1983-89 AUTOMATIC TRANSMISSIONS

Ford Motor Co. C-3 Overhaul

APPLICATION

TRANSMISSION APPLICATION

Vehicle Application	Transmission
Ford	
1983 Fairmont 2.3L & 3.3L	C3
1983-86 LTD 2.3L	C3
1983 LTD 3.3L	C3
1983-86 Mustang 2.3L	C3
1983-84 Ranger 2.3L	C3
1984-86 Thunderbird 2.3L	C3
Mercury	
1983-86 Capri 2.3L	C3
1984-86 Cougar 2.3L	C3
1983-86 Marquis 2.3L	C3
1983 Zephyr 2.3L	C3
Merkur (1985-89 XR4Ti 2.3L)	C3

IDENTIFICATION

Transmission may be identified by metal tag attached to lower extension housing retaining bolt. Top line of tag shows transmission model number and line shift code. Bottom line on tag shows build date code. See **Fig. 1** .

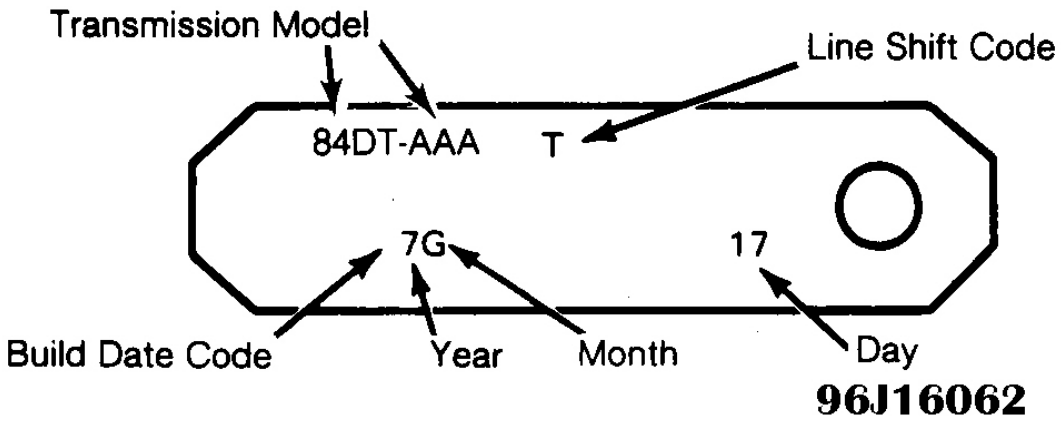

Fig. 1: Service Identification Tag
Courtesy of FORD MOTOR CO.

DESCRIPTION

Transmission has 3 forward speeds. Manual selection of 1st and 2nd gears is provided. Transmission consists of torque converter, planetary gear train, 2 multiple disc clutches, one-way clutch, and hydraulic control system. Only front band adjustment is required.

LUBRICATION & ADJUSTMENTS

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

SERVICE (IN VEHICLE)

CONTROL VALVE BODY

Removal

Remove oil pan, filter screen, and gasket. Remove rear servo cover and gasket. Remove valve body retaining bolts. Carefully ease valve body from case while unlocking and detaching selector lever connecting rod.

NOTE: Note size and location of valve body retaining bolts. Bolts are of different sizes and must be replaced in proper position at reassembly.

Installation

1. Attach and lock selector lever connecting rod ("Z" link) to manual valve. Ease control valve body to case. Install and finger tighten valve body locating bolts "A" and "B". See **Fig. 2** . Install and tighten remaining valve body retaining bolts (except for filter screen). Remove bolt "A" and install detent spring, then reassemble and tighten bolts "A" and "B".

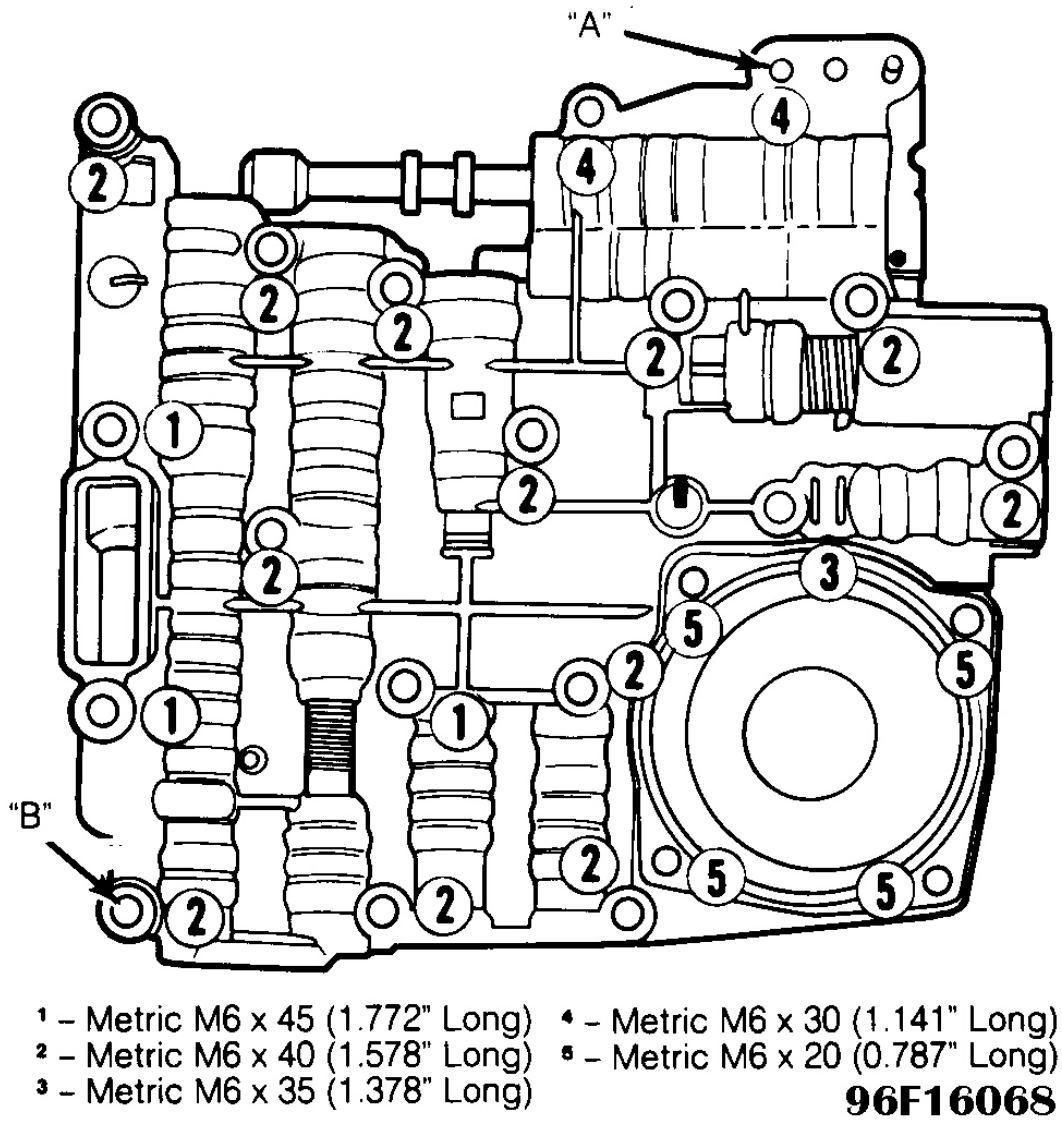

Fig. 2: Location of Valve Body Retaining Bolts
Courtesy of FORD MOTOR CO.

2. Install rear servo cover with new gasket. Clean filter screen. Install filter screen and gasket. **DO NOT** use spacers when installing screen and gasket, as was done on former models. To do this would reduce control pressure and malfunction or failure will result.
3. Install oil pan using new gasket. Tighten pan bolts evenly. Lower vehicle and fill transmission with 3 quarts of fluid. Start engine and add fluid as necessary. Check for leaks.

REAR SERVO

Removal & Installation

With oil pan and filter screen removed, remove rear servo cover retaining bolts, cover, gasket, servo piston, and spring. Force of servo spring will push cover off. To install, reverse removal procedure. See **Fig. 3** .

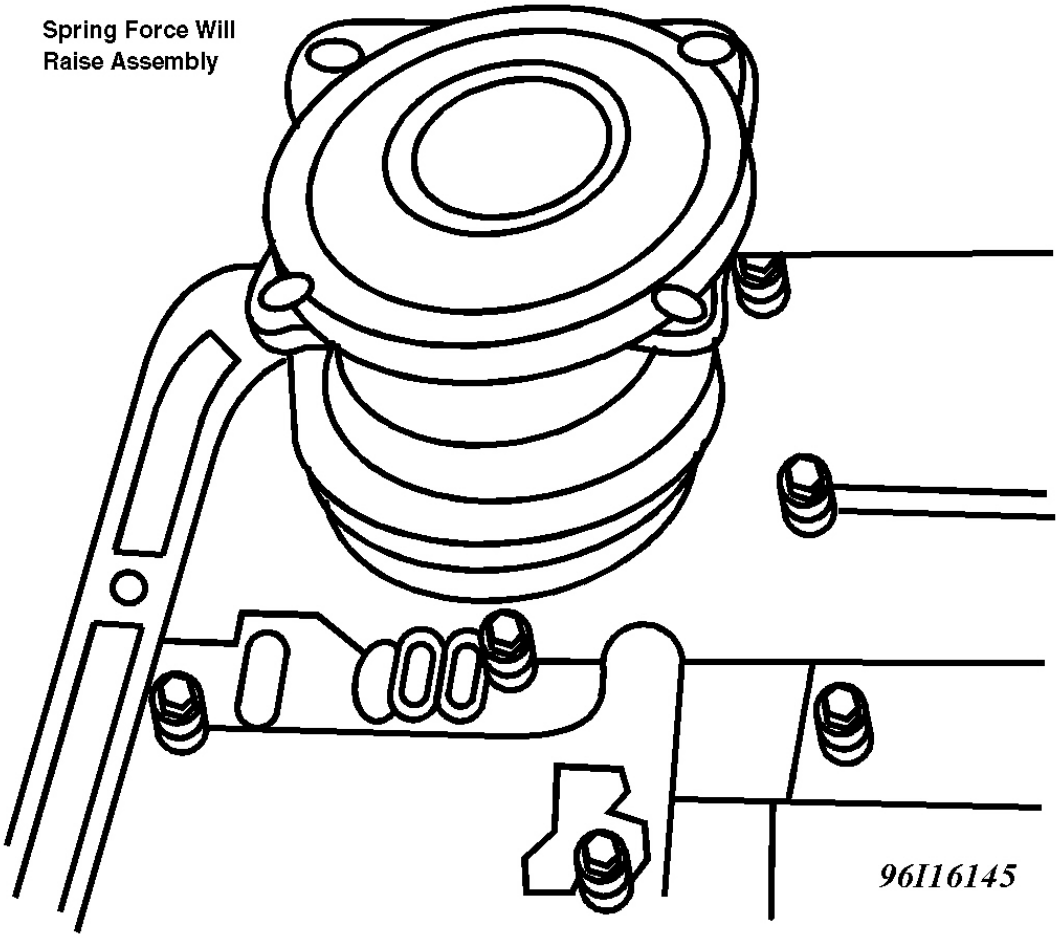

Fig. 3: Removing Rear Servo
Courtesy of FORD MOTOR CO.

EXTENSION HOUSING REAR SEAL & BUSHING

Removal

1. Raise and support vehicle. Mark propeller shaft end yoke and rear axle companion flange for reassembly reference. Remove propeller shaft.
2. Remove extension housing rear oil seal and bushing using Pullers (T71P-7657-A for seal and T77L-7697-E for bushing). See **Fig. 4** .

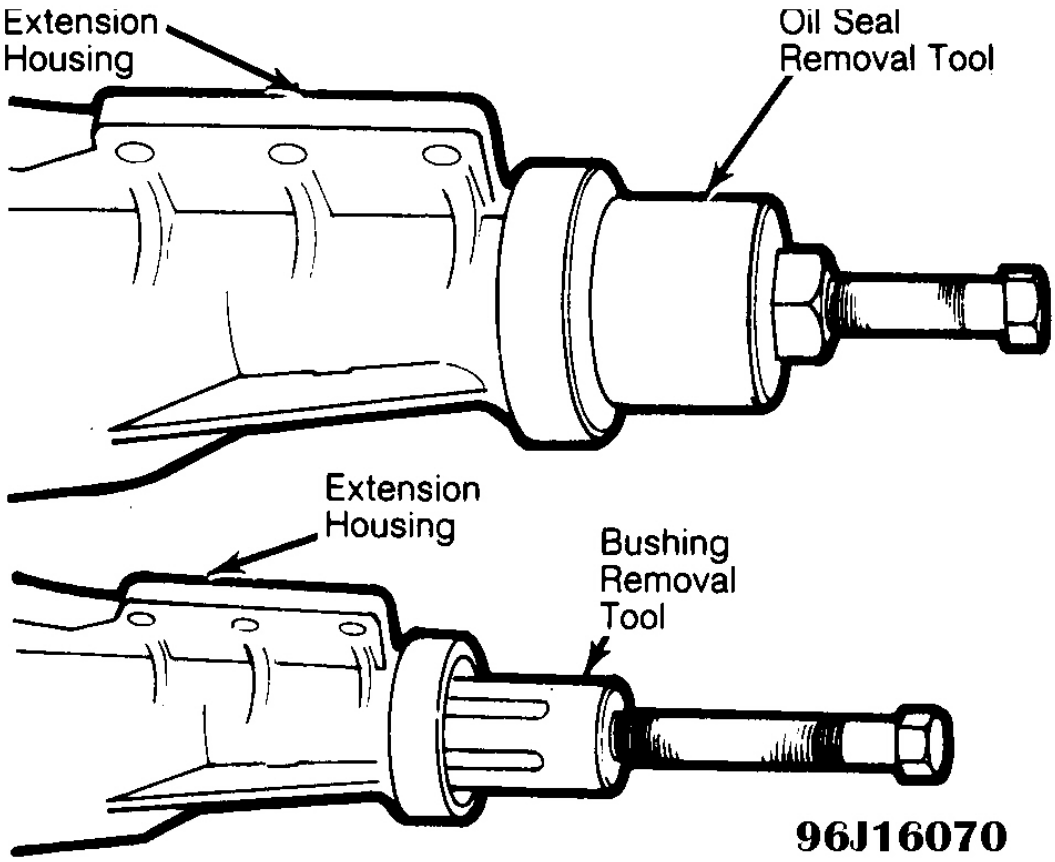

Fig. 4: Removing Extension Housing Oil Seal & Bushing
Courtesy of FORD MOTOR CO.

Installation

Check sealing surface of yoke for scoring. Replace if scoring found. Check housing counterbore for burrs and remove with crocus cloth (if necessary). Drive new bushing and oil seal into extension housing using Drivers (T77L-7697-F for bushing and T74P-77052-A for oil seal). Install propeller shaft, aligning reference marks made at removal.

EXTENSION HOUSING

Removal

1. Raise and support vehicle. Mark propeller shaft for installation reference. Remove shaft. Disconnect speedometer cable from extension housing. Support transmission with jack.
2. Remove rear support-to-crossmember bolts. Raise transmission slightly and remove rear support from extension housing.
3. Loosen extension housing retaining bolts and allow transmission fluid to drain. Remove bolts and slide

extension housing off output shaft.

Installation

Soak new gasket in clean transmission fluid for 5 minutes. Position extension housing on case. Pay special attention to correctly aligning parking pawl actuating rod. Install and tighten bolts. To complete installation, reverse removal procedures.

GOVERNOR

Removal

Remove extension housing as previously described. Remove governor body-to-oil collector body retaining bolts. Remove governor body, valve, spring, and weight from collector body. See **Fig. 5** .

NOTE: Components are not retained once governor body bolts have been removed. It is necessary to hold body and components while removing and installing governor.

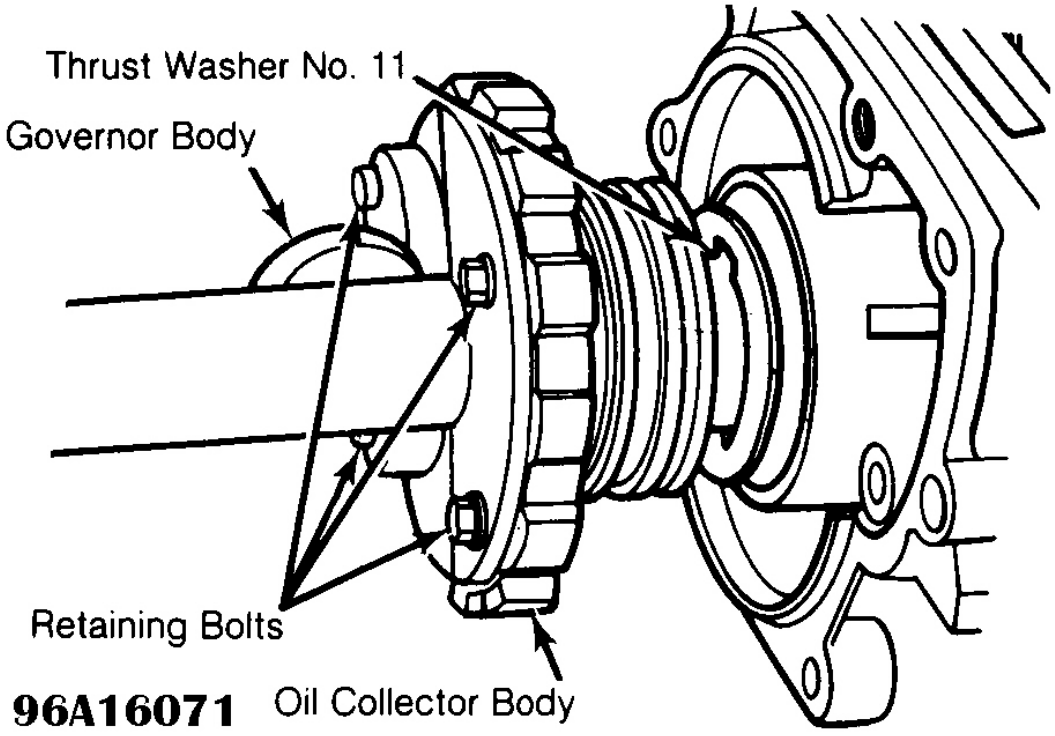

Fig. 5: Removing Governor Assembly
Courtesy of FORD MOTOR CO.

Installation

Assemble governor body and components. Position body over oil feed holes of oil collector body. Install retaining bolts. Install extension housing.

VACUUM MODULATOR ASSEMBLY

Removal

Disconnect hose from unit. Remove heat shield. Remove retaining bracket (do not pry or bend bracket). See **Fig. 6** . Remove vacuum modulator, actuating pin and throttle valve from case. Remove "O" ring from assembly.

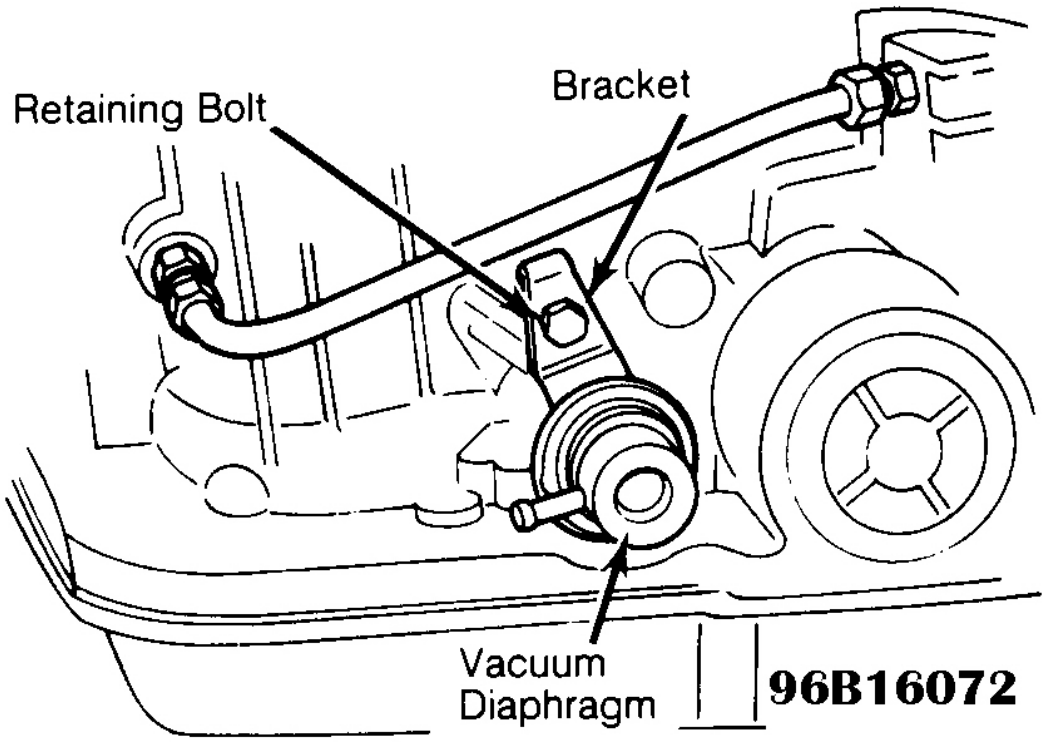

Fig. 6: Side View of Transmission Case
Courtesy of FORD MOTOR CO.

Installation

Install new "O" ring. Install throttle valve, actuating pin and vacuum modulator (with tube pointing rearward). Install retaining bracket and tighten bolt. Install heat shield ensuring it does not touch diaphragm.

TROUBLE SHOOTING

NOTE: Ensure transmission fluid is at proper level before trouble shooting.

SLOW INITIAL ENGAGEMENT

Linkage improperly adjusted. Improper clutch and band application, or low main control pressure.

ROUGH INITIAL ENGAGEMENT IN FORWARD OR REVERSE

High engine idle. Loose driveshaft, "U" joints or engine mounts. Improper clutch or band application, or oil control pressure. Valve body dirty or sticking valves.

HARSH ENGAGEMENTS

Vacuum modulator defective. Engine curb idle too high. Valve body bolts too loose or tight. Valve body dirty or sticking valves.

NO/DELAYED FORWARD ENGAGEMENT (REVERSE OKAY)

Manual linkage misadjusted. Low main control pressure. Forward clutch assembly burned or damaged. Forward clutch cylinder check ball leaking. Leaking piston seal rings. Valve body bolts too loose or tight. Valve body dirty or sticking valves. Filter plugged. Pump damaged or leaking.

NO/DELAYED REVERSE ENGAGEMENT (FORWARD OKAY)

Manual linkage misadjusted. Low main control pressure in reverse. Reverse-high clutch assembly burned or worn. Reverse-high clutch assembly burned or worn. Reverse-high clutch piston check ball leaking or leaking piston seal rings. Valve body bolts too loose or tight. Valve body dirty or sticking valves. Transmission filter plugged. Pump damaged or leaking. Intermediate servo piston seal cut or leaking.

NO/DELAYED REVERSE ENGAGEMENT AND/OR NO ENGINE BRAKING IN MANUAL LOW

Low-reverse band burned or worn. Low-reverse servo piston seal leaking. Low-reverse band misadjusted. Polished, glazed band or drum. End play clearance too tight.

NO ENGINE BRAKING IN MANUAL 2ND GEAR

Intermediate band misadjusted. Improper band or clutch application, or oil pressure control system. Intermediate servo leaking. Polished or glazed intermediate band or drum.

FORWARD ENGAGEMENT SLIPS, SHUDDERS OR CHATTERS

Manual linkage misadjusted or damaged. Low main control pressure. Valve body bolts loose or tight. Valve body dirty or sticking valves. Forward clutch piston ball check not seating or leaking. Forward clutch piston seal cut or worn. One-way clutch damaged.

REVERSE SHUDDERS, CHATTERS OR SLIPS

Low main control pressure in reverse. Low-reverse servo leaking. Reverse clutch drum bushing damaged. Reverse-high clutch piston seal cut or worn. Low-reverse band misadjusted. Loose drive shaft or "U" joints.

NO DRIVE, SLIPS OR CHATTERS IN 1ST GEAR IN "D" (ALL OTHER GEARS OKAY)

Damaged or worn planetary one-way clutch.

NO DRIVE, SLIPS OR CHATTERS IN 2ND GEAR

Intermediate band misadjusted. Improper band or clutch application. Low main control pressure. Intermediate band adjustment. Valve body dirty or sticking valves. Polished, glazed intermediate band or drum.

INITIAL DRIVE IN 2ND OR 3RD

Improper band and/or clutch application, or oil pressure control system. Damaged or worn governor. Valve body loose. Valve body dirty or sticking valves. Cross leaks between valve body and case mating surface.

SHIFT POINTS INCORRECT

Vacuum modulator line damaged, clogged or leaks. Improper operation of EGR system. Improper speedometer gear installed. Improper clutch or band application, or oil pressure control system. Governor worn or damaged. Vacuum diaphragm bent, sticking or damaged. Valve body dirty or sticking valves.

ALL UPSHIFTS HARSH, DELAYED OR NO UPSHIFTS

Manual linkage misadjusted or damaged. Governor sticking. Main control pressure too high. Valve body bolts too loose or tight. Valve body dirty or sticking valves. Vacuum leak to modulator. Vacuum modulator diaphragm bent, sticking or leaking.

MUSHY, EARLY UPSHIFTS

Low main control pressure. Valve body bolts too loose or tight. Valve body dirty or sticking valves. Governor valve sticking.

NO 1-2 UPSHIFTS

Manual linkage misadjusted or damaged. Governor valve sticking. Intermediate band misadjusted. Vacuum leak to modulator. Vacuum modulator diaphragm bent, sticking or leaks. Valve body bolts too loose or tight. Valve body dirty or sticking valves. Intermediate clutch band and/or servo assembly burnt.

ROUGH, HARSH, DELAYED 1-2 UPSHIFT

Poor engine performance. Intermediate band out of adjustment. Main control pressure too high. Governor valve sticking. Damaged intermediate servo. Engine vacuum leak. Valve body bolts too loose or tight. Valve body dirty or sticking valves. Vacuum leak to modulator. Vacuum modulator diaphragm bent, sticking or leaks.

MUSHY, EARLY, SOFT, SLIPPING 1-2 UPSHIFT

Incorrect engine performance, Intermediate band out of adjustment. Low main control pressure. Valve body bolts too loose or tight. Valve body dirty or sticking valves. Governor valve sticking. Damaged intermediate servo or band. Polished, glazed band or drum.

NO 2-3 UPSHIFT

Low main control pressure to direct clutch. Valve body bolts too loose or tight. Valve body dirty or sticking valves. Direct clutch or reverse-high clutch assembly burnt or worn.

HARSH, DELAYED 2-3 UPSHIFT

Engine vacuum leak. Damaged or worn intermediate servo release and high clutch piston check ball. Valve body bolts too loose or tight. Valve body dirty or sticking valves. Vacuum diaphragm or rod bent, sticking or leaking.

SOFT, EARLY, MUSHY 2-3 UPSHIFT

Valve body bolts too loose or tight. Valve body dirty or sticking valves. Vacuum modulator diaphragm bent, sticking or leaking.

ERRATIC SHIFTS

Poor engine performance. Valve body bolts too loose or tight. Valve body dirty or sticking valves. Governor valve stuck. Oil collector body seal rings damaged.

SHIFTS 1-3 IN "D"

Intermediate band out of adjustment. Damaged intermediate servo and/or internal leaks. Improper band or clutch application, or oil pressure control system. Polished, glazed band or drum. Valve body dirty or sticking valves. Governor valve stuck.

ENGINE OVER-SPEEDS ON 2-3 SHIFT

Linkage misadjusted. Improper band or clutch application, or oil pressure control system. Damaged or worn high clutch and/or intermediate servo. Intermediate servo piston seals cut or leaking. Valve body dirty or sticking valves.

ROUGH SHUDDER 3-1 SHIFT AT CLOSED THROTTLE IN "D"

Incorrect engine idle or performance. Improper linkage adjustment. Improper clutch or band application or oil pressure control system. Improper governor operation. Valve body dirty or sticking valves.

NO FORCED DOWNSHIFTS

Kickdown cable misadjusted. Damaged internal kickdown linkage. Improper clutch or band application, or oil pressure control system. Dirty or sticking governor. Valve body dirty or sticking valves.

ENGINE OVER-SPEEDS ON 3-2 DOWNSHIFT

Linkage misadjusted. Intermediate band misadjustment. Damaged or worn intermediate servo. Polished, glazed band or drum. Valve body dirty or sticking valves.

SHIFT EFFORTS HIGH

Manual shift linkage damaged or misadjusted. Inner manual lever nut loose. Manual lever retainer pin damaged.

TRANSMISSION OVERHEATS

Incorrect engine idle or performance. Improper clutch or band application, or oil pressure control system. Restriction in cooler or lines. Seized converter one-way clutch. Valve body dirty or sticking valves.

POOR VEHICLE ACCELERATION

Poor engine performance. Torque converter one-way clutch locked up.

TRANSMISSION NOISY (VALVE RESONANCE)

Linkage misadjusted. Improper band or clutch application, or oil pressure control system. Cooler lines grounding. Dirty or sticking valve body. Internal leakage or pump cavitation.

TRANSMISSION NOISY (OTHER THAN VALVE RESONANCE)

Bands misadjusted. Speedometer gear noise.

TESTING

Check fluid level and correct if necessary. Use initial road test to verify malfunction of transmission. Make sure that engine appears to be running properly. If transmission problems occur on initial road test, check adjustments and fluid levels.

ROAD TEST

1. If vehicle is not so equipped, attach tachometer to engine. Check minimum throttle upshifts in "D" position. See **MERKUR SHIFT SPEEDS TABLE** . Transmission should start in 1st gear, shift to 2nd, and then shift to 3rd gear as speed increases.
2. With transmission in 3rd gear, depress accelerator through detent (to floor). Transmission should shift from 3rd to 2nd, or 3rd to 1st, depending on vehicle speed.
3. Check closed throttle downshift from 3rd to 1st by coasting down from about 30 MPH in 3rd gear. Shift should occur at correct vehicle speed. With transmission selector lever in "2" position, transmission should operate only in 2nd gear.
4. With transmission in 3rd gear and road speed over 50 MPH, transmission should downshift to 2nd gear when selector lever is moved from "D" to "2" or "1". When same manual shift is made below 25 MPH, transmission should shift from 2nd or 3rd to 1st.

5. Step 1) will determine if governor pressure and shift control valves are operating properly. Erratic shifts could be caused by stuck governor valve. If shift points do not occur at correct engine RPM or road speeds, check linkage, engine operating condition, and vacuum supply.

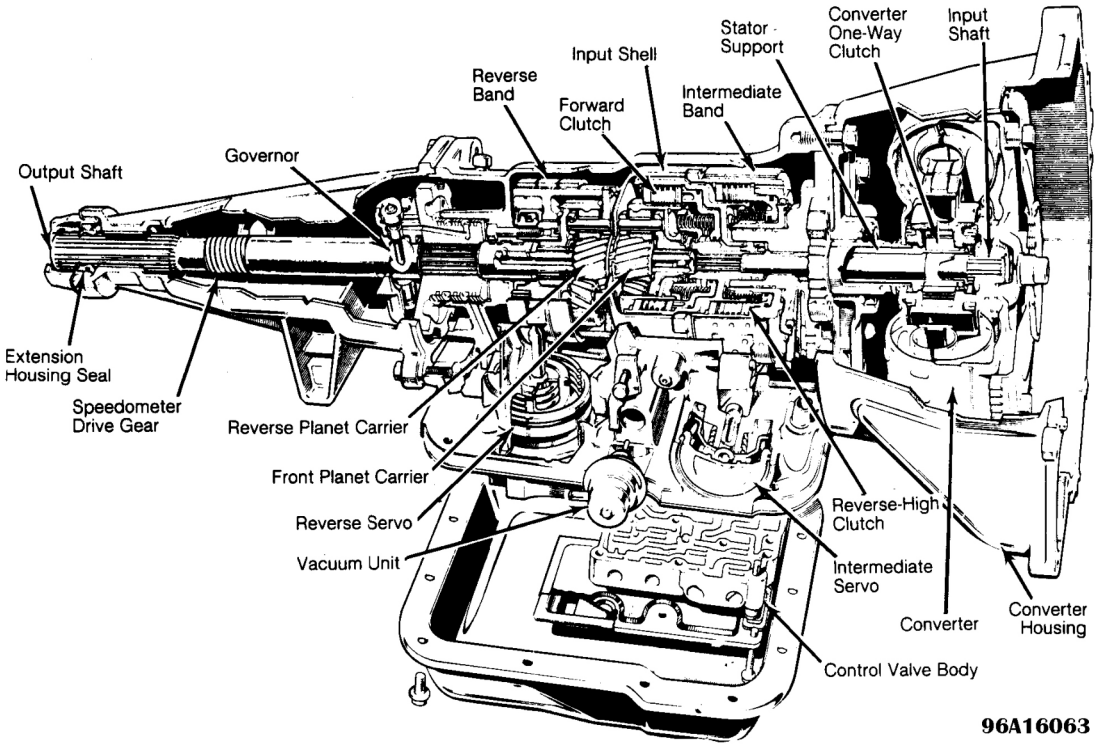

Fig. 7: Cutaway View of C-3 Automatic Transmission Assembly
Courtesy of FORD MOTOR CO.

6. Slipping (increase in engine speed greater than increase in road speed) in gear usually indicates clutch or band problems. Specific clutch or band that is slipping can usually be determined by noting transmission operation in each selector position. Compare application of internal components as used in those positions. See **CLUTCH & BAND APPLICATION TABLE** .

MERKUR SHIFT SPEEDS

Shift	MPH	Output Shaft RPM
1-2 minimum 10-15 in. Hg.	12-16	580-790
2-3 minimum 10-15 in. Hg.	17-24	845-1215
1-2 to detent 6 psi boost pressure	35-41	1740-2060
2-3 to detent 6 psi boost pressure	50-56	2480-2800
1-2 thru detent (WOT) 10 psi boost pressure	41-47	2038-2325
2-3 thru detent (WOT) 10 psi boost pressure	65-71	3275-3560
3-2 torque demand lockout 1 psi boost pressure	33-39	1640-1955
3-2 thru detent (kickdown) max. lockout 5 psi boost pressure	57-63	2850-3170

3-1 or 2-1 thru detent (kickdown) max. lockout 3 psi boost pressure	28-36	1425-1795
3-2 closed throttle coast out	11-17	530-845
2-1 closed throttle coast out	8-15	425-740
2-1 manual low closed throttle coast out	30-41	1530-2060

VACUUM MODULATOR

1. Remove hose from vacuum modulator unit. If transmission fluid is evident on vacuum side of modulator or in vacuum hose, replace modulator unit. Fluid indicates that diaphragm is broken.
2. Hook vacuum pump to fitting on modulator. Operate pump until gauge shows 18 in. Hg. If gauge reading holds steady, modulator unit is good. If gauge reading drops, diaphragm is bad and must be replaced.
3. With modulator removed from transmission, draw 18 in. Hg on vacuum pump attached to vacuum port of unit. Hold finger over end of control rod of modulator unit. When hose is removed, good modulator will push out on control rod due to internal spring pressure.

CONTROL PRESSURE TEST

NOTE: There are 2 methods to perform test. One is to use engine vacuum, the other is using a hand operated vacuum pump. Governor can be checked at same time control pressure test is performed and in same manner.

ENGINE VACUUM PRESSURE

1. If vacuum modulator is working properly and downshift linkage is adjusted correctly, all shifts should occur within certain road speed limits. See **MERKUR SHIFT SPEEDS TABLE** . If shifts do not occur at proper points or slipping occurs during shifts, check engine vacuum, vacuum supply, and vacuum unit for possible cause of problem.
2. Connect tachometer to engine. Connect vacuum gauge to manifold vacuum line, using "T" fitting at modulator hookup. Attach pressure gauge to control pressure outlet on transmission case. See **Fig. 8** .

CAUTION: Pressure gauge affects quality of transmission shifting. When gauge is installed in transmission port, DO NOT accelerate or decelerate rapidly as transmission failure could occur.

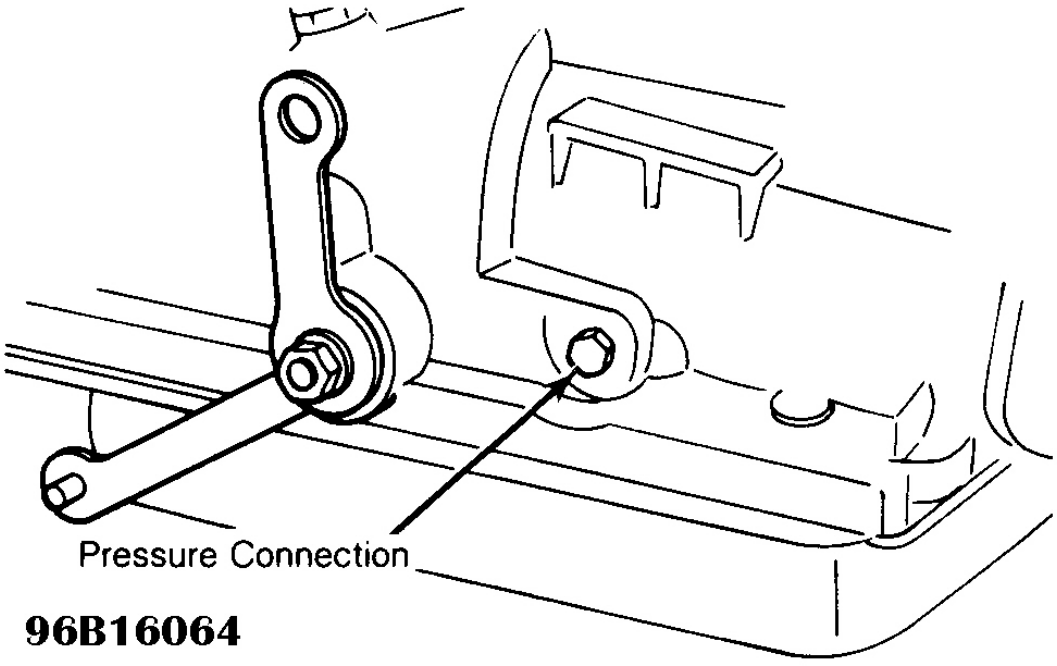

Fig. 8: Control Pressure Outlet Location
Courtesy of FORD MOTOR CO.

3. Apply parking brake. Start engine. On vehicle equipped with vacuum brake release, apply service brakes. Parking brake automatically releases when transmission is moved to "D".
4. Adjust engine idle speed to correct RPM. If engine idle cannot be brought within limits, check throttle and downshift linkages for binding. Check for vacuum leaks in hoses and tubes if linkage is correctly in place. Check vacuum units such as power brake booster for leaks.

VACUUM PUMP PROCEDURE

Disconnect and plug engine vacuum line from modulator. Hook up vacuum pump to unit. Apply parking and service brakes. Start engine and apply 15 in. Hg vacuum to diaphragm. Select all ranges of transmission. Read and record control pressures.

VACUUM SUPPLY TEST

1. To check supply to vacuum modulator, disconnect vacuum line at modulator and connect to a vacuum gauge. Vacuum reading at gauge should be steady with engine idling. Reading should also be same as that measured at intake manifold. Reading must be acceptable for altitude where test is being performed. If vacuum reading is correct at idle, accelerate engine rapidly and release throttle immediately. Vacuum reading must drop rapidly during acceleration.
2. Vacuum should return as soon as throttle is released. If vacuum reading does not respond correctly, check lines for restriction or plugging. Also make sure that vacuum line is not hooked up to reservoir.

CONTROL PRESSURE SPECIFICATIONS

Engine RPM	Man. Vacuum In. Hg.	Throttle Position	Gear	Record Actual PSI	Spec.
Idle	Above 12	Closed	P	.	51-61
Idle	Above 12	Closed	N	.	51-61
Idle	Above 12	Closed	D	.	51-61
Idle	Above 12	Closed	2	.	51-61
Idle	Above 12	Closed	1	.	51-61
Idle	Above 12	Closed	R	.	51-61
As Needed	10	As Needed	D	.	51-90
As Needed	10	As Needed	R	.	83-143
As Needed	Below 3	Wide Open	D	.	164-188
As Needed	Below 3	Wide Open	2	.	164-188
As Needed	Below 3	Wide Open	1	.	164-188
As Needed	Below 3	Wide Open	R	.	276-304

CONTROL PRESSURE RESULTS

Compare recorded control pressures to control pressures listed in table. See **CONTROL PRESSURE SPECIFICATIONS** . If control pressures are outside of specified ranges, use following list to determine cause of trouble.

High at Idle in All Ranges

Check engine EGR system, vacuum modulator unit, and manifold vacuum line. Check throttle valve, control rod, and regulator boost valves for sticking.

Low at Idle in All Ranges

Check engine EGR system. Check fluid level. Check for restricted intake screen or filter. Check for loose oil tubes. Check if valve body-to-case or regulator-to-case bolts are loose. Check for excessive leakage in oil pump, control valve body, and case. Check control pressure regulator valve for sticking.

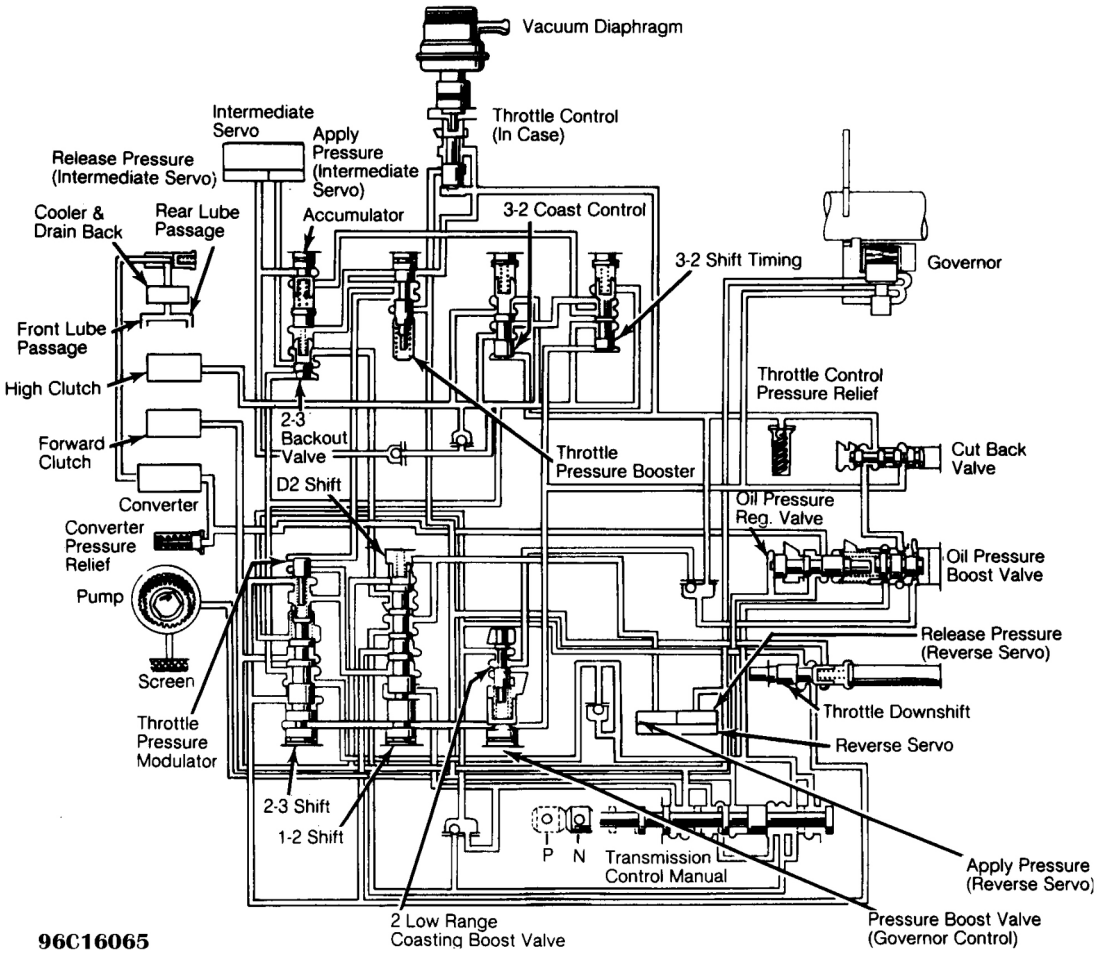

Fig. 9: C-3 Automatic Transmission Hydraulic Circuits Diagram
Courtesy of FORD MOTOR CO.

Normal at Idle; Low at 10 in. Hg

Check vacuum modulator unit. Control rod or throttle valve stuck.

Normal at Idle and 10 in. Hg.; Low at 1 in. Hg

Check for excessive leakage, low pump capacity, or restricted oil pan screen.

Low in "P" or "N"

Check valve body.

Low in "D"

Check forward clutch.

Low in "2"

Check forward clutch or intermediate servo.

Low in "1"

Check forward or reverse clutch and respective servo.

Low in "R"

Check reverse-direct clutch or reverse servo.

GOVERNOR PRESSURE TEST

CAUTION: Never exceed 60 MPH speedometer reading during governor pressure test. After each test, move selector lever to Neutral and run engine at 1000 RPM to cool transmission.

1. Raise vehicle until rear wheels are clear of ground. Disconnect and plug vacuum line to vacuum modulator unit. Connect hand-held vacuum pump to diaphragm unit.

NOTE: Rear suspension must not hang free. Support rear suspension arms so halfshaft CV joint angles are at curb weight condition (5-9 degree shaft angle). Without support, CV joint will operate at a very high angle resulting in damage to joint.

2. Place transmission in "D". Apply 10 in. Hg to diaphragm unit with no load on engine. Increase speed slowly and watch speedometer. Note speed at which control pressure cut-back occurs. It should occur between 6-20 MPH.
3. Governor is okay if cut-back occurs as specified. If not, check shift speeds to verify that problem is in governor and not due to stuck cut-back valve. Repair or replace governor.

CLUTCH & BAND APPLICATION

Lever Position	Inter- mediate Band	Low Reverse Band	Forward Clutch	Reverse- High Clutch	1-Way Clutch
D - First	.....	.....	Applied	.....	Applied
D - Second	Applied	.....	Applied	.....	.....
D - Third	.....	.....	Applied	Applied	.....
2 - Second	Applied	.....	Applied	.....	.....
1 - First	.....	Applied	Applied	.....	.....
R - Reverse	.....	Applied	.....	Applied	.....
N - Neutral	.....	.....	.....	.....	.....
P - Park	.....	.....	.....	.....	.....

STALL TEST

Testing Precautions

1. Engine coolant and transmission fluid must be at proper levels and operating temperatures. TV linkage must be set properly. Hold accelerator down just long enough to get stable tachometer reading. **DO NOT** floor accelerator for more than 5 seconds.
2. **DO NOT** exceed maximum specified RPM for vehicle. Before shifting into each selector position, run engine in "N" at 1000 RPM for 15 to 20 seconds to cool transmission. If engine speed exceeds upper specification, release accelerator immediately as this is an indication of clutch or band slippage.

Testing Procedure

1. Connect tachometer to engine. Apply parking and service brakes. Place selector lever in "D" position, and push accelerator completely to floor. Record tachometer reading.
2. Engine speed should be within specifications given in **STALL SPEEDS** . Repeat procedure in "2", "1", and "R" positions.

STALL SPEEDS

Application	Stall RPM
Merkur	3000-3300

STALL TEST RESULTS

Low in All Ranges

Poor engine performance. Faulty torque converter stator one-way clutch.

High in All Ranges

General transmission problems are indicated. Perform control pressure tests.

High in "D" Only

Planetary one-way clutch faulty.

High in "D", "2" & "1"

Forward clutch faulty.

High in "2" Only

Intermediate band or servo faulty.

High in "1" Only

Low-Reverse band or servo faulty.

High in "R" Only

Reverse-Direct clutch faulty. Low-Reverse band faulty.

AIR PRESSURE CHECKS

1. Condition of "No Drive" (no movement of output shaft) can exist, even with correct transmission fluid pressure. Inoperative clutches or bands may cause this problem.
2. Inoperative units can be located through series of checks by substituting air pressure for fluid pressure to determine location of malfunction.
3. Loosen oil pan bolts and allow transmission fluid to drain. Remove oil pan and control valve body. Apply air at points indicated. See **Fig. 10** . Minimum of 40 psi or maximum of 90 psi is needed to pressure check transmission.

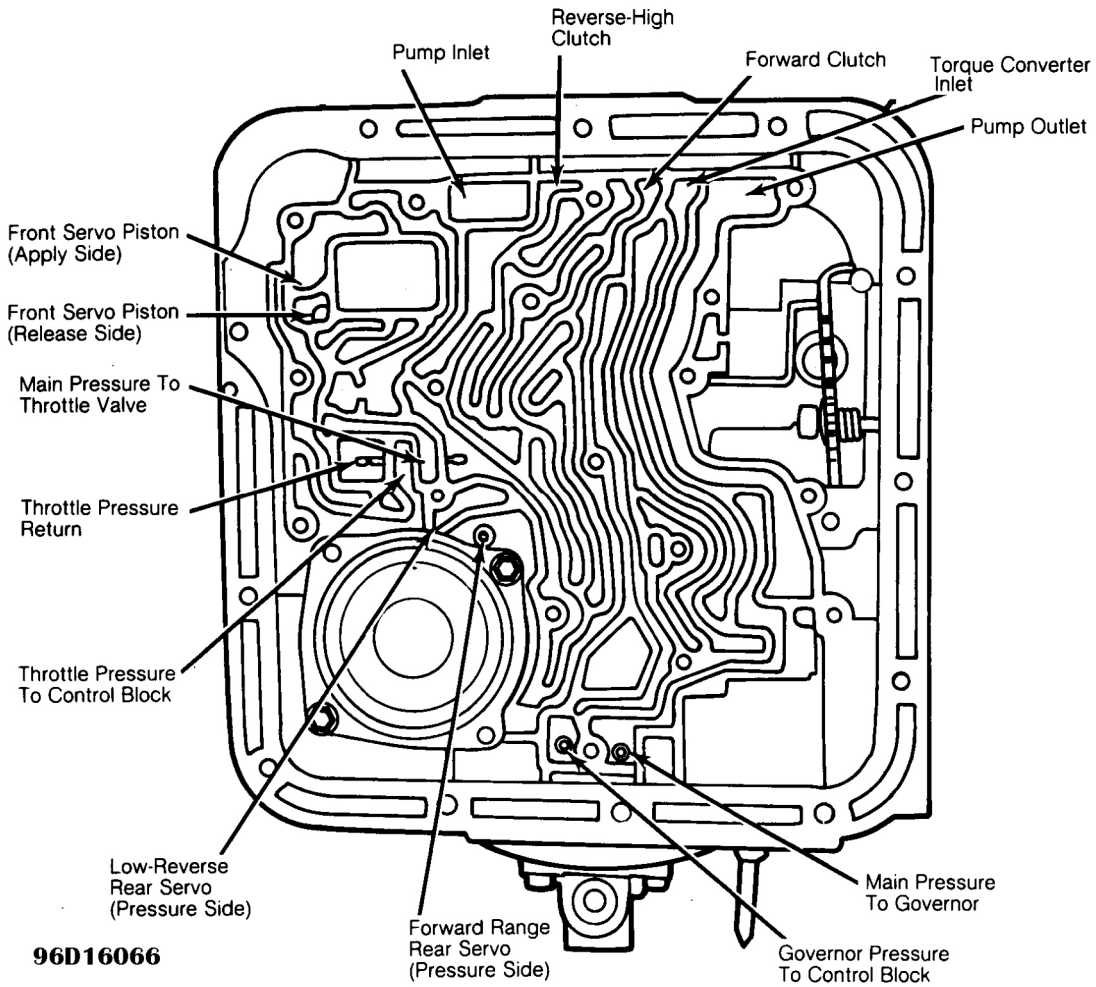

Fig. 10: Bottom View of Transmission Case
Courtesy of FORD MOTOR CO.

Forward Clutch

Apply air pressure into forward clutch passage. Dull thud can be heard when clutch piston is applied. Movement of piston can be felt by placing finger tips on input shell if no thud heard.

Governor

Apply some air pressure into the control pressure-to-governor passage. Listen for sharp clicking or whistling noise indicating governor valve movement.

Reverse-High Clutch

Apply air pressure into reverse-direct clutch passage. Dull thud can be heard when clutch piston is applied. Movement of piston can be felt by placing finger tips on clutch drum.

Intermediate Servo

1. Hold air nozzle in intermediate servo apply passage. Operation of servo is indicated by tightening of intermediate band around drum.
2. While continuing to apply air pressure at servo apply passage, apply air pressure to intermediate servo release passage. Intermediate servo should then release band against pressure in apply passage.

Low-Reverse Servo

Apply air pressure to low-reverse servo apply passage. Low-reverse band should tighten around drum if servo is operating properly.

NOTE: If air pressure applied to either clutch passages fails to operate clutch, or operates both clutches at once, remove and check fluid passages in case and oil pump. Use air pressure to detect obstructions.

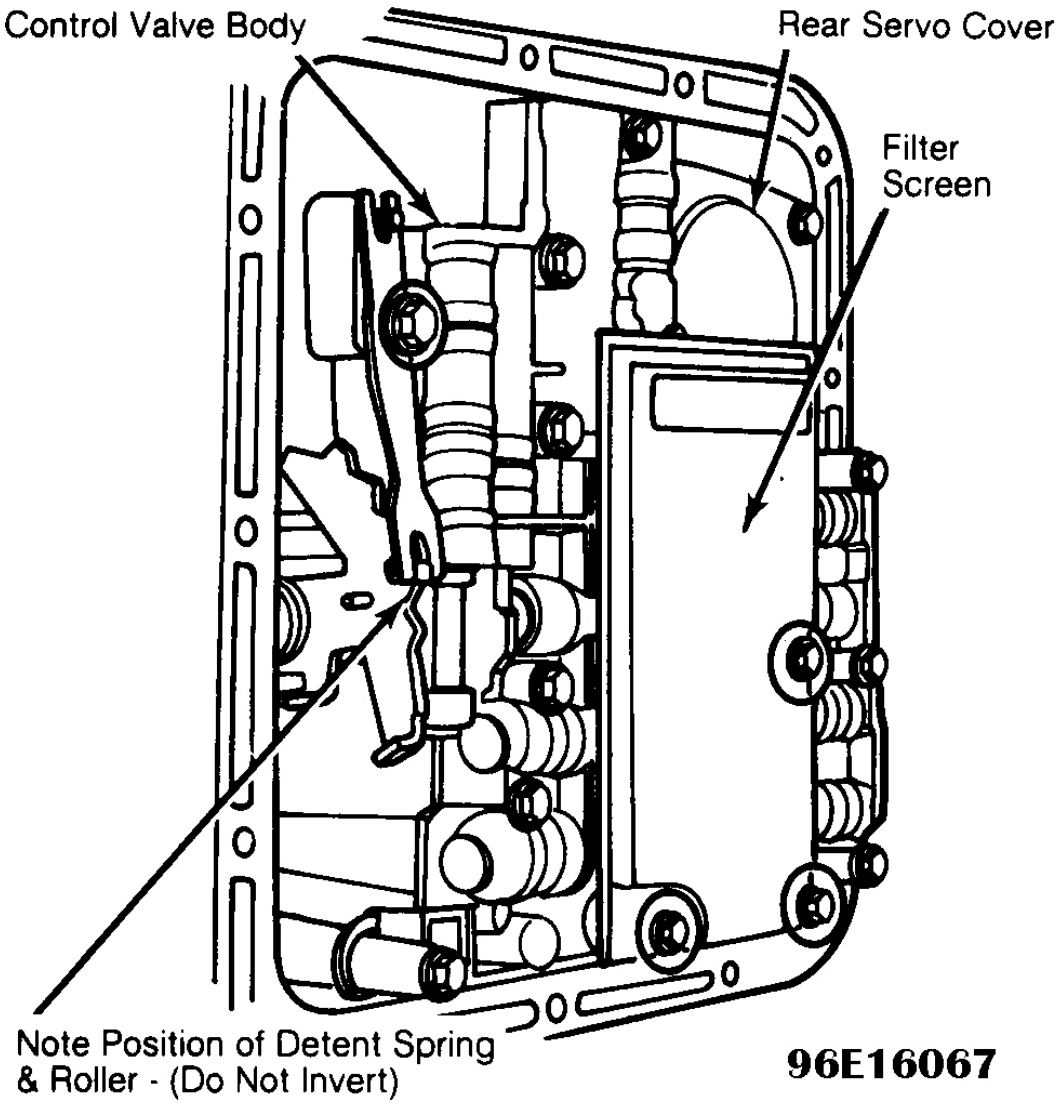

Fig. 11: Bottom View of Case
Courtesy of FORD MOTOR CO.

REMOVAL & INSTALLATION

See appropriate TRANSMISSION REMOVAL & INSTALLATION - A/T article in AUTOMATIC TRANS SERVICE section.

TORQUE CONVERTER

NOTE: Converter is a sealed unit and cannot be disassembled for service. Replace if found to be defective. Do following tests to ensure converter is defective before

replacing.

FLUSHING CONVERTER

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 agitated cleaner (Rotunda 1400028). Under no conditions should converter or oil cooler be cleaned by hand agitation using solvent.

LEAK TEST

NOTE: If torque converter indicates leakage, attach Torque Converter Leak Detector (Rotunda 7200004) and follow detector kit instructions.

TURBINE & STATOR END PLAY CHECK

1. Insert Tester (T80L-7902-D) into converter pump drive hub until it bottoms. Expand sleeve in turbine spline by tightening threaded inner post of tester until it is securely locked into spine. See **Fig. 12** .

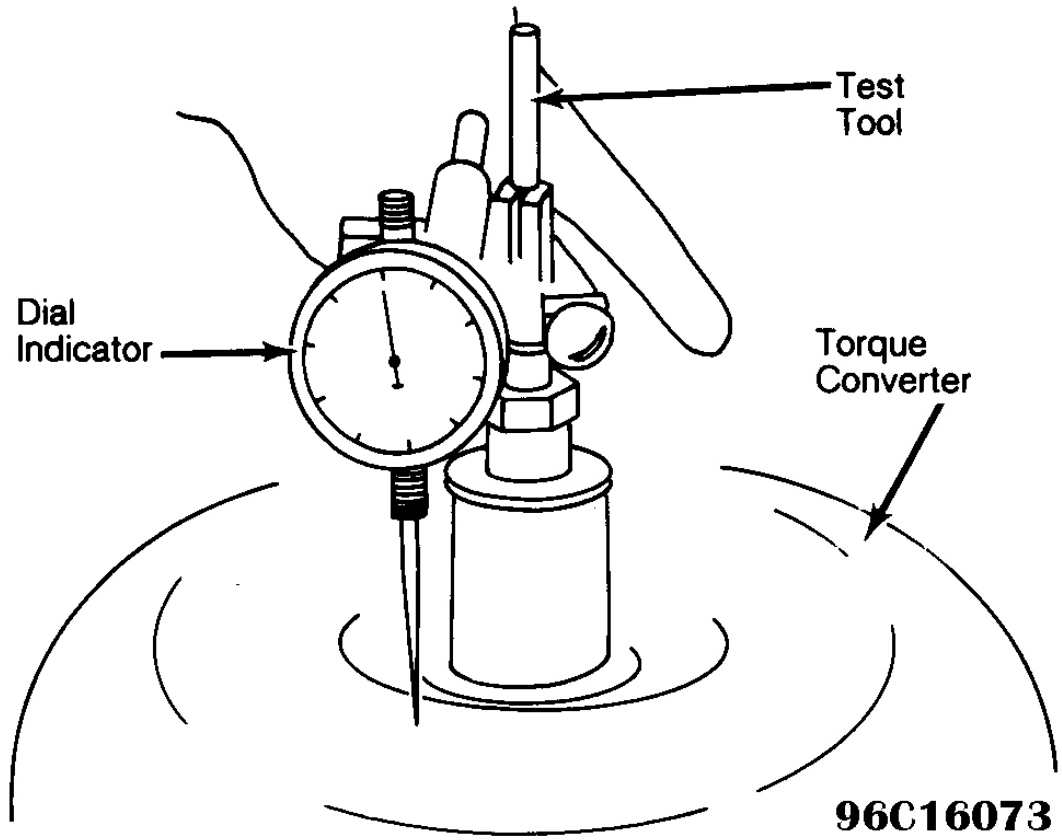

Fig. 12: Checking Torque Converter Turbine & Stator End Play
Courtesy of FORD MOTOR CO.

2. Attach a dial indicator to tool with button on indicator on converter pump drive hub. Zero dial face. Lift tool upward as far as it will go and note indicator reading.
3. Reading is total end play of turbine and stator. If end play exceeds .021" (.53 mm) on new or rebuilt converter, or .040" (1.02 mm) on used converter, replace torque converter assembly.

STATOR ONE-WAY CLUTCH CHECK

1. Insert one-way clutch holding tool into one of the grooves in the stator thrust washer. Insert Torque Adapter (T83L-7902-A1) into converter pump drive hub so as to engage one-way clutch inner race. See **Fig. 13** .

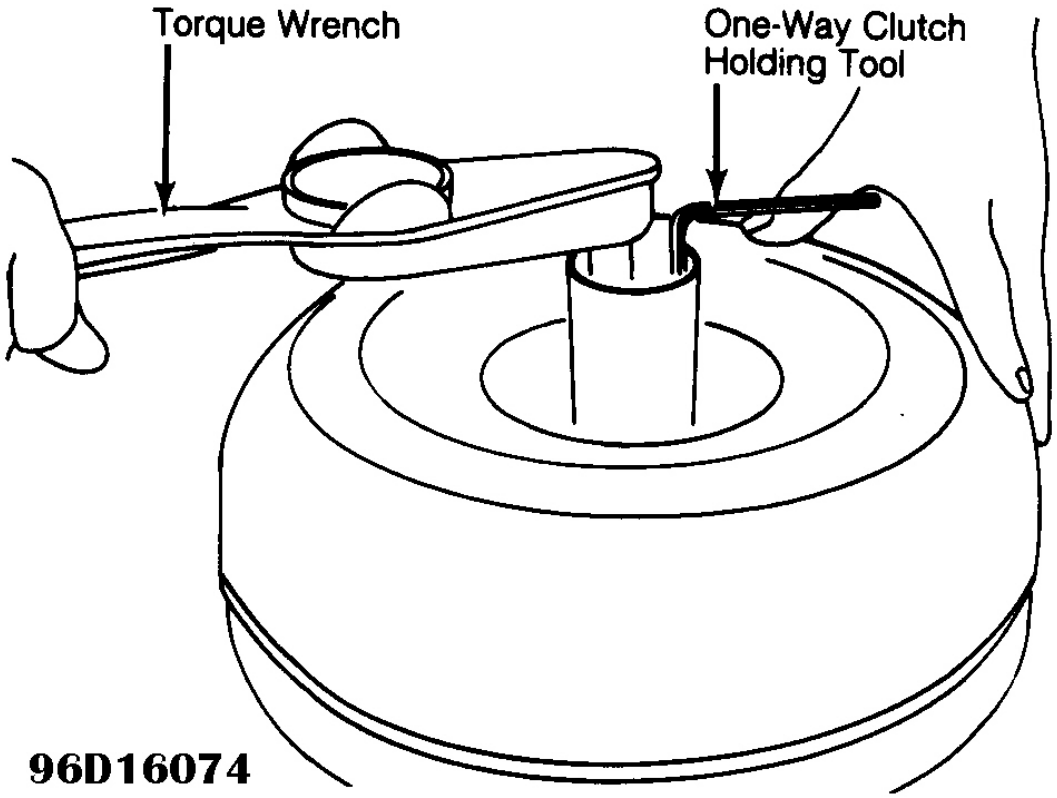

Fig. 13: Stator One-Way Clutch Check
Courtesy of FORD MOTOR CO.

2. Attach a torque wrench to torque adapter. With clutch holding wire held stationary, turn torque wrench counterclockwise. The converter one-way clutch should lock-up and hold a 10 ft. lbs. (14 N.m) force. 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.

STATOR INTERFERENCE CHECK

Stator-to-Impeller Interference Check

1. Position front pump assembly on bench with spline end of stator shaft pointing up. Mount converter on pump so splines of one-way clutch inner race engage splines of stator support and converter hub engages pump drive gear.
2. While holding pump stationary, rotate converter counterclockwise. Converter should rotate freely without interference or scraping within assembly. Should this condition exist, replace converter unit.

Stator-To-Turbine Interference Check

1. Place converter on bench, front side down. Install front pump assembly to engage mating splines of stator support, stator and pump drive gear lugs.
2. Install input shaft, engaging the splines with turbine hub. While holding pump stationary, rotate turbine with input shaft.
3. Turbine should rotate freely in both directions without interference or noise. If interference or noise exists, stator front thrust washer may be worn; converter should be replaced.

TRANSMISSION DISASSEMBLY

NOTE: Ten thrust washers and one thrust bearing are used in this transmission, with No. 1 at front pump and No. 11 at governor. Note that No. 5 and No. 6, while performing thrust functions, are actually bearings. Because No. 6 bearing is part of staked portion of planet assembly, it is NOT removable. Refer to Fig. 14 for identification and location of thrust washers.

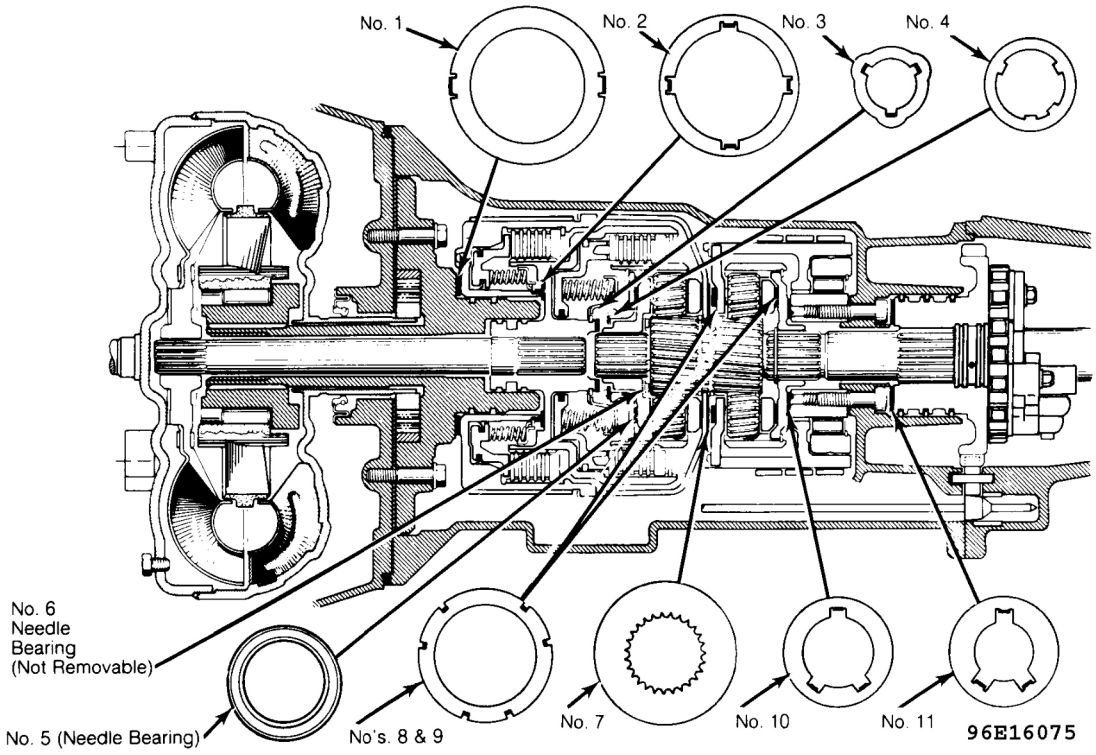

Fig. 14: Transmission Thrust Washer Identification & Location
Courtesy of FORD MOTOR CO.

REAR SERVO, VALVE BODY & OIL PUMP

1. Pull torque converter straight out of transmission. Remove input shaft. Remove oil pan and gasket. Remove oil filter and gasket. Ensure all attaching bolts are kept with their respective components for reassembly reference.
2. Remove manual lever detent spring attaching bolt and detent spring. Remove reverse servo cover and gasket. Remove reverse servo piston. Remove valve body attaching bolts and valve body. Disconnect selector lever "Z" link from manual valve. Remove converter housing attaching bolts. Remove converter housing and pump assembly.

INTERMEDIATE BAND & INTERNAL COMPONENTS

1. Loosen intermediate band adjuster screw lock nut. See **Fig. 15** . Back out intermediate band adjuster screw. From inside transmission case, remove intermediate band and struts. Remove reverse-high clutch, forward clutch, No. 3 thrust washer, front internal gear/planetary assembly and drive shell/sun gear assembly.

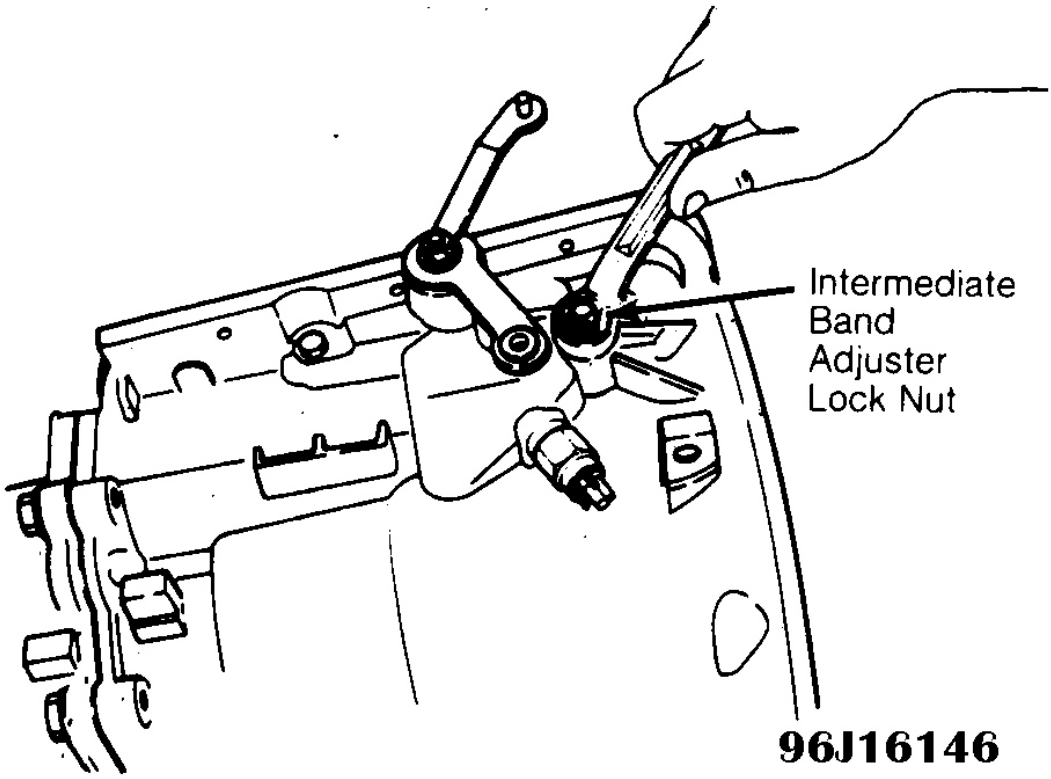

Fig. 15: Intermediate Band Adjuster Lock Nut Location
Courtesy of FORD MOTOR CO.

2. Remove No. 8 thrust washer from rear planetary carrier. Remove extension housing attaching bolts and extension housing. Remove rear planetary snap ring. Remove rear planetary gear and thrust washer. Remove rear internal gear snap ring. See **Fig. 16** . Remove rear internal gear and reverse drum/one-way clutch assembly.

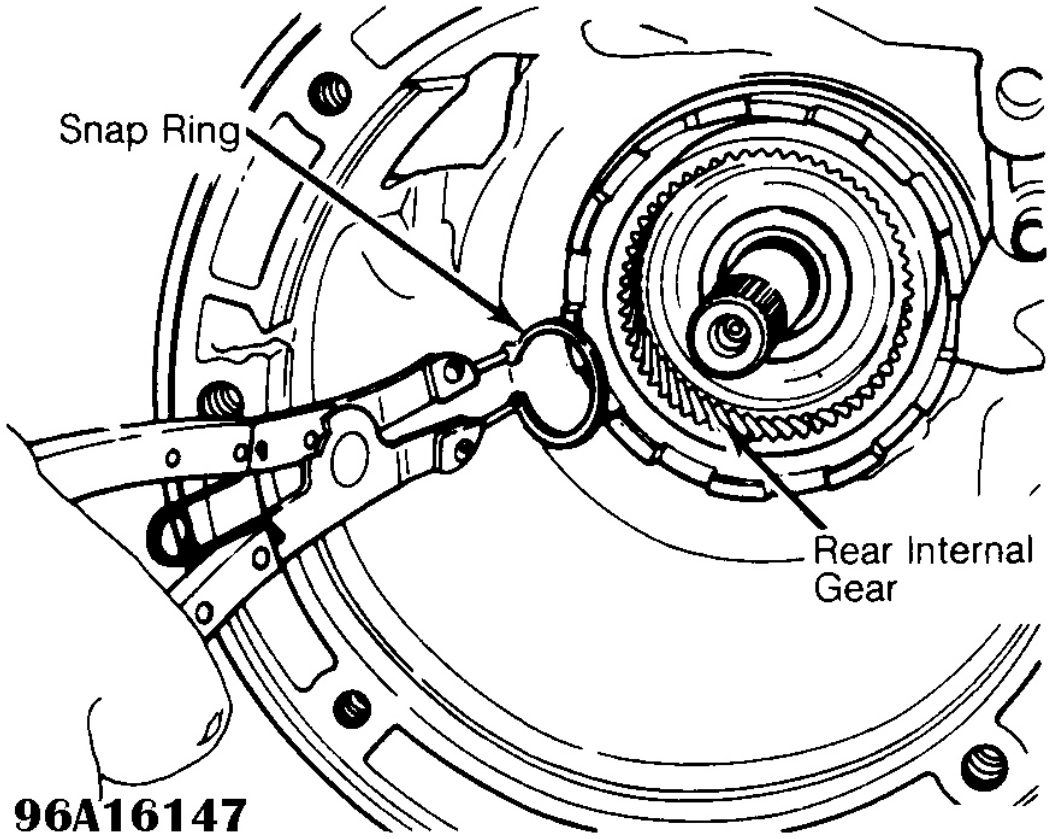

Fig. 16: Rear Internal Gear Snap Ring Location
Courtesy of FORD MOTOR CO.

3. Remove output shaft with governor flyweight, spring and valve. Remove governor collector body assembly. Remove No. 11 thrust washer from governor/oil collector bore. See **Fig. 17** . Remove reverse band. Remove No. 10 thrust washer from one-way clutch inner race.

NOTE: One-way clutch inner race is NOT removable.

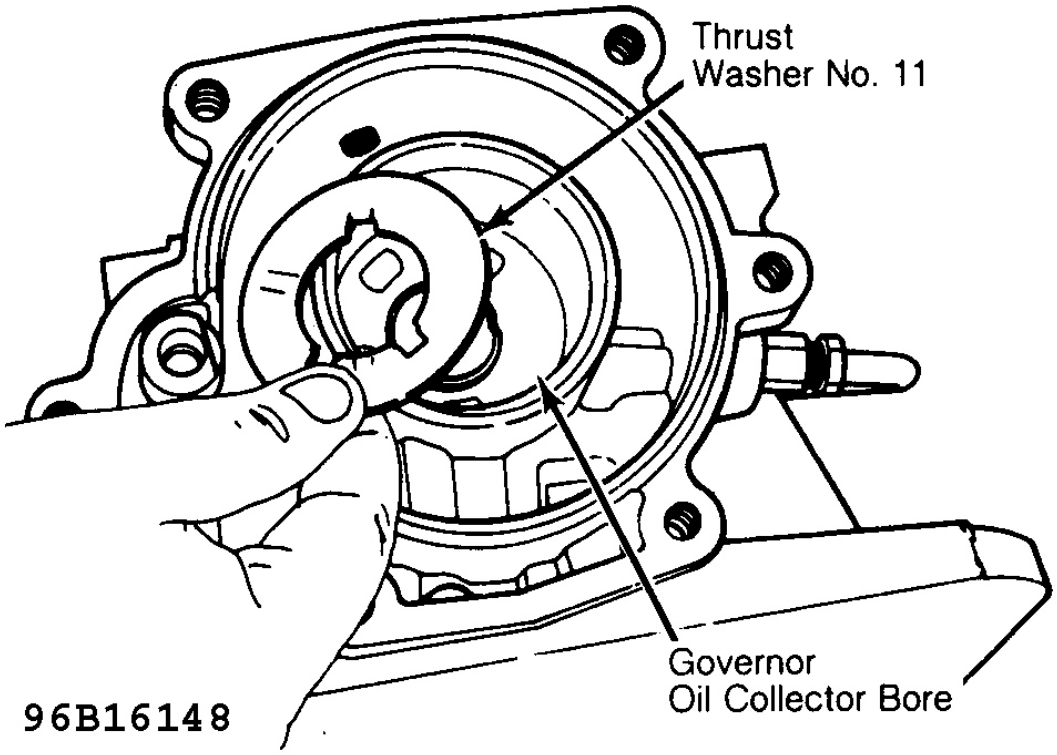

Fig. 17: Removing No. 11 Thrust Washer
Courtesy of FORD MOTOR CO.

4. Using Front Servo Compressor (T74P-77028-A), compress intermediate servo. See **Fig. 18** . Remove intermediate servo retaining ring and snap ring. Remove piston, cover and return spring. Remove intermediate band apply lever retaining pin and apply lever. Remove parking pawl, retaining spring and pin from extension housing.

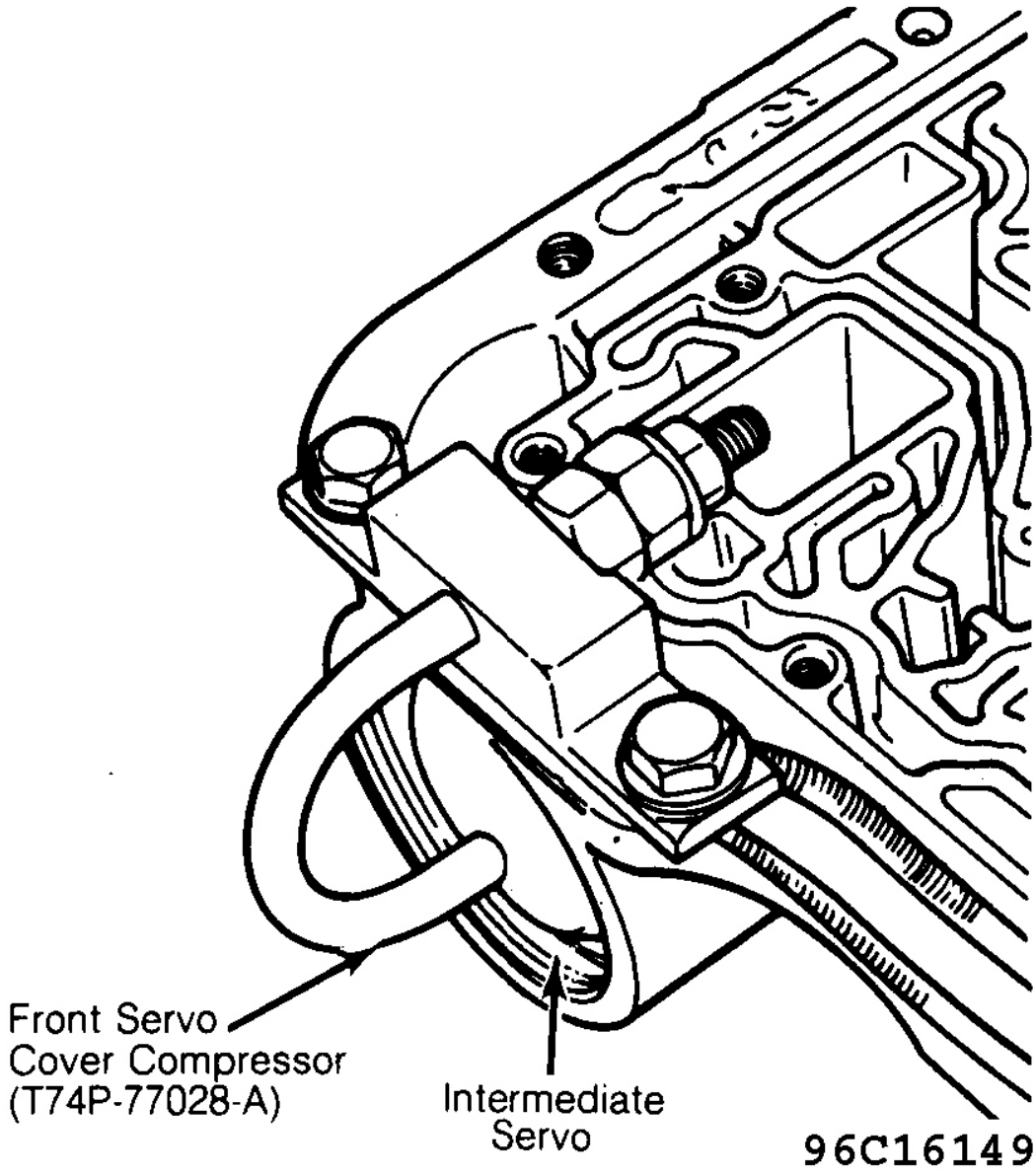

Fig. 18: Compressing Intermediate Servo
Courtesy of FORD MOTOR CO.

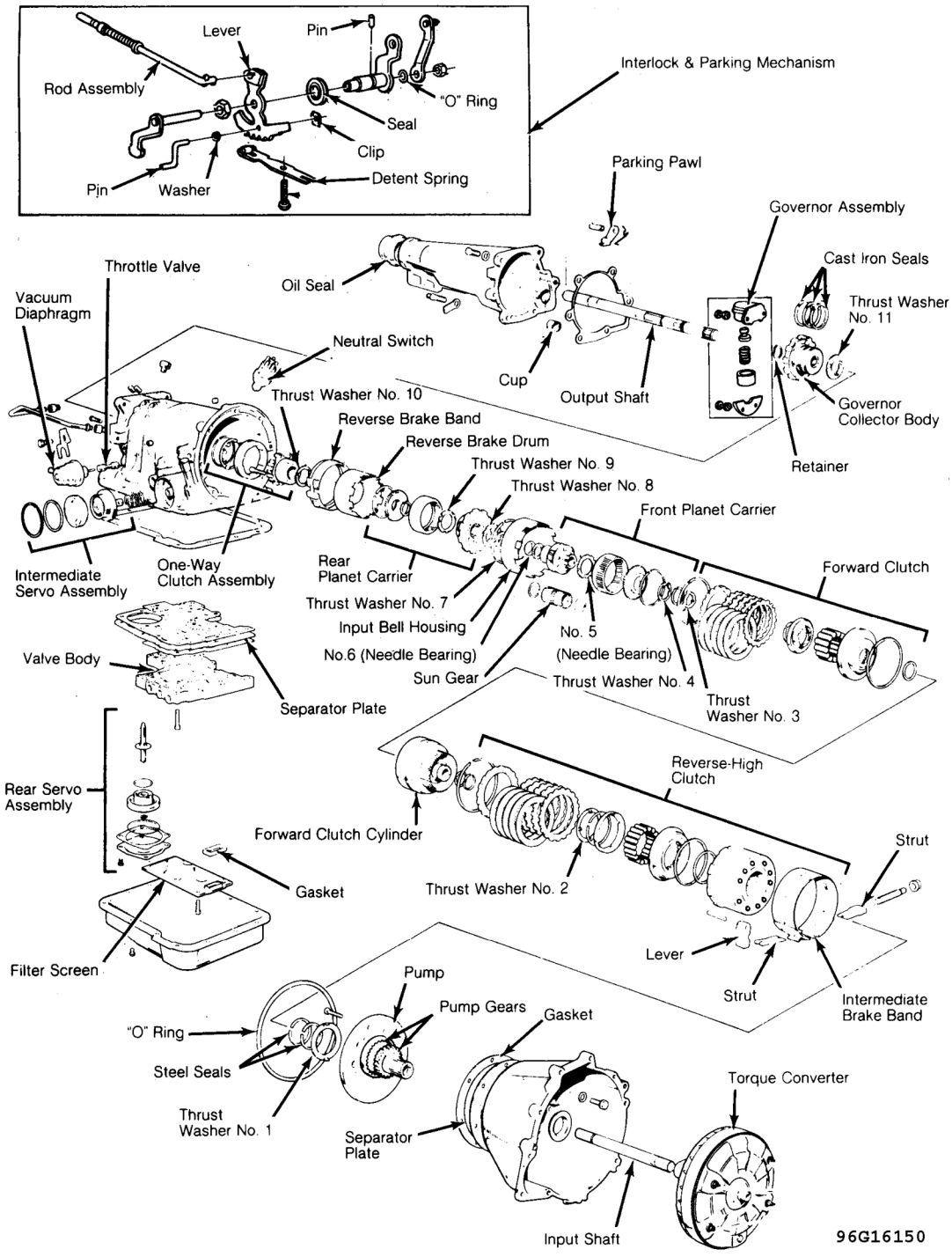

Fig. 19: Exploded View of C-3 Automatic Transmission Assembly
Courtesy of FORD MOTOR CO.

COMPONENT DISASSEMBLY & REASSEMBLY

PUMP

1. Remove pump gasket from pump assembly. Remove converter housing seal from converter housing. Remove thrust washer No. 1 from pump assembly. Remove seal rings from pump hub. Remove pump assembly attaching bolts and pump. Remove separator plate from converter housing.
2. Remove pump gears from pump body. **DO NOT** reassemble pump at this time. Pump body will be needed during disassembly of clutches and for an end play check during final reassembly.

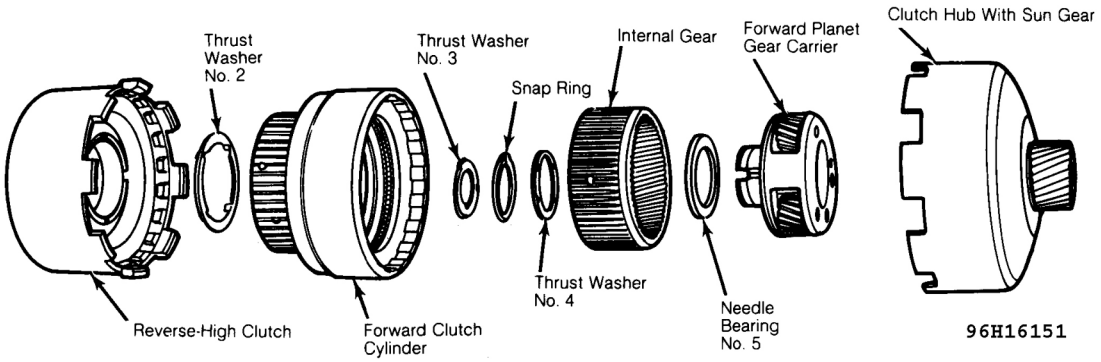

Fig. 20: Exploded View of Forward Part of Transmission Gear Train
Courtesy of FORD MOTOR CO.

REVERSE-HIGH CLUTCH

Disassembly

1. Remove large pressure plate retaining ring. Remove pressure plate and clutch pack. Using Spring Compressor (T65L-77515-A), compress piston return springs and remove small retaining ring. See **Fig. 21** . Carefully release pressure on springs.

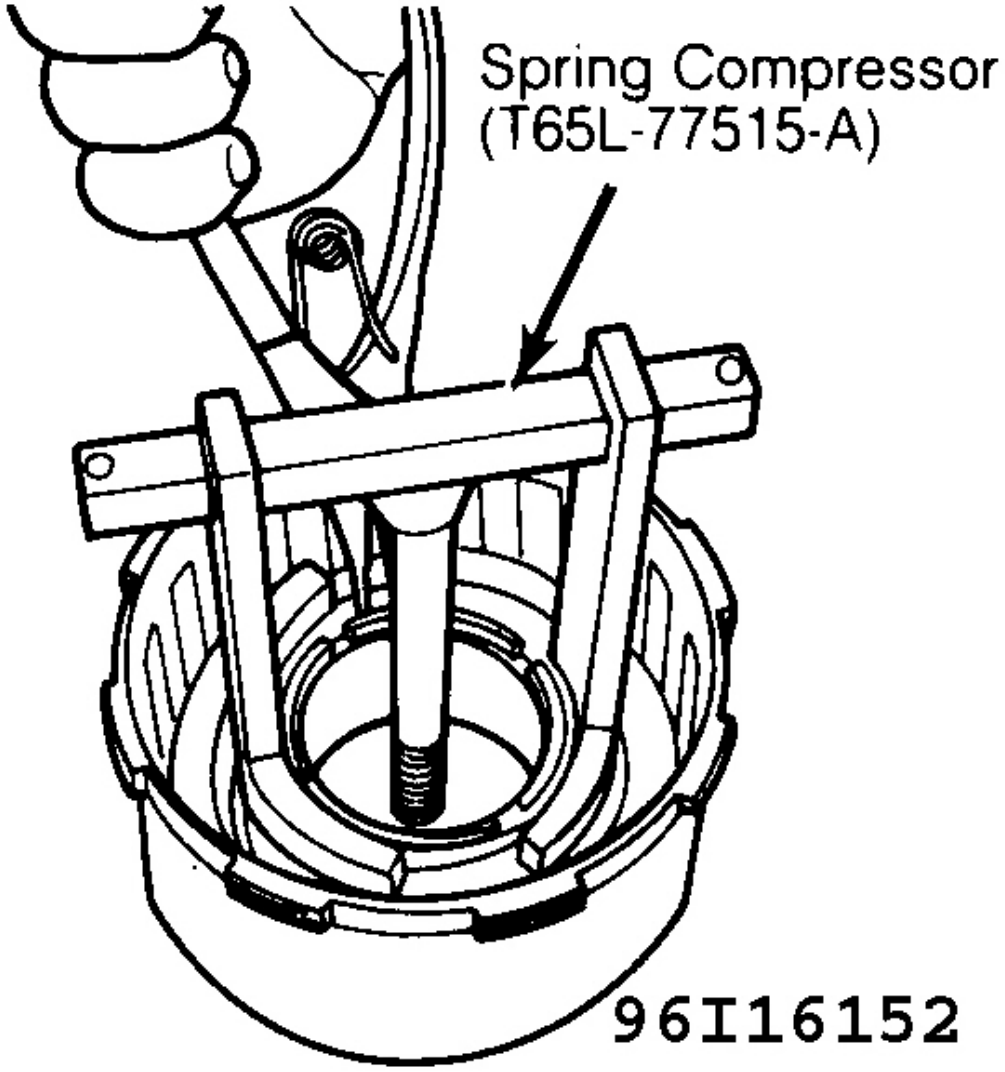

Fig. 21: Compressing Piston Return Springs & Retainer
Courtesy of FORD MOTOR CO.

2. Remove spring retainer and return springs. Turn clutch body over and carefully force out piston with compressed air. See **Fig. 22** . Remove hydraulic pump and "O" rings from piston and clutch body.

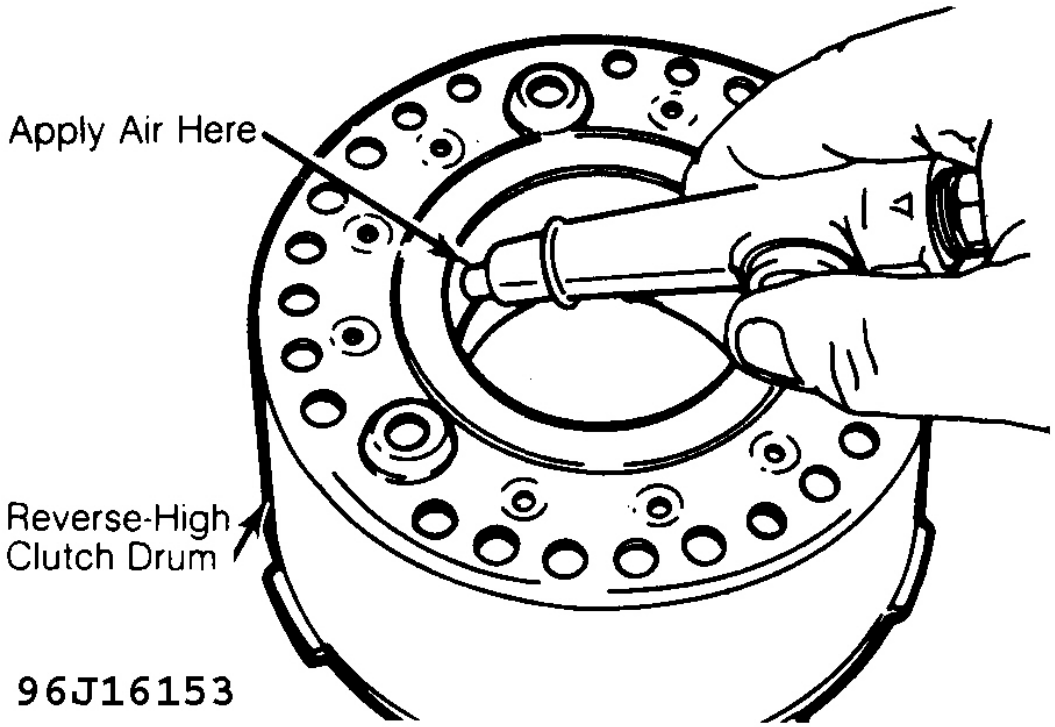

Fig. 22: Using Compressed Air to Remove Reverse-High Clutch Piston
Courtesy of FORD MOTOR CO.

Reassembly

1. Inspect all parts for wear, damage, or effects of overheating. If new composition clutch plates are to be used, soak in transmission fluid for 30 minutes before installing.
2. Install new "O" rings on piston and clutch body. Carefully install clutch piston, using Seal Protectors (T74P-77404-A) to protect inner and outer seals. See **Fig. 23** .

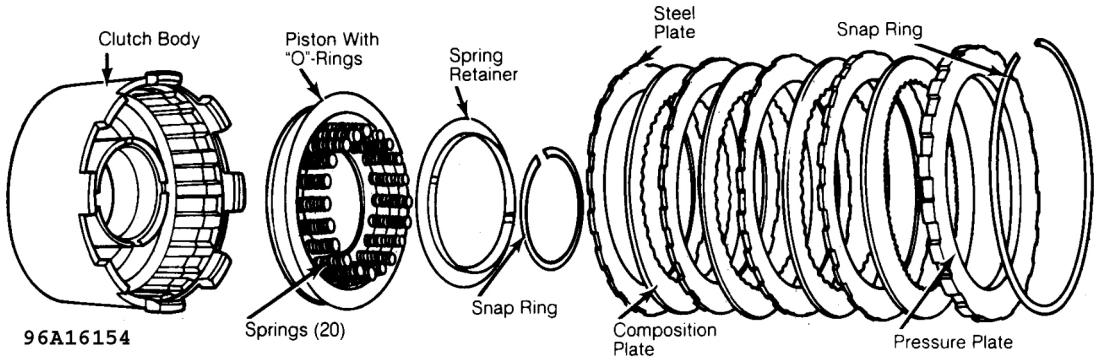

Fig. 23: Exploded View of Reverse-High Clutch Assembly
Courtesy of FORD MOTOR CO.

3. Install 20 piston return springs and spring retainer. Compress springs with tool used at disassembly. Install snap ring and remove compressing tool. Install clutch plates, starting with steel plate.
4. Alternate composition and steel plates until all clutch plates are installed. Last plate installed is thick pressure plate. Install pressure plate and secure with snap ring. Push down on pressure plate. Measure clearance between pressure plate and snap ring with feeler gauge. See **Fig. 25** . Clearance should be .054-.082" (1.39-2.11 mm).

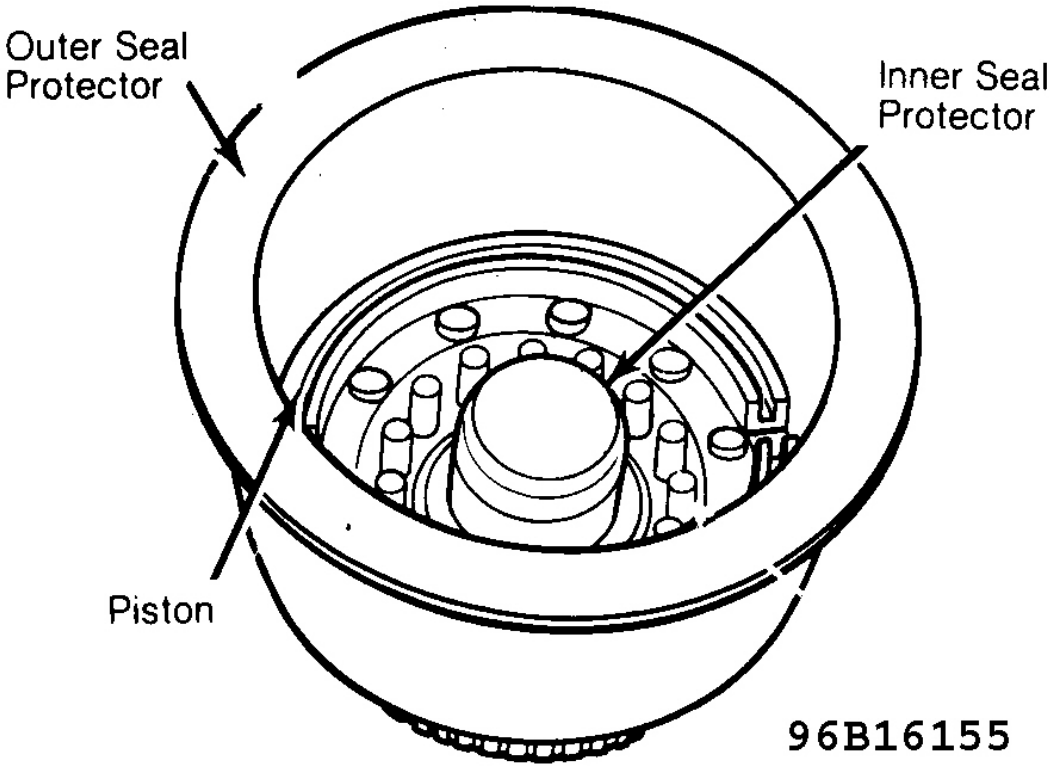

Fig. 24: Reverse-High Clutch Piston Installation
Courtesy of FORD MOTOR CO.

5. If clearance is not within specification, install correct thickness selective snap ring. Reverse-High clutch selective snap rings are available in following thicknesses: .054", .068", .082", and .096" (1.37, 1.73, 2.08, and 2.44 mm).

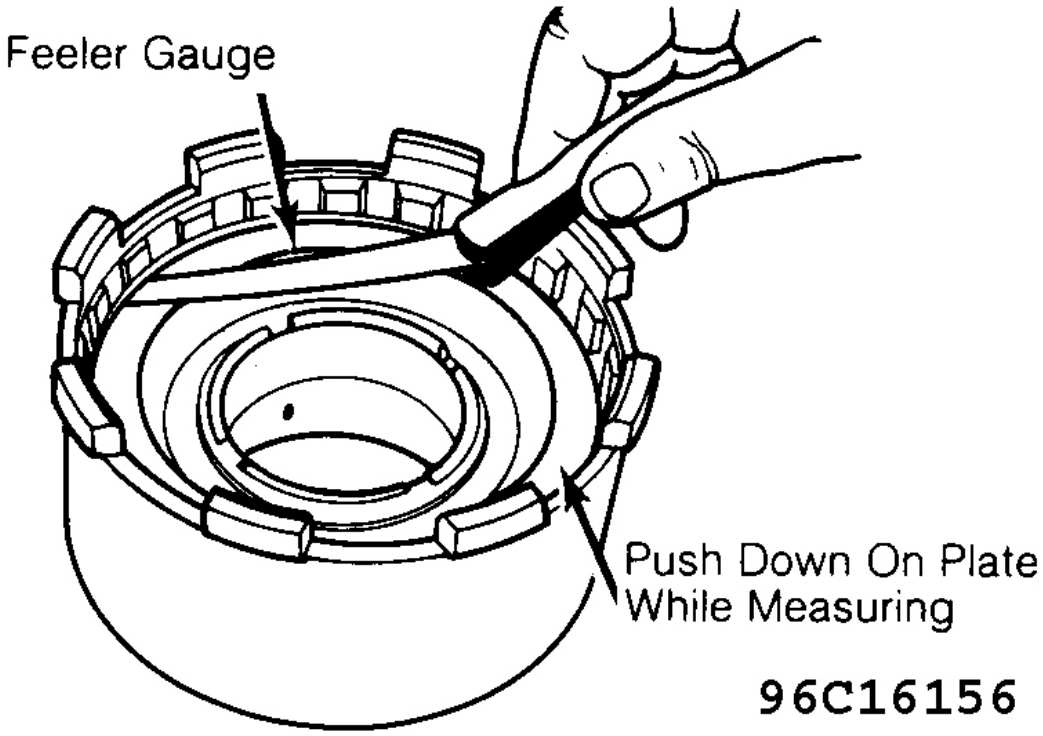

Fig. 25: Reverse-High Clutch Pressure Plate Clearance
Courtesy of FORD MOTOR CO.

FORWARD CLUTCH

Disassembly

1. Remove large retaining ring. Lift out pressure plate, clutch pack, and rubber cushion spring. Using Spring Compressor (T65L-77515-A), compress piston return springs. Remove small retaining ring. See **Fig. 27** .

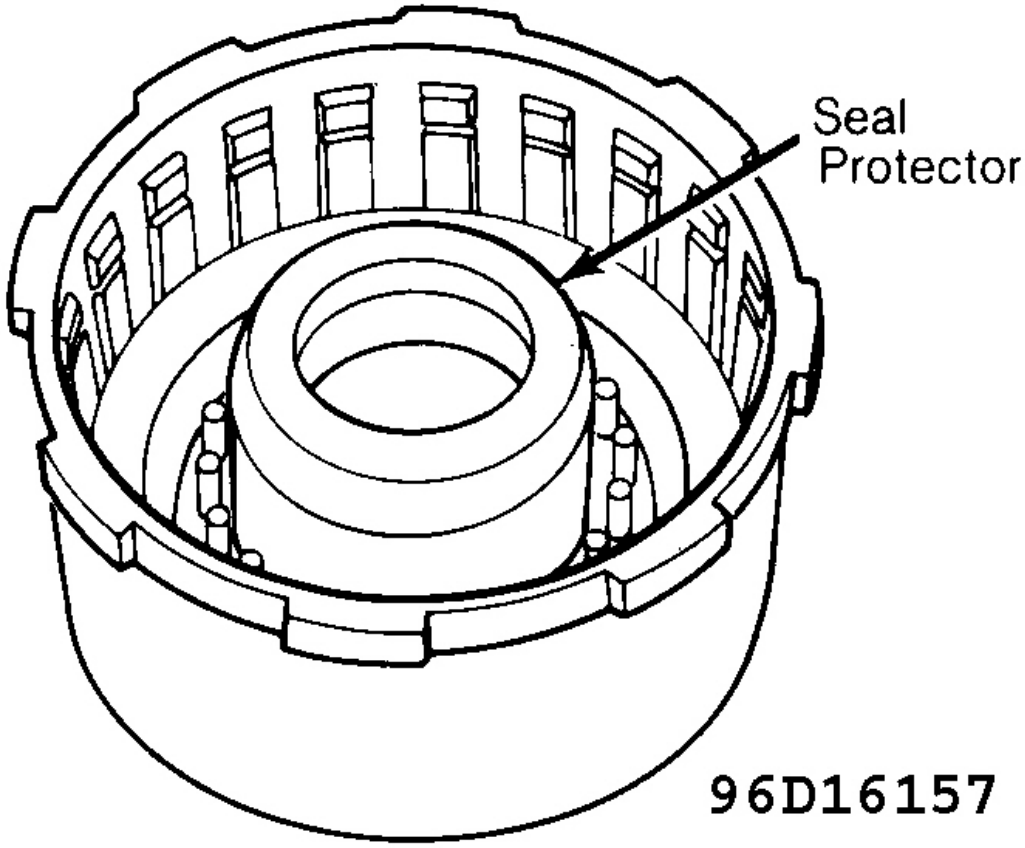

Fig. 26: Positioning of Seal Protectors for Forward Clutch Piston Installation
Courtesy of FORD MOTOR CO.

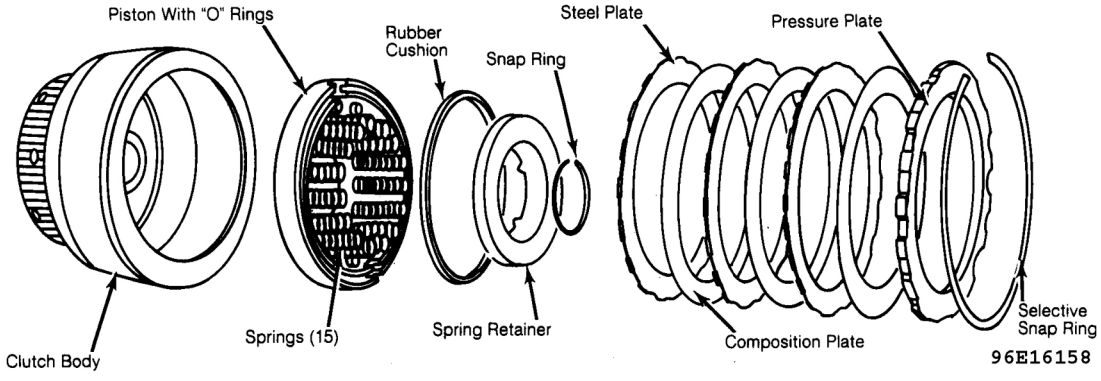

Fig. 27: Exploded View of Forward Clutch Assembly
Courtesy of FORD MOTOR CO.

2. Carefully release pressure on springs. Remove spring retainer and springs. Using compressed air, carefully force clutch piston from clutch body. Remove "O" rings from piston and clutch body.

Reassembly

1. Inspect all parts for wear, damage, or effects of overheating. If new composition clutch plates are to be used, soak in transmission fluid for 30 minutes before installing.
2. Use Protector (T74P-77548-A & B) to prevent damage when installing inner and outer seals. Install new "O" rings. Apply petroleum jelly to rings and to shoulder at clutch stub. Carefully install piston. See **Fig. 26** .
3. Install piston return springs and spring retainer. Compress springs with tool used at disassembly. Install snap ring and remove tool.
4. Install rubber cushion in groove on outer face of hydraulic piston. Install clutch plates. Start with steel plate. Alternate composition and steel plates until all clutch plates are installed. Last plate installed is thick pressure plate.
5. Install pressure plate and large retainer ring. Measure clearance between retainer ring and pressure plate following procedures given for reverse-high clutch. Clearance for forward clutch is .051-.079" (1.3-2.0 mm).
6. Install new steel seals on clutch hub. See **Fig. 27** . Forward clutch selective snap rings are available in following thicknesses: .054", .068", .082", and .096" (1.37, 1.73, 2.08, and 2.44 mm).

INTERNAL GEAR & PLANET GEAR ASSEMBLY

Disassembly

Remove snap ring, planet gear carrier internal gear, and thrust washer No. 4. Separate planet gear carrier from internal gear. Remove needle bearing No. 5.

Reassembly

Insert planet gear carrier with needle bearing No. 5 into internal gear. Position thrust washer No. 4 in place and secure with new snap ring. Make sure internal gear is free from planet gear carrier.

NOTE: Needle roller bearing (No. 6 washer) can only be replaced complete, with planet gear carrier. If needle bearing thrust washer is removed, washer must be positioned with collar pointing toward rear.

ONE-WAY CLUTCH

Disassembly

Using screwdriver, remove snap ring. See **Fig. 28** . Lift out cage with springs and bearing rollers as unit.

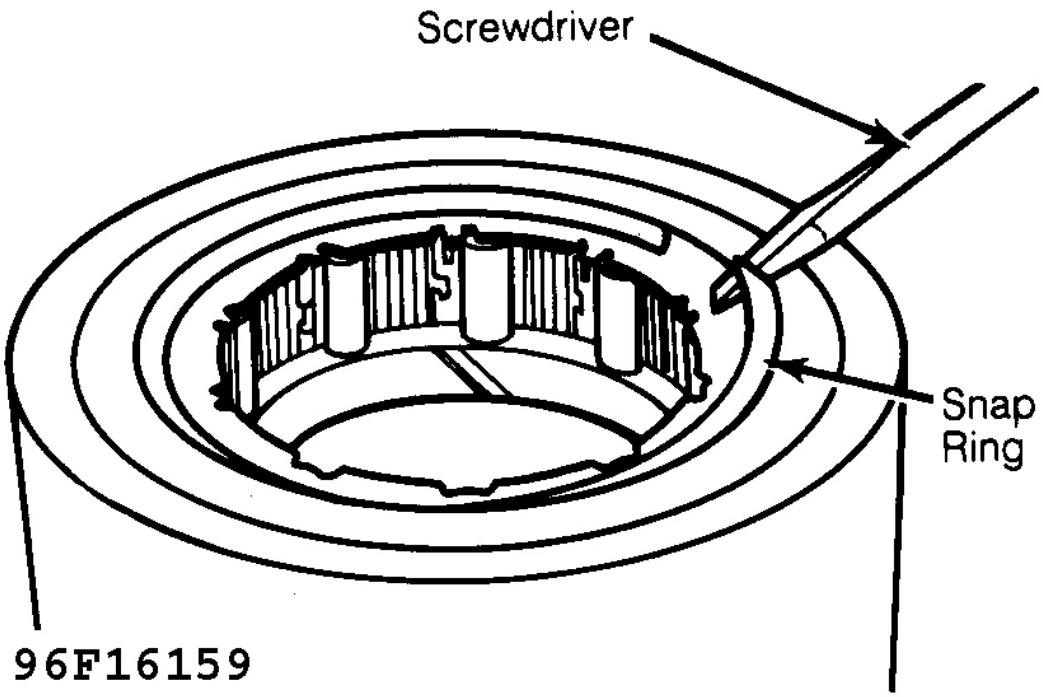

Fig. 28: Removing Snap Ring from One-Way Clutch Cage
Courtesy of FORD MOTOR CO.

Reassembly

Inspect all parts for wear or damage. Install cage with springs. Insert bearing rollers one by one. Use screwdriver to compress springs. Install snap ring. See **Fig. 29** .

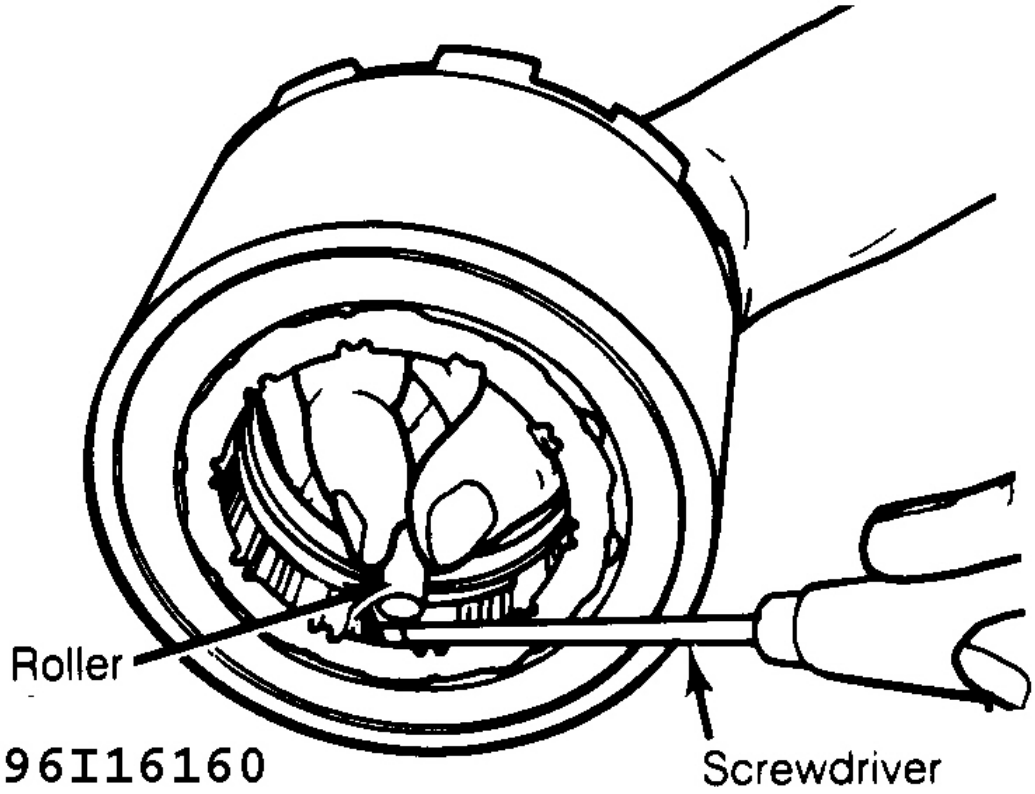

Fig. 29: Installing One-Way Clutch Bearing Rollers
Courtesy of FORD MOTOR CO.

GOVERNOR

Disassembly

Remove governor body-to-oil collector body retaining bolts. Care must be taken not to drop governor body and components when bolts are removed. Remove components from governor body. Remove counterweight.

Reassembly

1. Clean and inspect all parts. Remove 3 rubber seals from oil collector body. Install new seals without excessive stretching.
2. Assemble counterweight, spring, and primary valve in governor body. Assemble governor body and counterweight to oil collector body. Ensure fluid passages are not covered with counterweight. See **Fig. 30** .

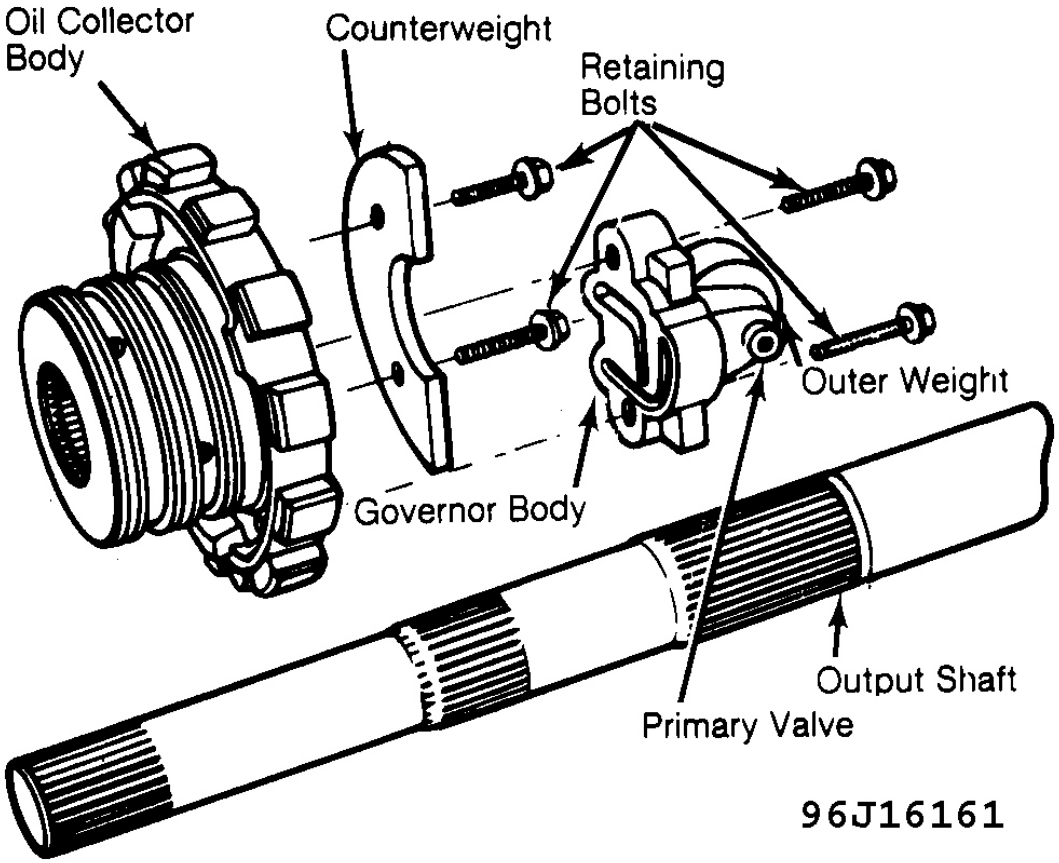

Fig. 30: Exploded View of Governor Assembly
Courtesy of FORD MOTOR CO.

CONTROL VALVE BODY

Disassembly

Remove separator plate bolts. See **Fig. 31** . Lift off separator plate and gasket. Remove 4 check balls, one check puck and both relief valves with springs. See **Fig. 32** . Remove retaining plates, dowels, plugs, and valves with springs from valve body.

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

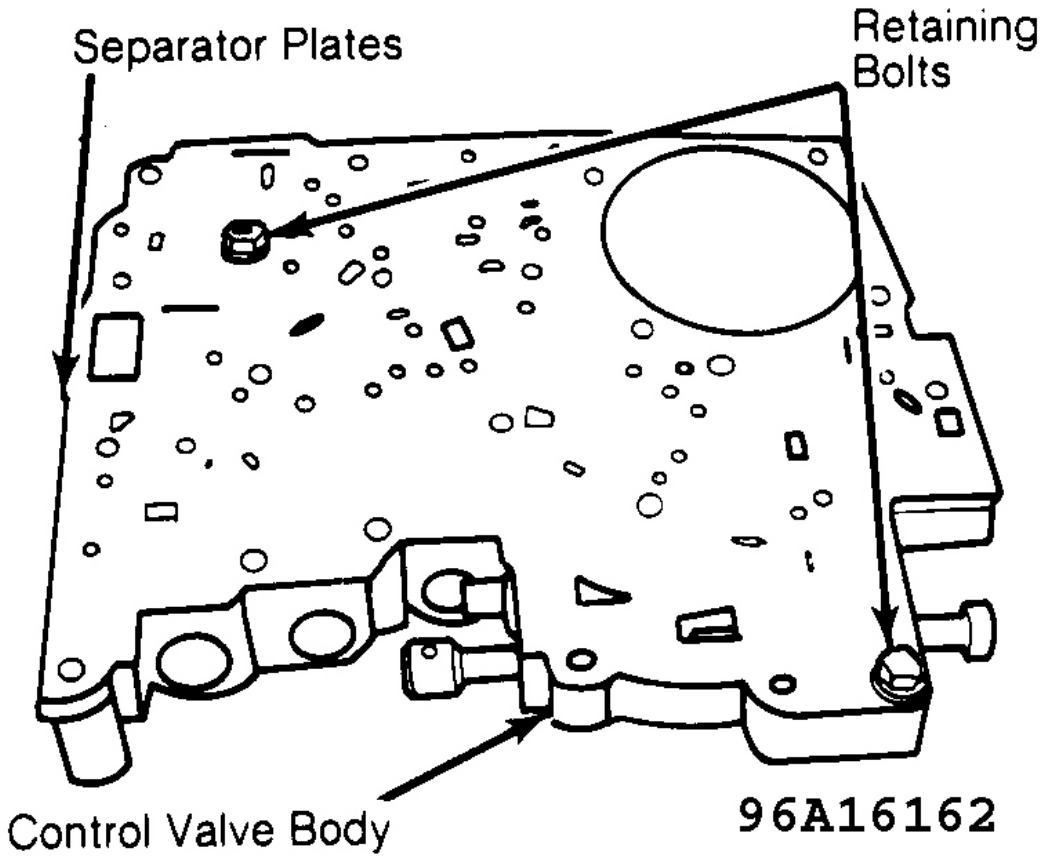

Fig. 31: Valve Body Separator Plate & Bolt Locations
Courtesy of FORD MOTOR CO.

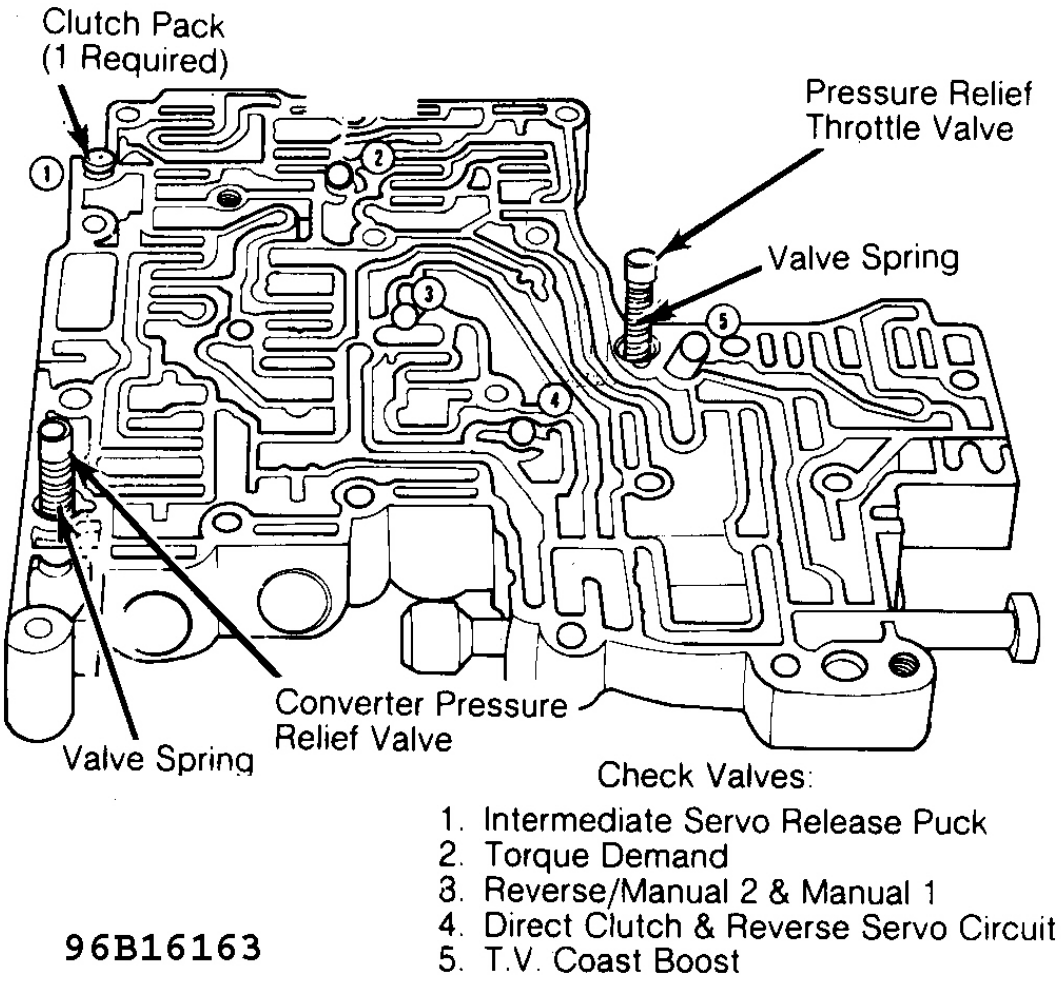

Fig. 32: Locations of Check Balls & Pressure Relief Valve in Valve Body
Courtesy of FORD MOTOR CO.

Reassembly

Clean all parts and blow dry. Inspect all parts for burring, unevenness, and gum deposits. Lubricate all parts with transmission fluid. Install valves, springs, plugs, and pins. See **Fig. 35** . Using new gasket, install separator plate.

NOTE: Ensure I.D. tag on separator plate does not interfere with valve body fit to case.

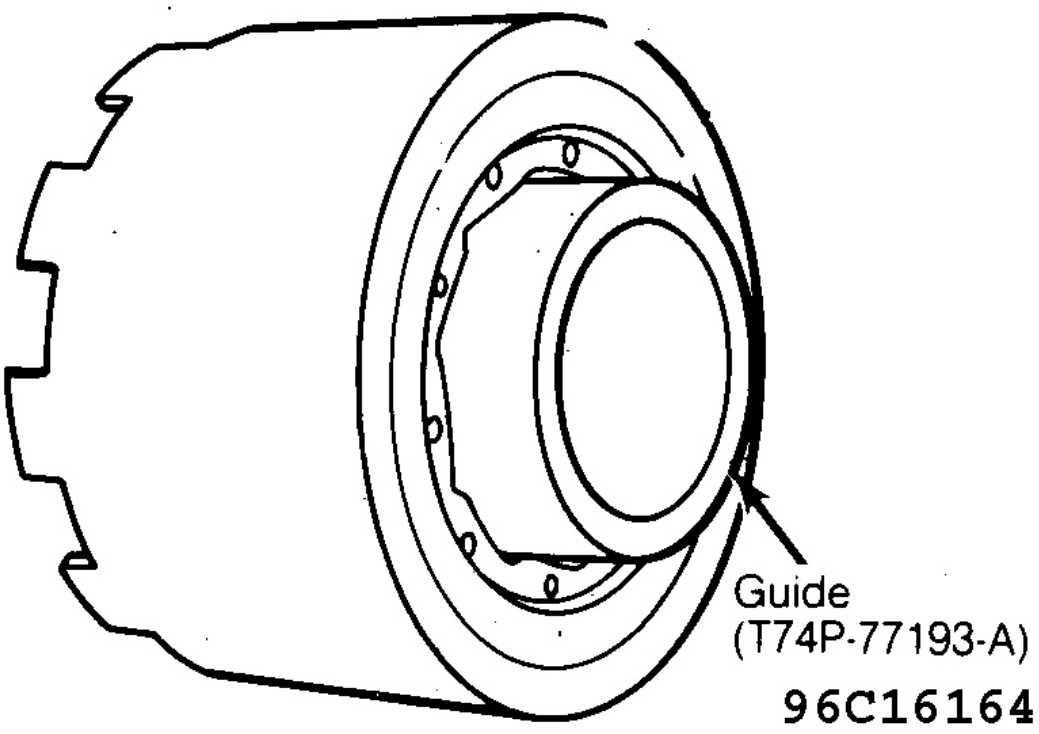

Fig. 33: Clutch Replacing Guide Used to Install One-Way Clutch Inner Race
Courtesy of FORD MOTOR CO.

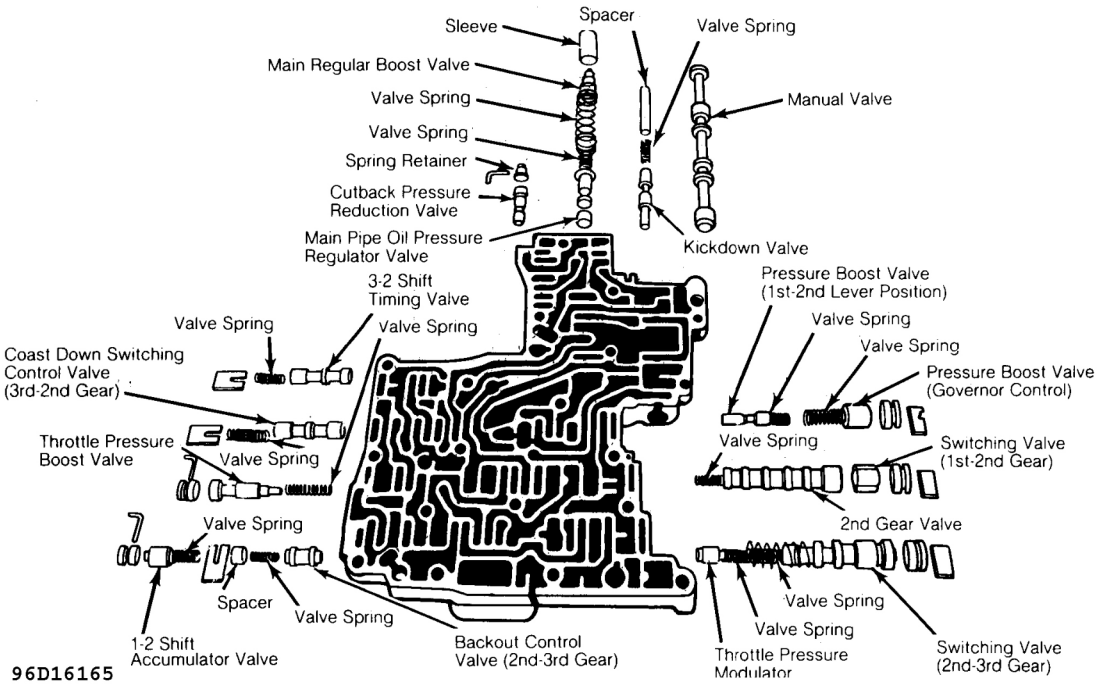

Fig. 34: Exploded View of Valve Body Assembly
Courtesy of FORD MOTOR CO.

TRANSMISSION REASSEMBLY

NOTE: Lubricate all parts with transmission fluid before reassembly. Thrust washers and gaskets should be held in place with petroleum jelly. Ensure thrust washers are installed in correct locations. See Fig. 14 .

1. Install new pump oil seal, using Front Pump Alignment Set (T74P-77103-A) and Front Pump Seal Replacer (T74P-77248-B). Install vacuum diaphragm unit.
2. Position thrust washer No. 11 in case. Install output shaft and governor assembly, taking care to avoid damaging rubber oil seal rings.
3. Position rear band in housing. Ensure it is aligned with guide pilots. Position thrust washer No. 10 in case. Install reverse brake drum using Clutch Replacing Guide (T74P-77193-A). Check operation of one-way clutch. Looking into case, reverse drum should not rotate counterclockwise.
4. Remove guide. Install internal gear and attach with snap ring. Position thrust washer No. 9 to back of planet carrier. Install carrier and attach to reverse brake drum with snap ring. Position thrust washer No. 8 on planet gear carrier and install front assembly.
5. Replace front servo piston or "O" rings at this time, if necessary. Install spiral spring on front servo piston assembly. Install piston and cover. Press down on cover with Compressor (T74P-77028-A). Install snap ring. See Fig. 35 .

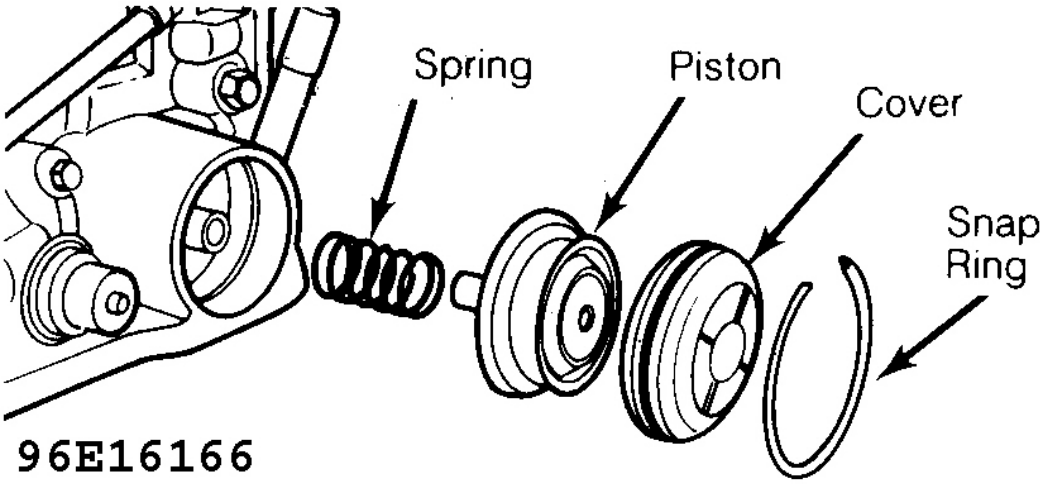

Fig. 35: Exploded View of Front Servo Assembly
Courtesy of FORD MOTOR CO.

6. Install brake band and struts, starting with strut at servo piston lever. Being careful not to damage oil seals, turn transmission so output shaft points downward.

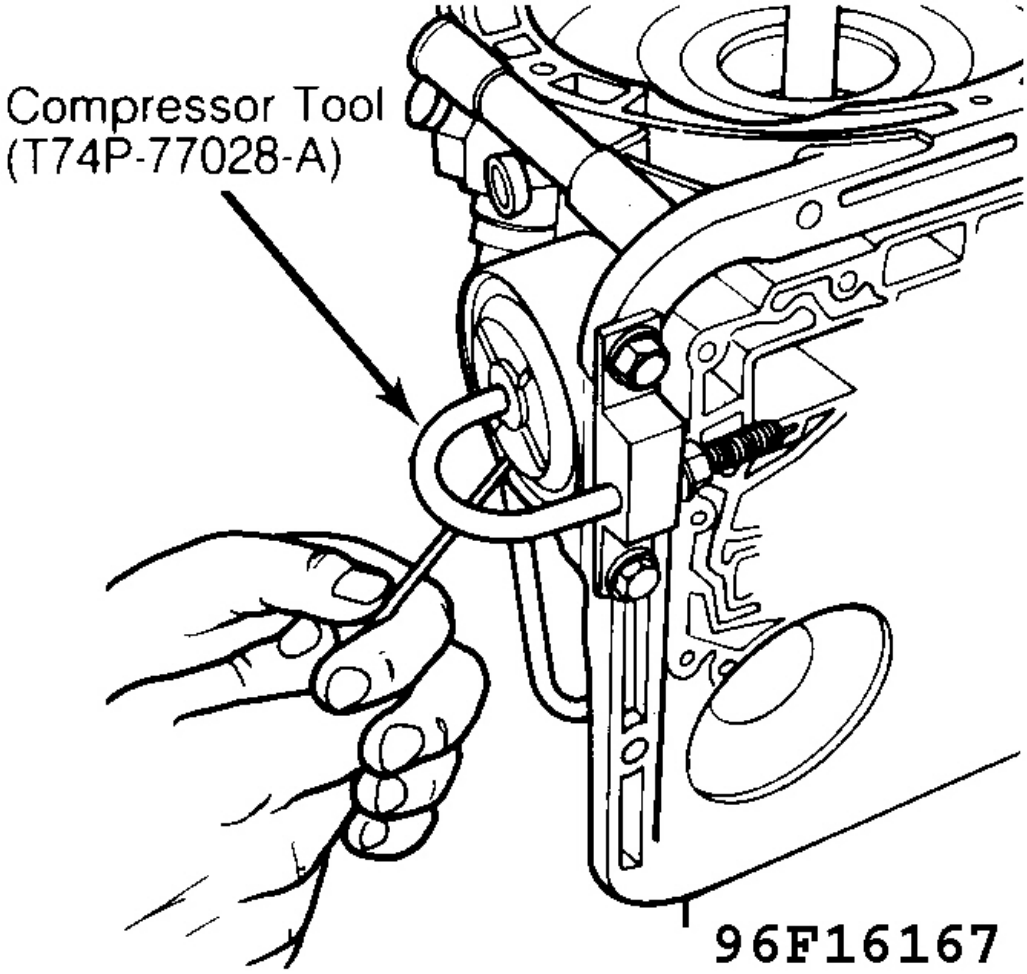

Fig. 36: Tool Set-Up for Front Servo Snap Ring Installation
Courtesy of FORD MOTOR CO.

7. Install oil pump and thrust washer No. 1. See **Fig. 37** . Ensure pump body is correctly engaged. Pump body must be below level of case gasket surface. Mount a dial indicator on pump body with stylus resting on transmission housing. Zero indicator. Swing gauge around so stylus rests on pump body.
8. Check endplay reading on dial indicator and note for reference. Move dial indicator to opposite side of pump and repeat procedure. Determine average of 2 endplay readings. Endplay specification is .001-.025" (.025-.64 mm).
9. If reading exceeds specification, No. 1 thrust washer should be replaced. Thrust washers are available in .053-.094" (1.35-2.40 mm) thicknesses, in increments of .001" (.05 mm).

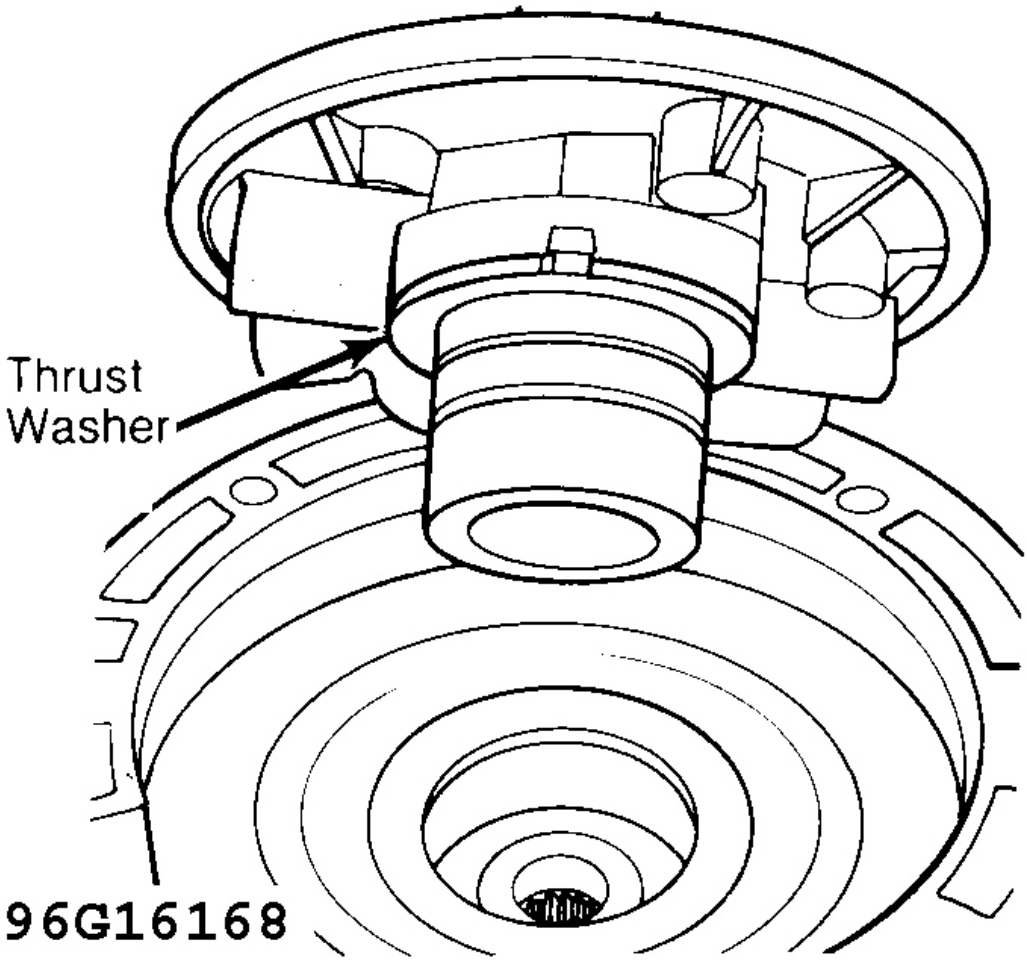

Fig. 37: Installing Pump Into Case
Courtesy of FORD MOTOR CO.

10. Remove dial indicator and oil pump body. Install inside and outside pump gears. Ensure small gear has I.D. pump drive flat recess facing upward and large gear has identification dot facing downward.
11. Position steel plate on oil pump in exact position required. See **Fig. 38** . Install complete assembly to converter housing and tighten retaining bolts finger tight.

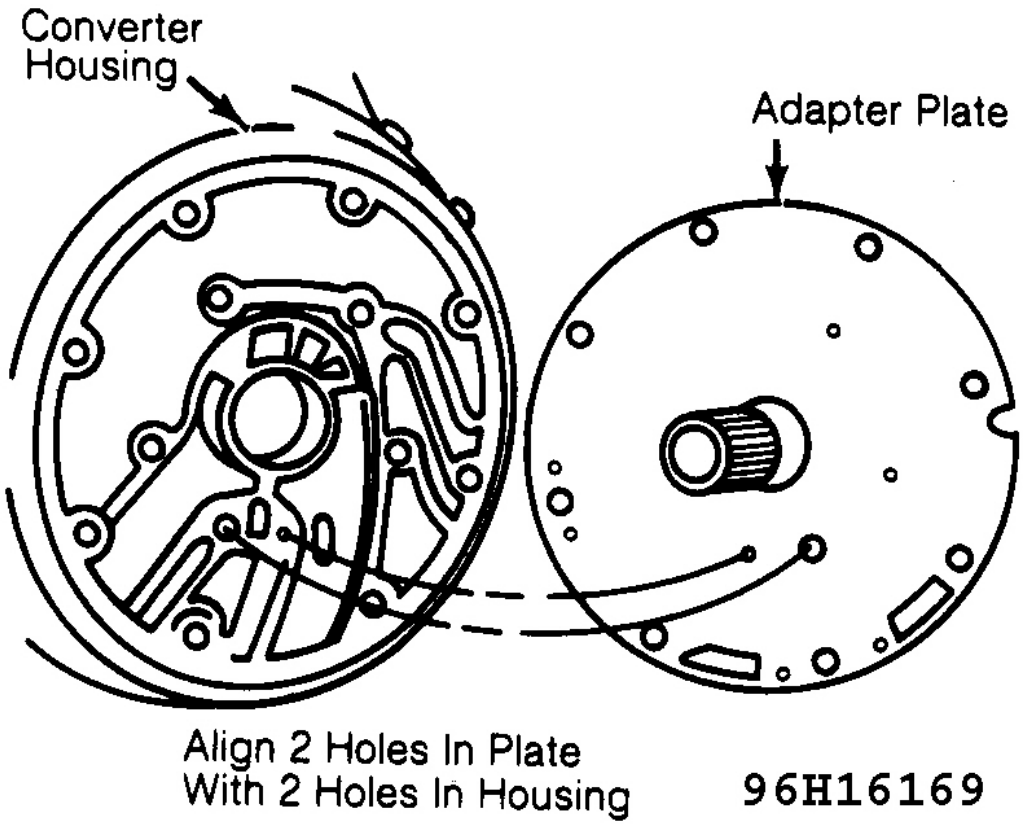

Fig. 38: Correct Positioning of Adapter Plate on Housing
Courtesy of FORD MOTOR CO.

12. To align front pump, use Pump Alignment Set (T74P-77103-X). Set consists of 4 sleeves and handle. Each sleeve has same O.D. but different I.D. See **Fig. 39**

CAUTION: As measurement is critical, ensure sleeve gauging surfaces are in good condition. Damage to sleeve gauging surfaces may result in incorrect pump-to-converter housing alignment. Pump seal leakage, pump gear breakage, or bushing failure will occur.

13. Select smallest I.D. sleeve which will fit completely over support shaft. Assemble selected sleeve to handle. Slide tool down over shaft until it bottoms against pump. See **Fig. 40** .

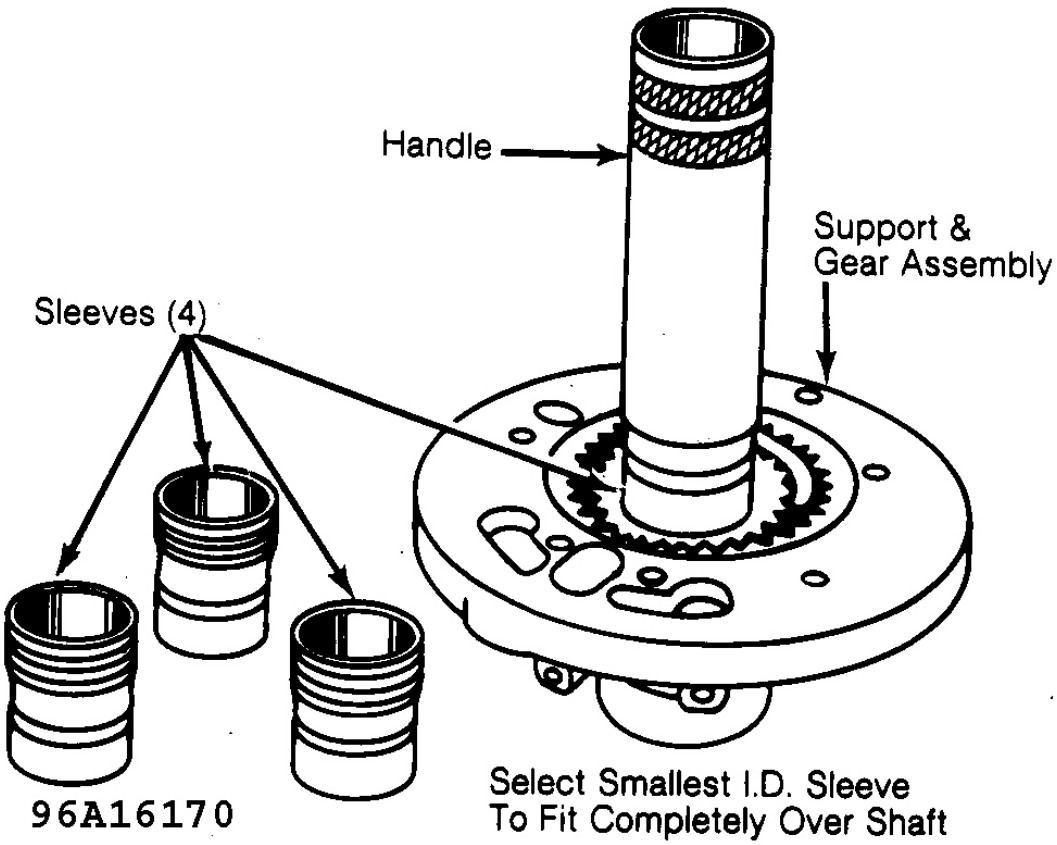

Fig. 39: Front Pump Alignment Set
Courtesy of FORD MOTOR CO.

14. Outside diameter of sleeve centers pump in converter housing. Tighten retaining bolts and remove centering tool. Install input shaft into pump. Install converter into pump gears. Rotate converter to check for free movement.
15. Remove converter and input shaft. Position selected No. 1 thrust washer to pump housing. Install new "O" ring. Carefully install converter housing with pump using new gasket. Use care to avoid damaging steel oil seals.

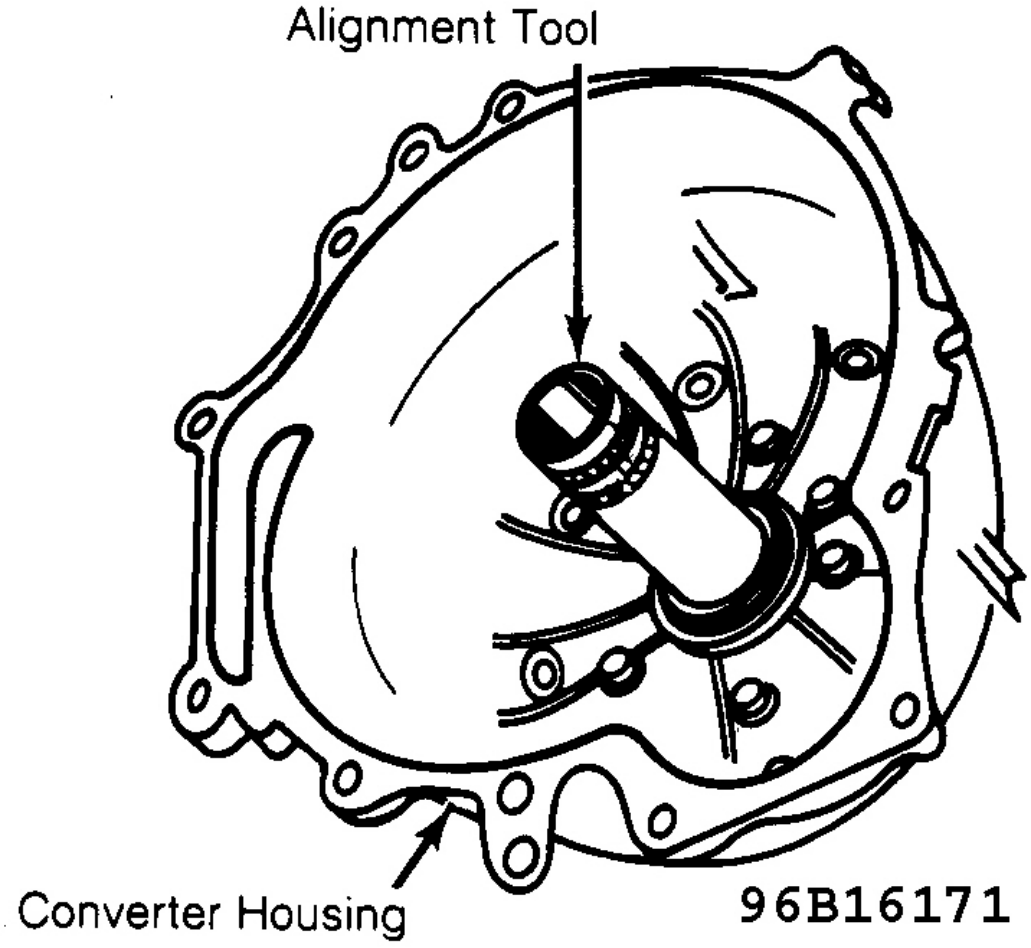

Fig. 40: Front View of Converter Housing.
Courtesy of FORD MOTOR CO.

16. Install bolts and tighten. Be sure to use new aluminum washers. Adjust front band. Perform air pressure tests to ensure proper transmission operation as described under **AIR PRESSURE CHECKS** in this article.
17. Install parking pawl and return spring in extension housing and preload. See **Fig. 41** . Using new gasket, install extension housing. Make sure to correctly seat operating parking rod in extension guide cup. See **Fig. 42** . Install and tighten bolts. Replace extension housing oil seal and bushing.

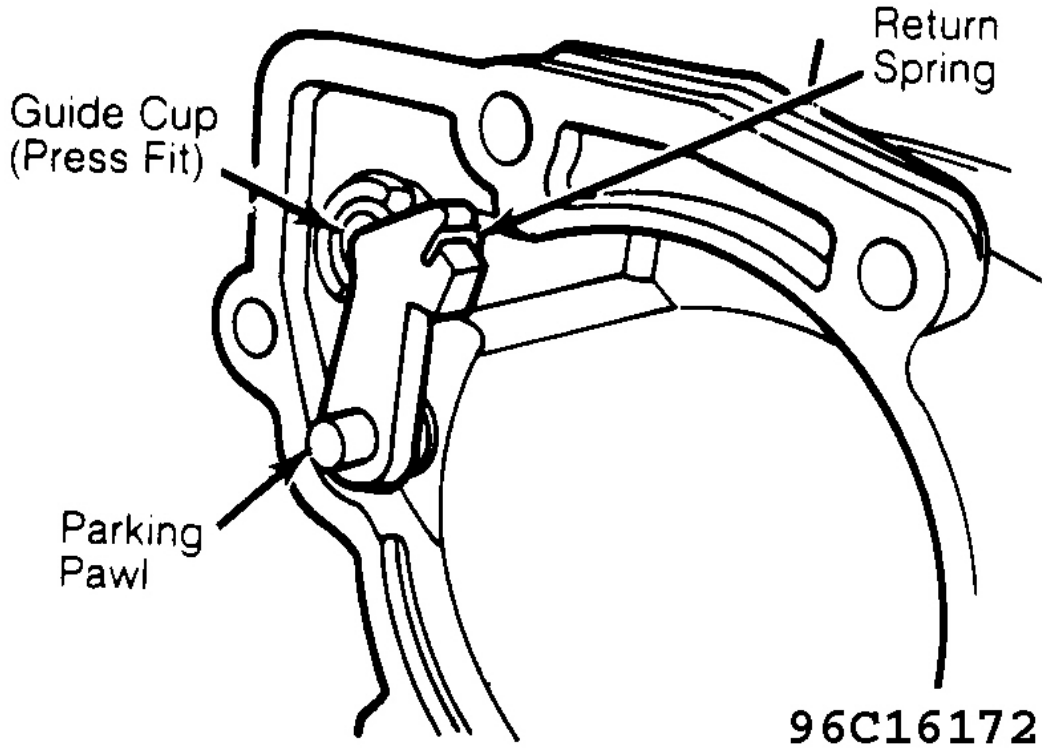

Fig. 41: Interior View of Extension Housing
Courtesy of FORD MOTOR CO.

18. Using new gasket, place control valve body in position. Attach and lock connecting rod to manual valve. See **Fig. 43** . Be careful not to bend connecting rod ("Z" link). Install and finger tighten retaining bolts "A" and "B" to locate control valve body. See **Fig. 2** for bolt locations.

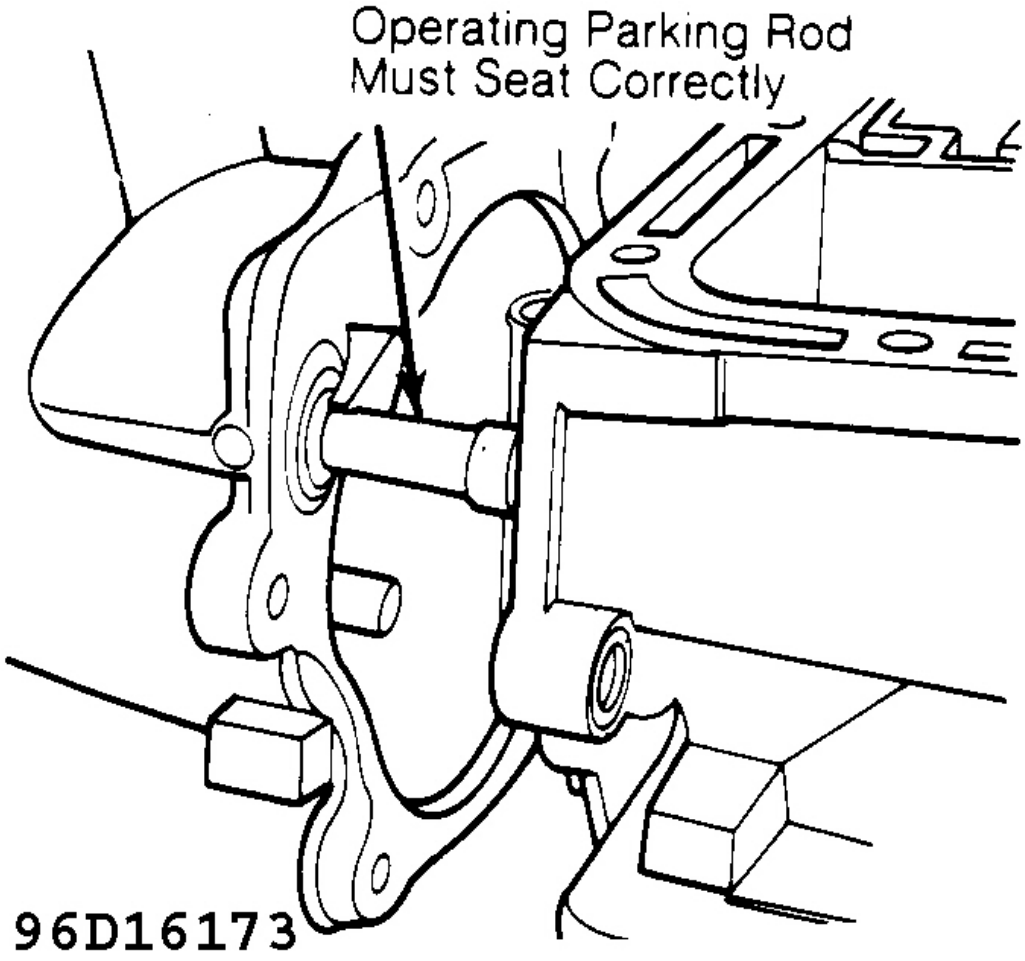

Fig. 42: Rear of Transmission Housing
Courtesy of FORD MOTOR CO.

19. Install and tighten all remaining bolts except filter screen bolts. Remove bolt "A" and attach detent spring to bolt. Reinstall bolt "A" and tighten bolts "A" and "B" completely. Ensure inner downshift lever is seated between stop and downshift valve. See **Fig. 44** .

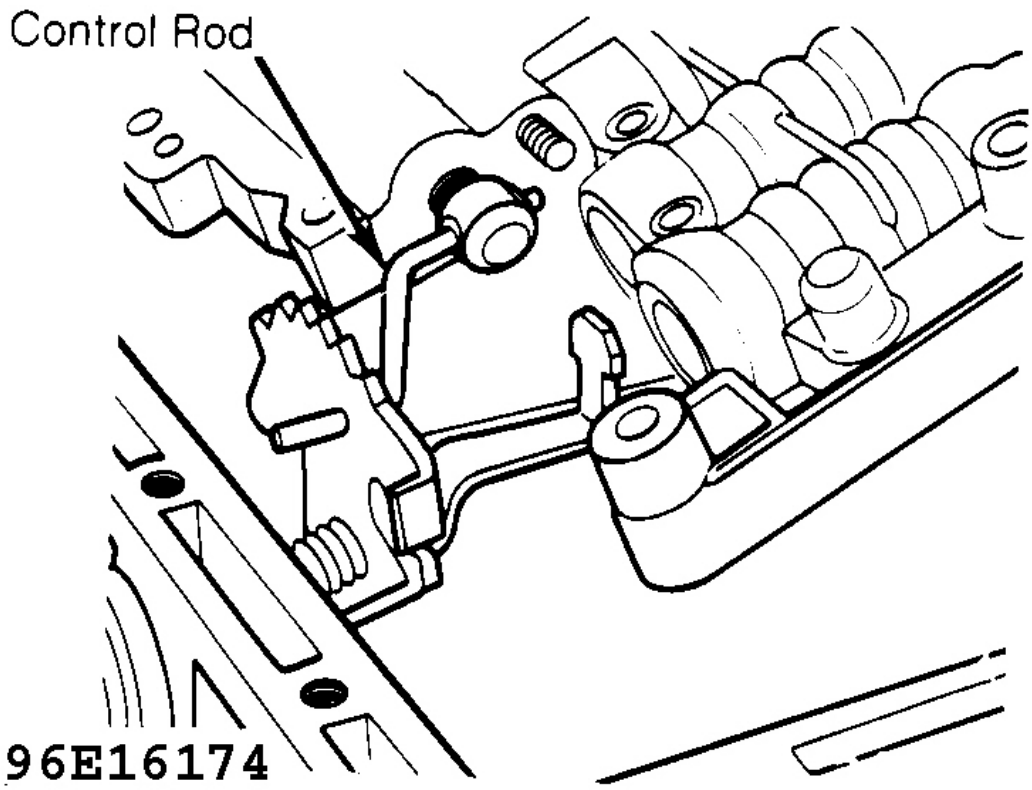

Fig. 43: Interior View of Transmission Case
Courtesy of FORD MOTOR CO.

20. Assemble servo piston rod, servo piston, and spring. Install additional reverse servo Piston Spring (D4ZZ-7D031-A) to check piston travel. Install piston assembly into rear servo bore. Make sure piston rod is correctly seated in reverse band apply end.
21. Install servo rod Selecting Guide (T74P-77190-A) using new servo cover gasket. Install and tighten 3 retaining bolts. Servo cover bolts are not long enough to attach tool to case. Use 3 M6 x 30 valve body retaining bolts.

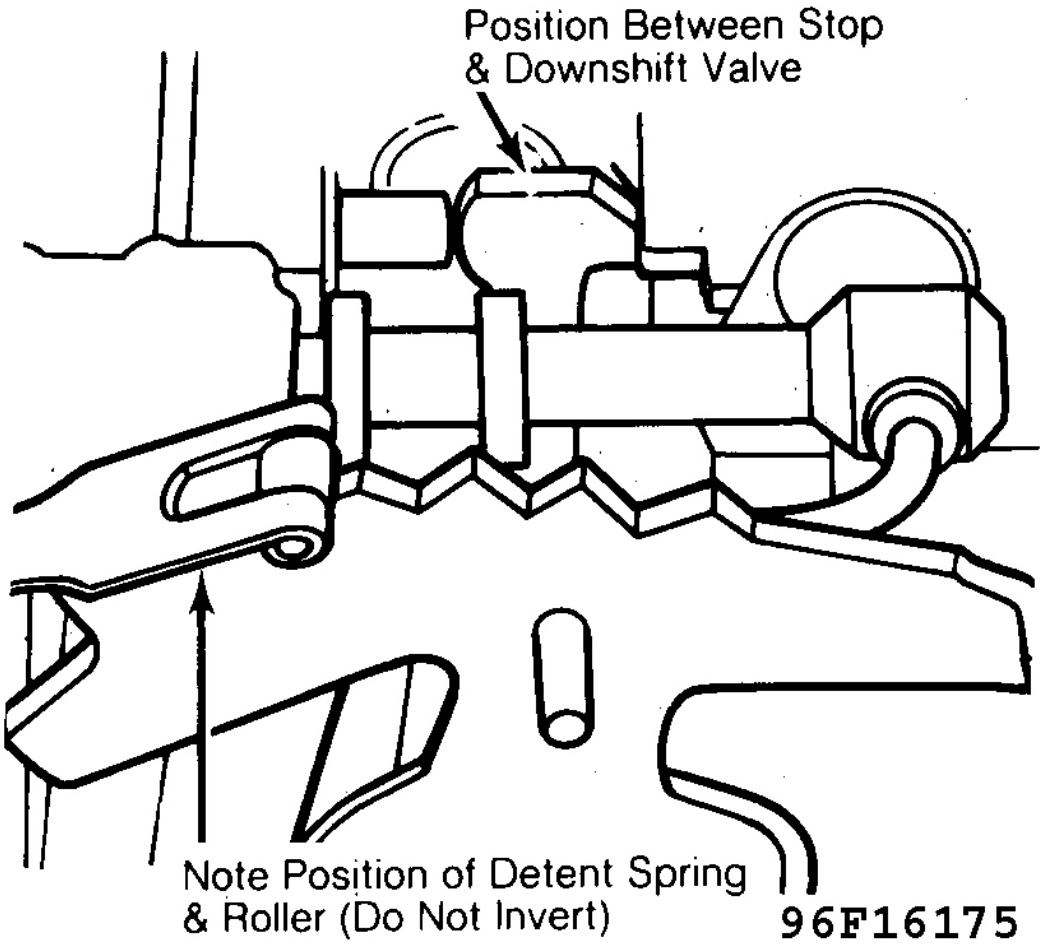

Fig. 44: Bottom of Transmission Case
Courtesy of FORD MOTOR CO.

22. Tighten servo tool adjusting screw to 36 INCH lbs. (4 N.m). Install dial indicator on case. Position indicator tip on one of 3 servo piston pads accessible through cut-out of tool. Zero dial indicator. See **Fig. 45** .

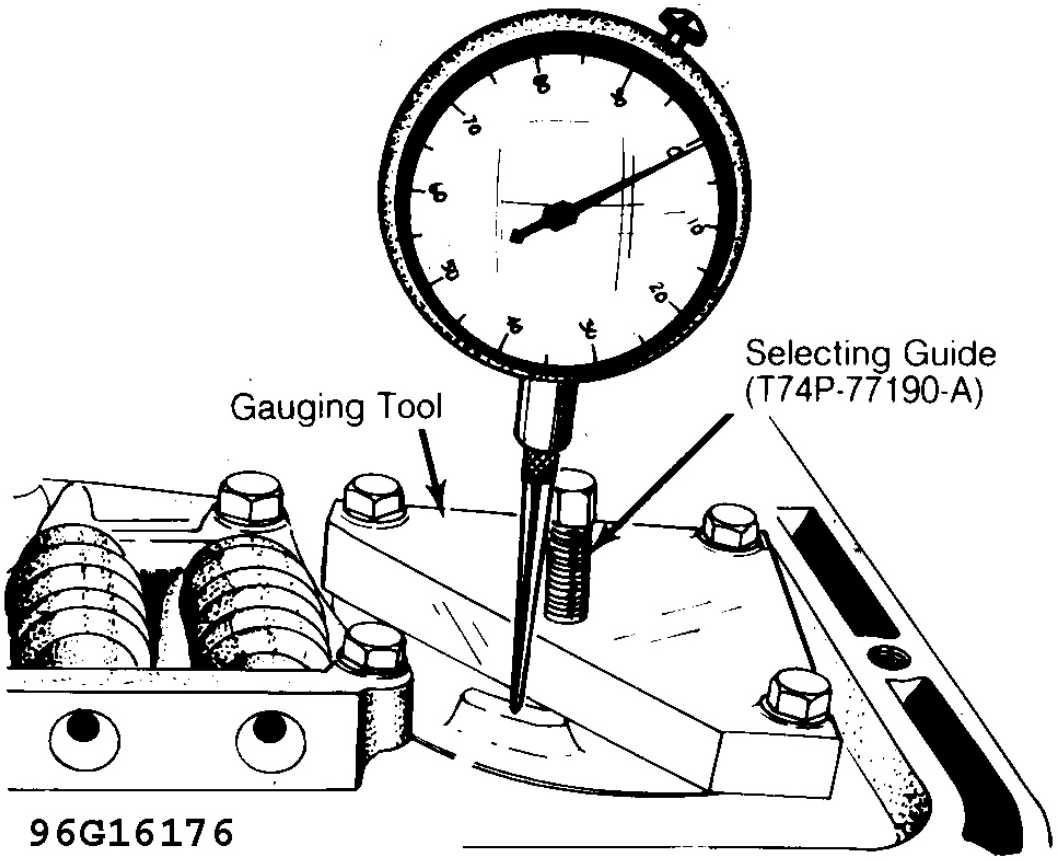

Fig. 45: Tool Set-Up for Rear Servo Pin Selection
Courtesy of FORD MOTOR CO.

23. Back out tool adjusting screw until servo piston bottoms out on tool. Record distance servo piston moved. If servo piston travel is .120-.220" (3.05-5.59 mm), servo piston rod is acceptable. If piston travel is greater than .220" (5.59 mm), use next longer servo piston and rod.

NOTE: Servo piston rods are available in 3 sizes and identified by grooves on rod. Rod sizes and I.D. are as follows: 2.085-2.112" (1 groove), 1.986-2.014" (no groove), and 1.888-1.915" (2 grooves).

24. If travel is less than .120" (3.05 mm), use next shorter piston and rod. Install correct servo piston and rod. Recheck piston travel. See **Fig. 46** . Remove servo adjusting tool and additional reverse servo spring (only used for checking piston travel).
25. Reinstall servo assembly. Install servo cover and bolts. Install oil pan with new gasket. Tighten pan bolts to specification in 2 steps. Install neutral start switch. Install input shaft and torque converter.

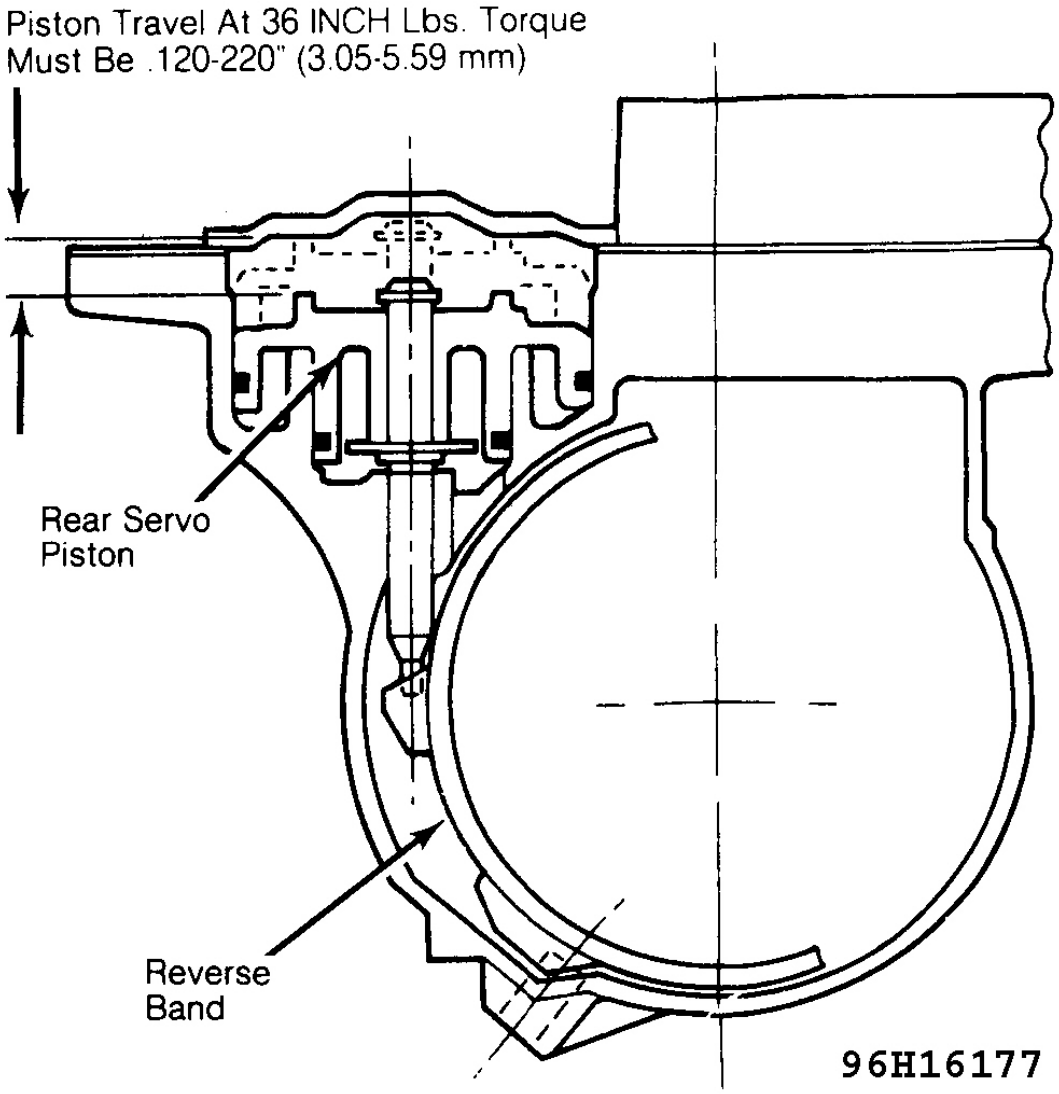

Fig. 46: Rear Servo Piston Travel Measurement
Courtesy of FORD MOTOR CO.

TORQUE SPECIFICATIONS

TORQUE SPECIFICATIONS

Application	Ft. Lbs. (N.m)
Connector-to-Case Bolts	10-15 (14-20)
Converter Drain Plug	20-30 (27-41)
Converter Housing-to-Case Bolts	27-39 (37-53)
Converter Housing-to-Engine Bolts	28-38 (38-52)

Converter-to-Flywheel Bolts	27-49 (37-67)
Extension Housing-to-Case Bolts	27-39 (37-53)
Filler Tube to Engine Clip Bolts	28-38 (38-52)
Flywheel-to-Crankshaft Bolts	48-53 (65-72)
Front Band Adjusting Screw Lock Nut	35-45 (47-61)
Oil Pan-to-Case Bolts	12-17 (16-23)
Manual Lever Inner Nut	30-40 (41-54)
	INCH Lbs. (N.m)
Downshift Lever Outer Nut	89-120 (10-14)
Governor-to-Collector Body Bolts	89-120 (10-14)
Neutral Switch to Case Bolts	89-120 (10-14)
Oil Cooler Line or By-Pass Tube-to Connector Bolts	89-120 (10-14)
Pump-to-Converter Housing Bolts	89-120 (10-14)
Rear Servo Cover-to-Case Bolts	89-120 (10-14)
Separator Plate-to-Valve Body Bolts	89-120 (10-14)
Valve Body-to-Case Bolts	72-96 (8-11)
Vacuum Diaphragm Retaining Clip to Case Bolts	89-120 (10-14)