



THM 700-R4 (4L60)

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INTRODUCTION

GENERAL MOTORS 700-R4

1987-1993

This booklet contains general description and procedures necessary to repair, overhaul, or service the 1987-1993 THM 700-R4 transmission and includes all design levels.

This transmission is a fully automatic unit consisting of a 3 element torque converter with the addition of a converter clutch. Five multiple disc clutch packs, one roller clutch, one sprag and one band provide the friction elements required to obtain the desired function of the planetary gear set. The combination of these elements provides four forward speeds with 4th gear being overdrive, and reverse. Changing of the gear ratios is fully automatic in relation to vehicle speed and engine torque. Vehicle speed and engine torque signals are fed to the transmission to provide the proper gear ratio for maximum efficiency and performance at all throttle openings.

*We wish to thank General Motors Co.
for the information and some illustrations
that have made this booklet possible.*

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Technical Service Information

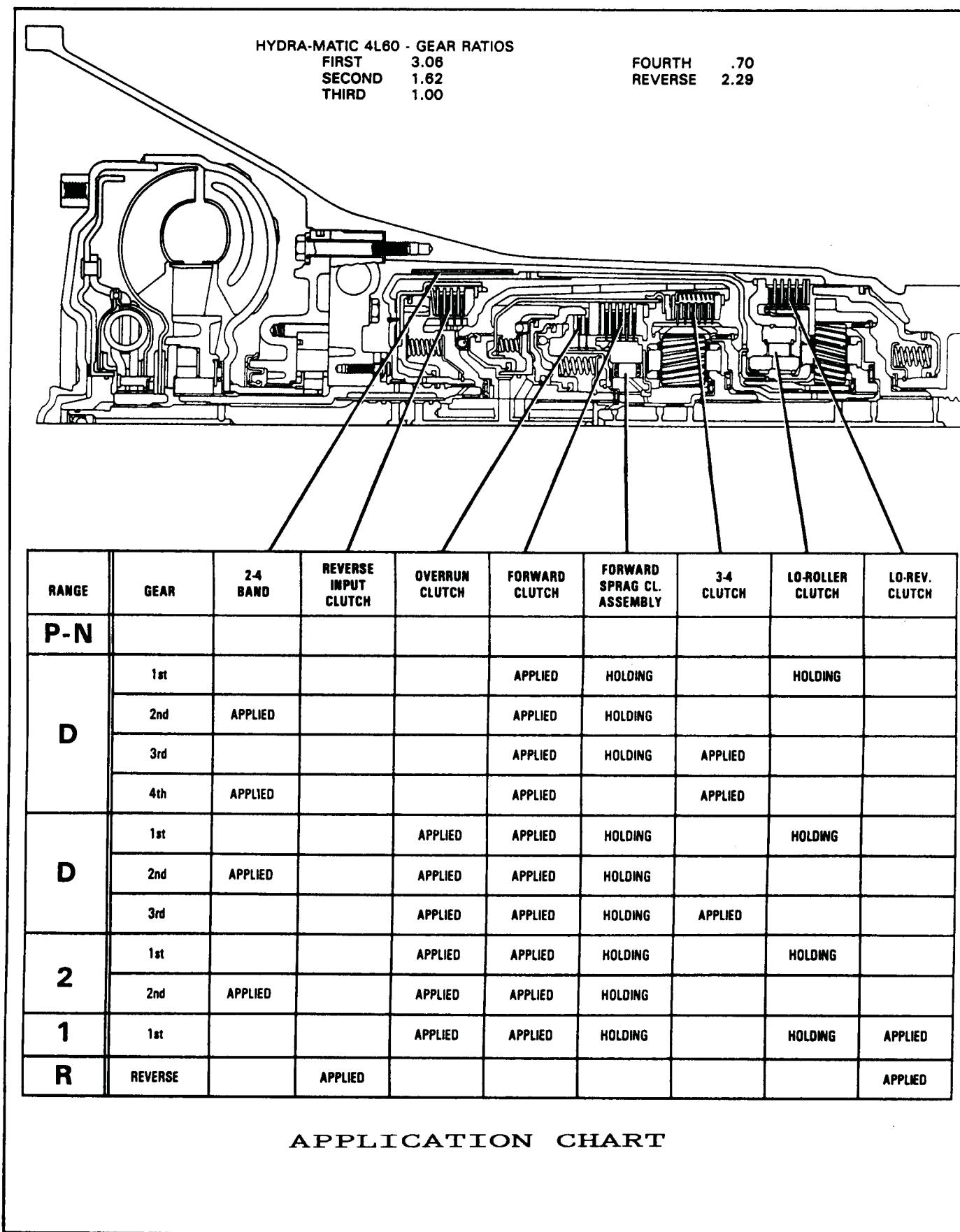


Figure 1

AUTOMATIC TRANSMISSION SERVICE GROUP

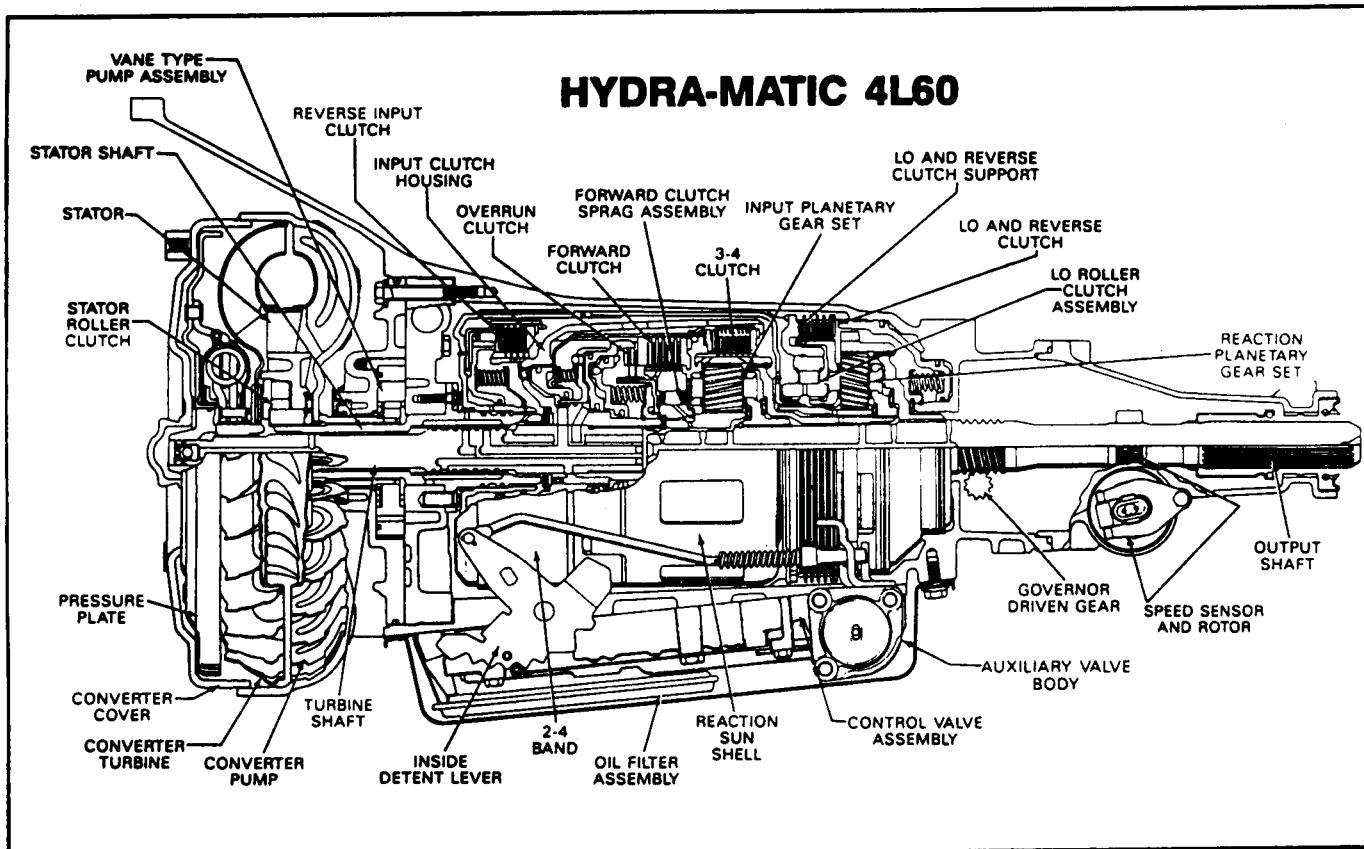


Figure 2

GENERAL DESCRIPTION

The THM 700-R4 is a fully automatic transmission for rear wheel drive vehicles which provides four forward speeds and a reverse range.

The major components of this transmission are:

1. Torque Converter Clutch Assembly.
2. 10 Vane Type Oil Pump
3. 2-4 Band Assembly
4. Five Multiple-Disc Clutch Packs.
5. Two Planetary Gear Sets.
6. One Sprag Clutch.
7. One Roller Clutch.
8. Valve Body Assembly.
9. Auxiliary Valve Body Assembly.

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

The transmission can be operated in any of seven different modes shown on the shift quadrant (See Figure 3).



Technical Service Information

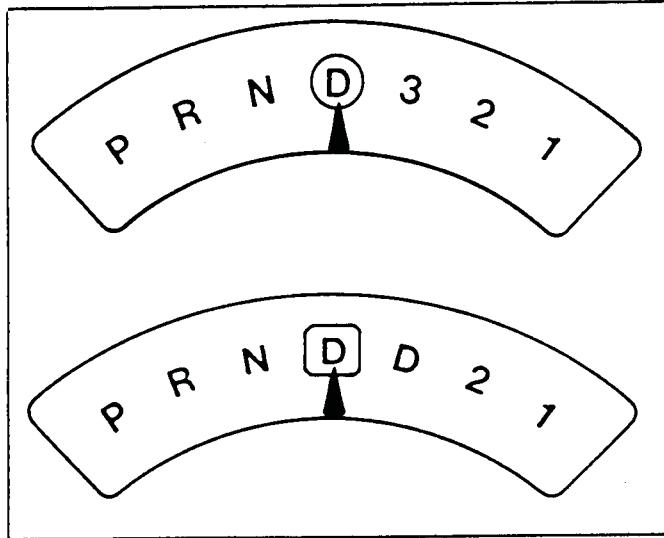


Figure 3

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 re-started with the vehicle moving.

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

D or 3 - DRIVE position is used for city traffic, hilly terrain, and trailer towing. It provides three gear ratios plus torque converter clutch operation. Again, the downshifts are available by depressing the accelerator pedal.

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 only downshift below Approx. 40 MPH.

ROAD TEST PROCEDURE

OVERDRIVE RANGE:

While stopped, position the range selector lever in the O.D. range and accelerate. Check for a 1-2, 2-3, and 3-4 upshift. Shift points will vary with different throttle positions. Also, the converter clutch may apply in 2nd or 3rd gear depending on calibration. Check for part throttle downshifts by depressing the throttle to a 3/4 open position. Check for detent downshifts by depressing the accelerator to wide open position at various vehicle speeds.

DRIVE RANGE:

At road speed in fourth gear (Overdrive Range), manually shift the transmission to Drive Range. The transmission should shift back to 3rd gear. Check for part throttle and detent downshifts.

MANUAL 2 RANGE:

While in 3rd gear range, shift to manual second; the transmission should downshift immediately. Check for a 2-1 detent downshift.

MANUAL LO RANGE:

Position the selector lever in Lo Range and check operation. (In some vehicles it may be possible to obtain a 1-2 upshift while in this gear range).

OVERRUN BRAKING:

OVERRUN braking can be checked by manually downshifting to a lower gear range. Engine R.P.M.'s should increase and a braking effect should be noticed.

REVERSE RANGE:

Position the selector lever in Reverse and check reverse operation.

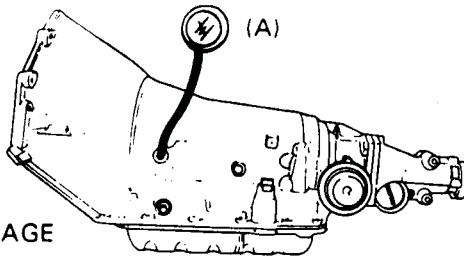


Technical Service Information

LINE PRESSURE CHECK PROCEDURE

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

(A) ATTACH PRESSURE GAGE



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 engine 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.

1991 HYDRA-MATIC 4L60 TRANSMISSION PRESSURES

RANGE	MODEL	NORMAL PRESSURE AT MINIMUM T.V.		NORMAL PRESSURE AT FULL T.V.	
		kPa	PSI	kPa	PSI
PARK, NEUTRAL, OVERDRIVE & MANUAL 3RD @ 1000 RPM	BBM	483-622	70-90	868-1146	125-166
	CAM, CBM, KAM, MJM, MNM, WAM	451-515	65-75	851-1083	123-154
	CCM, CFM, KBM, WBM	451-515	65-75	947-1185	137-172
	CHM, CJM, KCM, RAM, WCM	451-515	65-75	914-1149	133-167
	FBM	451-515	65-75	918-1148	133-186
	FTM, FUM, FZM	451-515	65-75	1073-1354	155-196
	LAM, LBM, LCM, LDM, LFM	451-515	65-75	899-1134	130-184
	MSM	483-622	70-90	797-1079	116-157
	SAM	451-515	65-75	845-1068	123-155
REVERSE @ 1000 RPM	SHM, TLM	451-515	65-75	969-1231	141-179
	BBM	793-1023	115-148	1424-1883	206-273
	CAM, CBM, KAM, MJM, MNM, WAM	742-847	108-123	1400-1747	203-253
	CCM, CFM, KBM, WBM	742-847	108-123	1556-1948	228-283
	CHM, CJM, KCM, RAM, WCM	742-847	108-123	1503-1889	218-274
	FBM	580-882	84-98	1180-1472	171-214
	FTM, FUM, FZM	742-847	108-123	1783-2225	258-323
	LAM, LBM, LCM, LDM, LFM	741-845	107-123	1474-1860	214-270
	MSM	793-1023	115-148	1311-1773	190-257
MANUAL 2ND & MANUAL LO @ 1000 RPM	SAM	580-882	84-98	1085-1372	157-199
	SHM, TLM	742-847	108-123	1583-2023	231-293
	CAM, CBM, CCM, CFM, CHM, CJM, FBM, FTM, FUM, FZM, KAM, KBM, KCM, MJM, MNM, RAM, SAM, SHM, TLM, WAM, WBM, WCM	1127-1286	163-186	1127-1286	163-186
	BBM, MSM	1205-1554	175-226	1205-1554	175-226
	LAM, LBM, LCM, LDM, LFM	1191-1359	173-197	1191-1359	173-197

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 pressure 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.

The main line pressure tap plug is located on the left side of the transmission above the outside manual lever.

Figure 4

AUTOMATIC TRANSMISSION SERVICE GROUP



Technical Service Information

CONDITION	INSPECT COMPONENT	FOR CAUSE
OIL PRESSURE HIGH OR LOW (Verify With Gage—Refer To Line Pressure Check Procedure)	<ul style="list-style-type: none">• Oil Pump Assembly (7)• Oil Filter (71)• T.V. Exhaust Ball (91)• Throttle Lever & Bracket Assembly (65)• Throttle Link (64)• Valve Body (67)• Case (10)	<ul style="list-style-type: none">— Pressure regulator valve (218) stuck.— Pressure regulator valve spring (219) damaged.— Rotor guide (213) omitted or misassembled.— Rotor (214) cracked or broken.— T.V. boost valve (222), reverse boost valve (220) or sleeve (221) stuck, damaged or incorrectly assembled.— Orifice hole in pressure regulator valve (218) plugged.— Sticking slide (206) or excessive rotor clearance.— Pressure relief ball (231) not seated or damaged.— Porosity in pump cover or body.— Wrong pump cover.— Pump faces not flat.— Excessive rotor clearance.— Intake pipe restricted by casting flash.— Cracks in filter body or intake pipe.— "O" ring seal (70) missing, cut or damaged.— Wrong grease used on rebuild.— Stuck or damaged.— Misassembled, binding or damaged.— Misassembled, binding or damaged.— Manual valve (340) scored or damaged.— Spacer plate (56) or gaskets (88 & 89) incorrect, misassembled or damaged.— Face not flat.— Throttle valve (326) sticking.— T.V. limit valve (332) sticking.— Modulated downshift valve (301) stuck.— Line bias valve (336) stuck.— 2-3 Shift valve (316) stuck.— Checkballs omitted or misassembled.— Case to valve body face not flat.
HIGH OR LOW SHIFT POINTS	<ul style="list-style-type: none">• T.V. Cable• T.V. Exhaust Ball (91)• Throttle Lever & Bracket Assembly (65)	<ul style="list-style-type: none">— Binding or not correctly adjusted.— Stuck or damaged.— Misassembled, binding or damaged.

ALL ILLUSTRATION NUMBERS REFERENCE HYDRA-MATIC 4L60 UNIT REPAIR

Figure 5

AUTOMATIC TRANSMISSION SERVICE GROUP



Technical Service Information

CONDITION	INSPECT COMPONENT	FOR CAUSE
HIGH OR LOW SHIFT POINTS (Continued)	<ul style="list-style-type: none">• Oil Pump Assembly (7)• Valve Body Assembly (67)• Case (10)	<ul style="list-style-type: none">– Stuck pressure regulator valve (218) or T.V. boost valve (222).– Sticking pump slide (206).– Sticking throttle valve (326) or plunger (324).– Modulated T.V. up or down valves (301 & 303) sticking.– T.V. limit valve (332) sticking.– Spacer plate (56) or gaskets (88 & 89) misassembled, damaged or incorrect.– Line bias valve (336) sticking.– Porous or damaged valve body pad.– Governor filter (47A) restricted or damaged.– 2-4 Servo Assembly (13-31)<ul style="list-style-type: none">a. 2-4 accumulator porosity.b. Damaged servo piston seals.c. Apply pin damaged or improper length.– 2-4 Band Assembly (602)<ul style="list-style-type: none">a. Burned.b. Anchor pin not engaged.
1ST GEAR RANGE ONLY – NO UPSHIFT	<ul style="list-style-type: none">• Governor Assembly (45)• Valve Body (67)• Case (10)	<ul style="list-style-type: none">– Governor valve (107) sticking.– Governor driven gear (83) loose or damaged:<ul style="list-style-type: none">a. Wear on bottom of gear indicates pin is not pressed in deep enough.b. Wear of corner of gear indicates pin is missing.c. Wear resembles an apple core if wrong gear is used, or there is a burr on the output shaft.d. Wear on one side of gear indicates output shaft snap ring is missing or the governor has seized in the bore.– Governor driven gear retaining pin (82) missing.– Nicks or burrs on output shaft (687).– Nicks or burrs on governor sleeve (106) or case bore.– Governor support pin in case too long or short.– Governor weights (108 & 109) or springs (110 & 111) missing, binding or damaged.– 1-2 Shift valve (322) sticking.– Spacer plate (56) or gaskets (88 & 89) mispositioned or damaged.– Case to valve body face not flat or damaged.– Governor filter (47A) restricted or damaged.

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Figure 6

AUTOMATIC TRANSMISSION SERVICE GROUP



Technical Service Information

CONDITION	INSPECT COMPONENT	FOR CAUSE
1ST GEAR RANGE ONLY — NO UPSHIFTS (Continued)	<ul style="list-style-type: none">• 2-4 Servo Assembly (13-31)• 2-4 Band Assembly (602)	<ul style="list-style-type: none">— Restricted or blocked apply passages in case.— Nicks or burrs on servo pin (29) or pin bore in case.— 4th Servo piston (16) in backwards.— 2-4 Band (602) worn or damaged.— Band anchor pin not engaged.
SLIPS IN 1ST GEAR	<ul style="list-style-type: none">• Forward Clutch Assembly• Forward Clutch Accumulator• Oil Pump (7)• Input Housing & Shaft Assembly (621)• Valve Body (67)• T.V. Cable• Low Roller Clutch (678)• Torque Converter (1)	<ul style="list-style-type: none">— Clutch plates (649) worn.— Porosity or damage in forward clutch piston (630).— Forward clutch piston inner and outer seals (629) missing, cut or damaged.— Input housing to forward clutch housing "O" ring seal (622) missing, cut or damaged.— Damaged forward clutch housing (628).— Forward clutch housing retainer and ball assembly (627) not sealing or damaged.— Piston seal (369) missing, cut or damaged.— Piston (367) out of its bore.— Porosity in the piston or auxiliary valve body (377).— Stuck abuse valve (360).— Auxiliary accumulator valve tube (96) leaks, not seated in pump cover or missing.— Turbine shaft seals (619) missing, cut or damaged.— 1-2 Accumulator valve (333) stuck.— Face not flat, damaged lands or interconnected passages.— Spacer plate (56) or gaskets (88 & 89) incorrect, mispositioned or damaged.— Binding or broken.— Damage to lugs or inner ramps.— Rollers not free moving.— Inadequate spring tension— Damage to inner splines.— Lube passage plugged.— Stator roller clutch not holding.

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Figure 7

AUTOMATIC TRANSMISSION SERVICE GROUP



Technical Service Information

CONDITION	INSPECT COMPONENT	FOR CAUSE
SLIPS IN 1ST GEAR (Continued)	<ul style="list-style-type: none">• 1-2 Accumulator Assembly (59-63)• Oil Pressure• 2-4 Servo Assembly (13-31)	<ul style="list-style-type: none">— Porosity in piston (61) or 1-2 accumulator cover and pin assembly (62).— Damaged ring grooves on piston.— Piston seal (60) missing, cut or damaged.— Valve body to spacer plate gasket (89) at 1-2 Accumulator cover, missing or damaged.— Leak between piston and pin.— Broken 1-2 accumulator spring (59).— (See Causes of High or Low Oil Pressure.)— 4th Servo piston (16) in backwards.
1-2 SHIFT SPEED — HIGH OR LOW	<ul style="list-style-type: none">• T.V. Cable• Governor Assembly (45)• Throttle Lever & Bracket Assembly (65)• Valve Body (67)• Oil Pump Assembly (71) or Case (10)	<ul style="list-style-type: none">— Binding or broken.— Not correctly adjusted.— (See 1st Gear Range Only — No Upshift.)— Misassembled, binding or damaged.— T.V. link missing, binding or damaged.— T.V. exhaust checkball (91) stuck.— T.V. plunger (324) sticking.— Face not flat.— Face not flat.
SLIPPING OR ROUGH 1-2 SHIFT	<ul style="list-style-type: none">• Throttle Lever & Bracket Assembly (65)• Valve Body Assembly (67)• 2-4 Servo Assembly (13-31)• 2nd Accumulator (59-63)	<ul style="list-style-type: none">— Incorrectly installed or damaged.— T.V. cable broken or binding.— Throttle valve (326) sticking.— 1-2 Shift valve train (317-322) stuck.— Gaskets (88 & 89) or spacer plate (56) incorrect, mispositioned or damaged.— Line bias valve (336) stuck.— 1-2 Accumulator valve (333) stuck.— T.V. limit valve (332) stuck.— Face not flat.— Apply pin (29) too long or too short.— 2nd servo apply piston seal missing, cut or damaged.— Restricted or missing oil passages.— Servo bore in case damaged.— Porosity in 1-2 accumulator housing (62) or piston (61).— Piston seal or groove damaged.— Nicks or burrs in 1-2 accumulator housing.— Missing or restricted oil passage.

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Figure 8

AUTOMATIC TRANSMISSION SERVICE GROUP



Technical Service Information

CONDITION	INSPECT COMPONENT	FOR CAUSE
SLIPPING OR ROUGH 1-2 SHIFT (Continued)	<ul style="list-style-type: none">• 2-4 Band (602)• Oil Pump Assembly (7) or Case (10)	<ul style="list-style-type: none">— Worn or mispositioned.— Faces not flat.
NO 2-3 SHIFT OR 2-3 SHIFT SLIPPING, ROUGH OR HUNTING	<ul style="list-style-type: none">• Converter (1)• Governor Assembly (45)• Oil Pump (7)• Valve Body (67)• Input Housing Assembly (621)• Case (10)• 2-4 Servo Assembly (13-31)	<ul style="list-style-type: none">— Internal damage.— Valve (107) stuck.— Drive gear retaining pin (82) missing or loose.— Governor weights (108 & 109) binding.— Governor driven gear (83) damaged.— Governor support pin in case too long or too short.— Stator shaft (216) sleeve scored or off location.— 2-3 Valve train (313-316) stuck.— Accumulator valve (333) stuck.— Spacer plate (56) or gaskets (88 & 89) incorrect, mispositioned or damaged.— Throttle valve (326) stuck.— T.V. limit valve (332) stuck.— Clutch plates worn [3-4 (654) or forward (649)].— Excessive clutch plate travel.— Cut or damaged piston seals [3-4 (624) or forward (629)].— Porosity in input clutch housing (621) or piston (623).— 3-4 Piston checkball (620) stuck, damaged or not sealing.— Restricted apply passages.— Forward clutch piston retainer and ball assembly (627) not seating.— Sealing balls loose or missing.— 3rd Accumulator retainer and ball assembly (80) not seating.— 2nd Apply piston seals (23 & 24) missing, cut or damaged.
NO 3-4 SHIFT/SLIPPING OR ROUGH 3-4 SHIFT	<ul style="list-style-type: none">• Governor (45)	<ul style="list-style-type: none">— Governor weights (108 & 109) binding.— Governor valve (107) stuck.— Governor driven gear retaining pin (82) missing or loose.— Governor driven gear (83) damaged.— Governor support pin in case too long or too short.

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Figure 9

AUTOMATIC TRANSMISSION SERVICE GROUP



Technical Service Information

CONDITION	INSPECT COMPONENT	FOR CAUSE
NO 3-4 SHIFT/SLIPPING OR ROUGH 3-4 SHIFT (Continued)	<ul style="list-style-type: none">• Oil Pump Assembly (7)• Valve Body Assembly (67)• 2-4 Servo Assembly (13-31)• Case (10)• Input Housing Assembly (621)• 2-4 Band Assembly (602)	<ul style="list-style-type: none">Faces not flat.— Pump cover retainer and ball assembly omitted or damaged.— Valves stuck.<ul style="list-style-type: none">• 2-3 Shift valve (313-316) train.• Accumulator valve (333).• Throttle valve (326).• T.V. limit valve (332).• 1-2 Shift valve train (317-322).• 3-2 Control valve (339).— Manual valve link (64) bent or damaged.— Spacer plate (56) or gaskets (88 & 89) incorrect, mispositioned or damaged.— Incorrect band apply pin (29).— Missing or damaged servo seals (14 & 17).— Porosity in pistons, cover or case.— Damaged piston seal grooves.— Plugged or missing orifice cup plug (86).— 3rd Accumulator retainer and ball assembly (80) leaking.— Porosity in 3-4 accumulator piston (52) or bore.— 3-4 Accumulator piston seal (53) or seal grooves damaged.— Plugged or missing orifice cup plug (81).— Restricted oil passage.— Refer to Slipping 2-3 Shift.— Worn or misassembled.
NO REVERSE OR SLIPS IN REVERSE	<ul style="list-style-type: none">• Input Housing Assembly (621)• Manual Valve Link (705)• Oil Pump Assembly (7)	<ul style="list-style-type: none">— 3-4 Apply ring (625) stuck in applied position.— Forward clutch not releasing.— Turbine shaft seals (619) missing, cut or damaged.— Disconnected.— Retainer and ball assembly missing or damaged.— Stator shaft seal rings (233) or ring grooves damaged.— Stator shaft sleeve scored or damaged.— Reverse boost valve (220) stuck, damaged or misassembled.— Cup plug missing.— Restricted oil passage.— Faces not flat.— Converter clutch valve (227) stuck.

ALL ILLUSTRATION NUMBERS REFERENCE HYDRA-MATIC 4L60 UNIT REPAIR

Figure 10

AUTOMATIC TRANSMISSION SERVICE GROUP



Technical Service Information

CONDITION	INSPECT COMPONENT	FOR CAUSE
NO REVERSE OR SLIPS IN REVERSE (Continued)	<ul style="list-style-type: none">• Valve Body Assembly (67)• Reverse Input Clutch Assembly (605)• Auxiliary Valve Body (377)• Lo And Reverse Clutch	<ul style="list-style-type: none">— 2-3 Shift valve (316) stuck.— Manual linkage (64) not adjusted.— Spacer plate (56) and gaskets (88 & 89) incorrect, mispositioned or damaged.— Clutch plate (612) worn.— Reverse input housing and drum assembly (605) cracked at weld.— Clutch plate retaining ring out of groove.— Return spring assembly retaining ring (610) out of groove.— Seals (608) cut or damaged.— Restricted apply passage.— Porosity in piston (607).— Belleville plate (611) installed incorrectly.— Excessive clutch plate travel.— Lo overrun valve (364) stuck.— Orificed cup plug (359) restricted, missing or damaged.— Clutch plates (682) worn.— Porosity in piston (695).— Seals (696) damaged.— Return spring assembly retaining ring (693) mispositioned.— Restricted apply passage.
NO PART THROTTLE OR DELAYED DOWNSHIFTS	<ul style="list-style-type: none">• T.V. Cable• T.V. Bracket Assembly (65)• 2-4 Servo Assembly (13-31)• Governor Assembly (45)• Valve Body Assembly (67)	<ul style="list-style-type: none">— Loose or incorrectly installed.— Bent.— Servo cover retaining ring (13) omitted or misassembled.— 4th Apply piston (16) damaged or misassembled.— Servo inner housing (22) damaged or misassembled.— Governor weights (108 & 109) binding.— Governor valve (107) stuck.— Valves stuck.<ul style="list-style-type: none">• Throttle valve (326)• 3-2 Control valve (339)• T.V. modulated downshift (301)— 4-3 Sequence valve body channel blocked.

ALL ILLUSTRATION NUMBERS REFERENCE HYDRA-MATIC 4L60 UNIT REPAIR

Figure 11

AUTOMATIC TRANSMISSION SERVICE GROUP



Technical Service Information

CONDITION	INSPECT COMPONENT	FOR CAUSE
NO OVERRUN BRAKING — MANUAL 3-2-1	<ul style="list-style-type: none">• External Linkage• Valve Body Assembly (67)• Input Clutch Assembly (621)	<ul style="list-style-type: none">— Not adjusted properly.— Valves stuck.<ul style="list-style-type: none">• 4-3 Sequence valve (329)• Throttle valve (326)— Checkball #3 mispositioned.— Spacer plate (56) and gaskets (88 & 89) incorrect, damaged or mispositioned.— Turbine shaft oil passages plugged or not drilled.— Turbine shaft seal rings (619) damaged.— Turbine shaft sealing balls loose or missing.— Porosity in forward (630) or overrun clutch piston (632).— Overrun piston seals (631) cut or damaged.— Overrun piston checkball (633) not sealing.
NO CONVERTER CLUTCH APPLY	<ul style="list-style-type: none">• Electrical• Converter (1)• Oil Pump Assembly (7)• Input Housing and Shaft (621)• Valve Body Assembly (67)• Solenoid Screen (47B)	<ul style="list-style-type: none">— 12 Volts not supplied to transmission.— Outside electrical connector damaged.— Inside electrical connector, wiring harness or solenoid damaged.— Electrical short (pinched solenoid wire).— Solenoid not grounded.— Incorrect or damaged pressure switches.— Temperature switch damaged.— Internal damage.— Converter clutch valve (227) stuck or assembled backwards.— Converter clutch valve retaining ring (225) mispositioned.— Pump to case gasket (9) mispositioned.— Orifice cup plug (240) restricted or damaged.— Solenoid "O" ring seal (49) cut or damaged.— High or uneven bolt torque (pump body to cover).— Turbine shaft "O" ring seal (618) cut or damaged.— Turbine shaft retainer and ball assembly (617) restricted or damaged.— TCC shift valve stuck.— TCC apply valve stuck.— Solenoid o-ring leaking.— Blocked.

ALL ILLUSTRATION NUMBERS REFERENCE HYDRA-MATIC 4L60 UNIT REPAIR

Figure 12

AUTOMATIC TRANSMISSION SERVICE GROUP



Technical Service Information

CONDITION	INSPECT COMPONENT	FOR CAUSE
CONVERTER SHUDDER	<ul style="list-style-type: none">• Torque Converter Assembly (1)• Oil Pump Assembly (7)• Oil Filter (71)• Miscellaneous• Input Housing and Shaft Assembly (621)	<ul style="list-style-type: none">— Internal damage.— Converter clutch valve (227) stuck.— Restricted oil passage.— Crack in filter body.— Flash restricting filter neck.— "O" ring seal (70) cut or damaged.— Low oil pressure.— Engine not tuned properly.— Turbine shaft "O" ring (618) cut or damaged.— Turbine shaft retainer and ball assembly (617) restricted or damaged.
NO CONVERTER CLUTCH RELEASE	<ul style="list-style-type: none">• Solenoid• Converter (1)• Valve Body Assembly (67)• Oil Pump Assembly (7)• ECM	<ul style="list-style-type: none">— External ground.— Clogged exhaust orifice.— Internal damage.— Converter clutch apply valve stuck in apply position.— Converter clutch valve (227) stuck.— External ground.
DRIVES IN NEUTRAL	<ul style="list-style-type: none">• Forward Clutch• Manual Valve Link (705)• Case (10)	<ul style="list-style-type: none">— Not releasing.— Disconnected.— Face not flat.— Internal leakage.
2ND GEAR START (DRIVE RANGE)	<ul style="list-style-type: none">• Governor Assembly (45)• Forward Clutch Sprag Assembly (642)	<ul style="list-style-type: none">— Valve (107) stuck.— Governor support pin too long or missing.— Sprag assembly installed backwards.
NO PARK	<ul style="list-style-type: none">• Parking Linkage (701-715)	<ul style="list-style-type: none">— Actuator rod assembly (701) bent or damaged.— Actuator rod spring binding or improperly crimped.— Actuator rod not attached to inside detent lever (703).— Parking lock bracket (710) damaged or not torqued properly.

ALL ILLUSTRATION NUMBERS REFERENCE HYDRA-MATIC 4L60 UNIT REPAIR

Figure 13

AUTOMATIC TRANSMISSION SERVICE GROUP



Technical Service Information

CONDITION	INSPECT COMPONENT	FOR CAUSE
NO PARK (Continued)	<ul style="list-style-type: none">• Parking Linkage (Cont.)	<ul style="list-style-type: none">— Inside detent lever (703) not torqued properly.— Detent roller and spring assembly (709) mispositioned or not torqued properly.— Parking pawl (711) binding or damaged.
RATCHETING NOISE	<ul style="list-style-type: none">• Parking Pawl (711)	<ul style="list-style-type: none">— Parking pawl return spring (714) weak, damaged or misassembled.
OIL OUT THE VENT	<ul style="list-style-type: none">• Oil Pump (7)• Valve Body (67)• Miscellaneous	<ul style="list-style-type: none">— Chamfer in pump body rotor pocket too large.— T.V. limit valve (332) stuck.— Fluid level - overfilled.
VIBRATION IN REVERSE AND WHINING NOISE IN PARK	<ul style="list-style-type: none">• Oil Pump (7)	<ul style="list-style-type: none">— Broken vane rings (212).
NO DRIVE IN ALL RANGES	<ul style="list-style-type: none">• Torque Converter (1)	<ul style="list-style-type: none">— Converter to flex plate bolts missing.
NO DRIVE IN DRIVE RANGE	<ul style="list-style-type: none">• Torque Converter (1)	<ul style="list-style-type: none">— Stator roller clutch not holding.— Converter not bolted to flex plate.
FRONT OIL LEAK	<ul style="list-style-type: none">• Torque Converter (1)• Torque Converter Seal (2)	<ul style="list-style-type: none">— Welded seam leaking.— Damaged converter hub.— Damaged seal assembly.— Missing garter spring.
DELAY IN DRIVE AND REVERSE	<ul style="list-style-type: none">• Torque Converter (1)	<ul style="list-style-type: none">— Converter drainback.

ALL ILLUSTRATION NUMBERS REFERENCE HYDRA-MATIC 4L60 UNIT REPAIR

Figure 14

AUTOMATIC TRANSMISSION SERVICE GROUP



Technical Service Information

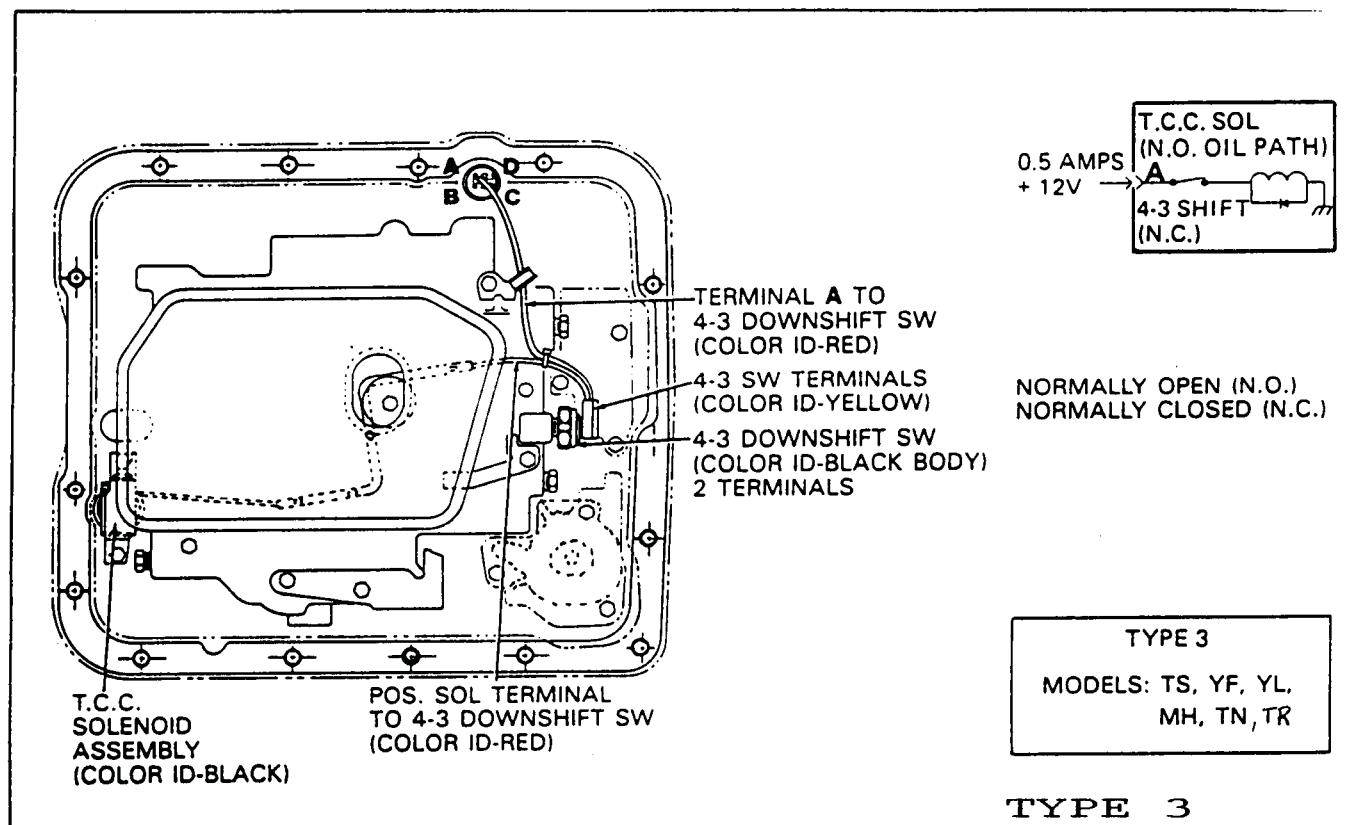


Figure 15

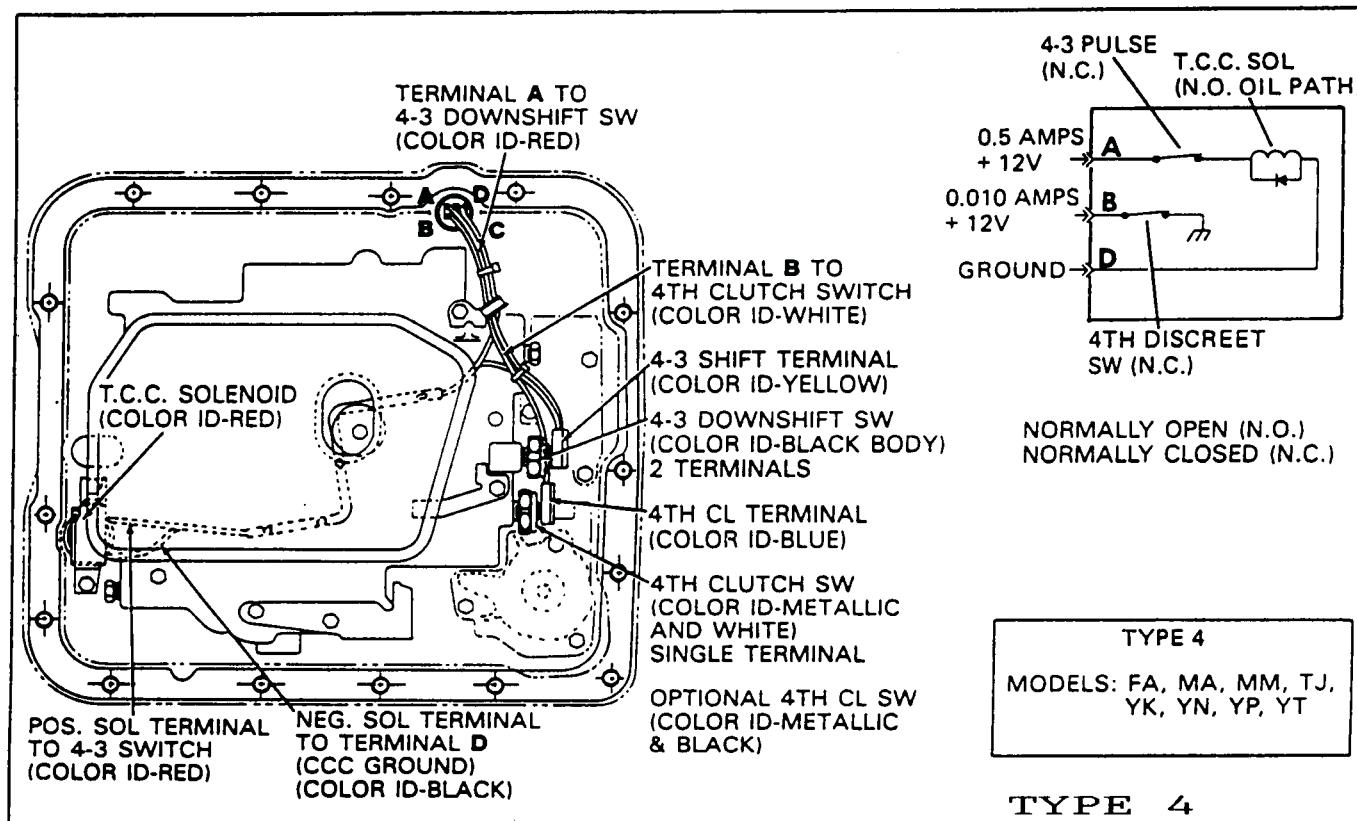


Figure 16



Technical Service Information

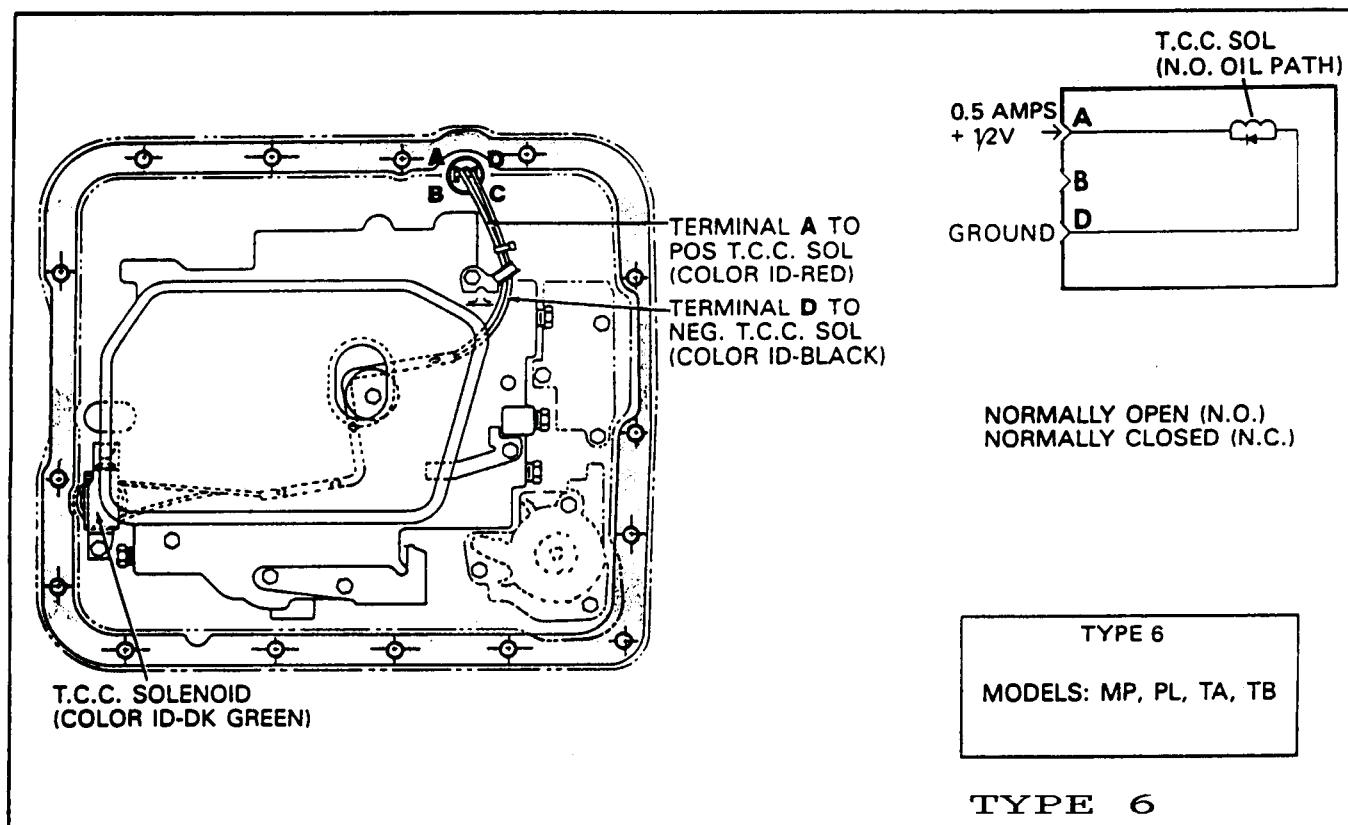


Figure 17

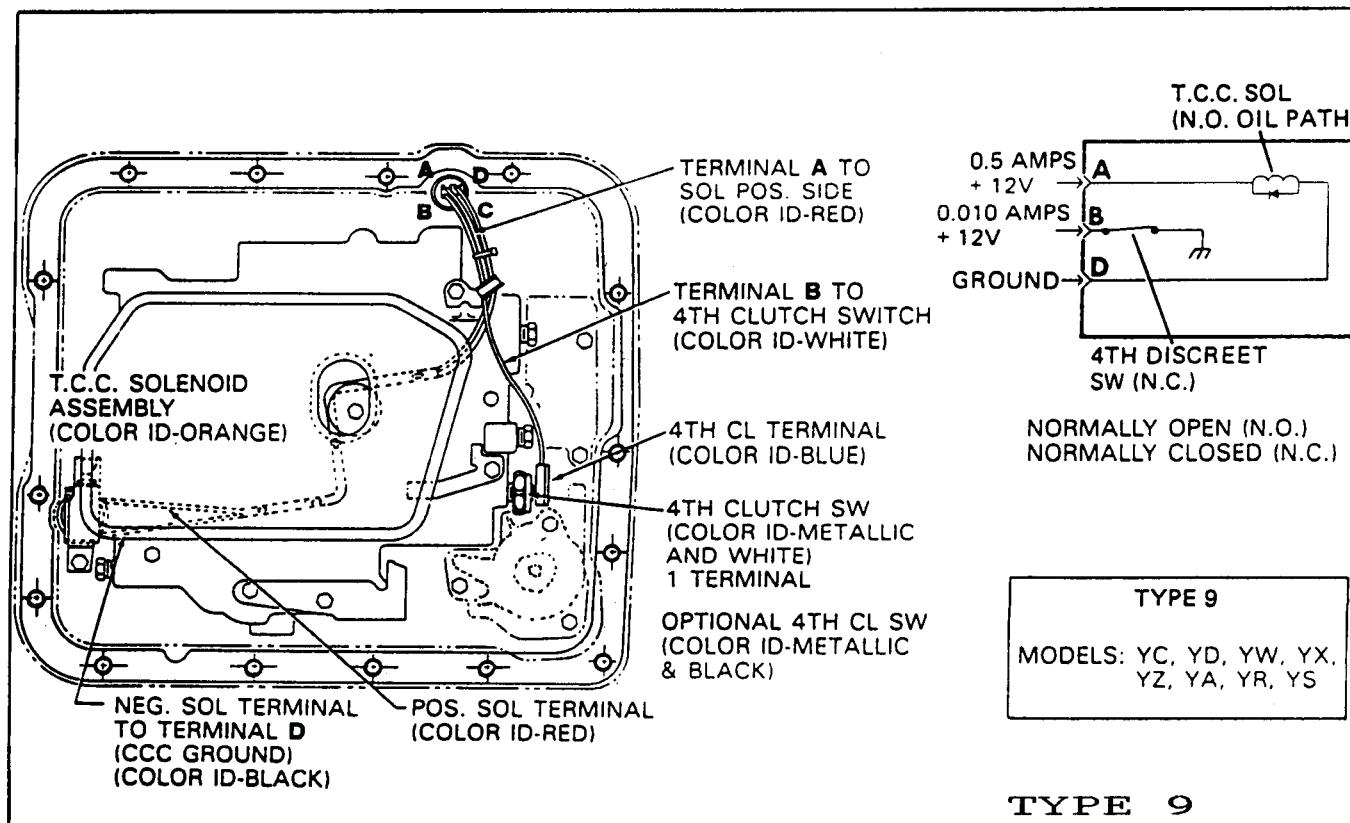


Figure 18



Technical Service Information

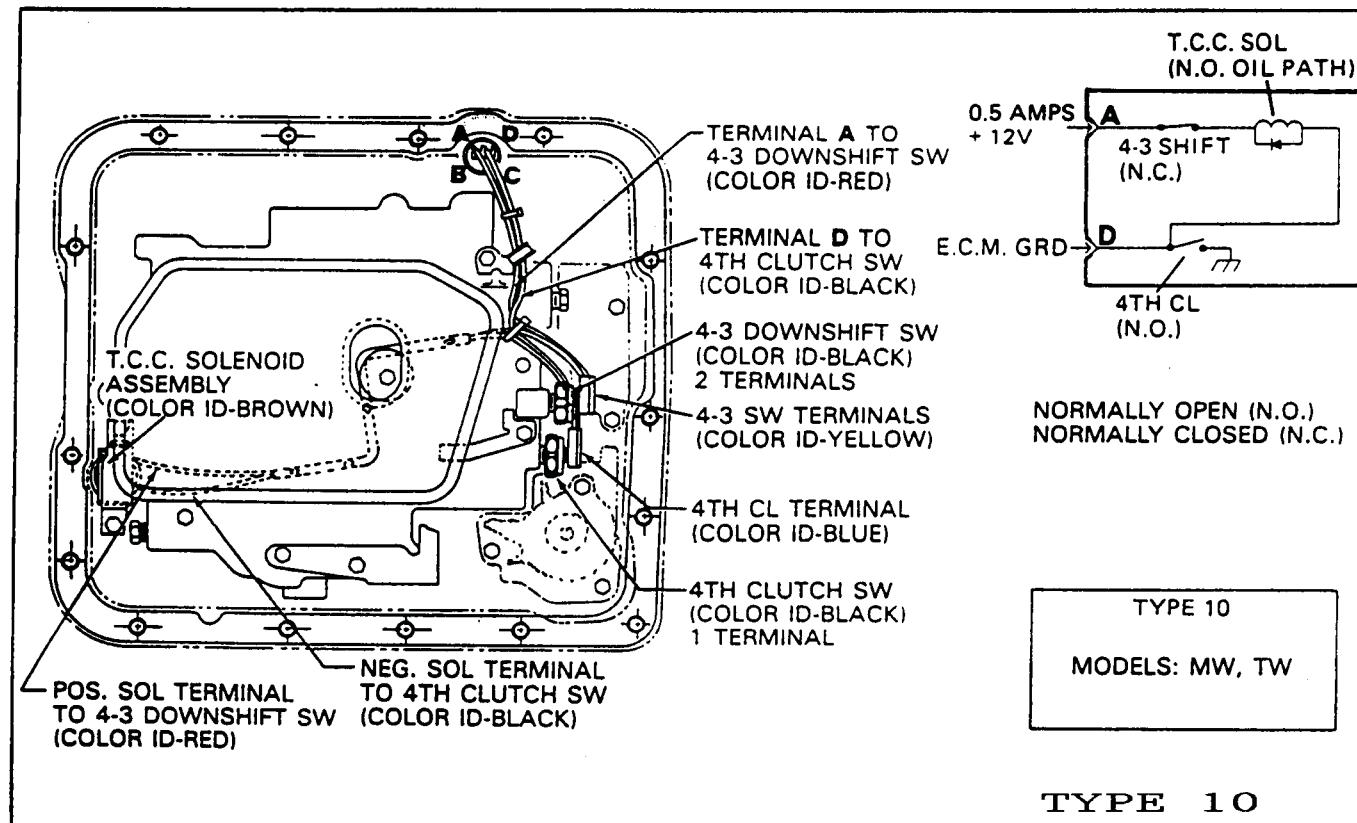


Figure 19

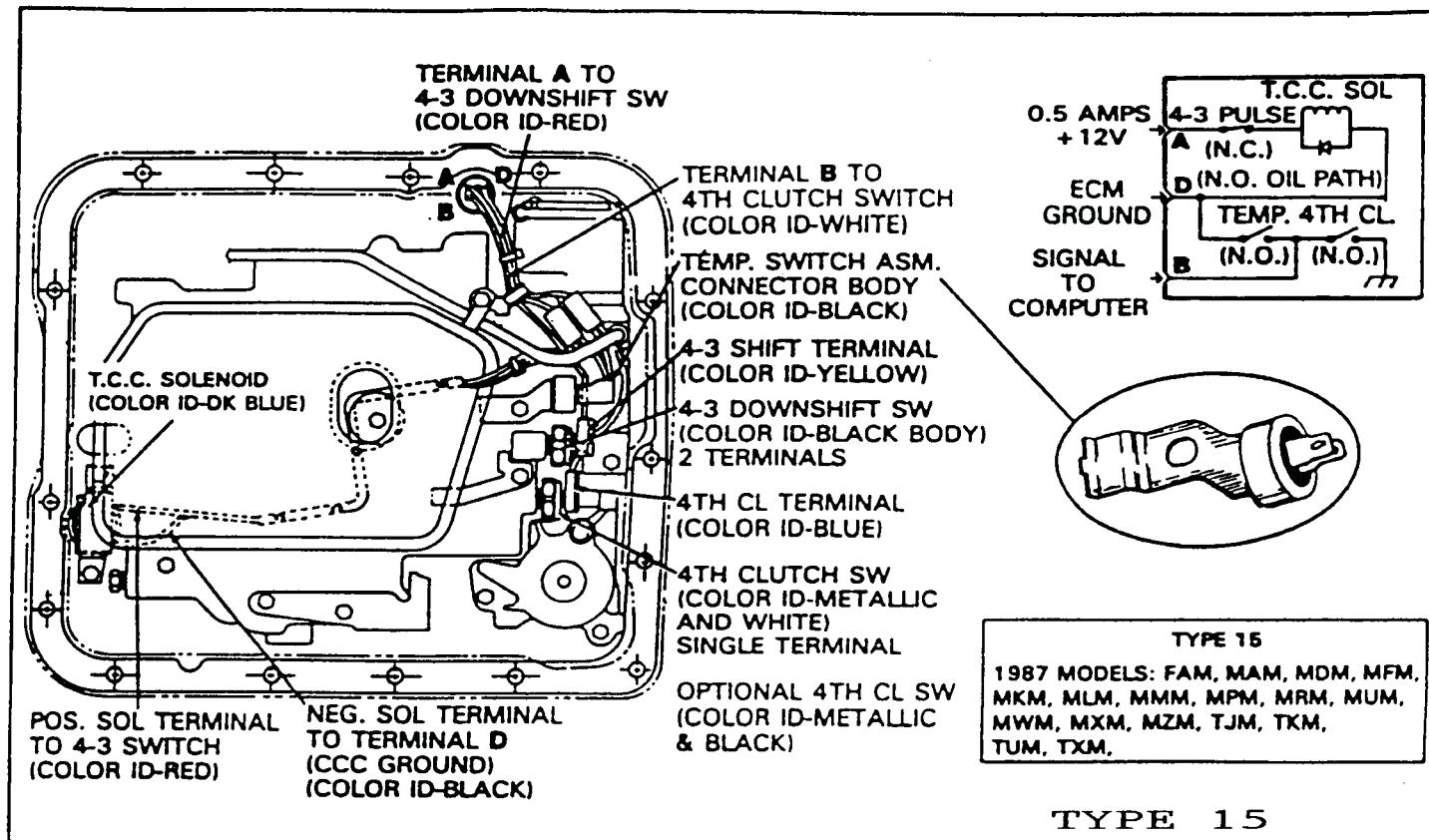


Figure 20

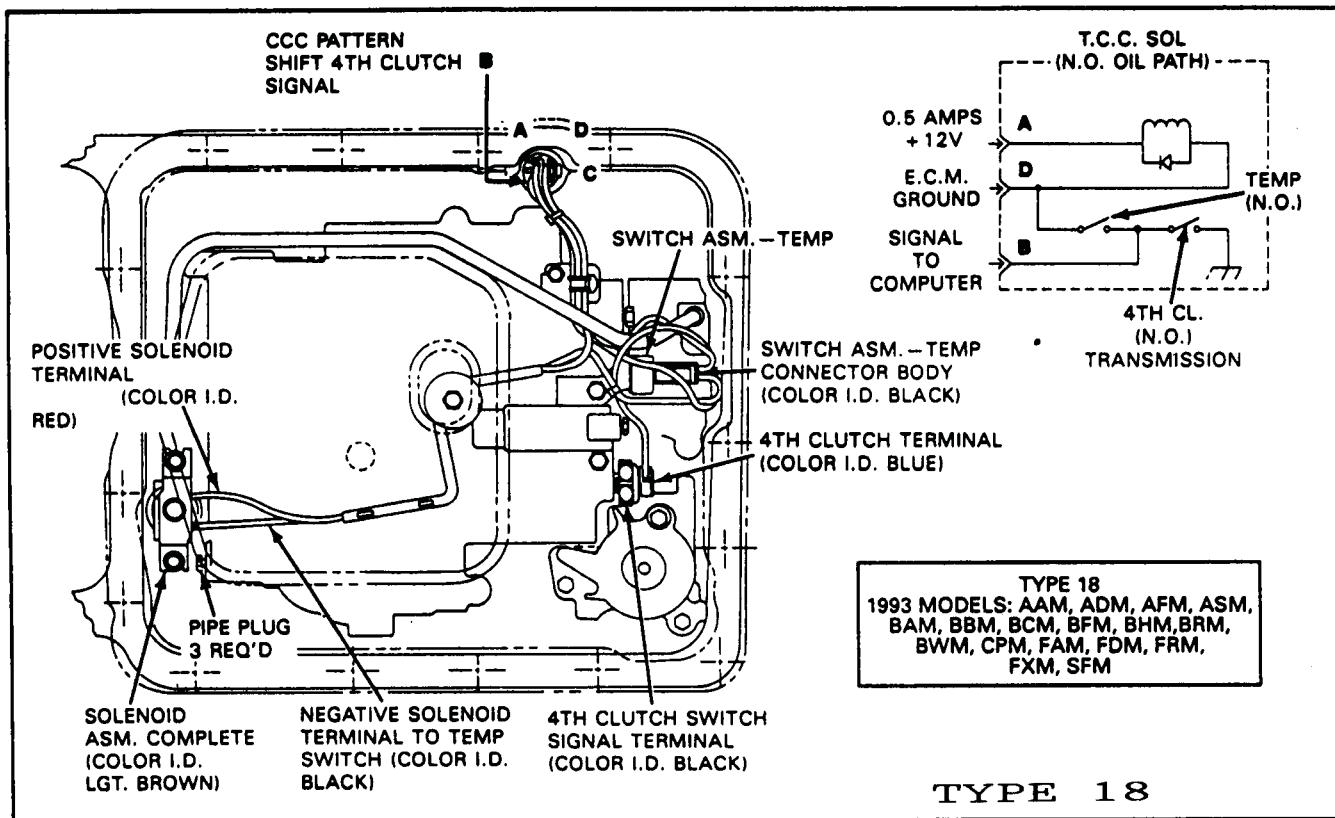


Figure 21

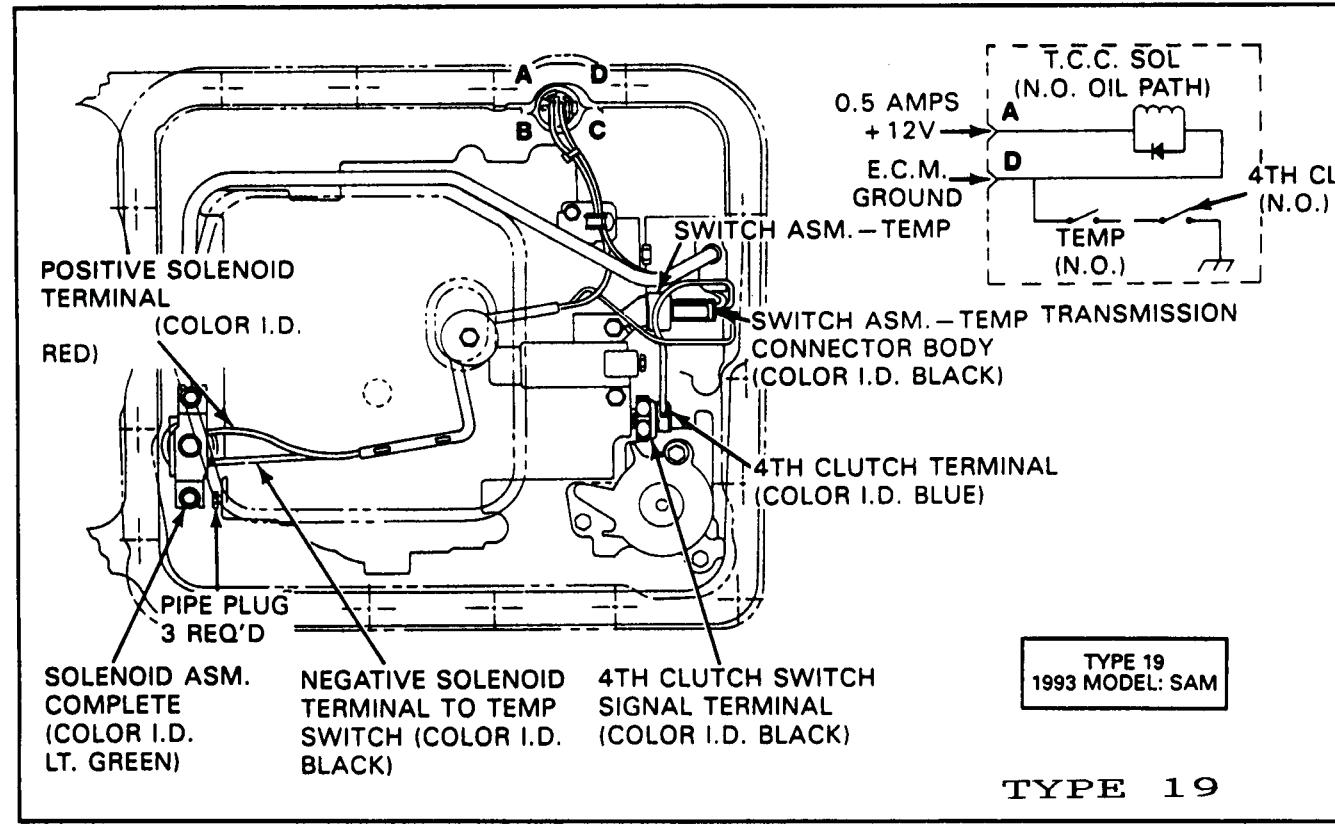


Figure 22

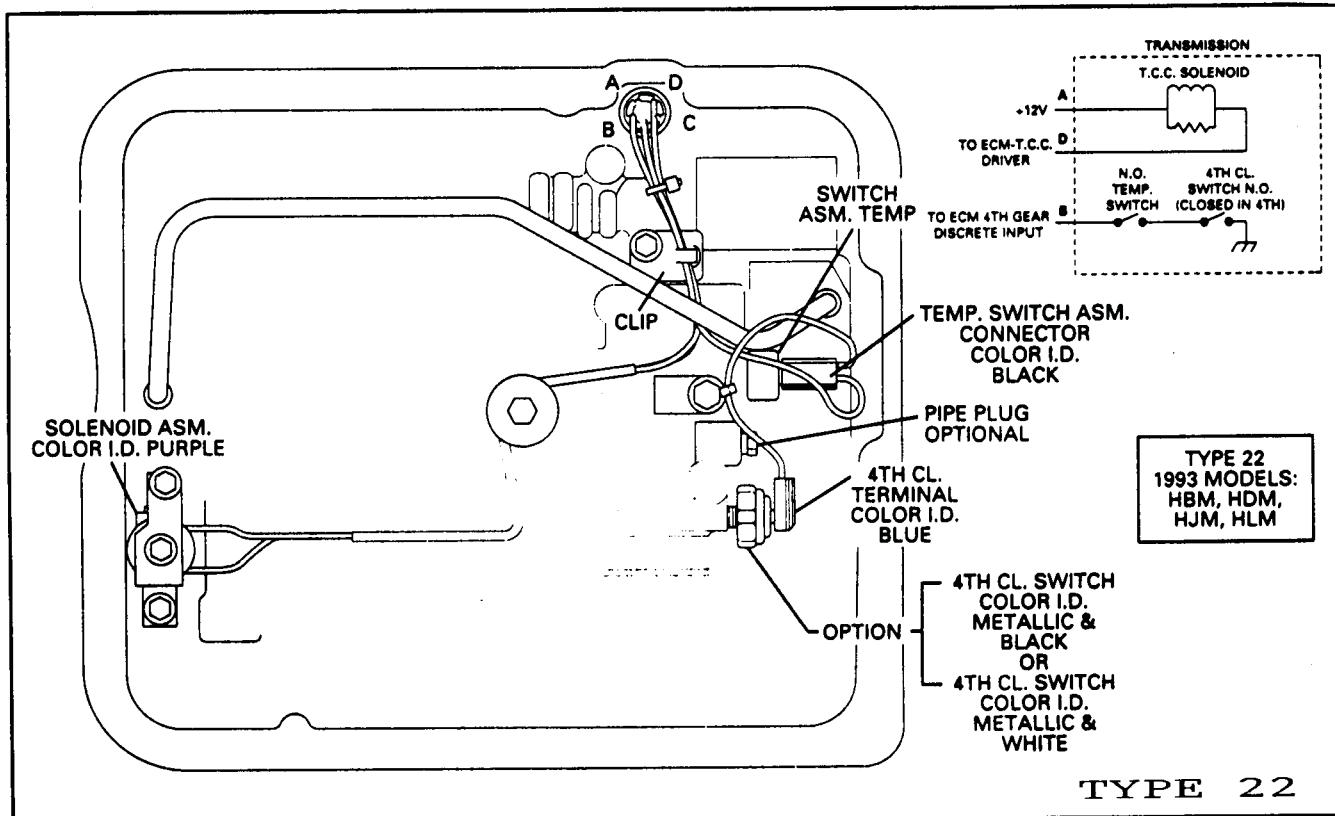


Figure 23

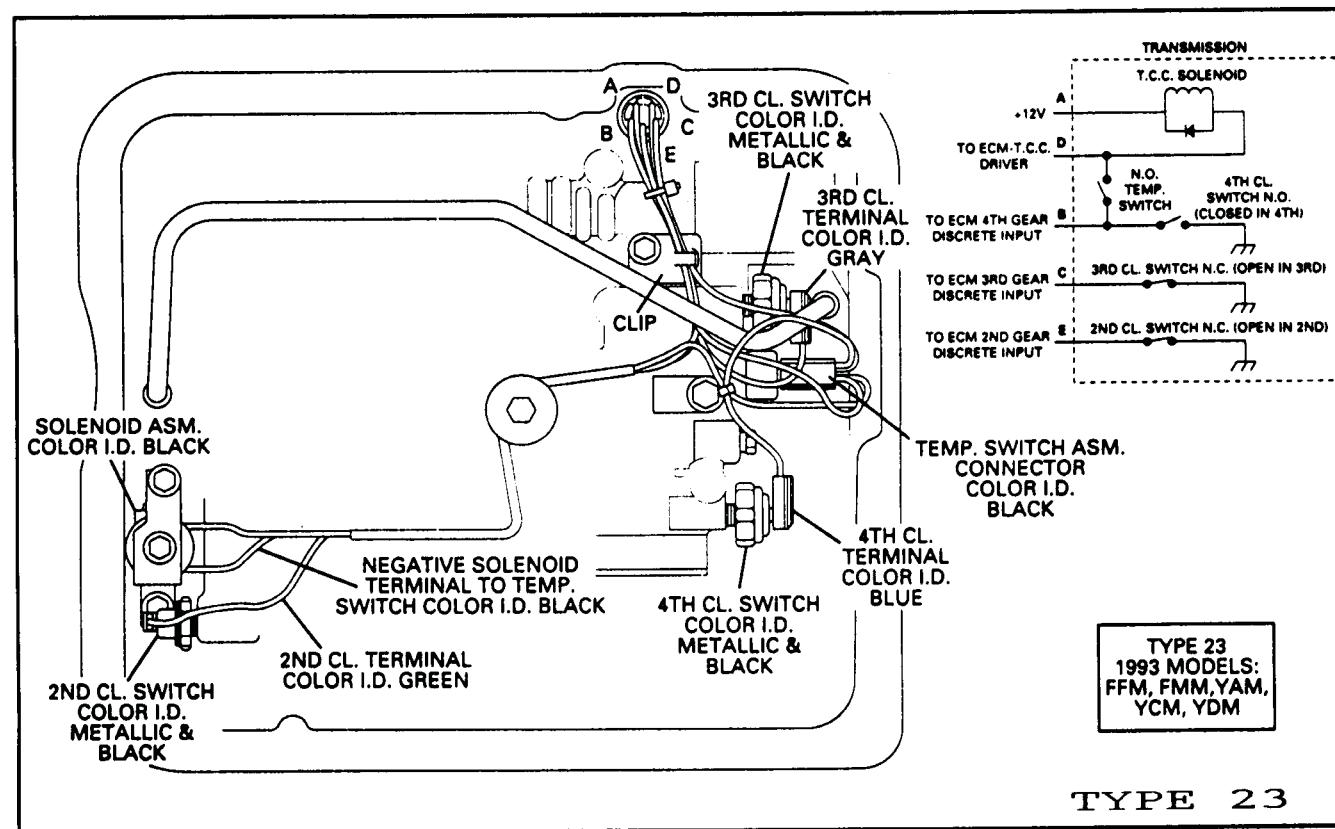
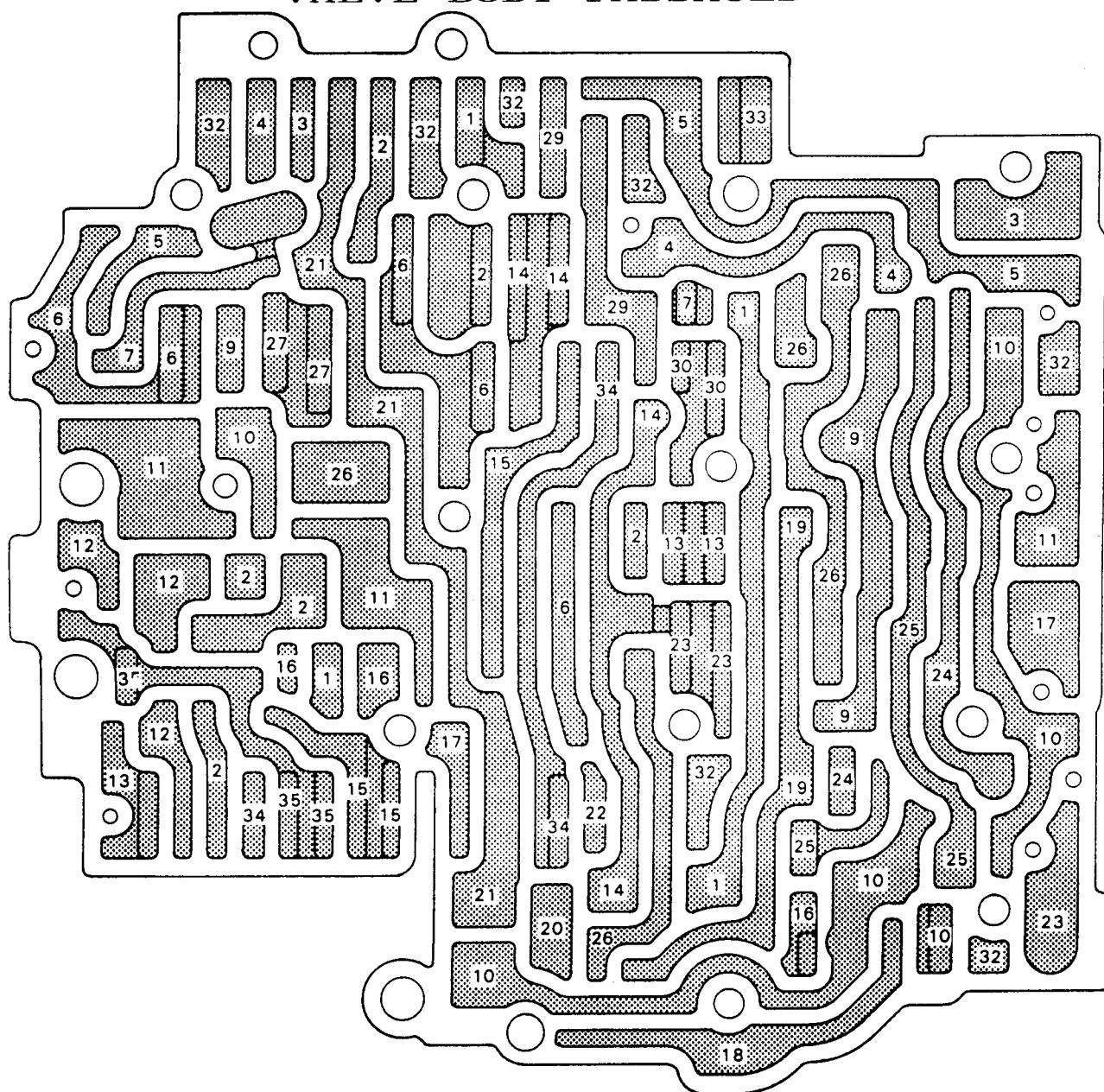


Figure 24

VALVE BODY PASSAGES



ILL. NO.	DESCRIPTION
1	LINE
2	D4
3	D2
4	LO
5	REVERSE
6	GOVERNOR
7	LO - 1ST FEED
9	3RD ACCUMULATOR
10	T.V.
11	M.T.V.
12	ACCUMULATOR
13	4TH SIGNAL
14	2ND CLUTCH
15	3-4 ACCUMULATOR

ILL. NO.	DESCRIPTION
16	T.V.F.
17	OVERRUN CLUTCH
18	T.V. EX.
19	D3/PART THROTTLE
20	PART THROTTLE
21	D3
22	4TH CLUTCH
23	C.C. SIG.
24	MOD. UP
25	MOD. DOWN
26	DETENT
27	3-4 CLUTCH
29	RND4-3
30	3RD CLUTCH

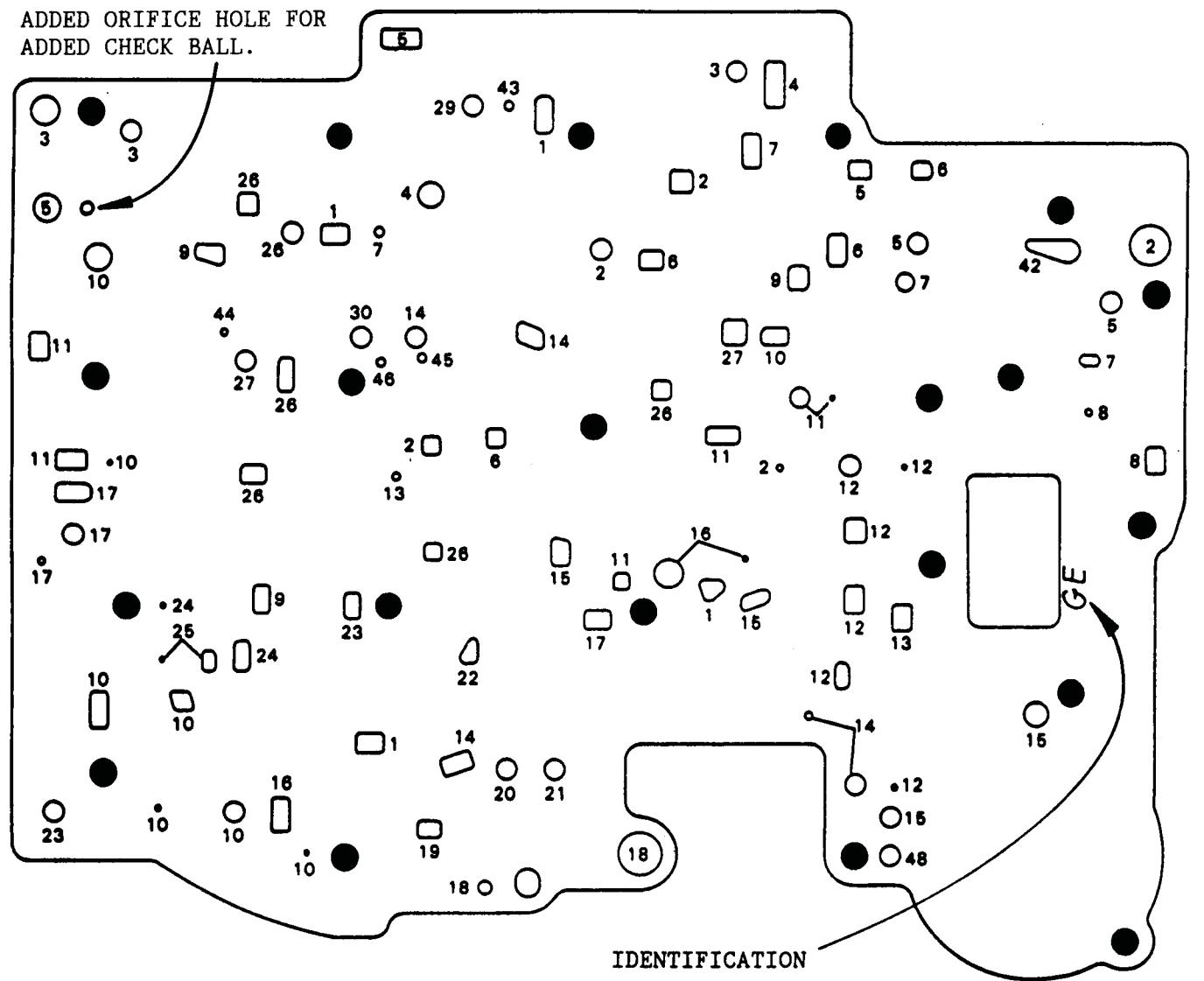
ILL. NO.	DESCRIPTION
31	IDENTIFICATION
32	VOID
33	EXHAUST
34	SF
35	4-3
42	D4 ABUSE
43	3RD FEED
44	3-2 HIGH SPEED
45	2ND FEED
46	3RD CL. EXHAUST
47	4TH FEED
48	1-2 ACCUMULATOR

Figure 25

TYPICAL SPACER PLATE

THERE IS AN ADDED ORIFICE HOLE IN THE 1993 SPACER PLATE THAT THE 1987-1992 SPACER PLATE DOES NOT HAVE. THIS HOLE IS TO ACCOMODATE THE ADDED CHECKBALL IN 1993 MODELS.

ADDED ORIFICE HOLE FOR ADDED CHECK BALL.



ILL. NO.	DESCRIPTION
1	LINE
2	D4
3	D2
4	LO
5	REVERSE
6	GOVERNOR
7	LO - 1ST FEED
8	LO/REVERSE
9	3RD ACCUMULATOR
10	T.V.
11	M.T.V.
12	ACCUMULATOR
13	4TH SIGNAL

ILL. NO.	DESCRIPTION
14	2ND CLUTCH
15	3-4 ACCUMULATOR
16	T.V.F.
17	OVERRUN CLUTCH
18	T.V. EX.
19	D3/PART THROTTLE
20	PART THROTTLE
21	D3
22	4TH CLUTCH
23	C.C. SIG.
24	MOD. UP
25	MOD. DOWN
26	DETENT

ILL. NO.	DESCRIPTION
27	3-4 CLUTCH
29	RND4-3
30	3RD CLUTCH
31	IDENTIFICATION
42	D4 ABUSE
43	3RD FEED
44	3-2 HIGH SPEED
45	2ND FEED
46	3RD CL. EXHAUST
47	4TH FEED
48	1-2 ACCUMULATOR

Figure 26



Technical Service Information

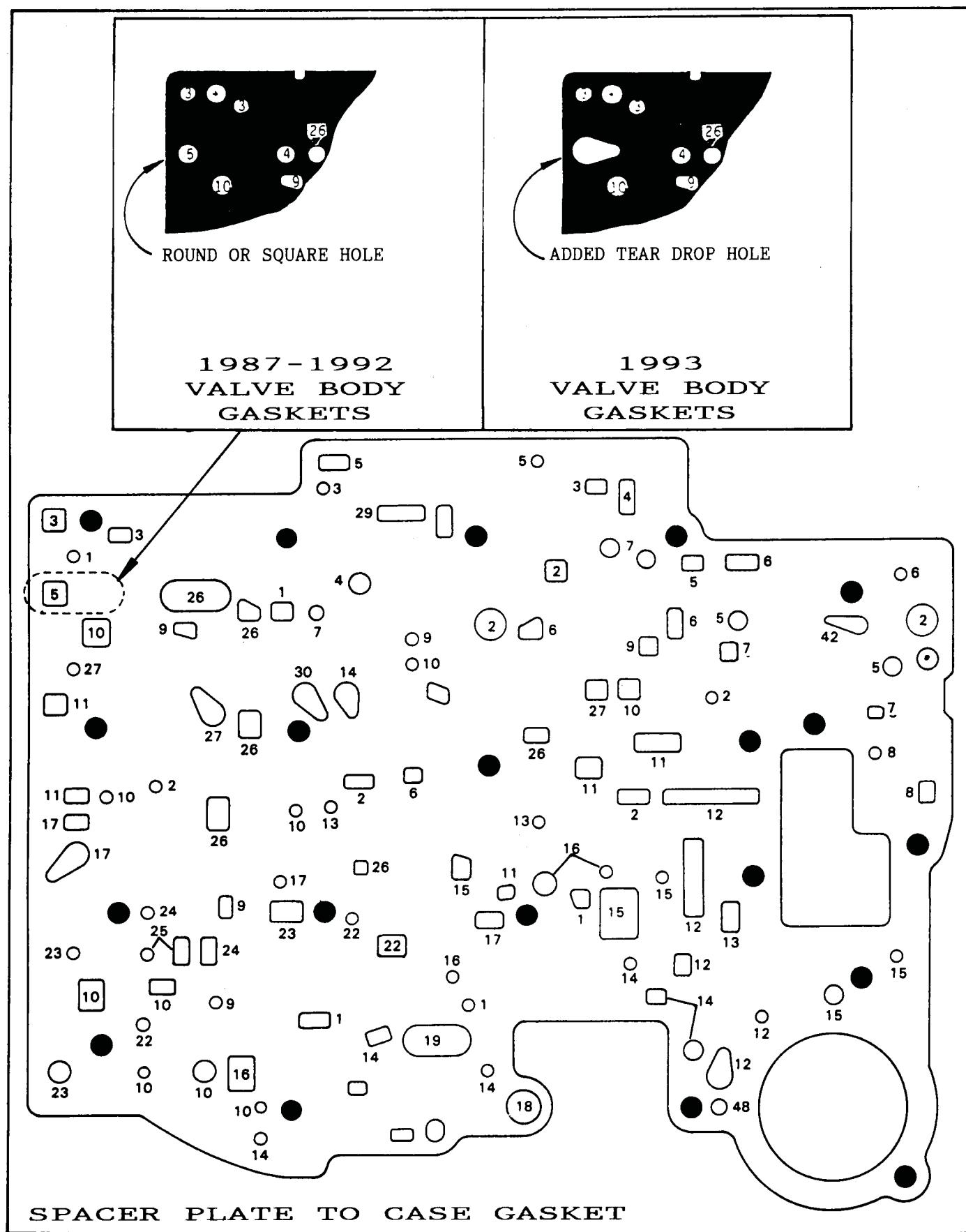


Figure 27

AUTOMATIC TRANSMISSION SERVICE GROUP



Technical Service Information

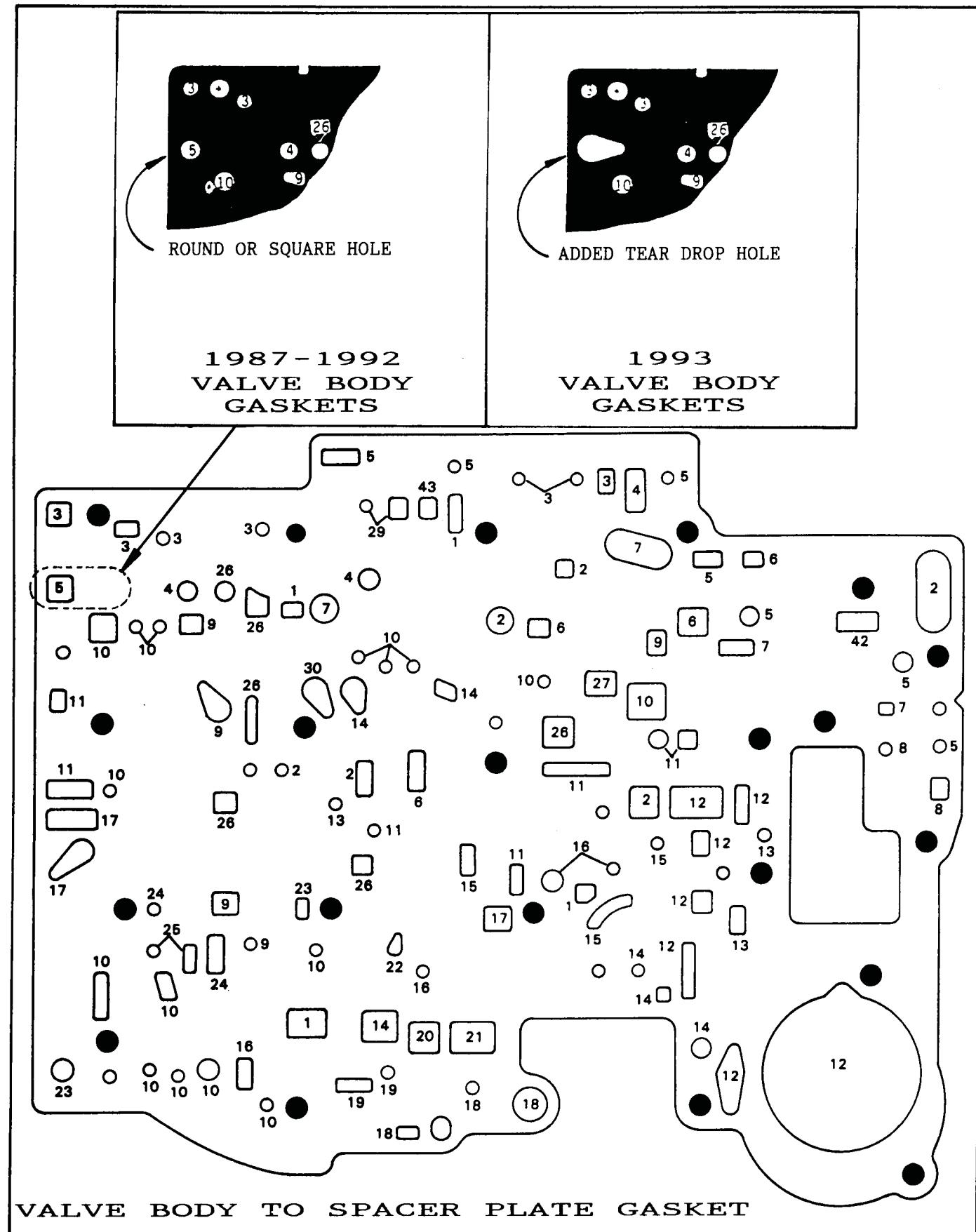


Figure 28

AUTOMATIC TRANSMISSION SERVICE GROUP

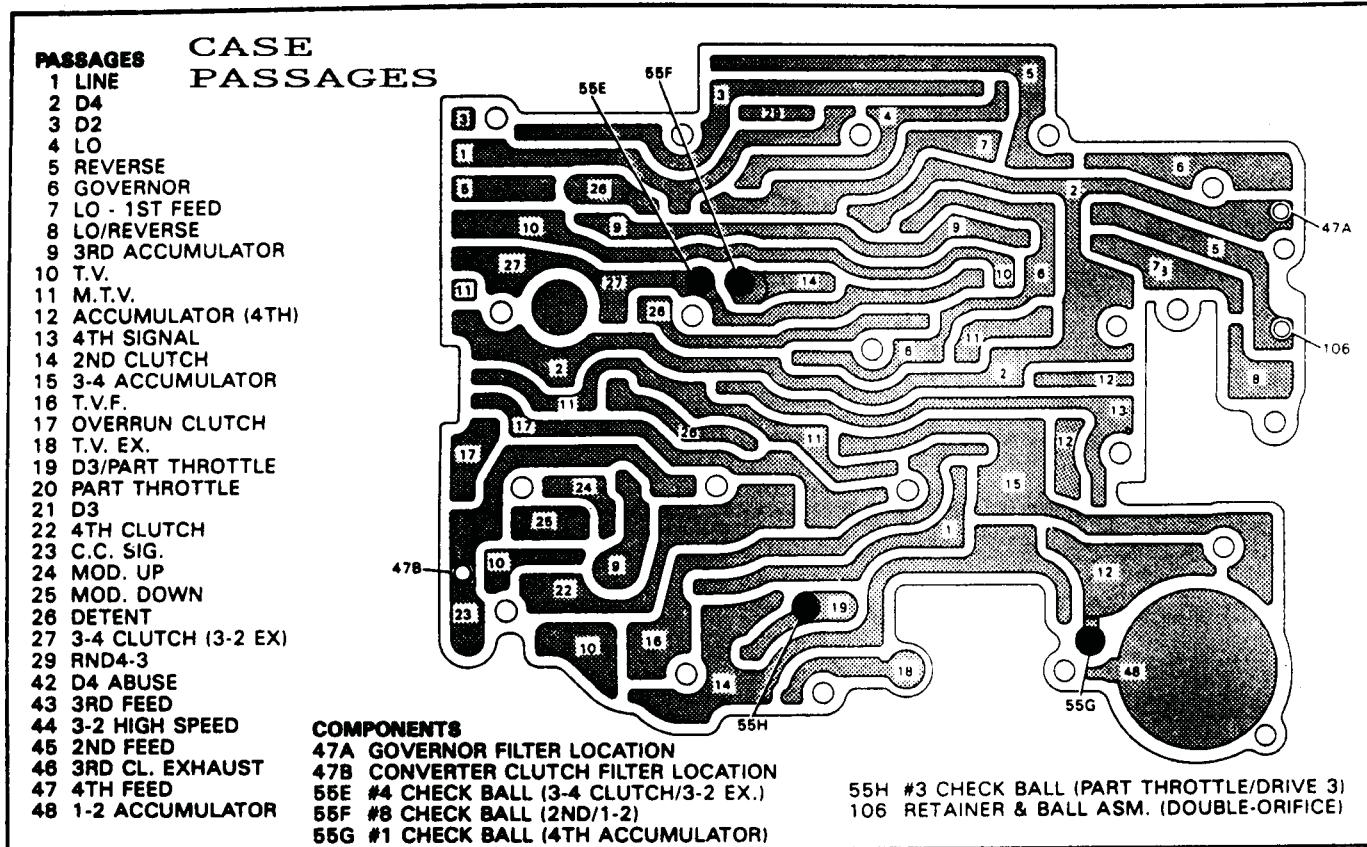


Figure 29

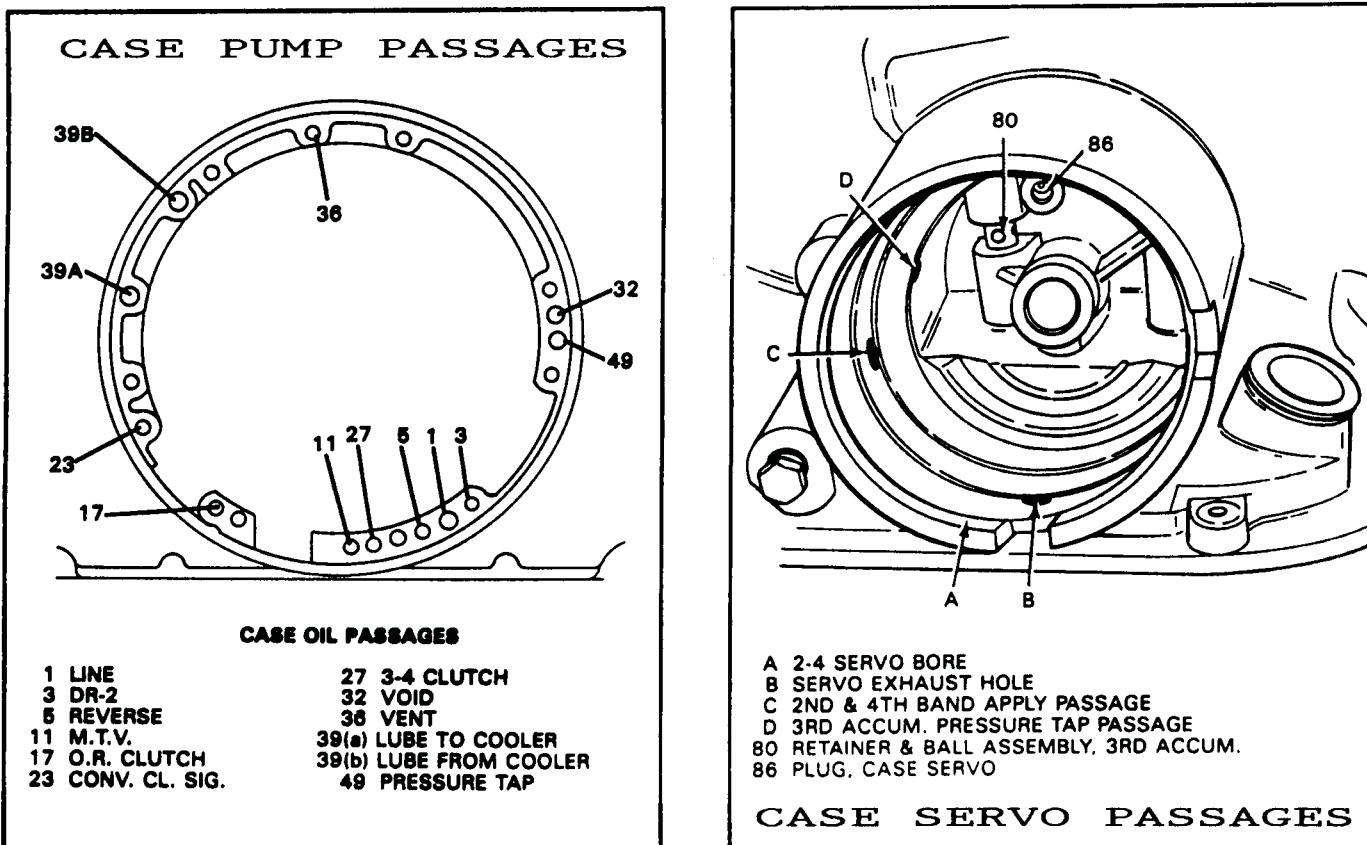


Figure 30

Figure 31

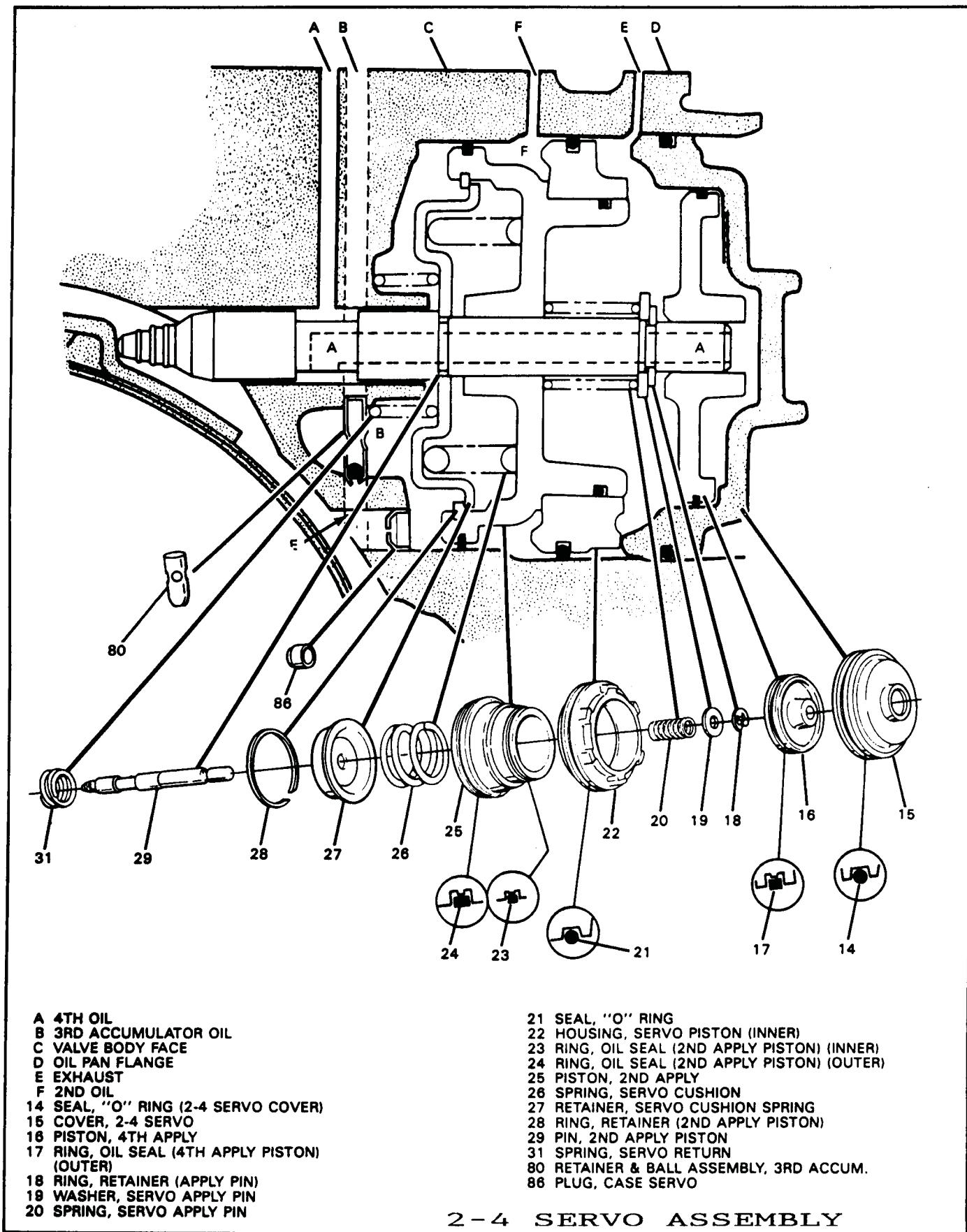


Figure 32

PUMP COVER PASSAGES

- 1 LINE
 3 D2
 5 REVERSE
 11 MODULATED T.V.
 17 OVERRUN CLUTCH
 23 CONVERTER CLUTCH SIGNAL
 23(a) CONVERTER CLUTCH SIGNAL (ORIFICE CUP PLUG)
 27 3-4 CLUTCH
 32 VOID
 33 EXHAUST
 33(a) EXHAUST (T.C.C. RELEASE)
 33(b) EXHAUST (PRESS. REG.)
 36 VENT
 37 DECREASE
 37(a) DECREASE AIR BLEED (ORIFICE CUP PLUG)
 38 SEAL DRAIN
 39 LUBE
 39(a) LUBE TO COOLER
 39(b) LUBE FROM COOLER
 40 CONVERTER CLUTCH RELEASE
 41 CONVERTER CLUTCH FEED
 41(a) CONVERTER CLUTCH FEED TO COOLER (ORIFICE CUP PLUG)

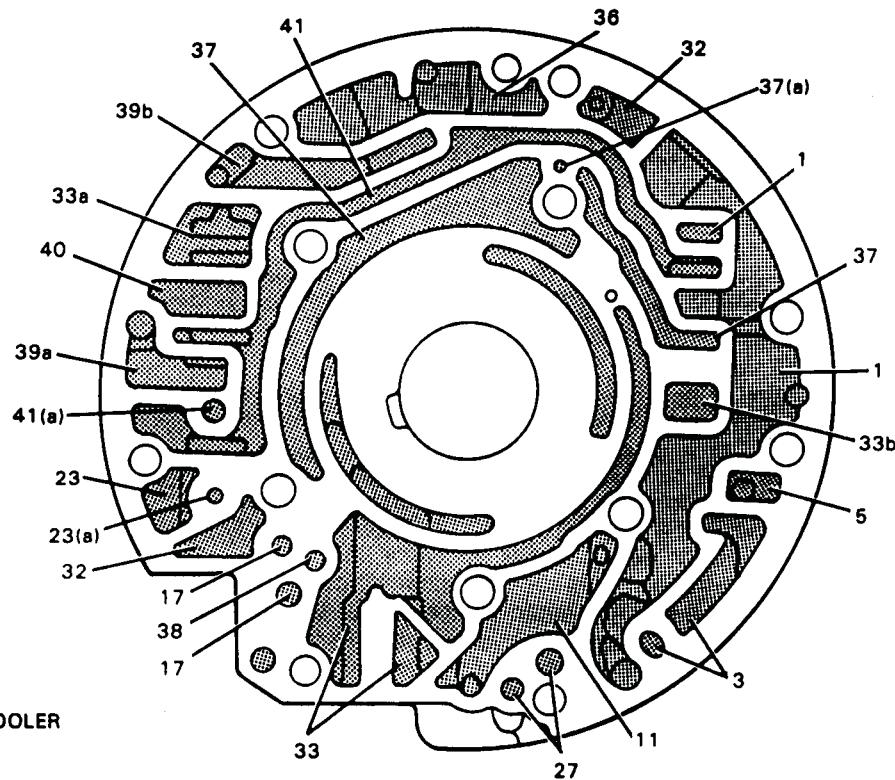


Figure 33

PUMP BODY PASSAGES

- 1 LINE
 3 D2
 5 REVERSE
 11 MODULATED T.V.
 17 OVERRUN CLUTCH
 23 CONVERTER CLUTCH SIGNAL
 27 3-4 CLUTCH
 32 VOID
 33 EXHAUST
 33(a) EXHAUST (T.C.C. RELEASE)
 33(b) EXHAUST (PRESS. REG.)
 36 VENT
 37 DECREASE
 38 SEAL DRAIN
 39 LUBE
 39(a) LUBE TO COOLER
 39(b) LUBE FROM COOLER
 40 CONVERTER CLUTCH RELEASE
 41 CONVERTER CLUTCH FEED

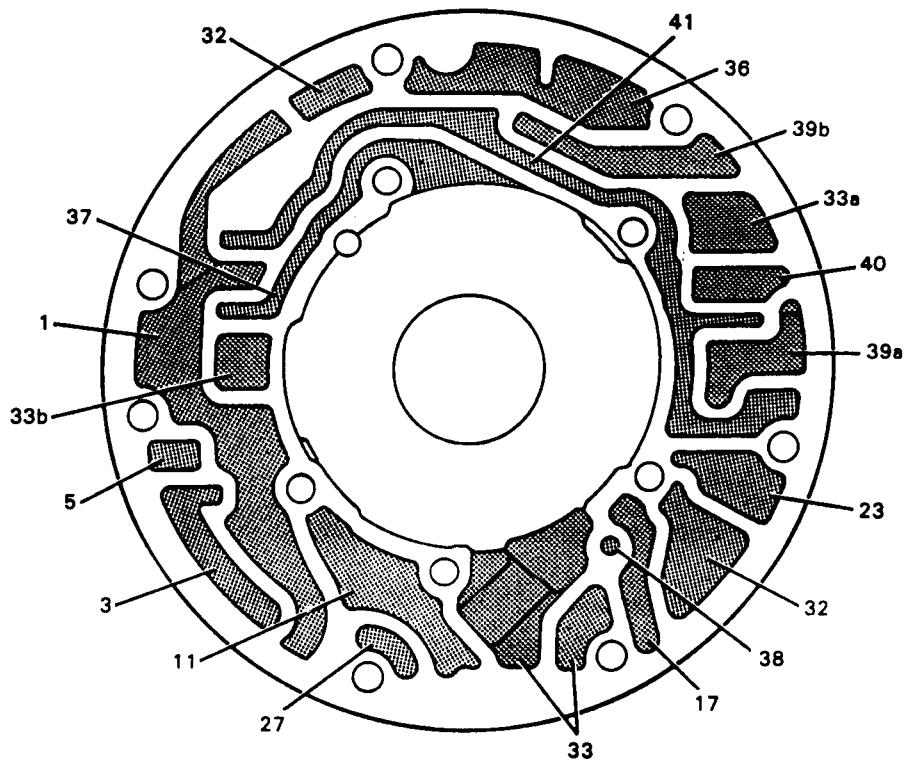


Figure 34

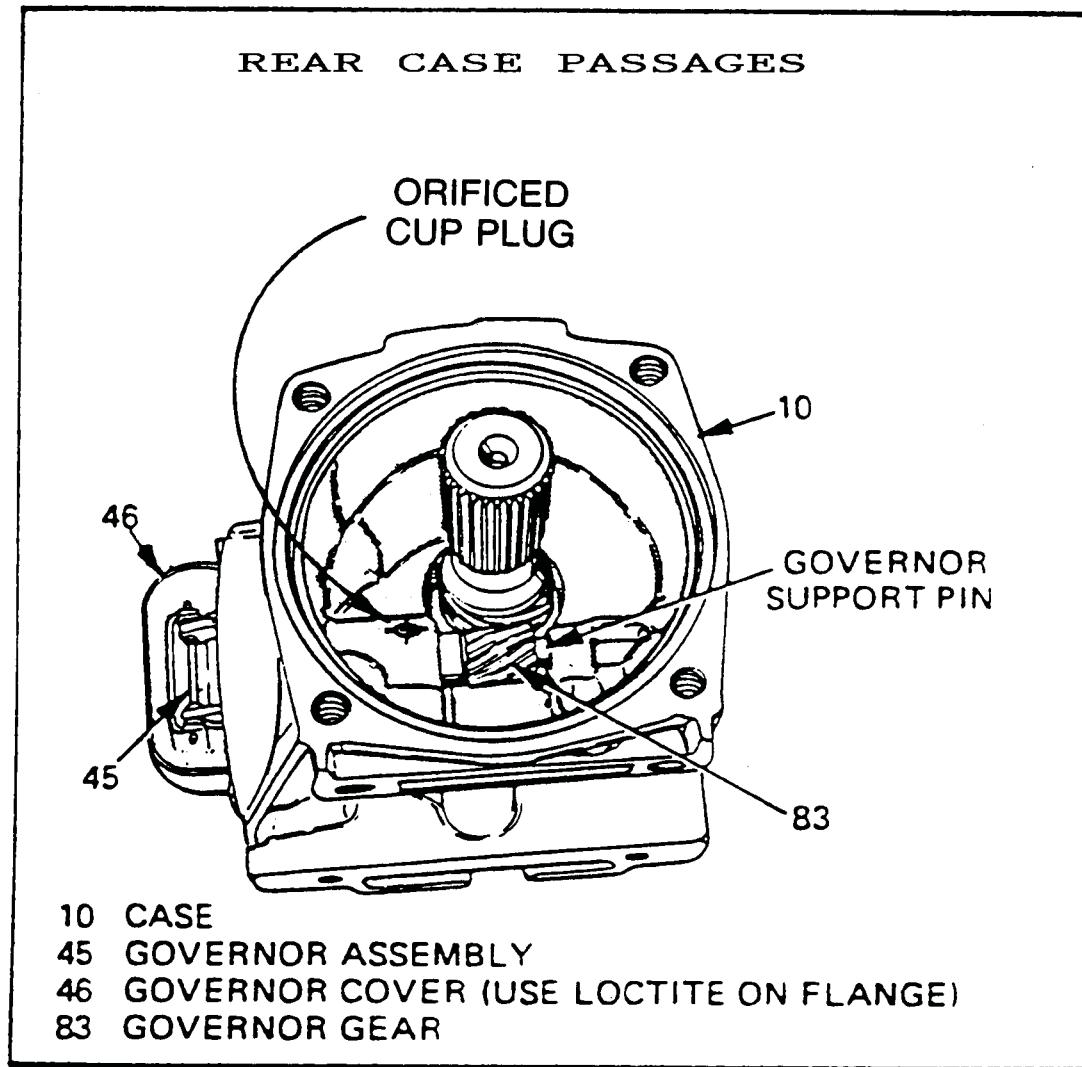


Figure 35



Technical Service Information

1987 THM 700-R4 SPACER PLATE CHART						
PART NO.	8663589	8667064	8663595	8663587	8663763	8663593
I.D. CODE	AF	AP	AM	AD	AN	AK
FITS THESE MODELS	MUM TJM TKM MDM MKM MLM	MHM TNM TRM	MWM TUM TXM MZM MPM	FAM MMM MAM MRM MXM MFM	TSM	YFM
PART NO.	8663592	8663585	8667703	8663590	8663764	8667525
I.D. CODE	AJ	AB	AZ	AG	AO	AU
FITS THESE MODELS	YLM	YTM	YWM	YKM	YPM	YNM
PART NO.	8663584	8667061	8663591	8663588	8667063	8663594
I.D. CODE	AA	AS	AH	AE	AT	AL
FITS THESE MODELS	YZM YMM	YSM	PAM PBM PCM YAM	PRM MTM MCM	TAM TBM YXM	YDM

1988 THM 700-R4 SPACER PLATE CHART						
PART NO.	8667353	8667354	8667355	8667356	8667357	8667358
I.D. CODE	BH	BE	BD	BF	BM	BA
FITS THESE MODELS	PAM PBM PCM MHM TNM	MCM PRM MTM	FAM MAM MFM FMM MRM MXM	MDM MKM MLM TJM TKM	MPM MWM TUM TXM MZM	YZM
PART NO.	8667359	8667360	8667363	8667364	8667475	8667700
I.D. CODE	BL	BG	BT	BB	BU	BX
FITS THESE MODELS	YDM	YKM	YXM TAM TBM	YTM	YNM	YMM
PART NO.	8667367	8667704	8667825			
I.D. CODE	BO	BZ	BS			
FITS THESE MODELS	YPM	YWM	THM TLM			

Figure 36

AUTOMATIC TRANSMISSION SERVICE GROUP



Technical Service Information

1989 THM 700-R4 SPACER PLATE CHART						
PART NO.	8673053	8673136	8673137	8667825	8673139	8673135
I.D. CODE	BC	BN	BP	BS	BV	BW
FITS THESE MODELS	HBM HHM	MCM PRM	MDM MKM MLM TJM TKM	THM TLM	MPM MWM MZM TUM TXM	FMM MAM MFM MRM MXM
-----	-----	-----	-----	-----	-----	-----
PART NO.	8673138	8673165	8673160	8673164	8673166	8673163
I.D. CODE	BY	CB	CC	CD	CG	CH
FITS THESE MODELS	MHM PAM PBM PCM TNM	FKM	YDM	YTM	YXM	YPM
-----	-----	-----	-----	-----	-----	-----
PART NO.	8673238	8673206	8673352	8673353	8673499	8673500
I.D. CODE	CK	CL	CM	CO	CW	CX
FITS THESE MODELS	YNM	HDM	FXM	YZM	HCM	HFM

Figure 37



Technical Service Information

1990 THM 700-R4 SPACER PLATE CHART						
PART NO.	8673053	8673136	8673137	8667825	8673139	8673135
I.D. CODE	BC	BN	BP	BS	BV	BW
FITS THESE MODELS	HBM	MBM SAM	CCM CFM KLM WBM	SHM SPM TLM	CHM CJM KCM KRM RAM WCM	CAM CBM KMM MJM MNW WAM
-----	-----	-----	-----	-----	-----	-----
PART NO.	8673164	8673238	8673206	8673352	8673401	8673441
I.D. CODE	CD	CK	CL	CM	CN	CS
FITS THESE MODELS	BAM	BPM	HDM	FUM	MSM	FBM
-----	-----	-----	-----	-----	-----	-----
PART NO.	8673509	8673510	8673511	8673499	8673500	8673645
I.D. CODE	CT	CU	CV	CW	CX	CZ
FITS THESE MODELS	YDM	FTM	FZM	HCM	HLM	HJM
-----	-----	-----	-----	-----	-----	-----
PART NO.	8673633	8673440				
I.D. CODE	DA	DB				
FITS THESE MODELS	LAM LBM LCM LDM LFM	DBM				

Figure 38



Technical Service Information

1991 THM 700-R4 SPACER PLATE CHART						
PART NO.	8673053	8667825	8673135	8673165	8673238	8673352
I.D. CODE	BC	BS	BW	CB	CK	CM
FITS THESE MODELS	HBM	SHM TLM	MJM MNW WAM	FYM	BJM	FUM
-----	-----	-----	-----	-----	-----	-----
PART NO.	8673401	8673441	8673509	8673510	8673551	8673499
I.D. CODE	CN	CS	CT	CU	CV	CW
FITS THESE MODELS	MSM	FBM	YHM	FTM	FZM	HCM
-----	-----	-----	-----	-----	-----	-----
PART NO.	8673500	8673655	8673653	8673654	8676590	8676591
I.D. CODE	CX	DC	DD	DG	DH	DJ
FITS THESE MODELS	HLM	CCM CFM KLM WBM	CAM CBM KMM	SAM	DAM	BCM
-----	-----	-----	-----	-----	-----	-----
PART NO.	8677426	8677719	8677720	8677704	8678207	8678042
I.D. CODE	DK	DM	DN	DO	DP	DS
FITS THESE MODELS	DBM	HDM	HJM	SFM	2DDM 92 MODEL	BBM BHM
-----	-----	-----	-----	-----	-----	-----
PART NO.	8678328	8678567	8679298	8680144	8680371	
I.D. CODE	DT	DU	DV	EA	EB	
FITS THESE MODELS	LHM	LAM LBM LCM LDM LFM	AAM	CNM CYM KWM RCM RDM	AMM APM	

Figure 39



Technical Service Information

1992 THM 700-R4 SPACER PLATE CHART						
PART NO.	8673053	8667825	8673165	8673238	8673441	8673510
I.D. CODE	BC	BS	CB	CK	CS	CU
FITS THESE MODELS	HBM	SHM TLM	FUM	BFM	FBM	FTM
-----	-----	-----	-----	-----	-----	-----
PART NO.	8673511	8673500	8673655	8673653	8673654	8676590
I.D. CODE	CV	CX	DC	DD	DG	DH
FITS THESE MODELS	FZM	HLM	CCM CFM KHM WBM	CAM CBM KMM MJM MNW WAM	SAM	ACM
-----	-----	-----	-----	-----	-----	-----
PART NO.	8676591	8679435	8677719	8677720	8677704	8678207
I.D. CODE	DJ	DL	DM	DN	DO	DP
FITS THESE MODELS	BCM	TWM	HDM	HJM	SFM	DDM
-----	-----	-----	-----	-----	-----	-----
PART NO.	8678042	8678328	8678567	8679298	8679492	8680144
I.D. CODE	DS	DT	DU	DV	DY	EA
FITS THESE MODELS	BBM BHM	LHM	LBM LCM LDM LFM	AAM	TAM TBM	CJM CHM KJM WCM
-----	-----	-----	-----	-----	-----	-----
PART NO.	8680678	8680677	8680502	8680503	8680770	8680828
I.D. CODE	EC	ED	EE	EG	EH	EJ
FITS THESE MODELS	YAM YCM	YDM	BAM	BWM	ADM AKM	MMM MSM
-----	-----	-----	-----	-----	-----	-----
PART NO.	8681061					
I.D. CODE	EK					
FITS THESE MODELS	CPM					

Figure 40



Technical Service Information

1993 THM 700-R4 SPACER PLATE CHART						
PART NO.	8681262	8681263	8681264	8681265	8681266	8681267
I.D. CODE	EP	ES	ET	EU	EV	EW
FITS THESE MODELS	AAM	BWM	ADM AFM	FAM FDM	HBM	HDM
PART NO.	8681268	8681269	8681270			
I.D. CODE	EX	EY	EZ			
FITS THESE MODELS	FFM	FMM	HJM			
PART NO.	8681271	8681272	8681273	8681274	8681275	8681276
I.D. CODE	GA	GB	GC	GD	GE	GG
FITS THESE MODELS	HLM	YAM YCM	YDM	BAM	BBM BHM	BCM
PART NO.	8681277	8681278	8681280	8681285	8681289	8681259
I.D. CODE	GH	GJ	GL	GS	GW	GX
FITS THESE MODELS	BFM	SAM	CPM	LHM	SFM	BRM
PART NO.	8684466					
I.D. CODE	HA					
FITS THESE MODELS	ASM					

Figure 41

TRANSMISSION DISASSEMBLY

GENERAL INFORMATION

1. Thoroughly clean the exterior of the transmission before disassembly.
2. Remove the torque converter.
3. Install holding fixture, as shown in Figure 42, on transmission case.
4. Install transmission into the fixture base on work bench, as shown Figure 42.
5. Rotate the transmission with extension housing down, and drain the fluid.

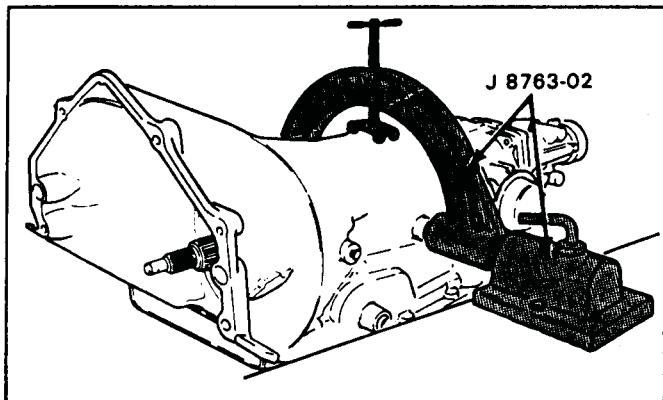


Figure 42

2-4 SERVO ASSEMBLY

1. Install J-29714 servo cover compressor, as shown in Figure 43.
2. Remove servo cover retaining ring.
3. Pull the "O" ring up thru the slot in case and cut, remove the "O" ring.
4. Remove the servo cover.
5. Remove the 2-4 servo assembly.
6. Remove the 4th apply piston.
7. Remove the servo return spring.
8. Remove "E" clip, washer, and the apply pin spring.
9. Remove the 2nd apply piston assembly from the servo pin.
10. Install J-22269-01 compressor on the second apply piston, as shown in Figure 44.
11. Remove second apply piston snap ring as shown in Figure 44.
12. Remove cushion spring retainer and the cushion spring.
13. Use Figure 47 as a guide for the disassembly of the 2-4 servo parts.

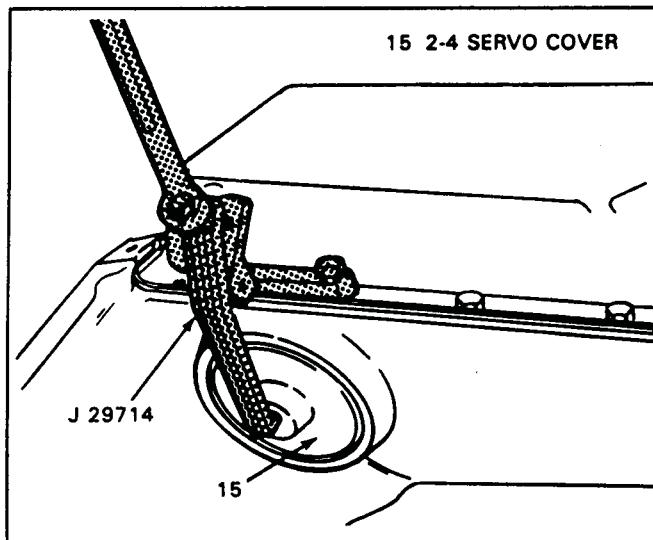


Figure 43

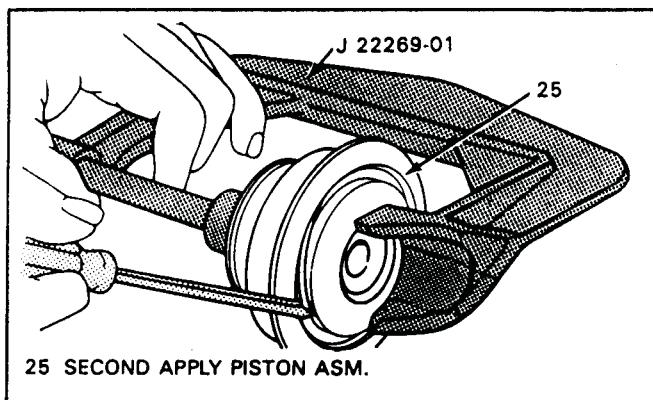


Figure 44

SERVICE NOTE:

As a diagnostic aid, the servo pin length should now be checked for proper selection. If the servo pin length is not proper, be certain to inspect the 2-4 band and reverse input housing for wear.

BAND PIN SELECTION

1. Install J-33037 with the apply pin as shown in Figure 45.
2. Apply 100 in.lbs. of torque as shown, in Figure 45.
3. If white line appears in the window of J-33037 tool, pin length is correct.
4. Use the servo pin selection chart in Figure 45 to determine the correct pin length.
5. Length can be measured as shown in Figure 46.

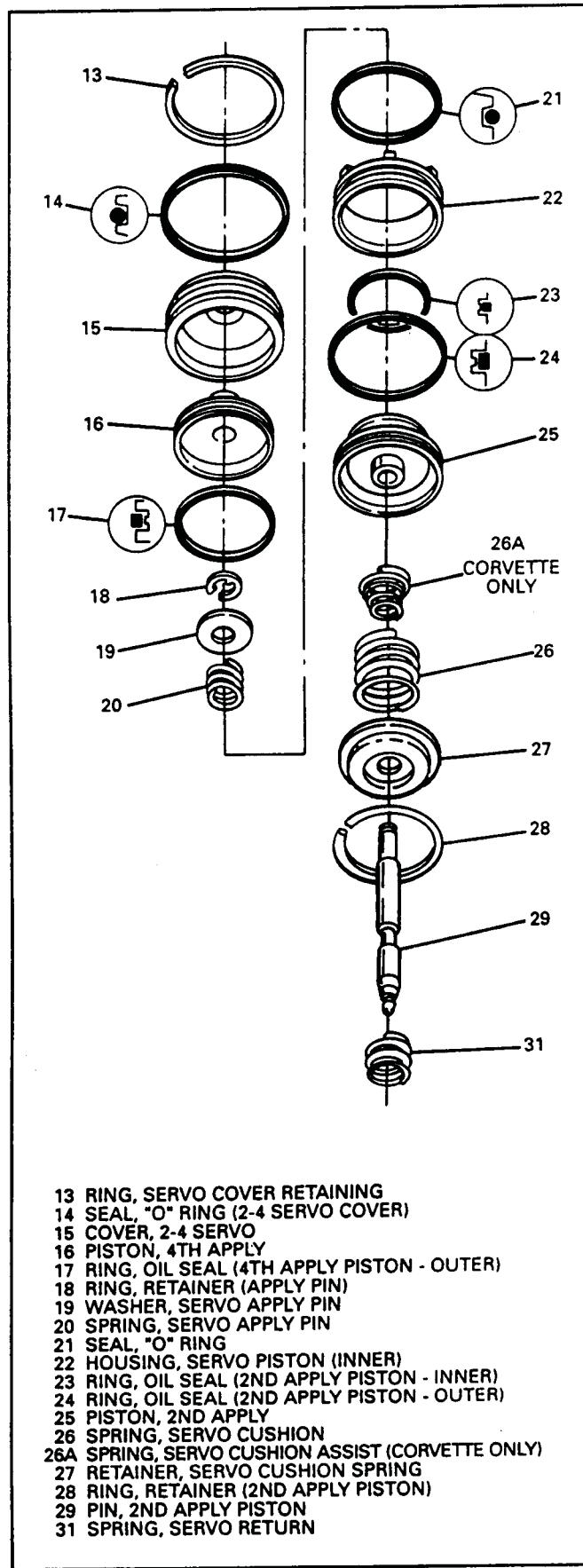
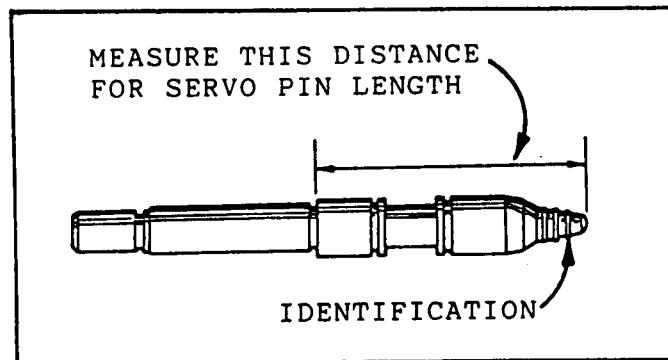
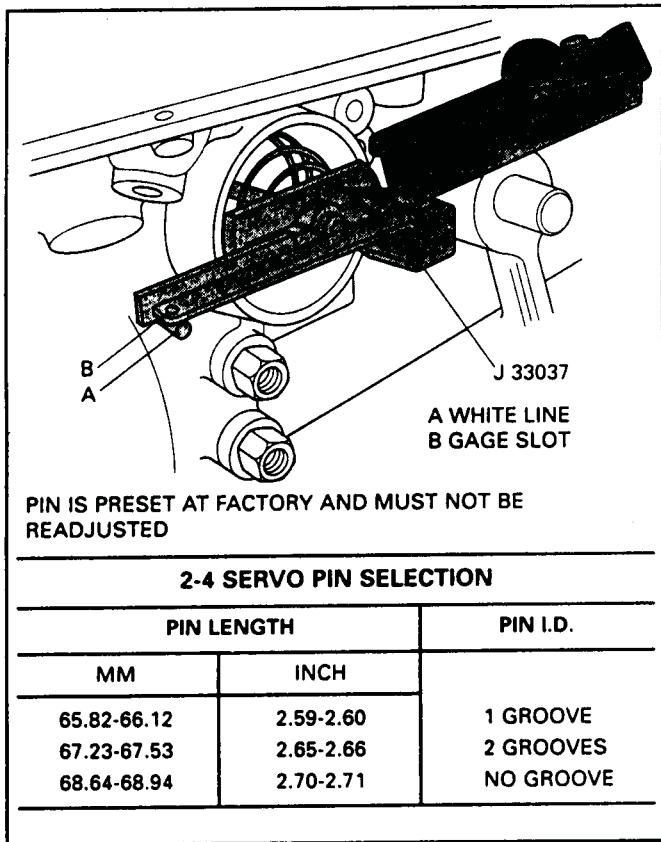


Figure 47



Technical Service Information

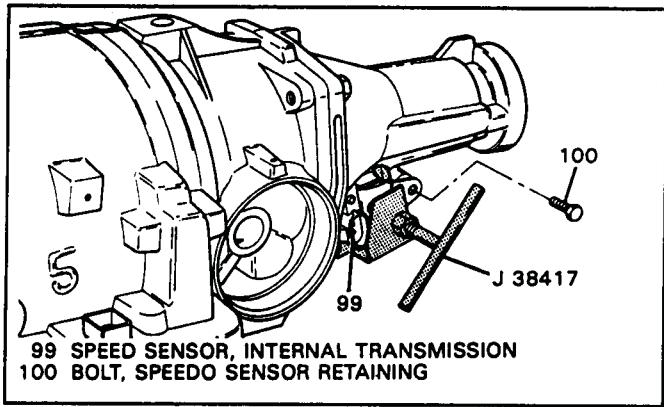


Figure 48

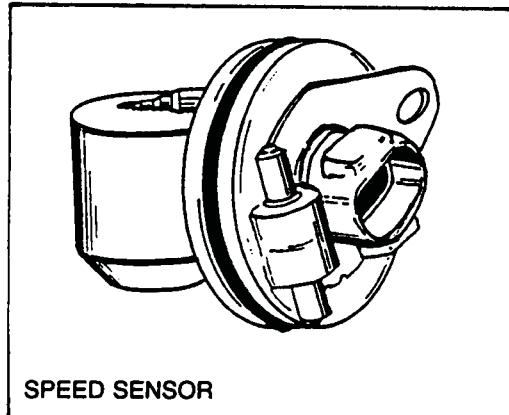


Figure 49

EXTENSION HOUSING AND GOVERNOR

1. Remove the output speed sensor from extension housing bore, using tool J-38417, as shown in Figure 48. (Used on some models only).
 2. Remove the bolt, adapter retainer and speedometer adapter housing, as shown in Figure 50. (Used some models only).
 3. Remove four extension housing bolts and the extension housing. Refer to Figure 50.
 4. Remove and discard the extension housing "O" ring (Figure 50).
 5. Remove the output shaft sleeve (690) if so equipped (Figure 50).
 6. Push down on tab of speedometer gear clip, and tap speedometer gear off of the output shaft using care not to damage the speedo gear (Figure 51).
 7. Remove speed sensor rotor from the output shaft with puller. Some models have plastic speedometer gear, and some models have speed sensor rotor in this location (See Figure 51).

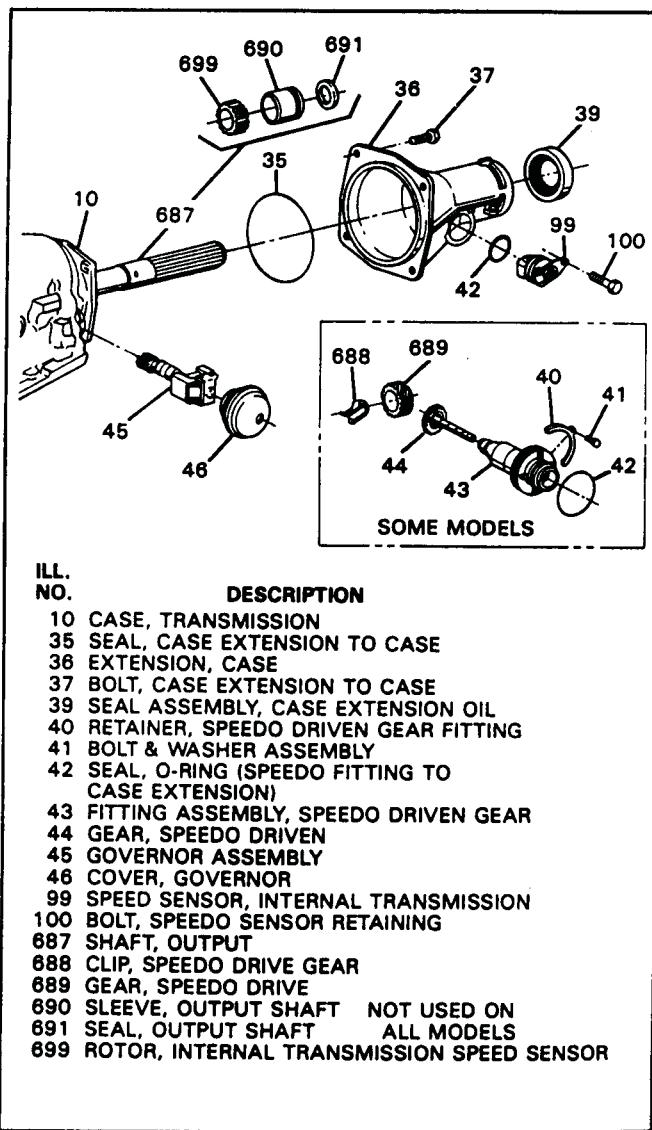


Figure 50

8. Tap around the governor cover flange with a punch to remove the governor cover. Great care must be used so as not to damage the governor cover.
 9. Remove the governor from the case bore with a twisting motion, and inspect for damage and/or wear, and inspect the case bore for wear or damage.

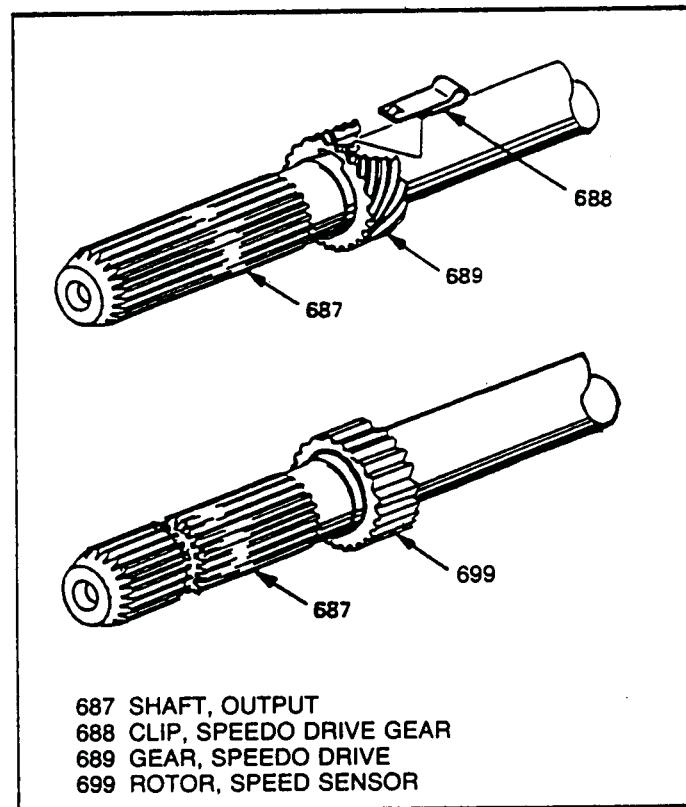


Figure 51

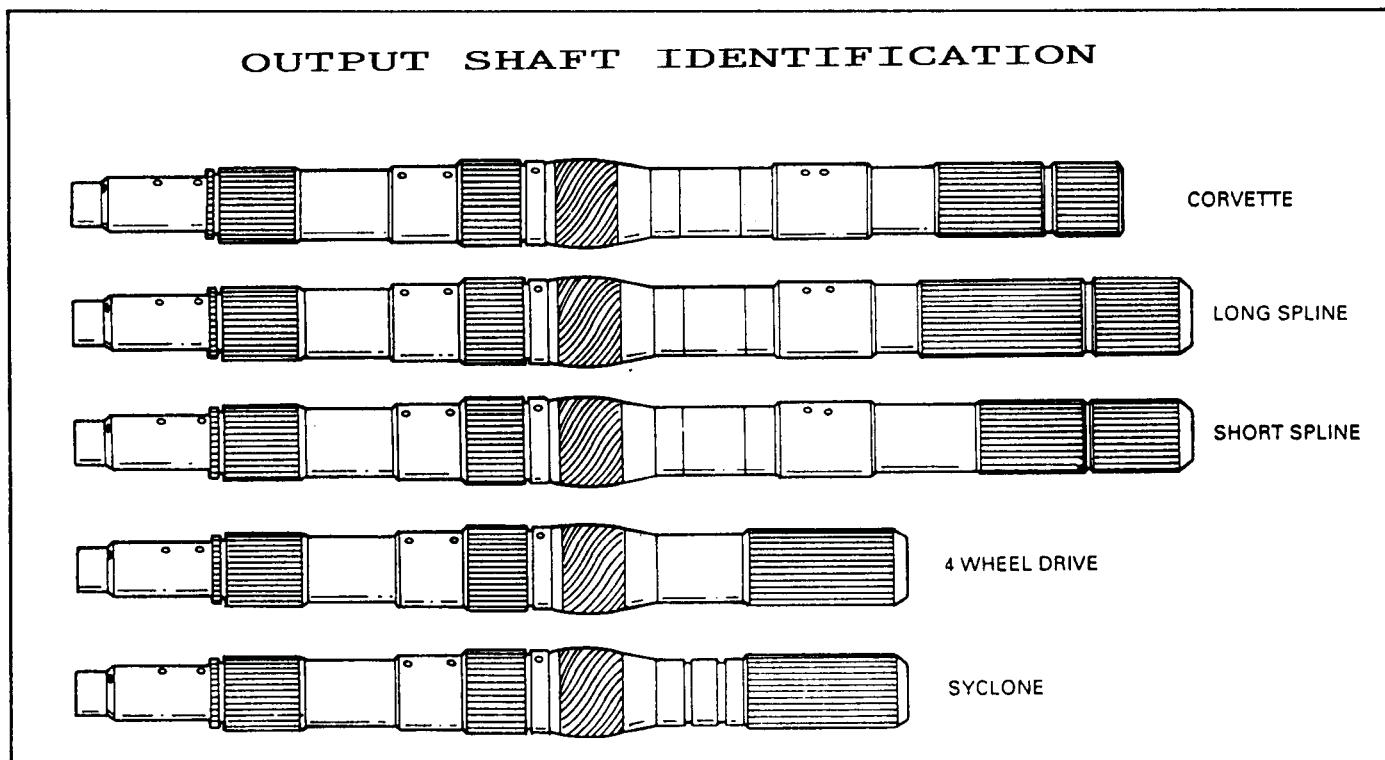


Figure 52

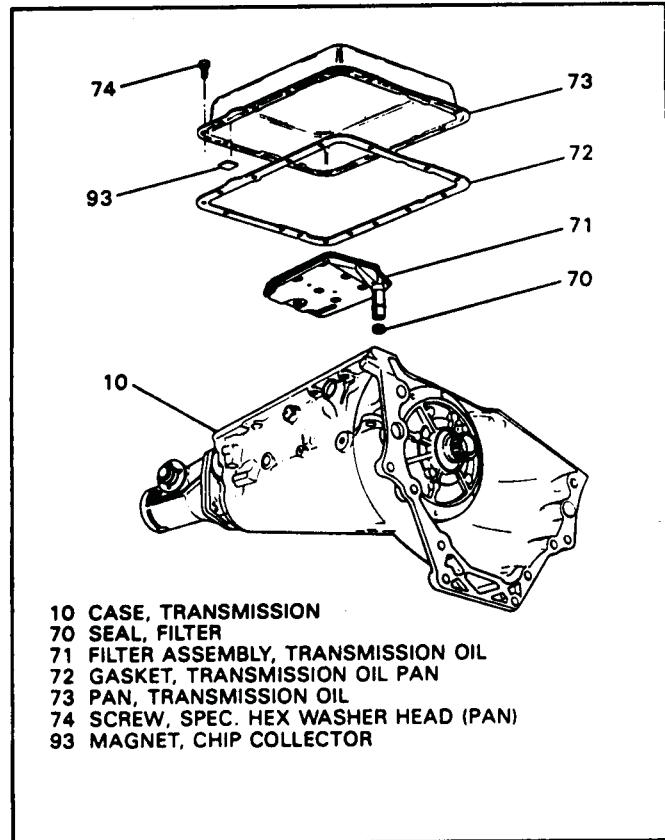


Figure 53

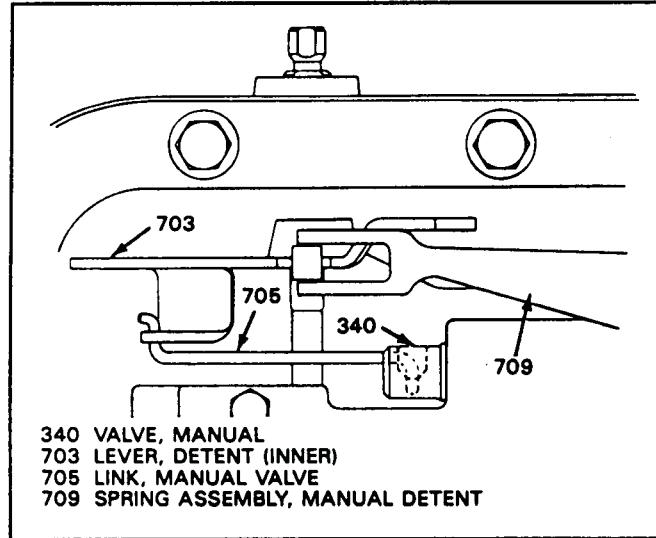


Figure 55

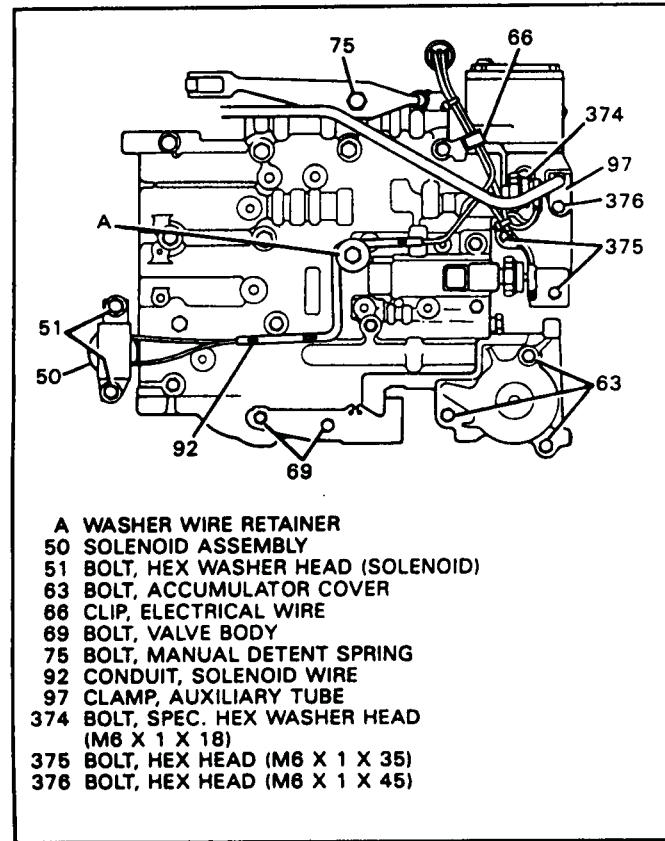


Figure 54

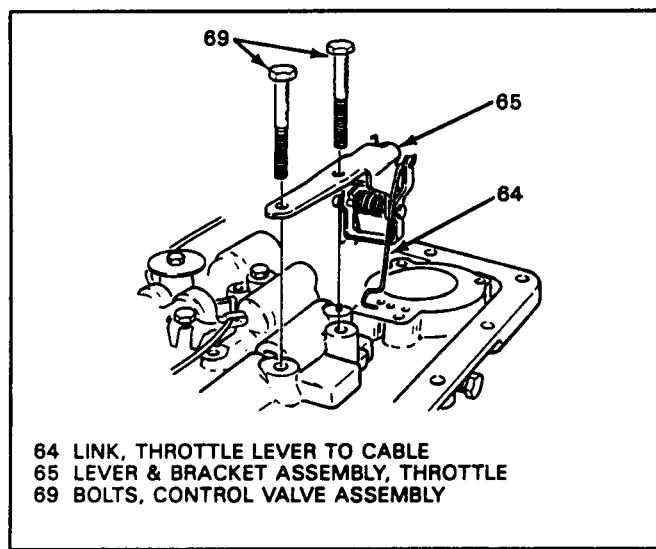


Figure 56

BOTTOM PAN AND VALVE BODY COMPONENTS

1. Rotate transmission so that bottom pan is facing up and lock fixture.
2. Remove remaining pan bolts using a 13mm socket and speed handle.
3. Remove the bottom oil pan and discard the oil pan gasket.
4. Remove the main oil filter and open the filter by prying the metal crimping away from the top of the filter (Black Part) and pull apart. The filter may contain important evidence for diagnosis.
5. Remove and discard the filter seal that is stuck in the pump cover bore with a pair of snap ring pliers.
6. Remove solenoid bolts (51), lock-up solenoid (50), wiring harness from the switches, and harness assembly.



Technical Service Information

7. See the wiring schematics on Pages 17 thru 21 for specific wiring types for various applications.
8. Remove the case connector and the "O" ring seal, and discard "O" ring seal.
9. Remove bolt (75) and remove the manual detent spring (See Figure 54).
10. Remove the auxiliary valve body tube bolts and clamps, and remove auxiliary valve body tube by prying carefully with screwdriver (See Figure 58).
11. Remove the T.V. lever and bracket assembly (See Figure 56).
12. Remove the remaining main valve body bolts, lift valve body straight up and off of manual valve link, and set valve body aside.
13. Remove the checkballs from top of the spacer plate. There may be two check balls or three checkballs depending on model. See "Checkball Locations" in the assembly section of this manual.
14. Remove the three remaining auxiliary valve body bolts and remove auxiliary valve body and set aside.
NOTE: There is one checkball located under the auxiliary valve body. On some models it will be retained in the auxiliary valve body by a retaining clip, and on some models you will find it on the spacer plate.

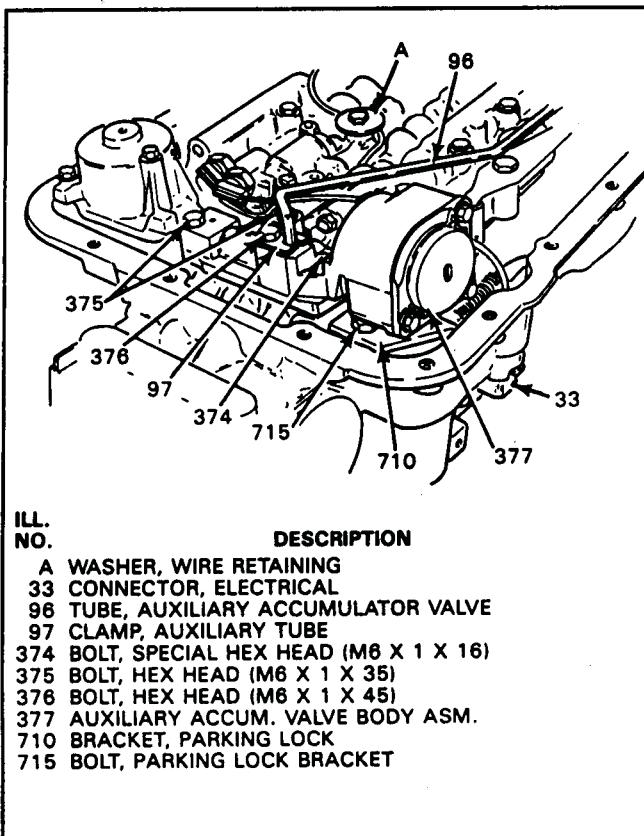


Figure 57

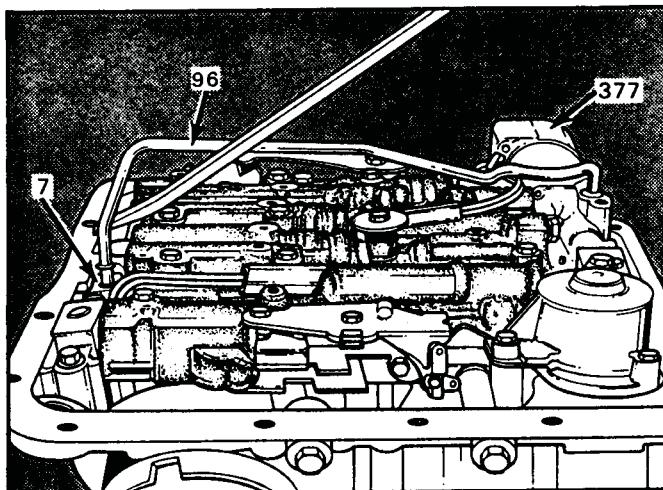


Figure 58

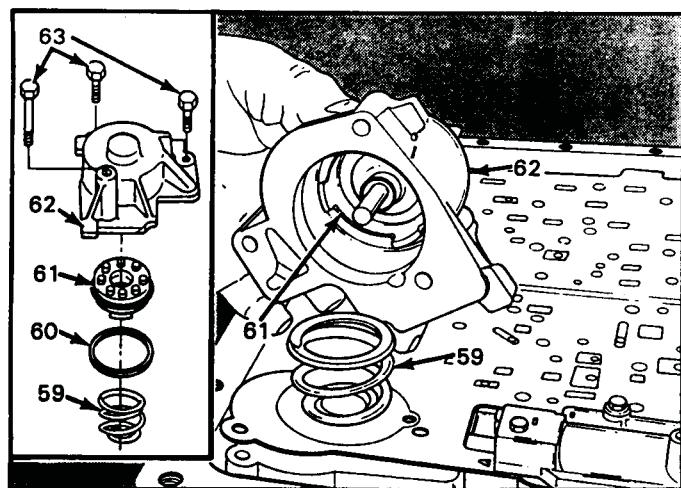
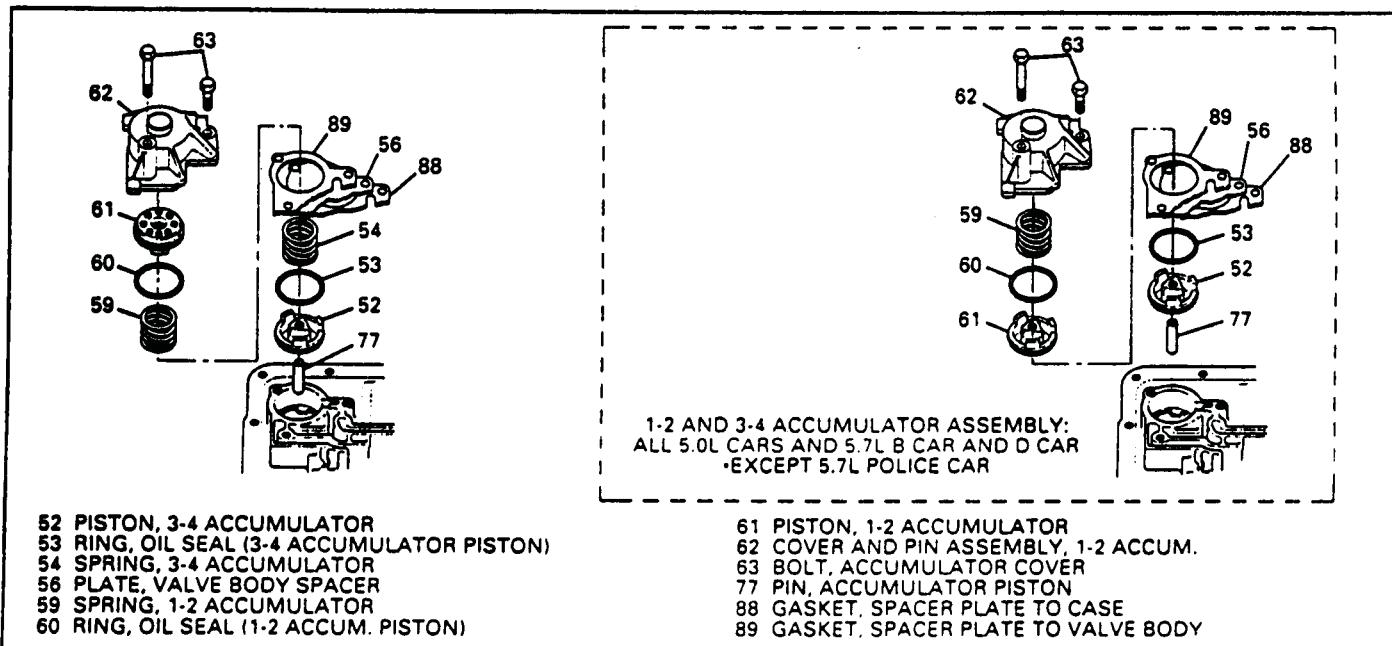


Figure 59

ACCUMULATOR HOUSING ASSEMBLY

1. Remove the three accumulator housing retaining bolts and remove the 1-2 accumulator housing (See Figure 59)
2. Remove the 1-2 accumulator piston, seal, and spring.
NOTE: The 1-2 accumulator spring may "Conical" shape and may not be on the different models.
3. Make note of the spring so that it can be put back in the same position.
4. Remove the spacer plate, both valve body gaskets, and discard the valve body gaskets.
NOTE: Record the spacer plate code.
5. Remove the 3-4 accumulator spring and piston from the case bore.

NOTE: In the 1993 model year the accumulator pistons and springs could be installed in different directions depending on the model you are working on. Refer to Figure 60 for identification.



1993 MODELS	BCM, BWM	AAM, ADM, AFM, ASM, BBM, BHM, BRM	SAM	SFM	HBM, HLM	HJM	HDM	YAM, YCM, YDM, FFM, FMM	FAM, FOM	BFM, LHM	BAM, CPM
1-2 ACCUMULATOR SPRING COLOR	DARK GREEN	YELLOW	YELLOW	NO PAINT	DARK GREEN	VIOLET	DARK GREEN	YELLOW	YELLOW	NO PAINT	NO PAINT
3-4 ACCUMULATOR SPRING COLOR	NOT USED	NOT USED	RED	DARK GREEN	YELLOW	YELLOW	VIOLET	NO PAINT	VIOLET	NO PAINT	VIOLET

Figure 60

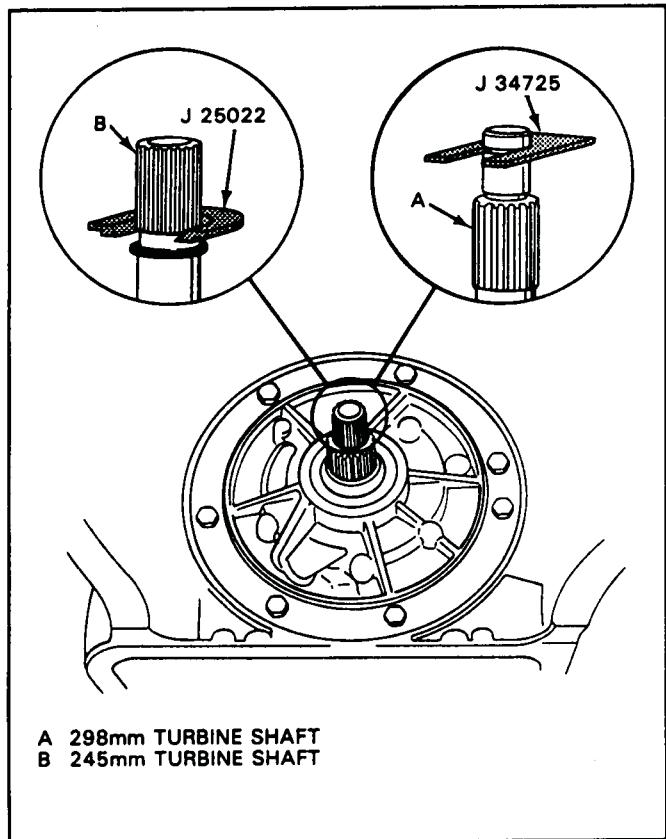


Figure 61

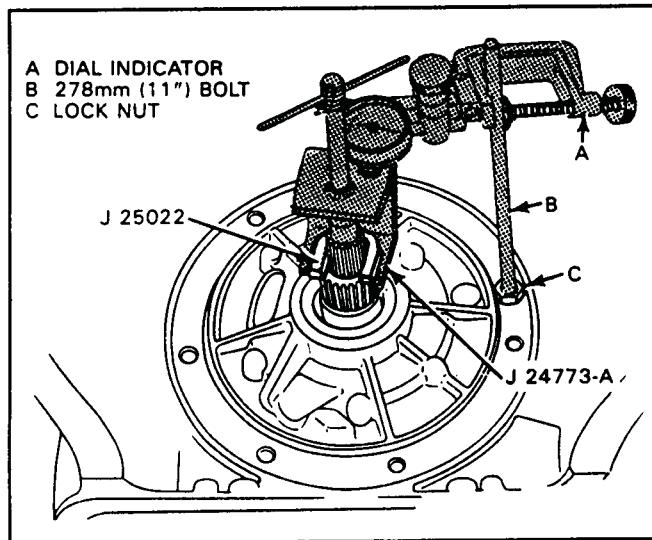


Figure 62

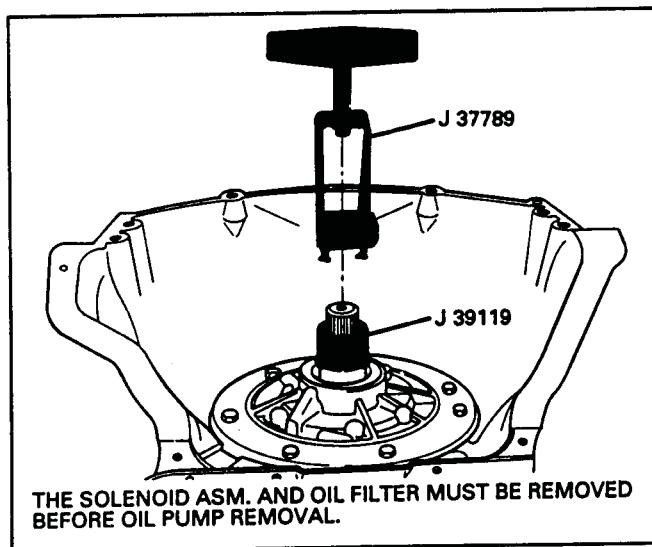


Figure 63

6. Remove the checkballs from the case passages. The checkball locations are different for different model years. See "Checkball Locations" in the assembly section of this manual for the model year you are working on.
7. Remove and inspect the converter clutch and the governor screens.
8. Rotate the transmission so that the pump is facing up, as shown in Figure 63, to check transmission end play.

IMPORTANT:

As a diagnostic aid, transmission end play should be checked BEFORE pump is removed.

CHECKING TRANSMISSION END PLAY

1. Remove a front pump bolt and install a 11" bolt and lock nut (See Figure 62).
2. Install J-25022 adapter, or J-34725 adapter (Figure 61) onto the turbine shaft as shown in Figure 61.
3. Install pump remover J-24773-A shown in Figure 62.
4. Install dial indicator, as shown in Figure 62 and set to zero.

5. Lift up on pump remover and record the transmission end play observed.
6. End play should be .015" minimum to .036" maximum.
7. Remove the dial indicator set-up.
8. Remove the remaining oil pump bolts.
9. Install pump remover J-37789 and the adapter J-39119 as shown in Figure 63.
10. Turn the handle clockwise to remove the oil pump from the case bore, and remove oil pump.

NOTE: THE SOLENOID AND WIRING HARNESS ASM, AND OIL FILTER MUST BE REMOVED BEFORE OIL PUMP REMOVAL.

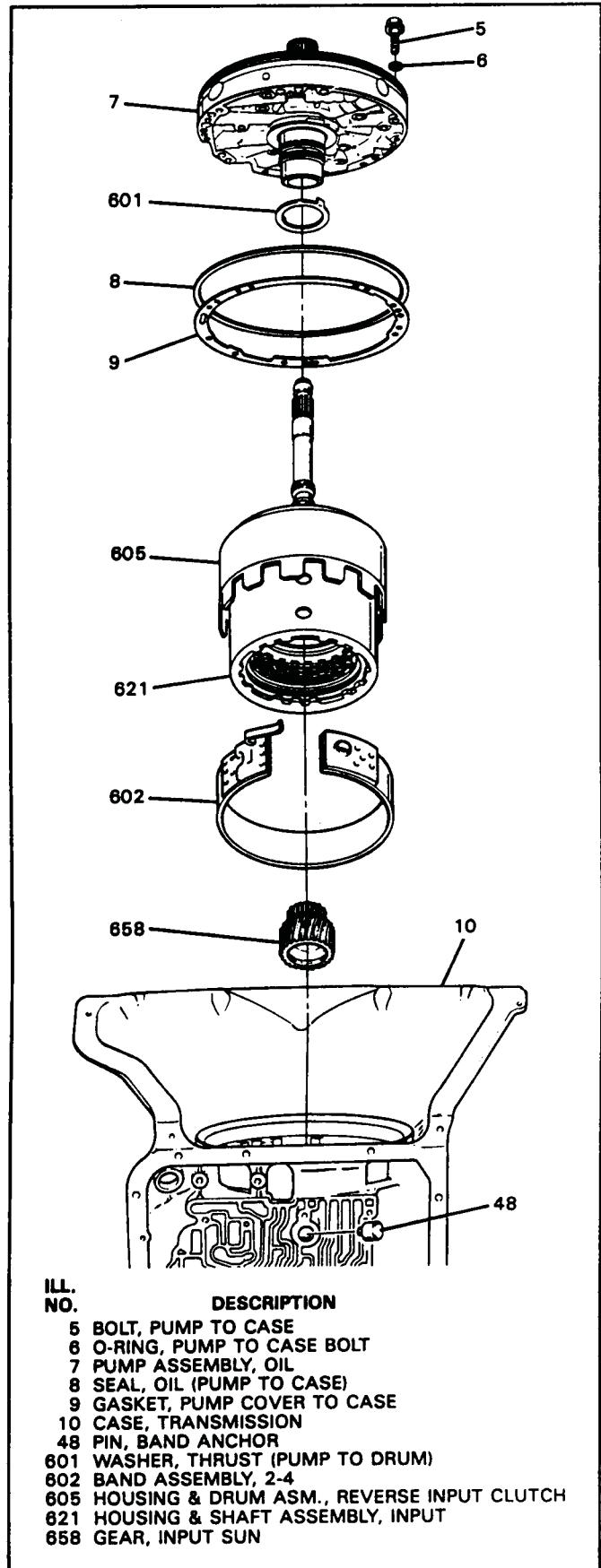


Figure 64

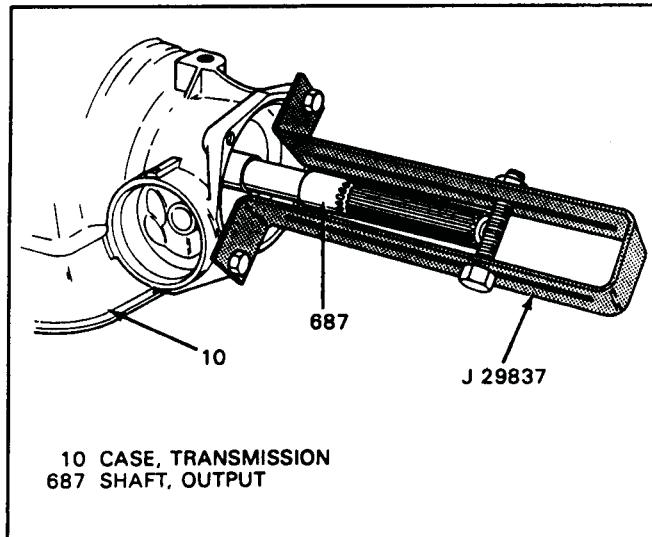


Figure 65

REVERSE INPUT DRUM, INPUT HOUSING, 2-4 BAND, AND INPUT GEAR SET.

1. Remove the band anchor pin from the case bore (See Figure 67).
2. Remove the 2-4 band assembly from case.
3. Grasp the turbine shaft and lift straight up, removing the input housing and reverse input drum together (See Figure 64).
4. Remove the input sun gear as shown in Figure 64.
5. Install J-29837 output shaft support fixture, as shown in Figure 65.
NOTE: Output shaft may fall out when input carrier snap ring is removed, if fixture is not used.
6. Remove the input carrier to output shaft snap ring using snap ring pliers as shown in Figure 66. Use care so as not to over-expand the snap ring.
7. Remove the input carrier, and input ring gear and support as an assembly. Refer to Figure 68.
8. Remove ring gear support thrust washer, and sun gear shell (Figure 68).
9. Remove reaction sun gear, and thrust washer on top of low roller clutch inner race (See Figure 68).
10. Remove the low roller clutch inner race (See Figure 68).



Technical Service Information

IMPORTANT!

If the output shaft has not yet fallen from the reaction ring gear, leave it in place, as we can use it to remove the reaction carrier, center support, the Lo/Reverse clutches, all at one time. The manufacturer assembles the output shaft and reaction ring gear with adhesive for ease of assembly.

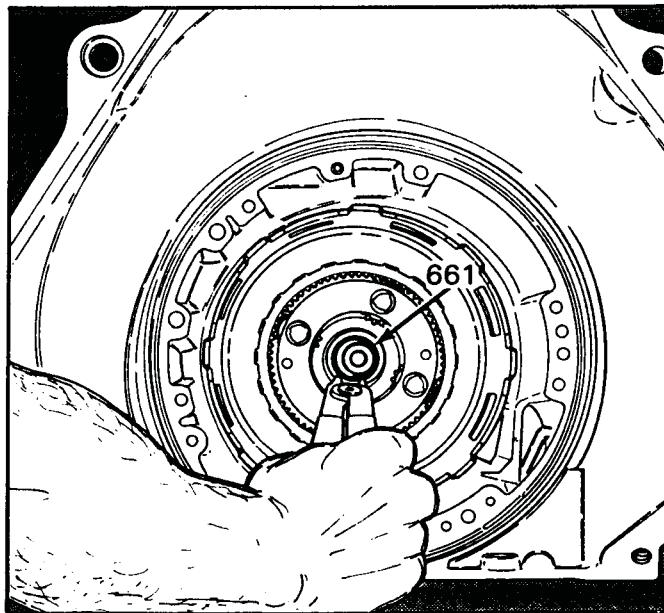


Figure 66

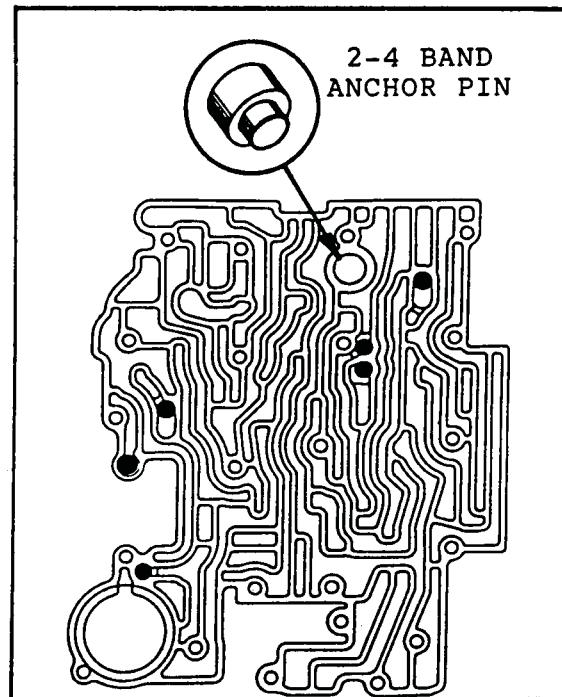


Figure 67

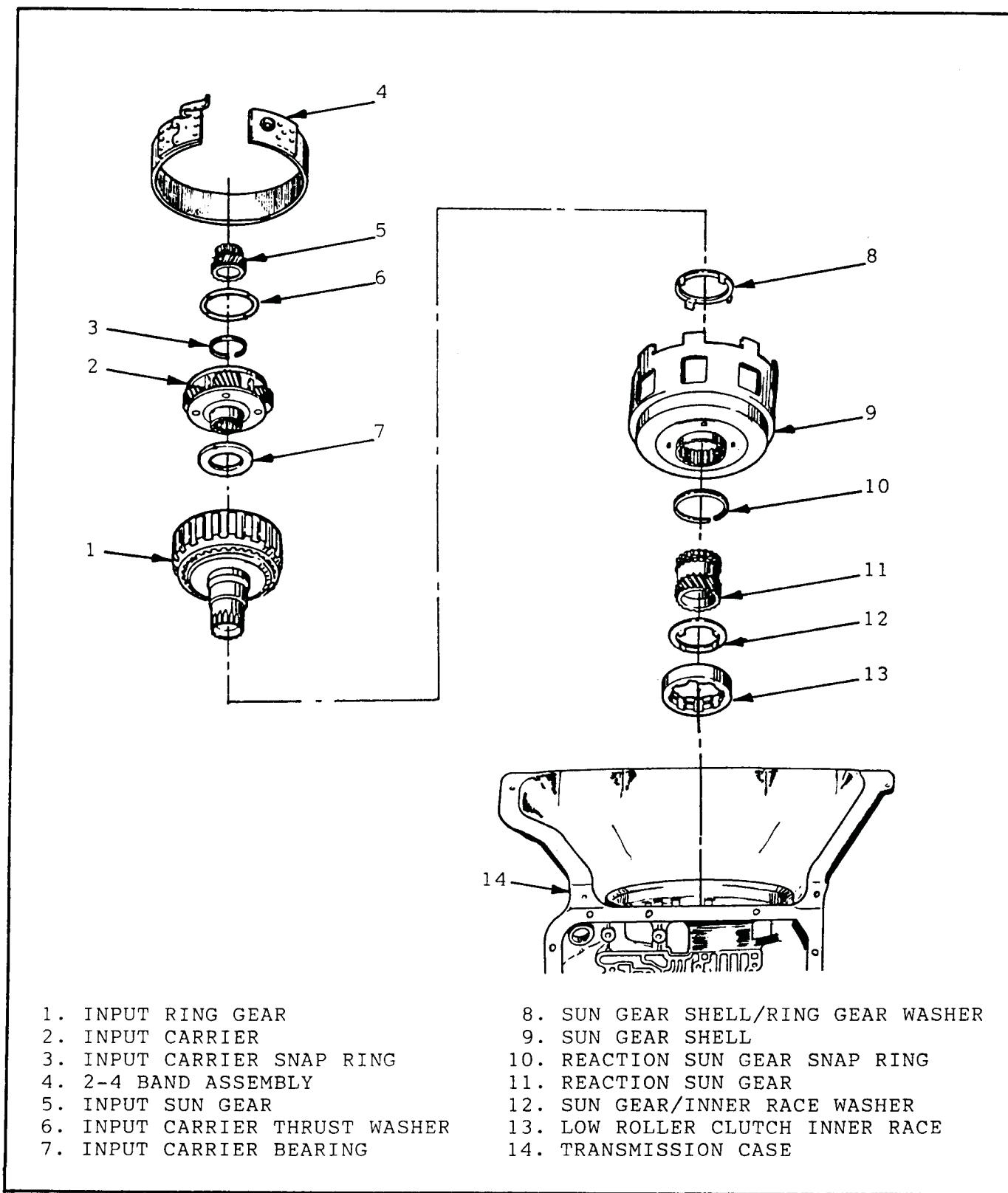


Figure 68

AUTOMATIC TRANSMISSION SERVICE GROUP

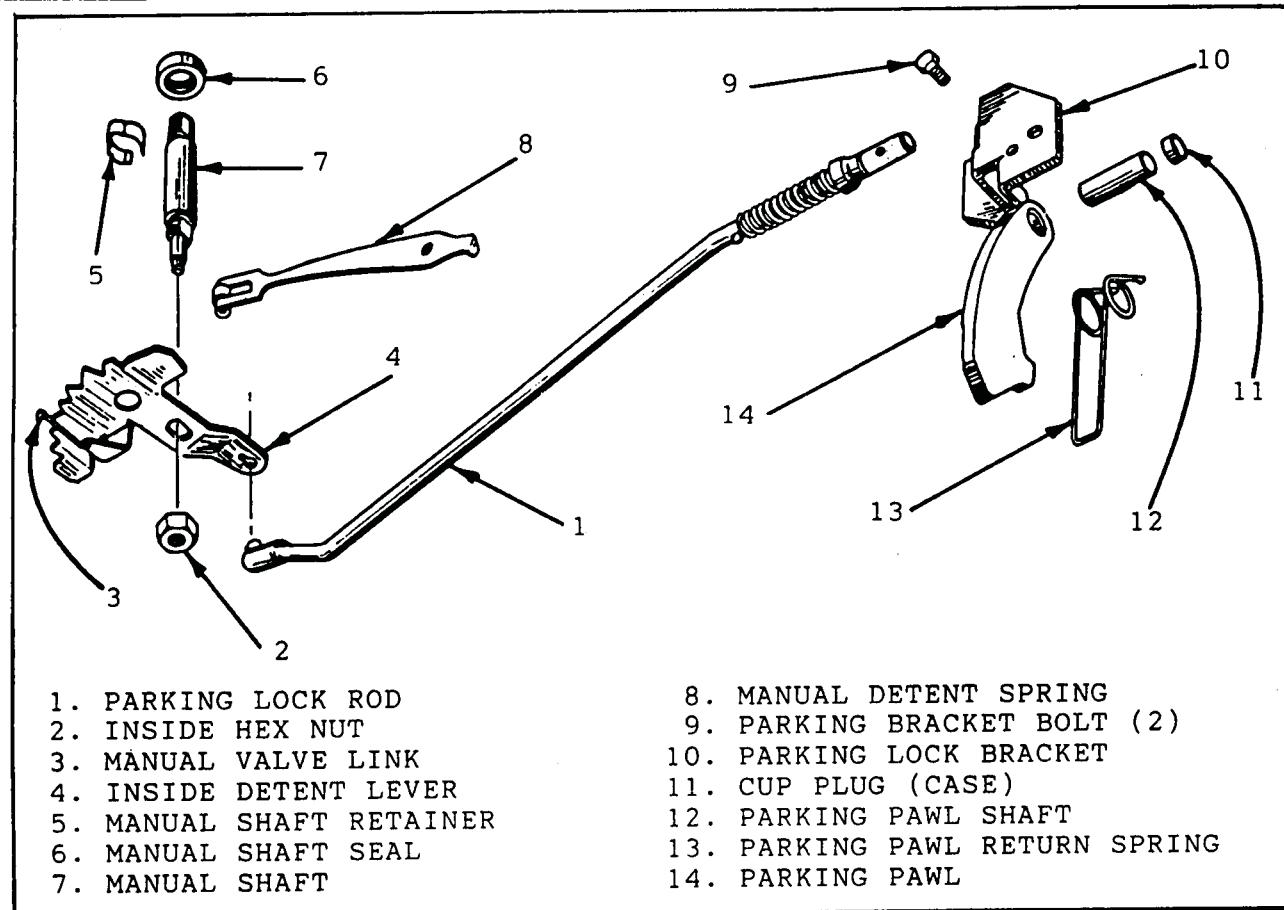


Figure 69

PARKING LINKAGE COMPONENTS

1. Remove the bolts and parking lock bracket from the case.
2. Remove parking pawl shaft cup plug from case with #4 screw extractor. See Figure 70.
3. Remove parking pawl pivot shaft with a pencil magnet.
4. Remove parking pawl and the parking pawl return spring.
5. Remove inside manual shaft nut.
6. Remove inside detent lever and the parking lock rod (Figure 69).
7. Remove the manual shaft retainer.
8. Remove the manual shaft.
9. Remove manual shaft seal by prying out carefully with a screwdriver.
10. Refer to Figures 69 and 70.

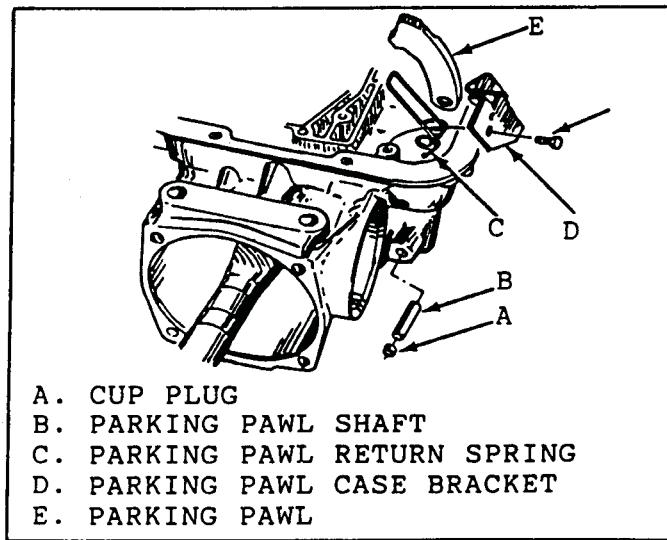


Figure 70

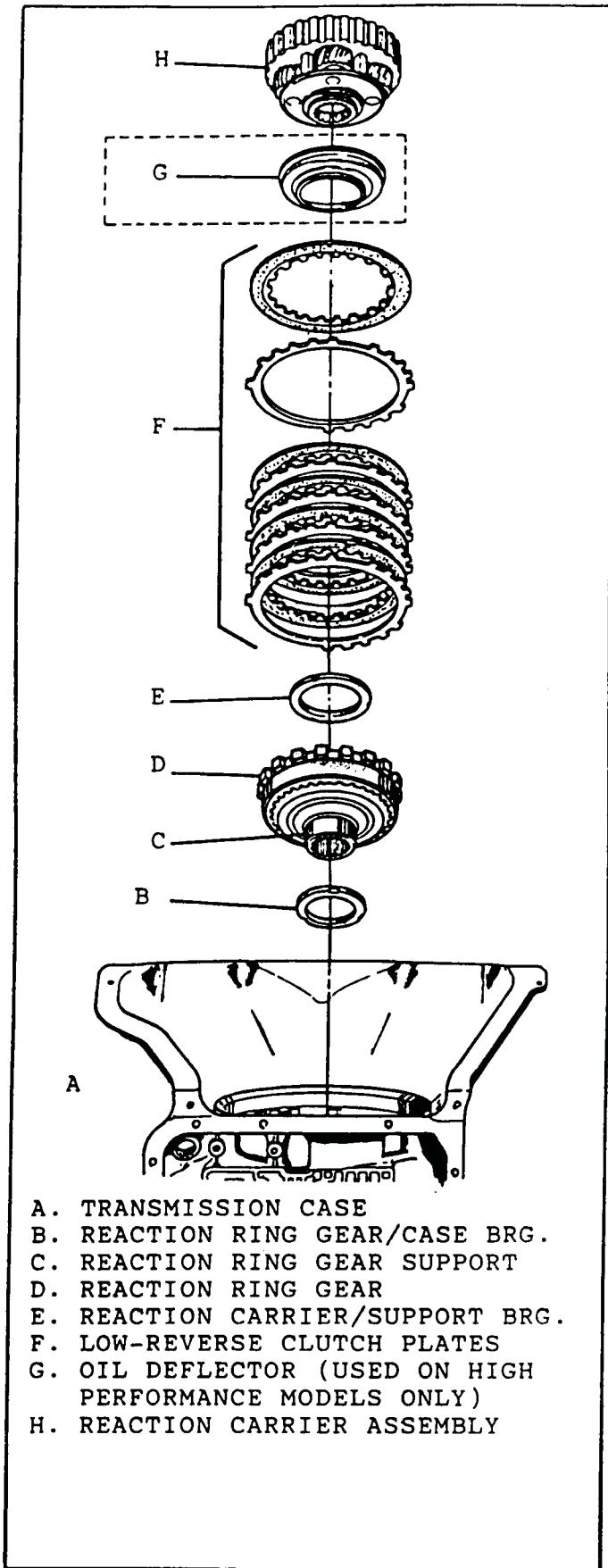


Figure 71

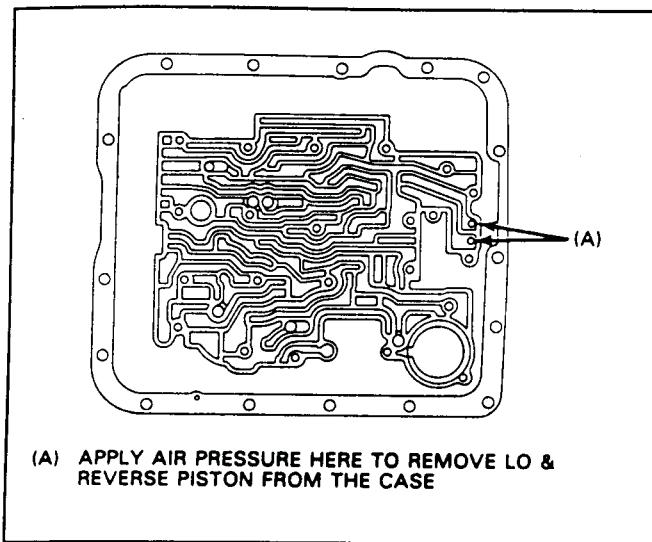


Figure 72

LOW/REVERSE CLUTCH PLATES AND REACTION GEAR SET

1. Remove the low roller support snap ring from the case as shown in Figure 73.
2. Remove "Anti-Clunk" spring from between the support and case (See Figure 75).
3. Remove the low roller support from the case (Center Support).
4. Remove the reaction carrier (Figure 71).
5. Remove the Lo/Reverse clutch plates.
6. Remove the reaction ring gear and the thrust bearing.

NOTE: If the output shaft has not yet been separated from the reaction ring gear, grasp the output shaft and lift up to the low roller support, lo/reverse clutch plates, reaction carrier, and reaction ring gear all at one time.

LOW/REVERSE CLUTCH PISTON

1. Remove parking lock from the case.
2. Install clutch spring compressor, as shown in Figure 74.
3. Compress the return spring and remove lo/reverse retainer snap ring, and then remove the spring compressor.
4. Remove the lo/reverse return spring assembly from the case (Figure 76).
5. Remove the lo/reverse piston and seals by blowing compressed air into the lo/reverse apply passage (See Figure 72).

NOTE: The parking pawl may have to be removed before removing the lo/reverse piston, due to interference.

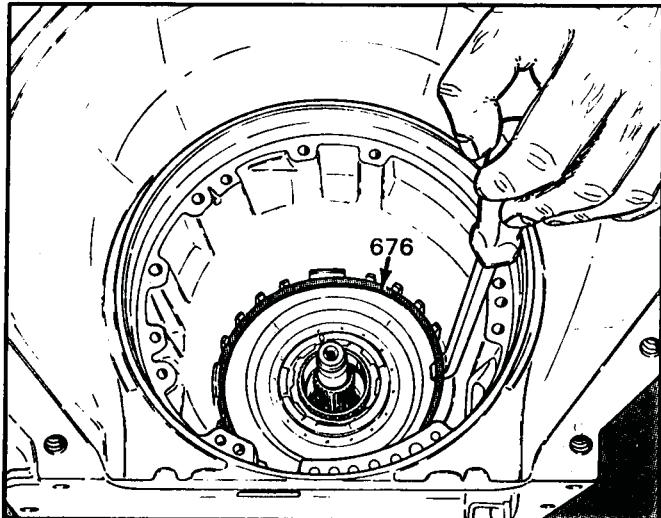


Figure 73

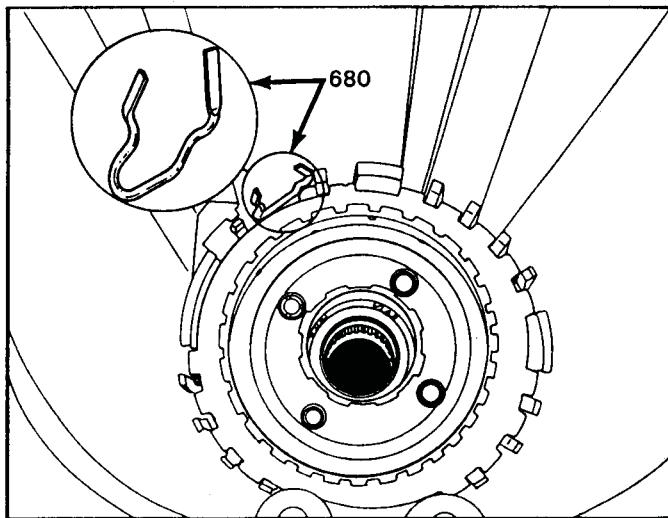


Figure 75

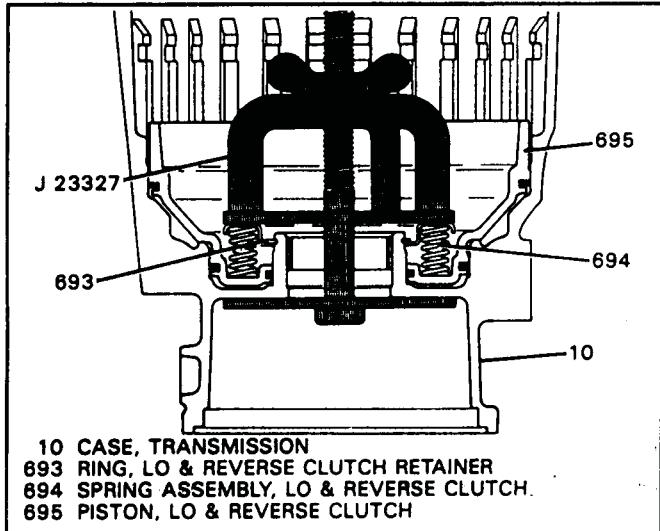


Figure 74

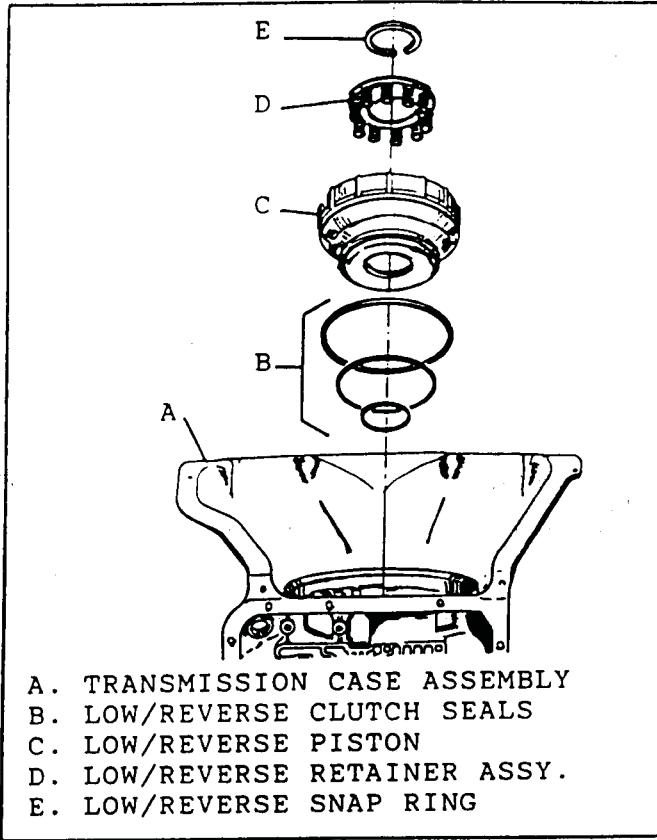


Figure 76



Technical Service Information

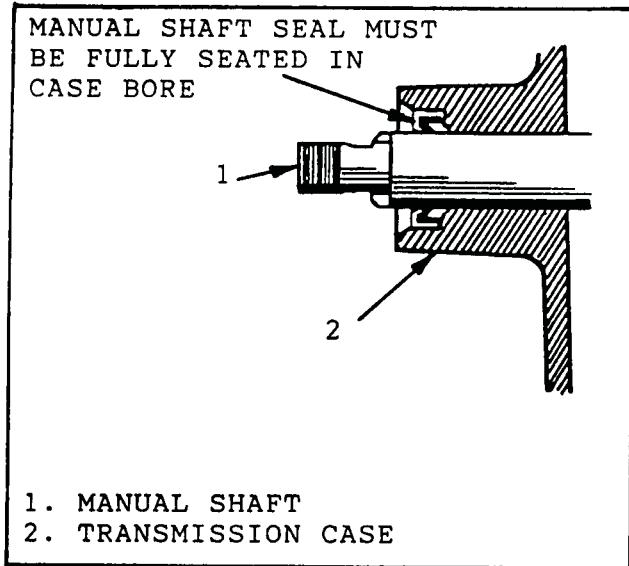


Figure 77

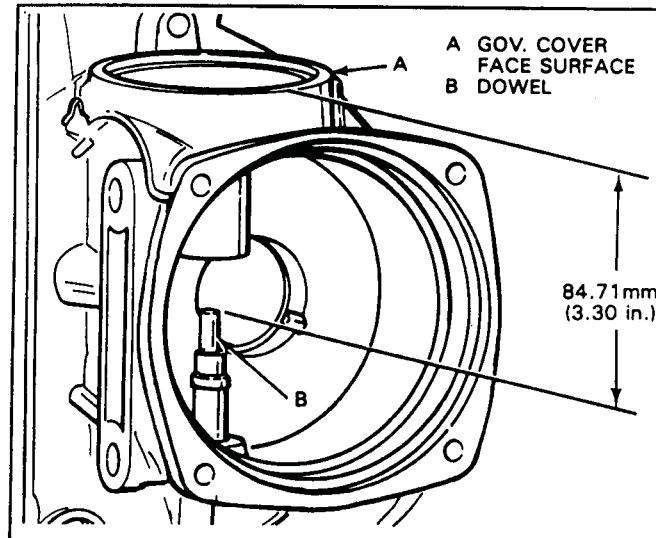


Figure 78

COMPONENT REPAIR AND RE-ASSEMBLY

1. Thoroughly clean all parts and dry with compressed air.
2. Inspect the transmission case for the following:
 - Exterior for cracks, porosity and/or damage.
 - Valve body surface for any damage, interconnected oil passages, and straightedge this surface.
 - Vent assembly for damage.
 - Air check all oil passages to insure that they are open.
 - 2-4 servo bore for damage, wear or porosity.
 - Orifice cup plug in servo bore for debris or damage.
 - 3rd accumulator ball capsule for missing, sticking or leaking.
 - Orifice cup plug in the 3-4 accumulator bore for debris.
 - Speedometer or speed sensor bore for any damage.
 - All bolt holes for thread damage, and Heli-Coil if necessary.
 - Cooler line fittings for damage, and proper torque.
 - Case interior for damaged snap ring grooves, clutch plate lugs worn, and case bushing for wear.
 - Governor support pin installation depth (See Figure 78).
3. Install new manual shaft seal into the case using a 9/16" deep socket, and fully seat seal (See Figure 77).

4. Install the manual shaft, inside detent lever, park rod, and inside manual shaft nut. Make certain that flats of inside detent lever are engaged on the flats of manual shaft, BEFORE nut is tightened.
5. Torque nut to 23 ft.lbs.
6. Install manual shaft retainer onto the manual shaft by snapping into place. Refer to Figure 69.

PARKING PAWL

1. Inspect parking pawl and all components for wear and/or damage.
2. Install parking pawl and parking pawl return spring into case, refering to Figures 69 and 70.
3. Install parking pawl pivot shaft into case, and through the parking pawl and spring.
4. Install cup plug into the case with sealer to prevent leakage.
5. Check parking linkage for the proper operation.

NOTE: It may be necessary to install the parking pawl after installing the Lo/Reverse piston into case.



Technical Service Information

3RD ACCUMULATOR BALL CAPSULE, LEAK CHECKING PROCEDURE

1. Install the 2-4 servo assembly into the case servo bore.
2. Install the servo cover and snap ring.
3. Pour a suitable solvent into passage that feed 3rd accumulator, from the valve body side (See Figure 79).
4. Watch for leakage inside the barrel of the case (See Figure 79).
5. If leakage is seen from the exhaust hole in the case bore, replace the 3rd accumulator ball capsule assembly with part number 8634400.

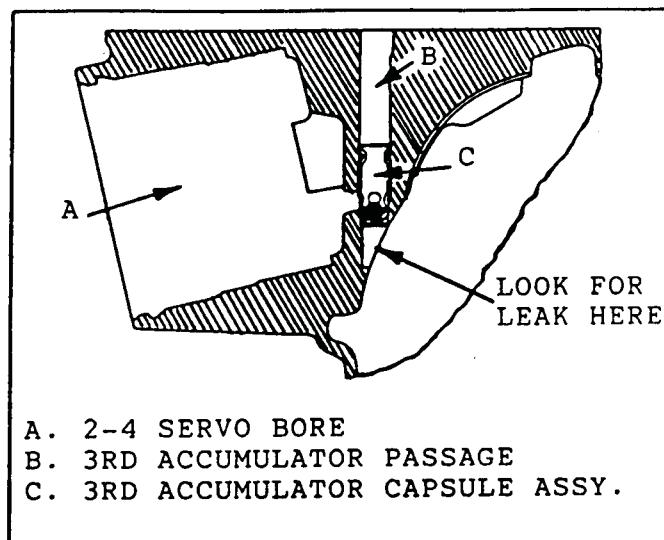


Figure 79

REPLACEMENT PROCEDURE FOR 3RD ACCUMULATOR BALL CAPSULE ASSEMBLY

1. Remove the defective ball capsule assembly with a #4 screw extractor.
2. Install new ball capsule assembly into case, seat end first (Figure 79).
3. Using a 3/8" diameter steel rod, drive the ball capsule assembly down into the case until it is 1 5/8" below the worm track surface.
4. Oil feed slots in the ball capsule MUST line up with oil passage in the servo bore, as shown in Figure 80, refer to "D" in illustration.

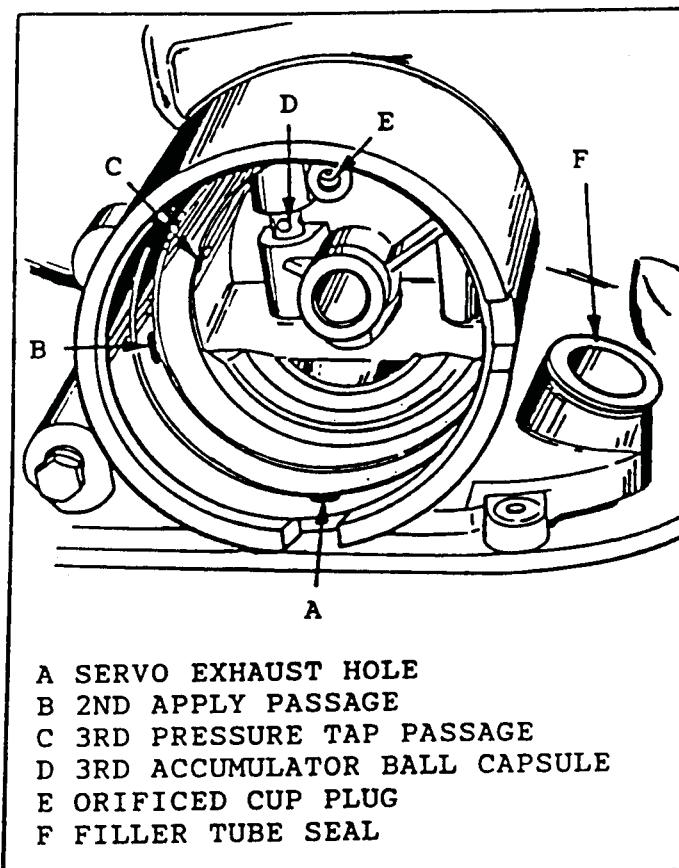
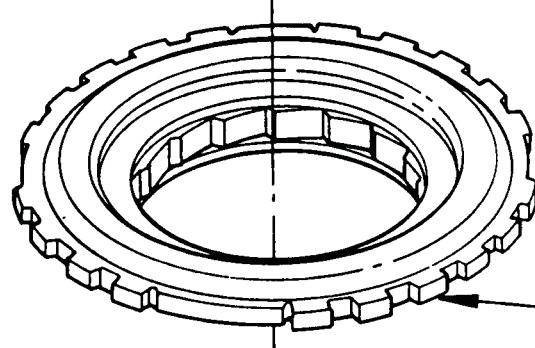
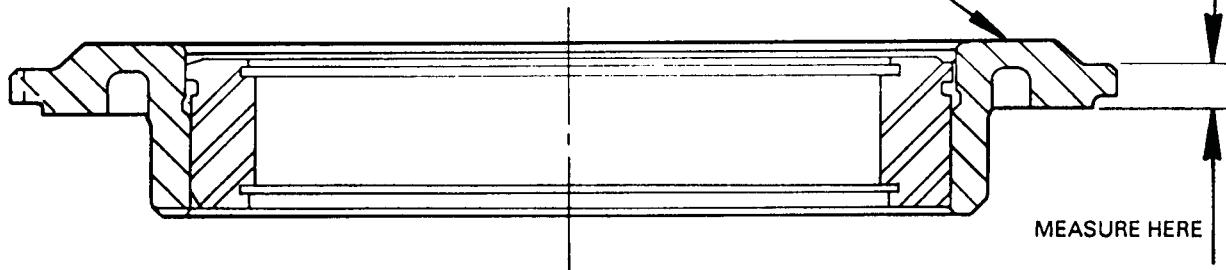


Figure 80

**LOW/REVERSE CLUTCH SUPPORT AND
LOW/REVERSE PISTON IDENTIFICATION**


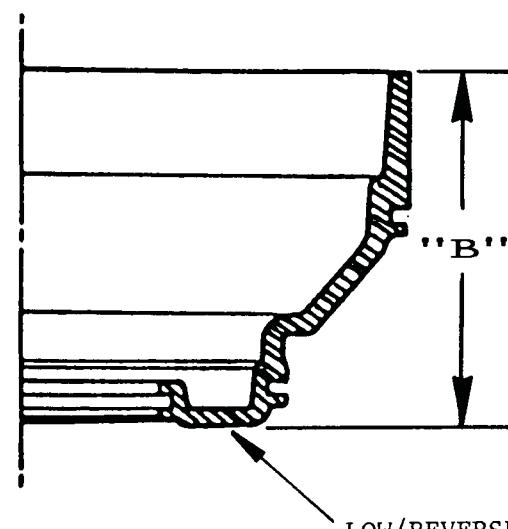
LOW/REVERSE CLUTCH SUPPORT



'A'

MEASURE HERE

YEAR MODEL	SUPPORT DIMENSION "A"	L/R PISTON CASTING NO.	L/R PISTON DIMENSION "B"
ALL 1993 MODELS	.243"- .249"	8681725 OR 8685550	2.905"
90 (PARTIAL)-1992	.302"- .309"	8663888	2.845"
1987-90 (PARTIAL)	.262"- .272"	8663888	2.845"

THESE PARTS ARE NOT INTERCHANGEABLE !

LOW/REVERSE CLUTCH PISTON

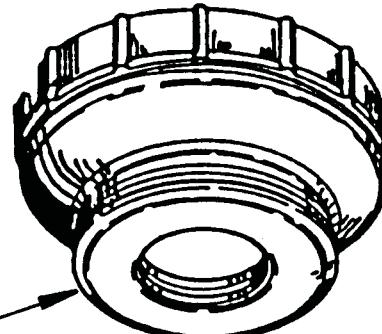


Figure 81



Technical Service Information

LOW AND REVERSE PISTON ASSEMBLY

1. IT IS MANDATORY THAT THE LOW/REVERSE PISTON, AND THE LOW/REVERSE SUPPORT BE MATCHED. THEY WILL NOT INTERCHANGE BETWEEN MODEL YEARS. REFER TO FIGURE 81 TO IDENTIFY PARTS FOR PROPER BUILD CONTENT BEFORE THE LOW/REVERSE PISTON IS INSTALLED
2. Inspect the low/reverse piston for cracks and/or damage.
3. Install three new seals on low/reverse piston and coat seals with a light coat of Trans-Jel lubricant.
4. Install the low/reverse piston into the case so that alignment tab goes into the slot in case, and parking pawl window is aligned for parking pawl.
5. Install return spring assembly on top of the low/reverse piston (Figure 82).
6. Install J-23327 spring compressor as shown in Figure 83.
7. Compress the return spring assembly by turning clockwise, and install the snap ring onto case hub.
8. Remove the spring compressor.

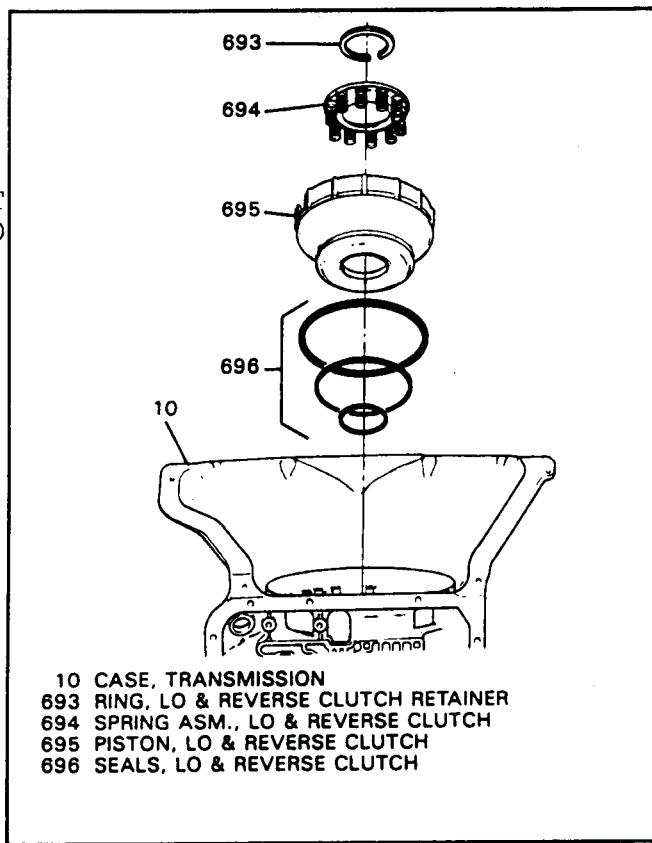


Figure 82

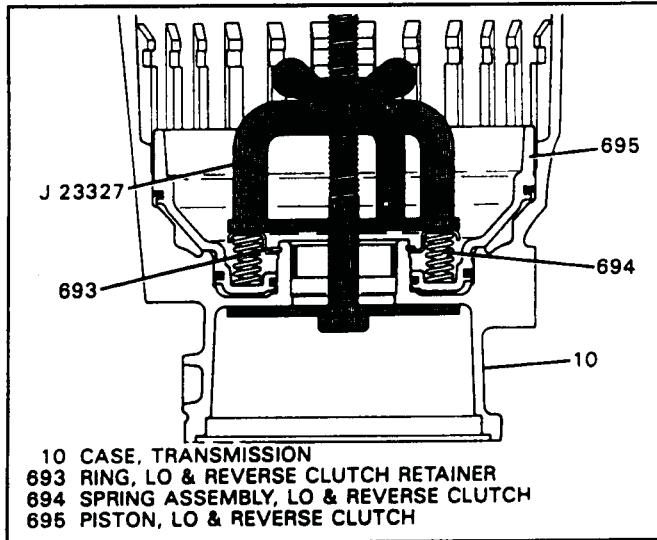


Figure 83

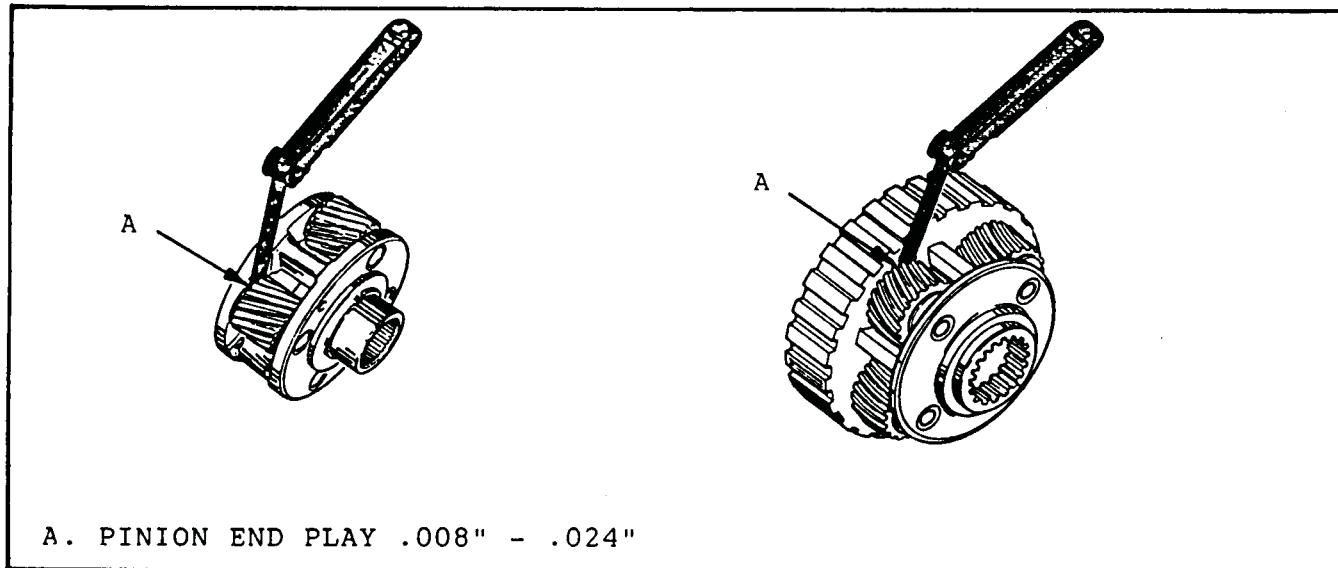


Figure 84

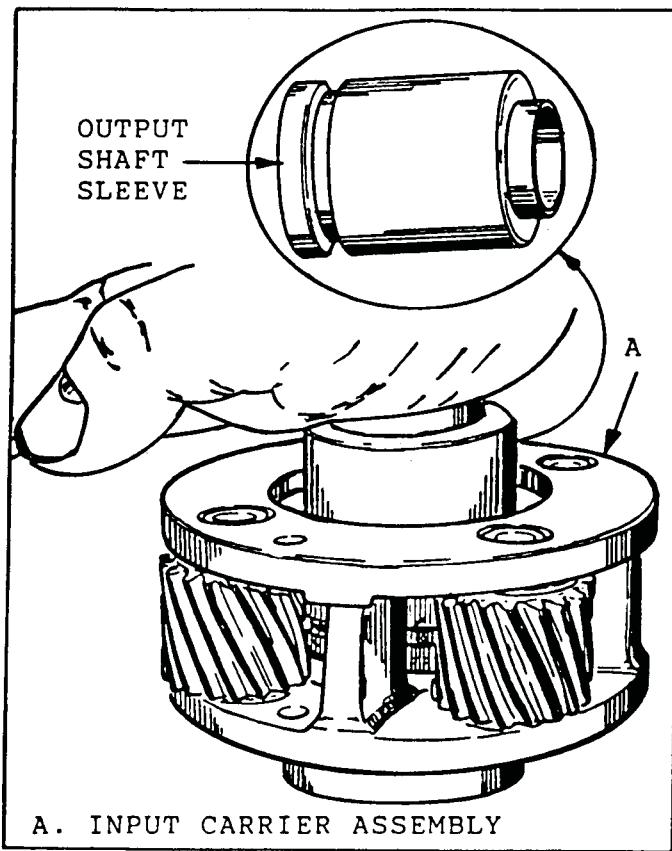


Figure 85



Technical Service Information

REACTION PLANETARY GEAR SET

1. Carefully inspect the following:
 - Reaction ring gear and ring gear support for cracks, stripped splines, and teeth or park lug damage.
 - Thrust bearing assemblies for damage, and/or wear.
 - Reaction carrier assembly for pinion gear damage, proper pinion pin staking, stripped splines, peening on the clutch lugs, and for excessive pinion washer wear. Pinion end play should be between .008"-.024" (See Figure 84).
 - To check the trapped thrust bearings in the carriers for wear, place a bushing or output shaft sleeve on the bearing race, as shown in Figure 85. (Do not contact the pinion gears). Turn it with the palm of your hand, any imperfections will be felt through the sleeve.
2. Install the thrust bearing on back side of reaction ring gear support, in the direction shown in Figure 86, and retain with Trans-Jel.
3. Install the thrust bearing in front side of reaction ring gear support, in the direction shown in Figure 86, and retain with Trans-Jel.
4. Install reaction carrier into reaction ring gear with a twisting motion until seated fully on thrust bearing.
5. Install the entire reaction planetary gear set into the case.

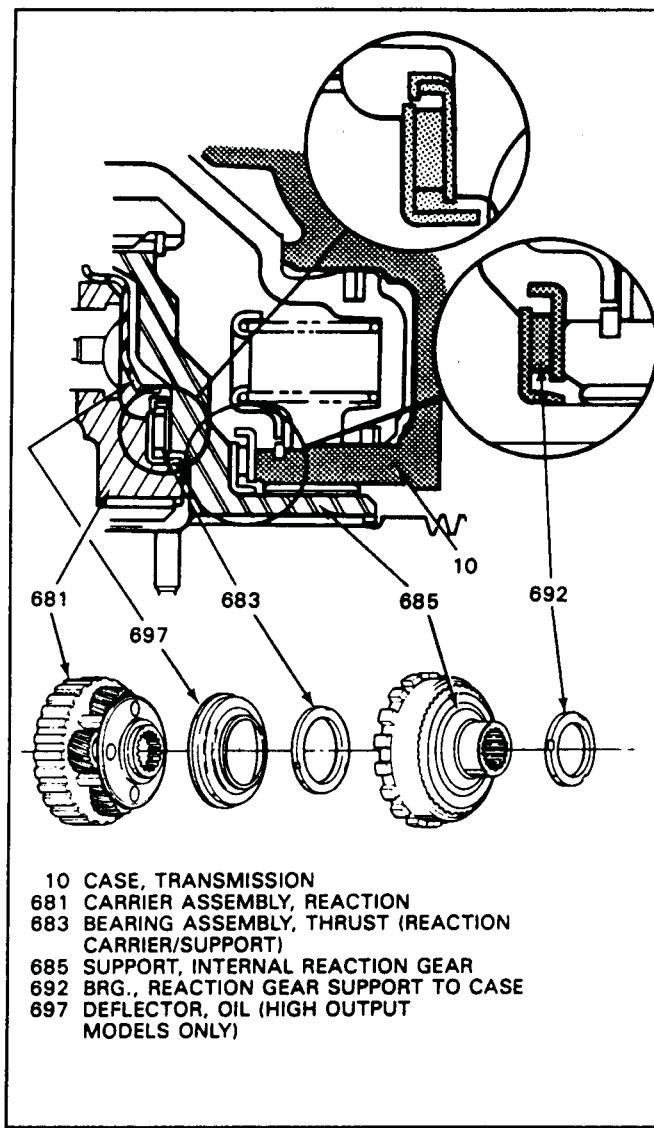
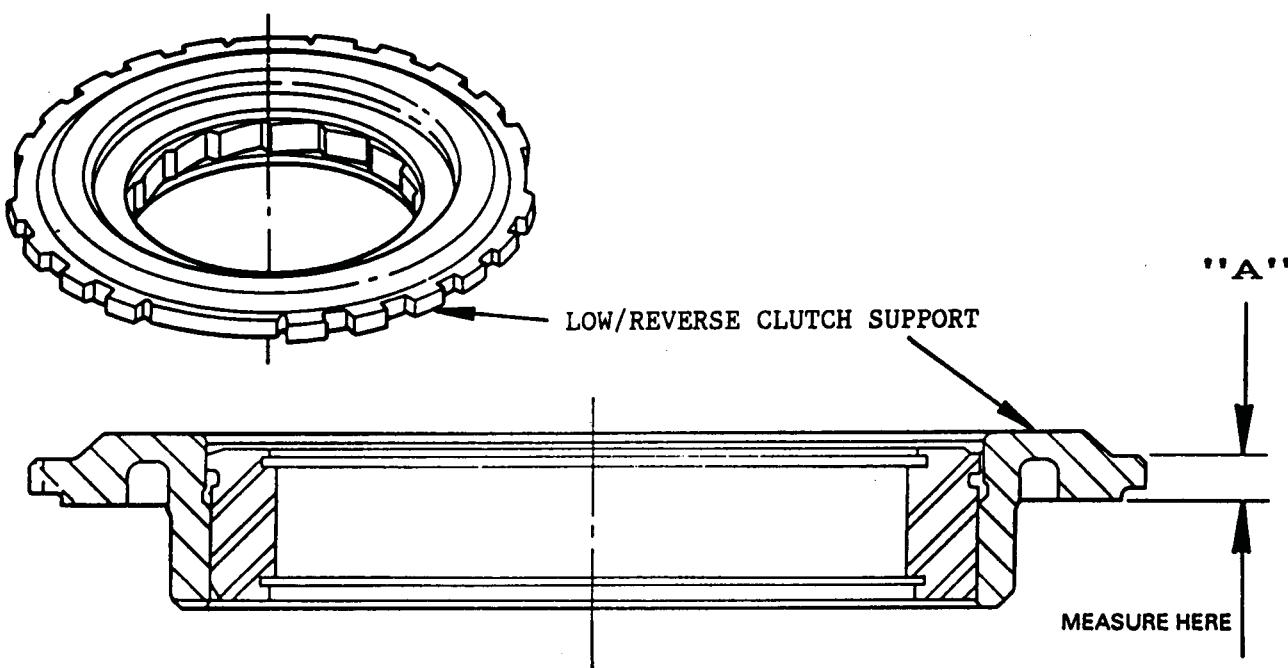


Figure 86

**LOW/REVERSE CLUTCH SUPPORT AND
L/R CLUTCH SELECTIVE IDENTIFICATION**


IF LOW/REVERSE SUPPORT MEASURES .243"-.249", USE CHART "A".
REQUIRES LOW/REVERSE PISTON 8681725 OR 8685550 (SEE FIGURE 81).

IF LOW/REVERSE SUPPORT MEASURES .302"-.309", USE CHART "A".
REQUIRES LOW/REVERSE PISTON 8663888 (SEE FIGURE 81).

IF LOW/REVERSE SUPPORT MEASURES .262"-.272", USE CHART "B"
REQUIRES LOW/REVERSE PISTON 8663888 (SEE FIGURE 81).

THESE PARTS WILL NOT INTERCHANGE!

CHART "A"
LOW/REVERSE SELECTIVE PLATE
90 (PARTIAL)-1993

PART NUMBER	THICKNESS	IDENTIFICATION
8673548	.046"-.052"	STAMPED "8"
6261120	.066"-.072"	NONE (REGULAR STEEL PLATE)
8673549	.086"-.092"	STAMPED "9"

CHART "B"
LOW/REVERSE SELECTIVE PLATE
1987-90 (PARTIAL)

PART NUMBER	THICKNESS	IDENTIFICATION
6261120	.066"-.072"	NONE (REGULAR STEEL PLATE)
8667584	.094"-.100"	STAMPED "4"
8667585	.122"-.128"	STAMPED "5"

Figure 87

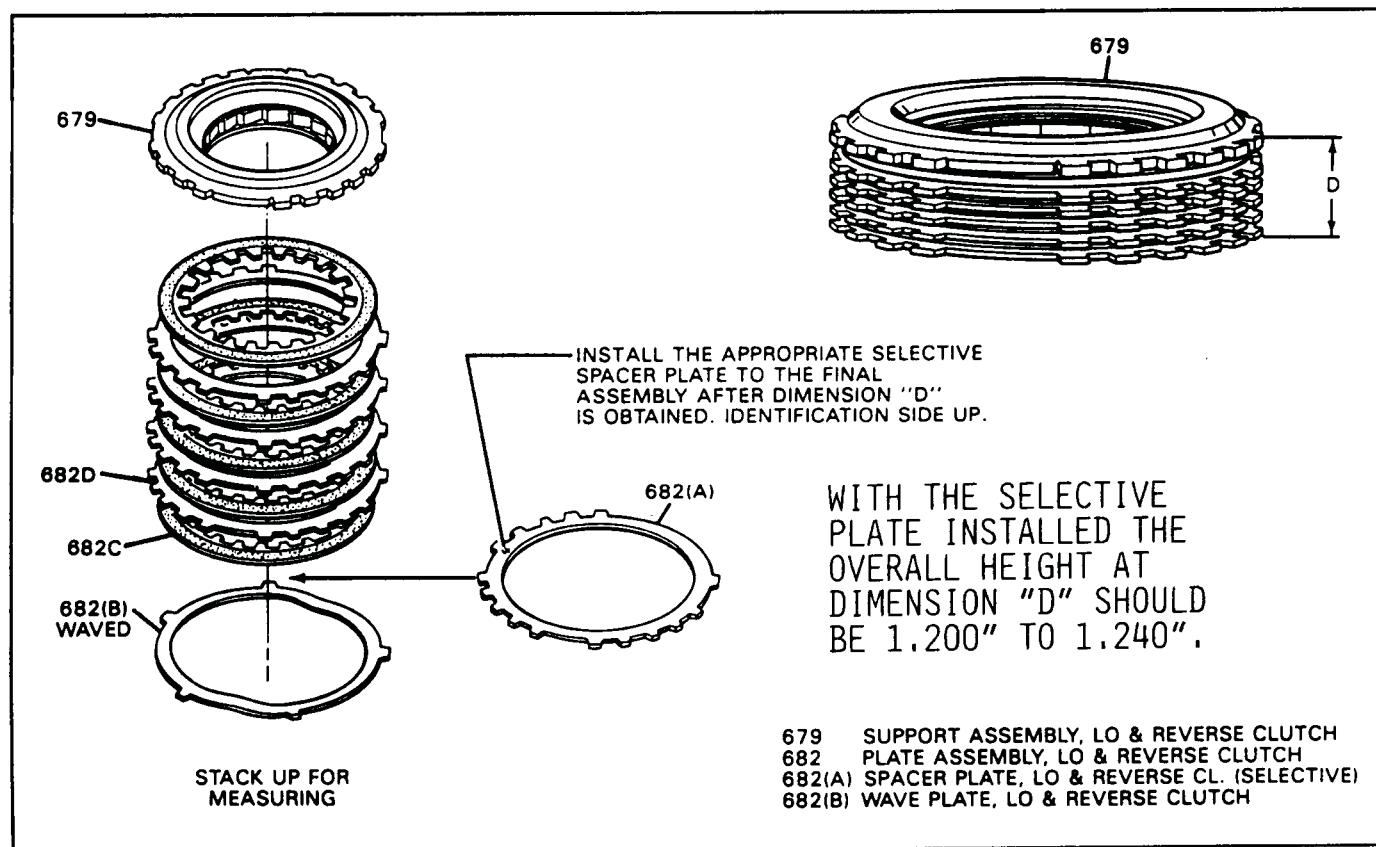


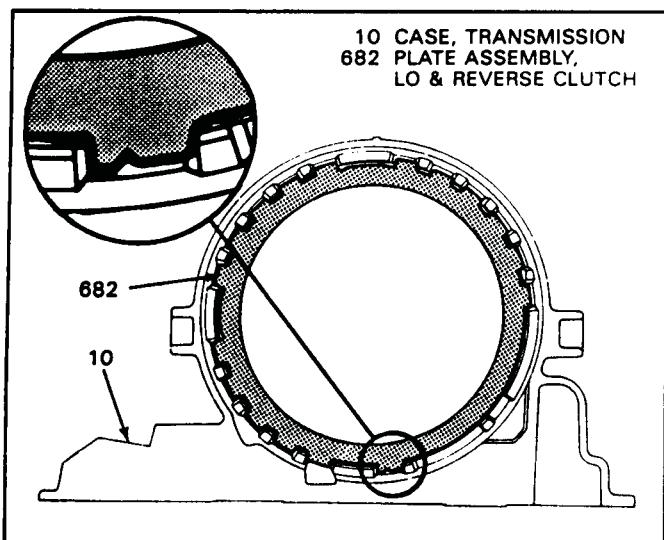
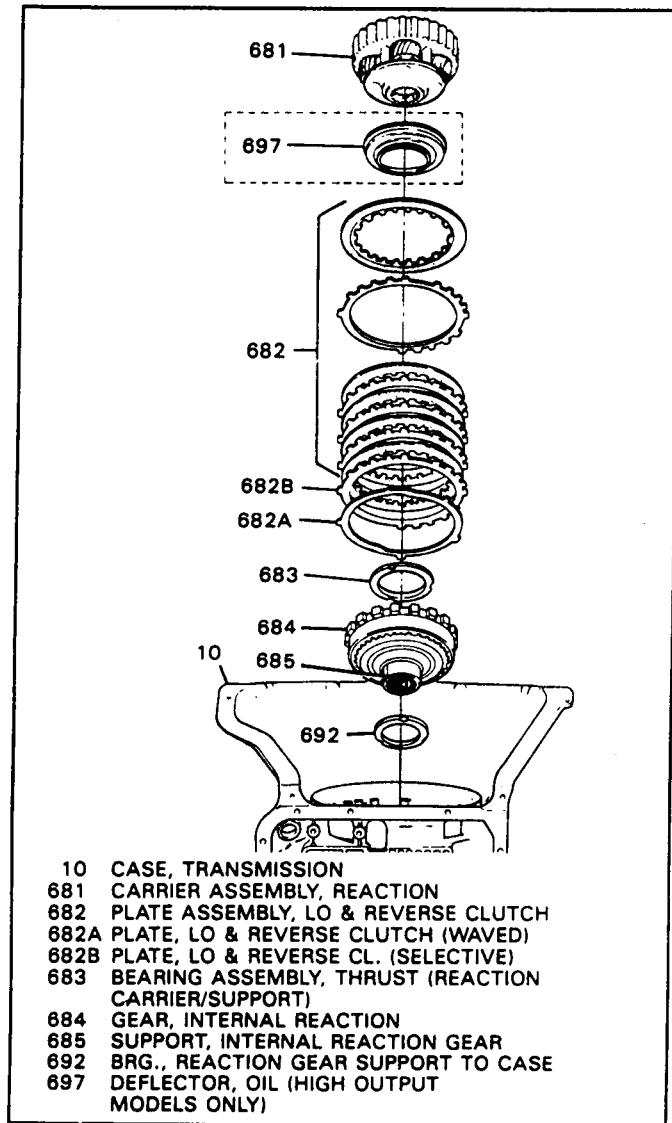
Figure 88

IT IS MANDATORY THAT THE LOW/REVERSE SUPPORT AND THE LOW/REVERSE SELECTIVE PLATE BE A MATCHED SET. THEY WILL NOT INTERCHANGE BETWEEN MODEL YEARS, AND THEY MUST ALSO BE COMPATABLE WITH THE LOW/REVERSE PISTON THAT YOU HAVE ALREADY INSTALLED. REFER TO FIGURE 87 TO DETERMINE PROPER BUILD CONTENT BEFORE THE LOW/REVERSE CLUTCHES ARE INSTALLED.

MEASURING FOR L/R SELECTIVE PLATE

1. Measure the Low/Reverse support as shown in Figure 87 to determine which selective plates to use.
 2. Use chart "A" or chart "B" to make your selection based on low/reverse support thickness (See Figure 87).
 3. To measure for the proper selective plate, stack the low/reverse clutches on a flat work surface in the following order:
 - A. One "Waved" plate (682B).
 - B. One "Selective" plate (682A).
 - C. Five lined and four steel plates, starting with one lined plate and alternating with steel plates.
 - D. Low/Reverse Clutch Support on top of the clutch pack.
- Refer to Figure 88 for proper order.

4. Apply an evenly distributed load to the top of the low/reverse support assembly with your hand. Light pressure (Approx. 5 lbs.) on the support will provide the correct dimension for measurement.
5. Measure the height of the clutch pack from the work surface to the top of the Low/Reverse clutch support (Dimension "D"), as shown in Figure 88.
6. The overall height for dimension "D" with the selective spacer plate included should be 1.200"-1.240".
7. Change the selective plate as necessary to obtain the proper dimension "D" using the proper chart in Figure 87.
8. All models 1987-1993 use five friction plates, four steel plates, one "Waved" plate and one selective plate.



LOW/REVERSE CLUTCH PLATES

1. Install the Low/Reverse clutch "Waved" plate into the case (See Figure 89).
2. Install the Low/Reverse selective plate (682B) from the selection procedure.
3. Install the Low/Reverse clutch plates beginning with a friction plate on top of the selective, and alternating with steel plates until five friction plates and four steel plates have been placed into the case (See Figure 89).
4. Align the teeth of the friction plates onto the reaction carrier as they are installed.
5. Align the steel plates with the notch in the case lug as shown in Figure 90.
6. A friction plate should be the last plate installed (See Figure 89).
7. Install the "Anti-Clunk" spring in the position shown in Figure 91, and retain with Trans-Jel.

LOW/REVERSE SUPPORT ASSEMBLY

1. Carefully inspect the following:
 - Low roller clutch inner race for any damage to the surface finish.
 - Low roller clutch assembly for damaged rollers or broken springs.
 - Cam and support assembly for loose cam, surface finish for damage, and for cracked or damaged lugs.
2. Install low roller clutch assembly into support and install snap rings (677), as shown in Figure 93.
3. Install low roller clutch inner race into low roller clutch by rotating clockwise into position (Figure 93).
4. Install the Low/Reverse support assembly into the case lugs by aligning the wide notch in the support with the wide case lug (See Figure 92).
5. Rotate the low roller clutch inner race clockwise and push down until the inner race is fully engaged on the tangs of the reaction carrier.
6. Install the Low/Reverse support snap ring into the case snap ring groove. The gap on the snap ring should be placed as shown in Figure 92.
7. Install the low roller inner race thrust washer onto the inner race. The inside tangs of thrust washer should engage in four slots of the inner race when it is properly installed.

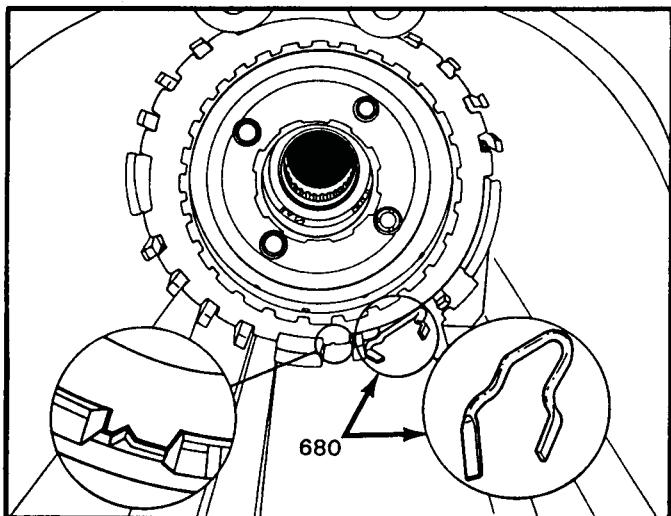


Figure 91

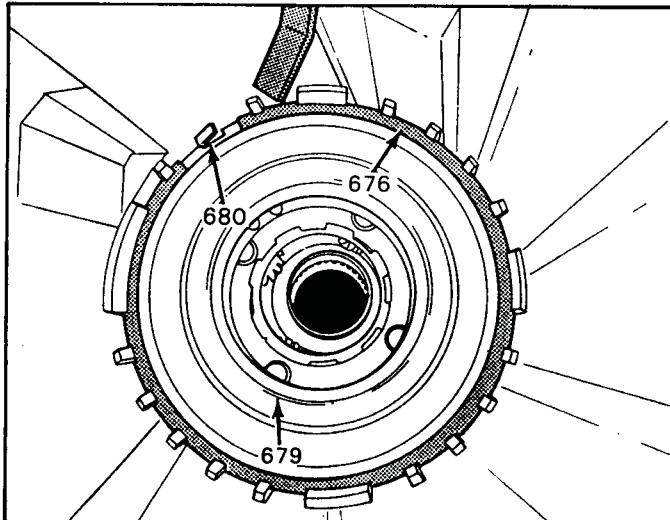


Figure 92

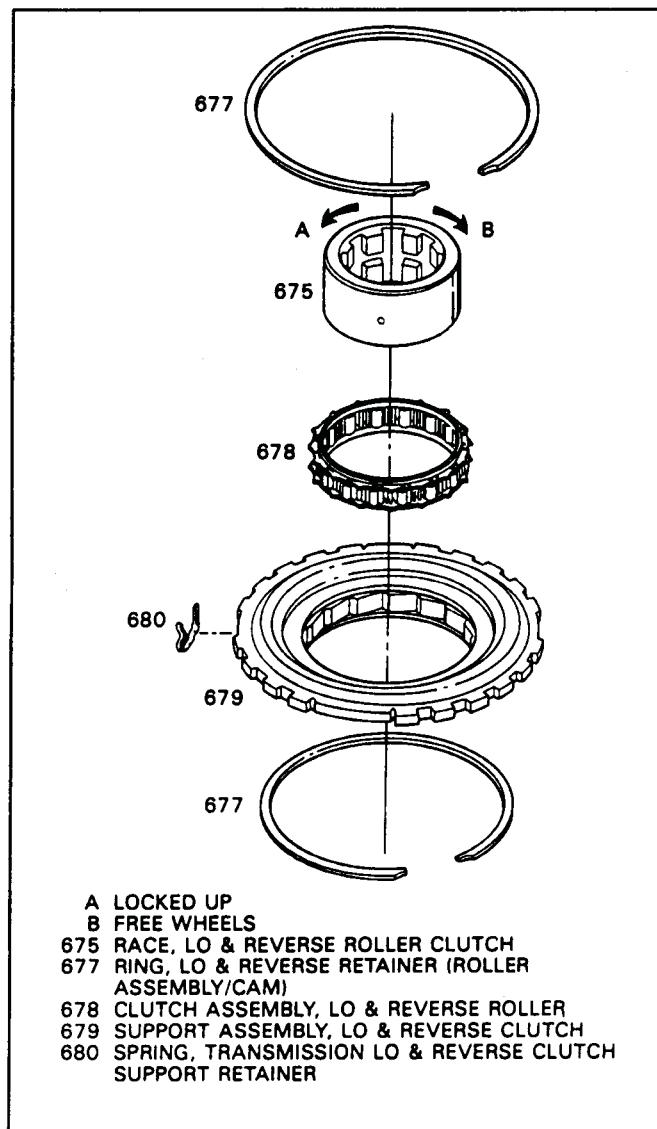


Figure 93

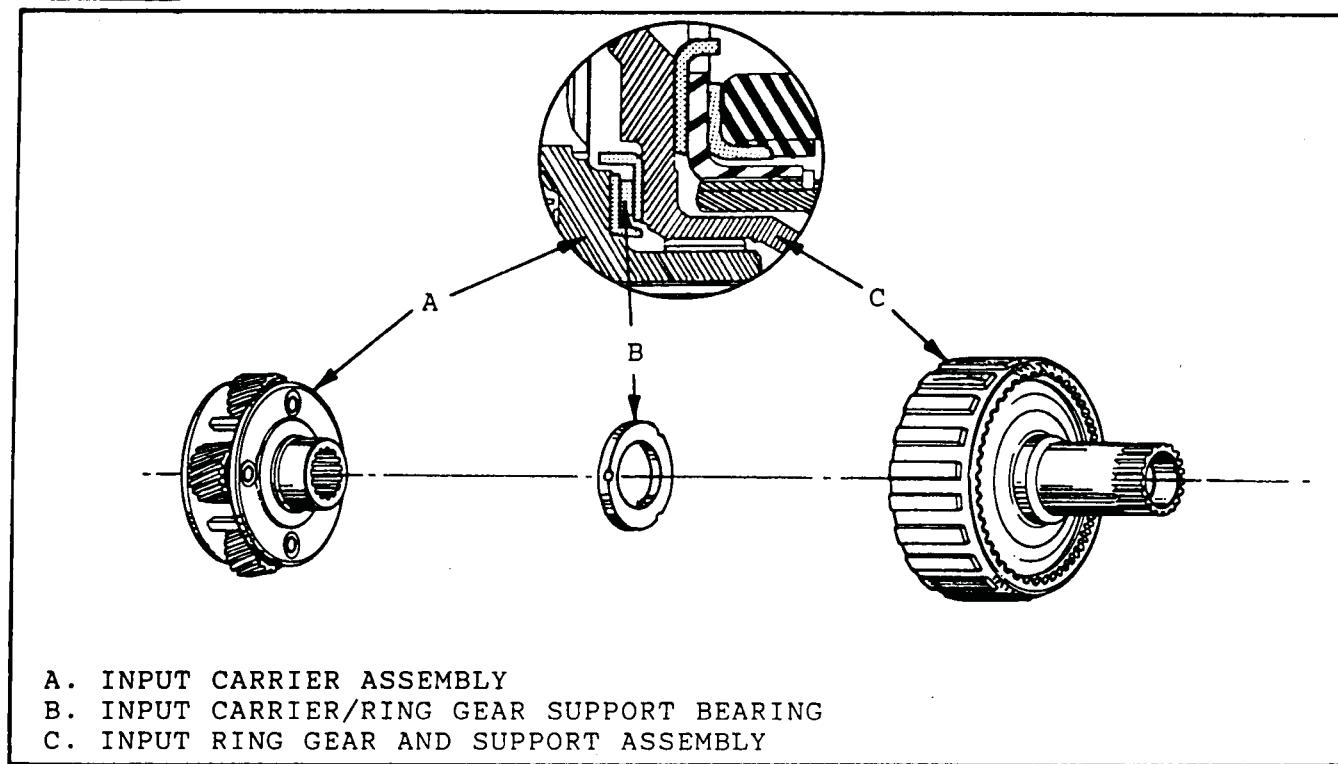


Figure 94

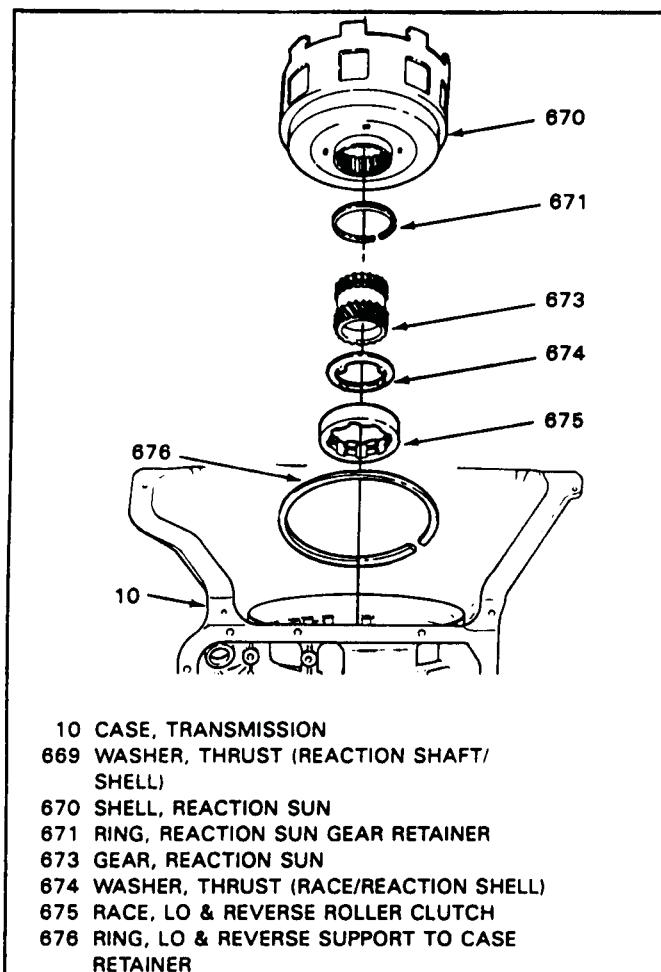


Figure 95

REACTION SUN GEAR AND SHELL

1. Inspect the following:
 - Reaction sun gear for nicked, scored, or worn bushing.
 - Damaged splines and/or teeth.
 - Loose or weak snap ring. This snap ring should never be removed unless replacement is necessary.
 - Sun gear shell for stripped or worn splines, broken hub or bent tangs.
2. Install reaction sun gear with snap ring in place, into the reaction carrier by rotating into the pinions.
3. Install the reaction sun gear shell thrust washer onto the reaction sun gear shell (Figure 96), and retain with Trans-Jel.
4. Install the reaction sun shell and thrust washer by rotating onto the reaction sun gear splines. Refer to Figure 96.

INPUT GEAR SET AND OUTPUT SHAFT

1. Inspect the following:
 - Input ring gear and support for worn or damaged bushings, damaged splines or gear teeth, and cracked shaft.
 - Input carrier to ring gear thrust bearing for wear or damage (Figure 94).

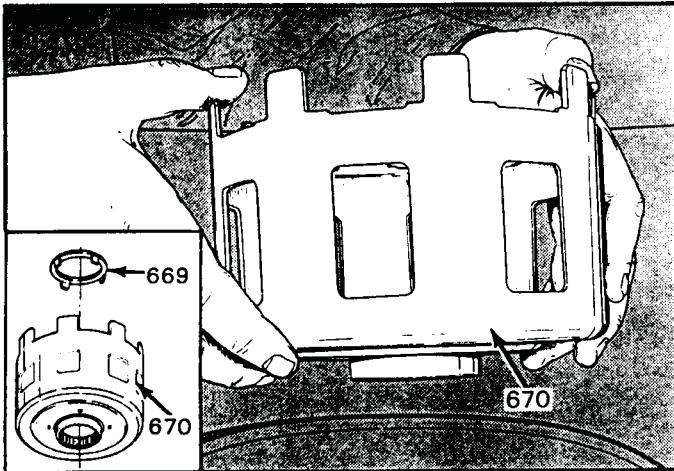


Figure 96

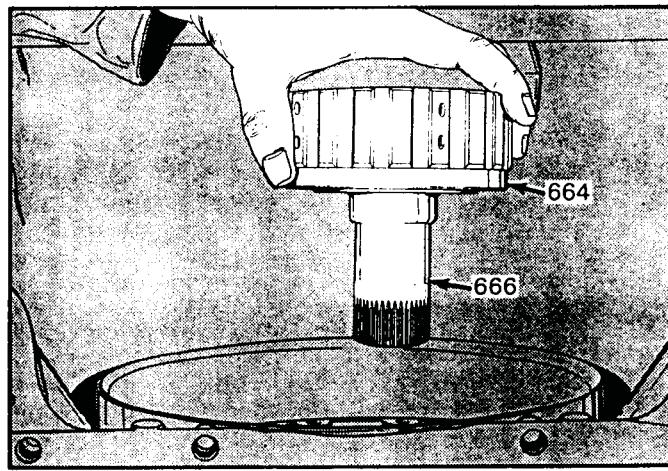


Figure 97

- 0 Input carrier trapped thrust bearing as shown in Figure 85, on Page 54.
- 0 Input carrier for worn thrust washer. Pinion end play should be .008"-.024" as shown in Figure 84, on Page 54.
- 0 Output shaft for plugged or restricted lube oil passages, damaged splines or governor teeth, damage or burrs to the front of shaft at lube seal area. Polish with crocus as necessary.
- 2. Install thrust bearing into input ring gear and retain with Trans-Jel (See Figure 94 for bearing direction).
- 3. Install input carrier into input ring gear by rotating into position.
- 4. Install entire assembly into the transmission by rotating into position as shown in Figure 97.
- 5. Identify output shaft using Figure 100 and install output shaft into transmission by rotating to index the shaft splines with the mating parts.
- 6. Install J-29837 output shaft holding fixture if necessary, as shown in Figure 102.
- 7. Install input carrier snap ring using care not to over-expand the snap ring. This snap ring should be replaced on all units.
- 8. Install input sun gear as shown in Figure 99, by rotating into the carrier pinions.
- 9. Remove the output shaft holding tool.
- 10. NOTE: 1987-1993 model transmissions DO NOT use the black thrust washer on top of input carrier.

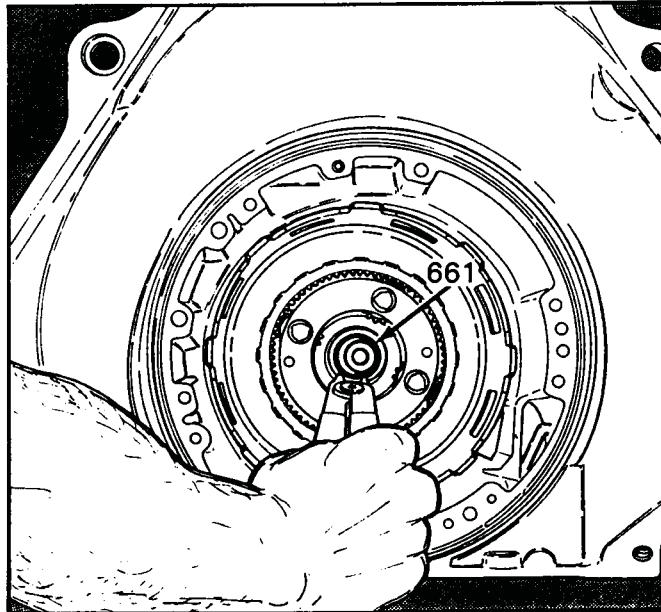


Figure 98

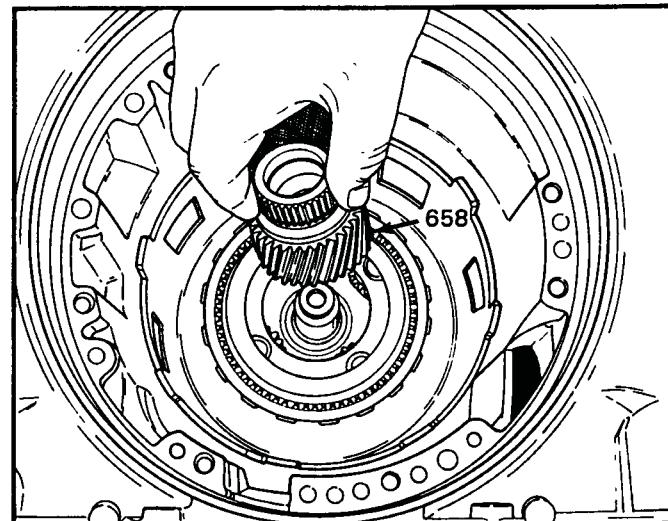


Figure 99



Technical Service Information

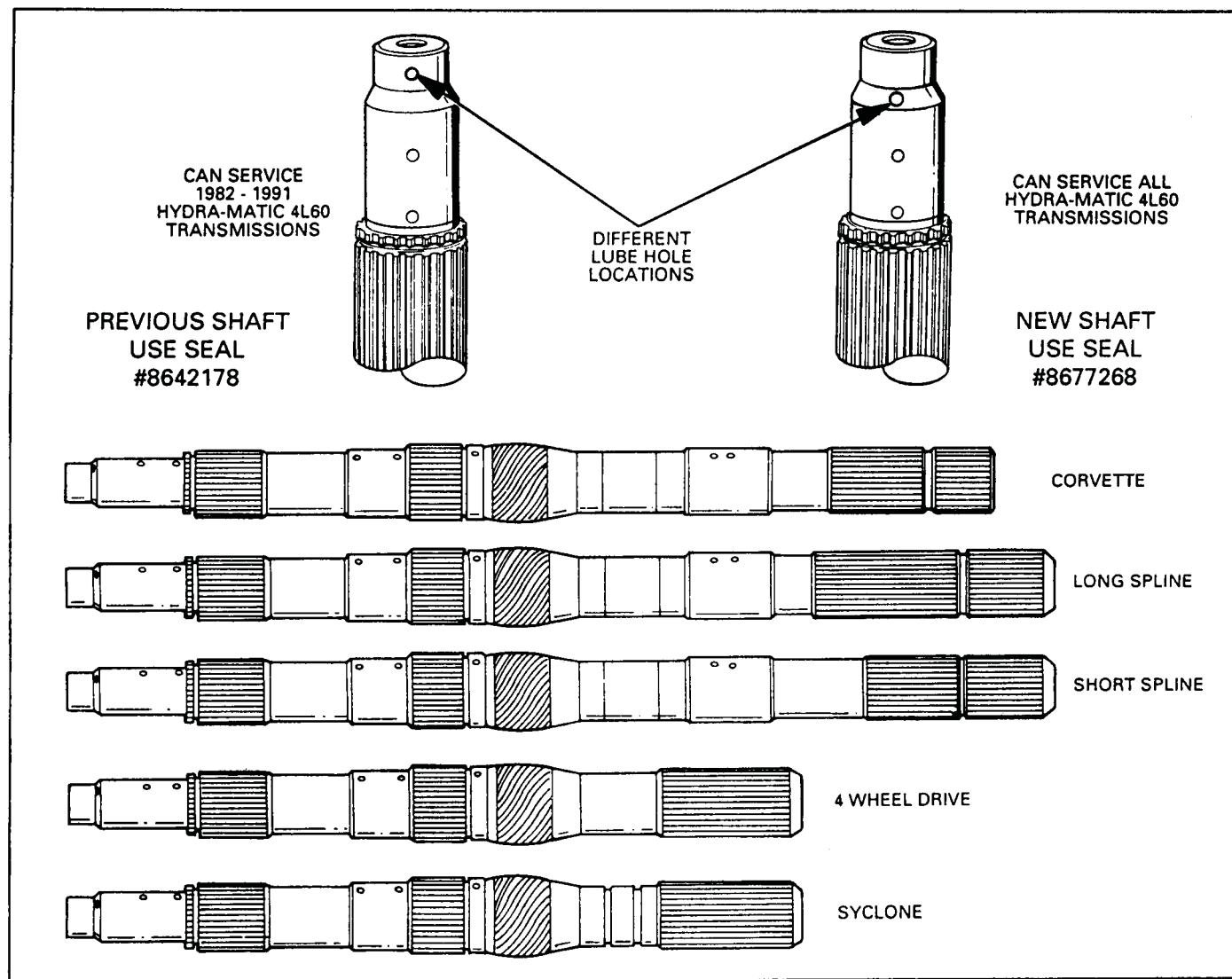


Figure 100

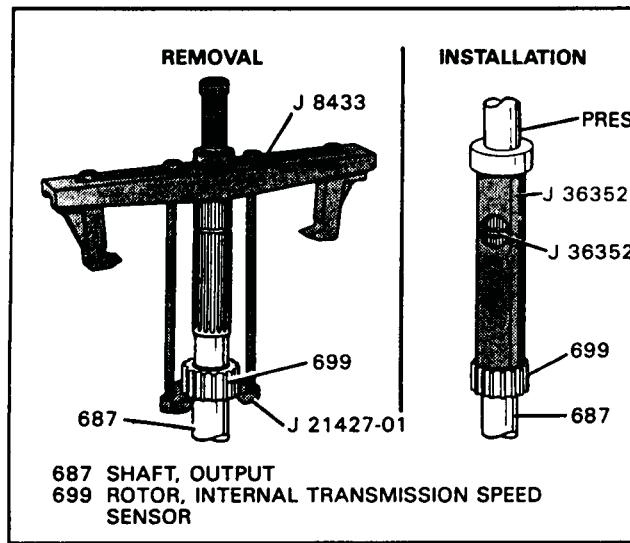


Figure 101

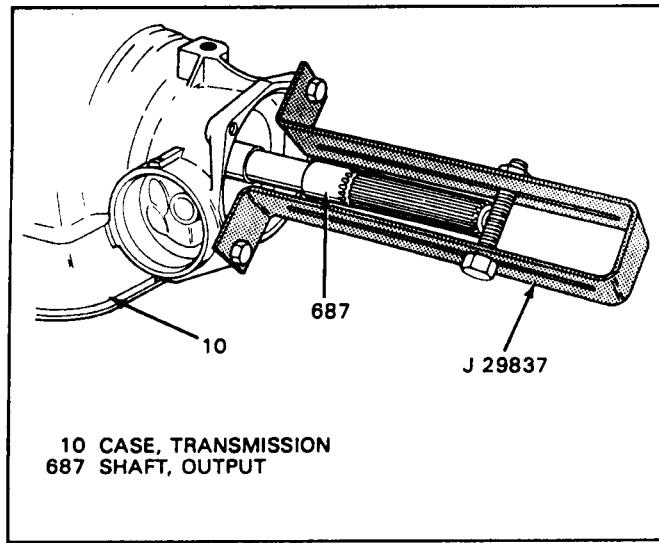
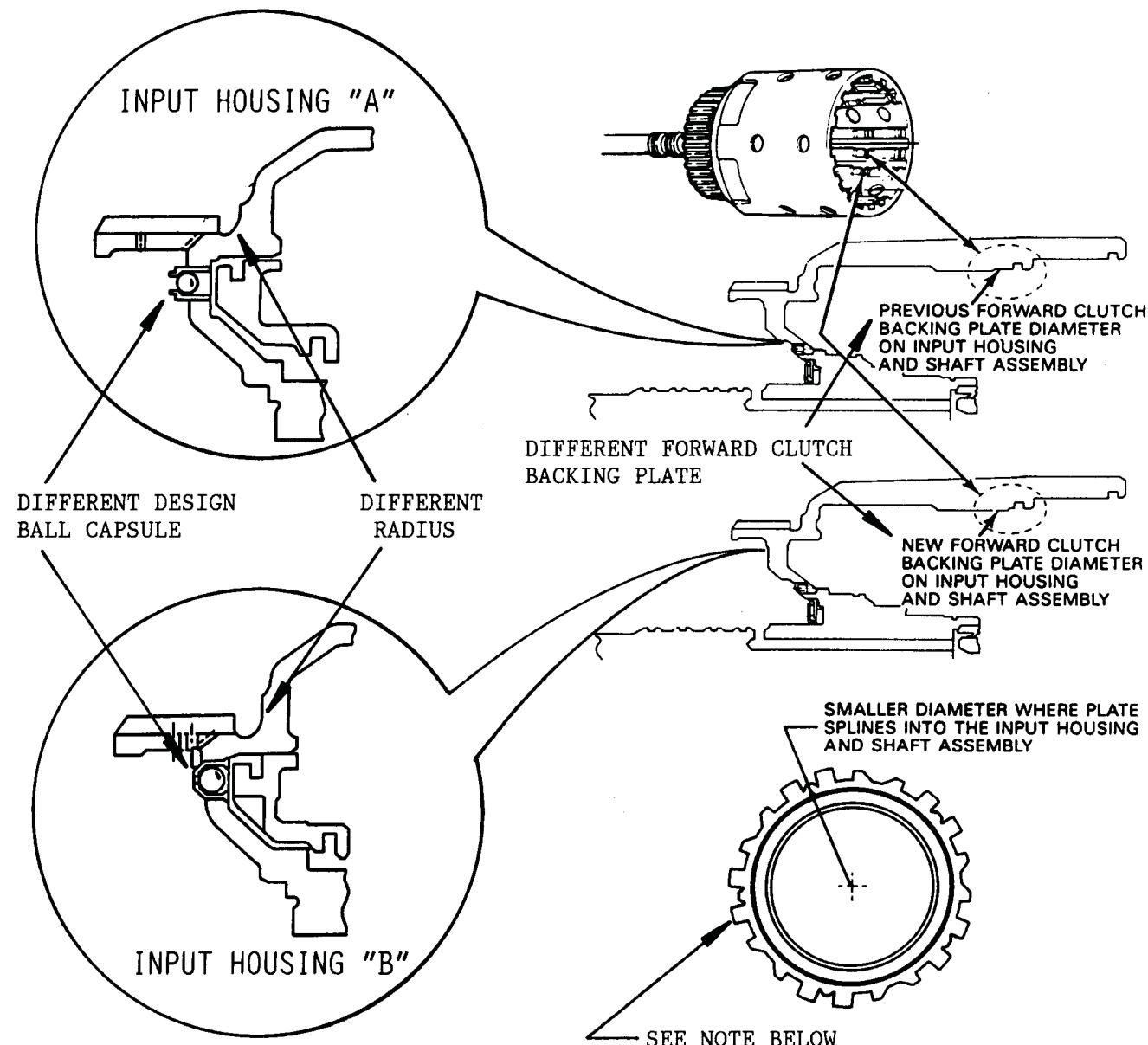


Figure 102

INPUT CLUTCH HOUSING IDENTIFICATION

INPUT HOUSING "A" = USED WITH REVERSE INPUT HOUSING THAT HAS STEEL PISTON, AND FOUND IN EARLY 1987 MODELS ONLY.

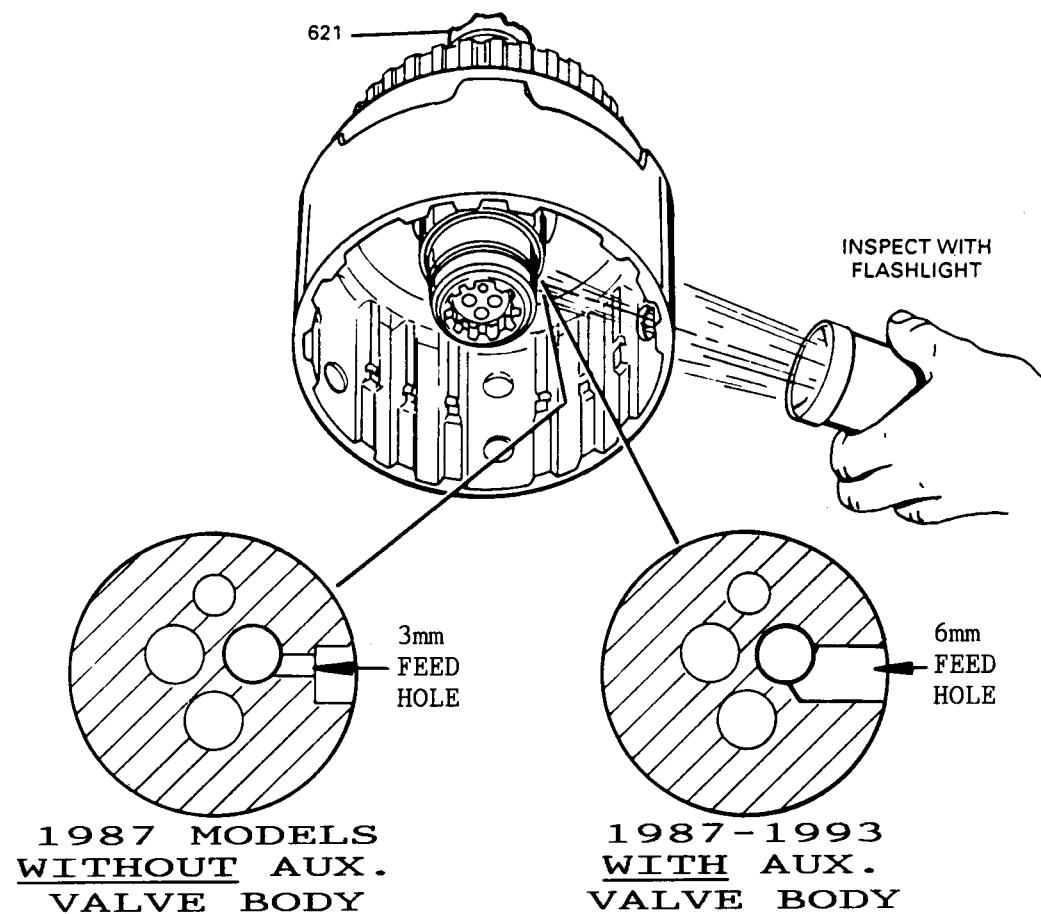
INPUT HOUSING "B" = USED WITH REVERSE INPUT HOUSING WITH ALUMINUM PISTON, AND FOUND IN LATE 1987 THRU 1993 MODELS.



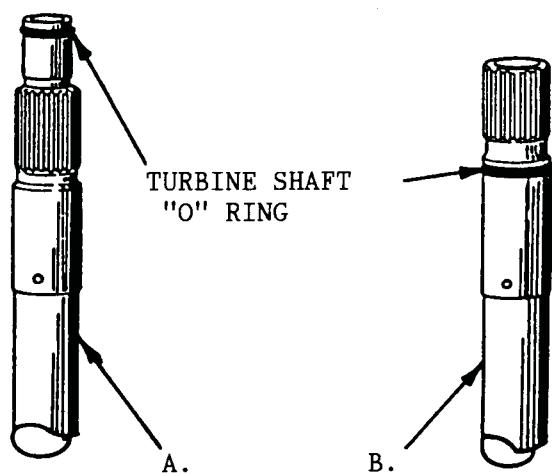
EARLY AND LATE MODEL FORWARD CLUTCH BACKING PLATES ARE NOT INTERCHANGEABLE. THE EARLY DESIGN BACKING PLATE IS TOO LARGE TO FIT INTO THE NEW DESIGN INPUT HOUSING. HOWEVER, THE NEW DESIGN BACKING PLATE WILL FIT INTO AN EARLY DESIGN INPUT HOUSING. DO NOT INSTALL A NEW DESIGN BACKING PLATE INTO AN EARLY DESIGN INPUT HOUSING, AS THE FIT WILL BE VERY LOOSE AND CAN CAUSE A RATTLING NOISE IN PARK AND NEUTRAL.

Figure 103

TURBINE SHAFT IDENTIFICATION



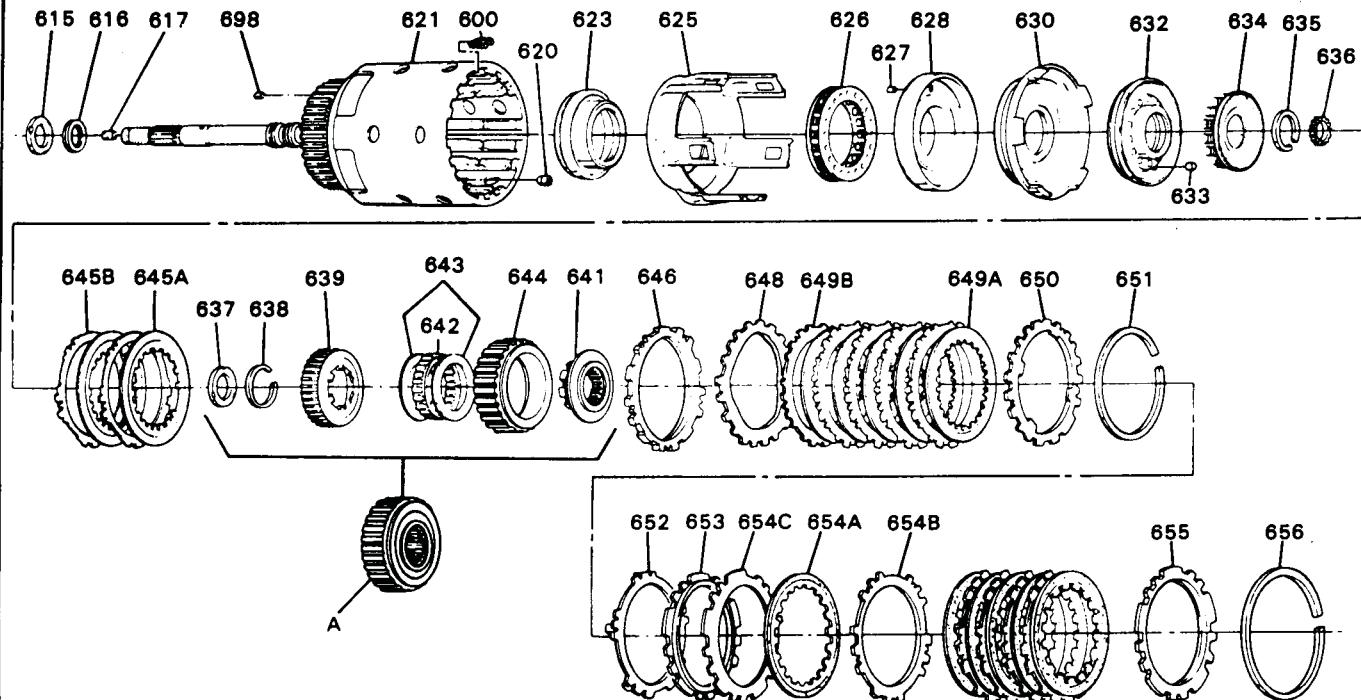
NOTE: USE CARE WHEN DETERMINING HOLE SIZE. IT IS MOST DIFFICULT TO TELL WHICH HOLE IS THE NEW DESIGN, WITHOUT REMOVING THE TURBINE SHAFT FROM THE INPUT HOUSING.



- A. FITS 298mm CONVERTER ONLY (COMES IN BOTH HOLE SIZES).
- B. FITS 245mm CONVERTER ONLY (COMES IN BOTH HOLE SIZES).

Figure 104

INPUT CLUTCH HOUSING EXPLODED VIEW

ILL.
NO. DESCRIPTION

600	SPRING ASM., 3-4 CLUTCH BOOST (5)
615	BEARING ASSEMBLY, STATOR SHAFT/ SELECTIVE WASHER
616	WASHER, THRUST (SELECTIVE)
617	RETAINER & BALL ASSEMBLY, CHECK VALVE
620	RETAINER & CHECK BALL ASSEMBLY
621	HOUSING & SHAFT ASSEMBLY, INPUT
623	PISTON, 3RD & 4TH CLUTCH
625	RING, 3RD & 4TH CLUTCH APPLY
626	SPRING ASSEMBLY, 3RD & 4TH CLUTCH
627	RETAINER & BALL ASSEMBLY, FORWARD CLUTCH HOUSING
628	HOUSING, FORWARD CLUTCH
630	PISTON, FORWARD CLUTCH
632	PISTON, OVERRUN CLUTCH
633	BALL, OVERRUN CLUTCH
634	SPRING ASSEMBLY, OVERRUN CLUTCH
635	SNAP RING, OVERRUN CLUTCH SPRING RETAINER
636	SEAL, INPUT HOUSING TO OUTPUT SHAFT
645A	PLATE ASSEMBLY, OVERRUN CLUTCH (FIBER)
645B	PLATE, OVERRUN CLUTCH (STEEL)
A	FORWARD CLUTCH SPRAG ASSEMBLY
637	BEARING ASSEMBLY, INPUT SUN GEAR
638	SNAP RING, OVERRUN CL. HUB RET.
639	HUB, OVERRUN CLUTCH
641	RETAINER & RACE ASSEMBLY, SPRAG
642	FORWARD SPRAG ASSEMBLY
643	RETAINER RINGS, SPRAG ASSEMBLY
644	RACE, FORWARD CLUTCH (OUTER)

ILL.
NO. DESCRIPTION

646	PLATE, FORWARD CLUTCH APPLY
648	PLATE, FORWARD CLUTCH (WAVED)
649A	PLATE ASSEMBLY, FORWARD CLUTCH (FIBER)
649B	PLATE, FORWARD CLUTCH (STEEL)
650	PLATE, FORWARD CLUTCH BACKING (SEL.)
651	RING, FORWARD CLUTCH BACKING PLATE RETAINER
652	PLATE, 3RD & 4TH CLUTCH RING RETAINER
653	PLATE, 3RD & 4TH CLUTCH APPLY (STEPPED)
654A	PLATE ASSEMBLY, 3RD & 4TH CLUTCH (FIBER)
654B	PLATE, 3RD & 4TH CLUTCH (FLAT STEEL)
654C	PLATE, 3RD & 4TH CLUTCH (STEEL)
655	PLATE, 3RD & 4TH CLUTCH BACKING (SELECTIVE)
656	RING, 3RD & 4TH CLUTCH BACKING PLATE RETAINER
698	PLUG, ORIFICED CUP

Figure 105

AUTOMATIC TRANSMISSION SERVICE GROUP

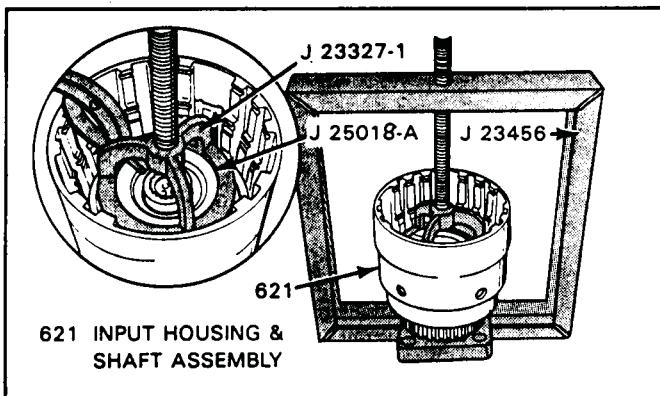


Figure 106

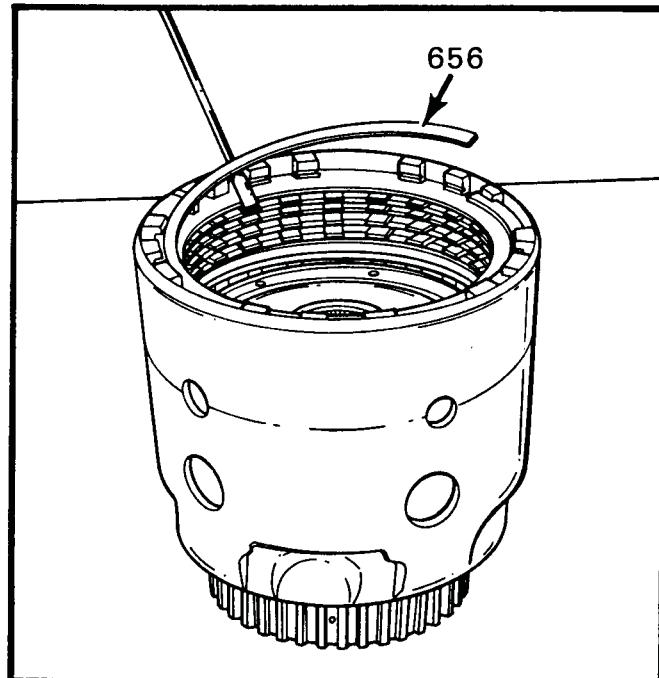


Figure 108

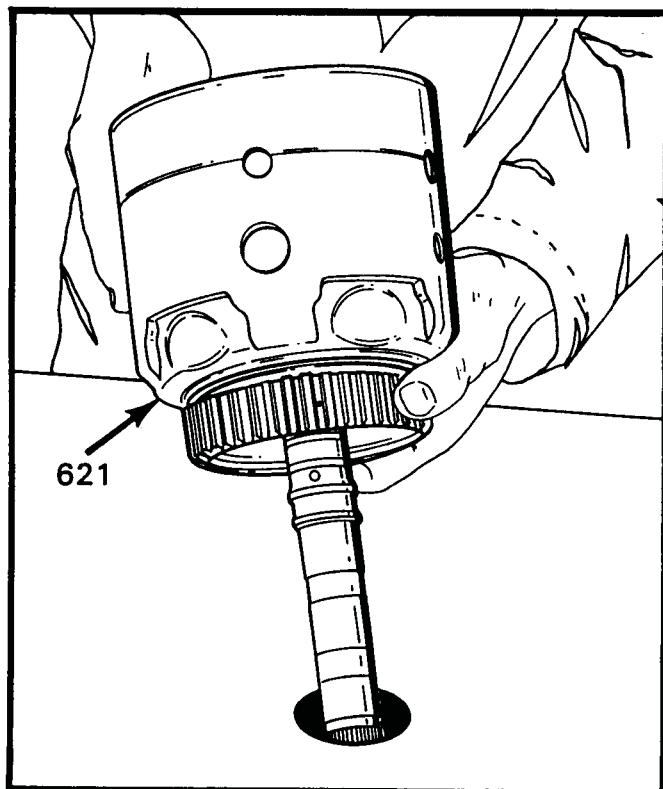


Figure 107

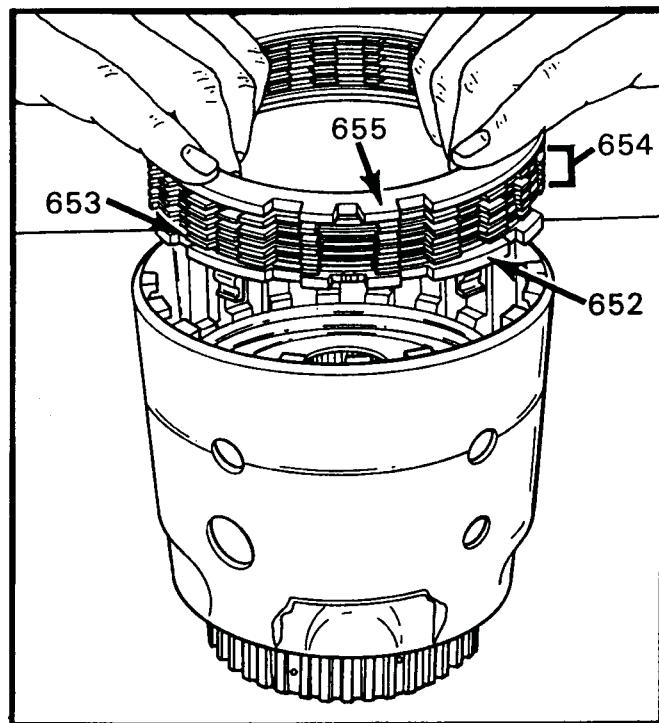


Figure 109

INPUT CLUTCH HOUSING DISASSEMBLY

1. Remove the thrust bearing assembly (615) and the selective thrust washer (616) from the turbine shaft, as shown in Figure 105.
2. Place the input housing assembly on the bench, with the turbine shaft through a hole in the bench (See Figure 107).
3. Remove the 3-4 clutch snap ring using a screwdriver, as shown in Figure 108.
4. Remove the entire 3-4 clutch pack, as shown in Figure 109.
5. Remove the forward clutch snap ring using a screwdriver (See Figure 110). **USE CAUTION WHEN REMOVING THE SNAP RING AS IT IS EXTREMELY STIFF.**
6. Turn the input housing upside down to remove the forward clutch pack, and the overrun clutch pack. Use CAUTION when removing these clutch packs, as the forward sprag assembly will come out at the same time.
7. Install the proper spring compressor, as shown in Figure 106, and compress the overrun clutch return spring.
8. Remove the overrun clutch return spring snap ring with snap ring pliers.
9. Remove the overrun clutch return spring assembly from the input housing.
10. Remove the overrun clutch piston, and remove and discard both lip seals.
11. Remove the forward clutch piston, and remove and discard both lip seals.
12. Remove the forward clutch housing. Refer to Figure 105 for exploded view of the input housing assembly.
13. Remove the 3-4 clutch apply ring from the input housing assembly.
14. Remove the 3-4 clutch piston, remove and discard both lip seals.
15. Remove the forward clutch housing to input housing "O" ring seal from the groove down inside the input housing.
16. Refer to Figure 105 for disassembly.
17. Remove and discard the four turbine shaft sealing rings from the turbine shaft (See Figure 112).
18. **ALWAYS REPLACE THESE SEALING RINGS WITH THE SOLID TEFILON SEALS.**

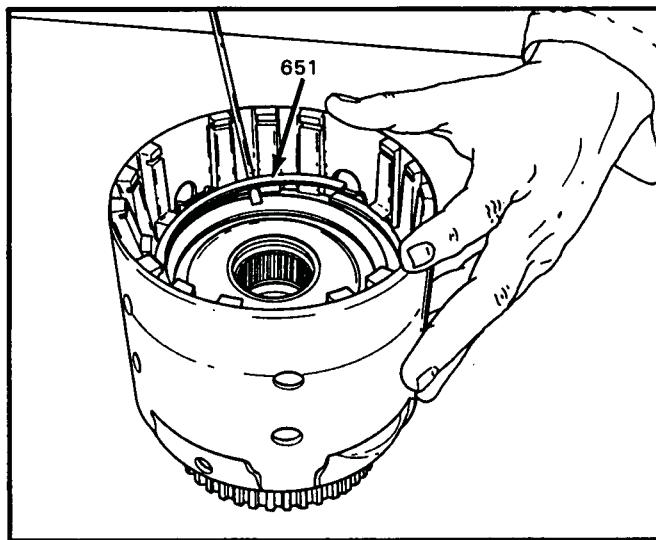


Figure 110

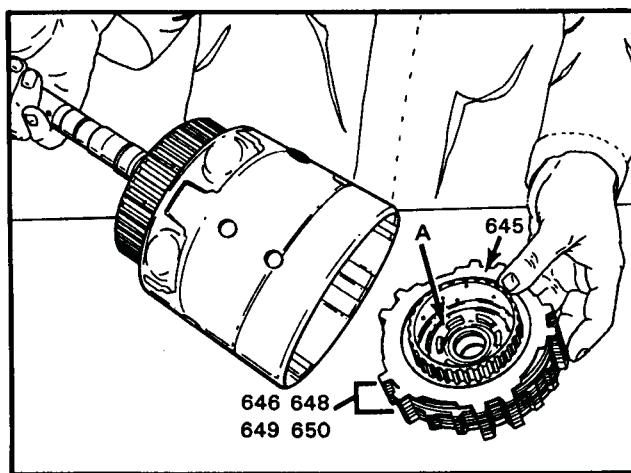


Figure 111

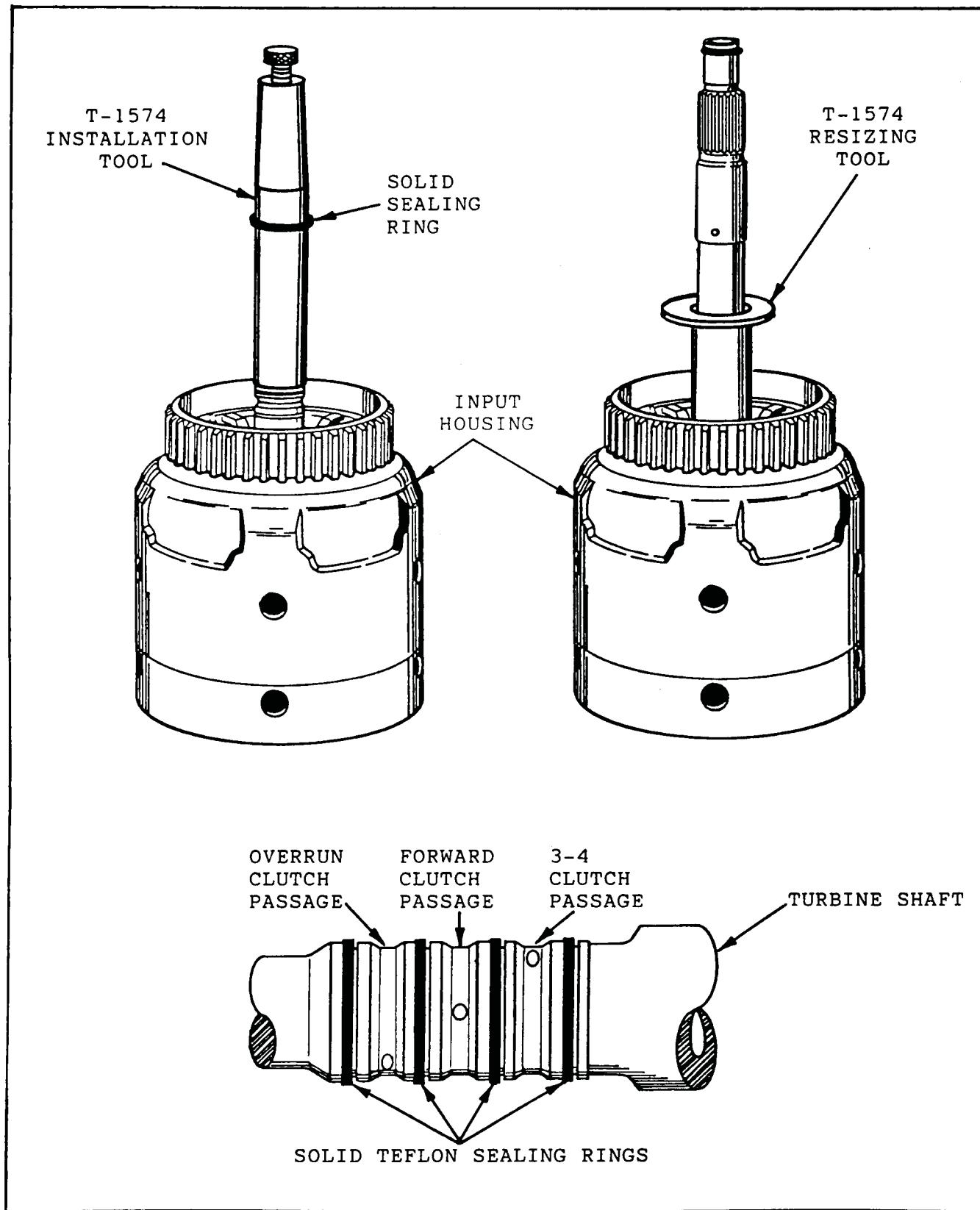


Figure 112



Technical Service Information

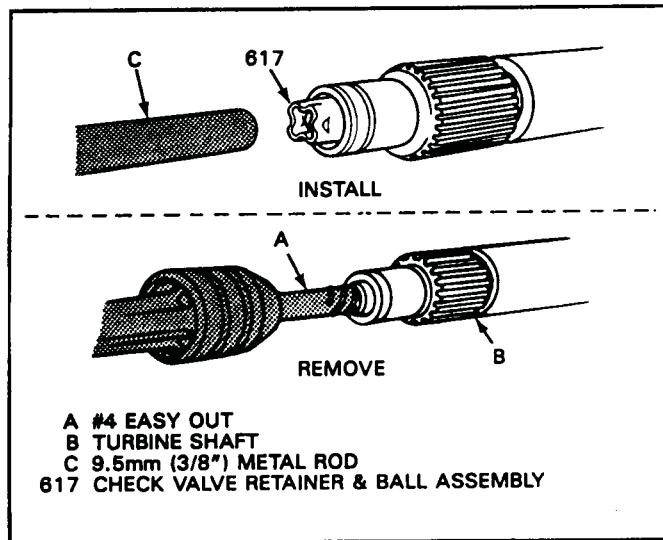


Figure 113

TURBINE SHAFT CAPSULE REPLACEMENT

1. Straighten the inside tangs of capsule and remove the ball from capsule.
2. Remove the ball capsule retainer using a #4 screw extractor (See Figure 113).
3. OEM part number for the 298mm converter is 8639284 (See Figure 104).
4. OEM part number for the 245mm converter is 8647037 (See Figure 104).
5. Install the new ball capsule assembly using a 3/8" drift punch and seat the retainer 1/8" below the top surface of turbine shaft (See Figure 113).
6. Be certain that the ball is still loose in the retainer after installation.
7. For HEAVY DUTY APPLICATIONS ONLY, the BALL ONLY, can be left out of the retainer, for a firmer converter clutch apply. DO NOT leave the retainer out of the turbine shaft, the BALL ONLY can be omitted.

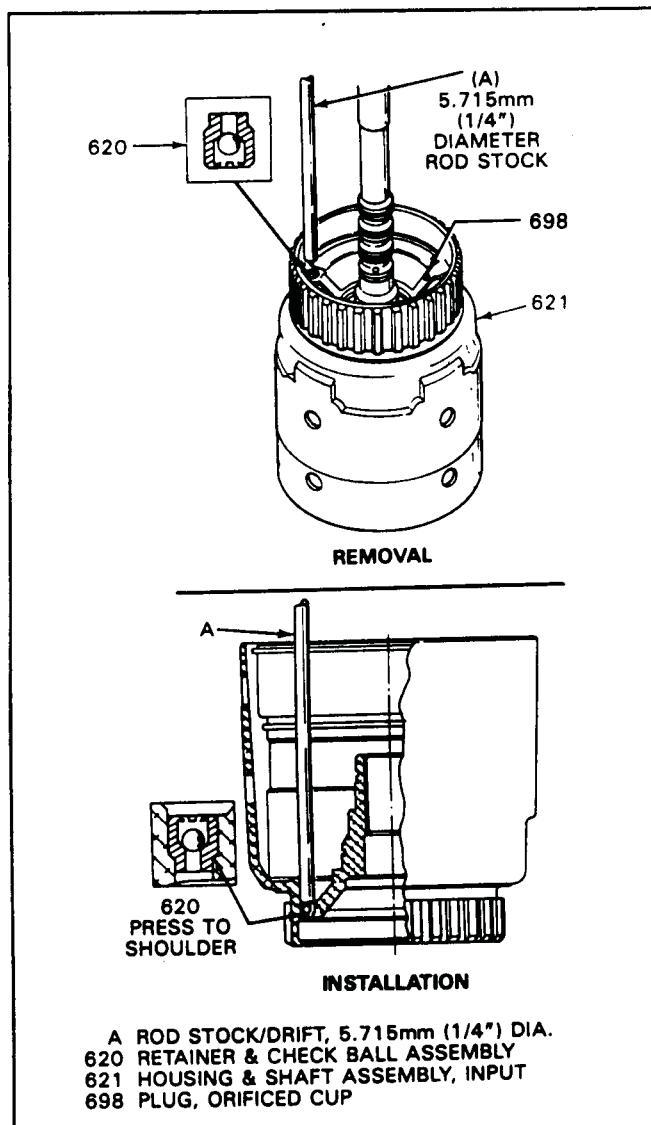


Figure 114

INPUT HOUSING BALL CAPSULE REPLACEMENT

1. Leak check the ball capsule with solvent.
2. If replacement is necessary, use a 1/4" drift punch and hammer to remove and replace the capsule assembly, as shown in Figure 114.
3. OEM part number for the input housing ball capsule is 8654438 (Figure 114).



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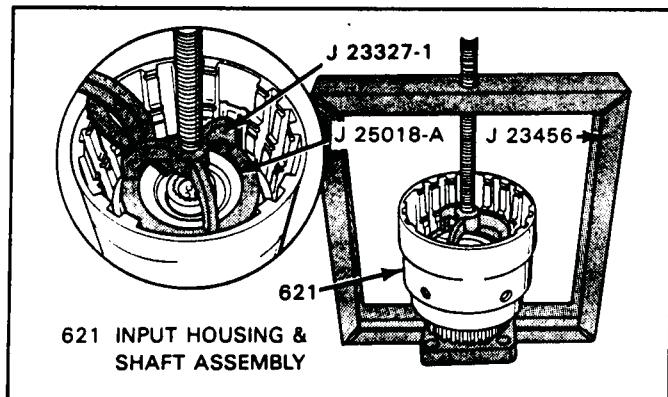


Figure 115

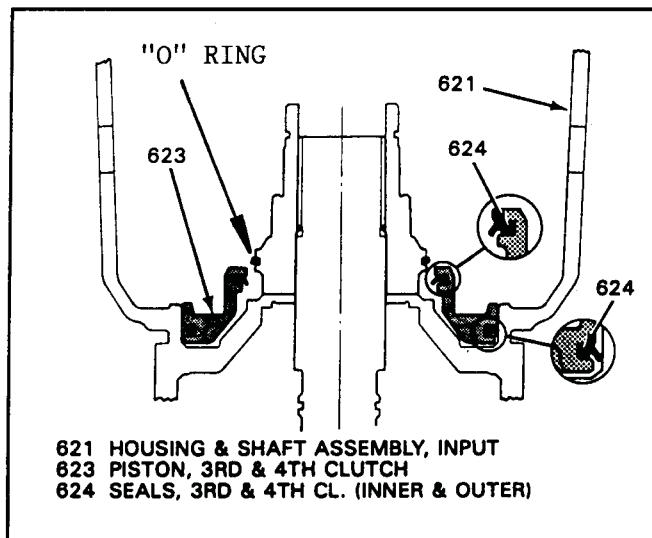
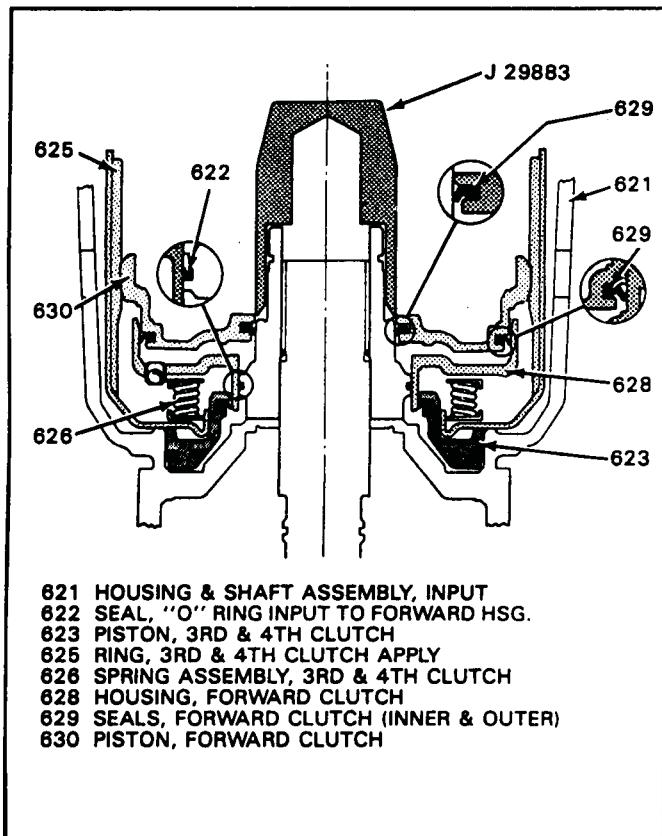
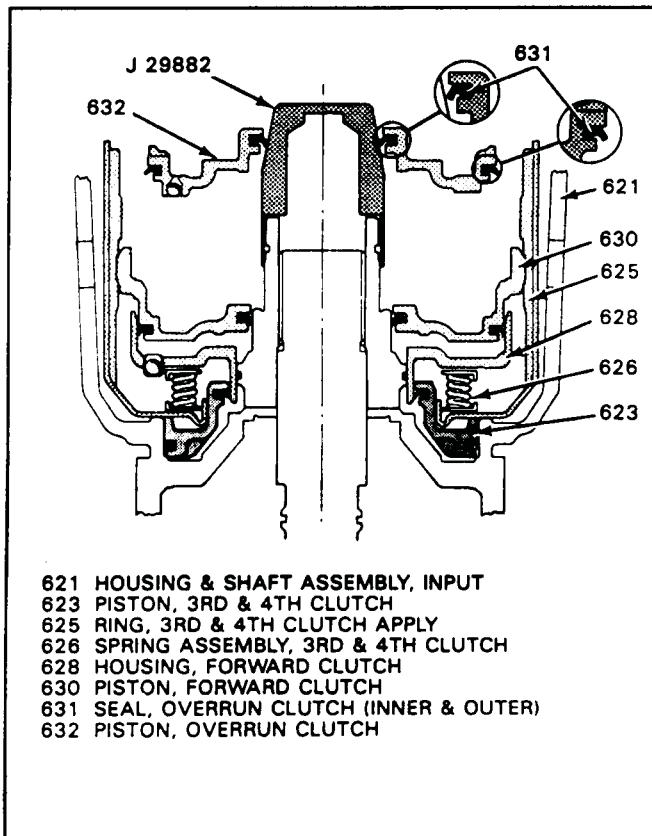


Figure 117



621 HOUSING & SHAFT ASSEMBLY, INPUT
622 SEAL, "O" RING INPUT TO FORWARD HSG.
623 PISTON, 3RD & 4TH CLUTCH
625 RING, 3RD & 4TH CLUTCH APPLY
626 SPRING ASSEMBLY, 3RD & 4TH CLUTCH
628 HOUSING, FORWARD CLUTCH
629 SEALS, FORWARD CLUTCH (INNER & OUTER)
630 PISTON, FORWARD CLUTCH



621 HOUSING & SHAFT ASSEMBLY, INPUT
623 PISTON, 3RD & 4TH CLUTCH
625 RING, 3RD & 4TH CLUTCH APPLY
626 SPRING ASSEMBLY, 3RD & 4TH CLUTCH
628 HOUSING, FORWARD CLUTCH
630 PISTON, FORWARD CLUTCH
631 SEAL, OVERRUN CLUTCH (INNER & OUTER)
632 PISTON, OVERRUN CLUTCH

Figure 116

Figure 118



Technical Service Information

INPUT HOUSING ASSEMBLY

1. Thoroughly clean and inspect all parts and dry with compressed air.
2. Position the input housing on bench with the turbine shaft through a hole in the bench (See Figure 107).
3. Install the inner and outer lip seals on the 3-4 clutch piston in direction shown in Figure 117, with the lips facing down.
ALWAYS USE LONG LIP SEALS IN THE OUTER LIP SEAL LOCATIONS.
4. Lubricate the lip seals with Trans-Jel, and install the 3-4 clutch piston into the input housing with a rotating motion, as shown in Figure 117.
5. Install a new "O" ring into the input housing groove as shown in Figure 117, and lubricate with Trans-Jel.
6. Install the 3-4 clutch apply ring on top of the 3-4 clutch piston. Refer to Figure 116, item (625).
7. Install the 3-4 clutch return spring (626) on top of the 3-4 clutch apply ring (See Figure 116).
8. Lubricate both inside diameters of the forward clutch housing (628), and then install it into the input housing, as shown in Figure 116.
9. Install the inner and outer lip seals on the forward clutch piston in the direction shown in Figure 116, with the lips facing down.
ALWAYS USE LONG LIP SEALS IN THE OUTER LIP SEAL LOCATIONS.
10. Install the forward clutch piston into forward clutch housing using the tool J-29883, as shown in Figure 116.
NOTE: The forward clutch apply legs must be indexed with the 3-4 apply ring legs.
11. Firmly seat the assembly.
12. Install the inner and outer lip seals on the overrun clutch piston in the direction shown in Figure 118, with the lips facing down.
ALWAYS USE LONG LIP SEALS IN THE OUTER LIP SEAL LOCATIONS.
13. Install the overrun clutch piston into the housing using tool J-29882, shown in Figure 118.
14. If all parts are properly seated to this point, the overrun clutch hub will be approximately 3/16" below the snap ring groove in the input housing hub.
15. Install the overrun clutch return spring assembly onto the overrun clutch piston, locating the springs on the piston tabs.
16. Lay the overrun clutch snap ring on top of the overrun clutch return spring assembly.
17. Install the proper spring compressor as shown in Figure 115, and compress the return spring assembly carefully.
18. Install the snap ring with a pair of snap ring pliers.
19. Remove the spring compressor.

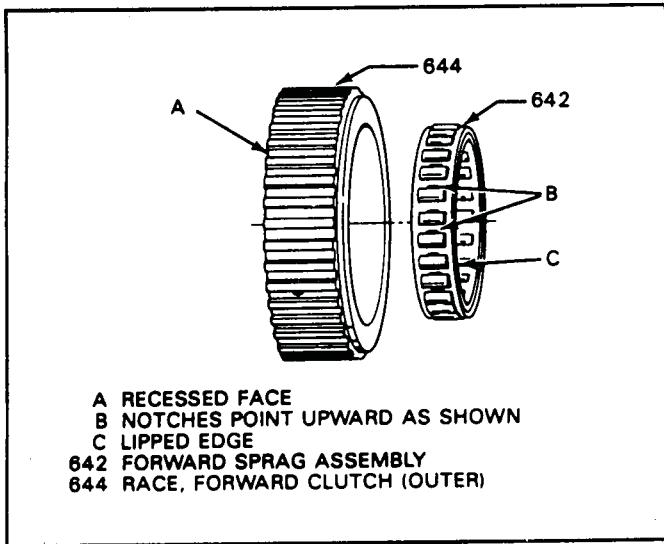


Figure 119

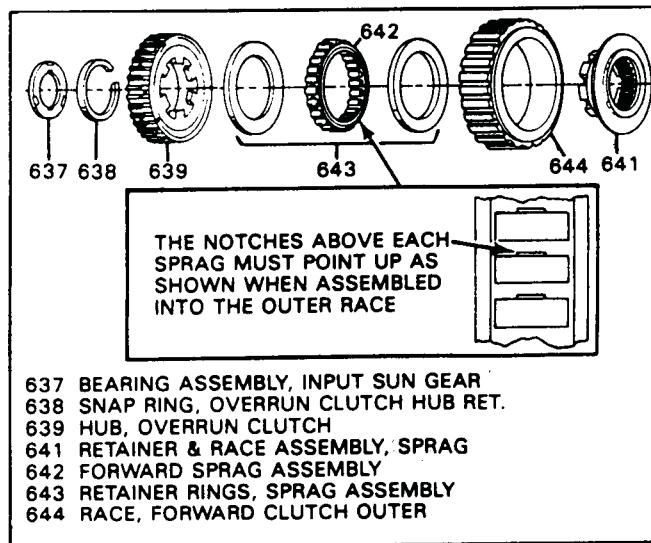


Figure 122

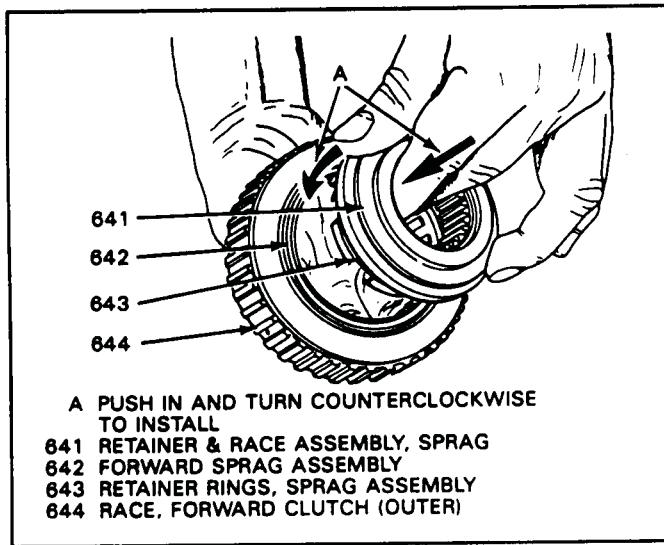


Figure 120

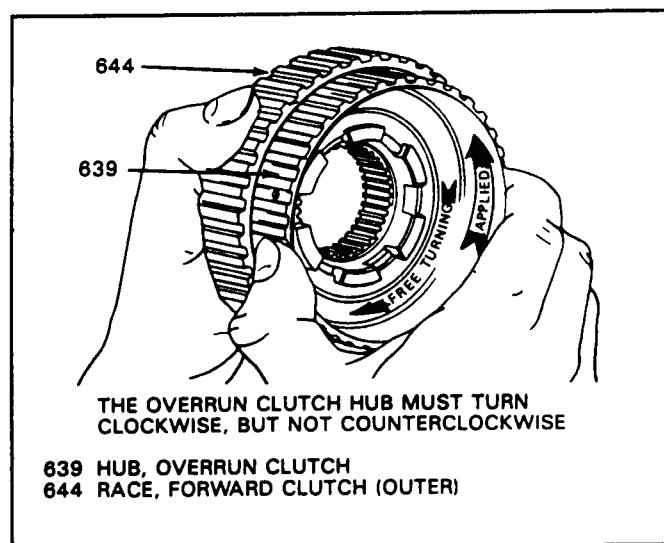


Figure 121

FORWARD CLUTCH SPRAG ASSEMBLY

1. Disassemble and inspect the forward clutch sprag assembly (Figure 122).
2. Install the forward sprag assembly in the outer race from the side opposite the recess (See Figure 119).
3. The notches in the sprag assembly cage MUST face upward as shown in Figure 119.
4. Install wear plate onto the inner race and install the inner race into the sprag assembly by pushing in and turning to the left (See Figure 120).
5. Install the remaining wear plate.
6. Install the overrun clutch hub and the overrun hub snap ring (Figure 122).
7. Test the complete assembly as shown in Figure 121. If the assembly operates backwards, you have installed the sprag backwards. Reassemble correctly.

INSTALL OVERRUN CLUTCH PLATES

1. Install the overrun clutch plates into the input housing (See Figure 124).
2. The overrun clutch plates are smallest of the three sets of plates in the input housing.
3. Start the pack with a steel plate and alternate with a friction until you have installed two of each.
4. The overrun clutch steel plates must be indexed into the input housing, and requires ONLY two lined and two steels (See Figure 123).
5. Install input housing lube oil seal in the input housing as shown in Figure 125. There are two different seals depending on output shaft design, but the hard plastic will work either way. See Figure 100.



Technical Service Information

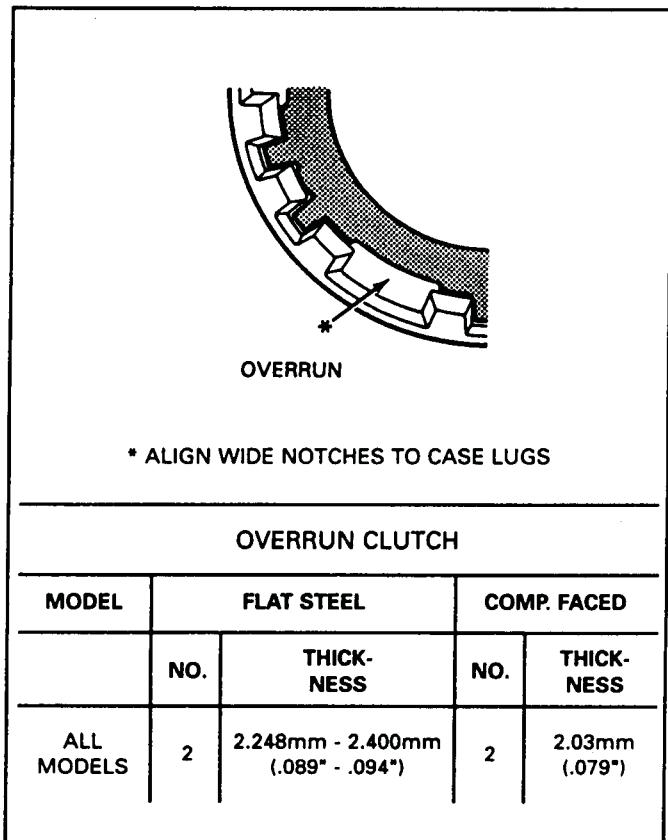


Figure 123

6. Install the thrust bearing into the input housing, as shown in Figure 125.
7. Retain the bearing with Trans-Jel.
8. Install the pre-assembled forward sprag assembly into the input housing, shown in Figure 126, by turning, and indexing the overrun clutch hub into overrun clutch friction plates.
9. It should be down against the thrust bearing when installed properly, as shown in Figure 126.

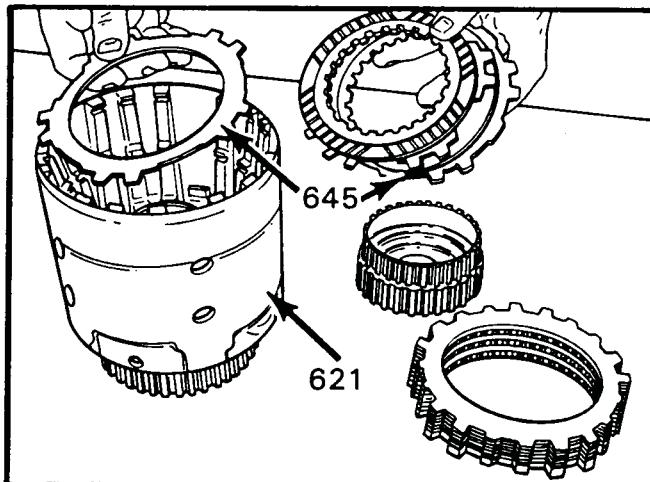


Figure 124

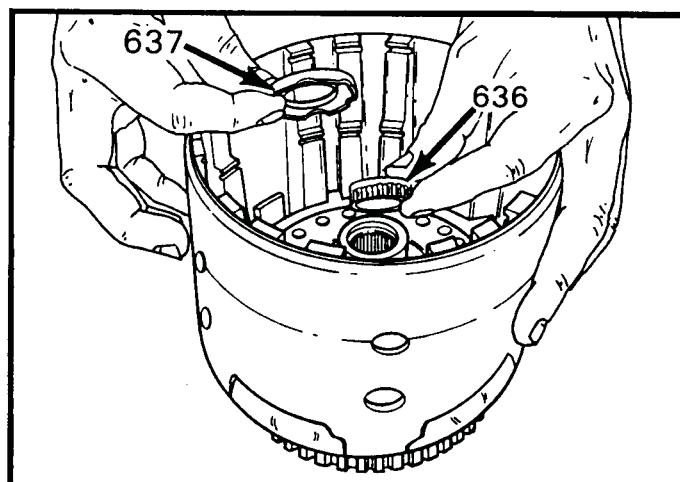


Figure 125

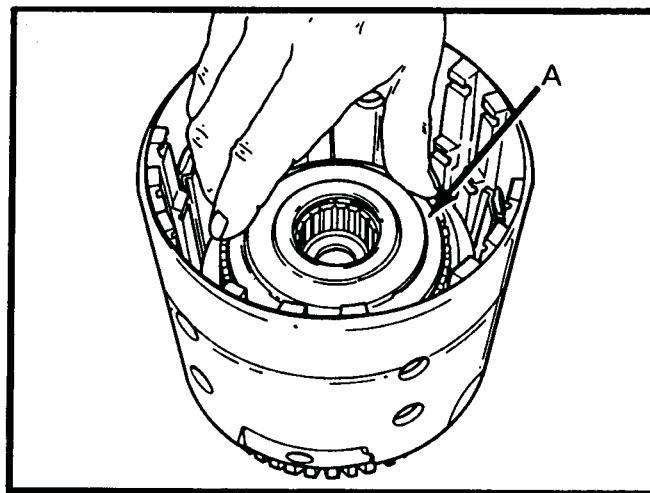
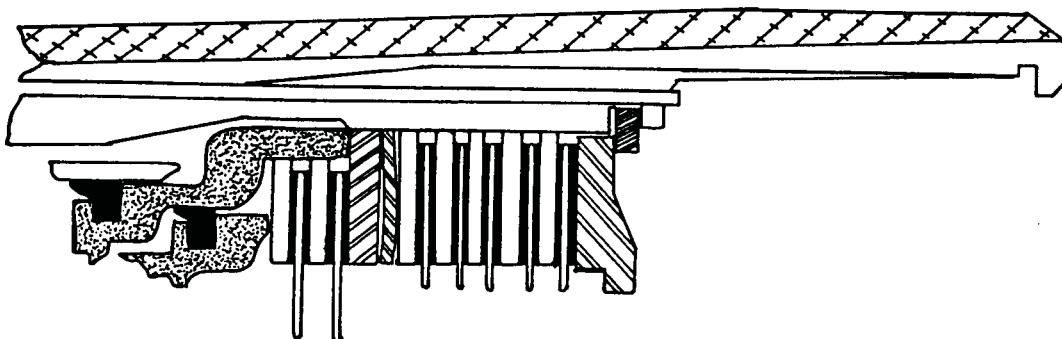


Figure 126

OVERRUN AND FORWARD CLUTCH PACKS


OVERRUN AND FORWARD CLUTCH PACK STACK-UPS ARE THE SAME ON ALL 1987-1993 MODELS AND IS SHOWN ABOVE.

Figure 127

FORWARD CLUTCH INFORMATION CHART

PLATE TYPE	THICKNESS	QUANTITY REQUIRED
		ALL MODELS
APPLY PLATE	4.30mm (.169")	1
WAVED STEEL CLUTCH PLATE	1.79mm (.070")	1
FLAT STEEL CLUTCH PLATE	2.29mm (.090")	5
COMPOSITION FACED CLUTCH PLATE	1.78mm (.070")	5
BACKING PLATE	SELECTION	1

Figure 128

INSTALL FORWARD CLUTCH PLATES

1. Install the forward clutch apply plate on top of the overrun clutch plates with the teeth aligned with the overrun plates (See Figure 129).
2. The forward clutch apply plate is the thickest (.169" Thick) as shown Figure 127 and 128.
3. Install the forward clutch wave plate on top of the apply plate as shown in Figure 130, with the teeth aligned to the apply plate.
4. Install the remainder of the forward clutch plates beginning with a steel plate on top of the waved plate, and alternating with friction plate until you have installed five steel plates and five friction plates. Refer to Figures 127 and 128.
5. Install the proper forward clutch backing plate as shown in Figure 131, with stepped side facing up.
6. Install the backing plate snap ring using a screwdriver as shown in Figure 133.
7. Check the forward clutch backing plate travel with a feeler gage as shown in Figure 132.
8. Change the selective backing plate as necessary to obtain the desired travel, which is .040"-.063".

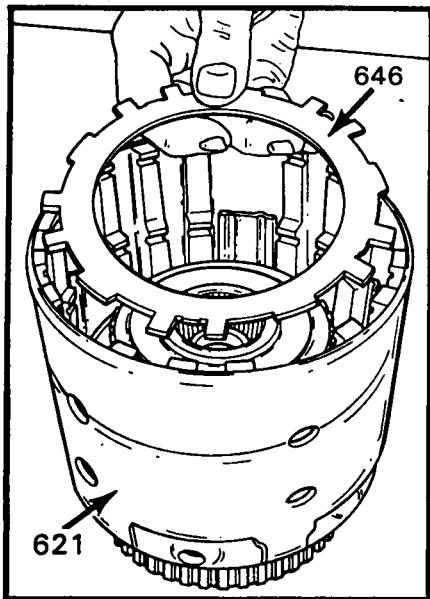


Figure 129

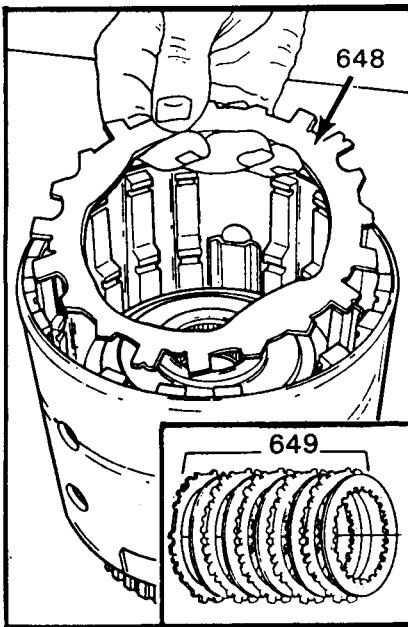


Figure 130

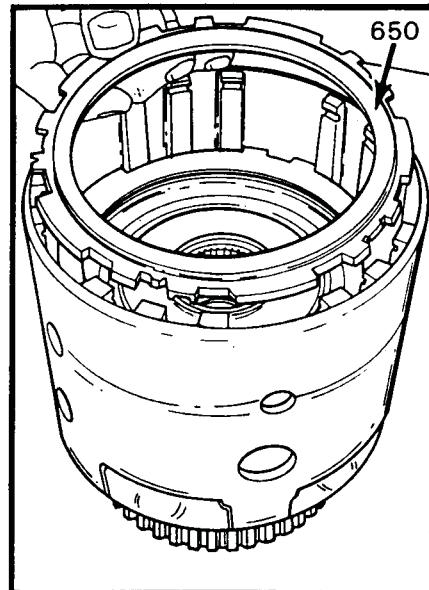


Figure 131

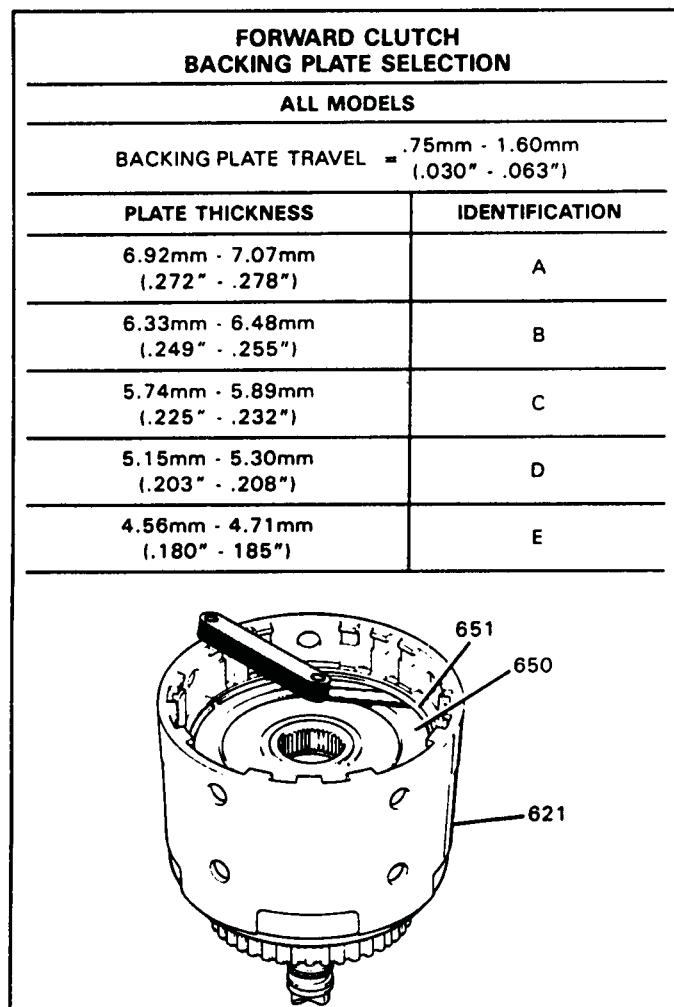


Figure 132

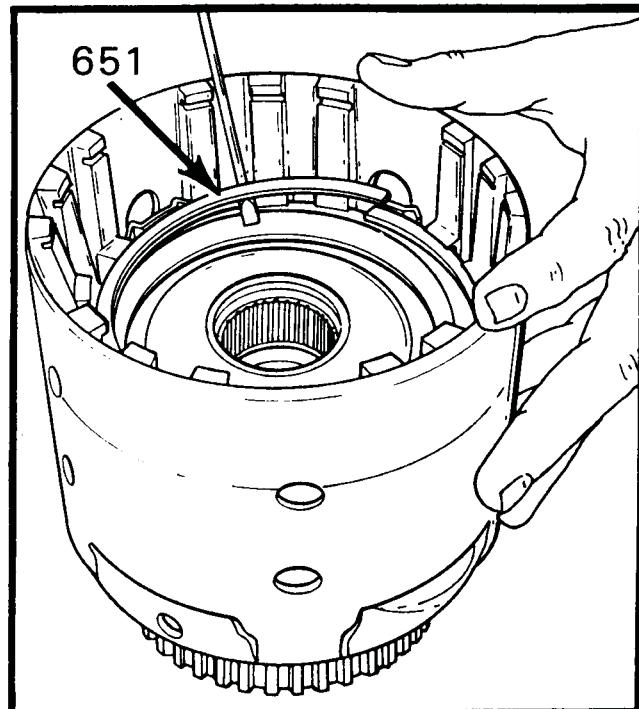


Figure 133

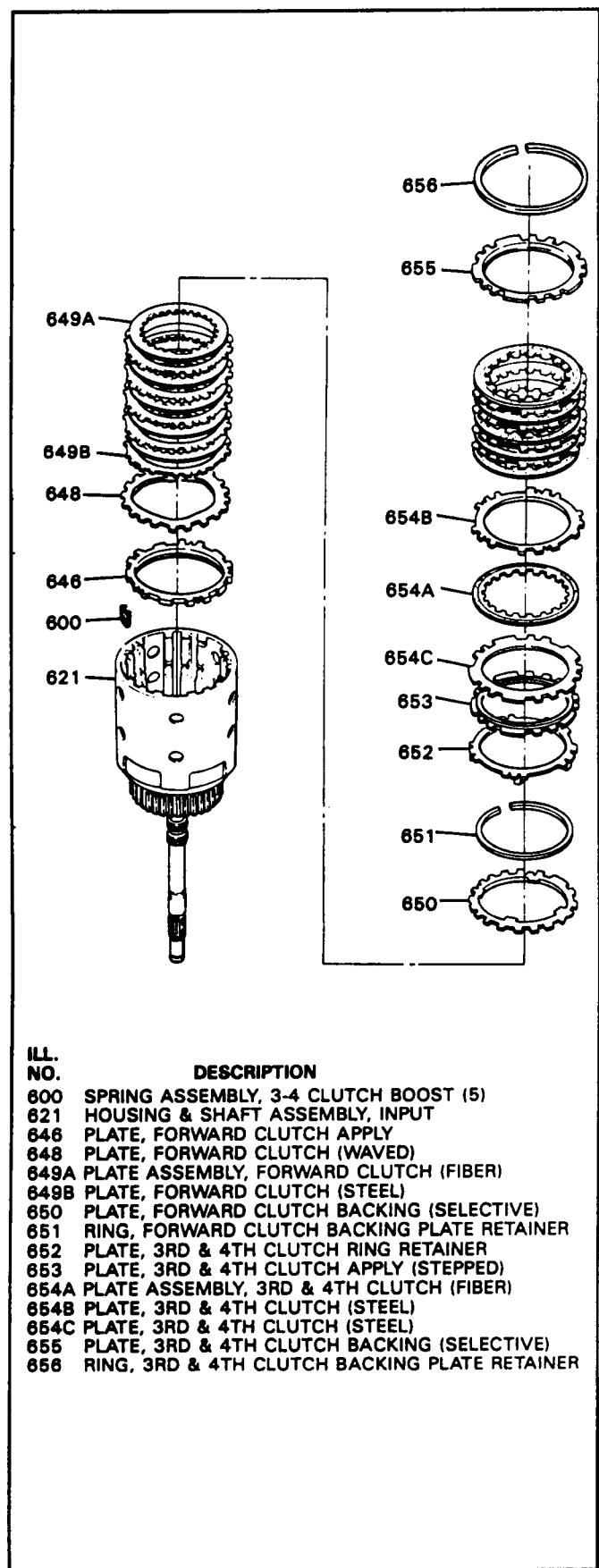


Figure 134

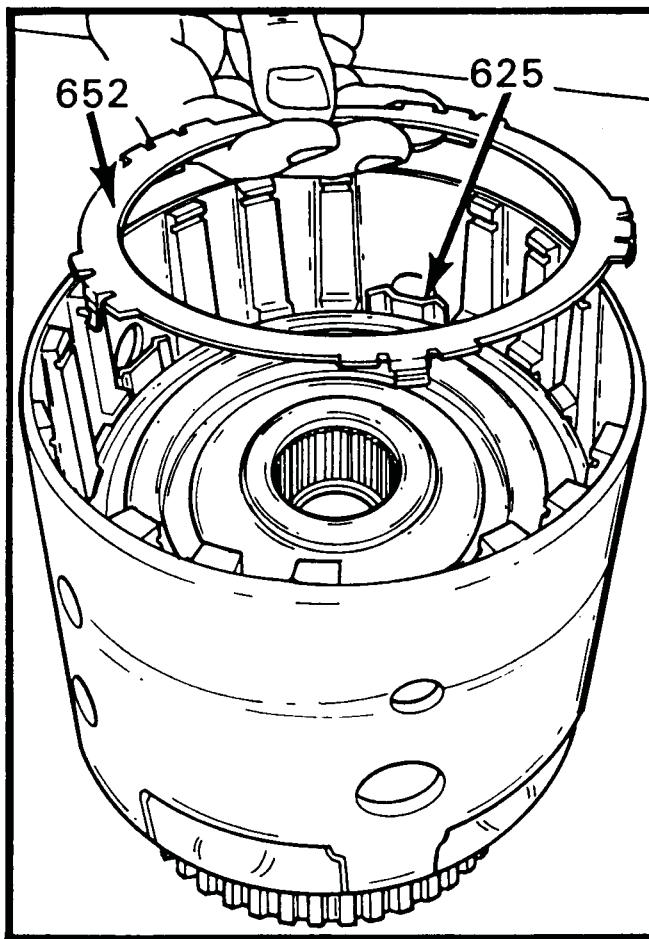


Figure 135

INSTALL 3-4 CLUTCH PLATES

1. Install the 3-4 clutch retainer as shown in Figure 135. Be sure that each tab on the retainer is on the outside of the legs of the 3-4 apply ring. SOME MODELS USE A DIFFERENT TYPE OF RETAINER THAT ALSO SERVES AS APPLY PLATE (SEE FIGURE 141).
2. Install the 3-4 clutch STEPPED apply plate as shown in Figure 136, with the step facing up. SOME MODELS DO NOT USE THE STEPPED APPLY PLATE (SEE FIGURE 141).
3. Install the 3-4 clutch FLAT apply plate as shown in Figure 137. This plate has wide tabs as shown in Figure 137. SOME MODELS DO NOT USE FLAT APPLY PLATE (SEE FIGURE 141).
4. Install the 3-4 clutch plates into the input housing using Figure 141 as your guide. THERE ARE THREE DIFFERENT 3-4 CLUTCH STACK-UPS DEPENDING THE MODEL THAT YOU ARE WORKING ON (SEE FIGURE 141).

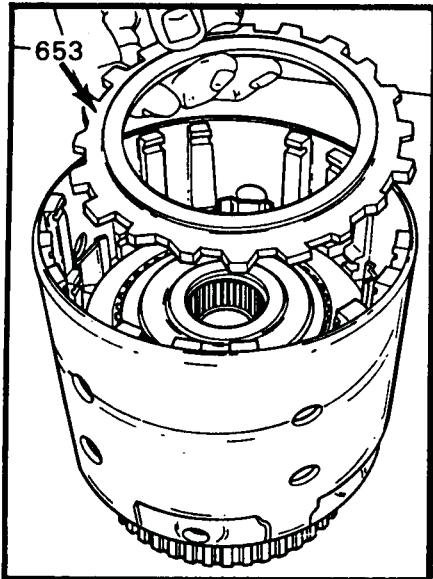


Figure 136

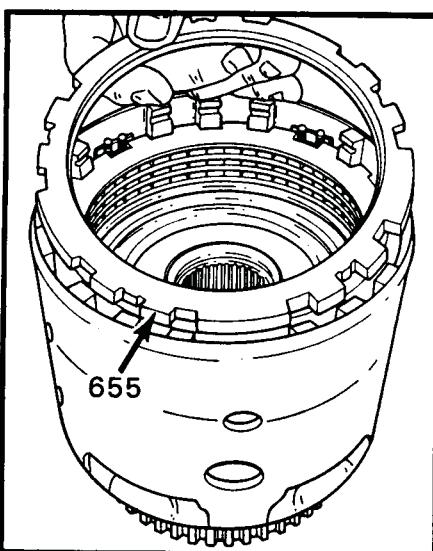


Figure 137

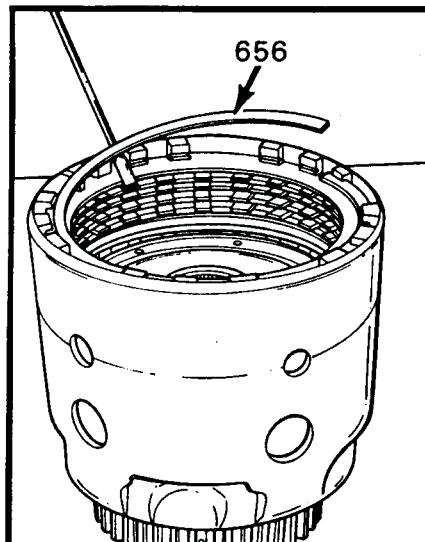


Figure 138

5. SOME MODELS ALSO USE A "2050" FRICTION PLATE IN THE 3-4 CLUTCH PACK. SEE PAGE 78 FOR THE MODELS THAT USE THIS PLATE.
6. Install the proper 3-4 clutch backing plate as shown in Figure 137. THIS BACKING PLATE IS DIFFERENT ON THE DIFFERENT MODELS. WHEN THE THICKER 3-4 STEEL PLATES WERE INTRODUCED, BACKING PLATE WAS MADE THINNER. MAKE SURE OF THE MODEL YOU ARE WORKING ON TO INSURE PROPER BUILD CONTENT (SEE FIGURE 141).
7. Install the 3-4 clutch backing plate snap ring as shown in Figure 138 using a screwdriver.
8. 3-4 backing plate travel should be .060"-.080" (See Figure 142).

THERE IS NOW AVAILABLE UNDER OEM PART NUMBER 8690923, AN UPDATED 3-4 CLUTCH SERVICE PACKAGE WITH THICKER 3-4 STEEL PLATES (SHOWN IN FIGURE 141).

INCLUDES THE FOLLOWING:

1. NEW APPLY RING WITH SHORTER LEGS.
2. NEW APPLY PLATE THAT REPLACES THE THREE PREVIOUS APPLY PLATES.
3. NEW THICKER STEEL PLATES.
4. NEW SELECTIVE BACKING PLATE.
5. "2050" FRICTION PLATES.
6. "145" FRICTION PLATES.
7. INSTRUCTION SHEET.

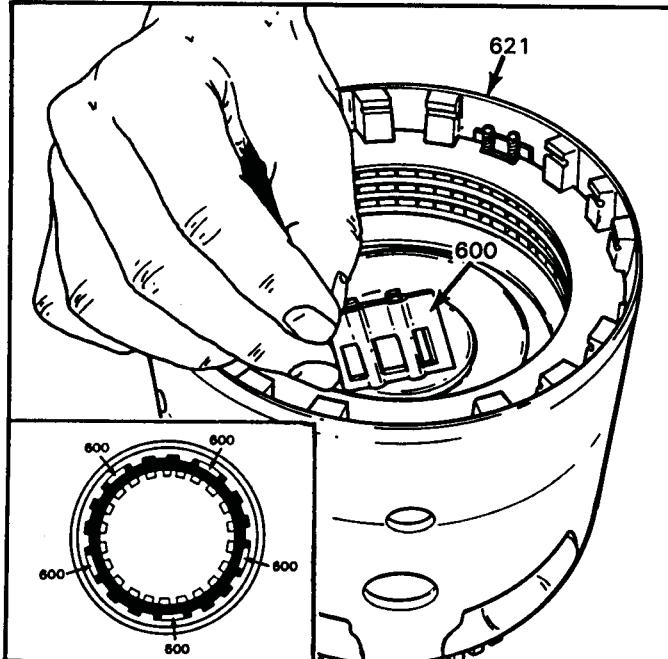


Figure 139

ATSG RECOMMENDS THAT YOU REMOVE AND DISCARD THE 3-4 LOAD RELEASE SPRING ASSEMBLIES SHOWN ABOVE, ALL MODELS, FOR A MUCH IMPROVED 2-3 SHIFT AND BETTER 3-4 CLUTCH DURABILITY.

THE NUMBER 44 HOLE IN THE SPACER PLATE SHOWN IN FIGURE 26 MUST BE DRILLED OUT TO .093" AT THE SAME TIME, EVEN IF THE HOLE IS NOT THERE!



Technical Service Information

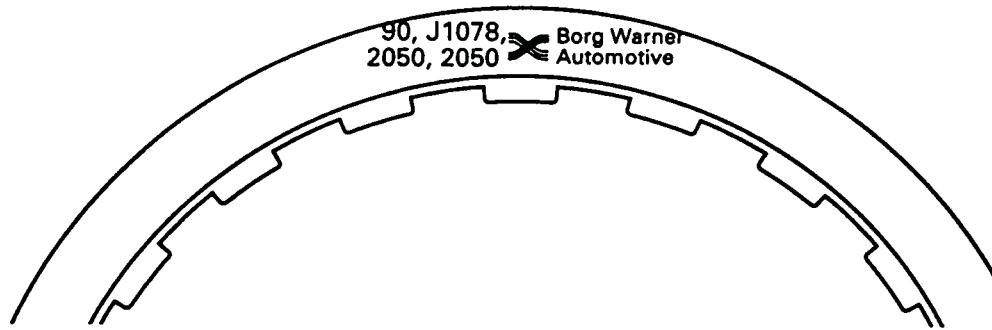


Figure 140

IN SOME OVERHAUL AND REPAIR KITS THERE ARE TWO DIFFERENT SETS OF 3-4 CLUTCH FRICTION PLATES. THE TWO DIFFERENT FRICTION PLATES ARE CALIBRATION SENSITIVE AND INTERCHANGING THE WRONG PLATES MAY CAUSE PREMATURE FAILURE.

THE FOLLOWING CHART SHOWS WHICH MODELS SHOULD USE THE PLATES LABELED "2050" AS SHOWN IN FIGURE 140 ABOVE.

1991	1992	1993	
1AAM	2ADM	3AAM	3ADM
1APM	2AKM	3AFM	3ASM
1CNM	2BFM	3BAM	3BBM
1CYM	2CHM	3BCM	3BFM
1FYM	2CJM	3BHM	3BRM
1KWM	2FUM	3BWM	3CPM
1LHM	2KJM	3FAM	3FDM
1RCM	2LHM	3FFM	3FMM
1RDM	2WCM	3LHM	3SFM
1YHM	2YCM	3YAM	3YCM
	2YDM	3YDM	



Technical Service Information

DIFFERENT 3-4 CLUTCH STACK-UPS

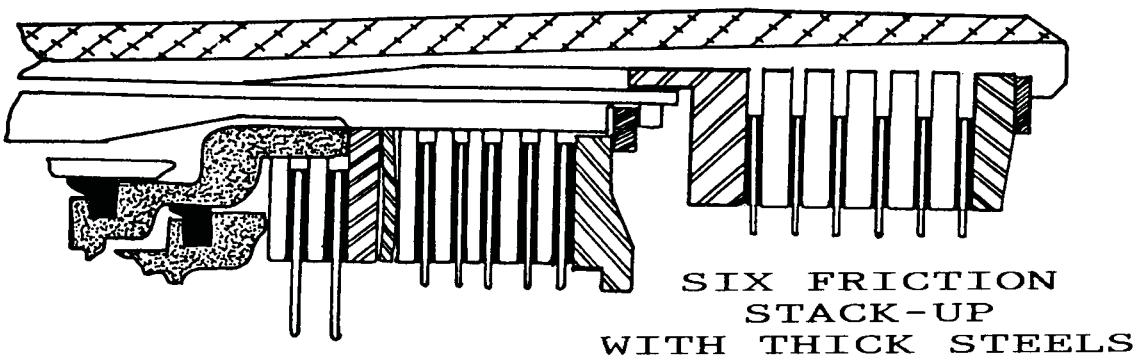
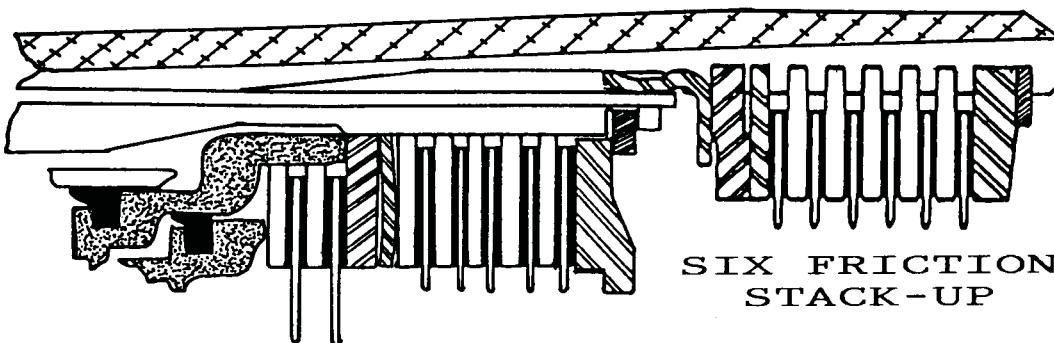
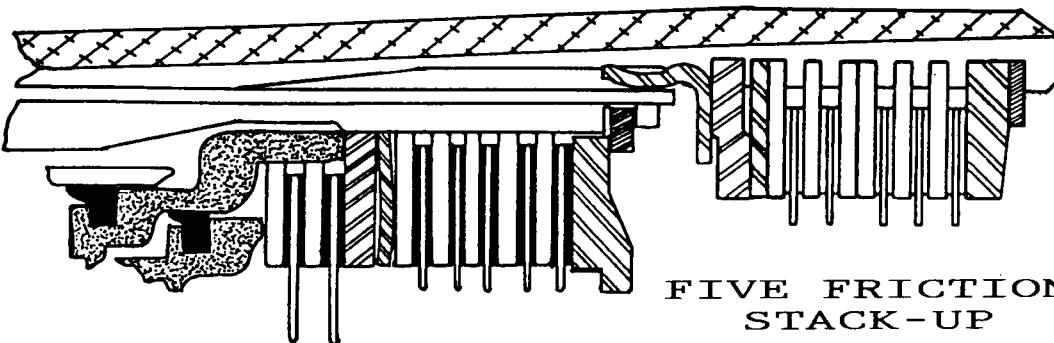


Figure 141

AUTOMATIC TRANSMISSION SERVICE GROUP

**3-4 BACKING PLATE SELECTION
1987-1993 MODELS**

PART NUMBER	THICKNESS	IDENTIFICATION
8685046	.224"- .231"	STAMPED "A"
8685047	.187"- .196"	STAMPED "B"
8685048	.154"- .161"	STAMPED "C"

3-4 CLUTCH BACKING PLATE TRAVEL SHOULD BE
.060"- .080", AND MEASURED AS SHOWN BELOW.

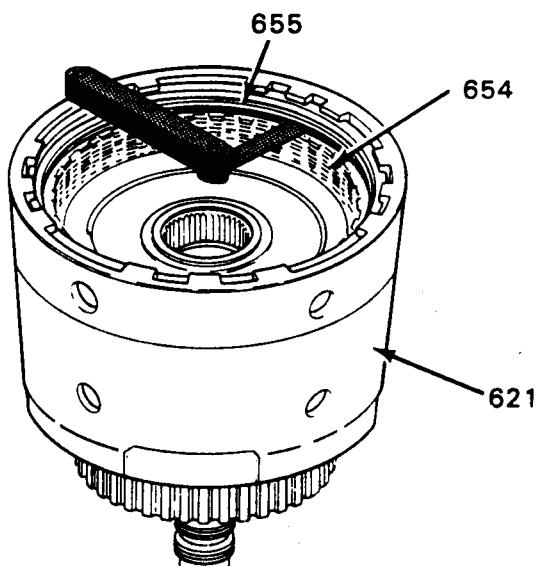


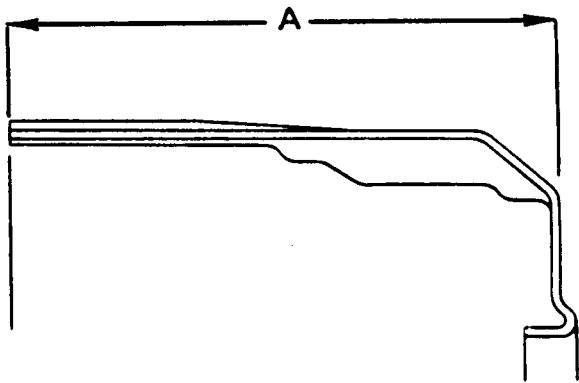
Figure 142

AUTOMATIC TRANSMISSION SERVICE GROUP

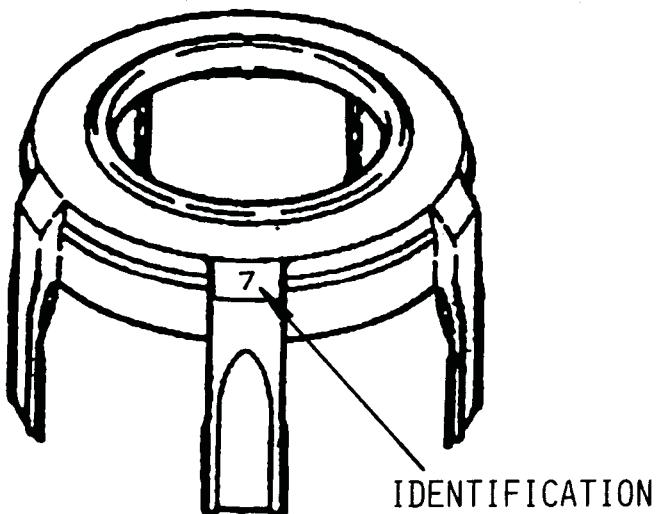


Technical Service Information

3-4 CLUTCH APPLY RING CHART 1987-1993 MODELS



<u>STEEL PLATES</u>	<u>DIMENSION "A"</u>	<u>IDENTIFICATION</u>
THIN (.076")	3.700"-3.711"	STAMPED "4"
THICK (.106")	3.671"-3.682"	STAMPED "7"



3-4 CLUTCH APPLY RING (THIN STEEL) 8642374
3-4 CLUTCH APPLY RING (THICK STEEL) 8685043

Figure 143

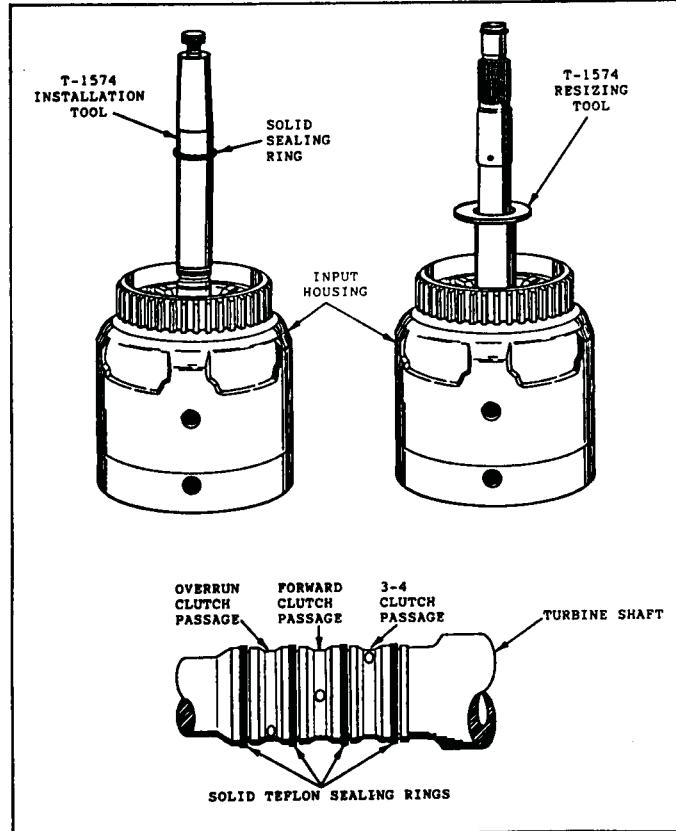


Figure 144

SEALING RING INSTALLATION

1. Set the input housing on the bench with turbine shaft up (See Figure 144).
2. Install the four turbine shaft sealing rings onto the turbine beginning with the bottom ring (See Figure 144).
3. Adjust the screw to obtain the proper height for each seal ring.
4. Solid Teflon sealing rings should ALWAYS be used in these positions.
5. Solid rings will require installation tool, and re-sizing tool, as shown in Figure 144.
6. The Kent-Moore tool numbers J-36418-1 and J-36418-2A, in addition to the Trans-Tool numbers in Figure 144 can be used for this operation.
7. Air check the 3-4, forward, and the overrun clutches by applying air to the feed holes in the turbine shaft (See Figure 144).
8. When the overrun clutch is checked, air will exit the forward clutch feed hole in the turbine shaft, close the hole with your finger when making this test.

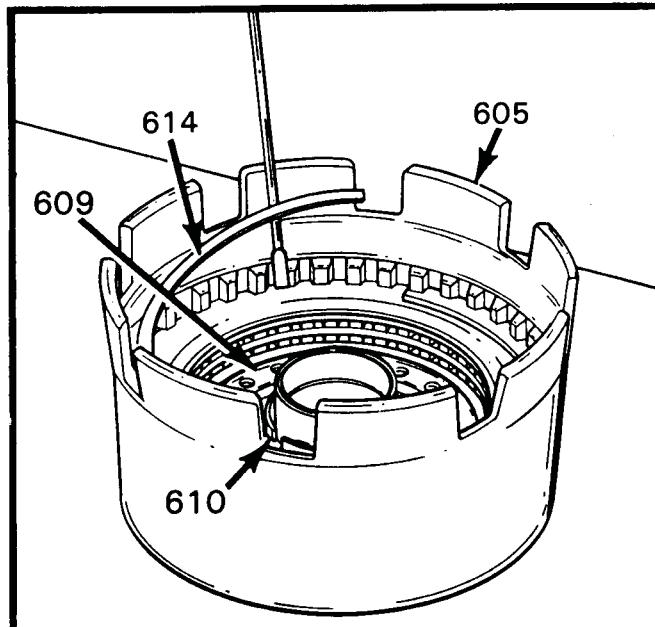


Figure 145

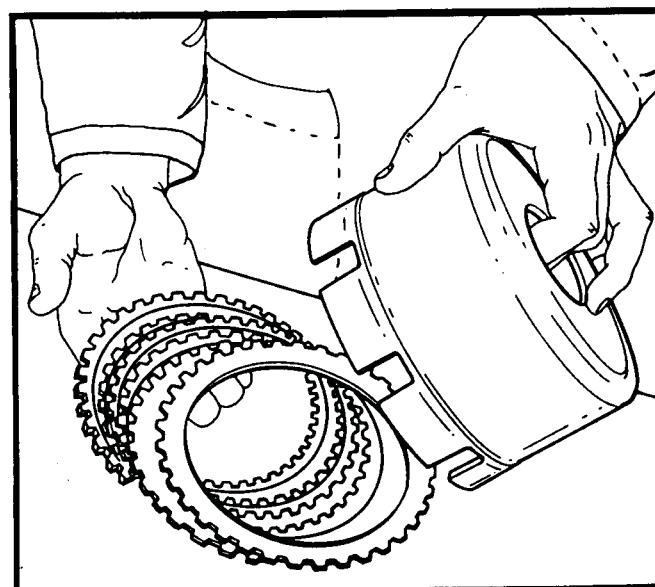


Figure 146

9. Set the completed input housing aside until final assembly.
10. NOTE: It would be best to leave the re-sizing tool installed on the input housing sealing rings until you are ready for final assembly. This will ensure no damage when we install the oil pump into transmission.

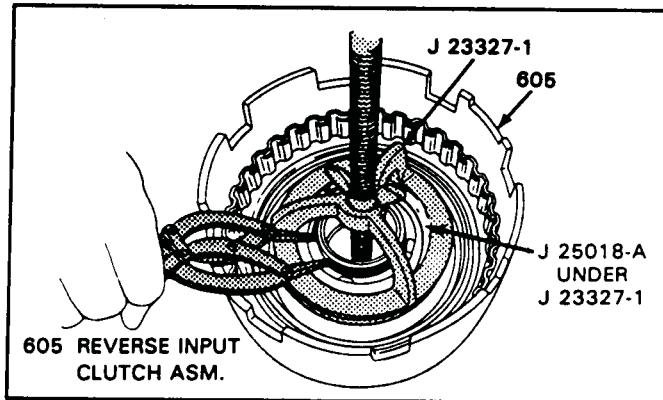


Figure 147

REVERSE INPUT HOUSING DISASSEMBLY

1. Remove the backing plate snap ring from the reverse input housing, as shown in Figure 145, with a screwdriver.
2. Turn the housing over to remove the entire reverse input clutch pack, as shown in Figure 146.
3. Install spring compressor J-23327-1 as shown in Figure 147, compress the reverse input return spring assembly.
4. Remove the return spring snap ring with snap ring pliers, as shown in Figure 147.
5. Remove the spring compressor and the return spring assembly from housing.
6. Remove the reverse input piston from the housing, remove and discard the piston lip seals (See Figure 148).

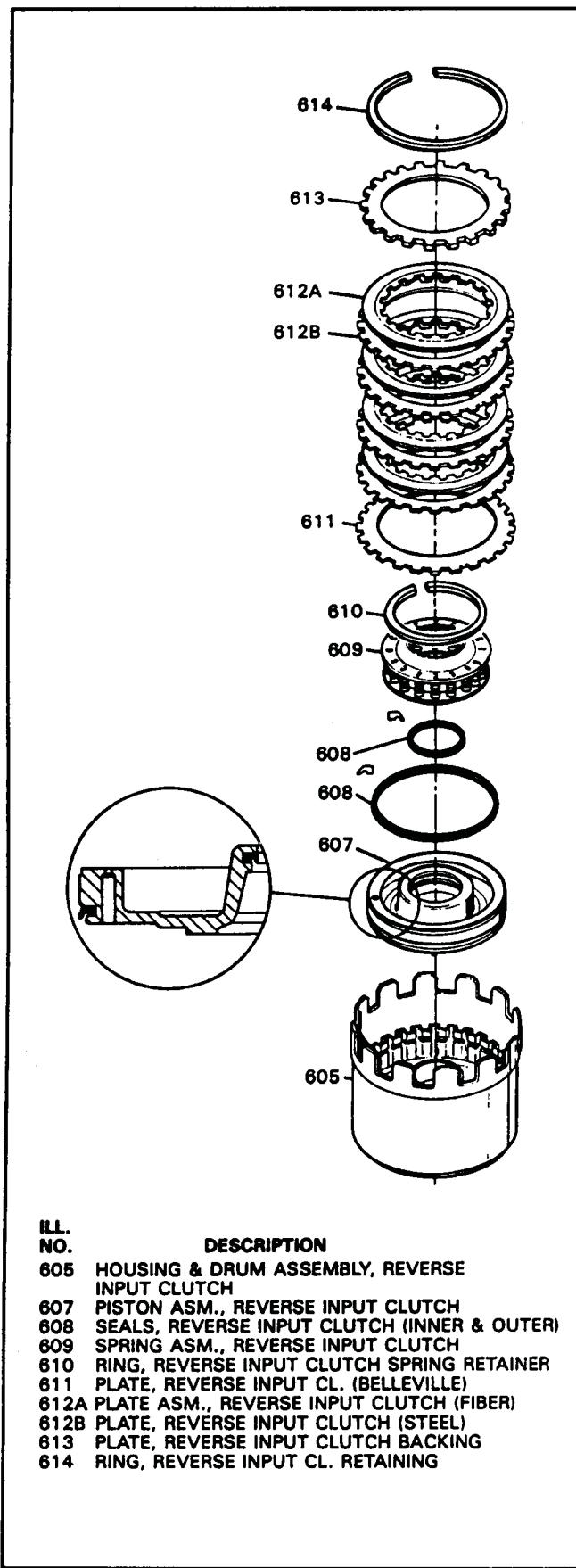
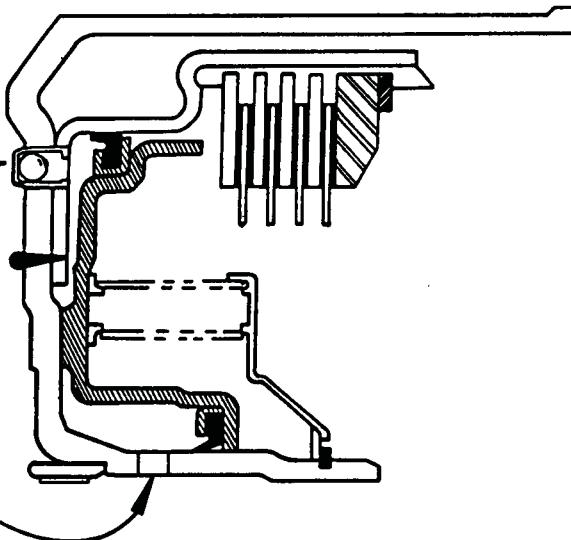


Figure 148

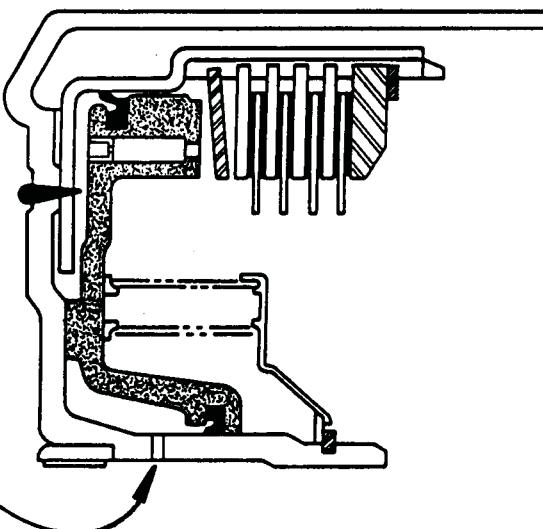
REVERSE INPUT HOUSING IDENTIFICATION

EARLY 1987 ONLY!

1. DOES NOT USE BELLVILLE PLATE IN THE CLUTCH PACK.
2. HAS BALL CAPSULE IN HOUSING.
3. USES STEEL PISTON.
4. REQUIRES PUMP COVER WITH .095" HOLE BETWEEN THE SEALING RINGS.
5. HAS LARGE SQUARE HOLE BETWEEN THE SEALING RINGS IN THE HOUSING.


LATE 1987-1992 ONLY!

1. USES A BELLVILLE PLATE IN THE CLUTCH PACK.
2. BALL CAPSULE ELIMINATED IN HOUSING.
3. USES CAST ALUMINUM PISTON.
4. REQUIRES PUMP COVER WITH .215" HOLE BETWEEN THE SEALING RINGS.
5. HAS ROUND .095" ORIFICE HOLE BETWEEN THE SEALING RINGS IN HOUSING.


1993 MODEL ONLY!

1. USES A BELLVILLE PLATE IN THE CLUTCH PACK.
2. BALL CAPSULE ELIMINATED IN HOUSING.
3. USES CAST ALUMINUM PISTON.
4. REQUIRES PUMP COVER WITH .215" HOLE BETWEEN THE SEALING RINGS.
5. HAS LARGE SQUARE HOLE BETWEEN THE SEALING RINGS IN HOUSING.
6. REQUIRES 1993 CHECKBALL LOCATIONS IN VALVE BODY, AND USES THREE. SEE CHECKBALL LOCATIONS SECTION OF THIS MANUAL.

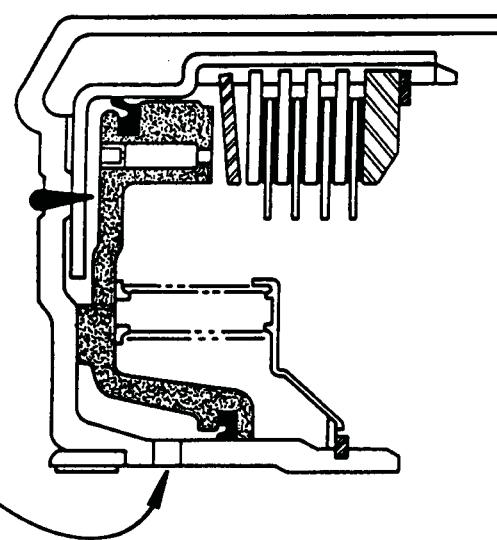


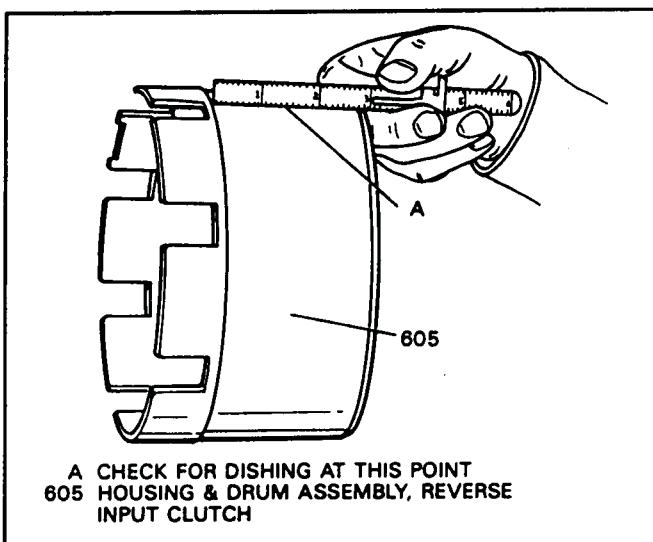
Figure 149



Technical Service Information

REVERSE INPUT HOUSING IDENTIFICATION

1. There are 3 different reverse input housings, THAT WILL NOT INTERCHANGE.
2. Use Figure 149 to identify which of the reverse input housings you have, to ensure proper build content.
3. Check the reverse input housing using a straight edge, as shown in Figure 150, to ensure that you have a flat band surface.



A CHECK FOR DISHING AT THIS POINT
605 HOUSING & DRUM ASSEMBLY, REVERSE
INPUT CLUTCH

Figure 150

REVERSE INPUT PISTON MODIFICATION

1. We recommend that you reduce the size of the bleed orifice in the ALUMINUM reverse input piston, using an orifice cup plug that is available at "TECKPAK" under part number 77761C.
2. We recommend that this modification be done on ALL MODELS WITH ALUMINUM PISTON.
3. The "TECKPAK" orifice cup plug goes into the back side of the reverse input piston, as shown in Figure 151.

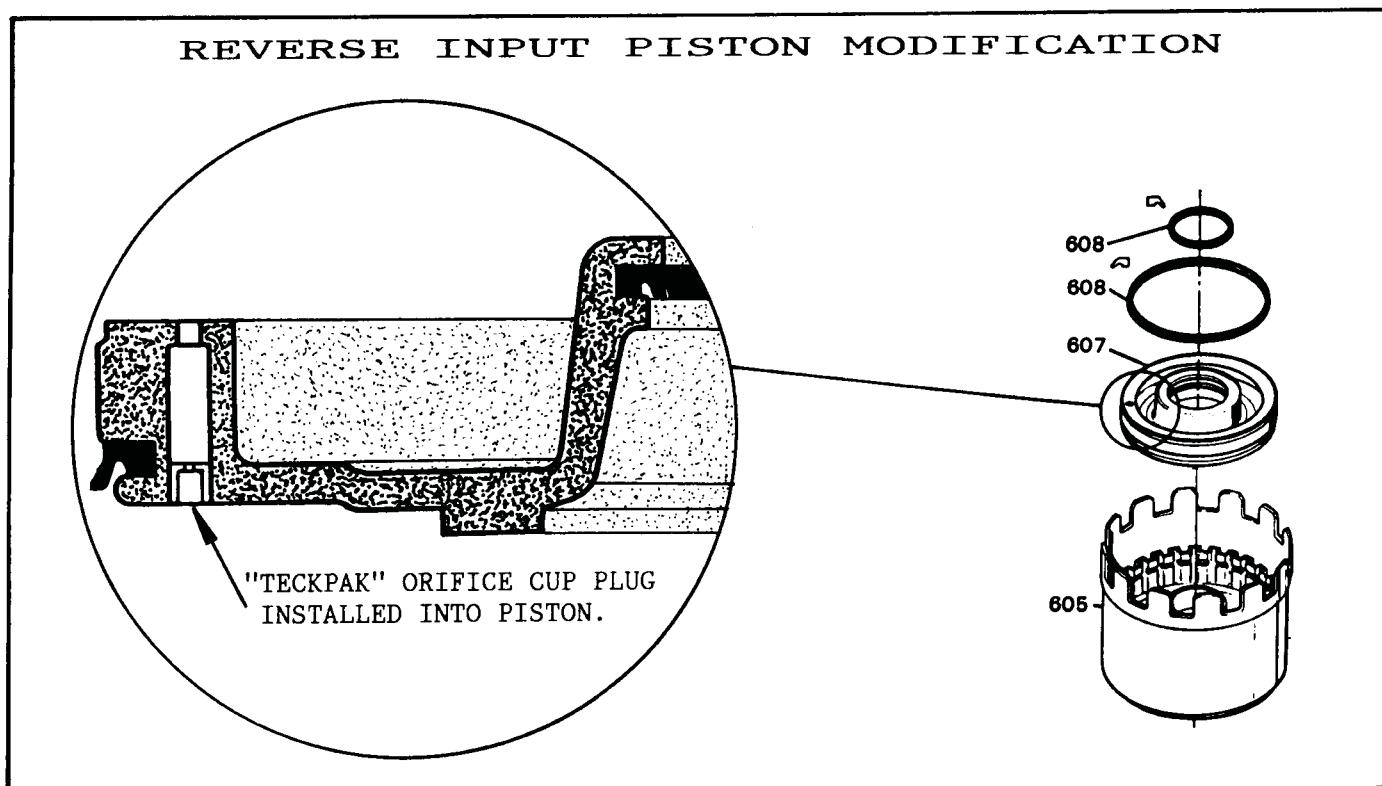


Figure 151

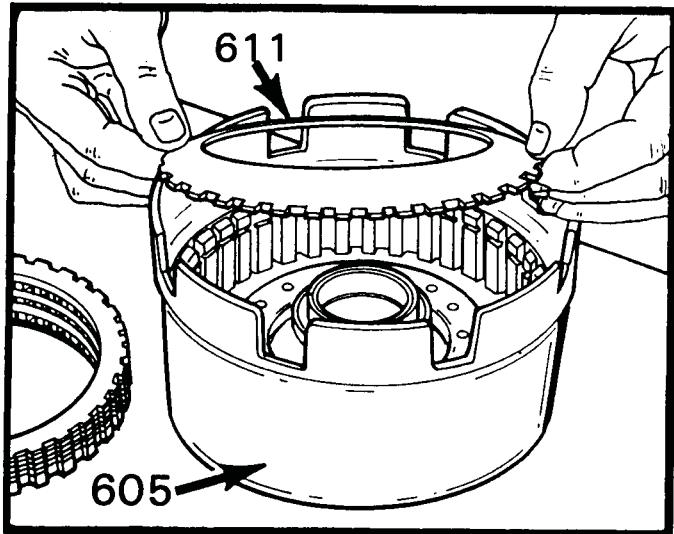


Figure 152

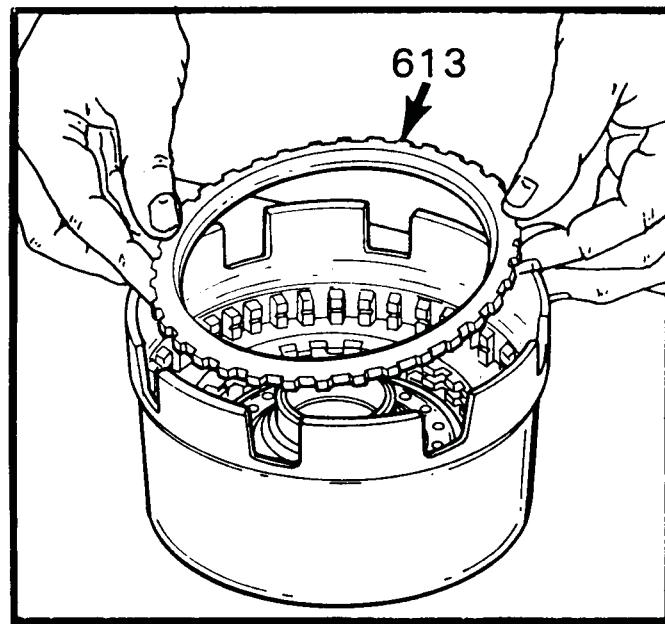


Figure 155

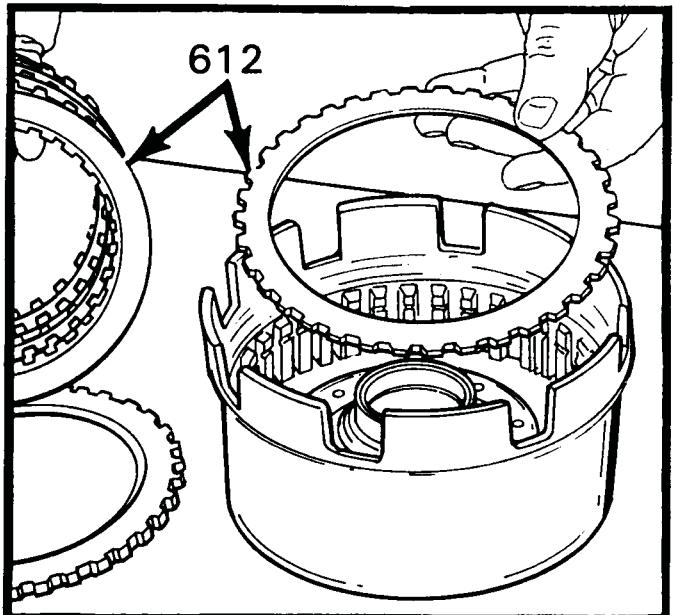


Figure 153

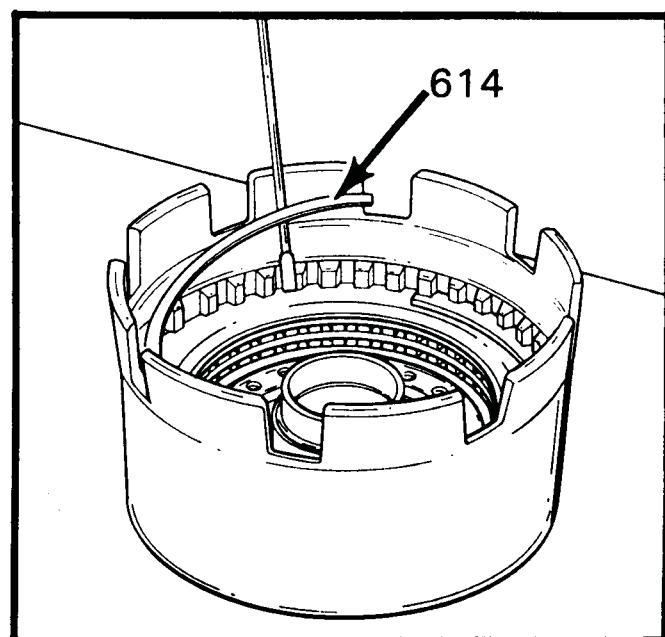


Figure 156

REVERSE INPUT CLUTCH		
	NO.	THICKNESS
BELLEVILLE PLATE	1	2.311mm (.091") 2.210mm (.087")
FLAT STEEL CLUTCH PLATE	4	2.045mm (.081") 1.892mm (.075")
COMPOSITION FACED CLUTCH PLATE	4	1.880mm (.074") 1.730mm (.068")
BACKING PLATE	1	SELECTIVE

Figure 154

REVERSE INPUT CLUTCH BACKING PLATE SELECTION	
ALL MODELS	
BACKING PLATE TRAVEL = 1.02mm - 1.94mm (.040" - .076")	
PLATE THICKNESS	IDENTIFICATION
7.60mm - 7.45mm (.299" - .293")	5
6.94mm - 6.79mm (.273" - .267")	6
6.28mm - 6.13mm (.247" - .241")	7
5.62mm - 5.47mm (.221" - .215")	8

Figure 157

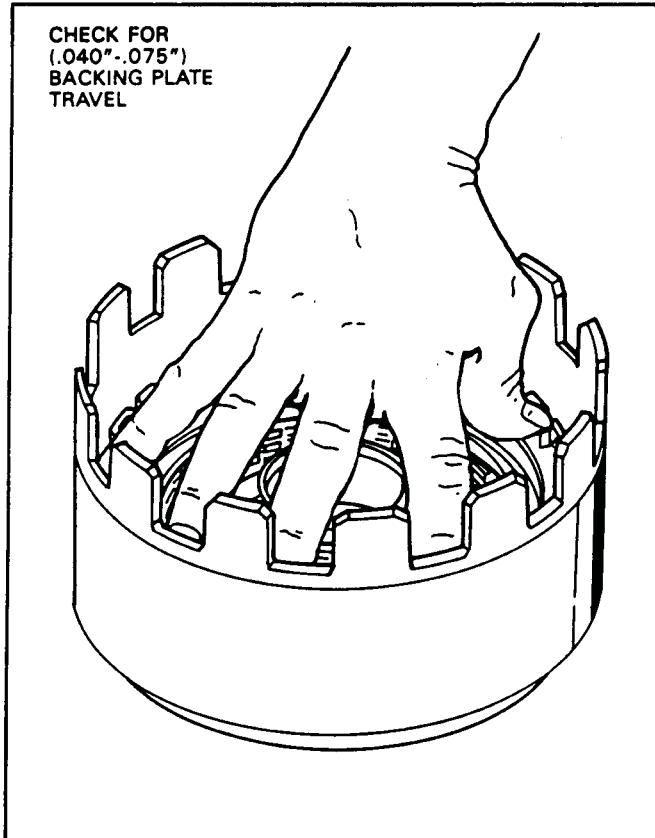


Figure 158

REVERSE INPUT HOUSING ASSEMBLY

1. Inspect all components of the reverse input clutch assembly for damage or wear.
2. Inspect the reverse input clutch housing with a straight edge, as shown in Figure 150, for flatness.
3. If the tangs of the reverse input housing and the tangs of the sun gear shell have "Flared" out, replace the forward sprag regardless of how good it happens to look and/or check.
4. Modify the reverse input ALUMINUM piston, as shown in Figure 151, by installing the orifice cup plug.
5. Install the inner and outer lip seal onto the reverse input piston, and lubricate with Trans-Jel. Lips on seals must face the direction shown in Figure 151.
ALWAYS USE LONG LIP SEALS IN THE OUTER LIP SEAL LOCATIONS.
6. Lubricate reverse input housing seal surfaces with Trans-Jel.
7. Install the reverse input piston into the housing, using care not to damage the lip seals.
8. Install the return spring assembly on top of the reverse input piston, as shown in Figure 148.
9. Install spring compressor J-23327-1 as shown in Figure 147, compress the reverse input return spring assembly.
10. Install the return spring snap ring with snap ring pliers, as shown in Figure 147.

11. Remove the spring compressor.
12. Install the reverse input "Bellville" plate (IF SO EQUIPPED), into reverse input housing, as shown in Figure 152. CONCAVE SIDE GOES DOWN.
13. Install the reverse input clutch plates beginning with a flat steel plate, as shown in Figure 153.
14. Alternate friction and steel plates until you have installed 4 friction and 4 steel plates. Refer to Figure 149 for clutch stack-ups to ensure proper build content.
15. Install the reverse input clutch backing plate, chamfered side up, as shown in Figure 155.
16. Install the backing plate snap ring as shown in Figure 156, using screwdriver.
17. Air check the reverse input housing to ensure no damage to lip seals during the assembly process.
18. Check the reverse input clearance with a feeler gage between the backing plate and snap ring.
19. Clearance should be .040"-.075". Change backing plate as necessary, using the chart in Figure 157.

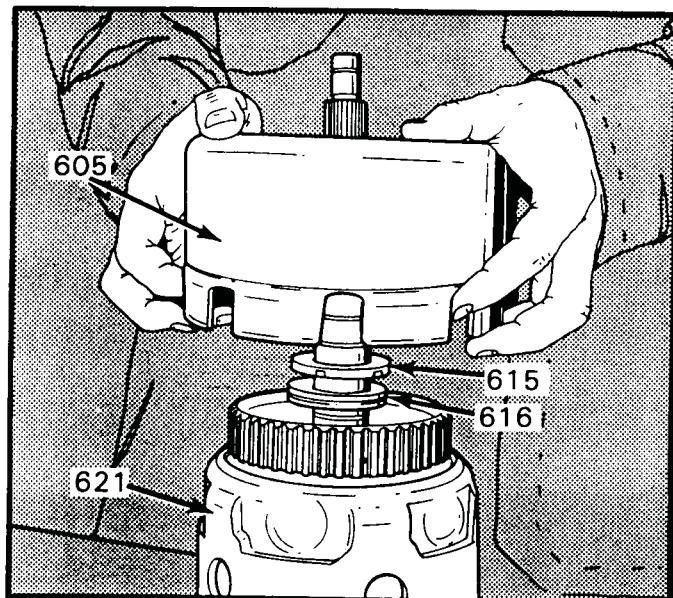


Figure 159

ASSEMBLE REVERSE INPUT CLUTCH AND INPUT CLUTCH HOUSINGS

1. Install the selective thrust washer and thrust bearing assembly onto the input housing, as shown in Figure 160.
2. The thrust bearing should be on top of the selective washer, with the BLACK side facing up.
3. Install the reverse input housing by rotating and index the reverse input clutch plates onto the hub of the input clutch housing (See Figure 159).
4. When installed properly, the thrust bearing will turn with the reverse input clutch housing.
5. Install the reverse input and the input clutch housing assembly into the transmission case as shown in Figure 161.
6. There will be three items to index properly during installation.
 - 3-4 clutch plates must be indexed onto the input ring gear.
 - Input sun gear must be indexed into the forward sprag inner race.
 - Reverse input housing tangs must be indexed into the sun gear shell.
7. Great care must be exercised to ensure that all clutch plates are fully seated.
8. When properly assembled, the reverse input housing will be located just below the case oil pump surface.

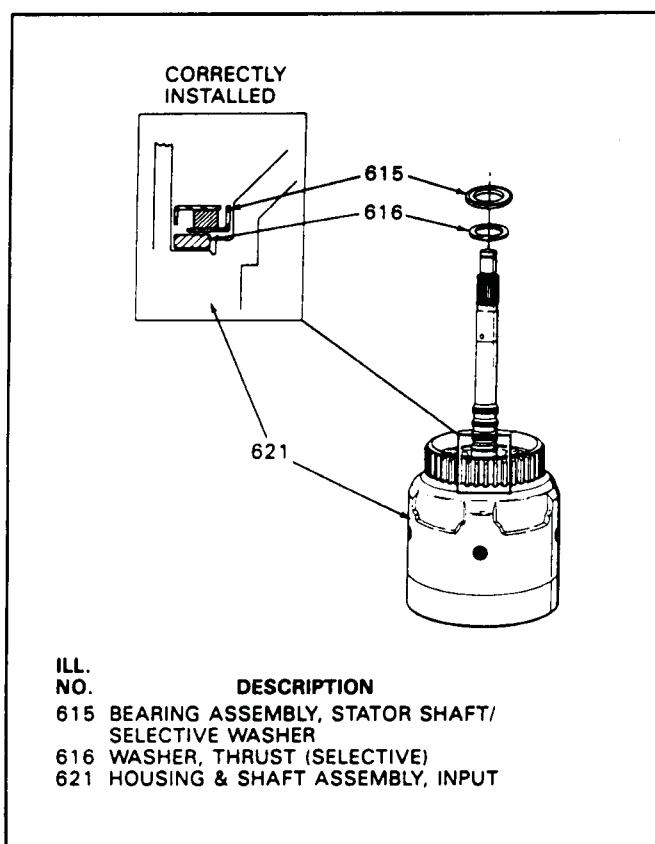


Figure 160

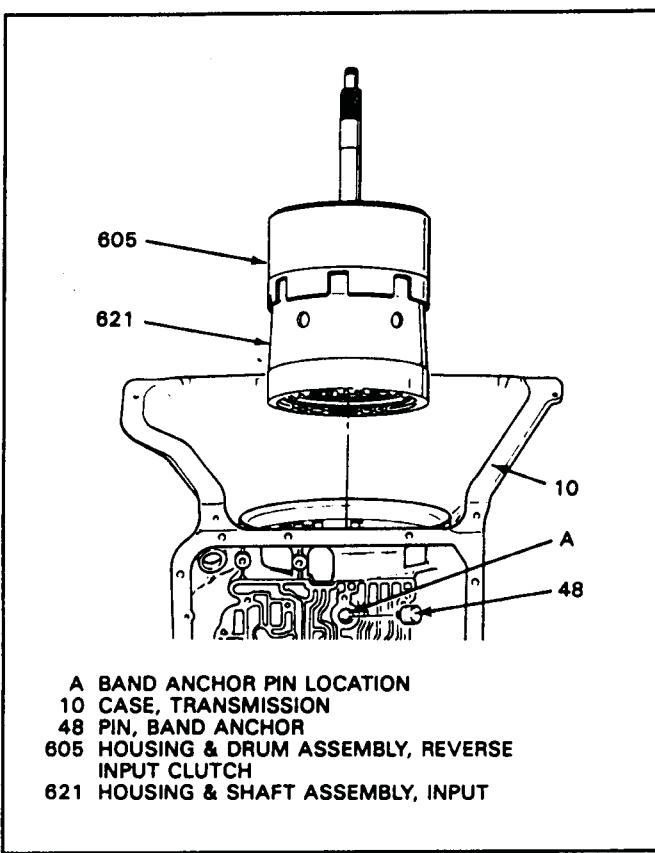


Figure 161

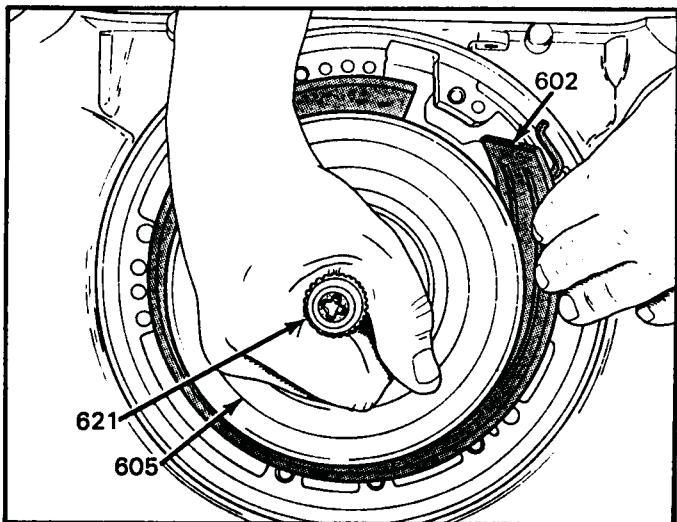


Figure 162

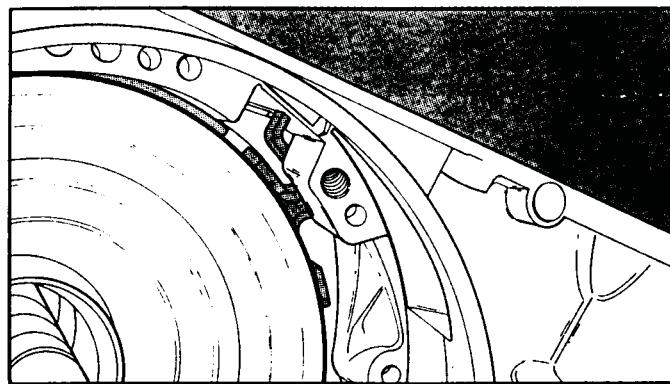


Figure 163

INSTALL 2-4 BAND ASSEMBLY

1. Install the 2-4 band assembly beginning as shown in Figure 162.
2. Line up the anchor pin hole in the band with the hole in the case, and the clip end of the band as shown in Figure 163.
3. Install the band anchor pin into the case hole as shown in Figure 164.
4. Index the 2-4 band onto the band anchor pin.
5. Anchor pin will be just below valve body surface when properly installed.

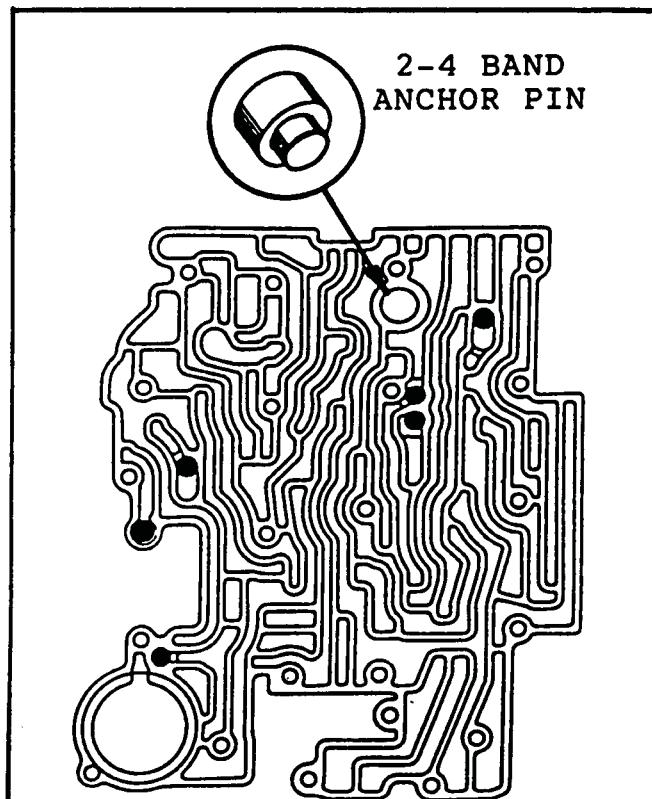
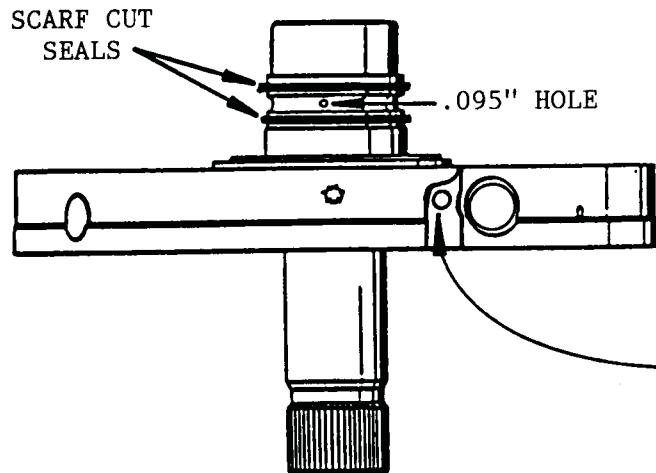


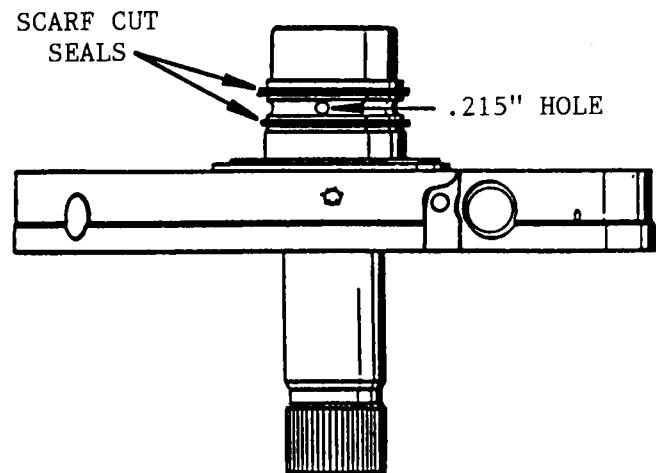
Figure 164

PUMP COVER IDENTIFICATION



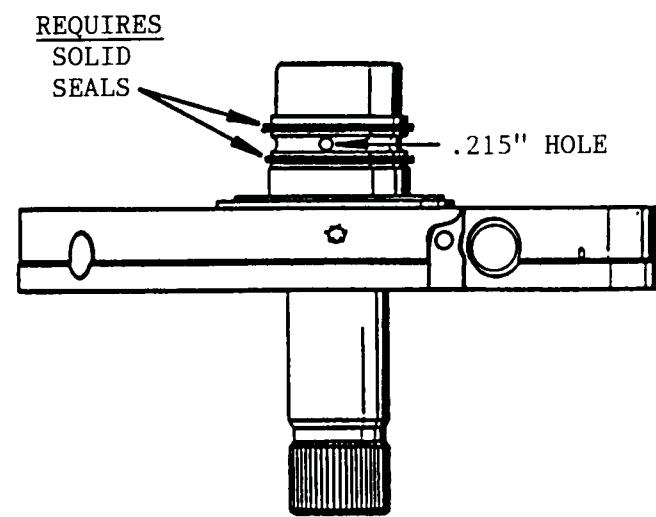
EARLY 1987 ONLY!

1. HOLE BETWEEN SEALING RINGS IS .095" DIAMETER.
2. REQUIRES REVERSE INPUT HOUSING WITH BALL CAPSULE AND STEEL PISTON. REFER TO FIGURE 149.
3. CAN USE SCARF CUT SEALING RINGS BUT SOLID SEALS ARE RECOMMENDED.
4. MODELS WITHOUT AUXILIARY VALVE BODY MUST HAVE CUP PLUG IN THIS HOLE.



LATE 1987-1992 ONLY!

1. HOLE BETWEEN SEALING RINGS IS .215" DIAMETER.
2. REQUIRES REVERSE INPUT HOUSING WITH ALUMINUM PISTON AND .095" DIAMETER HOLE BETWEEN SEAL RINGS. REFER TO FIGURE 149.
3. CAN USE SCARF CUT SEALING RINGS BUT SOLID SEALS ARE RECOMMENDED.



1993 MODEL ONLY!

1. HOLE BETWEEN SEALING RINGS IS .215" DIAMETER.
2. REQUIRES REVERSE INPUT HOUSING WITH ALUMINUM PISTON AND LARGE SQUARE HOLE BETWEEN SEALING RINGS. REFER TO FIGURE 149.
3. REQUIRES SOLID SEALING RINGS.
4. REQUIRES 1993 CHECKBALL LOCATIONS, AND USES THREE. REFER TO CHECKBALL LOCATIONS SECTION OF THIS MANUAL.

Figure 165

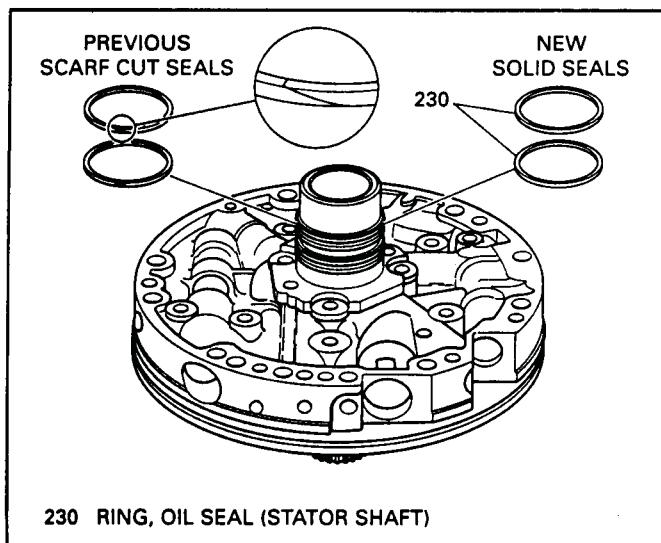


Figure 166

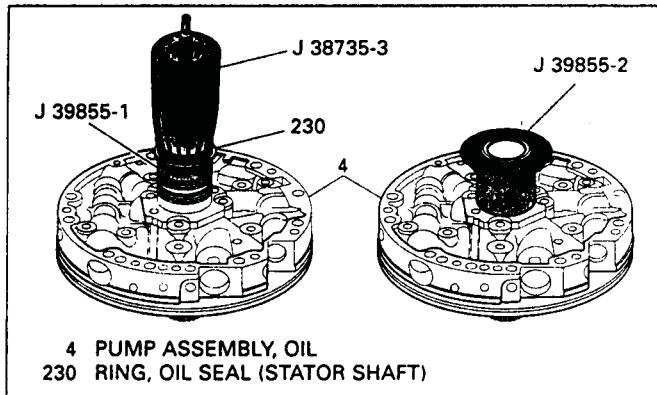


Figure 167

PUMP COVER IDENTIFICATION

1. There are two different oil pump covers THAT WILL NOT INTERCHANGE!
2. Use Figure 165 to identify which one of the oil pump covers that you have, to ensure proper build content.
3. Some models use scarf cut seal rings on the stator shaft, as shown in Figure 165, but the solid seal rings will fit ALL previous models and are recommended.
4. The solid seal rings are REQUIRED on 1993 models, as shown in Figure 165.

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

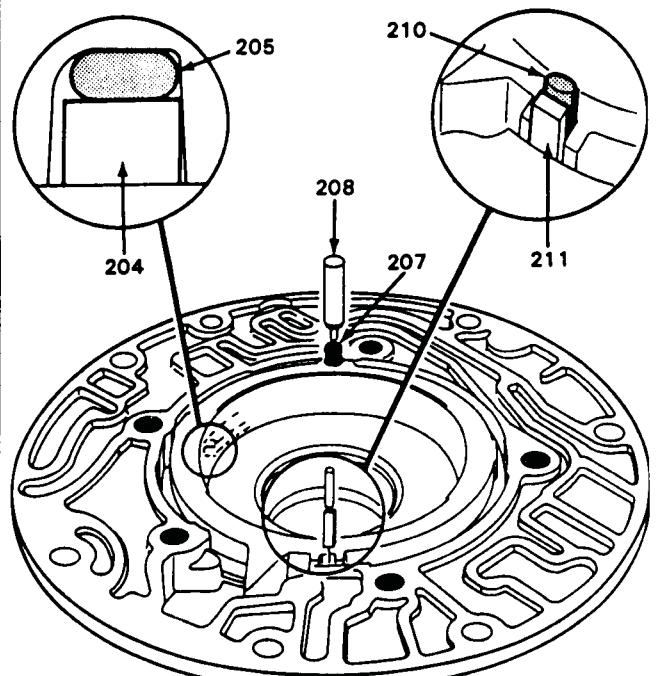
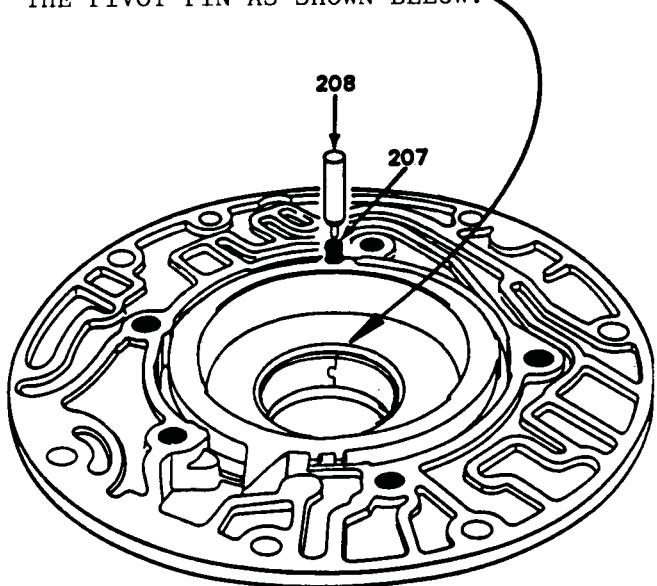
OIL PUMP SLIDE SELECTION CHART	
THICKNESS (mm)	THICKNESS (in.)
17.948 - 17.961	0.7066 - 0.7071
17.961 - 17.974	0.7071 - 0.7076
17.974 - 17.987	0.7076 - 0.7081
17.987 - 18.000	0.7081 - 0.7086
18.000 - 18.013	0.7086 - 0.7091

Figure 168

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 the rotor, as shown in Figure 168.
2. Refer to the chart in Figure 168 for 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 replacement rotor/slide to remove any nicks.

WHEN REPLACING THE FRONT 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

ASSEMBLE PUMP BODY AND PUMP COVER

1. Install a new pump body bushing into the pump body, if necessary. Bushing be driven out from the seal side of body and reinstalled from the pump pocket side of the pump body.
- WHEN REPLACING THE FRONT PUMP BUSHING ORIENT THE SEAM OF THE NEW BUSHING SO IT IS POINTED AT THE BOLT HOLE NEXT TO THE PIVOT PIN AS SHOWN IN FIGURE 169.
2. Install new front pump seal, and seal retainer (See Figure 170).
3. Install "O" ring back-up and oil seal ring into the groove on the back side of the pump slide (See Figure 169).
4. Install slide seal support and the Teflon slide seal onto pump slide and retain with Trans-Jel (See Figure 169).
5. Install pump slide assembly into pump pocket being carefull not to disturb slide seals.
6. Proper selection of rotor and slide sizes are very important. Refer to the chart in Figure 168 for proper rotor and slide selection.
7. Pull the pump slide straight towards the slide seal with one hand, and with the other hand install the pivot pin and spring (See Figure 169).
8. Ensure that pump slide moves back and forth freely in the pump pocket.
9. Install both of the pump slide springs (See Figure 170).
10. Install rotor guide onto pump rotor and retain with Trans-Jel.
11. Install one vane ring into pump pocket.
12. Install pump rotor and guide assembly into pump pocket with guide towards the pump pocket (See Figure 170).
13. Install ten vanes into the pump rotor. **NEVER USE A SEVEN VANE ROTOR IN THE 1987-1993 MODEL YEAR PUMPS.**
14. Install remaining vane ring into the pump rotor (See Figure 170).
15. Align and install oil pump cover onto the oil pump body.
16. Install five pump cover to pump body bolts, but **DO NOT** tighten them yet.
17. Install alignment tool J-21368 onto the oil pump assembly, as shown in Figure 171.

(Continued on Page 94)

Figure 169

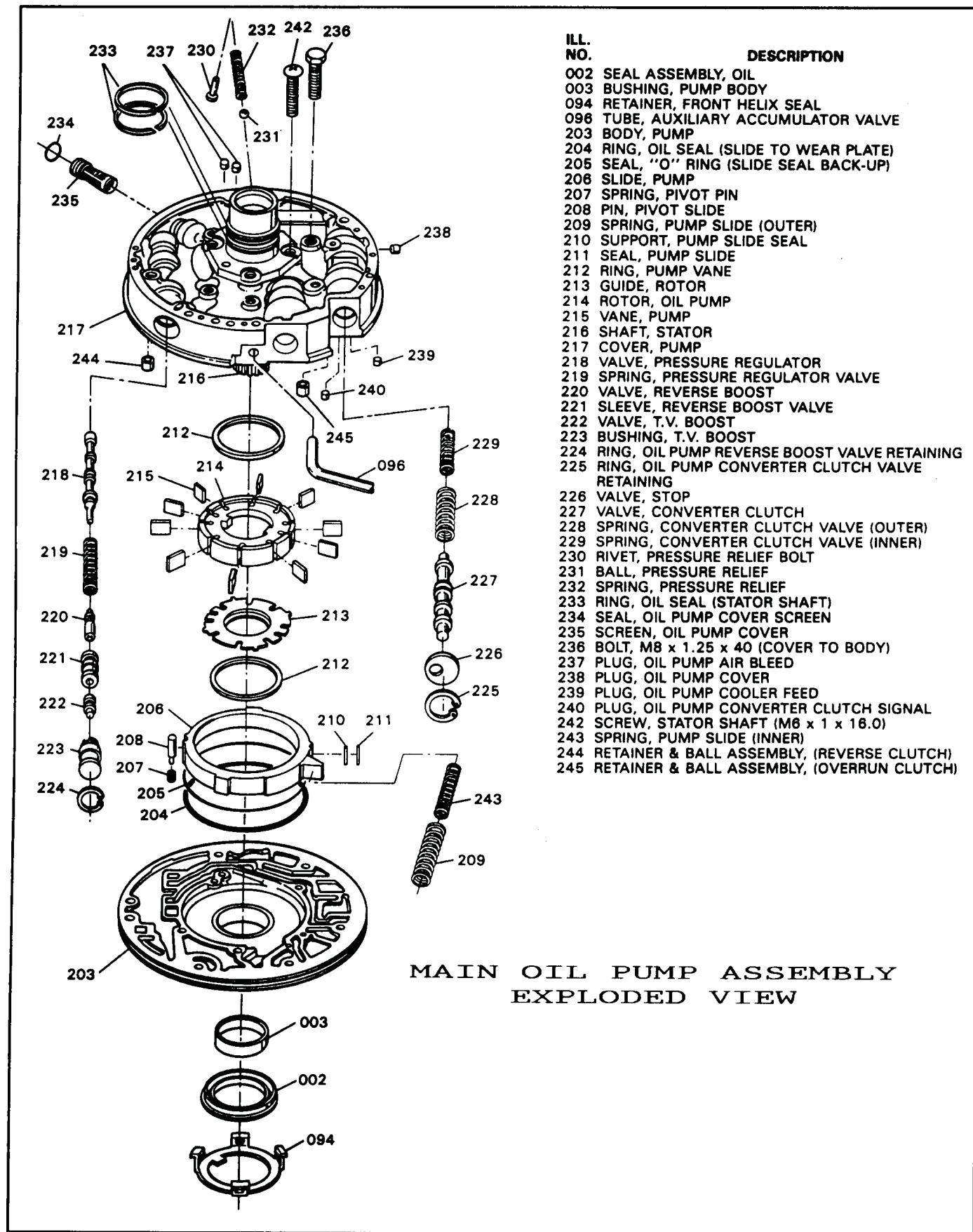


Figure 170

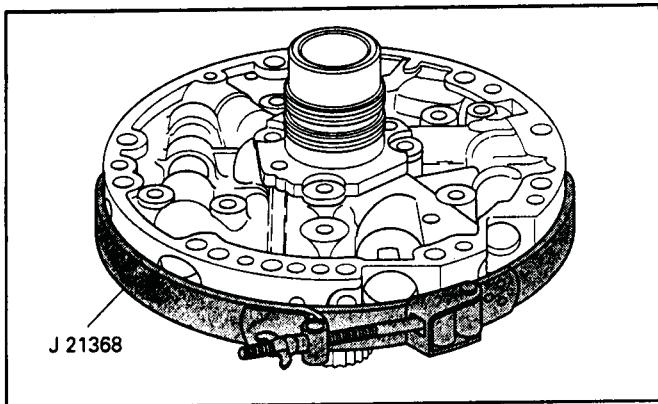


Figure 171

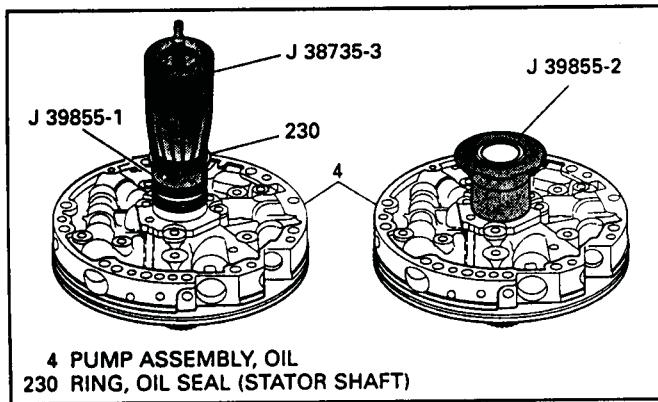


Figure 172

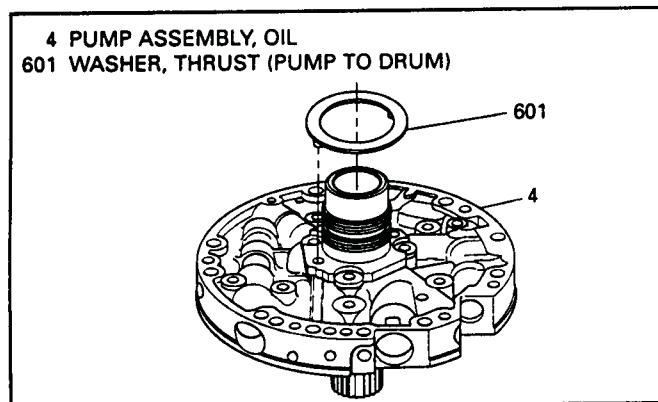


Figure 173

Continued from Page 92.

18. Torque the five pump cover to pump body bolts to 18 ft. lbs. while the alignment strap is tight.
19. Remove the alignment strap from pump.
20. Install inner and outer converter clutch apply valve springs into the pump cover (See Figures 170 and 175).
21. Install the converter clutch apply valve into the same bore, with the valve installed exactly as shown in Figure 175.
22. Install converter clutch valve stop, push down with screwdriver, and install snap ring with the flat side facing out (See Figure 170).
23. Grind two "Flats" on the second land of the pressure regulator valve, as shown in Figure 174, or purchase the updated pressure regulator valve that is available under part NO. 8684048.
24. Install modified pressure regulator valve into pressure regulator valve bore in the pump cover (Figure 170).
25. Ensure that the valve moves freely in the bore.
26. Install pressure regulator valve spring into the same bore. Refer to Figure 170.
27. Install the reverse boost valve into the reverse boost valve bushing, as shown in Figure 175.
28. Install the reverse boost assembly in the P.R.V. bore on top of spring, as shown in Figure 175.
29. Install the T.V. boost valve into the T.V. boost valve bushing "Exactly" as shown in Figure 175.
30. Install T.V. boost assembly into the P.R.V. bore on top of reverse boost assembly as shown in Figure 175.
31. Push the entire assembly down with a small screwdriver, and install snap ring with the flat side facing out.
32. Install the thrust washer on back of the pump cover, ensuring that washer tabs are engaged in slots, and retain with Trans-Jel (See Figure 173).
33. Install the two sealing rings on the pump cover (See Figure 170).
34. Some models use scarf cut seal rings on the stator shaft, as shown in Figure 166, but the solid seal rings will fit ALL previous models and are recommended.
35. The solid seal rings are REQUIRED on 1993 models, as shown in Figure 165.

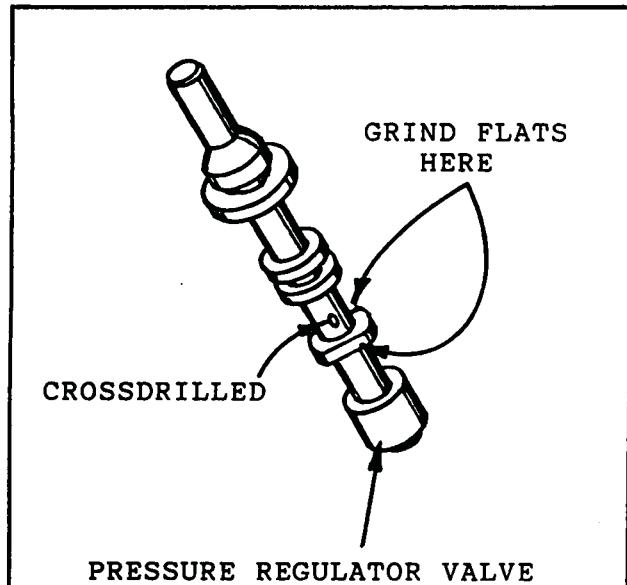


Figure 174

36. If installing the solid sealing rings use J-39855-1 and J-38735-3 to install the seal rings on the stator as shown in Figure 172.
37. Adjust the screw on the tool to obtain the proper height.
38. Use J-39855-2 to resize the solid seals after installation, as shown in Figure 172.
39. Install the oil pump to case "O" ring into the groove in the oil pump body.
40. The chamfered edge of the "O" ring should be facing out, and make sure that it is not twisted in the groove.
41. Lubricate the "O" ring with Trans-Jel.
42. Oil pump assembly is now ready for assembly into the transmission.
43. It is recommended to leave the resizing tool in place over the solid sealing rings until you are ready to install the oil pump into case.

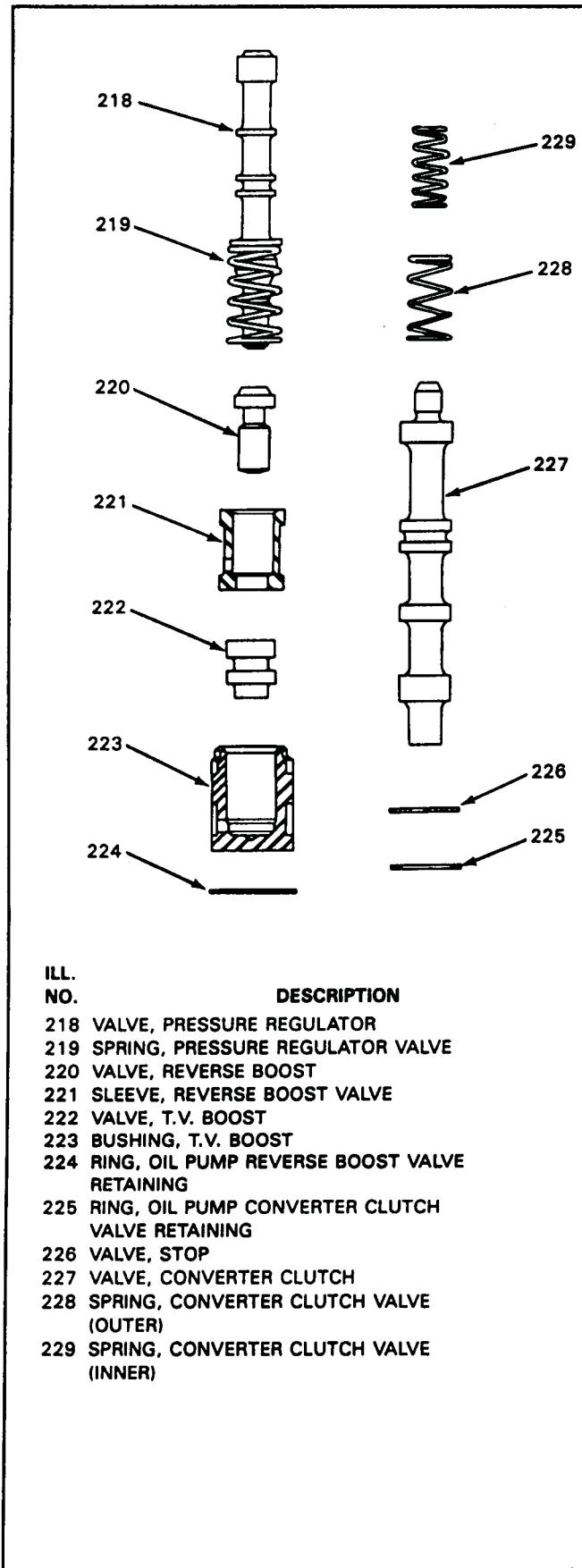


Figure 175

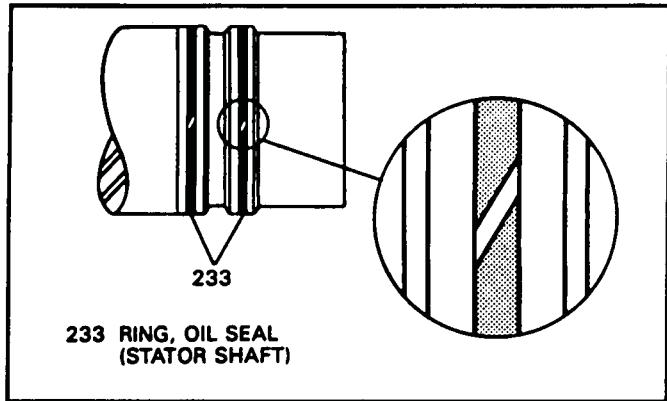


Figure 176

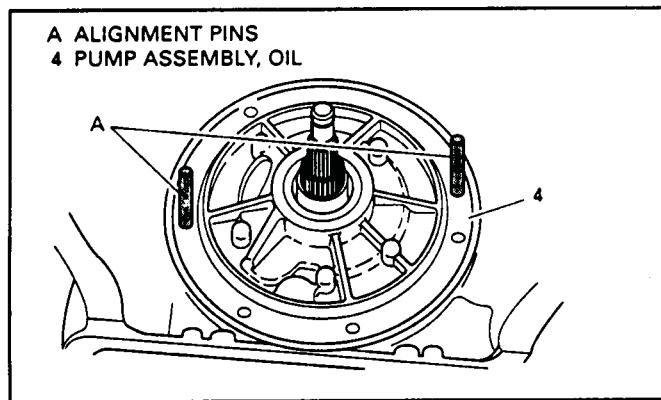


Figure 177

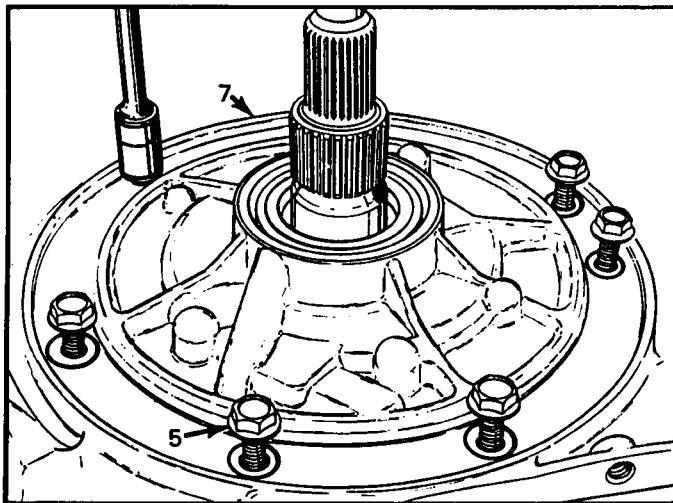


Figure 178

INSTALL OIL PUMP ASSEMBLY

1. Remove the resizing tool from sealing rings, if you are using solid seals.
2. If you are using scarf cut seal rings ensure that they are installed proper as shown in Figure 176.
3. Lubricate the sealing rings with a small amount of Trans-Jel.
4. Install oil pump to case gasket into case and retain with Trans-Jel.
5. Lubricate the case pump bore where the "O" ring rides, for easy installation.
6. Install new "O" rings onto the pump retaining bolts.
7. Install the complete oil pump assembly into the transmission case using the alignment dowels as shown in Figure 177.
8. Install oil pump retaining bolts and remove the alignment dowels, install the remaining bolts (See Figure 178).
9. Torque all oil pump retaining bolts to 18 ft.lbs.
10. Install the proper "O" ring on turbine shaft AFTER end clearance is checked and properly set.

CAUTION:

There should be clearance between the reverse input housing and the sun gear shell. When installed these two parts have a normal clearance of Approx. .150". DO NOT try to shim the internal parts because of this clearance.

**TRANSMISSION END PLAY
WASHER SELECTION CHART**

WASHER THICKNESS	I.D.
1.87 - 1.97 mm	(.074" - .078") 67
2.04 - 2.14 mm	(.080" - .084") 68
2.21 - 2.31 mm	(.087" - .091") 69
2.38 - 2.48 mm	(.094" - .098") 70
2.55 - 2.65 mm	(.100" - .104") 71
2.72 - 2.82 mm	(.107" - .111") 72
2.89 - 2.99 mm	(.113" - .118") 73
3.06 - 3.16 mm	(.120" - .124") 74

Figure 179

CHECKING TRANSMISSION END PLAY

1. Remove a front pump bolt and install an 11" bolt and lock nut, as shown in Figure 181.
2. Install J-25022 adapter, or J-34725 adapter on turbine shaft, as shown in Figure 180.
3. Install lifting tool J-24773-A and a dial indicator as shown in Figure 181.
4. Set the dial indicator to zero.
5. Pull up on lifting tool J-24773-A and observe the reading.
6. Proper end play is .015"-.036"

CAUTION:

NEVER SET END PLAY ANY CLOSER THAN .015", BECAUSE ALUMINUM PUMP WILL EXPAND OR "GROW" AND YOU COULD END UP WITH A NEGATIVE END CLEARANCE.

NOTE:

The selective washer which controls the end play is located between the input housing and thrust bearing that rides on oil pump cover hub. Refer to Figure 160.

If more or less end play is required, select the proper washer from chart in Figure 179.

If dial indicator shows no end play, the selective washer and thrust bearing may have been mis-assembled.

Refer to Figure 160 for proper assembly.

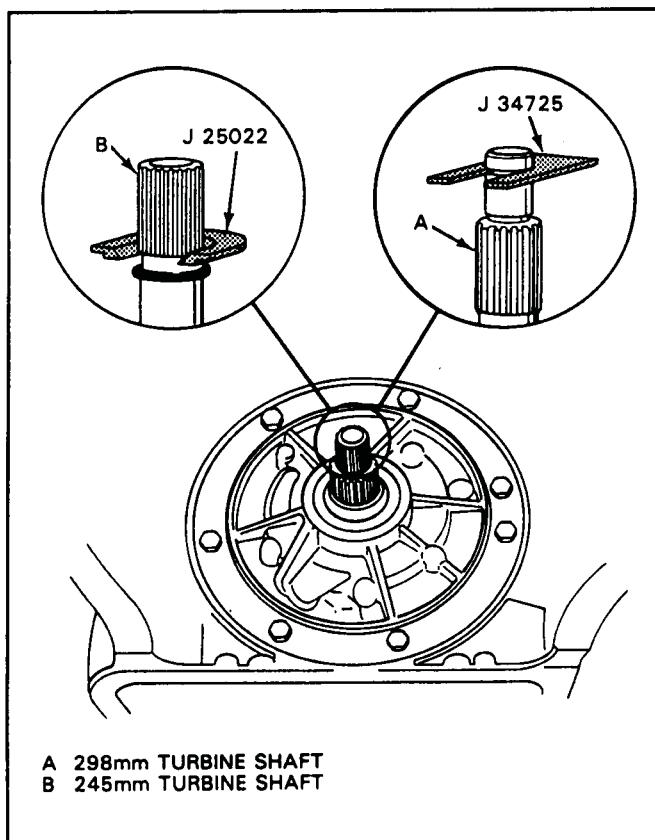


Figure 180

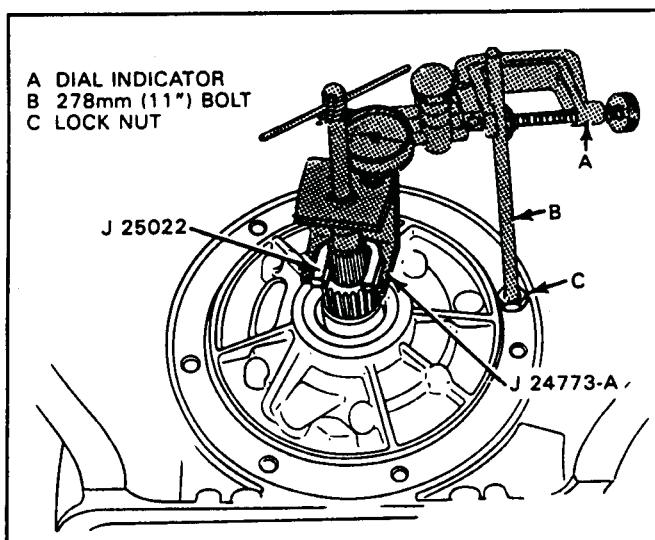
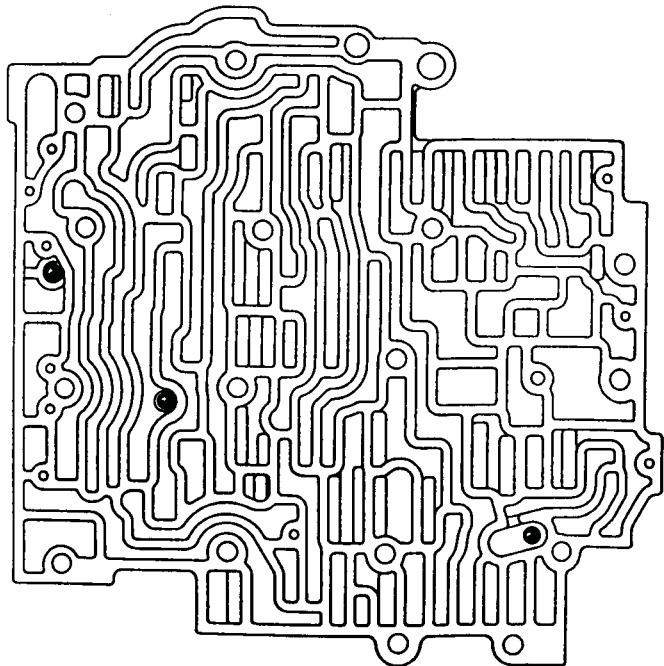


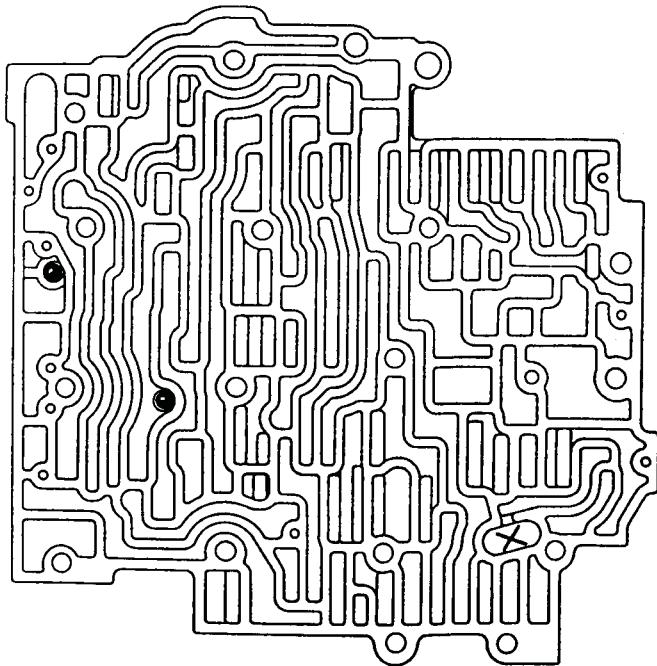
Figure 181



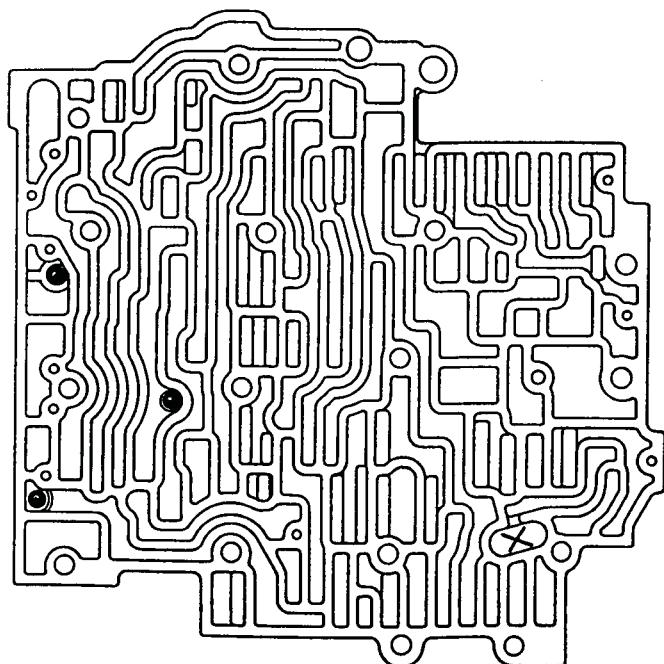
Technical Service Information



1982 THRU EARLY 1987 ONLY!
VALVE BODY CHECKBALL LOCATIONS
(WITHOUT AUXILIARY VALVE BODY)



LATE 1987 THRU 1992 ONLY!
VALVE BODY CHECKBALL LOCATIONS
(WITH AUXILIARY VALVE BODY)

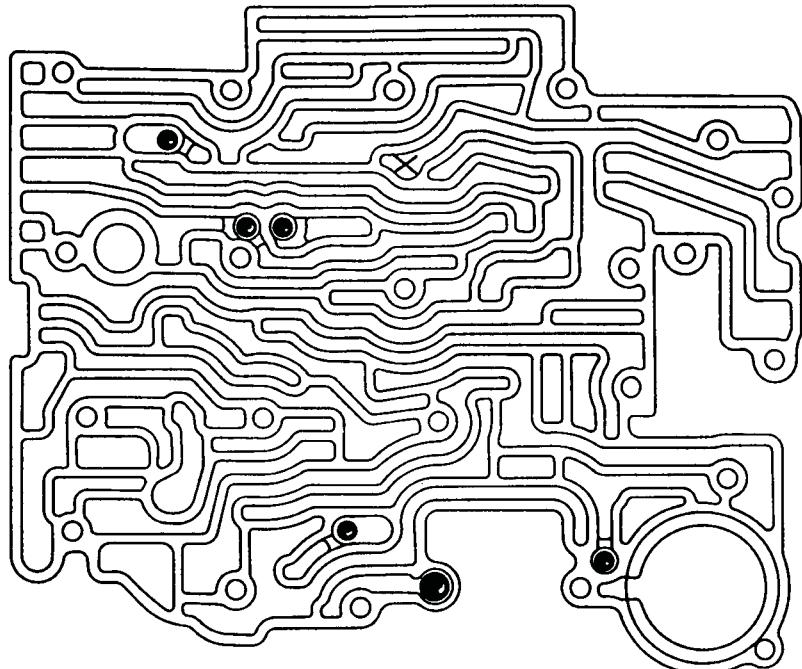


1993 MODELS ONLY!
VALVE BODY CHECKBALL LOCATIONS
(WITH AUXILIARY VALVE BODY)

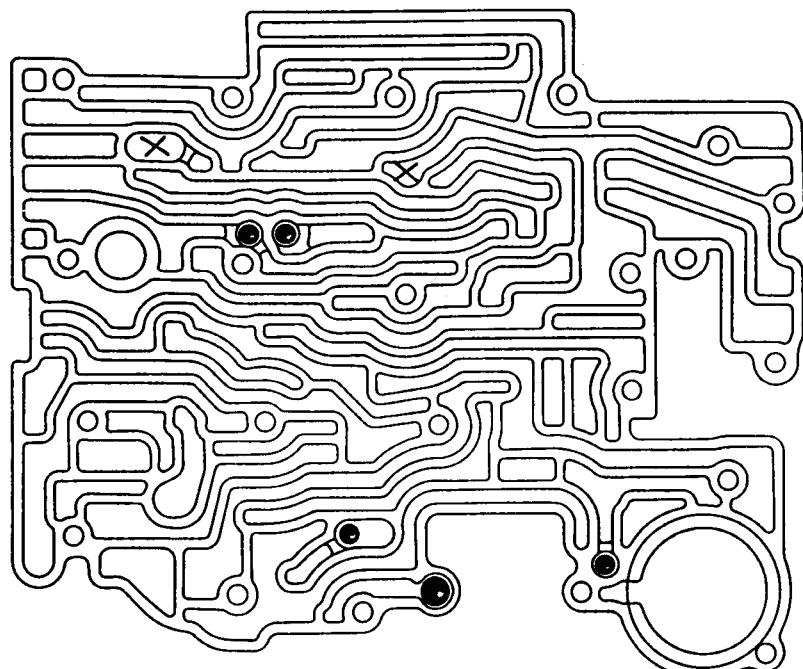
Figure 182



Technical Service Information



1982 THRU 1987 ONLY!
CASE CHECKBALL LOCATIONS

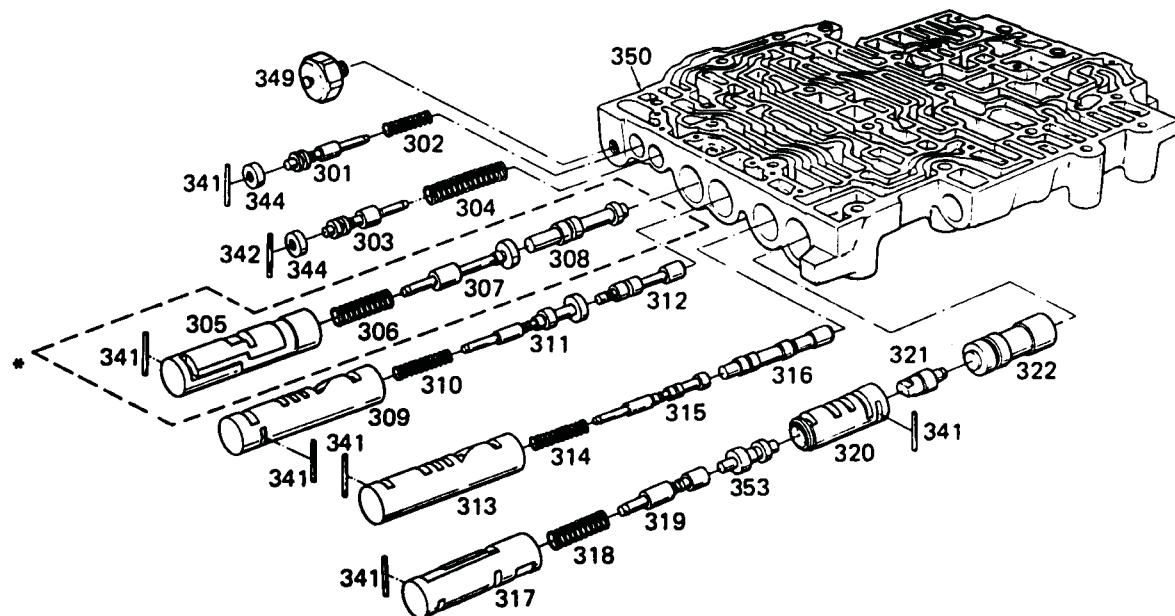
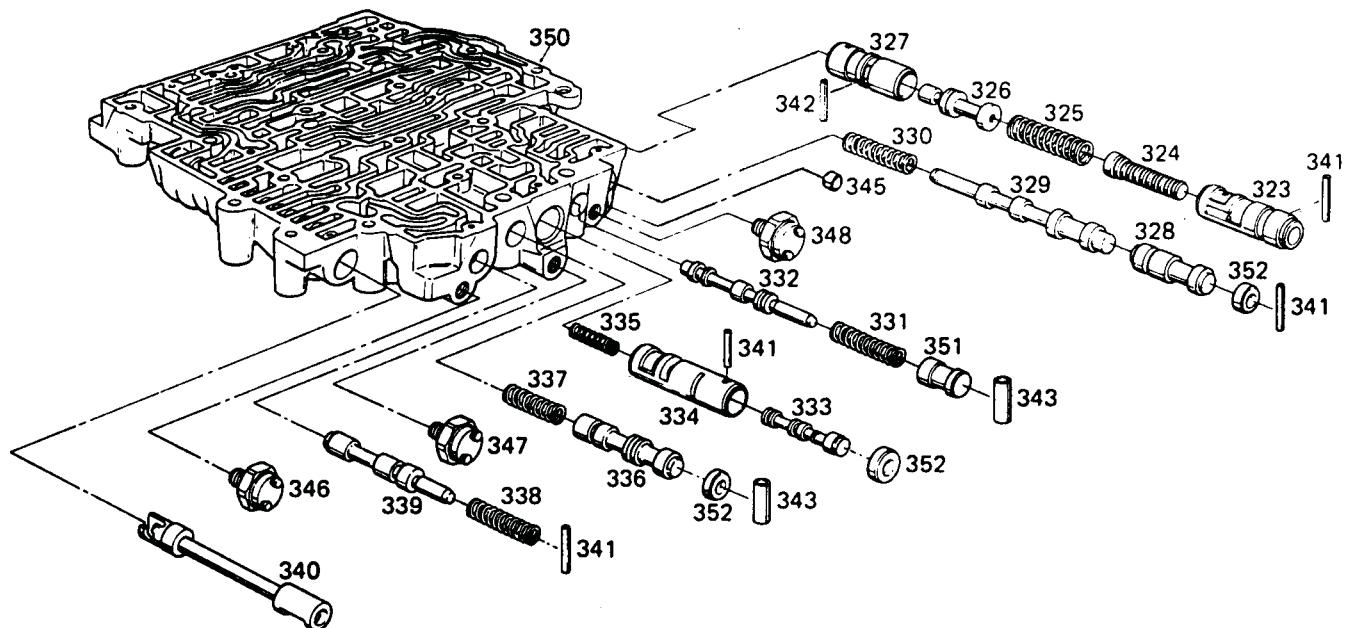


1988 THRU 1993 ONLY!
CASE CHECKBALL LOCATIONS

Figure 183

1982-1987 VALVE BODY ASSEMBLY

LEGEND FOR THIS ILLUSTRATION IS ON PAGE 102.



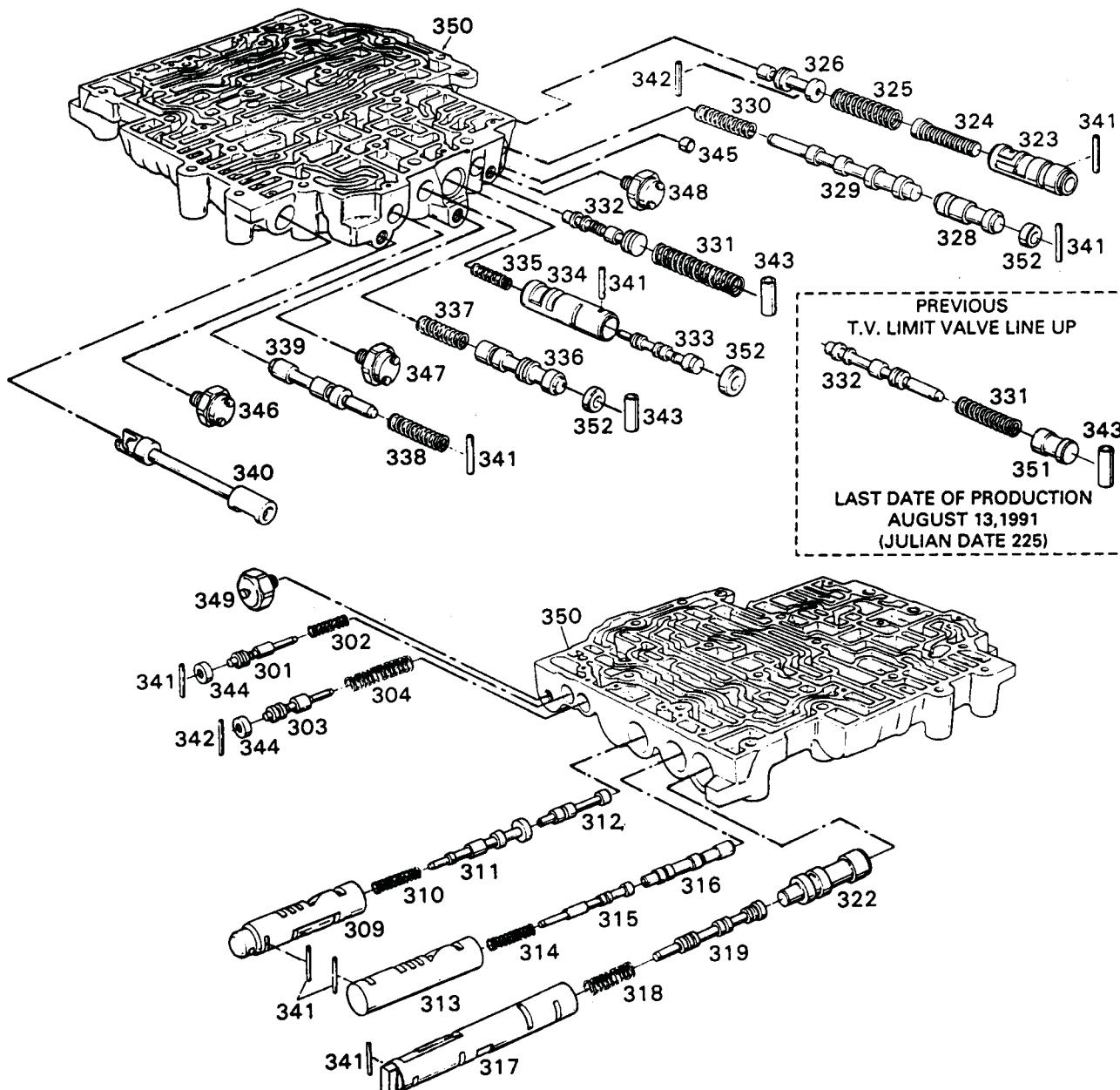
* USED ON NON-ECM CONTROLLED VEHICLES ONLY

Figure 184



Technical Service Information

1988-1993 VALVE BODY ASSEMBLY



- 301 VALVE, T.V. MODULATOR DOWNSHIFT
302 SPRING, T.V. MODULATOR DOWNSHIFT VALVE
303 VALVE, T.V. MODULATOR UPSHIFT
304 SPRING, T.V. MODULATOR UPSHIFT VALVE
309 SLEEVE, 3-4 THROTTLE VALVE
310 SPRING, 3-4 THROTTLE VALVE
311 VALVE, 3-4 THROTTLE
312 VALVE, 3-4 SHIFT
313 SLEEVE, 2-3 THROTTLE VALVE
314 SPRING, 2-3 THROTTLE VALVE
315 VALVE, 2-3 THROTTLE
316 VALVE, 2-3 SHIFT
317 SLEEVE, 1-2 THROTTLE VALVE
318 SPRING, 1-2 THROTTLE VALVE
319 VALVE, 1-2 THROTTLE
322 VALVE, 1-2 SHIFT
323 SLEEVE, THROTTLE VALVE PLUNGER
324 PLUNGER, THROTTLE VALVE
325 SPRING, THROTTLE VALVE
326 VALVE, THROTTLE
328 VALVE, 3-4 RELAY
329 VALVE, 4-3 SEQUENCE

- 330 SPRING, 4-3 SEQUENCE VALVE
331 SPRING, T.V. LIMIT VALVE
332 VALVE, T.V. LIMIT
333 VALVE, 1-2 ACCUMULATOR
334 SLEEVE, 1-2 ACCUMULATOR VALVE
335 SPRING, 1-2 ACCUMULATOR VALVE
336 VALVE, LINE BIAS
337 SPRING, LINE BIAS VALVE
338 SPRING, 3-2 CONTROL
339 VALVE, 3-2 CONTROL
340 VALVE, MANUAL
341 PIN, COILED SPRING
342 PIN, COILED SPRING
343 RETAINER, SPRING (SLEEVE)
344 PLUG, VALVE BORE
345 PLUG, CUP (.33 DIA)
346 SWITCH ASM., PRESSURE (3RD CL.)
347 SWITCH ASM., PRESSURE (4-3 PULSE)
348 SWITCH ASM., PRESSURE (4TH CL.)
349 SWITCH ASM., PRESSURE (T.C.C. SIGNAL)
350 BODY, CONTROL VALVE
351 PLUG, T.V. LIMIT
352 PLUG, VALVE BORE (12.5 - O.D.)

Figure 185



Technical Service Information

ILL. NO.	DESCRIPTION
301	VALVE, T.V. MODULATOR DOWNSHIFT
302	SPRING, T.V. MODULATOR DOWNSHIFT VALVE
303	VALVE, T.V. MODULATOR UPSHIFT
304	SPRING, T.V. MODULATOR UPSHIFT VALVE
305	SLEEVE, CONVERTER CLUTCH THROTTLE
306	SPRING, CONVERTER CLUTCH THROTTLE
307	VALVE, CONVERTER CLUTCH THROTTLE
308	VALVE, CONVERTER CLUTCH SHIFT
309	SLEEVE, 3-4 THROTTLE VALVE
310	SPRING, 3-4 THROTTLE VALVE
311	VALVE, 3-4 THROTTLE
312	VALVE, 3-4 SHIFT
313	SLEEVE, 2-3 THROTTLE VALVE
314	SPRING, 2-3 THROTTLE VALVE
315	VALVE, 2-3 THROTTLE
316	VALVE, 2-3 SHIFT
317	SLEEVE, 1-2 THROTTLE VALVE
318	SPRING, 1-2 THROTTLE VALVE
319	VALVE, 1-2 THROTTLE
320	SLEEVE, LO RANGE CONTROL
321	VALVE, 1-2 LO RANGE DOWNSHIFT
322	VALVE, 1-2 SHIFT
323	SLEEVE, THROTTLE VALVE PLUNGER
324	PLUNGER, THROTTLE VALVE
325	SPRING, THROTTLE VALVE
326	VALVE, THROTTLE
327	SLEEVE, THROTTLE VALVE
328	VALVE, 3-4 RELAY
329	VALVE, 4-3 SEQUENCE
330	SPRING, 4-3 SEQUENCE VALVE
331	SPRING, T.V. LIMIT VALVE
332	VALVE, T.V. LIMIT
333	VALVE, 1-2 ACCUMULATOR
334	SLEEVE, 1-2 ACCUMULATOR VALVE
335	SPRING, 1-2 ACCUMULATOR VALVE
336	VALVE, LINE BIAS
337	SPRING, LINE BIAS VALVE
338	SPRING, 3-2 CONTROL
339	VALVE, 3-2 CONTROL
340	VALVE, MANUAL
341	PIN, COILED SPRING
342	PIN, COILED SPRING
343	RETAINER, SPRING (SLEEVE)
344	PLUG, VALVE BORE
345	PLUG, CUP (.33 DIA.)
346	SWITCH ASSEMBLY, PRESSURE (3RD CLUTCH)
347	SWITCH ASSEMBLY, PRESSURE (4-3 PULSE)
348	SWITCH ASSEMBLY, PRESSURE (4TH CLUTCH)
349	SWITCH ASSEMBLY, PRESSURE (T.C.C. SIGNAL)
350	BODY, CONTROL VALVE
351	PLUG, T.V. LIMIT
352	PLUG, VALVE BORE (12.5 .O.D.)
353	VALVE, 1-2 LO RANGE UPSHIFT

VALVE BODY ASSEMBLY

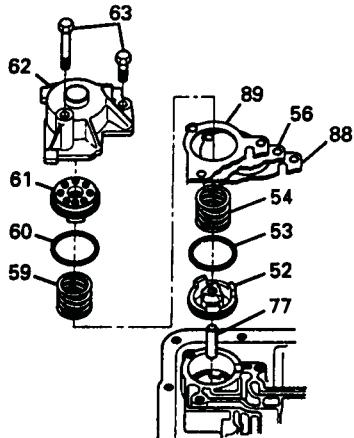
1. Clean valve body assembly thoroughly in clean solvent. Move the valves with a pick or small screwdriver to free any debris or dirt that may have accumulated.
2. Air dry completely with compressed air.
3. Identify your valve body with Figures 184 and 185, as valve trains are different for different model years.
4. Remove all valve trains. Some of the valve trains are under spring pressure so cover the bores while removing the roll pins.
5. All bore plugs, valves, springs, and bushings should be laid out on a clean dry surface, in the exact sequence as shown in Figures 184 and 185.
6. Remove and check all pressure switches if they are so equipped.
7. Clean all bore plugs, valves, springs, bushings, and valve body casting in clean solvent, and air dry.
8. Inspect all parts for damage.
9. Assemble the valve body EXACTLY as shown in Figures 184 or 185, depending on the model that you have.
10. Notice the position of the valve lands, and the bushing passages. Ensure that all roll pins are reinstalled.
11. The roll pins that go into blind hole must be pushed all the way down.
12. REFER TO FIGURES 184 OR 185 FOR THE PROPER ASSEMBLY SEQUENCE, DEPENDING ON THE MODEL YEAR.
13. There are also different checkball locations for the valve body, again depending on the model year that you are working on.
14. REFER TO FIGURE 182 FOR VALVE BODY CHECKBALL LOCATIONS FOR THE VARIOUS MODEL YEARS.
15. Install the checkballs into proper locations, and retain with Trans-Jel.
16. Set the completed valve body aside for final assembly onto the unit.

Figure 186



Technical Service Information

TWO DIFFERENT ACCUMULATOR ASSEMBLIES

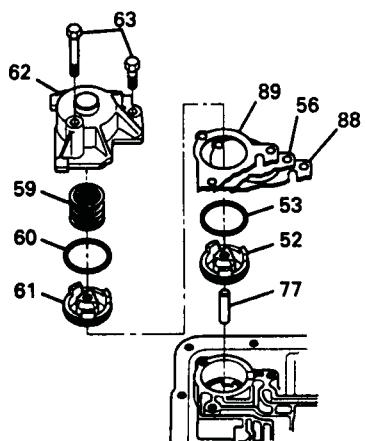


**1987-1992 ALL MODELS
AND 1993 EXCEPT MODELS,**

3AAM, 3ADM, 3AFM, 3ASM,
3BBM, 3BCM, 3BHM, 3BRM,
3BWM

52 PISTON, 3-4 ACCUMULATOR
53 RING, OIL SEAL (3-4 ACCUMULATOR PISTON)
54 SPRING, 3-4 ACCUMULATOR
56 PLATE, VALVE BODY SPACER
59 SPRING, 1-2 ACCUMULATOR
60 RING, OIL SEAL (1-2 ACCUM. PISTON)

61 PISTON, 1-2 ACCUMULATOR
62 COVER AND PIN ASSEMBLY, 1-2 ACCUM.
63 BOLT, ACCUMULATOR COVER
77 PIN, ACCUMULATOR PISTON
88 GASKET, SPACER PLATE TO CASE
89 GASKET, SPACER PLATE TO VALVE BODY



1993 ONLY MODELS,

3AAM, 3ADM, 3AFM, 3ASM,
3BBM, 3BCM, 3BHM, 3BRM,
3BWM

NOTE: 3-4 ACCUMULATOR SPRING ELIMINATED,
AND INVERTED 1-2 ACCUMULATOR PISTON
AND SPRING.

52 PISTON, 3-4 ACCUMULATOR
53 RING, OIL SEAL (3-4 ACCUMULATOR PISTON)
54 SPRING, 3-4 ACCUMULATOR
56 PLATE, VALVE BODY SPACER
59 SPRING, 1-2 ACCUMULATOR
60 RING, OIL SEAL (1-2 ACCUM. PISTON)

61 PISTON, 1-2 ACCUMULATOR
62 COVER AND PIN ASSEMBLY, 1-2 ACCUM.
63 BOLT, ACCUMULATOR COVER
77 PIN, ACCUMULATOR PISTON
88 GASKET, SPACER PLATE TO CASE
89 GASKET, SPACER PLATE TO VALVE BODY

1993 MODELS	BCM, BWM	AAM, ADM, AFM, ASM, BBM, BHM, BRM	SAM	SFM	HBM, HLM	HJM	HDM	YAM, YCM, YDM, FFM, FMM	FAM, FOM	BFM, LHM	BAM, CPM
1-2 ACCUMULATOR SPRING COLOR	DARK GREEN	YELLOW	YELLOW	NO PAINT	DARK GREEN	VIOLET	DARK GREEN	YELLOW	YELLOW	NO PAINT	NO PAINT
3-4 ACCUMULATOR SPRING COLOR	NOT USED	NOT USED	RED	DARK GREEN	YELLOW	YELLOW	VIOLET	NO PAINT	VIOLET	NO PAINT	VIOLET

Figure 187

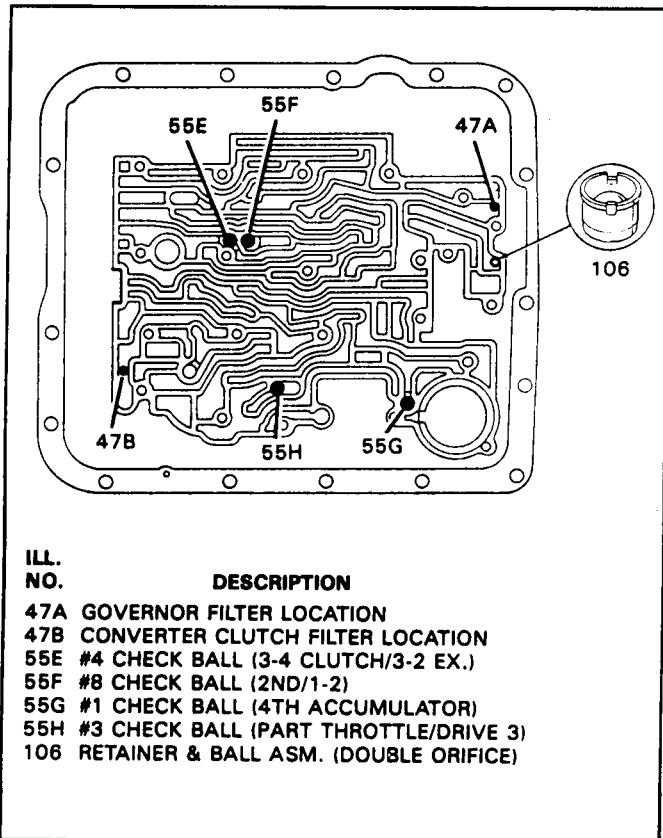


Figure 188

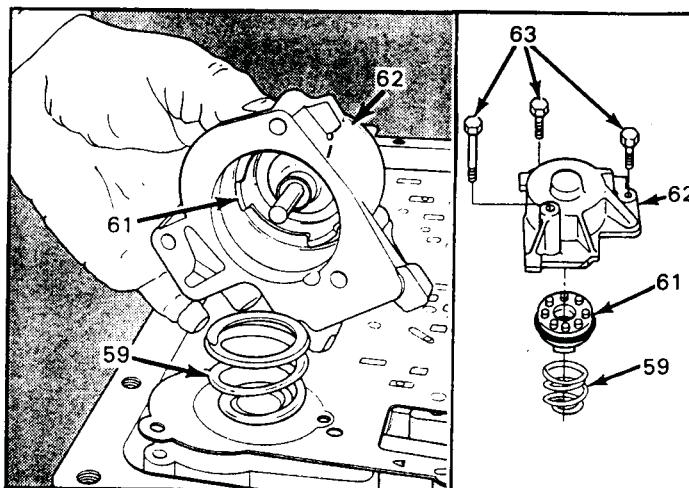


Figure 190

NOTE: THE EARLY 1987 UNITS THAT USE THE REVERSE INPUT HOUSING WITH THE "STEEL" PISTON (SEE FIGURE 149), DOES NOT USE BALL CAPSULE IN THE CASE PASSAGE, THAT IS SHOWN IN FIGURE 188.

3. Install checkballs in their proper locations in the case, depending on the model year.
REFER TO FIGURE 183 FOR THE PROPER CASE CHECKBALL LOCATIONS.
4. Install guide pins into the case for gasket and spacer plate alignment.
5. Install the 3-4 accumulator piston and spring, depending on model, ACCORDING TO FIGURE 187!
6. INSTALL VALVE BODY GASKETS TO THE SPACER PLATE, ONE AT A TIME, TO ENSURE THERE ARE NO HOLES BLOCKED.
7. Install case to spacer plate gasket over dowel pins and onto the case surface. This gasket is stamped with a "C" for identification (See Figure 189).
8. INSTALL THE PROPER SPACER PLATE, DEPENDING ON MODEL, USING THE CHARTS LOCATED IN FIGURES 36 THRU 41.
9. Install spacer plate to valve body gasket over dowel pins and onto the spacer plate. This gasket is stamped with a "V" for identification (See Figure 189).
10. Install the 1-2 accumulator piston and spring into the 1-2 accumulator housing, depending on model, ACCORDING TO FIGURE 187!
11. Install the 1-2 accumulator housing assembly as shown in Figure 190, and torque bolts to 8 ft.lbs.

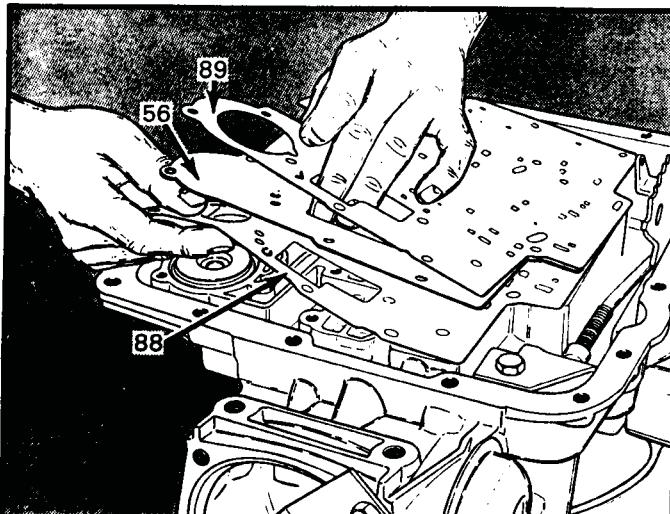


Figure 189

ASSEMBLE BOTTOM PAN COMPONENTS

1. Rotate transmission so that bottom pan area is facing up, as shown in Figure 189, and lock fixture.
2. Ensure that ball capsule in case is free and operational, as shown in Figure 188.

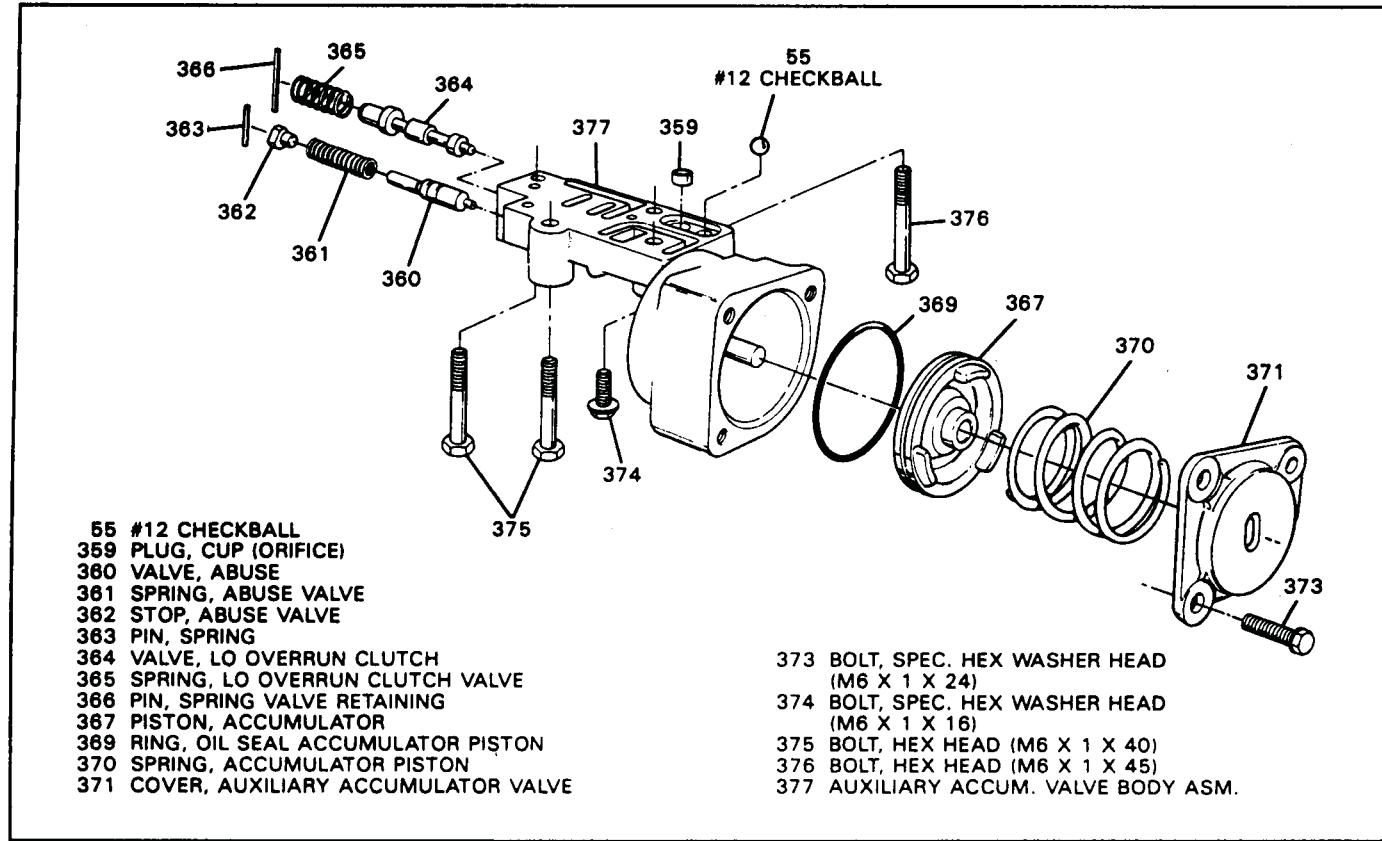


Figure 191

12. Assemble the auxiliary valve body EXACTLY as shown in Figure 191, using a new seal on the forward clutch accumulator piston.
 13. Torque the three accumulator cover bolts to 8 ft.lbs. (Figure 191).
 14. Install the No. 12 checkball into the auxiliary valve body in the position shown in Figure 191, and retain with a small amount of Trans-Jel.
SOME AUXILIARY VALVE BODYS HAVE A RETAINER TO PREVENT THIS BALL FROM FALLING OUT.
 15. Ensure that it is installed NEXT TO the orifice cup plug and NOT on top of cup plug (See Figure 191).
 16. Install the auxiliary valve body onto the transmission, as shown Figure 192, using ONLY the three bolts shown, and torque 3 bolts to 8 ft.lbs.
 17. The fourth bolt will be installed after the forward clutch feed pipe is put in its place with the clamp.

(Continued on Page 106).

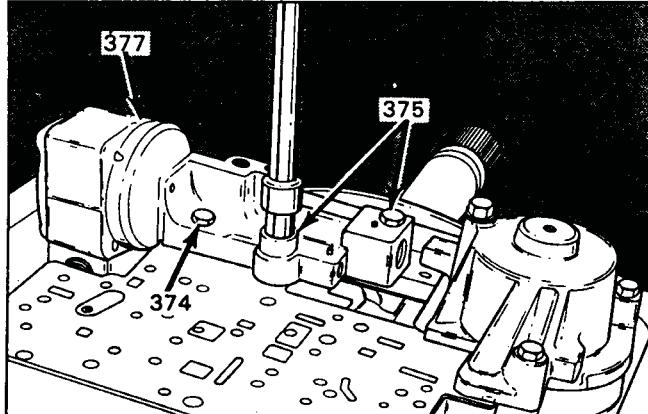


Figure 192

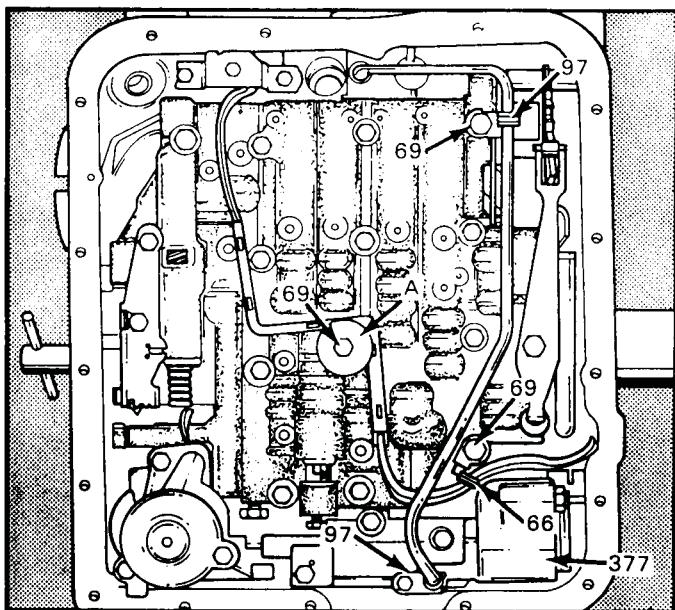


Figure 193

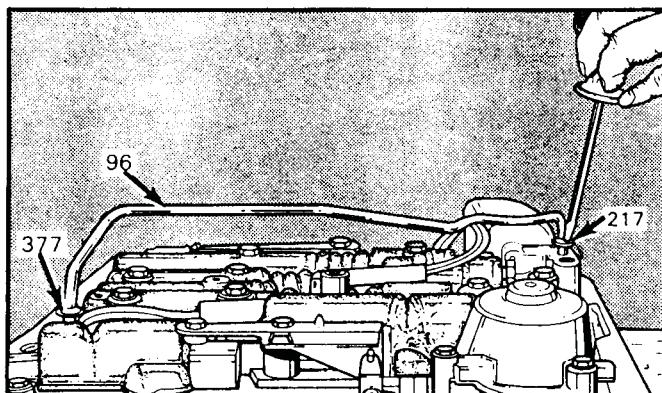


Figure 194

27. Install the remaining valve body bolts and tube clamps, including the one on the auxiliary valve body, and torque all valve body bolts to 8 ft.lbs. (See Figure 197).

CAUTION:

TORQUE VALVE BODY BOLTS IN A SPIRAL PATTERN STARTING FROM THE CENTER, AS SHOWN IN FIGURE 197.

28. Install the detent spring on top of detent lever as shown in Figure 195, and install retaining bolt.
29. Torque the bolt to 18 ft.lbs.

(Continued on Page 108).

CONTINUED FROM PAGE 105

18. Remove the guide pins from the case.
19. Install the pre-assembled valve body, ensuring that the manual valve link is hooked into the manual valve properly, as shown in Figure 195.
20. Carefully set the valve body down on the gasket, using care not to disturb the gasket or valve body checkballs.
21. Start the center bolt with the large flat washer, and hand tighten only (See Figure 193).
22. Install the T.V. link into bracket and install the T.V. lever and the bracket assembly onto the valve body with two bolts as shown Figure 196.
23. Install the forward clutch feed pipe into auxiliary valve body first, and then into the pump bore (Figure 194).
24. Using a screwdriver on the rib of the tube, lightly tap the tube in place, as shown in Figure 194.
DO NOT TAP DIRECTLY ON THE TUBE, IT MAY CAUSE DAMAGE.
25. Install lock-up solenoid and wiring harness assembly, installing two bolts to retain solenoid. Refer to Figure 197.
26. TO CORRECTLY ROUTE AND HOOK UP WIRES, SEE THE WIRING DIAGRAMS IN FIGURES 16 THRU 24, TO ENSURE PROPER BUILD CONTENT. IT WILL BE NECESSARY TO IDENTIFY AND USE THE WIRING DIAGRAM CHART FOR THE MODEL YOU ARE WORKING ON.



Technical Service Information

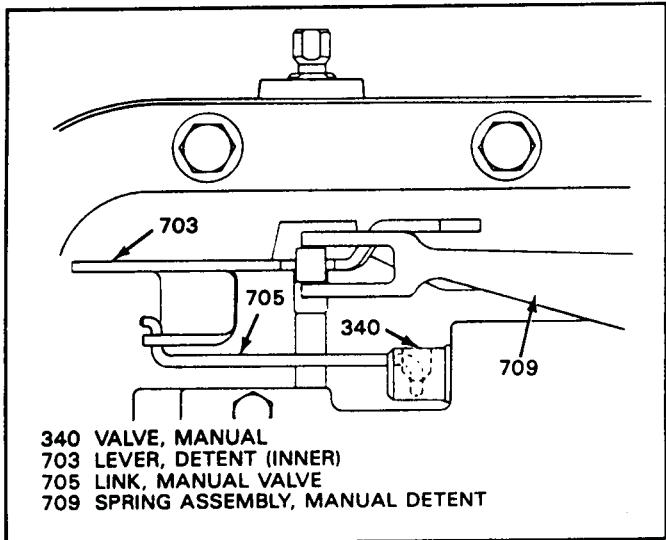


Figure 195

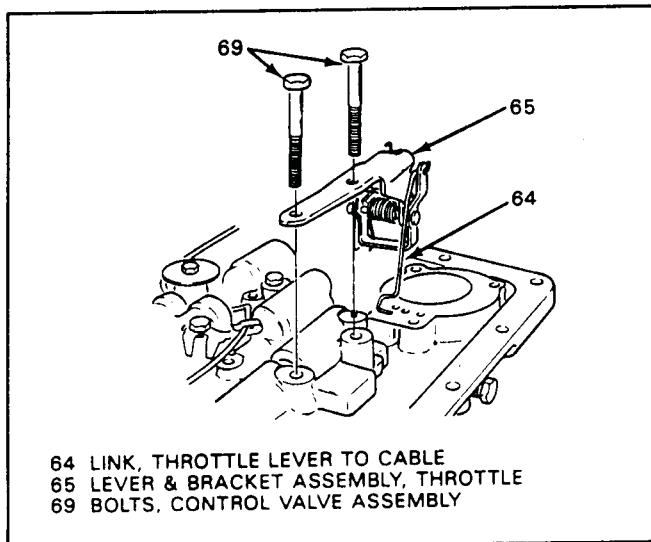


Figure 196

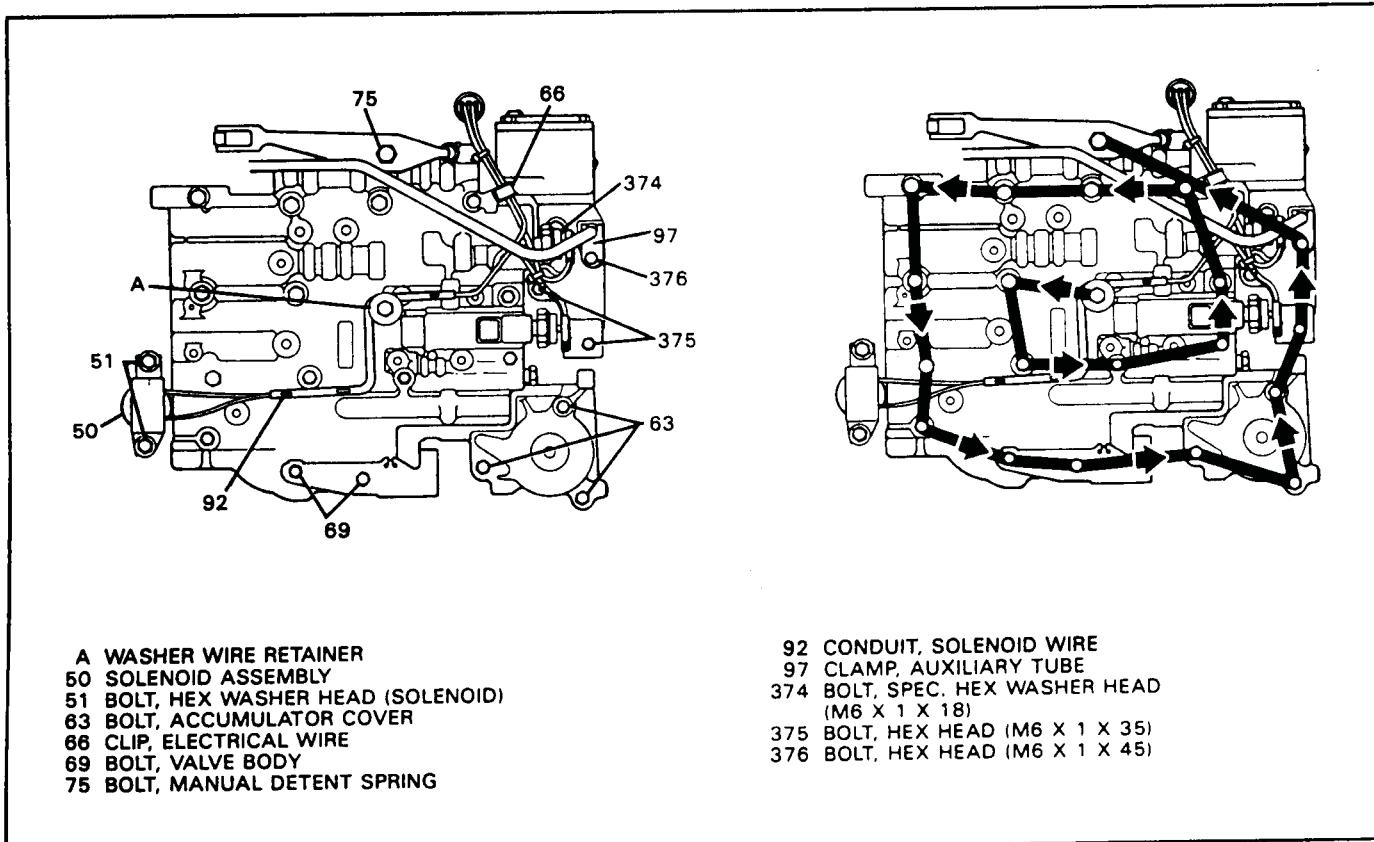
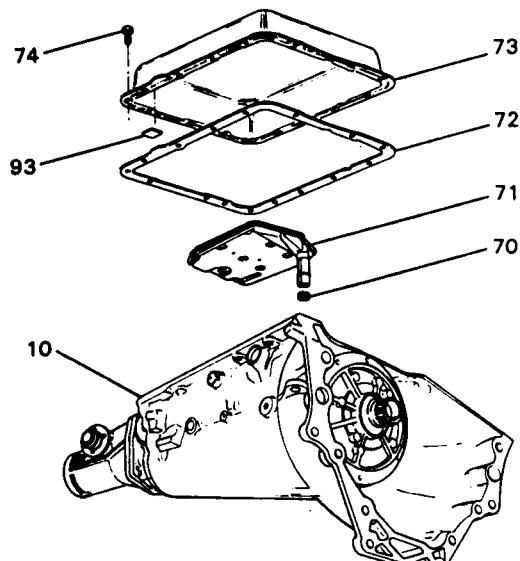


Figure 197



10 CASE, TRANSMISSION
 70 SEAL, FILTER
 71 FILTER ASSEMBLY, TRANSMISSION OIL
 72 GASKET, TRANSMISSION OIL PAN
 73 PAN, TRANSMISSION OIL
 74 SCREW, SPEC. HEX WASHER HEAD (PAN)
 93 MAGNET, CHIP COLLECTOR

Figure 198

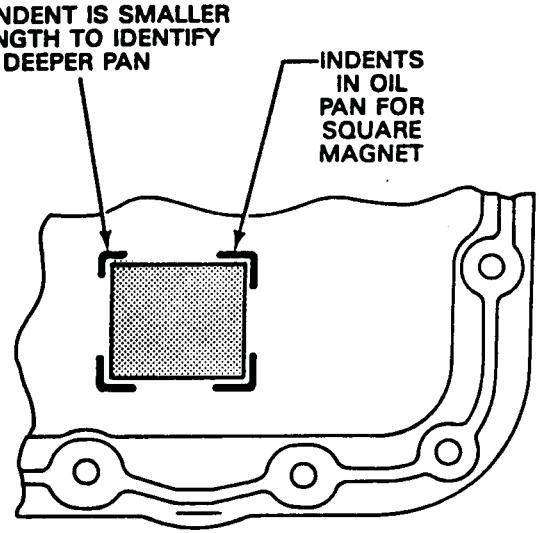


Figure 199

CONTINUED FROM PAGE 106.

30. Install new "O" ring onto case connector and install into the case bore.
31. Ensure that all switches are properly connected, and that you have installed the correct wiring harness.
32. Install the parking bracket and bolts and torque bolts to 18 ft.lbs.
33. Install two (2) "O" rings onto the filter neck, lubricate with Trans-Jel, and install filter into the pump bore.
34. Install new oil pan gasket on case.
35. Install magnet into the oil pan in the location shown in Figure 199.
36. Install bottom oil pan onto the case and torque all pan bolts to 9 ft.lbs. (See Figure 198).

MEASURE 2-4 SERVO PIN LENGTH

1. Install servo tool J-33037, as shown in Figure 201, with the servo pin you are going to install.
2. Install servo cover retaining ring to secure the servo tool in bore.
3. Apply 98 in.lbs. torque, with torque wrench, as shown in Figure 201.
4. If white line "A" appears in the gage slot "B", pin length is correct (See Figure 201).
5. Use the pin selection chart in Figure 201 to determine the correct pin length if a new pin is needed.
6. Figure 200 shows where to measure the pin to determine the length, or use the identification rings.
7. Remove the servo tool J-33037 from the servo bore.



Technical Service Information

MEASURE THIS DISTANCE
FOR SERVO PIN LENGTH

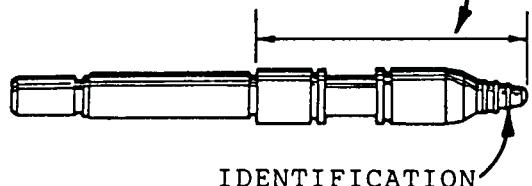
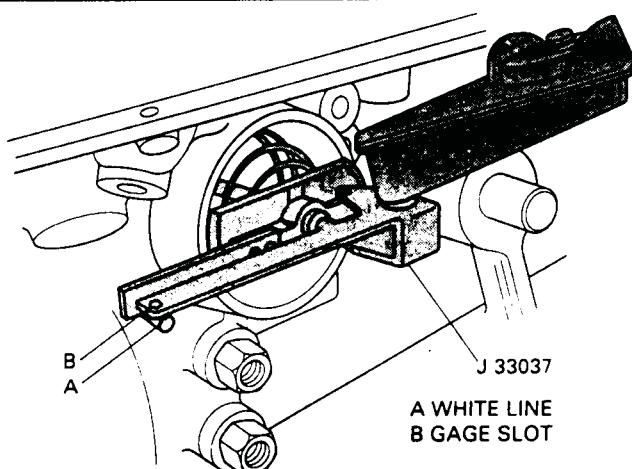


Figure 200



PIN IS PRESET AT FACTORY AND MUST NOT BE
READJUSTED

2-4 SERVO PIN SELECTION

PIN LENGTH		PIN I.D.
MM	INCH	1 GROOVE 2 GROOVES NO GROOVE
65.82-66.12	2.59-2.60	
67.23-67.53	2.65-2.66	
68.64-68.94	2.70-2.71	

Figure 201

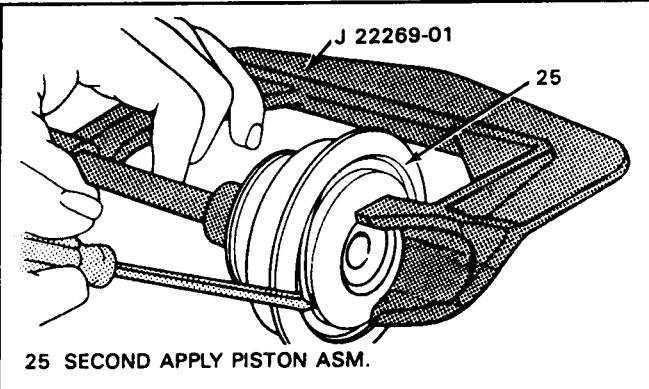


Figure 202

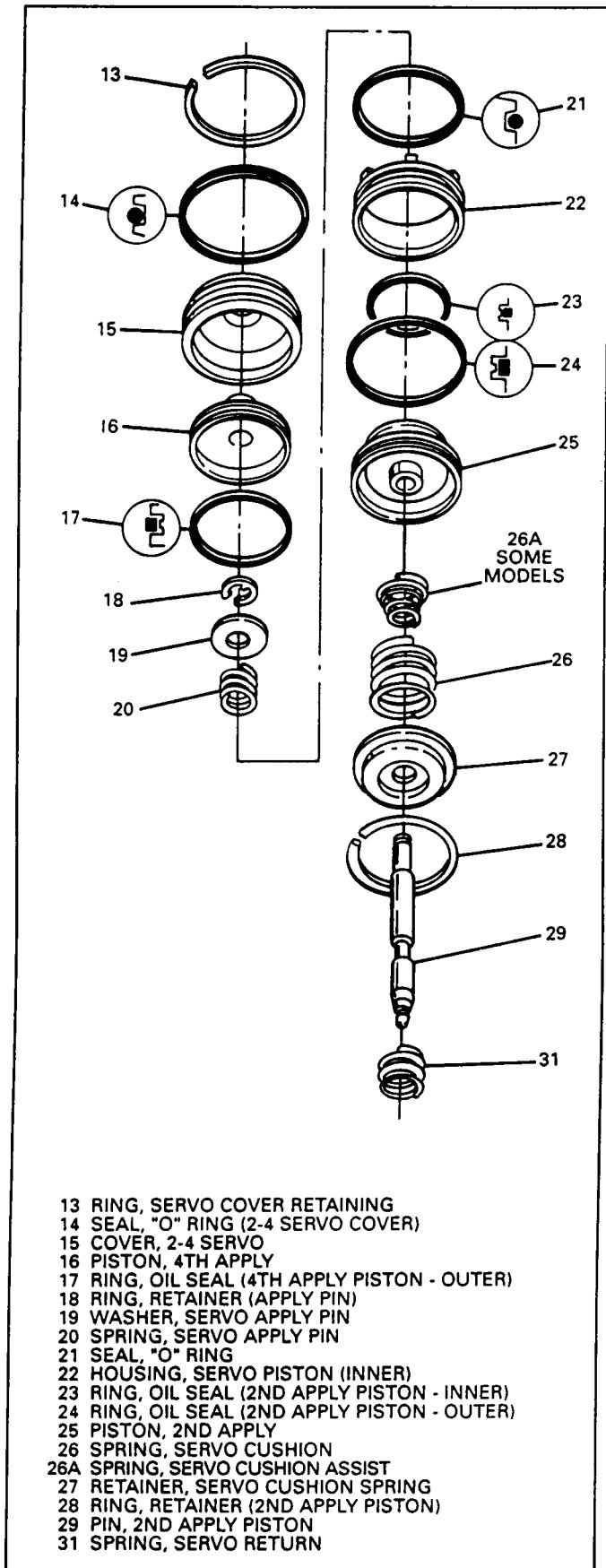


Figure 203

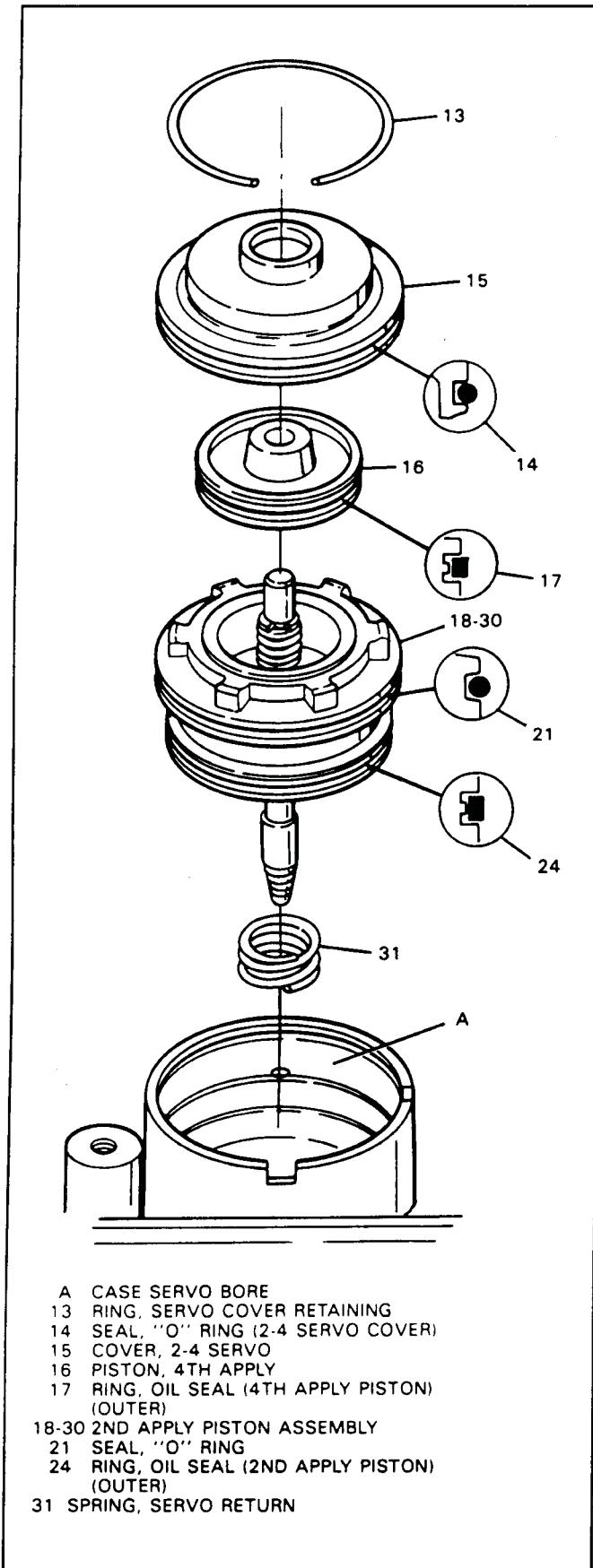


Figure 204

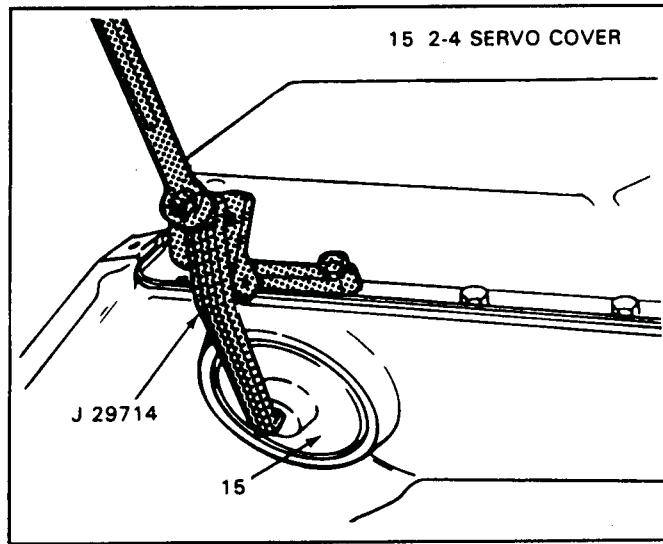


Figure 205

ASSEMBLE 2-4 SERVO

1. Check the dimensions of the 2nd apply piston and housing, as shown Figure 206, to ensure compatible parts and proper build content.
2. Assemble the 2-4 servo assembly as shown in Figure 203.
3. Use tool J-22269-01, as shown Figure 202, to compress the cushion spring if necessary.
4. Install the servo return spring onto the servo assembly and install the 2-4 servo into the case bore, as shown in Figure 204.
5. Compress the servo cover using J-29714 tool, as shown in Figure 205.
6. Install the servo cover snap ring.
7. Remove the servo tool and retorque the pan bolt (See Figure 205).

ASSEMBLE GOVERNOR AND COVER

1. Inspect the governor valve inside the governor shaft, and the weights for free operation.
2. Inspect the governor shaft for nicks and for wear or damage.
3. Inspect the governor gear for damage, replace as necessary.
4. Install the governor assembly into the case bore (See Figure 207).
5. Apply sealant to governor cover flange before installation (See Figure 207).
6. Install governor cover using a C-6 servo cover as an installation tool, so as not to distort governor cover.

2ND APPLY PISTON AND HOUSING APPLICATION

MODEL	PISTON DIMENSION *A	HOUSING DIMENSION **B
YAM, YCM, YDM, LHM	44.64mm (1.78")	45.54mm (1.79")
AAM, ADM, ALM, ACM, BBM, BCM, BHM, BFM, BRM, BWM, CJM, CHM, DDM, FUM, FZM, HJM, KJM, LBM, LCM, LDM, LFM, TAM, TBM, WCM	57.85mm (2.28")	58.74mm (2.31")
CAM, CBM, CCM, CFM, BAM, FBM, FTM, HBM, HLM, HDM, KHM, KMM, MDM, MJM, MMM, MNM, MSM, SAM, SFM, SHM, TLM, TWM, WAM, WBM	63.10mm (2.48")	64.00mm (2.52")

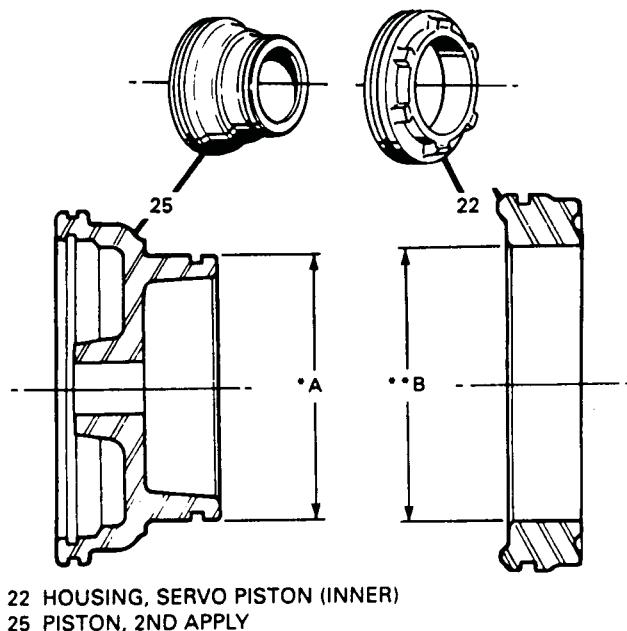


Figure 206

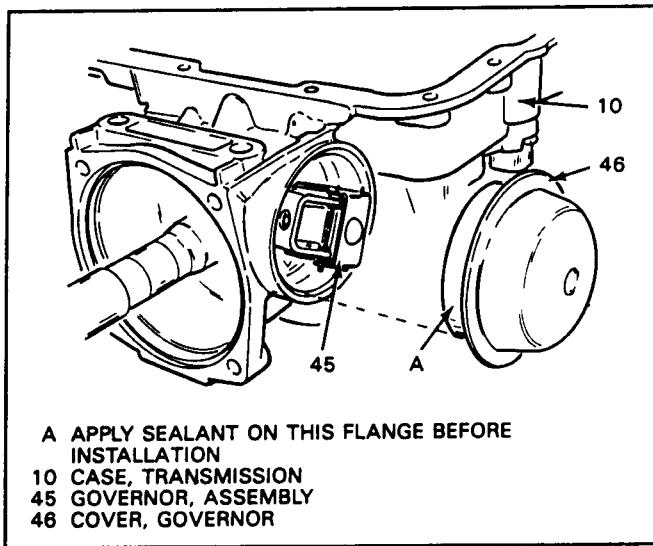


Figure 207

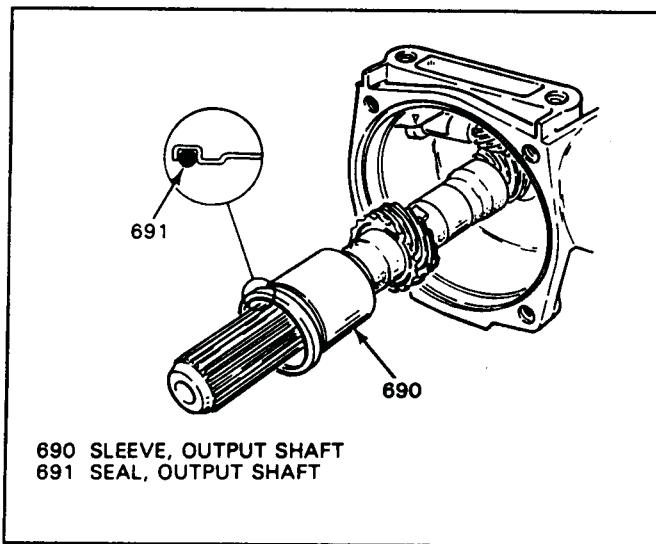
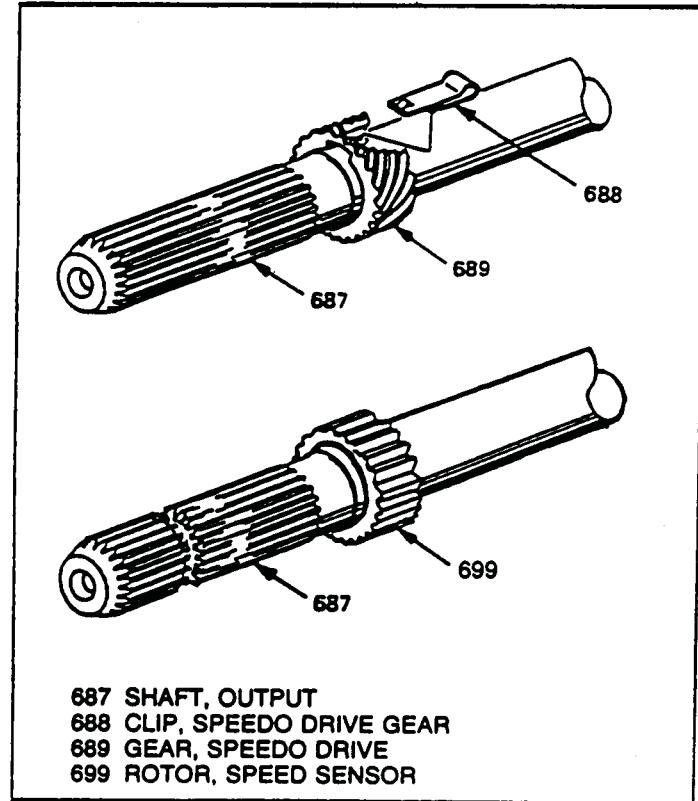


Figure 210

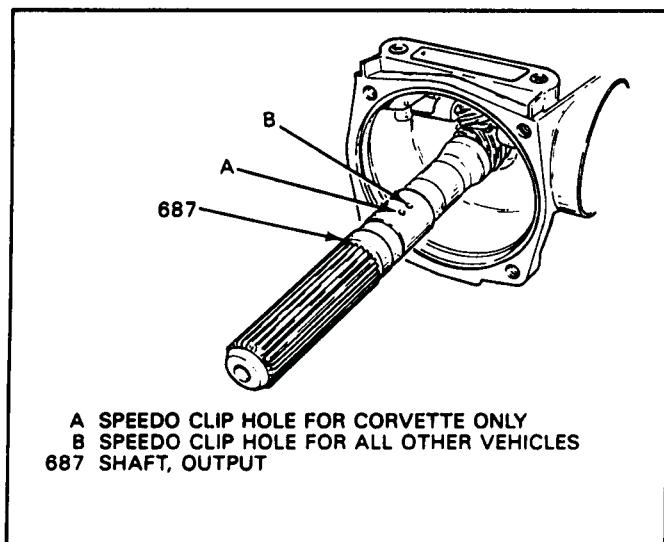


Figure 209

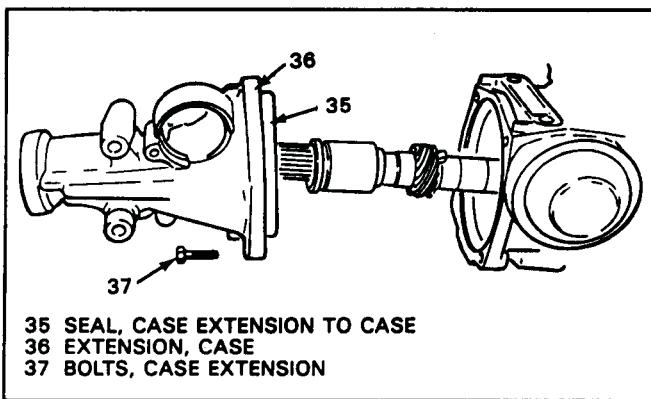


Figure 211

EXTENSION HOUSING AND SPEED SENSOR

1. Install the speedometer drive gear and retaining clip onto the output shaft as shown in Figure 208.
CAUTION:
THE OUTPUT SHAFT HAS TWO HOLES TO LOCATE THE SPEEDO CLIP. USE THE HOLE MARKED "A" FOR CORVETTE, AND HOLE MARKED "B" FOR ALL OTHER MODELS, AS SHOWN IN FIGURE 209.
2. NOT ALL MODELS USE THE SPEEDOMETER DRIVE GEAR. SOME MODELS USE SPEED SENSOR ROTOR, AS SHOWN FIGURE 208.
3. Install the metal speed sensor rotor, by pressing onto the output shaft, as shown in Figure 208, if so equipped.
4. Install new "O" ring into the output shaft sleeve, and install onto the output shaft as shown in Figure 210. NOTE: NOT USED ON ALL MODELS. DO NOT PUSH THE SLEEVE PAST THE MACHINED SURFACE ON THE OUTPUT SHAFT. (SEE FIGURE 211).



Technical Service Information

5. Install new square cut seal onto the extension housing (See Figure 211).
6. Install new extension housing seal in extension housing, using seal driver J-21426, as shown in Figure 212.
7. Install extension housing on the case so the speedometer hole is on the same side of case as governor cover, shown in Figure 211.
8. Install four retaining bolts and torque bolts to 26 ft.lbs.
9. Install the speedometer adapter or the speed sensor, using new "O" ring seal into extension housing bore, as shown in Figure 213.
10. Remove the transmission from holding fixture and place on transmission jack.
11. Lubricate the torque converter hub with small amount of Trans-Jel, and install the torque converter in transmission.

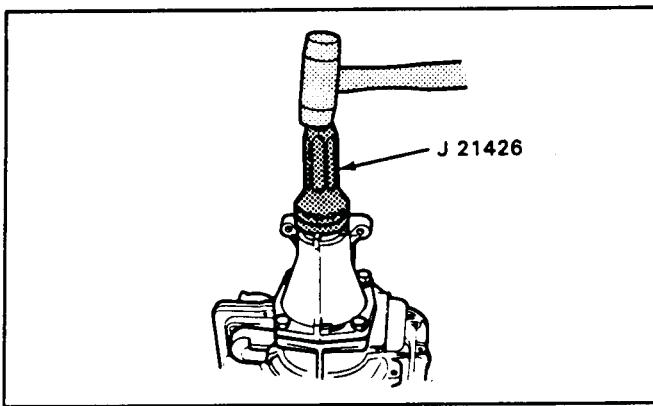
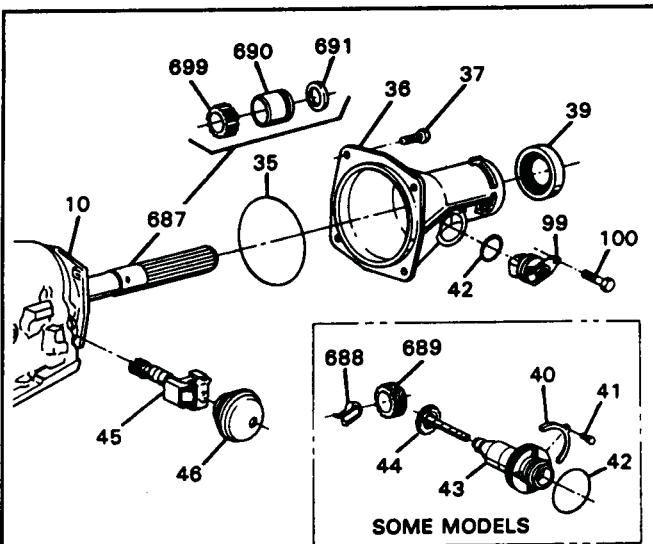


Figure 212



ILL. NO.	DESCRIPTION
10	CASE, TRANSMISSION
35	SEAL, CASE EXTENSION TO CASE
36	EXTENSION, CASE
37	BOLT, CASE EXTENSION TO CASE
39	SEAL ASSEMBLY, CASE EXTENSION OIL
40	RETAINER, SPEEDO DRIVEN GEAR FITTING
41	BOLT & WASHER ASSEMBLY
42	SEAL, O-RING (SPEEDO FITTING TO CASE EXTENSION)
43	FITTING ASSEMBLY, SPEEDO DRIVEN GEAR
44	GEAR, SPEEDO DRIVEN
45	GOVERNOR ASSEMBLY
46	COVER, GOVERNOR
99	SPEED SENSOR, INTERNAL TRANSMISSION
100	BOLT, SPEEDO SENSOR RETAINING
687	SHAFT, OUTPUT
688	CLIP, SPEEDO DRIVE GEAR
689	GEAR, SPEEDO DRIVE
690	SLEEVE, OUTPUT SHAFT NOT USED ON
691	SEAL, OUTPUT SHAFT ALL MODELS
699	ROTOR, INTERNAL TRANSMISSION SPEED SENSOR

Figure 213



Technical Service Information

ILL. NO.	DESCRIPTION	ILL. NO.	DESCRIPTION
1	CONVERTER ASSEMBLY	59	SPRING, 1-2 ACCUMULATOR
2	SEAL ASSEMBLY, OIL	60	RING, OIL SEAL (1-2 ACCUMULATOR PISTON)
3	BUSHING, OIL PUMP BODY	61	PISTON, 1-2 ACCUMULATOR
4	BUSHING, STATOR SHAFT (FRONT)	62	COVER & PIN ASSEMBLY, 1-2 ACCUM.
5	BOLT, PUMP TO CASE	63	BOLT, ACCUMULATOR COVER
6	O-RING, PUMP TO CASE BOLT	64	LINK, THROTTLE LEVER TO CABLE
7	PUMP ASSEMBLY, OIL	65	LEVER & BRACKET ASSEMBLY, THROTTLE
8	SEAL, OIL (PUMP TO CASE)	66	CLIP, ELECTRICAL WIRE
9	GASKET, PUMP COVER TO CASE	67	VALVE ASSEMBLY, CONTROL BODY
10	CASE, TRANSMISSION	69	BOLT, VALVE BODY
11	VENT ASSEMBLY, TRANSMISSION	70	SEAL, FILTER
12	CONNECTOR, OIL COOLER PIPE	71	FILTER ASSEMBLY, TRANSMISSION OIL
13	RING, SERVO COVER RETAINING	72	GASKET, TRANSMISSION OIL PAN
14	SEAL, "O" RING (2-4 SERVO COVER)	73	PAN, TRANSMISSION OIL
15	COVER, 2-4 SERVO	74	SCREW, SPEC. HEX WASHER HEAD (PAN)
16	PISTON, 4TH APPLY	75	BOLT, MANUAL DETENT SPRING
17	RING, OIL SEAL (4TH APPLY PISTON) (OUTER)	76	BUSHING, CASE
18	RING, RETAINER (APPLY PIN)	77	PIN, ACCUMULATOR PISTON
19	WASHER, SERVO APPLY PIN	80	RETAINER & BALL ASSEMBLY, 3RD ACCUMULATOR
20	SPRING, SERVO APPLY PIN	81	PLUG, TRANSMISSION CASE (ACCUMULATOR BLEED)
21	SEAL, "O" RING	82	PIN, GOVERNOR GEAR RETAINER
22	HOUSING, SERVO PISTON (INNER)	83	GEAR, GOVERNOR DRIVEN
23	RING, OIL SEAL (2ND APPLY PISTON) (INNER)	84	PIN, GOVERNOR WEIGHT
24	RING, OIL SEAL (2ND APPLY PISTON) (OUTER)	85	CAP, GOVERNOR THRUST
25	PISTON, 2ND APPLY	86	PLUG, CASE SERVO
26	SPRING, SERVO CUSHION	88	GASKET, SPACER PLATE TO CASE
27	RETAINER, SERVO CUSHION SPRING	89	GASKET, SPACER PLATE TO VALVE BODY
28	RING, RETAINER (2ND APPLY PISTON)	90	BUSHING, STATOR SHAFT (REAR)
29	PIN, 2ND APPLY PISTON	91	BALL, CARBON STEEL (T.V. EXHAUST)
31	SPRING, SERVO RETURN	92	CONDUIT, SOLENOID WIRE
32	PLUG, PRESSURE	93	MAGNET, CHIP COLLECTOR
33	CONNECTOR, ELECTRICAL	94	RETAINER, FRONT HELIX SEAL
34	SEAL, "O" RING (ELECTRICAL CONNECTION)	96	TUBE, AUXILIARY ACCUMULATOR VALVE
35	SEAL, CASE EXTENSION TO CASE	97	CLAMP, TUBE
36	EXTENSION, CASE	99	SPEED SENSOR, INTERNAL TRANSMISSION
37	BOLT, CASE EXTENSION TO CASE	100	BOLT, SPEEDO SENSOR RETAINING
38	BUSHING, CASE EXTENSION	106	RETAINER & BALL ASM. (DOUBLE ORIFICE)
39	SEAL ASSEMBLY, CASE EXTENSION OIL	359	PLUG, CUP (ORIFICE)
40	RETAINER, SPEEDO DRIVEN GEAR FITTING	372	SWITCH, TEMPERATURE (SOME MODELS)
41	BOLT & WASHER ASSEMBLY	374	BOLT, SPECIAL HEX HEAD (M6 X 1 X 16)
42	SEAL, "O" RING (SPEEDO FITTING TO CASE EXTENSION)	375	BOLT, HEX HEAD (M6 X 1 X 35)
43	FITTING ASSEMBLY, SPEEDO DRIVEN GEAR	376	BOLT, HEX HEAD (M6 X 1 X 45)
44	GEAR, SPEEDO DRIVEN	377	AUXILIARY ACCUMULATOR VALVE BODY ASSEMBLY
45	GOVERNOR ASSEMBLY	709	SPRING ASSEMBLY, MANUAL DETENT
46	COVER, GOVERNOR		
47	SCREEN, TRANSMISSION OIL PRESSURE (CONVERTER & GOVERNOR)		
48	PIN, BAND ANCHOR		
49	SEAL, "O" RING (SOLENOID)		
50	SOLENOID ASSEMBLY		
51	BOLT, HEX WASHER HEAD (SOLENOID)		
52	PISTON, 3-4 ACCUMULATOR		
53	RING, OIL SEAL (3-4 ACCUMULATOR PISTON)		
54	SPRING, 3-4 ACCUMULATOR		
55	BALL, .26 DIAMETER		
56	PLATE, VALVE BODY SPACER		

Figure 214

AUTOMATIC TRANSMISSION SERVICE GROUP

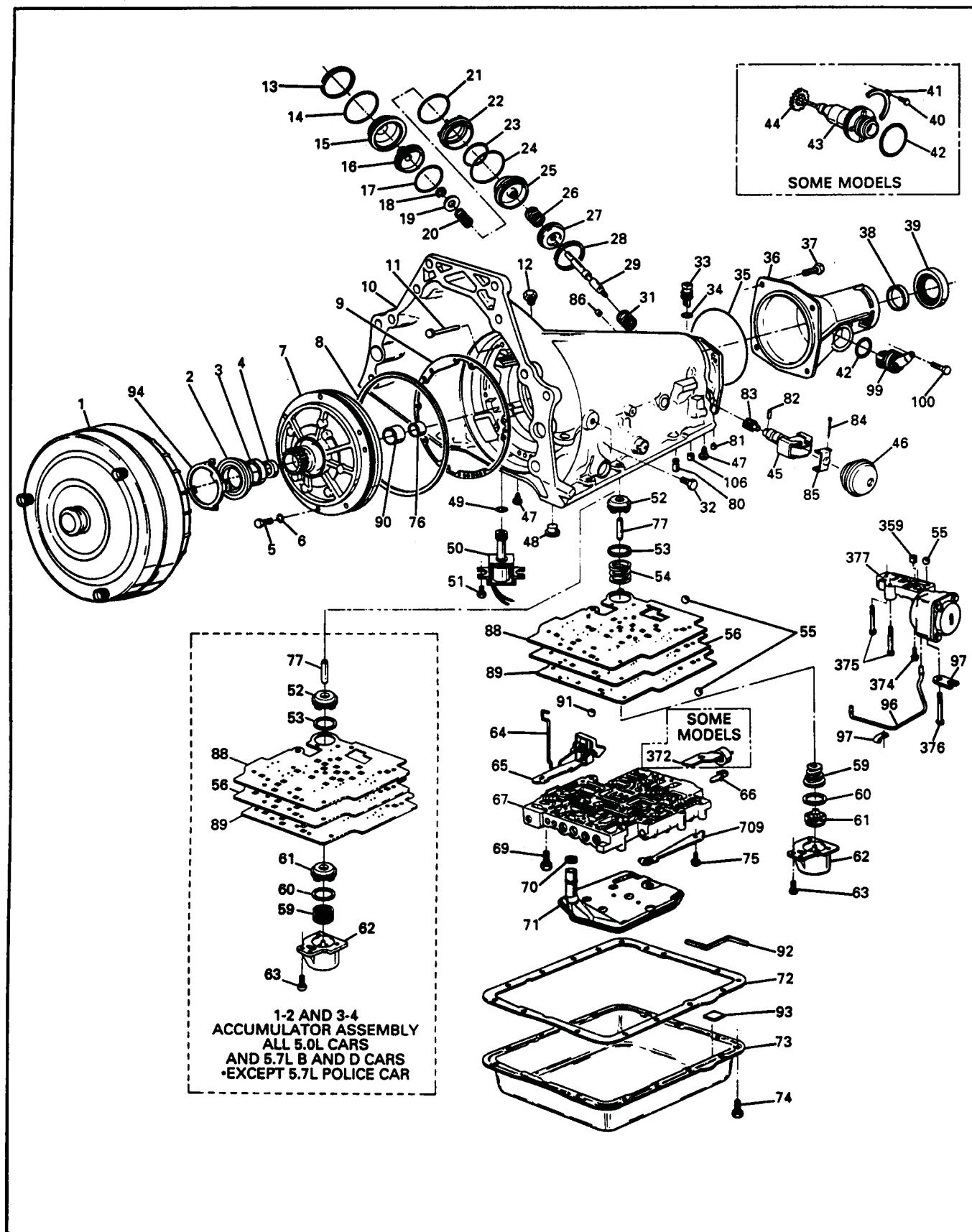


Figure 215



Technical Service Information

ILL. NO.	DESCRIPTION	ILL. NO.	DESCRIPTION
600	SPRING ASM., 3-4 CLUTCH BOOST (5)	654A	PLATE ASSEMBLY, 3RD AND 4TH CLUTCH (FIBER)
601	WASHER, THRUST (PUMP TO DRUM)	654B	PLATE, 3RD AND 4TH CLUTCH (STEEL)
602	BAND ASSEMBLY, 2-4	654C	PLATE, 3RD AND 4TH CLUTCH (STEEL)
603	BUSHING, REVERSE INPUT CL. (FRONT)	655	PLATE, 3RD AND 4TH CLUTCH BACKING (SEL.)
605	HOUSING AND DRUM ASSEMBLY, REVERSE INPUT CLUTCH	656	RING, 3RD AND 4TH CLUTCH BACKING PLATE RETAINER
606	BUSHING, REVERSE INPUT CLUTCH (REAR)	657	BUSHING, INPUT SUN GEAR (FRONT)
607	PISTON ASM., REVERSE INPUT CLUTCH	658	GEAR, INPUT SUN
608	SEALS, REVERSE INPUT CLUTCH (INNER AND OUTER)	659	BUSHING, INPUT SUN GEAR (REAR)
609	SPRING ASM., REVERSE INPUT CLUTCH	661	RET., OUTPUT SHAFT TO INPUT CARRIER
610	RING, REVERSE INPUT CLUTCH SPRING RETAINER	662	CARRIER ASSEMBLY, INPUT (COMPLETE)
611	PLATE, REVERSE INPUT CLUTCH (BELLEVILLE)	663	BEARING ASSEMBLY, THRUST (INPUT CARRIER TO REACTION SHAFT)
612A	PLATE ASM., REVERSE INPUT CLUTCH (FIBER)	664	GEAR, INPUT INTERNAL
612B	PLATE, REVERSE INPUT CLUTCH (STEEL)	665	BUSHING, REACTION CARRIER SHAFT (FRONT)
613	PLATE, REVERSE INPUT CLUTCH BACKING (SELECTIVE)	666	SHAFT, REACTION CARRIER
614	RING, REVERSE INPUT CL. RETAINING	667	BUSHING, REACTION CARRIER SHAFT (REAR)
615	BEARING ASSEMBLY, STATOR SHAFT/ SELECTIVE WASHER	668	RING, REACTION SHAFT/INTERNAL GEAR RETAINER
616	WASHER, THRUST (SELECTIVE)	669	WASHER, THRUST (REACTION SHAFT/SHELL)
617	RETAINER AND BALL ASM., CHECK VALVE	670	SHELL, REACTION SUN
618	SEAL, O-RING (TURBINE SHAFT/ SELECTIVE WASHER)	671	RING, REACTION SUN GEAR RETAINER
619	RING, OIL SEAL (SOLID)	672	BUSHING, REACTION SUN
620	RETAINER AND CHECKBALL ASSEMBLY	673	GEAR, REACTION SUN
621	HOUSING AND SHAFT ASSEMBLY, INPUT	674	WASHER, THRUST (RACE/REACTION SHELL)
622	SEAL, O-RING INPUT TO FORWARD HSG.	675	RACE, LO AND REVERSE ROLLER CLUTCH
623	PISTON, 3RD AND 4TH CLUTCH	676	RING, LO AND REVERSE SUPPORT TO CASE RETAINER
624	SEAL, 3RD AND 4TH CL. (INNER AND OUTER)	677	RING, LO AND REVERSE RETAINER (ROLLER ASSEMBLY/ CAM)
625	RING, 3RD AND 4TH CLUTCH (APPLY)	678	CLUTCH ASSEMBLY, LO AND REVERSE ROLLER
626	SPRING ASSEMBLY, 3RD AND 4TH CLUTCH	679	SUPPORT ASM., LO AND REVERSE CLUTCH
627	RETAINER AND BALL ASSEMBLY, FORWARD CLUTCH HOUSING	680	SPRING, TRANSMISSION (LO AND REVERSE CLUTCH SUPPORT RETAINER)
628	HOUSING, FORWARD CLUTCH	681	CARRIER ASSEMBLY, REACTION
629	SEAL, FORWARD CLUTCH (INNER AND OUTER)	682A	PLATE, LO AND REVERSE CLUTCH (WAVED)
630	PISTON, FORWARD CLUTCH	682B	PLATE, SPACER LO AND REVERSE CLUTCH (SELECTIVE)
631	SEAL, OVERRUN CLUTCH (INNER AND OUTER)	682C	PLATE ASSEMBLY, LO AND REVERSE CLUTCH (FIBER)
632	PISTON, OVERRUN CLUTCH	682D	PLATE, LO AND REVERSE CLUTCH (STEEL)
633	BALL, OVERRUN CLUTCH	683	BEARING ASSEMBLY, THRUST (REACTION CARRIER/ SUPPORT)
634	SPRING ASSEMBLY, OVERRUN CLUTCH	684	GEAR, INTERNAL REACTION
635	SNAP RING, OVERRUN CLUTCH SPRING RETAINER	685	SUPPORT, INTERNAL REACTION GEAR
636	SEAL, INPUT HOUSING TO OUTPUT SHAFT	686	RING, REACTION GEAR/SUPPORT RETAINER
637	BEARING ASSEMBLY, INPUT SUN GEAR	687	SHAFT, OUTPUT
638	SNAP RING, OVERRUN CL. HUB RETAINING	688	CLIP, SPEEDO DRIVE GEAR
639	HUB, OVERRUN CLUTCH	689	GEAR, SPEEDO DRIVE
641	RETAINER AND RACE ASSEMBLY, SPRAG	690	SLEEVE, OUTPUT SHAFT
642	FORWARD SPRAG ASSEMBLY	691	SEAL, OUTPUT SHAFT
643	RETAINER RINGS, SPRAG ASSEMBLY	692	BRG., REACTION GEAR SUPPORT TO CASE
644	RACE, FORWARD CLUTCH (OUTER)	693	RING, LO AND REVERSE CLUTCH RETAINER
645A	PLATE ASSEMBLY, OVERRUN CLUTCH (FIBER)	694	SPRING ASSEMBLY, LO AND REVERSE CLUTCH
645B	PLATE, OVERRUN CLUTCH (STEEL)	695	PISTON, LO AND REVERSE CLUTCH
646	PLATE, FORWARD CLUTCH (APPLY)	696	SEAL, TRANSMISSION (LO AND REVERSE CLUTCH - OUTER, CENTER, INNER)
648	PLATE, FORWARD CLUTCH (WAVED)	697	DEFLECTOR, OIL (HIGH OUTPUT MODELS ONLY)
649A	PLATE ASSEMBLY, FORWARD CLUTCH (FIBER)	698	PLUG, ORIFICED CUP
649B	PLATE, FORWARD CLUTCH (STEEL)	699	ROTOR, INTERNAL TRANSMISSION SPEED SENSOR
650	PLATE, FORWARD CLUTCH BACKING (SEL.)		
651	RING, FORWARD CLUTCH BACKING PLATE RETAINER		
652	PLATE, 3RD AND 4TH CLUTCH RING RETAINER		
653	PLATE, 3RD AND 4TH CLUTCH APPLY (STEPPED)		

Figure 216



Technical Service Information

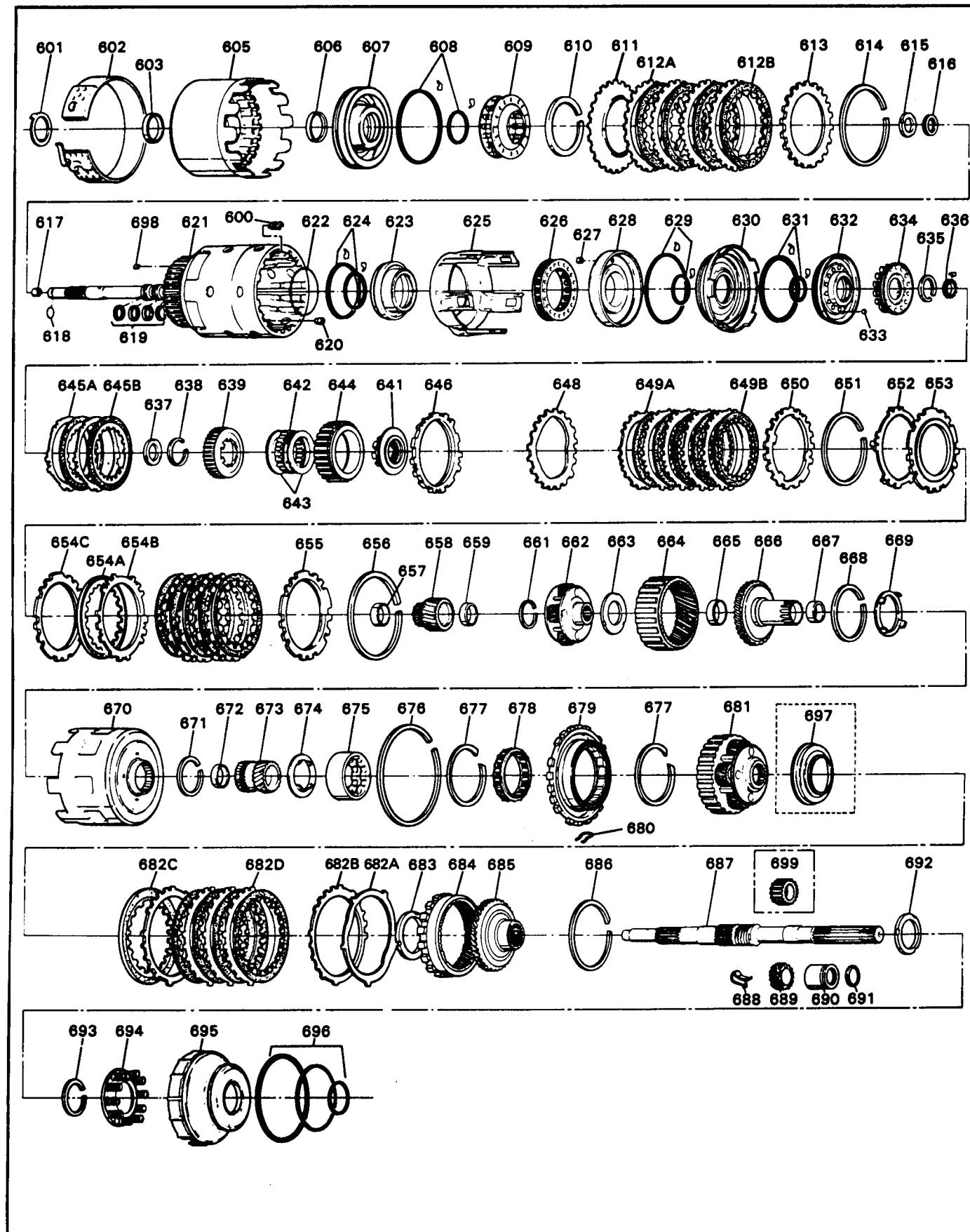


Figure 217

AUTOMATIC TRANSMISSION SERVICE GROUP

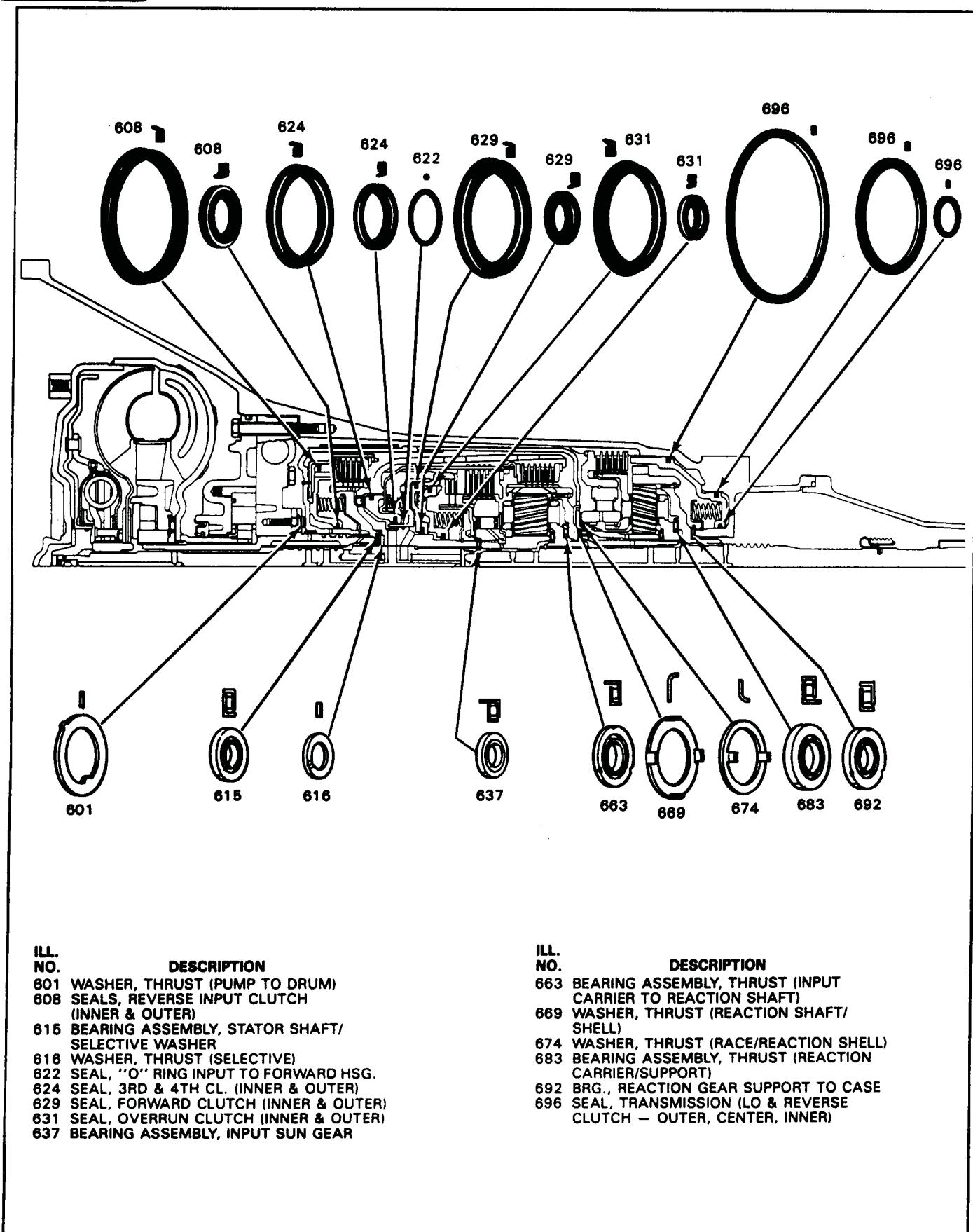
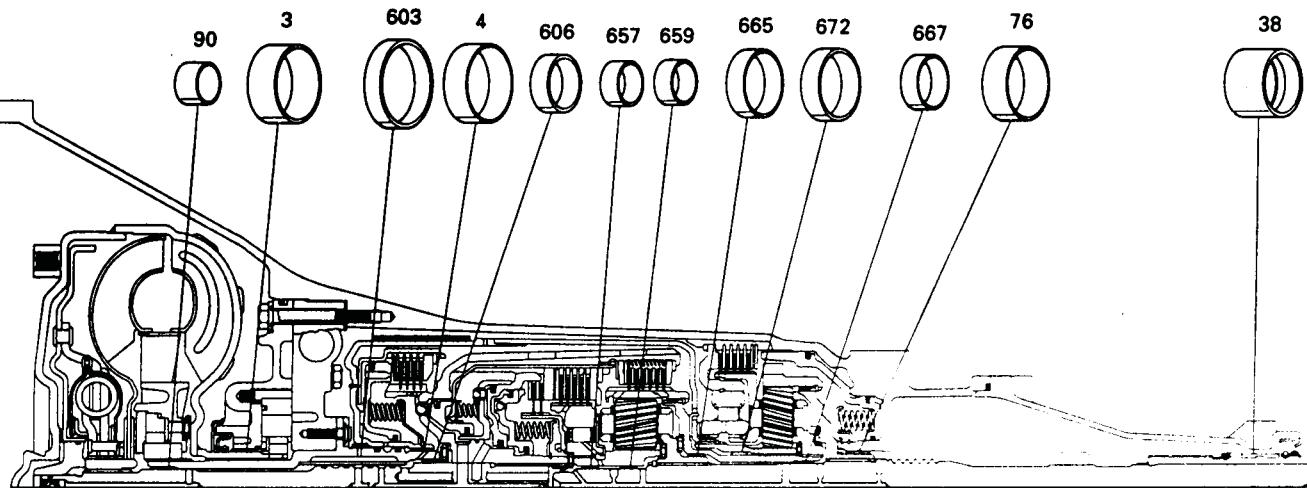


Figure 218



3 BUSHING, OIL PUMP BODY
 4 BUSHING, STATOR SHAFT (FRONT)
 38 BUSHING, CASE EXTENSION
 76 BUSHING, CASE
 90 BUSHING, STATOR SHAFT (REAR)
 603 BUSHING, REVERSE INPUT CLUTCH (FRONT)
 606 BUSHING, REVERSE INPUT CLUTCH (REAR)

657 BUSHING, INPUT SUN GEAR (FRONT)
 659 BUSHING, INPUT SUN GEAR (REAR)
 665 BUSHING, REACTION SHAFT (FRONT)
 667 BUSHING, REACTION SHAFT (REAR)
 672 BUSHING, REACTION SUN GEAR

TORQUE SPECIFICATIONS

LOCATION	QTY.	SIZE	TORQUE	LOCATION	QTY.	SIZE	TORQUE
ACCUMULATOR COVER TO CASE	2	M6 1.0 x 35.0	11 N·m (8 LB.-FT.)	PARK BRAKE BRACKET TO CASE	2	M8 1.25 X 20.0	31 N·m (23 LB.-FT.)
ACCUMULATOR COVER TO CASE	1	M6 1.0 x 65.0	11 N·m (8 LB.-FT.)	PUMP COVER TO BODY	5	M8 1.25 X 40.0	24 N·m (18 LB.-FT.)
DETENT SPRING TO VALVE BODY	1	M8 1.25 x 20.0	24 N·m (18 LB.-FT.)	PUMP ASSEMBLY TO CASE	7	M8 1.25 X 60.0	24 N·m (18 LB.-FT.)
VALVE BODY TO CASE	15	M6 1.0 x 50.0	11 N·m (8 LB.-FT.)	CASE EXTENSION TO CASE	4	M10 1.50 X 30.0	35 N·m (26 LB.-FT.)
OIL PASSAGE COVER TO AUX. VALVE BODY	3	M6 1.0 x 24.0	11 N·m (8 LB.-FT.)	MANUAL SHAFT TO INSIDE DETENT LEVER	1	M10 1.50 NUT	31 N·m (23 LB.-FT.)
SOLENOID ASSEMBLY TO PUMP COVER	2	M6 1.0 x 12.0	11 N·m (8 LB.-FT.)	PRESSURE PLUGS	1-4	1/8 - 27	11 N·m (8 LB.-FT.)
TRANSMISSION OIL PAN TO CASE	16	M8 1.25 x 19.3	12 N·m (9 LB.-FT.)	CONNECTOR COOLER PIPE	2	1/4 - 18	38 N·m (28 LB.-FT.)
PRESSURE SWITCHES	1-3	1/8 - 27	11 N·m (8 LB.-FT.)	SPEED SENSOR RETAINER	1	M6 1.0 X 21.7	11 N·m (8 LB.-FT.)
AUXILIARY VALVE BODY TO CASE	1	M6 1.0 x 19.0	11 N·m (8 LB.-FT.)				
AUXILIARY VALVE BODY TO CASE	1	M6 1.0 x 35.0	11 N·m (8 LB.-FT.)				
AUXILIARY VALVE BODY TO CASE	1	M6 1.0 x 47.4	11 N·m (8 LB.-FT.)				

Figure 219