



*Reprinted
July, 2010*

INTRODUCTION THM 350C

The THM 350C transmission, first introduced in model year 1980, is a modified version of the previous THM 350 transmission, with the addition of a Torque Converter Clutch. The similarity of the THM 350C and the THM 350 are covered in this manual, along with some of the 350 updates

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

This booklet covers the procedures necessary to diagnose, repair and/or overhaul the 350C transmission and the 350 transmission.

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THM 350 / 350C

INDEX

| | |
|---|-------|
| <i>GENERAL DESCRIPTION</i> | 4 |
| <i>DIAGNOSIS</i> | 14,66 |
| <i>TEARDOWN</i> | 23 |
| <i>PUMP</i> | 34 |
| <i>VALVE BODY</i> | 43 |
| <i>ASSEMBLY</i> | 44 |
| <i>SPECIFICATIONS</i> | 58 |
| <i>350 SUPPLEMENT INFORMATION</i> | 59 |
| <i>TECH BULLETINS</i> | 79 |

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AUTOMATIC 350 TRANSMISSION

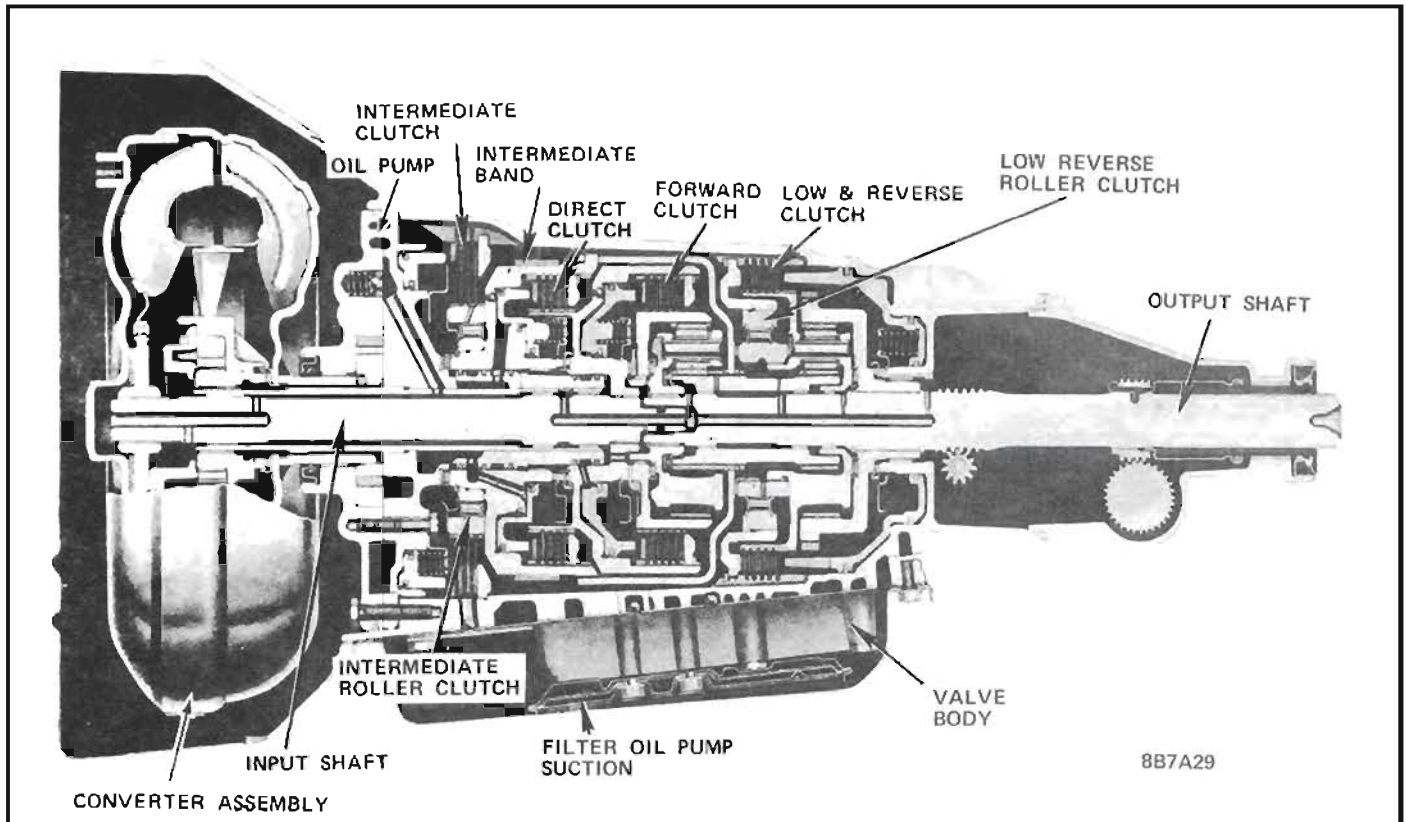


Figure 1 Typical 350 Automatic Transmission

GENERAL DESCRIPTION

The 350C automatic transmission, is a fully automatic unit consisting primarily of a 4-element hydraulic torque converter and two planetary gear sets. Four multiple-disc clutches, two roller clutches, and an intermediate overrun band provide the friction elements required to obtain the desired function of the two planetary gear sets.

A hydraulic system pressurized by a gear type pump provides the working pressure required to operate the friction elements and automatic controls.

- External control connections to the transmission are:
1. Manual Linkage - To select the desired operating range.
 2. Engine Vacuum - To operate the vacuum modulator.
 3. Detent Cable - To operate the detent valve.

TROUBLE DIAGNOSIS

The key to correcting any complaints is to make use of all the available symptoms and logically letting them direct you to the cause. Symptoms or conditions that will help are determined by subjective road test, oil pressure checks or noise evaluation.

When dealing with automatic transmission complaints, it is best to gather as many symptoms as possible before making the decision to remove the transmission from the vehicle. Remember, **THE VEHICLE IS THE BEST TEST STAND AND DIAGNOSTIC TOOL AVAILABLE TO YOU**, if the transmission is operable. Once the transmission is on the bench, it cannot tell you "what hurts" and quite frequently the correction of the cause of the complaint does not require removal of the transmission from the vehicle.

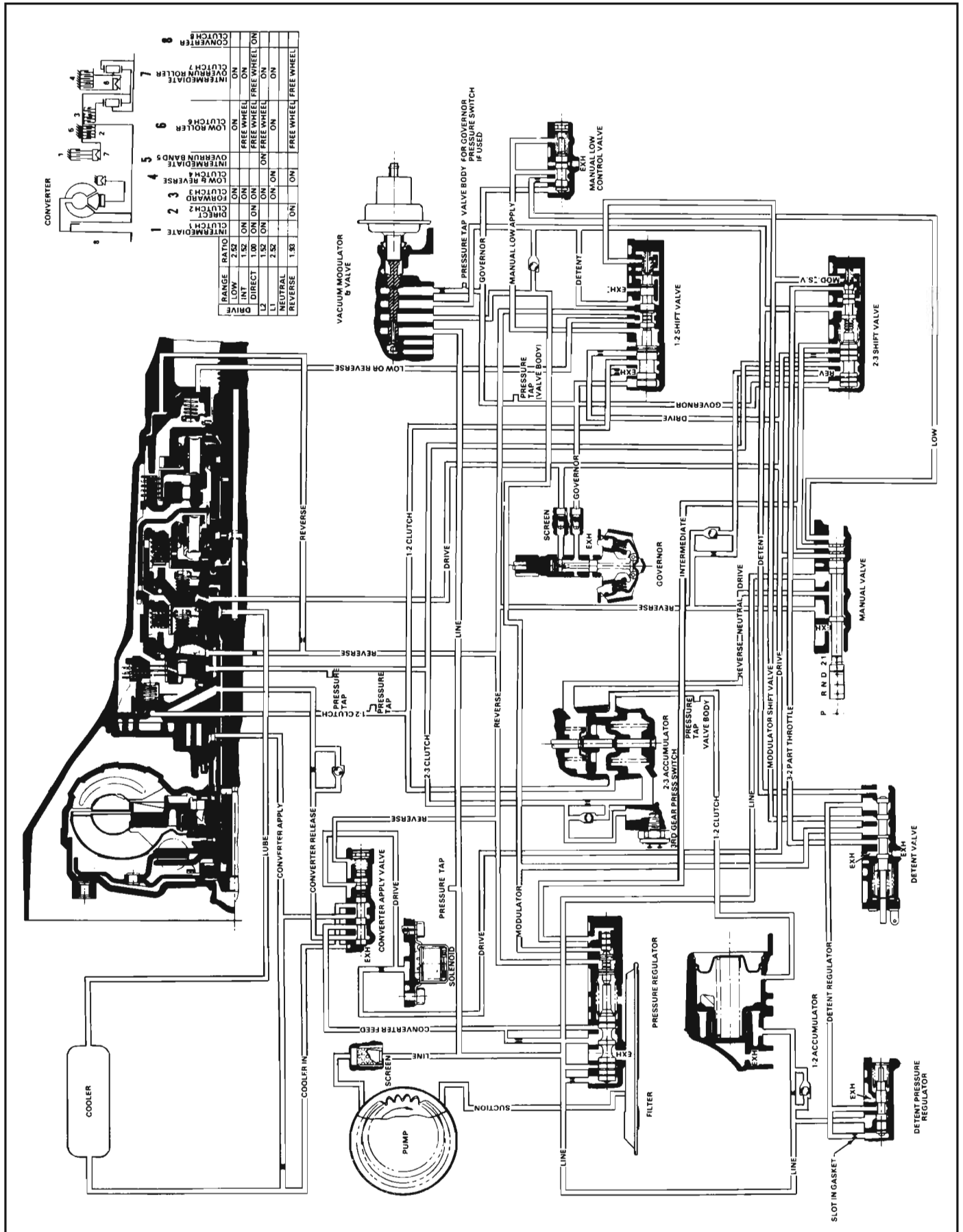
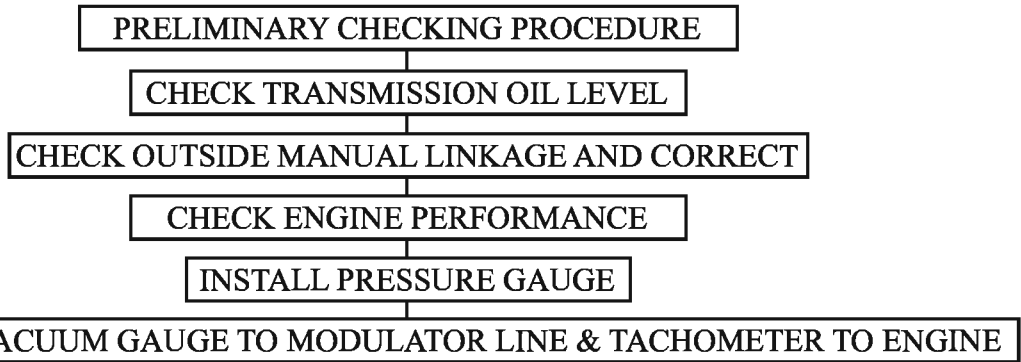


Figure 3 Neutral - Engine Running

LINE PRESSURE CHART



| RANGE | MODELS | PSI | |
|---|----------|--------------------------|------------------------------|
| | | MODULATOR * CONNECTED | MODULATOR ** DISCONNECTED |
| DRIVE - BRAKES APPLIED | XA XX | 68-88 55-64 | 148-171 148-173 |
| L2 or L1 - BRAKES APPLIED | XA XX | 89-111 80-93 | 148-172 148-173 |
| REVERSE - BRAKES APPLIED | XA XX | 102-134 83-97 | 226-259 237-270 |
| NEUTRAL - BRAKES APPLIED | XA XX | 68-86 55-64 | 148-170 148-173 |
| DRIVE IDLE - SET ENGINE IDLE TO SPECIFICATIONS BRAKES APPLIED | XA XX | 68-88 55-64 | |
| DRIVE IDLE - 30 MPH CLOSED THROTTLE OR ON LIFT | XA XX | 68-88 55-64 | |

* MODULATOR LINE CONNECTED: Run engine to 1000RPM, close throttle and check psi.

** MODULATOR LINE DISCONNECTED: Check psi at 1000RPM, throttle open.

**TOTAL RUNNING TIME
FOR THIS COMBINATION
NOT TO EXCEED 2 MINUTES**

Figure 4

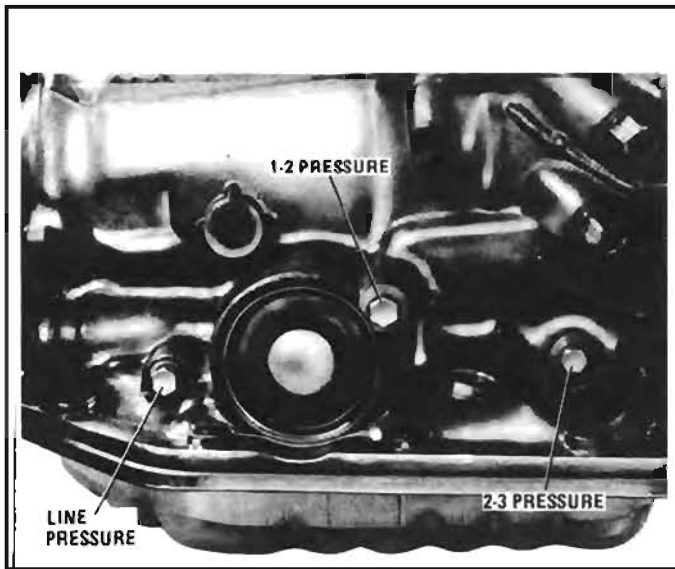


Figure 5 Line Pressure Plug Location

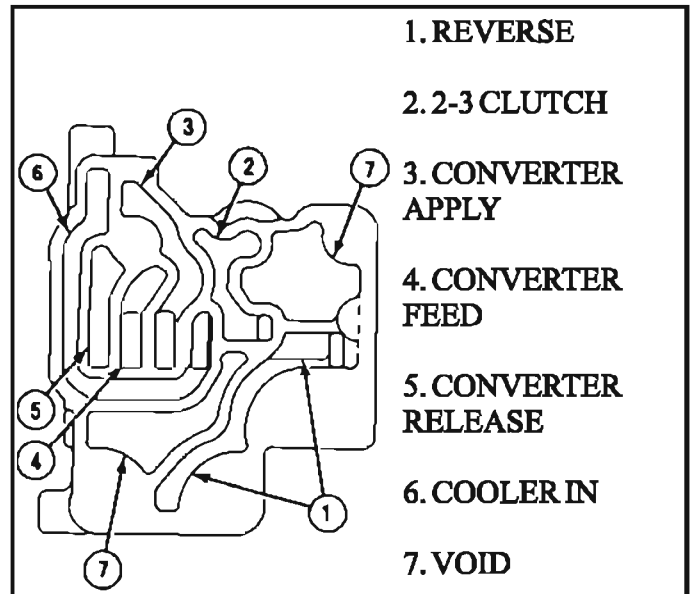
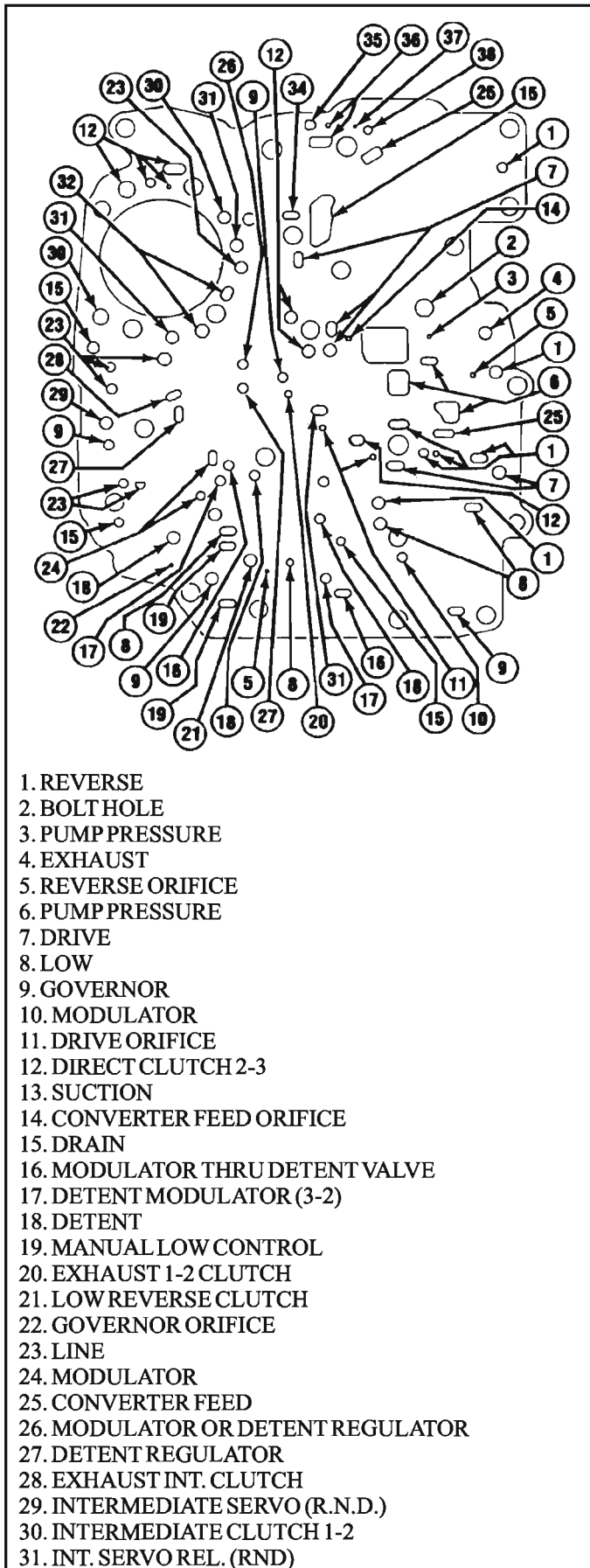
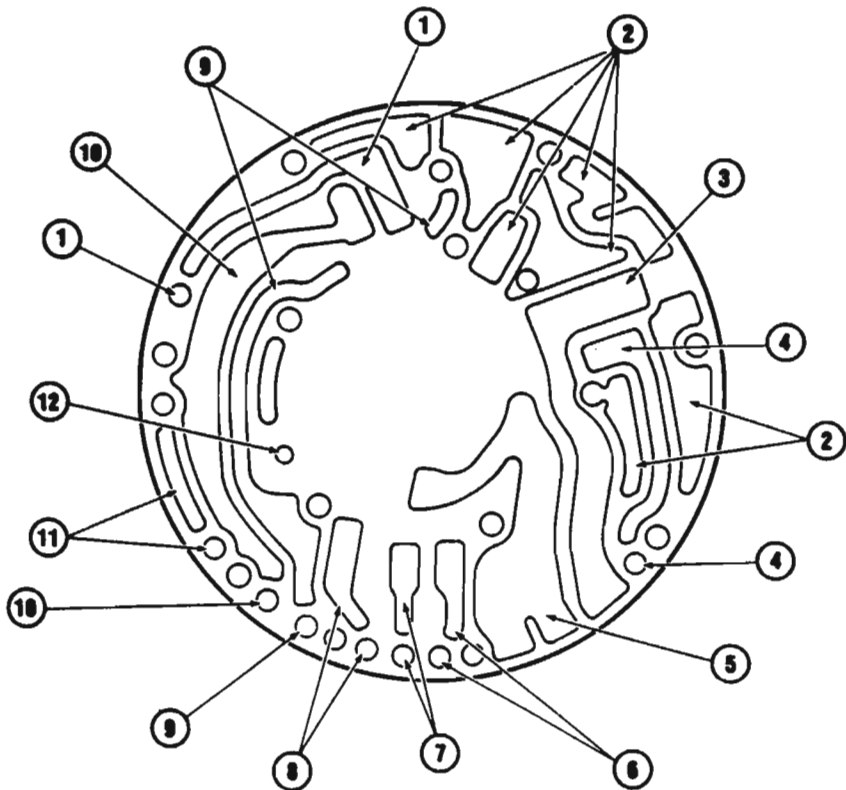


Figure 6 Auxiliary Valve Body Oil Passages



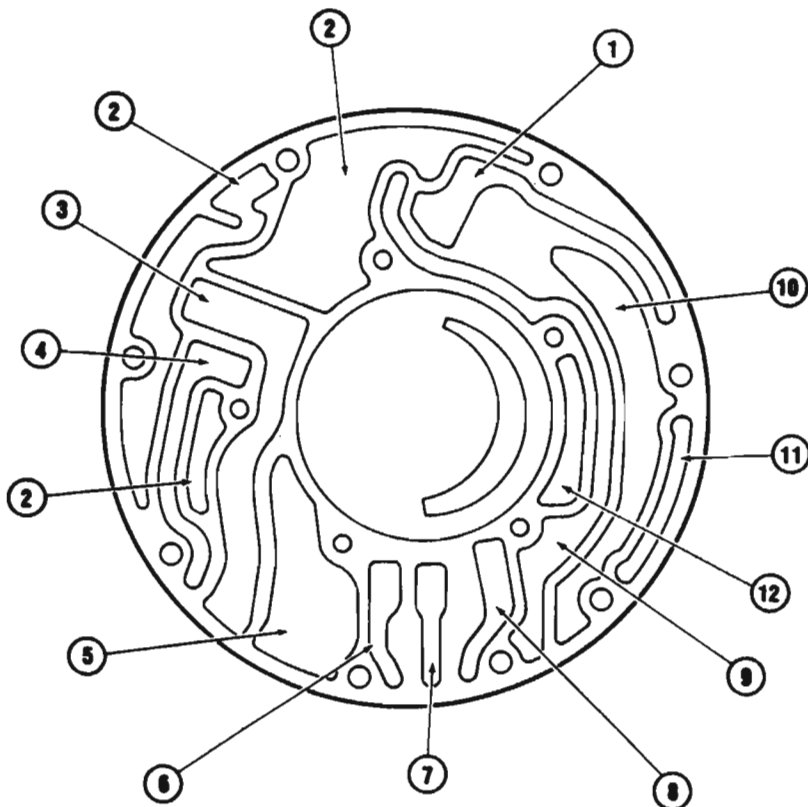
- 1. REVERSE
- 2. BOLT HOLE
- 3. PUMP PRESSURE
- 4. EXHAUST
- 5. REVERSE ORIFICE
- 6. PUMP PRESSURE
- 7. DRIVE
- 8. LOW
- 9. GOVERNOR
- 10. MODULATOR
- 11. DRIVE ORIFICE
- 12. DIRECT CLUTCH 2-3
- 13. SUCTION
- 14. CONVERTER FEED ORIFICE
- 15. DRAIN
- 16. MODULATOR THRU DETENT VALVE
- 17. DETENT MODULATOR (3-2)
- 18. DETENT
- 19. MANUAL LOW CONTROL
- 20. EXHAUST 1-2 CLUTCH
- 21. LOW REVERSE CLUTCH
- 22. GOVERNOR ORIFICE
- 23. LINE
- 24. MODULATOR
- 25. CONVERTER FEED
- 26. MODULATOR OR DETENT REGULATOR
- 27. DETENT REGULATOR
- 28. EXHAUST INT. CLUTCH
- 29. INTERMEDIATE SERVO (R.N.D.)
- 30. INTERMEDIATE CLUTCH 1-2
- 31. INT. SERVO REL. (RND)

Figure 7 Valve Body Spacer Plate

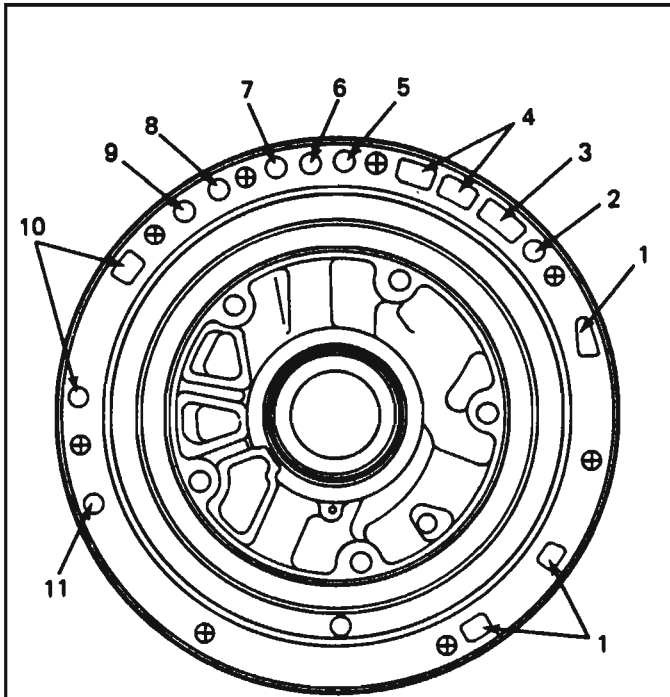


IDENTIFICATION OF OIL CHANNELS IN PUMP COVER

1. COOLER OUT
2. EXHAUST
3. PUMP PRESSURE
4. REVERSE
(DIRECT CLUTCH OUTER)
5. SUCTION
6. CONVERTER RELEASE
7. FORWARD CLUTCH
(DRIVE)
8. DIRECT CLUTCH
9. INTERMEDIATE CLUTCH
10. CONVERTER CLUTCH
APPLY
11. COOLER IN
12. LIP SEAL DRAIN

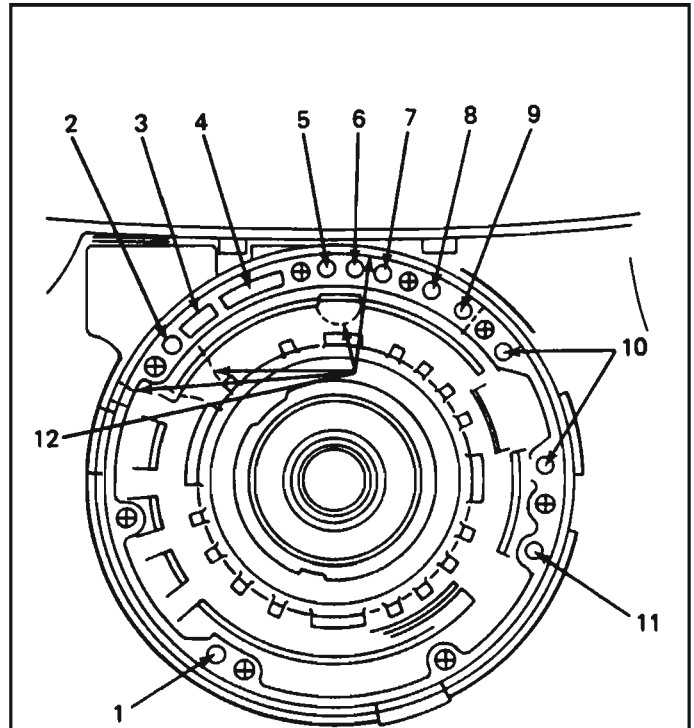


IDENTIFICATION OF OIL CHANNELS IN PUMP BODY FRONT FACE



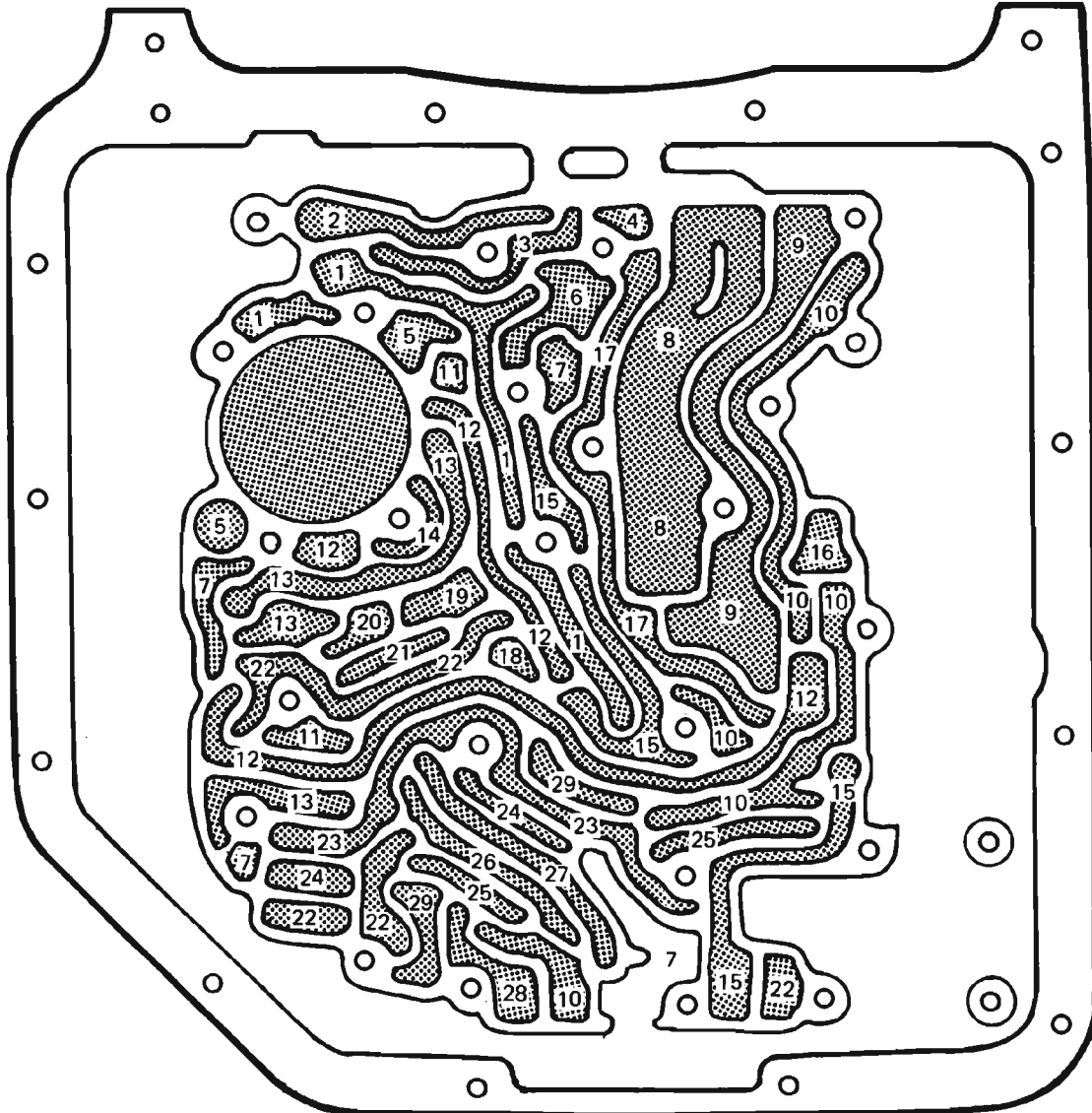
| ILL. NO. | DESCRIPTION |
|----------|---------------------------------|
| 1 | BREATHER |
| 2 | REVERSE (DIRECT CLUTCH - OUTER) |
| 3 | PUMP PRESSURE |
| 4 | SUCTION |
| 5 | CONVERTER RELEASE |
| 6 | FORWARD CLUTCH |
| 7 | DIRECT CLUTCH |
| 8 | INTERMEDIATE CLUTCH APPLY |
| 9 | CONVERTER APPLY |
| 10 | COOLER IN |
| 11 | COOLER OUT |

Figure 9 Identification of Pump Rear Oil Passages



| ILL. NO. | DESCRIPTION |
|----------|---------------------------------|
| x | BOLT HOLES |
| 1 | BREATHER |
| 2 | REVERSE (DIRECT CLUTCH - OUTER) |
| 3 | PUMP PRESSURE |
| 4 | SUCTION |
| 5 | C.C. RELEASE |
| 6 | FORWARD CLUTCH |
| 7 | DIRECT CLUTCH |
| 8 | INTERMEDIATE CLUTCH APPLY |
| 9 | CONVERTER APPLY |
| 10 | COOLER IN (TO RADIATOR) |
| 11 | COOLER OUT (FROM RADIATOR) |
| 12 | DRAIN (4) CAST OPEN PORTS |

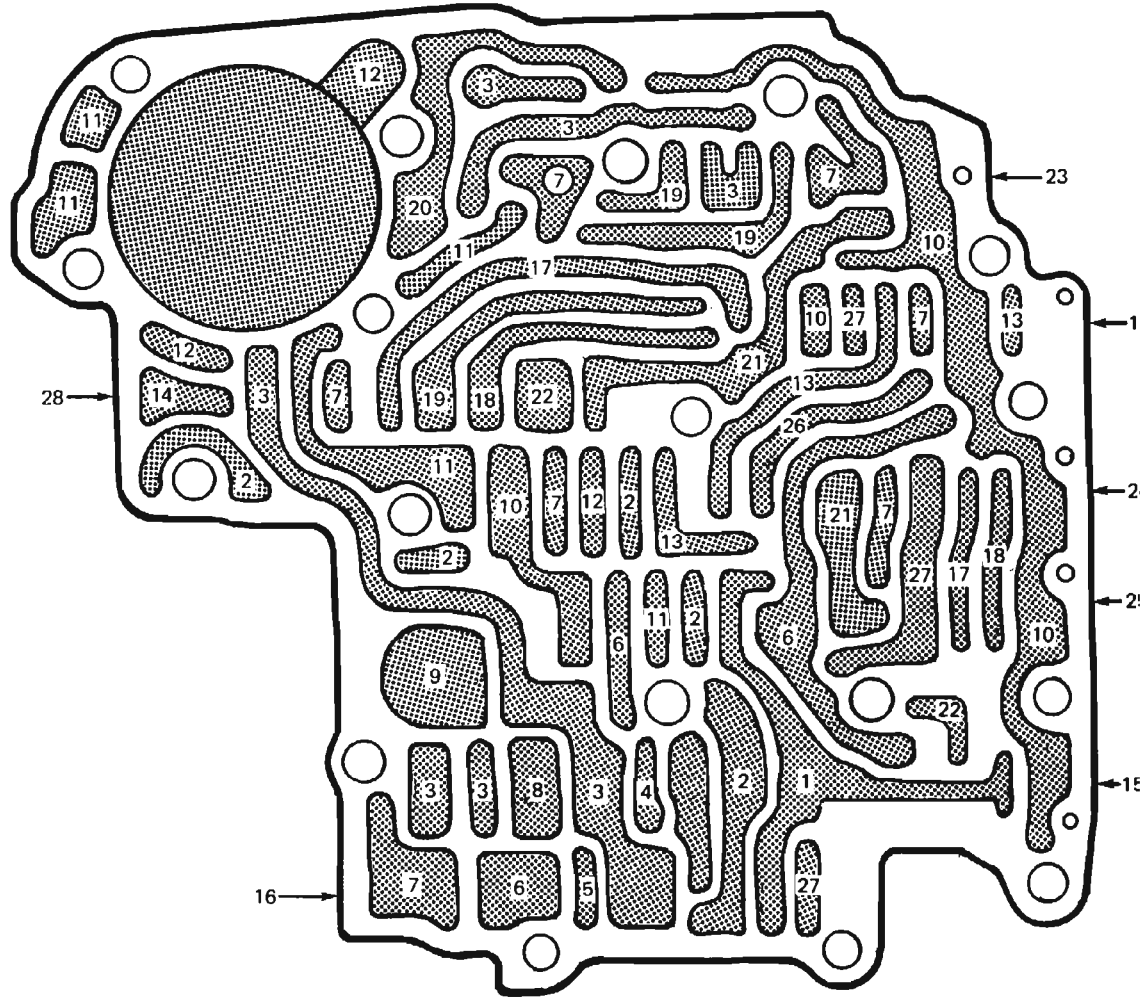
Figure 10 Identification of Case to Pump Oil Passages



| ILL. NO. | DESCRIPTION |
|----------|----------------------------------|
| 1 | DIRECT CLUTCH (2-3) |
| 2 | COOLER IN |
| 3 | CONVERTER APPLY |
| 4 | CONVERTER RELEASE |
| 5 | INTERMEDIATE CLUTCH (1-2) |
| 6 | DRIVE FORWARD CLUTCH |
| 7 | DRAIN |
| 8 | SUCTION |
| 9 | PUMP PRESSURE |
| 10 | REVERSE |
| 11 | VOID |
| 12 | INTERMEDIATE SERVO RELEASE (RND) |
| 13 | LINE |
| 14 | 2-3 CLUTCH |
| 15 | DRIVE |

| ILL. NO. | DESCRIPTION |
|----------|-------------------------------|
| 16 | EXHAUST |
| 17 | CONVERTER FEED |
| 18 | EXHAUST, 1-2 CLUTCH |
| 19 | MODULATOR OR DETENT REGULATOR |
| 20 | EXHAUST, INTERMEDIATE CLUTCH |
| 21 | DETENT REGULATOR |
| 22 | GOVERNOR |
| 23 | MODULATOR |
| 24 | DETENT 2 |
| 25 | LO |
| 26 | DETENT MODULATOR (3-2) |
| 27 | MODULATOR THRU DETENT VALVE |
| 28 | LO/REVERSE CLUTCH |
| 29 | MANUAL LO CONTROL |

Figure 11 Identification of Case Face Oil Passage



| ILL. NO. | DESCRIPTION |
|----------|----------------------|
| 1 | INTERMEDIATE (L2) |
| 2 | DRIVE |
| 3 | LINE |
| 4 | CONVERTER FEED |
| 5 | SPEED RELEASE |
| 6 | REVERSE |
| 7 | EXHAUST |
| 8 | EXHAUST OPEN TO SUMP |
| 9 | SUCTION |
| 10 | GOVERNOR |
| 11 | 2-3 CLUTCH |
| 12 | 1-2 CLUTCH |
| 13 | MANUAL LO CONTROL |
| 14 | VOID |
| 15 | PRESSURE REGULATOR |

| ILL. NO. | DESCRIPTION |
|----------|-------------------------------|
| 16 | MANUAL |
| 17 | DETENT 1 |
| 18 | MODULATOR OR DETENT REGULATOR |
| 19 | DETENT REGULATOR |
| 20 | INTERMEDIATE SERVO RELEASE |
| 21 | DETENT 2 |
| 22 | MODULATOR |
| 23 | DETENT PRESSURE REGULATOR |
| 24 | 1-2 SHIFT |
| 25 | 2-3 SHIFT |
| 26 | LO OR REVERSE |
| 27 | LO |
| 28 | DETENT |

Figure 12 Identification of Valve Body Oil Passages

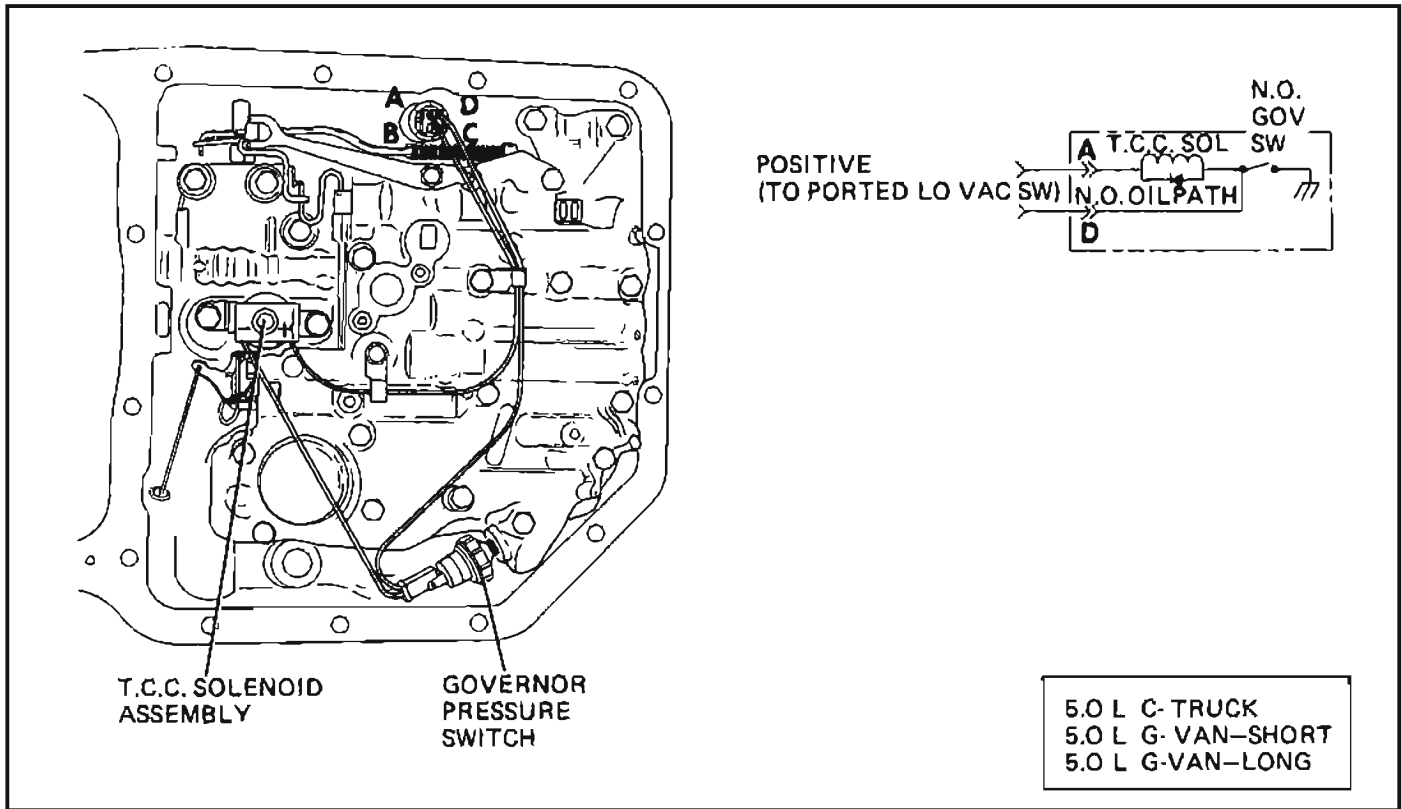


Figure 13

TRUBLE DIAGNOSIS CHART

| Condition | Possible Cause | Correction |
|--|-------------------------------|---|
| No Drive Range (install pressure gauge) | 1. Low oil level. | 1. Correct level - Check for external leaks or vacuum modulator. (leaking diaphragm will evacuate oil from the unit). |
| | 2. Manual linkage adjustment. | 2. See manual linkage adjustment. |
| | 3. Low oil pressure. | 3a. Filter Assembly blocked. b. Pump assembly- pressure regulator, pump drive gear - tangs damaged by converter. c. Case - porosity in intake bore. |
| | 4. Control valve assembly. | 4. Manual valve disconnected from inner lever. |
| | 5. Forward Clutch. | 5a. Forward clutch does not apply - piston cracked; seals missing, damaged; clutches burned. b. Pump feed circuit to forward clutch oil seal rings missing or broken on pump cover; pump to case gasket mispositioned or damaged. Clutch drum check ball stuck or missing. |



Technical Service Information

| Condition | Possible Cause | Correction |
|---------------------------------|------------------------------|--|
| No Drive Range continued | 6. Roller clutch assembly. | 6. Broken springs or damaged cage. |
| Oil pressure high or low. | 1. High pressure | 1. Vacuum lines leaking. b. Vacuum modulator. c. Modulator valve. d. Pressure regulator. e. Oil pump. |
| | 3. Low pressure. | 1. Vacuum lines or fittings obstructed. b. Vacuum modulator. c. Modulator valve. d. Pressure regulator. e. Governor. f. Oil pump. |
| 1-2 shift - full throttle only. | 1. Detent valve misadjusted. | 1. Sticking or linkage. |
| | 2. Vacuum leak. | 2. Vacuum line or fittings leaking. |
| | 3. Control valve assembly. | 3a. Valve body gaskets - leaking damaged, incorrectly installed. b. Detent valve train stuck. c. 1-2 valve stuck. |
| | 4. Case assembly. | 4. Porosity. |
| 1st gear only - no up shift. | 1. Governor assembly. | 1a. Governor valve sticking. b. Driven gear loose, damaged or worn (check for pin in case and length of pin showing); also, check output shaft drive gear for nicks or rough finish, if driven gear shows damage. |
| | 2. Control valve assembly. | 2a. 1-2 shift valve train stuck. b. Governor feed channels blocked. c. Valve body gaskets - leaking damaged, incorrectly installed. |
| | 3. Case. | 3a. Porosity between channels. b. Governor feed channels blocked, governor bore worn, allowing cross pressure leak. |
| | 4. Intermediate clutch. | 4a. Clutch piston seals - missing, improperly assembled, cut. b. Intermediate roller clutch - Broken springs or damaged cage. |



Technical Service Information

| Condition | Possible Cause | Correction |
|---|----------------------------|--|
| 1st and 2nd gear only, no 2-3 shift. | 1. Control valve assembly. | 1a. 2-3 shift train stuck. b. Valve body gaskets - leaking damaged, incorrectly installed. |
| | 2. Direct clutch. | 2a. Pump hub - direct clutch oil seal rings - broken or missing. b. Clutch piston seals - missing, improperly assembled, cut, piston check ball stuck or missing. |
| Drive in "Neutral" | 1. Manual linkage. | 1. Misadjusted. |
| | 2. Forward clutch. | 2. Clutch does not release - (this condition will also cause "No Reverse"). |
| No movement in "Reverse", or slips in "Reverse" - install pressure gauge. | 1. Low oil level. | 1. Add oil. |
| | 2. Manual linkage. | 2. Misadjusted. |
| | 3. Oil pressure. | 3a. Modulator valve stuck. b. Modulator and reverse boost valve stuck. c. Pump Hub - direct clutch oil seal rings broken. d. Direct clutch piston seal cut or missing. e. Low and reverse clutch piston seal cut or missing. f. #1 check ball missing |
| | 4. Control valve assembly. | 4a. Valve body gaskets - leaking, damaged, incorrectly installed (other malfunctions may also be indicated). b. 2-3 valve train stuck in upshifted position. This will also cause a 1-3 shift in drive range. c. 1-2 valve train stuck in upshifted position. |
| | 5. Intermediate servo. | 5. Piston or pin stuck so the intermediate overrun band is applied. |
| | 6. Low / Reverse clutch. | 6. Piston out or seal is damaged or missing. |
| | 7. Direct clutch. | 7a. Outer seal damage or missing. b. Clutch plates burned - may be a stuck check ball in piston. |
| | 8. Forward clutch. | 8. Clutch will not release (will also cause "Drive" in "Neutral"). |



Technical Service Information

| Condition | Possible Cause | Correction |
|--|--|--|
| Slips in all ranges, slips on take-off - (install pressure gauge). | 1. Low oil level. | 1. Add oil. |
| | 2. Oil pressure. | 2a. Vacuum modulator inoperative. b. Vacuum modulator valve sticking. c. Filter assembly - plugged or leaks. |
| | 3. Case. | 3a. Pressure regulator valve stuck. b. Pump to case gasket damaged or incorrectly installed. |
| | 4. Forward clutch slipping. | 4. Cross leaks, porosity. |
| Slips 1-2 shift - (install pressure gauge). | 1. Low oil level. | 1. Add oil. |
| | 2. Oil pressure. | 2a. Vacuum modulator assembly inoperative. b. Modulator valve stuck. c. Pump pressure regulator valve. |
| | 3. 2-3 accumulator. | 3. Oil ring damaged or missing. |
| | 4. 1-2 accumulator. | 4. Oil ring damaged or missing, case bore damaged. |
| | 5. Pump to case gasket. | 5. Mispositioned. |
| | 6. Case. | 6. Porosity between channels. |
| | 7. Intermediate clutch. | 7. Piston seals missing or damaged; clutch plates burned. |
| Rough 1-2 shift - (install pressure gauge). | 1. Oil pressure, loose fittings, restrictions in line. | 1a. Vacuum modulator - check. b. Modulator valve stuck. c. Valve body - regulator or boost valve stuck. d. Pump to case gasket - off location or damaged. |
| | 2. Case. | 2. Porosity between channels. |
| | 3. 1-2 accumulator assembly. | 3a. Oil rings damaged b. Piston stuck. c. Broken or missing spring. d. Bore damaged. e. Check accumulator feed hole in valve body plate. |



Technical Service Information

| Condition | Possible Cause | Correction |
|---|--|---|
| Slips 2-3 shift - (install pressure gauge). | 1. Low oil level. | 1. Add oil. |
| | 2. Oil pressure low. | 2a. Modulator assembly. b. Modulator valve sticking. c. Pump pressure regulator valve; pump to case gasket off location. |
| | 3. Case. | 3. Porosity. |
| | 4. Direct clutch. | 4. Piston seals leaking, or check ball leak. |
| Rough 2-3 shift - (install pressure gauge). | 1. Oil pressure high. | 1a. Vacuum leak. b. Modulator valve stuck. c. Valve body - pressure regulator or boost valve stuck. |
| | 2. 2-3 accumulator assembly. | 2a. 2-3 accumulator spring missing or broken. b. Accumulator piston stuck. |
| No engine breaking, L-2 - 2nd gear. | 1. Intermediate servo and 2-3 accumulator. | 1a. Servo or accumulator oil rings or bores leaking. b. Servo piston stuck. |
| | 2. Intermediate overrun band. | 2. Intermediate overrun band broken, burned (check for cause). |
| | 3. Low oil pressure. | 3. Pressure regulator and/or boost valve stuck. |
| No engine breaking, L-1 - 1st gear. | 1. Manual low control valve assembly. | 1. Stuck. |
| | 2. Oil pressure low. | 2. Pressure regulator and/or boost valve stuck. |
| | 3. Low and reverse clutch. | 3. Piston inner seal damaged or stuck. |
| No part throttle down shift (install pressure gauge). | 1. Oil pressure. | 1. Vacuum modulator assembly, modulator valve, pressure regulator valve train. |
| | 2. Detent valve and linkage. | 2. Sticks or disconnected or broken. |
| No detent downshifts. | 1. Control valve assembly. | 1. 2-3 valve stuck. |
| | 2. Detent valve and linkage. | 2. Sticks or disconnected or broken. |
| Low or high shift points (install pressure gauge). | 1. Oil pressure. | 1a. Engine vacuum. b. Modulator assembly vacuum line connections at engine and trans, modulator valve, pressure regulator. |



Technical Service Information

| Condition | Possible Cause | Correction |
|--|---|---|
| Low or high shift points (install pressure gauge) continued. | 2. Governor. | 2a. Valve sticking. b. Feed holes restricted or leaking, pipes damaged or mispositioned. c. Feed line plugged. |
| | 3. Detent valve and linkage. | 3. Stuck open (will cause late shifts). |
| | 4. Control valve assembly. | 4a. 2-3 valve train sticking. b. 1-2 shift valve train sticking. |
| | 5. Case. | 5. Porosity. |
| Wont hold in "Park". | 1. Manual linkage. | 1. Misadjusted. |
| | 2. Internal linkage. | 2a. Parking break lever and actuator. Check for chamfer on actuator rod sleeve. b. Parking pawl broken or inoperative.. |
| Lock up in manual low (usually hot only). | 1. Converter pressure leaking into direct clutch thru stator shaft. | 1. Check stator shaft position. |
| | 2. Direct clutch. | 2a. Direct clutch bore undersized or piston oversized. b. Direct clutch feed hole shy small chamfer. |
| | 3. Low / Reverse clutch. | 3. Low / Reverse clutch piston seal missing or cut. |
| Second gear start or slips second gear only. | 1. Intermediate clutch. | 1. Wrong number of clutch plates or wrong piston. |
| Lock up in reverse (usually hot only). | 1. Forward clutch. | 1. Bore undersized or piston oversized. |
| | 2. Direct clutch. | 2. Direct clutch feeding forward clutch thru stator shaft. (check stator shaft position.) |
| Locks in reverse from park to reverse only. | 1. Parking pawl. | 1. Parking pawl staying in due to a burr on leading edge. |
| Cold morning reverse no drive till engine warms up. | 1. Pressure regulator bore and sleeve tight. | 1. Remove and repair. |
| Shifts cold but not warm. | 1. Governor assembly. | 1. Nylon gear roll pin shy. |
| No drive but has manual low. | 1. Low & Reverse roller clutch. | 1. Low & Reverse roller clutch installed backwards. |

| Condition | Possible Cause | Correction |
|--|--------------------------------|---|
| No 1-2 shift - makes 1-3 shift and 3-1 shift, but has all shifts manually. | 1. Intermediate roller clutch. | 1. Intermediate roller clutch not locking. |
| Governor nylon gear stripped 360°. | 1. Case pin missing. | 1. Governor case pin. |
| | 2. Output shaft. | 2. Output shaft rough or worn. |
| Governor gear stripped one side. | 1. Governor seizing in bore. | 1. Repair or replace as necessary. |
| Slow reverse (cold only). | 1. Low oil level. | 1. Adjust oil level. |
| Harsh 1-2 shift. | 1. 1-2 accumulator. | 1a. Piston or spring. b. Accumulator feed hole in valve body plate. |
| Slow reverse (hot only). | 1. Valve body. | 1. Leaking valve body support plate. |
| | 2. Shift selector lever. | 2a. Bent or S-hook hole off location. b. S-hook bent. c. Detent roller spring hole off location. d. Manual valve S-hook hole off location. |

UNIT REPAIR

EXTERNAL PARTS

Removal and Inspection

1. Place transmission in Fixture J-8763-02. Do not over tighten. See Figure 14.
2. With transmission in Holding Fixture J-8763-02, remove torque converter assembly. It may be necessary to pry the converter with a screwdriver due to a suction condition caused by the input shaft "O" ring.
3. Remove modulator assembly attaching bolt and retainer.
4. Remove vacuum modulator assembly "O" ring seal and modulator valve from case. See Figure 16.
5. Inspect modulator "O" ring seal for nicks, cuts or damage. Replace if necessary.

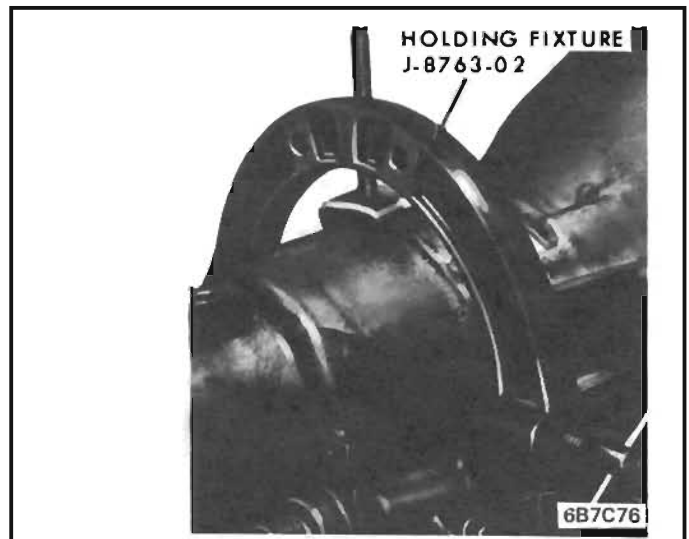


Figure 14 Transmission Holding Fixture

Extension Housing

6. Remove bolts retainer and speedometer driven gear from side of extension housing and remove four (4) extension housing to case attaching bolts. See Figure 17

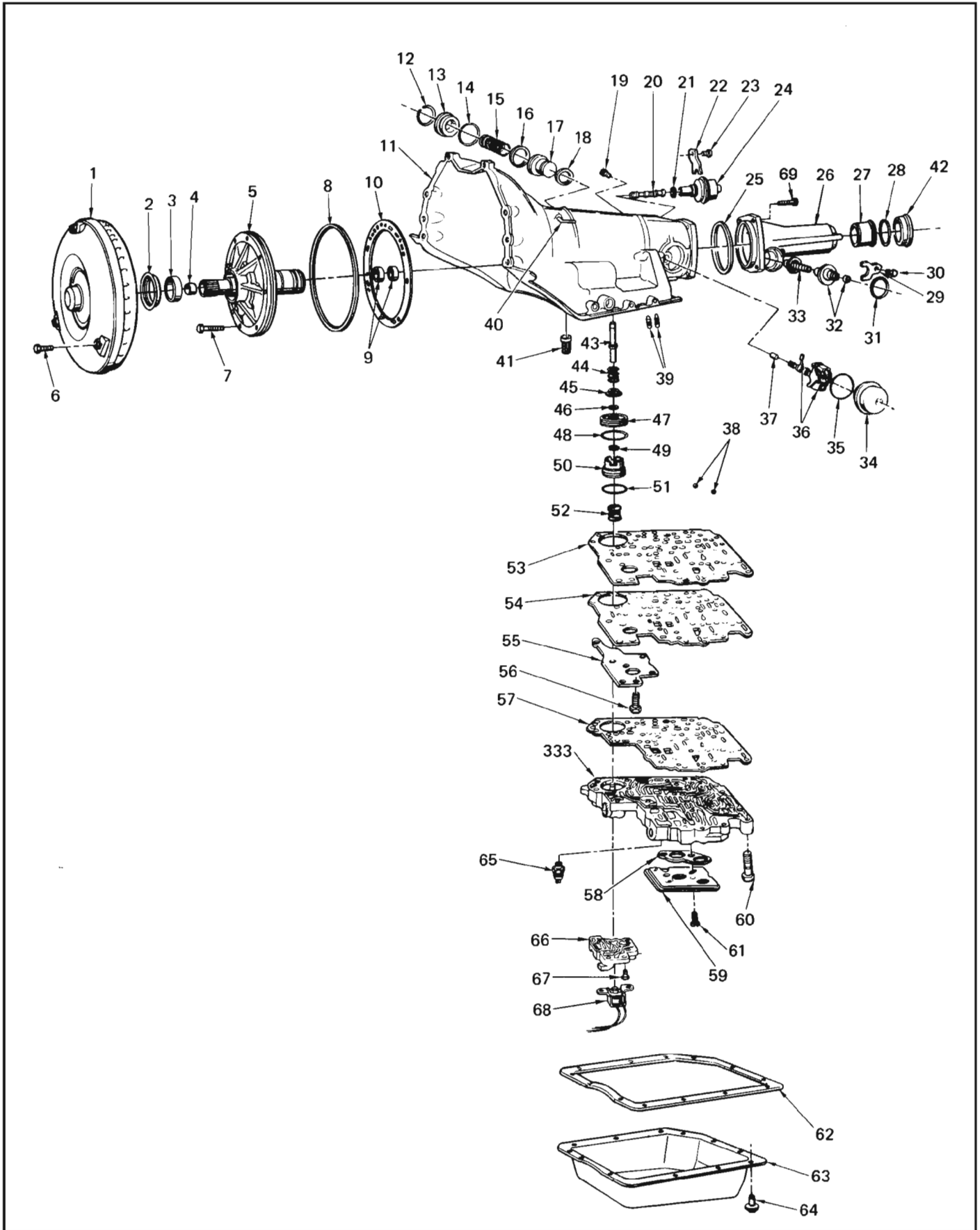


Figure 15 External Parts



Technical Service Information

| ILL. NO. | DESCRIPTION | ILL. NO. | DESCRIPTION |
|----------|--|----------|--|
| 1 | CONVERTER ASSEMBLY, TRANSMISSION | 35 | SEAL GOVERNOR COVER TO CASE |
| 2 | SEAL OIL PUMP TO CONVERTER HUB | 36 | GOVERNOR ASSEMBLY, TRANSMISSION |
| 3 | BUSHING, OIL PUMP BODY (1) | 37 | PIN, DOWEL (5/16" X 1") |
| 4 | BUSHING OIL PUMP STATOR SHAFT (FRONT) (3) | 38 | BALL, CHECK VALVE |
| 5 | PUMP ASSEMBLY, OIL | 39 | SCREEN GOVERNOR PRESSURE HOLE |
| 6 | BOLT CONVERTER TO FLYWHEEL | 40 | PIPE, TRANSMISSION VENT |
| 7 | SCREW, OIL PUMP TO CASE (5/16" - 18 X 1-7/16") | 41 | SCREEN OIL PUMP PRESSURE HOLE |
| 8 | SEAL OIL PUMP TO CASE | 42 | SEAL, CASE EXTENSION OIL |
| 9 | BUSHING OIL PUMP STATOR SHAFT (REAR) (3) | 43 | ROD INTERMEDIATE SERVO PISTON |
| 10 | GASKET, OIL PUMP TO CASE | 44 | SPRING, INTERMEDIATE SERVO PISTON |
| 11 | CASE ASSEMBLY, TRANSMISSION | 45 | SEAT, INTERMEDIATE SERVO PISTON SPRING |
| 12 | RETAINER, INTER. CLUTCH ACCUMULATOR PISTON COVER | 46 | WASHER INTERMEDIATE SERVO PISTON |
| 13 | COVER, INTER. CLUTCH ACCUMULATOR PISTON | 47 | PISTON, INTERMEDIATE SERVO |
| 14 | SEAL INTER. CLUTCH ACCUMULATOR PISTON COVER | 48 | SEAL, INTERMEDIATE SERVO PISTON |
| 15 | SPRING, INTER. CLUTCH ACCUMULATOR PISTON | 49 | RING, DIRECT CLUTCH ACCUMULATOR PISTON RING |
| 16 | RING, INTER. CLUTCH ACCUMULATOR PISTON SEAL | 50 | PISTON, DIRECT CLUTCH ACCUMULATOR |
| 17 | PISTON, INTER. CLUTCH ACCUMULATOR (W/SEAL) | 51 | SEAL, DIRECT CLUTCH ACCUMULATOR PISTON |
| 18 | RING, INTER. CLUTCH ACCUMULATOR PISTON SEAL | 52 | SPRING, DIRECT CLUTCH ACCUMULATOR PISTON |
| 19 | PLUG, LINE PRESSURE CHECK | 53 | GASKET VALVE BODY (UPPER) |
| 20 | VALVE VACUUM MODULATOR | 54 | PLATE VALVE BODY SPACER |
| 21 | SEAL, VACUUM MODULATOR TO CASE | 55 | SUPPORT VALVE BODY SPACER PLATE |
| 22 | RETAINER, VACUUM MODULATOR | 56 | BOLT SUPPORT TO CASE (5/16" - 18 X 3/4") |
| 23 | BOLT (5/16" - 18 X 11/16") | 57 | GASKET VALVE BODY (LOWER) |
| 24 | MODULATOR, VACUUM | 333 | BODY, VALVE |
| 25 | SEAL CASE EXTENSION TO CASE | 58 | GASKET, OIL PUMP FILTER |
| 26 | EXTENSION, TRANSMISSION CASE | 59 | SCREEN KIT, W/ FILTER |
| 27 | BUSHING, EXTENSION TRANSMISSION | 60 | BOLT, VALVE BODY TO CASE (5/16"-18 X 1-3/4") |
| 28 | SEAL, TRANSMISSION OUTPUT YOKE SLEEVE | 61 | BOLT, OIL PUMP FILTER TO BODY (1/4" - 20 X 3/8") |
| 29 | RETAINER SPEEDOMETER DRIVEN GEAR SLEEVE | 62 | GASKET, OIL PAN |
| 30 | BOLT, SLEEVE RETAINER | 63 | PAN, OIL |
| 31 | SEAL, SPEEDO DRIVEN GEAR SLEEVE TO EXTENSION | 64 | SCREW, OIL PRESSURE |
| 32 | SLEEVE, SPEEDO DRIVEN GEAR | 65 | SWITCH OIL PRESSURE |
| 33 | GEAR, SPEEDO DRIVEN | 66 | BODY, AUXILIARY VALVE |
| 34 | COVER, GOVERNOR | 67 | BOLT, AUXILIARY VALVE BODY TO VALVE BODY |
| | | 68 | SOLENOID, TORQUE CONVERTER CLUTCH |
| | | 69 | BOLT (3/8" - 16 X 1.375") |

Figure 15A External Parts

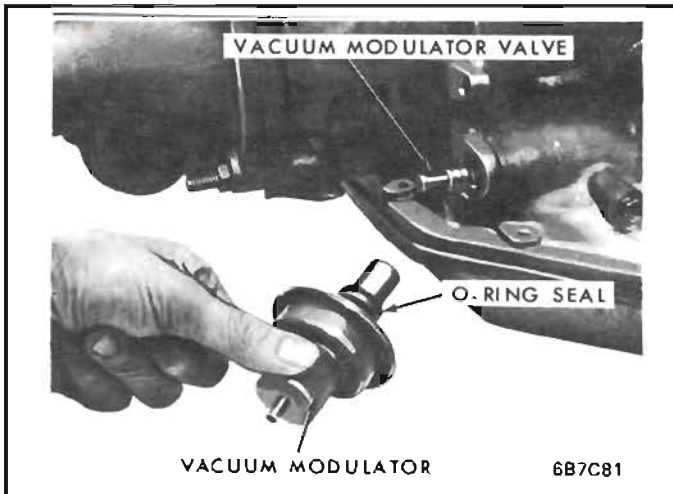


Figure 16 Vacuum Modulator

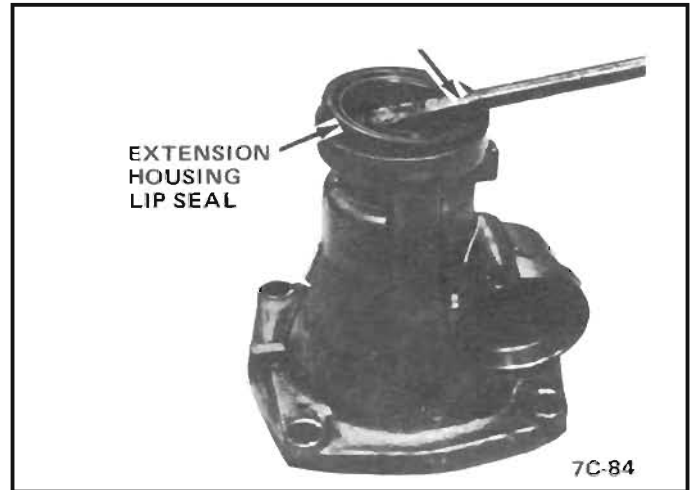


Figure 18 Extension Housing Lip Seal Removal

9. Remove speedometer drive gear and retaining clip.

10. Inspect gear teeth for nicks burrs or damage.

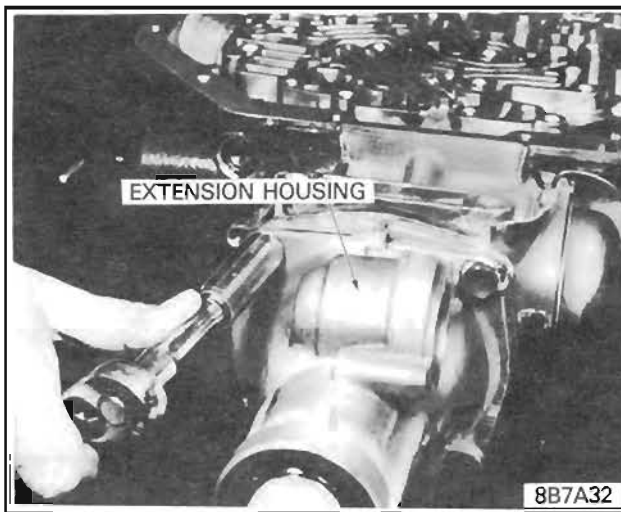


Figure 17 Extension Housing

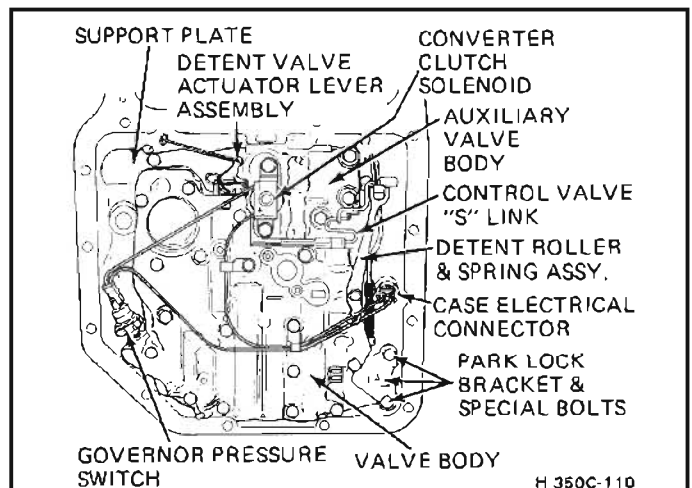


Figure 19 Valve Body and Related Components

7. Remove extension housing to case oil seal.

8. Remove the extension housing lip seal using a screwdriver. *See Figure 18.*

9. Remove oil pan and pan gasket.

10. Remove filter assembly and filter gasket.

Valve Body

11. Remove detent roller and spring assembly from valve body. *See Figure 19.*

12. Remove actuator pin from detent valve actuator lever assembly. Remove detent control link.

13. Disconnect solenoid wires. Remove pressure switch only if replacement is necessary.

14. Remove solenoid attaching bolts and solenoid.

Inspect solenoid wires for loose connections and cut or wore insulator.

15. Remove manual shaft retaining clip with screwdriver and slide manual shaft outward. This will allow the control valve "S" link to be removed. *See Figure 20.*

See Figure 20.

16. Remove valve body attaching bolts and valve body.

17. Remove auxiliary valve body attaching bolts and auxiliary valve body. *See Figure 21.*

18. Remove support plate attaching bolts and support plate.

19. Remove spacer plate and gaskets.

See Figure 22. The spacer plate to valve body gasket has a yellow ink stripe. The yellow ink stripe is necessary for identification purposes. This gasket is almost identical to the spacer plate to case gasket.

20. Remove 5 check balls. Note the locations of check balls. *See Figure 23.*

21. Remove park lock bracket and special bolts. *See Figure 19.*

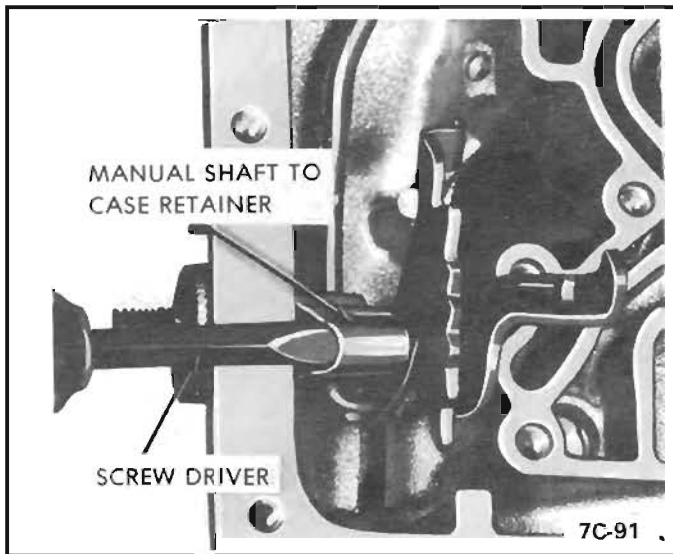


Figure 20 Manual Shaft Retainer Removal

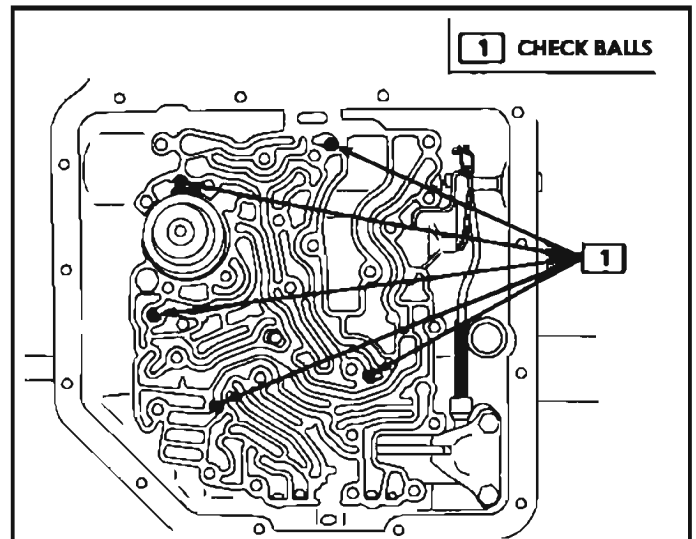


Figure 23 Check Ball Locations

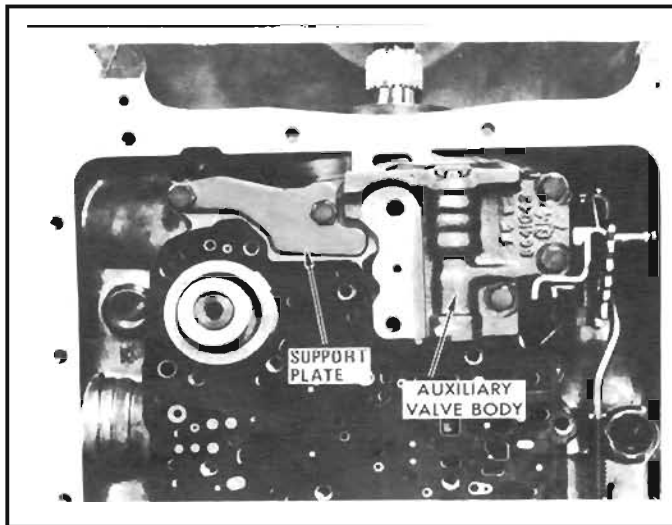


Figure 21 Auxiliary Valve Body and Support Plate

22. Remove oil pump pressure screen from the case. Inspect for damage. Clean or replace as necessary. See Figure 24.

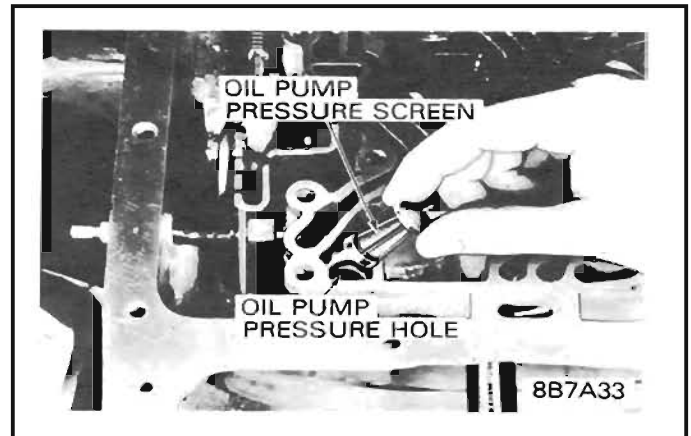


Figure 24 Pump Screen Removal

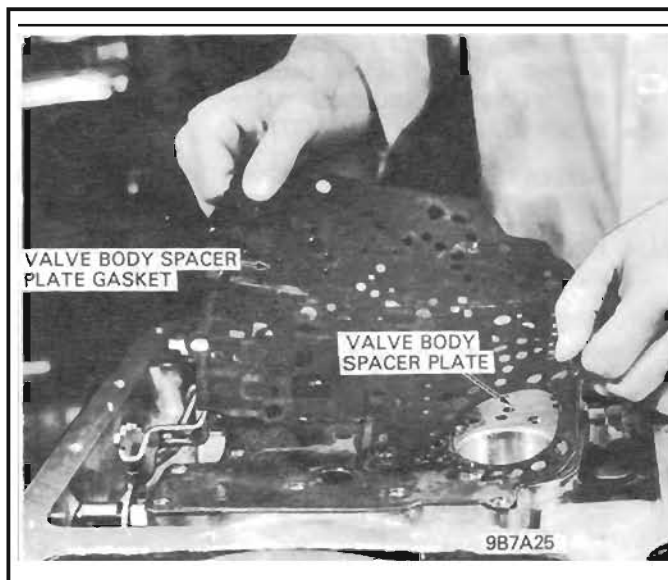


Figure 22 Valve Body and Spacer Plate Gasket

23. Remove governor screen from case. Inspect for damage. Clean or replace as necessary. See Figure 25.

24. Remove case electrical connector and "O" ring by depressing tabs.

25. If removal of internal manual linkage is required proceed as follows:

a. Remove jam nut holding range selector inner lever to manual shaft.

b. Remove manual shaft from case. Remove range selector inner lever and parking pawl actuating rod.

c. Remove manual shaft to case lip seal, if necessary. See Figure 26.

d. Remove parking pawl shaft retaining plug stake marks.

Remove retaining plug, parking pawl shaft, parking pawl, disengaging ring. See Figure 27.

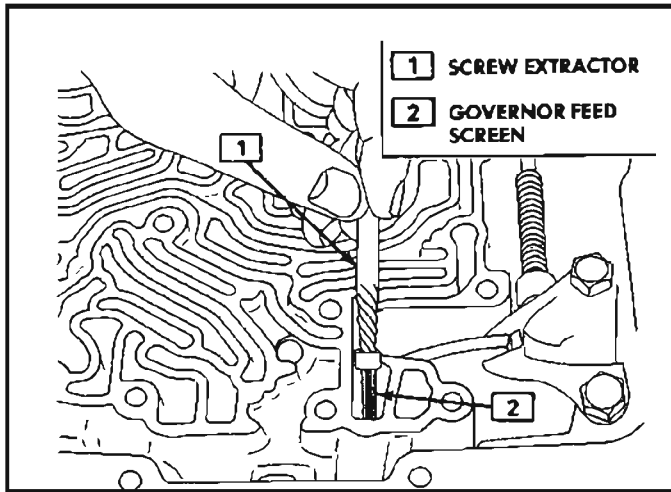


Figure 25 Governor Feed Screen Removal

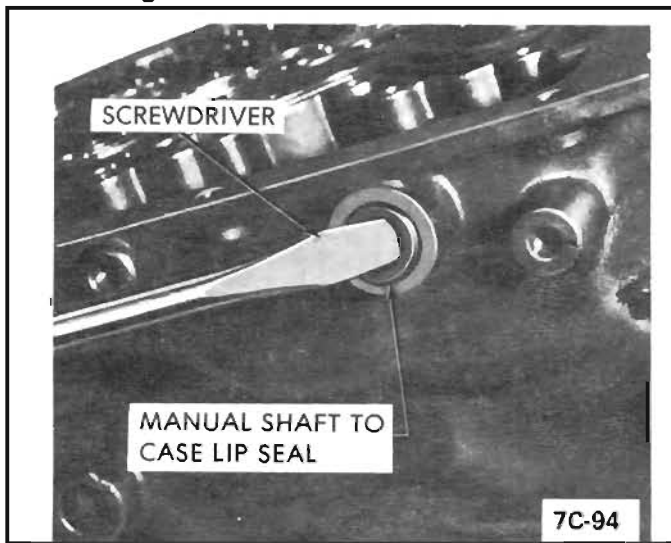


Figure 26 Manual Shaft Lip Seal Removal

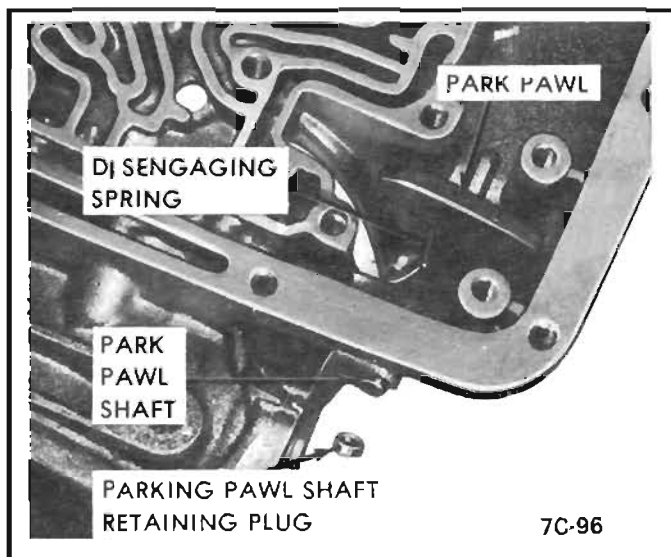


Figure 27 Park Pawl

26. Remove intermediate servo piston, washer, spring seat and apply pin. See Figure 28.

31. If the piston or seal requires replacement the piston assembly will have to be replaced. (Piston and Seal are one assembly.)

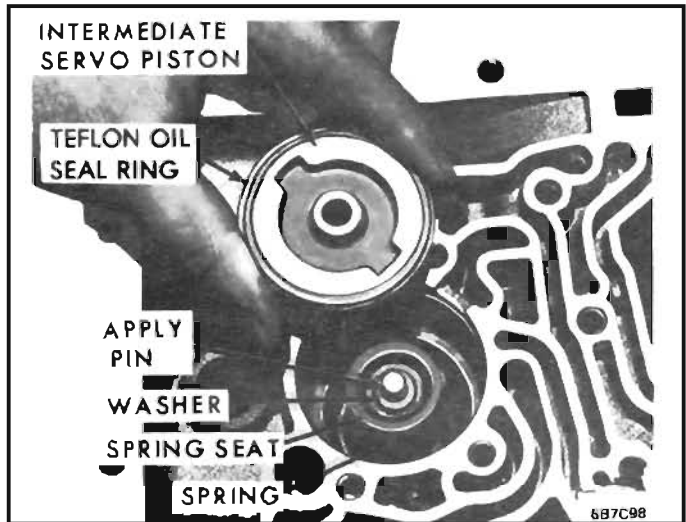


Figure 28 Intermediate Servo Assembly

INTERNAL PARTS-SEE FIGURE 29 Removal and Inspection

Oil Pump Assembly

1. Remove eight (8) pump attaching bolts with washer type seals.
2. Install two (2) threaded slide hammers J-7004 into threaded holes in pump body. Tighten jam nuts and remove pump assembly from case. See Figure 30.
3. Remove pump assembly to case gasket.

Intermediate Clutch Cushion Spring, Intermediate Clutch Plates and Intermediate Overrun Brake Band

1. Remove intermediate clutch cushion spring.
2. Remove the intermediate clutch faced plates, the steel separator plates and one wave spring.
3. Inspect condition of the composition and steel plates. Do not diagnose a lined drive plate by color.
 - A. Dry composition plates with compressed air and inspect the surfaces for:
 1. Pitting and flaking
 2. Wear
 3. Glazing
 4. Cracking
 5. Charring
 6. Chips or metal particles imbedded in lining
 If the drive plate exhibits any of the above conditions replacement is required.
 - B. Wipe steel plates dry and check for heat discoloration. If the surface is smooth and an even color smear is indicated, the plates should be reused.

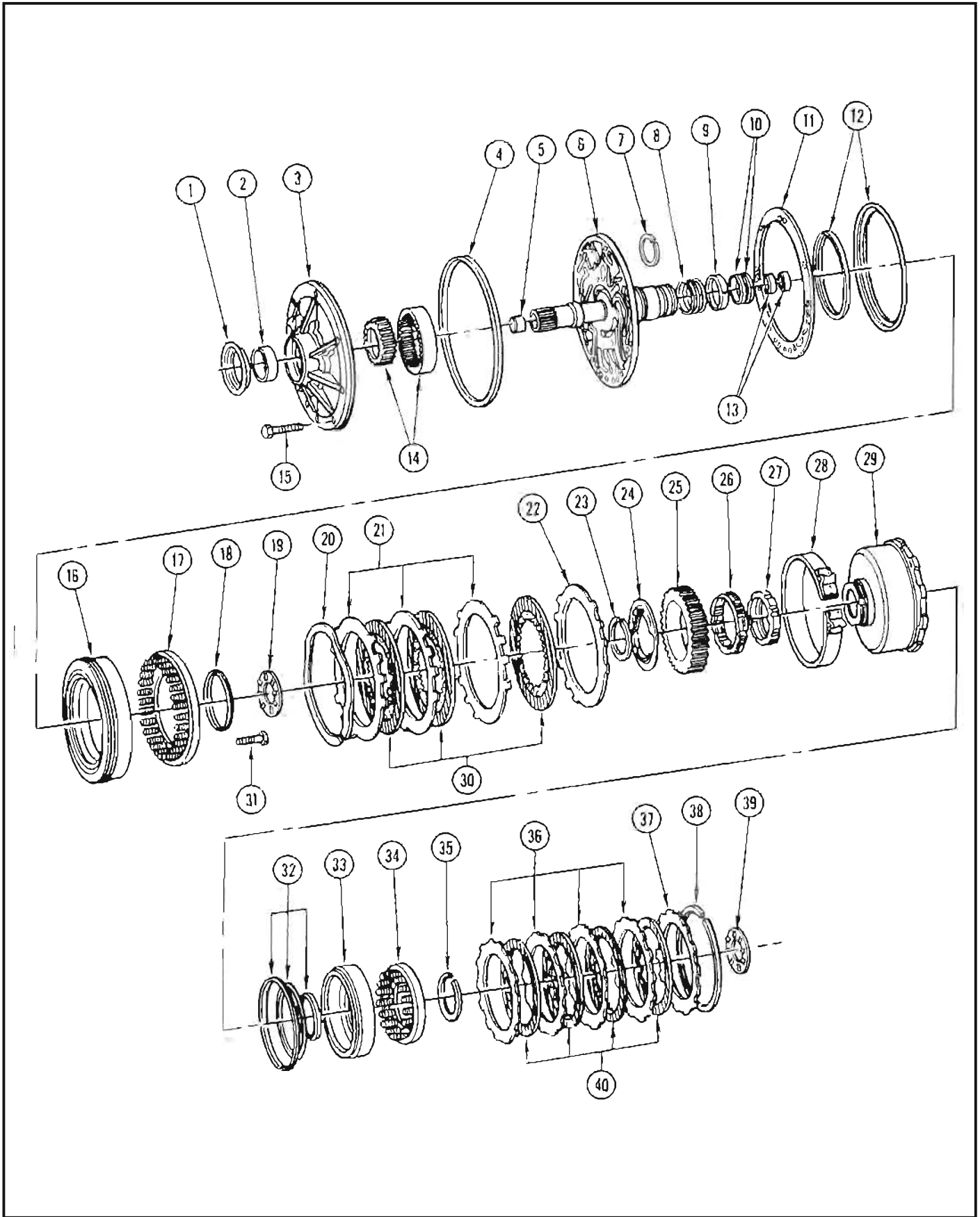


Figure 29 Internal Parts

| ILL. NO. | DESCRIPTION |
|-------------|--|
| 1 | SEAL, OIL PUMP TO CONVERTER HUB |
| 2 | BUSHING, OIL PUMP BODY |
| 3 | BODY ASSEMBLY OIL PUMP |
| 4 | SEAL OIL PUMP TO CASE |
| 5 | BUSHING OIL PUMP STATOR SHAFT - FRONT |
| 6 | COVER ASSEMBLY, OIL PUMP |
| 7 | RING STEADY REST |
| 8 | RING DIRECT CLUTCH DRUM OIL |
| 9 | BUSHING DIRECT CLUTCH DRUM |
| 10 | RING, FORWARD CLUTCH HOUSING OIL SEAL |
| 11 | GASKET OIL PUMP TO CASE |
| 12 | SEAL, INTERMEDIATE CLUTCH PISTON |
| 13 | BUSHING OIL PUMP STATOR SHAFT - REAR |
| 14 | GEAR, OIL PUMP DRIVE AND DRIVEN |
| 15 | BOLT OIL PUMP TO CASE |
| 16 | PISTON INTERMEDIATE CLUTCH |
| 17 | SEAT ASSEMBLY INTERMEDIATE CLUTCH PISTON RETURN - W/ SPRINGS |
| 18 | SPACER, OIL PUMP THRUST BEARING |
| 19 | BEARING DIRECT CLUTCH DRUM TO PUMP COVER - THRUST |
| 20 | SPRING INTERMEDIATE CLUTCH CUSHION |
| 21 | PLATE, INTERMEDIATE CLUTCH REACTION (STEEL) |
| 22 | PLATE INTERMEDIATE CLUTCH PRESSURE |
| 23 | RING, INTERMEDIATE OVERRUN CLUTCH RETAINER - FRONT |
| 24 | RETAINER, INTERMEDIATE OVERRUN CLUTCH |
| 25 | RACE INTERMEDIATE OVERRUN CLUTCH - OUTER |
| 26 | CLUTCH, INTERMEDIATE OVERRUN |
| 27 | CAM INTERMEDIATE OVERRUN CLUTCH |
| 28 | BAND, INTERMEDIATE OVERRUN CLUTCH BRAKE |
| 29 | DRUM DIRECT CLUTCH |
| 30 | PLATE INTERMEDIATE CLUTCH DRIVE (FACED) |
| 31 | BOLT, PUMP COVER TO BODY |
| 32 | SEAL DIRECT CLUTCH PISTON |
| 33 | PISTON, DIRECT CLUTCH |
| 34 | SEAT ASSEMBLY, DIRECT CLUTCH PISTON RETURN - W/ SPRINGS |
| 35 | RING, DIRECT CLUTCH RETURN SPRING RETAINER |
| 36 | PLATE, DIRECT CLUTCH DRIVEN (STEEL) |
| 37 | PLATE, DIRECT CLUTCH PRESSURE (STEEL) |
| 38 | RING, DIRECT CLUTCH PRESSURE PLATE |
| 39 | BEARING, DIRECT CLUTCH DRUM THRUST - REAR |
| 40 | PLATE, DIRECT CLUTCH DRIVE (FACED) |

Figure 29A Internal Parts - Callouts

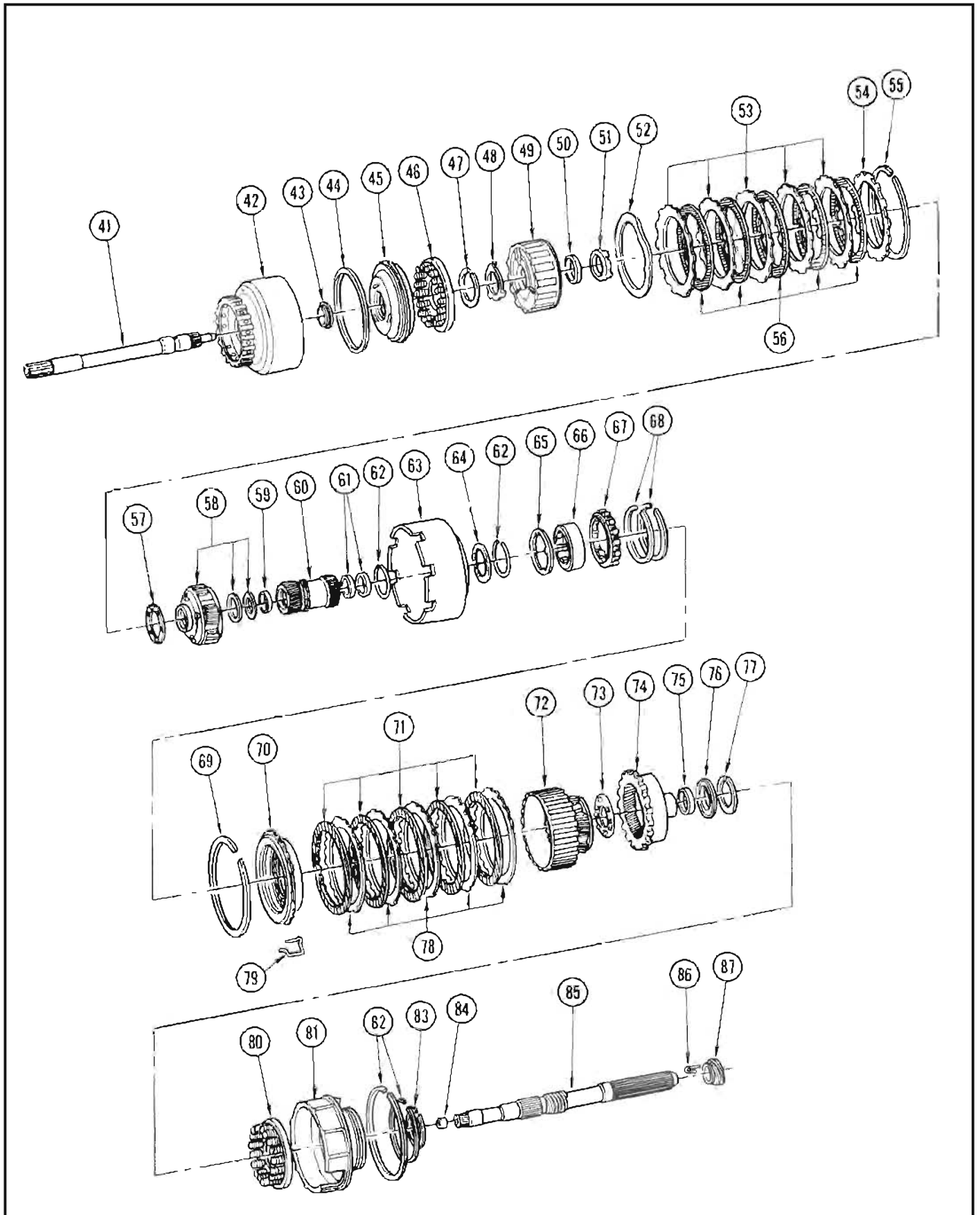


Figure 29B Internal Parts - (Continued)



Technical Service Information

| ILL. NO. | DESCRIPTION |
|---------------------|--|
| 41 | SHAFT TRANSMISSION INPUT |
| 42 | HOUSING FORWARD CLUTCH |
| 43 | SEAL, FORWARD CLUTCH PISTON - INNER |
| 44 | SEAL, FORWARD CLUTCH PISTON - OUTER |
| 45 | PISTON, FORWARD CLUTCH |
| 46 | SEAT ASSEMBLY, FORWARD CLUTCH PISTON - WITH SPRINGS |
| 47 | RING, FORWARD CLUTCH PISTON RETURN SPRING SEAT RETAINER |
| 48 | WASHER INPUT RING GEAR THRUST - FRONT |
| 49 | GEAR INPUT RING |
| 50 | BUSHING INPUT RING GEAR |
| 51 | RETAINER |
| 52 | SPRING, FORWARD CLUTCH PISTON CUSHION |
| 53 | PLATE, FORWARD CLUTCH DRIVE (STEEL) |
| 54 | PLATE, FORWARD CLUTCH PRESSURE (STEEL) |
| 55 | RING, FORWARD CLUTCH PRESSURE PLATE RETAINER |
| 56 | PLATE, FORWARD CLUTCH DRIVEN (FACED) |
| 57 | BEARING, OUTPUT CARRIER |
| 58 | CARRIER ASSEMBLY, OUTPUT |
| 59 | BUSHING, REACTION CARRIER PLANET |
| 60 | GEAR, SUN |
| 61 | BUSHING, SUN GEAR TO OUTPUT SHAFT |
| 62 | RING, SUN GEAR DRIVE SHELL RETAINER |
| 63 | SHELL, SUN GEAR DRIVE |
| 64 | WASHER, SUN GEAR THRUST |
| 65 | WASHER SUN GEAR SHELL REAR THRUST |
| 66 | RACE, LO AND REVERSE OVERRUN CLUTCH |
| 67 | CLUTCH, LO AND REVERSE OVERRUN |
| 68 | RING LO AND REVERSE CLUTCH TO CAM RETAINER |
| 69 | RING, LO AND REVERSE CLUTCH SUPPORT TO CASE |
| 70 | SUPPORT ASSEMBLY, LO AND REVERSE CLUTCH |
| 71 | PLATE LO AND REVERSE CLUTCH DRIVE (FACED) |
| 72 | CARRIER, REACTION PLANET |
| 73 | BEARING, OUTPUT RING GEAR THRUST - FRONT |
| 74 | GEAR OUTPUT RING |
| 75 | BUSHING, CASE TO OUTPUT SHAFT |
| 76 | BEARING, OUTPUT RING GEAR SUPPORT TO CASE |
| 77 | RING LO AND REVERSE CLUTCH PISTON RETURN SPRING SEAT RETAINER |
| 78 | PLATE LO AND REVERSE CLUTCH REACTION (STEEL) |
| 79 | SPRING, LO AND REVERSE CLUTCH SUPPORT RETAINER |
| 80 | SEAT ASSEMBLY LO AND REVERSE CLUTCH PISTON RETURN WITH SPRINGS |
| 81 | PISTON, LO AND REVERSE |
| 82 | SEAL, LO AND REVERSE CLUTCH PISTON |
| 83 | RING, OUTPUT CARRIER RETAINER TO OUTPUT SHAFT |
| 84 | BUSHING, OUTPUT SHAFT |
| 85 | SHAFT ASSEMBLY, OUTPUT |
| 86 | CLIP SPEEDOMETER DRIVE GEAR TO OUTPUT SHAFT |
| 87 | GEAR, SPEEDOMETER DRIVE |

Figure 29C Internal Parts - Callouts

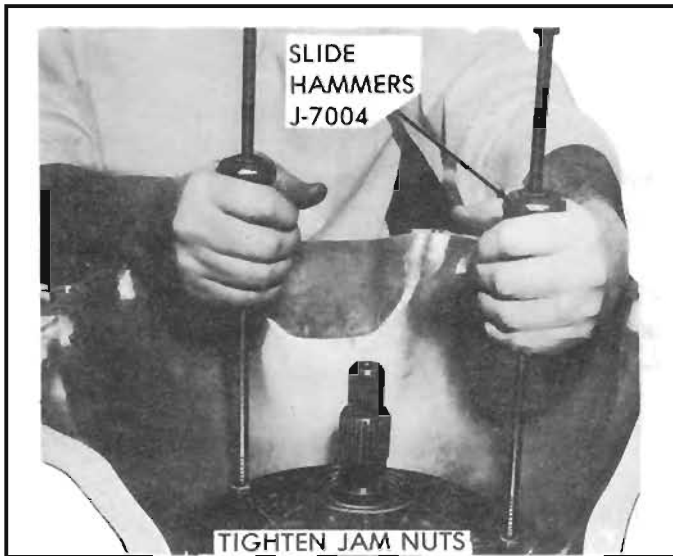


Figure 30 Pump Removal

If severe heat spot discoloration or surface scuffing, the plates must be replaced.

4. Remove intermediate clutch pressure plate.
5. Remove intermediate overrun brake band.
See Figure 31.

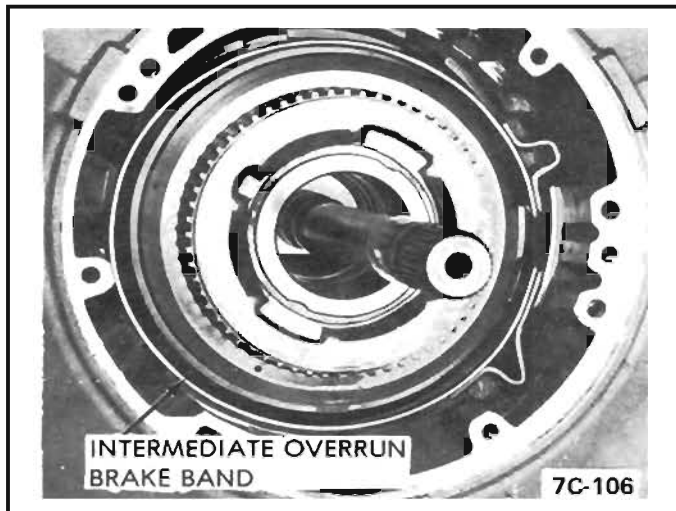


Figure 31 Intermediate Overrun Brake Band

Direct and Forward Clutch Assemblies

1. Remove direct and forward clutch assemblies from case. *See Figure 32.*

Input Ring Gear

1. Remove forward clutch housing to input ring gear front thrust washer. Inspect for excessive wear or scoring.
2. Remove input ring gear. *See Figure 33.*

Output Carrier Assembly

1. Remove input ring gear to output carrier needle thrust bearing.
2. Remove output carrier to output shaft snap ring.
See Figure 34.

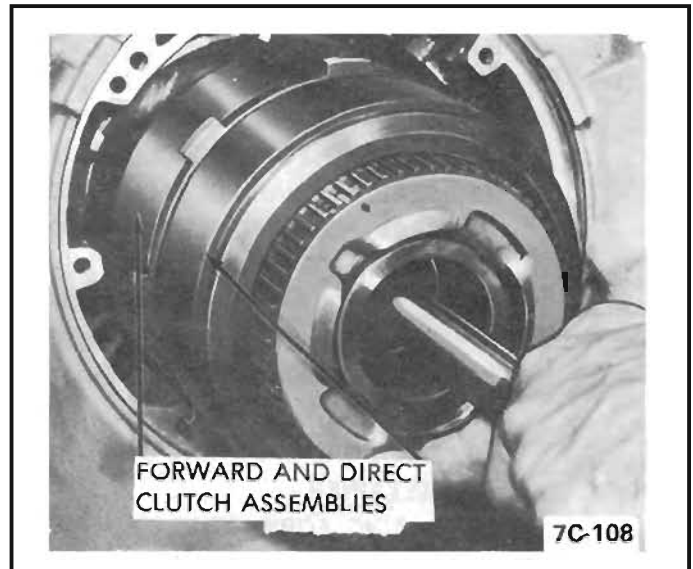


Figure 32 Forward and Direct Clutch Assembly Removal

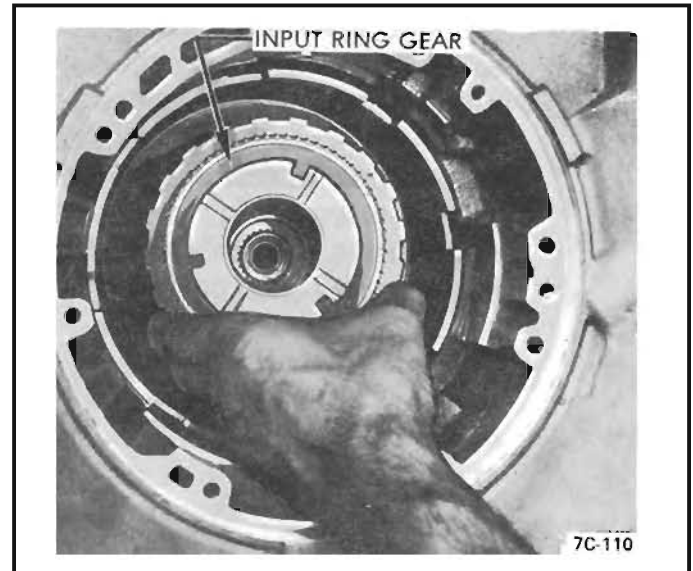


Figure 33 Input Ring Gear Removal

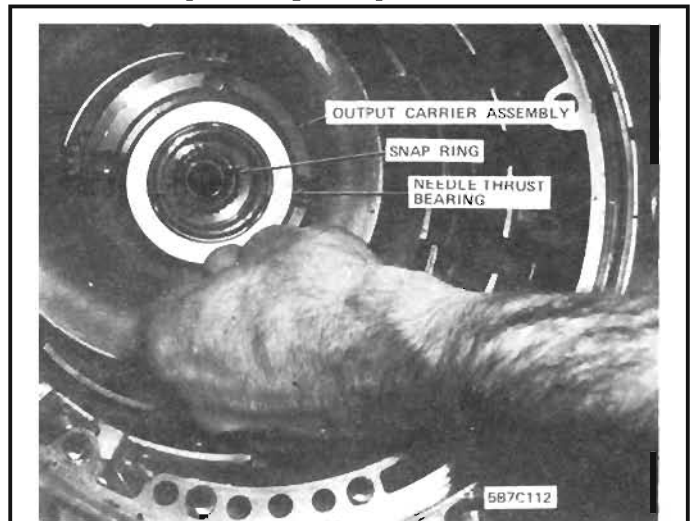


Figure 34 Output Carrier Removal

3. Remove output carrier assembly.

Sun Gear Drive Shell Assembly

1. Remove sun gear drive shell assembly. *See Figure 35.*

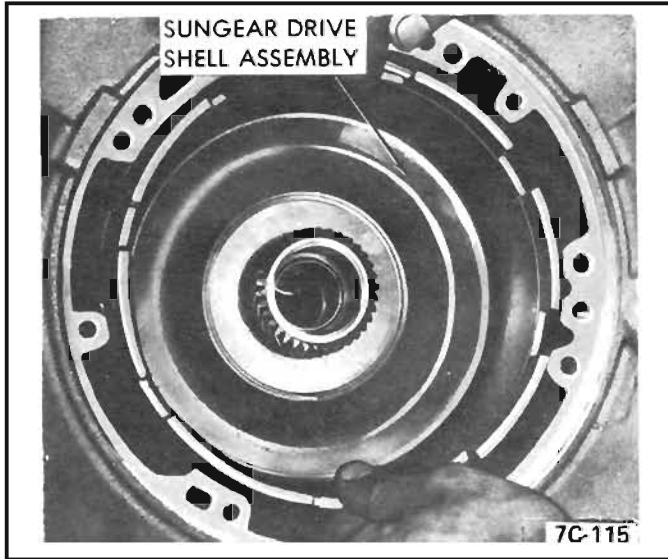


Figure 35 Drive Shell Assembly Removal

Low and Reverse Clutch Support Assembly

1. Remove low and reverse roller clutch support to case retaining ring. *See Figure 36.*
2. Grasp the output shaft. Pull up until the low and reverse roller clutch and the support assembly, clears the low and reverse clutch support retainer spring. Remove the support assembly.
3. Remove low and reverse clutch support retainer spring. *See Figure 36.*

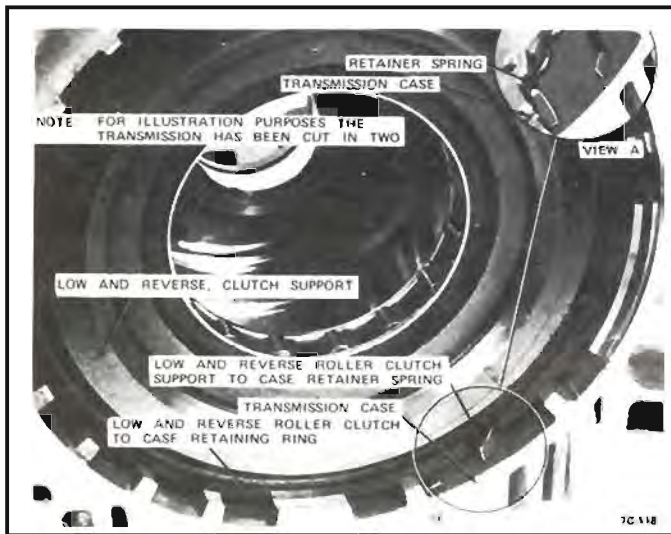


Figure 36 Retainer Position

Low and Reverse Clutch Plates

1. Remove the low and reverse clutch composition plates and the steel separator plates. *See Figure 37.*

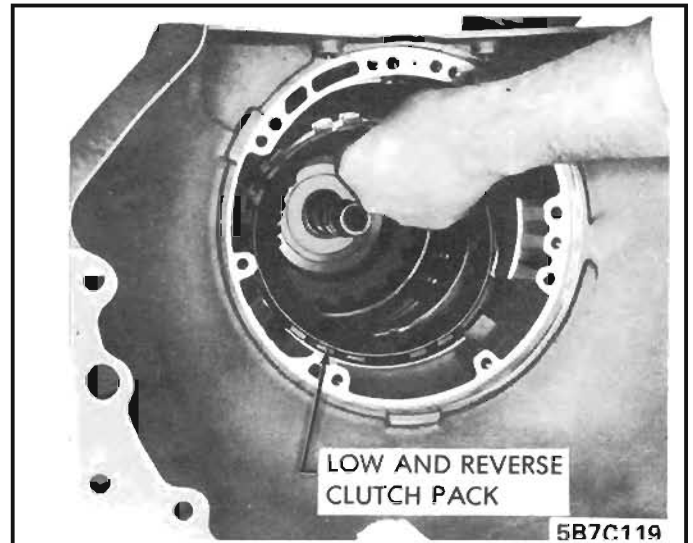


Figure 37 Lo and Reverse Clutch Removal

Reaction Carrier Assembly

1. Remove reaction carrier assembly from output ring gear and shaft assembly. *See Figure 38.*

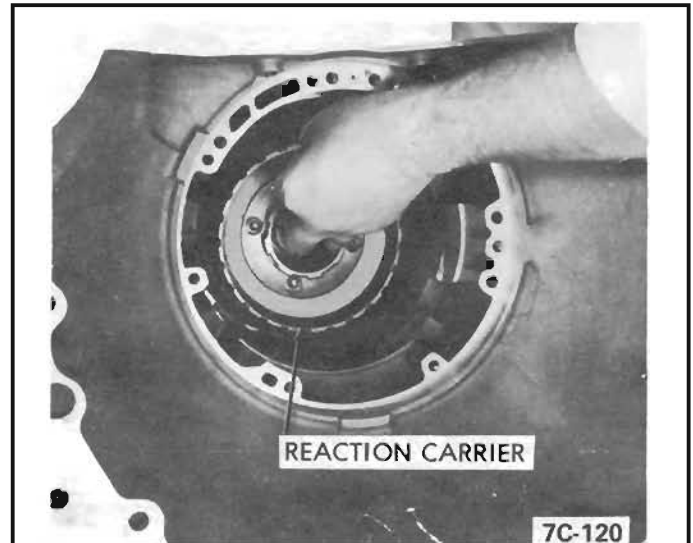


Figure 38 Reaction Carrier Removal

Output Ring Gear and Shaft Assembly

1. Remove output ring gear and shaft assembly from case. *See Figure 39.*
2. Remove reaction carrier to output ring gear needle thrust bearing.
3. Remove output ring gear to output shaft snap ring. Remove output ring gear from output shaft.
4. Remove output ring gear to case needle bearing. *See Figure 40.*

Low and Reverse Clutch Piston

1. Using Tool J-23327 compress low and reverse clutch piston spring retainer and remove piston retaining ring and spring retainer with springs. *See Figure 41.*

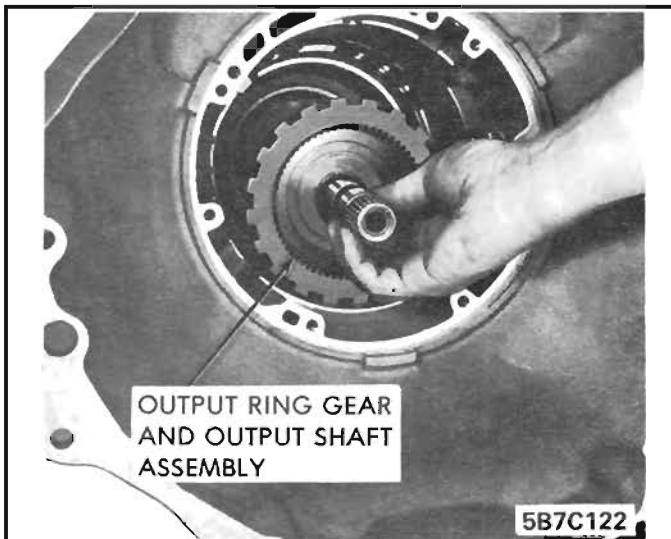


Figure 39 Output Ring Gear and Shaft Removal

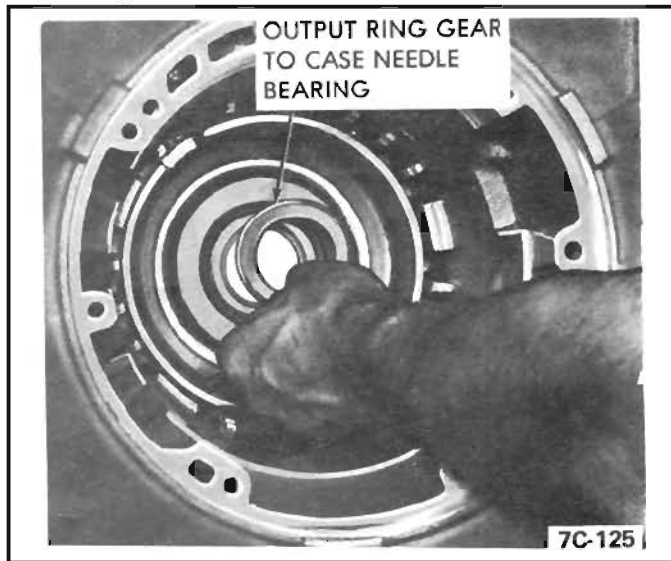


Figure 40 Needle Bearing Removal

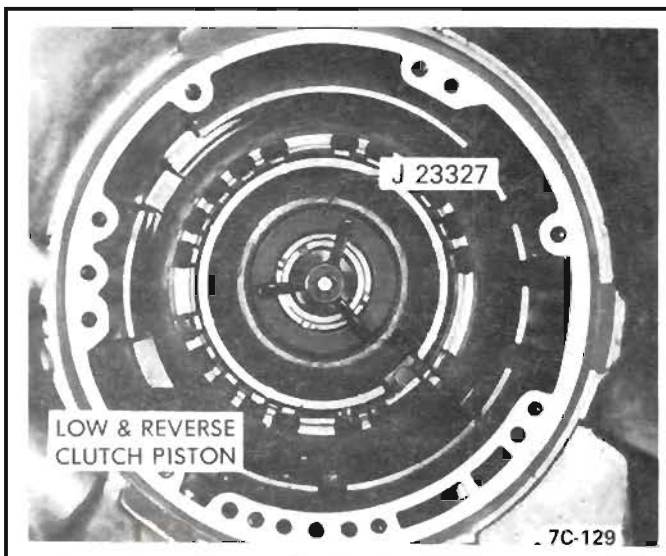


Figure 41 Low and Reverse Piston Snap Ring Removal

2. Remove low and reverse clutch piston assembly. Aid removal with the use of compressed air in passage shown. See Figure 42.

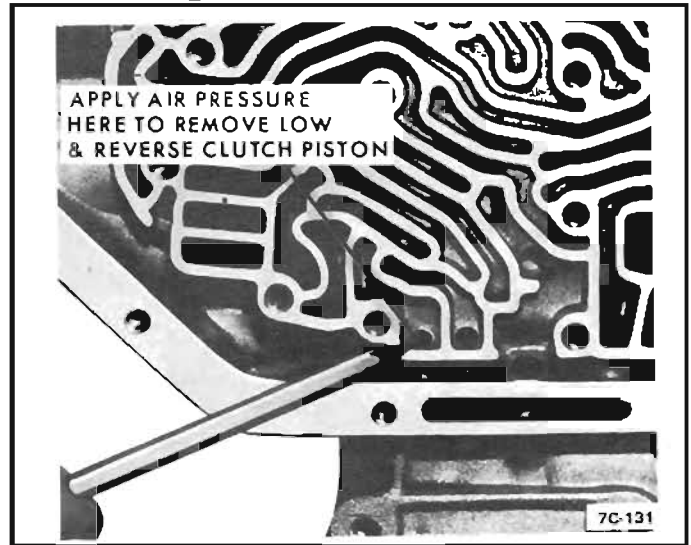


Figure 42 Location of Air Pressure

Low and Reverse Clutch Piston Seals

1. Remove low and reverse clutch piston outer seal.
2. Remove low and reverse clutch piston center and inner seal. See Figure 43.

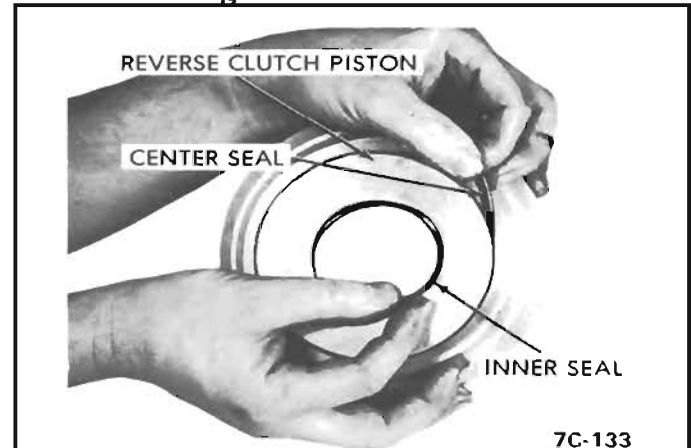


Figure 43 Reverse Clutch Piston Center & Inner Seal Removal

Intermediate Clutch 1-2 Accumulator Piston

NOTE: Removal and installation of intermediate clutch 1-2 accumulator can be done without removal of transmission from car. See on Car Service. If removal is required with the transmission out of the car, the oil pan must be installed to use tool J-23069.

1. Install Tool J-23069 to compress intermediate clutch 1-2 accumulator cover and remove retaining ring. See Figure 44.
2. Remove intermediate clutch 1-2 accumulator piston cover and "O" ring seal from case. See Figure 45.

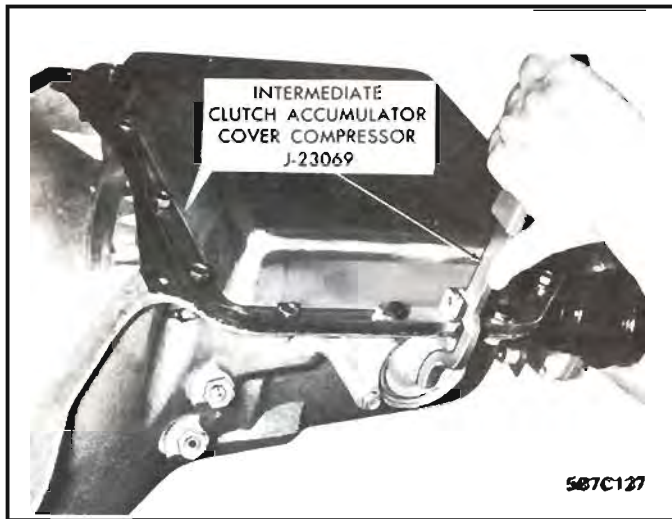


Figure 44 1-2 Accumulator Cover Removal

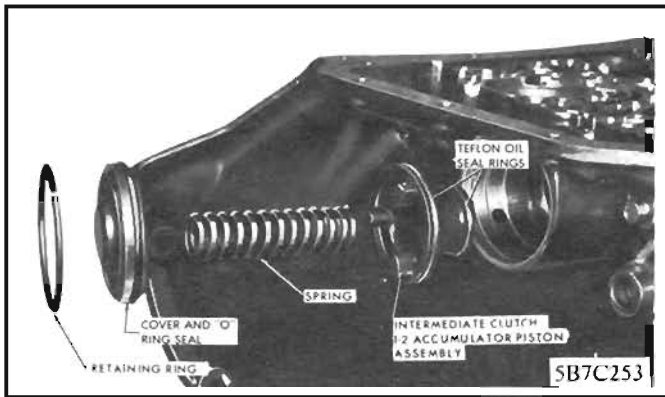


Figure 45 Intermediate Clutch 1-2

3. Remove intermediate clutch 1-2 accumulator piston spring. *See Figure 45.*
4. Remove intermediate clutch 1-2 accumulator piston assembly. *Inspect the inner and outer teflon oil seal rings for wearing and scoring. DO NOT REMOVE THESE TWO RINGS UNLESS THEY ARE DAMAGED.* If replacement of one or the other of the two rings is necessary, the piston assembly will have to be replaced. *See Figure 45.* (Piston and Seal are one assembly.)

Intermediate Clutch 1-2 Assembly Piston

Installation

1. Install intermediate clutch 1-2 accumulator piston assembly and spring. *See Figure 45.*
2. Place new "O" ring seal on intermediate clutch 1-2 accumulator piston cover, and install cover into case. *See Figure 45.*
3. Install J-23069 tool and compress intermediate clutch 1-2 accumulator cover and install retaining ring. *See Figure 44.*

INTERNAL PARTS

Disassembly, Inspection and Reassembly

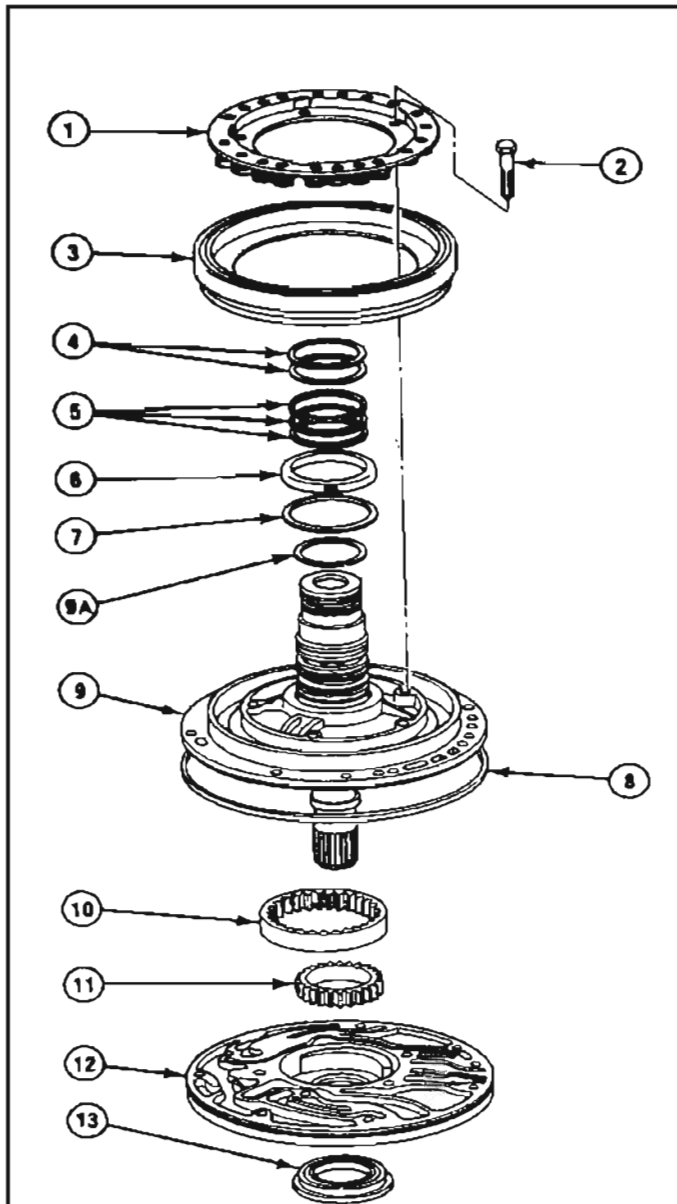
Oil Pump

Disassembly

1. Place stator shaft side of pump assembly through hole in bench. Remove five (5) pump cover to body attaching bolts. *See Figure 47.*
2. Remove intermediate clutch return spring seat retainer, springs and the intermediate clutch piston assembly. *See Figure 47.*
3. Remove intermediate clutch piston inner and outer seals. *See Figure 47.*
4. Remove three (3) direct clutch to pump hub oil rings. Remove pump cover to direct clutch drum needle thrust bearing. Inspect the two (2) forward clutch to pump hub teflon oil seals rings, (come rings will be solid new type rings will be scarf cut for easier assembly with no expander ring behind) but do not remove them unless they are damaged. If replacement is necessary use two metal hook type service replacement rings. *See Figure 47.*
5. Check steady rest ring, if cut or frozen in bore remove and replace with the same color ring. The different colors compensate for groove depth.
6. Remove pump cover and stator shaft assembly from pump body. *See Figure 48.*
7. Remove pump drive gear and driven gear from pump body. Inspect pump gears and cover for wear and scoring. *See Figure 49.*
The pump body assembly should be replaced only if:
 - a. The drive and/or driven gears are broken or galled.
 - b. Pump body galled.
 - c. Uneven machined surfaces.
 - d. Pump body to case seal ring groove damaged.
 - e. Pump seal drainback hole is unmachined.
8. Remove pump outside diameter to case square cut "O" ring seal. *See Figure 47.*
9. Remove pump body to converter hub lip seal if necessary. *See Figure 50.*
10. Place pump on wood blocks so surface finish is not damaged and install pump to converter hub lip seal using Seal Driver J-21359. *See Figure 51.* Make certain lip seal is not turned or nicked.

Inspection and reassembly

1. Install pump drive gear and driven gear.
2. Assemble drive gear with tang face up to prevent damage to converter. *See Figure 49.*



- | | |
|--|--|
| 1 SPRING RETAINER | 7 .017 SHIM |
| 2 PUMP COVER TO PUMP BODY ATTACHING BOLTS (5) | 8 SQUARE CUT "O" RING SEAL |
| 3 INTERMEDIATE CLUTCH PISTON ASSEMBLY | 9 PUMP COVER AND STATOR SHAFT ASSEMBLY |
| 4 FORWARD CLUTCH TO PUMP HUB SCARF CUT TYPE RINGS (2) | 9A STEADY REST RING |
| 5 DIRECT CLUTCH TO PUMP HUB SCARF CUT OIL SEAL RINGS (3) | 10 DRIVEN GEAR |
| 6 PUMP COVER TO DIRECT CLUTCH DRUM NEEDLE THRUST BEARING | 11 DRIVE GEAR |
| | 12 PUMP BODY ASSEMBLY |
| | 13 PUMP TO CONVERTER HUB LIP SEAL |

Figure 47 Oil Pump Assembly

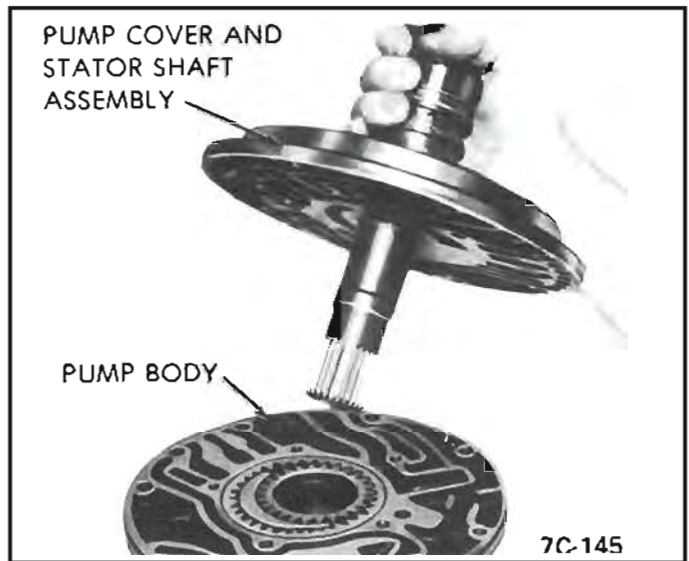


Figure 48 Pump Cover Removal

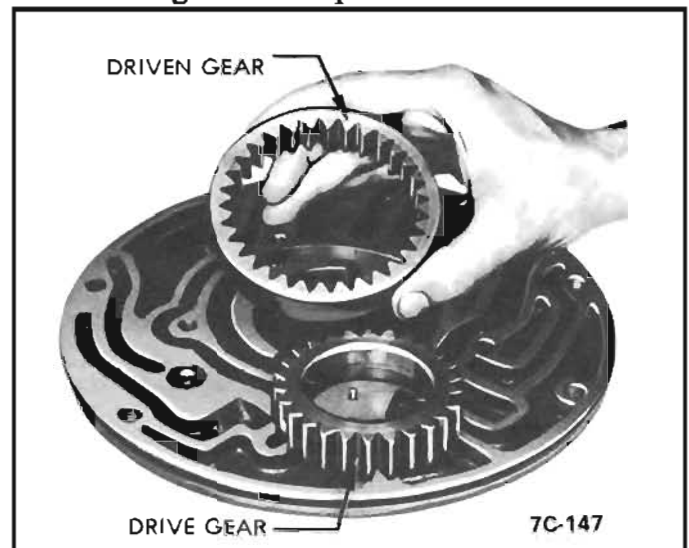


Figure 49 Oil Pump Gears

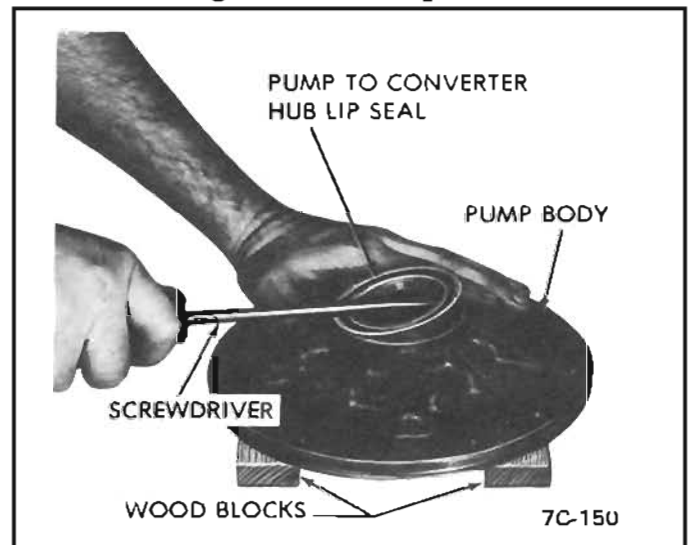


Figure 50 Converter Seal Removal

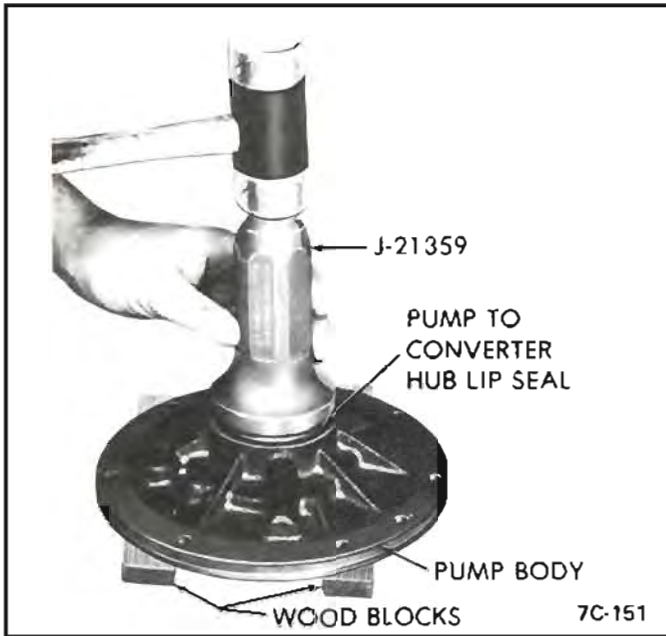


Figure 51 Converter Seal Installation

3. Assemble pump cover to pump body. *See Figure 48.*
4. Install intermediate clutch piston new inner and outer seals. *See Figure 47.*
5. Install intermediate clutch piston assembly into pump cover with J-26744-A.
6. Install spring retainer and install five (5) attaching bolts, finger tight. *See Figure 47 and 46.*
7. Place pump aligning strap, J-21368 over pump body and cover and tighten.
8. Torque attaching bolts to 18 ft. lbs. (24 N*m)
9. Install pump outside diameter to case square cut seal. *See Figure 47.* Use new seal if necessary.
10. Install three (3) direct clutch to pump hub scarf cut oil seal rings. Inspect two (2) forward clutch to pump hub oil seal rings, (some rings will be solid new
11. Check three (3) pump cover hub lube holes. Make certain they are not restricted. *See Figure 52.*



Figure 52 Lube Hole Location

type rings will be scarf cut for easier assembly with no expander ring behind) for service if rings require replacement use hook type cast iron rings. *See Figure 47.*

DIRECT CLUTCH

Disassembly

Refer to specifications in rear of this section to determine the required amount of composition and steel clutch plates to use specific transmission model and engine combination. When replacing piston assembly specific part number must be used.

1. Remove intermediate overrun clutch front retainer ring and retainer. *See Figure 53.*

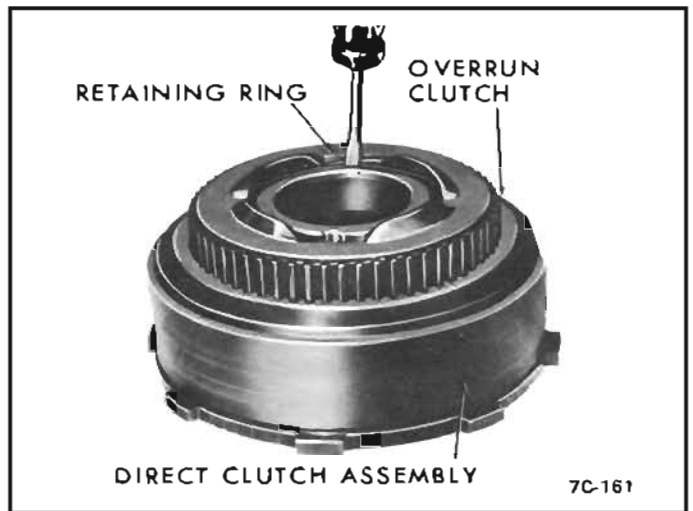


Figure 53 Overrun Clutch Retaining Ring

2. Remove intermediate clutch overrun outer race. *See Figure 54.*



Figure 54 Roller Clutch Outer Race

3. Remove intermediate overrun roller clutch assembly. *See Figure 54.*

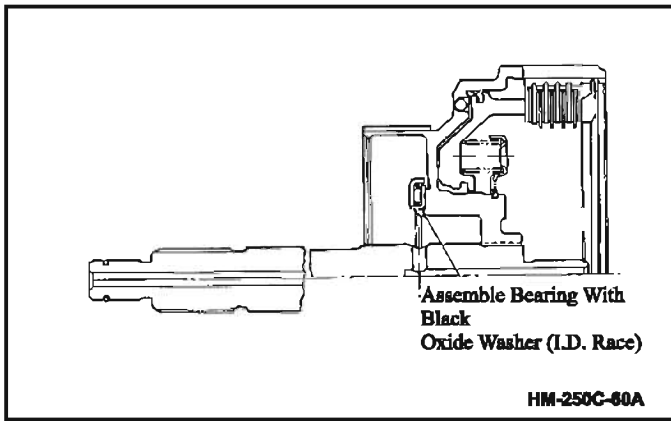


Figure 55 Needle Bearing Assembly

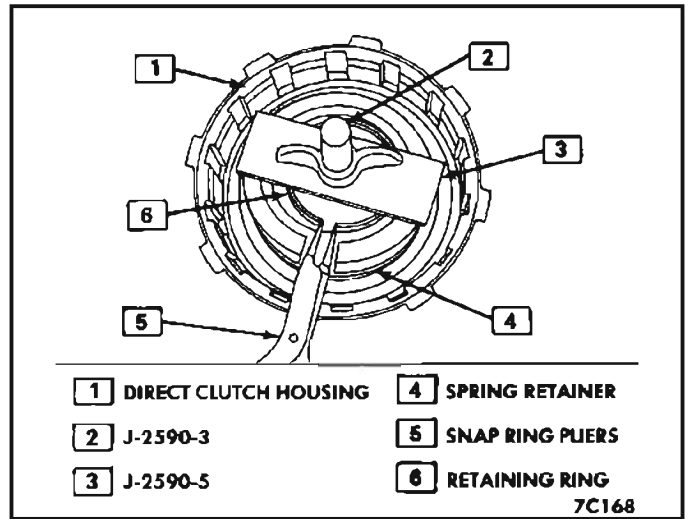


Figure 57 Piston Snap Ring

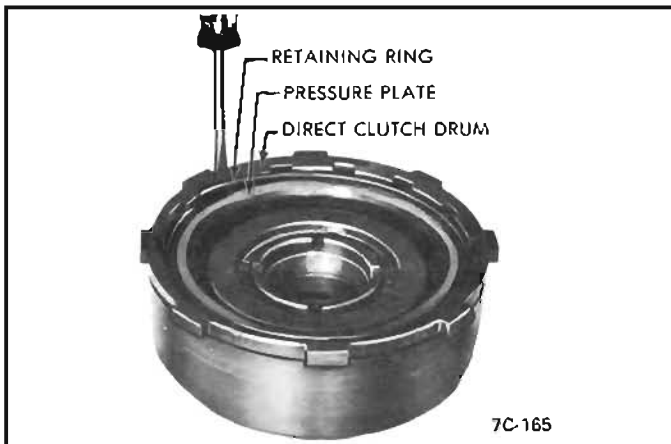


Figure 56 Direct Clutch Disassembly

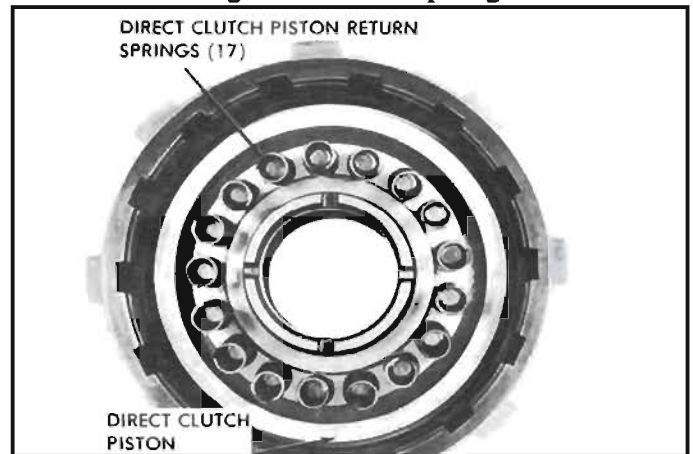


Figure 58 Piston Return Springs

4. Remove direct clutch drum to forward clutch housing needle roller bearing. *See Figure 55.*
5. Remove direct clutch pressure plate to clutch drum retaining ring and pressure plate. *See Figure 56.*
6. Remove composition plates, steel plates and one cushion spring from direct clutch housing.
7. Inspect condition of lined and steel plates. *Do not diagnose a composition drive plate by color.*
8. Remove direct clutch piston return spring seat retaining ring and spring seat by using Tools J-2590-3, J-2590-5 and snap ring pliers. *See Figure 57.*
9. Remove spring retainer, springs and piston. *See Figure 58.*
10. Inspect the return springs. Evidence of extreme heat or burning in the area of the clutch may have caused the springs to take ha heat set and would justify replacement of the springs.
11. Remove direct clutch piston inner and outer seals.
12. Remove direct clutch piston center seal. *See Figure 59.*

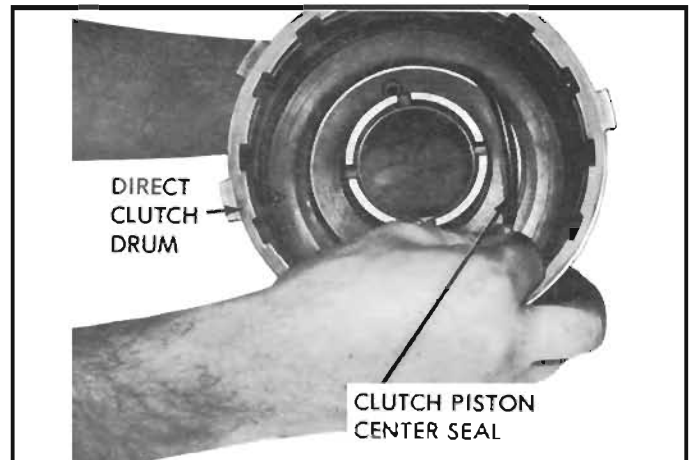


Figure 58 Center Seal

Reassembly

1. Install new direct clutch piston outer seal and inner seal.
2. Install new direct clutch piston center seal. *See Figure 59.*

3. Install the direct clutch piston into housing with the aid of a piece of .020" music wire crimped into copper tubing. Use a liberal amount of transmission fluid during assembly. See Figure 60.

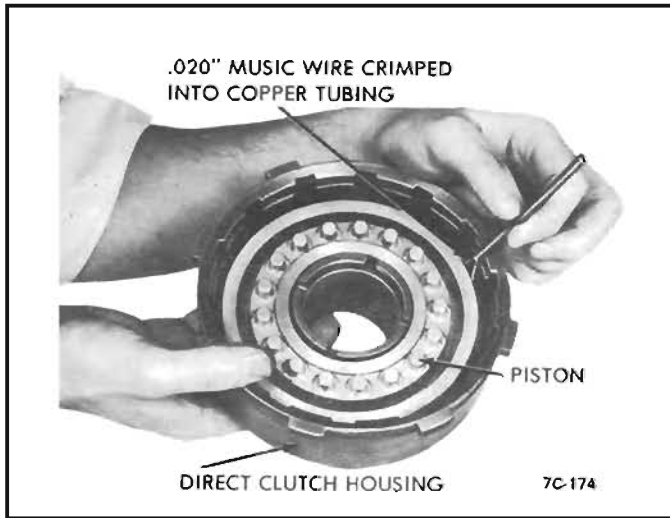


Figure 60 Direct Clutch Piston Installation

4. Install spring retainer and springs. Compress spring retainer and install retaining ring, use Tools J 2590-3 and J-2590-5. See Figure 57.

5. Lubricate with transmission fluid and install composition plates and steel plates starting with a steel plate and alternating steel and composition.

6. Install direct clutch pressure plate and retaining ring. See Figure 56.

7. Install intermediate overrun roller clutch assembly. See Figure 62. Roller clutch assembly must be assembled with four (4) holes up (toward front of transmission)

8. Install intermediate clutch overrun outer race. See Figure 62.

When the intermediate overrun clutch outer race is installed, it should free wheel in the counterclockwise direction only.

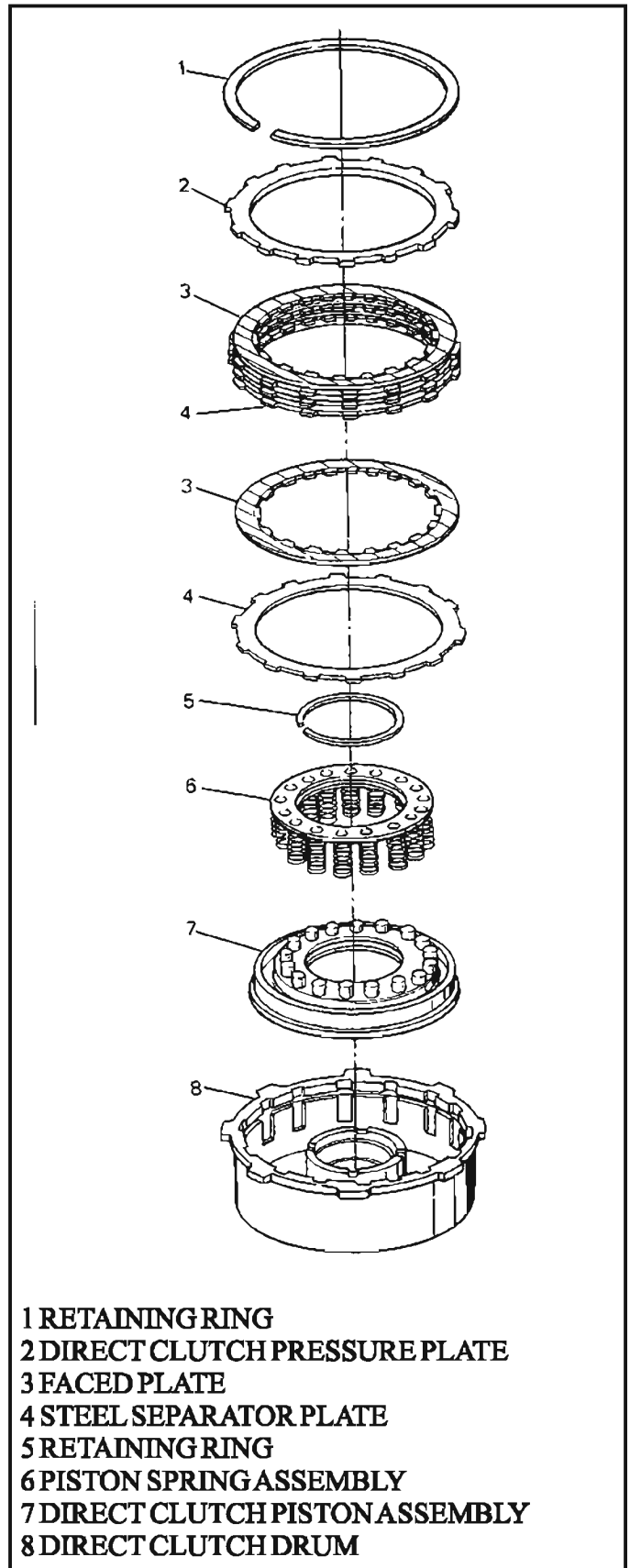
9. Install intermediate overrun clutch retainer and retaining ring. See Figure 62.

FORWARD CLUTCH

Disassembly and Inspection

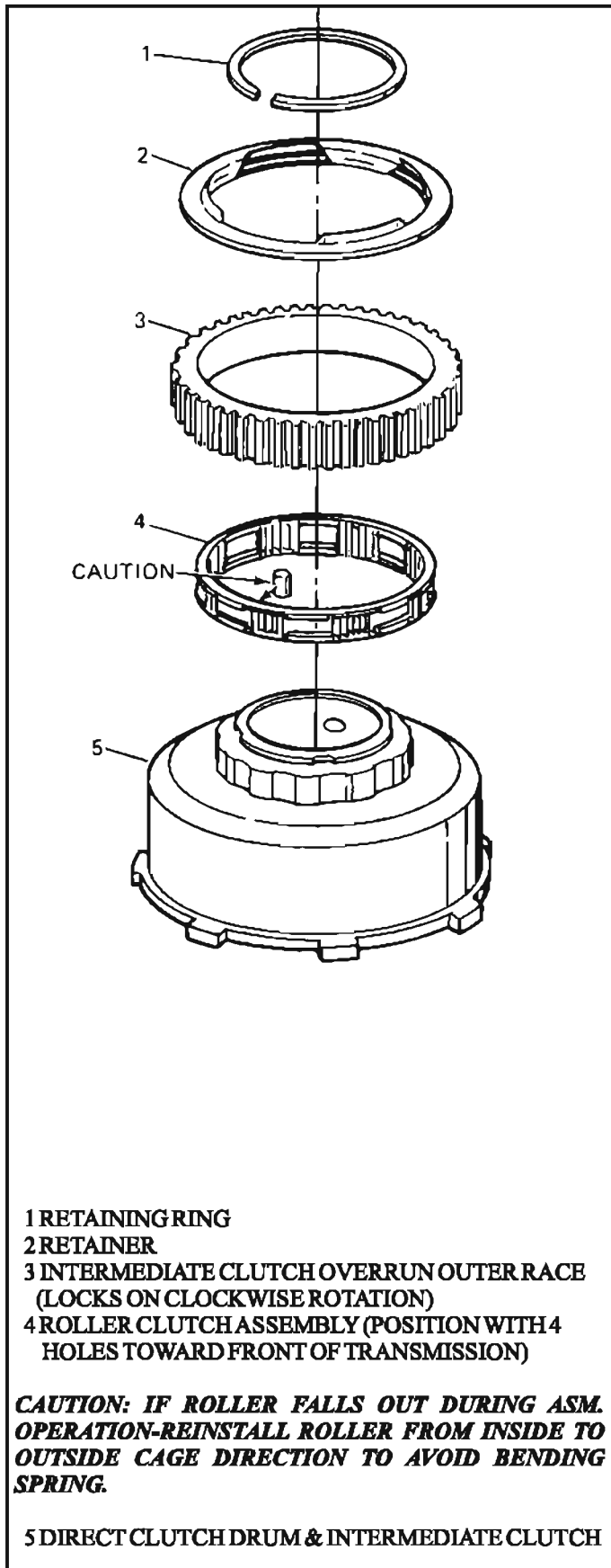
Refer to specifications in rear of this section to determine the required amount of composition and steel clutch plates to use with specific transmission model and engine combination. When replacing piston assembly specific part number must be used.

1. Remove forward clutch drum to pressure plate retaining ring. Remove forward clutch pressure plate. See Figure 63.



- 1 RETAINING RING
- 2 DIRECT CLUTCH PRESSURE PLATE
- 3 FACED PLATE
- 4 STEEL SEPARATOR PLATE
- 5 RETAINING RING
- 6 PISTON SPRING ASSEMBLY
- 7 DIRECT CLUTCH PISTON ASSEMBLY
- 8 DIRECT CLUTCH DRUM

Figure 61 Direct Clutch Assembly



- 1 RETAINING RING
- 2 RETAINER
- 3 INTERMEDIATE CLUTCH OVERRUN OUTER RACE (LOCKS ON CLOCKWISE ROTATION)
- 4 ROLLER CLUTCH ASSEMBLY (POSITION WITH 4 HOLES TOWARD FRONT OF TRANSMISSION)

CAUTION: IF ROLLER FALLS OUT DURING ASM. OPERATION-REINSTALL ROLLER FROM INSIDE TO OUTSIDE CAGE DIRECTION TO AVOID BENDING SPRING.

5 DIRECT CLUTCH DRUM & INTERMEDIATE CLUTCH

Figure 62 Intermediate Overrun Roller Clutch Assembly

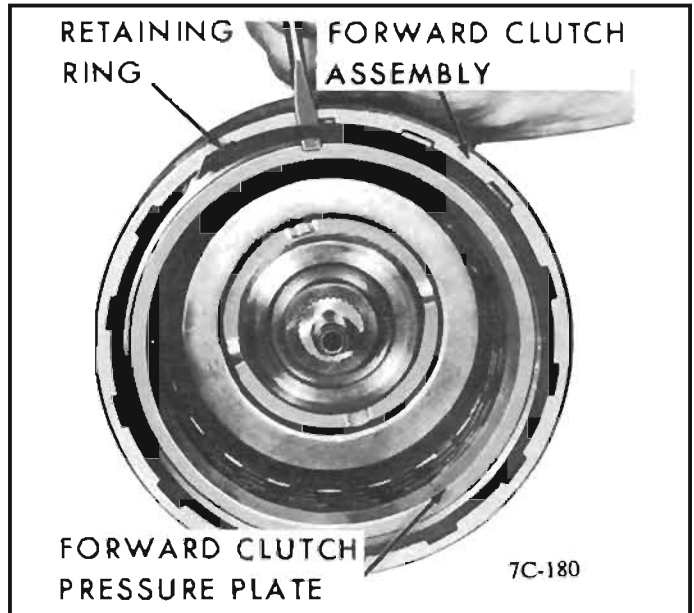


Figure 63 Forward Clutch Retaining Ring

- 2. Remove forward clutch housing faced plates, steel plates and cushion spring.
- 3. Inspect condition of lined and steel plates. *Do not diagnose a drive plate by color.*
- 4. Remove spring retainer and springs by compressing with a ram press. *See Figure 64.*

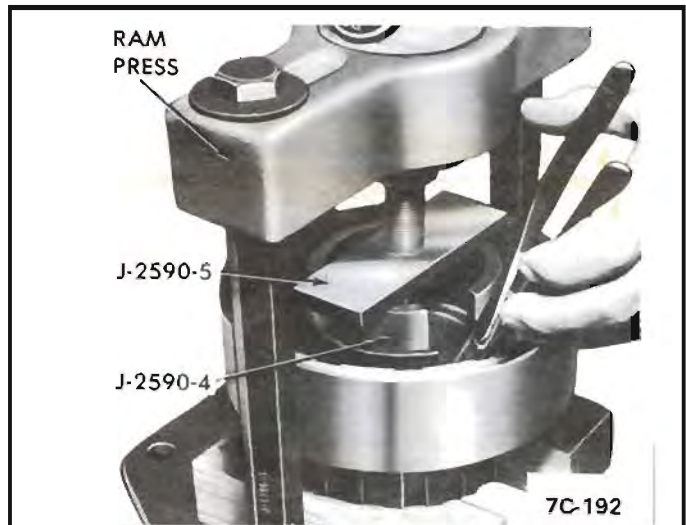
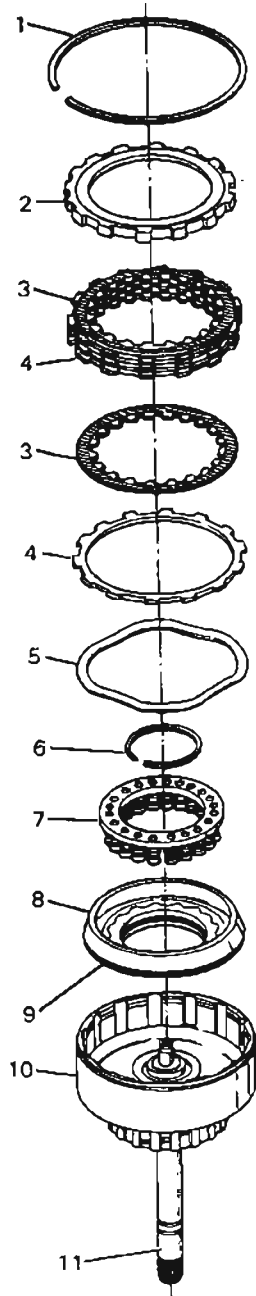


Figure 64 Forward Clutch Piston Snap Ring Removal

- 5. Inspect the return springs. Evidence of extreme heat or burning in the area of the clutch may have caused the springs to take a heat set and would justify replacement of the springs.
- 6. Remove forward clutch piston assembly.
- 7. Inspect the forward clutch piston inner and outer seals for nick or tears. Remove and replace if necessary. *See Figure 65.*
- 8. Make certain forward clutch ball check exhaust is free of dirt, etc. *See Figure 66.*



- 1 RETAINING RING
- 2 FORWARD CLUTCH PRESSURE PLATE
- 3 FACED PLATE
- 4 STEEL SEPARATOR PLATE
- 5 CUSHION SPRING
- 6 RETAINING RING
- 7 PISTON SPRING ASSEMBLY
- 8 FORWARD CLUTCH PISTON ASSEMBLY
- 9 SEAL
- 10 FORWARD CLUTCH DRUM
- 11 INPUT SHAFT

Figure 65 Forward Clutch Assembly

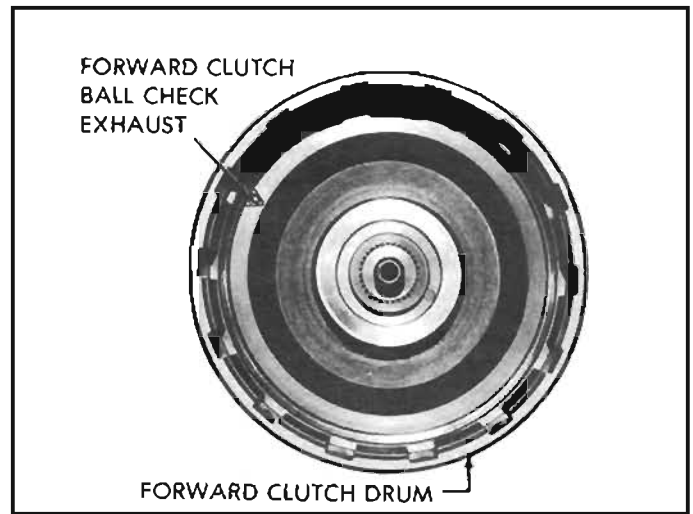


Figure 66 Ball Exhaust Location

When pressing the input shaft into the forward clutch housing, care must be taken not to place excessive force on the pilot end of the input shaft as damage may result.

9. If the input shaft is scored excessively it may be replaced using the following procedure:

- a. Using wood blocks for support, press input shaft out of forward clutch housing.
- b. Carefully support forward clutch housing on rear thrust washer surface and press input shaft into housing until it is properly seated.

Reassembly

- 1. Install the forward clutch inner piston seal and outer piston seal if previously removed.
- 2. Install the forward clutch piston assembly using a thin feeler gage. See Figure 67.

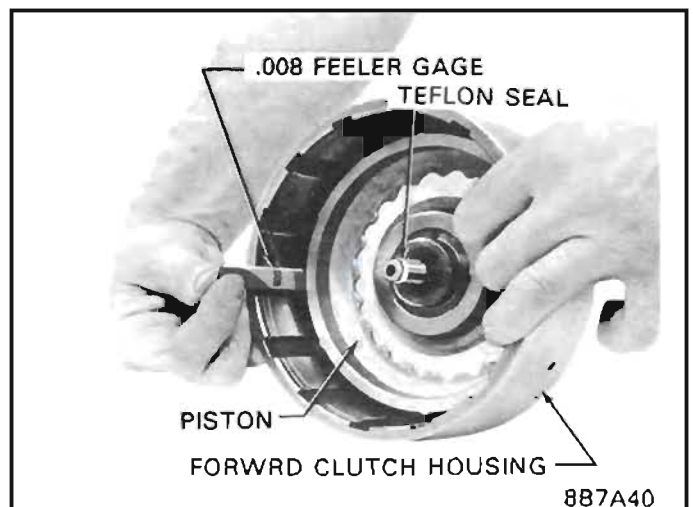


Figure 67 Installing Forward Clutch Piston

- 3. Install spring retainer and springs. Compress spring retainer with an arbor press or ram press. See Figure 64.

3. Install spring retainer and springs. Compress spring retainer with an arbor press or ram press. See Figure 64.

4. Lubricate with transmission fluid and install cushion spring, faced plates and steel separator plates, starting with the cushion spring and alternating steel and faced. See Figure 65.

5. Install forward clutch pressure plate and retaining ring. Using a feeler gage check clearance between forward clutch pressure plate and faced plate. See Figure 68.

The specifications for this transmission call for a clearance of no less than .011" and no greater than .082". There are three pressure plates available which are identified by tangs adjacent to the source identification mark. See Figure 69. These three pressure plates have different thicknesses.

If the clearance between the forward clutch pressure plates and the faced plate checks out to be less than .011", a thinner pressure plate should be used to have a clearance between .011" and .082". If the clearance checks out to be greater than .082", a thicker pressure plate should be used to have a clearance between .011" and .082". If the clearance checks out to be between .011" and .082", no change of pressure plate is necessary.

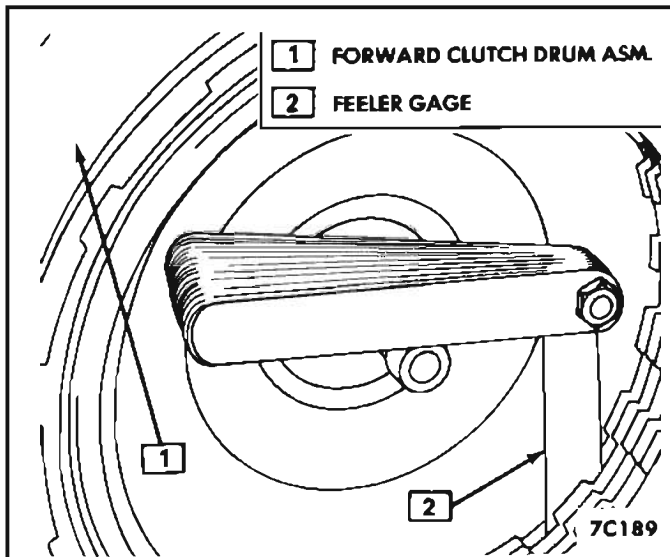


Figure 68 Checking Pressure Plate Clearance

Sun Gear to Drive Shell

Disassembly

1. Remove sun gear to sun gear drive shell rear retaining ring. See Figure 70.
2. Remove sun gear to drive shell flat rear thrust washer. See Figure 70.

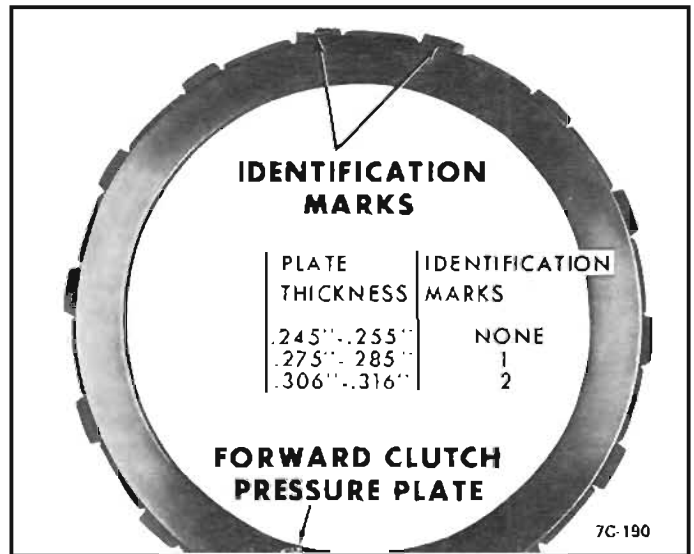


Figure 69 Pressure Plate Selection

3. Remove front retaining ring from sun gear. See Figure 71.
4. Inspect parts for wear and damage. Replace parts if necessary.

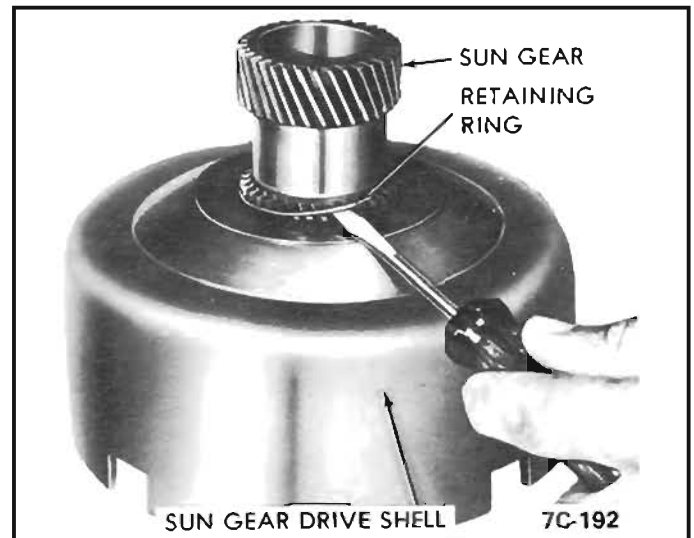


Figure 70 Sun Gear Retaining Ring Removal

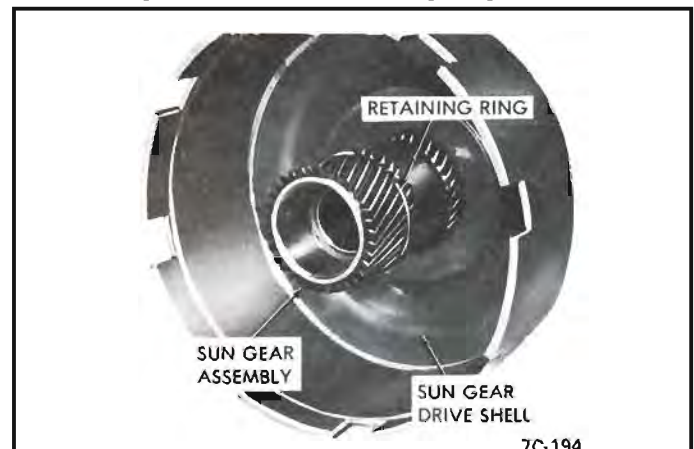


Figure 71 Front Retaining Ring Removal

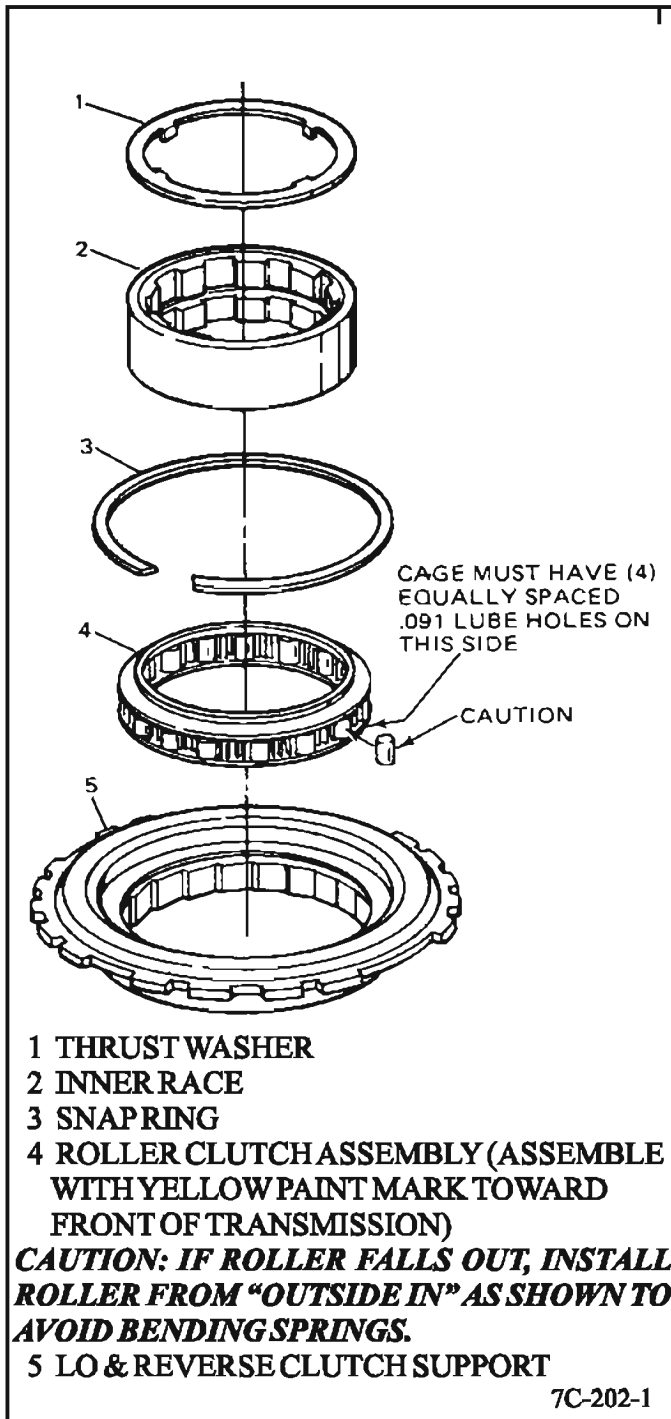


Figure 72 Low & Reverse Clutch Support and Overrun Roller Clutch Assembly

Reassembly

1. Install sun gear to drive shell front retaining ring, and install into drive shell. *See Figure 71.* Use a new ring and do not overstress when installing.
2. Install sun gear to drive shell flat thrust washer.
3. Install sun gear to sun gear drive shell rear retaining ring. *See Figure 70.* Use a new ring and do not overstress when installing.

Low and Reverse Roller Clutch (Refer to Figure 72.)

Disassembly

1. Remove low and reverse clutch to sun gear shell thrust washer.
2. Remove low and reverse overrun clutch inner race.
3. Remove low and reverse roller clutch retaining ring.

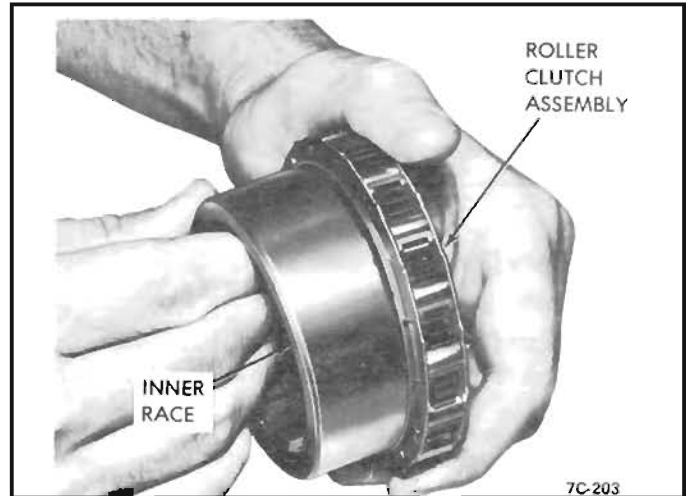


Figure 73 Checking Roller Clutch

4. Remove low and reverse roller clutch assembly and visually inspect the rollers for wear and scoring and check for any springs that may be collapsed.

Reassembly

1. Install low and reverse roller clutch assembly to inner race. The inner race should free wheel in the clockwise direction only. *See Figure 73.*

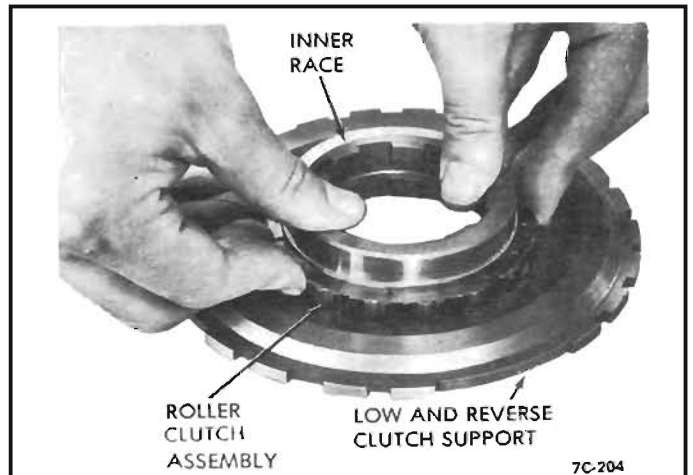


Figure 74 Roller Clutch Inner Race Installation

2. Install low and reverse overrun roller clutch assembly and inner race into the low and reverse clutch support. *See Figure 74.* Assemble with four (4) holes down or to rear of transmission.

3. Install low and reverse clutch to cam retaining ring. *See Figure 75.*
4. Install low and reverse clutch to sun gear drive shell thrust washer. *See Figure 72.*

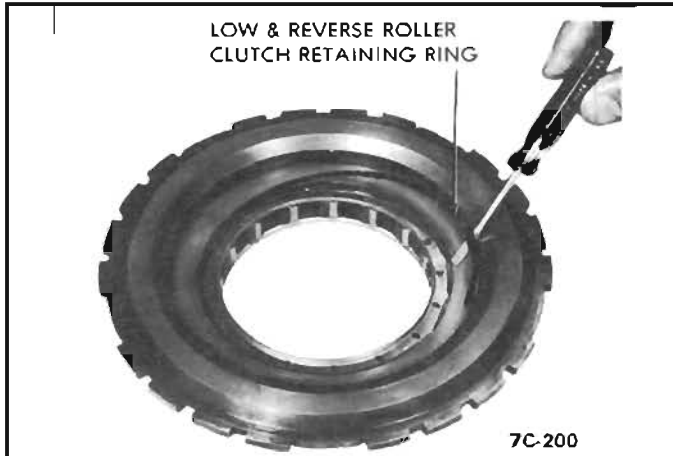


Figure 75 Roller Clutch Retaining Ring Installation

Valve Body (refer to Figure 76)

Disassembly

1. Position valve body assembly with cored face up.
2. Remove manual valve from lower left hand bore (J).
3. From lower right hand bore remove the pressure regulator valve train retaining pin, boost valve sleeve, intermediate boost valve, reverse and modulator boost valve, pressure regulator valve spring and the pressure regulator valve.
4. From the next bore (B), remove the 2-3 shift valve train retaining pin, sleeve, control valve spring, 2-3 shift control valve, shift valve spring and the 2-3 shift valve.
5. From the next bore (C), remove the 1-2 shift valve train retaining pin sleeve, shift control valve spring, 1-2 shift control valve and the 1-2 shift valve.
6. From the next bore (E), remove retaining pin, plug, manual low control valve spring and the manual low control valve.
7. From the next bore (F), remove the retaining pin spring seat and the detent regulator valve.
8. Install Tool J-22269-01, on direct clutch 2-3 accumulator piston and remove retaining "E" ring. (G) *See Figure 77.*
9. Remove direct clutch 2-3 accumulator piston and spring. (G) If the piston seal needs replacing the piston assembly will have to be replaced. (Piston and seal are one assembly.)
10. From the next bore down (D) from the direct

clutch accumulator remove the detent actuating lever bracket bolt, bracket actuating lever and retaining pin, stop, spring retainer, seat, outer spring, inner spring, washer and the detent valve. Use care when handling valve body assembly as valve body sleeve retaining pins may fall out.

Inspection

1. Inspect all valves for scoring, cracks and free movement in their respective bores.
2. Inspect valve body for cracks scored bores, interconnected oil passages and flatness of mounting face.
3. Check all springs for distortion or collapsed coils.

Reassembly

1. Install direct clutch accumulator piston spring and piston into valve body.
2. Install J-22269-01 and J-24675 (installs piston evenly) on direct clutch 2-3 accumulator piston and compress spring and piston and secure with retaining ring. *See Figure 77.* Align piston and oil seal ring when entering bore.
3. Install the detent valve, washer, outer spring, inner spring, spring seat and spring retainer. Install detent valve stop and detent valve actuating bracket. Torque bolt to 52 lb. in. Assemble detent actuating lever with retaining pin.
4. Install the pressure regulator valve, spring, reverse and modulator boost valve, intermediate boost valve, boost valve sleeve and retaining pin.
5. In the next bore up install 2-3 shift valve, shift valve spring, 2-3 shift control valve, shift control valve spring, shift control valve sleeve and retaining pin.
6. In the next bore up install 1-2 shift valve, 1-2 shift control valve, control valve spring, control valve sleeve and retaining pin.
7. In the next bore up, install the manual low control valve, spring, plug and retaining pin.
8. In the top right hand bore, install the detent regulator valve, spring seat, spring and retaining pin.

INTERNAL PARTS

Installation

General Instructions

1. Before starting to assemble the transmission make certain that all parts are clean. Keep hands and tools clean to avoid getting dirt into assembly. If work is stopped before assembly is completed cover all openings with clean cloths.

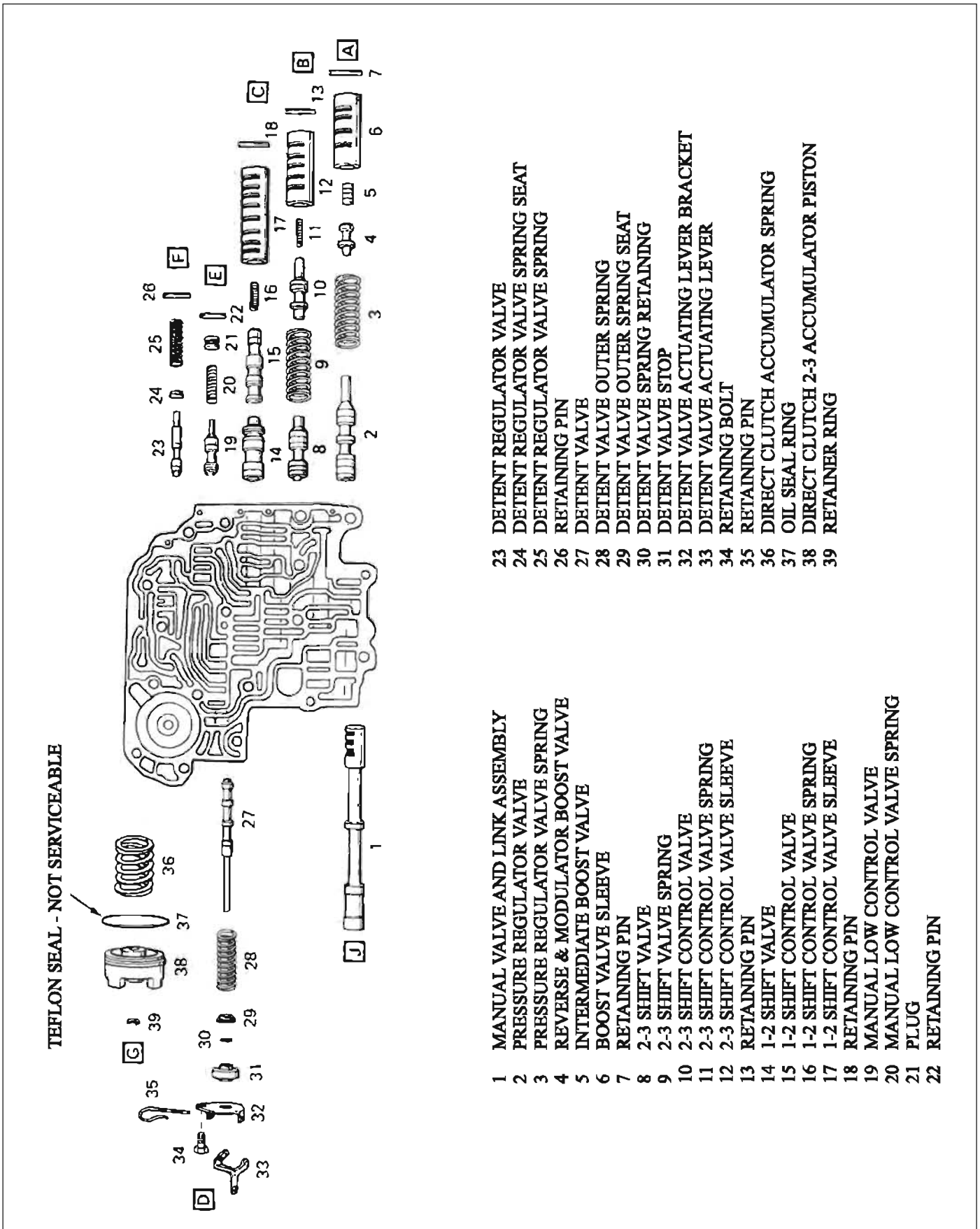


Figure 76 Valve Body - Typical

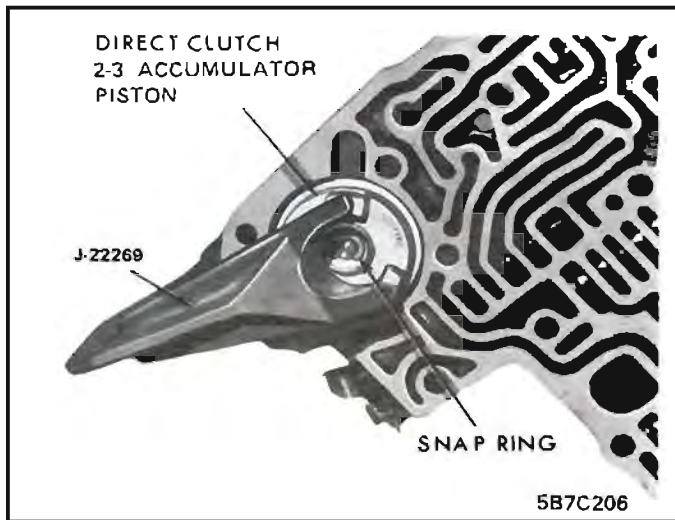


Figure 77 2-3 Accumulator Removal



Figure 78 Outer Seal Installation

2. When reassembling it is important that all thrust washer surfaces be given an initial lubrication. Bushings should be lubricated with transmission fluid. Thrust washers should be lubricated with transmission fluid. Thrust washers should be lubricated on both surfaces with petrolatum before installation.

3. Use care to avoid making nicks or burrs on parts, particularly on surfaces where gaskets are used.

4. It is extremely important to tighten all parts evenly and in proper sequence, to avoid distortion of parts and leakage at gaskets and other joints. *Use a reliable torque wrench to tighten all bolts and nuts to specified torque and in specified sequence.*

Low and Reverse Clutch Piston

1. Install low and reverse clutch piston outer seal, if previously removed. *See Figure 78.*

2. Install low and reverse clutch piston center and inner seal, if previously removed. *See Figure 79.*

3. Install low and reverse clutch piston assembly with notch in piston installed adjacent to parking pawl. *See Figure 80.*

4. Position piston return seat and springs. Place snap ring on return seat so that ring may be easily installed when seat is compressed with Tool J-21420.

5. Using tool J-21420-1 compress return seat so spring retainer retaining ring may be installed with snap ring pliers. *See Figure 80.*

As spring retainer is compressed make certain inner edge of retainer does not hang up on snap ring groove.

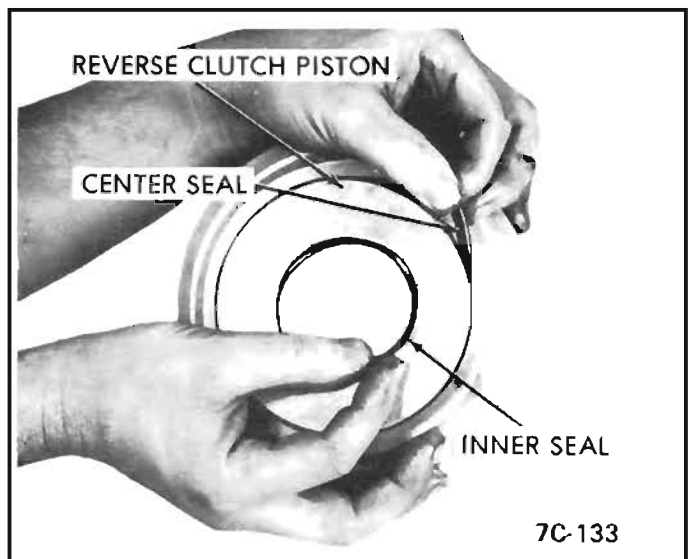


Figure 79 Inner and Center Seal Installation

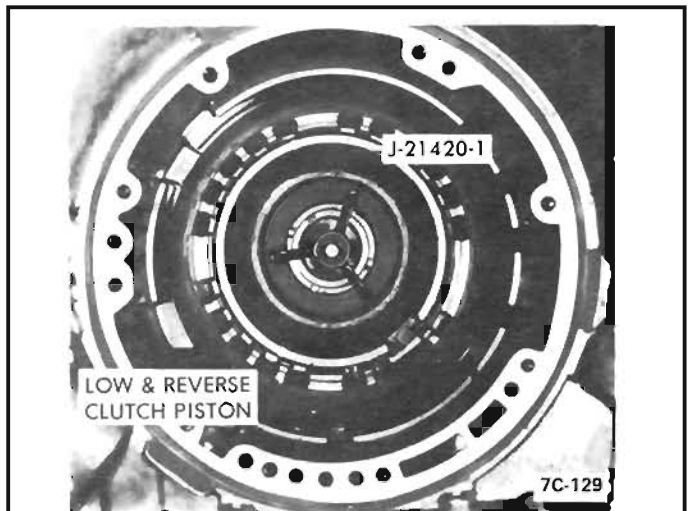


Figure 80 Low and Reverse Piston Snap Ring

Output Shaft and Reaction Carrier

1. Install output ring gear to output shaft and output ring gear to output shaft snap ring. *See Figure 81.*

DO NOT OVER STRESS SNAP RING ON ASSEMBLY. ALWAYS USE NEW RING ON REASSEMBLY.

2. Install reaction carrier to output ring gear needle thrust bearing with lip side face up. See Figure 81.
3. Install output ring gear to case needle bearing assembly. See Figure 82. Lip on inner race of bearing MUST point toward rear of transmission.
4. Install reaction carrier assembly into output ring gear and shaft assembly. See Figure 83.
5. Install output shaft and reaction carrier assembly into case.

steel plate and alternating with faced plates. See Figure 84.

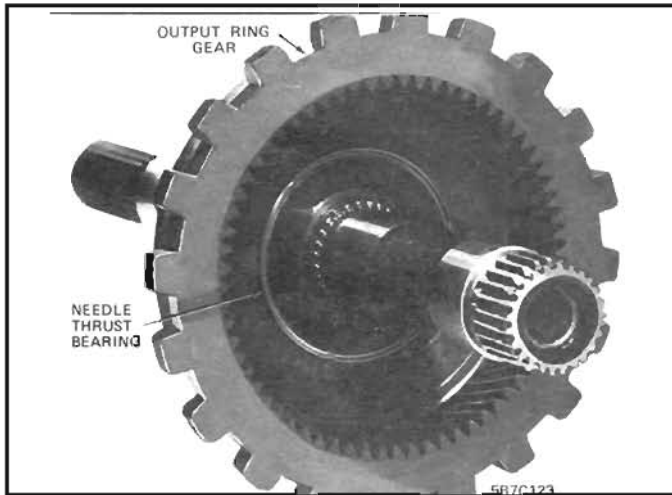


Figure 81 Needle Bearing Assembly

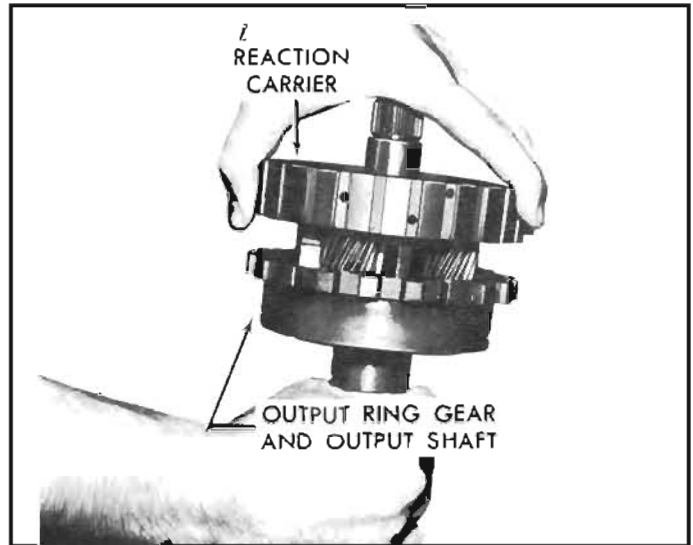


Figure 83 Reaction Carrier Installation

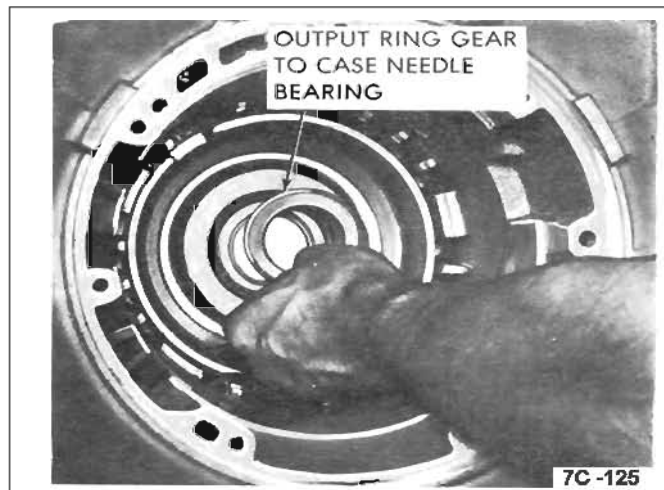


Figure 82 Needle Bearing Assembly

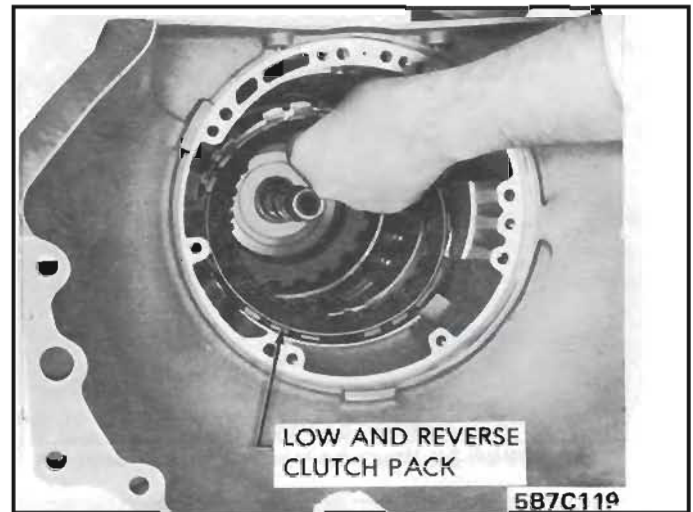


Figure 84 Low and Reverse Clutch Plate Installation

Low and Reverse Clutch Plates

Refer to specifications in rear of this section to determine the required amount of lined and steel clutch plates to use with specific transmission model and engine combination. When replacing piston assembly specific part number must be used.

1. Oil and install low and reverse clutch steel separator plates and faced plates, starting with a

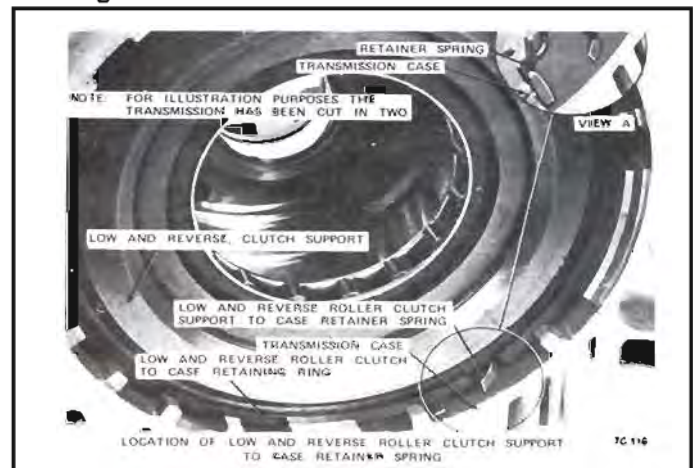


Figure 85 Retainer Location

2. Install low and reverse clutch support retainer spring. See Figure 85.

3. Install low and reverse clutch support assembly pushing firmly until support assembly is seated past top of low and reverse clutch support retainer spring so retaining ring can be installed. *See Figure 86.*

Make certain the splines on inner race of the roller clutch align with splines on reaction carrier.

4. Install low and reverse clutch support to case retaining ring. *See Figure 85.*

Sun Gear Drive Shell Assembly

1. Install low and reverse clutch support inner race to sun gear drive shell thrust washer and install sun gear drive shell assembly. *See Figure 87.*

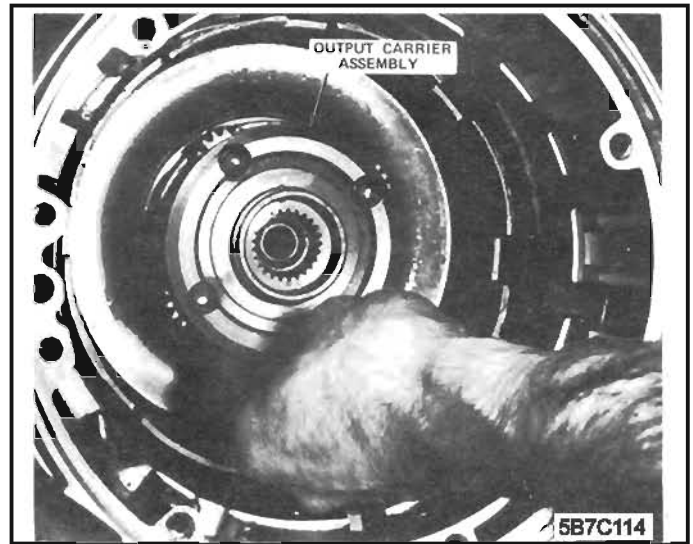


Figure 88 Output Carrier Installation

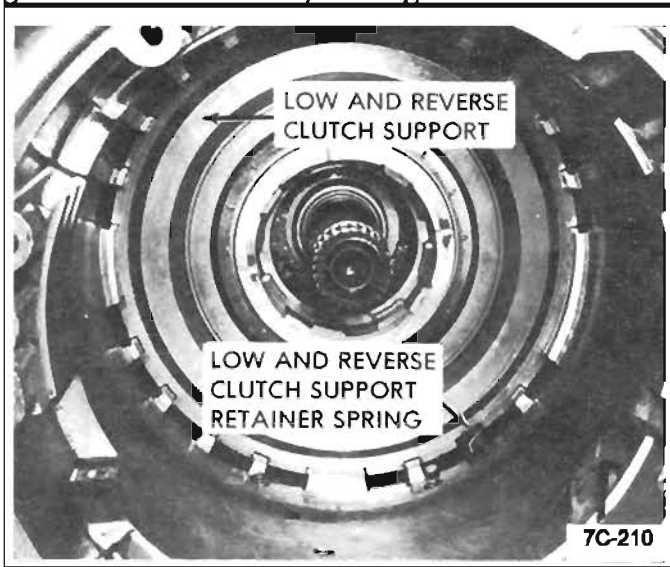


Figure 86 Low and Reverse Clutch Support

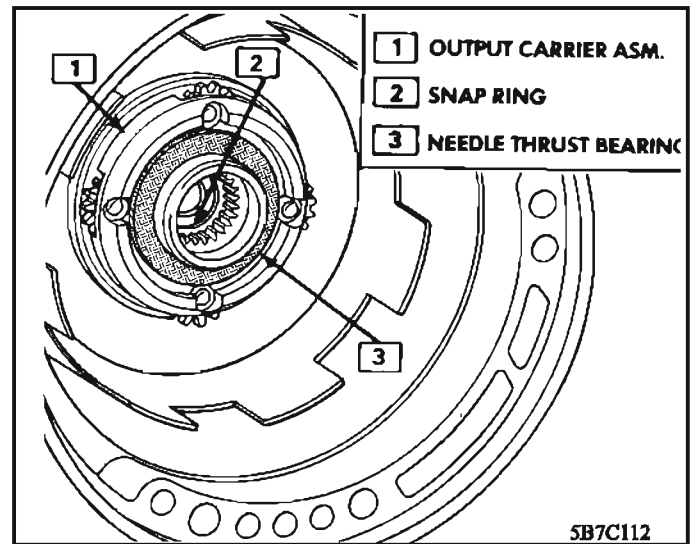


Figure 89 Output Carrier Needle Bearing

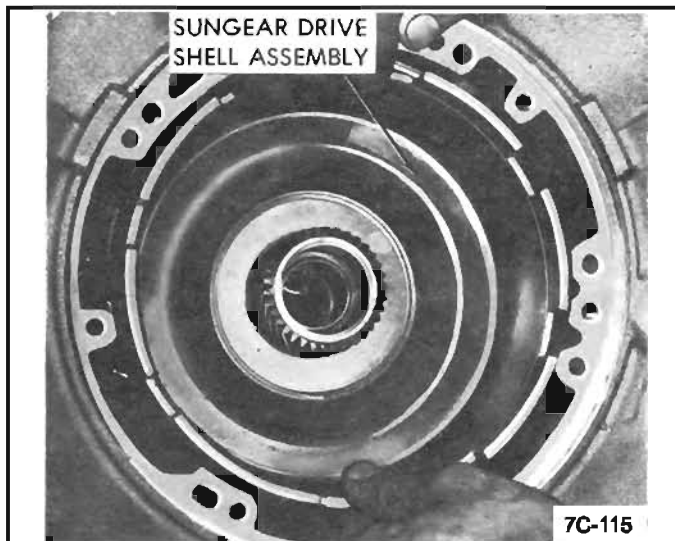


Figure 87 Sun Gear Drive Shell Assembly

Output Carrier Assembly

1. Install output carrier assembly. *See Figure 88.*
2. Install input ring gear to output carrier needle thrust bearing lip side face down. *See Figure 89.*

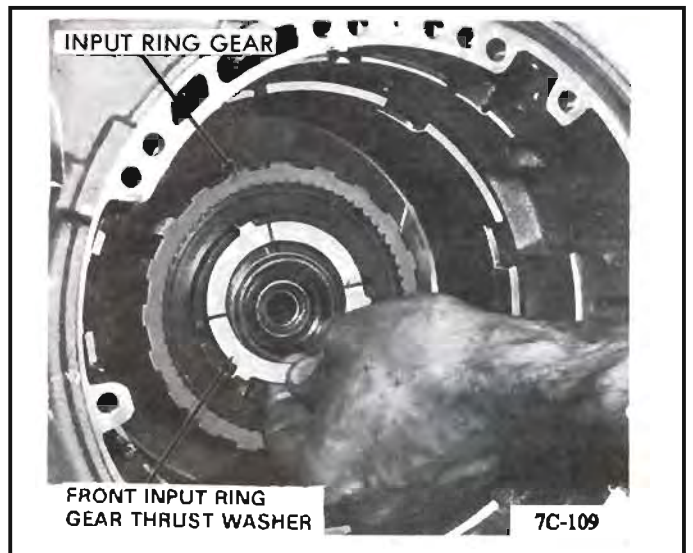


Figure 90 Input Ring Gear Thrust Washer

3. Install output carrier to output shaft snap ring. Use new snap ring and do not over stress on installing. *See Figure 89.*

Input Ring Gear

1. Install input ring gear. *See Figure 90.*
2. Install forward clutch housing to input ring gear front thrust washer. *See Figure 90.* Washer has three (3) tangs.

Direct and Forward Clutch Assemblies

1. Install direct clutch drum to forward clutch housing needle roller bearing. *See Figure 91.*

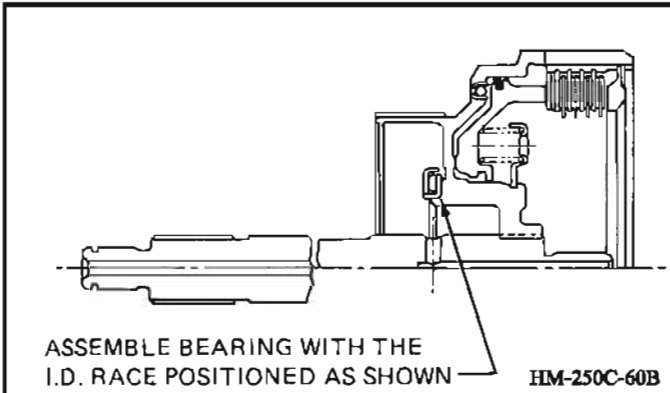


Figure 91 Forward Clutch Needle Bearing

2. Install direct clutch assembly to forward clutch assembly. Install assemblies into case making certain forward clutch faced plates are positioned over input ring gear and the tangs on direct clutch housing are installed onto slots on the sun gear drive shell. *See Figure 92.*

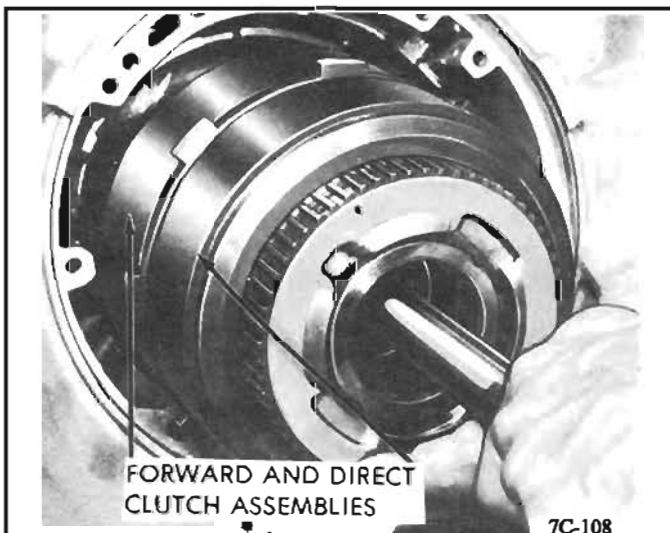


Figure 92 Forward and Direct Clutch Assembly Installation

Intermediate Clutch Overrun Brake Band

Refer to specification in rear of this section to determine the required amount of composition and steel clutch plates to use with specific transmission model and engine.

When replacing piston assembly specific part number must be used.

1. Install intermediate clutch pressure plate. *See Figure 94.*
2. Oil and install composition and steel intermediate clutch plates, starting with a lined plate and alternating steel and lined.
3. Install intermediate clutch cushion spring.

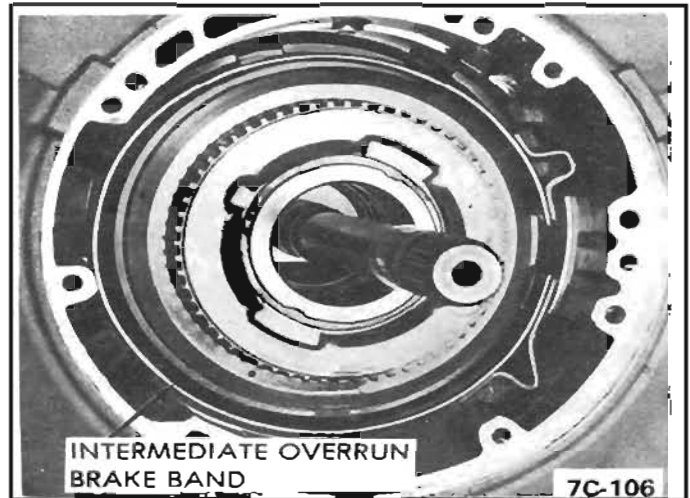


Figure 93 Intermediate Band Installation

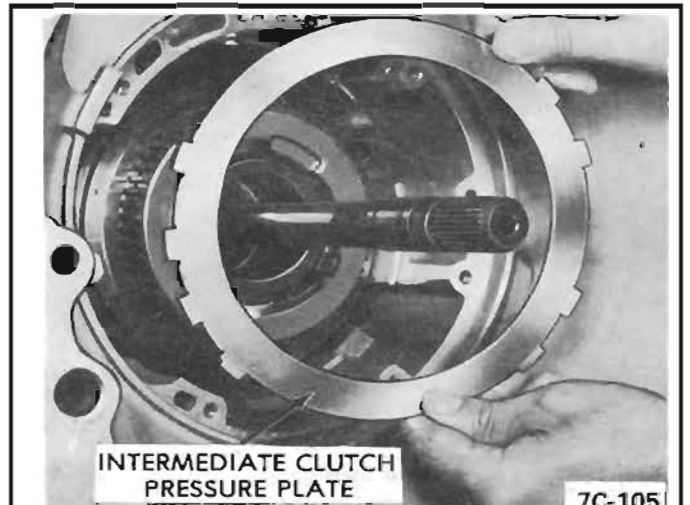


Figure 94 Intermediate Clutch Pressure Plate

Oil Pump Assembly

1. Install original amount of .017 shims and needle thrust bearing lip side face down on pump cover hub. Before installation apply petrolatum to both sides of shim and bearing. *See Figure 95.*
2. Install new pump assembly to case gasket. *See Figure 96.* Before installing pump lubricate case bore.
3. Install guide pins into case. Install pump assembly into case, remove guide pins and install pump to case bolts. Using new washer type seals tighten alternately to 20 ft. lbs. (27 N*m) torque. *See Figure 97.*

4. If input shaft cannot be rotated as the pump is being pulled into place, the direct and forward clutch housings have not been properly installed to index the composition plates with their respective parts. This condition must be corrected before the pump is pulled into place.

5. Checking direct clutch to oil pump clearance, attach slide hammer bolt to threaded hole in oil pump. See Figure 98. With flat of hand on end of input shaft move shaft rearward. Install Dial Indicator Set J-8001 on rod and "O" dial indicator on end of input shaft.

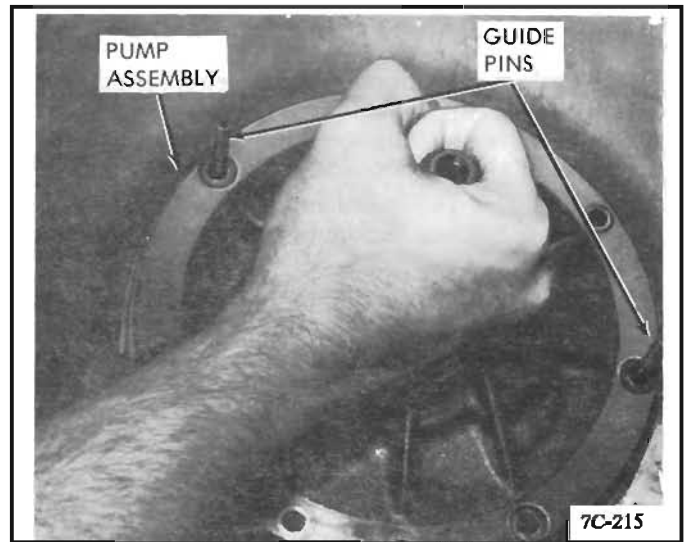


Figure 97 Pump Installation

EXTERNAL PARTS

Installation

Speedometer Drive Gear

1. Place speedometer drive gear retaining clip into hole in output. See Figure 99.
2. Align slot in speedometer drive gear with retaining clip and install. See Figure 99.

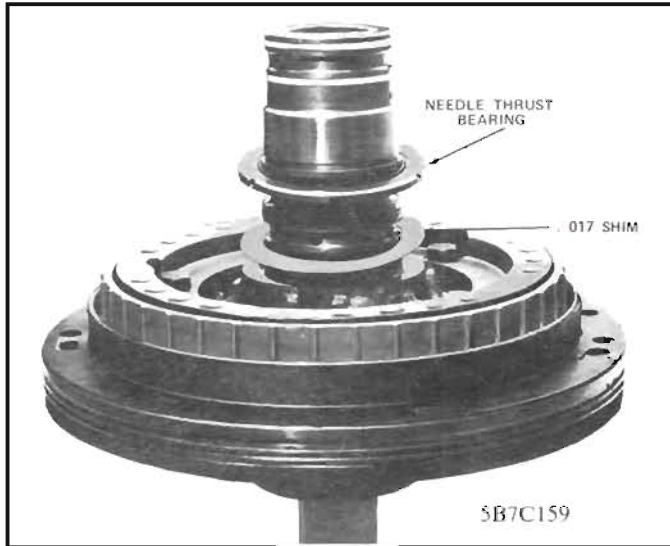


Figure 95 Pump Shim and Needle Bearing

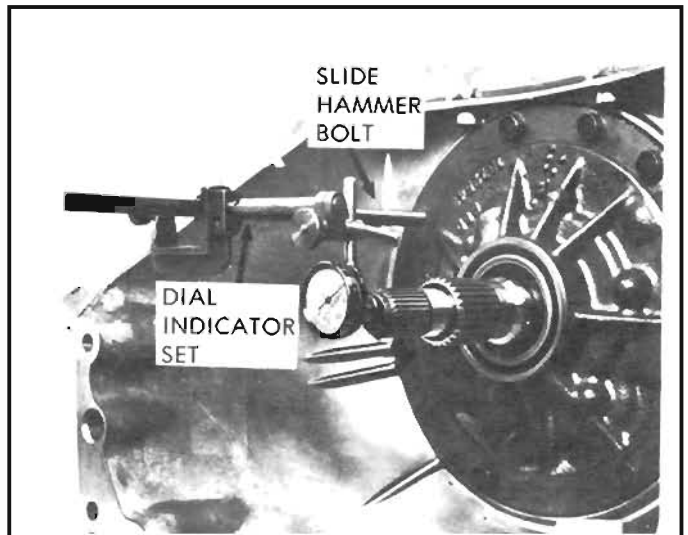


Figure 98 Checking End Play Output Shaft Sleeve and "O" Ring

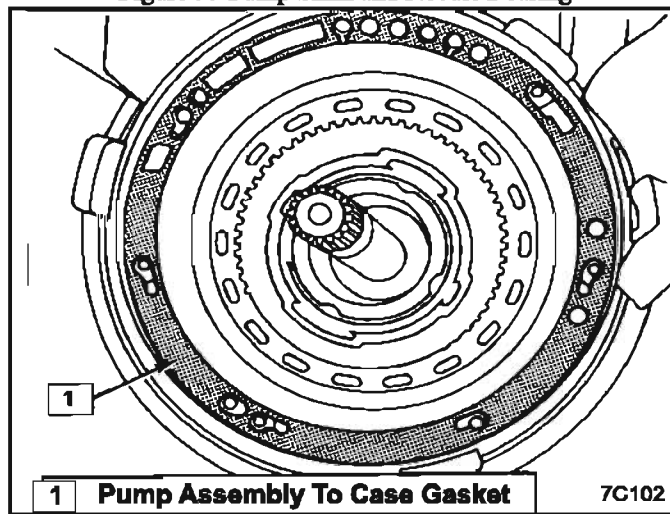


Figure 96 Pump Gasket

Push on end of output shaft to move shaft forward the reading obtained should be between .010 and .044. If the reading is incorrect remove pump assembly and install enough .017 shims to obtain correct reading. See Figure 95.

Extension Housing

1. Install extension housing to case square cut seal. See Figure 100.
2. Attach extension housing to case using attaching bolts. Torque to 35 ft. lbs. (47 N*m).
3. Install speedometer driven gear, retainer and bolt. Torque bolt to 12 ft. lbs. (16 N*m)

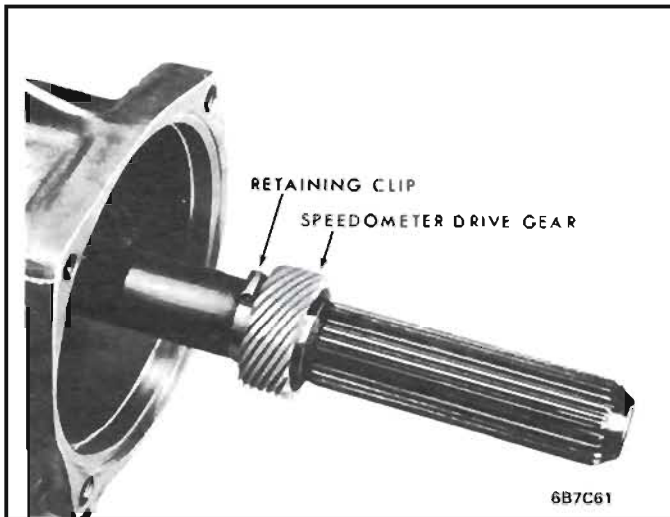


Figure 99 Speedo Gear and Clip



Figure 100 Extension Oil Seal

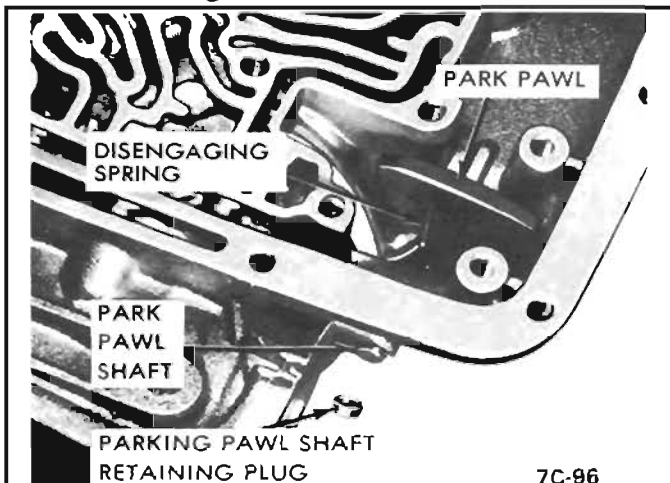


Figure 101 Parking Pawl Shaft and Retaining Plug

Parking Pawl and Actuating Rod

If internal linkage was removed proceed as follows:

1. Install parking pawl, tooth toward the inside of case. See Figure 101.

2. Install parking pawl shaft into case through disengaging spring. Install disengaging spring on parking pawl and slide shaft through parking pawl. See Figure 101.

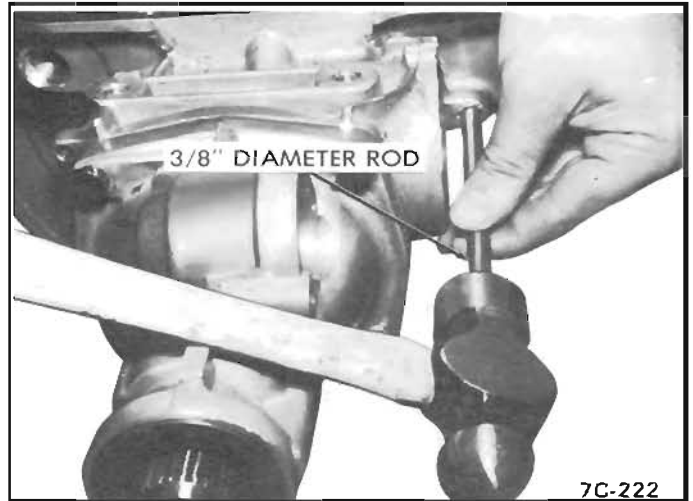


Figure 102 Retaining Plug Installation

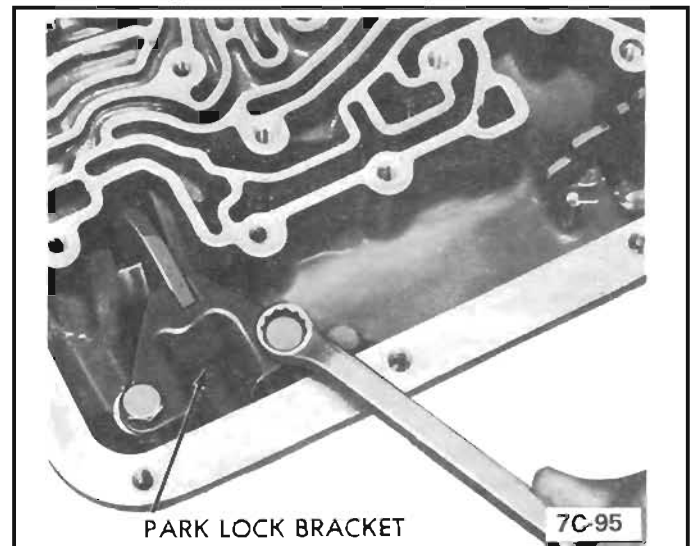


Figure 103 Park Lock Bracket Installation

3. Install parking pawl shaft retainer plug. Drive into case using a 3/8" diameter rod, until retainer plug is flush to .010" below face of case. Stake plug in three (3) places to retain plug in case. See Figure 102.

4. Install park lock bracket, torque bolts to 29 ft. lbs. (39N*m). See Figure 103.

5. Install actuating rod under the park lock bracket and parking pawl. See Figure 104.

Manual Shaft and Range Selector Inner Lever

1. If a new manual shaft to case lip seal is necessary use a 7/8" diameter rod and seat flush with case. See Figure 105.

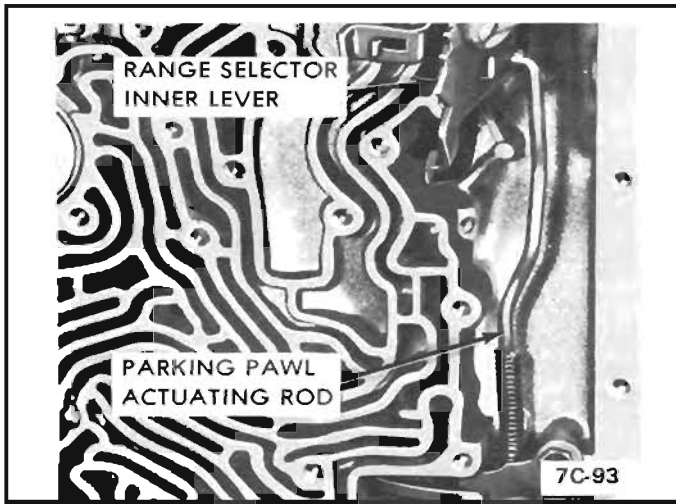


Figure 104 Actuating Rod

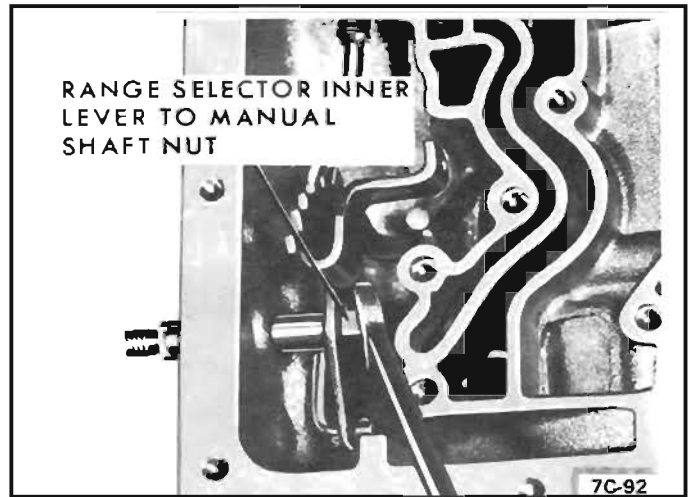


Figure 106 Manual Shaft Nut

2. Install manual shaft through case and range selector inner lever.
3. Install retaining jam nut on manual shaft. Torque jam nut to 30 ft. lbs. (40 N*m). See Figure 106. Install manual shaft to case retainer.

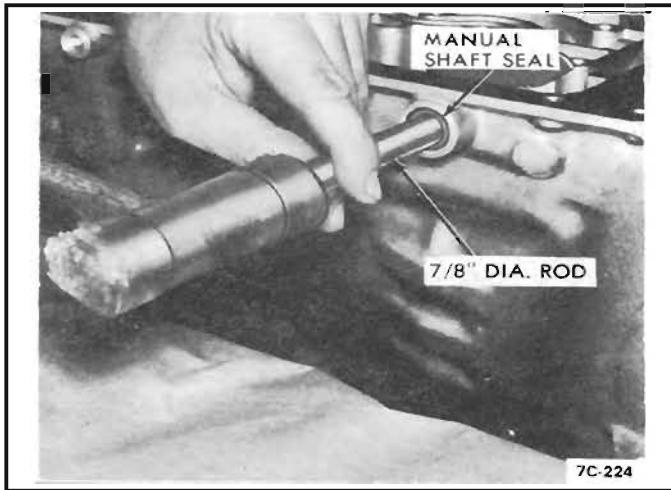


Figure 105 Seal Installation

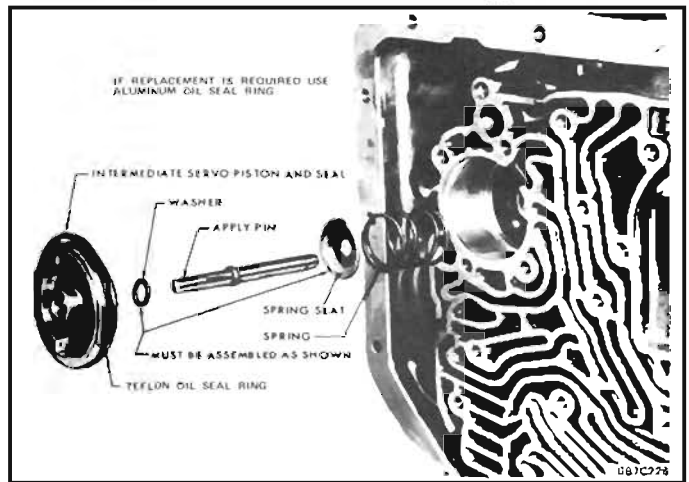


Figure 107 Intermediate Servo Assembly

Intermediate Servo Piston Check Balls, Oil Pump Pressure Screen and Governor Feed Screens

1. Install park lock bracket and special bolts.
2. Install intermediate servo piston, apply pin, spring seat. See Figure 107.
3. Install 5 check balls into correct transmission case pockets. See Figure 108. If number one (1) check ball is omitted or incorrectly placed, transmission failure will result die to minium line pressure.
4. Install oil pump pressure screen in the oil pump pressure hole in case. Open end of screen must be installed toward case face. See Figure 109. (Clean before installing)
5. Install governor screen in the case. See Figure 110. (Clean before installing)

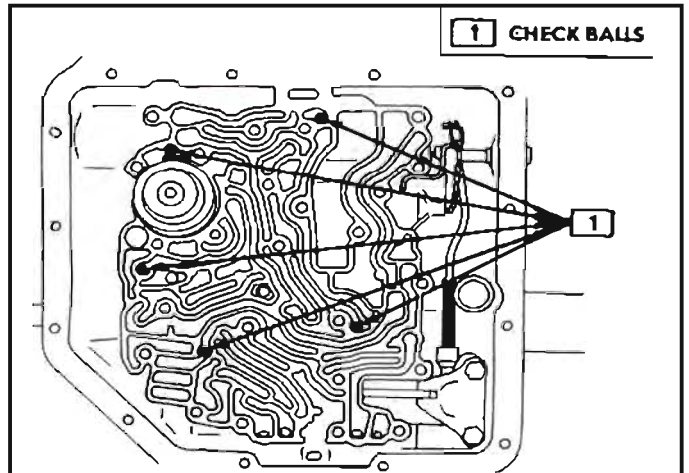


Figure 108 Check Ball Location

6. If removed install case electrical connector with new "O" ring seal.

Valve Body, Detent Roller and Spring Assembly and Filter

1. Install valve body spacer plate to case gasket, valve body spacer plate and spacer plate to valve body

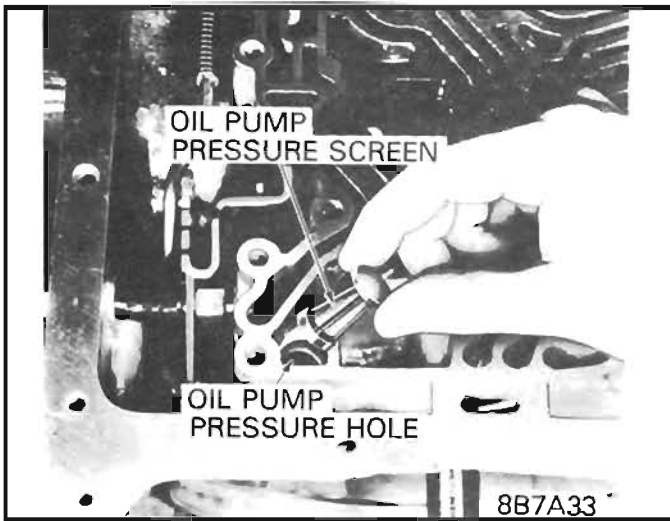


Figure 109 Pump Screen

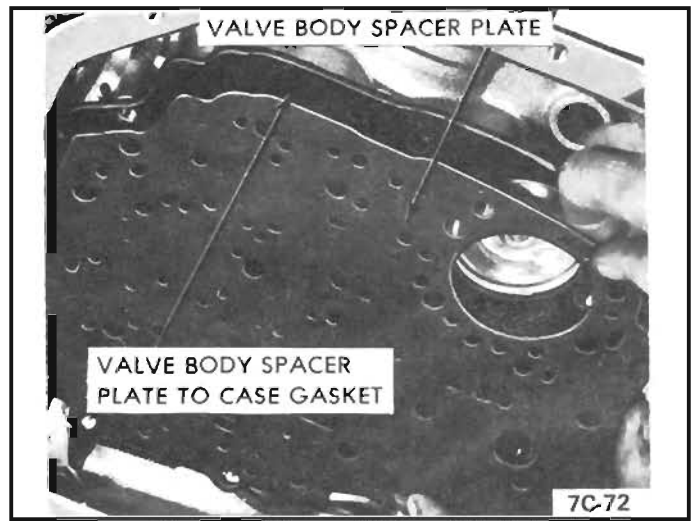


Figure 111 Spacer Plate and Gaskets

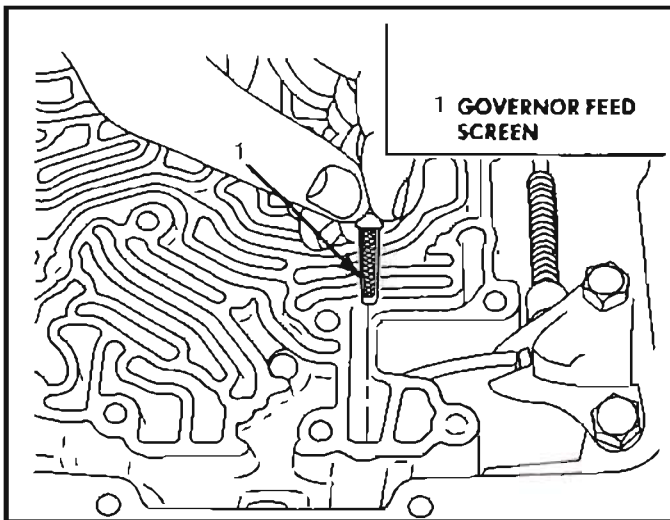


Figure 110 Governor Feed Screen Installation

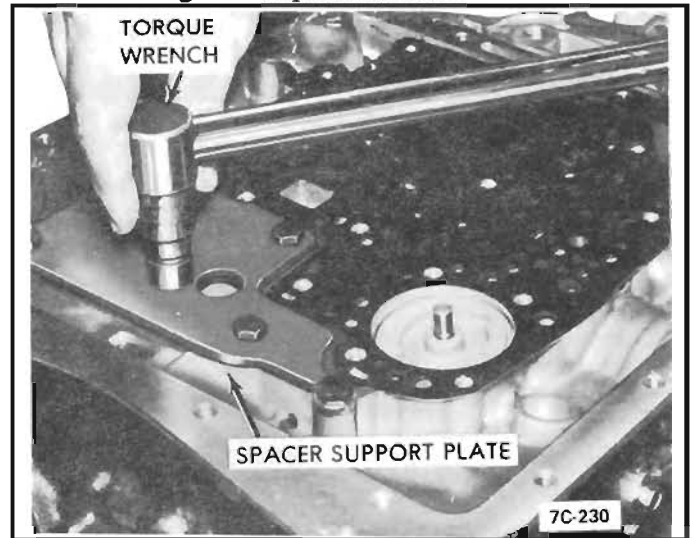


Figure 112 Support Plate

gasket. (The gasket has a yellow ink stripe for identification purposes.) See Figure 111.

2. Install spacer support plate. Torque bolts to 13 ft. lbs. (18 N*m). See Figure 112.

3. Install auxiliary valve body, torque bolts to 13 ft. lbs.

4. Install valve body. Connect manual control valve link to range selector inner lever. Install manual shaft retaining clip. Torque bolts in random sequence to 13 ft. lbs. leaving bolt loose for detent roller and spring assembly. See Figure 113. When handling valve body assembly do not touch sleeves as retainer pins may fall into transmission.

5. Install detent roller and spring assembly to valve body. See Figure 113.

6. Install detent control valve wire to detent valve actuating lever, then attach lever to valve body.

7. Install solenoid and connect wires (if removed, install governor pressure switch).

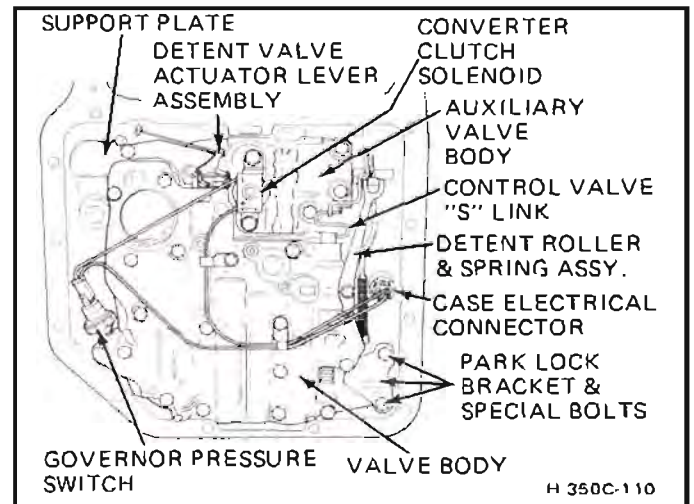


Figure 113 Valve Body and Related Components

8. Install filter and gasket assembly. Install filter and gasket exactly as shown. Always replace filter when foreign material is found to be present.

Oil Pan, Governor and Modulator Valve

1. Install new bottom pan gasket and bottom pan.
2. Install governor assembly. Check governor dowel pin for proper dimension and looseness. If pin is too high tap down to proper dimension. However, if the pin is installed too low or loose, the case must be replaced. *See Figure 115.* Uniformly apply Loctite Cup Plug Sealant #2 or equivalent to governor cover O.D. and install by gently tapping into place with a plastic or rawhide hammer. If cover is damaged it must be replaced.
3. Install vacuum modulator valve and modulator. *See Figure 114.* Lubricate "O" ring seal to prevent damage, install retaining clip and torque bolt to 12 ft. lbs. (16 N*m)

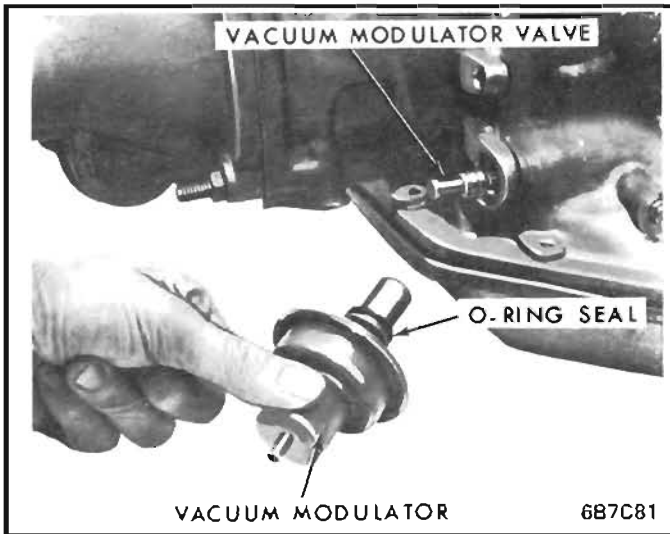


Figure 114 Modulator Installation

Converter

1. Install converter, making sure that the converter hub engages the drive lugs inside the pump gear. If they are not correctly engaged, pump damage will occur.
2. Check the converter to be sure that it turns freely and is able to move forward to meet the flywheel.

BUSHING REPAIR

GOVERNOR BUSHING

Removal

1. Remove transmission from car.
2. Remove the output shaft, valve body, support plate and governor from the case.
3. Assemble transmission case in fixture J-8763 and mount in a vise.
4. Clean off excess stock from the governor O-ring seal to case mating surface. *See Figure 116.*
5. Loosely bolt the drill bushing fixture J-22976-1 to the case.

6. Place the alignment arbor J-22976-3 into the drill bushing fixture and down into the governor bore until it bottoms on the dowel pin. *See Figure 117.*

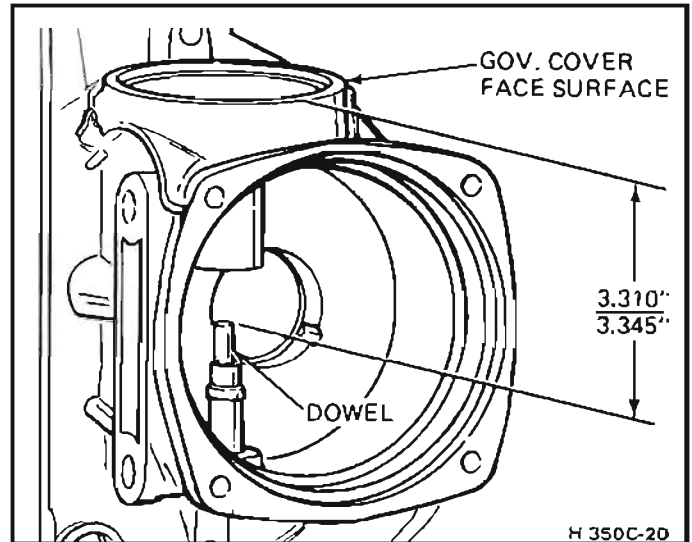


Figure 115 Dowel Pin Dimension

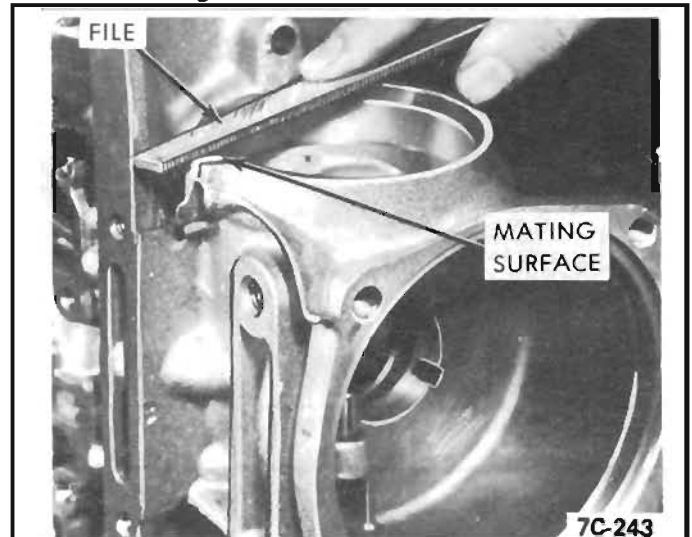


Figure 116 Removing Excess Material From Governor Surface

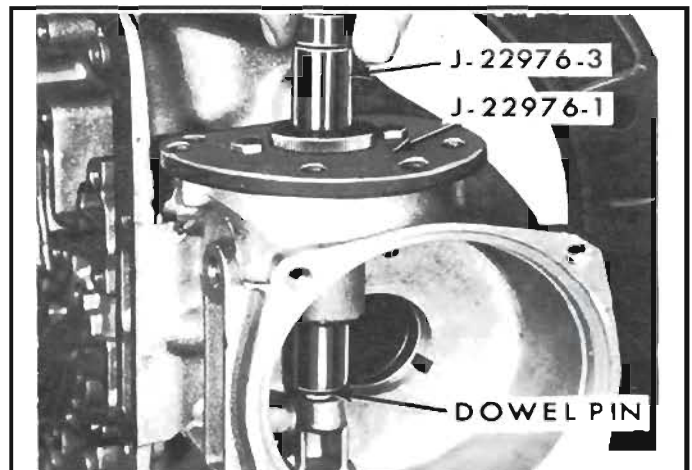


Figure 117 Alignment Arbor

7. Torque the bolts on the drill bushing fixture 10 ft. lbs. (13 N*m). *Do not over torque and strip the threads.* The alignment arbor should be able to rotate freely after the bolts are properly torqued. If the alignment arbor cannot be rotated by hand, recheck the work performed in step 4.

8. Remove the alignment arbor.

9. Using reamer J-22976-9 and drive ratchet, hand ream the governor bore using the following procedure: (*Hand Ream Only*)

a. Oil the reamer, drill bushing and governor bore.

b. Use 7 lbs. of feeding force on the reamer. See *Figure 118*.

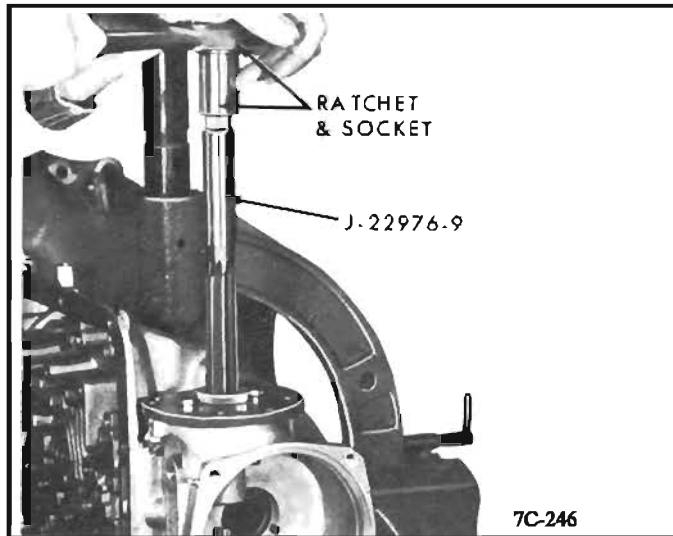


Figure 118 Reamer

c. *After each 10 revolutions* remove the reamer and dip it into a cup full of transmission oil. This will clean the chips from the reamer and lubricate it. See *Figure 119*.

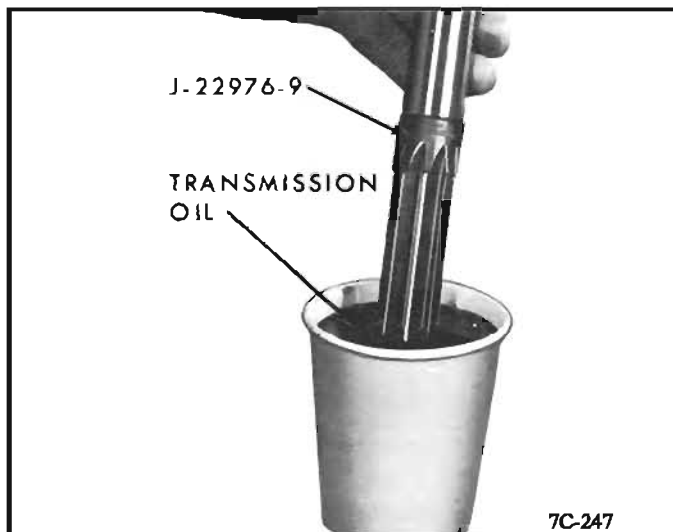


Figure 119

d. When the reamer reaches the end of the bore, continue reaming the bore until the reamer bottoms out the dowel pin in the case. *At this point, rotate the reamer 10 complete revolutions.*

e. Remove the reamer using a clockwise rotation and 7-10 lbs. force upward.

Pulling the reamer out without rotating it may score the bore causing a leak between the case and the bushing.

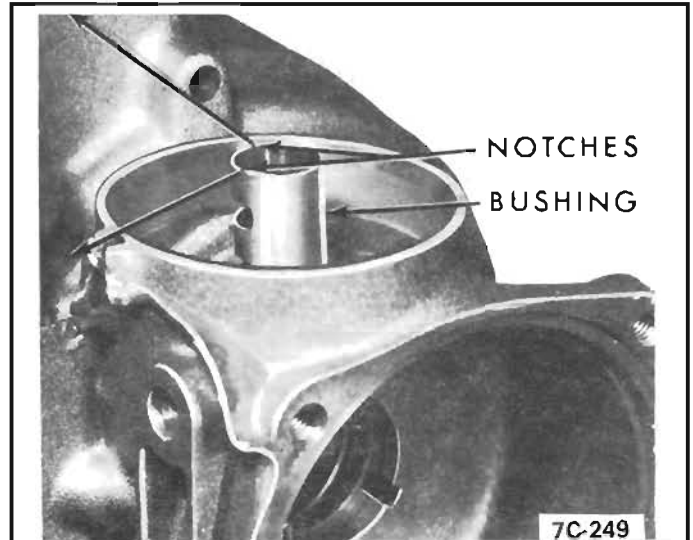


Figure 120 Position Notches

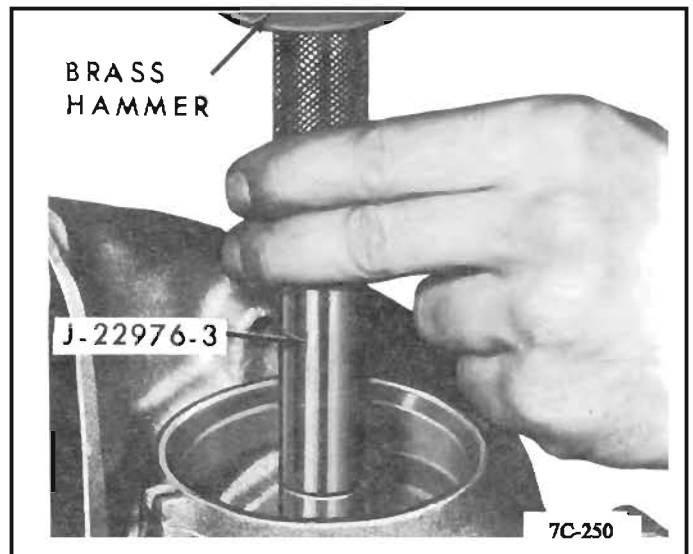


Figure 121 Bushing Installer

11. Thoroughly clean the chips from the case, visually check the governor feed holes to insure that they are free from chips.

Installation

1. Install the bushing using the following procedure:

a. Note the two (2) notches at one end of the bushing.

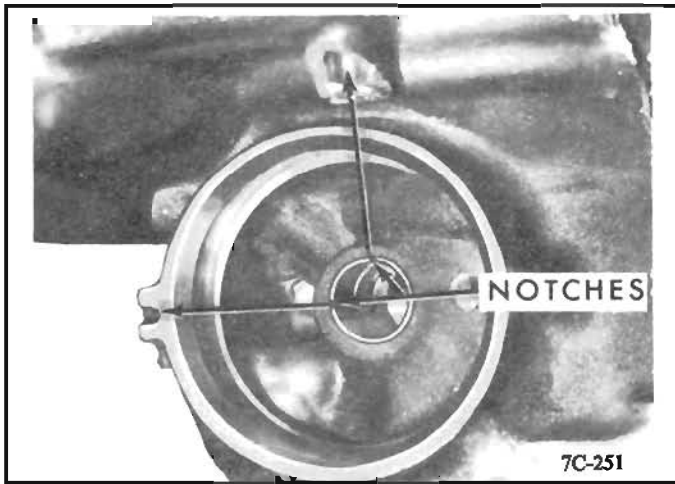


Figure 122 Bushing Properly Seated

b. Position the notches so that one notch is toward the front of the case and the other is toward the bottom of the case. *See Figure 120.*

c. Use J-22976-3 alignment arbor and bushing installer to drive the bushing into the case. *See Figure 121.* A brass hammer should be used to strike the hardened steel bushing installer tool.

d. Drive the bushing until it is flush with the top of the bore and seated properly in the case. *See Figure 122.*

2. Oil a new governor and insert it into the installed bushing. The governor should spin freely. If slight honing on the bushing is necessary, use crocus or fine emery cloth and move in a circular one-way direction only.

Extension Housing Bushing

Removal

1. Remove extension housing bushing using screwdriver to collapse bushing. *See Figure 123.*



Figure 123 Collapsing Bushing

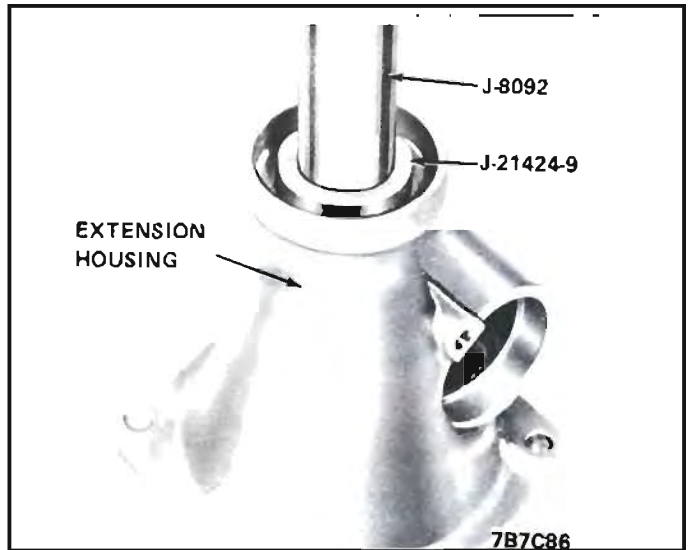


Figure 124 Extension Housing Bushing Installation

Installation

1. Install extension housing bushing using drive handle J-8092 and Bushing Tool J-21424-9. *See Figure 124.*

Input Ring Gear Bushing

Removal and Installation

1. Inspect bushing for wear or galling. If replacement is necessary, proceed as follows:

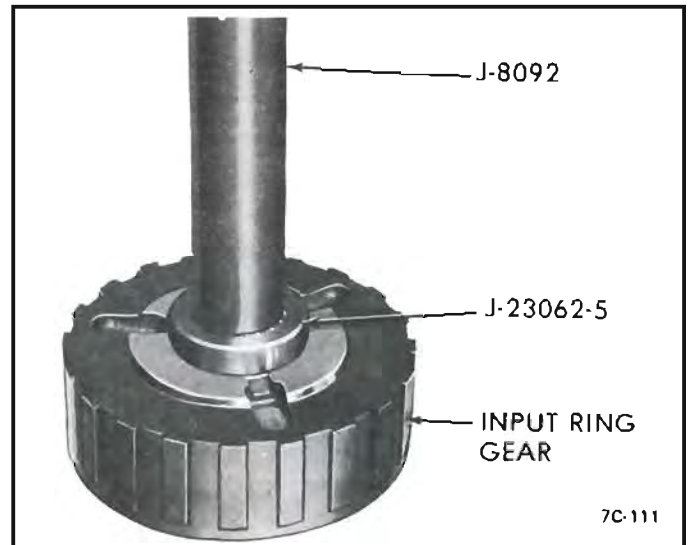


Figure 125 Reaction Carrier Bushing Removal

a. Thread Tool J-23062-5 on Drive Handle J-8092 and remove bushing from ring gear. *See Figure 125.*

b. Using Tool J-23062-5, press in new bushing .050" to .060" from inner surface of hub. *See Figure 125.*

Reaction Carrier Bushing Removal and Installation

1. Inspect reaction carrier bushing for wear or galling. If replacement is necessary, proceed as follows:

- a. Thread Tool J-23062-3 on Drive Handle J-8092 and remove bushing. *See Figure 126.*
- b. Using Tool J-23062-3, press in new bushing flush to .010" from inner surface of hub. *See Figure 126.*

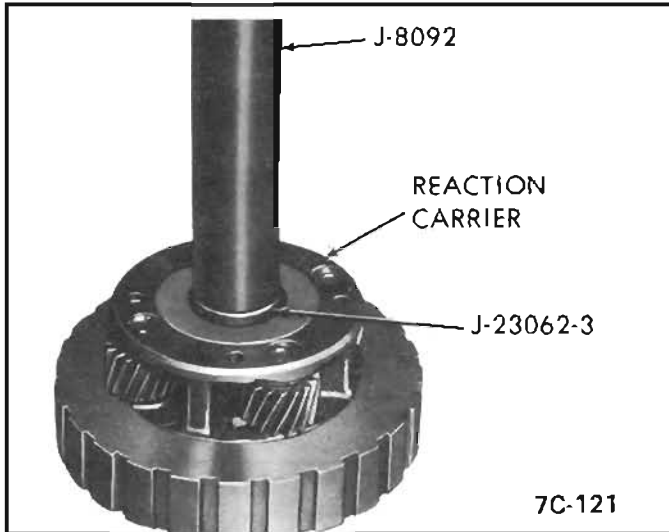


Figure 126 Reaction Carrier Bushing Installation

Case Bushing Removal

1. Inspect case bushing for nicks, scoring or excessive wear. If damaged, remove as follows: Assemble Tool J-23062-16 on Drive Handle J-8092. Place Tool J-23062-8 into back of case, insert assembly of drive handle J-8092 and Tool J-23062-16 into Tool J-23062-8 and remove bushing. *See Figure 127.*

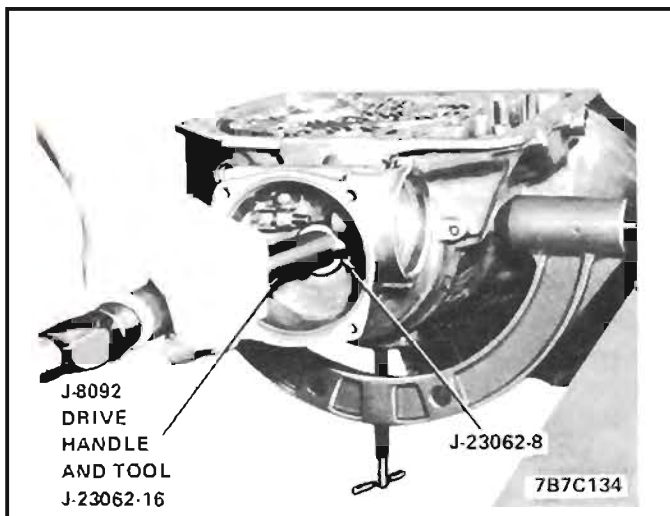


Figure 127 Case Bushing Removal

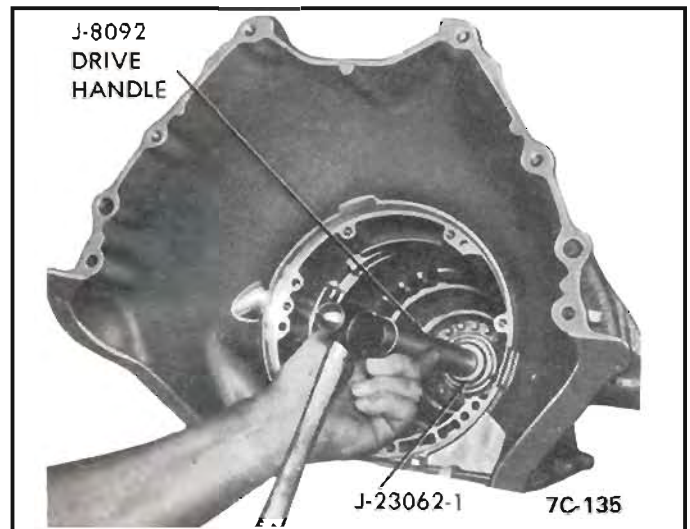


Figure 128 Case Bushing Installation

Installation

1. Using Tool J-23062-01 and Drive Handle J-8092, press bushing to 1/5" below chamfered edge of case. Make certain split in bushing is opposite notch in case. *See Figure 128.*

Pump Body Bushing Removal and Installation

1. Check oil pump bushing for nicks, severe scoring or wear. If bushing replacement is necessary remove as follows: Support on wood blocks. Use Tool J-21465-17 and Drive Handle J-8092 to press bushing out of pump body. To install new oil pump bushing, use Tool J-21465-17 and Drive Handle J-8092 and press bushing into pump body from gear pocket face until it is flush to .010" below opposite face. (Front pump seal side) *See Figure 129.*

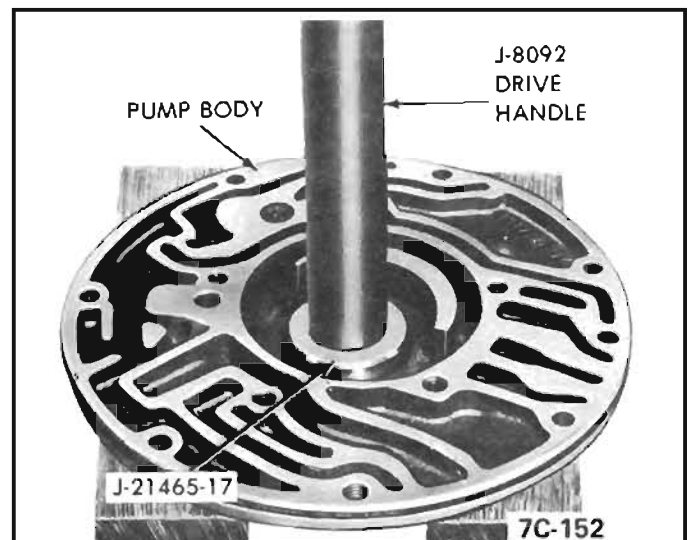


Figure 129 Pump Bushing Removal

Front Stator Shaft Bushing

Removal

1. Check front stator shaft bushing for nicks, severe scoring or wear. If bushing replacement is necessary, remove as follows: Assemble bushing remover J-21465-15 to adapter J-2619-4. Assemble this assembly into slide hammer J-2619-01. Clamp slide hammer into vise. Grasp stator shaft and remove bushing. *See Figure 130.*

Installation

1. Install front stator shaft bushing as follows:
Support pump assembly on J-21424-7 before installing bushing. Install bushing into the front end of stator shaft. Using installer J-21424-7 and Drive Handle J-8092, tap bushing into shaft 1/4 inch below top of stator shaft. *See Figure 131.* Extreme care must be taken so bushing is not driven past shoulder.

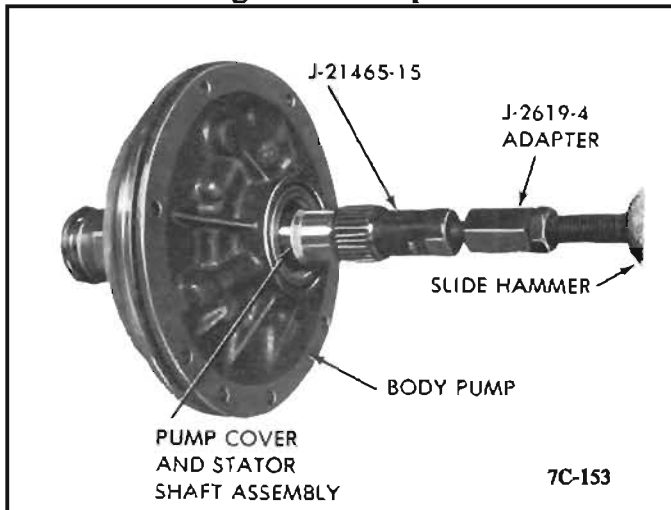


Figure 130 Front Stator Shaft Bushing Removal

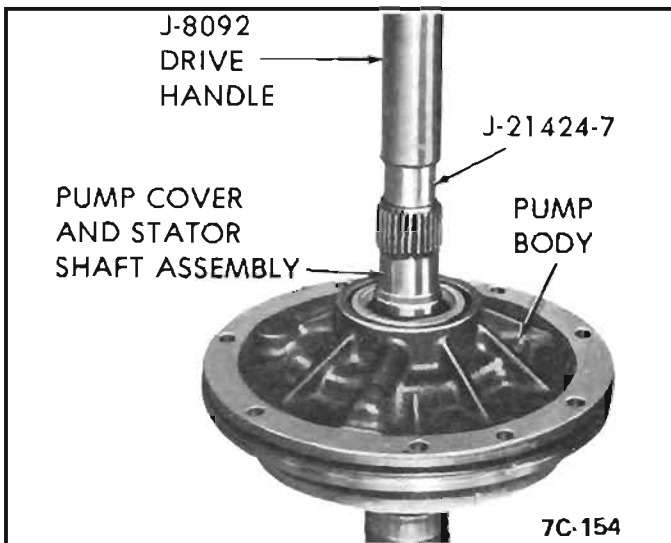


Figure 131 Front Stator Shaft Bushing Installation

Rear Stator Shaft Bushings

Removal

1. If replacement at lower rear stator shaft bushing is required, proceed as follows: Thread Tool J-21465-15 into stator shaft lower rear bushing. Thread slide hammer J-2619-01 into remover. Clamp slide hammer into vise. Grasp stator shaft and remove bushing. *See Figure 132.* If upper rear stator shaft bushing is required, repeat above procedure.

Installation

1. Using Tool J-23062-2, press upper rear stator shaft bushing to 1-11/32 inch below top surface of oil pump delivery sleeve. *See Figure 133.*

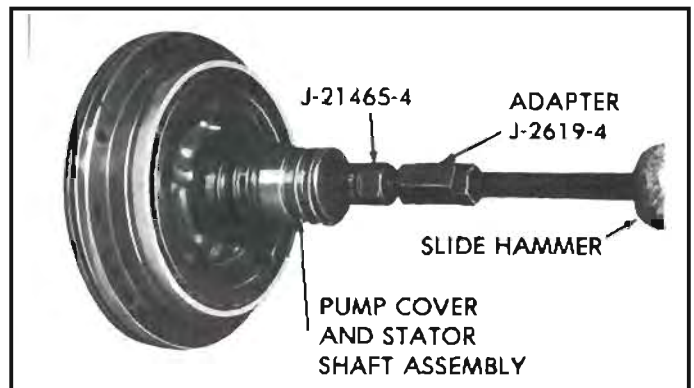


Figure 132 Rear Stator Shaft Bushing Removal

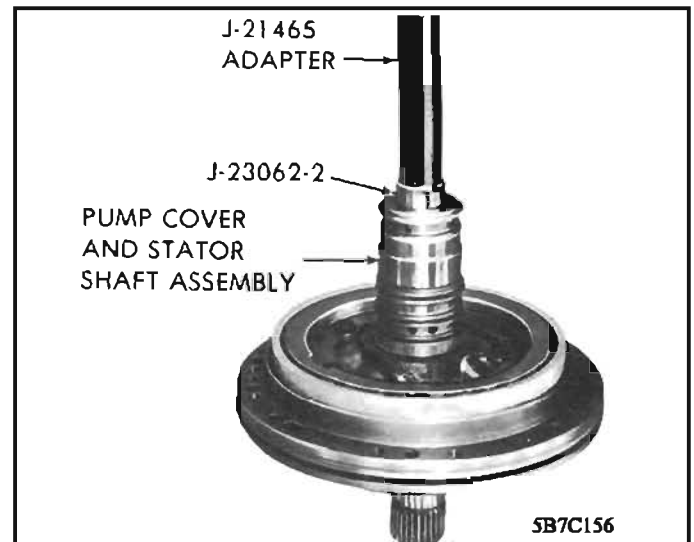


Figure 133 Rear Stator Shaft Bushing Installation

2. Using Tool J-23062-2, press lower rear stator shaft bushing flush to .010" before chamfer on oil pump delivery sleeve.

Direct Clutch Bushing

Removal

1. If bushing replacement is necessary, use Tool J-23062-10 and Drive Handle J-8092 and remove the bushing. *See Figure 134.*

Installation

1. Install direct clutch bushing using Tool J-23062-04, Drive Handle J-8092 and remove the bushing. *See Figure 135.*

Sun Gear Bushing

Removal

1. If replacement of sun gear bushings is necessary, use Tool J-23062-3 and Drive Handle J-8092 and drive both bushings out through sun gear. *See Figure 136.*

Installation

1. Install sun gear bushing using Tool J-23062-3 and Drive Handle J-8092 and install flush to .010" below counter bores. *See Figure 136.*

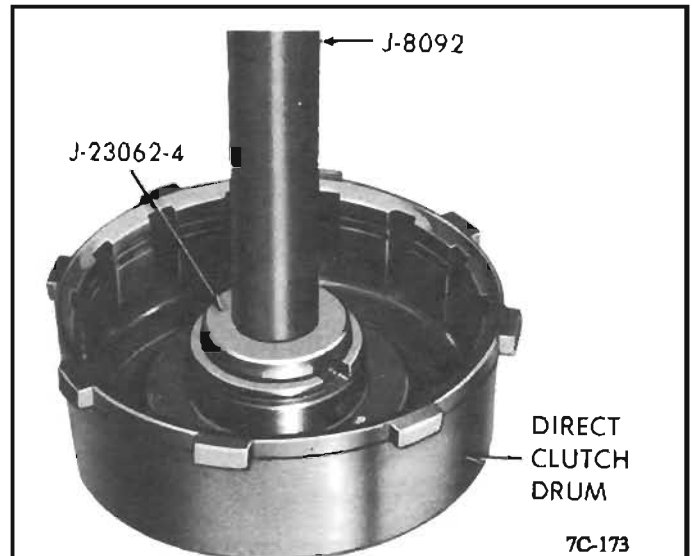


Figure 135 Direct Clutch Bushing Installation

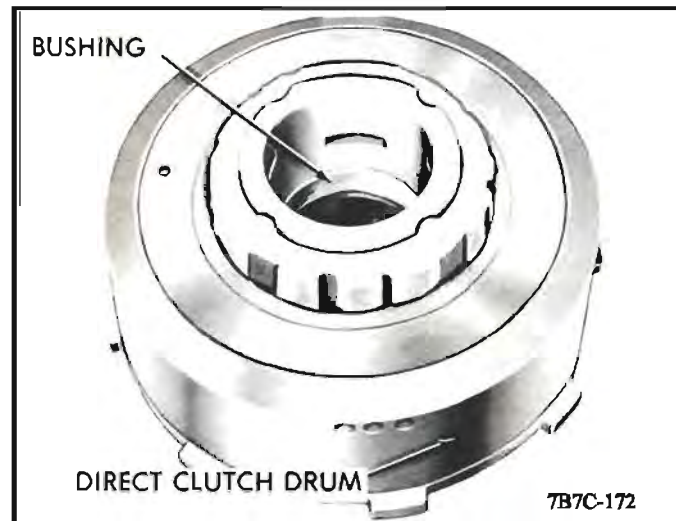


Figure 134 Direct Clutch Bushing Removal

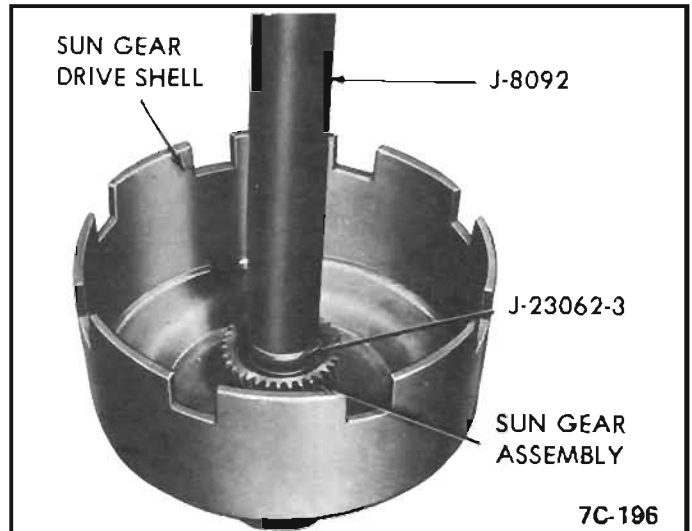


Figure 136 Sun Gear Bushing Installation



TORQUE SPECIFICATIONS

| LOCATION | THREAD | TORQUE ft. lbs. |
|---------------------------------|-----------|-----------------|
| OIL PAN TO CASE | 5/16 - 18 | 13 |
| PUMP TO CASE | 5/16 - 18 | 20 |
| MODULATOR RETAINER TO CASE | 5/16 - 18 | 12 |
| VALVE BODY TO CASE | 5/16 - 18 | 13 |
| CHANNEL SUPPORT PLATE TO CASE | 5/16 - 18 | 13 |
| PUMP BODY TO PUMP COVER | 5/16 - 18 | 15 |
| PARKING PAWL BRACKET TO CASE | 5/16 - 18 | 29 |
| EXTENSION HOUSING TO CASE | 3/8 - 16 | 35 |
| INSIDE SHIFT NUT | 3/8 - 16 | 30 |
| EXTERNAL TEST PLUGS TO CASE | 1/8 - 27 | 8 |
| TRANS MOUNT TO TRANSMISSION | M10 - 1.5 | 35 (48 N.m) |
| SPEEDO RETAINER TO EXT. HOUSING | M6 - 1.0 | 150 (17 N.m) |
| DETENT CABLE TO CASE | M6 - 1.0 | 75 (8.5 N.m) |
| SELECTOR LEVER SHAFT NUT | M10 - 1.5 | 20 (27 N.m) |
| CONVERTER TO FLY WHEEL | M10 - 1.5 | 35 (45 N.m) |

CLUTCH PLATE USAGE

| TRANS I.D. | SPEEDO GEAR | | INTERMEDIATE CLUTCH | | | DIRECT CLUTCH | | | FORWARD CLUTCH | | | LOW / REVERSE CLUTCH | | |
|------------|-------------|--------|---------------------|-------|-------|---------------|-------|-------|----------------|-------|-------|----------------------|-------|-------|
| | NO. TEETH | COLOR | LINED | STEEL | THICK | LINED | STEEL | THICK | LINED | STEEL | THICK | LINED | STEEL | THICK |
| XA | 10 | PURPLE | 3 | 3 | .992 | 4 | 4 | .833 | 5 | 5 | 1.405 | 5 | 5 | 3.106 |
| XX | 9 | GREEN | 3 | 3 | .992 | 4 | 4 | .833 | 5 | 5 | 1.233 | 5 | 5 | 2.921 |

Figure 137

350 SUPPLEMENTAL INFORMATION

INTRODUCTION

The 350 Automatic transmission trouble shooting guide is designed for field service personnel who have had a minimum amount of training or experience in working on the 350 transmission. It will be valuable to a service organization from service writers and road testers to the mechanic who performs the repair operation.

This trouble shooting guide is not intended to take the place of the 350 Automatic Transmission Section in any Divisional Service Manuals. It is intended to supplement it by making available to you a practical method and systematic approach to solving transmission malfunctions with the information that can be gained by oil pressure checks which can be made without a road test.

Internal oil leaks within the transmission that are fed through an orifice or orifices (porosity, sand holes etc.) will not show up on an oil pressure check as low pressure; however, by following the Trouble Shooting Charts and with the information gained from the pressure checks, you will be led to the possible cause or causes of the malfunction and the corrective action.

Preliminary Check Procedure

"Preliminary Checking Procedure" has the normal oil pressure ranges under specific conditions listed. All of these can be made without a road test. Deviation from the normal oil pressure ranges are indicators to specific areas and causes of transmission malfunctions. But like working a jig-saw puzzle, in order to finish the picture, you need all the pieces. In this case you need all the pressure readings the chart lists and they can be made in the shop and do not require a road test.

In the majority of malfunctions, this information will be required in order to efficiently diagnose the malfunction. If the customer complaint is unknown other than it just doesn't work right, the preliminary oil pressure check will be necessary to aid you in determining if a malfunction exists and in what area to look for the cause. However, an important and often overlooked aspect of diagnosis is precise determination of the customer's complaint. For this purpose, a short ride with the customer will often prove beneficial. It may be found that the condition the customer wants corrected is standard and should not be altered.

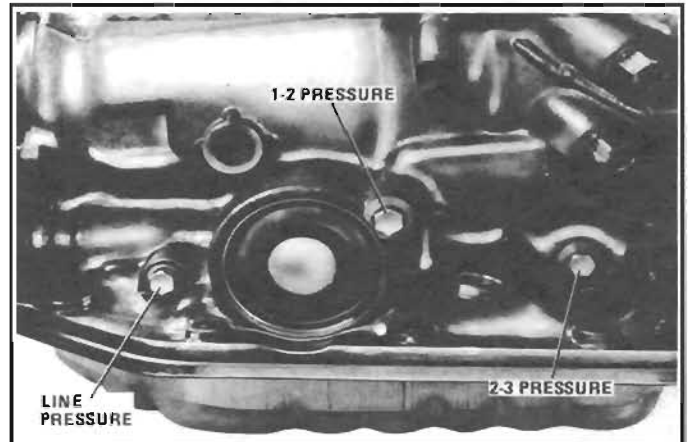
When the malfunction or complaint is known, you can proceed to the Trouble Shooting Chart or Charts that cover the specific condition. In some instances, you may correct the condition in the first few steps of the chart; in others, it will require that the pressure check be performed in order to lead you in the right direction to remedy the malfunction.

The first step when searching for the cause of a malfunction is to check the Transmission Oil Level.

The second step when searching for the cause of a malfunction is to check the Outside Manual Linkage.

If discrepancies are found in these first two steps, they should be corrected and the vehicle road tested to see if the malfunction has been corrected.

If no discrepancies are found, or if after correcting discrepancies the malfunction still exists, the next step of the procedure is to make oil pressure checks.



Refer to Figure 4, located on page 7, for pressure check specifications.

If no discrepancies are found, or if after correcting discrepancies the malfunction still exists, the next step of the procedure is to make oil pressure checks.

Install the pressure gage. See Figure 81. Proceed to follow the steps on the Preliminary Checking Procedure and record the pressures and compare them with the normal pressure provided for each condition.

If the malfunction is unknown and a road test can be made, it can be combined with the Preliminary Checking Procedure. If a road test cannot be made and the complaint is delayed or no upshifts, and high pressures are recorded on the pressure checks, the detent linkage should be disconnected from the transmission and oil pressures rechecked. Normal pressures on recheck indicate that the cause of the malfunction is in the detent linkage to the transmission, such as misadjusted, broken or sticking cable.

With the information you have obtained through the Preliminary Checking Procedure and road test, if it was required, you can now apply it to the chart or charts in the Trouble Shooting guide that fits the malfunction.

Road Test

Check all Shifts in the following manner:

NOTE: Pressures and shift points may vary by model year.

Always compare readings with associated service manuals.

Drive Range:

Position selector lever in DRIVE RANGE and accelerate the vehicle from 0 MPH. A 1-2 and 2-3 shift should occur at all throttle openings. (The shift points will vary with the throttle opening) As the vehicle decreases in speed to 0 MPH, the 3-2 and 2-1 shifts should occur.

Low L2 Range:

Position the selector lever in L2 RANGE and accelerate the vehicle from 0 MPH. A 1-2 shift should occur at all throttle openings. (No 2-3 shift can be obtained in this range.) The 1-2



Technical Service Information

shift point will vary with throttle opening. As the vehicle decreases in speed to 0 MPH, a 2-1 shift should occur.

NOTE: The 1-2 shift in INTERMEDIATE RANGE is somewhat firmer than in DRIVE RANGE. This is normal.

Low L1 Range:

Position the selector lever in L1 RANGE and accelerate the vehicle from 0 MPH. No upshift should occur in this range.

2ND Gear - Overrun Braking: (L2)

Position the selector lever in DRIVE RANGE, and with the vehicle speed at approximately 35 MPH, move the selector lever to Low L2 RANGE. The transmission should downshift to 2nd. An increase in engine RPM and an engine braking effect should be noticed. Line pressure should change from approximately 100 PSI to approximately 125 PSI in 2ND.

1st Gear - Overrun braking (L1)

Position the selector lever in L2 RANGE, at approximately 30 to 50 MPH, with throttle closed, move the selector lever to L1. A 2-1 downshift should occur in the speed range of approximately 45 to 30 MPH, depending on axle ratio and valve body calibration. The 2-1 downshift at closed throttle will be accompanied by increased engine RPM and engine braking effect should be noticed. Line pressure should be approximately 150 PSI. Stop vehicle.

Reverse Range: (R)

Position the selector in the REVERSE POSITION and check for reverse operation.

The following shift points are APPROXIMATE and should be obtained providing Engine Tune-Up is satisfactory.

| Selector Lever In: | Upshifts (MPH) | | Downshifts (MPH) | |
|--------------------|----------------|--------|------------------|----------|
| | 1-2 | 2-3 | 3-2 | 3 or 2-1 |
| <u>Drive Range</u> | | | | |
| Coast | - | - | 22 | 9 |
| Part Throttle | | | 50 | - |
| Minimum Throttle | 9-14 | 15-22 | - | - |
| Full Throttle | 45-55 | *65-85 | *below 75 | below 40 |

* Upshift and maximum forced downshift will not occur before exceeding national 55 MPH speed limit.

L1 (MAN. LOW) - (ENGINE BRAKING @ 46 MPH OR BELOW)

L2 (MAN. 2ND) - (ENGINE BRAKING @ ANY SPEED)

Causes of Oil Leaks

I. Before attempting to determine the source of any automatic transmission leak proceed as follows:

- a. Remove converter cover and completely degrease underside of transmission, converter and pump assembly with suitable cleaning solvent.

NOTICE: DO NOT USE ANY CLEANING SOLVENT THAT WILL DAMAGE RUBBER PARTS.

II. Road test to get unit at operating temperature. (180F)

III. Raise car on twin post or frame contact hoist, start engine and place transmission selector in Drive (D) range. Accelerate at light throttle until transmission upshifts into direct drive. Inspect entire transmission for external leaks. Use of a mirror is helpful in determining the source of the leak.

CAUTION: EXTREME CAUTION MUST BE EXERCISED NOT TO GET NEAR MOVING FLEX PLATE, CONVERTER ASSEMBLY PROPELLER SHAFT OR REAR WHEELS.

Caution: When stopping rear wheels, it is important that the brake application be made gradually to avoid possible damage to the drive line, differential, axle and rear brake assemblies. The impact force exerted on these components when the brake is applied severely with the wheels spinning free is far greater than that experienced under normal driving conditions.

Before any work is attempted on a transmission for external leaks, the areas outlined below should be observed to obtain the most accurate diagnosis.

A. Extension Housing:

1. Extension housing retainer lip seal.
2. Extension housing retainer to case seal.

NOTE: If an extension housing seal or extension housing to case seal is damaged, it is not necessary to remove transmission from the car to replace the seal.

IMPORTANT: A leak at any of the locations described under "Case Leaks" (see Step C below) could appear as extension housing lip seal leak due to wind flow around the transmission. Therefore, it is of the utmost importance that STEPS I, II, and III be followed before any work is attempted on the transmission.

B. Bottom Pan Leaks

1. Attaching bolts improperly torqued.
2. Damaged gasket.

C. Case Leaks

1. Pressure taps loose and cross threaded.
2. Cooler fittings loose or cross threaded in case.

NOTE: Do not over torque fittings as case failure will result.

3. Porpous casting.
4. Filler pipe "O" ring seal damaged.
5. Modulator assembly "O" ring damaged.
6. Governor cover to case "O" ring damaged.
7. Speedometer gear "O" ring damaged or speedometer gear lip seal leaking at shaft.
8. Manual shaft lip seal damaged.

D. Pump Assembly Leaks

IMPORTANT: A leak at any of the above locations could appear as a pump assembly leak or oil bottom pan gasket leak due to the fluid draining toward front of transmission and dripping off bottom of the oil pan or converter cover. Extreme care must be taken so any transmission external fluid leak is not diagnosed as a pump assembly leak.



Technical Service Information

1. Oil pump to case seal (square cut sealing ring) damaged.

NOTE: Under no circumstances can a pump assembly to case gasket cause an external fluid leak.

2. Porous pump casing.

3. Converter leak in weld area.

4. Pump assembly attaching bolts loose and/or bolt washer type seals damaged or missing.

5. Pump assembly lip seal damaged. Before the pump assembly seal is diagnosed as a failed part, make certain fluid can be seen coming from the area of the seal. A pump assembly lip seal leak is caused by one of the following:

a. Seal lip cut. Check converter hub, etc.

b. Busing moved forward and seal damaged.

c. Seal drain cast shut. If the drain hole is cast shut, pressure builds up behind the seal lip will be pushed outward and/or split with resultant loss of fluid.

NOTE: This type of failure will be an early milage failure only.

Diagnosis of Transmission Clutch Plates

A. Lined Drive Plates

1. Dry plates with compressed air and inspect the lined surface for:

a. Pitting and flaking

b. wear

c. glazing

d. cracking

e. charring

f. chips or metal particles imbedded in lining.

If a lined drive plate exhibits any of the above conditions replacement is required.

IMPORTANT: Do not diagnose drive plates by color.

B. Steel Driven Plates

Wipe plates dry and check for heat discoloration. If the surface is smooth and an even color smear is indicated, the plate should be reused. If severe heat spot discoloration or surface scuffing is indicated, the plate must be replaced.

C. Clutch Release Springs

Evidence of extreme heat or burning in the area of the clutch may have caused the springs to take heat set and would justify replacement of the springs.

Causes of Burned Clutch Plates

1. FORWARD CLUTCH

A. Check ball in clutch housing damaged, struck or missing.

B. Clutch piston cracked seals damaged or missing.

C. Low line pressure.

D. Pump cover oil seal rings missing, broken or undersize: ring groove oversize.

E. Case valve body face not flat or porosity between channels.

2. INTERMEDIATE CLUTCH

A. Intermediate clutch piston seals damaged or missing.

B. Low line pressure.

C. Case valve face not flat or porosity between channels.

DIRECT CLUTCH

A. Restricted orifice in vacuum line to modulator (poor vacuum response).

B. Check ball in direct clutch piston or drum damaged, stuck or missing.

C. Defective modulator bellows.

D. Clutch piston seals damaged or missing.

E. Case valve body face not flat or porosity between channels.

F. Clutch installed backwards.

NOTE: Burned clutch plates can be caused by incorrect usage of clutch plates. Also, anti-freeze in transmission fluid can cause severe damage, such as large pieces of composition clutch plate material peeling off.

Checking Transmission Oil Level

1. Engine Running.

2. Vehicle on level surface.

3. Brakes applied.

4. Move lever through all ranges.

5. Place transmission in "PARK"

6. Check oil level.

7. If oil is low, check for possible causes - refer to page 14.

The oil level should be between the "ADD" and "FULL" marks at normal operating temperature (180F). This temperature is obtained after at least 15 miles of expressway driving or equivalent city driving.

If the transmission is not at operating temperature, the oil level should be approximately 1/4" below the "ADD" mark with the oil at approximately 70F. (Room temperature). If the oil level is correctly established at room temperature, it should be at the "FULL" mark on the dip stick when the transmission reaches normal operating temperature (180F).

CAUTION: DO NOT OVERFILL TRANSMISSION AS THIS WILL CAUSE FOAMING AND LOSE OF OIL THROUGH THE VENT PIPE.

Manual Linkage Adjustment

The transmission manual linkage must be adjusted so that the pointer on the indicator quadrant and linkage detents or stops corresponds with the transmission inside detent lever detents. If the linkage is not adjusted properly, an internal leak could occur at the manual valve which could cause a clutch and/or front band failure.

Refer to the Divisional Service Manual for manual linkage adjustment procedure.

NOTE: If a manual linkage adjustment is made, the associated neutral start switch should be adjusted, if necessary. The neutral start switch should be adjusted so that the engine will start in "PARK" and "NEUTRAL" positions only, with the selector freely engage and prevent the vehicle from rolling.

Causes of Low Line Pressure

1. Low Transmission oil level.

2. Modulator Assembly.

3. Screen Assembly.

a. Blocked or restricted.

b. Gasket between screen and valve body omitted or damaged.

4. Pump

- a. Gear clearance, damaged, worn (pump will become damaged if drive gear is installed backwards or if converter pilot does not enter crankshaft freely).
- b. Pump to case gasket mis-positioned.
- c. Defective pump body and/or cover.

5. Valve Body

- a. Pressure regulator or boost valve stuck.
- b. Pressure regulator spring too weak.

6. Internal Circuit Leaks

- a. Forward clutch leak (pressure normal in neutral and reverse pressure in low drive).
 - (1) Check pump rings.
 - (2) Check forward clutch seals.
- b. Direct clutch leak (pressure normal in neutral low, int. and drive - pressure low in reverse).
 - (1) Check direct clutch outer seal for damage.
 - (2) Check 1-2 accumulator and 2-3 accumulator pistons and rings for damage or missing.

7. Case Assembly

- a. #1 check ball missing.

Causes of High Line Pressure

1. Vacuum Leak

- a. Full leak, vacuum line disconnected.
- b. Partial leak in line from engine to modulator.
- c. Improper engine vacuum.
- d. Vacuum operated accessory leak. (Hoses, vacuum advance, etc.)

2. Damaged Modulator

- a. Stuck valve
- b. Water in modulator.
- c. Not operating properly. See vacuum

Modulator Assembly.

3. Detent System

- a. Detent valve or cable stuck in detent position.

4. Pump

- a. Incorrect pressure regulator spring.

5. Valve Body

- a. Pressure regulator and/or sleeve broken or otherwise defective.

Causes of Improper Vacuum at Modulator

1. Engine

- a. Tune up.
- b. Loose vacuum fittings.
- c. Vacuum operated accessory leak (hoses, vacuum advance, etc.)

2. Vacuum Line to Modulator

- a. Leak.
- b. Loose fitting.
- c. Carbon build up at modulator vacuum fitting.
- d. Pinched line.
- e. Grease in pipe (no or delayed upshift - cold)

Governor Pressure Check

1. Install line Pressure Gage.
2. Disconnect vacuum line to modulator.
3. With car on hoist (rear wheels, off ground), foot off brake, in drive, check line pressure at 1000 RPM.

4. Slowly increase engine to 3000 RPM and determine if a line pressure drop occurs (7 PSI or more).

5. If no pressure drop occurs:

- a. Inspect Governor
 - (1) Stuck Valve
 - (2) Weight freeness.
 - (3) Restricted orifice in governor valve.
- b. Governor Feed System
 - (1) Check screen in control valve assembly.
 - (2) Check for restriction in feed line.
 - (3) Scored governor bore.

Modulator Assembly Diagnosis Procedure

A defective vacuum modulator can cause one or more of the following complaints:

1. Harsh upshifts and downshifts.
2. Delayed upshifts.
3. Soft upshifts and downshifts.
4. Slips in low, drive and reverse.
5. Transmission overheating.
6. Engine burning transmission oil.

If any one of the above complaints are encountered, the modulator must be checked as outlined below:

The vacuum modulator has three areas to be checked. If any one of the three areas fails to pass the prescribed checks, the modulator must be replaced.

Vacuum Modulator Assembly

1. Load Comparison Check

Using a comparison gage, compare the load of a known good modulator of the same part number with the modulator in question. Fabricate a modulator comparison gage as shown in figure 82 or use J24466 comparison gage. See Figure 83.

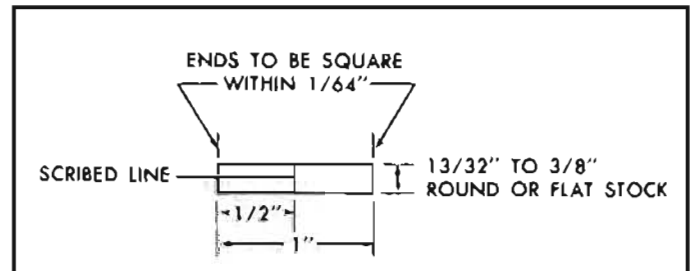


Figure 82 Modulator Gage

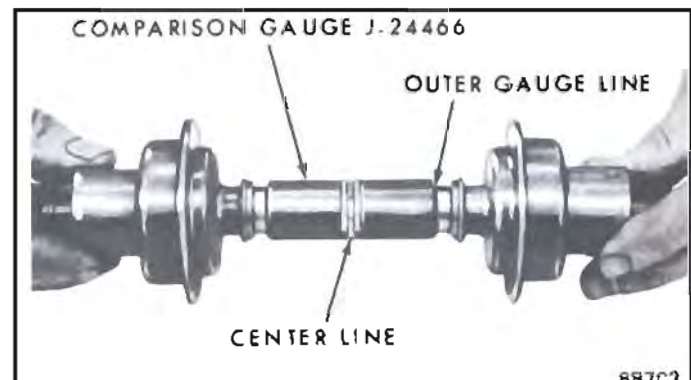


Figure 83

a. Insert one end of the comparison gage into the suspected defective modulator sleeve. Insert the opposite end of the gage into a known good modulator the same part number as the suspected defective modulator.

b. Holding the modulators in a horizontal position, bring them slowly together under pressure. The modulator in question, if defective, will reach the center line of the comparison gage before the known good modulator lines up with the outer gage line. See *Figure 84*.

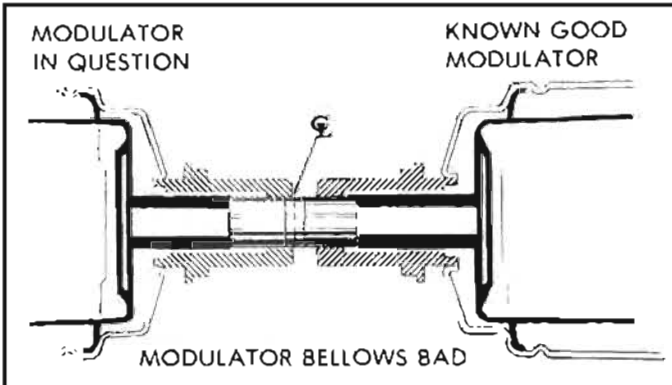


Figure 84

If the modulator in question is good, both modulator assemblies will be within the outer gage lines as the assemblies are slowly brought together. See *Figure 85*.

2. Vacuum Diaphragm Leak Check

Turn modulator so vacuum line stem points downward. If transmission oil comes out, the vacuum diaphragm is defective.

NOTICE: Gasoline and/or water vapor may settle in the vacuum side of the modulator. If this is found **WITHOUT** the presence of oil the modulator **MUST NOT BE CHANGED**.

Check solution that comes out of the modulator for evidence of lubricity. If the solution does not have the feel of oiliness, it can be assumed the solution is a mixture of gas and/or water.

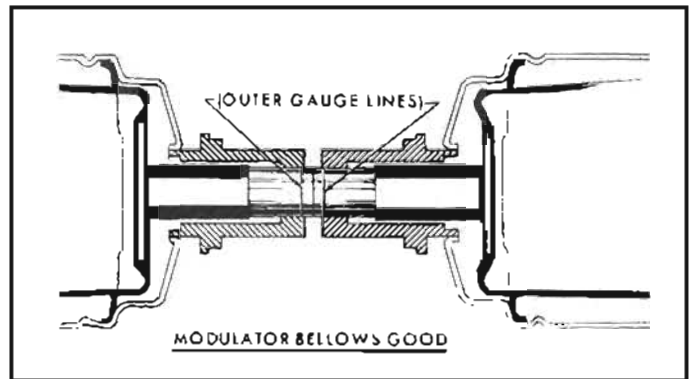


Figure 85

The way transmission oil can be on the vacuum side of the modulator is by a leak in the vacuum diaphragm.

If oil is found, the modulator must be replaced. If oil is not found in the vacuum side of the modulator but the transmission oil level is continually low, and **NO** external leaks are found, there is a possibility that a pin hole leak exists in the diaphragm and the modulator should be replaced.

3. Inspection for External Damage

a. Check for dents or cracks in modulator.

b. Check modulator valve sleeve alignment. Roll modulator on a flat surface to determine if the sleeve is concentric to the modulator can. If the sleeve is bent, run out will be visible and modulator must be replaced.

If the modulator passes the above checks, the following items should be checked as a possible cause of the problem.

a. Check freeness of modulator valve in modulator.

b. Check freeness of modulator valve in transmission case.

c. Check the vacuum line from the manifold to the modulator for holes, cracks or dents. Check the rubber hose connection at the modulator and the connection at the intake manifold for leaks.



Technical Service Information

DIAGNOSIS GUIDE

Dependability of this Diagnosis Guide depends upon:

1. Careful analysis of symptoms so that proper malfunction on the charts will be used.
2. Accurate oil pressure check with a known good gauge is made as indicated on the chart and these readings recorded so that they can be compared with the following diagnosis charts.
3. Oil pressure readings must be made with transmission oil at normal operating temperatures.
4. Refer to detailed diagnosis charts for additional diagnosis on 1-2 and 2-3 shift malfunction diagnosis.
5. Engine must be properly tuned to specification.

PRELIMINARY CHECKING PROCEDURES

1. Check transmission oil level.
2. Check vacuum hoses under hood.
3. Connect Tachometer to engine.
4. Install vacuum pump to modulator - apply 15 - 20" check for leak down.
5. Install oil pressure gauge.
6. Check oil pressure using the chart below.

| 15 - 20" VACUUM APPLIED TO MODULATOR | | | | | | | 0" VACUUM TO MODULATOR | |
|--|------------------------------------|-------------------------------------|------------------------------------|--|------------|---------------------------------|--|---|
| **DRIVE BRAKES APPLIED 1000 RPM | ** REVERSE BRAKES APPLIED 1000 RPM | ** SUPER/LO BRAKES APPLIED 1000 RPM | ** NEUTRAL BRAKES APPLIED 1000 RPM | **DRIVE BRAKES ON 1000 RPM DETENT ACTIVE | DRIVE IDLE | (1) DRIVE 30MPH CLOSED THROTTLE | DRIVE FROM 1000-3000 RPM WHEELS FREE TO MOVE | PRESSURE TEST CONDITIONS |
| 60 - 90 | 85 - 150 | 85 - 110 | 55 - 70 | 90 - 110 | 60 - 85 | 55 - 70 | PRESSURE DROPS OF 10 PSI OR MORE | NORMAL RESULTS NOTE (2) |
| | | | | | | | DROP | MALFUNCTION IN VALVE BODY |
| | | | | | | | NO DROP | MALFUNCTION IN GOVERNOR OR GOV. FEED SYSTEM |
| ALL PRESSURE HIGH WITH LESS THAN 35 PSI BETWEEN PRESSURE READINGS | | | | | | | — | MALFUNCTION IN DETENT SYSTEM |
| ALL PRESSURE HIGH WITH MORE THAN 35 PSI BETWEEN PRESSURE READINGS | | | | | | | — | MALFUNCTION IN MODULATOR |
| | LOW | | | | — | LOW TO NORMAL | — | LEAK IN DIRECT CLUTCH CIRCUIT |
| LOW | | LOW TO NORMAL | | LOW TO NORMAL | — | LOW TO NORMAL | — | LEAK IN FORWARD CLUTCH CIRCUIT |
| | | | | LOW | | | — | DETENT SYSTEM |
| BLANK SPACE = NORMAL DASH (-) = PRESSURE READING HAS NO MEANING (1) COAST FROM 30mph - READ BEFORE REACHING 20 mph (2) IF LINE PRESSURE HIGH SEE "HIGH PRESSURE" NOTE * CABLE PULLED OR BLOCKED THRU DETENT POSITION | | | | | | | | |



Technical Service Information

High Line Pressure - Note (2)

Engines With EGR Valves

With Exhaust Gas Recirculation (EGR), the throttle is open enough in :Drive: range 1000 RPM to cause the EGR valve to open. When the EGR valve opens, exhaust gas enters the intake manifold which lowers intake manifold vacuum. When intake manifold vacuum is lowered, the transmission line oil pressure raises accordingly and may go above the upper specification limit. For this reason, if high line pressures are obtained, proceed as follows:

1. Disconnect the EGR vacuum line at the EGR valve and plug the vacuum line.
2. Recheck line pressures as indicated on the Preliminary Checking Procedure Chart on page
3. If high line pressures are still obtained, continue below.

Engines Without EGR Valve or if High Line Pressures were obtained with the EGR Vacuum Line plugged

If high line pressures are experienced with the EGR line plugged it may be that the engine is not producing enough vacuum to lower transmission line pressure within specifications.

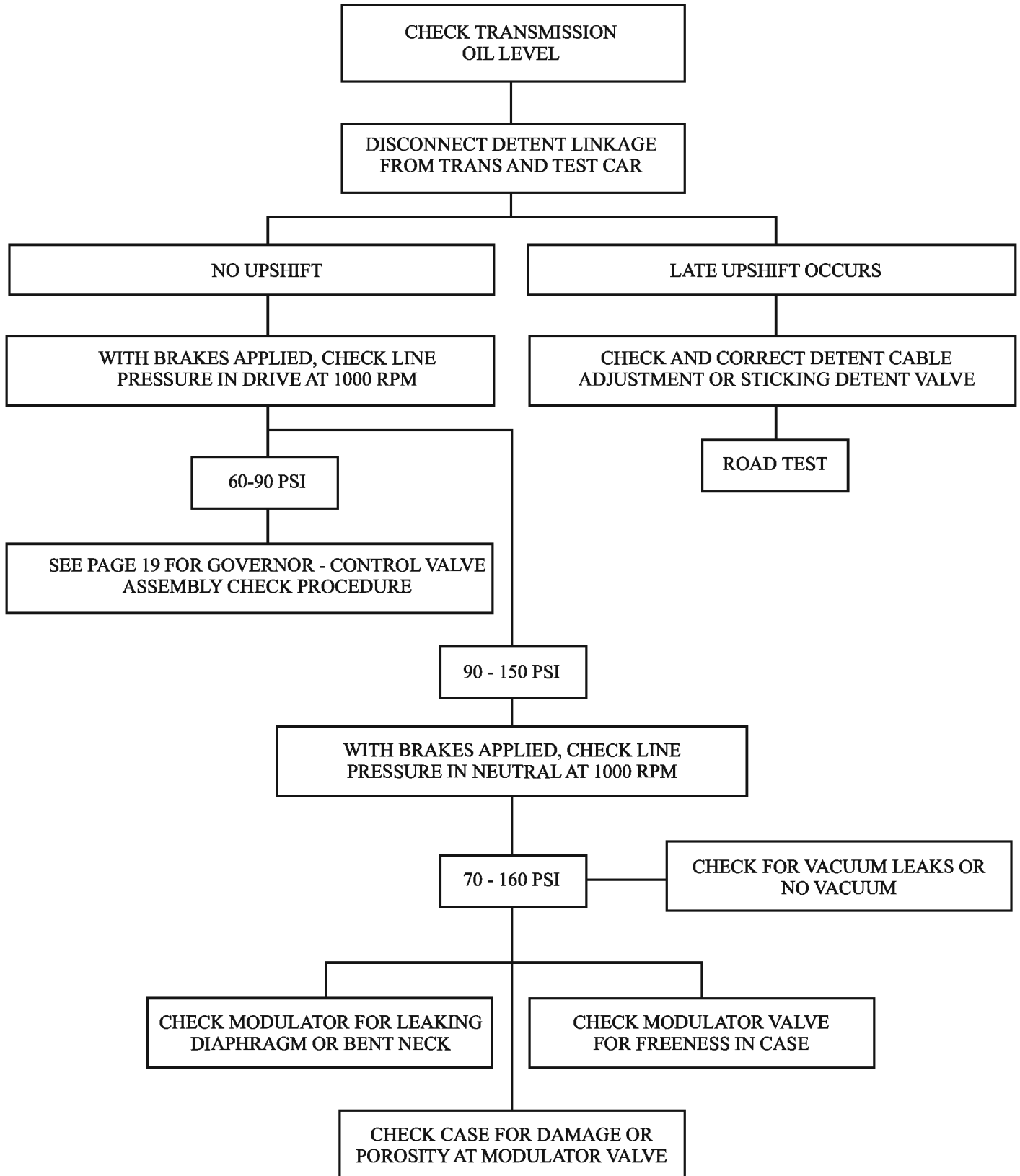
The newer engines with emission controls characteristically have lower engine vacuum than older past model engines. To obtain line pressures suitable for evaluation, it is recommended that vacuum be applied to the modulator using an external vacuum source such as a Kent-Moore J-23738 hand operated vacuum device or its equivalent. The unit allows definite amounts of vacuum to be applied to the modulator so that consistent line pressures may be obtained for evaluation as follows:

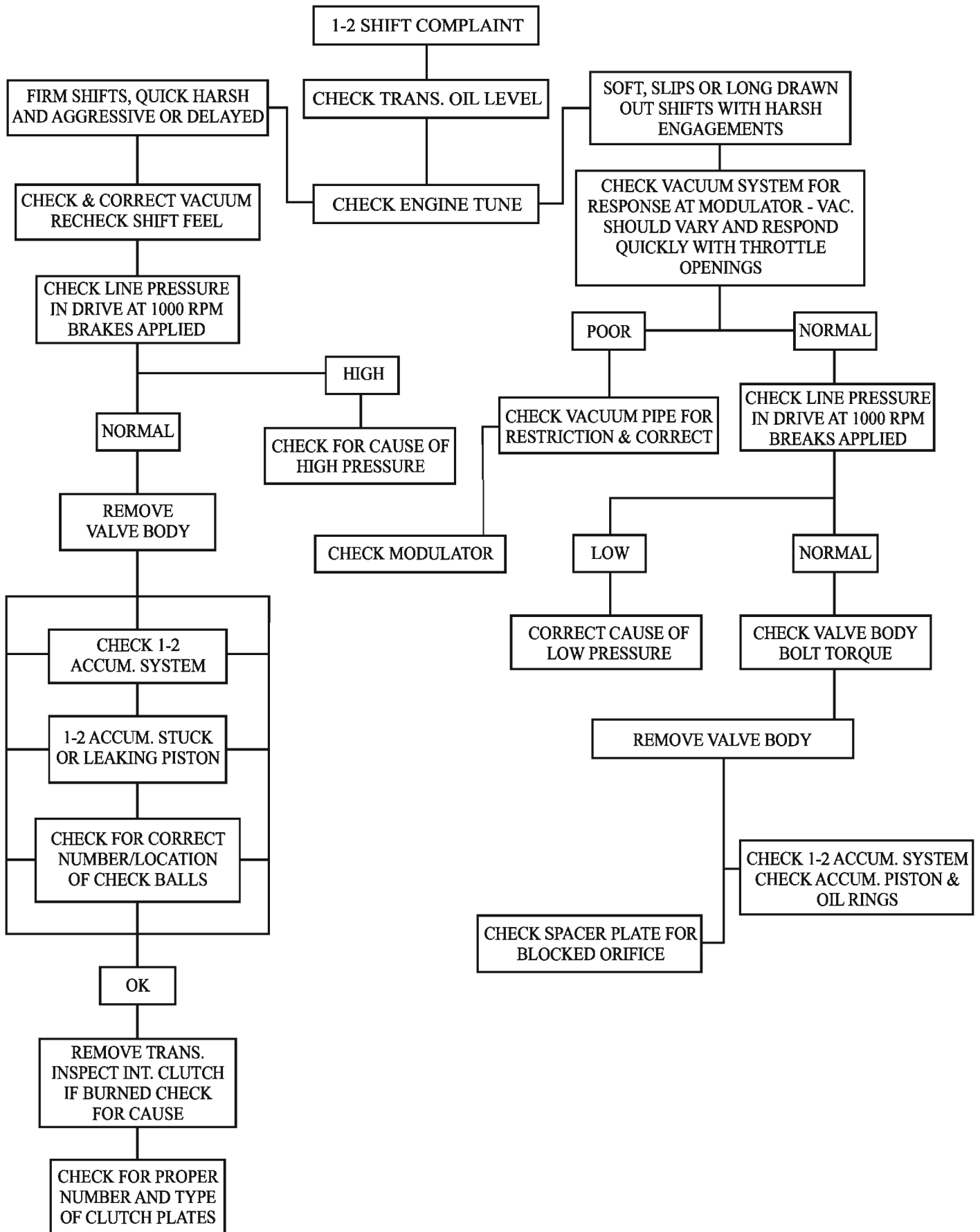
1. Disconnect the vacuum line to the modulator at the modulator and plug the vacuum hose.
2. Attach the hand operated vacuum device and apply 20" of vacuum.
3. Recheck line pressures according to the Preliminary Checking Procedure Chart on page
4. If line pressures are still high, proceed to the specific diagnosis chart that applies to the malfunction encountered.
5. If line pressures are normal with the external vacuum device applied, check engine vacuum and vacuum systems leak.



Technical Service Information

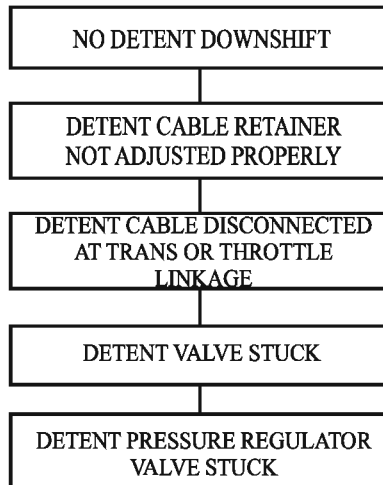
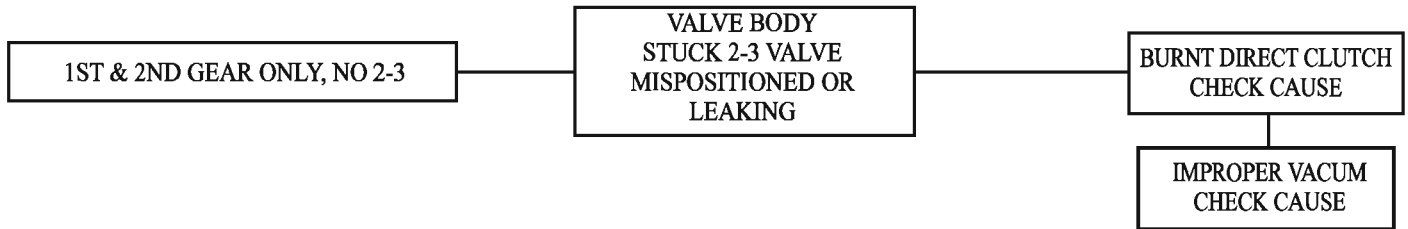
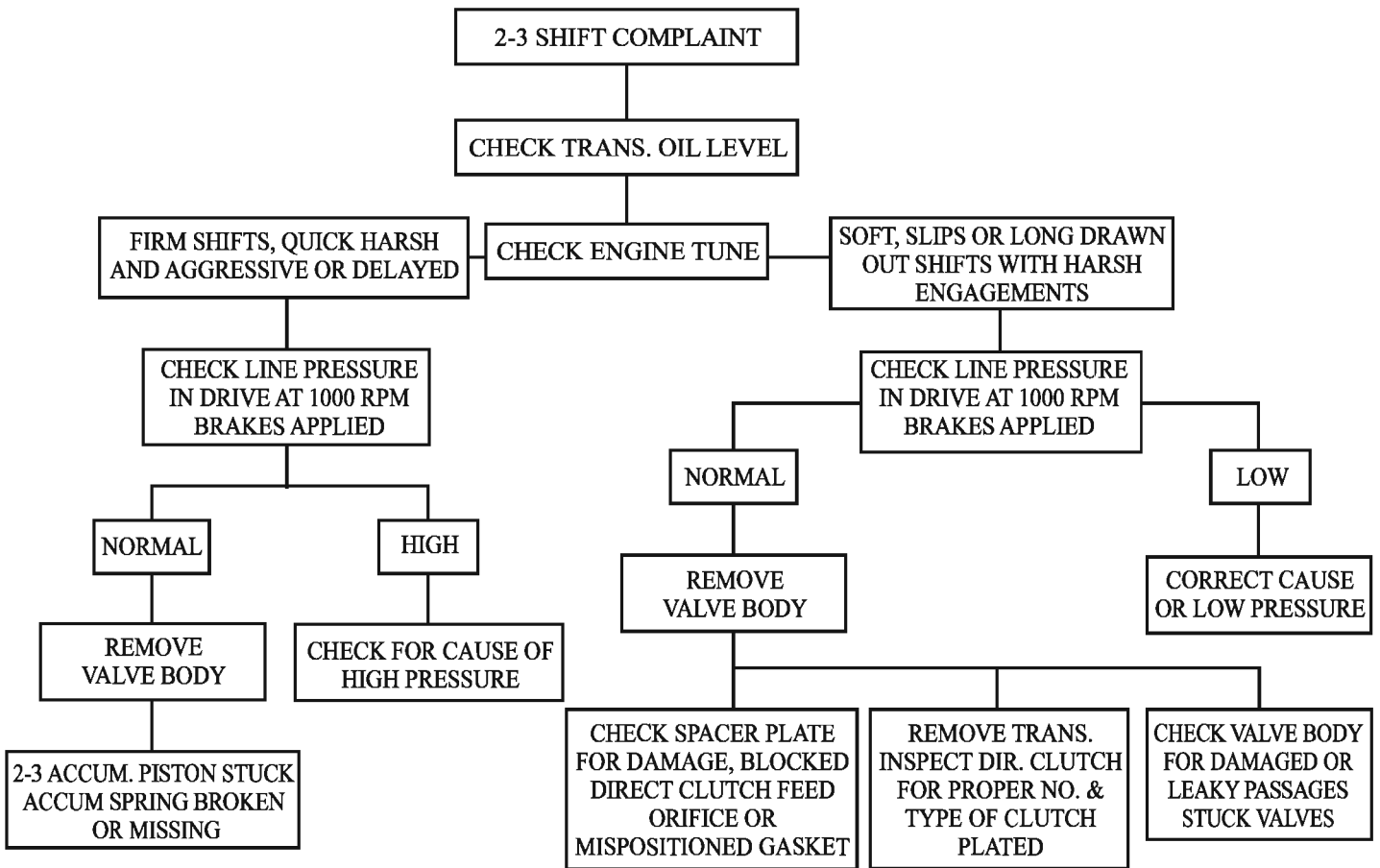
NO. 1-2 UPSHIFT AND/OR DELAYED UPSHIFT
OR 1-2 & 2-3 UPSHIFT - FULL THROTTLE ONLY





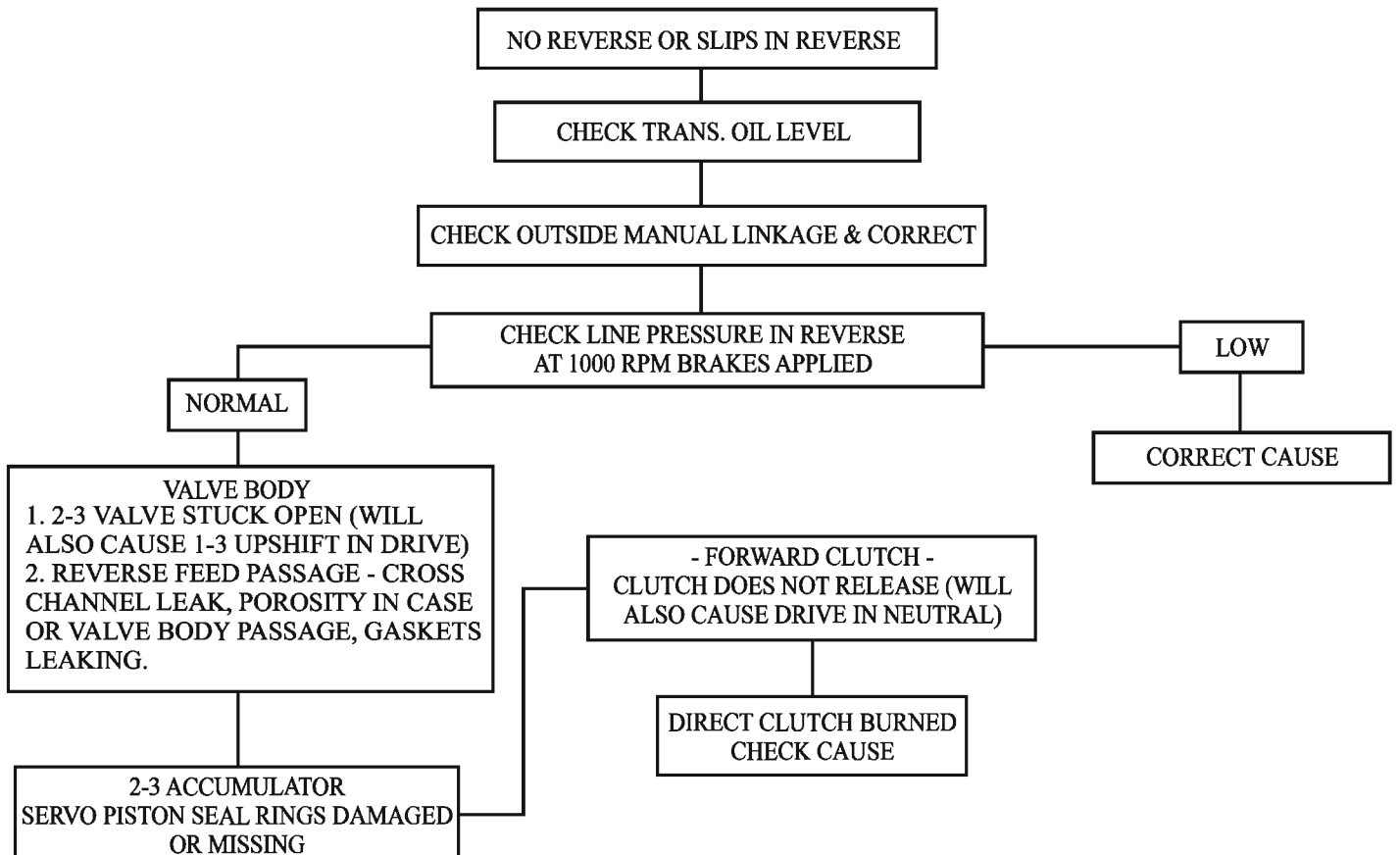
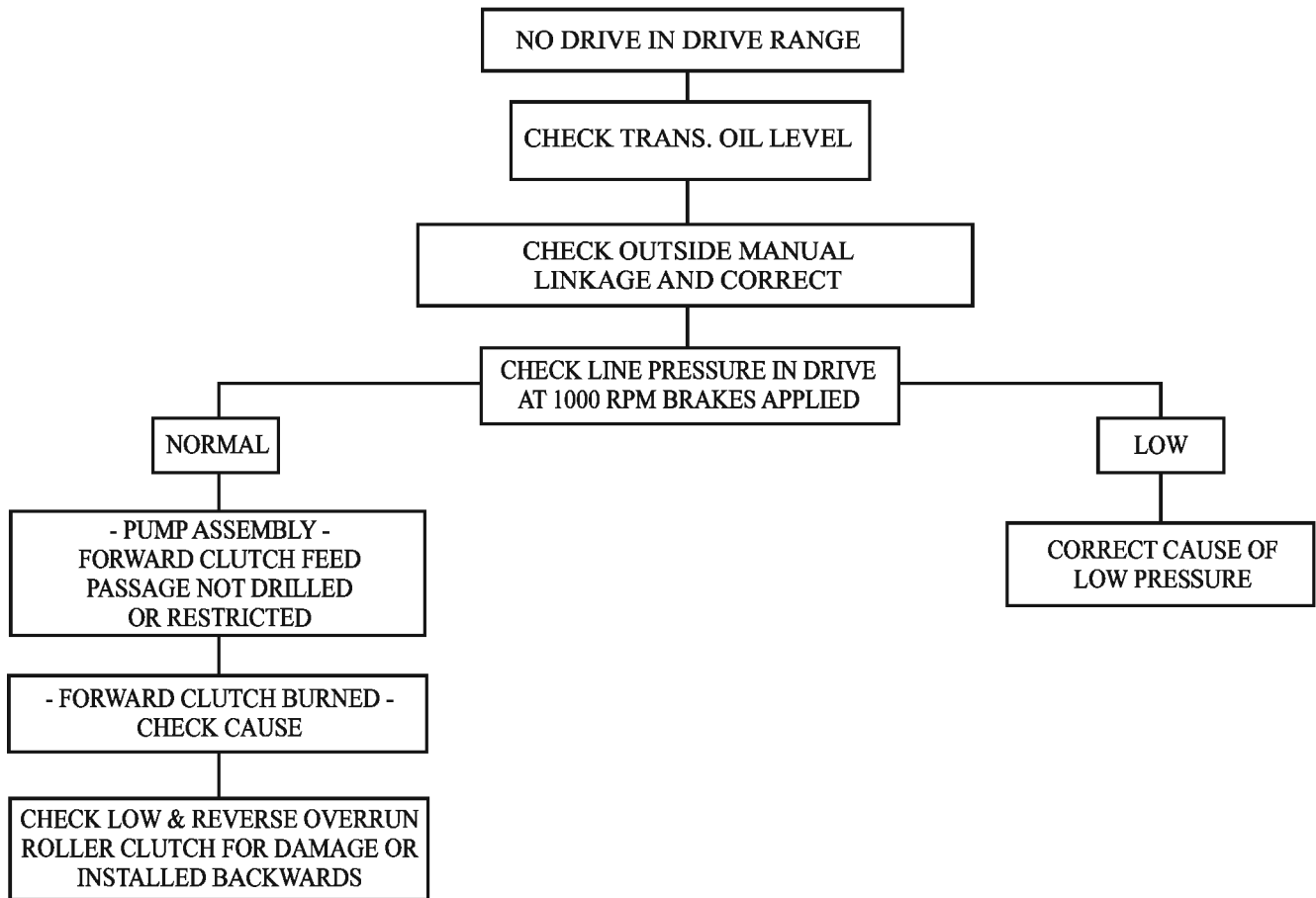


Technical Service Information





Technical Service Information





Technical Service Information

NO ENGINE BRAKING - INTERMEDIATE RANGE - SECOND GEAR

- 2-3 ACCUMULATOR - OIL RINGS AND/OR BORES LEAKING OR SERVO PISTON COCKED OR STUCK

- INTERMEDIATE OVERRUN BAND - BROKEN, BURNED (CHECK FOR CAUSE), NOT ENGAGED ON SERVO PIN.

NO ENGINE BRAKING - LOW RANGE FIRST GEAR

CASE ASSEMBLY

MANUAL LOW CONTROL VALVE STUCK

INNER SEAL ON LOW REVERSE PISTON CUT

DRIVE IN NEUTRAL

CHECK OUTSIDE MANUAL LINKAGE & CORRECT

- INTERNAL LINKAGE - MANUAL VALVE DISCONNECTED OR END BROKEN

- LINE PUMP ASSEMBLY - TRANSMISSION PRESSURE LEAKING INTO FORWARD CLUTCH APPLY PASSAGE

- FORWARD CLUTCH - BURNED PLATES CHECK CAUSE INCORRECT CLUTCH PLATE USAGE

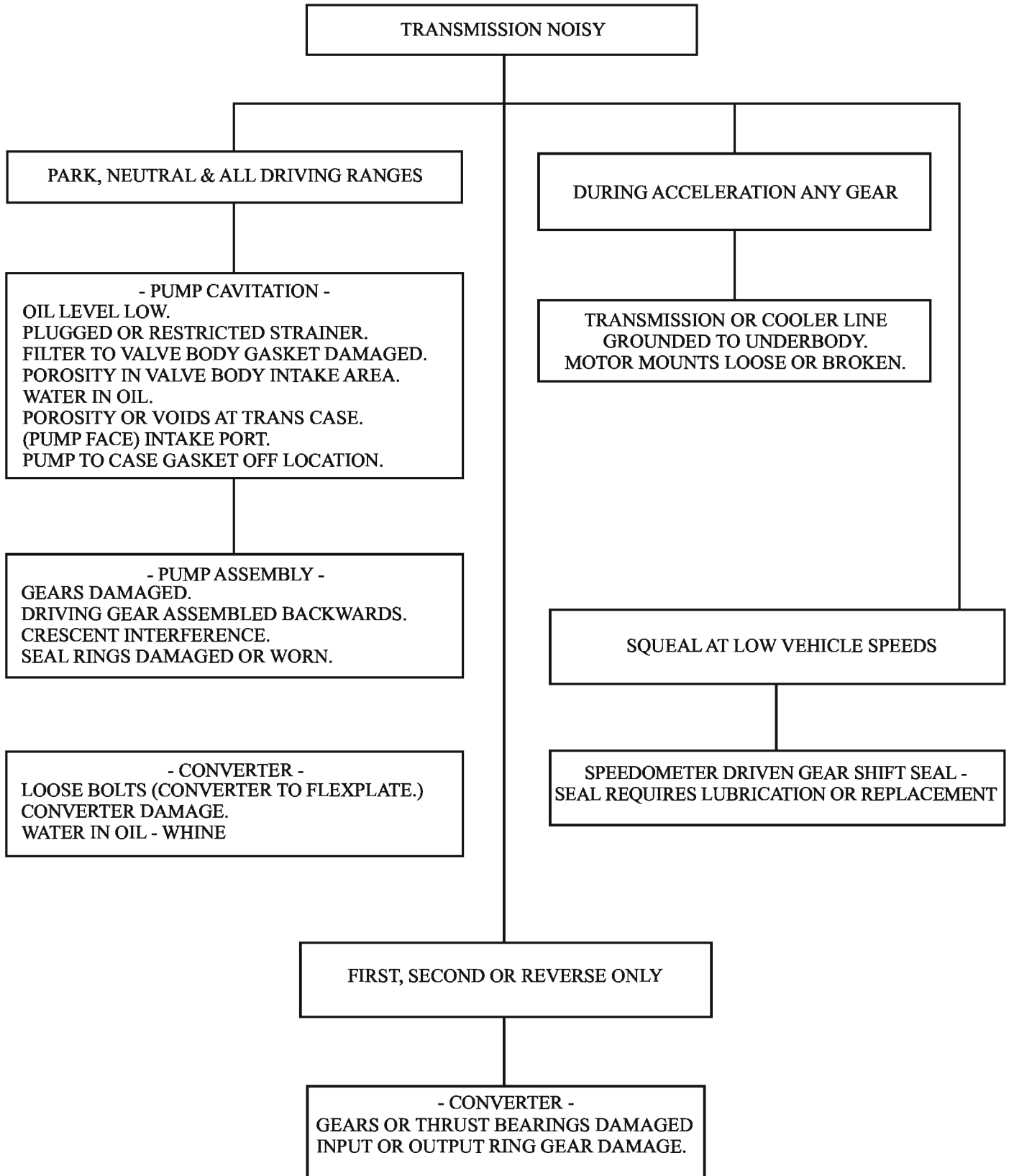
WONT HOLD IN PARK OR WONT RELEASE FROM PARK

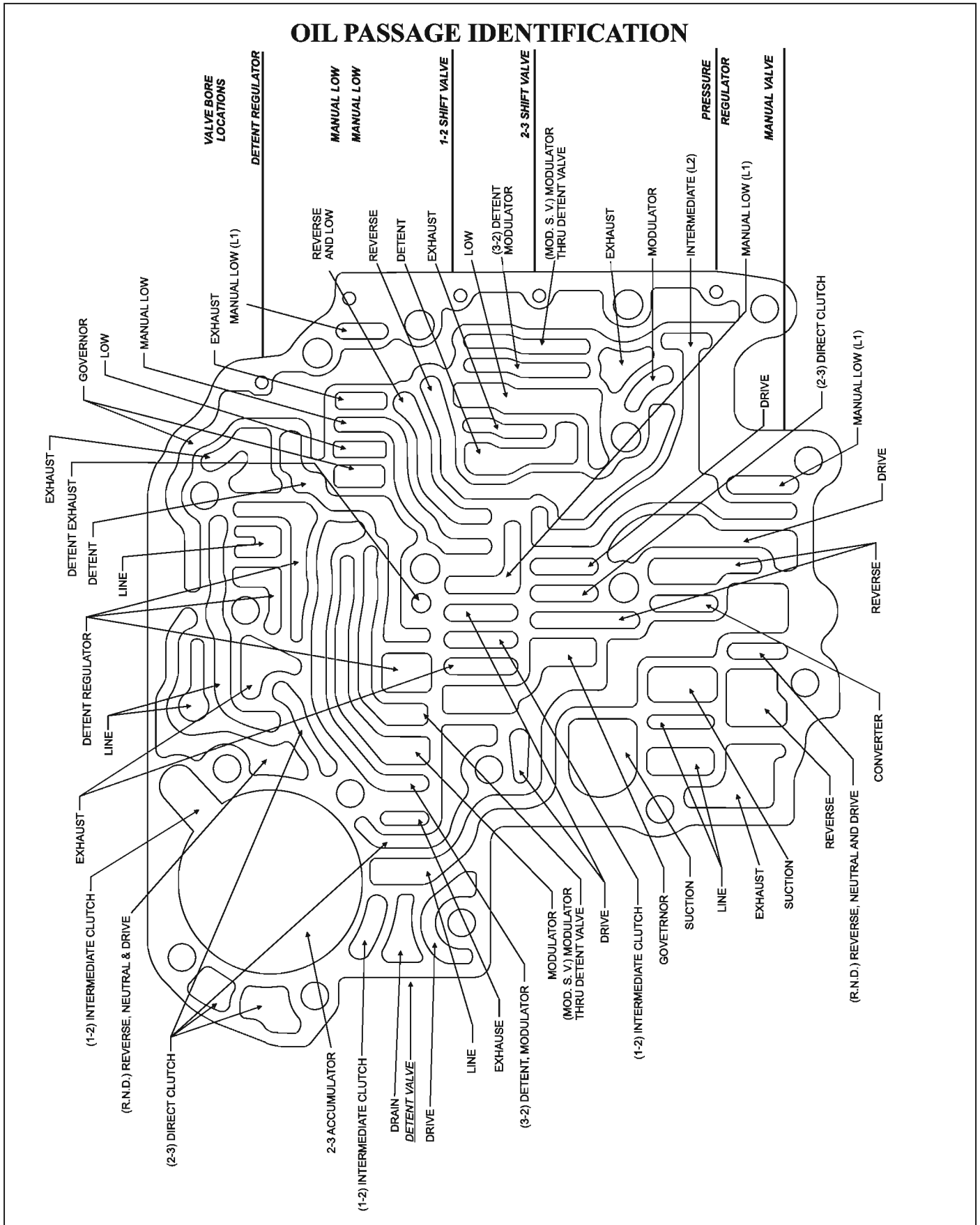
CHECK OUTSIDE MANUAL LINKAGE & CORRECT

- INTERNAL LINKAGE -
1. PARKING BRAKE ROD ASSEMBLY.
2. PARKING PAWL BROKEN.
3. PARKING BRAKE BRACKET LOOSE. BURR OR ROUGH EDGES, OR INCORRECTLY INSTALLED.
4. PARKING PAWL RETURN SPRING MISSING, BROKEN OR INCORRECTLY HOOKED.



Technical Service Information





VALVE BODY ASSEMBLY

Figure 74 Valve Body Assembly

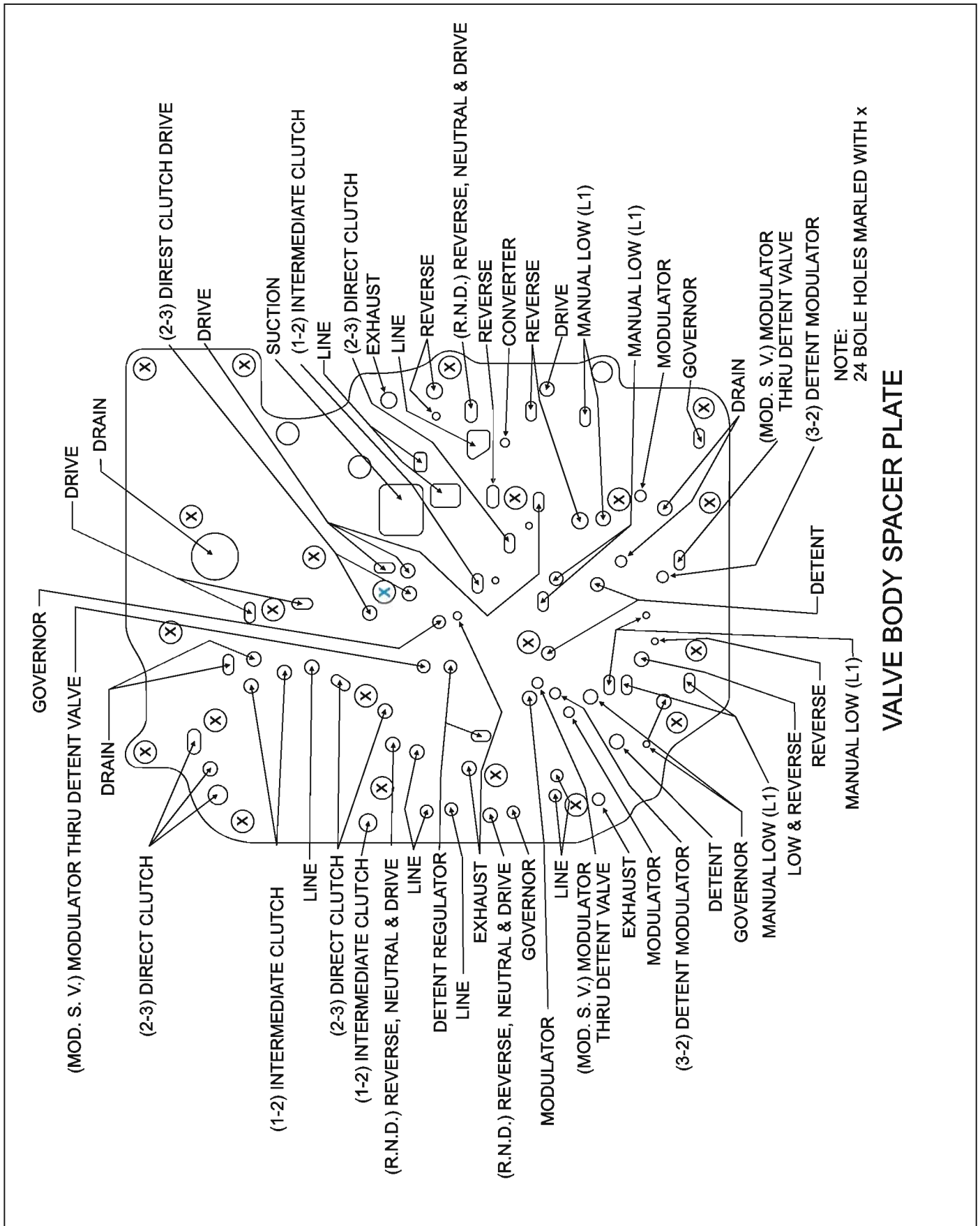


Figure 75 Valve Body Spacer Plate

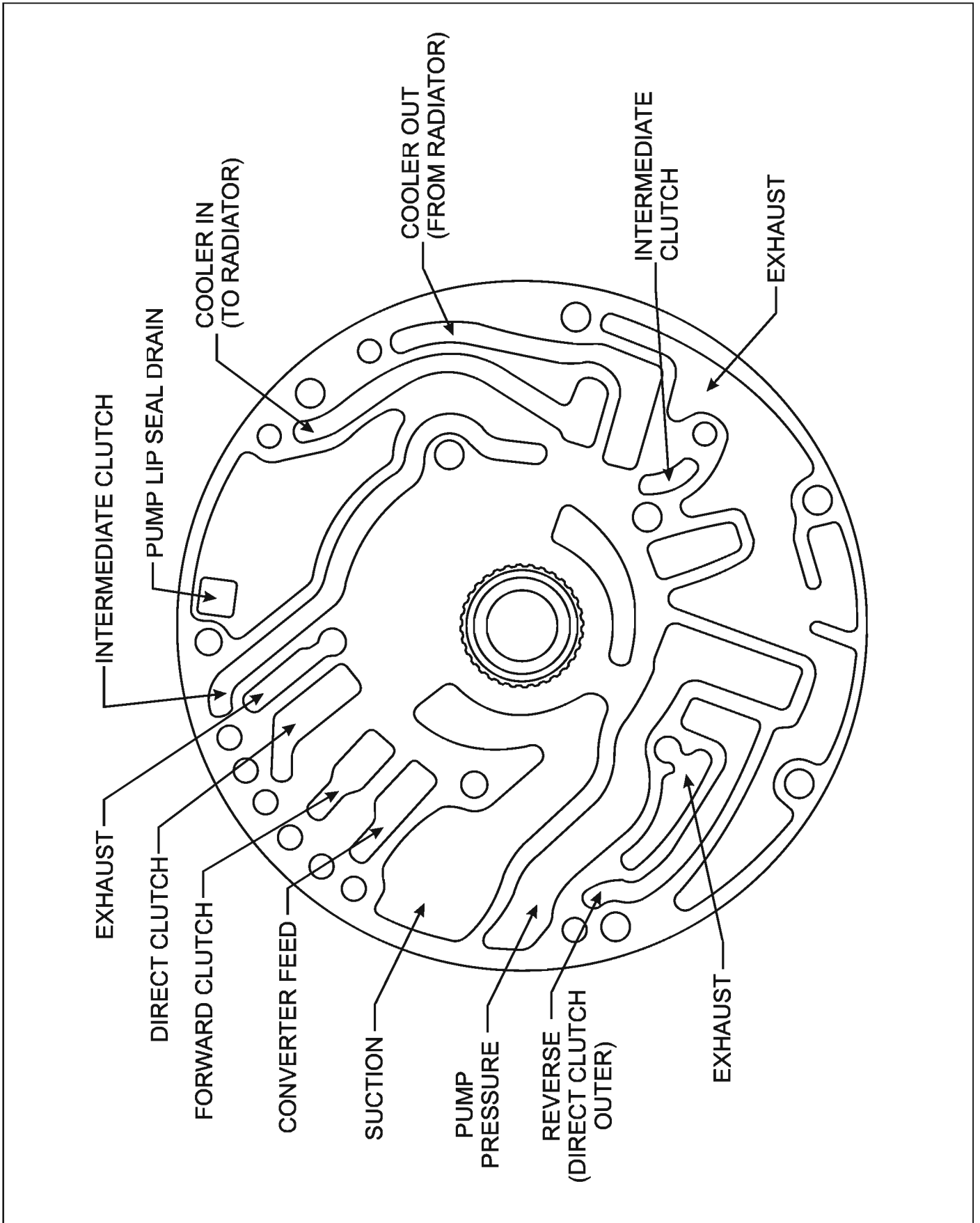


Figure 77 Pump Cover and Stator Shaft Assembly

CASE PASSAGES

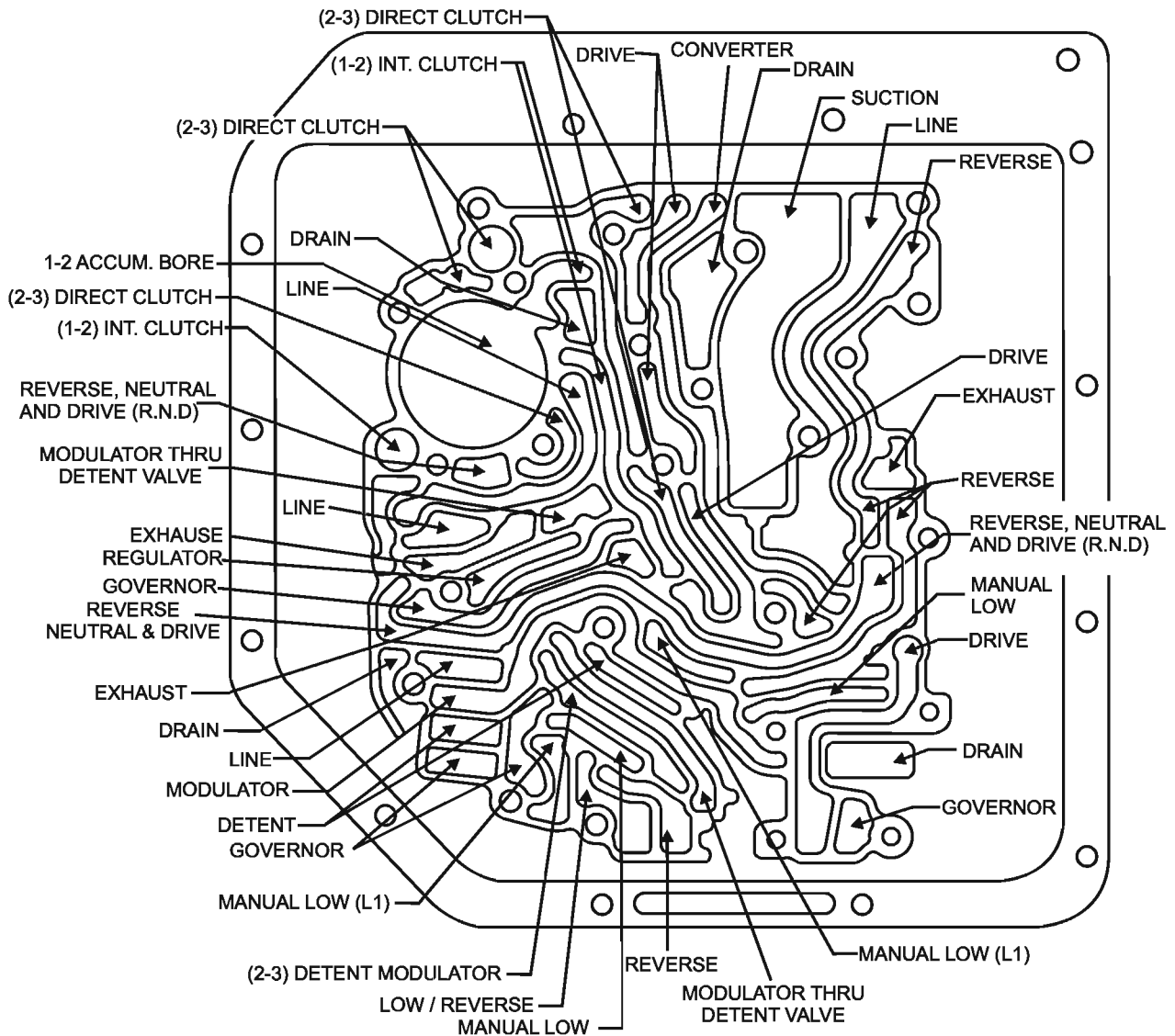


Figure 76 Case Passages

FRONT PUMP COVER - (CASE FACE)

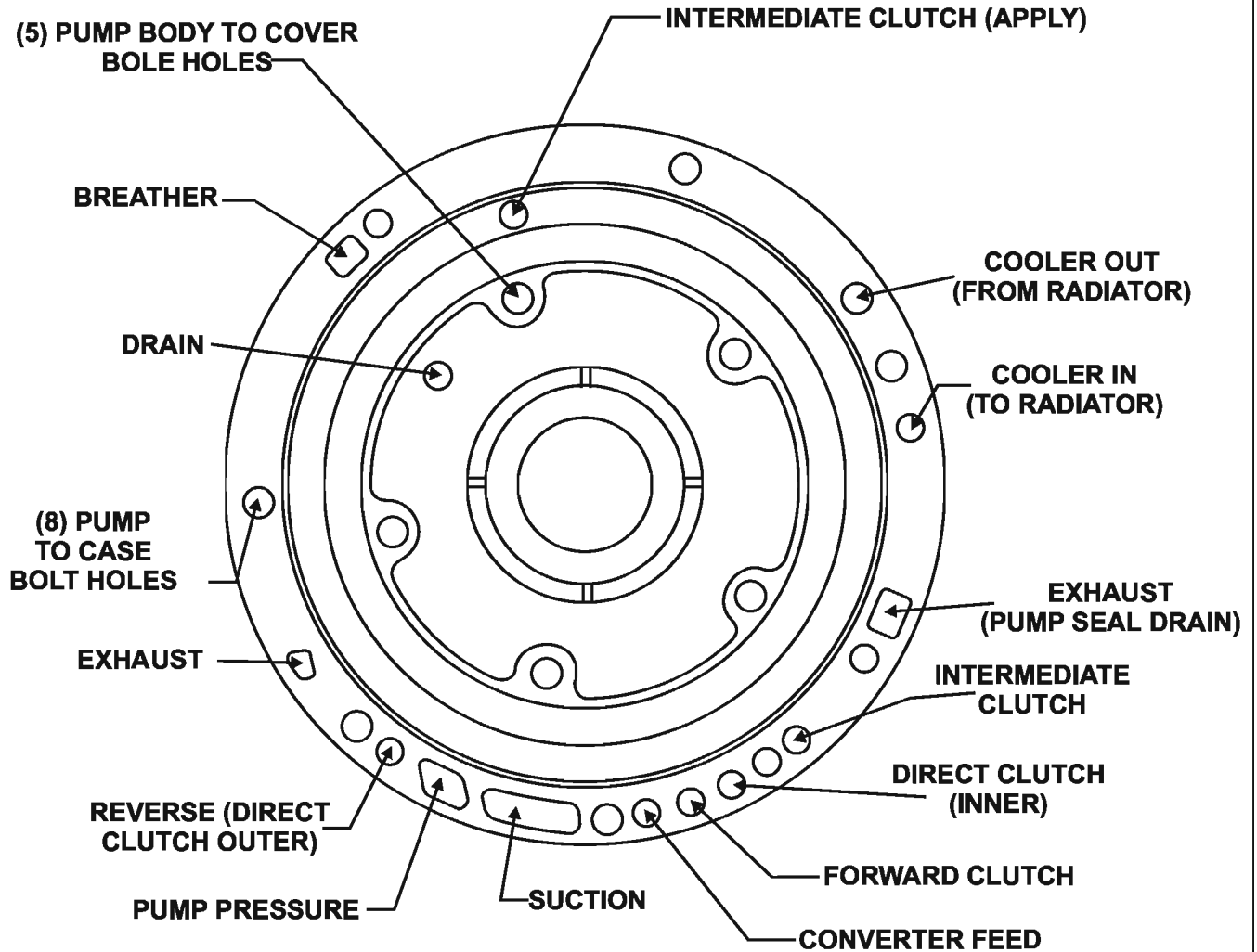


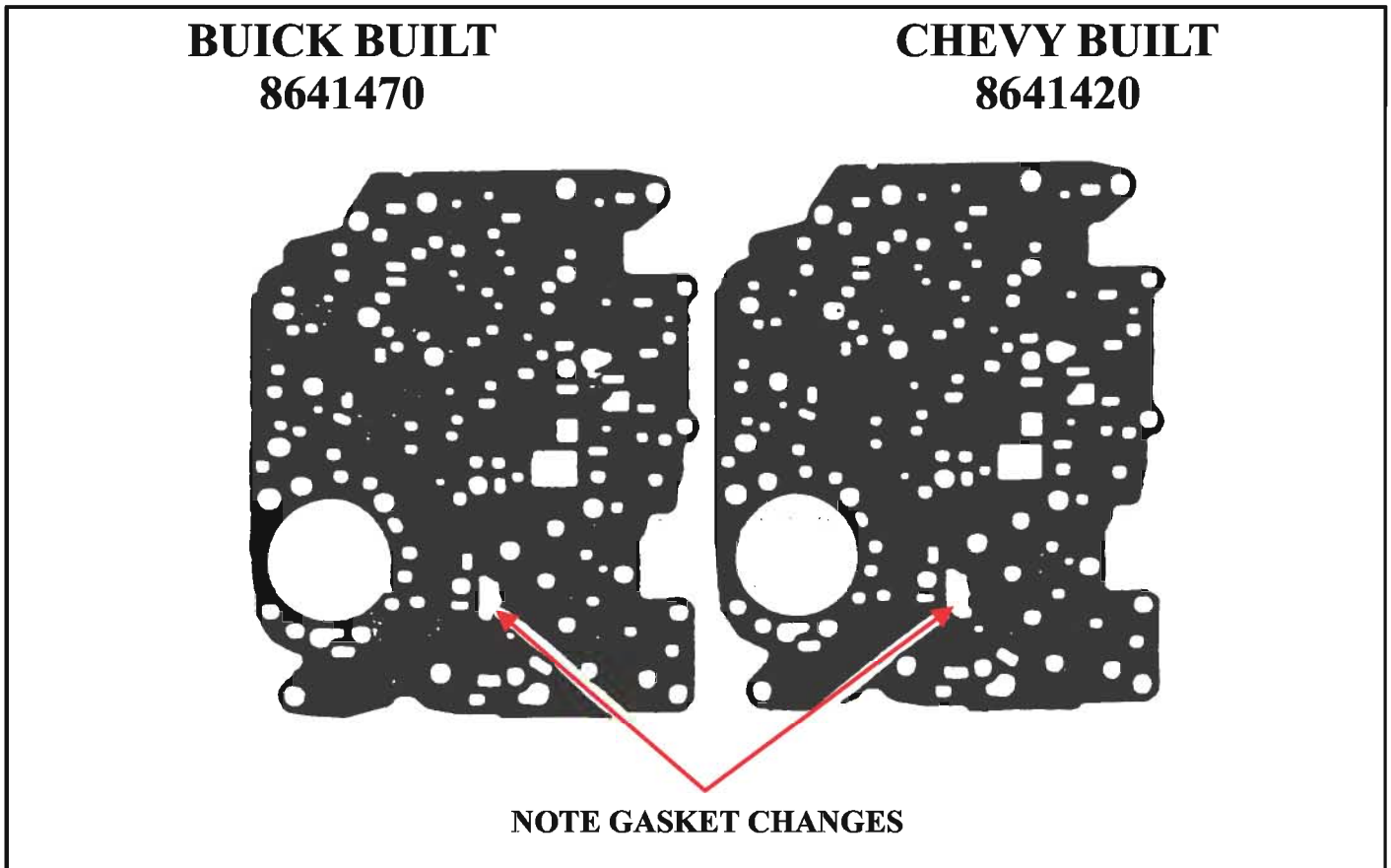
Figure 79 Front Pump Cover (Case Face)

THM 350 ERRATIC CONVERTER CLUTCH

COMPLAINT: Erratic lockup of converter clutch, usually will lock up when Transmission is placed in drive or reverse, sometimes only when hot. May even let transmission lock up in third gear when the wire harness is disconnected. When hot the converter clutch may drag a little and give the engine a rough idle.

CAUSE: The cause may be a mis-matched gasket between the separator and the case. A mis-match of the separator to the case can also cause this problem-complaint. The illustration of the two gaskets or plates show the difference. The complaint will occur when a chevrolet gasket is used with an old-buick transmission case. However a buick gasket can be used on a chevrolet without any problem

CORRECTION: Always check the gasket and the plate when rebuilding a unit if a cross leak is noted where indicated on the gasket install proper gasket





Technical Service Information

350C / 250C

Some 1984 THM 250-C XD, WK, WN, XE, XH, XK, and THM 350C WS model transmissions may experience a rattle which is similar to a tin can rattle coming through the transmission shifter cable (floor console models only) which is most noticeable at speeds over 50 mph (80 km).

This noise may be caused by the low and reverse piston and clutch plate assembly. To repair this condition, replace the low and reverse piston and clutch plate assembly. Order service package number 8641962.

Service package number 8641962 contains;

| QUANTITY | QUANTITY | IDENTIFICATION |
|----------|--|----------------|
| 1 | PISTON, LOW AND REVERSE CLUTCH | GREEN |
| 5 | PLATE, LOW AND REVERSE CLUTCH (DRIVE) | YELLOW |
| 5 | PLATE, LOW AND REVERSE CLUTCH (REACTION) | N/A |
| 1 | INSTRUCTION SHEET | N/A |

CONVERTING TO NON LOCK-UP

- 1 - Install complete non lock-up pump, do not inter-mix pump halves.
- 2 - Drill 1/4" hole in drain back area, *as shown in figure 80*.
- 3 - Install original lock-up valve body and spacer plate.
- 4 - Remove roll pin and bore plug and spring from auxiliary valve body, *as shown in figure 79*.
- 5 - Install piece of rubber hose in place of spring and install bore plug and pin, *see figure 79*.
- 6 - Install non lock-up converter.
- 7 - Make a solid gasket and install under the solenoid.
- 8 - Leave the number 5 check ball out of the case, *see figure 81*.

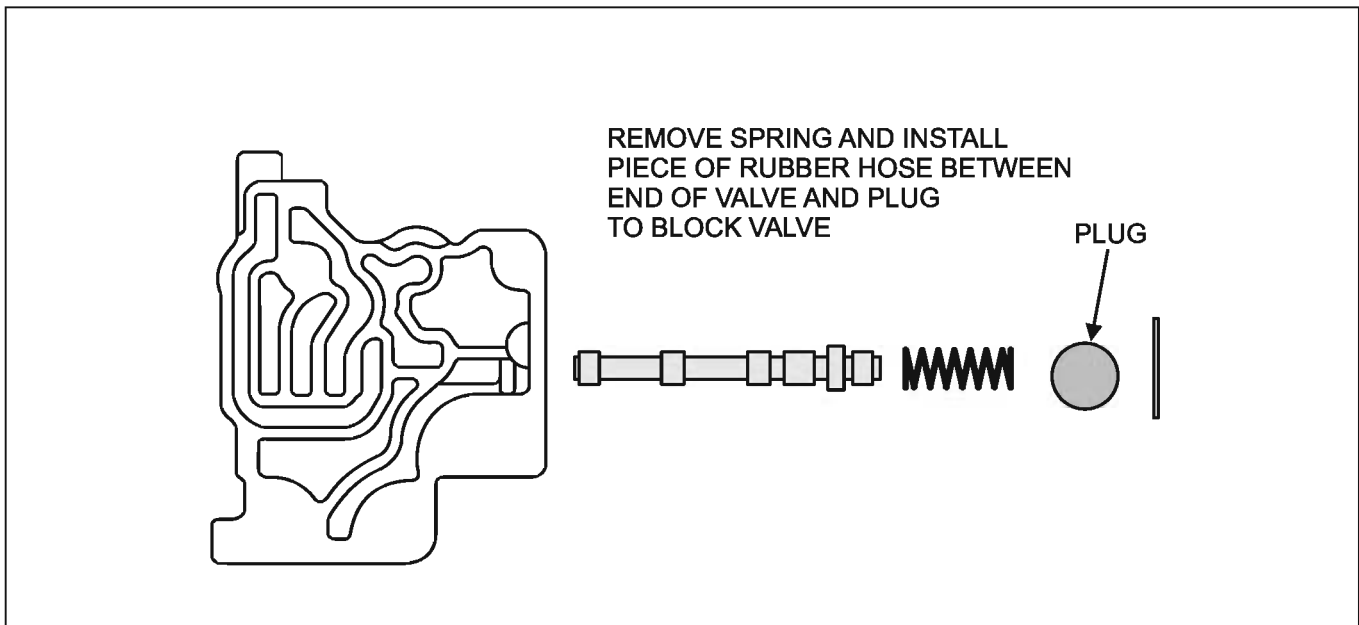


Figure 79

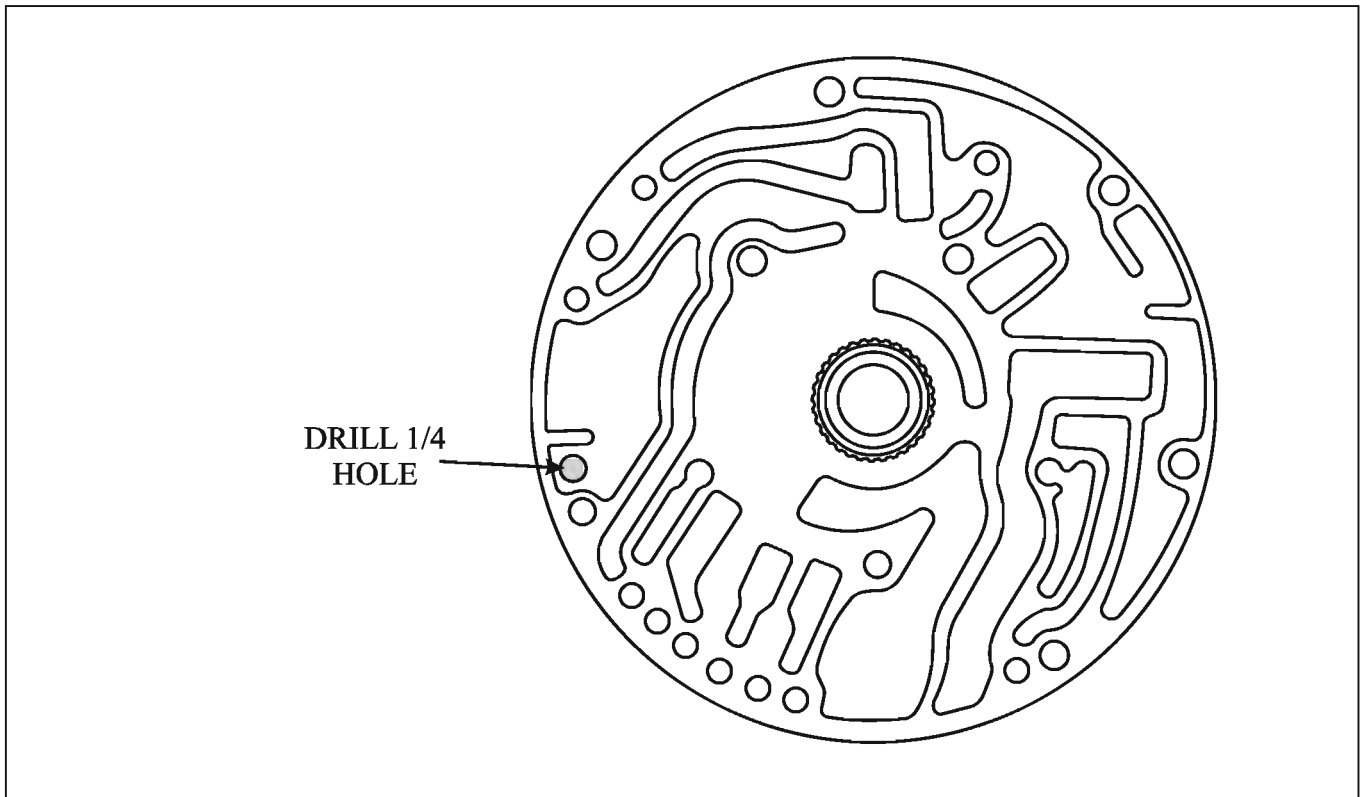


Figure 80

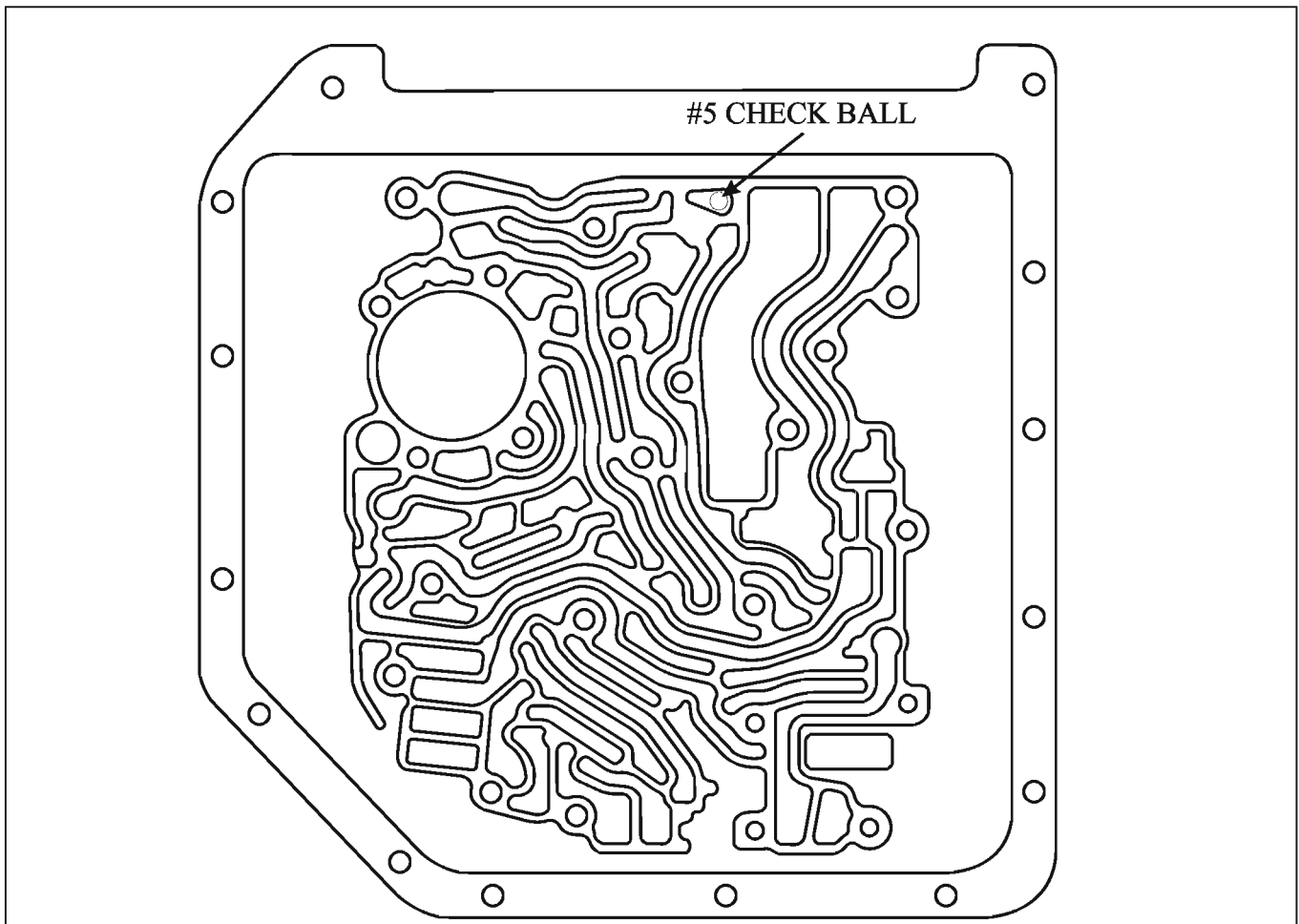


Figure 81