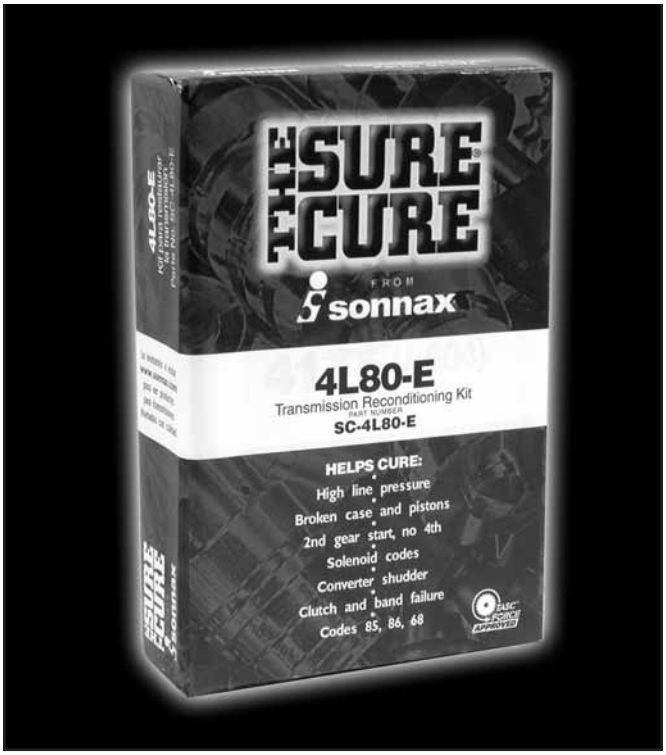
THE SURE CURE®

sonnax®

4L80-E

Transmission Reconditioning Kit

Part No. SC-4L80E



FULL COMPATIBILITY

- **Full compatibility with 1991 and up.**

PUMP PARTS

- Boost valve kit **(34200-01K)**
- Wide stator bushing **(34016-W)**
- End plugs TCC and PR valve bores **(34994-11, -13, -14 & 34200-05)**

VALVE BODY PARTS

- AFL valve kit **(34200-16K)** U.S. Patent No. 6,634,377
- TCC regulator valve kit **(34994-01K)**
- Shift valve spring kit **(34994-02K)**
- Torlon® checkballs **(10000-08)**
- Spring pin, large and small **(34994-07 & -09)**

REASSEMBLY PARTS

- No-walk case bushing **(34006-SP)**
- Endplay washer **(34301-078)**
- Endplay shim **(34500-Z)**

REQUIRED TOOLS

- Sonnax tool kit **77754-TL** is required to ream the AFL valve.

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TORQUE SPECIFICATIONS

Pump to stator	18 lb ft
Pump to case	18 lb ft
4th clutch housing in case bolt	18 lb ft
Center support to case bolt	32 lb ft
Valve body to case	97 lb inches
Accumulator housing to v-body	97 lb inches
Oil pan	18 lb ft
Extension housing	25 lb ft

CLEARANCE AND ENDPLAY

Front Unit Endplay
.004" to .022". Check with output shaft pushed up. Adjust with selective pump washers or Sonnax #34301-078 & 094 (included in kit)

Rear Endplay
.005" to .025". Adjust with selective output thrust washers or Sonnax #34500-Z (included in kit)

Pump Clearance
Pump gear to pocket clearance is .0008" to .0028".

PLANET PINION WASHER CLEAR-

Output/reaction/overdrive/carrier gear endplay
.009" to .024".

CLUTCH CLEARANCE

Overdrive
.040"-.100" (not adjustable from factory)

Overrun Clutch
.033"-.094" (not adjustable from factory)

Intermediate/2nd Gear
.041"-.107" (different thickness frictions available)

Direct
.050"-.060" (different thickness steels available)

Forward
.038"-.060" (different thickness steels available)

Low reverse band
Gage tool and selective pins

Front band (manual 2nd)
Not adjustable

TECH TIP

*Cooler return line (92-96 = lower line) (97 & up = rear line)

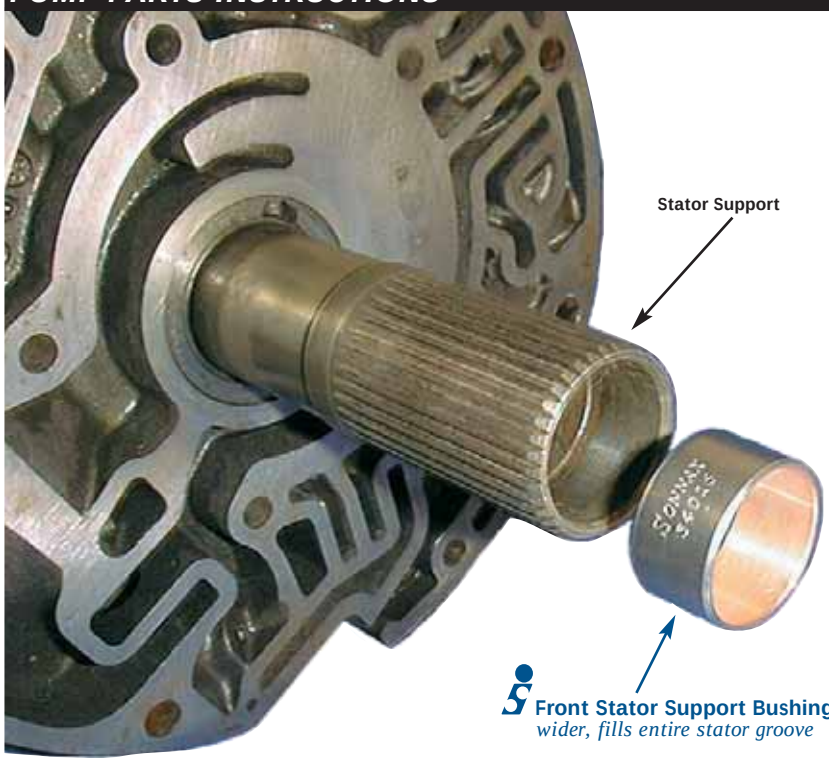
*Never reuse shift solenoids made of white plastic. Solenoids that are white plastic where o-ring is located are prone to internal wear and leaking. Later solenoids with brown or tan plastic do not have this problem.

*Very Important! For all 1996 model trucks produced from late '95 to mid-96 with gas engine, there is a computer ground update that affects line pressure. Symptoms include poor line rise and burned clutches. Check GM Bull. #00-07-03-026, Part # for update 12167310. If computer "service number" printed on computer is 16244210, update is not needed.

*Very Important! For diesel applications with electronic injection pump, (can be identified by no throttle cable and has sensor on gas pedal). Soft shifts, burned clutches, poor line rise can be caused by bad injection pump. Check to see if engine can be held at 1500 rpm in park. If rpms run away and fuel rate drops, then diesel injection pump is leaking internally and will cause low transmission line pressure.

*Excess converter slip or P1870 code can be caused by cracked converter piston. Most common on 2000 and newer vehicles or units with rebuilt converters.

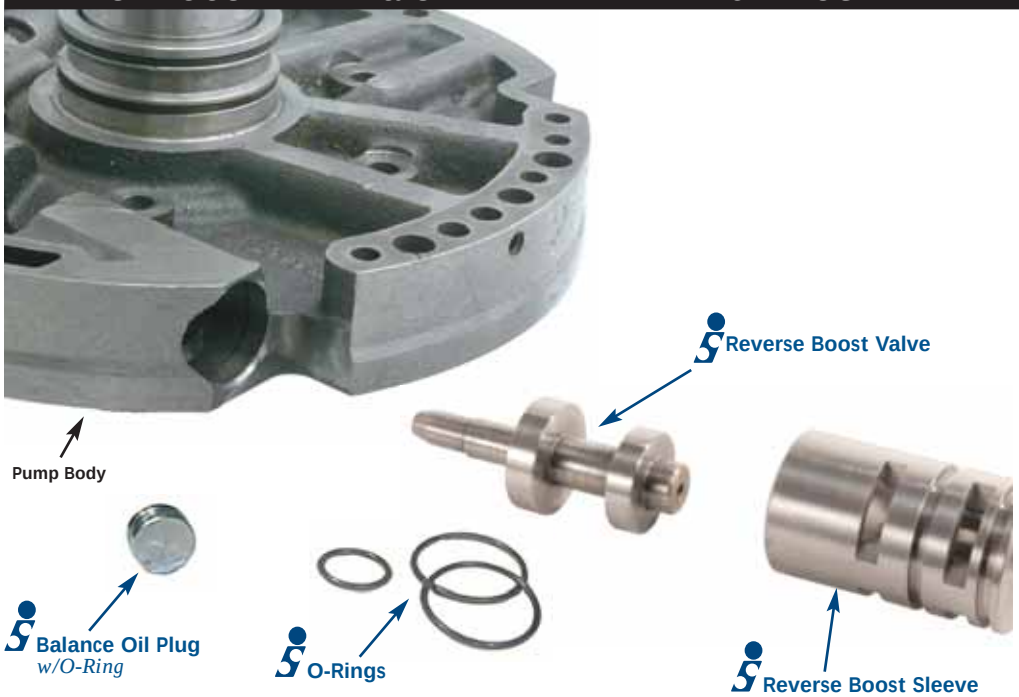
PUMP PARTS INSTRUCTIONS



INSTALLATION INSTRUCTIONS

1. Remove worn bushing from the front of the stator support.
2. Press in Sonnax replacement bushing.
3. Check fit between bushing I.D. and input shaft. In some cases, it may be necessary to hone the bushing I.D. slightly for proper fit due to stator shaft tolerance variations.

REVERSE BOOST VALVE & SLEEVE AND BALANCE PLUG



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BALANCE OIL PLUG INSTRUCTIONS:

Remove the balance oil plug last after disassembly of pump halves and pressure regulator valve. Remove the roll pin and drive the plug outward from the pressure regulator bore. Prepare bore as described below.

Reinstall the end plug after the pressure regulator valve. This procedure will prevent the plug from being installed too far into the larger bore.

BORE PREPARATION INSTRUCTIONS (ON O-RING DESIGNED PARTS):

Sharp leading edges or casting surfaces must be deburred with a file and / or a new ScotchBrite™ pad or 320-grit emery cloth. The areas that usually create a concern are the balance oil plug roll pin cross holes, the boost sleeve entry near the snap ring groove and the sleeve's entry across the oval opening in the pump casting.

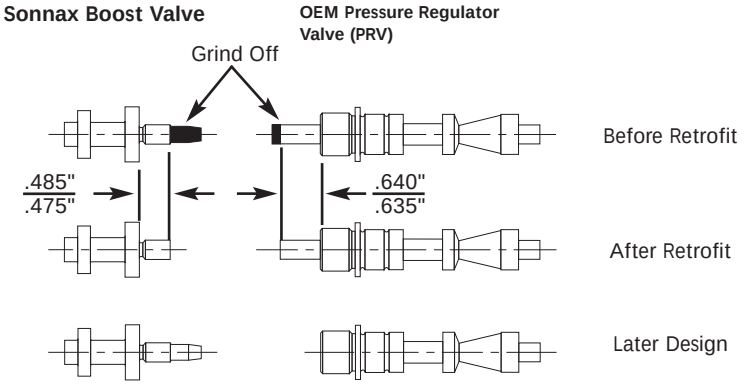
1996 & EARLIER VS. 1997 & LATER OEM BOOST VALVE DESIGNS:

Starting in 1997, the larger of the two boost valve diameters was decreased from .855" to .830". A corresponding diameter change is also found in the mating boost sleeve. 1997 & later OEM boost valves / sleeves can be identified by a groove machined in the end of the sleeve. The design change was made to reduce the maximum reverse pressure by approximately 40-50 psi. 1996 & earlier boost valves can be replaced with the Sonnax design so long as the valve and sleeve are both replaced.

1989-1991 RETROFIT INSTRUCTIONS:

Between 1989 and 1991, the OEM pressure regulator valve and boost valve used a different design. The pressure regulator valve was longer and the boost valve shorter. The Sonnax boost valve can be modified for use with 1989-1991 OEM pressure regulator valves. The retrofit involves shortening both the Sonnax boost valve and the pressure regulator valve (see illustration). No alterations are required for newer OEM pressure regulator valve designs.

High line pressure will result from using the late-design boost with an early, unmodified pressure regulator valve.

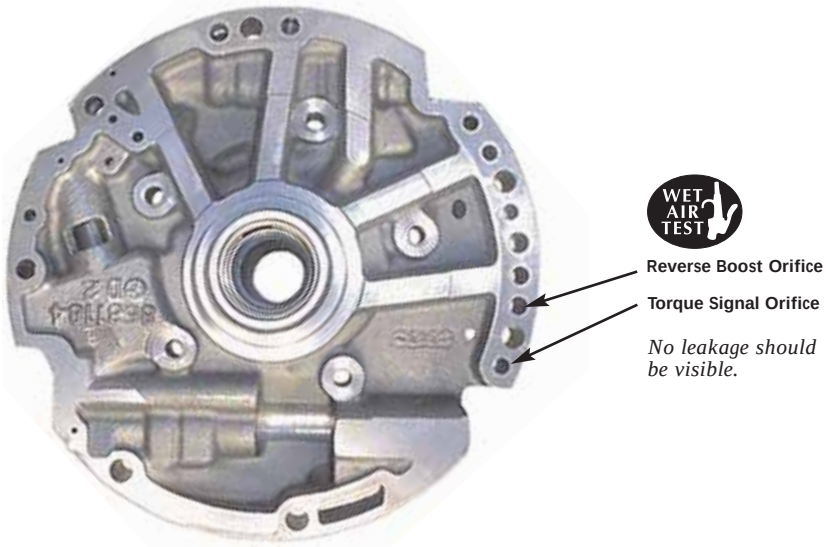


1989-1991 Pressure Regular Valve Design
Grind Sonnax boost valve back to step for a finished length of .475"-.485". Grind OEM PRV to a finished length of .635"-.640"

1991 & Later Pressure Regulator Valve Design
No modifications required

WET AIR TEST

To test for a worn reverse boost sleeve and valve assembly, perform a Wet Air Test with the pump halves still torqued together. Put a small amount of oil into either the reverse boost or torque signal orifice. Force low air pressure into the orifice. If oil comes out of the other orifice, there is leakage across the reverse boost / torque signal circuit. If there is excessive leakage, the sleeve I.D. is worn, the pump bore is leaking around the sleeve or the pump is not flat. Discard both the OEM sleeve and valve and replace with Sonnax kit **34200-01K** (with o-ring design). It is a good idea to perform the Wet Air Test again after installing the Sonnax kit. Continued leakage after replacing the boost valve / sleeve (with o-ring design) indicates cross leakage between the pump halves. Replace or resurface the pump halves to eliminate the remaining leakage.



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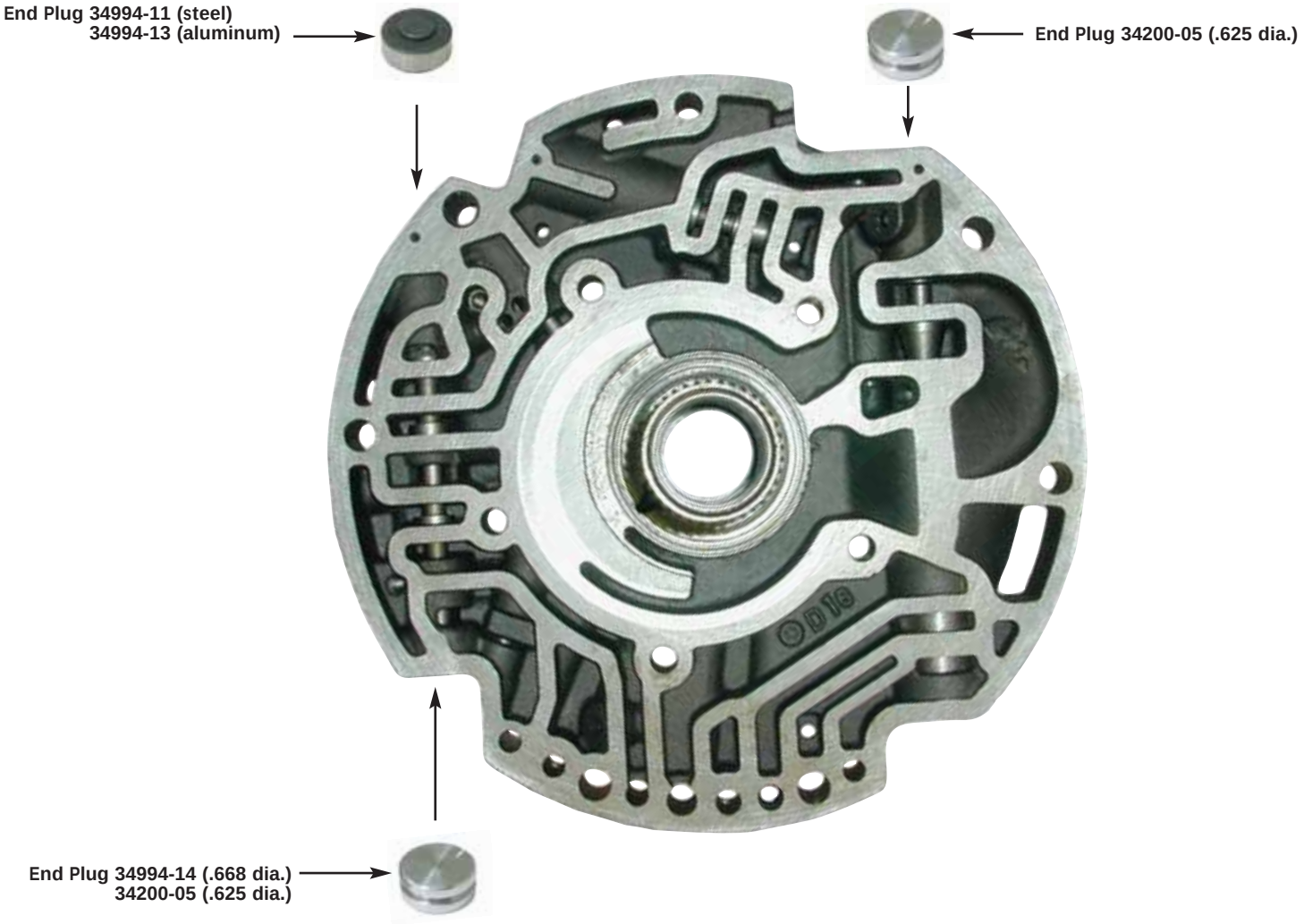
TCC VALVE BORE END PLUG INSTRUCTIONS

Remove and inspect TCC valve.

Select matching end plugs from the four provided.

Reassemble as shown below.



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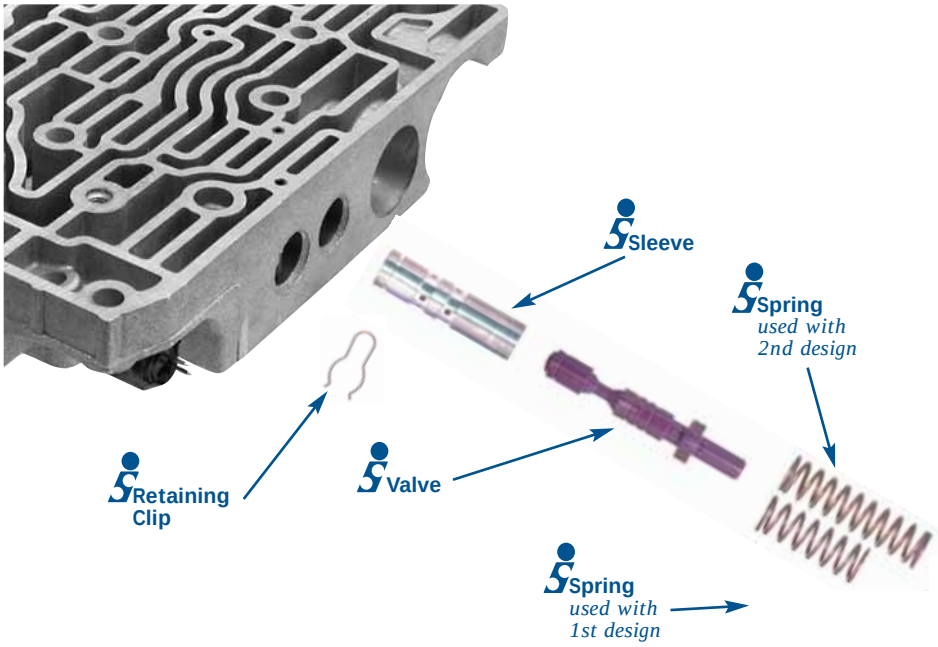
VALVE BODY INSTRUCTIONS

Acutator Feed Limit Valve Kit



AFL valve should have no side to side movement.

OEM VALVE LINE-UPS

Caution: Inspect OEM valve line-ups first.

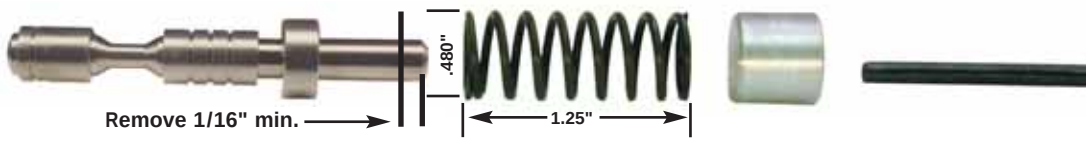
4L80-E 1st Design AFL Line-Up **Important: Replacement valve modification will be required.**

4L80-E 2nd Design AFL Line-Up **No modification required.**

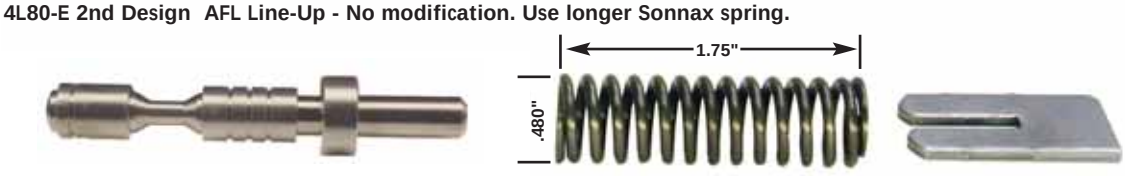
SONNAX VALVE LINE-UPS

4L80-E 1st Design AFL Line-Up - Modify Sonnax valve and use short Sonnax spring.

Important: With the first design valve line-up, the Sonnax replacement valve stem must be shortened by a minimum of 1/16" (more is not a problem).



4L80-E 2nd Design AFL Line-Up - No modification. Use longer Sonnax spring.



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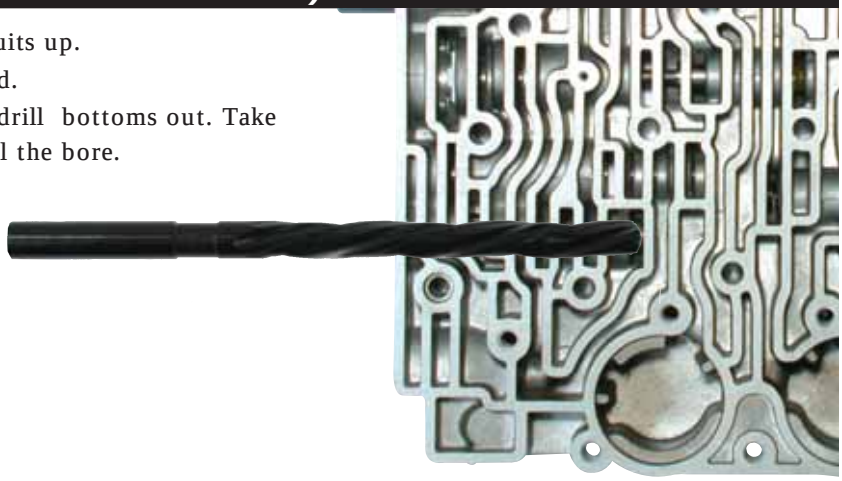
DRILLING INSTRUCTIONS (MUST BE DONE PRIOR TO REAMING)

1. Clamp the valve body to a bench with the open circuits up.
2. Insert the drill jig and fill the bore with cutting fluid.
3. Drill the bore at approximately 1000 rpm until the drill bottoms out. Take care not to force the drill or let it "grab" as you drill the bore.



REAMING INSTRUCTIONS AFTER PILOT DRILL:

1. Clamp the valve body to bench with open circuits up.
2. Fill bore with cutting fluid (kerosene, Tap Magic®, etc.).
3. Insert the correct reamer jig for the application into the bore. The reamer jigs are clearly marked as to which fits the 4L60-E or 4L80-E valve body.
4. Soak fluted end of reamer with cutting fluid.
5. Insert reamer into reamer jig until reamer tip contacts the first bore to be cut. Securely position the jig against the bore to remove any reamer wobble. The jig will help stabilize and center the reamer.
6. With the reamer carefully and securely positioned, use a speed handle to ream the bore. The reaming action should be clockwise in a smooth and continuous motion, at approximately 1 to 1½ revolutions per second.
7. The reamer should pull itself through the bore, so little or no forward pressure should be applied to the reamer or speed handle.
8. Continue reaming until the tip of the reamer bottoms in the bore. Spin the reamer 5-10 more times after bore bottoming to allow for excess material removal and better surface finish.
9. Using low air pressure, blow the chips free before removing the reamer.
10. To remove the reamer, turn clockwise while slowly pulling outward on the reamer.
11. Remove any remaining debris from the bore with low air pressure and mineral spirits / degreaser.

CAUTIONS:

- Never turn the reamer backward.
- Pushing on the reamer will result in poor surface finish, inadequate and sporadic material removal, and material being left unremoved as the reamer exits a bore.
- Blow free any chips from the reamer after each use.
- Never use a crescent wrench, t-handle or ratchet to turn the reamer.

INSTALLATION INSTRUCTIONS

1. Discard the original valve and spring. Keep the OEM end plug and roll pin or retaining clip for reuse.
2. Remove the Sonnax valve from the sleeve and install the sleeve with the retaining clip groove inward.

Important Note: *The sleeve must fit the bore with a slight resistance! If the sleeve slides in easily or rotates in the bore, a tubing cutter may be used to raise a slight ridge around the sleeve lands (as pictured).*

3. Lightly tap the sleeve into position (the old valve inserted backward may be used to drive the sleeve). Install the retaining clip around the sleeve.
4. Install the Sonnax valve and spring with the OEM end plug and roll pin or retaining clip, as shown in Sonnax valve line-ups on previous page.

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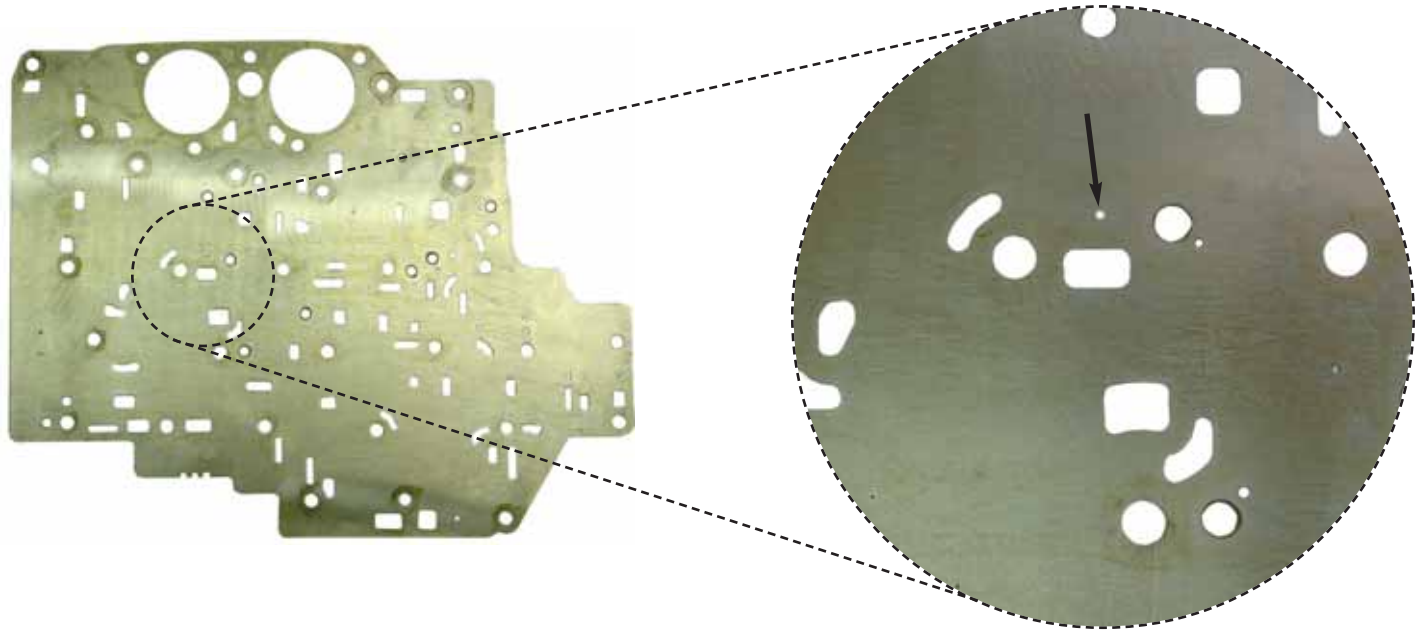
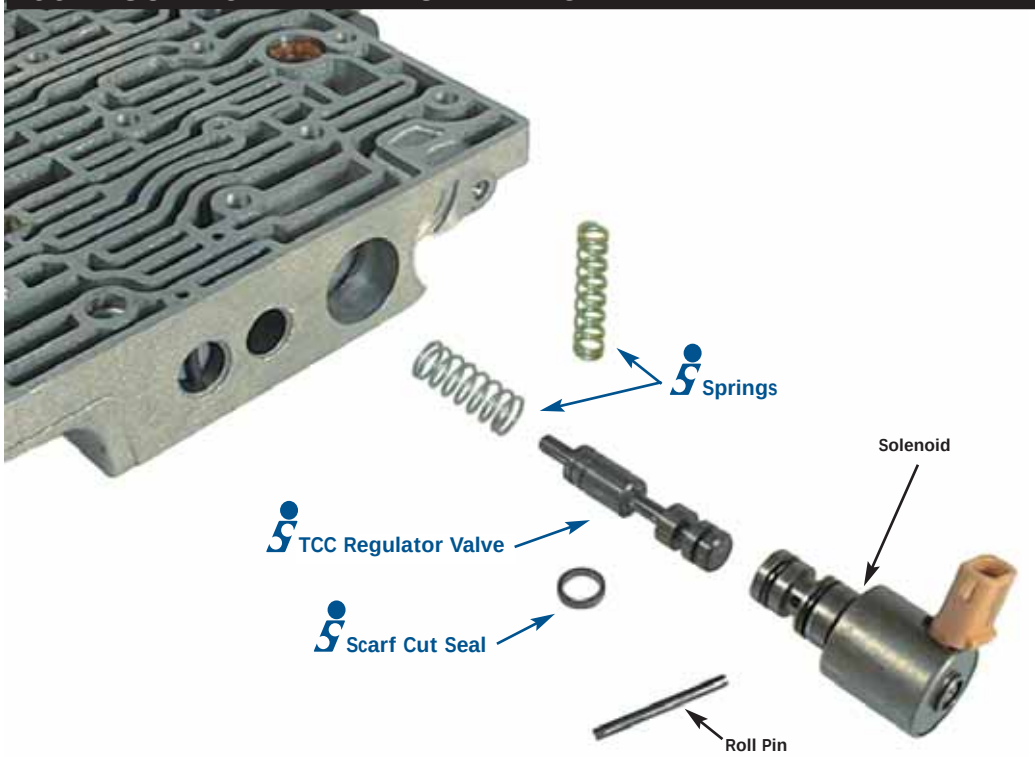
SEPARATOR PLATE MODIFICATION

The indicated AFL balance orifice must be enlarged to .052" with the drill bit included in the **77754-TL** tool kit.



TCC REGULATOR VALVE INSTALLATION



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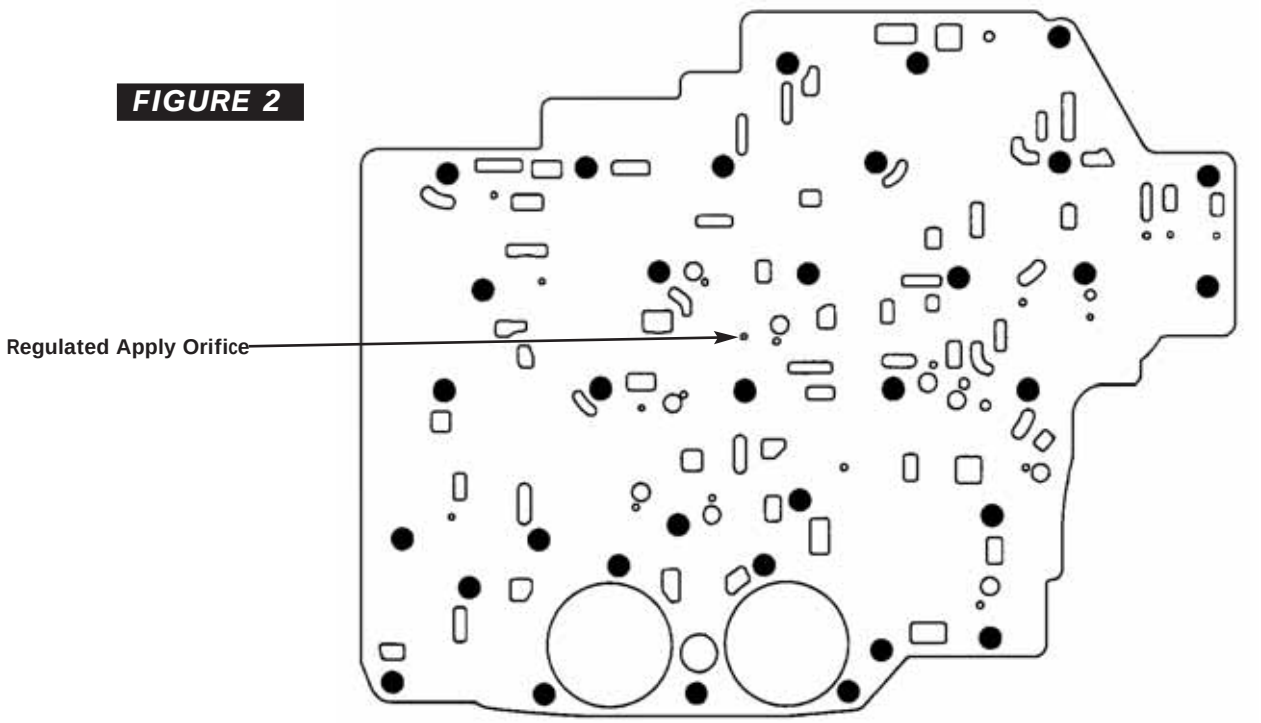
TCC REGULATOR VALVE INSTALLATION

Note: *A small chamfer may need to be machined into the valve body bore to aid in the installation of the valve/Teflon® seal. A 15/32" drill or counterbore is recommended. Remove any debris created prior to installing valve assembly parts.*

1. To install the Sonnax replacement assembly, remove the retaining clip from the PWM solenoid and the roll pin from the valve body.
2. Remove the TCC regulator valve and spring and discard.
3. Grease the seal groove on the replacement valve, and carefully insert the scarf-cut seal so that the tips are not raised above the valve spool diameter.
4. **Spring selection**
   a) For OEM shift feel, select the heavier (.420" diameter) spring.
   b) For a firmer lockup (best suited for towing applications), select the lighter spring (.300" diameter) and restrict the feed orifice to .025" by peening closed and redrilling (see Figure 2).
5. Place the selected replacement spring over the long stem on the TCC valve.
6. Carefully push the spring and valve assembly into the valve bore, spring end first.
7. Make sure that the seal remains fully seated in the groove as it is pushed past open valve body ports.
8. Reinstall the roll pin to secure the valve and spring.
9. With a pick or small screwdriver, carefully stroke the valve in the bore to make sure that the seal has not hung up during assembly.
10. Return the PWM solenoid to the valve body.

FIGURE 2



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SHIFT VALVE SPRING INSTALLATION

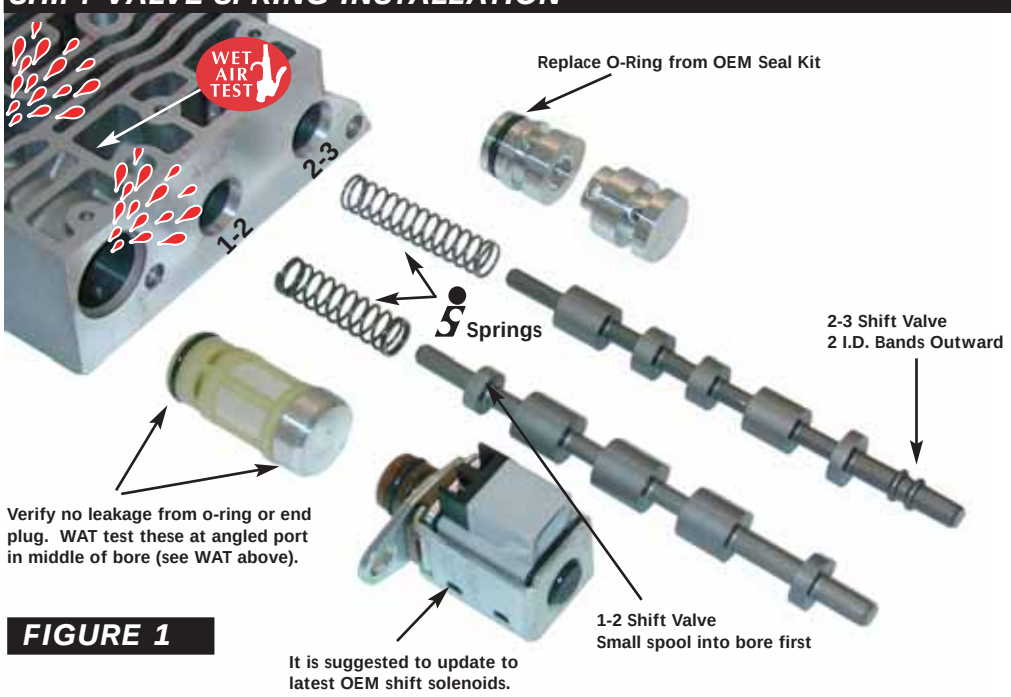


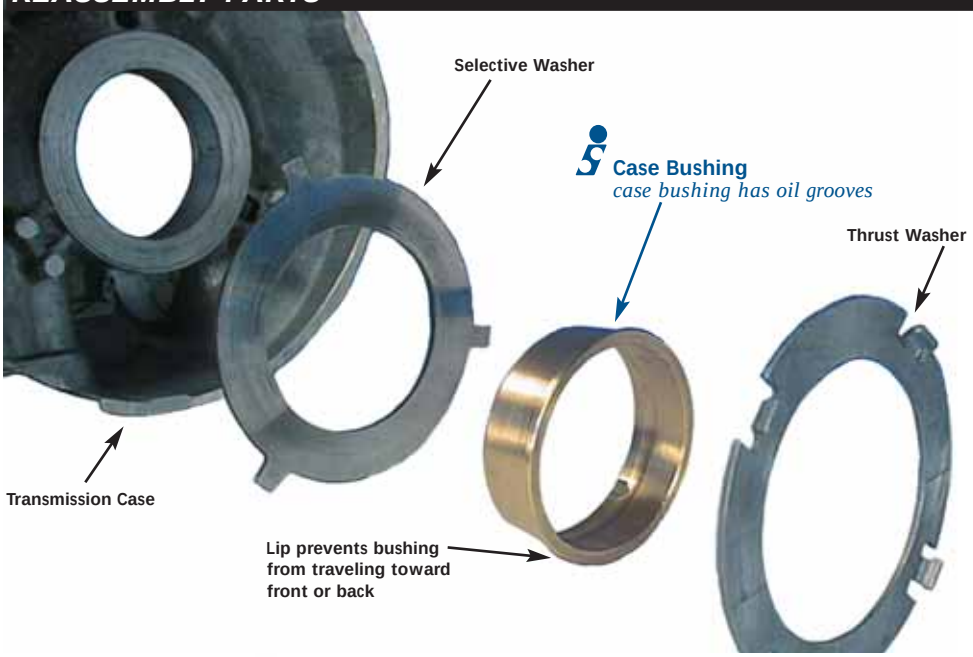
FIGURE 1

INSTALLATION INSTRUCTIONS:

Refer to Figure 1 illustration for appropriate spring installation.

1. Remove the 1-2 and 2-3 shift valves and springs.
2. Install the Sonnax 1.25" x .350" spring in the 1-2 shift valve location.
3. Install the Sonnax 1.69" x .390" spring in the 2-3 shift valve location.
4. Assemble both valve trains.
5. Continue with valve body service.
   a. Service should include new OEM shift solenoids and replacement of all o-rings pictured.
   b. Many rebuilders enlarge shift solenoid feed orifices during overhaul. If feed orifices are too large, shift solenoids can be flooded with oil, causing wrong gear starts and missing gears, etc. Suggested shift solenoid feed orifice size = .020 - .030 inch. Sonnax shift valve springs can be used with either unmodified or acceptably enlarged orifices.

REASSEMBLY PARTS



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INSTALLATION INSTRUCTIONS

1. Remove the output shaft, selective washer, thrust washer and OEM case bushing from the transmission case.
2. Press the **34006-SP** bushing into the housing bore from the inside of the transmission with the flange seated on the flat, raised surface of the transmission case. The housing bore should measure between 2.1285" / 2.1295" in diameter for an ideal fit. For some applications, the bushing may be slightly longer than the bore depth. This will not be a problem.
3. Return the selective washer, thrust washer and output shaft to the transmission case.
4. The rear unit endplay, controlled by the selective washer, should be set in accordance with OEM specifications.

***Note**: On some applications, the output shaft may be snug during reassembly. Tap on the shaft at spline area to reform the bushing high spots.*

5. Inspect output shaft. Late-style shafts with lube holes must be modified.

LUBE HOLE MODIFICATION

In some 1991 to 1996 models the output shaft lube holes may be partially restricted by the new bushing (see Figure 1). These two lube holes feed lube oil into the center of the output shaft and forward into the planetaries and rear section of the transmission. THM 400 and 1997 to current 4L80-E units do not have these lube holes.

Using a die grinder, chamfer the lube holes as pictured in Figure 2. Do not grind the bushing.

FIGURE 1

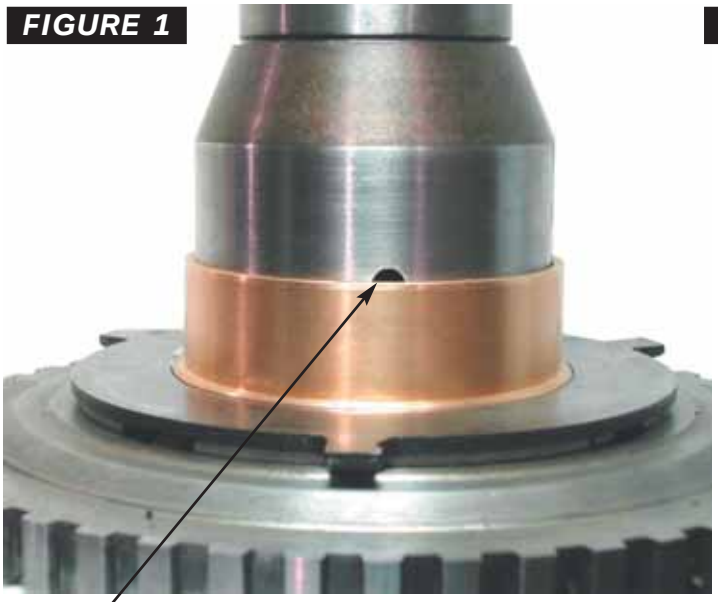
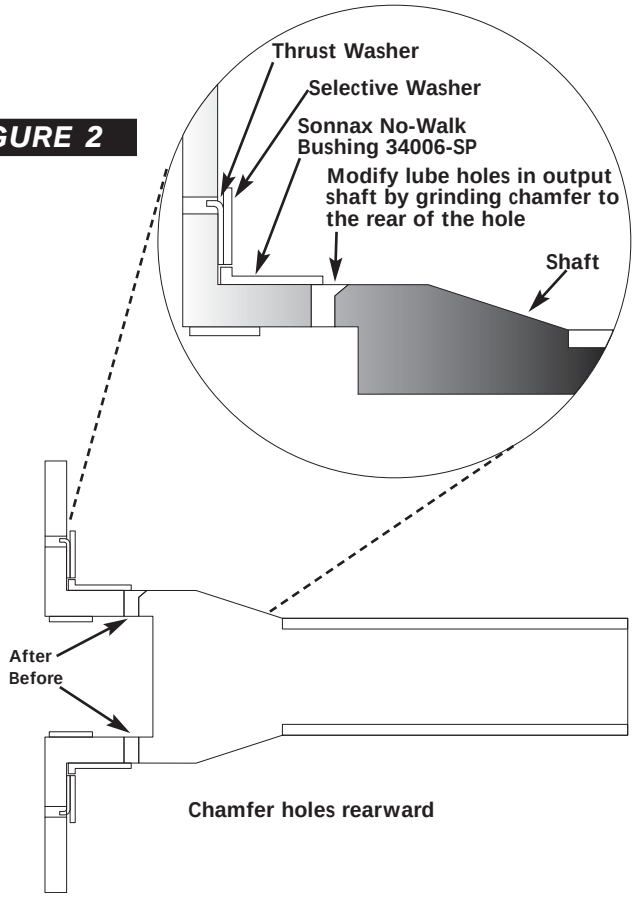


FIGURE 2



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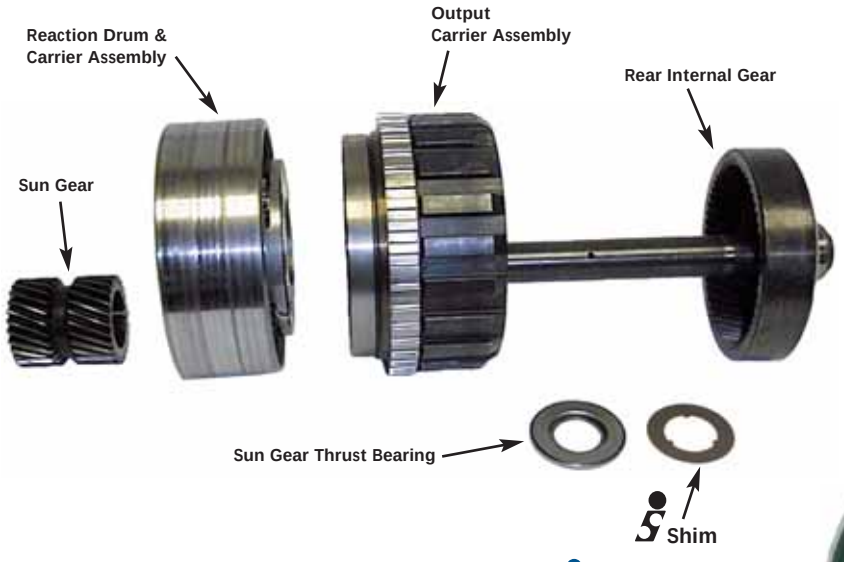
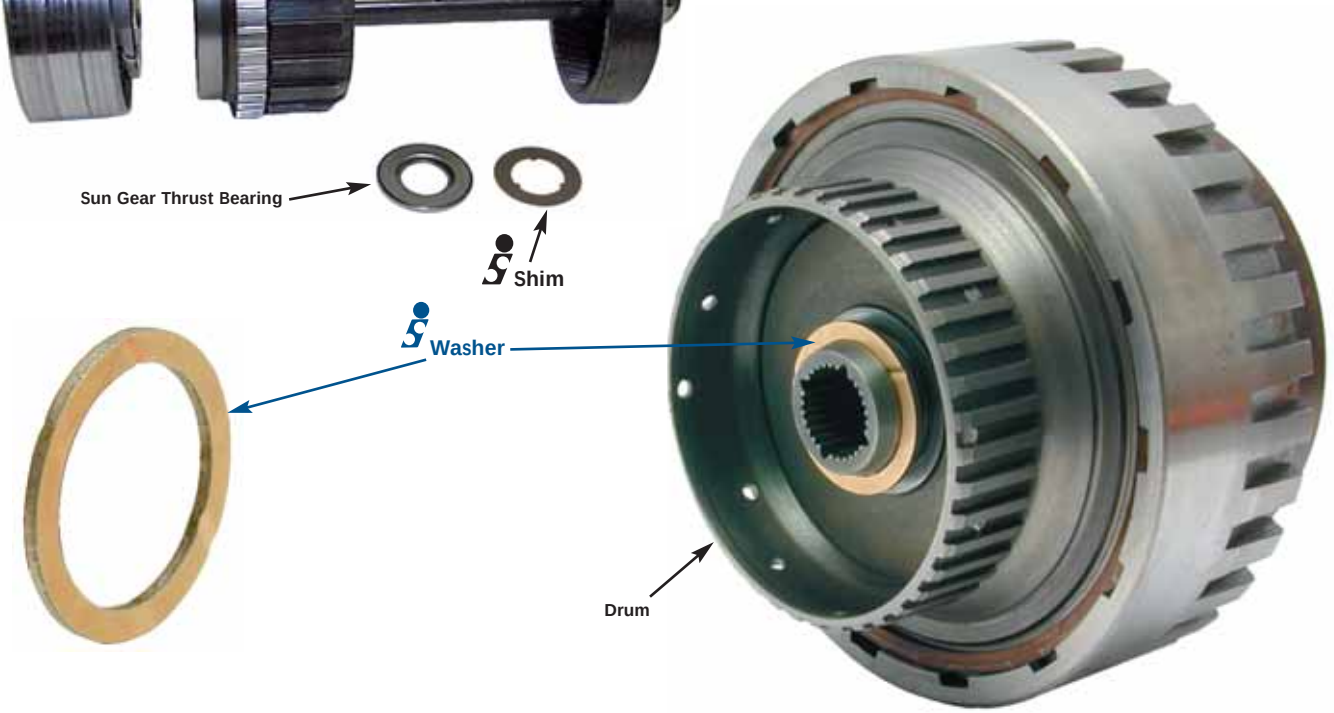
REAR ENDPLAY SET-UP

Use a dial indicator on the output shaft to verify and obtain a rear unit endplay of .005" to .025". The Sonnax shim **34500-Z** is .010" (which installs between the sun gear and the rear internal gear) and can be used to reduce both front and rear unit endplay. The sun gear can only be shimmed to a certain point before it loads the center support. This amount depends on the rear unit accumulated wear. The selective spacers between the rear case and output shaft hub also compensate for rear unit endplay. These OEM selective spacer range from .074" to .118".





REAR UNIT ENDPLAY

Sonnax Shims

34500-Z	.010" Thick

OEM Shims	*ID Notch*	*No.*
.074"-.078"	none	1
.082"-.086"	on side 1 tab	2
.090"-.094"	on side 2 tab	3
.098"-.102"	on side 3 tab	4
.105"-.110"	on side 4 tab	5
.114"-.118"	on side 5 tab	6

FRONT UNIT ENDPLAY

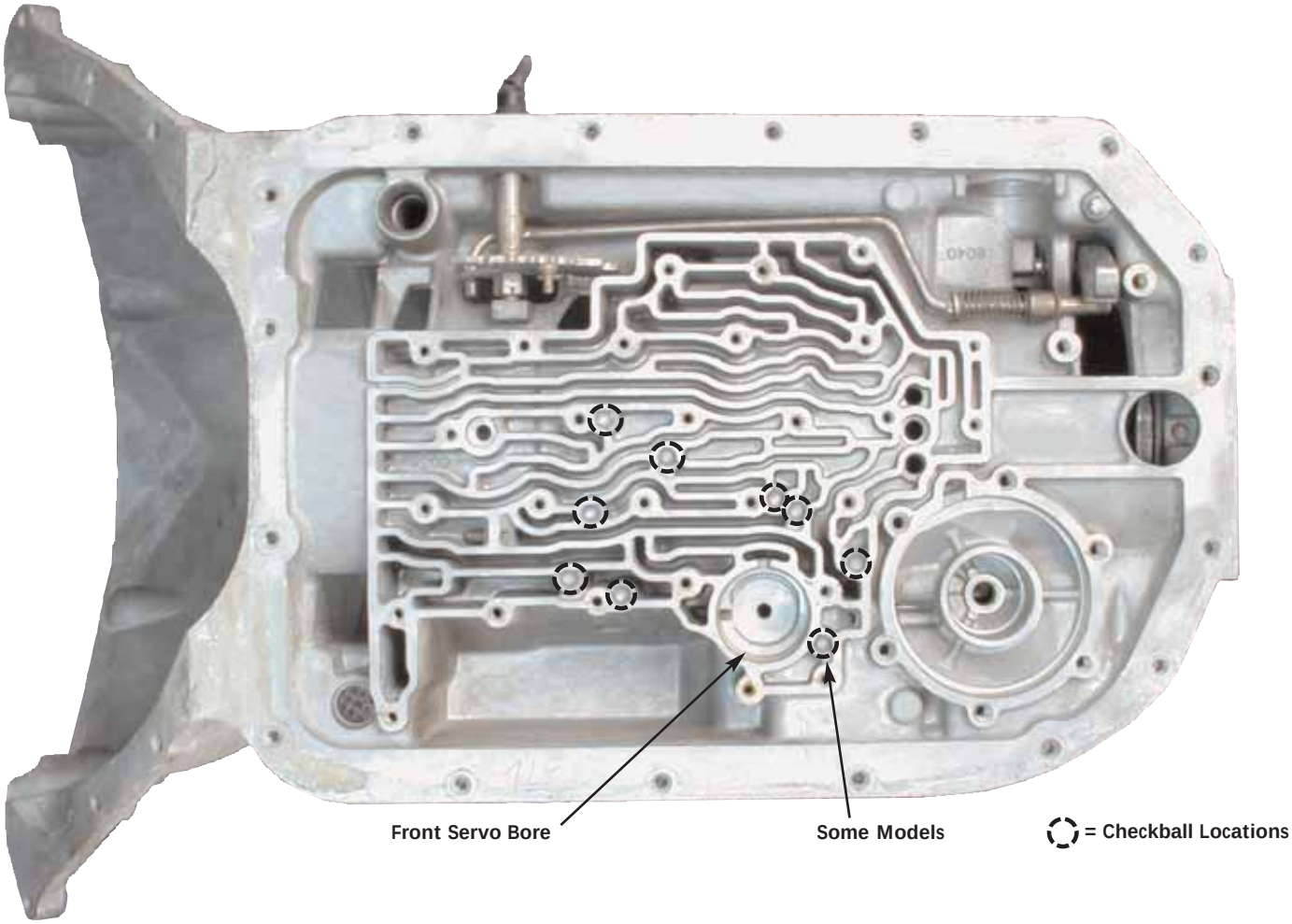
Place dial indicator on input shaft, preload shaft inward, zero-out indicator and pull shaft outward to measure endplay. Suggested front endplay of input shaft is .004"-.022". This endplay can be reduced by adding the Sonnax **34301-078** (.015" oversized) or **34301-094** (.030" oversized). As a word of caution, do not shim a forward drum from the pump support washer. Adding shim material here pushes the sealing rings into a very minimal surface contact on the drums.

FRONT UNIT ENDPLAY

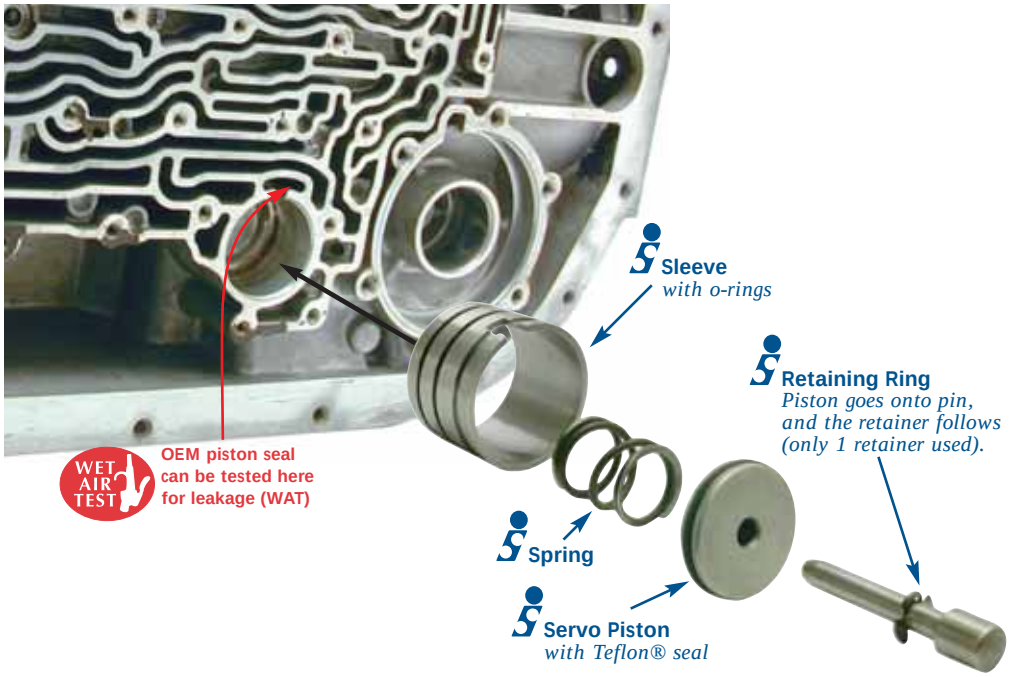
Sonnax Shims

34301-078	.078" Thick
34301-094	.094" Thick

OEM Shims	*Color*	*No.*
.060"-.064"	Yellow	0
.071"-.075"	Blue	1
.082"-.086"	Red	2
.093"-.097"	Brown	3
.104"-.108"	Green	4
.115"-.119"	Black	5
.126"-.130"	Purple	6



1. Note checkball locations for **10000-08** Torlon® balls.
2. Inspect front servo bore. Servo repair kit **34989-02K** is available separately to prevent delayed engagement and burned forward clutch.



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