

1997-98 AUTOMATIC TRANSMISSIONS

4R70W Overhaul

APPLICATION

TRANSMISSION APPLICATION

| Model | Engine Application |
|-----------------------|--------------------|
| Cougar, Thunderbird | 3.8L SFI |
| Cougar, Thunderbird | 4.6L SFI |
| Crown Victoria | 4.6L SFI |
| Expedition, Navigator | |
| 2WD | 4.6L SFI |
| 4WD | 4.6L SFI |
| Explorer, Mountaineer | |
| 2WD | 5.0L SFI |
| 4WD | 5.0L SFI |
| Grand Marquis | 4.6L SFI |
| Mark VIII | 4.6L SFI |
| Mustang | 3.8L SFI |
| Mustang GT | 4.6L SFI |
| Town Car | 4.6L SFI |
| E-Series | 4.2L SFI |
| E-Series | 4.6L SFI |
| F-Series | |
| 2WD | 4.2L & 4.6L |
| 4WD | 4.2L & 4.6L |

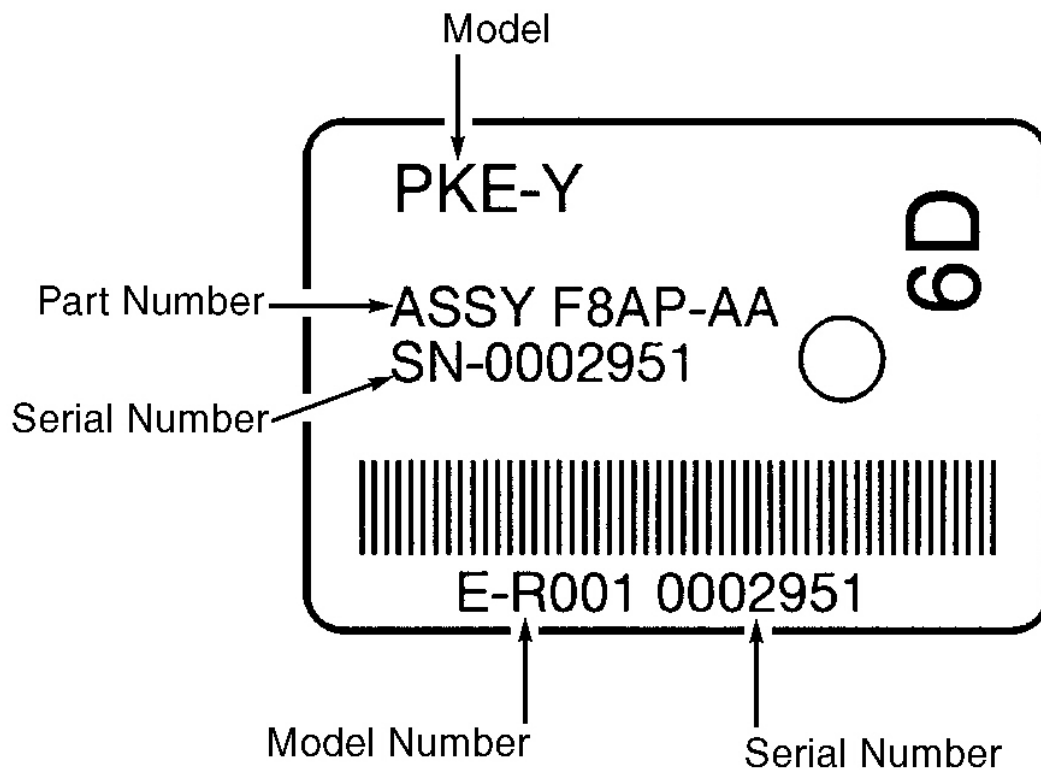
IDENTIFICATION

NOTE: For electronic component diagnostic procedures, see appropriate **DIAGNOSIS** article. AODE is mechanically identical to 4R70W.

NOTE: When working on Navigator or Mountaineer, refer to information given for Expedition and Explorer respectively, unless otherwise noted. 4R70W transmission is identified by a code letter on lower line of Vehicle Certification Label. This code can be found directly under the TR designation. Label is attached to driver's door lock post. See **TRANSMISSION IDENTIFYING CODE LETTER CHART**. Transmission model may be identified by service identification tag attached to right side of transmission case or fluid pan. Tag shows transmission model, assembly number, serial number and engine size. See **Fig. 1**.

TRANSMISSION IDENTIFYING CODE LETTER CHART

| Application | Letter Identification |
|---------------------|-----------------------|
| 1997 | |
| Cougar, Thunderbird | L |
| All Other Models | U |
| 1998 (All Models) | U |



G98C01939

Fig. 1: Service Identification Tag
 Courtesy of FORD MOTOR CO.

DESCRIPTION

4R70W is a 4-speed, automatic with electronic shift, converter clutch and line pressure controls. It uses a double-pinion compound gearset to produce 4 forward speeds and reverse. It uses 2 bands, 2 one-way roller clutches and 4 friction clutches to hold or drive the planetary gearset members. See **Fig. 2**.

Shift control solenoids provide gear selection and are controlled by the EEC microprocessor. For additional information on the EEC system, refer to appropriate TESTS W/CODES article in ENGINE PERFORMANCE section.

The EEC system has self-diagnostic capabilities. Fault codes for faulty engine and transmission sensors, switches and circuits are stored in the PCM and may be retrieved to aid diagnosis and repair.

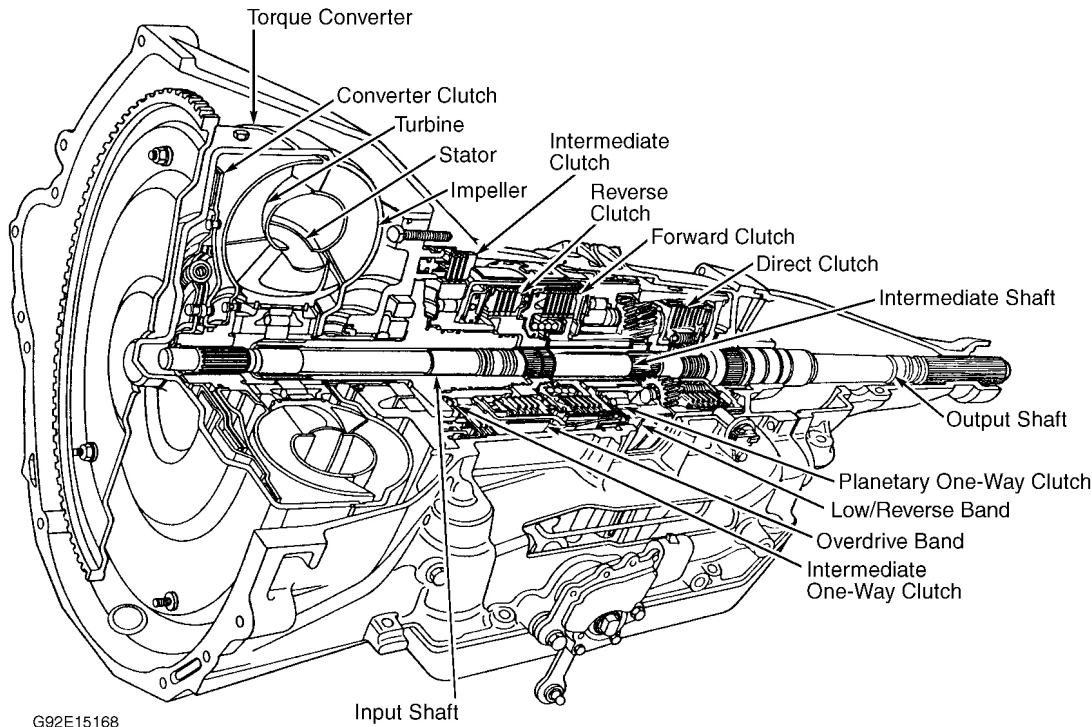


Fig. 2: Cross-Sectional View Of 4R70W
Courtesy of FORD MOTOR CO.

LUBRICATION & ADJUSTMENTS

See appropriate TRANSMISSION SERVICING - A/T article in AUTOMATIC TRANSMISSION SERVICING.

ON-VEHICLE SERVICE

VALVE BODY ASSEMBLY

NOTE: If valve body removal is necessary, ensure correct gasket is used.

Removal

1. Raise and support vehicle. Loosen oil pan retaining bolts and allow transmission fluid to drain. Remove oil pan and gasket. Discard gasket. Remove transmission oil filter. Disconnect all solenoid and sensor harness connectors.
2. Remove manual lever detent spring. Remove EPC solenoid bracket. Remove valve body bolts. Note position lengths of bolts for reassembly reference. Remove valve body and gasket from transmission.

Installation

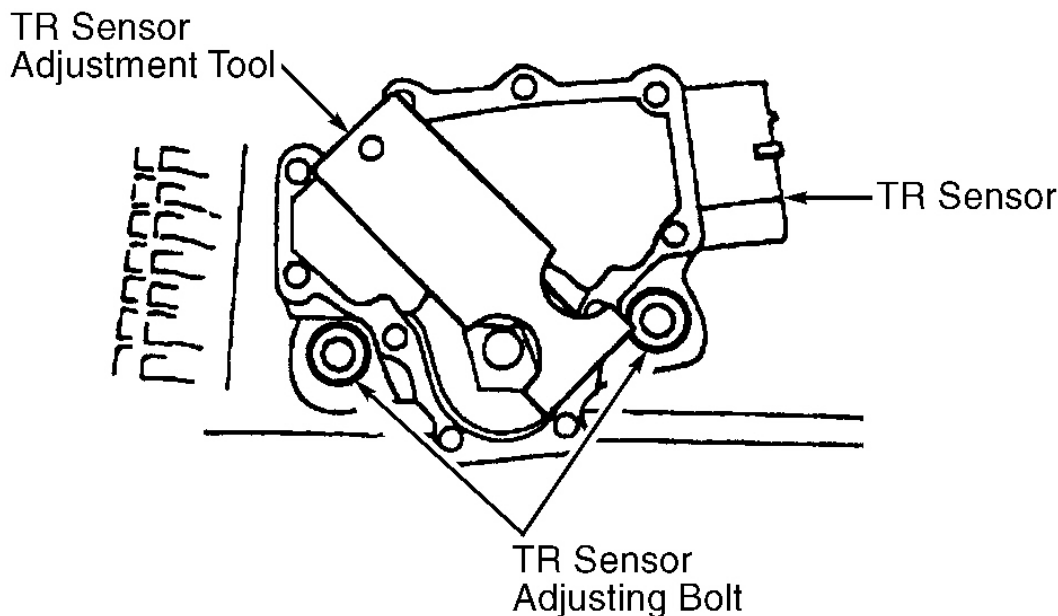
1. Using 2 alignment bolts as guides, position valve body (with new gasket) in case. Ensure check balls are in proper locations. Loosely install remaining valve body bolts. Install EPC solenoid bracket. Install manual valve detent spring.
2. Tighten valve body bolts to specification. See TORQUE SPECIFICATIONS. Connect all solenoid and sensor harness connectors. Install filter and grommet. Install pan gasket and oil pan. To complete installation, reverse removal procedure. Refill with fluid.

TRANSMISSION RANGE (TR) SENSOR**Removal**

Raise and support vehicle. Disconnect linkage and electrical connector from sensor. Remove bolts and TR sensor from case.

Installation

1. Install TR sensor and 2 shims onto manual control lever shaft. Install bolts but do not tighten. Place TR sensor in Neutral position (2 detent positions back from Park).
2. Insert Transmission Range Sensor Alignment tool (T97L-70010-A) into slots. See **Fig. 3**. Align the three slots on TR sensor with tabs on adjuster. Tighten bolts to specification. See TORQUE SPECIFICATIONS.



G98E01940

Fig. 3: Adjusting Transmission Range (TR) Sensor

Courtesy of FORD MOTOR CO.

OVERDRIVE SERVO ASSEMBLY

Removal

Remove valve body. See VALVE BODY ASSEMBLY. Locate overdrive servo. See **Fig. 4**. Using Servo Piston Compressor (T92P-70023-A), depress overdrive servo piston and remove retaining ring. See **Fig. 5**. Remove piston assembly and spring.

Installation

1. Ensure .020" (.51 mm) overdrive servo bleed hole clear. Using ATF, lubricate overdrive servo bore in transmission case. Assemble spring to piston. Install assembly into case bore. Ensure servo rod contacts overdrive band apply bore.
2. Using compressor tool, depress piston and install retaining ring. See **Fig. 5**. Install valve body. To complete installation, reverse removal procedure.

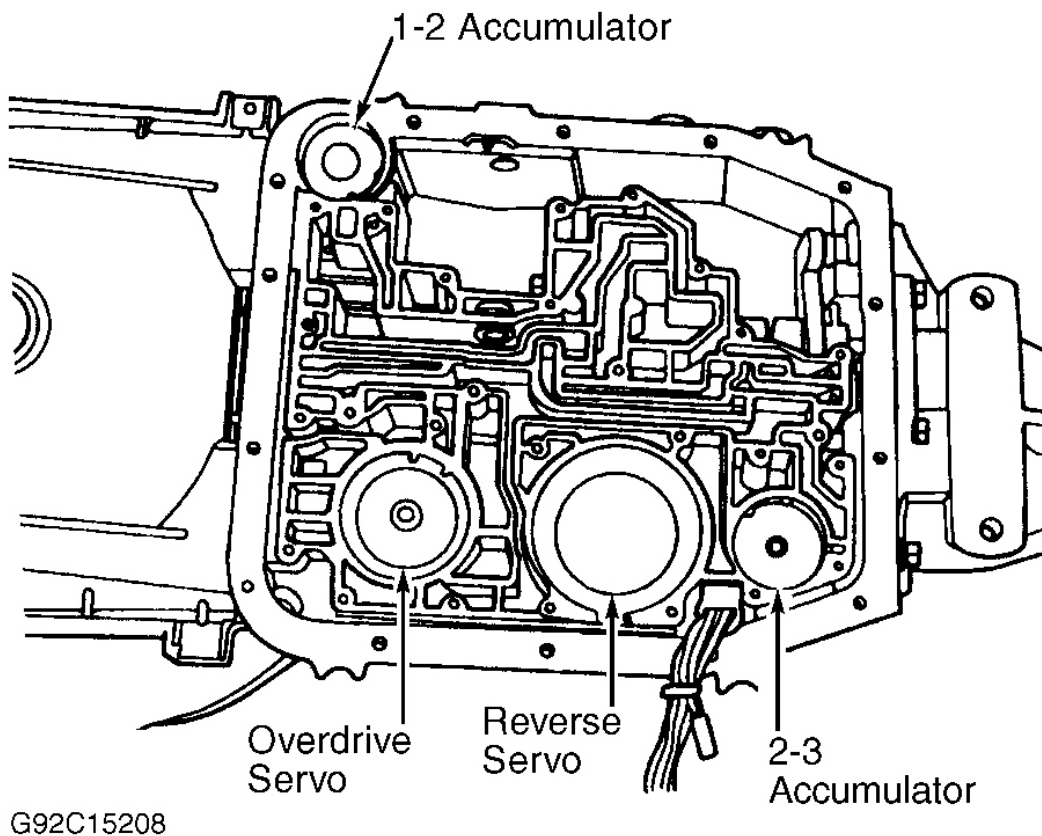


Fig. 4: Identifying Accumulator & Servo Locations
Courtesy of FORD MOTOR CO.

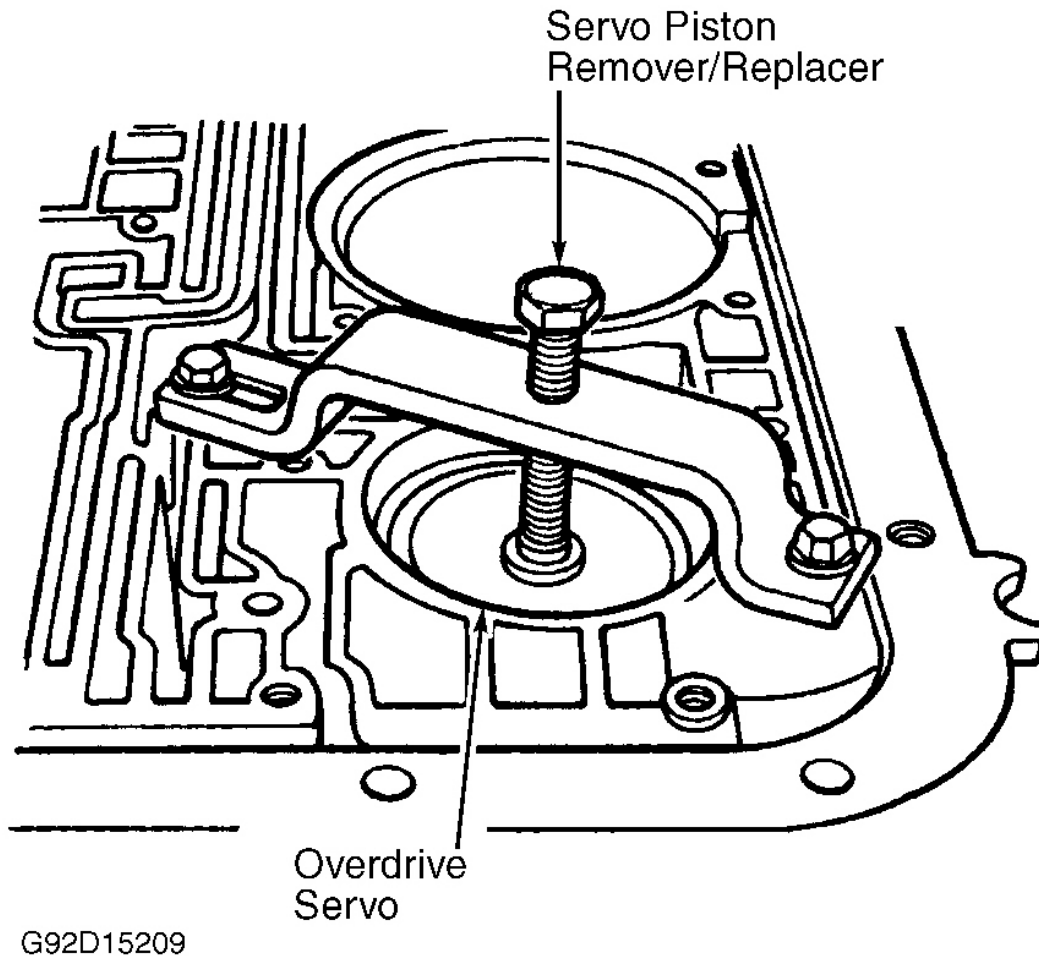


Fig. 5: Removing & Replacing Overdrive Servo
Courtesy of FORD MOTOR CO.

REVERSE SERVO ASSEMBLY

Removal

Remove valve body, see VALVE BODY ASSEMBLY. Locate reverse servo. See **Fig. 4** . Using servo piston compressor tool, depress reverse servo piston cover and remove retaining snap ring and cover. Remove piston and spring from case.

Installation

1. Install return spring, reverse servo piston and Servo Piston Selection Tool (T80L-77030-A). See **Fig. 6** . Do not install piston cover and retaining ring at this time. Tighten adjusting bolt to 50 INCH lbs. (5.6 N.m). Install dial indicator with rod touching piston top. Zero dial indicator. Back out adjusting bolt until

piston touches bottom of tool.

2. Note dial indicator reading. Normal piston travel should be .112-.237" (2.85-6.02 mm). If piston travel is out of specification, replace with appropriate rod to obtain specification. See REVERSE SERVO PISTON ROD SPECIFICATIONS table.
3. Remove piston selection tool and replace piston and rod (if necessary). To complete installation, reverse removal procedure. Ensure servo piston is installed with the same length rod as was removed.

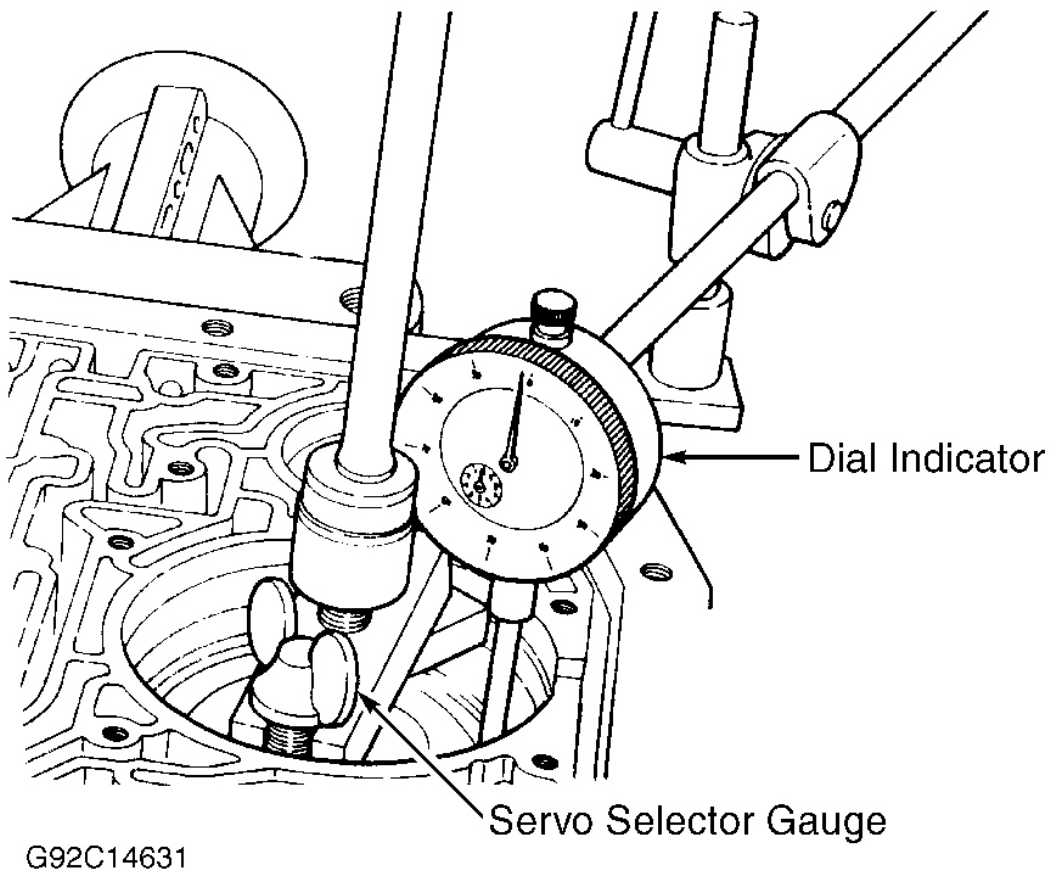


Fig. 6: Measuring Reverse Servo Pin Travel
Courtesy of FORD MOTOR CO.

REVERSE SERVO PISTON ROD SPECIFICATIONS

| Identification | Length In. (mm) |
|----------------|-----------------|
| 1 Groove | 2.936 (74.56) |
| 2 Grooves | 2.989 (75.92) |
| 3 Grooves | 3.043 (77.29) |

1-2 & 2-3 ACCUMULATOR PISTON

NOTE: **Note location and number of springs during removal for reassembly reference.**

Removal

1. Remove valve body, see VALVE BODY ASSEMBLY. Locate 1-2 or 2-3 accumulator. See **Fig. 4** . Using servo piston compressor tool, depress piston cover and remove retaining snap ring and cover or remove spring cover.
2. Remove spring(s) and related components. Remove accumulator piston (reverse snap ring pliers can be used, if necessary). Remove accumulator seals from piston.

Installation

To install, reverse removal procedure. Using ATF, lubricate piston seals and piston pocket in case prior to installation.

EXTENSION HOUSING BUSHING & REAR OIL SEAL

Removal

1. Disconnect negative battery cable. Raise and support vehicle on hoist. Mark drive shaft yoke and axle companion flange for reassembly reference. Disconnect drive shaft from transmission. Remove oil seal using appropriate puller.
2. Remove bushing using appropriate puller, taking care not to damage output shaft splines.

Installation

Install new bushing into extension housing. Install new seal into housing using appropriate seal installer. Coat inside diameter of rubber portion of seal and yoke splines with lubricant. Install drive shaft.

EXTENSION HOUSING

Removal

1. Raise and support vehicle. Remove exhaust system components as necessary for access. Drain transmission fluid. Mark drive shaft yoke and axle companion flange for reassembly reference. Remove drive shaft. Disconnect and remove Vehicle Speed Sensor (VSS) from extension housing.
2. Remove engine rear support-to-extension housing retaining bolts. Raise transmission just enough to remove weight from rear support. Remove rear support-to-crossmember retaining bolts. Remove crossmember-to-frame side support bolts and remove rear support.
3. Lower transmission and remove extension housing retaining bolts. Slide housing off output shaft. Remove and discard extension housing-to-case gasket.

Installation

Clean mating surface on transmission and extension housing. Position new gasket on transmission. Slide extension housing into place. Install bolts and tighten to specification. See TORQUE SPECIFICATIONS. To complete installation, reverse removal procedure.

TROUBLE SHOOTING

NOTE: After verifying driveability complaint, perform trouble shooting and testing procedures in this article. For electronic diagnostics and testing, see 4R70W ELECTRONIC CONTROLS article. When fault codes are retrieved, all engine related codes **MUST** be repaired first. For engine trouble code repair and diagnostic information, see appropriate TESTS W/CODES article in ENGINE PERFORMANCE section.

NOTE: Always check fluid level and condition. Ensure linkage is correctly adjusted and not damaged. Ensure electronic component connectors are tight and free from damage or contamination.

SYMPTOM DIAGNOSIS

No Forward Engagement

Fluid level and condition, shift linkage, low forward clutch pressure, low line pressure, filter (plugged or damaged), valve body (3-4 shift valve, main regulator valve, manual valve), incorrectly tightened valve body (cross-leaks), 2-3 accumulator, pump assembly, forward clutch assembly, low one-way clutch assembly (planetary) and output shaft.

No Reverse Engagement

Fluid level and condition, shift linkage, low reverse clutch pressure, low reverse band pressure, low line pressure, filter (plugged), valve body (No. 6 shuttle ball, manual valve, main regulator valve), 1-2 accumulator, incorrectly tightened valve body (cross-leaks), low reverse servo, pump assembly, reverse clutch assembly and low reverse band.

Harsh Reverse Engagement

Fluid level and condition, shift linkage, high line pressure, high Electronic Pressure Control (EPC) pressure, oil filter (plugged), valve body (No. 6 shuttle ball, No. 5 check ball, manual valve, main regulator valve), incorrectly tightened valve body (cross-leaks), low reverse servo, pump assembly, reverse clutch assembly and low reverse band.

Harsh Forward Engagement

Fluid level and condition, high forward clutch pressure, high line pressure, high Electronic Pressure Control (EPC) pressure, valve body (main regulator valve, 2-3 accumulator), incorrectly tightened valve body (cross-leaks), pump assembly and forward clutch assembly.

Delayed/Soft Reverse Engagement

Fluid level and condition, shift linkage, low reverse clutch pressure, low reverse band pressure, low line pressure, filter (plugged), valve body (No. 6 shuttle ball, 1-2 accumulator, manual valve, main regulator valve), incorrectly tightened valve body (cross-leaks), low reverse servo, pump assembly, reverse clutch assembly and

low reverse band.

Delayed/Soft Forward Engagement

Fluid level and condition, shift linkage, low forward clutch pressure, low line pressure, low Electronic Pressure Control (EPC) pressure, filter (plugged), valve body (3-4 shift valve, main regulator valve), incorrectly tightened valve body (cross-leaks), 2-3 or 1-2 accumulator, pump assembly and forward clutch assembly.

Some Or All Shifts Missing

Fluid level and condition, shift linkage and Transmission Range (TR) sensor (misadjusted or damaged).

Early/Late Shift Speeds

Incorrect tire size, incorrect axle ratio, fluid level and condition, line pressure, Electronic Pressure Control (EPC) pressure and valve body (EPC solenoid, miscellaneous components stuck, blocked solenoid screen).

Erratic/Hunting Shifting

Fluid level and condition, valve body (miscellaneous valves, accumulators-stuck), blocked valve body solenoid screen and Torque Converter Clutch (TCC).

Soft/Slipping Shift Feel

Fluid level and condition, low line pressure, Low Electronic Pressure Control (EPC) pressure, valve body (1-2 accumulator, main regulator valve, overdrive servo regulator) and EPC solenoid (stuck).

Harsh Shift Feel

Fluid level and condition, high line pressure, high Electronic Pressure Control (EPC) pressure, valve body (1-2 accumulator, main regulator valve, overdrive servo regulator) and EPC solenoid (stuck).

No 1st Gear In Drive, Engages In Higher Gear

Shift linkage, Transmission Range (TR) sensor, low reverse clutch pressure, low reverse band pressure, low line pressure and miscellaneous internal failures.

No Manual Low Gear

Shift linkage, Transmission Range (TR) sensor, low reverse clutch pressure, low reverse band pressure, low line pressure, low Electronic Pressure Control (EPC) pressure, filter (plugged), valve body (No. 6 shuttle ball, manual valve, main regulator valve, low servo modulator valve), incorrectly tightened valve body (cross-leaks) and low reverse servo.

No Manual 2nd Gear

Shift linkage or cable, Transmission Range (TR) sensor, valve body (3-4 shift valve, 1-2 and 2-3 shift valve, 3-4 capacity modulator valve) and incorrectly tightened valve body (cross-leaks).

No 1-2 Automatic Shift

Shift linkage, Transmission Range (TR) sensor, intermediate clutch pressure, line pressure, valve body (1-2 shift valve, 1-2 accumulator valve), Shift Solenoid No. 1 (SS1) failure, damaged No. 8 check ball, incorrectly tightened valve body (cross-leaks), pump assembly, intermediate clutch assembly, intermediate one-way clutch assembly and low one-way clutch assembly.

No 2-3 Automatic Shift

Shift linkage, direct clutch pressure, valve body (2-3 shift valve, No. 3 or No. 9 check ball, solenoid pressure regulator valve, 2-3 modulator valve), Shift Solenoid No. 2 (SS2) failure, output shaft seals, missing or leaking cup plug, 2-3 accumulator, blocked valve body solenoid screen, intermediate overrunning clutch assembly, direct clutch assembly and case (damaged output shaft seal area).

No 3-4 Automatic Shift

Shift linkage, Transmission Range (TR) sensor, forward clutch pressure, direct clutch pressure, line pressure, valve body (3-4 shift valve, solenoid pressure regulator valve, OD servo regulator, 3-4 capacity modulator valve, 1-2 and 2-3 shift valves), incorrectly tightened valve body (cross-leaks), Shift Solenoid No. 1 or 2 (SS1 or SS2) failure, OD servo cover, OD rod and piston cushion spring, No. 2, 4, 7 and/or 9 valve body check balls, blocked valve body solenoid screen, pump assembly, OD Band and/or reverse clutch drum assembly, intermediate overrunning clutch assembly, forward clutch assembly and input shaft.

No 4-3 Automatic Downshift

Forward clutch pressure, line pressure, valve body (3-4 shift valve, solenoid pressure regulator valve, OD servo regulator, 3-4 capacity modulator valve, 2-3 backout valve, 1-2 and 2-3 shift valves), incorrectly tightened valve body (cross-leaks), Shift Solenoid No. 1 (SS1) failure, OD servo, No. 2, 7, and/or 9 valve body check balls, blocked valve body solenoid screen, pump assembly, OD Band and/or reverse clutch drum assembly, intermediate overrunning clutch assembly, forward clutch assembly and input shaft.

No 3-2 Automatic Downshift

Direct clutch pressure, valve body (2-3 shift valve, check balls damage or missing), Shift Solenoid No. 2 (SS2) failure, intermediate one-way clutch assembly and direct clutch assembly.

No 2-1 Automatic Downshift

Intermediate clutch pressure, valve body (1-2 shift valve, 1-2 accumulator solenoid pressure regulator valve), Shift Solenoid No. 1 (SS1) failure, incorrectly tightened valve body (cross-leaks), pump assembly, intermediate clutch assembly, intermediate one-way clutch assembly and low one-way clutch assembly.

No Torque Converter Clutch Application

Shift linkage, low line pressure, low Electronic Pressure Control (EPC) pressure, valve body (solenoid pressure regulator valve, manual valve, bypass clutch control valve and plunger, converter pressure limit valve, drain back valve), incorrectly tightened valve body (cross-leaks), blocked valve body solenoid screen, TCC solenoid failure, pump assembly, input shaft and torque converter assembly.

1997 Ford Club Wagon E150

1997-98 AUTOMATIC TRANSMISSIONS 4R70W Overhaul

Torque Converter Clutch Always Applied

Valve body (drain back valve, TCC valve and plunger), incorrectly tightened valve body (cross-leaks), TCC solenoid failure, No. 7 valve body check ball, pump assembly, input shaft and torque converter assembly.

Torque Converter Clutch Cycling/Shudder/Chatter

Fluid condition, valve body (solenoid pressure regulator valve, No. 7 check ball, bypass clutch control valve and plunger, converter pressure limit valve), incorrectly tightened valve body (cross-leaks), blocked valve body solenoid screen, TCC solenoid failure, pump assembly, input shaft and torque converter.

MISCELLANEOUS FAULTS

No Engine Braking In 2nd Gear, Manual 2nd Or 1st Gear

Shift linkage, valve body (3-4 shift valve, 1-2 and 2-3 shift valve, 3-4 capacity modulator valve), OD band, reverse clutch drum assembly and intermediate overrunning clutch assembly.

Poor Vehicle Performance

Shift linkage, Transmission Range (TR) sensor, incorrect shift speed or engagement, TCC always applied and torque converter.

Transmission Overheating

Fluid level and condition, poor fluid flow (cooler lines, auxiliary oil cooler, engine performance, valve body (drain back valve, TCC control valve, converter limit valve) and torque converter.

CLUTCH & BAND APPLICATION CHART

CLUTCH & BAND APPLICATION CHART

| Selector Lever Position | Elements In Use |
|-------------------------|---|
| "OD" (Overdrive) | |
| 1st Gear | Forward Clutch, Planetary One-Way Clutch |
| 2nd Gear | Intermediate Clutch, Forward Clutch & Intermediate One-Way Clutch |
| 3rd Gear | Forward Clutch, Intermediate Clutch & Direct Clutch |
| 4th Gear | Overdrive Band, Intermediate Clutch & Direct Clutch |
| "D" (Drive) | |
| 1st Gear | Forward Clutch, Planetary One-Way Clutch |
| 2nd Gear | Intermediate Clutch, Forward Clutch & Intermediate One-Way Clutch |
| 3rd Gear | Forward Clutch, Intermediate Clutch & Direct Clutch |

1997 Ford Club Wagon E150**1997-98 AUTOMATIC TRANSMISSIONS 4R70W Overhaul**

| | |
|---------------|---|
| "2" (Manual) | Forward Clutch, Intermediate Clutch, Intermediate One-Way Clutch & Overdrive Band |
| "1" (Manual) | Forward Clutch, Planetary One-Way Clutch & Low Reverse Band |
| "R" (Reverse) | Reverse Clutch & Low Reverse Band |

TESTING**ROAD TEST**

1. Drive vehicle with transmission in "OD" position to normal operating temperature. Check minimum throttle upshifts in "OD". Transmission should start in 1st gear, shift to 2nd, 3rd, and 4th gear at approximately the speeds shown in SHIFT SPEEDS SPECIFICATIONS tables.
2. With transmission in 4th gear (Overdrive), press Transmission Control Switch (TCS). Transmission should downshift to 3rd gear. Release accelerator pedal. Engine braking should occur.
3. Press accelerator pedal to WOT. Transmission should shift from 3rd to 2nd gear, or 3rd to 1st gear depending on vehicle speed. See appropriate SHIFT SPEED SPECIFICATIONS table. Torque converter clutch should disengage and then reapply.
4. With transmission in "D" position, and vehicle speed more than 50 MPH, move transmission selector lever to manual "2" position. Release accelerator pedal. Transmission should immediately downshift to 2nd gear. Move transmission selector lever to manual "1" position. Transmission should downshift to 1st gear at speeds less than 30-35 MPH.
5. If transmission fails to operate normally or torque converter does not apply, diagnose problem by symptom. See SYMPTOM DIAGNOSIS under TROUBLE SHOOTING.

NOTE: Shift speeds shown are approximate. All shift speeds may vary due to production tolerances and emission control equipment.

SHIFT SPEED SPECIFICATIONS (1997 COUGAR & THUNDERBIRD)

| Operating Condition | Shift Speed MPH (3.8L) | Shift Speed MPH (4.6L) |
|---------------------|------------------------|------------------------|
| Light Throttle | | |
| 1-2 | 8-14 | 10-13 |
| 2-3 | 18-23 | 19-23 |
| 3-4 | 28-36 | 32-37 |
| 4-3 | 28-32 | 29-33 |
| 3-2 | 12-16 | 18-19 |
| 2-1 | 6-10 | 9-12 |
| Full Throttle (WOT) | | |
| 1-2 | 34-44 | 38-47 |
| 2-3 | 62-72 | 71-83 |
| 3-2 | 25-62 | 62-69 |
| 2-1 | 10-25 | 30-35 |

1997 Ford Club Wagon E150

1997-98 AUTOMATIC TRANSMISSIONS 4R70W Overhaul

SHIFT SPEED SPECIFICATIONS(1997 CROWN VICTORIA,GRAND MARQUIS/TOWN CAR)

| Operating Condition | Shift Speed MPH (2.73 Axle Ratio) | Shift Speed MPH (3.08 Axle Ratio) | Shift Speed MPH (3.27 Axle Ratio)⁽¹⁾ |
|---|--|--|--|
| Light Throttle | | | |
| 1-2 | 10-15 | 10-12 | 8-11 |
| 2-3 | 22-26 | 21-24 | 19-22 |
| 3-4 | 40-44 | 35-40 | 33-37 |
| 4-3 | 33-35 | 29-31 | 27-29 |
| 3-2 | 13-15 | 12-14 | 12-14 |
| 2-1 | 8-10 | 7-9 | 6-8 |
| Full Throttle (WOT) | | | |
| 1-2 | 44-49 | 40-46 | 36-41 |
| 2-3 | 86-93 | 73-81 | 71-76 |
| 3-2 | 78 Max. | 70 Max. | 66 Max. |
| 2-1 | 34 Max. | 30 Max. | 28 Max. |
| (1) These shift speeds apply to Crown Victoria Police Special models and vehicles equipped with trailer towing or limousine packages. | | | |

SHIFT SPEED SPECIFICATIONS (1997-98 EXPEDITION 4.6L)

| Operating Condition | Shift Speed MPH (3.31 Axle Ratio) | Shift Speed MPH (3.55 Axle Ratio) |
|----------------------------|--|--|
| Light Throttle | | |
| 1-2 | 10-14 | 9-13 |
| 2-3 | 21-25 | 20-24 |
| 3-4 | 32-36 | 31-35 |
| 4-3 | 24-26 | 23-25 |
| 3-2 | 16-18 | 15-17 |
| 2-1 | 10-12 | 10-12 |
| WOT | | |
| 1-2 | 48-52 | 46-50 |
| 2-3 | 74-78 | 71-75 |
| 3-2 | 65-67 | 62-64 |
| 2-1 | 29-31 | 28-30 |

SHIFT SPEED SPECIFICATIONS (1997-98 EXPLORER 5.0L ⁽¹⁾)

| Operating Condition | Shift Speed MPH |
|----------------------------|------------------------|
| Light Throttle | |
| 1-2 | 9-13 |
| 2-3 | 19-23 |
| 3-4 | 38-42 |
| 4-3 | 22-24 |

1997 Ford Club Wagon E150

1997-98 AUTOMATIC TRANSMISSIONS 4R70W Overhaul

| | |
|------------------------------------|-------|
| 3-2 | 12-14 |
| 2-1 | 4-8 |
| Full Throttle (WOT) | |
| 1-2 | 36-40 |
| 2-3 | 66-70 |
| 3-2 | 60-62 |
| 2-1 | 26-28 |
| (1) Applies to 2WD and 4WD models. | |

SHIFT SPEED SPECIFICATIONS (1997-98 MARK VIII)

| Operating Condition | (1) Shift Speed MPH |
|---------------------------------|---------------------|
| Light Throttle | |
| 1-2 | 7-12 |
| 2-3 | 18-22 |
| 3-4 | 33-37 |
| 4-3 | 30-32 |
| 3-2 | 12-16 |
| 2-1 | 5-9 |
| Full Throttle (WOT) | |
| 1-2 | 50-55 |
| 2-3 | 94-100 |
| 3-2 | 76 Max. |
| 2-1 | 40 Max. |
| (1) Applies to all axle ratios. | |

SHIFT SPEED SPECIFICATIONS (1997 MUSTANG 3.8L)

| Operating Condition | Shift Speed MPH |
|---------------------|-----------------|
| Light Throttle | |
| 1-2 | 9-11 |
| 2-3 | 21-23 |
| 3-4 | 41-43 |
| 4-3 | 29-31 |
| 3-2 | 14-16 |
| 2-1 | 7-9 |
| Full Throttle (WOT) | |
| 1-2 | 40-45 |
| 2-3 | N/A |
| 3-2 | 69 Max. |
| 2-1 | 29 Max. |

1997 Ford Club Wagon E150

1997-98 AUTOMATIC TRANSMISSIONS 4R70W Overhaul

SHIFT SPEED SPECIFICATIONS (1997 MUSTANG GT 4.6L)

| Operating Condition | Shift Speed MPH (3.08 Axle Ratio) | Shift Speed MPH (3.27 Axle Ratio) |
|----------------------------|--|--|
| Light Throttle | | |
| 1-2 | 9-11 | 8-11 |
| 2-3 | 26-30 | 25-29 |
| 3-4 | 39-44 | 37-42 |
| 4-3 | 27-29 | 25-27 |
| 3-2 | 14-16 | 13-15 |
| 2-1 | 7-9 | 7-9 |
| WOT | | |
| 1-2 | 40-45 | 37-42 |
| 2-3 | 74-79 | 69-74 |
| 3-2 | 72 Max. | 68 Max. |
| 2-1 | 35 Max. | 33 Max. |

SHIFT SPEED SPECIFICATIONS (1997 E-150 4.2L)

| Operating Condition | Shift Speed MPH (3.31 Axle Ratio) | Shift Speed MPH (3.55 Axle Ratio) | Shift Speed MPH (3.73 Axle Ratio) | Shift Speed MPH (4.09 Axle Ratio) |
|----------------------------|--|--|--|--|
| Light Throttle | | | | |
| 1-2 | 11-15 | 9-13 | 10-14 | 10-14 |
| 2-3 | 15-19 | 13-17 | 18-22 | 13-17 |
| 3-4 | 36-40 | 34-38 | 38-42 | 34-38 |
| 4-3 | 22-24 | 21-23 | 23-25 | 23-25 |
| 3-2 | 13-15 | 12-14 | 12-14 | 10-12 |
| 2-1 | 6-8 | 5-7 | 6-8 | 6-8 |
| Full Throttle (WOT) | | | | |
| 1-2 | 37-41 | 34-38 | 40-44 | 35-39 |
| 2-3 | 70-74 | 69-73 | 70-74 | 65-69 |
| 4-3 | 88-90 | 83-85 | 78-80 | 73-75 |
| 3-2 | 65-67 | 61-63 | 60-62 | 54-56 |
| 2-1 | 31-33 | 29-31 | 33-35 | 31-33 |

SHIFT SPEED SPECIFICATIONS (1997 E-150 4.6L)

| Operating Condition | Shift Speed MPH (3.31 Axle Ratio) | Shift Speed MPH (3.55 Axle Ratio) |
|----------------------------|--|--|
| Light Throttle | | |
| 1-2 | 7-11 | 7-11 |
| 2-3 | 18-22 | 17-21 |
| 3-4 | 38-42 | 36-40 |
| 4-3 | 24-26 | 22-24 |
| 3-2 | 11-13 | 11-13 |

1997 Ford Club Wagon E150

1997-98 AUTOMATIC TRANSMISSIONS 4R70W Overhaul

| | | |
|-----|-------|-------|
| 2-1 | 4-6 | 4-6 |
| WOT | | |
| 1-2 | 40-44 | 37-41 |
| 2-3 | 73-77 | 69-73 |
| 4-3 | 88-90 | 83-85 |
| 3-2 | 67-69 | 63-65 |
| 2-1 | 33-35 | 31-33 |

SHIFT SPEED SPECIFICATIONS (1997-98 F-150 4.2L)

| Operating Condition | (1) Shift Speed MPH |
|---------------------------------|---------------------|
| Light Throttle | |
| 1-2 | 7-11 |
| 2-3 | 16-20 |
| 3-4 | 24-28 |
| 4-3 | 20-24 |
| 3-2 | 12-16 |
| 2-1 | 4-8 |
| Full Throttle (WOT) | |
| 1-2 | 36-40 |
| 2-3 | 65-76 |
| 3-4 | 88-100 |
| 4-3 | 76-92 |
| 3-2 | 57-67 |
| 2-1 | 29-34 |
| (1) Applies to all axle ratios. | |

SHIFT SPEED SPECIFICATIONS(1998 CROWN VICTORIA,GRAND MARQUIS/TOWNCAR)

| Operating Condition | Shift Speed MPH (2.73 Axle Ratio) | Shift Speed MPH (3.08 Axle Ratio) | Shift Speed MPH (3.27 Axle Ratio)(1) |
|---------------------|-----------------------------------|-----------------------------------|--------------------------------------|
| Light Throttle | | | |
| 1-2 | 7-9 | 6-8 | 6-8 |
| 2-3 | 19-22 | 17-20 | 16-19 |
| 3-4 | 34-38 | 31-35 | 29-33 |
| 4-3 | 31-33 | 28-30 | 26-28 |
| 3-2 | 13-15 | 12-14 | 12-14 |
| 2-1 | 4-6 | 4-6 | 4-6 |
| Full Throttle (WOT) | | | |
| 1-2 | 40-46 | 37-42 | 39-44 |
| 2-3 | 77-83 | 70-75 | 72-77 |
| 3-2 | 78 Max. | 70 Max. | 70 Max. |
| 2-1 | 31 Max. | 28 Max. | 35 Max. |

1997 Ford Club Wagon E150

1997-98 AUTOMATIC TRANSMISSIONS 4R70W Overhaul

(1) These shift speeds apply to Crown Victoria Police Special models and vehicles equipped with trailer towing or limousine packages.

SHIFT SPEED SPECIFICATIONS (1998 E-150 & E-250 4.2L)

| Operating Condition | Shift Speed MPH (3.31 Axle Ratio) | Shift Speed MPH (3.55 Axle Ratio) | Shift Speed MPH (3.73 Axle Ratio) | Shift Speed MPH (4.09 Axle Ratio) |
|---------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|
| Light Throttle | | | | |
| 1-2 | 10-13 | 9-12 | 10-15 | 10-15 |
| 2-3 | 17-27 | 16-25 | 15-25 | 14-23 |
| 3-4 | 36-45 | 33-42 | 36-45 | 34-38 |
| 4-3 | 22-24 | 21-23 | 23-25 | 23-25 |
| 3-2 | 13-15 | 12-14 | 12-14 | 10-12 |
| 2-1 | 6-8 | 5-7 | 6-8 | 6-8 |
| Full Throttle (WOT) | | | | |
| 1-2 | 37-41 | 34-38 | 38-44 | 35-39 |
| 2-3 | 70-74 | 69-73 | 68-74 | 65-69 |
| 4-3 | 88-90 | 83-85 | 77-80 | 73-75 |
| 3-2 | 65-67 | 61-63 | 60-62 | 54-56 |
| 2-1 | 31-33 | 29-31 | 30-32 | 27-29 |

SHIFT SPEED SPECIFICATIONS (1998 E-150 4.6L)

| Operating Condition | Shift Speed MPH (3.31 Axle Ratio) | Shift Speed MPH (3.55 Axle Ratio) |
|---------------------|-----------------------------------|-----------------------------------|
| Light Throttle | | |
| 1-2 | 7-13 | 7-13 |
| 2-3 | 17-27 | 16-26 |
| 3-4 | 38-55 | 36-52 |
| 4-3 | 24-26 | 22-24 |
| 3-2 | 11-13 | 11-13 |
| 2-1 | 4-6 | 4-6 |
| WOT | | |
| 1-2 | 40-44 | 37-41 |
| 2-3 | 73-77 | 69-73 |
| 4-3 | 88-90 | 83-85 |
| 3-2 | 67-69 | 63-65 |
| 2-1 | 33-35 | 31-33 |

SHIFT SPEED SPECIFICATIONS (1998 MUSTANG 3.8L)

| Operating Condition | Shift Speed MPH |
|---------------------|-----------------|
| Light Throttle | |
| 1-2 | 6-10 |
| 2-3 | 20-22 |

1997 Ford Club Wagon E150

1997-98 AUTOMATIC TRANSMISSIONS 4R70W Overhaul

| | |
|---------------------|---------|
| 3-4 | 39-43 |
| 4-3 | 24-26 |
| 3-2 | 13-15 |
| 2-1 | 5-7 |
| Full Throttle (WOT) | |
| 1-2 | 40-45 |
| 2-3 | N/A |
| 3-2 | 69 Max. |
| 2-1 | 29 Max. |

SHIFT SPEED SPECIFICATIONS (1998 MUSTANG GT 4.6L)

| Operating Condition | Shift Speed MPH (3.08 Axle Ratio) | Shift Speed MPH (3.27 Axle Ratio) |
|---------------------|-----------------------------------|-----------------------------------|
| Light Throttle | | |
| 1-2 | 7-10 | 7-10 |
| 2-3 | 14-18 | 14-18 |
| 3-4 | 24-27 | 23-28 |
| 4-3 | 23-25 | 22-24 |
| 3-2 | 12-14 | 12-14 |
| 2-1 | 5-7 | 5-7 |
| WOT | | |
| 1-2 | 40-45 | 37-42 |
| 2-3 | 74-79 | 69-74 |
| 3-2 | 72 Max. | 68 Max. |
| 2-1 | 35 Max. | 33 Max. |

SHIFT SPEED SPECIFICATIONS (1998 F-150 4.6L)

| Operating Condition | Shift Speed MPH |
|---------------------|-----------------|
| Light Throttle | |
| 1-2 | 8-12 |
| 2-3 | 16-24 |
| 3-4 | 30-35 |
| 4-3 | 22-29 |
| 3-2 | 13-15 |
| 2-1 | 6-7 |
| Full Throttle (WOT) | |
| 1-2 | 36-41 |
| 2-3 | 64-74 |
| 3-4 | 94-100 |
| 4-3 | 78-90 |
| 3-2 | 57-62 |

SHIFT SPEED SPECIFICATIONS (1997-98 F-250 4.6L)

| Operating Condition | Shift Speed MPH (3.31 Axle Ratio) | Shift Speed MPH (3.73 Axle Ratio) |
|---------------------|-----------------------------------|-----------------------------------|
| Light Throttle | | |
| 1-2 | 7-11 | 7-11 |
| 2-3 | 18-22 | 15-20 |
| 3-4 | 32-36 | 28-32 |
| 4-3 | 23-29 | 22-26 |
| 3-2 | 14-17 | 11-13 |
| 2-1 | 6-10 | 5-9 |
| WOT | | |
| 1-2 | 40-44 | 37-41 |
| 2-3 | 75-79 | 66-70 |
| 4-3 | 88-90 | 83-85 |
| 3-2 | 65-67 | 61-63 |
| 2-1 | 31-33 | 29-31 |

HYDRAULIC PRESSURE TEST

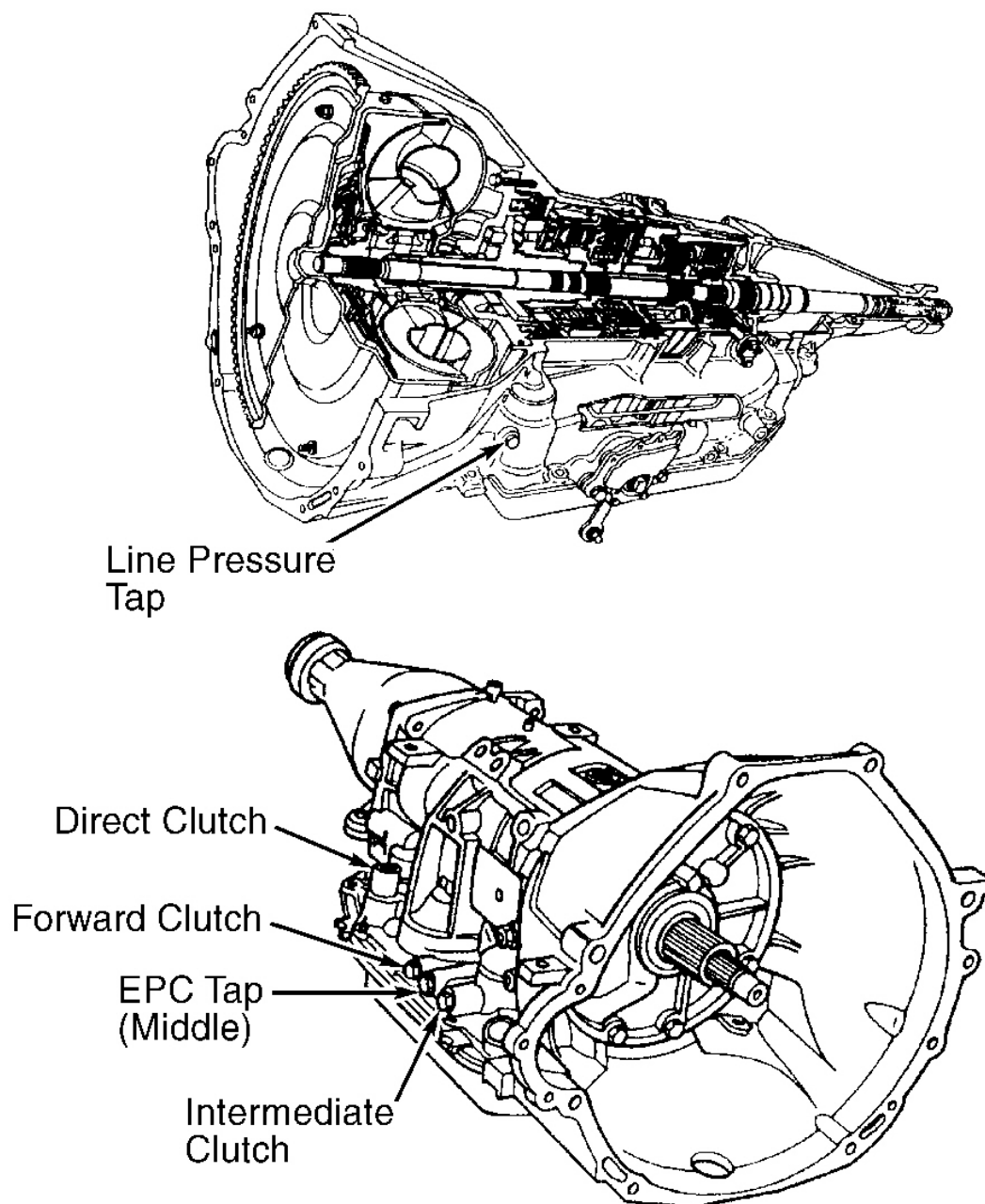
CAUTION: Perform line pressure test before stall speed test. If line pressure is low at stall, DO NOT perform stall speed test or transmission damage will occur.

Line Pressure Test

1. Connect a 0-300 psi (0-21.1 kg/cm²) pressure gauge to line pressure port tap on left side of transmission case forward of control lever. See **Fig. 7**. Gauge hose must be long enough to read gauge while operating engine.
2. With engine at normal operating temperature, apply parking and service brakes. Check line pressure at idle and WOT stall in all ranges. See HYDRAULIC PRESSURE SPECIFICATIONS TABLE. If pressure is not as specified, perform EPC PRESSURE CHECK.

EPC Pressure Check

1. Connect a 0-100 psi (0-7.0 kg/cm²) pressure gauge to EPC pressure tap at right side of transmission case. See **Fig. 7**. Gauge hose must be long enough to read gauge while operating engine.
2. With engine at normal operating temperature, apply parking and service brakes. Check EPC pressure at idle and WOT stall in all ranges. See HYDRAULIC PRESSURE SPECIFICATIONS table. If pressure is not as specified, go to PINPOINT TEST E in 4R70W ELECTRONIC CONTROLS article, to diagnose EPC operation. If EPC operation is okay, go to LINE PRESSURE TEST RESULTS.



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Fig. 7: Identifying Hydraulic Pressure Taps
Courtesy of FORD MOTOR CO.

NOTE: Pressure test at idle position must be taken with engine at normal operating temperature. Pressure test at WOT position should be taken at full stall conditions. Run engine at a fast idle in "N" for 15 seconds to cool fluid between

1997 Ford Club Wagon E150

1997-98 AUTOMATIC TRANSMISSIONS 4R70W Overhaul

tests.**1997 HYDRAULIC PRESSURE SPECIFICATIONS**

| Throttle Position | Line Pressure PSI | EPC Pressure PSI |
|--|-------------------|------------------|
| Idle | | |
| Reverse Range | | |
| Crown Victoria Grand Marquis, Town Car | 84-128 | 15-25 |
| Cougar, T-Bird (3.8L) | 60-104 | 3-13 |
| Cougar, T-Bird (4.6L) | 68-112 | 7-17 |
| Expedition | 54-96 | 0-9 |
| Explorer | 64-108 | 5-15 |
| Mark VIII | 54-92 | 0-7 |
| Mustang (3.8L) | 60-104 | 3-13 |
| Mustang (4.6L) | 54-92 | 0-7 |
| "E" & "F" Series | 54-96 | 0-9 |
| All Other Ranges | | |
| Crown Victoria Grand Marquis, Town Car | 55-94 | 15-25 |
| Cougar, T-Bird (3.8L) | 55-94 | 15-25 |
| Cougar, T-Bird (4.6L) | 43-81 | 7-17 |
| Expedition | 31-69 | 0-9 |
| Explorer | 39-78 | 5-15 |
| Mark VIII | 31-65 | 0-7 |
| Mustang (3.8L) | 49-88 | 11-21 |
| Mustang (4.6L) | 31-65 | 0-7 |
| "E" & "F" Series | 31-69 | 0-9 |
| WOT@Stall | | |
| Reverse Range | | |
| All Models | 207-267 | 83-93 |
| All Other Ranges | | |
| All Models | 160-210 | 83-93 |

1998 HYDRAULIC PRESSURE SPECIFICATIONS

| Throttle Position | Line Pressure PSI | EPC Pressure PSI |
|--|-------------------|------------------|
| Idle | | |
| Reverse Range | | |
| Crown Victoria Grand Marquis, Town Car | 70-114 | 8-18 |
| Expedition, "F" Series | 54-96 | 0-9 |
| Explorer, "E" Series | 64-98 | 5-15 |
| Mark VIII | 54-92 | 0-7 |

1997 Ford Club Wagon E150

1997-98 AUTOMATIC TRANSMISSIONS 4R70W Overhaul

| | | |
|---|---------|-------|
| Mustang (3.8L) | 67-109 | 0-9 |
| Mustang (4.6L) | 64-99 | 5-15 |
| All Other Ranges | | |
| Crown Victoria Grand Marquis, Town Car | 55-94 | 15-25 |
| Expedition, "F" Series | 31-69 | 0-9 |
| Explorer, "E" Series | 39-78 | 5-15 |
| Mark VIII | 55-94 | 15-25 |
| Mustang (3.8L) | 47-86 | 10-20 |
| Mustang (4.6L) | 63-102 | 20-30 |
| WOT@Stall | | |
| Reverse Range | | |
| All Models | 207-267 | 83-93 |
| All Other Ranges | | |
| All Models | 160-210 | 83-93 |

LINE PRESSURE TEST RESULTS**High At Idle In All Ranges**

Main regulator valve sticking, EPC solenoid sticking. Check transmission wiring harness. Perform QUICK TEST. See 4R70W ELECTRONIC CONTROLS article.

Low At Idle In All Ranges

Low fluid level, restricted inlet filter or damaged filter inlet seal, loose valve body bolts, damaged gaskets or separator plate, pump leakage, case leakage, faulty valve body, excessively low engine idle, fluid too hot or main regulator valve sticking. Low In "P"

Valve body loose, faulty main oil regulator valve sticking or low-reverse servo leakage.

Low In "R"

Separator plate, reverse clutch or low-reverse servo leakage. Valve body loose.

Low In "N"

Loose valve body or main oil regulator valve sticking.

Low In "D"

Faulty forward clutch, main oil regulator valve or loose valve body.

Low In "2nd"

Forward clutch, intermediate clutch or valve body leakage.

1997 Ford Club Wagon E150

1997-98 AUTOMATIC TRANSMISSIONS 4R70W Overhaul

Low In "1st"

Forward clutch, low-reverse servo or valve body leakage.

DIRECT CLUTCH PRESSURE TEST

NOTE: Shift quality is affected when test gauges are attached to transmission. DO NOT accelerate or decelerate rapidly during test. Transmission failure could result.

1. Attach pressure gauges capable of reading 300 psi (21.1 kg/cm²) to the forward clutch pressure tap and the direct clutch pressure tap. See **Fig. 7**. Mount gauges inside vehicle.
2. Drive vehicle. When pressure is applied to the direct clutch, note pressure difference between forward clutch pressure reading and direct clutch pressure reading.
3. If the difference is less than 15 psi (1.05 kg/cm²), direct clutch circuit is okay. If difference is greater than specification, there is a leak in direct clutch pressure circuit. Repair as necessary.

STALL SPEED TEST

CAUTION: Perform line pressure test before stall speed test. If line pressure is low at stall, DO NOT perform stall speed test or transmission damage will occur.

Testing Precautions

When performing stall test, do not hold throttle open longer than 5 seconds. Allow a cooling period of 15 seconds with transmission in "N" and engine speed at 1000 RPM between each test. If engine speed exceeds maximum limits shown, release accelerator immediately, as this is an indication of clutch or band slippage.

Testing Procedure

Bring engine to normal operating temperature. Apply parking and service brakes. Stall test transmission in each driving range at WOT. Note maximum RPM obtained. Engine speed should be within limits. See STALL SPEED SPECIFICATIONS table. If maximum RPM obtained is not within specifications, see STALL SPEED TEST RESULTS.

STALL SPEED SPECIFICATIONS

| Application | RPM |
|-------------------------------|-----------|
| 1997 | |
| Cougar, T-Bird (3.8L) | 1880-2210 |
| Cougar, T-Bird (4.6L) | 2012-2375 |
| Crown Victoria, Grand Marquis | 2038-2383 |
| Crown Victoria (Police) | 2063-2431 |
| Expedition | 2200-2500 |
| Explorer | 2438-2838 |
| Mark VIII | 2355-2746 |

1997 Ford Club Wagon E150

1997-98 AUTOMATIC TRANSMISSIONS 4R70W Overhaul

| | |
|-------------------------------|-----------|
| Mustang (3.8L) | 1869-2193 |
| Mustang (4.6L) | 2324-2757 |
| Town Car | 2053-2412 |
| E-150, 250 & F-150 (4.2L) | 1975-2317 |
| E-150 (4.6L) | 2135-2492 |
| E-250 HD (4.2L) | 2008-2342 |
| F-150, 250 (4.6L) | 2200-2500 |
| 1998 | |
| Crown Victoria, Grand Marquis | 2094-2447 |
| Town Car | 2116-2471 |
| Town Car (Tow) | 2350-2763 |
| Expedition | 2200-2500 |
| Explorer | 2478-2901 |
| Mark VIII | 2336-2718 |
| Mustang (3.8L) | 2197-2567 |
| Mustang (4.6L) | 2362-2807 |
| E-150, 250 & F-150 (4.2L) | 1975-2317 |
| E-150, 250 (4.6L) | 2135-2492 |
| E-250 & F-250 HD (4.2L) | 2008-2342 |
| F-150, 250 (4.6L) | 2200-2500 |

STALL SPEED TEST RESULTS**Low In All Ranges**

Check engine tune-up. Check torque converter using bench test for stator one-way clutch slippage.

High In "D" Position

Check planetary one-way clutch.

High In "D", "2" & "1" Position

Check forward clutch or intermediate clutch.

High In "D", "2", "1" & "R" Position

Perform HYDRAULIC PRESSURE TEST.

High In "R" Position

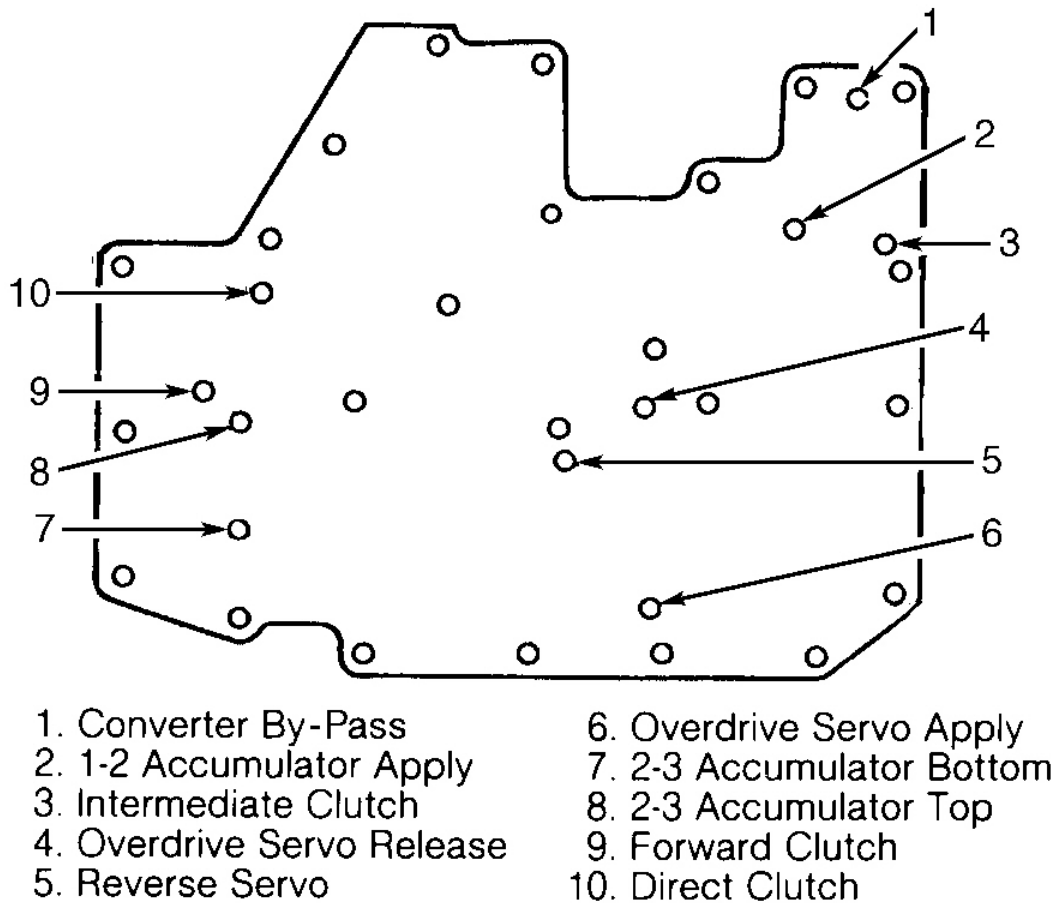
Check reverse clutch and/or low-reverse band or servo.

AIR PRESSURE TESTS

Test Procedures

1. A no-drive condition can exist even with correct transmission fluid pressure, because of inoperative clutches or bands. The inoperative units can be located by substituting air pressure for fluid pressure to determine location of malfunction.
2. Remove pan and drain fluid. Remove main control (valve body) assembly from transmission. See ON-VEHICLE SERVICE. Using attaching screws, install Transmission Test Plate (T92P-7006-A) and gasket. Tighten bolts to 89-106 INCH lbs. (10-12 N.m)
3. With a rubber-tipped air nozzle, apply air pressure into the appropriate locations specified in the following tests. See **Fig. 8** . If servo or accumulator does not move when air is applied, clean and inspect to locate cause. If during test, 2 clutches apply or clutch fails to operate, check fluid passages in case and front pump for blockage or damage.

NOTE: **Air pressure should be regulated to 40 psi (2.8 km/cm²) maximum. Compressed air used for test should be filtered and dry to avoid contaminating transmission fluid.**



92F15201

Fig. 8: Identifying Air Pressure Test Ports On Adapter Plate
Courtesy of FORD MOTOR CO.

Reverse Clutch

Apply air pressure to reverse clutch passage. A dull thud can be heard when clutch piston is applied, or movement can be felt by placing fingertips on clutch drum.

Forward Clutch

Apply air pressure to the forward clutch apply passage in the adapter plate. A dull thud can be heard when clutch piston is applied, or movement can be felt by placing fingertips on input shell.

Intermediate Clutch

Apply air pressure to intermediate clutch apply passage in the adapter plate. A dull thud can be heard or felt if clutch is operating properly.

Overdrive Servo

Apply air pressure to overdrive servo apply passage. Operation of the band is indicated by tightening of the band around reverse clutch drum. A thud can be felt on the servo cover when the servo returns to the release position as a result of spring force from the release spring. The band will then relax.

Low-Reverse Servo

Apply air pressure to low-reverse servo apply passage. A dull thud can be heard when the low-reverse band tightens around the planetary drum. Movement of the ring gear should also be detected.

Direct Clutch

Apply air pressure to direct clutch passage in the adapter plate. A dull thud can be heard or felt on the drive shaft if clutch is operating properly.

2-3 Accumulator

Apply air pressure to 2-3 accumulator passage. Accumulator piston should unseat and can be detected by inserting a metal rod into 2-3 piston hole. When piston unseats, rod will move.

TORQUE CONVERTER

NOTE: **Torque converter is a sealed unit and cannot be disassembled for service. Replace if found to be defective. The following tests will identify a defective converter.**

FLUSHING

Whenever transmission has been disassembled to replace worn or damaged parts or because valve body sticks due to foreign material, converter and oil cooler must be cleaned using a mechanically operated agitating cleaner. Under no conditions should converter or oil cooler be cleaned by hand agitation using solvent.

LEAK TEST

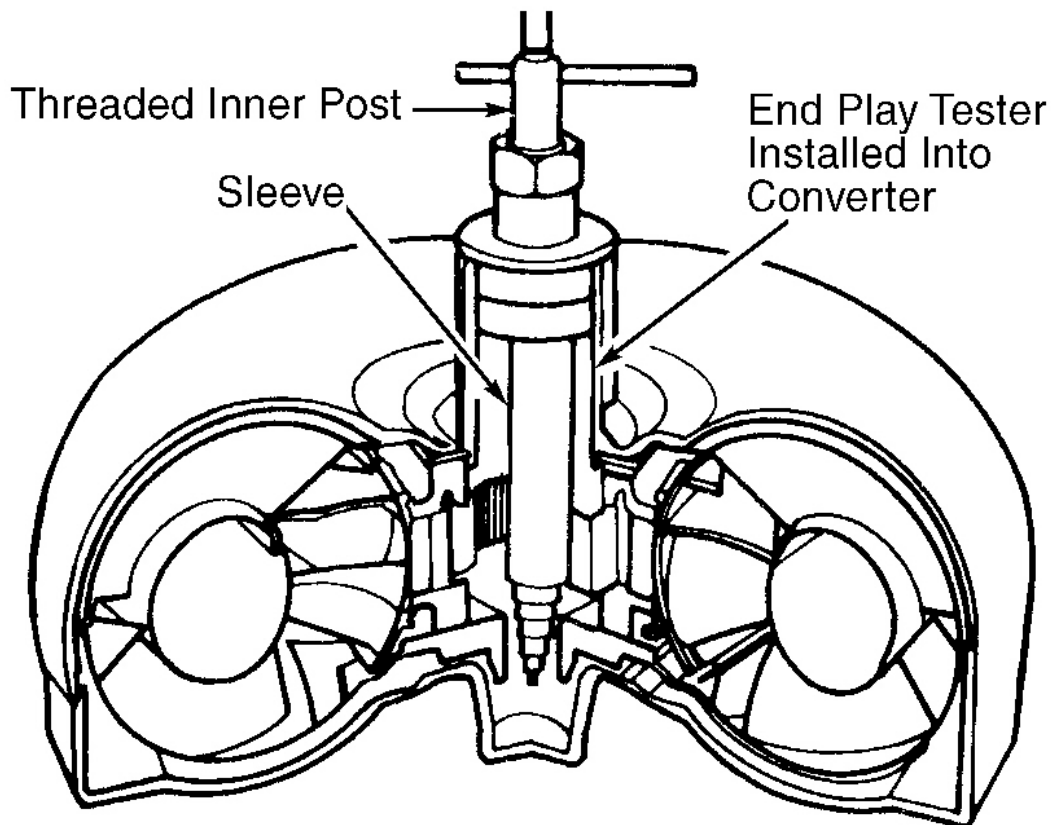
If torque converter welds indicate leakage, attach Torque Converter Leak Detector (Rotunda 014-R1067) to converter and follow detector kit instructions.

END-PLAY CHECK

1. Insert Tester (T80L-7902-A) into converter pump drive hub until hub bottoms. Expand sleeve in turbine spline by tightening threaded inner post of tester until sleeve is securely locked into spline. See **Fig. 9**.
2. Attach a dial indicator to tool with button on indicator positioned on converter pump drive hub. Zero dial face. Lift tool upward as far as tool will go and note indicator reading.
3. Reading is total end play of turbine and stator. If end play exceeds specification, replace torque converter assembly. See TORQUE CONVERTER END PLAY SPECIFICATIONS table.

TORQUE CONVERTER END PLAY SPECIFICATIONS

| Application | In. (mm) |
|--------------------------|-------------|
| New or Rebuilt Converter | .041 (1.04) |
| Used Converter | .074 (1.88) |

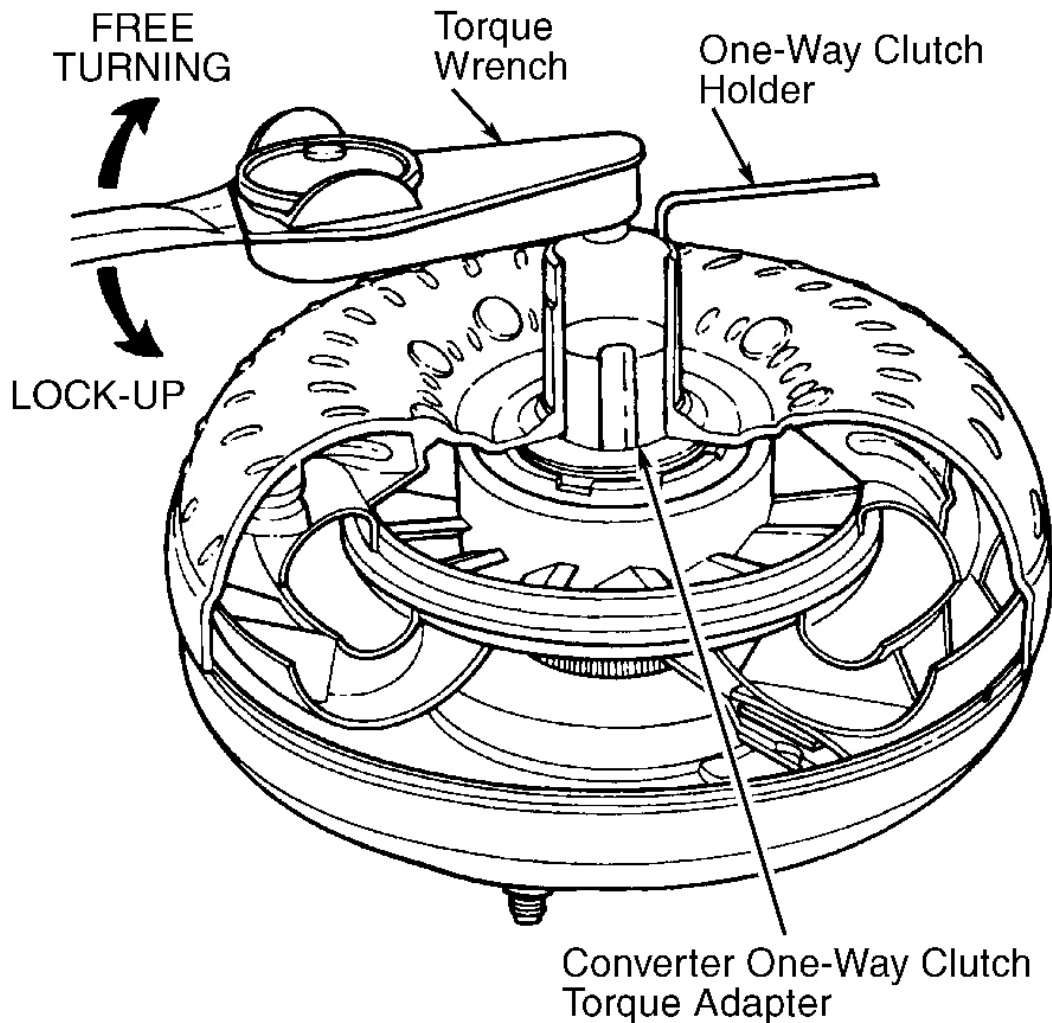


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Fig. 9: Installing Torque Converter End Play Tester
 Courtesy of FORD MOTOR CO.

ONE-WAY CLUTCH CHECK

1. Insert one-way Clutch Holder (T77L-7902-R) into one of the grooves in the stator thrust washer. Insert Torque Adapter (T76L-7902-C) into converter impeller hub so as to engage one-way clutch inner race.
2. Attach a torque wrench to torque adapter. With clutch holder held stationary, turn torque wrench counterclockwise. See **Fig. 10**. Converter one-way clutch should lock-up and hold at 10 Ft. Lbs. (14 N.m). One-way clutch should rotate freely in a clockwise direction.
3. Repeat lock-up test in at least 5 different locations around torque converter. If clutch fails to lock-up and hold, replace torque converter.



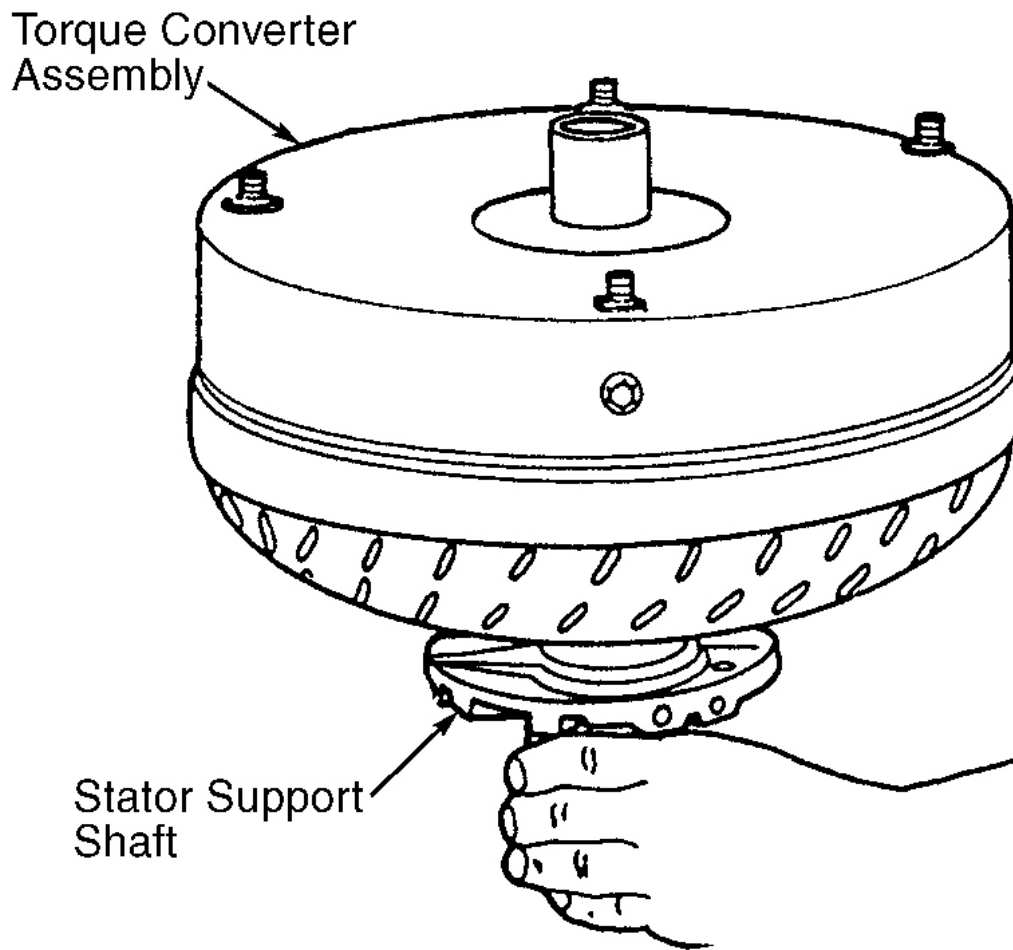
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Fig. 10: Checking Converter One-Way Clutch
Courtesy of FORD MOTOR CO.

STATOR INTERFERENCE CHECK

Stator-To-Impeller Interference Check

1. Position stator support shaft on bench with spline end pointing up. Mount converter vertically onto shaft so support shaft splines engage one-way clutch splines. See **Fig. 11**.
2. While holding support shaft stationary, rotate converter counterclockwise. Converter should rotate freely without interference or scraping within assembly. Should interference or a scraping condition within converter exist or if converter does not rotate freely, replace converter unit.



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Fig. 11: Checking For Stator-To-Impeller Interference
Courtesy of FORD MOTOR CO.

Stator-To-Turbine Interference Check

1. Place converter on bench, front side down. Install stator support to engage mating splines of stator support shaft.
2. Install input shaft, engaging the splines with turbine hub. While holding stator shaft stationary, rotate turbine with input shaft.
3. Turbine should rotate freely in both directions without interference or noise. Torque required to turn shaft should not exceed 84 INCH lbs. (9.5 N.m) If interference or noise exists, stator front thrust washer may be worn and the converter should be replaced.

REMOVAL & INSTALLATION

See appropriate AUTOMATIC TRANSMISSION REMOVAL article.

TRANSMISSION DISASSEMBLY

NOTE: See **Fig. 25** and **Fig. 26** for exploded view of internal parts, thrust washer and needle bearing locations.

1. Remove torque converter. Mount transmission in holding fixture. Remove oil pan and gasket. Remove oil filter, grommet, and gasket. Disconnect all solenoid and sensor harness connectors. Unbolt and remove Output Shaft Sensor (OSS).
2. Remove outer nut and manual control lever. Remove TR sensor. Remove manual valve detent spring. Remove 24 valve body retaining bolts and lift off valve body and gasket. Note bolt positions for reassembly. Using diagonal cutters, remove retaining roll pin from manual shaft lever. Remove inner nut, manual lever shaft, detent lever and parking lever actuating rod.
3. Slide out Electronic Pressure Control (EPC) solenoid and remove. Remove 2-3 accumulator assembly, low-reverse servo assembly, overdrive servo and 1-2 accumulator assembly by pushing down on servo covers and removing retaining snap rings. Note length of low-reverse servo piston rod, 1-2 shift accumulator piston and 1-2 shift springs for reassembly reference. See **Fig. 4** and **Fig. 12**.

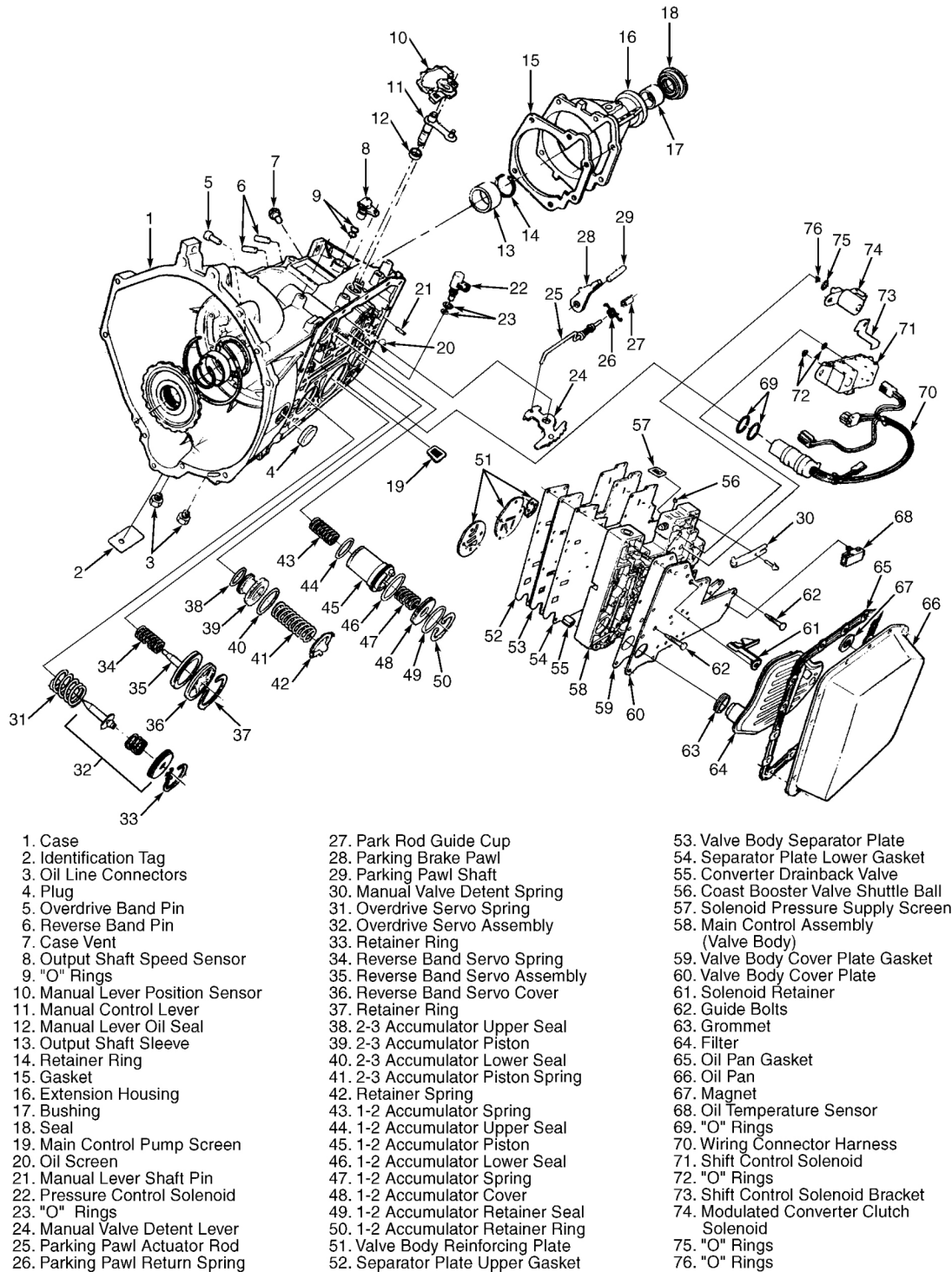
NOTE: Length of low-reverse piston rod may vary. Three possible rod lengths are available.

4. Remove oil screen. See **Fig. 12**. Remove extension housing seal and bushing. Remove retaining bolts and slide extension housing from transmission. Remove and discard housing-to-case gasket. Remove parking pawl shaft, parking pawl and return spring. Push transmission harness connector out through bottom of case.

NOTE: The output shaft may have shipping seal still attached. Remove and discard seal. Seal is not required for assembly.

5. Remove front torque converter-to-pump seal. Remove pump body retaining bolts. Remove pump from case using 2 slide hammers installed in opposite pump retaining bolt holes. Remove pump-to-case gasket.
6. Grasp forward clutch cylinder and shaft and pull intermediate clutch pack, intermediate one-way clutch, reverse clutch, and forward clutch from transmission case as an assembly. Disconnect overdrive band from anchor pins and remove band from case.
7. Remove forward clutch hub and No. 3 needle bearing as an assembly. Remove intermediate shaft. Rotate reverse clutch gear and shell to align indent with overdrive band anchor pin. Remove forward sun gear, No. 5 needle bearing, reverse sun gear and drive shell, and No. 4 needle bearing from case as an assembly.
8. Note position of center support snap ring tangs for installation reference. Remove snap ring. Using a screwdriver, pry case center support spring from between center support and case. Prior to removal, note position of case center support spring to ensure it is reinstalled correctly.
9. Remove center support and planetary carrier from case as an assembly. Remove reverse band from case. If direct clutch hub did not come out with planetary carrier, remove it from direct clutch.
10. Remove output shaft, ring gear, and direct clutch as an assembly through front of case. Remove output

shaft No. 9 needle bearing from rear of case. Remove intermediate clutch pack from one-way clutch. Remove reverse clutch assembly from forward clutch assembly.



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Fig. 12: Exploded View Of 4R70W Valve Body, Servos, Accumulators & Case Components

Courtesy of FORD MOTOR CO.

COMPONENT DISASSEMBLY & REASSEMBLY

NOTE: See **Fig. 25** and **Fig. 26** for exploded view of internal parts, thrust washer and needle bearing locations.

PLANETARY GEAR SUPPORT & PLANETARY ONE-WAY CLUTCH

NOTE: If a roller from planetary one-way clutch is lost or damaged, entire one-way clutch assembly must be replaced.

Disassembly

Remove center support from planetary carrier by lifting up on center support while rotating it counterclockwise. Carefully remove planetary one-way clutch from planetary assembly.

Inspection

Check planet support bushing, clutch inner and outer race, band surface, pinion gears, bearings and thrust washer for roughness. Check one-way clutch for damaged rollers or broken springs.

Reassembly

Assemble one-way clutch. Lubricate clutch races and clutch assembly with petroleum jelly to aid in assembly. Install one-way clutch in planetary carrier. Install center support into one-way clutch by rotating center support counterclockwise.

DIRECT CLUTCH ASSEMBLY

Disassembly

1. Remove direct clutch hub. Remove No. 7 direct clutch hub inner needle bearing and bearing support. Using a screwdriver, remove clutch pack selective retaining snap ring and lift out clutch pack. See **Fig. 13**.
2. Using appropriate compressor, compress piston return springs and remove retaining snap ring. Remove tool and lift spring retainer assembly and piston from clutch drum.
3. If necessary, piston can be removed by applying compressed air to lubrication hole in clutch drum. Note position and direction of lip seals. Remove seals from drum and piston.

Inspection

1. Check piston check ball for freedom of movement. Check for leakage by turning piston upside down (flat side up), allowing check ball to seat in piston.
2. Pour small quantity of solvent over check ball. If solvent drips past check ball, replace piston.

Reassembly

1. Using appropriate seal protector, install inner seal on clutch drum hub with sealing lip facing down into drum. Lubricate seals and seal protector with petroleum jelly prior to installation. Ensure inner seal is positioned in groove. Install outer seal on piston with lip pointing away from spring posts.
2. Coat piston seals, clutch drum sealing area, and piston inner seal area with petroleum jelly. Install piston into clutch drum using seal protector, prevent damaging seals.
3. Position piston spring and retainer assembly in clutch drum. Compress assembly and install retaining snap ring. Install clutch pack into drum. Install pressure plate on top of clutch pack. Install clutch pack selective retaining ring.
4. Using a feeler gauge, measure clearance between clutch pack retaining ring and pressure plate with pressure plate held down. See **DIRECT CLUTCH CLEARANCE SPECIFICATIONS** table. If clearance is not as specified, install correct size snap ring to obtain specification and recheck clearance. Selective snap rings are available in the following sizes: .050-.054" (1.27-1.37 mm), .064-.068" (1.63-1.73 mm), .078-.082" (1.98-2.08 mm) and .092-.096" (2.34-2.44 mm).
5. Install No. 7 bearing support with Black side up. Install No. 7 direct clutch inner needle bearing with chamfer down. Install direct clutch hub.

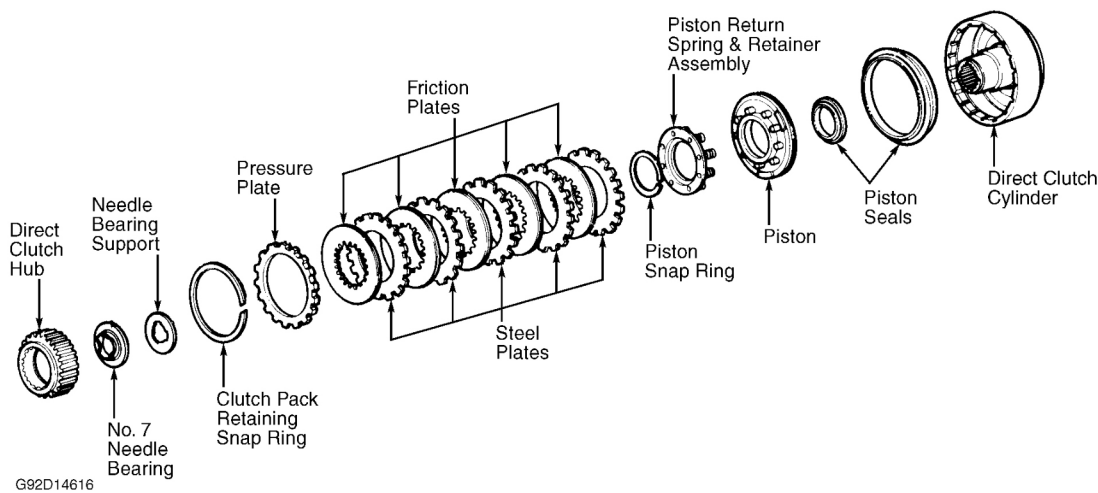


Fig. 13: Exploded View Of Direct Clutch Assembly
 Courtesy of FORD MOTOR CO.

DIRECT CLUTCH CLEARANCE SPECIFICATION

| Engine Size | No. Of Plates | Clearance In. (mm) |
|-------------|---------------|-----------------------|
| 3.8L | 5 | .050-.071 (1.27-1.80) |
| 4.2L & 4.6L | 6 | .062-.085 (1.57-2.16) |

FORWARD CLUTCH**Disassembly**

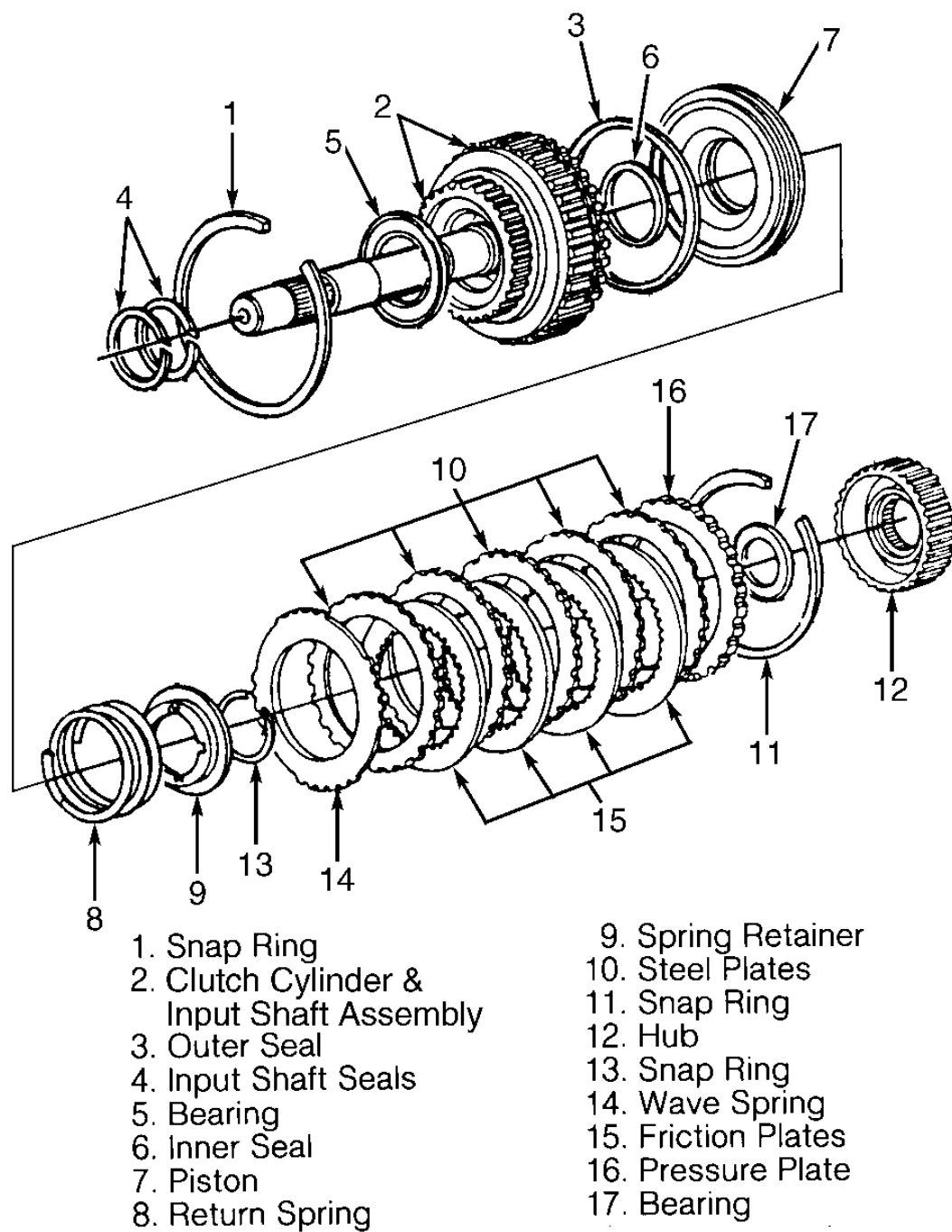
1. Lift clutch hub and No. 3 needle bearing from forward clutch assembly. Using a screwdriver, pry clutch pack selective retaining snap ring from drum. Remove clutch pack, pressure plate and wave spring. See **Fig. 14**.
2. Using appropriate compressor, compress piston return spring and remove retaining snap ring. Lift out retainer and return spring. Remove clutch piston from drum.
3. Note position of inner and outer piston seals, then remove seals. Ensure input shaft Teflon seals are not damaged. Ensure check balls in piston move freely.

Reassembly

1. Lubricate and install inner and outer seals on piston with sealing edge facing into clutch drum. Lubricate piston seals and drum sealing area with petroleum jelly. Install piston into drum using appropriate seal protector to prevent damaging seals.
2. Position return spring and retainer on piston. Compress return spring and install retaining snap ring. Install clutch pack into clutch drum starting with waved spring. Install a steel plate and then a friction plate. Alternately install remaining plates in clutch pack. Install pressure plate and snap ring.
3. Install dial indicator and bracketry with stem touching pressure plate. See **Fig. 15**. Press down on pressure plate and zero indicator. Pull up on pressure plate until plate touches selective snap ring and note reading on dial indicator. If clearance is not .050-.089" (1.27-2.26 mm), install correct size snap ring to obtain specification and recheck clearance. Selective snap rings are available in the following sizes: .060-.064" (1.52-1.73 mm), .074-.078" (1.88-1.98 mm), .086-.092" (2.23-2.34 mm) and .102-.106" (2.59-2.69 mm).

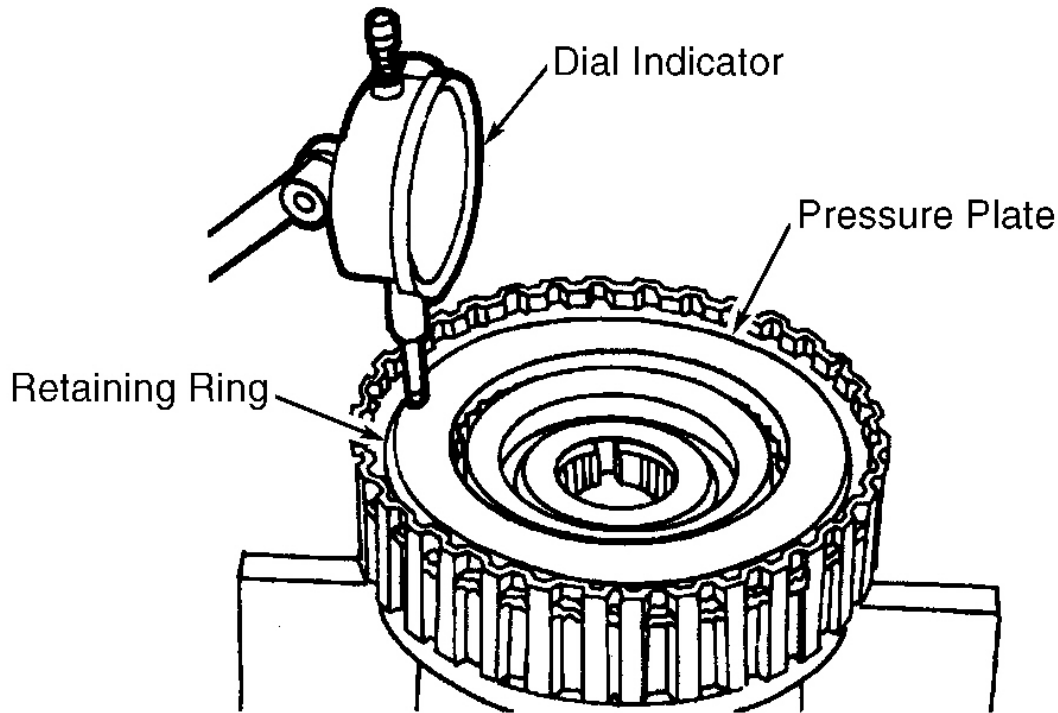
NOTE: Solid shaft seals may be replaced with scarf-cut seals if necessary. Ensure new scarf-cut seals are installed so edges do not overlap.

4. If original seals are damaged or missing, install NEW input shaft seals. Install No. 3 needle bearing. Install forward clutch hub into forward clutch cylinder and shaft. Ensure forward clutch hub is against No. 3 needle bearing.



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Fig. 14: Exploded View Of Forward Clutch Assembly
 Courtesy of FORD MOTOR CO.



G98G01941

Fig. 15: Measuring Clutch Pack Clearance
Courtesy of FORD MOTOR CO.

INTERMEDIATE ONE-WAY CLUTCH

Disassembly & Reassembly

Remove clutch retaining ring and lift off clutch retaining plate. Remove clutch outer race by lifting on race while turning counterclockwise. Carefully lift one-way clutch from inner race. See **Fig. 16**. To reassemble, reverse disassembly procedure. Ensure chamfer on outer clutch race faces up. One-way clutch must rotate counterclockwise when installed on reverse clutch drum.

NOTE: If a roller is damaged or lost, entire one-way clutch assembly must be replaced.

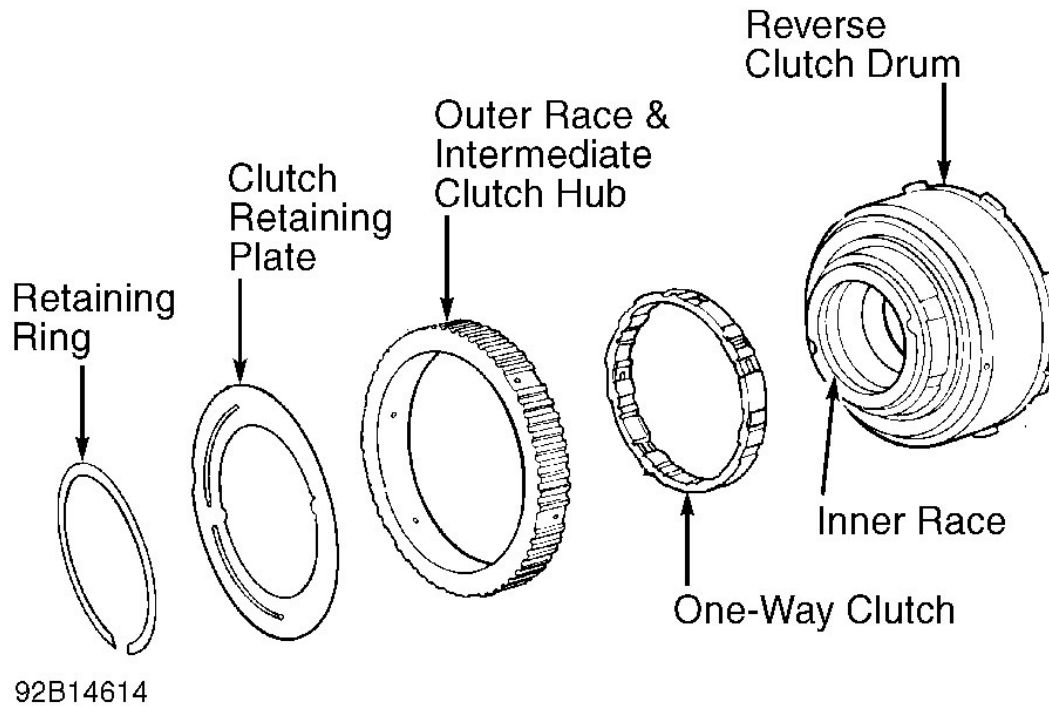


Fig. 16: Exploded View Of Intermediate One-Way Clutch Assembly
Courtesy of FORD MOTOR CO.

OIL PUMP & INTERMEDIATE CLUTCH PISTON

Disassembly

1. Lift No. 1 thrust washer from stator support. Remove retaining bolts and separate stator support from pump body. Remove 4 seal rings from stator support. Remove inner and outer gerotor gears from pump body.
2. Remove spring retainer assembly by carefully dislodging the tabs. Lift intermediate clutch piston from pump assembly. Remove pump body-to-case seal and discard. See **Fig. 17**.

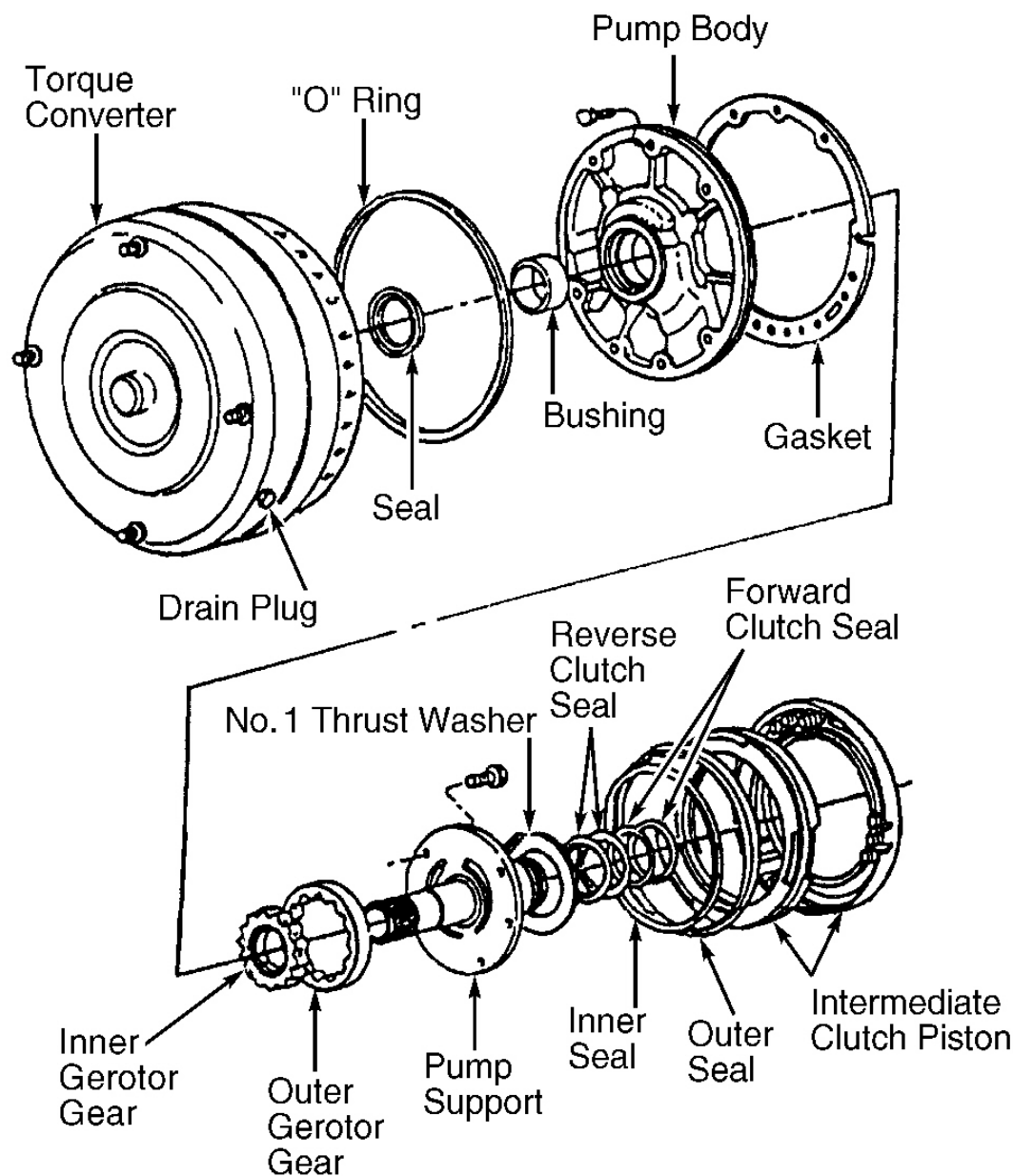
NOTE: Reverse clutch seal rings on stator support are larger than forward clutch seal rings.

Reassembly

1. Install front pump seal. Install NEW seals on intermediate clutch piston. Coat piston seal and pump body sealing area with petroleum jelly. Use appropriate seal protector and install piston in pump body, ensuring piston bleed hole is located at 12 o'clock position (toward top of transmission case).
2. Snap spring retainer assembly into place on pump body using even pressure. Install inner and outer Gerotor gear into pump body with chamfer on both gears facing into pump body. Install seal rings on

stator support. Install 2 larger rings closer to pump.

3. Position stator support on pump body. Install and tighten retaining bolts to specification. See TORQUE SPECIFICATIONS. Install pump body-to-case seal around outer diameter of pump body.



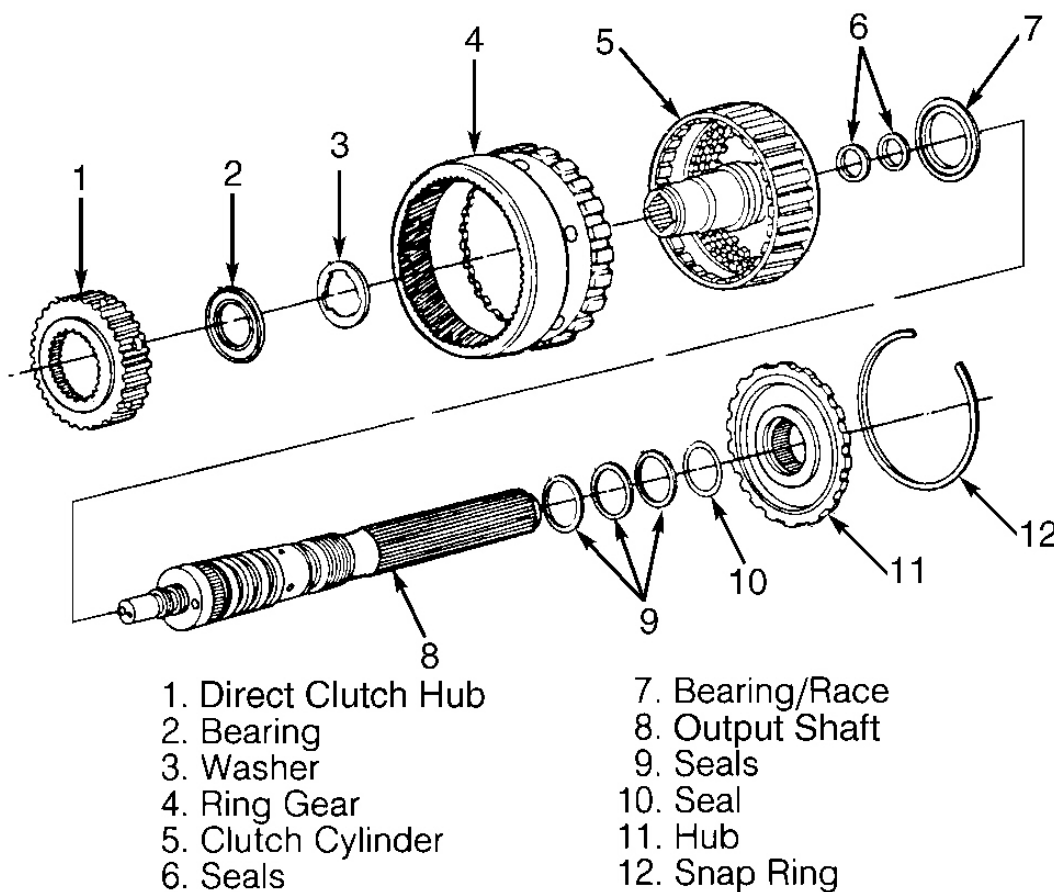
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Fig. 17: Exploded View Of Oil Pump & Intermediate Clutch
Courtesy of FORD MOTOR CO.

OUTPUT SHAFT ASSEMBLY

Disassembly & Reassembly

1. Remove retaining ring and separate output hub assembly from ring gear. Remove direct clutch from ring gear and No. 8 needle bearing from rear of direct clutch.
2. Remove 4 output shaft seal rings and hub-to-shaft retaining ring. Separate hub from output shaft. Remove 2 direct clutch seal rings from end of output shaft. See **Fig. 18**. To reassemble, reverse disassembly procedure.



G94E38780

Fig. 18: Exploded View Of Output Shaft Assembly
Courtesy of FORD MOTOR CO.

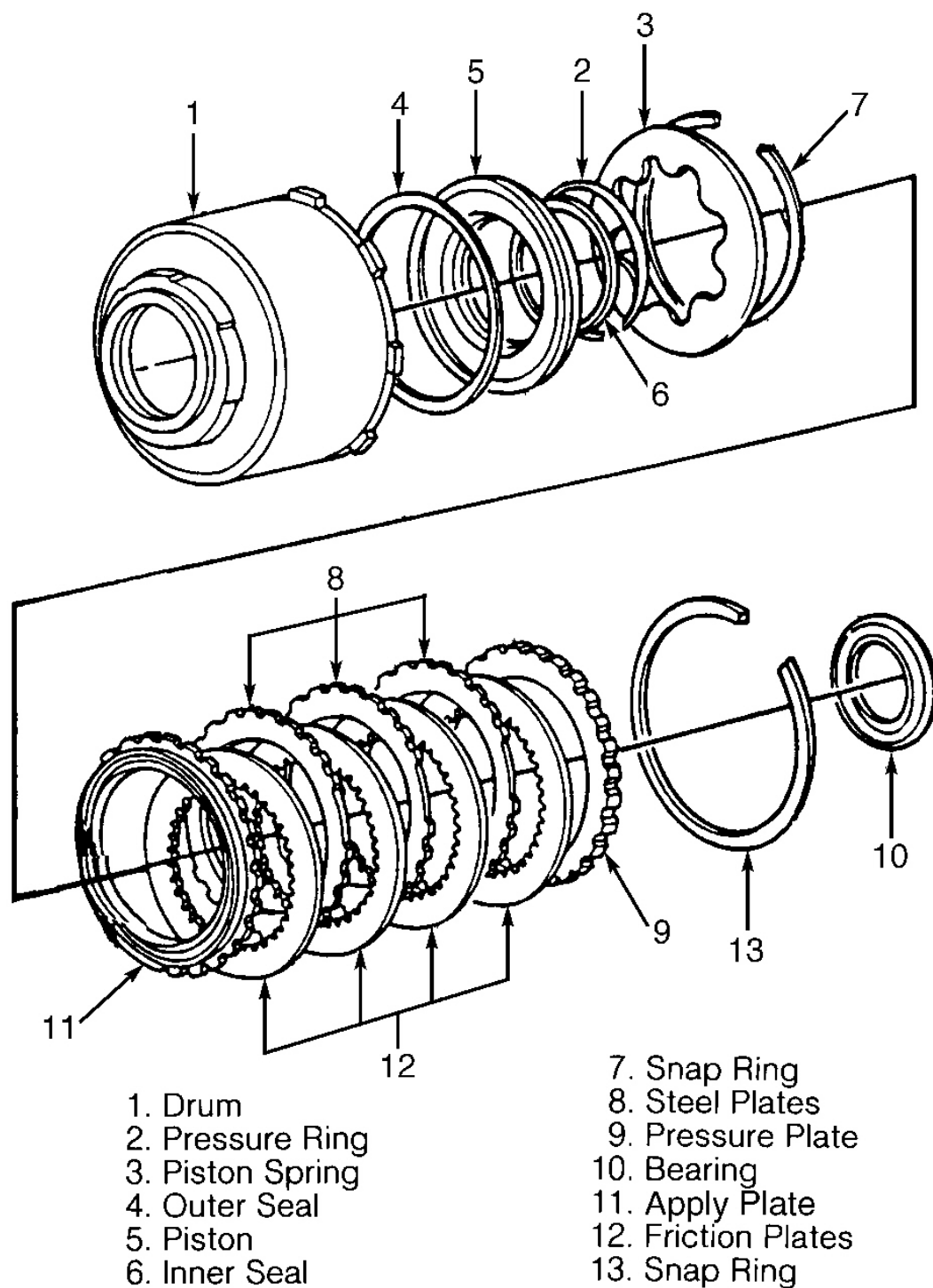
REVERSE CLUTCH

Disassembly

1. Remove No. 2 needle bearing. Using a screwdriver, pry clutch pack retaining snap ring from clutch drum. Lift out clutch pack. See **Fig. 19**.
2. Compress return spring and remove snap ring. Remove return spring and thrust ring. Remove piston from drum. Remove seals from piston.
3. It may be necessary to apply compressed air to clutch drum lubrication hole to remove piston. Block remaining hole with finger.

Reassembly

1. Ensure check ball in inner piston is free. Install NEW oil seals on piston. Coat seals and sealing surface in clutch drum with petroleum jelly.
2. Install piston into clutch drum using appropriate seal protectors to prevent damaging seals. Seals used on reverse clutch piston are square cut; direction of installation is not important.
3. Install thrust ring and return spring. Compress return spring and install snap ring with points facing downward. Install apply plate into clutch drum with dished side facing piston. Install clutch pack and retaining snap ring.
4. Install dial indicator and bracketry with stem touching pressure plate. See **Fig. 15**. Press down on pressure plate and zero indicator. Pull up on pressure plate until plate touches selective snap ring and note reading on dial indicator. If clearance is not .040-.060" (1.02-1.52 mm), install correct size snap ring and recheck clearance.
5. Selective snap rings are available in sizes; .060-.064" (1.52-1.73 mm), .074-.078" (1.88-1.98 mm), .088-.092" (2.24-2.34 mm) and .102-.106" (2.59-2.69 mm).
6. With reverse clutch reassembly completed, check clutch operation using compressed air. Ensure clutch applies smoothly and without leakage. Install No. 2 needle bearing.



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Fig. 19: Exploded View Of Reverse Clutch Assembly
Courtesy of FORD MOTOR CO.

SUN GEAR & DRIVING SHELL

Disassembly

Remove No. 4 needle bearing from driving shell. Remove forward sun gear and No. 5 needle bearing from shell. Remove No. 5 needle bearing from forward sun gear.

Reassembly

Sun gear and driving shell will be reassembled as part of TRANSMISSION REASSEMBLY.

VALVE BODY ASSEMBLY

NOTE: As valves are removed from each valve body bore, place individual parts in correct order and in relative position to valve body for reassembly reference. Tag all springs as they are removed for reassembly reference.

Disassembly

1. Remove and discard valve body gasket. Remove retaining bolts. Remove separator plate, reinforcement plates, and separator plate gasket. Discard gasket.
2. Remove 8 check balls from valve body. See **Fig. 20** . Remove retaining plates, valves and springs. Keep all valves and springs in original order for reassembly reference. See **Fig. 21** .

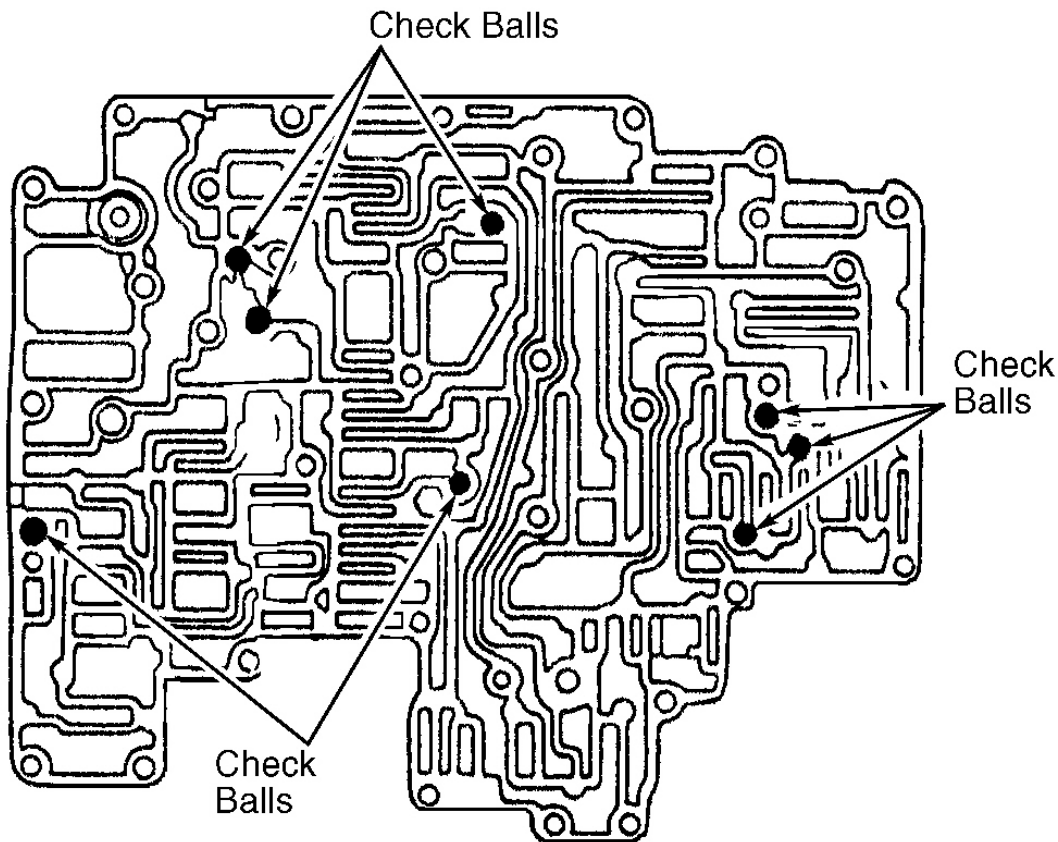
Cleaning & Inspection

1. Clean all parts thoroughly in clean solvent, and blow dry with compressed air. Inspect all valves and plug bores for scoring. Check all fluid passages for obstructions.
2. Inspect all mating surfaces, plugs, and valves for burrs and scoring. If necessary, use crocus cloth to polish valves and plugs.
3. Inspect all springs for distortion. Check all valves and plugs for free movement in their respective bores. Valves and plugs, when dry, must fall of their own weight within their respective bores.

CAUTION: Avoid rounding off sharp edges of valves and plugs with crocus cloth. These edges perform a cleaning action.

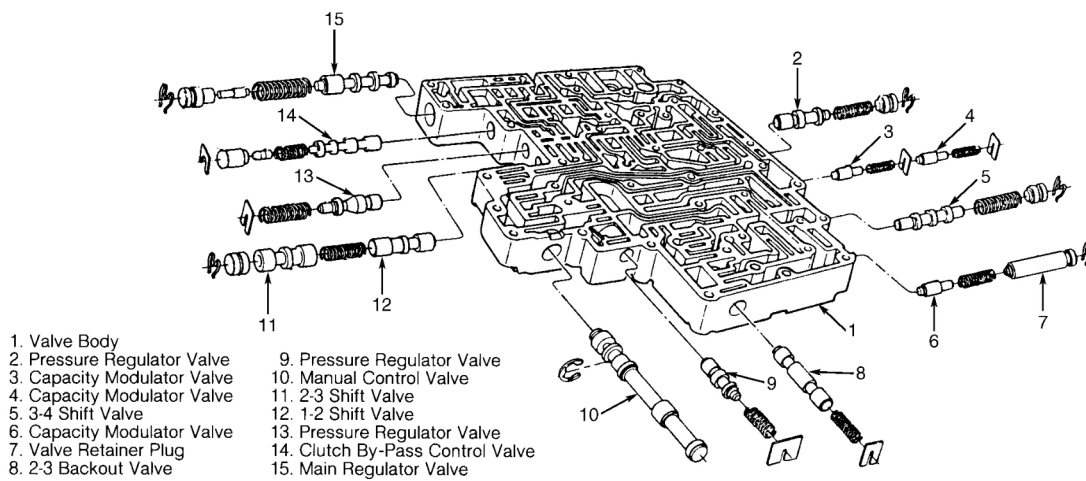
Reassembly

1. Install all valves into their respective bores using illustration as guide. Ensure notch in plugs face bottom of bore.
2. Install valve body check balls. See **Fig. 20** . Install guide pin bolts into holes. These 2 holes align valve body gasket and valve body assembly with case. Using a NEW separator plate gasket, slide plate and gasket over alignment pins. Position 3 reinforcement plates and loosely install retaining bolts. Tighten retaining bolts to specification in correct order. See **Fig. 22** . See TORQUE SPECIFICATIONS.



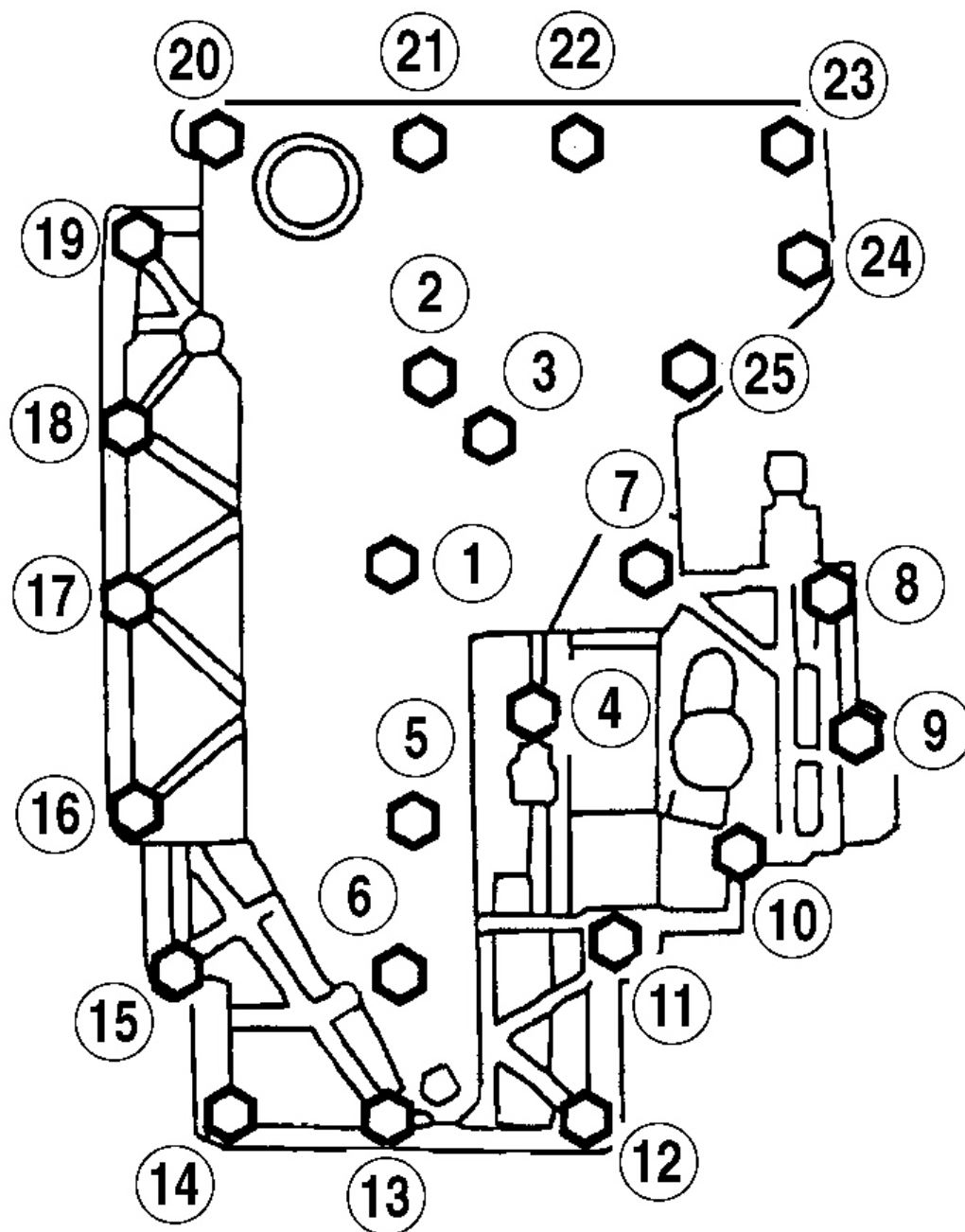
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Fig. 20: Locating Check Balls In Valve Body
Courtesy of FORD MOTOR CO.



94H38783

Fig. 21: Exploded View Of Valve Body Components
Courtesy of FORD MOTOR CO.



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Fig. 22: Tightening Sequence For Valve Body
Courtesy of FORD MOTOR CO.

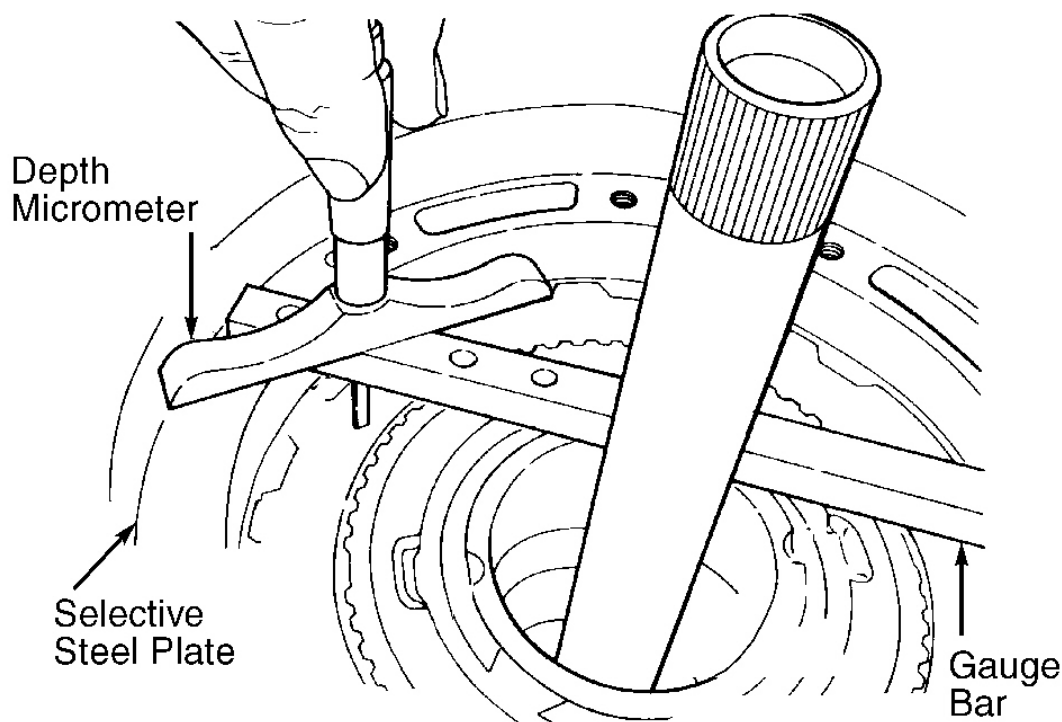
TRANSMISSION REASSEMBLY

NOTE: See Fig. 25 and Fig. 26 for exploded view of internal parts, thrust washer and needle bearing locations. Lubricate all parts with ATF. Use petroleum jelly on gaskets, thrust washers, and needle bearings to retain in place. Use **NEW** gaskets and seals.

Reassembly

1. Using appropriate installer, install rear case bushing. Install No. 9 output shaft needle bearing in transmission case. Install output shaft, output shaft ring gear and direct clutch as an assembly. Ensure No. 7 needle bearing and direct clutch hub are installed correctly.
2. Install reverse band support retaining ring. Install reverse band into transmission case and ensure band is seated on anchor pins. When properly installed, center of band actuating rod seat can be seen through servo piston bore.
3. Align notch in planetary gear support with overdrive band anchor pin. Install center support and planetary assembly into case. If necessary, rotate output shaft to align planet carrier splines with direct clutch hub splines. Install center support spring using a hammer handle or wooden dowel. Spring tabs must face out. Install center support retaining ring.
4. Install forward clutch sun gear, No. 5 needle bearing reverse sun gear and No. 4 forward clutch needle bearing as an assembly. Rotate output shaft to aid in engaging sun gear with planetary gears. Install intermediate shaft.
5. Install forward clutch hub and No. 3 needle bearing. Install forward clutch assembly. Install reverse clutch on forward clutch. Ensure No. 2 needle bearing is in position in reverse clutch. Wiggle input shaft while engaging reverse clutch splines. Ensure reverse clutch cylinder lugs are fully seated in notches of reverse sun gear.
6. Install overdrive band into case and around drive shell assembly. Ensure band anchor is properly positioned on anchor pin. Using a screwdriver to hold overdrive band in position, lubricate and install overdrive servo piston return spring and servo piston. Using appropriate compressor, compress overdrive servo piston and install retaining ring. Ensure .020" (.51 mm) overdrive servo bleed hole is clear.
7. With overdrive servo installed, inspect band and apply pin for proper position and engagement. If band anchor and apply pin are not properly engaged, remove servo piston and re-position band as necessary.
8. Install intermediate clutch pack pressure plate with chamfer down, clutch pack (starting with a friction plate and alternating steel and friction plates) and selective steel plate in order. Measure intermediate clutch clearance.
9. Intermediate clutch clearance is measured using a depth micrometer and appropriate end play straight bar. Set end play bar across pump case mounting surface. Place micrometer on end play bar and read depth to selective steel plate. See Fig. 23.

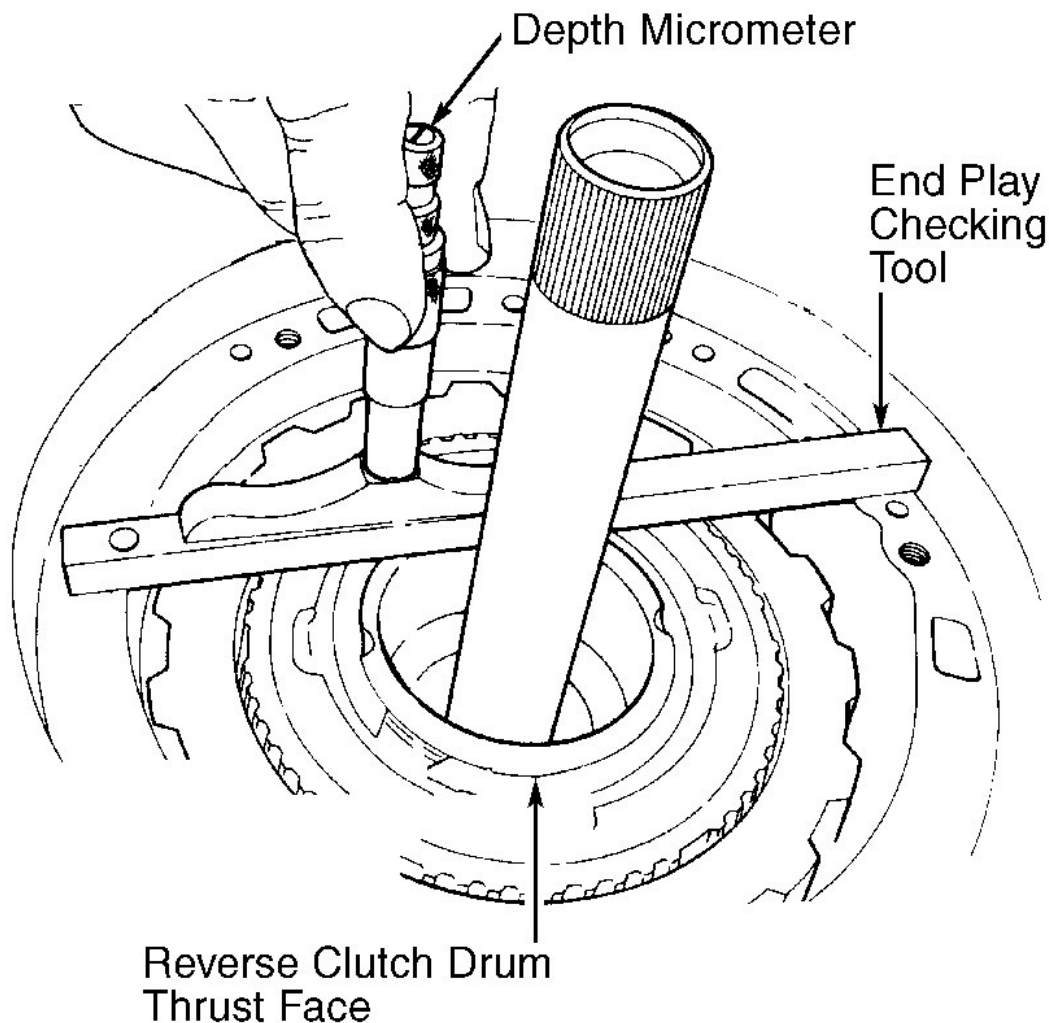
NOTE: A downward pressure must be applied to clutch pack while measuring intermediate clutch clearance.



G92E14633

Fig. 23: Measuring Intermediate Clutch Clearance
 Courtesy of FORD MOTOR CO.

10. Check depth again with micrometer 180 degrees opposite from previous measurement. Ensure depth at intermediate clutch selective steel plate is 1.643-1.670" (41.7-42.4 mm). Ensure average of the 2 measurements is within this range.
11. If intermediate clutch clearance (depth) is not within tolerance, select correct thickness selective steel plate to obtain specified depth. Selective plates are available in the following thicknesses: .067-.071" (1.70-1.80 mm), .077-.081" (1.95-2.05 mm), .087-.091" (2.20-2.31 mm) and .97-.101 (2.46-2.56 mm). Install correct plate and recheck clearance.
12. Check transmission end play by locating depth micrometer on end play straight bar. Ensure depth is measured at reverse clutch drum thrust face. See **Fig. 23** . Standard end play is .004-.044" (.101-1.11 mm).
13. Check end play 180 degrees opposite end of reverse clutch drum thrust face to determine average depth. Thrust washer controlling transmission end play is located on stator support which is attached to back of pump housing.
14. Transmission end play can be adjusted using one of selective thrust washers available for service. After measuring depth, select required thrust washer. See NO. 1 THRUST WASHER SELECTION table.



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Fig. 24: Measuring Transmission End Play
Courtesy of FORD MOTOR CO.

15. Install selected transmission end play thrust washer on stator support. Use petroleum jelly to hold it in place. Install pump alignment dowel, made by cutting the head from a M8 x 1.25 bolt, into pump mounting bolt hole at 12 o'clock position.
16. Install new pump gasket into case. Ensure case passages are covered. Apply petroleum jelly to pump-to-case seal surfaces. Install pump assembly into case. Wiggle input shaft while pressing down on pump. Remove alignment dowel and install pump-to-case bolts.
17. Alternately tighten bolts a few turns at a time to draw pump into case. Tighten bolts to specification. See TORQUE SPECIFICATIONS. Install parking pawl shaft, parking pawl and return spring. Install Output Shaft Sensor (OSS). Tighten bolt to specification.

18. If removed, install manual control lever shaft seal. Install EPC solenoid. If removed, install extension housing bushing. Position new gasket on transmission. Slide extension housing into place. Install bolts and tighten to specification. Using appropriate seal installer, install extension housing rear seal.
19. Position manual valve detent lever and parking lever actuating rod into case. Parking lever actuating rod must be positioned over parking pawl. Slide manual control lever shaft into case and position through detent. Install inner nut and tighten to specification. Install manual lever shaft retaining roll pin. Install oil screen into case.
20. If low-reverse servo piston and rod replacement is necessary or if reverse band has been replaced, perform REVERSE SERVO ASSEMBY under ON-VEHICLE SERVICE installation procedures.

NOTE: **Transmissions with a spacer installed between low-reverse servo cover and retaining ring require a special selection procedure for low-reverse servo piston.**

21. Install low-reverse servo spring, piston and rod. Install servo cover and cover retaining snap ring. Install 2-3 accumulator spring, piston, cover and seal. Install accumulator piston retaining ring. Install 1-2 accumulator spring, piston, cover and seal. Install accumulator piston retaining ring.
22. Install wiring harness connector into case. Replace "O" ring on wiring harness connector (if necessary). Install valve body gasket and valve body assembly using 2 alignment bolts as guide. Ensure coasting booster valve check balls in correct locations.
23. Install EPC solenoid bracket. Loosely install valve body retaining bolts. Install manual valve detent spring. Tighten bolts to specification. See **Fig. 22** . See **TORQUE SPECIFICATIONS** .
24. Connect all solenoid and sensor harness connectors. Install filter grommet, new filter gasket, and filter on valve body. Install filter attaching bolts and tighten. Install TR sensor onto transmission case and install bolts but do not tighten.
25. Place manual lever in Neutral position (2 detent positions back from Park). Insert Transmission Range Sensor Alignment tool (T97L-70010-A) into slots. See **Fig. 3** . Align the 3 slots on TR sensor with tabs on adjuster. Tighten bolts to specification. Install manual control lever and outer nut. Tighten nut to specification.
26. Position new pan gasket on case and install oil pan. Tighten bolts to specification. Install torque converter. Ensure torque converter is properly installed. When installation is correct, measurement between torque converter pilot nose and front face of bellhousing will be approximately .403-.568" (10.23-14.43 mm).

NO. 1 THRUST WASHER SELECTION

| Measured Depth In. (mm) | Washer Thickness In. (mm) | Color Code |
|---------------------------|---------------------------|------------|
| 1.485-1.503 (37.72-38.17) | .050-.054 (1.27-1.37) | Green |
| 1.504-1.521 (38.20-38.63) | .068-.072 (1.73-1.83) | Yellow |
| 1.522-1.538 (38.65-39.07) | .085-.089 (2.16-2.26) | Natural |
| 1.539-1.555 (39.09-39.50) | .102-.106 (2.59-2.69) | Red |
| 1.556-1.581 (39.52-40.16) | .119-.123 (3.02-3.12) | Blue |

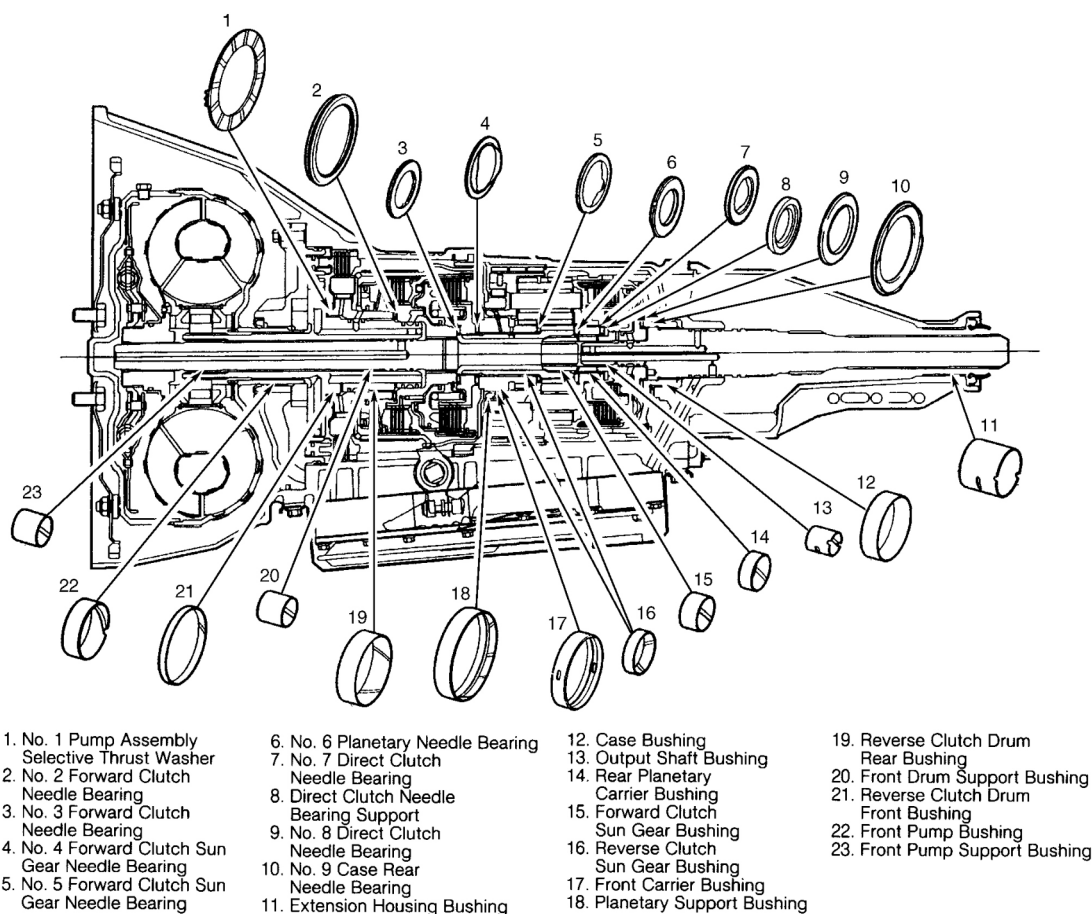
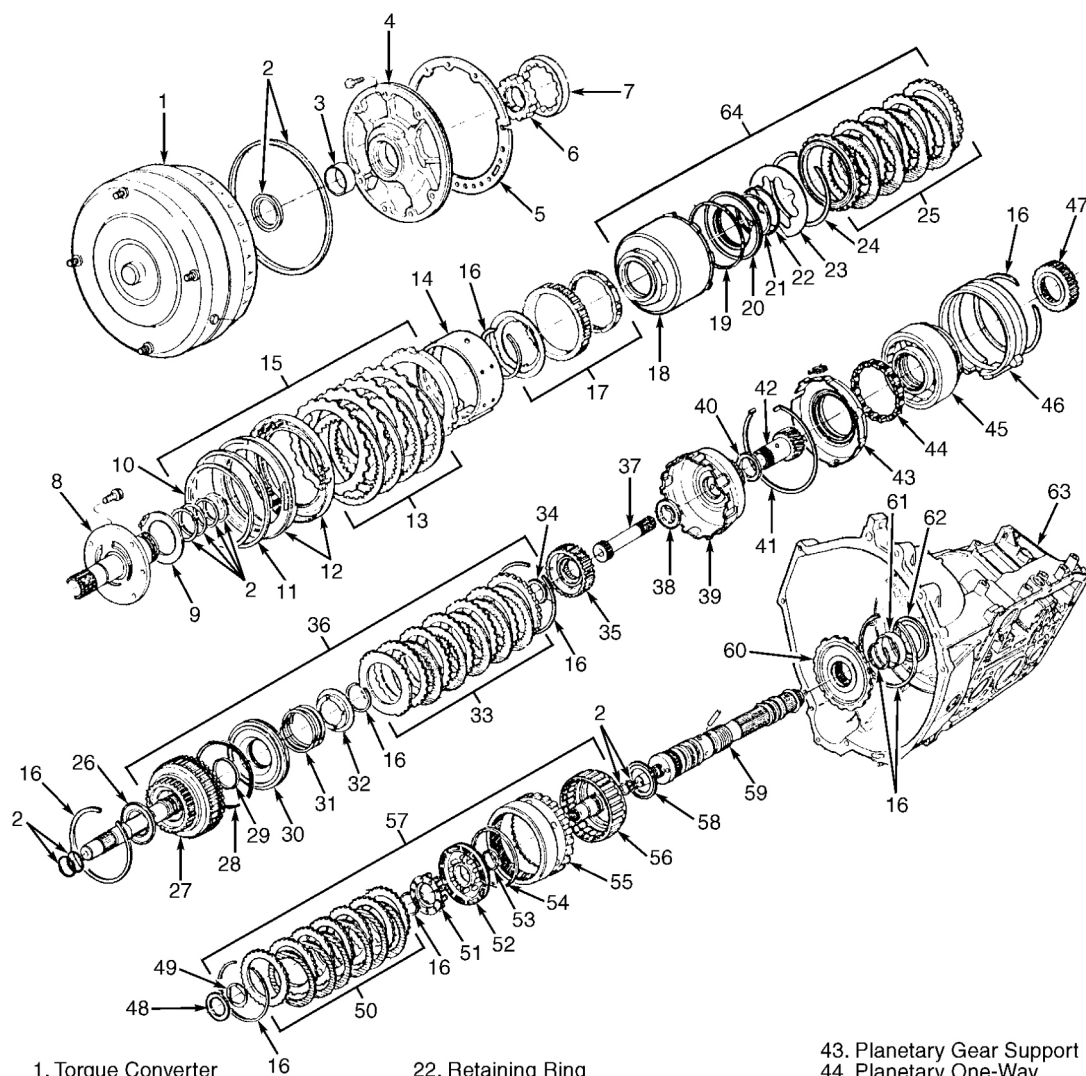


Fig. 25: Locating Needle & Thrust Bearings
Courtesy of FORD MOTOR CO.

1997 Ford Club Wagon E150

1997-98 AUTOMATIC TRANSMISSIONS 4R70W Overhaul



1. Torque Converter
2. Seal
3. Pump Bushing
4. Pump
5. Pump Gasket
6. Inner Gerotor
7. Outer Gerotor
8. Pump Support
9. No. 1 Thrust Washer
10. Inner Intermediate Clutch Piston Seal
11. Outer Intermediate Clutch Piston Seal
12. Intermediate Clutch Piston
13. Intermediate Clutch Pack
14. Overdrive Band
15. Intermediate Clutch Assembly
16. Retaining Ring
17. Intermediate One-Way Clutch Assembly
18. Reverse Clutch Drum
19. Outer Reverse Clutch Piston Seal
20. Reverse Clutch Piston
21. Inner Reverse Clutch Piston Seal

22. Retaining Ring
23. Piston Return Spring
24. Retaining Ring
25. Reverse Clutch Pack
26. No. 2 Thrust Bearing
27. Input Shaft & Forward Clutch Assembly
28. Outer Forward Clutch Piston Seal
29. Inner Forward Clutch Piston Seal
30. Forward Clutch Piston
31. Forward Clutch Piston Return Spring
32. Return Spring Retaining Ring
33. Forward Clutch Pack
34. No. 3 Thrust Bearing
35. Forward Clutch Hub
36. Forward Clutch Assembly
37. Intermediate Shaft
38. No. 4 Thrust Bearing
39. Reverse Clutch Sun Gear
40. No. 5 Thrust Bearing
41. Center Support Retaining Ring
42. Forward Clutch Sun Gear

43. Planetary Gear Support
44. Planetary One-Way Clutch Assembly
45. Planetary Assembly
46. Reverse Band
47. Direct Clutch Hub
48. No. 7 Thrust Washer
49. Washer
50. Direct Clutch Pack
51. Direct Clutch Piston Return Spring
52. Direct Clutch Piston
53. Inner Direct Clutch Piston Seal
54. Outer Direct Clutch Piston Seal
55. Output Shaft Ring Gear
56. Direct Clutch Cylinder
57. Direct Clutch Assembly
58. No. 8 Thrust Bearing
59. Output Shaft
60. Output Shaft Hub
61. Rear Case Bushing
62. No. 9 Thrust Bearing
63. Transmission Case
64. Reverse Clutch Assembly

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Fig. 26: Exploded View Of 4R70W Transmission
 Courtesy of FORD MOTOR CO.

TRANSMISSION SPECIFICATIONS

TRANSMISSION SPECIFICATIONS

| Application | In. (mm) |
|------------------------------------|---------------------------|
| Converter End Play | |
| New or Rebuilt Converter | .014-.041 (.355-1.04) |
| Used Converter | .014-.074 (.355-1.88) |
| Direct Clutch Pack Clearance | |
| 3.8L | .050-.071 (1.27-1.80) |
| 4.2L & 4.6L | .062-.085 (1.57-2.16) |
| Forward Clutch Pack Clearance | .050-.089 (1.27-2.26) |
| Intermediate Clutch Pack Clearance | 1.634-1.646 (41.50-41.81) |
| Reverse Clutch Pack Clearance | .040-.060 (1.02-1.52) |

TORQUE SPECIFICATIONS

TORQUE SPECIFICATIONS

| Application | Ft Lbs. (N.m) |
|--|------------------------|
| Converter-To-Flywheel Nut | 20-34 (27-46) |
| Converter Housing Cover-To-Converter Housing | 12-16 (16-22) |
| Converter Drain Plug | 21-22 (28-30) |
| Cooler Line-To-Case | 15-19 (20-26) |
| Extension Housing-To-Case Bolt | 18-22 (25-30) |
| Flexplate-To-Crankshaft Bolt | 54-64 (73-87) |
| Manual Lever Shaft Inner/Outer Nut | 19-27 (26-37) |
| Pump-To-Case Bolt | 15-19 (20-26) |
| Stator Support-To-Pump Bolt | 15-19 (20-26) |
| Transmission-To-Engine Bolt | 41-50 (55-68) |
| | INCH Lbs. (N.m) |
| Detent Spring Attaching Bolt | 80-120 (9-14) |
| Filter-To-Valve Body | 80-120 (9-14) |
| TR Sensor-To-Case Bolt | 62-89 (7-10) |
| Oil Pan-To-Case Bolt | 106-130 (12-15) |
| Output Shaft Speed Sensor Bolt | 62-89 (7-10) |
| Pressure Plug-To-Case | 72-144 (8-16) |
| Reinforcing Plate-To-Valve Body Bolt | 80-97 (9-11) |
| Separator Plate-To-Valve Body Bolt | 80-97 (9-11) |
| Valve Body-To-Case Bolt | 80-97 (9-11) |