



THM 400

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INTRODUCTION

THM 400

This booklet contains general description and overhaul procedures necessary to repair, overhaul or service the THM 400 transmission, and is found in both passenger cars and trucks. The THM 400 transmission was first introduced in 1964 and was used through the 1990 model year with some engineering changes that occurred during that time. We have included the major changes and updates in the appropriate sections of this booklet. We wish to thank General Motors Corporation for the information and illustrations that have made this booklet possible.

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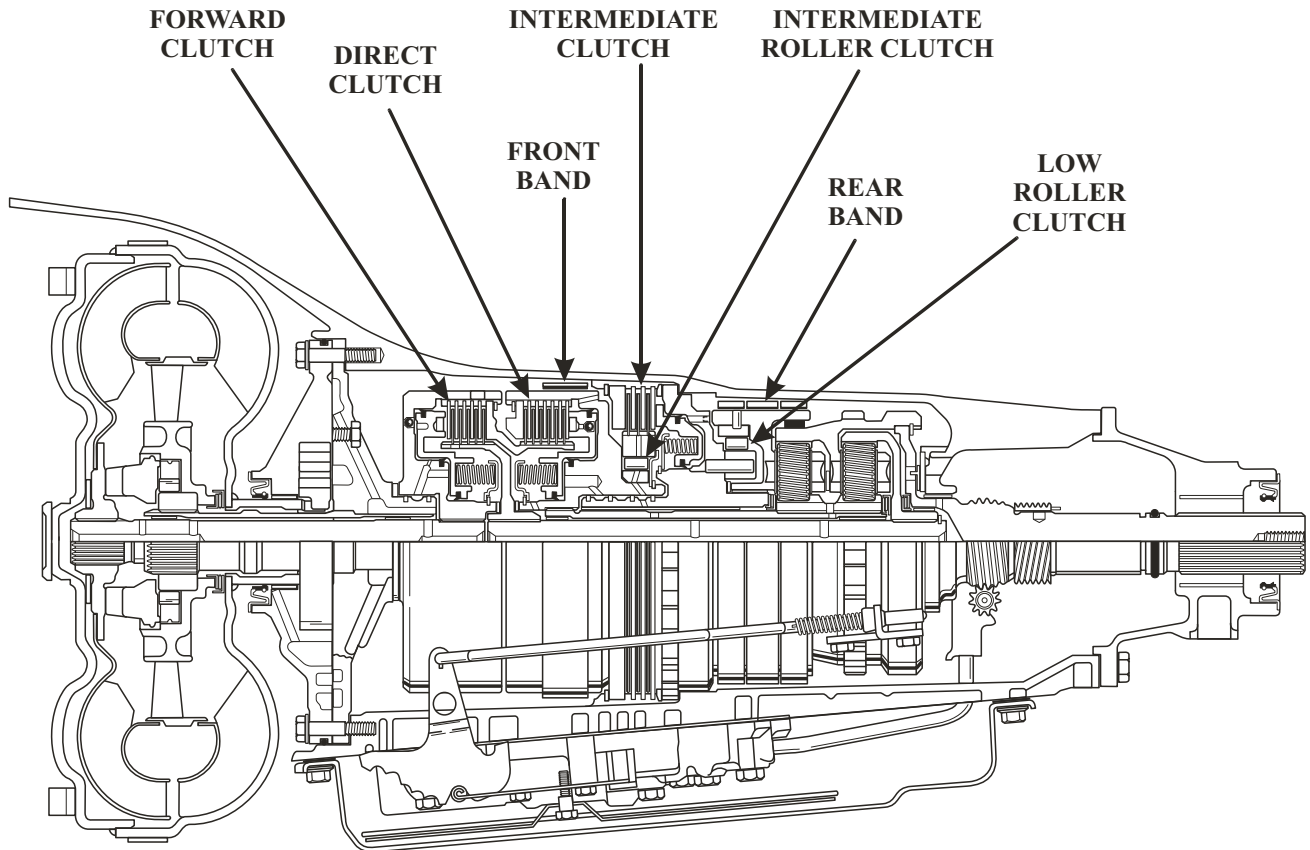
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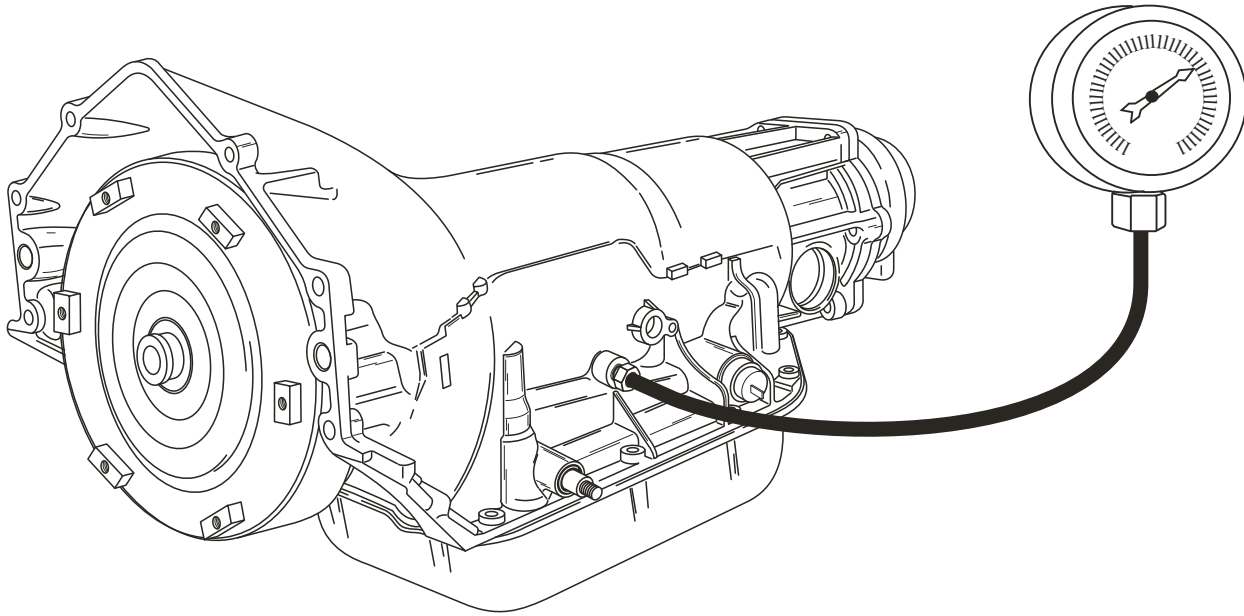
COMPONENT APPLICATION CHART							
RANGE	FORWARD CLUTCH	INTERMED CLUTCH	DIRECT CLUTCH	FRONT BAND	REAR BAND	INTERMED ROLLER	LOW ROLLER
PARK/NEUT							
REVERSE			ON		ON		
DRIVE 1ST	ON						HOLD
DRIVE 2ND	ON	ON				HOLD	
DRIVE 3RD	ON	ON	ON				
DRIVE "2" 1ST	ON						
DRIVE "2" 2ND	ON	ON		ON		HOLD	
MANUAL LOW	ON				ON		HOLD



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Figure 1

LINE PRESSURE GUAGE INSTALLED



LINE PRESSURE SPECIFICATIONS

RANGE	NORMAL P.S.I.
NEUTRAL - Brakes Applied, Engine At 1000 RPM	55-70
DRIVE - Engine At Curb Idle Specifications	60-85
DRIVE - Brakes Applied, Engine At 1000 RPM	60-90
DRIVE "2" - Brakes Applied, Engine At 1000 RPM	135-160
REVERSE - Brakes Applied, Engine At 1000 RPM	95-150
DRIVE - Brakes Applied, Engine 1000 RPM, Downshift Solenoid On	90-110

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Figure 2



Technical Service Information

THM 400 DIAGNOSIS		
CONDITION	INSPECT	FOR CAUSE
FLUID LEAK	Oil Pan and Oil Pan Gasket.	<ol style="list-style-type: none"> 1. Missing Bolts. 2. Damaged Oil Pan or Gasket. 3. Loose bolts or low bolt torque. 4. Bolts over torqued. 5. Damaged sealing surface on pan or case.
	Transmission Case, Extension Housing, Gasket and Seal.	<ol style="list-style-type: none"> 1. Porosity and/or cracks. 2. Damaged gasket or seal. 3. Damaged "O" ring/gasket sealing surfaces. 4. Damaged bolt holes. 5. Bolts over/under torqued. 6. Shallow tapped holes. 7. Missing bolts.
	Oil Pump Assembly Pump to Case Gasket. Oil Pump Seal Ring. Front Oil Seal Assembly	<ol style="list-style-type: none"> 1. Porosity and/or cracks. 2. Damaged gasket or seal. 3. Damaged "O" ring/gasket sealing surfaces. 4. Damaged bolt holes. 5. Bolts over/under torqued. 6. Shallow tapped holes. 7. Garter spring missing from front seal. 8. Missing bolts.
	Torque Converter.	<ol style="list-style-type: none"> 1. Seam weld leaks. 2. Damaged hub or hub surface finish.
	Vacuum Modulator and "O" Ring Seal.	<ol style="list-style-type: none"> 1. Damaged seams in modulator can. 2. Damaged bellows or diaphragm. 3. Damaged case bore. 4. Loose modulator retainer 5. Missing or damaged "O" ring seal.
	Cooler Line Fittings and Pressure Tap.	<ol style="list-style-type: none"> 1. Low torque. 2. Split cooler line tubing. 3. Porus transmission case. 4. Damaged threads on fitting or case.
	Governor Cover and Gasket.	<ol style="list-style-type: none"> 1. Damaged cover and/or gasket. 2. Damaged case sealing surface. 3. Stripped bolt holes. 4. Missing bolt or gasket.
	Electrical Connector and "O" Ring Seal.	<ol style="list-style-type: none"> 1. Damaged or cracked connector 2. Damaged or missing "O" ring seal. 3. Damaged case bore.
Manual Shaft Seal.	<ol style="list-style-type: none"> 1. Damaged manual shaft seal. 2. Improperly seated manual shaft seal. 3. Damaged manual shaft. 	

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Figure 3



Technical Service Information

THM 400 DIAGNOSIS		
CONDITION	INSPECT	FOR CAUSE
FLUID LEAK (Continued)	Fluid Out Vent Pipe.	<ol style="list-style-type: none"> 1. Transmission overfilled. 2. Coolant in fluid. 3. Overheating (Heavy Trailers etc...). 4. Filter "O" ring or intake pipe damaged that will create foaming condition. 5. Oil pump to case gasket mispositioned. 6. Oil pump not properly seated in case. 7. Breather hole in pump missing or blocked.
	Filler Tube and Seal.	<ol style="list-style-type: none"> 1. Damaged seal or filler tube. 2. Damaged seal case bore. 3. Plugged vent pipe.
	Speedo Adapter and Seal.	<ol style="list-style-type: none"> 1. Damaged adapter or "O" ring seal. 2. Missing or damaged shaft seal. 3. Damaged speedo adapter case bore.
LOW LINE PRESSURE	Fluid Level.	<ol style="list-style-type: none"> 1. Fluid level low, adjust as necessary
	Vacuum Modulator.	<ol style="list-style-type: none"> 1. Vacuum does not drop, inspect for carbon build up where line enters intake manifold. 2. Damaged, bent or wrong modulator 3. Modulator valve in case stuck. 4. Vacuum regulator valve (Diesel Engine Only).
	Filter Assembly, Intake Pipe and "O" Ring Seals.	<ol style="list-style-type: none"> 1. Blocked or restricted filter 2. Damaged or missing "O" ring seal on pipe. 3. Intake pipe damaged or cracked. 4. Damaged intake pipe case bore.
	Oil Pump Assembly.	<ol style="list-style-type: none"> 1. Pressure regulator or boost valve stuck. 2. Wrong boost valve and sleeve. 3. Excessive pump gear clearance. 4. Pump body wear in gear pocket. 5. Excessive wear on pump cover (Stator). 6. Porosity in pump body or cover 7. Pump to case gasket mispositioned.
	Transmission Case.	<ol style="list-style-type: none"> 1. Damaged or porosity in valve body area. 2. Intermediate clutch cup plug missing or
	Internal Leaks (Clutches).	<ol style="list-style-type: none"> 1. Piston seal damage on Forward, Direct, or Intermediate clutches.
	Internal Leaks. (Oil Pump and Center Support)	<ol style="list-style-type: none"> 1. Oil sealing ring damage or misassembly. 2. Sealing ring groove damage or wear.
Internal Leaks (Rear Servo and Front Accumulator).	<ol style="list-style-type: none"> 1. Pistons or seals damaged. 2. Servo cover or gasket damaged. 	

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Figure 4



Technical Service Information

THM 400 DIAGNOSIS		
CONDITION	INSPECT	FOR CAUSE
HIGH LINE PRESSURE	Vacuum Modulator and	<ol style="list-style-type: none"> 1. Low vacuum from poor engine tune. 2. Vacuum lines leaking. 3. Vacuum operated accessory leak. 4. Vacuum storage tank leak. 5. Damaged, bent or wrong modulator 6. Modulator valve in case stuck. 7. Vacuum regulator valve (Diesel Engine Only).
	Detent Solenoid.	<ol style="list-style-type: none"> 1. Mechanically stuck open. 2. Detent switch actuated or shorted. 3. Detent gasket missing. 4. Detent feed orifice in spacer plate blocked. 5. Mounting bolts loose.
	Oil Pump Assembly.	<ol style="list-style-type: none"> 1. Pressure regulator or boost valve stuck. 2. Wrong boost valve and sleeve. 3. Incorrect pressure regulator spring. 4. Improper assembly. 5. Aluminum bore plug damaged. 6. Porosity in pump body or cover
	Valve Body Assembly.	<ol style="list-style-type: none"> 1. Detent valve bore plug damaged/leaking. 2. Detent regulator valve pin short. 3. Detent regulator valve or detent valve stuck. 4. Spacer plate to case gasket off location or gaskets reversed.
NO MOVEMENT ANY RANGE	Fluid Level.	<ol style="list-style-type: none"> 1. Low fluid level, adjust as necessary.
	Oil Pressure.	<ol style="list-style-type: none"> 1. Refer to "LOW LINE PRESSURE".
	Manual Linkage	<ol style="list-style-type: none"> 1. Linkage not properly adjusted. 2. Manual valve loose from rooster cone pin. 3. Rooster cone nut loose on manual shaft.
	Torque Converter.	<ol style="list-style-type: none"> 1. Stator roller clutch damaged (Vehicle moves, but is very sluggish). 2. Turbine hub splines stripped or broken. 3. Turbine or pump vanes damaged. 4. Mis-stabbed (Damaged hub and gears).
	Transmission Internal.	<ol style="list-style-type: none"> 1. Internal splines stripped or damaged. 2. Differential damaged or axle broken. (Does speedo work in forward gear?)

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Figure 5



Technical Service Information

THM 400 DIAGNOSIS		
CONDITION	INSPECT	FOR CAUSE
NO FORWARD MOVEMENT, REVERSE OK	Oil Pump Assembly and Oil Sealing Rings. Forward Clutch Housing.	1. Drive feed passage in stator blocked, restricted or has porosity. 2. Oil seal rings on stator (Fwd clutch feed) are damaged or missing. 1. Forward clutch housing damaged, porosity. 2. Check ball in housing damaged or missing. 3. Piston lip seals damaged or missing. 4. Piston damaged or cracked.
NO MOVEMENT IN DRIVE OR DRIVE "2" RANGE LOW AND REVERSE OK	Low Roller Clutch Assembly COLD ONLY.	1. Damaged or missing components. 2. Cage assembly installed backwards. 1. Forward clutch feed orifice in clutch housing or the pump cover restricted. 2. Forward clutch piston seal damage (Hard). 3. Oil pump seal ring damaged or worn.
NO REVERSE, ALL FORWARD OK	Rear Servo Assembly. Valve Body Assembly. Transmission Case. Direct Clutch Assembly. Center Support and Oil Sealing Rings. Oil Pump Assembly. Rear Band Assembly.	1. Rear servo piston damaged or cracked. 2. Piston oil seal damaged or missing. 3. Rear servo apply pin damaged or improper pin length selection. 4. Rear servo cover or gasket leaking. 5. Rear servo apply pin not engaged in target area of rear band lug. 6. Porosity in case apply pin bore. 1. Reverse oil passages blocked, restricted or valve body casting porosity. 2. Spacer plate gaskets leaking. 1. Reverse oil passages blocked, restricted or case casting porosity. 1. Check ball in housing or piston missing. 2. Direct piston outer seal damaged or rolled. 3. Direct clutch housing damaged, or porosity. 1. Reverse oil passages blocked, restricted or has porosity or is cracked. 2. Oil seal rings damaged or missing. 3. Oil seal ring grooves damaged or worn. 1. Reverse oil passages blocked, restricted or has porosity. 2. Oil seal rings damaged or missing. 3. Oil seal ring grooves damaged or worn. 1. Rear band damaged, burned or broken.

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Figure 6



Technical Service Information

THM 400 DIAGNOSIS		
CONDITION	INSPECT	FOR CAUSE
NO 1-2 UPSHIFT, 1ST GEAR ONLY	<p>Oil Pressure.</p> <p>Governor Assembly, Governor Oil Pipes and Governor Feed Screen.</p> <p>Valve Body Assembly.</p> <p>1-2 Accumulator Piston. (Located In Rear Servo)</p> <p>Intermediate Clutch.</p> <p>Intermediate Roller Clutch.</p>	<p>1. Refer to "HIGH LINE PRESSURE".</p> <p>1. Governor weights binding, sticking or worn. 2. Governor valve stuck in governor bore. 3. Governor driven gear damaged or broken. 4. Governor binding in case bore. 5. Governor oil pipes damaged, missing or improperly seated in valve body or case. 6. Governor screen blocked or restricted.</p> <p>1. 1-2 shift valve binding or stuck. 2. Valve body casting porosity 3. Governor feed passages restricted or leaks. 4. Spacer plate and gaskets damaged. 5. Detent solenoid missing or damaged. 6. Detent valve or detent regulator valve stuck.</p> <p>1. Damaged piston or seal ring groove. 2. Damaged or missing oil sealing ring.</p> <p>1. Damaged clutch piston or lip seals. 2. Center support bolt loose or broken. 3. Small orifice cup plug missing from support.</p> <p>1. Roller clutch not holding or damaged. (Will have Manual "2") 2. Installed backwards.</p>
DELAYED 1-2 UPSHIFT, OR FULL THROTTLE UPSHIFT ONLY	<p>Oil Pressure.</p> <p>Detent Solenoid.</p> <p>Valve Body Assembly.</p> <p>Governor Assembly, Governor Oil Pipes and Governor Feed Screen.</p>	<p>1. Refer to "HIGH LINE PRESSURE".</p> <p>1. Mechanically stuck open. 2. Detent switch actuated or shorted. 3. Detent gasket missing. 4. Detent feed orifice in spacer plate blocked. 5. Mounting bolts loose.</p> <p>1. 1-2 shift valve binding or stuck. 2. Valve body casting porosity 3. Governor feed passages restricted or leaks. 4. Spacer plate and gaskets damaged. 5. Detent solenoid missing or damaged. 6. Detent valve or detent regulator valve stuck. 7. Detent valve bore plug damaged/leaking.</p> <p>1. Governor weights binding, sticking or worn. 2. Governor valve stuck in governor bore. 3. Governor driven gear damaged or broken. 4. Governor binding in case bore. 5. Governor oil pipes damaged, missing or improperly seated in valve body or case. 6. Governor screen blocked or restricted.</p>

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Figure 7



Technical Service Information

THM 400 DIAGNOSIS		
CONDITION	INSPECT	FOR CAUSE
NO 2-3 UPSHIFT, 1ST & 2ND GEAR ONLY	<p>Oil Pressure.</p> <p>Governor Assembly, Governor Oil Pipes and Governor Feed Screen.</p> <p>Valve Body Assembly.</p> <p>Direct Clutch Housing.</p> <p>Center Support and Oil Sealing Rings.</p>	<p>1. Refer to "HIGH LINE PRESSURE".</p> <p>1. Governor weights binding, sticking or worn. 2. Governor valve stuck in governor bore. 3. Governor driven gear damaged. 4. Governor binding in case bore. 5. Governor oil pipes damaged, missing or improperly seated in valve body or case. 6. Governor screen blocked or restricted.</p> <p>1. 2-3 shift valve binding or stuck. 2. 2-3 modulator valve stuck. 2. Valve body casting porosity 3. Governor feed passages restricted or leaks. 4. Spacer plate and gaskets damaged. 5. 2-3 accumulator piston or seal damage.</p> <p>1. Damaged clutch piston or lip seals. 2. Missing check ball in piston or housing. 3. Porosity in housing or piston.</p> <p>1. Porosity or crack in center support. 2. Oil seal rings damaged or missing. 3. Oil seal ring grooves damaged or worn. 4. Support bolt loose or broken.</p>
HARSH UPSHIFTS AT MINIMUM THROTTLE	<p>Oil Pressure.</p> <p>Valve Body Assembly.</p> <p>1-2 Accumulator Piston (Located in Rear Servo)</p> <p>Transmission Case.</p>	<p>1. Refer to "HIGH LINE PRESSURE".</p> <p>1. 1-2 accumulator valve binding or stuck. 2. 2-3 accumulator piston binding or stuck. 3. 2-3 accumulator spring broken. 4. Wrong seal on 2-3 accumulator piston.</p> <p>1. Intermediate accumulator piston cracked. 2. Oil seal rings damaged or missing. 3. Oil seal ring grooves damaged or worn.</p> <p>1. Intermediate accumulator feed passages blocked or restricted.</p>

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Figure 8



Technical Service Information

THM 400 DIAGNOSIS		
CONDITION	INSPECT	FOR CAUSE
NO UPSHIFTS OR DELAYED, FULL THROTTLE UPSHIFT ONLY	Oil Pressure.	1. Refer to "HIGH LINE PRESSURE".
	Detent Solenoid.	1. Mechanically stuck open. 2. Detent switch actuated or shorted. 3. Detent gasket missing. 4. Mounting bolts loose.
	Governor Assembly, Governor Oil Pipes and Governor Feed Screen.	1. Governor weights binding, sticking or worn. 2. Governor valve stuck in governor bore. 3. Governor driven gear damaged or broken. 4. Governor binding in case bore. 5. Governor oil pipes damaged, missing or improperly seated in valve body or case. 6. Governor screen blocked or restricted.
	Valve Body Assembly.	1. 1-2 or 2-3 shift valves binding or stuck. 2. Valve body casting porosity 3. Governor feed passages restricted or leaks. 4. Governor feed pipes missing/misassembled. 4. Spacer plate and gaskets damaged. 5. Detent solenoid missing or damaged. 6. Detent valve or detent regulator valve stuck. 7. Detent valve bore plug damaged/leaking.
	Valve Body Spacer Plate.	1. Mechanically stuck open. 2. Detent switch actuated or shorted. 3. Detent gasket missing. 4. Detent feed orifice in spacer plate blocked. 5. Mounting bolts loose.
	Transmission Case.	1. Governor oil passages blocked or restricted. 2. Damage to worm track passages.
NO DETENT DOWNSHIFTS	Detent Solenoid Circuit.	1. Loose electrical connections. 2. Defective electrical activation switch usually on accelerator linkage on early models, and activated by PCM/TCM via TPS on 88 & later 3. Pinched and/or cut wiring in circuit. 4. Damaged electrical connector 5. Mechanically or electrically defective. 6. Plugged orifice.
	Valve Body Assembly.	1. Detent valve or detent regulator valve stuck. 2. Detent valve bore plug damaged/leaking.

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Figure 9



Technical Service Information

THM 400 DIAGNOSIS		
CONDITION	INSPECT	FOR CAUSE
EARLY, SOFT OR SLIPPING SHIFTS	<p>Oil Pressure.</p> <p>Governor Assembly.</p> <p>Valve Body Assembly.</p> <p>Front Servo Assembly. Rear Servo Assembly.</p> <p>Forward Clutch. Intermediate Clutch. Direct Clutch.</p> <p>Center Support and Oil Sealing Rings.</p>	<p>1. Refer to "LOW LINE PRESSURE".</p> <p>1. Governor weights binding, sticking or worn, creating high governor pressure. 2. Governor valve stuck in governor bore, creating high governor pressure.</p> <p>1. Valve body bolts with low torque. 2. Shift valves binding allowing partial oil feed. 3. 2-3 accumulator spring damaged. 4. 2-3 accumulator piston or seal ring damage. 5. Valve body casting porosity.</p> <p>1. Sticking servo pistons. 2. Damaged or broken servo springs. 3. Leaking gaskets and/or piston seal rings.</p> <p>1. Damaged clutch piston or lip seals. 2. Missing check ball in piston or housing. 3. Porosity in housing or piston.</p> <p>1. Porosity or crack in center support. 2. Oil seal rings damaged or missing. 3. Oil seal ring grooves damaged or worn. 4. Support bolt loose or broken.</p>
NO PART THROTTLE DOWNSHIFTS	<p>Vacuum Modulator Assembly.</p> <p>Valve Body Assembly.</p>	<p>1. Vacuum does not drop. Inspect for carbon build up where line enters intake manifold. 2. Damaged, bent or wrong modulator 3. Modulator valve in case stuck. 4. Vacuum regulator valve (Diesel Engine Only).</p> <p>1. 3-2 valve binding or stuck. 2. 2-3 modulator valve binding or stuck. 3. 1-2 or 2-3 shift valve sticking.</p>
NO ENGINE BRAKING LO RANGE (1ST GEAR)	<p>Transmission Case.</p> <p>Rear Servo Assembly.</p> <p>Rear Band Assembly.</p>	<p>1. Low/Rev checkball missing or off location. 2. Case porosity or damage in worm tracks. 3. Rear servo piston case bore damage. 4. Rear band anchor pin damaged.</p> <p>1. Piston or sealing ring damaged. 2. Band apply pin too short. 3. Mis-assembled rear servo. 4. Servo cover or gasket damage.</p> <p>1. Rear band damaged or burnt. 2. Band apply pin not engaged properly.</p>

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Figure 10



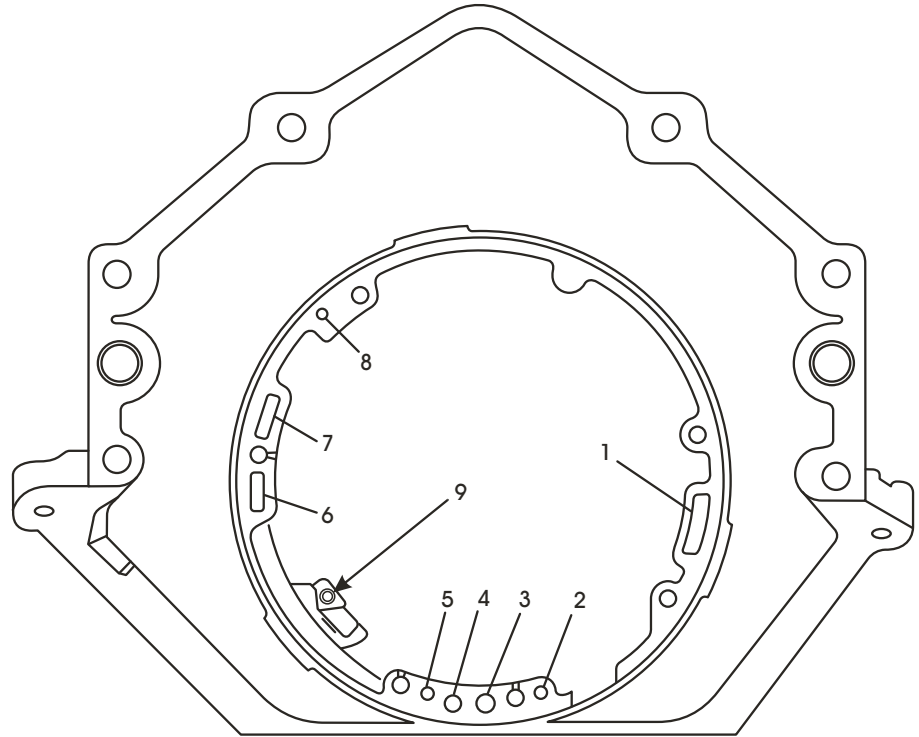
Technical Service Information

THM 400 DIAGNOSIS		
CONDITION	INSPECT	FOR CAUSE
NO ENGINE BRAKING "D2" RANGE (2ND GEAR)	Transmission Case. Front Servo Assembly. Front Band Assembly.	1. Front servo damaged or has porosity. 2. Servo piston stuck in bore. 1. Damaged servo piston or pin bore. 2. Damaged servo piston seal. 3. Damaged servo piston pin. 4. Front servo mis-assembled or wrong parts. 1. Damaged, burnt, broken or missing. 2. Apply pin or anchor pin not engaged.

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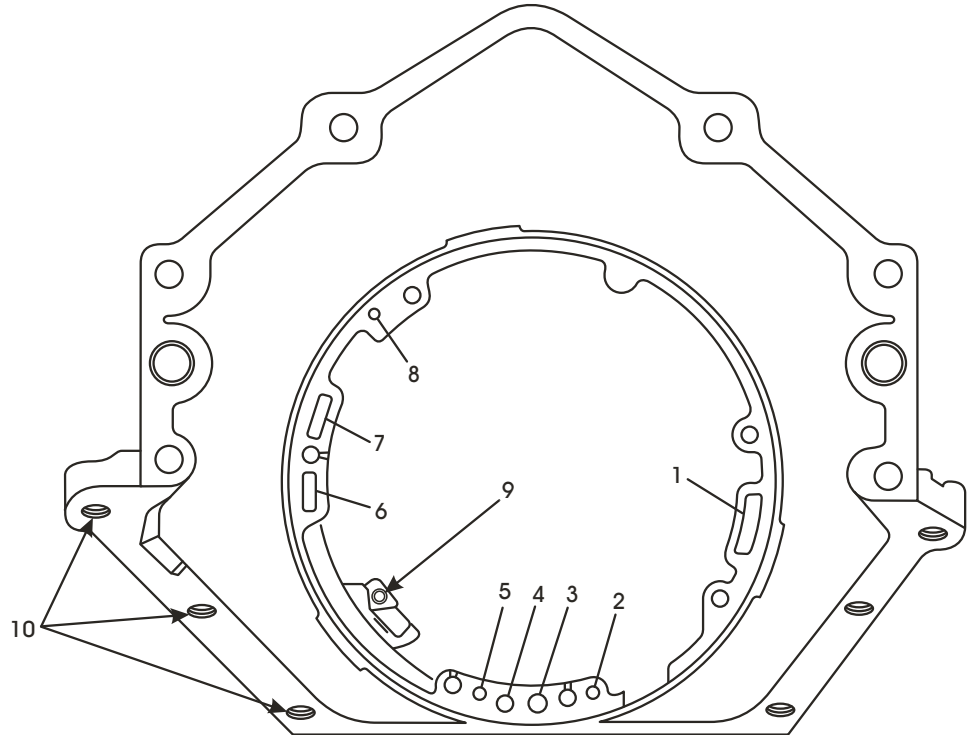
Figure 11

**REGULAR CASE USES STAMPED TIN
OR PLASTIC CONVERTER COVER**



1. PUMP INTAKE
2. REVERSE
3. LINE PRESSURE
4. DRIVE OIL
5. MODULATOR
6. TO COOLER
7. COOLER RETURN
8. VENT
9. INTERMEDIATE CLUTCH CUP PLUG

**HEAVY DUTY CASE USES CAST
ALUMINUM CONVERTER COVER**

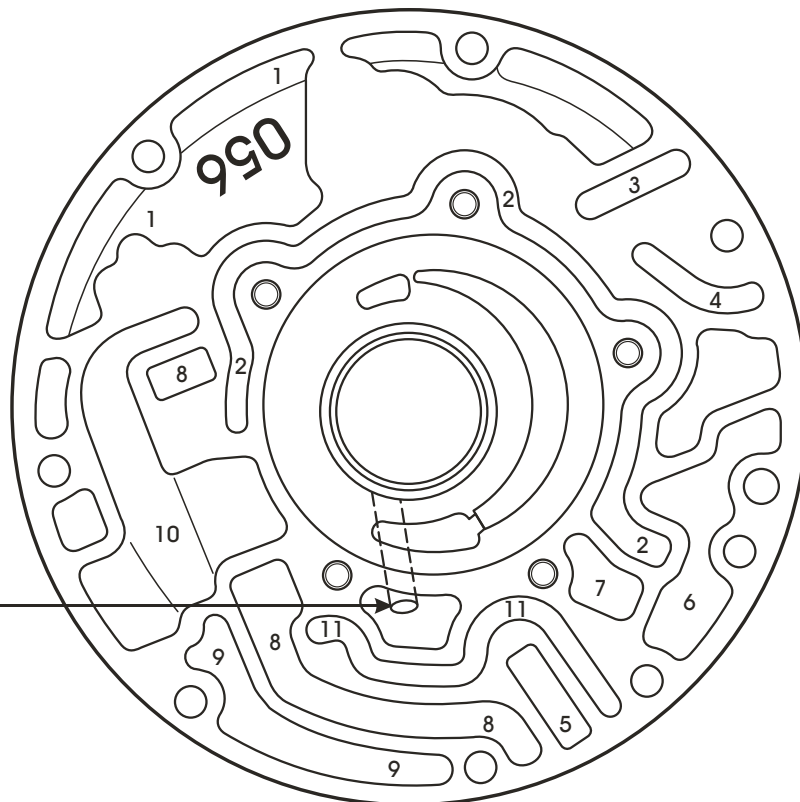


1. PUMP INTAKE.
2. REVERSE.
3. LINE PRESSURE.
4. DRIVE OIL.
5. MODULATOR.
6. TO COOLER.
7. COOLER RETURN.
8. VENT.
9. INTERMEDIATE CLUTCH CUP PLUG.
10. MOUNTING HOLES FOR CAST ALUMINUM CONVERTER COVER.

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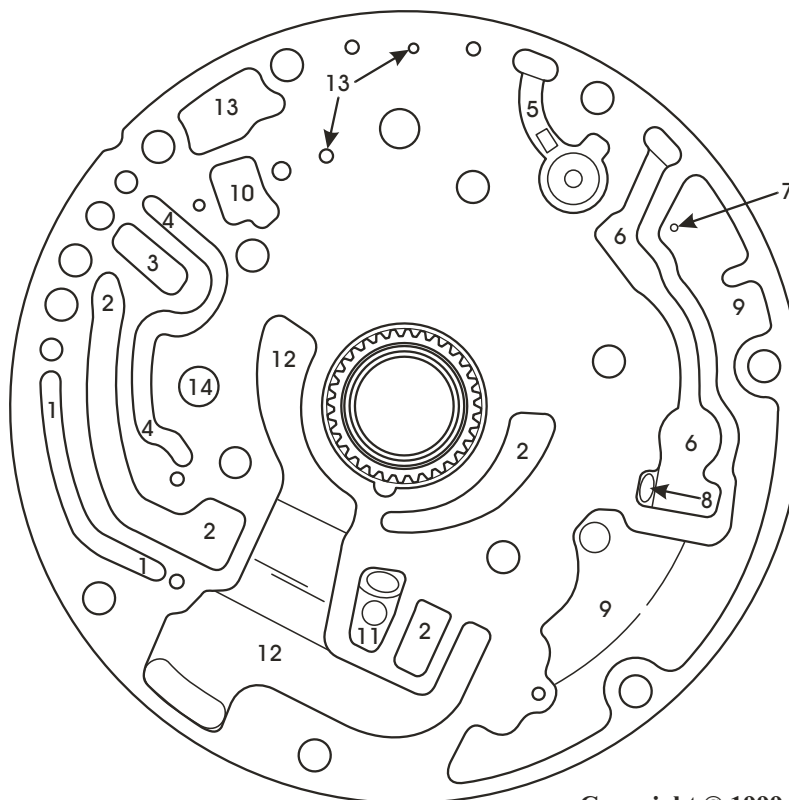
Figure 12

"VARIABLE PITCH" PUMP BODY PASSAGES



- 1. VENT
- 2. CONVERTER
- 3. COOLER RETURN
- 4. TO COOLER
- 5. DRIVE OIL
- 6. STATOR SIGNAL
- 7. STATOR
- 8. LINE PRESSURE
- 9. REVERSE
- 10. PUMP SUCTION
- 11. MOD. OR INTERMEDIATE

"VARIABLE PITCH" PUMP COVER PASSAGES

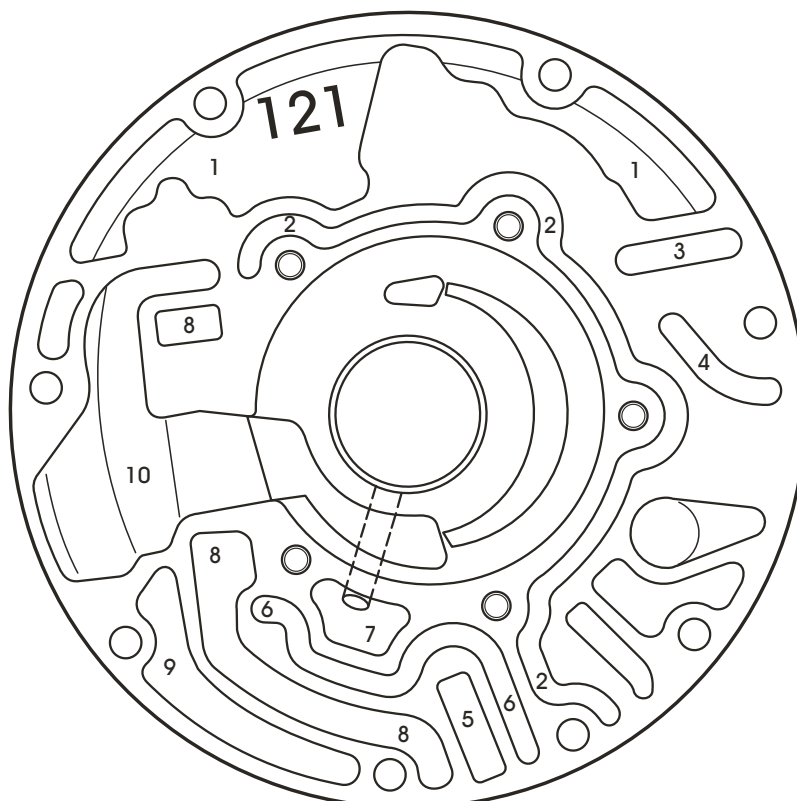


- 1. REVERSE
- 2. LINE PRESSURE
- 3. DRIVE OIL
- 4. MOD. OR INTERMEDIATE
- 5. TO COOLER
- 6. COOLER RETURN
- 7. BREATHER HOLE
- 8. LUBE OIL
- 9. VENT
- 10. STATOR
- 11. CONVERTER
- 12. PUMP SUCTION
- 13. STATOR SIGNAL
- 14. EXHAUST

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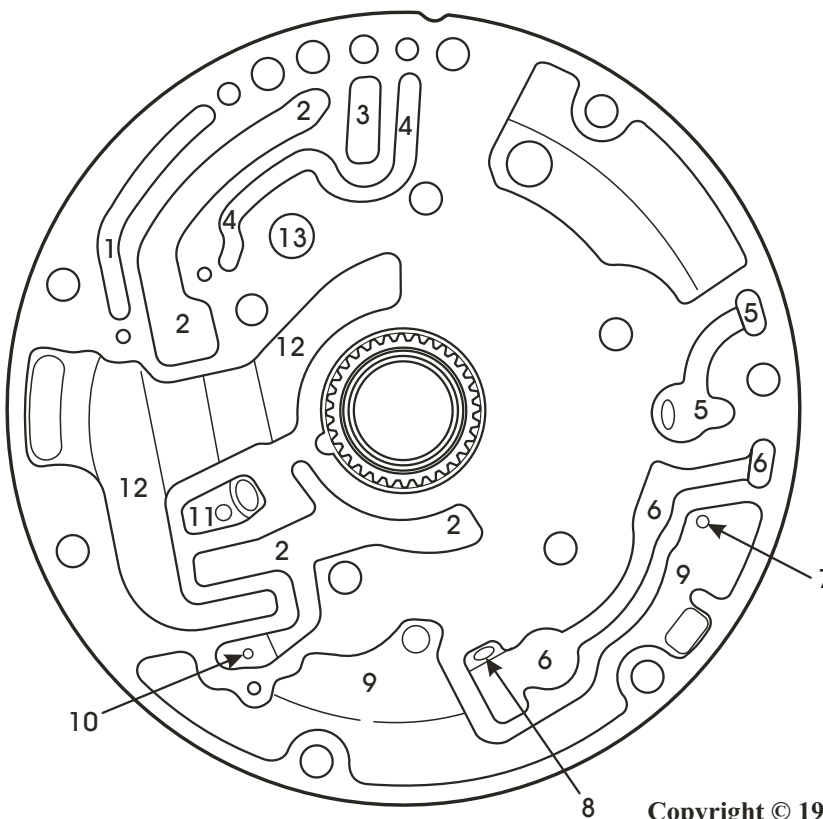
Figure 13

"EARLY" CASTING NO. 8626121 PUMP BODY PASSAGES



1. VENT
2. CONVERTER
3. COOLER RETURN
4. TO COOLER
5. DRIVE OIL
6. MOD. OR INTERMEDIATE
7. SEAL DRAIN BACK HOLE
8. LINE PRESSURE
9. REVERSE
10. PUMP SUCTION

"EARLY" CASTING NO. 8626174 PUMP COVER PASSAGES

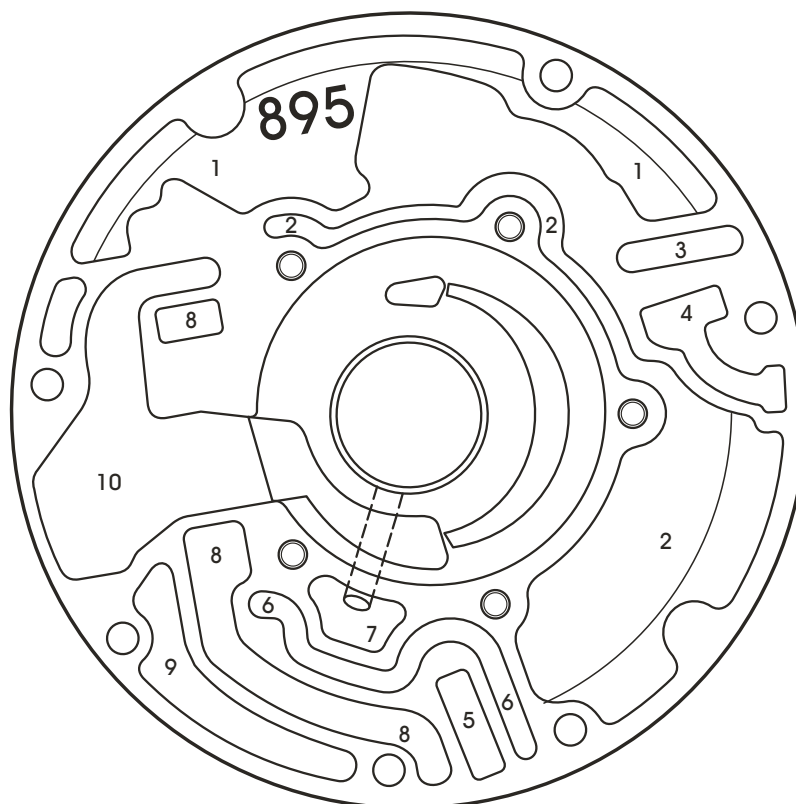


1. REVERSE
2. LINE PRESSURE
3. DRIVE OIL
4. MOD. OR INTERMEDIATE
5. TO COOLER
6. COOLER RETURN
7. BREATHER HOLE
8. LUBE OIL
9. VENT
10. PRESSURE REG. FEED HOLE
11. CONVERTER
12. PUMP SUCTION
13. EXHAUST

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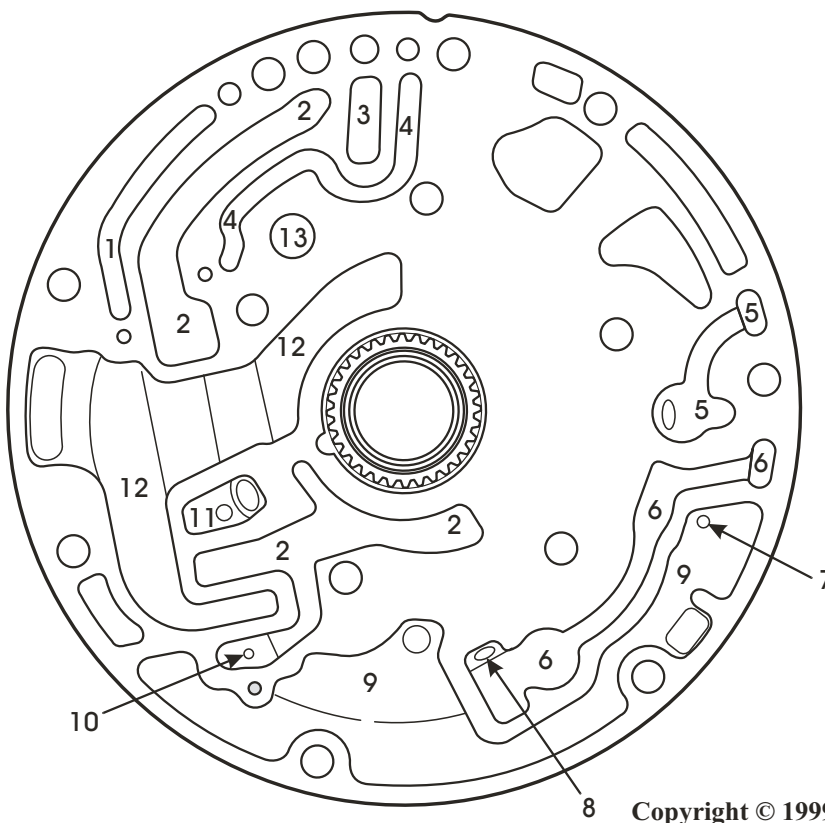
Figure 14

"LATE" CASTING NO. 8626895 PUMP BODY PASSAGES



- 1. VENT
- 2. CONVERTER
- 3. CONVERTER RETURN
- 4. TO COOLER
- 5. DRIVE OIL
- 6. MOD. OR INTERMEDIATE
- 7. SEAL DRAIN BACK HOLE
- 8. LINE PRESSURE
- 9. REVERSE
- 10. PUMP SUCTION

"LATE" CASTING NO. 8626896 PUMP COVER PASSAGES



- 1. REVERSE
- 2. LINE PRESSURE
- 3. DRIVE OIL
- 4. MOD. OR INTERMEDIATE
- 5. TO COOLER
- 6. COOLER RETURN
- 7. BREATHER HOLE
- 8. LUBE OIL
- 9. VENT
- 10. PRESSURE REG. FEED HOLE
- 11. CONVERTER
- 12. PUMP SUCTION
- 13. EXHAUST

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Figure 15

PUMP AND COVER IDENTIFICATION

The basic *fixed stator* Turbo 400 pump body and pump cover castings have been changed somewhat over the years. Due to these casting changes, not all of the pump covers and body assemblies produced can be used together. The chart below shows which pump halves will work together with "Yes" in the box. The reference numbers on the chart are casting numbers for identification purposes, and are found cast into the parts in the locations shown below.

PUMP BODIES	PUMP COVERS		
	1964-1966 1358649	1968-1970 8626174 8626176	1971-1994 8626896 8627000
1964-1966 1358649	YES	NO	NO
1967 8624068	YES	NO	NO
1968-1970 8626121	YES	YES	YES
1971-1994 8626895	YES	YES	YES

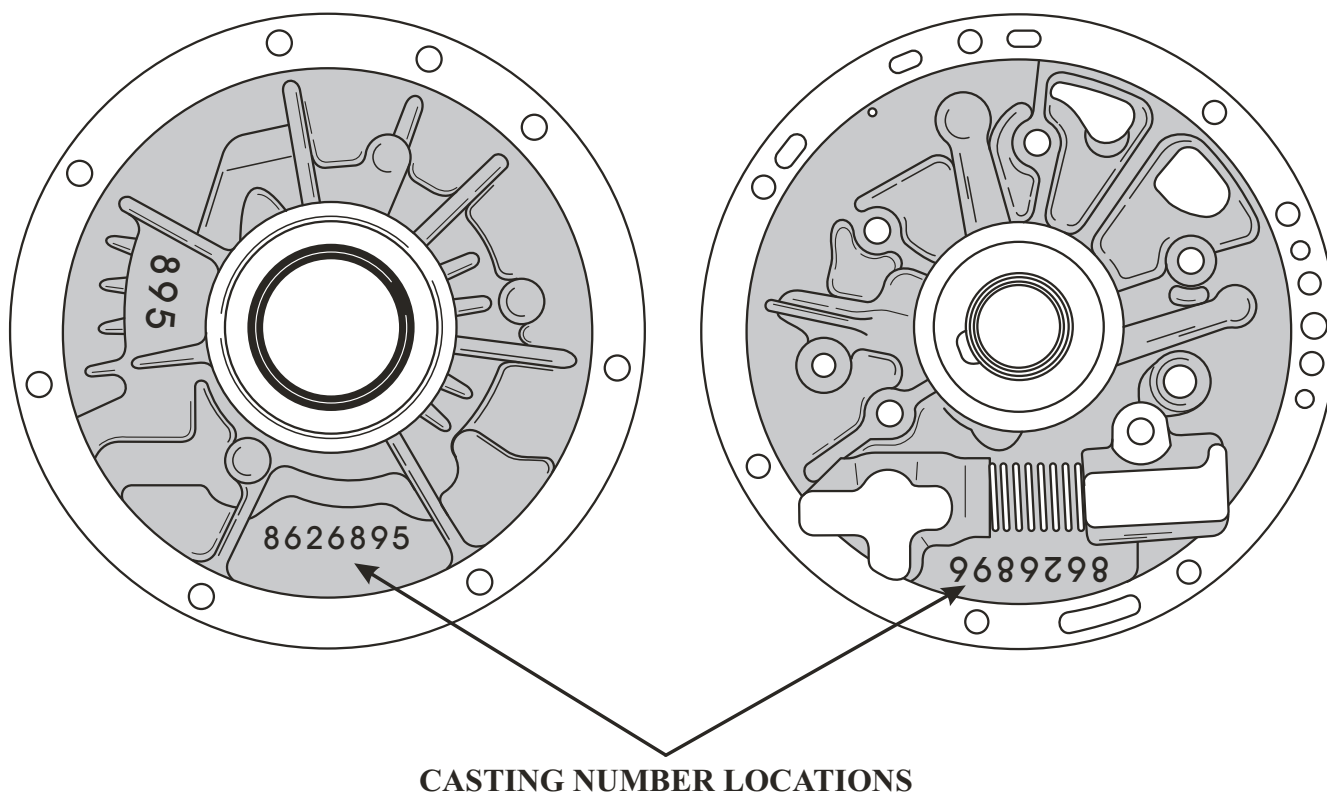
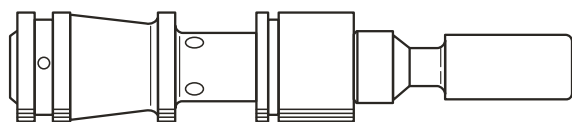
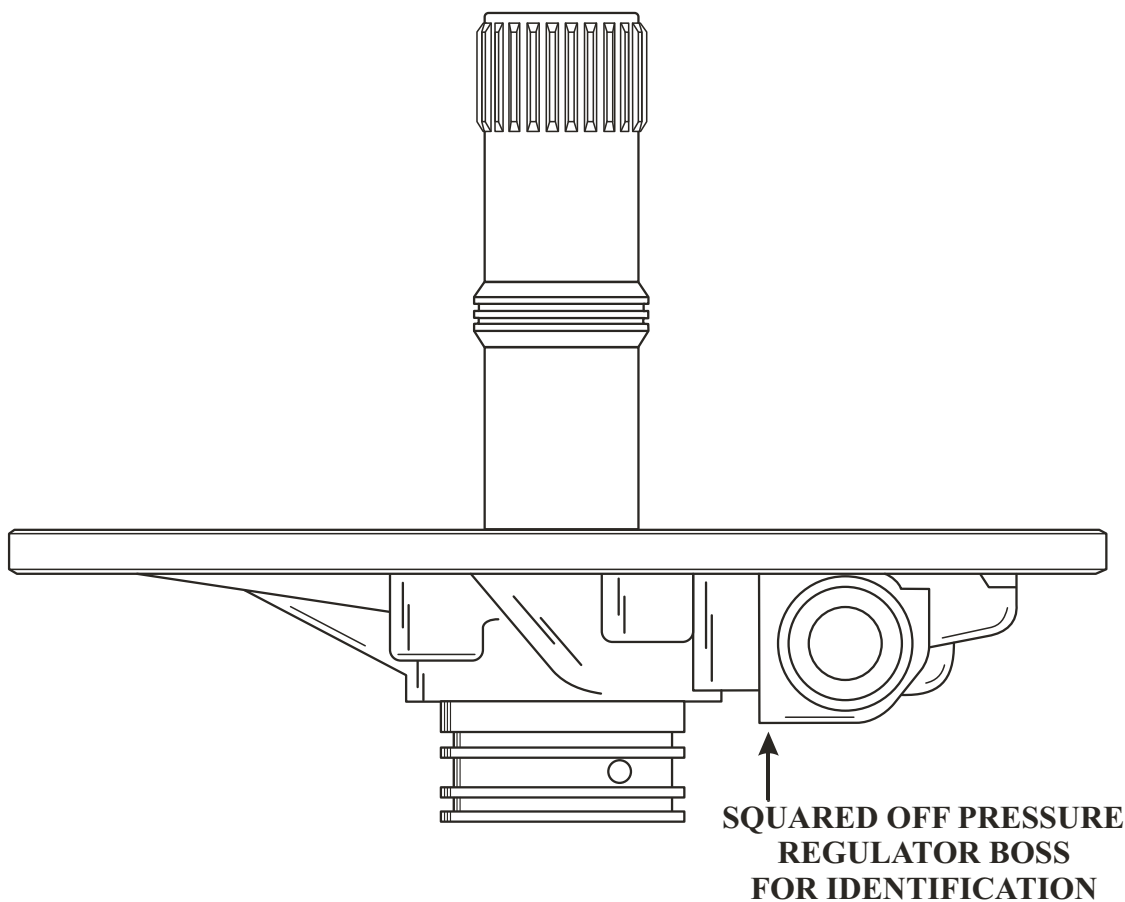
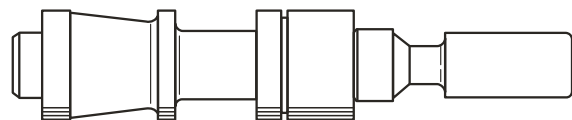


Figure 16

PUMP COVER AND PRESSURE REGULATOR VALVE IDENTIFICATION



1ST DESIGN WITH ORIFICE PLUG

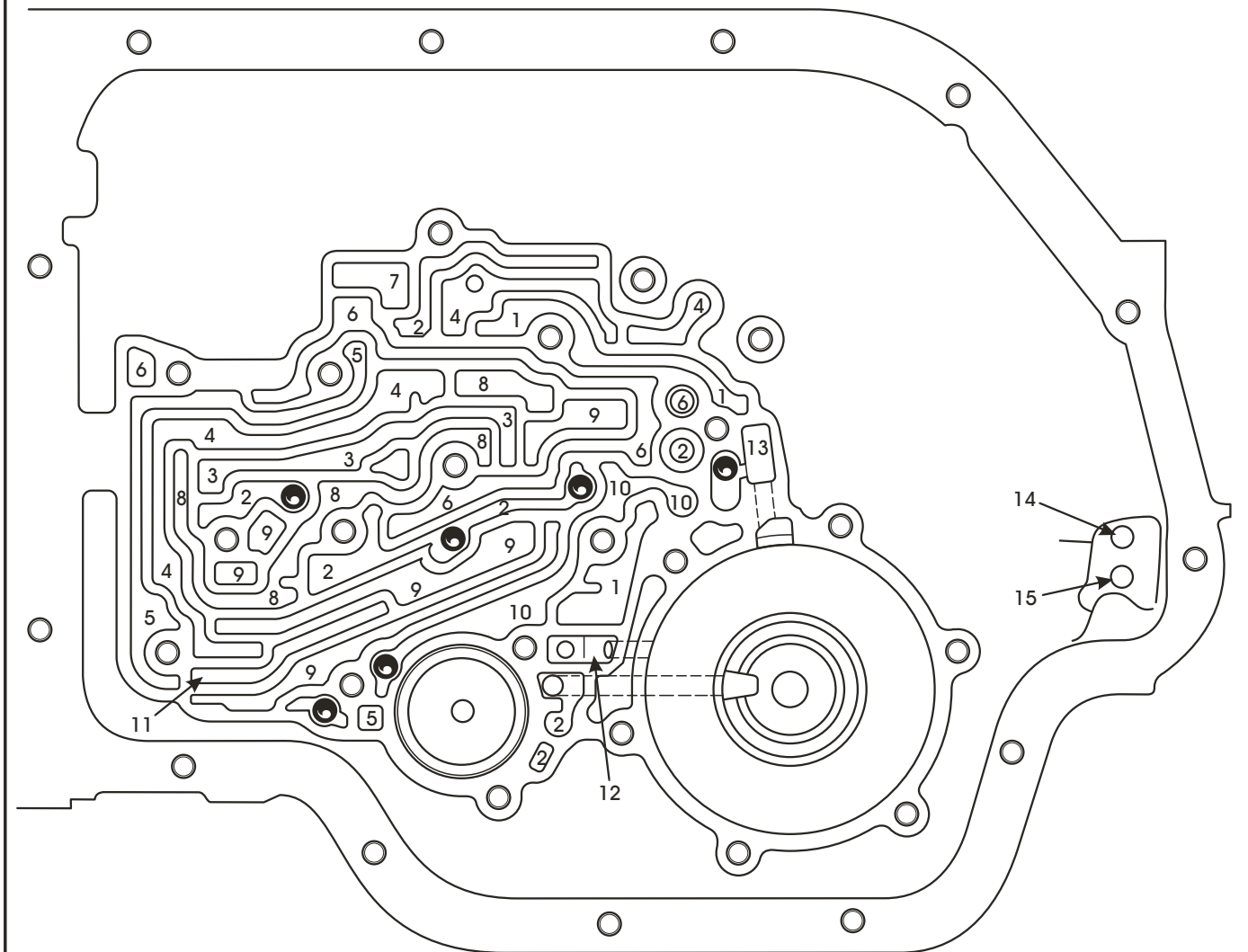


2ND DESIGN (SOLID)

The solid pressure regulator valve (2nd Design) can be used "only" in the pump cover with the squared off pressure regulator boss as shown above. Maximum line pressure will be the result if you install 2nd design valve into early cover. The 1st design pressure regulator valve with the vent holes and orifice cup plug, has been released for service and can be used to service either past model or the current pump cover.

Figure 17

1965-1987 CASE PASSAGES

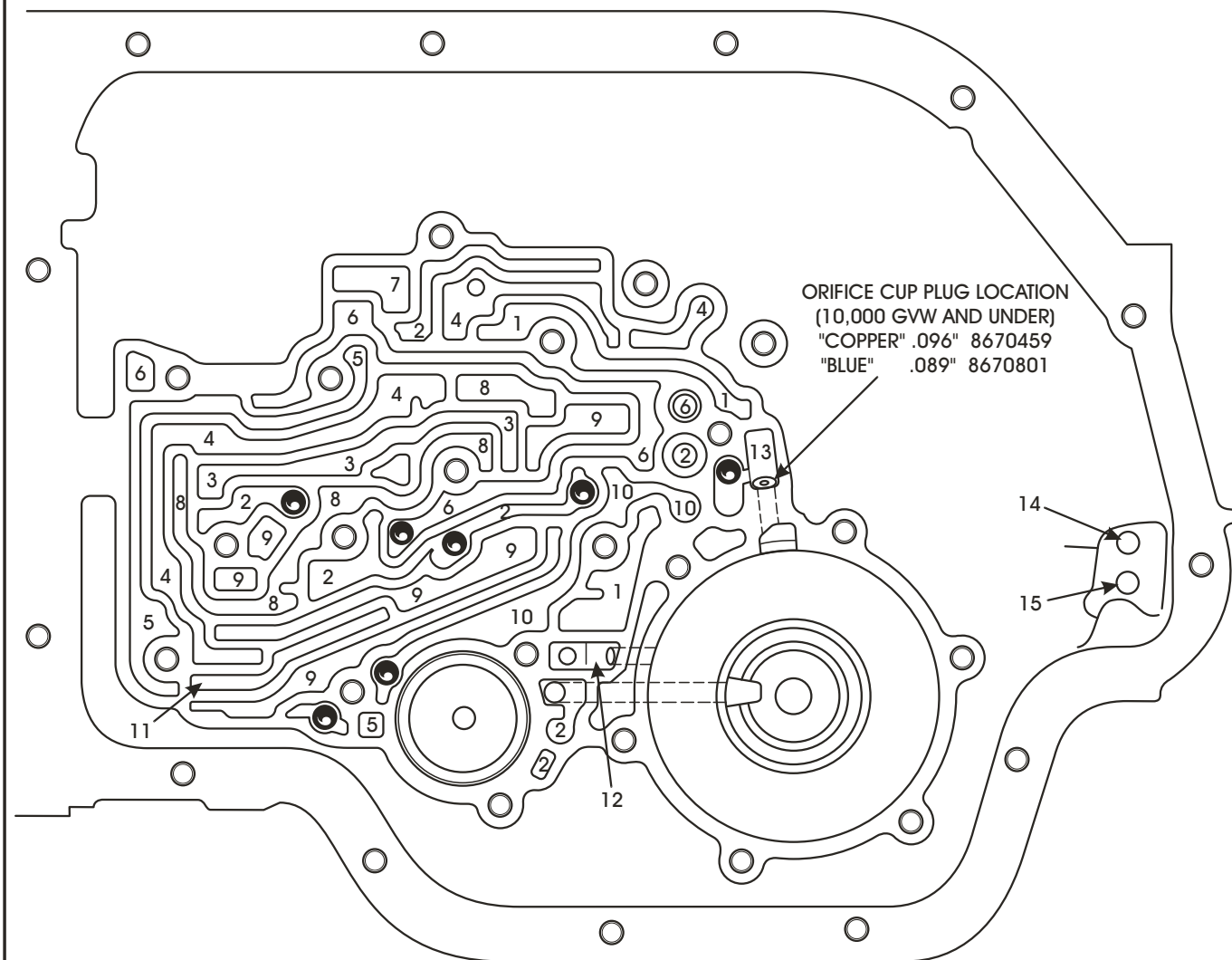


- | | |
|-----------------------|---------------------------|
| 1. MANUAL LO | 10. DIRECT CLUTCH |
| 2. INTERMEDIATE | 11. GOVERNOR |
| 3. DRIVE | 12. 1-2 ACCUMULATOR |
| 4. LINE PRESSURE | 13. REVERSE OR LO |
| 5. INTERMEDIATE SERVO | 14. GOVERNOR FEED (DRIVE) |
| 6. REVERSE | 15. GOVERNOR PRESSURE |
| 7. EXHAUST | |
| 8. DETENT OIL | |
| 9. MODULATOR | |

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Figure 18

1988-1990 CASE PASSAGES



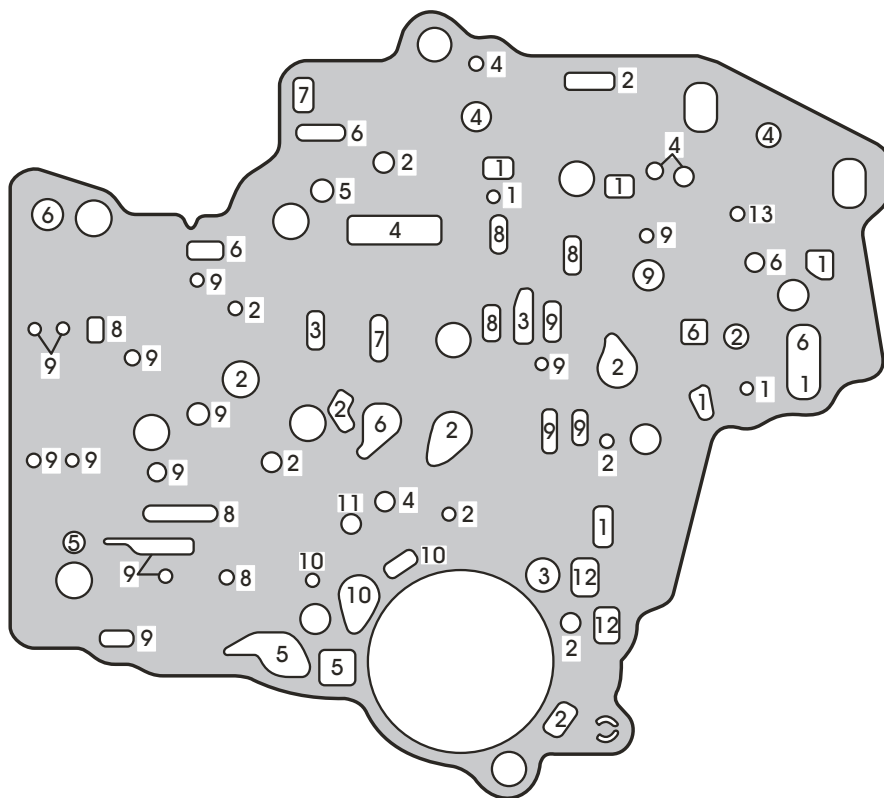
- | | |
|-----------------------|---------------------------|
| 1. MANUAL LO | 10. DIRECT CLUTCH |
| 2. INTERMEDIATE | 11. GOVERNOR |
| 3. DRIVE | 12. 1-2 ACCUMULATOR |
| 4. LINE PRESSURE | 13. REVERSE OR LO |
| 5. INTERMEDIATE SERVO | 14. GOVERNOR FEED (DRIVE) |
| 6. REVERSE | 15. GOVERNOR PRESSURE |
| 7. EXHAUST | |
| 8. DETENT OIL | |
| 9. MODULATOR | |

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Figure 19

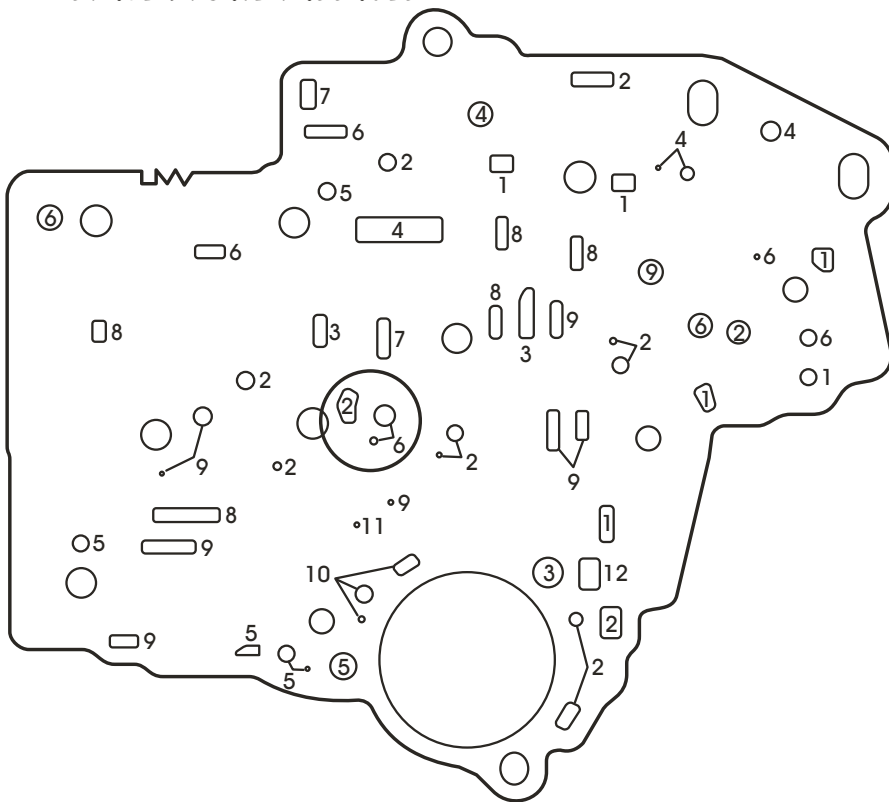
SPACER PLATE TO CASE GASKET PASSAGES

1. MANUAL LO
2. INTERMEDIATE
3. DRIVE
4. LINE PRESSURE
5. INTERMEDIATE SERVO
6. REVERSE
7. EXHAUST
8. DETENT
9. MODULATOR
10. DIRECT CLUTCH
11. GOVERNOR
12. 1-2 ACCUMULATOR
13. VOID



SPACER PLATE PASSAGES

1. MANUAL LO
2. INTERMEDIATE
3. DRIVE
4. LINE PRESSURE
5. INTERMEDIATE SERVO
6. REVERSE
7. EXHAUST
8. DETENT
9. MODULATOR
10. DIRECT CLUTCH
11. GOVERNOR
12. 1-2 ACCUMULATOR
13. VOID

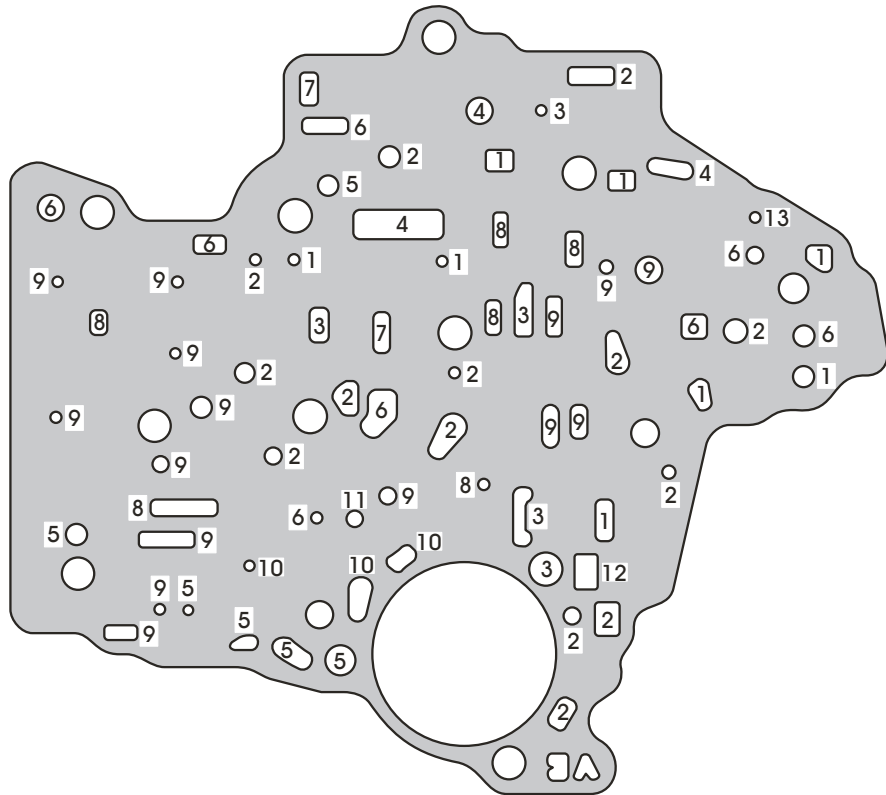


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Figure 20

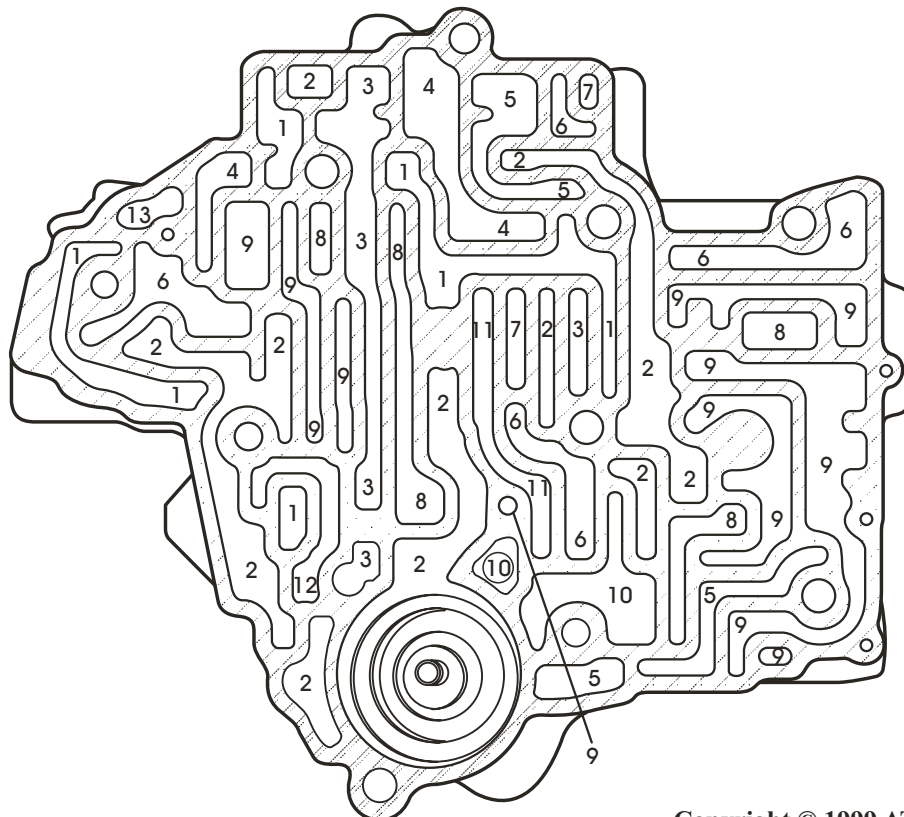
SPACER PLATE TO VALVE BODY GASKET PASSAGES

1. MANUAL LO
2. INTERMEDIATE
3. DRIVE
4. LINE PRESSURE
5. INTERMEDIATE SERVO
6. REVERSE
7. EXHAUST
8. DETENT
9. MODULATOR
10. DIRECT CLUTCH
11. GOVERNOR
12. 1-2 ACCUMULATOR
13. VOID



VALVE BODY PASSAGES

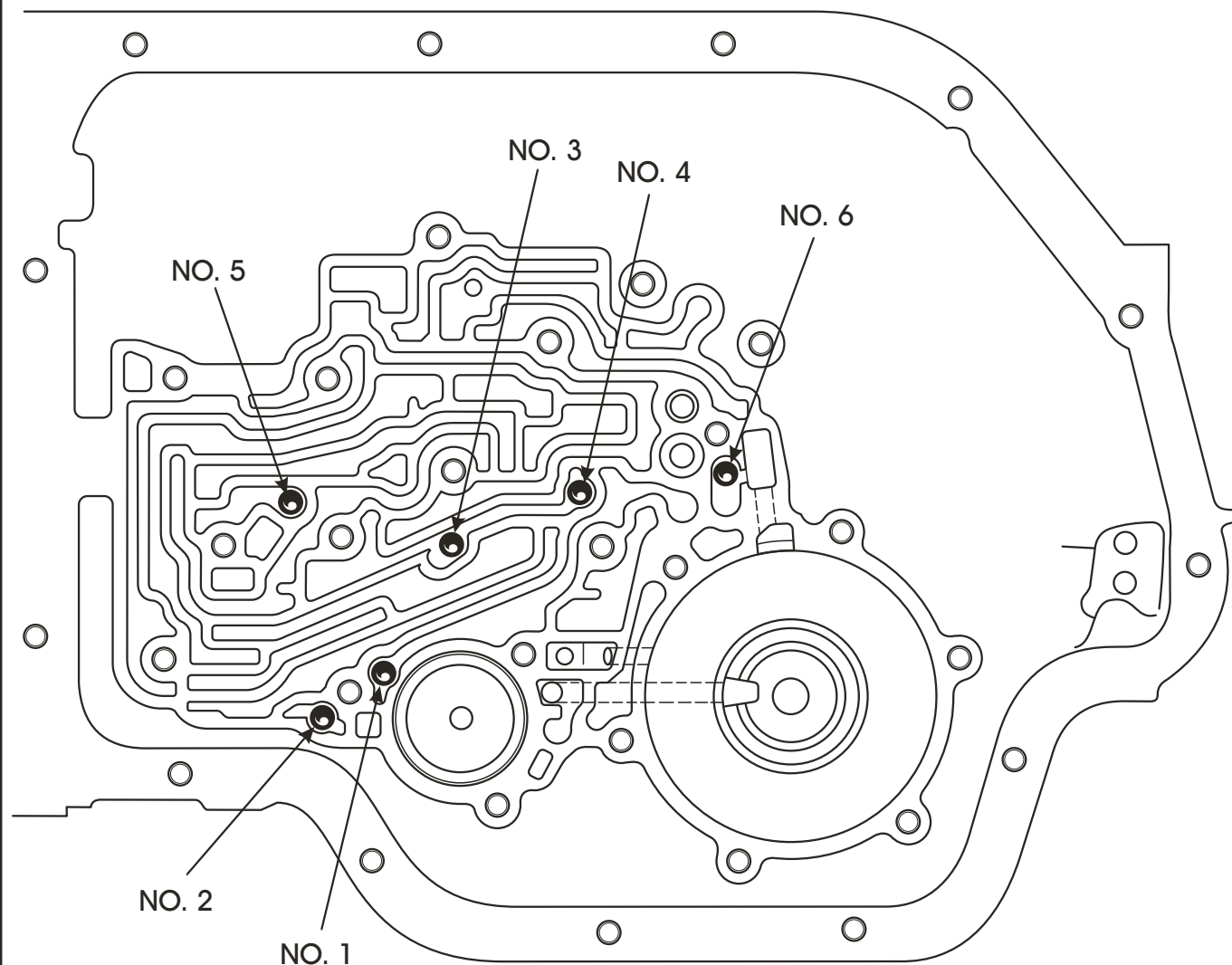
1. MANUAL LO
2. INTERMEDIATE
3. DRIVE
4. LINE PRESSURE
5. INTERMEDIATE SERVO
6. REVERSE
7. EXHAUST
8. DETENT
9. MODULATOR
10. DIRECT CLUTCH
11. GOVERNOR
12. 1-2 ACCUMULATOR
13. VOID



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Figure 21

1965-1987 CHECKBALL LOCATIONS

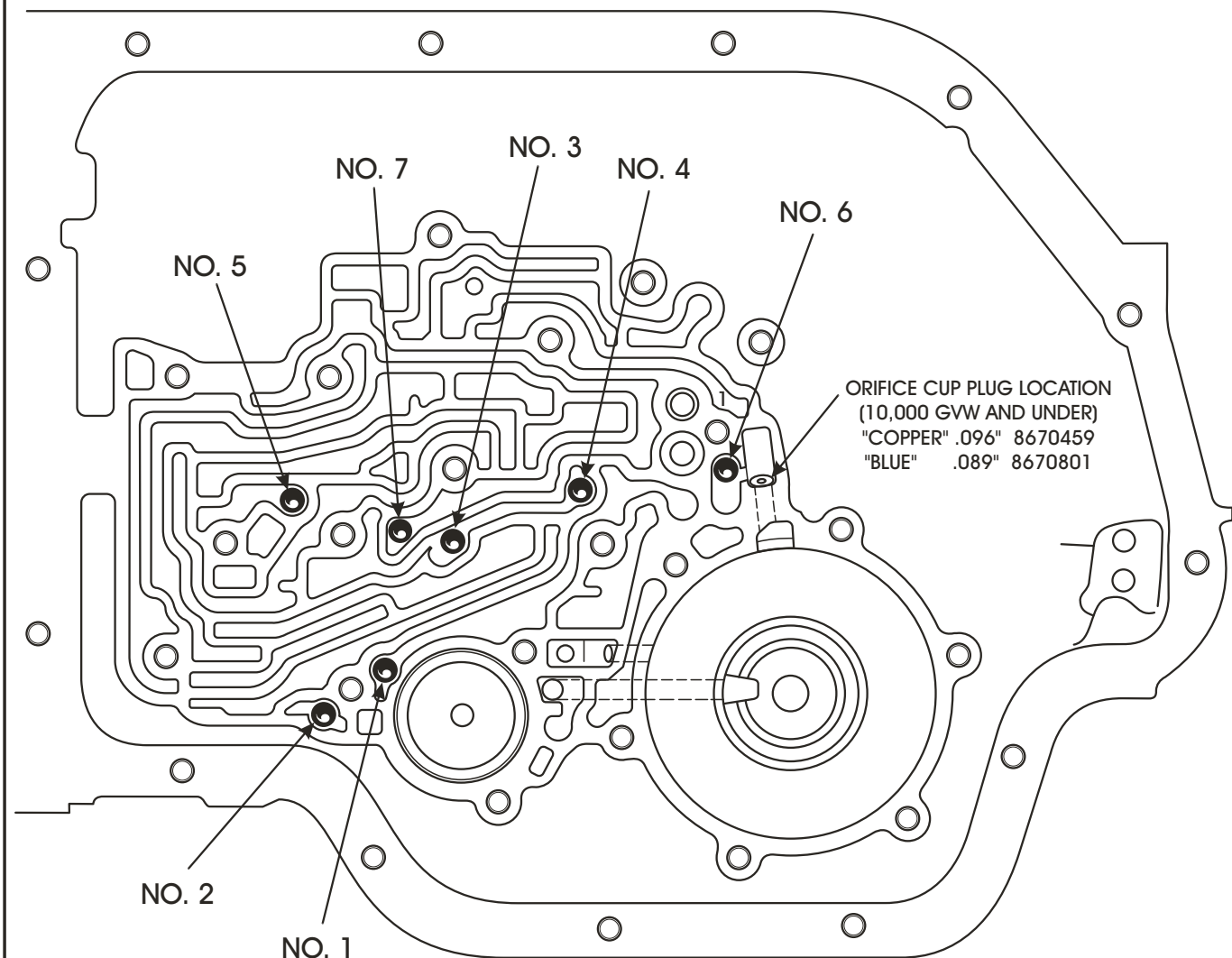


- No. 1 Non-Functional (Omit During Rebuild)
- No. 2 Intermediate Servo
- No. 3 2-3 Drive
- No. 4 1-2 Shift
- No. 5 Intermediate
- No. 6 Lo/Reverse

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Figure 22

1988-1990 CHECKBALL LOCATIONS



ORIFICE CUP PLUG LOCATION
(10,000 GVW AND UNDER)
"COPPER" .096" 8670459
"BLUE" .089" 8670801

- No. 1 Non-Functional (Omit During Rebuild)
- No. 2 Intermediate Servo
- No. 3 2-3 Drive
- No. 4 1-2 Shift
- No. 5 Intermediate
- No. 6 Lo/Reverse
- No. 7 Reverse

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Figure 23

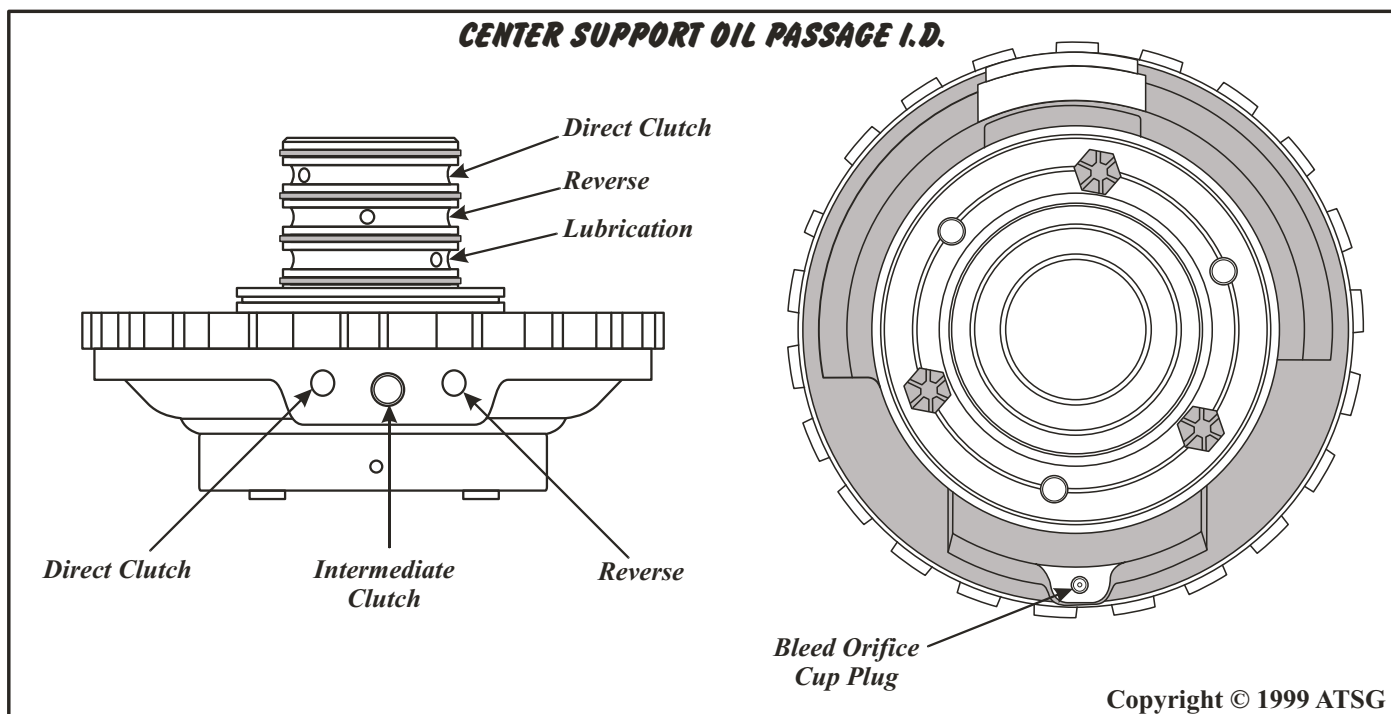


Figure 24

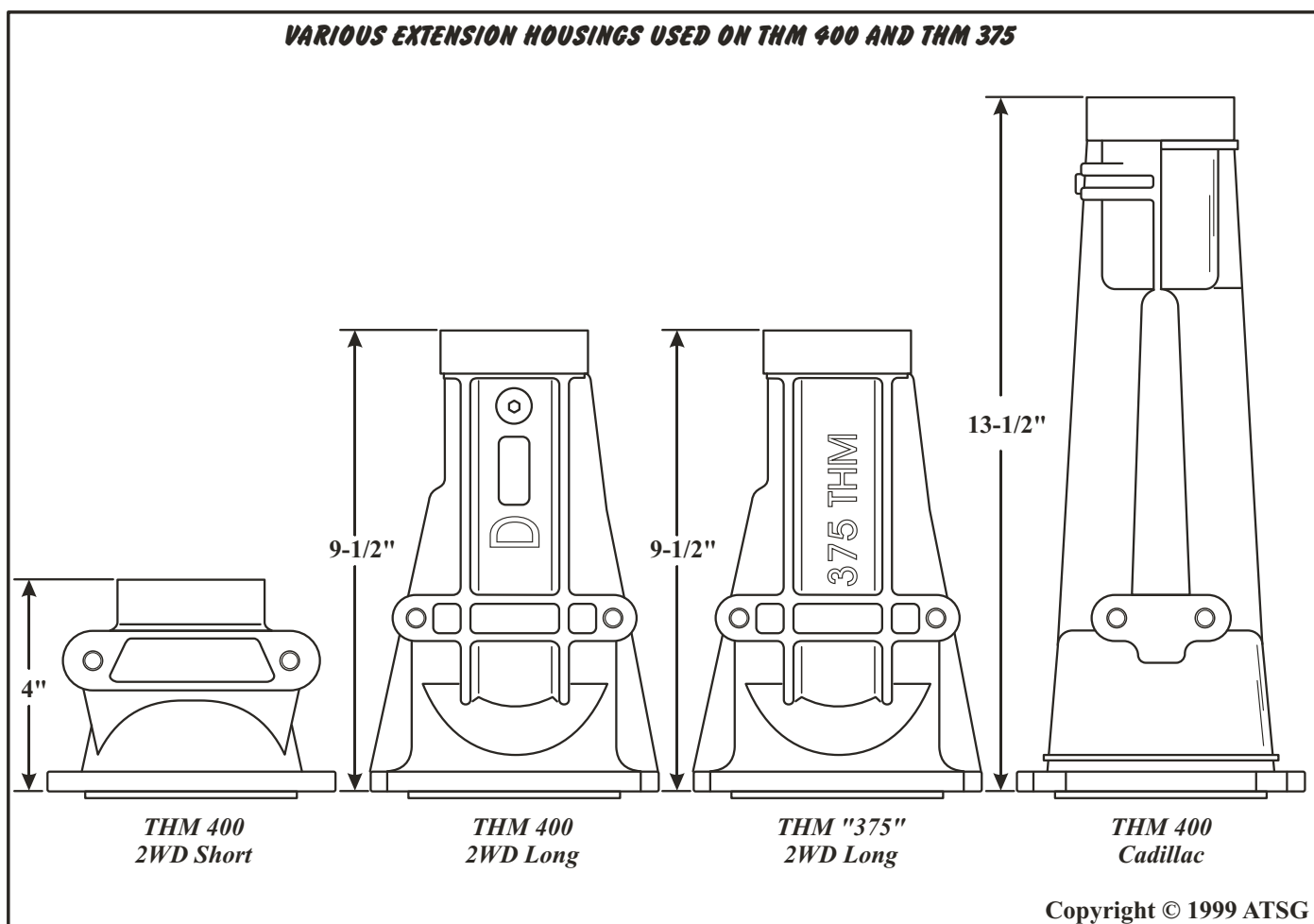
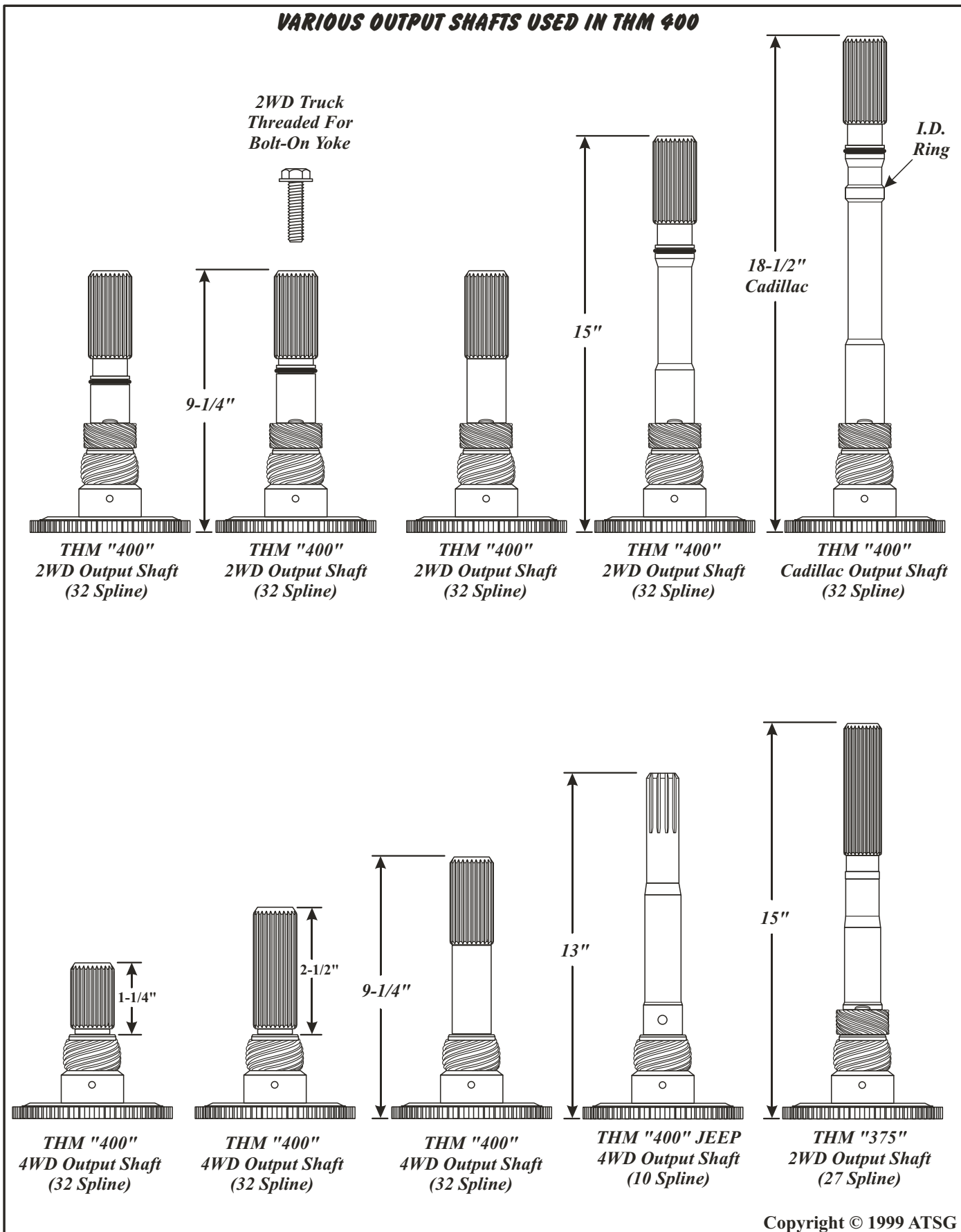


Figure 25

VARIOUS OUTPUT SHAFTS USED IN THM 400



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Figure 26

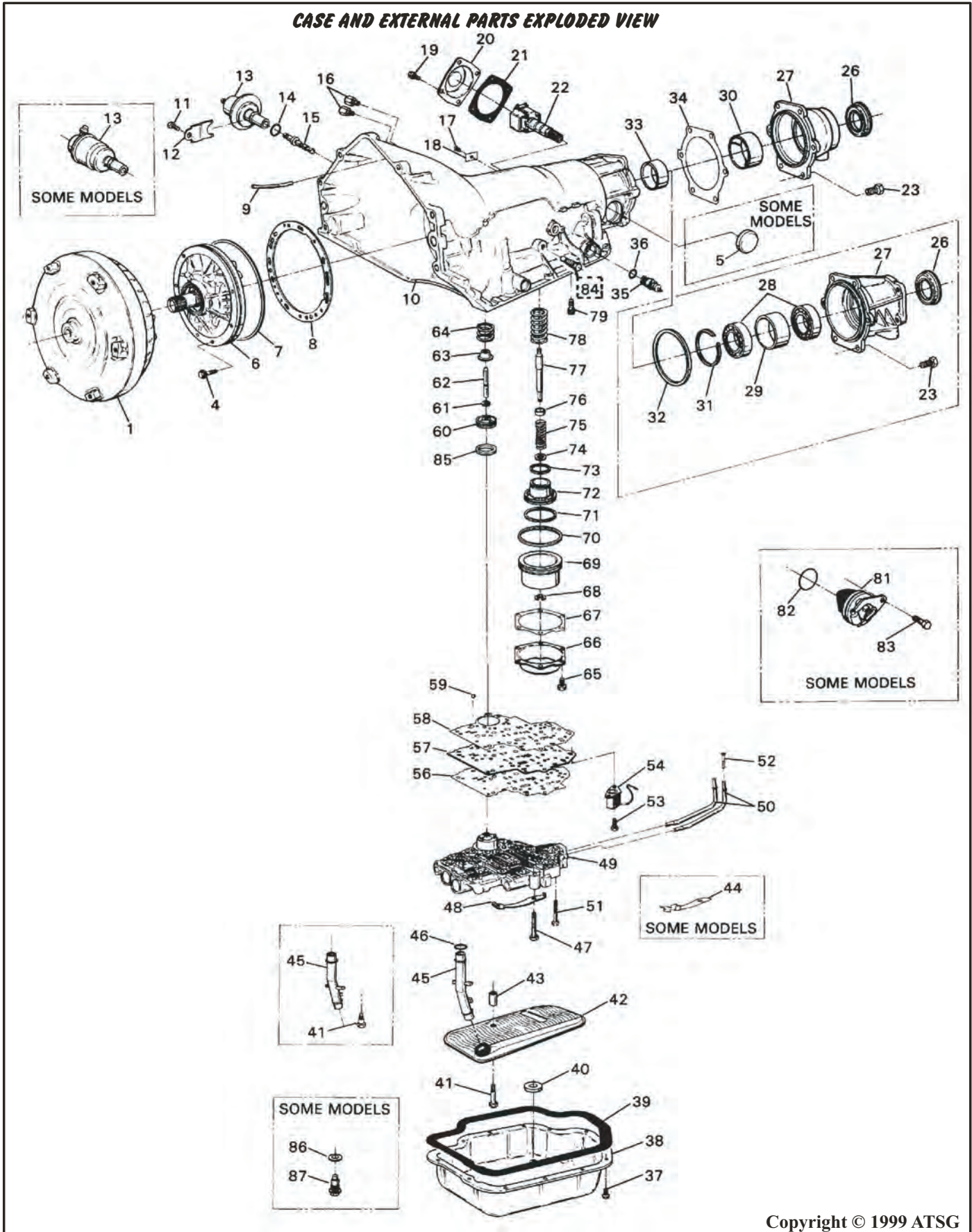


Figure 27



Technical Service Information

LEGEND FOR FIGURE 27

- | | |
|--|--|
| 1. TORQUE CONVERTER ASSEMBLY | 45. FILTER INTAKE PIPE (SHORT, SHALLOW PAN - LONG, DEEP PAN) |
| 4. BOLT AND "O" RING ASSEMBLY (PUMP TO CASE) | 47. MANUAL DETENT SPRING RETAINING BOLT, 5/16-18 X 1.875") |
| 5. SPEEDO HOLE STEEL PLUG (4WD MODELS) | 48. MANUAL DETENT SPRING AND ROLLER ASSEMBLY |
| 6. OIL PUMP ASSEMBLY | 49. VALVE BODY ASSEMBLY |
| 7. OIL PUMP TO CASE SEALING RING | 50. GOVERNOR FEED AND RETURN PIPES |
| 8. PUMP COVER TO CASE GASKET | 51. VALVE TO CASE BODY BOLTS, 1/4-20 X 1.620" |
| 9. VENT PIPE | 52. GOVERNOR SCREEN ASSEMBLY |
| 10. TRANSMISSION CASE ASSEMBLY | 53. DETENT SOLENOID RETAINING BOLTS, 1/4-20 X .750" |
| 11. MODULATOR RETAINING BOLT, 5/16-18 X .620" | 54. DETENT SOLENOID ASSEMBLY |
| 12. MODULATOR RETAINING BRACKET | 56. VALVE BODY TO SPACER PLATE GASKET |
| 13. VACUUM MODULATOR ASSEMBLY | 57. VALVE BODY SPACER PLATE |
| 14. MODULATOR "O" RING SEAL | 58. SPACER PLATE TO CASE GASKET |
| 15. VACUUM MODULATOR VALVE | 59. CHECKBALLS, .250" STEEL (SOME 6 REQ. AND SOME 7 REQ.) |
| 16. COOLER FITTING | 60. FRONT SERVO PISTON |
| 17. IDENTIFICATION TAG SCREW | 61. FRONT SERVO PISTON PIN RING |
| 18. IDENTIFICATION TAG | 62. FRONT SERVO PISTON PIN |
| 19. GOVERNOR COVER RETAINING BOLTS (4 REQUIRED) | 63. FRONT SERVO RETURN SPRING RETAINER |
| 20. GOVERNOR COVER | 64. FRONT SERVO PISTON RETURN SPRING |
| 21. GOVERNOR COVER GASKET | 65. REVERSE SERVO COVER RETAINING BOLTS, 5/16-18 X .620" |
| 22. GOVERNOR ASSEMBLY | 66. REVERSE SERVO COVER |
| 23. EXTENSION HOUSING TO CASE BOLTS, 3/8-16 X 1" | 67. REVERSE SERVO COVER GASKET |
| 26. EXTENSION HOUSING METAL CLAD SEAL | 68. REVERSE SERVO PISTON RETAINING "E" CLIP |
| 27. EXTENSION HOUSING ASSEMBLY | 69. REVERSE SERVO PISTON |
| 28. BALL BEARING ASSEMBLY | 70. REVERSE SERVO PISTON SEAL |
| 29. BALL BEARING SPACER | 71. 1-2 ACCUMULATOR PISTON OUTER SEAL |
| 30. EXTENSION HOUSING BUSHING | 72. 1-2 ACCUMULATOR PISTON |
| 31. INTERNAL SNAP RING | 73. 1-2 ACCUMULATOR PISTON INNER SEAL |
| 32. EXTENSION HOUSING TO CASE SEAL (SOME MODELS) | 74. REVERSE SERVO PISTON WASHER |
| 33. REAR CASE BUSHING | 75. REVERSE SERVO SPRING |
| 34. EXTENSION HOUSING TO CASE GASKET (SOME MODELS) | 76. REVERSE SERVO SPRING RETAINER |
| 35. ELECTRICAL CONNECTOR | 77. REVERSE SERVO PISTON BAND APPLY PIN (SELECTIVE) |
| 36. ELECTRICAL CONNECTOR "O" RING | 78. 1-2 ACCUMULATOR SPRING |
| 37. BOTTOM PAN BOLTS, 5/16-18 X .690" | 79. CENTER SUPPORT TO CASE BOLT (SHORT OR LONG) |
| 38. BOTTOM TRANSMISSION OIL PAN (SHALLOW OR DEEP) | 81. OUTPUT SPEED SENSOR ASSEMBLY (SOME MODELS) |
| 39. BOTTOM PAN TO CASE GASKET | 82. OUTPUT SPEED SENSOR "O" RING |
| 40. BOTTOM PAN MAGNET | 83. SPEED SENSOR RETAINING BOLT |
| 41. SHOULDERED FILTER BOLT, (SHORT OR LONG) | 84. LINE PRESSURE TEST PLUG, 1/8" PIPE |
| 42. BOTTOM PAN FILTER ASSEMBLY | 85. FRONT SERVO PISTON SEAL |
| 43. FILTER SPACER, DEEP PAN ONLY | 86. DRAIN PLUG GASKET (SOME MODELS) |
| 44. MANUAL DETENT SPRING SUPPORT (SOME MODELS) | 87. BOTTOM PAN DRAIN PLUG (SOME MODELS) |

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Figure 28

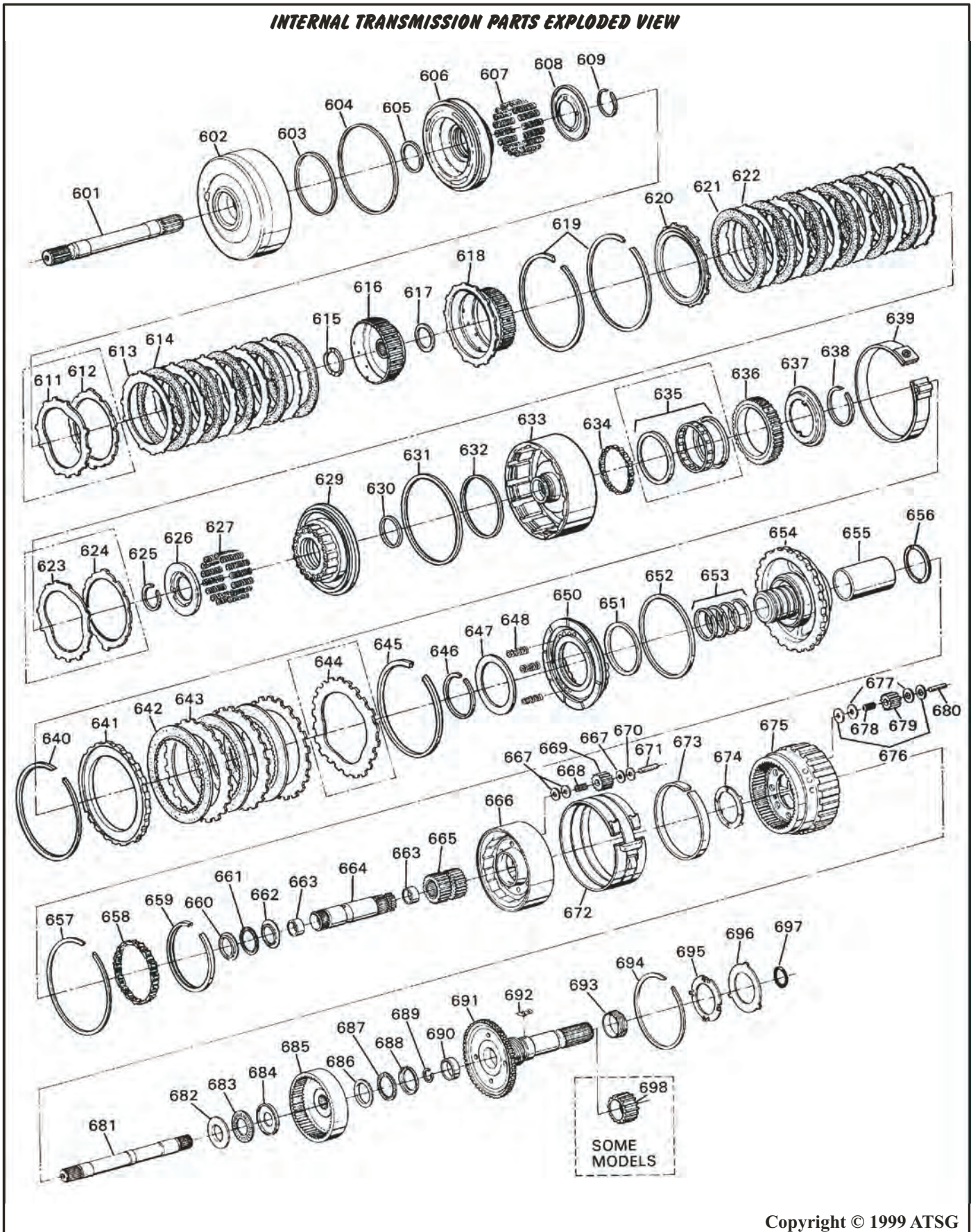


Figure 29



Technical Service Information

LEGEND FOR FIGURE 29

- | | |
|---|--|
| 601. TURBINE SHAFT | 652. INTERMEDIATE CLUTCH PISTON OUTER LIP SEAL |
| 602. FORWARD CLUTCH HOUSING | 653. CENTER SUPPORT SEALING RINGS, 4 REQUIRED |
| 603. FORWARD CLUTCH HOUSING CENTER SEAL | 654. CENTER SUPPORT ASSEMBLY |
| 604. FORWARD CLUTCH PISTON OUTER LIP SEAL | 655. CENTER SUPPORT BUSHING |
| 605. FORWARD CLUTCH PISTON INNER LIP SEAL | 656. CENTER SUPPORT TO REAR DRUM THRUST WASHER |
| 606. FORWARD CLUTCH PISTON | 657. CENTER SUPPORT TO CASE FRETTING RING (SOME MODELS) |
| 607. FORWARD CLUTCH PISTON RETURN SPRINGS | 658. LOW ROLLER CLUTCH ASSEMBLY |
| 608. FORWARD CLUTCH RETURN SPRING RETAINER | 659. REAR REACTION DRUM SPACER (FOR ROLLER CLUTCH ASM) |
| 609. FWD CLUTCH RETURN SPRING RETAINER SNAP RING | 660. CENTER SUPPORT TO NEEDLE BEARING RACE |
| 611. FORWARD CLUTCH WAVE (CUSHION) PLATE (SOME MODELS) | 661. CENTER SUPPORT NEEDLE BEARING ASSEMBLY |
| 612. FORWARD CLUTCH DISHED PLATE (SOME MODELS) | 662. CENTER SUPPORT NEEDLE BEARING TO SUN GEAR RACE |
| 613. FORWARD CLUTCH FLAT STEEL PLATES | 663. SUN GEAR SHAFT BUSHINGS(2 REQUIRED) |
| 614. FORWARD CLUTCH LINED PLATES | 664. SUN GEAR SHAFT ASSEMBLY |
| 615. FORWARD CLUTCH HUB TO HOUSING THRUST WASHER | 665. SUN GEAR |
| 616. FORWARD CLUTCH HUB | 666. REACTION DRUM AND INPUT CARRIER ASSEMBLY |
| 617. THRUST WASHER (FWD CLUTCH HUB TO DIR CLUT HOUSING) | 667. PINION GEAR STEEL THRUST WASHERS |
| 618. DIRECT CLUTCH HUB | 668. PINION GEAR ROLLER NEEDLE BEARINGS |
| 619. SNAP RING (FORWARD AND DIRECT CLUTCHES) | 669. INPUT CARRIER PINION GEARS |
| 620. DIRECT CLUTCH BACKING PLATE | 670. PINION GEAR BRONZE THRUST WASHER |
| 621. DIRECT CLUTCH LINED PLATES | 671. PINION GEAR PINS |
| 622. DIRECT CLUTCH STEEL PLATES | 672. REVERSE BAND ASSEMBLY |
| 623. DIRECT CLUTCH WAVED PLATE (SOME MODELS) | 673. FRONT INTERNAL RING GEAR SILENCING RING |
| 624. DIRECT CLUTCH DISHED PLATE (SOME MODELS) | 674. INTERNAL RING GEAR TO RING GEAR THRUST WASHER |
| 625. DIRECT CLUTCH RETURN SPRING RETAINER SNAP RING | 675. OUTPUT CARRIER ASSEMBLY |
| 626. DIRECT CLUTCH RETURN SPRING RETAINER | 676. PINION GEAR BRONZE THRUST WASHER |
| 627. DIRECT CLUTCH PISTON RETURN SPRINGS | 677. PINION GEAR STEEL THRUST WASHER |
| 629. DIRECT CLUTCH PISTON ASSEMBLY | 678. PINION GEAR ROLLER NEEDLE BEARINGS |
| 630. DIRECT CLUTCH PISTON INNER LIP SEAL | 679. OUTPUT CARRIER PINION GEARS |
| 631. DIRECT CLUTCH PISTON OUTER LIP SEAL | 680. PLANETARY PINION GEAR PINS |
| 632. DIRECT CLUTCH HOUSING CENTER LIP SEAL | 681. TRANSMISSION MAIN SHAFT TO RING GEAR |
| 633. DIRECT CLUTCH HOUSING ASSEMBLY | 682. SUN GEAR TO NEEDLE BEARING RACE |
| 634. INTERMEDIATE ROLLER CLUTCH ASSEMBLY (SOME MODELS) | 683. SUN GEAR NEEDLE BEARING ASSEMBLY |
| 635. INTERMEDIATE SPRAG CLUTCH ASSEMBLY (SOME MODELS) | 684. NEEDLE BEARING TO REAR RING GEAR RACE |
| 636. INTERMEDIATE ROLLER OR SPRAG OUTER RACE | 685. REAR INTERNAL RING GEAR |
| 637. INTERMEDIATE ROLLER OR SPRAG RETAINER | 686. REAR RING GEAR TO NEEDLE BEARING RACE |
| 638. INTERMEDIATE ROLLER OR SPRAG RETAINER SNAP RING | 687. REAR RING GEAR NEEDLE BEARING ASSEMBLY |
| 639. FRONT BAND ASSEMBLY | 688. NEEDLE BEARING TO OUTPUT SHAFT RACE |
| 640. INTERMEDIATE CLUTCH BACKING PLATE "FLAT" SNAP RING | 689. MAIN SHAFT/REAR RING GEAR SNARING |
| 641. INTERMEDIATE CLUTCH BACKING PLATE | 690. OUTPUT SHAFT BUSHING |
| 642. INTERMEDIATE CLUTCH LINED PLATES | 691. OUTPUT SHAFT (MODEL SENSITIVE, SEE FIGURE 26) |
| 643. INTERMEDIATE CLUTCH STEEL PLATES | 692. SPEEDOMETER DRIVE GEAR RETAINING CLIP |
| 644. INTERMEDIATE CLUTCH WAVED PLATE (SOME MODELS) | 693. SPEEDOMETER DRIVE GEAR (MODEL SENSITIVE) |
| 645. CENTER SUPPORT TO CASE "TAPERED" SNAP RING | 694. OUTPUT SHAFT/OUTPUT CARRIER SNAP RING |
| 646. INTERMEDIATE CLUTCH RETURN SPRING RETAINER SNAP RING | 695. OUTPUT SHAFT TO CASE BRONZE THRUST WASHER |
| 647. INTERMEDIATE CLUTCH RETURN SPRING RETAINER | 696. OUTPUT SHAFT TO CASE STEEL THRUST WASHER(SELECTIVE) |
| 648. INTERMEDIATE CLUTCH RETURN SPRINGS | 697. OUTPUT SHAFT "O" RING SEAL(SOME MODELS) |
| 650. INTERMEDIATE CLUTCH PISTON | 698. OUTPUT SHAFT SPEED SENSOR ROTOR(SOME MODELS) |
| 651. INTERMEDIATE CLUTCH PISTON INNER LIP SEAL | |

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Figure 30

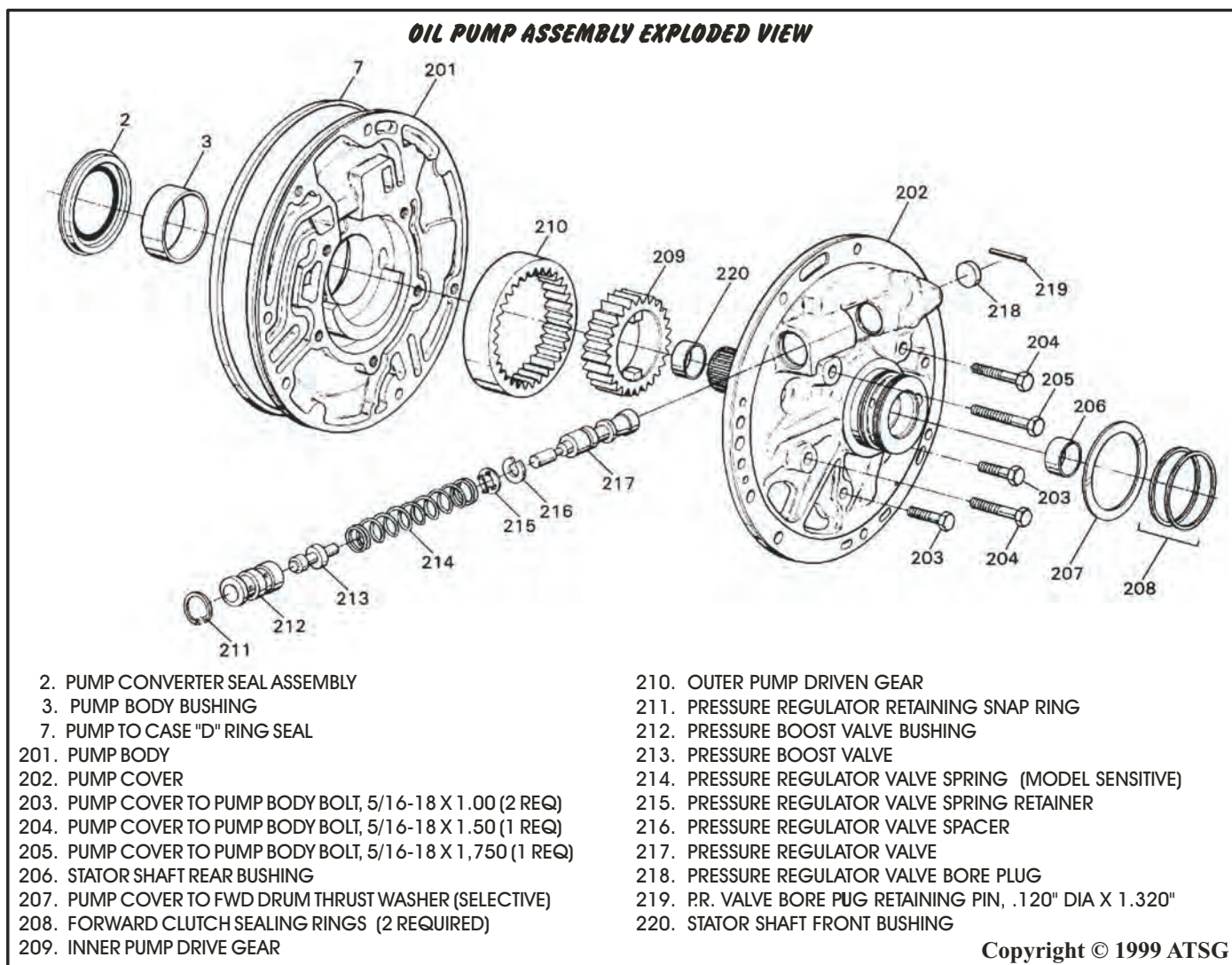


Figure 31

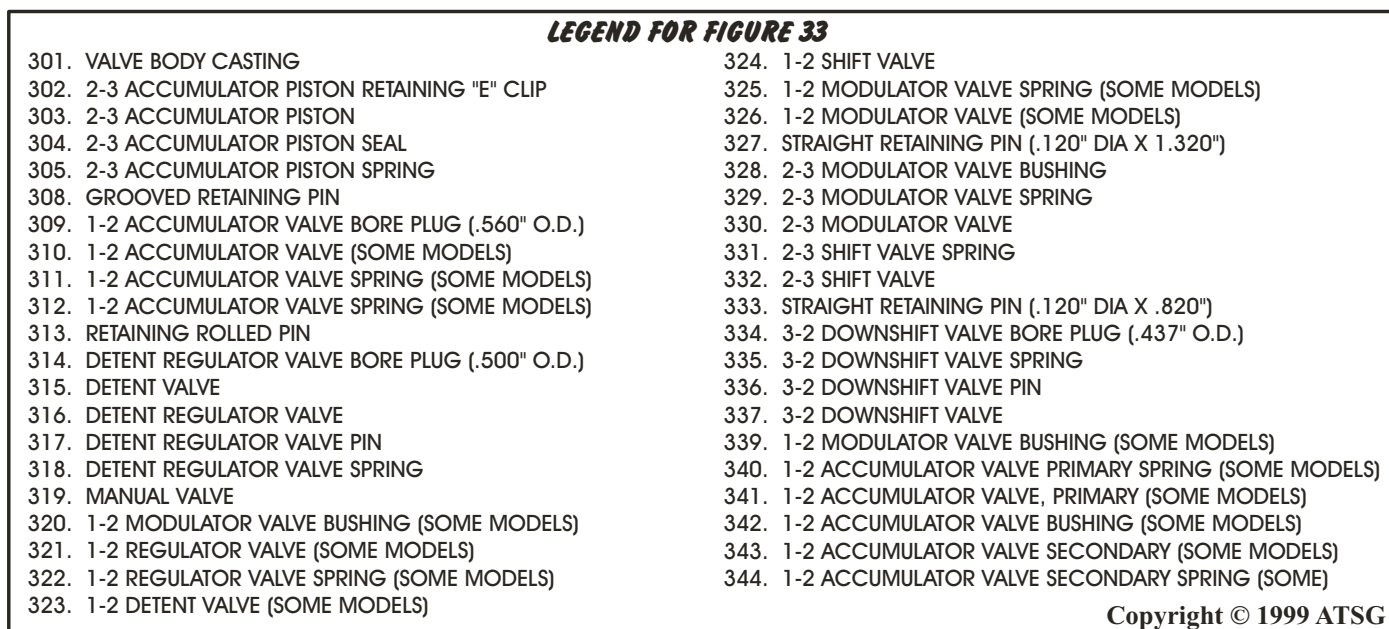
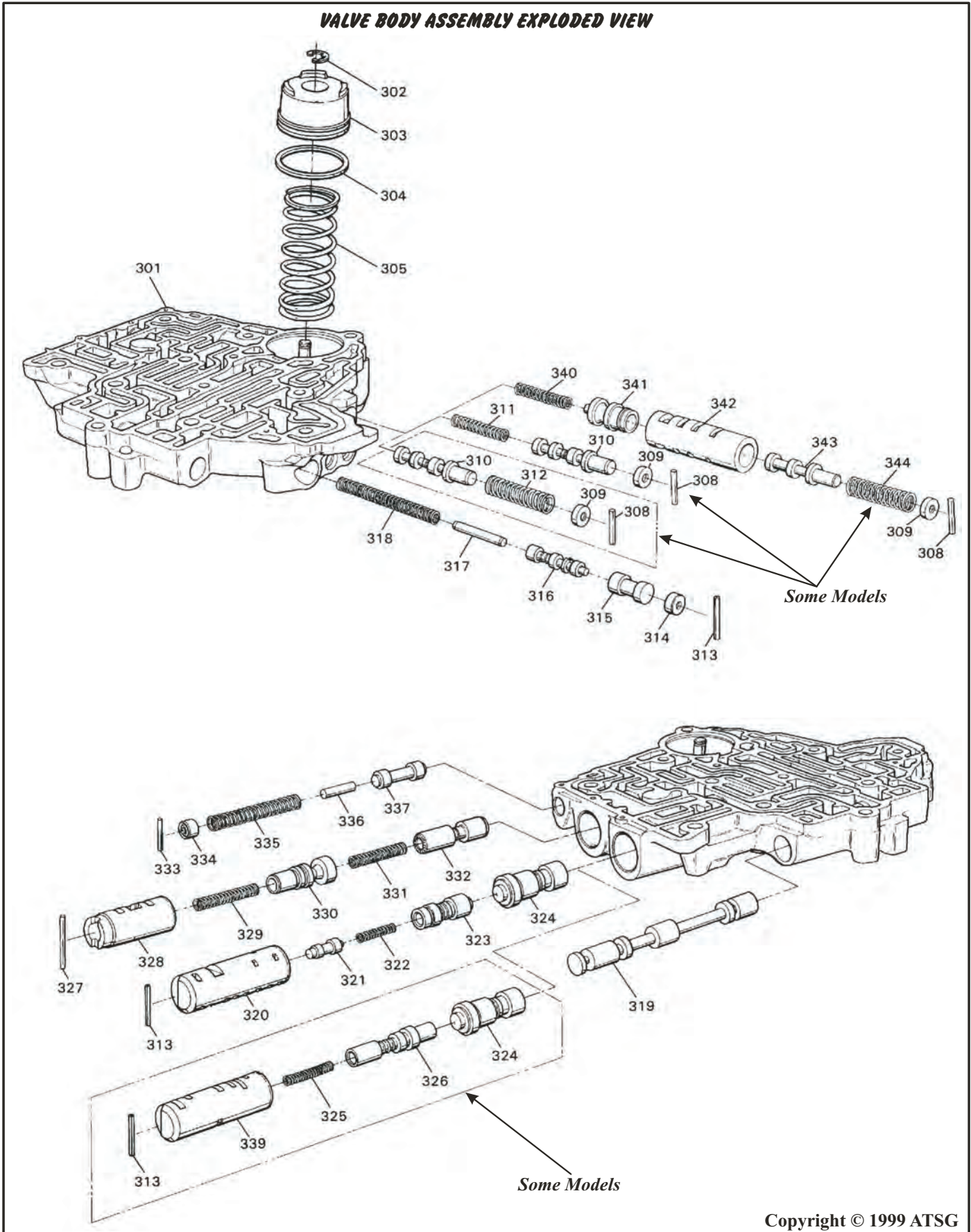


Figure 32



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Figure 33

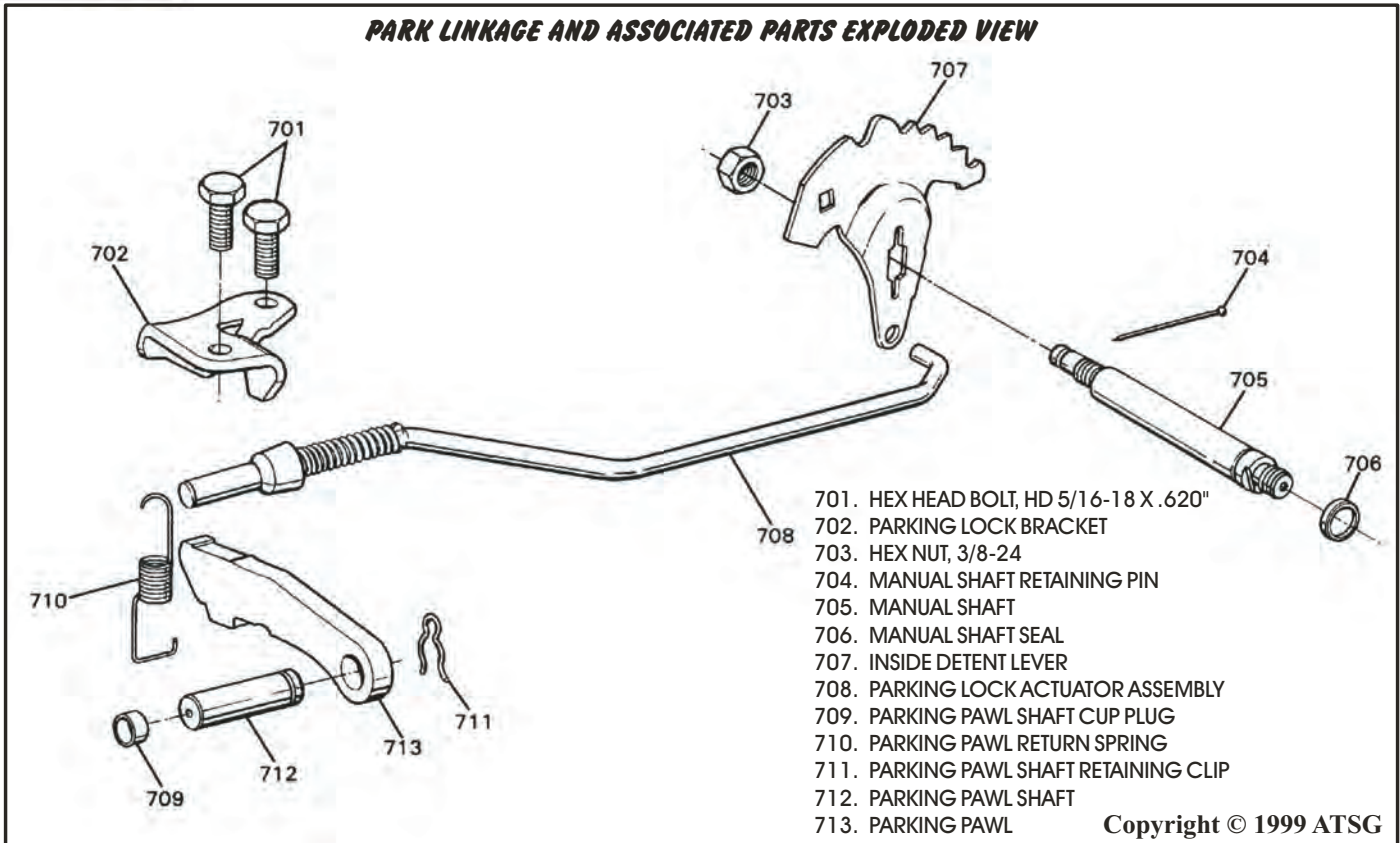


Figure 34

TRANSMISSION DISASSEMBLY

EXTERNAL PARTS

1. Remove the torque converter.
2. For safety considerations, install transmission holding fixture as shown in Figure 35.
3. Remove modulator bracket retaining bolt and modulator bracket as shown in Figure 36.
4. Remove the vacuum modulator and modulator valve from case, as shown in Figure 36.

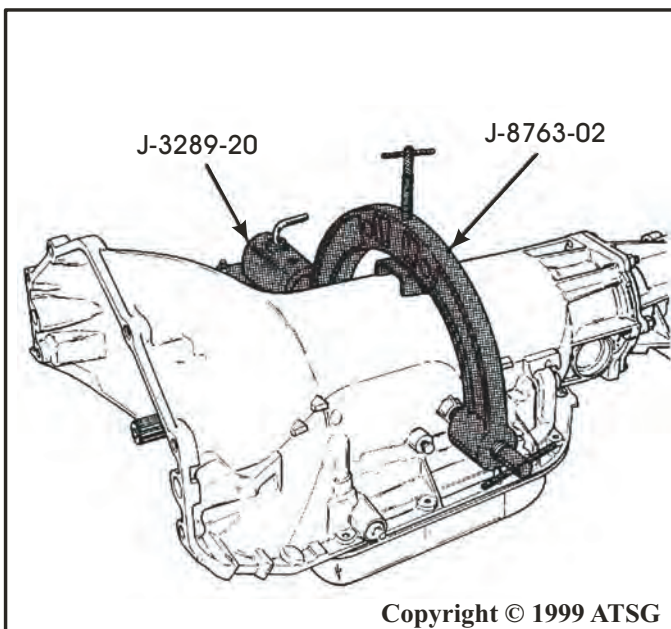


Figure 35

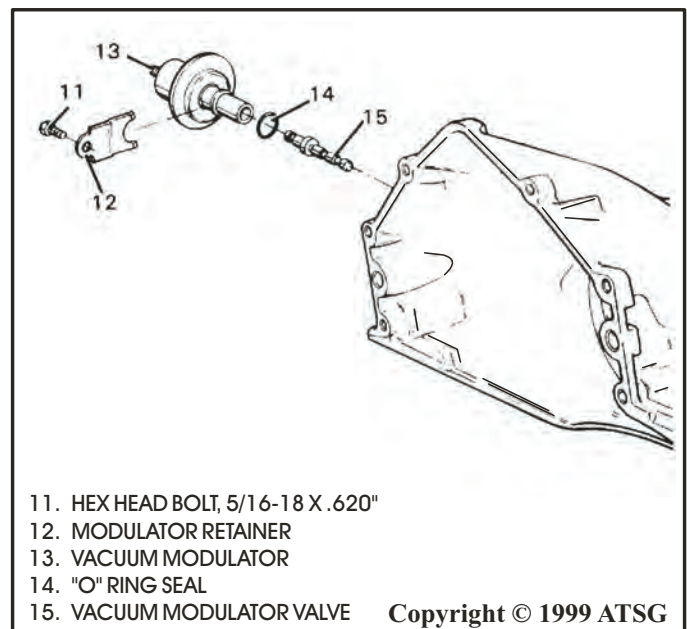
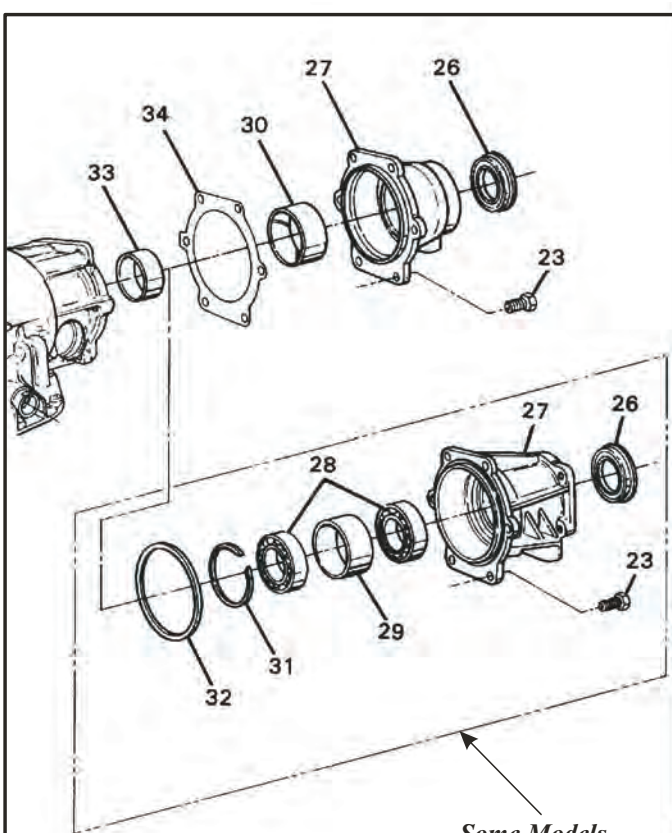


Figure 36

5. Remove the six extension housing bolts and remove the extension housing (See Figure 37).
6. Remove and discard the extension housing seal or gasket (See Figure 37).
7. Remove the four governor cover retaining bolts and remove governor assembly with a twisting motion (See Figure 38).
8. Remove the speedometer adapter or the output speed sensor, whichever it is equipped with, as shown in Figure 38.
9. Attach J-6125-B to one of the bolt holes at the rear of the case as shown in Figure 39.
10. Install dial indicator on the shaft and index it to the end of the output shaft and zero the dial indicator, as shown in Figure 39.
11. Move the output shaft in and out and record the amount of rear end play (See Figure 39).

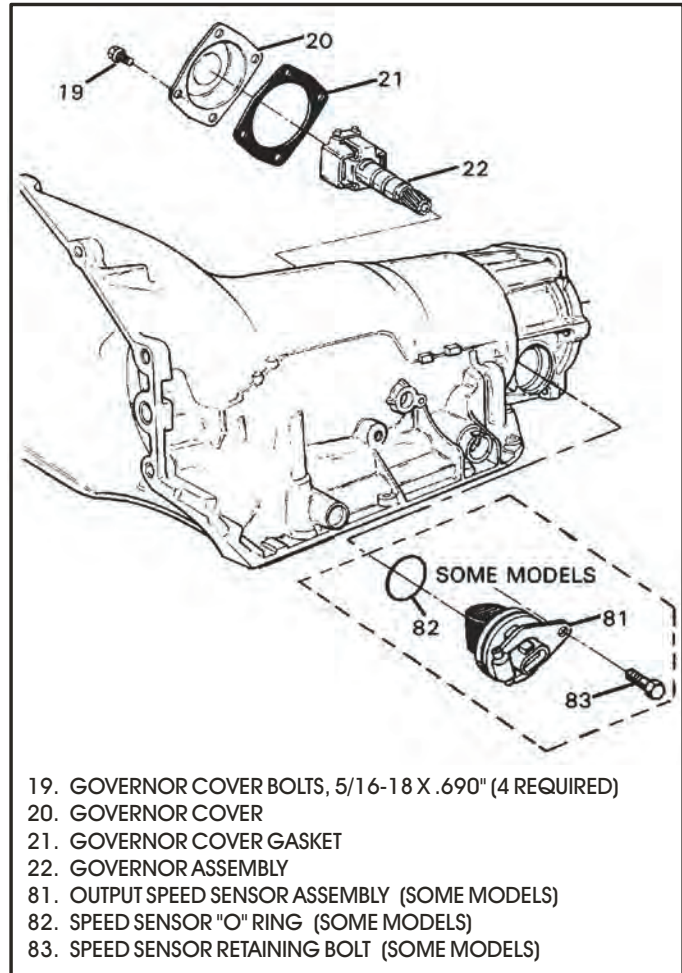
12. Rear end-play should be .178mm-.483mm (.007"-.019") if correct.

Continued on next Page.



- 23. EXTENSION HOUSING BOLTS, 3/8-16 X 1" (6 REQUIRED)
- 26. EXTENSION HOUSING METAL CLAD SEAL
- 27. EXTENSION HOUSING ASSEMBLY (MODEL SENSITIVE)
- 28. BALL BEARING ASSEMBLY (SOME MODELS)
- 29. BALL BEARING SPACER (SOME MODELS)
- 30. EXTENSION HOUSING BUSHING
- 31. INTERNAL SNAP RING (SOME MODELS)
- 32. EXTENSION HOUSING TO CASE SEAL (SOME MODELS)
- 33. TRANSMISSION REAR CASE BUSHING
- 34. EXTENSION HOUSING TO CASE GASKET (SOME MODELS)

Figure 37



- 19. GOVERNOR COVER BOLTS, 5/16-18 X .690" (4 REQUIRED)
- 20. GOVERNOR COVER
- 21. GOVERNOR COVER GASKET
- 22. GOVERNOR ASSEMBLY
- 81. OUTPUT SPEED SENSOR ASSEMBLY (SOME MODELS)
- 82. SPEED SENSOR "O" RING (SOME MODELS)
- 83. SPEED SENSOR RETAINING BOLT (SOME MODELS)

Figure 38

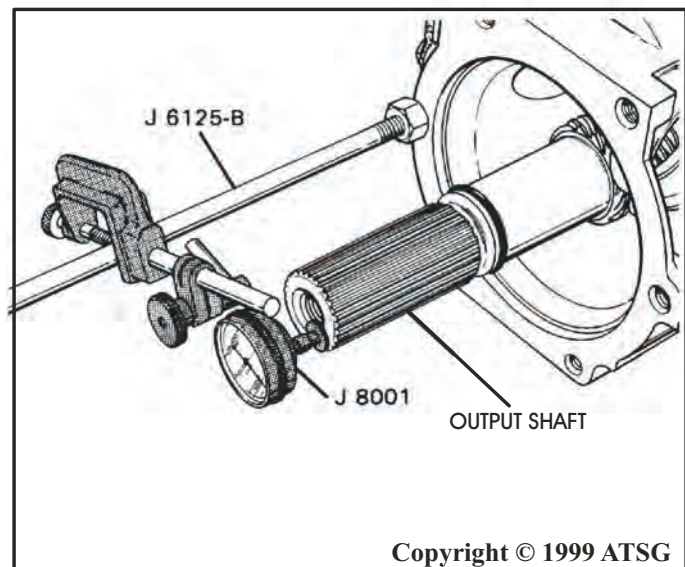


Figure 39

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Continued from Page 35

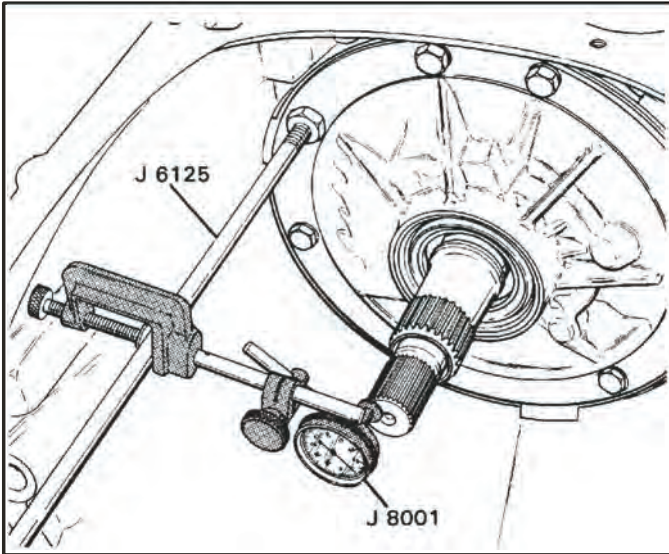
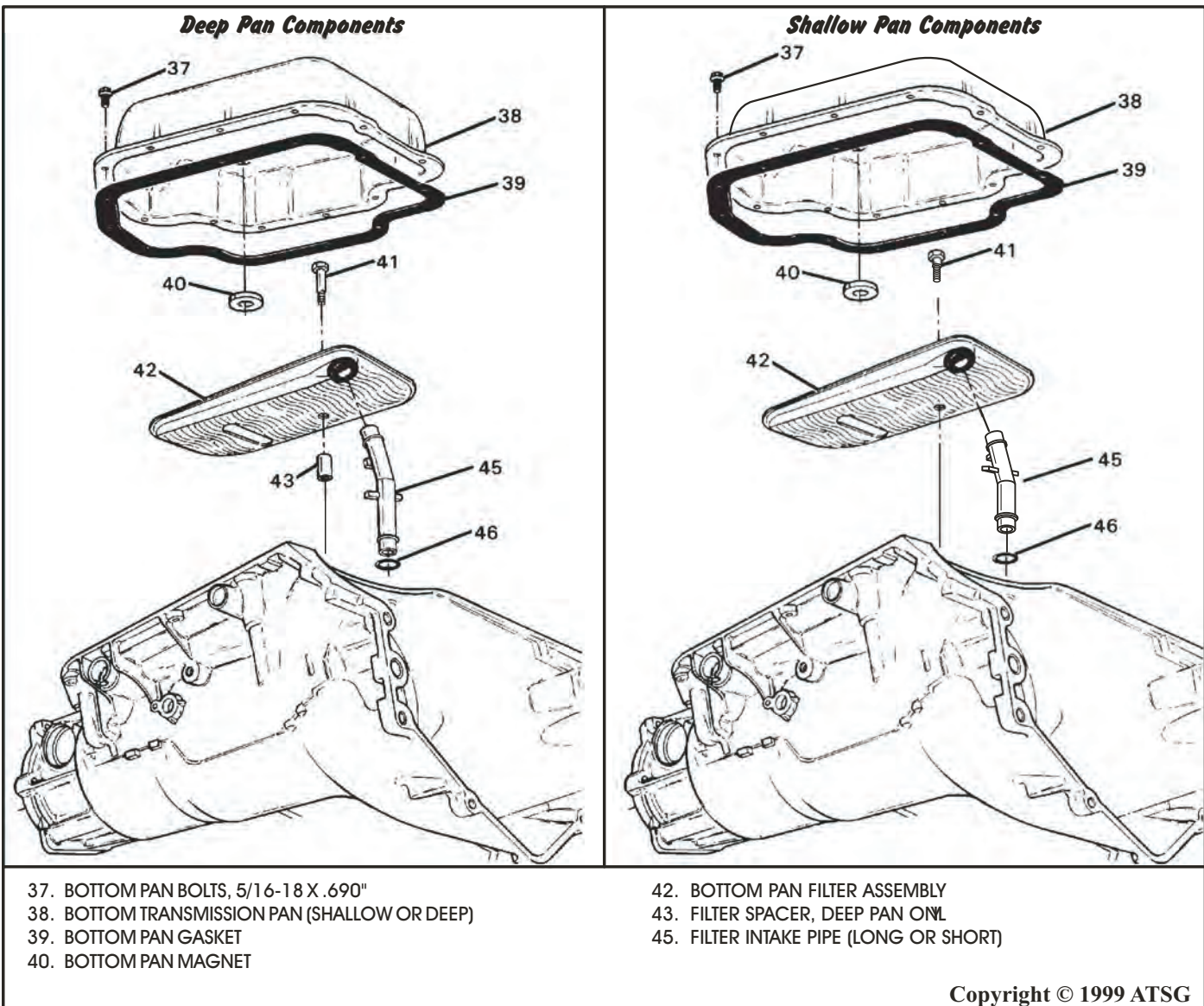


Figure 40

12. Rotate transmission and holding fixture so that the bottom pan is facing up (See Figure 41).
13. Remove one oil pump retaining bolt and install J-6125-1 in bolt hole as shown in Figure 40.
14. Install dial indicator on bolt and index indicator to flat surface on the end of turbine shaft as shown in Figure 40.
15. Hold output shaft forward while pushing the turbine shaft rearward to its stop.
16. Zero the dial indicator.
17. Pull the turbine shaft forward and record the indicated end-play. Front end clearance should be .007"-.024".
18. Remove the dial indicator and bolt.



- 37. BOTTOM PAN BOLTS, 5/16-18 X .690"
- 38. BOTTOM TRANSMISSION PAN (SHALLOW OR DEEP)
- 39. BOTTOM PAN GASKET
- 40. BOTTOM PAN MAGNET

- 42. BOTTOM PAN FILTER ASSEMBLY
- 43. FILTER SPACER, DEEP PAN ONL
- 45. FILTER INTAKE PIPE (LONG OR SHORT)

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Figure 41

19. Remove the bottom pan bolts and bottom pan, as shown in Figure 41.
20. Remove and discard the bottom pan gasket.

Note: There are two different styles of the bottom pan, shallow and deep pans, as shown in Figure 41. This affects filter components required for this unit. Refer to Figure 41.
21. Remove the filter retaining bolt, remove and discard the filter, and remove the filter bolt spacer if it is the deep pan model, as shown in Figure 41.
22. Remove the intake pipe from the case as shown in Figure 41. Remove and discard the intake pipe "O" ring.
23. Remove the retaining bolt and the detent roller and spring assembly (See Figure 42).
24. Remove the 10 remaining valve body bolts but leave the detent solenoid bolts in place.
25. Remove the valve body and the governor pipes as an assembly (See Figure 42).
26. Remove and discard the valve body to spacer plate gasket (See Figure 42).
27. Remove the two detent solenoid retaining bolts and the detent solenoid, as shown in Figure 42.
28. Remove the spacer plate and spacer plate to case gasket, as shown in Figure 42.
29. Remove the governor screen from the case or from the end of the governor feed pipe.
30. Remove the governor pipes from back of the valve body. Governor pipes are interchangeable and need not be identified (See Figure 42).
31. Remove the six or seven check balls from the pockets in the case depending on your model.
32. Set the valve body aside for component rebuild.

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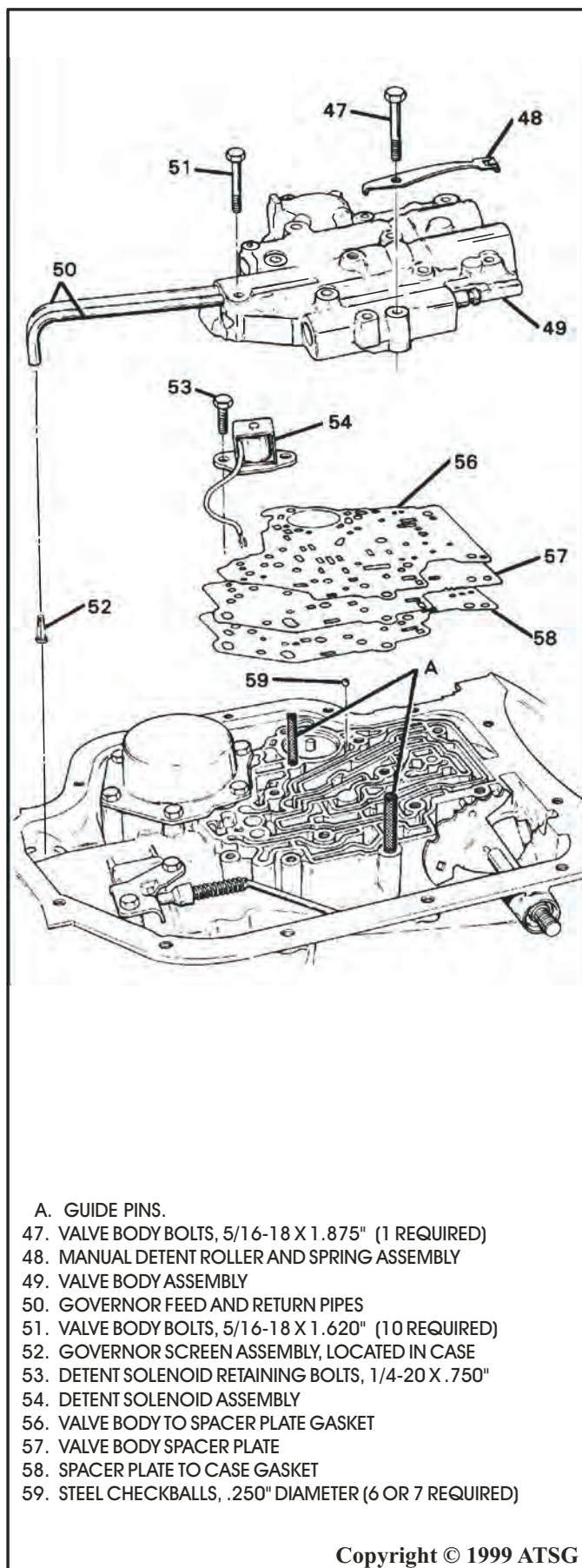
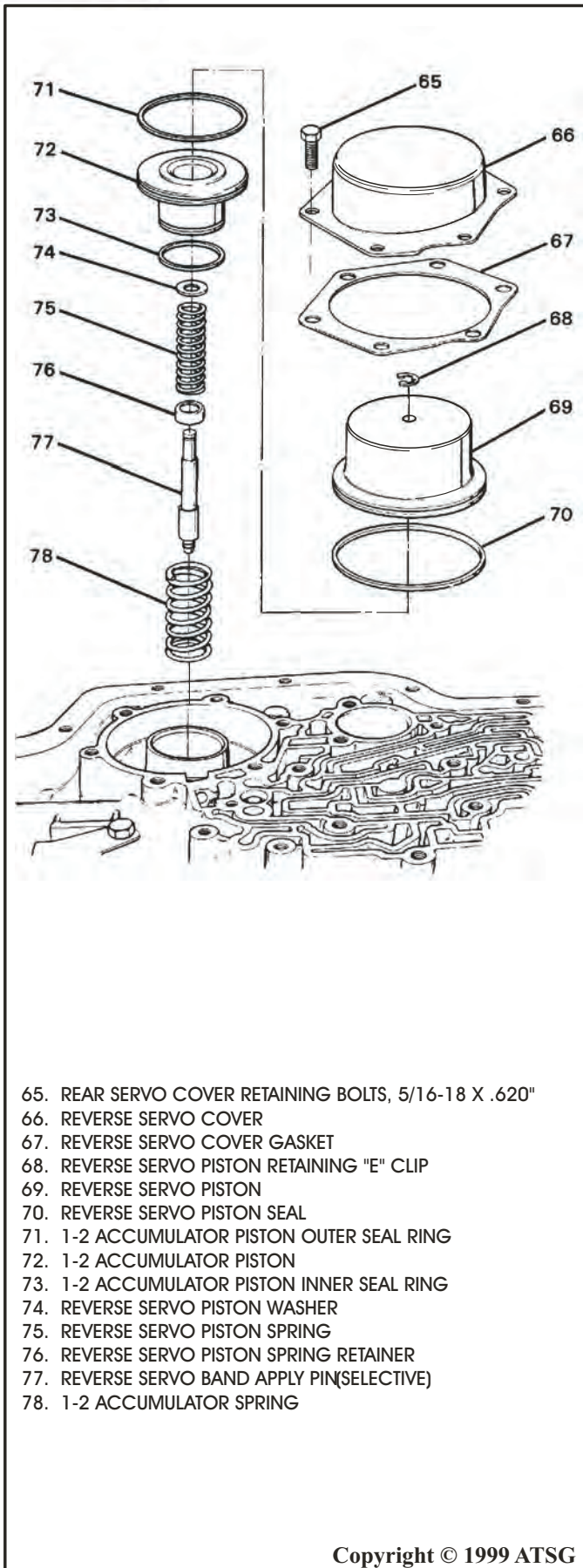


Figure 42

Continued from Page 37

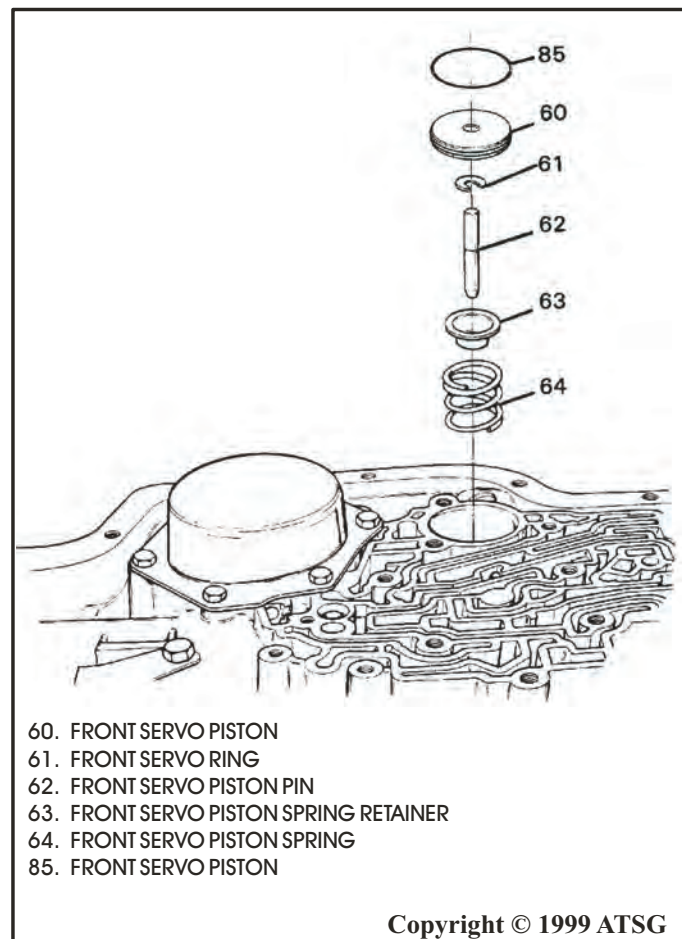


- 65. REAR SERVO COVER RETAINING BOLTS, 5/16-18 X .620"
- 66. REVERSE SERVO COVER
- 67. REVERSE SERVO COVER GASKET
- 68. REVERSE SERVO PISTON RETAINING "E" CLIP
- 69. REVERSE SERVO PISTON
- 70. REVERSE SERVO PISTON SEAL
- 71. 1-2 ACCUMULATOR PISTON OUTER SEAL RING
- 72. 1-2 ACCUMULATOR PISTON
- 73. 1-2 ACCUMULATOR PISTON INNER SEAL RING
- 74. REVERSE SERVO PISTON WASHER
- 75. REVERSE SERVO PISTON SPRING
- 76. REVERSE SERVO PISTON SPRING RETAINER
- 77. REVERSE SERVO BAND APPLY PIN(SELECTIVE)
- 78. 1-2 ACCUMULATOR SPRING

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Figure 43

- 33. Remove the front servo components from the case as shown in Figure 44.
- 34. Remove the six retaining bolts for the reverse servo cover (See Figure 43).
- 35. Remove the reverse servo cover, remove and discard the reverse servo cover gasket as shown in Figure 43.
- 36. Remove the reverse servo piston assembly and remove and discard servo piston seal, as shown in Figure 43.
- 37. Remove the 1-2 accumulator piston from the inside of the reverse servo piston, as shown in Figure 43.
- 38. Remove the 1-2 accumulator spring from the transmission case bore (See Figure 43).
- 39. Rotate the transmission so that the oil pump is facing up, as shown in Figure 45.
- 40. Remove the oil pump retaining bolts as shown in Figure 45.
- 41. Install pump remover J-24773-A, as shown in 46, or use slide hammers to remove pump.



- 60. FRONT SERVO PISTON
- 61. FRONT SERVO RING
- 62. FRONT SERVO PISTON PIN
- 63. FRONT SERVO PISTON SPRING RETAINER
- 64. FRONT SERVO PISTON SPRING
- 85. FRONT SERVO PISTON

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Figure 44

42. Remove the oil pump assembly from the case as shown in Figure 45.
43. Remove and discard the oil pump cover to case gasket, as shown in Figure 45.
44. Remove and discard the oil pump to case "D" ring seal (See Figure 45).
45. Remove the oil pump to forward drum thrust washer which is selective (See Figure 45).
46. Set the complete oil pump assembly aside for component rebuild later.
47. Remove the forward clutch drum complete by lifting straight up on the turbine shaft as shown in Figure 47.
48. Set the complete forward clutch drum aside for component rebuild later.

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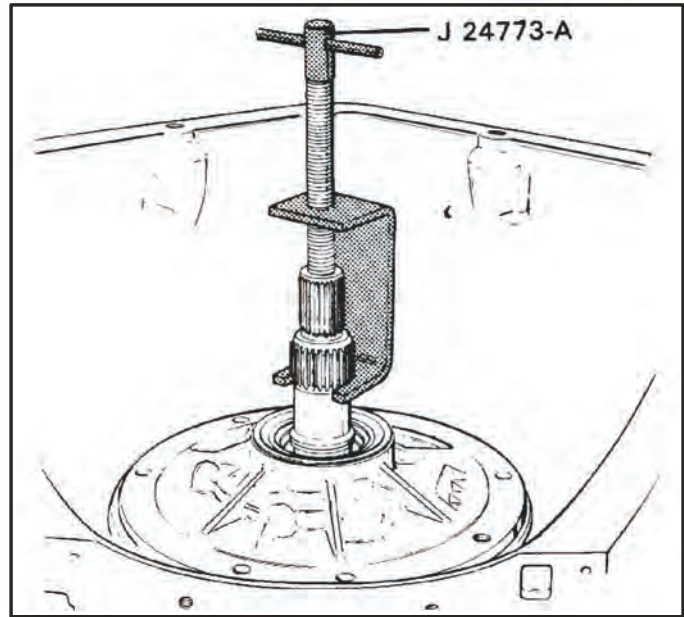


Figure 46

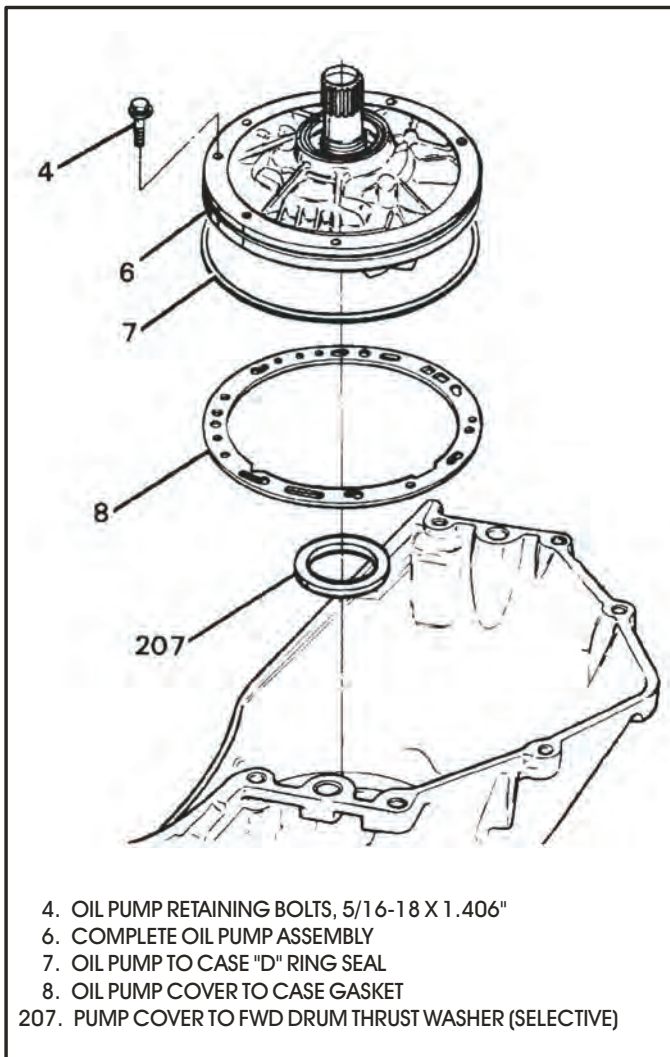


Figure 45

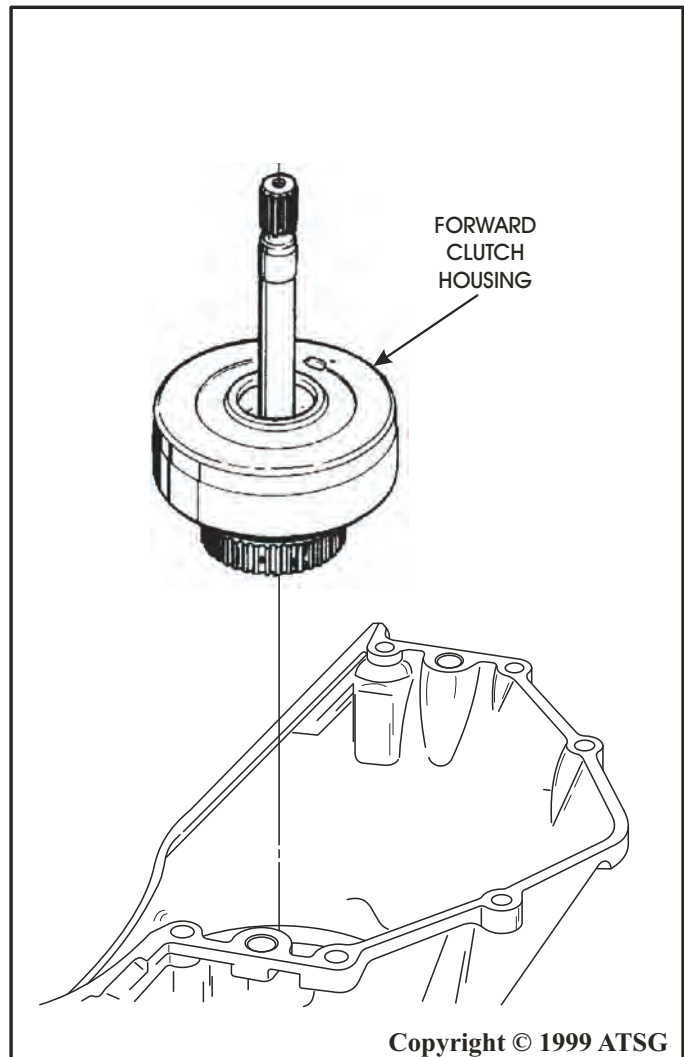


Figure 47

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Continued from Page 39

49. Remove the direct clutch housing by lifting straight up, as shown in Figure 48.
50. Set the complete direct clutch housing aside for component rebuild later.
51. Remove the manual 2 band from the band lug and remove from case (See Figure 48).
52. Remove the intermediate clutch backing plate snap ring from the groove in case using large screwdriver (See Figure 49).
53. Remove the intermediate clutch backing plate from the case (See Figure 49).
54. Remove the intermediate clutch plates both lined and steel (See Figure 49).
55. Remove the intermediate clutch waved plate, if it is present. The waved plate is used only on some models (See Figure 49).
56. Remove the center support feed and retaining bolt using a 12 point socket (See Figure 50).
57. Install lifting tool J-21795-02 onto the gear train, and lift the entire gear train out of the transmission case, as shown in Figure 52.

58. Set the entire gear train into holding fixture J-6116-01 using adapter J-21364-A, as shown in Figure 51, for disassembly of gear train.
59. Remove the lifting tool from gear train.

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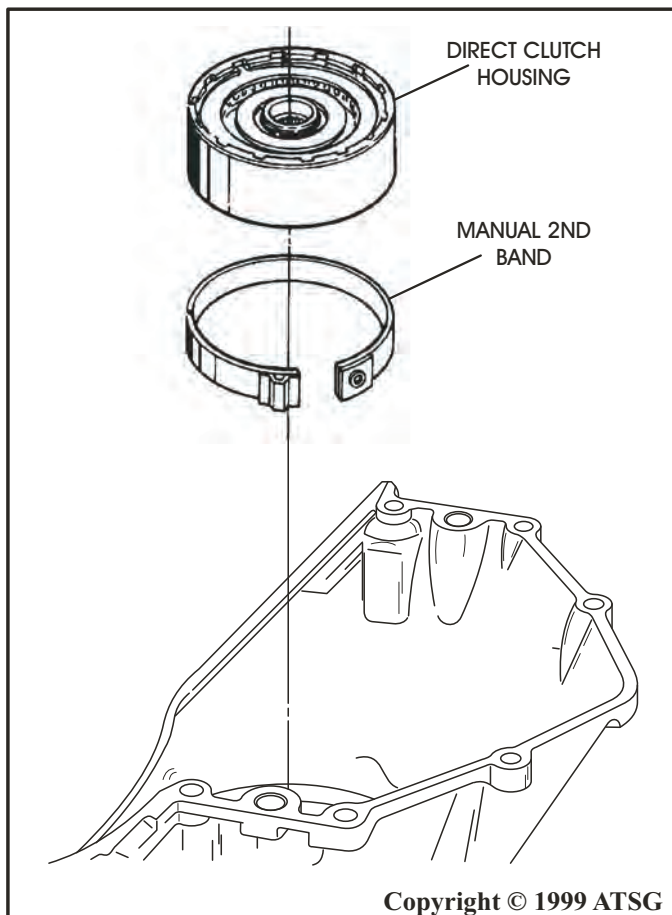


Figure 48

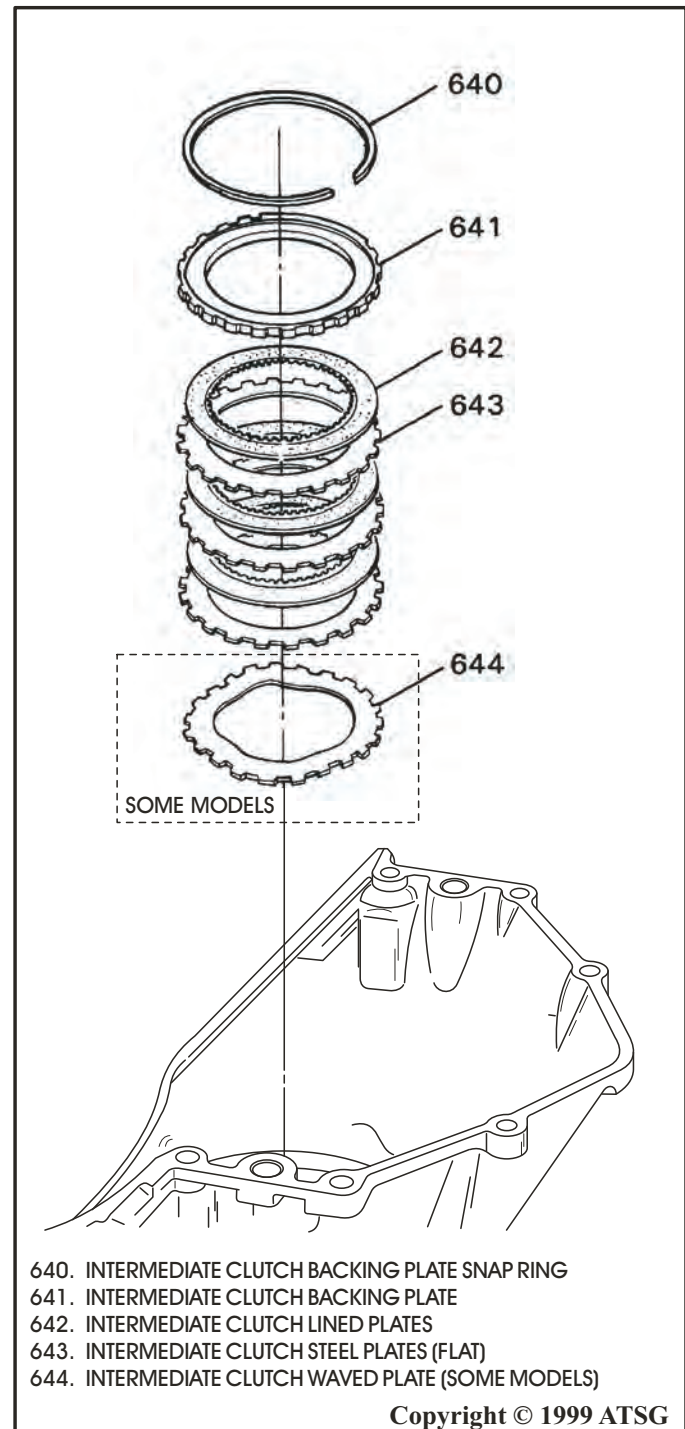


Figure 49

- 640. INTERMEDIATE CLUTCH BACKING PLATE SNAP RING
- 641. INTERMEDIATE CLUTCH BACKING PLATE
- 642. INTERMEDIATE CLUTCH LINED PLATES
- 643. INTERMEDIATE CLUTCH STEEL PLATES (FLAT)
- 644. INTERMEDIATE CLUTCH WAVED PLATE (SOME MODELS)

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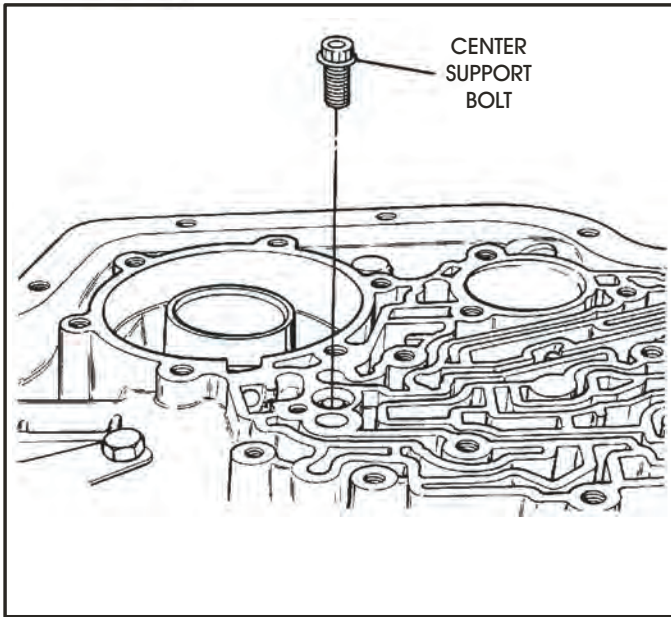


Figure 50

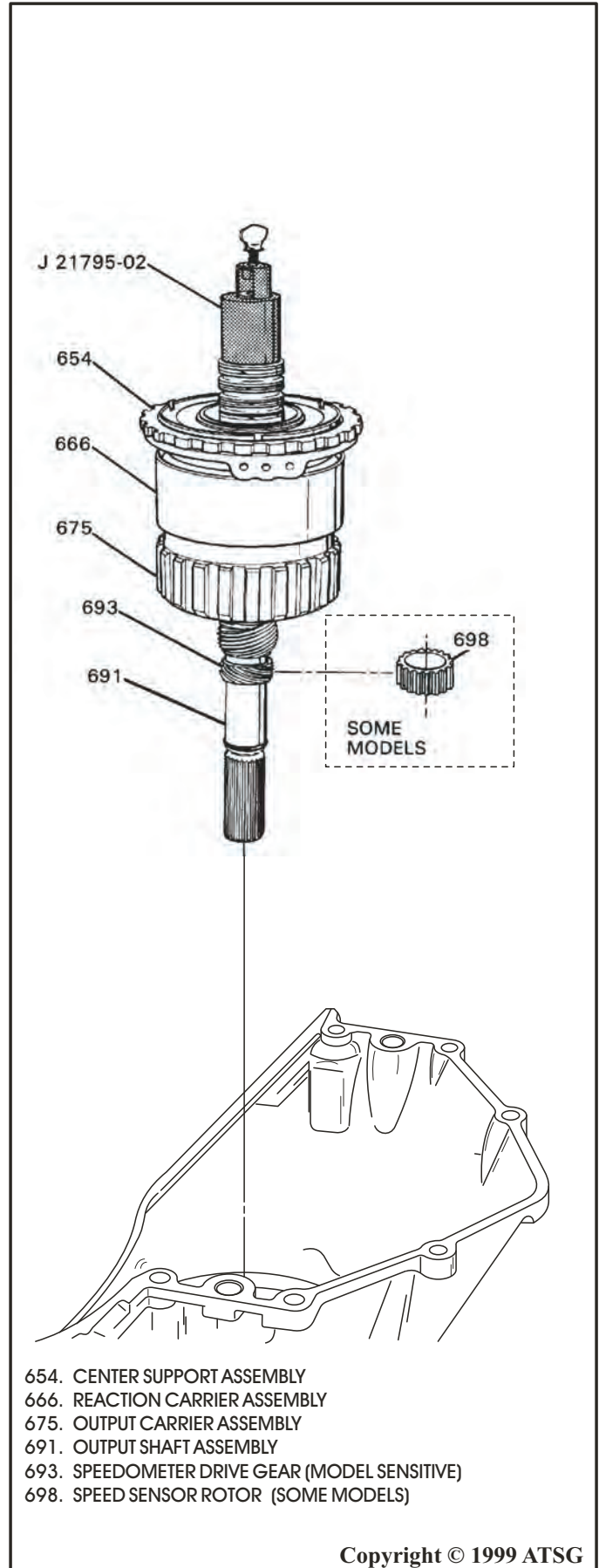


Figure 52

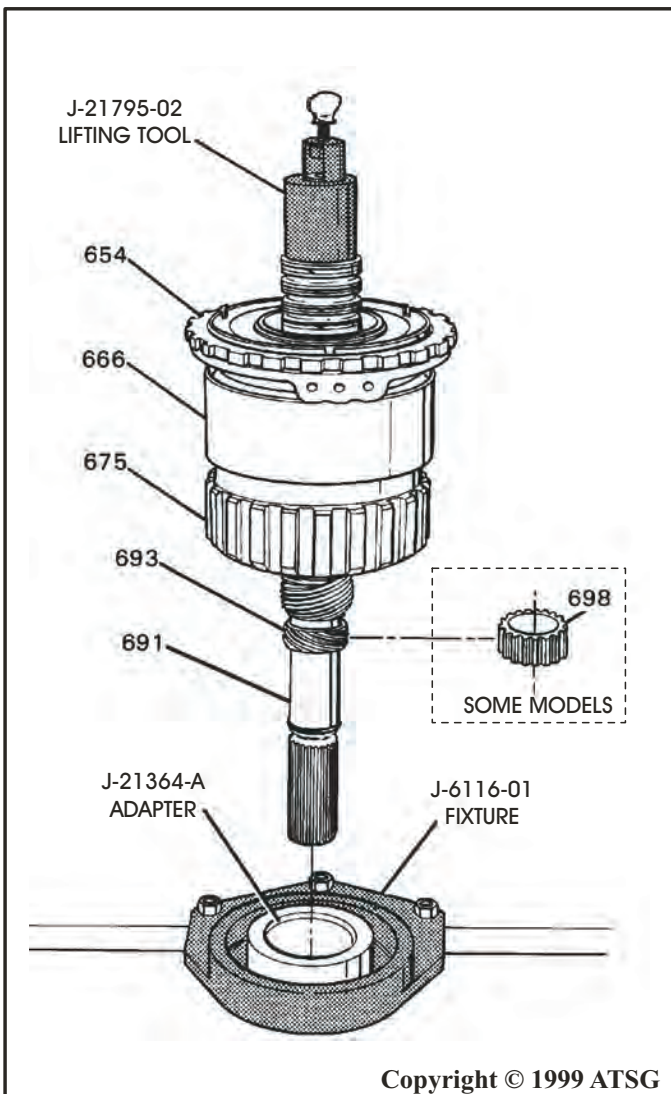


Figure 51

- 654. CENTER SUPPORT ASSEMBLY
- 666. REACTION CARRIER ASSEMBLY
- 675. OUTPUT CARRIER ASSEMBLY
- 691. OUTPUT SHAFT ASSEMBLY
- 693. SPEEDOMETER DRIVE GEAR (MODEL SENSITIVE)
- 698. SPEED SENSOR ROTOR (SOME MODELS)

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Continued from Page 40

60. Remove the reverse band assembly from the transmission case, as shown in Figure 53.
61. Remove the bronze output shaft thrust washer from the case, if it is not stuck on the output shaft (See Figure 53).
62. Remove the steel *selective* thrust washer from the back of case, as shown in Figure 53.

End Transmission Disassembly

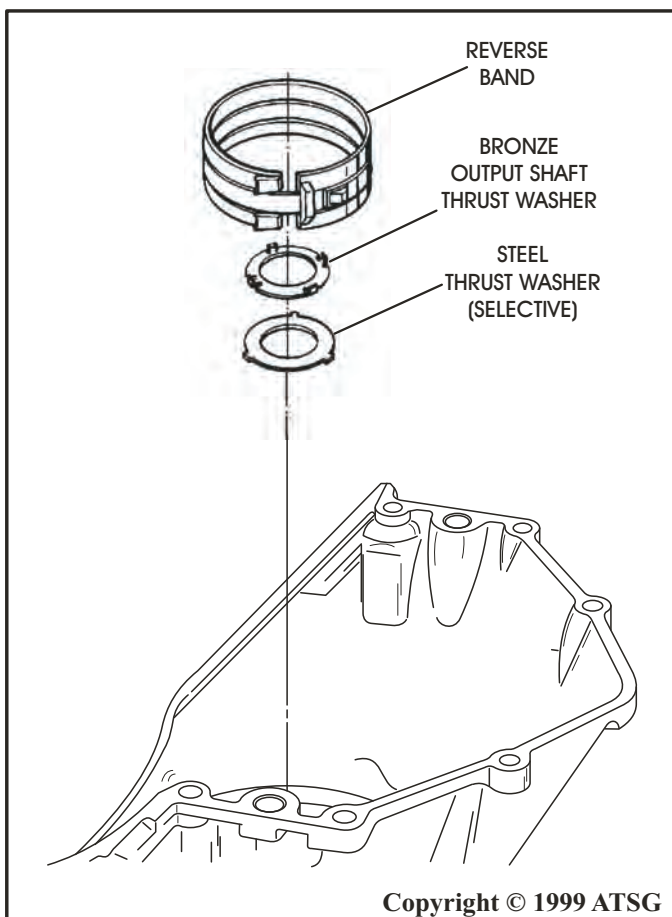


Figure 53

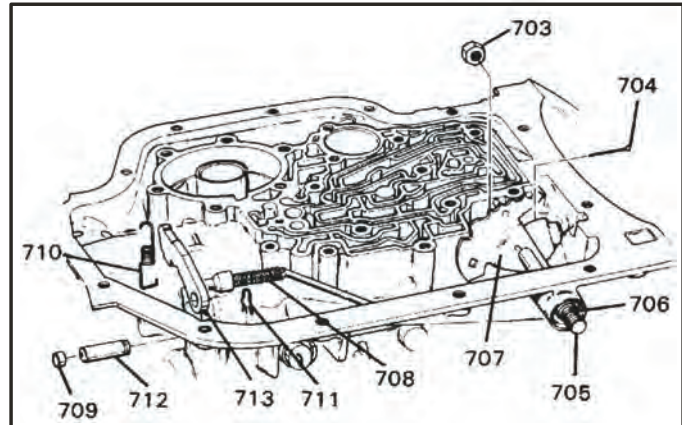
COMPONENT REBUILD

TRANSMISSION CASE

1. Clean all parts and components thoroughly and dry with compressed air.
2. The assembly of some components will require the use of an assembly lube. It is recommended that TransJelÖbe used during assembly.
Note: "Do Not" use any type of grease to retain parts during assembly of this unit. Grease other than the recommended assembly lube may create undesirable shift concerns and/or filter clogging.
3. Inspect the transmission case for the following:
 - Case for cracks, porosity or worm track damage. Scored bushing.
 - All threaded holes for damage.
 - Air check all fluid passages.
 - Front and rear servo bores for porosity, burrs or any damage.
 - Cooler line fittings for damage and proper torque, 38 Nm (28 ft. lb.).
 - Intermediate clutch plate lugs for damage.
 - Snap ring grooves for damage.
 - Governor and modulator bores for damage.
 - Case center support area for damage or wear.
4. It is not necessary to remove the park linkage from the transmission case, but is necessary to inspect all related parts closely. However if the parts have been removed use the following procedure for installation.
5. Install the parking pawl into case, and while holding in proper position, install parking pawl pin through case bore through hole in parking pawl (See Figures 54 and 55).
6. Install parking pawl shaft cup plug into case bore using pin punch (See Figures 54 and 55).
7. Install the retaining clip into the groove in the parking pawl shaft (See Figures 54 and 55).
8. Install the parking pawl return spring.
9. Install a new manual shaft seal into the case bore using a 1/2" deep socket (See Figure 54).
10. Install the manual shaft through the seal and into the case bore (See Figure 54).
11. Install the manual shaft retaining pin (Nail) into hole in case and through groove in shaft.
12. Install the park actuator rod (708) into inside detent lever (707), and install the assembly on the manual shaft and over the parking pawl, as shown in Figure 55.

13. Ensure that the flats in the inside detent lever are engaged with the flats on the manual shaft as shown in Figure 55.
14. Install the 3/8-24 nut onto the manual shaft and tighten securely (See Figures 54 and 55).
15. Install the parking lock bracket using the two bolts, as shown in Figure 55.
16. Torque the parking lock bolts to 17 ft. lb.

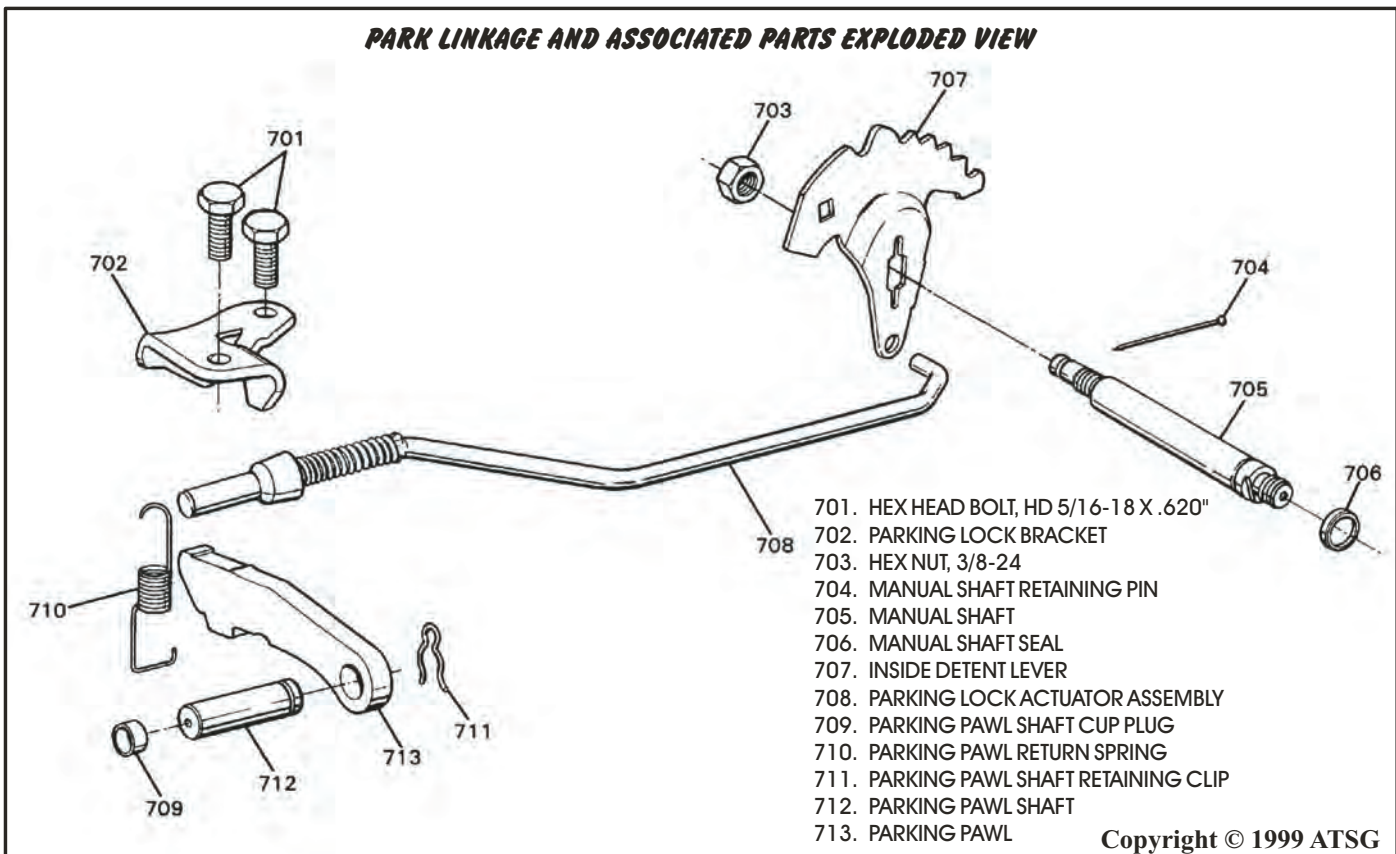
COMPONENT REBUILD
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- 701. HEX HEAD BOLT, HD 5/16-18 X .620"
- 702. PARKING LOCK BRACKET
- 703. HEX NUT, 3/8-24
- 704. MANUAL SHAFT RETAINING PIN
- 705. MANUAL SHAFT
- 706. MANUAL SHAFT SEAL
- 707. INSIDE DETENT LEVER
- 708. PARKING LOCK ACTUATOR ASSEMBLY
- 709. PARKING PAWL SHAFT CUP PLUG
- 710. PARKING PAWL RETURN SPRING
- 711. PARKING PAWL SHAFT RETAINING CLIP
- 712. PARKING PAWL SHAFT
- 713. PARKING PAWL

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Figure 54



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Figure 55

COMPONENT REBUILD

Continued from Page 43

GEAR TRAIN AND RELATED PARTS

1. Disassemble the gear train parts from the bench fixture using Figure 56 as a guide.
2. Clean all parts and components thoroughly and dry with compressed air.
3. Check all parts and components thoroughly for any damage and/or wear patterns. This includes all bushings, thrust washers and needle bearings and races. (Refer to Figure 56).

4. Measure reaction carrier planetary pinion end play using a feeler guage (See Figure 57).
5. Measure output carrier planetary pinion end play using a feeler guage (See Figure 57).
6. Both planetary carriers should measure between .228mm-.610mm (.009"-.024").
7. If removed, install the transmission main shaft into the ring gear as shown in Figure 58.
8. Install the main shaft retaining snap ring into the groove in main shaft and ensure that it is fully seated (See Figure 58).

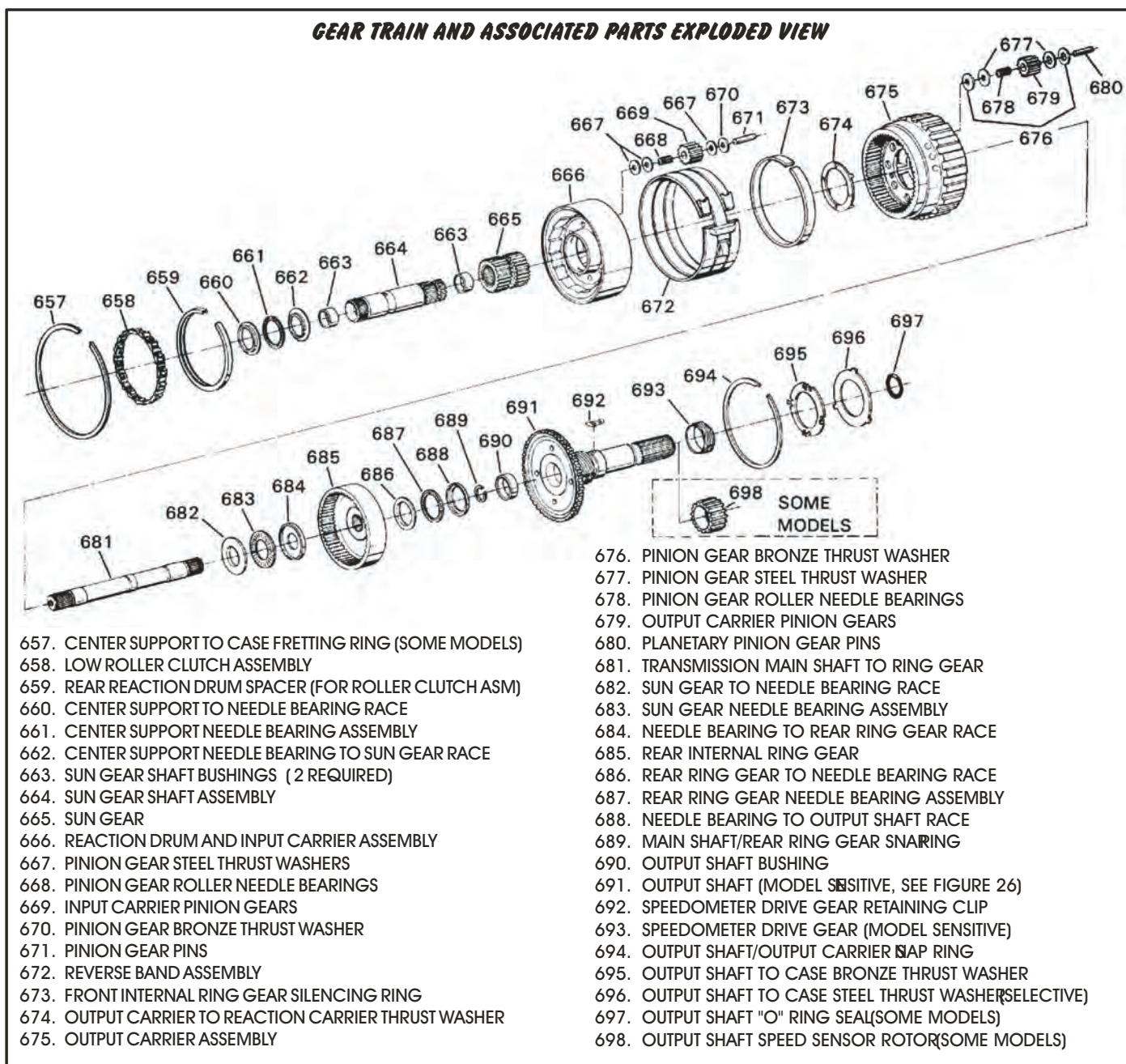


Figure 56

9. It is highly recommended to install new needle bearings, OEM Part No's 8623920, 8623921. and 8623922 in the gear train assembly.
10. Install the lower needle bearing race from the 8623921 package over the main shaft and onto the ring gear with the lip facing up, as shown in Figure 59.
11. Lubricate with small amount of transmission fluid and install the needle bearing assembly into the lower race (See Figure 59).
12. Install the upper needle bearing race on top of the needle bearing with the inside lip facing down, as shown in Figure 59.

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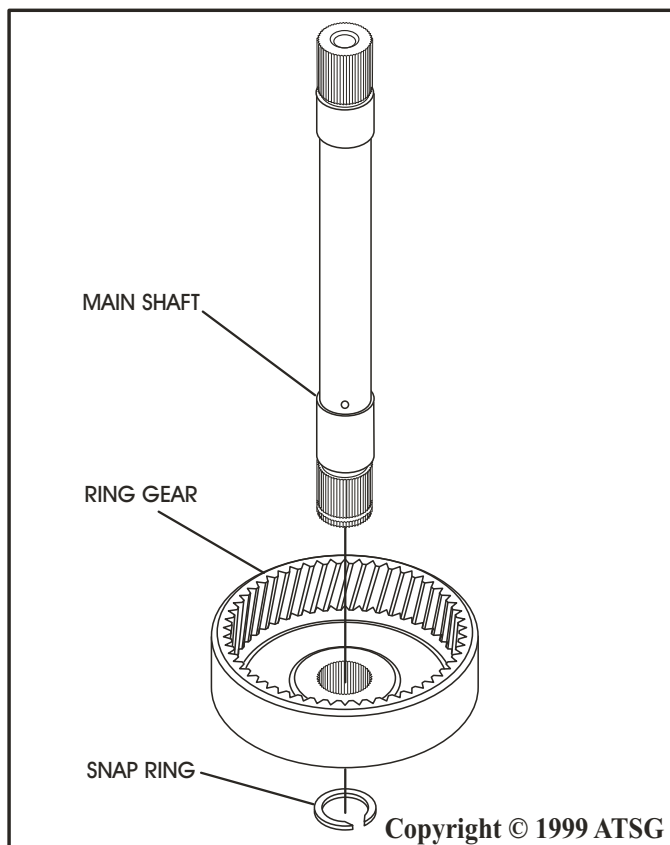


Figure 58

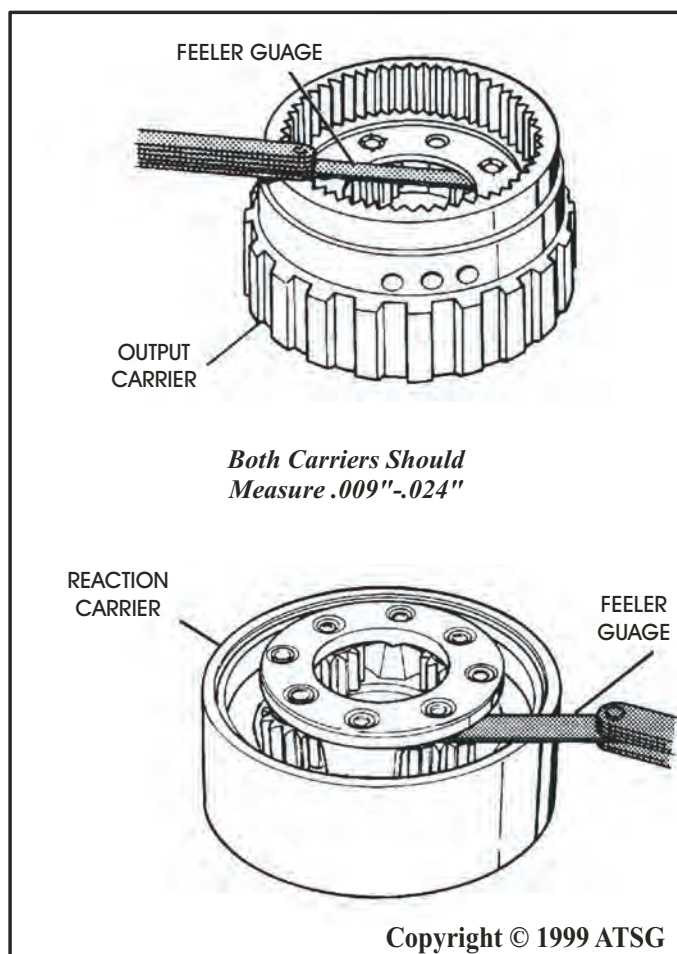


Figure 57

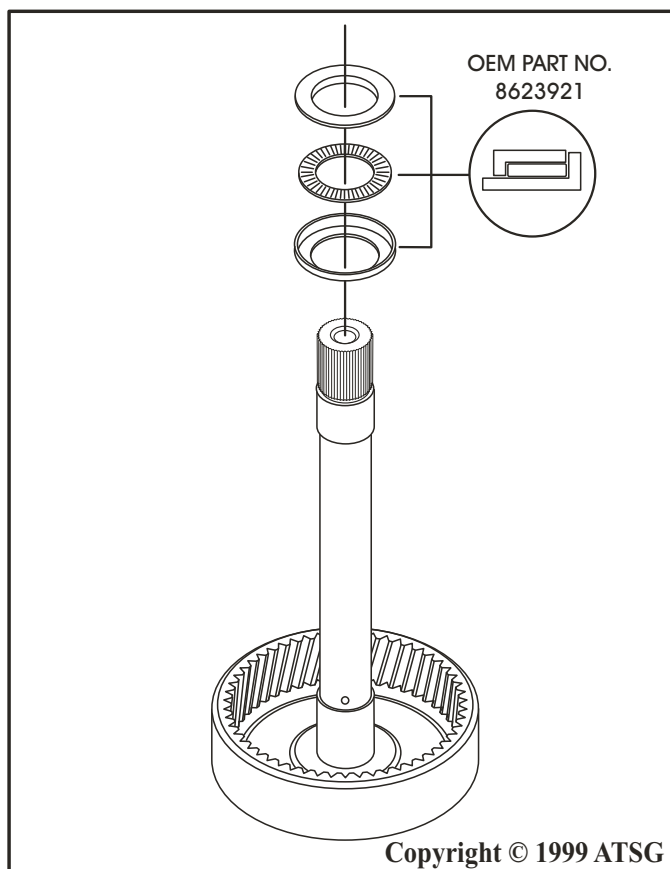


Figure 59

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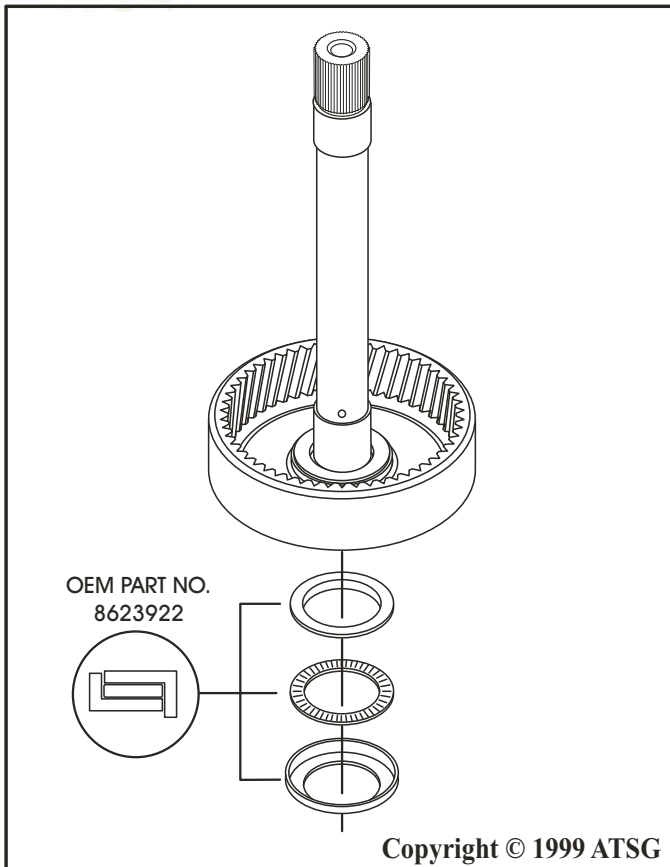


Figure 60

13. Install the upper needle bearing race from the 8623922 package over the ring gear snout with the inside lip facing away from the ring gear as shown in Figure 60, and retain with a small amount of TransJelÖ.
14. Install the needle bearing assembly onto the upper race and retain with a small amount of TransJelÖ, as shown in Figure 60.
15. Install the lower needle bearing race on top of the needle bearing with the inside lip facing up, as shown in Figure 60, and retain with a small amount of TransJelÖ.
16. Install the output shaft thrust washer onto the output shaft and ensure that the tabs engage in the holes in output shaft (See Figure 61).
17. Retain the output shaft thrust washer with a small amount of TransJelÖ.
18. Install the main shaft and ring gear assembly into and through the output carrier, as shown in Figure 62.
19. Install the output shaft assembly into the output carrier as shown in Figure 62, and ensure that the bearing on back side of ring gear is still in the proper position.
20. Install the output shaft retaining snap ring into the groove in the output carrier (See Figure 62).
21. Set the entire assembly into the bench fixture as shown in Figure 63, to finish the assembly process for the geartrain.

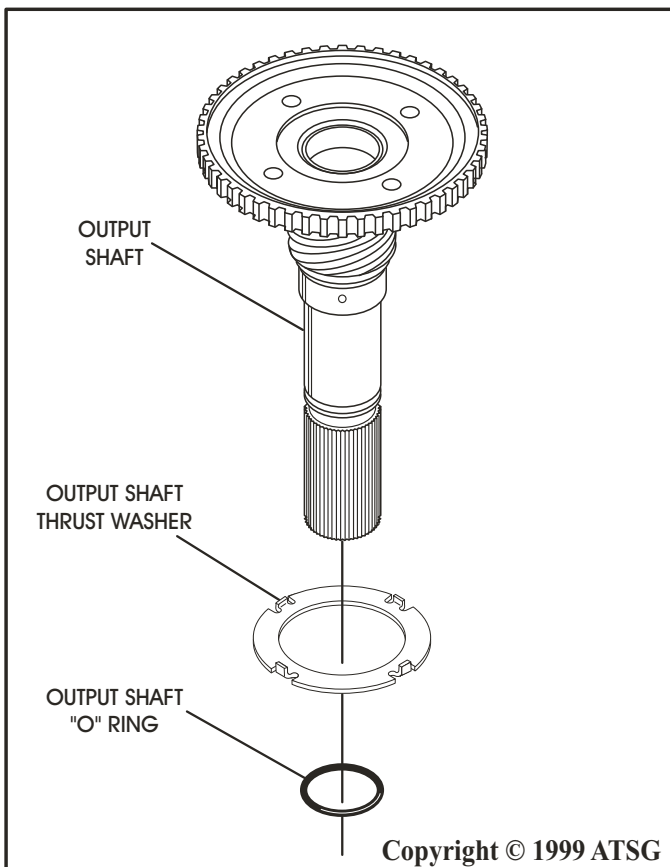


Figure 61

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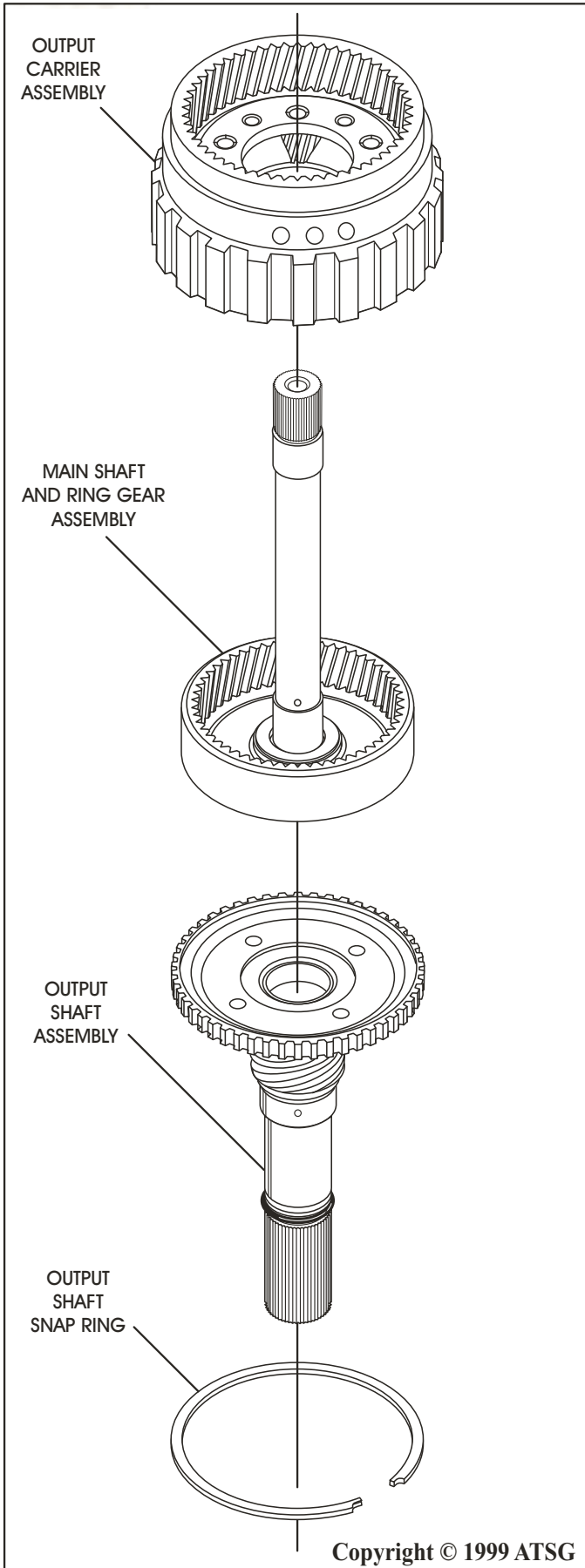


Figure 62

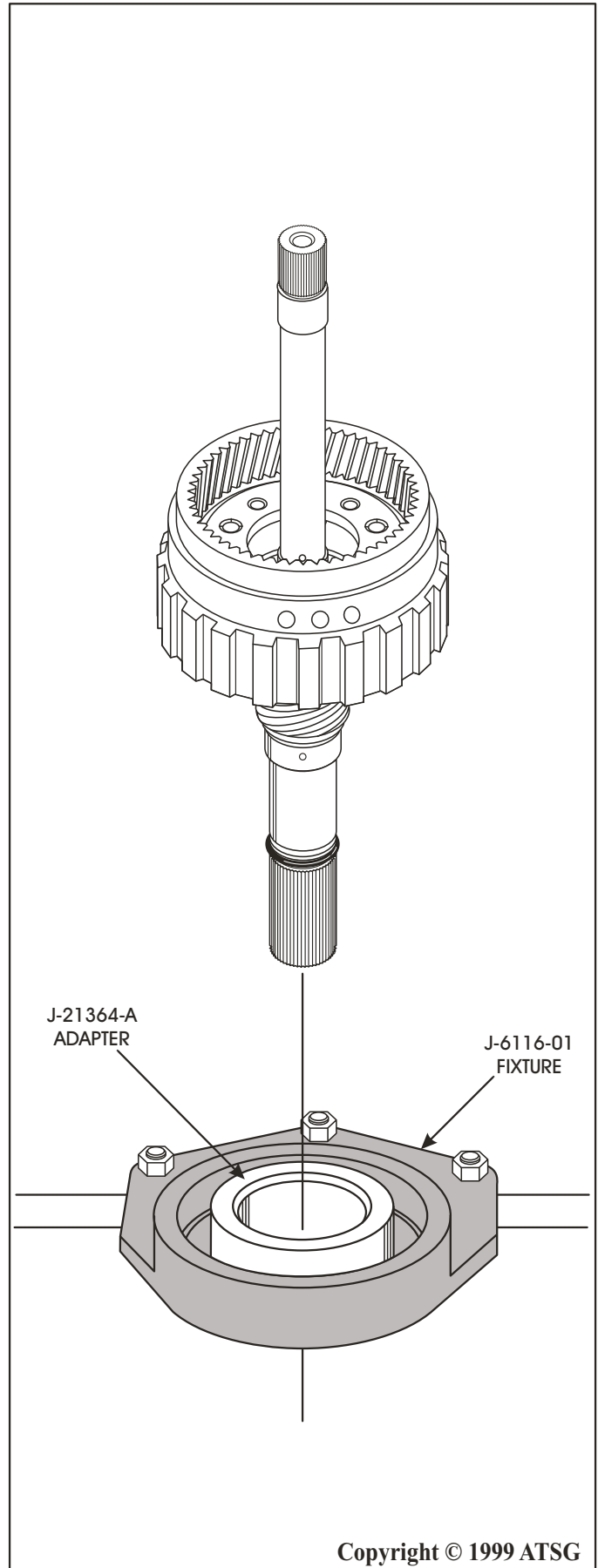


Figure 63

Continued from Page 46

22. Install the sun gear over the main shaft and into the output carrier by rotating into position, with inside chamfer *down* as shown in Figure 64.
23. Install the reaction carrier to output carrier thrust washer, ensuring that the tabs engage in the holes in output carrier, and retain with a small amount of TransJel[®] (See Figure 64).
24. Install the silencing ring over the top side of the output carrier. Refer to Figures 64 and 65.
25. Install the sun gear shaft into the splines of the sun gear, as shown in Figures 65 and 66.

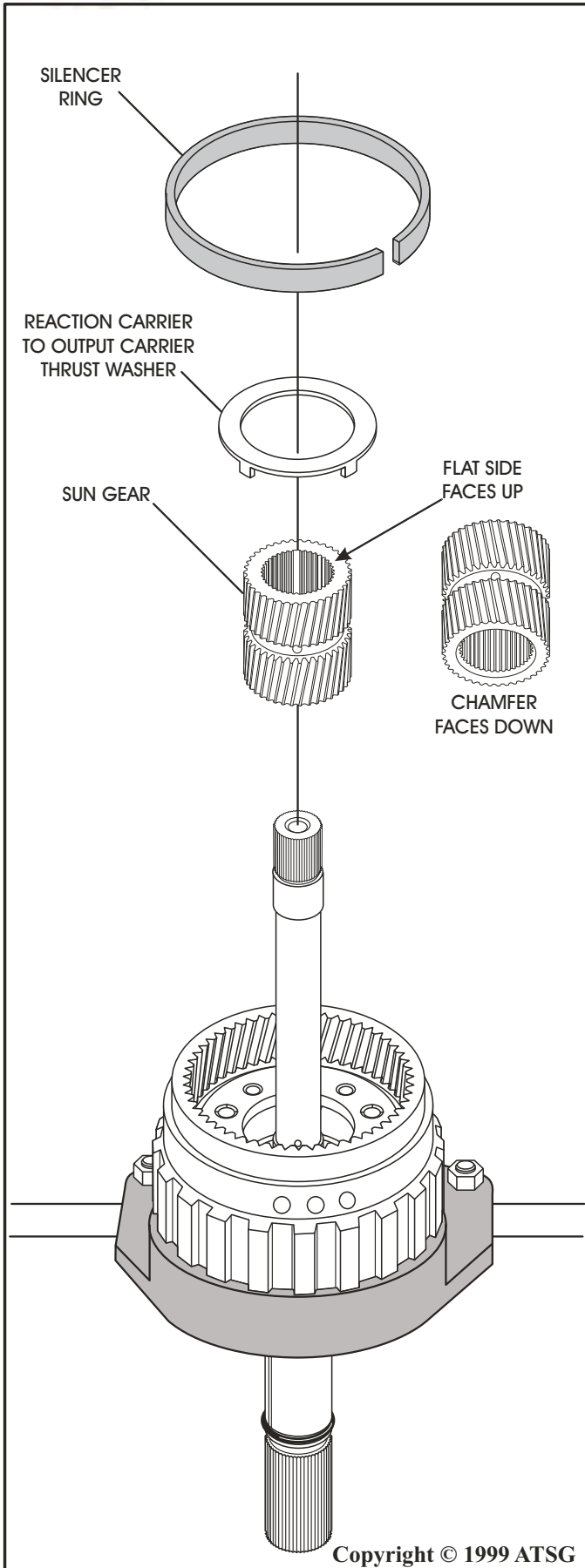


Figure 64

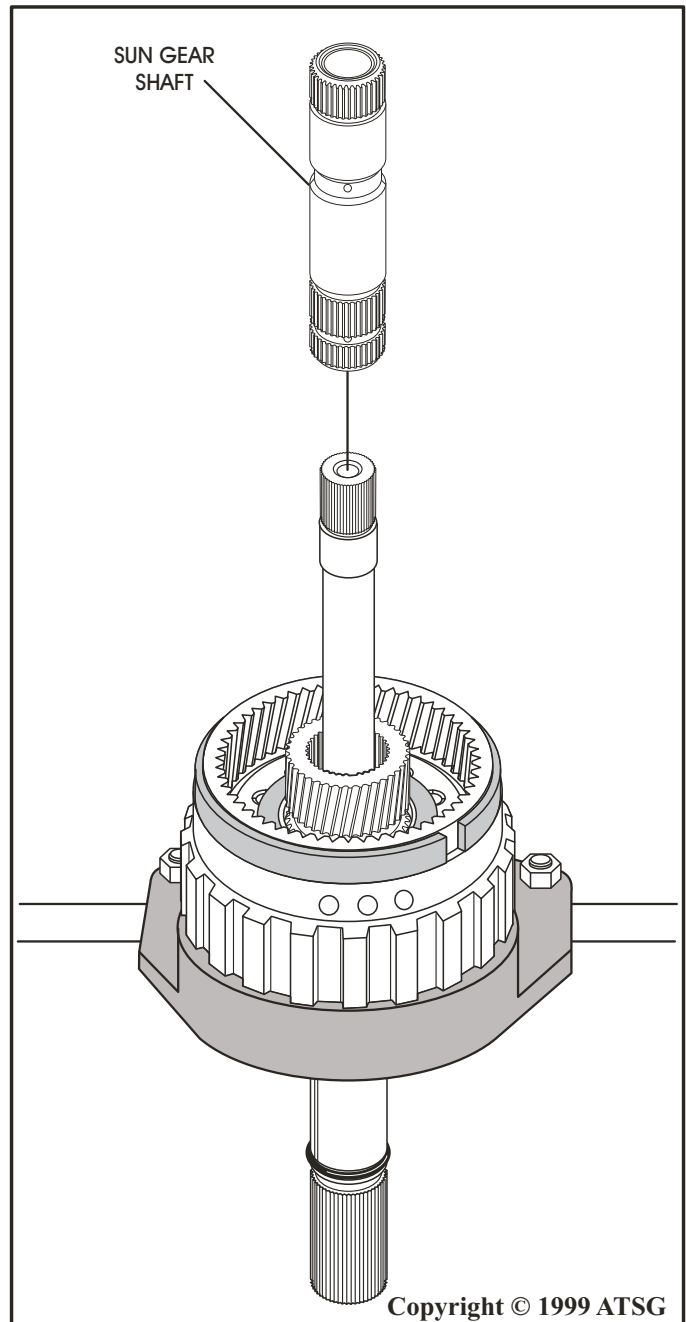


Figure 65

26. Install the lower needle bearing race from the 8623920 package over the sun gear shaft and onto the sun gear, with the inside lip facing up as shown in Figure 66.
27. Lubricate with small amount of transmission fluid and install the needle bearing assembly into the lower race (See Figure 66).
28. Install the upper needle bearing race on top of the needle bearing with the inside lip facing, up as shown in Figure 66.
29. If it was removed, install the lo-roller clutch spacer down into the reaction carrier assembly, as shown in Figure 67, ensuring that it is fully seated.
30. Install the lo-roller clutch assembly down into the reaction carrier by aligning the notches in the roller clutch cage with the notches in the reaction carrier (See Figures 67 and 68).

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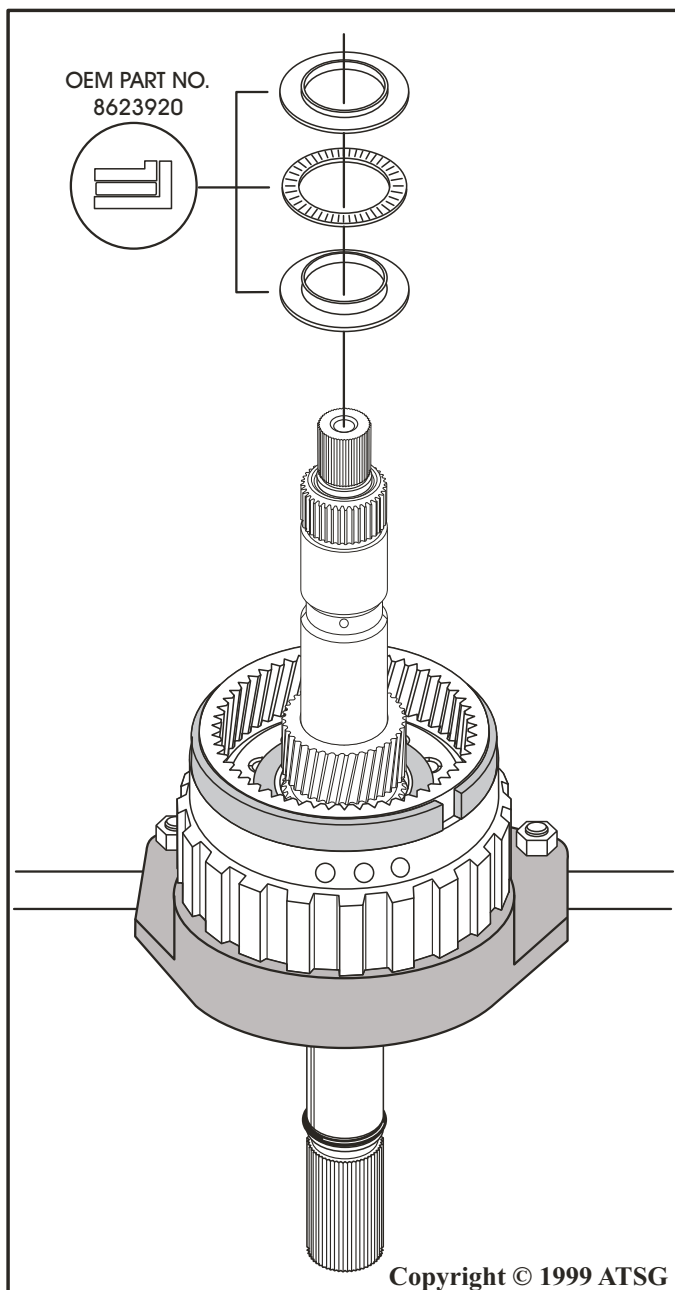


Figure 66

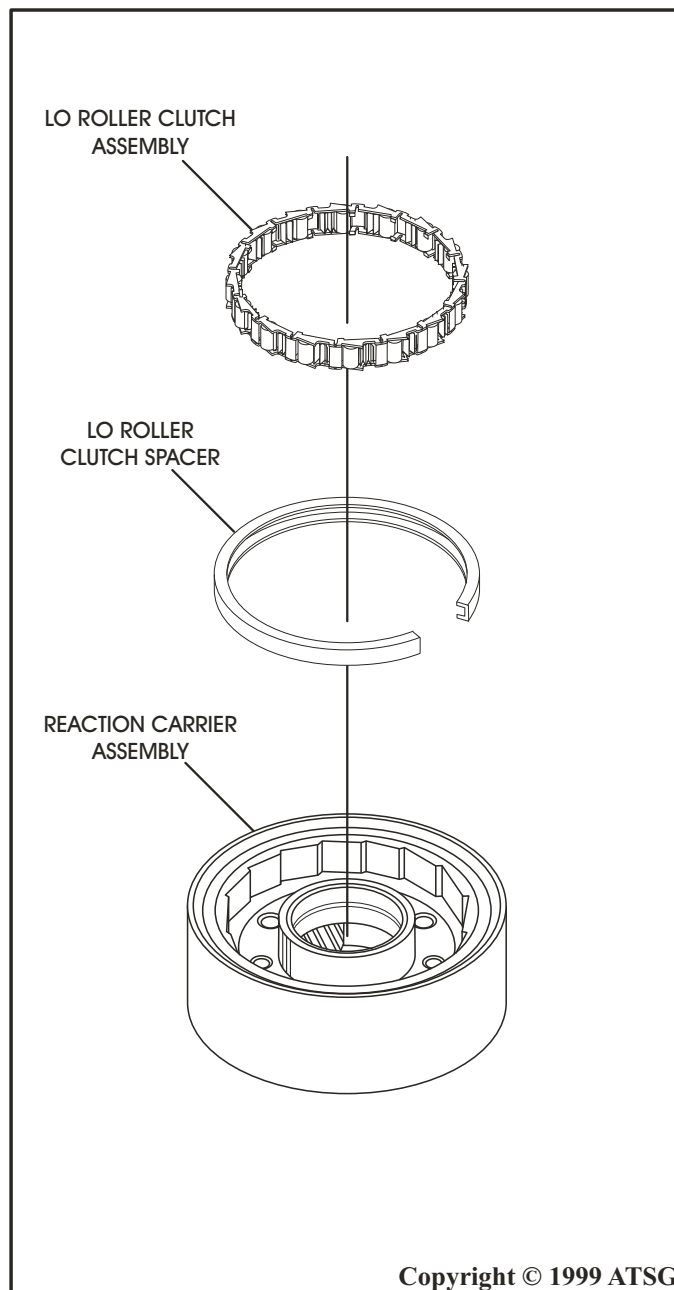


Figure 67

Continued from Page 49

31. Install the completed reaction carrier into the sun gear and ring gear by rotating the sun gear shaft until it is fully seated (See Figure 68).
32. Disassemble the center support assembly using Figure 69 as a guide.
33. Inspect all center support components for any wear and/or damage.
34. Clean all center support parts thoroughly, and dry with compressed air.
35. Ensure that orificed cup plug is in place, as shown in Figure 69.

36. Install a new intermediate clutch outer lip seal into the groove in the piston, in the direction shown in Figure 69.
37. Install a new intermediate clutch inner lip seal into the groove in the piston, in the direction shown in Figure 69.

Note: *Some models have a stamped steel piston which requires a return spring guide.*

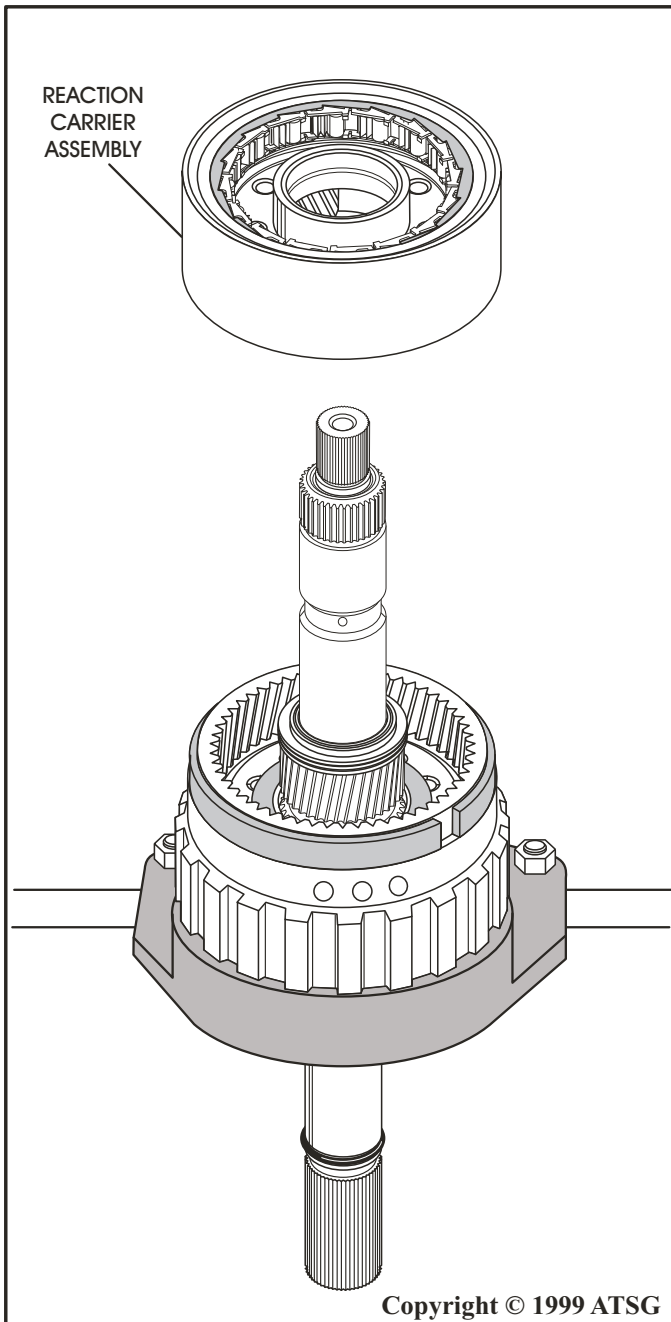


Figure 68

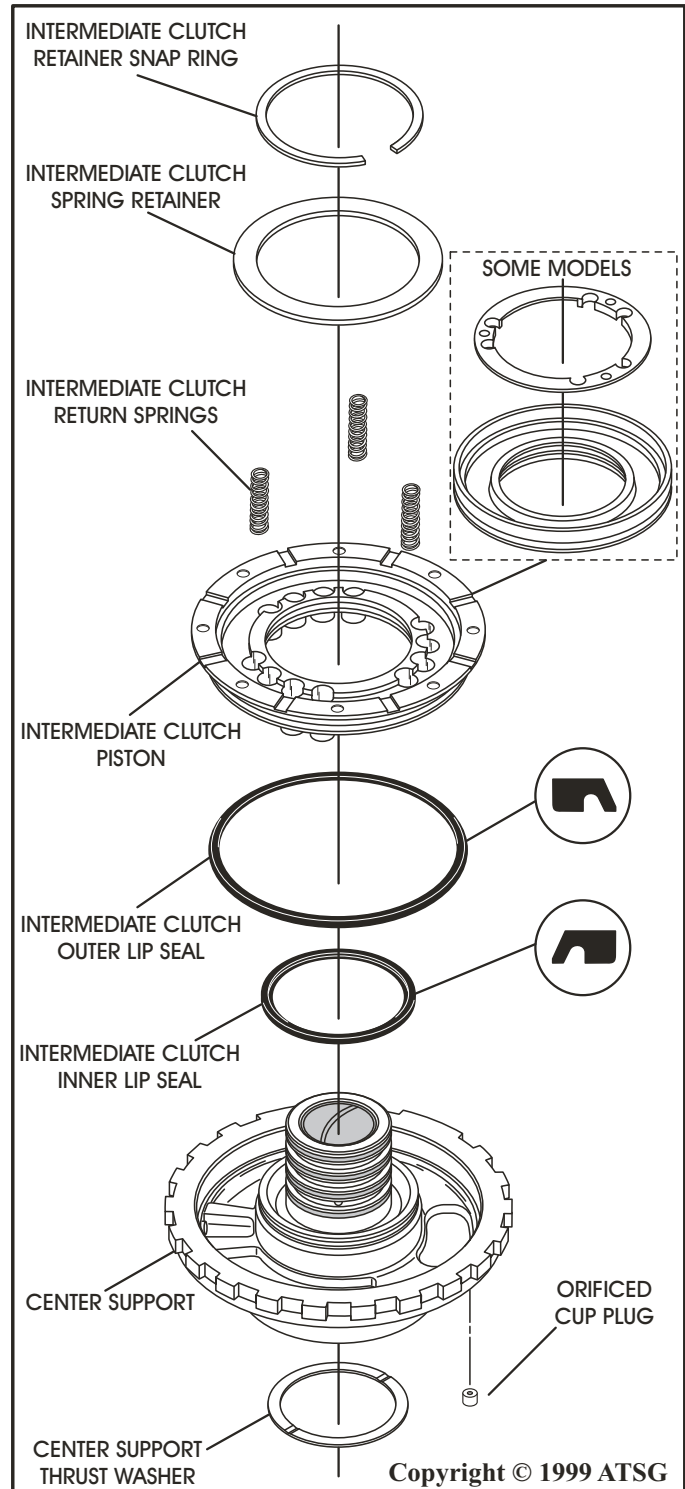


Figure 69

38. Install four new sealing rings into the grooves in the center support (See Figure 69).
39. Install J-21363 lip seal protector over the center support, as shown in Figure 70.
40. Lubricate both lip seals and install intermediate clutch piston assembly over the seal protector and into the center support (See Figure 70).
41. Install the return springs into the intermediate piston so that they are equally spaced around the piston (See Figure 71).
42. Install the intermediate clutch return spring retainer as shown in Figure 71.
43. Compress the spring retainer with proper spring compressor and install the snap ring using pair of snap ring pliers (See Figure 71).
44. Turn the completed center support assembly over and install the brass thrust washer, shown in Figure 72, and retain with TransJelö.
45. Ensure that the orificed cup plug is in place, as shown in Figure 72.

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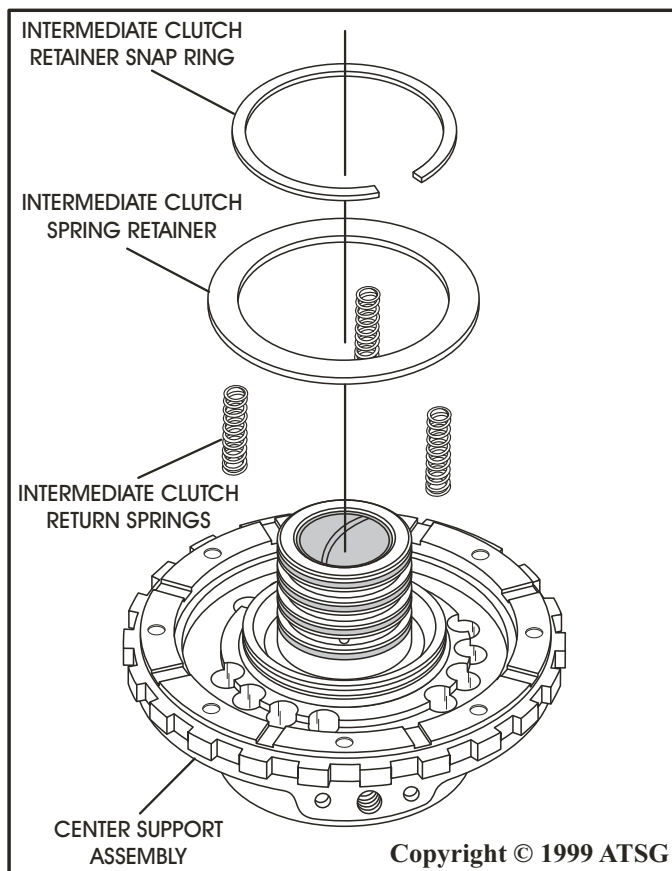


Figure 71

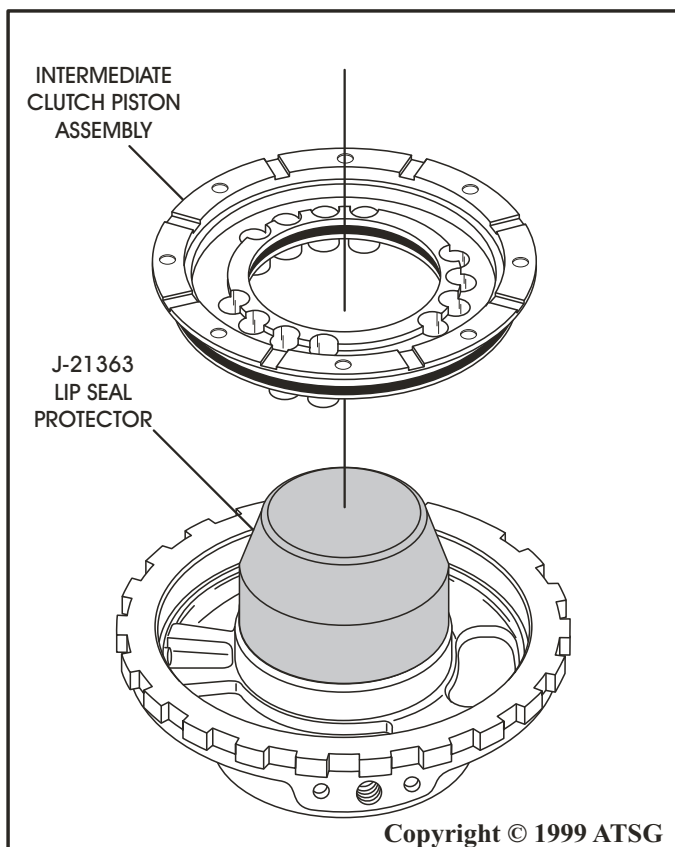


Figure 70

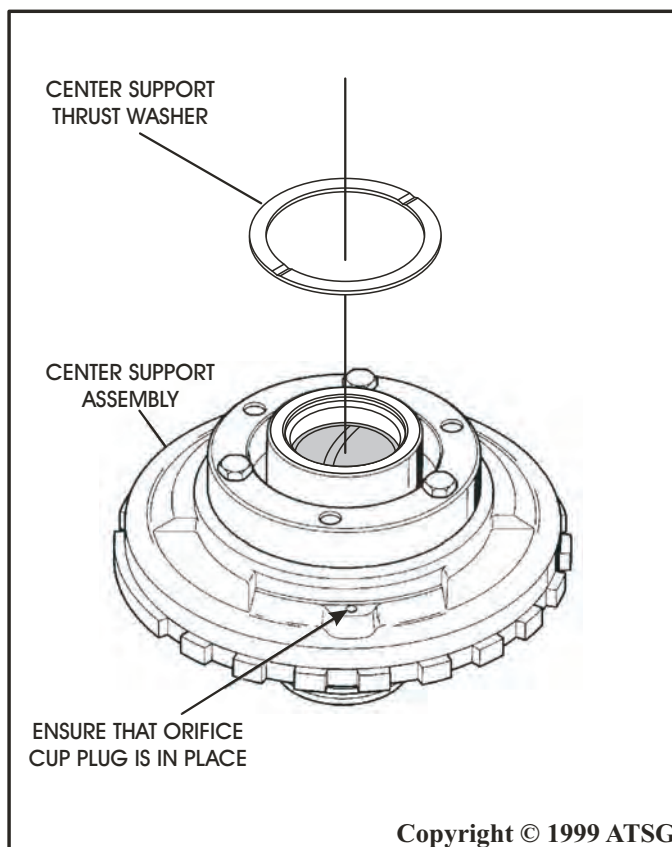
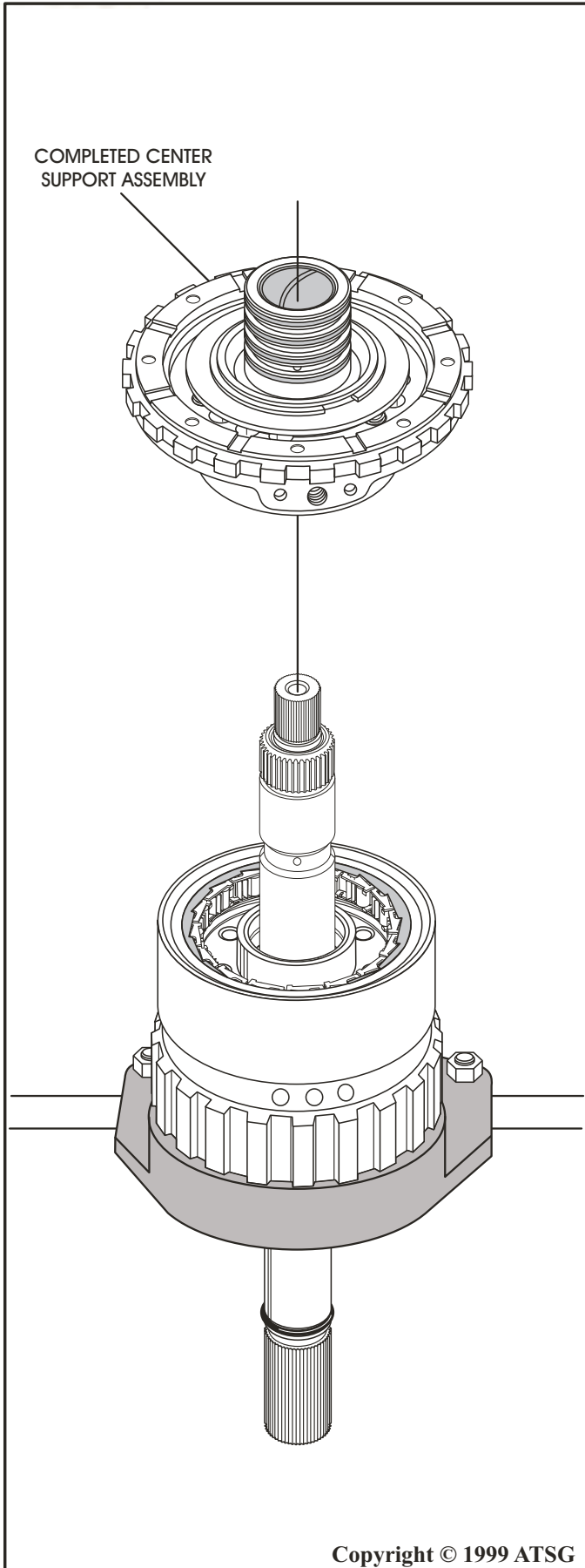
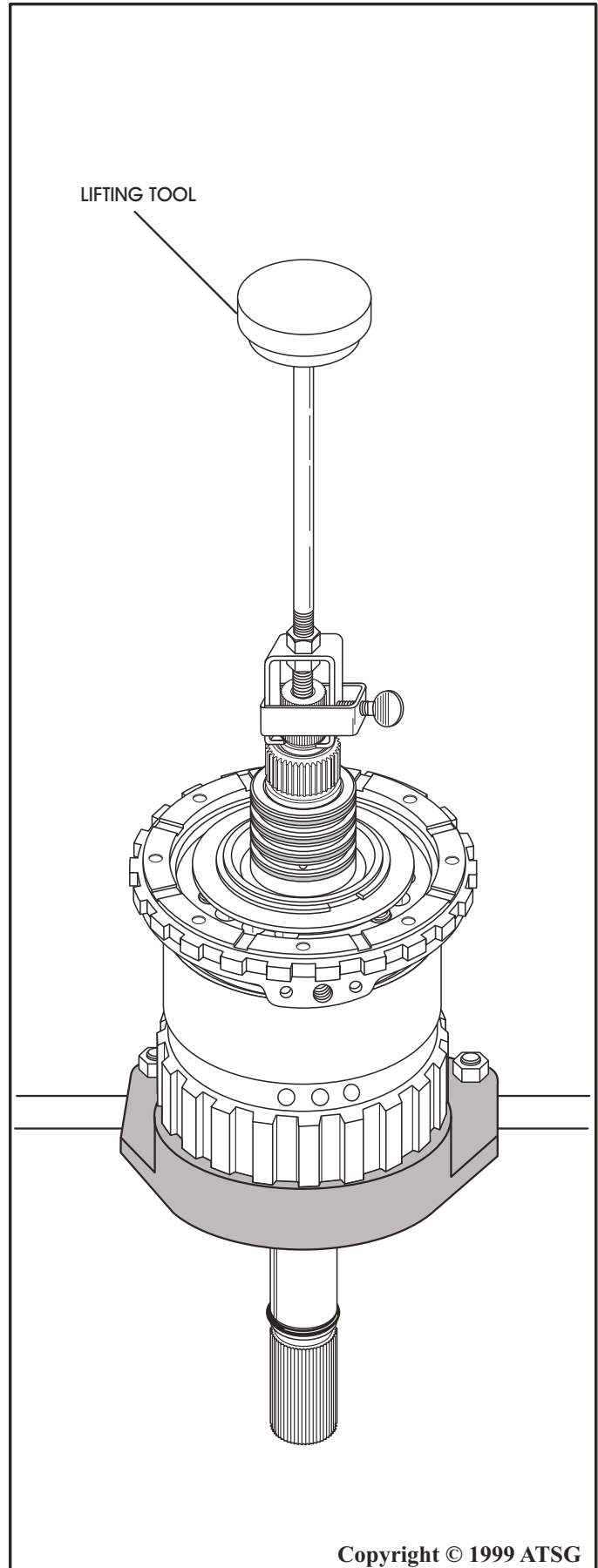


Figure 72



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Figure 73



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Figure 74

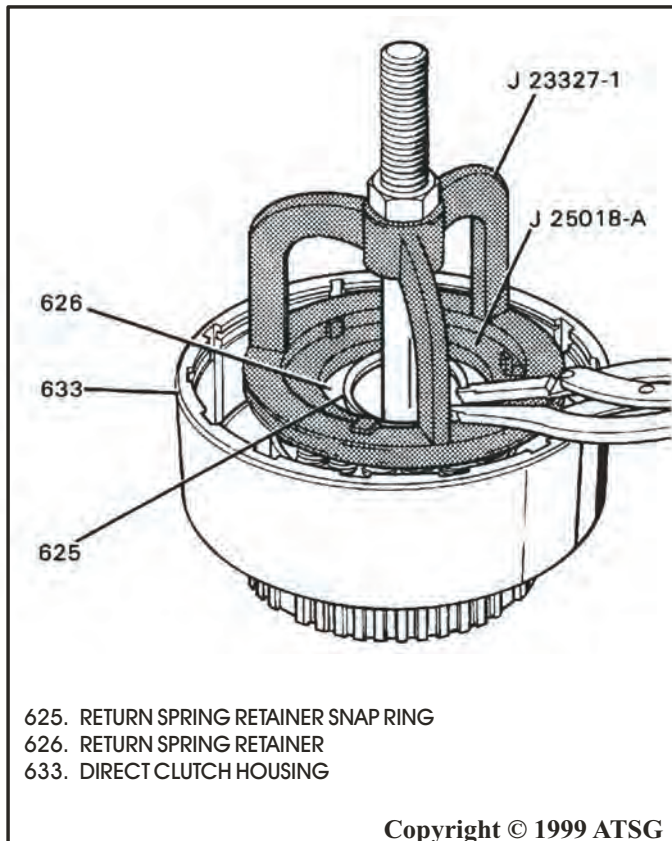
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46. Install the completed center support assembly by rotating clockwise and turning the sun gear shaft, until the center support is fully seated. Refer to Figure 73.
47. Install the lifting tool onto the completed gear train assembly, to prepare for final assembly, as shown in Figure 74.

DIRECT CLUTCH HOUSING

1. Disassemble the direct clutch housing using a spring compressor, as shown in Figure 75, and use Figure 76 as a guide for disassembly.
2. Inspect all direct clutch parts thoroughly for any wear and/or damage.
3. Clean all direct clutch parts thoroughly and dry with compressed air.
4. Notice in Figure 76 that some models use an intermediate roller clutch and some models use an intermediate sprag assembly.
5. Also notice in Figure 76 that some models use a direct clutch waved plate and some do not.

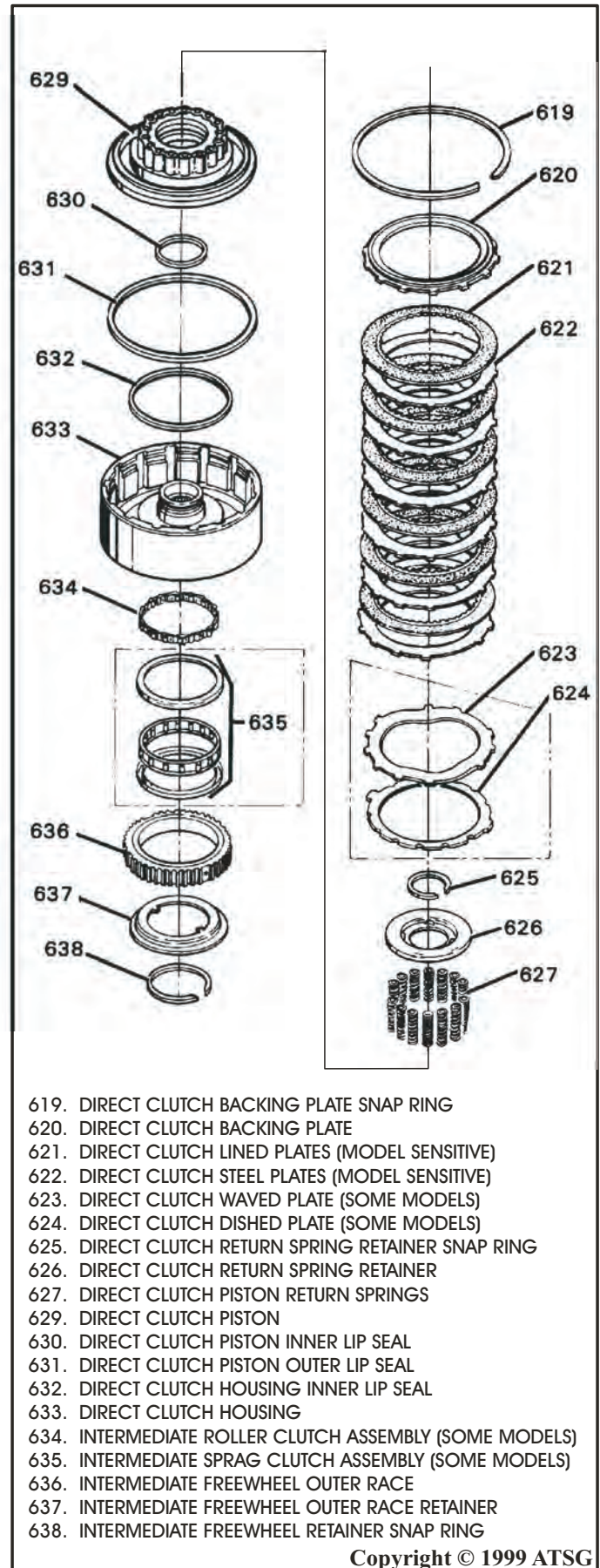
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- 625. RETURN SPRING RETAINER SNAP RING
- 626. RETURN SPRING RETAINER
- 633. DIRECT CLUTCH HOUSING

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Figure 75



- 619. DIRECT CLUTCH BACKING PLATE SNAP RING
- 620. DIRECT CLUTCH BACKING PLATE
- 621. DIRECT CLUTCH LINED PLATES (MODEL SENSITIVE)
- 622. DIRECT CLUTCH STEEL PLATES (MODEL SENSITIVE)
- 623. DIRECT CLUTCH WAVED PLATE (SOME MODELS)
- 624. DIRECT CLUTCH DISHED PLATE (SOME MODELS)
- 625. DIRECT CLUTCH RETURN SPRING RETAINER SNAP RING
- 626. DIRECT CLUTCH RETURN SPRING RETAINER
- 627. DIRECT CLUTCH PISTON RETURN SPRINGS
- 629. DIRECT CLUTCH PISTON
- 630. DIRECT CLUTCH PISTON INNER LIP SEAL
- 631. DIRECT CLUTCH PISTON OUTER LIP SEAL
- 632. DIRECT CLUTCH HOUSING INNER LIP SEAL
- 633. DIRECT CLUTCH HOUSING
- 634. INTERMEDIATE ROLLER CLUTCH ASSEMBLY (SOME MODELS)
- 635. INTERMEDIATE SPRAG CLUTCH ASSEMBLY (SOME MODELS)
- 636. INTERMEDIATE FREEWHEEL OUTER RACE
- 637. INTERMEDIATE FREEWHEEL OUTER RACE RETAINER
- 638. INTERMEDIATE FREEWHEEL RETAINER SNAP RING

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Figure 76

Continued from Page 53

6. Install new direct drum lip seal into the groove in direct drum, with the lip facing the direction shown in Figure 79, and lubricate with a small amount of TransJelö.
7. Install new direct clutch piston outer lip seal in groove of direct clutch piston, with lip facing the direction shown in Figure 79.
8. Install new direct clutch piston inner lip seal in groove of direct clutch piston, with lip facing the direction shown in Figure 79.
9. Lubricate both seals with a small amount of TransJelö.

Note: Some models use a stamped steel direct clutch piston and spacer (See Figure 79).

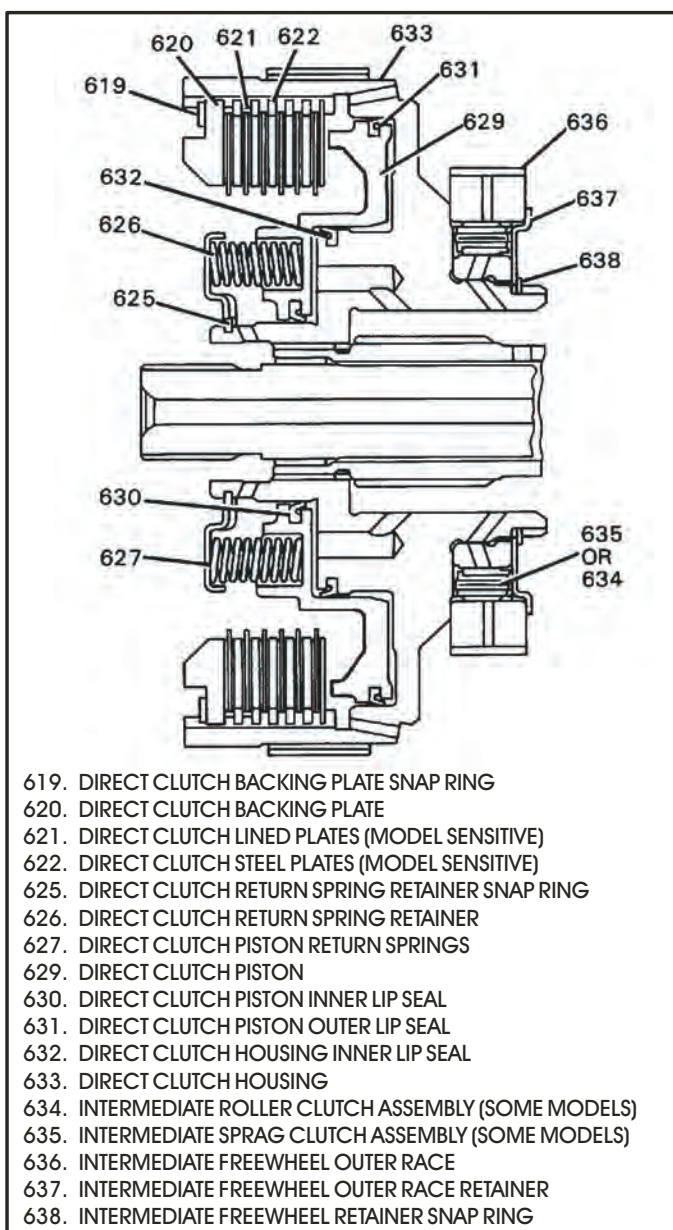


Figure 77

10. Install inner lip seal protector J-21362 on the hub of direct drum (See Figure 78).
11. Install outer lip seal protector J-21409 into the direct drum as shown in Figure 78.
12. Install the direct clutch piston assembly into the direct clutch housing using a twisting motion as shown in Figure 78.
13. Install the 14 direct clutch piston return springs into the cavities in the piston in the positions shown in Figure 79, leaving two blank pockets 180 degrees from one another.
14. Install the direct clutch return spring retainer on top of the springs, and lay the snap ring on top of the retainer (See Figure 79).
15. Compress the spring retainer and return springs and install the snap ring, using the compressor as shown in Figure 75.
16. Install the waved plate or the cushion plate, as shown in Figure 80.
17. Install the direct clutches beginning with a steel plate and alternating with a friction plate, as shown in Figure 80.
18. Install the direct clutch backing plate with flat side down, as shown in Figure 80.
19. Install the direct clutch backing plate snap ring and ensure that it is seated in groove, as shown in Figure 80.

Note: The direct clutch may use 4, 5 or 6 lined plates depending on the specific model.

Note: Direct clutch clearance should measure approximately .010" per lined plate.

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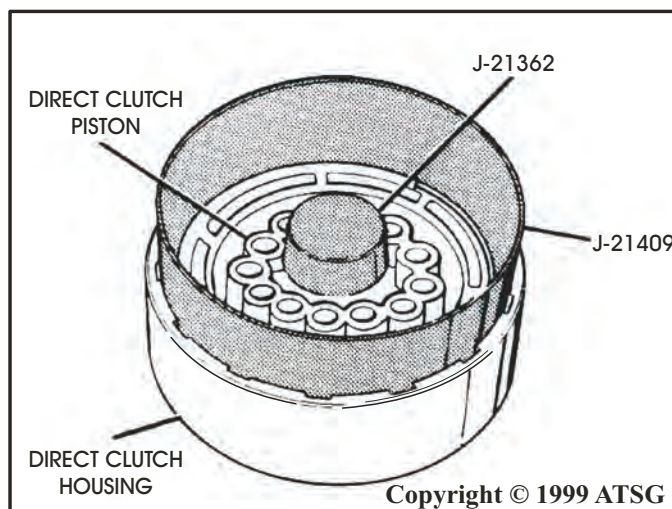


Figure 78

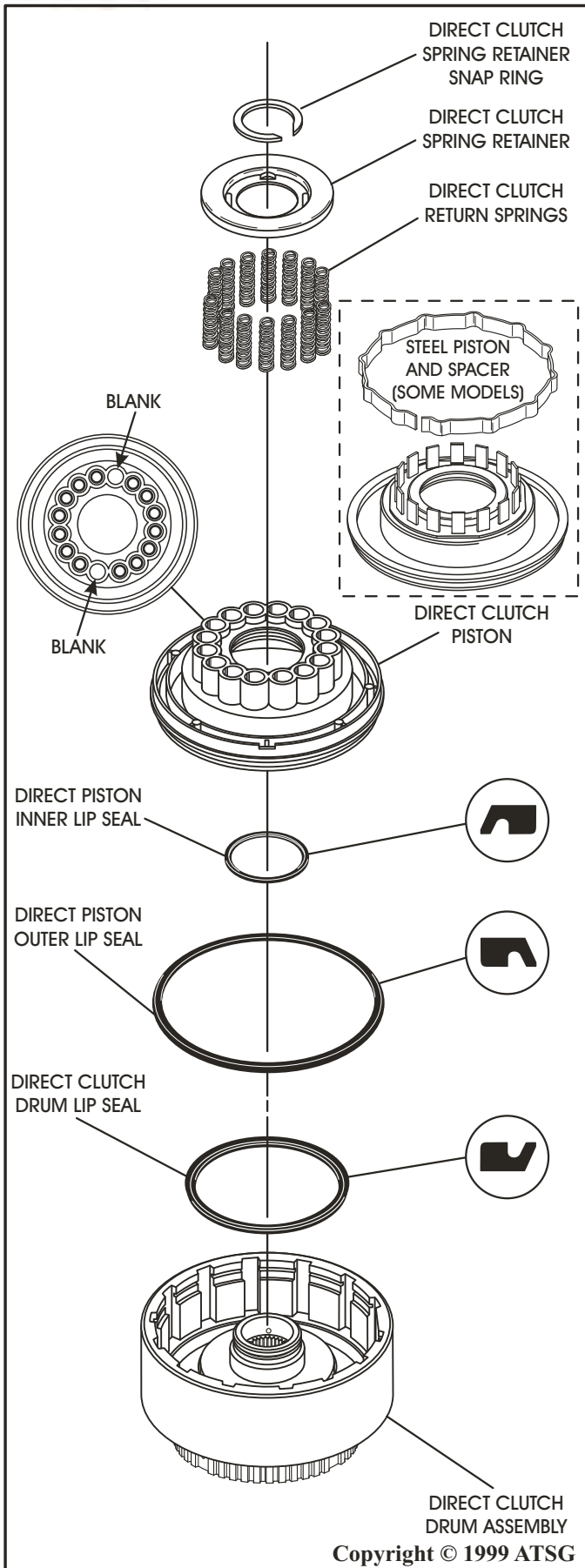


Figure 79

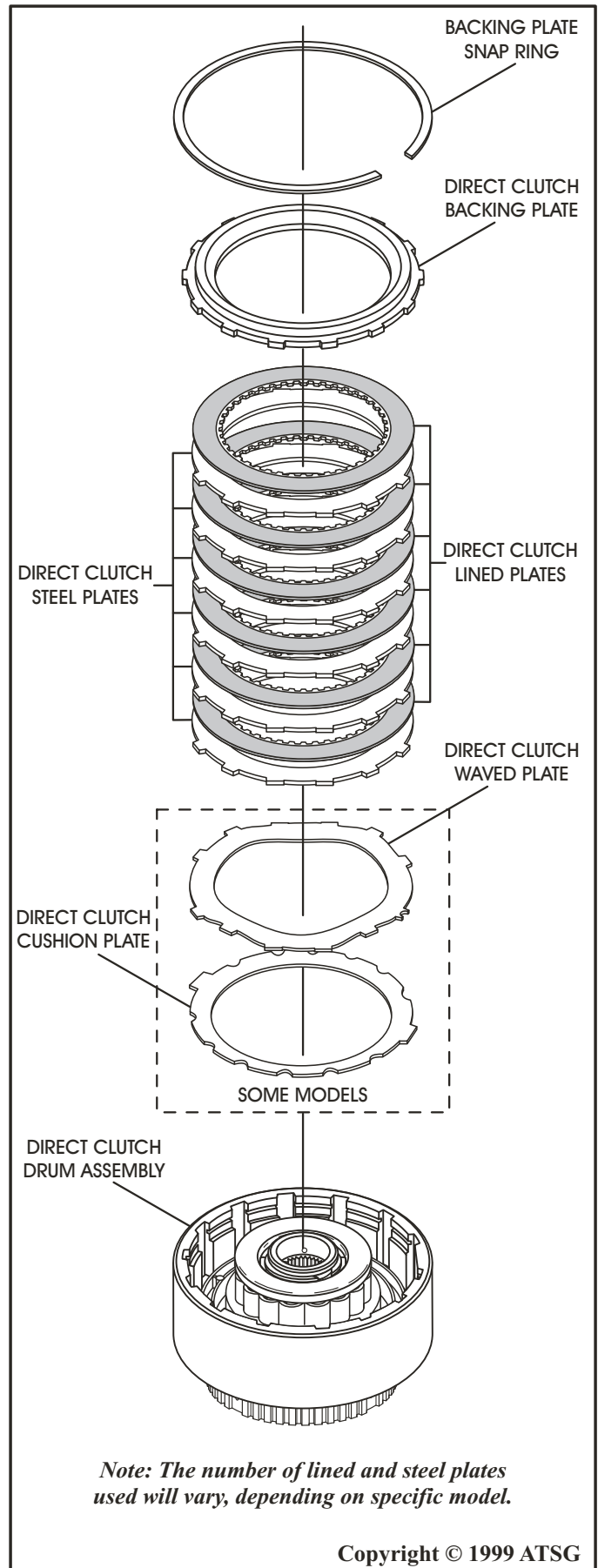


Figure 80

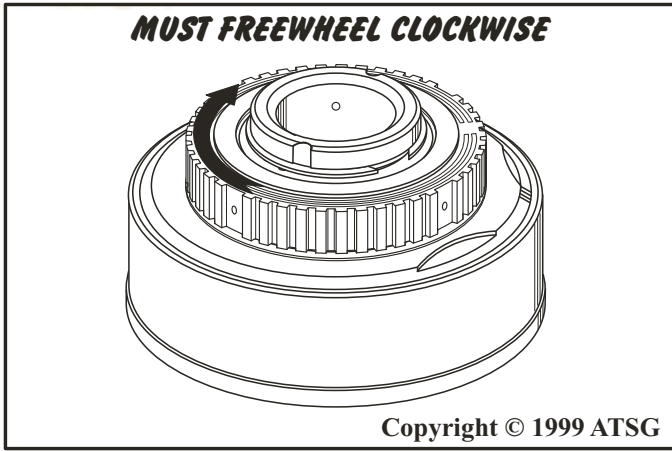


Figure 81

Continued from Page 54

20. Turn the direct clutch housing over as shown in Figures 82 and 83. There are 2 different styles of direct clutch housings, one for the "Sprag" style freewheel, and one for the "Roller Clutch" as shown below.
21. Use Figure 82 to assemble the "Roller Clutch" style freewheel and use Figure 83 to assemble "Sprag" style intermediate freewheel.
22. After assembly, check the outer race for proper freewheel direction, as shown in Figure 81.
23. Set the direct clutch housing assembly aside for the final assembly process.

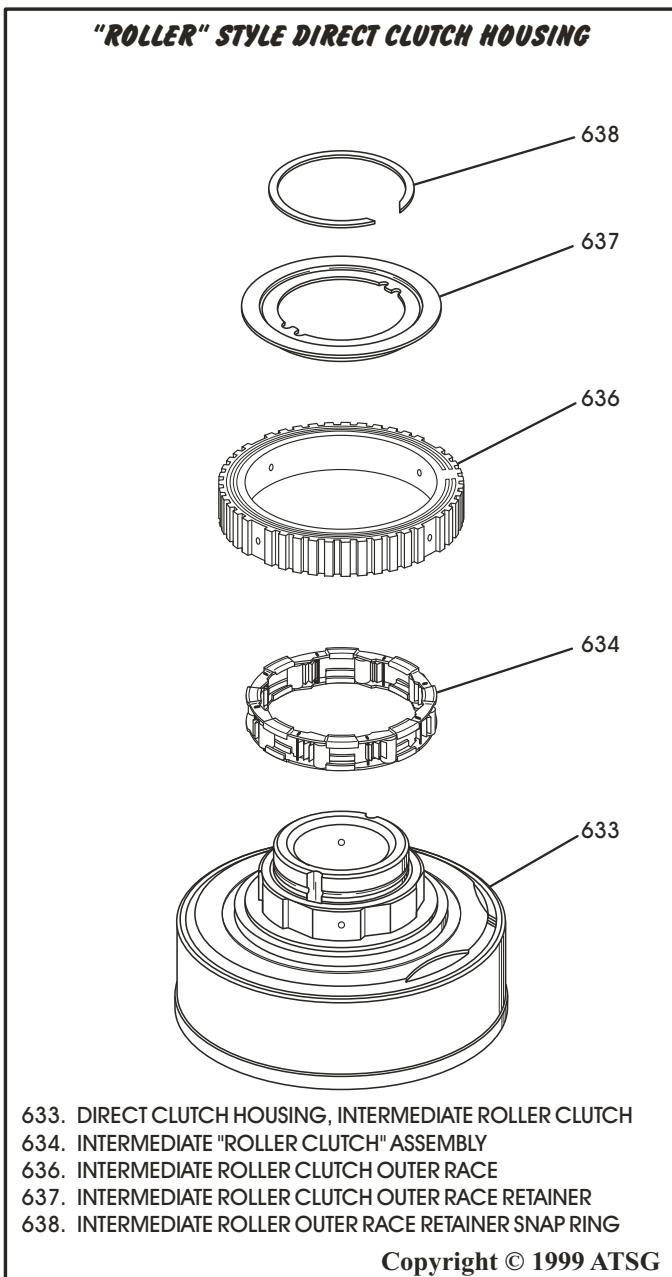


Figure 82

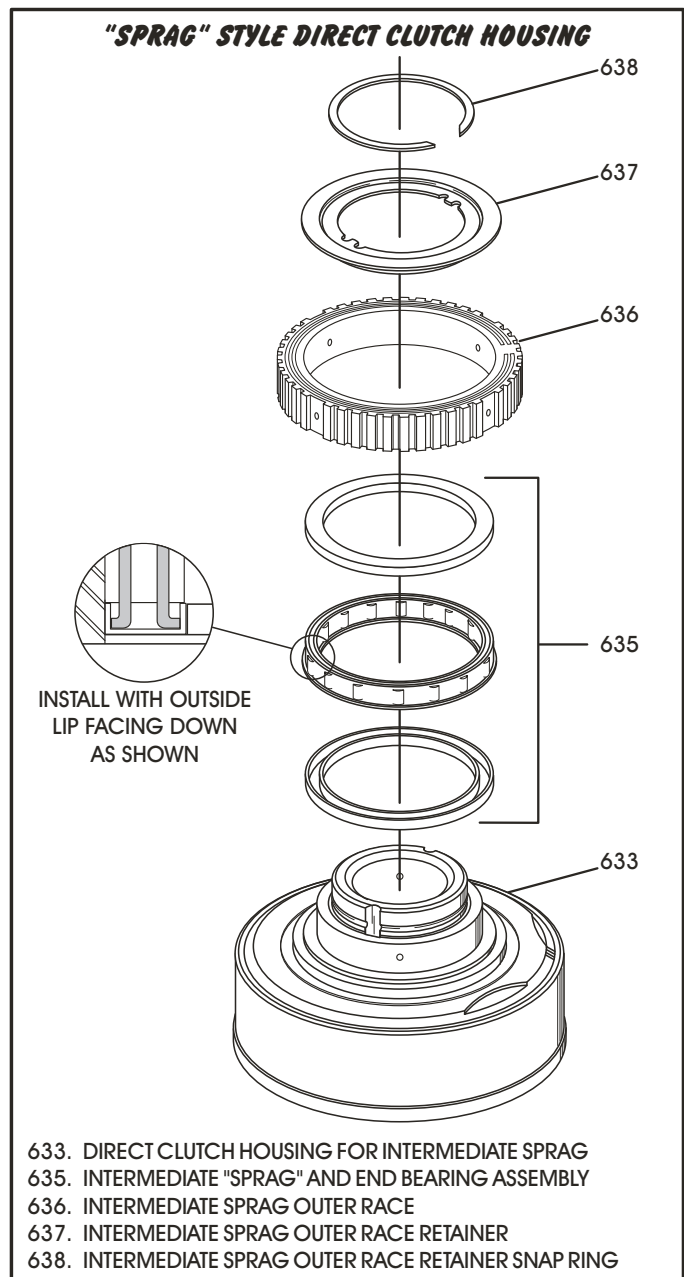
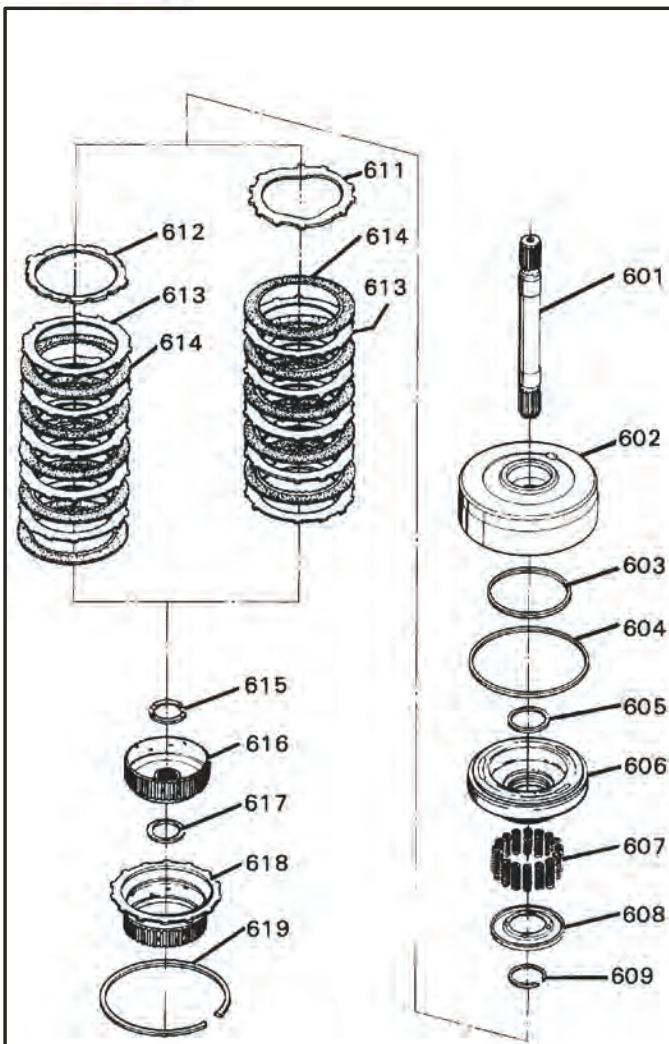


Figure 83

COMPONENT REBUILD (Cont'd) FORWARD CLUTCH HOUSING

1. Disassemble the forward clutch housing using Figure 84 as a guide.
2. Set the forward clutch housing into the bench fixture J-6116-01, as shown in Figure 85.
3. Using a suitable spring compressor, compress the forward clutch return springs and retainer and remove the snap ring (See Figure 85).
4. Inspect all forward clutch parts thoroughly for any wear and/or damage, remove and discard all lip seals.
5. Clean all forward clutch parts thoroughly and dry with compressed air.
6. Notice in Figure 84 that some models use a waved plate and some models use the dished cushion plate.
7. Some models also use the stamped steel piston with the selective spacer.

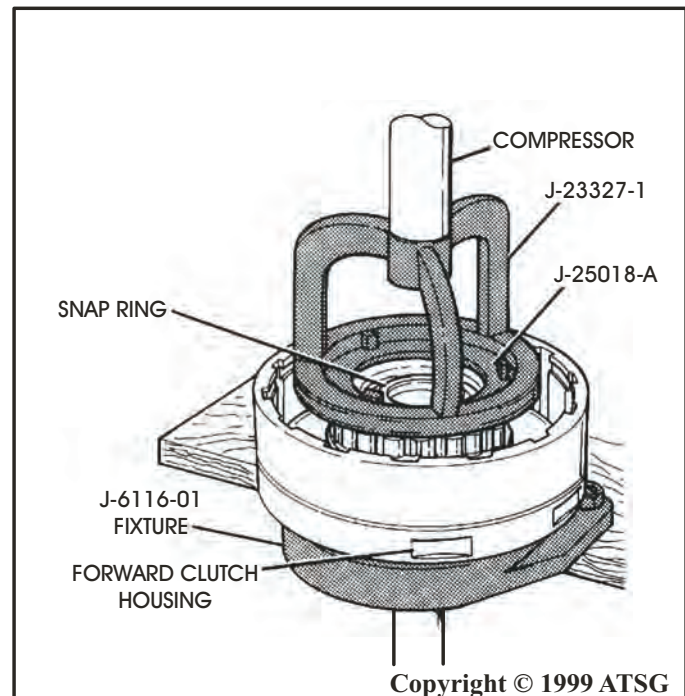
Continued on Page 58.



- 601. TURBINE SHAFT (MODEL SENSITIVE)
- 602. FORWARD CLUTCH HOUSING
- 603. FORWARD CLUTCH HOUSING CENTER LIP SEAL
- 604. FORWARD CLUTCH PISTON OUTER LIP SEAL
- 605. FORWARD CLUTCH PISTON INNER LIP SEAL
- 606. FORWARD CLUTCH PISTON
- 607. FORWARD CLUTCH PISTON RETURN SPRINGS
- 608. FORWARD CLUTCH PISTON RETURN SPRING RETAINER
- 609. RETURN SPRING RETAINER SNAP RING
- 611. FORWARD CLUTCH WAVED PLATE (SOME MODELS)
- 612. FORWARD CLUTCH DISHED CUSHION PLATE (SOME MODELS)
- 613. FORWARD CLUTCH FLAT STEEL PLATES
- 614. FORWARD CLUTCH FRICTION PLATES
- 615. FORWARD CLUTCH HUB TO FWD. HOUSING THRUST WASHER
- 616. FORWARD CLUTCH HUB
- 617. FORWARD CLUTCH HUB TO DIR. HOUSING THRUST WASHER
- 618. DIRECT CLUTCH HUB/FORWARD BACKING PLATE
- 619. DIRECT CLUTCH HUB/FORWARD BACKING PLATE SNAP RING

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Figure 84



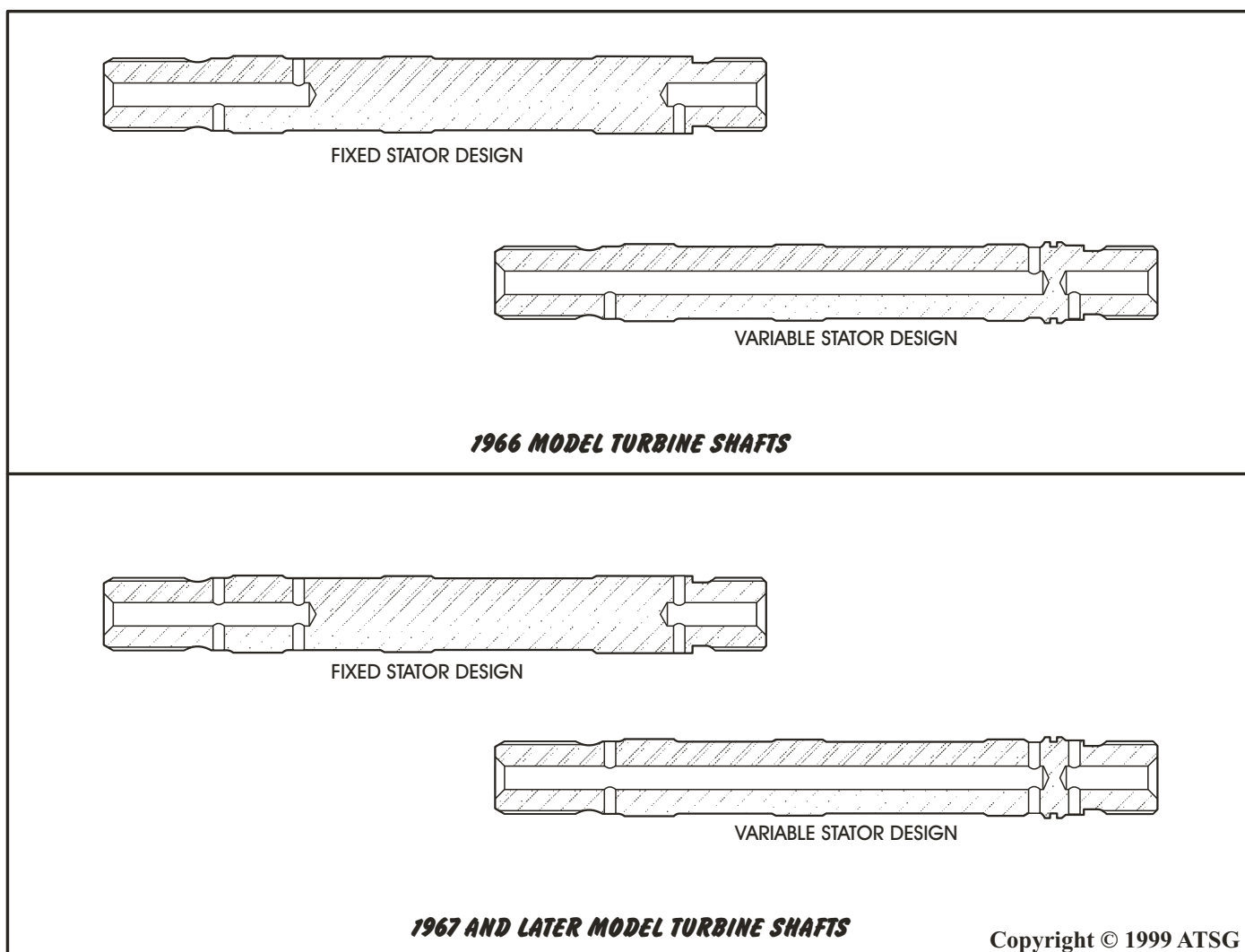
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Figure 85

Continued from Page 57

8. There are also several different turbine shafts for this transmission as shown in Figure 86. Notice that there were added oil passages in the 1967 and later model units and also notice the difference in the oil passages between "Fixed" stator turbine shafts and the "Variable" stator turbine shafts. Refer to Figure 86.
9. Install new forward center drum lip seal into the groove in forward drum, with the lip facing the direction shown in Figure 87, and lubricate with a small amount of TransJelÖ.
10. Install new forward clutch piston outer lip seal in groove of forward clutch piston, with the lip facing in the direction shown in Figure 87.
11. Install new forward clutch piston inner lip seal in groove of forward clutch piston, with the lip facing in the direction shown in Figure 87.
12. Lubricate both seals with a small amount of TransJelÖ.
Note: Some models use stamped steel forward clutch piston and spacer (See Figure 87).
13. Install inner lip seal protector J-21362 on the hub of forward drum (See Figure 88).
14. Install outer lip seal protector J-21409 into the forward drum as shown in Figure 88.
15. Install forward clutch piston assembly into the forward clutch housing using a twisting motion as shown in Figure 88.
16. Install 14 forward clutch piston return springs into the cavities in the piston in the positions shown in Figure 87, leaving two blank pockets 180 degrees from one another.
17. Install forward clutch return spring retainer on top of the springs, and lay the snap ring on top of the retainer (See Figure 89).

Continued on Page 59.



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Figure 86

Continued from Page 58

18. Compress the spring retainer and return springs and install the snap ring, using the compressor as shown in Figure 89.

Continued on Page 61.

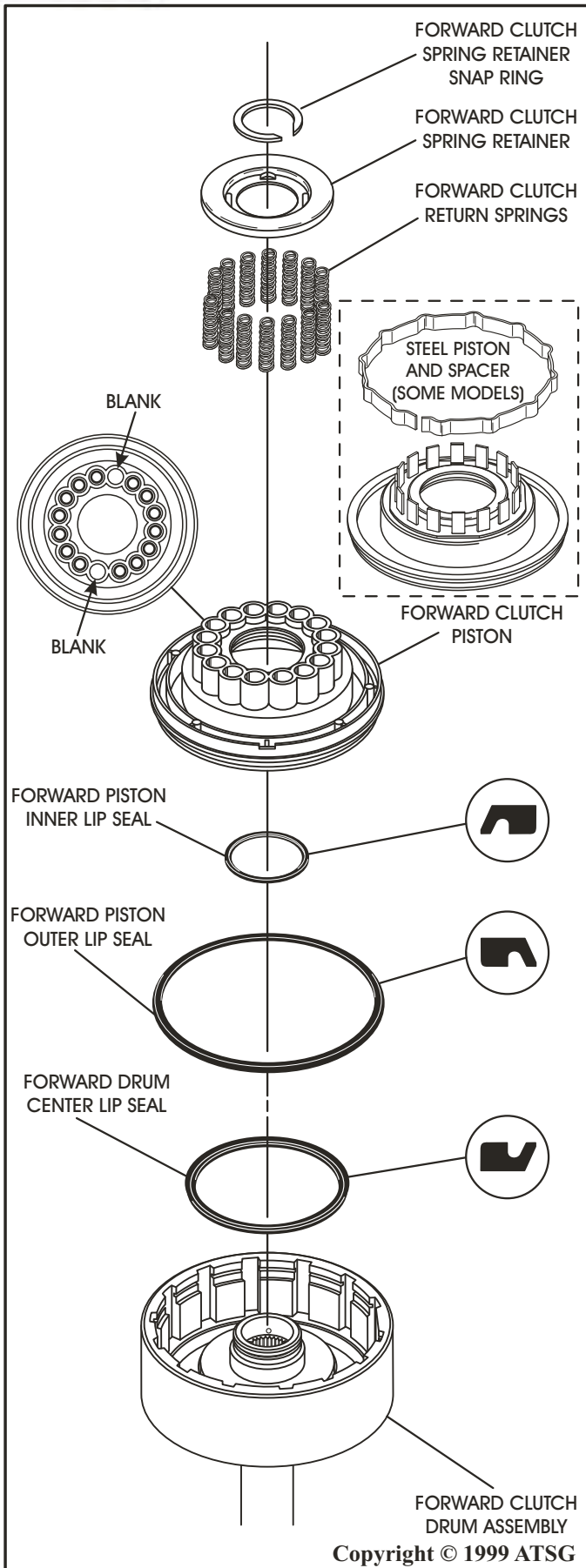


Figure 87

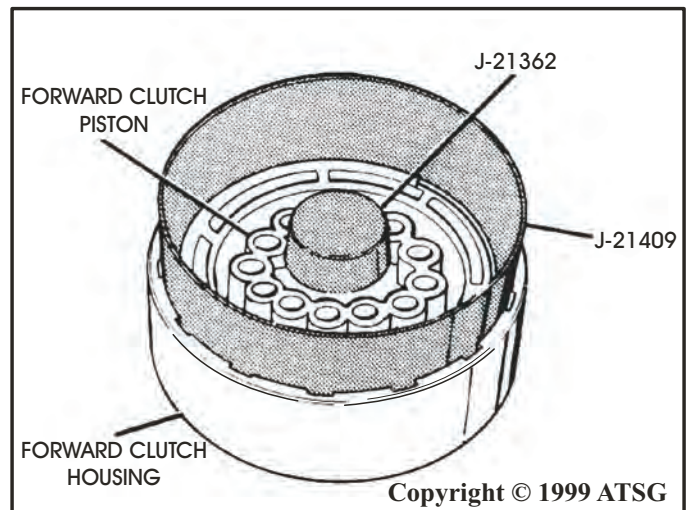


Figure 88

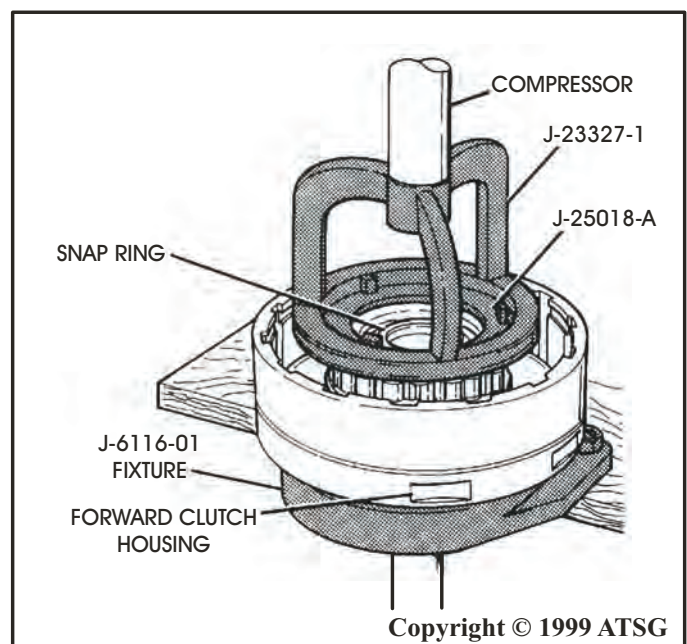
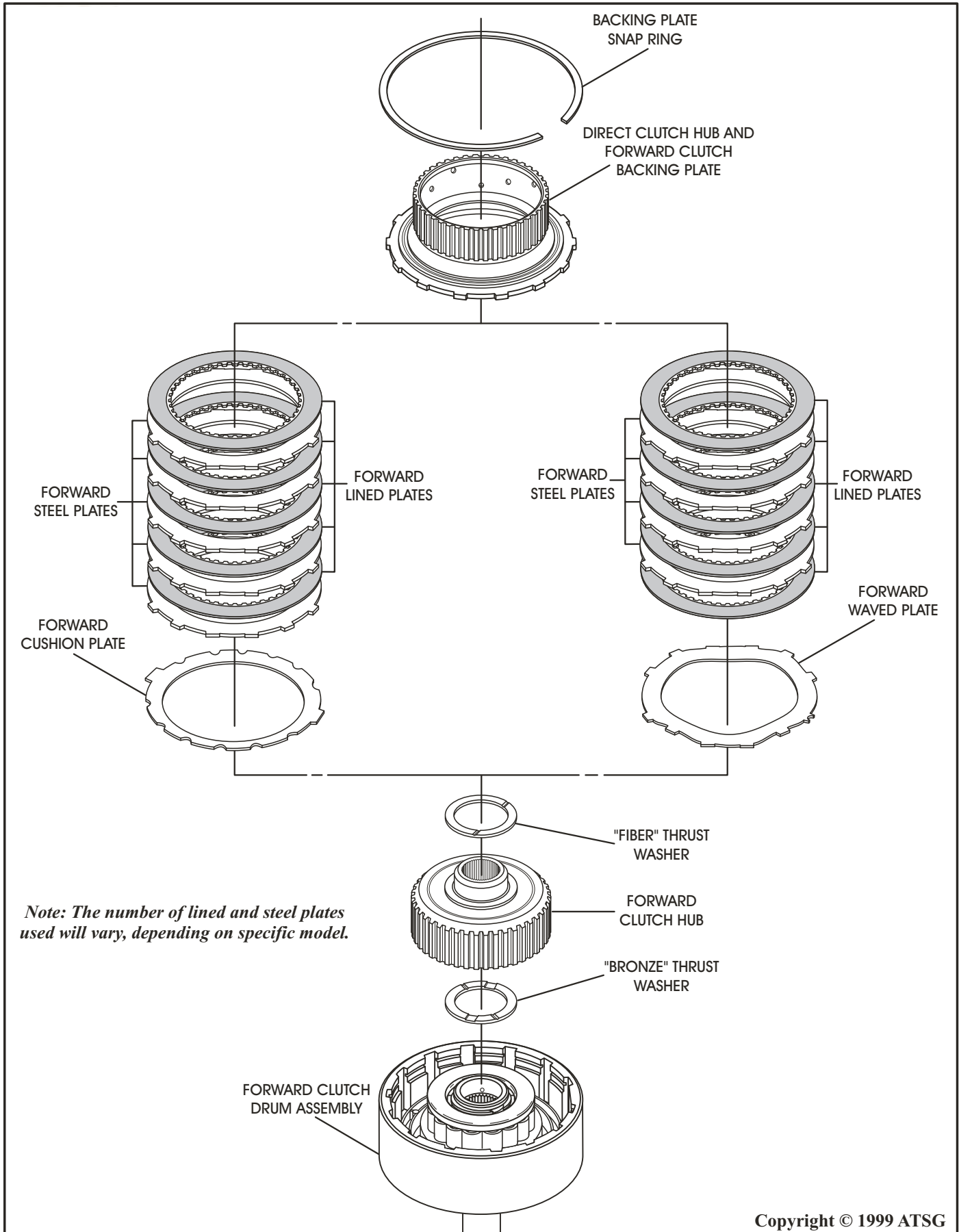


Figure 89



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Figure 90

Continued from Page 59

19. Install the bronze thrust washer onto the back side of the forward clutch hub, as shown in Figure 90, and retain with TransJelÖ.
20. Install the fiber thrust washer onto the top side of forward clutch hub, as shown in Figure 90, and retain with small amount of TransJelÖ.
21. Install the forward clutch hub with both thrust washers into the forward clutch housing. Refer to Figure 90.
22. Install the waved plate or the cushion plate, depending on the model as shown in Figure 90.
23. Install the forward clutches using Figure 90 as a guide as the stack-up is different, depending on the model you are building.

Note: The forward clutch may use 4 or 5 lined plates depending on the specific model.

24. Install the direct clutch hub/forward backing plate as shown in Figure 90.
25. Install forward clutch backing plate snap ring and ensure that it is seated in groove, as shown in Figure 90.

Note: Fwd. clutch clearance should measure approximately .010" per lined plate.

26. Set the completed forward clutch housing aside for final assembly process.

COMPONENT REBUILD (Cont'd)

GOVERNOR ASSEMBLY

1. Measure between valve and sleeve at the entry passage with the weights extended for .020" clearance, as shown in Figure 91.
2. Measure between valve and sleeve at exhaust passage with the weights full inward for .020" clearance, as shown in Figure 91.
3. We have provided you an exploded view of the governor assembly in Figure 92, even though no parts are available except the driven gear.

Continued on Page 62.

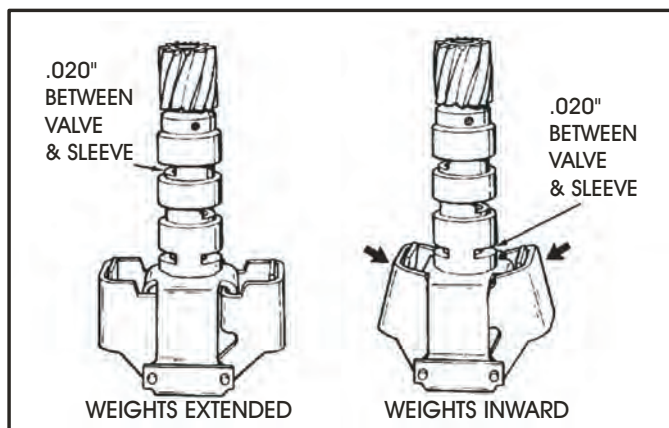
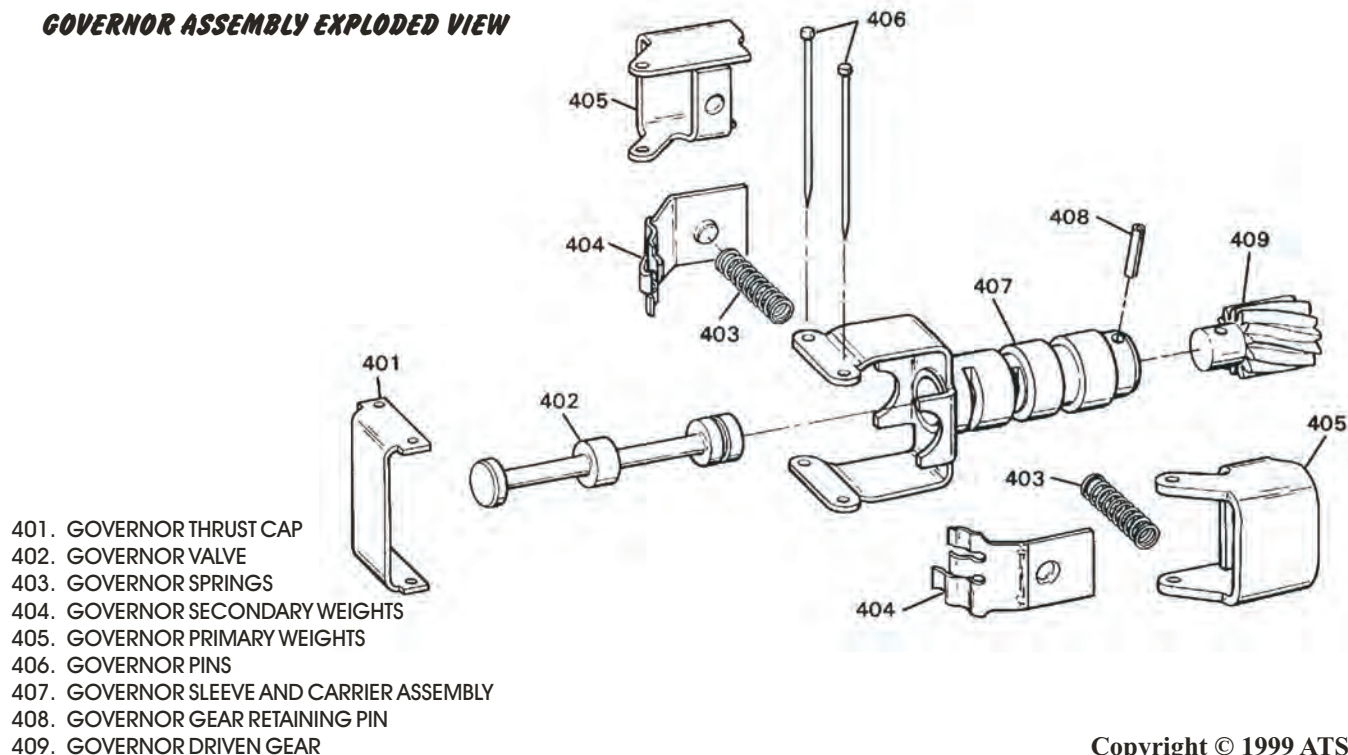


Figure 91

GOVERNOR ASSEMBLY EXPLODED VIEW



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Figure 92

Continued from Page 61

4. If it becomes necessary to replace the governor driven gear, remove the roll pin (408) and the governor driven gear (See Figure 92).
5. Install new governor driven gear into governor sleeve and carrier assembly (See Figure 92).
6. Drill new 1/8 in. (.125") hole in the sleeve and carrier assembly and governor driven gear that is 180 degrees from the original hole as shown in Figure 93.
7. Install the roll pin into the *new* 1/8" hole.
8. Inspect the weights for free movement on the pins and for free movement of the governor valve in the sleeve.
9. Set the completed governor assembly aside for the final assembly process.

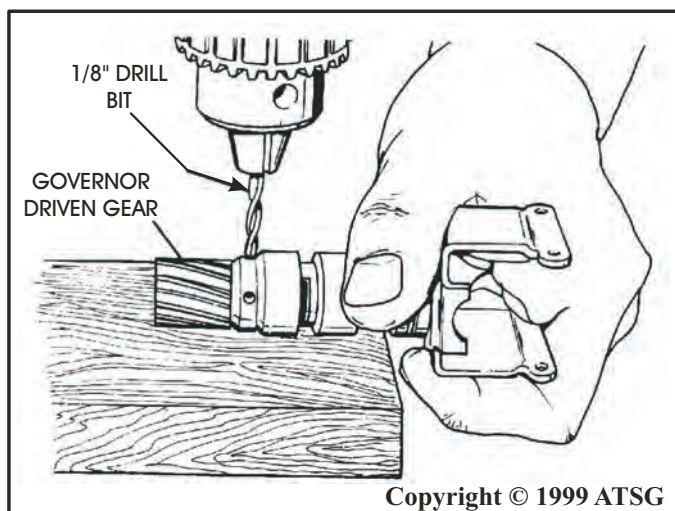


Figure 93

COMPONENT REBUILD (Cont'd)

OIL PUMP ASSEMBLY

1. Disassemble the oil pump by removing the five pump cover to pump body bolts, as shown in Figure 94.
2. Before removing the pump inner and outer gear from the pump body, mark the gear faces to ensure reassembly with same side facing up.
3. Remove the inner and outer oil pump gears from the pump body (See Figure 94).
4. Remove and discard the two oil seal rings, as shown in Figure 94.
5. Remove and discard the converter helix seal using a seal remover tool (See Figure 94).
6. Remove the pressure regulator retaining snap ring, as shown in Figure 94.

Caution: *Pressure regulator spring is tightly compressed and the boost sleeve and the snap ring will be loaded with pressure. Use caution when removing the snap ring.*

7. Inspect all oil pump assembly parts thoroughly for any wear and/or damage.
8. Clean all oil pump parts thoroughly and dry with compressed air.
9. Install the outer and inner pump gears into the pump body with previous marks facing up, as shown in Figure 95.
10. Measure the clearance between the pump gears and the face of the pump body. This clearance is shown as Dimension "A" in Figure 95.
Caution: *Clearance here is critical and should be .018mm-.066mm (.0007"-.0026").*
11. Remove both pump gears and install new pump body bushing as necessary (See Figure 94).
12. Install new converter helix seal using proper seal driver to prevent damage.
13. Re-install outer and inner pump gears in proper direction with marks facing up, as shown in Figure 95, and lubricate with trans fluid.
Note: *Lugs on the inner gear should be flush with the pump body face.*
14. Install the pump cover onto the pump body and install the five retaining bolts in their proper locations as shown in Figure 96.
Note: *Do Not torque at this time. Install finger tight only.*

Continued on Page 64.

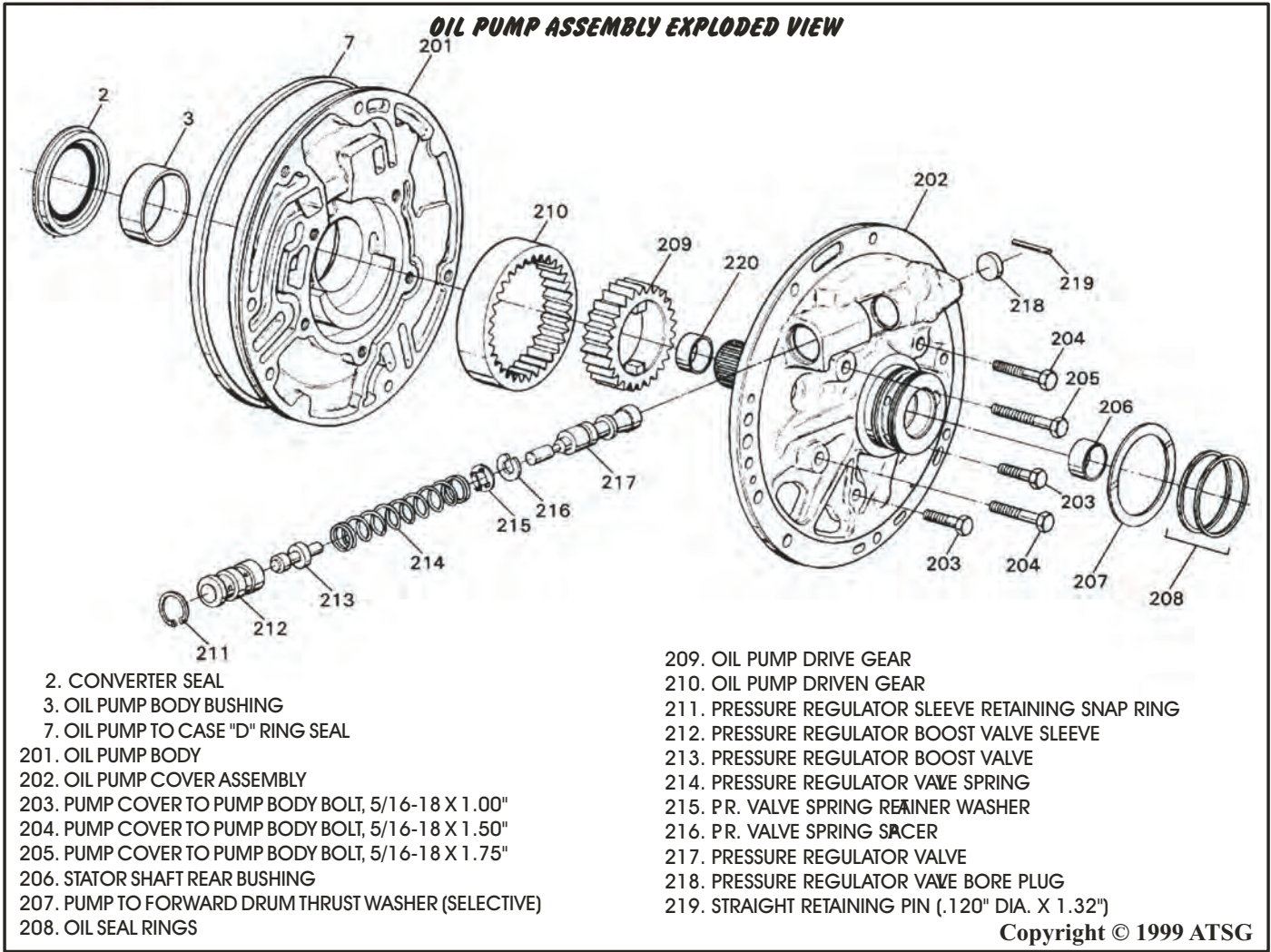


Figure 94

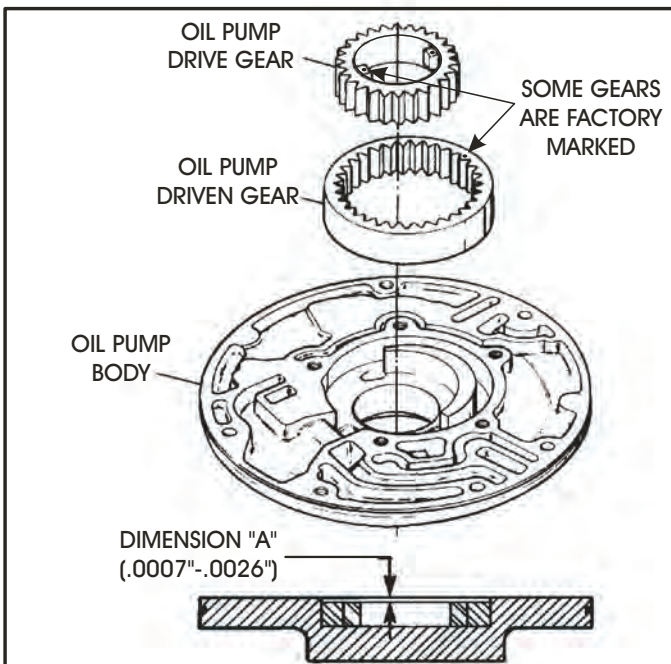


Figure 95

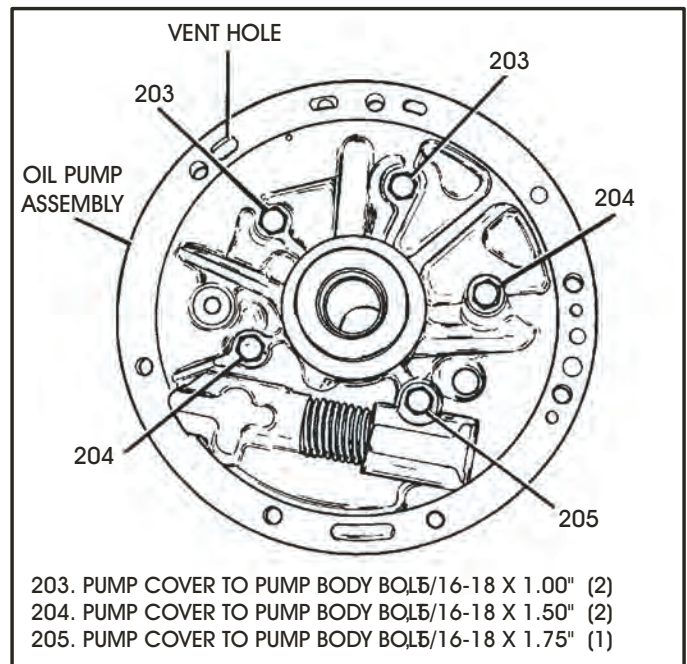


Figure 96

Continued from Page 62

15. Install the pressure regulator bore plug and the straight retaining pin into oil pump cover, if it was removed, as shown in Figure 97.
16. Install the proper pressure regulator valve into oil pump cover, as shown in Figure 97.
Caution: All pressure regulator valves will not work with All oil pump covers. Care must be used to ensure proper pressure regulator valve is installed (See Figure 99).
17. Install pressure regulator spacer or spacers, if they were used, as shown in Figure 97.
18. Install pressure regulator spring and retainer into pressure regulator bore (See Figure 97).
19. Lubricate pressure regulator boost valve and install boost valve into boost valve sleeve as shown in Figure 97.
20. Install the boost valve and sleeve assembly in the pressure regulator bore, push in with a pin punch to overcome spring pressure and install the retaining snap ring (See Figure 97).
Note: It should be mentioned here that not all pump halves will work with one another. If replacement was necessary, of either half, refer to the chart on Page 18 to ensure that you have compatible parts.
21. With the pump cover to pump body bolts loose, install the pump alignment strap J-21368 onto the pump assembly, and tighten the wing nut, as shown in Figure 98.
22. Torque pump cover to pump body bolts down to 24 Nm (18 ft.lb.) using a crossing pattern from side to side (See Figure 98).

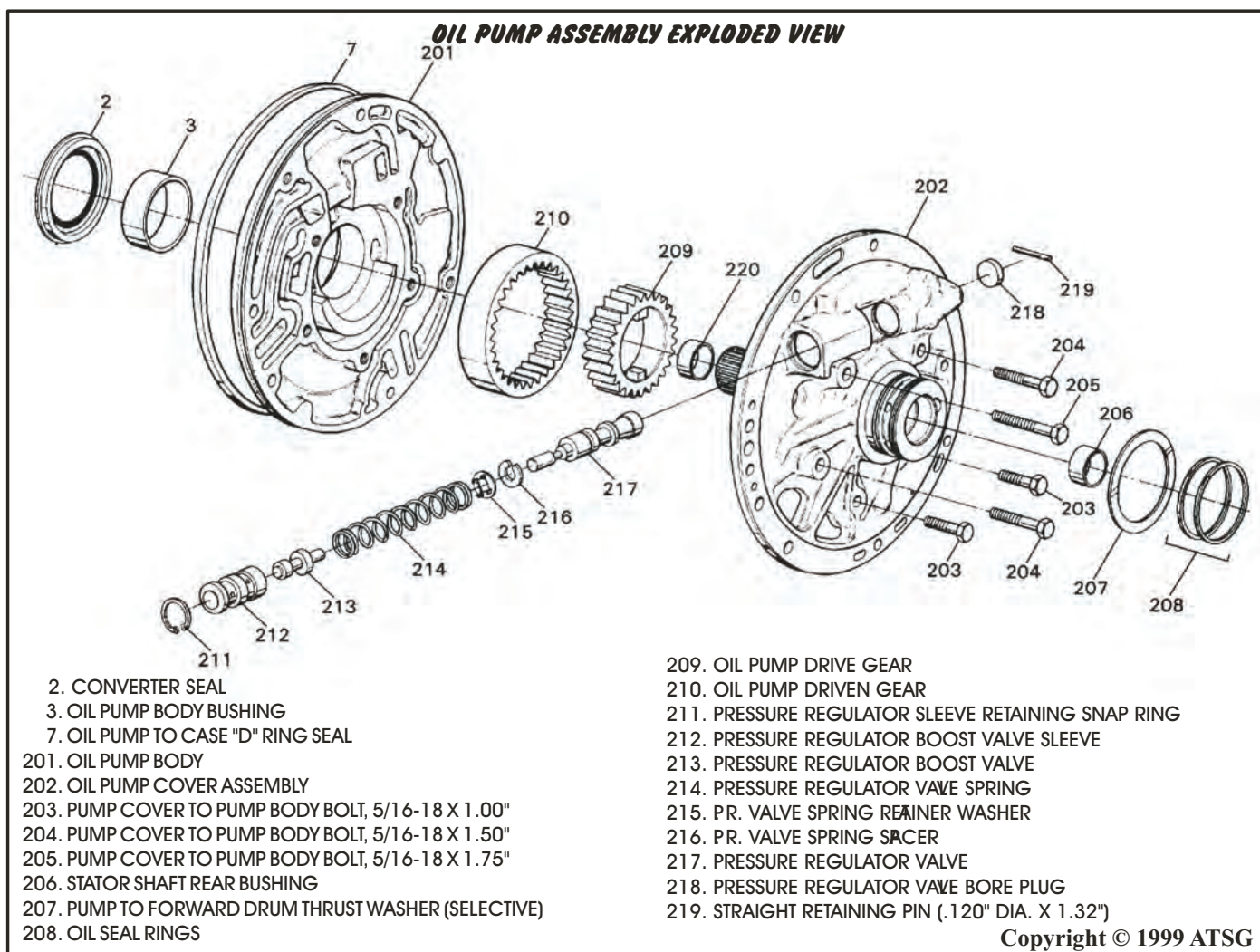


Figure 97

23. Install new pump to case "D" ring seal in the groove in the pump, ensure that it is not twisted and lubricate with small amount of TransJel. (See Figure 97).
24. Install the correct selective thrust washer, as determined by the front end-play check during disassembly, and retain with TransJel. Refer to Figure 97.
25. Install the two oil seal rings into the grooves in the pump cover and lubricate with a small amount of trans fluid (See Figure 97).
26. Set the completed oil pump assembly aside for the final assembly process.

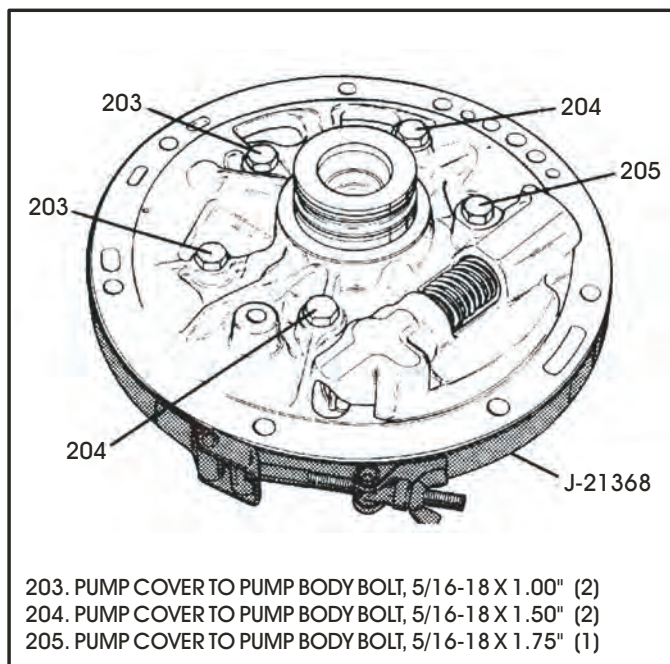


Figure 98

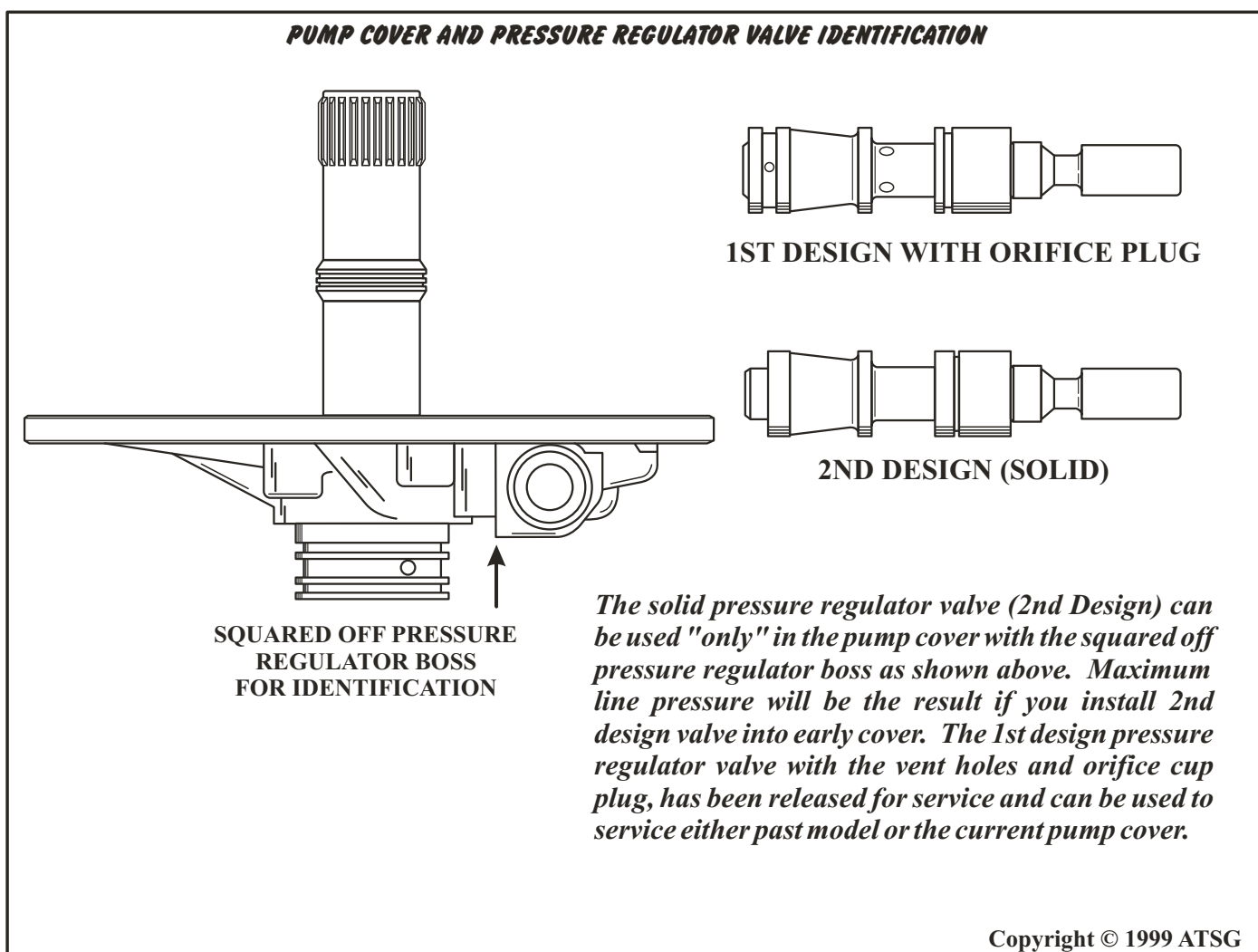


Figure 99

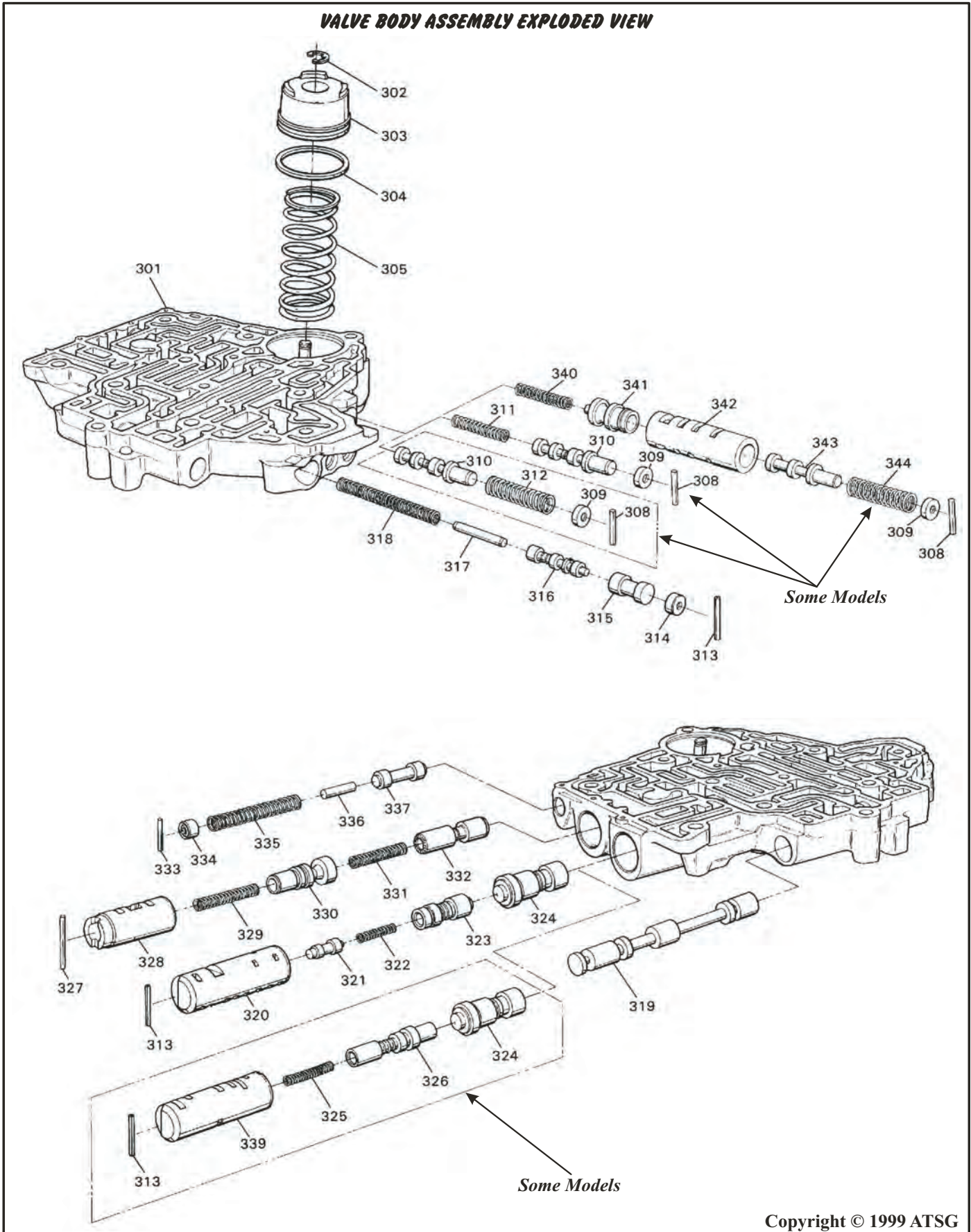


Figure 100

LEGEND FOR FIGURE 100

301. VALVE BODY CASTING	324. 1-2 SHIFT VALVE
302. 2-3 ACCUMULATOR PISTON RETAINING "E" CLIP	325. 1-2 MODULATOR VALVE SPRING (SOME MODELS)
303. 2-3 ACCUMULATOR PISTON	326. 1-2 MODULATOR VALVE (SOME MODELS)
304. 2-3 ACCUMULATOR PISTON SEAL	327. STRAIGHT RETAINING PIN (.120" DIA X 1.320")
305. 2-3 ACCUMULATOR PISTON SPRING	328. 2-3 MODULATOR VALVE BUSHING
308. GROOVED RETAINING PIN	329. 2-3 MODULATOR VALVE SPRING
309. 1-2 ACCUMULATOR VALVE BORE PLUG (.560" O.D.)	330. 2-3 MODULATOR VALVE
310. 1-2 ACCUMULATOR VALVE (SOME MODELS)	331. 2-3 SHIFT VALVE SPRING
311. 1-2 ACCUMULATOR VALVE SPRING (SOME MODELS)	332. 2-3 SHIFT VALVE
312. 1-2 ACCUMULATOR VALVE SPRING (SOME MODELS)	333. STRAIGHT RETAINING PIN (.120" DIA X .820")
313. RETAINING ROLLED PIN	334. 3-2 DOWNSHIFT VALVE BORE PLUG (.437" O.D.)
314. DETENT REGULATOR VALVE BORE PLUG (.500" O.D.)	335. 3-2 DOWNSHIFT VALVE SPRING
315. DETENT VALVE	336. 3-2 DOWNSHIFT VALVE PIN
316. DETENT REGULATOR VALVE	337. 3-2 DOWNSHIFT VALVE
317. DETENT REGULATOR VALVE PIN	339. 1-2 MODULATOR VALVE BUSHING (SOME MODELS)
318. DETENT REGULATOR VALVE SPRING	340. 1-2 ACCUMULATOR VALVE PRIMARY SPRING (SOME MODELS)
319. MANUAL VALVE	341. 1-2 ACCUMULATOR VALVE, PRIMARY (SOME MODELS)
320. 1-2 MODULATOR VALVE BUSHING (SOME MODELS)	342. 1-2 ACCUMULATOR VALVE BUSHING (SOME MODELS)
321. 1-2 REGULATOR VALVE (SOME MODELS)	343. 1-2 ACCUMULATOR VALVE SECONDARY (SOME MODELS)
322. 1-2 REGULATOR VALVE SPRING (SOME MODELS)	344. 1-2 ACCUMULATOR VALVE SECONDARY SPRING (SOME)
323. 1-2 DETENT VALVE (SOME MODELS)	

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Figure 101

COMPONENT REBUILD (Cont'd)

VALVE BODY ASSEMBLY

1. Remove the 2-3 accumulator piston from the valve body casting using J-22269-01 press, as shown in Figure 102.
2. Remove and discard the 2-3 accumulator piston seal ring (See Figure 100).
3. Remove the 2-3 accumulator piston spring as shown in Figure 100.
4. Clean the valve body assembly thoroughly in clean solvent, and dry with compressed air.
5. Move the valves carefully with a pick or small screwdriver to dislodge any dirt or debris that may have accumulated.
6. Position the valve body on a clean dry surface.
7. Remove the valve trains one at a time and lay them out on a clean surface in the exact order that they are removed (See Figure 100).
8. Clean all valves, springs, bushings and valve body casting in clean solvent and dry with compressed air.
9. Inspect all valves and bushings for porosity, scoring, nicks and scratches.
10. Inspect springs for damaged or distorted coils.
11. Inspect valve body casting for porosity, cracks, damaged machined surfaces and interconnected passages.

12. Assemble the valve body components exactly as shown in Figure 100. Notice the position of the valve lands and bushing passages.
13. Notice also that we have provided you with all of the different valve line-ups for the various models that are out there (See Figure 100).

Continued on Page 68.

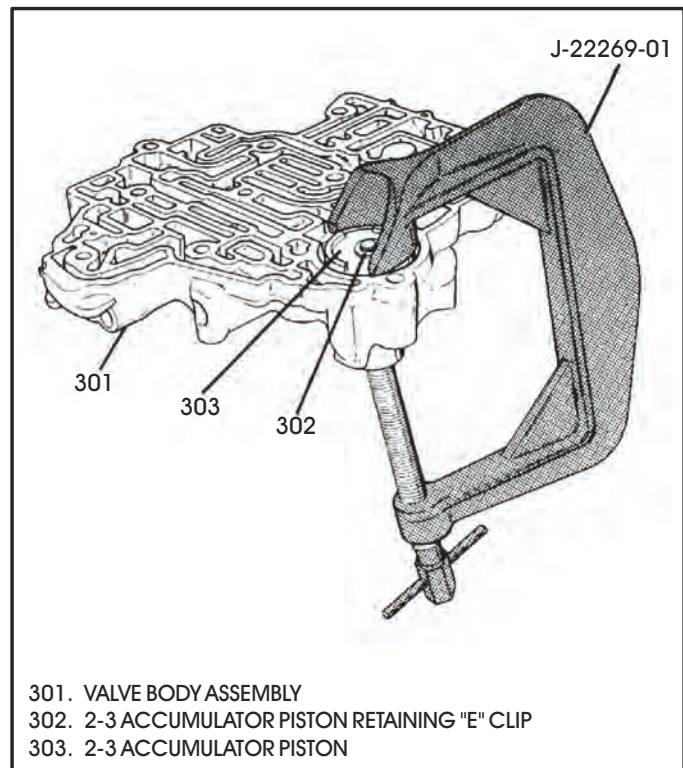


Figure 102

FRONT SERVO AND ACCUMULATOR PARTS

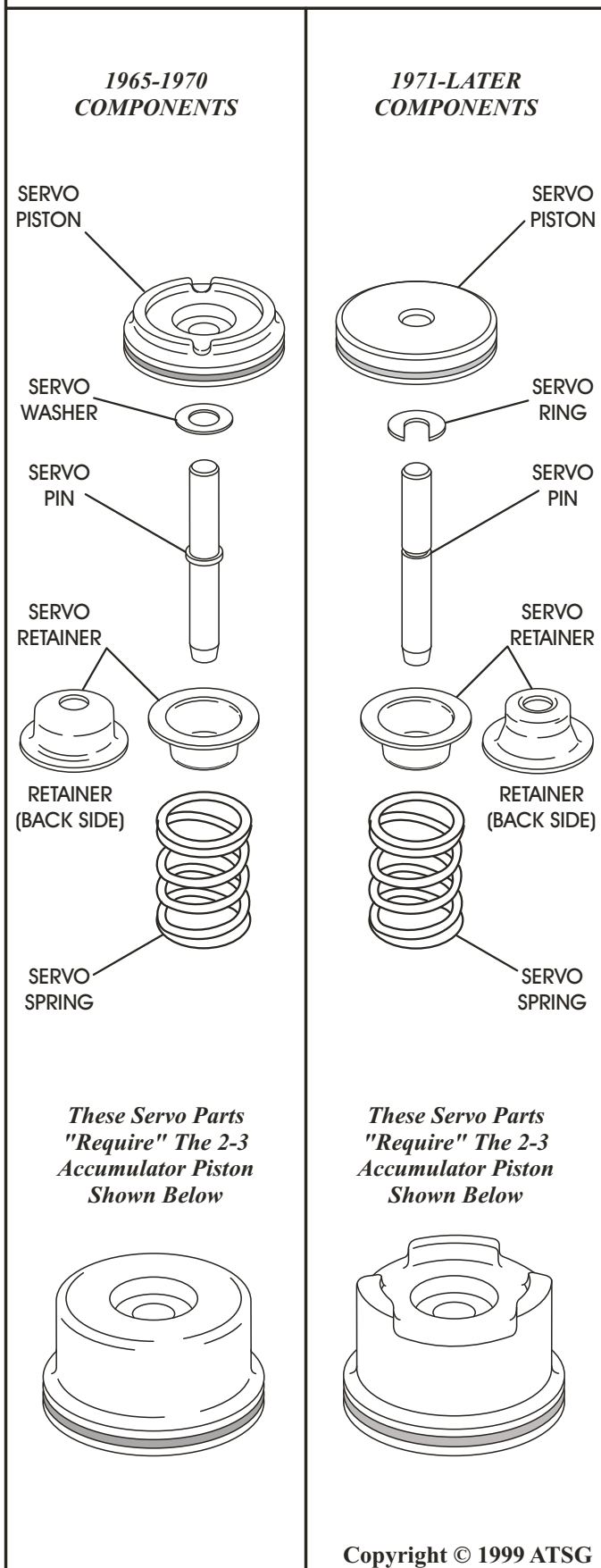


Figure 103

CONTINUED FROM PAGE 67

14. Install the 2-3 accumulator spring in the valve body bore, as shown in Figure 100.
15. Install the proper 2-3 accumulator piston with a new seal on piston as shown in Figure 100.
Caution: *There are two different styles of the 2-3 accumulator piston. One with "Castles" on top and one that is flat on top. The 2-3 accumulator piston "Must" be matched with the front servo parts, as shown in Figure 103.*
16. Compress the 2-3 accumulator piston against the spring pressure using J-2226-01, as shown in Figure 102, and install retaining "E" clip.
17. Install the manual valve into the manual valve bore in the valve body (See Figure 100).
18. Set the completed valve body assembly aside for the final assembly process.

FINAL TRANSMISSION ASSEMBLY

1. Install the completed case assembly into the fixture and rotate so that the bell housing is facing up, as shown in Figure 104.
2. Install the steel selective thrust washer with the tabs engaged into the slots in case, and retain with TransJelÖ (See Figure 104).

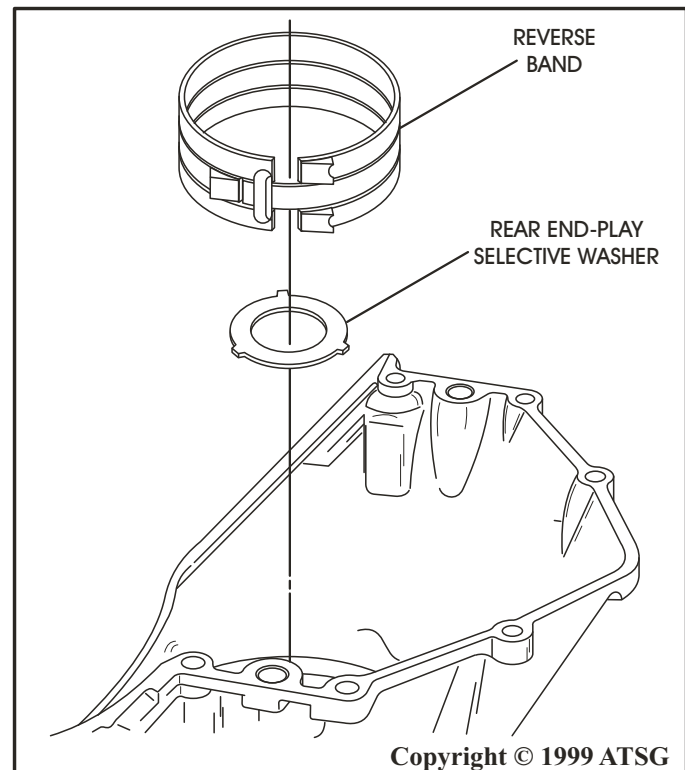


Figure 104

3. Install the reverse band into the case and ensure that it engages on case lugs (See Figure 104).
4. Install the "fretting" snap ring into the proper groove in the case, if it was removed, as shown in Figure 105.

Note: Use of the fretting snap ring (657) is determined by the thickness of the lug area on the center support. The cases are the same this area. Refer to Figure 106 to determine whether your center support requires the fretting snap ring (657), and proper location in the transmission case.

Continued on Page 70.

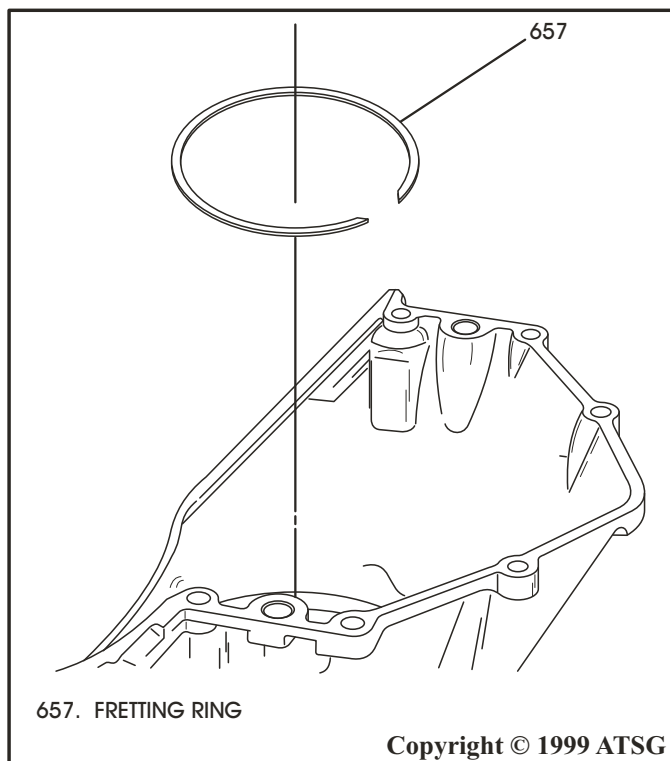


Figure 105

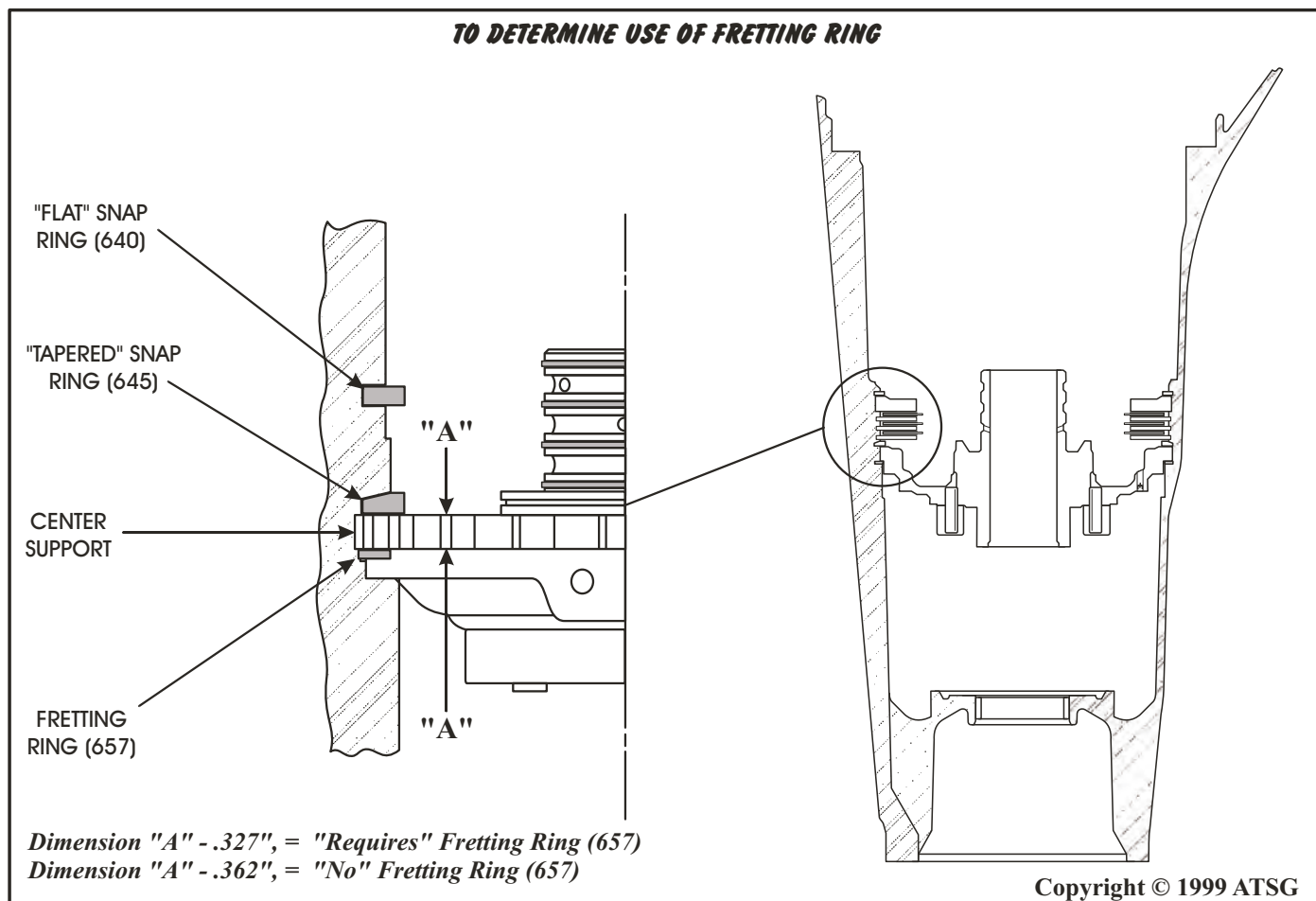


Figure 106

CONTINUED FROM PAGE 69

5. Install the completed gear train assembly into the transmission case, by carefully aligning the bolt hole in the center support with the hole in the case, and carefully lower into case. Refer to Figures 107 and 108.

6. Start a new center support bolt into the center support, but **do not** tighten.

Note: There are two different support bolts, as shown in Figure 108. Ensure that your bolt is compatible with both the transmission case and the center support for the model that you are building. 1990 and later cases and center supports require the long bolt.

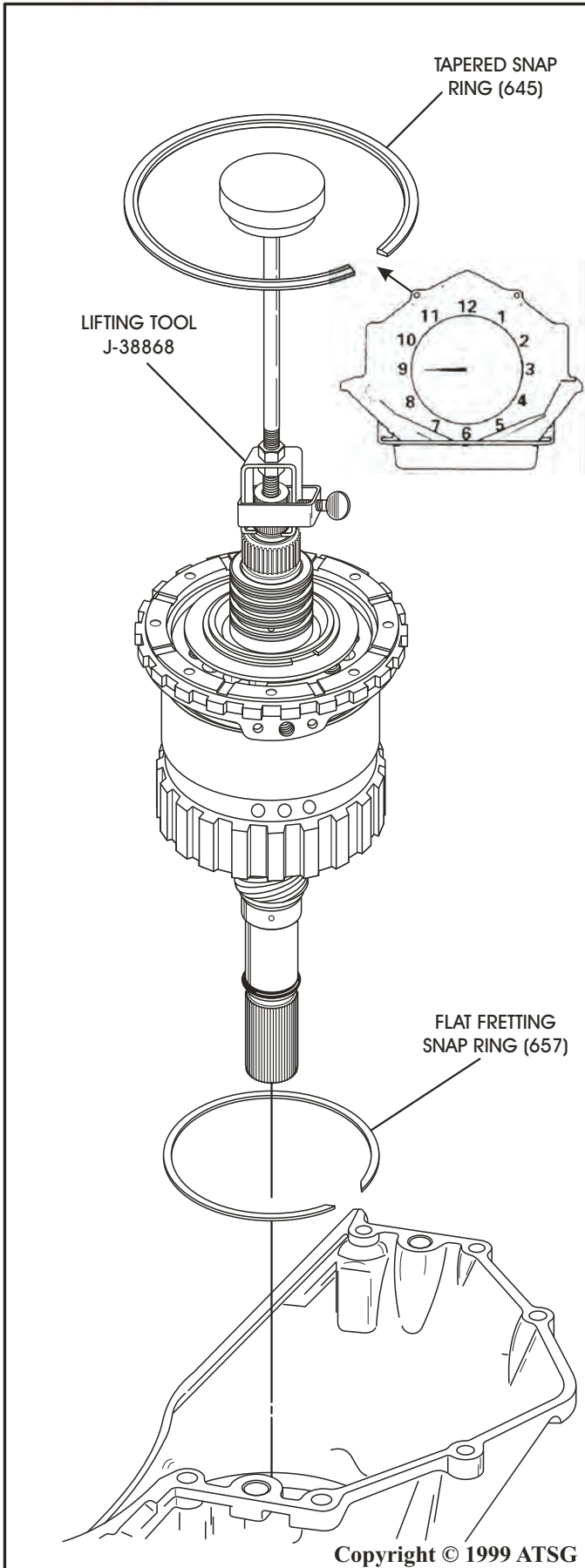


Figure 107

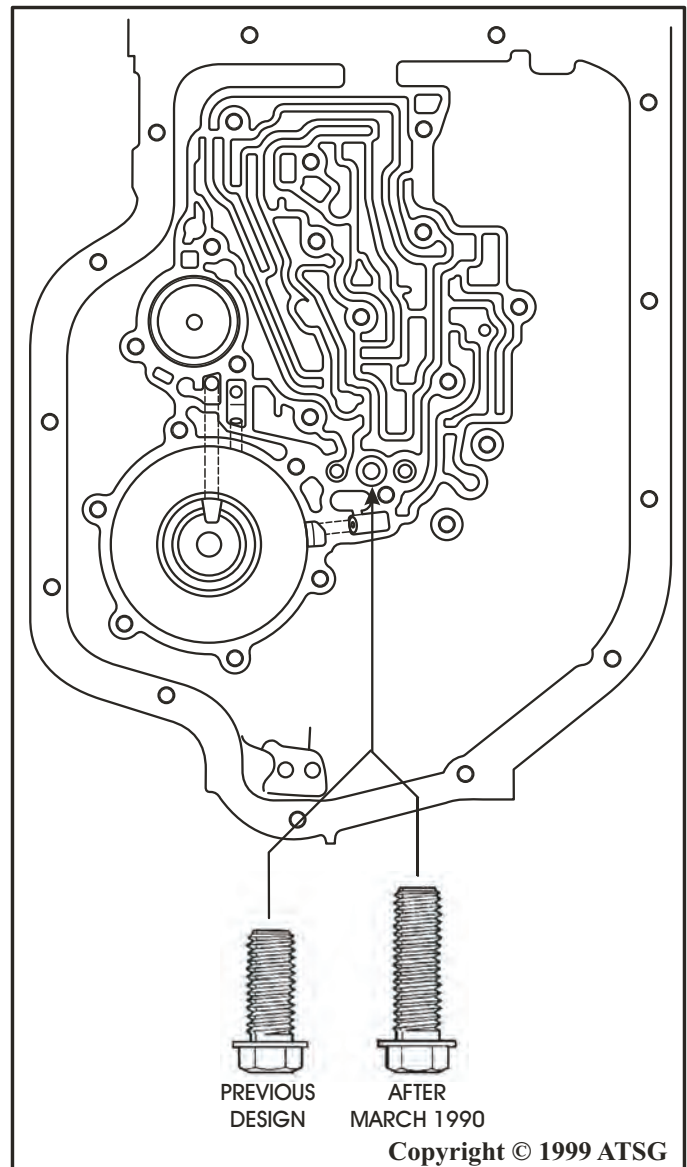


Figure 108

7. Install the "Tapered" snap ring into the groove in the case with the opening in the snap ring to the 9 O-Clock position in the case, as shown in Figure 107.
 8. Locate a small screwdriver into center support direct clutch passage through the case. Apply pressure on the screwdriver so as to rotate the center support counterclockwise, seating the center support lugs on the case lugs.
 9. Now torque the new center support bolt down to 30 Nm (22 ft.lb.) as you hold pressure on the center support.
 10. Install the intermediate clutch wave plate, if it is used in your model (See Figure 109).
 11. Install the intermediate clutches beginning with a steel plate and alternating with a lined plate, until you have three of each installed, as shown in Figure 109.
- Note: If the waved plate is used you begin with a lined plate on top of the waved plate and then alternate until you have three each.*
12. Install the intermediate clutch backing plate on top of the last friction plate, ensuring that it is fully seated, as shown in Figure 109.
 13. Install the "Flat" intermediate clutch backing plate snap ring, with the opening in snap ring facing the 3 O-Clock position in the case.

Continued on Page 72.

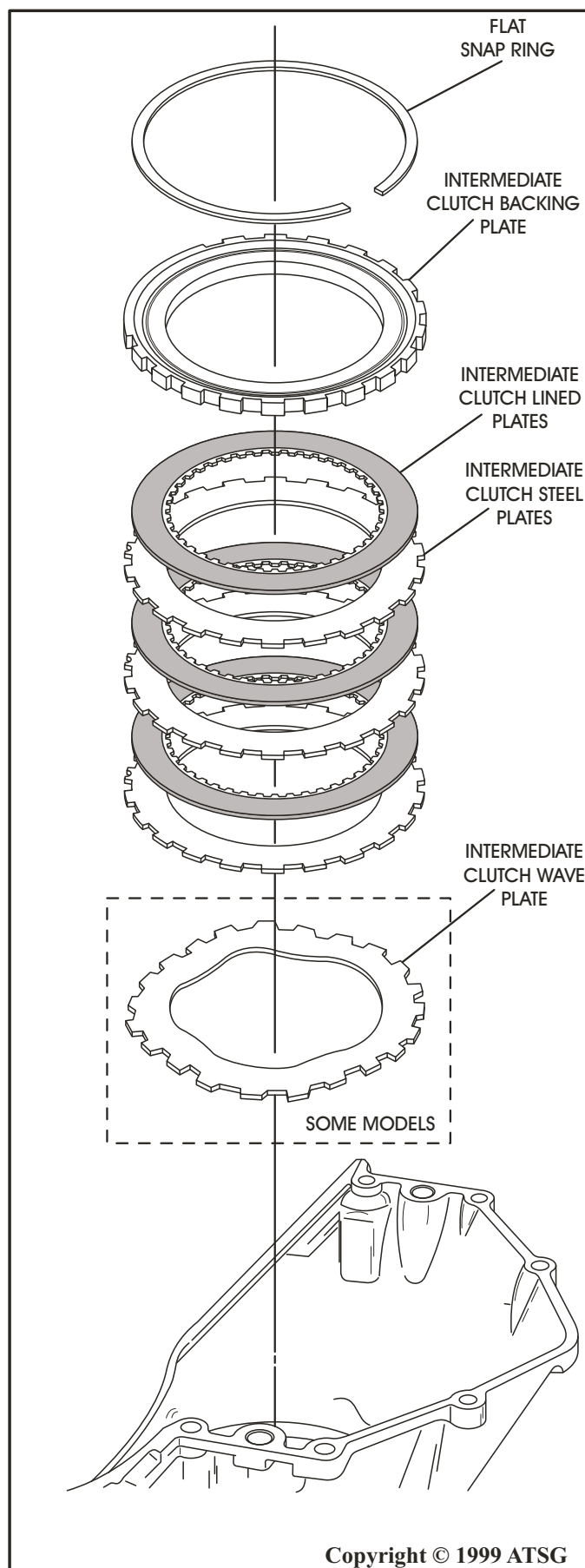


Figure 109

CONTINUED FROM PAGE 71

14. Install the manual 2nd band assembly into the case, ensuring that it is engaged on the lug in the case (See Figure 110).
15. Install the completed direct clutch housing assembly into the case by rotating to engage sprag outer race into teeth of the intermediate lined plates, until fully seated (See Figure 110).
16. Install the completed forward clutch housing assembly into the case by rotating back and forth until fully seated (See Figure 111).
17. Install the oil pump to case gasket onto the case as shown in Figure 112, ensuring that the holes are properly aligned.
18. Lubricate the case bore for the "D" ring with a small amount of TransJelö.
19. Install the completed oil pump assembly into the case, as shown in Figure 112.

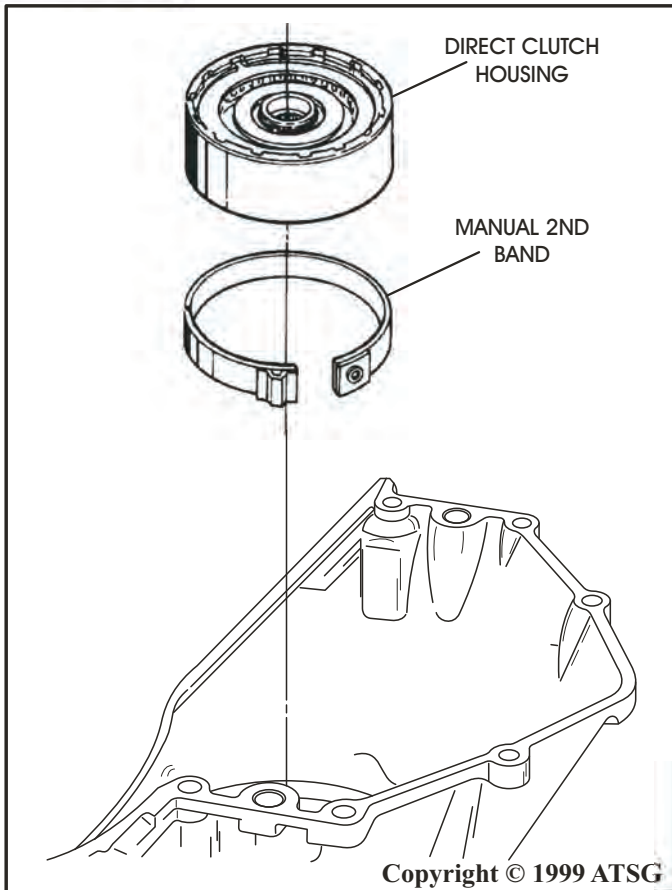


Figure 110

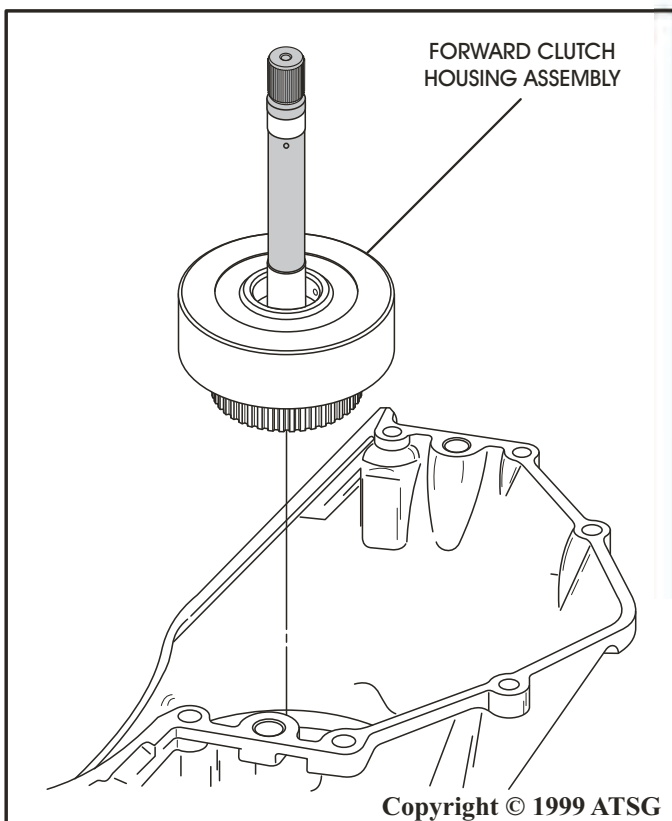
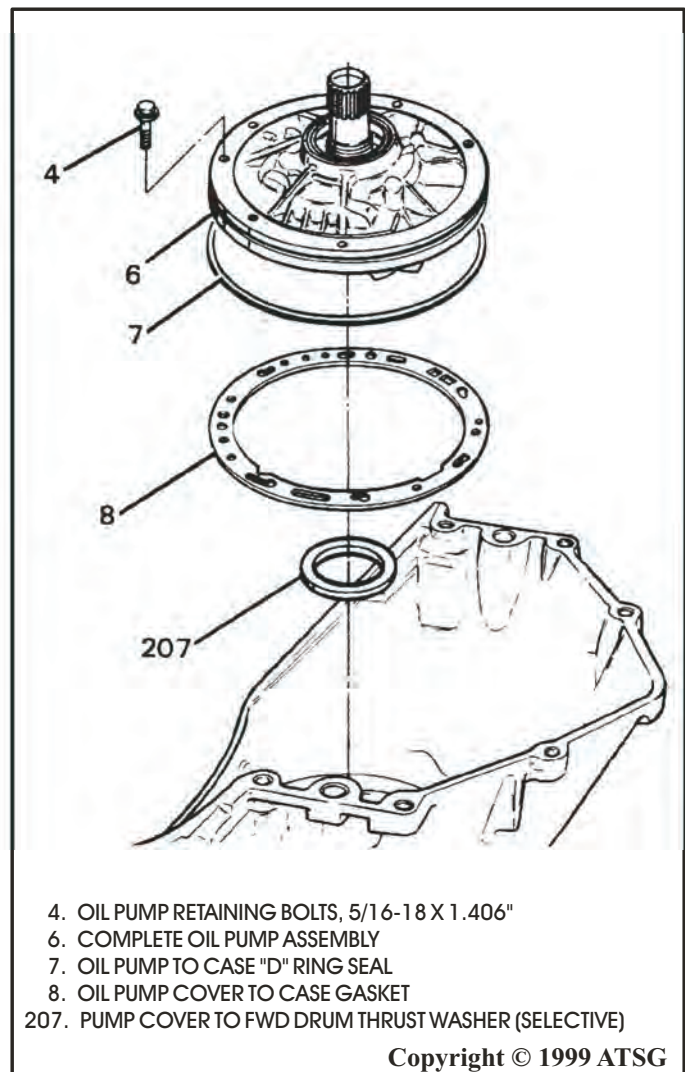


Figure 111



4. OIL PUMP RETAINING BOLTS, 5/16-18 X 1.406"
6. COMPLETE OIL PUMP ASSEMBLY
7. OIL PUMP TO CASE "D" RING SEAL
8. OIL PUMP COVER TO CASE GASKET
207. PUMP COVER TO FWD DRUM THRUST WASHER (SELECTIVE)

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Figure 112

20. Install the oil pump assembly to case retaining bolts, as shown in Figure 112.

Caution: *There are two different types of the pump retaining bolts, one type that uses the fiber washer and one type that uses "O" ring seal as shown in Figure 113. You must use proper type of seal on the appropriate bolt.*

21. Torque the oil pump retaining bolts down to 24 Nm (18 ft.lb.)

Note: *If turbine shaft cannot be rotated as the pump assembly is being pulled into place, the forward and/or direct clutch housings have not been installed properly to index with all of the clutch plates. This condition must be fixed before pump assembly is fully seated.*

22. Install J-6125 slide hammer bolt in place of the pump bolt as shown in Figure 114.

23. Install dial indicator on the bolt and index it to the end of the turbine shaft (See Figure 114).

24. Move the turbine shaft in and out and observe end-play reading on dial indicator.

25. Proper front end play is .178mm - .483mm (.007" - .019").

26. Remove the dial indicator tools and correct as necessary, by changing the selective thrust on the back side of pump assembly, and using the chart provided in Figure 115.

27. Replace the pump bolt and torque to 18 ft.lb. if front end-play is correct.

Continued on Page 74.

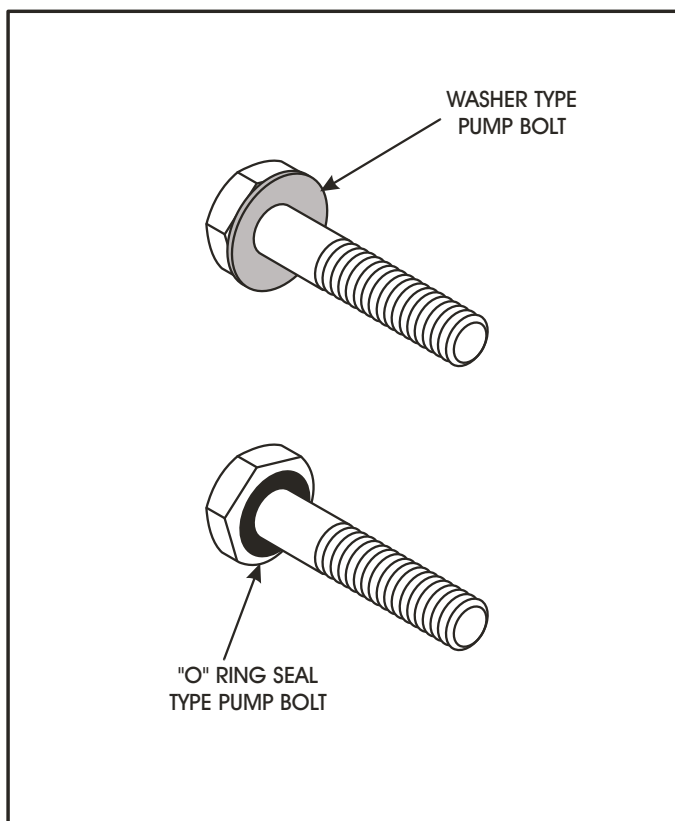


Figure 113

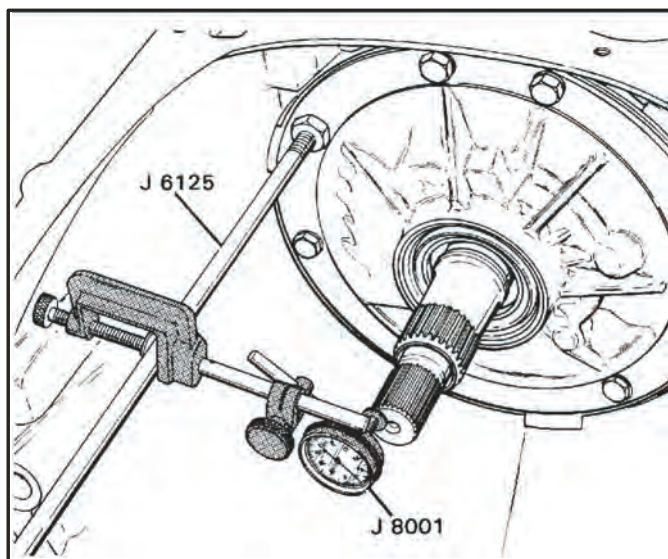


Figure 114

FRONT END PLAY WASHER CHART		
THICKNESS	COLOR I.D.	NUMBER
.060" - .064"	YELLOW	0
.071" - .075"	BLUE	1
.082" - .088"	RED	2
.093" - .097"	BROWN	3
.104" - .108"	GREEN	4
.115" - .119"	BLACK	5
.126" - .130"	PURPLE	6

Figure 115

CONTINUED FROM PAGE 73

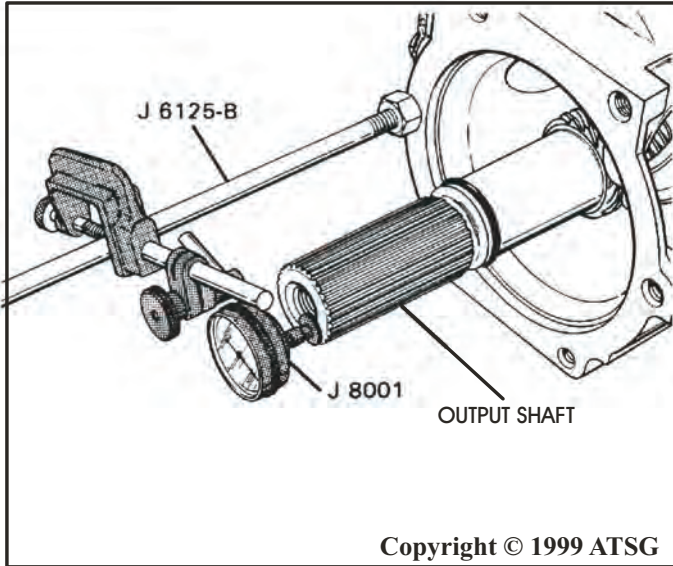


Figure 116

28. Install J-6125 slide hammer bolt in hole of the case, as shown in Figure 116.
29. Install dial indicator on the bolt and index it to the end of the output shaft (See Figure 114).
30. Move the output shaft in and out and observe end-play reading on dial indicator.
31. Proper rear end play is .178mm - .483mm (.007" - .019").
32. Remove the dial indicator tools and correct as necessary, by changing steel selective thrust washer in the rear of transmission, and using the chart provided in Figure 117.
33. Place J-21370-10 gage pin into the reverse servo pin bore (See Figure 118).
34. Position J-21370-6 selector gage tool over the bore with the hex nut facing parking linkage, as shown in Figure 118.
35. Fasten with two 5/16-18 x 1" bolts and torque to 24 Nm (18 ft.lb.) (See Figure 118).

REAR END PLAY WASHER CHART		
THICKNESS	I.D. NOTCH	NUMBER
.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

REAR END PLAY SELECTIVE THRUST WASHER

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Figure 117

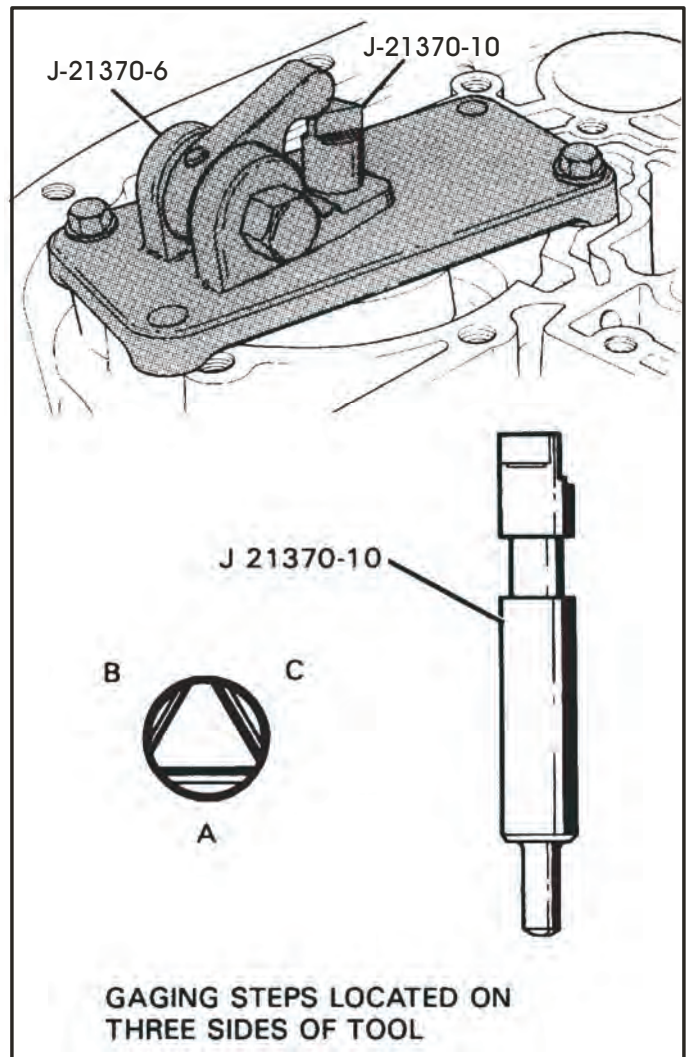


Figure 118

FRONT SERVO AND ACCUMULATOR PARTS

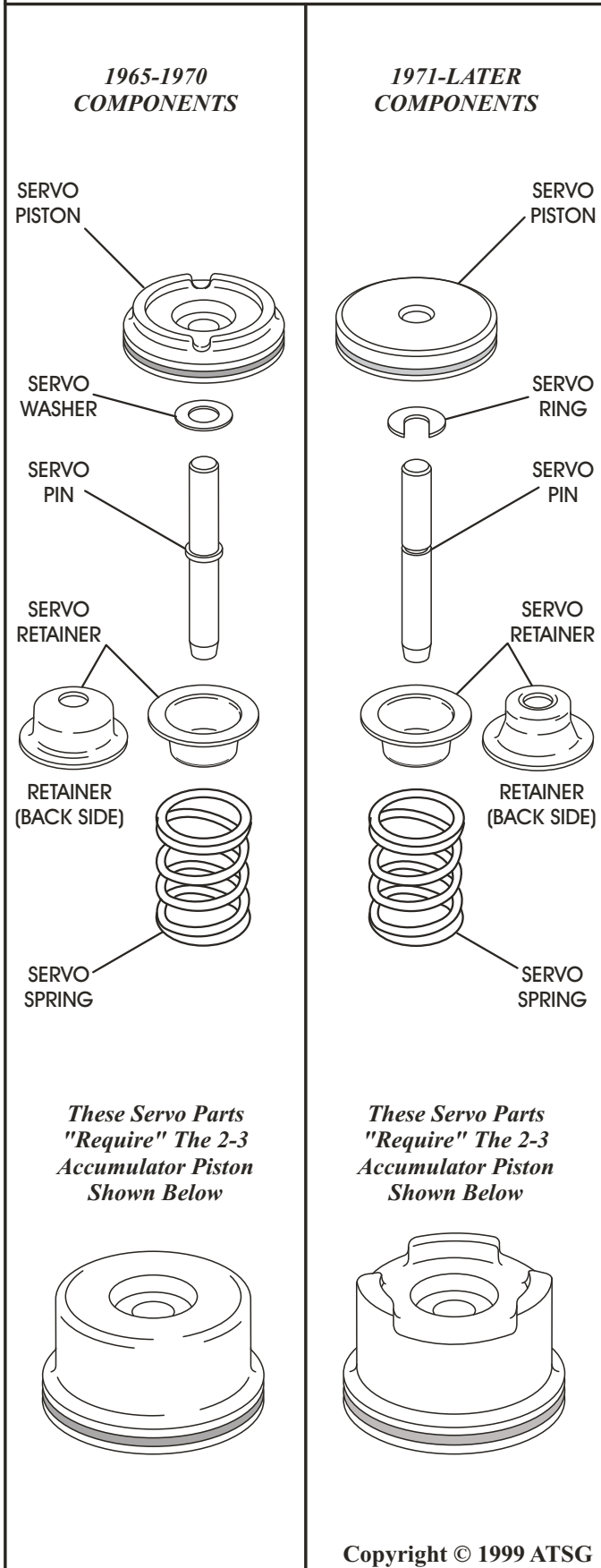


Figure 121

CONTINUED FROM PAGE 75

46. Install the manual 2 servo components into the case bore as shown in Figure 122.
Caution: *There are two different styles of the Manual 2 servo components. One with the "Castles" on top of the servo piston and one that is flat on top. The servo components must match the 2-3 accumulator piston in the valve body, as shown in Figure 121.*
47. Ensure that proper manual 2 servo components are installed into case bore (See Figure 122).
48. Install a new governor screen into the case in the position and location shown in Figure 123.
49. Install the proper amount of 1/4" (.250") Dia. checkballs into the proper pockets in the case, according to the model that you are building, as shown in Figure 124.

Continued on Page 78.

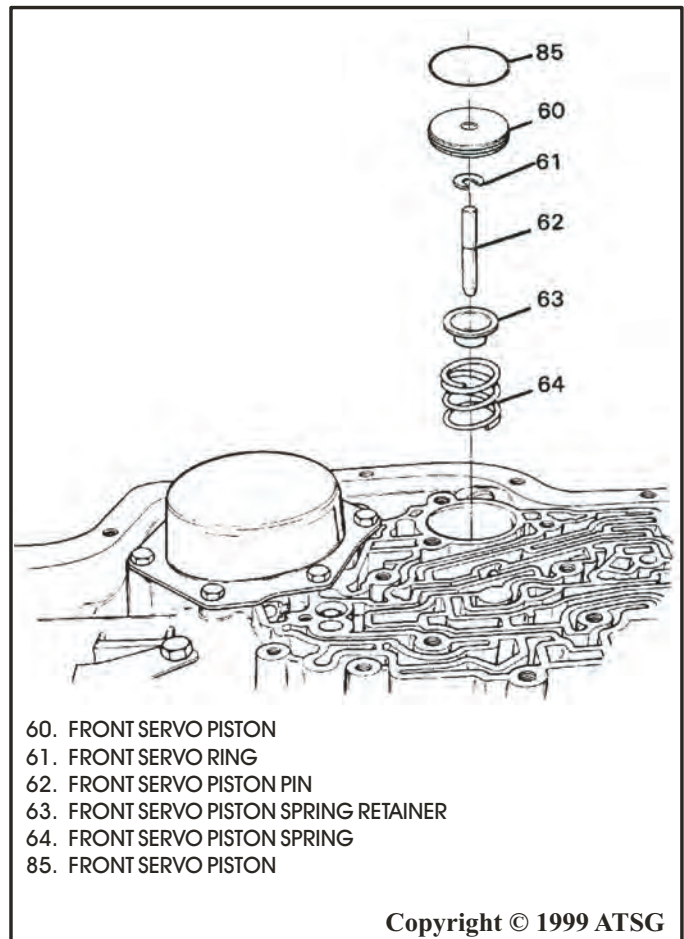


Figure 122

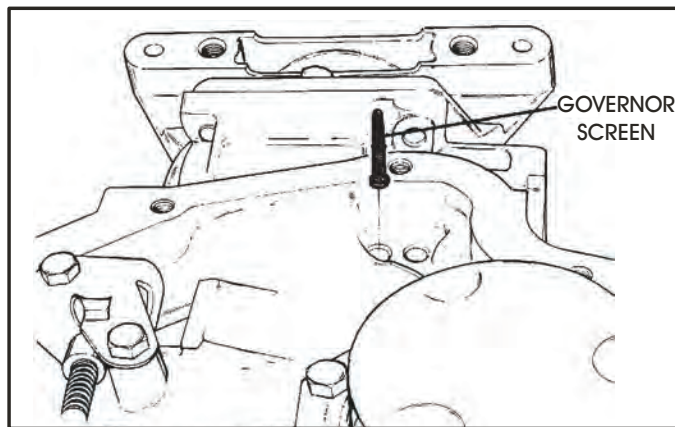
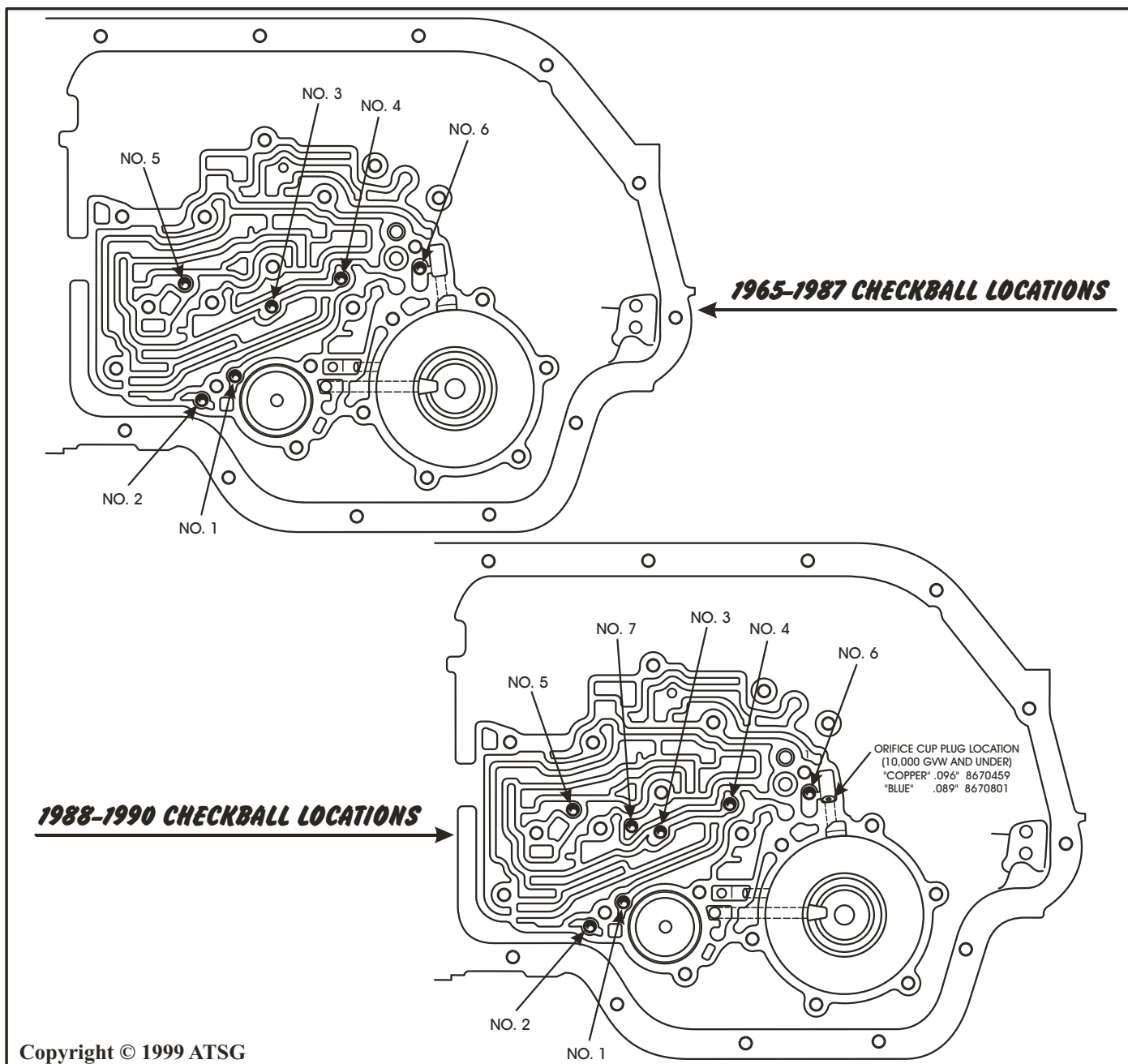


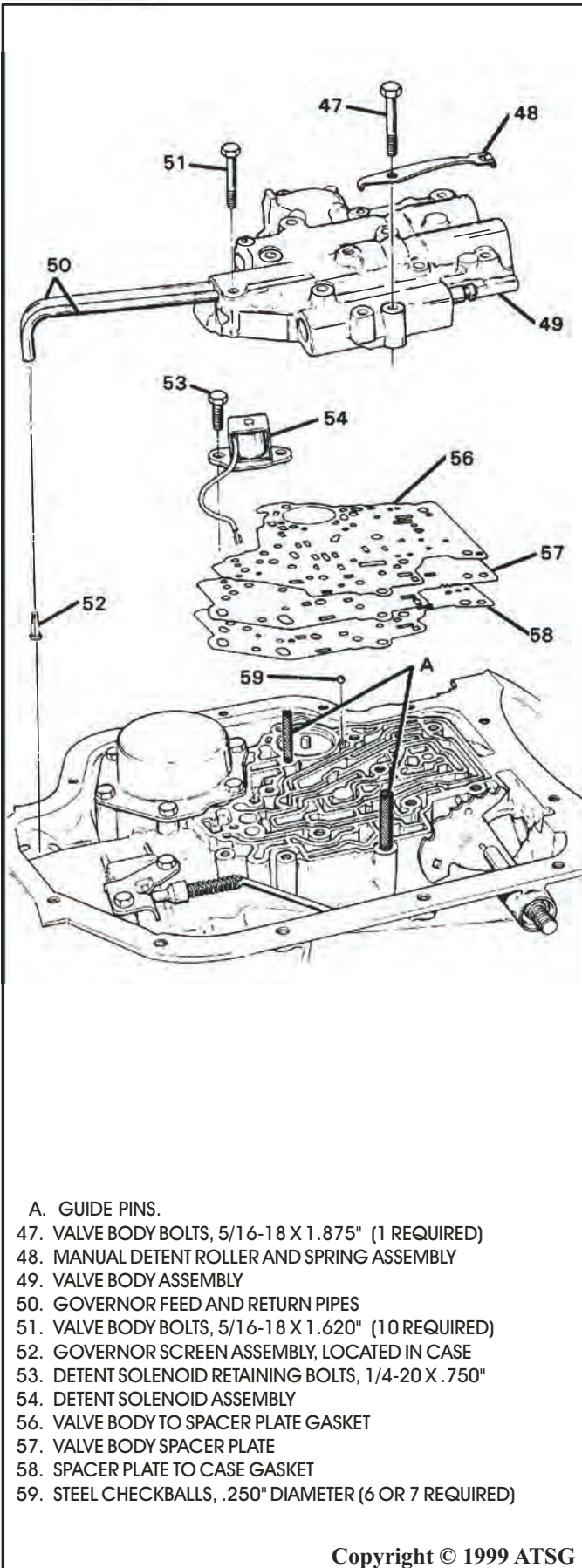
Figure 123



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Figure 124

CONTINUED FROM PAGE 76



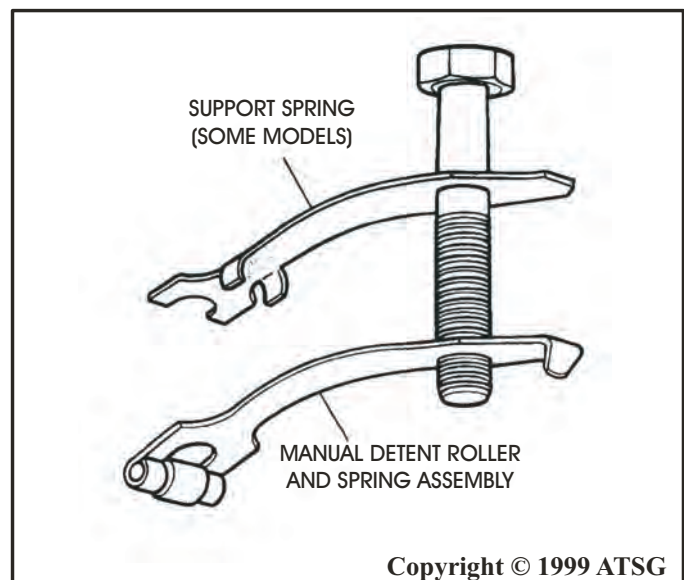
- A. GUIDE PINS.
47. VALVE BODY BOLTS, 5/16-18 X 1.875" (1 REQUIRED)
 48. MANUAL DETENT ROLLER AND SPRING ASSEMBLY
 49. VALVE BODY ASSEMBLY
 50. GOVERNOR FEED AND RETURN PIPES
 51. VALVE BODY BOLTS, 5/16-18 X 1.620" (10 REQUIRED)
 52. GOVERNOR SCREEN ASSEMBLY, LOCATED IN CASE
 53. DETENT SOLENOID RETAINING BOLTS, 1/4-20 X .750"
 54. DETENT SOLENOID ASSEMBLY
 56. VALVE BODY TO SPACER PLATE GASKET
 57. VALVE BODY SPACER PLATE
 58. SPACER PLATE TO CASE GASKET
 59. STEEL CHECKBALLS, .250" DIAMETER (6 OR 7 REQUIRED)

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Figure 125

50. Install guide pins into case in the locations that are shown in Figure 125.
51. Install a new case to spacer plate gasket over the guide pins and onto case (See Figure 125).
52. Install the proper valve body spacer plate over the guide pins and on top of the case gasket, as shown in Figure 125.
53. Install a new valve body to spacer plate gasket over the guide pins on top of the spacer plate as shown in Figure 125.
54. Install the detent solenoid and tighten the bolts finger tight (See Figure 125).
55. Connect the wire from the detent solenoid to the case connector on the inside.
56. Install the governor pipes into the previously completed valve body assembly (Figure 125).
57. Install the valve body and governor pipes onto the case, ensuring that the manual valve is on the pin of the inside detent lever and engaged properly and governor pipes are engaged into the transmission case (See Figure 125).
58. Push the valve body assembly down against the pressure of Manual 2 servo spring, and install the valve body bolts finger tight.
59. Install the manual detent roller and spring onto valve body, as shown in Figure 125, and install retaining bolt.

Note: Some models also use a support spring on top of the manual detent roller and spring as shown in Figure 126.



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Figure 126

- 60. Torque all valve body bolts beginning in the center and working outward in a circle down to 11 Nm (98 in.lb.).
- 61. Torque the detent solenoid retaining bolts down to 10 Nm (89 in.lb.).
- 62. Install a new bottom pan gasket onto the case as shown in Figure 127.

Note: There are two different styles of the bottom pan, shallow and deep pans, as shown in Figure 41. This affects filter components required for this unit. Refer to Figure 41.

- 63. Install a new "O" ring onto proper filter intake pipe, lube with small amount of TransJel and install intake pipe into case (See Figure 127). **Notice in Figure 127 that the intake pipe for shallow pan is shorter than the intake pipe for the deep pan.**

- 64. Install new filter assembly on intake pipe and install filter bolt and spacer if used, as shown in Figure 127.
- 65. Torque filter retaining bolt to 10 Nm (89 in.lb.).
- 66. Install the magnet into the proper bottom oil pan, as shown in Figure 127.
- 67. Install the proper bottom oil pan onto the case as shown in Figure 127.
- 68. Install the bottom oil pan bolts and torque to 13 Nm (116 in.lb.).

Continued on Page 80.

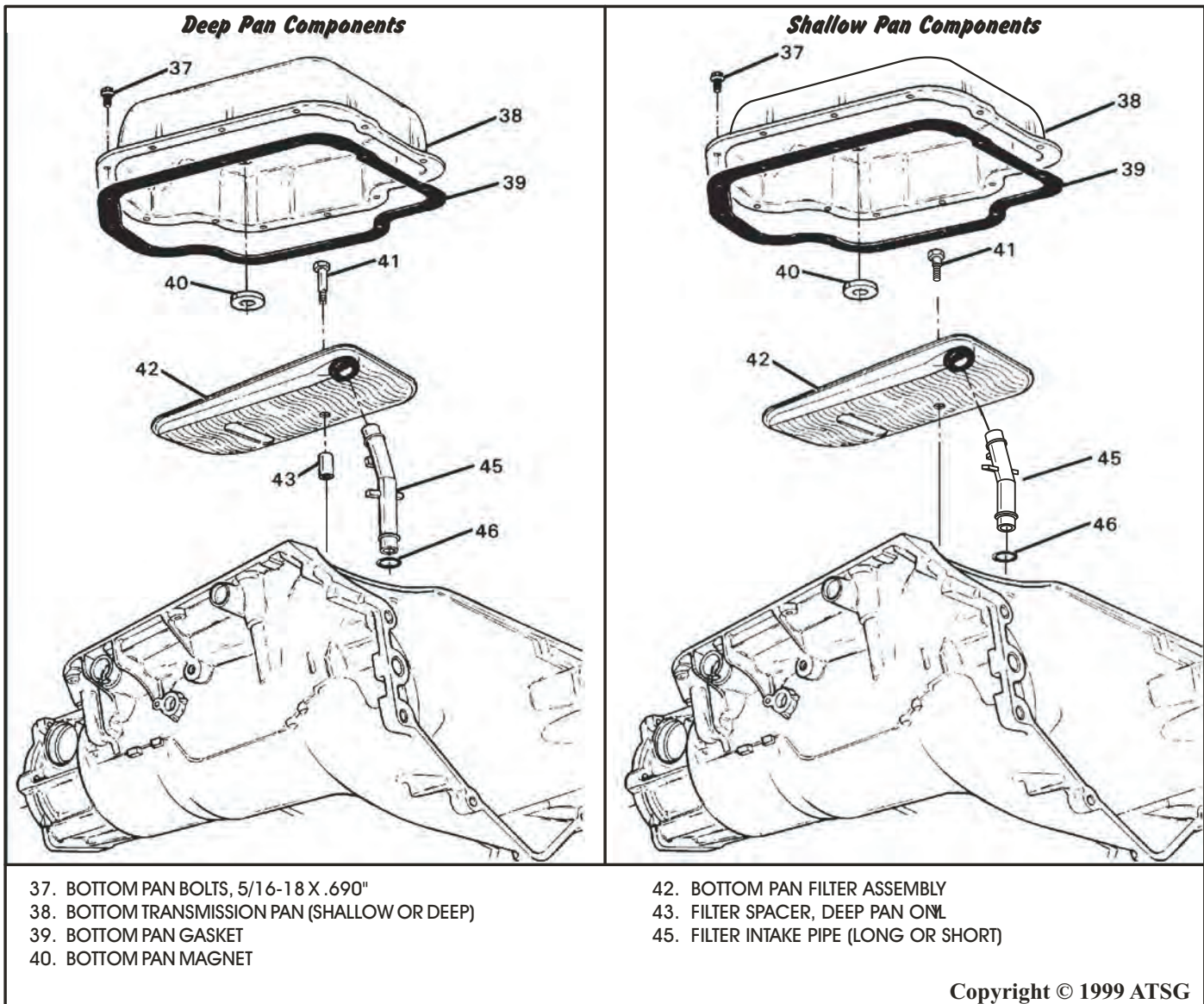
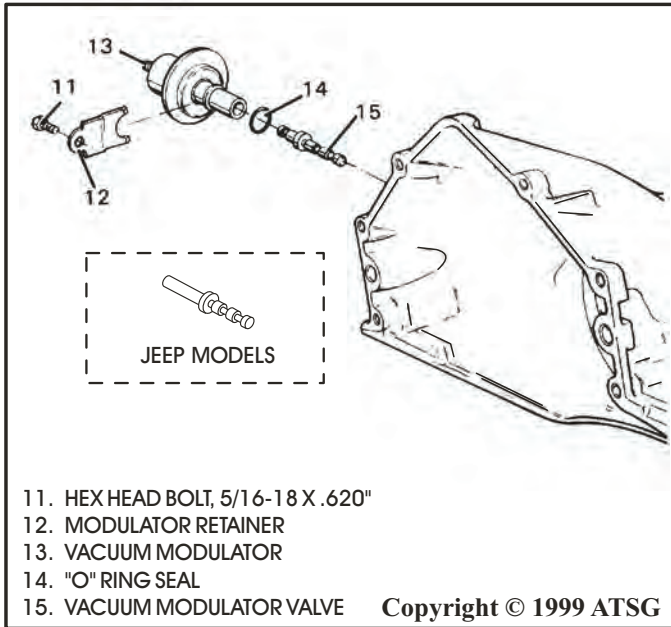


Figure 127

CONTINUED FROM PAGE 79



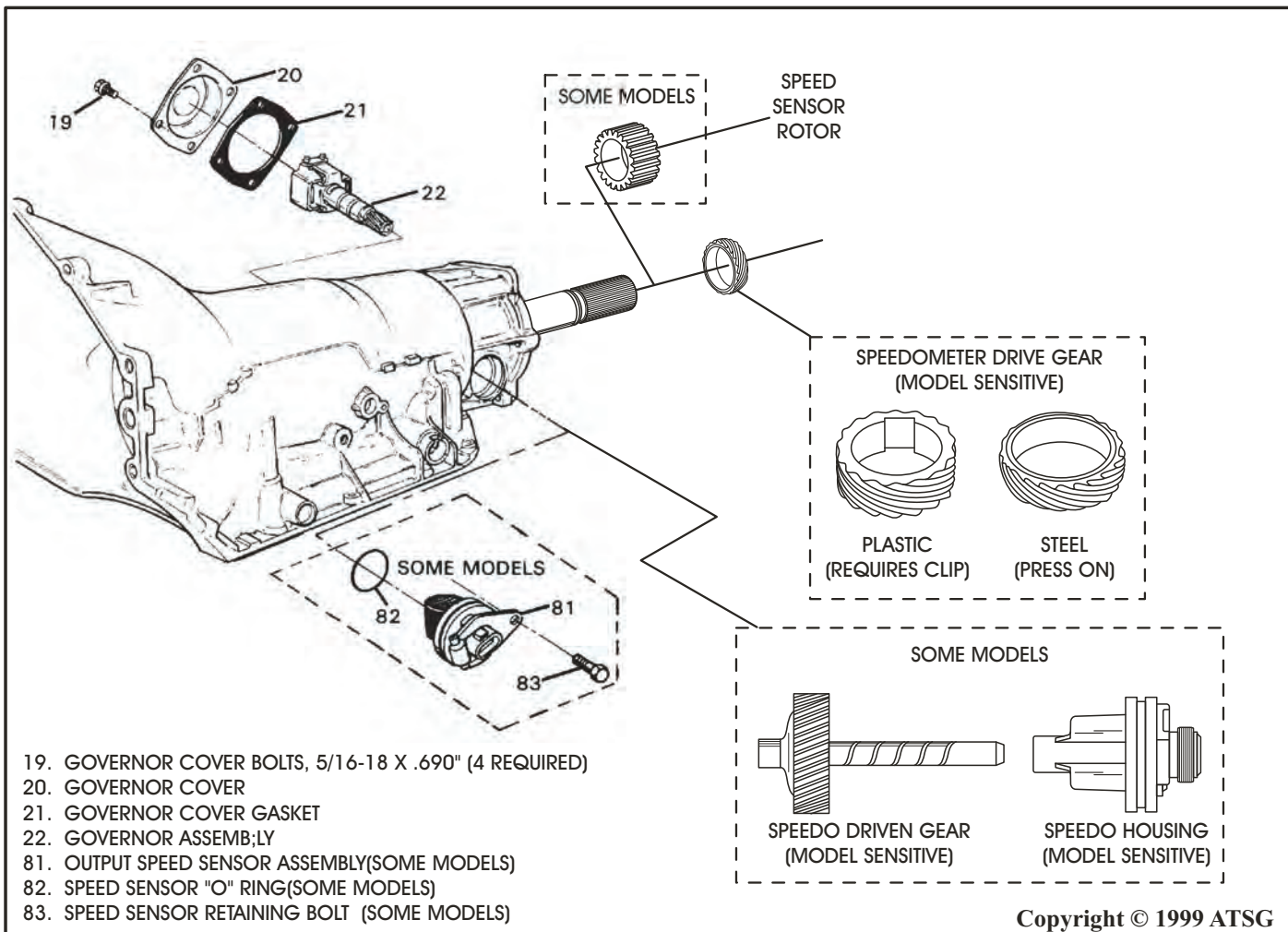
- 11. HEX HEAD BOLT, 5/16-18 X .620"
 - 12. MODULATOR RETAINER
 - 13. VACUUM MODULATOR
 - 14. "O" RING SEAL
 - 15. VACUUM MODULATOR VALVE
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Figure 128

- 69. Rotate transmission fixture so that the bottom pan is facing down.
- 70. Lubricate modulator valve (15) with fluid and install modulator valve into transmission case as shown in Figure 128.

Note: Jeep models use a modulator valve that has a longer stem on the modulator side, as shown in Figure 128, and requires modulator with the bellows.

- 71. Install a new vacuum modulator with a new "O" ring into case, as shown in Figure 128.
- 72. Install the modulator retaining bracket, torque the retaining bolt to 14 Nm (125 in.lb).
- 73. Install the governor assembly into case bore by rotating into position (See Figure 129).
- 74. Install the governor cover with a new gasket as shown in Figure 129, and torque the 4 bolts to 14 Nm (125 in.lb.).



- 19. GOVERNOR COVER BOLTS, 5/16-18 X .690" (4 REQUIRED)
- 20. GOVERNOR COVER
- 21. GOVERNOR COVER GASKET
- 22. GOVERNOR ASSEMBLY
- 81. OUTPUT SPEED SENSOR ASSEMBLY(SOME MODELS)
- 82. SPEED SENSOR "O" RING(SOME MODELS)
- 83. SPEED SENSOR RETAINING BOLT (SOME MODELS)

SOME MODELS

SPEED SENSOR ROTOR

SPEEDOMETER DRIVE GEAR (MODEL SENSITIVE)

PLASTIC (REQUIRES CLIP)

STEEL (PRESS ON)

SOME MODELS

SPEEDO DRIVEN GEAR (MODEL SENSITIVE)

SPEEDO HOUSING (MODEL SENSITIVE)

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Figure 129

75. Install the proper speed drive gear or speed sensor rotor onto the output shaft if it has not been previously installed (See Figure 129).
76. Install the speed sensor or the speedometer drive gear and adapter and torque the retaining bolt to 7 Nm (62 in.lb.) (See Figure 129).
77. Install the proper extension housing and gasket as shown in Figure 130.
Note: Refer to Figures 25 and 26 for various models of output shafts and extensions.
78. Torque the six extension housing bolts down to 20-25 ft.lb.
79. Check the torque converter end-play using the tools shown in Figure 131. Converter end-play should be .010" - .035".

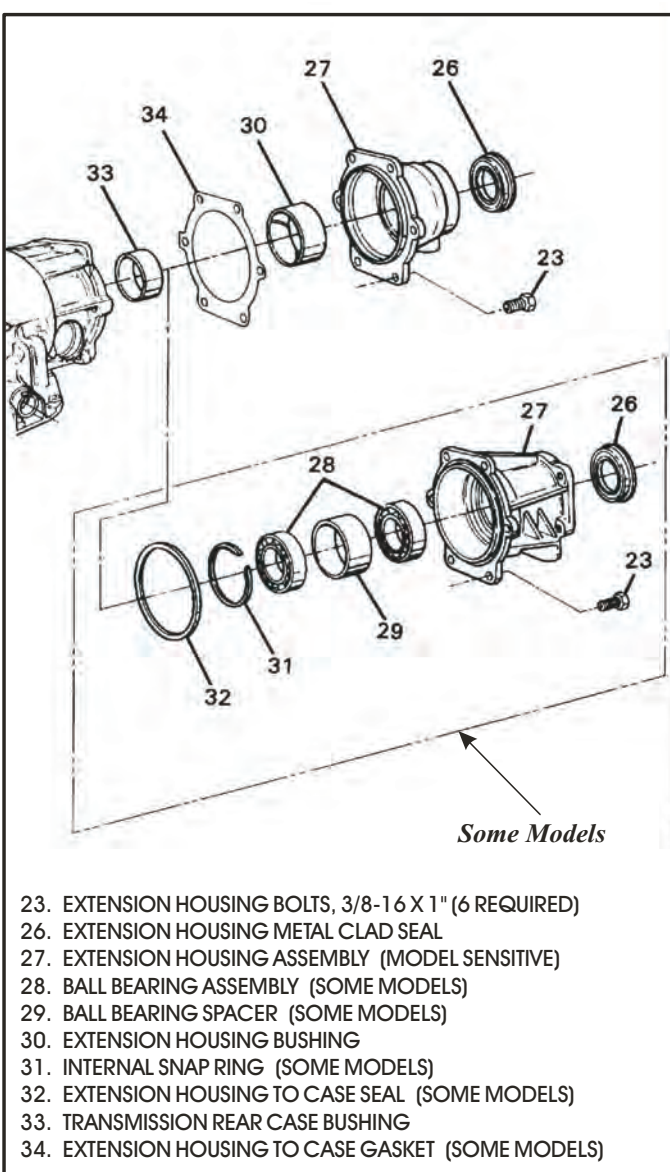


Figure 130

80. Remove transmission assembly from fixture, as shown in Figure 132.
81. Lubricate converter hub with a small amount of TransJel[®], and carefully install into trans.

END TRANSMISSION ASSEMBLY

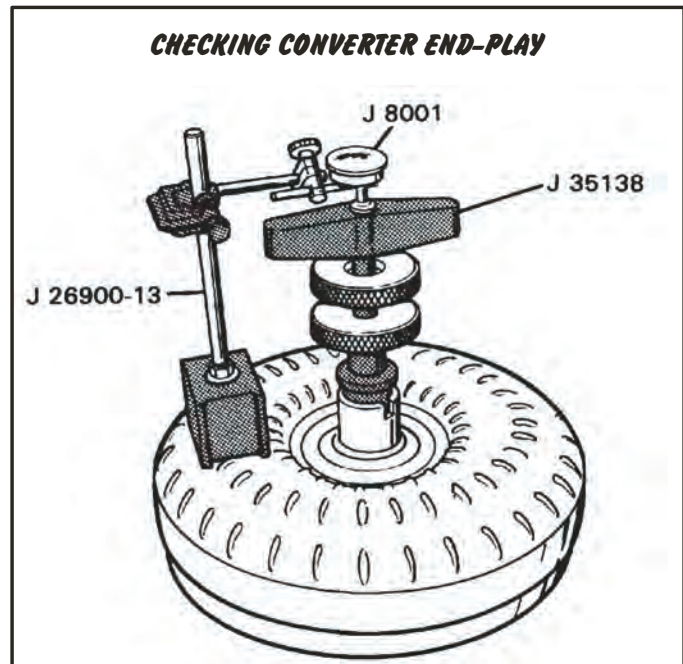


Figure 131

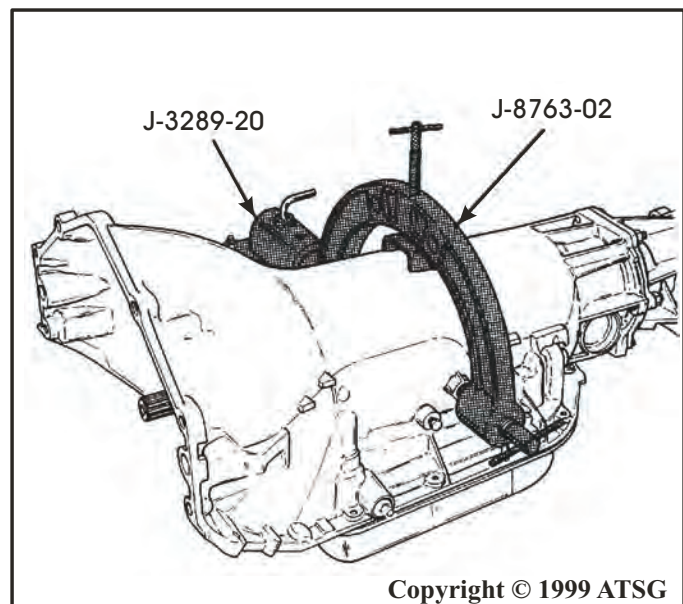
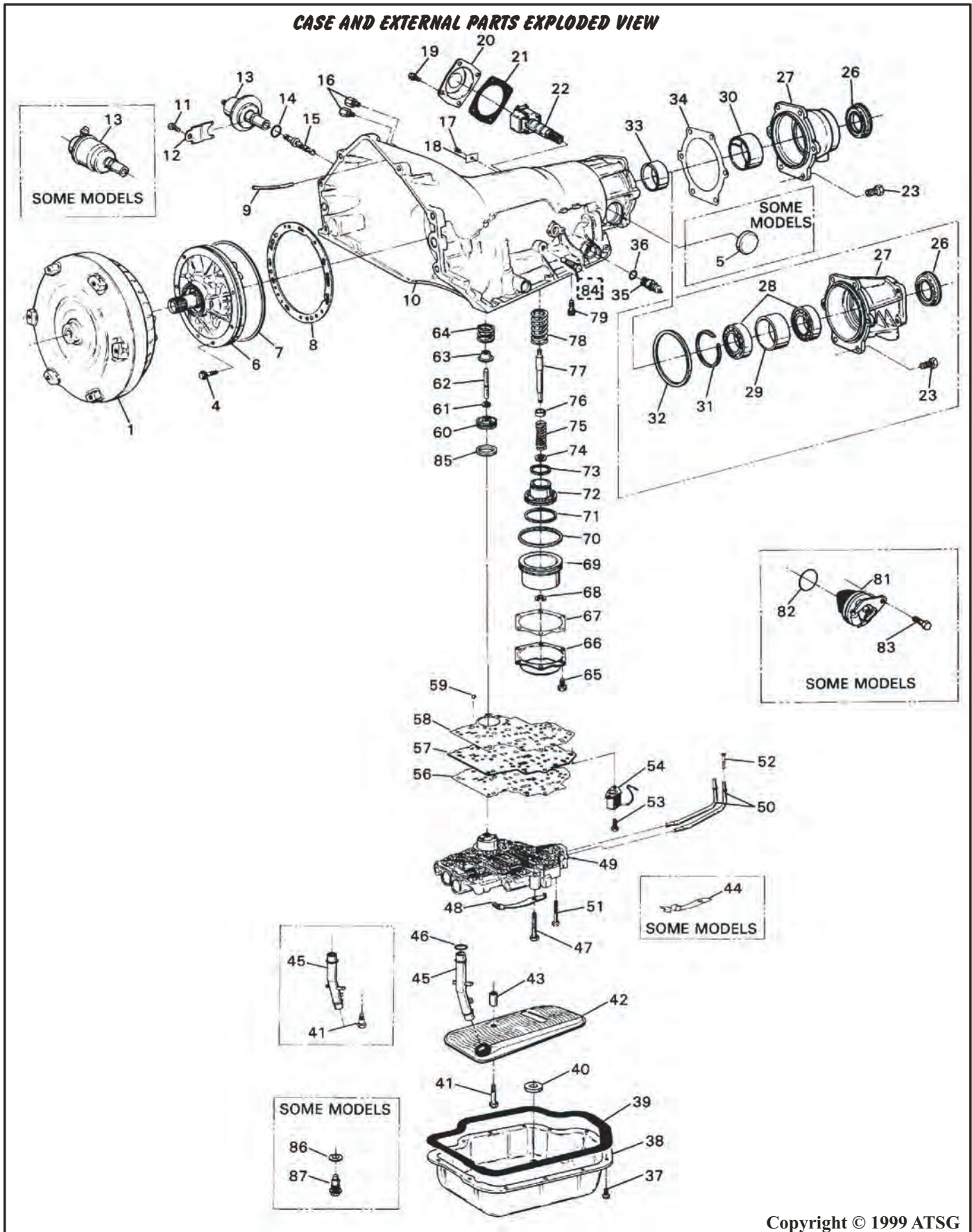


Figure 132

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Figure 133



Technical Service Information

LEGEND FOR FIGURE 133

- | | |
|--|--|
| 1. TORQUE CONVERTER ASSEMBLY | 45. FILTER INTAKE PIPE (SHORT, SHALLOW PAN - LONG, DEEP PAN) |
| 4. BOLT AND "O" RING ASSEMBLY (PUMP TO CASE) | 47. MANUAL DETENT SPRING RETAINING BOLT, 5/16-18 X 1.875") |
| 5. SPEEDO HOLE STEEL PLUG (4WD MODELS) | 48. MANUAL DETENT SPRING AND ROLLER ASSEMBLY |
| 6. OIL PUMP ASSEMBLY | 49. VALVE BODY ASSEMBLY |
| 7. OIL PUMP TO CASE SEALING RING | 50. GOVERNOR FEED AND RETURN PIPES |
| 8. PUMP COVER TO CASE GASKET | 51. VALVE TO CASE BODY BOLTS, 1/4-20 X 1.620" |
| 9. VENT PIPE | 52. GOVERNOR SCREEN ASSEMBLY |
| 10. TRANSMISSION CASE ASSEMBLY | 53. DETENT SOLENOID RETAINING BOLTS, 1/4-20 X .750" |
| 11. MODULATOR RETAINING BOLT, 5/16-18 X .620" | 54. DETENT SOLENOID ASSEMBLY |
| 12. MODULATOR RETAINING BRACKET | 56. VALVE BODY TO SPACER PLATE GASKET |
| 13. VACUUM MODULATOR ASSEMBLY | 57. VALVE BODY SPACER PLATE |
| 14. MODULATOR "O" RING SEAL | 58. SPACER PLATE TO CASE GASKET |
| 15. VACUUM MODULATOR VALVE | 59. CHECKBALLS, .250" STEEL (SOME 6 REQ. AND SOME 7 REQ.) |
| 16. COOLER FITTING | 60. FRONT SERVO PISTON |
| 17. IDENTIFICATION TAG SCREW | 61. FRONT SERVO PISTON PIN RING |
| 18. IDENTIFICATION TAG | 62. FRONT SERVO PISTON PIN |
| 19. GOVERNOR COVER RETAINING BOLTS (4 REQUIRED) | 63. FRONT SERVO RETURN SPRING RETAINER |
| 20. GOVERNOR COVER | 64. FRONT SERVO PISTON RETURN SPRING |
| 21. GOVERNOR COVER GASKET | 65. REVERSE SERVO COVER RETAINING BOLTS, 5/16-18 X .620" |
| 22. GOVERNOR ASSEMBLY | 66. REVERSE SERVO COVER |
| 23. EXTENSION HOUSING TO CASE BOLTS, 3/8-16 X 1" | 67. REVERSE SERVO COVER GASKET |
| 26. EXTENSION HOUSING METAL CLAD SEAL | 68. REVERSE SERVO PISTON RETAINING "E" CLIP |
| 27. EXTENSION HOUSING ASSEMBLY | 69. REVERSE SERVO PISTON |
| 28. BALL BEARING ASSEMBLY | 70. REVERSE SERVO PISTON SEAL |
| 29. BALL BEARING SPACER | 71. 1-2 ACCUMULATOR PISTON OUTER SEAL |
| 30. EXTENSION HOUSING BUSHING | 72. 1-2 ACCUMULATOR PISTON |
| 31. INTERNAL SNAP RING | 73. 1-2 ACCUMULATOR PISTON INNER SEAL |
| 32. EXTENSION HOUSING TO CASE SEAL (SOME MODELS) | 74. REVERSE SERVO PISTON WASHER |
| 33. REAR CASE BUSHING | 75. REVERSE SERVO SPRING |
| 34. EXTENSION HOUSING TO CASE GASKET (SOME MODELS) | 76. REVERSE SERVO SPRING RETAINER |
| 35. ELECTRICAL CONNECTOR | 77. REVERSE SERVO PISTON BAND APPLY PIN (SELECTIVE) |
| 36. ELECTRICAL CONNECTOR "O" RING | 78. 1-2 ACCUMULATOR SPRING |
| 37. BOTTOM PAN BOLTS, 5/16-18 X .690" | 79. CENTER SUPPORT TO CASE BOLT (SHORT OR LONG) |
| 38. BOTTOM TRANSMISSION OIL PAN (SHALLOW OR DEEP) | 81. OUTPUT SPEED SENSOR ASSEMBLY (SOME MODELS) |
| 39. BOTTOM PAN TO CASE GASKET | 82. OUTPUT SPEED SENSOR "O" RING |
| 40. BOTTOM PAN MAGNET | 83. SPEED SENSOR RETAINING BOLT |
| 41. SHOULDERED FILTER BOLT, (SHORT OR LONG) | 84. LINE PRESSURE TEST PLUG, 1/8" PIPE |
| 42. BOTTOM PAN FILTER ASSEMBLY | 85. FRONT SERVO PISTON SEAL |
| 43. FILTER SPACER, DEEP PAN ONLY | 86. DRAIN PLUG GASKET (SOME MODELS) |
| 44. MANUAL DETENT SPRING SUPPORT (SOME MODELS) | 87. BOTTOM PAN DRAIN PLUG (SOME MODELS) |

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Figure 134

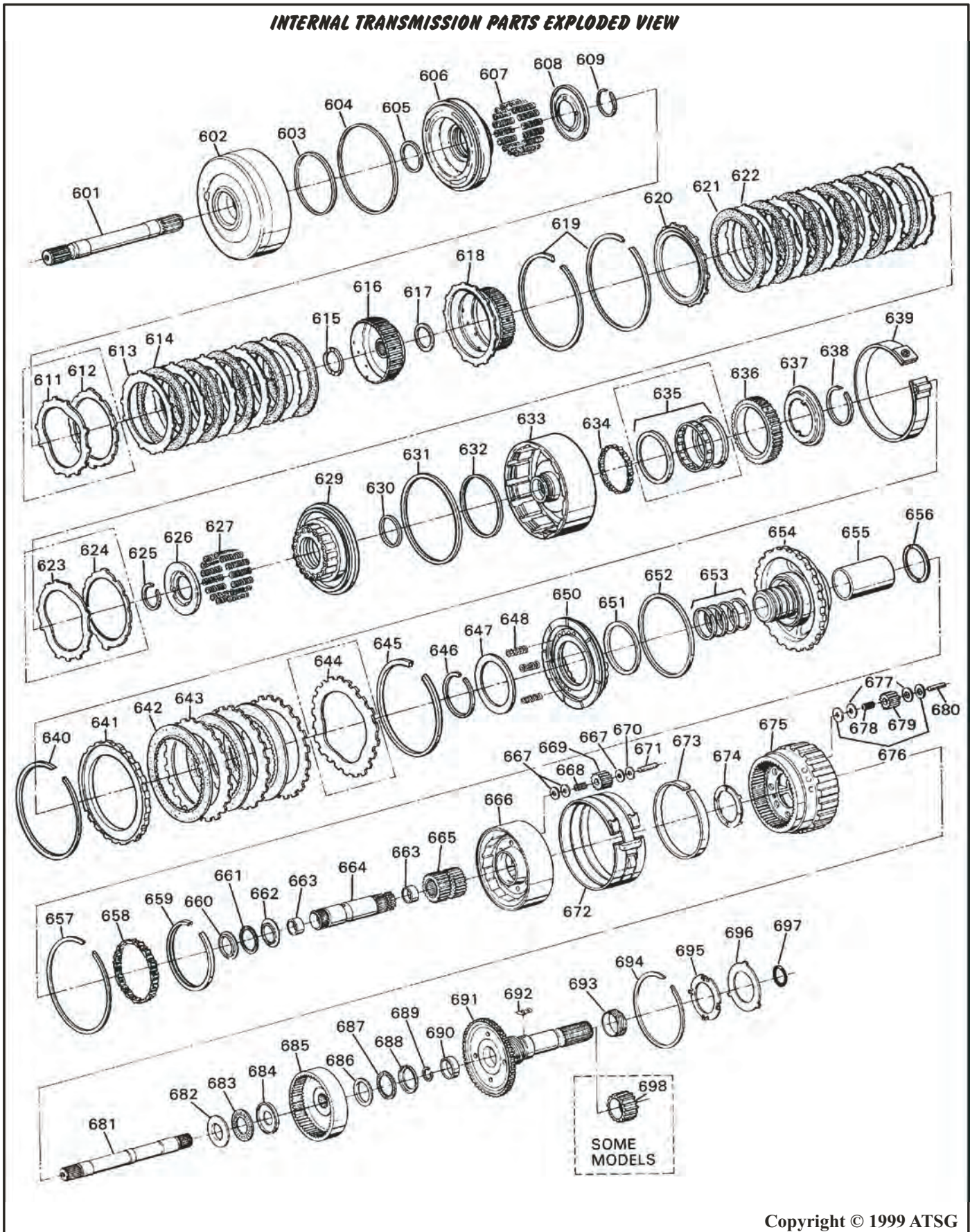


Figure 135



Technical Service Information

LEGEND FOR FIGURE 135

- | | |
|---|--|
| 601. TURBINE SHAFT | 652. INTERMEDIATE CLUTCH PISTON OUTER LIP SEAL |
| 602. FORWARD CLUTCH HOUSING | 653. CENTER SUPPORT SEALING RINGS, 4 REQUIRED |
| 603. FORWARD CLUTCH HOUSING CENTER SEAL | 654. CENTER SUPPORT ASSEMBLY |
| 604. FORWARD CLUTCH PISTON OUTER LIP SEAL | 655. CENTER SUPPORT BUSHING |
| 605. FORWARD CLUTCH PISTON INNER LIP SEAL | 656. CENTER SUPPORT TO REAR DRUM THRUST WASHER |
| 606. FORWARD CLUTCH PISTON | 657. CENTER SUPPORT TO CASE FRETTING RING (SOME MODELS) |
| 607. FORWARD CLUTCH PISTON RETURN SPRINGS | 658. LOW ROLLER CLUTCH ASSEMBLY |
| 608. FORWARD CLUTCH RETURN SPRING RETAINER | 659. REAR REACTION DRUM SPACER (FOR ROLLER CLUTCH ASM) |
| 609. FWD CLUTCH RETURN SPRING RETAINER SNAP RING | 660. CENTER SUPPORT TO NEEDLE BEARING RACE |
| 611. FORWARD CLUTCH WAVE (CUSHION) PLATE (SOME MODELS) | 661. CENTER SUPPORT NEEDLE BEARING ASSEMBLY |
| 612. FORWARD CLUTCH DISHED PLATE (SOME MODELS) | 662. CENTER SUPPORT NEEDLE BEARING TO SUN GEAR RACE |
| 613. FORWARD CLUTCH FLAT STEEL PLATES | 663. SUN GEAR SHAFT BUSHINGS(2 REQUIRED) |
| 614. FORWARD CLUTCH LINED PLATES | 664. SUN GEAR SHAFT ASSEMBLY |
| 615. FORWARD CLUTCH HUB TO HOUSING THRUST WASHER | 665. SUN GEAR |
| 616. FORWARD CLUTCH HUB | 666. REACTION DRUM AND INPUT CARRIER ASSEMBLY |
| 617. THRUST WASHER (FWD CLUTCH HUB TO DIR CLUT HOUSING) | 667. PINION GEAR STEEL THRUST WASHERS |
| 618. DIRECT CLUTCH HUB | 668. PINION GEAR ROLLER NEEDLE BEARINGS |
| 619. SNAP RING (FORWARD AND DIRECT CLUTCHES) | 669. INPUT CARRIER PINION GEARS |
| 620. DIRECT CLUTCH BACKING PLATE | 670. PINION GEAR BRONZE THRUST WASHER |
| 621. DIRECT CLUTCH LINED PLATES | 671. PINION GEAR PINS |
| 622. DIRECT CLUTCH STEEL PLATES | 672. REVERSE BAND ASSEMBLY |
| 623. DIRECT CLUTCH WAVED PLATE (SOME MODELS) | 673. FRONT INTERNAL RING GEAR SILENCING RING |
| 624. DIRECT CLUTCH DISHED PLATE (SOME MODELS) | 674. INTERNAL RING GEAR TO RING GEAR THRUST WASHER |
| 625. DIRECT CLUTCH RETURN SPRING RETAINER SNAP RING | 675. OUTPUT CARRIER ASSEMBLY |
| 626. DIRECT CLUTCH RETURN SPRING RETAINER | 676. PINION GEAR BRONZE THRUST WASHER |
| 627. DIRECT CLUTCH PISTON RETURN SPRINGS | 677. PINION GEAR STEEL THRUST WASHER |
| 629. DIRECT CLUTCH PISTON ASSEMBLY | 678. PINION GEAR ROLLER NEEDLE BEARINGS |
| 630. DIRECT CLUTCH PISTON INNER LIP SEAL | 679. OUTPUT CARRIER PINION GEARS |
| 631. DIRECT CLUTCH PISTON OUTER LIP SEAL | 680. PLANETARY PINION GEAR PINS |
| 632. DIRECT CLUTCH HOUSING CENTER LIP SEAL | 681. TRANSMISSION MAIN SHAFT TO RING GEAR |
| 633. DIRECT CLUTCH HOUSING ASSEMBLY | 682. SUN GEAR TO NEEDLE BEARING RACE |
| 634. INTERMEDIATE ROLLER CLUTCH ASSEMBLY (SOME MODELS) | 683. SUN GEAR NEEDLE BEARING ASSEMBLY |
| 635. INTERMEDIATE SPRAG CLUTCH ASSEMBLY (SOME MODELS) | 684. NEEDLE BEARING TO REAR RING GEAR RACE |
| 636. INTERMEDIATE ROLLER OR SPRAG OUTER RACE | 685. REAR INTERNAL RING GEAR |
| 637. INTERMEDIATE ROLLER OR SPRAG RETAINER | 686. REAR RING GEAR TO NEEDLE BEARING RACE |
| 638. INTERMEDIATE ROLLER OR SPRAG RETAINER SNAP RING | 687. REAR RING GEAR NEEDLE BEARING ASSEMBLY |
| 639. FRONT BAND ASSEMBLY | 688. NEEDLE BEARING TO OUTPUT SHAFT RACE |
| 640. INTERMEDIATE CLUTCH BACKING PLATE "FLAT" SNAP RING | 689. MAIN SHAFT/REAR RING GEAR SNARING |
| 641. INTERMEDIATE CLUTCH BACKING PLATE | 690. OUTPUT SHAFT BUSHING |
| 642. INTERMEDIATE CLUTCH LINED PLATES | 691. OUTPUT SHAFT (MODEL SENSITIVE, SEE FIGURE 26) |
| 643. INTERMEDIATE CLUTCH STEEL PLATES | 692. SPEEDOMETER DRIVE GEAR RETAINING CLIP |
| 644. INTERMEDIATE CLUTCH WAVED PLATE (SOME MODELS) | 693. SPEEDOMETER DRIVE GEAR (MODEL SENSITIVE) |
| 645. CENTER SUPPORT TO CASE "TAPERED" SNAP RING | 694. OUTPUT SHAFT/OUTPUT CARRIER SNAP RING |
| 646. INTERMEDIATE CLUTCH RETURN SPRING RETAINER SNAP RING | 695. OUTPUT SHAFT TO CASE BRONZE THRUST WASHER |
| 647. INTERMEDIATE CLUTCH RETURN SPRING RETAINER | 696. OUTPUT SHAFT TO CASE STEEL THRUST WASHER(SELECTIVE) |
| 648. INTERMEDIATE CLUTCH RETURN SPRINGS | 697. OUTPUT SHAFT "O" RING SEAL(SOME MODELS) |
| 650. INTERMEDIATE CLUTCH PISTON | 698. OUTPUT SHAFT SPEED SENSOR ROTOR(SOME MODELS) |
| 651. INTERMEDIATE CLUTCH PISTON INNER LIP SEAL | |

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Figure 136

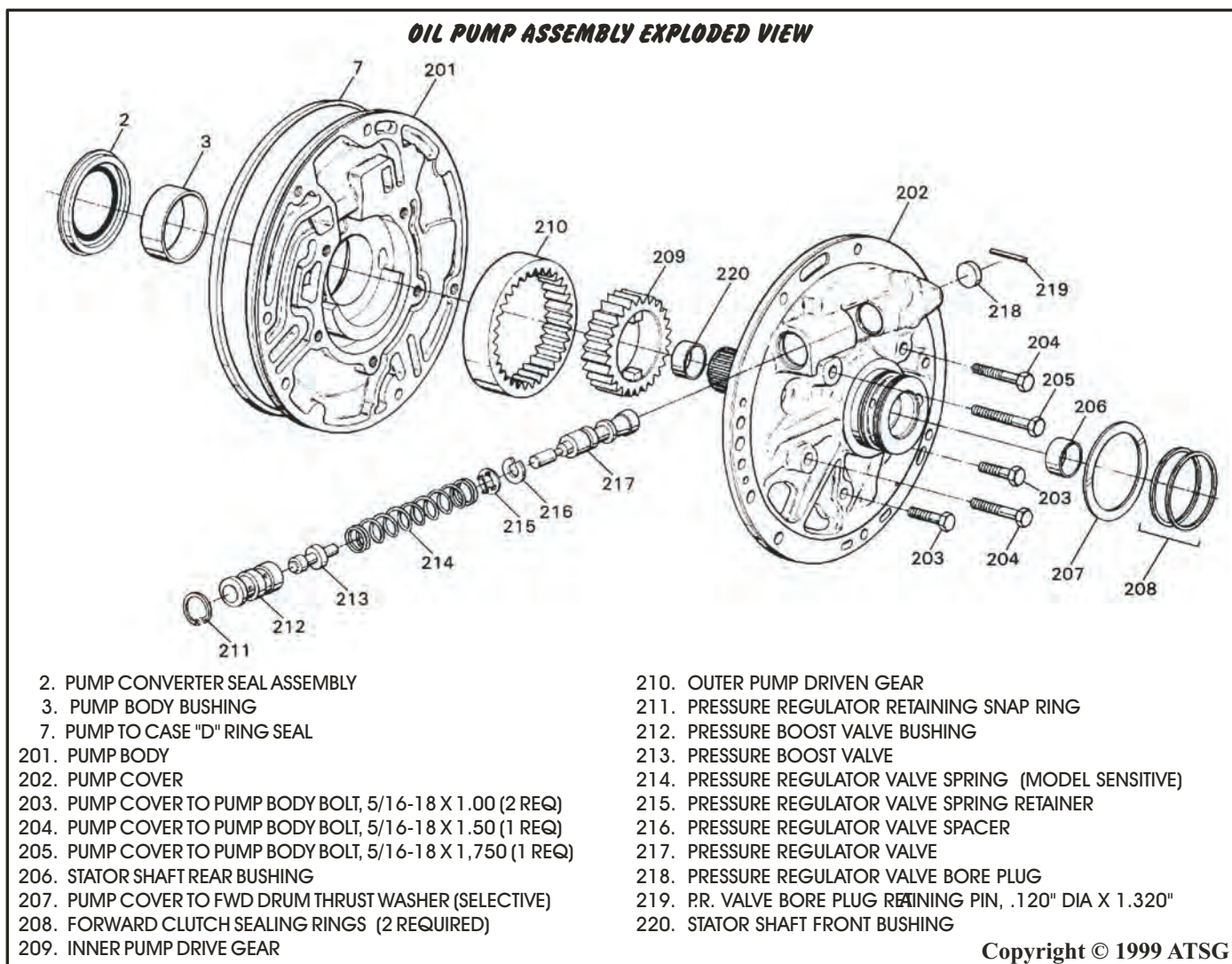


Figure 137

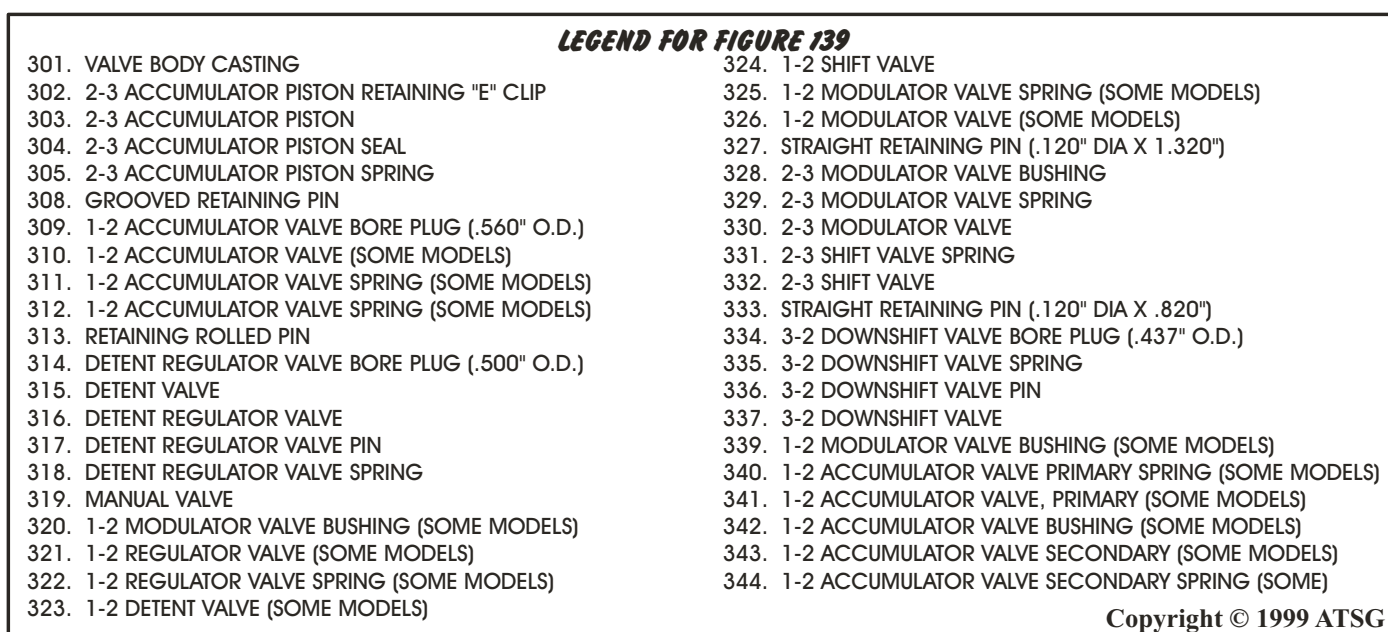
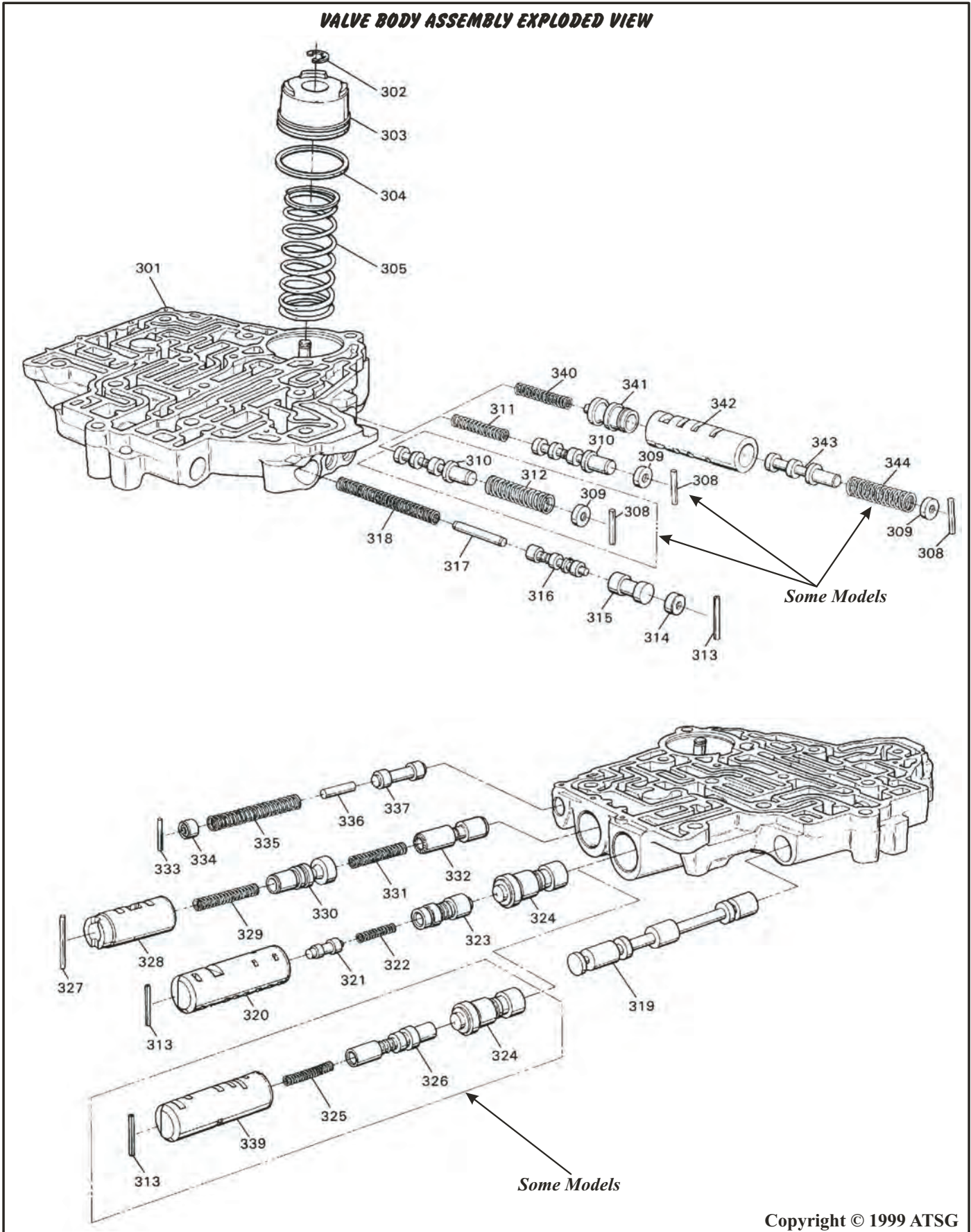


Figure 138



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Figure 139

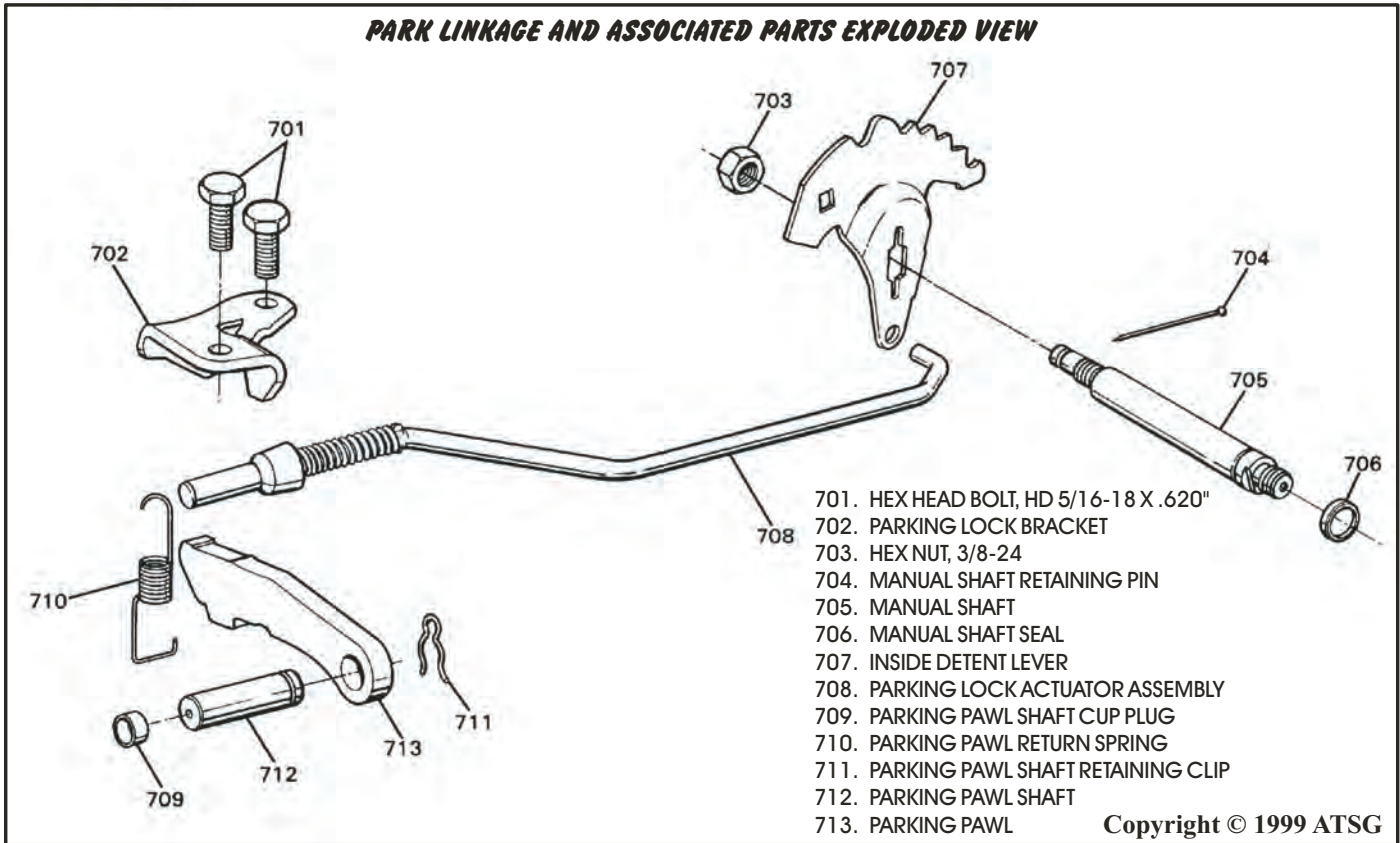
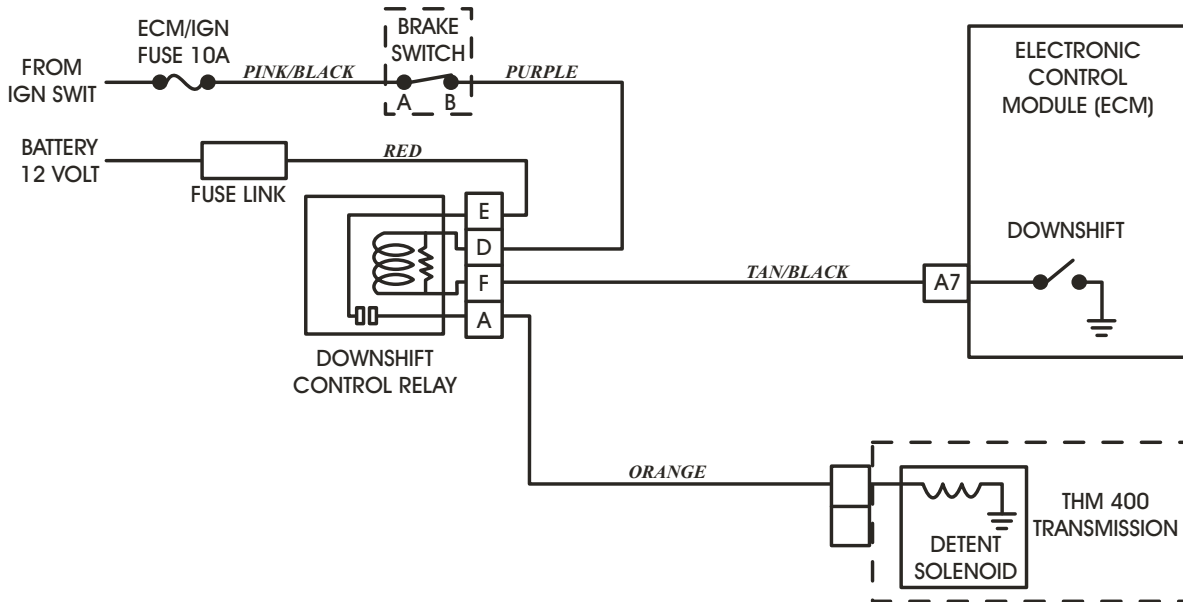
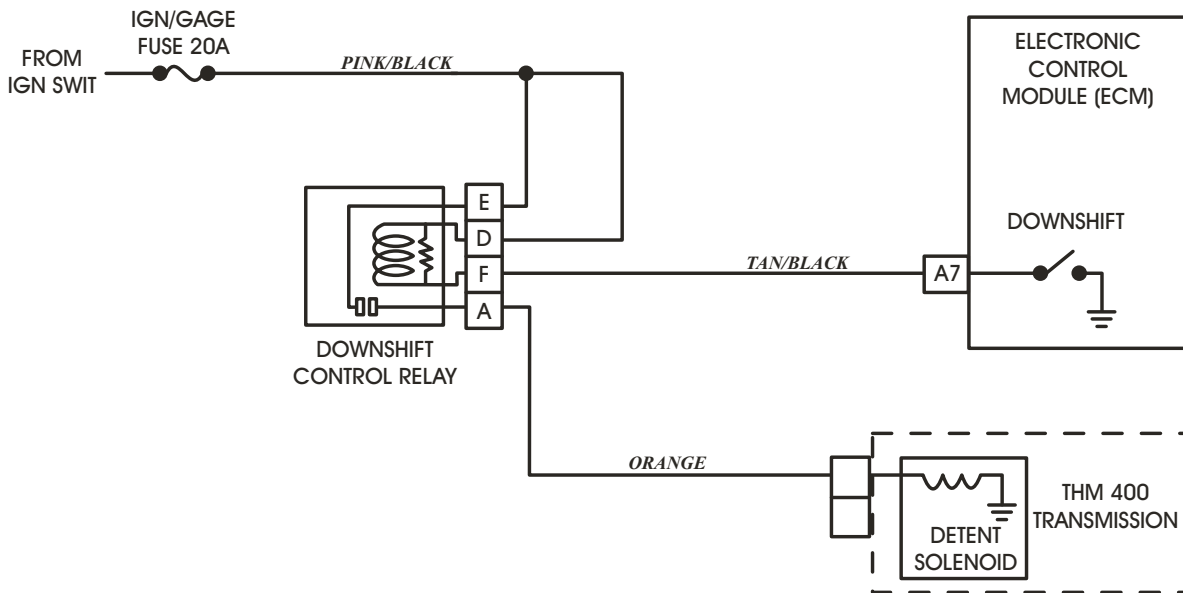


Figure 140

DETENT SOLENOID CIRCUITS 1988 AND LATER "C" AND "K" TRUCKS



DETENT SOLENOID CIRCUITS 1988 AND LATER "R", "V", AND "P" TRUCKS AND "G" VANS

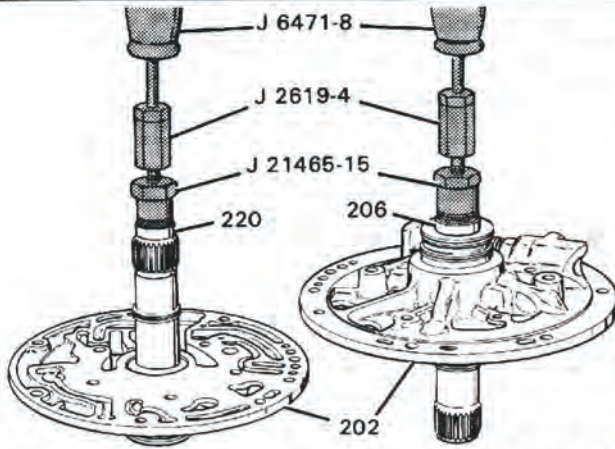


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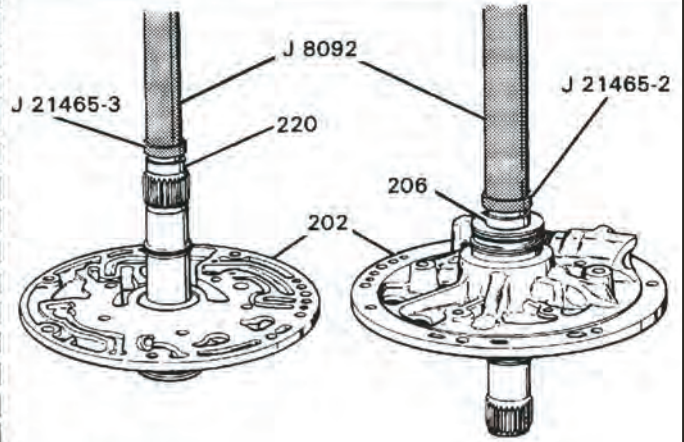
Figure 141

BUSHING SERVICE

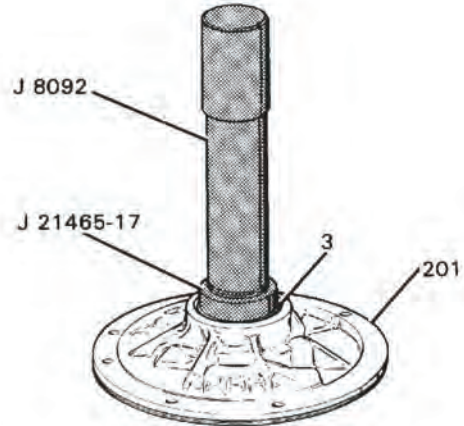
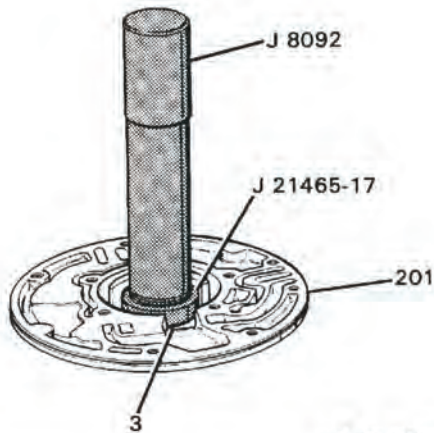
REMOVE AS SHOWN



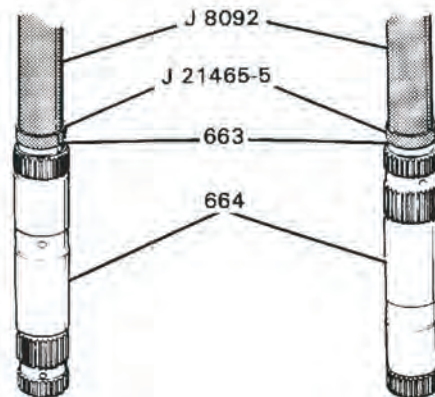
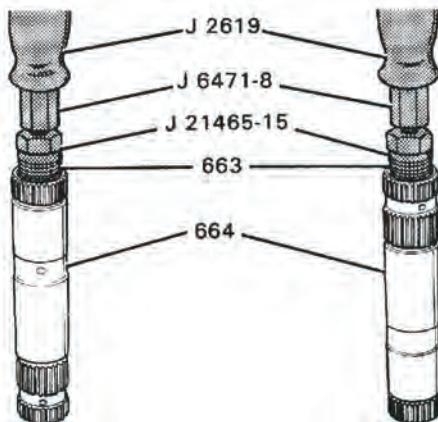
INSTALL AS SHOWN



202 COVER, PUMP
206 BUSHING, STATOR SHAFT (REAR)
220 BUSHING, 1.12 O.D. X .50



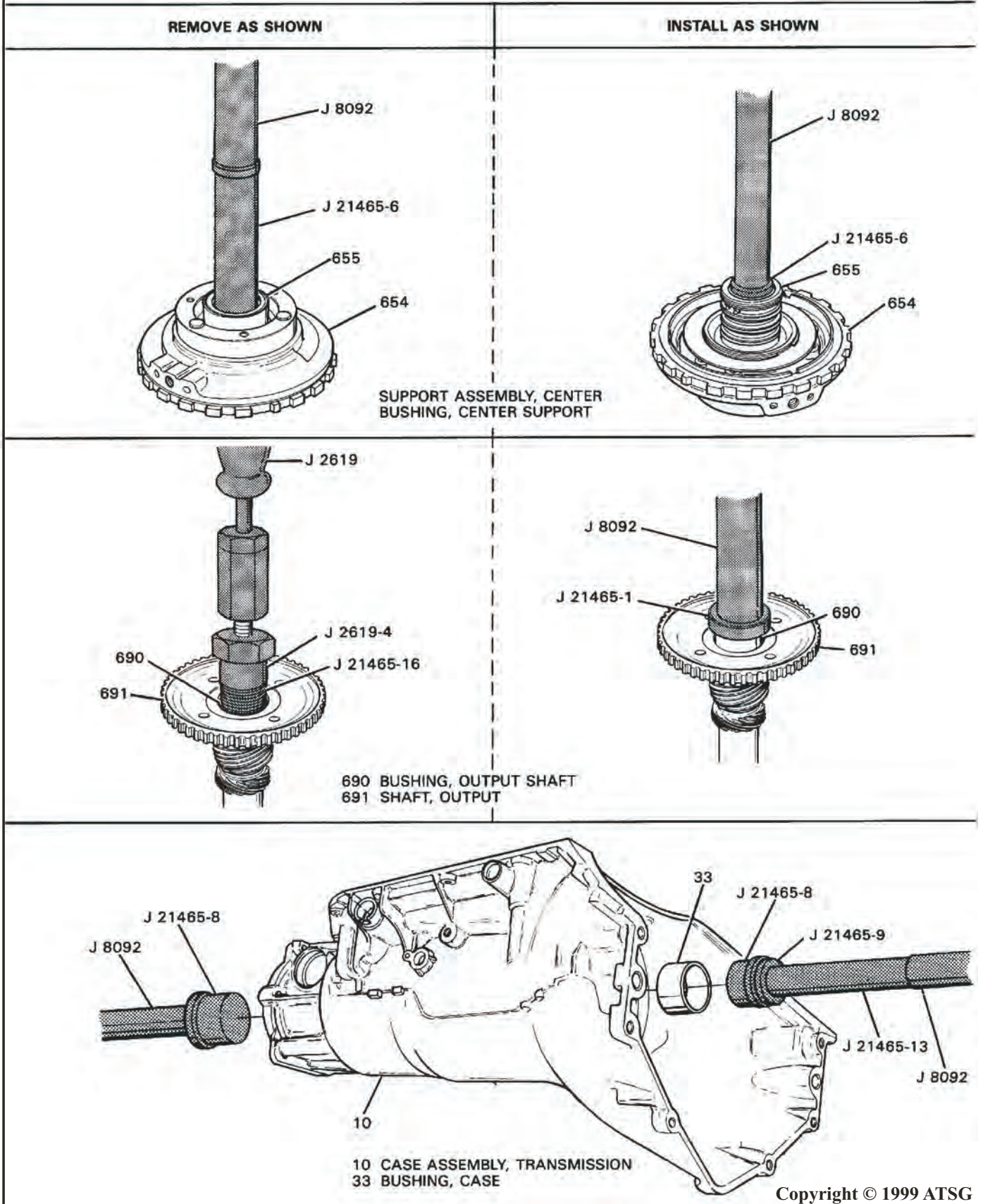
3 BUSHING, PUMP BODY
201 BODY, PUMP



663 BUSHING, 1.12 O.D. X .50
664 SHAFT, SUN GEAR

Figure 142

BUSHING SERVICE



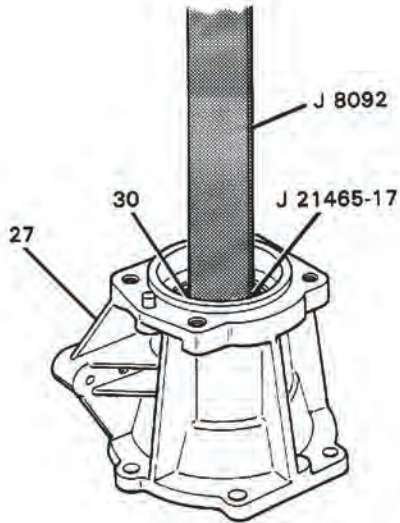
Copyright © 1999 ATSG

Figure 143

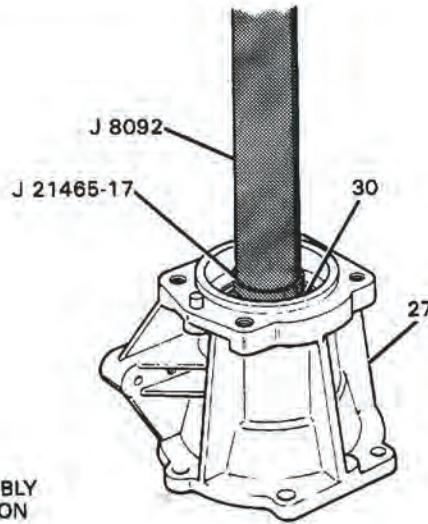
BUSHING SERVICE

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

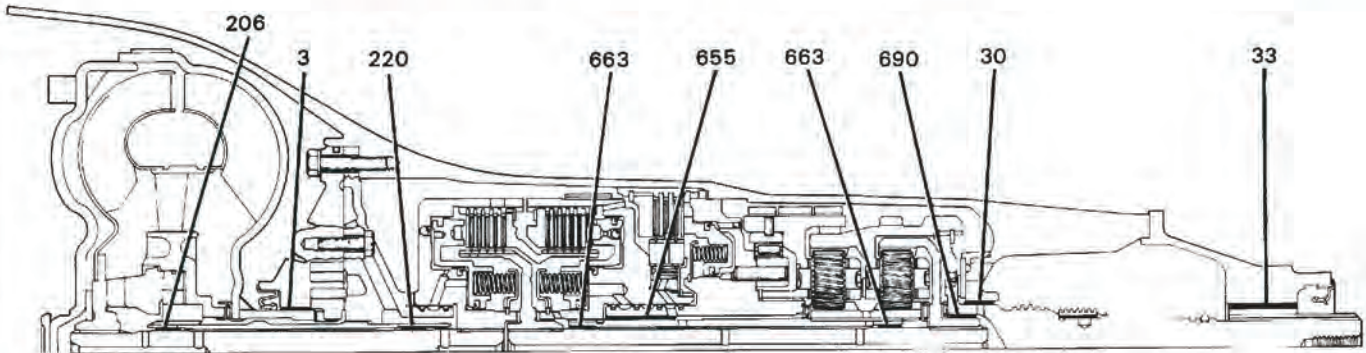
REMOVE AS SHOWN



INSTALL AS SHOWN



27 CASE EXTENSION ASSEMBLY
30 BUSHING, CASE EXTENSION



3 BUSHING, PUMP BODY
30 BUSHING, CASE EXTENSION
33 BUSHING, CASE
206 BUSHING, STATOR SHAFT (REAR)

220 BUSHING, 1.12 O.D. X .50
655 BUSHING, CENTER SUPPORT
663 BUSHING, 1.12 O.D. X .50
690 BUSHING, OUTPUT SHAFT

Figure 144



Technical Service Information

TORQUE SPECIFICATIONS				
FASTENER APPLICATION	ASSEMBLY TORQUE		RECHECK TORQUE	
	N·m	LB. - FT.	N·m	LB. - FT.
FILTER TO VALVE BODY SCREW	8-14	6-10	8-27	6-20
SOLENOID TO CASE SCREW	5-14	4-10	5-20	4-15
CONTROL VALVE ASSEMBLY TO CASE SCREW	8-14	6-10	8-27	6-20
LINE PRESSURE PLUG	7-14	5-10	7-14	5-10
FLYWHEEL HOUSING COVER TO TRANSMISSION SCREW	5-8	4-6	5-8	4-6
PUMP BODY TO COVER SCREW	20-27	15-20	20-34	15-25
PUMP ASSEMBLY TO CASE SCREW	20-27	15-20	14-41	11-31
REAR SERVO COVER TO CASE SCREW	20-27	15-20	20-27	15-20
GOVERNOR COVER TO CASE	11-16	8-12	5-21	4-16
PARKING PAWL BRACKET TO CASE SCREW	20-27	15-20	20-41	15-30
VACUUM MODULATOR RETAINER TO CASE SCREW	20-27	15-20	20-27	15-20
SPEEDOMETER DRIVEN GEAR RETAINER TO CASE SCREW	5-8	4-6	5-8	4-6
PAN TO CASE SCREW	8-14	6-10	4-21	3-16
EXTENSION HOUSING TO CASE SCREW	27-34	20-25	20 MIN.	15 MIN.
MANUAL SHAFT TO DETENT LEVER NUT	20-27	15-20	20-34	15-26
MANUAL YOKE TO MANUAL SHAFT NUT	18-24	13-18	18-24	13-18
CASE TO CENTER SUPPORT SCREW	27-34	20-25	27-51	20-39
FLYWHEEL TO CONVERTER SCREW	41-47	30-35	41-47	30-35
TRANSMISSION CASE TO ENGINE SCREW	41-47	30-35	41-47	30-35
COOLER PIPE CONNECTOR NUT AT CASE & RADIATOR	35-41	26-30	35-41	26-30
COOLER PIPE CONNECTOR AT CASE	35-41	26-30	35-41	26-30
ENGINE REAR MOUNT TO TRANSMISSION BOLT	41-47	30-35	41-47	30-35
ENGINE REAR SUPPORT BRACKET TO FRAME NUT	41-47	30-35	41-47	30-35
SWITCH ASSEMBLY	3-5	2-3.5	3-5	2-3.5

Figure 145

HYDRA-MATIC PRODUCT DESIGNATIONS

The following system will be in full effect September 1, 1991. In the interim, all products will be referred to using both the previous and new designations.

PREVIOUS DESIGNATION

THM 400
THM 475

NEW DESIGNATION

HYDRA-MATIC 3L80
HYDRA-MATIC 3L80-HD

DESIGNATION SYSTEM

<u>Manufacturer</u>	<u>Number of Forward Speeds</u>	<u>TypeΔ</u>	<u>Series*</u>	<u>Major Feature\dagger</u>
Hydra-matic	3	L	80	
Hydra-matic	3	L	80	— HD

Δ L-Longitudinal

* Based on relative torque capacity

\dagger HD - Heavy Duty

MODEL IDENTIFICATION

The Figure below shows the location of the identification tag, and how to read the information found on the tag

- Model
- Model year of production
- Julian date of production
- Production serial number
- Model code (first two characters)
- Model code (third character, if used)

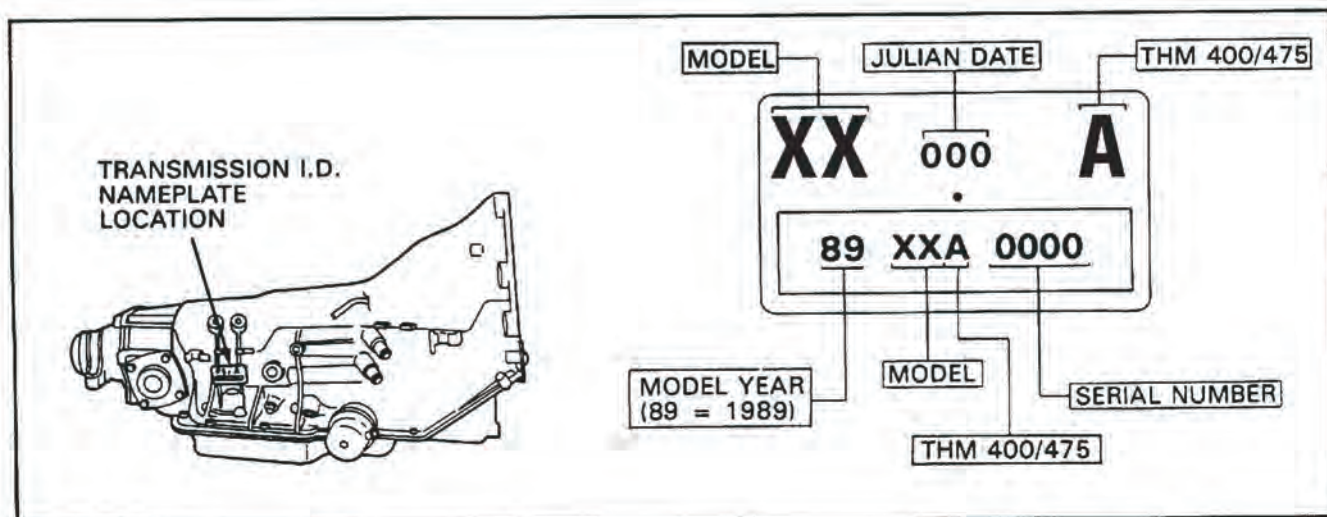


Figure 146




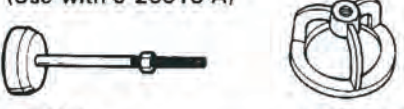




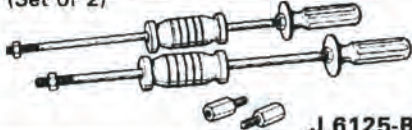


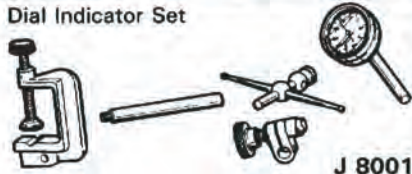








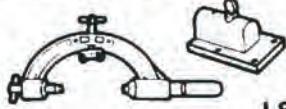


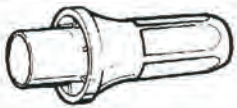

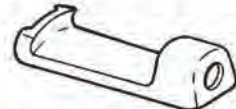
SPECIAL TOOLS		
<p>Slide Hammer (5/8" x 18 with 1/2" x 13 Adapter)</p>  <p>J 6471-8 J 2619-01</p>	<p>Forward and Direct Clutch Inner Seal Protector</p>  <p>J 21362</p>	<p>Compressor Adapter (Used with J 23327-1 & J 6129)</p>  <p>J 25018-A</p>
<p>Clutch Spring Compressor (Use with J 25018-A)</p>  <p>J 6129 J 23327-1</p>	<p>Second Clutch Inner Seal Protector</p>  <p>J 21363</p>	<p>Gear Unit Holding Tool (Use with J 6125-A)</p>  <p>J 21795-02</p>
<p>Clutch Unit Holding Fixture</p>  <p>J 6116-01</p>	<p>Support Adapter (Used with J 6116-01)</p>  <p>J 21364-A</p>	<p>Low Servo Cover Remover & Installer</p>  <p>J 22269-01</p>
<p>5/16-18 Thread with 3/8-16 Adapter (Set of 2)</p>  <p>J 6125-B</p>	<p>Pump Body and Cover Alignment Band</p>  <p>J 21368</p>	<p>Transmission Modulator Checking Tool</p>  <p>J 24466</p>
<p>Dial Indicator Set</p>  <p>J 8001</p>	<p>Band to Apply Pin Gauge (Used with J 21370-6)</p>  <p>J 21370-10</p>	<p>Oil Pump Remover & End-Play Checking Fixture</p>  <p>J 24773-A</p>
<p>Driver Handle—3/4"-10 Thread (Use with J 21465-01 Bushing Service Set)</p>  <p>J 8092</p>	<p>Band to Apply Pin Assembly</p>  <p>J 21370-6</p>	<p>Universal Converter End-Play Tool (All Turbo Hydra-matic Torque Converters)</p>  <p>J 35138</p>
<p>Speedo Gear Remover (Use with J 21427-01)</p>  <p>J 8433</p>	<p>Forward and Direct Clutch Outer Seal Protector</p>  <p>J 21409</p>	<p>Center Support Tool</p>  <p>J 23093</p>
<p>Transmission Holding Fixture (Use with J 3289-20)</p>  <p>J 8763-02</p>	<p>Intermediate Clutch Pack Alignment Tool</p>  <p>J 24396</p>	<p>Speed Sensor Rotor Installer</p>  <p>J 36352-2 J 36352-3</p>
<p>Extension Housing & Fluid Pump Seal Installer</p>  <p>J 21359</p>	<p>Speedo Gear Remover (Used with J 8433)</p>  <p>J 21427-01</p>	<p>Axle Seal Remover (Use with J 6125-1B)</p>  <p>J 23129</p>

Figure 147



Technical Service Information

Notes