# sonnax®

# THE SURE CURE® 4T65-E

## Transmission Reconditioning Kit


Part No. **SC-4T65E**

### Full Compatibility

- Full compatibility with all 4T65-E units.

### Valve Body Parts

- Boost Valve & Sleeve **(84754-30K)**
- TCC Apply Valve **(84754-43K)**
- TCC Regulated Apply Valve **(84754-34K)**
- Pump Slide Pivot Pin **(84881A)**
- 8 Imidized Checkballs, .250" **(10000-08)**
- 2 Imidized Checkballs, .375" **(10000-11)**

### Channel Casting Parts

- AFL Valve **(84596-02K)**
- Converter Relief Valve **(84757-01K)**

### Reassembly Parts

- Differential Lube Tube Retainer **(84532-01K)**
- Input Hub Shim, .010" **(84733-10)**
- Input Hub Shim, .020" **(84733-20)**
- Differential Shim **(75410-10)**

### Required Tools

- Sonnax tool kit **84754-TL3** is required to ream the TCC regulated apply valve bore.
- Sonnax tool kit **F-84596-TL** is required to ream the AFL valve bore.
- Sonnax Valve Body Reaming Fixture VB-FIX is required for use with AFL tool kit.

**Part No.**
**84754-TL3**
Required for use with this Sure Cure® Kit.

**Part No.**
**F-84596-TL**
Required for use with this Sure Cure® Kit & requires use of the VB-FIX reaming fixture.

VALVE BODY FIXTURE REQUIRED




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## TORQUE SPECIFICATIONS

Pump, valve body, channel plate & driven sprocket support bolts

M6 x 1.00mm, 71-124 in lbs

M8 x 1.25mm, 15-20 ft lbs

***Note:*** *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 & crack the castings.*

Case cover 18 ft lbs

***Note:*** *Tighten carefully as cover likes to crack at Torx bolts under valve body.*

Oil pan 10 lb ft

Extension housing 18 ft lbs

## CLEARANCE AND ENDPLAY

Total Unit Endplay
.002" to .006" selective washer located under bearing on input housing. See page 8.

Differential Endplay
.005" to .025" selective washer under differential to extension housing bearing. See page 8.

Pump Clearance

Slide Endplay .0013" - .0003"

Rotor & Vane Endplay .002" - .0033"

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

## PLANET PINION WASHER CLEAR-

Input & Reaction Carrier .009"-.030"

Differential Pinion Gears .009"-.025"

## CLUTCH CLEARANCE

4th Clutch Not adjustable
*(in channel plate)*

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 TIPS

Cooler return line = Horizontal fitting

Perform line pressure checks at 1200 rpm.

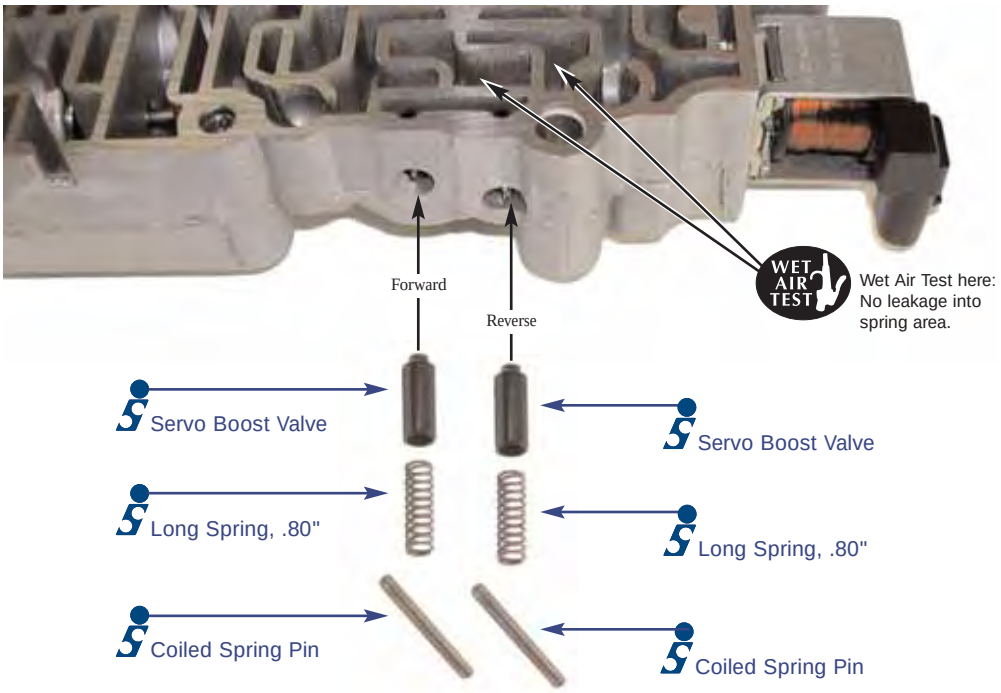
TCC Orifice; 1998-2002 models, enlarge orifice 9b from .020"-.030". See page 5.

Fluctuating RPM with TCC applied can be eliminated by cleaning the Mass Air Flow Sensor and disconnecting computer for several hours to clear memory.

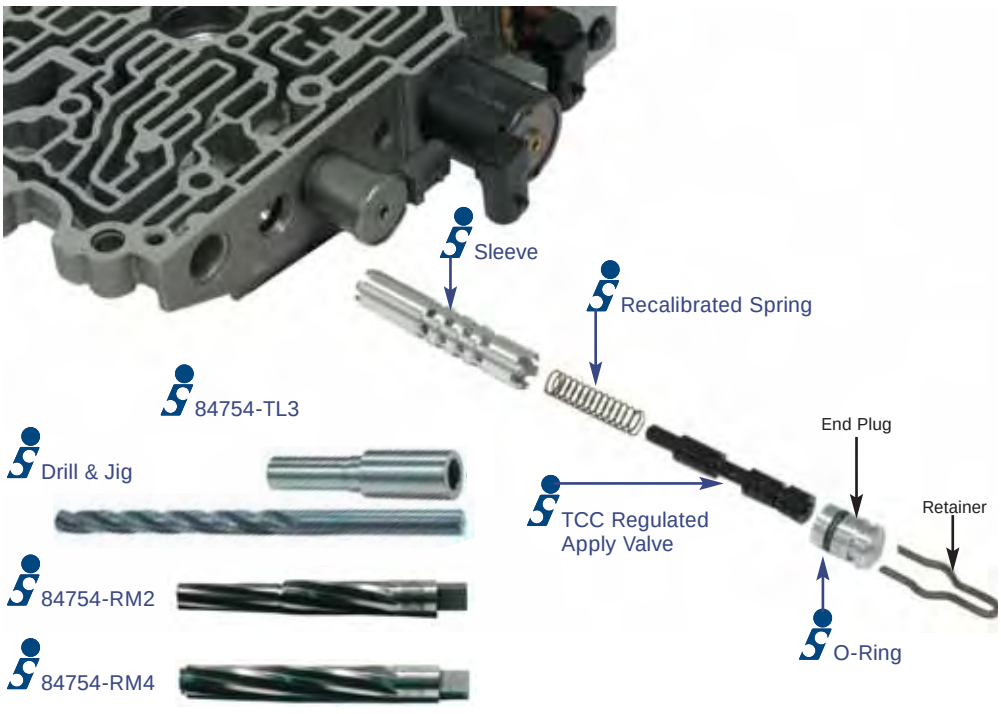
## Valve Body Inspection for 1999 & Earlier Units:

Be sure to inspect the 1-2 forward servo boost valve and reverse servo boost valve on 1999 and earlier units. Common delayed engagements, flare 1-2 shifts or burned 1-2 bands or low reverse pressure can be repaired by installing the **84754-40K** Servo Boost Valve Kit into either bore, using the **84754-TL2** tool kit. The **84754-40K** kit is not included in the Sure Cure Kit but can be ordered separately.

### Inspection Procedure – Wet Air Test both servo boost valve bores:




## Valve Body Repairs: **84754-34K** TCC Regulated Apply Valve







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## Disassembly Instructions

1. Remove OEM retainer, end plug, valve and spring
2. Clean the bore thoroughly to remove any sludge or debris.

## First Reaming Operation

1. Apply appropriate cutting fluid to TCC regulator bore.
2. Lubricate self-piloting reamer marked “4T65E TCC Reg Reamer #1".
3. Carefully ream the bore using a speed handle.
4. Ream the bore until the smaller pilot diameter contacts the bottom of the bore.
5. Remove the reamer and thoroughly clean the valve bore.

## Drilling Operation

1. Install the drill jig into the bore that was reamed in the first reaming operation.
2. Lubricate the valve body bore, drill jig and drill.
3. Using an electric drill, drill to the bottom of the bore.
4. Remove drill and guide and thoroughly clean the valve body.

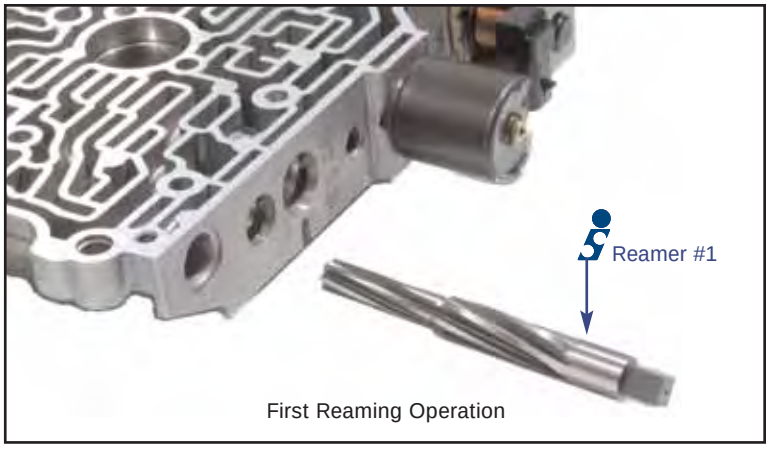
## Second Reaming Operation

1. Lubricate the valve body bore and reamer labeled “4T65E TCC Reg. Reamer #2”.
2. Install the reamer into the bore made by the previous reamer.
3. Using a speed handle, ream the remainder of the TCC regulator bore.
4. Remove reamer and clean valve body.

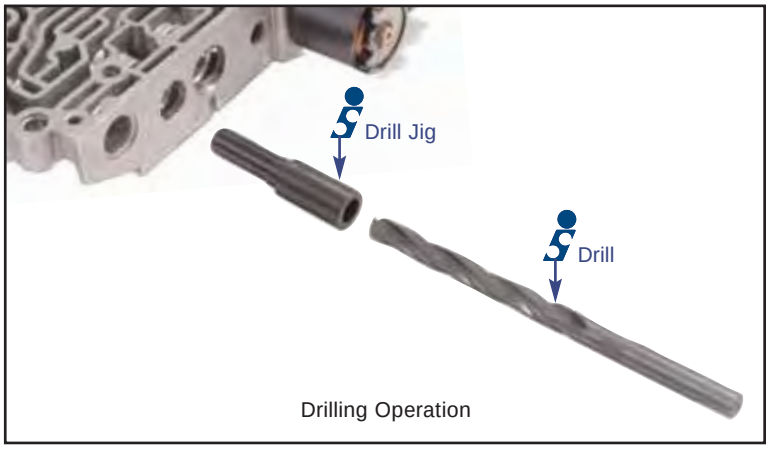
## 4T65-E TCC Regulator Sleeve Repair Kit

1. Install the Sonnax sleeve as pictured on the previous page. The sleeve must fit snugly in the bore. If the sleeve is loose in the bore, then very lightly use a tube cutter to raise five ridges as pictured.

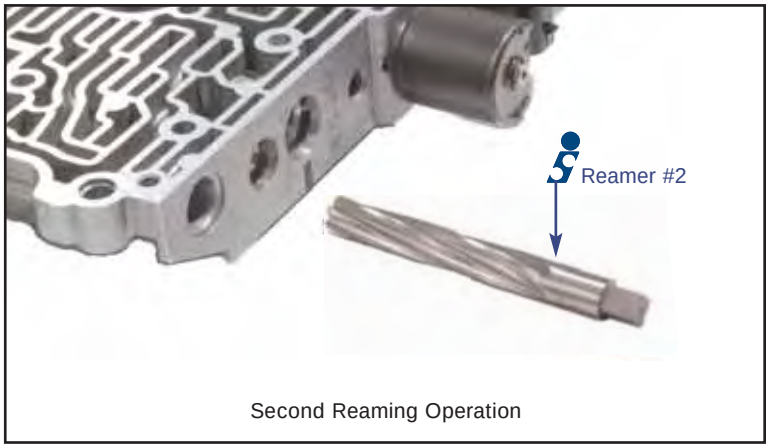
   **Important:** Use extra caution when using the tubing cutter. It only requires the slightest ridge to get a good, snug fit. Too much of a ridge can distort the sleeve, clamp down on the valve when inserted in the bore or cause the sleeve to become stuck before it is completely installed.
2. Install the Sonnax spring and valve as pictured on the previous page, ensuring the valve moves freely in the sleeve.
3. Replace the o-ring on the OEM end plug.
4. Install the OEM end plug and retainer.



First Reaming Operation



Drilling Operation



Second Reaming Operation


Ridging the Sleeve



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## Valve Body Repairs: **84754-43K** TCC Apply Valve Kit

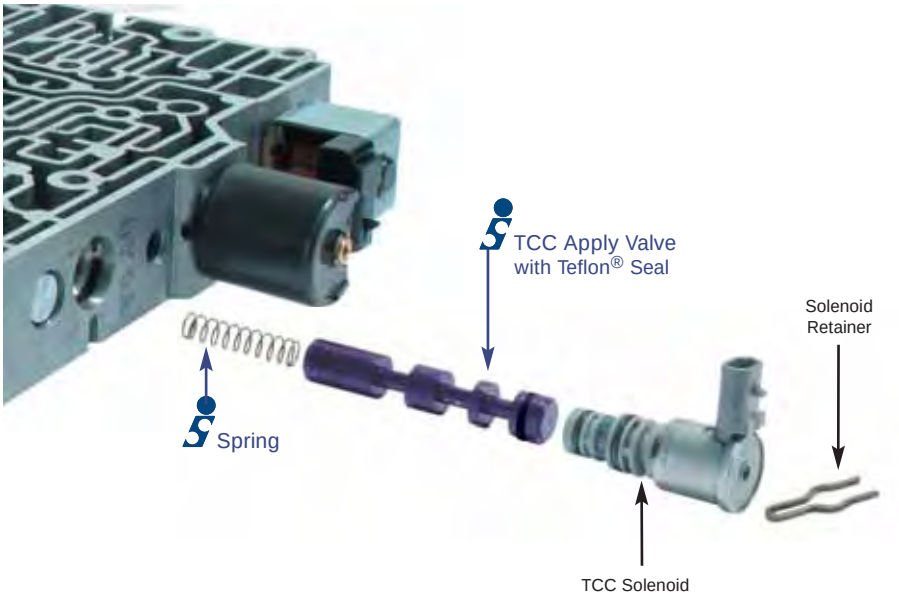




Figure 1

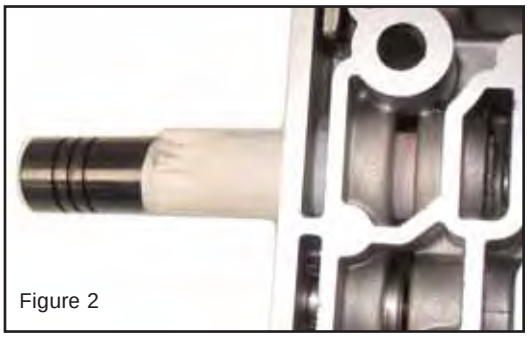


Figure 2

### Disassembly:

Remove the OEM solenoid retainer, solenoid, TCC apply valve and spring. Save or replace the solenoid as needed. Save the OEM solenoid retainer.

### Teflon® Seal Sizing Instructions:

For proper functioning of the valve and Teflon® seal, the seal must be properly set, centered and sized on the valve prior to assembly.

1. Fill the valve seal groove with Sonnax Slippery Stick p/n O-LUBE seal lubricant, or an equally dense lubricant. Assembly gel is too thin to retain and position the seal.
2. Roll the seal into a smaller diameter as shown in Figure 1 before installing onto valve.
3. Place the Teflon® seal (one extra provided) into the valve groove, ensuring the scarf cut tips do not bend or overlap improperly.
4. Make a tube about 2 inches long from 3 pieces of paper rolled up; dip one end of the tube into ATF.
5. Place the valve with seal into this paper tube; the seal end of the valve goes into the end of the tube dipped in ATF. Insert seal end of valve first into the TCC solenoid bore as illustrated in Figure 2. Let stand for 45 minutes.
6. Remove valve from valve body and discard paper.

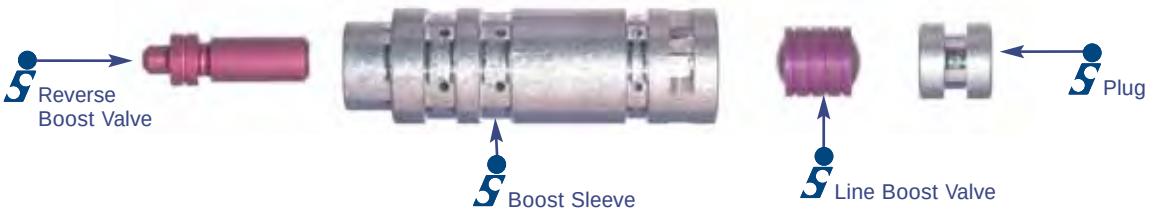
### Installation:

1. Place the replacement spring into pocket of the new valve, securing with Transgel™ as needed.
2. Insert the new valve, with previously installed Teflon® seal, and the spring into bore with the spring going in first.
3. Install new or original solenoid and OEM solenoid retainer.

## Valve Body Repairs: **84754-30K** Boost Sleeve Assembly

### Installation:

1. Remove and discard the OEM boost valve and sleeve assembly (reverse boost valve, line boost valve and boost plug). Save the retainer clip, 2 springs and pressure regulator valve that reside in the valve body bore.
2. Install the Sonnax boost valve and sleeve assembly **84754-30K** as shown on next page.




OEM Boost Valve Assembly

Sonnax Boost Valve Assembly



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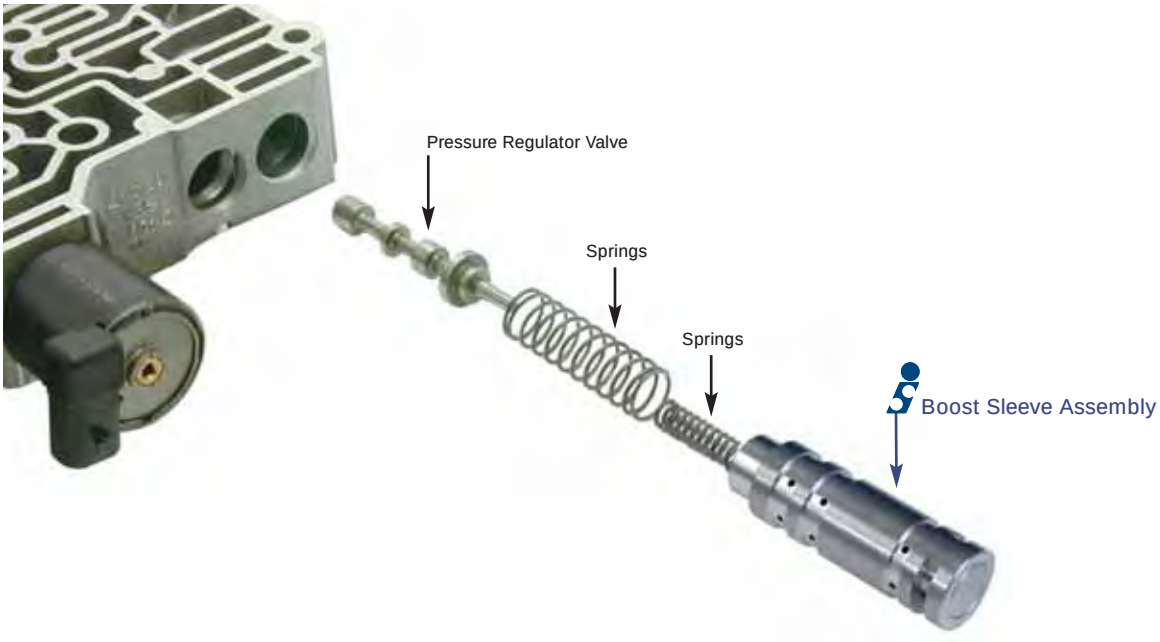
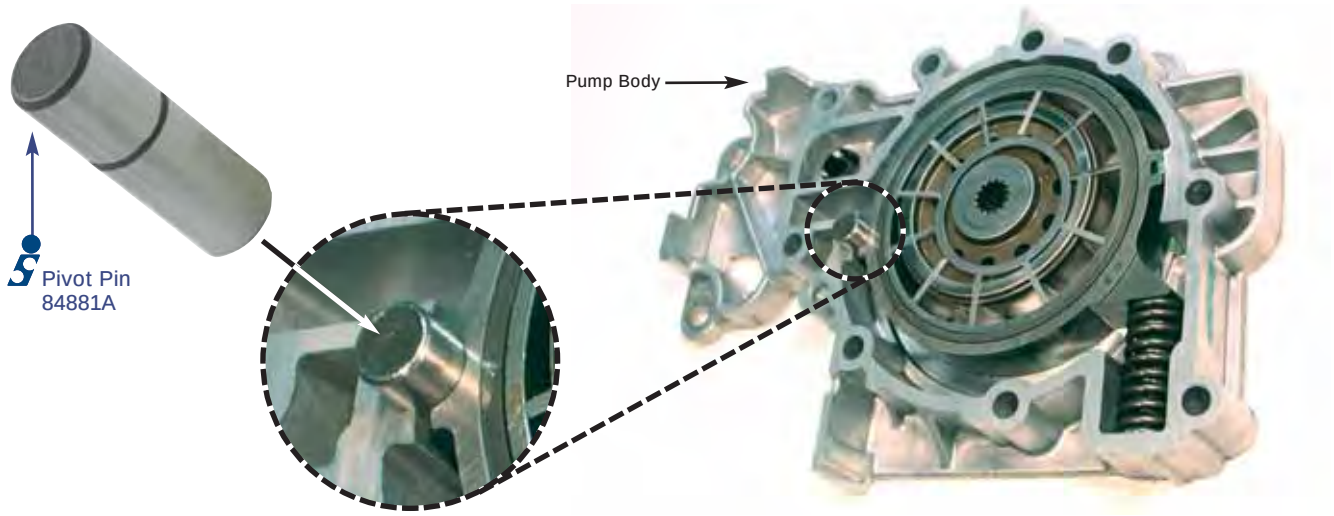
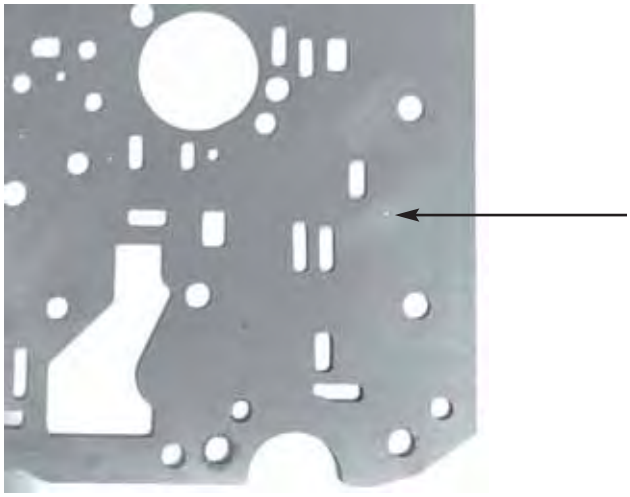
## Valve Body Repairs: **84754-30K** Boost Sleeve Assembly *(continued)*




## Replacement of Pump Slide Pin:




**Enlarge TCC Orifice:**




**Note:** On some units, TCC orifice 9b is too small and can easily become plugged. Inspect TCC orifice size and enlarge to .030" if needed.



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## Channel Casting Repairs: **84596-02K** AFL Valve Kit

NOTE: Due to the nature of the channel plate AFL bore, the Sonnax Reaming Fixture **VB-FIX** is required for use with this tool kit.

## Reaming Instructions: Prep, Set-up and Reaming

Refer to **VB-FIX** instructions for general fixture procedures.

1. Remove all components from AFL bore and thoroughly clean channel plate in solvent tank.
2. Place guide pin in AFL bore. Make sure pin slides in and out freely. If pin does not slide smoothly, clean guide pin and casting bore, lubricate pin with cutting fluid and recheck the fit.
3. Put channel plate on base of **VB-FIX** reaming fixture. Do not clamp in place at this time.
4. Install first reamer jig (**F-84596-RJ**) into inner race of reaming fixture.
5. Install guide pin into reamer jig.
6. Align casting so guide pin fits into the bore, leaving wing-nuts on fixture loose.
7. Using a "C" clamp, clamp casting securely to fixture base. It is recommended to use only one clamp, since two may distort the casting. Place casting bore opening close to the reamer jig.
8. Check fit of guide pin. The pin should slide smoothly in the bore, with no binding.
9. Lightly tighten all three wing-nuts, recheck guide pin fit, then tighten wing-nuts securely by hand. Do not use pliers or tools to tighten wing-nuts. Do not overtighten one wing-nut, as this will pull the fixture out of alignment.
10. Recheck to see if guide pin slides smoothly in bore. If guide pin does not slide smoothly, loosen the wing-nuts and realign.
11. Remove guide pin and install first reamer (**F-84596-RM**).
12. The pilot (middle diameter) should fit into the first bore to be cut.
13. Ream casting using standard procedure.
14. Remove first reamer and reamer jig, but **do not alter position of fixture or casting**.
15. Install the second reamer jig (**F-84596-RJ2**) into inner race of reaming fixture.
16. Install the second reamer into the jig. The pilot (middle diameter) should fit into the first bore to be cut.
17. Ream casting using standard procedure. Due to chip build-up, it maybe necessary to remove the reamer and clear chips prior to completing the reaming procedure.

## Installation / Assembly Steps:

1. After reaming and cleaning the casting, lubricate the sleeve/valve assembly with ATF. Push the sleeve/valve assembly into the bore, smaller diameter end of the sleeve inboard, until the sleeve bottoms in the bore.
2. Install the smaller diameter regulating spring over the stem of the valve.
3. Install the larger diameter spring into the bore, seating the end against the face of the sleeve.
4. Compress the springs with a screwdriver, and return the OEM clip to the outboard exhaust port.
5. Push on the valve at the inboard exhaust port to ensure that it strokes freely and the springs do not coil bind.



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## Channel Caster Repairs:

**84757-01K** Converter Relief Valve

### To remove the OEM assembly:

1. Set the cover over an opening, such as two E4OD sprag races. (*see Figure 1.*)
2. Using a 3⁄16 flat punch, inserted from the valve body side, drive the ball, spring and spring seat out. (*see Figure 1.*)
3. Keep the spring and spring seat for reassembly. Discard the ball. **Measure the OEM spring: if longer than 1.230", flat-grind the end coils until length is 1.210" to 1.230".**

### To install:

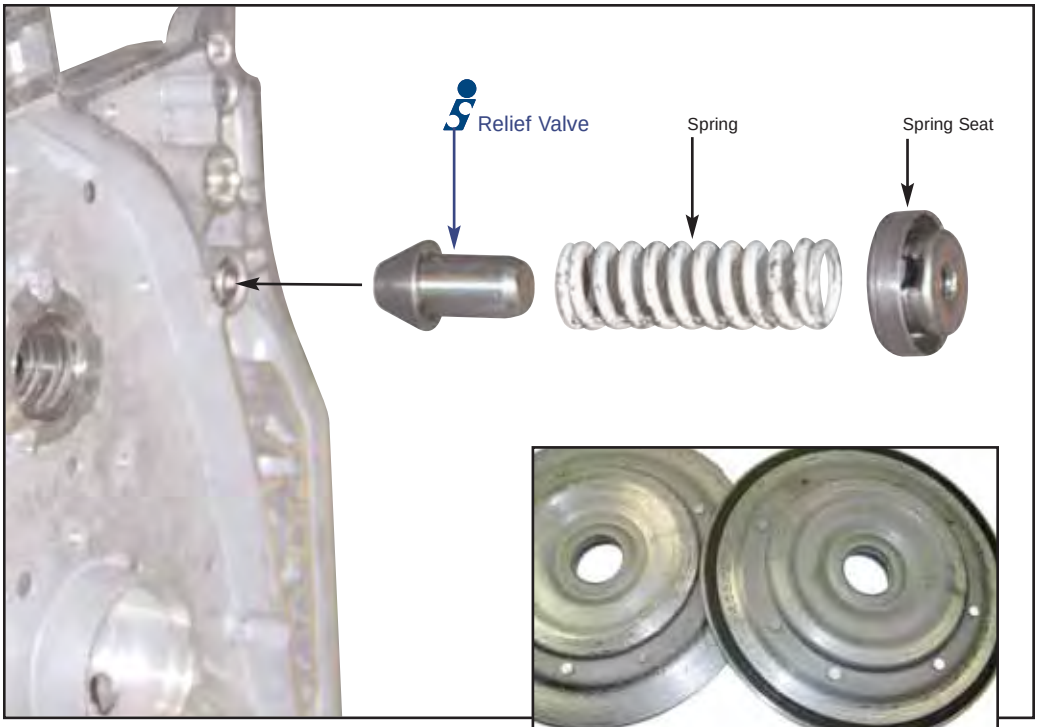
1. Set the Sonnax relief valve **84754-01K** into the pocket, followed by the spring and spring seat.
2. Press or drive the spring seat into the pocket until it is flush with the gasket surface. If left too high, the chain cover installation would have to press it down flush. If set too deep, it can cause excessively high converter pressure. *(see Figure 2).*

**Note:** An AXODE boost sleeve works well as a mandrel. Use large closed end to install the seat squarely. If seat is loose in channel plate, use small open end to reform seat for better retention *(see Figure 3).*

### After install:

From the spring side, using the 3⁄16 punch, hit the stem of the relief valve sharply to reform the seat and prevent leaks. (*see Figure 4.*)

**Note:** If contamination was found around the original relief valve, be sure to check cooler flow with a Sonnax SonnaFlow® or replace cooler.






Pistons destroyed by uncontrolled OEM apply pressure. Debris winds up in cooler.

NOTE

Not all covers have a cooler drainback ball. If there is not one in the cover, make sure there is one in the case cooler line fitting.

**Figure 1**

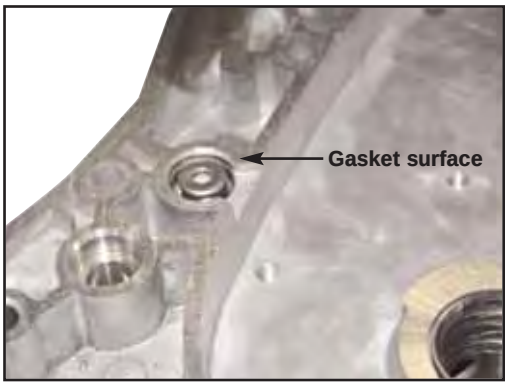



**Figure 2**

**Figure 3**

**Figure 4**



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## Differential Endplay:

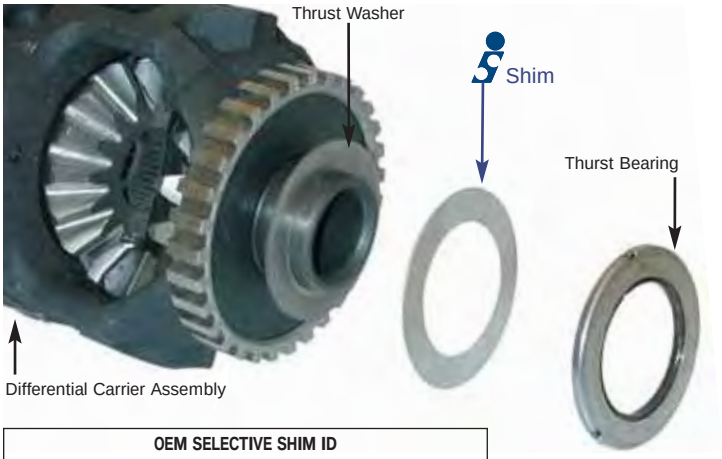
Sonnax shim **75410-10** installs between the differential carrier selective shim and the bearing.

**Note:** Shim does not work with all-wheel-drive units.

**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.

See list at right for OEM selective shim thickness.




| OEM SELECTIVE SHIM ID | | |
|---|---|---|
| ID# | 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 |

## Front Unit 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 preloaded 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 **84733-20** (.020"). The Sonnax recommended shim position is between the drum and the OEM shim.

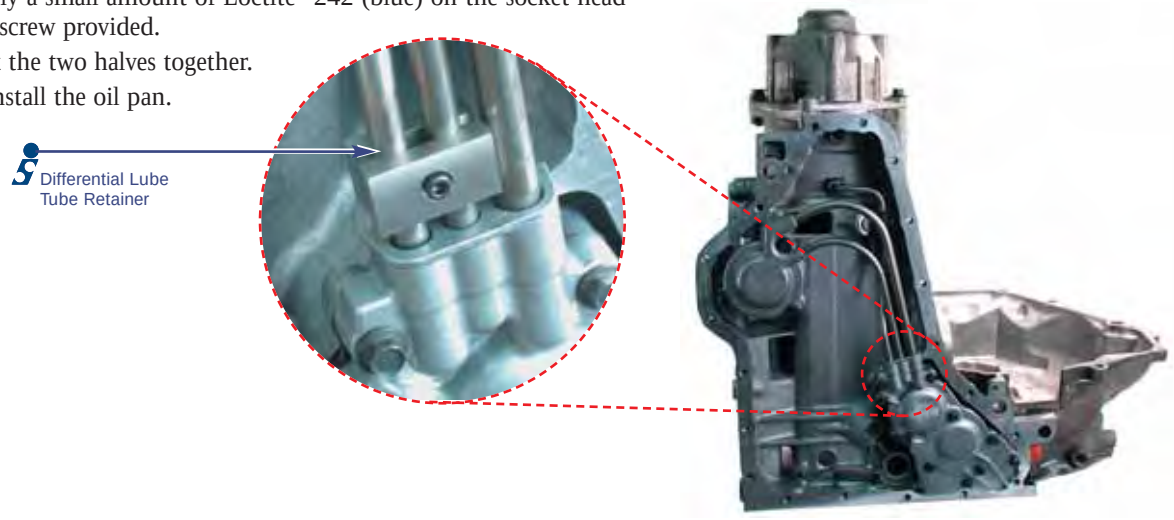
**Note:** The gasket when torqued will result in additional endplay of .005" to .008". The compressed gasket thickness must be added to the straight-edge and the feeler-gauge measurement.

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.) Their procedure will result in a .005" to .012" input drum clearance.


| Input Clutch Hub Shim | | |
|---|---|---|
| I.D.# | 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") |

## Reassembly Parts: **84532-01K** Differential Lube Tube Retainer

1. Place the threaded half of the lube tube retainer between the tubes and the case.
2. Place the other half of the lube tube retainer over the tubes.
3. Apply a small amount of Loctite® 242 (blue) on the socket head cap screw provided.
4. Bolt the two halves together.
5. Reinstall the oil pan.



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