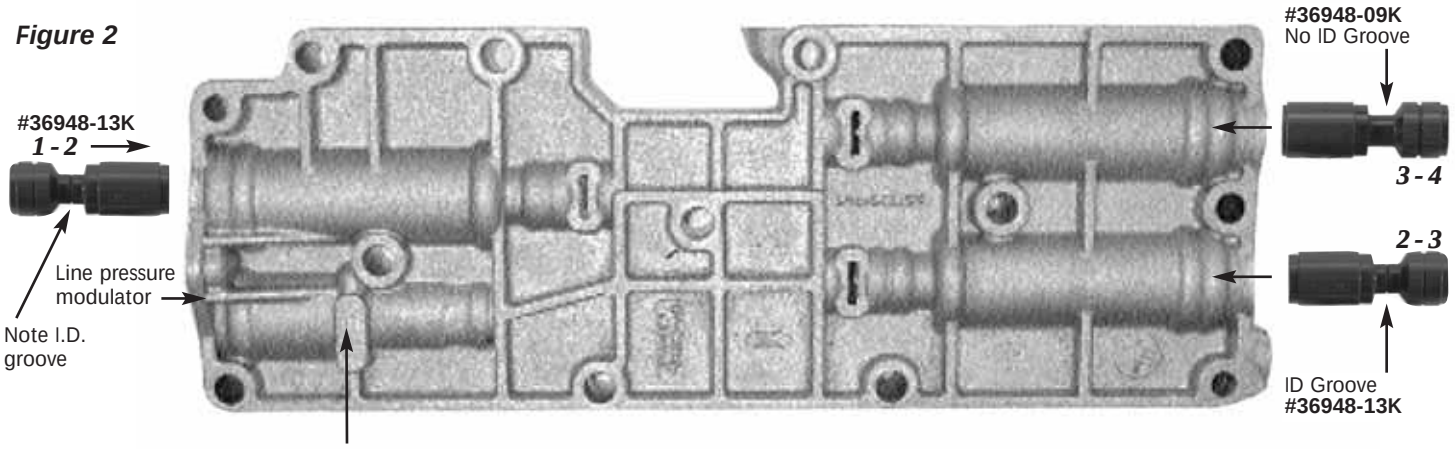
STEP 4 (continued)

1. Remove and save the OEM clip, end plug, accumulator springs and accumulator.
2. Remove the OEM retaining clip, spring and valve. Discard the OEM valve but save the clip and spring.
3. If the OEM valve was stuck in the valve body or if the new Sonnax valve sticks in the bore, use the Sonnax bore sizing tool (see additional bore sizing instructions on page 6).
4. Refer to the "Shift Calibration" section to determine if the use of spring shims is desired. No shims will result in shift firmness closest to the OEM performance.
5. Install the Sonnax accumulator control valve, shims (if desired) and original spring. Refer to application chart below for correct valve placement. Valve without ID groove is for 3-4 accumulator.
6. Place the Sonnax retaining clip under the bent hook of the original clip. Compress the control valve spring and insert both retaining clips in to the accumulator body (refer to Figure 3).
7. Reinstall OEM accumulator, springs, end plug and clip.

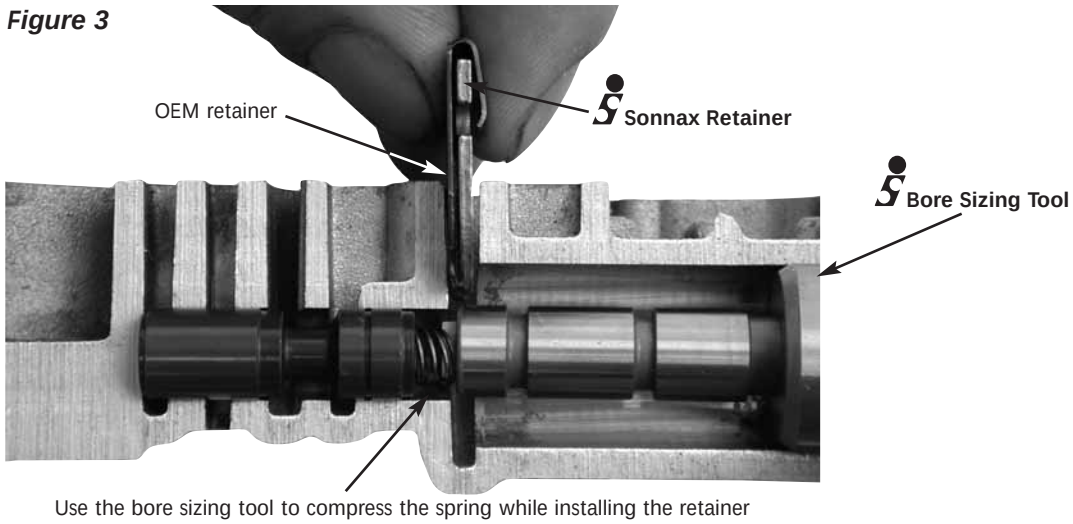
Figure 2



No slot here on '96 and later. DO NOT mix match separator plate and body, or low pressure, no reverse, no 3rd gear.

The firmness of all shifts can be tailored by using a larger or smaller line pressure modulator valve. Use Sonnax valve **96948-01K** for the firmest shift, **36948-05K** for moderate OEM (included in this kit), **36948-03K** for the softest shift.

Figure 3



Use the bore sizing tool to compress the spring while installing the retainer

SHIFT CALIBRATION

Each accumulator can be tuned to achieve the desired shift feel. This is accomplished by using one of the techniques outlined below, or by changing the accumulator piston spring. In addition, the overall shift feel for a particular until may be tuned by using one of the following techniques listed below. In any case, using the **36948-09K** valve in any location will result in a firmer, shorter shift than the **36948-13K** valve in the same location.

Sonnax Valve Used	Shift Quality 1-2	Shift Quality 2-3	Shift Quality 3-4
36948-09K	Very Firm Shift (not recommended)	Firmer Shift than OEM	Firmer Shift than OEM
36948-13K	OEM Shift Quality	OEM Shift Quality	OEM Shift Quality

To increase shift firmness for a specific shift (i.e. 2-3 shift), use one or more or the following techniques:

1. Install shims provided. Generally two are sufficient for heavy-duty use.
2. Make the “V” notch in the accumulator body deeper using a .120" drill bit.
3. Drill the appropriate accumulator feed hole in the separator plate to .072".
4. Install **36948-09K** control valve into 2-3 position.

To increase shift firmness for all shifts in a particular unit, use the following technique:

1. Increase the diameter of the line modulator valve (see Step 4, Figure 1 for application information).

To decrease shift firmness for a specific shift, use one or both of the following techniques:

1. Reduce spring preload on the control valve by removing ¾ of a coil from the control valve spring.
2. Install **36948-13K** control valve into 3-4 position.

To decrease shift firmness for all shifts in a particular unit, use the following technique:

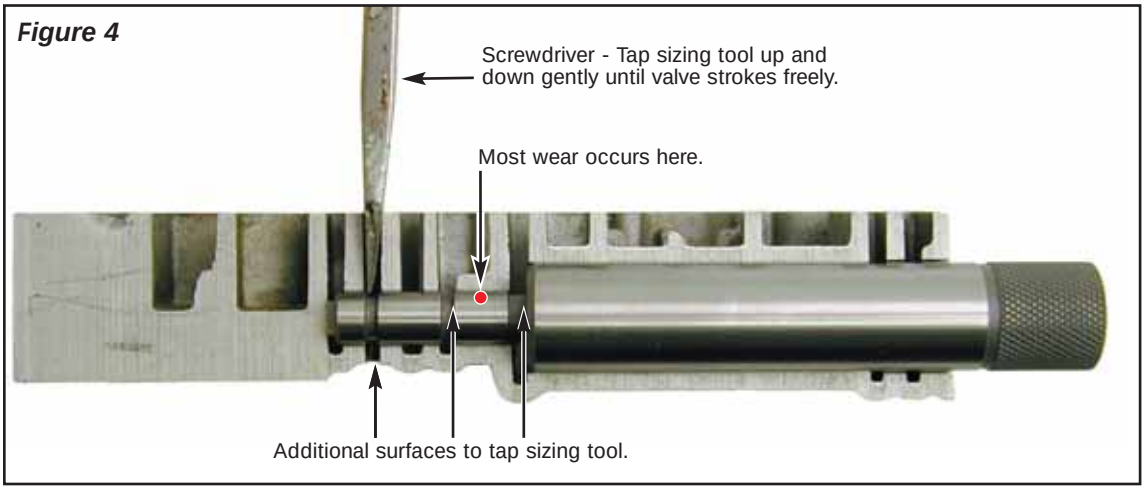
1. Install a smaller diamerter line modulator valve (see Step 4, Figure 1 for specific application information).

Note: *This kit, SC-E4OD, contains two **36948-13K** valves and one **36948-09K** valve. Individual valve kits are available separately from Sonnax under the following numbers: **36948-09K** and **36948-13K**.*

BORE SIZING INSTRUCTIONS

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. In the valve does not move freely, reinstall the bore sizing tool and tap the sizing tool up and down using a hammer and screwdriver as shown in Figure 4. This will smooth out any ridges in the bore. Repeat process until the valve strokes freely.

Figure 4



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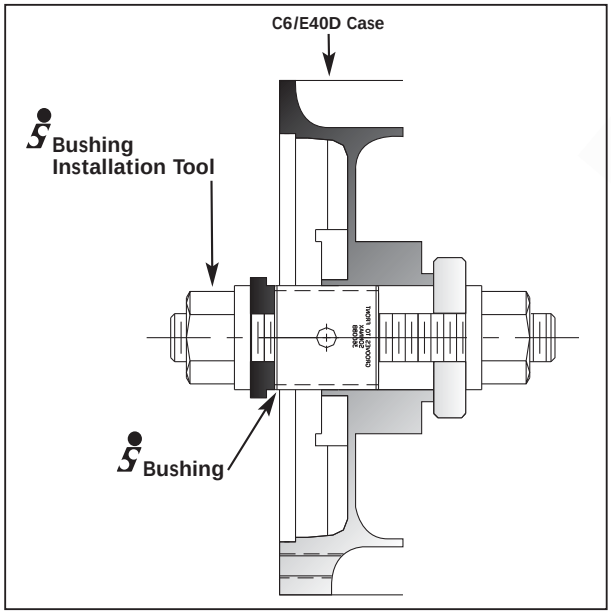
STEP 5 INSTALL REAR CASE BUSHING

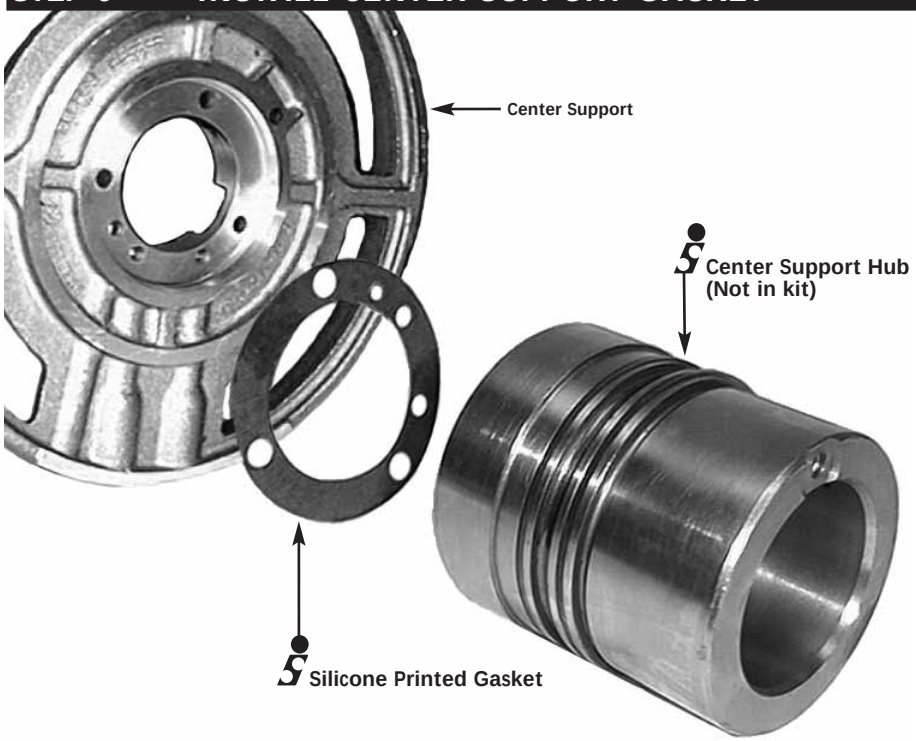
1. Remove worn or damaged OEM bushings from the transmission case.
2. Remove any ridge or case material with a hone if the bore I.D. is irregular.
3. Apply Loctite® 609 sealant to case bore.
4. Align the lubrication hole of the replacement bushing with the hole in the transmission case.
5. It is important 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. Install the Sonnax bushing with grooves to front.
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



Bushing Installation Tool
(Not included with SC-E4OD kit)

STEP 6 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 Nos. 6,325,388 and 6,588,766. Patent infringement will not be tolerated.*

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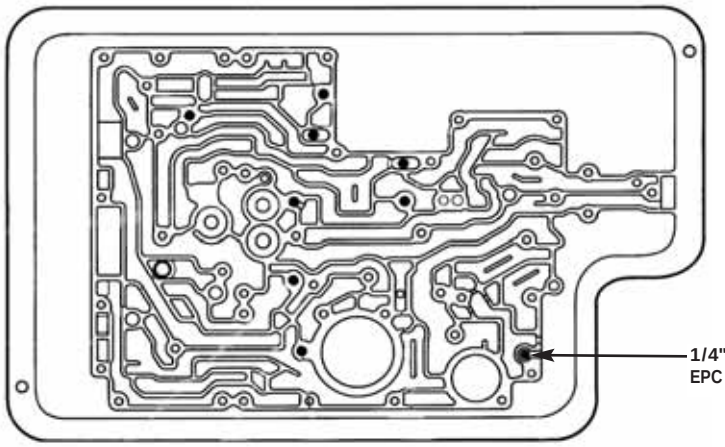
STEP 7 INSTALL RELIEF VALVE

Replace the EPC blow-off checkball (in the case) with the improved design Sonnax relief valve **10000-02K**.

Relief Valve
High Radius

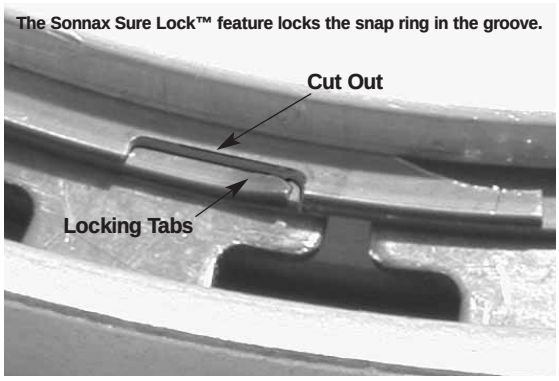


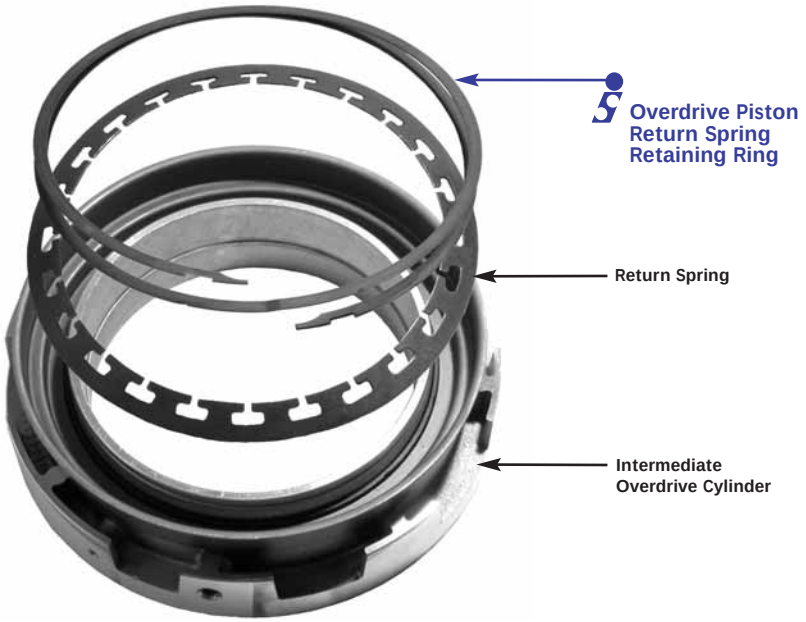
Replace the EPC relief ball with Sonnax stemmed relief valve.

STEP 8 INSTALL OVERDRIVE PISTON

Assemble overdrive piston assembly using Sure Lock™ retaining ring (**36744-01**). Make sure both tabs on the ring are locked as shown.

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

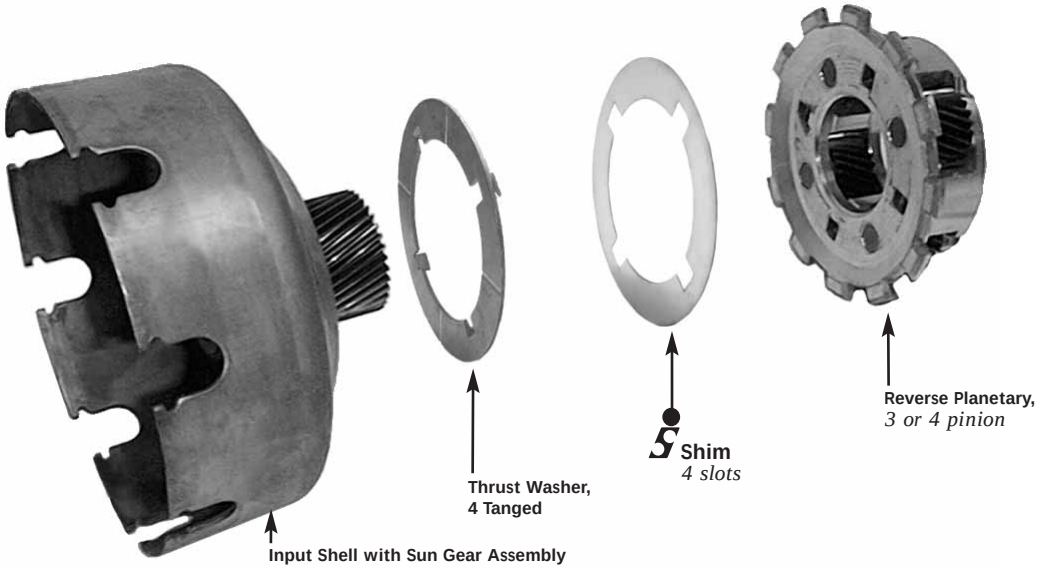




STEP 9 INSTALL UNIT ENDPLAY SHIMS

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 mic., or dial caliper. The OEM endplay 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.*



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