

THE SURE CURE[®]

4T60-E (93-'96)

Transmission Reconditioning Kit

FULL COMPATIBILITY

- Full compatibility with 1993-1996 PWM units.
- Identified by steel TCC apply valve with large spool fitting inside a 15mm wrench.
- For 1997 and up units, use SC-4T60E-1. TCC apply valve is aluminum and will NOT fit in a 15mm wrench.

REASSEMBLY PARTS

- 1-2 roller clutch spring kit (K84956-SP)
- Differential side gear thrust washer (75890-30)
- Endplay shims (84733-10 & 20, 75410-10)

VALVE BODY / PUMP CARD

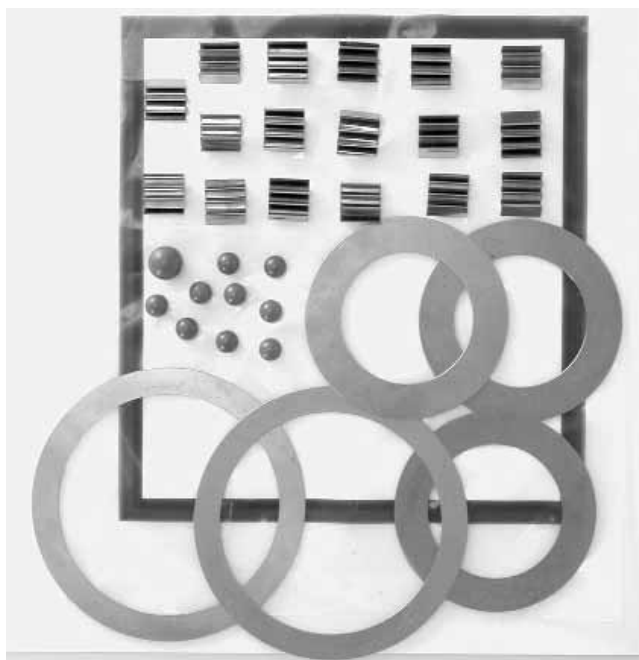
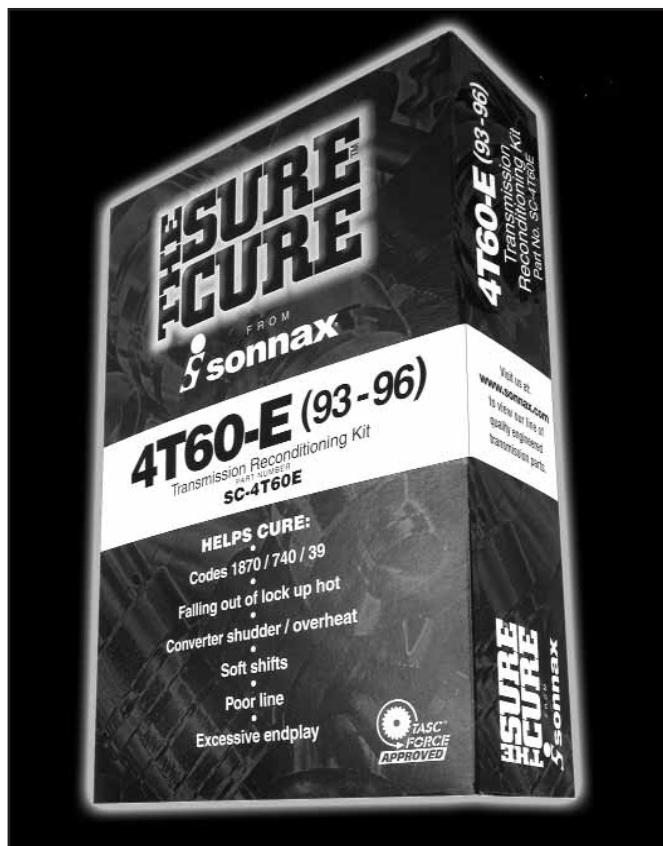
- TCC regulator valve assembly (84754-01K)
- TCC apply valve kit (84754-16K) patent pending
- Reverse boost valve assembly (84754-19K)
- Modulated line boost valve assembly (84754-17K)
- Pump slide pivot pin (84881)
- Imidized plastic checkballs (10000-08 & 10000-09)
- Boost valve retainer clip (84754-27)

REQUIRED TOOLS

Sonnax tool kit 84754-TL5 or 84754-TL is required to ream the TCC apply valve bore for oversized TCC apply valve.

sonnax[®]

Part No. SC-4T60E



TORQUE SPECIFICATIONS

Pump, valve body, channel plate and driven sprocket support bolts.

M6 x 1.0mm 71- 124 in. lbs

M8 x 1.25mm 15 - 20 ft. lbs.

Start at center of VB and work outward. Blown gaskets after OH are caused by impact.

Important: Never use impact to assemble pump! Causes slide to bind & cracks the castings.

Oil Pan
90 -100 in. lbs.

Extension housing
18 ft. lbs

CLEARANCE & ENDPLAY SPECIFICATIONS

Total Unit Endplay
.000" to .010" selective washer located under bearing on input housing.

Differential unit end play
.005" to .025" selective washer under differential to extension housing bearing.

Pump clearance, rotor slide and vanes
.0005" to .002"

Super Important: Too loose = low pressure, while too tight = no line rise (slide stuck)

PLANET PINION WASHER CLEARANCE

Input & reaction carrier
.009" to .030"

Differential pinion gears
.009" to .025"

CLUTCH CLEARANCE

4th clutch (in channel plate)
Not adjustable

2nd Clutch
Not adjustable from factory: Note: Alto sells thicker .090" steels

Input clutch
Not adjustable

3rd clutch
Not adjustable

Reverse band
Not adjustable

Forward band
Not adjustable

TECH TIP

*Cooler return line = horizontal fitting

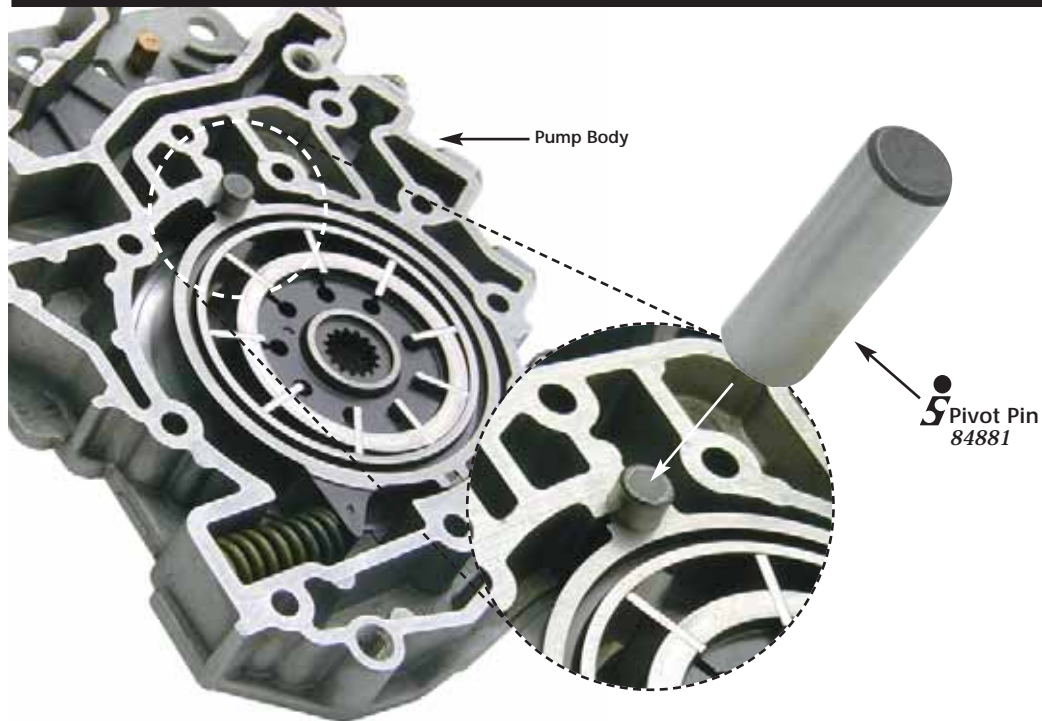
*Be careful not to mix up the servo apply and lube tubes that fit into the accumulator housing. This will cause a bind on the 2-3 shift and a creeping in neutral problem. The servo feed pipe fits in the center of the 3 tube holes in the accumulator.

*Roughing the 2nd clutch drum with 120-grit sandpaper will offer a smoother reverse apply.

*Early models use a bearing on the 1-2 support. Late models use a washer. You can interchange these parts provided you change the support.

*2nd clutch drum inner liner weld can crack. Check 2nd clutch drum liner by gently prying up on liner with a small screwdriver. Any area of the liner that lifts up indicates that the weld is cracked.

STEP 1 REPLACEMENT OF PUMP SLIDE PIVOT



PIN STYLE SELECTION

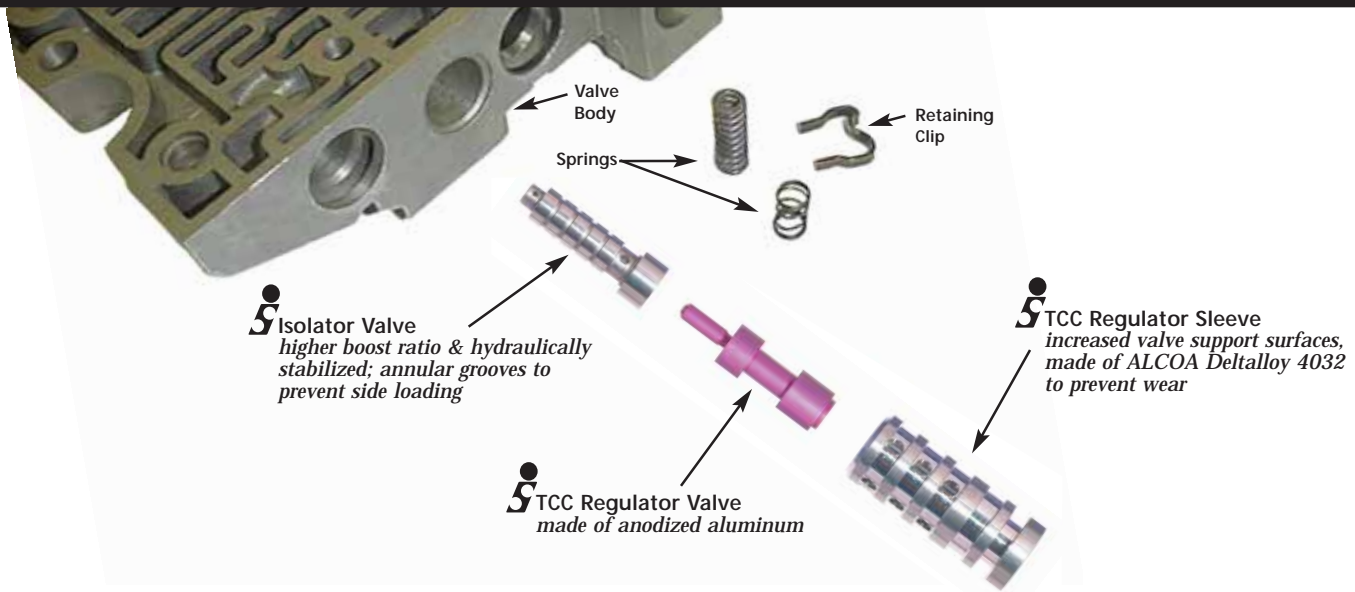
Solid Pin (in kit): Installs in pumps with brass orifice plug (4T60 & early 4T60-E).

Grooved Pin: Installs in pumps without brass orifice plug (later 4T60-E). Order Sonnax Part No. 84881A

Important: Care must be taken to install the correct pin style or line pressure and pump performance will be affected.



STEP 2 INSTALLATION OF TCC REGULATOR VALVE KIT



INSTALLATION INSTRUCTIONS

Standard Installation:

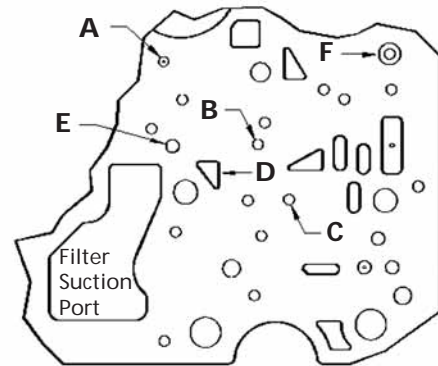
1. Remove the worn TCC regulator valve line-up and discard all but the small short compression spring (if present) and retaining clip.
2. Install the Sonnax regulator valve kit as pictured below, reusing the OEM small short compression spring (if present) and retaining clip. If short spring was not present, valves may be installed without a spring between them.

Note: The large diameter of the isolator valve will ride in a previously unused portion of the bore. There is frequently an aluminum edge over which the new valve must be pushed to clean it up. A light tap on the isolator valve usually frees the valve.

Slightly Firmer TCC Apply (recommended):

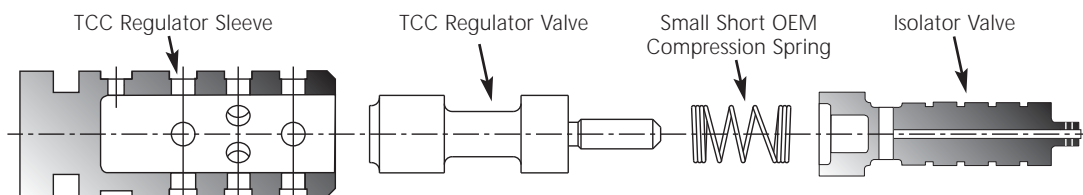
1. Drill the PWM orifice feed hole in the separator plate (labeled A) to .048"-.050".

Channel Plate Gasket Placed Over Separator Plate to Identify Orifice Location

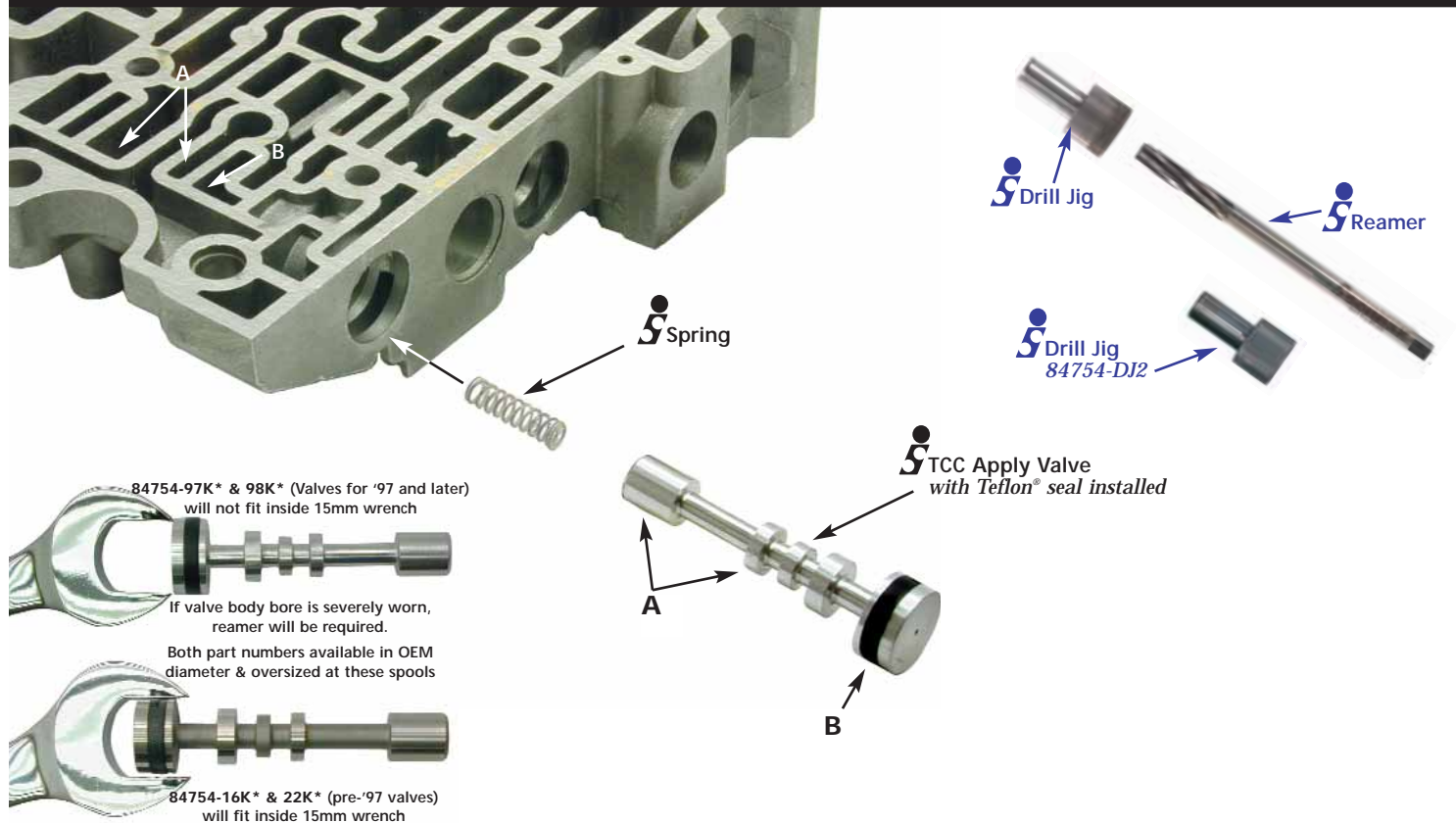


- A. PWM/Isolator Valve Feed Orifice
- B. Modulated Boost Orifice (hole in gasket) ties modulator oil into isolator circuit.
- C. If .046" orifice here, channel plate has a TCC accumulator piston.
- D. If plate has a .100" round hole here and an orifice at -E-, it is a TCC control plate, not a PWM plate. A-hole modification is not compatible with a TCC control plate!
- E. PWM plates have no hole here. TCC plates have .046" hole here.
- F. PWM plates have .112" hole here to feed PWM solenoid. TCC plates have no hole here.

ASSEMBLE AS ILLUSTRATED



STEP 3A IDENTIFICATION OF TCC APPLY VALVE



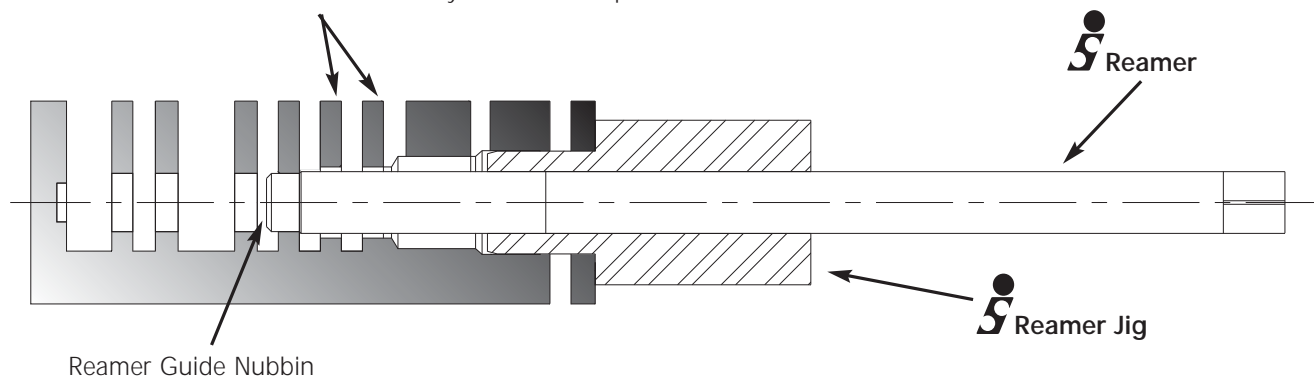
•Patent Pending

Note: Check OEM valve before reaming. Large spool should fit inside 15mm wrench. If spool does not fit, Sonnax kits 84654-97K and 84754-DJ2 will be required to service the apply valve circuit (84754-DJ2 is now included in the 84754-TL5).

STEP 3B REAMING INSTRUCTIONS FOR TCC APPLY VALVE

1. Remove the valve from bore.
2. Clean the valve body. A 5:1 mix ratio of mineral spirits and degreaser is recommended.
3. Clamp the valve body to bench with open circuits up.
4. Fill bore with proper cutting fluid (kerosene, Tap Magic™, etc.).
5. Insert the reamer jig into bore as illustrated.
6. Soak the fluted end of reamer with cutting fluid.
7. Insert the reamer into reamer jig until the guide nubbin enters the first bore to be cut, as illustrated. Securely position the reamer to remove any wobble.
8. 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.
9. The reamer should actually pull itself through the bore, so little or no back pressure should be applied to the reamer or speed handle.
10. 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.
11. Using low air pressure, blow free the chips before removing the reamer.
12. To remove the reamer, turn clockwise while slowly pulling outward on the reamer.
13. Remove any remaining debris from the bore with low air pressure and mineral spirits/degreaser mixture.
14. Lubricate the replacement, without the Teflon® seal installed, with ATF. Fit the valve into the reamed bore to check for fit.
15. Due to variations in valve body wear and reaming processes, the valve may seem snug at the middle spool diameter. In these instances, buff the indicated bore with emory cloth until the valve strokes freely. The valve body should be cleaned again to remove any grit.

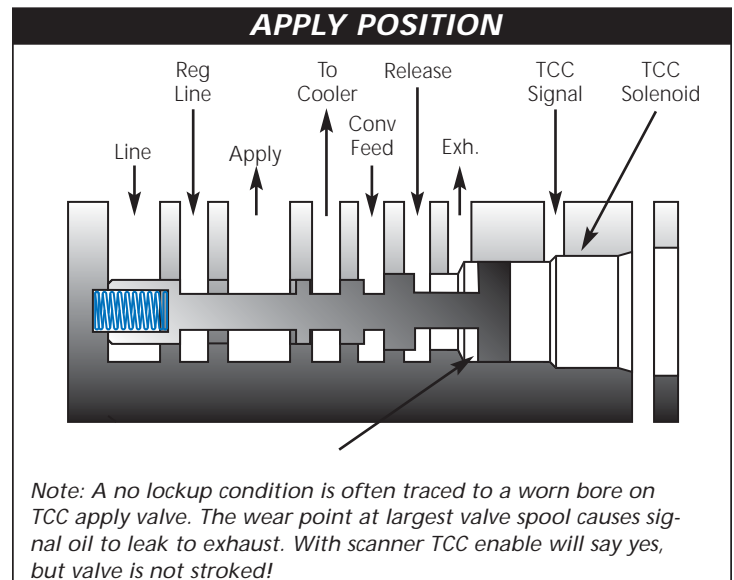
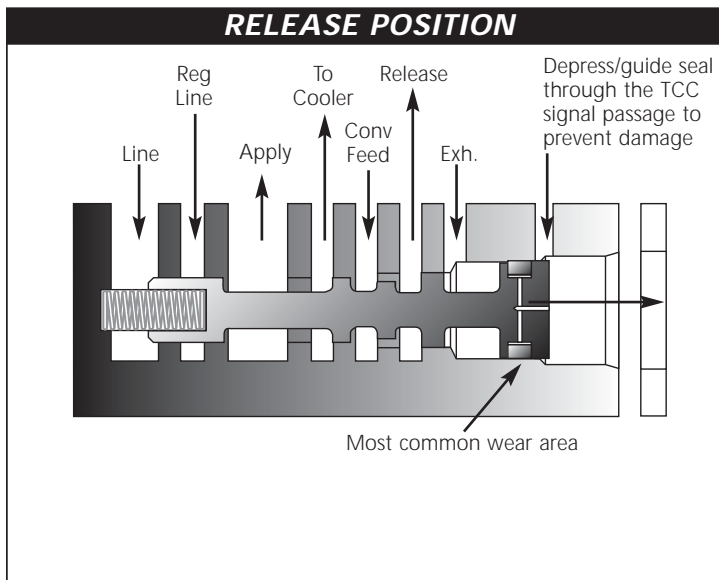
If valve is too snug after reaming, buff the bore slightly at arrows.
ScotchBrite™ cloth or fine emory on a wire loop works well for this.



STEP 3C INSTALLATION INSTRUCTIONS FOR TCC APPLY VALVE

1. Lubricate the replacement valve.
2. Secure the spring into the pocket at the end of the valve.
3. Using gel, secure the seal into the valve groove. Depress/guide the seal through the TCC signal passage to prevent damage.
4. Manually stroke the valve fully a number of times to make sure there are no hangups.

Note: Some OEM applications do not have the inboard valve return spring. In these applications, line pressure is the force holding the valve into TCC off position. The addition of the return spring requires more signal oil pressure, and ensures that a restricted solenoid or large feed signal filter/orifice does not force the valve into apply. Install the Sonnax spring on all units.



STEP 4 INSTALLATION OF BOOST VALVE KITS

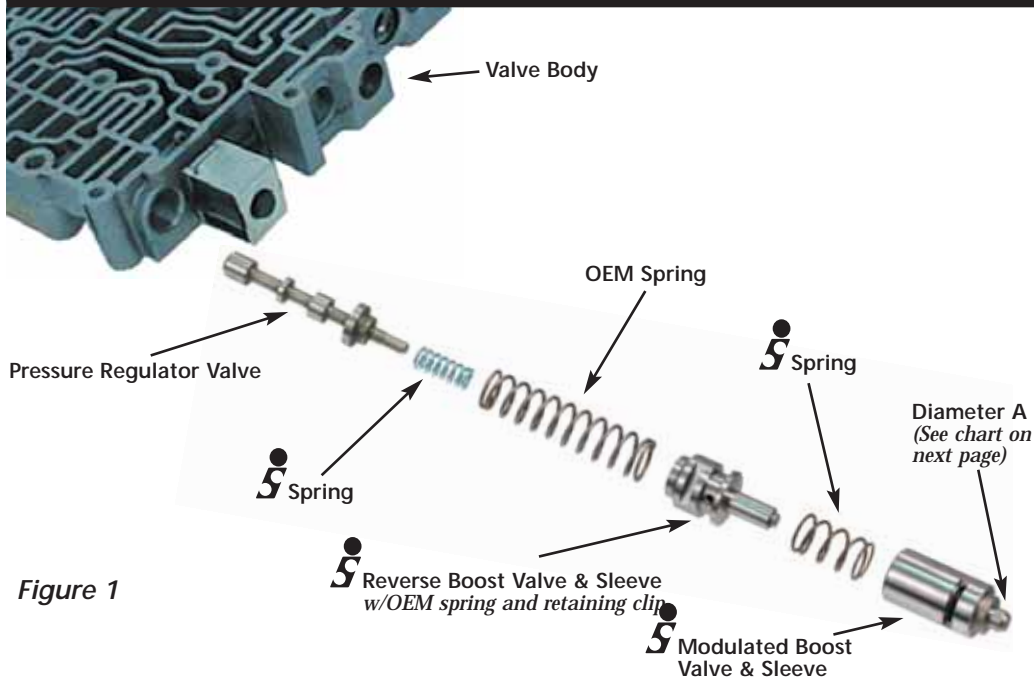
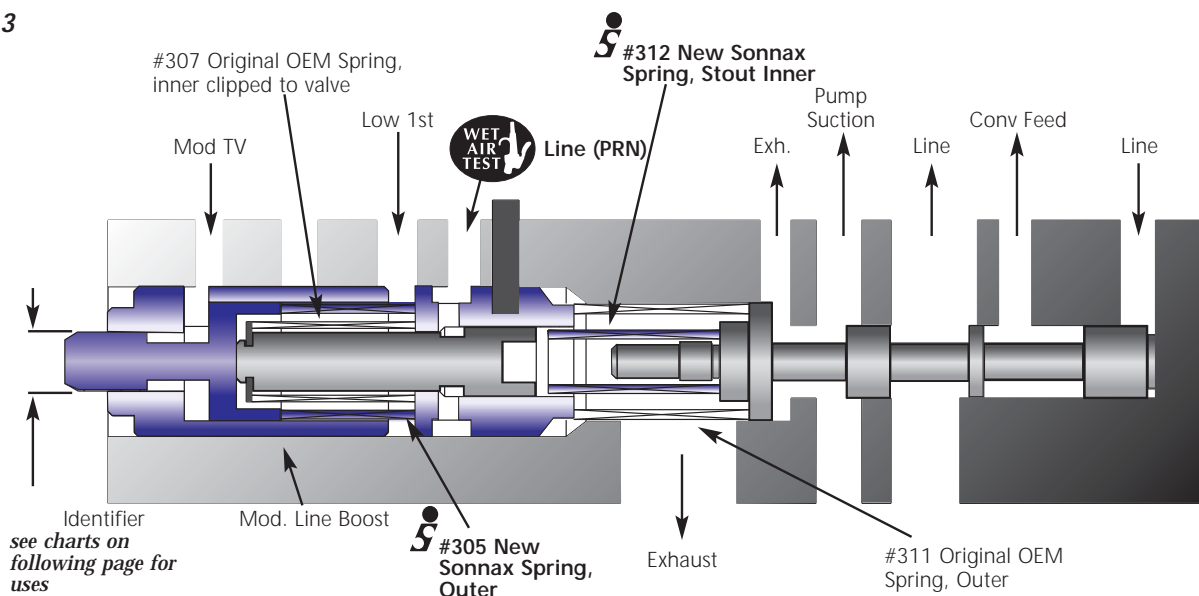


Figure 1

1. Remove the retaining clip, OEM MTV boost sleeve and valve and spring (#305). Save the clip.
2. Remove the grooved retaining pin, OEM reverse boost valve and clipped-on spring (#307), reverse boost sleeve and 2 springs (#311 & #312). Caution – PR valve is still inside bore but may fall out. Save the retaining pin and OEM spring #311 and spring #307 & clip.
3. Place the Sonnax boost valve into its sleeve. Place the OEM spring (#307) over the reverse boost valve stem and retain with OEM clip. Place the Sonnax inner spring (#312) over the PR valve stem and place the OEM outer spring (#311) up against the PR spool flange. Push the reverse boost valve assembly into the bore just far enough to reinstall the grooved retaining pin.
4. Install the Sonnax MTV valve and Sonnax #305 outer spring into the MTV sleeve. Install the assembly and spring into the bore, far enough to secure with the original retaining clip.

Figure 3



Note: The #311 spring can be changed to set idle pressure, which will not affect the Sonnax parts.

Note: SC 4T60-E contains high ratio MTV boost valves. The chart at right indicates valve sizes and common applications.

MTV BOOST VALVE OEM DESIGN

Technical drawing of the MTV Boost Valve. It shows a side view of the valve assembly. Dimension øA is indicated for the main body diameter, and dimension øB is indicated for the flange diameter. Arrows point to the respective dimensions.

Low Boost Ratio*

øA .276"

øB .567"

øC .273"

øD .328"

Sonnax Kit No. [84754-12K](#)

Sonnax Kit No. [84754-14K](#)

Common *3.1, 3.4, 4.1, 4.5L Engines

REVERSE BOOST VALVE OEM DESIGN

Technical drawing of the Reverse Boost Valve. It shows a side view of the valve assembly. Dimension øC is indicated for the main body diameter, and dimension øD is indicated for the flange diameter. Arrows point to the respective dimensions.

High Boost Ratio*

øA .199"

øB .567"

øC .293"

øD .348"

Sonnax Kit No. [84754-17K](#)

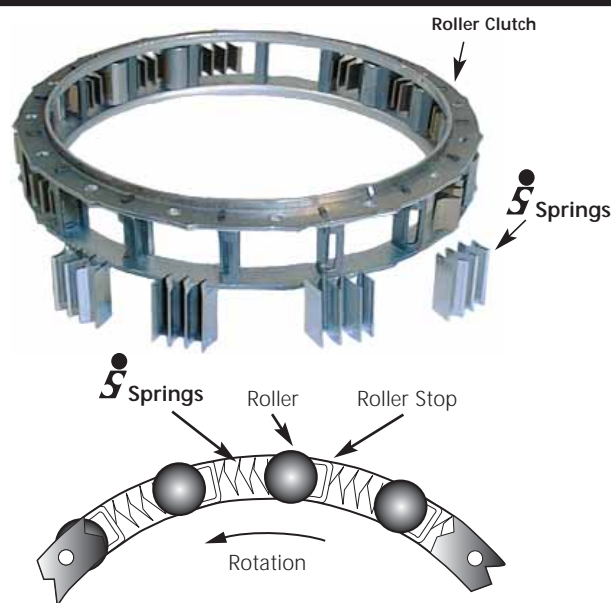
Sonnax Kit No. [84754-19K](#)

Common *2.3 Quad, 3.8L Engines

Note: MTV & reverse boost assemblies can be swapped to achieve varied boost rates.

STEP 5 INSTALLATION OF 1-2 SPRINGS

1. Remove the roller clutch assembly from the 1-2 outer race.
2. Remove the OEM accordion springs and return the empty roller clutch to the outer race.
3. Return the rollers to the roller clutch, butting them up to the open ends of the roller stops.
4. Insert the Sonnax K84956-SP springs into the roller clutch, to the left of the rollers.
5. Spring orientation is important, so refer to the drawing at right.



STEP 6 DIFFERENTIAL SIDE GEAR THRUST WASHER INSTALLATION

1. Drive out differential pinion pin retainer.
2. Remove pinion pin, pinions and washers.
3. Remove side gears and washers to allow replacement.
4. Using new washers, reassemble in reverse order.



STEP 7 SETUP DIFFERENTIAL ENDPLAY

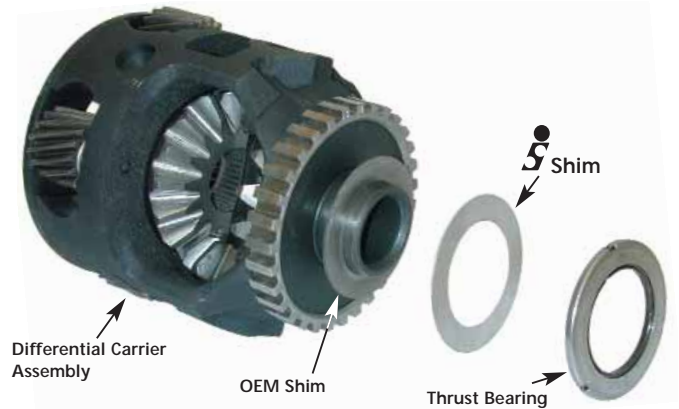
Sonnax shim 75410-10 installs between the differential carrier selective shim and the bearing.

To set and test differential endplay:

Install the differential final drive internal gear and snap ring. Mount a dial indicator to the differential end of the case at the frame mounts. A disc or bushing driver, fitted into the end of the differential carrier's axle hole, eases the dial indicator reading. The carrier should be lifted up and down with a screwdriver through the case oil drainback area. Adjust with shims until an endplay of .005" to .025" is obtained.

Sonnax shim is .010" thick and may be used in combination with thicker OEM shim to achieve precise endplay.

See list at right for OEM selective shim thickness.



I.D.#	Thickness	Part Number
2	1.56mm (0.061")	8631422
3	1.75mm (0.069")	8631423
4	1.85mm (0.073")	8631424
5	1.95mm (0.077")	8631425
6	2.05mm (0.081")	8631426
7	2.15mm (0.085")	8631427
8	2.25mm (0.089")	8631428
9	2.35mm (0.093")	8631429

STEP 7A SETUP INPUT CLUTCH HOUSING ENDPLAY

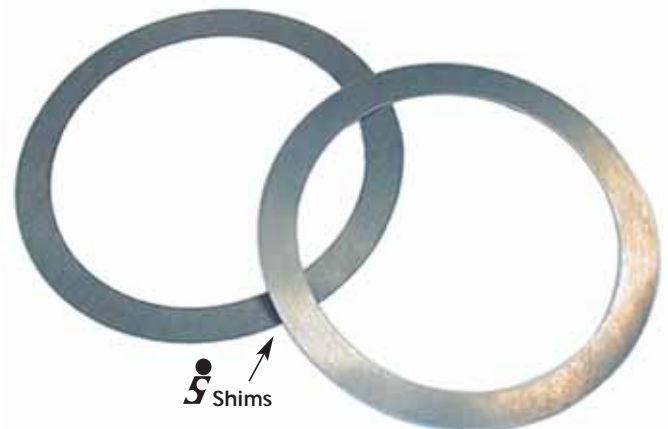
Total input clutch housing endplay should be from .005" to .020", including gasket crush.

There are two procedures that accomplish similar results:

1. A method used by most shops is to use a feeler-gauge to obtain a measurement from the driven sprocket support (channel plate mating surface) to the case gasket surface (case gasket removed, and differential pre-loaded toward input drum). The driven sprocket support should be flush to .017" recessed when measured with a straight-edge placed on the case surface. If the measurement exceeds .020", a shim or shims should be added, either Sonnax 84733-10 (.010") or 84744-20 (.020"). (The Sonnax recommended shim position is between the bearing and the OEM shim, although it could be placed between the drum and OEM select.)

Note: The gasket when torqued will result in additional endplay of .005" to .008". The compressed gasket thickness must be added to the straight-edge and the feeler-gauge measurement.

2. OEM has a tool available from Kent Moore (# J-33386), which results in using the OEM selective shim to verify unit endplay (see unit repair manual for this procedure). This procedure will result in a .005" to .012" input drum clearance.



I.D.#	Input Clutch Hub Shim	
	OEM Shim	Color
1	Orange, Green	2.95mm (.116")
2	Orange, Black	3.10mm (.122")
3	Orange	3.25mm (.128")
4	White	3.40mm (.134")
5	Blue	3.55mm (.140")
6	Pink	3.70mm (.146")
7	Brown	3.85mm (.152")
8	Green	4.00mm (.157")
9	Black	4.15mm (.163")
10	Purple	4.30mm (.169")
11	Purple, White	4.45mm (.175")
12	Purple, Blue	4.60mm (.181")
13	Purple, Pink	4.75mm (.187")
14	Purple, Brown	4.90mm (.193")
15	Purple, Green	5.05mm (.199")