sonnax®
PERFORMANCE

High Performance TRANSMISSION Parts

Instructions

Performance Pack

4L60-E ('94-Later), 4L65-E & 4L70-E

Part No.
HP-4L60E-01

Pump Parts
- Boost Valve with O-Ring, .490"
- Elevated Pressure Regulator Spring
- High RPM Pump Slide Spring
- Spacer

Servo Parts
- 4th Servo Return Spring
- Servo Cushion Spring
- Servo Piston D-Ring Kit

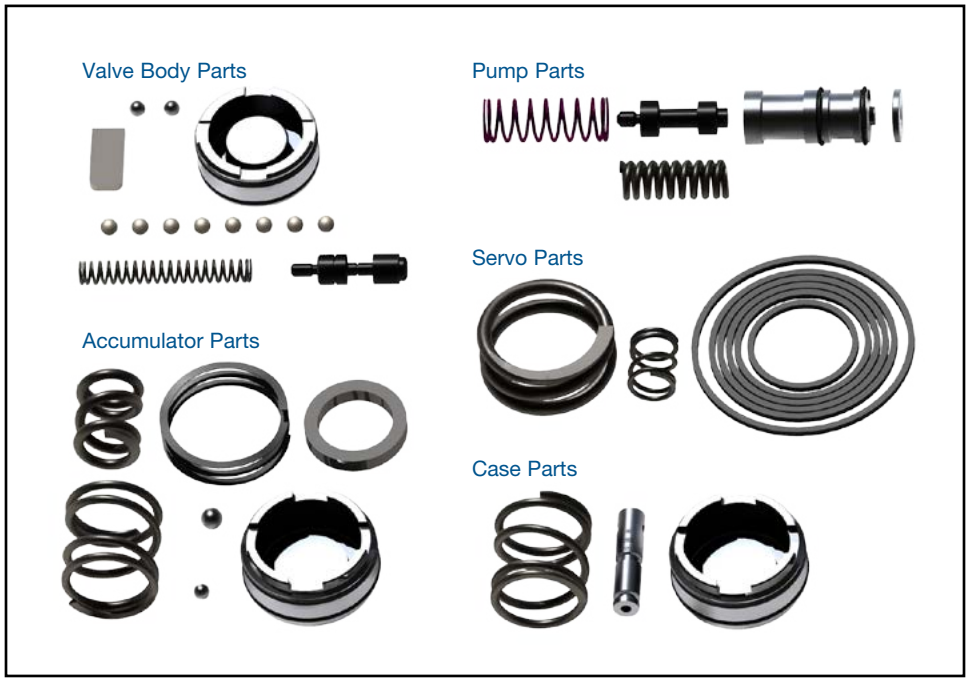
Case Parts
- 3-4 Accumulator Piston Kit
- 3-4 Accumulator Spring
- Servo Release Check Valve

Valve Body Parts
- Forward Accumulator Kit
- Accumulator Valve Shim
- TCC Pressure Limiter:
  - TCC Valve
  - TCC Spring
- Checkballs (8)
- Separator Plate Plugs — Not Shown
- Twist Drills — Not Shown

Accumulator Parts
- 1-2 Pinless Accumulator Piston Kit
- 1-2 Accumulator Inner Spring
- 1-2 Accumulator Outer Spring
- 1-2 Accumulator Waved Spring
- Accumulator Housing Spacer

The parts listed here may be protected by one of these patent numbers: 6,619,323 & 6,899,211.

NOTE: For more radical applications and even greater levels of performance, combine the Performance Pack with the Sonnax 1-2 and 4th Super Hold Servos. Order **Part No. 77911-03K** for 1-2 and **Part No. 77767K** for 4th.



Before You Begin

The Sonnax TCC pressure limiter is required when your converter is NOT built with friction material designed for "partial slip" EC3 operation.

Most 1998-later 4L60-E applications are programmed for "partial slip" of the torque converter clutch (TCC) under light load conditions that GM calls EC3 programming. These applications have clutch friction material specially suited to "partial slip." High performance converters may be built with on/off friction material that should not be allowed to slip. For these converters, it is necessary to disable the partial slip function of the transmission by reprogramming the computer or modifying the transmission. Identifying whether the Sonnax TCC pressure limiter is required will help prevent converter failure. Check with your converter builder to confirm what type of clutch material is inside your converter.

NOTE: Other common modifications to the TCC regulator valve in the valve body which block the valve or add a different valve/spring combination allow line pressure to apply the converter clutch at double normal converter pressures. This leads to extra force on the engine crankshaft thrust bearing and causes TCC piston flexing that – over time – leads to broken rivets and converter failure. **The TCC valve and spring modification in this kit is the ONLY available modification that both eliminates PWM/EC3 operation AND regulates converter pressure to normal levels.**

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1. Pre-Installation Checks for Using TCC Pressure Limiter

a. Determine what style TCC valve is in your valve body by comparing valve lineup to **Figure 1**.

- **For '93-'94 Non-PWM:** Original valve can be reused, there is no need to install Sonnax TCC Pressure Limiter unless bore is worn.
- **For '95-Later:** Follow inspection and installation steps.
- **'96-Later GM Remanufactured "SERV" with Oversized TCC Regulator:** Reference Sonnax guidelines for tool **77754-SERV**. See **Figure 1** to identify a SERV valve body.

b. Inspect TCC regulator valve bore for wear (**Figure 2**).

c. If the bore is O.K., go to Step 2 for pressure limiter installation instructions. If the bore is excessively worn and you want to prevent line pressure leaks, the bore must be reamed and sleeve kit **77754-04K*** or **77754-03K*** installed.

2. Pressure Limiter Installation

a. Locate the PWM hole in the separator plate. Pre-drill with a 1/16" drill bit and lightly chamfer both sides of the plate. Install small aluminum plug and peen in place with a hammer (**Figure 3**).

b. Do NOT install inner isolator valve with this kit. Install the TCC limiter spring, then the regulator valve and end plug with original bore (**Figure 4**) or regulator valve sleeve kit **77754-04K*** or **77754-03K*** with a reamed bore (**Figure 5**). With the Sonnax TCC valve from the Performance Pack or the Sonnax sleeve kit **77754-04K***, TCC apply pressure will be limited to 100 psi. With Sonnax sleeve kit **77754-03K*,** TCC apply pressure will be limited to 120 psi.

* These additional kits are not included in the Performance Pack.

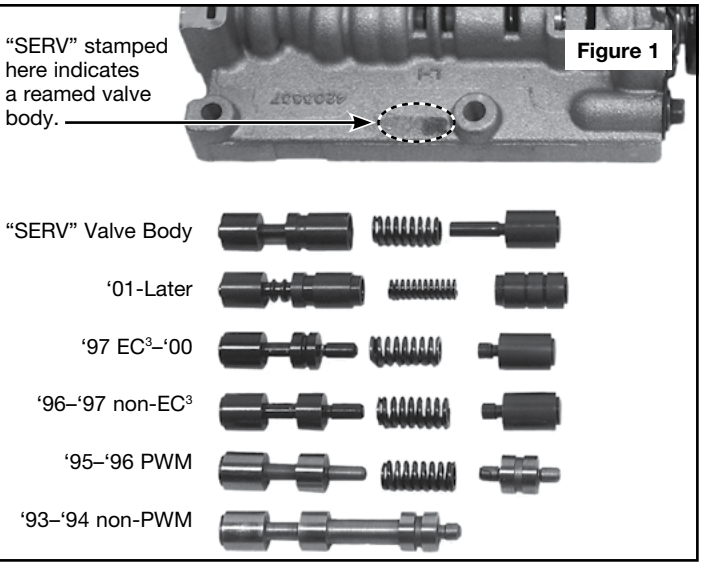
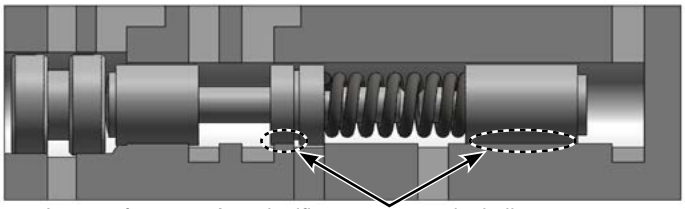


Figure 2 OE TCC Regulator Valve Bore



Inspect for wear. Any significant wear results in line pressure leakage to exhaust, regardless of valve type.

Figure 3 PWM TCC Feed or 2nd Clutch Oil on Non-PWM Units

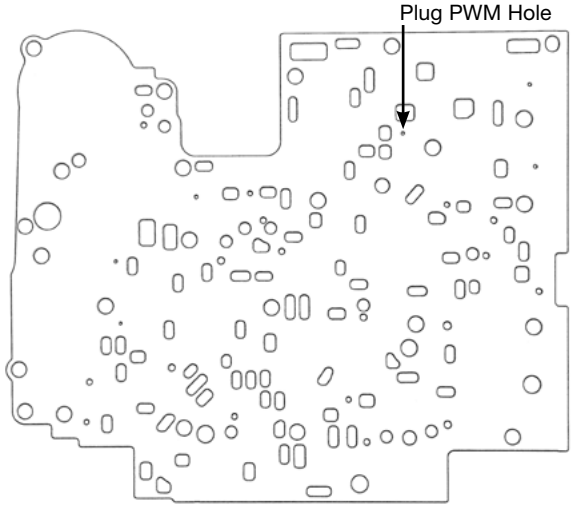


Figure 4 Sonnax Regulator Valve and End Plug with OE Bore

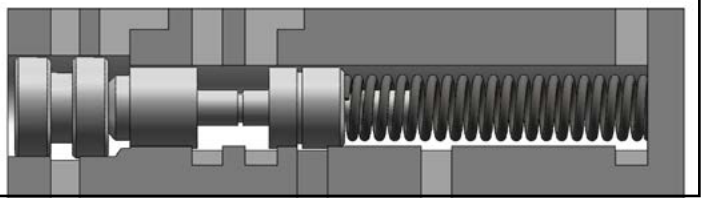
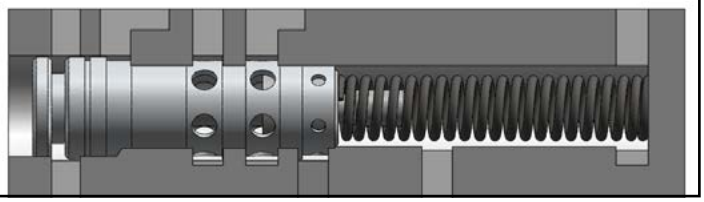


Figure 5 Sonnax Regulator Valve Sleeve Kit with Reamed Bore



Pump Parts

3. Pressure Regulator Boost Valve & Spring Installation

a. Remove OE boost sleeve and springs. The OE boost valve sleeve comes in two lengths, depending on year. The 1994-2004 boost sleeve is longer (1.907") and should be replaced with the boost sleeve AND included spacer. The additional spacer MUST be installed in the earlier applications or transmission failure will result. For 2005-later applications with 1.810" long original boost sleeve, do NOT use the included spacer.

b. After placing the two O-rings into the grooves on the boost sleeve, pre-lube them and roll sleeve over bench to resize the O-ring. Assemble correct boost sleeve/spacer combination, OE bumper spring and included higher-rate pressure regulator spring.

c. Insert the valve into sleeve with the nubbed end facing out (**Figure 6**).

d. Carefully push the sleeve assembly into the pump body with the open end toward the two springs, only deep enough to reinstall the retaining ring.

e. Return the retaining clip to the pump body.

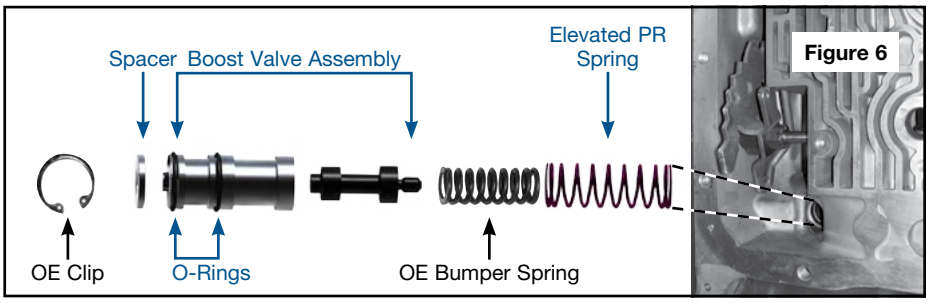


Figure 6

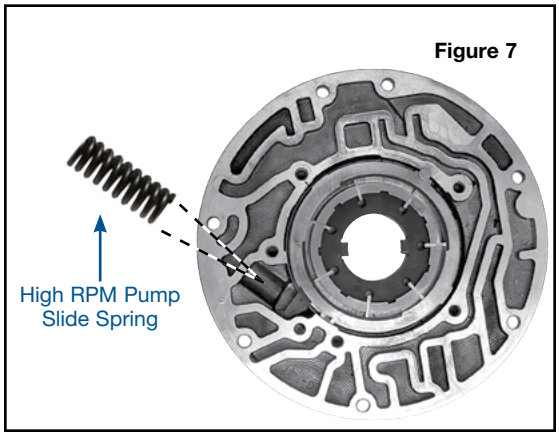


Figure 7

4. Pump Slide Spring Installation

Remove both of the OE pump slide springs from the pump housing and replace with the Sonnax spring (**Figure 7**).

Servo Parts

5. Servo Installation

a. Remove the OE servo cushion spring and replace with the Sonnax servo cushion spring (**Figure 8**).

b. Reinstall the OE conical inner cushion spring if used in your application.

c. Replace the OE 4th servo return spring under the washer and C-clip with the Sonnax 4th servo return spring.

d. Install rubber D-rings onto servos. Ensure seals are not twisted in groove.

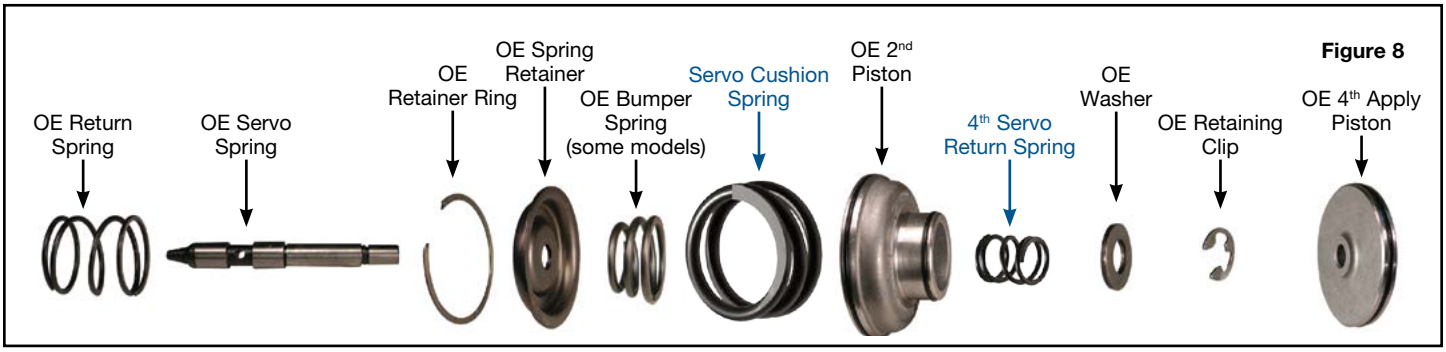


Figure 8

Accumulator Parts

6. Pinless 3-4 Accumulator Installation

a. Remove pin, no checkball needed.

b. Install D-ring toward dome with Teflon® seal toward open end. Install dome toward case (**Figure 9**).

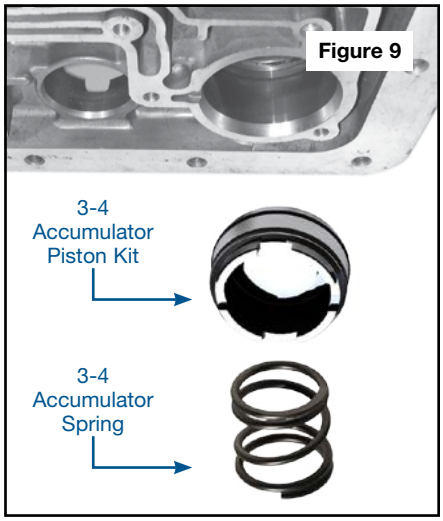


Figure 9

Case Parts

7. 3rd Accumulator Check Valve Installation

The bore in the case is not a critical diameter for OE manufacturing purposes, so some variations in the fit of the check valve are possible. The O-ring ensures a positive seal in cases with larger bores. The check valve is installed between the OE checkball capsule and the separator plate. The check valve DOES NOT replace the OE checkball capsule.

a. Install the check valve, tapered end first, into the case. If resistance is felt, tap the check valve in until flush or just below flush with the case. If it slides all the way in without resistance, remove and reinstall with the O-ring (**Figure 10**).

b. Run a straight edge over the case to verify the check valve is not sticking up above the case gasket surface.

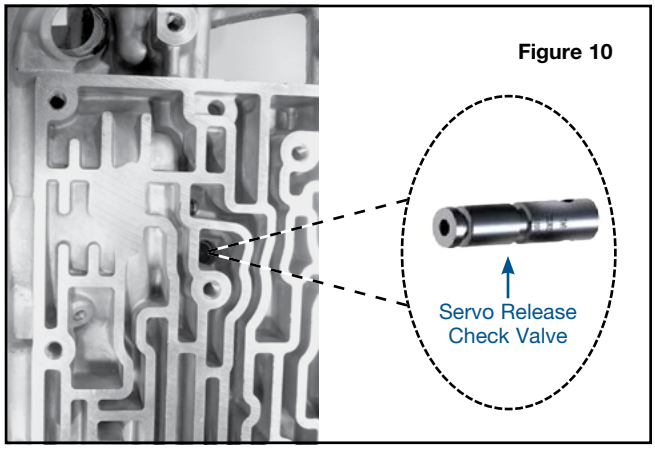


Figure 10

Valve Body Parts

8. Pinless Forward Accumulator Installation

a. Remove OE piston, pin and seal and discard. (Do not reuse the OE D-ring seal.)

b. Plug the pin bore in bottom of accumulator bore by installing both the Sonnax steel balls (**Figure 11**). Lightly stake the pin bore after pressing in the balls.

c. Install forward accumulator kit (**Figure 11**).

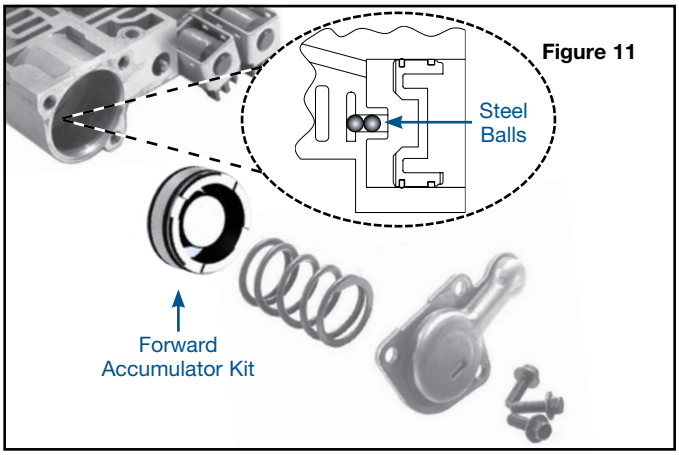


Figure 11

9. Separator Plate

a. Drill the plate as indicated to the following specifications (**Figure 12**):

- Hole "**A**" (3-2 shift) use drill .093" #42.
- Hole "**B**" (2nd clutch) use drill .086" #44. Max perf: .093" #42.
- Hole "**C**" (3rd clutch) use drill .086" #44. Max perf: .093" #42.
- Hole "**D**" (4th clutch) use drill .093" #42.
- Hole "**E**" (AFL balance oil) use drill .052" or #55.

b. Install eight plastic checkballs in original locations.

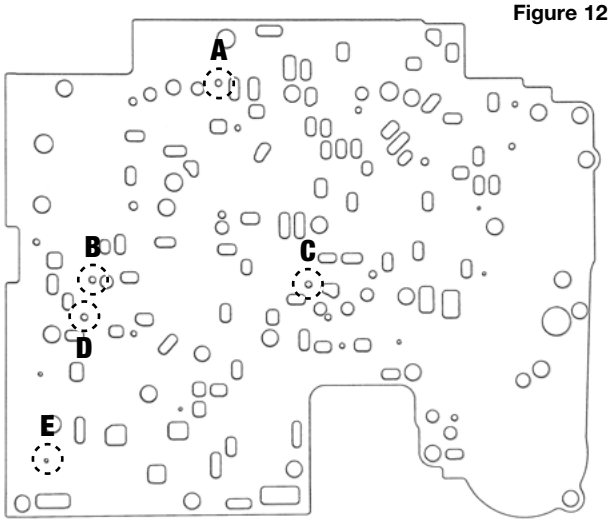


Figure 12

10. 1-2 Accumulator Valve Shim Installation

a. Reuse OE accumulator valve spring.

b. Install shim beveled side down into sleeve pocket. This can be done by removing the accumulator valve or by simply inserting the shim between the spring and the end of the bore using a feeler gauge as an installation tool (**Figure 13**).

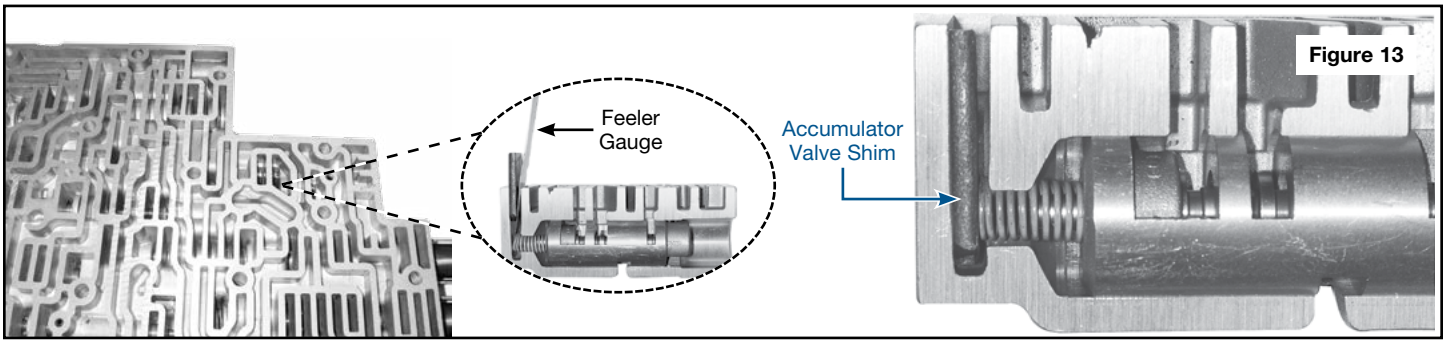


Figure 13

Accumulator Parts

11. Pinless 1-2 Accumulator Installation

NOTE: Do not use this kit with '93 housings. '01-Later housings need to have the spacer installed, '94-'00 housings do not need the spacer (**Figure 14**).

a. Remove piston pin from the 1-2 accumulator housing.

b. Plug pin hole by driving one of the steel checkballs provided into the hole.

c. Stake ball in place.

d. Install rubber D-rings toward dome, with Teflon® seal toward open end.

e. Install piston with dome toward plate.

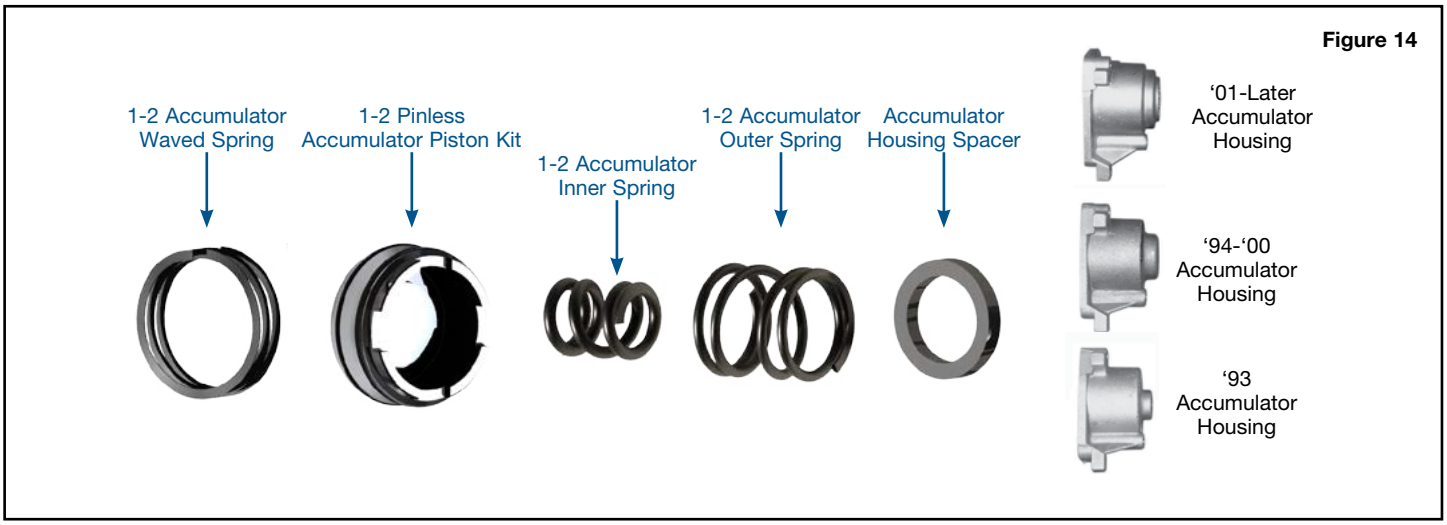


Figure 14