FORD
4R44E/4R55E

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FORD 4R44E/4R55E

GEARTRAIN

Power is transmitted from the torque converter to the (simple) planetary gearsets through the input shaft.

By holding and driving certain members of the gearsets, four forward ratios and one reverse ratio are obtained and transmitted to the output shaft and differential.

The ratios from the (simple) planetary gearsets are:

- 2.474:1 in 1st (Low)
- 1.474:1 in 2nd (Intermediate)
- 1.000:1 in 3rd (Drive)
- 0.75:1 in 4th (Overdrive)
- 2.1:1 in Reverse

APPLY COMPONENTS

These are the following apply components in the 4R44E/4R55E:

- Overdrive band
- Intermediate band
- Reverse band
- Direct clutch
- Forward clutch
- Overdrive one-way clutch
- Low one-way clutch
- Coast clutch

BAND/CLUTCH APPLICATION CHART

	OVERDRIVE BAND	INTERMEDIATE BAND	LOW/REVERSE BAND	FORWARD CLUTCH	DIRECT CLUTCH	COAST CLUTCH	OD ONE-WAY CLUTCH		REAR ONE-WAY CLUTCH		SHIFT SOLENOID 1 (SS1)	SHIFT SOLENOID 2 (SS2)	SHIFT SOLENOID 3 (SS3)	COAST CLUTCH SOLENOID CCS	ENGINE BRAKING	TCIL
							DRIVE	COAST	DRIVE	COAST						
PARK											ON	OFF	OFF	OFF	NE	NE
REVERSE			A		A		H	OR			ON	OFF	OFF	OFF	NO	OFF
REVERSE*			A		A	A	H	H			ON	OFF	OFF	ON	YES	ON
NEUTRAL											ON	OFF	OFF	OFF	NE	NE
1ST				A			H	OR	H	OR	ON	OFF	OFF	OFF	NO	OFF
1ST*				A		A	H	H	H	OR	ON	OFF	OFF	ON	YES	ON
2ND		A		A			H	OR	OR	OR	ON	ON	OFF	OFF	NO	OFF
2ND*		A		A		A	H	H	OR	OR	ON	ON	OFF	ON	YES	ON
3RD				A	A		H	OR	OR	OR	OFF	OFF	OFF	OFF	NO	OFF
3RD*				A	A	A	H	H	OR	OR	OFF	OFF	OFF	ON	YES	ON
4TH	A			A	A		OR	OR	OR	OR	OFF	OFF	ON	OFF	NO	OFF
MAN. 1ST			A	A		A	H	H	H	H	ON	OFF	OFF	ON	YES	NE
MAN. 2ND		A		A		A	H	H	OR	OR	ON	ON	OFF	ON	YES	NE

A = APPLIED H = HOLD OR = OVERRUNNING * = OVERDRIVE CANCELLED NE = NO EFFECT

DESCRIPTION AND OPERATION (Continued)

4R44E

Item	Part Number	Description
1	7C096	No. 5 Forward Clutch Cylinder Thrust Washer
2	7D234	No. 6A Forward Ring Gear Hub Thrust Bearing
3	7D090	No. 6B Forward Clutch Thrust Washer
4	7F374	No. 7 Forward Planet Thrust Bearing
5	—	Needle Bearing (Part of 7A398)
6	7A166	No. 8 Reverse Planet Carrier Thrust Washer
7	7A166	No. 9 Reverse Planet Carrier Thrust Washer
8	7B368	No. 11 Output Shaft Thrust Washer
9	7A034	Extension Housing Bushing
10	—	Bushing (Part of 7005)
11	7D422	No. 10 Output Shaft Hub Thrust Washer
12	—	Needle Bearing (Part of 7D006)
13	7D066	No. 14 Input Shell Thrust Washer
14	—	Bushings (Part of 7D063)

(Continued)

Item	Part Number	Description
15	—	Needle Bearing (Part of 7A398)
16	—	Needle Bearing (Part of 7060)
17	—	Bushing (Part of 7D044)
18	—	Needle Bearing (Part of 7B446)
19	—	Needle Bearing (Part of 7B446)
20	7D235	No. 12 Sun Gear Thrust Bearing Race
21	—	Bushing (Part of 7D063)
22	—	Bushing (Part of 7A103)
23	—	Bushing (Part of 7976)
24	—	Bushing (Part of 7A103)
25	7D014	No. 1 Front Pump Thrust Washer
26	—	Bushing (Part of 7L669)
27	—	Needle Bearing (Part of 7B446)
28	7L495	No. 2 Overdrive Planet Thrust Bearing
29	7L326	No. 3 Center Shaft Thrust Bearing
30	7L326	No. 4 Intermediate Brake Drum Thrust Bearing

4R55E

Item	Part Number	Description
1	7C096	No. 5 Forward Clutch Cylinder Thrust Washer
2	7D234	No. 6A Forward Ring Gear Hub Thrust Bearing
3	7D090	No. 6B Forward Clutch Thrust Washer
4	7F374	No. 7 Forward Planet Thrust Bearing
5	—	Needle Bearing (Part of 7A398)
6	7A166	No. 8 Reverse Planet Carrier Thrust Washer
7	7A166	No. 9 Reverse Planet Carrier Thrust Washer
8	—	Washer (Part of 7005)
9	7A034	Extension Housing Bushing
10	7B368	No. 11 Output Shaft Thrust Washer
11	—	Bushing (Part of 7005)
12	7D422	No. 10 Output Shaft Hub Thrust Washer
13	—	Needle Bearing (Part of 7D006)
14	—	Needle Bearing (Part of 7A398)

Item	Part Number	Description
15	—	Needle Bearing (Part of 7060)
16	—	Bushing (Part of 7D044)
17	—	Needle Bearing (Part of 7B446)
18	—	Needle Bearing (Part of 7B446)
19	7D235	No. 12 Sun Gear Thrust Bearing Race
20	—	Bushing (Part of 7D063)
21	—	Bushing (Part of 7A103)
22	—	Bushing (Part of 7976)
23	—	Bushing (Part of 7A103)
24	7D014	No. 1 Front Pump Thrust Washer
25	—	Bushing (Part of 7L669)
26	—	Needle Bearing (Part of 7B446)
27	7L495	No. 2 Overdrive Planet Thrust Bearing
28	7L326	No. 3 Center Shaft Thrust Bearing
29	7L326	No. 4 Intermediate Brake Drum Thrust Bearing

DIAGNOSIS AND TESTING (Continued)

LINE PRESSURE DIAGNOSIS CHART

Test Results	Possible Source
High at Idle — All Ranges	• Wiring Harnesses • EPC Boost Valve • EPC Solenoid • Main Regulator Valve
Low at Idle — All Ranges	• Low Fluid Level • Fluid Inlet Filter / Seal • Main Control Body • Cross Leaks • Gaskets • Pump • Separator Plate
Low — All Forward Ranges	• Forward Clutch • Main Control • O / D Servo
Low in Park Only	• Valve Body
Low in Reverse Only	• Separator Plate • Rear Servo Piston, Cover Seal • Reverse Clutch • O / D Servo • Valve Body • Forward Clutch
Low in Neutral Only	• Valve Body • O / D Servo
Low in Overdrive Only	• Forward Clutch • O / D Servo • Valve Body
Low in Drive Only (O / D Cancelled)	• Forward Clutch • O / D Servo • Valve Body
Low in Manual 1st Only	• Forward Clutch • Valve Body
Low in Manual 2nd Only	• Intermediate Servo • O / D Servo • Forward Clutch

Stall Speed Test

This test checks operation of the following items:

- Torque Converter Clutch
- Forward Clutch
- Low OWC Assembly
- Engine Performance

NOTE: The stall speed test should be performed with the engine and transmission at normal operating temperatures.

CAUTION: Always perform Line Pressure Test procedures prior to performing the Stall Speed Test. If line pressure is LOW at stall, DO NOT perform Stall Speed Test or further transmission damage will occur.

WARNING: APPLY THE PARKING BRAKE FIRMLY WHILE PERFORMING EACH STALL TEST.

1. Connect tachometer to the engine.
2. **CAUTION: After testing each of the following ranges (D), 2, 1, R move the transmission range selector lever to N (NEUTRAL) and run engine at 1000 rpm for about 15 SECONDS to allow the torque converter to cool before testing the next range.**

   CAUTION: DO NOT MAINTAIN WIDE-OPEN THROTTLE in any range for more than FIVE (5) seconds.

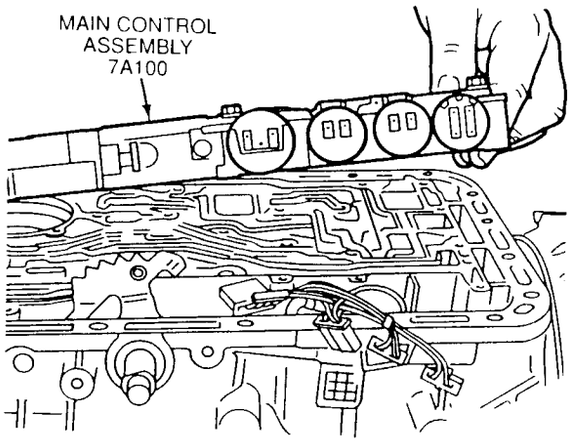
   NOTE: Prolonged use of this procedure may set Diagnostic Trouble Code 638, 657, P0712, P1783. After performing Stall Test procedures run OBD Test and clear DTCs from memory.

   Press accelerator pedal to floor (WOT) in each range. Record rpm reached in each range. Stall speeds should be as follows:

Engine	Stall Speed (RPM)
2.3, 3.0L	2720-3165 rpm
4.0L	2550-2950 rpm

Three-Digit DTC	Four-Digit DTC	Component	Description	Condition	Symptom
—	P1703	BOO	BOO switch circuit failed.	Brake ON/OFF circuit failure during KOEO.	Failed ON or note connected — torque converter clutch will not engage at less than 1/3 throttle. Failed OFF or not connected — torque converter clutch will not disengage when brake is applied.
539	P1460	A/C	A/C clutch cycling pressure switch error	A/C or Defrost ON condition may result from A/C clutch being ON during on-board diagnostic.	DTC set during on-board diagnostic — rerun with A/C OFF. Failed ON — EPC pressure slightly low with A/C OFF.
645**	P0731**	SS1, SS2, SS3 or internal parts	1st gear error	No 1st gear.	Improper gear selection depending on failure or mode and manual lever position. Shift errors may also be due to other internal transmission concerns (stuck valves, damaged friction material).
646**	P0732**	SS1, SS2, SS3 or internal parts	2nd gear error	No 2nd gear.	Improper gear selection depending on failure or mode and manual lever position. Shift errors may also be due to other internal transmission concerns (stuck valves, damaged friction material).
647**	P0733**	SS1, SS2, SS3 or internal parts	3rd gear error	No 3rd gear.	Improper gear selection depending on failure or mode and manual lever position. Shift errors may also be due to other internal transmission concerns (stuck valves, damaged friction material).
648**	P0734**	SS1, SS2, SS3 or internal parts	4th gear error	No 4th gear.	Improper gear selection depending on failure or mode and manual lever position. Shift errors may also be due to other internal transmission concerns (stuck valves, damaged friction material).
621*	P0750*	SS1	SS1 solenoid circuit failure	SS1 circuit failed to provide voltage drop across solenoid. Circuit open or shorted or PCM driver failure during on-board diagnostic.	Improper gear selection depending on condition mode and manual lever position. See Solenoid On/Off charts.
622*	P0755*	SS2	SS2 solenoid circuit failure	SS2 circuit fails to provide voltage drop across solenoid. Circuit open or shorted or PCM driver failure during on-board diagnoatic.	Improper gear selection depending on condition mode and manual lever position. See Solenoid On/Off charts.
631	—	TCIL	TCIL circuit failure	TCIL circuit open or shorted.	Failed ON — Overdrive cancel mode always ON. NO flashing TCIL for EPC failure or sensor. Failed OFF — Overdrive cancel mode never indicated. NO flashing TCIL for EPC sensor failure.

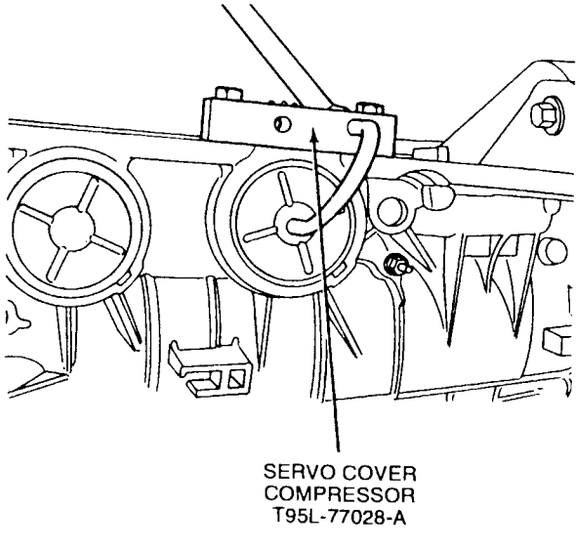
25. Remove the main control assembly.



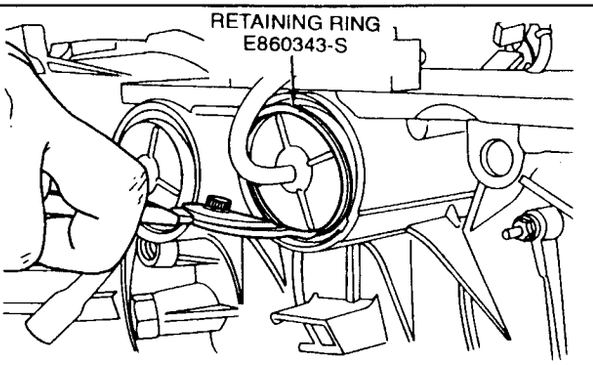
26. NOTE: The J-hook must be in the appropriate hole for the servo being removed.

    Install Servo Cover Compressor T95L-77028-A over the intermediate servo cover at the fluid pan rail. Tighten the bolts.

27. Using a 1/2-inch wrench, tighten the nut on the J-hook until there is a gap between the servo cover and the snap ring.



28. Carefully remove the servo cover snap ring.



29. **CAUTION: The servo cover is under spring tension.**

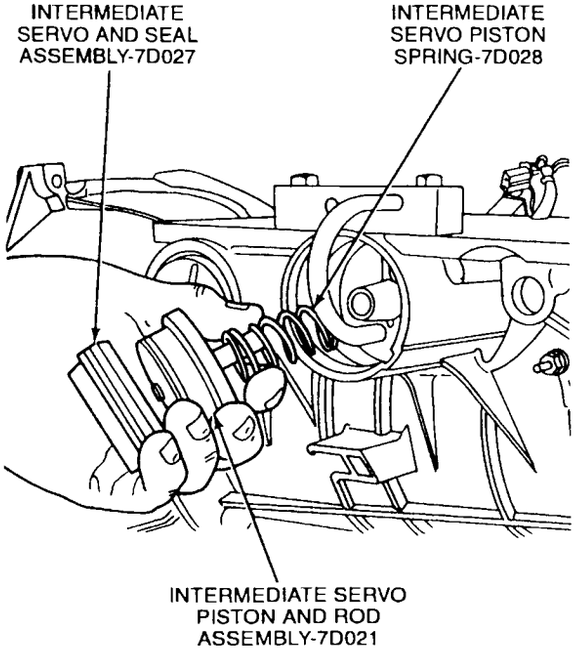
    Carefully back off the nut on the J-hook until the servo spring is unloaded.

30. **WARNING: AIR PRESSURE SHOULD NOT BE GREATER THAN 138 KPA (20 PSI). WEAR SAFETY GLASSES WHEN USING COMPRESSED AIR. THE PISTON ASSEMBLY CAN POP OUT UNEXPECTEDLY DUE TO SPRING PRESSURE BEHIND THE PISTON. DO NOT STAND DIRECTLY IN FRONT OF THE PISTON.**

    NOTE: Light tapping on the cover and case, or air pressure applied on the release side may be needed. Use 4R44E / 4R55E Transmission Test Plate T95L-77000-AH and Transmission Test Plate Gasket T95L-7006A.

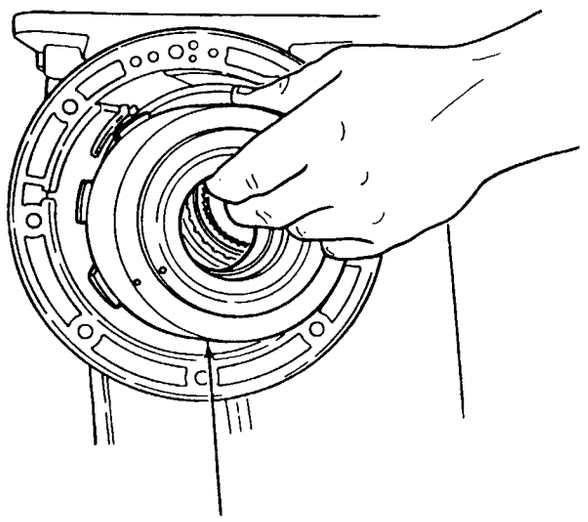
    NOTE: Tag the spring, piston and cover assembly. Label accordingly for assembly. The covers have letters cast on the outer surface for identification.

    Remove the intermediate servo cover, piston and spring.



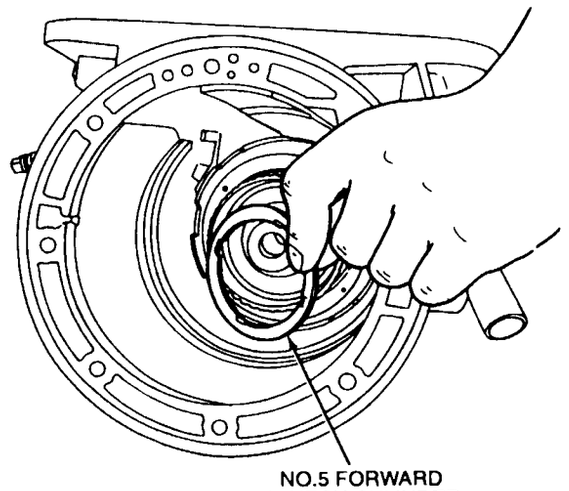
67. NOTE: The No. 5 forward clutch cylinder thrust washer may come out with the intermediate brake and direct clutch drum.

    Remove the intermediate brake and direct clutch drum.



INTERMEDIATE
BRAKE AND DIRECT
CLUTCH DRUM
7D044

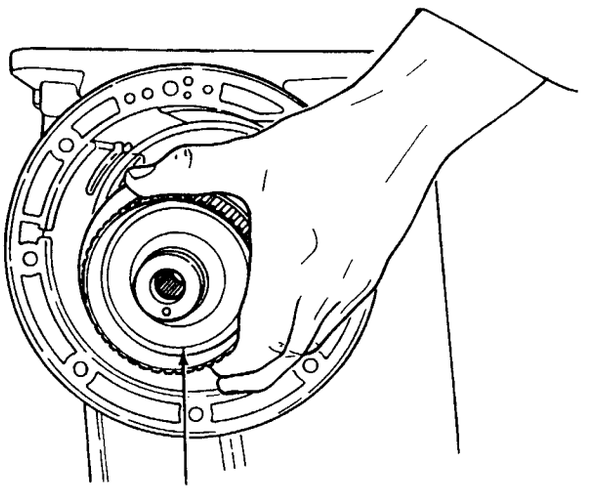
68. Remove the No. 5 forward clutch cylinder thrust washer.



NO.5 FORWARD
CLUTCH CYLINDER
THRUST WASHER
7C096

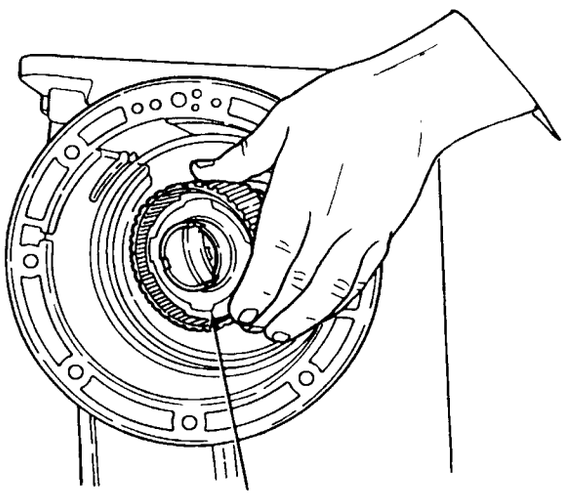
69. NOTE: The No. 5 forward clutch cylinder thrust washer may come out with the forward clutch cylinder.

    Remove the forward clutch cylinder.



FORWARD
CLUTCH CYLINDER
7A360

70. Remove the forward ring gear and forward ring gear hub.



FORWARD RING
GEAR AND FORWARD
RING GEAR HUB

DISASSEMBLY AND ASSEMBLY OF SUBASSEMBLIES

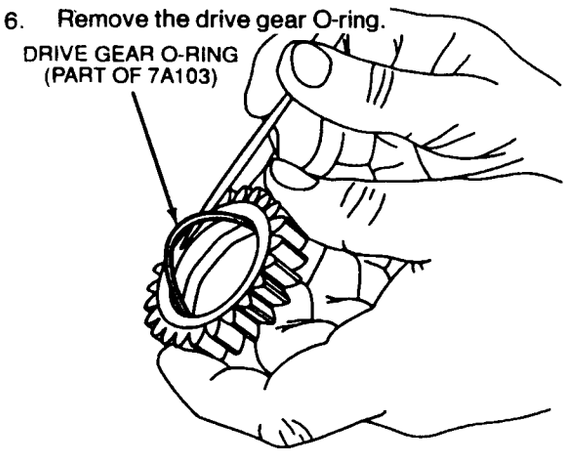
Item	Part Number	Description
1	—	Manual Valve (Part of 7A100)
2	—	Valve Plug Retainer (Part of 7A100)
3	—	Valve Retainer Plug (Part of 7A100)
4	—	Forward Modulator Valve (Part of 7A100)
5	—	Forward Modulator Spring (Part of 7A100)
6	—	Valve Plug Retainer (Part of 7A100)
7	—	Valve Retainer Plug (Part of 7A100)
8	—	EPC Boost Valve (Part of 7A100)
9	—	EPC Boost Spring (Part of 7A100)
10	—	Valve Plug Retainer (Part of 7A100)
11	—	Pressure Boost Valve Sleeve (Part of 7A100)
12	—	Pressure Boost Valve (Part of 7A100)
13	—	Pressure Boost Spring (Part of 7A100)
14	—	Oil Pressure Regulator Spring (Part of 7A100)
15	—	Main Regulator Spring Retainer (Part of 7A100)
16	—	Pressure Regulator Valve (Part of 7A100)
17	—	Valve Retainer Plug (Part of 7A100)
18	—	Forward Engagement Control Spring (Part of 7A100)
19	—	Forward Engagement Control Valve (Part of 7A100)
20	7M107	Shift Solenoids and Coast Clutch Solenoid (4 Req'd)
21	—	3-2 Spring (Part of 7A100)
22	—	3-2 Valve (Part of 7A100)
23	—	Manual Low Spring (Part of 7A100)
24	—	Manual Low Valve (Part of 7A100)
25	—	Valve Retainer Plug (Part of 7A100)
26	—	3-2 Valve (Part of 7A100)
27	—	3-4 Shift Valve (Part of 7A100)
28	—	3-4 Shift Spring (Part of 7A100)

(Continued)

Item	Part Number	Description
29	—	Valve Plug Retainer (Part of 7A100)
30	—	Thermostat Bypass Spring (Part of 7A100)
31	—	Thermostat Bypass Valve (Part of 7A100)
32	—	Thermostat Bypass Valve (Part of 7A100)
33	—	Thermostat Bypass Spring (Part of 7A100)
34	—	Valve Retainer Plug (Part of 7A100)
35	—	Cooler Limit Spring (Part of 7A100)
36	—	Cooler Limit Valve (Part of 7A100)
37	7F037	Torque Converter Clutch (TCC) Solenoid
38	—	Converter Clutch Valve (Part of 7A100)
39	—	Converter Clutch Spring (Part of 7A100)
40	—	Valve Retainer Plug (Part of 7A100)
41	—	Solenoid Regulator Valve (Part of 7A100)
42	—	Solenoid Regulator Spring (2.3L, 1 Req'd) Solenoid Regulator Outer Spring (3.0L, 4.0L) Solenoid Regulator Inner Spring (3.0L, 4.0L) (Part of 7A100)
43	—	Valve Retainer Plug (Part of 7A100)
44	—	Coast Clutch Valve (Part of 7A100)
45	—	Coast Clutch Spring (Part of 7A100)
46	—	Valve Retainer Plug (Part of 7A100)
47	—	Solenoid Regulator Valve (Part of 7A100)
48	—	Solenoid Regulator Spring (Part of 7A100)
49	6916	EPC Solenoid
50	—	Valve Plug Retainer (Part of 7A100)
51	—	Valve Retainer Plug (Part of 7A100)
52	—	1-2 Shift Valve (Part of 7A100)
53	—	1-2 Shift Valve (Part of 7A100)
54	—	1-2 Shift Spring (Part of 7A100)
55	—	Valve Retainer Plug (Part of 7A100)
56	—	2-3 Shift Spring (Part of 7A100)
57	—	2-3 Shift Valve (Part of 7A100)

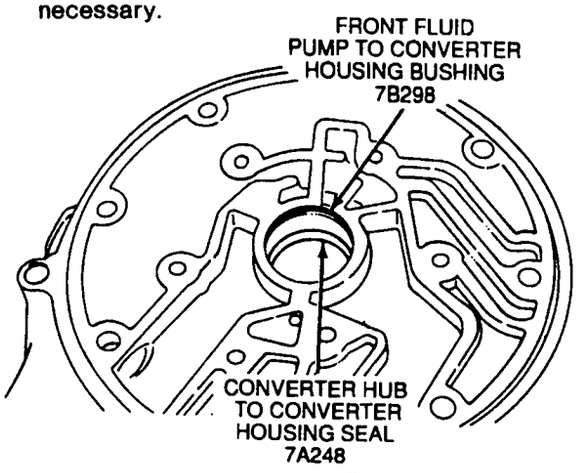
(Continued)

6. Remove the drive gear O-ring.

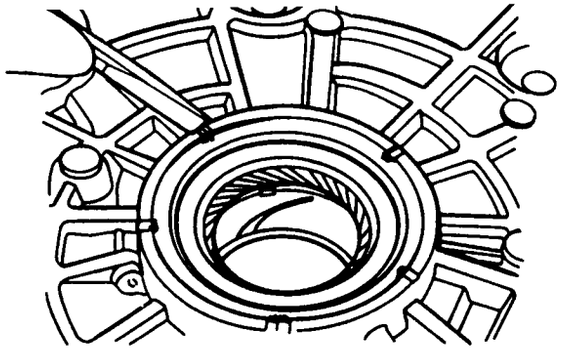


7. Inspect the pump gears for scoring and cracks. Replace pump assembly if damaged.
8. NOTE: Front fluid pump to converter housing bushing is not serviced separately. If service is required, the converter housing assembly must be replaced.

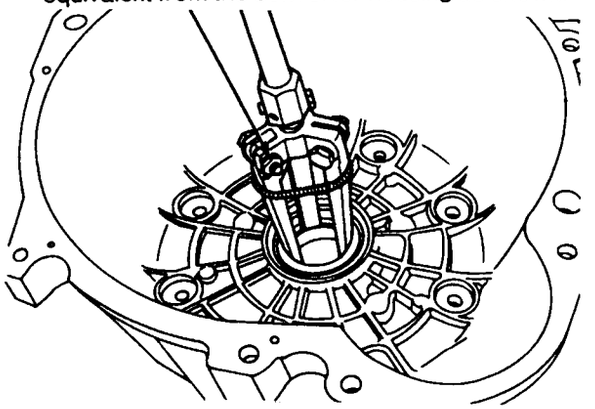
   Inspect the front fluid pump to converter housing bushing and converter hub to converter housing seal. Replace converter housing assembly if necessary.



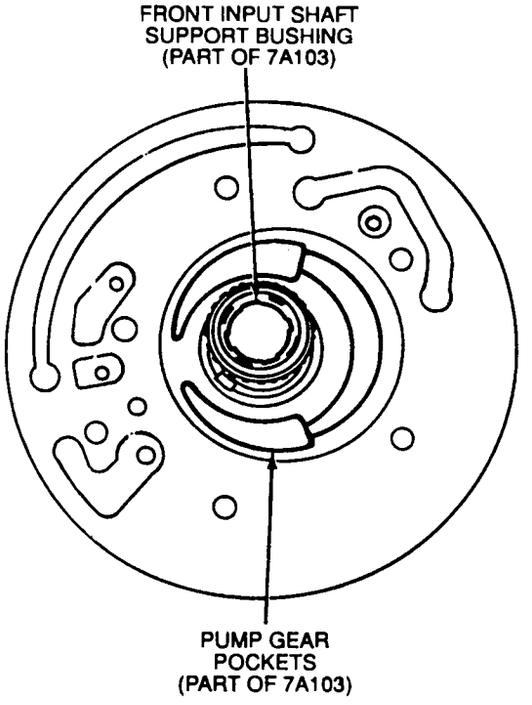
9. Using a small chisel, carefully remove the metal displaced by prior staking. This will allow for the removal of the converter hub-to-converter housing seal from the converter housing.



10. Remove the converter hub-to-converter housing seal using Seal Remover TOOL-1175-AC or equivalent from the converter housing as shown.



11. Clean and inspect the front and rear input shaft support bushings. If bushings are worn, scored or damaged, replace the front pump support and gear assembly. Inspect the pump gear pockets for scoring and wear. Replace if necessary.



12. Inspect the mating surfaces of the pump body and case for burrs.

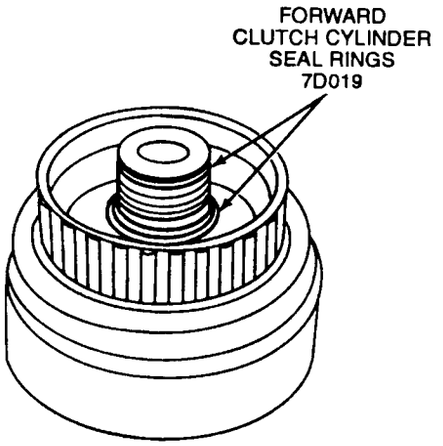
    Inspect the drive and driven gear bearing surface for scores and check the gear teeth for burrs.

    Inspect the front pump seal for cuts or nicks. Inspect the pump bushing for scoring.

    Check the fluid passages for obstruction.

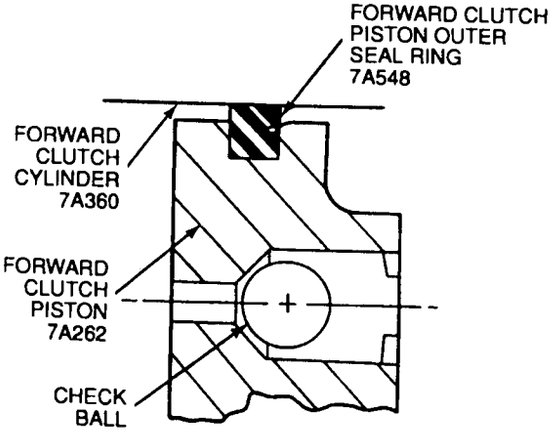
    If any parts are found to be damaged or worn, replace the pump as an assembly. Minor burrs and scores may be removed with a crocus cloth.

8. Remove the forward clutch cylinder seal rings.



9. Inspect the forward clutch cylinder thrust surfaces, piston bore and clutch plate serration for scores or burrs. Minor scores or burrs may be removed with a crocus cloth. Replace the forward clutch cylinder if it is badly scored or damaged.
10. Check the fluid passages in the forward clutch cylinder for obstructions. Clean out all passages. Inspect the forward clutch piston for scores and replace if necessary. Inspect the piston check ball for freedom of movement and proper seating.
11. Check the clutch release springs for distortion and cracks. Replace the springs if they are distorted or cracked.
12. Inspect the friction clutch plates, steel clutch plates and clutch pressure plate for worn or scored bearing surface. Replace all parts that are deeply scored.
13. Check clutch plates for flatness and fit on the clutch hub serrations. Discard any plate that does not slide freely on the serrations or that is not flat.
14. Check clutch hub thrust surfaces for scores and clutch hub splines for wear.
15. NOTE: The check ball is located in the piston.

    Make sure the check ball is free and clear of debris prior to installing the forward clutch piston.

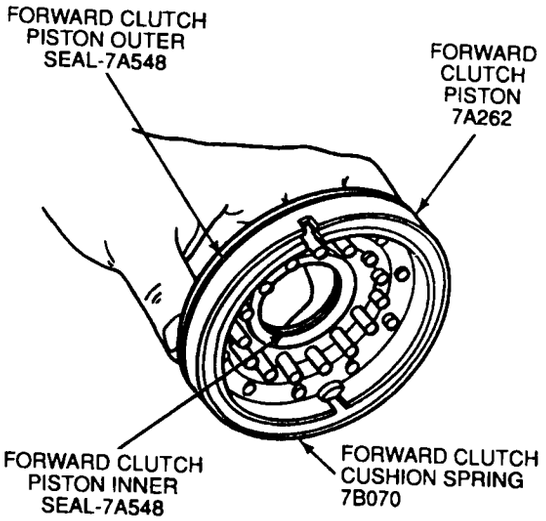


Assembly

1. **CAUTION: If there is evidence of clutch plate burning, replace the forward clutch cushion spring.**

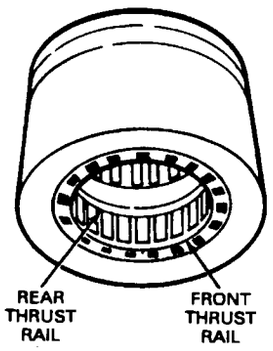
   CAUTION: The forward clutch cushion spring is model dependent.

   Install new inner and outer forward clutch piston seals on the forward clutch piston. Install the forward clutch cushion spring.



3. NOTE: For 4.0L applications, there is no retaining ring. The sprag-type one-way clutch is serviced with the reverse brake drum. Make sure the thrust rails are installed as shown.

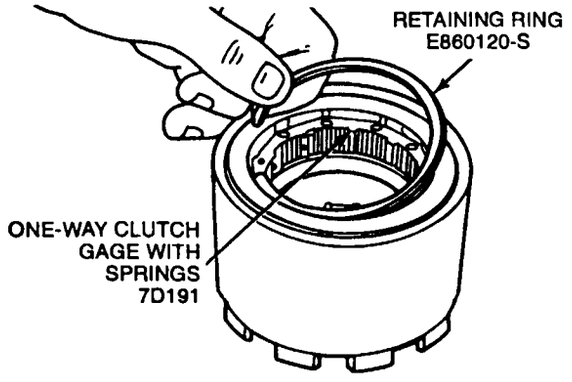
   For 4.0L applications, inspect the thrust rails for scoring and wear.



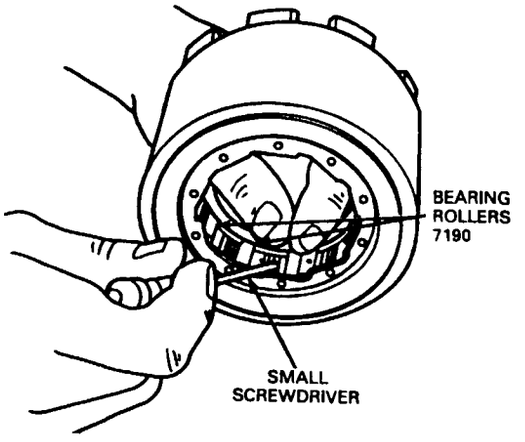
4. **CAUTION: If the rollers or sprags are damaged, inspect the inner race that is in the case and the reverse brake drum. Replace as necessary.**

   Inspect the rollers, springs, sprags and reverse brake drum for damage. Replace as necessary.

5. Install the one-way clutch with springs into the reverse brake drum. Install the retaining ring.

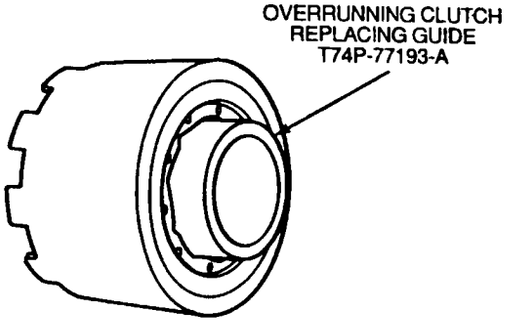


6. Compress the springs using a screwdriver and install the 10 bearing rollers as shown.

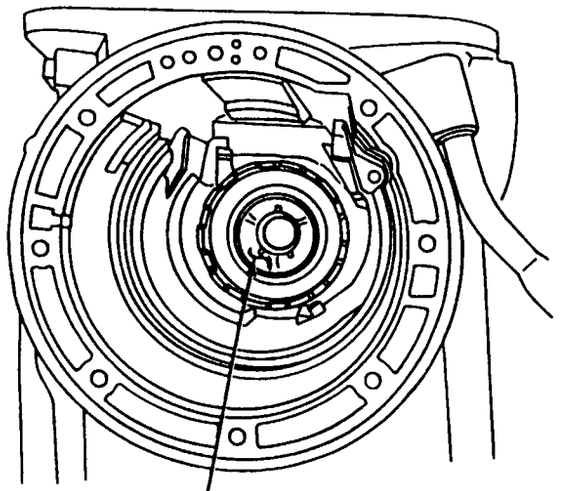


7. NOTE: Overrunning Clutch Replacing Guide T74P-77193-A can be used to keep the rollers in place prior to assembly in the case.

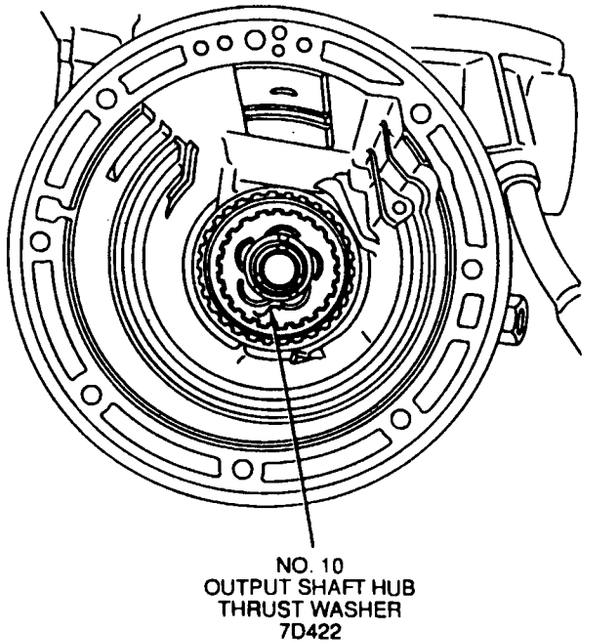
   Install Overrunning Clutch Replacing Guide T74P-77193-A after installing the last roller.



No. 10 Output Shaft Hub Thrust Washer Installation, 2.3L, 3.0L

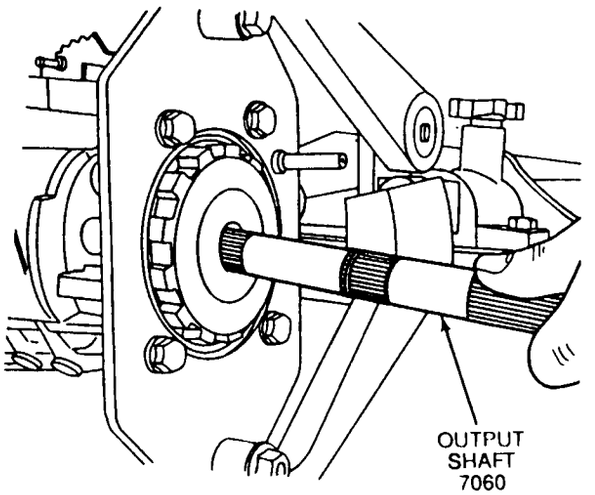


No. 10 Output Shaft Hub Thrust Washer Installation, 4.0L



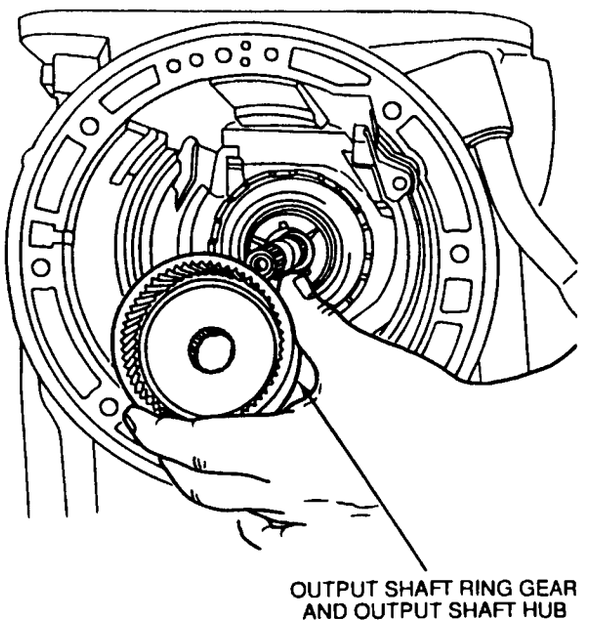
20. **CAUTION: The output shaft is model dependent. The 4.0L output shaft does not have lube holes.**

    Install the output shaft through the output shaft park gear.



21. Install the output shaft ring gear and output shaft hub assembly.

Output Shaft Ring Gear and Hub Assembly Installation, 2.3L, 3.0L

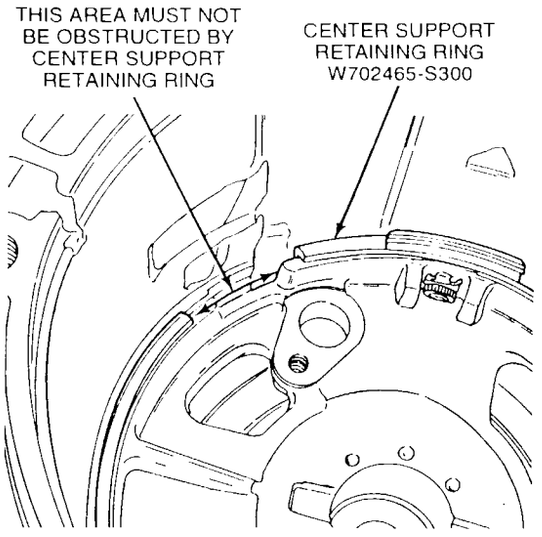


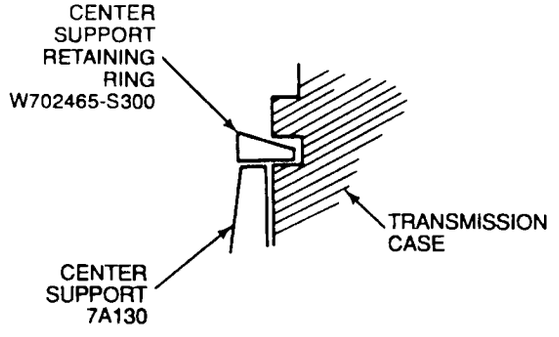
Output Shaft Ring Gear and Hub Assembly Installation, 4.0L

39. **CAUTION: Install the retaining ring in the transmission case groove with the tapered side facing up.**

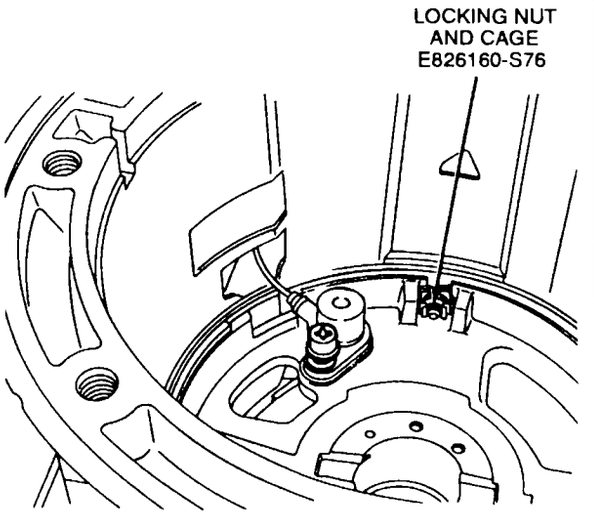
    CAUTION: The retaining ring must be installed with the notch opening as shown. This will prevent damage to the Turbine Shaft Speed (TSS) Sensor wires.

    Install the center support retaining ring in the transmission case groove.

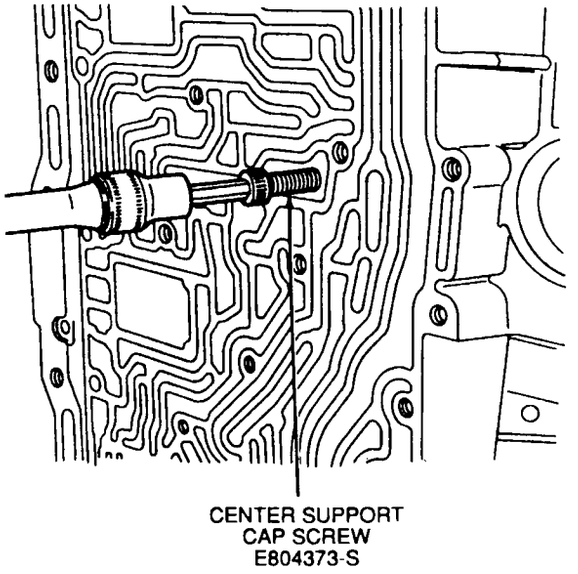




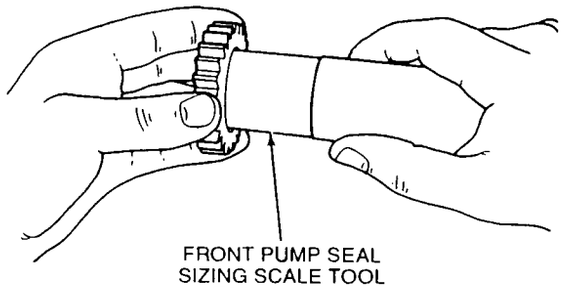
40. Ensure that the nut and cage assembly is in place.



41. Use a 5mm Allen wrench to install the M6 x 20mm center support capscrew into the nut and cage assembly as shown. Tighten the center support capscrew to 9-13 N·m (80-115 lb-in).



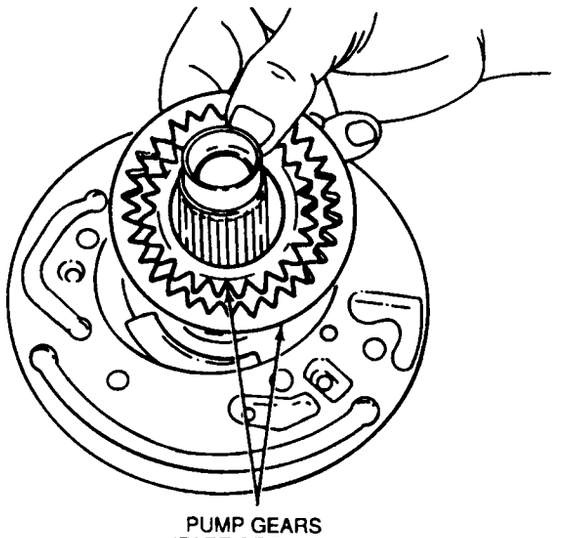
58. Lubricate front pump seal sizing tool T95L-70010-G seat O-ring.
59. Install Front Pump Drive Gear O-Ring Seating Tool T95L-70010-G into pump drive gear to seat O-ring into groove.



FRONT PUMP SEAL
SIZING SCALE TOOL
T95L-70010-G

60. Remove Front Pump Drive Gear O-Ring Seating Tool T95L-70010-G.
61. **CAUTION: The chamber on the inside edge of the small gear must be up when in the pump housing gear pocket. The dimple on the larger gear must be down when in the pump housing gear pocket.**

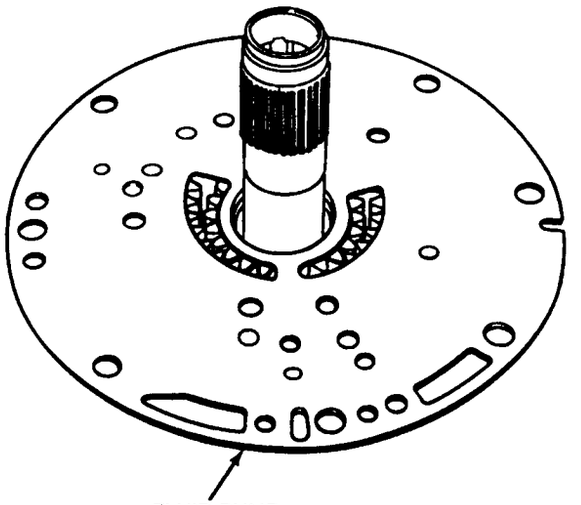
    Position the two pump gears into the pump housing. Apply a lubricant to the pump gears to prevent scoring at initial start-up.



PUMP GEARS
(PART OF 7A103)

62. **CAUTION: Make sure the holes in the plate line up with the holes in the pump.**

    Install the fluid pump adapter plate.

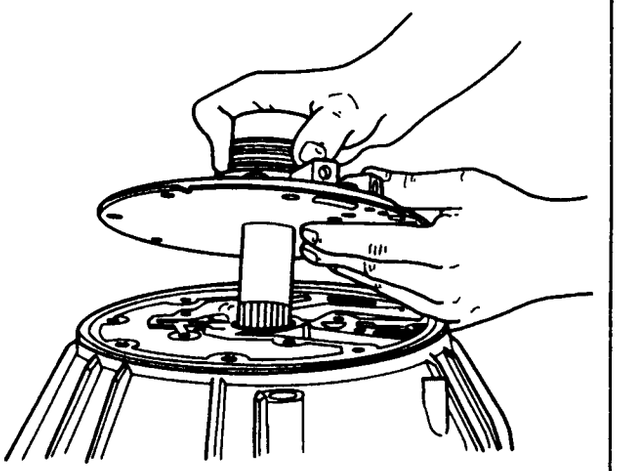


FLUID PUMP
ADAPTER PLATE
7B472

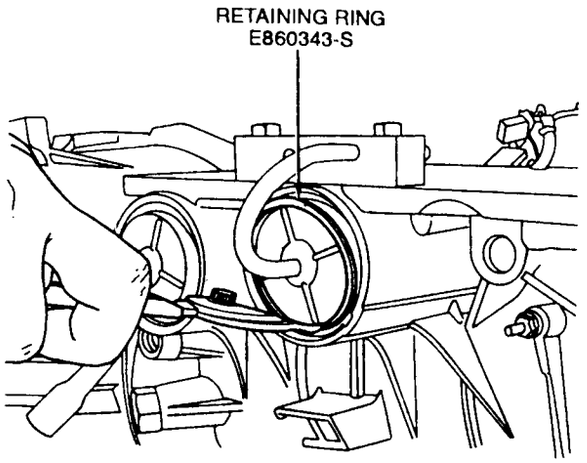
63. **CAUTION: Do not allow the pump gears to come out of the pump housing pocket.**

    NOTE: The notch on the outside of the fluid pump adapter plate will be at the nine o'clock position, relative to the converter housing.

    Turn the converter housing face down on the bench. Hold the fluid pump adapter plate against the front pump support and gear to keep the pump gears in place. Turn the pump and adapter plate over and place on the converter housing.



80. Carefully install the servo cover snap ring.



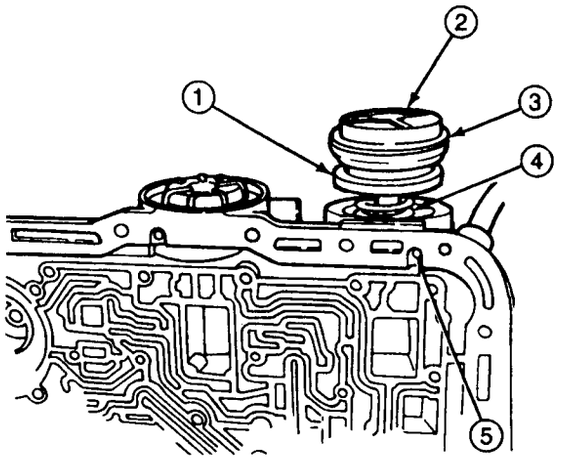
81. **CAUTION: The servo cover is under spring tension.**

    Carefully back off the nut on the J-hook until the servo spring is unloaded.

82. Remove Servo Cover Compressor T95L-77028-A.

83. **CAUTION: Do not damage the oil ring during installation. Do not press the servo cover and O-ring past the relief hole in the case. O-ring damage may occur.**

    Install the overdrive servo spring, piston and cover assembly with O-ring.



Item	Part Number	Description
1	7D021	Piston and Rod Assembly
2	7D027	Servo Cover
3	7D040	O-Ring
4	7D028	Spring
5	—	Relief Hole (Part of 7005)