

1995 Ford Escort

1995-96 AUTOMATIC TRANSMISSIONS F4E/4EAT - Type-F Overhaul

1995-96 AUTOMATIC TRANSMISSIONS

F4E/4EAT - Type-F Overhaul

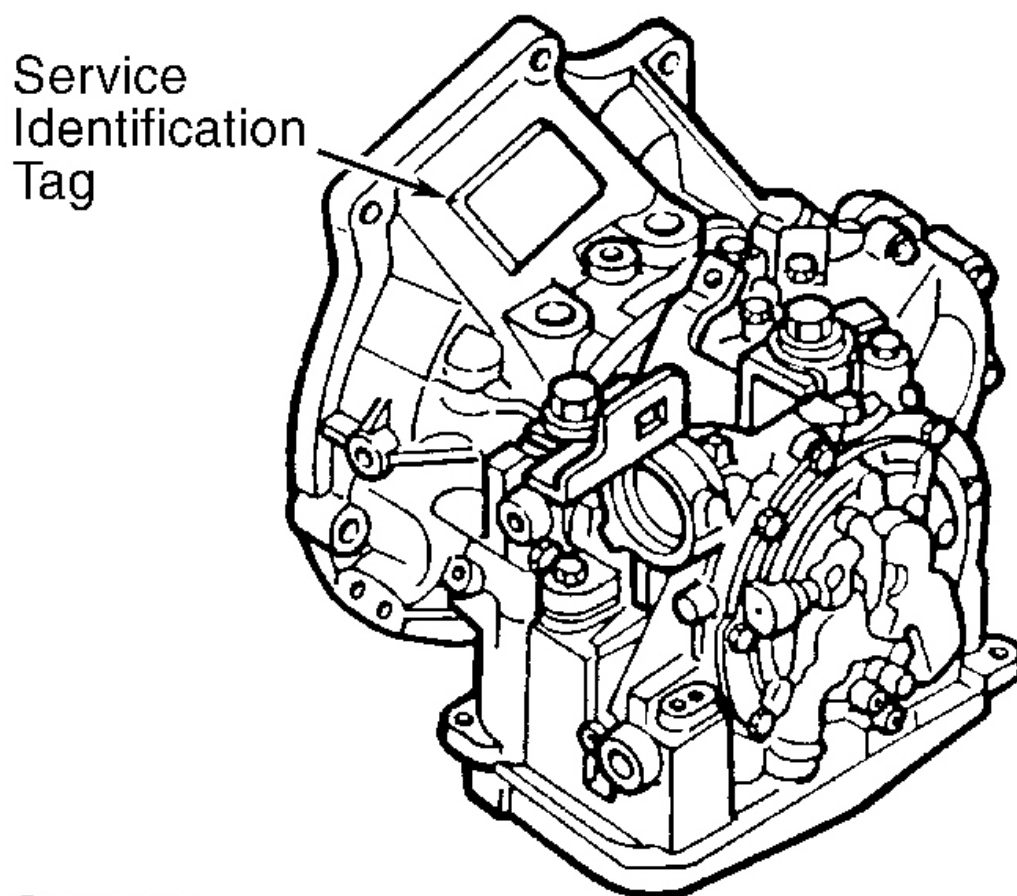
APPLICATION

APPLICATION

Application	Transaxle
Escort	
1.8L SFI	F4E/4EAT
1.9L SFI	F4E/4EAT
Tracer	
1.8L SFI	F4E/4EAT
1.9L SFI	F4E/4EAT

IDENTIFICATION

Transaxle is identified on vehicle certification label by "E" designation under TR space. Label is attached to driver-side door jamb, below the latch striker. For model, assembly and serial number information refer to service identification tag attached to transaxle. See **Fig. 1** and **Fig. 2**.



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Fig. 1: Identifying F4E/4EAT - Type-F Transaxle F4E/4EAT - Type-F Transaxle Assembly
Courtesy of FORD MOTOR CO.



Fig. 2: Identifying F4E/4EAT - Type-F Transaxle Service Identification Tag
 Courtesy of FORD MOTOR CO.

DESCRIPTION & OPERATION

The F4E/4EAT is a 4-speed transaxle assembly controlled by both electronic and mechanical systems. Input signals from sensors are sent to Powertrain Control Module (PCM) and computed to determine gear, shift patterns and lock-up timing. The PCM has built-in self-diagnosis, fail-safe mode and warning code display for the main input sensors and solenoid valves.

Four solenoid valves are located on the valve body. Solenoid valves actuate shifting and torque converter lock-up by switching oil flow through passages within the valve body.

When the lock-up solenoid is switched on, fluid pressure holding the lock-up control valve is drained, allowing valve to open. When valve opens, hydraulic pressure from the rear chamber causes the converter clutch to press tightly against the converter cover. Lock-up occurs and force is transmitted directly to the transaxle with no fluid slippage.

When the PCM switches lock-up solenoid off, hydraulic pressure in the front chamber becomes greater than pressure in the rear chamber. The converter clutch then moves away from the converter cover and lock-up is released.

LUBRICATION & ADJUSTMENTS

See appropriate TRANSMISSION SERVICING article.

ON-VEHICLE SERVICE

2-4 SERVO

Removal & Installation

Remove air cleaner and upper radiator hose. Depress servo assembly with large pair of slide-lock pliers. Remove retaining ring. Remove servo assembly. Coat new seals with fluid before assembly. To install, reverse removal procedure. Check fluid level.

DIFFERENTIAL OIL SEALS

NOTE: Support engine with appropriate 3-bar engine support if rear engine mount removal is necessary.

Removal

1. Raise and support vehicle. Remove front wheels and splash shields. Drain transaxle fluid. Disconnect tie rods from steering arms. Disconnect stabilizer link (if equipped).
2. Remove ball joint stud clamp bolts and nuts. Pull down lower control arms to separate lower arms from knuckles. Remove transmission support crossmember. Remove right joint shaft bracket (if equipped).
3. Remove axle shafts by carefully prying between shaft and transaxle case. Support axle shafts using wire. Remove oil seals.

Installation

1. Using appropriate seal replacer, install oil seals. Replace circlip on end of axle shafts. Install axle shafts. Install right joint shaft bracket (if equipped). Install transmission support crossmember. Attach ball joints to knuckles. Install tie rod ends, and tighten nuts to specification. See **TORQUE SPECIFICATIONS**.
2. Install ball joint bolts and nuts. Tighten nuts to specification. Install stabilizer link assemblies (if applicable). Turn nuts on each link assembly until 1.00 (25.4 mm) of bolt thread can be measured from upper nut. Secure upper nut, and back off lower nut until torque of 12-17 ft. lbs. (16-23 N.m) is reached.
3. Install splash shields and front wheels. Lower vehicle and remove engine support (if necessary). Fill transaxle with Mercon ATF. Check for leaks.

LINE PRESSURE ADJUSTMENT

1. Remove left engine and transmission splash shield. Connect appropriate pressure gauge to line pressure port (square head plug, marked "L"). See **Fig. 5**. Place gear selector lever in "P" position. Apply parking brake. Run engine until normal operating temperature is obtained.
2. Using scan tool, verify transmission fluid temperature (TFT) is 140-160°F (60-71°C) and engine idle is 670-730 RPM. Loosen T.V. cable bolt "A" and then bolt "B". See **Fig. 3** and **Fig. 4**. Ensure throttle plate is fully closed.
3. Tighten bolt "A" to 62-87 INCH lbs. (7-10 N.m). Pull T.V. cable outer housing away from bracket until line pressure is slightly above 81 psi. Push T.V. cable outer housing toward bracket until line pressure is 71-74 psi. Tighten bolt "B" to 62-87 INCH lbs. (7-10 N.m). Verify all slack is removed by applying slight

downward pressure on inner cable.

4. Turn engine off and ensure T.V. cable operates smoothly. Start engine, slightly depress accelerator and allow engine to idle. If line pressure is not 61-81 psi, repeat procedure beginning with step 3). If pressure is within specification, turn engine off. Remove pressure gauge and install NEW square head oil passage plug. Tighten plug to 43-87 INCH lbs. (5-10 N.m).

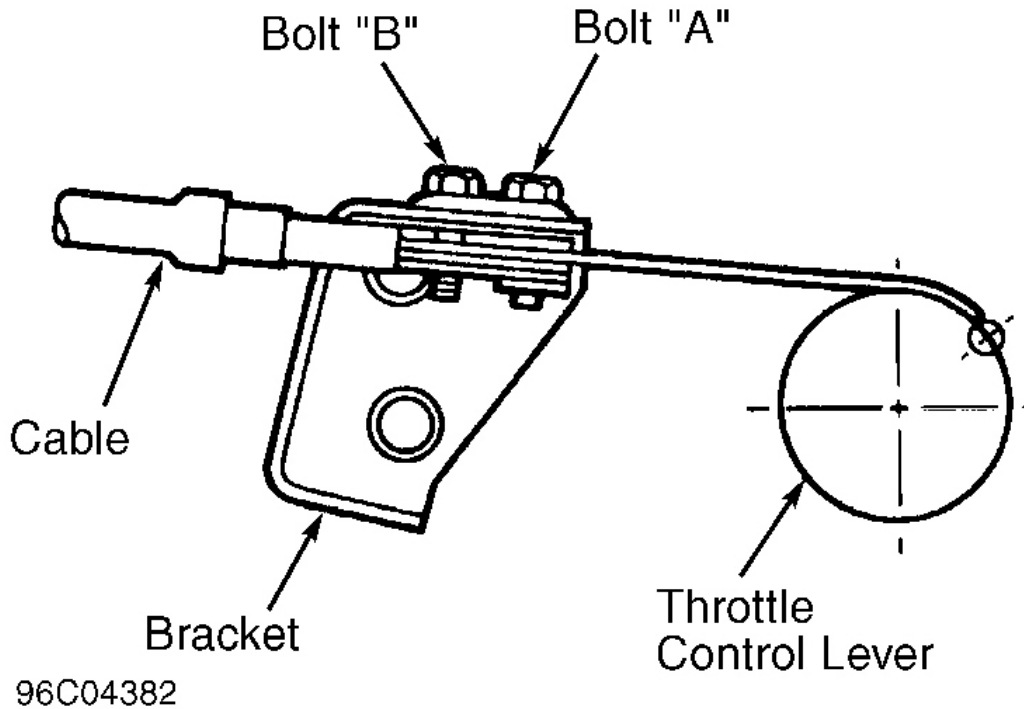
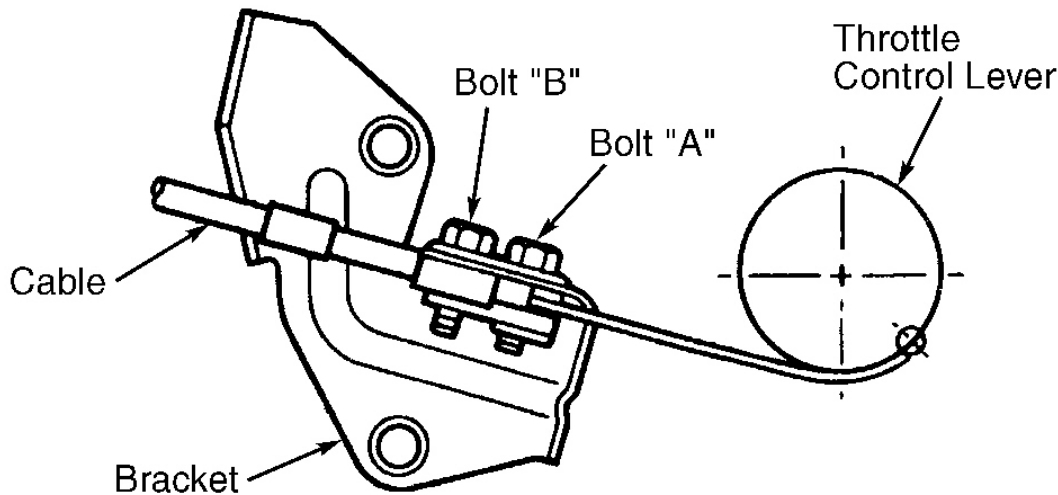


Fig. 3: Adjusting Line Pressure 1.8L Engine
Courtesy of FORD MOTOR CO.



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Fig. 4: Adjusting Line Pressure 1.9L Engine
 Courtesy of FORD MOTOR CO.

PULSE SIGNAL GENERATOR (PSG)

Removal & Installation

Disconnect battery cables, negative cable first. Remove battery hold down clamp, battery cover and battery. Remove battery tray. Disconnect Pulse Signal Generator (PSG) harness connector and remove PSG. To install, reverse removal procedure. Tighten PSG bolt to 69-95 INCH lbs. (8-11 N.m).

THROTTLE VALVE (T.V.) ACTUATING CABLE

Removal

Loosen T.V. cable-to-throttle body bracket nuts. Disconnect T.V. cable from throttle control lever. Remove T.V. cable-to-transaxle bolts. Remove valve body. See **VALVE BODY R & I**. Disconnect T.V. cable from transaxle throttle control lever.

Installation

1. Install T.V. cable into transaxle. Tighten mounting bolt to 69-95 INCH lbs. (8-11 N.m). Connect T.V. cable to transaxle throttle control lever. Remove T.V. cable pin bolt and insert a .16" (4 mm) diameter pin into throttle control lever hole. Install valve body and fluid pan. Fill transaxle with fluid.
2. Remove pin installed in previous step. Apply sealant to T.V. cable pin bolt. Install bolt and tighten to 69-95 INCH lbs. (8-11 N.m). Install T.V. cable into throttle body bracket. Adjust line pressure. See **LINE PRESSURE ADJUSTMENT**.

VALVE BODY R & I

Removal

Raise and support vehicle. Remove transaxle pan bolts and drain fluid. Remove pan. Disconnect harness connectors at valve body assembly. Remove valve body bolts securing wiring harness. Remove remaining bolts and remove valve body assembly.

Installation

Place shift selector lever in "R" position. Install valve body using a mirror to align groove of manual valve with manual valve detent lever. To complete installation, reverse removal procedure. Tighten bolts to specification. See **TORQUE SPECIFICATIONS** . Fill transaxle with fluid. Confirm shift selector is indexed correctly.

TROUBLE SHOOTING

NOTE: Always check fluid levels and selector linkage. Ensure all computer control systems are operating properly before diagnosing transaxle shifting problems. See **AUTO TRANS DIAGNOSIS - F4E/4EAT** article.

SYMPTOMS

Engine Will Not Crank In Any Shift Control Selector Lever

Position

Transmission Range (TR) switch malfunction or disconnected.

Engine Does Not Crank In "P" And/Or "N"

Shift linkage adjustment and TR sensor adjustment.

Engine Starts In Any Position Other Than "P" Or "N"

Shift linkage adjustment and TR sensor adjustment.

Vehicle Moves In Park Or Transaxle Stays In Park

Shift control selector or linkage adjustment, parking pawl damaged.

Vehicle Moves In Neutral

Shift control selector or linkage adjustment, control valve, torque converter and forward clutch.

Vehicle Does Not Move In Forward Gears Or Reverse

Shift cable, control valves, fluid level, oil pump and torque converter.

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Vehicle Does Not Move In Forward Gears, Reverse Okay

Control valves, forward clutch, one-way clutch (sprag) and forward clutch oil supply (blocked).

Vehicle Moves In Forward Gears, No Reverse

Reverse clutch and low clutch.

Severe Noise During Acceleration Or Deceleration

Speedometer cable, shift cable, torque converter, reverse clutch or engine mounts.

Noise In All Shift Selector Positions

Loose flywheel-to-converter nuts, oil pump and torque converter.

Noise In All Forward Gears, Changes Acceleration To Deceleration

Differential assembly, fluid level and front axle or CV joint.

Noise In All Forward Gears During Any Operational Condition

Speedometer drive gear, internal bearings and front planetary assembly.

Harsh Shifting In All Ranges

T.V. cable (adjustment), idle air control valve, incorrect line pressure, band adjustment, axle shaft or CV joint, engine mounts, valve body, 2-4 band, and sticking accumulator piston.

Soft Shifts In All Ranges

Fluid level, T.V. cable (adjustment), idle air control valve, band adjustment, band servo, pressure regulator (damaged), valve body, sticking accumulator piston, internal leakage and oil pump.

Erratic Shifts, Early/Late Shift Timing Or Improper Shift Sequence

Fluid level and condition, T.V. cable (adjustment), throttle position sensor, 2-4 band adjustment, control valves and clutches slipping.

Improper Lockup

Throttle position sensor, control valves and torque converter.

Skipped Shifts

Transmission fluid temperature sensor, valve body, control valves and 2-4 band.

Transaxle Overheating

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Fluid level, poor engine performance, clutch assemblies (worn), band application, oil pressure, fluid flow (restriction) and oil cooler.

Drags In "R"

Brake adjustment, 2-4 band adjustment.

Momentary Upshift Flare

Transmission fluid temperature sensor, fluid level, valve body, control valves, low oil pump pressure and clutches slipping.

Momentary Downshift Flare

Fluid level, low oil pump pressure, clutches slipping.

Excessive Creep

Ignition timing, idle speed, T.V. cable (adjustment), manual valve (adjustment), torque converter and oil pump.

No Creep

Fluid level and condition, T.V. cable (adjustment), shift selector lever (adjustment), valve body, control valve, forward clutch, reverse clutch, oil pump and vehicle brake adjustment.

Engine Stalls When Transaxle Is Engaged

Torque converter, valve body, control valve and oil pump.

No Kickdown

Valve body.

Poor Fuel Economy

Brake On/Off (BOO) switch and TCC solenoid.

Lack Of Power

Poor engine performance, torque converter and forward clutch.

Surges During Cruise

TCC solenoid, valve body.

Poor Acceleration

Engine performance, TCC solenoid, valve body and torque converter.

CLUTCH & BAND APPLICATION

CLUTCH & BAND APPLICATION

Selector Lever Application	Elements In Use
"P" & "N"	No Elements
"R" (Reverse)	Low-Reverse Clutch & Reverse Clutch
"D" (Drive)	
1st Gear	Forward Clutch, ⁽¹⁾ Coasting Clutch, One-Way Clutch (Sprag) & One-Way Clutch (Roller)
2nd Gear	Low-Intermediate Band, Forward Clutch & One-Way Clutch (Sprag)
3rd Gear	Coasting Clutch, Forward Clutch, 3-4 Clutch & One-Way Clutch (Sprag)
4th Gear	Low-Intermediate Band, 3-4 Clutch, Forward Clutch & ⁽²⁾ One-Way Clutch (Sprag)
"2"	Low-Intermediate Band, Forward Clutch, One-Way Clutch (Sprag) & Coasting Clutch
"1"	Forward Clutch, One-Way Clutch (Sprag), ⁽¹⁾ Coasting Clutch, & Low-Reverse Clutch
(1) 1.8L models only.	
(2) Does not transmit power.	

TESTING

PRELIMINARY INSPECTION

Inspect fluid level and condition. Visually check for vehicle modifications, electronic add-ons, fluid leaks and/or incorrect linkage adjustment. Check for trouble codes before any mechanical repair is performed. See appropriate ELECTRONIC CONTROLS article for trouble code diagnosis and repair procedures. If no trouble codes are present, see applicable symptom diagnosis.

LINE PRESSURE TEST

CAUTION: DO NOT allow engine to run at maximum stall speed for more than 5 seconds. Run engine in "N" for one minute to cool transmission after each test is completed.

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1. Block wheels. Connect tachometer to engine. Connect appropriate pressure gauge to line pressure port (square head plug, marked "L"). See **Fig. 5**.
2. Run engine until normal operating temperature is obtained. Ensure engine is idling within specification. Consult underhood emissions label. Shift transaxle to "OD" or "D" as applicable and record line pressure. Firmly apply brake pedal. Steadily increase engine RPM to maximum speed and record line pressure (when engine speed stabilizes). Release accelerator. **DO NOT** allow engine to operate at full stall speed for more than 5-second limit.
3. Repeat step 2) for each gear. Before shifting into each selector position, run engine in Neutral for one minute to cool transmission. If line pressure is within specification, go to **STALL SPEED TEST**. See **LINE PRESSURE SPECIFICATIONS**. If line pressure is not within specification, go to **LINE PRESSURE TEST RESULTS**.

LINE PRESSURE SPECIFICATIONS (PSI)

Selector Position	@ Idle RPM	@ WOT Stall RPM
"R"	110-120	217-248
"P", "OD", "D" & "L"	62-81	217-248

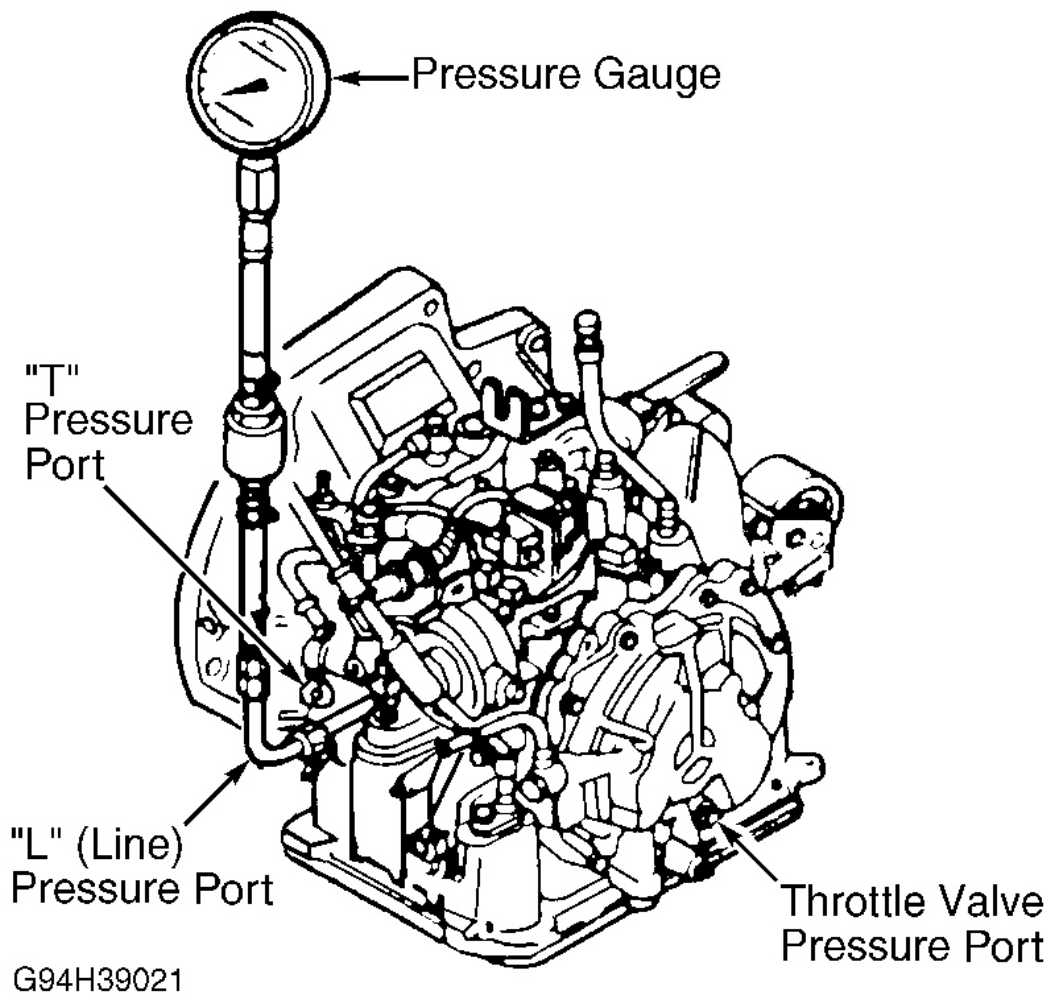


Fig. 5: Connecting Pressure Gauge
Courtesy of FORD MOTOR CO.

LINE PRESSURE TEST RESULTS

Ensure line pressure is correctly adjusted. See **LINE PRESSURE ADJUSTMENT** under ON-VEHICLE SERVICE. If line pressure cannot be adjusted to specification, use following list to determine cause of trouble. Ensure fluid filter is not obstructed.

Low In All Ranges

Worn oil pump, leaking oil pump, valve body and/or case. Pressure regulator valve sticking.

Low In "OD" & "D"

Fluid leaking from forward clutch.

Low In "L" & "R"

Fluid leaking from low-reverse clutch.

Low In "R" Only

Fluid leaking from reverse clutch.

High In All Ranges

Pressure regulator valve or pressure modifier sticking.

STALL SPEED TEST

CAUTION: DO NOT allow engine to run at maximum stall speed for more than 5 seconds. Run engine in "N" for one minute to cool transmission after each test is completed.

1. Engine coolant and transmission fluid must be at proper levels and normal operating temperatures. Connect tachometer to engine. Apply parking and service brakes firmly. Block wheels and place selector in "R" position.
2. While observing tachometer, steadily increase engine RPM to maximum speed and release within 5 seconds. **DO NOT** exceed 5-second limit. Engine speed should 2200-2500 RPM for 1.8L models and 2400-2700 RPM for 1.9L models.
3. Run engine in Neutral for one minute to cool transaxle. Repeat procedure in each gear. If not within specification, release accelerator immediately. See **STALL SPEED TEST RESULTS** . If within specification, see **HYDRAULIC CONTROL SYSTEM TIME LAG TESTING** .

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

Insufficient line pressure due to worn or leaking oil pump, control valve and/or case. Pressure regulator valve sticking.

High "OD" Only

One-way clutch (overrunning) slipping.

High In Forward Ranges

Forward clutch slipping. One-way clutch (sprag) slipping.

High In "D" & "L"

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Coasting clutch slipping.

High In "OD" & "D"

2-4 band slipping.

High In "R" & "L"

Low-reverse clutch slipping.

High In "R"

Low-reverse clutch slipping. Reverse clutch slipping.

Low In All Ranges

Poor engine performance. One-way clutch slipping in torque converter.

HYDRAULIC CONTROL SYSTEM TIME LAG TESTING

1. Engine coolant and transmission fluid must be at proper levels and normal operating temperature. Block wheels, apply parking and service brake firmly. Start engine, and ensure idle is within specification. See underhood emissions label.
2. Shift from "N" range to "OD" while measuring elapsed time until transaxle engages in gear. Run engine in Neutral for one minute to cool transmission. Repeat procedure shifting from "N" to "R".
3. Repeat 3 times, and average results. Refer to the **HYDRAULIC CONTROL SYSTEM TIME LAG** . If transaxle engagement time is within specification, proceed to **THROTTLE PRESSURE TEST** . If transaxle engagement time is not within specification, proceed to **HYDRAULIC CONTROL SYSTEM TIME LAG TEST RESULTS** .

HYDRAULIC CONTROL SYSTEM TIME LAG

Gear Selection	(1) Seconds
"N" To "OD"	.9
"N" To "R"	1.1
(1) If transaxle engagement is not within specification, go to <u>HYDRAULIC CONTROL SYSTEM TIME LAG TEST RESULTS</u> .	

HYDRAULIC CONTROL SYSTEM TIME LAG TEST RESULTS

High "N" To "OD"

Insufficient line pressure. Forward clutch or one-way clutch (sprag) slipping & one-way clutch (roller) slipping.

Low "N" To "OD"

N-D accumulator faulty. 1-2 accumulator faulty. Excessive line pressure.

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High "N" To "R"

Insufficient line pressure. Low-reverse clutch or reverse clutch slipping.

Low "N" To "R"

N-R accumulator faulty. Excessive line pressure.

THROTTLE PRESSURE TEST

CAUTION: DO NOT allow engine to run at maximum stall speed for more than 5 seconds. Run engine in "N" for one minute to cool transmission after each test is completed.

1. Connect tachometer to engine. Connect gauge and adapter to throttle valve pressure port (square head plug "T"). See **Fig. 5**.
2. Start engine and ensure engine idle is within specification. See underhood emission label. Shift to transaxle to "OD" and record throttle pressure at idle. Firmly apply brake pedal. Steadily increase engine RPM to maximum speed and record line pressure (when engine speed stabilizes). Release accelerator. **DO NOT** allow engine to operate at full stall speed for more than 5-second limit.
3. If within specification, go to **SHIFT POINT ROAD TEST**. Refer to the **THROTTLE PRESSURE SPECIFICATIONS**. If throttle pressure is not within specification, check for throttle valve (sticking), clean or replace as necessary. Ensure pressure regulator valve is clean and free in its bore. Remove throttle cable, check for damage and free movement. Replace and adjust as necessary.

THROTTLE PRESSURE SPECIFICATIONS (PSI)

Selector Position	@ Idle RPM	@ WOT Stall RPM
"OD"	7-17	59-75

SHIFT POINT ROAD TEST

Ensure engine and transaxle is at normal operating temperature. Road test vehicle with transaxle shift selector in gear specified by shift table. Apply throttle and observe speeds at which upshift/downshift occurs and torque converter is applied. See VEHICLE SHIFT SPEEDS table. If shift points are not within specification, go to **SHIFT SYMPTOM DIAGNOSIS**.

VEHICLE SHIFT SPEEDS

Operating Condition	Shift Speed MPH (1.8L Engine)	Shift Speed MPH (1.9L Engine)
Half Throttle ⁽¹⁾		
1-2	22-25	17-21
2-3	43-51	33-41
3-4	74-85	51-61
Manual 1-2 ⁽²⁾	27-30	27-30
Lockup		

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3rd Gear - On	N/A	41-52
3rd Gear - Off	N/A	42-47
4th Gear - On	74-85	50-61
4th Gear - Off	60-65	50-55
WOT ⁽³⁾		
1-2	38-42	34-38
2-3	66-71	65-70
3-4	108-114	82-88
Coast ⁽⁴⁾		
4-3	17-21	17-20
3-2	7-11	6-10
2-1	7-11	6-10
Kickdown		
4-3	100-107	78-84
3-2	61-66	60-64
2-1	34-38	24-27
Manual 2-1 ⁽²⁾	27-30	27-30
(1) TPS voltage 1.6-2.2 volts.		
(2) Gear selector lever in "L" position.		
(3) TPS voltage 4.0 volts.		
(4) TPS voltage .5 volts. Closed throttle, coasting condition. Downshift may be imperceptible.		

SHIFT SYMPTOM DIAGNOSIS**Harsh Shifting In All Ranges**

T.V. cable (adjustment), idle air control valve, improper tire pressure, axle shaft, CV joint or engine mounts, 2-4 band and servo, pressure regulator (sticking or damaged), control valves, coasting clutch, accumulator piston, low-reverse clutch and 3-4 clutch.

Harsh 1-2 Shift

T.V. cable broken or out of adjustment, 1-2 accumulator piston (sticking or damaged).

Harsh "N" To "R" Engagement

Neutral-Reverse accumulator (sticking or damaged).

Harsh "N" To "OD" Engagement

Neutral-Overdrive accumulator (sticking or damaged).

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Harsh 2-3 Shift

2-3 accumulator (sticking or damaged).

Erratic Shifts

T.V. cable broken or out of adjustment, valve body.

Soft Shifts In All Ranges

T.V. cable broken or out of adjustment, idle air control valve, improper tire pressure, pressure regulator (sticking or damaged) and valve body.

Soft 1-2 Shift

Valve body and 2-4 band (adjustment).

Soft 2-3 Shift

2-3 accumulator (sticking or damaged) and valve body.

Soft "N" To "R" Engagement

Neutral-Reverse accumulator piston (sticking or damaged).

No TCC Lockup

TCC solenoid (sticking or damaged) and torque converter.

Drags In "R"

2-4 band (adjustment).

Slow Engagement In "R"

Reverse clutch and low-reverse clutch.

Momentary 3-2 Downshift Flare

2-4 band (damaged or misadjusted).

3-2 Downshift Hesitation

Valve body.

No Engine Braking - "OD" To "D"

Coasting clutch, fluid flow to coasting clutch (blockage) and valve body.

No Engine Braking - "D" To "L"

Coasting clutch, fluid flow to coasting clutch (blockage), 2-4 band, control valve and valve body.

No 2-3 Upshift

Valve body and 3-4 clutch.

No 2nd Gear (Transaxle Shifts 1-3)

Valve body and 2-4 band (adjustment).

No TCC Lockup

TCC solenoid (sticking or damaged) and torque converter.

Improper Shift Points

Valve body and 2-4 band (adjustment).

Upshifting Flare

Transmission Range (TR) switch, valve body, 2-4 band and servo, one-way clutch, and 3-4 clutch.

No "D" To "OD" Upshift

One-way clutch and valve body.

Delayed 1-2 Shift

Valve body and 2-4 band (damaged or misadjusted).

COMPONENT TESTING**TORQUE CONVERTER****Cleaning & Inspection**

NOTE: **DO NOT clean torque converter by hand using solvent.**

1. Torque converter is a sealed unit and cannot be disassembled for service. Replace torque converter if it is found to be defective. Remove any rust from pilot hub and boss of converter. Measure pilot bushing inner diameter. If measurement exceeds 2.090" (53.076 mm), replace torque converter.
2. Using Converter Cleaner (Rotunda 014-00028), flush torque converter. After converter is removed from cleaner, thoroughly drain solvent through hub. Add about .53 qt. (.5L) clean ATF to converter. Agitate fluid by hand. Thoroughly drain ATF through converter hub.

End Play Check

Insert fingers into converter hub opening and move one-way clutch up and down. If end play is greater than .04" (1 mm), replace converter.

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 interference or a scraping condition exist, or if converter does not rotate freely, 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 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.

REMOVAL & INSTALLATION

See appropriate Transmission Removal & Installation article.

TRANSAXLE DISASSEMBLY

1. Mount transaxle in stand. Carefully remove torque converter from case. Remove oil pump drive shaft. Remove dipstick tube from case. Remove Transmission Range (TR) switch and Pulse Signal Generator (PSG). Remove oil pan and gasket.
2. Remove solenoid valve connector retaining clip. Disconnect solenoid valve connector. Remove retaining bolts from valve body, and carefully remove valve body. Ensure all electrical harness connectors are disconnected. Remove kickdown cable and bracket. Remove throttle cable from cam.
3. Remove manual control lever and manual valve detent lever. Remove parking rod support plate. Remove park actuator support and parking lever actuating rod as an assembly. Remove park lever plate, parking plate torsion spring and support.
4. Remove oil pump and gasket. Remove planetary gear thrust washer and needle bearing. See **Fig. 6**. Remove turbine shaft retaining ring. Remove reverse clutch assembly and needle bearing. Remove primary sun gear and one-way clutch assembly. Remove needle bearing from primary sun gear and one-way clutch assembly. Remove thrust washer from carrier hub.
5. Remove 2-4 band and secure using wire to prevent stretching. Pull actuating lever shaft while holding servo band lever, and remove lever. Depress servo assembly with large pair of slide-lock pliers. Remove retaining ring. Remove servo assembly and servo piston.
6. Remove one-way clutch retaining ring. Remove one-way clutch and carrier hub assembly. Remove thrust washer. Remove clutch pressure plate/ring gear retaining ring. Remove ring gear from front sun shell.

Remove low-reverse clutch pressure plate retaining ring. Remove low-reverse clutch pressure plate and clutch pack.

7. Remove turbine shaft seal ring located on converter housing side of turbine shaft. Pull out turbine shaft and 3-4 clutch assembly from pump side of transaxle. Remove 3-4 clutch needle bearings and slide 3-4 clutch off turbine shaft.
8. Remove transaxle case-to-converter bolts. Tap lightly using a plastic hammer to separate case from converter housing. Remove retaining ring, parking pawl return spring, parking pawl shaft and parking pawl. Remove output shell from output gear with thrust washer and needle bearing. Remove differential assembly.
9. Using pin punch, remove and discard bearing housing roll pin. Remove bearing housing bolts. Tapping lightly using a plastic hammer, remove bearing housing. Using drift punch, remove idler gear and output gear assemblies by lightly tapping on idler gear shaft from torque converter side of housing.
10. Remove converter housing from holding fixture. Remove stator support bolts. Press stator support out of torque converter housing using Step Plate (D80L-630-10). Using slide hammer and appropriate puller, remove rear bearing cup and shims from case.

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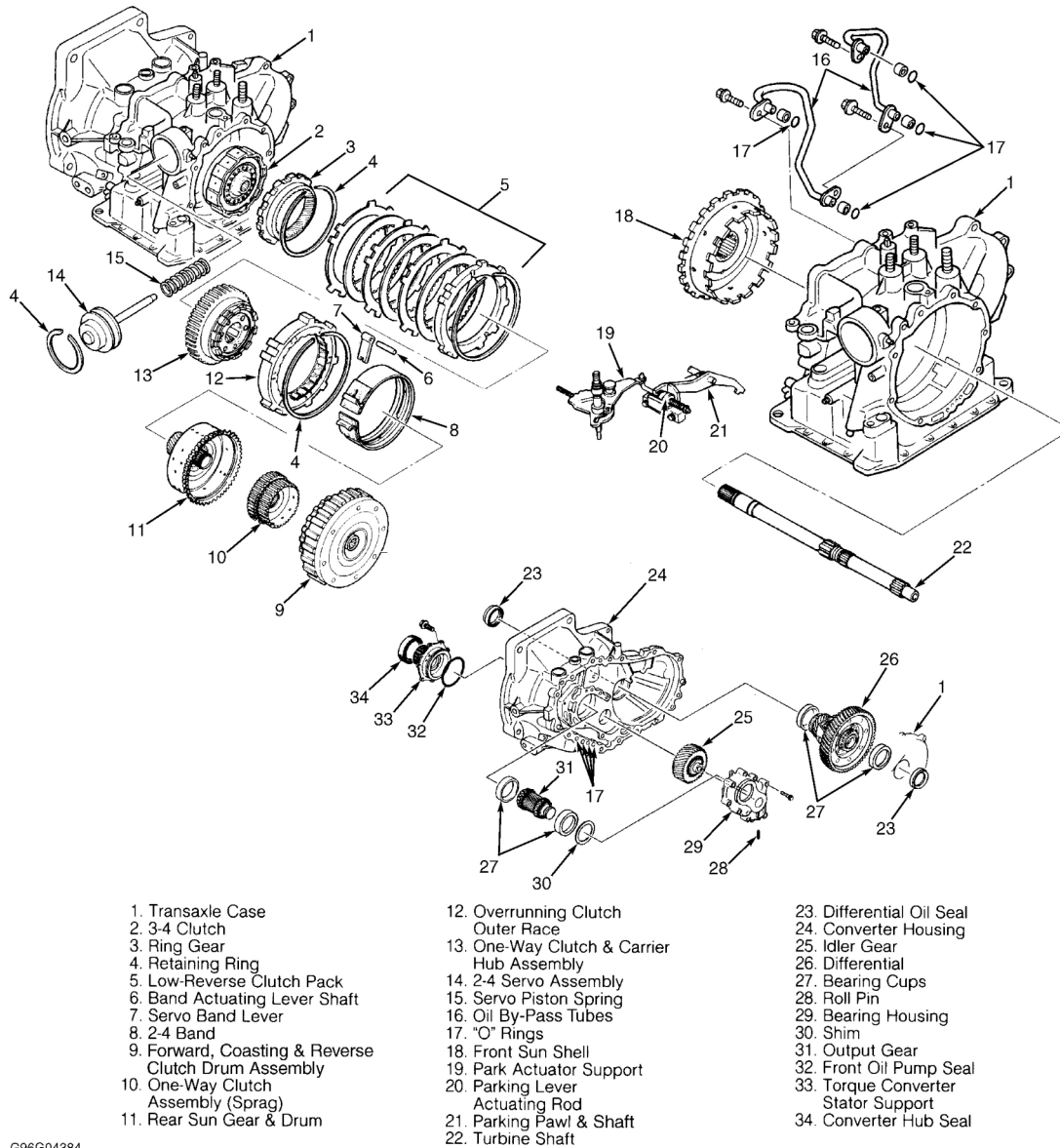
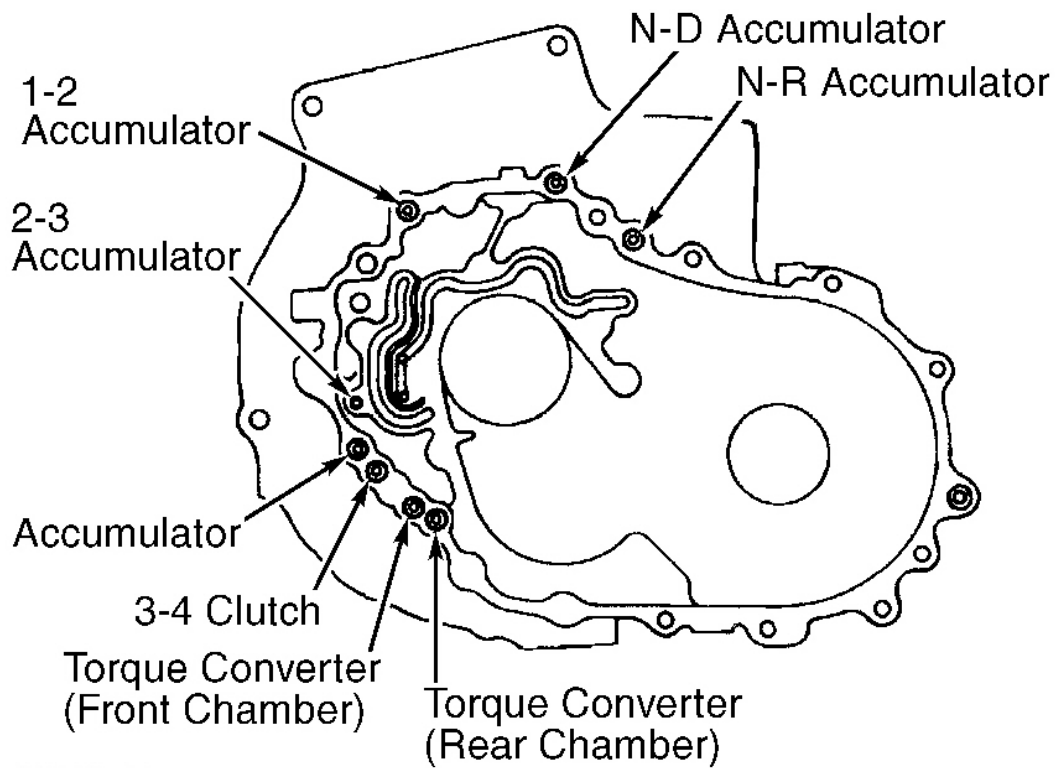


Fig. 6: Exploded View Of F4E/4EAT - Type-F Transaxle Assembly
 Courtesy of FORD MOTOR CO.



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Fig. 7: Identifying Oil Passages Converter Housing-To-Transaxle Case
 Courtesy of FORD MOTOR CO.

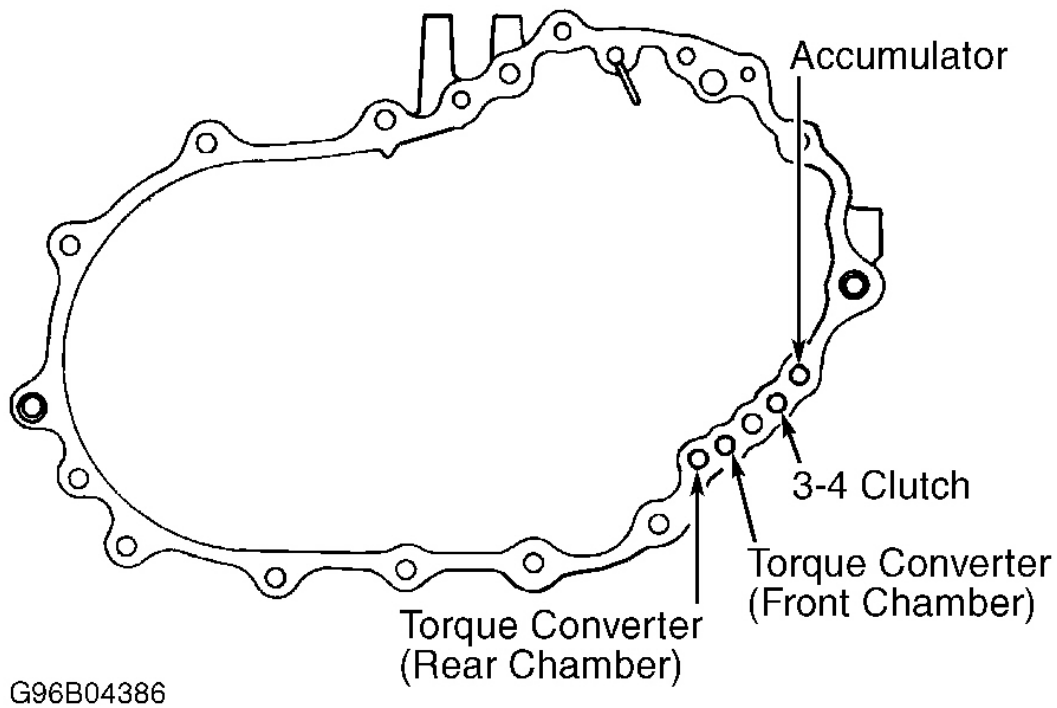


Fig. 8: Identifying Oil Passages Transaxle Case-To-Converter Housing
Courtesy of FORD MOTOR CO.

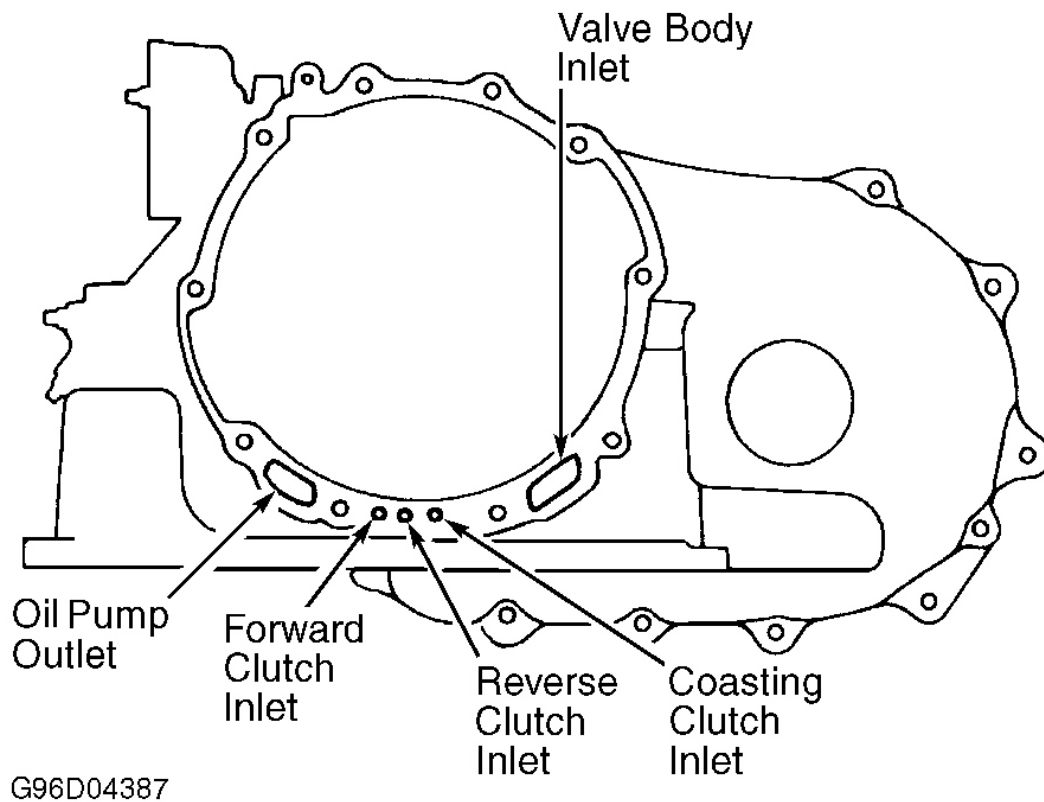


Fig. 9: Identifying Oil Passages Transaxle Case-To-Oil Pump
Courtesy of FORD MOTOR CO.

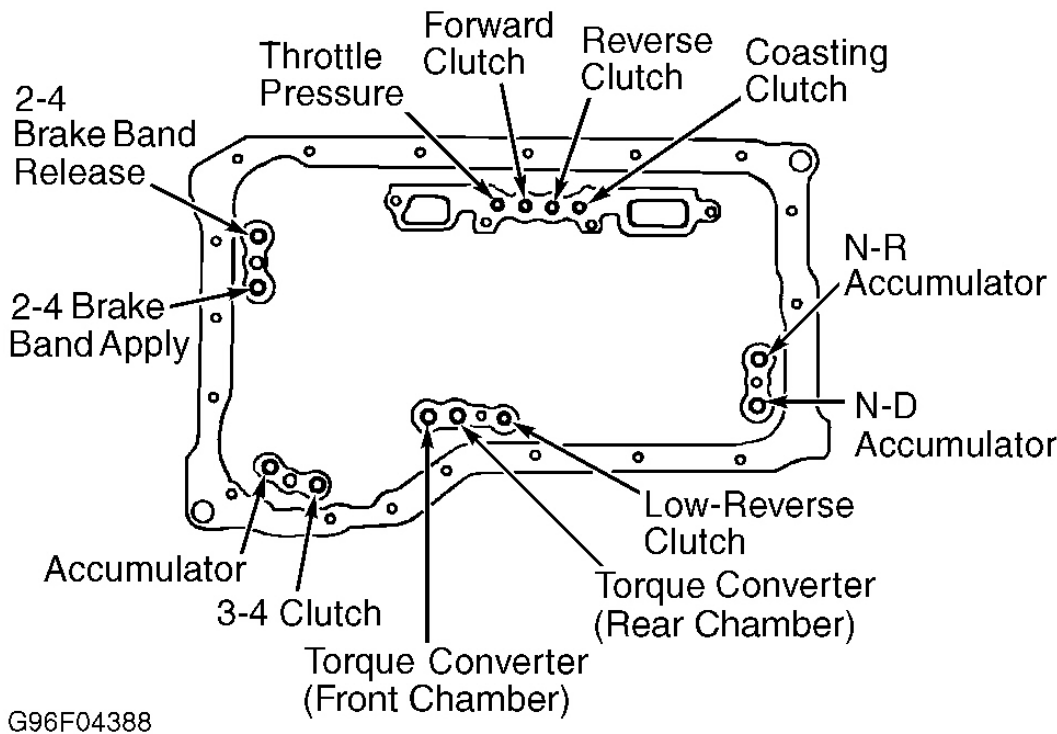


Fig. 10: Identifying Oil Passages Transaxle Case-To-Valve Body
 Courtesy of FORD MOTOR CO.

COMPONENT DISASSEMBLY & REASSEMBLY

OIL PUMP

Disassembly & Reassembly

Remove thrust washer and sealing rings. Remove oil pump cover bolts in crisscross pattern. Remove cover and place reference marks on pump gears for reassembly reference. Remove drive flange and gears. See **Fig. 11**. Remove plug, washer spring and valve from housing. Assemble pump in reverse order of disassembly. Tighten cover bolts to specification. See **TORQUE SPECIFICATIONS**.

Inspection

Check oil pump for broken or worn seal ring, weakened springs and damaged or worn sliding surfaces. Replace as required. Measure clearances for parts listed in **OIL PUMP COMPONENT CLEARANCES**, using appropriate gauge bar, feeler gauge and/or micrometer as needed. If clearances are not within specifications, replace oil pump.

OIL PUMP COMPONENT CLEARANCES

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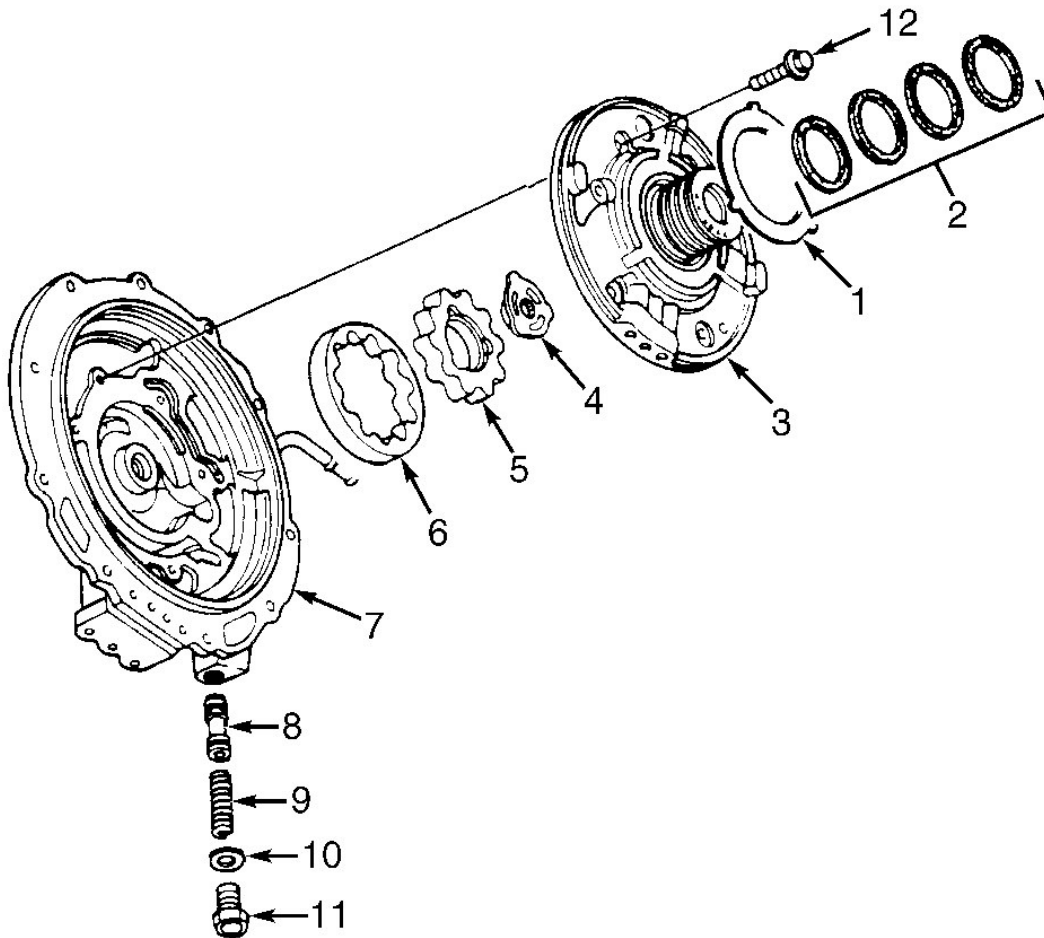
1995 Ford Escort

1995-96 AUTOMATIC TRANSMISSIONS F4E/4EAT - Type-F Overhaul

Component	Clearance In. (mm)	Clearance In. (mm)
Rotor-To-Housing ⁽¹⁾	.0008-.0015 (.02-.04)	.0019 (.05)
Inner Rotor-To-Oil Pump Boss	.0157-.0453 (.040-.115)	.0492(.125)
Spool Valve	⁽²⁾ .550-.551 (13.98-14.00)	N/A

(1) Outer and inner rotors.

(2) Diameter.



- | | |
|--------------------|------------------|
| 1. Thrust Washer | 7. Oil Pump Body |
| 2. Seal Ring | 8. Valve |
| 3. Cover | 9. Spring |
| 4. Flange | 10. Washer |
| 5. Inner Pump Gear | 11. Plug |
| 6. Outer Pump Gear | 12. Bolt |

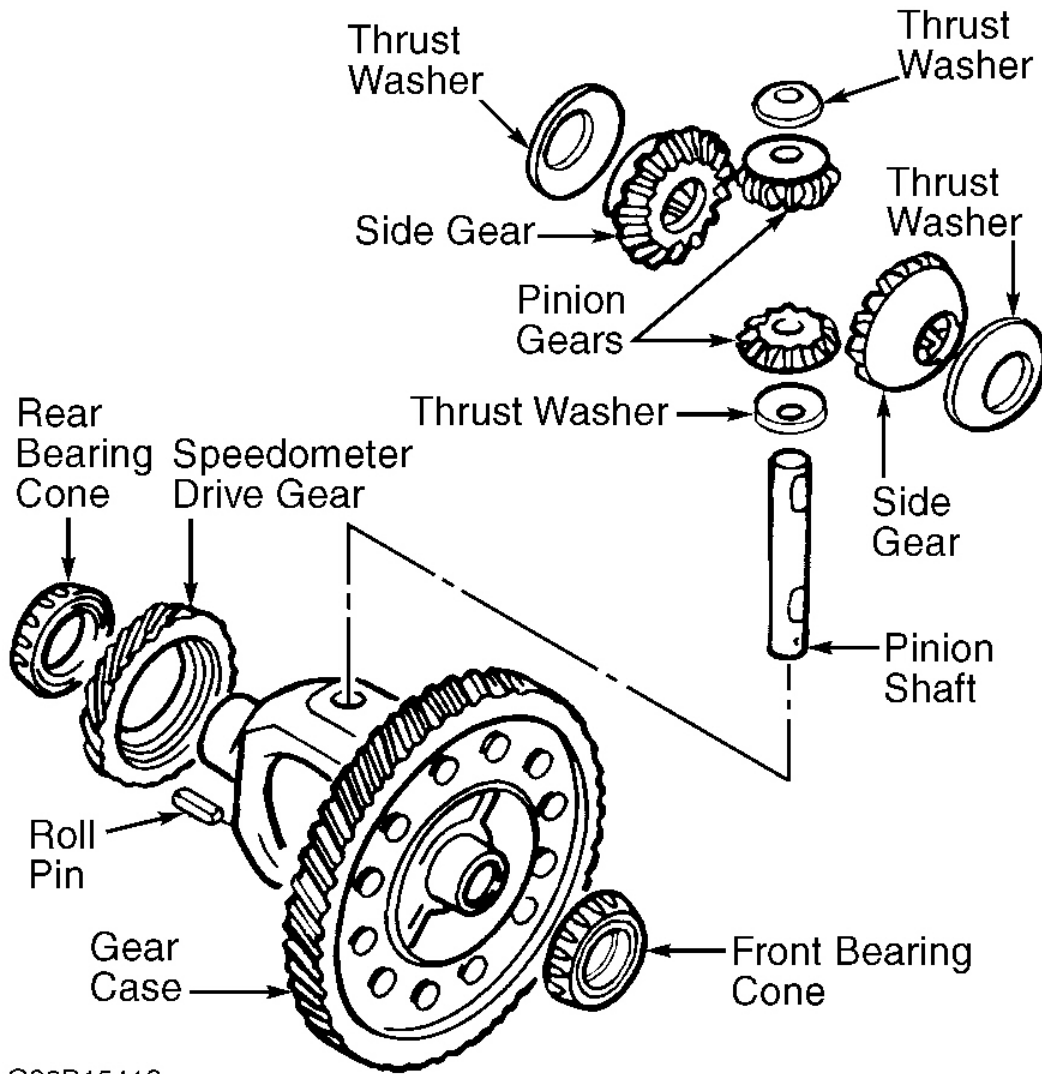
G94A39040

Fig. 11: Exploded View Of Oil Pump**Courtesy of FORD MOTOR CO.****DIFFERENTIAL ASSEMBLY****Disassembly**

Using pin punch and hammer, drive out roll pin and remove pinion shaft. See **Fig. 12** . Remove pinion gears, side gears and thrust washers from differential case. Using a bearing splitter and appropriate puller, remove differential case side bearings and speedometer drive gear.

Reassembly

1. Install speedometer gear. Using a press and appropriate adapter, install replacement case bearings. Install thrust washers, pinion gears and side gears. Install pinion shaft. Install and crimp roll pin.
2. Install left and right half-shafts into differential assembly. Support half-shafts on "V" blocks. See **Fig. 13** . Using a dial indicator, measure backlash of both pinion gears. Backlash should be 0-.004" (0-.10 mm). Replace differential assembly if specification is exceeded.



G92B15413

Fig. 12: Exploded View Of Differential
 Courtesy of FORD MOTOR CO.

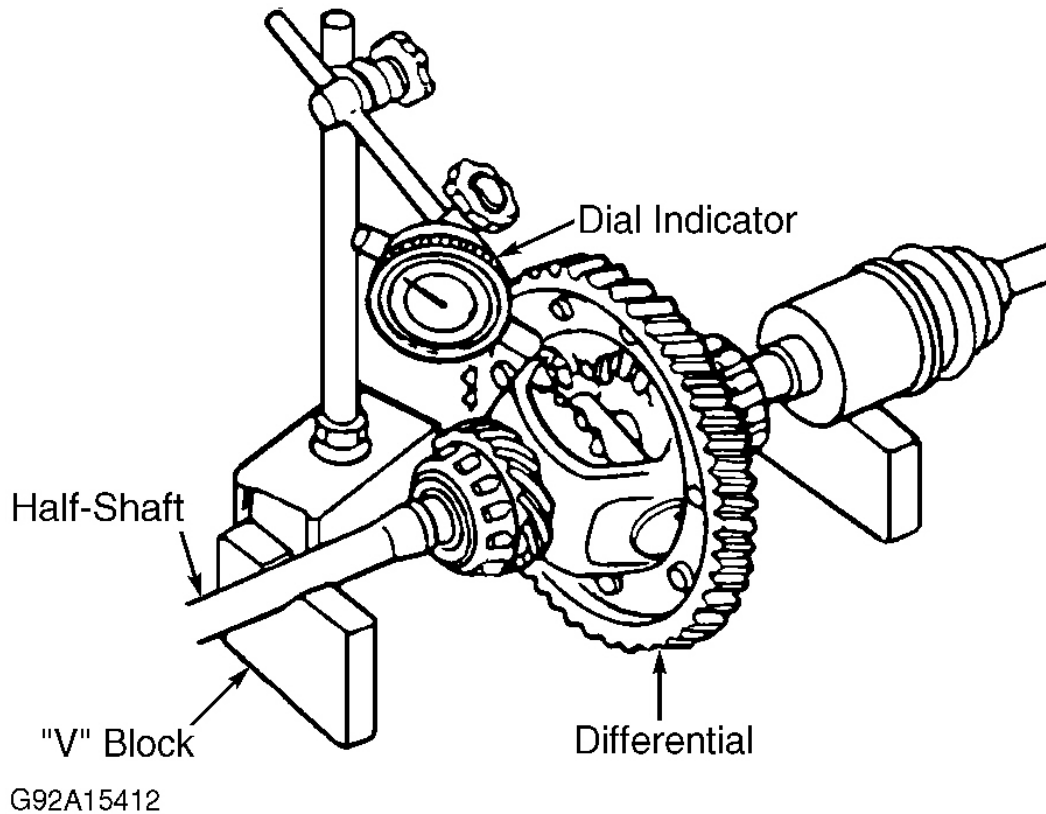


Fig. 13: Checking Differential Pinion Gear Backlash
Courtesy of FORD MOTOR CO.

FORWARD CLUTCH

Disassembly

Remove retaining ring and pressure plate. Remove forward clutch pack and dished plate. See **Fig. 14**.

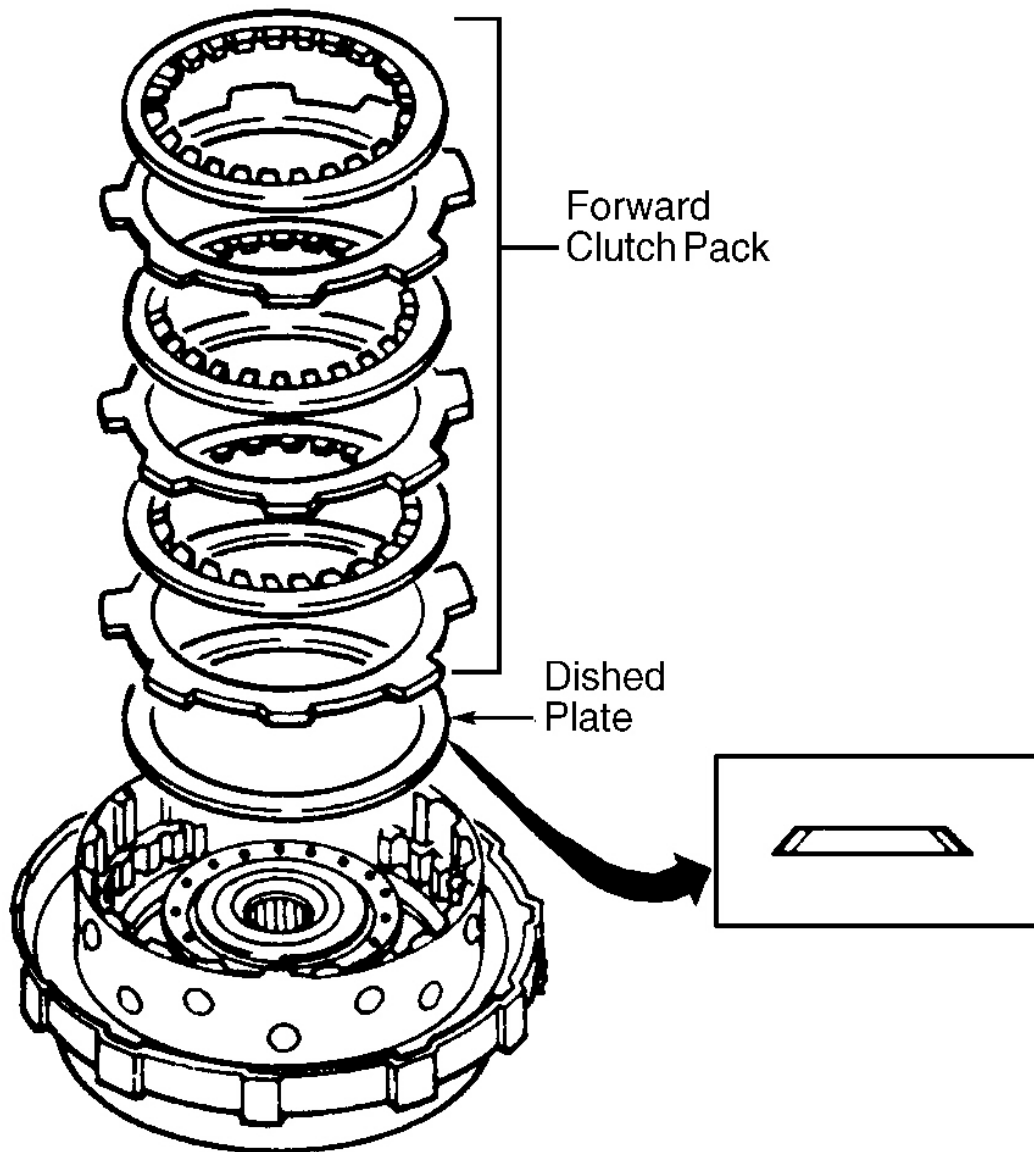
Inspection

Inspect all parts for wear, damage and effects of overheating. Check body thoroughly for wear and damage. Replace all parts as necessary.

Reassembly

1. Install dished plate with beveled side facing up. Install forward clutch pack starting with a steel plate. Install pressure plate and retaining ring.
2. Using a feeler gauge, check clearance between retaining ring and pressure plate. If clearance is not .039-.047" (1.0-1.2 mm), install correct thickness retaining ring.

3. Retaining rings are available in following thicknesses: .079" (2.00 mm), .085" (2.15 mm), .091" (2.30 mm), .097" (2.45 mm), .102" (2.60 mm) and .108" (2.75 mm). Set forward and reverse drum on oil pump. Check clutch operation by applying air pressure through forward clutch fluid passage.
4. Apply short burst of air through fluid passages. Clutch pack should make a solid apply sound, with no whistles or leaks. Pressure should not exceed 57 psi (4 kg/cm²).



G92B15405

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

COASTING CLUTCH

Disassembly

Remove retaining ring, pressure plate, coasting clutch pack and dished plate. See **Fig. 15** . Install appropriate spring compressor, and compress return spring and retainer. Remove retaining ring. Remove spring compressor. Remove return spring and retainer. Remove coasting clutch drum piston from clutch assembly using compressed air.

Inspection

Inspect all parts for wear, damage and effects of overheating. Inspect body for damage and wear. Replace as necessary.

Reassembly

1. Install NEW "O" rings on coasting piston. Apply transmission fluid to "O" rings, and install piston into coasting clutch drum. Roll outer "O" ring lip down to ease installation.
2. Install coasting clutch drum into reverse and forward drum. Install return spring and retainer. Use spring compressor to compress spring and retainer. Install retaining ring.
3. Carefully remove spring compressor. Install dished plate with beveled side down. Install coasting clutch pack. Install pressure plate, and secure pack using retaining ring.
4. Using a feeler gauge, check clearance between retaining ring and pressure plate. If clearance is not .039-.047" (1.00-1.20 mm), install correct thickness retaining ring.
5. Retaining rings are available in following thicknesses: .059" (1.50 mm), .065" (1.65 mm), .071" (1.80 mm), .077" (1.95 mm), .083" (2.10 mm) and .089" (2.25 mm). Set coasting clutch on oil pump. Check clutch operation by applying air pressure through coasting clutch fluid passage.
6. Apply short burst of air through fluid passages. Clutch pack should make a solid apply sound, with no whistles or leaks. Pressure should not exceed 57 psi (4 kg/cm²).

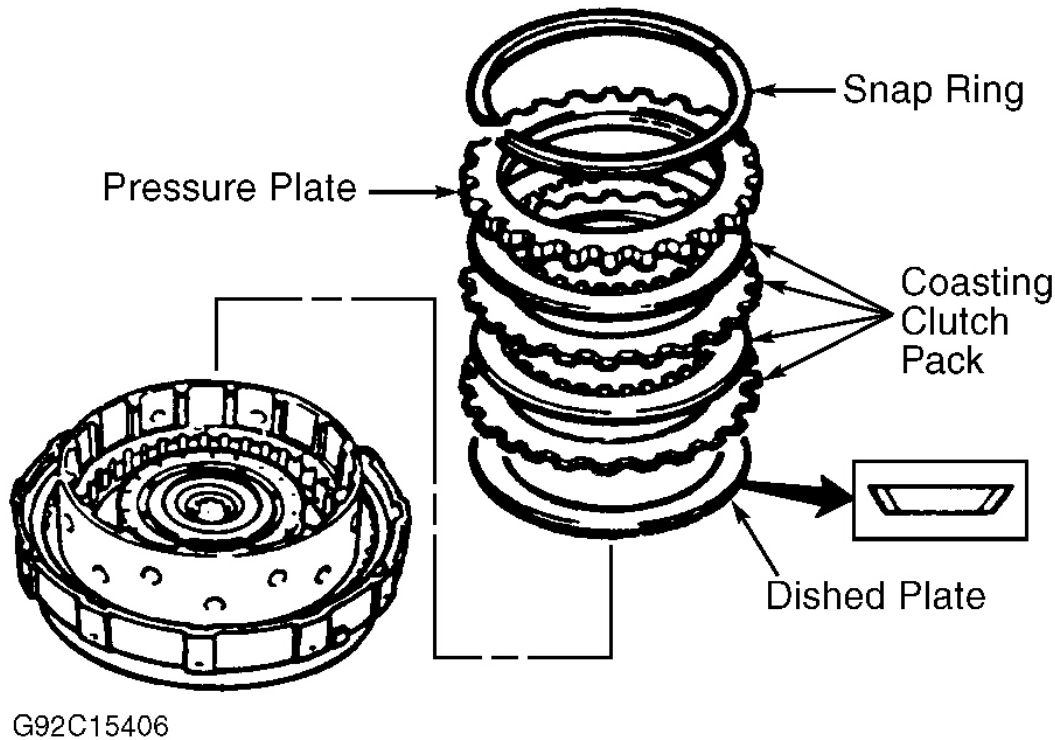


Fig. 15: Exploded View Of Coasting Clutch
 Courtesy of FORD MOTOR CO.

LOW-REVERSE CLUTCH PISTON

Disassembly

1. Using appropriate spring compressor, compress piston support and spring. See **Fig. 16** . Remove piston retaining ring, low-reverse clutch support and spring.
2. To prevent damage to low-reverse clutch piston, face transaxle case opening down, over soft surface. Apply compressed air (40 psi (2.8 kg/cm²) maximum) to fluid passage, and remove low-reverse piston. See **Fig. 8** . Remove piston inner and outer seals.

Inspection

Inspect all parts for wear, damage and effects of overheating. Check body thoroughly for wear and damage. Replace all parts as necessary.

Reassembly

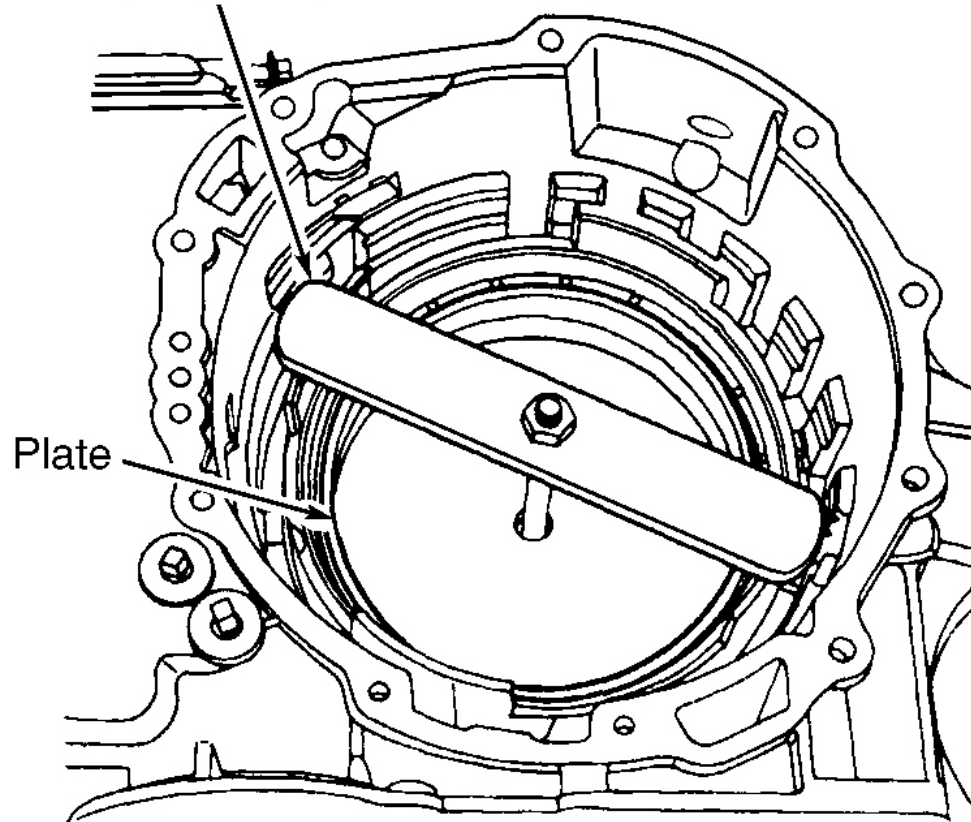
1. Install NEW "O" rings on low-reverse piston. Apply transmission fluid to "O" rings. Use Seal Protector (T90P-77000-EH) to install piston into transaxle case. See **Fig. 17** .

2. Remove seal protector. Install clutch support and spring. Using spring compressor, compress clutch support and spring. Install retaining ring. Remove spring compressor.

NOTE: **Perform following steps to determine proper low-reverse clutch pack selective retaining ring. After correct clearance is obtained, remove low-reverse clutch pack. Ensure selected retaining ring is identified for later assembly.**

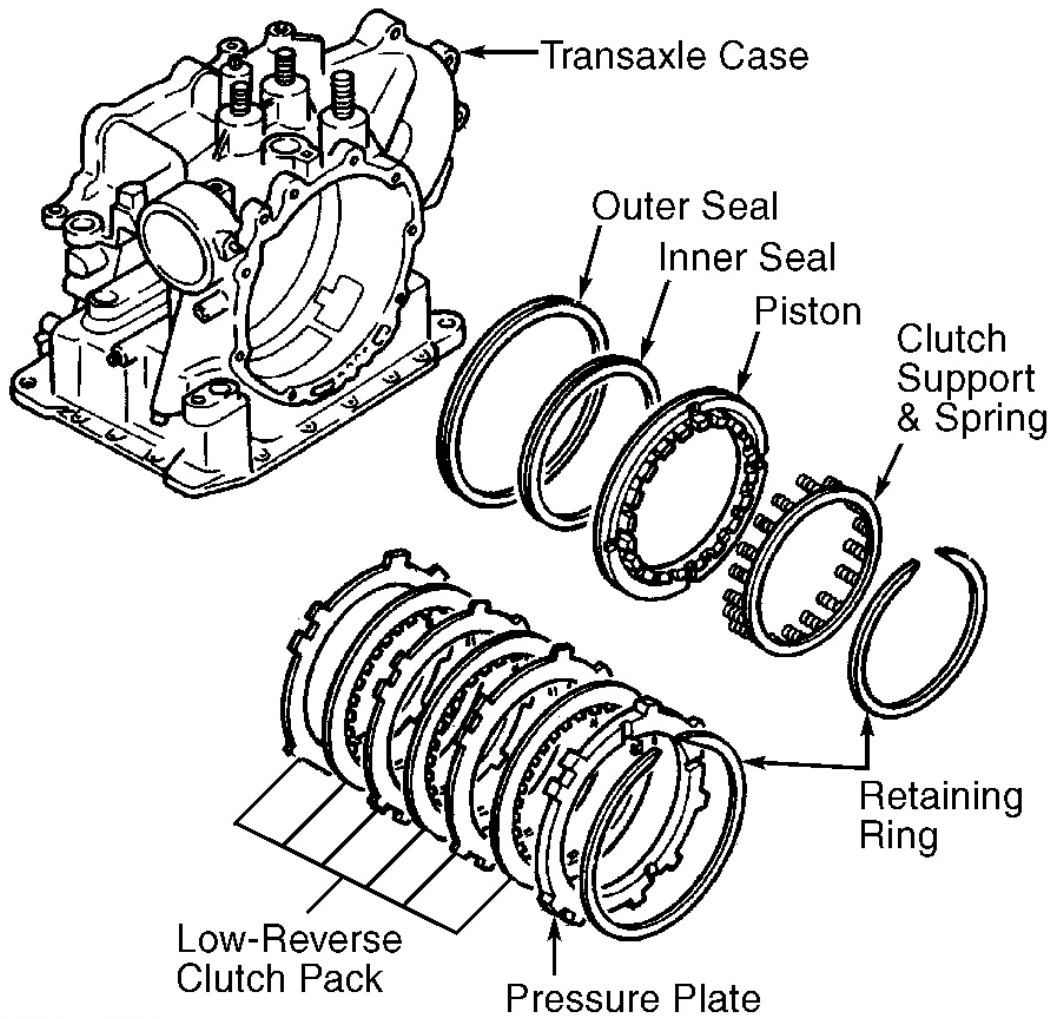
3. Install low-reverse clutch pack. Install pressure plate and retaining ring. Using a feeler gauge, check clearance between retaining ring and pressure plate. If clearance is not .083-.094" (2.1-2.4 mm), install correct thickness retaining ring and recheck clearance.
4. Retaining rings are available in following thicknesses: .079" (2.0 mm), .087" (2.2 mm), .094" (2.4 mm), .102" (2.6 mm), .110" (2.8 mm) and .118" (3.0 mm). Check clutch operation by applying air pressure through low-reverse clutch fluid passage. See **Fig. 8**.
5. Apply short burst of air through fluid passage. Clutch pack should make a solid apply sound, with no whistles or leaks. Pressure should not exceed 57 psi (4 kg/cm²).
6. Remove low-reverse clutch retaining ring, pressure plate and clutch pack. Identify selected retaining ring for reassembly reference. Low-reverse clutch pack will be installed during transaxle reassembly.

Return Spring Compressor



G92F15425

Fig. 16: Installing Low-Reverse Piston Spring Compressor
Courtesy of FORD MOTOR CO.



G96H04389

Fig. 17: Exploded View Of Low-Reverse Clutch

Courtesy of FORD MOTOR CO.

REVERSE CLUTCH

Disassembly

Remove retaining ring, pressure plate, reverse clutch pack and dished plate. See **Fig. 18**. Using appropriate spring compressor, compress piston return spring. Remove retaining ring from groove using snap ring pliers. Place clutch drum on oil pump. Apply compressed air to fluid passage, and remove reverse piston. See **Fig. 7** - **Fig. 8**.

Inspection

Inspect all parts for wear, damage and effects of overheating. Check body thoroughly for wear and damage. Replace all parts as necessary.

Reassembly

1. Install NEW "O" rings on reverse piston. Apply transmission fluid to "O" rings. Use Seal Protector (T90P-77000-EH) to install piston into reverse and forward drum. If necessary, use a screwdriver to seat piston.
2. Remove seal protector. Install NEW piston return spring with tabs facing away from piston. Install return spring spacer with step facing upward. Install retaining ring half-way down reverse and forward drum.
3. Using spring compressor, compress spring. Install retaining ring using a screwdriver. Remove spring compressor. Install dished plate with beveled side facing upward. Install reverse clutch pack.
4. Install pressure plate with step facing down. Install retaining ring. Using a feeler gauge, check clearance between retaining ring and pressure plate. If clearance is not .039-.051" (1.0-1.3 mm), install correct thickness retaining ring.
5. Retaining rings are available in following thicknesses: .087" (2.20 mm), .094" (2.40 mm), .102" (2.60 mm) and .110" (2.80 mm). Set reverse clutch on oil pump. Check clutch operation by applying air pressure through reverse clutch fluid passage.
6. Apply short burst of air through fluid passages. Clutch pack should make a solid apply sound, with no whistles or leaks. Pressure should not exceed 57 psi (4 kg/cm²).

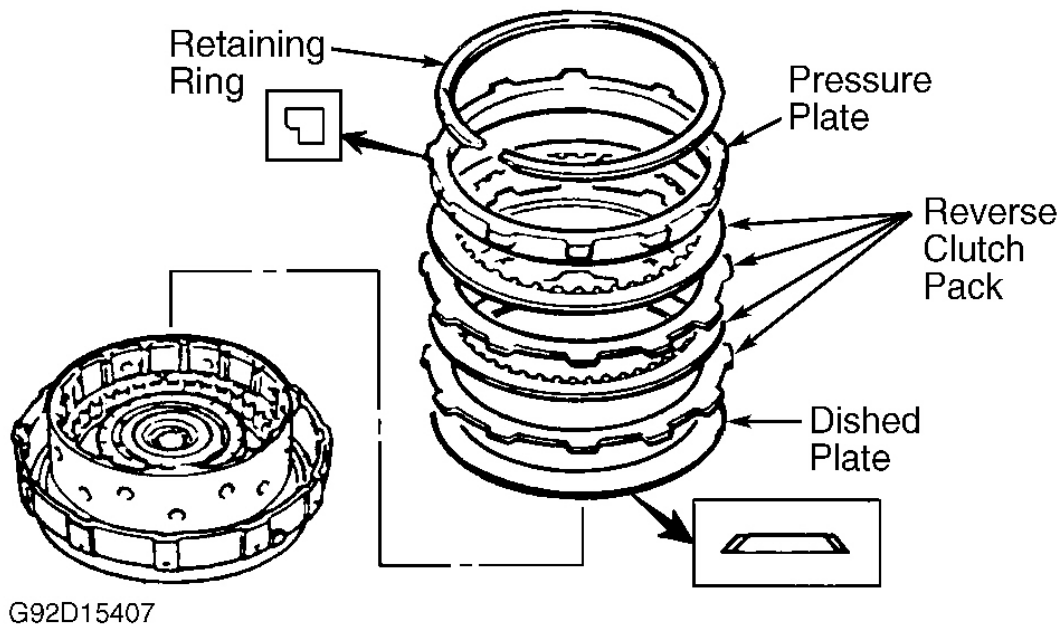


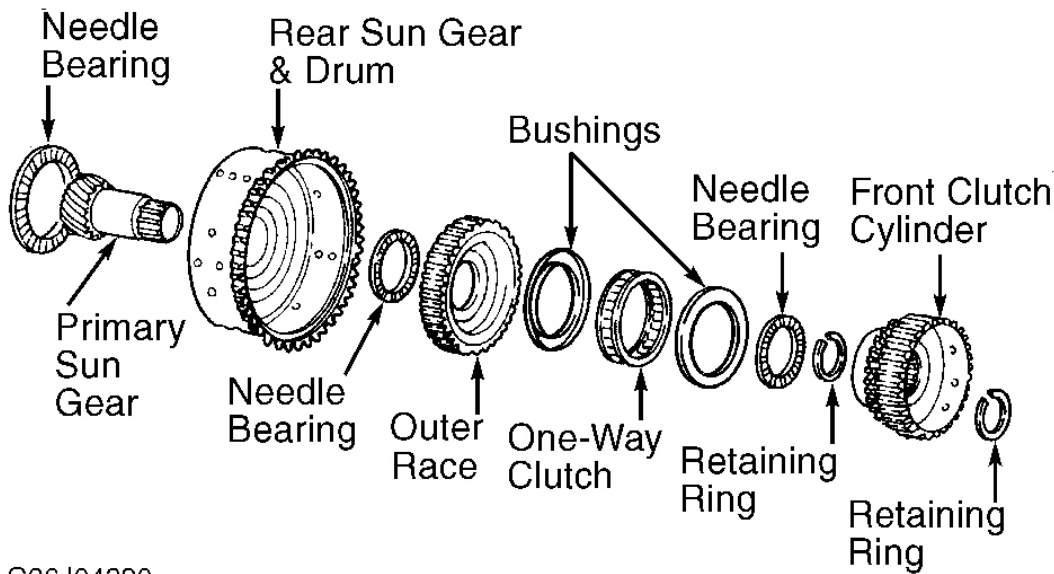
Fig. 18: Exploded View Of Reverse Clutch
Courtesy of FORD MOTOR CO.

PRIMARY SUN GEAR & ONE-WAY CLUTCH (SPRAG)**Disassembly**

Remove planet gear needle bearing. Remove retaining ring and one-way clutch inner and outer race. See **Fig. 19**. Remove retaining ring and small sun gear from drum. Separate one-way clutch inner race from outer race. Remove inner and outer race brass bushings. Remove one-way clutch and needle bearing.

Reassembly

1. Apply petroleum jelly to one-way clutch bearings, and install bearings into inner race. Install one-way clutch into outer race. Ensure spring cage faces toward outer race.
2. Install one-way clutch inner race into outer race by turning inner race counterclockwise. Ensure inner race turns counterclockwise only (facing upward).
3. Install small sun gear into drum, and install retaining ring. Install one-way clutch inner and outer races to sun gear drum. Ensure one-way clutch inner race and small sun gear clutch hub splines are aligned. Install retaining ring.
4. Hold small sun gear, and ensure one-way clutch outer race turns smoothly and only clockwise. Apply petroleum jelly to needle bearing, and install bearing to sun gear drum.



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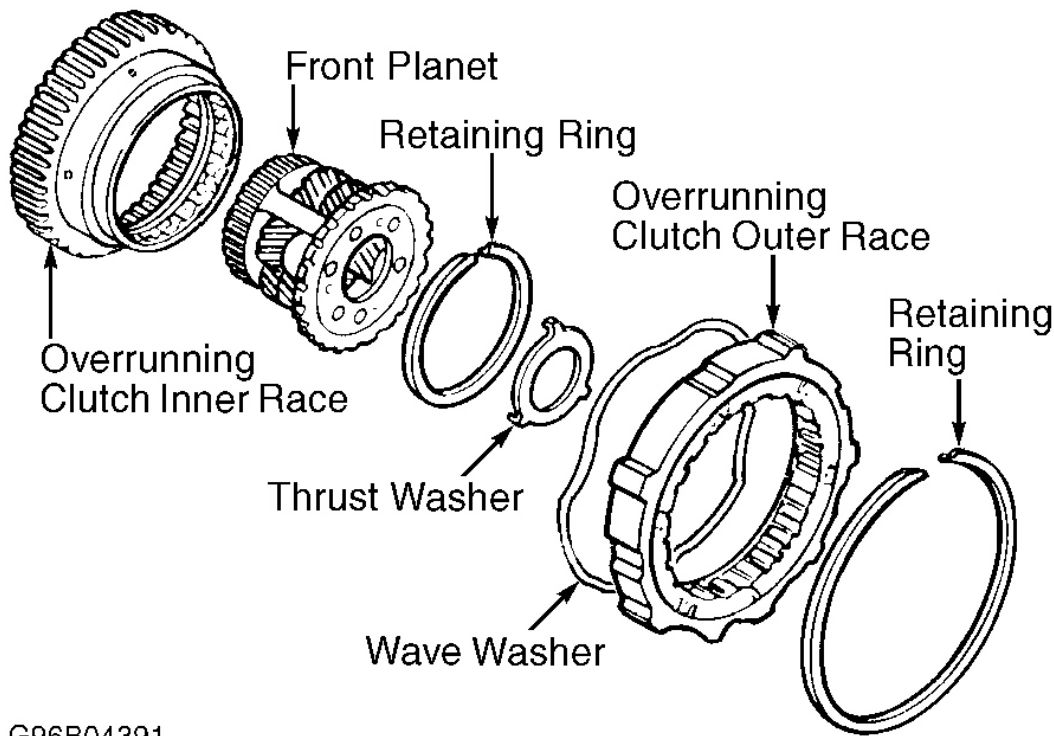
Fig. 19: Exploded View Of Primary Sun Gear & One-Way Clutch
Courtesy of FORD MOTOR CO.

ONE-WAY CLUTCH (OVERRUNNING) & PLANETARY CARRIER**Disassembly**

1. Remove one-way clutch, thrust washers and retaining ring. See **Fig. 20** . Remove planetary carrier assembly from inner race. Place one-way clutch on inner race, and ensure clutch rotates smoothly and clockwise only.

Reassembly

Assemble planetary gear to inner race. Install retaining ring. Apply petroleum jelly to thrust washer, and install washer on planetary carrier assembly. Thrust washer outer diameter on sun gear drum side should be 3.31" (84.0 mm). Install one-way clutch outer race and thrust washer.



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Fig. 20: Exploded View Of One-Way Clutch & Planetary Carrier
Courtesy of FORD MOTOR CO.

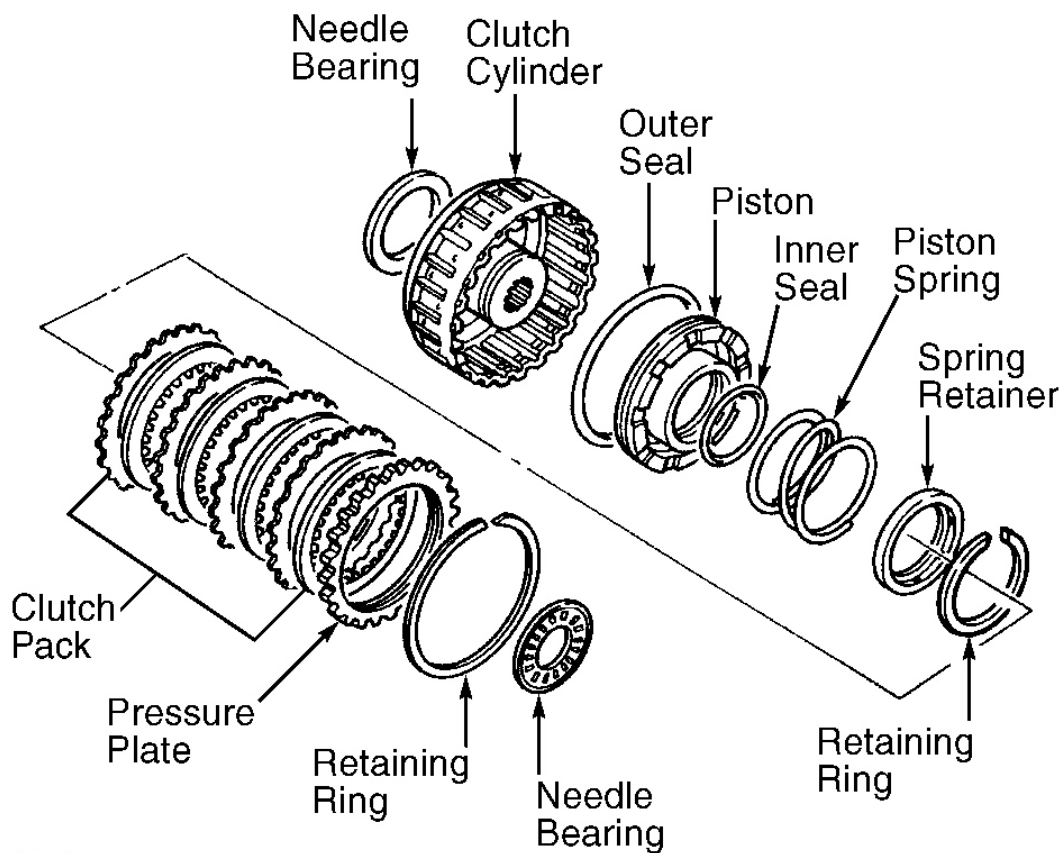
3-4 CLUTCH

Disassembly

Remove needle bearing. Remove retaining ring, pressure plate and clutch pack. See **Fig. 21** . Using appropriate spring compressor, compress return spring and retainer assembly and remove retaining ring. Remove compressor. Remove return spring and retainer. Using Leak Check Adapter (T90P-77000-AH), remove piston using compressed air. Remove inner and outer seals from piston.

Reassembly

1. Install NEW "O" rings on 3-4 clutch piston. Apply transmission fluid. Using spring compressor, compress return spring and retainer assembly. Install retaining ring. Remove compressor.
2. Install 3-4 clutch pack. Install pressure plate with step facing upward. Install retaining ring. Using a feeler gauge, check clearance between retaining ring and pressure plate. If clearance is not .051-.063" (1.3-1.6 mm), install correct thickness retaining ring.
3. Install leak check adapter, and apply compressed air to check clutch operation. **DO NOT** apply over 57 psi (4 kg/cm²) air pressure for more than 3 seconds.
4. Pour specified transmission fluid into clutch drum so 3-4 piston is fully submerged. Apply compressed air and ensure no bubbles come from clutch piston seal.



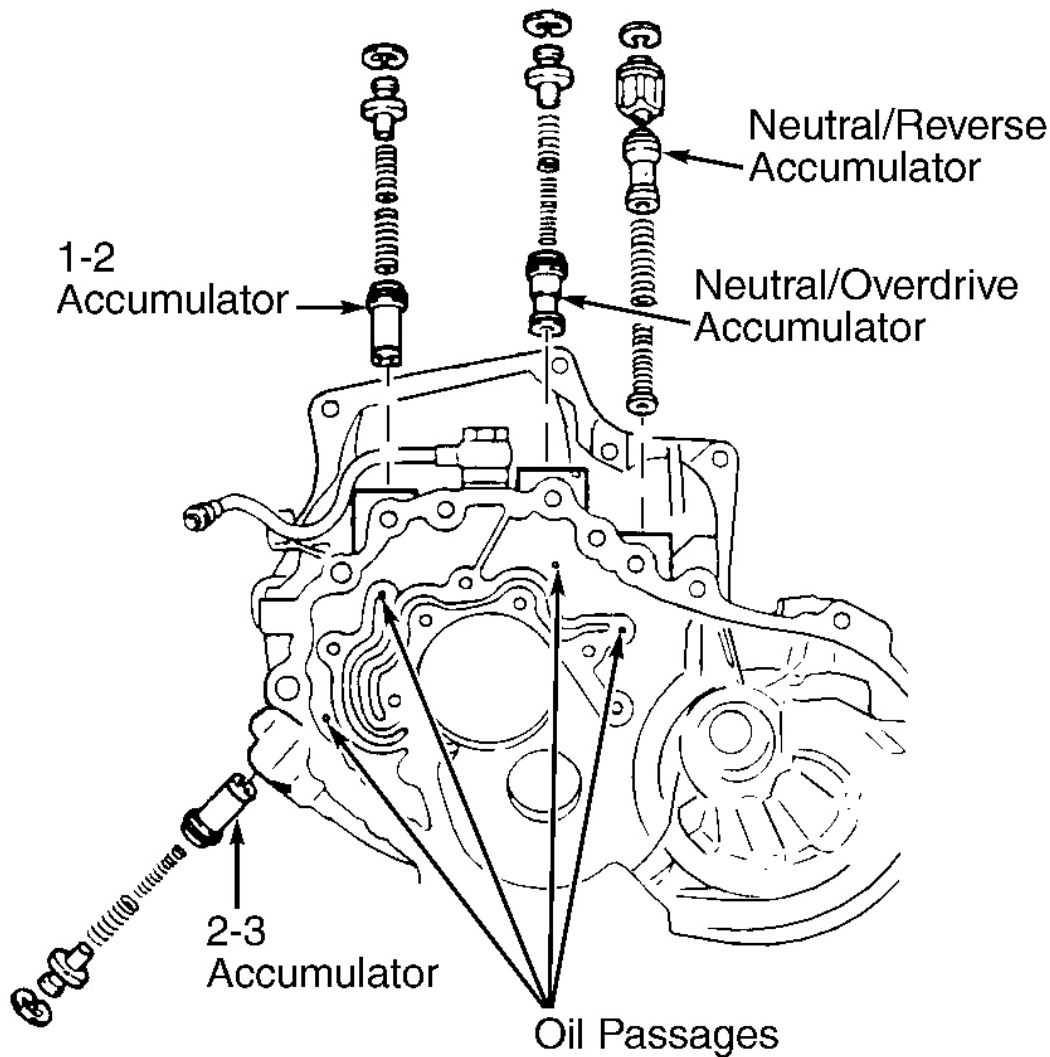
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Fig. 21: Exploded View Of 3-4 Clutch
 Courtesy of FORD MOTOR CO.

ACCUMULATORS

Disassembly & Reassembly

For exploded view of accumulator assemblies, see **Fig. 22** . Lubricate all seal and "O" ring with transmission fluid before reassembly.



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Fig. 22: Exploded View Of Accumulator Assemblies
Courtesy of FORD MOTOR CO.

IDLER GEAR

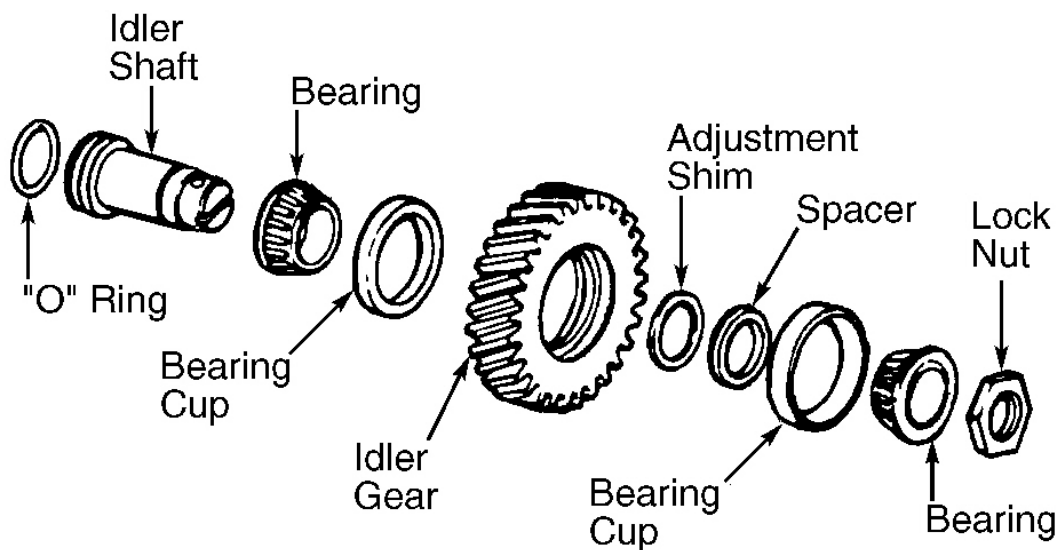
Disassembly

1. Using Torque Adapter (T87C-77000-E), secure idler shaft in a vise. Remove idler gear shaft nut.
2. Remove bearing, spacer and idler gear from idler shaft. See **Fig. 23** . Remove adjustment shim and other

bearing. Using puller and slide hammer, remove bearing cups.

Reassembly

1. Press bearing cups into Idler gear. Install bearing on idler shaft. Install adjust shim, spacer and idler gear. Install remaining bearing.
2. Secure idler shaft in a vise using adapter. Use protective plates to prevent damage to adapter. Tighten lock nut to 94 ft. lbs. (128 N.m).
3. Turn idler gear and adapter over, with gear mounted in vise. Measure bearing preload by turning shaft with INCH-lb. torque wrench. Turning torque should be .26-7.8 INCH lbs. (.03-.90 N.m). If turning torque is not within specification, tighten lock nut. **DO NOT** exceed 94-130 ft. lbs. (128-177 N.m).
4. If preload is not within specified range, adjustment shim assortment pack is available. Preload is reduced by increasing shim thickness and increased by reducing shim thickness. Shims range in thickness between .150-.187" (3.80-4.75 mm) in .002" (.05 mm) increments. **DO NOT** use more than 7 shims.



G92D15415

Fig. 23: Exploded View Of Idler Gear
Courtesy of FORD MOTOR CO.

TORQUE CONVERTER STATOR SUPPORT

Disassembly & Reassembly

Using pin punch, remove bearing outer race from stator support. Remove converter hub seal and front pump "O" ring. Install converter hub seal and front pump "O" ring. Using appropriate bearing cup replacer, press bearing outer race into stator support.

BEARING HOUSING

NOTE: When transaxle is disassembled, output gear bearing preload **MUST** be adjusted by selecting shims to insert under bearing cup.

Output Gear Bearing Preload

1. Align bearing-stator support using Guide Pins (T80L-77100-A). Press support into converter housing using Step Plate (D80L-630-6). Install stator support bolts and tighten to specification. See **TORQUE SPECIFICATIONS**.
2. Remove bearing cup and adjustment shim(s) from bearing housing. Insert output gear into converter housing. Place bearing cup over output gear bearing and 4 collars of Shim Selector Set (T88C-77000-JF) on converter housing.
3. Install Shim Selector Gauge (T91P-77000-B) on output gear. Turn both halves of gauge to eliminate any gap. Place bearing housing on collars. Install 4 bolts with washers. Tighten bolts to 14-19 ft. lbs. (19-26 N.m).
4. Install Preload Torque Adapter (T90P-77000-BH) on output gear. Using pins provided in Shim Selector Set (T88C-77000-JF), loosen gauge halves until all free play is removed and bearing cup is seated. Thread gauge halves together.
5. Measure drag on output gear bearing using an INCH-lb. torque wrench. Read preload when output gear starts to turn. Turn gauge using pins until starting preload is .26-7.8 INCH lbs. (0.03-0.9 N.m).
6. Using a feeler gauge, measure gap between 2 halves of shim selection gauge in 4 locations at 90 degree intervals. See **Fig. 24**. Use largest measurement. Select no more than 7 shims to maintain clearance. Shims are available in thicknesses of .020-.057" (.500-1.450 mm) in .001" (.025 mm) increments.
7. Remove bolts, washers, bearing housing, gauge and bearing cup. Install selected shim(s) and bearing cup into bearing housing. Install bearing housing. Tighten retaining bolts to 14-19 ft. lbs. (19-26 N.m). Measure bearing preload. If preload is not .26-7.8 INCH lbs. (.03-.9 N.m), repeat steps 1) -7) . Remove bearing housing when proper preload specification is obtained.

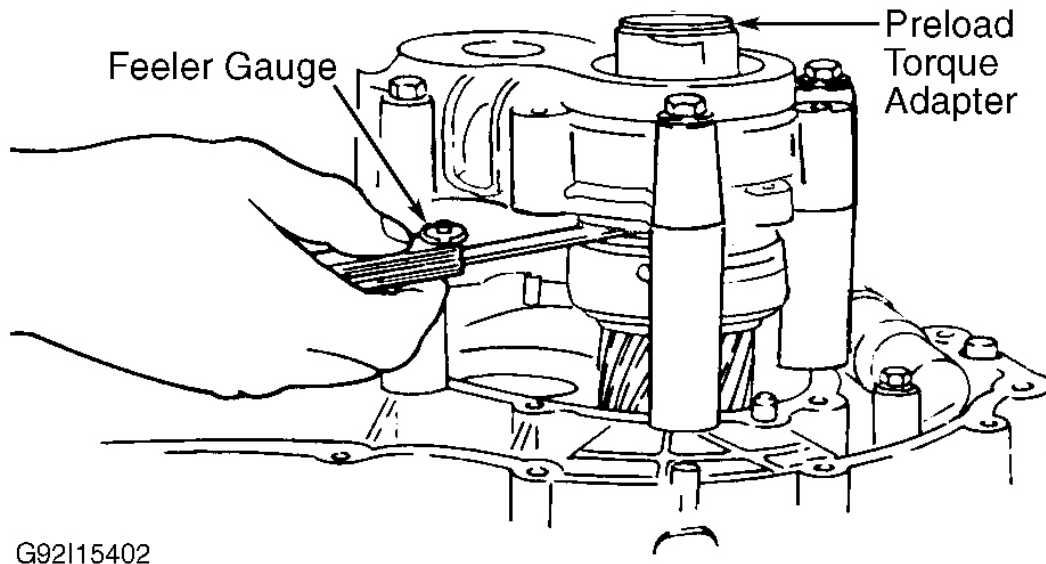


Fig. 24: Measuring Output Gear Preload
 Courtesy of FORD MOTOR CO.

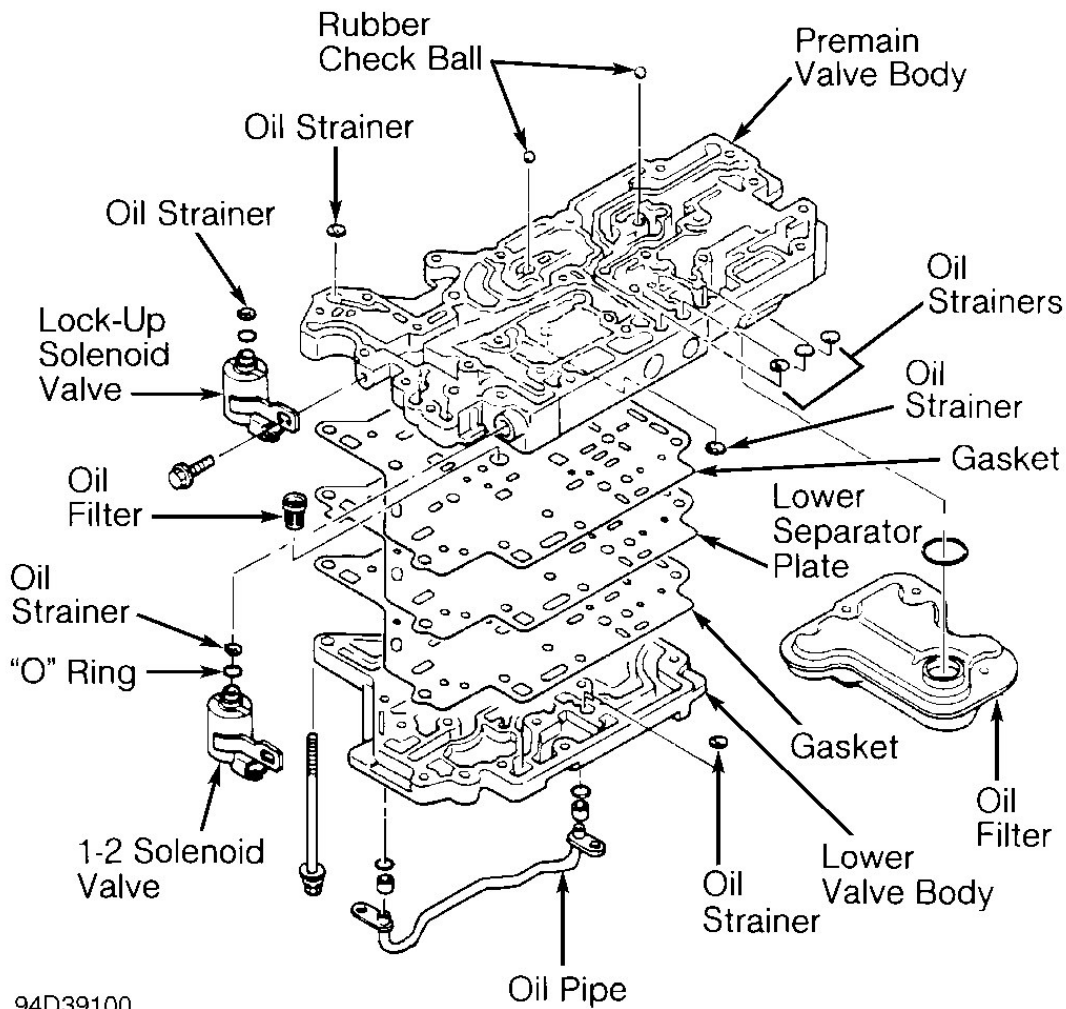
VALVE BODY

CAUTION: Disassembly procedures identify valve body components as follows:

- TOPSIDE - Side of component facing oil pan.
- UNDERSIDE - Side of component facing transaxle case.

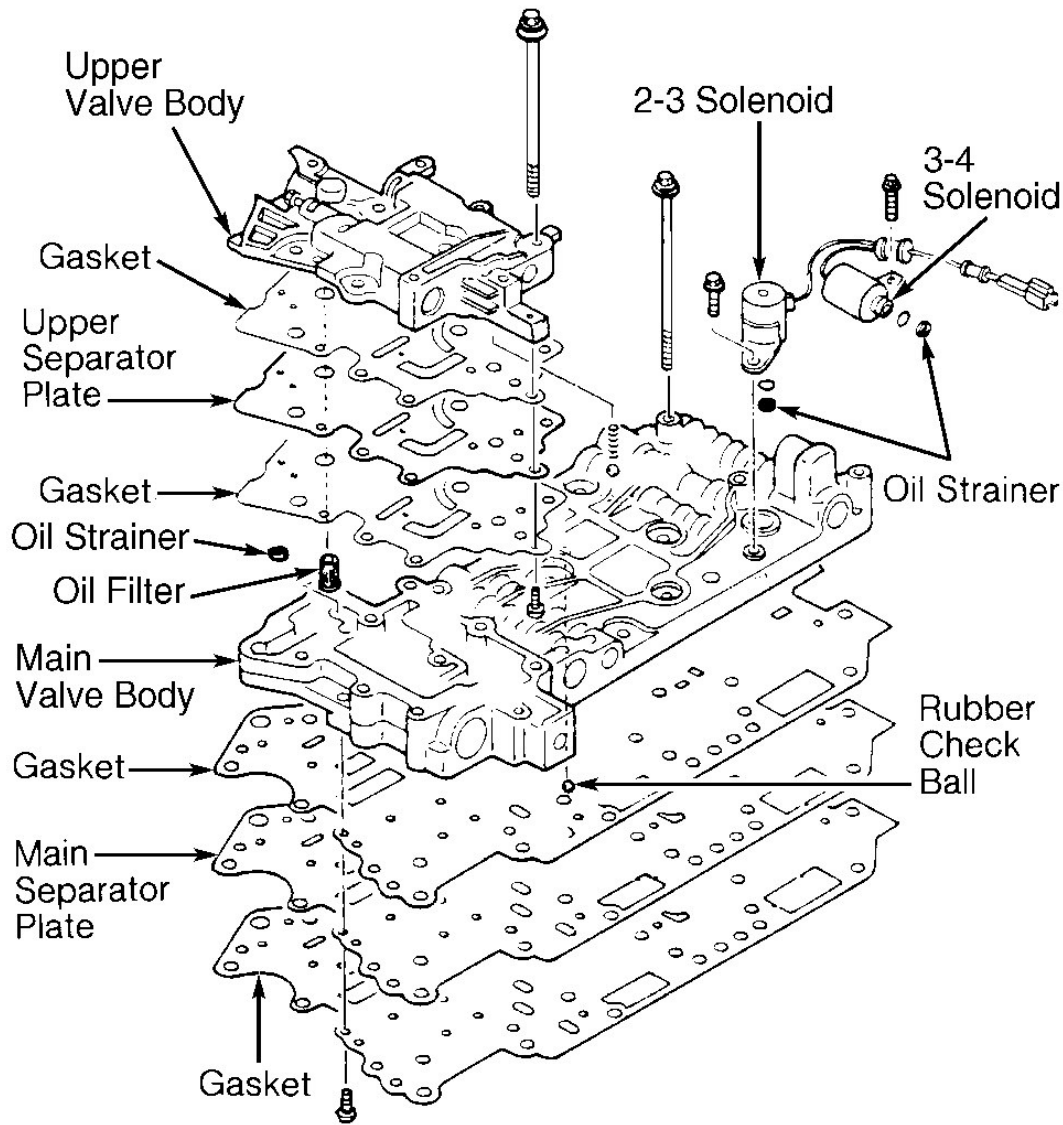
Disassembly

1. Remove oil filter and "O" ring. Remove oil pipe from lower valve body. Remove 1-2 solenoid and TCC solenoid with oil strainers. Remove 2-3 solenoid and 3-4 solenoid with oil strainers. See **Fig. 25** and **Fig. 26**.
2. Unbolt and remove upper valve body. Remove gaskets and separator plate from upper valve body. Remove throttle relief check ball and spring from underside of upper valve body. Unbolt and remove main valve body from premain valve body.
3. Remove gaskets and separator plate from main valve body. Remove check balls from topside of main valve body. See **Fig. 27** and **Fig. 28**. Remove check balls and oil strainers from underside of premain valve body. Remove gaskets, separator plate and oil filter from topside of premain valve body.



94D39100

Fig. 25: Exploded View Of Premain & Lower Valve Body
Courtesy of FORD MOTOR CO.



94E39101

Fig. 26: Exploded View Of Main & Upper Valve Body
Courtesy of FORD MOTOR CO.

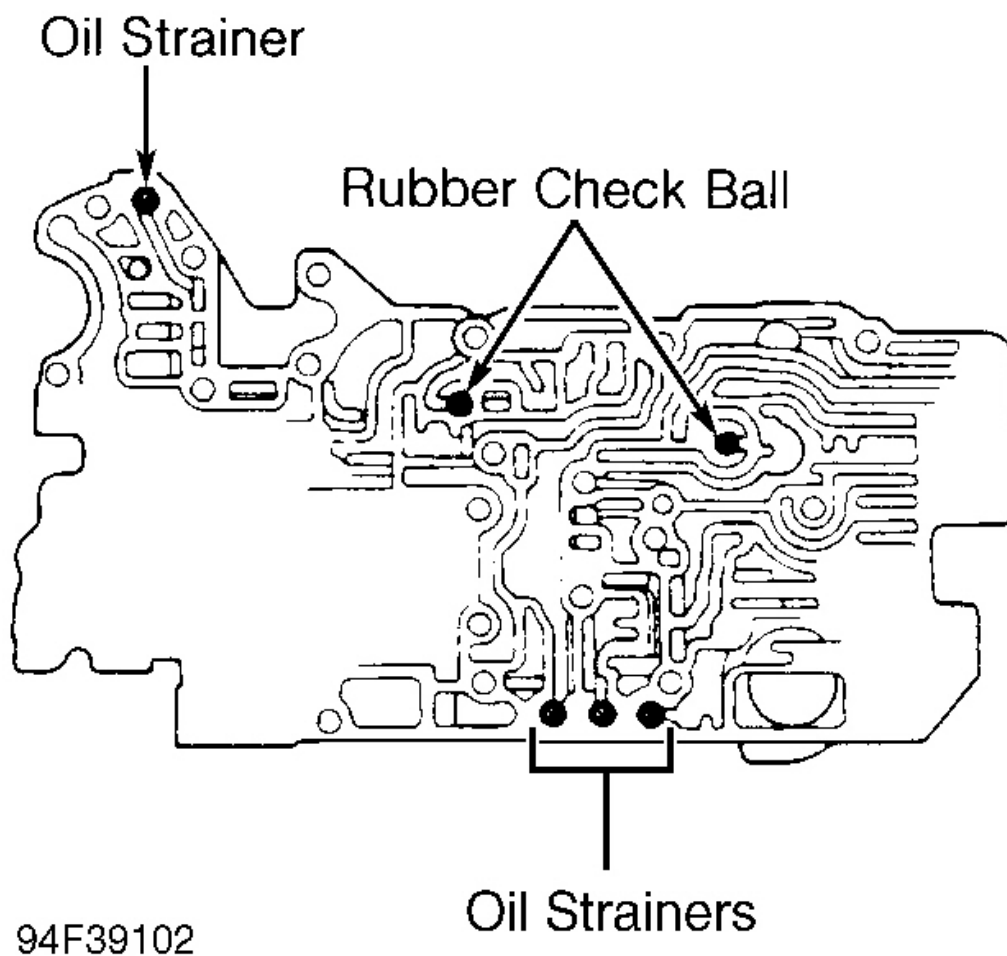


Fig. 27: Locating Valve Body Check Balls & Oil Strainers - Premain Valve Body (Underside)
Courtesy of FORD MOTOR CO.

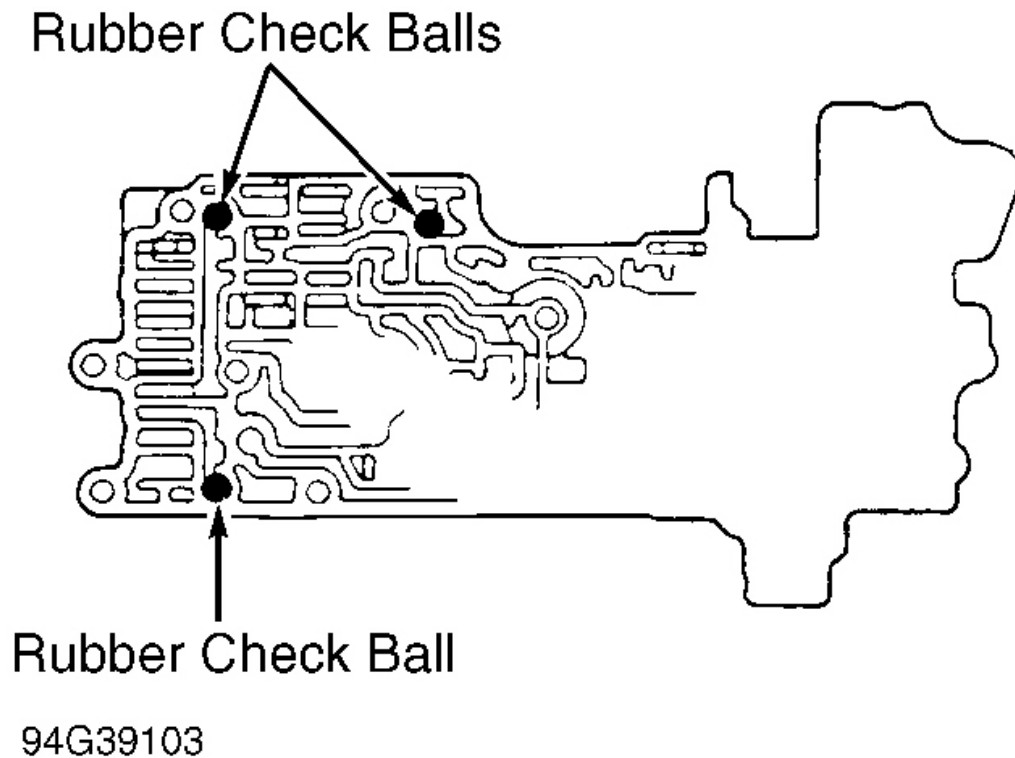


Fig. 28: Locating Valve Body Check Balls & Oil Strainers - Main Valve Body (Topside)
Courtesy of FORD MOTOR CO.

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

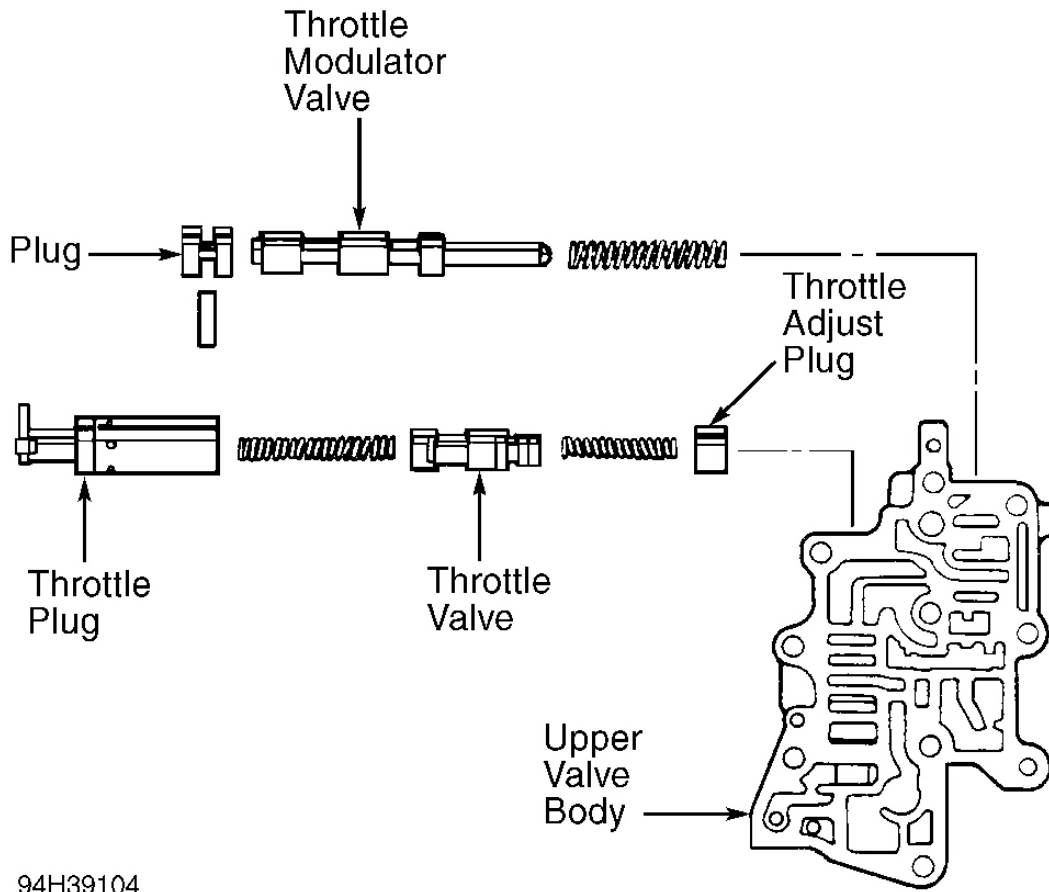
Cleaning & Inspection

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

NOTE: Match bolt head letter with corresponding letter on valve body. DO NOT mix gaskets during assembly.

Reassembly

1. Install all valve trains into respective bores using illustrations as assembly guides. See **Fig. 25 -Fig. 28** . Assemble all valve body components in reverse order of disassembly. Coat "O" rings with transmission fluid. Tighten bolts to specifications. See **TORQUE SPECIFICATIONS** .



94H39104

Fig. 29: Exploded View Of Upper Valve Body
Courtesy of FORD MOTOR CO.

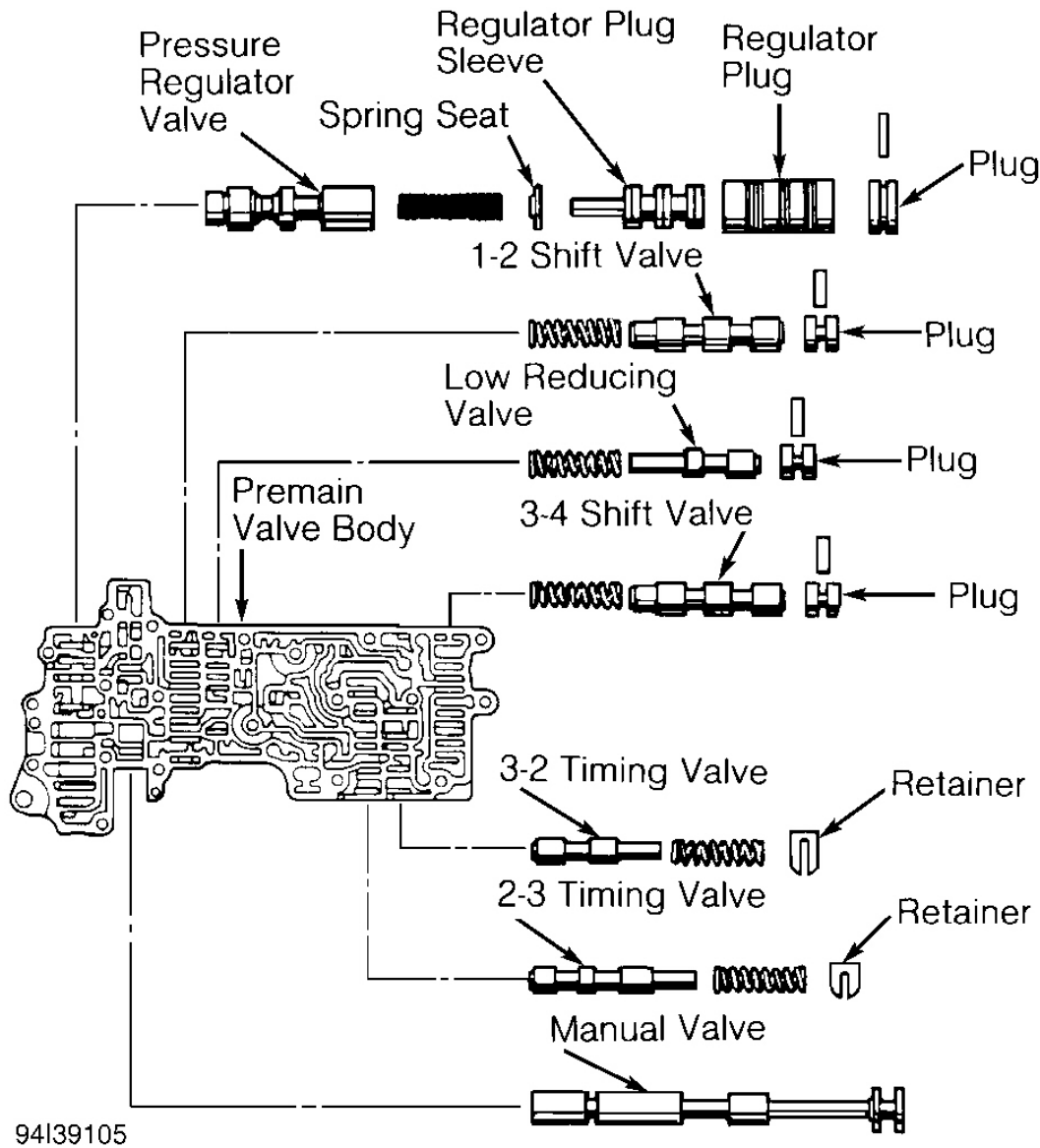


Fig. 30: Exploded View Of Premain Valve Body

Courtesy of FORD MOTOR CO.

TRANSAXLE REASSEMBLY

NOTE: Handle all parts carefully to avoid damaging bearings and mating surfaces. Lubricate all parts with clean ATF. Use petroleum jelly on gaskets, thrust washers and needle bearings to retain in place. Use all new gaskets and seals. Tighten bolts evenly. For thrust washer and needle bearing location, see [Fig. 36](#).

NOTE: **When transaxle is disassembled, differential bearing preload MUST be adjusted by selecting shims to insert under bearing cup.**

1. Install front bearing cup into converter housing using appropriate bearing cup replacer. Insert differential gear into converter housing. Place rear bearing cup over differential bearing and 6 collars of Shim Selector Set (T88C-77000-JF) on converter housing.
2. Install Shim Selector Gauge, part of (T88C-77000-JF) and Shim Gauge Adapter Ring (T90P-7025-AH) on output gear. Turn both halves of gauge to eliminate any gap. Place transaxle case on collars. Install 6 bolts and washers of Shim Selector Set (T88C-77000-JF). Tighten bolts to 14-19 ft. lbs. (19-26 N.m).
3. Install Preload Torque Adapter (T90P-7025-BH) on output gear. Using pins provided in Shim Selector Set (T88C-77000-JF), loosen gauge halves until all free play is removed and bearing cup is seated. Thread gauge halves together.
4. Measure drag on output gear bearing using an INCH-lb. torque wrench. Read preload when output gear starts to turn. Turn gauge using pins until starting preload is 4.3 INCH lbs. (0.5 N.m).
5. Using a feeler gauge, measure gap between 2 halves of shim selection gauge in 4 locations at 90 degree intervals. See **Fig. 31** . Use largest measurement, and add .012" (.30 mm). Select no more than 3 shims to maintain clearance. Shims are available in thicknesses of .020-.057" (.500-1.450 mm) in .001" (.025 mm) increments.

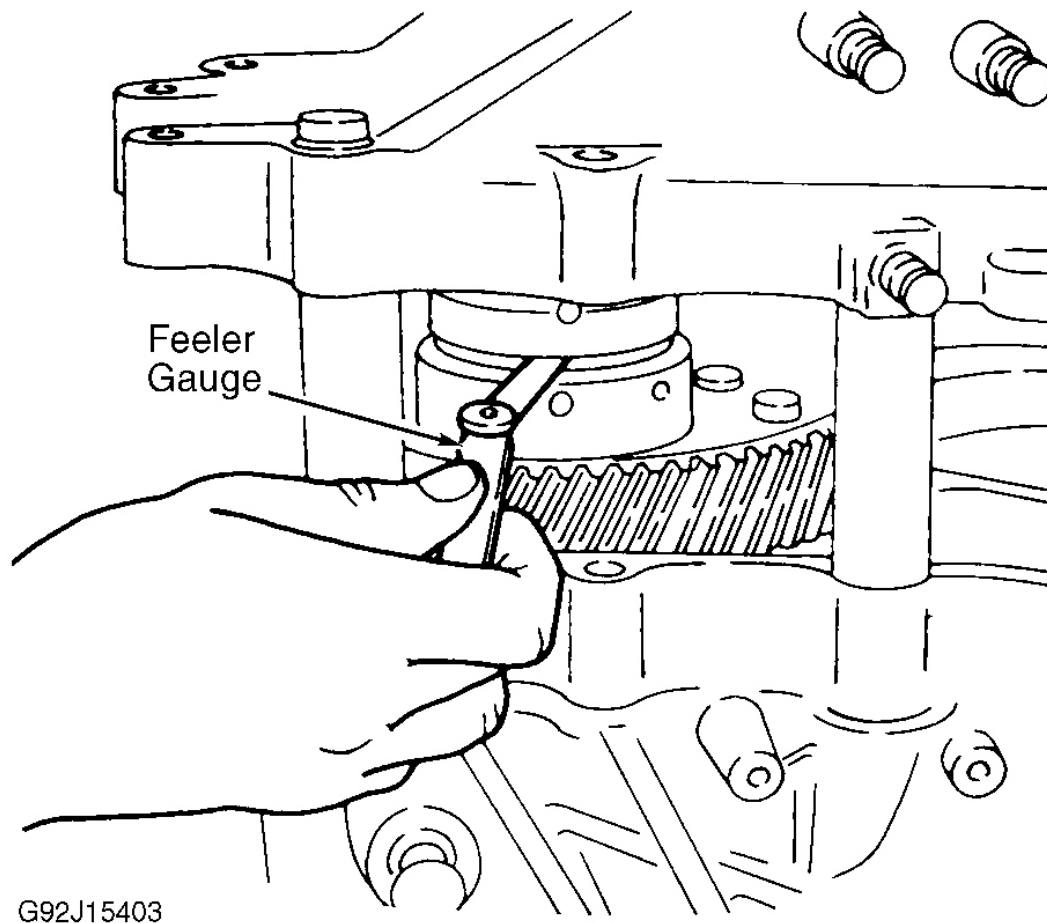


Fig. 31: Measuring Differential Preload
 Courtesy of FORD MOTOR CO.

6. Remove bolts, washers, transaxle case, gauge and bearing cup. Install selected shim(s) and bearing cup into transaxle case. Install transaxle case. Tighten retaining bolts to 27-38 ft. lbs. (37-52 N.m). Measure bearing preload. If preload is not 26-35 INCH lbs. (2.9-3.9 N.m), repeat steps 1) -6) . Remove transaxle case when proper preload specification is obtained.
7. Install output gear and idler gear as an assembly into converter housing. Install bearing housing. Tighten bolts to specification. See **TORQUE SPECIFICATIONS** . Align groove on idler gear shaft with matching mark on bearing housing. Install NEW roll pin with pin punch and hammer.
8. Install parking pawl return spring, parking pawl and parking pawl shaft. Install support, using NEW bolts. Tighten bolts to specification. Install park lever plate and parking plate torsion spring.
9. Install park actuator support and parking lever actuating rod as an assembly. Install parking rod support plate, tighten bolt to specification. Install manual control lever and manual valve detent lever, washer and nut. Tighten nut to specification.
10. Install differential. Install front sun shell onto output shaft. Apply thin coat of silicone sealant to contact

surfaces of converter housing and transaxle case. Install NEW "O" rings into oil passage ports. Install case to converter housing, and tighten retaining bolts to specification.

NOTE: **Install Transaxle Plugs (T88C-7025-AH) to differential side gears. Failure to install plugs may allow differential side gears to become mispositioned.**

11. If necessary, assemble 3-4 clutch. See **3-4 CLUTCH** . Install Turbine Shaft Holder (T88C-77000-KH) to turbine shaft. Install 3-4 clutch onto turbine shaft. Ensure converter turbine shaft seal is installed on inner groove of turbine shaft. Ensure thrust washer is installed between 3-4 clutch and front sun shell. See **Fig. 36** .
12. Install turbine shaft and 3-4 clutch assembly with thrust washer into transaxle case. See **Fig. 32** . Install ring gear with external gear side down, and secure with retaining ring. Install needle bearing and carrier hub assembly into 3-4 clutch cylinder by rotating carrier hub to align with 3-4 clutch pack. Install low-reverse clutch pack, pressure plate and previously selected retaining ring.

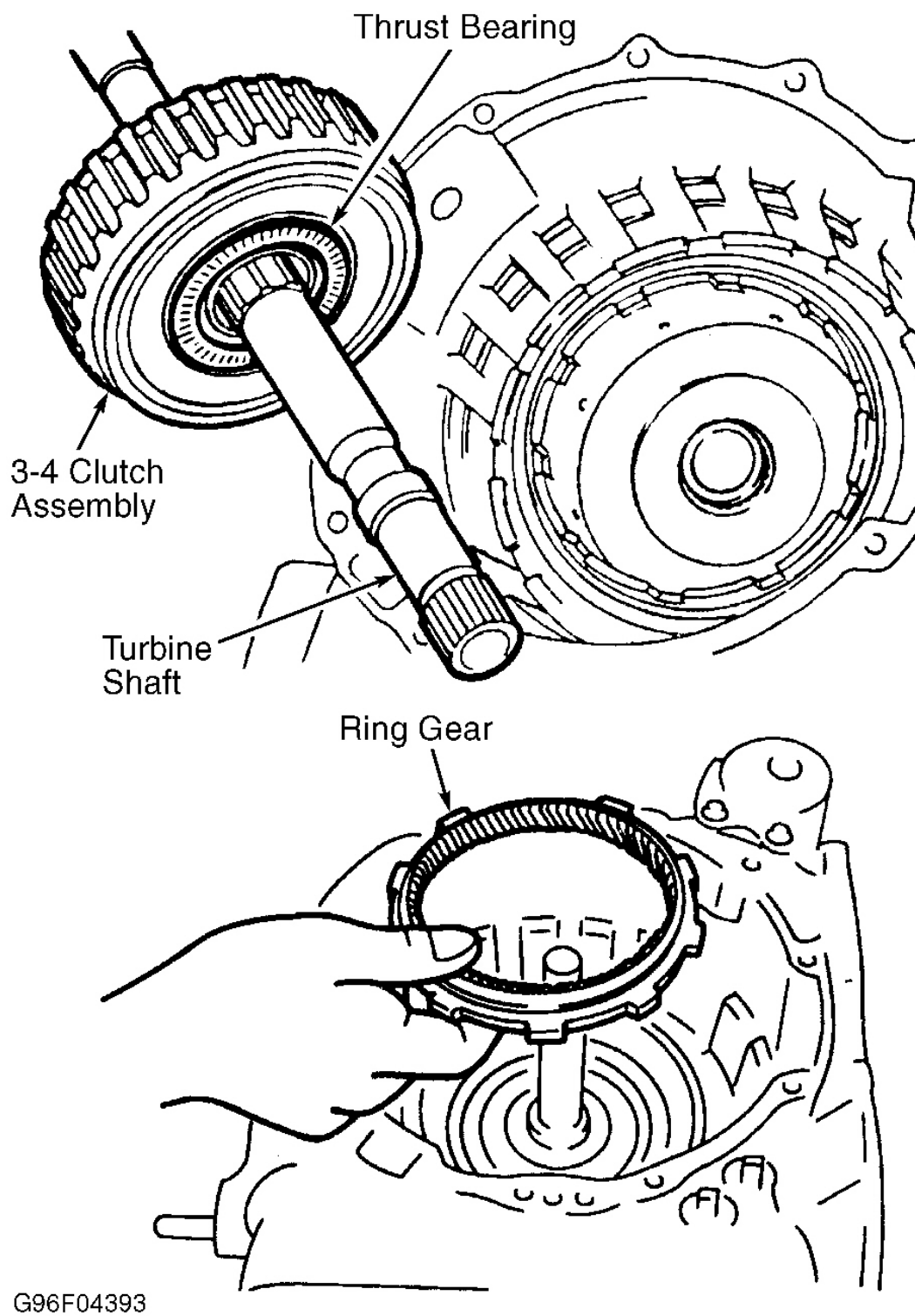


Fig. 32: Installing Turbine Shaft, 3-4 Clutch Assembly & Ring Gear

Courtesy of FORD MOTOR CO.

CAUTION: One-way clutch can be installed incorrectly. Ensure carrier hub rotates counterclockwise while turning from rear of transaxle when one-way clutch is installed.

13. Install one-way clutch thrust washer. Carefully install one-way clutch while turning carrier hub assembly counterclockwise. Install retaining ring. Install servo band lever and shaft. Install 2-4 band in case fully expanded. Interlock 2-4 band and servo band lever. Install servo assembly and servo piston spring into case. Ensure piston stem engages properly in 2-4 band. Compress servo assembly into bore and install piston retaining ring.
14. Install dial indicator with Adapter (T75L-4201-A) to measure servo travel. See **Fig. 33**. Apply air pressure to 3rd fluid passage (2-4 band apply) beneath throttle control lever. See **Fig. 8**. Servo piston stem should move .039-.067" (1.0-1.7 mm).

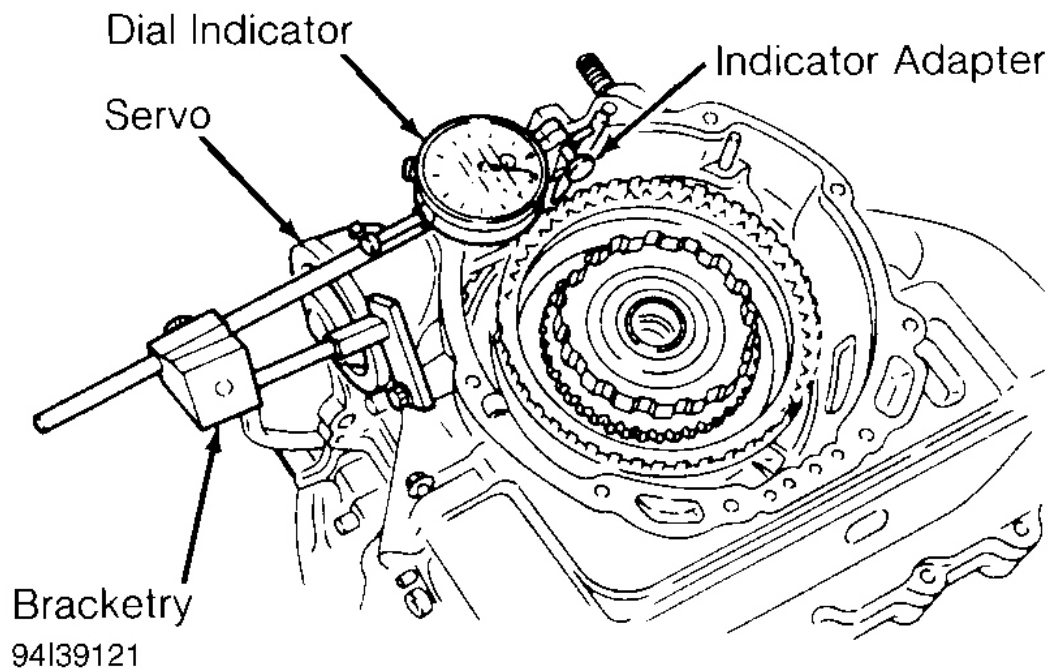
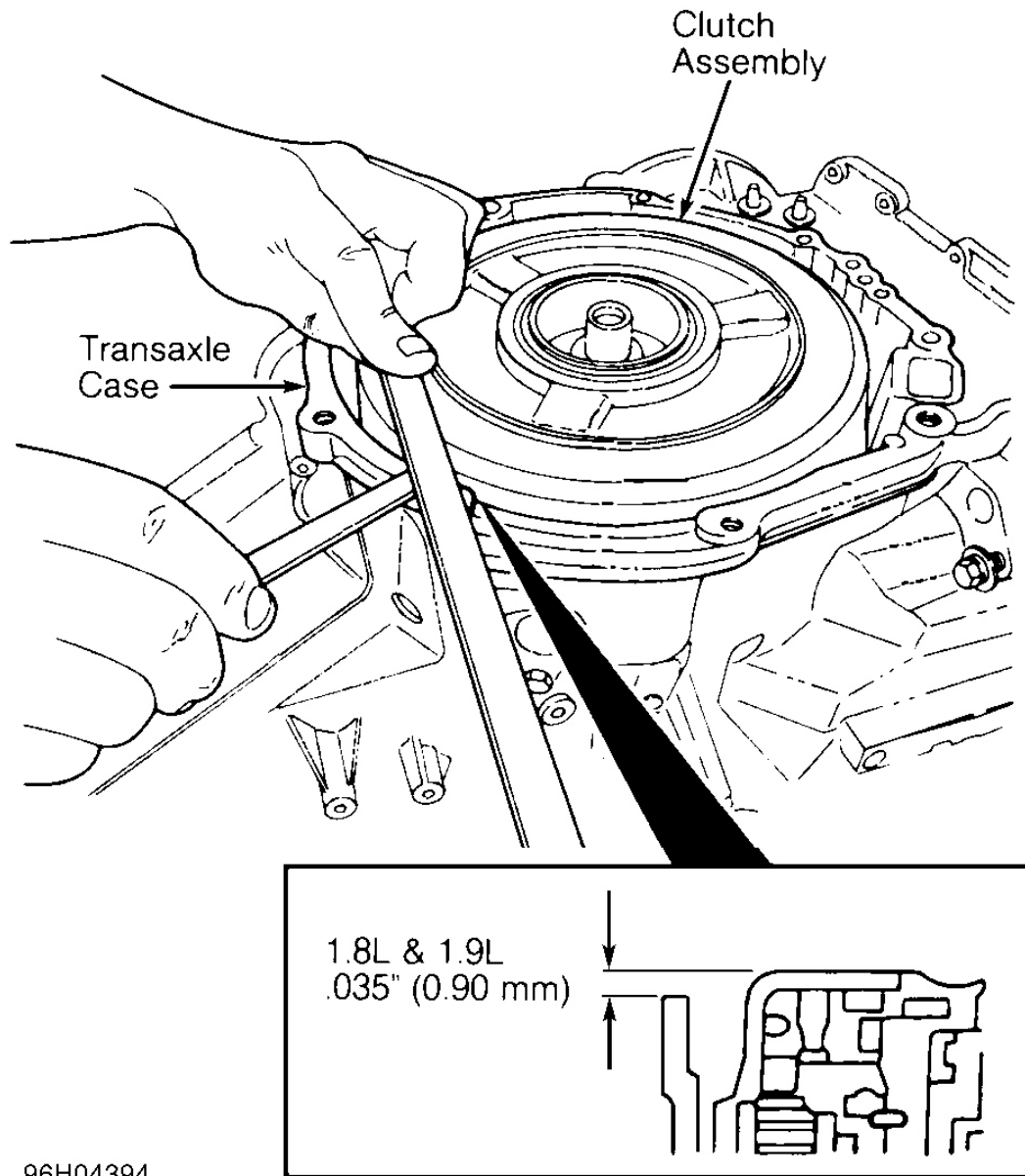


Fig. 33: Measuring 2-4 Servo Travel
Courtesy of FORD MOTOR CO.

15. If stem movement is not within specification, disassemble servo assembly and replace stem with correct length replacement. Stem lengths range from 3.74" (95.0mm) to 3.90" (99.0 mm) in .020" (.5 mm) increments. Recheck servo movement once stem is installed.
16. Install primary sun gear and one-way clutch into forward and reverse clutch drum. Ensure planet gear bearing thrust washer and needle bearing are installed between carrier hub assembly and primary sun gear

and one-way clutch. See **Fig. 36**.

17. Install rear sun gear, one-way clutch and forward and reverse clutch drum assembly. Insert 2 screwdrivers through access hole in bottom of case to spread 2-4 band. Rotate one-way clutch and forward and reverse clutch drum to align clutch pack and gears. Install NEW turbine shaft retaining ring into bottom groove.
18. Remove turbine shaft holder. Measure height difference between reverse clutch drum and transaxle case. See **Fig. 34**. If assembled height is more than .035" (.90 mm), recheck all assembled components.



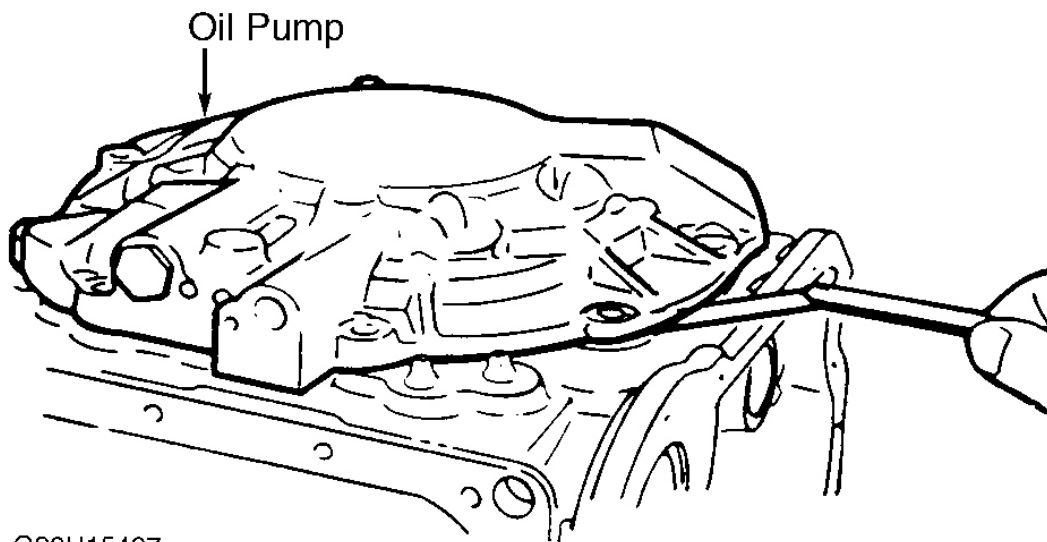
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Fig. 34: Measuring Height Difference Of Case & Clutch
Courtesy of FORD MOTOR CO.

19. To adjust total end play, place planet gear needle bearing on reverse clutch assembly. Remove previously used thrust washer and gasket from oil pump. Place a .087" (2.2 mm) thrust washer on oil pump. Set oil pump on clutch assembly.
20. Using a feeler gauge, measure clearance between transaxle case and oil pump in several locations. See **Fig. 35** . Average measurements. Select correct end play thrust washer to install. See **END PLAY THRUST WASHER SELECTION CHART** .

END PLAY THRUST WASHER SELECTION CHART

Measured Clearance In. (mm)	Thrust Washer Thickness: In. (mm)
.000-.004 (0.00-0.10)	.087 (2.20)
.004-.011 (0.11-0.30)	.078 (2.00)
.012-.019 (0.31-0.50)	.071 (1.80)
.020-.027 (0.51-0.70)	.063 (1.60)
.028-.035 (0.71-0.90)	.055 (1.40)
.036-.043 (0.91-1.10)	.047 (1.20)



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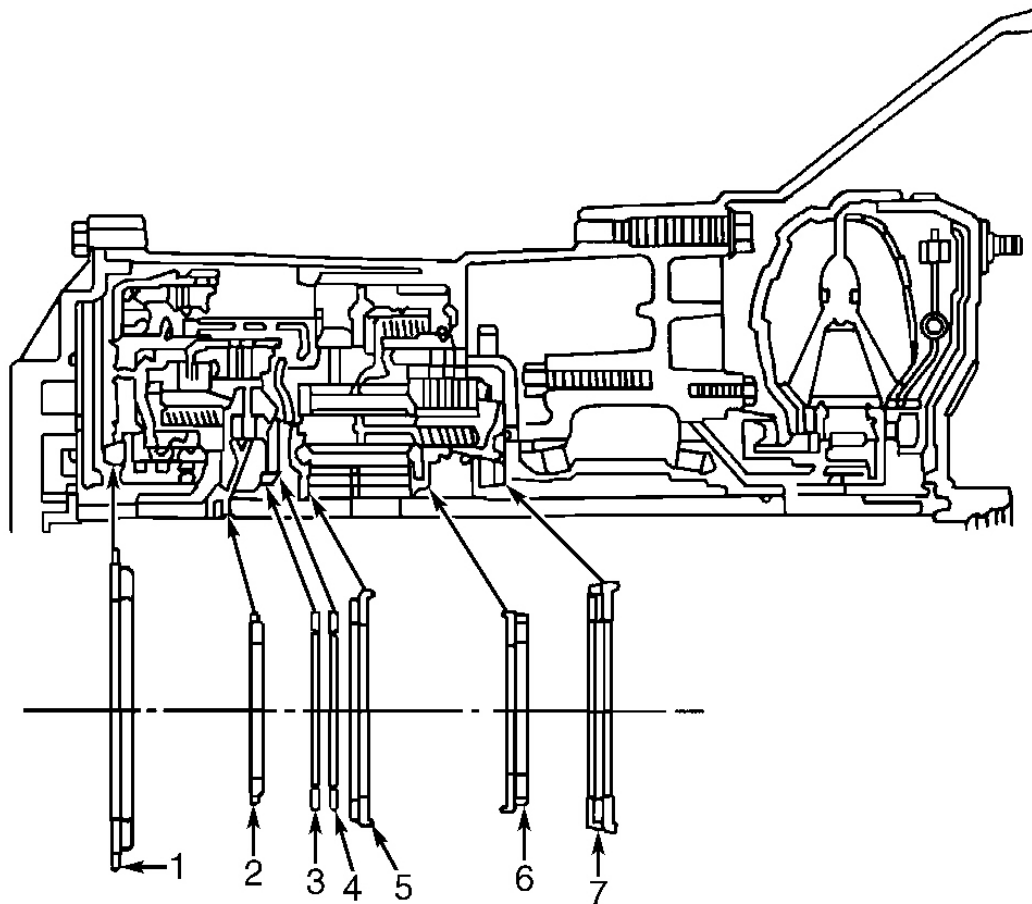
Fig. 35: Measuring Oil Pump-To-Case Clearance

Courtesy of FORD MOTOR CO.

21. Remove oil pump. Using petroleum jelly, place selected thrust washer and planet gear needle bearing on oil pump. Install NEW gasket and place oil pump on clutch assembly. Install oil pump-to-transaxle bolts, and tighten to specification.
22. Install NEW "O" ring on kickdown cable bracket. Feed cable through case, and connect cable to throttle cam. Install kickdown cable attaching bolt and bracket. Align manual valve with pin on manual valve detent lever, and install valve body onto transaxle case. Tighten retaining bolts to 69-95 INCH lbs. (8-11

N.m).

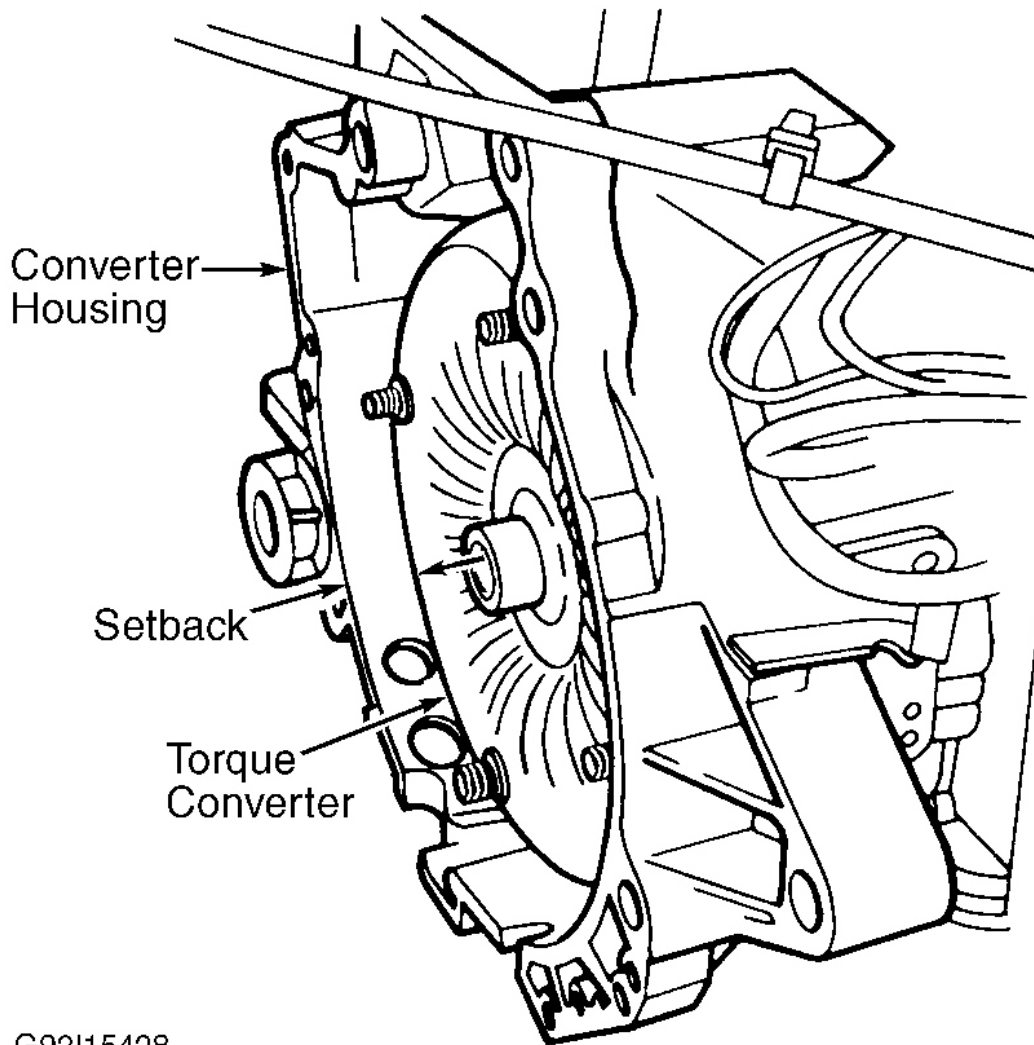
23. Install solenoid harness connector using a NEW "O" ring in case. Connect harness to solenoids. Install oil screen with NEW "O" ring. Ensure magnets are correctly positioned in oil pan. Install oil pan and NEW gasket. Tighten bolts to specification. Refer to the **TORQUE SPECIFICATIONS** . Install Pulse Signal Generator (PSG).
24. Turn manual shaft to neutral position. Install Transmission Range (TR) switch. Loosely tighten retaining bolts. Remove access screw, and insert a .079" (2.00 mm) pin. Move neutral safety switch until pin engages switch alignment hole.
25. Tighten switch retaining bolts to 69-95 INCH lbs. (8-11 N.m). Remove pin, and install screw. Install harness using remaining brackets. Install dipstick tube using a NEW "O" ring.
26. Remove transaxle from holding fixture. Using appropriate seal replacer, install converter seal. Install NEW "O" ring on turbine shaft. Install oil pump shaft. Fill torque converter with specified transaxle fluid. Carefully install torque converter in converter housing while rotating to align splines.
27. Measure distance between torque converter and end of converter housing. Torque converter setback should be at least .54" (13.6 mm). See **Fig. 37** . Using appropriate seal replacer, install differential oil seals.



- | | |
|-------------------------------|------------------------------------|
| 1. Oil Pump & Clutch Assembly | 5. Small Sun Gear & One-Way Clutch |
| 2. Clutch Assembly | 6. Planetary Carrier Assembly |
| 3. One-Way Clutch Inner Race | 7. 3-4 Clutch Assembly |
| 4. One-Way Clutch Outer Race | |

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Fig. 36: Locating Thrust Washers & Needle Bearings
 Courtesy of FORD MOTOR CO.



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Fig. 37: Measuring Converter Housing Clearance
 Courtesy of FORD MOTOR CO.

TORQUE SPECIFICATIONS

TORQUE SPECIFICATIONS

Application	Ft. Lbs. (N.m)
Axle Shaft Nut	174-235 (236-319)
Ball Joint Bolt/Nut	32-44 (43-60)
Bearing Housing Bolts	14-19 (19-26)
Center Transaxle Mount Bolt	27-40 (37-54)

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Center Transaxle Mount Nuts	47-66 (64-89)
Drain Plug	29-36 (39-50)
TFT Sensor Bolt	22-29 (29-39)
Manual Lever Nut	30-41 (41-56)
Oil Filler Tube Bolt	7-11 (62-95)
Oil Pump Plug	23-35 (31-47)
Oil Pump Bolts	14-19 (19-26)
Right Transaxle Mount Bolts	43-49 (58-66)
Switch Box Bolts	12-17 (16-23)
Tie Rod End Nut	25-33 (34-45)
Torque Cable Bracket Bolt	32-45 (43-61)
Torque Converter Nuts	32-45 (43-61)
Transaxle Case-To-Converter Housing	27-38 (37-52)
Transaxle-To-Engine Bolts	66-86 (89-117)
Transaxle-To-Left Mount Bolts	49-69 (67-93)
INCH Lbs. (N.m)	
Converter Cover Bolts	71-97 (8-11)
Dipstick Tube Bolt	61-89 (7-10)
Front Face & Rear Face Valve Body Bolts	57-71 (6-8)
Line Pressure Plug	43-89 (5-10)
Oil Bypass Tube Bolts	71-97 (8-11)
Oil Pan Bolts	71-97 (8-11)
Oil Pump Cover Bolts	71-97 (8-11)
Pulse Signal Generator Bolt	71-97 (8-11)
Solenoid Valve Bolts	71-97 (8-11)
Stator Support Bolts	97-120 (11-14)
Support Bolts	97-120 (11-14)
Throttle Cam Bolts	71-97 (8-11)
TR Switch Bolts	71-89 (8-10)
Valve Body Bolts	71-97 (8-11)

TRANSMISSION SPECIFICATIONS

TRANSMISSION SPECIFICATIONS

Application	In. (mm)
Coasting Clutch Pack Clearance	.039-.047 (1.0-1.2)
Torque Converter Setback	.54 (13.6)
Differential Pinion Backlash	0-.004 (0-.10)
Forward Clutch Pack Clearance	.039-.047 (1.0-1.2)
Low-Reverse Clutch Pack Clearance	.083-.094 (2.1-2.4)
Reverse Clutch Pack Clearance	.039-.051 (1.0-1.3)

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3-4 Clutch Pack Clearance	.051-.063 (1.3-1.5)
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