THM 200-4R

INDEX

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INTRODUCTION
THM 200-4R

This booklet contains the general description, diagnosis charts, and the procedures necessary to overhaul, repair or service the General Motors THM 200-4R four speed automatic overdrive transmission. This information will assist you in training your technicians to provide your customers with the best possible transmission service that is available.

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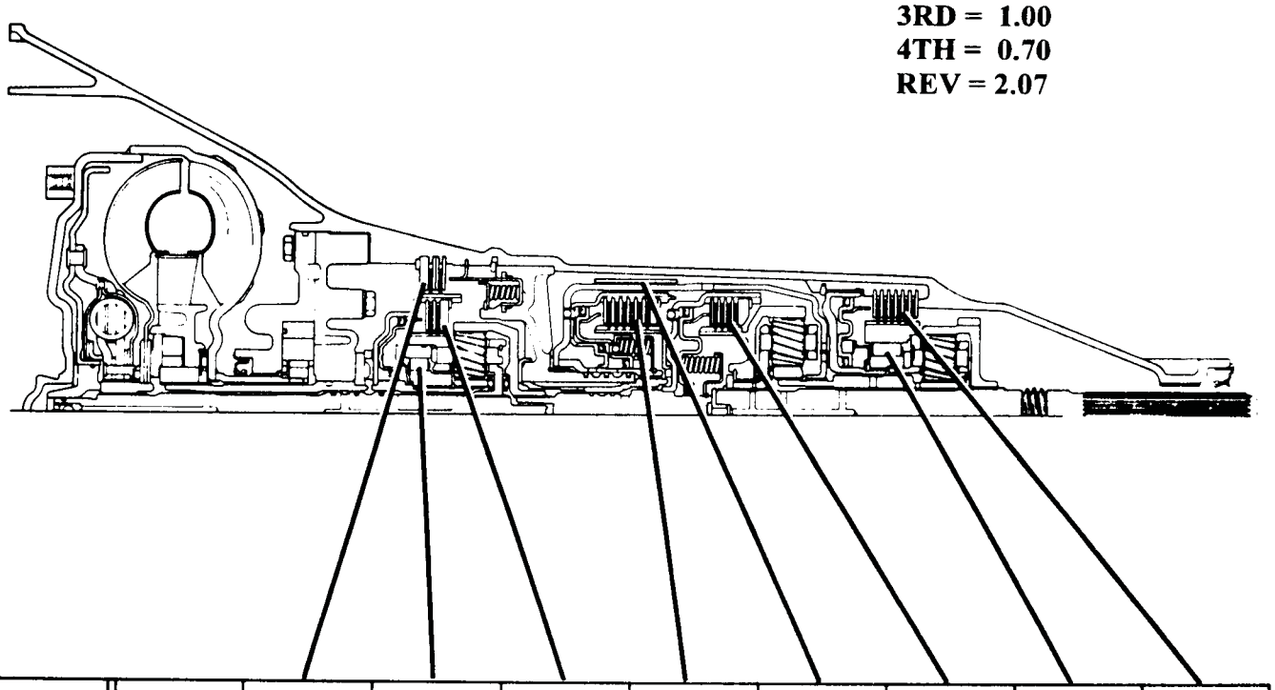
THM 200-4R APPLICATION CHART

GEAR RATIOS

1ST = 2.74
2ND = 1.57
3RD = 1.00
4TH = 0.70
REV = 2.07



RANGE	GEAR	FOWARD CLUTCH	DIRECT CLUTCH	INTERMEDIATE BAND	FOURTH CLUTCH	OVERDRIVE ROLLER CLUTCH	OVERRUN CLUTCH	LO-ROLLER CLUTCH	LO-REVERSE CLUTCH
P-N						HOLDING			
D	1st	APPLIED				HOLDING		HOLDING	
	2nd	APPLIED		APPLIED		HOLDING			
	3rd	APPLIED	APPLIED			HOLDING			
	4th	APPLIED	APPLIED		APPLIED				
D	1st	APPLIED					APPLIED	HOLDING	
	2nd	APPLIED		APPLIED			APPLIED		
	3rd	APPLIED	APPLIED				APPLIED		
2	1st	APPLIED					APPLIED	HOLDING	
	2nd	APPLIED		APPLIED			APPLIED		
1	1st	APPLIED					APPLIED		APPLIED
R	REVERSE		APPLIED			HOLDING			APPLIED

Figure 1

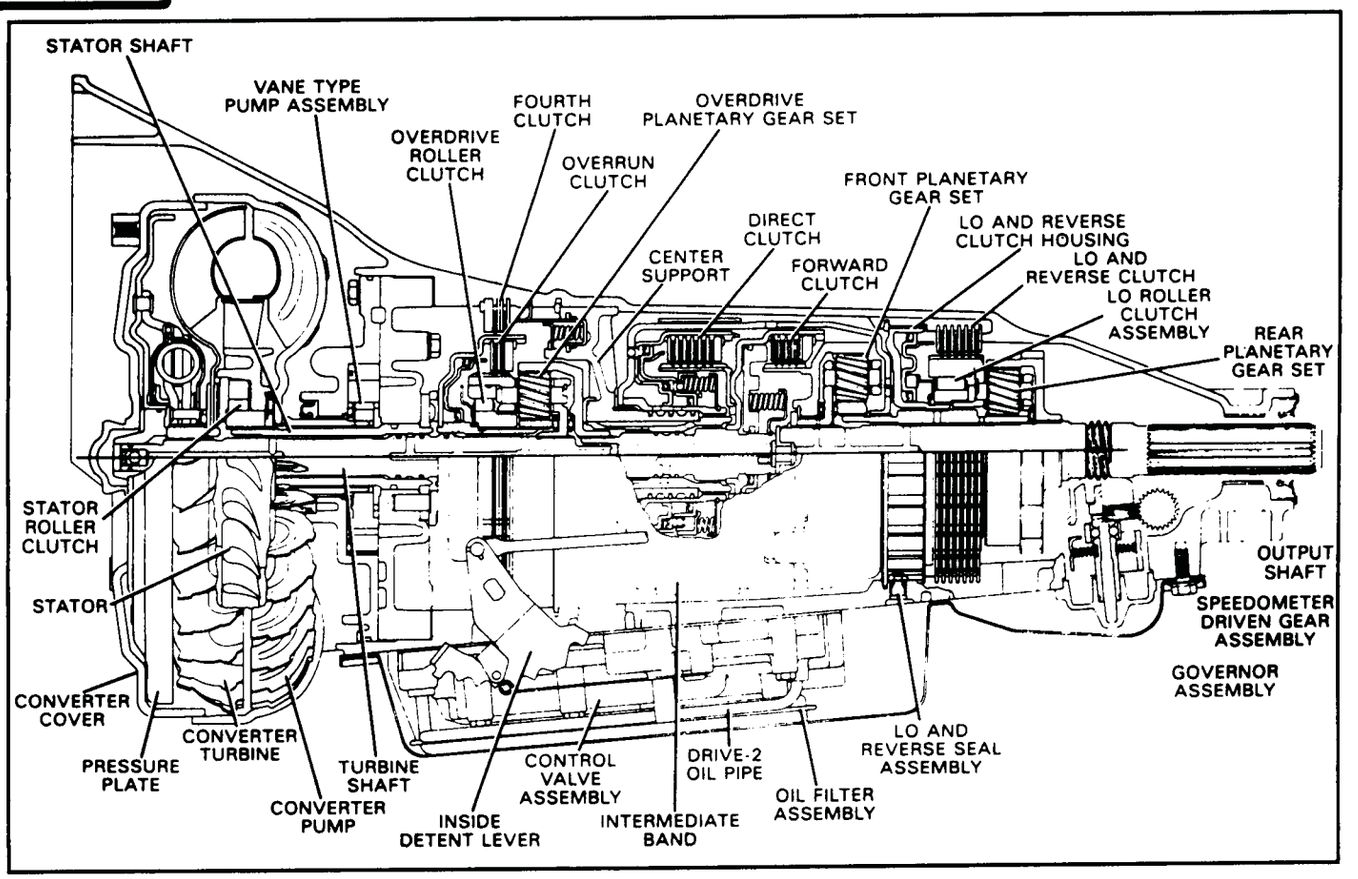


Figure 2

GENERAL DESCRIPTION

The THM 200-4R is a fully automatic transmission for rear wheel drive vehicles which provides four forward gear ranges and a reverse.

THE MAJOR COMPONENTS OF THIS TRANSMISSION ARE:

- **0 ONE BAND ASSEMBLY**
  - **(1) Intermediate Band**
- **0 FIVE MULTIPLE DISC CLUTCH ASSEMBLIES**
  - **(1) Forward Clutch**
  - **(2) Direct Clutch**
  - **(3) Fourth Clutch**
  - **(4) Low/Reverse Clutch**
  - **(5) Overrun Clutch**
- **0 TWO ROLLER CLUTCHES**
  - **(1) Low Roller Clutch**

The oil pressure and shift points are controlled by throttle opening with a throttle valve cable.

P- Park position prevents the vehicle from rolling either forward or backward. For safety reasons the parking brake should be used in addition to the park position.

R- Reverse allows the vehicle to be operated in a rearward direction.

N- Neutral allows the engine to be started and operated without driving the vehicle. If necessary this position may be selected if the engine must be restarted with the vehicle moving.

D Overdrive is used for most all normal driving conditions. It provides four gear ratios plus torque converter clutch operation. Downshifts for safe passing are available by depressing the accelerator.

3- Drive position is used for city traffic, hilly terrain, and trailer towing. It provides 3 gear ranges. Again, downshifts are available by depressing the accelerator.

2- Manual second is used to provide acceleration and engine braking. This range may be selected at any vehicle speed.

1- Manual Lo is used to provide maximum engine braking. This range may also be selected at any vehicle speed, but will drop to second gear until the vehicle speed drops below approximately 35 MPH.

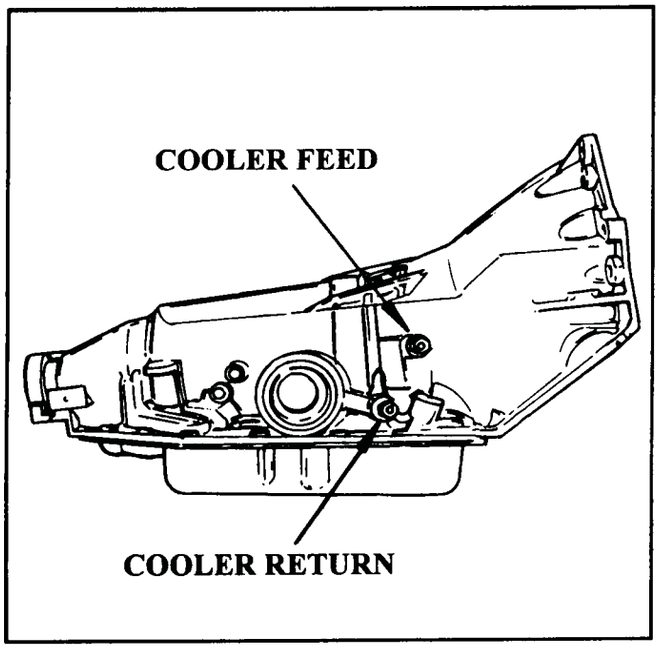


Figure 3

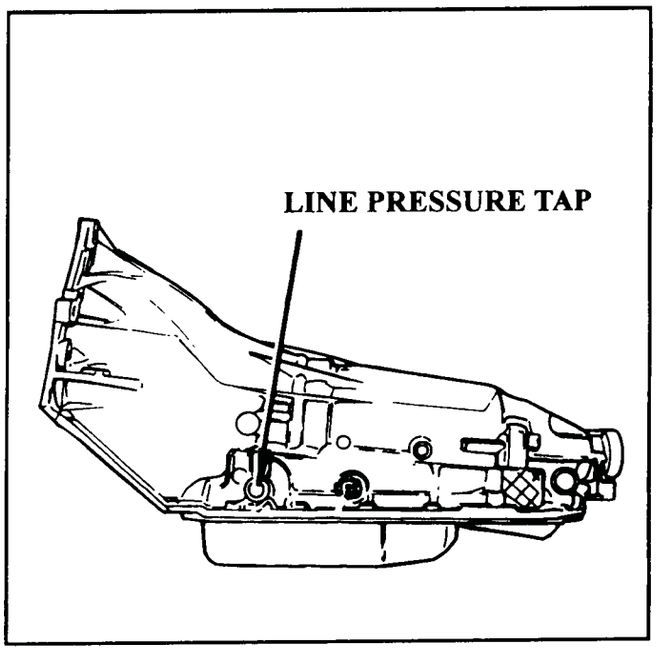


Figure 4

LINE PRESSURE CHECK

1. Install a 0-300 pound gage into the line pressure port. The line pressure plug location is shown in Figure 4.
2. Check line pressures at both Min. and Max. T.V. using the line pressure chart shown in Figure 5 as a guide. Line pressures may vary slightly from the chart provided.
3. The cooler feed and cooler return fittings are identified in Figure 3.

THM 200-4R LINE PRESSURE CHECK PROCEDURE

CHECK TRANSMISSION FLUID LEVEL
CHECK AND ADJUST T.V. CABLE
CHECK OUTSIDE MANUAL LINKAGE AND CORRECT
CHECK ENGINE TUNE
INSTALL FLUID PRESSURE GAGE
CONNECT TACHOMETER TO ENGINE

CHECK FLUID PRESSURES IN THE FOLLOWING MANNER:

Minimum T.V. Line Pressure Check
Set the T.V. cable to specification; and with the brakes applied, take the line pressure readings in the ranges and at the engine r.p.m. indicated in the chart below.

Full T.V. Line Pressure Check
Full T.V. line pressure readings are obtained by tying or holding the T.V. cable to the full extent of its travel; and with the brakes applied, take the line pressure readings in the ranges and at the engines r.p.m. indicated in the chart below.

***NOTICE** Total running time for this combination not to exceed 2 minutes.

CAUTION Brakes must be applied at all times.

1990 200-4R AUTOMATIC TRANSMISSION FLUID PRESSURE

MODEL	RANGE	NORMAL FLUID PRESSURE AT MINIMUM T.V.		NORMAL FLUID PRESSURE AT FULL T.V.	
		kPa	P.S.I.	kPa	P.S.I.
CTF, CUF KDF, KJF, KTF	PARK & NEUTRAL @ 1000 RPM	389 - 439 389 - 439	56 - 64 56 - 64	829 - 933 797 - 896	120 - 135 116 - 130
CTF, CUF KDF, KJF, KTF	*REVERSE @ 1000 RPM	725 - 817 725 - 817	105 - 118 105 - 118	1544 - 1737 1485 - 1667	224 - 252 215 - 242
CTF, CUF KDF, KJF, KTF	*DRIVE (D4) & MANUAL THIRD (D3) @ 1000 RPM	389 - 439 389 - 439	56 - 64 56 - 64	829 - 933 797 - 896	120 - 135 116 - 130
CTF, CUF KDF, KJF, KTF	*MANUAL SECOND (D2) & LO (D1) @ 1000 RPM	846 - 953 846 - 953	123 - 138 123 - 138	846 - 953 846 - 853	123 - 138 123 - 138

Line pressure is basically controlled by pump output and the pressure regulator valve. In addition, line pressure is boosted in Reverse, Second and Lo by the reverse boost valve.

Also, in the Neutral, Drive, Intermediate and Reverse positions of the selector lever, the line pressure should increase with throttle opening because of the T.V. system. The T.V. system is controlled by the T.V. cable, the throttle lever and bracket assembly and the T.V. link, as well as the control valve assembly.

Figure 5

DIAGNOSTIC CHARTS

CONDITION	INSPECT COMPONENT	FOR CAUSE
OIL LEAK	• Oil Pan (65)	— Bolts (64) not correctly torqued. — Improperly installed or damaged pan gasket (66). — Oil pan gasket mounting face not flat.
	• Filler Pipe	— Multi lip seal damaged or missing.
	• Filler Pipe Bracket	— Mispositioned.
	• Throttle Valve Cable	— Multi lip seal missing, damaged or improperly installed.
	• Rear Seal Assembly (33)	— Damaged or improperly installed.
	• Speedometer Driven Gear	— "O" ring damaged.
	• Manual Shaft	— Lip seal damaged or improperly installed.
	• Case (12)	— Line pressure tap plug. — Fourth clutch pressure tap plug. — Porous.
	• Intermediate Servo	— "O" rings (17) damaged.
	• Oil Pump Assembly (7)	— Front pump seal (201) leaks: Seal lip cut — check converter hub for nicks, etc. — Front pump attaching bolts (5) loose or bolt seal damaged or missing. — Front pump housing "O" ring (10) damaged or cut. — Porous casting. — Inspect converter weld area.
	• Vent Pipe	— Transmission over filled. — Water in oil. — Foreign matter between pump (7) and case (12) or between pump cover (217) and body (203). — Case porous; front pump cover mounting face shy of stock near breather. — Pump to case gasket (11) mispositioned. — Incorrect fluid level indicator. — Pump shy of stock on mounting faces, porous casting, breather hole plugged in pump cover.
NO DRIVE IN DRIVE RANGE (Install Pressure Gage)	• Oil Level	— Incorrect. — External leaks.
	• Manual Linkage	— Misadjusted.

Figure 6

DIAGNOSTIC CHARTS

CONDITION	INSPECT COMPONENT	FOR CAUSE
NO DRIVE IN DRIVE RANGE (Install Pressure Gage) (Continued)	• Oil Pressure	— Plugged or restricted oil filter (68). — Cut or missing oil filter seals (67). — Pump assembly - pressure regulator (218) stuck. — Pump rotor - tangs damaged by converter. — Porosity in oil filter to pump intake bore.
	• Overdrive Unit	— Springs missing in the roller clutch (518). — Rollers galled or missing.
	• Forward Clutch	— Piston (622) cracked, seals (621) missing, damaged; clutch plates (626) burned; snap ring out of groove. — Oil seal rings (504) missing or damaged on turbine shaft; leak in feed circuits; pump to case gasket mispositioned or damaged. — Cup plug leaking or missing in the rear of the forward clutch shaft in the clutch apply passage.
	• Lo & Reverse Roller Clutch (658)	— Springs missing. — Rollers galled or missing.
HIGH OR LOW OIL PRESSURE (Refer To Oil Pressure Checks)	• Throttle Valve Cable	— Misadjusted, binding, unhooked, broken or wrong link.
	• Throttle Valve Assembly	— Damaged or leaking. — Throttle lever and bracket assembly binding, unhooked or mispositioned. — Throttle valve (302) or plunger valve (305) binding.
	• Pressure Regulator Valve (218)	— Binding.
	• T.V. Boost Valve (222)	— Binding. — Wrong valve - causing low oil pressure only.
	• Reverse Boost Valve (220)	— Binding.
	• Manual Valve (345)	— Unhooked. — Mispositioned.
	• Pressure Relief Valve	— Ball (231) missing. — Spring (232) damaged.
	• Pump (7)	— Slide (206) stuck. — Slide seal (211) damaged or missing. — Decrease air bleed orifice missing or damaged - causing high oil pressure. — Decrease air bleed orifice plugged - causing low oil pressure.
	• T.V. Limit Valve (309)	— Binding.

Figure 7

DIAGNOSTIC CHARTS

CONDITION	INSPECT COMPONENT	FOR CAUSE
HIGH OR LOW OIL PRESSURE (Refer To Oil Pressure Checks) (Continued)	• Line Bias Valve (318)	— Binding in open position - causing high oil pressure. — Binding in closed position - causing low oil pressure.
	• Control Valve Assembly Spacer Plate (56) & Case (12)	— Correct orifices and passages.
1-2 SHIFT - FULL THROTTLE ONLY	• Throttle Valve Cable	— Binding, unhooked or broken. — Misadjusted.
	• Throttle Lever & Bracket Assembly (69)	— Binding or unhooked.
	• T.V. Exhaust Ball Lifter (72) Or No. 5 Ball (55N)	— Binding, mispositioned or unhooked. (Allowing No. 5 ball to seal causes full T.V. pressure regardless of throttle valve position.)
	• Throttle Valve (302) & Plunger (305)	— Binding.
	• Control Valve Assembly (74)	— Valve body gaskets (86, 87) leaking, damaged, incorrectly installed.
	• Case Assembly (12)	— Porosity.
NO 1-2 SHIFT	• Governor (41) & Governor Feed Passages	— Plugged governor oil feed orifice in spacer plate. — Ball or balls missing in governor assembly. — Inner governor cover rubber "O" ring seal missing or leaking. — Governor shaft seal missing or damaged. — Driven gear stripped. — Weights binding on pin. — Driven gear not engaged with governor shaft.
	• Control Valve Assembly (74)	— 1-2 shift (331), Lo 1st/Detent (333), or 1-2 throttle valve (334) stuck in downshift position. — Spacer plate gaskets (86, 87) in wrong position.
	• Case (12)	— Porosity in case channels or undrilled 2nd oil feed hole. — Excessive leakage between case bore and intermediate band apply rings. — Intermediate band anchor pin (47) missing or unhooked from band. — Broken or missing band (601).

Figure 8

DIAGNOSTIC CHARTS

CONDITION	INSPECT COMPONENT	FOR CAUSE
NO 1-2 SHIFT (Continued)	• Intermediate Servo Assy.	— Servo cover oil seal ring (17) missing. — Porosity in servo; cover (16), inner piston (21) or outer piston (19). — Wrong intermediate band apply pin (27). — Incorrect usage of cover and piston.
	• 1-2 Accumulator	— Housing bolts (63, 88) loose. — Housing (62) face damaged. — Missing or damaged accumulator plate (57).
NO 2-3 SHIFT	• Control Valve Assembly (74) & Spacer Plate (56)	— 2-3 shift valve (341) or 2-3 throttle valve (342) stuck in the downshift position. — Valve body gaskets (86, 87) leaking, damaged or incorrectly installed. — Reverse/3rd check ball (55E) not seating, damaged or missing.
	• Case (12)	— Porosity in case channels.
	• Center Support (537)	— Direct clutch feed passage in the center support plugged or not drilled through. — Steel oil seal rings (539) on center support damaged.
	• Direct Clutch	— Inner oil seal ring (606) missing or damaged on piston (608). — Center oil seal ring missing or damaged on direct clutch hub. — Check ball and/or retainer (607) damaged or missing from direct clutch piston. — Direct clutch piston or housing (604) damaged or missing. — Direct clutch plates (613) damaged or missing. — Direct clutch backing plate snap ring (615) out of groove. — Release spring guide (611) mislocated, preventing piston check ball from seating in retainer.
	• Intermediate Servo Assy. (Third Clutch Accumulator Oil Passages)	— Servo to case oil seal ring broken or missing on intermediate servo piston. — Intermediate servo and/or capsule missing or damaged. — Exhaust hole in case between servo piston seal rings plugged or undrilled. — Bleed orifice cup plug missing from intermediate servo pocket in case.
NO REVERSE OR SLIPS IN REVERSE (Install Pressure Gage)	• Throttle Valve Cable	— Binding or misadjusted.
	• Manual Linkage	— Misadjusted.
	• Throttle Valve (302)	— Binding.

Figure 9

DIAGNOSTIC CHARTS

CONDITION	INSPECT COMPONENT	FOR CAUSE
NO REVERSE OR SLIPS IN REVERSE (Install Pressure Gage) (Continued)	• T.V. Limit Valve (309)	— Binding.
	• Line Bias Valve (318)	— Binding.
	• Reverse Boost Valve (220)	— Binding in pressure regulator bore.
	• Reverse/3rd (55E) Or Lo/Reverse (55H) Check Ball	— Missing or seat in spacer plate damaged.
	• Reverse Clutch	— Piston (649) cracked, or missing inner or outer seals (648). Clutch plates (655) burned. — Reverse oil seal in case missing or damaged. — Missing clutch plate or wave plate.
	• Center Support (537)	— Attaching bolts (538) loose or missing. — Passages blocked or not drilled. — Porosity.
	• Direct Clutch Housing (604)	— Piston (608) or housing cracked. — Inner or outer piston seal (606) missing or damaged. — Check ball in either the direct clutch housing (603) or the piston (607) missing or damaged. — Plates (613) burned.
	• Spacer Plate (56)	— Lo/Reverse overrun clutch orifice plugged.
DRIVE IN NEUTRAL	• Manual Linkage	— Misadjusted or disconnected.
	• Forward Clutch	— Clutch does not release. — Plates (626) burned together.
	• Case (12)	— Cross leakage to forward clutch passage (D4).
SLIP IN 1-2 SHIFT	• Oil Level	— Low oil level.
	• Spacer Plate (56) & Gaskets (86, 87)	— Gaskets damaged or incorrectly installed.
	• Accumulator Valve (322)	— Valve sticking in valve body causing low 1-2 accumulator pressure. — Weak or missing spring.
	• 1-2 Accumulator Piston (61)	— Seal (60) leaking, spring (59) broken or missing. — Leak between piston and pin (76). — Piston binding. — Piston bore damaged.
	• Intermediate Band Apply Pin (27)	— Wrong selection of apply pin. — Excessive leakage between apply pin and case. — Apply pin feed hole not completely drilled.

Figure 10

DIAGNOSTIC CHARTS

CONDITION	INSPECT COMPONENT	FOR CAUSE
SLIP IN 1-2 SHIFT (Continued)	• Intermediate Servo Assy.	— Porosity in piston (21, 19). — Cover to servo oil seal ring (17) damaged or missing. — Leak between servo apply pin (27) and case.
	• Throttle Valve Cable	— Not properly adjusted.
	• Throttle Valve (302)	— Binding, causing low T.V. pressure.
	• T.V. Limit Valve (309)	— Binding.
	• Line Bias Valve (318)	— Sticking, causing low line pressure.
	• Intermediate Band (601)	— Worn or burned.
	• Case (12)	— Porosity in 2nd clutch passage.
ROUGH 1-2 SHIFT	• Throttle Valve Cable	— Not adjusted properly. — Binding.
	• Throttle Valve (302) Or T.V. Plunger	— Binding.
	• T.V. Limit Valve (309)	— Binding.
	• Accumulator Valve (322)	— Binding.
	• Line Bias Valve (318)	— Binding.
	• Intermediate Servo Assy.	— Wrong selection apply pin (27). — Servo piston to case oil seal ring (20) damaged or missing. — Bleed cup plug missing in case.
	• 1-2 Accumulator	— Oil ring (60) damaged. — Piston (61) stuck. — Broken or missing spring (59). — Bore damaged.
	• 1-2 Shift Check Ball No. 8 (55B)	— Missing or sticking.
SLIP IN 2-3 SHIFT	• Oil Level	— Low oil level.
	• Throttle Valve Cable	— Not adjusted properly.
	• Throttle Valve (302)	— Binding.
	• Spacer Plate (56) & Gaskets (86, 87)	— Direct Clutch orifice partially blocked in spacer plate. — Gaskets mispositioned or damaged.

Figure 11

DIAGNOSTIC CHARTS

CONDITION	INSPECT COMPONENT	FOR CAUSE
SLIP IN 2-3 SHIFT (Continued)	• Intermediate Servo Assy.	— Servo to case oil seal ring (20) damaged or missing. — Piston (19, 21) or servo bore damaged. — Intermediate servo orifice bleed cup plug in case missing. — Porosity in the case in the servo bore area.
	• Direct Clutch Feed	— Porosity in direct clutch feed channels in case. — Case to support bolts (538) not tight causing leakage. — Direct clutch piston (608) or housing (604) cracked. — Piston seals (606) cut or missing. — Direct clutch plates (613) burned. — Check ball in piston (607) and/or housing (603) missing, damaged or leaking. — Check ball capsule damaged. — Release spring guide mislocated preventing check ball from seating in piston.
	• Center Support (537)	— Channels cross feeding, leaking or restricted. — Oil seal rings (539) damaged or missing.
ROUGH 2-3 SHIFT	• Throttle Valve Cable	— Mispositioned or missing.
	• Throttle Valve (302) & Plunger	— T.V. plunger binding. — Throttle valve binding.
	• T.V. Limit Valve (309)	— Binding.
	• Intermediate Servo Assy.	— Exhaust hole undrilled or plugged between intermediate servo piston seals, not allowing intermediate servo piston to complete its stroke.
	• 3-2 Exhaust Check Ball No. 4 (55F)	— Missing or mispositioned.
	• 3rd Accumulator Check Ball No. 2 (55D)	— Missing or mispositioned.
SLIP IN 3-4 SHIFT	• Oil Level	— Low.
	• Control Valve Assembly (74) & Spacer Plate (56)	— Gaskets (86, 87) or spacer plate (56) damaged or incorrectly installed. — Accumulator valve (322) sticking causing low 3-4 accumulator pressure. — Weak or missing accumulator valve spring.
	• 3-4 Accumulator	— Piston (49) stuck. — Bore damaged. — Oil ring (50) damaged.

Figure 12

DIAGNOSTIC CHARTS

CONDITION	INSPECT COMPONENT	FOR CAUSE
SLIP IN 3-4 SHIFT (Continued)	• Center Support (537)	— Porosity. — Center support attaching bolts (538) loose. — Fourth clutch piston (534) surface damaged. — Fourth clutch piston seals (535) damaged. — Proper plate (508) usage (see Clutch Plate Usage Chart). — Fourth clutch plates burned.
	• Case (12)	— Porosity. — 1-2 accumulator housing bolts (63, 88) loose. — 3-4 accumulator piston seal (50) damaged. — 3-4 accumulator leaking between the piston (49) and pin (76). — 3-4 accumulator bore damaged.
ROUGH 3-4 SHIFT	• Throttle Valve Cable	— Mispositioned or missing.
	• Throttle Valve (302) & Plunger	— Binding.
	• T.V. Limit Valve (309)	— Binding.
	• 3-4 Accumulator	— Piston (49) stuck. — Bore damaged.
	• Fourth Clutch	— Piston (534) binding.
NO CONVERTER CLUTCH APPLY	• Electrical System (12 volts must be supplied to the solenoid for it to engage)	— Defective solenoid (53). — Damaged electrical connector (39). — Defective pressure switch. — Wire grounded.
	• Control Valve Assembly (74) & Spacer Plate (56)	— Converter clutch shift valve (337) or throttle valve (302) stuck.
	• Pump Assembly (7)	— Orifice plugged for converter signal oil in pump. — "O" ring (52) damaged or missing on solenoid. — Orificed cup plug (238) missing in oil cooler passage in pump. — Pump to case gasket (11) damaged or mispositioned. — Converter clutch apply valve (227) stuck. — Cup plug missing from apply passage.
ROUGH CONVERTER CLUTCH APPLY	• Converter Clutch Pressure Plate	— Damaged.
	• Check Ball (501) In End Of Turbine Shaft (503)	— Damaged or missing.

Figure 13

DIAGNOSTIC CHARTS

CONDITION	INSPECT COMPONENT	FOR CAUSE
NO CONVERTER CLUTCH RELEASE	• Converter Clutch Apply Valve	– Stuck.
	• Converter	– Damaged.
	• Pump	– Cup plug in release passage missing.
	• Turbine Shaft (503)	– Seal (504) missing or damaged. – Hole not drilled through.
NO 3-4 SHIFT (Install Pressure Gage To Fourth Clutch Pressure Tap)	• Control Valve Assembly (74) & Spacer Plate (56)	– 3-4 shift valve or 3-4 throttle valve stuck. – Orifice in spacer plate plugged.
	• Center Support (537)	– Oil passages plugged or not drilled. – Center support attaching bolts (538) loose or missing. – Fourth clutch piston (534) cracked or damaged. – Fourth clutch piston seals (535) damaged, missing or improperly assembled. – Improper plate usage (see Clutch Plate Usage Chart). – Fourth clutch plates burned. – Overrun clutch plates binding.
	• Case (12)	– Porosity. – Orificed cup plug missing in 3-4 accumulator passage in case. – Leakage between accumulator piston (49) and pin (76). – 3-4 accumulator bore damaged.
NO MANUAL 3RD OR 2ND	• Turbine Shaft (503) & Overrun Clutch	– D-3 oil passage not drilled or plugged in turbine shaft. – D-3 oil passage not drilled through in overrun clutch hub. – Oil seals (512) missing or damaged in the overrun clutch piston (511). – Overrun clutches burned. – Overrun clutch backing plate snap ring (515) out of groove.

Figure 14

DIAGNOSTIC CHARTS

CONDITION	INSPECT COMPONENT	FOR CAUSE
NO ENGINE BRAKING IN MANUAL LO-1ST GEAR	• Control Valve Assembly (74) & Spacer Plate (56)	– Manual linkage misadjusted. – D-3 orifice in spacer plate plugged. – Valve body gaskets (86, 87) leaking, damaged or incorrectly installed. – D-2 oil pipe leaking or out of position. – Lo overrun clutch valve (330) binding in valve body. – Lo/Reverse check ball (#10) (55H) mispositioned or missing. – Lo/Detent check ball (#9) (55G) mispositioned or missing. – Lo/Reverse overrun clutch orifice in spacer plate plugged. – PT/D-3 check ball (#3) (55M) mispositioned or missing.
	• Turbine Shaft (503) & Overrun Clutch	– D-3 oil passage not drilled or plugged in turbine shaft. – D-3 oil passage not drilled through in overrun clutch hub. – Oil seals (512) missing or damaged in the overrun clutch piston (511). – Overrun clutches burned. – Overrun clutch backing plate snap ring (515) out of groove.
	• Case (12)	– Porosity.
	• Lo/Reverse Clutch Assy.	– Piston seals (648) broken or missing. – Clutch housing snap ring (644) out of case. – Piston (649) or housing (646) cracked or porous. – Cup plug or rubber seal missing or damaged between case and lo/reverse clutch housing.
NO ENGINE BRAKING IN MANUAL 2ND-2ND GEAR	• Control Valve Assembly (74) & Spacer Plate (56)	– Manual linkage misadjusted. – Valve body gaskets (86, 87) leaking, damaged, or incorrectly installed. – D-2 oil pipe leaking or out of position. – D-3 orifice in spacer plate plugged. – PT/D-3 check ball (#3) (55M) mispositioned or missing.
	• Case (12)	– Porosity.
	• Intermediate Servo Assy.	– Servo cover to case oil seal ring (17) missing or damaged.
	• Intermediate Band (601)	– Off anchor pin (47). – Broken or burned.

Figure 15

DIAGNOSTIC CHARTS

CONDITION	INSPECT COMPONENT	FOR CAUSE
NO ENGINE BRAKING IN MANUAL 2ND-2ND GEAR (Continued)	• Turbine Shaft (503) & Overrun Clutch	– D-3 oil passage not drilled through in overrun clutch hub. – Oil seals (512) missing or damaged in the overrun clutch piston. – D-3 oil hole not drilled or plugged in turbine shaft. – Overrun clutches burned. – Overrun clutch backing plate snap ring (515) out of groove.
NO ENGINE BRAKING IN MANUAL 3RD-3RD GEAR	• Control Valve Assembly (74) & Spacer Plate (56)	– Manual linkage misadjusted. – D-3 orifice in spacer plate plugged. – Valve body gaskets (86, 87) leaking, damaged, or incorrectly installed. – PT/D-3 check ball (#3) (55M) mispositioned or missing.
	• Turbine Shaft (503) & Overrun Clutch	– D-3 oil passage not drilled or plugged in turbine shaft. – D-3 oil hole not drilled through in overrun clutch hub. – Oil seals (512) missing or damaged in the overrun clutch piston (511). – Overrun clutches burned. – Overrun clutch backing plate snap ring (515) out of groove.
WILL NOT HOLD IN PARK	• Manual Linkage	– Misadjusted.
	• Internal Linkage	– Parking pawl (712) binding in case. – Actuator rod, spring or plunger (709) damaged. – Parking pawl broken. – Parking bracket (711) loose or damaged. – Manual shaft to case pin (703) missing or mispositioned.
	• Inside Detent Lever & Pin Assembly (704)	– Nut (707) loose. – Hole in lever worn or damaged.
	• Manual Detent Roller & Spring Assembly (708)	– Bolt (80) loose that holds roller assembly to valve body. – Pin or roller damaged, mispositioned or missing.
NO PART THROTTLE DOWNSHIFTS (Install Pressure Gage)	• Throttle Valve (302)	– Binding.
	• T.V. Limit Valve (309)	– Binding.
	• Spacer Plate (56)	– Hole plugged or undrilled.

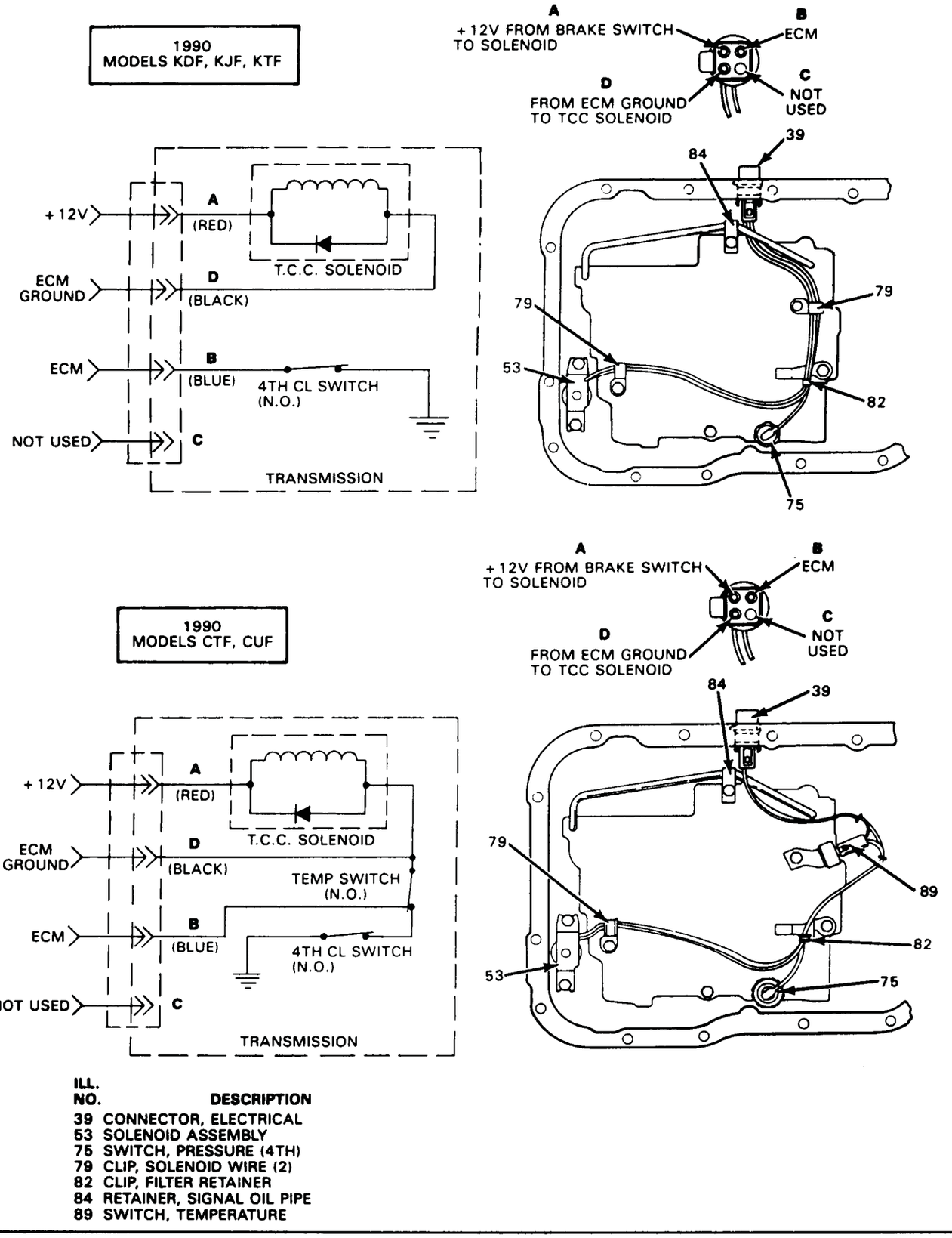
Figure 16

DIAGNOSTIC CHARTS

CONDITION	INSPECT COMPONENT	FOR CAUSE
NO PART THROTTLE DOWNSHIFTS (Install Pressure Gage) (Continued)	• Valve Body Gaskets (86, 87)	— Mispositioned or damaged.
	• T.V. Modulator Downshift Valve (314)	— Stuck.
	• Throttle Valve Cable	— Improperly set.
NO PART THROTTLE 4-3 DOWNSHIFT (On Selected Models With A P.T. Passage In The Throttle Plunger Bushing)	• Throttle Plunger Bushing	— Passages not open.
	• 3-4 Throttle Valve Bushing (326)	— Passages not open.
	• PT/D-3 Check Ball (#3) (55M)	— Mispositioned or missing.
	• Valve Body Gaskets (86, 87)	— Mispositioned or damaged.
	• Throttle Valve Cable	— Improperly set.
	• T.V. Limit Valve (309)	— Binding.
LOW OR HIGH SHIFT POINTS (Install Pressure Gage To Line Pressure Tap)	• Throttle Valve Cable	— Binding or misadjusted.
	• T.V. Limit Valve (309)	— Binding.
	• Throttle Valve (302)	— Binding.
	• T.V. Modulator Upshift Valve (312)	— Binding.
	• T.V. Modulator Downshift Valve (314)	— Binding.
	• Valve Body Gaskets (86, 87)	— Mispositioned, leaking or damaged.
	• Throttle Valve Plunger	— Binding.
	• 1-2, 2-3 or 3-4 Throttle Valves (334, 342, 324)	— Binding in bushings.
	• Pressure Regulator Valve (218)	— Binding.
	• T.V. Exhaust Ball (#5) (55N) & Lifter (72)	— Mispositioned, unhooked or missing.
	• Throttle Lever & Bracket Assembly (69)	— Binding, unhooked or loose at mounting valve body bolt (80). — Not positioned at the throttle valve plunger bushing pin locator.
	• Governor Shaft To Cover Seal Ring	— Broken or missing.
	• Governor Cover Gasket (42)	— Broken or missing.
	• Case (12)	— Porosity.

Figure 17

LATE MODEL WIRING SCHEMATICS



ILL. NO.	DESCRIPTION
39	CONNECTOR, ELECTRICAL
53	SOLENOID ASSEMBLY
75	SWITCH, PRESSURE (4TH)
79	CLIP, SOLENOID WIRE (2)
82	CLIP, FILTER RETAINER
84	RETAINER, SIGNAL OIL PIPE
89	SWITCH, TEMPERATURE

Figure 18

PUMP BODY OIL PASSAGES

ILL. NO.	DESCRIPTION
1	CONVERTER CL. SIGNAL
2	OVERRUN CLUTCH
3	VENT
4	DRAIN
5	LO
6	MTV
7	VOID
8	REVERSE
9	LINE
10	CONVERTER FEED
11	EXHAUST
12	RELEASE
13	TO COOLER

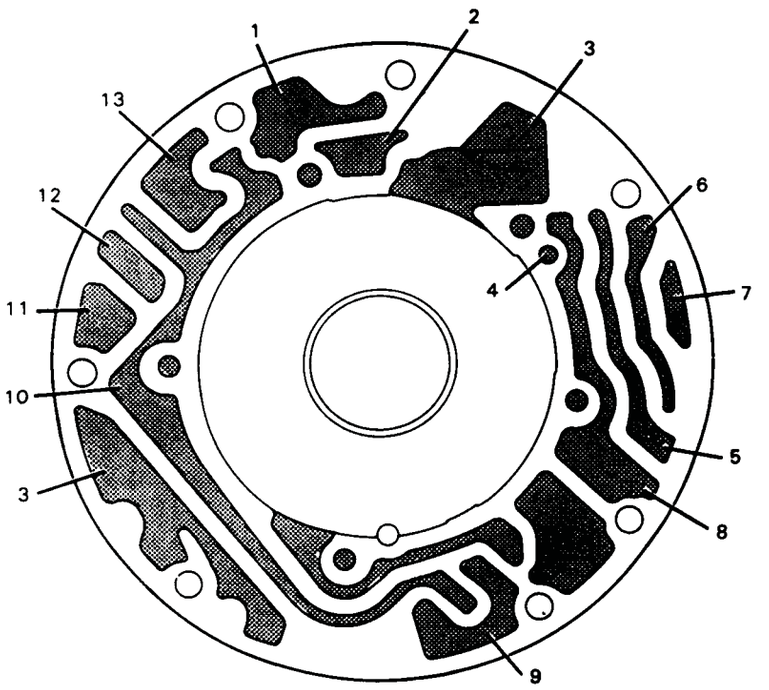


Figure 19

PUMP COVER OIL PASSAGES

ILL. NO.	DESCRIPTION
1	CONVERTER CL. SIGNAL
2	OVERRUN CLUTCH
3	VENT
4	DECREASE
5	LO
6	MTV
7	REVERSE
8	LINE
9	CONVERTER FEED
10	EXHAUST
11	RELEASE
12	TO COOLER

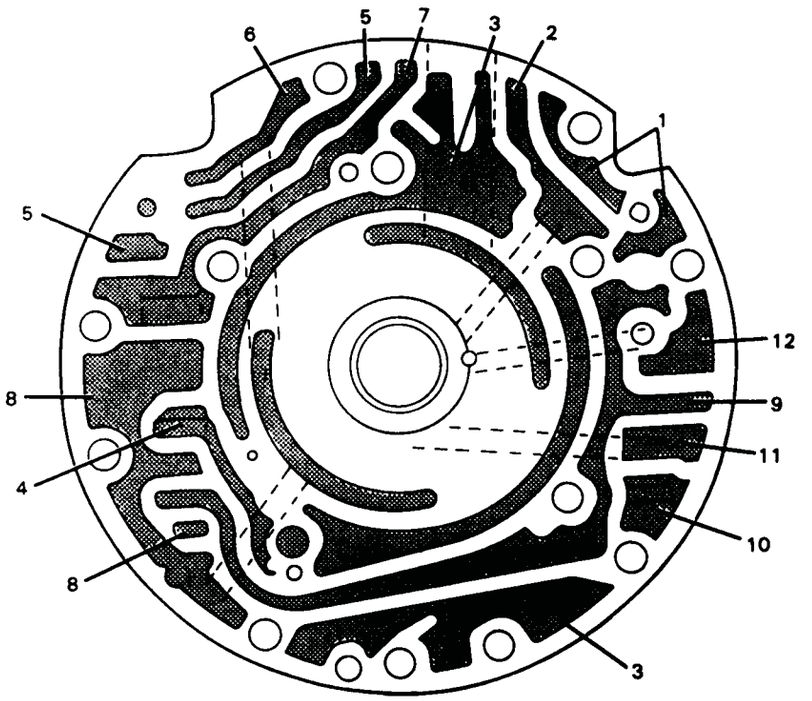
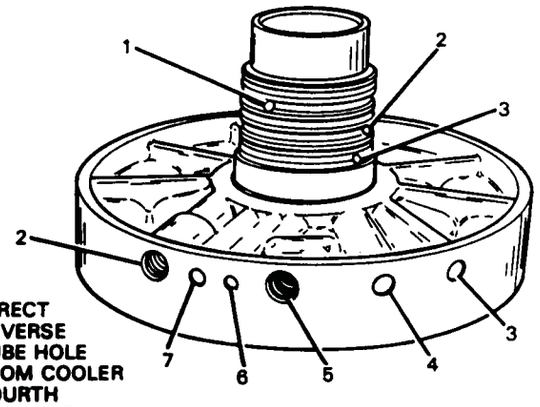


Figure 20

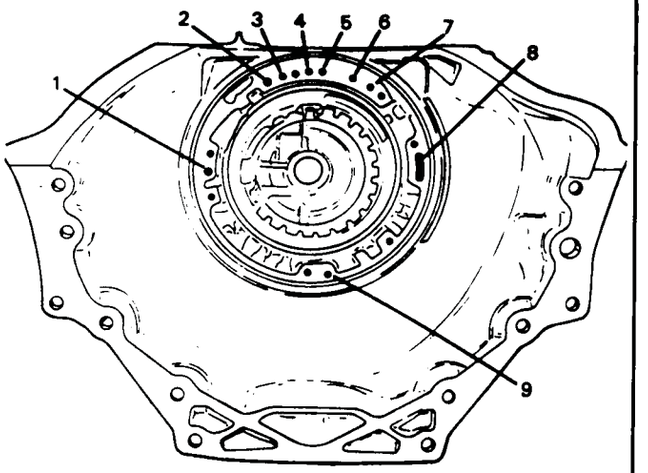
CENTER SUPPORT OIL PASSAGES



1 DIRECT
2 REVERSE
3 LUBE HOLE
4 FROM COOLER
5 FOURTH
6 FORWARD
7 REVERSE/3RD

Figure 21

CASE FRONT OIL PASSAGES



ILL. NO.	DESCRIPTION
1	LINE PRESSURE TAP
2	LINE
3	MODULATOR THROTTLE VALVE
4	DRIVE 2
5	REVERSE
6	DRIVE 3
7	CONVERTER CL. SIGNAL
8	TO COOLER
9	CASE VENT

Figure 22

CASE VALVE BODY OIL PASSAGES

1 EXHAUST
2 LINE
3 REVERSE
4 RND4D3
5 3RD CLUTCH
6 REVERSE/3RD
7 3RD ACCUMULATOR
8 DRIVE 2
9 GOVERNOR
10 RND4
11 LO/DETENT
12 DRIVE 4
13 DRIVE 3
14 REVERSE OR LO OVERRUN
15 VOID
16 4TH CLUTCH
17 4TH ACCUMULATOR
18 LO OVERRUN
19 2ND CLUTCH
20 LO-1ST
21 LO
22 SERVO EXHAUST
23 THROTTLE VALVE
24 PART THROTTLE/D3
25 TV FEED
26 TV EXHAUST
27 MTV DOWN
28 MOD. THROTTLE VALVE
29 CONVERTER CL. SIGNAL
30 MTV UP
31 CUP PLUG

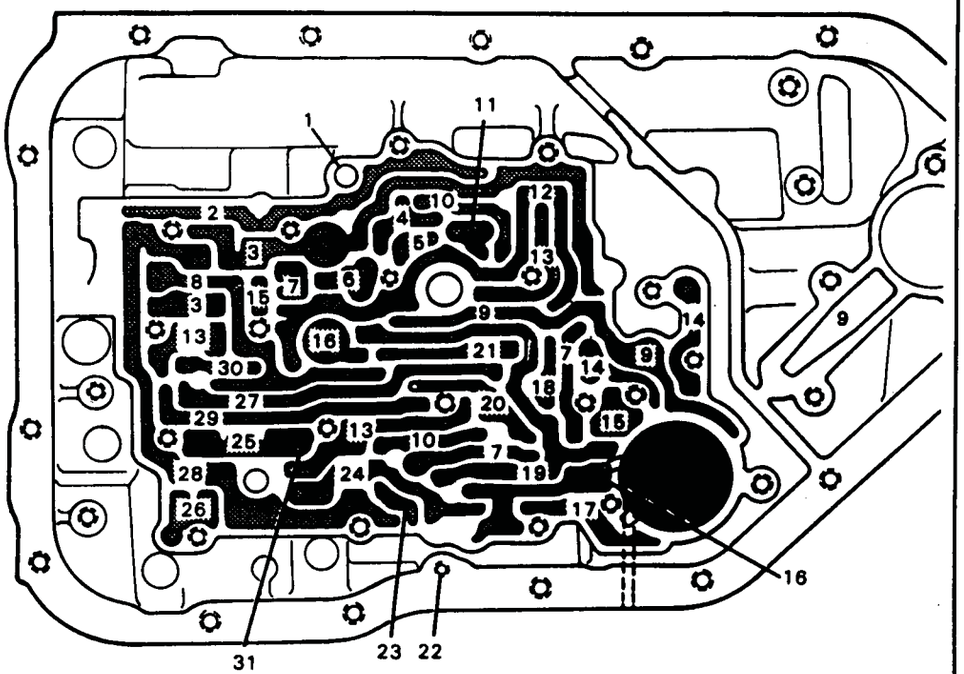


Figure 23

VALVE BODY OIL PASSAGES

1 LO
2 DRIVE 2
3 DRIVE 3
4 DRIVE 4
5 LINE
6 RND4D3
7 RND4
8 3RD CLUTCH
9 REVERSE
10 EXHAUST
11 GOVERNOR
12 3RD ACCUMULATOR
13 ORIFICED MODULATED TV
14 THROTTLE VALVE
15 DETENT
16 MTV UP
17 MTV DOWN
18 ORIFICED MTV UP
19 ORIFICED MTV DOWN
20 2ND CLUTCH
21 4-3
22 PART THROTTLE
23 TV FEED
24 MODULATED TV
25 LO-1ST
26 ORIFICED TV
27 4TH CLUTCH
28 LO OR DETENT
29 PART THROTTLE/D3
30 VOID
31 ACCUMULATOR
32 4TH ACCUMULATOR
33 LO OVERRUN
34 CONVERTER CL. SIGNAL

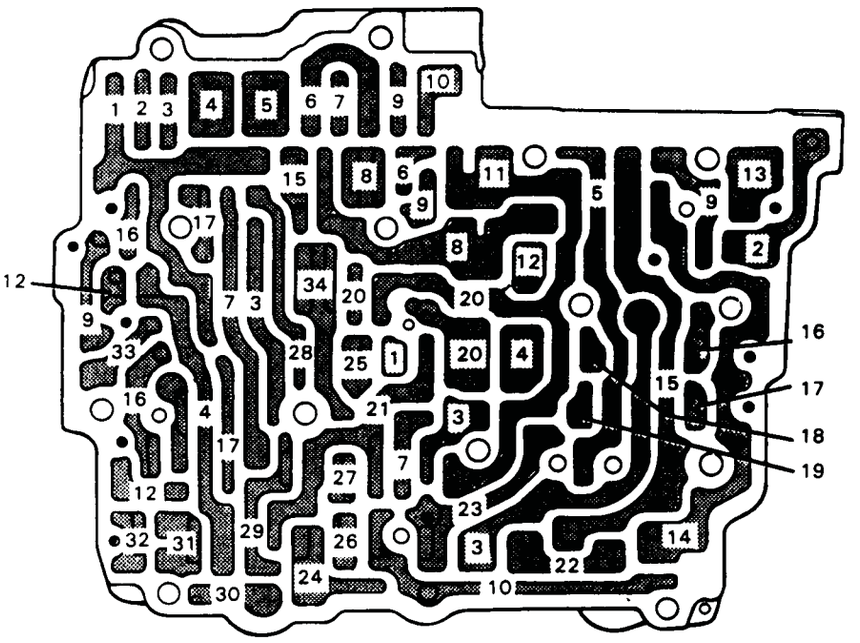


Figure 24

"TYPICAL" SPACER PLATE

1 ORI MTV
2 REVERSE
3 MTV
4 DRIVE 2
5 3RD ACC.
6 LINE
7 EXHAUST
8 RND4D3
9 RND4
10 DETENT
11 DRIVE 4
12 DRIVE 3
13 LO/DETENT
14 3RD CLUTCH
15 MTV UP
16 MTV DOWN
17 ORI MTV DOWN
18 ORIFICE
19 GOVERNOR
20 2ND CLUTCH
21 4TH CLUTCH
22 LO
23 LO-1ST
24 GOV. ORIFICE
25 LO OV
26 REV/LO OV
27 CONV. CL. SIGNAL
28 RND4 ORI
29 TV FEED
30 PART THROTTLE
31 PT/D3
32 ACCUMULATOR
33 TV

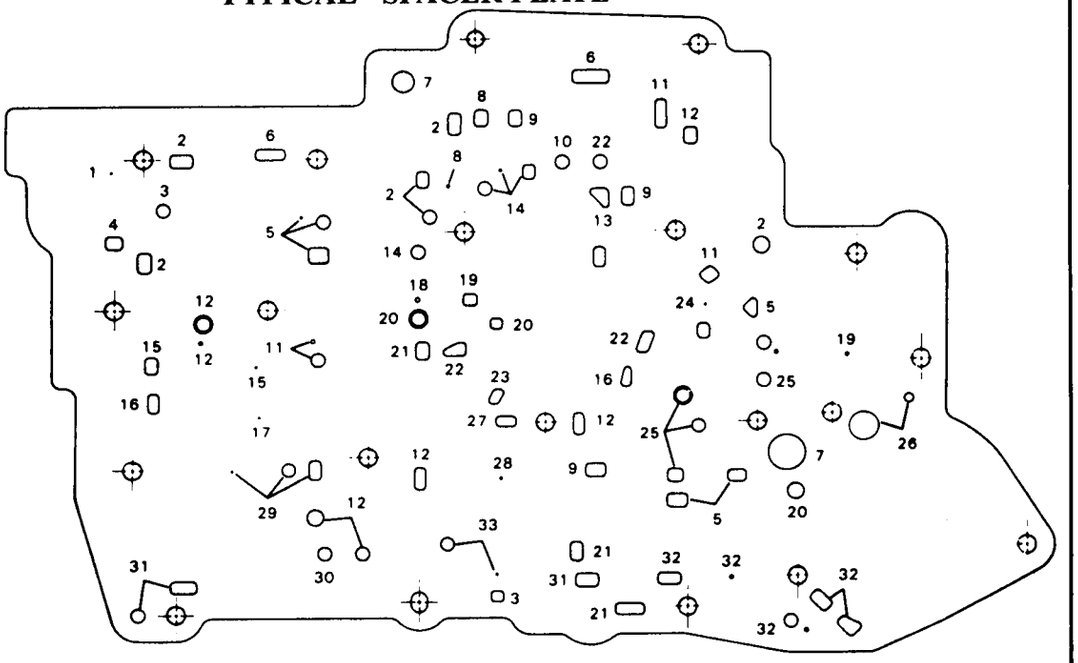
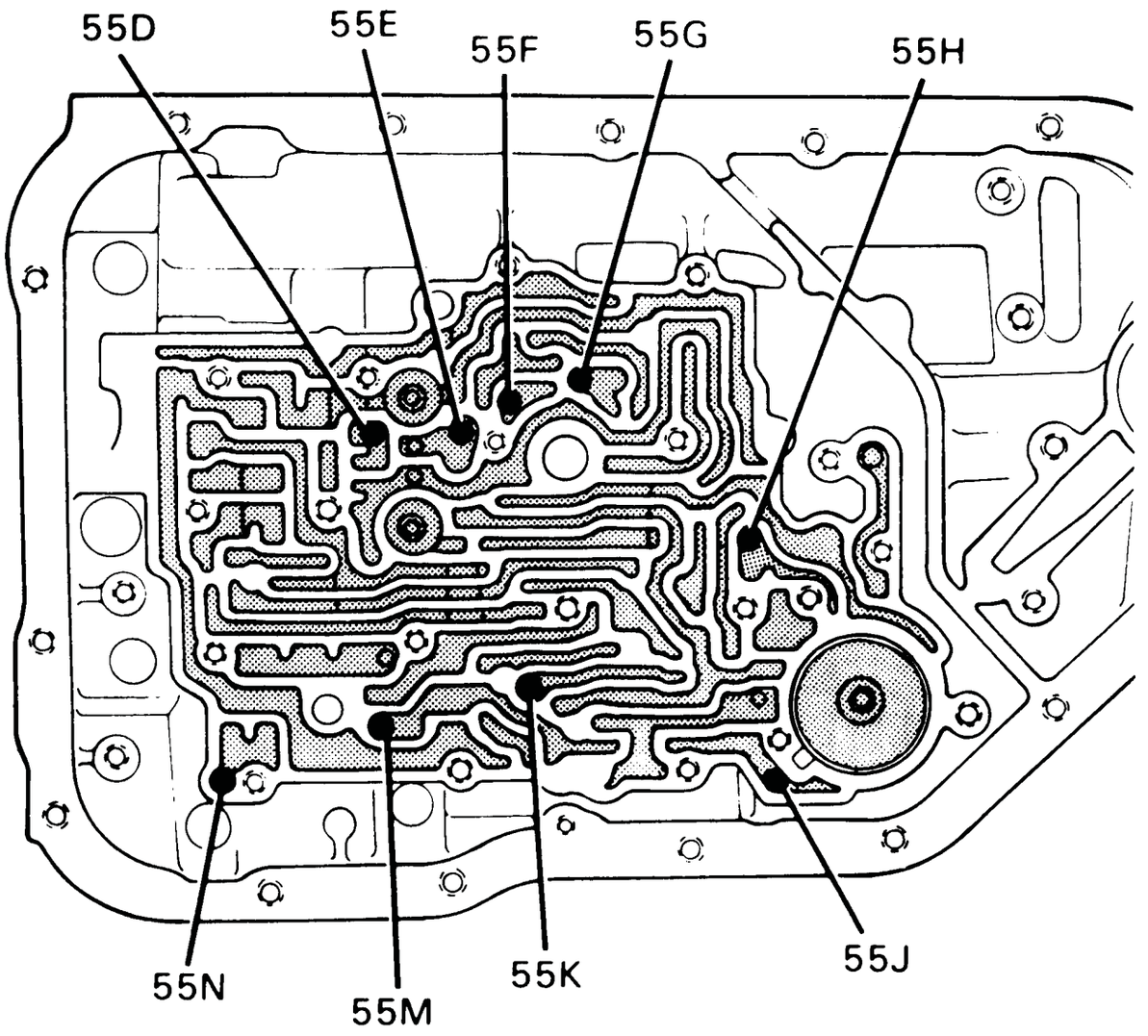


Figure 25

CASE CHECKBALL LOCATIONS



ILL NO.	DESCRIPTION	
55D	CHECKBALL NO. 2	3RD ACCUMULATOR
55E	CHECKBALL NO. 6	REVERSE/3RD
55F	CHECKBALL NO. 4	3RD CLUTCH
55G	CHECKBALL NO. 9	LO/DETENT
55H	CHECKBALL NO. 10	LO/REVERSE
55J	CHECKBALL NO. 1	4TH ACCUMULATOR
55K	CHECKBALL NO. 7	INTERMEDIATE SERVO CHECKBALL LOCATED IN CAPSULE IN SERVO
55M	CHECKBALL NO. 3	PART THROTTLE/D3
55N	CHECKBALL NO. 5	T.V. EXHAUST (ATSG RECOMMENDS LEAVING THIS BALL OUT OF CASE)

Figure 26

VALVE BODY CHECKBALL LOCATIONS

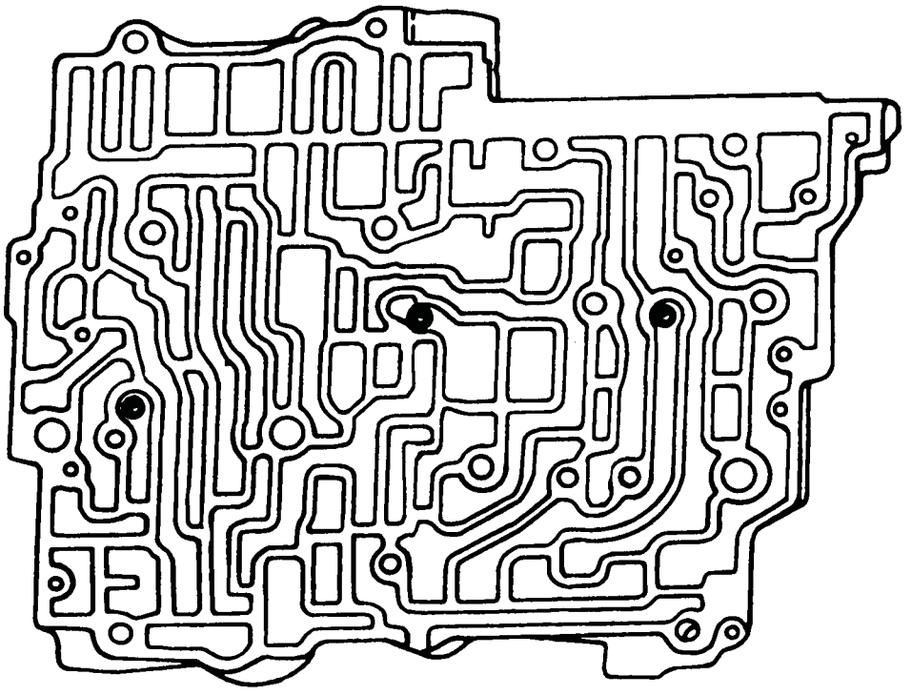


Figure 27

VALVE BODY CHECKBALL LOCATIONS
WHEN PLACED ON SPACER PLATE

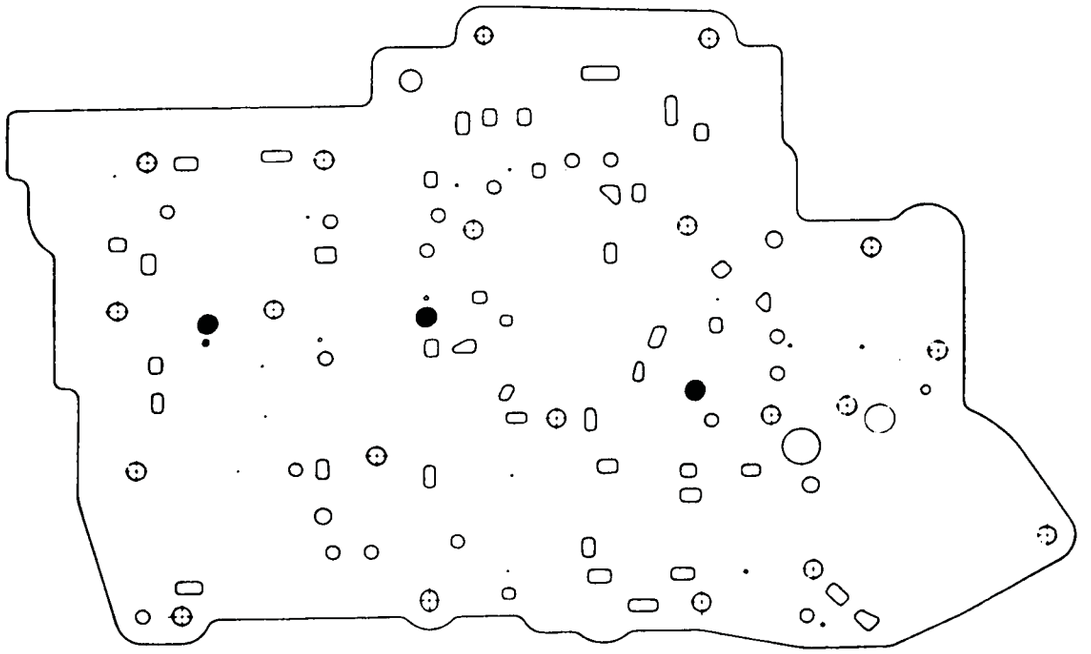


Figure 28

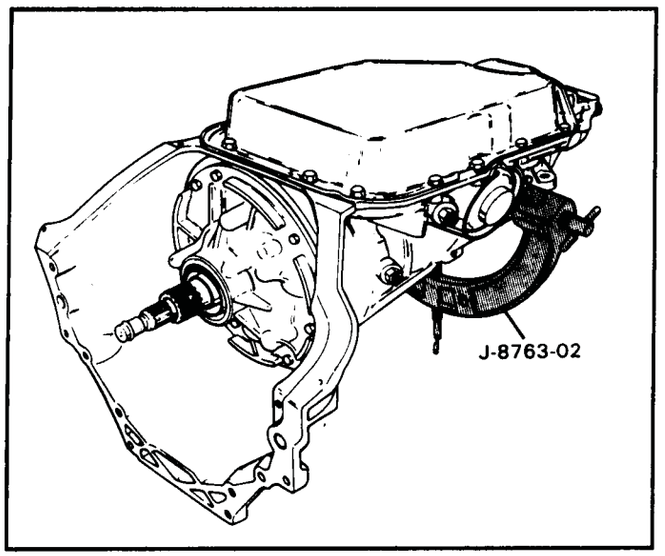
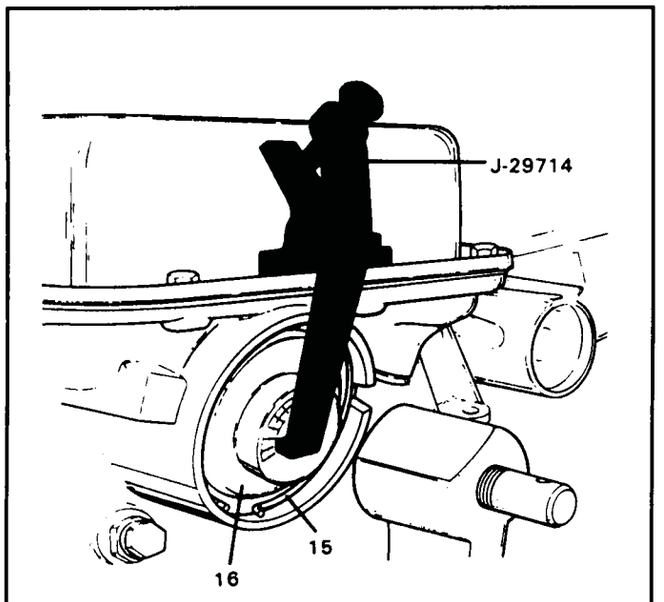
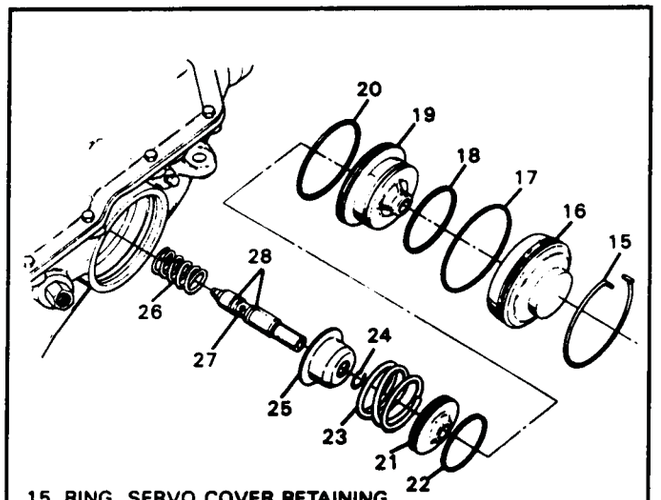


Figure 29



ILL. NO.	DESCRIPTION
15	RING, SERVO COVER RETAINING
16	COVER, INTERMEDIATE SERVO

Figure 30



15 RING, SERVO COVER RETAINING
16 COVER, INTERMEDIATE SERVO
17 SEAL, "O" RING (INTERMEDIATE SERVO COVER)
18 RING, OIL SEAL (INNER)
19 PISTON, INTERMEDIATE SERVO (OUTER)
20 RING, OIL SEAL (OUTER)
21 PISTON, INTERMEDIATE SERVO (INNER)
22 RING, OIL SEAL PISTON (INNER)
23 SPRING, INTERMEDIATE SERVO CUSHION
24 RING, SNAP (APPLY PIN/RETAINER)
25 RETAINER, SERVO SPRING
26 SPRING, INTERMEDIATE SERVO (INNER)
27 PIN, INTERMEDIATE BAND APPLY (SELECTIVE)
28 RING, OIL SEAL (INTERMEDIATE BAND APPLY PIN)

Figure 31

TRANSMISSION DISASSEMBLY

1. Thoroughly clean the exterior of transmission with steam cleaner before disassembly begins.
2. Mount holding fixture J-8763-02 onto the case as shown in Figure 1, and tighten the mounting screws.
3. Install the transmission and fixture assembly in the bench fixture J-3289-20, and rotate so that the bottom pan is facing up (See Figure 29).
4. Drain the transmission fluid by turning the rear seal area down into a drain pan.
5. Install servo compressor tool J-29714 as shown in Figure 30, and compress servo cover.
6. Remove the servo cover retaining ring as shown in Figure 30 with small screwdriver.
7. Release the pressure with servo compressor tool and remove the tool from transmission.
8. Remove the servo cover and "O" ring seal.
9. Remove the complete servo assembly from the case, and remove the band apply pin from servo piston assembly (See Figure 31).
10. As a diagnostic aid, the servo pin length should now be checked.

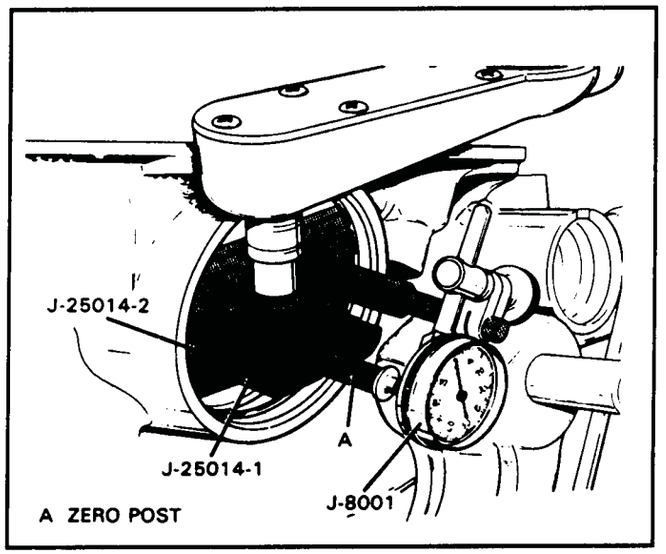


Figure 32

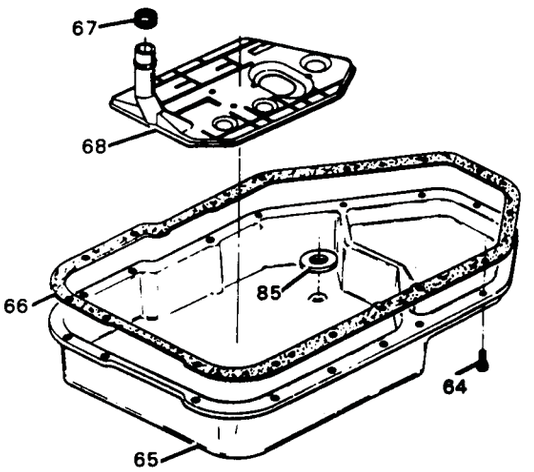
INTERMEDIATE BAND APPLY PIN SELECTION CHART

DIAL INDICATOR TRAVEL		APPLY PIN IDENTIFICATION
.0 - .72mm	(.0" - .029")	1 GROOVE
.72 - 1.44mm	(.029" - .057")	2 GROOVES
1.44 - 2.16mm	(.057" - .086")	3 GROOVES
2.16 - 2.88mm	(.086" - .114")	NONE

Figure 33

CHECK SERVO PIN LENGTH

11. Install band apply pin checking tool in the case servo bore and retain with the servo cover snap ring, as shown in Figure 32.
12. Insert the band apply pin into the case.
13. Make sure the tapered end of tool is properly located against the band apply pin.
14. Install dial indicator as shown in Figure 32, and zero the dial indicator.
15. Apply 107 in.lb. of torque.
16. Position dial indicator stem over J-25014-1, and read dial indicator.
17. Refer to chart in Figure 33 for proper servo pin.
18. Remove the bottom pan bolts.
19. Remove the bottom pan and magnet, as shown in Figure 34.
20. Remove and discard the bottom pan gasket, as shown in Figure 34.

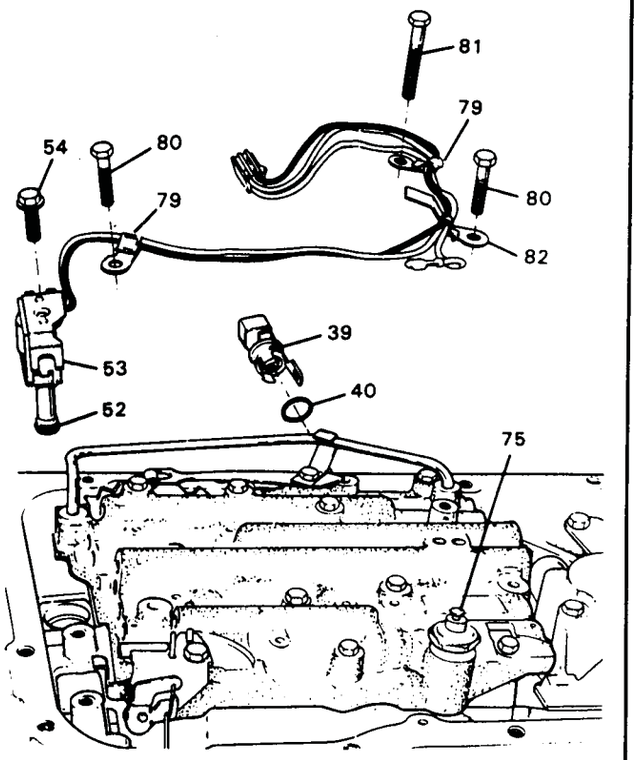


64 SCREW, CONICAL WASHER ASSEMBLY
65 PAN, TRANSMISSION OIL
66 GASKET, PAN
67 SEAL ASSEMBLY, FILTER NECK
68 FILTER ASSEMBLY, TRANSMISSION OIL
85 MAGNET, CHIP COLLECTOR

Figure 34

21. Remove and discard the bottom pan oil filter, as shown in Figure 34.
22. Remove and discard the filter "O" ring seals, as shown in Figure 34.

Continued on next Page.

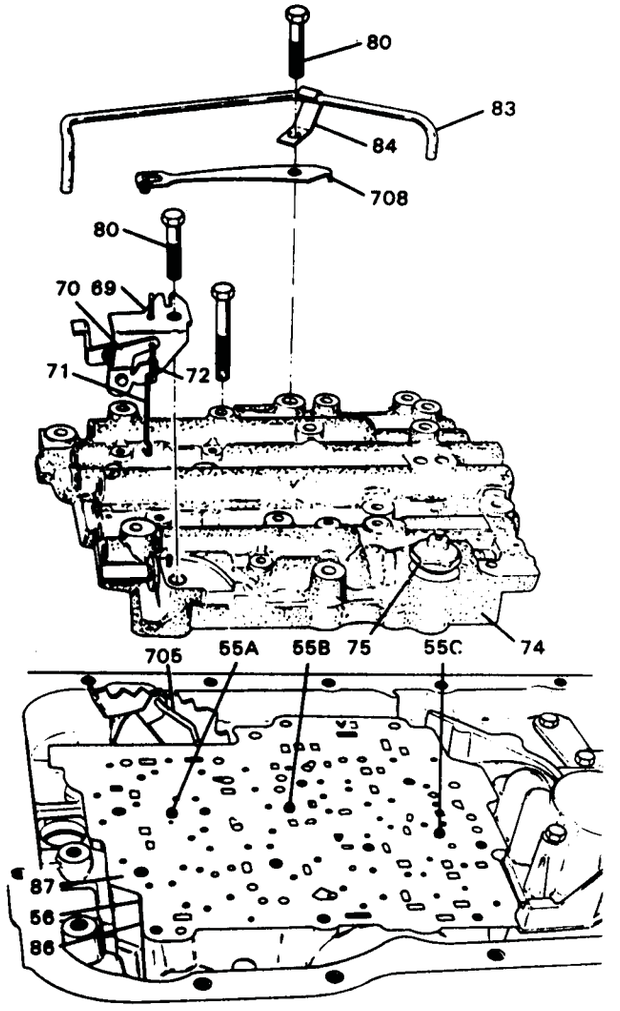


39 CONNECTOR, ELECTRICAL
40 SEAL, "O" RING (ELECTRICAL CONNECTOR)
52 SEAL, "O" RING (SOLENOID)
53 SOLENOID ASSEMBLY
54 BOLTS, HEX WASHER HEAD M6 X 1 X 12.0
75 SWITCH ASSEMBLY, PRESSURE (3RD OR 4TH)
79 CLIP, SOLENOID WIRE (2)
80 BOLT, M6 X 1 X 45
81 BOLT, M6 X 1 X 60
82 CLIP, FILTER RETAINER

Figure 35

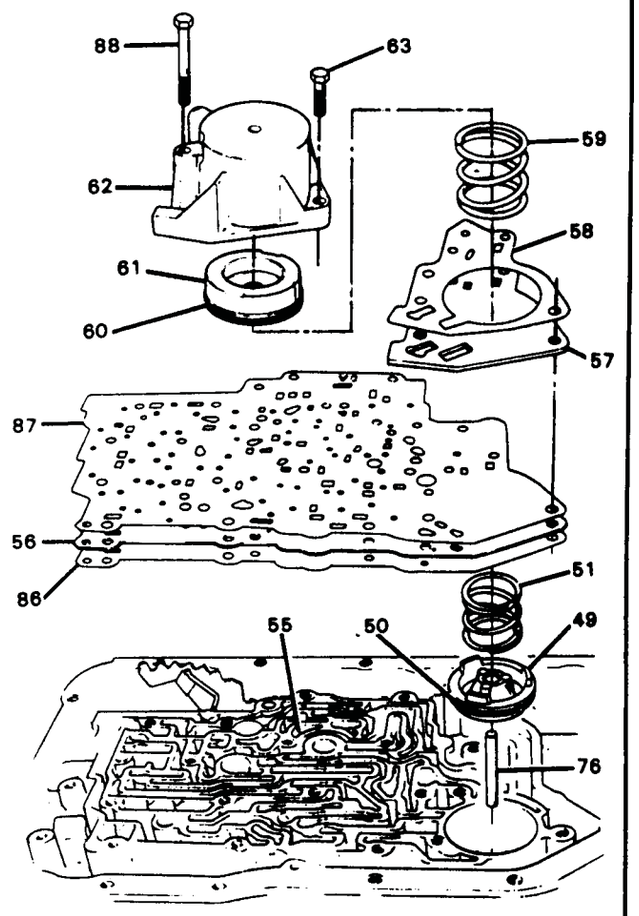
23. Remove electrical connections from the case connector and the 4th clutch switch, as shown in Figure 35.
24. Remove the valve body bolts and wire harness retaining clips as shown in Figure 35.
25. Remove the lock-up solenoid retaining bolts, and remove the solenoid and wiring harness assembly, as shown in Figure 35.
26. Remove the electrical case connector, discard the "O" ring seal as shown in Figure 35.
27. Remove the throttle lever and bracket assembly and throttle lever to cable link (See Figure 36).
28. Remove the manual detent roller and spring assembly, signal oil pipe retainer and the signal pipe as shown in Figure 36.
29. Remove the remaining valve body bolts.
30. Remove the complete valve body assembly and manual valve, and set aside for rebuild, shown in Figure 36.
31. Remove the three checkballs from the spacer plate as shown in Figure 36.
32. Remove the 1-2 accumulator housing assembly and tension plate as shown in Figure 37.
33. Remove 1-2 accumulator piston and spring from the housing as shown in Figure 37.
34. Remove the spacer plate and both valve body gaskets as shown in Figure 37.
35. Remove the 3-4 accumulator piston and spring from the case as shown in Figure 37.
36. ***Note the position of spring and piston because all models are not the same. Parts must be installed in the same position as removed.***
37. Remove and discard the seal ring from the 3-4 accumulator piston (See Figure 37.
38. Remove eight checkballs from the case.

Continued on Page 29



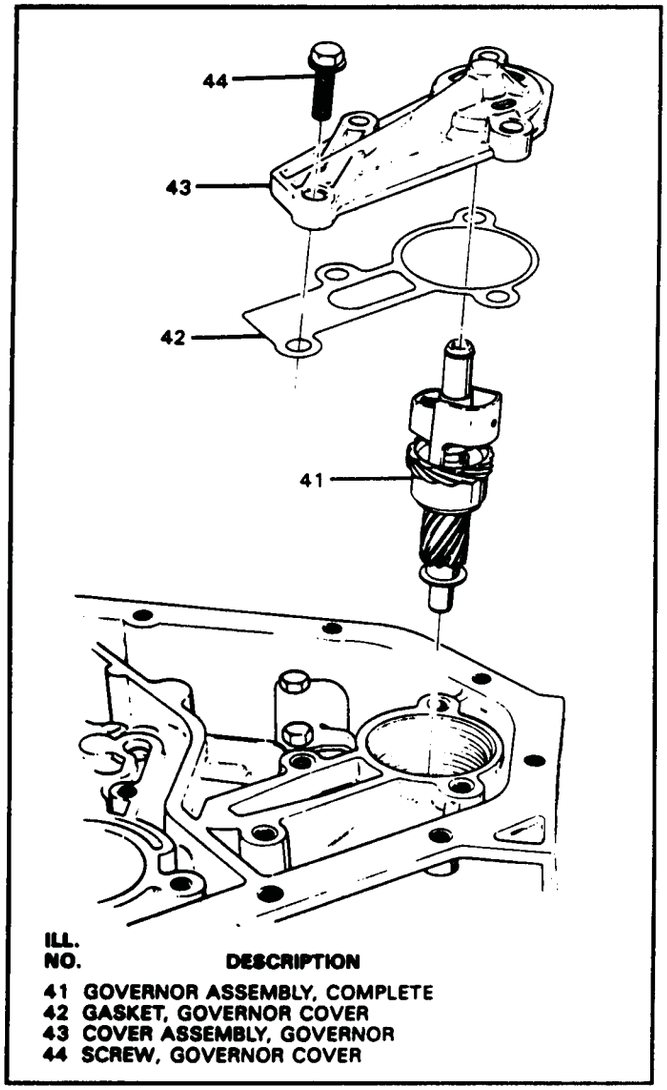
ILL. NO.	DESCRIPTION
55A	CHECK BALL #11
55B	CHECK BALL #8
55C	CHECK BALL #12
56	PLATE, VALVE BODY SPACER
69	LEVER & BRACKET ASSEMBLY, THROTTLE
70	SPRING, LIFTER (T.V. EXHAUST VALVE)
71	LINK, THROTTLE LEVER TO CABLE
72	LIFTER, T.V. EXHAUST
75	SWITCH ASSEMBLY, PRESSURE (3RD OR 4TH)
74	VALVE ASSEMBLY, CONTROL
80	BOLT, M6 X 1 X 45
83	PIPE, SIGNAL OIL
84	RETAINER, SIGNAL OIL PIPE
86	GASKET, SPACER PLATE TO CASE
87	GASKET, VALVE BODY TO SPACER PLATE
705	LINK, INSIDE DETENT (LEVER TO VALVE)
708	MANUAL DETENT ROLLER & SPRING ASSEMBLY

Figure 36



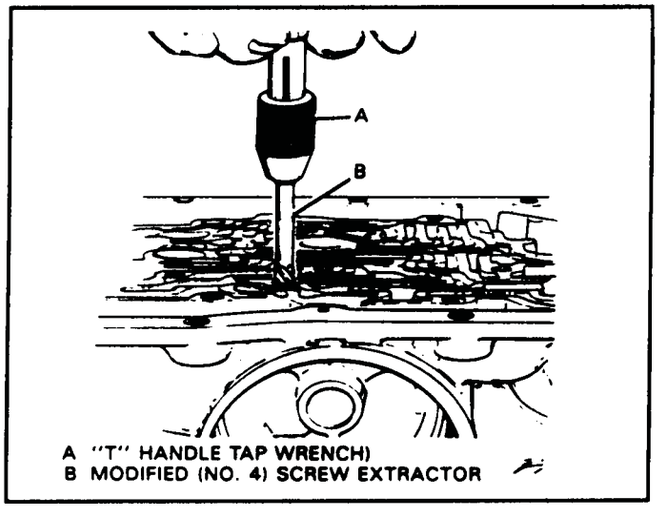
ILL. NO.	DESCRIPTION
49	PISTON, 3-4 ACCUMULATOR
50	RING, OIL SEAL (3-4 ACCUMULATOR PISTON)
51	SPRING, 3-4 ACCUMULATOR
55	BALL, .25 DIAMETER
56	PLATE, VALVE BODY SPACER
57	PLATE, ACCUMULATOR
58	GASKET, ACCUMULATOR HSG. TO ACCUM. PLATE
59	SPRING, 1-2 ACCUMULATOR PISTON
60	RING, OIL SEAL (1-2 ACCUMULATOR PISTON)
61	PISTON, 1-2 ACCUMULATOR
62	HOUSING & PIN ASSEMBLY, 1-2 ACCUMULATOR
63	BOLT, ACCUMULATOR HOUSING
76	PIN, ACCUMULATOR PISTON
86	GASKET, SPACER PLATE TO CASE
87	GASKET, VALVE BODY TO SPACER PLATE
88	BOLT, ACCUMULATOR HOUSING

Figure 37



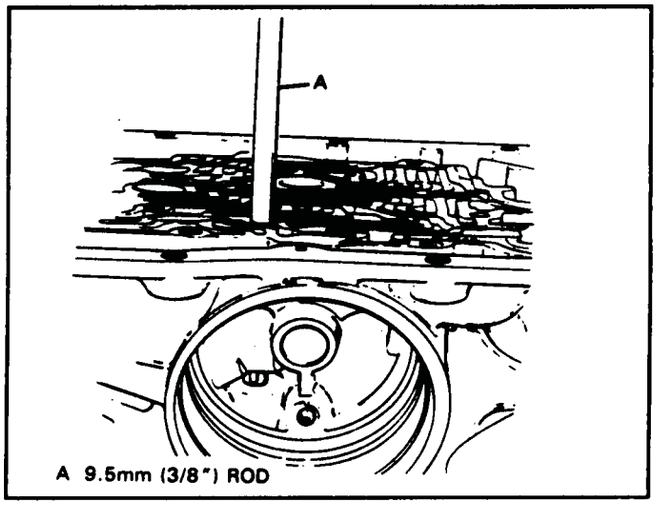
ILL. NO. DESCRIPTION
41 GOVERNOR ASSEMBLY, COMPLETE
42 GASKET, GOVERNOR COVER
43 COVER ASSEMBLY, GOVERNOR
44 SCREW, GOVERNOR COVER

Figure 38



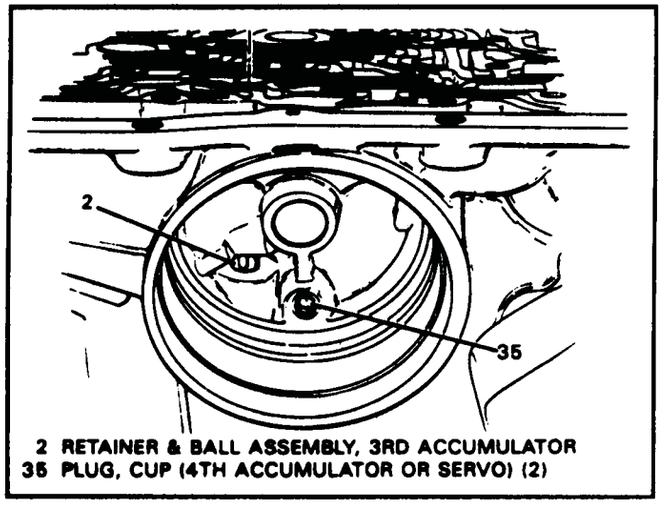
A "T" HANDLE TAP WRENCH)
B MODIFIED (NO. 4) SCREW EXTRACTOR

Figure 40



A 9.5mm (3/8") ROD

Figure 41



2 RETAINER & BALL ASSEMBLY, 3RD ACCUMULATOR
35 PLUG, CUP (4TH ACCUMULATOR OR SERVO) (2)

Figure 39

Continued from Page 27

39. Remove the governor cover retaining bolts as shown in Figure 38, and remove the governor cover and gasket.
40. Remove the governor assembly from the case as shown in Figure 38.
41. Inspect the 3rd accumulator ball capsule for the proper operation and ensure that ball is free. (See Figure 39)
42. Remove the 3rd accumulator ball capsule ***only if necessary***, and replace with part number 8634400.
43. Inspect for presence of orifice cup plug in the servo bore as shown in Figure 39.

REMOVE AND INSTALL THE 3RD ACCUMULATOR CAPSULE

1. Insert a No. 4 screw extractor into a tap handle as shown in Figure 40.
2. Insert screw extractor into 3rd accumulator ball capsule assembly as shown in Figure 40.
3. Pull straight up while turning the tap handle counter-clockwise (See Figure 40).
4. Insert new ball capsule part number 8634400, small end first, into the oil feed slot facing the servo cover.
5. Seat the checkball capsule using a 3/8"diameter metal rod or pin punch (See Figure 41).
6. When the capsule is seated properly, the oilfeed should be visible, as shown in Figure 39.

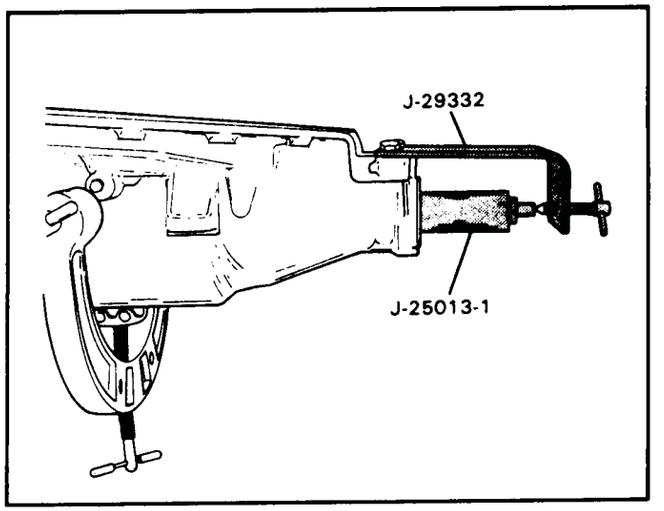


Figure 42

OVERDRIVE UNIT END PLAY CHECK

1. As a diagnostic aid, overdrive unit end play should be checked prior to removing internal parts.
2. Install output shaft support tool as shown in Figure 42, and remove rear end play.
3. Remove an oil pump bolt , install J-25025-7A, as shown in Figure 43.
4. Install turbine shaft lifting tool as shown in Figure 43.
5. Install dial indicator, as shown in Figure 43 and set dial indicator to zero.
6. Using the lifting tool, end play should read .004" to .027" (See Figure 43).
7. Use the chart in Figure 44 to choose the proper selective thrust washer.
8. Remove the dial indicator and lifting tool.

Continued on next Page

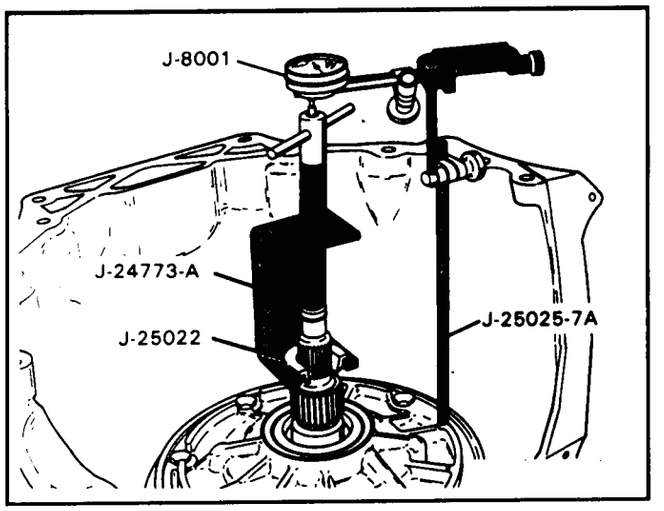
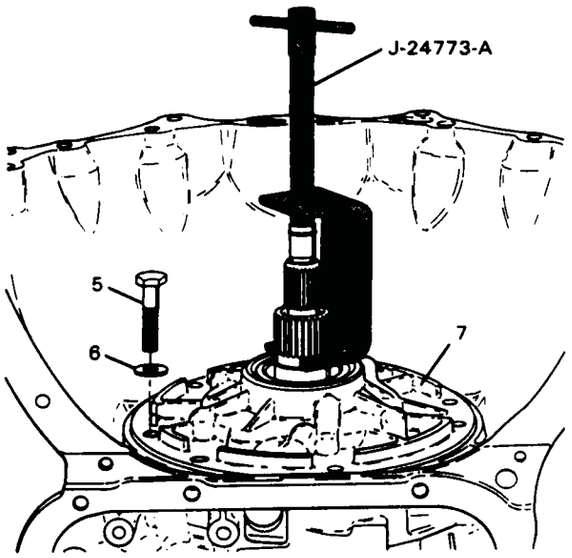


Figure 43

OVERDRIVE UNIT END PLAY WASHER THICKNESS CHART

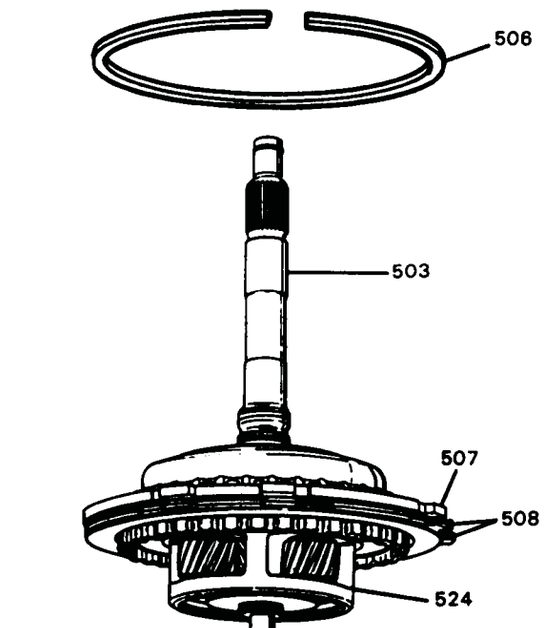
THICKNESS		IDENTIFICATION NUMBER AND/OR COLOR
4.25-4.36mm	(0.167"-0.171")	0 - SCARLET
4.36-4.48mm	(0.172"-0.176")	1 - WHITE
4.49-4.60mm	(0.177"-0.180")	2 - COCOA BROWN
4.61-4.72mm	(0.181"-0.185")	3 - GRAY
4.73-4.84mm	(0.186"-0.190")	4 - YELLOW
4.85-4.96mm	(0.191"-0.195")	5 - LIGHT BLUE
4.97-5.08mm	(0.196"-0.200")	6 - PURPLE
5.09-5.20mm	(0.201"-0.204")	7 - ORANGE
5.21-5.32mm	(0.205"-0.209")	8 - GREEN

Figure 44



ILL. NO.	DESCRIPTION
5	BOLTS, M8 X 1.25 X 62
6	WASHER, PUMP TO CASE BOLTS
7	PUMP ASSEMBLY, COMPLETE

Figure 45



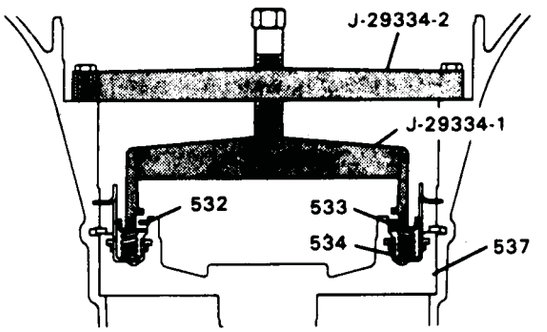
503 SHAFT, TURBINE
506 RING, SNAP (4TH CLUTCH RETAINER IN CASE)
507 PLATE, 4TH CLUTCH BACKING
508 PLATE ASSEMBLY, 4TH CLUTCH
524 CARRIER ASSEMBLY, OVERDRIVE (COMPLETE)

Figure 46

REMOVE INTERNAL PARTS

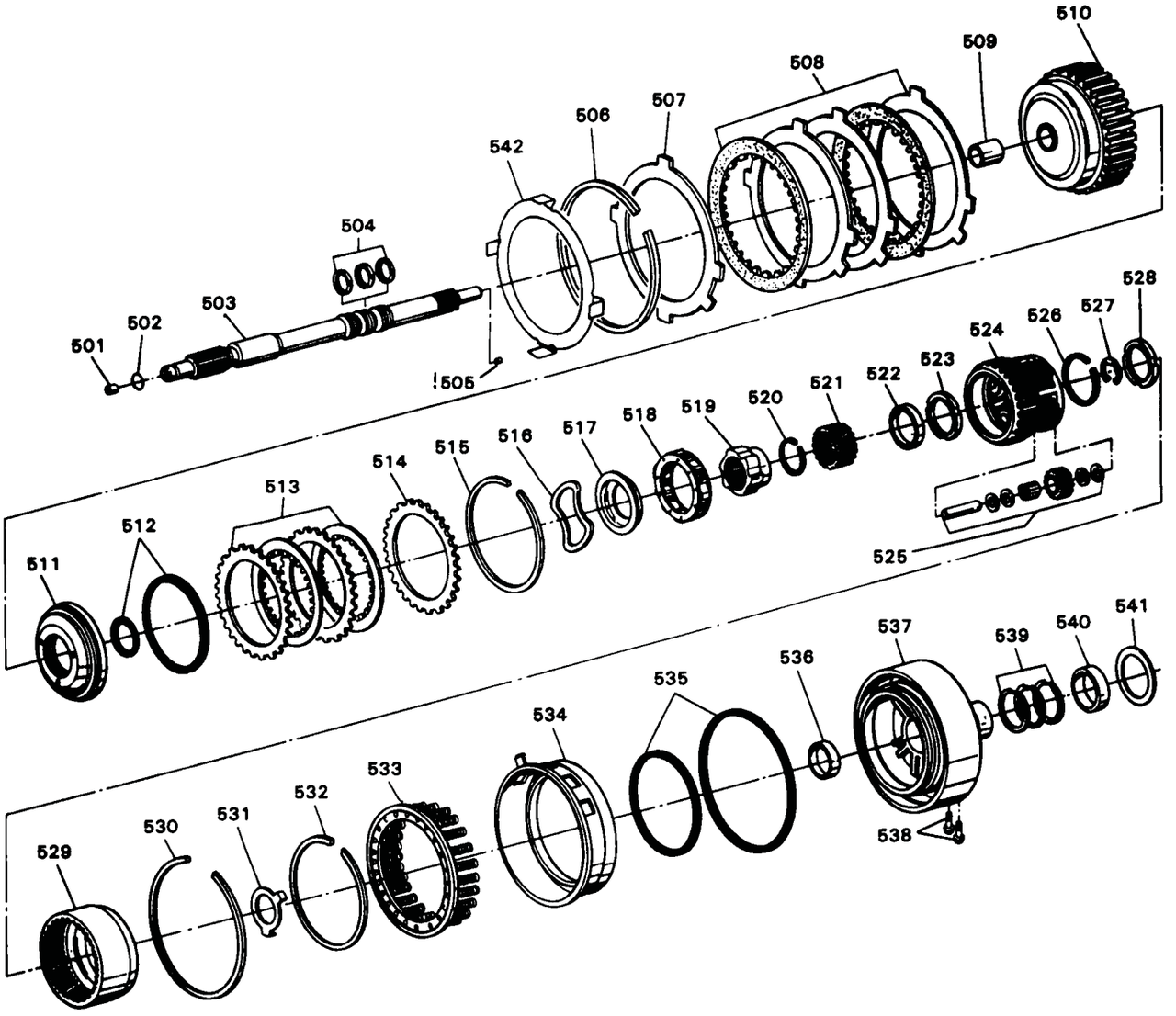
1. Remove the remaining oil pump bolts and the washers, as shown in Figure 45.
2. Install oil pump remover J-24773-A as shown in Figure 45, and remove oil pump assembly.
3. Remove and discard the oil pump "O" ring seal and pump to case gasket.
4. Remove the oil deflector plate.
5. Remove the 4th clutch snap ring from the case as shown in Figure 46.
6. Remove the overdrive section and 4th clutch plates by grasping the turbine shaft and lifting straight up (See Figure 46).
7. Remove thrust bearing.
8. Remove the overdrive ring gear.
9. Remove thrust washer.
10. Install spring compressor J-29334-1 on the 4th clutch return spring & retainer (See Figure 47).
11. Install compressor J-29334-2 on the case with retaining bolts, as shown in Figure 47.
12. Compress the 4th clutch return spring and the retainer by turning the screw on J-29334-2.
13. Remove the snap ring (See Figure 47).
14. Remove the spring compressor, spring retainer and 4th clutch piston.
15. Use Figure 48 on Page 32 as a guide.

Continued on Page 33



532 RING, SNAP (SUPPORT/4TH CLUTCH SPRING)
533 RETAINER & SPRING ASSEMBLY, 4TH CLUTCH
534 PISTON, 4TH CLUTCH
537 SUPPORT, CENTER

Figure 47



501 RETAINER & BALL ASSEMBLY, CHECK VALVE
502 SEAL, "O" RING (TURBINE SHAFT/SELECTIVE WASHER)
503 SHAFT, TURBINE
504 RING, OIL SEAL (TURBINE SHAFT)
505 PLUG, TURBINE SHAFT (4.80 DIA.)
506 RING, SNAP (4TH CLUTCH RETAINER IN CASE)
507 PLATE, 4TH CLUTCH BACKING
508 PLATE ASSEMBLY, 4TH CLUTCH
509 BUSHING, OVERRUN CLUTCH
510 HOUSING, OVERRUN CLUTCH ASSEMBLY
511 PISTON ASSEMBLY, OVERRUN CLUTCH
512 SEALS, OVERRUN CLUTCH (INNER/OUTER)
513 PLATE ASSEMBLY, OVERRUN CLUTCH
514 PLATE, OVERRUN CLUTCH BACKING
515 RING, SNAP (OVERRUN CLUTCH HOUSING)
516 SPRING, WAVE (OVERRUN CLUTCH RELEASE)
517 RETAINER, OVERRUN CLUTCH RELEASE SPRING
518 ROLLER ASSEMBLY, OVERDRIVE CLUTCH
519 CAM, OVERDRIVE ROLLER CLUTCH
520 RING, SNAP (OVERRUN CLUTCH HUB)
521 GEAR, OVERDRIVE SUN
522 BUSHING, OVERDRIVE CARRIER
523 BEARING ASSEMBLY, THRUST (CARRIER/SUN)
524 CARRIER ASSEMBLY, OVERDRIVE (COMPLETE)
525 PINION ASSEMBLY, OVERDRIVE CARRIER
526 RING, SNAP (OVERDRIVE CARRIER)
527 RING, SNAP (TURBINE SHAFT/CARRIER)
528 BEARING ASM., THRUST (CARRIER/INTERNAL GEAR)
529 GEAR, OVERDRIVE INTERNAL
530 RING, SNAP (CENTER SUPPORT TO CASE)
531 WASHER, THRUST (INTERNAL GEAR/SUPPORT)
532 RING, SNAP (SUPPORT/4TH CLUTCH SPRING)
533 RETAINER & SPRING ASSEMBLY, 4TH CLUTCH
534 PISTON, 4TH CLUTCH
535 SEALS, 4TH CLUTCH (INNER & OUTER)
536 BUSHING, CENTER SUPPORT (29.8 O.D. X 11.0)
537 SUPPORT, CENTER
538 SCREW, FLANGED (MOD) M10 X 1.5 X 23.0
539 RING, OIL SEAL (CENTER SUPPORT)
540 BUSHING, CENTER SUPPORT (33.8 O.D. X 11)
541 WASHER, THRUST (SUPPORT/DIRECT CLUTCH)
542 PLATE, OIL DEFLECTOR

Figure 48

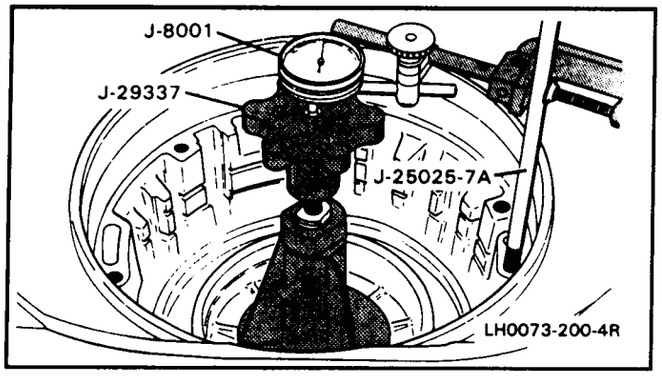


Figure 49

THICKNESS		IDENTIFICATION NUMBER AND/OR COLOR
1.66 - 1.77mm	(0.065" - 0.070")	1 - –
1.79 - 1.90mm	(0.070" - 0.075")	2 - –
1.92 - 2.03mm	(0.076" - 0.080")	3 - BLACK
2.05 - 2.16mm	(0.081" - 0.085")	4 - LIGHT GREEN
2.18 - 2.29mm	(0.086" - 0.090")	5 - SCARLET
2.31 - 2.42mm	(0.091" - 0.095")	6 - PURPLE
2.44 - 2.55mm	(0.096" - 0.100")	7 - COCOA BROWN
2.57 - 2.68mm	(0.101" - 0.106")	8 - ORANGE
2.70 - 2.81mm	(0.106" - 0.111")	9 - YELLOW
2.83 - 2.94mm	(0.111" - 0.116")	10 - LIGHT BLUE
2.96 - 3.07mm	(0.117" - 0.121")	11 - –
3.09 - 3.20mm	(0.122" - 0.126")	12 - –
3.22 - 3.33mm	(0.127" - 0.131")	13 - PINK
3.35 - 3.46mm	(0.132" - 0.136")	14 - GREEN
3.48 - 3.59mm	(0.137" - 0.141")	15 - GRAY

Figure 50

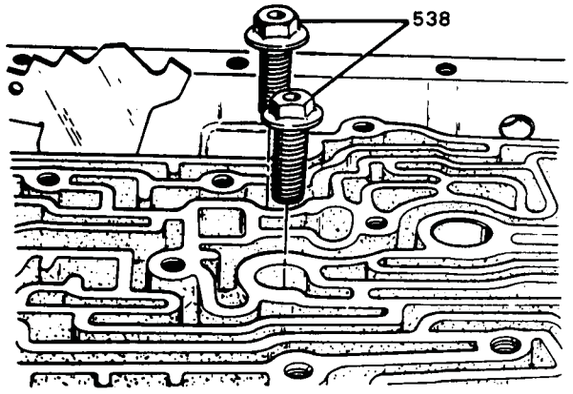


Figure 51

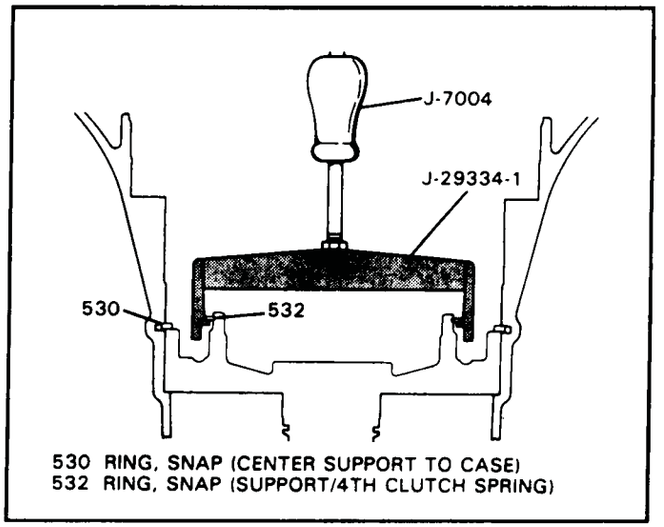


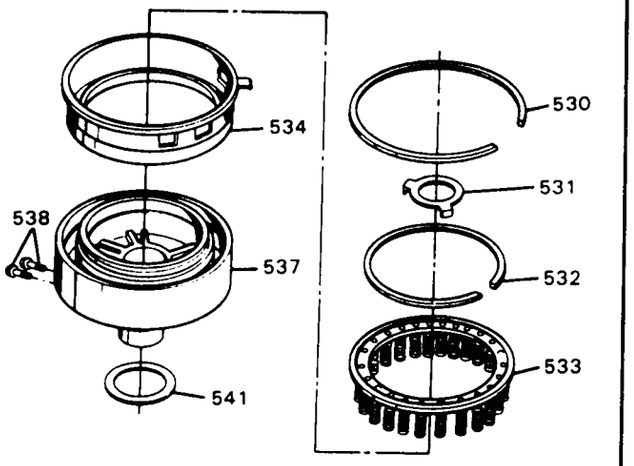
Figure 52

FORWARD CLUTCH SHAFT END PLAY

1. As a diagnostic aid, a forward clutch shaft end play check should be made before removing.
2. Push forward clutch shaft down.
3. Install lifting tool J-29337 on forward clutch shaft, as shown in Figure 49.
4. Install dial indicator as shown in Figure 49.
5. Turn the adjusting screw on the output shaft holding fixture until white scribe line on tool begins to disappear.
6. Zero the dial indicator (See Figure 49).
7. Lift up on tool J-29337 and read dial indicator.
8. End play should be .022" to .051".
9. Remove the dial indicator, and leave the output shaft holding fixture in place.
10. Use the chart in Figure 50 to choose the proper selective thrust washer.

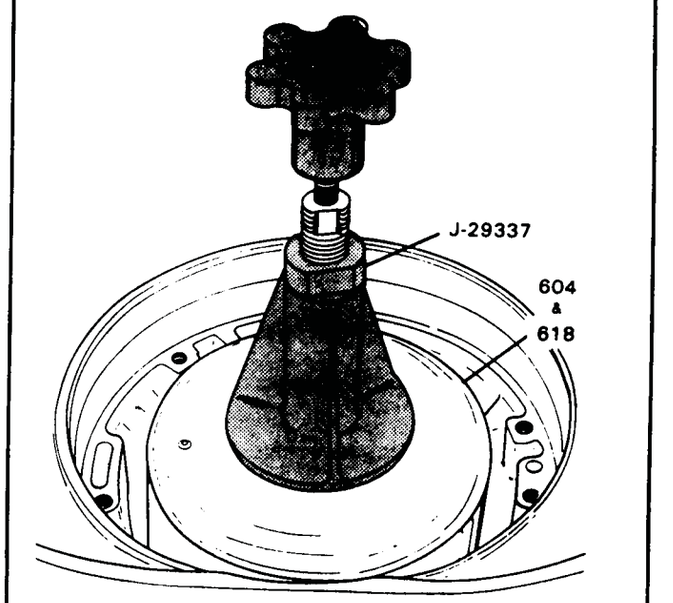
REMOVE CENTER SUPPORT AND INTERNAL PARTS

1. Remove the two center support bolts as shown in Figure 51.
2. Remove the snap ring (530) in case retaining the center support (See Figure 52).
3. Install lifting tool J-29334-1 using snap ring as shown in Figure 52.
4. Remove the center support by lifting straight up (See Figure 52).
5. Set center support aside for component rebuild.
6. Install the lifting tool J-29337 on the forward clutch shaft as shown in Figure 54.



ILL. NO.	DESCRIPTION
530	RING, SNAP (CENTER SUPPORT TO CASE)
531	WASHER, THRUST (INTERNAL GEAR/SUPPORT)
532	RING, SNAP (SUPPORT/4TH CLUTCH SPRING)
533	RETAINER & SPRING ASSEMBLY, 4TH CLUTCH
534	PISTON, 4TH CLUTCH
537	SUPPORT, CENTER
538	SCREW, FLANGED (MOD) M10 X 1.5 X 23.0
541	WASHER, THRUST (SUPPORT/DIRECT CLUTCH)

Figure 53

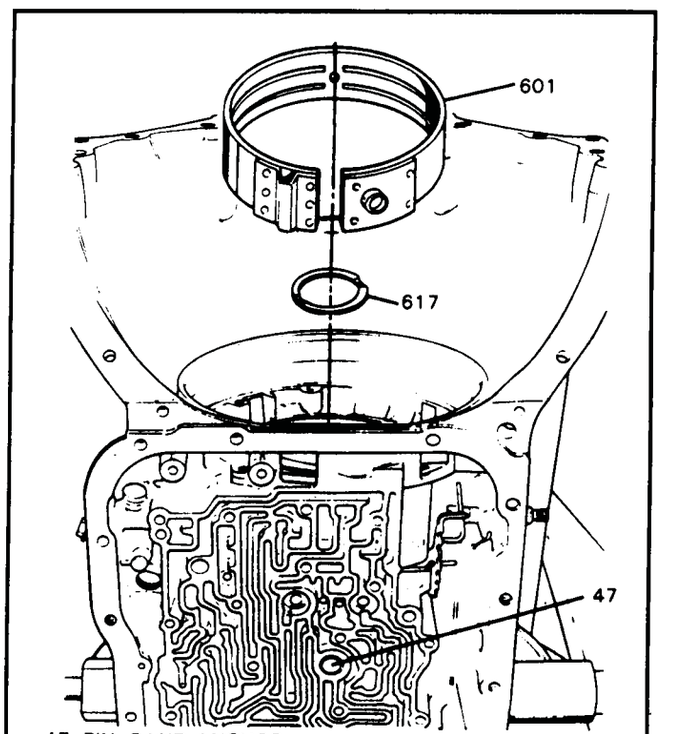


ILL. NO.	DESCRIPTION
604	HOUSING & DRUM ASSEMBLY, DIRECT CLUTCH
618	HOUSING ASSEMBLY, FORWARD CLUTCH

Figure 54

7. Remove the forward and direct clutch housings by lifting straight up (See Figure 54).
8. Remove the lifting tool from the forward and direct clutch housings, and set both the clutch housings aside for component rebuild.
9. Remove the intermediate band assembly, as shown in Figure 55.
10. Remove the intermediate band anchor from the case, as shown in Figure 55.

Continued on Page 35



47	PIN, BAND ANCHOR
601	BAND ASSEMBLY, INTERMEDIATE
617	WASHER, THRUST

Figure 55

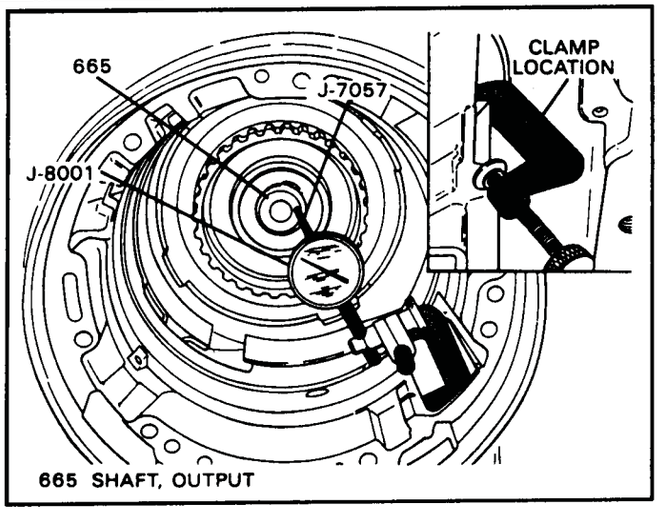


Figure 56

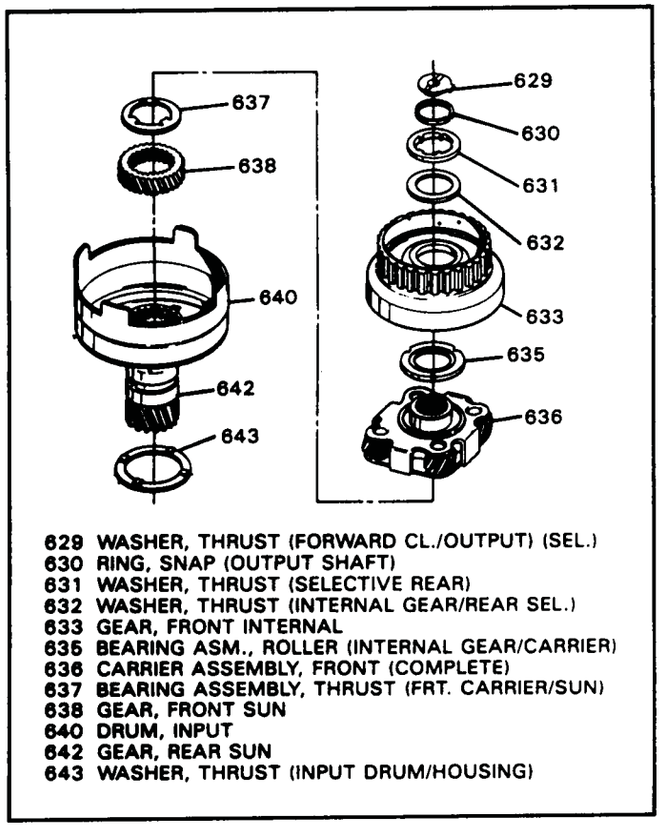


Figure 57

THICKNESS		IDENTIFICATION NUMBER AND/OR COLOR
2.90 - 3.01mm	(0.114" - 0.119")	1 - ORANGE
3.08 - 3.19mm	(0.121" - 0.126")	2 - WHITE
3.26 - 3.37mm	(0.128" - 0.133")	3 - YELLOW
3.44 - 3.55mm	(0.135" - 0.140")	4 - BLUE
3.62 - 3.73mm	(0.143" - 0.147")	5 - RED
3.80 - 3.91mm	(0.150" - 0.154")	6 - BROWN
3.98 - 4.09mm	(0.157" - 0.161")	7 - GREEN
4.16 - 4.27mm	(0.164" - 0.168")	8 - BLACK
4.34 - 4.45mm	(0.171" - 0.175")	9 - PURPLE

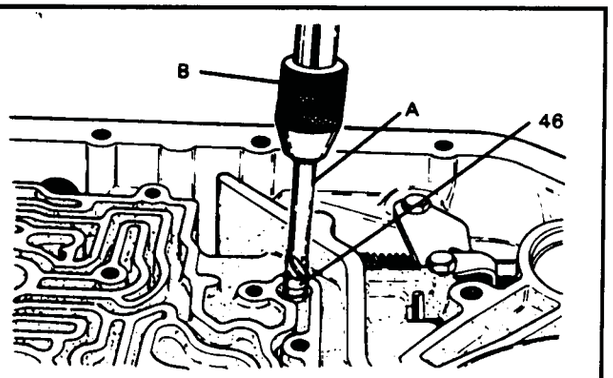
Figure 58

OUTPUT SHAFT END PLAY CHECK

1. As a diagnostic aid, rear shaft end play should be checked before removal.
2. Lossen the screw on the output shaft holding fixture, and push output shaft all the way down.
3. Install dial indicator, and clamp to the case as shown in Figure 56.
4. ***Zero the dial indicator.***
5. Turn the adjusting screw on the output shaft holding fixture until white/scribe line begins to disappear.
6. Read the dial indicator.
7. End play should be .004" to .015".
8. Record end play reading, and remove the dial indicator (See Figure 56).
9. Use the chart in Figure 58 to choose the proper selective thrust washer.

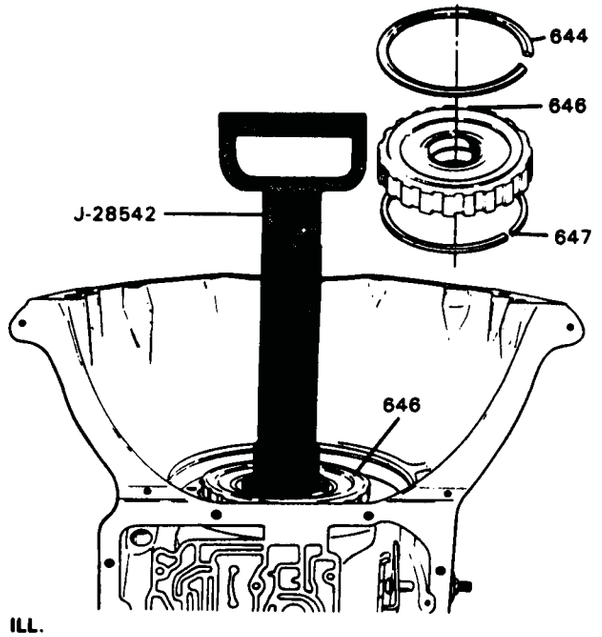
REMOVE REAR INTERNAL PARTS

1. Remove the snap ring from the output shaft using snap ring pliers.
2. Remove the thrust washer and selective thrust washer (See Figure 57).
3. Remove the front internal ring gear and hub assembly (See Figure 57).
4. Remove the front planetary carrier and thrust bearing as shown in Figure 57.
5. Remove the front sun gear and thrust bearing as shown in Figure 57. Thrust bearing has only one race.
6. Remove sun gear shell and rear sun gear shown in Figure 57.
7. Remove the tanged thrust washer (643), shown in Figure 57.



A MODIFIED (NO. 4) SCREW EXTRACTOR
B "T" HANDLE TAP WRENCH
46 SEAL, REVERSE OIL (CASE TO HOUSING)

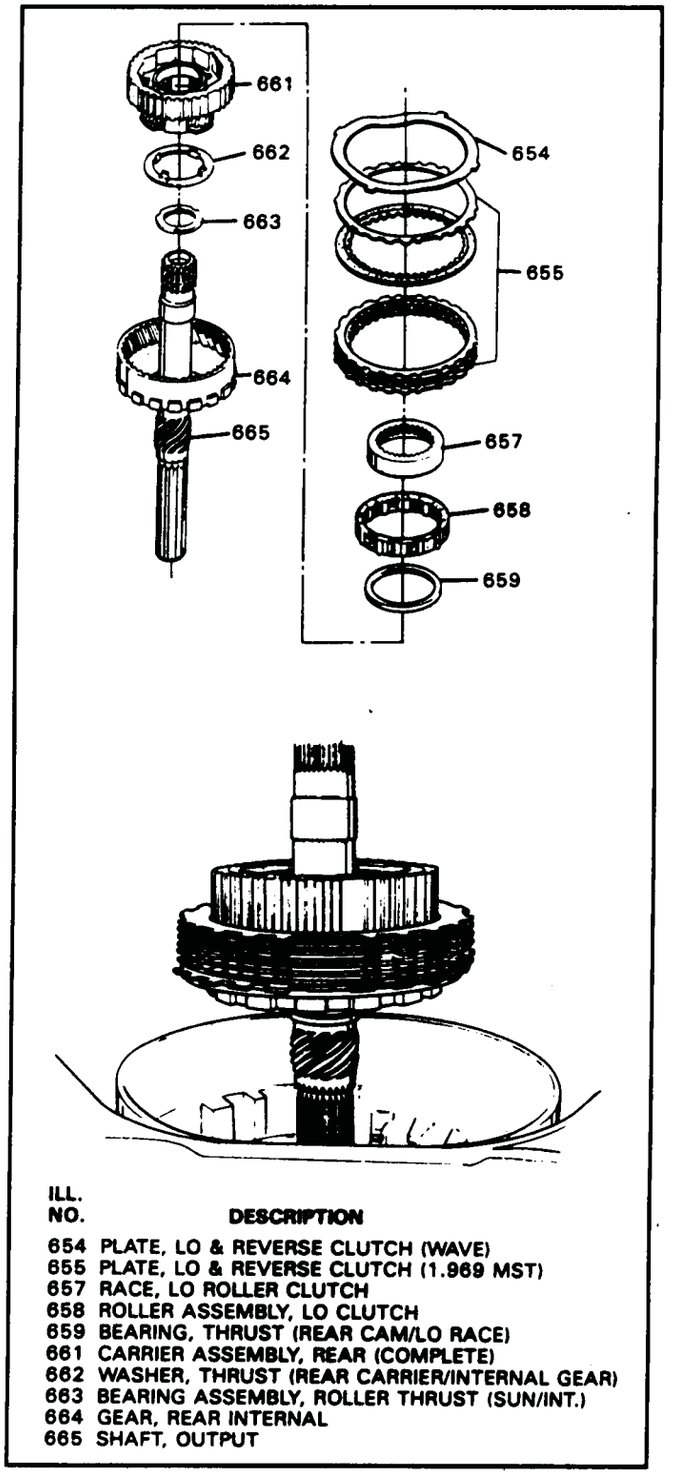
Figure 59



ILL. NO.	DESCRIPTION
644	RING, SNAP (HOUSING/CASE)
646	HOUSING ASSEMBLY, LO & REVERSE CLUTCH
647	SPACER, HOUSING TO CASE

Figure 60

8. Remove and discard the case cup plug with a modified #4 easy-out as shown in Figure 59.
9. Remove the snap ring from case that retains the Lo/Reverse clutch housing (See Figure 60).
10. Remove the Lo/Reverse clutch housing using J-28542 tool as shown in Figure 60.
11. Remove the housing to case spacer (647) , as shown in Figure 60.
12. Remove the complete rear gear train assembly and Lo/Reverse clutches (See Figure 61).



ILL. NO.	DESCRIPTION
654	PLATE, LO & REVERSE CLUTCH (WAVE)
655	PLATE, LO & REVERSE CLUTCH (1.969 MST)
657	RACE, LO ROLLER CLUTCH
658	ROLLER ASSEMBLY, LO CLUTCH
659	BEARING, THRUST (REAR CAM/LO RACE)
661	CARRIER ASSEMBLY, REAR (COMPLETE)
662	WASHER, THRUST (REAR CARRIER/INTERNAL GEAR)
663	BEARING ASSEMBLY, ROLLER THRUST (SUN/INT.)
664	GEAR, REAR INTERNAL
665	SHAFT, OUTPUT

Figure 61

13. The rear internal ring gear is pressed onto the output shaft. Do not remove the rear ring gear from the output shaft.

Continued on next Page

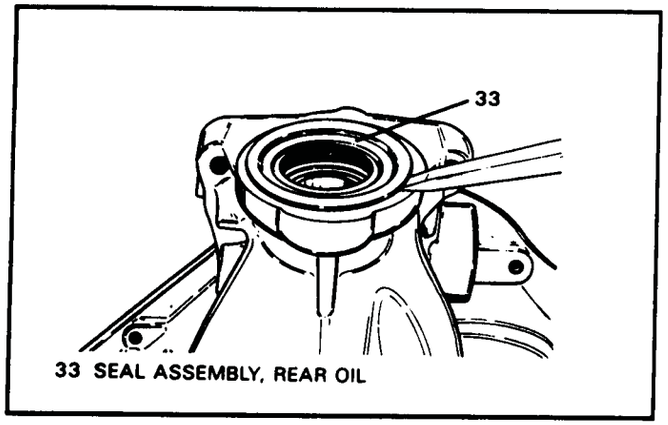


Figure 62

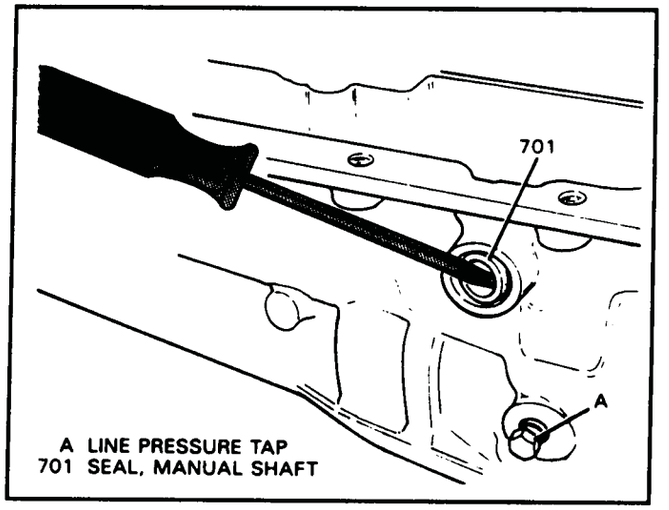
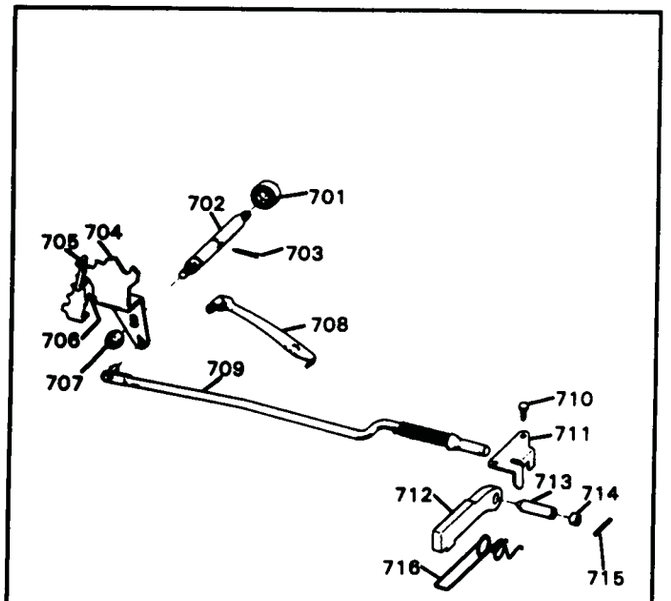
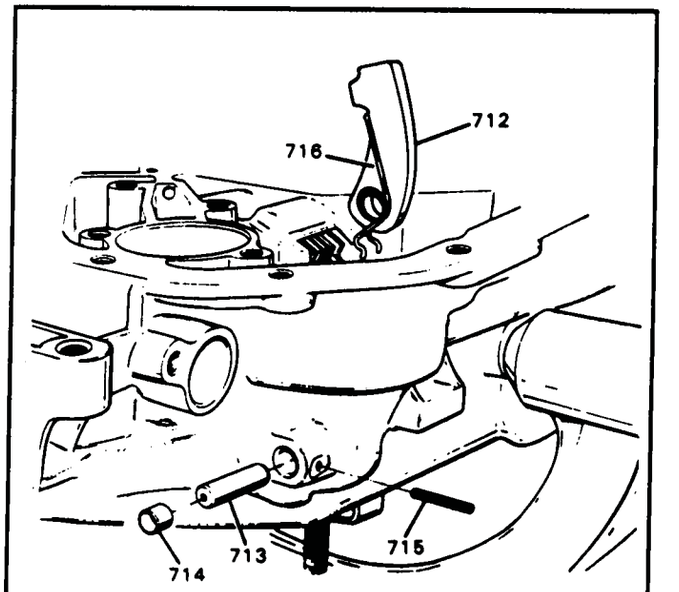


Figure 64



ILL. NO.	DESCRIPTION
701	SEAL, MANUAL SHAFT
702	SHAFT, MANUAL
703	PIN, RETAINING (MANUAL SHAFT TO CASE)
704	LEVER, INSIDE DETENT
705	LINK, INSIDE DETENT (LEVER TO VALVE)
706	CLIP, LINK TO DETENT LEVER
707	NUT, HEX
708	MANUAL DETENT ROLLER & SPRING ASSEMBLY
709	ROD ASSEMBLY, PARKING LOCK
710	BOLT, PARK LOCK BRACKET TO CASE (M8 X 1.25 X 20)
711	BRACKET, PARKING LOCK
712	PAWL, PARKING LOCK
713	SHAFT, PARKING LOCK PAWL
714	PLUG, STEEL CUP (.38 DIAMETER)
715	PIN, SLOTTED SPRING
716	SPRING, PARKING PAWL RETURN

Figure 63

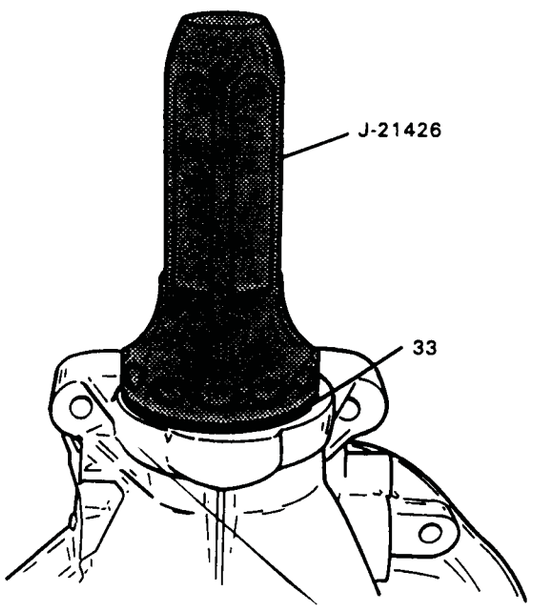


ILL. NO.	DESCRIPTION
712	PAWL, PARKING LOCK
713	SHAFT, PARKING LOCK PAWL
714	PLUG, STEEL CUP (.38 DIAMETER)
715	PIN, SLOTTED SPRING
716	SPRING, PARKING PAWL RETURN

Figure 65

Continued from Page 36

14. Remove the output shaft seal from the case as shown in Figure 62, using care so as not to do any damage to the seal bore in the case.
15. Discard the output shaft seal.
16. Remove the hex nut and inside detent lever as shown in Figure 63, from the manual shaft.
17. Remove the manual shaft retaining pin (703) (nail) from the case (See Figure 63).
18. Remove the manual shaft from the case, as shown in Figure 63.
19. Remove the manual shaft seal from the case, as shown in Figure 64, using care not to damage the seal bore in the case.
20. Discard the manual shaft seal.
21. Remove the parking pawl and spring from the case, ***only if necessary***, using Figure 65.
22. Clean all transmission parts and blow dry with compressed air. Do not use shop towels to dry the parts.



ILL. NO.	DESCRIPTION
33	SEAL ASSEMBLY, REAR OIL

Figure 66

COMPONENT REPAIR AND TRANSMISSION ASSEMBLY

1. The assembly of some components will require the use of an assembly lube. It is recommended that "Trans-Jel" or the equivalent be used.
2. Inspect the case for the following:
   - Case exterior for any cracks or porosity.
   - Case to valve body surface for damage.
   - 3-4 accumulator bore for any sharp edges, porosity, and/or wear or damage.
   - Intermediate servo bore for any sharp edges, porosity, and/or wear or damage.
   - Governor bore for any sharp edges, porosity, and/or wear or damage.
   - Speedometer bore for wear and/or damage.
   - All bolt hole threads for any damage, use a heli-coil to repair as necessary.
   - Clutch plate internal lugs worn or damaged.
   - Any damaged snap ring grooves.
   - Rear case bushing for wear or damage. See Bushing Replacement in back of manual for bushing replacement procedures.
3. Install the parking pawl and spring, if removed, as shown in Figure Figure 65.
4. Install new manual shaft seal into case bore and ensure that it is fully seated using a 9/16" deep socket.
5. Install the manual shaft through case bore using a small amount of "Trans-Jel" for lubrication.
6. Install the park rod into the inside detent lever, install the inside detent lever onto the manual shaft and ensure it is engaged on the flats (See Figure 63).
7. Install the hex nut onto the manual shaft, and torque to 20-25 ft.lbs.
8. Install the manual shaft retaining pin (nail) into case and insure it is engaged in shaft groove.
9. Rotate transmission and install a new output shaft seal into the case using driver J-21426 as shown in Figure 66.
10. Rotate transmission so that bell housing and the pump bore are facing up, to assemble internal parts.

Continued on Page 39

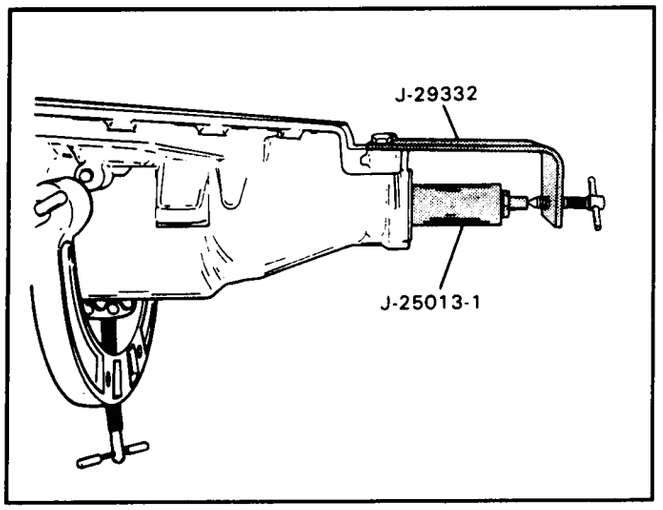


Figure 67

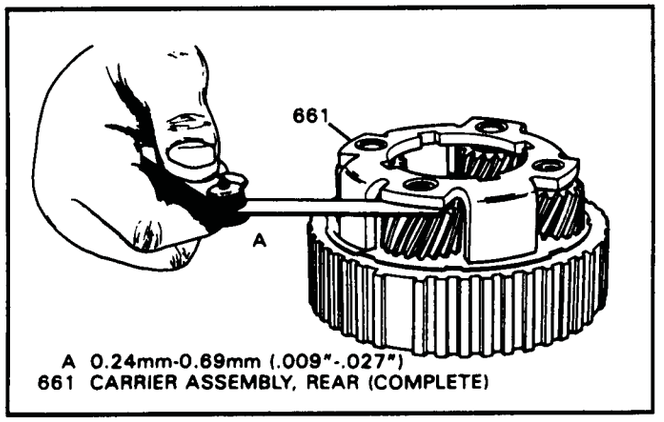


Figure 68

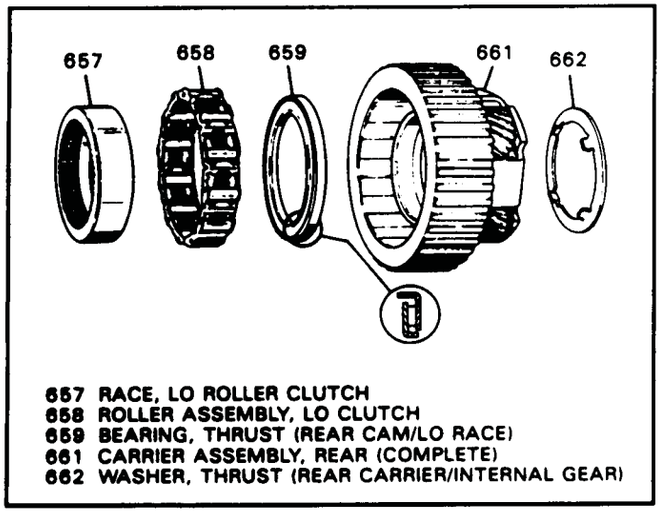


Figure 69

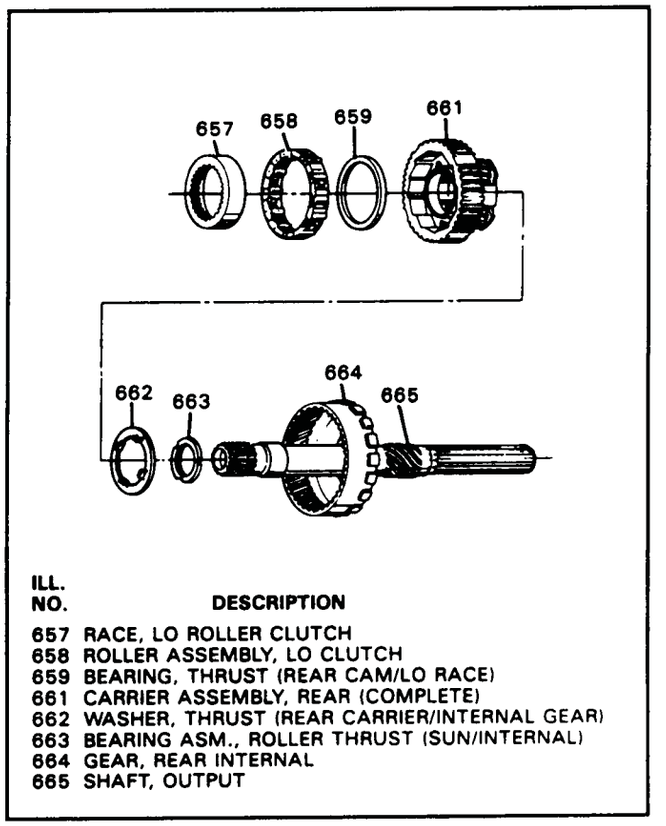


Figure 70

Continued from Page 38

11. Install output shaft support fixture onto the case as shown in Figure 67.
12. Inspect all rear gear train parts for any wear or damage. See Bushing Replacement if bushing is needed in the planetary carrier.
13. Check pinion end play on planetary carrier with feeler gage, as shown in Figure 68. End play should be .009" to .027".
14. Install thrust bearing (663) into the ring gear , with inside diameter of race against ring gear.
15. Install inside tanged thrust washer on back side of planetary carrier and retain with "Trans-Jel" as shown in Figure 69.
16. Install thrust bearing (659) into the carrier, in the direction shown in Figure 69.
17. Install all rollers into the Lo Roller Clutch, by compressing spring with forefinger and install roller (See Figure 69).
18. Install completed roller clutch assembly in the carrier (See Figure 69).
19. Install the Lo roller clutch inner race, with the splines facing up, as shown in Figure 69.

20. Rotate the inner race counterclockwise into position, and push down for full engagement.
21. Install the rear carrier assembly into the ring gear by rotating into position (See Figure 71).
22. Install the completed output shaft and the rear carrier assembly into the case (See Figure 71).
23. Align the parking lugs on the rear ring gear, with the parking pawl in the case, by rotating the adjusting screw on the output shaft holding fixture (See Figure 71).

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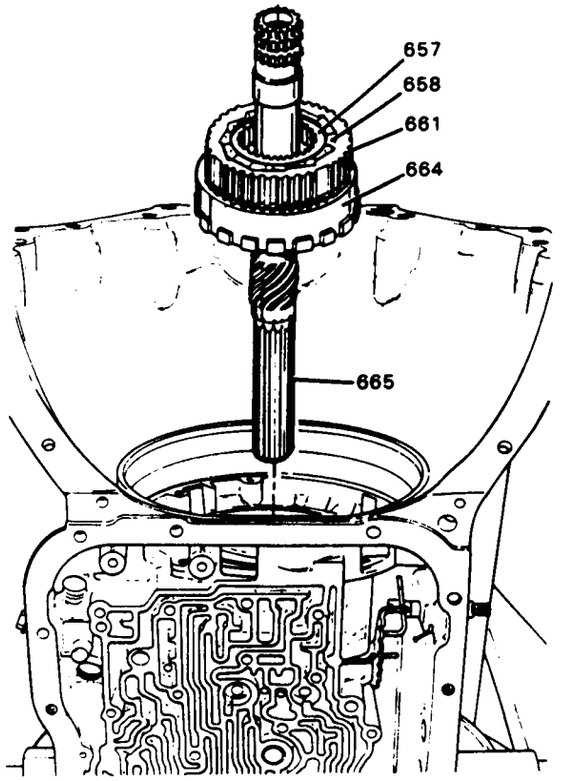


ILL. NO.	DESCRIPTION
657	RACE, LO ROLLER CLUTCH
658	ROLLER ASSEMBLY, LO CLUTCH
661	CARRIER ASSEMBLY, REAR (COMPLETE)
664	GEAR, REAR INTERNAL
665	SHAFT, OUTPUT
712	PAWL, PARKING LOCK

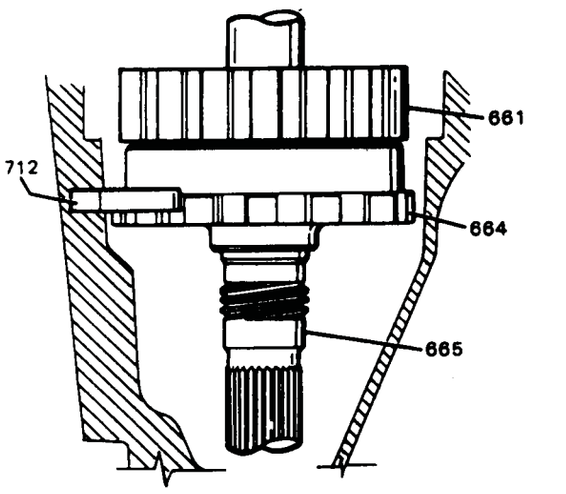
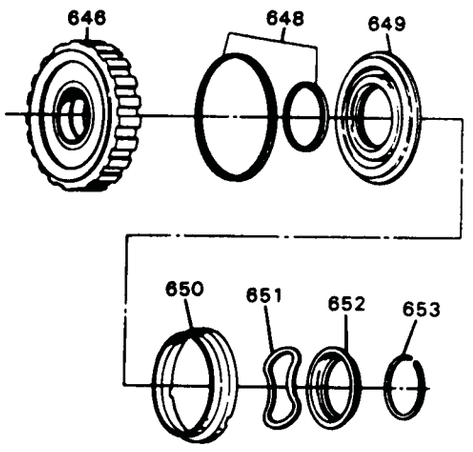
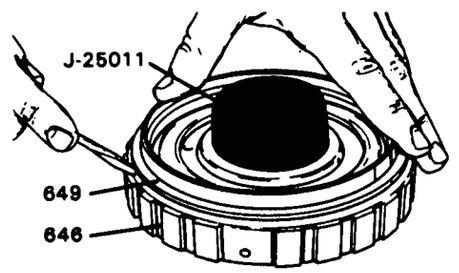


Figure 71



ILL. NO.	DESCRIPTION
646	HOUSING ASSEMBLY, LO & REVERSE CLUTCH
648	SEALS, LO & REVERSE PISTON (INNER/OUTER)
649	PISTON ASSEMBLY, LO & REVERSE CLUTCH
650	RING, CLUTCH APPLY (13.13mm)
651	SPRING, WAVE (REVERSE CLUTCH RELEASE)
652	RETAINER, LO & REVERSE CLUTCH SPRING
653	RING, SNAP (RETAINER/HOUSING)

Figure 72

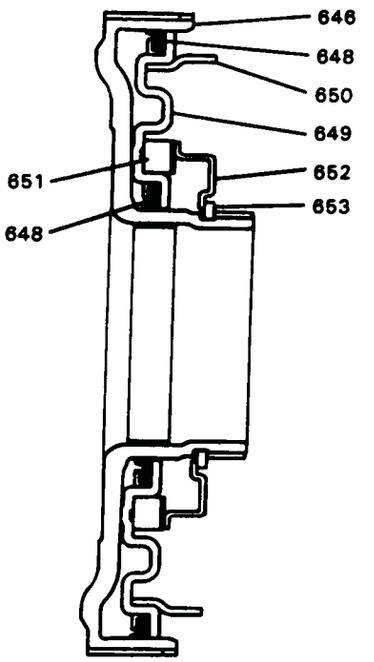


646 HOUSING ASSEMBLY, LO & REVERSE CLUTCH
649 PISTON ASSEMBLY, LO & REVERSE CLUTCH

Figure 73

Continued from Page 40

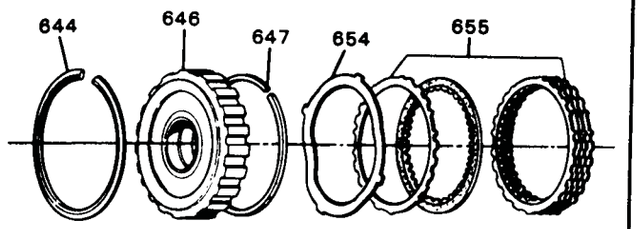
24. Inspect the following:
    - 0 Lo/Reverse clutch housing for plugged feed hole, worn and/or chipped splines, bushing for wear or damage. If bushing is needed see Bushing Replacement in this manual.
    - 0 Clutch apply ring for cracks or distortion.
    - 0 Lo/Reverse clutch piston for cracks, and/or damage.
    - 0 Wave spring and spring retainer for damage.
    - 0 Refer to Figure 72.
25. Install new inner and outer lip seals onto the Lo/Reverse piston with the lips facing in the direction shown in Figure 74.



ILL. NO.	DESCRIPTION
646	HOUSING ASSEMBLY, LO & REVERSE CLUTCH
648	SEALS, LO & REVERSE PISTON (INNER/OUTER)
649	PISTON ASSEMBLY, LO & REVERSE CLUTCH
650	RING, CLUTCH APPLY (13.13mm)
651	SPRING, WAVE (REVERSE CLUTCH RELEASE)
652	RETAINER, LO & REVERSE CLUTCH SPRING
653	RING, SNAP (RETAINER/HOUSING)

Figure 74

26. Place the lip seal protector J-25011 onto the Lo Reverse housing, as shown in Figure 73.
27. Lubricate the piston lip seals with "Trans-Jel" and install piston into the housing by rotating into position (See Figure 73).
28. Install the waved return spring onto piston, and retainer on top of wave spring (See Figure 72).
29. Compress the wave spring and install the snap ring onto the Lo/Reverse clutch housing.
30. Install the Lo/Reverse clutch plates in the case, beginning with a steel plate, and alternating with lined plates.
31. Install the cushion (Wave) plate on top of last steel plate as shown in Figure 75.
32. Install the case to housing spacer (647) into the case, as shown in Figure 75.

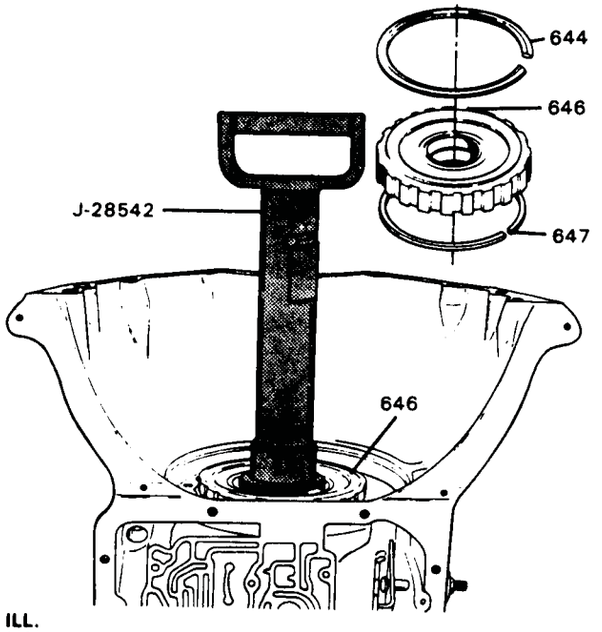


ILL. NO.	DESCRIPTION
644	RING, SNAP (HOUSING/CASE)
646	HOUSING ASSEMBLY, LO & REVERSE CLUTCH
647	SPACER, HOUSING TO CASE
654	PLATE, LO & REVERSE CLUTCH (WAVE)
655	PLATE, LO & REVERSE CLUTCH (1.969 MST)

Figure 75

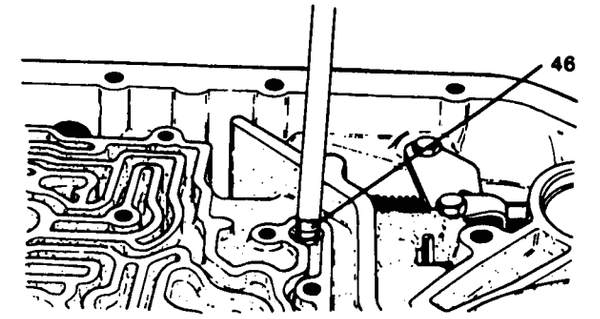
33. Install the complete Lo/Reverse clutch housing into the case using installation tool J-28542, as shown in Figure 76.
34. Ensure that clutch housing feed hole is aligned with case feed passage where cup plug goes.
35. If the clutch housing does not seat past the snap ring groove in the case, install sun gear, rotate sun gear to align roller clutch and the clutch hub splines to fully seat the housing.
36. Install the snap ring (644) into the groove in the case with the bevel side facing up, and opening opposite the parking lock actuator rod.
37. Install the case to housing reverse oil seal and seat the seal against the housing with the proper diameter steel rod (See Figure 77).

Continued on next Page



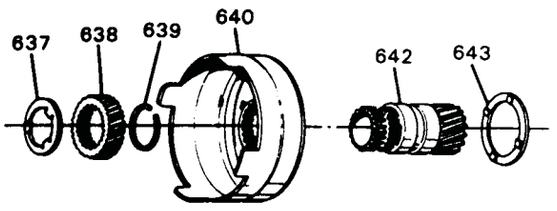
ILL. NO.	DESCRIPTION
644	RING, SNAP (HOUSING/CASE)
646	HOUSING ASSEMBLY, LO & REVERSE CLUTCH
647	SPACER, HOUSING TO CASE

Figure 76



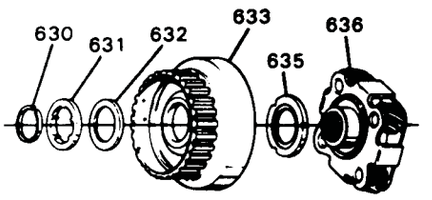
46 SEAL, REVERSE OIL (CASE TO HOUSING)

Figure 77



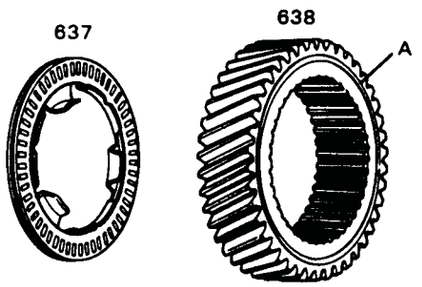
ILL. NO.	DESCRIPTION
637	BEARING ASSEMBLY, THRUST (FRT. CARRIER/SUN)
638	GEAR, FRONT SUN
639	RING, SNAP (INPUT DRUM/REAR SUN)
640	DRUM, INPUT
642	GEAR, REAR SUN
643	WASHER, THRUST (INPUT DRUM/HOUSING)

Figure 78



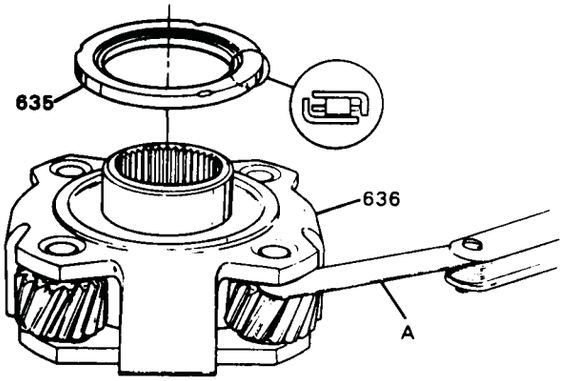
ILL. NO.	DESCRIPTION
630	RING, SNAP (OUTPUT SHAFT)
631	WASHER, THRUST (SELECTIVE REAR)
632	WASHER, THRUST (INTERNAL GEAR/REAR)
633	GEAR, FRONT INTERNAL
635	BEARING ASM., ROLLER (INTERNAL GEAR/CARRIER)
636	CARRIER ASSEMBLY, FRONT (COMPLETE)

Figure 81



ILL. NO.	DESCRIPTION
A	IDENTIFICATION GROOVE
637	BEARING ASSEMBLY, THRUST (FRT. CARRIER/SUN)
638	GEAR, FRONT SUN

Figure 79



A	0.24mm-0.69mm (.009"-.027")
635	BEARING ASM., ROLLER (INTERNAL GEAR/CARRIER)
636	CARRIER ASSEMBLY, FRONT (COMPLETE)

Figure 80

Continued from Page 42

38. Remove the snap ring (639) from the sun gear, remove and inspect the sun gear shell splines. (See Figure 78).
39. Always replace the sun gear shell with the new design level which has ***hardened*** splines, if it is not already so equipped.
40. The OEM part number for the sun gear shell with the ***hardened*** splines is 8648360.
41. Install the new sun gear shell onto the sun gear and reinstall the snap ring (See Figure 78).
42. Install thrust washer (643) onto sun gear shell, and retain with small amount of "Trans-Jel" as shown in Figure 78.
43. Install the sun gear and shell assembly into the transmission by rotating into position.
44. Install the front sun gear onto the splines with identification groove against the snap ring. (See Figure 79).
45. Install thrust bearing (637) onto the front sun gear with needle bearings against the gear, as shown in Figure 79.
46. Measure the front carrier pinion end play with a feeler gage as shown in Figure 80. Pinion end play should be .009" to .027".
47. Install front planetary carrier into transmission by rotating into position.
48. Install thrust bearing (635) on the front carrier in direction shown in Figure 80.

49. Install the front internal ring gear and hub into the transmission by rotating into position (See Figure 81).
50. Install thrust washer (632) over the output shaft and onto ring gear (See Figure 81).
51. Install the ***selective*** thrust washer (631) on top of the previous washer, with the identification number facing up (See Figure 81).
52. Install the snap ring on the output shaft using a pair of snap ring pliers and ensure it is seated. (See Figure 81).
53. Measure rear end play as described below.

REAR END PLAY MEASUREMENT

1. Loosen the adjusting screw on output holding fixture, and push output shaft all the way down.
2. Install dial indicator with clamp on case as it is shown in Figure 82.
3. Position dial indicator extension against the end of the output shaft, as shown in Figure 82.
4. Zero the dial indicator.
5. Move the output shaft upward, by turning the adjusting screw on holding fixture, and observe the reading on dial indicator.
6. End play should be .004" to .010".
7. If more or less washer thickness is needed to bring end play within specifications, select the proper washer from the chart in Figure 83.

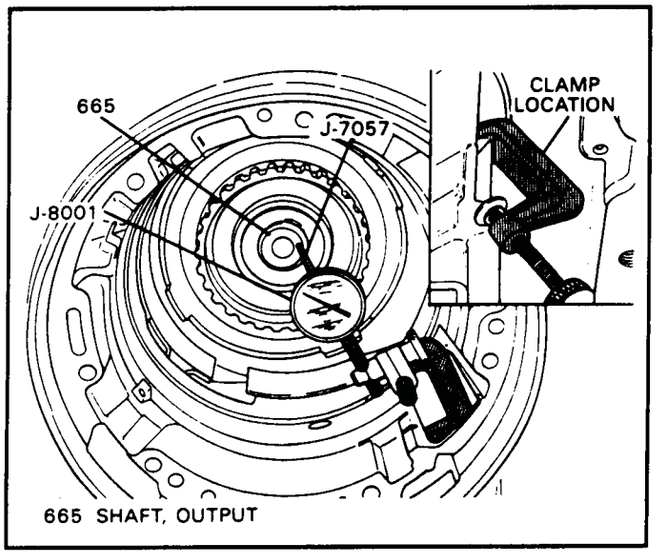
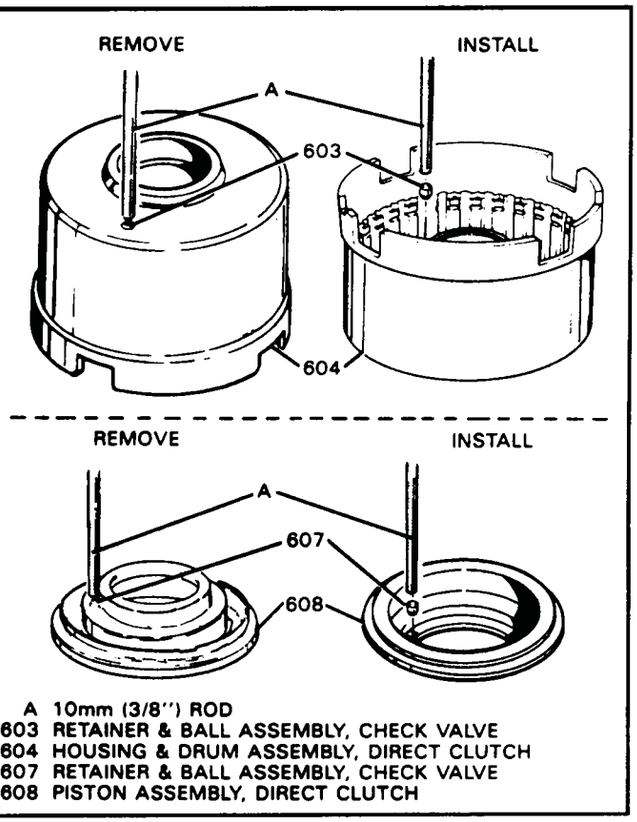


Figure 82

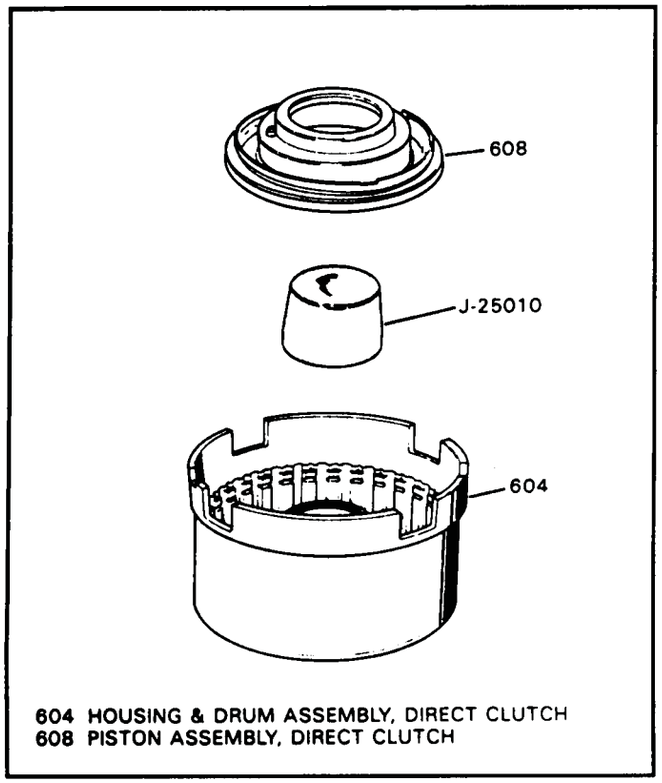
THICKNESS		IDENTIFICATION NUMBER AND/OR COLOR
2.90-3.01mm	(0.114"-0.119")	1 - ORANGE
3.08-3.19mm	(0.121"-0.126")	2 - WHITE
3.26-3.37mm	(0.128"-0.133")	3 - YELLOW
3.44-3.55mm	(0.135"-0.140")	4 - BLUE
3.62-3.73mm	(0.143"-0.147")	5 - RED
3.80-3.91mm	(0.150"-0.154")	6 - BROWN
3.98-4.09mm	(0.157"-0.161")	7 - GREEN
4.16-4.27mm	(0.164"-0.168")	8 - BLACK
4.34-4.45mm	(0.171"-0.175")	9 - PURPLE

Figure 83



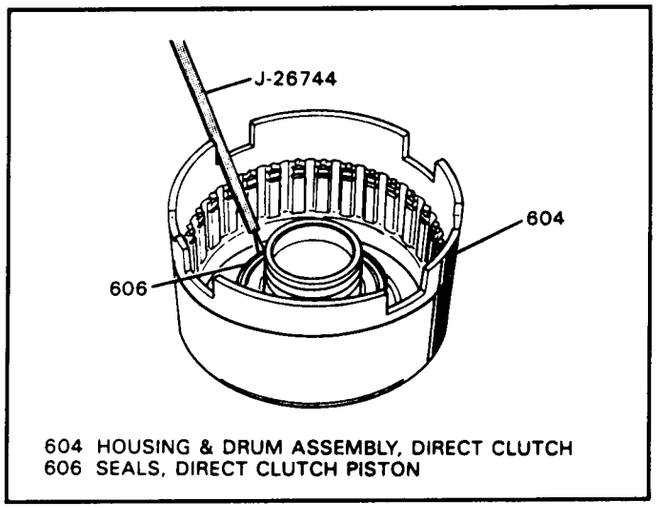
A 10mm (3/8") ROD
603 RETAINER & BALL ASSEMBLY, CHECK VALVE
604 HOUSING & DRUM ASSEMBLY, DIRECT CLUTCH
607 RETAINER & BALL ASSEMBLY, CHECK VALVE
608 PISTON ASSEMBLY, DIRECT CLUTCH

Figure 84



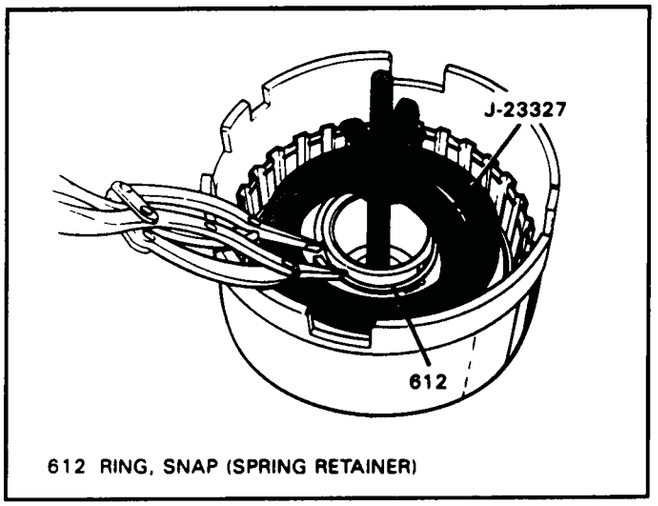
604 HOUSING & DRUM ASSEMBLY, DIRECT CLUTCH
608 PISTON ASSEMBLY, DIRECT CLUTCH

Figure 85



604 HOUSING & DRUM ASSEMBLY, DIRECT CLUTCH
606 SEALS, DIRECT CLUTCH PISTON

Figure 86

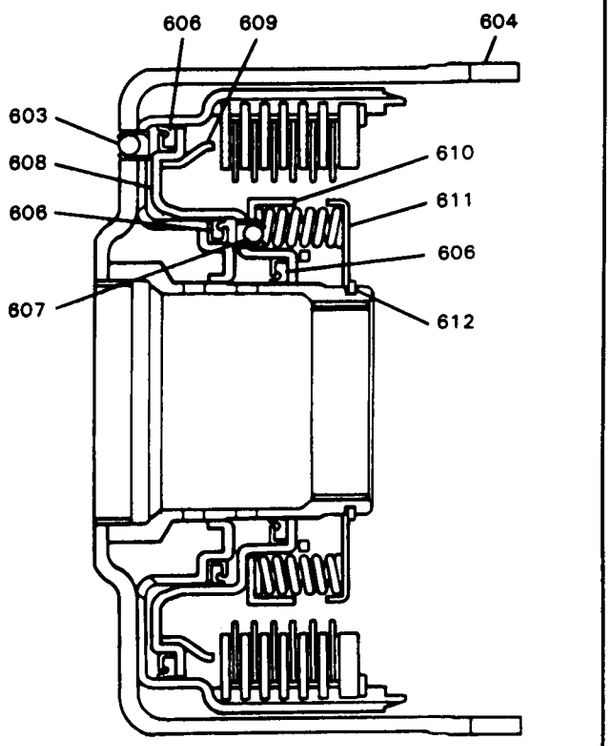


612 RING, SNAP (SPRING RETAINER)

Figure 87

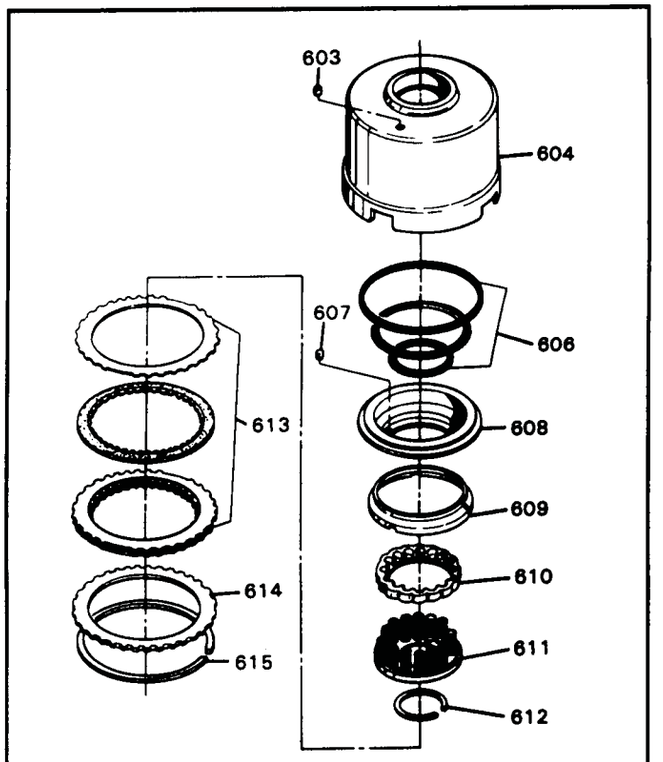
ASSEMBLE FORWARD AND DIRECT CLUTCH HOUSINGS

1. Clean and inspect all the direct clutch housing parts that are shown in Figure 89.
2. If replacing the ball capsules is necessary, refer to Figure 84.
3. Install new inner and outer lip seals on piston with the lips facing away from the apply ring side, as shown in Figure 88, and lubricate with small amount of "Trans-Jel".
   See "Lip Seal Identification" in Figure 105, on Page 52 of this manual.
4. Install the center lip seal into the direct clutch housing groove with the lip facing up as shown in Figure 88, and lubricate with "Trans-Jel".
5. Install lip seal protector J-25010 onto the direct clutch housing (See Figure 85).



603 RETAINER & BALL ASSEMBLY, CHECK VALVE
604 HOUSING & DRUM ASSEMBLY, DIRECT CLUTCH
606 SEALS, DIRECT CLUTCH PISTON
607 RETAINER & BALL ASSEMBLY, CHECK VALVE
608 PISTON ASSEMBLY, DIRECT CLUTCH
609 RING, CLUTCH APPLY (DIRECT)
610 GUIDE, RELEASE SPRING
611 RETAINER & SPRING ASSEMBLY, DIRECT CLUTCH
612 RING, SNAP (SPRING RETAINER)

Figure 88



603 RETAINER & BALL ASSEMBLY, CHECK VALVE
604 HOUSING & DRUM ASSEMBLY, DIRECT CLUTCH
606 SEALS, DIRECT CLUTCH PISTON
607 RETAINER & BALL ASSEMBLY, CHECK VALVE
608 PISTON ASSEMBLY, DIRECT CLUTCH
609 RING, CLUTCH APPLY (DIRECT)
610 GUIDE, RELEASE SPRING
611 RETAINER & SPRING ASSEMBLY, DIRECT CLUTCH
612 RING, SNAP (SPRING RETAINER)
613 PLATE ASSEMBLY, DIRECT CLUTCH
614 PLATE, CLUTCH BACKING
615 RING, SNAP (DIRECT CLUTCH HOUSING)

Figure 89

6. Install the direct clutch piston into the direct clutch housing in a rotating motion, and using tool J-26744 to compress outer lip seal while pushing down on piston (See Figure 86).
7. Remove lip seal protector J-25010.
8. Install apply ring (609) into piston, as shown in Figure 89.
9. Install return spring guide (610) into piston, as shown in Figure 89.
10. Install spring retainer assembly (611) as shown in Figure 89.
11. Lay the snap ring on housing and install spring compressor as shown in Figure 87.
12. Compress the return springs and install direct clutch snap ring as shown in Figure 87.
13. Do not let retainer catch on snap ring groove as you compress the return spring.
14. Remove the spring compressor from the direct clutch housing (See Figure 87).
15. Install the direct clutch plates beginning with a steel plate and alternating with lined plates, as shown in Figures 88 and 89.
16. Install the direct clutch backing plate with the micro finish side facing the lined plate.
17. Install the backing plate snap ring as shown in Figures 88 and 89.
18. Direct clutch pack clearance should be approximately .010" per lined clutch plate.
19. Set the completed direct clutch housing aside until we have finished the forward clutch drum.

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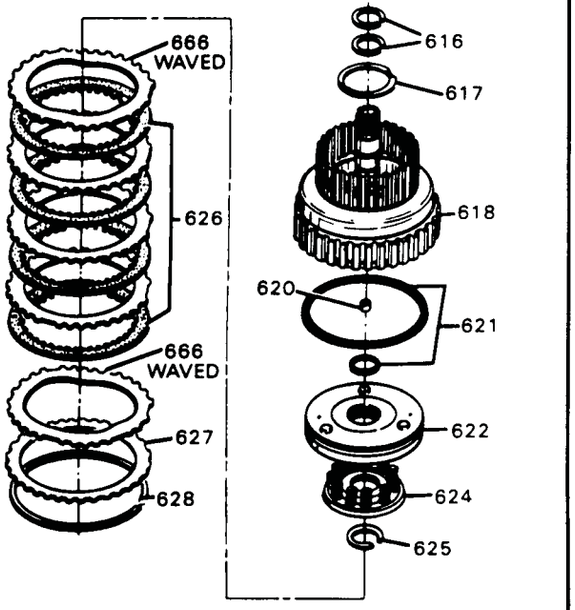
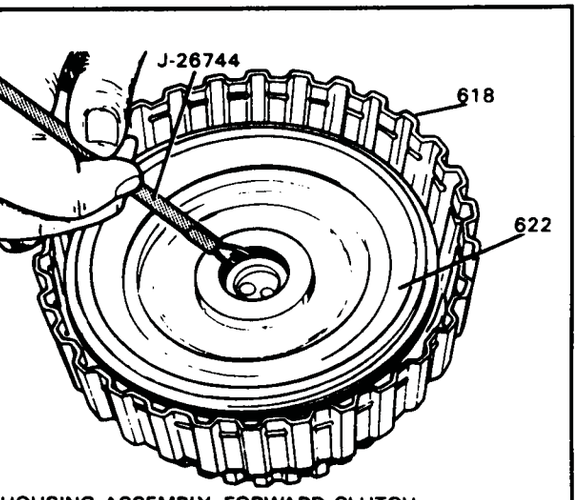


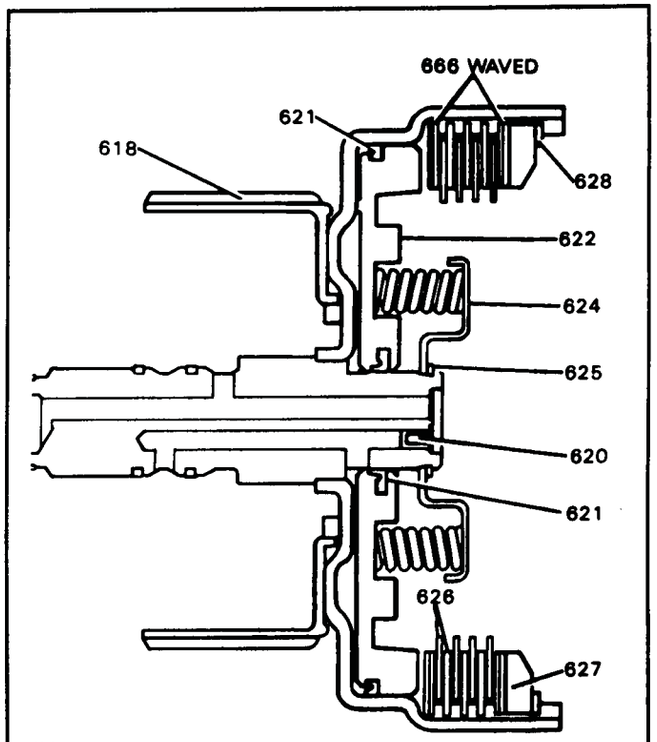
ILL. NO.	DESCRIPTION
616	SEALS, RING (FORWARD CLUTCH SHAFT) TEF
617	WASHER, THRUST (DIRECT/FORWARD CLUTCH)
618	HOUSING ASSEMBLY, FORWARD CLUTCH
620	PLUG, CUP (4.8 DIAMETER)
621	SEALS, FORWARD CLUTCH PISTON (PACKAGE)
622	PISTON ASSEMBLY, FORWARD CLUTCH
624	RETAINER & SPRING ASSEMBLY, FORWARD
625	RING, SNAP (FORWARD SPRING RETAINER)
626	PLATE, FORWARD CLUTCH (FLAT)
627	PLATE, CLUTCH BACKING
628	RING, SNAP (FORWARD CLUTCH HOUSING)
666	PLATE, CLUTCH 1.585 (WAVED)

Figure 90



618 HOUSING ASSEMBLY, FORWARD CLUTCH
622 PISTON ASSEMBLY, FORWARD CLUTCH

Figure 91



ILL. NO.	DESCRIPTION
618	HOUSING ASSEMBLY, FORWARD CLUTCH
620	PLUG, CUP (4.8 DIAMETER)
621	SEALS, FORWARD CLUTCH PISTON (PACKAGE)
622	PISTON ASSEMBLY, FORWARD CLUTCH
624	RETAINER & SPRING ASSEMBLY, FORWARD
625	RING, SNAP (FORWARD SPRING RETAINER)
626	PLATE, FORWARD CLUTCH (FLAT)
627	PLATE, CLUTCH BACKING
628	RING, SNAP (FORWARD CLUTCH HOUSING)
666	PLATE, CLUTCH 1.585 (WAVED)

Figure 92

Continued from Page 46

20. Clean and inspect all the parts for the forward clutch housing that are shown in Figure 90.
21. Install new inner and outer lip seals on forward clutch piston, with the lips facing the direction shown in Figure 92.
    See "Lip Seal Identification" in Figure 105, on Page 105 of this manual.
22. Lubricate the lip seals with a small amount of "Trans-Jel", as well as the inside of housing.
23. Install the piston into the forward clutch drum with a rotating motion and using J-26744 while pushing down on piston (See Figure 91.
24. Install return spring and retainer assembly, as shown in Figure 90.
25. Install spring compressor shown in Figure 93, compress the return spring assembly, and then install the snap ring as shown in Figure 93.
26. Remove the spring compressor.

27. Install one wave plate into the forward clutch housing first as shown in Figures 90 and 92.
28. Install the forward clutch plates beginning with a lined plate on top of the waved, and alternate with steel plates until you have installed four lined plates and three steel plates, as shown in Figure 92.
29. Install the second wave plate on top of the last lined plate. There are two wave plates used in this clutch pack, as shown in Figure 92.
30. Install the forward clutch backing plate, with the bevel side facing up as shown in Figure 92.
31. Install the backing plate snap ring, as shown in Figure 92.
32. Apply evenly distributed 20 lbs. of pressure against the backing plate to compress the wave plates. Excessive pressure will cause inacurate measurement.
33. Using a feeler gage to measure the distance between the backing plate and snap ring should be .030" to .050".
34. Use the chart in Figure 94 to select the proper thickness backing plate.
35. Install thrust washer (617) and retain with a small amount of "Trans-Jel" (See Figure 90).
36. Install the two scarf cut sealing rings onto the shaft of the forward clutch housing and ensure the cut ends are assembled properly, as shown in Figure 95.

Continued on next Page

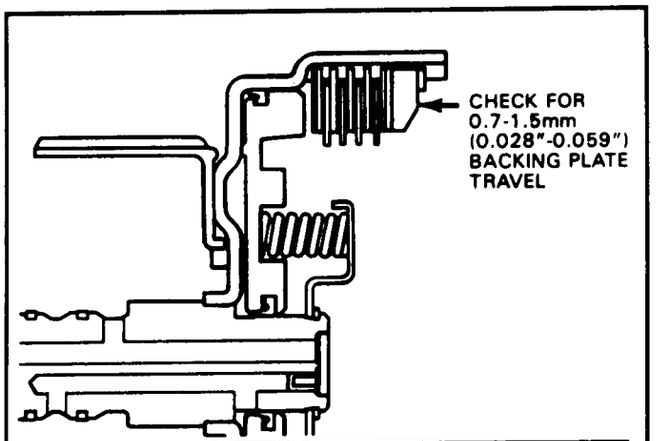
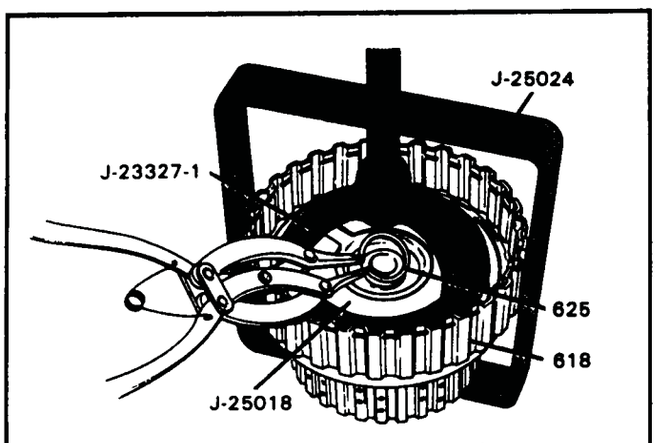


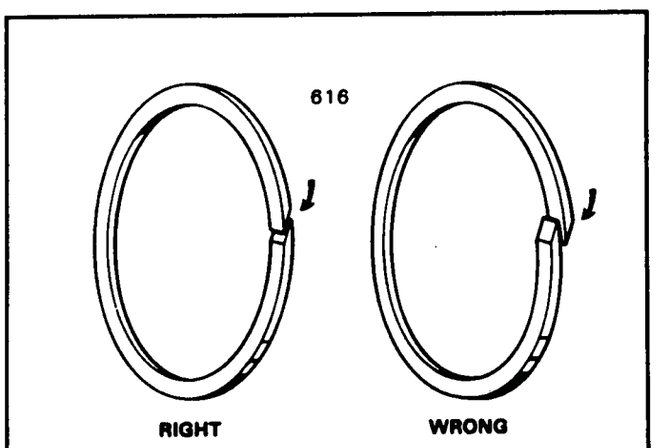
PLATE THICKNESS	IDENTIFICATION
3.70mm - 4.15mm (.146" - .163")	7
4.25mm - 4.70mm (.167" - .185")	6
4.80mm - 5.25mm (.189" - .207")	X
5.02mm - 5.47mm (.197" - .215")	8
5.35mm - 5.80mm (.211" - .228")	5
5.90mm - 6.35mm (.232" - .250")	4

Figure 94



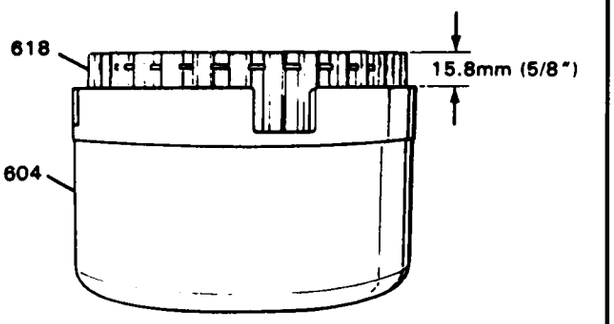
618 HOUSING ASSEMBLY, FORWARD CLUTCH
625 RING, SNAP (FORWARD SPRING RETAINER)

Figure 93



616 SEALS, RING (FORWARD CLUTCH SHAFT) TEF

Figure 95



ILL. NO.	DESCRIPTION
604	HOUSING & DRUM ASSEMBLY, DIRECT CLUTCH
618	HOUSING ASSEMBLY, FORWARD CLUTCH

Figure 96

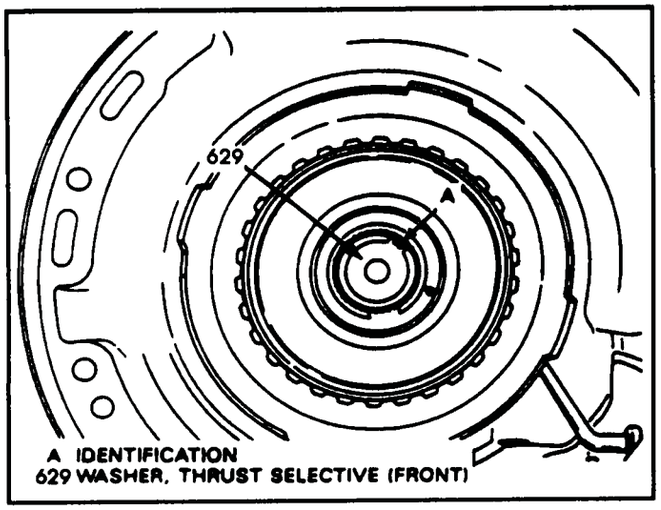
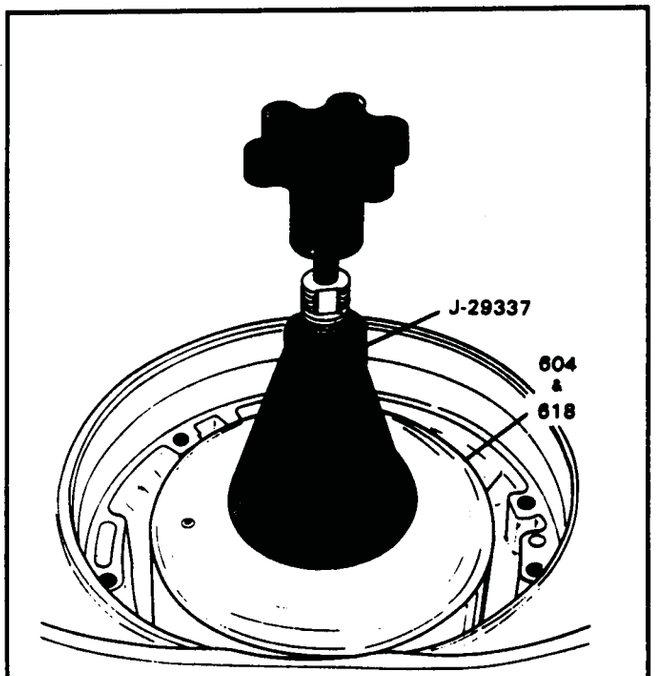


Figure 97

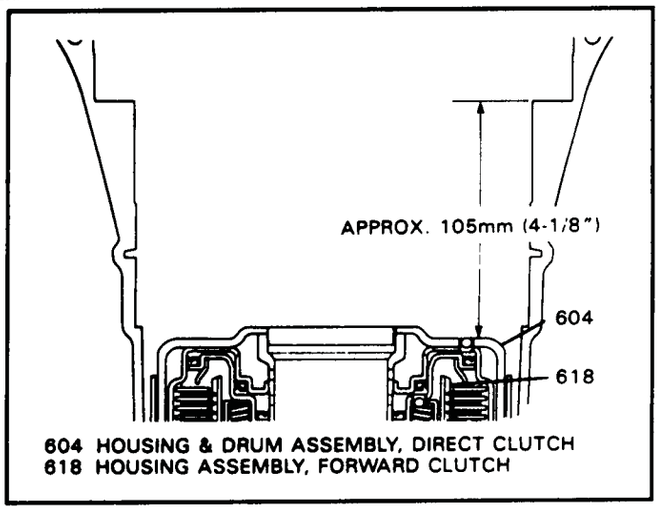


ILL. NO.	DESCRIPTION
604	HOUSING & DRUM ASSEMBLY, DIRECT CLUTCH
618	HOUSING ASSEMBLY, FORWARD CLUTCH

Figure 98

Continued from Page 48

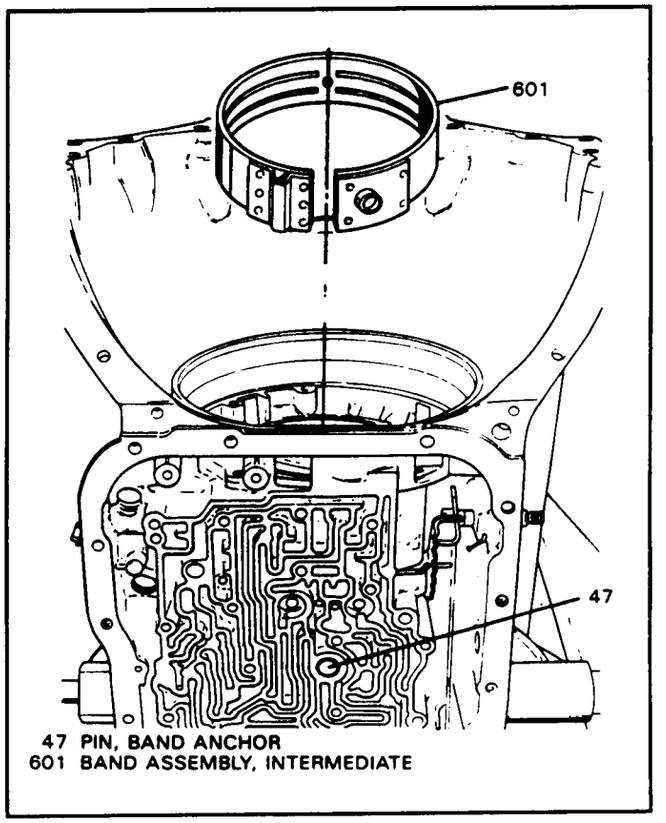
37. Set the direct clutch housing on work surface with clutch plates facing up (See Figure 96).
38. Install the completed forward clutch housing into the direct clutch housing by rotating back and forth until all clutch plates are aligned.
39. When forward clutch housing is fully seated, it will protrude approximately 5/8" from direct clutch housing, as shown in Figure 96.
40. Ensure that selective thrust washer (629) is in place on the output shaft (See Figure 97).
41. Position the direct and forward clutch housing assemblies with the forward clutch shaft facing up, and install tool J-29337 to prevent housings from seperating (See Figure 98).
42. Using the tool as a handle, install both clutch housing assemblies into the transmission by rotating back and forth until they are seated. (See Figure 98).



604 HOUSING & DRUM ASSEMBLY, DIRECT CLUTCH
618 HOUSING ASSEMBLY, FORWARD CLUTCH

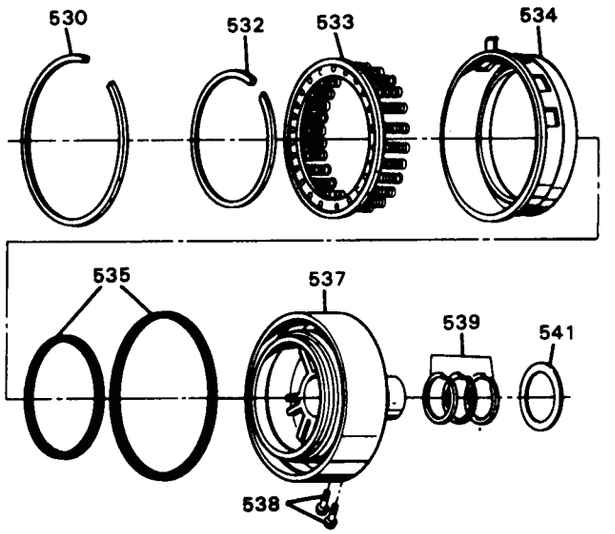
Figure 99

43. Remove the tool J-29337 from the direct and forward clutch housings (See Figure 98).
44. Direct clutch housing will be approximately 4 -1/8" from the pump face surface of the case when fully seated, as shown in Figure 99.
45. Install the intermediate band around the direct clutch housing and in the case (See Figure 100)
46. Install the band anchor pin through its bore in case, (See Figure 100) and engage it into the band lug.



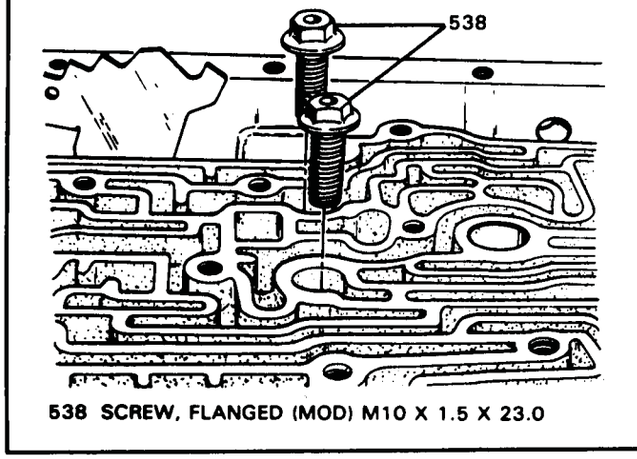
47 PIN, BAND ANCHOR
601 BAND ASSEMBLY, INTERMEDIATE

Figure 100



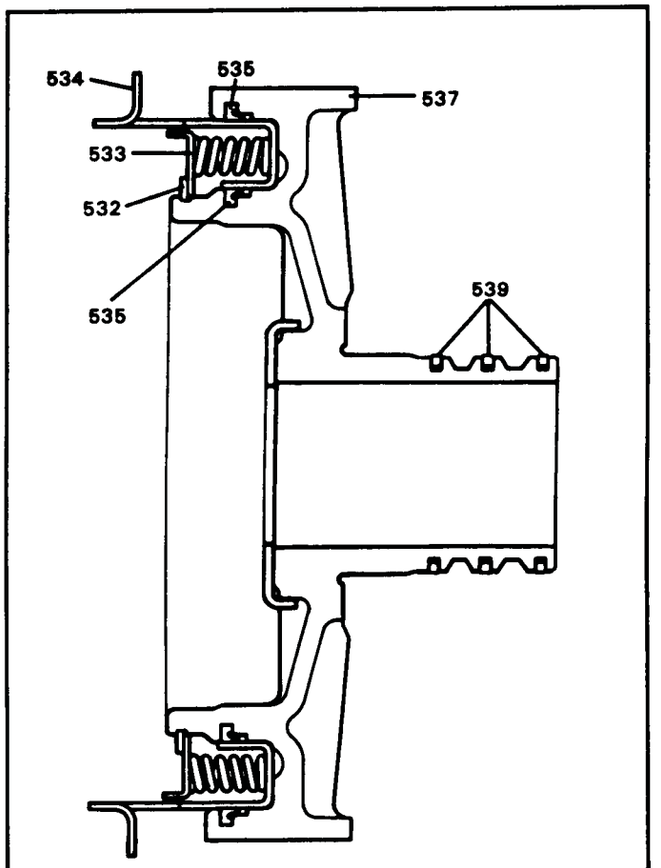
530 RING, SNAP (CENTER SUPPORT TO CASE)
532 RING, SNAP (SUPPORT/4TH CLUTCH SPRING)
533 RETAINER & SPRING ASSEMBLY, 4TH CLUTCH
534 PISTON, 4TH CLUTCH
535 SEALS, 4TH CLUTCH (INNER & OUTER)
537 SUPPORT, CENTER
538 SCREW, FLANGED (MOD) M10 X 1.5 X 23.0
539 RING, OIL SEAL (CENTER SUPPORT)
541 WASHER, THRUST (SUPPORT/DIRECT CLUTCH)

Figure 101



538 SCREW, FLANGED (MOD) M10 X 1.5 X 23.0

Figure 102



ILL. NO.	DESCRIPTION
532	RING, SNAP (SUPPORT/4TH CLUTCH SPRING)
533	RETAINER & SPRING ASSEMBLY, 4TH CLUTCH
534	PISTON, 4TH CLUTCH
535	SEALS, 4TH CLUTCH (INNER & OUTER)
537	SUPPORT, CENTER
539	RING, OIL SEAL CENTER SUPPORT

Figure 103

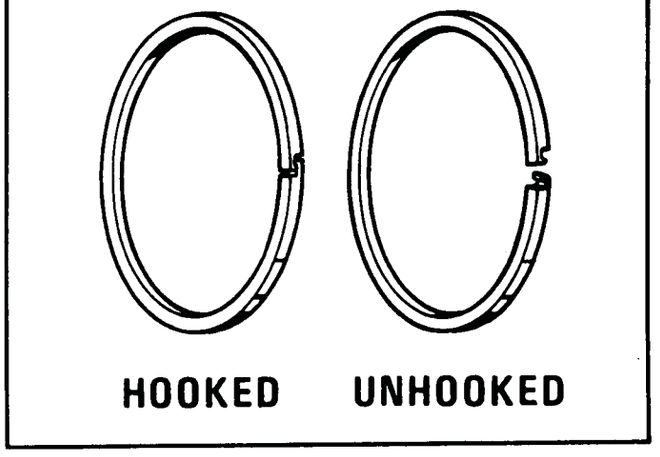


Figure 104

ASSEMBLE CENTER SUPPORT

1. Clean and inspect all the parts, that are shown in Figure 101.
2. Install three new steel sealing rings on center support and verify that they are hooked. Refer to Figure 104.
3. Install new inner and outer lip seals into center support, with the lips facing down, as shown in Figure 103.
   See "Lip Seal Identification" in Figure 105. These seals are easily mixed up and functional problems will be the result.
4. Lubricate the lip seals with a small amount of "Trans-Jel".
5. Install thrust washer (541) as shown Figure 101 and retain with a small amount of "Trans-Jel".
6. Install the center support into the transmission case while aligning bolt holes.
7. Install the two center support bolts, as shown in Figure 102, ***finger tight only.***
8. Install snap ring (530) into the groove in case on top of the center support, with the beveled side facing up (See Figure 101).
9. Torque the center support bolts to 18 ft.lbs. (See Figure 102).
10. It is now time to check the front end play.

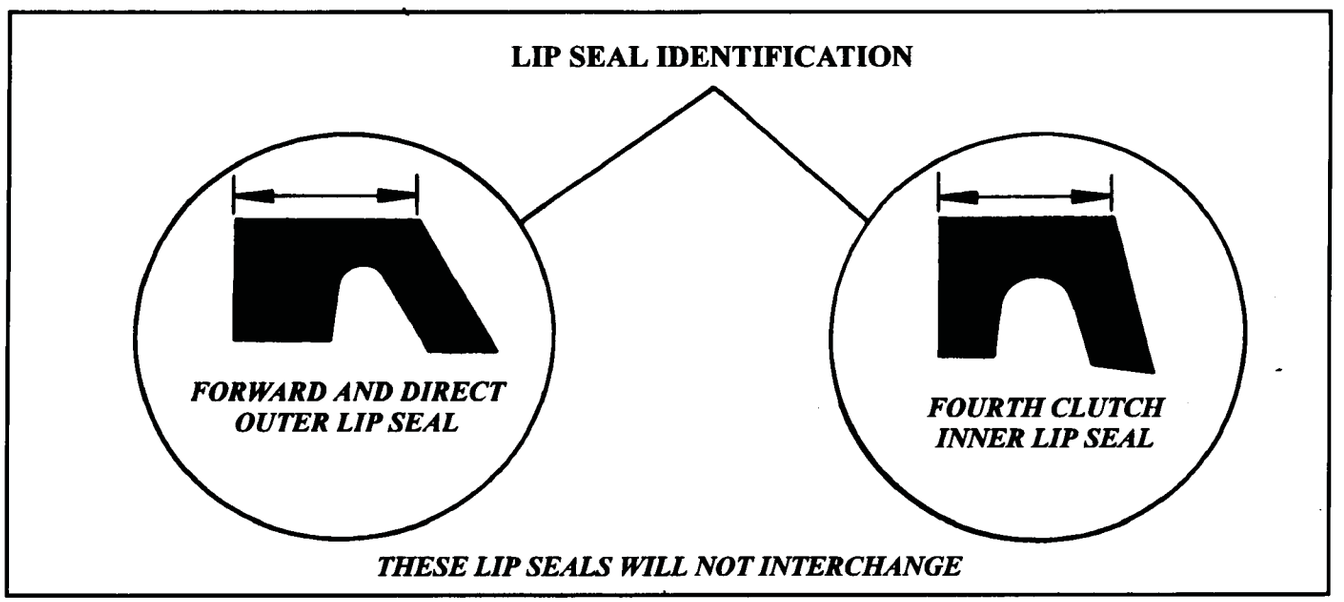


Figure 105

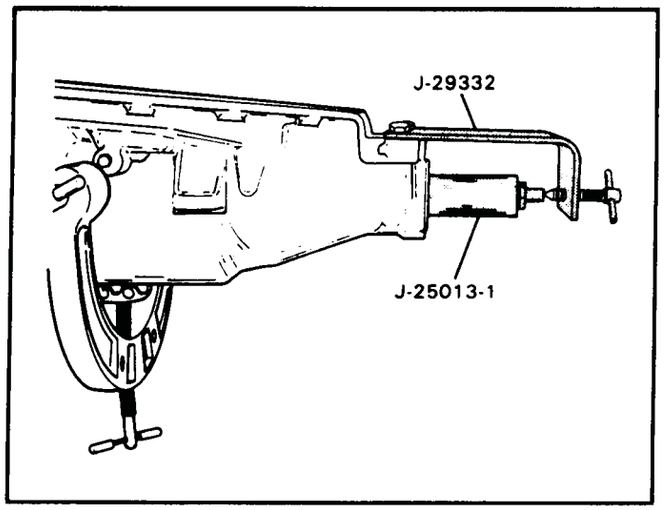


Figure 106

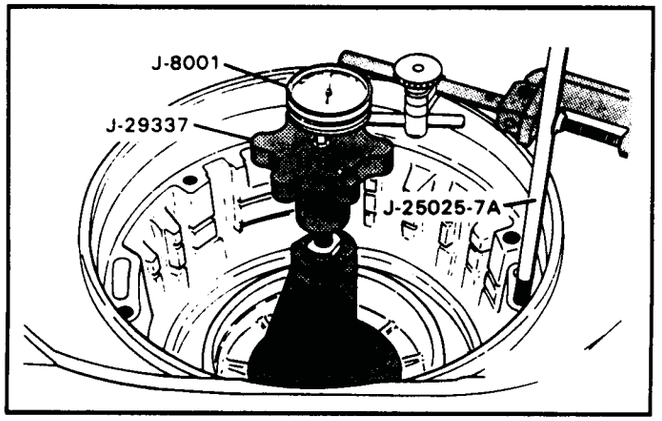


Figure 107

FORWARD CLUTCH SHAFT END PLAY CHECK

1. Push the forward clutch shaft downward as far as it will go.
2. Install lifting tool J-29337 onto the forward clutch shaft as shown in Figure 107.
3. Install dial indicator onto the transmission as shown in Figure 107.
4. Turn the adjusting screw on the holding fixture until white/scribed line begins to dissapear, as shown in Figure 106.
5. Zero the dial indicator.
6. Pull upward on the lifting tool J-29337, shown in Figure 107, and read dial indicator.
7. End play should be .015" to .025".

NOTE: REAR END PLAY SHOULD HAVE ALREADY BEEN RECORDED. NEVER LET REAR END PLAY EXCEED FRONT END PLAY.

8. If more or less end play is required, select the proper selective thrust washer from the chart in Figure 108 and install. The selective washer which controls front end play is placed on top the output shaft before the drums are installed, and is shown in Figure 108.

FRONT END PLAY SELECTIVE WASHER CHART

Thickness (mm)	Thickness (in.)	Identification		Part Number
		Number	Color	
1.66 - 1.77	0.065 - 0.070	1	—	8639291
1.79 - 1.90	0.070 - 0.075	2	—	8639292
1.92 - 2.03	0.076 - 0.080	3	Black	8639293
2.05 - 2.16	0.081 - 0.085	4	Lt. Green	8639294
2.18 - 2.29	0.086 - 0.090	5	Scarlet	8639295
2.31 - 2.42	0.091 - 0.095	6	Purple	8639296
2.44 - 2.55	0.096 - 0.100	7	Cocoa Brown	8639297
2.57 - 2.68	0.101 - 0.106	8	Orange	8639298
2.70 - 2.81	0.106 - 0.111	9	Yellow	8639299
2.83 - 2.94	0.111 - 0.116	10	Lt. Blue	8639300
2.96 - 3.07	0.117 - 0.121	11	Blue	8639301
3.09 - 3.20	0.122 - 0.126	12	—	8639302
3.22 - 3.33	0.127 - 0.131	13	Pink	8639303
3.35 - 3.46	0.132 - 0.136	14	Green	8639304
3.48 - 3.59	0.137 - 0.141	15	Gray	8639305

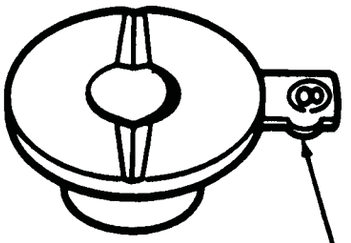
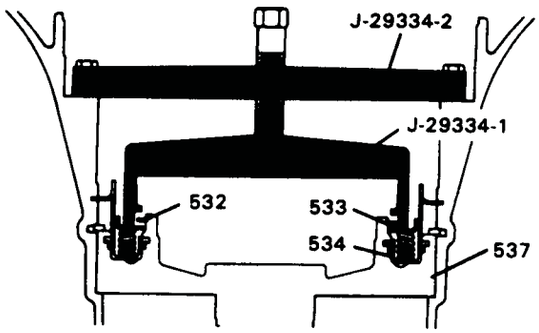


Figure 108

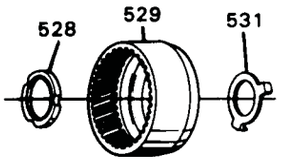


532 RING, SNAP (SUPPORT/4TH CLUTCH SPRING)
533 RETAINER & SPRING ASSEMBLY, 4TH CLUTCH
534 PISTON, 4TH CLUTCH
537 SUPPORT, CENTER

Figure 109

INSTALL 4TH CLUTCH PISTON

1. Lubricate both seal surfaces on the 4th clutch piston with small amount of "Trans-Jel".
2. Install the 4th clutch piston into center support and align tangs with case spline.
3. Install the 4th clutch return spring assembly on top of piston as shown in Figure 109.
4. Install 4th clutch return spring compressor, as shown in Figure 109, and compress the return spring.
5. Install snap ring (532) onto the center support as shown in Figure 109.
6. Release and remove the spring compressor.



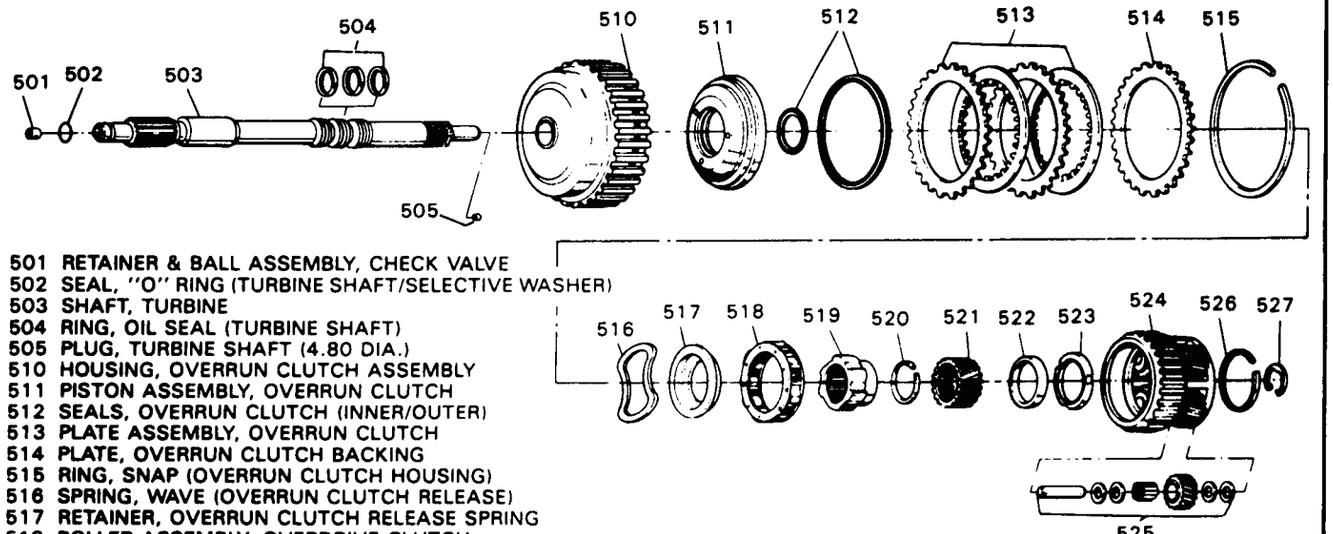
ILL. NO.	DESCRIPTION
528	BEARING ASM., THRUST (CARRIER/INTERNAL GEAR)
529	GEAR, OVERDRIVE INTERNAL
531	WASHER, THRUST (INTERNAL GEAR/SUPPORT)

Figure 110

INSTALL OVERDRIVE SECTION AND FOURTH CLUTCHES

1. Clean and inspect all overdrive section parts that are shown in Figures 110 and 111.
2. Inspect the overrun clutch housing for cracks around the weld, as shown in Figure 112. ***In all instances where the hub weld is broken on the overrun clutch housing (Figure 112), both the overrun clutch housing and the O.D. carrier must be replaced (See Figure 112).***
3. Measure the pinion end play in the overdrive carrier with a feeler gage as shown in Figure 113. End play should be .009" to .025".
4. Inspect the turbine shaft for the presence of the cup plug (505), as shown in Figure 114.
5. Inspect the turbine shaft for proper operation of the ball capsule (501) (See Figure 114.
6. If replacement of the ball capsule is necessary, refer to Figure 115 for procedure.

Continued on Page 57



501	RETAINER & BALL ASSEMBLY, CHECK VALVE
502	SEAL, "O" RING (TURBINE SHAFT/SELECTIVE WASHER)
503	SHAFT, TURBINE
504	RING, OIL SEAL (TURBINE SHAFT)
505	PLUG, TURBINE SHAFT (4.80 DIA.)
510	HOUSING, OVERRUN CLUTCH ASSEMBLY
511	PISTON ASSEMBLY, OVERRUN CLUTCH
512	SEALS, OVERRUN CLUTCH (INNER/OUTER)
513	PLATE ASSEMBLY, OVERRUN CLUTCH
514	PLATE, OVERRUN CLUTCH BACKING
515	RING, SNAP (OVERRUN CLUTCH HOUSING)
516	SPRING, WAVE (OVERRUN CLUTCH RELEASE)
517	RETAINER, OVERRUN CLUTCH RELEASE SPRING
518	ROLLER ASSEMBLY, OVERDRIVE CLUTCH
519	CAM, OVERDRIVE ROLLER CLUTCH
520	RING, SNAP (OVERRUN CLUTCH HUB)
521	GEAR, OVERDRIVE SUN
522	BUSHING, OVERDRIVE CARRIER
523	BEARING ASSEMBLY, THRUST (CARRIER/SUN)
524	CARRIER ASSEMBLY, OVERDRIVE (COMPLETE)
525	PINION ASSEMBLY, OVERDRIVE CARRIER
526	RING, SNAP (OVERDRIVE CARRIER)
527	RING, SNAP (TURBINE SHAFT/CARRIER)

Figure 111

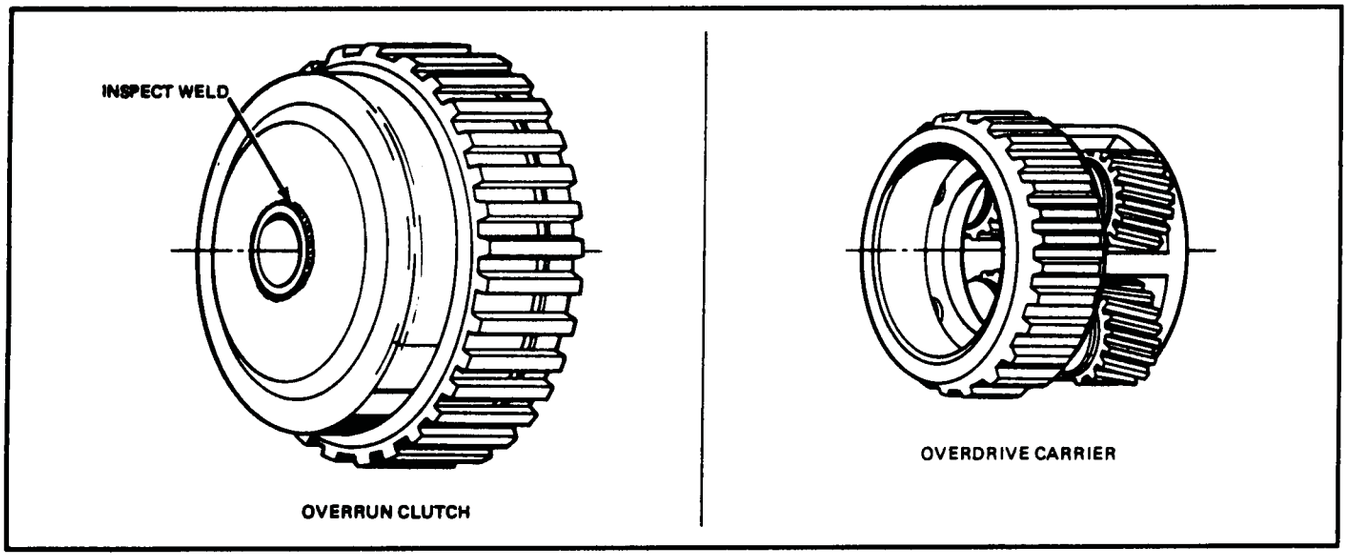


Figure 112

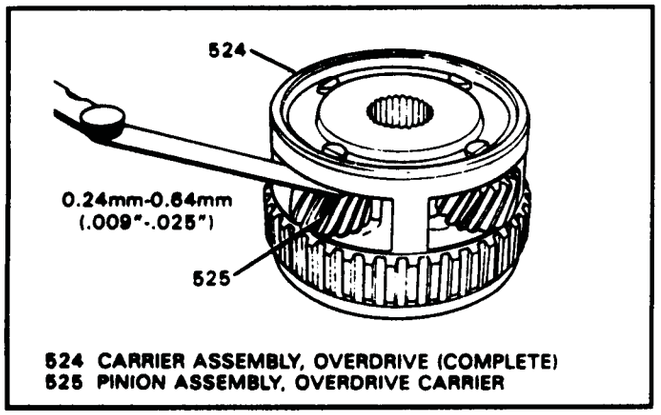


Figure 113

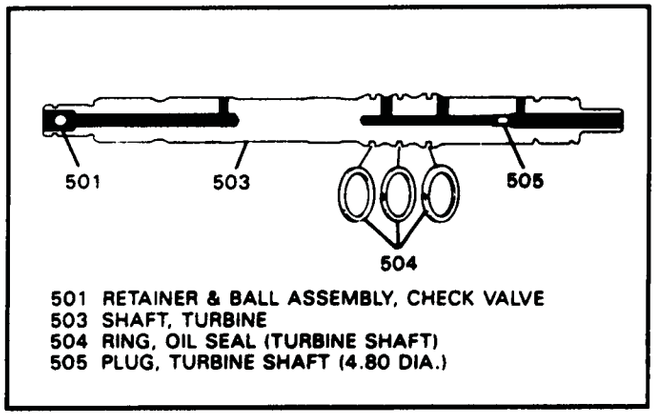


Figure 114

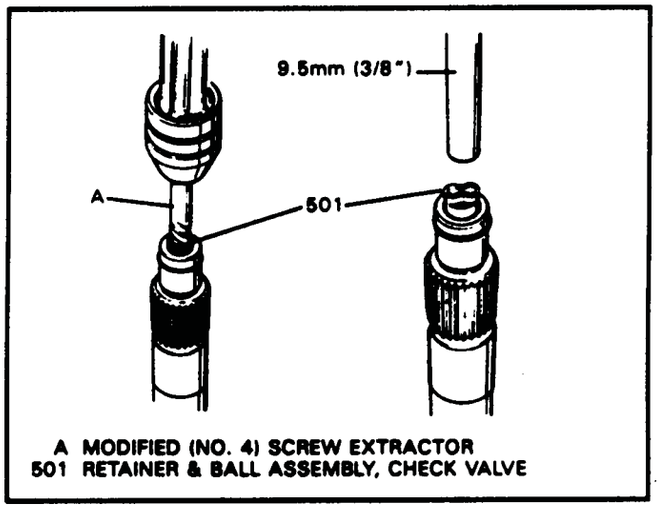


Figure 115

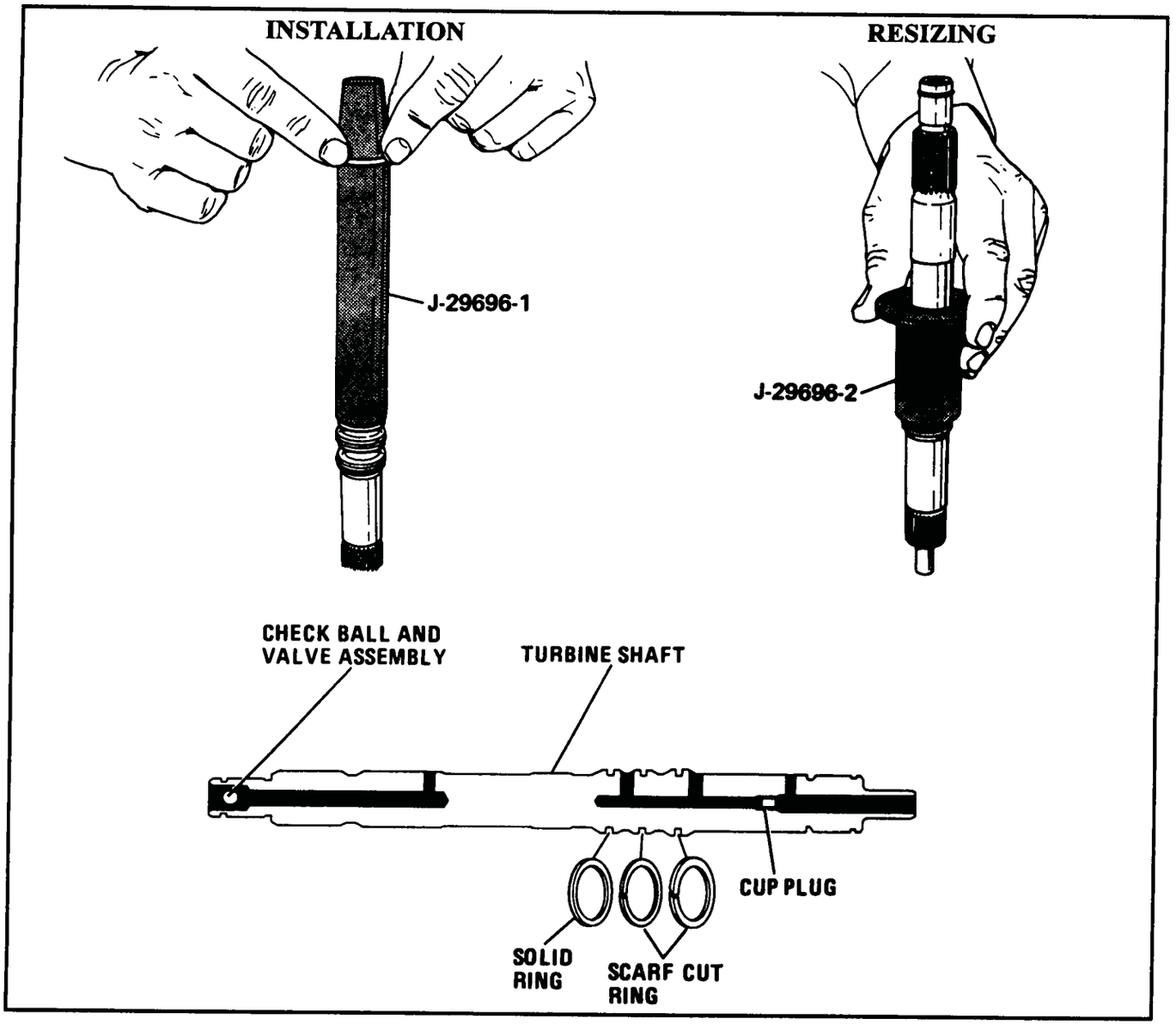


Figure 116

Continued from Page 55

7. Install the two scarf cut Teflon sealing rings on turbine shaft, in the positions shown in Figure 116.
8. Ensurethe scarf cut rings are installed properly, as shown in Figure 117.
9. Install the solid Teflon sealing ring on turbine shaft in the position shown in Figure 116, and using the installation and re-sizing tools that are shown in Figure 116.
10. Some kits may have three solid Teflon sealing rings for this location. In that case use the tools shown in Figure 116 to install all three solid Teflon rings.

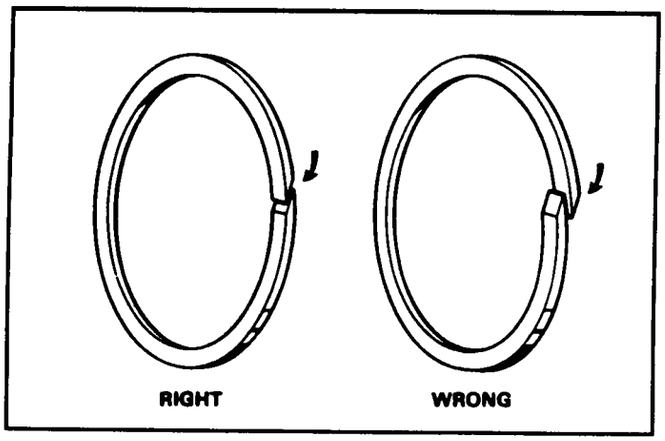
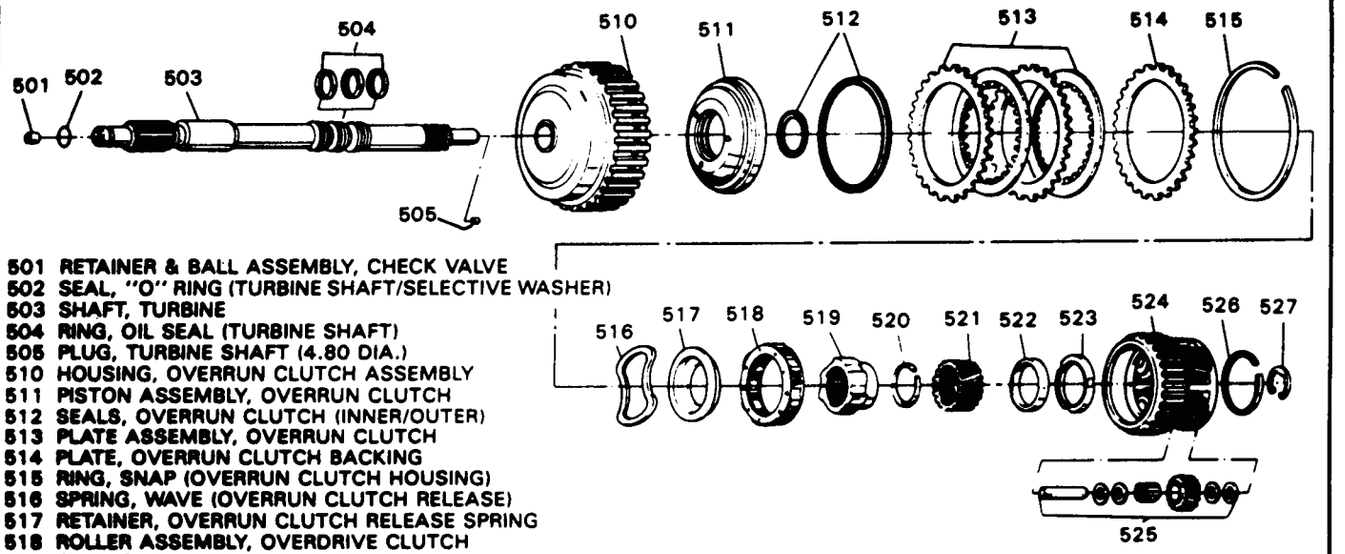


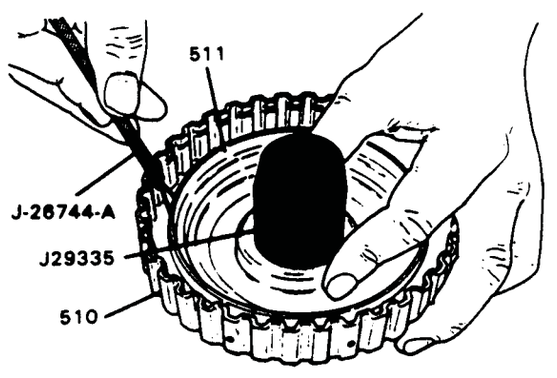
Figure 117



501 RETAINER & BALL ASSEMBLY, CHECK VALVE
502 SEAL, "O" RING (TURBINE SHAFT/SELECTIVE WASHER)
503 SHAFT, TURBINE
504 RING, OIL SEAL (TURBINE SHAFT)
505 PLUG, TURBINE SHAFT (4.80 DIA.)
510 HOUSING, OVERRUN CLUTCH ASSEMBLY
511 PISTON ASSEMBLY, OVERRUN CLUTCH
512 SEALS, OVERRUN CLUTCH (INNER/OUTER)
513 PLATE ASSEMBLY, OVERRUN CLUTCH
514 PLATE, OVERRUN CLUTCH BACKING
515 RING, SNAP (OVERRUN CLUTCH HOUSING)
516 SPRING, WAVE (OVERRUN CLUTCH RELEASE)
517 RETAINER, OVERRUN CLUTCH RELEASE SPRING
518 ROLLER ASSEMBLY, OVERDRIVE CLUTCH
519 CAM, OVERDRIVE ROLLER CLUTCH
520 RING, SNAP (OVERRUN CLUTCH HUB)
521 GEAR, OVERDRIVE SUN
522 BUSHING, OVERDRIVE CARRIER
523 BEARING ASSEMBLY, THRUST (CARRIER/SUN)
524 CARRIER ASSEMBLY, OVERDRIVE (COMPLETE)
525 PINION ASSEMBLY, OVERDRIVE CARRIER
526 RING, SNAP (OVERDRIVE CARRIER)
527 RING, SNAP (TURBINE SHAFT/CARRIER)

Figure 118

11. Lubricate the sealing rings with a small amount "Trans-Jel", and set turbine shaft aside for now.
12. Install new inner and outer lip seals on overrun clutch piston, with the lips facing the direction shown in Figure 120, away from clutch plates.
13. Lubricate the lip seals with a small amount of "Trans-Jel".
14. Install lip seal protector J-29335 onto overrun clutch housing as shown in Figure 119.
15. Install overrun clutch piston over seal protector and into the overrun clutch housing, as shown in Figure 119.
16. Use wire loop J-26744-A while pushing down on the piston, as shown in Figure 119.
17. Remove the seal protector.
18. Install the wave return spring (516) on top of overrun piston, as shown in Figure 118.
19. Install return spring retainer (517) with the cup side facing down, as shown in Figure 118.
20. Install overdrive roller clutch assembly (518), onto the overdrive roller clutch cam (519), as shown in Figure 118. Roller assembly locator tangs must sit on the roller clutch cam.

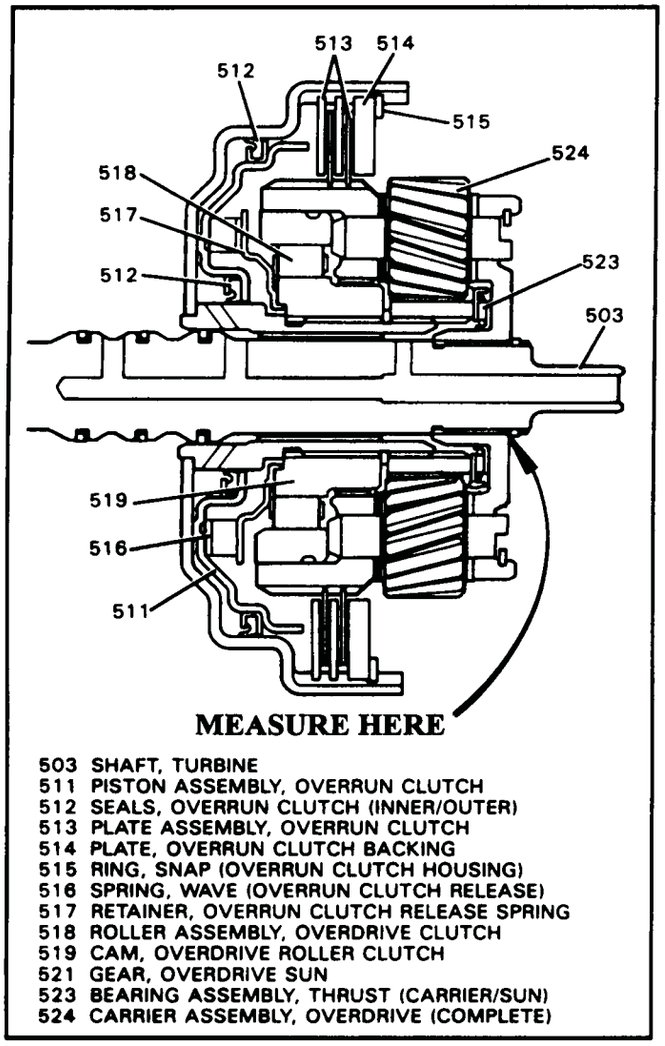


510 HOUSING, OVERRUN CLUTCH ASSEMBLY
511 PISTON ASSEMBLY, OVERRUN CLUTCH

Figure 119

21. Install entire overdrive roller clutch assembly on top of the retainer as shown in Figure 118.
22. Compress the assembly and install snap ring (520) onto the overrun clutch housing as shown in Figure 118.

Continued on next Page



503 SHAFT, TURBINE
511 PISTON ASSEMBLY, OVERRUN CLUTCH
512 SEALS, OVERRUN CLUTCH (INNER/OUTER)
513 PLATE ASSEMBLY, OVERRUN CLUTCH
514 PLATE, OVERRUN CLUTCH BACKING
515 RING, SNAP (OVERRUN CLUTCH HOUSING)
516 SPRING, WAVE (OVERRUN CLUTCH RELEASE)
517 RETAINER, OVERRUN CLUTCH RELEASE SPRING
518 ROLLER ASSEMBLY, OVERDRIVE CLUTCH
519 CAM, OVERDRIVE ROLLER CLUTCH
521 GEAR, OVERDRIVE SUN
523 BEARING ASSEMBLY, THRUST (CARRIER/SUN)
524 CARRIER ASSEMBLY, OVERDRIVE (COMPLETE)

Figure 120

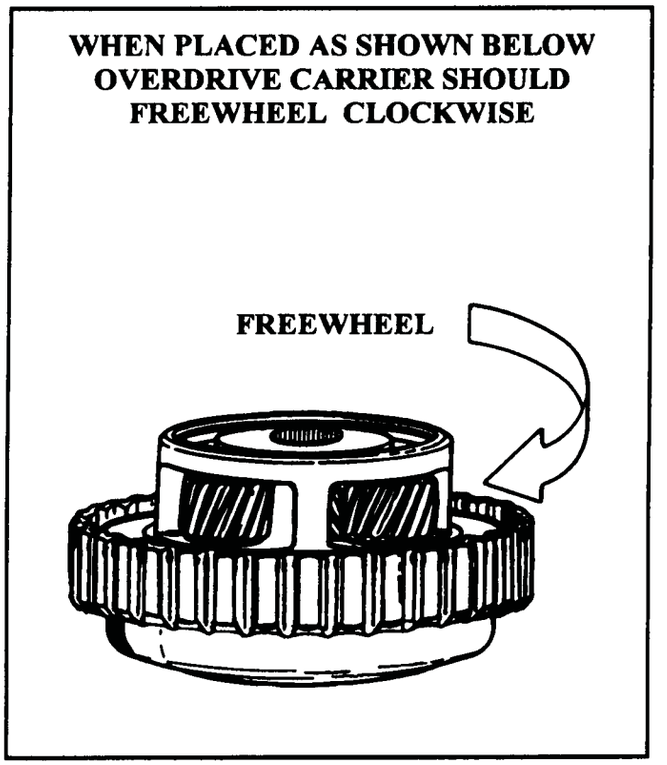
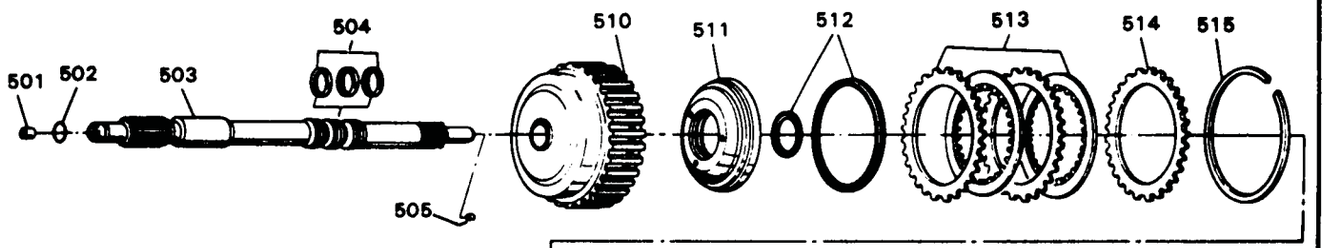


Figure 121

Continued from Page 58

23. Install the overrun clutch plates into overrun clutch housing, beginning with a steel plate and alternating with lined plates, until you have 2 steel plates and 2 lined plates installed, shown in Figures 120 and 122.
24. Install the overrun clutch backing plate (514), with chamfered side up (See Figure 120).
25. Install the backing plate snap ring (515) shown in Figures 120 and 122.
26. Install the overdrive sun gear (521) as shown in Figures 120 and 122.
27. Install the overdrive carrier assembly (524) into the overrun clutch housing by rotating in clockwise direction until it is fully seated in clutch plates as shown in Figure 121.
28. With the overrun clutch housing and overdrive carrier assembly placed as shown in Figure 121 the overdrive carrier should freewheel in clockwise direction, and lock counterclockwise, as you hold the overrun clutch housing.



501 RETAINER & BALL ASSEMBLY, CHECK VALVE
502 SEAL, "O" RING (TURBINE SHAFT/SELECTIVE WASHER)
503 SHAFT, TURBINE
504 RING, OIL SEAL (TURBINE SHAFT)
505 PLUG, TURBINE SHAFT (4.80 DIA.)
510 HOUSING, OVERRUN CLUTCH ASSEMBLY
511 PISTON ASSEMBLY, OVERRUN CLUTCH
512 SEALS, OVERRUN CLUTCH (INNER/OUTER)
513 PLATE ASSEMBLY, OVERRUN CLUTCH
514 PLATE, OVERRUN CLUTCH BACKING
515 RING, SNAP (OVERRUN CLUTCH HOUSING)
516 SPRING, WAVE (OVERRUN CLUTCH RELEASE)
517 RETAINER, OVERRUN CLUTCH RELEASE SPRING
518 ROLLER ASSEMBLY, OVERDRIVE CLUTCH
519 CAM, OVERDRIVE ROLLER CLUTCH
520 RING, SNAP (OVERRUN CLUTCH HUB)
521 GEAR, OVERDRIVE SUN
522 BUSHING, OVERDRIVE CARRIER
523 BEARING ASSEMBLY, THRUST (CARRIER/SUN)
524 CARRIER ASSEMBLY, OVERDRIVE (COMPLETE)
525 PINION ASSEMBLY, OVERDRIVE CARRIER
526 RING, SNAP (OVERDRIVE CARRIER)
527 RING, SNAP (TURBINE SHAFT/CARRIER)

Figure 122

29. While holding overdrive carrier and overrun clutch housing together as shown in Figure 121 install the preassembled turbine shaft through the overdrive carrier splines and install the snap ring onto the turbine shaft (See Figure 120).
30. Measure the distance between the snap ring on the turbine shaft, and the overdrive carrier, as shown in Figure 120 with a feeler gage.
31. ***Record this measurement as we will need this to figure overdrive end play after the oil pump is installed.***

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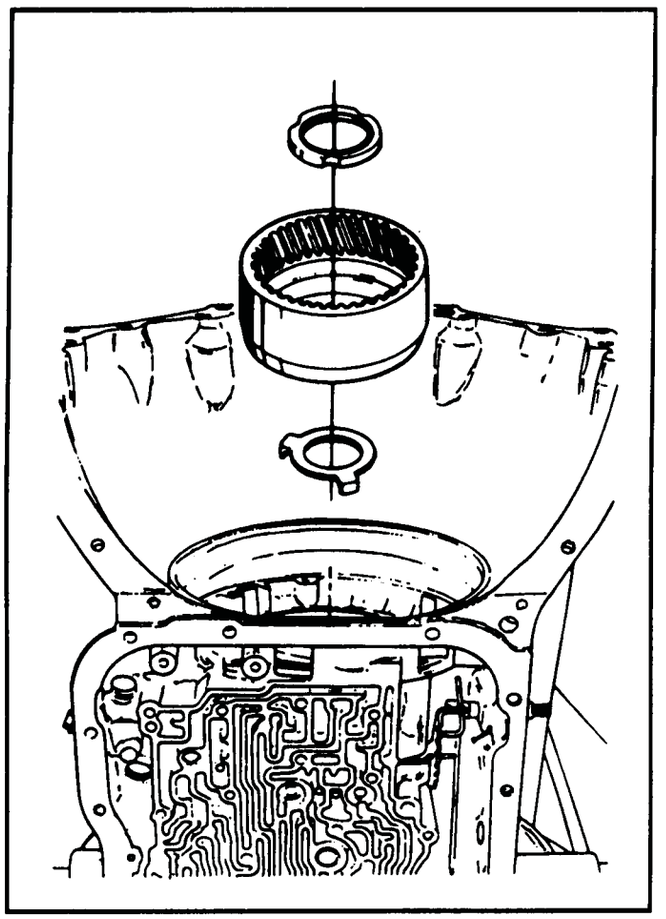
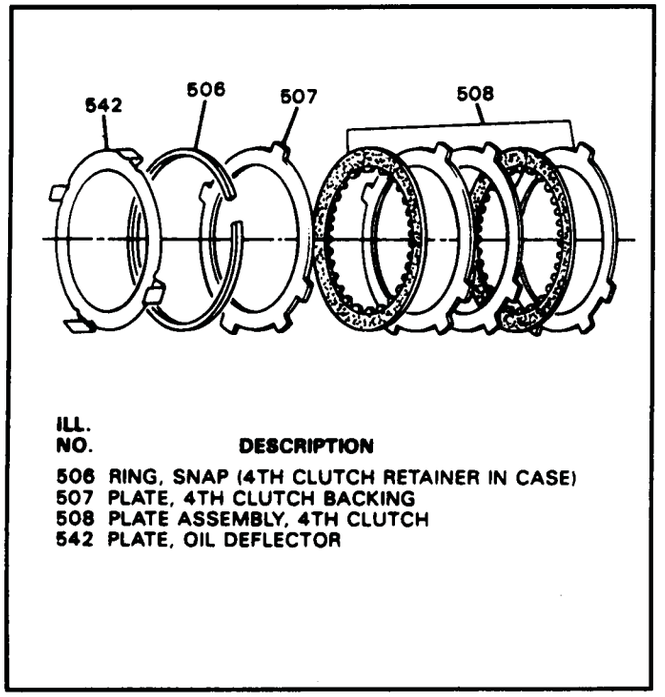


Figure 123



ILL. NO.	DESCRIPTION
506	RING, SNAP (4TH CLUTCH RETAINER IN CASE)
507	PLATE, 4TH CLUTCH BACKING
508	PLATE ASSEMBLY, 4TH CLUTCH
542	PLATE, OIL DEFLECTOR

Figure 124

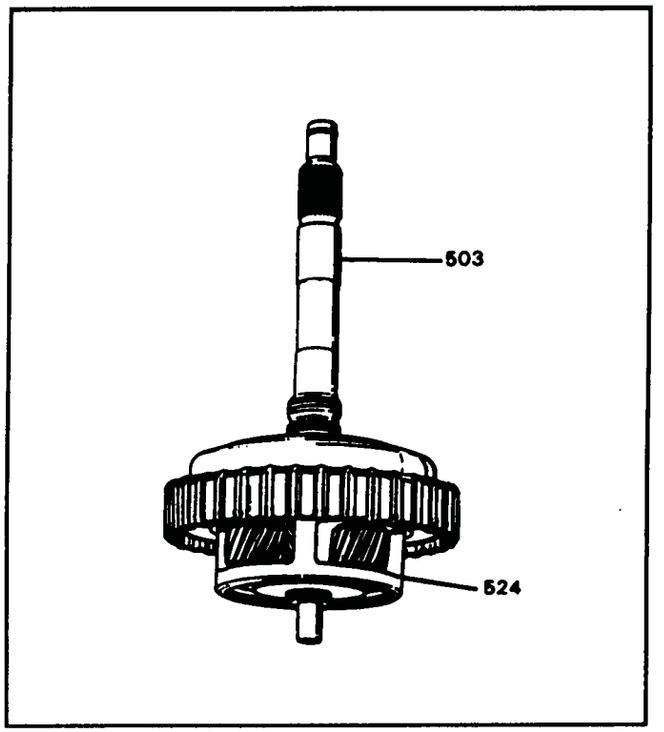
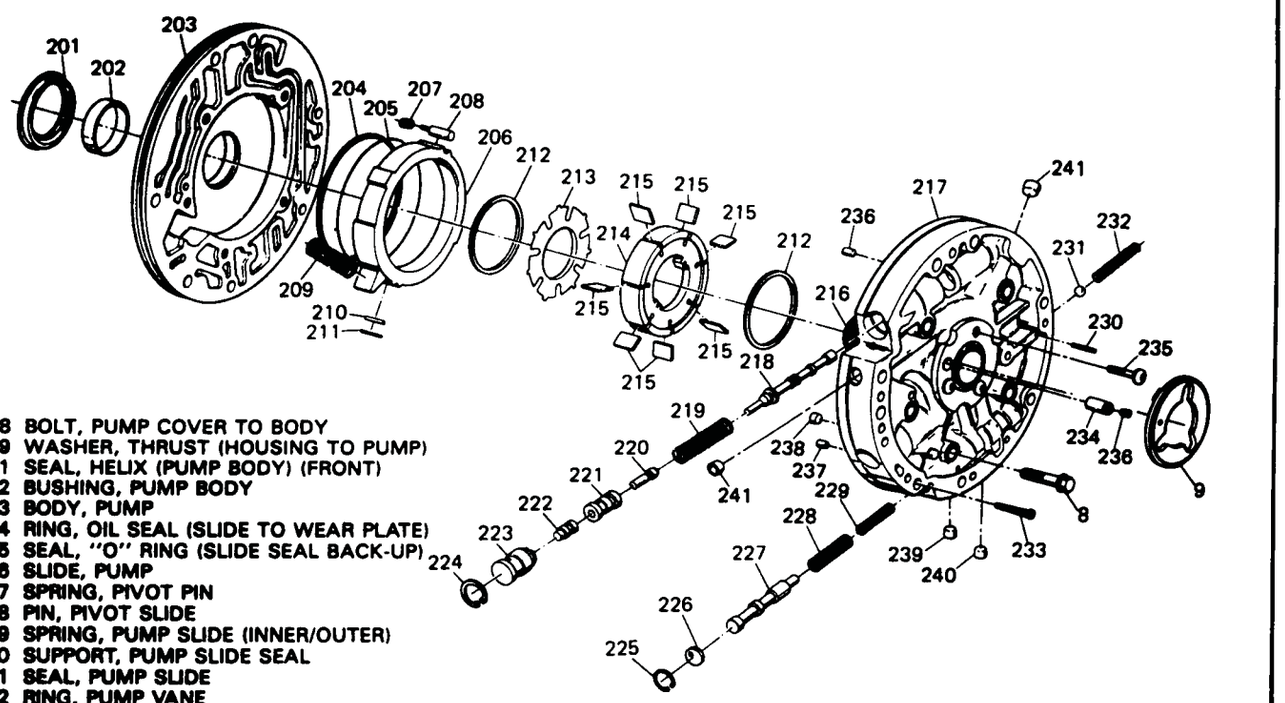


Figure 125

Continued from Page 60

32. Install the tanged thrust washer on the center support in the transmission and retain with a small amount of "Trans-Jel" (See Figure 123).
33. Install the overdrive ring gear in transmission as shown in Figure 123.
34. Install thrust bearing into the overdrive ring gear, as shown in Figure 123.
35. Grasp the turbine shaft and install completed overdrive gear train assembly into ring gear by rotating down into position (See Figure 125).
36. Install the 4th clutch plates as follows, refering to Figure 124 as a guide.
    One steel plate.
    One lined plate.
    Two steel plates.
    One lined plate.
37. Install the 4th clutch backing plate (507) into the case, as shown in Figure 124.
38. Install the backing plate snap ring (506) in the case groove, as shown in Figure 124.
39. Install the oil deflector plate on top of the snap ring, with the tangs facing up (See Figure 124).



8 BOLT, PUMP COVER TO BODY
9 WASHER, THRUST (HOUSING TO PUMP)
201 SEAL, HELIX (PUMP BODY) (FRONT)
202 BUSHING, PUMP BODY
203 BODY, PUMP
204 RING, OIL SEAL (SLIDE TO WEAR PLATE)
205 SEAL, "O" RING (SLIDE SEAL BACK-UP)
206 SLIDE, PUMP
207 SPRING, PIVOT PIN
208 PIN, PIVOT SLIDE
209 SPRING, PUMP SLIDE (INNER/OUTER)
210 SUPPORT, PUMP SLIDE SEAL
211 SEAL, PUMP SLIDE
212 RING, PUMP VANE
213 GUIDE, ROTOR
214 ROTOR, OIL PUMP
215 VANE, PUMP
216 SHAFT & FLANGE ASSEMBLY, STATOR
217 COVER, PUMP
218 VALVE, PRESSURE REGULATOR
219 SPRING, PRESSURE REGULATOR VALVE
220 VALVE, REVERSE BOOST
221 BUSHING, REVERSE BOOST VALVE
222 VALVE, T.V. BOOST
223 BUSHING, T.V. BOOST VALVE
224 RING, SNAP PRESSURE REGULATOR CASE
225 RING, SNAP (CONVERTER CL. PUMP VALVE RET.)
226 STOP, VALVE (CONVERTER CLUTCH)
227 VALVE, CONVERTER CLUTCH
228 SPRING, CONVERTER CLUTCH VALVE (OUTER)
229 SPRING, CONVERTER CLUTCH VALVE (INNER)
230 RIVET, FLAT HEAD (.156 X 1.0)
231 BALL, PRESSURE RELIEF
232 SPRING, PRESSURE RELIEF
233 SCREEN ASSEMBLY, GOVERNOR
234 PIN, DOWEL (PUMP COVER)
235 SCREW, SOCKET BUTTON HEAD (M6 X 1 X 16)
236 PLUG, CUP (SELECTIVE WASHER LUBE) (2)
237 PLUG, ORIFICE (CONV. CLUTCH SIGNAL) 4.84 DIA.
238 PLUG, ORIFICE (COOLER FEED) 6.84 DIA.
239 PLUG, CUP (COOLER FEED) 6.8 DIA.
240 PLUG, CUP (CLUTCH RELEASE) 6.8 DIA.
241 PLUG, CUP (LINE/CASE) .511 DIA. (2)

Figure 126

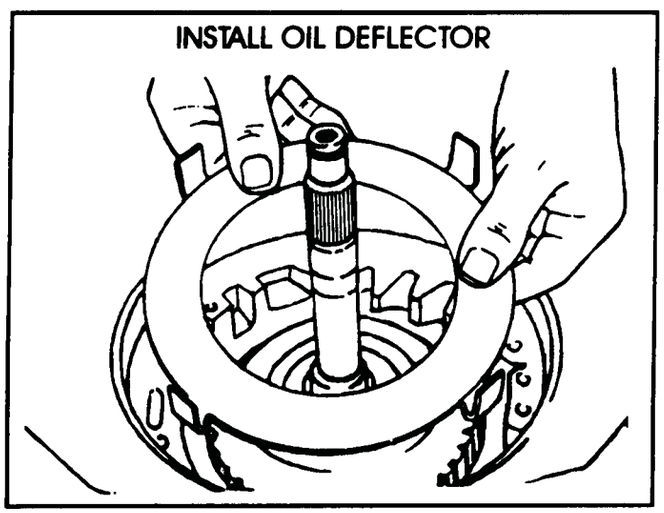


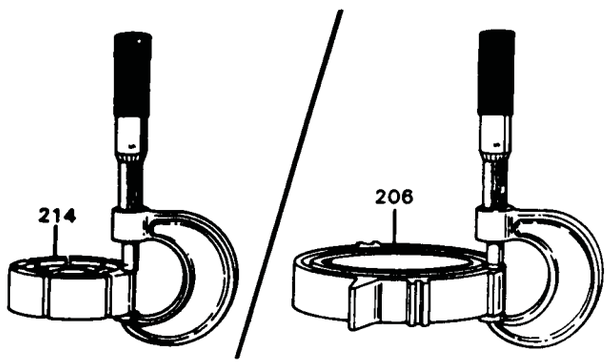
Figure 126A

OIL PUMP DISASSEMBLY

1. Disassemble, clean and inspect all the oil pump parts that are shown in Figure 126.
2. Use Figure 126 as a guide for disassembly.

CAUTION:

PUMP SLIDE SPRINGS AND SPRINGS IN THE PUMP COVER ARE UNDER VERY HIGH PRESSURE. PLACE COVERING OVER SPRINGS TO PREVENT INJURY



206 SLIDE, PUMP
214 ROTOR, OIL PUMP

OIL PUMP ROTOR SELECTION CHART

THICKNESS (mm)	THICKNESS (in.)
17.948 - 17.961	0.7066 - 0.7071
17.961 - 17.974	0.7071 - 0.7076
17.974 - 17.987	0.7076 - 0.7081
17.987 - 18.000	0.7081 - 0.7086
18.000 - 18.013	0.7086 - 0.7091

OIL PUMP SLIDE SELECTION CHART

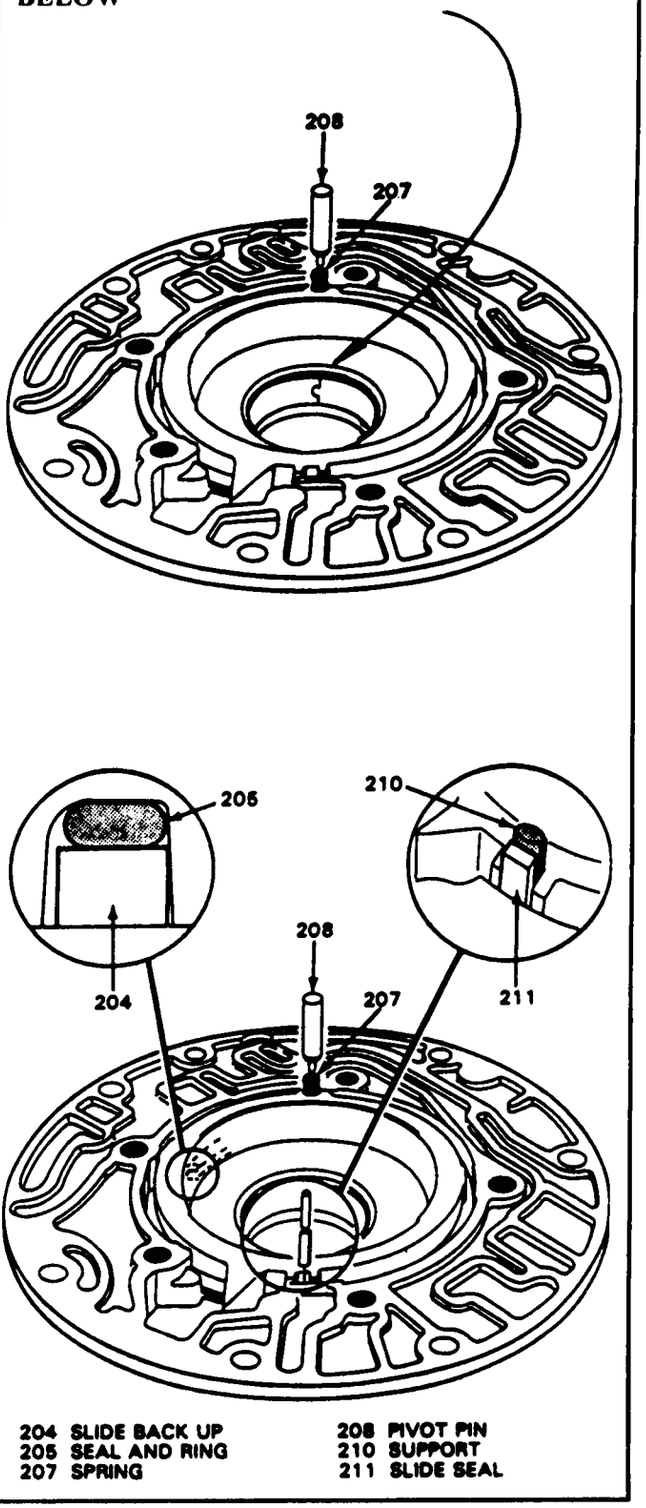
THICKNESS (mm)	THICKNESS (in.)
17.948 - 17.961	0.7066 - 0.7071
17.961 - 17.974	0.7071 - 0.7076
17.974 - 17.987	0.7076 - 0.7081
17.987 - 18.000	0.7081 - 0.7086
18.000 - 18.013	0.7086 - 0.7091

Figure 127

ROTOR AND/OR SLIDE REPLACEMENT

1. A one inch micrometer, capable of measuring in tenths will be required to accurately measure the pump slide and rotor, as shown in Figure 127.
2. Refer to the chart in Figure 127 for the proper rotor and slide selection.
3. ***Proper*** selection of rotor and slide sizes are very important on this transmission.
4. Measurement of rotor and slide must be made on undamaged surfaces. Select exact size replacements. Lightly hone both sides of the replacement rotor/slide to remove any nicks.

WHEN REPLACING THE PUMP BUSHING, ORIENT THE SEAM OF THE NEW BUSHING SO IT IS POINTED AT THE BOLT HOLE NEXT TO THE PIVOT PIN AS SHOWN BELOW



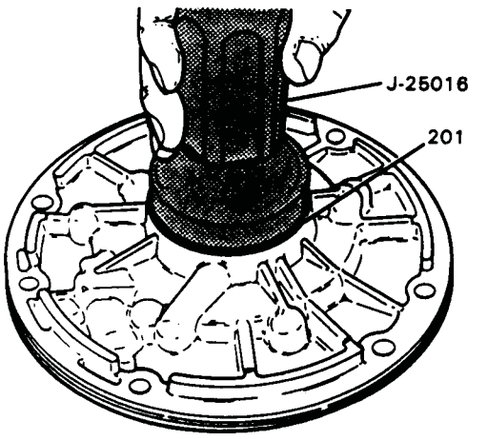
204 SLIDE BACK UP
205 SEAL AND RING
207 SPRING
208 PIVOT PIN
210 SUPPORT
211 SLIDE SEAL

Figure 128

ASSEMBLE PUMP BODY AND PUMP COVER

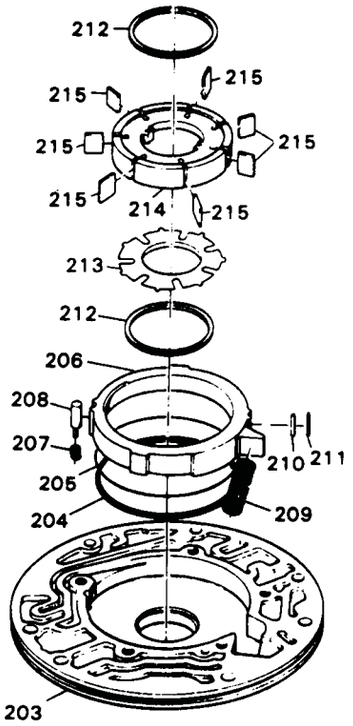
1. Install a new pump body bushing into the pump body as necessary. Some models requires that the bushing be driven out from the seal side of the body and reinstalled from the pump pocket side of the body.
2. ***When replacing the pump bushing, orient the the seam of the bushing so that it is pointed at the bolt hole next to the pivot pin as shown in Figure 128.***
3. Install a new front pump seal using J-25016 as shown in Figure 129.
4. Install a new seal retainer.
5. Install new "O" ring (205) and oil seal ring into the groove on the back side of pump slide, as shown in Figure 130.
6. Install new slide seal support (210) and a new Teflon slide seal onto pump slide, as shown in Figure 128, and retain with "Trans-Jel".
7. Install the pump slide assembly into the pump pocket, being careful not to disturb the slide seals (See Figure 128).
8. Pull the pump slide straight toward the slide seal with one hand, and with the other install the pivot pin and spring (See Figure 128).
9. Ensure that pump slide moves back and forth freely in the pump pocket.
10. Install both of the pump slide springs as shown in Figure 130.
11. Install rotor guide (213) onto the pump rotor and retain with "Trans-Jel" (See Figure 130).
12. Install one vane ring into the pump pocket.
13. Install pump rotor and guide assembly into the pump pocket with guide towards pump pocket (See Figure 130).
14. Install seven vanes (215) into the pump rotor as shown in Figure 130.
15. Install the remaining vane ring (212) into the pump rotor as shown in Figure 130.

Continued on next page



201 SEAL, HELIX (PUMP BODY) FRONT

Figure 129



ILL. NO.	DESCRIPTION
203	BODY, PUMP
204	RING, OIL SEAL (SLIDE TO WEAR PLATE)
205	SEAL, "O" RING (SLIDE SEAL BACK-UP)
206	SLIDE, PUMP
207	SPRING, PIVOT PIN
208	PIN, PIVOT SLIDE
209	SPRING, PUMP SLIDE (INNER/OUTER)
210	SUPPORT, PUMP SLIDE SEAL
211	SEAL, PUMP SLIDE
212	RING, PUMP VANE
213	GUIDE, ROTOR
214	ROTOR, OIL PUMP
215	VANE, PUMP

Figure 130

ILL. NO.	DESCRIPTION
8	BOLT, PUMP COVER TO BODY
9	WASHER, THRUST (HOUSING TO PUMP)
216	SHAFT & FLANGE ASSEMBLY, STATOR
217	COVER, PUMP
218	VALVE, PRESSURE REGULATOR
219	SPRING, PRESSURE REGULATOR VALVE
220	VALVE, REVERSE BOOST
221	BUSHING, REVERSE BOOST VALVE
222	VALVE, T.V. BOOST
223	BUSHING, T.V. BOOST VALVE
224	RING, SNAP PRESSURE REGULATOR CASE
225	RING, SNAP (CONVERTER CL. PUMP VALVE RET.)
226	STOP, VALVE (CONVERTER CLUTCH)
227	VALVE, CONVERTER CLUTCH
228	SPRING, CONVERTER CLUTCH VALVE (OUTER)
229	SPRING, CONVERTER CLUTCH VALVE (INNER)
230	RIVET, FLAT HEAD (.156 X 1.0)
231	BALL, PRESSURE RELIEF
232	SPRING, PRESSURE RELIEF
233	SCREEN ASSEMBLY, GOVERNOR
234	PIN, DOWEL (PUMP COVER)
235	SCREW, SOCKET BUTTON HEAD
236	PLUG, CUP (SELECTIVE WASHER LUBE)
237	PLUG, ORIFICE (CONV. CLUTCH SIGNAL)
238	PLUG, ORIFICE (COOLER FEED) 6.84 DIA.
239	PLUG, CUP (COOLER FEED) 6.8 DIA.
240	PLUG, CUP (CLUTCH RELEASE) 6.8 DIA.
241	PLUG, CUP (LINE/CASE) .511 DIA. (2)

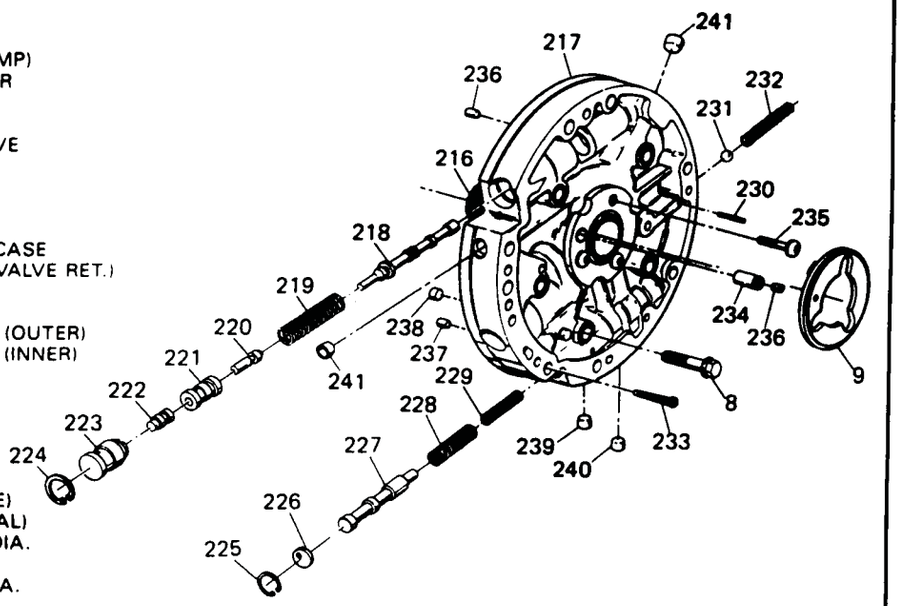
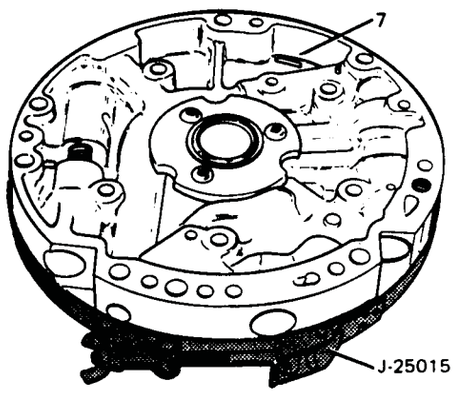


Figure 131

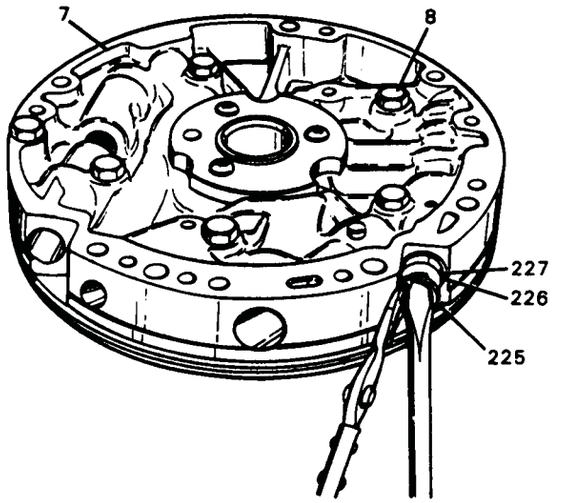


ILL. NO.	DESCRIPTION
7	PUMP ASSEMBLY, COMPLETE

Figure 132

Continued from Page 64

16. Align and install the pump cover onto the pump body as shown in Figure 132.
17. Install five pump cover to pump body bolts but ***do not*** tighten them at this time.
18. Install the pump alignment band J-25015 onto the pump assembly as shown in Figure 132.
19. Torque the five pump cover to pump body bolts to 18 ft.lbs.
20. Remove the pump alignment band.
21. Install oil pump to case "O" ring with chamfer side facing out, and ensure that it is not twisted.
22. Install the two valve line-ups that go in pump cover ***exactly*** as they are shown in Figure 131.
23. Use a small screwdriver to push the bore plugs into position and snap ring pliers to install the snap rings as shown in Figure 133.
24. Ensure that the snap ring is installed with the rounded edge towards valve (See Figure 134).
25. Install selective thrust washer (9) on the pump cover and retain with "Trans-Jel", as shown in Figure 131.



ILL. NO.	DESCRIPTION
7	PUMP ASSEMBLY, COMPLETE
8	BOLT, PUMP COVER TO BODY
225	RING, SNAP (CONVERTER CL. PUMP VALVE RET.) (FLAT SIDE OUT)
226	STOP, VALVE (CONVERTER CLUTCH)
227	VALVE, CONVERTER CLUTCH

Figure 133

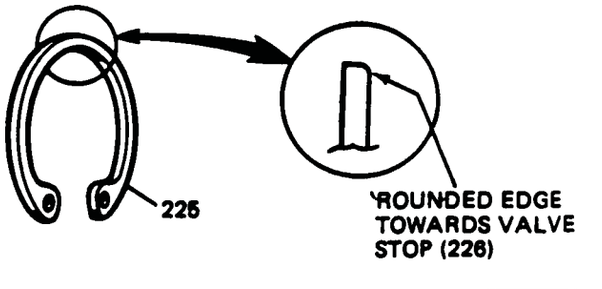


Figure 134

26. Install two guide pins into the case as shown in Figure 135.
27. Install new pump to case gasket over the guide pins and onto case as shown in Figure 136.
28. Lubricate the pump case bore with a small amount of "Trans-Jel".
29. Install the completed oil pump assembly over the guide pins and into the case, as shown in Figure 136.
30. Install the pump to case retaining bolts finger tight (See Figure 136).
31. Remove the guide pins, install two remaining pump to case bolts, and torque the pump bolts to 18 ft.lbs.

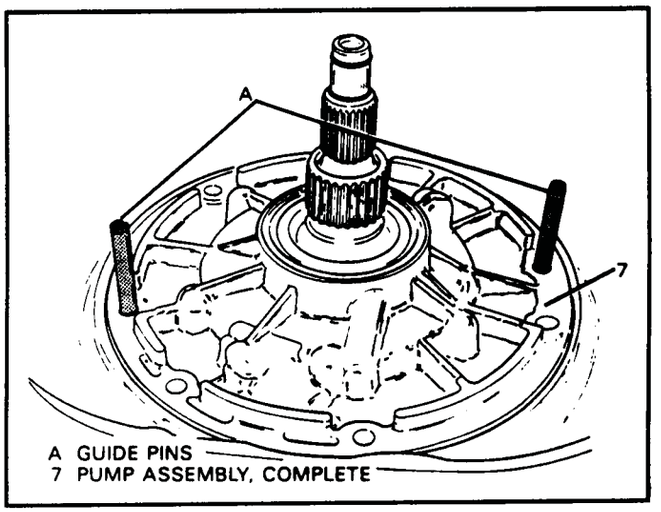
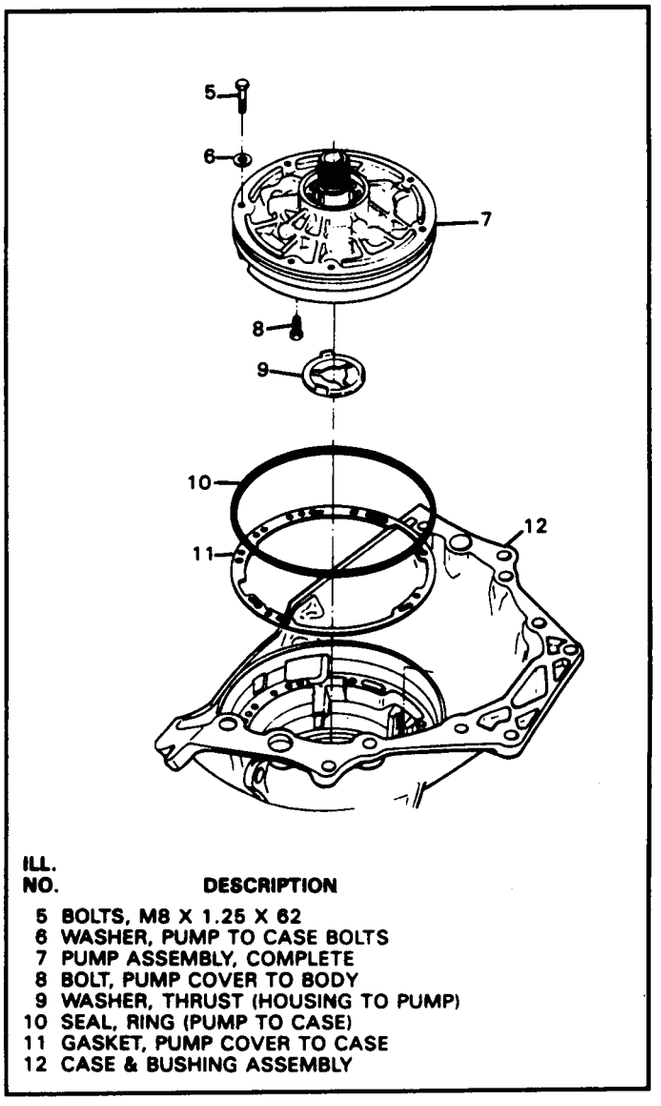


Figure 135



ILL. NO.	DESCRIPTION
5	BOLTS, M8 X 1.25 X 62
6	WASHER, PUMP TO CASE BOLTS
7	PUMP ASSEMBLY, COMPLETE
8	BOLT, PUMP COVER TO BODY
9	WASHER, THRUST (HOUSING TO PUMP)
10	SEAL, RING (PUMP TO CASE)
11	GASKET, PUMP COVER TO CASE
12	CASE & BUSHING ASSEMBLY

Figure 136

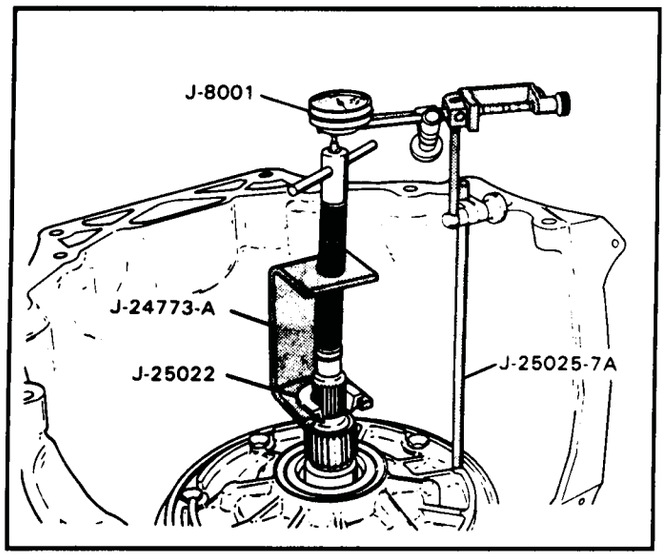


Figure 137

OVERDRIVE UNIT END PLAY WASHER THICKNESS CHART

THICKNESS		IDENTIFICATION NUMBER AND/OR COLOR
4.25-4.36mm	(0.167"-0.171")	0 - SCARLET
4.36-4.48mm	(0.172"-0.176")	1 - WHITE
4.49-4.60mm	(0.177"-0.180")	2 - COCOA BROWN
4.61-4.72mm	(0.181"-0.185")	3 - GRAY
4.73-4.84mm	(0.186"-0.190")	4 - YELLOW
4.85-4.96mm	(0.191"-0.195")	5 - LIGHT BLUE
4.97-5.08mm	(0.196"-0.200")	6 - PURPLE
5.09-5.20mm	(0.201"-0.204")	7 - ORANGE
5.21-5.32mm	(0.205"-0.209")	8 - GREEN

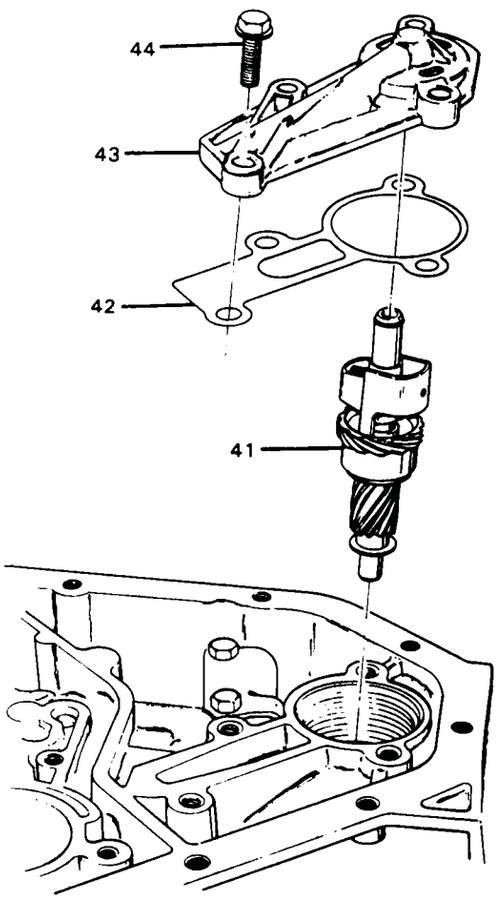
Figure 138

OVERDRIVE UNIT END PLAY CHECK

1. Remove one oil pump to case bolt and install J-25025-7A dial indicator post, as shown in Figure 137.
2. Install turbine shaft lifting tool, & dial indicator as shown in Figure 137.
3. Zero the dial indicator.
4. Lift up on the lifting tool, observe and record the reading on the dial indicator.
5. ***Subtract the reading you recorded earlier on the feeler gage between the turbine shaft snap ring and the overdrive carrier.***
6. End play should be .004" to .025".
7. The selective washer that controls overdrive section end play is located between the pump and the overrun clutch housing. If more or less end play is required, select the proper washer from the chart in Figure 138 and install.
8. Remove the dial indicator and dial indicator post as shown in Figure 137.
9. Reinstall the pump to case bolt and torque to 18 ft.lbs.
10. Rotate the transmission so that the pan side is facing up so we can install external parts.

INSTALL GOVERNOR ASSEMBLY

1. Inspect the governor assembly for scoring on the shaft, or for plugged oil passage.
2. Ensure that the governor balls seal when they are seated on the shaft, and governor weights move freely.
3. Inspect the governor driven gear, speedometer drive gear for any damage.
4. Ensure that you are installing the proper tooth count on the speedometer drive gear.
5. There are four different colors of speedometer drive gears to identify tooth count, and they are as follows:
   Green ..... 10 Tooth
   Orange ..... 11 Tooth
   Red ..... 12 Tooth
   White ..... 13 Tooth
6. Install the governor assembly into the case bore as shown in Figure 139.
7. Install governor gasket onto case, as shown in Figure 139.
8. Install the governor cover making sure that the governor pilots into the cover (See Figure 139).
9. Install the governor cover retaining bolts and torque to 18 ft.lbs. (See Figure 139).



ILL. NO.	DESCRIPTION
41	GOVERNOR ASSEMBLY, COMPLETE
42	GASKET, GOVERNOR COVER
43	COVER ASSEMBLY, GOVERNOR
44	SCREW, GOVERNOR COVER

Figure 139

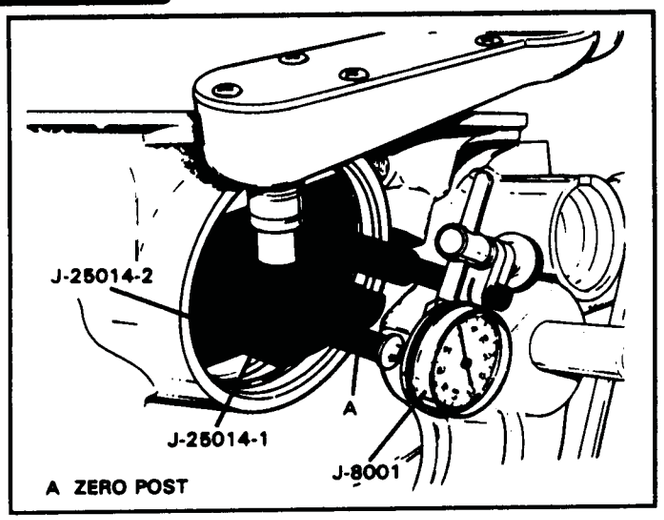


Figure 140

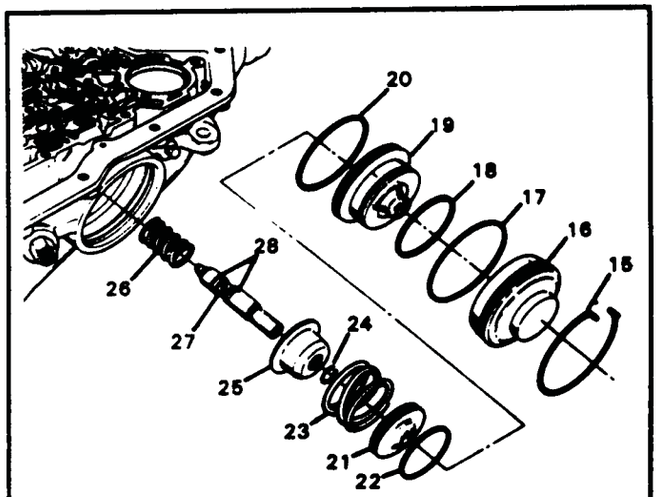
INTERMEDIATE BAND APPLY PIN SELECTION CHART

DIAL INDICATOR TRAVEL		APPLY PIN IDENTIFICATION
.0 - .72mm	(.0" - .028")	1 GROOVE
.72 - 1.44mm	(.028" - .057")	2 GROOVES
1.44 - 2.16mm	(.057" - .086")	3 GROOVES
2.16 - 2.88mm	(.086" - .114")	NONE

Figure 141

BAND APPLY PIN MEASUREMENT

1. Place servo apply pin into servo bore.
2. Install measuring tool J-25014-2 into the intermediate servo bore, and retain with servo cover snap ring, as shown in Figure 140.
3. Install J-25014-1 into J-25014-2 and ensure it is seated against band apply pin.
4. Install dial indicator on J-25014-2 zero post, as shown in Figure 140.
5. Align stepped side of pin J-25014-1 with the torquing arm of J-25014-2 (See Figure 140).
6. Apply 100 in.lbs. of torque to hex nut on the side of gage. Slide dial indicator over the gage pin and read dial indicator.
7. Use the chart in Figure 141 to determine which apply pin should be used and change the apply pin as necessary.



15 RING, SERVO COVER RETAINING
16 COVER, INTERMEDIATE SERVO
17 SEAL, "O" RING (INTERMEDIATE SERVO COVER)
18 RING, OIL SEAL (INNER)
19 PISTON, INTERMEDIATE SERVO (OUTER)
20 RING, OIL SEAL (OUTER)
21 PISTON, INTERMEDIATE SERVO (INNER)
22 RING, OIL SEAL PISTON (INNER)
23 SPRING, INTERMEDIATE SERVO CUSHION
24 RING, SNAP (APPLY PIN/RETAINER)
25 RETAINER, SERVO SPRING
26 SPRING, INTERMEDIATE SERVO (INNER)
27 PIN, INTERMEDIATE BAND APPLY (SELECTIVE)
28 RING, OIL SEAL (INTERMEDIATE BAND APPLY PIN)

Figure 142

INTRMEDIATE SERVO ASSEMBLY

1. Assemble the intermediate servo assembly and use Figure 142 as a guide.
2. Install new seals on intermediate servo piston as shown in Figure 143, depending on which type of piston and seals that you are using.
3. Install new "O" ring on the intermediate servo cover and lubricate with "Trans-Jel".
4. Install intermediate servo piston assembly into servo cover, and install the intermediate servo assembly into the case bore (See Figure 142).
5. Make sure the tapered end of the band apply pin is seated against the intermediate band lug.
6. Install J-29714 servo compressor tool on case, as shown in Figure 144.
7. Compress the servo cover by turning the hex nut on the tool, as shown in Figure 144.
8. Install the servo cover snap ring into the case, as shown in Figure 144.
9. Remove the servo compressor tool.

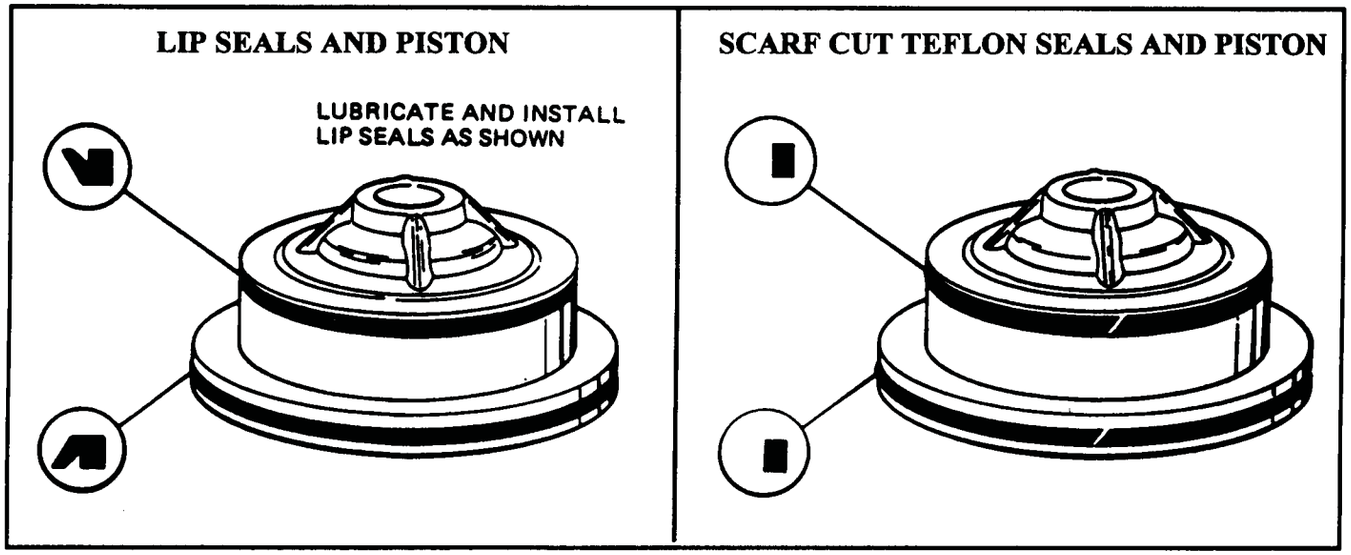


Figure 143

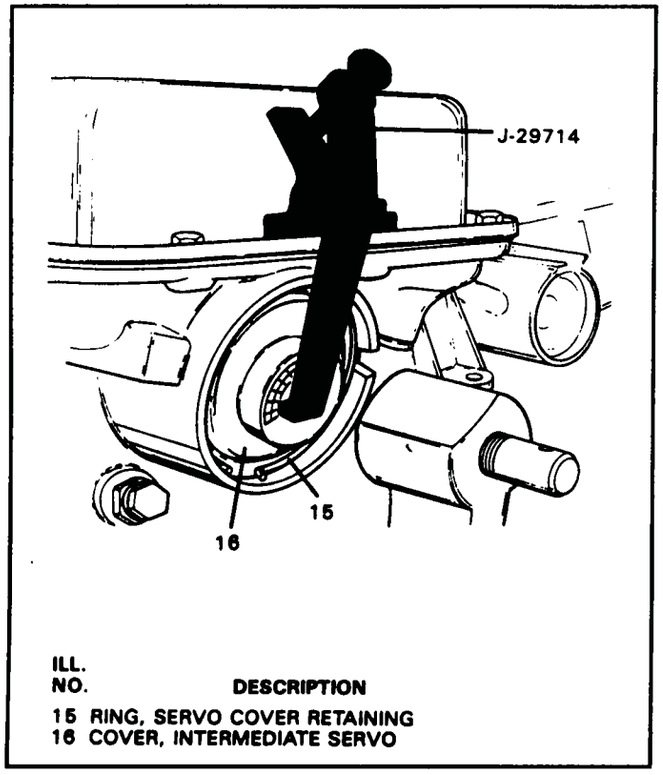


Figure 144

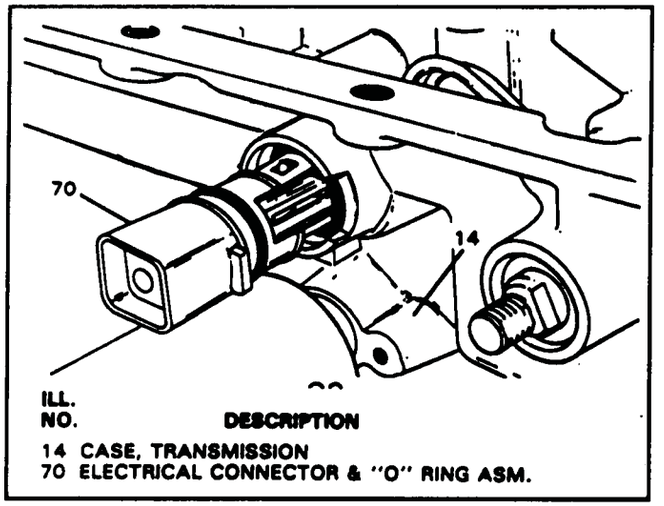
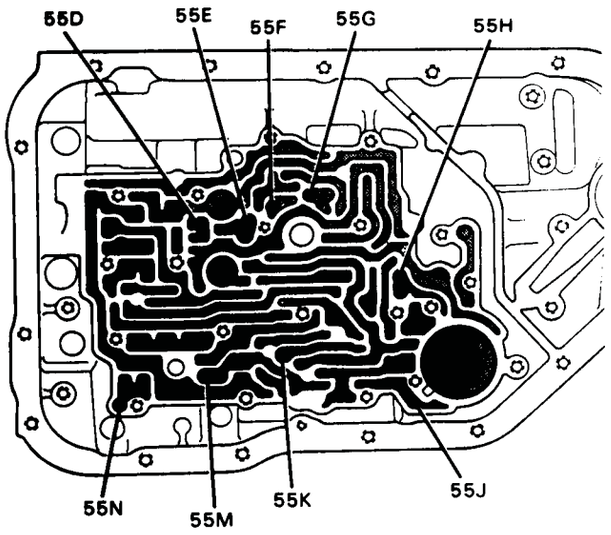


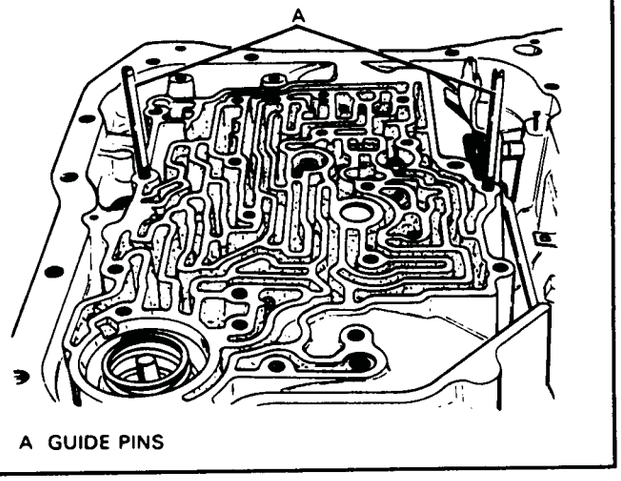
Figure 145

10. Install new "O" ring on the case connector and lubricate with small amount of "Trans-Jel" (See Figure 145).
11. Install the case connector into the case bore, as shown in Figure 145, until fully seated.



ILL. NO.	DESCRIPTION
55D	CHECK BALL #2 3RD ACCUMULATOR
55E	CHECK BALL #6 REVERSE/3RD
55F	CHECK BALL #4 3RD CLUTCH
55G	CHECK BALL #9 LO/DETENT
55H	CHECK BALL #10 LO/REVERSE
55J	CHECK BALL #1 4TH ACCUMULATOR
55K	CHECK BALL #7 INTERMEDIATE SERVO CHECK BALL IS LOCATED IN CAPSULE
55M	CHECK BALL #3 PT/D3
55N	CHECK BALL #5 T.V. EXHAUST

Figure 146



A GUIDE PINS

Figure 147

BOTTOM PAN PARTS

1. Install the checkballs into the case pockets in the locations shown in Figure 146. See also Page 23 for checkball locations.
   NOTE:
   ATSG recommends leaving out the number 5 (T.V. Exhaust) checkball (55N).
2. Install the 3-4 accumulator pin into the case if it was removed.
3. Install a new seal on the 3-4 accumulator piston and lubricate with small amount of "Trans-Jel".
4. Install the 3-4 accumulator piston and spring in case bore in the same direction it came out.
   There are two different stackups for the 3-4 accumulator piston and spring, for different calibration requirement. Refer to Figures 148 and 149, to check the positioning for all 1986, 1987 and 1988 models.
5. Install two guide pins into transmission case in the locations shown in Figure 147.

Continued on Page 73

1986	AAF, ABF, APF, CHF, CRF, CZF, HCF, HFF, KZF
1987	CHF, CRF, CTF, HDF, HFF, HTF, KZF
1988	CCF, CHF, CRF, CTF, CYF

ILL. NO.	DESCRIPTION
12	CASE & BUSHING ASSEMBLY
49	PISTON, 3-4 ACCUMULATOR
50	RING, OIL SEAL (3-4 ACCUMULATOR PISTON)
51	SPRING, 3-4 ACCUMULATOR
76	PIN, ACCUMULATOR PISTON

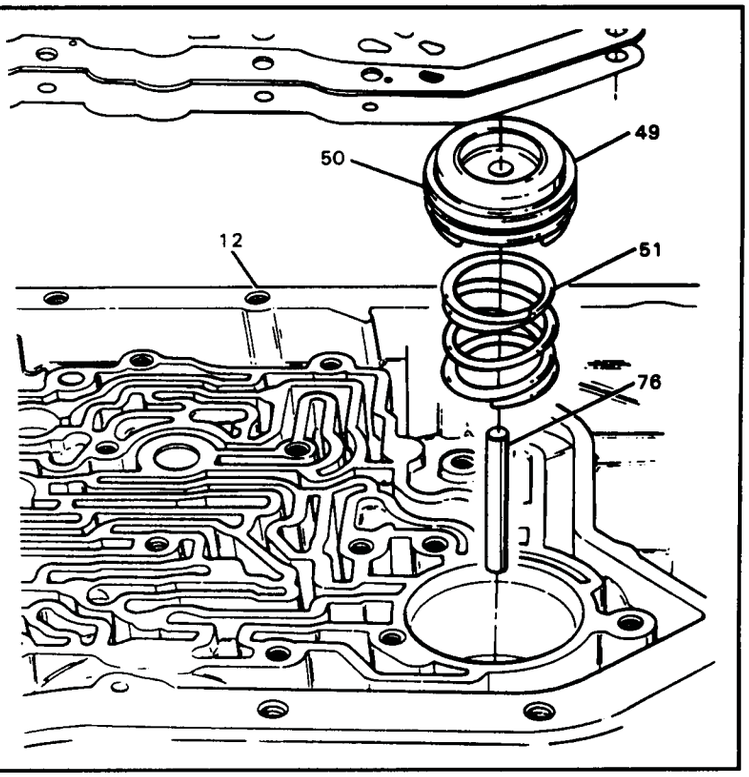


Figure 148

1986	BRF, CAF, KBF, KCF, KJF
1987	BRF, CCF, CYF, CZF, KCF, KJF, KTF
1988	CZF, KJF, KTF

ILL. NO.	DESCRIPTION
12	CASE & BUSHING ASSEMBLY
49	PISTON, 3-4 ACCUMULATOR
50	RING, OIL SEAL (3-4 ACCUMULATOR PISTON)
51	SPRING, 3-4 ACCUMULATOR
76	PIN, ACCUMULATOR PISTON

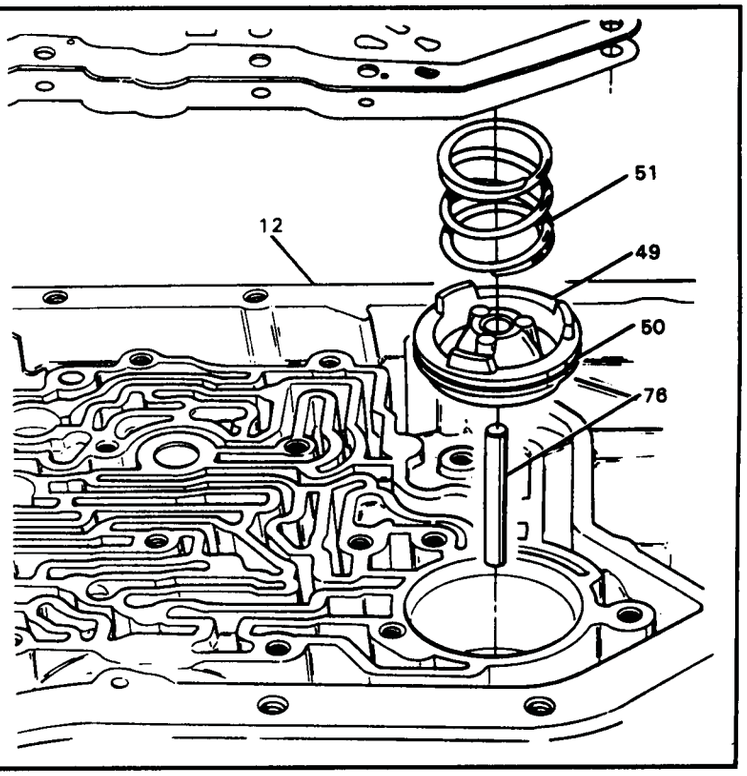
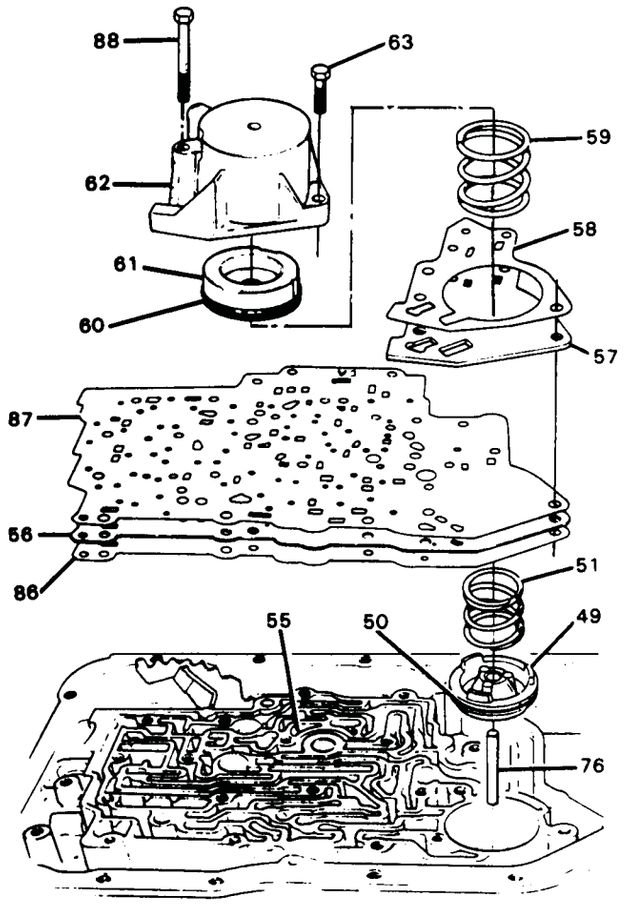


Figure 149



ILL. NO.	DESCRIPTION
49	PISTON, 3-4 ACCUMULATOR
50	RING, OIL SEAL (3-4 ACCUMULATOR PISTON)
51	SPRING, 3-4 ACCUMULATOR
55	BALL, .25 DIAMETER
56	PLATE, VALVE BODY SPACER
57	PLATE, ACCUMULATOR
58	GASKET, ACCUMULATOR HSG. TO ACCUM. PLATE
59	SPRING, 1-2 ACCUMULATOR PISTON
60	RING, OIL SEAL (1-2 ACCUMULATOR PISTON)
61	PISTON, 1-2 ACCUMULATOR
62	HOUSING & PIN ASSEMBLY, 1-2 ACCUMULATOR
63	BOLT, ACCUMULATOR HOUSING
76	PIN, ACCUMULATOR PISTON
86	GASKET, SPACER PLATE TO CASE
87	GASKET, VALVE BODY TO SPACER PLATE
88	BOLT, ACCUMULATOR HOUSING

Figure 150

Continued from Page 71

6. Install spacer plate to case gasket marked "C" over guide pins and onto the case, as shown in Figure 150.
7. Install the ***proper*** spacer plate over the guide pins and on top of the case gasket, as shown in Figure 150.
8. Install spacer plate to valve body gasket that is marked "VB" over the guide pins and on top of spacer plate, as shown in Figure 150.
9. Install accumulator tension plate (57) on top of the valve body gasket as shown in Figure 150.
10. Install 1-2 accumulator gasket (58) on top of the tension plate as shown in Figure 150.
11. Install a new seal on the 1-2 accumulator piston and lubricate with small amount of "Trans-Jel" as shown in Figure 150.
12. Inspect the 1-2 accumulator housing for free movement of the checkball in the capsule if your model is so equipped (See Figure 151).
13. ***All models built after March 14, 1987, were built with the new 1-2 accumulator housing and the new spacer plate (See Figure 151).***
14. The new spacer plate is shown in Figure 152, and must be compatable with the accumulator housing that you are about to install.
15. Install the 1-2 accumulator piston into the 1-2 accumulator housing as shown in Figure 150.
16. Install the 1-2 accumulator spring into housing and install the complete 1-2 accumulator Asm. onto the transmission as shown in Figure 150.
17. Install the 1-2 accumulator housing retaining bolts as shown in Figure 150.
18. Torque the retaining bolts to 107 in.lbs.

Continued on Page 76

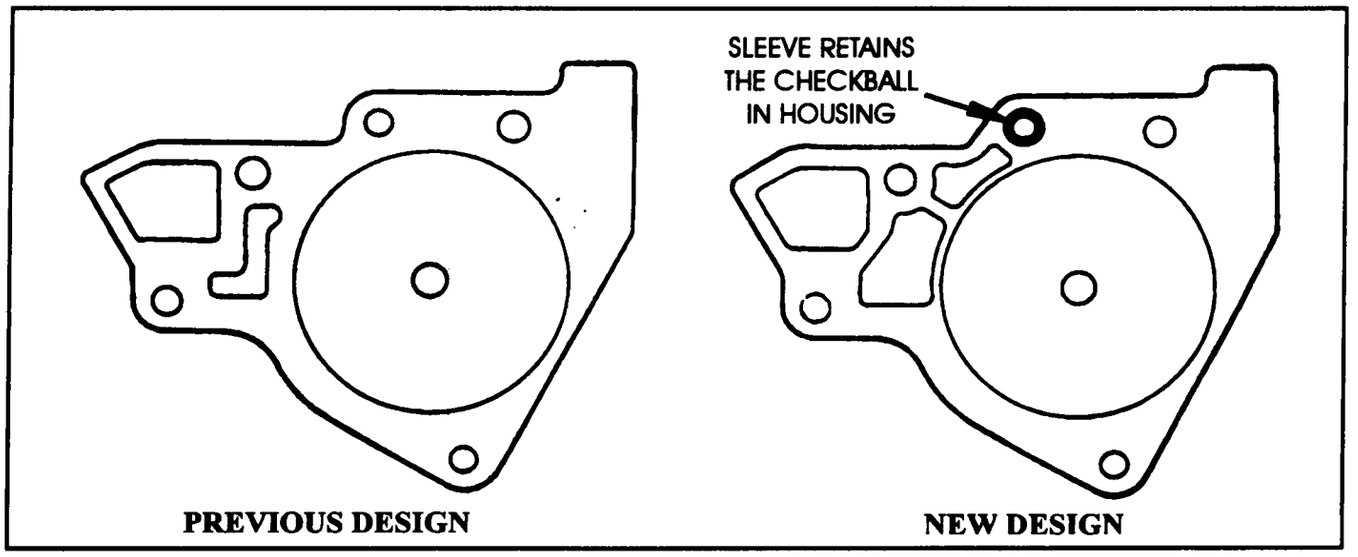


Figure 151

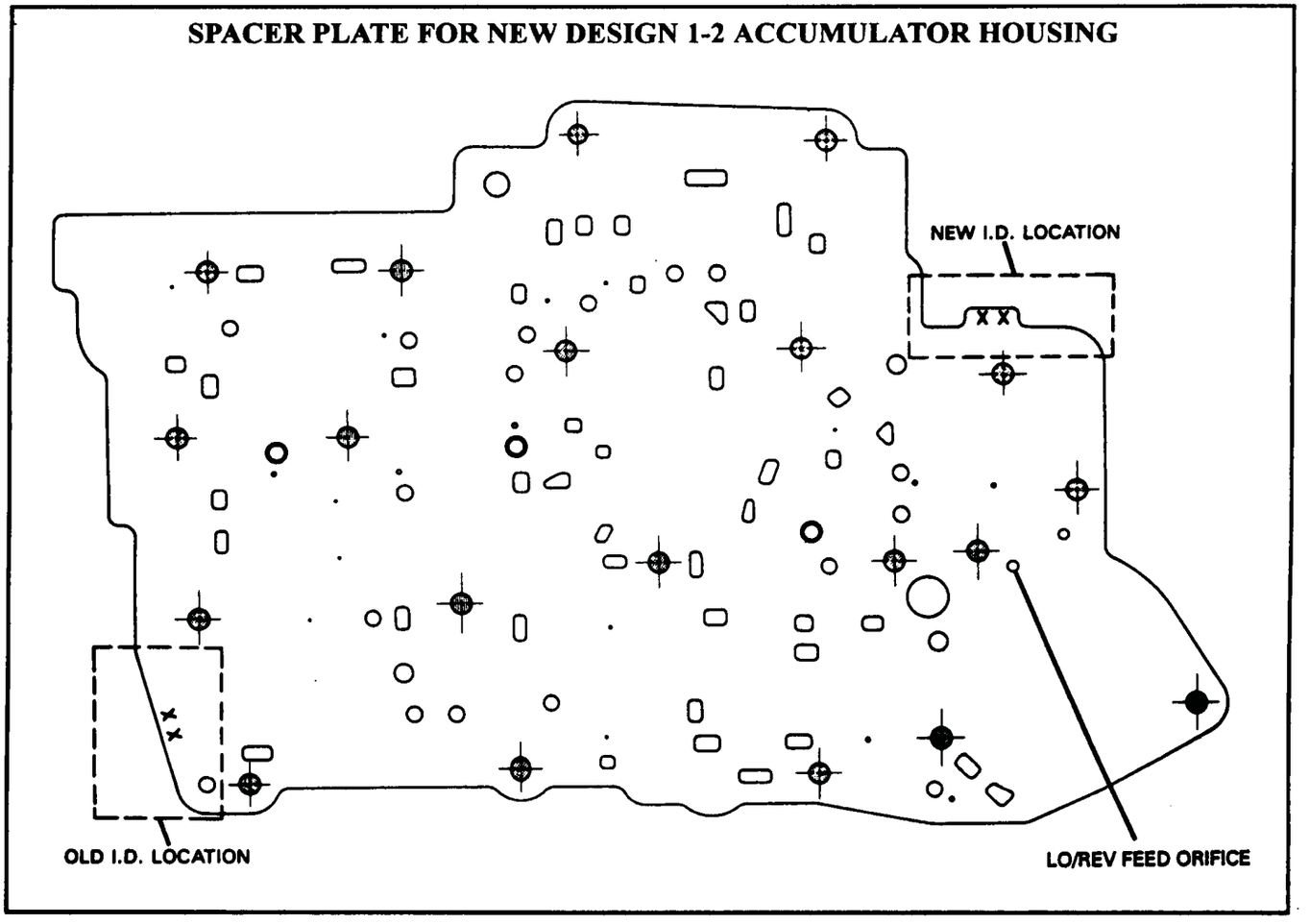
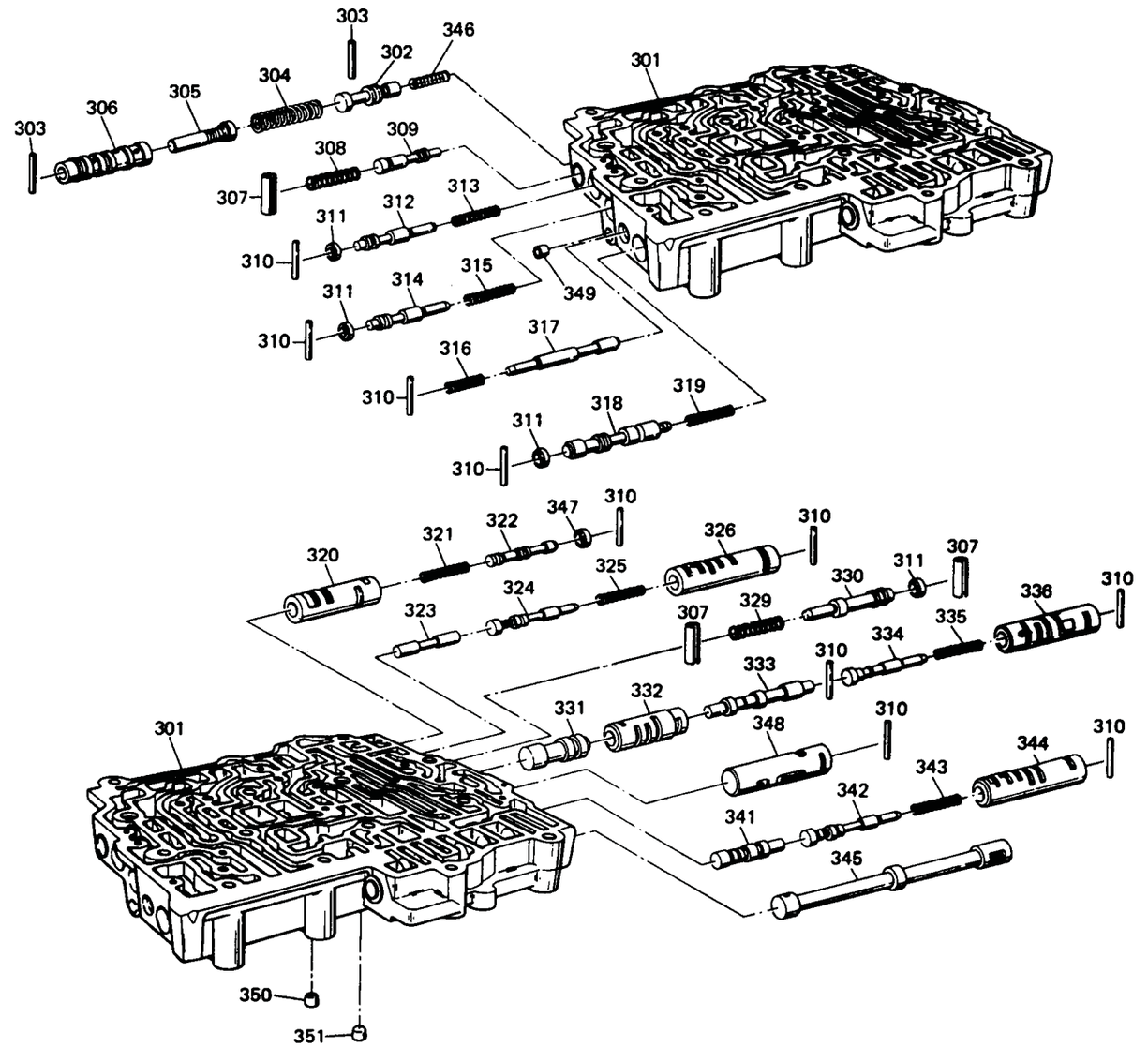


Figure 152



301 BODY, CONTROL VALVE
302 VALVE, THROTTLE
303 PIN, COILED SPRING 2.72 X 25 (2)
304 SPRING, THROTTLE VALVE
305 PLUNGER, THROTTLE VALVE
306 BUSHING, THROTTLE VALVE PLUNGER
307 SLEEVE, SPRING RETAINING (3)
308 SPRING, T.V. LIMIT VALVE
309 VALVE, T.V. LIMIT
310 PIN, COILED SPRING 2.72 X 20 (10)
311 PLUG, VALVE BORE 12.5mm (4)
312 VALVE, T.V. MODULATOR DOWNSHIFT
313 SPRING, T.V. MODULATOR DOWNSHIFT VALVE (SOME MODELS)
314 VALVE, T.V. MODULATOR UPSHIFT
315 SPRING, T.V. MODULATOR UPSHIFT VALVE (SOME MODELS)
316 SPRING, 3-2 CONTROL VALVE
317 VALVE, 3-2 CONTROL
318 VALVE, LINE BIAS
319 SPRING, LINE BIAS VALVE
320 BUSHING, ACCUMULATOR VALVE
321 SPRING, ACCUMULATOR VALVE
322 VALVE, ACCUMULATOR
323 VALVE, 3-4 SHIFT
324 VALVE, 3-4 THROTTLE
325 SPRING, 3-4 THROTTLE VALVE
326 BUSHING, 3-4 THROTTLE VALVE
329 SPRING, LO OVERRUN CLUTCH VALVE
330 VALVE, LO OVERRUN CLUTCH
331 VALVE, 1-2 SHIFT
332 BUSHING, LO-1ST/DETENT VALVE
333 VALVE, LO-1ST/DETENT
334 VALVE, 1-2 THROTTLE
335 SPRING, 1-2 THROTTLE VALVE
336 BUSHING, 1-2 THROTTLE VALVE
341 VALVE, 2-3 SHIFT
342 VALVE, 2-3 THROTTLE
343 SPRING, 2-3 THROTTLE VALVE
344 BUSHING, 2-3 THROTTLE VALVE
345 VALVE, MANUAL
346 SPRING, THROTTLE VALVE BOOST
347 PLUG, VALVE BORE (.56 DIA.)
348 PLUG, CONVERTER CLUTCH T.V. BORE
349 PLUG, CUP (7)
350 PLUG, CUP 4TH EXHAUST
351 PLUG, CUP 2-1 COASTDOWN

Figure 153

Continued from Page 73

19. Clean the valve body assembly thoroughly with clean solvent, & blow dry with compressed air.
20. Move the valves with a small screwdriver or a pick to dislodge any dirt or debris and blow dry again with compressed air.
21. Position the valve body as shown in Figure 153 on a clean flat work surface.
22. Remove the bushings, valves and springs and lay them out on clean surface in exact sequence they are removed.
23. Use a No. 49 drill bit, grind a taper to one end of drill bit. Lightly tap tapered end of drill bit into the roll pins, then pull straight up, remove the roll pins (See Figure 154).
24. Thoroughly clean and blow dry all valve body bushings, valves and springs.
25. Check fourth clutch pressure switch, replace as necessary.
26. Assemble the valve body components ***exactly*** as shown in Figure 153. Give particular attention to position of the valve lands and bushing passages (See Figure 153).
27. Install the fourth clutch switch into valve body.
28. Lubricate all valves and bores with fluid or "Lube Gard" spray lube.

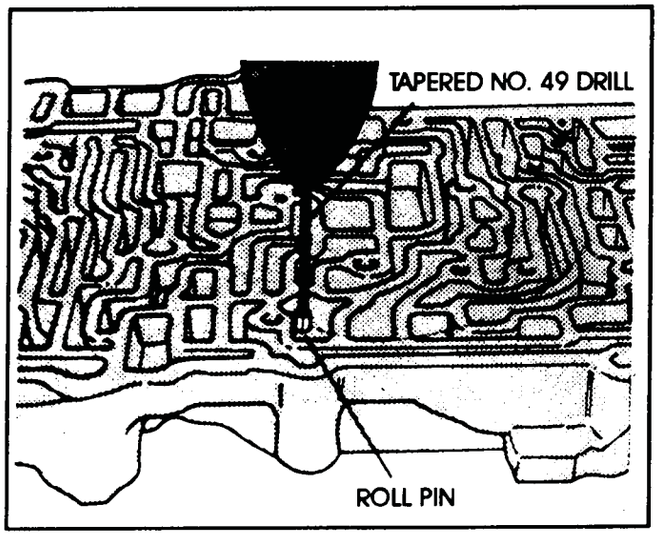


Figure 154

Continued on next Page

VALVE BODY CHECKBALL LOCATIONS

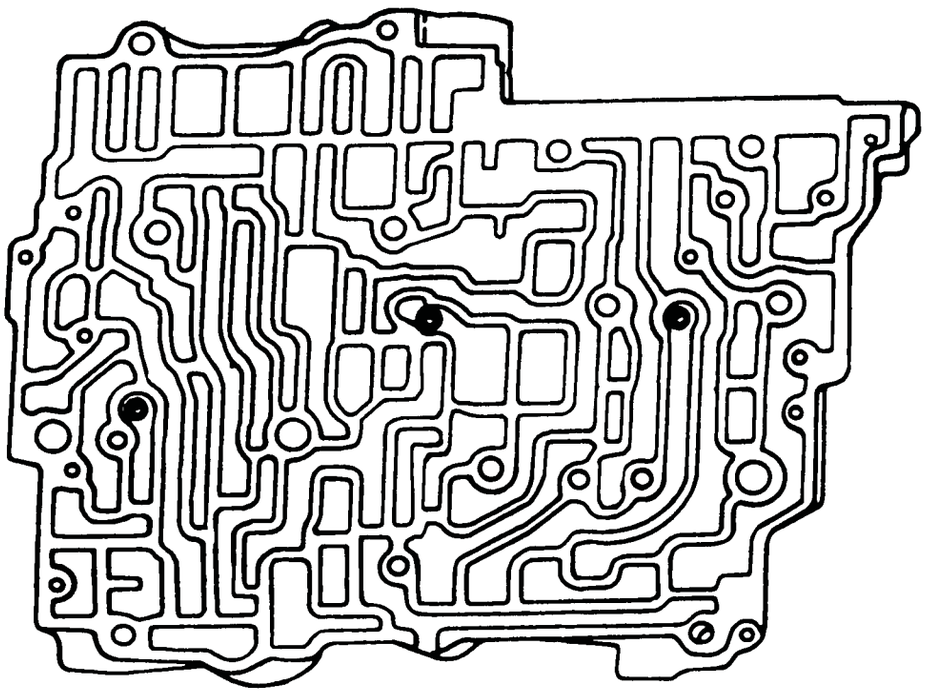


Figure 155

VALVE BODY CHECKBALL LOCATIONS
WHEN PLACED ON SPACER PLATE

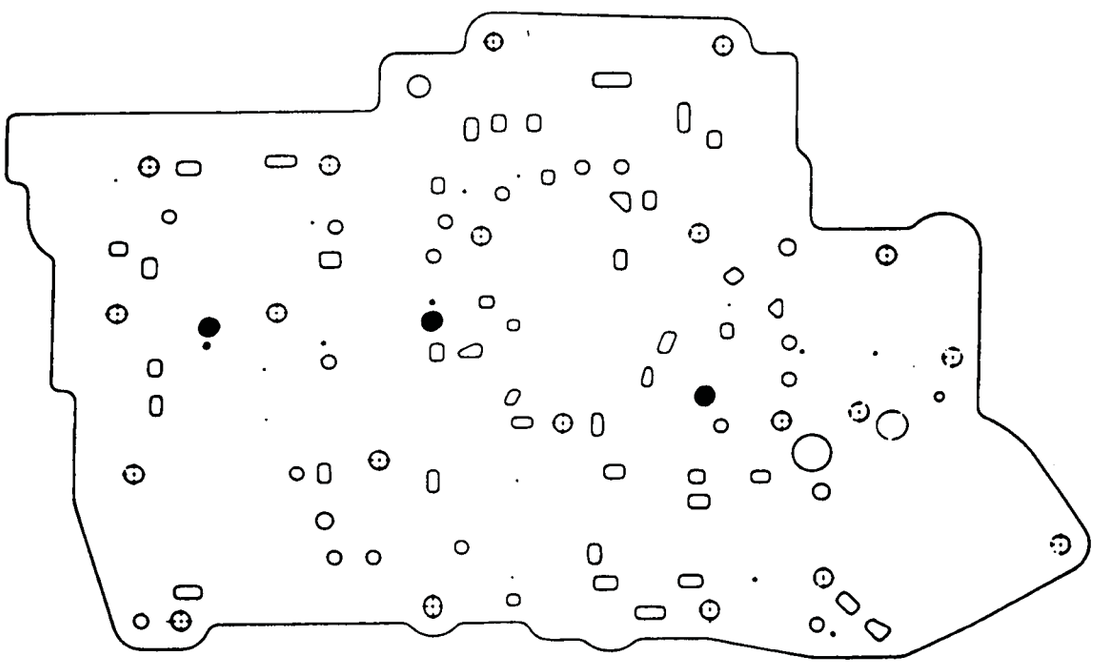
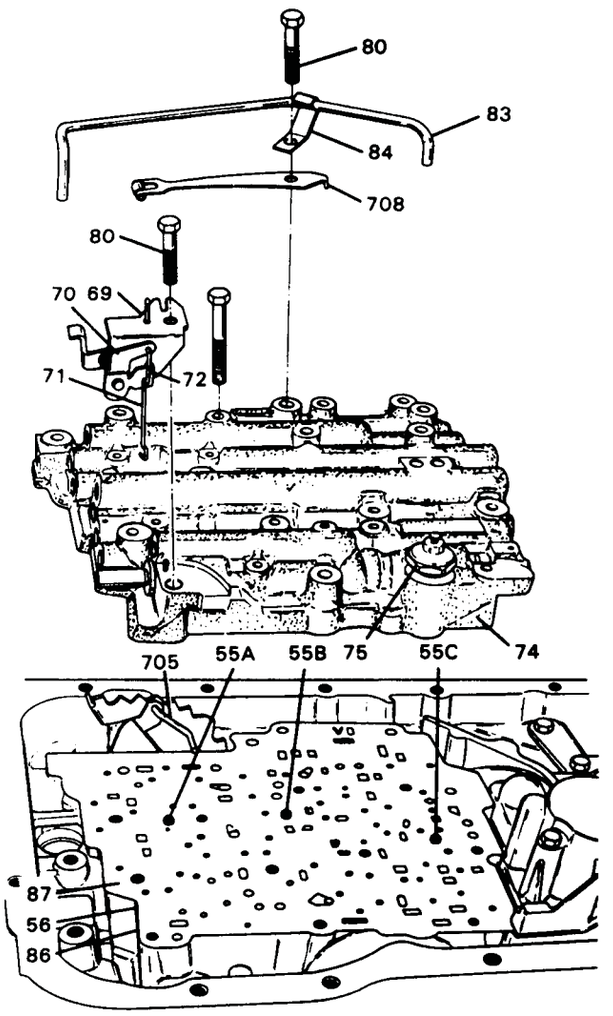


Figure 156

Continued from Page 76

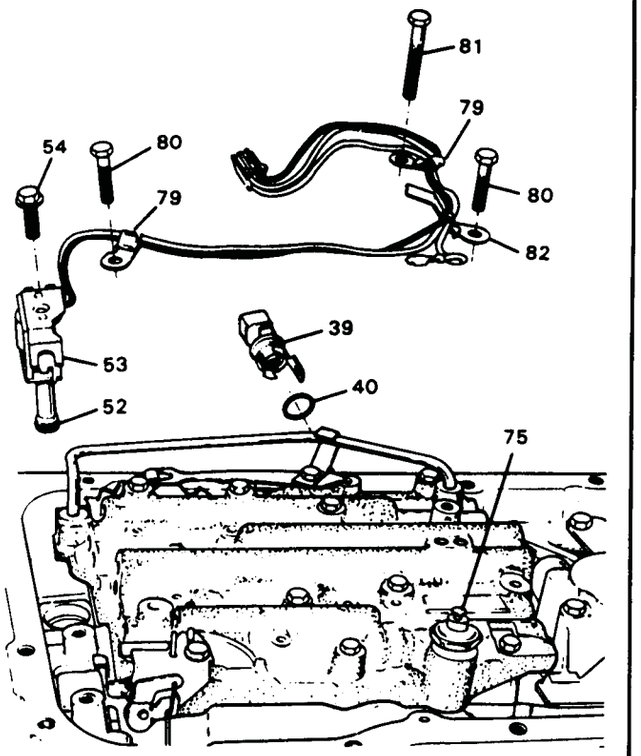
29. Install three checkballs into the valve body in the locations shown in Figure 155 and retain them with a ***small*** amount of "Trans-Jel", or place them on the spacer plate in the locations shown in Figure 156, and again retain with a ***small*** amount of "Trans-Jel".
30. Install the valve body assembly on transmission and ensure that manual valve link is connected to the manual valve properly.
31. Install the signal oil pipe (83) and the bracket, as shown in Figure 157.
32. Install the throttle valve linkage (69) onto the valve body and install retaining bolts as shown in Figure 157.
33. Install the manual lever detent spring and roller (708) as shown in Figure 157 and install the retaining bolt.
34. Tighten valve body bolts by hand only.

Continued on next Page



ILL. NO.	DESCRIPTION
55A	CHECK BALL #11
55B	CHECK BALL #8
55C	CHECK BALL #12
56	PLATE, VALVE BODY SPACER
69	LEVER & BRACKET ASSEMBLY, THROTTLE
70	SPRING, LIFTER (T.V. EXHAUST VALVE)
71	LINK, THROTTLE LEVER TO CABLE
72	LIFTER, T.V. EXHAUST
75	SWITCH ASSEMBLY, PRESSURE (3RD OR 4TH)
74	VALVE ASSEMBLY, CONTROL
80	BOLT, M6 X 1 X 45
83	PIPE, SIGNAL OIL
84	RETAINER, SIGNAL OIL PIPE
86	GASKET, SPACER PLATE TO CASE
87	GASKET, VALVE BODY TO SPACER PLATE
705	LINK, INSIDE DETENT (LEVER TO VALVE)
708	MANUAL DETENT ROLLER & SPRING ASSEMBLY

Figure 157

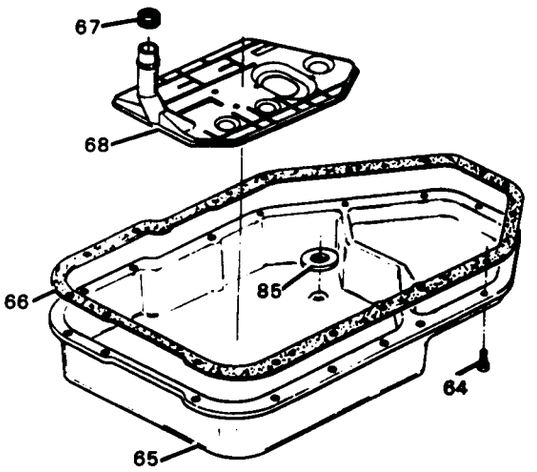


39 CONNECTOR, ELECTRICAL
40 SEAL, "O" RING (ELECTRICAL CONNECTOR)
52 SEAL, "O" RING (SOLENOID)
53 SOLENOID ASSEMBLY
54 BOLTS, HEX WASHER HEAD M6 X 1 X 12.0
75 SWITCH ASSEMBLY, PRESSURE (3RD OR 4TH)
79 CLIP, SOLENOID WIRE (2)
80 BOLT, M6 X 1 X 45
81 BOLT, M6 X 1 X 60
82 CLIP, FILTER RETAINER

Figure 158

Continued from Page 78

35. Install new "O" ring onto the lock-up solenoid and lubricate with small amount of "Trans-Jel" as shown in Figure 158.
36. Install the lock-up solenoid into the pump bore and install retaining bolts as shown in Figure 158.
37. Install the wire harness clips and the remaining valve body bolts as shown in Figure 158.
38. Torque all valve body bolts to 107 in.lbs.
39. Torque solenoid bolts to 107 in.lbs.
40. Connect the wiring harness internally to case connector as shown in Figure 158.
41. Connect the wire harness to the fourth clutch switch (See Figure 158).



64 SCREW, CONICAL WASHER ASSEMBLY
65 PAN, TRANSMISSION OIL
66 GASKET, PAN
67 SEAL ASSEMBLY, FILTER NECK
68 FILTER ASSEMBLY, TRANSMISSION OIL
85 MAGNET, CHIP COLLECTOR

Figure 159

42. Install ***two"O"rings*** onto the filter neck shown in Figure 159, and lubricate with small amount of "Trans-Jel".
43. Install the oil filter assembly.
44. Install new pan gasket onto the case.
45. Install magnet into the oil pan in the location shown in Figure 159.
46. Install the oil pan onto the transmission and all retaining bolts.
47. Torque the bottom pan bolts to 12 ft.lbs.

TORQUE CONVERTER ASSEMBLY

1. The torque converter must be replaced for any of the following:
   - Evidence of damage to the pump assembly.
   - Metal particles are found after flushing the cooler and cooler lines.
   - External leaks in welded areas.
   - Converter pilot is broken, damaged, or poor fit in the crankshaft.
   - Converter hub is scored and/or damaged.
   - Contamination from engine coolant.
   - Excessive converter end play.
2. Install torque converter end play checking tool J-35138 into converter as shown in Figure 160.
3. Install dial indicator as shown in Figure 160, and measure converter end play.
4. End play should be .005" to .040". for a torque converter already in service.
5. Inspect the thread area of the converter lugs for damage, and repair with heli-coil if it is necessary.
6. Fill the converter with two quarts of fresh transmission fluid before installing onto the transmission.

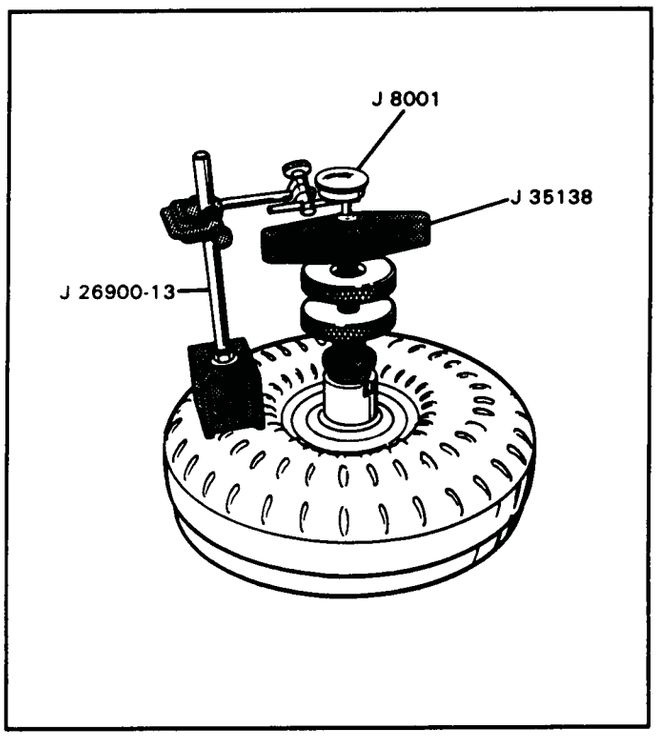
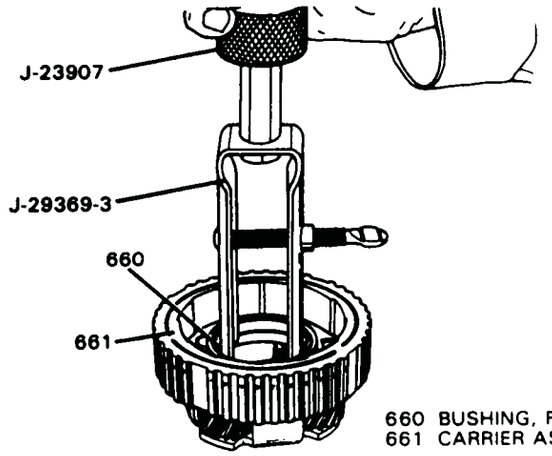
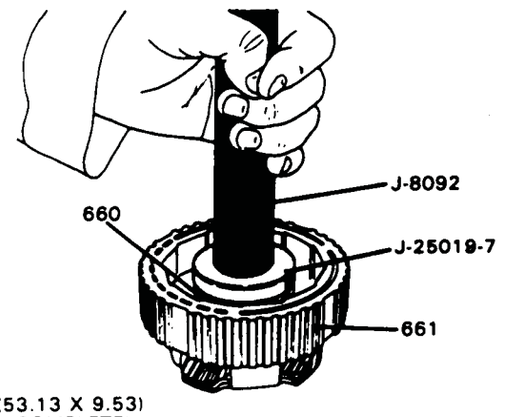


Figure 160

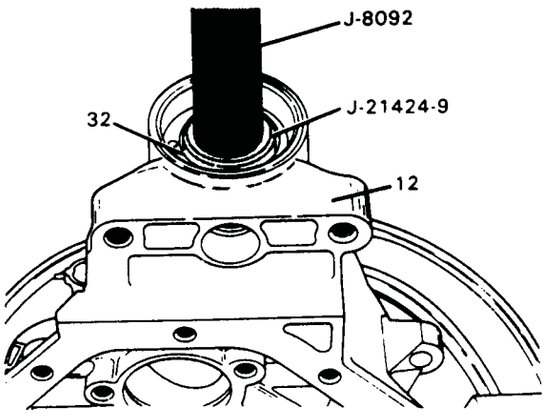
BUSHING REPLACEMENT PROCEDURE
PROTECT PARTS WITH WOOD BLOCKS
OR CLOTH AS NECESSARY

REMOVE AS SHOWN	INSTALL AS SHOWN

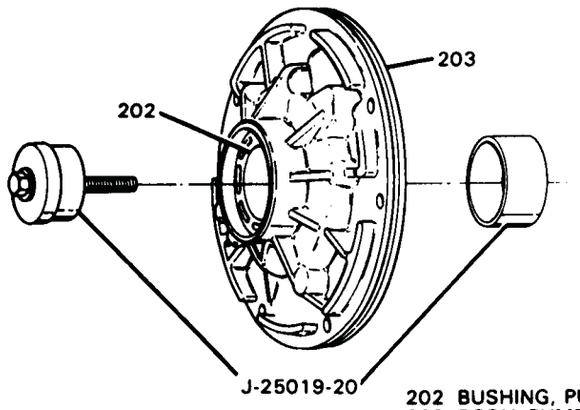


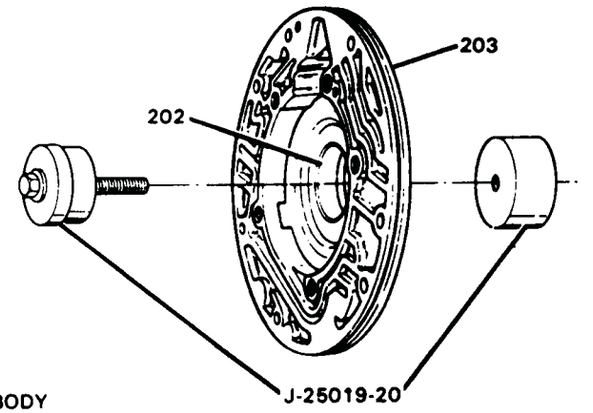


660 BUSHING, REAR CARRIER (53.13 X 9.53)
661 CARRIER ASSEMBLY, REAR (COMPLETE)



12 CASE & BUSHING ASSEMBLY
32 BUSHING, CASE REAR



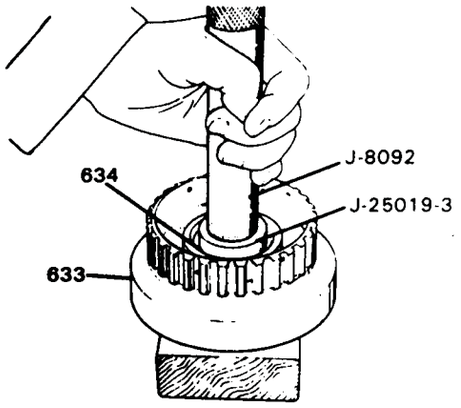


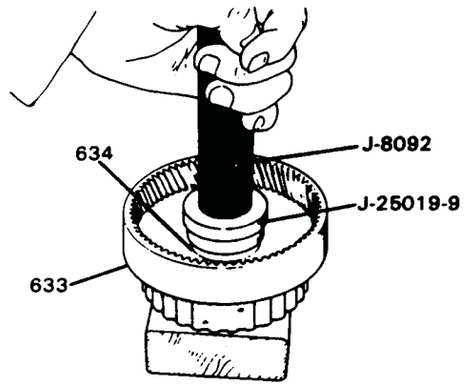
202 BUSHING, PUMP BODY
203 BODY, PUMP

Figure 161

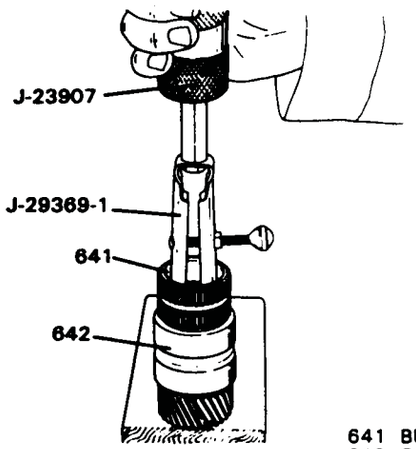
BUSHING REPLACEMENT PROCEDURE
PROTECT PARTS WITH WOOD BLOCKS
OR CLOTH AS NECESSARY

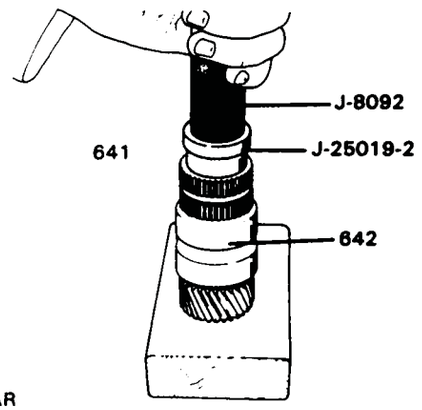
REMOVE AS SHOWN	INSTALL AS SHOWN



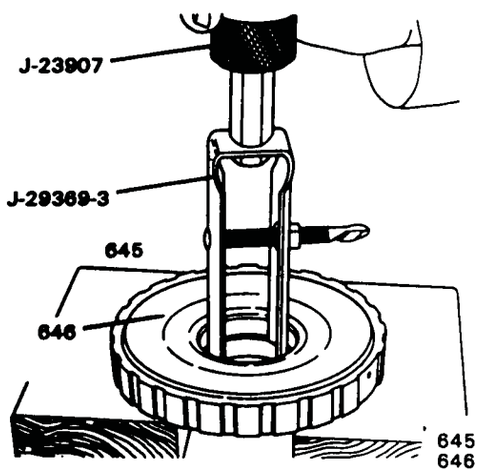


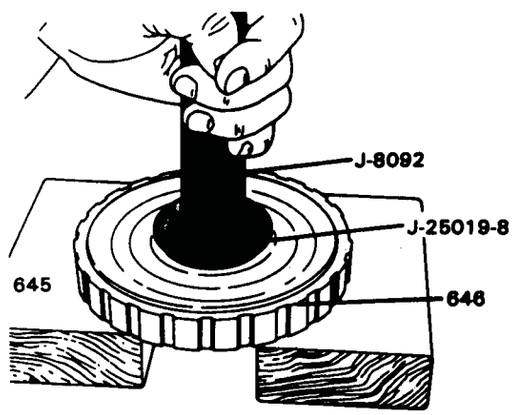
633 GEAR, FRONT INTERNAL
634 BUSHING, FRONT INTERNAL GEAR





641 BUSHING, REAR SUN GEAR
642 GEAR, REAR SUN



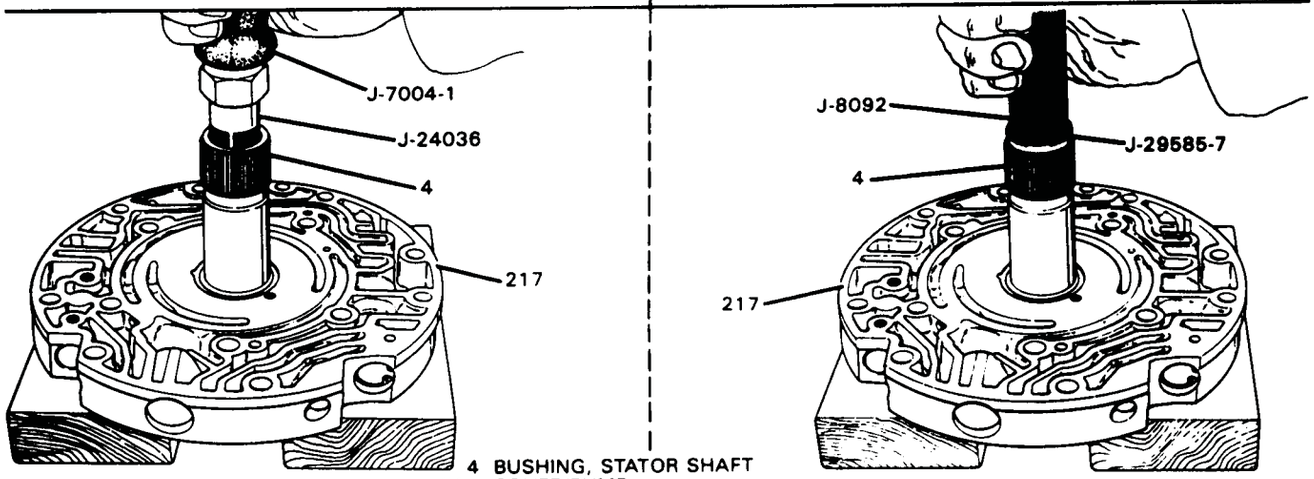


645 BUSHING, LO & REVERSE HOUSING
646 HOUSING ASSEMBLY, LO & REVERSE CLUTCH

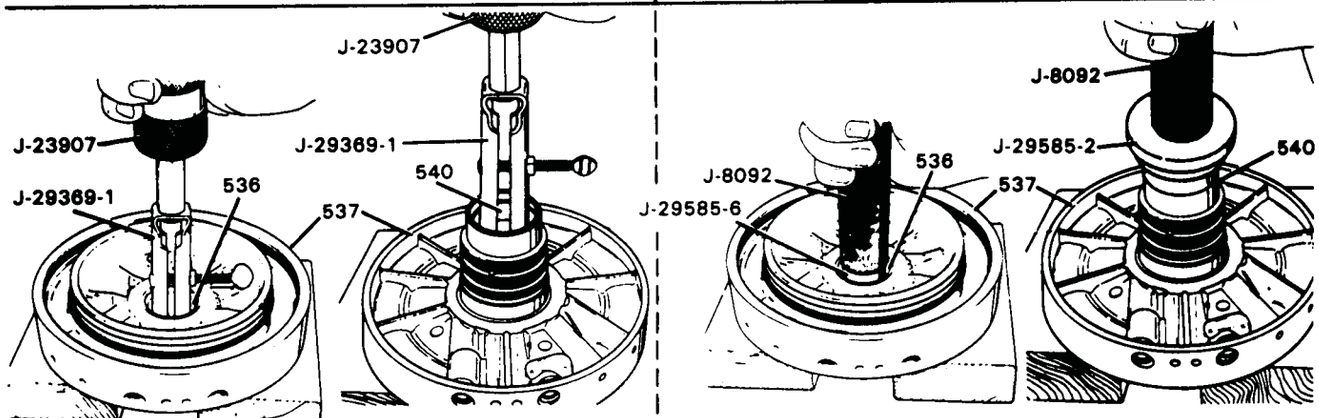
Figure 162

BUSHING REPLACEMENT PROCEDURE
PROTECT PARTS WITH WOOD BLOCKS
OR CLOTH AS NECESSARY

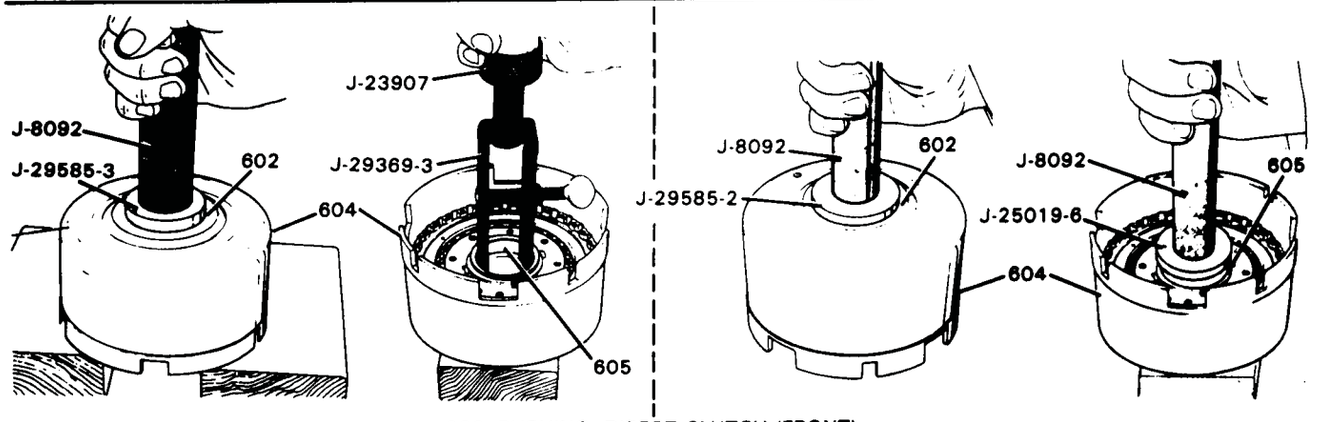
REMOVE AS SHOWN | **INSTALL AS SHOWN**



4 BUSHING, STATOR SHAFT
217 COVER/PUMP



536 BUSHING, CENTER SUPPORT (29.8 O.D. X 11.0)
537 SUPPORT, CENTER
540 BUSHING, CENTER SUPPORT (33.8 O.D. X 11.0)

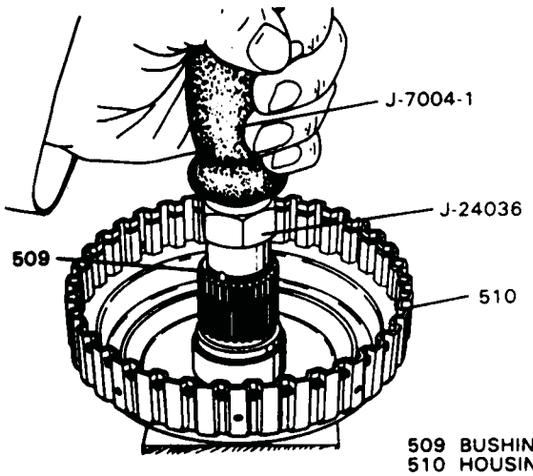


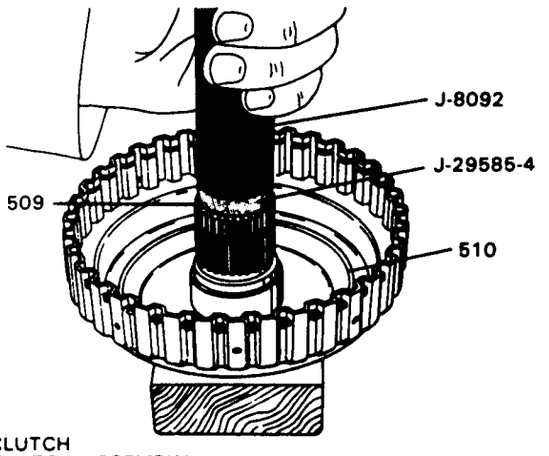
602 BUSHING, DIRECT CLUTCH (FRONT)
604 HOUSING & DRUM ASSEMBLY, DIRECT CLUTCH
605 BUSHING, DIRECT CLUTCH (REAR)

Figure 163

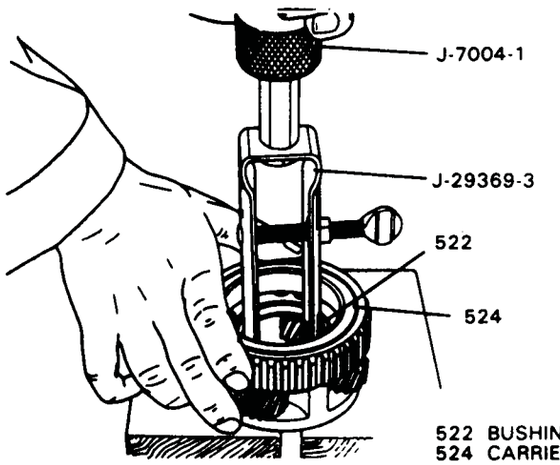
BUSHING REPLACEMENT PROCEDURE
PROTECT PARTS WITH WOOD BLOCKS OR CLOTH AS NECESSARY

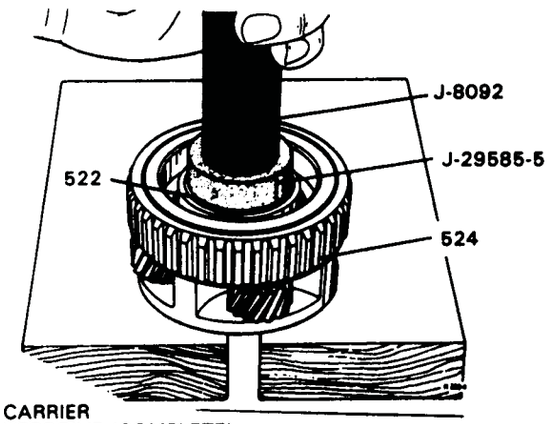
REMOVE AS SHOWN	INSTALL AS SHOWN



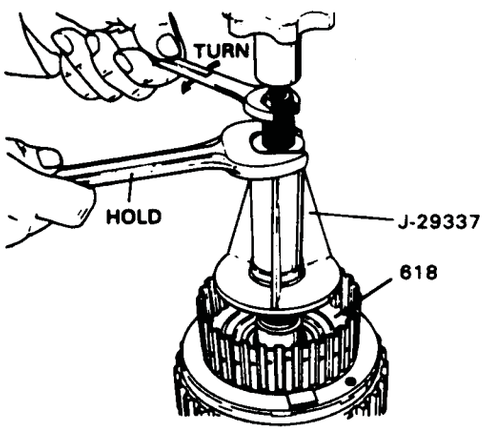


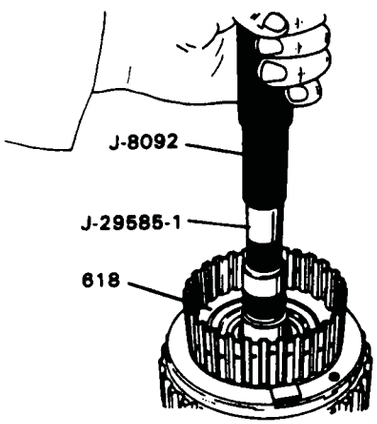
509 BUSHING, OVERRUN CLUTCH
510 HOUSING, OVERRUN CLUTCH ASSEMBLY





522 BUSHING, OVERDRIVE CARRIER
524 CARRIER ASSEMBLY, OVERDRIVE (COMPLETE)





618 HOUSING ASSEMBLY, FORWARD CLUTCH

Figure 164

200-4R CLUTCH PLATE AND APPLY RING USAGE CHART

	OVERRUN CLUTCH			FOURTH CLUTCH			DIRECT CLUTCH				
	FLAT STEEL PLATE		COMP. FACED PLATE	FLAT STEEL PLATE		COMP. FACED PLATE	FLAT STEEL PLATE		COMP. FACED PLATE	APPLY RING	
	No.	Thickness	No.	No.	Thickness	No.	No.	Thickness	No.	I.D.	Width
	2	1.969mm (.077")	2	3	1.969mm (.077")	2	6	2.324mm (.091")	6	19	12.5mm (.492")

	FORWARD CLUTCH					LO & REVERSE CLUTCH						
	WAVE PLATE		FLAT STEEL PLATE		COMP. FACED PLATE	WAVE PLATE		FLAT STEEL PLATE		COMP. FACED PLATE	APPLY RING	
	No.	Thickness	No.	Thickness	No.	No.	Thickness	No.	Thickness	No.	I.D.	Width
	2	1.585mm (.062")	3	1.969mm (.077")	4	1	1.969mm (.077")	7	1.969mm (.077")	6	0	13.13mm (.516")

Figure 165

TORQUE SPECIFICATIONS

DESCRIPTION OF USAGE	QUANTITY	SIZE	TORQUE ASSEMBLY
LINE PRESSURE TAKE-OFF AND DIRECT CLUTCH PRESSURE TAKE-OFF	2	1/8-27 NPTF	7.0-14.0 N·m (5-10 ft.-lbs.)
COOLER CONNECTOR	2	1/4-18 NPSF	35.0-40.0 N·m (26-30 ft.-lbs.)
VALVE BODY ASSEMBLY TO CASE	15	M6 x 1.0	13.0-17.0 N·m (9-12 ft.-lbs.)
SPEEDO RETAINER TO CASE	1	M6 x 1.0	8.0-14.0 N·m (6-10 ft.-lbs.)
PUMP BODY TO PUMP COVER	5	M8 x 1.25	20.0-27.0 N·m (15-20 ft.-lbs.)
PUMP ASSEMBLY TO CASE	7	M8 x 1.25	20.0-27.0 N·m (15-20 ft.-lbs.)
PARKING LOCK BRACKET TO CASE	2	M8 x 1.25	20.0-27.0 N·m (15-20 ft.-lbs.)
TRANSMISSION OIL PAN TO CASE	16	M8 x 1.25	8.0-14.0 N·m (6-10 ft.-lbs.)
MANUAL SHAFT TO INSIDE DETENT LEVER (NUT)	1	M10 x 1.5	27.0-34.0 N·m (20-25 ft.-lbs.)
STATOR SHAFT TO PUMP COVER	3	M6 x 1.0	10.0-14.0 N·m (7-10 ft.-lbs.)
CASE TO CENTER SUPPORT	2	M10 x 1.5	20.0-27.0 N·m (15-20 ft.-lbs.)
SOLENOID TO CASE	2	M6 x 1.0	10.0-14.0 N·m (7-10 ft.-lbs.)
PRESSURE SWITCH	1	1/8-27 NPTF	7.0-14.0 N·m (5-10 ft.-lbs.)
ACCUMULATOR HOUSING TO CASE	5	M6 x 1.0	10.0-14.0 N·m (7-10 ft.-lbs.)
GOVERNOR COVER TO CASE	4	M8 x 1.25	20.0-27.0 N·m (15-20 ft.-lbs.)

Figure 166

REQUIRED SPECIAL TOOLS

TOOL NO.	NAME	TOOL NO.	NAME
J-29332	OUTPUT SHAFT LOADING FIXTURE ADAPTER	J-25015	OIL PUMP BODY AND COVER ALIGNMENT BAND
J-25013-1	REAR UNIT SUPPORT	J-25016	FRONT OIL PUMP SEAL INSTALLER
J-24773-5	OIL PUMP REMOVER SCREW	J-25018-A	FORWARD CLUTCH SPRING COMPRESSOR ADAPTER
J-24773-A	OIL PUMP REMOVER & END PLAY CHECKING FIXTURE	J-25022	OIL PUMP END-PLAY CHECKING FIXTURE ADAPTER
J-29334	FOURTH CLUTCH COMPRESSOR & CENTER SUPPORT REMOVER	J-25024	FORWARD CLUTCH SPRING COMPRESSOR
J-29335	INNER OVERRUN CLUTCH PISTON SEAL PROTECTOR	J-25025-A	ALIGNMENT PIN & STUD SET
J-29337	FORWARD & DIRECT CLUTCH UNIT FIXTURE	J-28542	REVERSE CLUTCH HOUSING INSTALLER & REMOVER
J-8763-02	HOLDING FIXTURE	J-29060	TORQUE CONVERTER CLUTCH END-PLAY FIXTURE
J-3289-20	HOLDING FIXTURE BASE	J-7004	SLIDE HAMMER
J-25359-3	#27 TORX BIT	J-8001	DIAL INDICATOR SET
J-26744-A	SEAL INSTALLER	or	
J-21426	REAR OIL SEAL INSTALLER	J-26900-12	DIAL INDICATOR SET
J-23327	CLUTCH SPRING COMPRESSOR	J-8092	DRIVER HANDLE
J-25010	DIRECT CLUTCH SEAL PROTECTOR	J-29696	TURBINE SHAFT SEAL INSTALLER
J-25011	REVERSE CLUTCH SEAL PROTECTOR		
J-25014	INTERMEDIATE BAND APPLY PIN GAGE		

STANDARD TOOLS

SPEED HANDLE WRENCH, 3/8" DRIVE
10mm, 13mm & 24mm SOCKETS, 3/8" DRIVE
SMALL FLAT EDGE SCREWDRIVER & LONG FLAT EDGE SCREWDRIVER
PLASTIC OR RUBBER HAMMER
NO. 4 EASY OUT OR EQUIVALENT
"T" HANDLE TAP WRENCH
3mm (1/8"), 5mm (3/16") & 6.4mm (1/4") PUNCH
FEELER GAGE FROM 0.04mm - 2.40mm
EXPANDING TYPE SNAP RING PLIERS
CONTRACTING TYPE SNAP RING PLIERS
NEEDLE NOSE PLIERS
NEWTON METER (INCH POUND & FOOT POUND) TORQUE WRENCH
#49 DRILL
300mm (12") SCALE
PLIERS

Figure 167

CASE AND EXTERNAL PARTS

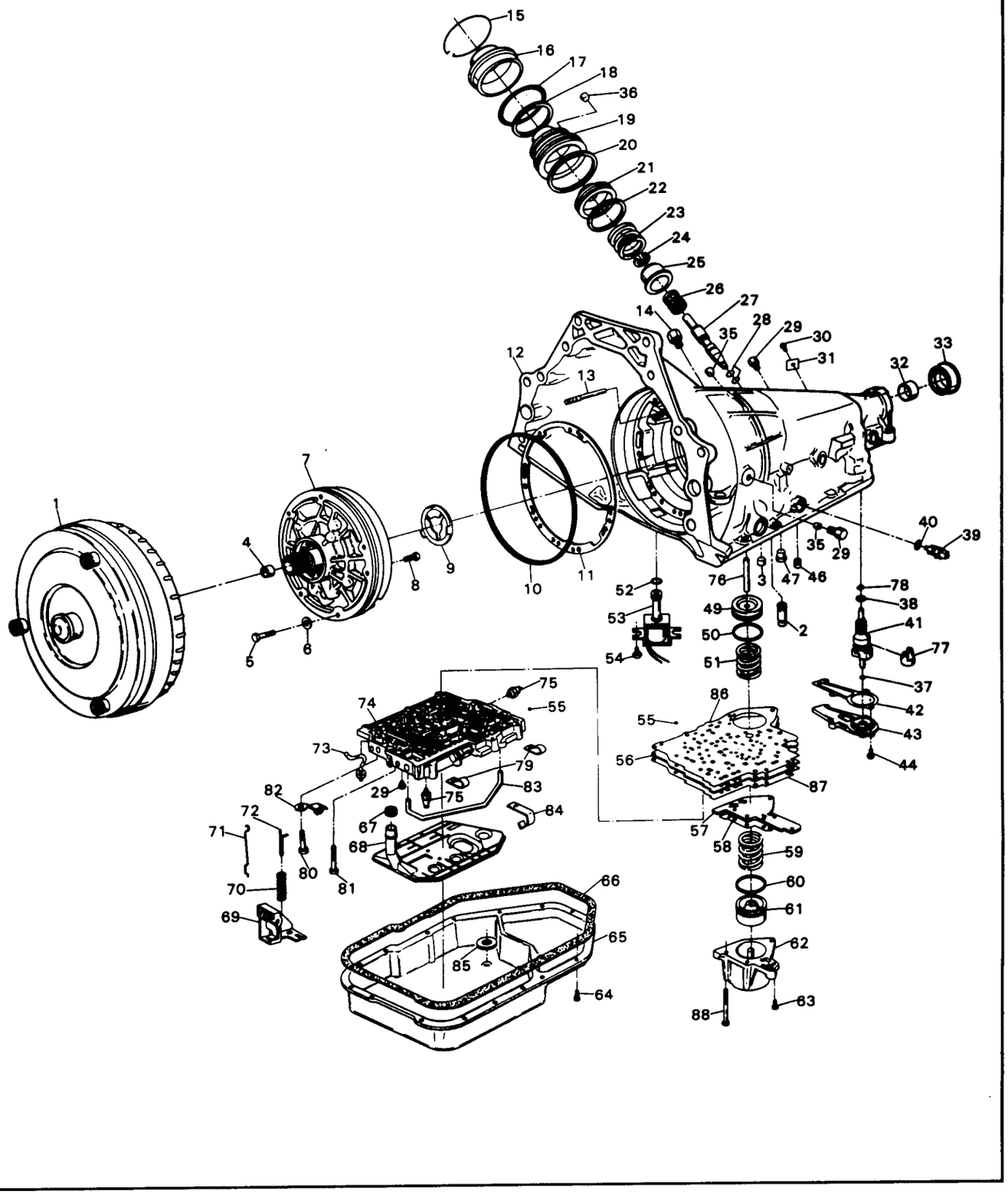


Figure 168

CASE AND EXTERNAL PARTS LEGEND

1 CONVERTER ASSEMBLY, COMPLETE
2 RETAINER & BALL ASSEMBLY, 3RD ACCUMULATOR
3 PLUG, CUP (LUBE HOLE) (8.05 DIA.)
4 BUSHING, STATOR SHAFT
5 BOLTS, M8 X 1.25 X 62
6 WASHER, PUMP TO CASE BOLTS
7 PUMP ASSEMBLY, COMPLETE
8 BOLT, PUMP COVER TO BODY
9 WASHER, THRUST (HOUSING TO PUMP)
10 SEAL, RING (PUMP TO CASE)
11 GASKET, PUMP COVER TO CASE
12 CASE & BUSHING ASSEMBLY
13 PIPE, VENT
14 CONNECTOR, INVERTED FLARE (BRASS)
15 RING, SERVO COVER RETAINING
16 COVER, INTERMEDIATE SERVO
17 SEAL, "O" RING (INTERMEDIATE SERVO COVER)
18 RING, OIL SEAL (INNER)
19 PISTON, INTERMEDIATE SERVO (OUTER)
20 RING, OIL SEAL (OUTER)
21 PISTON, INTERMEDIATE SERVO (INNER)
22 RING, OIL SEAL PISTON (INNER)
23 SPRING, INTERMEDIATE SERVO CUSHION
24 RING, SNAP (APPLY PIN/RETAINER)
25 RETAINER, SERVO SPRING
26 SPRING, INTERMEDIATE SERVO (INNER)
27 PIN, INTERMEDIATE BAND APPLY (SELECTIVE)
28 RING, OIL SEAL (INTERMEDIATE BAND APPLY PIN)
29 PLUG, HEX HEAD 1/8" PIPE (2)
30 SCREW, TRUSS HEAD DRIVE (NAMEPLATE)
31 NAMEPLATE
32 BUSHING, CASE REAR
33 SEAL ASSEMBLY, REAR OIL
34 GEAR, SPEEDO DRIVEN (GOVERNOR)
35 PLUG, CUP (4TH ACCUMULATOR OR SERVO) (2)
36 PLUG, CUP (ORIFICE)
37 RING, OIL SEAL
38 WASHER, THRUST (GOVERNOR DRIVEN GEAR/CASE)
39 CONNECTOR, ELECTRICAL
40 SEAL, "O" RING (ELECTRICAL CONNECTOR)
41 GOVERNOR ASSEMBLY, COMPLETE
42 GASKET, GOVERNOR COVER
43 COVER ASSEMBLY, GOVERNOR
44 SCREW, GOVERNOR COVER
46 SEAL, REVERSE OIL (CASE TO HOUSING)
47 PIN, BAND ANCHOR
49 PISTON, 3-4 ACCUMULATOR
50 RING, OIL SEAL (3-4 ACCUMULATOR PISTON)
51 SPRING, 3-4 ACCUMULATOR
52 SEAL, "O" RING (SOLENOID)
53 SOLENOID ASSEMBLY
54 BOLTS, HEX WASHER HEAD M6 X 1 X 12.0
55 BALL, .25 DIAMETER
56 PLATE, VALVE BODY SPACER
57 PLATE, ACCUMULATOR
58 GASKET, ACCUMULATOR HSG. TO ACCUM. PLATE
59 SPRING, 1-2 ACCUMULATOR PISTON
60 RING, OIL SEAL (1-2 ACCUMULATOR PISTON)
61 PISTON, 1-2 ACCUMULATOR
62 HOUSING & PIN ASSEMBLY, 1-2 ACCUMULATOR
63 BOLT, ACCUMULATOR HOUSING
64 SCREW, CONICAL WASHER ASSEMBLY
65 PAN, TRANSMISSION OIL
66 GASKET, PAN
67 SEAL ASSEMBLY, FILTER NECK
68 FILTER ASSEMBLY, TRANSMISSION OIL
69 LEVER & BRACKET ASSEMBLY, THROTTLE
70 SPRING, LIFTER (T.V. EXHAUST VALVE)
71 LINK, THROTTLE LEVER TO CABLE
72 LIFTER, T.V. EXHAUST
73 SWITCH, PRESSURE 4-3
74 VALVE ASSEMBLY, CONTROL
75 SWITCH ASSEMBLY, PRESSURE (3RD OR 4TH)
76 PIN, ACCUMULATOR PISTON
77 CLIP, SPEEDO DRIVE GEAR
78 RING, GOVERNOR GEAR RETAINER
79 CLIP, SOLENOID WIRE (2)
80 BOLT, M6 X 1 X 45
81 BOLT, M6 X 1 X 60
82 CLIP, FILTER RETAINER
83 PIPE, SIGNAL OIL
84 RETAINER, SIGNAL OIL PIPE
85 MAGNET, CHIP COLLECTOR
86 GASKET, SPACER PLATE TO CASE
87 GASKET, VALVE BODY TO SPACER PLATE
88 BOLT, ACCUMULATOR HOUSING

Figure 169

INTERNAL COMPONENTS

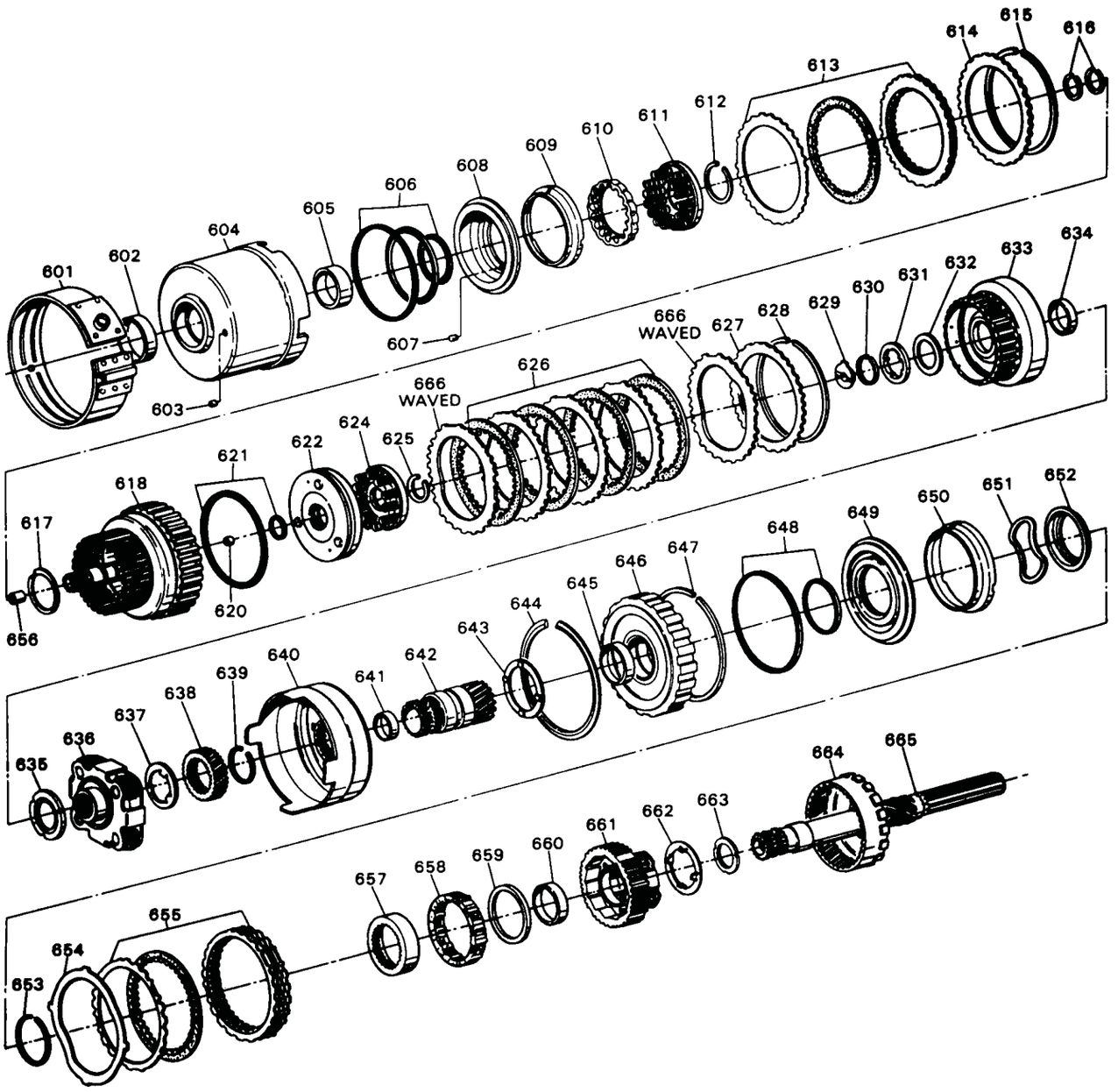


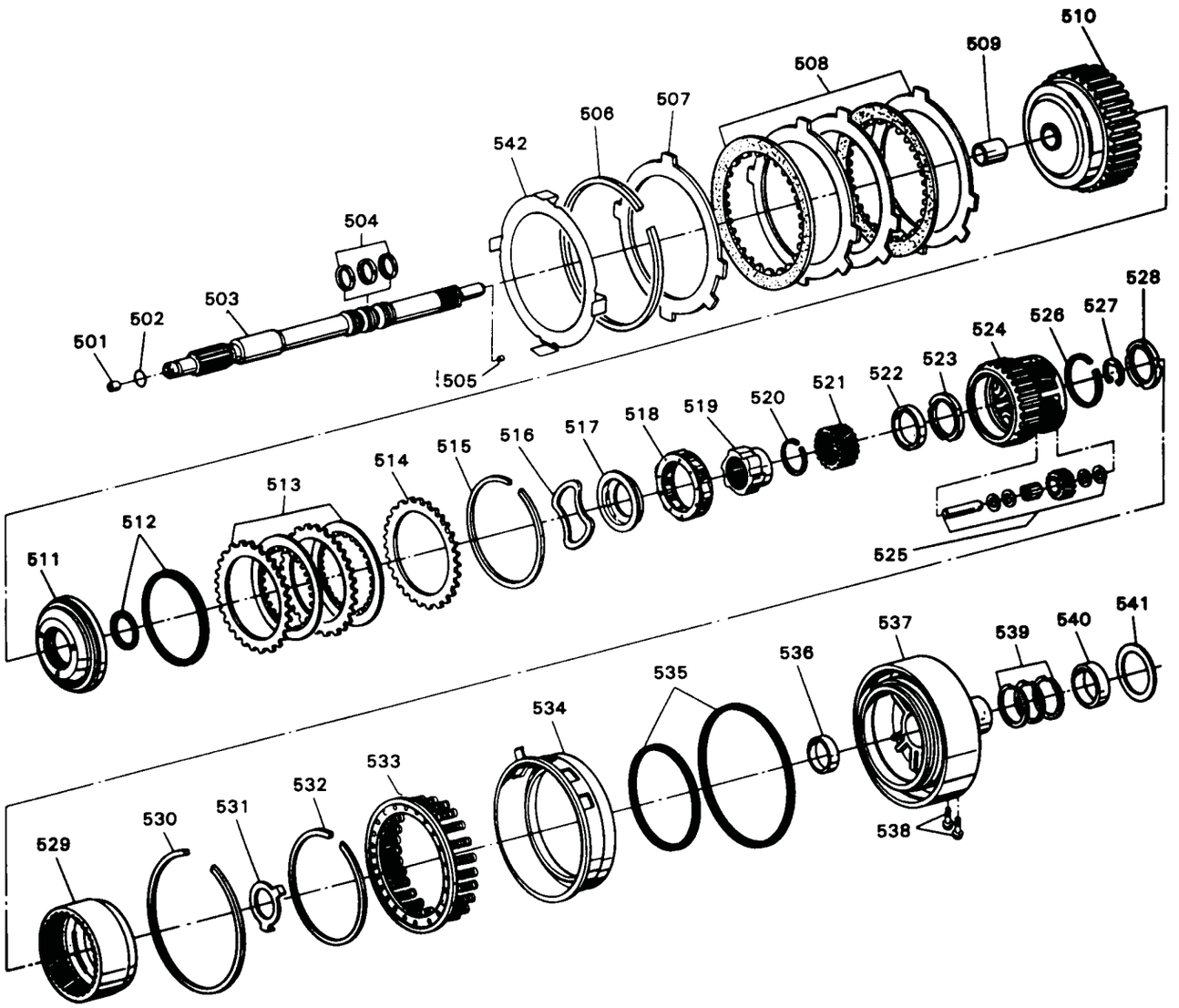
Figure 170

INTERNAL COMPONENTS LEGEND

601 BAND ASSEMBLY, INTERMEDIATE
602 BUSHING, DIRECT CLUTCH (FRONT)
603 RETAINER & BALL ASSEMBLY, CHECK VALVE
604 HOUSING & DRUM ASSEMBLY, DIRECT CLUTCH
605 BUSHING, DIRECT CLUTCH (REAR)
606 SEALS, DIRECT CLUTCH PISTON
607 RETAINER & BALL ASSEMBLY, CHECK VALVE
608 PISTON ASSEMBLY, DIRECT CLUTCH
609 RING, CLUTCH APPLY (DIRECT)
610 GUIDE, RELEASE SPRING
611 RETAINER & SPRING ASSEMBLY, DIRECT CLUTCH
612 RING, SNAP (SPRING RETAINER)
613 PLATE ASSEMBLY, DIRECT CLUTCH
614 PLATE, CLUTCH BACKING
615 RING, SNAP (DIRECT CLUTCH HOUSING)
616 SEALS, RING (FORWARD CLUTCH SHAFT) TEF
617 WASHER, THRUST (DIRECT/FORWARD CLUTCH)
618 HOUSING ASSEMBLY, FORWARD CLUTCH
620 PLUG, CUP (4.8 DIAMETER)
621 SEALS, FORWARD CLUTCH PISTON (PACKAGE)
622 PISTON ASSEMBLY, FORWARD CLUTCH
624 RETAINER & SPRING ASSEMBLY, FORWARD
625 RING, SNAP (FORWARD SPRING RETAINER)
626 PLATE, FORWARD CLUTCH (FLAT)
627 PLATE, CLUTCH BACKING (SELECTIVE)
628 RING, SNAP (FORWARD CLUTCH HOUSING)
629 WASHER, THRUST (FORWARD CL./OUTPUT) (SEL.)
630 RING, SNAP (OUTPUT SHAFT)
631 WASHER, THRUST (SELECTIVE REAR)
632 WASHER, THRUST (INTERNAL GEAR/REAR SEL.)
633 GEAR, FRONT INTERNAL
634 BUSHING, FRONT INTERNAL GEAR
635 BEARING ASM., ROLLER (INTERNAL GEAR/CARRIER)
636 CARRIER ASSEMBLY, FRONT (COMPLETE)
637 BEARING ASSEMBLY, THRUST (FRT. CARRIER/SUN)
638 GEAR, FRONT SUN
639 RING, SNAP (INPUT DRUM/REAR SUN)
640 DRUM, INPUT
641 BUSHING, REAR SUN GEAR
642 GEAR, REAR SUN
643 WASHER, THRUST (INPUT DRUM/HOUSING)
644 RING, SNAP (HOUSING/CASE)
645 BUSHING, LO & REVERSE HOUSING
646 HOUSING ASSEMBLY, LO & REVERSE CLUTCH
647 SPACER, HOUSING TO CASE
648 SEALS, LO & REVERSE PISTON (INNER/OUTER)
649 PISTON ASSEMBLY, LO & REVERSE CLUTCH
650 RING, CLUTCH APPLY (13.13mm)
651 SPRING, WAVE (REVERSE CLUTCH RELEASE)
652 RETAINER, LO & REVERSE CLUTCH SPRING
653 RING, SNAP (RETAINER/HOUSING)
654 PLATE, LO & REVERSE CLUTCH (WAVE)
655 PLATE, LO & REVERSE CLUTCH (1.969 MST)
656 BUSHING, FORWARD CLUTCH HOUSING
657 RACE, LO ROLLER CLUTCH
658 ROLLER ASSEMBLY, LO CLUTCH
659 BEARING, THRUST (REAR CAM/LO RACE)
660 BUSHING, REAR CARRIER (53.13 X 9.53)
661 CARRIER ASSEMBLY, REAR (COMPLETE)
662 WASHER, THRUST (REAR CARRIER/INTERNAL GEAR)
663 BEARING ASSEMBLY, ROLLER THRUST (SUN/INT.)
664 GEAR, REAR INTERNAL
665 SHAFT, OUTPUT
666 PLATE, CLUTCH 1.585 (WAVED)

Figure 171

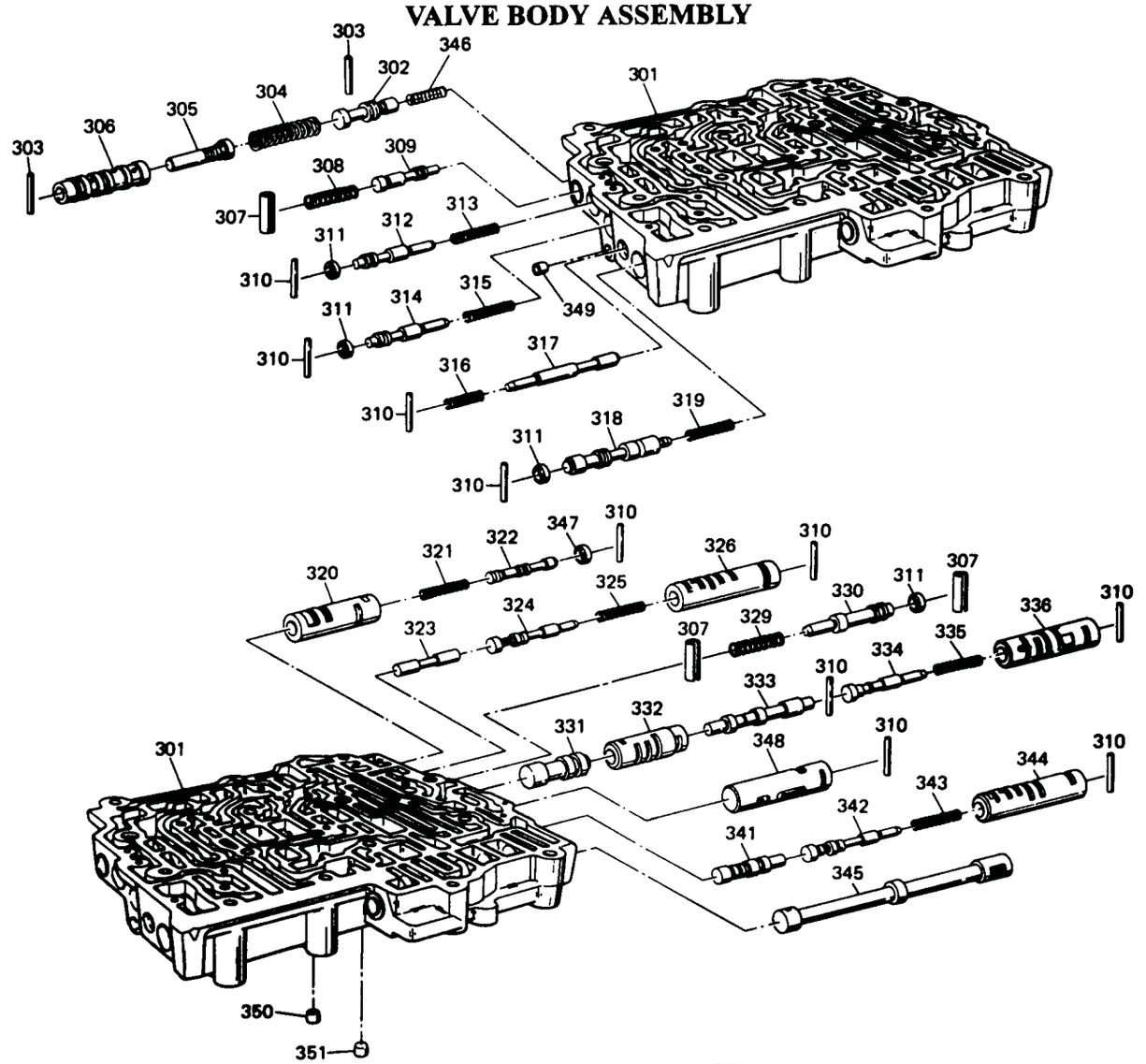
OVERDRIVE COMPONENTS



501 RETAINER & BALL ASSEMBLY, CHECK VALVE
502 SEAL, "O" RING (TURBINE SHAFT/SELECTIVE WASHER)
503 SHAFT, TURBINE
504 RING, OIL SEAL (TURBINE SHAFT)
505 PLUG, TURBINE SHAFT (4.80 DIA.)
506 RING, SNAP (4TH CLUTCH RETAINER IN CASE)
507 PLATE, 4TH CLUTCH BACKING
508 PLATE ASSEMBLY, 4TH CLUTCH
509 BUSHING, OVERRUN CLUTCH
510 HOUSING, OVERRUN CLUTCH ASSEMBLY
511 PISTON ASSEMBLY, OVERRUN CLUTCH
512 SEALS, OVERRUN CLUTCH (INNER/OUTER)
513 PLATE ASSEMBLY, OVERRUN CLUTCH
514 PLATE, OVERRUN CLUTCH BACKING
515 RING, SNAP (OVERRUN CLUTCH HOUSING)
516 SPRING, WAVE (OVERRUN CLUTCH RELEASE)
517 RETAINER, OVERRUN CLUTCH RELEASE SPRING
518 ROLLER ASSEMBLY, OVERDRIVE CLUTCH
519 CAM, OVERDRIVE ROLLER CLUTCH
520 RING, SNAP (OVERRUN CLUTCH HUB)
521 GEAR, OVERDRIVE SUN
522 BUSHING, OVERDRIVE CARRIER
523 BEARING ASSEMBLY, THRUST (CARRIER/SUN)
524 CARRIER ASSEMBLY, OVERDRIVE (COMPLETE)
525 PINION ASSEMBLY, OVERDRIVE CARRIER
526 RING, SNAP (OVERDRIVE CARRIER)
527 RING, SNAP (TURBINE SHAFT/CARRIER)
528 BEARING ASM., THRUST (CARRIER/INTERNAL GEAR)
529 GEAR, OVERDRIVE INTERNAL
530 RING, SNAP (CENTER SUPPORT TO CASE)
531 WASHER, THRUST (INTERNAL GEAR/SUPPORT)
532 RING, SNAP (SUPPORT/4TH CLUTCH SPRING)
533 RETAINER & SPRING ASSEMBLY, 4TH CLUTCH
534 PISTON, 4TH CLUTCH
535 SEALS, 4TH CLUTCH (INNER & OUTER)
536 BUSHING, CENTER SUPPORT (29.8 O.D. X 11.0)
537 SUPPORT, CENTER
538 SCREW, FLANGED (MOD) M10 X 1.5 X 23.0
539 RING, OIL SEAL (CENTER SUPPORT)
540 BUSHING, CENTER SUPPORT (33.8 O.D. X 11)
541 WASHER, THRUST (SUPPORT/DIRECT CLUTCH)
542 PLATE, OIL DEFLECTOR

Figure 172

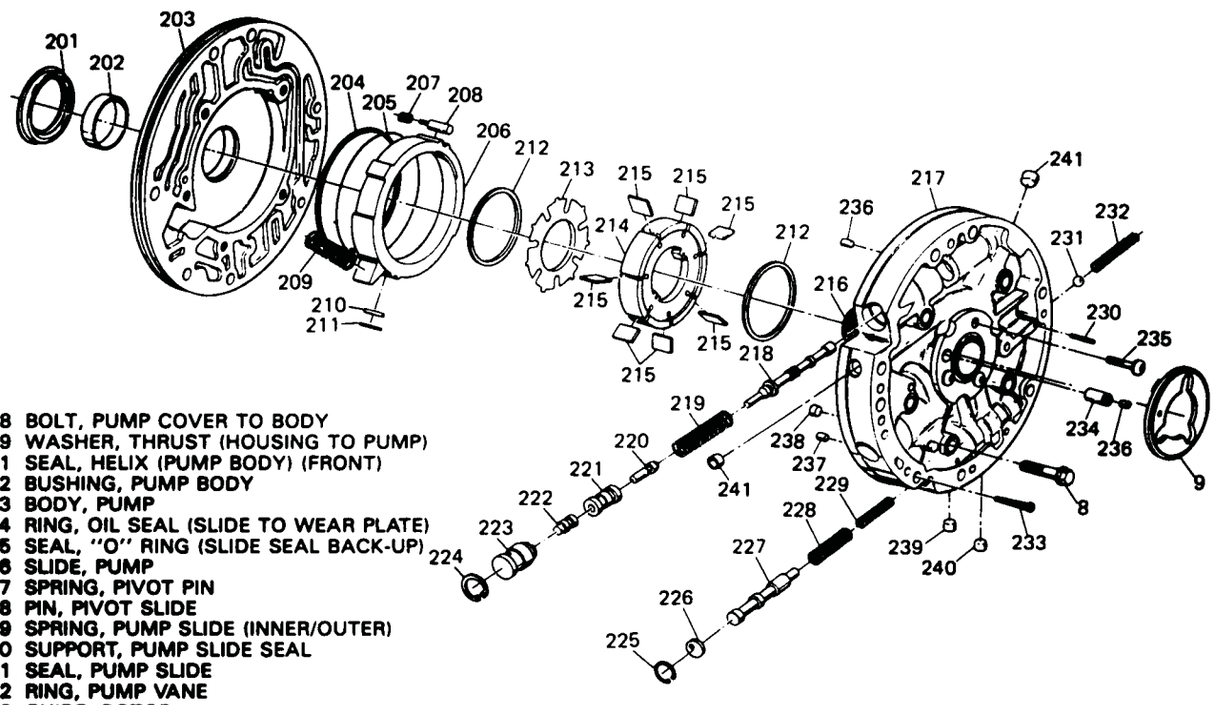
VALVE BODY ASSEMBLY



301 BODY, CONTROL VALVE
302 VALVE, THROTTLE
303 PIN, COILED SPRING 2.72 X 25 (2)
304 SPRING, THROTTLE VALVE
305 PLUNGER, THROTTLE VALVE
306 BUSHING, THROTTLE VALVE PLUNGER
307 SLEEVE, SPRING RETAINING (3)
308 SPRING, T.V. LIMIT VALVE
309 VALVE, T.V. LIMIT
310 PIN, COILED SPRING 2.72 X 20 (10)
311 PLUG, VALVE BORE 12.5mm (4)
312 VALVE, T.V. MODULATOR DOWNSHIFT
313 SPRING, T.V. MODULATOR DOWNSHIFT VALVE (SOME MODELS)
314 VALVE, T.V. MODULATOR UPSHIFT
315 SPRING, T.V. MODULATOR UPSHIFT VALVE (SOME MODELS)
316 SPRING, 3-2 CONTROL VALVE
317 VALVE, 3-2 CONTROL
318 VALVE, LINE BIAS
319 SPRING, LINE BIAS VALVE
320 BUSHING, ACCUMULATOR VALVE
321 SPRING, ACCUMULATOR VALVE
322 VALVE, ACCUMULATOR
323 VALVE, 3-4 SHIFT
324 VALVE, 3-4 THROTTLE
325 SPRING, 3-4 THROTTLE VALVE
326 BUSHING, 3-4 THROTTLE VALVE
329 SPRING, LO OVERRUN CLUTCH VALVE
330 VALVE, LO OVERRUN CLUTCH
331 VALVE, 1-2 SHIFT
332 BUSHING, LO-1ST/DETENT VALVE
333 VALVE, LO-1ST/DETENT
334 VALVE, 1-2 THROTTLE
335 SPRING, 1-2 THROTTLE VALVE
336 BUSHING, 1-2 THROTTLE VALVE
341 VALVE, 2-3 SHIFT
342 VALVE, 2-3 THROTTLE
343 SPRING, 2-3 THROTTLE VALVE
344 BUSHING, 2-3 THROTTLE VALVE
345 VALVE, MANUAL
346 SPRING, THROTTLE VALVE BOOST
347 PLUG, VALVE BORE (.56 DIA.)
348 PLUG, CONVERTER CLUTCH T.V. BORE
349 PLUG, CUP (7)
350 PLUG, CUP 4TH EXHAUST
351 PLUG, CUP 2-1 COASTDOWN

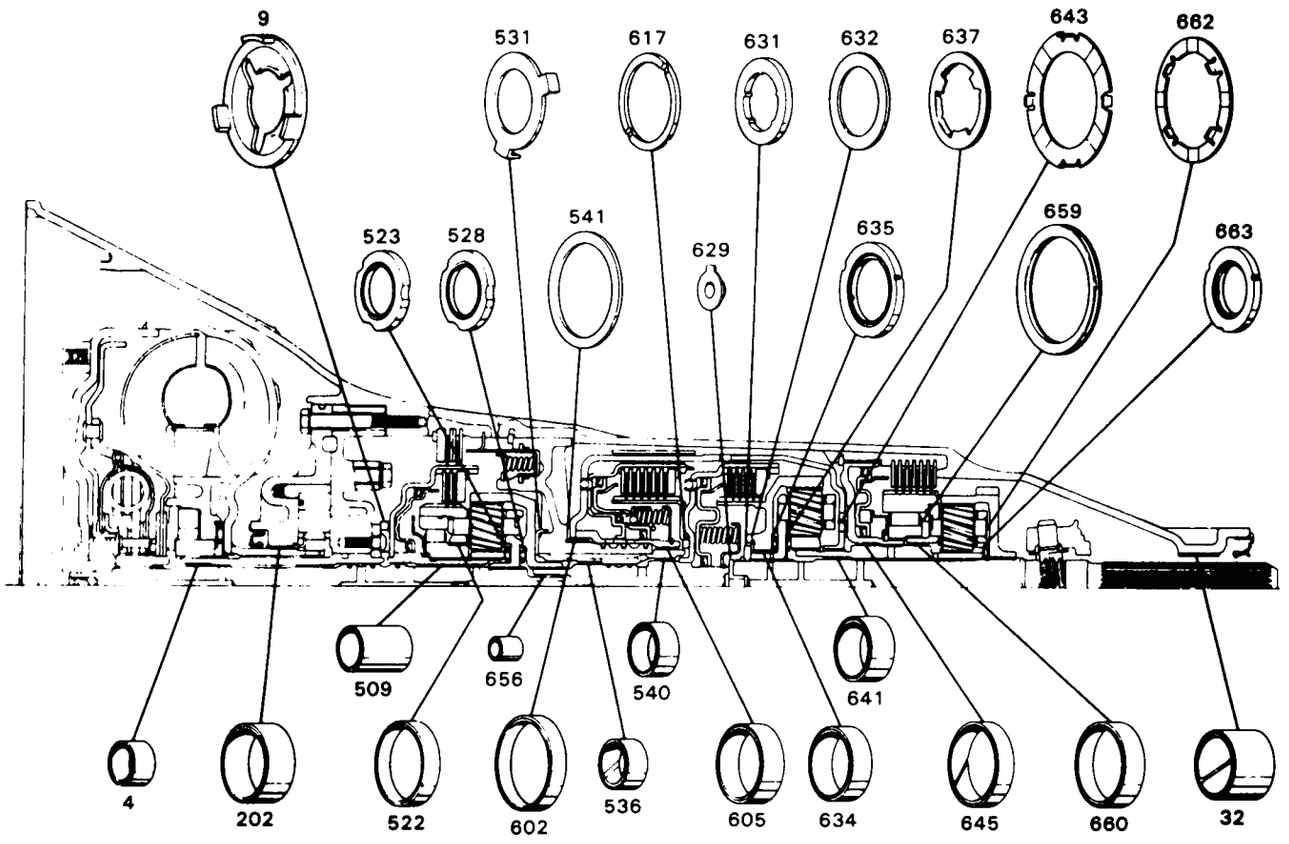
Figure 173

OIL PUMP ASSEMBLY



8 BOLT, PUMP COVER TO BODY
9 WASHER, THRUST (HOUSING TO PUMP)
201 SEAL, HELIX (PUMP BODY) (FRONT)
202 BUSHING, PUMP BODY
203 BODY, PUMP
204 RING, OIL SEAL (SLIDE TO WEAR PLATE)
205 SEAL, "O" RING (SLIDE SEAL BACK-UP)
206 SLIDE, PUMP
207 SPRING, PIVOT PIN
208 PIN, PIVOT SLIDE
209 SPRING, PUMP SLIDE (INNER/OUTER)
210 SUPPORT, PUMP SLIDE SEAL
211 SEAL, PUMP SLIDE
212 RING, PUMP VANE
213 GUIDE, ROTOR
214 ROTOR, OIL PUMP
215 VANE, PUMP
216 SHAFT & FLANGE ASSEMBLY, STATOR
217 COVER, PUMP
218 VALVE, PRESSURE REGULATOR
219 SPRING, PRESSURE REGULATOR VALVE
220 VALVE, REVERSE BOOST
221 BUSHING, REVERSE BOOST VALVE
222 VALVE, T.V. BOOST
223 BUSHING, T.V. BOOST VALVE
224 RING, SNAP PRESSURE REGULATOR CASE
225 RING, SNAP (CONVERTER CL. PUMP VALVE RET.)
226 STOP, VALVE (CONVERTER CLUTCH)
227 VALVE, CONVERTER CLUTCH
228 SPRING, CONVERTER CLUTCH VALVE (OUTER)
229 SPRING, CONVERTER CLUTCH VALVE (INNER)
230 RIVET, FLAT HEAD (.156 X 1.0)
231 BALL, PRESSURE RELIEF
232 SPRING, PRESSURE RELIEF
233 SCREEN ASSEMBLY, GOVERNOR
234 PIN, DOWEL (PUMP COVER)
235 SCREW, SOCKET BUTTON HEAD (M6 X 1 X 16)
236 PLUG, CUP (SELECTIVE WASHER LUBE) (2)
237 PLUG, ORIFICE (CONV. CLUTCH SIGNAL) 4.84 DIA.
238 PLUG, ORIFICE (COOLER FEED) 6.84 DIA.
239 PLUG, CUP (COOLER FEED) 6.8 DIA.
240 PLUG, CUP (CLUTCH RELEASE) 6.8 DIA.
241 PLUG, CUP (LINE/CASE) .511 DIA. (2)

Figure 174

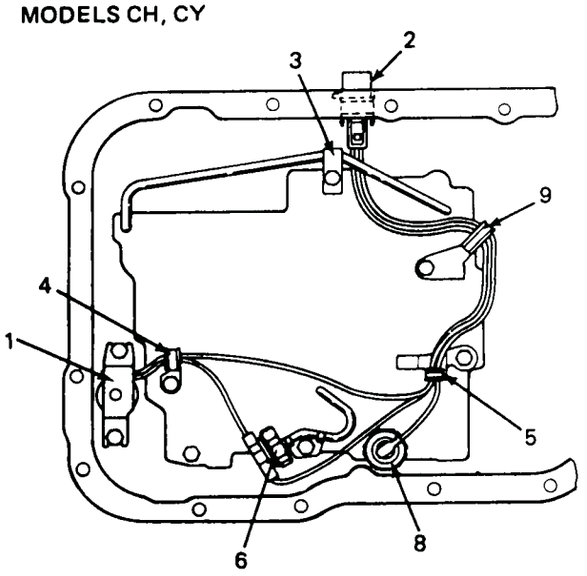


ILL. NO.	DESCRIPTION
4	BUSHING, STATOR SHAFT
9	WASHER, THRUST (HOUSING TO PUMP)
32	BUSHING, CASE REAR
202	BUSHING, PUMP BODY
509	BUSHING, OVERRUN CLUTCH
522	BUSHING, OVERDRIVE CARRIER
523	BEARING ASSEMBLY, THRUST (CARRIER/SUN)
528	BEARING ASM., THRUST (CARRIER/INTERNAL GEAR)
531	WASHER, THRUST (INTERNAL GEAR/SUPPORT)
536	BUSHING, CENTER SUPPORT (29.8 O.D. X 11.0)
540	BUSHING, CENTER SUPPORT (33.8 O.D. X 11.0)
541	WASHER, THRUST (SUPPORT/DIRECT CLUTCH)
602	BUSHING, DIRECT CLUTCH (FRONT)
605	BUSHING, DIRECT CLUTCH (REAR)
617	WASHER, THRUST (DIRECT/FORWARD CLUTCH)
629	WASHER, THRUST (FORWARD CL./OUTPUT) (SEL.)
631	WASHER, THRUST (SELECTIVE REAR)
632	WASHER, THRUST (INTERNAL GEAR/REAR SEL.)
634	BUSHING, FRONT INTERNAL GEAR
635	BEARING ASM., ROLLER (INTERNAL GEAR/CARRIER)
637	BEARING ASSEMBLY, THRUST (FRT. CARRIER/SUN)
641	BUSHING, REAR SUN GEAR
643	WASHER, THRUST (INPUT DRUM/HOUSING)
645	BUSHING, LO & REVERSE HOUSING
656	BUSHING, FORWARD CLUTCH HOUSING
659	BEARING, THRUST (REAR CAM/LO RACE)
660	BUSHING, REAR CARRIER (53.13 X 9.53)
662	WASHER, THRUST (REAR CARRIER/INTERNAL GEAR)
663	BEARING ASSEMBLY, ROLLER THRUST (SUN/INT.)

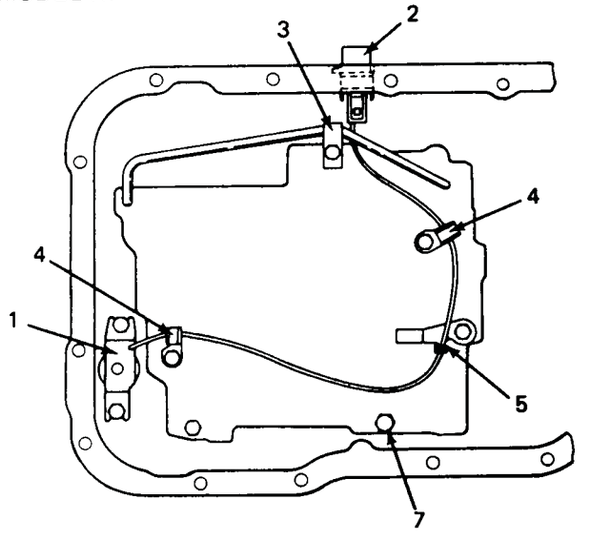
Figure 175

EARLY MODEL WIRING HARNESS

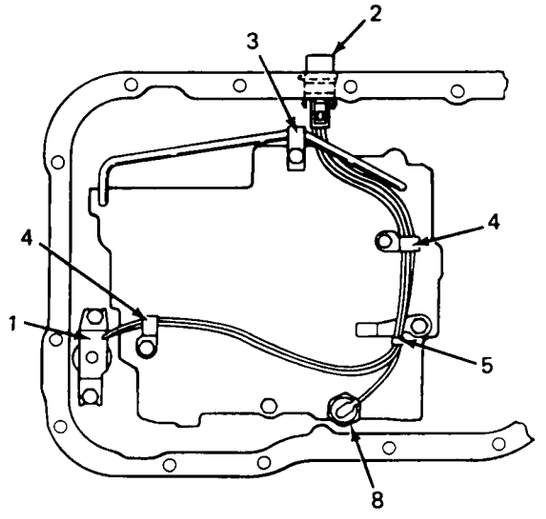
1986
MODELS CH, CY



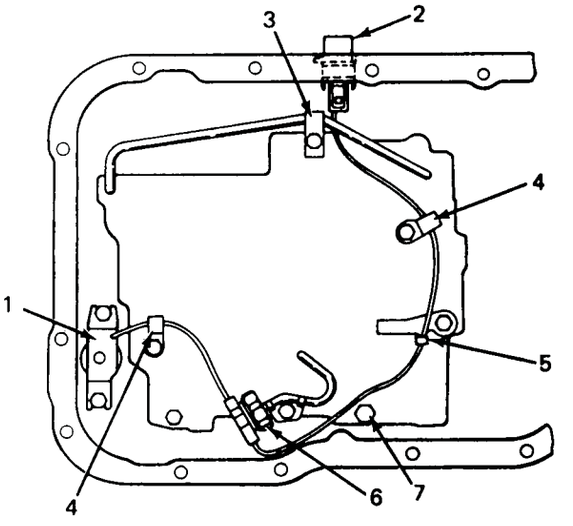
1986
MODEL HF



1986
MODELS AA, AB, AP,
CA, CZ, KC, KJ



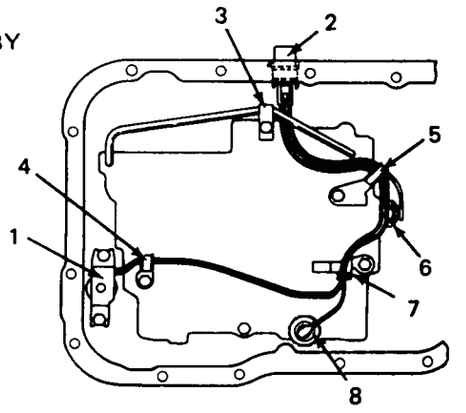
1986
MODEL HC



1. SOLENOID ASSEMBLY
2. CONNECTOR
3. RETAINER
4. SOLENOID WIRE CLIP
5. FILTER RETAINER CLIP
6. 4-3 PRESSURE SWITCH
7. PLUG
8. 4TH CLUTCH SWITCH
9. WIRE CLIP

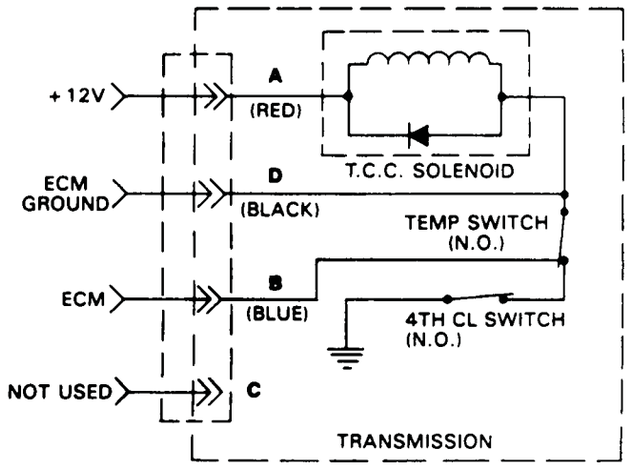
Figure 176

1986
MODEL BY



1. SOLENOID ASSEMBLY
2. CASE CONNECTOR
3. PIPE RETAINER
4. SOLENOID WIRE CLIP
5. FOUR WIRE CLIP
6. 3RD CLUTCH PRESSURE SWITCH
7. FILTER RETAINER CLIP
8. 4TH CLUTCH PRESSURE SWITCH

Figure 177



1989
MODELS CTF, CUF

ILL. NO.	DESCRIPTION
39	CONNECTOR, ELECTRICAL
53	SOLENOID ASSEMBLY
75	SWITCH, PRESSURE (4TH)
79	CLIP, SOLENOID WIRE (2)
82	CLIP, FILTER RETAINER
84	RETAINER, SIGNAL OIL PIPE
89	SWITCH, TEMPERATURE

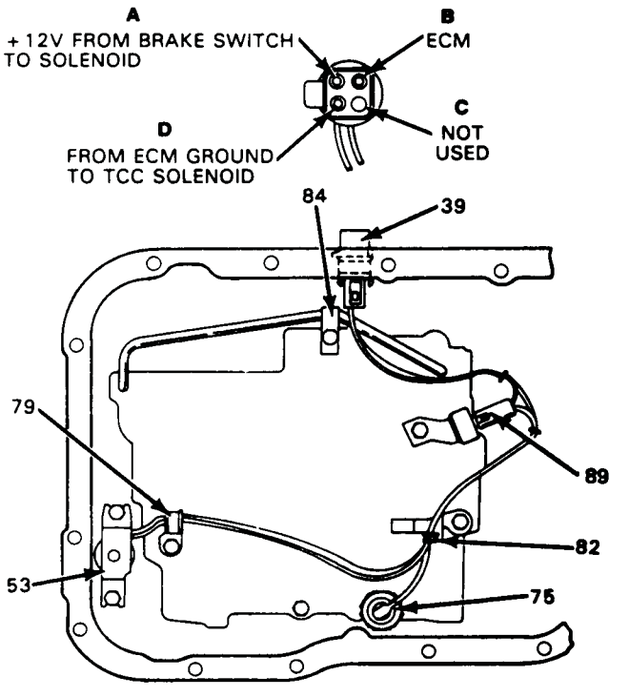


Figure 178