



THM 4L80-E

INDEX

POWERFLOW CHART AND SHIFT SOLENOID PATTERN	4
SHIFT SPEED CHART	5
LINE PRESSURE TESTS	6
TROUBLE SHOOTING CHARTS	7
OIL PASSAGE IDENTIFICATION	27
CHECK BALL LOCATIONS	34
1991-92 WIRING SCHEMATIC	35
TRANSMISSION DISASSEMBLY	36
TRANSMISSION ASSEMBLY PROCESS	45
THRUST BEARING LOCATIONS	91
TROUBLE CODE DESCRIPTION	92
TORQUE SPECIFICATIONS	94
UPDATED WIRE HARNESS AND CASE CONNECTOR FOR 1993	95
UPDATED ELECTRONICS FOR 1994	99
UPDATED CENTER LUBE SYSTEM FOR 1997	104
UPDATED MANUAL 2ND BAND FOR 1999	113
UPDATED OVERRUN CLUTCH FOR 2001	116

**AUTOMATIC TRANSMISSION SERVICE GROUP
18639 SW 107TH AVENUE
MIAMI, FLORIDA 33157
(305) 670-4161**

Copyright © ATSG 1991



*Updated
March, 2003*

INTRODUCTION

THM 4L80-E

We wish to thank General Motors Corporation for the information and illustrations that have made this booklet possible. This booklet contains general description and the procedures necessary to repair, overhaul, or service the THM 4L80-E electronic overdrive automatic transmission. The THM 4L80-E is a fully automatic rear wheel drive transmission. It provides Park, Reverse, Neutral, and four forward speeds with 4th gear being overdrive.

The shift pattern is controlled electronically with two solenoids that receive a ground signal from the Powertrain Control Module (PCM). The PCM will vary shift points and shift feel, as it is constantly interpreting numerous electronic signals from various operational sensors located on the vehicle. The PCM also controls the Torque Converter Clutch (TCC) apply speed, apply feel, and the release electronically with a solenoid.

Line pressure and shift feel are also controlled electronically with a Pressure Control Solenoid (PCS) located on the valve body. This function is also controlled by the PCM and the numerous electronic signals from the sensors.

No part of any ATSG publication may be reproduced, stored in any retrieval system or transmitted in any form or by any means, including but not limited to electronic, mechanical, photocopying, recording or otherwise, without *written* permission of Automatic Transmission Service Group. This includes all text illustrations, tables and charts.

"Portions of materials contained herein have been reprinted under license from General Motors Corp, Service & Parts Operations."

The information and part numbers contained in this booklet have been carefully compiled from industry sources known for their reliability, but ATSG does not guarantee its accuracy.

Copyright © ATSG 1991

DALE ENGLAND
FIELD SERVICE CONSULTANT

WAYNE COLONNA
TECHNICAL SUPERVISOR

PETER LUBAN
TECHNICAL CONSULTANT

JON GLATSTEIN
TECHNICAL CONSULTANT

ROLAND ALVAREZ
TECHNICAL CONSULTANT

GERALD CAMPBELL
TECHNICAL CONSULTANT

JIM DIAL
TECHNICAL CONSULTANT

ED KRUSE
TECHNICAL CONSULTANT

GREGORY LIPNICK
TECHNICAL CONSULTANT

DAVID CHALKER
TECHNICAL CONSULTANT

JERRY GOTT
TECHNICAL CONSULTANT

MIKE SOUZA
TECHNICAL CONSULTANT

AUTOMATIC TRANSMISSION SERVICE GROUP

**18639 SW 107TH AVENUE
MIAMI, FLORIDA 33157
(305) 670-4161**

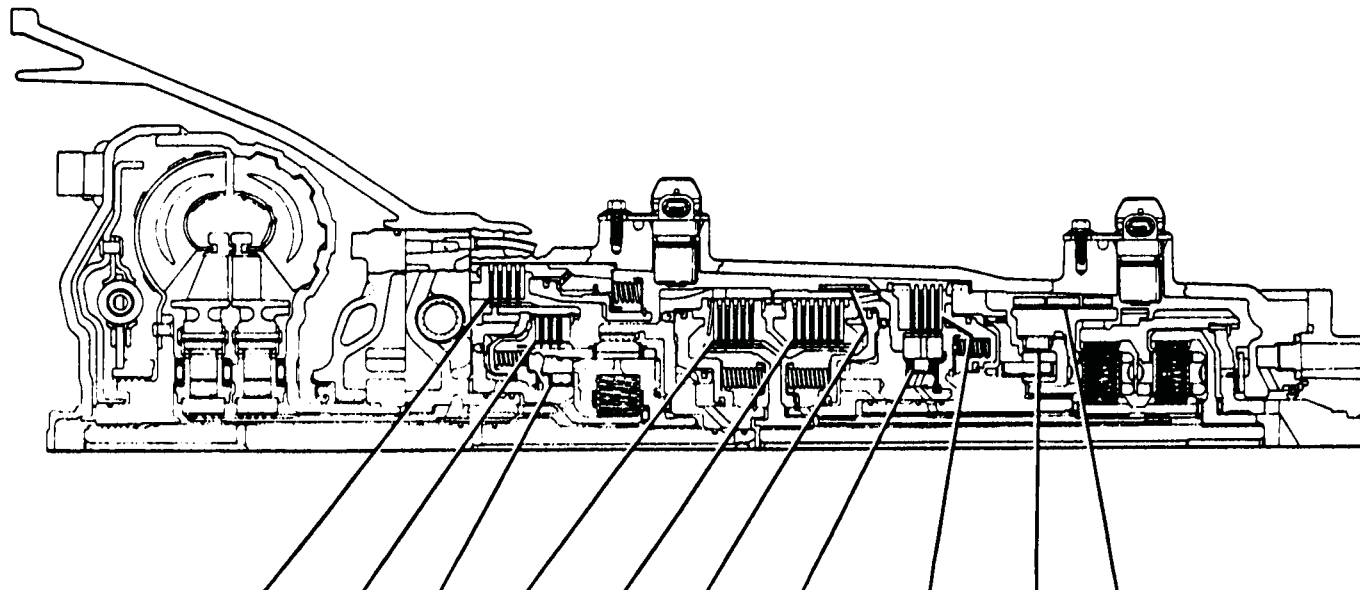


CASE ASSEMBLY
 TORQUE CONVERTER ASSEMBLY
 TURBINE SHAFT
 PRESSURE PLATE ASSEMBLY
 CONVERTER TURBINE ASSEMBLY
 CONVERTER TURBINE STATOR
 CONVERTER PUMP STATOR
 CONVERTER PUMP
 VARIABLE FORCE MOTOR SOLENOID
 BOTTOM PIN
 FILTER ASSEMBLY
 INSIDE DETENT LEVER
 MANUAL SHAFT
 FRONT BAND ASSEMBLY
 CONTROL VALVE ASSEMBLY
 PARKING LOCK ACTUATOR ASSEMBLY
 REAR BAND ASSEMBLY
 SUN GEAR
 SUN GEAR SHAFT
 PARKING LOCK PINN
 OUTPUT SPEED SENSOR ASSEMBLY
 OUTPUT SHAFT
 CASE EXTENSION
 REAR INTERNAL GEAR
 OUTPUT PLANETARY GEAR SET
 REACTION PLANETARY GEAR SET
 INTERMEDIATE SPRAG CLUTCH ASSEMBLY
 LO ROLLER CLUTCH ASSEMBLY
 MAIN SHAFT
 INTERMEDIATE CLUTCH
 FORWARD CLUTCH
 DIRECT CLUTCH
 OVERDRIVE CLUTCH
 OVERDRIVE PLANETARY GEAR SET
 OVERDRIVE ROLLER CLUTCH ASSEMBLY
 FOURTH CLUTCH
 OVERRUN CLUTCH
 PUMP ASSEMBLY
 CONVERTER PUMP ASSEMBLY
 STATOR ROLLER CLUTCH ASSEMBLY

3

HYDRA-MATIC 4L80-E GEAR RATIOS

FIRST	2.48	FOURTH	.75
SECOND	1.48	REVERSE	2.08
THIRD	1.00		



RANGE	GEAR	FOURTH CLUTCH	OVERRUN CLUTCH	OVERDRIVE ROLLER CLUTCH	FORWARD CLUTCH	DIRECT CLUTCH	FRONT BAND	INTERMEDIATE SPRAG CLUTCH	INTERMEDIATE CLUTCH	LO ROLLER CLUTCH	REAR BAND	SOLENOID A	SOLENOID B
P-N											APPLIED	ON	OFF
D4	1st			HOLDING	APPLIED			*		HOLDING		ON	OFF
	2nd			HOLDING	APPLIED			HOLDING	APPLIED			OFF	OFF
	3rd			HOLDING	APPLIED	APPLIED			APPLIED			OFF	ON
	4th	APPLIED			APPLIED	APPLIED			APPLIED			ON	ON
D3	1st		APPLIED	HOLDING	APPLIED			*		HOLDING		Ⓢ ON	Ⓢ OFF
	2nd		APPLIED	HOLDING	APPLIED			HOLDING	APPLIED			Ⓢ OFF	Ⓢ OFF
	3rd		APPLIED	HOLDING	APPLIED	APPLIED			APPLIED			Ⓢ OFF	Ⓢ ON
D2	1st		APPLIED	HOLDING	APPLIED			*		HOLDING		Ⓢ ON	Ⓢ OFF
	2nd		APPLIED	HOLDING	APPLIED		APPLIED	HOLDING	APPLIED			Ⓢ OFF	Ⓢ OFF
D1	1st		APPLIED	HOLDING	APPLIED			*		HOLDING	APPLIED	Ⓢ ON	Ⓢ OFF
	2nd		APPLIED	HOLDING	APPLIED		APPLIED	HOLDING	APPLIED			Ⓢ OFF	Ⓢ OFF
R	REVERSE			HOLDING		APPLIED				*	APPLIED	ON	OFF

*HOLDING BUT NOT EFFECTIVE
ON = SOLENOID ENERGIZED
OFF = SOLENOID DE-ENERGIZED

Ⓢ THE SOLENOID'S STATE FOLLOWS A SHIFT PATTERN WHICH DEPENDS UPON VEHICLE SPEED AND THROTTLE POSITION. IT DOES NOT DEPEND UPON THE SELECTED GEAR.

Figure 2

AUTOMATIC TRANSMISSION SERVICE GROUP



Technical Service Information

1991 HYDRA-MATIC 4L80-E SHIFT SPEED CHART

MODEL	BODY	TPS	1-2 SHIFT +/- 150 RPM					2-3 SHIFT +/- 200 RPM					3-4 SHIFT +/- 250 RPM					4-3 +/- 100 RPM	3-2 +/- 100 RPM	2-1 +/- 100 RPM
			18	20	30	40	50	18	20	30	40	50	18	20	30	40	50	0-10	0-10	0-10
ABP	P	TRANS RPM	536	682	779	974	1120	974	1218	1461	1705	1948	1705	1754	1948	2094	2289	1461	730	341
ACP, ADP	C, K	TRANS RPM	536	682	779	974	1120	974	1218	1364	1753	1948	1705	1754	1899	2240	2630	1461	730	341
BAP, BBP, BJP, BNP	C, K	TRANS RPM	512	698	837	930	1023	930	1302	1535	1674	1814	1442	1721	1953	2139	2511	1302	744	350
BAP, BBP, BJP	R, V, G, P	TRANS RPM	465	558	651	791	884	884	1070	1302	1442	1628	1442	1674	1907	2139	2372	1302	744	419
CAP, CBP, CKP	C, K, R, V, G, P	TRANS RPM	438	438	536	682	828	828	828	974	1218	1510	1266	1266	1412	1802	2192	1120	755	341
DBP, DCP, DDP, DFP, DKP, DLP, DRP	C, K, R, V, G, P	TRANS RPM	466	652	885	979	1072	979	1351	1584	1771	1957	1584	1911	2237	2470	2749	1305	652	419
DNP, DPP	P	TRANS RPM	559	699	885	979	1072	1025	1398	1584	1771	1911	1584	1957	2190	2470	2656	1305	652	419

NOTES:

1. ALL SPEEDS GIVEN ARE IN TRANSMISSION OUTPUT SHAFT RPM.
2. SPEEDS ARE BASED ON PERCENT THROTTLE POSITION SENSOR (TPS) DATA.
3. USE A TECH 1™ OR OTHER SCAN TOOL TO MONITOR THIS DATA.

1991 HYDRA-MATIC 4L80-E LINE PRESSURE CHECK PROCEDURE

Line pressures are calibrated for two sets of gear ranges — Drive-Park-Neutral, and Reverse. This allows the transmission line pressure to be appropriate for different pressure needs in different gear ranges:

<u>Gear Range</u>	<u>Line Pressure Range</u>
Drive, Park or Neutral	35 - 171 PSI
Reverse	67 - 324 PSI

Before performing a line pressure check, verify that the force motor is receiving the correct electrical signal from the vehicle computer:

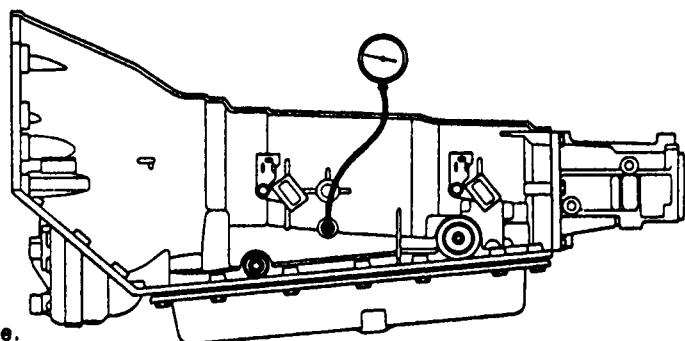
1. Install a scan tool.
2. Start the engine and set parking brake.
3. Check for a stored force motor malfunction code, and other malfunction codes.
4. Repair vehicle if necessary.

Inspect

- Fluid level (see Section 7A)
- Manual linkage

Install or Connect

- TECH 1 Scan tool
- Oil pressure gage at line pressure tap



5. Put gear selector in Park and set the parking brake.
6. Start engine and allow it to warm up at idle.
7. Access the "override force motor" test on the TECH 1 scan tool.
8. Increase FORCE MOTOR CURRENT in 0.1 Amp increments and read the corresponding line pressure on the pressure gage. (Allow pressure to stabilize for 5 seconds after each current change.)
9. Compare data to the Drive-Park-Neutral line pressure chart below.

Line pressure will pulse either high or low every ten seconds to keep the force motor plunger free. This is normal and will not harm the transmission.

***NOTICE** Total test running time should not exceed 2 minutes, or transmission damage could occur.

CAUTION Brakes must be applied at all times to prevent unexpected vehicle motion.

If pressure readings differ greatly from the line pressure chart, refer to the Diagnosis Charts contained in this section.

The TECH 1 scan tool is only able to control the force motor in Park and Neutral with the vehicle stopped at idle. This protects the clutches from extremely high or low pressures in Drive or Reverse ranges.

Force Motor Current (Amp)	Line Pressure (PSI)
0.02	157 - 177
0.10	151 - 176
0.20	140 - 172
0.30	137 - 162
0.40	121 - 147
0.50	102 - 131
0.60	88 - 113
0.70	63 - 93
0.80	43 - 73
0.90	37 - 61
0.98	35 - 55

Figure 4



Technical Service Information

CONDITION	INSPECT COMPONENT	FOR CAUSE
HIGH LINE PRESSURE	<ul style="list-style-type: none">• Pressure Regulator Valve (231)• Reverse Boost Valve (228)• Retainer Pin (211)• Orificed Plug (210)• Force Motor (320)• PCM• Possible Codes<ul style="list-style-type: none">– 73 Force Motor Current	<ul style="list-style-type: none">– Stuck at high torque signal due to under-sized bore or sediment.– Stuck at high torque signal due to under-sized bore or sediment.– Broken.– Blocked.– Failed "off".– Loose connector.– Loose connector.
FORWARD MOTION IN N	<ul style="list-style-type: none">• Manual Valve (319)• Forward Clutch Springs (607)• Forward Clutch Piston (606)• Forward Clutch Plates (610, 611)• Forward Clutch Housing (602)• Hub (613)	<ul style="list-style-type: none">– Mispositioned or stuck.– Jammed.– Jammed.– Seized or jammed.– Hole plugged.– Holes plugged.
INADEQUATE LUBE AT LOW LINE OR HEAVY VEHICLE LOADS	<ul style="list-style-type: none">• Converter Limit Valve (214)• Retainer Pin (211)	<ul style="list-style-type: none">– Stuck closed by sediment or valve bore collapse.– Broken.
INADEQUATE LUBE	<ul style="list-style-type: none">• Pressure Regulator Valve (231)• Pump Body (206)• Gasket (6)• Oil Transfer Hole Cup Plug	<ul style="list-style-type: none">– Stuck in high demand position.– Cross channel leakage.– Damaged.– Leaking.
ENGINE STALL	<ul style="list-style-type: none">• TCC System	<ul style="list-style-type: none">– TCC stuck on or dragging.
LOSS OF POWER	<ul style="list-style-type: none">• Transmission• TCC System• Torque Converter (1)• Stator Shaft (235)• Turbine Shaft (502)• Main Shaft (662)• Output Shaft (671)• Bearing (668)	<ul style="list-style-type: none">– Low oil.– Not starting in first gear.– TCC stuck on or dragging.– Debris.– Broken.– Bushing worn.– Bushing worn.– Bushing worn.– Worn.

ALL ILLUSTRATION NUMBERS REFERENCE HYDRA-MATIC 4L80-E UNIT REPAIR

Figure 5

AUTOMATIC TRANSMISSION SERVICE GROUP



Technical Service Information

CONDITION	INSPECT COMPONENT	FOR CAUSE
NO TORQUE IN REVERSE AND THIRD	<ul style="list-style-type: none">• Forward Clutch Hub (613)• Snap Ring (616a)• Forward Clutch Housing (602)	<ul style="list-style-type: none">— Broken.— Not seated.— Broken.
TRANS OVERHEATS	<ul style="list-style-type: none">• TCC Circuit• TCC Valve Spring (224)• Pump Cover (206)• Pressure Regulator Valve (231)• Oil Cooler• Gasket (6)• Retainer Pin (211)• Turbine Shaft O-ring (2)• Turbine Shaft Seals (503)• Stator Shaft Bushing (233)• Oil Transfer Hole Cup Plug• Fluid• Radiator	<ul style="list-style-type: none">— Blockage in apply or release.— Broken.— Cross channel leakage.— Stuck in high demand position.— Blocked cooler or cooler lines.— Damaged.— Broken.— Damaged.— Damaged.— Worn or damaged.— Leaking.— Low fluid level.— Restricted air flow.
@ WOT	<ul style="list-style-type: none">• Converter Limit Valve Bypass Orificed Cup Plug	<ul style="list-style-type: none">— Blocked, therefore converter limit valve stuck closed.
LOW LINE PRESSURE	<ul style="list-style-type: none">• Pump (203)• Pressure Regulator Valve (231)• Reverse Boost Valve (228)• Pump Valve Bores• Spring (230)• Retainer Pin (211)• Valve Body (301)• Gaskets/Spacer Plate• Force Motor (320)• PCM• Possible Codes<ul style="list-style-type: none">— 73 Force Motor Current	<ul style="list-style-type: none">— Cross channel air leak at body to cover, or body to case gasket.— Stuck at low torque signal due to under-sized bore or sediment.— Stuck at low torque signal due to under-sized bore or sediment.— Excessive valve clearance due to wear.— Broken.— Broken.— Cross channel leaks.— Cross valve land leaks.— Damaged or missing.— Stuck "on".— Broken clip causing leakage.— Pinched wire to ground.— Screen missing.— Failed.

ALL ILLUSTRATION NUMBERS REFERENCE HYDRA-MATIC 4L80-E UNIT REPAIR

Figure 6

AUTOMATIC TRANSMISSION SERVICE GROUP



Technical Service Information

CONDITION	INSPECT COMPONENT	FOR CAUSE
ENGINE STARTS IN GEAR	<ul style="list-style-type: none">• Manual Valve (319)• Neutral Safety Switch	<ul style="list-style-type: none">— Not engaged to detent lever.— Stuck in wrong position.— Not working.
SHIFT LEVER INDICATES WRONG GEAR	<ul style="list-style-type: none">• Manual Valve (319)• Detent Pin (711)• Manual Shaft (708)• Indicator Linkage	<ul style="list-style-type: none">— Not engaged to detent lever.— Misaligned or broken.— Flats not parallel.— Misadjusted.
NO GEAR SELECTIONS	<ul style="list-style-type: none">• Detent Lever (711)• Manual Valve (319)• Spacer Plate (46)• Valve Body/Case (301, 7)	<ul style="list-style-type: none">— Nut loose or missing.— Stuck.— Blocked holes.— Blocked channels.
LOSS OF DRIVE	<ul style="list-style-type: none">• Torque Converter (1)• Pump (203)• Case Extension Seal (20)• Orifice Plate• Gasket (6)• Oil Transfer Hole Cup Plug• Seals (503)• Housing (504)• Roller Clutch (512)• Carrier (514)• Pinions (518)• Bearing (513)• Roller Clutch (644)• Turbine Shaft (502)	<ul style="list-style-type: none">— Broken lug, failed lug welds.— Sheared lug bolts.— Worn turbine shaft splines.— Low oil.— Pump hub cracked, scored or broken.— Internal failure.— Closure weld failure.— Cover cracked at lug weld.— Seized.— Broken pump gears.— Missing, damaged or displaced.— Missing or leaking around edge.— Damaged.— Leaking or missing.— Damaged or missing.— Broken.— Worn, broken or locked.— Broken.— Broken free from pilot.— Spalled pins or pinions.— Plugged pinion pin holes.— Worn thrust washers.— Lack of lube.— Broken.— Worn, broken or locked.— No lube.— Shaft or splines broken.


ALL ILLUSTRATION NUMBERS REFERENCE HYDRA-MATIC 4L80-E UNIT REPAIR

Figure 7

AUTOMATIC TRANSMISSION SERVICE GROUP



Technical Service Information

CONDITION	INSPECT COMPONENT	FOR CAUSE
LOSS OF DRIVE (Continued)	(Forward Clutch Components) <ul style="list-style-type: none">• Seals (603, 604, 605)• Checkball• Piston (606)• Housing (602)• Friction Plates (611)• Reaction Plates (610)• Spring Assembly (607)• Driving Hub (615)• Snap Ring (616)• Driven Hub (613)	<ul style="list-style-type: none">— Nicked or cut.— Leaking.— Cracked or jammed.— Cracked.— Burned or splines worn.— Worn or splines worn.— Jammed.— Broken.— Not seated.— Gear teeth worn.
	(Rear Gearset) <ul style="list-style-type: none">• Pinions (655)• Pinion Pins (656)• Needle Bearings (654)• Sun Gear (649)• Pinion Thrust Washers (652)• Rear Internal Gear (666)• Front Internal Gear (661)• Turbine Shaft Ball Seal• Main Shaft (662)• Fluid Pressure	<ul style="list-style-type: none">— Broken or spalled.— Broken or spalled.— Broken or spalled.— Broken or spalled.— Worn.— Broken or spalled.— Broken or spalled.— Ineffective.— Shaft or splines broken.— Too low.
 NO PARK	<ul style="list-style-type: none">• Detent Lever (711)• Actuator Rod (710)• Detent Spring (41)• Parking Pawl (703)• Pawl Shaft (702)• Park Bracket (713)• Bolt (714)• Front Internal Gear (661)• Manual Shaft (708)	<ul style="list-style-type: none">— Incomplete travel.— Misaligned.— Rabbit ears bent, disconnected or broken.— Mispositioned.— Broken.— Broken.— Bent or broken.— Loose or broken.— Splines broken.— Flats not parallel.
REMAINS IN PARK	<ul style="list-style-type: none">• Actuator Rod Assembly (710)	<ul style="list-style-type: none">— Stretched.
DIFFICULT TO SHIFT OUT OF PARK	<ul style="list-style-type: none">• Pawl Return Spring (705)• Vehicle	<ul style="list-style-type: none">— Weak or broken.— Parked on hill.

ALL ILLUSTRATION NUMBERS REFERENCE HYDRA-MATIC 4L80-E UNIT REPAIR

Figure 8

AUTOMATIC TRANSMISSION SERVICE GROUP



Technical Service Information

CONDITION	INSPECT COMPONENT	FOR CAUSE
WILL NOT STAY IN PARK	<ul style="list-style-type: none">• Detent Spring (41)	<ul style="list-style-type: none">— Weak or broken.
[R] NO REVERSE	<ul style="list-style-type: none">• Case (7)• Center Support (640)• Center Support Seal (639)• Center Support Bolt (25)• Rear Band (657)• Rear Band Apply Pin (73)• Piston (65)• Seal (66)• Gasket (63)• Cover (62)• Bolts (61)• Checkball• Fluid Pressure <ul style="list-style-type: none">(Direct Clutch Components)• Reaction Plates (618)• Friction Plates (611)• Spring Assembly (607)• Housing (623)• Piston (619)• Seal (620, 621, 622)• Ball Check	<ul style="list-style-type: none">— Rear band anchor pin broken or not positioned.— Leaking at case or broken.— Leaking.— Loose, broken or feed hole blocked.— Broken, worn or not anchored.— Too short or binding in case.— Binding in case.— Leaking, damaged or worn.— Damaged or displaced.— Damaged.— Broken, loose or missing.— Missing.— Too low. <ul style="list-style-type: none">— Splines worn.— Splines or friction worn.— Jammed.— Cracked.— Leaking.— Leaking.— Leaking.
[D1] NO FIRST GEAR	<ul style="list-style-type: none">* See [D4] — No First Gear• Housing (504)• Case (7)• Detent Lever (711)	<ul style="list-style-type: none">— Broken.— Rear band anchor pin broken or not positioned.— Misaligned.
NO SECOND GEAR	<ul style="list-style-type: none">* See [D4] — No Second Gear	
NO OVERRUN BRAKING	<ul style="list-style-type: none">* See [D3] — No Overrun Braking• Possible Codes<ul style="list-style-type: none">— 28 PSM— 68 Overdrive Ratio— 85 Undefined Ratio	

ALL ILLUSTRATION NUMBERS REFERENCE HYDRA-MATIC 4L80-E UNIT REPAIR

Figure 9

AUTOMATIC TRANSMISSION SERVICE GROUP



Technical Service Information

CONDITION	INSPECT COMPONENT	FOR CAUSE
NO OVERRUN BRAKING (Continued)	<ul style="list-style-type: none">• Pressure Switch Manifold (40)	<ul style="list-style-type: none">— Pinched wire.— Loose connector.— Loose bolt causing leakage.— No signal to PCM.
NO ENGINE BRAKING	<ul style="list-style-type: none">• Rear Band (657)• Rear Band Apply Pin (73)• Piston (65)• Seal (66)• Cover (62)• Gasket (63)• Bolt (61)• Checkball• Fluid Pressure• Output Shaft (671)• Main Shaft (662)• Thrust Washer (218)• Bushing (234)	<ul style="list-style-type: none">— Damaged, worn or not anchored.— Too short or binding in case.— Binding in case.— Worn or damaged.— Damaged.— Damaged or missing.— Loose, broken or missing.— Missing, damaged, not sealing or mis-sized.— Too low.— Shaft or splines broken.— Shaft or splines broken.— Worn or damaged.— Worn or damaged.
D2 NO FIRST GEAR	<ul style="list-style-type: none">* See D4 — No First Gear• Front Band (628)	<ul style="list-style-type: none">— Stuck on.
NO SECOND GEAR	<ul style="list-style-type: none">* See D4 — No Second Gear• Case (7)	<ul style="list-style-type: none">— Front band anchor pin broken or not properly positioned.— Intermediate clutch feed cup plug missing or not seated.
NO OVERRUN BRAKING	<ul style="list-style-type: none">* See D3 — No Overrun Braking	
NO ENGINE BRAKING	<ul style="list-style-type: none">• Bushing (234)• Thrust Washer (218)• Rear Gearset• Reaction Drum & Carrier (651)• Main Shaft (662)• Output Shaft (671)• Sun Gear Shaft (649)	<ul style="list-style-type: none">— Worn or damaged.— Worn or damaged.— Spalled or broken.— Broken.— Shaft or splines broken.— Shaft or splines broken.— Shaft or splines broken.
NO SECOND GEAR ENGINE BRAKING	<ul style="list-style-type: none">• Fluid Pressure• Direct Clutch Housing (623)	<ul style="list-style-type: none">— Too low.— Internal diameter splines worn.— Outer band surface worn.

ALL ILLUSTRATION NUMBERS REFERENCE HYDRA-MATIC 4L80-E UNIT REPAIR

Figure 10

AUTOMATIC TRANSMISSION SERVICE GROUP



Technical Service Information

CONDITION	INSPECT COMPONENT	FOR CAUSE
NO SECOND GEAR ENGINE BRAKING (Continued)	<ul style="list-style-type: none">• Front Band (628)• Apply Pin (55)• Apply Clip (56)• Piston (58)• Seal (57)• Case (7)• Spacer Plate (46)• Gasket (48)• Valve Body Bolts (35)	<ul style="list-style-type: none">— Broken, worn or not anchored.— Too short or binding in case.— Broken or missing.— Cracked, broken or binding.— Damaged or worn.— Cracked or damaged.— Damaged.— Torn or pinched.— Loose, broken or missing.
D3 NO FIRST GEAR	<ul style="list-style-type: none">* See D4 — No First Gear• Front Band (628)	<ul style="list-style-type: none">— Stuck on.
NO SECOND GEAR	<ul style="list-style-type: none">* See D4 — No Second Gear	
NO THIRD GEAR	<ul style="list-style-type: none">* See D4 — No Third Gear• Front Band (628)	<ul style="list-style-type: none">— Stuck on.
NO OVERRUN BRAKING	<ul style="list-style-type: none">• Clutch Plates (508, 509)• Thrust Washer (218)• Output Shaft (671)• Seals• Checkball• Piston (505)• Housing (504)• Sun Gear (650)• Spring Assembly (506)• Oil Feed	<ul style="list-style-type: none">— Splines or plate wear.— Damaged or worn.— Shaft or splines broken.— Cut or nicked.— Leaking.— Jammed, cracked or damaged.— Cracked or damaged.— Worn.— Jammed.— Plugged.
NO ENGINE BRAKING	<ul style="list-style-type: none">• Main Shaft (662)• Bushing (234)	<ul style="list-style-type: none">— Shaft or splines broken.— Damaged or worn.
D4 NO FIRST GEAR	<ul style="list-style-type: none">• Low Roller Assembly (644)• Center Support (640)• Case (7)• Snap Rings (633, 643)	<ul style="list-style-type: none">— Not attached or race broken.— Support or splines broken.— Damage near center support.— Not seated.

ALL ILLUSTRATION NUMBERS REFERENCE HYDRA-MATIC 4L80-E UNIT REPAIR

Figure 11

AUTOMATIC TRANSMISSION SERVICE GROUP



Technical Service Information

CONDITION	INSPECT COMPONENT	FOR CAUSE
FIRST GEAR ONLY	<ul style="list-style-type: none">• Sun Gear Shaft (649)• Output Speed Sensor (22)• Input Speed Sensor (22)	<ul style="list-style-type: none">— Shaft or splines broken.— Reads zero.— Reads zero.
FIRST AND SECOND GEAR ONLY	<ul style="list-style-type: none">• Solenoid B (311)• 2-3 Shift Valve (312)• Quad Driver Module• Possible Codes<ul style="list-style-type: none">— 68 Overdrive Ratio— 81 QDM & Solenoid B Fault— 85 Undefined Ratio— 87 Solenoid B Stuck Off	<ul style="list-style-type: none">— Stuck "off".— Loose connector.— No voltage to solenoid.— Solenoid o-ring failure.— no PCM signal to solenoid.— Stuck— Failed.
SECOND GEAR ONLY	<ul style="list-style-type: none">• Possible Codes<ul style="list-style-type: none">— 24 Output Speed— 53 System Voltage High— 75 System Voltage Low— 81 QDM & Solenoid B	
SECOND AND THIRD GEAR ONLY	<ul style="list-style-type: none">• Solenoid A (313)• 1-2 Shift Valve (314)• Quad Driver Module• Possible Codes<ul style="list-style-type: none">— 68 Overdrive Ratio— 82 QDM & Solenoid A Fault— 85 Undefined Ratio	<ul style="list-style-type: none">— Stuck "off".— No voltage to solenoid.— Loose connector.— Solenoid o-ring failed.— No PCM signal to solenoid.— Stuck.— Failed.
FIRST AND FOURTH GEAR ONLY (Second And Third Gear Available In D3 And D2)	<ul style="list-style-type: none">• Solenoid A (313)• 1-2 Shift Valve (314)• Quad Driver Module• Possible Codes<ul style="list-style-type: none">— 68 Overdrive Ratio— 82 QDM and Solenoid A Fault— 85 Undefined Ratio	<ul style="list-style-type: none">— Stuck "on".— Pinched wire to ground.— Stuck.— Failed.

ALL ILLUSTRATION NUMBERS REFERENCE HYDRA-MATIC 4L80-E UNIT REPAIR

Figure 12

AUTOMATIC TRANSMISSION SERVICE GROUP



Technical Service Information

CONDITION	INSPECT COMPONENT	FOR CAUSE
THIRD AND FOURTH GEAR ONLY (Second Gear Available In D3 And D2)	<ul style="list-style-type: none"> • Solenoid B (311) • 2-3 Shift Valve (312) • Quad Driver Module • Possible Codes <ul style="list-style-type: none"> – 81 QDM and Solenoid B Fault – 85 Undefined Ratio – 86 Solenoid B Stuck On 	<ul style="list-style-type: none"> – Stuck "on". – Pinched wire to ground. – Stuck. – Failed.
NO SECOND GEAR	• Case (7)	– Intermediate clutch feed cup plug missing or not seated.
	(Intermediate Clutch Components) <ul style="list-style-type: none"> • Backing Plate (630) • Snap Ring (633) • Friction Plates (631) • Outer Race (625) • Center Support (640) • Center Support Bolt (25) • Seals (637, 638) • Piston (636) • Springs (635) • Transmission Fluid • Intermediate Sprag (624) • Direct Clutch Housing (623) • Snap Ring (627) 	<ul style="list-style-type: none"> – Broken. – Missing or not seated. – Worn. – Splines worn. – Cracked or oil feed hole blocked. – Broken or loose. – Oil hole blocked. – Worn. – Cracked or jammed. – Jammed. – Improper fluid. – Additive package. – Outer race splines worn. – Outer race broken. – Splines or inner race worn. – Broken. – Missing or not seated.
NO THIRD GEAR	(Direct Clutch Components) <ul style="list-style-type: none"> • Seal (620, 621, 622) • Ball Check • Piston (619) • Housing (623) • Reaction Plates (618) • Friction Plates (611) • Spring Assembly (607) • Center Support Seal (639) • Center Support (640) 	<ul style="list-style-type: none"> – Leaking. – Leaking. – Cracked or jammed. – Cracked. – Splines worn. – Splines or friction worn. – Jammed. – Leaking at case. – Broken or leaking at case.

ALL ILLUSTRATION NUMBERS REFERENCE HYDRA-MATIC 4L80-E UNIT REPAIR

Figure 13

AUTOMATIC TRANSMISSION SERVICE GROUP



Technical Service Information

CONDITION	INSPECT COMPONENT	FOR CAUSE
NO THIRD GEAR (Continued)	(Direct Clutch Components) <ul style="list-style-type: none">• Center Support Bolt (25)• Solenoid B (311)• 2-3 Shift Valve (312)• PCM• Quad Driver Module• Possible Codes<ul style="list-style-type: none">— 81 QDM and Solenoid B Fault— 85 Undefined Ratio— 87 Solenoid B Stuck Off	<ul style="list-style-type: none">— Loose or broken.— Hole blocked.— Stuck "off".— Pinched wire.— O-ring failure.— No voltage to solenoid.— Stuck.— No signal to solenoid.— Failed.
NO FOURTH GEAR	(Fourth Clutch Components) <ul style="list-style-type: none">• Seals (527, 531)• Cup Plug (530)• Bolt (26)• Piston (528)• Spring Assembly (532)• Snap Ring (523)• Friction Plates (525)• Reaction Plates (526)• Housing (529)	<ul style="list-style-type: none">— Nicked or cut.— Missing.— Loose, broken or missing.— Jammed.— Jammed.— Not seated.— Worn or burned.— Splines worn.— Damaged or cracked.
	(Overrun Clutch Components) <ul style="list-style-type: none">• Housing (504)• Reaction Plates (508)• Sun Gear (650)• Solenoid B (311)• 2-3 Shift Valve (312)• PCM• Quad Driver Module• Possible Codes<ul style="list-style-type: none">— 21 TPS High— 22 TPS Low— 28 Pressure Switch Manifold— 68 Overdrive Ratio— 75 System Voltage Low— 81 QDM and Solenoid B	<ul style="list-style-type: none">— Broken.— Splines worn.— Worn.— Stuck "off".— Pinched wire.— O-ring failure.— No voltage to solenoid.— Stuck.— No signal to solenoid.— Failed.

ALL ILLUSTRATION NUMBERS REFERENCE HYDRA-MATIC 4L80-E UNIT REPAIR

Figure 14

AUTOMATIC TRANSMISSION SERVICE GROUP



Technical Service Information

CONDITION	INSPECT COMPONENT	FOR CAUSE
NO TCC	<ul style="list-style-type: none">• TCC Solenoid (323)<ul style="list-style-type: none">– Stuck off.– O-ring failed.– No voltage to solenoid.– Poor connection.• Quad Driver Module<ul style="list-style-type: none">– Failed.• PCM<ul style="list-style-type: none">– No signal to solenoid.• Brake Switch<ul style="list-style-type: none">– Contact corroded.– Poor connection.– Pinched wire.– Misadjusted.– No supply voltage.• TCC Valve (223)<ul style="list-style-type: none">– Stuck off due to sediment or undersized bore.• Retainer Pin (211)<ul style="list-style-type: none">– Broken.• Torque Converter (1)<ul style="list-style-type: none">– Ballooning.• Turbine Shaft (502)<ul style="list-style-type: none">– Plugged oil holes.• Turbine Shaft Seals (501)<ul style="list-style-type: none">– Ineffective.• Pump Body Bushing (202)<ul style="list-style-type: none">– Worn.• O-ring (2)<ul style="list-style-type: none">– Heat set.• Oil Transfer Hole Cup Plug<ul style="list-style-type: none">– Leaking.• Regulated Apply Valve (324)<ul style="list-style-type: none">– Stuck.• TCC Valve Release Exhaust Orificed Cup Plug<ul style="list-style-type: none">– Blocked.• Possible Codes<ul style="list-style-type: none">– 21 TPS High– 22 TPS Low– 28 Pressure Switch Manifold– 37 Brake Switch Stuck On– 39 TCC Stuck Off– 53 System Voltage High– 68 Overdrive Ratio– 75 System Voltage Low– 81 QDM and Solenoid B– 83 QDM and TCC Solenoid* See Incorrect TCC Apply Or Release	
SOFT TCC APPLY	<ul style="list-style-type: none">• Turbine Shaft Seals (501)<ul style="list-style-type: none">– Ineffective.• Pump Body Bushing (202)<ul style="list-style-type: none">– Worn.• O-ring (2)<ul style="list-style-type: none">– Heat set.• Oil Transfer Hole Cup Plug<ul style="list-style-type: none">– Leaking.• TCC Solenoid (323)<ul style="list-style-type: none">– Malfunction.• Fluid<ul style="list-style-type: none">– Low pressure.	

ALL ILLUSTRATION NUMBERS REFERENCE HYDRA-MATIC 4L80-E UNIT REPAIR

Figure 15

AUTOMATIC TRANSMISSION SERVICE GROUP



Technical Service Information

CONDITION	INSPECT COMPONENT	FOR CAUSE
SLIPPING TCC	<ul style="list-style-type: none">• TCC Valve Release Exhaust Orificed Cup Plug• Turbine Shaft Seal	<ul style="list-style-type: none">— Blocked.— Cut.
TCC STUCK ON	<ul style="list-style-type: none">• Gasket (6)• TCC Solenoid (323)• TCC Apply Valve (324)• Quad Driver Module• Possible Codes<ul style="list-style-type: none">— 83 QDM And TCC Solenoid* See Incorrect TCC Apply Or Release	<ul style="list-style-type: none">— Damaged.— Stuck on.— Pinched wire to ground.— Stuck.— Failed.
INCORRECT TCC APPLY OR RELEASE	<ul style="list-style-type: none">• Output Speed Sensor (22)• Throttle Position Sensor• PCM• Pressure Switch Manifold (40)• Transmission Temperature Sensor (332)• Engine Coolant Temperature Sensor• Brake Switch• Possible Codes<ul style="list-style-type: none">— 14 Engine Temperature Sensor High— 15 Engine Temperature Sensor Low— 21 Throttle Position Sensor High	<ul style="list-style-type: none">— Poor connection.— Pinched wire.— Coil wire broken.— Incorrect air gap.— Inadequate signal.— Poor connection.— Pinched wire.— Incorrect resistance.— Failed.— Poor connection.— No signal to PCM.— Pinched wire.— Poor connection.— No signal to PCM.— Incorrect resistance.— Pinched wire.— Poor connection.— No signal to PCM.— Incorrect resistance.— Pinched wire.— Poor connection.— Pinched wire.— No voltage supply.— Misadjusted.

ALL ILLUSTRATION NUMBERS REFERENCE HYDRA-MATIC 4L80-E UNIT REPAIR

Figure 16

AUTOMATIC TRANSMISSION SERVICE GROUP



Technical Service Information

CONDITION	INSPECT COMPONENT	FOR CAUSE
INCORRECT TCC APPLY OR RELEASE (Continued)	<ul style="list-style-type: none"> • Possible Codes (Cont.) <ul style="list-style-type: none"> – 22 Throttle Position Sensor Low – 24 Output Speed Sensor – 28 Pressure Switch Manifold – 58 Transmission Temperature Sensor High – 59 Transmission Temperature Sensor Low – 68 Overdrive Ratio • Digital Ratio Adapter (DRAC) 	<ul style="list-style-type: none"> – Malfunction. – Incorrect.
Only 2WD		
CONVERTER BALLOONING	<ul style="list-style-type: none"> • Converter Limit Valve (214) 	<ul style="list-style-type: none"> – Stuck open due to sediment or under-sized bore.
@ High Speeds	<ul style="list-style-type: none"> • Converter Limit Valve Feedback Orificed Cup Plug 	<ul style="list-style-type: none"> – Blocked.
NO TORQUE MULTIPLICATION	<ul style="list-style-type: none"> • Stator Shaft (235) 	<ul style="list-style-type: none"> – Broken or detached from pump cover.
FLUID FOAMING	<ul style="list-style-type: none"> • Fluid • Engine • Filter (31) • Seal (32) • Vehicle 	<ul style="list-style-type: none"> – Contaminated (antifreeze). – Transmission overfilled. – Overheated. – Cracked or not seated. – Damaged or not seated. – Overloaded.
NOISE	<ul style="list-style-type: none"> • Torque Converter (1) • Transmission/Engine • Case Extension (19) 	<ul style="list-style-type: none"> – Loose lug bolts. – Out of balance. – Internal failure. – Misaligned. – Output shaft support bushing worn.
VIBRATION	<ul style="list-style-type: none"> • Torque Converter (1) • Transmission/Engine • Case Extension (19) • Turbine Shaft (502) • Main Shaft (662) • Output Shaft (671) • Bearing (668) 	<ul style="list-style-type: none"> – Out of balance. – Internal failure. – Misaligned. – Output shaft support bushing worn. – Worn stator shaft bushing surface. – Worn bushing. – Worn bushing. – Worn.
ALL ILLUSTRATION NUMBERS REFERENCE HYDRA-MATIC 4L80-E UNIT REPAIR		

Figure 17

AUTOMATIC TRANSMISSION SERVICE GROUP



Technical Service Information

CONDITION	INSPECT COMPONENT	FOR CAUSE
ENGINE STALL	<ul style="list-style-type: none">• Forward Clutch Housing (602)	<ul style="list-style-type: none">— Seized bearing if holes plugged.
	(Fourth Clutch Components) <ul style="list-style-type: none">• Plates (525, 526)• Piston (528)• Spring Assembly (532)	<ul style="list-style-type: none">— Seized or jammed.— Jammed.— Jammed.
	(Overrun Clutch Components) <ul style="list-style-type: none">• Plates (508, 509)• Piston (505)• Spring Assembly (506)	<ul style="list-style-type: none">— Seized or jammed.— Jammed.— Jammed.
OIL OUT BREATHER TUBE	<ul style="list-style-type: none">• Pump Cover (206)• Fluid• Transmission	<ul style="list-style-type: none">— Cross channel leakage can pressurize vent area.— Foaming and filling pump vent ports.— Transmission overfilled.— Overheated.
NO TORQUE IN SECOND GEAR	<ul style="list-style-type: none">• Intermediate Sprag (624)	<ul style="list-style-type: none">— Worn.— Excessive eccentricity.— Sprag rolled over or damaged.
SECOND GEAR STARTS	<ul style="list-style-type: none">• Intermediate Clutch Plates (631, 632)• Direct Clutch Lube Feed• Center Support Springs (635)• Center Support Piston (636)• Solenoid A (313)• PCM• Quad Driver Module• 1-2 Shift Valve (314)• Possible Codes<ul style="list-style-type: none">— 82 QDM and Solenoid A	<ul style="list-style-type: none">— Seized.— Blocked.— Jammed.— Jammed.— Stuck "off".— O-ring failed.— No voltage to solenoid.— Poor connection.— To PCM signal to solenoid.— Failed.— Stuck.
THIRD GEAR STARTS	(Forward Clutch Components) <ul style="list-style-type: none">• Driving Hub (615)• Plates (610, 611)	<ul style="list-style-type: none">— Holes plugged.— Seized.

ALL ILLUSTRATION NUMBERS REFERENCE HYDRA-MATIC 4L80-E UNIT REPAIR

Figure 18

AUTOMATIC TRANSMISSION SERVICE GROUP



Technical Service Information

CONDITION	INSPECT COMPONENT	FOR CAUSE
THIRD GEAR STARTS (Continued)	(Direct Clutch Components) <ul style="list-style-type: none"> • Plates (611, 618) • Piston (619) • Spring Assembly (607) • Lube Feed Hole 	<ul style="list-style-type: none"> — Seized. — Jammed. — Jammed. — Blocked.
FOURTH GEAR STARTS	<ul style="list-style-type: none"> • Solenoid B • Possible Codes <ul style="list-style-type: none"> — 86 Solenoid B Stuck On 	<ul style="list-style-type: none"> — Stuck "on". — Pinched wire to ground.
ERRATIC SHIFT QUALITY	<ul style="list-style-type: none"> • Gasket (6) • Oil Transfer Hole Cup Plug • Oil Seal Rings (219) 	<ul style="list-style-type: none"> — Damaged. — Leaking. — Damaged.
TRANSMISSION SLIPS	<ul style="list-style-type: none"> • Fluid Level 	<ul style="list-style-type: none"> — Too high or low.
TRANSMISSION SEIZED	(Rear Lube Components) <ul style="list-style-type: none"> • Cooler Circuit • Spacer Plate/Gasket • Lube Pipe (39) • Valve Body (301) • Filter (Inline) • Output Shaft Seal (20) • Main Shaft (662) • Center Support (640) • Apply Pin (55) • Piston (58) • Center Support (640) • Snap Ring (643) • Sun Gear Shaft (649) • Rear Gearset • Main Shaft (662) 	<ul style="list-style-type: none"> — Blocked or leaking. — Hole missing. — Poor seal. — Damaged. — Missing clips. — Loose, broken or missing bolts. — Blocked. — Missing or damaged. — Lube holes missing or blocked. — Lube holes missing or blocked. — Lube hole missing or blocked. — Too long. — Binding in case. — Binding in case. — Not held. — Not seated. — Bearing surface worn. — Lube hole blocked. — Bearing surface worn. — Lube holes plugged.
In 2nd, 3rd And 4th	<ul style="list-style-type: none"> • Rear Band (657) • Rear Servo Pin (73) • Piston (65) 	<ul style="list-style-type: none"> — Locked on. — Too long or binding in case. — Binding in case.

ALL ILLUSTRATION NUMBERS REFERENCE HYDRA-MATIC 4L80-E UNIT REPAIR

Figure 19

AUTOMATIC TRANSMISSION SERVICE GROUP



Technical Service Information

CONDITION	INSPECT COMPONENT	FOR CAUSE
CASE EXTENSION BEARING/SEAL FAILED	<ul style="list-style-type: none"> • Orifice Plate • Case Extension (19) 	<ul style="list-style-type: none"> — Missing or blocked hole. — Lube passages blocked or missing.
INACCURATE SHIFT POINTS	<ul style="list-style-type: none"> • Output Speed Sensor (22) • Throttle Position Sensor • Pressure Switch Manifold • Possible Codes <ul style="list-style-type: none"> — 21 Throttle Position Sensor High — 22 Throttle Position Sensor Low — 24 Output Speed Sensor — 28 Pressure Switch Manifold — 85 Undefined Ratio • Axle Ratio • Tire Size 	<ul style="list-style-type: none"> — Pinched or broken wire. — Loose connector. — Air gap incorrect. — Inadequate signal. — Coil damaged. — Damaged rotor teeth. — Loose connection. — Pinched or damaged wire. — Incorrect resistance. — Loose connector. — PCM malfunction. — Loose connector. — Loose bolts causing leakage. — Pinched wire. — No signal to PCM. — Incorrect or changed from original. — Incorrect or changed from original.
Only 2WD	<ul style="list-style-type: none"> • Digital Ratio Adapter (DRAC) 	<ul style="list-style-type: none"> — Incorrect. — Malfunction.
HARSH SHIFT	<ul style="list-style-type: none"> • Line Pressure • Force Motor (320) • PCM • Accumulator Piston • Accumulator Spring • Checkballs • Calibration PROM • Possible Codes <ul style="list-style-type: none"> — 21 TPS High — 22 TPS Low — 24 Output Speed 	<ul style="list-style-type: none"> — Too high. — Too low. — Failed "off". — Loose connector. — Loose connector. — Leaking. — Stuck. — Incorrect. — Missing. — Incorrect.

ALL ILLUSTRATION NUMBERS REFERENCE HYDRA-MATIC 4L80-E UNIT REPAIR

Figure 20

AUTOMATIC TRANSMISSION SERVICE GROUP



Technical Service Information

CONDITION	INSPECT COMPONENT	FOR CAUSE
HARSH SHIFT (Continued)	<ul style="list-style-type: none"> • Possible Codes (Cont.) <ul style="list-style-type: none"> — 28 Pressure Switch Manifold — 53 System Voltage High — 68 Overdrive Ratio — 73 Force Motor Current — 75 System Voltage Low — 81 QDM And Solenoid B — 85 Undefined Ratio 	
	[D] To [R] <ul style="list-style-type: none"> • Direct Lube Exhaust • Forward Clutch Spring (607) • Snap Ring (616) • Checkball 	<ul style="list-style-type: none"> — Blocked. — Not acting. — Not seated. — Plugged.
	3-4 <ul style="list-style-type: none"> • Spring Assembly (532) • Air Bleed • Bolt (26) 	<ul style="list-style-type: none"> — Not compressing evenly. — Plugged. — Oil feed hole plugged.
	4-3 <ul style="list-style-type: none"> • Snap Ring (533) • Spring Assembly (532) • Bolt (26) • Cup Plug (530) • Direct Lube Exhaust 	<ul style="list-style-type: none"> — Not seated. — Not acting. — Oil feed hole plugged. — Plugged. — Blocked.
	[D4] To [D3], [D2] Or [D1] <ul style="list-style-type: none"> • Spring Assembly (506) • Checkball • Snap Ring (511) 	<ul style="list-style-type: none"> — Not functioning. — Plugged. — Not seated.
SOFT SHIFT	<ul style="list-style-type: none"> • Line Pressure • Force Motor (320) • PCM • Accumulator Piston • Accumulator Spring • Calibration PROM • Possible Codes <ul style="list-style-type: none"> — 73 Force Motor Current 	<ul style="list-style-type: none"> — Too low. — Stuck "on". — Broken clip causing leakage. — Pinched wire to ground. — Failed. — Leaking. — Stuck. — Incorrect. — Incorrect.
	Into [R] <ul style="list-style-type: none"> • Direct Clutch Oil Feed • Direct Lube Exhaust 	<ul style="list-style-type: none"> — Plugged. — Blocked.

ALL ILLUSTRATION NUMBERS REFERENCE HYDRA-MATIC 4L80-E UNIT REPAIR

Figure 21

AUTOMATIC TRANSMISSION SERVICE GROUP



Technical Service Information

CONDITION	INSPECT COMPONENT	FOR CAUSE
SOFT SHIFT (Continued) R To D	<ul style="list-style-type: none"> • Direct Clutch Spring (607) • Snap Ring (616b) • Ball Check 	<ul style="list-style-type: none"> — Not acting. — Not engaged or missing. — Plugged.
	2-1 <ul style="list-style-type: none"> • Center Support Springs (635) • Snap Ring (634) • Center Support (640) 	<ul style="list-style-type: none"> — Not acting. — Not seated. — Air bleed blocked.
	2-3 <ul style="list-style-type: none"> • Direct Clutch Oil Feed • Direct Lube Exhaust 	<ul style="list-style-type: none"> — Plugged. — Blocked.
	3-2 <ul style="list-style-type: none"> • Direct Spring Assembly (607) • Snap Ring (608) • Ball Check 	<ul style="list-style-type: none"> — Not acting. — Not engaged or missing. — Plugged.
	D3 To D2 <ul style="list-style-type: none"> • Ball Check • Orifices 	<ul style="list-style-type: none"> — Missing. — Incorrect Sizes.
DELAYED 1-2 SHIFT	<ul style="list-style-type: none"> • Output Speed Sensor (22) • Input Speed Sensor (22) • Pressure Switch Manifold (40) • Calibration PROM • Possible Codes <ul style="list-style-type: none"> — 24 Output Speed Sensor — 28 Pressure Switch Manifold — 85 Undefined Ratio 	<ul style="list-style-type: none"> — Pinched or broken wire. — Loose connector. — Air gap incorrect. — Inadequate signal. — Coil damage. — Pinched or damaged wire. — Coil damage. — Inadequate signal. — Loose connector. — Pinched wire. — No signal to PCM. — Loose bolts causing leakage. — Incorrect.
	Only 2WD <ul style="list-style-type: none"> • Digital Ratio Adapter (DRAC) 	<ul style="list-style-type: none"> — Malfunction. — Loose connector.
NO D2 TO D1	<ul style="list-style-type: none"> • Rear Band (657) • Detent Lever (711) 	<ul style="list-style-type: none"> — Broken, worn or not anchored. — Incomplete travel.
NO D3 TO D2	<ul style="list-style-type: none"> • Front Band (628) 	<ul style="list-style-type: none"> — Broken, worn or not anchored.

ALL ILLUSTRATION NUMBERS REFERENCE HYDRA-MATIC 4L80-E UNIT REPAIR

Figure 22
AUTOMATIC TRANSMISSION SERVICE GROUP



Technical Service Information

CONDITION	INSPECT COMPONENT	FOR CAUSE
LEAKS AT: OIL PAN	<ul style="list-style-type: none"> • Oil Pan (28) • Gasket (29) • Case (7) • Bolt (27) 	<ul style="list-style-type: none"> — Damaged or not flat. — Damaged. — Porosity or cracked. — Flange inside out. — High or low torque.
FLUID FILL TUBE	<ul style="list-style-type: none"> • Seal • Case (7) • Fill Tube • Brackets 	<ul style="list-style-type: none"> — Cut or nicked. — Missing. — Porosity. — Damaged at case end. — Not seated in case. — Out of position causing tension on fill tube.
ELECTRICAL CONNECTOR	<ul style="list-style-type: none"> • Electrical Connector • O-ring Seal • Case (7) 	<ul style="list-style-type: none"> — Damaged or not seated. — Cut or nicked. — Missing. — Porosity or cracked.
COOLER CONNECTORS	<ul style="list-style-type: none"> • Cooler Connectors (8) • Case (7) 	<ul style="list-style-type: none"> — Stripped threads. — Damaged flare. — High or low torque. — Stripped threads. — Porosity. — Debris in threads.
CASE EXTENSION	<ul style="list-style-type: none"> • Case Extension (19) • Case (7) • Seal (15) • Bolt (21) 	<ul style="list-style-type: none"> — Porosity or cracked. — Porosity or cracked. — Cut or nicked. — Missing. — Low torque. — Missing.
MANUAL SHAFT	<ul style="list-style-type: none"> • Seal (707) • Linkage 	<ul style="list-style-type: none"> — Cut or nicked. — Not seated. — Misadjusted.
PUMP BODY SEAL	<ul style="list-style-type: none"> • Seal (201) • Torque Converter (1) • Bolt 	<ul style="list-style-type: none"> — Cut, nicked or worn. — Missing garter spring. — Damaged hub. — Low torque.

ALL ILLUSTRATION NUMBERS REFERENCE HYDRA-MATIC 4L80-E UNIT REPAIR

Figure 23
AUTOMATIC TRANSMISSION SERVICE GROUP



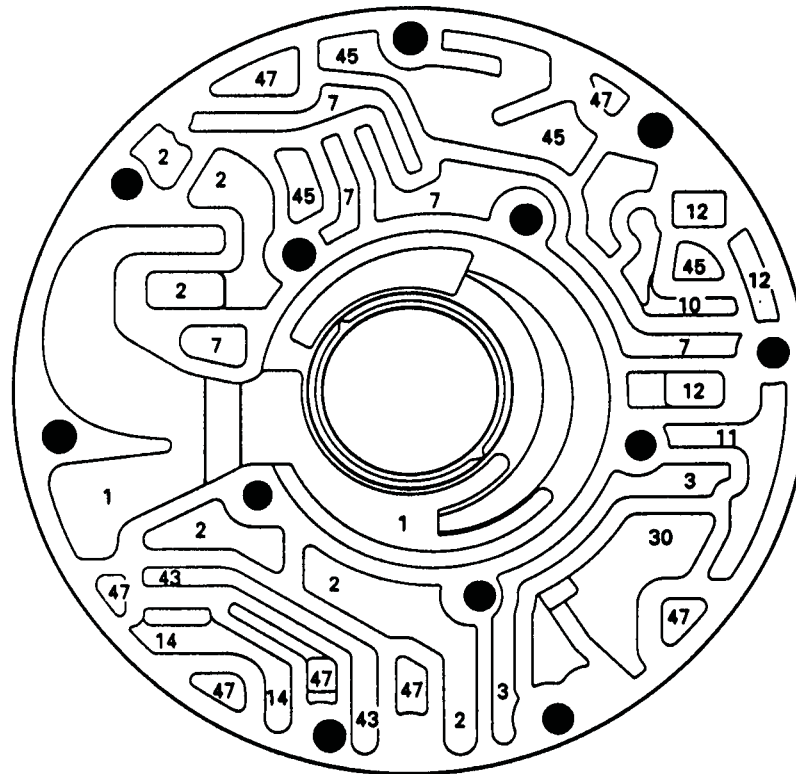
Technical Service Information

CONDITION	INSPECT COMPONENT	FOR CAUSE
LEAKS AT: (Continued) SPEED SENSOR	<ul style="list-style-type: none">• Seal• Speed Sensor (22)	<ul style="list-style-type: none">— Cut, missing, nicked.— Damaged.— Not seated.— Bracket damaged.
	<ul style="list-style-type: none">• Bolt (23)• Case (7)	<ul style="list-style-type: none">— Low torque.— Missing.— Damaged threads.— Porosity or cracked.
OUTPUT SHAFT SEAL	<ul style="list-style-type: none">• Seal (20)• Case (7)	<ul style="list-style-type: none">— Cut or nicked.— Porosity or cracked.
LINE PRESSURE PLUG	<ul style="list-style-type: none">• Plug (24)• Case (7)	<ul style="list-style-type: none">— Stripped threads.— Low or high torque.— Porosity or cracked.— Damaged threads.

ALL ILLUSTRATION NUMBERS REFERENCE HYDRA-MATIC 4L80-E UNIT REPAIR

Figure 24
AUTOMATIC TRANSMISSION SERVICE GROUP

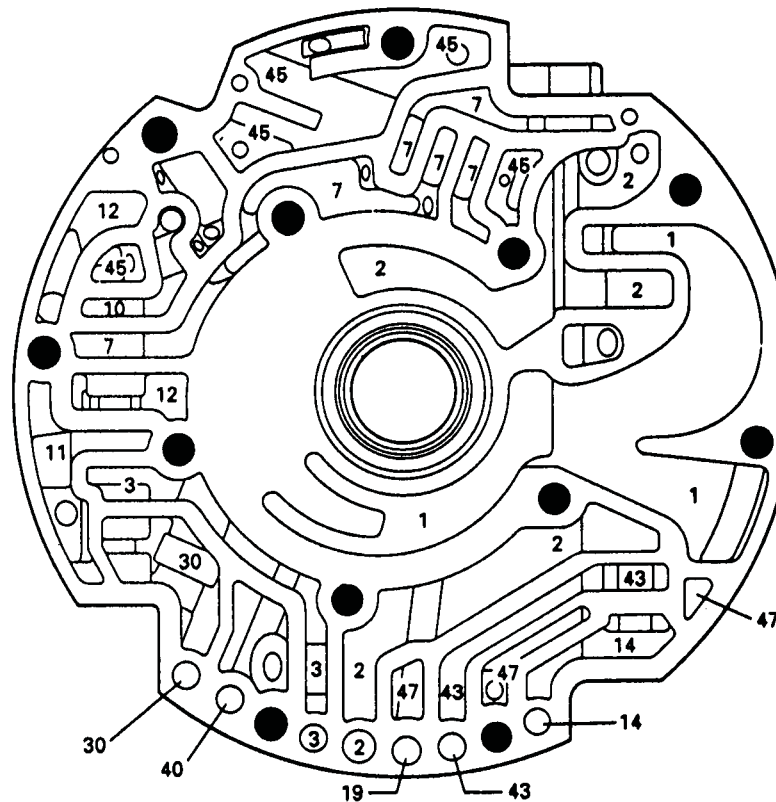
- 1 SUCTION
- 2 LINE
- 3 REGULATED APPLY
- 7 CONVERTER FEED
- 10 CONVERTER RELEASE
- 11 CONVERTER APPLY
- 12 COOLER
- 14 TORQUE SIGNAL
- 30 TCC SIGNAL
- 43 REVERSE
- 45 EXHAUST
- 47 VOID



PUMP BODY

Figure 25

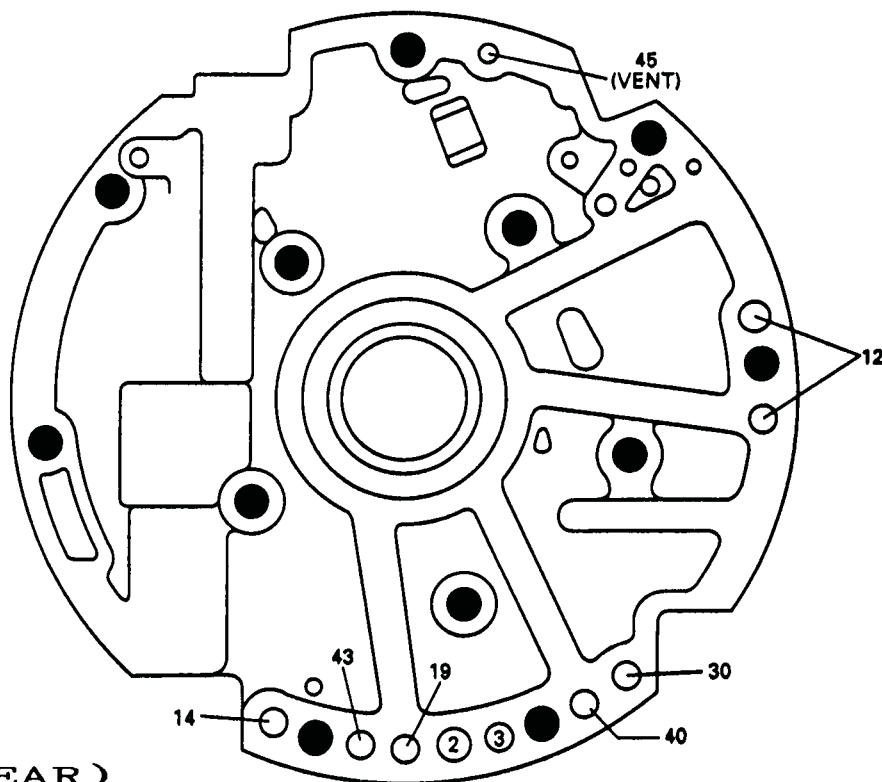
- 1 SUCTION
- 2 LINE
- 3 REGULATED APPLY
- 7 CONVERTER FEED
- 10 CONVERTER RELEASE
- 11 CONVERTER APPLY
- 12 COOLER
- 14 TORQUE SIGNAL
- 19 DRIVE
- 30 TCC SIGNAL
- 40 OVERRUN CLUTCH
- 43 REVERSE
- 45 EXHAUST
- 47 VOID



PUMP COVER

Figure 26

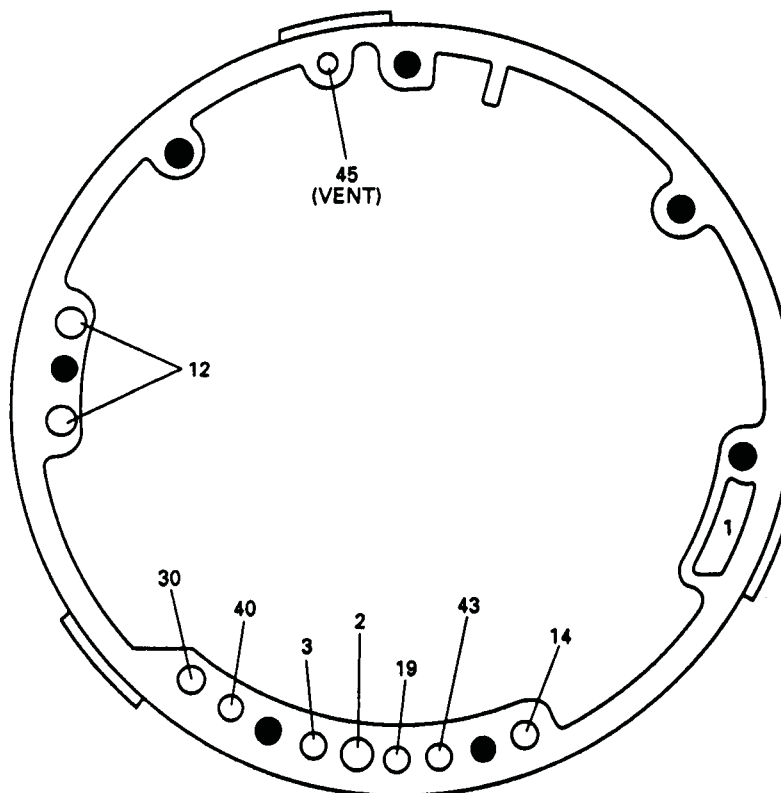
- 12 COOLER
- 14 TORQUE SIGNAL
- 19 DRIVE
- 30 TCC SIGNAL
- 40 OVERRUN CLUTCH
- 43 REVERSE
- 45 EXHAUST



PUMP COVER (REAR)

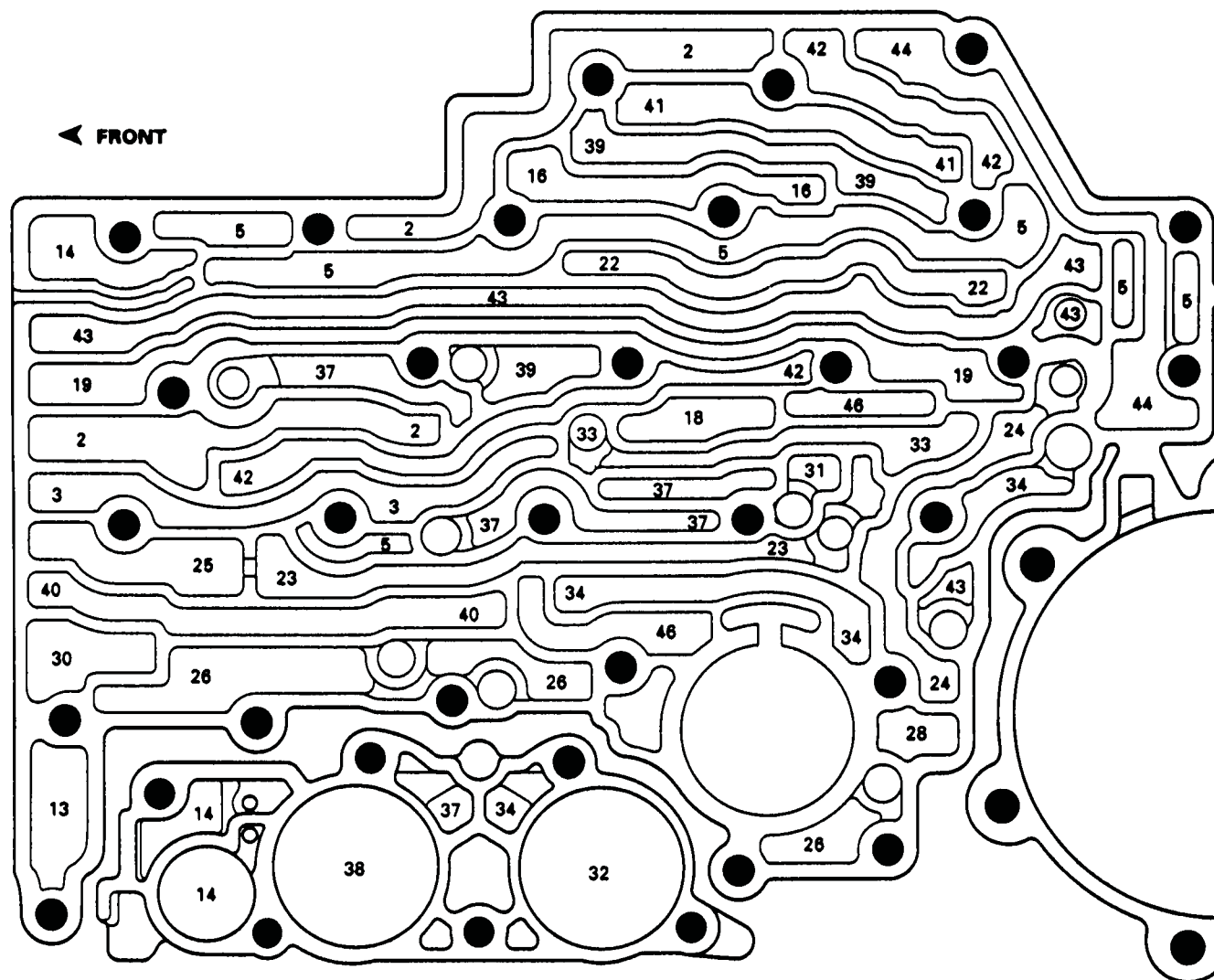
Figure 27

- 1 SUCTION
- 2 LINE
- 3 REGULATED APPLY
- 12 COOLER
- 14 TORQUE SIGNAL
- 19 DRIVE
- 30 TCC SIGNAL
- 40 OVERRUN CLUTCH
- 43 REVERSE
- 45 EXHAUST



CASE PASSAGES

Figure 28



- | | | |
|-------------------------------|-----------------------------|-----------------------|
| 1 SUCTION | 17 PRND 4-3 | 33 THIRD CLUTCH FEED |
| 2 LINE | 18 PRND 4 | 34 THIRD CLUTCH |
| 3 REGULATED APPLY | 19 DRIVE | 35 THIRD / REVERSE |
| 4 ORIFICED REGULATOR APPLY | 20 FILTERED ACTUATOR FEED | 36 FOURTH CLUTCH FEED |
| 5 ACTUATOR FEED | 21 SIGNAL "A" | 37 FOURTH CLUTCH |
| 6 ORIFICED ACTUATOR FEED | 22 SIGNAL "B" | 38 FOURTH ACCUMULATOR |
| 7 CONVERTER FEED | 23 2-2 DRIVE | 39 D 3-2-1 |
| 8 REGULATED CONVERTER FEED | 24 2ND CLUTCH | 40 OVERRUN CLUTCH |
| 9 TCC TOGGLE | 25 FILTERED 2-3 DRIVE | 41 D 2-1 |
| 10 CONVERTER RELEASE | 26 ACCUMULATOR | 42 LO |
| 11 CONVERTER APPLY | 27 ORIFICED ACCUMULATOR | 43 REVERSE |
| 12 COOLER | 28 SECOND ACCUMULATOR | 44 REAR BAND APPLY |
| 13 LUBE | 29 THIRD CLUTCH ACCUMULATOR | 45 EXHAUST |
| 14 TORQUE SIGNAL | 30 TCC SIGNAL | 46 ORIFICED EXHAUST |
| 15 ORIFICED TORQUE SIGNAL | 31 FRONT BAND APPLY | 47 VOID |
| 16 PRN (PARK REVERSE NEUTRAL) | 32 THIRD ACCUMULATOR | |

CASE OIL PASSAGES

Figure 29

AUTOMATIC TRANSMISSION SERVICE GROUP

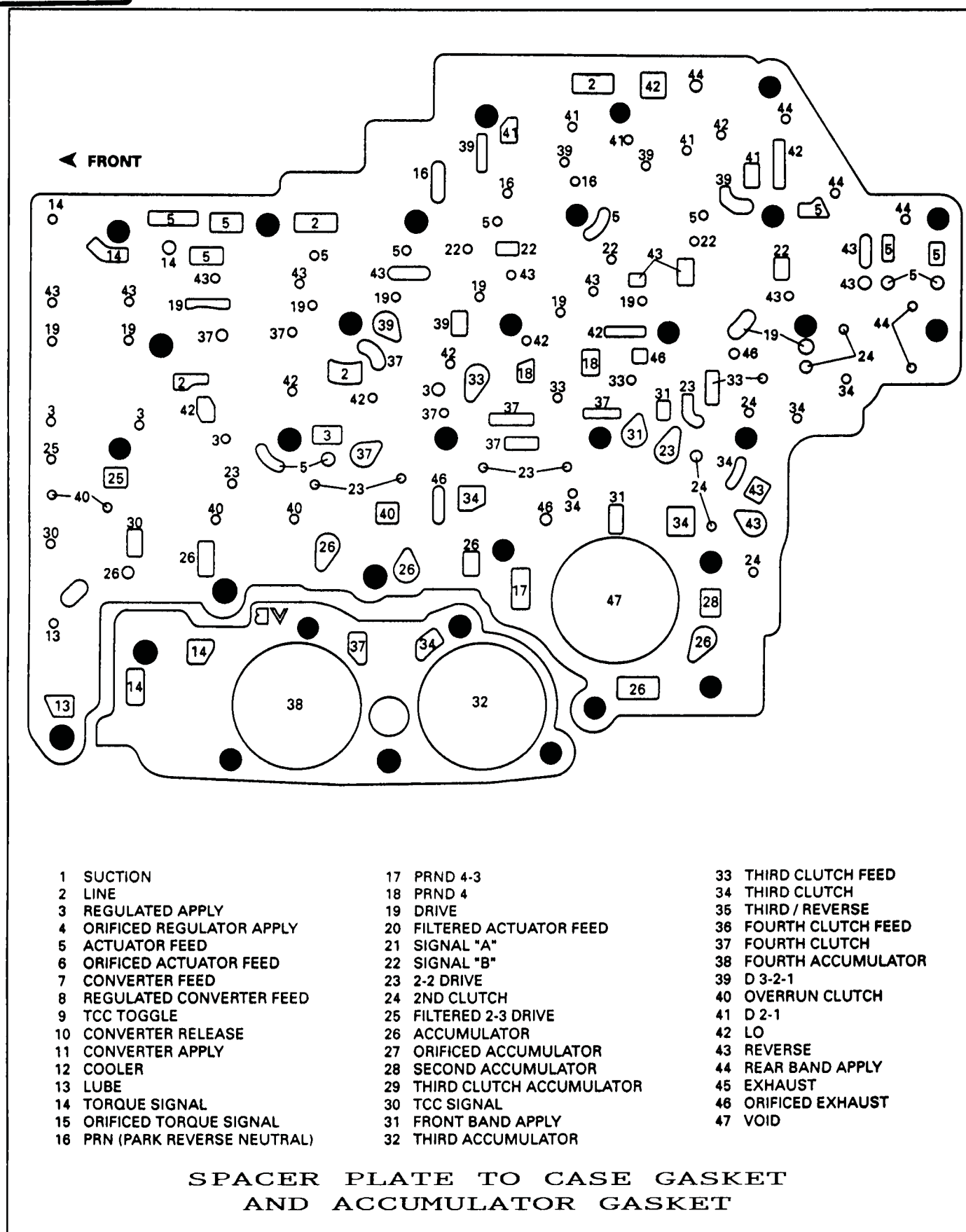


Figure 30
AUTOMATIC TRANSMISSION SERVICE GROUP

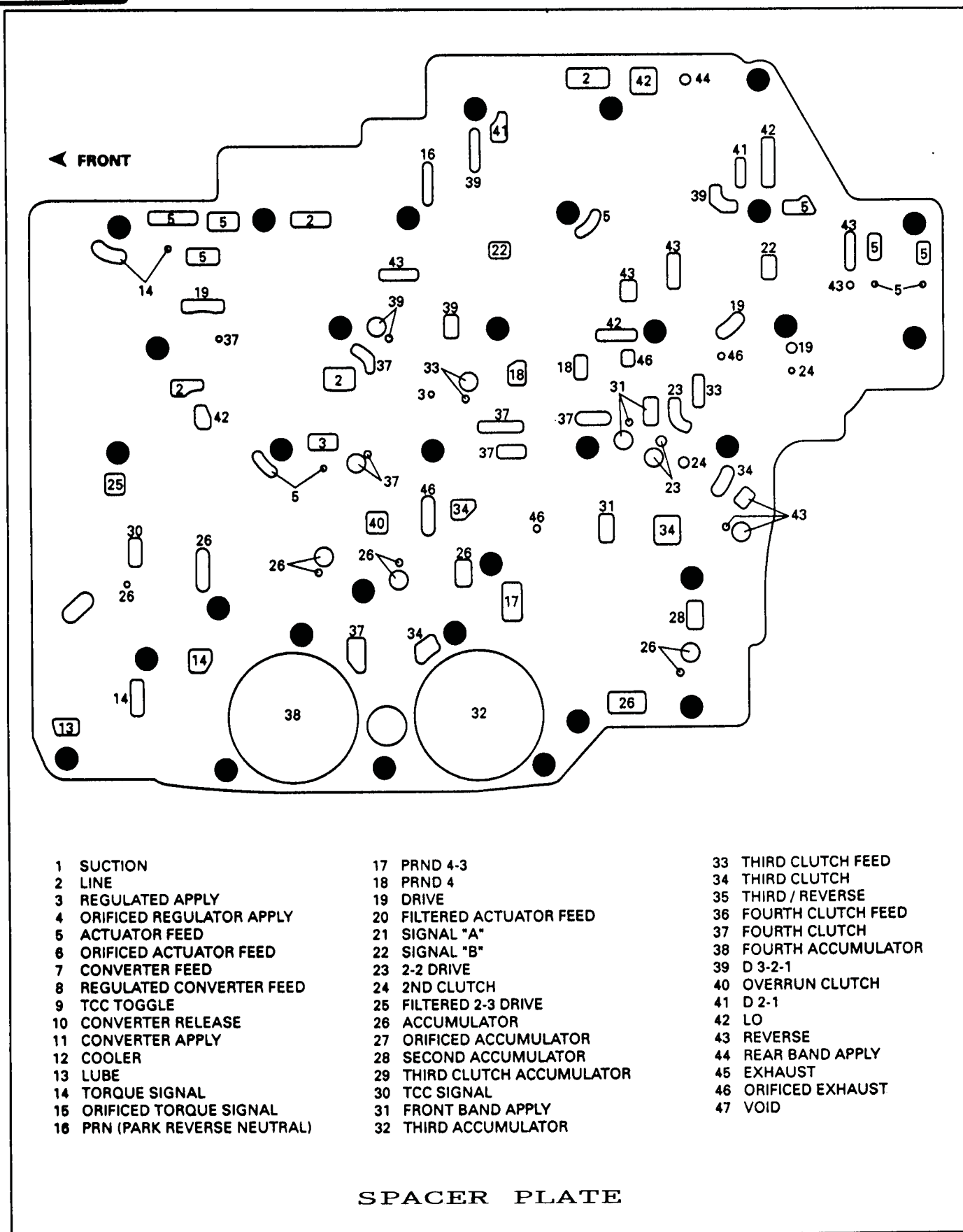


Figure 31
AUTOMATIC TRANSMISSION SERVICE GROUP

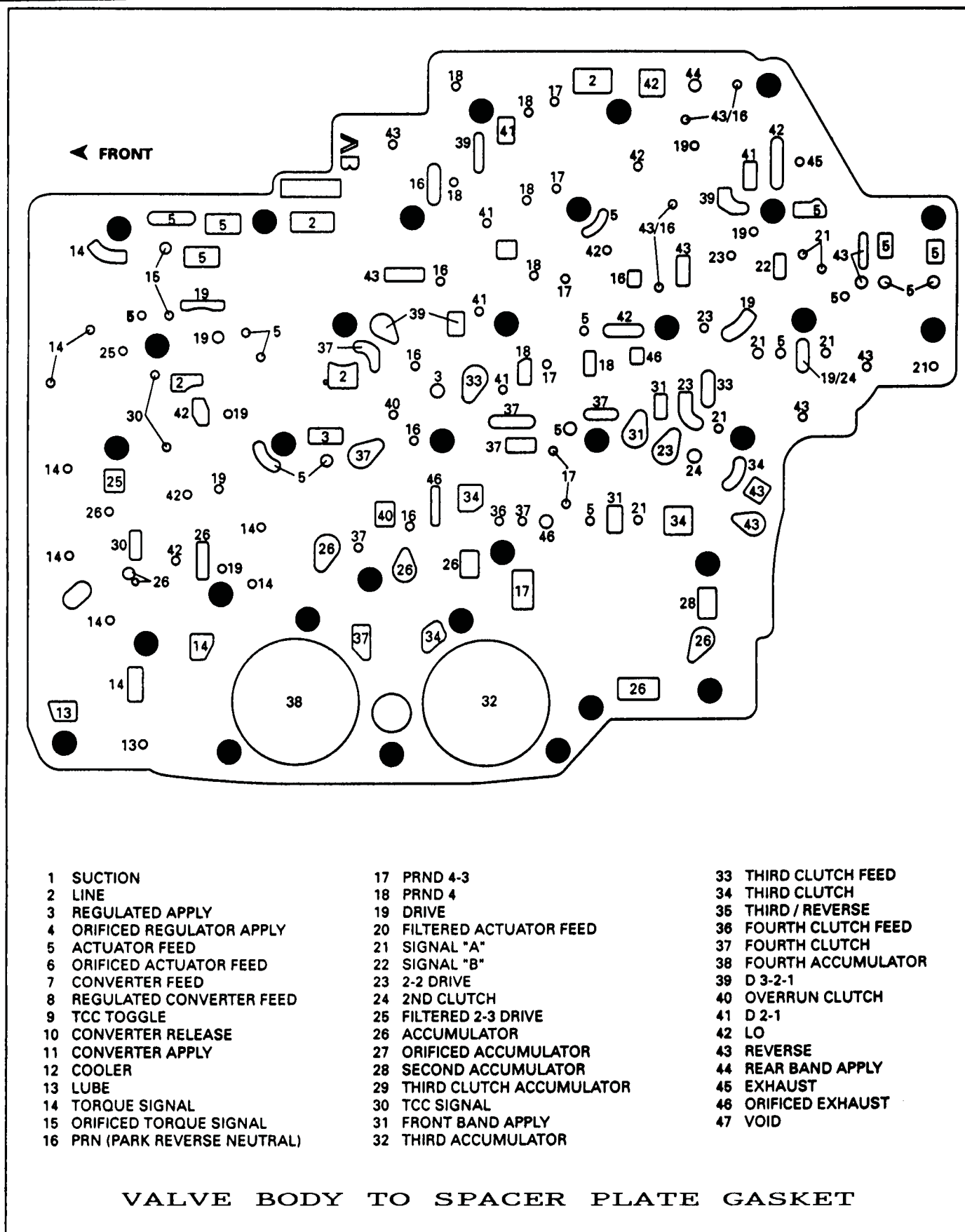
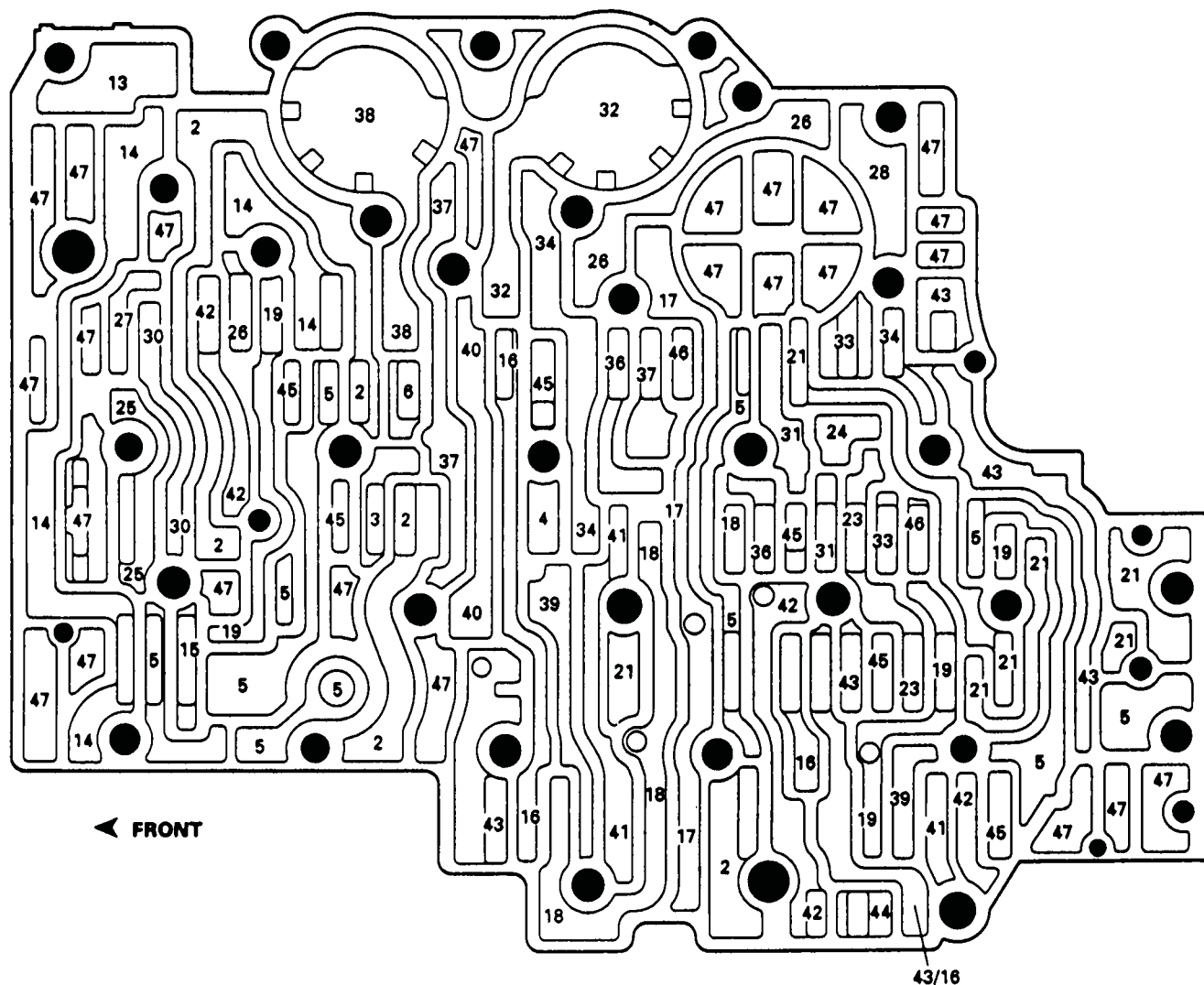


Figure 32
AUTOMATIC TRANSMISSION SERVICE GROUP



- 1 SUCTION
- 2 LINE
- 3 REGULATED APPLY
- 4 ORIFICED REGULATOR APPLY
- 5 ACTUATOR FEED
- 6 ORIFICED ACTUATOR FEED
- 7 CONVERTER FEED
- 8 REGULATED CONVERTER FEED
- 9 TCC TOGGLE
- 10 CONVERTER RELEASE
- 11 CONVERTER APPLY
- 12 COOLER
- 13 LUBE
- 14 TORQUE SIGNAL
- 15 ORIFICED TORQUE SIGNAL
- 16 PRN (PARK REVERSE NEUTRAL)

- 17 PRND 4-3
- 18 PRND 4
- 19 DRIVE
- 20 FILTERED ACTUATOR FEED
- 21 SIGNAL "A"
- 22 SIGNAL "B"
- 23 2-2 DRIVE
- 24 2ND CLUTCH
- 25 FILTERED 2-3 DRIVE
- 26 ACCUMULATOR
- 27 ORIFICED ACCUMULATOR
- 28 SECOND ACCUMULATOR
- 29 THIRD CLUTCH ACCUMULATOR
- 30 TCC SIGNAL
- 31 FRONT BAND APPLY
- 32 THIRD ACCUMULATOR

- 33 THIRD CLUTCH FEED
- 34 THIRD CLUTCH
- 35 THIRD / REVERSE
- 36 FOURTH CLUTCH FEED
- 37 FOURTH CLUTCH
- 38 FOURTH ACCUMULATOR
- 39 D 3-2-1
- 40 OVERRUN CLUTCH
- 41 D 2-1
- 42 LO
- 43 REVERSE
- 44 REAR BAND APPLY
- 45 EXHAUST
- 46 ORIFICED EXHAUST
- 47 VOID

VALVE BODY OIL PASSAGES

Figure 33

AUTOMATIC TRANSMISSION SERVICE GROUP

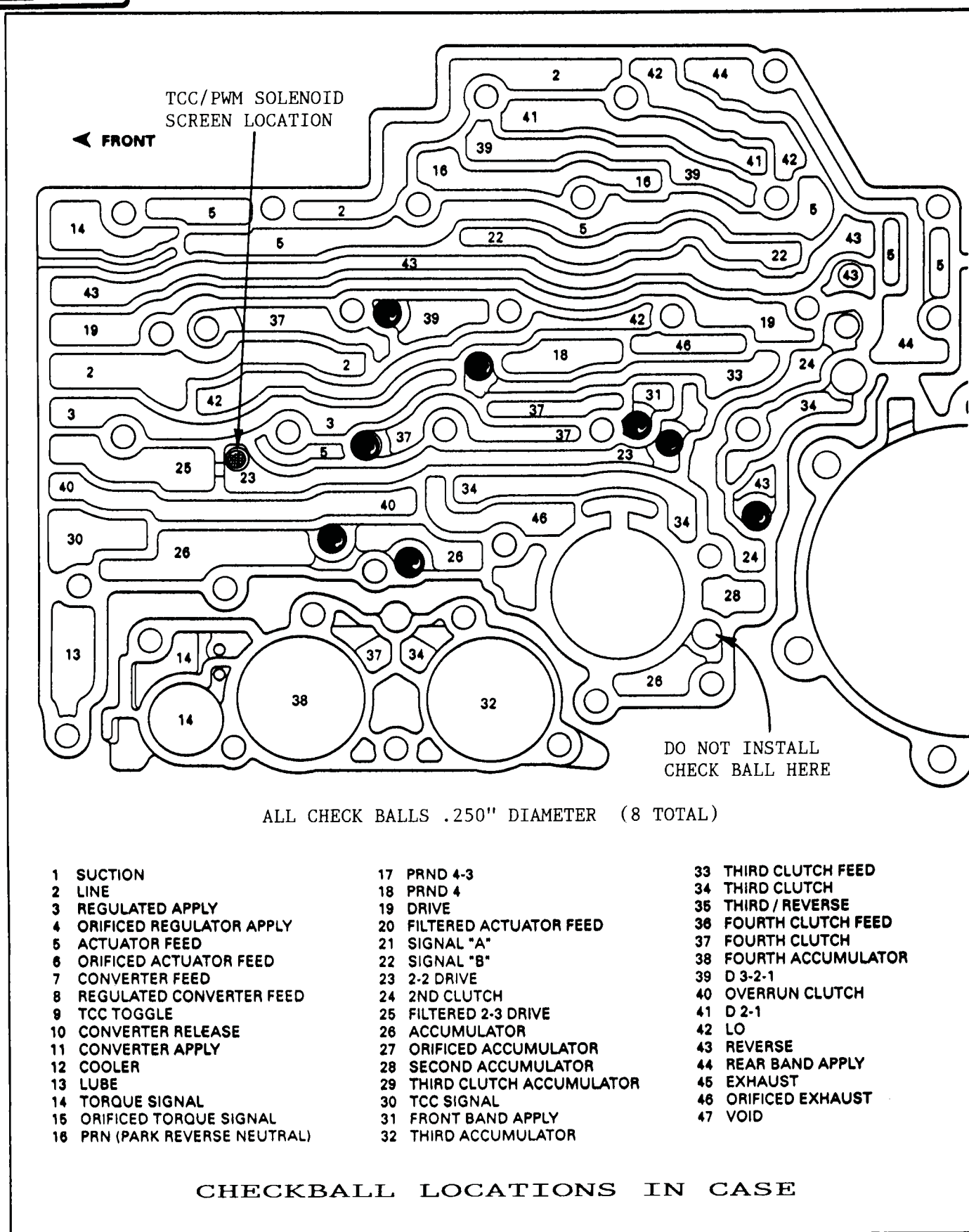


Figure 34

AUTOMATIC TRANSMISSION SERVICE GROUP

WIRING SCHEMATIC

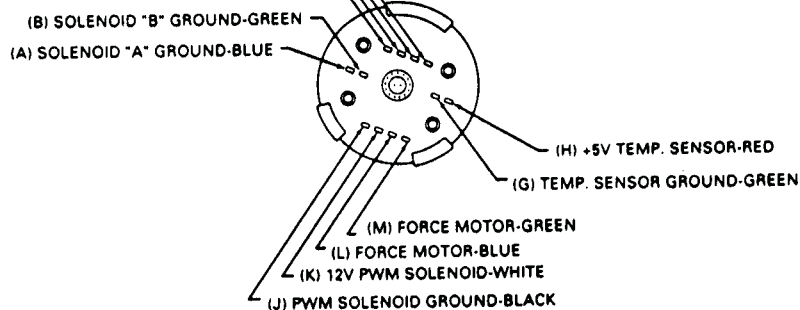
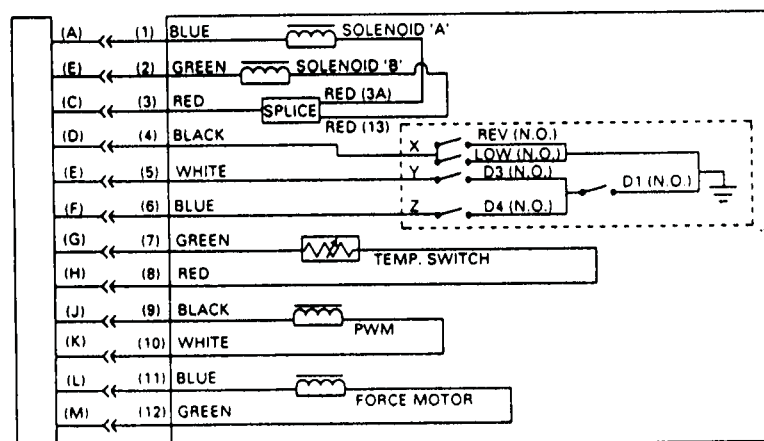
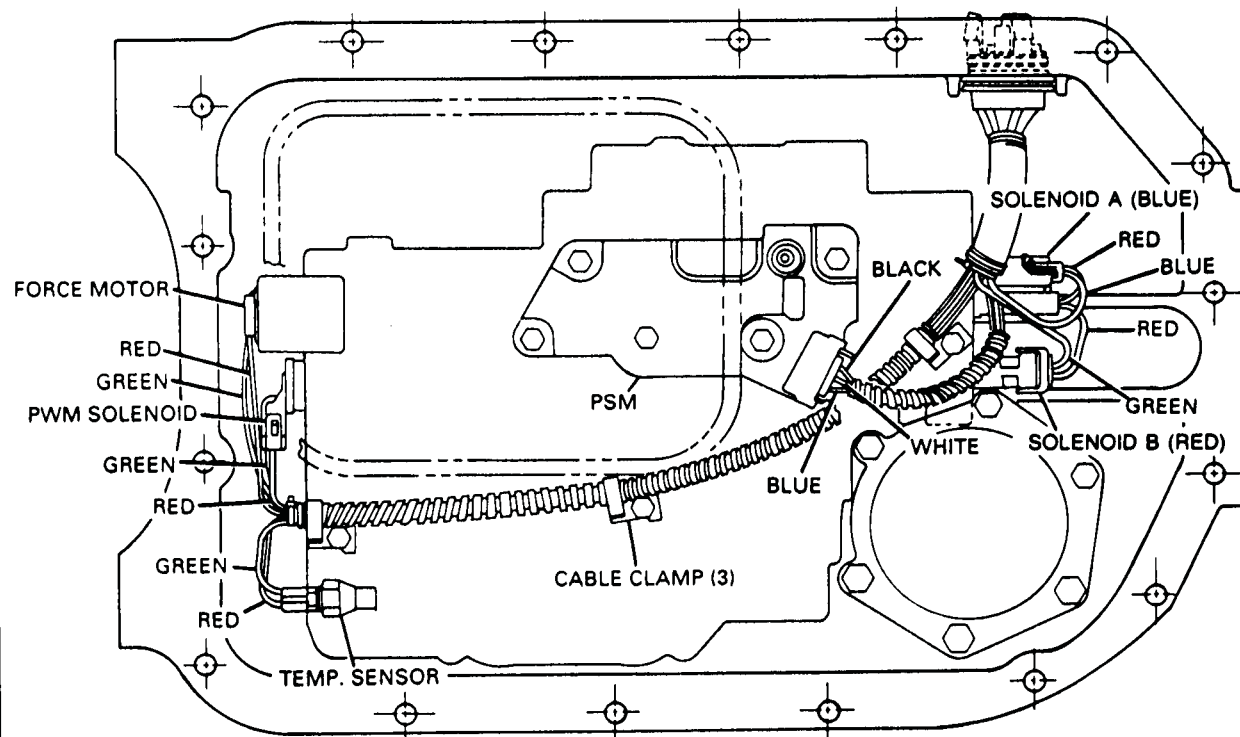


Figure 35

AUTOMATIC TRANSMISSION SERVICE GROUP

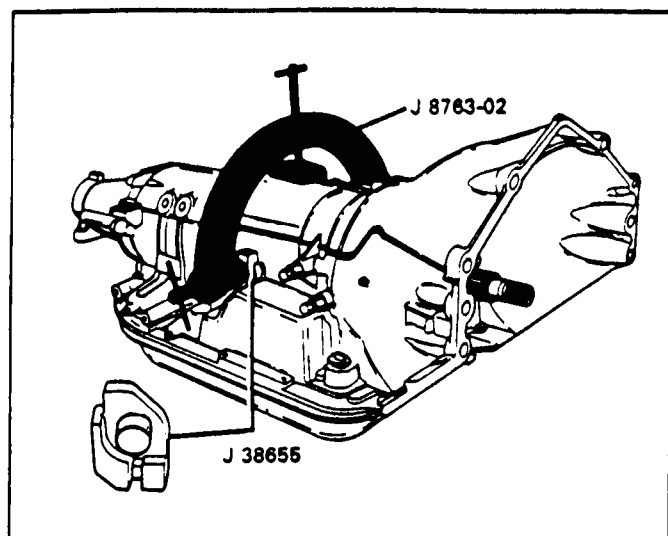


Figure 36

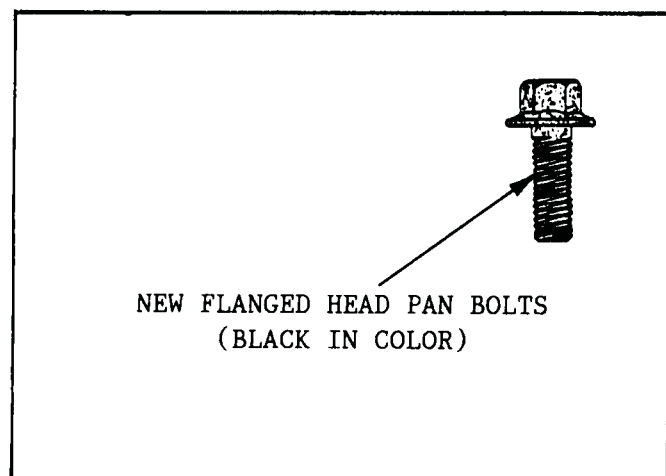


Figure 37

TRANSMISSION DISASSEMBLY

1. Remove the torque converter and drain transmission fluid.
2. Remove the two speed sensor assemblies and retaining bolts (See Figure 42).
3. Install holding fixture and J-38655 adapter onto the transmission, as shown in Figure 36.
4. DO NOT OVER TIGHTEN. Overtightening of fixture could cause case damage and inhibit disassembly.
5. Install transmission into J-3289-20 bench fixture, and lock in place with fixture pin.
6. Drain transmission fluid.
7. Rotate transmission so that bottom pan is up, and lock in place with base pin.

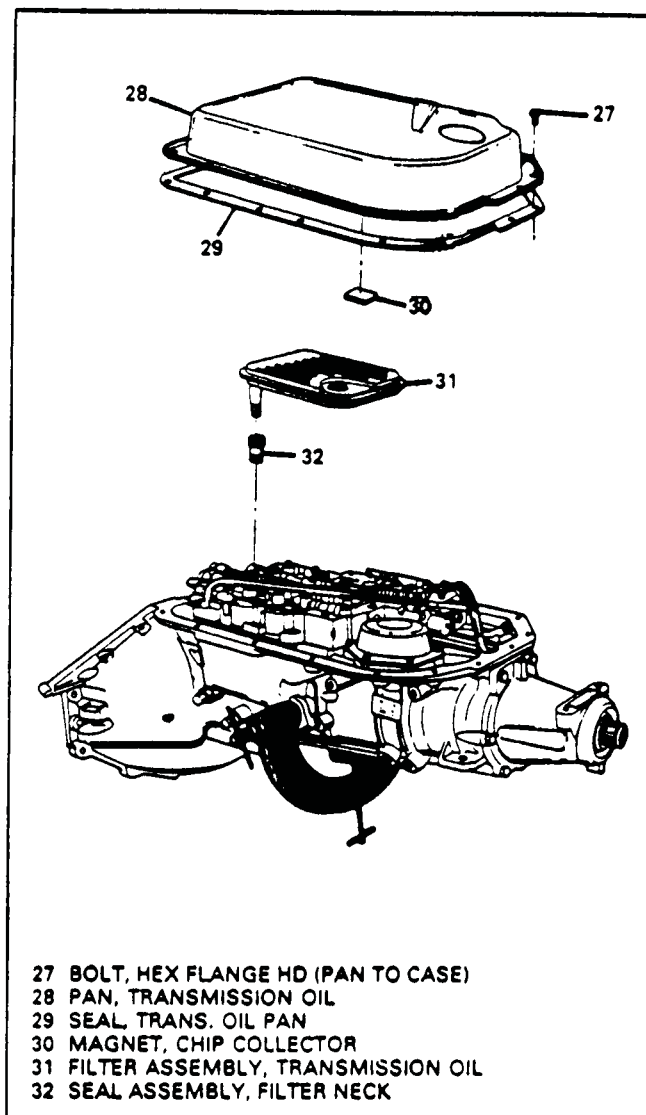


Figure 38

8. Remove 17 pan bolts using 10mm socket and speed handle.
9. Notice that the pan bolts are flange head bolts and black in color (See Figure 37).
10. Remove the bottom pan and the pan gasket. Notice that the pan gasket is the new "Controlled Compression" type and is reusable. Do not discard unless it is damaged or torn ribs.
11. Remove and discard the oil filter and multilip seal in case (See Figure 38).
12. Remove the wiring harness assembly from the case and six connectors.
13. Remove the six 8mm retaining bolts for the pressure switch manifold assembly, and remove the switch assembly (See Figure 39).

14. NOTE: Be sure 5 "O" rings are attached to pressure switch assembly, as they are not serviced.
15. Remove twenty one 10mm bolts from the valve body assembly.
16. Remove manual lever detent spring and roller assembly (See Figure 39).
17. Remove three wiring harness clips, and the fluid level indicator stop (43). (See Figure 39).
18. Remove lube pipe retainer, lube pipe, and lube pipe clamp (See Figure 39).
19. Remove the complete valve body assembly including the accumulator housing assembly (See Figure 39).
20. Remove the valve body gaskets and the spacer plate.
21. Remove 8 checkballs from case passages.
22. Remove the TCC/PWM solenoid screen from the case passage (See Figure 34).
23. Remove the intermediate (D2) servo assembly from the case bore (Figure 40).
24. Remove six retaining bolts for the reverse servo cover, and remove reverse servo cover (See Figure 41).
25. Remove the reverse servo assembly and the 1-2 accumulator assembly as shown in Figure 41.
26. Remove two retaining bolts for parking pawl bracket (713), and remove parking pawl bracket (See Figure 42).
27. Do not remove parking linkage from the case unless damaged.
28. If removal is necessary, use Figure 43 for procedure.

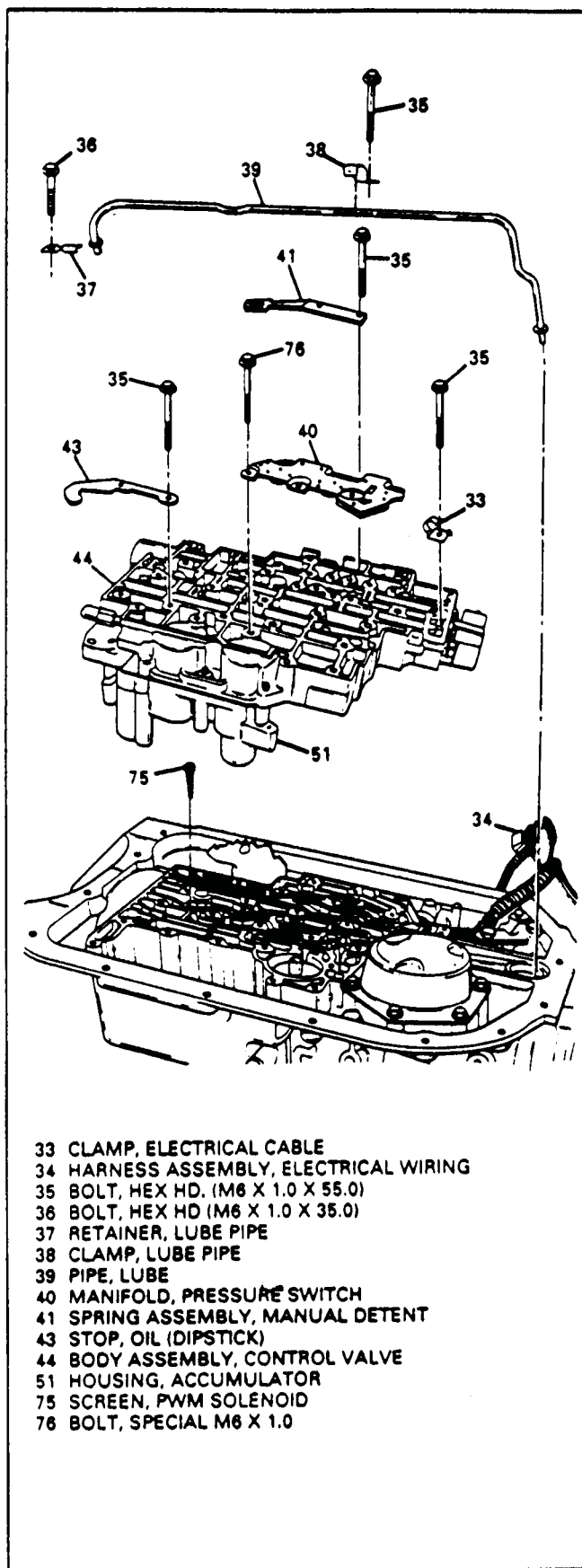


Figure 39

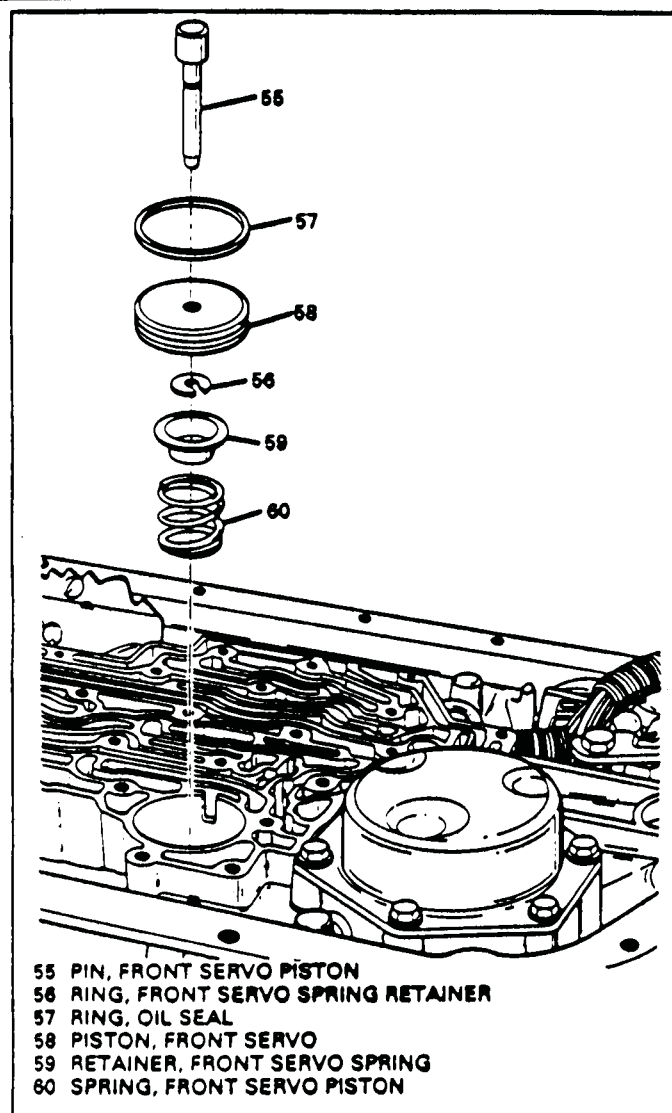


Figure 40

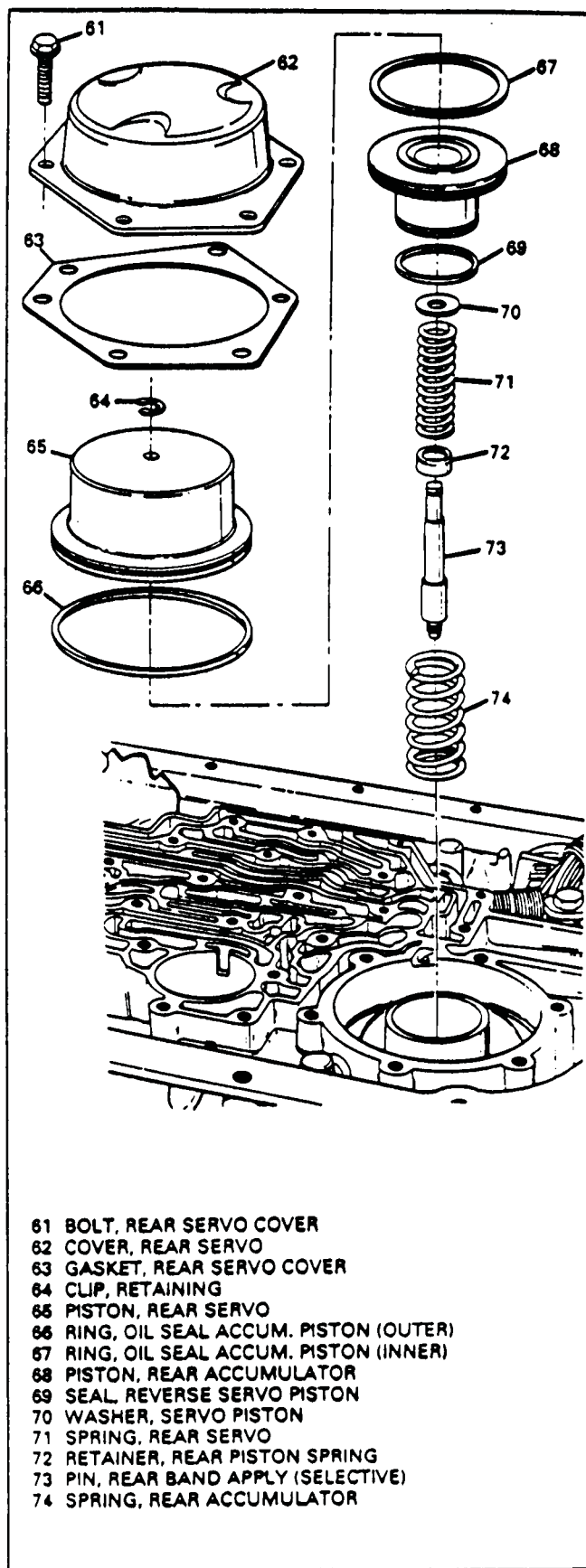


Figure 41

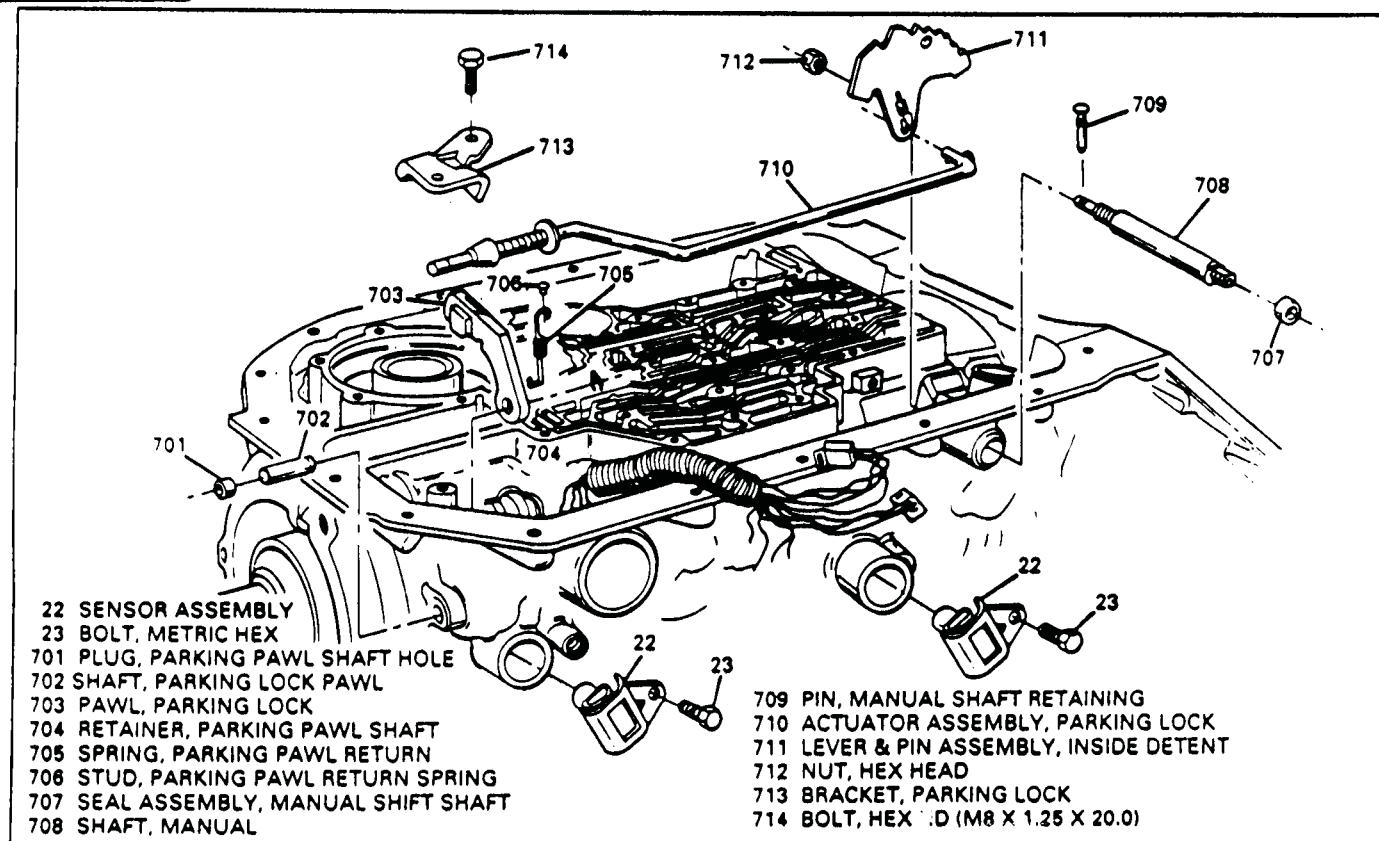


Figure 42

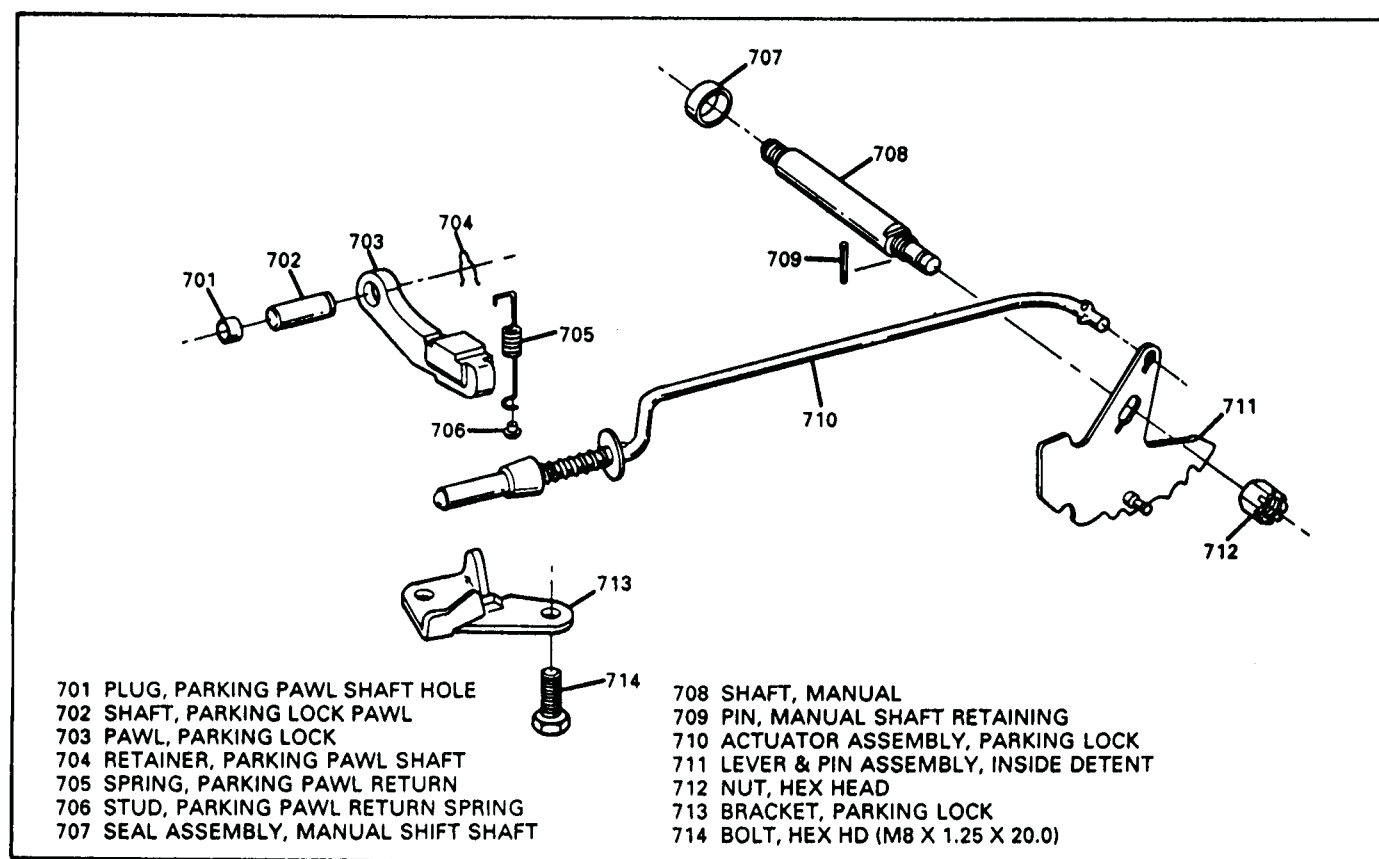


Figure 43

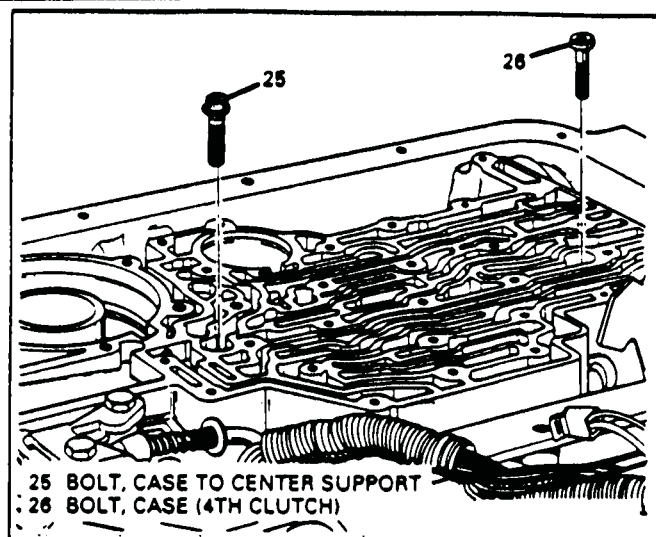


Figure 44

4TH CLUTCH BOLT AND CENTER SUPPORT BOLT

1. Remove the 4th clutch housing retaining bolt, using a 40 torx socket, as shown in Figure 44.
2. GM recommends replacing this bolt, and not reusing it.
3. Remove the center support bolt, using a 3/8" 12 point socket, from location shown in Figure 44.
4. GM recommends replacing this bolt, and not reusing it.

EXTENSION HOUSING REMOVAL

1. Remove the six extension housing bolts and remove extension housing. (See Figure 45).
2. Remove and discard the extension housing "O" ring seal (See Figure 45).
3. Remove the output shaft "O" ring seal shown in Figure 45. (Only Some Models).
4. Notice that there are two different type extension housing seals (20). (See Figure 45).

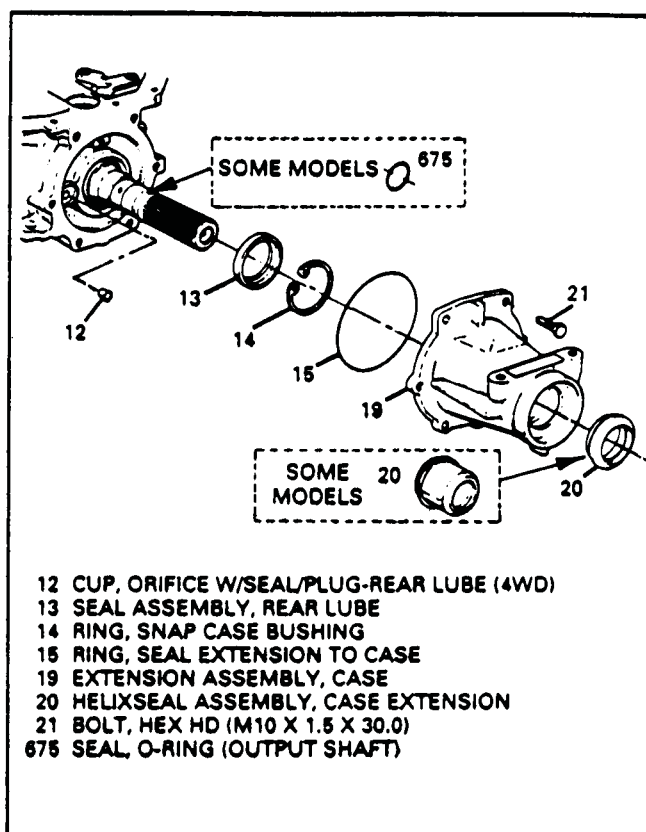


Figure 45

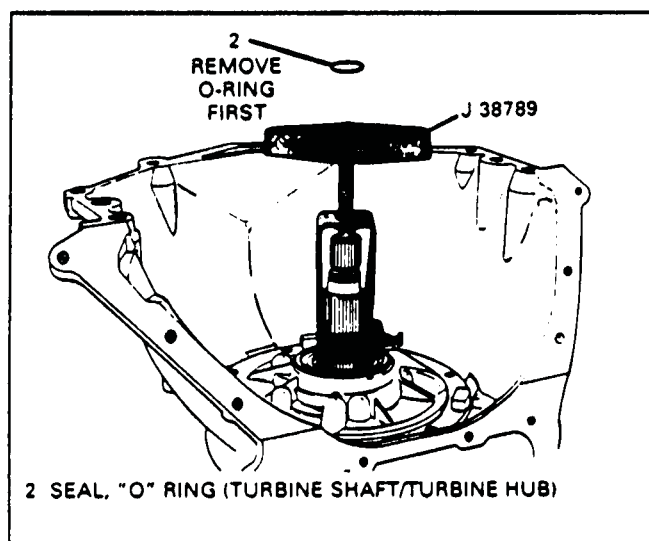


Figure 46

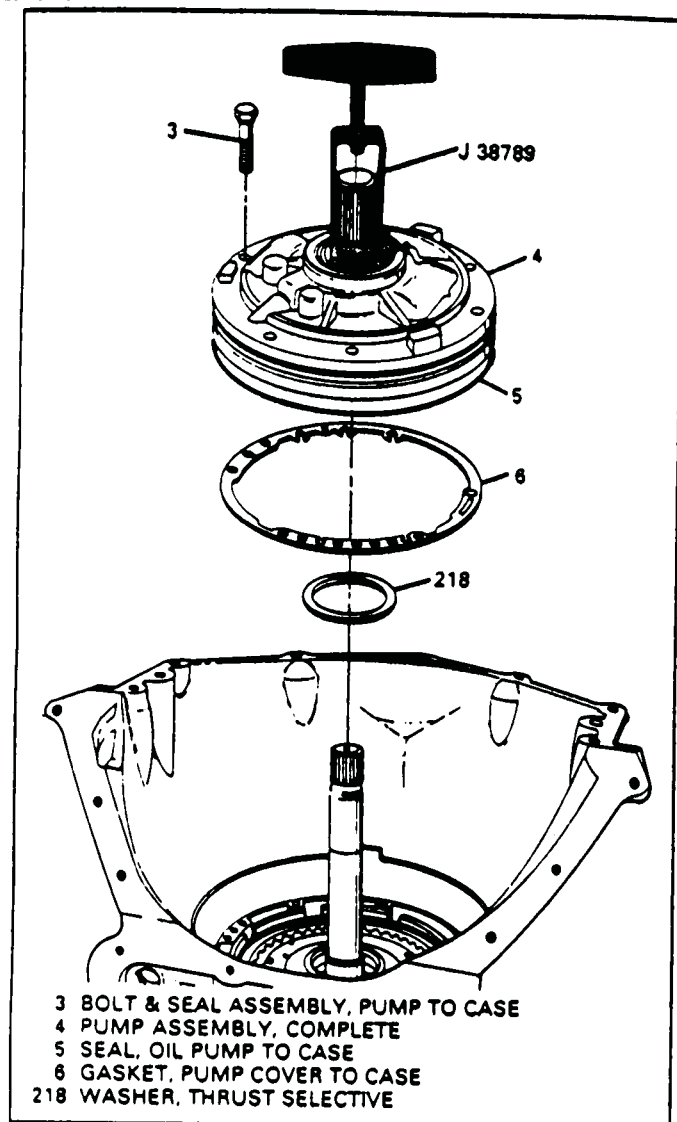


Figure 47

OIL PUMP ASSEMBLY REMOVAL

1. Remove the "O" ring seal from turbine shaft, as shown in Figure 46.
2. Remove seven 13mm pump retaining bolts and "O" rings (See Figure 47).
3. Install J-38789 pump removal tool as shown in Figure 46.
4. Tighten clamp onto stator shaft.
5. Turn the knob on top of the tool as much as necessary to break the pump assembly loose from the case.
6. Remove the oil pump assembly from the transmission (See Figure 47).
7. Remove and discard the oil pump gasket.

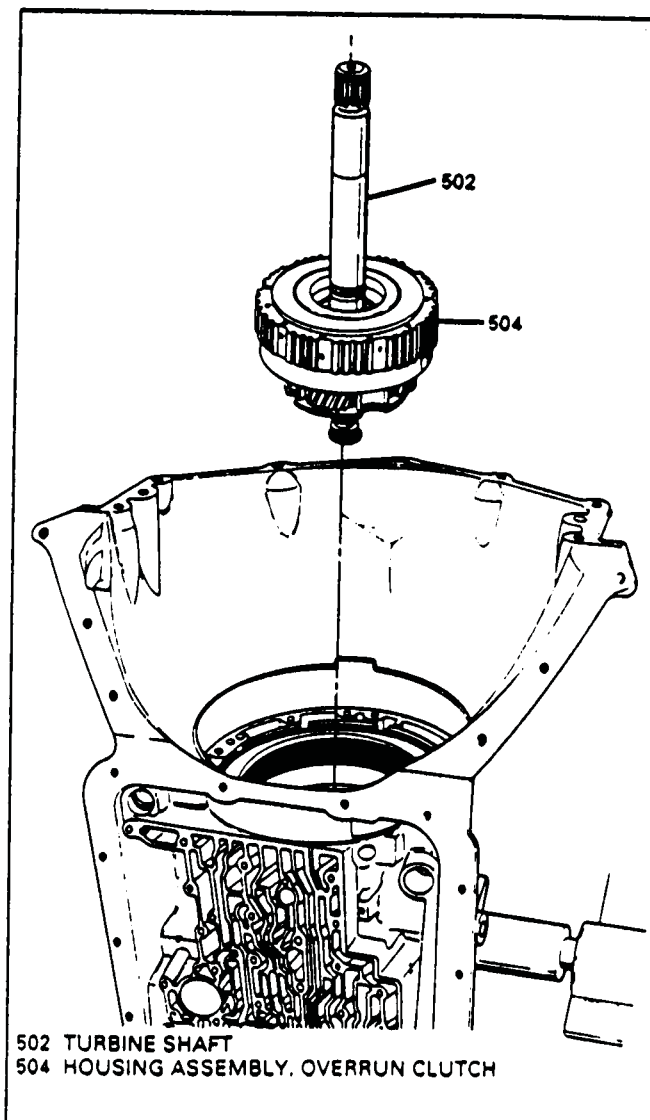


Figure 48

GEAR TRAIN REMOVAL

1. Remove the overdrive carrier and turbine shaft assembly, along with the overrun clutch housing assembly, by grasping the turbine shaft and lifting straight up (See Figure 48).
2. Insure that the 4th clutch retaining bolt has been removed (Figure 49).
3. Remove the complete 4th clutch assembly as shown in Figure 49.

Continued on next page.

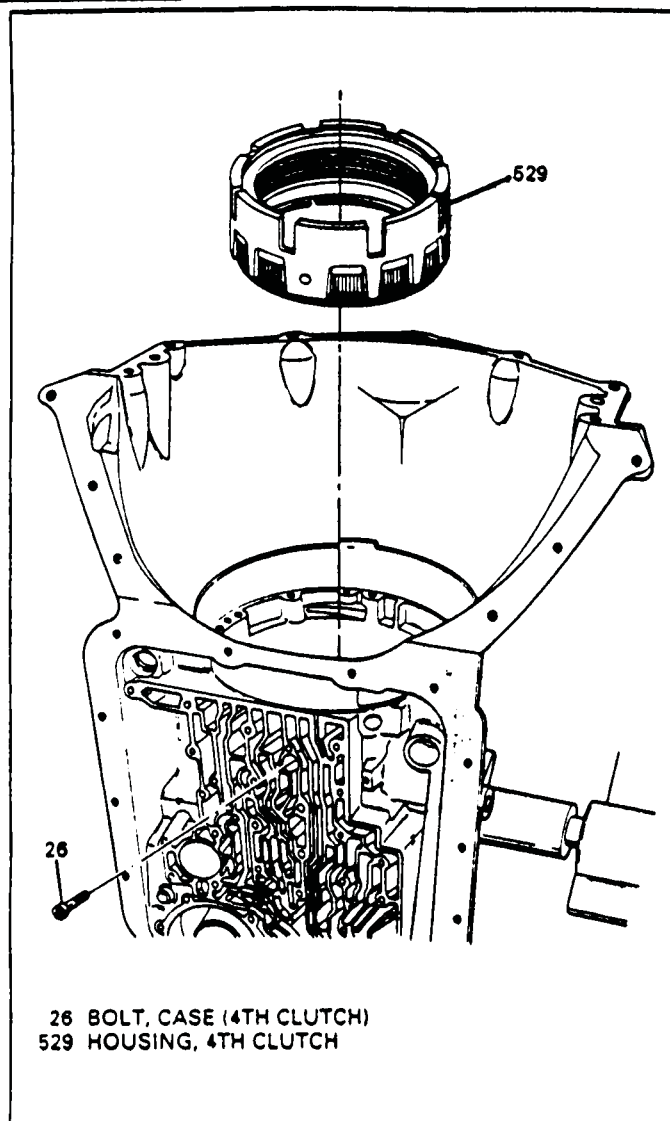


Figure 49

GEAR TRAIN REMOVAL (Continued)

4. Remove the forward clutch housing assembly, using J-38358-A, as shown in Figure 50.
5. Remove the thrust bearing from the top of the forward clutch housing. (See Figure 50).
6. Remove the thrust washer. This washer may be stuck to the bottom of forward clutch housing, or on top of direct clutch housing.
7. Remove the direct clutch housing, as shown in Figure 51, using J-38733.
8. Remove the intermediate (D2) band, as shown in Figure 51.
9. Remove the intermediate clutch snap ring with a large screwdriver.

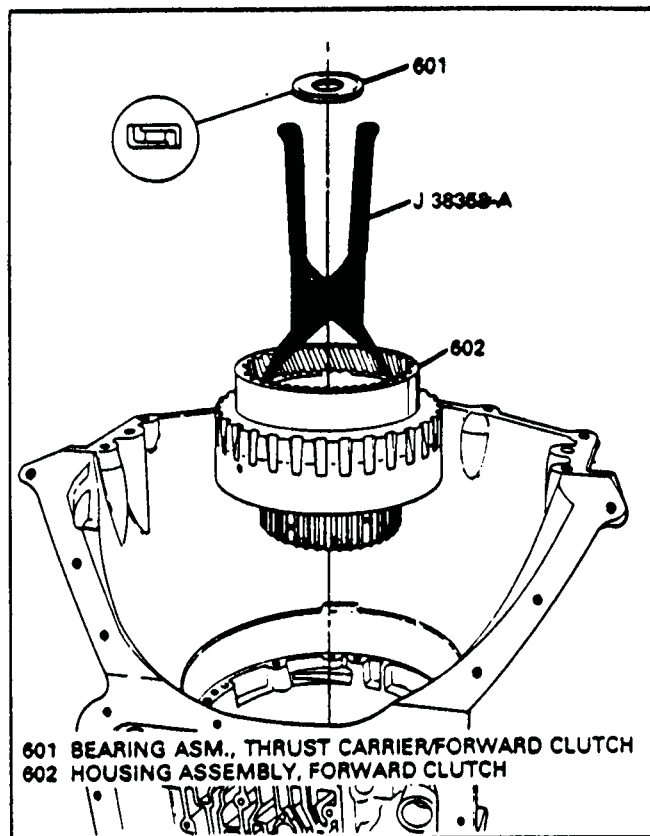


Figure 50

10. Remove the intermediate clutch backing plate (See Figure 52).
11. Remove the intermediate clutch plates both lined and steel, 4 of each, as shown in Figure 52.
12. Remove the center support bolt (25) from the location shown in Figure 54.
13. Remove the center support snap ring with a large screwdriver (Figure 53).
14. Attach tool J-38868 to the main shaft, as shown in Figure 53.
15. Remove the center support assembly and gear train unit (See Figure 53).
16. Place the center support assembly and gear train unit on work bench, remove the J-38868 tool.
17. Note the location, and remove the thin spacer (643) from case (Figure 53).
18. Remove the thrust washer, it may be stuck to gear train unit (Figure 53).
19. Remove the reverse band assembly, and the selective spacer from the case. (See Figure 55).

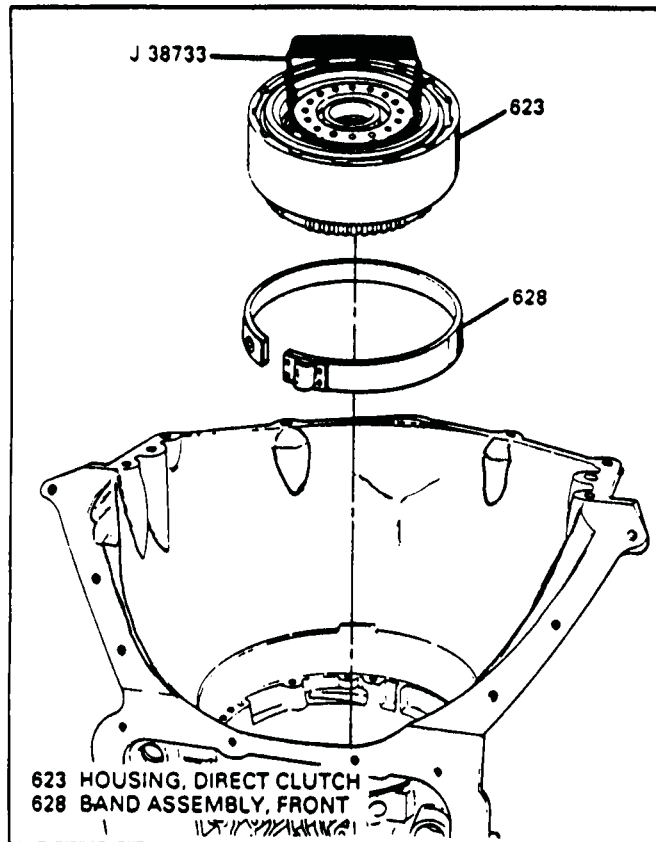


Figure 51

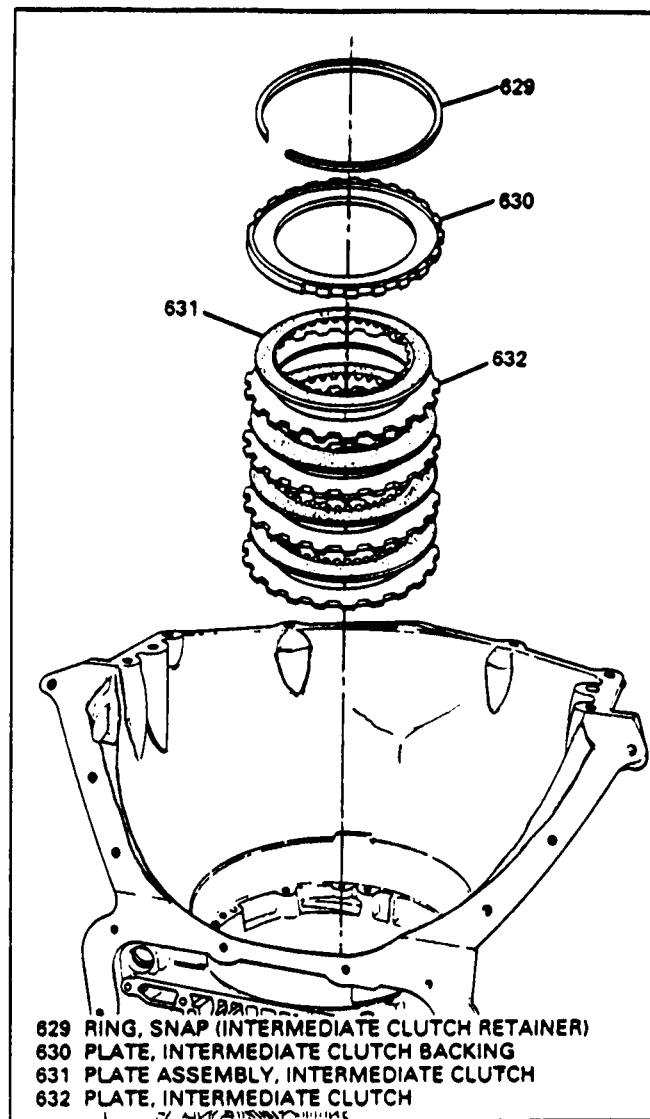


Figure 52

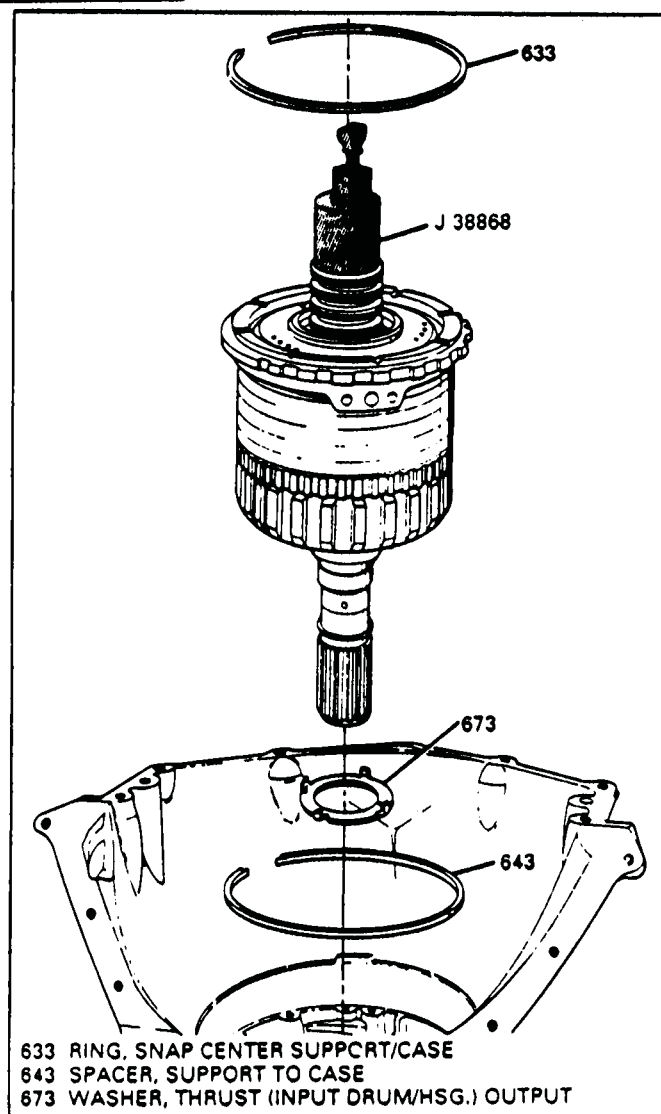


Figure 53

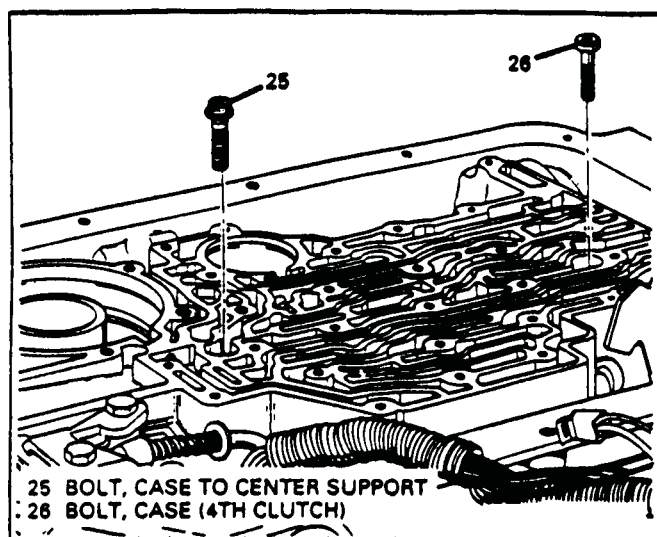


Figure 54

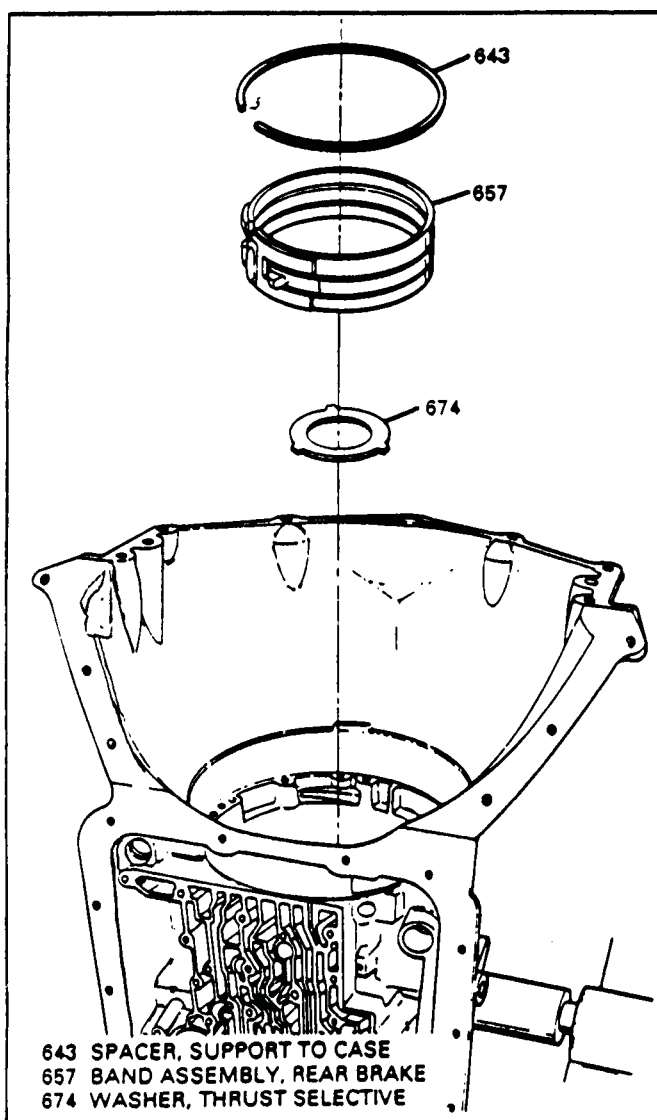


Figure 55

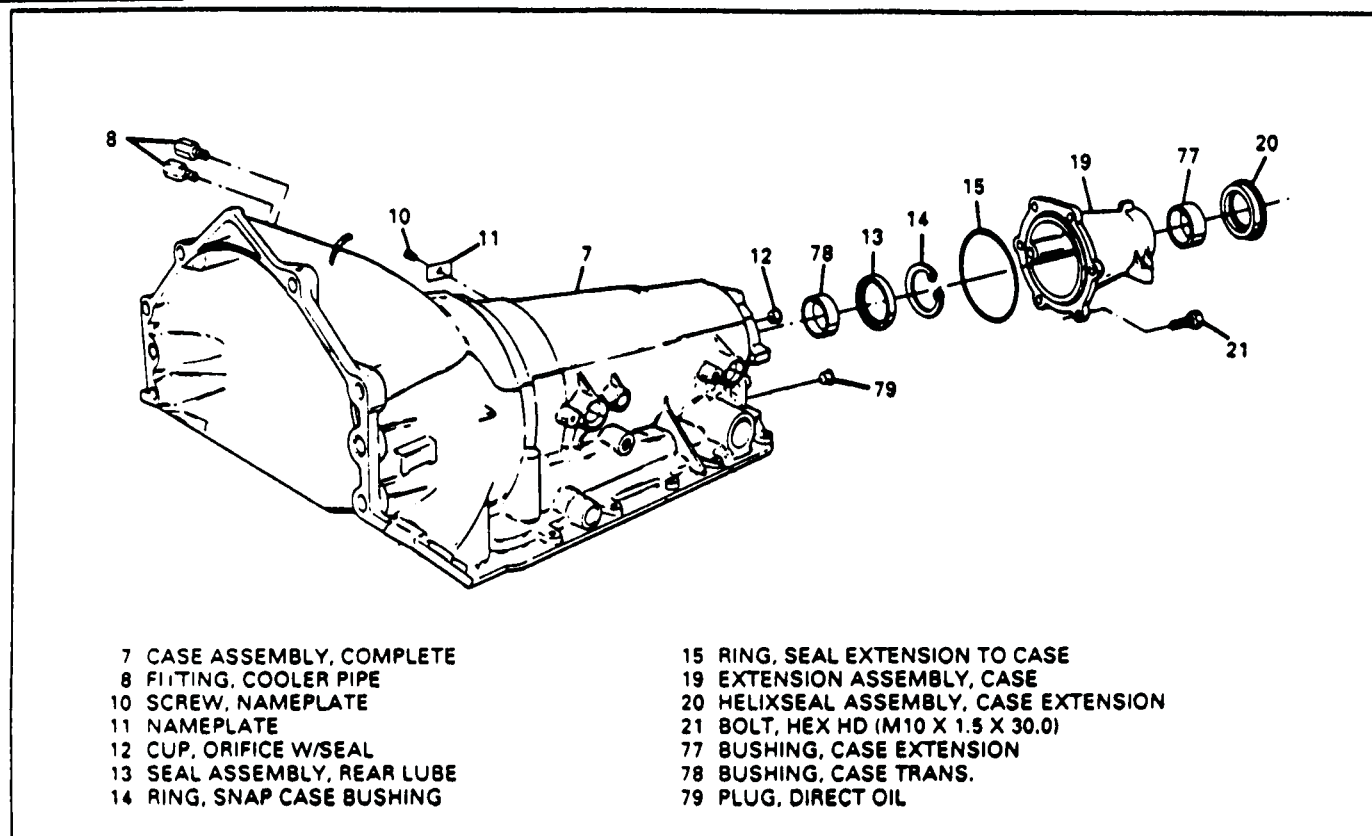


Figure 56

TRANSMISSION ASSEMBLY

TRANSMISSION CASE ASSEMBLY

1. Inspect the case for following:
 - * Cracks, Porosity, Bushing for wear and/or damage.
 - * All threaded holes for damage. (Heli-coil to repair damage).
 - * Front and rear servo bores for wear and/or damage.
 - * Case center lugs for damage.
2. Remove snap ring and replace rear lube lube seal with seal driver.
3. Install the snap ring (14) as shown in Figure 56.
4. Install the TCC/PWM solenoid screen in case passage shown in Figure 34.
5. Lubricate new manual shaft seal with petrolatum, and install manual shaft seal into case bore.
6. Make sure it is fully seated with a 14mm deep socket.
7. If parking linkage and manual shaft were removed, install linkage at this time using Figure 57 and 58 as guide.
8. DO NOT install parking bracket (713) or the speed sensors (22) at this time to prevent damage during gear train installation (See Figure 57).
9. Install selective thrust plate (674) into transmission case, and retain with petrolatum (See Figure 59).
10. Install the reverse band into case, and insure that band apply tab lines up with rear servo pin bore.

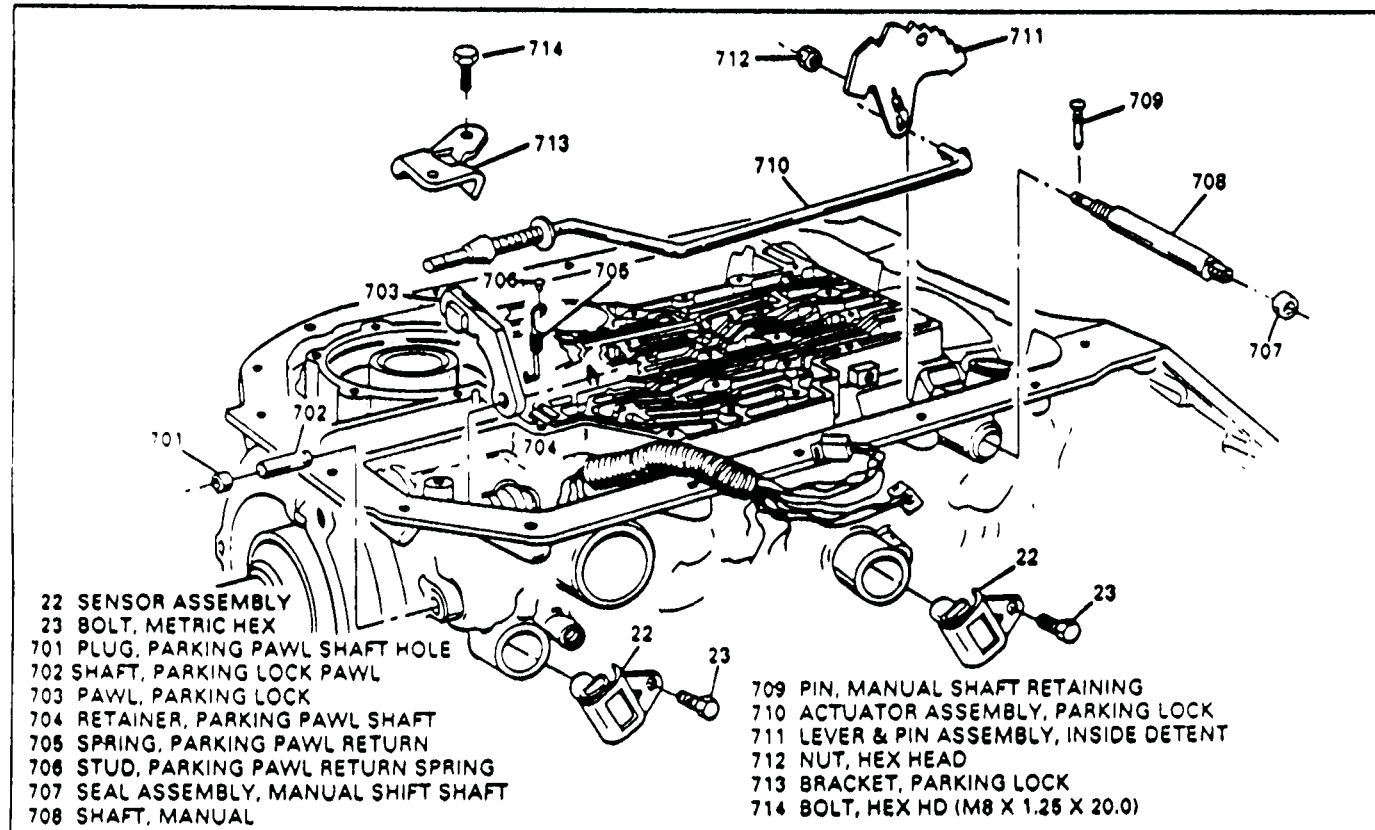


Figure 57

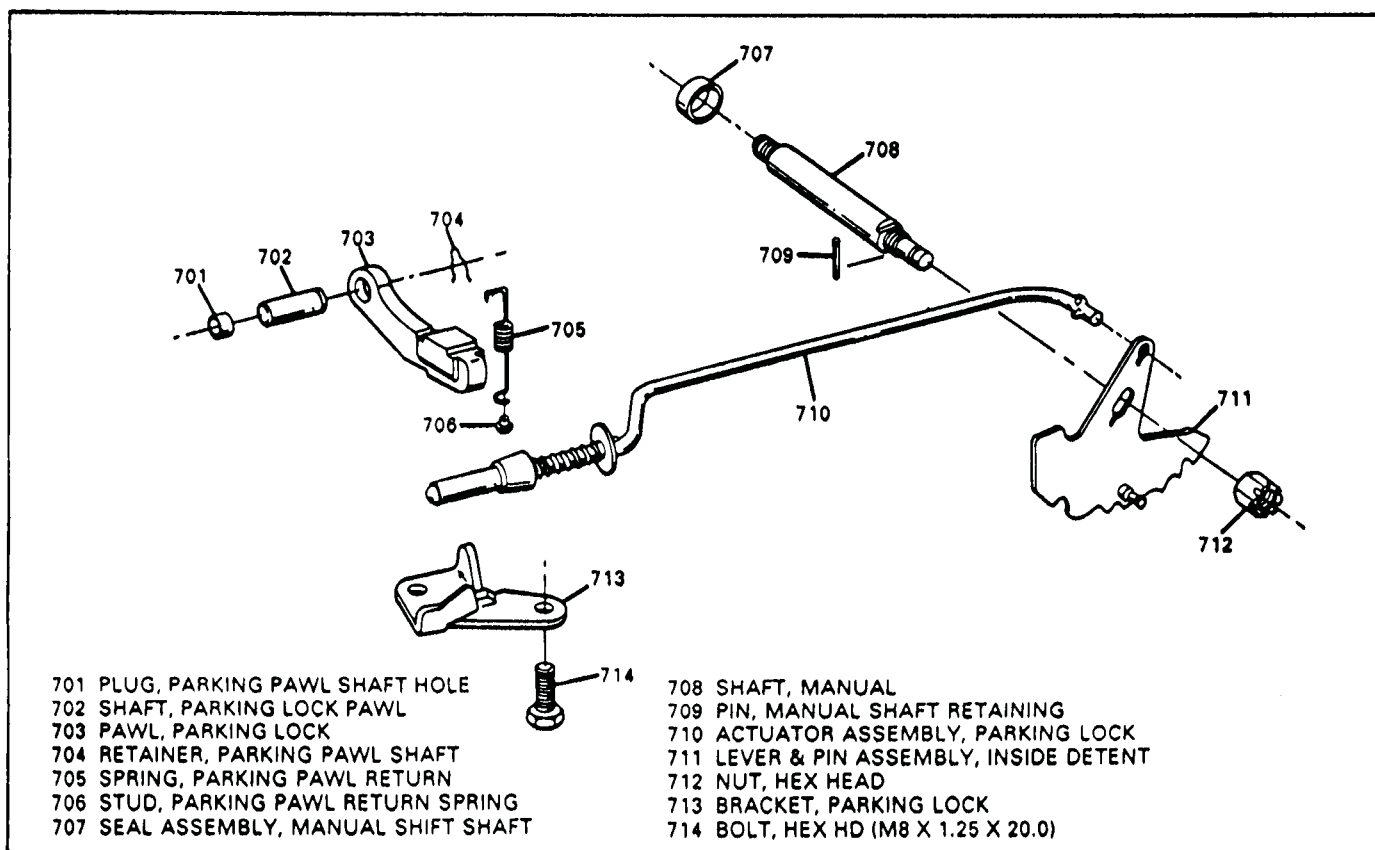


Figure 58

AUTOMATIC TRANSMISSION SERVICE GROUP

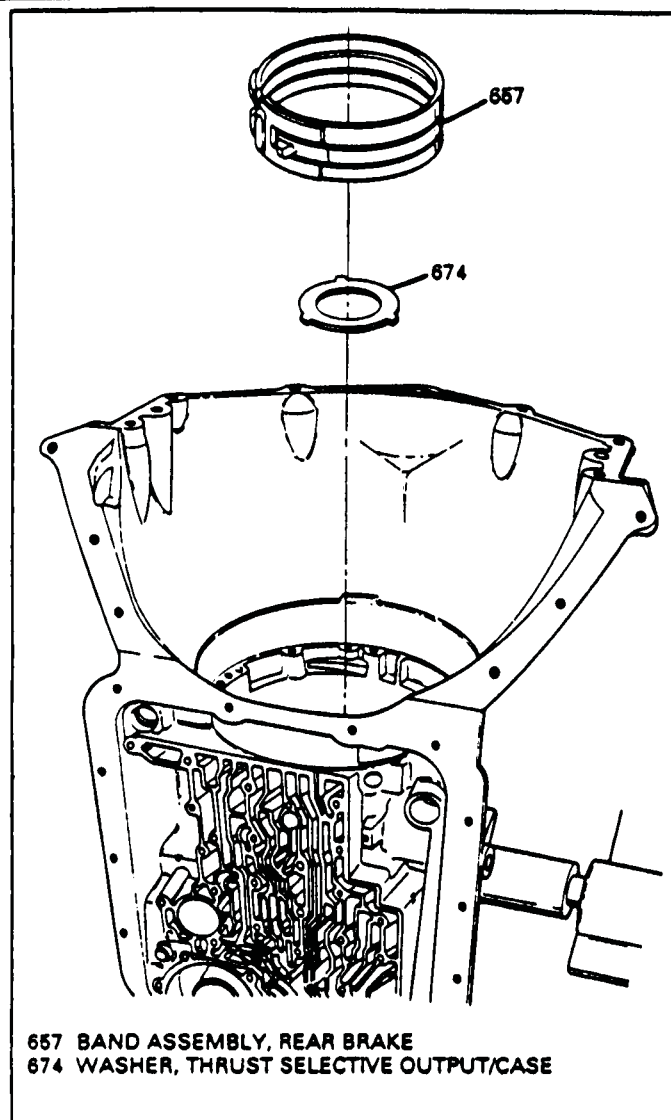
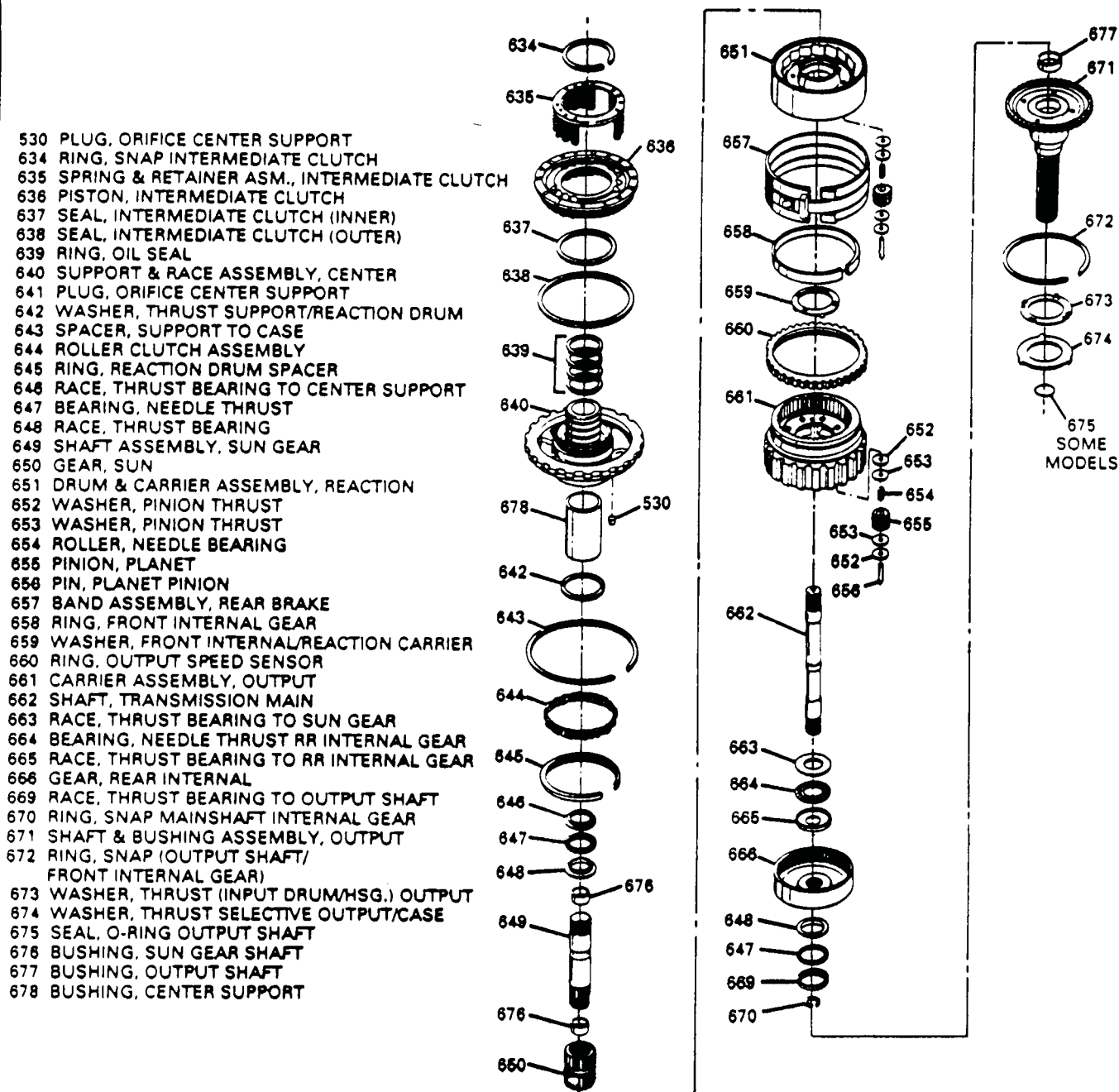


Figure 59

DISASSEMBLE GEAR TRAIN PARTS

1. Disassemble all gear train parts using Figure 60 as a guide.
2. Inspect all parts for wear or damage that are shown in Figure 60.
3. Check both planetary carriers for excessive pinion end play, using feeler gage, as shown in Figures 61 and 63.
4. Normal end play is .009" to .024".
5. Clean all parts thoroughly.



GEAR TRAIN PARTS

Figure 60

AUTOMATIC TRANSMISSION SERVICE GROUP

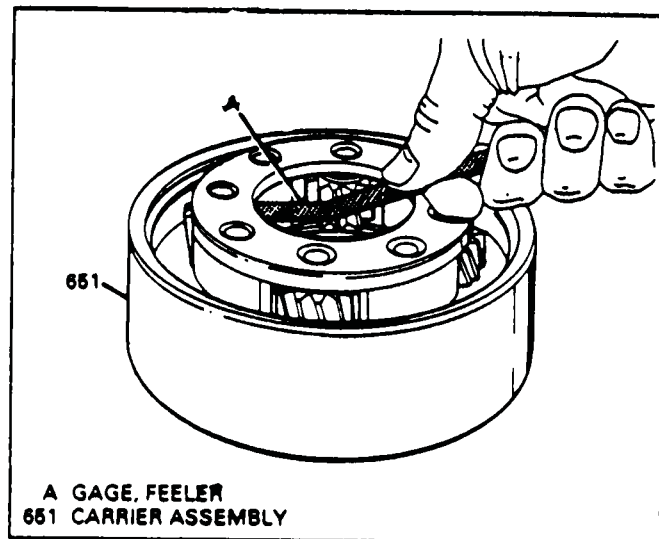


Figure 61

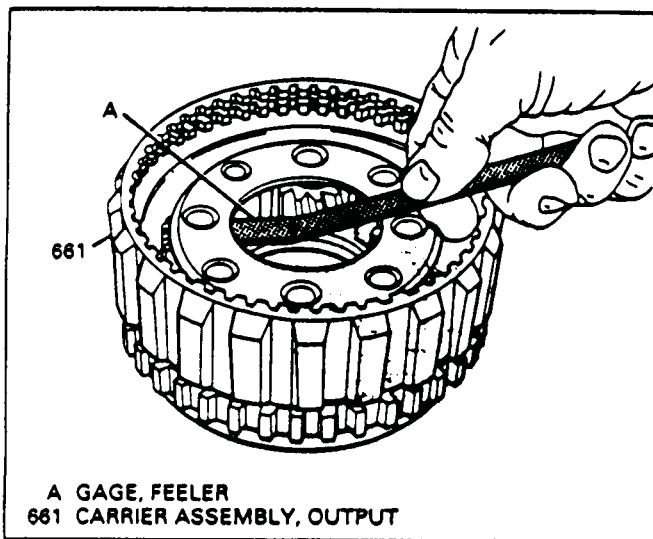


Figure 63

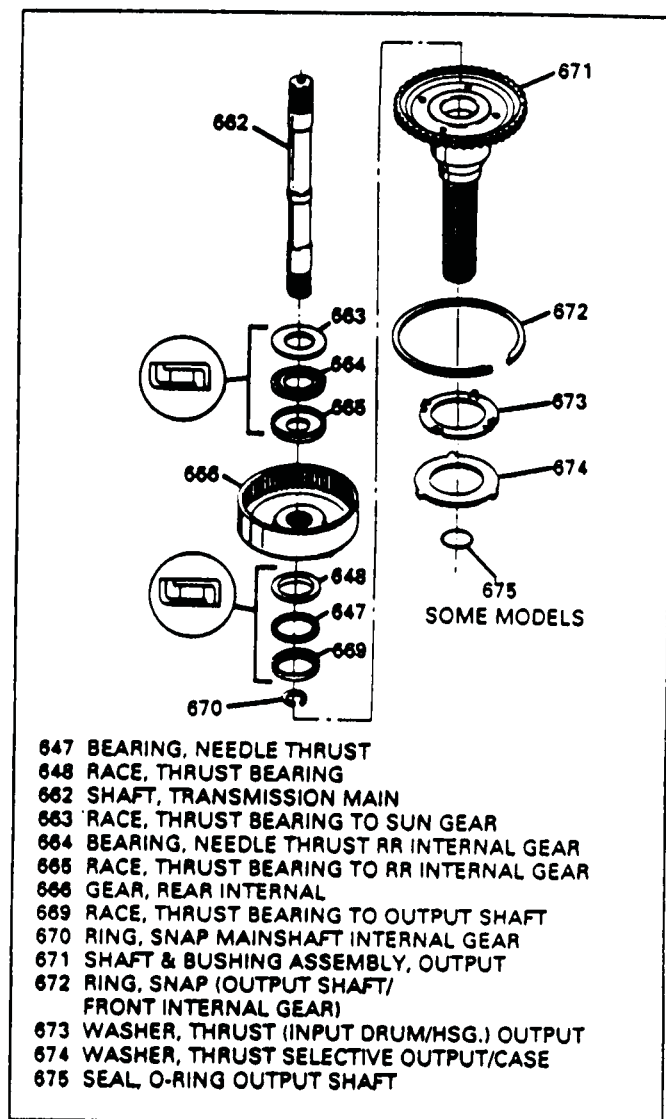


Figure 62

ASSEMBLE GEAR TRAIN PARTS

1. Install main shaft into rear ring gear (If Removed), and install snap ring on main shaft (See Figure 62).
2. Install inner race (648) with lip up, thrust bearing (647) and outer race with lip down, onto rear ring gear hub and retain with petrolatum (Figure 62).
3. Install outer race (665) with lip up, thrust bearing (664) and inner race (663), with lip down onto main shaft. (See Figure 62).
4. Install main shaft and rear ring gear assembly into output carrier assembly.
5. Install output shaft into output carrier assembly, and install snap ring. (See Figures 62 and 64).
6. Install thrust washer on back of output shaft, and retain with petrolatum. (See Figure 62).
7. Install thrust washer (659) onto output carrier with the tabs in pockets, and retain with petrolatum. (See Figure 64).
8. Install black spacer ring onto output carrier.
9. Install reaction carrier assembly onto output carrier by rotating into place. (See Figure 64).
10. Install sun gear into reaction carrier with the chamfered inner diameter facing down (See Figure 64).
11. Install sun gear shaft with the long splined end first and engage in the sun gear (See Figure 64).

Continued next page.

ASSEMBLE GEAR TRAIN PARTS (Continued)

12. Install longer lipped race (648) onto sun gear shaft with the lip facing up. (See Figure 64).
13. Install needle thrust bearing (647) on longer lipped race (See Figure 64).
14. With the center support on work bench install race (646) on center support and retain with petrolatum.
15. Install spacer ring (645) into reaction carrier assembly, if removed. (See Figure 64).
16. Install the intermediate roller clutch assembly into reaction carrier.
17. Inspect the center support assembly for any damage, and for presence of the orifice cup plug (See Figure 67).
18. Install the inner and outer lip seals onto intermediate piston, with the lip facing away from spring pockets. (See Figure 65).
19. Install tool J-21363 lip seal protector onto center support (See Figure 66).
20. Lubricate lip seals on piston with petrolatum, and install intermediate piston into center support by rotating into position.
21. Make sure that it is fully seated.
22. Install return spring and retainer assembly into the pockets in intermediate piston (See Figure 65).
23. Compress the spring assembly, install the snap ring, and insure fully seated.
24. Install new solid seal rings (639) on center support, using installer and resizing tool J-38735. See special tool section in rear of this booklet.
25. This tool is set up much like the 440 solid seal installer.
26. Be sure to use small chamfered end of resizer J-38735-2 to do the lower ring and the larger chamfered end to size all other seals. Start with the lower ring and work towards the top. (See Figure 68).
27. Lubricate the resized solid seals with petrolatum, for installation.
28. Install center support assembly into the intermediate roller clutch by rotating into position.

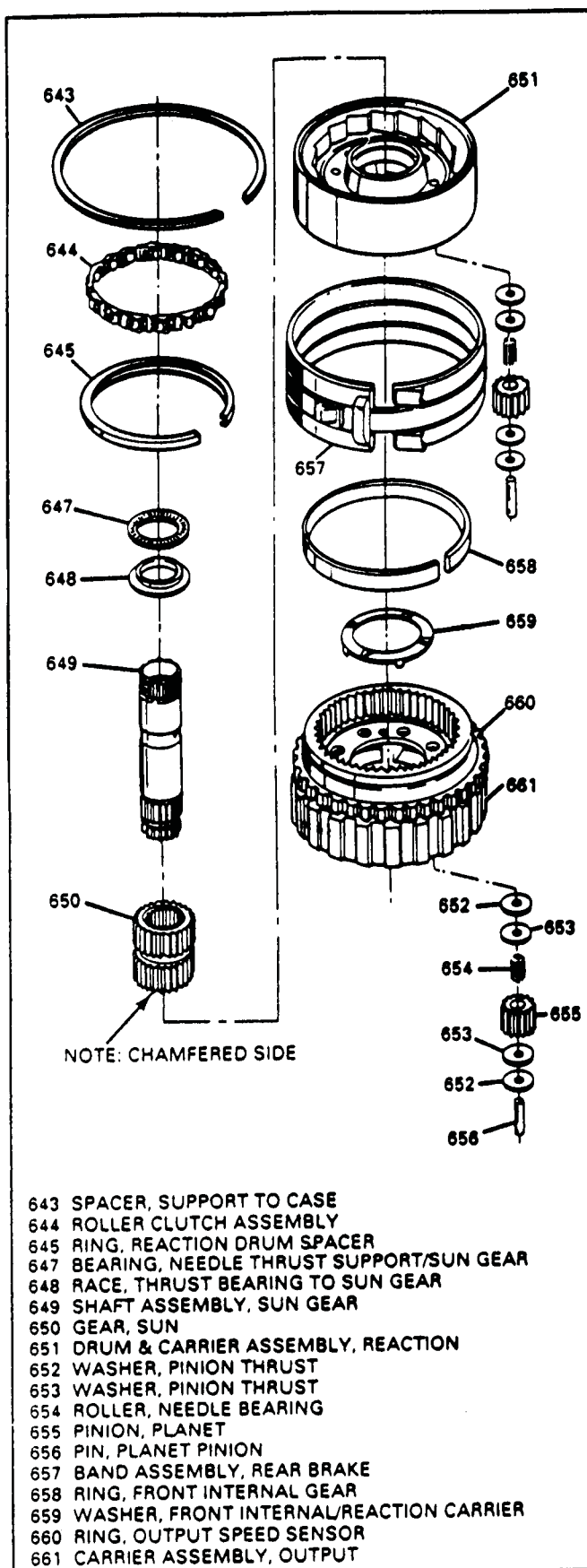


Figure 64

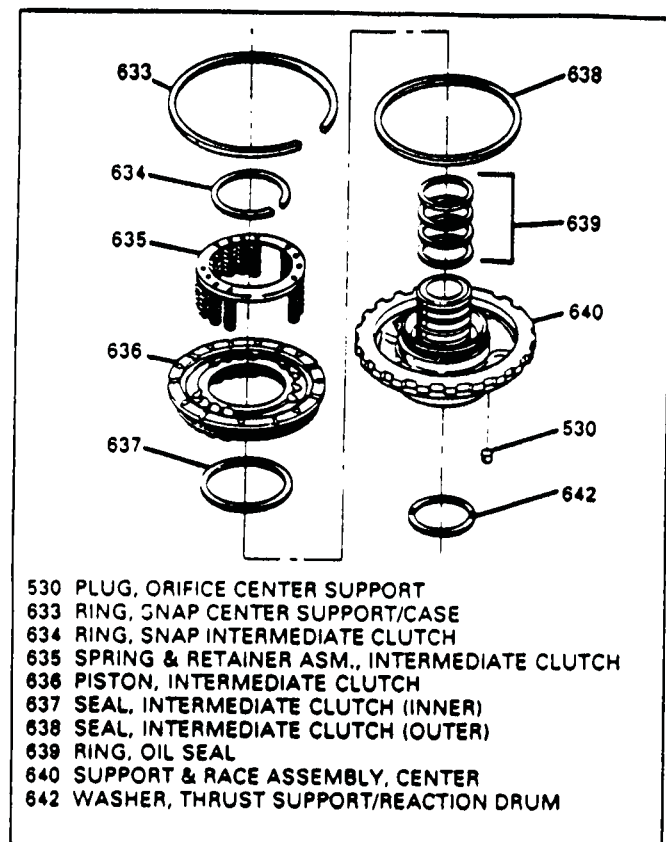


Figure 65

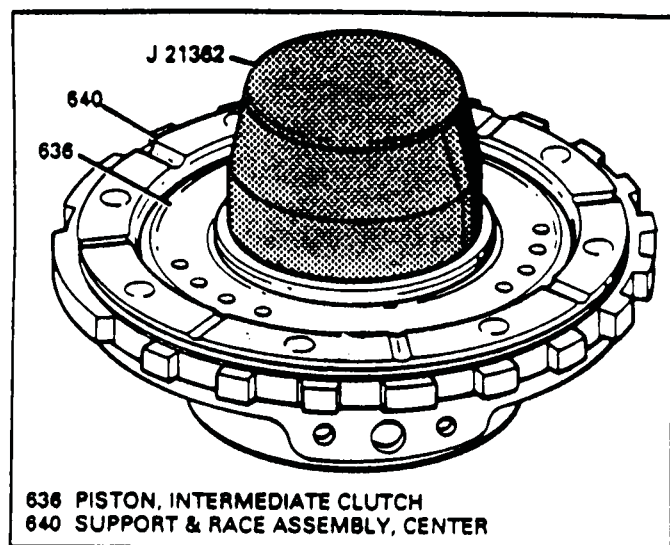


Figure 66

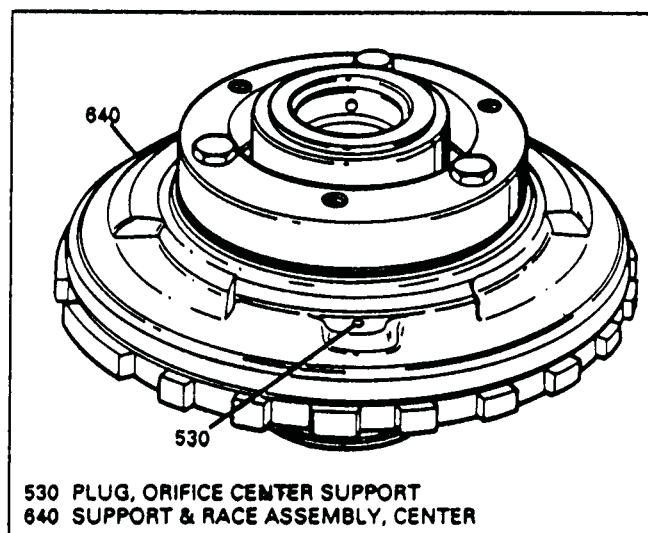


Figure 67

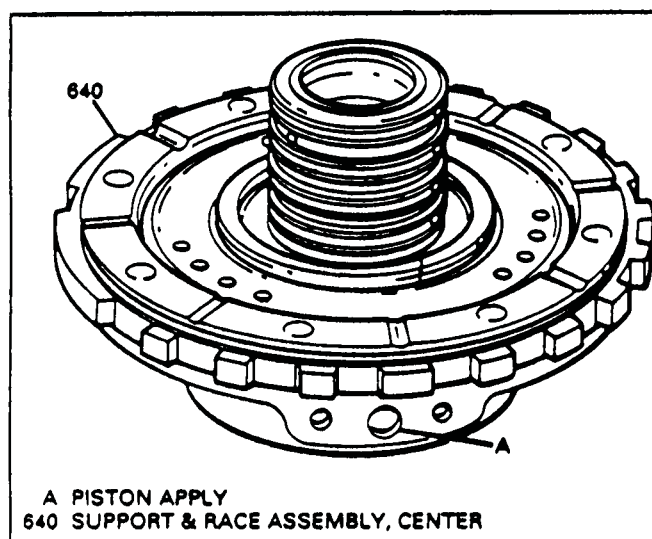


Figure 68

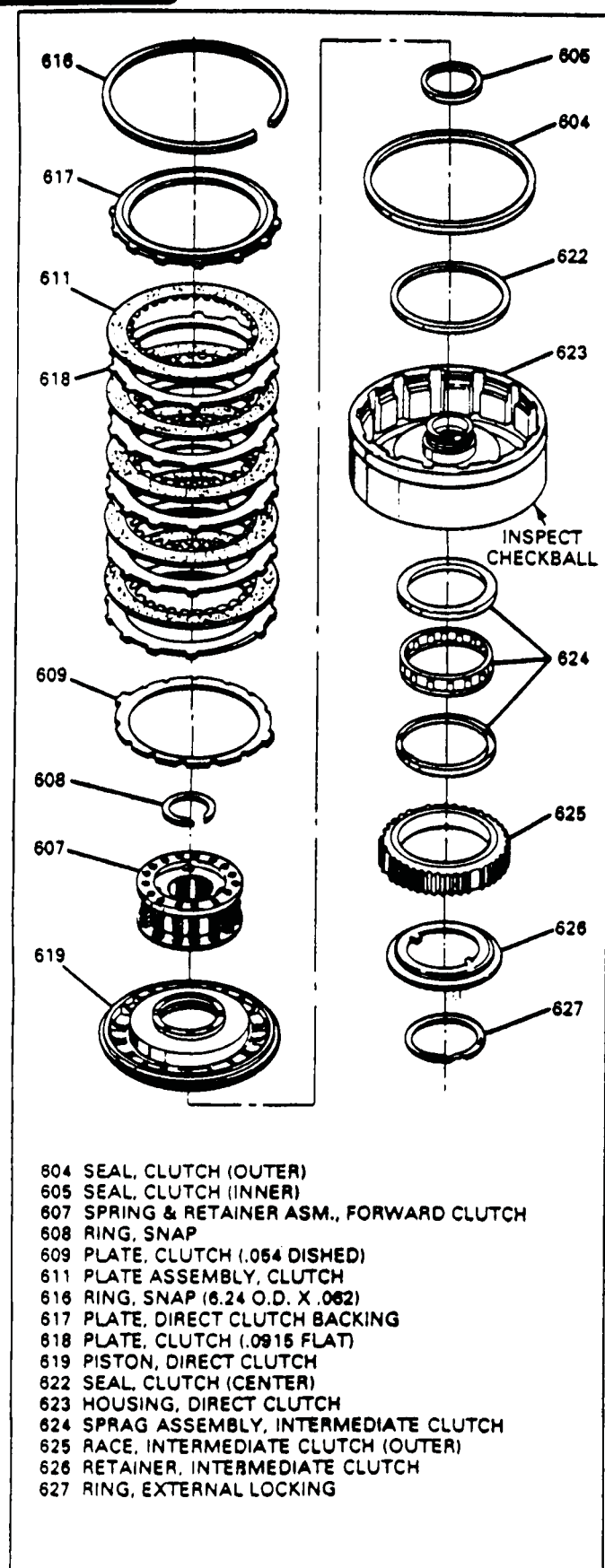


Figure 69

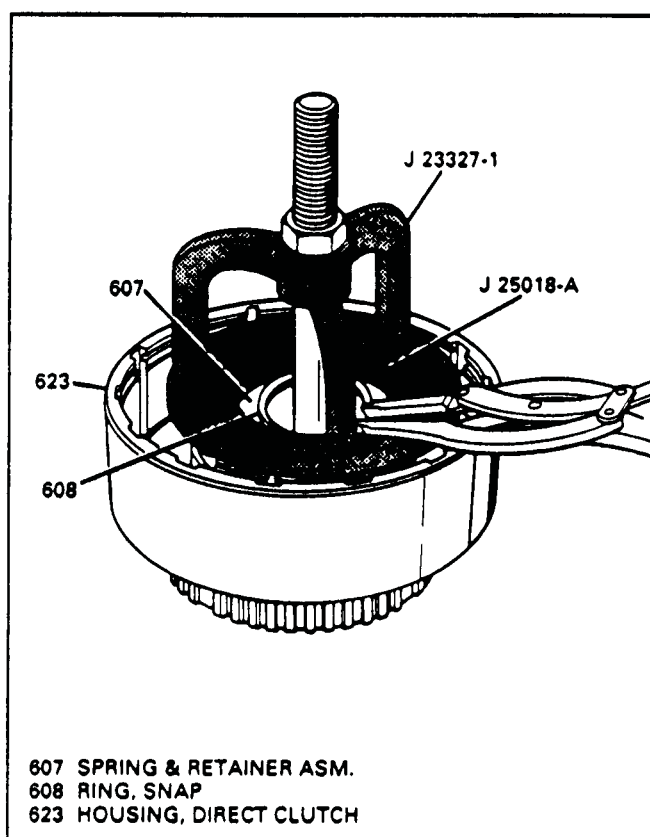


Figure 70

DIRECT CLUTCH ASSEMBLY

1. Remove the backing plate snap ring and the backing plate (See Figure 69).
2. Remove the direct clutch pack, 5 lined plates, 5 steel plates, and 1 dished plate (See Figure 73).
3. Note the direction of the dished plate.
4. Compress the return spring assembly as shown in Figure 70, and remove the snap ring.
5. Remove the spring compressor and remove the return spring assembly (Figure 69).
6. Remove the direct clutch piston, remove and discard the lip seals from piston.
7. Remove and discard the lip seal from the center of direct clutch housing.
8. Remove the intermediate sprag parts for inspection if necessary (See Figure 69).
9. Clean all parts thoroughly in solvent.
10. Install intermediate sprag assembly on direct clutch housing (See Figure 72).
11. Install the outer race, grooves up, by rotating with a clockwise motion.
12. Sprag race should freewheel clockwise and lock counterclockwise, if installed properly (See Figure 72).
13. Install sprag retainer and spiral snap ring (See Figure 72).

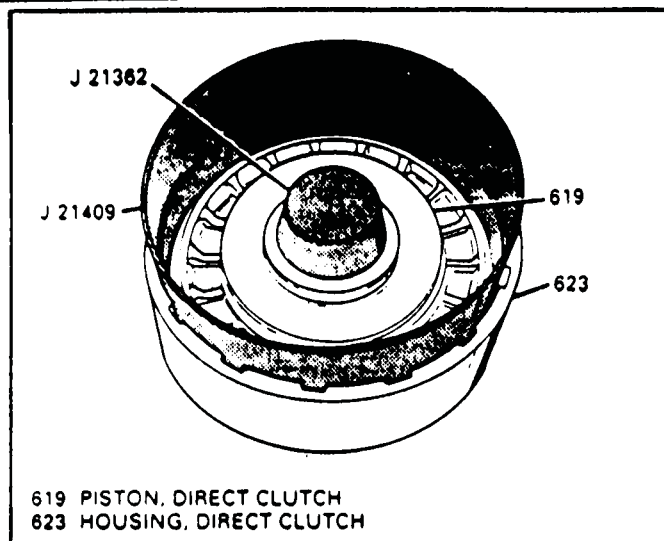


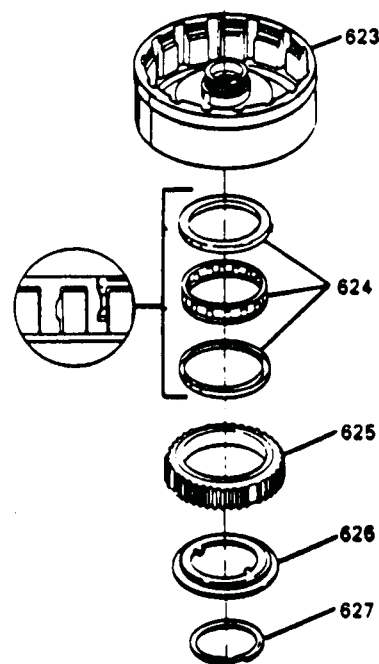
Figure 71

DIRECT CLUTCH ASSEMBLY (Continued)

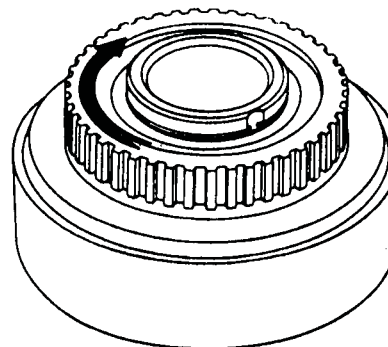
14. Install the inner lip seal and outer lip seal on direct clutch piston, with the lips facing the housing.
15. Lubricate lip seals with petrolatum.
16. Install lip seal onto center of direct clutch housing, with lip facing up, and lubricate with petrolatum.
17. Install lip seal protectors J-21362 and J-21409 on housing as shown in Figure 71.
18. Install the direct clutch piston into housing with rotating movement until it is fully seated in housing.
19. Install spring retainer, compress spring retainer, and install snap ring as shown in Figure 70.
20. Install dished plate into direct clutch housing with the inner diameter facing down (See Figure 73).
21. Install 5 lined plates and 5 steel plate starting with a steel plate on top of the dished plate, and alternating. (See Figure 73).
22. Install the direct clutch backing plate and backing plate snap ring.
23. Install the assembly onto center support and air check for proper operation, as shown in Figure 74.
24. Remove direct clutch from center support and set aside.

1991 HYDRA-MATIC 4L80-E CLUTCH PLATE APPLICATION CHART DIRECT CLUTCH

MODELS		NO. OF FLAT STEEL PLATES	NO. OF DISHED PLATES	NO. OF COMPOSITION PLATES	PISTON TRAVEL CHECK
	THICKNESS	2.32MM (.0915")		2.03MM (.080")	3.07-6.00MM (.121"-.236")
ALL MODELS		5	1	5	



- 623 HOUSING, DIRECT CLUTCH
624 SPRAG ASSEMBLY, INTERMEDIATE CLUTCH
625 RACE, INTERMEDIATE CLUTCH (OUTER)
626 RETAINER, INTERMEDIATE CLUTCH
627 RING, EXTERNAL LOCKING



SHOULD FREEWHEEL IN DIRECTION OF
ARROW AND LOCK OPPOSITE DIRECTION

Figure 72

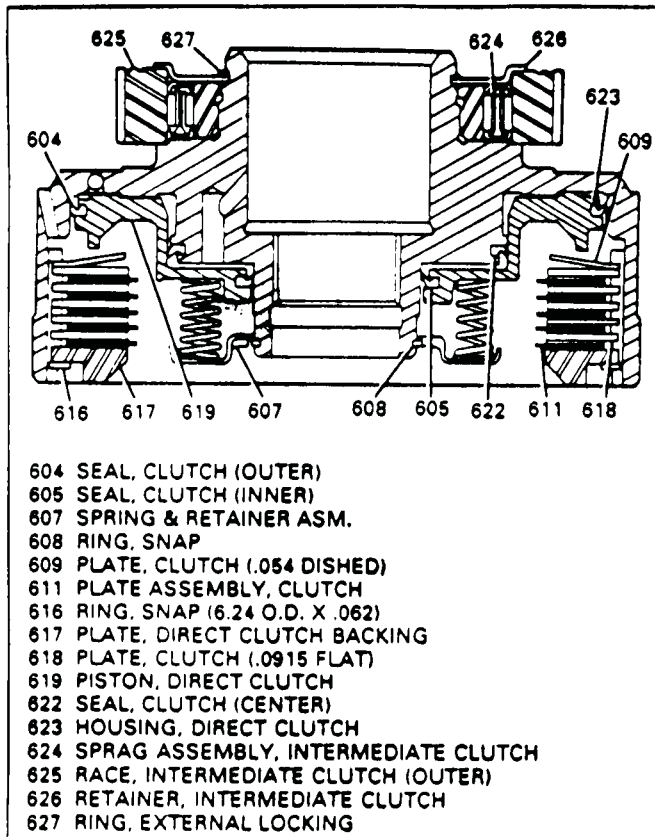


Figure 73

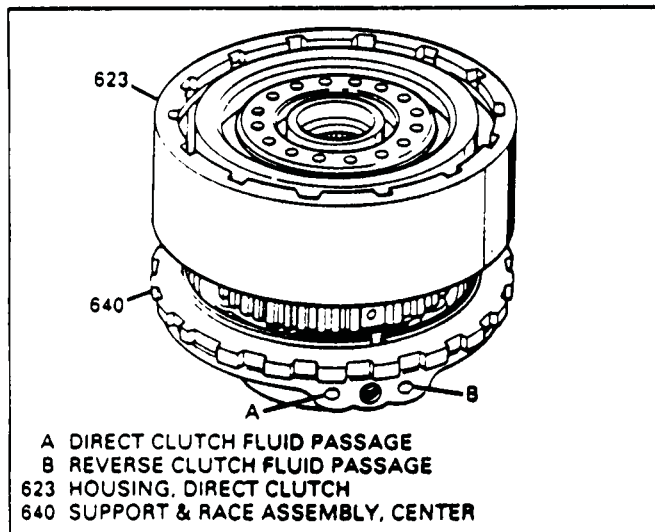


Figure 74

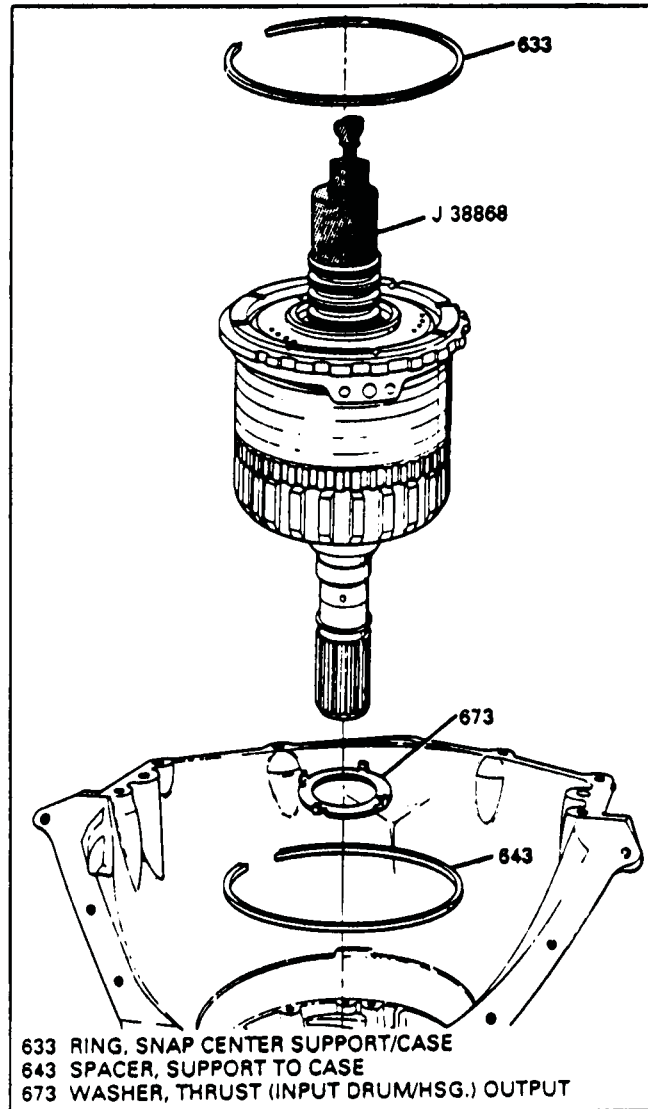


Figure 75

INSTALL CENTER SUPPORT AND GEAR TRAIN

1. Install thin spacer ring into the groove in case, that is shown in Figure 76. (Third snap ring groove down). Install so the snap ring opening is at the nine o'clock position.
2. Install J-38868 tool onto gear train assembly, as shown in Figure 75.
3. With transmission in a vertical position align bolt hole in center support with hole in case, and carefully lower gear unit and center support assembly into the case using J-38868 tool until fully seated (See Figure 75).
4. Install the "Beveled" snap ring into the case groove, with flat side down, and snap ring opening at the 9 o'clock position.

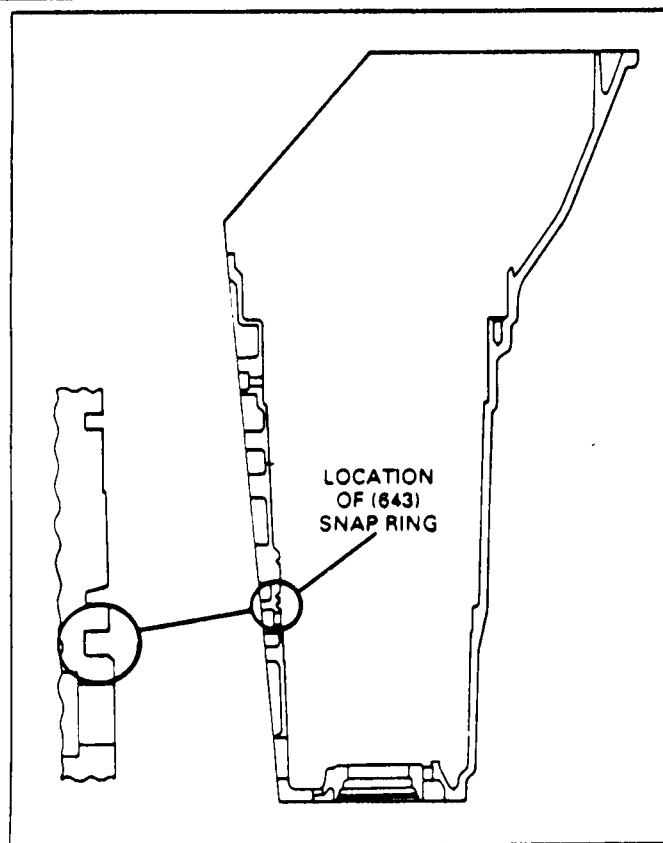


Figure 76

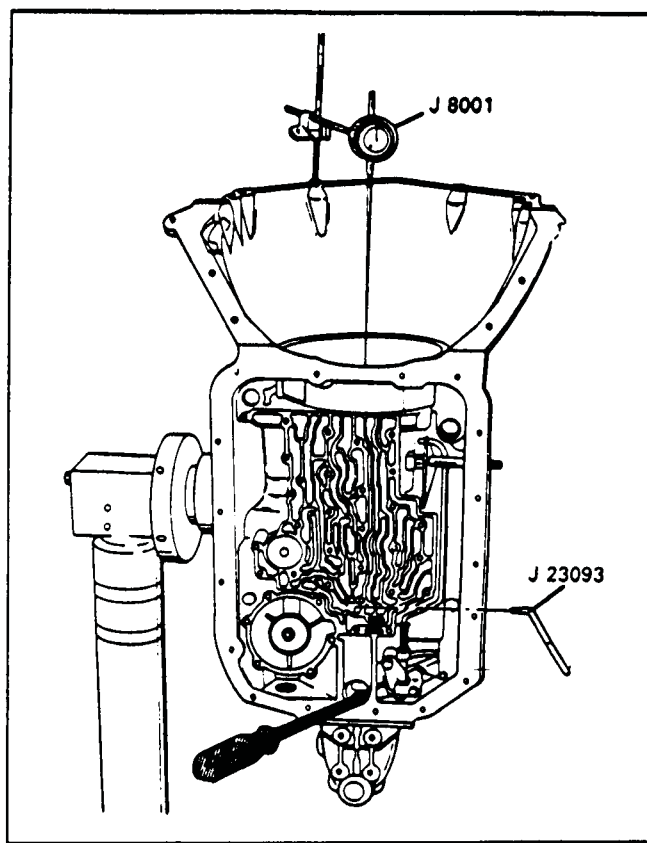


Figure 77

5. Check rear end play before installing the center support bolt.
6. Install dial indicator and locate on the main shaft, as shown in Figure 77.
7. While prying up on the output carrier with a large screwdriver, as shown in Figure 77, end play reading should be .005" to .025".
8. Change the selective spacer in rear of case to obtain this dimension.
9. Locate tool J-23093 into the direct clutch passage through the case. Apply pressure on J-23093 seating the center support splines counterclockwise against the case splines (See Figure 77).
10. Install the center support bolt into center support, using a 3/8" 12 point socket, and torque to 32 ft.lbs.
11. DO NOT OVER TORQUE, as this bolt is hollow to allow oil pressure to apply the intermediate clutch pack.

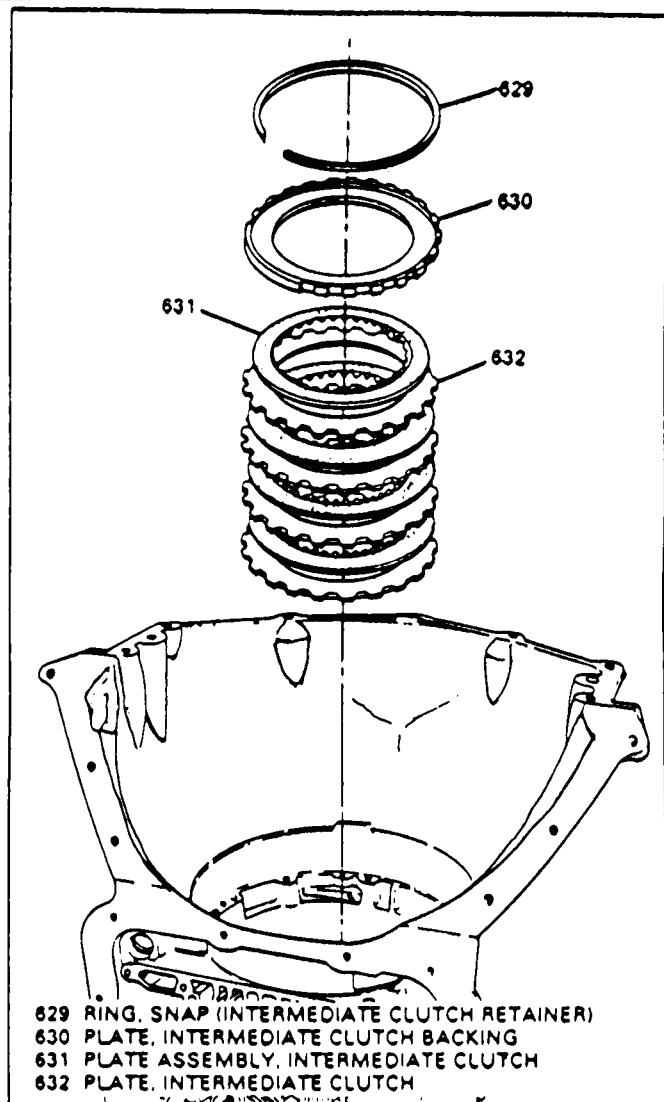


Figure 78

INSTALL INTERMEDIATE CLUTCH PLATES

1. Install the intermediate clutch plates both steel and lined, starting with a steel plate, and alternating with a lined plate (See Figure 78).
2. Install the intermediate backing plate as shown in Figure 78.
3. Install the backing plate snap ring, leaving the snap ring opening at the 9 o'clock position.
4. Check clutch pack end play, using a feeler gage between backing plate and snap ring.
5. End play should be .040" to .107".
6. Install the intermediate band assembly ensuring that it is engaged on band anchor in case.

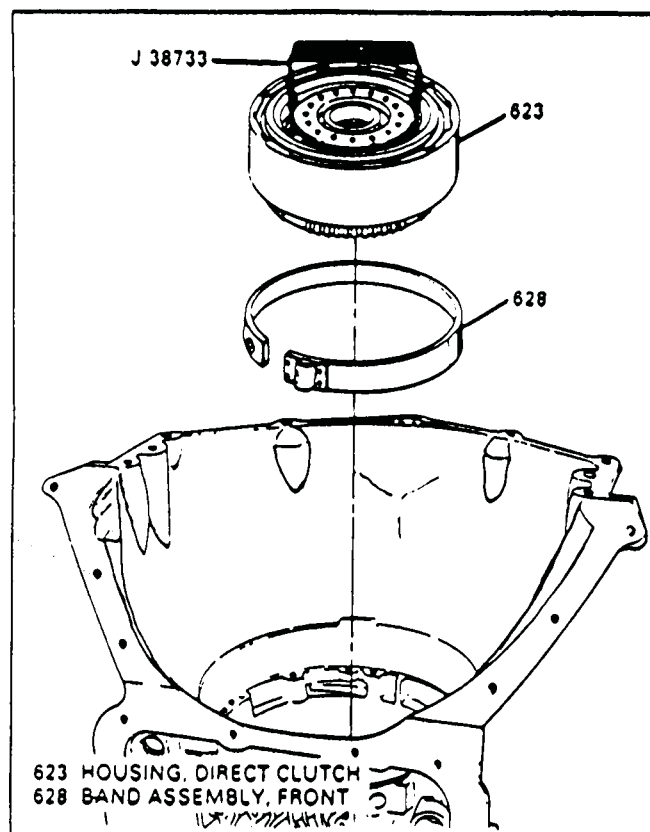


Figure 79

7. Install the direct clutch housing into transmission, and engage intermediate clutch plates, by rotating into position.
8. Make sure that it is fully seated into position.
9. Use tool J-38733, as shown in Figure 79 for installation.
10. Check for freedom of movement.

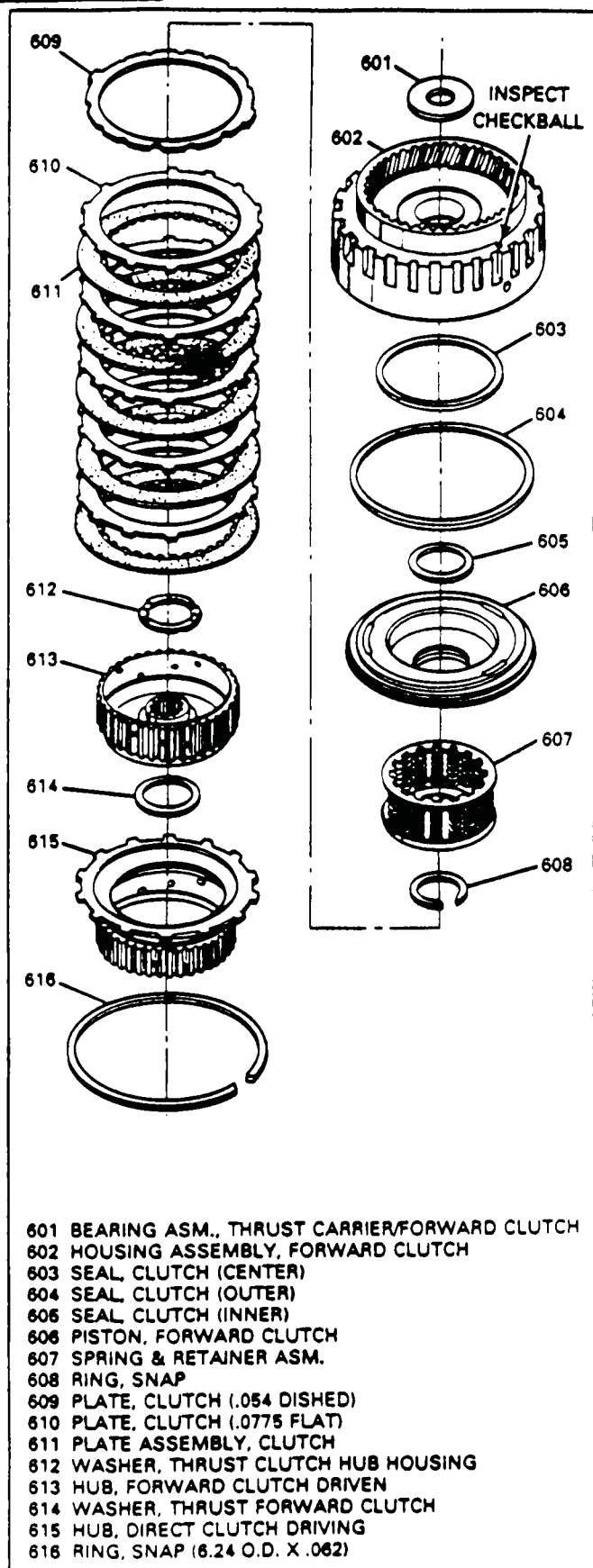


Figure 80

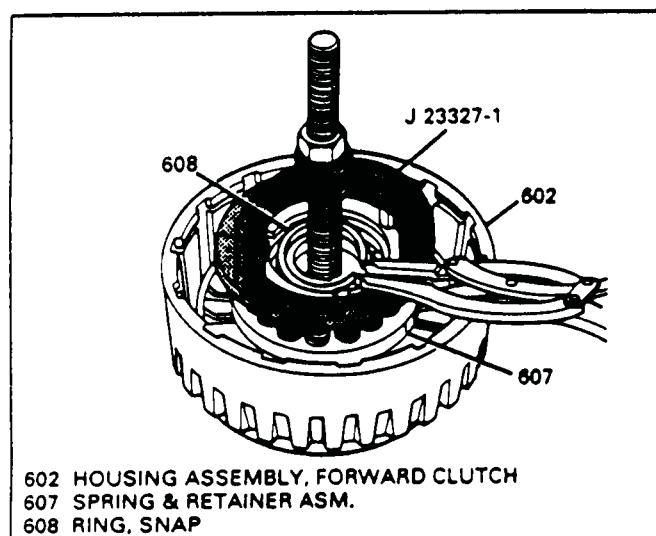


Figure 81

FORWARD CLUTCH HOUSING OVERHAUL

1. Remove the snap ring from top of the backing plate/direct clutch hub (See Figure 80).
2. Remove the direct clutch hub (615) as shown in Figure 80.
3. Remove the forward clutch hub (613) as shown in Figure 80, and both of the thrust washers.
4. Remove the forward clutch plates from forward housing, 5 lined plates, 5 steel plates, and 1 dished cushion plate, as shown in Figure 80.
5. Compress the return spring assembly as shown in Figure 81, and remove the snap ring with snap ring pliers.
6. Remove the spring compressor, and remove the return spring assembly.
7. Remove the forward clutch piston from the housing (See Figure 80).
8. Remove and discard the lip seals from the forward clutch piston.
9. Remove the lip seal from the center of forward clutch housing and discard.
10. Inspect all parts thoroughly for damage.
11. Clean all parts thoroughly in clean solvent, and air dry.

Continued on page 59.

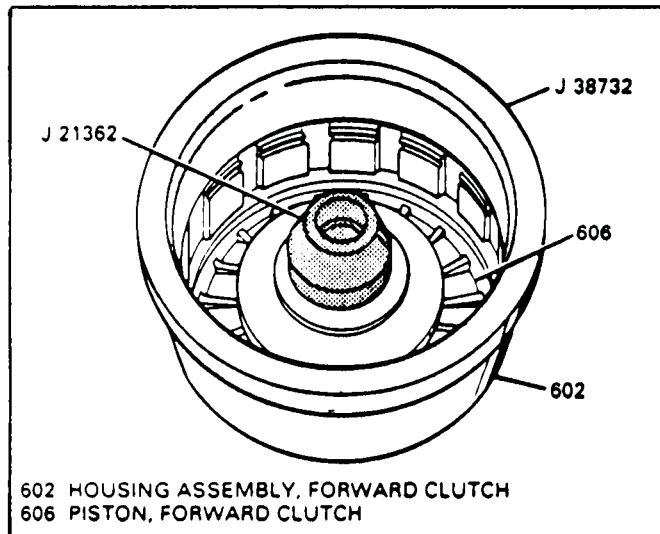


Figure 82

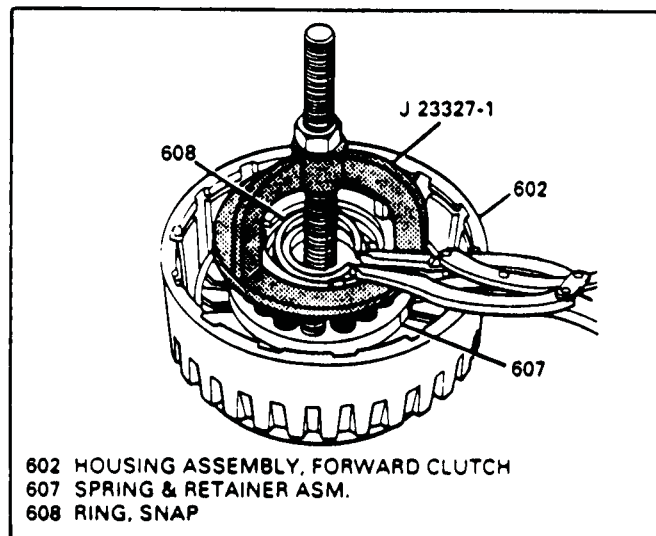


Figure 83

1991 HYDRA-MATIC 4L80-E CLUTCH PLATE APPLICATION CHART FORWARD CLUTCH					
MODELS		NO. OF FLAT STEEL PLATES	NO. OF DISHED PLATES	NO. OF COMPOSITION PLATES	PISTON TRAVEL CHECK
	THICKNESS	1.97MM (.0775")	1.37MM (.054")	2.03MM (.080")	3.07-6.00MM (.121"-.236")
ALL MODELS		5	1	5	

Figure 84

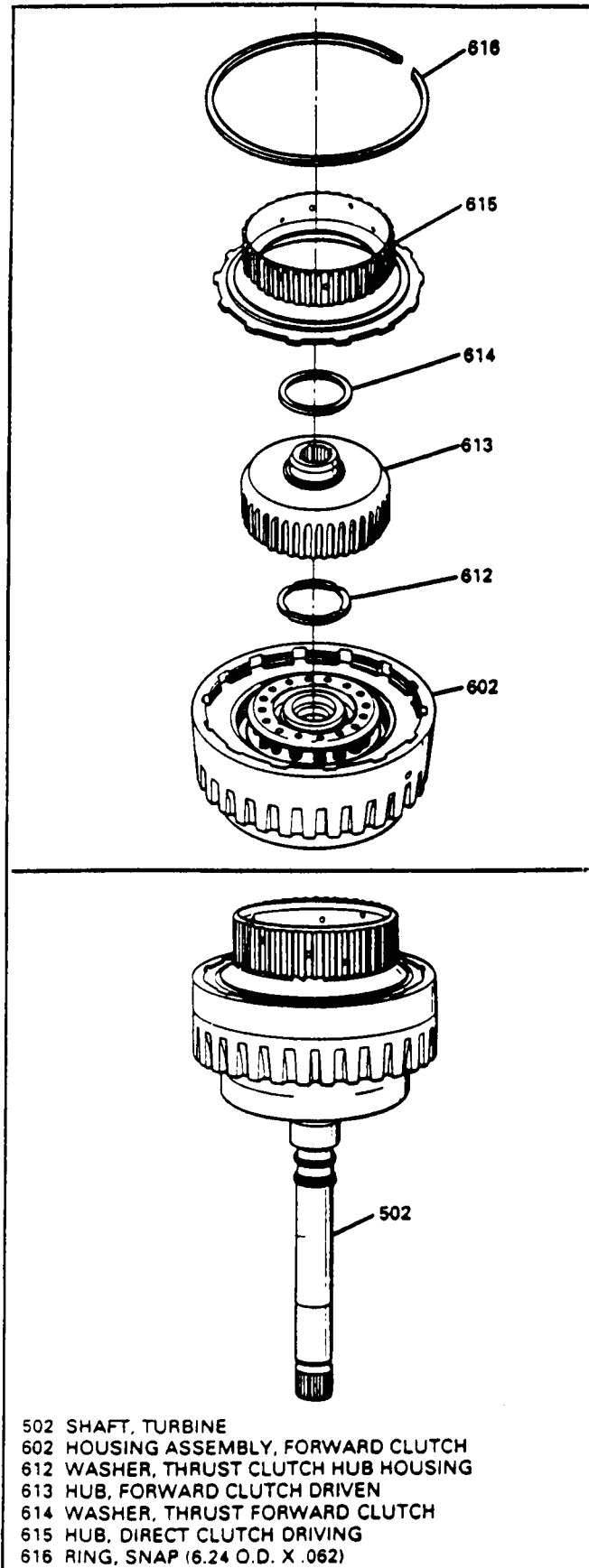


Figure 85

FORWARD CLUTCH HOUSING (Continued)

12. Install new lip seals onto the forward clutch piston, with the lips facing the housing, and lubricate with petrolatum.
13. Install new lip seal into the center of forward clutch housing, with the lip facing up, and lube with petrolatum.
14. Install lip seal protectors on housing as shown in Figure 82, and install the forward clutch piston into the housing by rotating into position.
15. Install the return spring assembly (607) as shown in Figure 80.
16. Compress the return spring assembly and install the snap ring as shown in Figure 83.
17. Remove the spring compressor slowly.
18. Install the bronze thrust washer (612) on the inside of forward clutch hub and retain with petrolatum (See Figure 85).
19. Install thrust washer (614) on outside of forward hub and retain with petrolatum (See Figure 85).
20. Install forward clutch hub into forward clutch housing (See Figure 85).
21. Install the dished cushion plate with the inside diameter facing down, same as the direct clutch.
22. Install forward clutch plates alternately starting with a steel plate on top of the dished plate (See Figure 80).
23. Install the Backing Plate/Direct Clutch Hub (615) as shown in Figure 85.
24. Install the forward clutch housing snap ring (See Figure 85).
25. Forward clutch can be air checked for proper operation, by installing on a reconditioned turbine shaft, and apply air between the 2 sealing rings. (See Figure 85).
26. Install the thrust bearing (601) shown in Figure 86, and retain with petrolatum.
27. Install the forward clutch housing, as shown in Figure 86, using tool J-38358-A into transmission by rotating back and forth until fully seated into place.

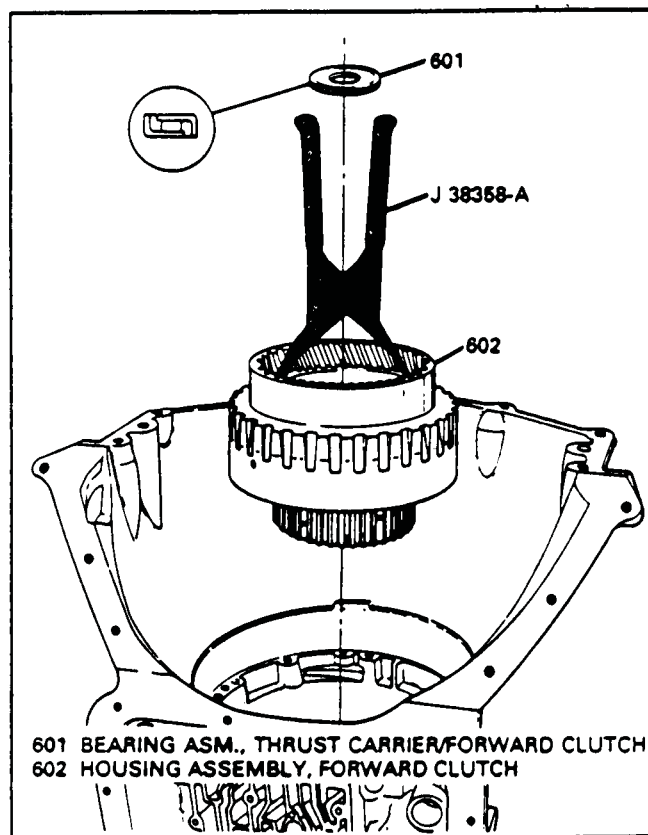


Figure 86

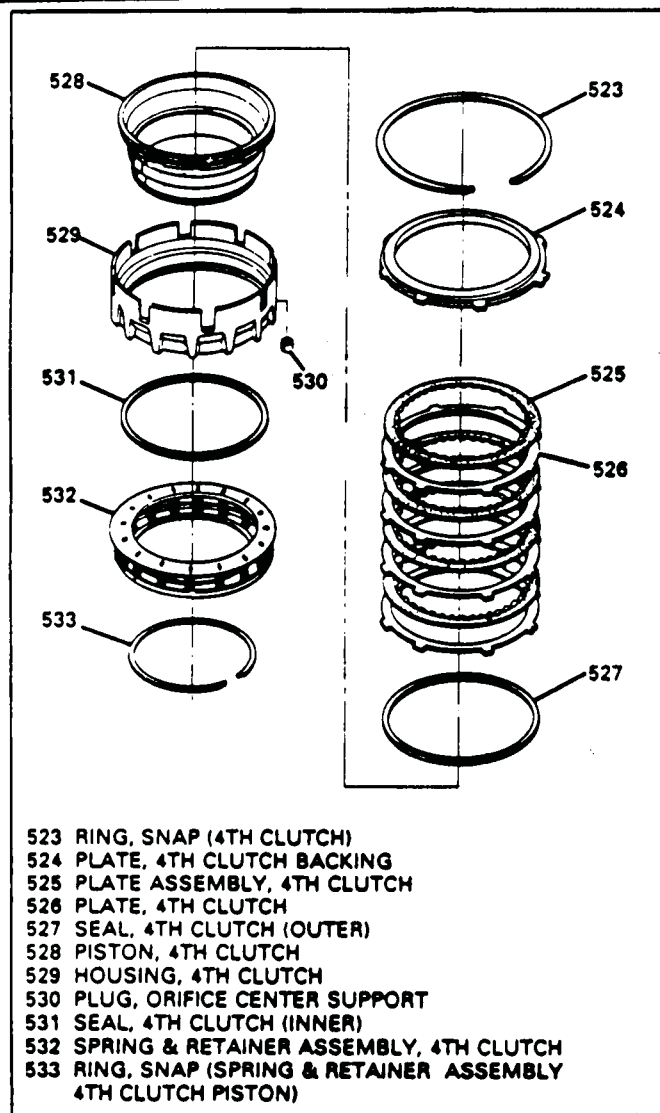


Figure 87

FOURTH CLUTCH ASSEMBLY OVERHAUL

1. Remove snap ring from the top of fourth clutch backing plate (See Figure 87).
2. Remove fourth clutch backing plate.
3. Remove fourth clutch plates, 4 steel plates, and 4 lined plates.
4. Compress the return spring assembly and remove the snap ring (533) as shown in Figure 87.
5. Remove the compressor and the return spring assembly.
6. Remove the 4th clutch piston with the outer seal, and 4th clutch housing with the inner seal.
7. Inspect all components thoroughly and clean all parts in clean solvent.
8. Dry all parts with compressed air.
9. Install new seal on 4th clutch piston and lubricate with petrolatum.
10. Install new seal into 4th clutch housing and lubricate with petrolatum.
11. Insure the presence of the orifice cup plug in the 4th clutch housing (See Figure 87).
12. Place seal protector J-38731-1 into the small end of 4th clutch housing. (See Figure 88).
13. Place seal protector J-38731-2 onto the large end of the 4th clutch piston. (See Figure 88).
14. Place spacer J-38731-3 inside of piston.
15. Place 4th clutch housing on bench resting on piston and piston spacer.
16. Push down on 4th clutch housing until piston is through housing, exposing the snap ring groove.
17. Remove seal protector J-38731-1.
18. Place return spring assembly onto the piston and compress.
19. Install the snap ring, and remove the spring compressor.
20. Turn the 4th housing assembly over and install 4steel plates, and 4 lined plates, starting with a steel plate and alternating. (See Figure 89).
21. Locate the steel plate index notch as shown in Figure 90.
22. Install the 4th clutch backing plate, with the flat side down, and index notch in same location as steels. (See Figure 90).
23. Install the snap ring, and make sure it is FULLY seated in the groove.
24. Measure 4th clutch clearance with feeler gage between backing plate and the snap ring. Clearance should be .040" - .100".
25. Install the 4th clutch housing assembly into the case.
 NOTE: Backing plate tang extending out of 4th clutch housing, must assemble into slot space in case and housing, with transmission in vertical position.
26. Install the 4th clutch bolt through case fluid passage into the 4th clutch housing (See Figure 54).
27. Torque 4th clutch bolt to 12 ft.lbs. DO NOT OVER TORQUE.

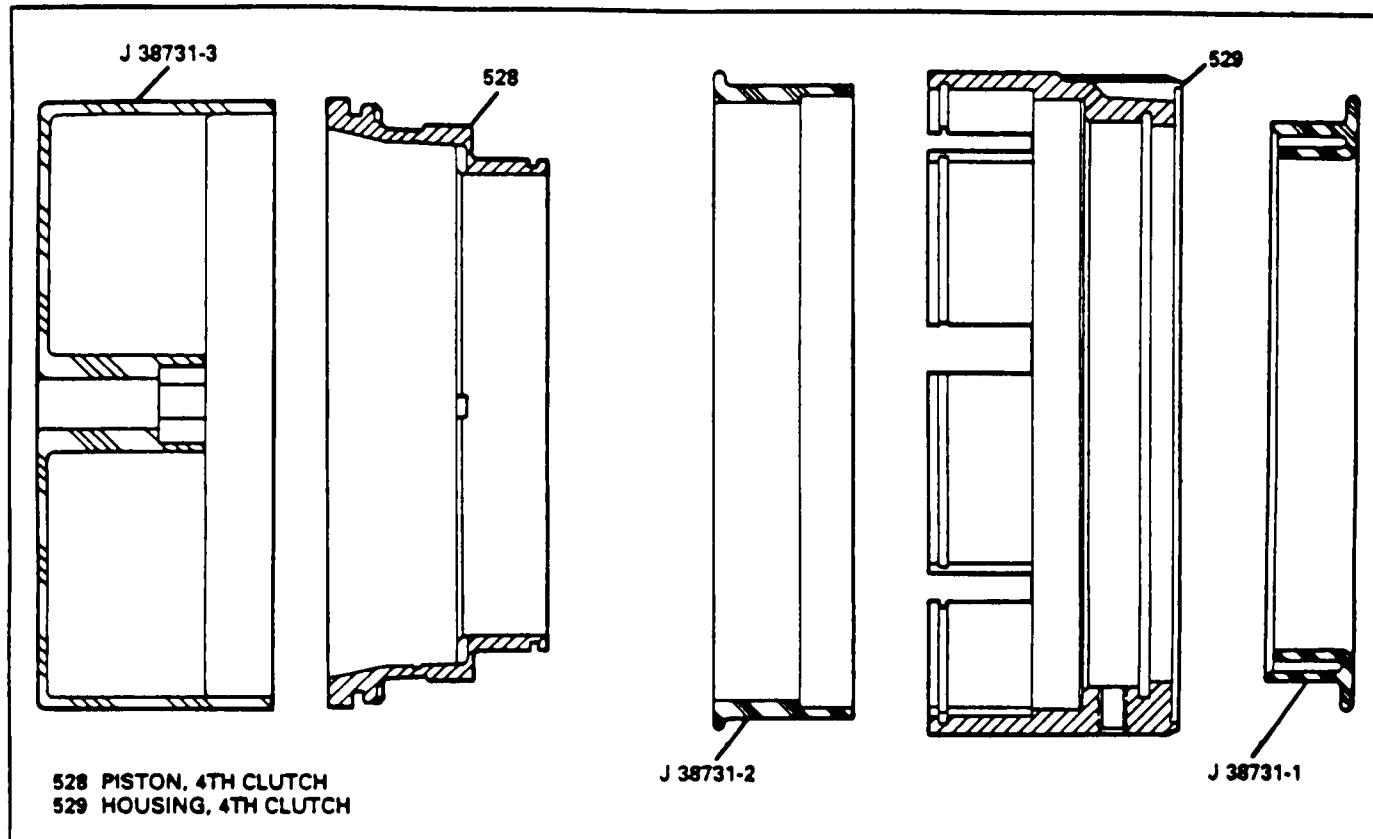


Figure 88

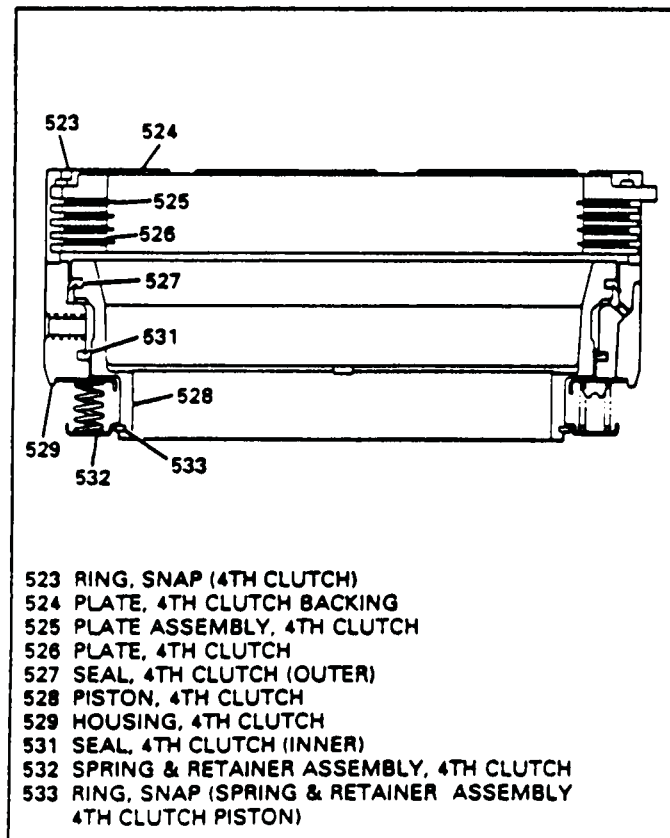


Figure 89

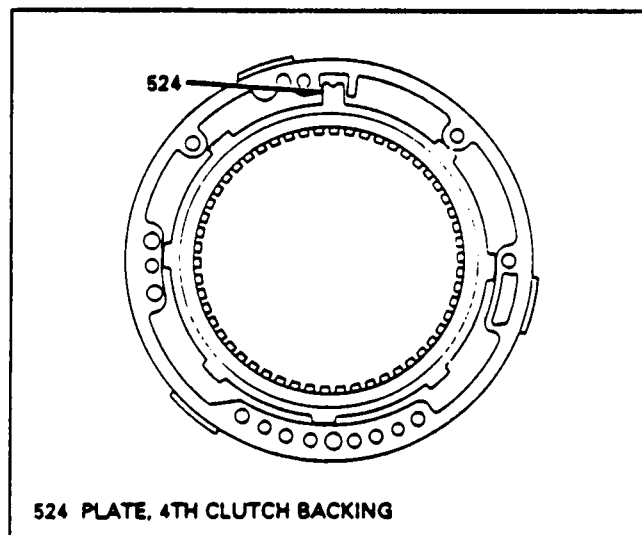
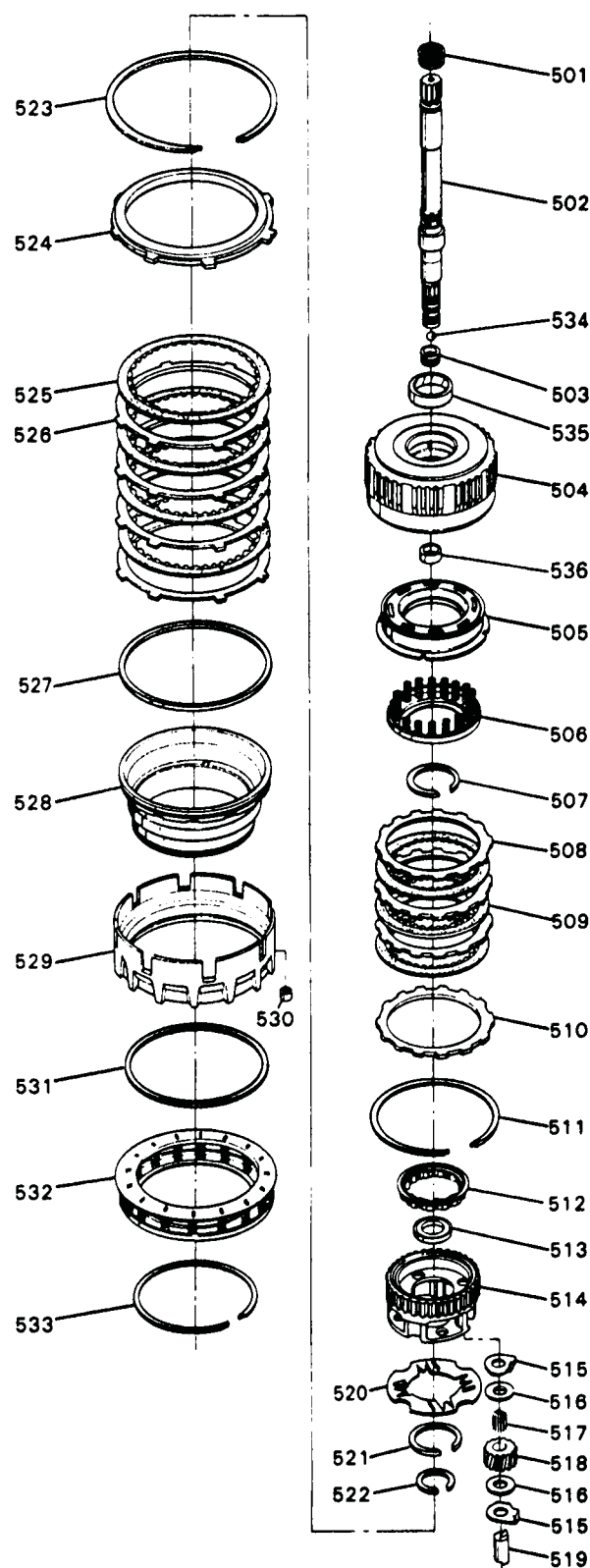


Figure 90

- 501 RING, OIL SEAL (TURBINE SHAFT/STATOR HSG.)
- 502 SHAFT, TURBINE
- 503 RING, OIL SEAL (TURBINE SHAFT/FORWARD HSG.)
- 504 HOUSING ASSEMBLY, OVERRUN CLUTCH
- 505 PISTON ASSEMBLY, OVERRUN CLUTCH
- 506 SPRING & RETAINER ASSEMBLY
- 507 RING, SNAP RETAINER
- 508 PLATE, OVERRUN CLUTCH
- 509 PLATE ASSEMBLY, OVERRUN CLUTCH
- 510 PLATE, OVERRUN CLUTCH BACKING
- 511 RING, SNAP
- 512 ROLLER CLUTCH ASSEMBLY, OVERDRIVE
- 513 BEARING ASSEMBLY, THRUST CARRIER/ OVERRUN CLUTCH
- 514 CARRIER ASSEMBLY, OVERDRIVE
- 515 WASHER, PINION THRUST
- 516 WASHER, PINION THRUST (STEEL)
- 517 ROLLER, NEEDLE BEARING
- 518 PINION, OVERDRIVE PLANET
- 519 PIN, OVERDRIVE PINION
- 520 RETAINER, PINION PIN
- 521 RING, SNAP
- 522 RING, SNAP (TURBINE SHAFT/CARRIER)
- 523 RING, SNAP (4TH CLUTCH)
- 524 PLATE, 4TH CLUTCH BACKING
- 525 PLATE ASSEMBLY, 4TH CLUTCH
- 526 PLATE, 4TH CLUTCH
- 527 SEAL, 4TH CLUTCH (INNER)
- 528 PISTON, 4TH CLUTCH
- 529 HOUSING, 4TH CLUTCH
- 530 PLUG, ORIFICE CENTER SUPPORT
- 531 SEAL, 4TH CLUTCH (OUTER)
- 532 SPRING GUIDE & RETAINER ASSEMBLY, 4TH CLUTCH
- 533 RING, SNAP (SPRING & RETAINER ASSEMBLY 4TH CLUTCH PISTON)
- 534 BALL, 0.28" DIA.
- 535 BUSHING, OVERRUN CLU. HSG.
- 536 BUSHING, 1.12" O.D. X 0.50"



4TH CLUTCH AND OVERDRIVE UNIT

Figure 91

AUTOMATIC TRANSMISSION SERVICE GROUP

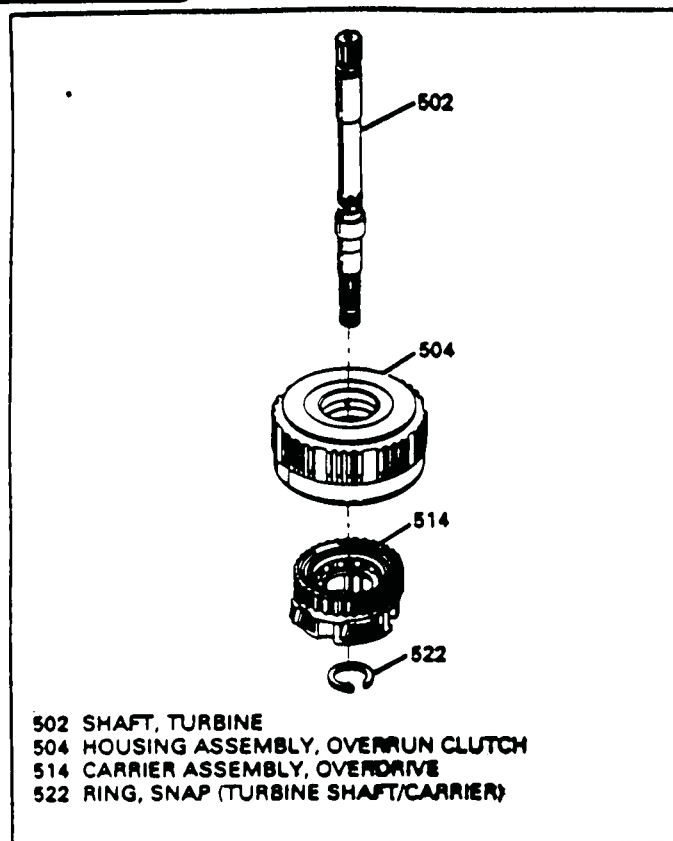


Figure 92

OVERHAUL OVERDRIVE UNIT ASSEMBLY

1. Remove snap ring (522) from the turbine shaft, as shown in Figure 92.
2. Remove the turbine shaft from the overdrive carrier (See Figure 92).
3. Remove the overrun clutch housing (504) from the overdrive carrier (Figure 92).
4. Remove the backing plate snap ring from the overrun clutch housing (Figure 93).
5. Remove the backing plate, and overrun clutches, 3 steel plates, and 3 lined plates, from the overrun clutch housing. (See Figure 93).
6. Compress the return spring assembly and remove snap ring (507), as shown in Figure 93.
7. Remove the spring compressor and remove the return spring assembly.
8. Remove the "Moulded" overrun clutch piston from the overrun clutch housing. (See Figure 93).
9. Inspect and clean all parts thoroughly.
10. DO NOT clean the "Moulded Seal" piston in any type of solvent.
11. Replace the piston as necessary.

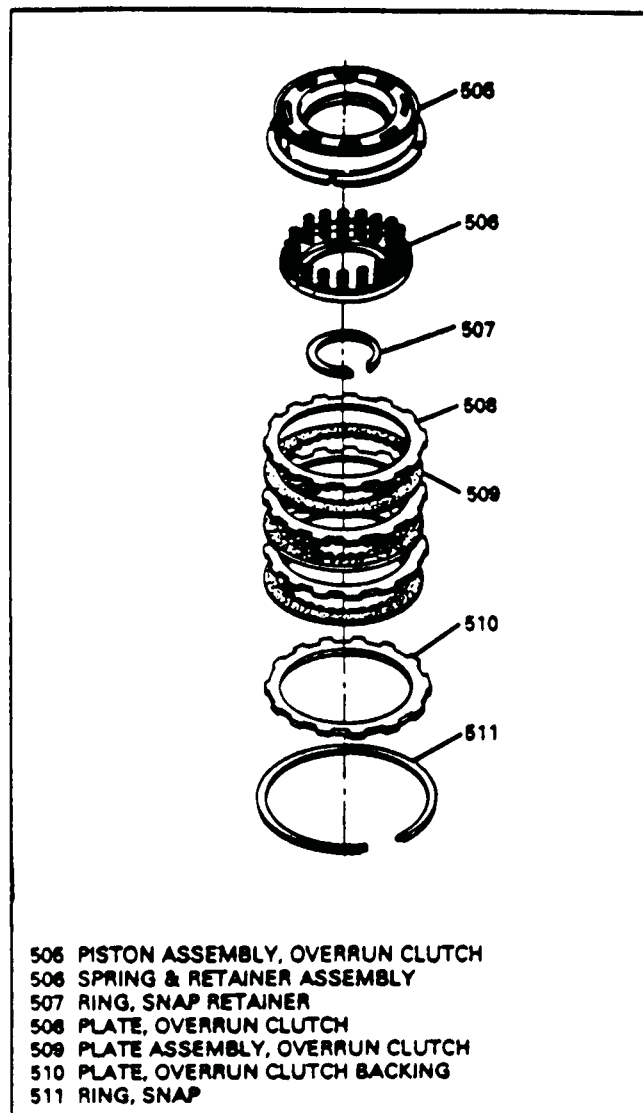


Figure 93

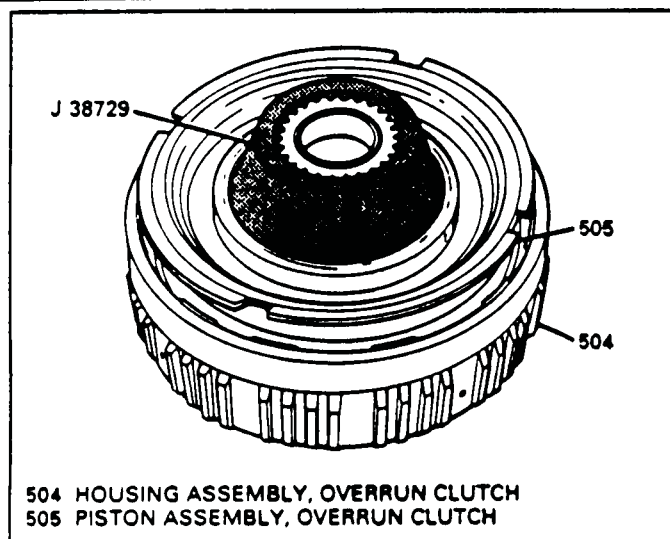


Figure 94

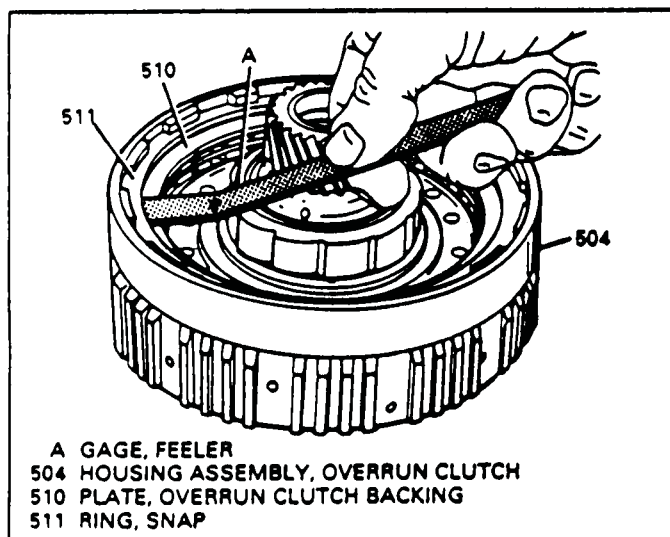


Figure 95

ASSEMBLE OVERRUN CLUTCH ASSEMBLY

1. Install seal protector J-38729 onto the overrun clutch housing (See Figure 94).
2. Lubricate the moulded seal piston with petrolatum, and install piston into the housing while rotating.
3. NOTE: Piston must be kept level while rotating into position.
4. Install the return spring assembly into the housing.
5. Install spring compressor and install snap ring.
6. Remove the spring compressor.

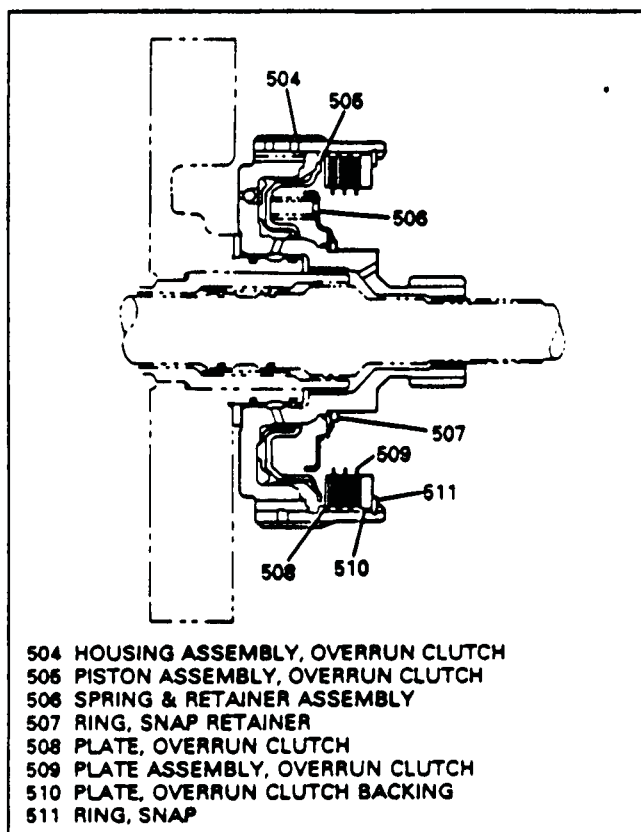


Figure 96

7. Install the overrun clutch plates alternately, beginning with a steel plate. (See Figure 91).
8. This pack uses 3 lined plates and 3 steel plates. No cushion plate.
9. Install the overrun clutch backing plate into the housing.
10. Install the backing plate snap ring.
11. Measure overrun clutch clearance with a feeler gage, as shown in Figure 95.
12. Proper clutch clearance should be .033" to .094"

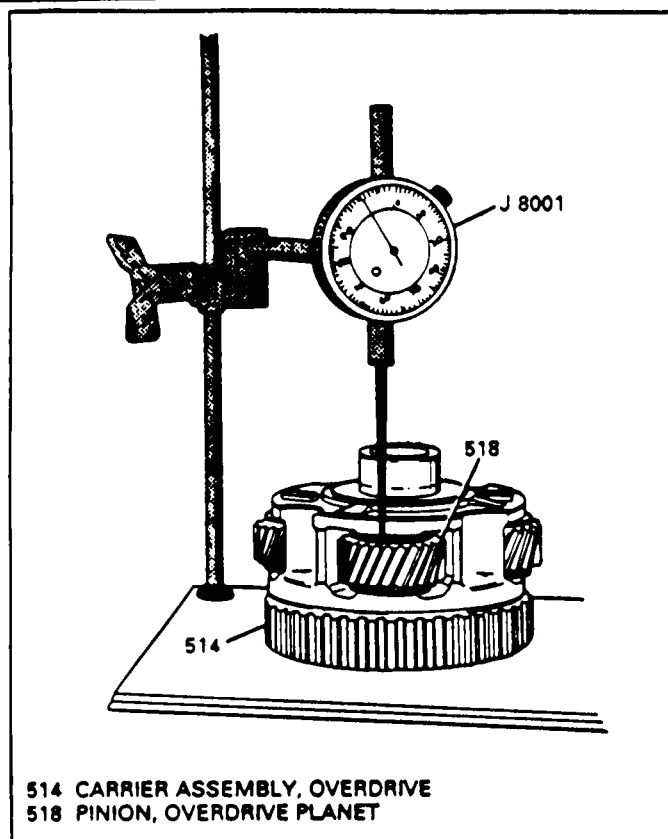


Figure 97

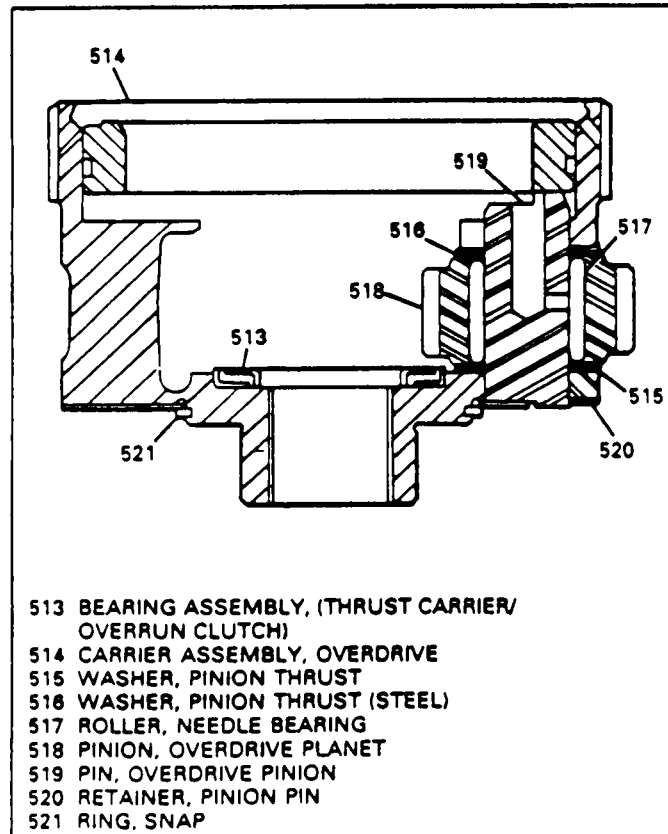


Figure 98

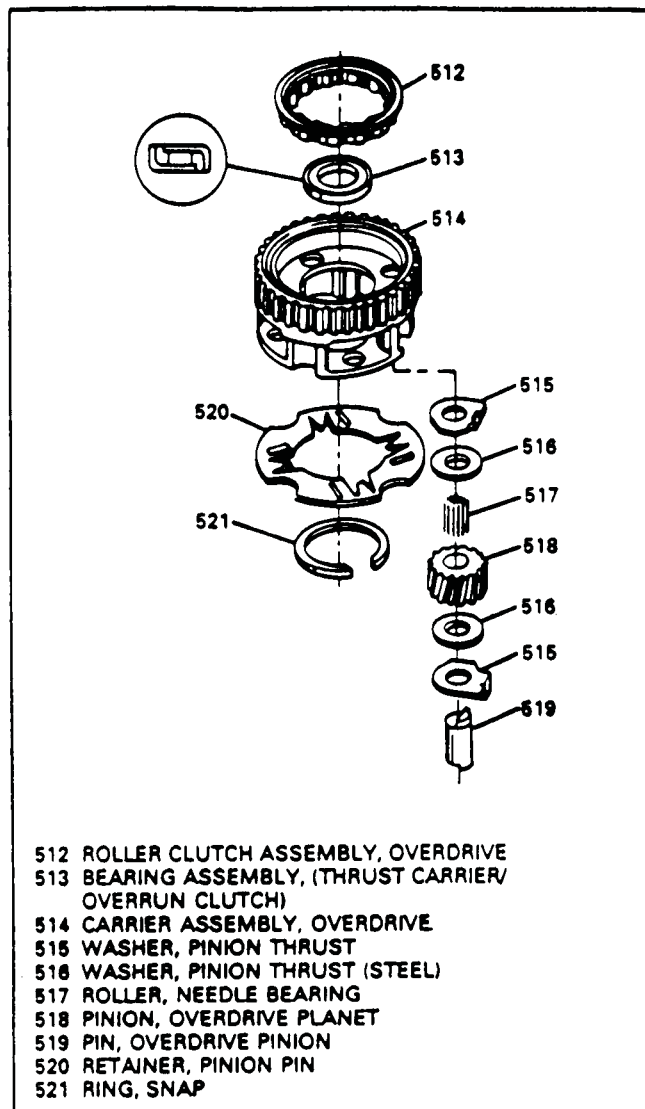


Figure 99

OVERDRIVE CARRIER ASSEMBLY

1. Measure overdrive carrier pinion end play, with dial indicator, as shown in Figure 97.
2. Proper end play should be .009"-.024".
3. DO NOT DISASSEMBLE OVERDRIVE CARRIER PINIONS UNLESS NECESSARY.
4. If disassembly is necessary use Figure 99 as a guide for disassembly.
5. Remove snap ring (521) and pinion pin retainer (520) (See Figure 99).
6. NOTE: Mark the top of pinion gears and location on carrier of pins to be re-installed in original positions.
7. Remove 4 pinion pins from carrier, all pinions, thrust washers, and needle bearings (See Figure 99).
8. DO NOT DISASSEMBLE UNLESS NECESSARY.

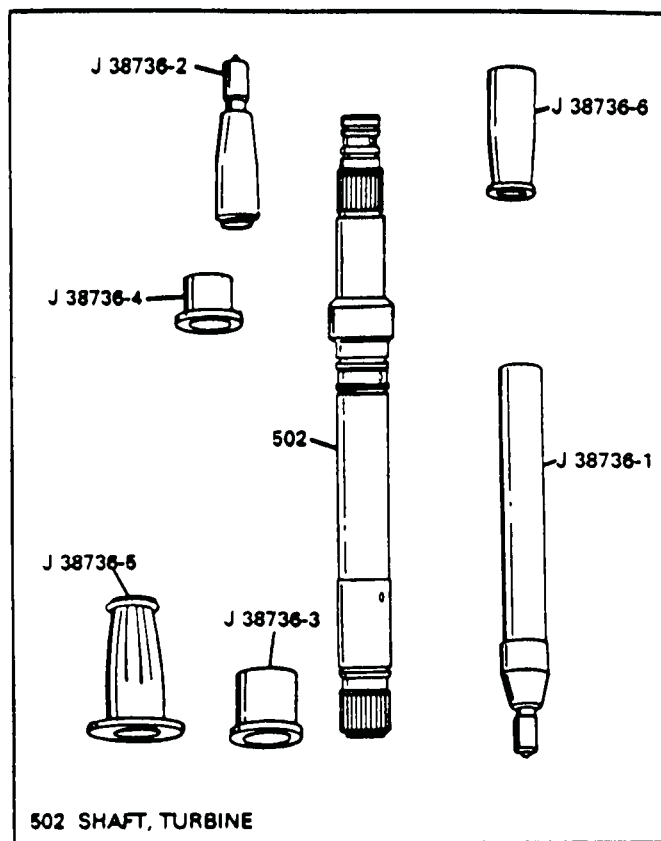


Figure 100

ASSEMBLE OVERDRIVE UNIT ASSEMBLY

1. Place solid seal installer J-38736-2 onto small end of turbine shaft, as shown in Figure 100.
2. Push the solid seals over and down the installer until they are in place using pusher tool J-38736-6 (See Figure 100).
3. Remove the installer tool.
4. Place the sizer J-38736-4 over turbine shaft to size the solid seals in place. (See Figure 100).
5. Always start with the lower seal first and work towards the top.
6. Repeat the above procedure with the different size set of tools that are shown in Figure 100, for the seals on the large end of the shaft.
7. Install the overdrive roller clutch (512) onto the inner cam in the overrun clutch housing.
8. Install the overdrive carrier into the overrun clutch housing, with a rotating motion, ensuring that all overrun clutches are engaged.

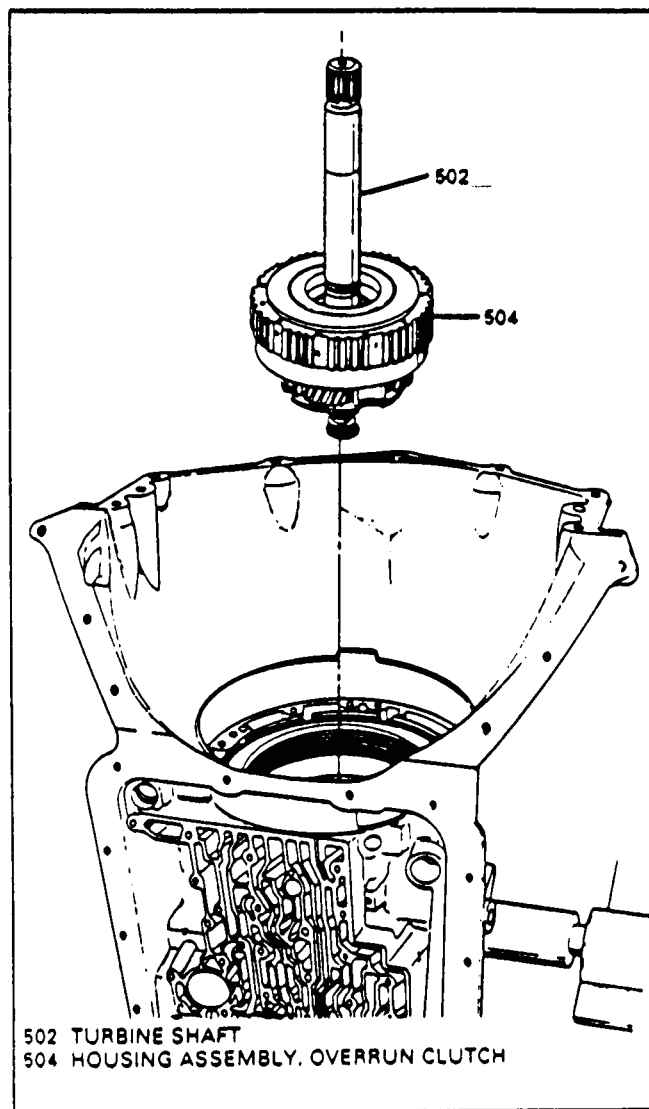


Figure 101

9. Install turbine shaft assembly through the overdrive carrier splines and use care not to damage seals.
10. Install snap ring (522) onto turbine shaft (See Figure 102).
11. Install thrust bearing assembly onto forward clutch housing, already in the transmission, and retain with petrol-atum.
12. Make sure that silver side is up.
13. Install the complete overdrive unit into the transmission by rotating into position (See Figure 101).
14. Make sure that the overdrive unit is fully seated.

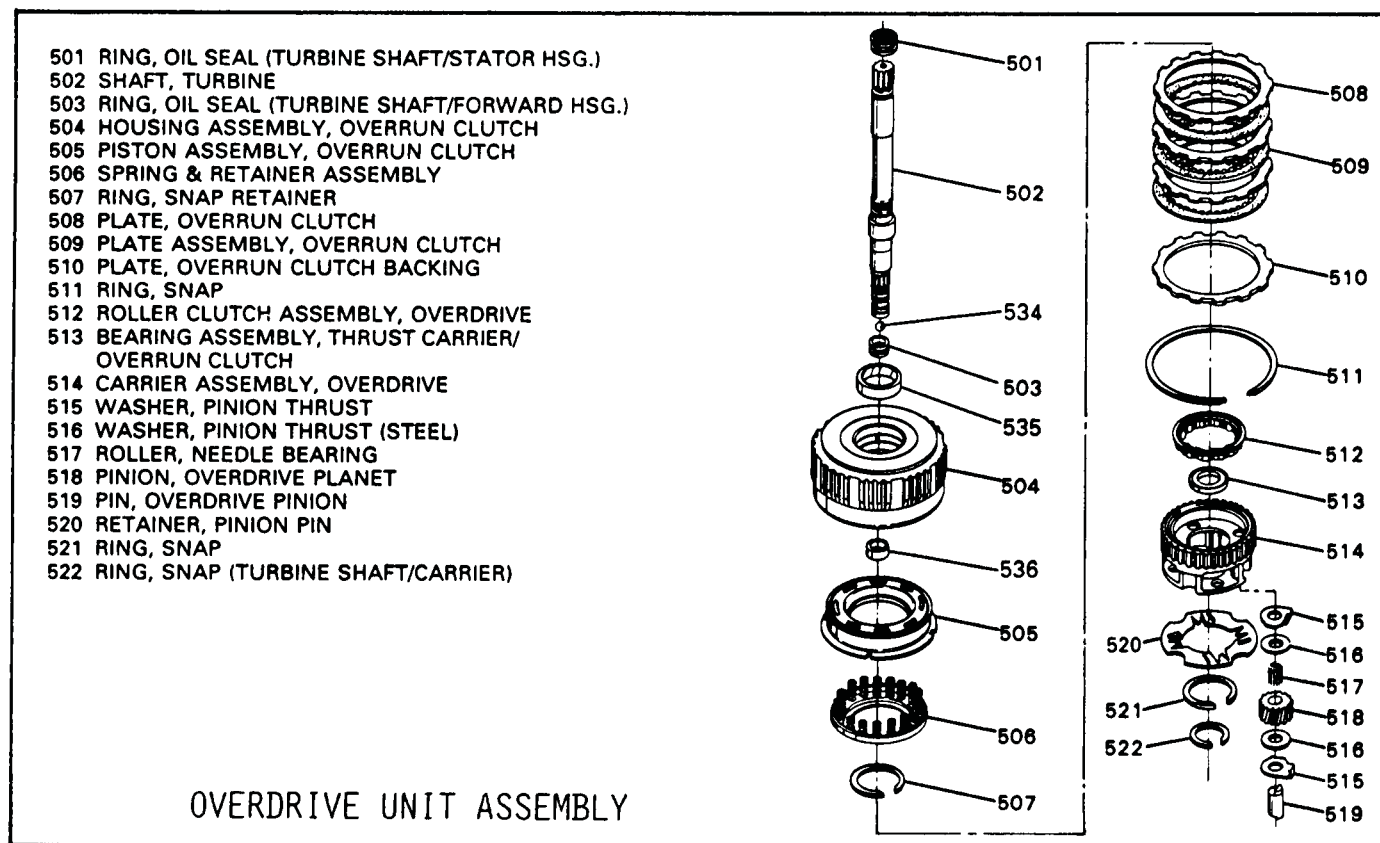
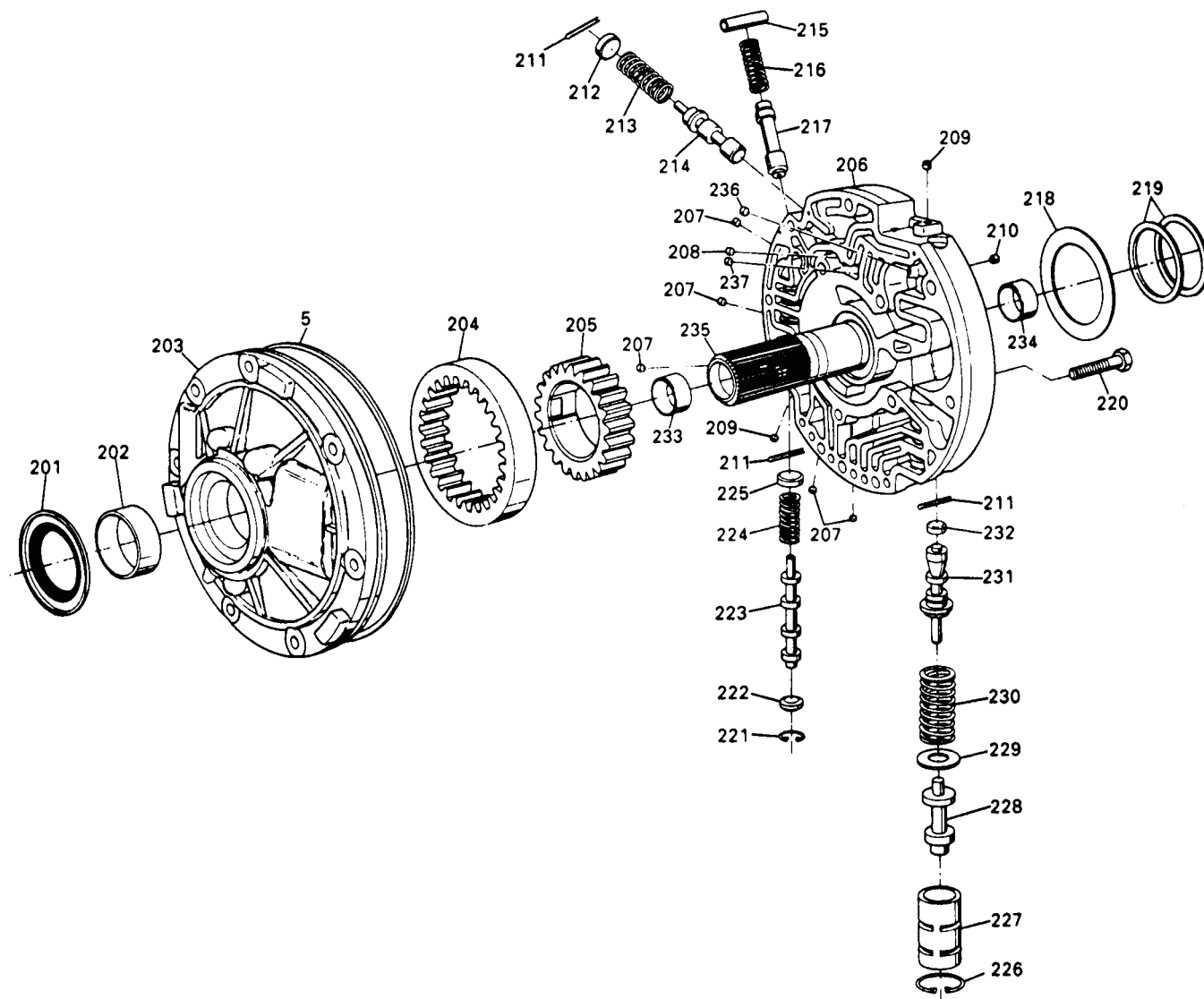


Figure 102



- 5 SEAL, OIL PUMP TO CASE
- 201 HELIX SEAL ASSEMBLY, PUMP BODY
- 202 BUSHING, PUMP BODY
- 203 BODY, OIL PUMP
- 204 GEAR, PUMP DRIVEN
- 205 GEAR, PUMP DRIVE
- 206 COVER, PUMP
- 207 PLUG, CUP (5)
- 208 PLUG, CUP (1)
- 209 PLUG, CUP (2)
- 210 PLUG, ORIFICE CUP (1)
- 211 PIN, COILED SPRING (3)
- 212 PLUG, CONVERTER LIMIT VALVE BORE
- 213 SPRING, CONVERTER LIMIT VALVE
- 214 VALVE, CONVERTER LIMIT
- 215 SLEEVE, SPRING RETAINER
- 216 SPRING, TCC ENABLE VALVE
- 217 VALVE, TCC ENABLE
- 218 WASHER, THRUST SELECTIVE

- 219 RING, OIL SEAL (2)
- 220 BOLT, M8 X 1.25 X 40 (5)
- 221 RING, SNAP
- 222 PLUG, TCC VALVE BORE
- 223 VALVE, TCC
- 224 SPRING, TCC VALVE
- 225 PLUG, TCC VALVE BORE
- 226 RING, RETAINER (REV. BOOST VALVE BUSHING)
- 227 BUSHING, REVERSE BOOST VALVE
- 228 VALVE, REVERSE BOOST
- 229 RETAINER, PRESSURE REGULATOR SPRING
- 230 SPRING, PRESSURE REGULATOR
- 231 VALVE, PRESSURE REGULATOR
- 232 PLUG, PRESSURE REGULATOR
- 233 BUSHING, STATOR SHAFT (FRONT)
- 234 BUSHING, STATOR SHAFT (REAR)
- 235 SHAFT, STATOR
- 236 PLUG, CUP (1)
- 237 PLUG, CUP (1)

Figure 103

AUTOMATIC TRANSMISSION SERVICE GROUP

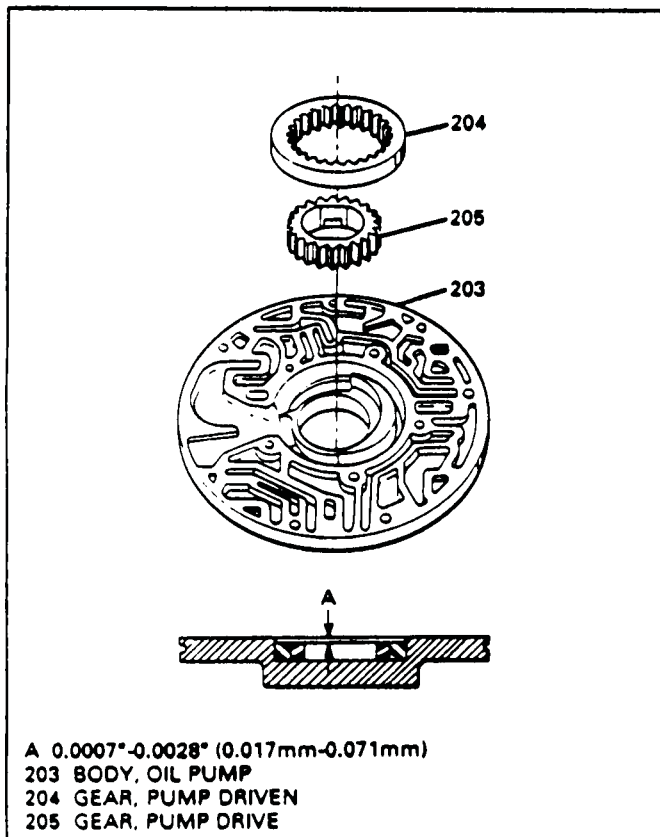


Figure 104

OIL PUMP ASSEMBLY

1. Install all valves, bushings, springs, and retainers as shown in Figure 103, into the pump cover assembly.
2. Inspect the oil pump cover to ensure that all cup plugs are in place. (See Figure 103).
3. Install the oil pump drive and driven gears into the pump body, with the identification marks facing up. (See Figure 104).
4. Place a straight edge across the pump body, and measure pump gear to face clearance, with a feeler gage (See Figure 104).
5. Proper gear to face clearance should be .0007" to .0028".
6. Remove both pump gears, lubricate with transmission fluid, and reinstall with identification marks facing up.
7. Install the oil pump cover onto the oil pump body, and install 5 oil pump cover retaining bolts.
8. DO NOT FULLY TIGHTEN BOLTS.

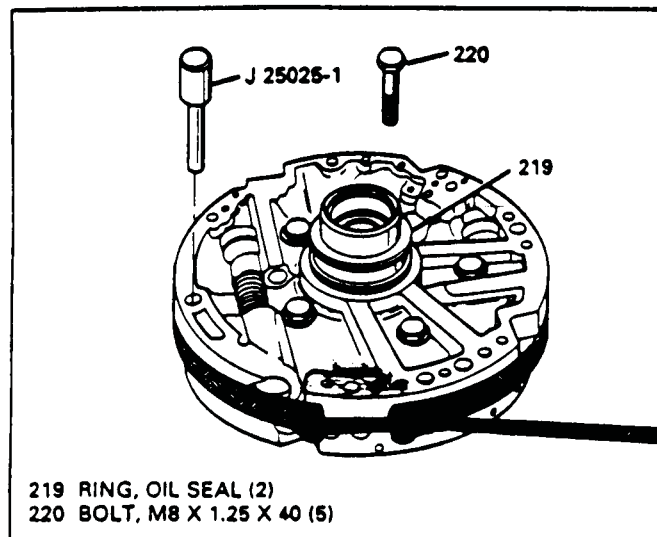


Figure 105

9. Insert oil pump alignment tool into the oil pump assembly, as shown in Figure 105.
10. Install the J-21368 alignment band as shown in Figure 105, and tighten the alignment band.
11. Torque the 5 oil pump cover bolts to 18 ft.lbs, using a crossing pattern.
12. Install front pump seal using a seal driver as shown in Figure 107.
13. Install selective thrust washer onto pump cover, and retain with petrolatum.
14. Install the 2 solid sealing rings on the oil pump cover, using J-38739 installer, pusher, and sizing tool.
15. Install new pump gasket into the case, and retain with petrolatum.
16. Install the oil pump assembly into the case, using J-38789, as shown in Figure 106.
17. Install the 6 oil pump to case bolts as shown in Figure 106.
18. NOTE: If turbine shaft cannot be rotated as pump assembly is being pulled into place, the overrun, 4th, forward and/or direct clutch housings have not been installed properly to index with all of the clutch plates. This must be corrected before pump assembly is fully installed.
19. Torque mounting bolts to 18 ft.lbs.

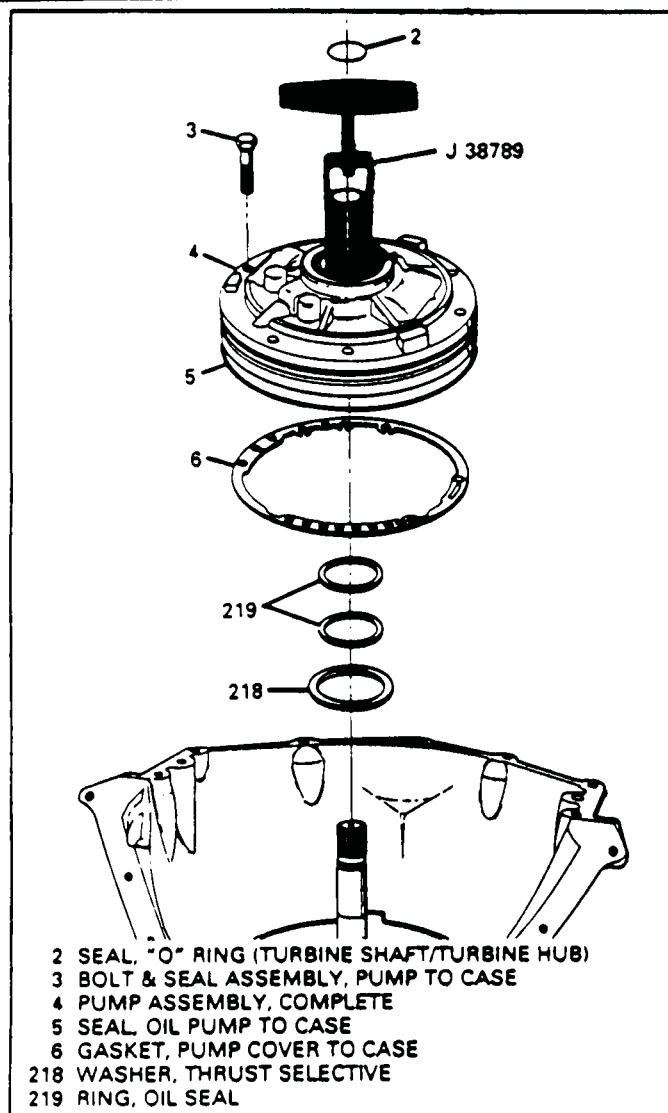


Figure 106

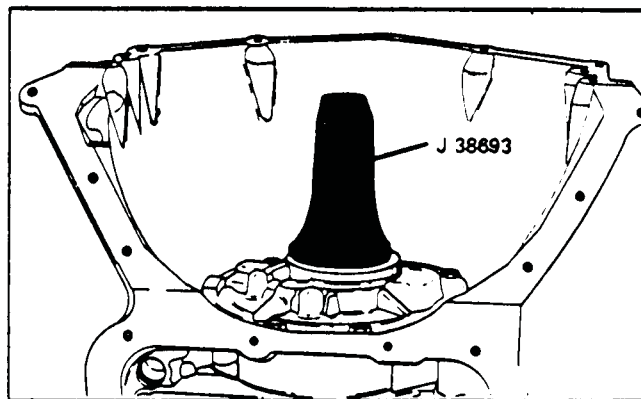


Figure 107

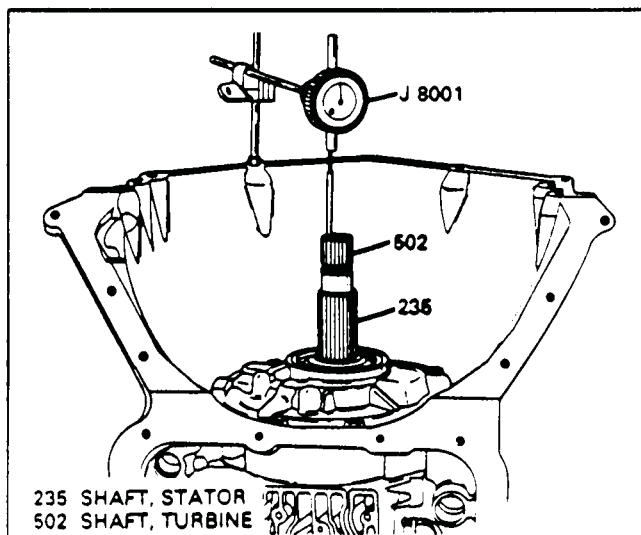


Figure 108

FRONT UNIT END PLAY CHECK

1. Install a dial indicator as shown in Figure 108, located on smooth section of turbine shaft.
2. Set dial indicator to zero.
3. Pull out on turbine shaft to read the transmission end play.
4. NOTE: There may be some play in the turbine shaft, between the snap ring and the overdrive carrier. This play MUST be subtracted from the end play reading obtained for proper transmission end play reading.
5. Proper transmission end play should be .004" to .022".
6. Change selective washer as necessary to obtain this dimension.
7. Use the chart in Figure 109 to select the proper selective washer.
8. Install new "O" ring onto the turbine shaft, as shown in Figure 106.
9. Lubricate "O" ring and front pump seal with petrolatum.



Technical Service Information

THICKNESS (INCH)	STRIPE
.057 - .061	BLUE
.073 - .077	RED
.089 - .093	BROWN
.105 - .109	GREEN
.121 - .125	PLAIN

Figure 109

REAR UNIT END PLAY CHECK

1. Mount a dial indicator, locating on the output shaft, as shown in Figure 110.
2. Set dial indicator to zero.
3. Move the output shaft in and out noting the end play.
4. Correct end play should be .005"-.025".

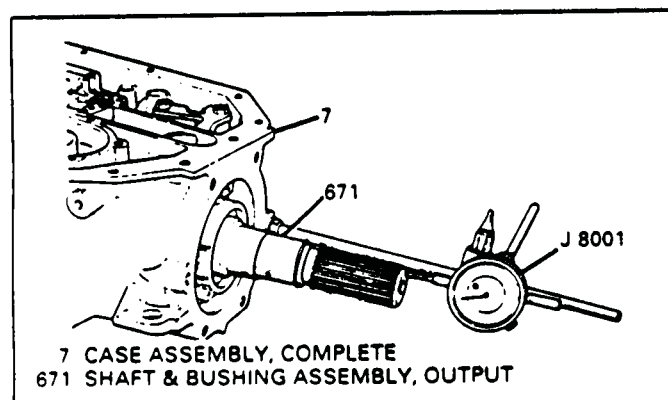


Figure 110

THICKNESS (INCH)	IDENTIFICATION NOTCH AND/OR NUMERAL	
.074 - .078	NONE	1
.082 - .086	ON SIDE OF 1 TAB	2
.090 - .094	ON SIDE OF 2 TABS	3
.098 - .102	ON END OF 1 TAB	4
.106 - .110	ON END OF 2 TABS	5
.114 - .118	ON END OF 3 TABS	6

Figure 111

INTERMEDIATE SERVO PISTON ASSEMBLY

1. Install new seal onto servo piston, and lubricate with petrolatum.
2. Install piston on the piston pin and install the "E" clip (See Figure 112).
3. Install the retainer onto the piston pin (See Figure 112).
4. Install the return spring into the transmission case bore.
5. Install the intermediate servo assembly into the case bore, and insure that the servo pin is engaged with the intermediate band (See Figure 112).

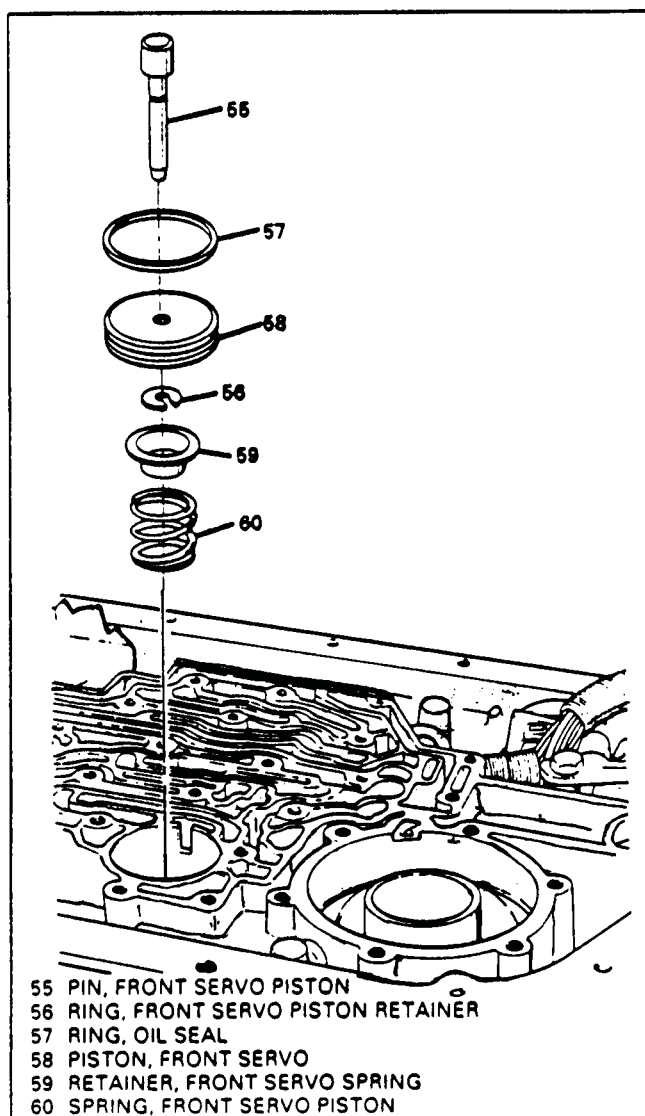


Figure 112

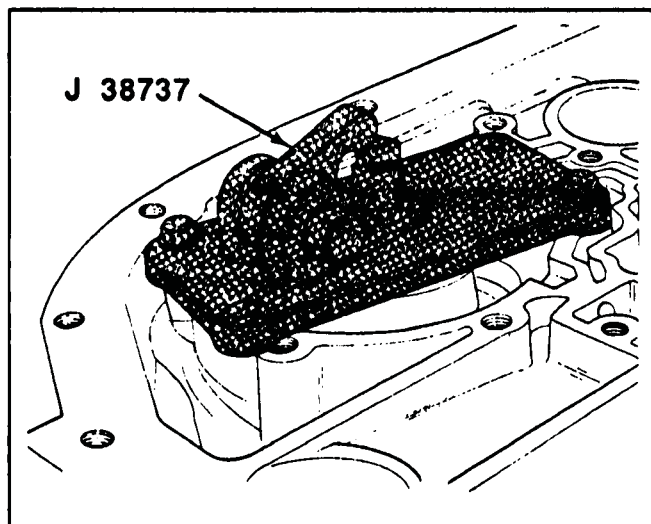


Figure 113

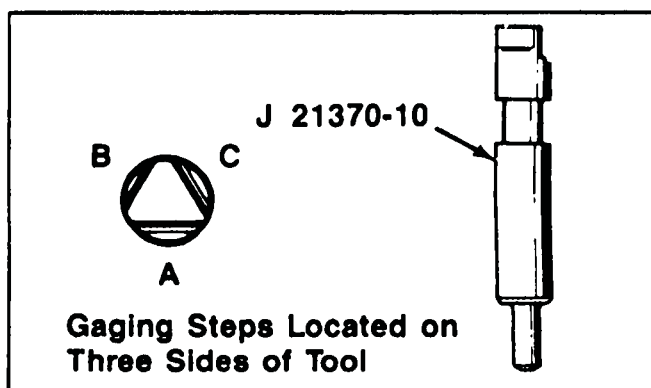


Figure 114

REVERSE BAND APPLY PIN CHECK

1. Place J-21370-10 gage pin into the reverse servo pin bore (Figure 114).
2. Position J-38737 tool over the gage pin and servo bore, with the hex nut facing the parking linkage, as shown in Figure 113.
3. Fasten the tool with two servo cover bolts, as shown in Figure 113.
4. Make sure that the gage pin moves free in the tool and case pin bore.
5. To determine the correct pin length, apply 25 ft.lbs. torque to the nut on the J-38737 gage tool.
6. There are gaging steps located on three sides of the gage pin (See Figure 114).
7. For proper pin selection and identification, see Figure 115.
8. Remove the gaging tool.















7. PIN LENGTH		I.D.
 #7  #6  #5 C	3.468" - 3.474"	
	3.440" - 3.446"	
	3.412" - 3.418"	
To Side C  #4  #3 B	3.384" - 3.390"	
	3.356" - 3.362"	
	3.328" - 3.334"	
To Side B  #2  #1 A	3.300" - 3.306"	

Figure 115

REVERSE SERVO AND 1-2 ACCUMULATOR ASSEMBLY

1. Install retainer (72) on reverse servo pin, spring (71) and washer (70) on servo pin (See Figure 116).
2. Install the servo pin assembly through the reverse servo piston, and install the "E" clip (See Figure 116).
3. Install a new seal onto the reverse servo piston, and lubricate with petrolatum (See Figure 116).
4. Install the 1-2 accumulator piston on the inside of the reverse servo piston. (See Figure 116).
5. Install the 1-2 accumulator spring (74) into the case bore (See Figure 116).
6. Install the reverse servo assembly into the case bore, using care so as not to cut the seal (See Figure 116).
7. Install new reverse servo cover gasket on case (See Figure 116).
8. Install the reverse servo cover, and 6 retaining bolts (See Figure 116).
9. Torque the reverse servo cover retaining bolts to 18 ft.lbs.

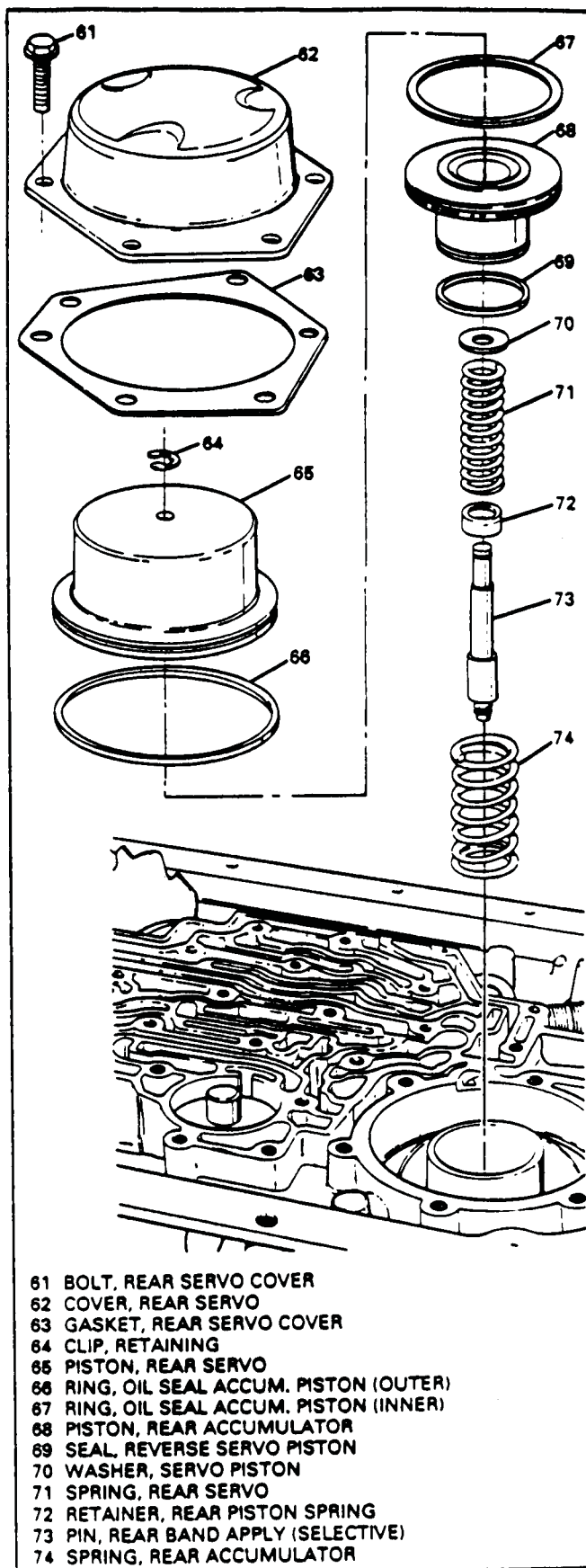


Figure 116

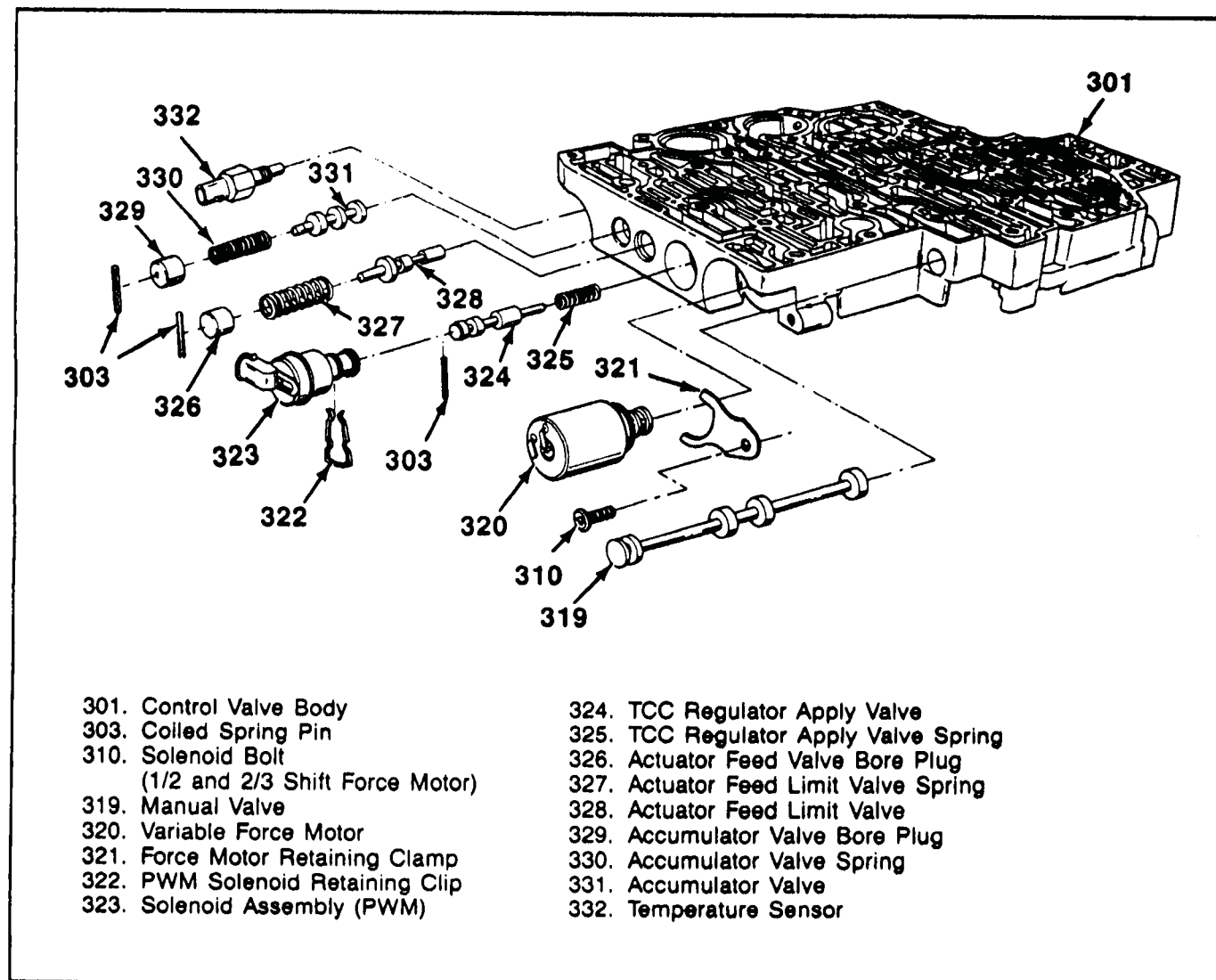


Figure 117

VALVE BODY ASSEMBLY

1. Clean the valve body assembly in clean solvent thoroughly.
2. Move the valves with a pick or small screwdriver to ensure that any debris or dirt is dislodged.
3. Dry with compressed air.
4. Position valve body on a clean and dry flat surface for disassembly.
5. Remove valve trains one at a time and begin in one corner of the valve body.
6. Some valves are under spring pressure so cover the end of the bore when removing roll pins and/or retainers.
7. Valves, springs, and bushings should be laid out on a clean dry surface EXACTLY the way they are removed.
8. Clean all valves, springs and bushings then dry using compressed air.
9. Inspect all valve body parts for wear and/or damage.
10. Use the illustrations in Figures 117 and 118, to reassemble the valves, springs, and bushings in their proper order.
11. Replace all "O" ring seals on solenoids before re-installing in valve body.
12. NOTE: Shift Solenoid "A" (313) is BLUE in color (See Figure 118).
Shift Solenoid "B" (311) is RED in color (See Figure 118).
13. After assembling the valve body, lay it with the worm track side facing up for accumulator housing assembly.

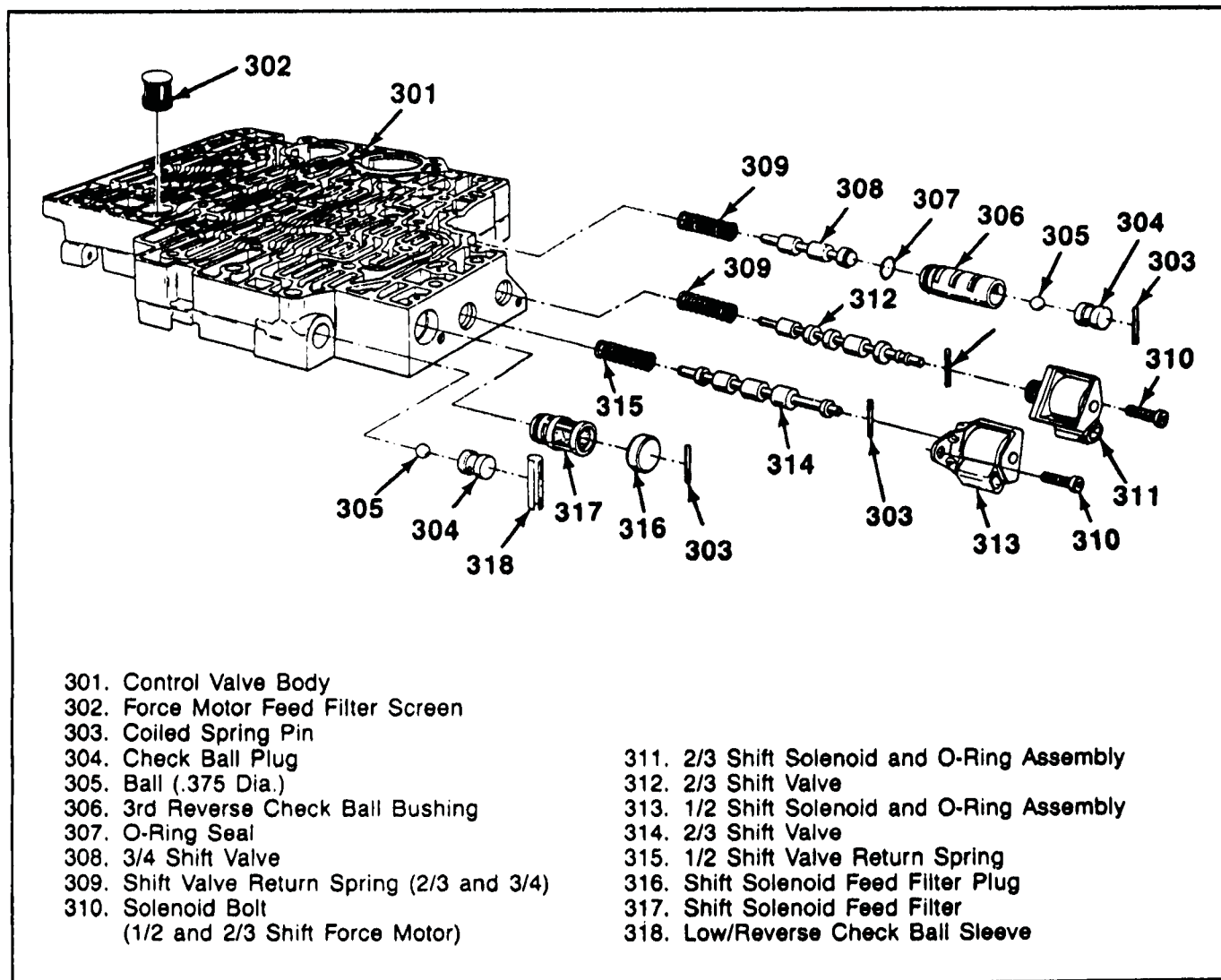
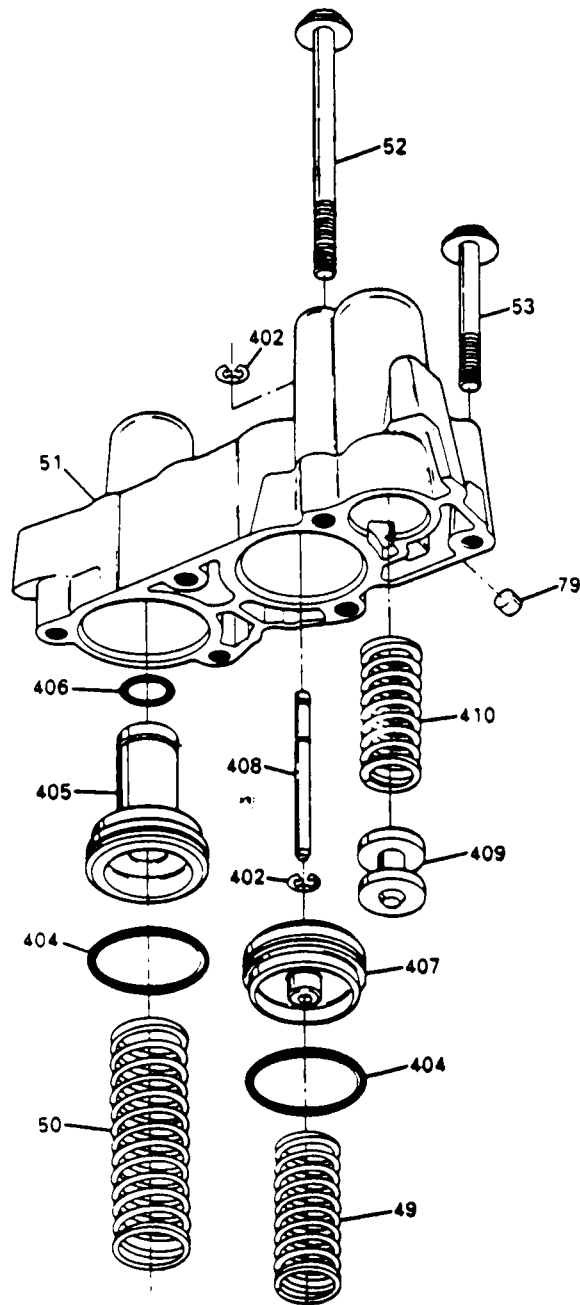


Figure 118



- 49 SPRING, 4TH CLUTCH ACCUM. PISTON
- 50 SPRING, 3RD CLUTCH ACCUM. PISTON
- 51 HOUSING, ACCUMULATOR
- 52 BOLT, ACCUM. HOUSING TO VALVE BODY (LONG)
- 53 BOLT, ACCUM. HOUSING TO VALVE BODY (SHORT)
- 79 PLUG, DIRECT OIL GAL (.25 DIA. CUP)
- 402 RING, SNAP
- 404 SEAL, (1.615) SQUARE CUT
- 405 PISTON, 3RD CLUTCH ACCUMULATOR
- 406 SEAL, (.859) SQUARE CUT
- 407 PISTON, 4TH CLUTCH ACCUMULATOR
- 408 PIN, 4TH CLUTCH ACCUMULATOR PISTON
- 409 VALVE, TORQUE SIGNAL COMPENSATOR
- 410 SPRING, T.S. COMPENSATOR

ACCUMULATOR HOUSING ASSEMBLY

1. Assemble the accumulator housing components exactly as shown in Figure 119.
2. Notice the positions of the springs, valve, and pistons (See Figure 119).
3. With the valve body on bench, wormtrack side facing up, install new valve body to spacer plate gasket.
4. Install the spacer plate.
5. Install new accumulator to spacer plate gasket (See Figure 121).
6. Install accumulator housing assembly on valve body, and tighten finger tight only.
7. Install alignment guide pin, in location shown in Figure 121.
8. Torque the accumulator housing to valve body bolts to 97 in.lbs., and use the tightening sequence shown in Figure 121.
9. Install eight check balls in locations shown in Figure 122.
10. Using guide pins in case, install a new spacer plate to case gasket onto case, and over the guide pins.
11. Install the complete valve body and accumulator assembly onto the case using guide pins.
12. Install the pressure switch manifold on valve body assembly (See Figure 124).
13. Install detent spring and roller into place, 3 wiring clips into place, and fluid indicator stop into place (See Figures 123 and 124).
14. Install all valve body bolts, 21 total.
15. Install six bolts into the pressure switch manifold (See Figure 124).
16. Install the lube pipe, with the long end into the case (See Figure 124).
17. Install lube pipe clip and bolt.
18. Tighten bolts to 116 in.lbs.
19. Install the wiring harness, and attach all connectors. (See Figures 123 and Figure 124).
20. Install large end into case first, then pressure switch hook up, shift solenoid "A" (Blue), shift solenoid "B" (Red), temperature sensor, PWM solenoid, and the force motor (See Figures 123 & 124).

Figure 119

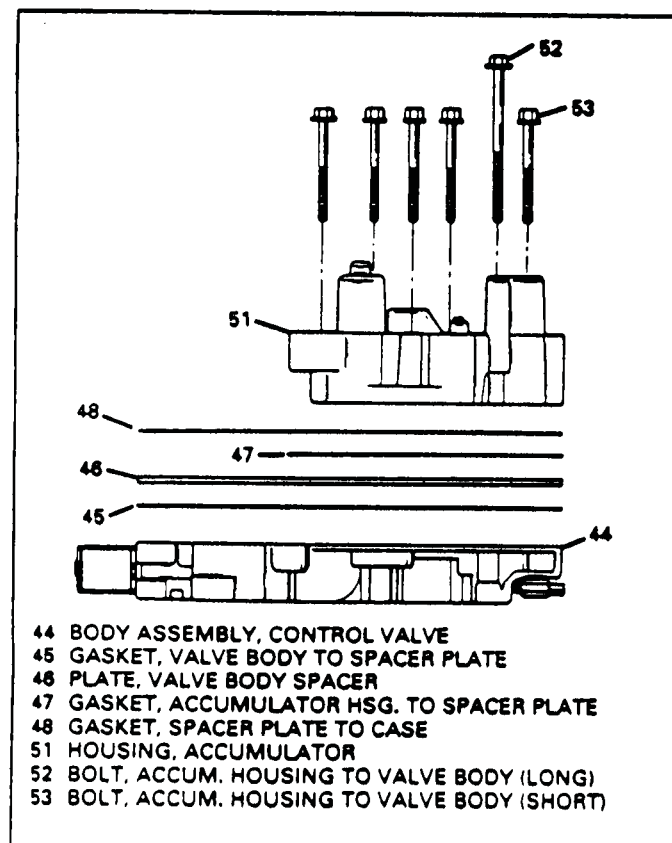


Figure 120

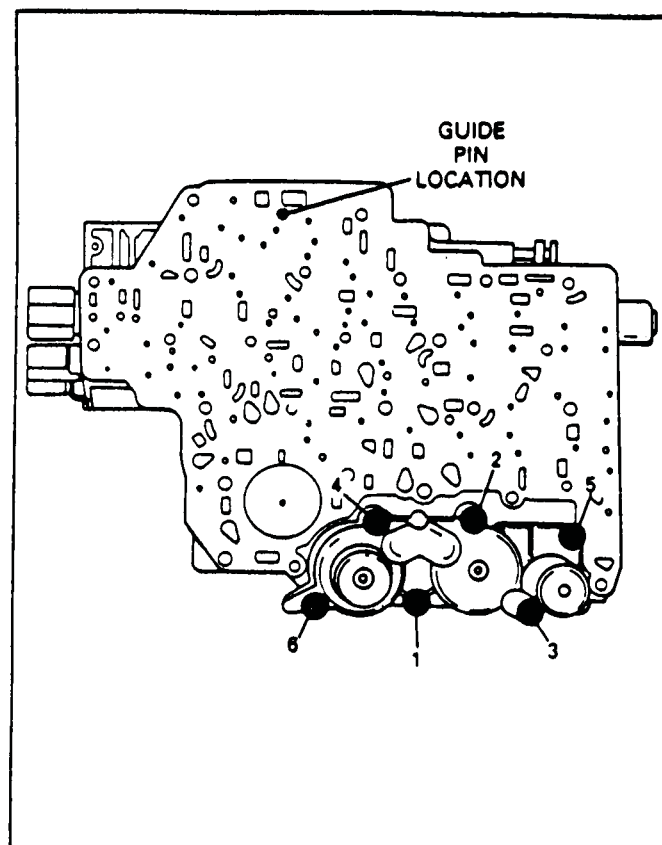


Figure 121

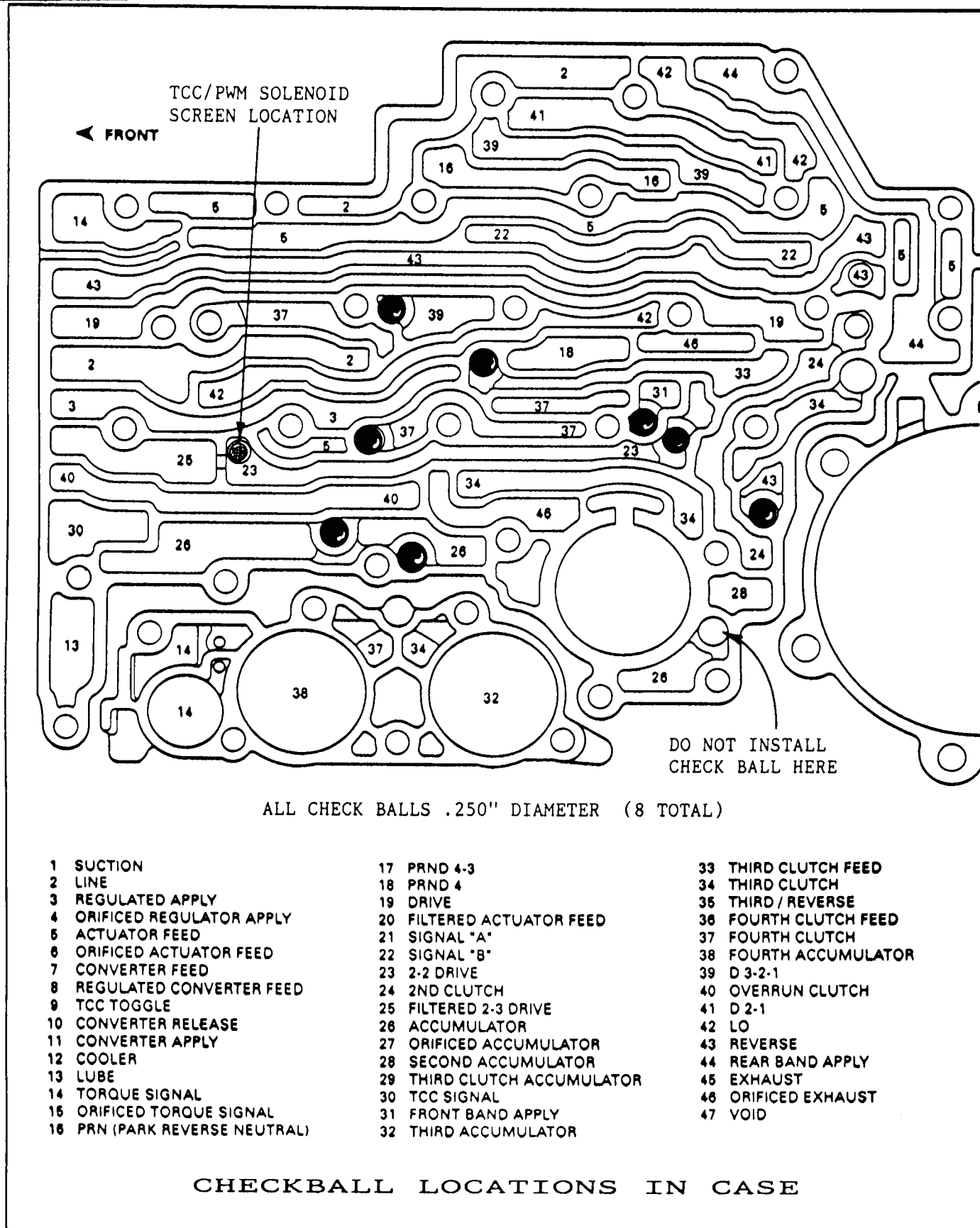
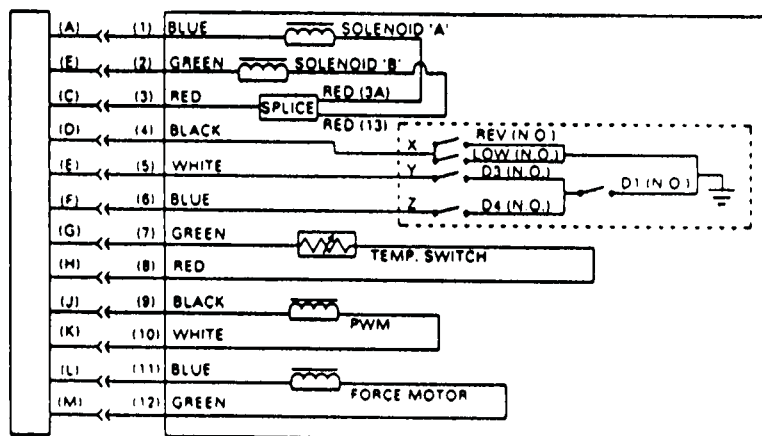
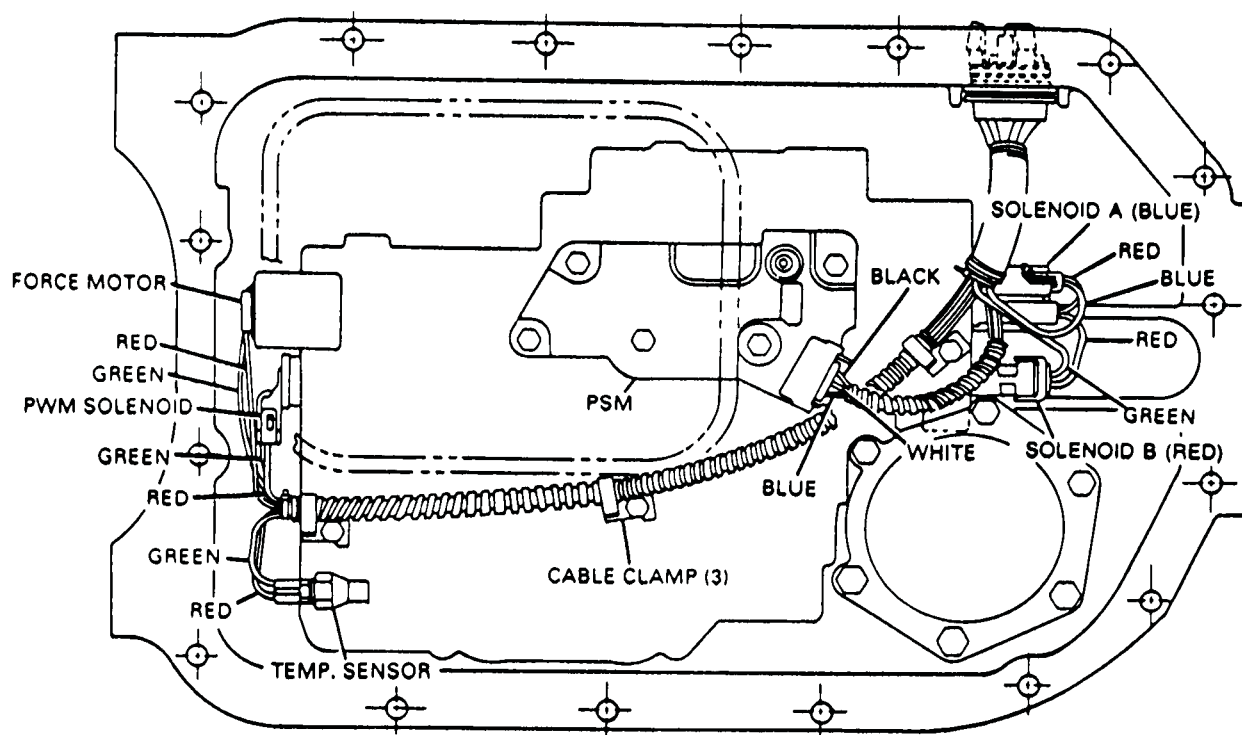


Figure 122

AUTOMATIC TRANSMISSION SERVICE GROUP

WIRING SCHEMATIC



(B) SOLENOID "B" GROUND-GREEN
(A) SOLENOID "A" GROUND-BLUE

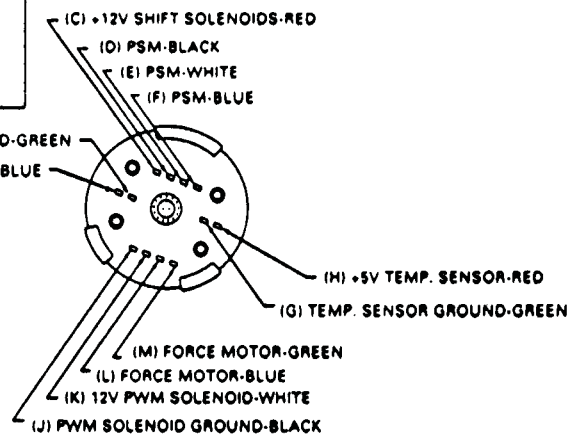
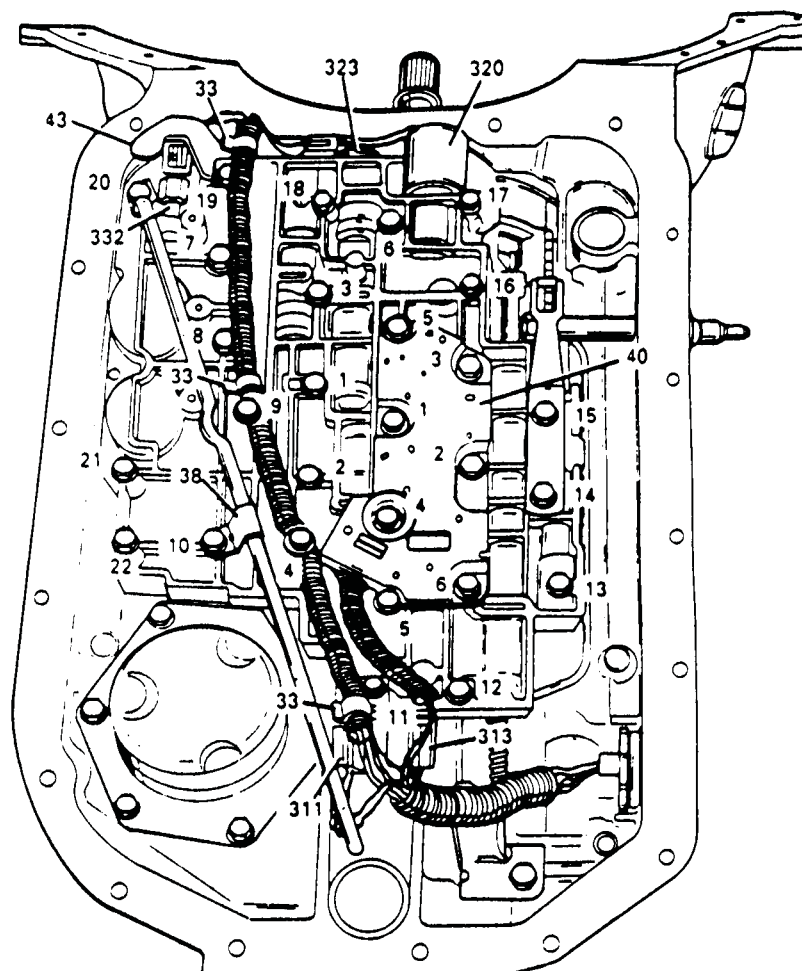


Figure 123

AUTOMATIC TRANSMISSION SERVICE GROUP



- 33 CLAMP, ELECTRICAL CABLE
- 38 CLAMP, LUBE PIPE
- 40 MAINFOLD, PRESSURE SWITCH
- 43 STOP, OIL (DIPSTICK)
- 311 SOLENOID & O-RING ASSEMBLY, B
- 313 SOLENOID & O-RING ASSEMBLY, A
- 320 VARIABLE FORCE MOTOR
- 323 SOLENOID ASSEMBLY, PWM
- 332 SENSOR, TEMPERATURE

Figure 124

BOTTOM PAN AND FILTER ASSEMBLY

1. Install new filter seal into the case bore (See Figure 126).
2. Install the filter assembly into the filter seal (See Figure 126).
3. Install the bottom pan gasket onto transmission case (See Figure 126).
4. NOTE: This pan gasket is a "Controlled Compression" type and can be re-used as long as there are no "Ribs" broken and/or cracked. Replace as necessary.
5. Install magnet into bottom pan.
6. Install the bottom pan onto case.
7. Install 17, 10mm pan bolts, and notice that they are flanged head and black in color (See Figure 127).
8. Torque all pan bolts to 18 ft.lbs.

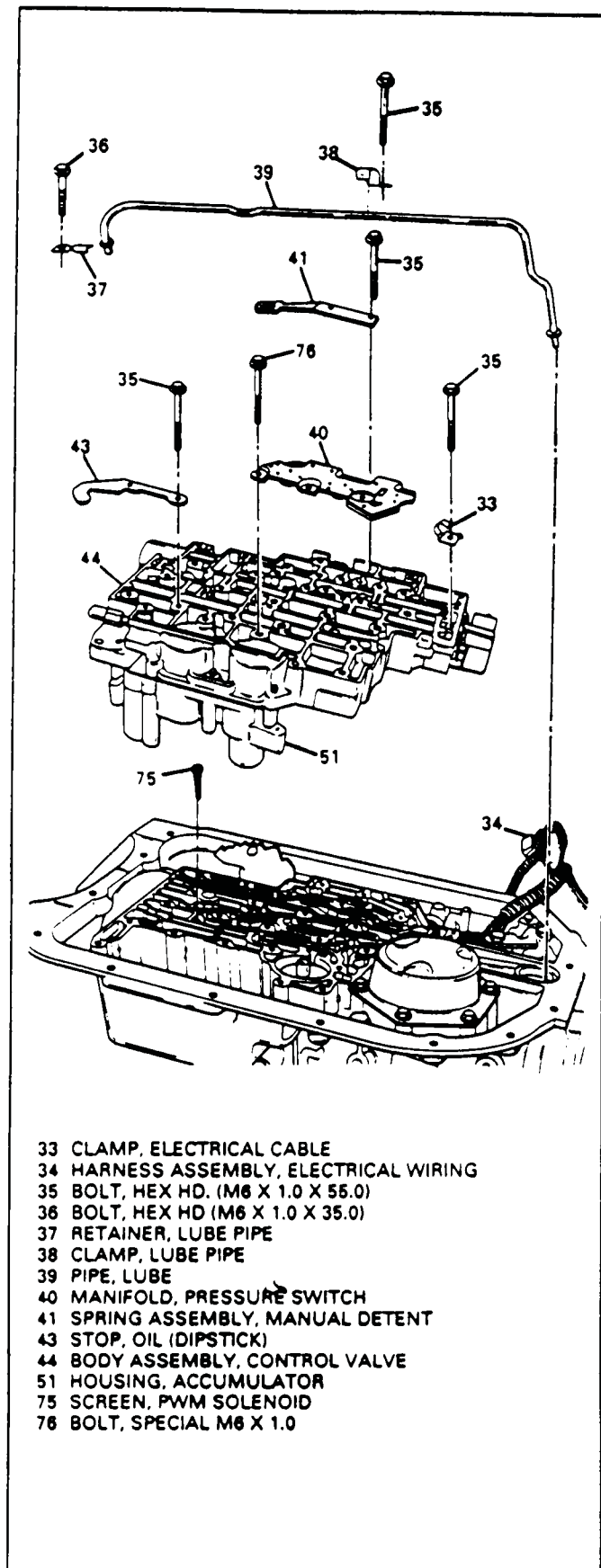


Figure 125

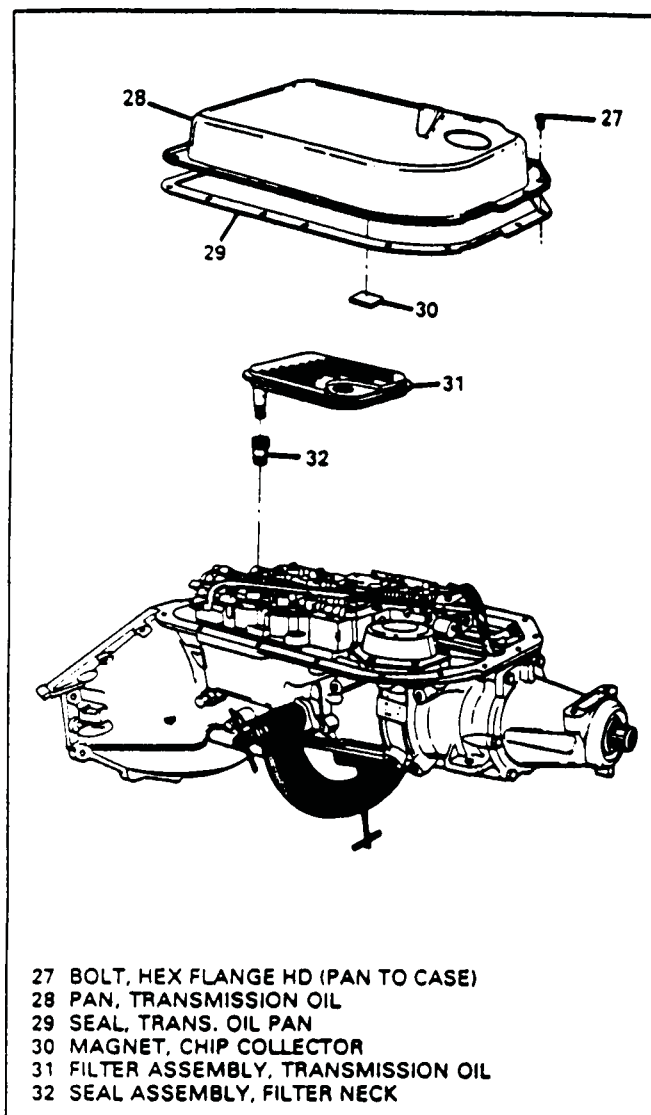


Figure 126

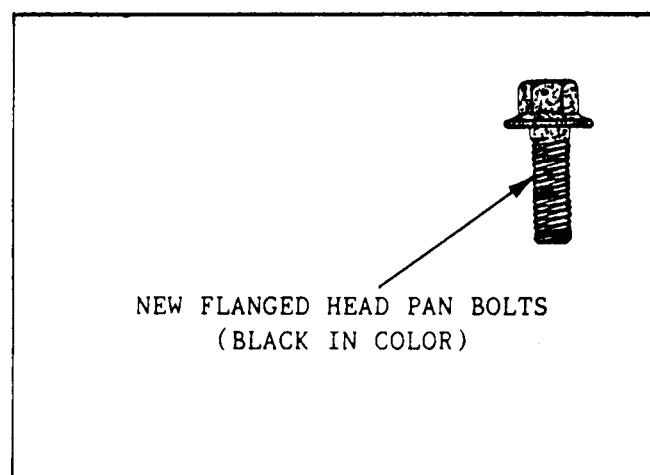


Figure 127

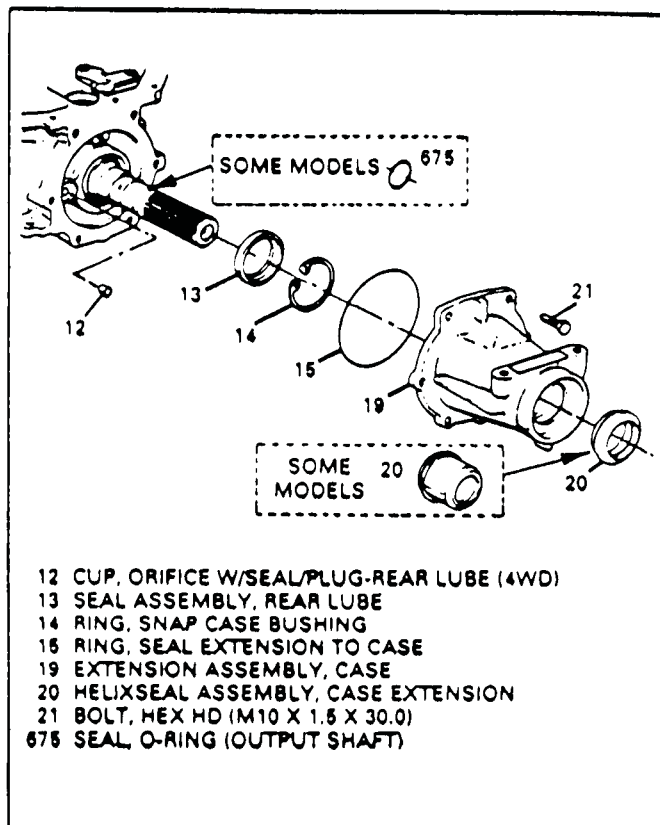


Figure 128

EXTENSION HOUSING ASSEMBLY

1. Inspect for presence of orificed cup plug (12) (See Figure 128).
2. Make sure that rear lube seal (13) and snap ring (14) are in place. (See Figure 128).
3. Install a new extension housing seal using the proper seal driver (See Figure 128).
4. Install new "O" ring seal onto the extension housing (See Figure 128).
5. Install the extension housing and 6 mounting bolts.
6. Torque the 6 bolts to 25 ft.lbs.
7. Lubricate the rear seal assembly with petrolatum.
8. Install the fixed yoke, if so equipped.

SPEED SENSOR ASSEMBLIES

1. Inspect speed sensor assemblies for evidence of any damage.
2. Install both speed sensor assemblies into case bores, and install the two retaining bolts (See Figure 129 & 130).
3. Torque the speed sensor retaining bolts to 97 in.lbs.

TORQUE CONVERTER ASSEMBLY

1. Install measuring device, as shown in Figure 131, and check for converter end play.
2. Proper end play should be .005"-.024"
3. Replace converter as necessary.
4. Install torque converter into the transmission.

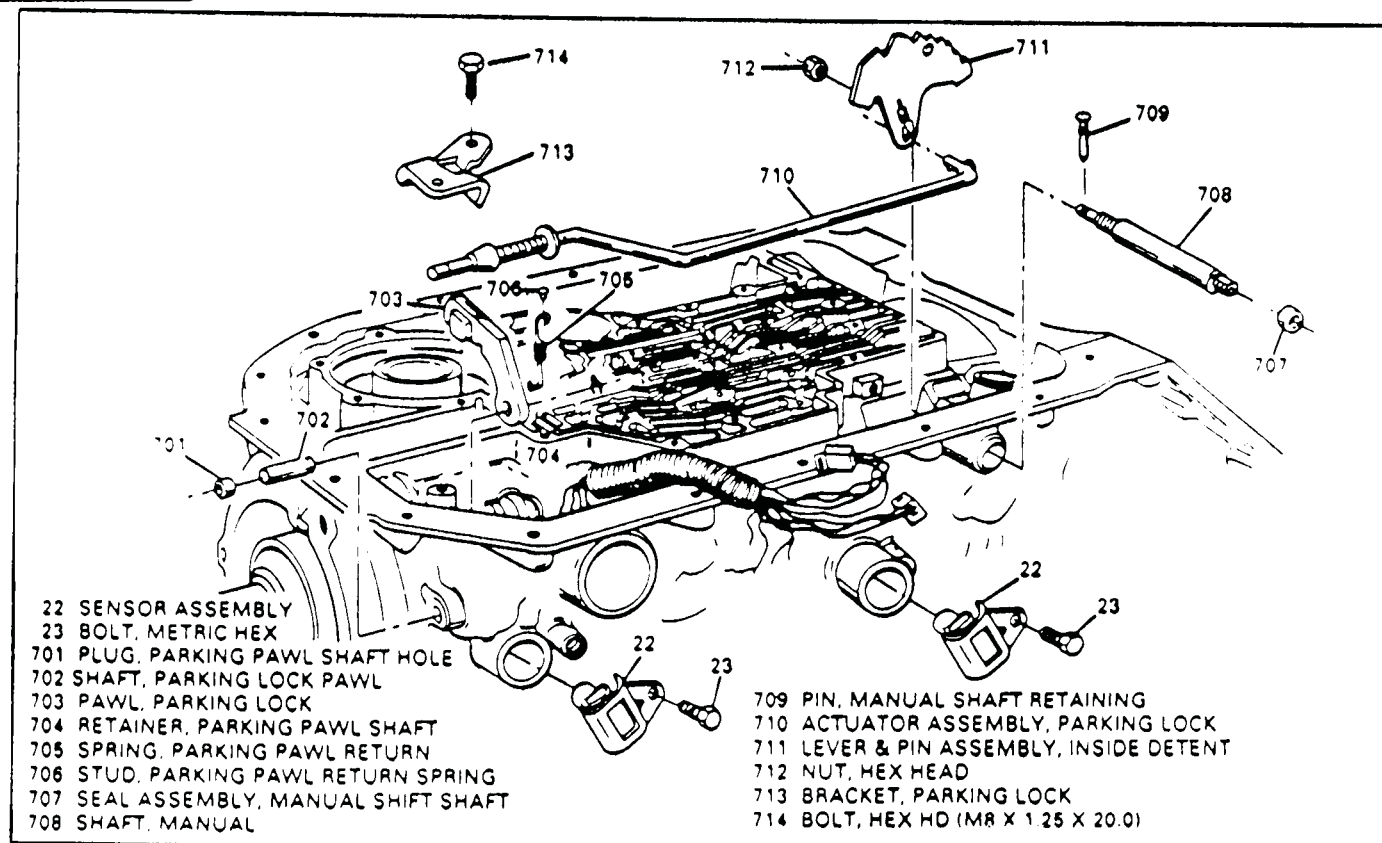


Figure 129

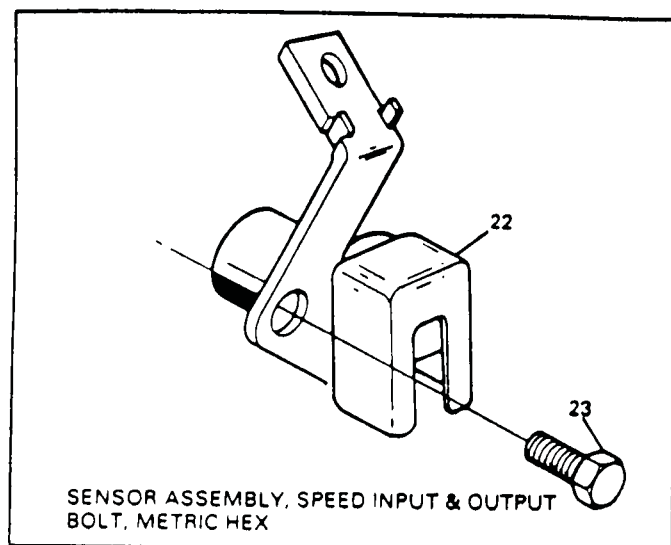


Figure 130

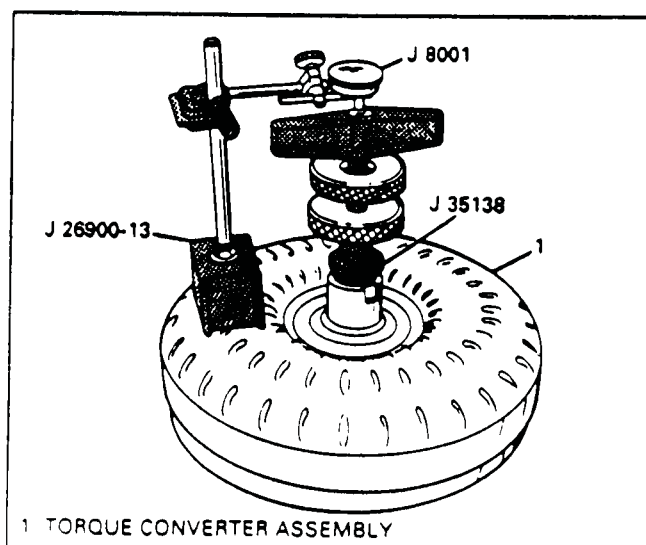


Figure 131

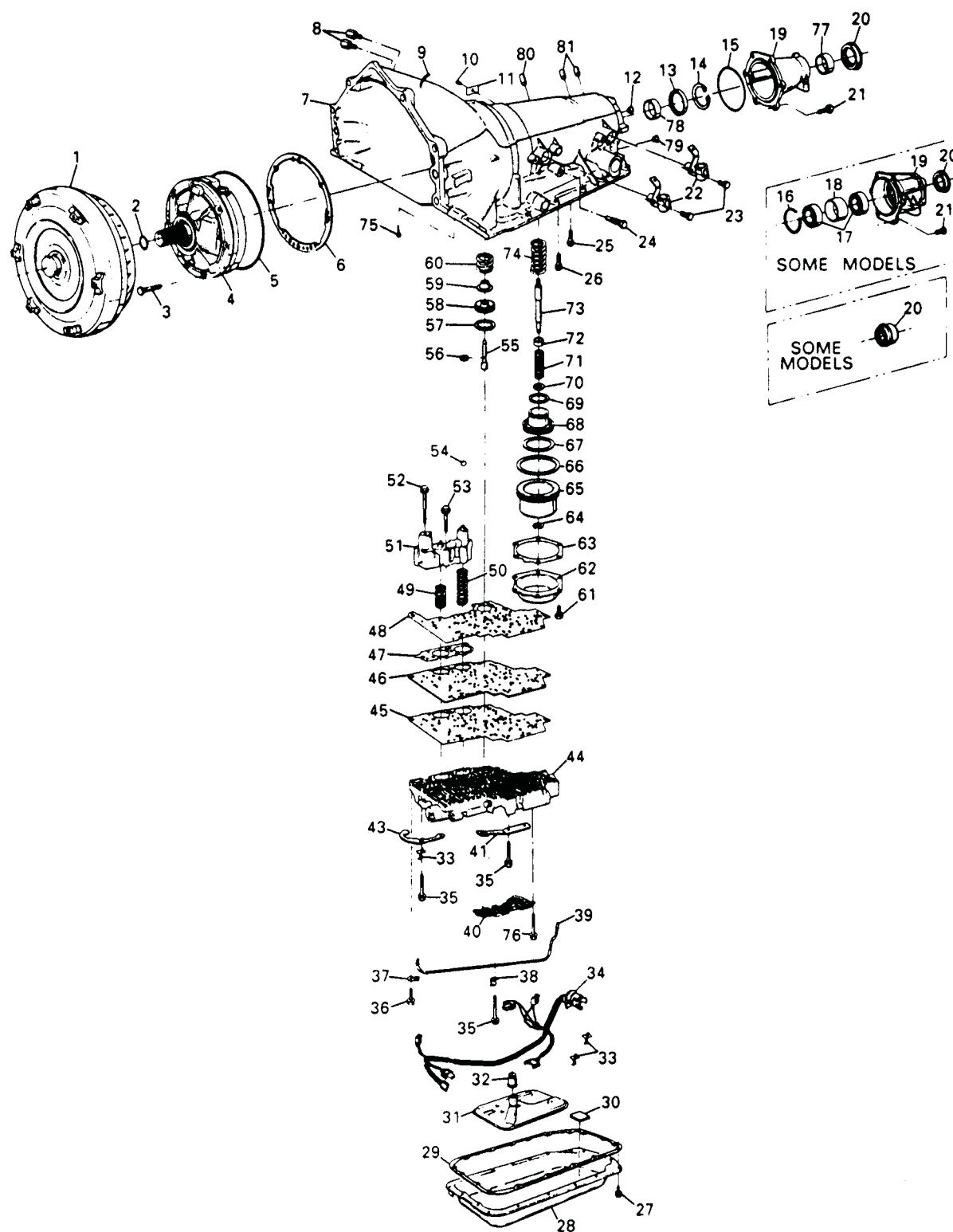


Figure 132

AUTOMATIC TRANSMISSION SERVICE GROUP



Technical Service Information

- | | |
|---|---|
| 1 TORQUE CONVERTER ASSEMBLY | 41 SPRING ASSEMBLY, MANUAL DETENT |
| 2 SEAL, O-RING (TURBINE SHAFT/TURBINE HUB) | 43 STOP, DIPSTICK (FLUID LEVEL INDICATOR) |
| 3 BOLT & SEAL ASSEMBLY, PUMP TO CASE | 44 BODY ASSEMBLY, CONTROL VALVE |
| 4 PUMP ASSEMBLY, COMPLETE | 45 GASKET, VALVE BODY TO SPACER PLATE |
| 5 SEAL, OIL PUMP TO CASE | 46 PLATE, VALVE BODY SPACER |
| 6 GASKET, PUMP COVER TO CASE | 47 GASKET, ACCUMULATOR HSG. TO SPACER PLATE |
| 7 CASE ASSEMBLY, COMPLETE | 48 GASKET, SPACER PLATE TO CASE |
| 8 CONNECTOR, INVERTED FLARED TUBE | 49 SPRING, 4TH CLUTCH ACCUM. PISTON |
| 9 PIPE, VENT | 50 SPRING, 3RD CLUTCH ACCUM. PISTON |
| 10 SCREW, NAMEPLATE | 51 HOUSING, ACCUMULATOR |
| 11 NAMEPLATE | 52 BOLT, ACCUM. HOUSING TO VALVE BODY (LONG) |
| 12 CUP, ORIFICE W/SEAL/PLUG-REAR LUBE (4WD) | 53 BOLT, ACCUM. HOUSING TO VALVE BODY (SHORT) |
| 13 SEAL ASSEMBLY, REAR LUBE | 54 BALL, .25 DIAMETER |
| 14 RING, SNAP SEAL RETAINER | 55 PIN, FRONT SERVO PISTON |
| 15 RING, SEAL EXTENSION TO CASE | 56 RING, FRONT SERVO SPRING RETAINER |
| 16 RING, SNAP INTERNAL | 57 RING, OIL SEAL |
| 17 BEARING ASSEMBLY, BALL | 58 PISTON, FRONT SERVO |
| 18 SPACER, BEARING | 59 RETAINER, FRONT SERVO SPRING |
| 19 EXTENSION ASSEMBLY, CASE | 60 SPRING, FRONT SERVO PISTON |
| 20 HELIXSEAL ASSEMBLY, CASE EXTENSION | 61 BOLT, REAR SERVO COVER |
| 21 BOLT, HEX HD (M10 X 1.5 X 30.0) | 62 COVER, REAR SERVO |
| 22 SENSOR ASSEMBLY, SPEED INPUT & OUTPUT | 63 GASKET, REAR SERVO COVER |
| 23 BOLT, METRIC HEX | 64 CLIP, RETAINING (BOTTOM) |
| 24 PLUG, OIL TEST HOLE (HEX HD 1/8 PIPE) | 65 PISTON, REAR SERVO |
| 25 BOLT, CASE TO CENTER SUPPORT | 66 RING, OIL SEAL ACCUM. PISTON (OUTER) |
| 26 BOLT, CASE (4TH CLUTCH) | 67 RING, OIL SEAL ACCUM. PISTON (INNER) |
| 27 BOLT, HEX FLANGE HD (PAN TO CASE) | 68 PISTON, REAR ACCUMULATOR |
| 28 PAN, TRANSMISSION OIL | 69 SEAL, REVERSE SERVO PISTON |
| 29 SEAL, TRANS. OIL PAN | 70 WASHER, SERVO PISTON |
| 30 MAGNET, CHIP COLLECTOR | 71 SPRING, REAR SERVO |
| 31 FILTER ASSEMBLY, TRANSMISSION OIL | 72 RETAINER, REAR PISTON SPRING |
| 32 SEAL ASSEMBLY, FILTER NECK | 73 PIN, REAR BAND APPLY (SELECTIVE) |
| 33 CLAMP, ELECTRICAL CABLE | 74 SPRING, REAR ACCUMULATOR |
| 34 HARNESS ASSEMBLY, ELECTRICAL WIRING | 75 SCREEN, PWM SOLENOID |
| 35 BOLT, HEX HD. (M6 X 1.0 X 55.0) | 76 BOLT, SPECIAL |
| 36 BOLT, M6 X 1.0 X 35.0 LG V/B TO C/P | 77 BUSHING, CASE EXTENSION |
| 37 RETAINER, LUBE PIPE | 78 BUSHING, TRANSMISSION CASE |
| 38 CLAMP, LUBE PIPE | 79 PLUG, DIRECT OIL GAL (.25 DIA. CUP) |
| 39 PIPE, LUBE | 80 PIN, ANCHOR FRONT BAND |
| 40 MANIFOLD, PRESSURE SWITCH | 81 PIN, ANCHOR REAR BAND |

Figure 132 Legend

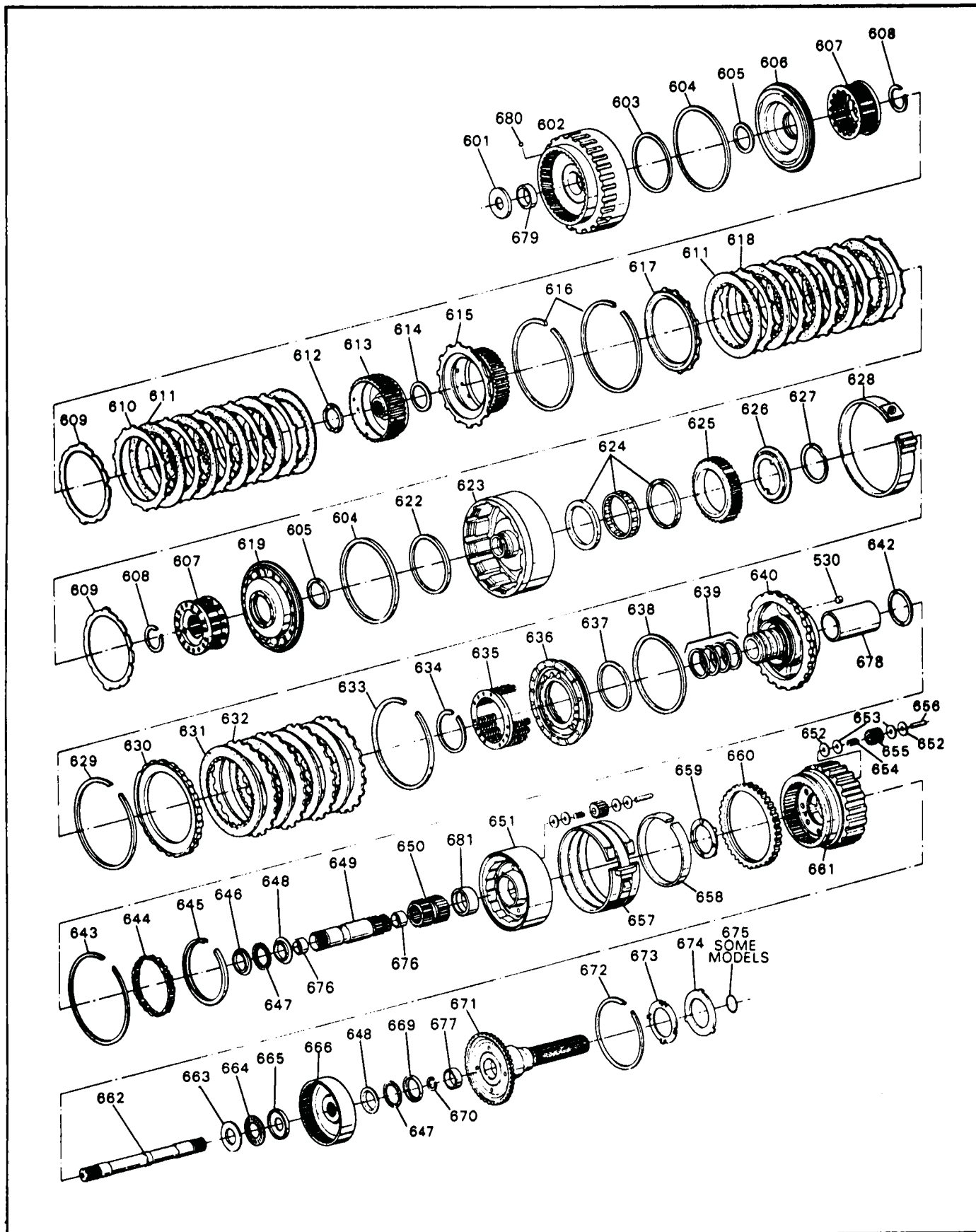


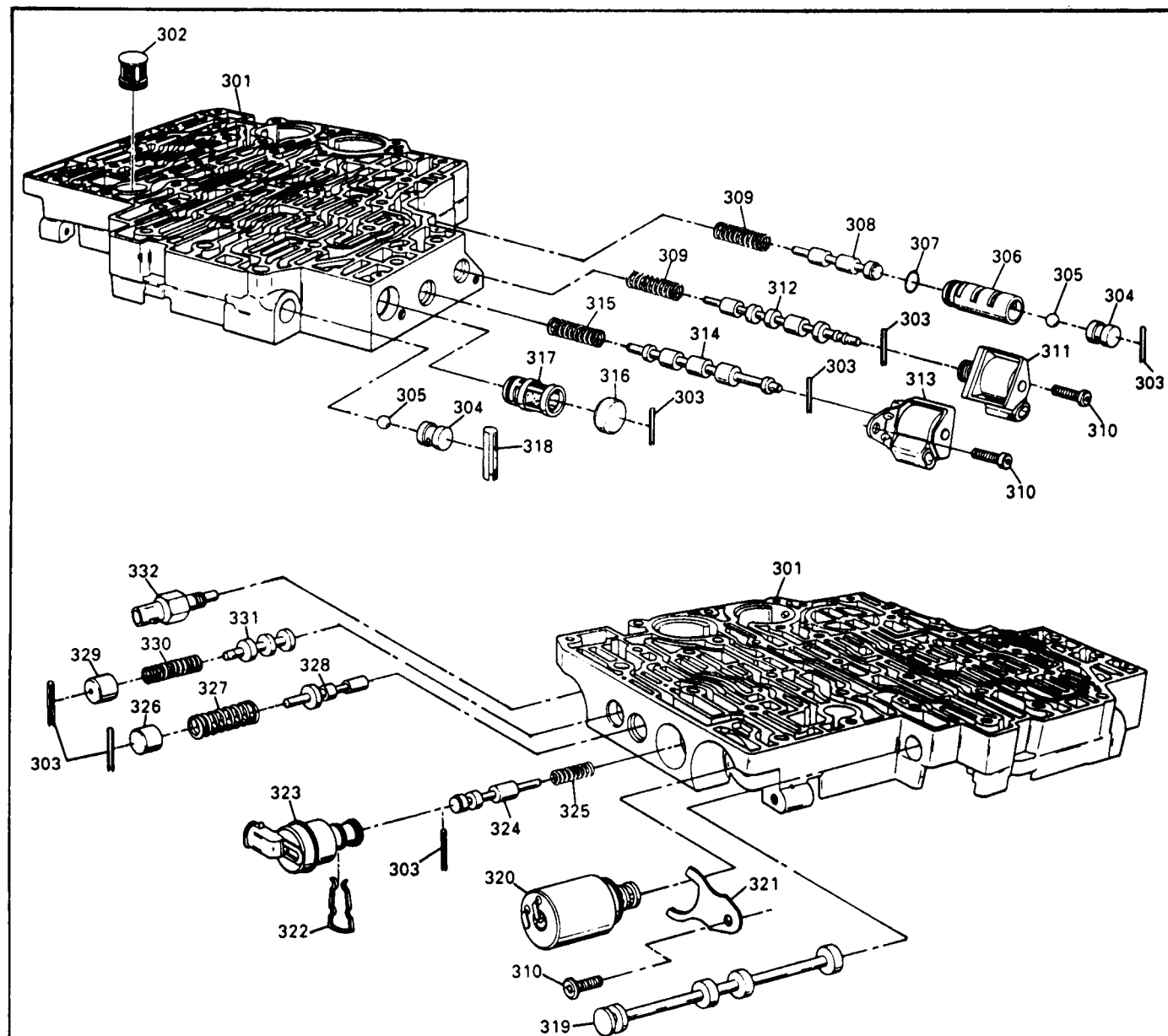
Figure 133
AUTOMATIC TRANSMISSION SERVICE GROUP



Technical Service Information

530 PLUG, ORIFICE CENTER SUPPORT	642 WASHER, THRUST SUPPORT/REACTION DRUM
601 BEARING ASM., THRUST CARRIER/FORWARD CLUTCH	643 SPACER, SUPPORT TO CASE
602 HOUSING ASSEMBLY, FORWARD CLUTCH	644 ROLLER CLUTCH ASSEMBLY
603 SEAL, CLUTCH (CENTER)	645 RING, REACTION DRUM SPACER
604 SEAL, CLUTCH (OUTER)	646 RACE, THRUST BEARING TO CENTER SUPPORT
605 SEAL, CLUTCH (INNER)	647 BEARING, NEEDLE THRUST
606 PISTON, FORWARD CLUTCH	648 RACE, THRUST BEARING
607 SPRING & RETAINER ASSEMBLY	649 SHAFT ASSEMBLY, SUN GEAR
608 RING, SNAP	650 GEAR, SUN
609 PLATE, CLUTCH (.054 DISHED)	651 DRUM & CARRIER ASSEMBLY, REACTION
610 PLATE, CLUTCH (.0775 FLAT)	652 WASHER, PINION THRUST
611 PLATE ASSEMBLY, CLUTCH	653 WASHER, PINION THRUST
612 WASHER, THRUST CLUTCH HUB HOUSING	654 ROLLER, NEEDLE BEARING
613 HUB, FORWARD CLUTCH DRIVEN	655 PINION, PLANET
614 WASHER, THRUST FORWARD CLUTCH	656 PIN, PLANET PINION
615 HUB, DIRECT CLUTCH DRIVING	657 BAND ASSEMBLY, REAR BRAKE
616 RING, SNAP (6.24 O.D. X .062)	658 RING, FRONT INTERNAL GEAR
617 PLATE, DIRECT CLUTCH BACKING	659 WASHER, FRONT INTERNAL/REACTION CARRIER
618 PLATE, CLUTCH (.0915 FLAT)	660 RING, OUTPUT SPEED SENSOR
619 PISTON, DIRECT CLUTCH	661 CARRIER ASSEMBLY, OUTPUT
622 SEAL, CLUTCH (CENTER)	662 SHAFT, TRANSMISSION MAIN
623 HOUSING, DIRECT CLUTCH	663 RACE, THRUST BEARING TO SUN GEAR
624 SPRAG ASSEMBLY, INTERMEDIATE CLUTCH	664 BEARING, NEEDLE THRUST RR INTERNAL GEAR
625 RACE, INTERMEDIATE CLUTCH (OUTER)	665 RACE, THRUST BEARING TO RR INTERNAL GEAR
626 RETAINER, INTERMEDIATE CLUTCH	666 GEAR, REAR INTERNAL
627 RING, EXTERNAL LOCKING	669 RACE, THRUST BEARING TO OUTPUT SHAFT
628 BAND ASSEMBLY, FRONT	670 RING, SNAP MAINSHAFT INTERNAL GEAR
629 RING, SNAP (INTERMEDIATE CLUTCH RETAINER)	671 SHAFT & BUSHING ASSEMBLY, OUTPUT
630 PLATE, INTERMEDIATE CLUTCH BACKING	672 RING, SNAP (OUTPUT SHAFT/ FRONT INTERNAL GEAR)
631 PLATE ASSEMBLY, INTERMEDIATE CLUTCH	673 WASHER, THRUST
632 PLATE, INTERMEDIATE CLUTCH	674 WASHER, THRUST SELECTIVE
633 RING, SNAP CENTER SUPPORT/CASE	675 SEAL, O-RING OUTPUT SHAFT
634 RING, SNAP INTERMEDIATE CLUTCH	676 BUSHING, SUN GEAR SHAFT
635 SPRING & RETAINER ASM., INTERMEDIATE CLUTCH	677 BUSHING, OUTPUT SHAFT
636 PISTON, INTERMEDIATE CLUTCH	678 BUSHING
637 SEAL, INTERMEDIATE CLUTCH (INNER)	679 BUSHING, 1.536" DIA. X 3.52"
638 SEAL, INTERMEDIATE CLUTCH (OUTER)	680 BALL, CHECK
639 RING, OIL SEAL	681 BUSHING, REACTION DRUM
640 SUPPORT & RACE ASSEMBLY, CENTER	
641 PLUG, ORIFICE CENTER SUPPORT	

Figure 133 Legend

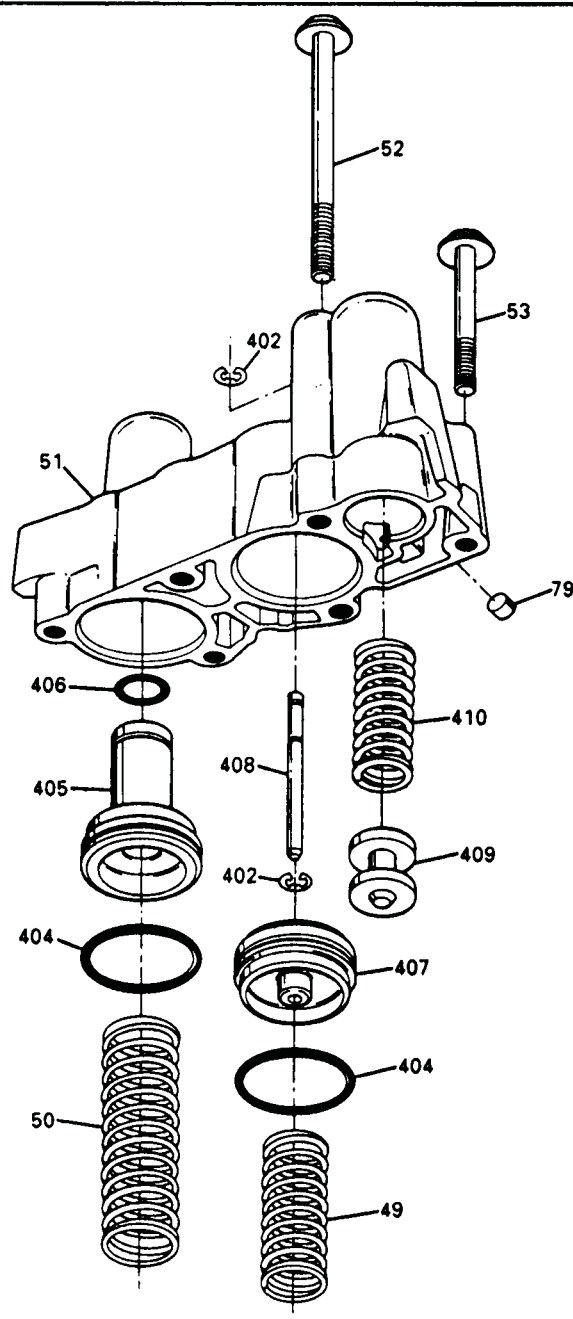


- 301 BODY, CONTROL VALVE
- 302 SCREEN FILTER, FORCE MOTOR FEED
- 303 PIN, COILED SPRING
- 304 PLUG, CHECKBALL
- 305 BALL (.375 DIA.)
- 306 BUSHING, 3RD/REVERSE CHECKBALL
- 307 SEAL, OIL PUMP CVR SCREEN
- 308 VALVE, 3/4 SHIFT
- 309 SPRING, SHIFT VALVE RETURN (2/3 & 3/4)
- 310 BOLT, SOLENOID (1/2 & 2/3 SHIFT, FORCE MOTOR)
- 311 SOLENOID & O-RING ASSEMBLY, B
- 312 VALVE, 2/3 SHIFT
- 313 SOLENOID & O-RING ASSEMBLY, A
- 314 VALVE, 1/2 SHIFT
- 315 SPRING, 1/2 SHIFT VALVE RETURN
- 316 PLUG, SHIFT SOLENOID FEED FILTER

- 317 FILTER, SHIFT SOLENOID FEED
- 318 SLEEVE, LO/REVERSE CHECKBALL
- 319 VALVE, MANUAL
- 320 VARIABLE FORCE MOTOR
- 321 CLAMP, FORCE MOTOR RETAINING
- 322 CLIP, PWM SOLENOID RETAINING
- 323 SOLENOID ASSEMBLY, PWM
- 324 VALVE, TCC REGULATOR APPLY
- 325 SPRING, TCC REGULATOR APPLY VALVE
- 326 PLUG, VALVE BORE (ACTUATOR FEED)
- 327 SPRING, ACTUATOR FEED LIMIT VALVE
- 328 VALVE, ACTUATOR FEED LIMIT
- 329 PLUG, ACCUMULATOR VALVE BORE
- 330 SPRING, ACCUMULATOR VALVE
- 331 VALVE, ACCUMULATOR
- 332 SENSOR, TEMPERATURE

Figure 134

AUTOMATIC TRANSMISSION SERVICE GROUP



- 49 SPRING, 4TH CLUTCH ACCUM. PISTON
- 50 SPRING, 3RD CLUTCH ACCUM. PISTON
- 51 HOUSING, ACCUMULATOR
- 52 BOLT, ACCUM. HOUSING TO VALVE BODY (LONG)
- 53 BOLT, ACCUM. HOUSING TO VALVE BODY (SHORT)
- 79 PLUG, DIRECT OIL GAL (.25 DIA. CUP)
- 402 RING, SNAP
- 404 SEAL, (1.615) SQUARE CUT
- 405 PISTON, 3RD CLUTCH ACCUMULATOR
- 406 SEAL, (.859) SQUARE CUT
- 407 PISTON, 4TH CLUTCH ACCUMULATOR
- 408 PIN, 4TH CLUTCH ACCUMULATOR PISTON
- 409 VALVE, TORQUE SIGNAL COMPENSATOR
- 410 SPRING, T.S. COMPENSATOR

Figure 135

AUTOMATIC TRANSMISSION SERVICE GROUP

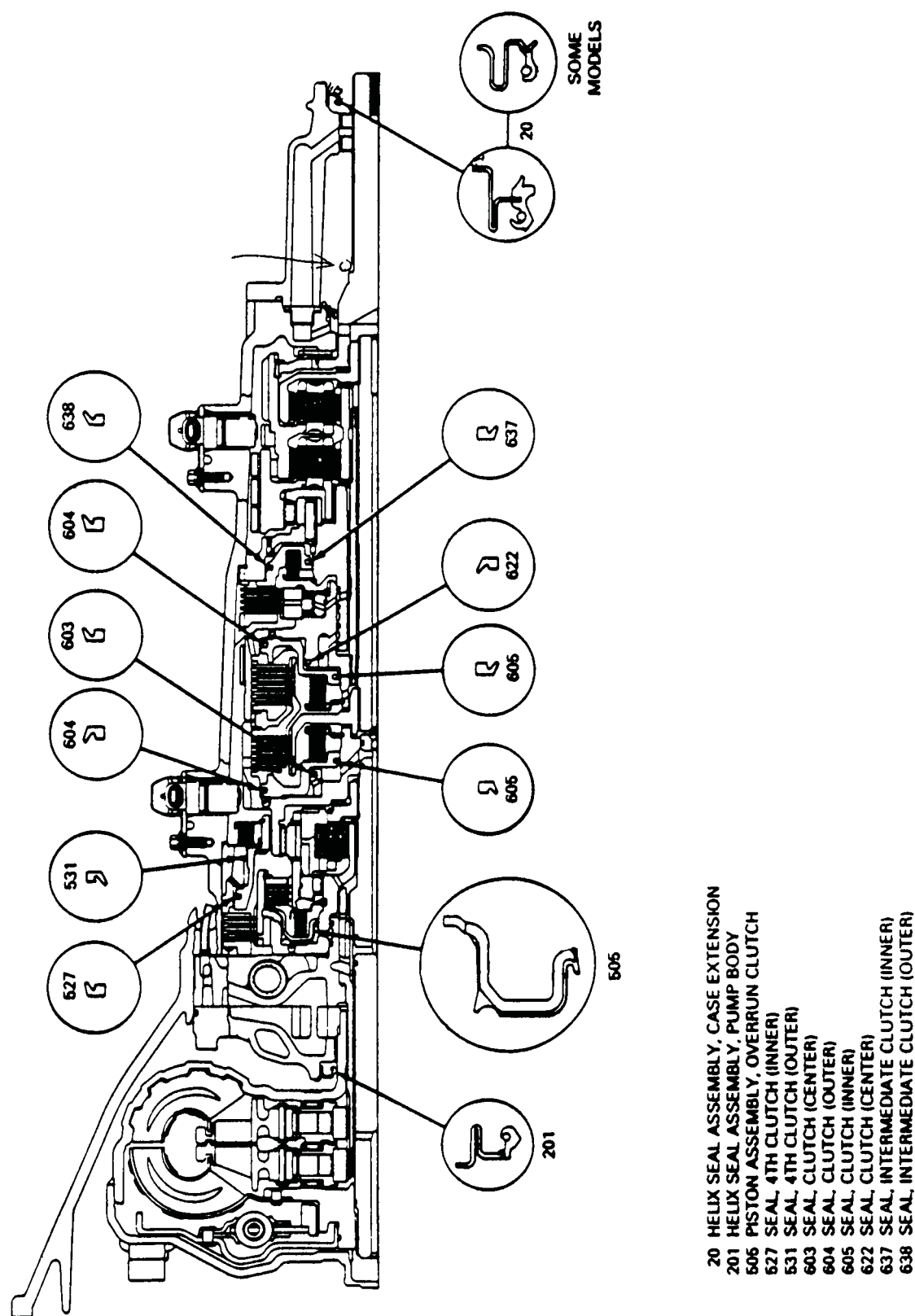
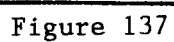


Figure 136

AUTOMATIC TRANSMISSION SERVICE GROUP



AUTOMATIC TRANSMISSION SERVICE GROUP



Technical Service Information

CODE IDENTIFICATION AND DEFAULT ACTION		
CODE AND CIRCUIT	PROBABLE CAUSE	DEFAULT ACTION
14 Engine Temperature High	Signal voltage has been above 130°C (270°F) for 1 second.	<ul style="list-style-type: none">• TCC apply cold.• Loss of driveability.
15 Engine Temperature Low	Signal voltage has been less than -33°C (-27°F) for 1 second.	<ul style="list-style-type: none">• TCC apply cold.• Loss of driveability.
21 Throttle Position High	Code 21 will set if signal voltage has been above 4.9 volts for 1 second.	<ul style="list-style-type: none">• Set line pressure to maximum.• Fixed shift points.• Inhibit 4th gear.• Inhibit TCC operation.
22 Throttle Position Low	Code 22 will set if TPS signal voltage is below .06 volt for more than 1 second.	<ul style="list-style-type: none">• Set pressure to maximum.• Fixed shift points.• Inhibit 4th gear.• Inhibit TCC operation.
24 Output Speed Low	With input speed at least 3000 rpm, output speed must read less than 200 rpm.	<ul style="list-style-type: none">• Set pressure to maximum.• Allow 4-3, 3-2, and 1-2 shifts, then maintain 2nd gear.• Calculate output speed from input speed.
28 Pressure Switch Manifold	PCM/TCM must see one of two "illegal" combinations from the pressure switch manifold.	<ul style="list-style-type: none">• Assume Ⓓ Drive 4 is selected.• Inhibit 4th gear operation.• Inhibit TCC operation.
39 TCC Stuck "OFF"	Code 39 sets if the TCC slip is greater than 65 rpm for 2 seconds.	<ul style="list-style-type: none">• Inhibit 4th gear.• Inhibit TCC operation.
53 System Voltage High	Code 53 will set if system voltage is above 19.5 volts for 2 seconds.	<ul style="list-style-type: none">• Maximum line pressure.• 2nd gear only.• Inhibit TCC operation.
58 Transmission Temperature High	Transmission temperature must be above 154°C (304°F) for 1 second.	<ul style="list-style-type: none">• TCC in 2nd, 3rd, 4th gears.• Maximum line pressure.
59 Transmission Temperature Low	Transmission Temperature must be below -48°C (-54°F) for 1 second.	<ul style="list-style-type: none">• TCC in 2nd, 3rd and 4th gears.• Maximum line pressure.

Figure 138
AUTOMATIC TRANSMISSION SERVICE GROUP



Technical Service Information

CODE IDENTIFICATION AND DEFAULT ACTION		
CODE AND CIRCUIT	PROBABLE CAUSE	DEFAULT ACTION
68 Over Drive Ratio	Code 68 will set if the engine speed is 200 rpm higher than input speed for 2 seconds must be in 4 th gear TCC engaged.	<ul style="list-style-type: none">• Set Pressure to maximum.
73 Force Motor Current	Code 73 sets when actual force motor current is more than 1.6 amps lower than command current.	<ul style="list-style-type: none">• Maximum line pressure.
75 System Voltage Low	Code 75 will set when system voltage falls below 8.6 volts.	<ul style="list-style-type: none">• Turn force motor "OFF."• Allow 4-3, 3-2, and 1-2 shifts, then maintain 2nd gear.• Inhibit TCC and 4th gear.
81 Quad Driver and Shift Solenoid "B" Fault	Code 81 will set if the PCM/TCM detects an inappropriate voltage on the shift solenoid "B" circuit.	<ul style="list-style-type: none">• Shift to 2nd gear.• Inhibit TCC operation.
82 Quad Driver and Shift Solenoid "A" Fault	Code 82 will set if the PCM/TCM detects an inappropriate voltage on the shift solenoid "A" circuit.	<ul style="list-style-type: none">• 2nd and 3rd gears only or 1st and 4th gears only.
83 Quad Driver and TCC Fault	Code 83 will set if an inappropriate voltage is detected on the TCC circuit.	<ul style="list-style-type: none">• Inhibit 4th gear.• Inhibit TCC operation.
85 Undefined Ratio	Code 85 will set if the PCM/TCM's calculations indicate an unexpected gear ratio does not include over drive.	<ul style="list-style-type: none">• Set pressure to maximum.
86 Shift Solenoid "B" Stuck "ON"	Code 86 will set if the PCM/TCM has commanded 1 st or 2 nd gear but a ratio calculation indicates 3 rd gear.	<ul style="list-style-type: none">• Set pressure to maximum.
87 Shift Solenoid "B" Stuck "OFF"	Code 87 will set if the PCM/TCM commands 3 rd or 4 th gear but a ratio calculation indicates 2 nd gear.	<ul style="list-style-type: none">• Set pressure to maximum.

Figure 139



Technical Service Information

FASTENER APPLICATION	ASSEMBLY TORQUE			RECHECK TORQUE		
	N.M	LB.-FT.	LB.-IN.	N.M	LB.-FT.	LB.-IN.
TEMPERATURE SENSOR TO VALVE BODY	4	—	35	4 MIN.	—	35 MIN.
SOLENOID TO VALVE BODY SCREW	8	—	71	5 MIN.	—	44 MIN.
CONTROL VALVE ASSEMBLY TO CASE SCREW	11	—	97	8 MIN.	—	71 MIN.
OIL TEST HOLE PLUG	11	—	97	8 MIN.	—	71 MIN.
FLYWHEEL HOUSING COVER TO TRANSMISSION SCREW ...	7	—	62	7 MIN.	—	62 MIN.
PUMP BODY TO COVER SCREW	24	18	—	20 MIN.	15 MIN.	—
PUMP ASSEMBLY TO CASE SCREW	24	18	—	20 MIN.	15 MIN.	—
REAR SERVO COVER TO CASE SCREW	24	18	—	20 MIN.	15 MIN.	—
FORCE MOTOR BRACKET TO VALVE BODY SCREW	8	—	71	5 MIN.	—	44 MIN.
PARKING PAWL BRACKET TO CASE SCREW	24	18	—	20 MIN.	15 MIN.	—
ACCUMULATOR HOUSING TO VALVE BODY SCREW	11	—	97	8 MIN.	—	71 MIN.
FOURTH CLUTCH SCREW	16	12	—	15 MIN.	—	133 MIN.
PAN TO CASE SCREW	24	18	—	15 MIN.	—	133 MIN.
EXTENSION HOUSING TO CASE SCREW	34	25	—	27 MIN.	20 MIN.	—
MANUAL SHAFT TO DETENT LEVER NUT	24	18	—	20 MIN.	15 MIN.	—
SPEED SENSOR TO CASE SCREW	11	—	97	8 MIN.	—	71 MIN.
CASE CENTER SUPPORT SCREW	39	29	—	34 MIN.	25 MIN.	—
FLYWHEEL TO CONVERTER SCREW	44	32	—	44 MIN.	32 MIN.	—
TRANSMISSION CASE TO ENGINE SCREW	44	32	—	44 MIN.	32 MIN.	—
COOLER PIPE CONNECTOR NUT AT CASE & RADIATOR	38	28	—	35 MIN.	26 MIN.	—
VALVE BODY TO CASE/LUBE PIPE	11	—	97	8 MIN.	—	71 MIN.
ENGINE REAR MOUNT TO TRANSMISSION BOLT	44	32	—	44 MIN.	32 MIN.	—
ENGINE REAR SUPPORT BRACKET TO FRAME NUT	44	32	—	44 MIN.	32 MIN.	—
VALVE BODY TO CASE/PSM	11	—	97	8 MIN.	—	71 MIN.

Figure 140

AUTOMATIC TRANSMISSION SERVICE GROUP



Technical Service Information

THM 4L80-E/4L80-EHD NEW DESIGN CASE CONNECTOR FOR 1993

CHANGE: Beginning on May 25, 1993 (Julian Date 145) a new case connector and wiring harness assembly went into production on all THM 4L80-E/4L80-EHD transmissions (See Figure 2).

REASON: Greatly decreased the possibility of bending the case connector terminals and ease of assembly.

PARTS AFFECTED:

- (1) CASE CONNECTOR AND INTERNAL WIRING HARNESS - Now has a much more durable case connector and REVISED pin locations.
Refer to Figure 1 for previous transmission case connector.
Refer to Figure 2 for new transmission case connector.
- (2) EXTERNAL VEHICLE HARNESS CONNECTOR - Changed to accomodate the new design transmission case connector and REVISED cavity locations.
Refer to Figure 3 for new design vehicle harness connector.

INTERCHANGEABILITY:

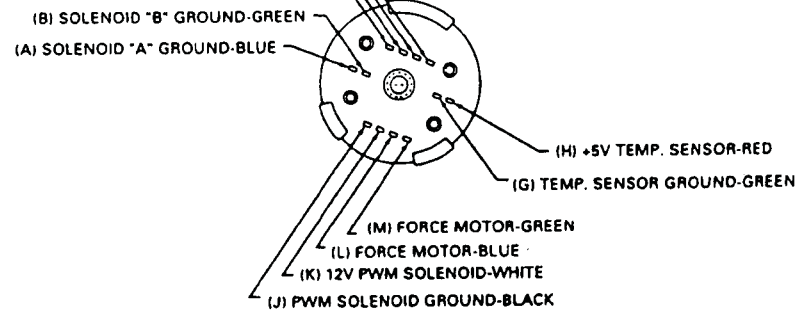
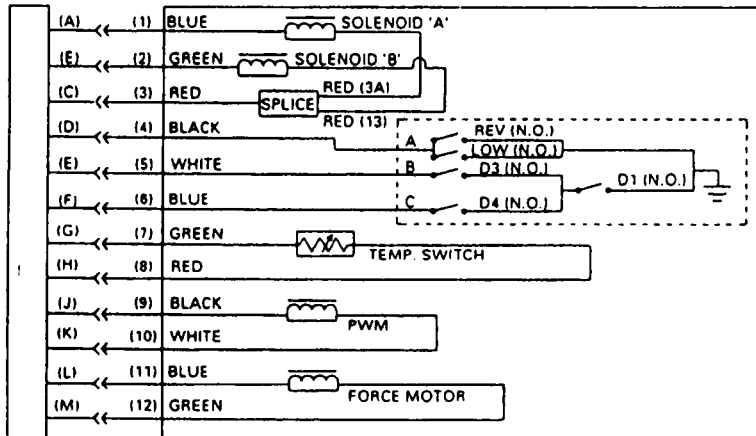
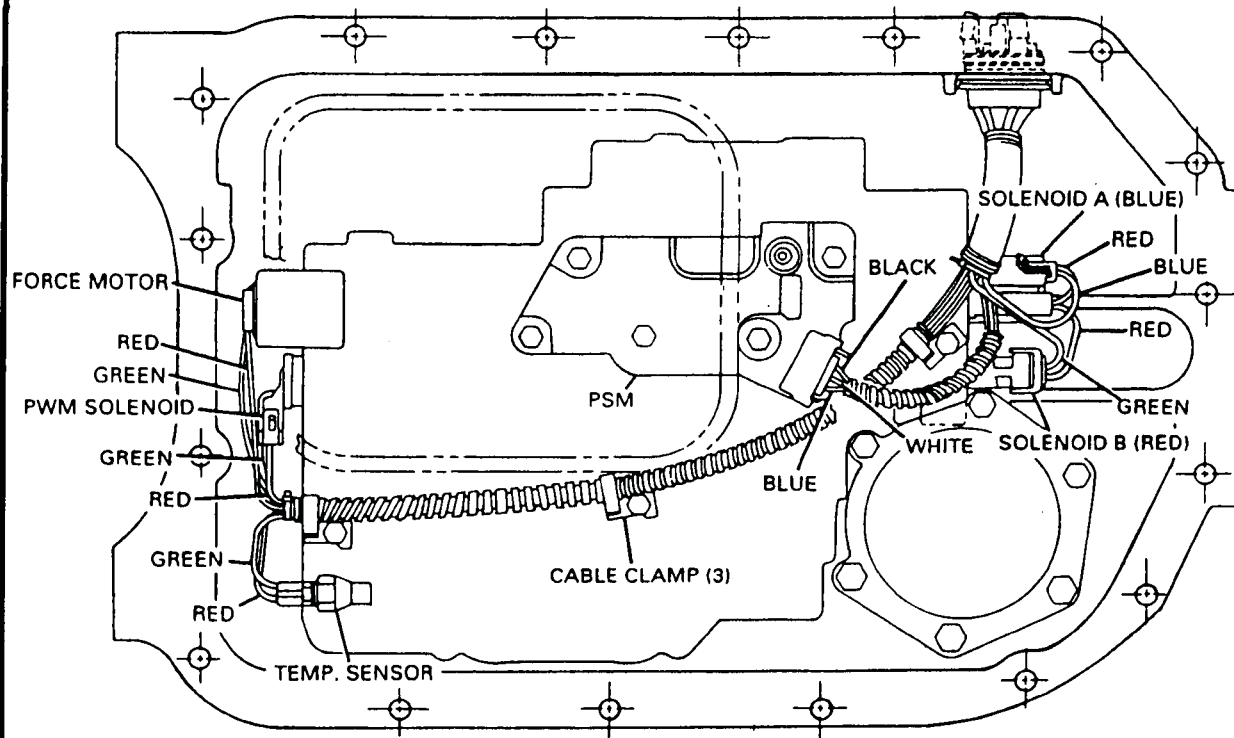
There is now available a new service package, OEM part number 24200161, that will update ANY previous model THM 4L80-E/4L80-EHD transmission to the new design case connector, and includes the following:

1. New design transmission case connector and internal wiring harness.
2. New design external vehicle harness connector that requires cutting and splicing the new connector to the existing vehicle harness.
Use the chart provided in Figure 2 as a guide.

SERVICE INFORMATION:

UPDATE SERVICE PACKAGE (Includes the following) 24200161

1. New Design Transmission Case Connector,
and Internal Wiring Harness Assembly.
2. New Design External Vehicle Harness Connector.

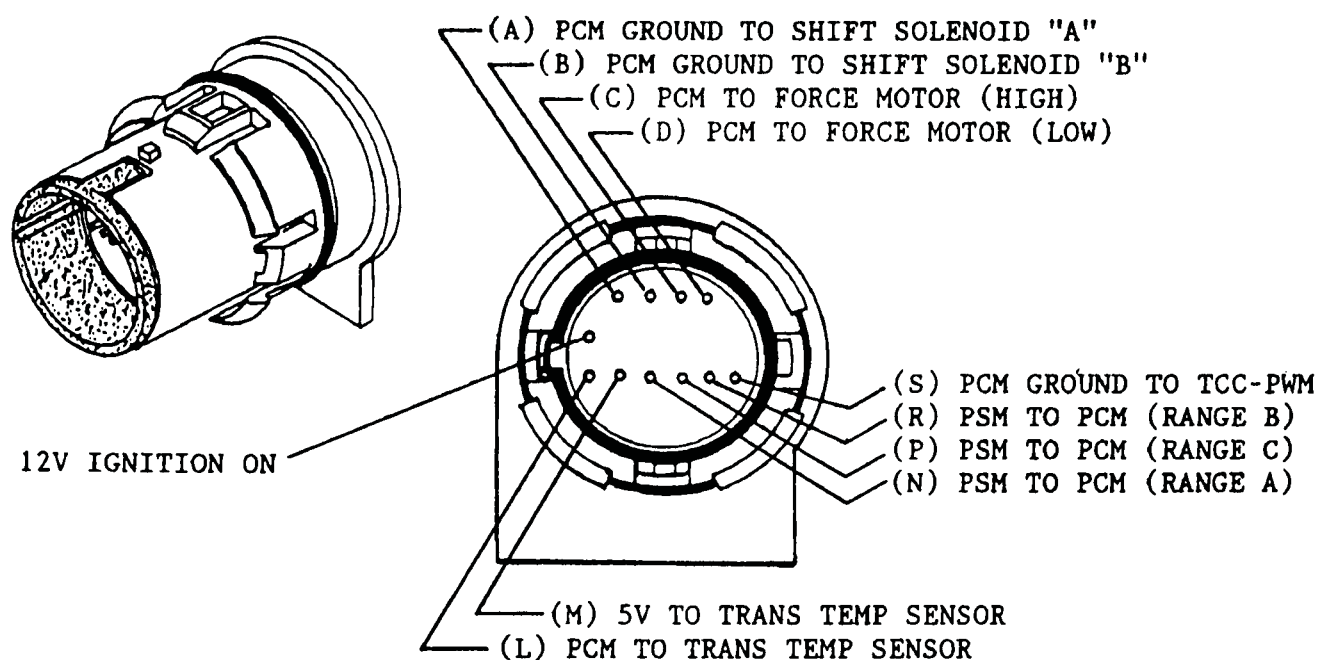


PREVIOUS CASE CONNECTOR

Figure 1
AUTOMATIC TRANSMISSION SERVICE GROUP

THM 4L80-E/4L80-EHD

NEW CASE CONNECTOR FOR 1993



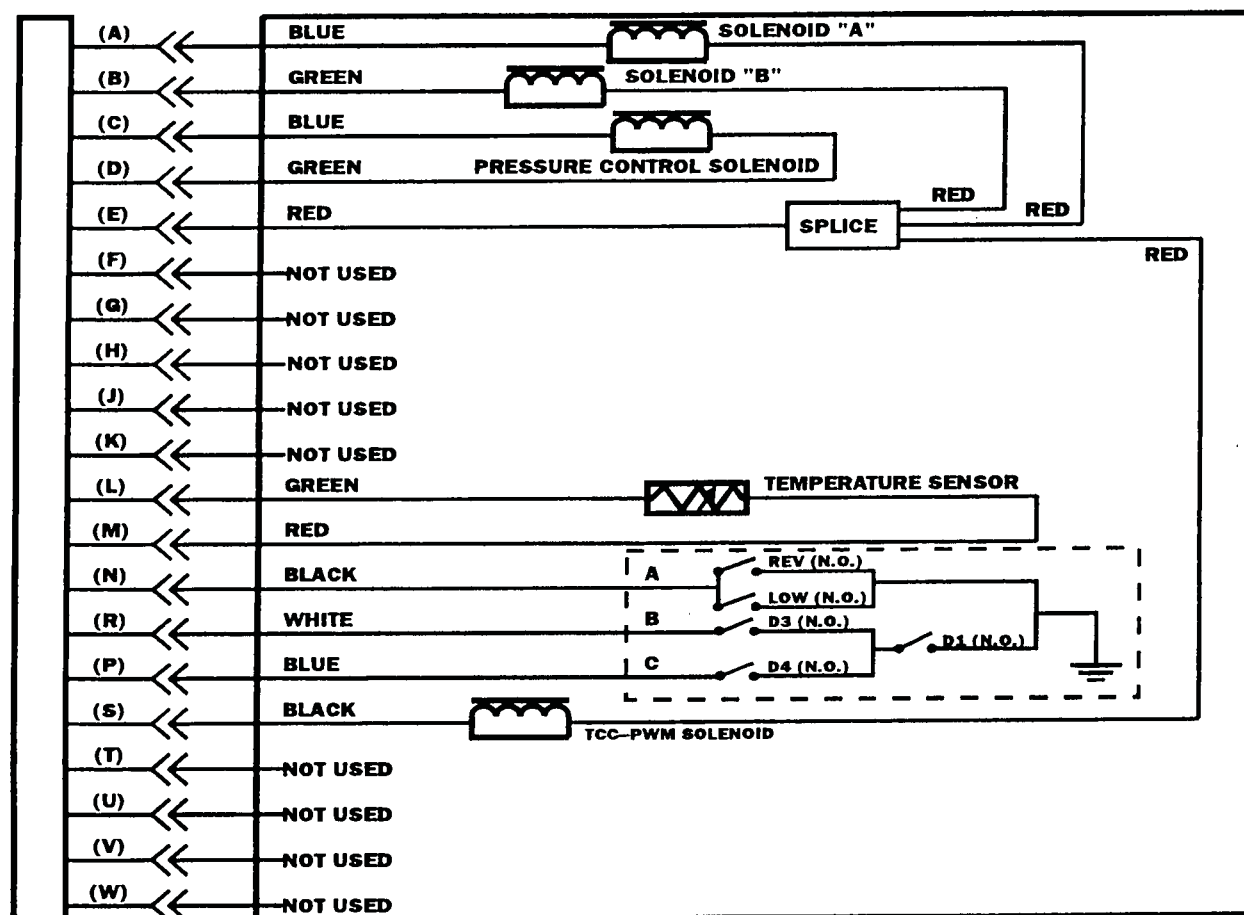
OLD CAVITY	NEW CAVITY	FUNCTION
A	A	PCM GROUND TO SHIFT SOLENOID "A"
B	B	PCM GROUND TO SHIFT SOLENOID "B"
L	C	PCM TO FORCE MOTOR (HIGH)
M	D	PCM TO FORCE MOTOR (LOW)
C	E	12V IGNITION ON, TO SOLENOIDS
G	L	PCM TO TRANS TEMP SENSOR
H	M	5V TO TRANS TEMP SENSOR
D	N	PSM TO PCM (RANGE A)
F	P	PSM TO PCM (RANGE C)
E	R	PSM TO PCM (RANGE B)
J	S	PCM GROUND TO TCC-PWM SOLENOID

NEW CASE CONNECTOR FOR 1993

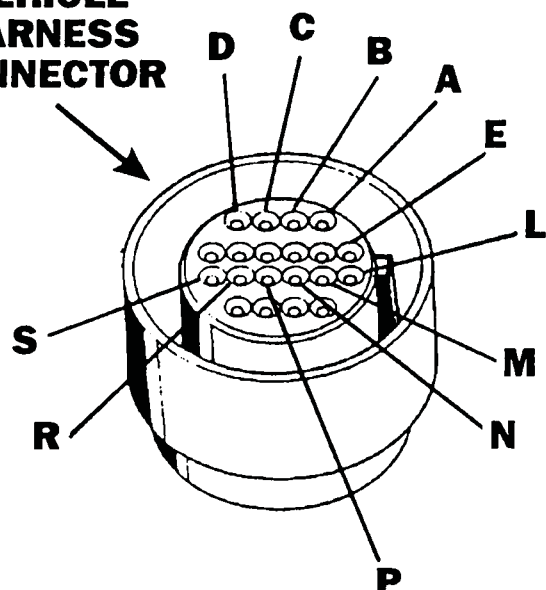
Figure 2

AUTOMATIC TRANSMISSION SERVICE GROUP

1993 WIRING SCHEMATIC AND EXTERNAL HARNESS CONNECTOR



VEHICLE HARNESS CONNECTOR



- A PCM GROUND TO SHIFT SOLENOID "A"
- B PCM GROUND TO SHIFT SOLENOID "B"
- C PCM TO FORCE MOTOR (HIGH)
- D PCM TO FORCE MOTOR (LOW)
- E 12V IGNITION ON, TO SOLENOIDS
- L PCM TO TRANS TEMP SENSOR
- M 5V TO TRANS TEMP SENSOR
- N PSM TO PCM (RANGE A)
- P PSM TO PCM (RANGE C)
- R PSM TO PCM (RANGE B)
- S PCM GROUND TO TCC-PWM SOLENOID

Figure 3
AUTOMATIC TRANSMISSION SERVICE GROUP



Technical Service Information

THM 4L80-E

NEW FORCE MOTOR FOR 1994 NEW ELECTRONICS FOR 1994

CHANGE: Beginning at the start of production 1994, ALL THM 4L80-E transmissions were built with a new Force Motor, new Spacer Plate, and elimination of the torque signal compensator valve in the accumulator housing. The new force motor operates at the 614 Hz (Cycles per Second) instead of the previous 292.5 Hz, which obviously requires a new PCM. With the new design force motor, the need for the cleaning cycle is eliminated, so the force motor is no longer pulsed every 10 seconds by the PCM/TCM.

REASON: Improved line pressure stability, and standardization, as the same part number will now fit 4L80-E, 4L60-E, and 4T80-E.

PARTS AFFECTED:

- (1) **FORCE MOTOR** - New design that does not require torque signal oil be sent back to the end of the enclosed spool valve, so the feed passage and the screen in the end of it were eliminated, as shown in Figure 1. The armature housing is also smaller in diameter than the previous force motor, and is now Black in color (See Figure 1).
- (2) **SPACER PLATE** - The orificed feed hole for torque signal oil in the spacer plate, marked "A" in Figure 2, has been eliminated to accomodate the new design force motor (See Figure 2).
- (3) **TORQUE SIGNAL COMPENSATOR VALVE** - Eliminated because it is no longer needed to absorb torque signal pulses created by the previous model PCM. The torque signal feed passage is no longer drilled in the accumulator housing on 1994 models (See Figures 3 and 4)

INTERCHANGEABILITY:

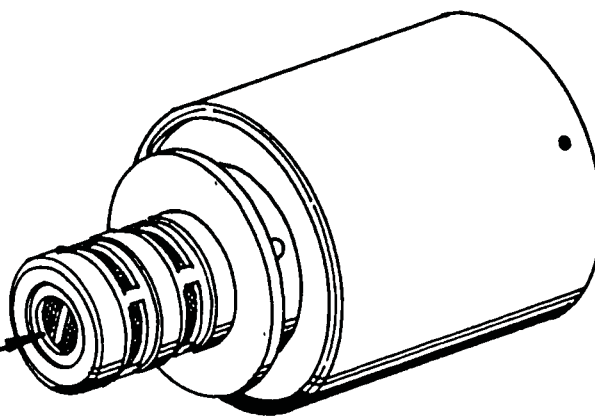
NONE OF THE PARTS LISTED ABOVE WILL INTERCHANGE WITH PREVIOUS MODELS.

SERVICE INFORMATION:

Force Motor, 91-93 Models 8677314
Force Motor, 94-Up Models 8684216

**FORCE MOTOR (PRESSURE CONTROL SOLENOID)
1991-1993 MODELS ONLY!**

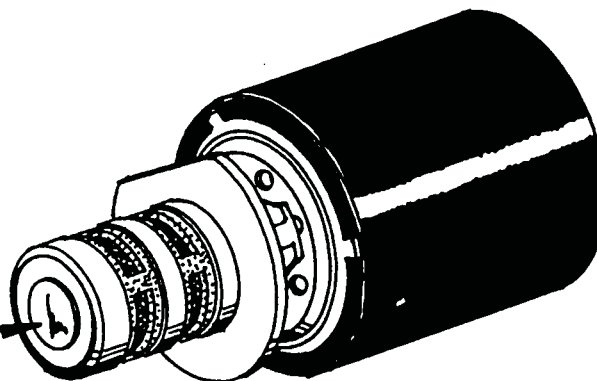
SCREEN IN FEED PASSAGE



OEM PART NUMBER 8677314
(OPERATES AT 292.5 Hz LEVEL)

**FORCE MOTOR (PRESSURE CONTROL SOLENOID)
1994-UP MODELS ONLY!**

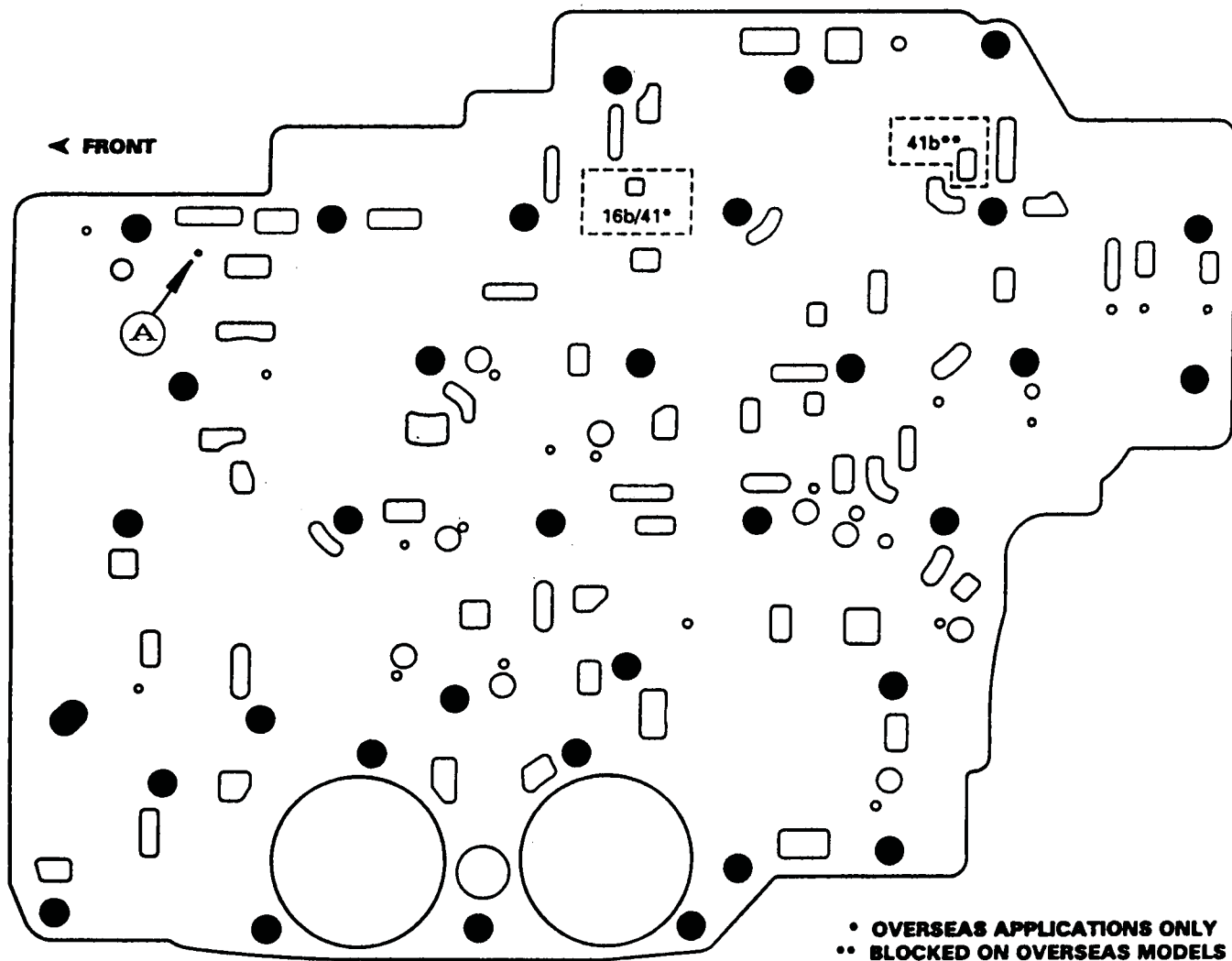
PASSAGE BLOCKED



OEM PART NUMBER 8684216
(OPERATES AT 614 Hz LEVEL)

Figure 1

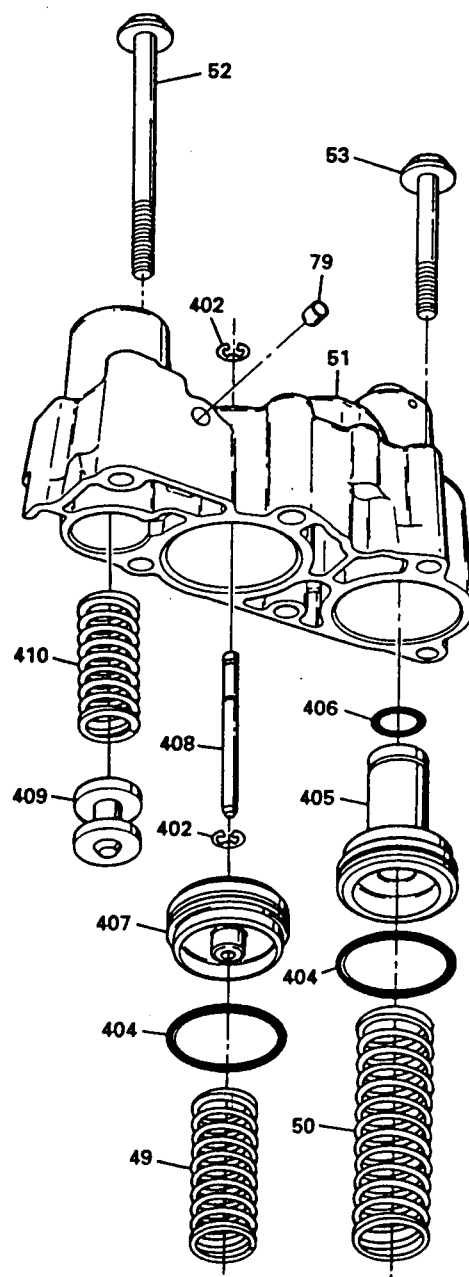
THM 4L80-E SPACER PLATE



HOLE MARKED "A" ELIMINATED IN THE 1994 MODEL SPACER PLATE.

Figure 2

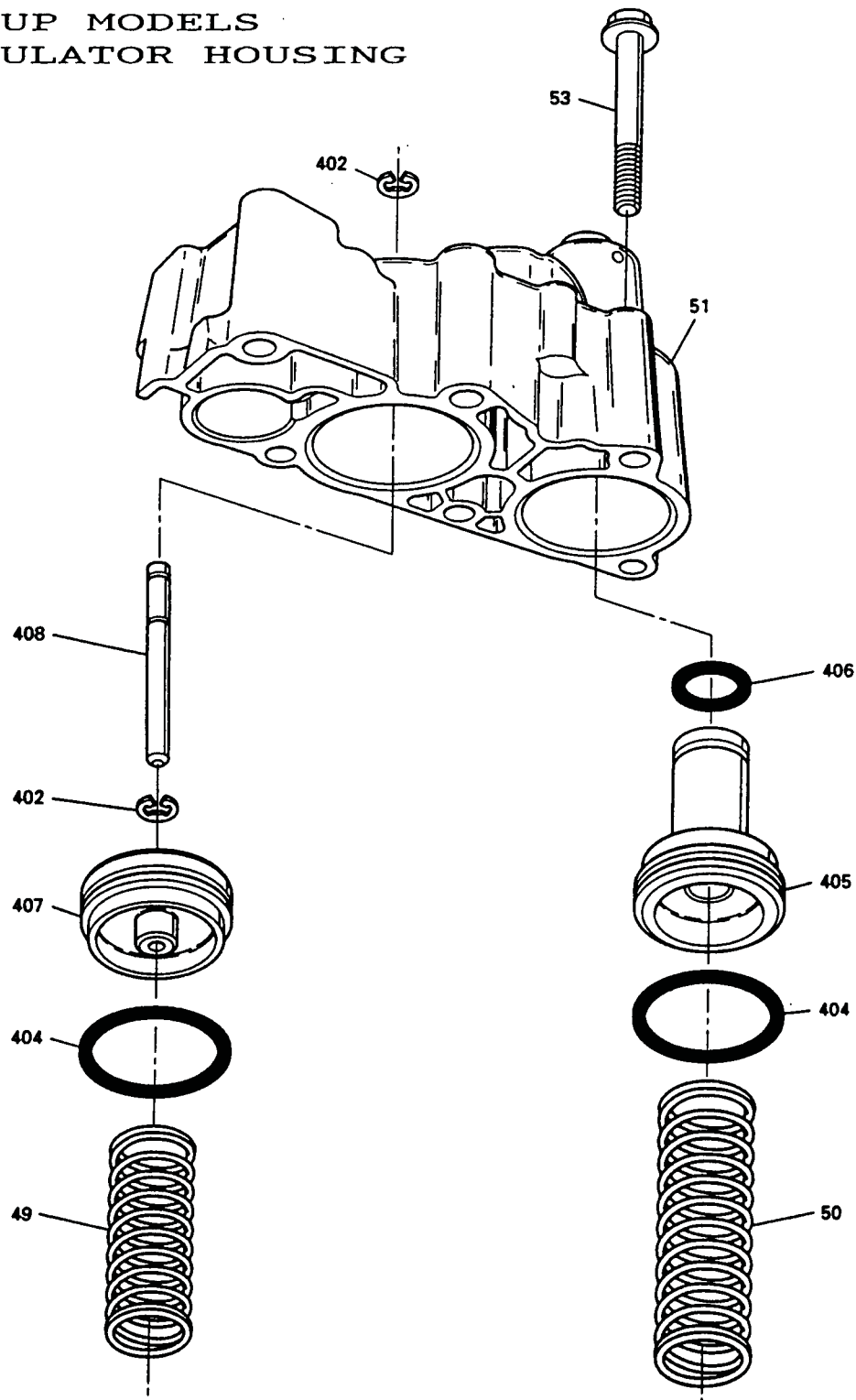
1991-1993 ACCUMULATOR HOUSING



- 49 SPRING, 4TH CLUTCH ACCUM. PISTON
- 50 SPRING, 3RD CLUTCH ACCUM. PISTON
- 51 HOUSING, ACCUMULATOR
- 52 BOLT, ACCUM. HOUSING TO VALVE BODY (LONG)
- 53 BOLT, ACCUM. HOUSING TO VALVE BODY (SHORT)
- 79 PLUG, DIRECT OIL GAL (.25 DIA. CUP)
- 402 RING, SNAP
- 404 SEAL, (1.615) SQUARE CUT
- 405 PISTON, 3RD CLUTCH ACCUMULATOR
- 406 SEAL, (.859) SQUARE CUT
- 407 PISTON, 4TH CLUTCH ACCUMULATOR
- 408 PIN, 4TH CLUTCH ACCUMULATOR PISTON
- 409 VALVE, TORQUE SIGNAL COMPENSATOR
- 410 SPRING, T.S. COMPENSATOR

Figure 3
AUTOMATIC TRANSMISSION SERVICE GROUP

1994-UP MODELS ACCUMULATOR HOUSING



- 49 SPRING, 4TH CLUTCH ACCUM. PISTON
- 50 SPRING, 3RD CLUTCH ACCUM. PISTON
- 51 HOUSING, ACCUMULATOR
- 53 BOLT, ACCUM. HOUSING TO VALVE BODY
- 402 RING, SNAP

- 404 SEAL, (1.615) SQUARE CUT
- 405 PISTON, 3RD CLUTCH ACCUMULATOR
- 406 SEAL, (.859) SQUARE CUT
- 407 PISTON, 4TH CLUTCH ACCUMULATOR
- 408 PIN, 4TH CLUTCH ACCUMULATOR PISTON

Figure 4



Technical Service Information

THM 4L80-E CENTER GEAR BOX CHANGES FOR 1999 MODELS

CHANGE: Beginning at the start of production for all 1999 model THM 4L80E transmissions, the planetary pinions on both carriers were produced 10% thicker than the previous models, as shown in Figure 1. This engineering change required the addition of a .041" shim in the gear train to re-center the sun gear in the new planetary pinions and affected several internal parts, that may create some confusion, and thus some mis-assembly concerns.

REASON: Increased durability and reliability.

PARTS AFFECTED:

- (1) **PLANETARY PINION GEARS** - Were increased in length by approximately .075" in both front and rear carriers, as shown in Figure 1, for increased durability.
- (2) **ADDED .041" SHIM** - There was a .041" shim added between the thrust bearing and the rear internal ring gear, to re-center the sun gear in the revised planetary pinion gears, as shown in Figure 2.
- (3) **CENTER SUPPORT** - Required a .041" recess to be machined into the center support bearing surface, to accommodate the sun gear being re-centered in the revised planetary pinion gears, as shown in Figure 3.
- (4) **SUN GEAR SHAFT** - Required that .041" be removed from the bottom of the rear bushing journal, to accommodate the re-centering of the sun gear in the revised planetary pinion gears, as shown in Figure 4. Notice that revised sun gear shaft can be identified with a groove cut into the shaft splines, as shown in Figure 4.

INTERCHANGEABILITY:

None of the parts listed above will interchange with any of the previous design level parts, and none of the previous design level parts can be used in the 1999 and later units.

However, when all pieces listed above are used as a service package, they can be used to back service "Center Lube" model 4L80-E transmissions.

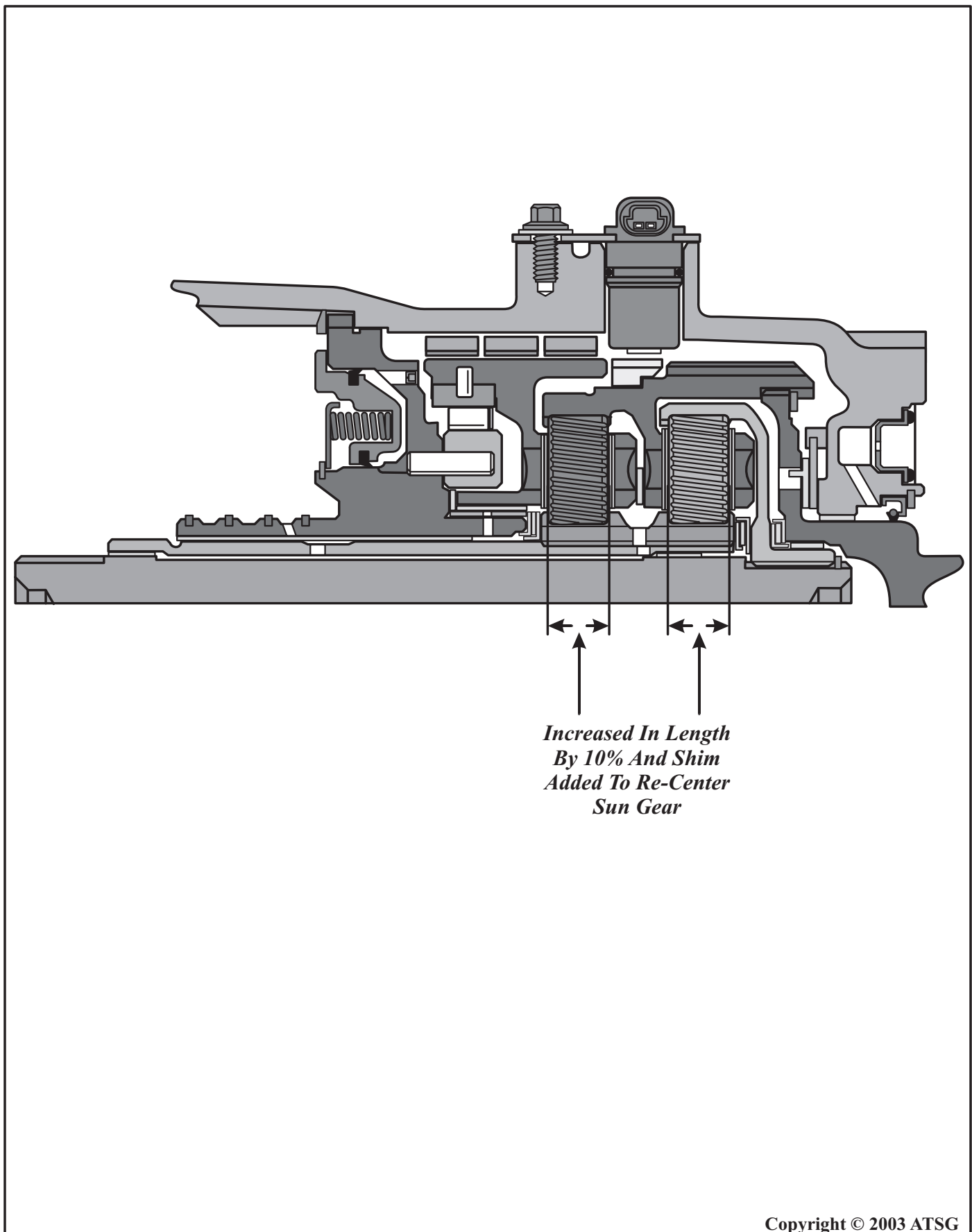
The Sun Gear, Main Shaft, Rear Internal Ring Gear and all Thrust Bearings remained the same, as shown in Figures 5, 6, and 7.

SPECIAL NOTE: *Some mis-assembly examples are illustrated in Figure 8 with some dimensional checks to prevent this from happening to you.*

SERVICE INFORMATION:

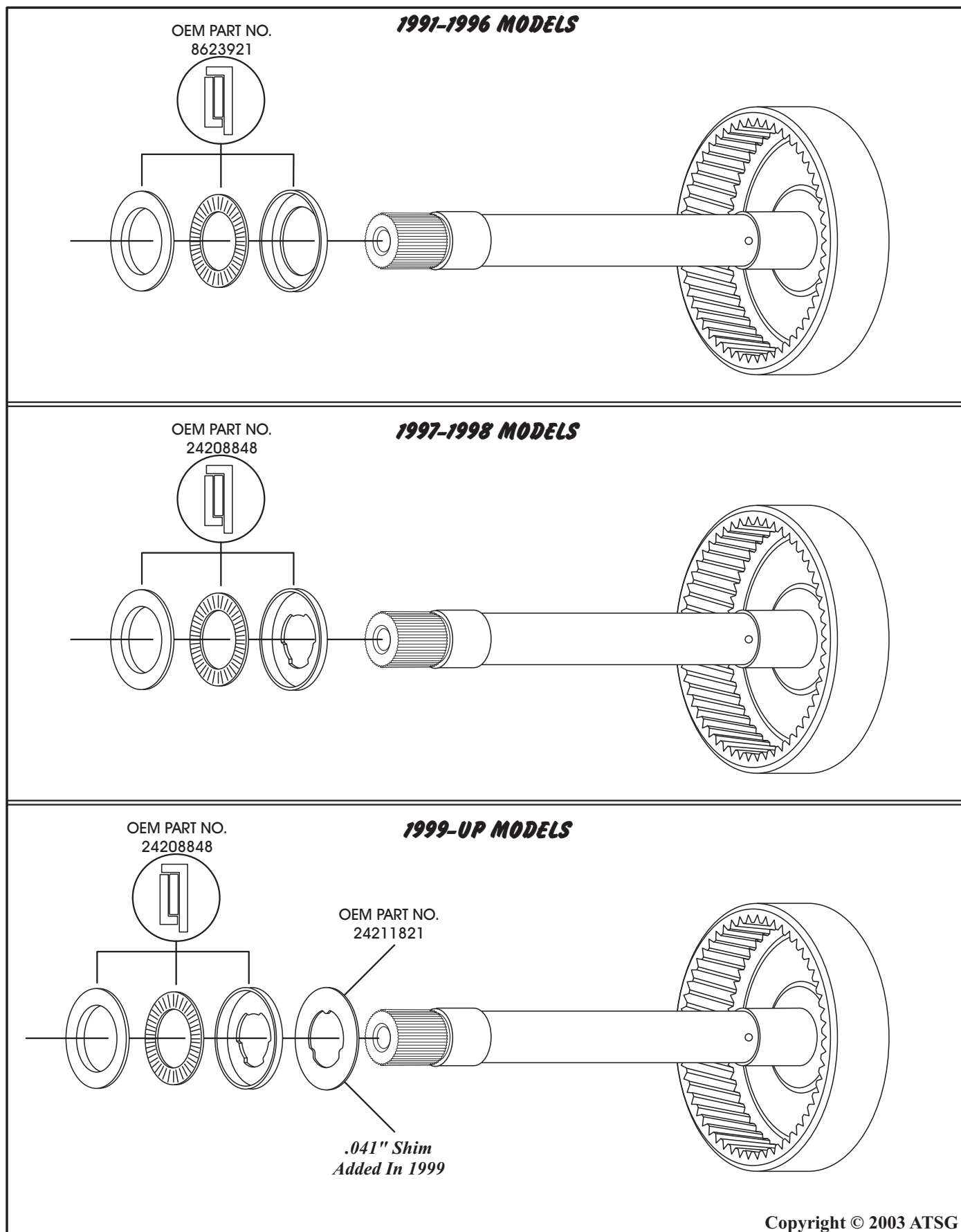
Reaction (Front) Carrier Assembly (99 Design Level)	24202051
Output (Rear) Carrier Assembly (99 Design Level)	24202052
Washer, .041" (99 Design Level)	24211821
Center Support Assembly (99 Design Level)	24217454
Sun Gear Shaft Assembly (99 Design Level)	24207264

Copyright © 2003 ATSG



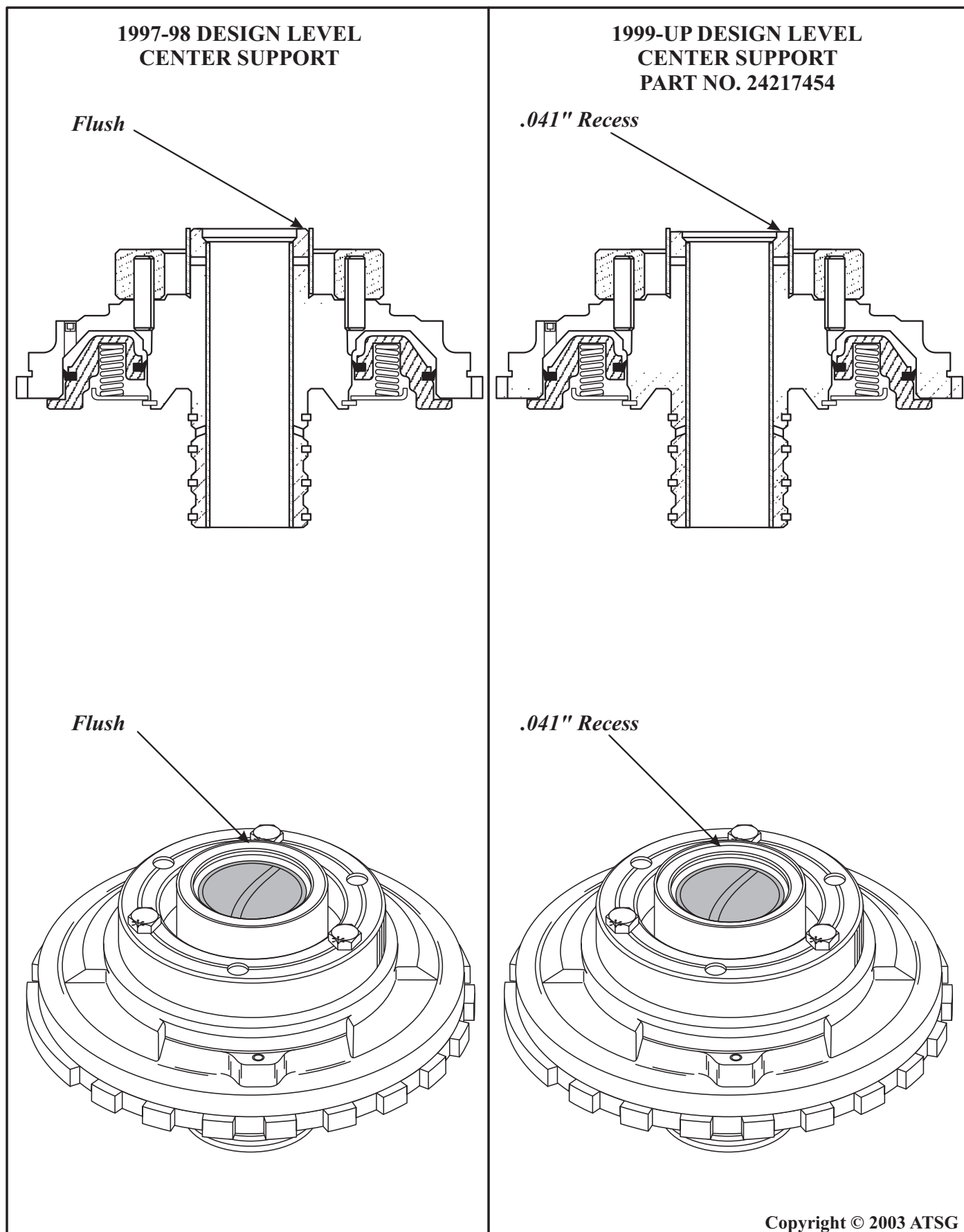
Copyright © 2003 ATSG

Figure 1
AUTOMATIC TRANSMISSION SERVICE GROUP
105



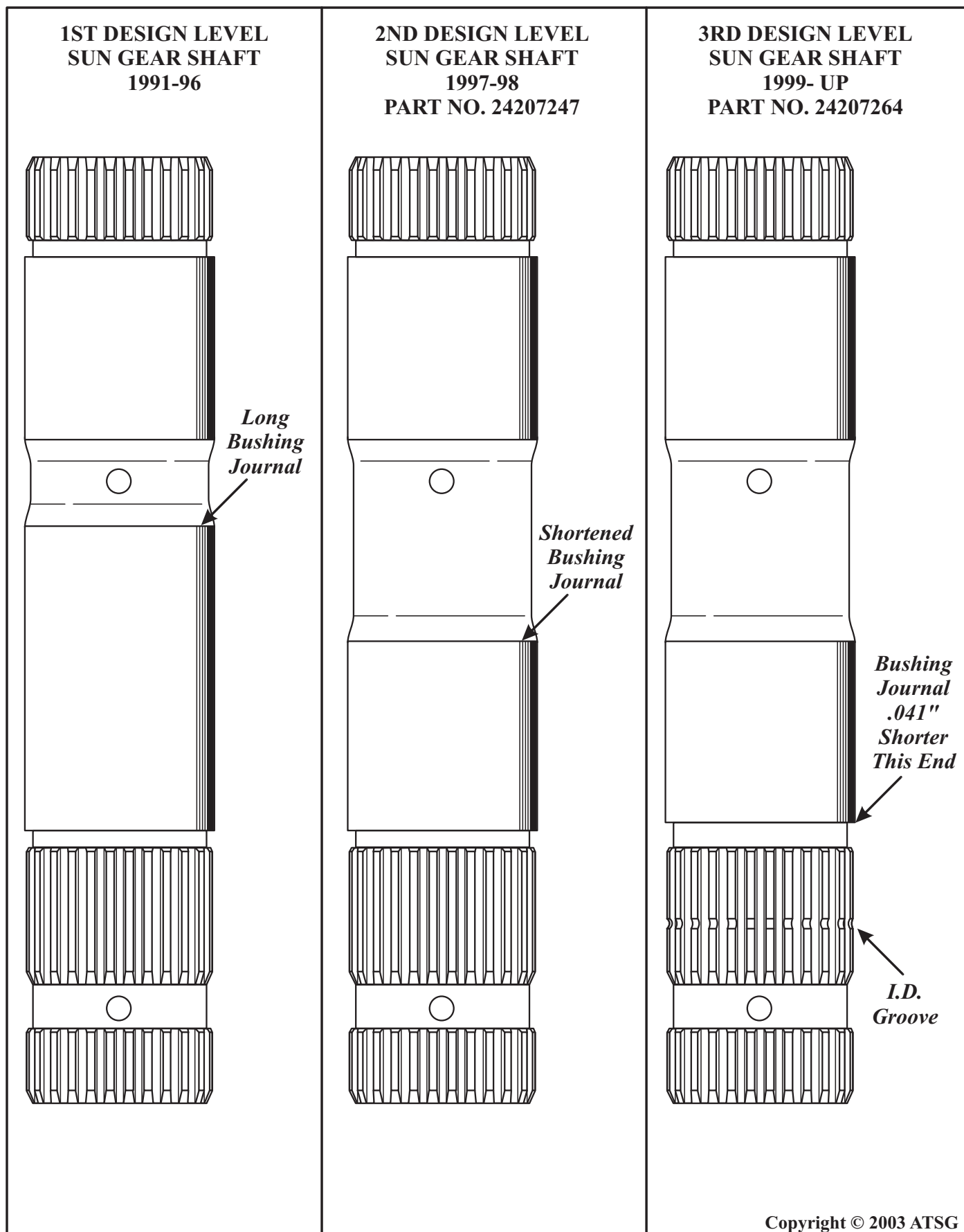
Copyright © 2003 ATSG

Figure 2
AUTOMATIC TRANSMISSION SERVICE GROUP
106



Copyright © 2003 ATSG

Figure 3
AUTOMATIC TRANSMISSION SERVICE GROUP



Copyright © 2003 ATSG

Figure 4
AUTOMATIC TRANSMISSION SERVICE GROUP
108

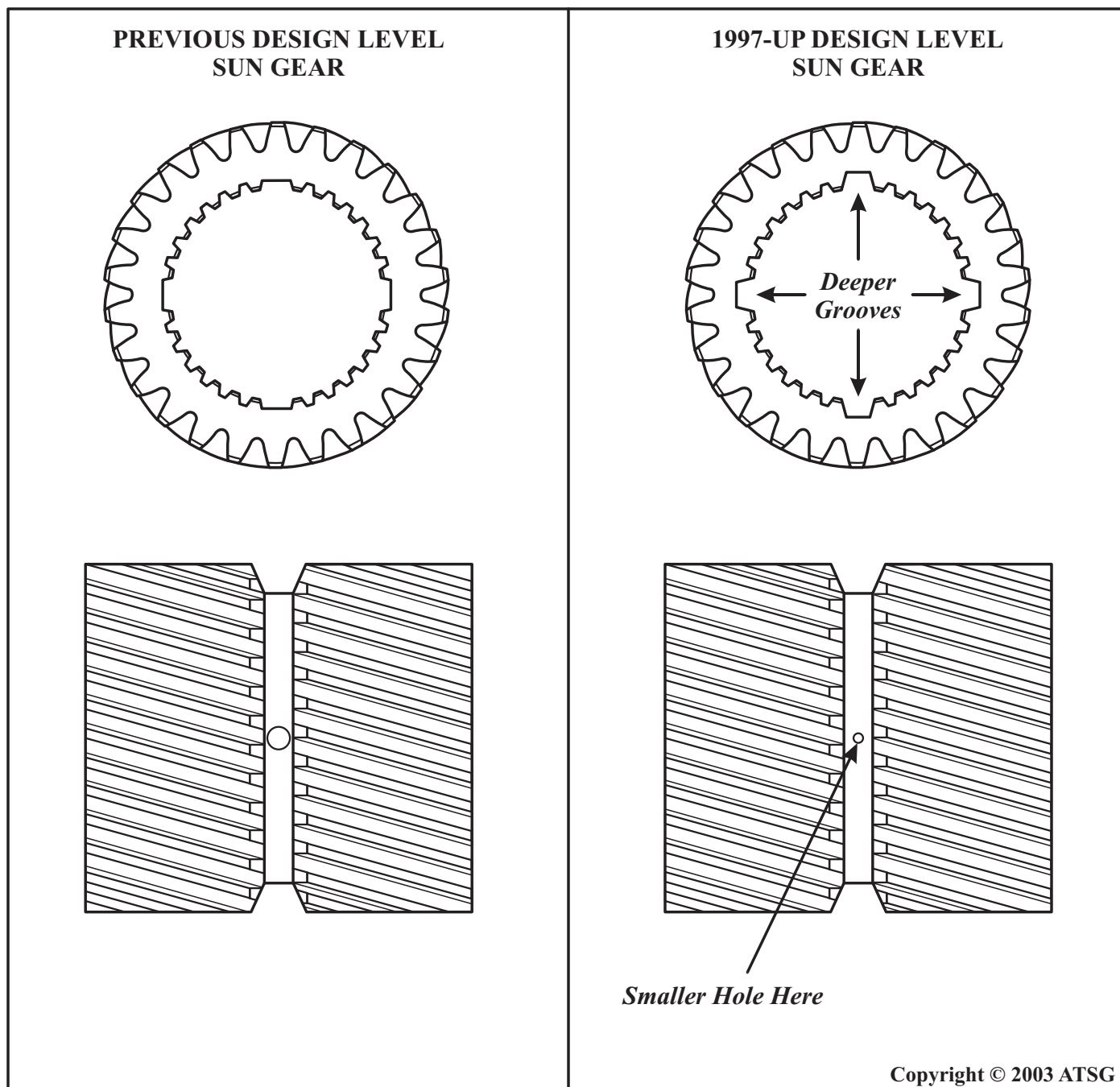


Figure 5

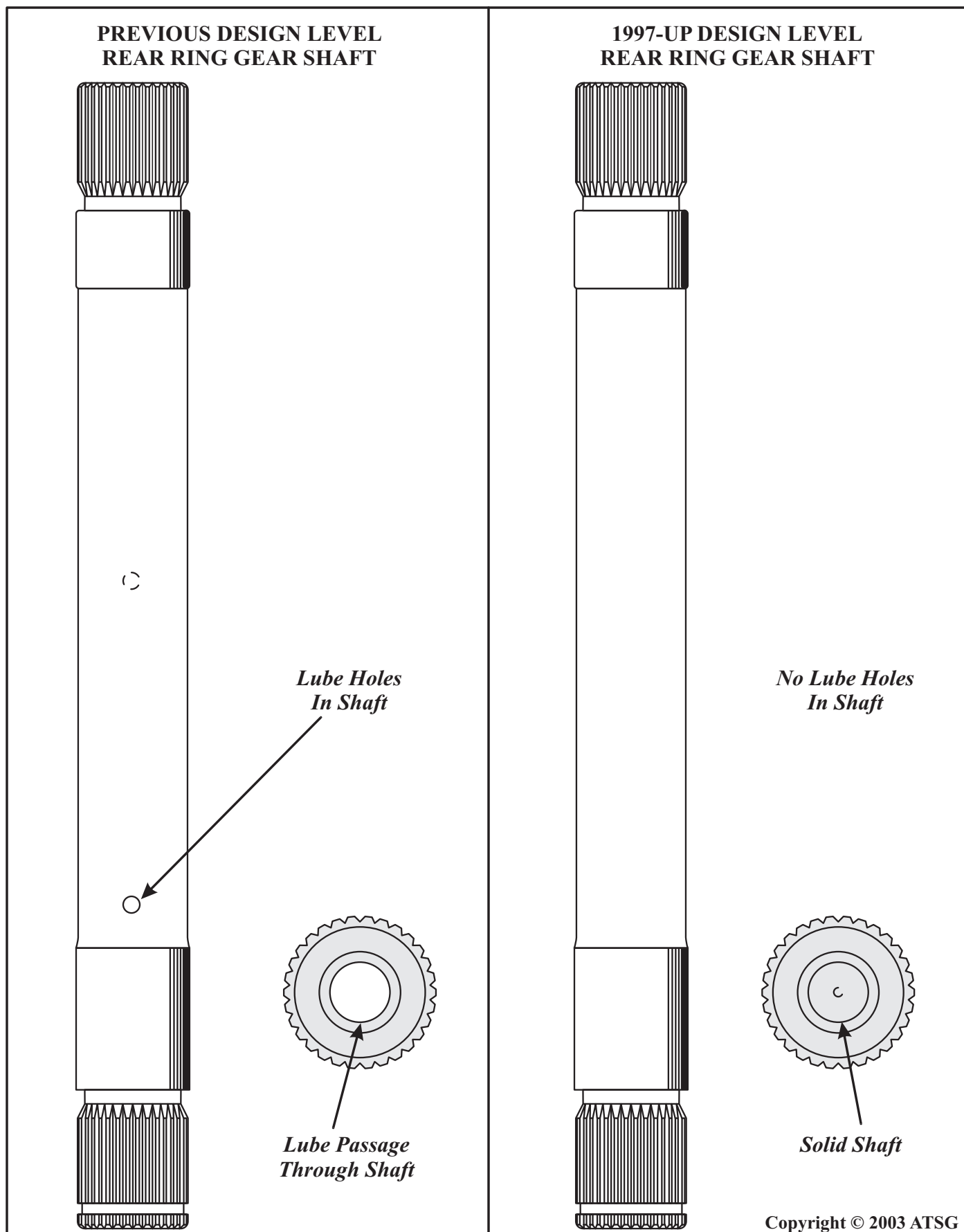
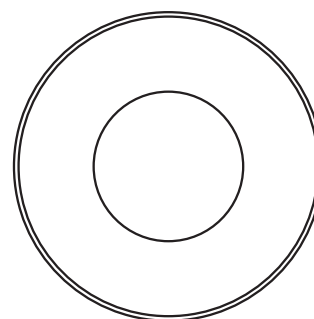
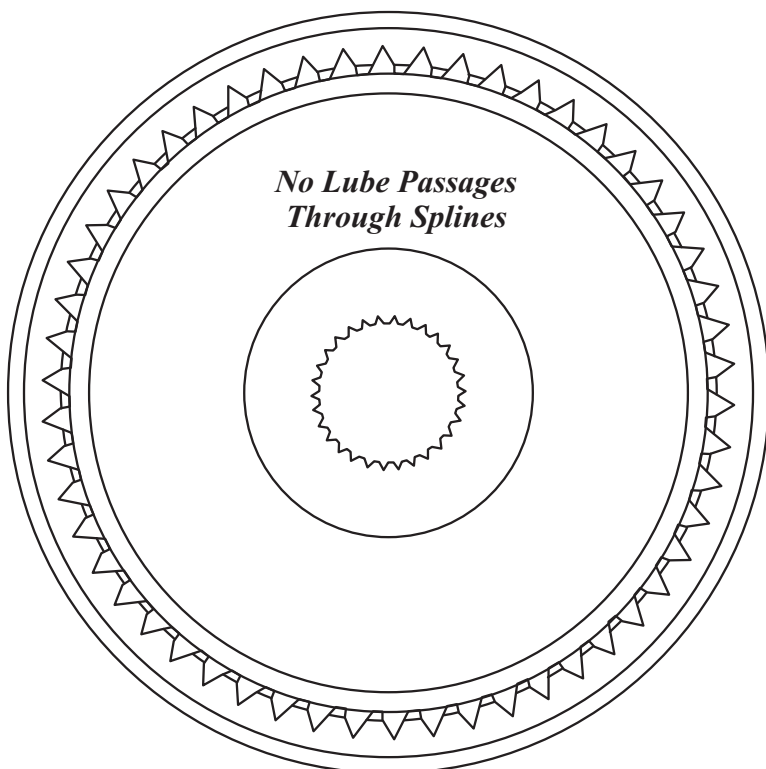


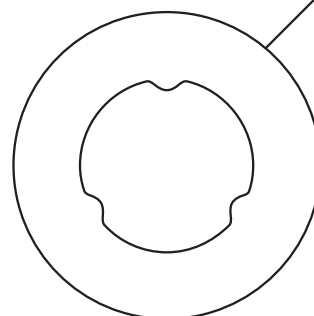
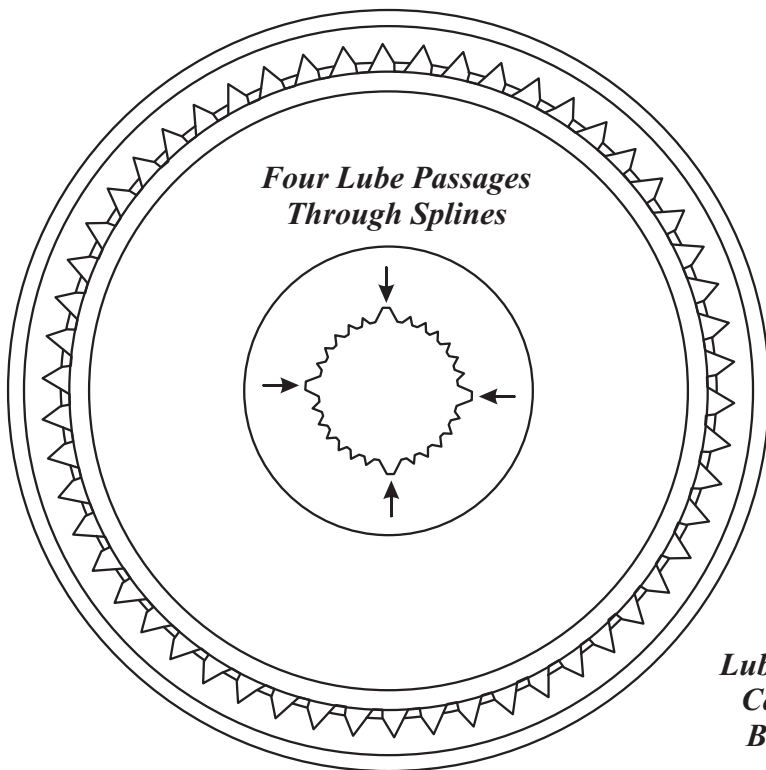
Figure 6
AUTOMATIC TRANSMISSION SERVICE GROUP
110

PREVIOUS DESIGN LEVEL REAR RING GEAR AND BEARING RACE

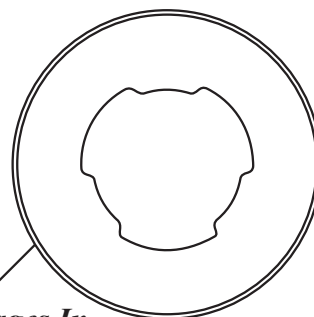


*Round Hole In
Center Of The
Bearing Race*

1997-UP DESIGN LEVEL REAR RING GEAR AND BEARING RACE



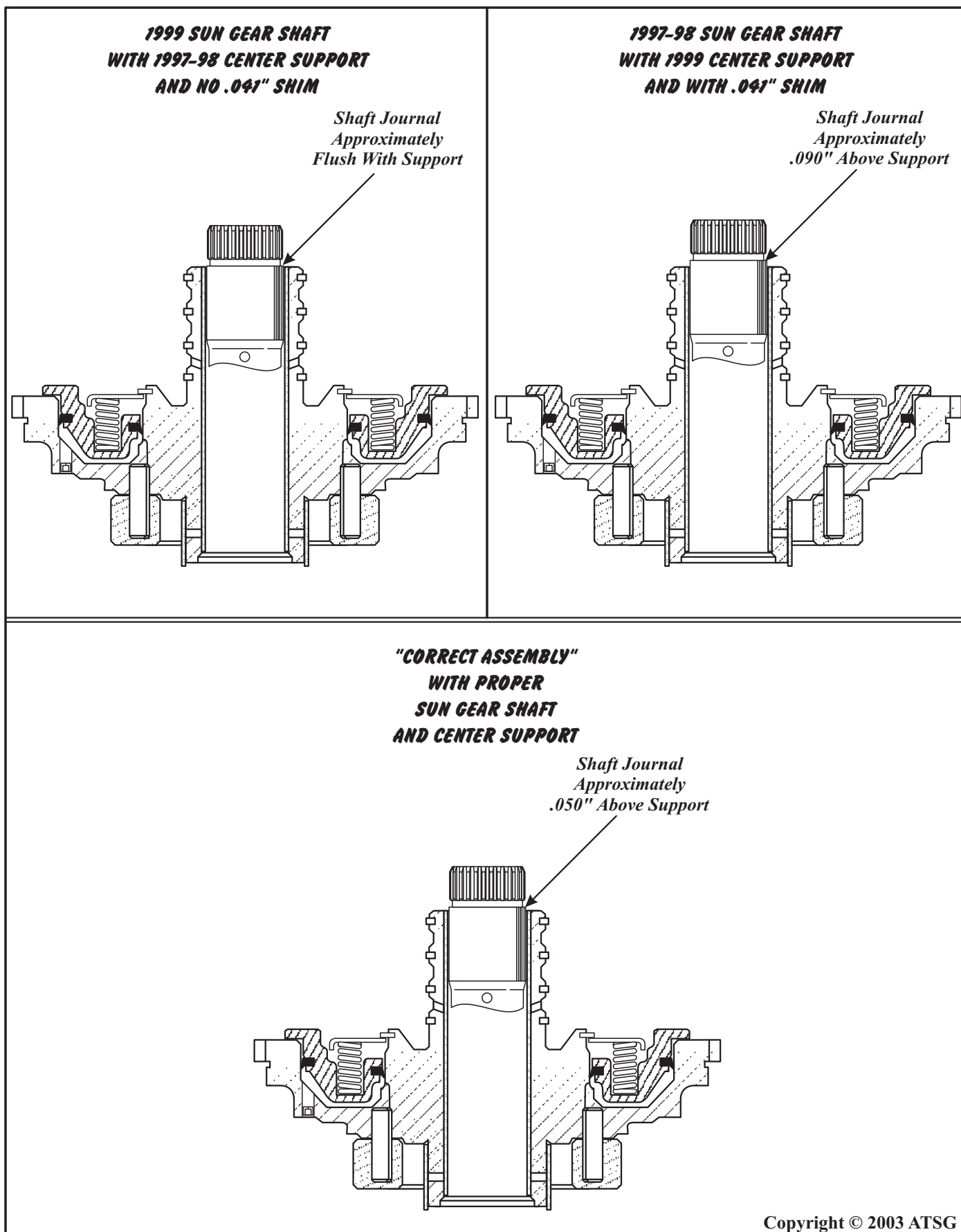
*.041" Shim Added
In 1999 Models*



*Lube Passages In
Center Of The
Bearing Race*

Copyright © 2003 ATSG

Figure 7
AUTOMATIC TRANSMISSION SERVICE GROUP



Copyright © 2003 ATSG

Figure 8
AUTOMATIC TRANSMISSION SERVICE GROUP
112



Technical Service Information

THM 4L80-E NEW DESIGN MANUAL 2ND BAND

CHANGE: Beginning at the start of production for 1999 models, all THM 4L80-E transmissions were built with a revised manual 2nd band that is wider than the previous design (See Figure 1).

REASON: Improved durability and reliability.

PARTS AFFECTED:

- (1) MANUAL 2ND BAND - Now 1-1/4 inches wide instead of the previous 1 inch wide, and manufactured with a revised band apply pin anchor, as illustrated in Figure 2.
- (2) MANUAL 2ND BAND APPLY PIN - The band apply pin has a revised overall length, 2.730" instead of the previous 2.530", to accommodate the revised apply pin anchor, as illustrated in Figure 2.

INTERCHANGEABILITY:

The new design "Wide Band" will retro-fit back, but you must purchase the new design band apply pin that is .200" longer than the previous design. Currently, it is only available in a service package that includes the piston and the return spring, under part number 24223081, as shown in Figure 2.

SERVICE INFORMATION:

"Narrow" Manual 2nd Band	24202631
"Wide" Manual 2nd Band	24210080
Apply Pin Service Package (Narrow Band)	24200418
Apply Pin Service Package (Wide Band)	24223081

Special Service Note:

If the "Wide Band" is used with the Narrow Band Apply Pin, the result will be No Engine Braking when selector lever is moved to the Manual 2nd position, because the apply pin is not long enough to apply the band.

If the "Narrow Band" is used with the Wide Band Apply Pin, the result will be 2nd Gear Starts and tie-up on the 2-3 shift and tie-up in reverse, because you have mechanically applied the band because of the length of the pin.

MANUAL 2ND BAND

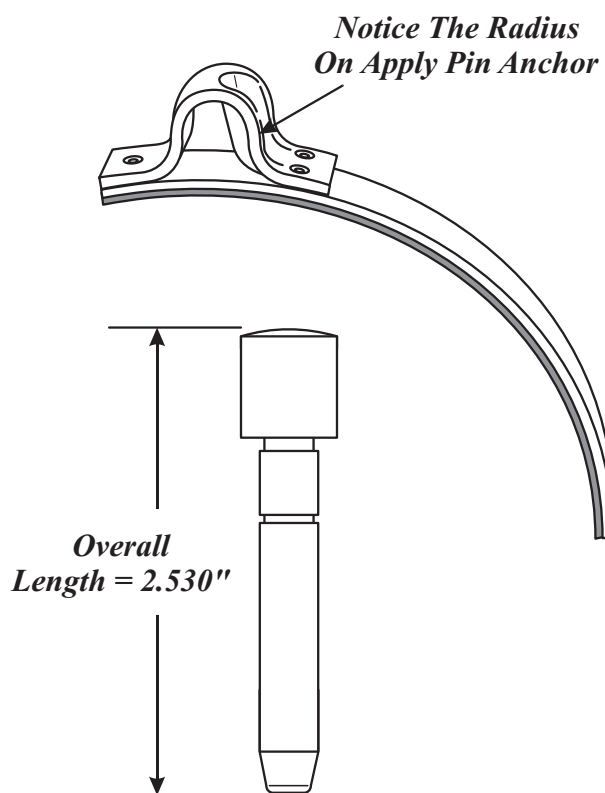
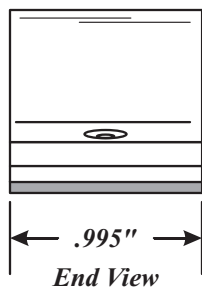


Copyright © 2001 ATSG

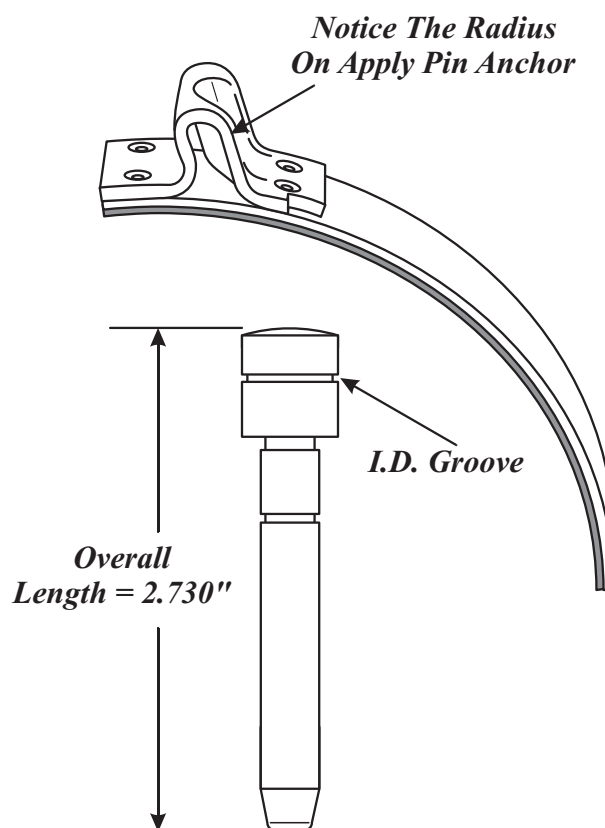
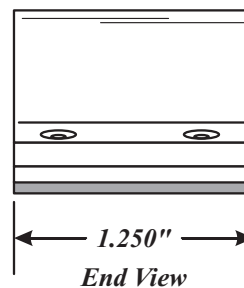
Figure 1

Copyright © 2003 ATSG

"NARROW" MANUAL 2ND BAND

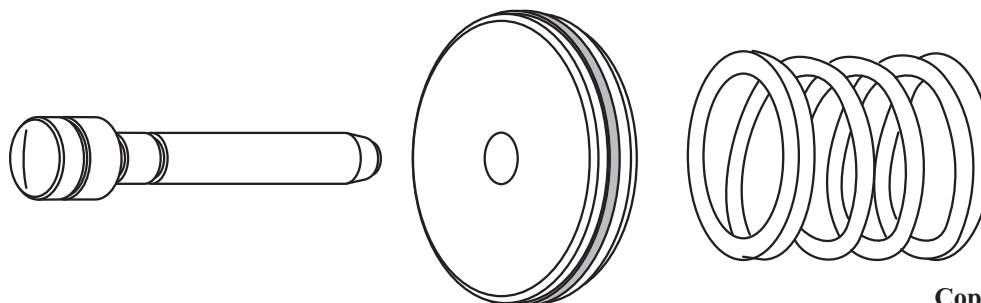


"WIDE" MANUAL 2ND BAND



CONTENTS OF SERVICE PACKAGES

"Wide Band" Service Package Part Number 24223081
"Narrow Band" Service Package Part Number 24200418



Copyright © 2003 ATSG

Figure 2
AUTOMATIC TRANSMISSION SERVICE GROUP
115



Technical Service Information

THM 4L80E/4L80EHD

NEW DESIGN OVERRUN ROLLER CLUTCH

CHANGE: Beginning in March 2001, a new design Overrun Roller Clutch was introduced into the THM 4L80E, as a running change. This engineering change affected many other related parts.

REASON: Increased durability and reliability with the new design roller clutch, by reducing the ability of the rollers to "skew".

PARTS AFFECTED:

- (1) OVERRUN ROLLER CLUTCH - Entirely new design with smaller diameter rollers and the rollers are now trapped inside of a "Shoe" to help prevent skewing, and the springs put pressure on the "Shoe", as shown in Figure 1.
- (2) OVERRUN CLUTCH HOUSING - Requires a different ramp angle on the inner cam, to accommodate the new design roller clutch, as shown in Figure 1. The snap ring was also moved away from the back of the roller clutch which required a new snap ring groove that is lower in the housing, as shown in Figure 2.
- (3) OVERRUN ROLLER CLUTCH RETURN SPRING - Now requires a recess in the return spring retainer to accommodate the relocated snap ring groove, as shown in Figure 2.
- (4) RETAINER SNAP RING - New design has revised dimensions, as shown in Figure 2. The new design snap ring is thinner and narrower.
- (5) OVERDRIVE PLANETARY CARRIER - The new design has a smaller diameter roller clutch outer race incorporated in the overdrive carrier, as shown in Figure 3.

INTERCHANGEABILITY:

None of the current design parts listed above will interchange with the previous design level parts. They will however retro-fit back on all models, when used as a service package.

SERVICE INFORMATION:

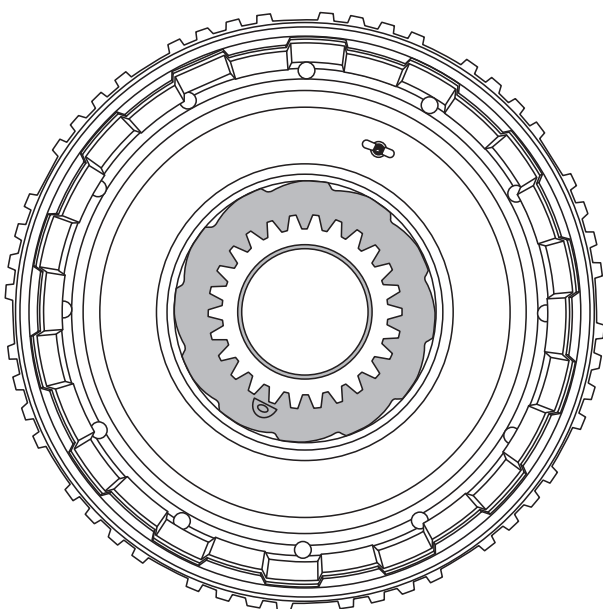
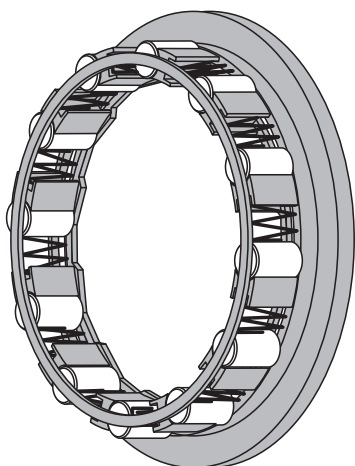
Overrun Roller Clutch Service Package (New Design)	24222160
Turbine Shaft Assembly (2nd Design)	24200128

SPECIAL NOTE:

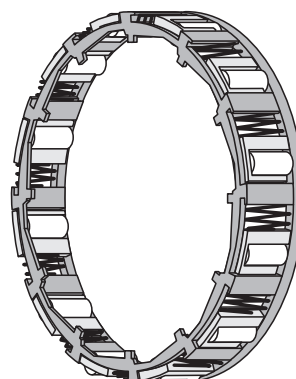
If installing this service package into an early model, with the 1st design turbine shaft, you must also purchase the 2nd design turbine shaft, as shown in Figure 4. The changes included shot peening the area around the forward clutch feed hole, the feed hole diameter reduced and drilled through the turbine shaft (See Figure 4).

Copyright © 2003 ATSG

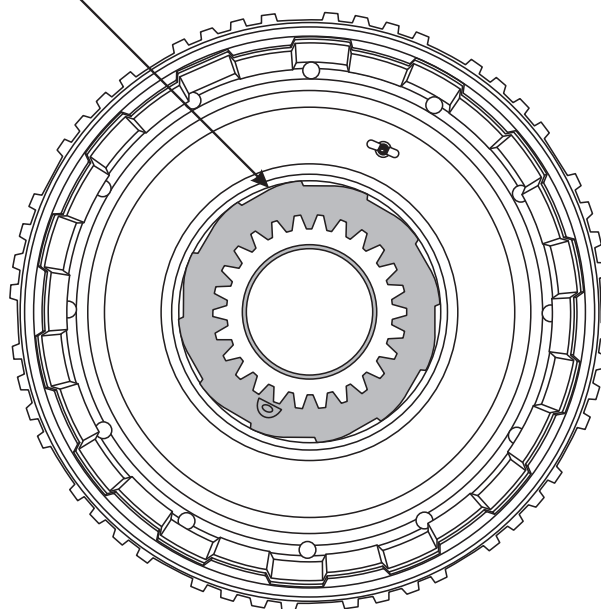
PREVIOUS DESIGN OVERRUN ROLLER CLUTCH



CURRENT DESIGN OVERRUN ROLLER CLUTCH

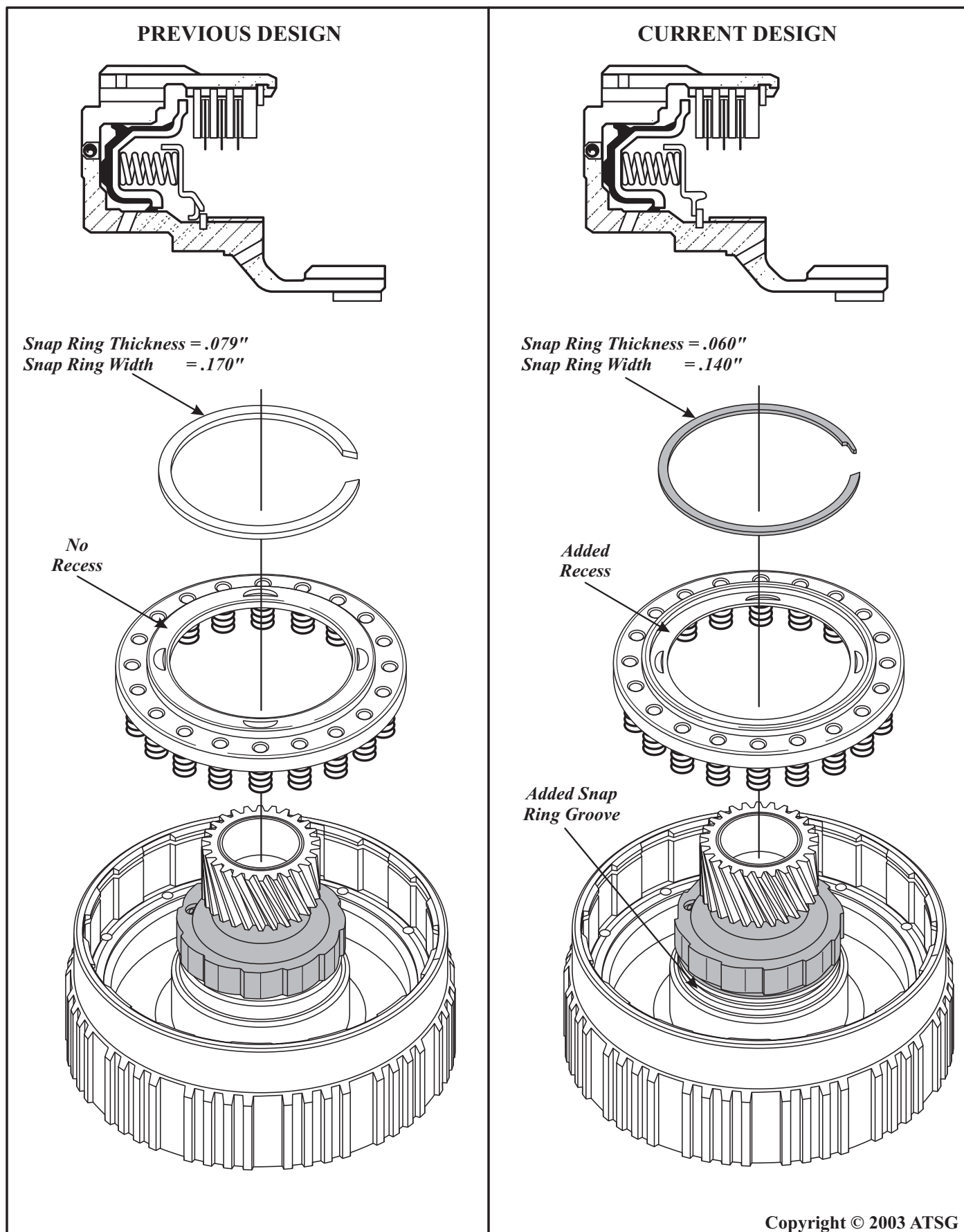


*Different Ramp Angle
On Inner Cam*



Copyright © 2003 ATSG

Figure 1
AUTOMATIC TRANSMISSION SERVICE GROUP
117



Copyright © 2003 ATSG

Figure 2
 AUTOMATIC TRANSMISSION SERVICE GROUP
 118

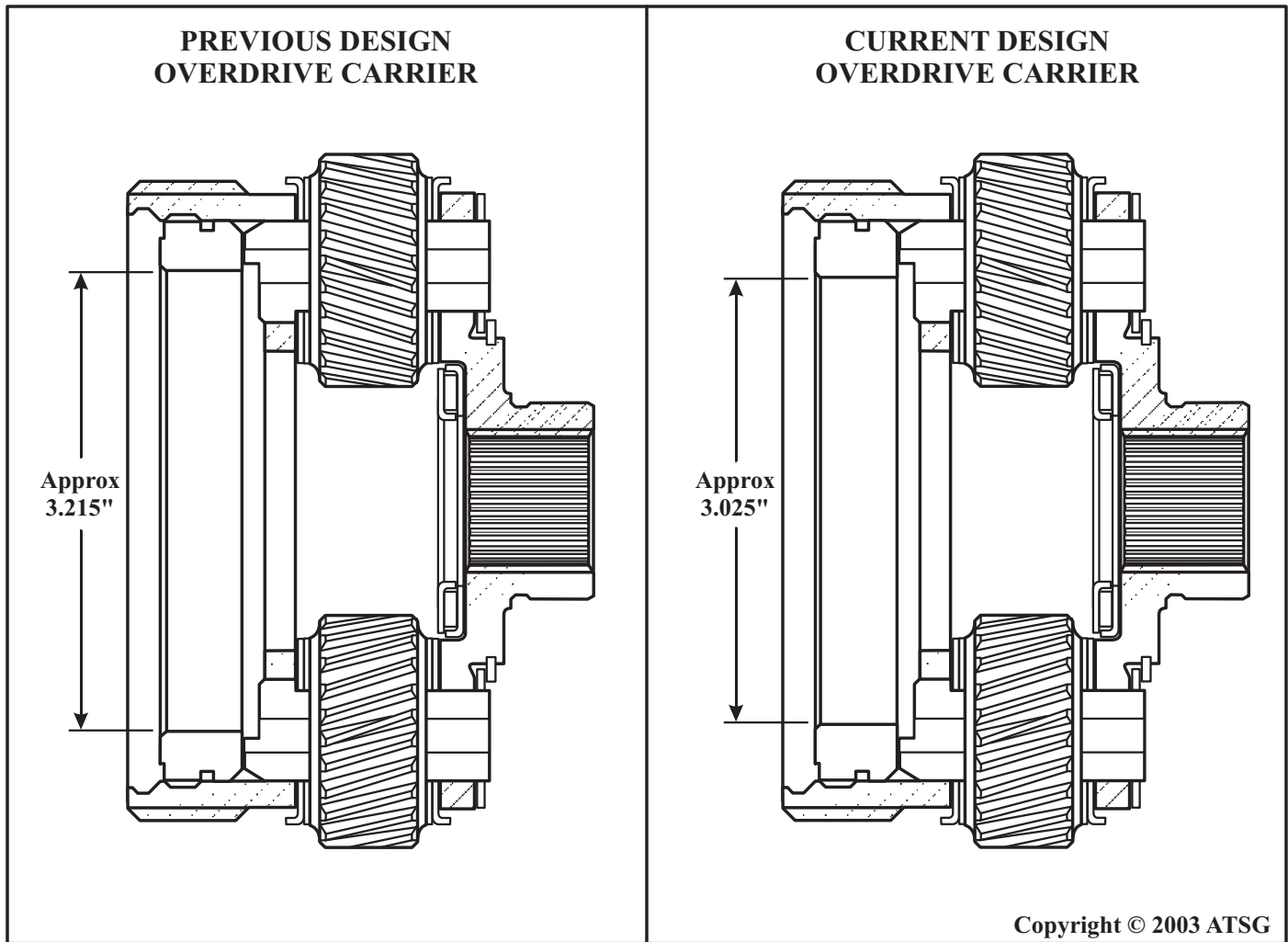
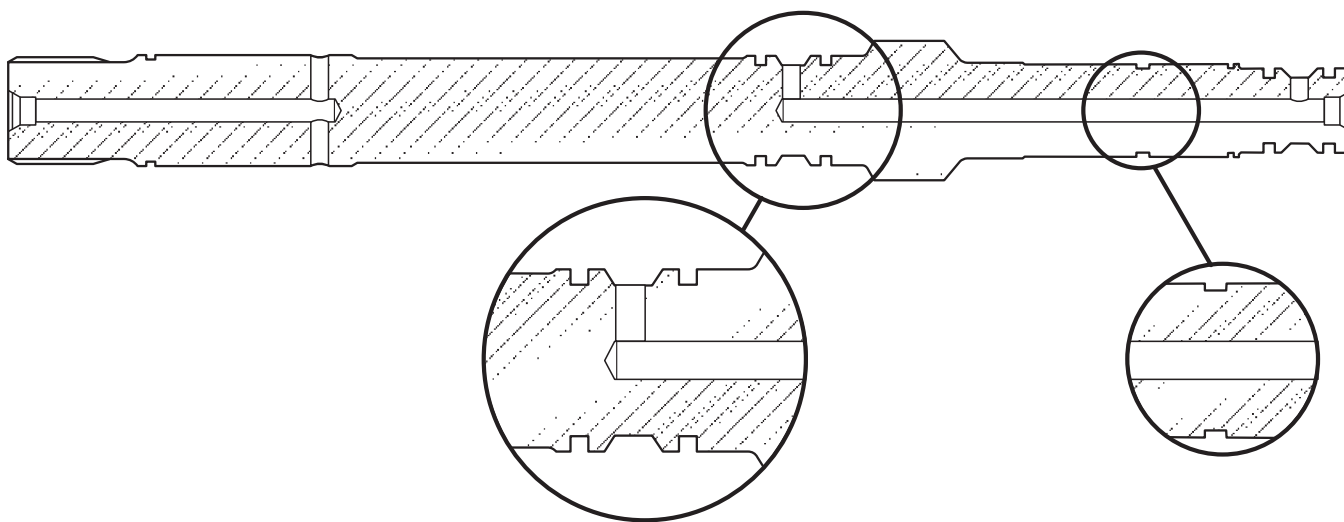
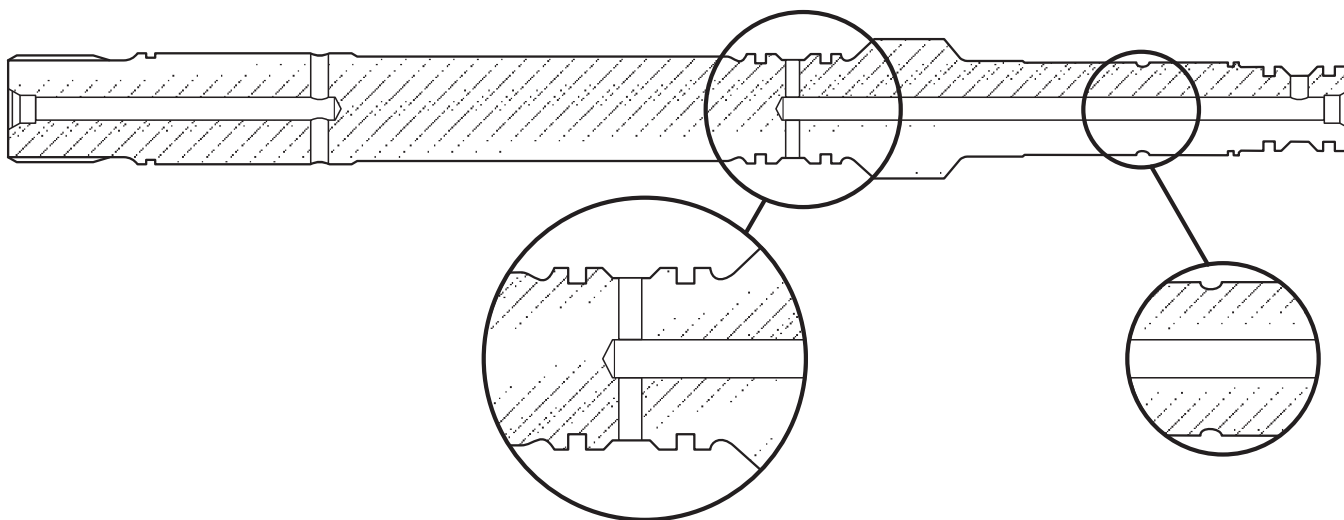


Figure 3

"1ST" DESIGN TURBINE SHAFT



"2ND" DESIGN TURBINE SHAFT



*Forward Clutch Feed
Hole Drilled Through*

Copyright © 2003 ATSG