

sonnax®

THE SURECURE®

46-47RH/RE

Transmission Reconditioning Kit



Updated Kit
also fits
48RE
*Except the 3 parts noted

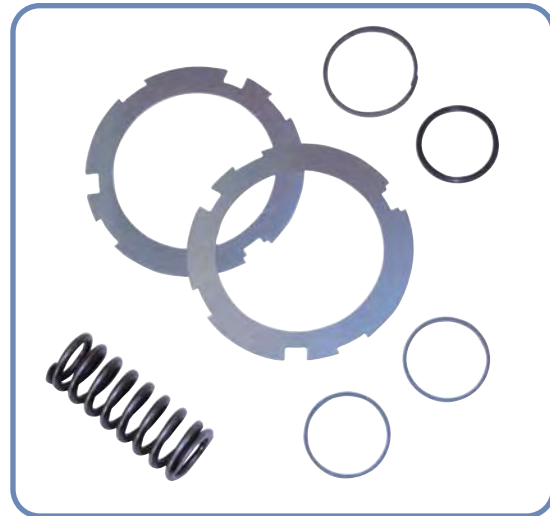
Reassembly Parts

- Endplay Shims (22700-Z*)
- 4th Accumulator Spring (12861-01*)
- Shift Linkage E-clip (10000-03K)
- Shaft End Plugs (22171A-02K)
- Imidized Plastic Checkballs (10000-13)
- Turbine Shaft Seals
- 4th Accumulator Seals
- Output Shaft Pilot Bushing (12510-01)

Valve Body/Pump Parts

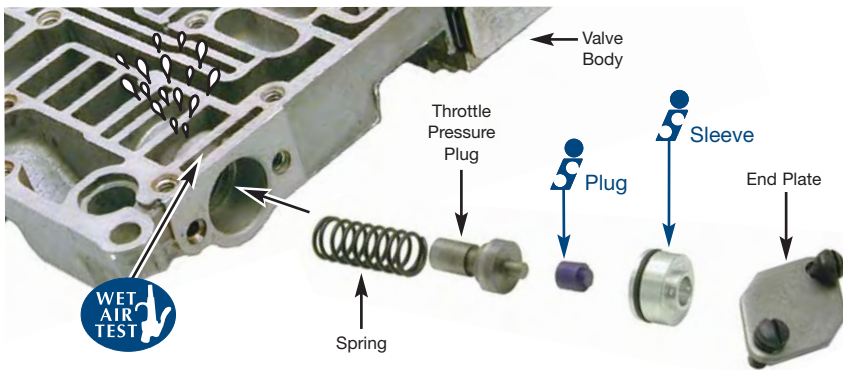
- Lube Regulated P.R. Valve (22771A-02K)
- Line Pressure Plug & Sleeve Kit (22229-01K*)
- Manual Valve (22771-09) Patent Pending
- Throttle Valve Kit (22771-03K)
- 4-Spoiled Switch Valve (22771A-01) Patent Pending

Part No.
SC-46/47RHE



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Install Line Pressure Plug & Sleeve Kit - Step 1

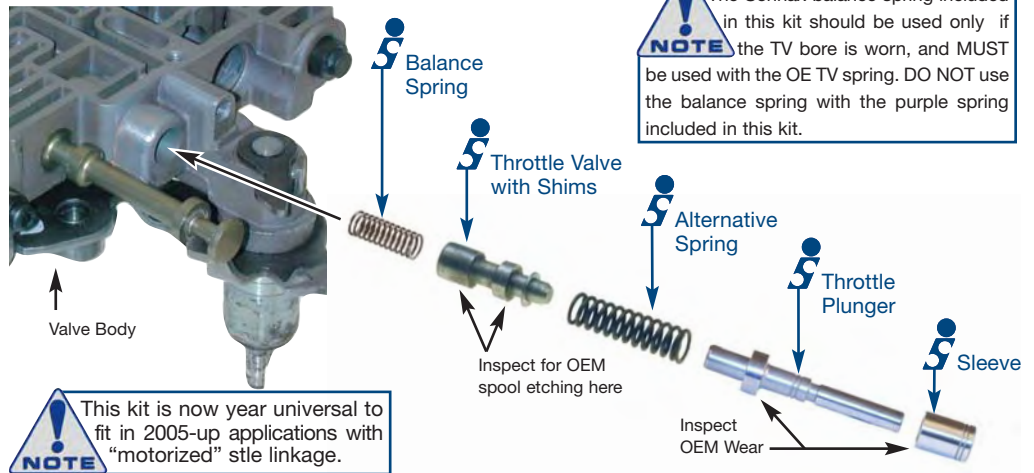


1. To install the replacement Sonnax valve and sleeve, first lubricate all parts.
2. Place the o-ring in the groove on the sleeve.
3. Push the sleeve into the valve body bore, o-ringed end first. The replacement plug should be inserted into the sleeve with the smaller diameter facing outward, towards the end plate.
4. Refer to the photo for proper valve orientation and sequence.



Install Throttle Valve Kit - Step 2

1. Remove the throttle valve line-up and save the original throttle valve spring. **Reuse the OE throttle valve spring whenever possible.**
2. Clean the valve body.
3. Follow inspection procedures below to determine if the Sonnax balance spring is required. **The inspection is important to determine if the Sonnax balance spring should be used.**
4. Reassemble using the Sonnax replacement throttle valve, throttle plunger and sleeve and the OE throttle valve spring.



The balance spring should be used only if the inspection process in Step 3 revealed a worn bore and the OE throttle valve spring will be used.

The Sonnax purple throttle valve spring should be used only when changes to shift timing are desired (see Step 6).

Note: The OEM throttle valve may appear to be etched between the spools. This is an indication of a poor ground circuit. An additional ground should be installed between the transmission and the negative battery post.

5. TV stop adjustment is the same for both early- and late- style brackets. Set throttle lever stop using a Sonnax rivet (77917-RV)

or equivalent tool measuring .627" as a gauge to set the distance between the throttle lever and the throttle plunger. To obtain the correct measurement, the throttle valve needs to be fully bottomed and the throttle valve spring fully compressed. With the tool in place, the valve line-up should have no movement.

6. Customizing TV pressure and shift points can be accomplished by following the directions and chart on the next page.

Customizing TV pressure and shift points can vary depending on the overall condition of the transmission, what type of loads the vehicle will be subject to, and driving habits.

1st Way to Inspect the bore: Wiggle Test

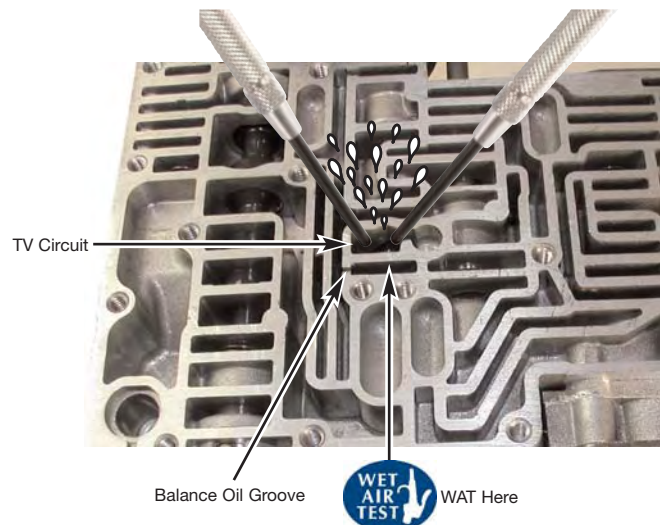
1. Hold the throttle valve in the bottom of the bore.
2. Pry the valve side to side as pictured. Seeing valve movement or any oil being squeezed out indicates excessive clearance.
3. Remove the valve and visually inspect the bore for wear. Pay close attention to bore surface between the balance oil groove and the TV circuit.

2nd Way to Inspect the bore

Be sure to hold the throttle valve against the bottom of the bore with this test. Add oil followed by regulated shop to the balance circuit. Be sure the balance feed groove is sealed during the test. There should be no leakage from the TV circuit.

3rd Way to Inspect the bore

Attach a rubber tube or grip the throttle valve with needle nose pliers, then stroke the valve in the normal operating range. The valve should stroke smoothly and freely: Any sticking or hang-up would indicate a worn bore.



To Increase TV Pressure Above OEM Specifications

Spring shims can be used to increase throttle sensitivity, delay upshifts and reduce throttle buzz or pulsation. The shims can be installed on either the plunger or control valve, where the spring sits. Spring shims increase spring load and TV pressure. TV pressure delays upshifts and gives sensitivity to 3-2 downshifts.

Note: Vehicle load, driving habits and engine modifications will affect the outcome. Increasing line pressure and leaking governor circuits result in sensitive 1-2, 2-3, & 3-2 shift timing.

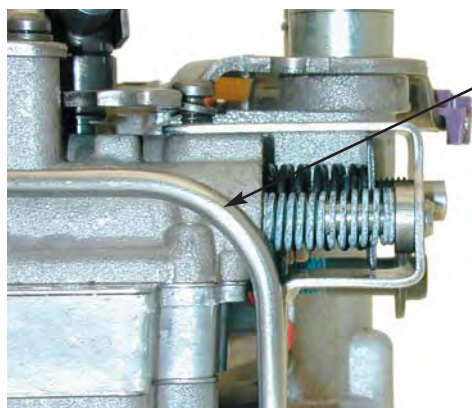
The spring shims can be installed to increase throttle pressure at idle, which stabilizes the TV valve and often eliminates a pulsation or buzz. Adding one shim will delay the upshifts slightly (approximately 3-5 mph depending on load, engine, etc.). Installing a second shim is suggested where late upshifts are desired. For example, on the OEM blue spring, each shim raises the spring weight approximately .5 lbs. and increases TV pressure by 7 psi. The shims can also be used in conjunction with the modified Sonnax spring (see chart below).

To Decrease TV Pressure Below OEM Specifications

A common complaint to the RH/RE throttle control occurs during heavy load or towing applications. The increased load requires the driver to use more throttle. This increases TV pressure and creates complaints such as late 2-3 upshifts and oversensitive 3-2 downshifts. Installing the modified spring designed by Sonnax (provided in kit) can reduce TV pressure and sensitivity. The Sonnax spring reduces throttle sensitivity, lowers shift points, prevents delayed upshifts, and reduces falling out of 3rd under heavy throttle. The Sonnax spring can be combined with spring shims to fine-tune TV pressure (see chart below).

Use the following chart as a general guide to determine change in TV pressure with any one of the spring/shim combinations.		
Desired Results	Spring/Shim Selection	Approximate Change to TV Pressure
HIGHER UPSHIFTS		
Increased throttle raises shift points and reduces throttle buzz	(3 Shims not recommended w/ OEM spring)	+21 psi
TV Pressure:	OEM Spring +2 Shims	+14 psi
	OEM Spring +1 Shim	+7 psi
OEM Specifications	OEM Spring	0 psi
LOWER UPSHIFTS - Do not use balance spring with Sonnax spring		
Decreased throttle lowers shift points and corrects oversensitive kickdown	Sonnax Spring +3 Shims	-7 psi
TV Pressure:	Sonnax Spring +2 Shims	-14 psi
	Sonnax Spring +1 Shims	-21 psi
	Sonnax Spring Only	-28 psi

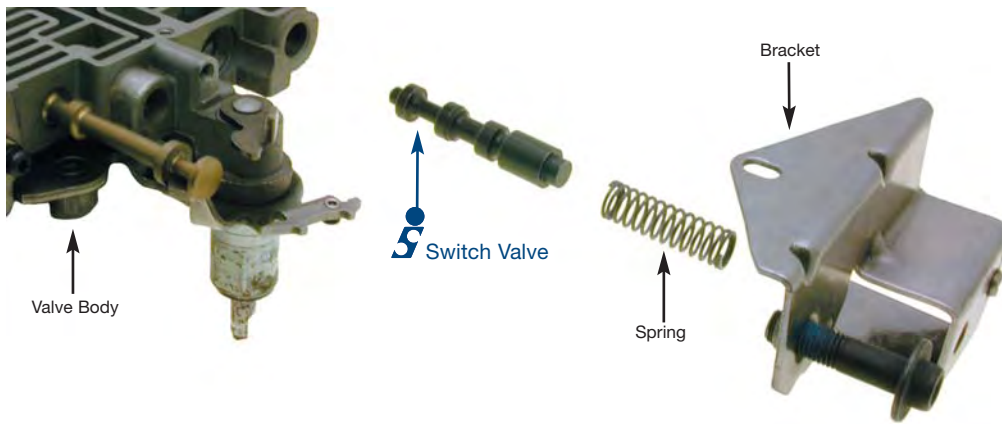
Install 4-Spooled Switch Valve - Step 3



Tube identifies valve body as applicable to Sonnax replacement 4-spooled switch valve. This tube supplies oil to the boost valve.

Note: Do not swap valve bodies between gas and diesel applications.

Install 4-Spooled Switch Valve - Step 3 (Continued)



1. Remove the OEM switch valve and spring.
2. Install new switch valve reusing the OEM spring.
3. Modify separator plate as per instructions below.

Boost Valve (Identified by the Auxiliary Tube and Triangular Plate on Top of Body)

Make sure this cover is flat and does not leak. The tube must be tight also.

Line pressure raises 8-10 lbs. (with no TV influence) on TCC apply and 3-4 shift by way of the boost valve. Line pressure at TCC apply and 4th gear can increase as much as 40% over the idle setting with heavy throttle. If a very strong pressure regulator spring or setting is used, line pressure in 4th and at TCC apply have been recorded up to 200 psi. Valve body warpage, hydraulic bind-up or converter damage can occur at this level. We strongly suggest installing pressure gauges to check line pressure at idle in drive.

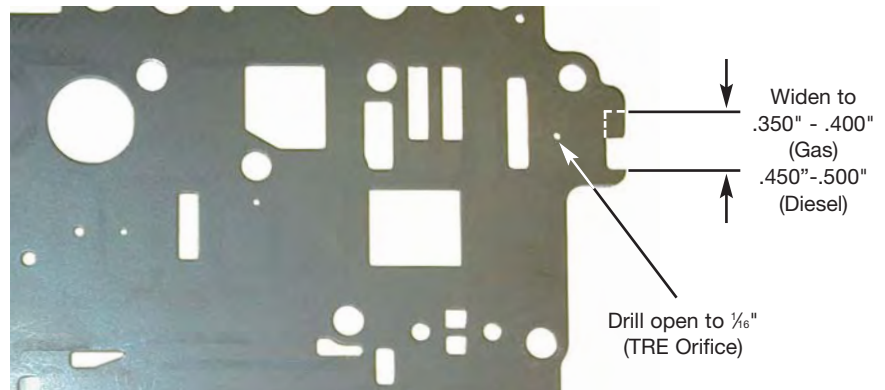
Note: All '93 and up production used the boost valve. The converters built prior to this '93 design are not suggested by OEM to be used with this boosted apply pressure.

Separator Plate Modifications

Open the exhaust port/slot cut in the plate. The exhaust should be .350"-.400" wide on gas or .450"-.500" wide on diesel.

The wider the slot, the faster the release oil exhausts and a firmer apply is felt.

Open the TRE orifice that was originally .042" to .062". This is the .042" orifice inboard of the slot mentioned above. Going larger will create a bump on TCC apply.



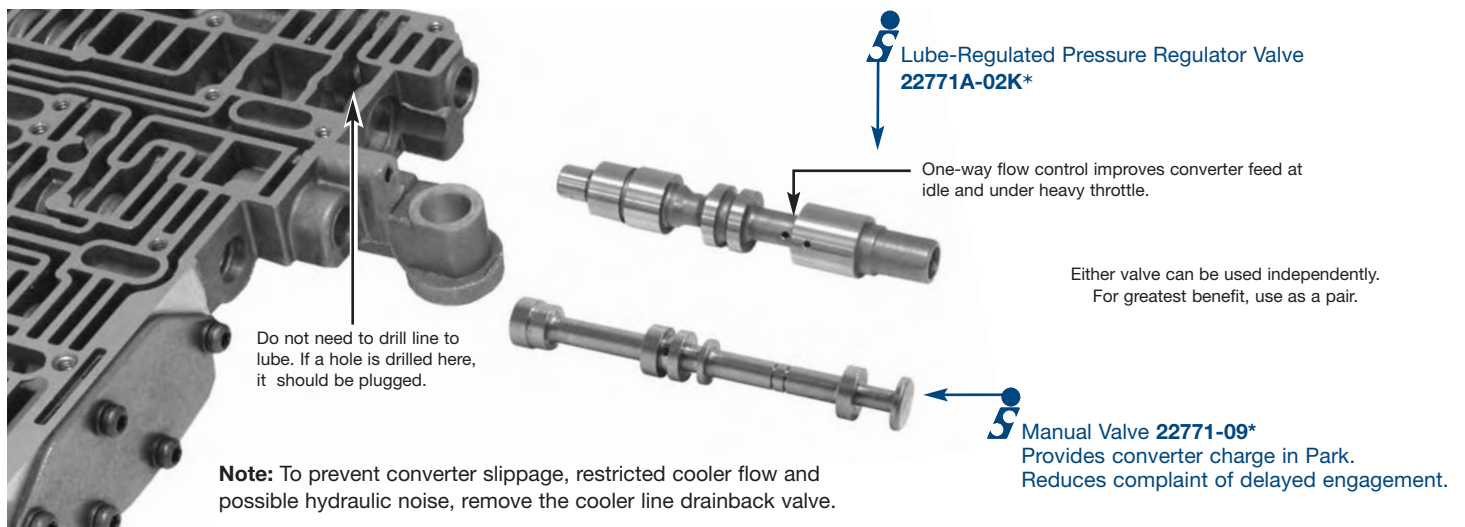
Pump and Cooler Flow Quality are Critical

There are many problems with restricted lines, drainback valves and contaminated coolers. If a previous converter failed, the remains will end up in the radiator.

From the return line (rear of case) cooler flow must be at least 1 qt. in 20 seconds (.8 gpm), in drive at idle. The SonnaFlow® is the best tool to isolate a restricted radiator. Good SonnaFlow® readings are: .7-.9 idle drive, 1.8 at 45 mph TCC off, a rapid rise to 2.1-2.2 gpm with TCC apply.

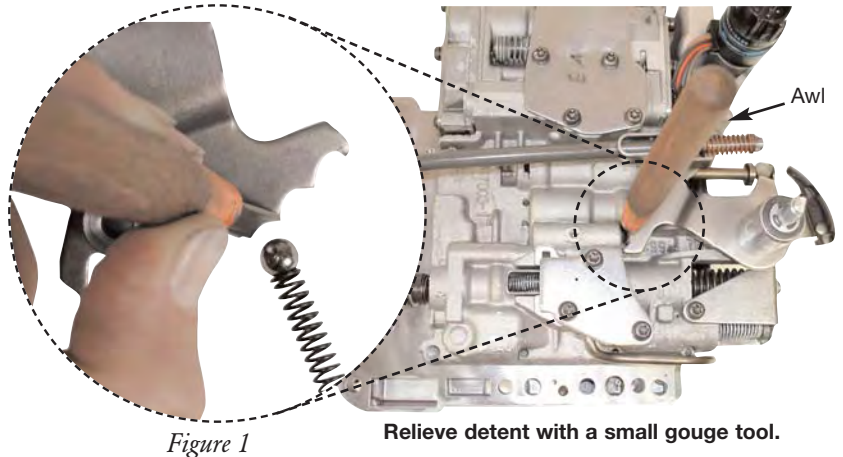
Make sure pump circuits are tight. The suction circuit has been found to pull in air through the separator plate at the front case surface. Verify this by pressurizing the filter suction hole, with selector in reverse. Look for leakage at the plate surfaces. Pulling air into the suction circuit will create poor engagement, acceleration and converter slippage. Many concerns of sealing ring leakage at the turbine shaft to pump area. This creates trapped release oil between the cover and piston, which reduces TCC clamping pressure.

Install Lube Regulated Pressure Regulator Valve & Manual Valve - Step 4



1. Removing pressure from the detent caused by the detent spring and ball can sometimes be difficult. An easy way to compress the detent ball and spring is by using a small woodworker's type gouge tool as in Figure 1 (screwdrivers are not recommended).
2. Remove the original pressure regulator from the valve body.
3. Replace with the new Sonnax lube regulated pressure regulator valve and adjust pressure (see section below).
4. Remove OEM manual valve and install the Sonnax manual valve. (No valve body modifications are necessary.)

Note: To prevent converter slippage, restricted cooler flow and possible hydraulic noise, remove the cooler line drainback valve.

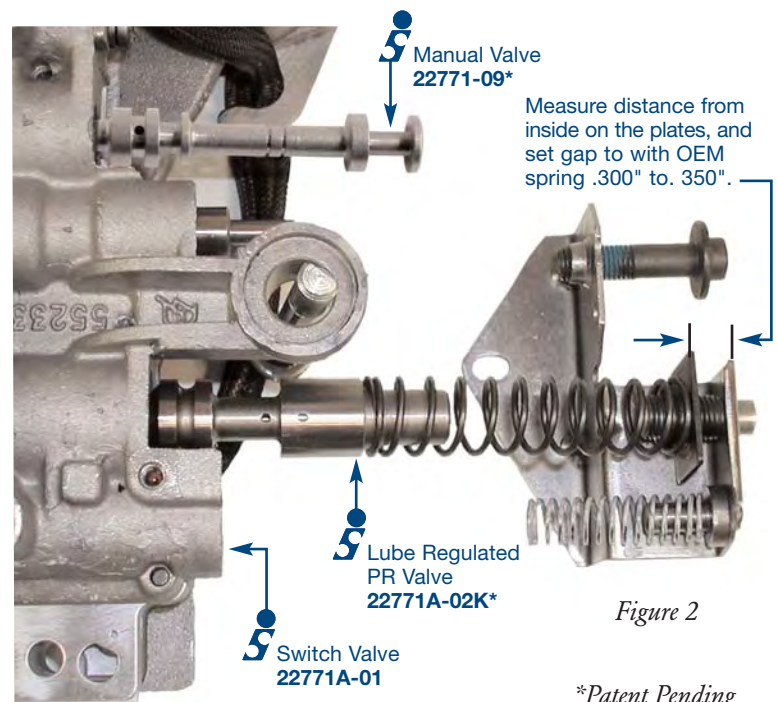


Pressure Regulator Spring Adjustment

Line pressure must be between 60 to 65 psi at idle in drive with minimum TV pressure. This is accomplished by setting the distance to .300" to .350" between the inside of the spring retaining plates (see Figure 2 at right) and with the more common .200" diameter balance plug.

1. Each full clockwise turn of the adjuster will distance the plate by approximately .050". Adjust gap between plates to .300" to .350".
2. This adjustment can only be made with an OEM spring. Aftermarket springs will require pressure gauge reading and subsequent readjustment of the distance setting to obtain correct line pressure. The OEM spring is:
 - 2.57" in free length
 - .061" wire diameter
 - 11½ coils
3. Verify line pressure after assembly with a gauge hooked into the line pressure tap located on passenger side, middle of case, between the accumulators. Line pressure will be boosted at TCC apply and 4th gear.

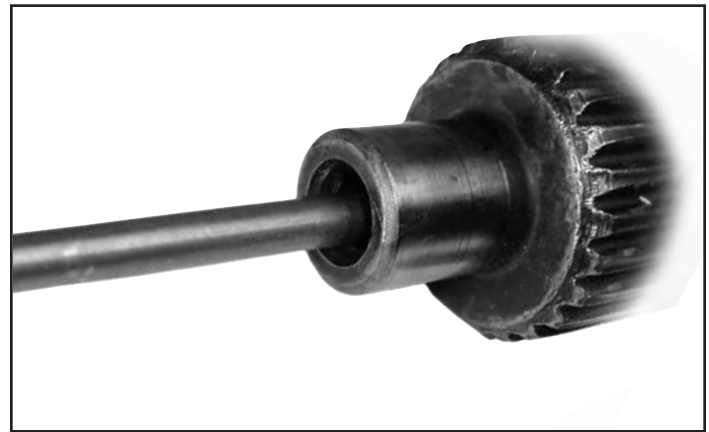
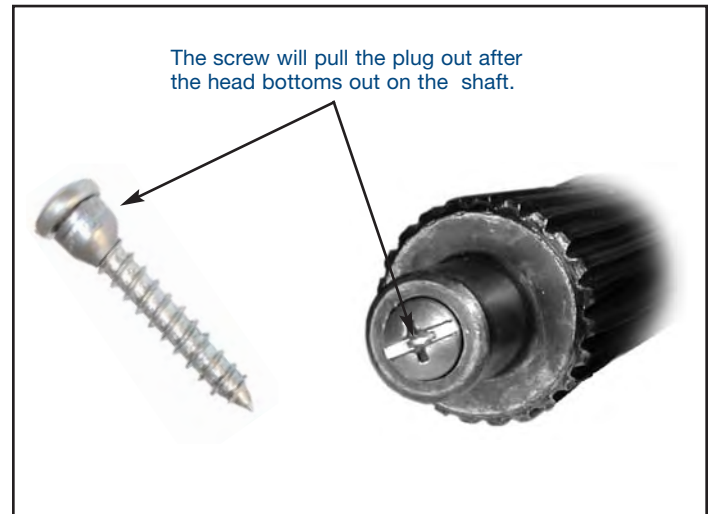
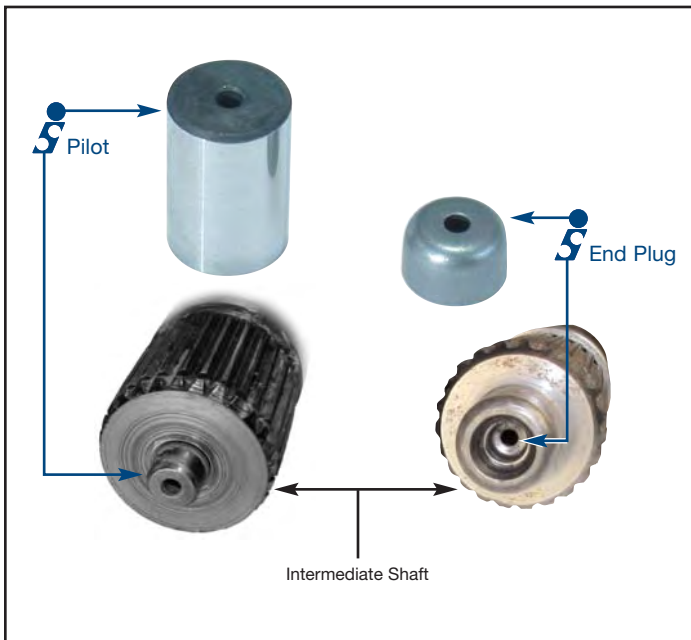
Important! Use caution adjusting the spring or high pressure will create bind-ups from cross leaks and increase throttle sensitivity.



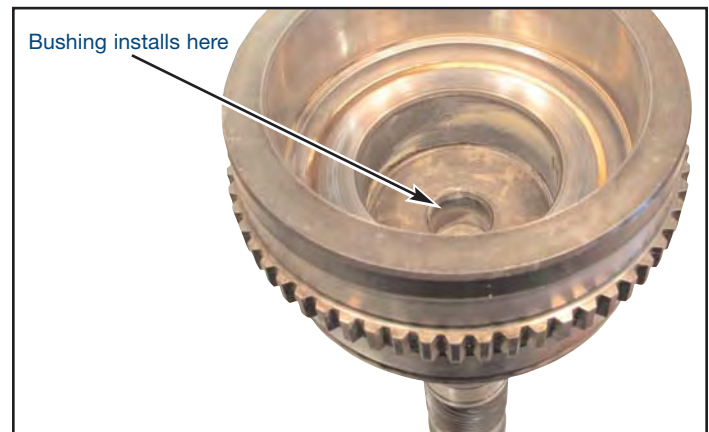
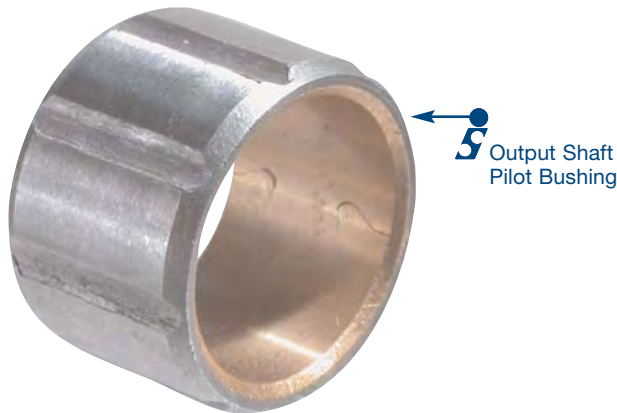
*Patent Pending

Install Intermediate Shaft Pilot & End Plug Kit - Step 5

1. Using a sheet metal screw, remove the original cup plug from the intermediate shaft.
2. Using a rod ($\frac{3}{16}$ " x 17"), drive the pilot out from the cup plug end.
3. Clean the intermediate shaft bore with the rod and a patch.
4. Drive the replacement cup plug into place (an AXOD servo pin works well for this).
5. Drive the replacement pilot into position. If the shaft does not have an internal stop to locate the pilot, position it so that .230" - .280" of the pilot protrudes from the shaft.

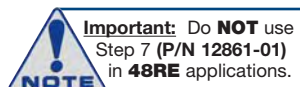


Install Overdrive Output Shaft Pilot Bushing - Step 6

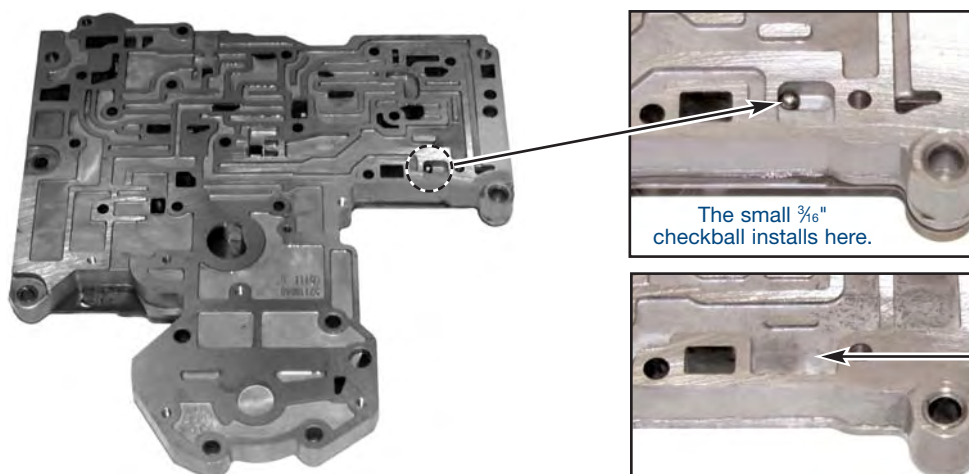


Install 3-4 Accumulator Spring - Step 7

Install the Sonnax spring in place of the OEM 3-4 accumulator spring.



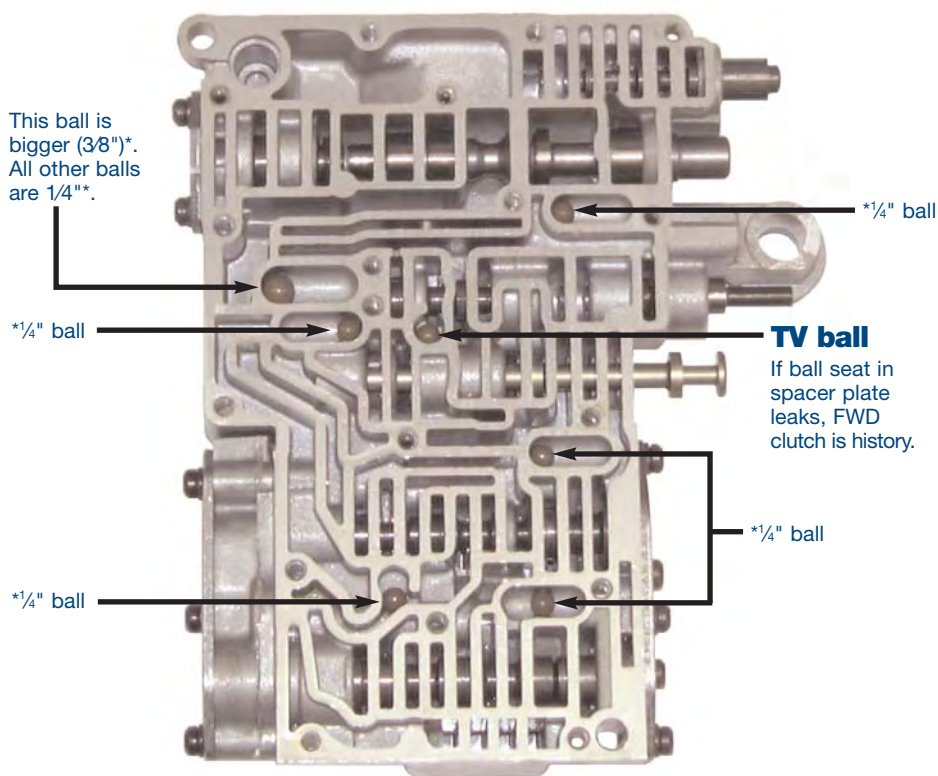
Install Imidized Plastic Checkball - Step 8



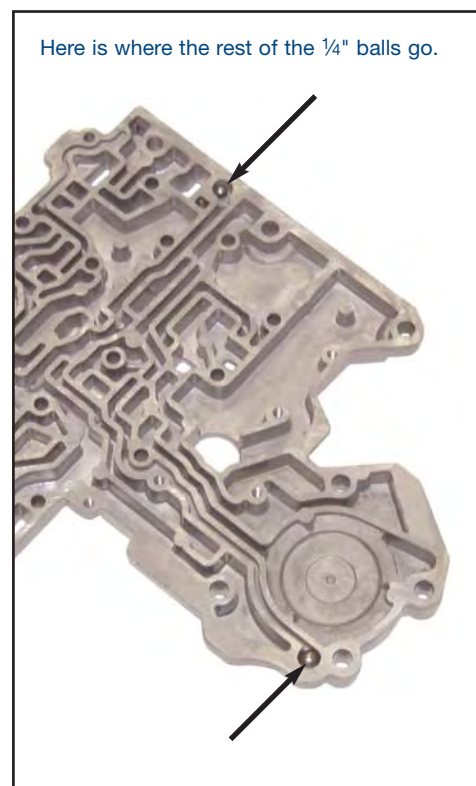
$\frac{3}{16}$ " Checkball

All 1998 & up RE units use a $\frac{3}{16}$ " checkball in this location. The ball usually ends up lost on teardown. We've included a new ball in the kit just in case you can't find yours.

Early valve bodies won't have a bathtub in the casting for the checkball.



* $\frac{3}{8}$ " & $\frac{1}{4}$ " balls not included with kit.



Install Retainer Clip - Step 9

Sonnax now offers **10000-03K** E-Rings for rebuilding the parking sprag. These are OEM replacements for the E-Ring that often get destroyed or lost when removing the parking sprag.

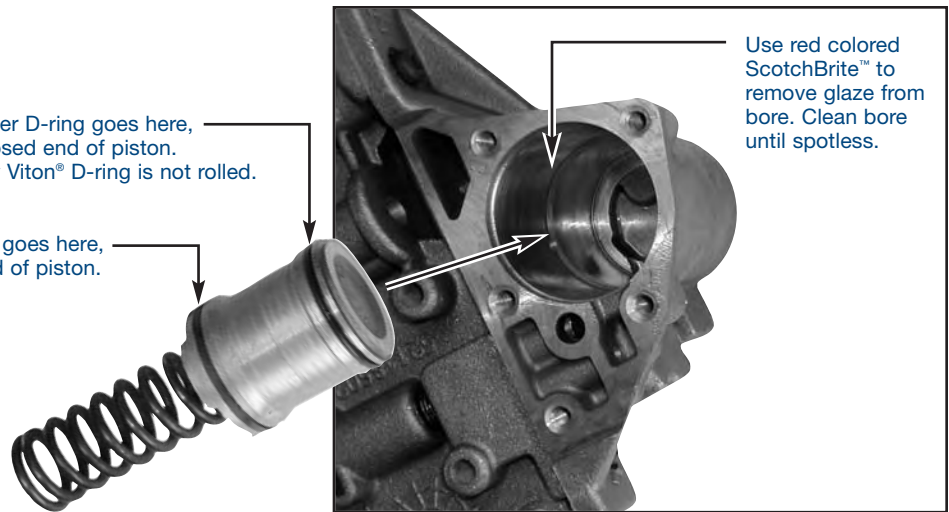


Install Sealing Rings - Step 10

1. Clean bore with Scotchbrite™.
2. Install Sonnax spring.
3. Install Teflon® seal by the open end of the piston.
4. Install D-ring by the closed end of the piston.

Rubber D-ring goes here, at closed end of piston. Verify Viton® D-ring is not rolled.

Teflon® ring goes here, at open end of piston.



The 2 Sonnax Teflon® rings are for the input shaft on the 47RH/RE, 48RE **ONLY**! These rings **WILL NOT** work on the 46RH/RE.

The 47RH/RE, 48RE has bigger ring lands, 1.245", while the 46RH/RE rings lands measure 1.170". That means the 47RH/RE, 48RE uses BIGGER sealing rings.



Measure Ring Lands

1.245"
Install Sonnax sealing rings.

1.170"
DO NOT install Sonnax rings!

Install Rear Planet Endplay Shim - Step 11

If inspection of rear annulus gear or shaft indicates visible wear, the **22700-Z** shim is generally required to reduce geartrain endplay. To verify the need, measure the endplay of planetary, sun gear and driving shell as an assembled unit as illustrated. Stand the assembly upright, with the snap ring installed, on a flat surface. Pull upward on the output shaft and measure the clearance. Insert a feeler gauge between the rear annulus gear support hub and the output shaft shoulder. The factory specification for this clearance should be between .005" and .048". A minimum of .005" - .010" endplay is preferred. If the clearance exceeds these specifications, Sonnax shim(s) **22700-Z** should be inserted between the OEM thrust washer and rear planet assembly.

Important: Do **NOT** use Step 11 (P/N 22700-Z) in **48RE** applications.

