



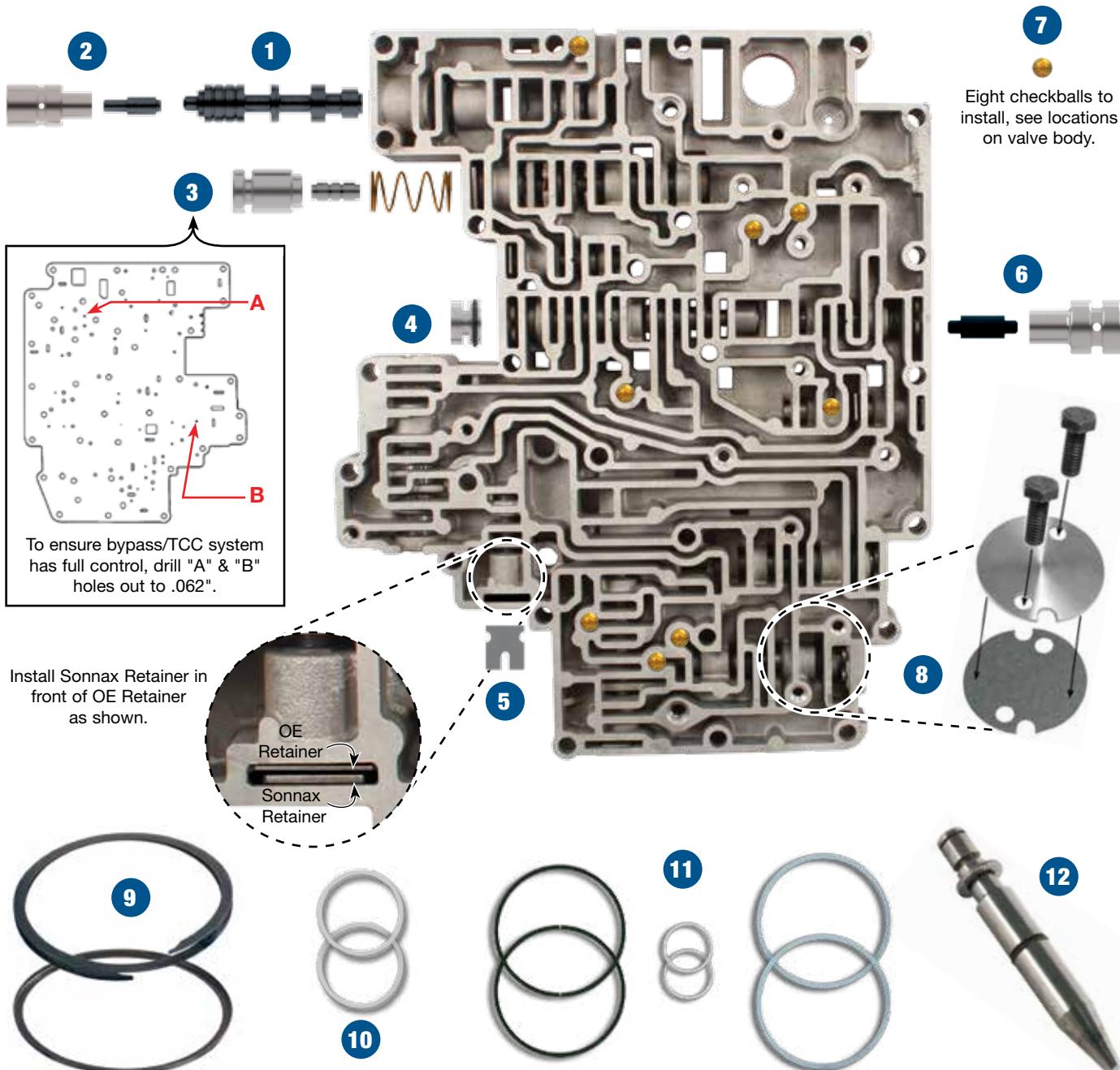
# 4R70E, 4R70W, 4R75E, 4R75W, AODE ZIP KIT®

PART NUMBER AODE-4R75E-ZIP

QUICK GUIDE

Parts are labeled here in order of installation. See other side of sheet for details on Zip Kit contents.

## INSTALLATION DIAGRAM



In addition to general rebuilding tips and technical information, the technical booklet included in this kit contains vacuum testing and additional repair options for higher mileage units or for repairing specific complaints which are beyond the scope of this kit.

## Zip Kit Contents & Installation Steps

### Step 1 Replace OE Main Pressure Regulator Valve

#### Packaging Pocket 1

- Valve

### Step 2 Replace OE Boost Sleeve & Valve

 **NOTE:** Some early applications have a spring between the boost valve and boost sleeve. It is ok to reuse this OE spring if present, but not necessary.

#### Packaging Pocket 2

- Valve • Sleeve

### Step 3 Replace OE Bypass Clutch Control Sleeve, Plunger Valve & Spring. Perform Separator Plate Modifications.

Reference page 2 in technical booklet for detailed instructions.

#### Packaging Pocket 3

- Valve • Sleeve • Spring • Drill bit, .062" (not shown)

### Step 4 Replace OE 2-3 Shift Valve End Plug

Place O-Ring in shallow groove, lubricate with Sonnax Slippery Stick O-LUBE and roll on bench to size. Install O-Ringed land inboard.

#### Packaging Pocket 4

- Plug • O-Rings (2) 1 extra

### Step 5 Install Solenoid Regulator Valve Retainer

Reference page 2 in technical booklet for detailed instructions.

#### Packaging Pocket 5

- Retainer

### Step 6 Replace OE Overdrive Servo Regulator Valve & Sleeve



**NOTE:** '01-Later applications only.

Reference page 2 in technical booklet for important inspection note.

#### Packaging Pocket 6

- Valve • Sleeve

### Step 7 Replace OE Checkballs

#### Packaging Pocket 7

- Checkballs (8)

### Step 8 Install Valve Body Retainer Plate

**NOTE:** Used on '01-later applications only. Installation requires drilling of separator plate and drilling and threading of valve body casting.

Reference pages 2 and 3 in technical booklet for detailed instructions.

#### Packaging Pocket 8

- Retainer Plate • Gasket • Bolts, 13/64" (2)

### Step 9 Install Intermediate Clutch Spiral Snap Ring

Reference page 3 in technical booklet for detailed instructions.

#### Packaging Pocket 9

- Spiral Retaining Ring • Locking Ring

### Step 10 Replace Output Shaft Seals. Inspect Direct Piston & Direct Clutch Drum.

Reference page 3 and 4 in technical booklet for detailed instructions.

#### Packaging Pocket 10

- Output Shaft Seals (2)

### Step 11 Install Pump Cover & Input Shaft Seals

**NOTE:** There are 2 types of seals for the stator '02-earlier and '03-later.

Reference pages 4 and 5 in technical booklet for detailed instructions.

#### Packaging Pocket 11

- Pump Cover Seals; Early (2), Late (2) • Input Shaft Seals (2)

### Step 12 Replace Overdrive Servo Pin

Reference page 4 and 5 in technical booklet for detailed instructions.

#### Packaging Pocket 12

- Servo Pin • O-Rings; Large (1), Medium (1) • Washer



# 4R70E, 4R70W, 4R75E, 4R75W, AODE ZIP KIT®

PART NUMBER AODE-4R75E-ZIP

INSTALLATION & TESTING BOOKLET

## Technical Specifications

Pump-to-Stator Bolts 15 ft-lb	Valve Body to Case Bolts 106 in-lb
Pump-to-Case Bolts 15 ft-lb	OE Endplay .005-.020"
Valve Body Plate Bolts 106 in-lb	

## 10 Pin Electronic Checks

Solenoid	Terminals	Ohm Value
Solenoid 1/A	1 & 2	20-30
Solenoid 2/B	6 & 2	20-30
TCC Solenoid	3 & 8	10-16
EPC Solenoid	7 & 10	2-5

## 10 Pin Terminal Location & Function

Pin	Terminal Function
1	Shift Solenoid 1/A Ground
2	12 Volt Power Supply for Shift Solenoids
3	TCC Solenoid Ground
4	Not Used
5	Transmission Oil Temp Sensor Ground
6	Shift Solenoid 2/B Ground
7	EPC Power Supply
8	TCC Power Supply
9	Transmission Oil Temp Sensor Power
10	EPC Ground

## 8 Pin Electronic Checks

Solenoid	Terminals	Ohm Value
Solenoid 1/A	4 & 7	20-30
Solenoid 2/B	4 & 8	20-30
TCC Solenoid	4 & 3	10-16
EPC Solenoid	4 & 6	2-5

## 8 Pin Terminal Location & Function

Pin	Terminal Function
1	Not used
2	Transmission Oil Temp Sensor Ground
3	TCC Solenoid Ground
4	12 Volt Power Supply for Solenoids
5	Transmission Oil Temp Sensor Power
6	EPC Ground
7	Shift Solenoid 1/A Ground
8	Shift Solenoid 2/B Ground

## Valve Body Identification

This kit fits '96-later units. It will not work on '91-'95 units. Rough forging must begin with RF-F6 or 1L3P located below stiffener plate (Figure 1).

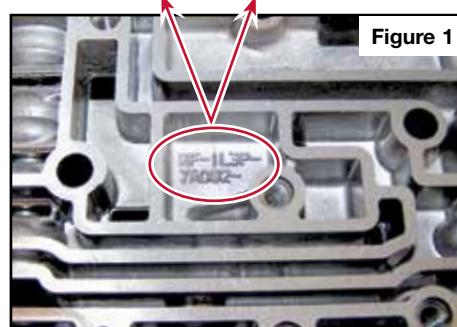


Figure 1

## Solenoid Application Chart

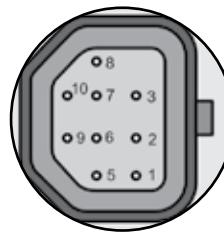
Gear	SS1/A	SS2/B	TCC
P	ON	OFF	
R	ON	OFF	
OD-1 <sup>st</sup>	ON	OFF	ON*
OD-2 <sup>nd</sup>	OFF	OFF	ON*
OD-3 <sup>rd</sup>	OFF	ON	ON*
OD-4 <sup>th</sup>	ON	ON	ON*

ON\* = Based on PCM command.

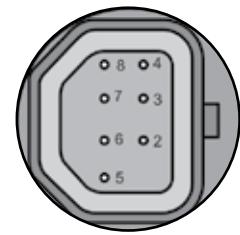
## Component Application Chart

Gear	Int. Clutch	Int. Sprag	Rev Clutch	Fwd Clutch	Over-drive Band	Low Roller Clutch	Low Reverse Band	Direct Clutch
P								
R			ON				ON	
OD-1 <sup>st</sup>				ON		Holding		
OD-2 <sup>nd</sup>	ON	Holding		ON				
OD-3 <sup>rd</sup>	ON			ON				ON
OD-4 <sup>th</sup>	ON	Holding			ON			ON
M2	ON	Holding		ON	ON			
M1				ON		Holding	ON	

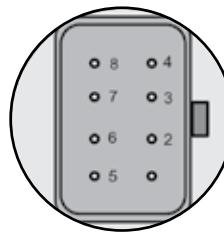
Case Connector Pin Side  
'97-Earlier



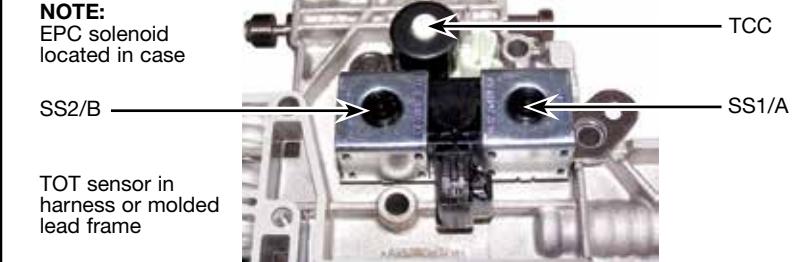
Case Connector Pin Side  
1998-2008



Case Connector Pin Side  
'09-Later



## Solenoid Locations



# Valve Body & Unit Rebuild Tips & Techniques

**Bore-by-bore tips for removal, installation, options and checks of components. The detailed instructions below correlate to the quick guide steps.**

## 1. Replace OE Main Pressure Regulator Valve

Reuse OE spring.

## 2. Replace OE Boost Sleeve & Valve

Reference quick guide for details.

## 3. Replace OE Bypass Clutch Control Sleeve, Plunger Valve & Spring. Perform Separator Plate Modifications.

- Remove plunger valve from Sonnax sleeve, set aside for reuse.
- With enclosed sonnax drill bit, drill thru existing Sonnax sleeve cross orifice hole and out other side of sleeve. Remove debris and burrs. Reinstall Sonnax plunger valve into sleeve.
- Install Sonnax orange spring and plunger valve and sleeve assembly into bore and retain with OE clip.
- Drill separator plate holes marked "A" and "B" out to .062" with enclosed drill bit.

## 4. Replace OE 2-3 Shift Valve End Plug

Reference quick guide for details.

## 5. Install Solenoid Regulator Valve Retainer

- Check bore for wear, and repair with Sonnax oversized valve (76948-47K, not included) if required.
- If not worn, check OE valve for sticking or hanging up.
- Resize bore with bore sizing tool (76948-BST2, not included) if required.
- Install Sonnax retainer outboard of OE retainer, as shown in quick guide inset photo.

## 6. Replace OE Overdrive Servo Regulator Valve & Sleeve

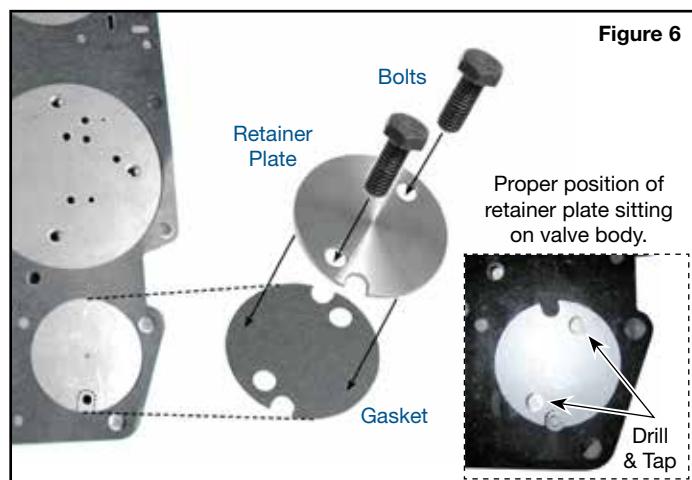
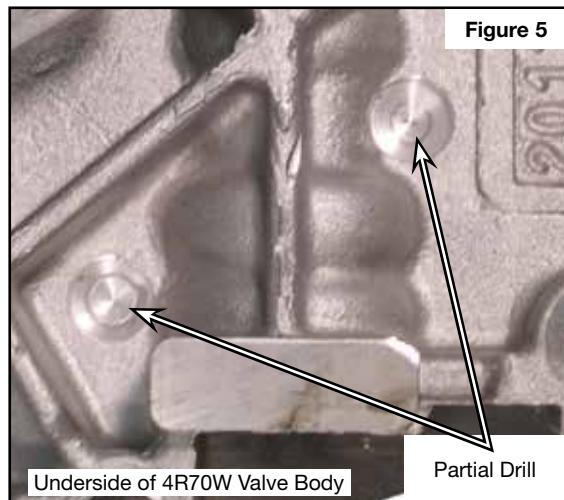
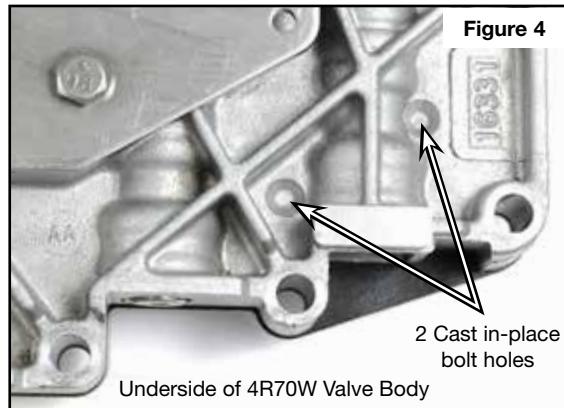
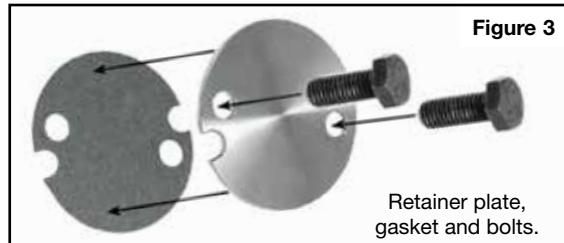
Reference quick guide for details.



**NOTE:** Remove inboard overdrive servo regulator valve and insure it is free in bore. The inboard valve is commonly stuck as overdrive servo retaining ring often breaks and pieces of the retaining ring lodge in this bore.

## 7. Replace OE Checkballs

Reference quick guide for details.



## 8. Install Valve Body Retainer Plate (Figure 3)



**NOTE:** Used on '01-later applications only. Installation requires drilling of separator plate and drilling and threading of valve body casting.

- Install separator plate onto valve body and align plate with OE alignment bolts.
- Locate the two cast in-place bolt hole locations on underside of valve body (Figure 4).
- In a drill press use a 5/16" drill bit to clean up the cast in-place bolt hole locations and establish a true center for drilling further with 13/64" or #9 drill (Figure 5).



**WARNING:** Do Not drill deeper than 1/16" with the 5/16" drill bit (Figure 5).

- After true center is established, use a 13/64" or #9 drill to drill all the way through the valve body AND separator plate with a piece of wood underneath to prevent the plate from deforming as the drill bit cuts through.
- Remove the separator plate and enlarge the two drilled holes with a 1/4" drill bit. De-burr the new holes in the separator plate.
- With a 6.0 x 1.0mm thread tap, cut new threads in the drilled holes in the valve body. De-burr the gasket surface, making sure there are no high spots.
- With Sonnax checkballs installed per quick guide, assemble valve body gaskets and separator plate using OE procedures.
- Install the Sonnax gasket, valve body retainer plate and two screws. Torque to 80-100 in-lb (Figure 6).

## 9. Install Intermediate Clutch Spiral Snap Ring

- Remove and discard OE snap ring from the intermediate roller clutch or mechanical diode assembly on reverse clutch drum.
- Install Sonnax locking ring, cup side facing up as shown (Figure 7 & 8).
- Walk Sonnax spiral ring into retaining groove as pictured (Figure 8).



**NOTE:** The locking ring may need to be moved for correct spiral ring positioning.

- Ensure Sonnax spiral ring is fully seated in groove all the way around assembly.
- Stake locking ring in six equally spaced places around outside as shown (Figure 9).

## 10. Replace Output Shaft Seals. Inspect Direct Piston & Direct Clutch Drum.

### Installation:

- Remove and discard OE output shaft sealing rings and replace with Sonnax seals as shown (Figure 10).



**CAUTION:** Be careful not to nick the sealing ring lands as this can cause ring damage.



Figure 7



Figure 8

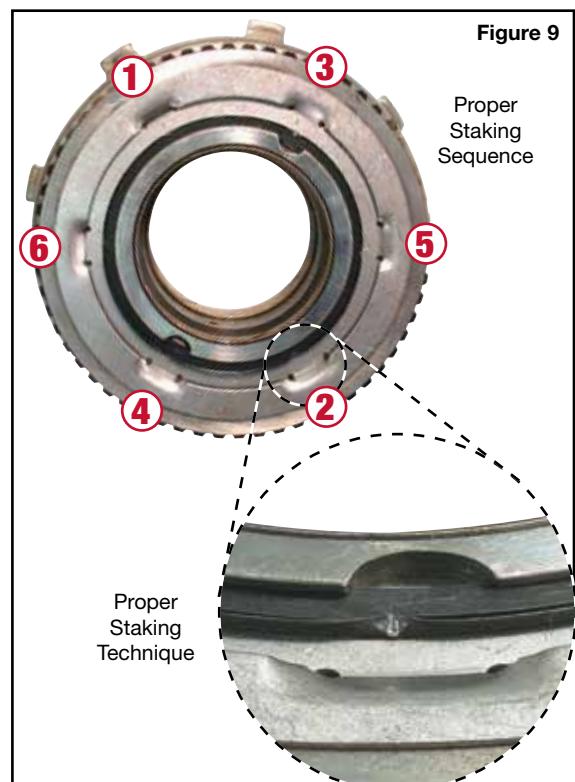


Figure 9

b. Inspect checkball in direct piston (**Figure 11**), as it is prone to sticking. Clean and flush with solvent or WD-40<sup>®</sup> and reseat with a small punch and hammer.

#### Final Testing:

- Assemble the direct clutch drum on to the output shaft (**Figure 12**).
- Squirt ATF into the direct clutch feed hole (**Figure 12**).
- Apply 30-60 psi. of air pressure into the feed hole.
- Verify that there are no leaks.



**NOTE:** If there are leaks, look for a worn bushing in the drum or leaks in the ring grooves or the checkball seat.

## 11. Install Pump Cover & Input Shaft Sealing Rings

- Install rings onto the pump cover (**Figure 13**).



**NOTE:** Two sets of seals are included. Select the correct size/style for the application. The early style is a solid ring (.110" width), the late style is a butt-cut ring (.083" width). Sizing of the early/solid style is required after installation. A mixture of ATF and STP can be used to lubricate the solid sealing rings while sizing with finger pressure.

- Press input shaft out of the forward clutch drum. Sand forward drum ring surface lightly with 320 grit sand paper, using a crosshatch pattern.
- Install solid PTFE seals onto the input shaft. Resize with your fingers. Pre-lube seals and install into the stator for final sizing (**Figure 13**).
- Inspect the checkballs in the forward clutch drum (**Figure 15**), as they are prone to sticking. Flush with solvent or WD-40<sup>®</sup>. Also be sure that the orifice shown, is free of debris that can come from parts washers.
- An AOD forward drum can be used to size the early stator seals (**Figure 14**). The seals can also be sized with the forward clutch drum, although it may take a little longer. Carefully use the back of a pick to work the seals into the drum and let sit for a while so the seals will stay conformed.
- Verify correct forward piston return spring for the application you are working on (**Figure 16**).

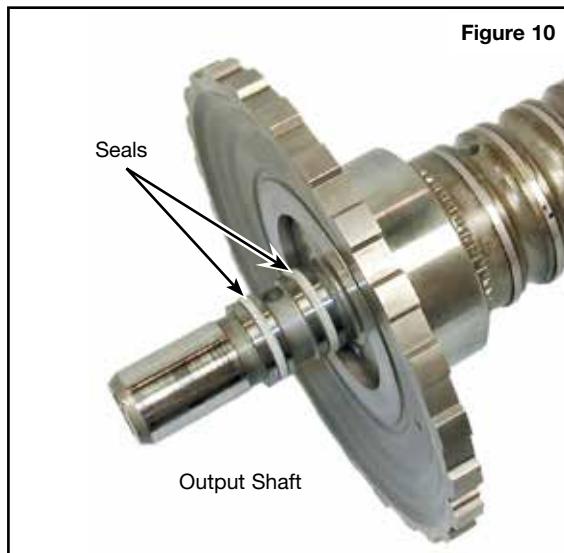


Figure 10

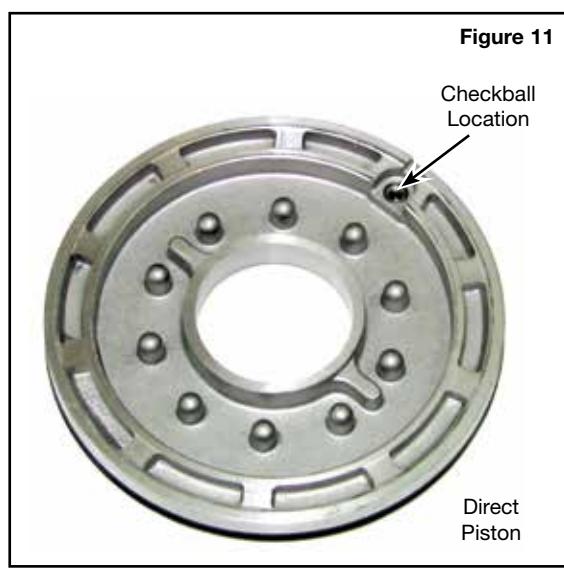


Figure 11

## 12. Replace Overdrive Servo Pin (Assembly illustration **Figure 17**)

- Use bore brush to remove sharp edges of overdrive servo pin bore in case.
- Install O-rings on Sonnax servo pin.
- Lubricate O-rings and roll pin on clean flat surface to size O-rings into pin grooves.



**TECH TIP:** If a firmer 3-4 shift is desired, place Sonnax washer on pin against shoulder to pre-load spring.



**NOTE:** Following step is easier if piston is compressed in bench vise to facilitate retaining clip installation.

- Install OE spring seat followed by springs, piston and retaining clip.
- Set servo travel according to OE specifications.

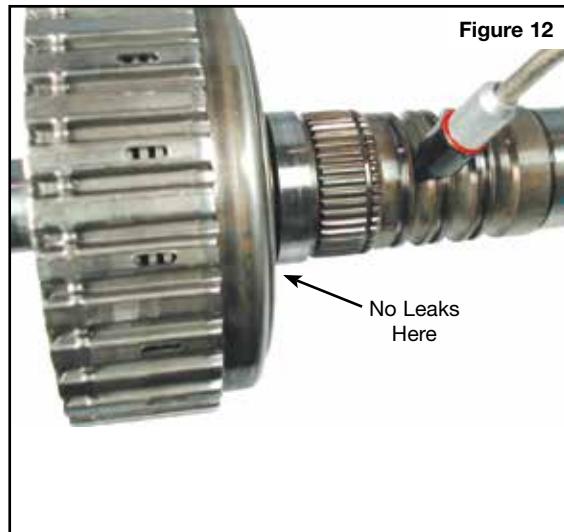


Figure 12

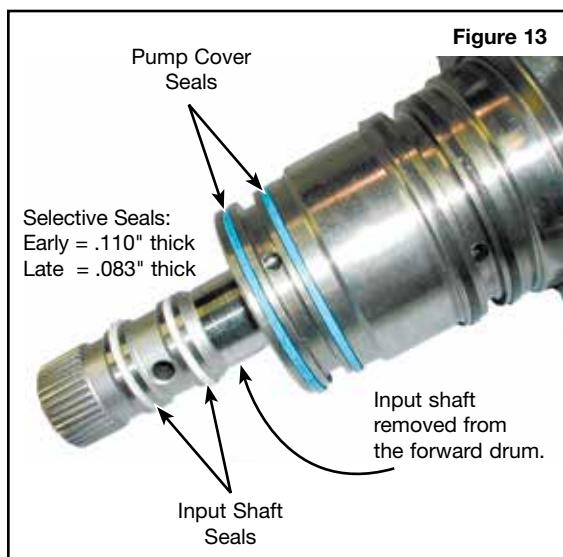


Figure 13

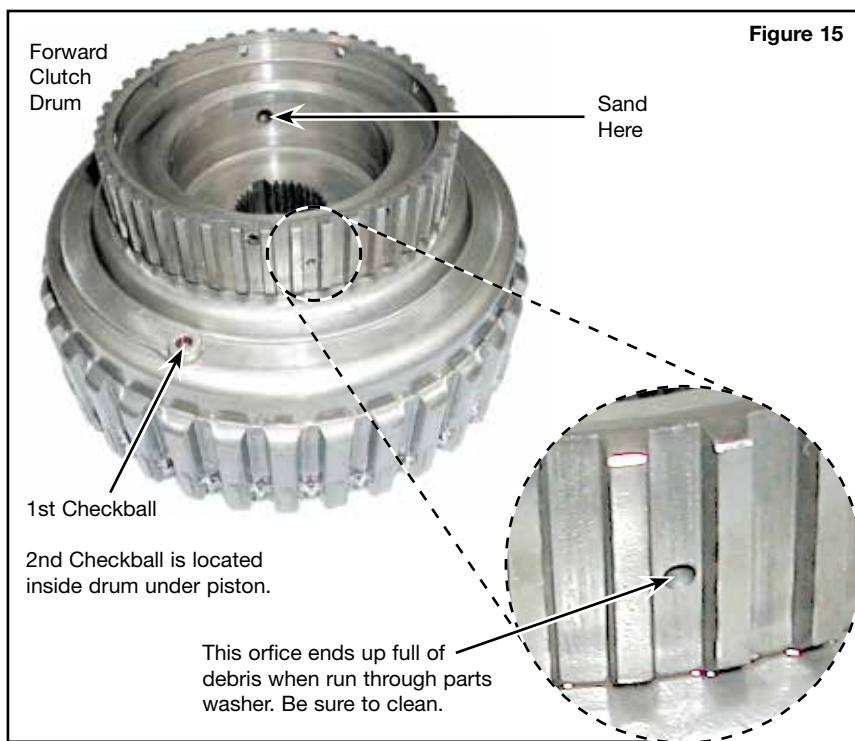


Figure 15

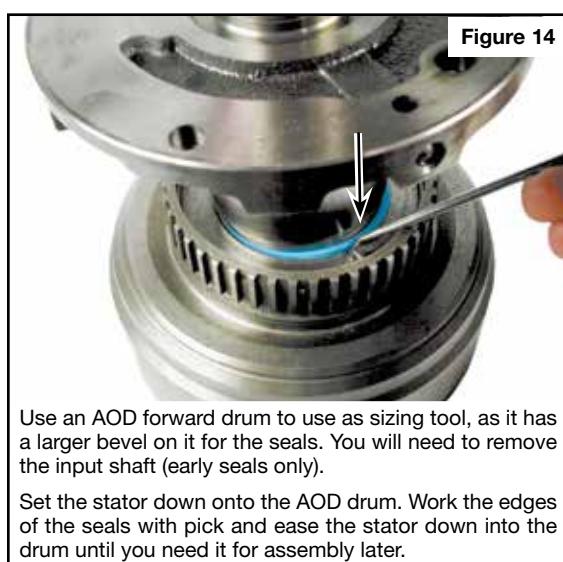


Figure 14

Use an AOD forward drum to use as sizing tool, as it has a larger bevel on it for the seals. You will need to remove the input shaft (early seals only).

Set the stator down onto the AOD drum. Work the edges of the seals with pick and ease the stator down into the drum until you need it for assembly later.

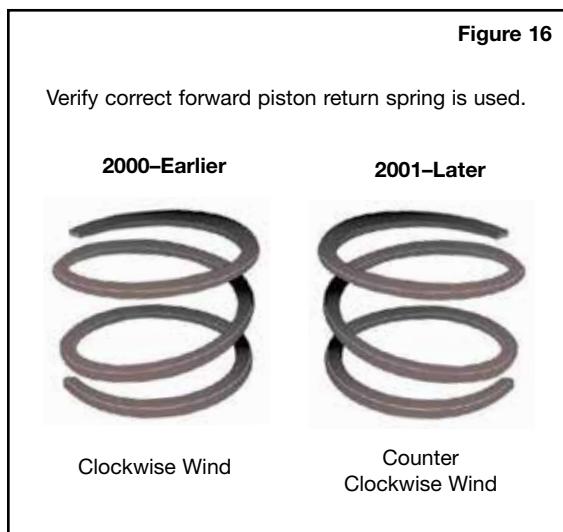


Figure 16

Verify correct forward piston return spring is used.

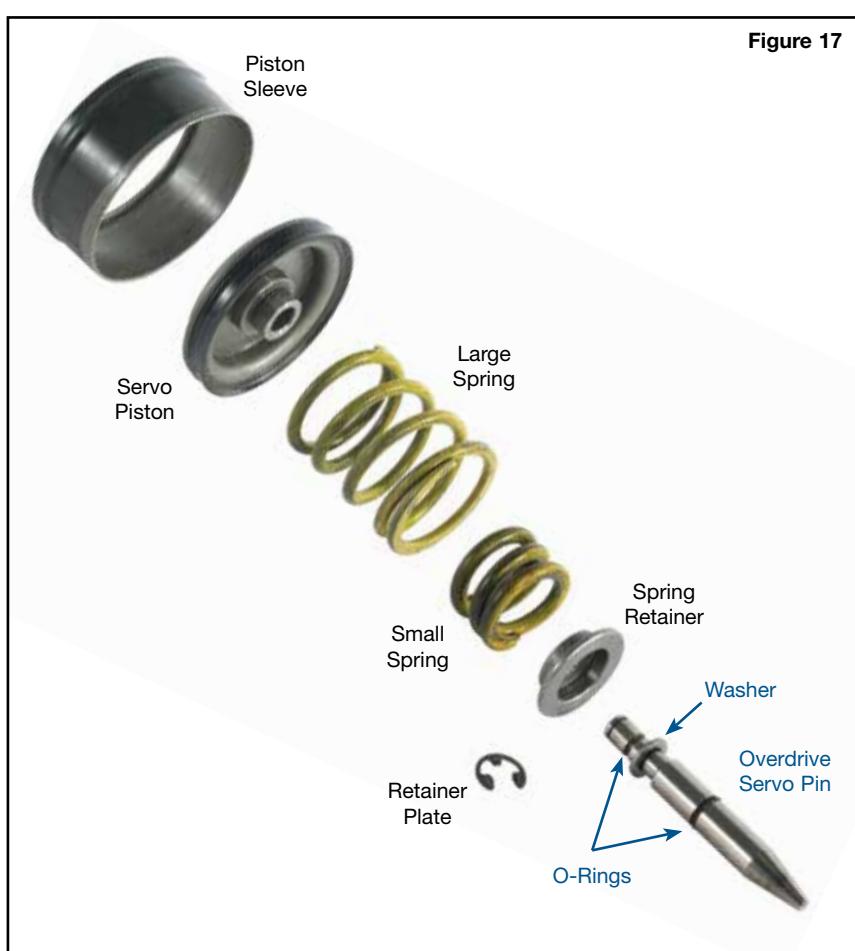


Figure 17

# Critical Wear Areas & Vacuum Test Locations

**NOTE:** OE valves are shown in rest position and should be tested in rest position unless otherwise indicated. Test locations are pointed to with an arrow. Springs are not shown for visual clarity. Low vacuum reading indicates wear and Sonnax parts noted for replacement.



## 4R75E Valve Body

### Boost Valve

- Delayed/No Reverse
- Burnt Reverse clutch
- Reverse slip

Replace with Sonnax Part No. **76948-02K\***

NOTE: Fits all '91-later applications.

### Main Pressure Regulator Valve

- Premature clutch/band failure
- Low line rise
- Poor shift quality

Replace with Sonnax Part No. **76948-09\* & 76948-17K**

76948-17K Requires F-76948-TL & VB-FIX

### Bypass Clutch Control Valve

- Code 628, 741, 1741, 1744
- Low cooler flow
- No lockup
- TCC slip

Replace with Sonnax Part No. **76948-31**

### Bypass Clutch Control Plunger Valve & Sleeve

- TCC failure
- TCC slip codes

Replace with Sonnax Part No. **76948-04K\***

### Converter Pressure Limit Valve

- Low converter pressure
- Lube failures

### 2-3 Shift Valve

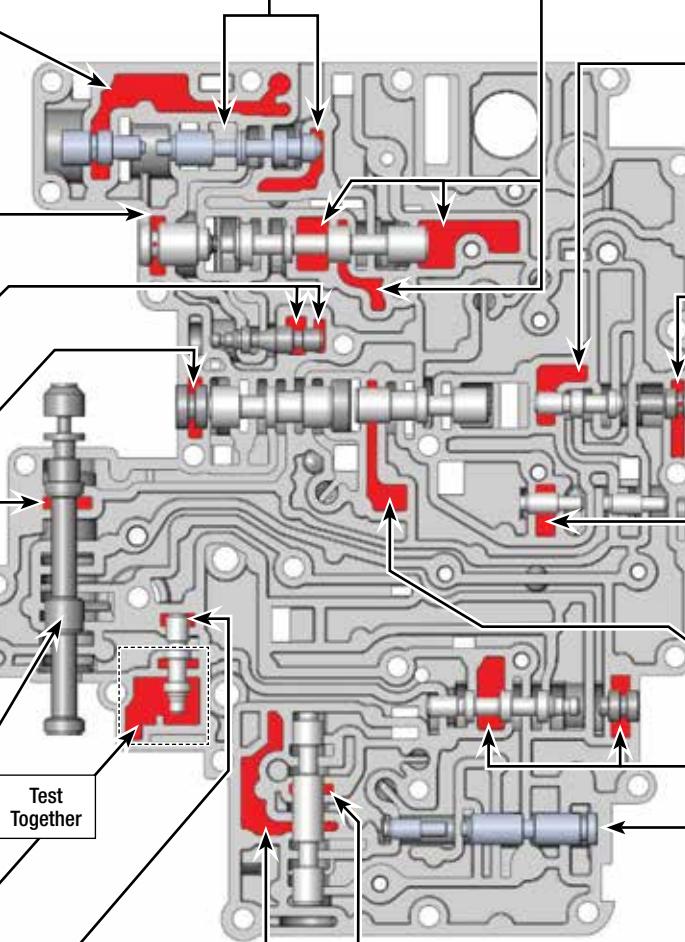
- Delayed 3rd
- Gear ratio codes
- Wrong gear starts

### Manual Valve

- Low line pressure
- Delayed engagements

Replace with Sonnax Part No. **76948-46**

Center this valve land in the passage as indicated.



### Solenoid Regulator Valve

- Erratic shifts
- No 2nd
- 2-3 Neutral
- Neutral after 4th

Replace with Sonnax Part No. **76948-14K & 76948-47K**

76948-47K Requires F-76948-TL & VB-FIX

### 2-3 Backout Valve

- No 2-3
- 2-3 Quality poor
- Gear ratio codes

### 2-3 Capacity Modulator Valve

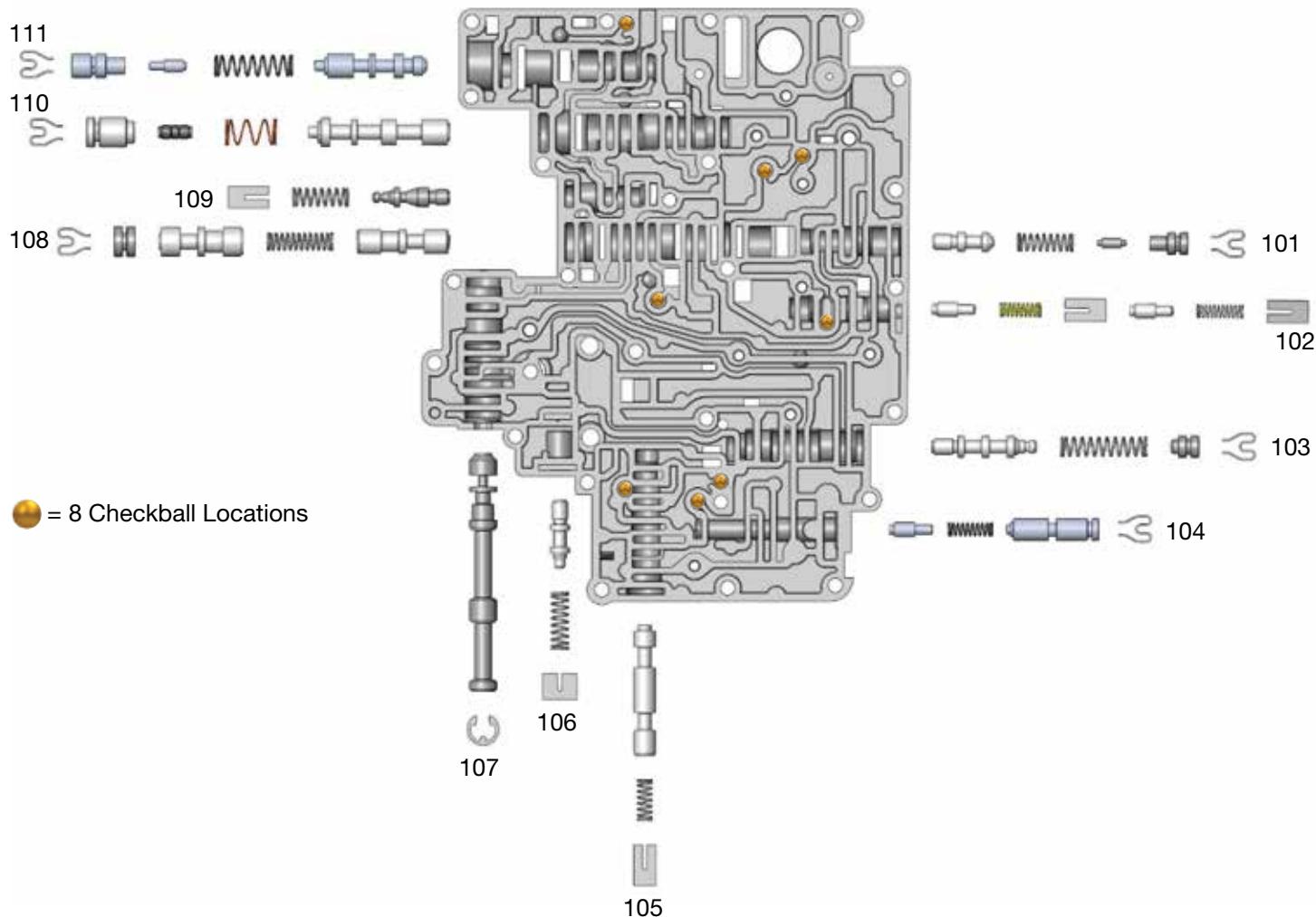
- 2-3 Flare
- No 3rd & 4th

NOTE: Not used in '01-Later

\*Part numbers with an asterisk (\*) are included in this Zip Kit.

## OE Exploded View

### 4R75E Valve Body



#### Valve Body Descriptions

I.D. No.	Description
101	Overdrive Servo Regulator Valve (Inboard), Overdrive Servo Regulator Valve & Sleeve (Outboard)
102	3-4 Capacity Modulator Valve (Inboard), 2-1 Capacity Modulator Valve (Outboard)
103	3-4 Shift Valve
104	2-3 Capacity Modulator Valve
105	2-3 Backout Valve
106	Solenoid Regulator Valve
107	Manual Valve
108	1-2 Shift Valve (Inboard), 2-3 Shift Valve (Outboard)
109	Converter Pressure Limit Valve
110	Bypass Clutch Control Valve (Inboard), Bypass Clutch Control Plunger Valve & Sleeve (Outboard)
111	Main Pressure Regulator Valve (Inboard), Boost Valve & Sleeve (Outboard)

# Problem...



A common failure of the Ford 4R70W series transmission is breakage of the forward drum at the snap ring groove.

Pressure on the forward clutch piston creates a high stress load at the snap ring groove, causing the upper portion of the drum to split and break away.

# ...Solution



Part No. 76654-01K  
Patent Pending

## 4R70W Smart-Tech® Forward Clutch Drum

- One-piece forged material for more strength and durability.
- Increased groove depth for additional ring support.

The NEW Sonnax forged forward clutch drum design provides increased strength in all areas, most importantly at the ring groove, preventing the breakage and subsequent transmission damage associated with OE stamped steel drums.

**sonnax®**  
TIME TESTED • INDUSTRY TRUSTED®