

2011 TRANSMISSION

Automatic Transmission - 4T80-E - Repair Instructions - Off Vehicle - Lucerne

REPAIR INSTRUCTIONS - OFF VEHICLE

TORQUE CONVERTER AND OIL PUMP DRIVE SHAFT REMOVAL

WARNING: The torque converter weighs approximately 65 lbs. Personal injury may result if you lift the torque converter improperly.

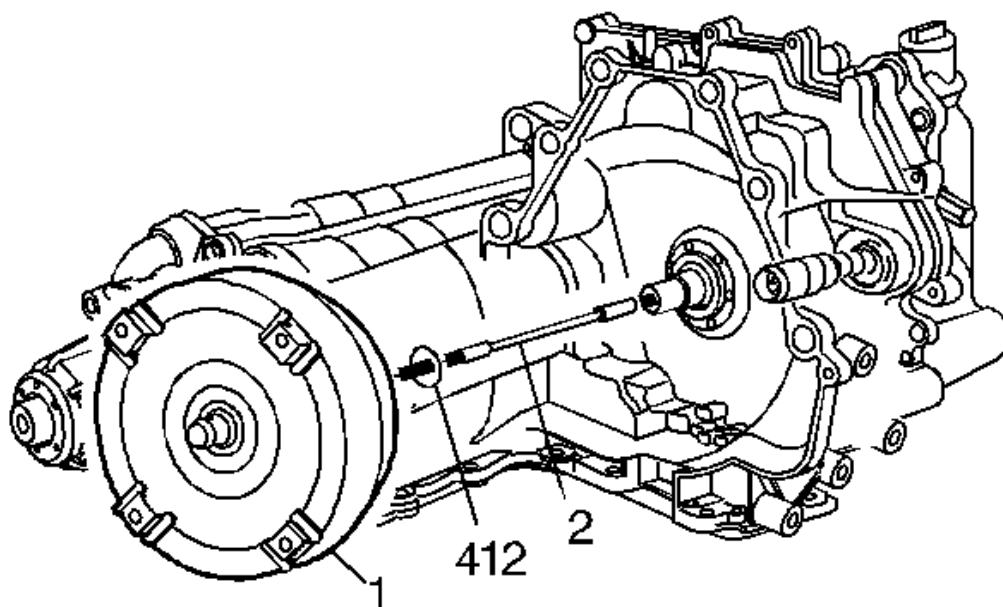


Fig. 1: Oil Pump Driven Shaft & Torque Converter
Courtesy of GENERAL MOTORS COMPANY

1. Remove the torque converter (1).
2. Remove the turbine shaft O-ring seal (412).
3. Remove the oil pump driven shaft (2).

HOLDING FIXTURE INSTALLATION

Special Tools

- **J 39050** Holding Fixture
- **J 3289-20** Transmission Support Fixture Base

For equivalent regional tools, refer to **Special Tools** .

WARNING: To reduce the possibility of personal injury or transmission damage, make sure, when doing the next step, that all of the bolts for the support fixture are installed as shown in illustration, and that the bolts are tightened to 11 N.m (98 lb in).

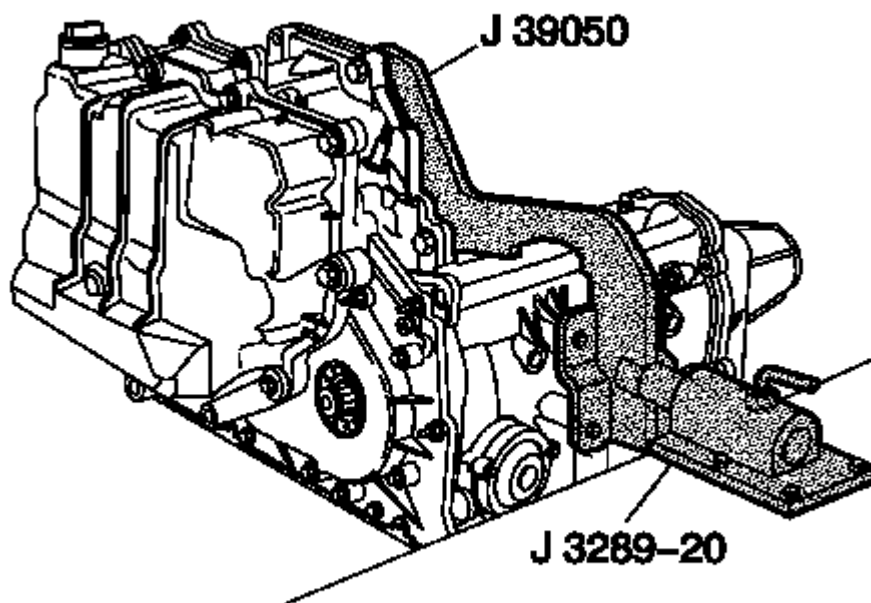


Fig. 2: View Of J 39050 & J 3289-20 On Transmission
Courtesy of GENERAL MOTORS COMPANY

1. Install the **J 39050** holding fixture on the transmission.
2. Install the **J 39050** holding fixture and the transmission into the **J 3289-20** support fixture base.
3. Position the transmission with the case extension pointing downward in order to allow the fluid to drain.
4. Insert the pin into the **J 3289-20** support fixture base.

VEHICLE SPEED SENSOR AND TRANSMISSION FLUID COOLER PIPE FITTING REMOVAL

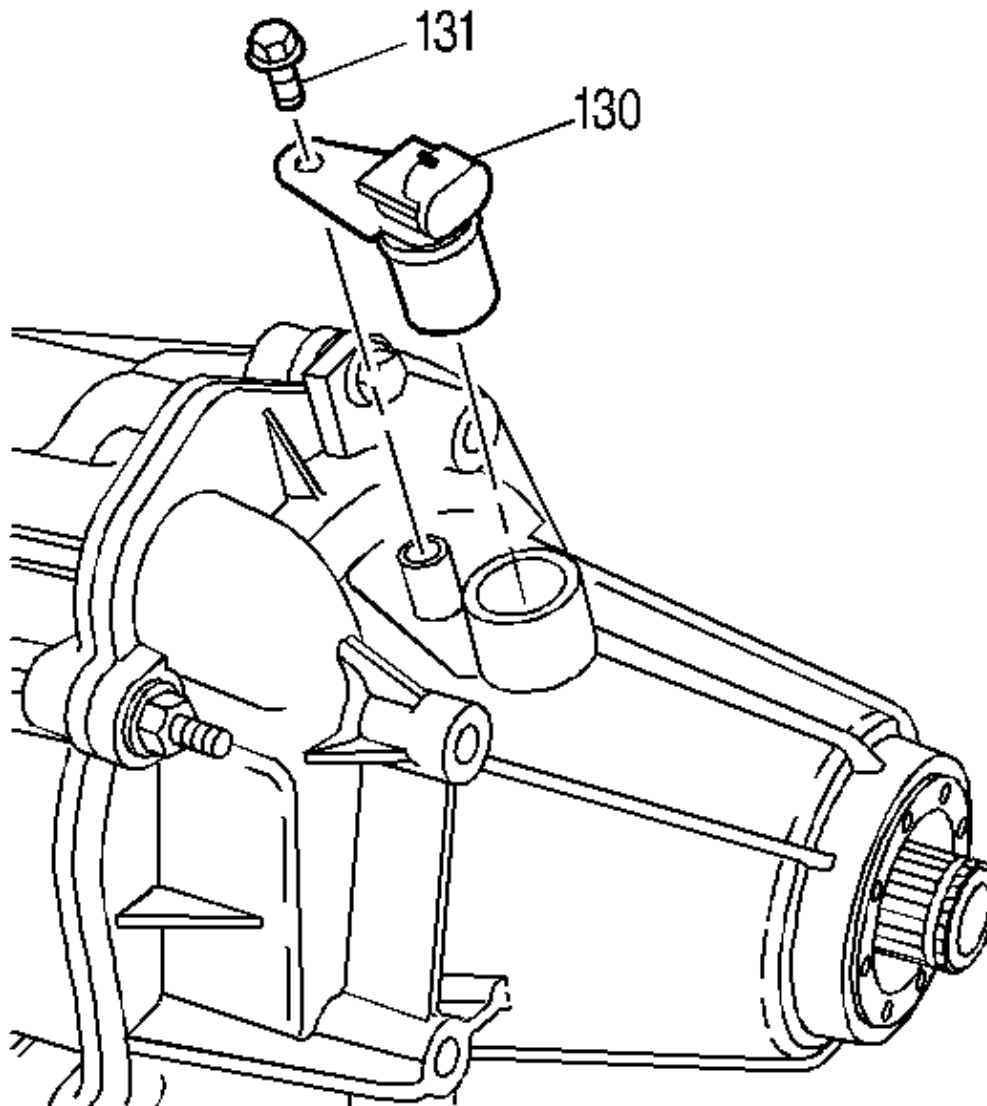


Fig. 3: Identifying Sensor & Retaining Bolt
Courtesy of GENERAL MOTORS COMPANY

1. Remove the 10 mm bolt (131) from the output shaft speed sensor.
2. Remove the output shaft speed sensor and seal (130).

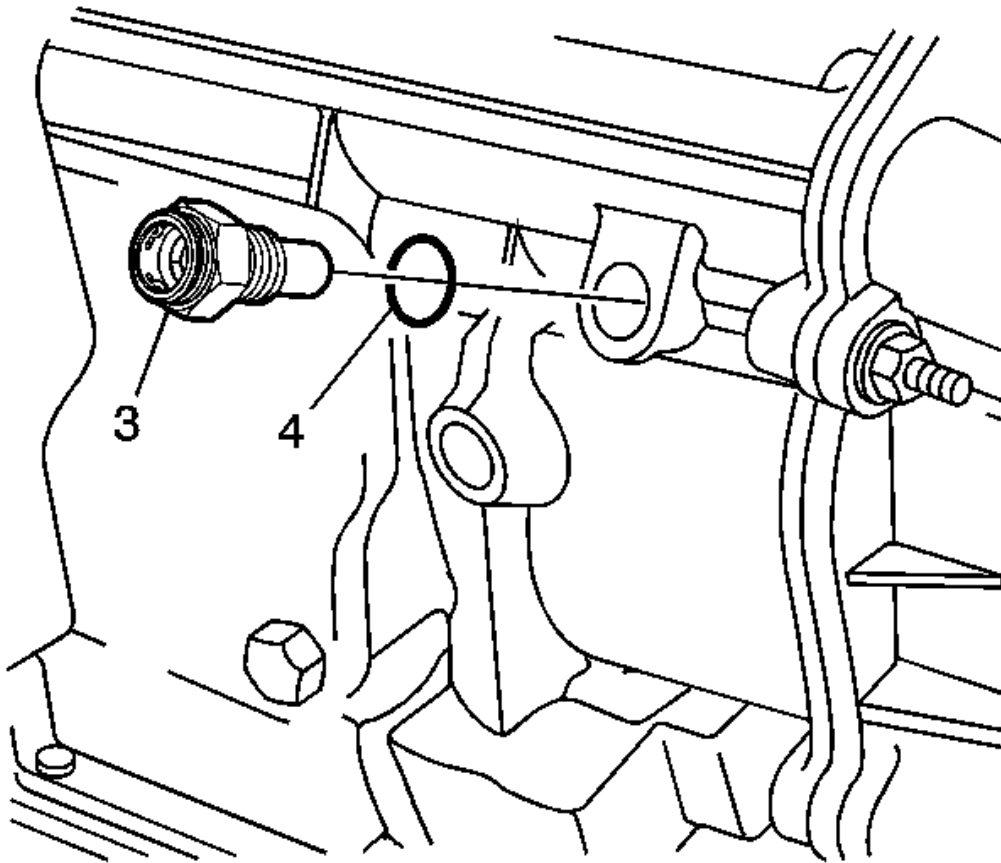


Fig. 4: Cooler Line Fitting & Seal

Courtesy of GENERAL MOTORS COMPANY

3. Remove the 19 mm cooler line fitting (3) and seal (4).

FOURTH SERVO REMOVAL

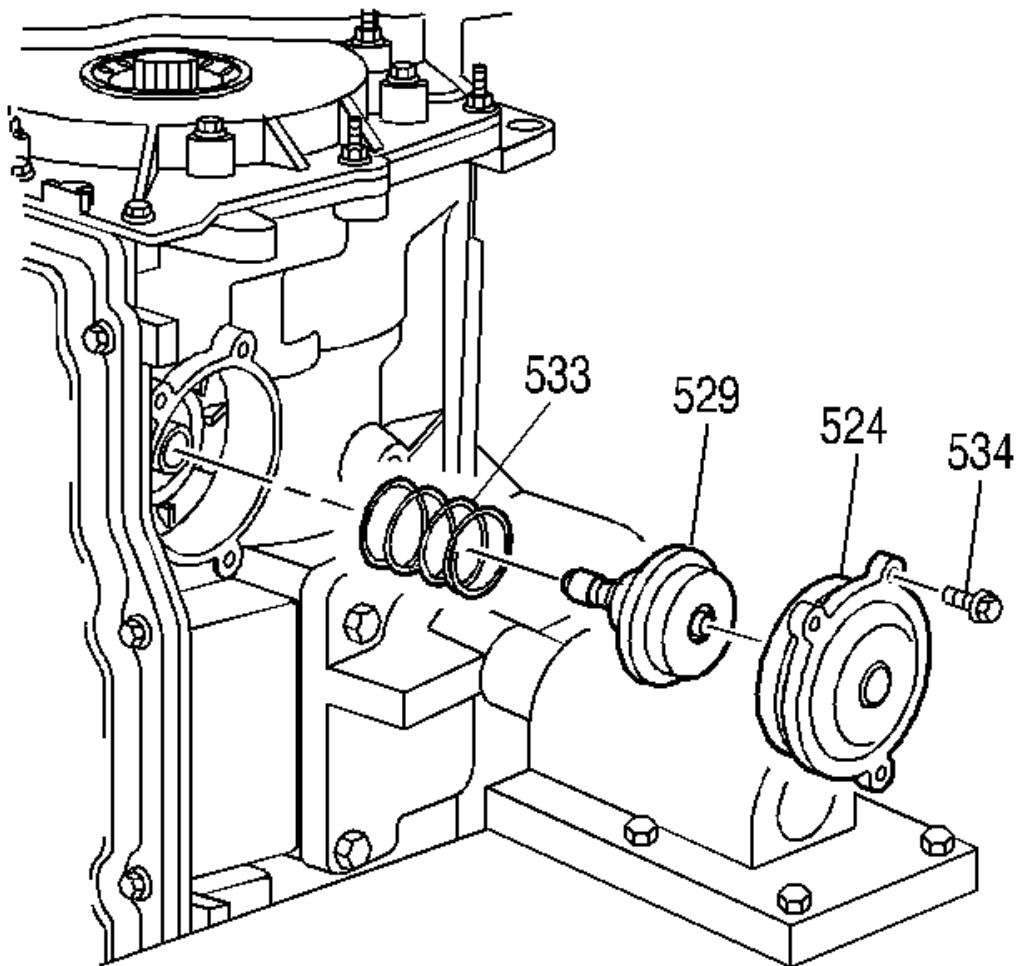


Fig. 5: Identifying 4th Servo Piston Assembly And Cover
Courtesy of GENERAL MOTORS COMPANY

CAUTION: Hold the servo cover in place until all the bolts are removed evenly or the apply pin will damage the bore.

1. Remove the three 10-mm bolts (534) from the servo cover.
2. Remove the following parts:
 - The servo cover (524)
 - The servo assembly (529)
 - The spring (533)

FRONT DIFFERENTIAL CARRIER END PLAY MEASUREMENT

Special Tools

- **J 25025-7A** Dial Indicator Post
- **J 28585** Snap Ring Remover
- **J 8001** Dial Indicator

For equivalent regional tools, refer to Special Tools .

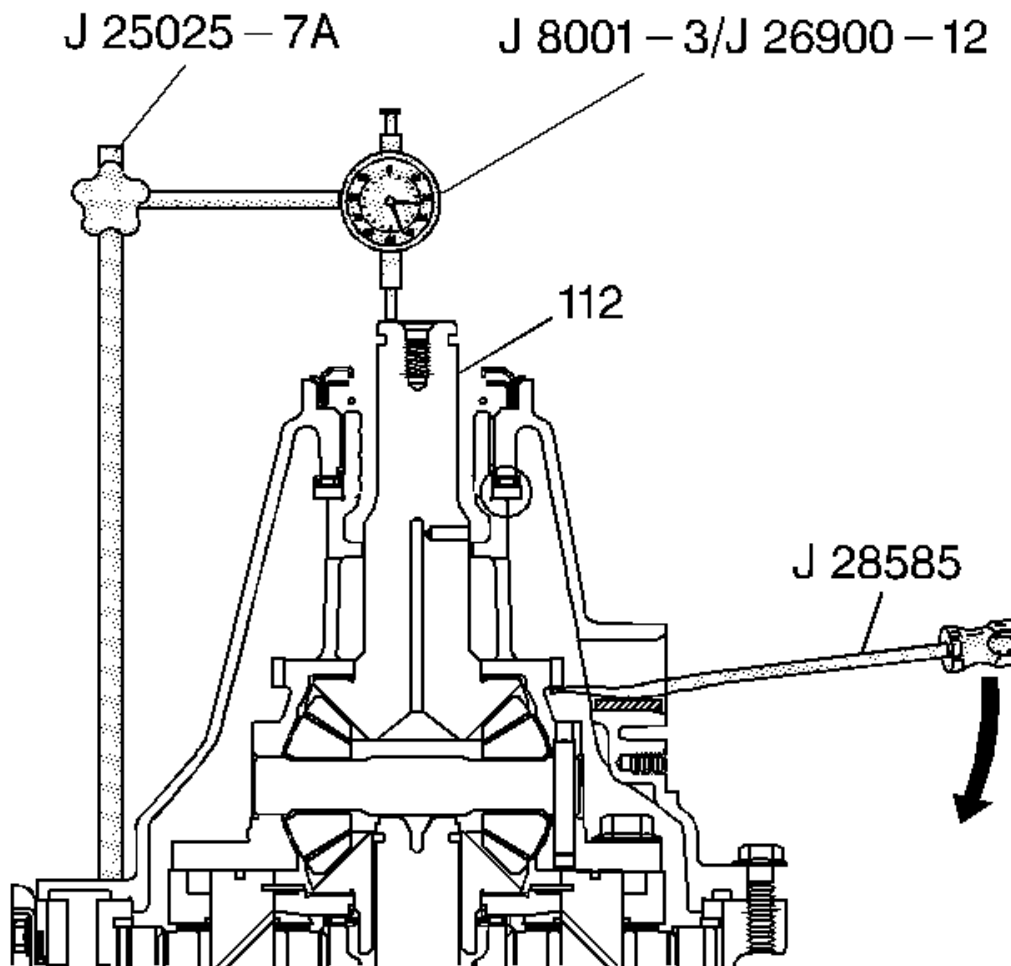


Fig. 6: View Of J 25025-7A & J 8001 Measuring End Play Clearance
 Courtesy of GENERAL MOTORS COMPANY

1. Install the **J 25025-7A** dial indicator post and the **J 8001** dial indicator.
2. Position the dial indicator with the stem contacting the output shaft (112). Zero the dial indicator.
3. Insert the **J 28585** snap ring remover through the vehicle speed sensor bore and lift the speed sensor rotor for measurement. Protect the bore with a piece of wood or a suitable piece of plastic.
4. Proper end play clearance is 0.15-0.65 mm (0.006-0.026 in).
5. Record the measured specification. If necessary make an adjustment during reassembly using a selective thrust washer with the proper thickness.
6. Remove the dial indicator set and the post.

CASE EXTENSION AND SCAVENGE PIPE REMOVAL

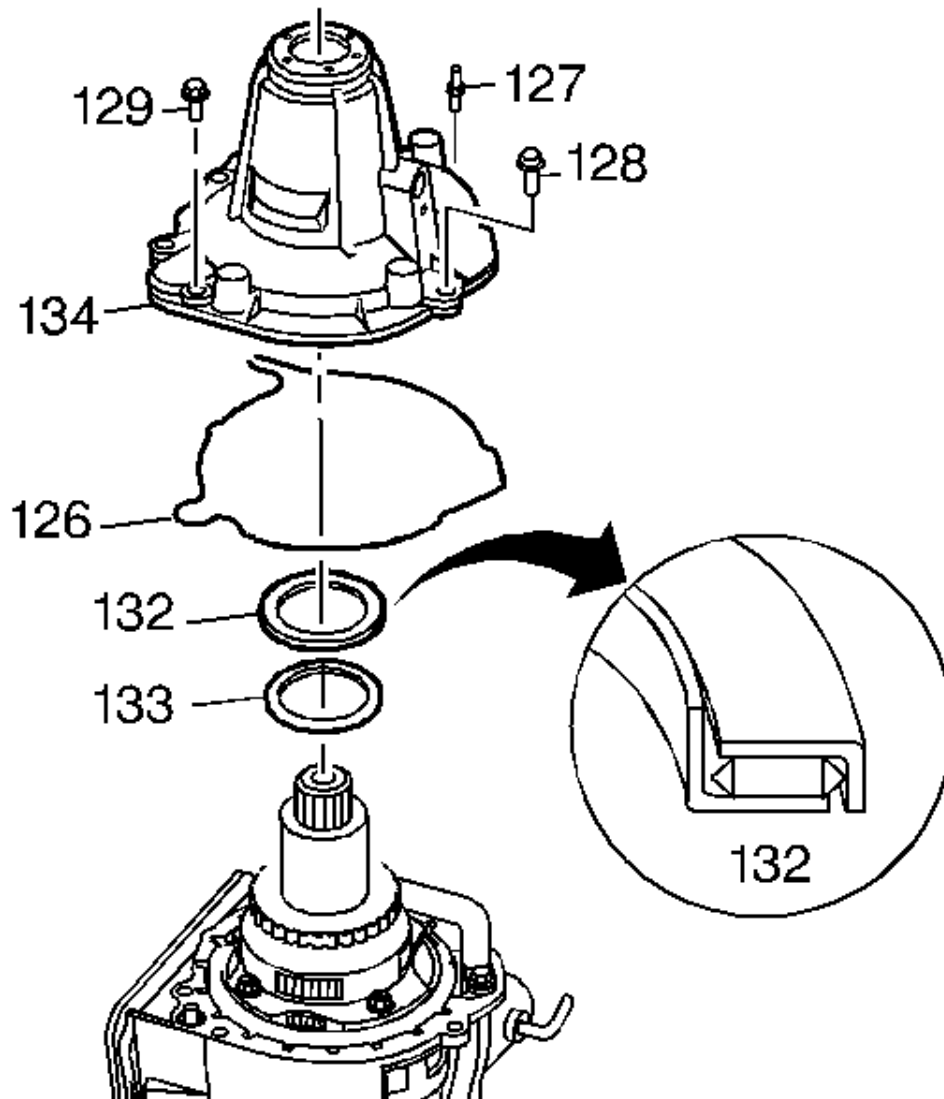


Fig. 7: View Of Case Extension Components
Courtesy of GENERAL MOTORS COMPANY

1. Remove the following parts from the case extension:
 - Five 13-mm bolts (128, 129)
 - One 15-mm stud (127)
2. Remove the case extension (134) and the seal (126).
3. Remove the roller thrust bearing (132) and the selective washer (133)

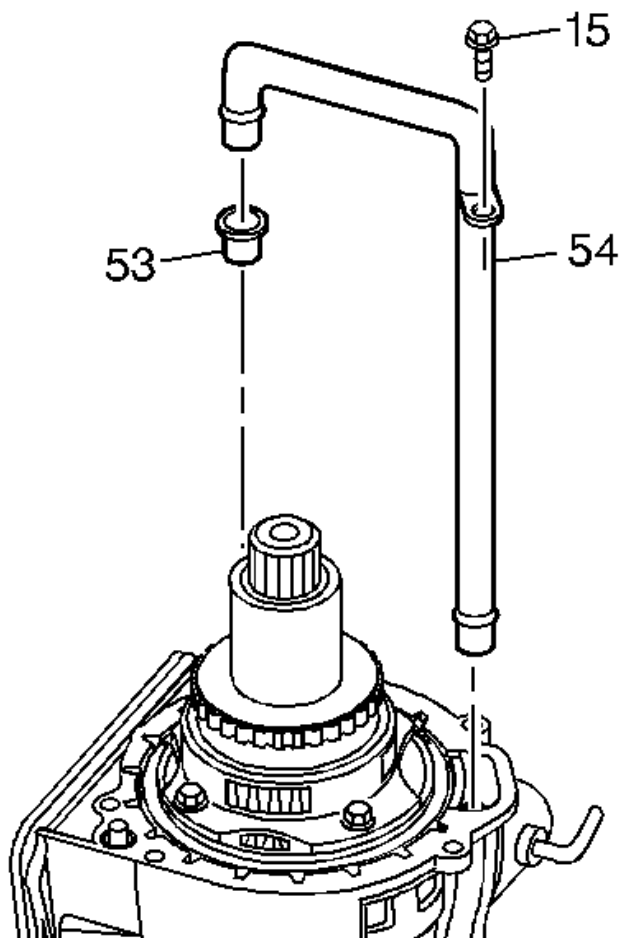


Fig. 8: Identifying Scavenge Tube & Seals
Courtesy of GENERAL MOTORS COMPANY

4. Remove the 8-mm scavenge tube bolt (15).
5. Remove the scavenge tube (54) by prying on the differential.
6. Remove the scavenge tube seal (53).

FRONT DIFFERENTIAL CASE REMOVAL

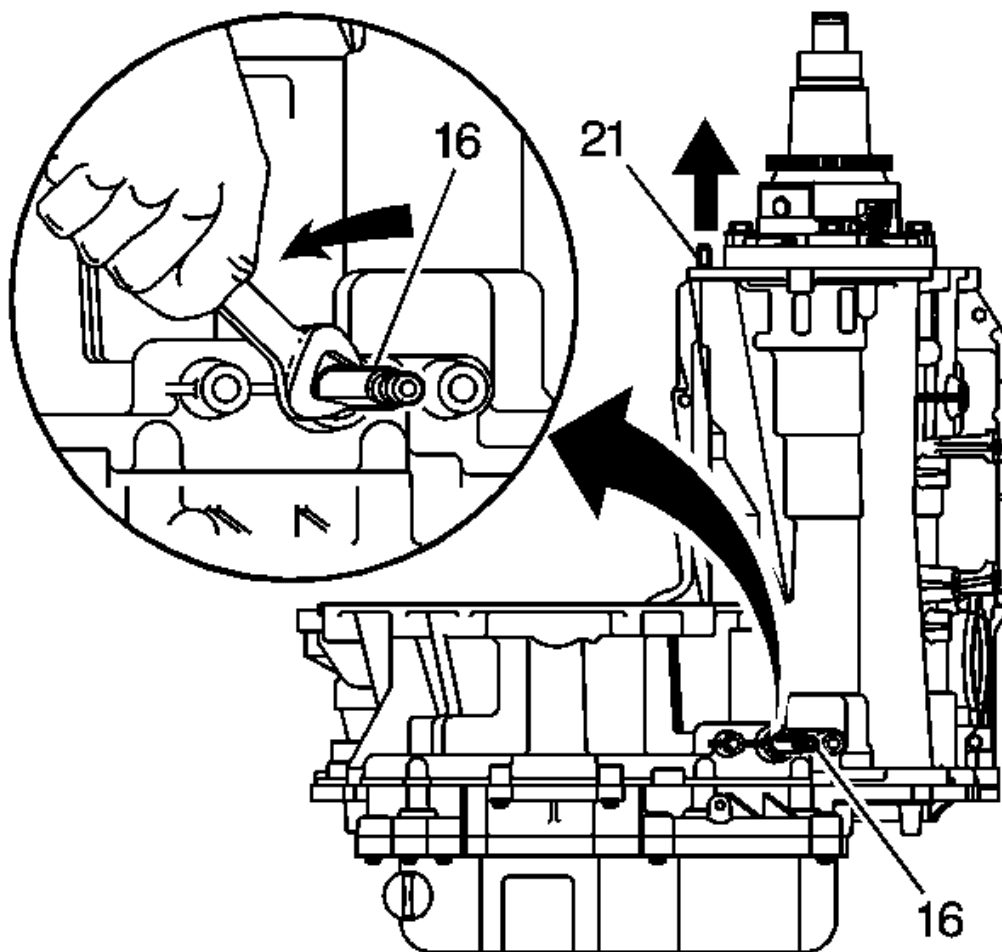


Fig. 9: Identifying Manual Shaft

Courtesy of GENERAL MOTORS COMPANY

1. Rotate the manual shaft (16) counterclockwise in order to place the transmission in Park and prevent the differential from rotating.

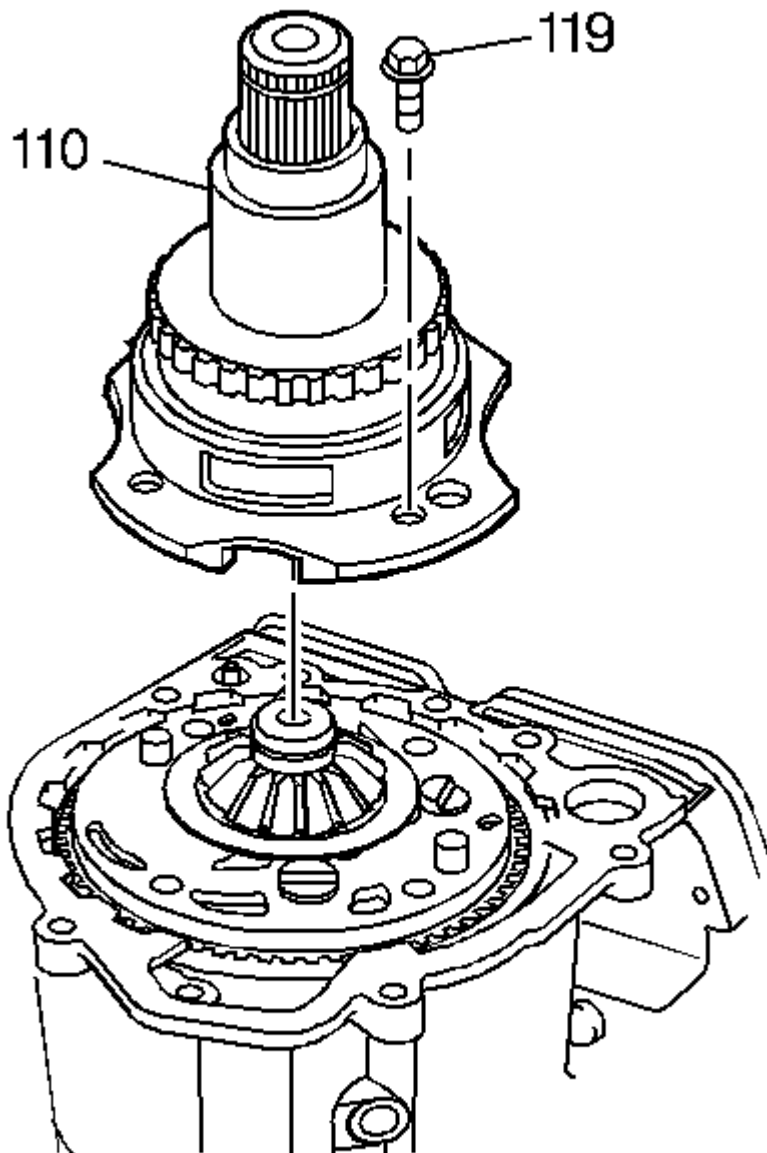


Fig. 10: Identifying Differential Carrier & Bolts
 Courtesy of GENERAL MOTORS COMPANY

2. Remove the four 15-mm differential bolts (119).
3. Remove the differential carrier (110).

OUTPUT SHAFT REMOVAL

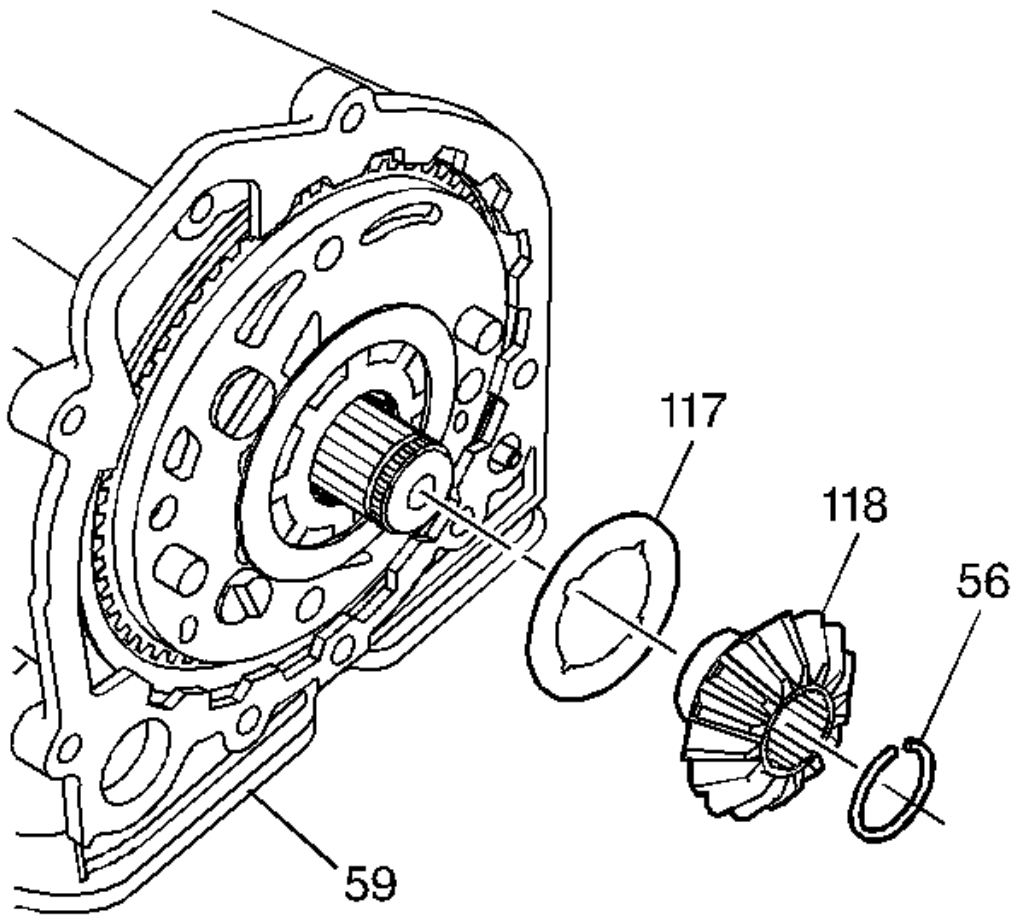


Fig. 11: Identifying Output Shaft Snap Ring, Differential Side Gear, & Thrust Washer
 Courtesy of GENERAL MOTORS COMPANY

1. Rotate the transmission so that the bottom pan (59) faces down.
2. Push on the output shaft in order to expose the snap ring. Remove the output shaft snap ring (56).
3. Remove the left side differential gear (118). Remove the thrust washer (117).

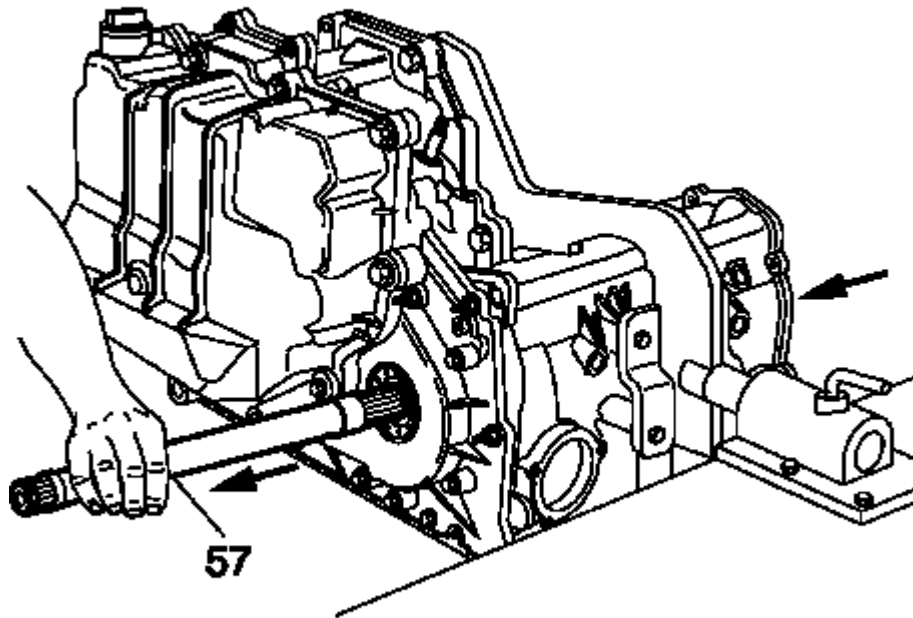


Fig. 12: Removing Output Shaft

Courtesy of GENERAL MOTORS COMPANY

4. Remove the output shaft (57) through the opposite end of the case.

FINAL DRIVE CARRIER, SUN AND INTERNAL GEAR REMOVAL

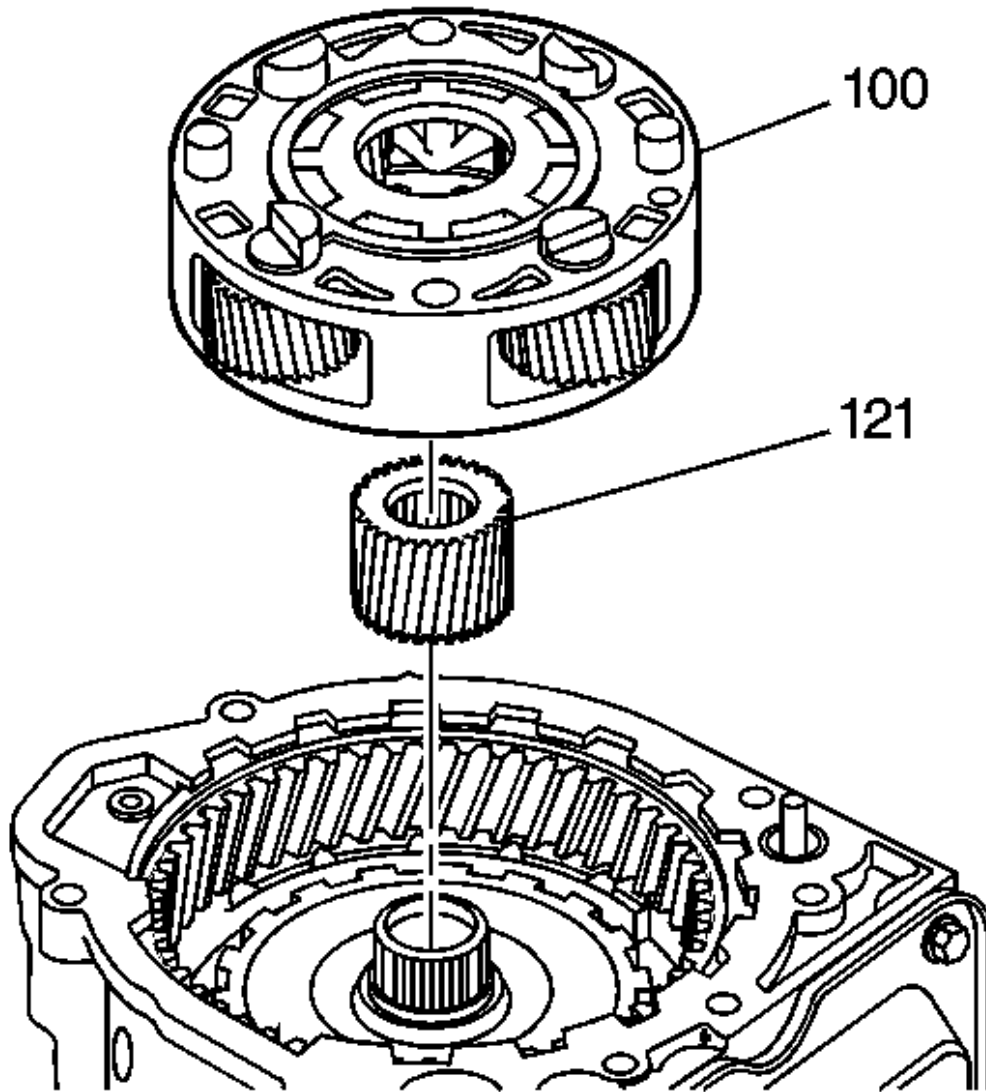


Fig. 13: Identifying Final Drive Sun Gear
Courtesy of GENERAL MOTORS COMPANY

1. Rotate the transmission so the final drive carrier (100) faces up.
2. Remove the final drive carrier and the thrust bearing (100).
3. Remove the final drive sun gear (121).

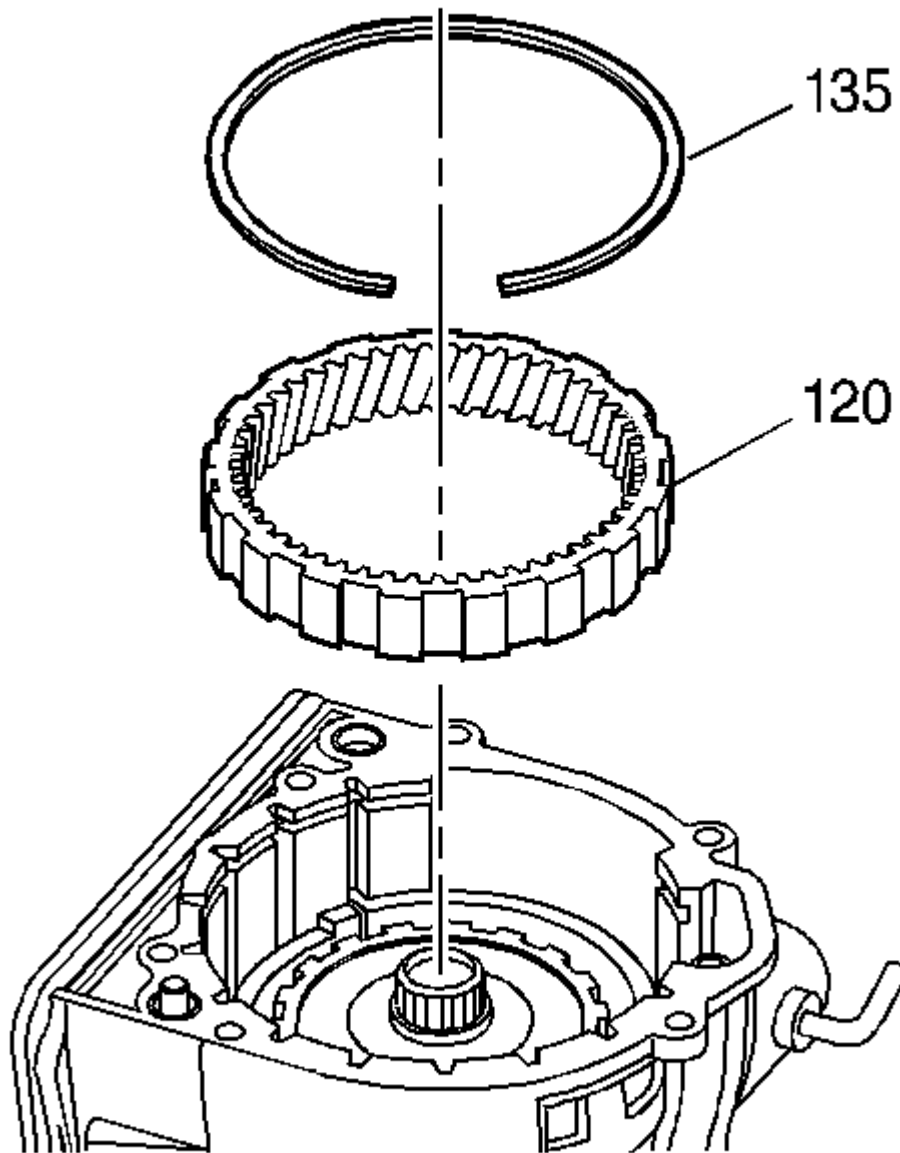


Fig. 14: View Of Final Drive Internal Gear With Groove Aligned Up
Courtesy of GENERAL MOTORS COMPANY

4. Remove the final drive internal gear snap ring (135).
5. Remove the final drive internal gear (120).

FLUID PAN, GASKET, AND TRANSFER OIL PUMP INLET SCREEN REMOVAL

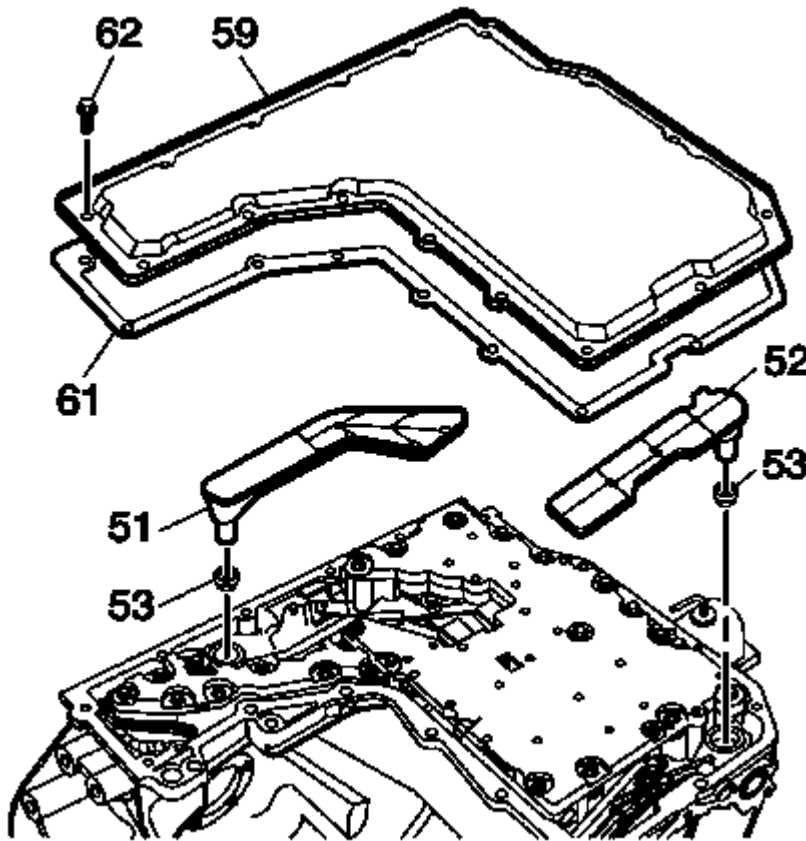


Fig. 15: View Of Bottom Pan, Scavenge Screens & Gasket
 Courtesy of GENERAL MOTORS COMPANY

1. Rotate the transmission so the bottom pan (59) faces up.
2. Remove the sixteen 10 mm bottom pan bolts (62).
3. Remove the bottom pan (59) and the gasket (61).
4. Remove the left scavenge screen and its seal (51, 53).
5. Remove the right scavenge screen and its seal (52, 53).

LOWER CONTROL VALVE BODY ASSEMBLY REMOVAL

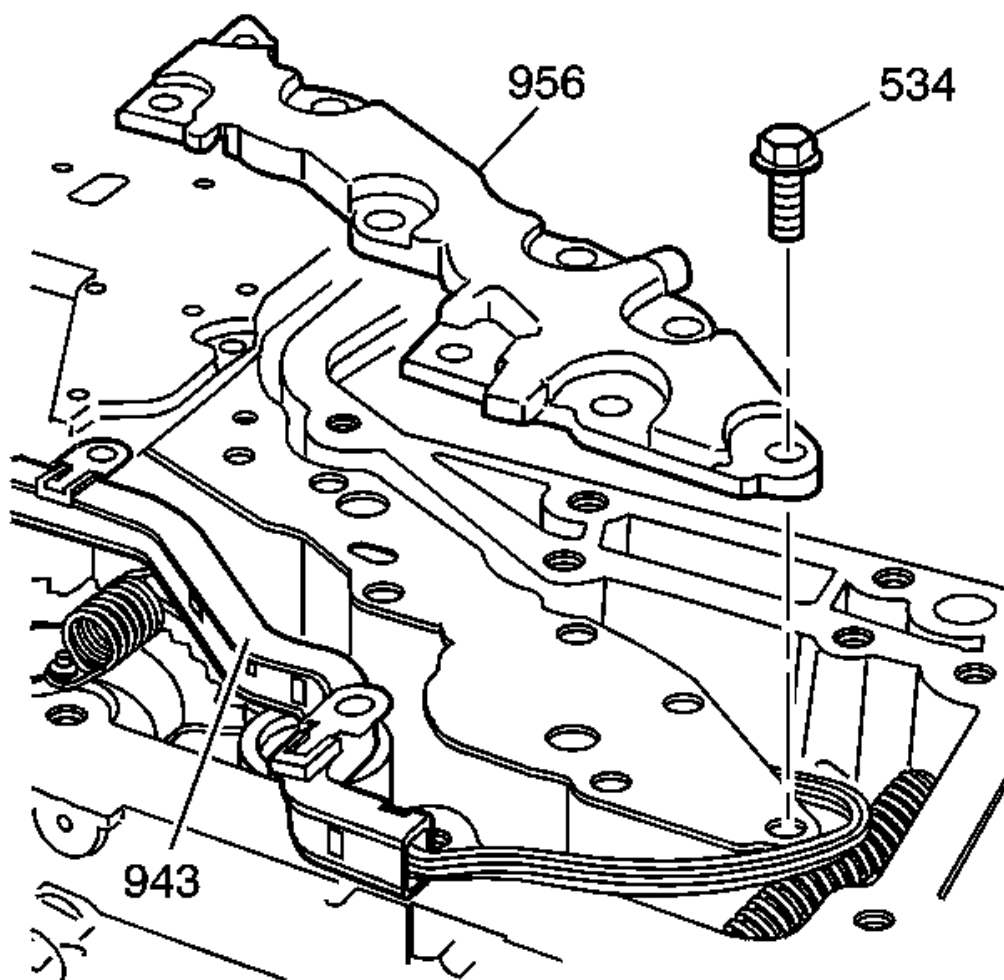


Fig. 16: Oil Transfer Plate, Bolts & Harness Assembly
 Courtesy of GENERAL MOTORS COMPANY

1. Remove the nine 10 mm bolts (534) from the oil transfer plate (956) and wire harness assembly (943).
2. Remove the oil transfer plate (956).

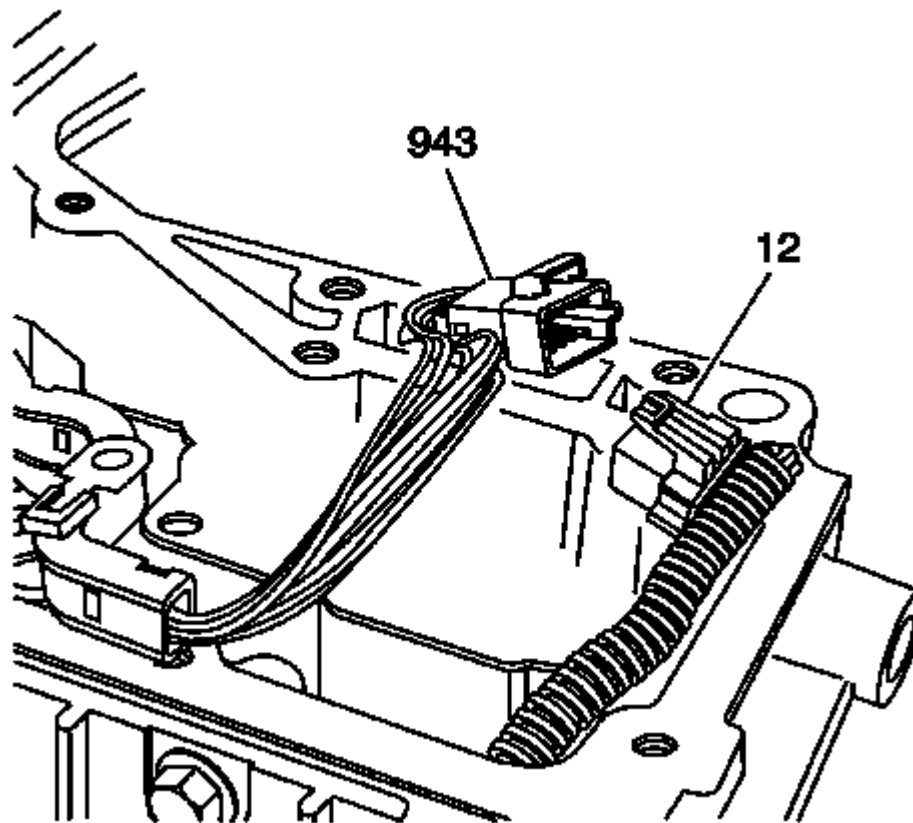


Fig. 17: Wire Harness Extension & Assembly
Courtesy of GENERAL MOTORS COMPANY

3. Disconnect the wire harness extension (943) from the wire harness assembly (12).

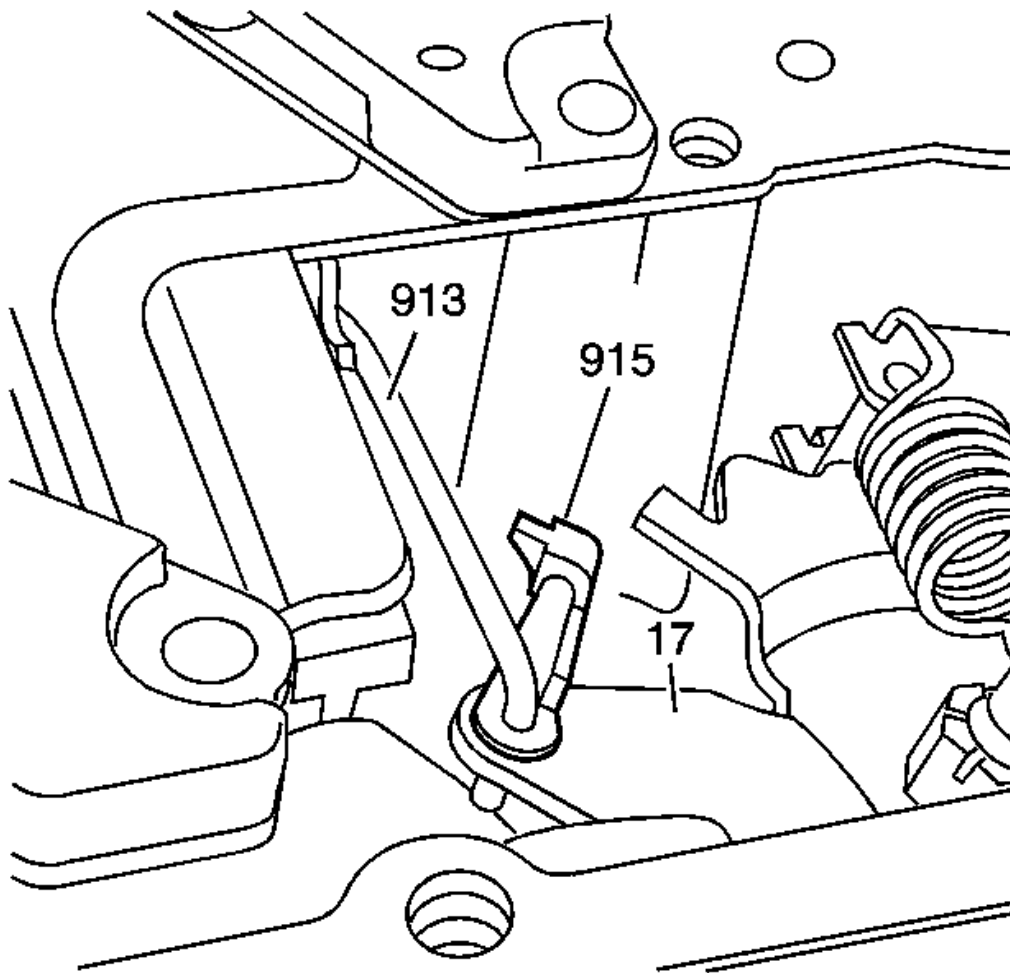


Fig. 18: Manual Valve Link

Courtesy of GENERAL MOTORS COMPANY

NOTE: Do not reuse retainer (915), it must be replaced.

4. Use a small screwdriver in order to disconnect the manual valve link retainer (915) from the manual valve link (913).

NOTE: Do not pry against the internal mode switch assembly.

5. Lift the manual valve and link assembly link (916) out of the inside detent lever (17).

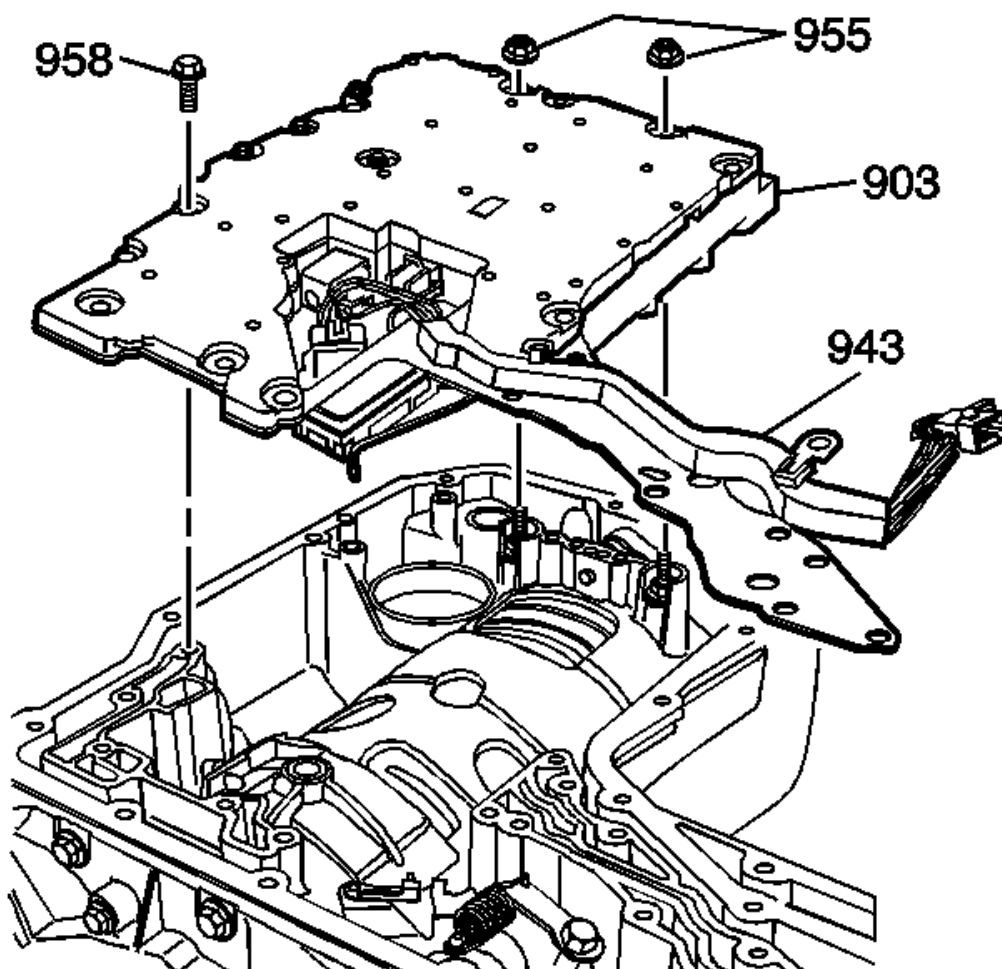


Fig. 19: Identifying Lower Channel Plate, Control Valve Body And Accumulator Assembly, And Lower Control Valve Body Wire Harness Extension
Courtesy of GENERAL MOTORS COMPANY

6. Remove the two 10 mm nuts (955) and the fourteen 10 mm bolts (958) from the lower control valve body assembly (903).
7. Lift the lower channel plate, control valve body and accumulator assembly (903) and the lower control valve body wire harness extension (943) from the case as a single unit.

INPUT SHAFT END PLAY MEASUREMENT

Special Tools

- **J 39686** Input End Play Check Tool
- **J 25025-7A** Dial Indicator Post
- **J 8001** Dial Indicator

For equivalent regional tools, refer to **Special Tools** .

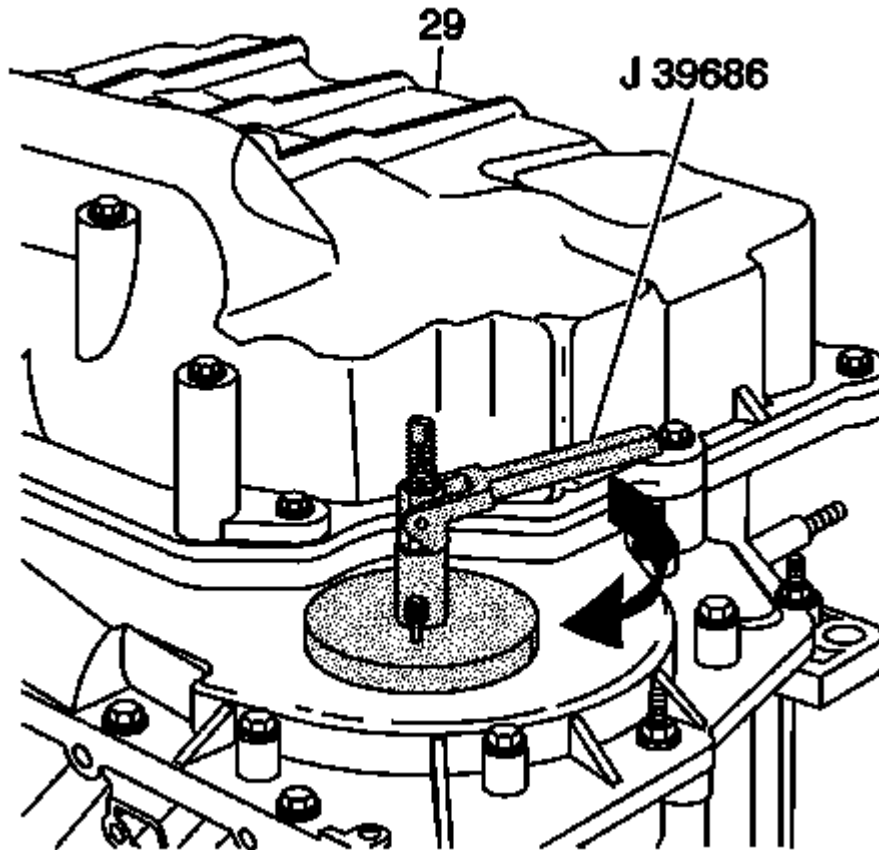


Fig. 20: Locating J 39686 & J 25025-7A On Transmission Case
 Courtesy of GENERAL MOTORS COMPANY

1. Rotate the transmission so the side cover (29) faces up.
2. Install the **J 39686** input end play check tool into the case barrel. Install the **J 25025-7A** dial indicator post.

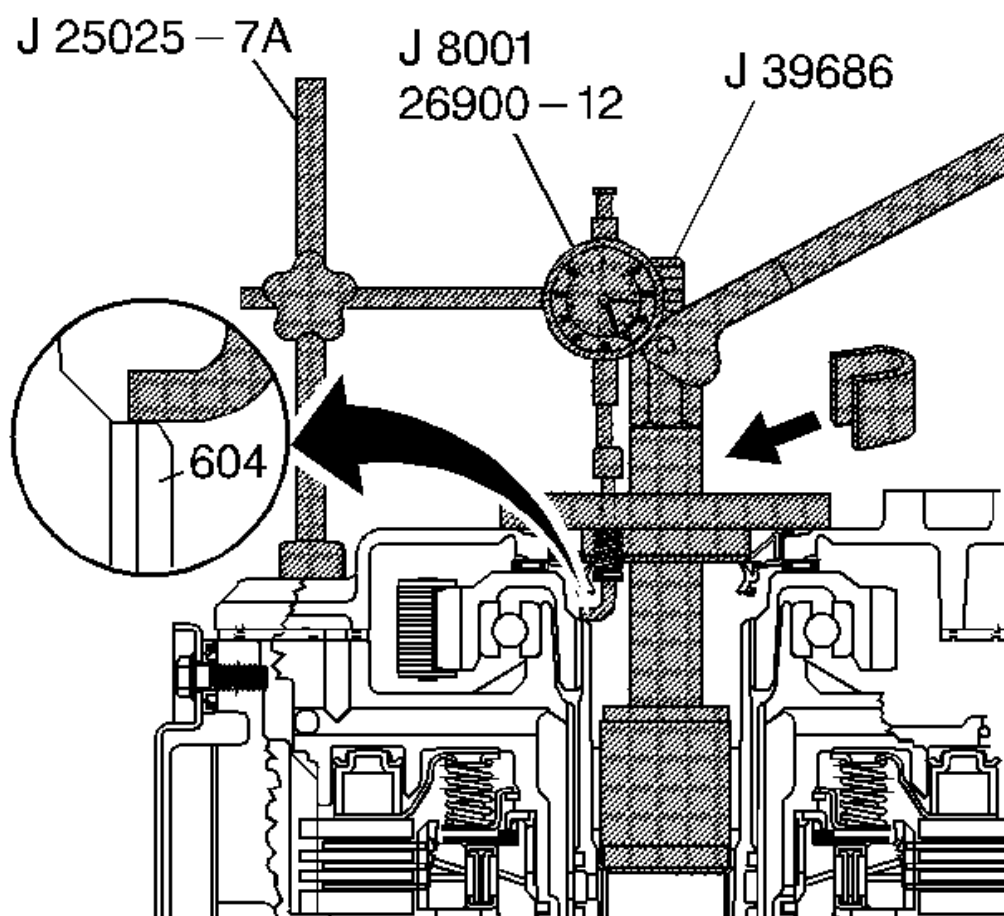


Fig. 21: Locating The J Tab On The Input Shaft
Courtesy of GENERAL MOTORS COMPANY

3. Locate the J tab of the **J 39686** input end play check tool on the input shaft (604). The arrow on the J tab should have a 90 degree orientation.

NOTE: The washer of the **J 39686** input end play check tool must rest flat on the case cover seal.

4. Rotate the threaded shaft of the **J 39686** input end play check tool clockwise until the shaft is tight. Leave enough space for the collar.
5. Insert the collar. Install the **J 8001** dial indicator.

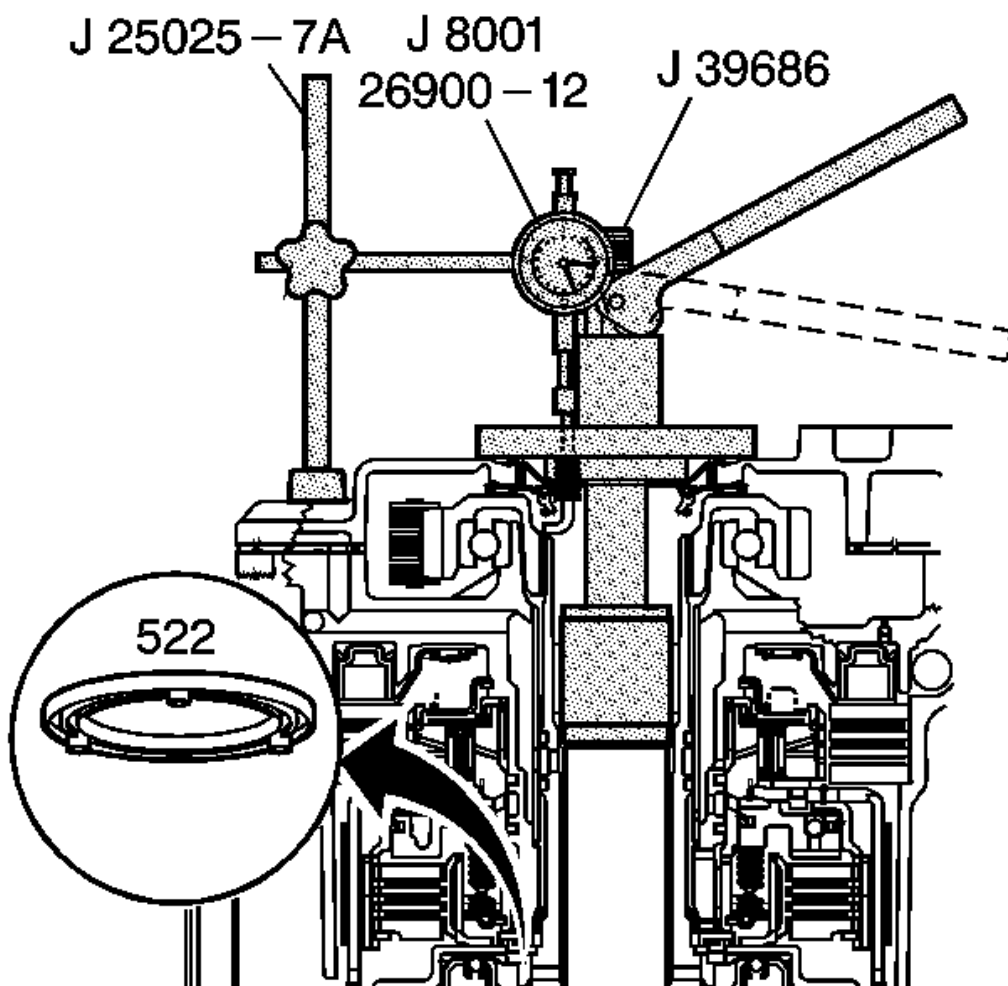


Fig. 22: Checking Input Shaft End Play

Courtesy of GENERAL MOTORS COMPANY

6. Push down on the handle of the **J 39686** input end play check tool and check the end play. End play should be 0.10-0.85 mm (0.004-0.033 in).

If the measurement is out of the specification range, determine the appropriate selective thrust washer (522) for installation when you reassemble the input shaft.

7. Remove the **J 8001** dial indicator, the **J 25025-7A** dial indicator post and the **J 39686** input end play check tool.

AUXILIARY CONTROL VALVE BODY COVER, FLUID FILTER SEAL, AND FILTER REMOVAL

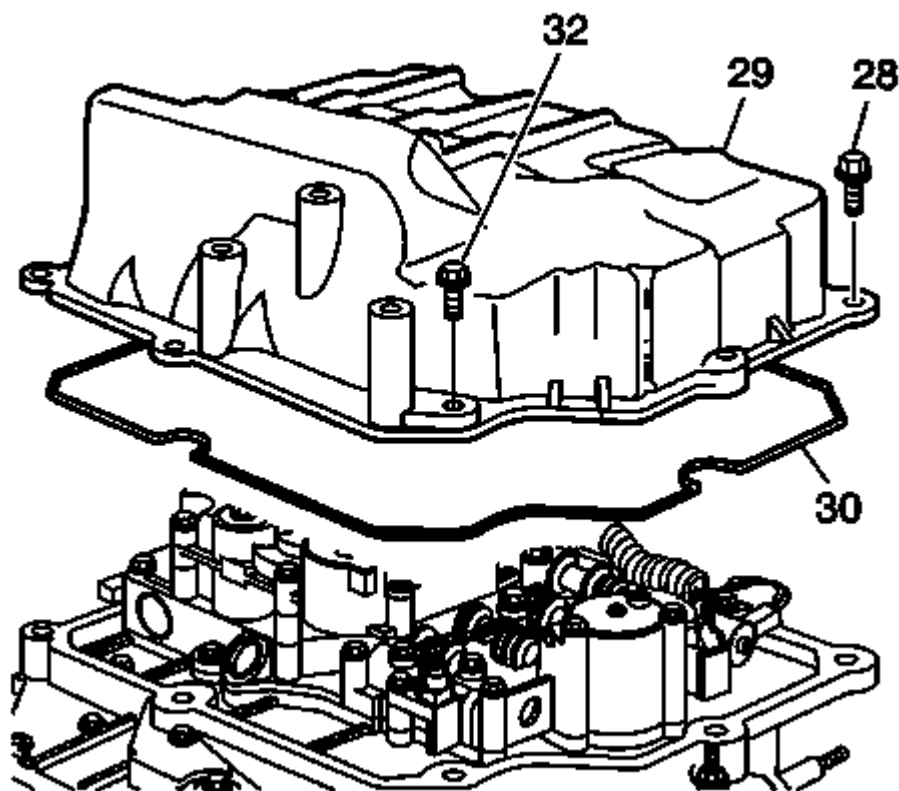


Fig. 23: Locating Side Cover & Gasket

Courtesy of GENERAL MOTORS COMPANY

1. Remove the eight 15 mm bolts (28) and the one 13 mm bolt (32) from the side cover (29).
2. Remove the side cover (29) and the gasket (30).

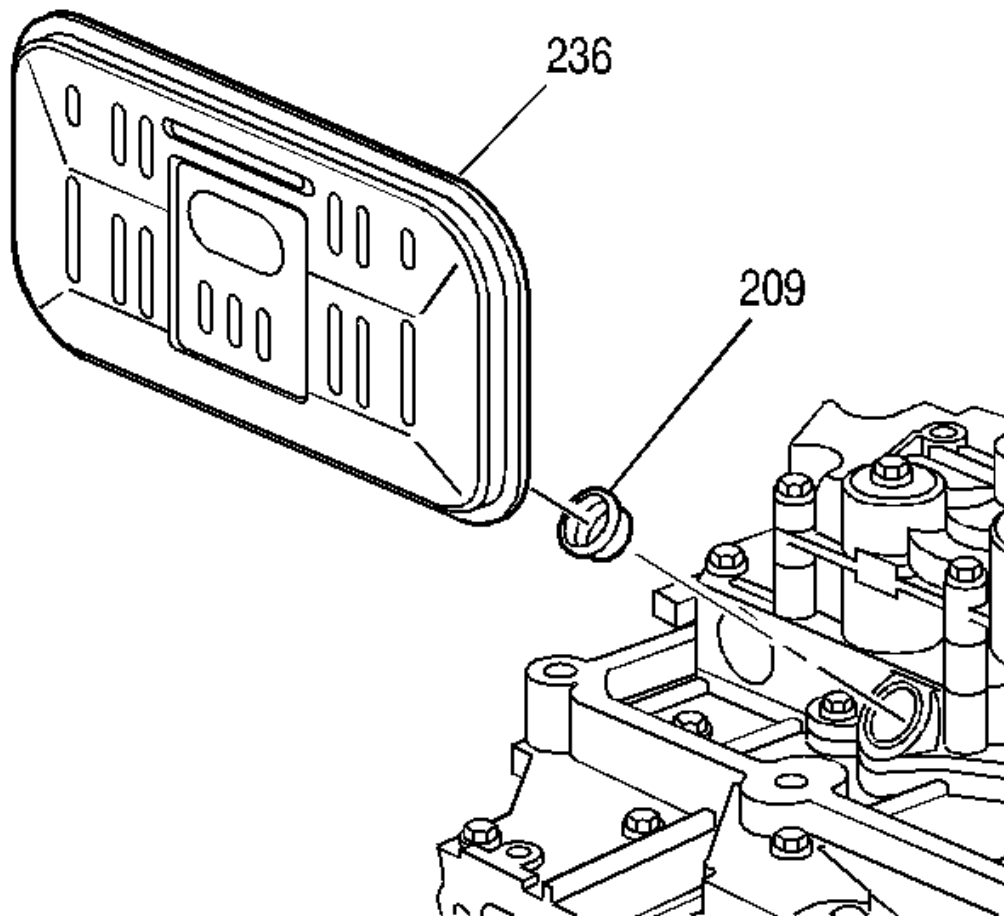


Fig. 24: View Of Oil Filter & Seal
Courtesy of GENERAL MOTORS COMPANY

3. Remove the main filter (236) and the seal (209).

OIL PUMP, UPPER CONTROL VALVE ASSEMBLY REMOVAL

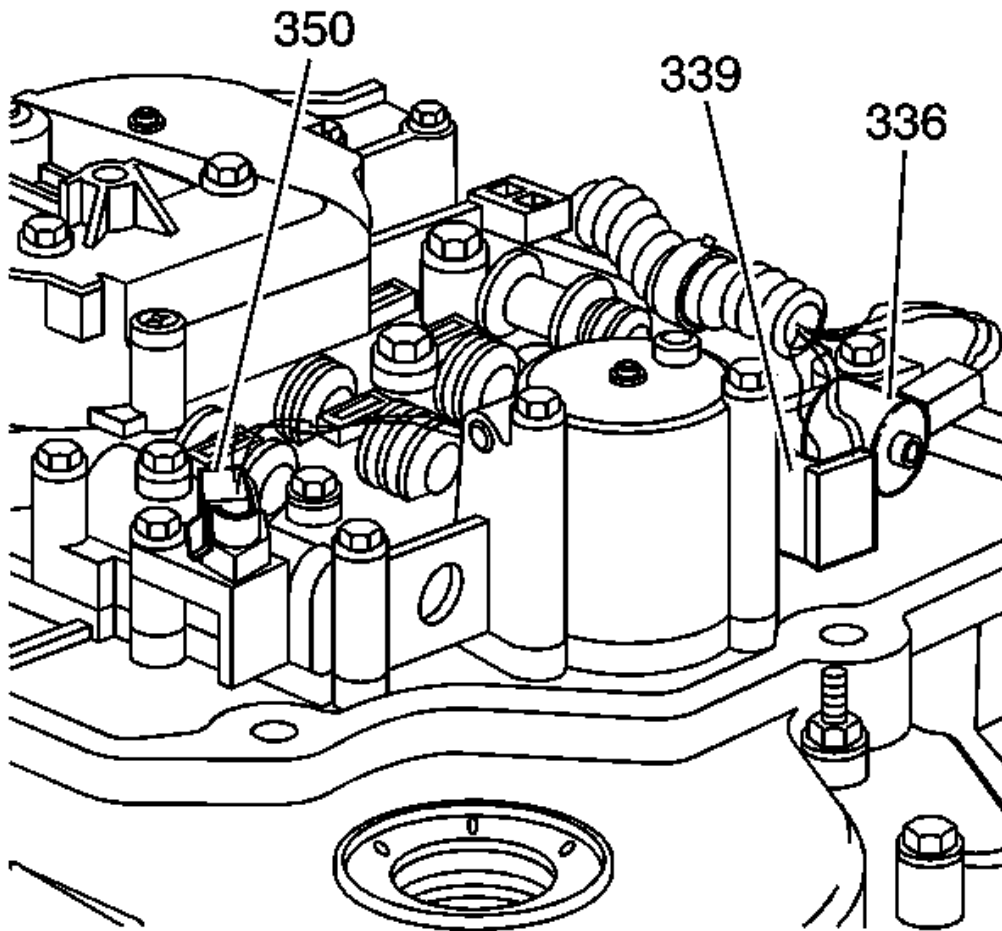


Fig. 25: View Of Pressure Control Solenoid Valve, Torque Converter Clutch Solenoid Valve & Transmission Temperature Sensor Electrical Connectors
 Courtesy of GENERAL MOTORS COMPANY

1. Using a small screwdriver, disconnect the following parts:
 - The electrical connector from the automatic transmission fluid temperature sensor (350)
 - The torque converter clutch solenoid valve (336)
 - The pressure control solenoid valve (339)

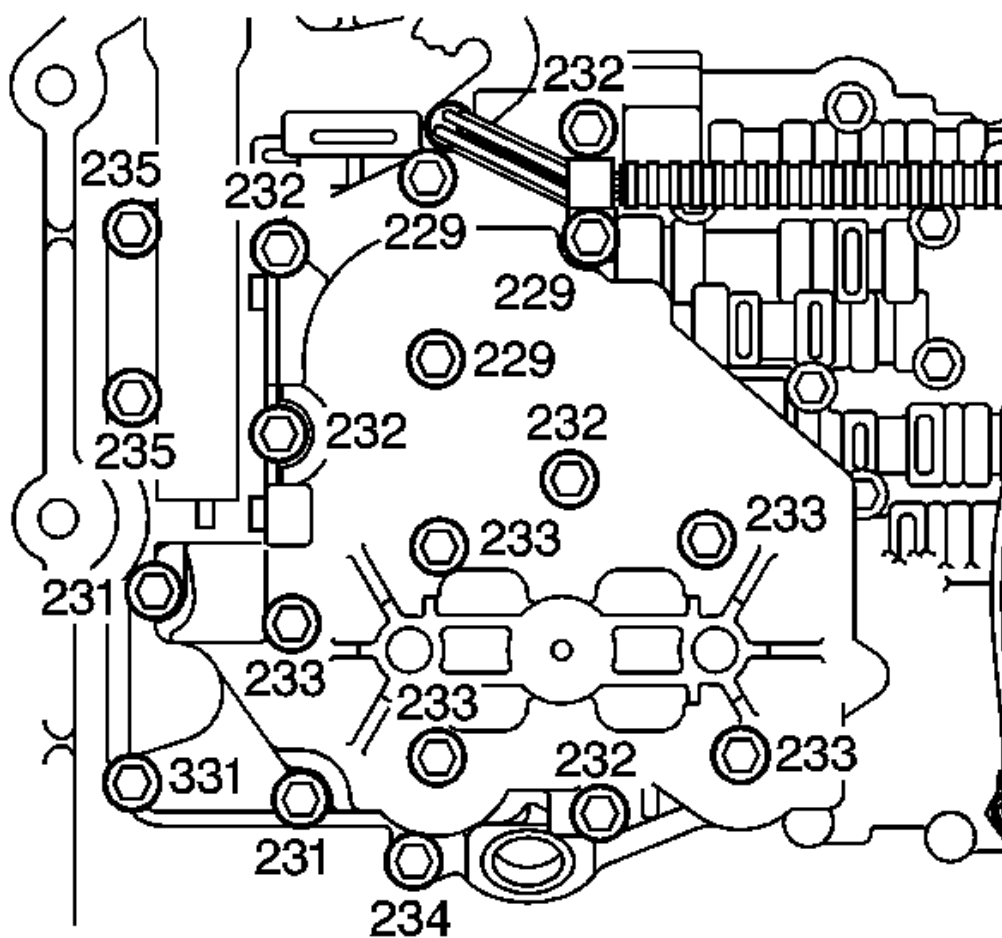


Fig. 26: Identifying Pump Housing Bolts
Courtesy of GENERAL MOTORS COMPANY

2. Remove the 19 8-mm bolts (229, 231, 232, 233, 234, 235, 331) from the pump housings.

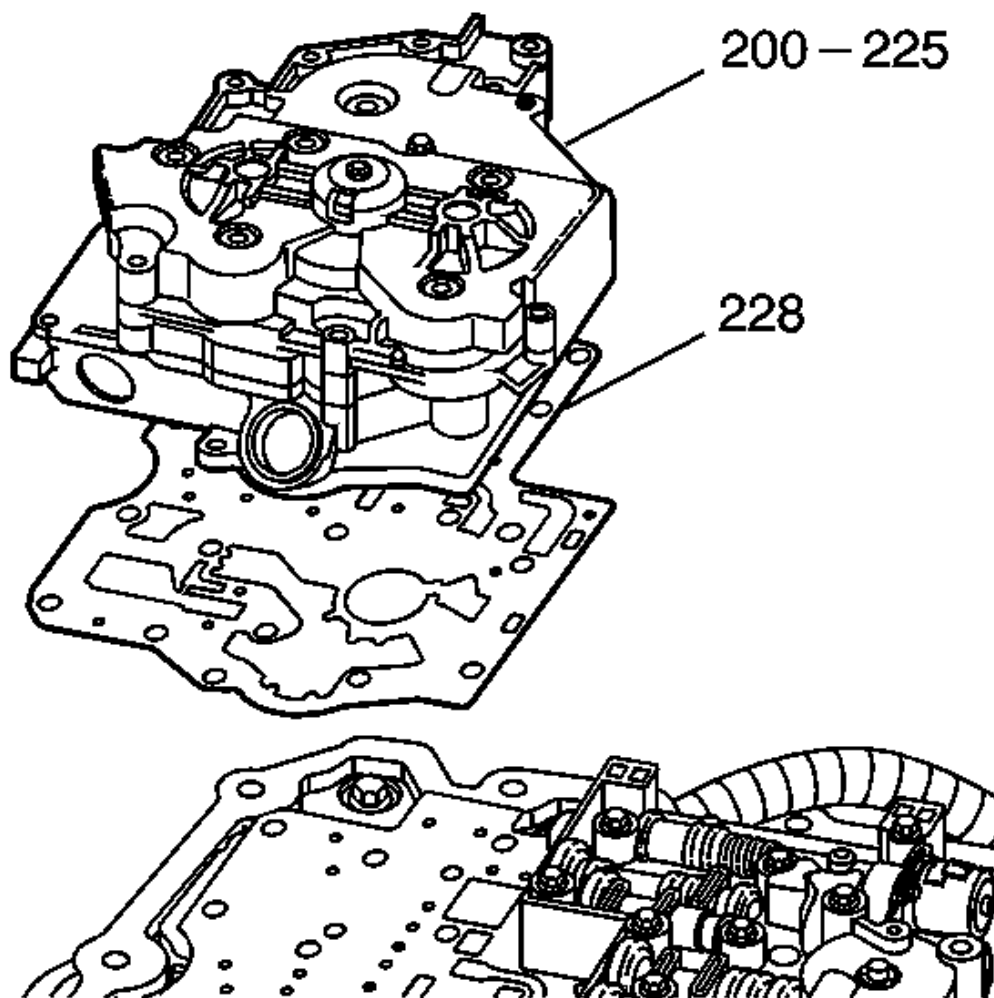


Fig. 27: View Of Scavenge, Primary And Secondary Pump Assemblies
Courtesy of GENERAL MOTORS COMPANY

3. Remove the scavenge, the primary and the secondary pump assemblies as one unit (200-225).
4. Remove the pump gasket (228).

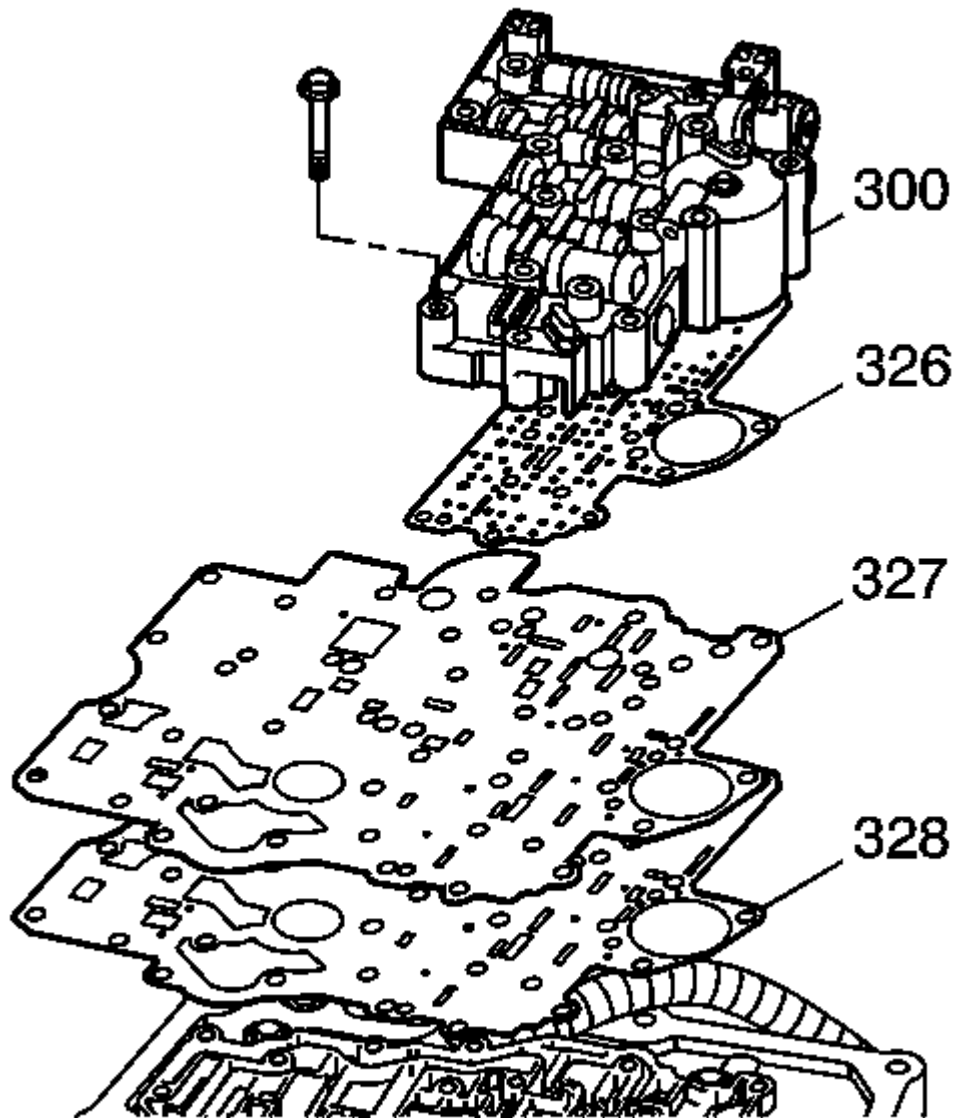


Fig. 28: View Of Upper Control Valve Assembly Components
Courtesy of GENERAL MOTORS COMPANY

5. Remove the seventeen 8-mm bolts from the upper control valve body assembly.
6. Remove the following parts:
 - The upper control valve body assembly (300)
 - The spacer plate (327)

- The gaskets (326, 328)

CASE COVER REMOVAL

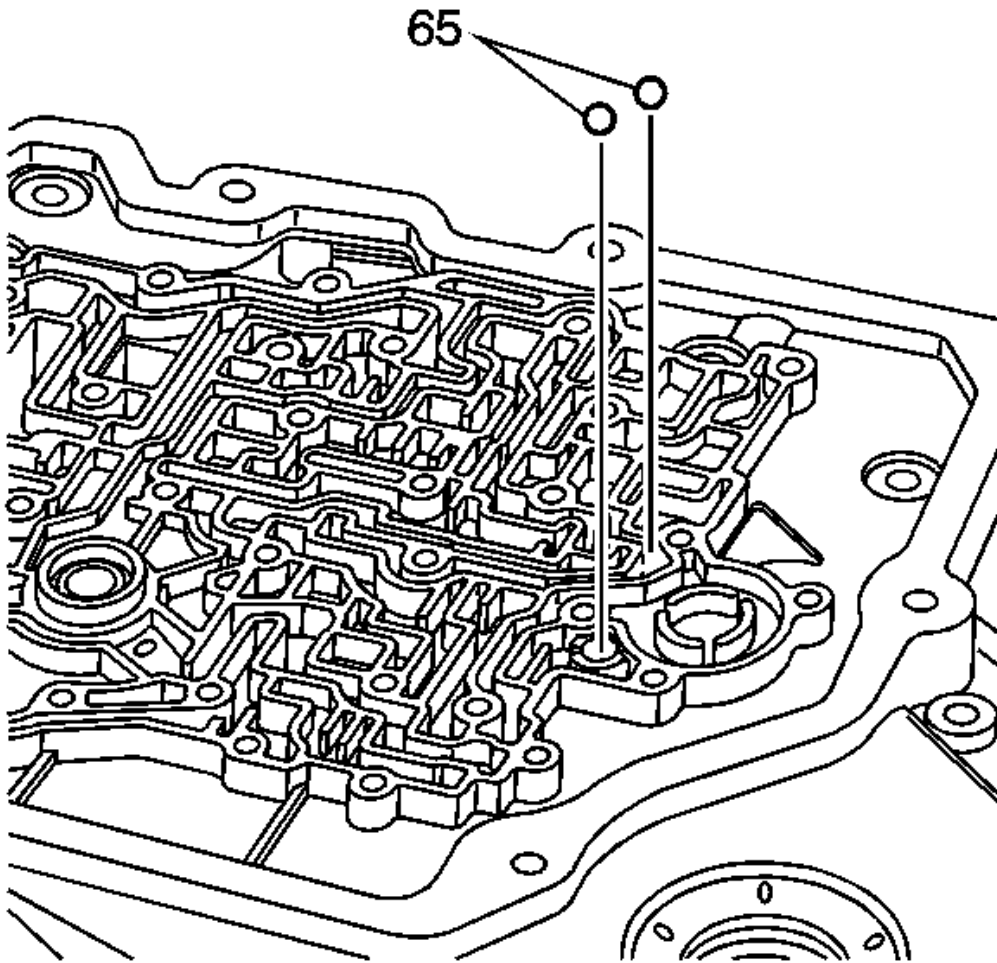


Fig. 29: Identifying Case Cover Checkballs
Courtesy of GENERAL MOTORS COMPANY

1. Remove the two checkballs from the case cover (65).

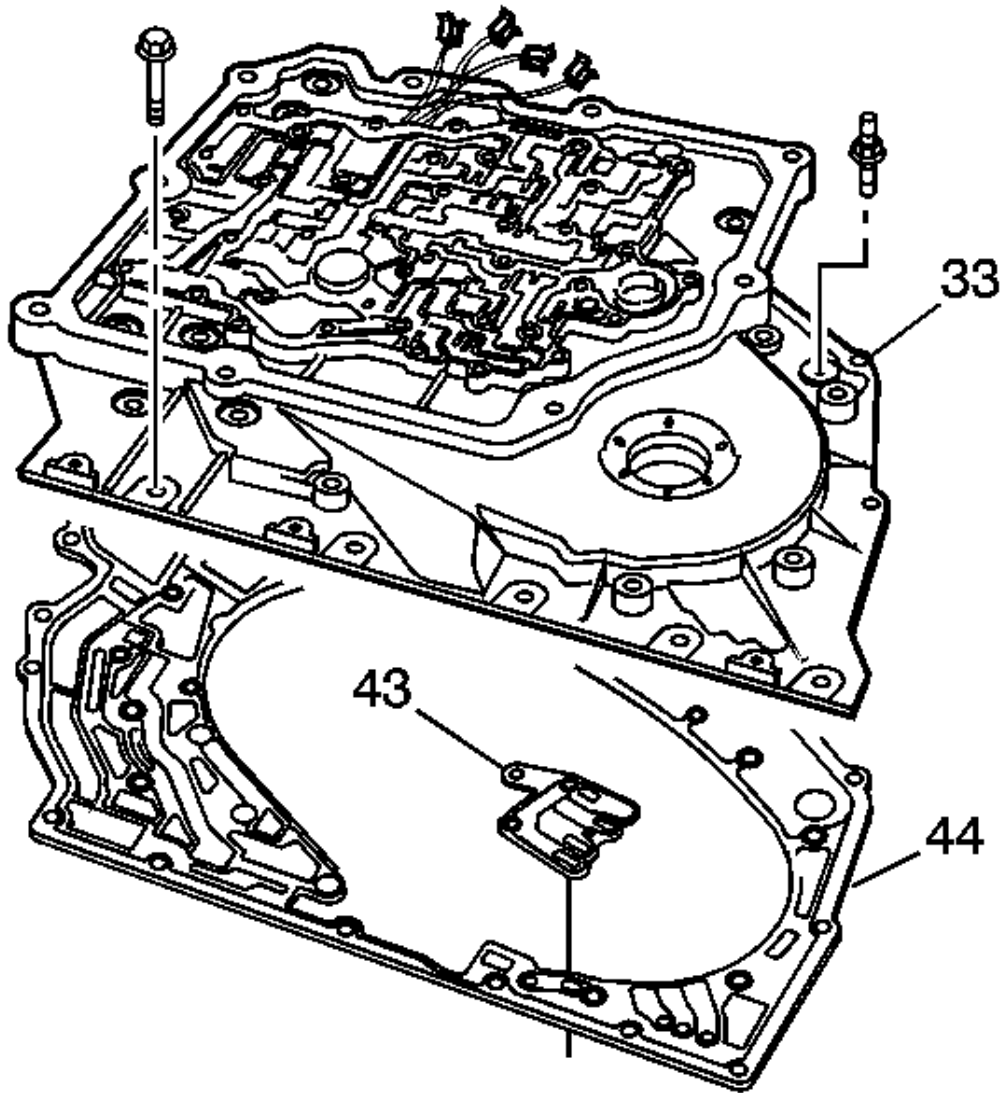


Fig. 30: View Of Island Gasket & Case Cover Gasket
 Courtesy of GENERAL MOTORS COMPANY

2. Remove the 26 case cover bolts and studs.
3. Remove the case cover assembly (33). Gently guide the ends of the wire harness through the opening in the case cover (33). The harness will remain in the case.
4. Remove the case cover gasket (44) and remove the island gasket (43).

DRIVE/DRIVEN SPROCKET AND CHAIN REMOVAL

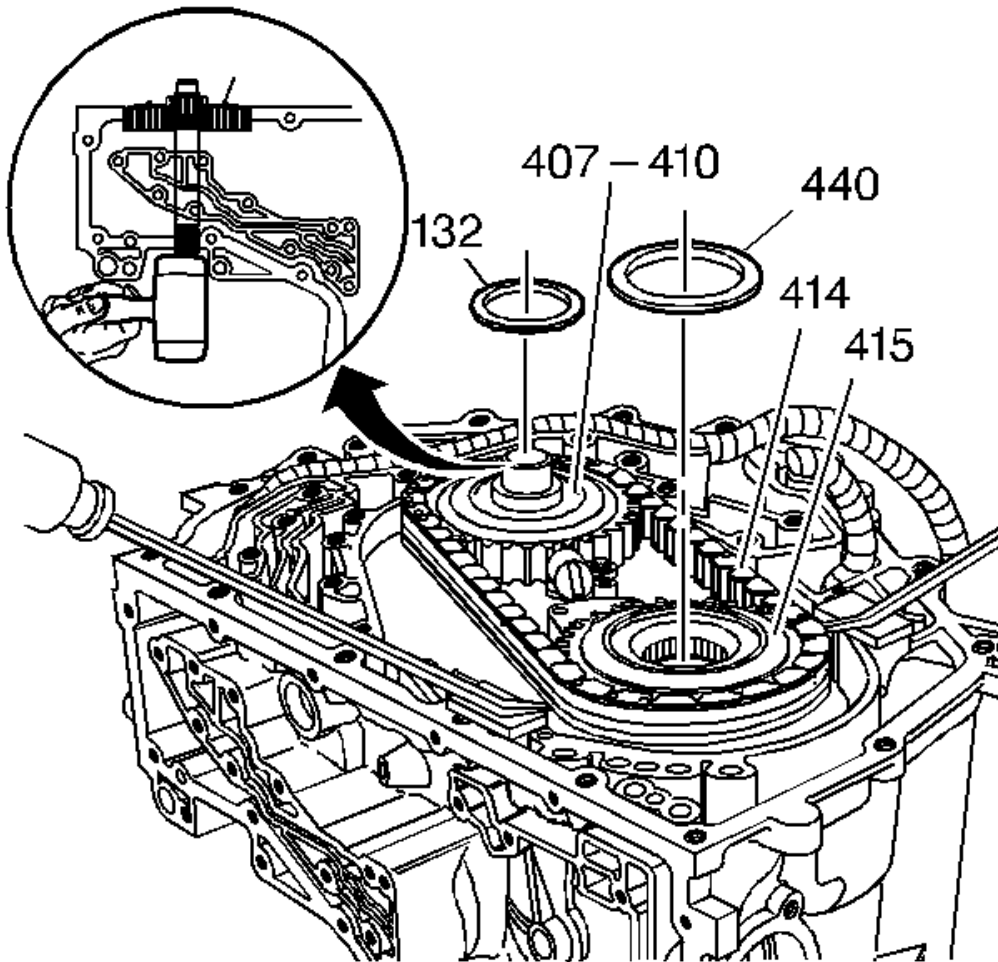


Fig. 31: Expanded View Of Drive Sprocket And Turbine Shaft Assembly
 Courtesy of GENERAL MOTORS COMPANY

1. Remove the thrust bearings (132, 440) from the drive and driven sprockets).
2. Remove the following parts:
 - The drive sprocket and turbine shaft assembly (407-410)
 - The driven sprocket (415)

NOTE: Mark the chain in order to indicate the direction in which you removed the chain.

- Remove the chain (414)

3. Use two screwdrivers in order to hold the driven sprocket in place, and pry off the driven sprocket. Place small blocks of wood or pieces of plastic under the screwdrivers in order to protect the case. Use a plastic hammer in order to tap the drive sprocket and the turbine shaft.

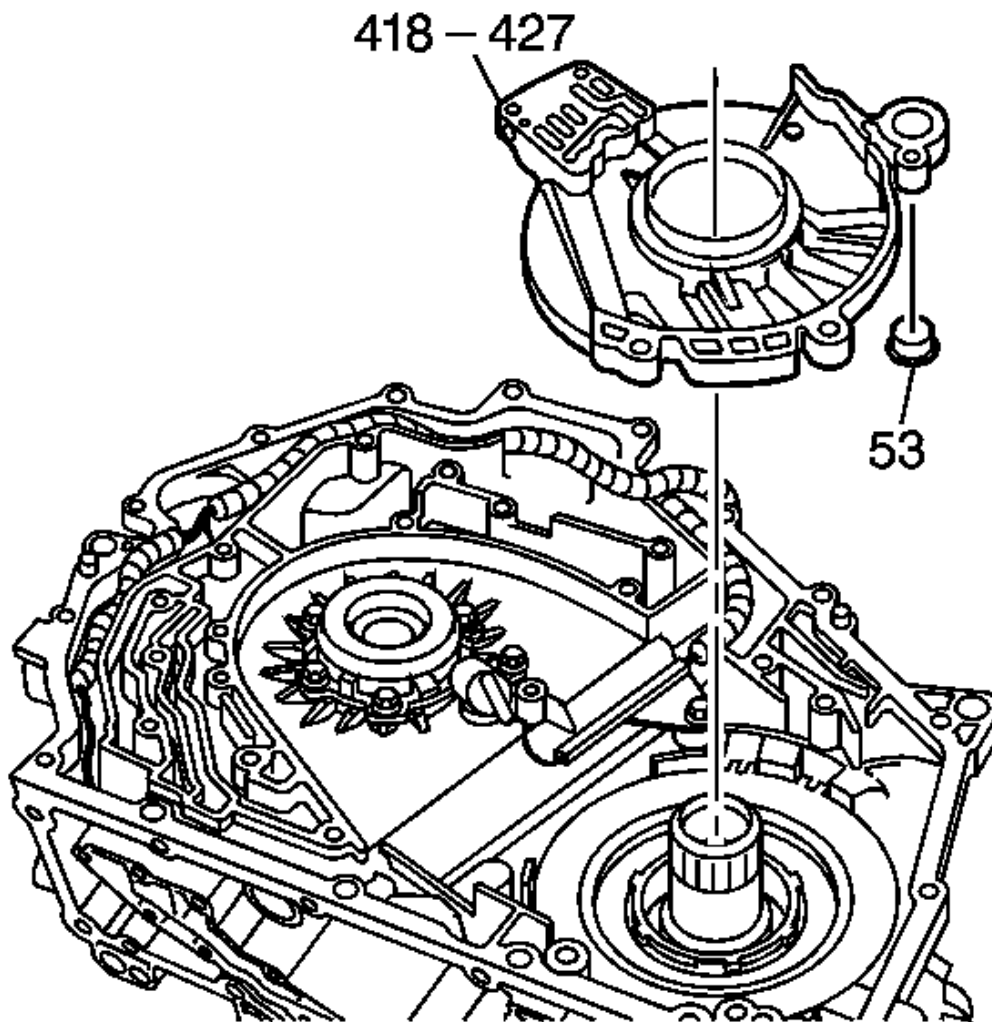


Fig. 32: Identifying Driven Sprocket Support
Courtesy of GENERAL MOTORS COMPANY

4. Remove the driven sprocket support assembly (418-427)
5. Inspect the scavenge tube case area for a dislodged seal (53) which may have become dislodged from the driven sprocket support assembly (418-427) when the scavenge tube was previously removed.

INPUT SPEED SENSOR AND WIRING HARNESS REMOVAL

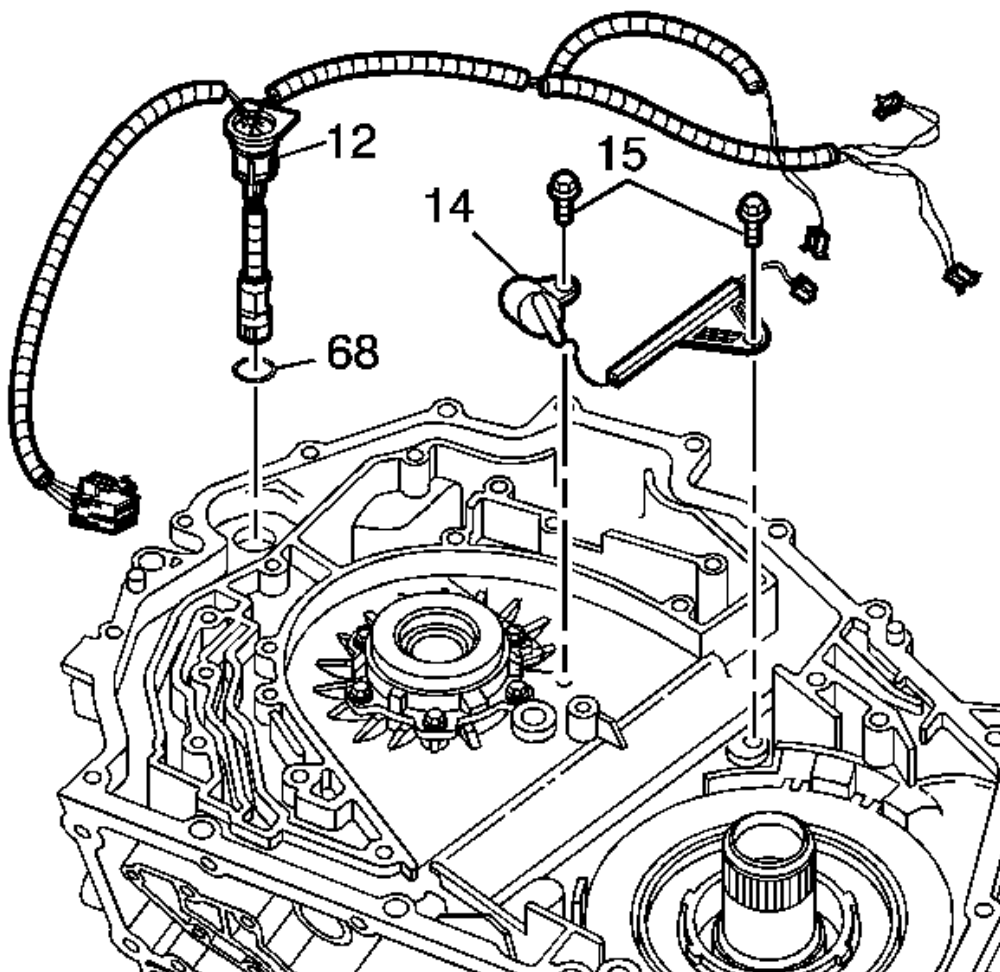


Fig. 33: View Of Automatic Transmission Wiring Harness Assembly Retaining Bolts
Courtesy of GENERAL MOTORS COMPANY

1. Remove the two 8 mm bolts (15) from the automatic transmission input (shaft) speed (A/T ISS) sensor and the retainer.
2. Disconnect the A/T ISS (14) and the harness.
3. Remove the pass through connector and the automatic transmission wiring harness assembly (12) and O-ring (68) from the case. Remove by pushing the three tabs inward from the outside of the case.

SECOND CLUTCH PLATES AND REVERSE CLUTCH REMOVAL

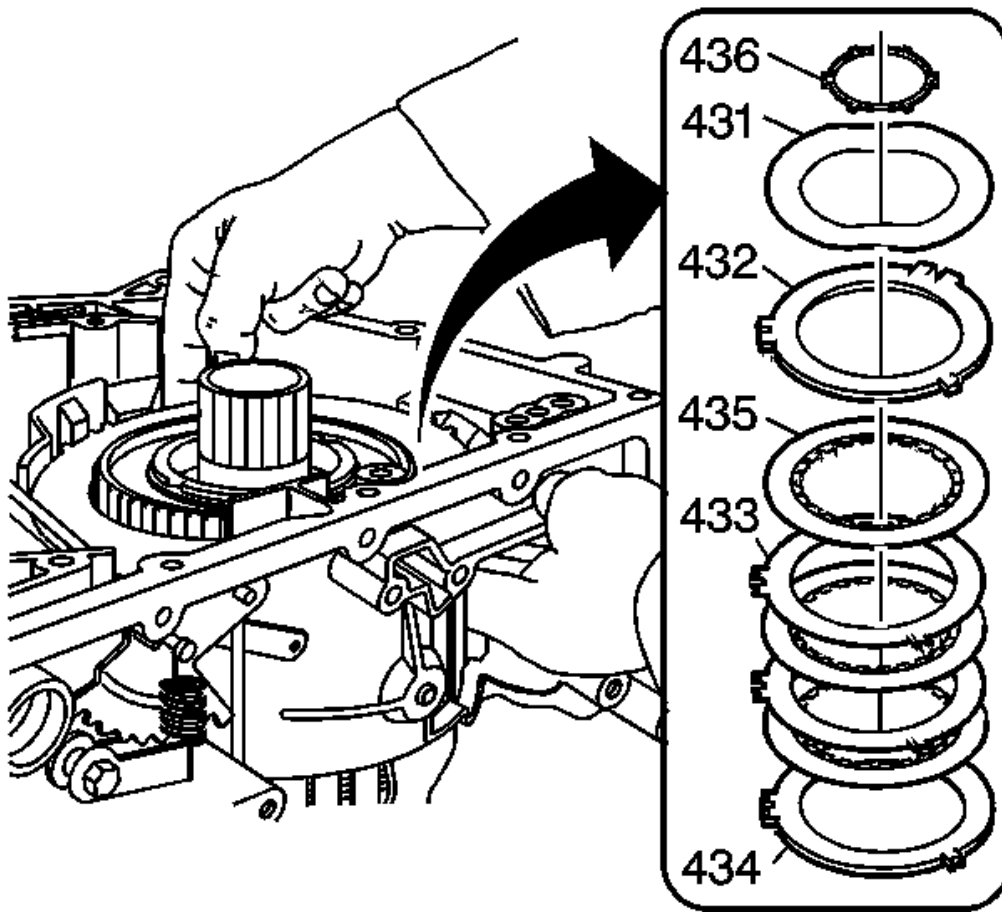


Fig. 34: View Of Second Clutch Plates
Courtesy of GENERAL MOTORS COMPANY

1. Remove the second clutch steel assembly (431-435). Push up near the scavenge tube channel and the bottom pan side.
2. Remove the reverse clutch support thrust washer (436).

4TH BAND AND THIRD CLUTCH/REACTION SHELL REMOVAL

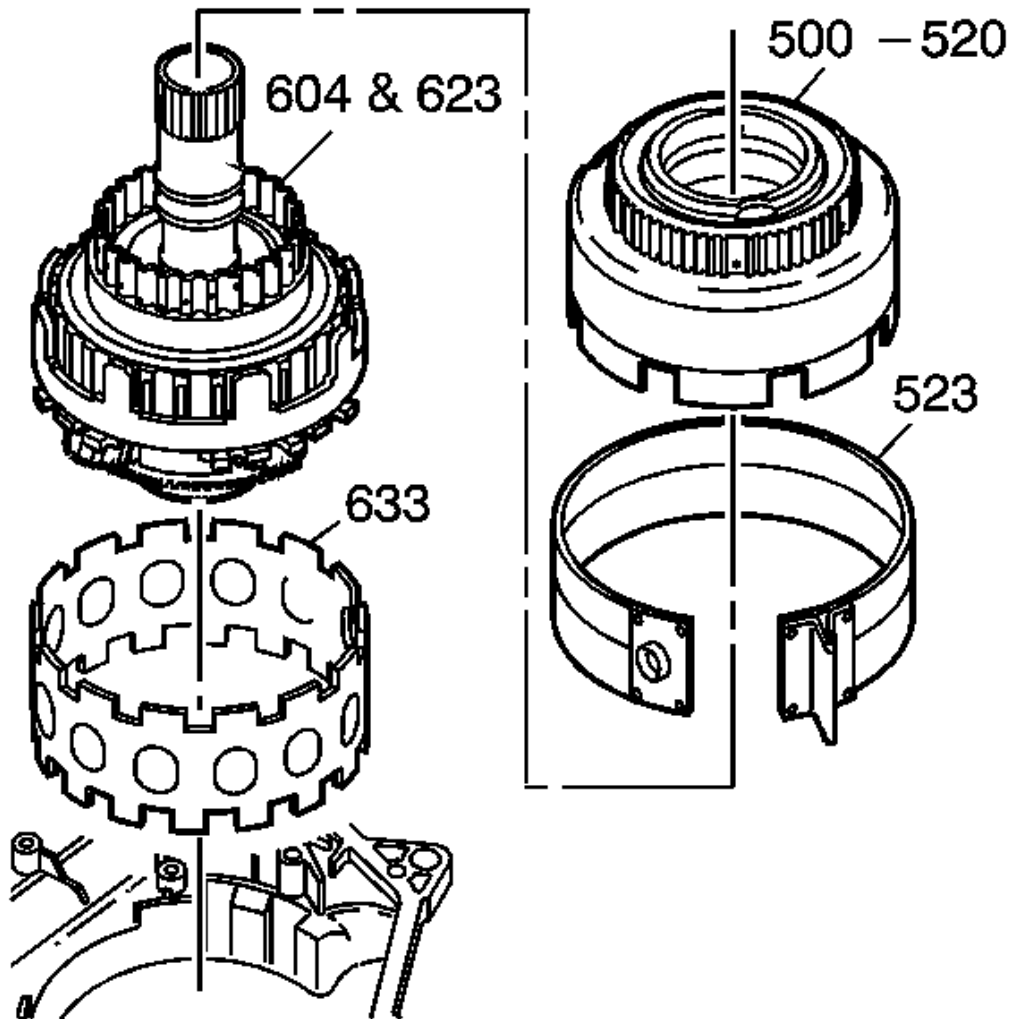


Fig. 35: Locating Reverse Clutch Housing & Second Sprag Assembly
Courtesy of GENERAL MOTORS COMPANY

1. Remove the reverse clutch housing and the second sprag assembly (500-520). Grasp the second sprag race to remove.
2. Remove the 4th band (523).
3. Remove the third clutch and the reaction carrier assemblies. Grasp the input shaft to remove the third clutch and reaction carrier assembly (604, 623).
4. Remove the reaction carrier shell (633).

PARK PAWL REMOVAL

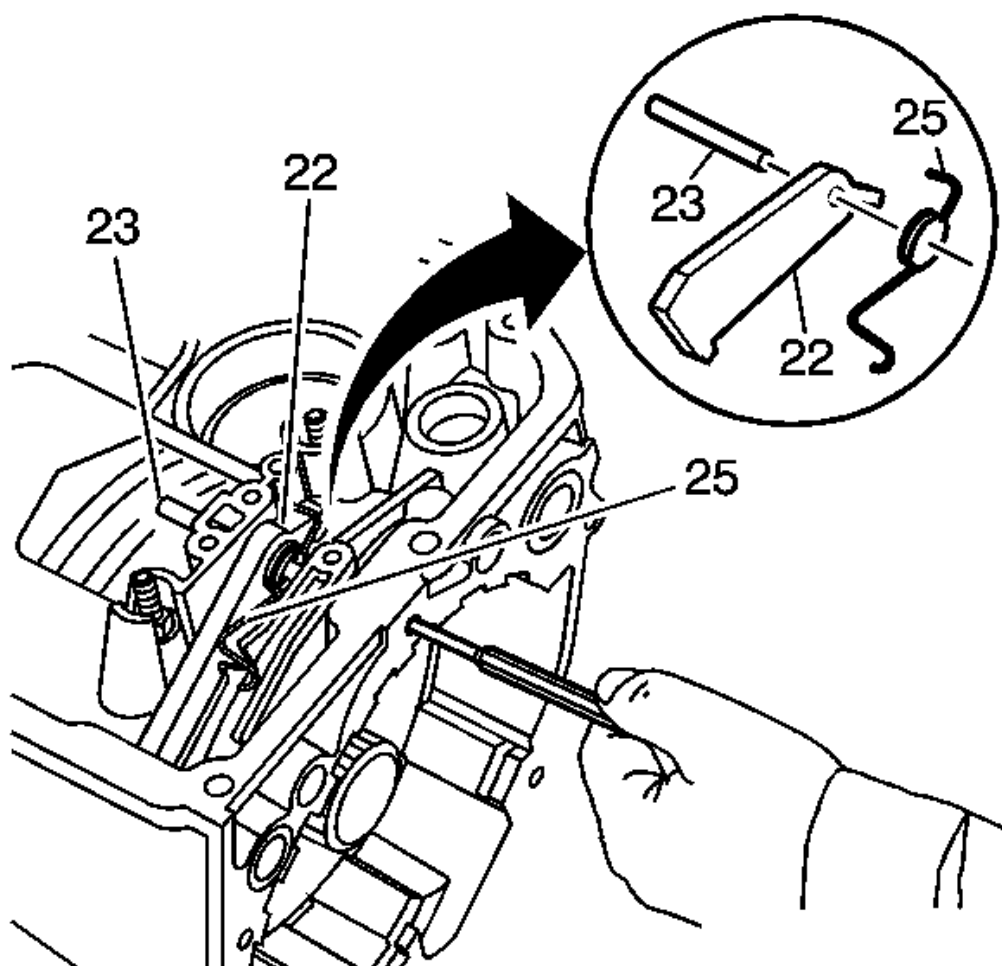


Fig. 36: Expanded View Of Parking Pawl, Spring & Pivot Pin
Courtesy of GENERAL MOTORS COMPANY

1. Move the manual shaft out of the Park position.
2. Push the parking pawl pivot pin (23) towards the side cover with a pin punch. Push down on the spring while driving the pin out. Remove the pivot pin.
3. Remove the parking pawl (22) and remove the spring (25).

FORWARD CLUTCH PLATE ASSEMBLY AND LOW AND REVERSE BAND REMOVAL

Special Tools

J 39053 Forward and Coast Clutch Assembly Puller

For equivalent regional tools, refer to **Special Tools** .

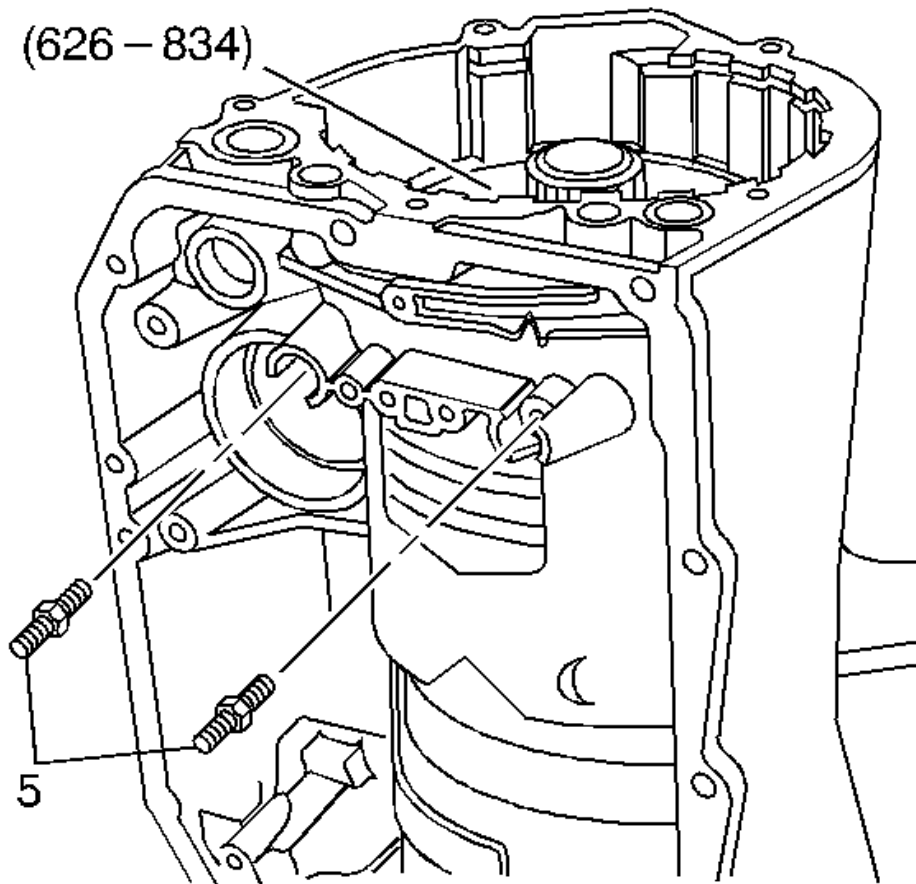


Fig. 37: Removing Forward Clutch Support Bolts
Courtesy of GENERAL MOTORS COMPANY

1. Rotate the transmission so that the forward clutch assembly (626-834) faces up.
2. Remove the two 13-mm forward clutch support bolts (5) from the case.

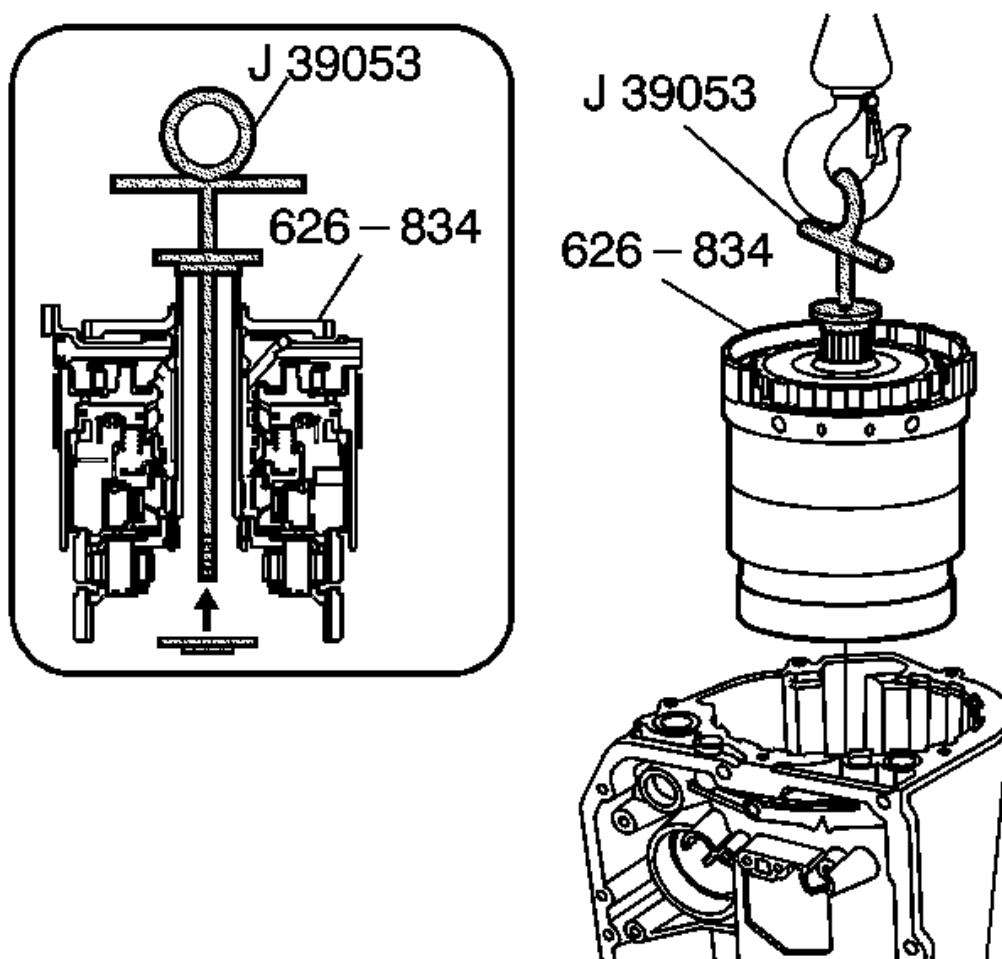


Fig. 38: Securing & Lifting Forward And Coast Clutch Assembly
Courtesy of GENERAL MOTORS COMPANY

WARNING: The forward and coast clutch assembly weighs approximately 50 lbs. Personal injury may result if you drop the assembly.

3. Install the **J 39053** Forward and Coast Clutch Assembly Puller. Using a chain hoist or suitable lifting equipment, secure and lift the forward and coast clutch assembly (626-834) out of the case.

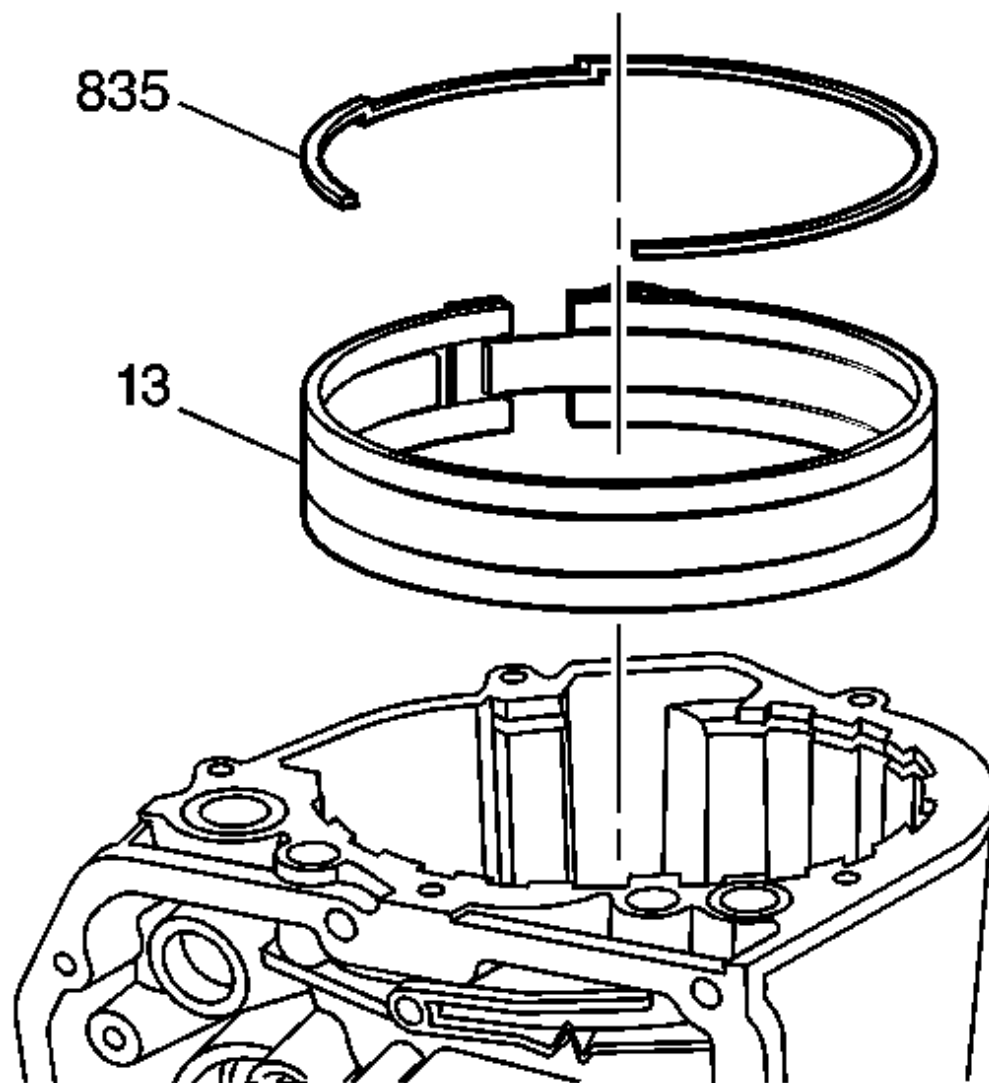


Fig. 39: Locating Fretting Ring

Courtesy of GENERAL MOTORS COMPANY

4. Remove the fretting ring (835).
5. Remove the Lo and Reverse band (13).

MANUAL SHIFT DETENT LEVER WITH MANUAL SHIFT SHAFT ASSEMBLY REMOVAL

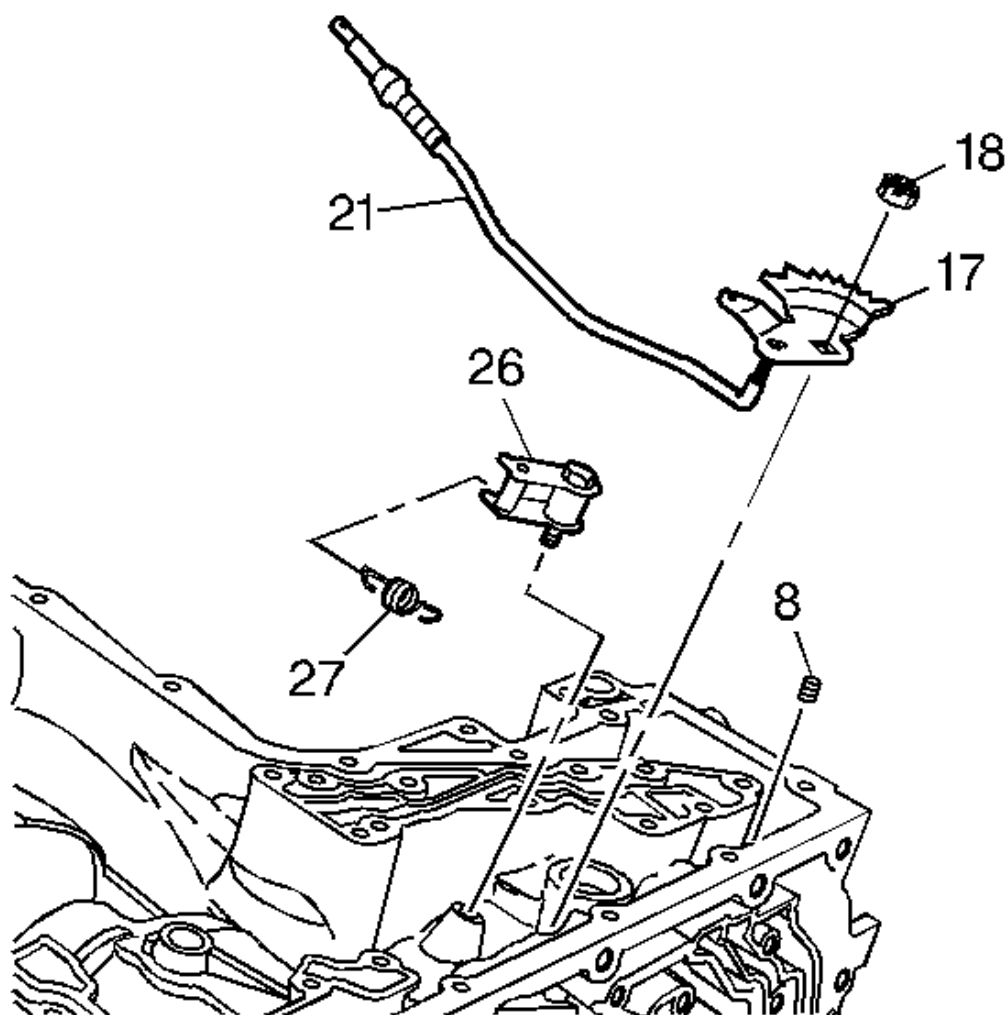


Fig. 40: Locating Detent Lever, Actuator Rod & Manual Shaft Nut
Courtesy of GENERAL MOTORS COMPANY

1. Rotate the transmission so the bottom is facing up.
2. Using a pair of pliers, grasp the detent roller end of the detent spring (27). Remove the detent spring (27).
3. Remove the 13 mm detent roller bolt pivot arm, the sleeve, and the washer (26).
4. Remove the 15 mm manual shaft nut (18). You must hold the detent lever (17) in place when removing the manual shaft nut (18) in order to prevent damage to the actuator rod (21).
5. Remove the detent lever (17) and the actuator rod (21)

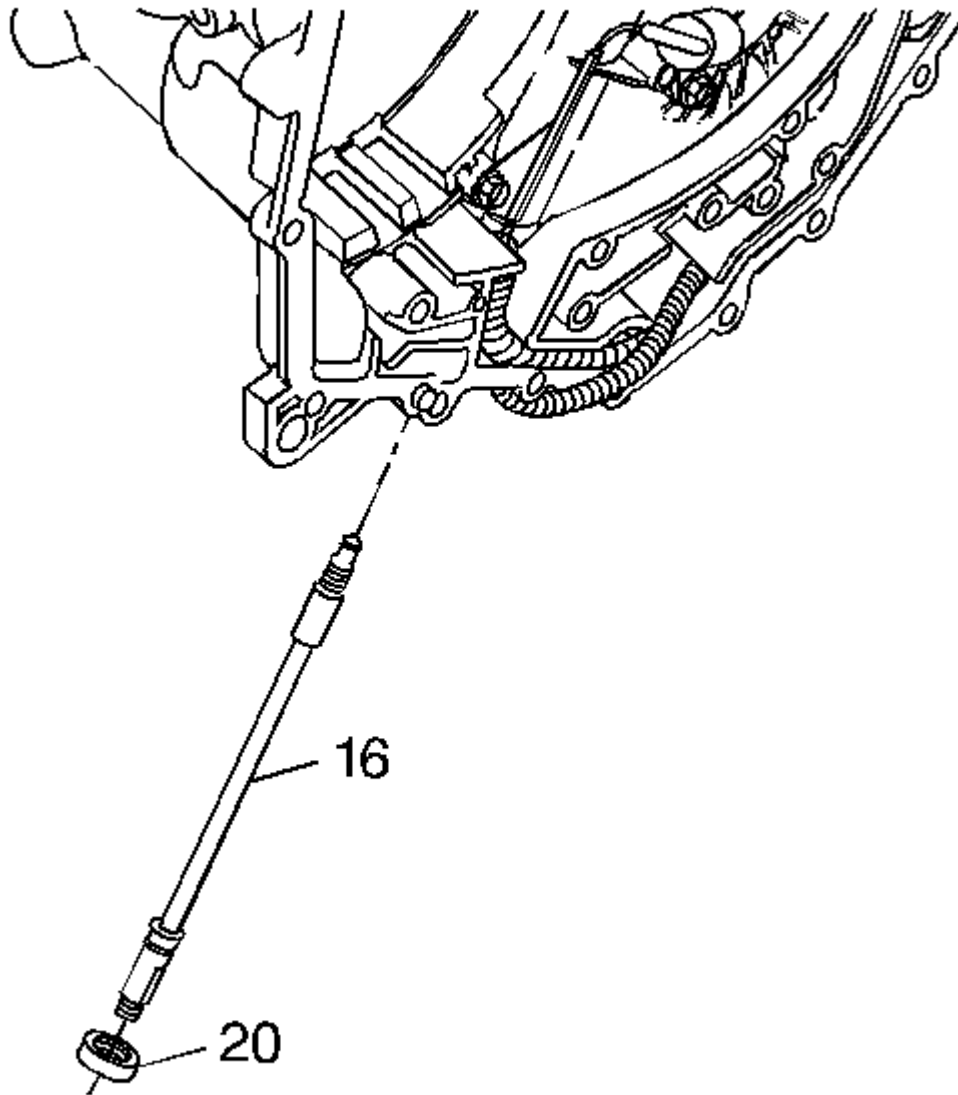


Fig. 41: View of Manual Shaft & Seal
Courtesy of GENERAL MOTORS COMPANY

6. Remove the following parts:
 - The manual shaft (16) out through the top of the bell housing
 - The manual shaft seal (20)

CASE INSPECTION

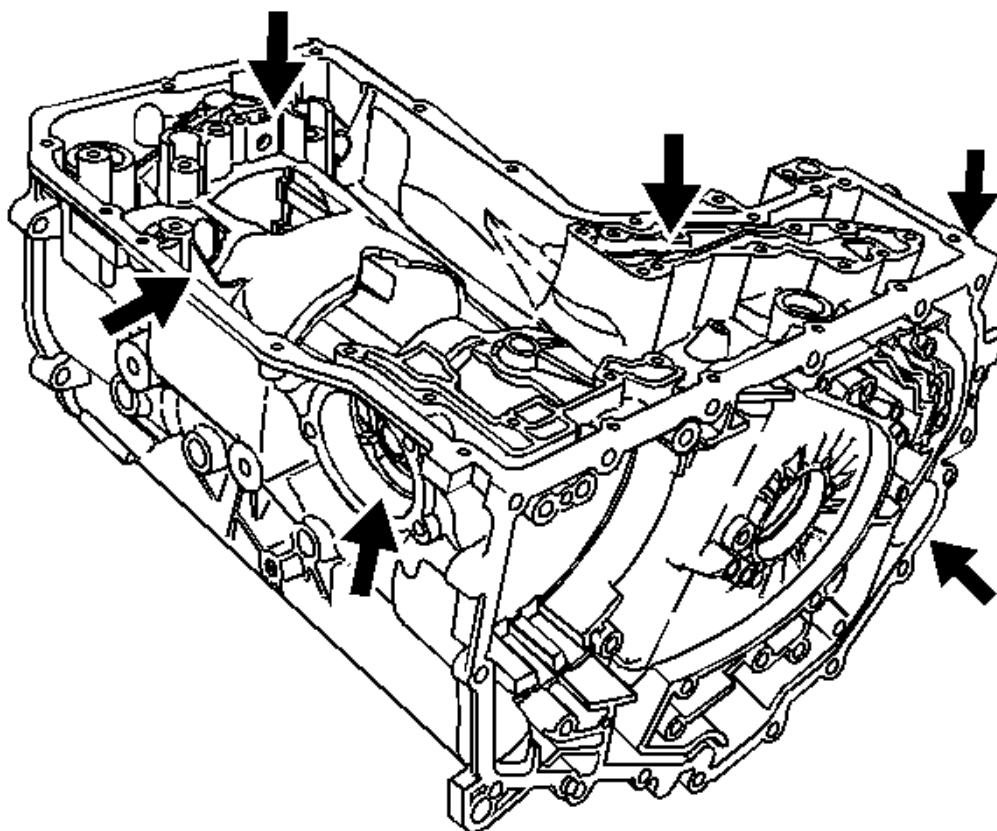


Fig. 42: Identifying Case Inspection Points
Courtesy of GENERAL MOTORS COMPANY

CAUTION: Use J 36850 or equivalent during assembly in order to retain checkballs or to lubricate components. Lubricants other than the recommended assembly lube changes the transmission fluid characteristics and causes undesirable shift conditions or filter clogging.

1. Clean the case thoroughly with solvent. Air dry.
 - Do not wipe with a cloth or with paper shop towels.
 - Remove all residual sealant. Clean the case threads.
2. Inspect the case channel plate side for the following:
 - Unmarred gasket sealing surfaces that need to be cleaned
 - Bolt holes with stripped threads

- Porosity between oil passages
- Cracks in the casting
- Damaged snap ring grooves
- Damaged band anchors
- Leaking drain plugs

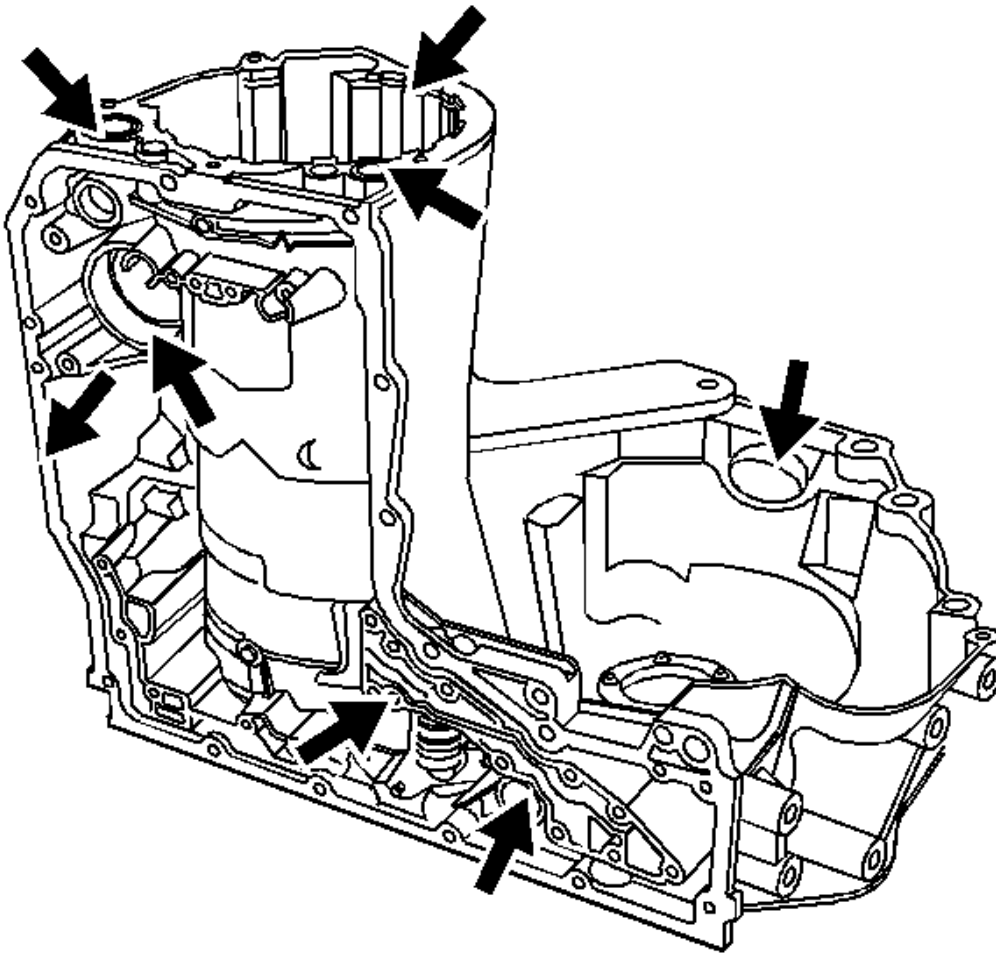


Fig. 43: Identifying Servo Bores Inspection Areas
Courtesy of GENERAL MOTORS COMPANY

3. Inspect all servo bores for the following:
 - Scratches or scoring
 - Porosity

DRIVE SPROCKET SUPPORT AND SEAL REPLACEMENT**Special Tools**

J 39061 Converter Seal Installer

For equivalent regional tools, refer to **Special Tools** .

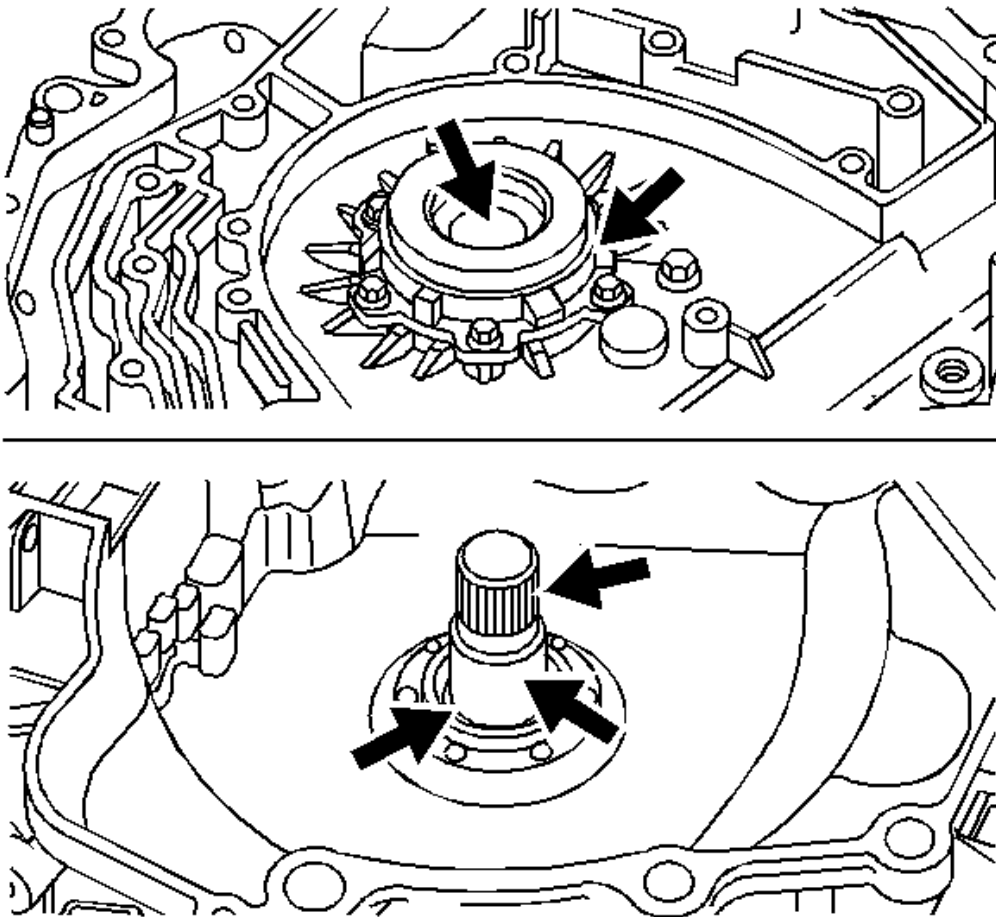


Fig. 44: Locating Inspection Areas Drive Sprocket Support
Courtesy of GENERAL MOTORS COMPANY

1. Inspect the drive sprocket support for the following:
 - Spline damage
 - Journal damage

- Bushing damage
- Blocked converter drain holes

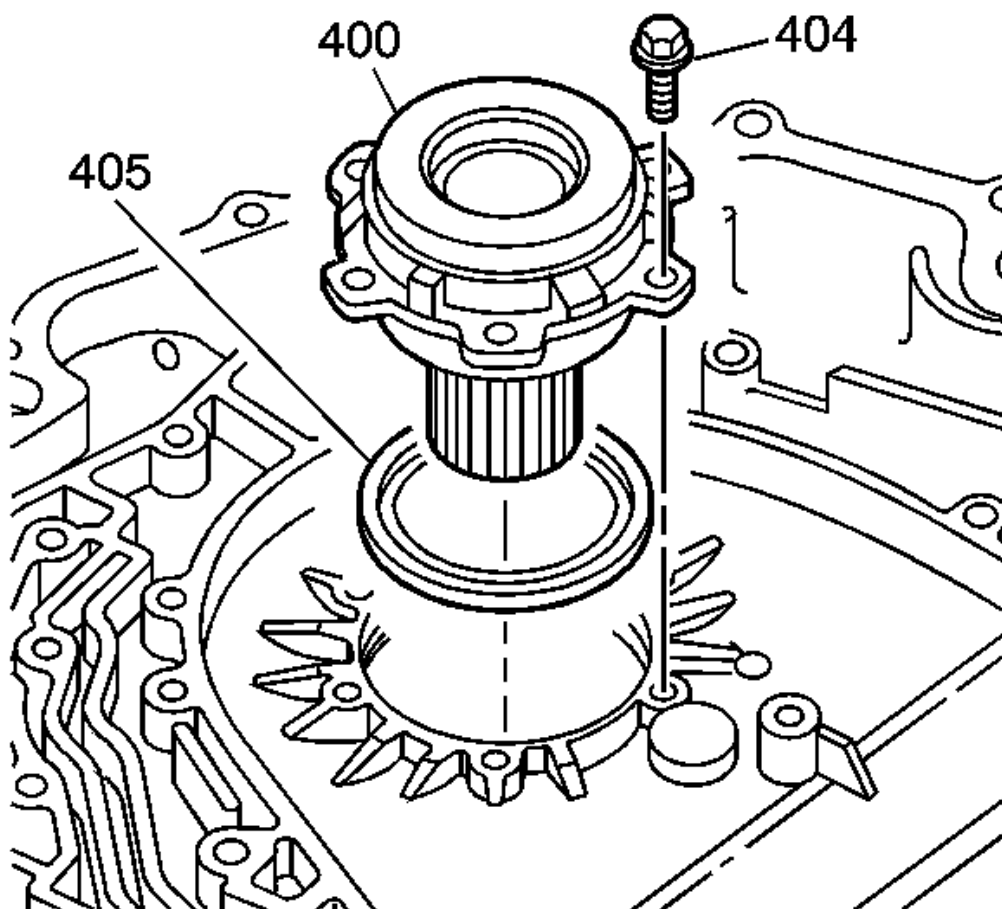


Fig. 45: View Of Drive Sprocket Support & Seal
 Courtesy of GENERAL MOTORS COMPANY

2. Remove the six 8 mm drive sprocket support bolts (404).
3. Remove the drive sprocket support (400) and the drive sprocket support seal (405).

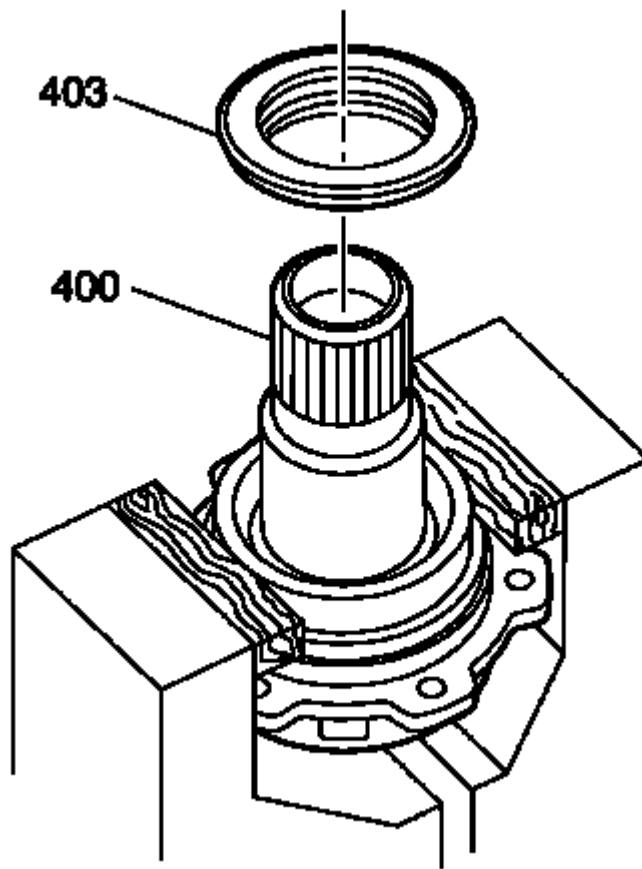


Fig. 46: Converter Helix Seal

Courtesy of GENERAL MOTORS COMPANY

4. Place the drive sprocket support (400) in a soft jaw vise. Use a wedge-shaped chisel in order to remove the converter helix seal (403).

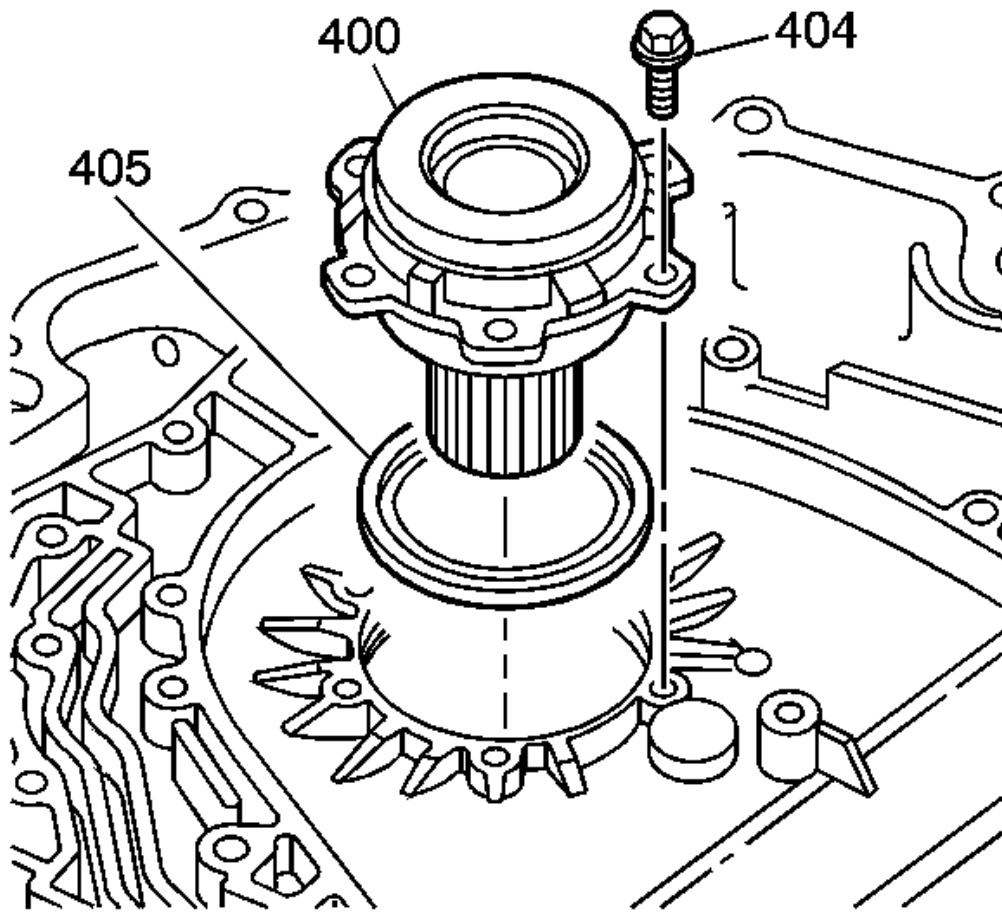


Fig. 47: View Of Drive Sprocket Support & Seal
 Courtesy of GENERAL MOTORS COMPANY

5. Install a new drive sprocket support seal (405). Install the drive sprocket support (400) into the case.

CAUTION: Refer to Fastener Caution .

6. Install the six 8 mm bolts (404) and using a star pattern, tighten the bolts to 11-13 N.m (8.0-9.5 lb ft).

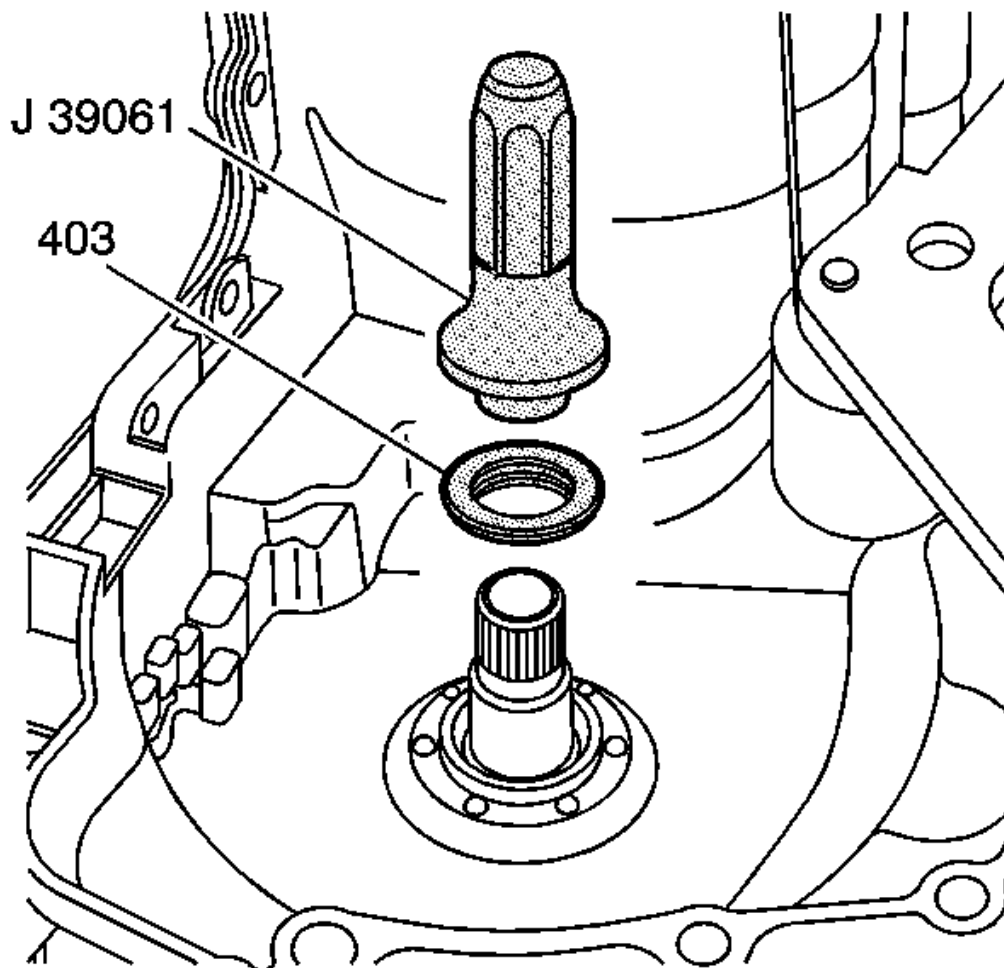


Fig. 48: Converter Seal Installer & Helix Seal
Courtesy of GENERAL MOTORS COMPANY

7. Use the **J 39061** seal installer in order to install the new converter helix seal (403).

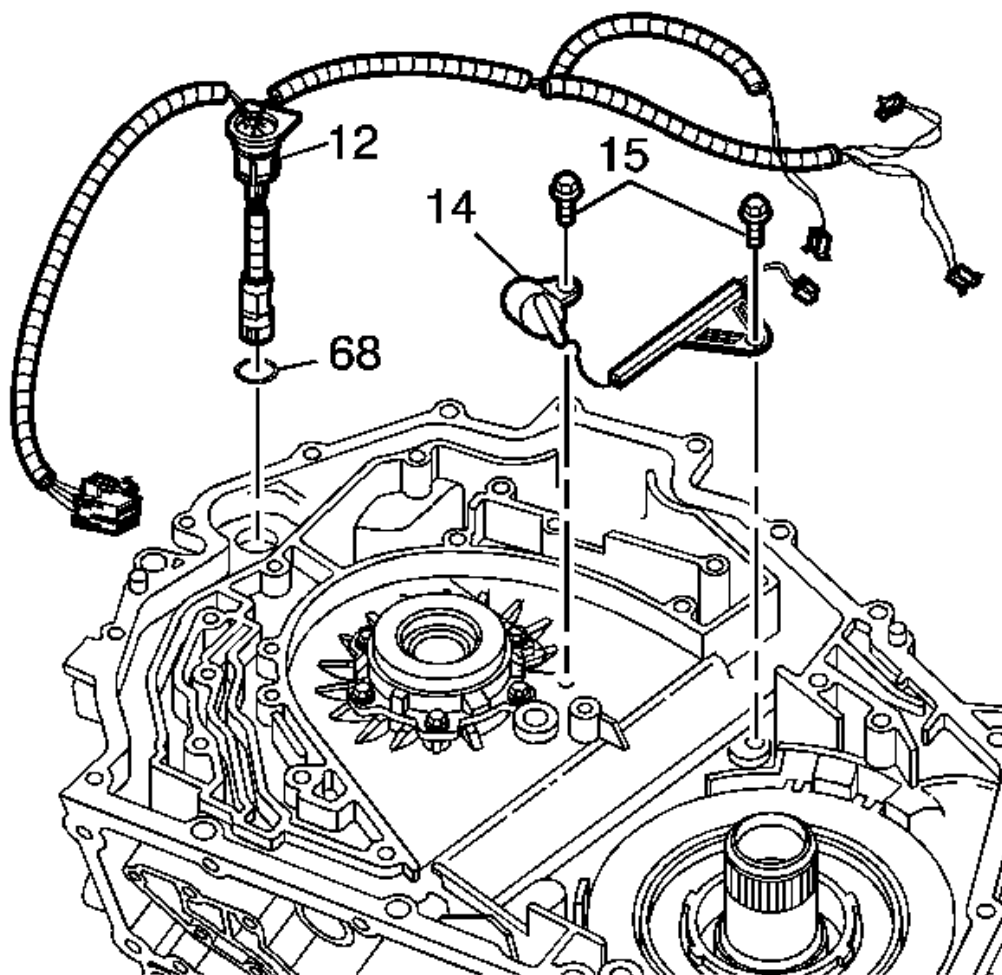


Fig. 49: View Of Automatic Transmission Wiring Harness Assembly Retaining Bolts
Courtesy of GENERAL MOTORS COMPANY

8. Inspect the wiring harness (12) for the following:
 - Cut or pinched wires
 - Cut wire insulation
 - Bent or broken connectors
9. Install the wiring harness (12) into the case, with the notch going toward the inside of the case. Make sure that the harness snaps into place at the pass through connector (12). Insert the remainder of the harness into the valleys of the case housing.
10. Install the input speed sensor (14) and its bolt (15).
11. Install the input speed sensor wire harness bracket to the center of the case. Install its bolt (15).

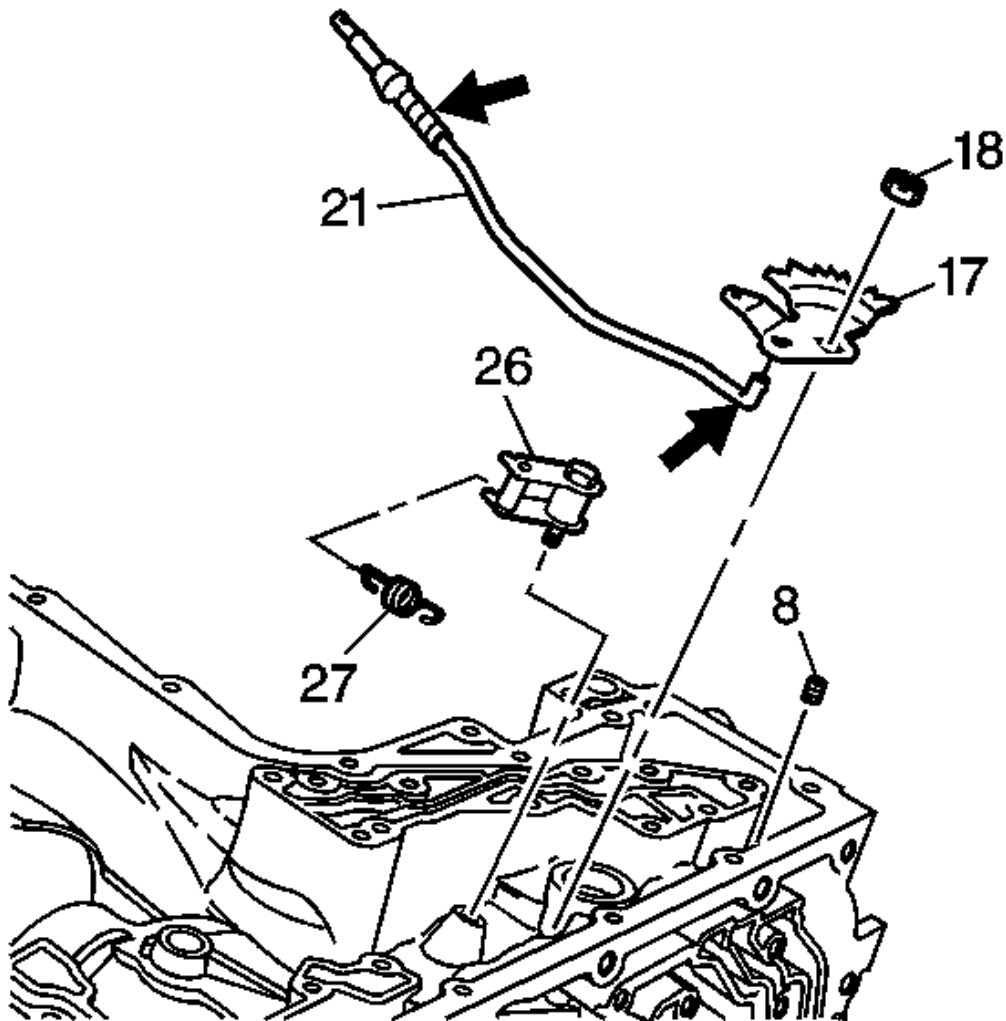


Fig. 50: Inspection Areas On Actuator Rod
 Courtesy of GENERAL MOTORS COMPANY

12. Inspect the actuator park lock sleeve for excessive wear. Inspect the actuator rod (21) for a cracked end, a bent rod, or a broken spring.

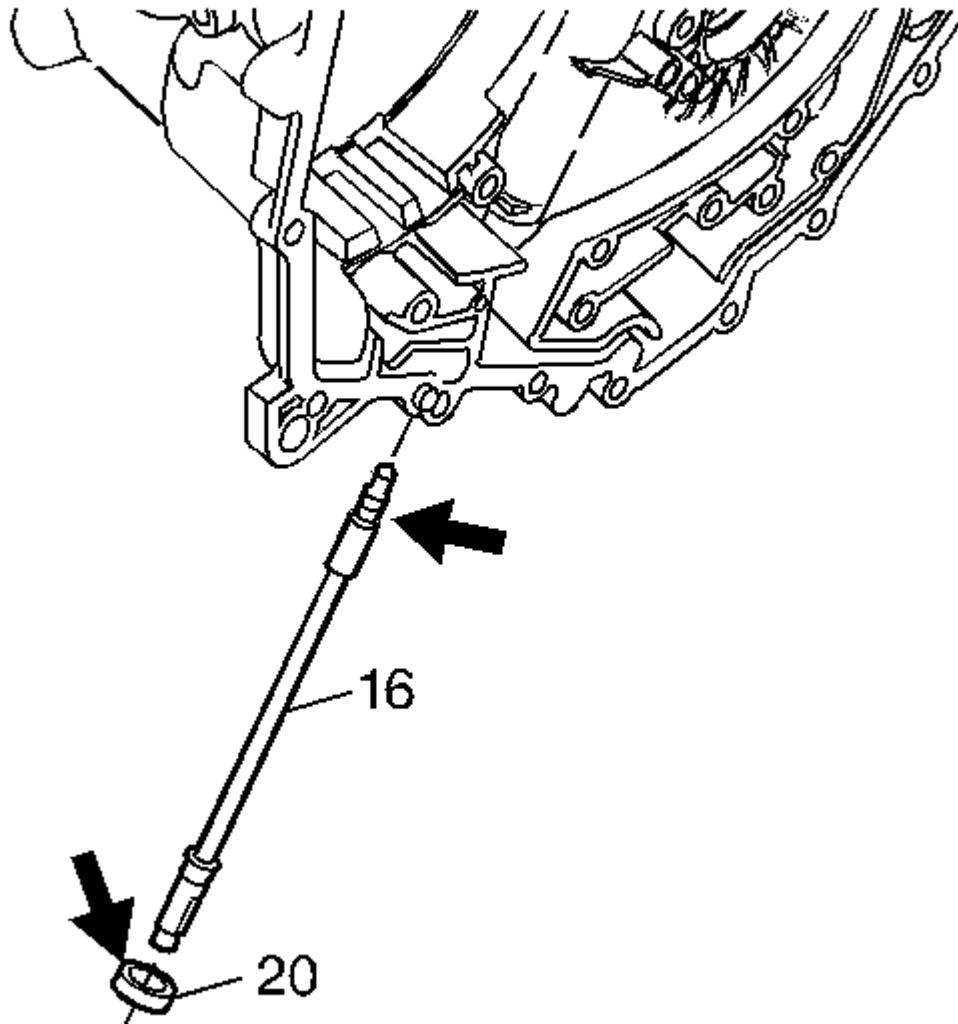


Fig. 51: Locating Inspection Areas Of Manual Shaft
 Courtesy of GENERAL MOTORS COMPANY

13. Inspect the threads on the manual shaft (16). Inspect the machined area of the manual shaft (16), where the manual shaft seal (20) rides, for nicks and burrs.

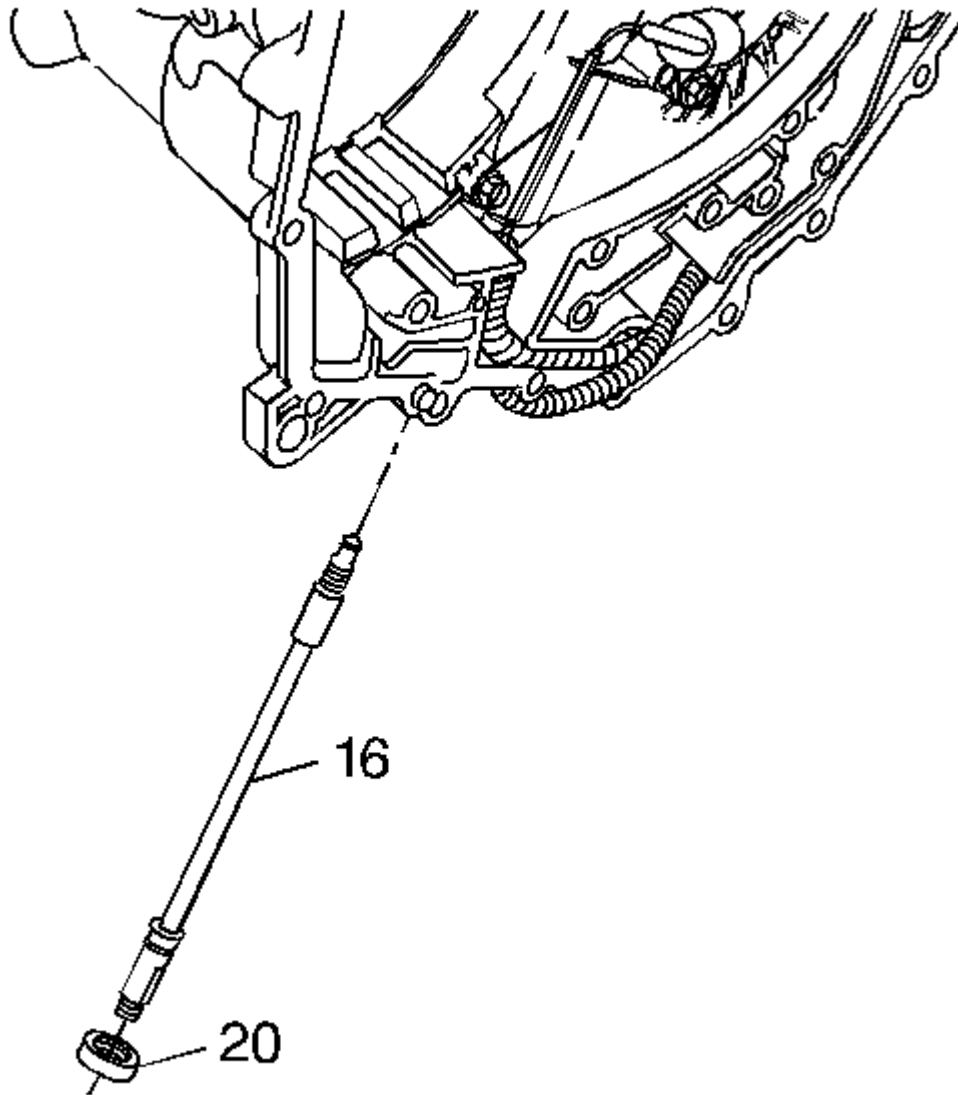


Fig. 52: View of Manual Shaft & Seal
Courtesy of GENERAL MOTORS COMPANY

14. Install the new manual shaft seal (20) onto the manual shaft (16).
15. Place the manual shaft (16) through the case.
16. Align the notch on the input speed sensor wire harness bracket to the groove on the manual shaft.
17. Tighten bolt (15) to 11-13 N.m (8.0-9.5 lb ft).
18. Seat the manual shaft seal (20) with the appropriate socket.

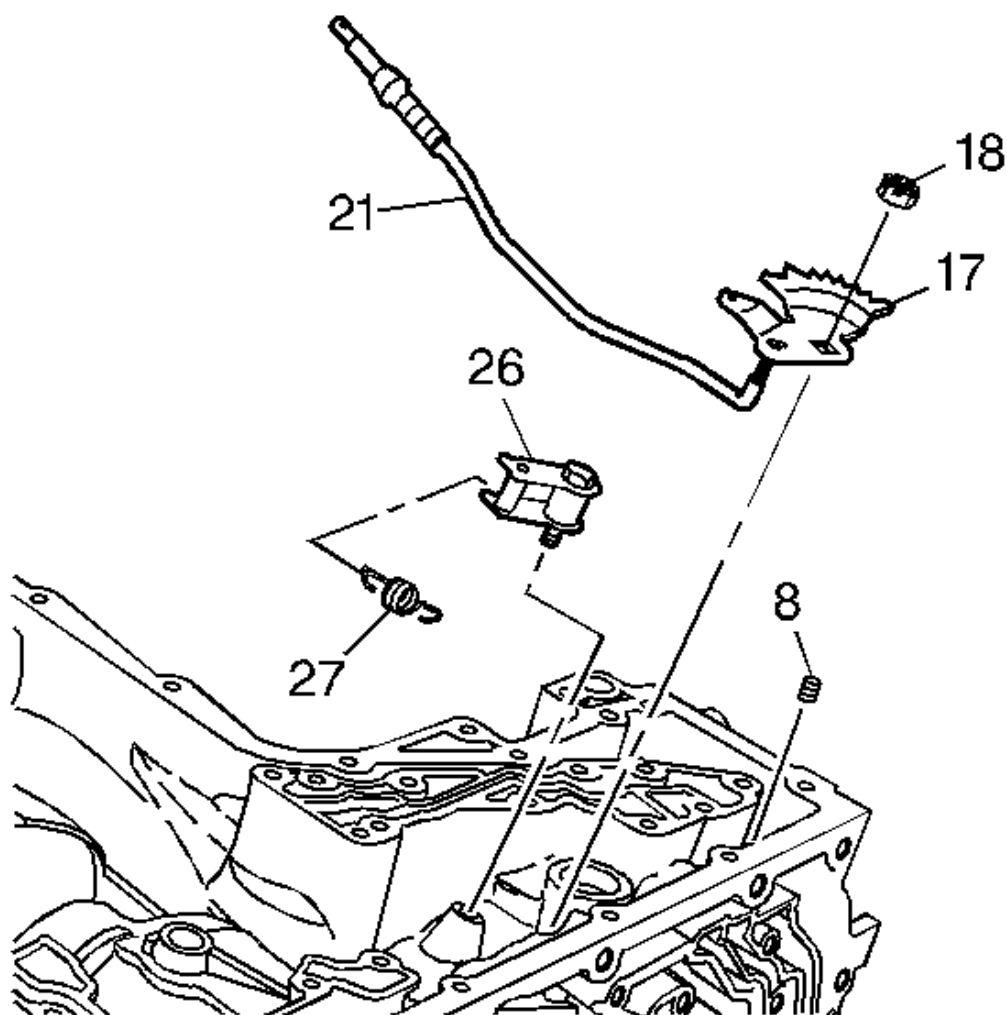


Fig. 53: Locating Detent Lever, Actuator Rod & Manual Shaft Nut
Courtesy of GENERAL MOTORS COMPANY

19. Attach the new detent lever (17), the actuator rod (21) and the manual shaft nut (18) to the manual shaft. Hold the detent lever (17) stationary with a screwdriver in order to prevent bending of the actuator rod (21). Slide the actuator rod (21) into the actuator park lock sleeve.
20. Tighten the manual shaft nut (18) to 27-34 N.m (20-25 lb ft).
21. Install the detent roller assembly washer (26), the pivot arm, and the sleeves. Start the pivot bolt by hand. Tighten the pivot bolt to 8-14 N.m (6-10 lb ft).
22. Tighten the pivot bolt to 27-34 N.m (20-25 lb ft).
23. Install the detent return spring (27) to the detent roller assembly (26) and to the manual shaft. Install the

spring with the small hook end around of the top of the manual shaft.

FORWARD AND COAST CLUTCH ASSEMBLY OVERHAUL

Special Tools

- **J 39055** Forward Clutch Inner Seal Protector
- **J 39056** Coast Clutch Seal Protector
- **J 23327** Clutch Spring Compressor
- **J 28585** Snap Ring Remover

For equivalent regional tools, refer to **Special Tools** .

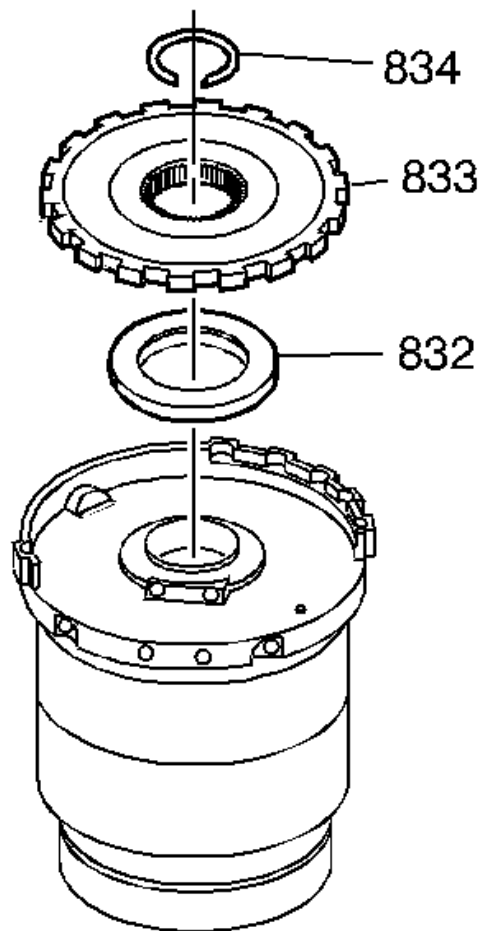


Fig. 54: Parking Lock Gear And The Thrust Bearing And Snap Ring
Courtesy of GENERAL MOTORS COMPANY

1. Using the **J 28585** snap ring remover, remove the snap ring (834) from the final drive sun gear shaft.
2. Remove the parking lock gear (833) and the thrust bearing (832).

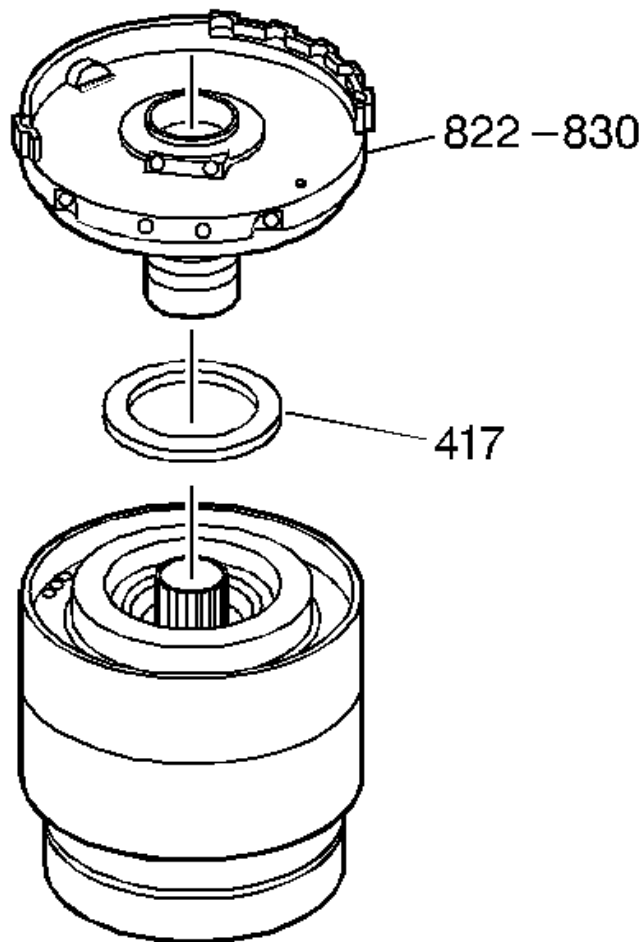


Fig. 55: Locating Low Roller Clutch Assembly, Forward And Coast Clutch Support & Thrust Bearing
Courtesy of GENERAL MOTORS COMPANY

3. Remove the forward and coast clutch support with the low roller clutch assembly (822-830).
4. Remove the thrust bearing (417).

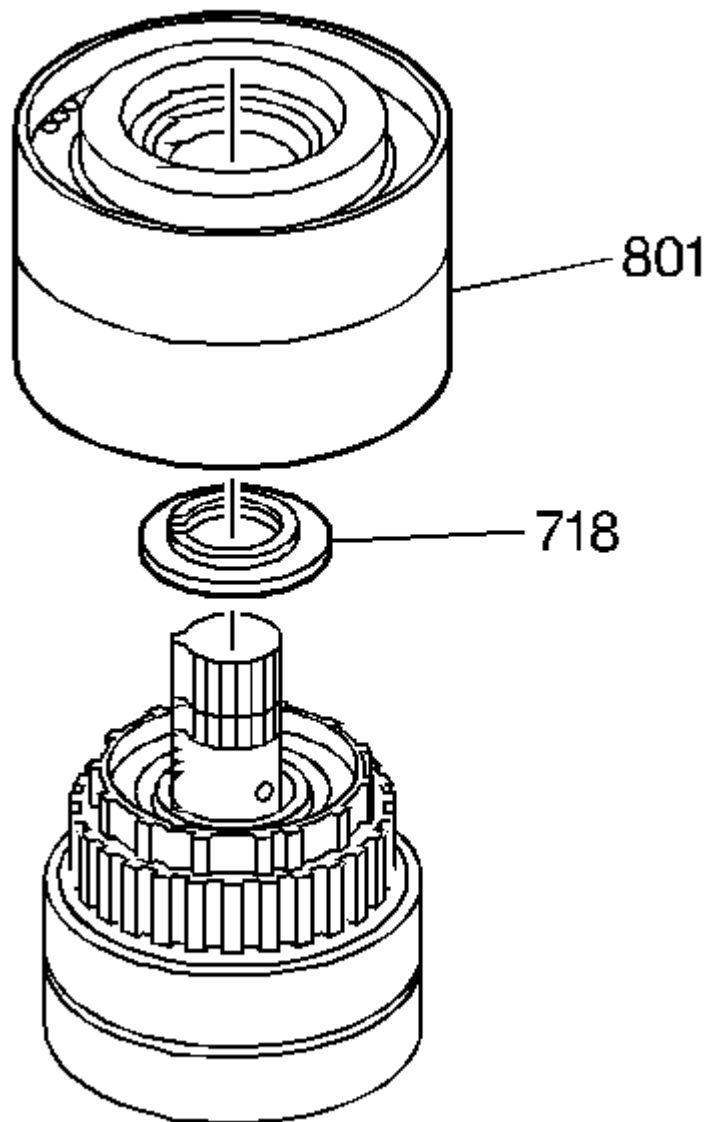


Fig. 56: Identifying Forward & Coast Clutch Housing
 Courtesy of GENERAL MOTORS COMPANY

5. Lift the forward and coast clutch housing (801) off of the coast clutch hub.
6. Remove the thrust bearing (718) from the forward coast clutch housing (801).

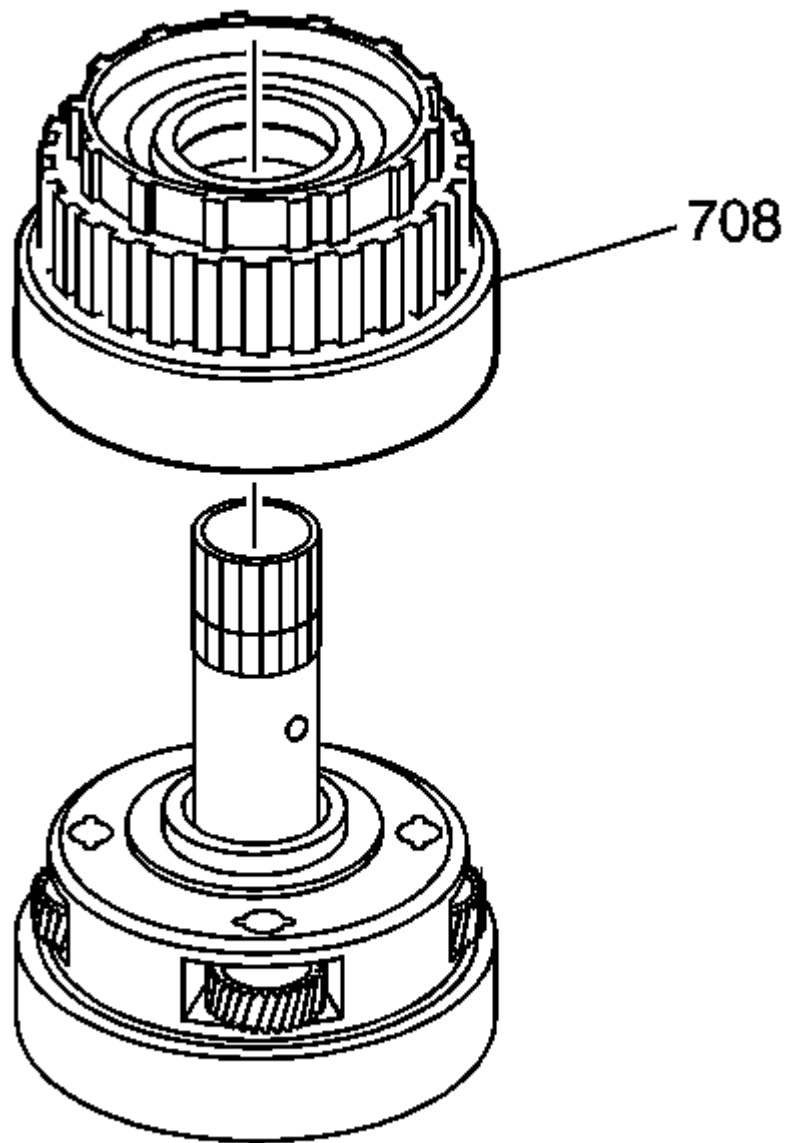


Fig. 57: Identifying Input Carrier With Input Internal Gear And Flange
Courtesy of GENERAL MOTORS COMPANY

7. Separate the input carrier (708) from the input internal gear and flange.

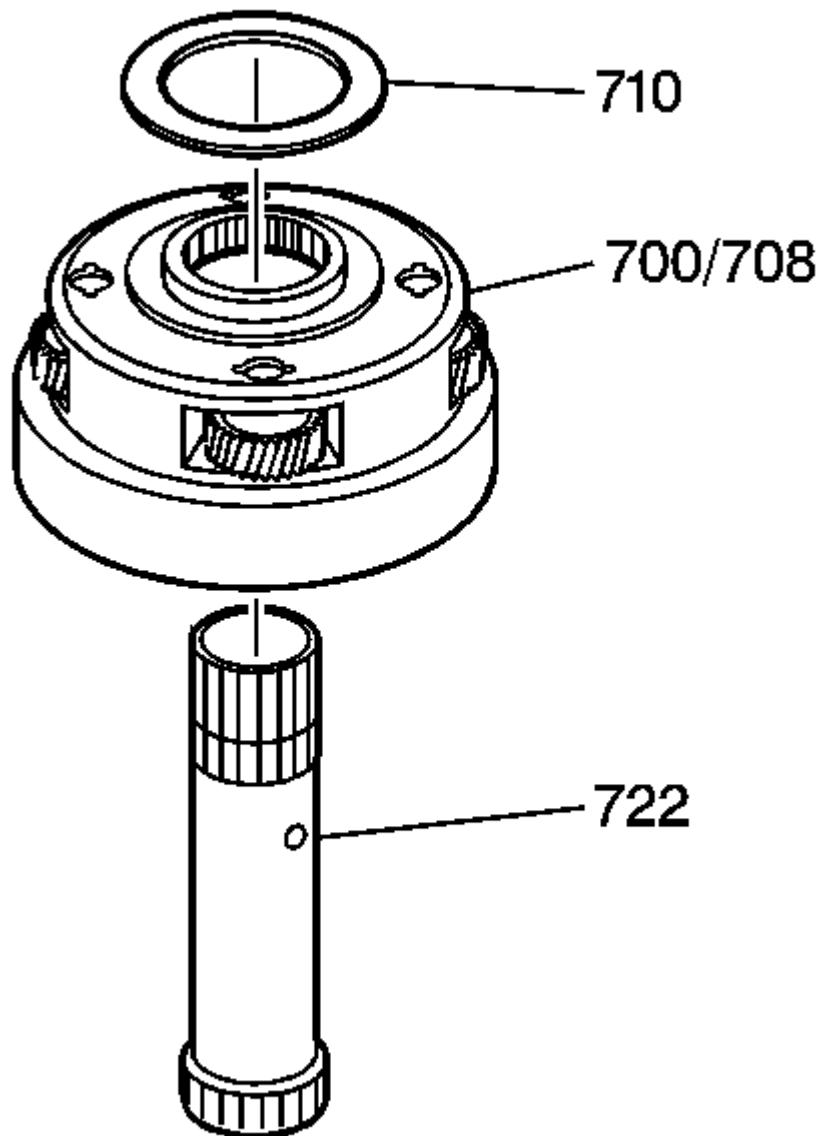


Fig. 58: Input Carrier Assembly & Thrust Bearing
Courtesy of GENERAL MOTORS COMPANY

8. Lift the input carrier assembly (700-708) off of the final drive sun gear shaft (722).
9. Remove the thrust bearing (710) from the input carrier assembly (700-708).

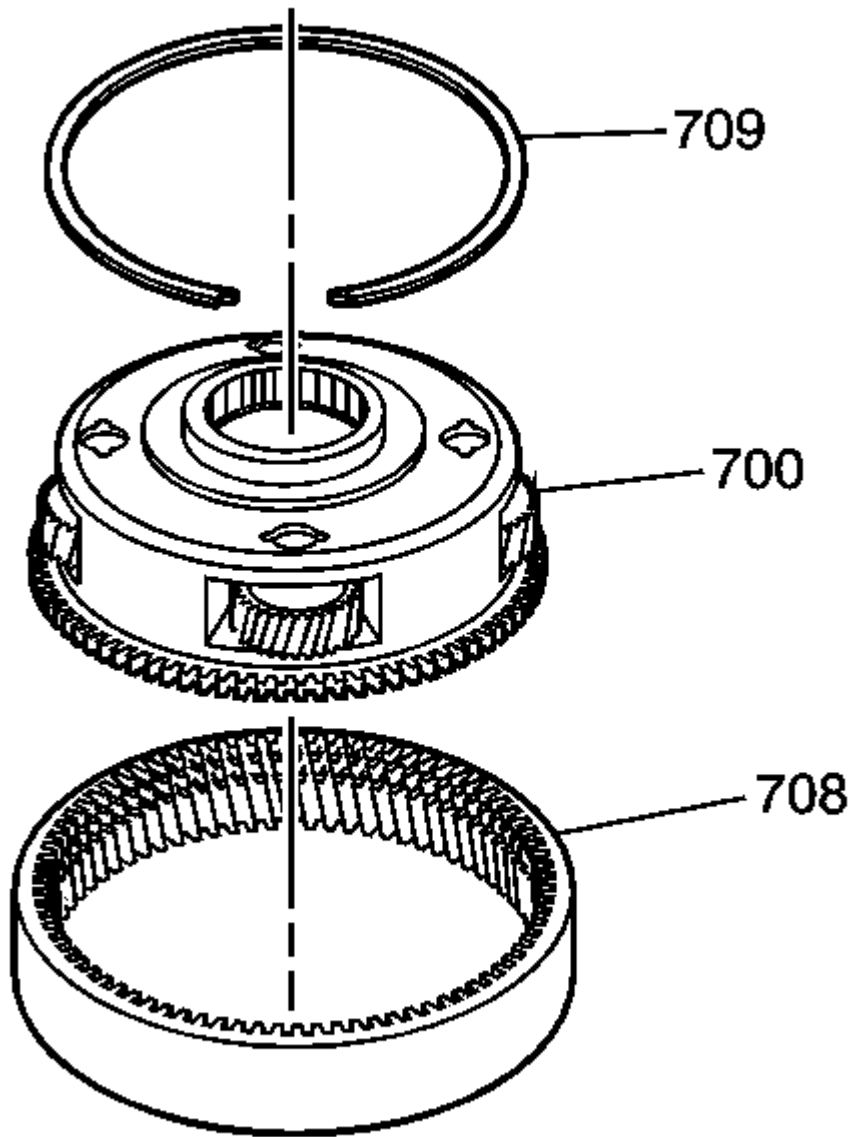


Fig. 59: View Of Input Carrier Assembly, Reaction Internal Gear & Snap Ring
Courtesy of GENERAL MOTORS COMPANY

10. Remove the snap ring (709) in order to separate the input carrier (700) from the reaction internal gear (708). The thrust bearing will stay inside of the input carrier (700).

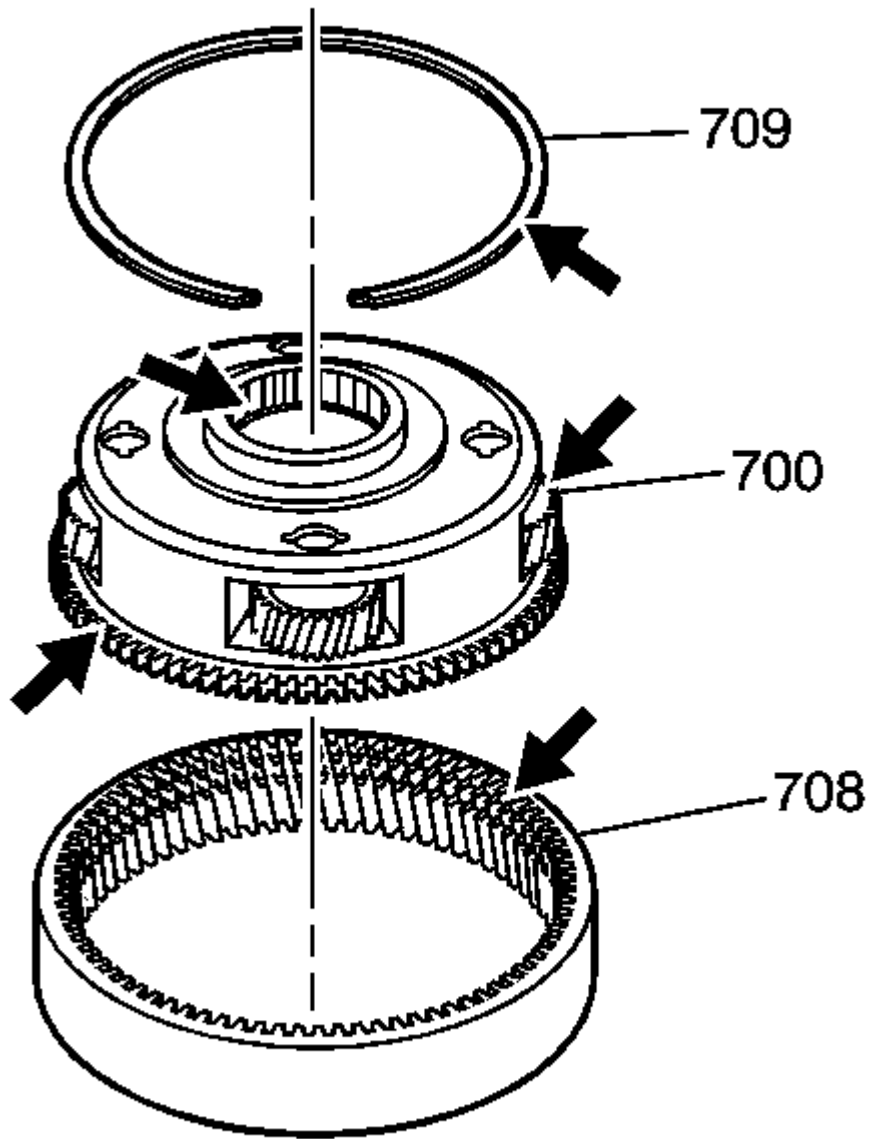


Fig. 60: Identifying Inspection Of Input Carrier Pinions, Reaction Internal Gear & Snap Ring For Damage

Courtesy of GENERAL MOTORS COMPANY

11. Inspect the snap ring (709) for burrs or damage.
12. Inspect the input carrier (700) pinions for nicked or broken teeth.
13. Inspect the input carrier internal gear (708) for broken teeth.

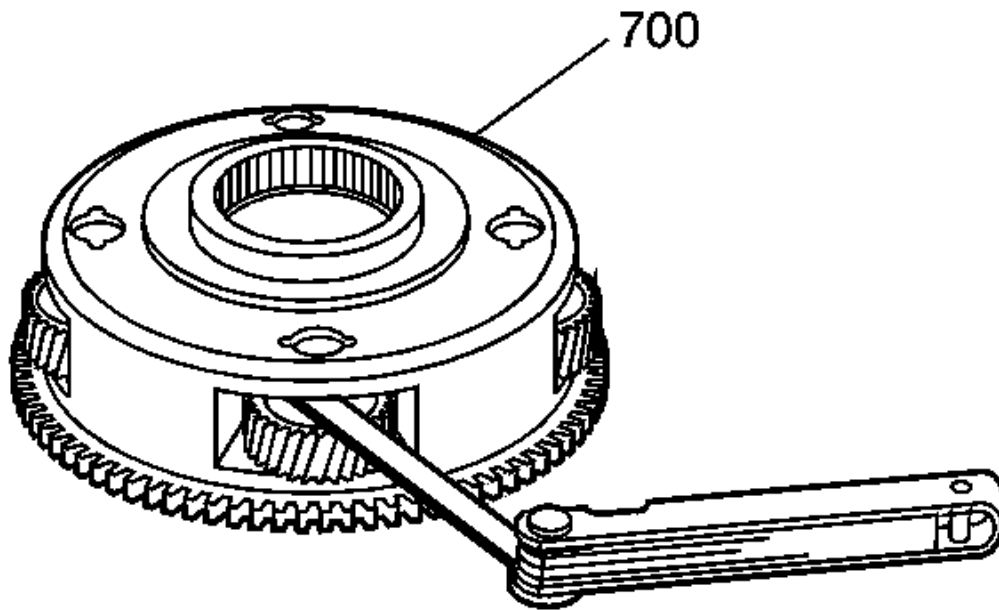


Fig. 61: Measuring Input Carrier End Play With Feeler Gage
Courtesy of GENERAL MOTORS COMPANY

14. With a feeler gauge, measure the input carrier (700) end play. The end play should be within a range of 0.09-0.90 mm (0.003-0.035 in).

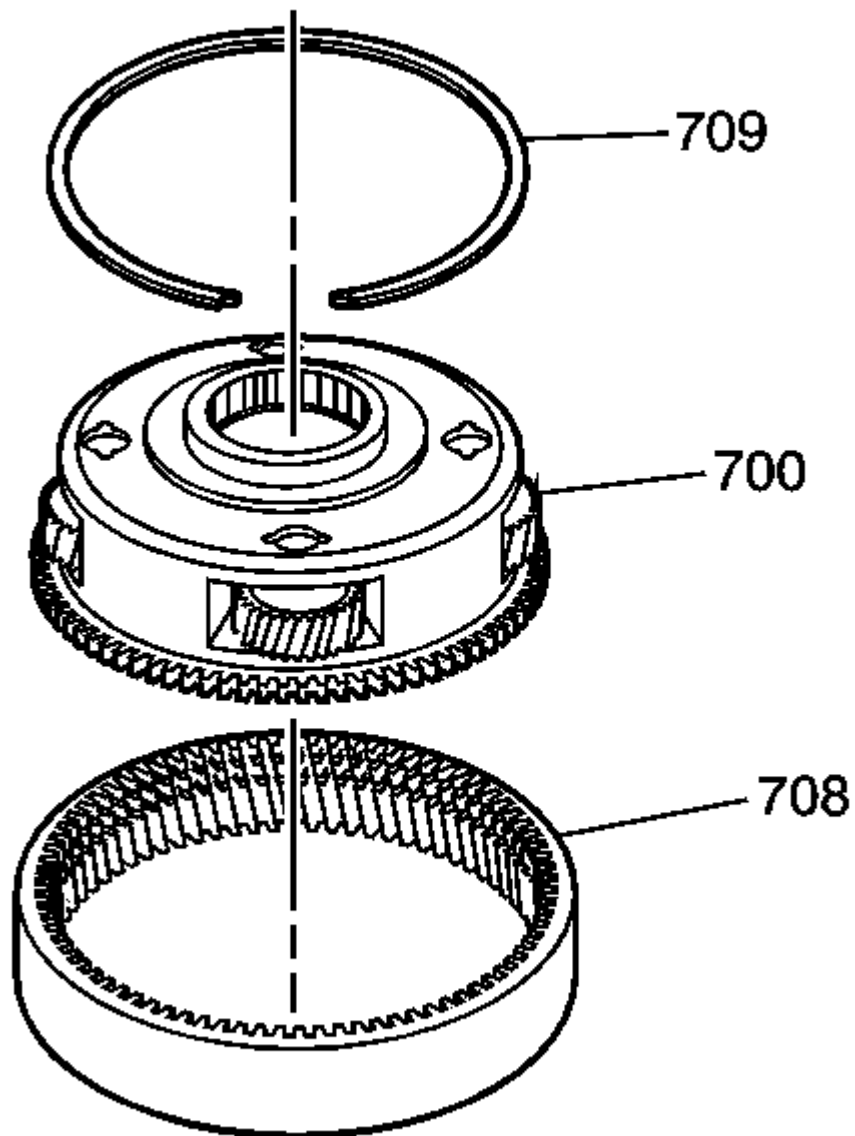


Fig. 62: View Of Input Carrier Assembly, Reaction Internal Gear & Snap Ring
Courtesy of GENERAL MOTORS COMPANY

15. Place the input carrier assembly (700) into the reaction internal gear (708).
16. Install the snap ring (709).

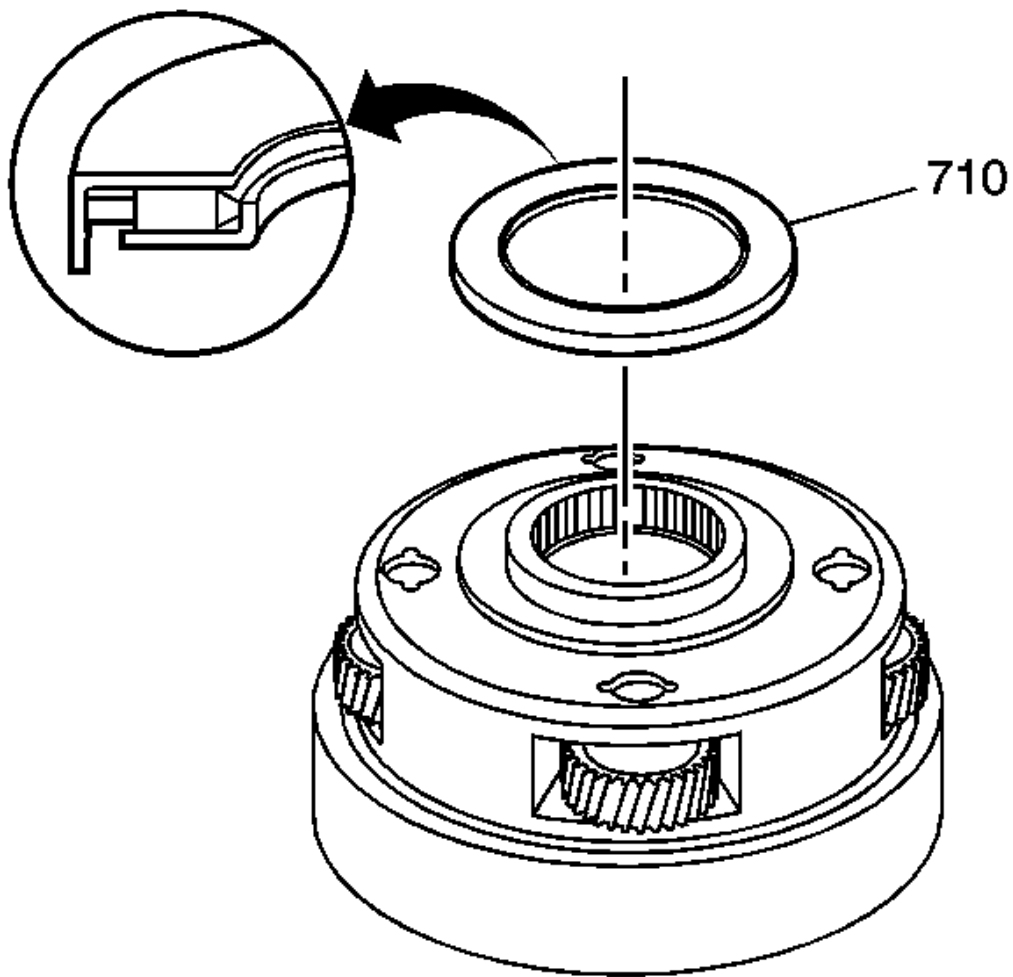


Fig. 63: Identifying Input Carrier & Reaction Internal Gear Assembly Thrust Bearing
 Courtesy of GENERAL MOTORS COMPANY

17. Install the thrust bearing (710) onto the input carrier and reaction internal gear assembly.

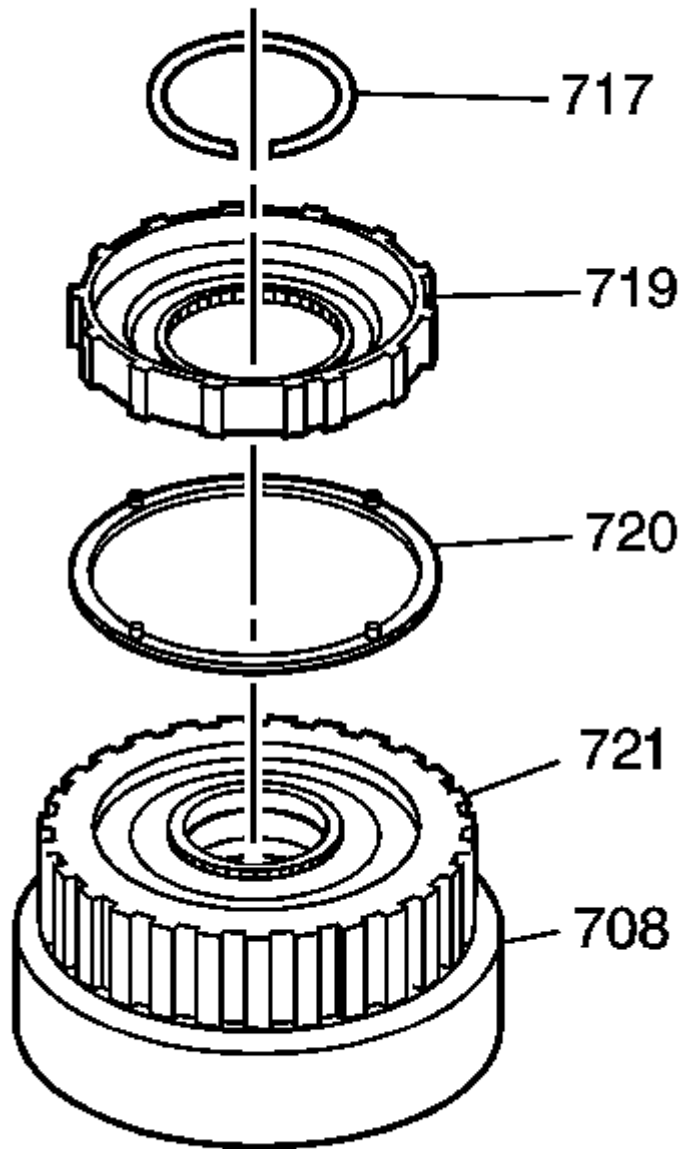


Fig. 64: View Of Thrust Washer On Coast Clutch Hub, Input Internal Gear Flange And Snap Ring
Courtesy of GENERAL MOTORS COMPANY

18. Remove the following parts:

- The input internal gear snap ring (717)
- The coast clutch hub (719)
- The thrust washer (720)

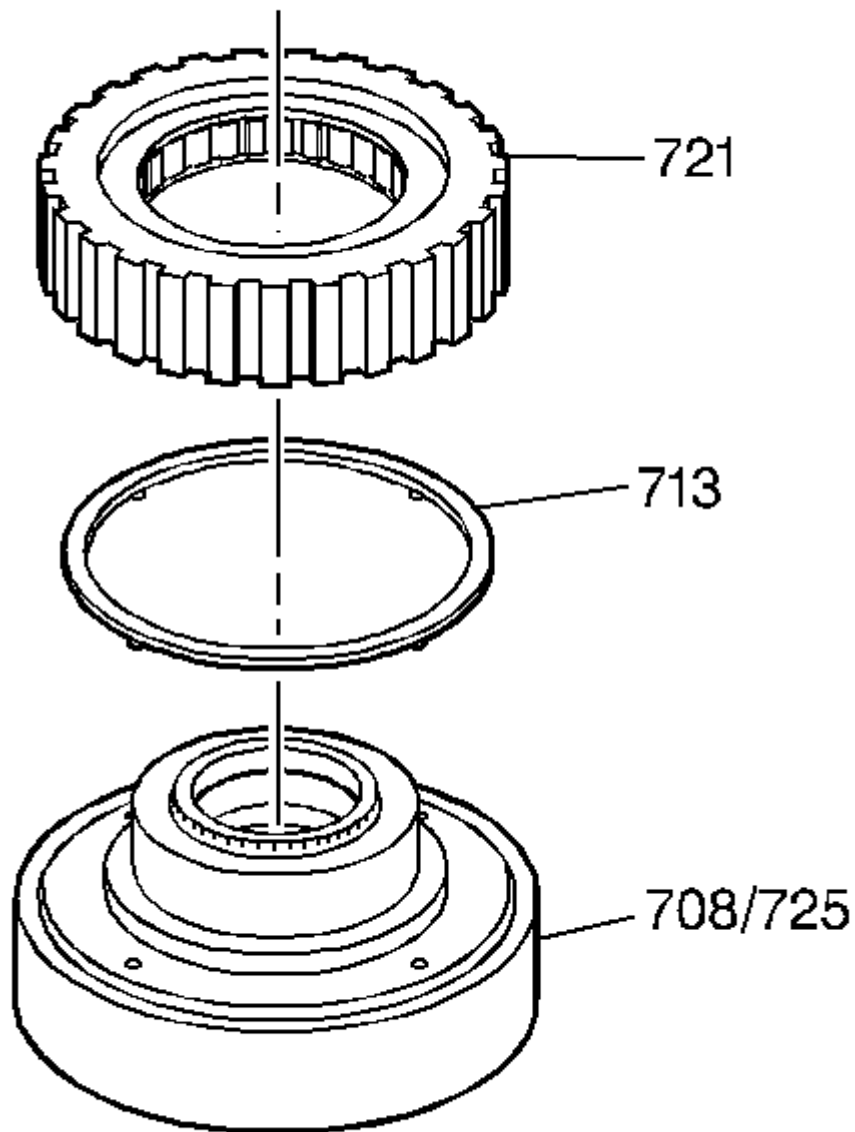


Fig. 65: View Of Forward Sprag, Thrust Washer And Input Internal Gear Flange
Courtesy of GENERAL MOTORS COMPANY

19. Remove the forward sprag outer race (721) and forward sprag from the input internal gear flange (708/725). Remove the thrust washer (713).

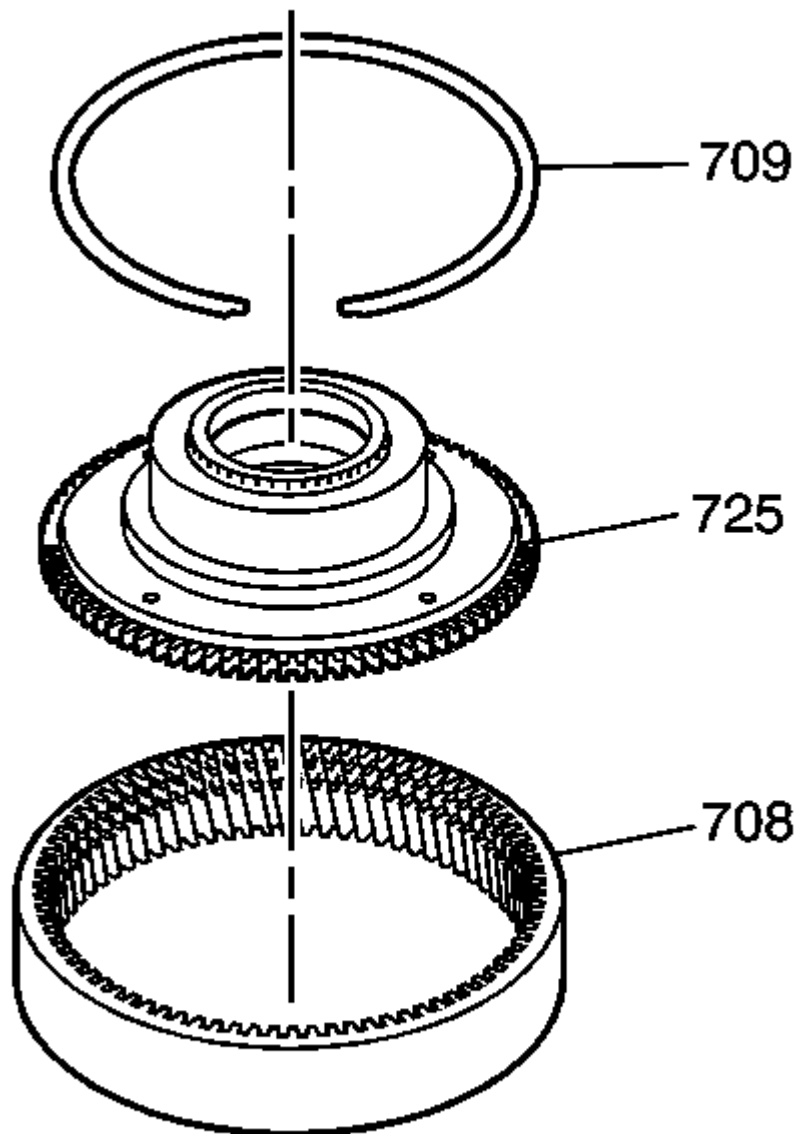


Fig. 66: Locating Input Internal Gear, Snap Ring And Input Internal Gear Flange
Courtesy of GENERAL MOTORS COMPANY

20. Remove the snap ring (709) from the input internal gear (708).
21. Lift the input internal gear flange (725) from the input internal gear (708).

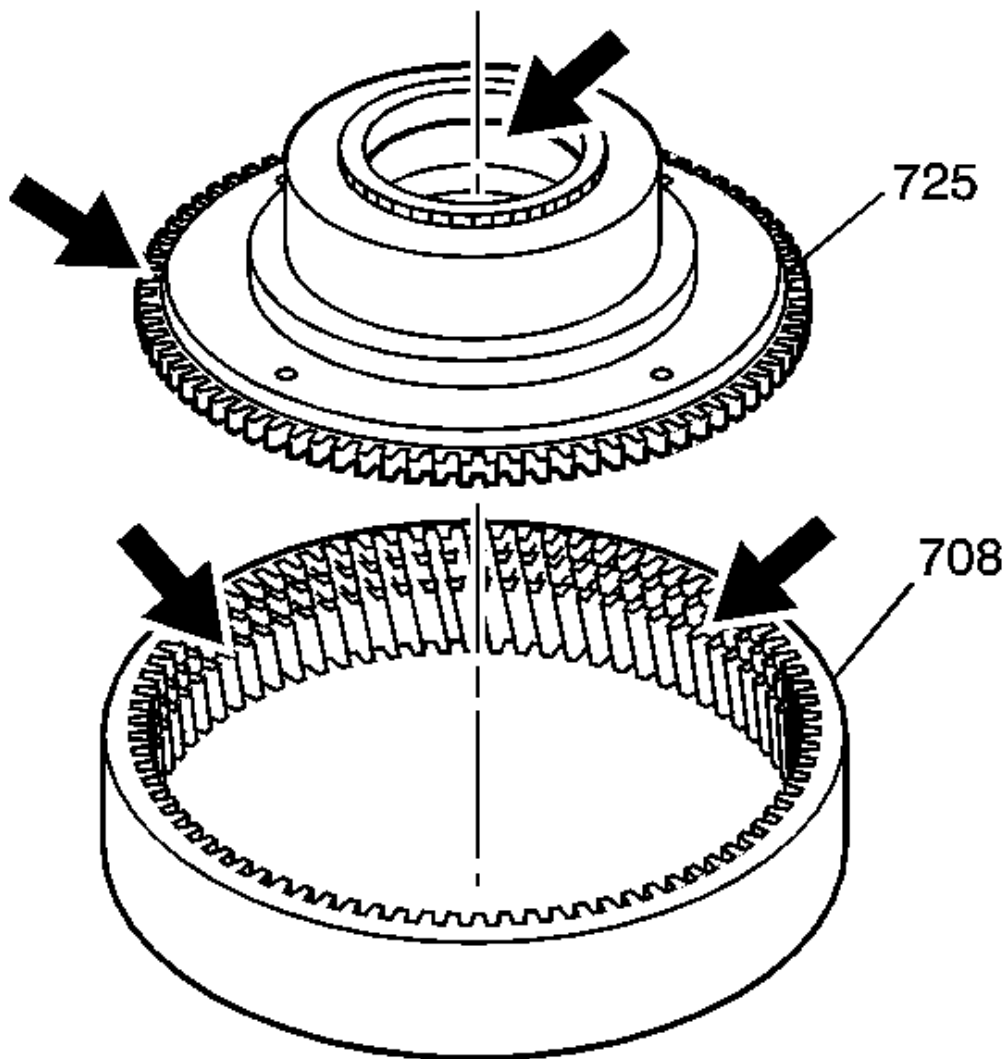


Fig. 67: View Of Input Internal Gear Flange & Bushing Inspection Areas
 Courtesy of GENERAL MOTORS COMPANY

22. Inspect the input internal gear flange (725) for broken teeth. Inspect the input internal gear flange bushing.
23. Inspect the input internal gear (708) for nicked or broken teeth.

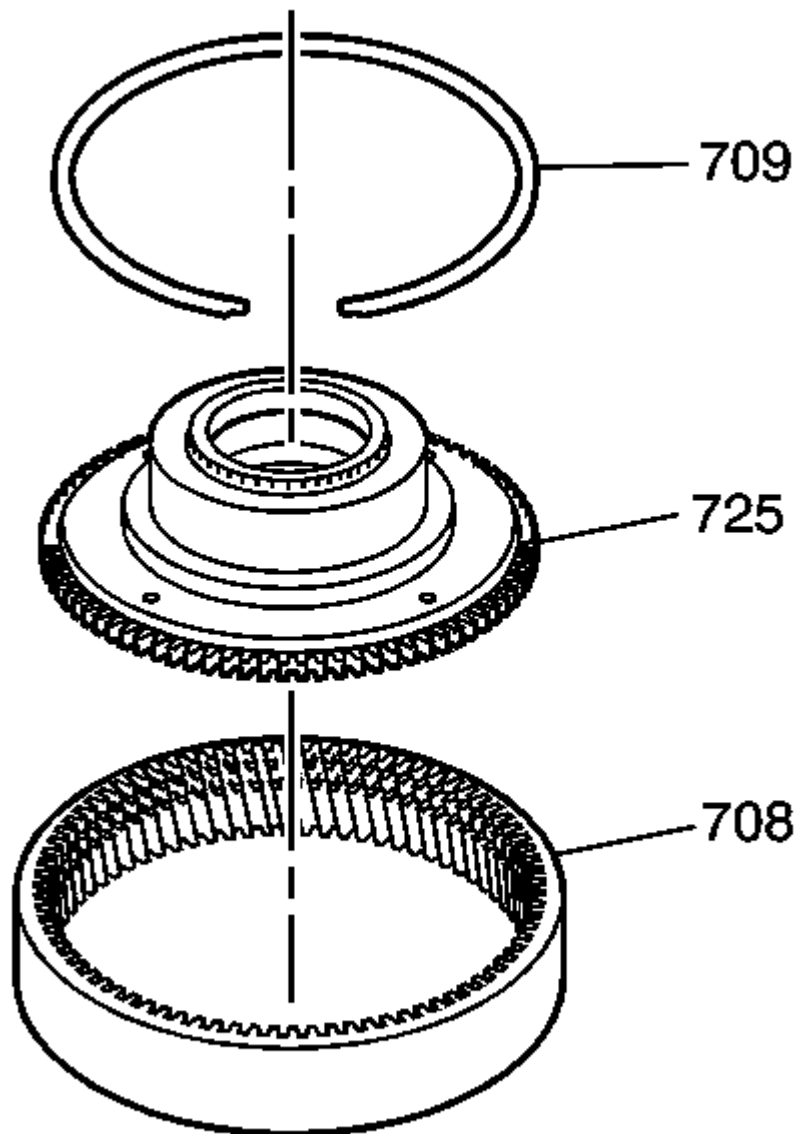


Fig. 68: Locating Input Internal Gear, Snap Ring And Input Internal Gear Flange
Courtesy of GENERAL MOTORS COMPANY

24. Install the input internal gear flange (725) into the input internal gear (708).
25. Install the input internal gear snap ring (709).

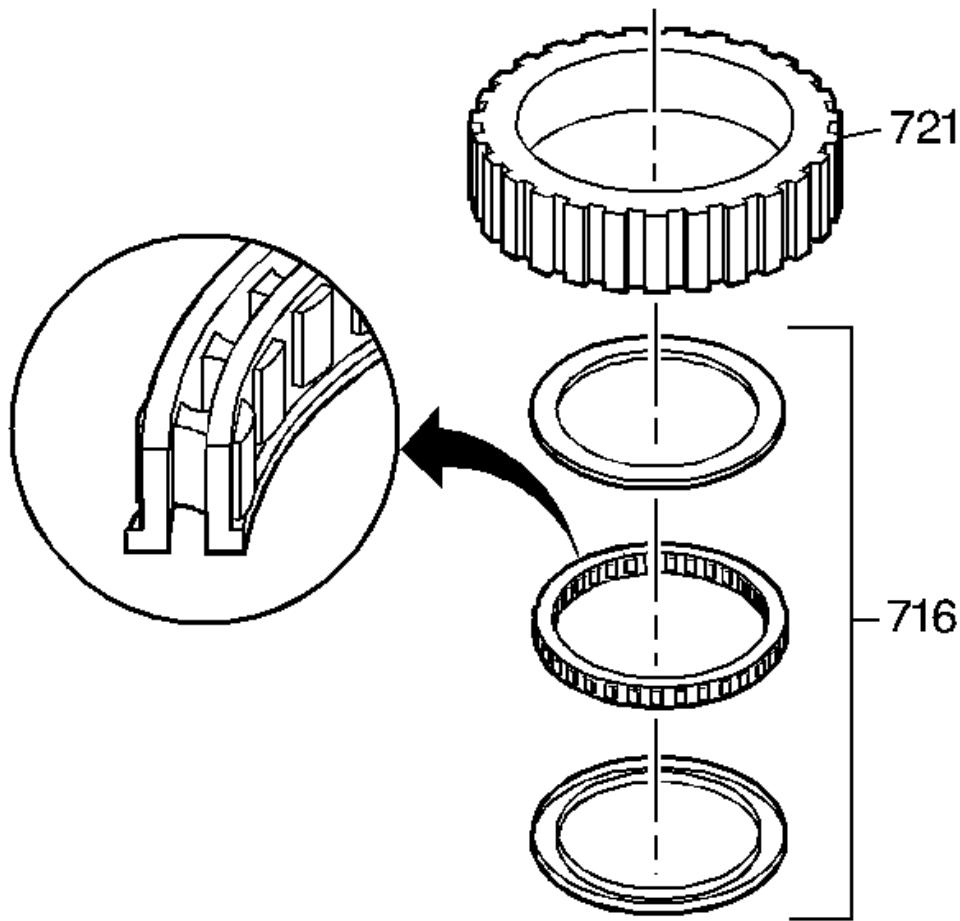


Fig. 69: View Of Forward Sprag Clutch
Courtesy of GENERAL MOTORS COMPANY

26. Remove the forward sprag outer race (721).
27. Disassemble the forward sprag clutch (716).
28. Inspect the forward sprag (716) for the following:
 - Damage or burrs
 - Damage to the inner side of the race

NOTE:

- Oil feed holes in the forward sprag outer race must face the input internal gear.
- The lip on the forward sprag cage must face the input internal gear.

29. Assemble the forward sprag clutch (716).
30. Install the forward sprag clutch (716) into the forward sprag outer race (721).

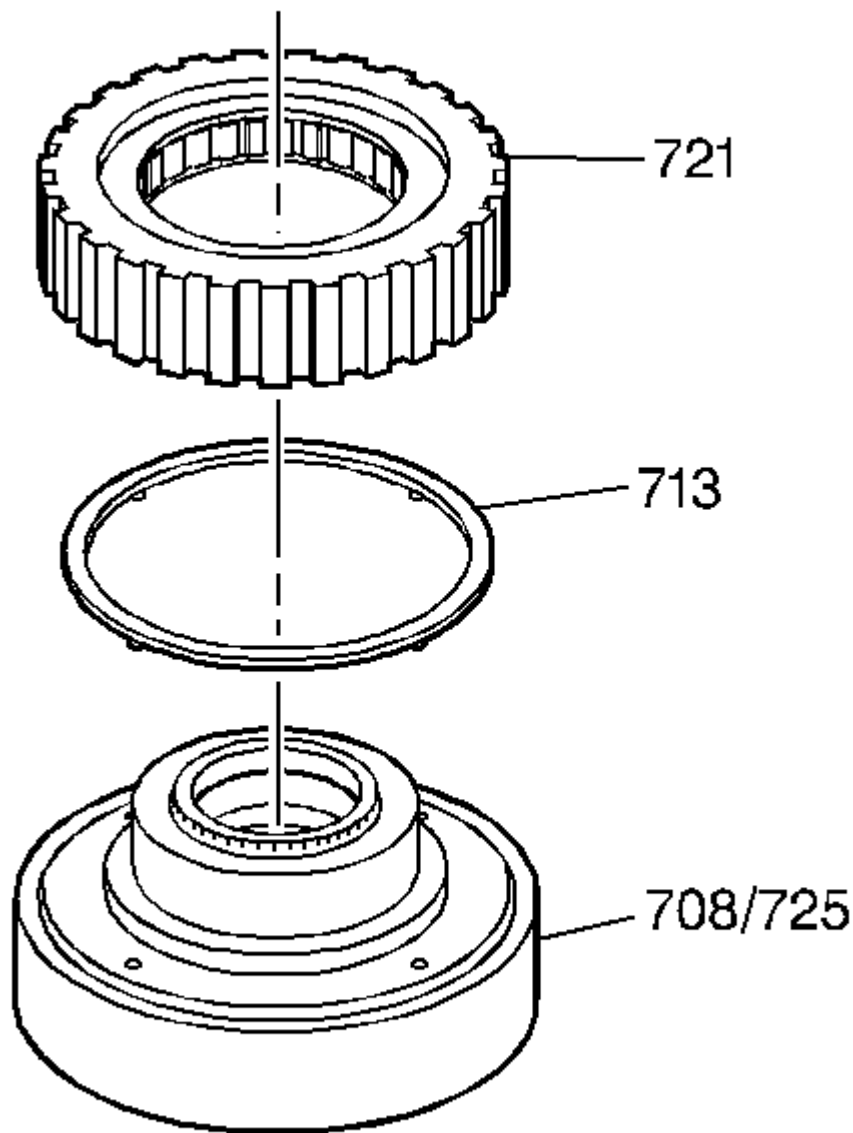


Fig. 70: View Of Forward Sprag, Thrust Washer And Input Internal Gear Flange
Courtesy of GENERAL MOTORS COMPANY

31. Install the thrust washer (713) onto the input internal gear flange (708/725).

32. Install the forward sprag and outer race (721) onto the input internal gear flange (708/725).

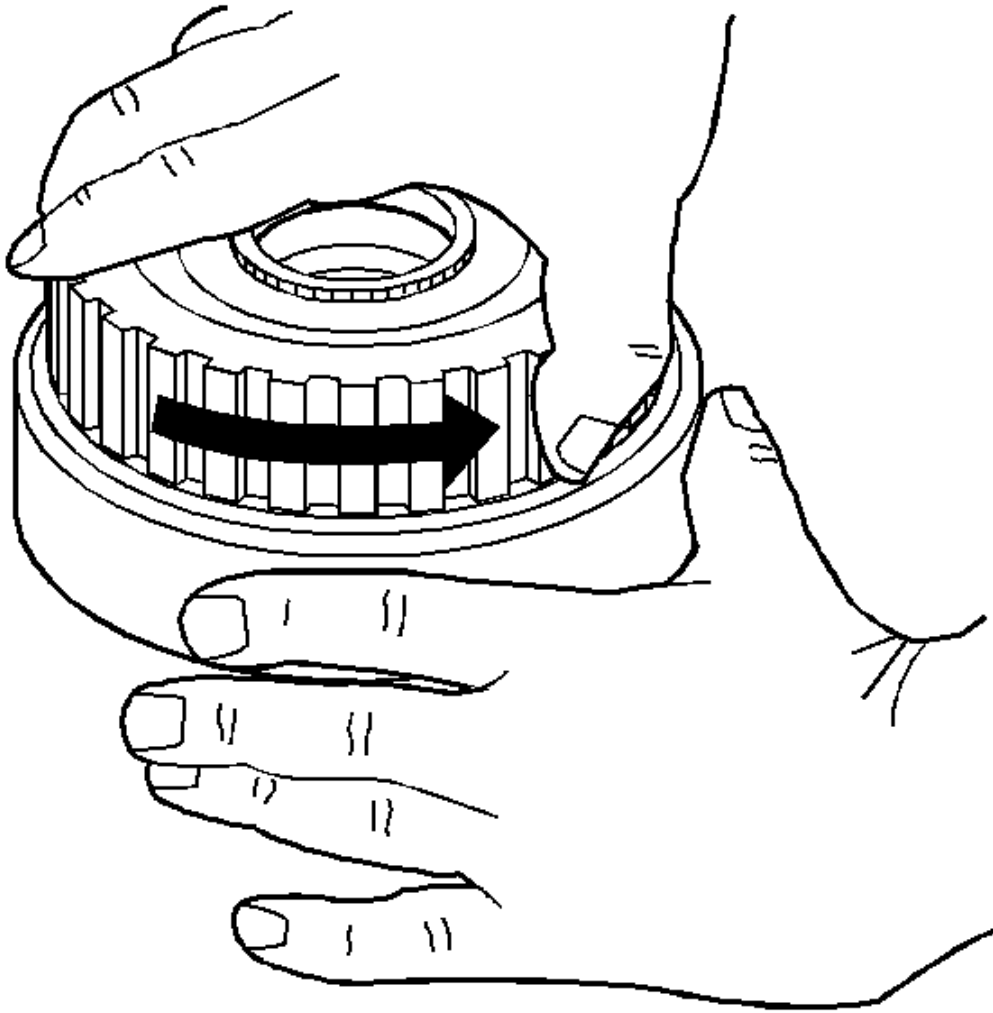


Fig. 71: Checking Forward Sprag Rotation
Courtesy of GENERAL MOTORS COMPANY

33. Check that the forward sprag rotation freewheels in a counterclockwise direction.

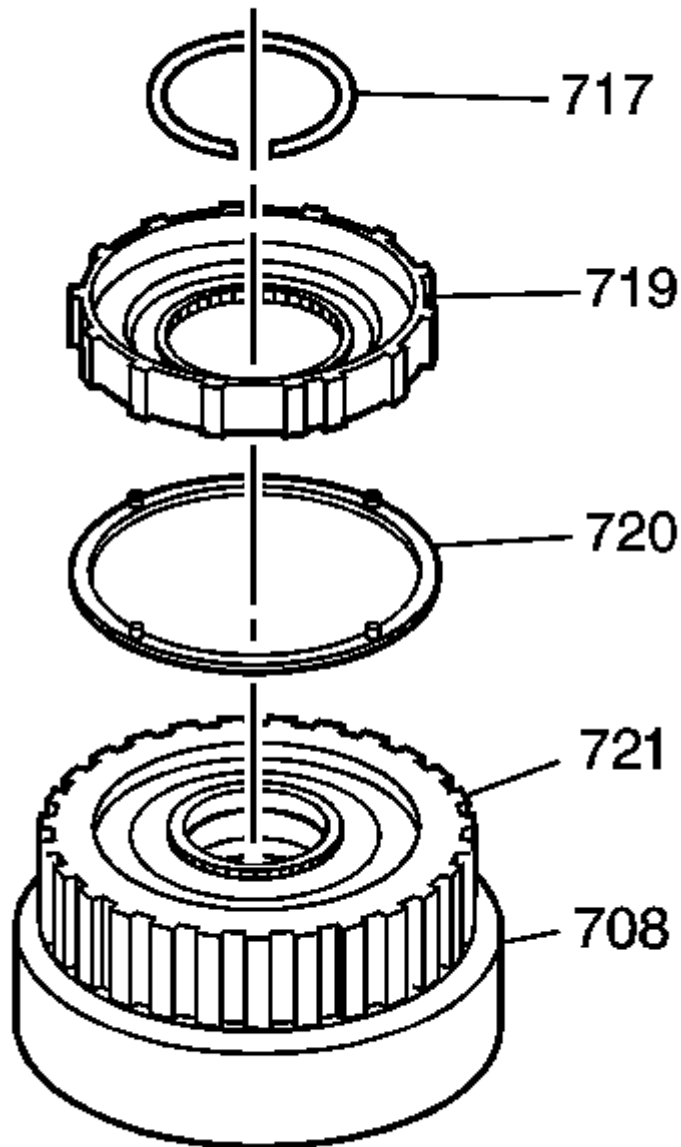


Fig. 72: View Of Thrust Washer On Coast Clutch Hub, Input Internal Gear Flange And Snap Ring
Courtesy of GENERAL MOTORS COMPANY

34. Install the thrust washer (720) onto the coast clutch hub (719).
35. Install the coast clutch hub (719) onto the input internal gear flange (708).
36. Install the snap ring (717) onto the input internal gear flange (708).

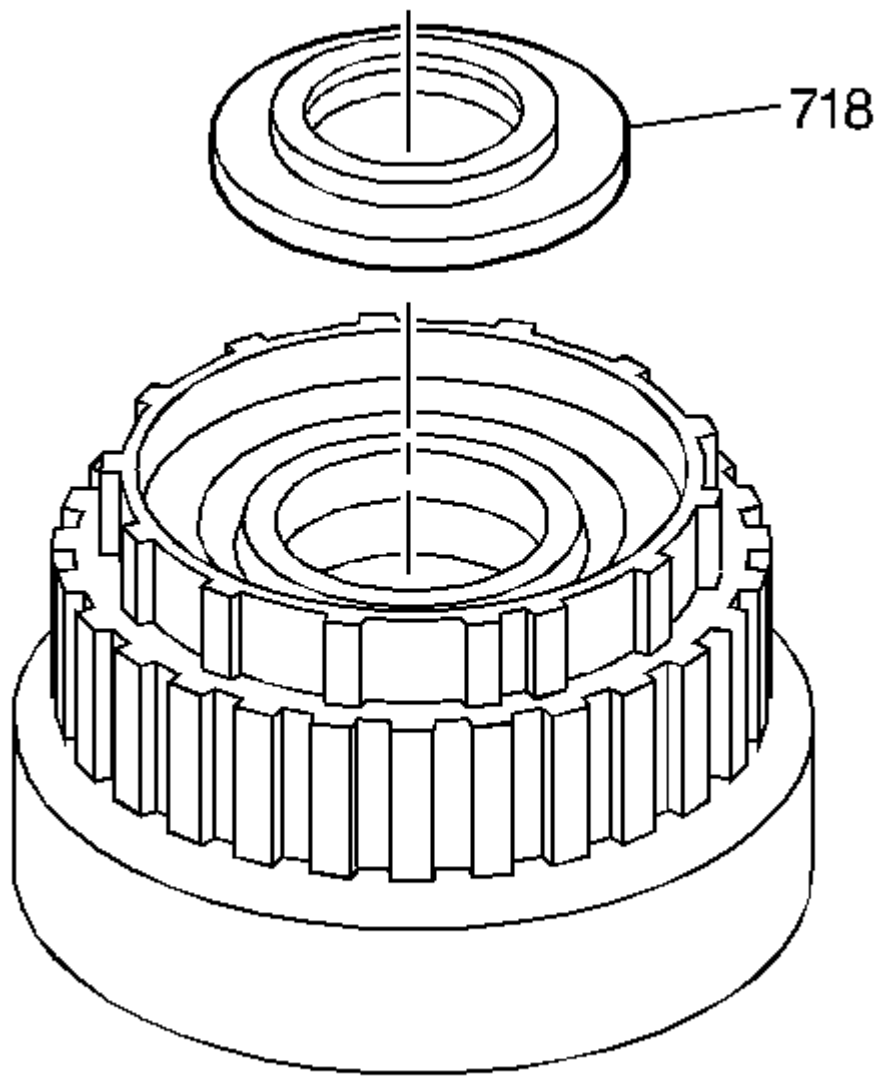


Fig. 73: Installing Thrust Bearing On Coast Clutch Hub
Courtesy of GENERAL MOTORS COMPANY

37. Install the thrust bearing (718) onto the coast clutch hub.

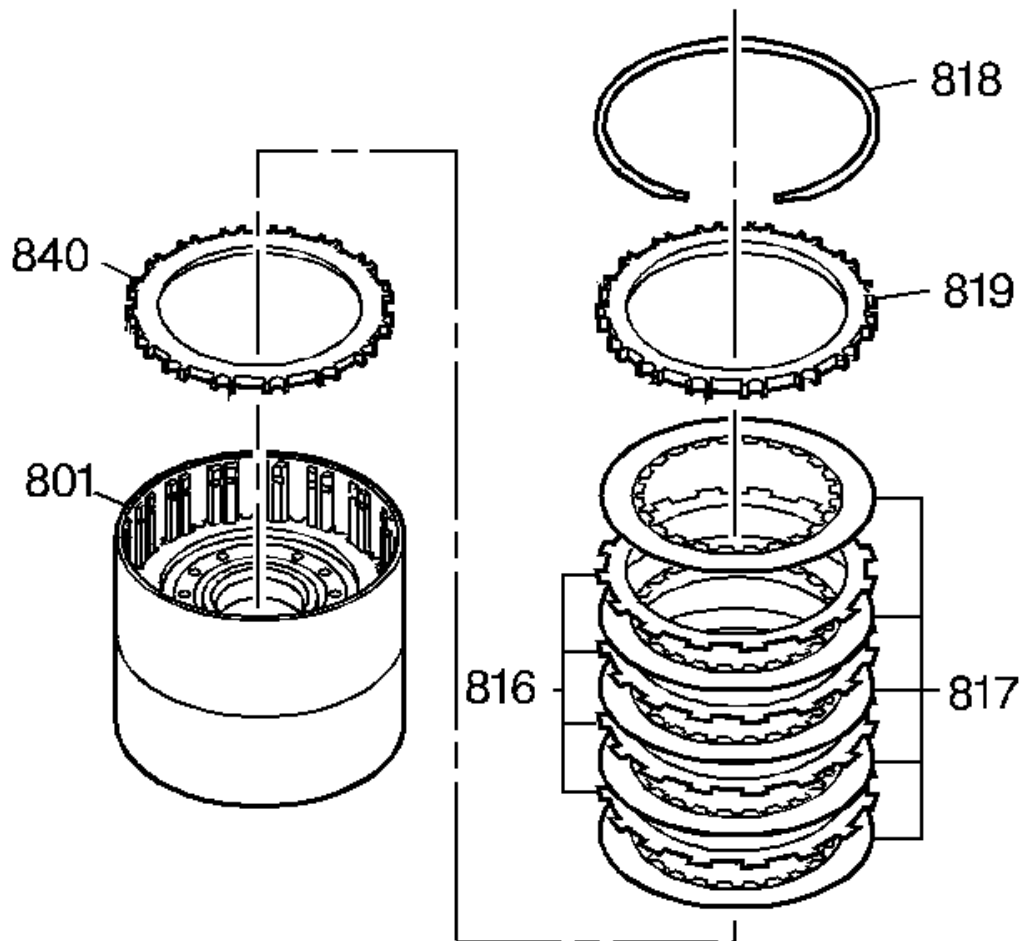


Fig. 74: Identifying Forward Clutch Plates
 Courtesy of GENERAL MOTORS COMPANY

38. Remove the forward and coast clutch housing snap ring (818).
39. Remove the forward and coast clutch backing plate (819), and all of the forward clutch fiber (817) and steel (816) plates. Remove the apply plate (840).

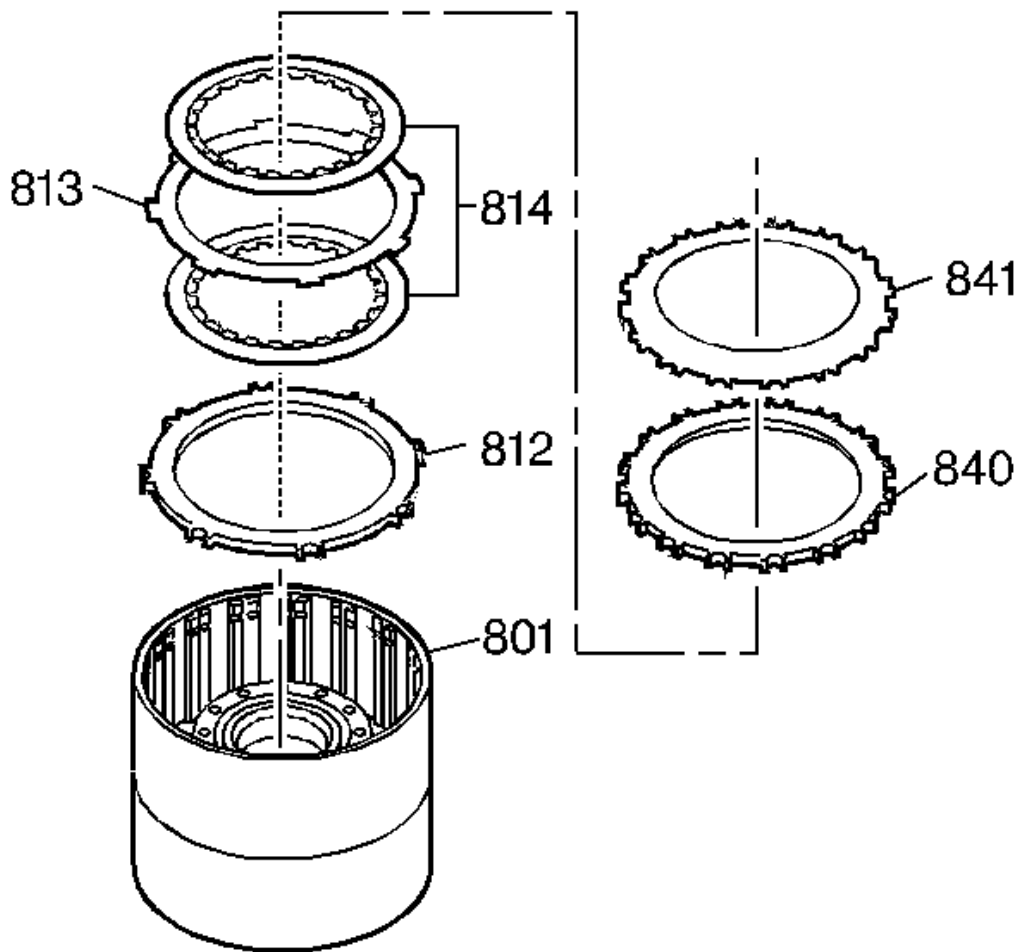


Fig. 75: Locating Coast Clutch Plates

Courtesy of GENERAL MOTORS COMPANY

40. Remove the forward and coast clutch belleville plate (841) and backing plate (840).
41. Remove the coast clutch fiber (814) and steel (813) plates. Remove the apply plate (812).

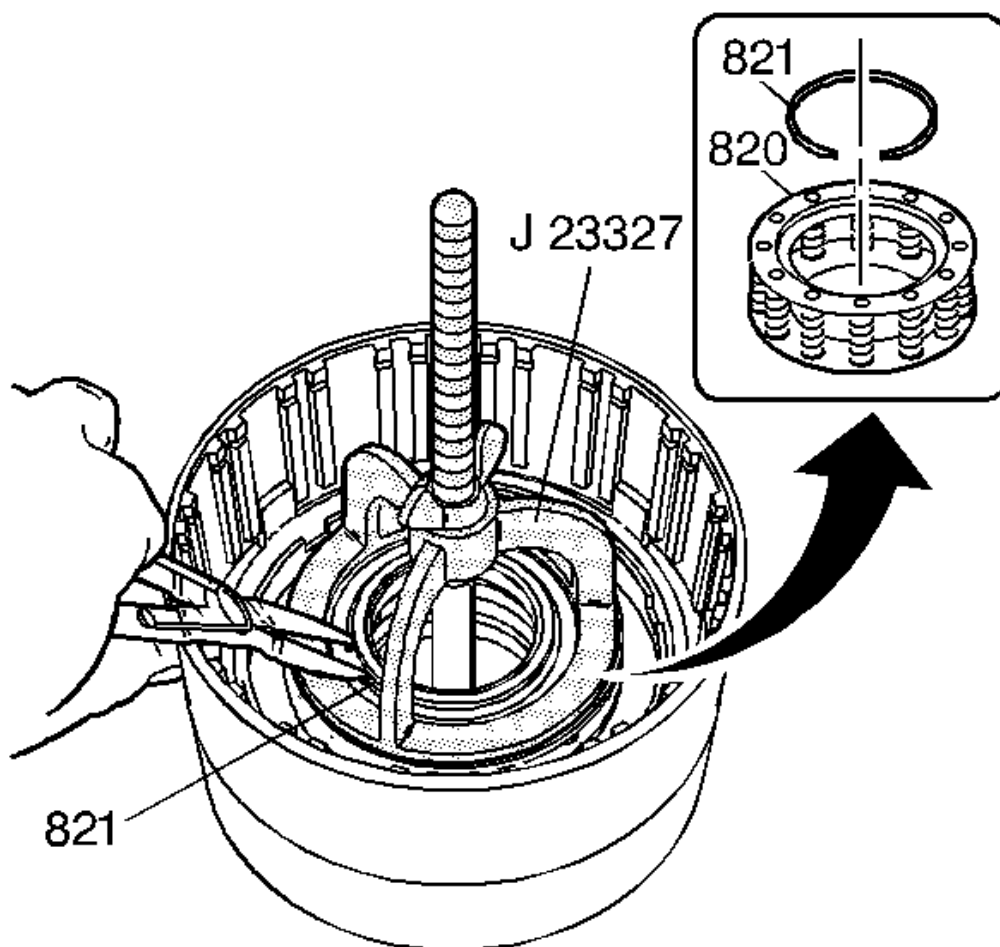


Fig. 76: Compressing Spring And Retainer Assembly Using The J 23327
Courtesy of GENERAL MOTORS COMPANY

42. Using the **J 23327** spring compressor, compress the spring and retainer assembly (820).

NOTE: Do not overexpand the snap ring.

43. Remove the snap ring (821).
44. Remove the **J 23327** spring compressor.
45. Remove the spring and retainer assembly (820).

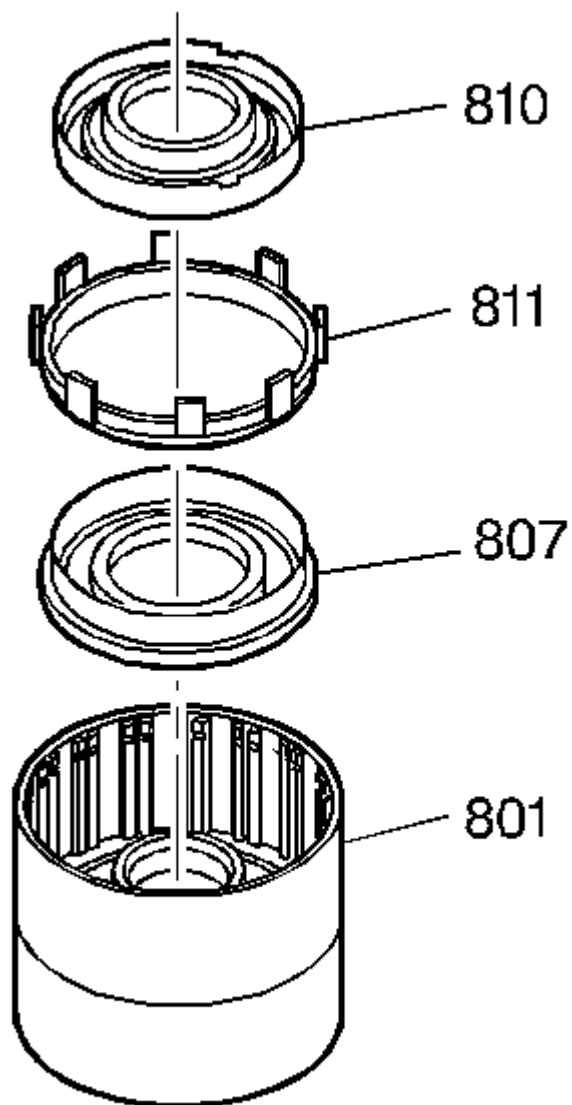


Fig. 77: Coast Clutch Piston Assembly
Courtesy of GENERAL MOTORS COMPANY

46. Remove the coast clutch piston assembly (810).
47. Remove the apply ring (811). Remove the forward clutch piston and seals assembly (807).

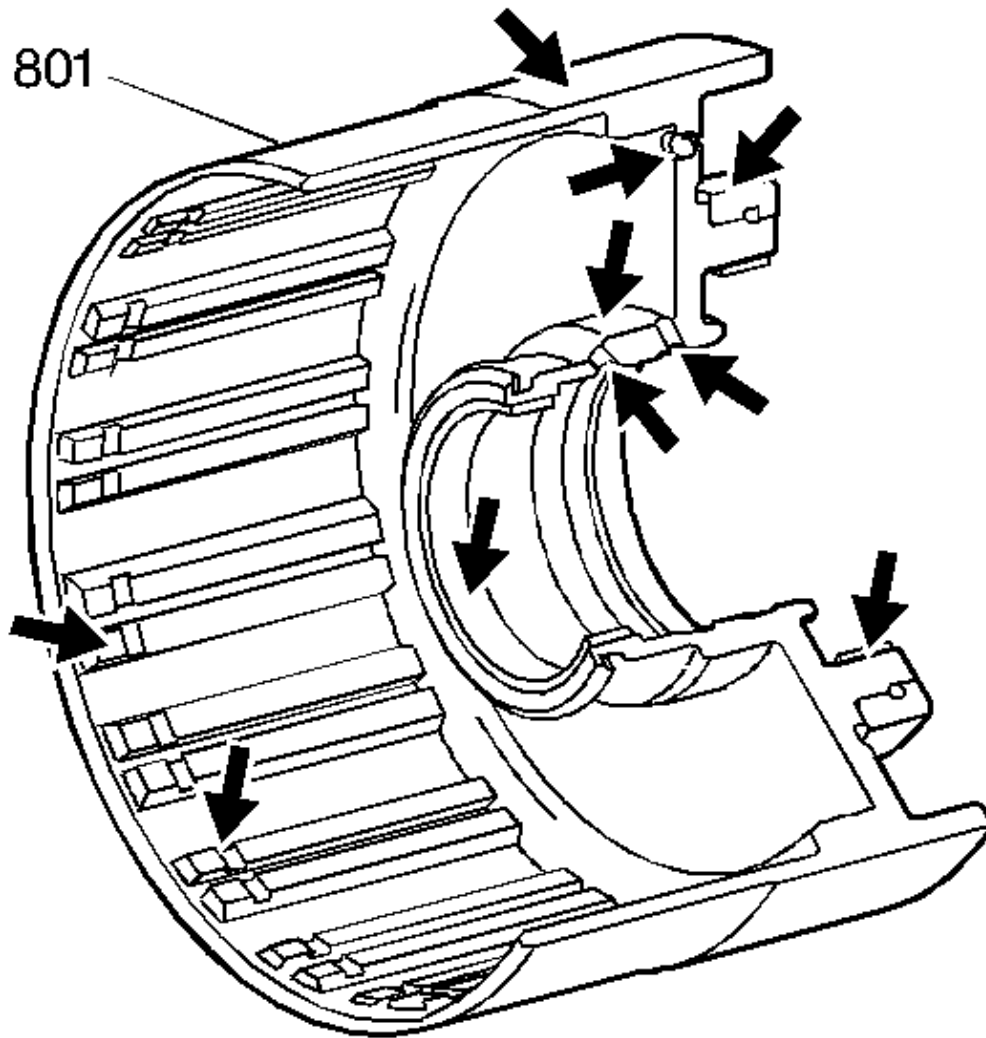


Fig. 78: Identifying Inspection Areas On Forward And Coast Clutch Housing
Courtesy of GENERAL MOTORS COMPANY

48. Inspect the forward and coast clutch housing (801) for the following:
- Feed passages that are plugged
 - Splines that are worn or damaged
 - Checkball for leaks
 - Welds for cracks
 - Bushings for excessive wear

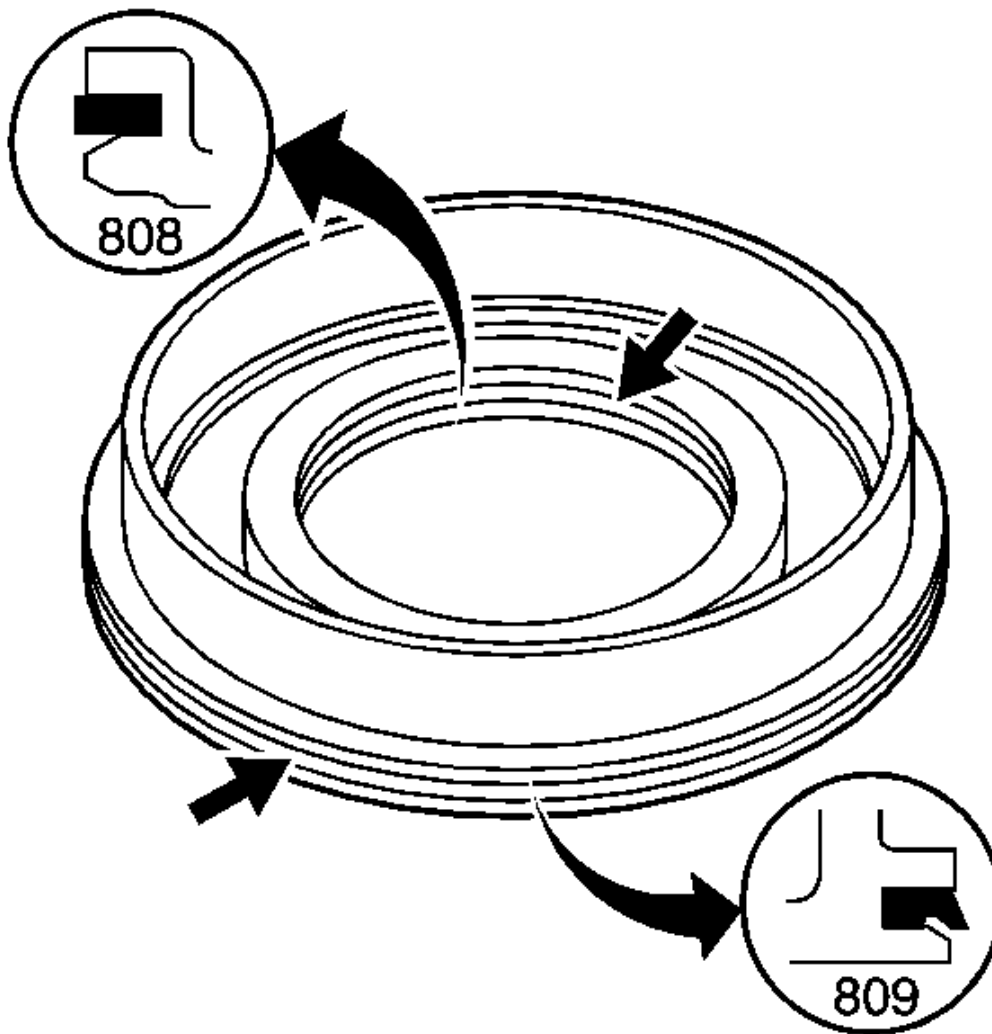


Fig. 79: View Of Forward Clutch Piston Seals Inspection Areas
Courtesy of GENERAL MOTORS COMPANY

49. Inspect the forward clutch piston seals (808, 809) for damage. If the seals are damaged, replace the piston.
50. Inspect the forward clutch piston for cracks or damage to the seal grooves.

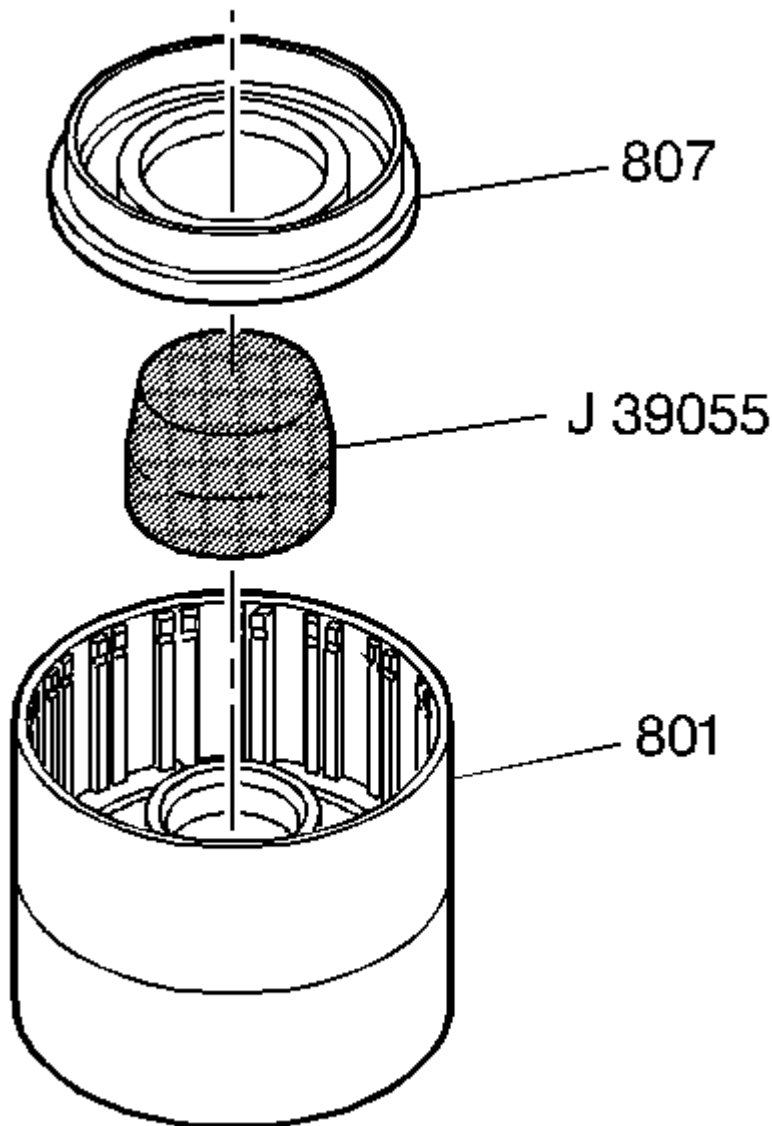


Fig. 80: Installing The Forward Clutch Piston (807) Into The Forward And Coast Clutch Housing Using J 39055

Courtesy of GENERAL MOTORS COMPANY

51. Install the new piston seals onto the forward clutch piston (807). Make sure that the outer seal does not roll backwards.
52. Using the **J 39055** seal protector, install the forward clutch piston (807) into the forward and coast clutch housing (801).

53. Remove the **J 39055** seal protector.

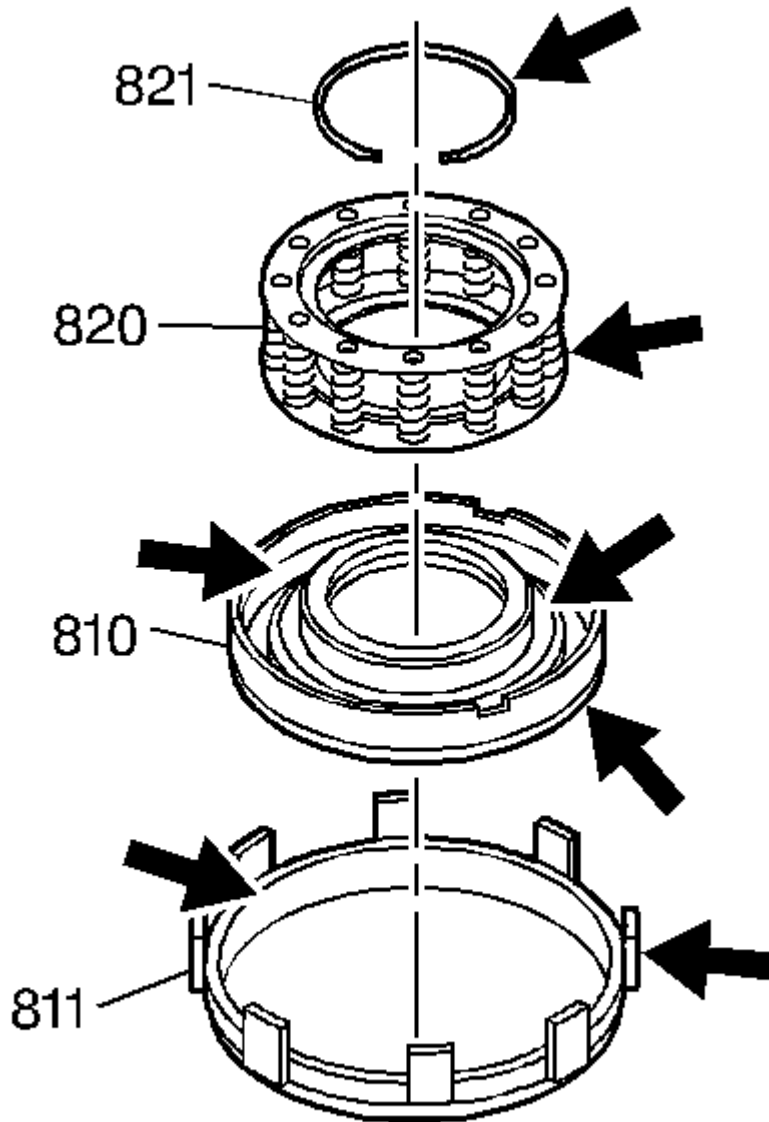


Fig. 81: Inspecting Coast Clutch Piston Assembly
Courtesy of GENERAL MOTORS COMPANY

54. Inspect the snap ring (821) for damage.
55. Inspect the spring and retainer assembly (820) for a damaged cage and distorted or missing springs.

56. Inspect the coast clutch piston assembly (810) for damage.
57. Inspect the apply ring (811) for damage.

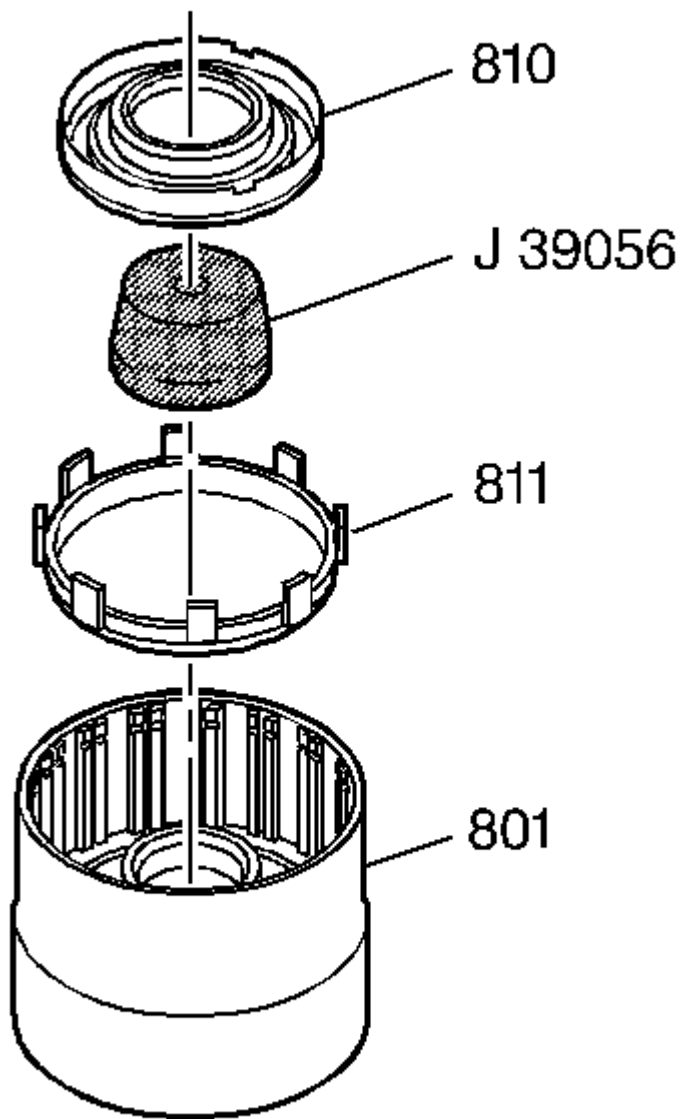


Fig. 82: Installing Coast Clutch Piston Assembly Into Coast Clutch Housing
Courtesy of GENERAL MOTORS COMPANY

58. Install the apply ring (811) into the forward and coast clutch housing (801).

59. Using the **J 39056** seal protector, install the coast clutch piston assembly into the coast clutch housing. Make sure that the outer seal does not roll backwards.
60. Remove the **J 39056** seal protector.

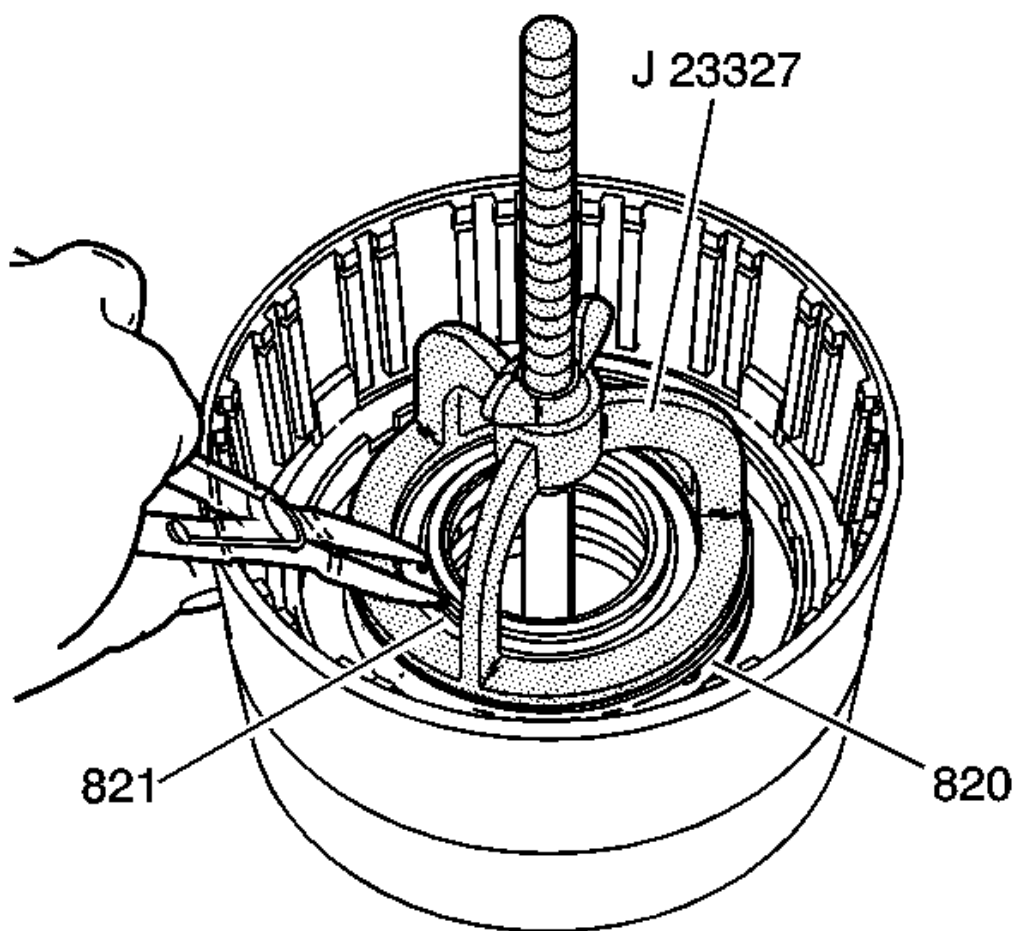


Fig. 83: Compressing Spring And Retainer Assembly Into Forward And Coast Clutch Housing Using J 23327

Courtesy of GENERAL MOTORS COMPANY

61. Install the spring and retainer assembly (820) into the forward and coast clutch housing.
62. Using the **J 23327** spring compressor, compress the spring and retainer assembly (820). Install the snap ring (821).
63. Remove the **J 23327** spring compressor.

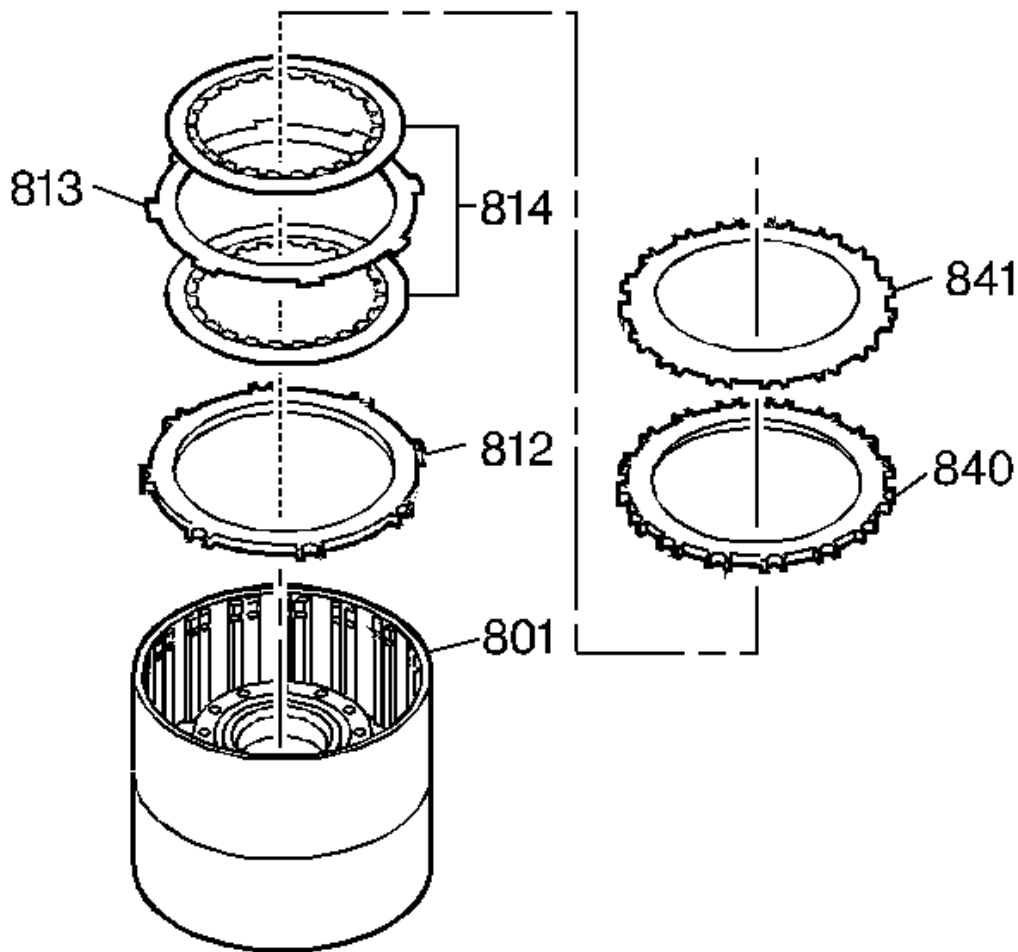


Fig. 84: Locating Coast Clutch Plates

Courtesy of GENERAL MOTORS COMPANY

64. Install the coast clutch apply plate (812) into the forward and coast clutch housing (801).
65. Install the coast clutch fiber (814) and steel (813) plates.
66. Install the forward and coast clutch plate (840), and the forward and coast clutch belleville plate (841).

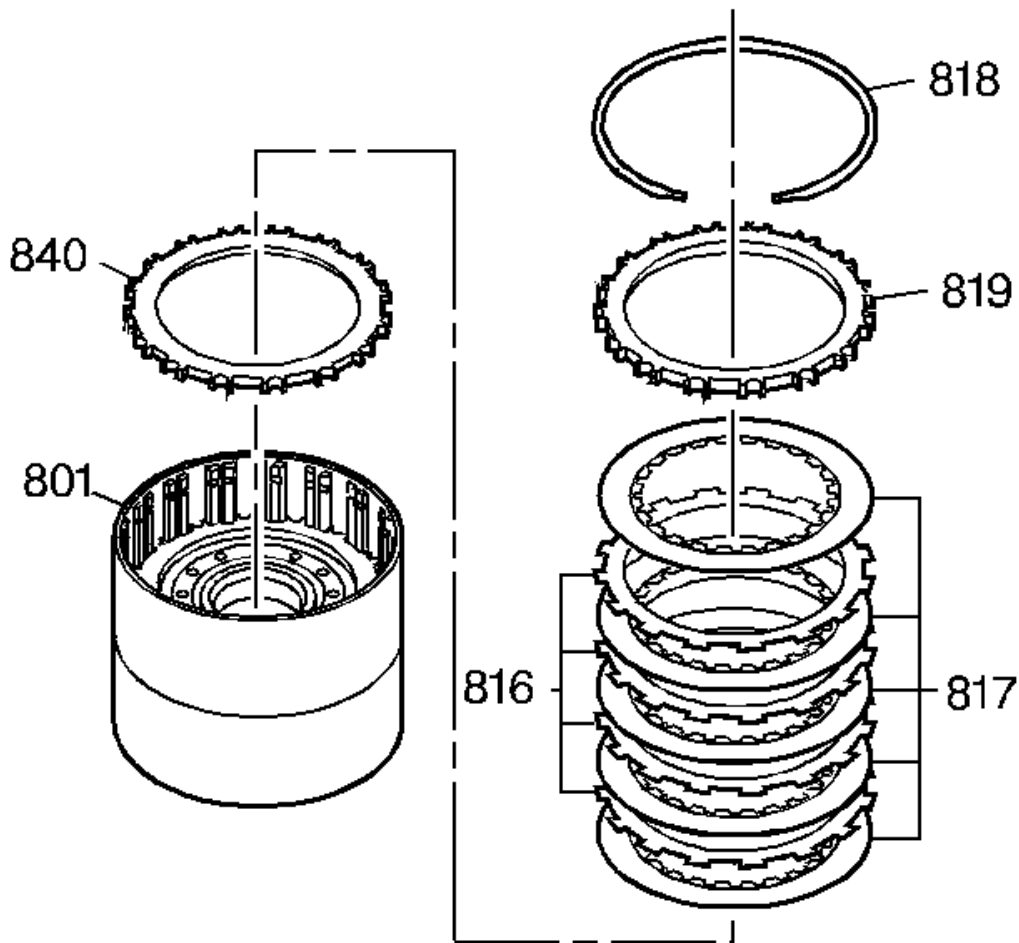


Fig. 85: Identifying Forward Clutch Plates
Courtesy of GENERAL MOTORS COMPANY

67. Install the forward and coast clutch plate (840)
68. Install all of the forward clutch fiber (817) and steel (816) plates.
69. Install the forward clutch backing plate (819).
70. Install the snap ring (818).

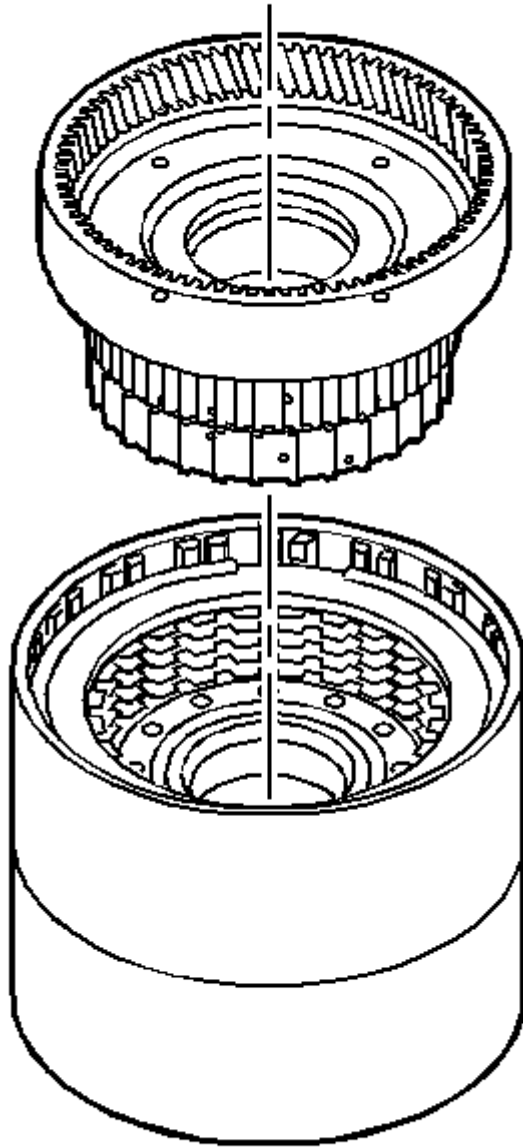


Fig. 86: Locating Coast Clutch Hub With The Thrust Bearing
Courtesy of GENERAL MOTORS COMPANY

71. Install the coast clutch hub with the thrust bearing, the forward sprag race, and the input internal gear and flange into the forward and coast clutch housing.

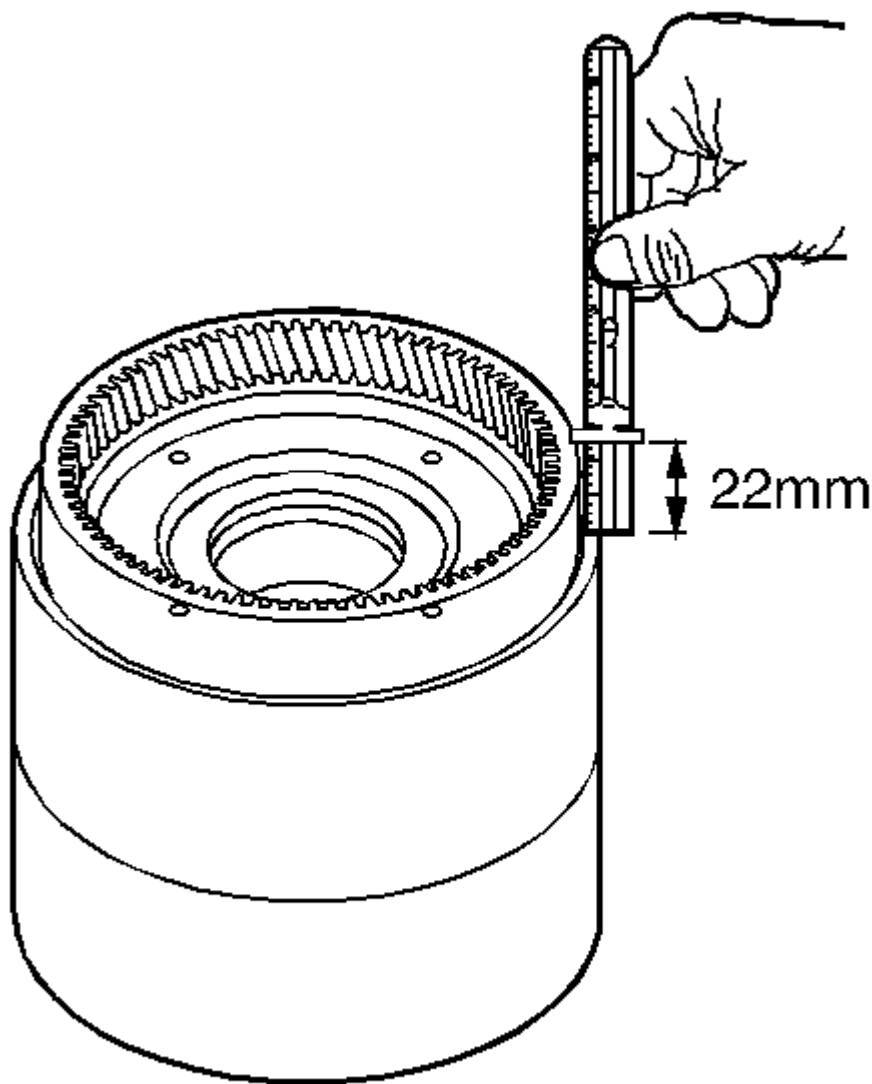


Fig. 87: Measuring Input Carrier And Reaction Internal Gear To Edge Of The Input Internal Gear
Courtesy of GENERAL MOTORS COMPANY

72. When the splines on the hubs are properly engaged, the bushing on the input carrier will drop below the forward and coast clutch support hub, producing a dull metal sound. The distance from the top edge of the forward and coast clutch housing to the top edge of the input internal gear is approximately 22 mm (0.886 in).

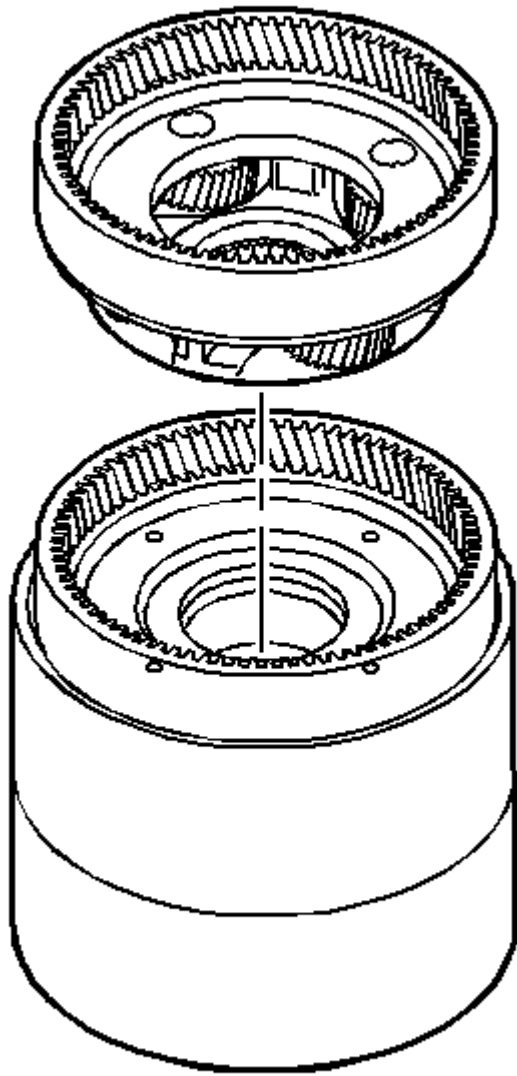


Fig. 88: Installing Input Carrier And Reaction Internal Gear
Courtesy of GENERAL MOTORS COMPANY

73. Install the input carrier and reaction internal gear with the thrust bearing onto the input internal gear.

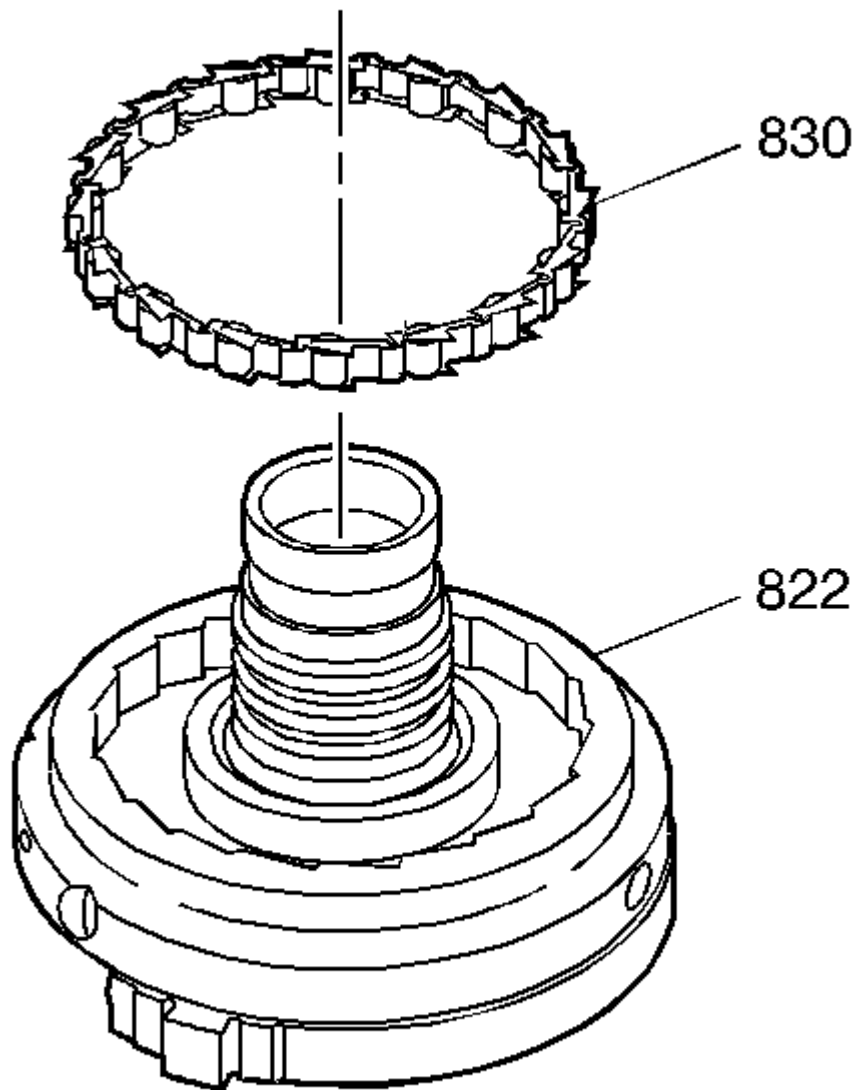


Fig. 89: Low Roller Clutch Assembly & Forward & Coast Clutch Support
Courtesy of GENERAL MOTORS COMPANY

74. Remove the low roller clutch assembly (830) from the forward and coast clutch support (822).

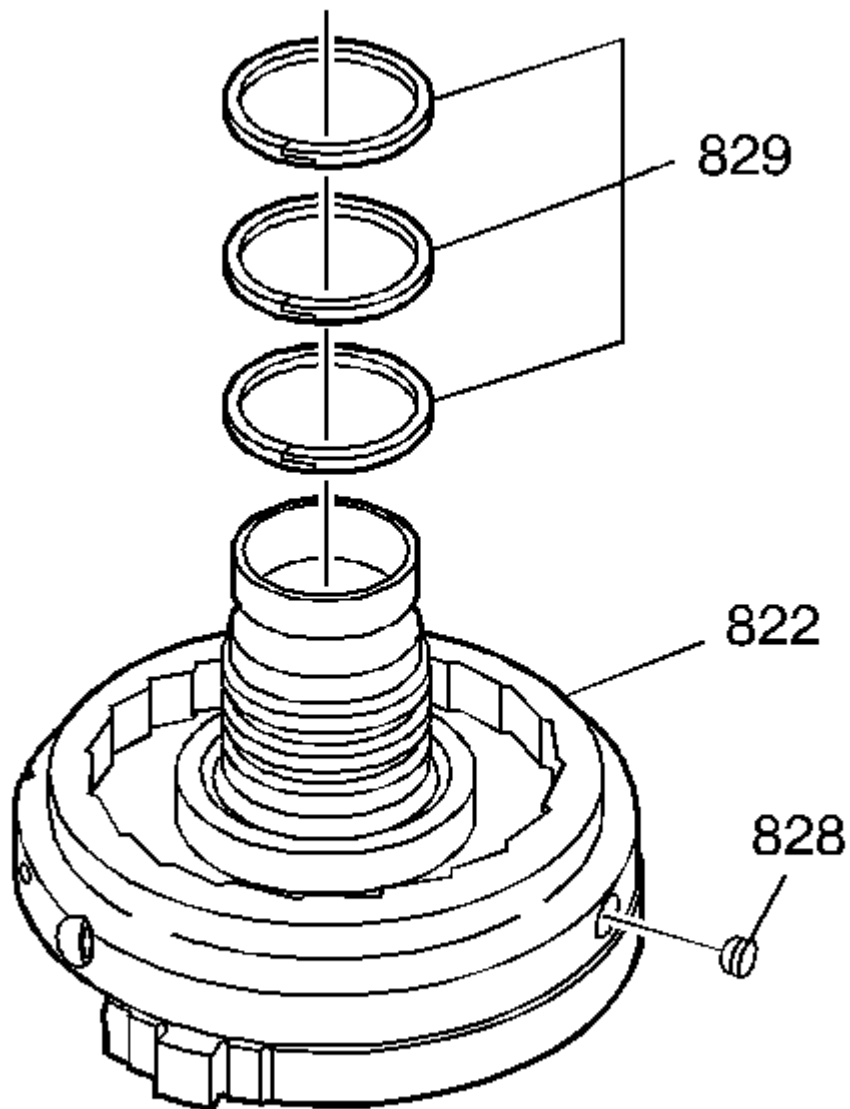


Fig. 90: View Of Oil Seal Rings

Courtesy of GENERAL MOTORS COMPANY

75. Remove the three oil seal rings (829) from the forward and coast clutch support (822).
76. Remove the cooler return seal (828).

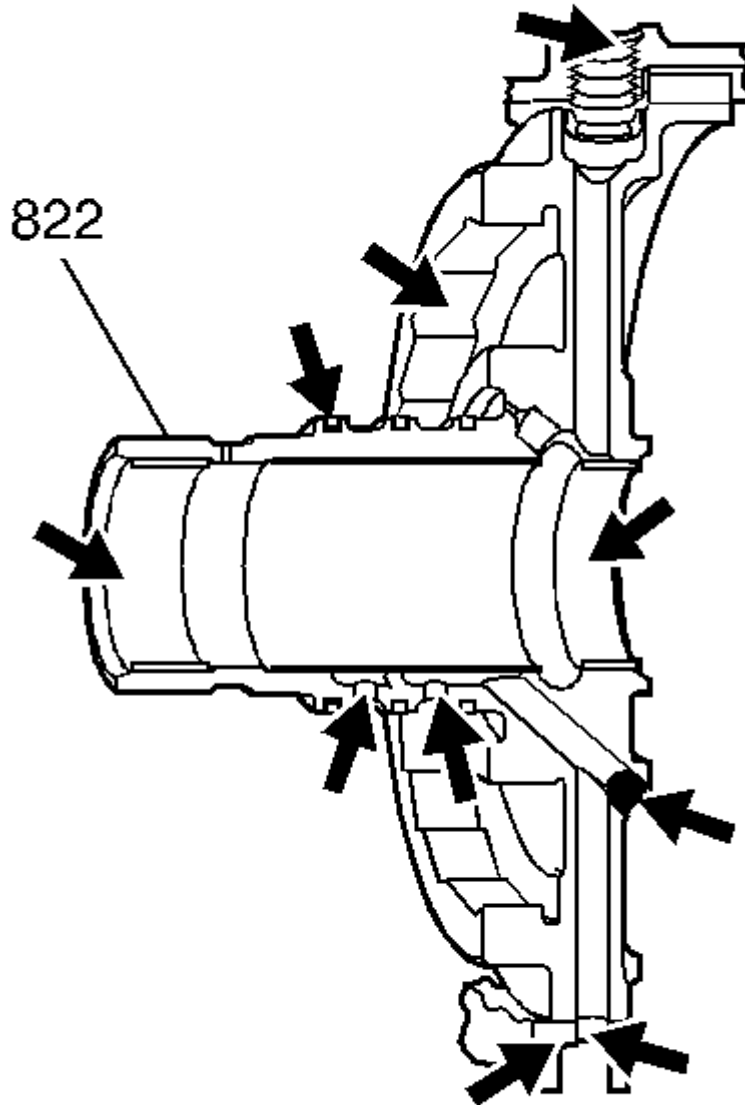


Fig. 91: Inspection Areas On Forward And Coast Clutch Support
Courtesy of GENERAL MOTORS COMPANY

77. Inspect the forward and coast clutch support (822) for the following:

- Damage to the seal ring grooves
- Damage to the checkball
- Damage and wear to the bushing and transfer sleeve

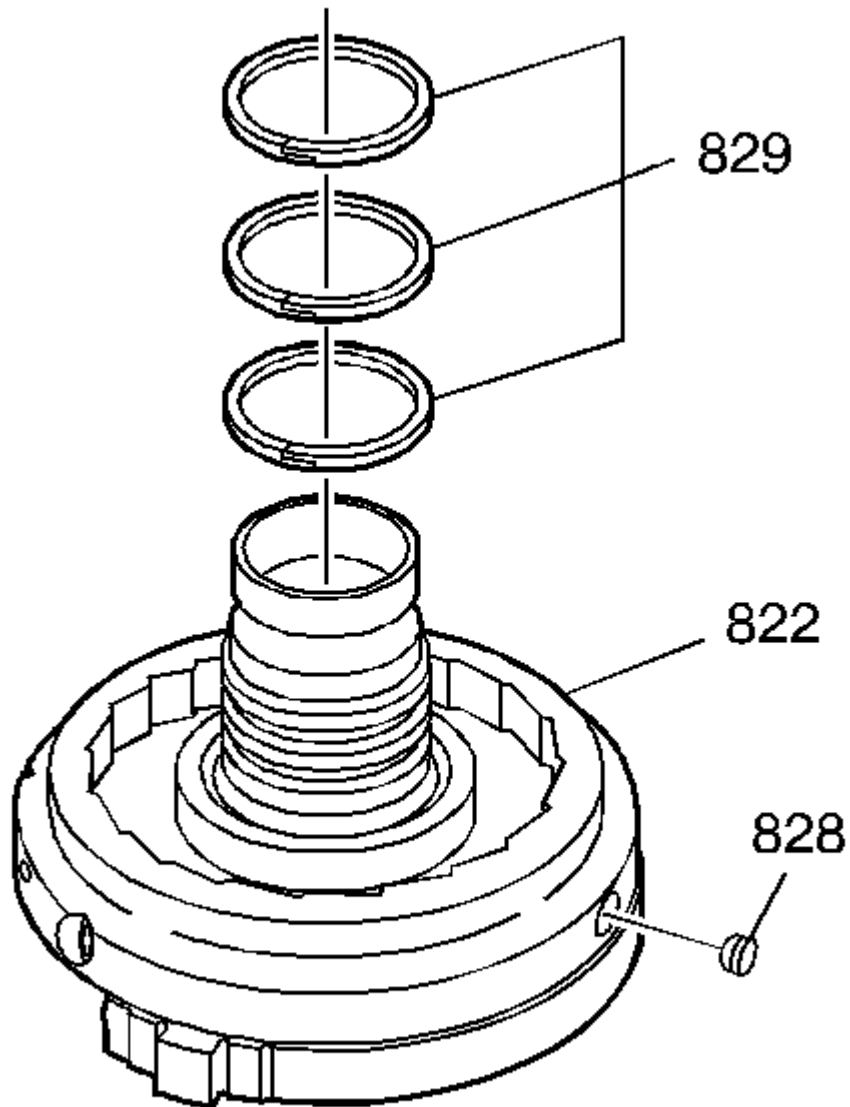


Fig. 92: View Of Oil Seal Rings

Courtesy of GENERAL MOTORS COMPANY

78. Install new oil seal rings (829).

NOTE: Do not press the seal so that the shape of the seal is distorted in the bore.

79. Install a new cooler return seal (828) with the appropriate socket.

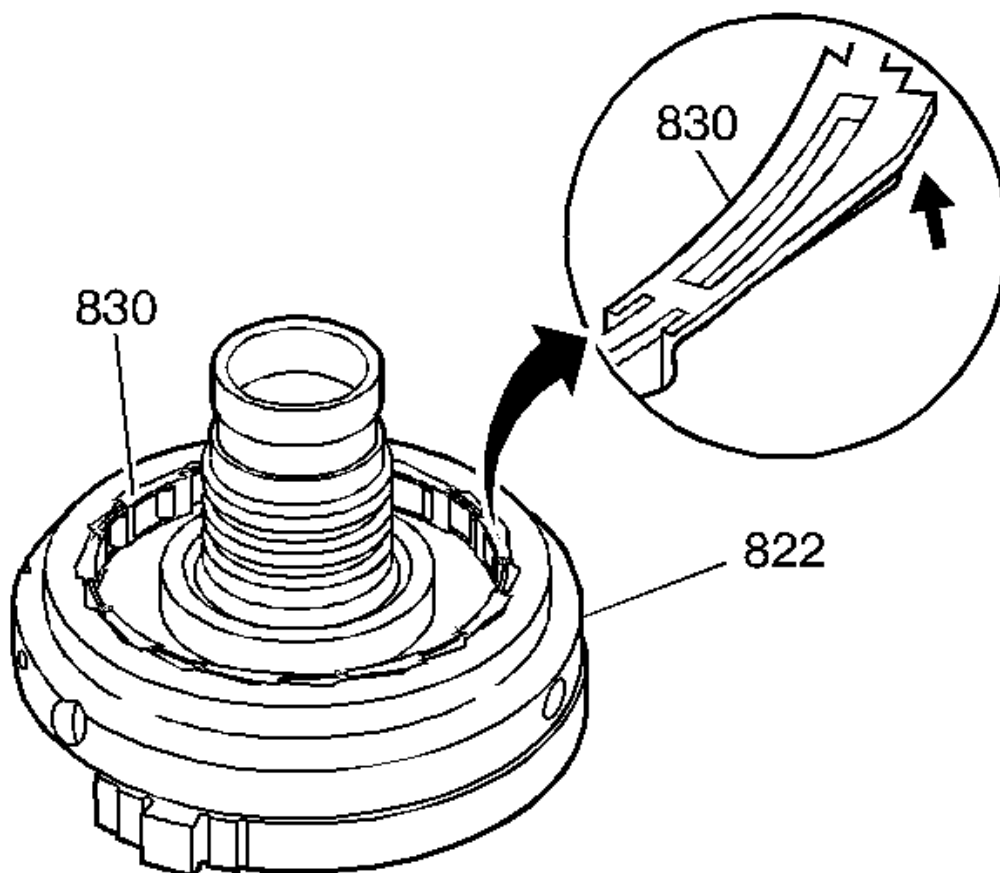


Fig. 93: Aligning Low Roller Clutch Assembly
Courtesy of GENERAL MOTORS COMPANY

80. Install the low roller clutch assembly (830) into the forward and coast clutch support (822). Turn the low roller clutch assembly (830) counterclockwise as far as it can go. The tabs on the low roller clutch assembly (830) must rest on the face of the forward and coast clutch support (822).

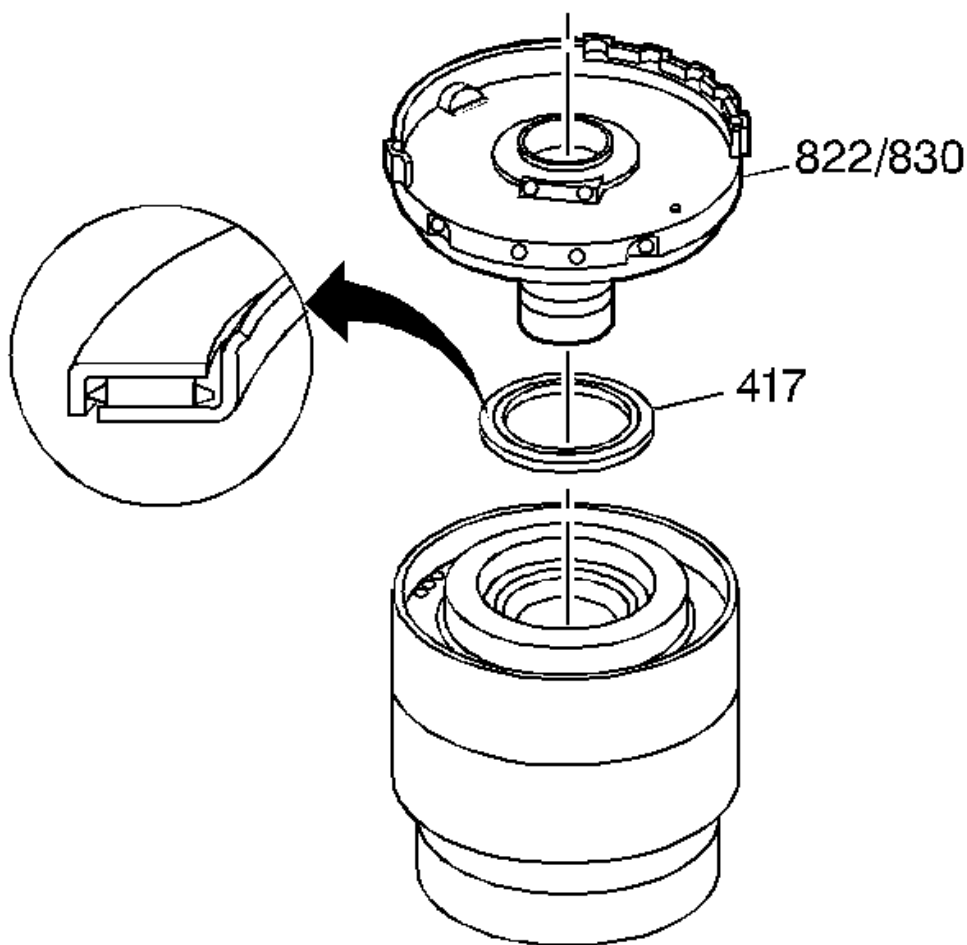


Fig. 94: Forward & Coast Clutch Assembly & Thrust Bearing
 Courtesy of GENERAL MOTORS COMPANY

81. Install the thrust bearing (417) onto the forward and coast clutch assembly.
82. Install the forward and coast clutch support and low roller clutch assembly (822/830) onto the forward and coast clutch assembly.

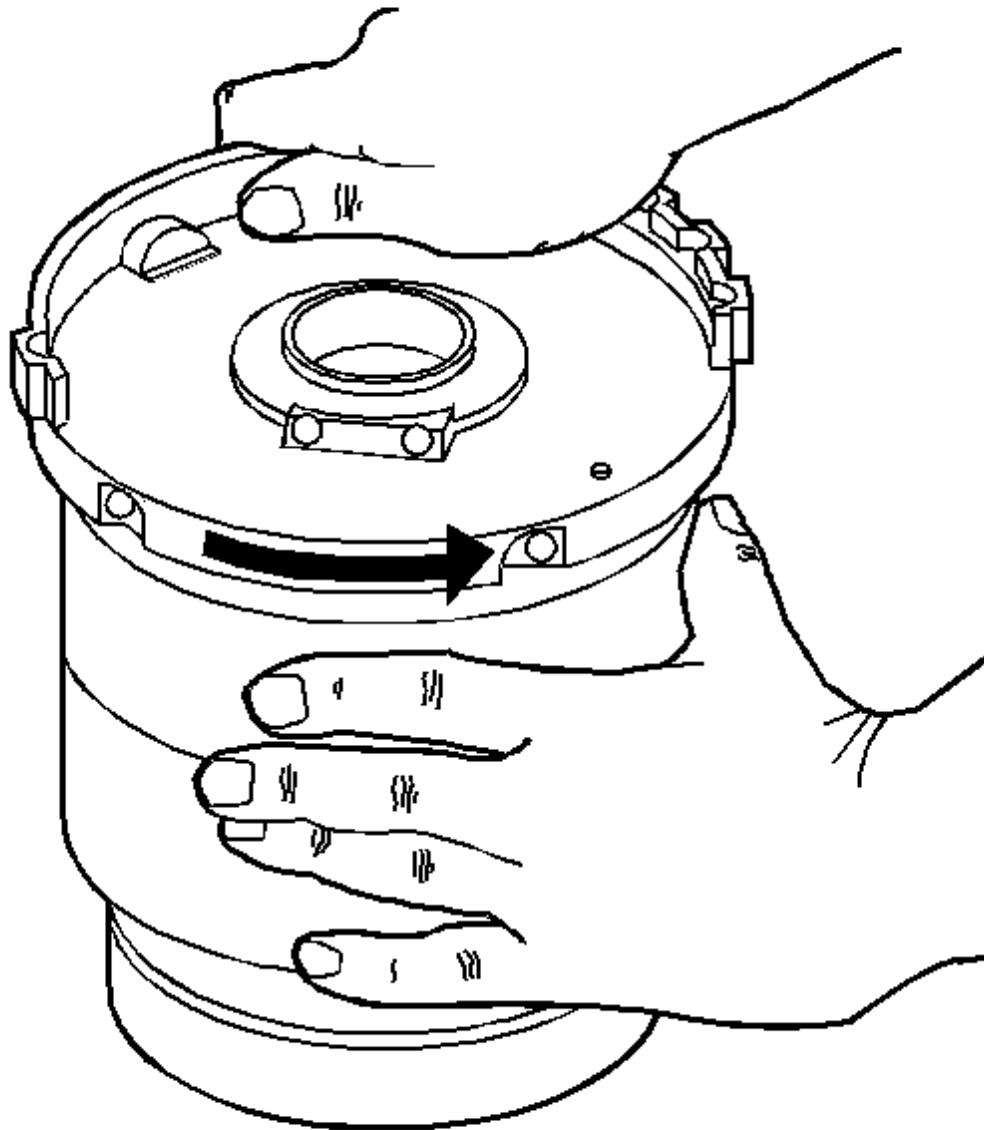


Fig. 95: Checking Low Roller Clutch Assembly Rotation
 Courtesy of GENERAL MOTORS COMPANY

83. Check the rotation of the low roller clutch assembly. The low roller clutch assembly should freewheel in the counterclockwise direction.

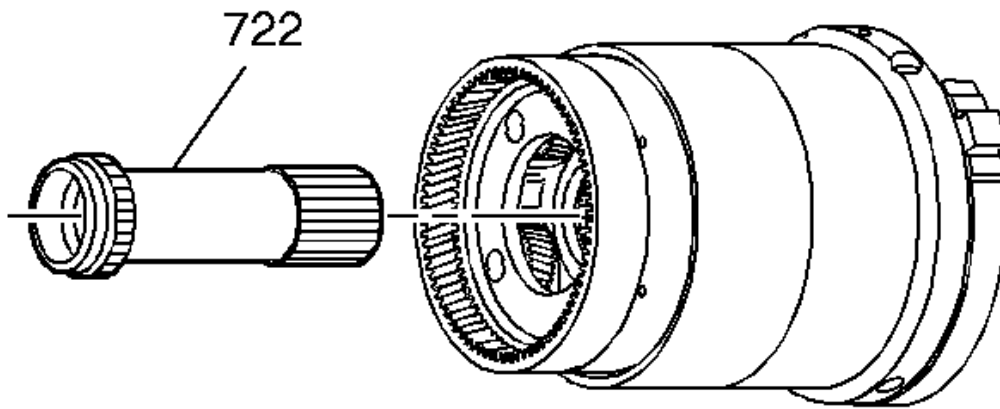


Fig. 96: Locating Final Drive Sun Gear Shaft
Courtesy of GENERAL MOTORS COMPANY

84. Install the final drive sun gear shaft (722).

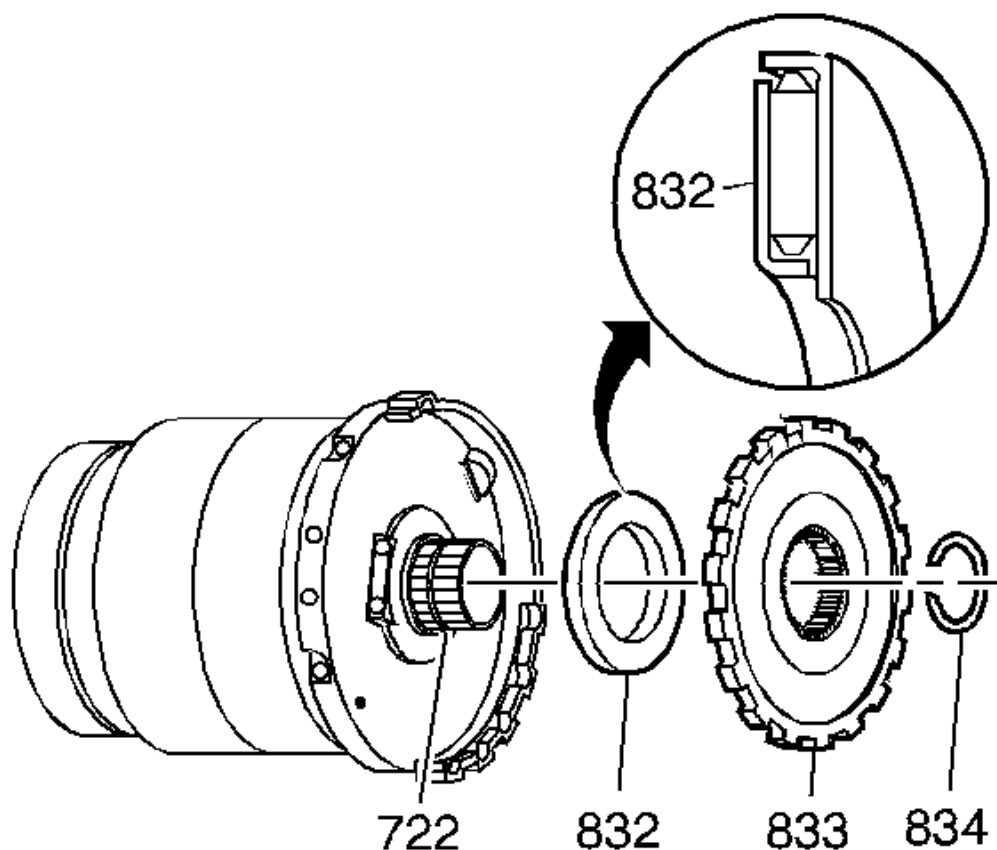


Fig. 97: Identifying Parking Lock Gear And Final Drive Sun Gear Shaft Components
Courtesy of GENERAL MOTORS COMPANY

85. Install the thrust bearing (832), the parking lock gear (833), and the snap ring (834) onto the final drive sun gear shaft (722).

LOW/REVERSE BAND AND FRETTING RING INSTALLATION

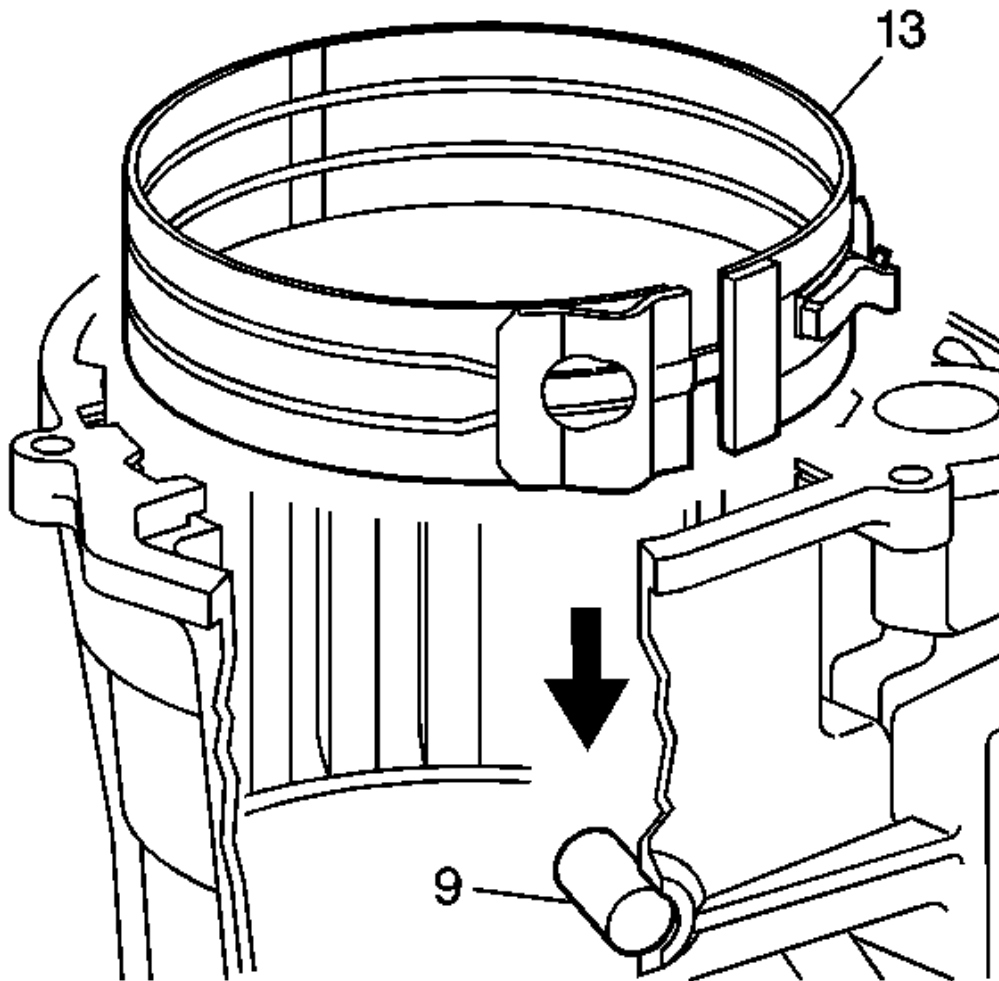


Fig. 98: Identifying Low Reverse Band
 Courtesy of GENERAL MOTORS COMPANY

NOTE: It may be easier to install the low reverse band if it is installed on the anchor pin first.

1. Install the low reverse band (13) into the case. Be sure to properly anchor the band in the case with the servo pin stop at the case bore.

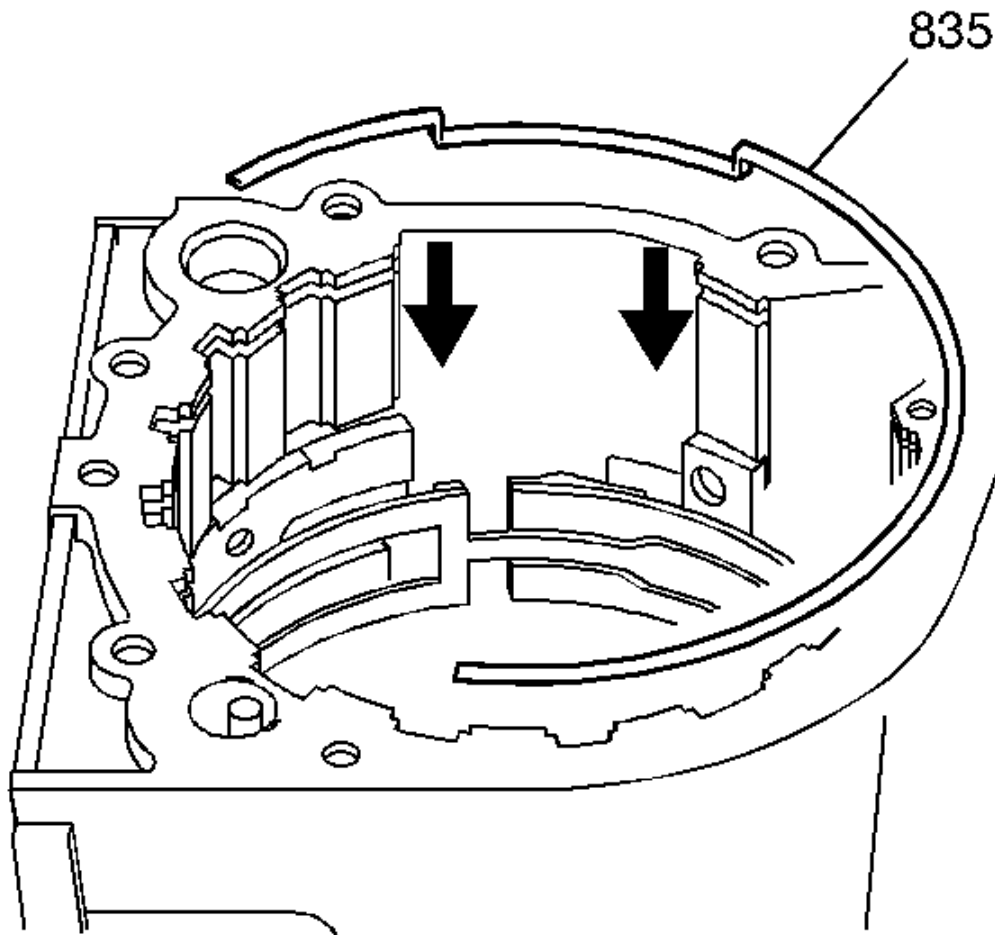


Fig. 99: View Of Fretting Ring

Courtesy of GENERAL MOTORS COMPANY

2. Install the fretting ring (835) into the case. Keep the gap in the fretting ring toward the bottom pan with the recessed area next to the anchor pin.

FORWARD AND COAST CLUTCH INSTALLATION

Special Tools

J 39053 Forward and Coast Clutch Assembly Installer

For equivalent regional tools, refer to **Special Tools** .

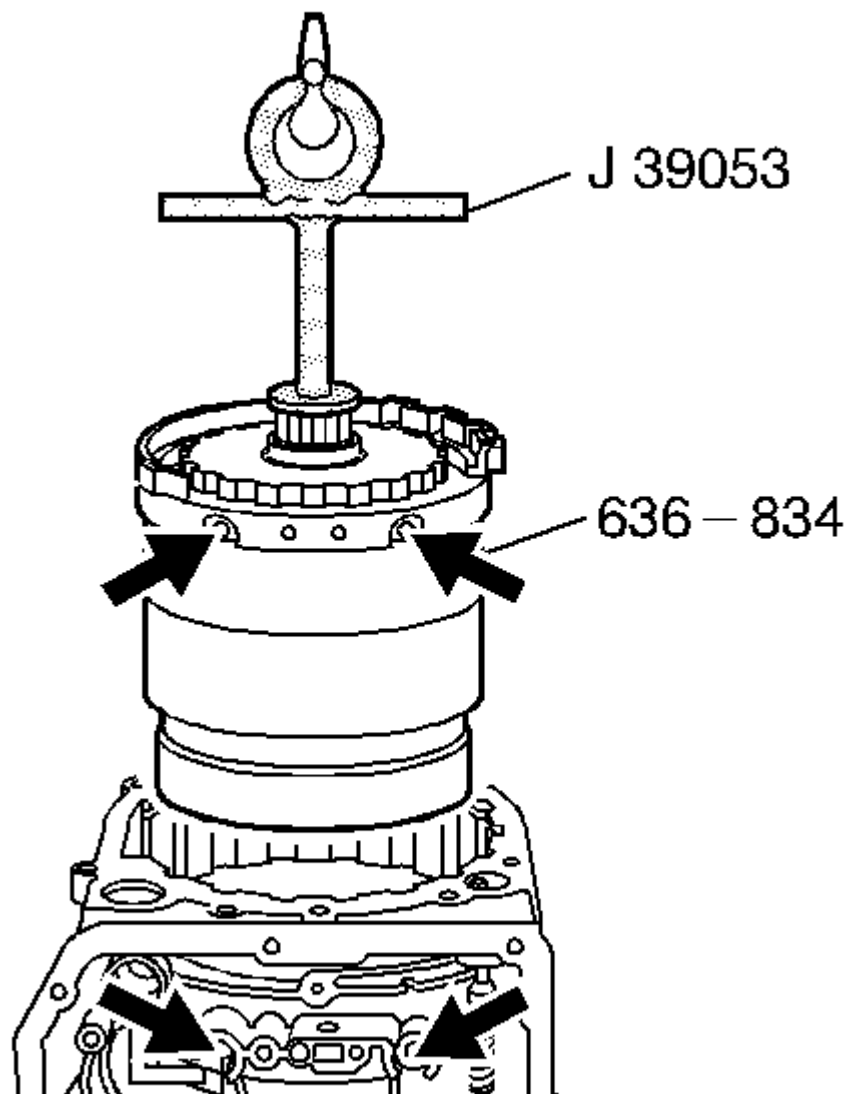


Fig. 100: Forward & Coast Clutch & Support Assembly
Courtesy of GENERAL MOTORS COMPANY

WARNING: The forward and coast clutch assembly weighs approximately 50 lbs. Personal injury may result if you drop the assembly.

1. Install the **J 39053** clutch assembly installer into the forward and coast clutch and support assembly (636-834).

2. Using a chain hoist or suitable lifting equipment, install the forward and coast clutch and support assembly (636-834) into the barrel of the case. The two bolt holes and feed holes must line up with the holes in the bottom of the case.

FINAL DRIVE INTERNAL GEAR AND SNAP RING INSTALLATION

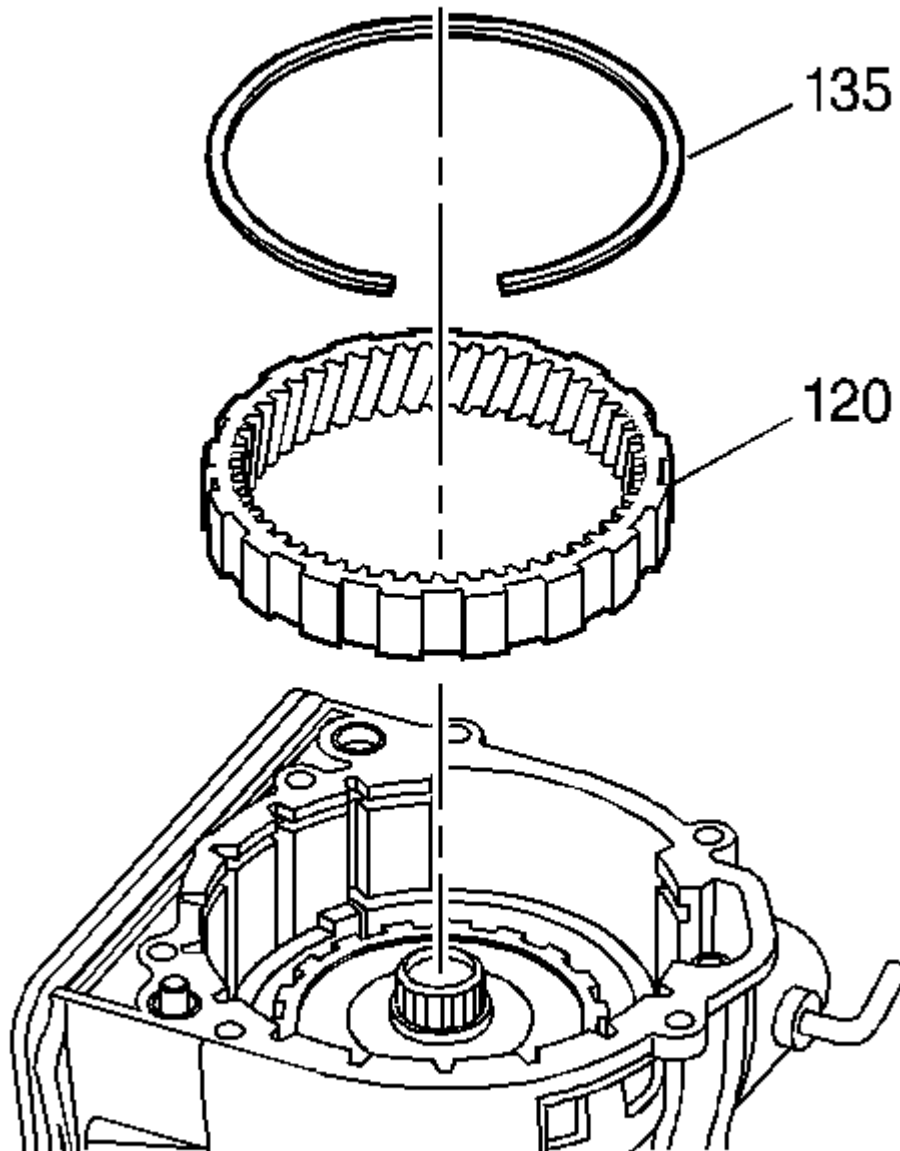


Fig. 101: View Of Final Drive Internal Gear With Groove Aligned Up

Courtesy of GENERAL MOTORS COMPANY

1. Install the final drive internal gear (120) with the groove up.
2. Install the final drive internal gear snap ring (135) flat side down.

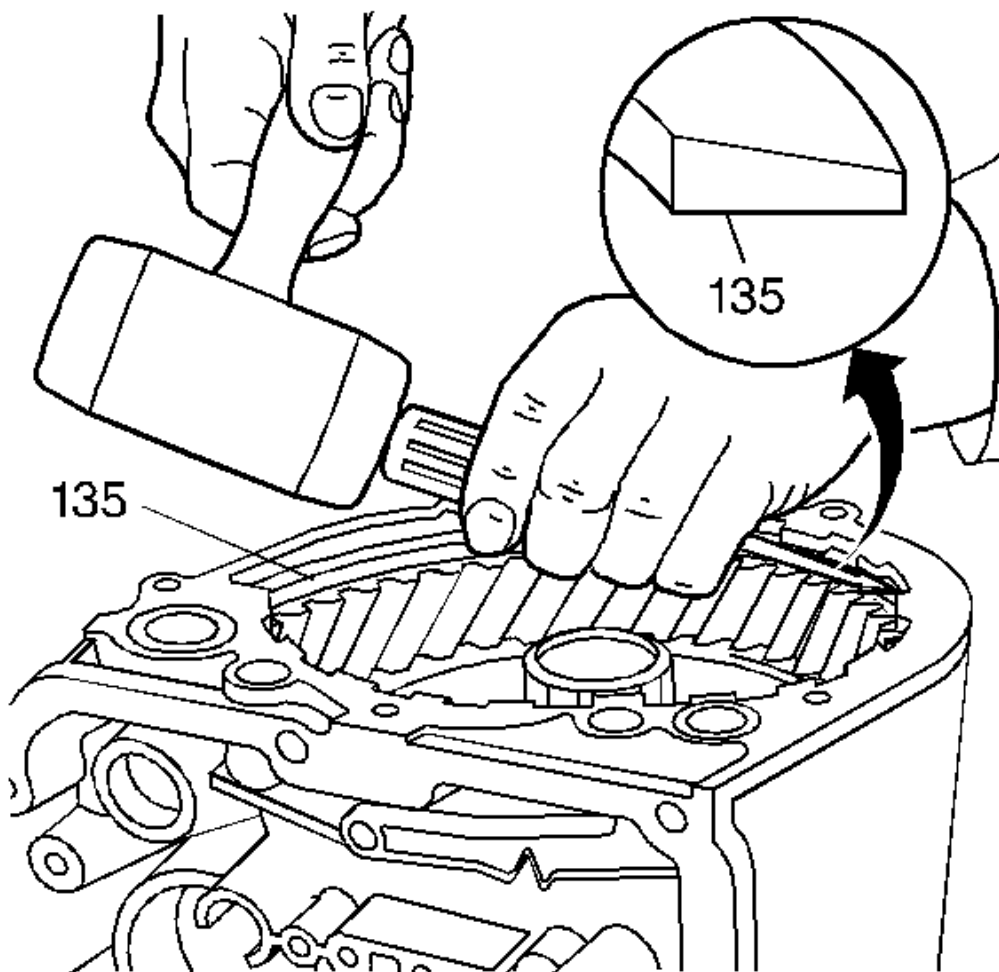


Fig. 102: Setting Final Drive Internal Gear Snap Ring With A Punch
Courtesy of GENERAL MOTORS COMPANY

3. The final drive internal gear snap ring (135) opening should be in the actuator rod area. Set the final drive internal gear snap ring (135) in place with a light tap on a punch.

FORWARD CLUTCH SUPPORT STUD INSTALLATION

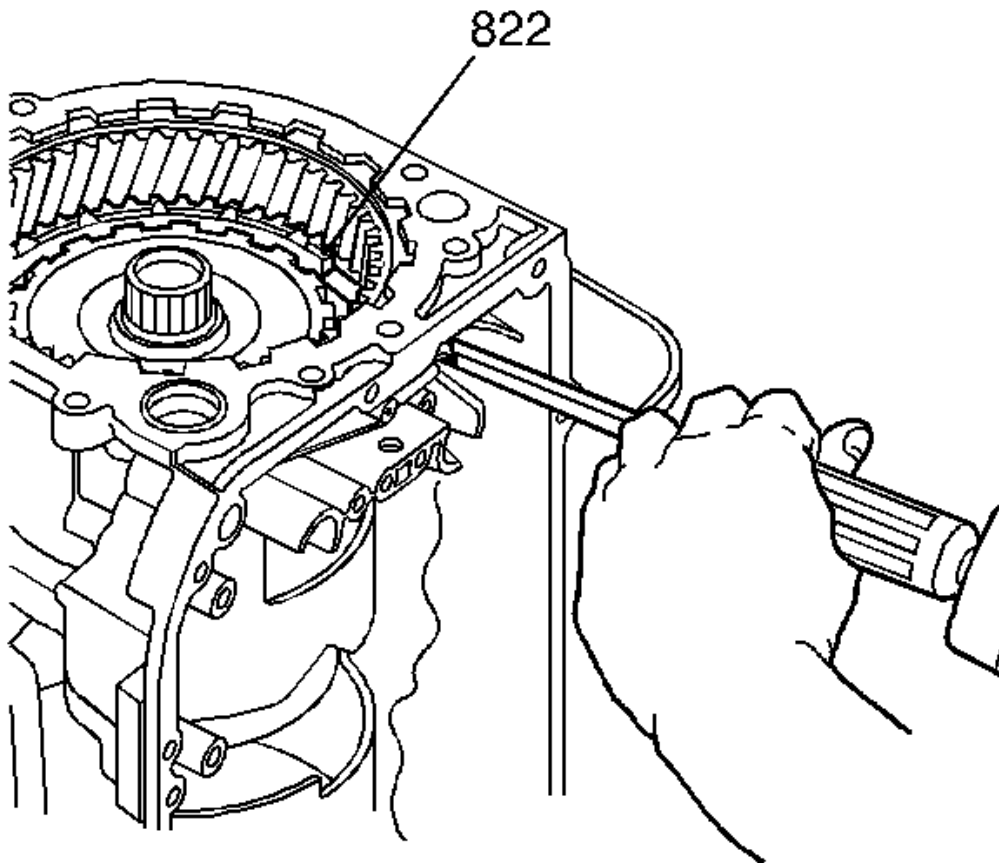


Fig. 103: Rotating Forward And Coast Clutch Support Counterclockwise Against The Spline
Courtesy of GENERAL MOTORS COMPANY

1. Rotate the forward and coast clutch support (822) counterclockwise against the spline. Do this by tapping on the support in a counterclockwise direction against the splines.

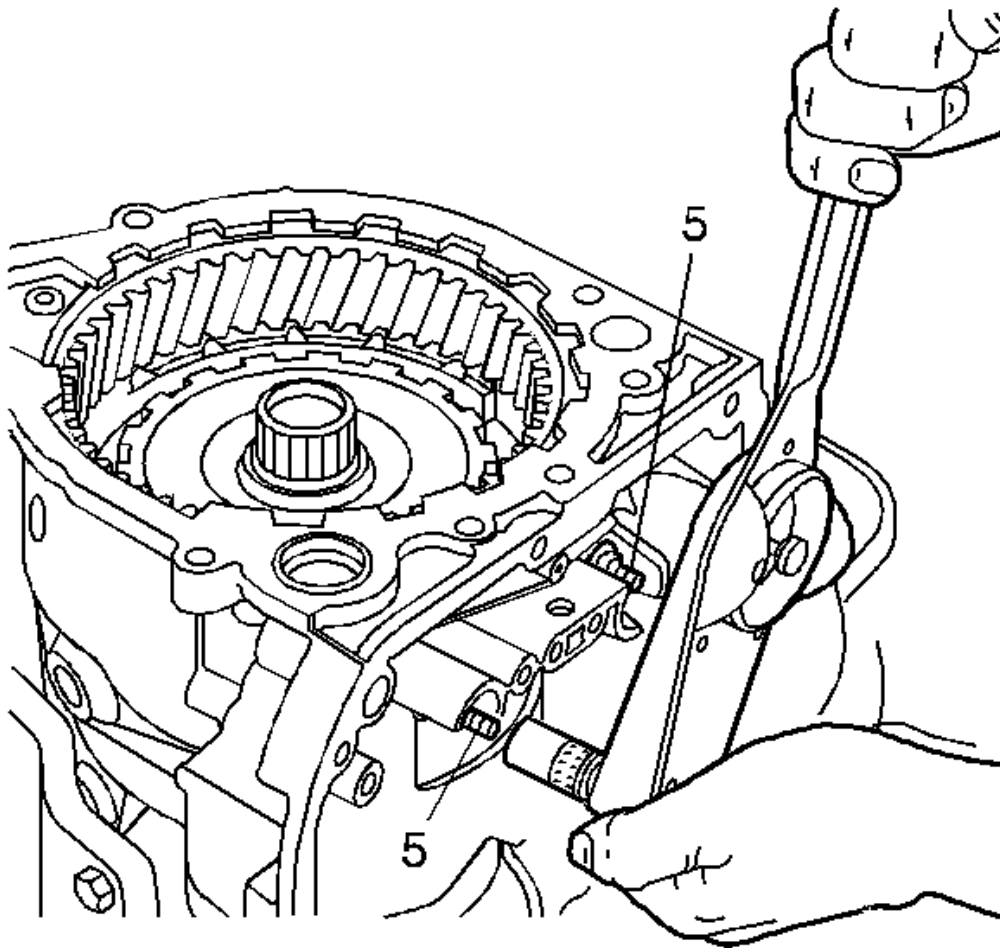


Fig. 104: Installing Forward Clutch Support Studs
Courtesy of GENERAL MOTORS COMPANY

CAUTION: Refer to Fastener Caution .

2. Install the forward clutch support studs (5). First tighten the stud closest to the bench (or the rear of the vehicle) to 25-27 N.m (19-20 lb ft). Then tighten the second stud to 25-27 N.m (19-20 lb ft).

PARKING PAWL AND PIVOT PIN INSTALL

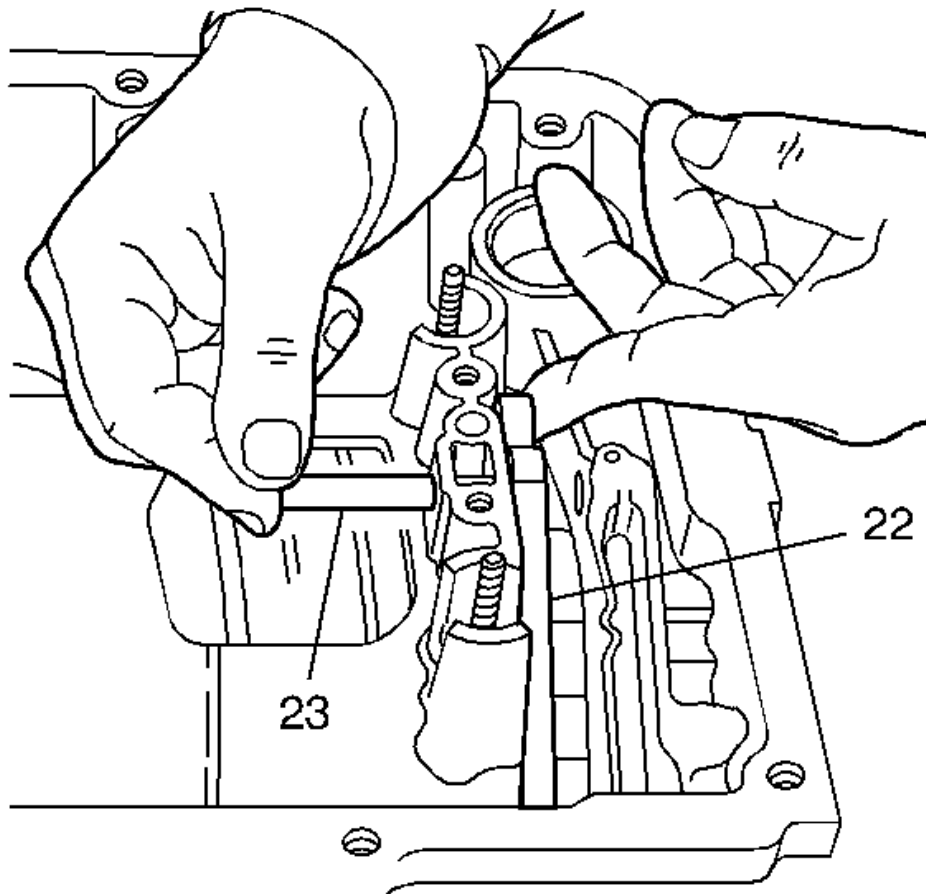


Fig. 105: Installing Parking Pawl Pivot Pin
Courtesy of GENERAL MOTORS COMPANY

1. Place the parking pawl (22) into the case slot.
2. Install the parking pawl pivot pin (23) into the case.
3. Install the parking pawl spring over the parking pawl. The hook end of the spring locates on the case, and the square end goes on top of the parking pawl.

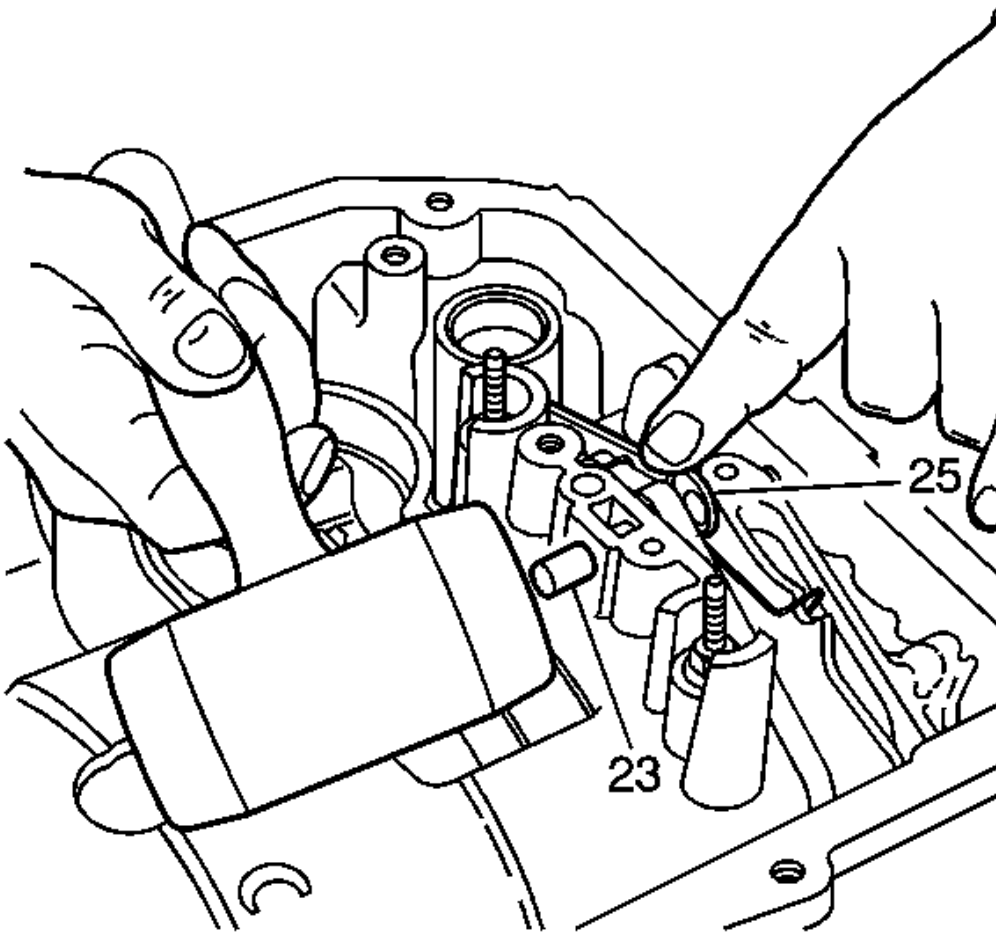


Fig. 106: Checking Parking Pawl

Courtesy of GENERAL MOTORS COMPANY

4. Tap the parking pawl pivot pin (23) in place while pressing down on the pawl and spring assembly (25).
5. Verify the correct function of the parking pawl by moving the manual shaft and detent lever through the different ranges. Then return the manual shaft to the Park position.

3RD CLUTCH PLATE ASSEMBLY AND REACTION CARRIER DISASSEMBLE

Special Tools

J 39694 Clutch Compressor

For equivalent regional tools, refer to **Special Tools** .

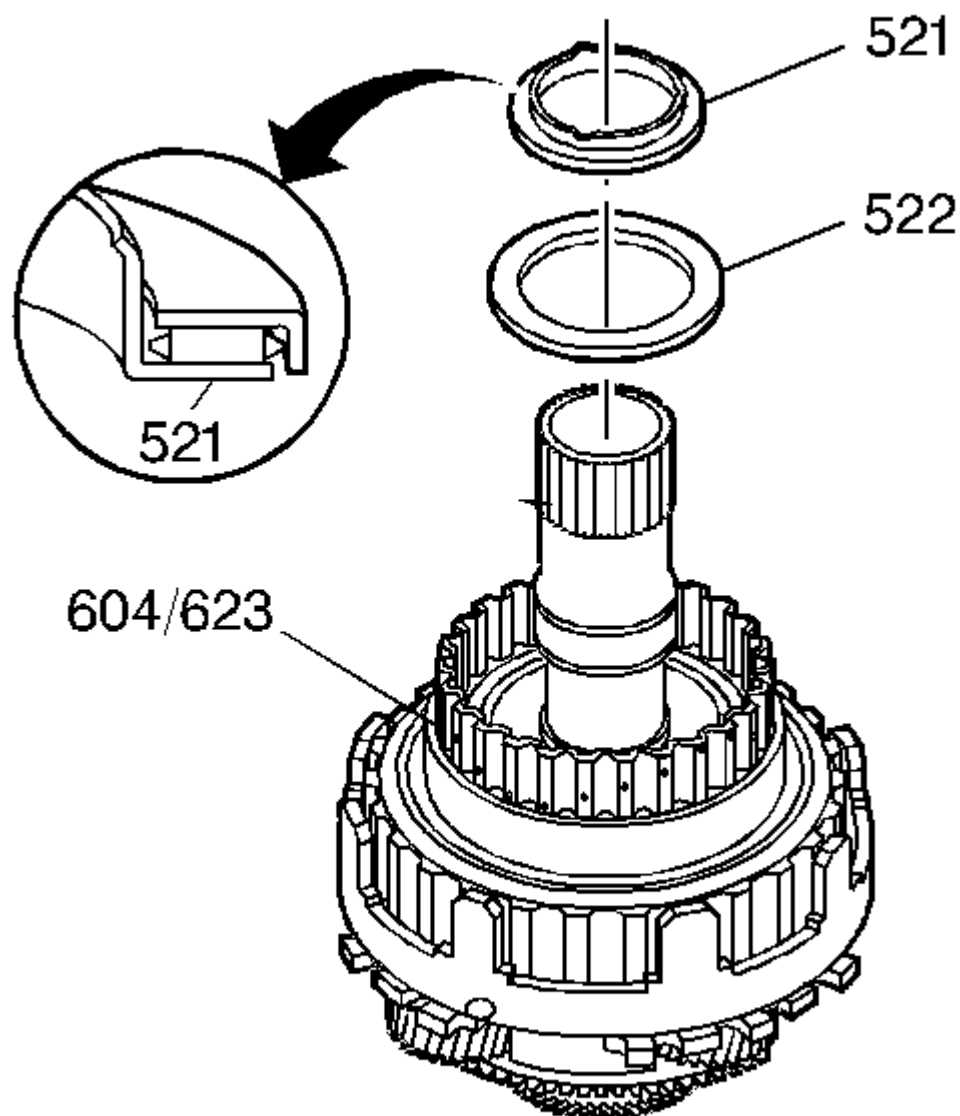


Fig. 107: Locating Selective Washer & Thrust Bearing
Courtesy of GENERAL MOTORS COMPANY

1. Remove the thrust bearing (521) and remove the selective thrust washer (522) from the third clutch housing (604).

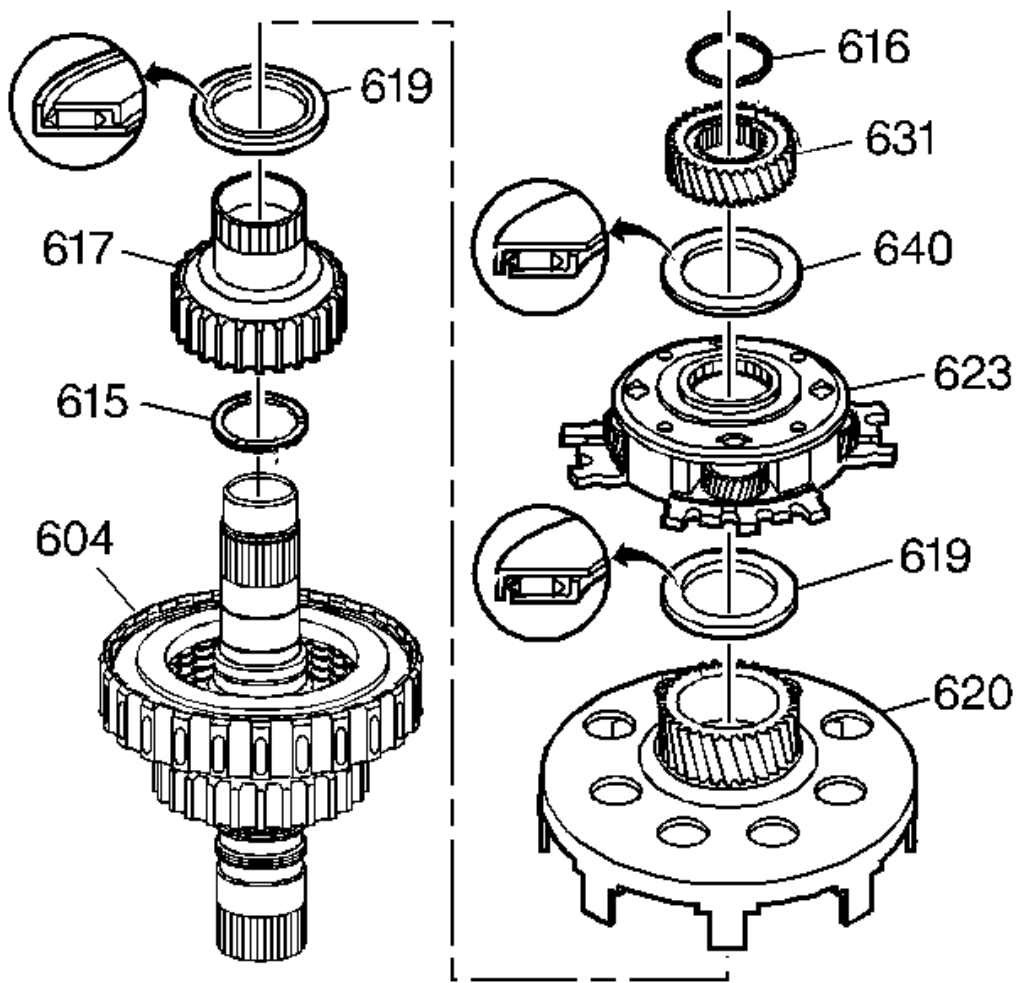


Fig. 108: Identifying Reaction Sun Gear And Shell Assembly, Reaction Carrier Assembly, Third Clutch Housing & Input Sun Gear
 Courtesy of GENERAL MOTORS COMPANY

2. Remove the snap ring (616) from the input shaft.
3. Remove the following parts:
 - The input sun gear (631)
 - The thrust bearing (640) and reaction carrier assembly (623). The thrust bearing will remain in the reaction carrier.
4. Remove the following parts:
 - The reaction sun gear and shell assembly (620)
 - The thrust bearing (619) from the 3rd clutch hub (617)

- The third clutch hub and bushing assembly (617)
- The thrust washer (615)

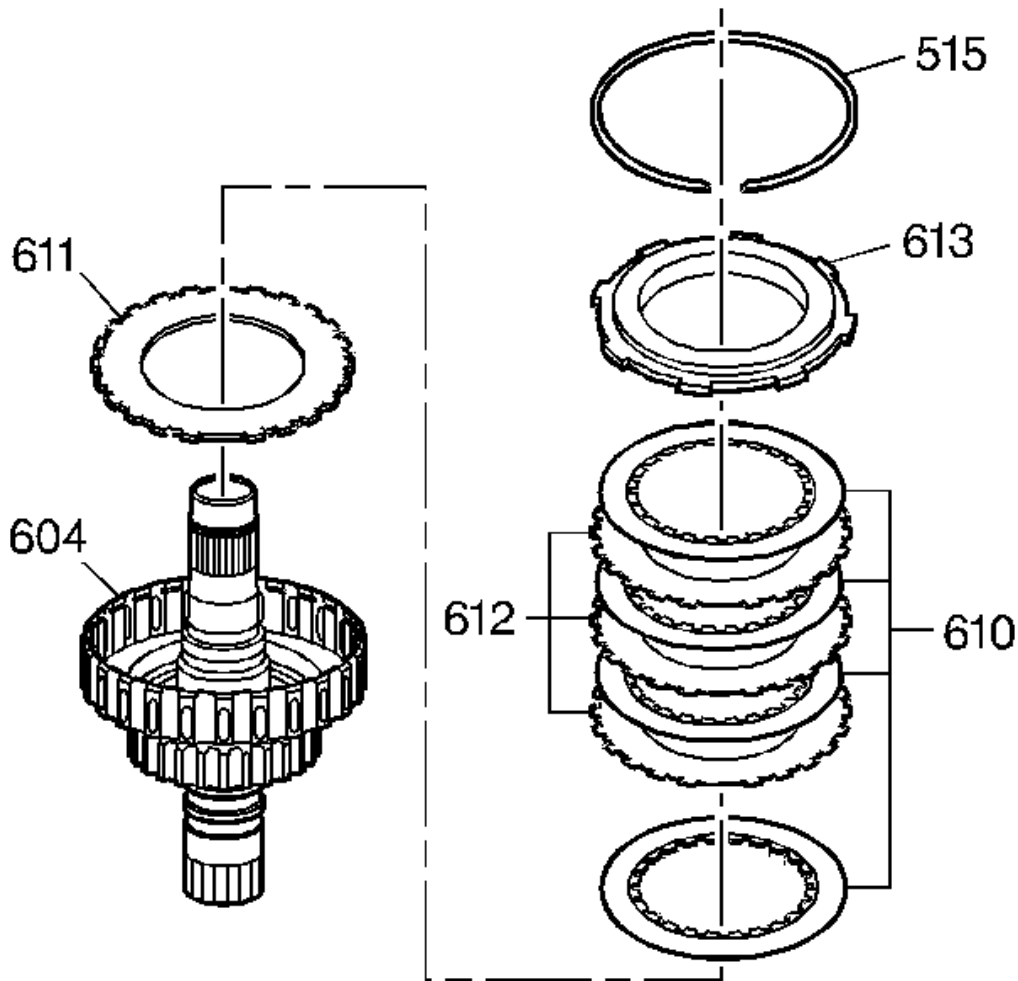


Fig. 109: View Of Third Clutch Plates
 Courtesy of GENERAL MOTORS COMPANY

5. Remove the snap ring (515) from the third clutch housing (604).
6. Remove the following parts:
 - The third clutch backing plate (613)
 - The fiber (610) and steel (612) clutch plates
 - The apply plate (611)

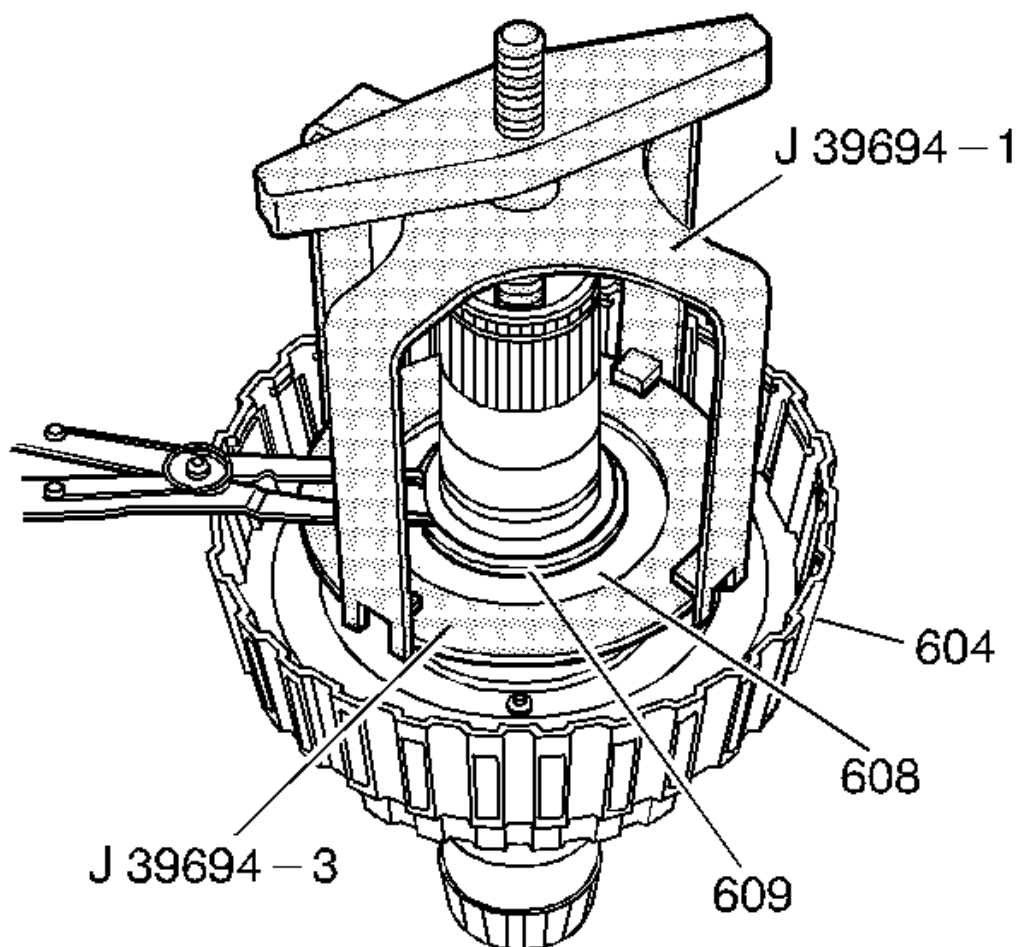


Fig. 110: Identifying Clutch Spring Compressor & Compress Spring With J 39694
Courtesy of GENERAL MOTORS COMPANY

7. Install the **J 39694** clutch compressor/clutch spring compressor and compress the spring.
8. Remove the spring assembly snap ring (609).
9. Remove the spring compressor tool.

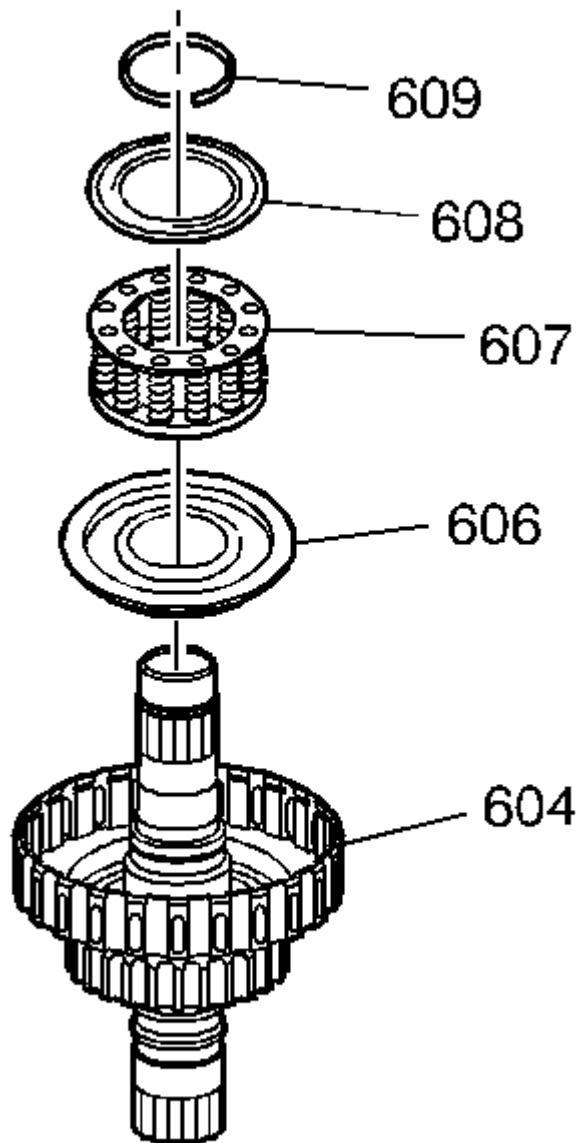


Fig. 111: Locating 3rd Clutch Piston Assembly
Courtesy of GENERAL MOTORS COMPANY

10. Remove the following parts:
- The snap ring retainer (608)
 - The spring and retainer assembly (607)
 - The piston assembly (606)

THIRD CLUTCH AND REACTION CARRIER ASSEMBLE

Special Tools

- **J 39694** Clutch Compressor
- **J 34741-1** Input Shaft Seal Protector
- **J 34741-2** Input Shaft Seal Pusher
- **J 34741-3** Input Shaft Seal Sizer
- **J 36850** Assembly Lubricant(or equivalent)

For equivalent regional tools, refer to **Special Tools** .

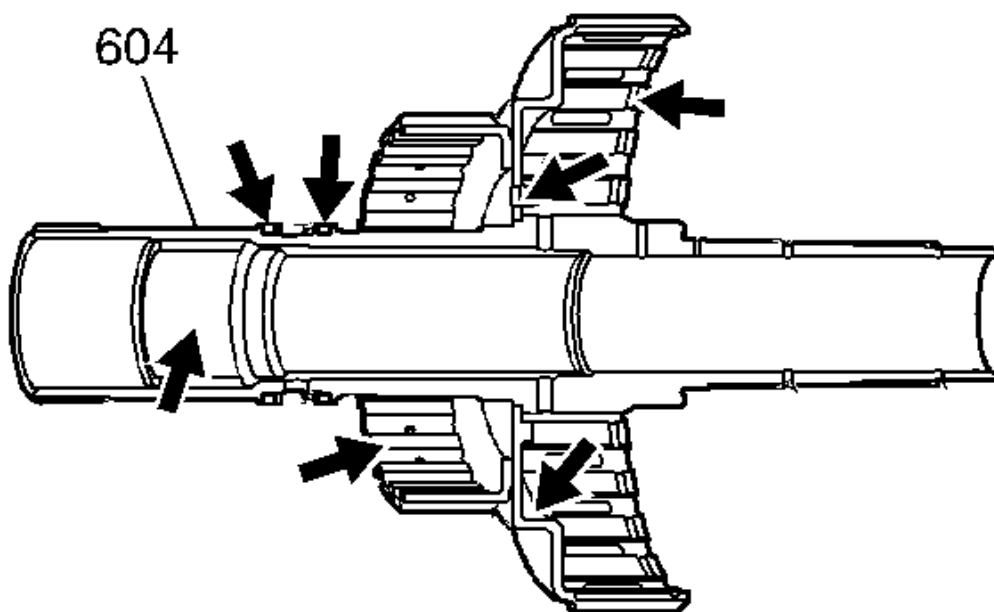


Fig. 112: Identifying 3rd Clutch Housing Inspection Points
Courtesy of GENERAL MOTORS COMPANY

1. Inspect the 3rd clutch housing (604) for the following:
 - Plugged feed holes
 - Seal ring grooves for nicks or burrs
 - Input shaft for cracked or blocked fluid passages
 - Input shaft bushing for excessive wear

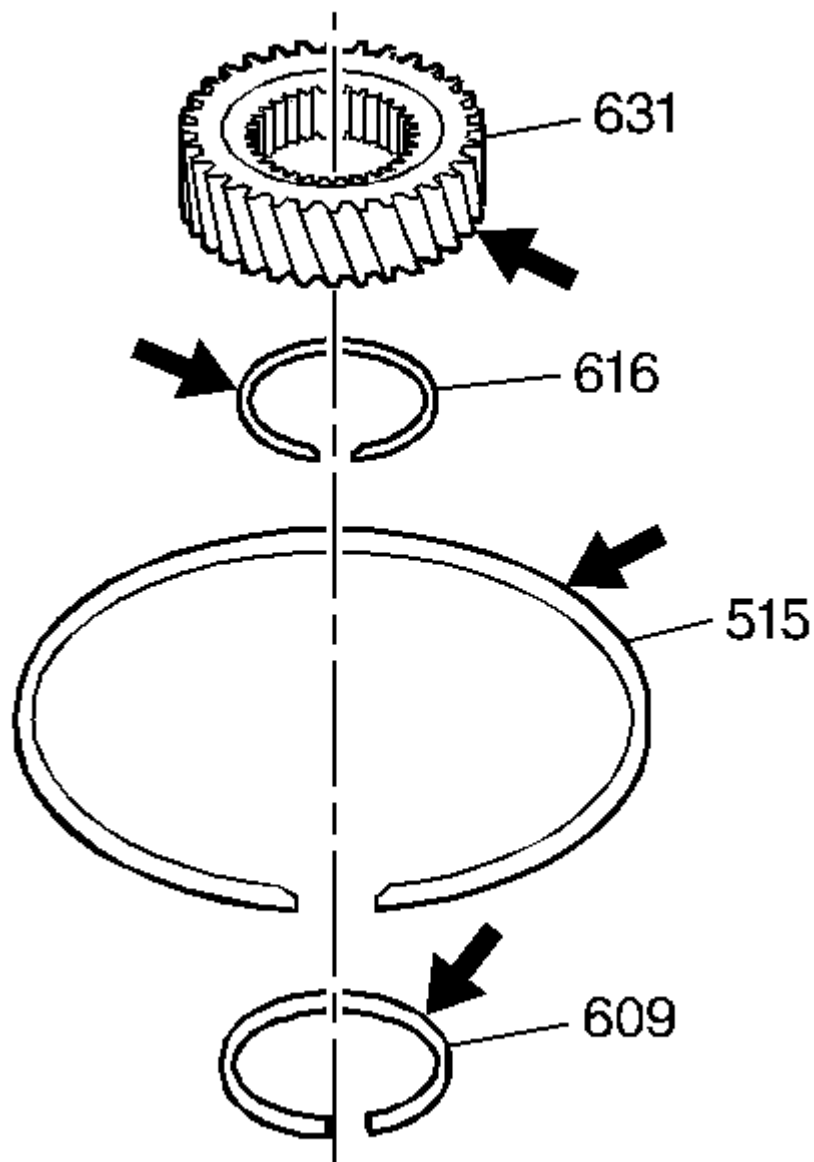


Fig. 113: View Of Input Sun Gear & Snap Rings
Courtesy of GENERAL MOTORS COMPANY

2. Inspect the input sun gear (631) for damage or wear.
3. Inspect the snap rings (616, 515, 609) for overexpansion.

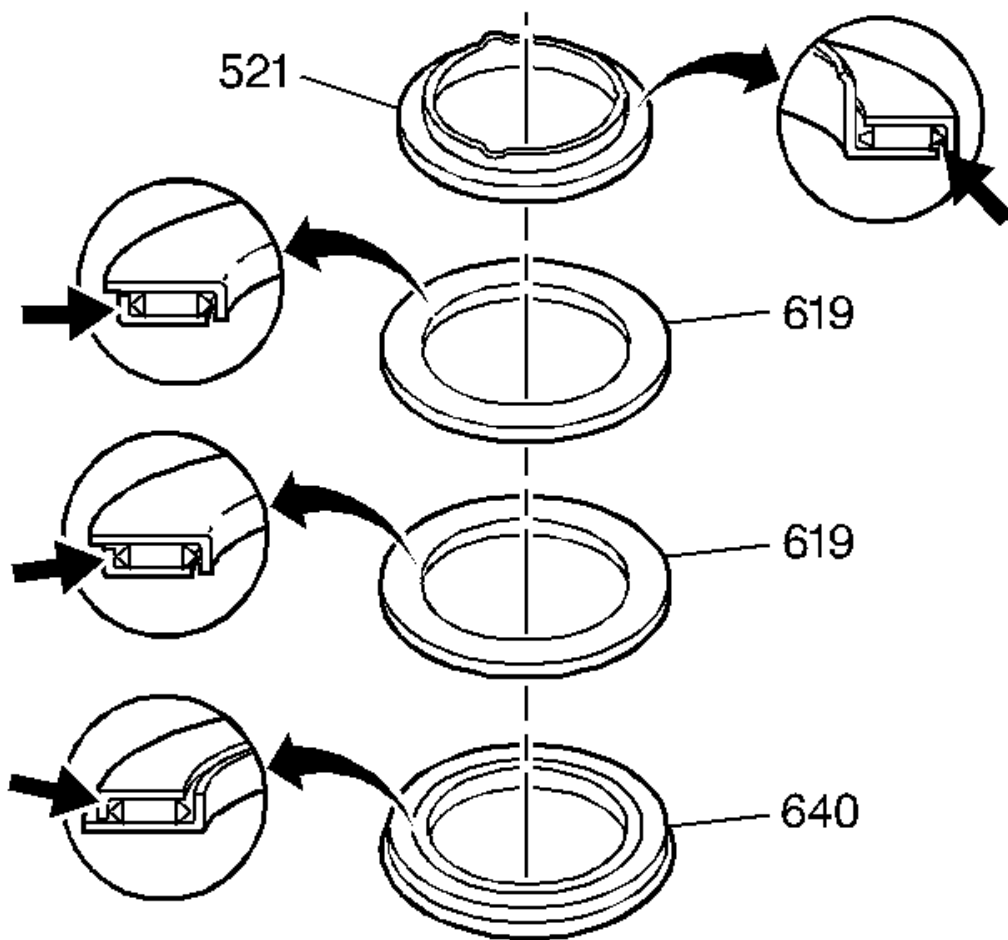


Fig. 114: Inspecting Thrust Bearing For Damage Or Wear
 Courtesy of GENERAL MOTORS COMPANY

4. Inspect the thrust bearings (521, 619, 640) for damage or wear.

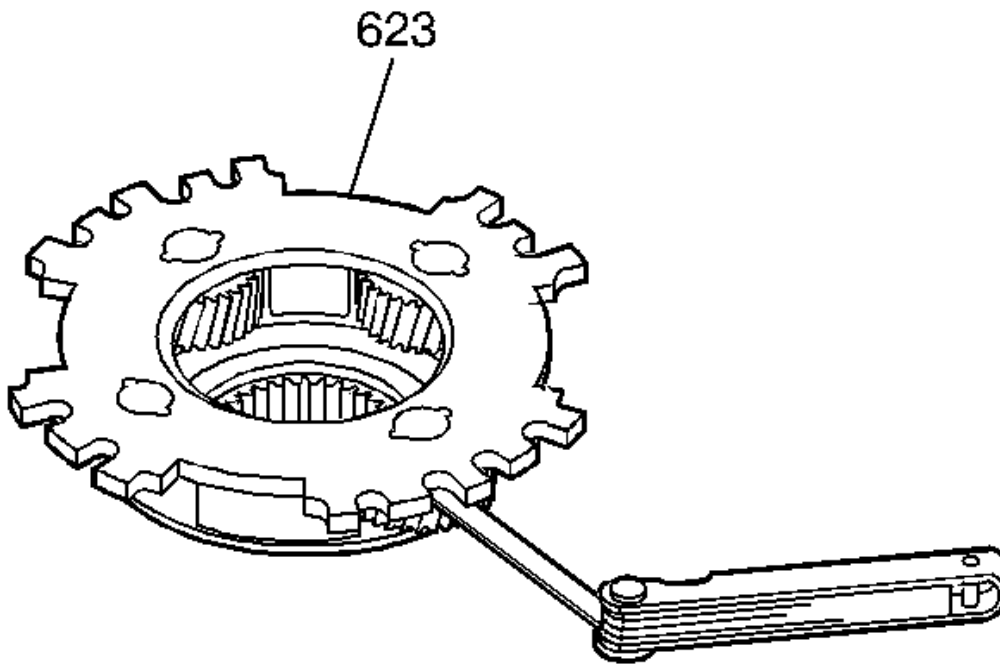


Fig. 115: Measuring Planet Pinion End Play With Feeler Gauge
Courtesy of GENERAL MOTORS COMPANY

5. Inspect the reaction carrier planet pinions (623) for wear. Inspect the planet pinion end play with a feeler gauge. Pinion gear end play is 0.09-0.90 mm (0.0035-0.035 in).

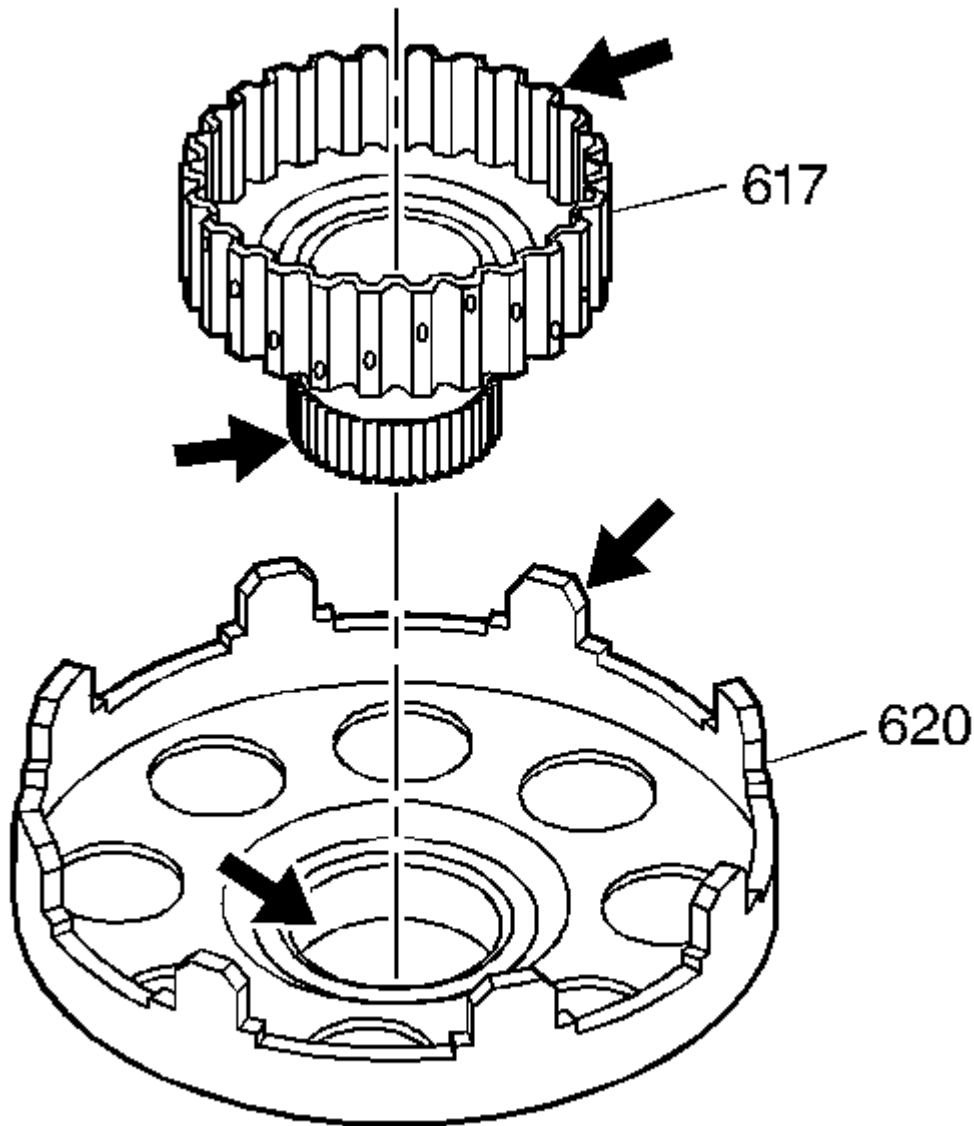


Fig. 116: Locating Reaction Sun Gear And Shell Assembly
 Courtesy of GENERAL MOTORS COMPANY

6. Inspect the reaction sun gear and shell assembly (620) for damage.
7. Inspect the bushing on the reaction sun gear and shell assembly (620) for wear.
8. Inspect the splines on the third clutch hub (617) for damage.
9. Check for plugged oil feed holes.

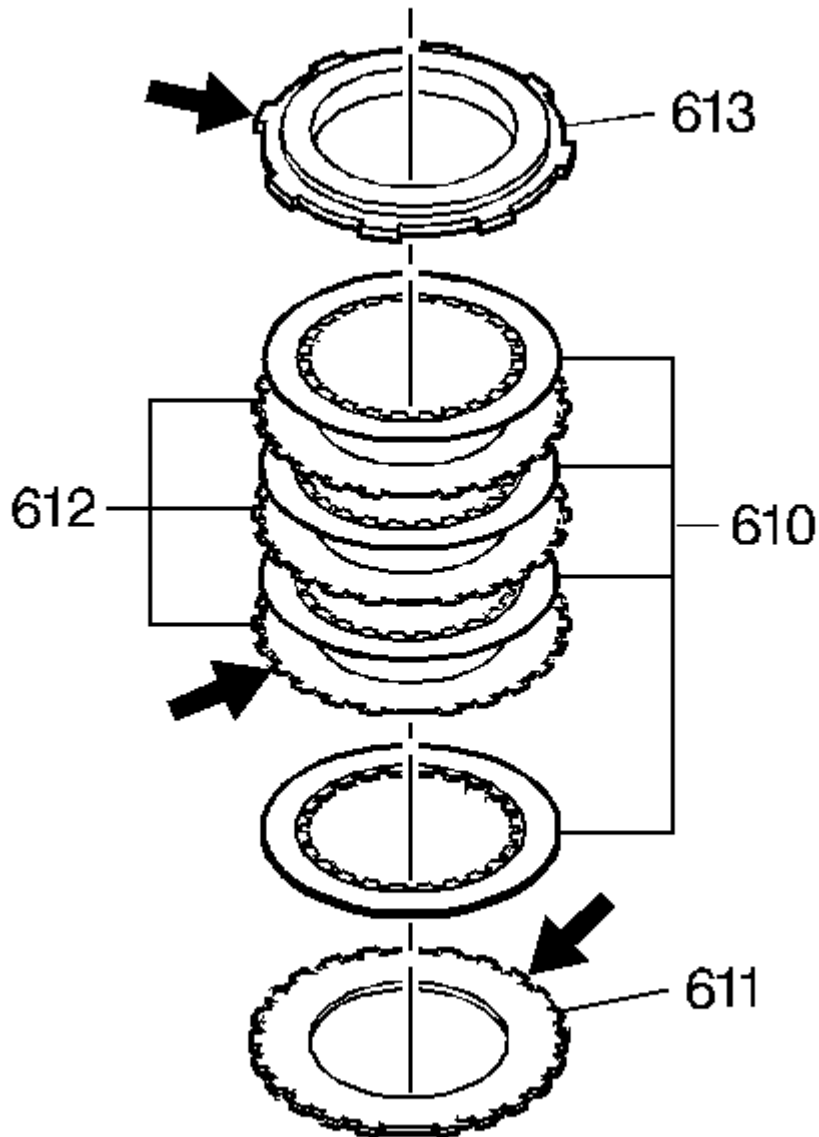


Fig. 117: View Of Inspection Areas On 3rd Clutch Plates
Courtesy of GENERAL MOTORS COMPANY

10. Inspect the third clutch backing plate (613) for damage.
11. Inspect all third clutch steel plates (612) for scoring.
12. Inspect the third clutch apply plate (611) for scoring.
13. Replace all fiber plates (610).

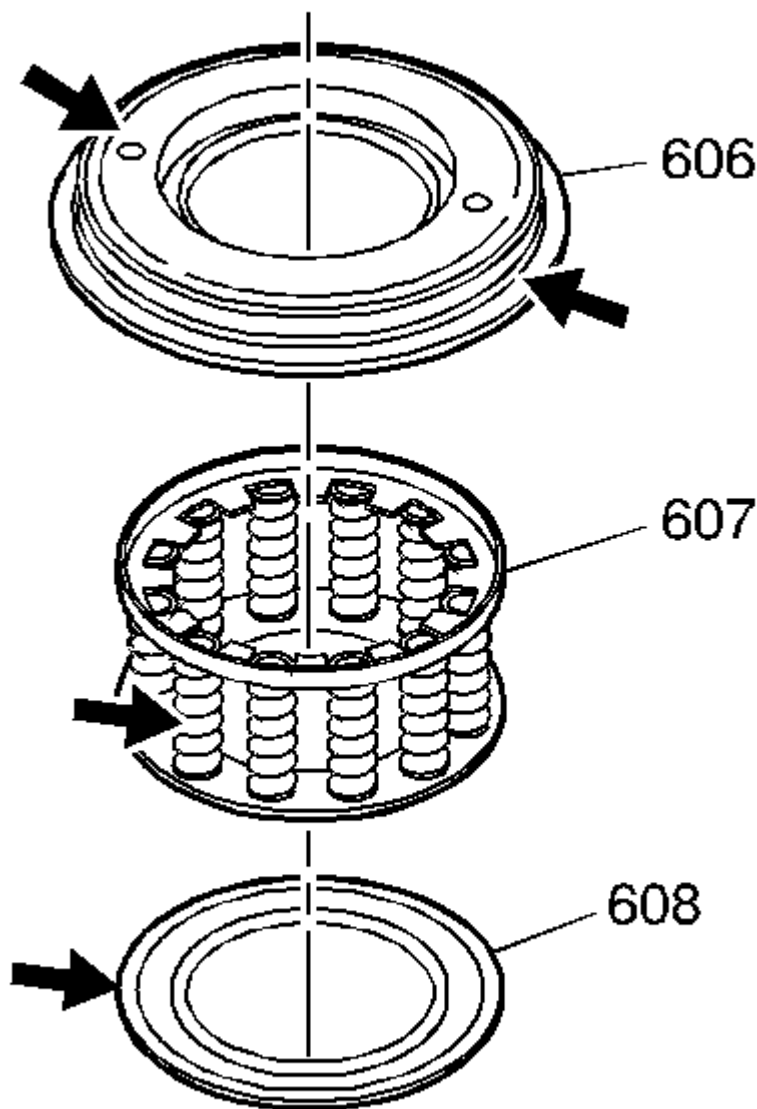


Fig. 118: Inspection Areas On Third Clutch Piston Assembly Seals
Courtesy of GENERAL MOTORS COMPANY

14. Inspect the seals of the third clutch piston assembly (606). Inspect the checkball orifices. The checkball should move freely in the capsule. If the seals or checkballs are damaged, replace the third clutch piston assembly (606).
15. Inspect the return spring and retainer assembly (607) for missing or broken springs.
16. Inspect the snap ring retainer (608) for damage.

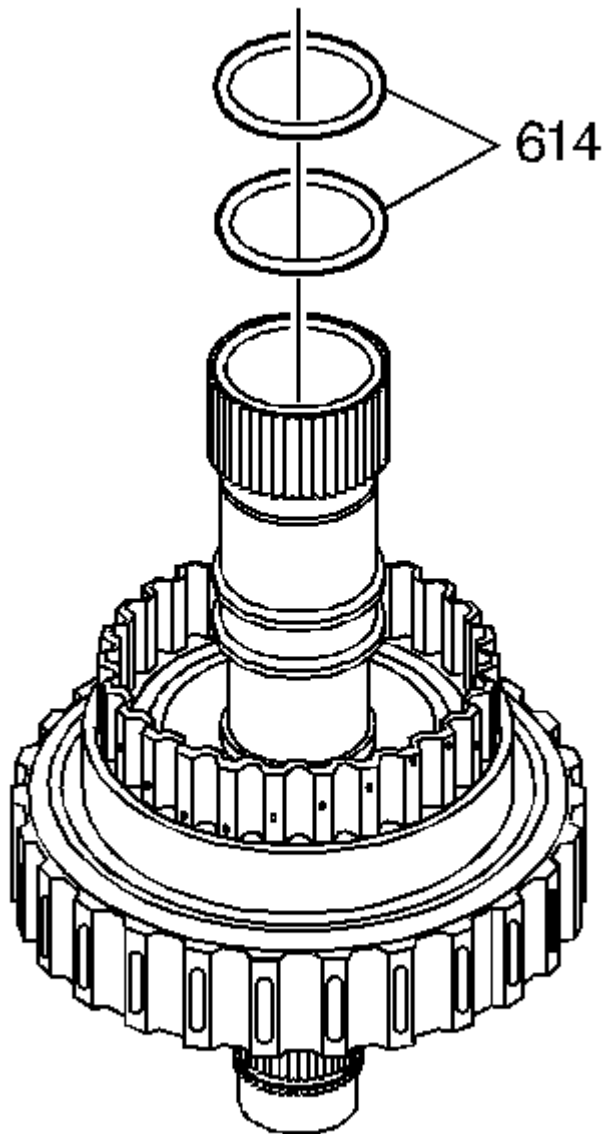


Fig. 119: Oil Seal Rings

Courtesy of GENERAL MOTORS COMPANY

17. Cut the oil seal rings (614) and remove the rings from the input shaft.

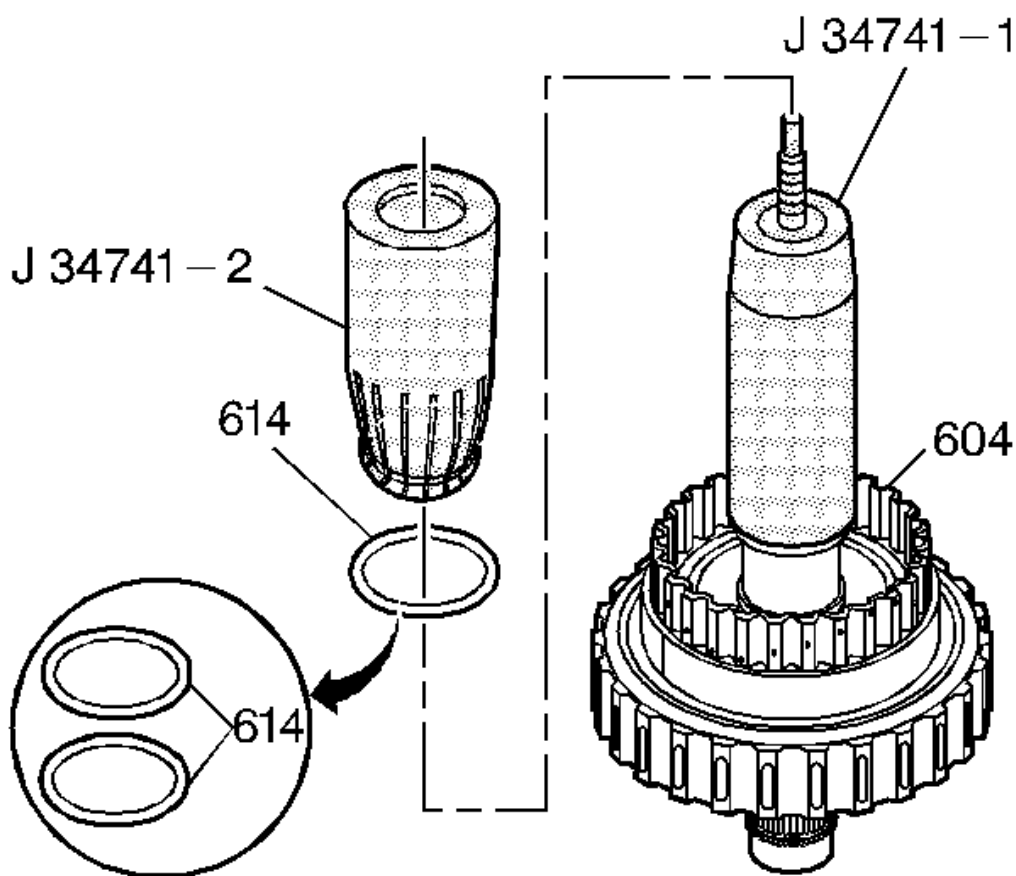


Fig. 120: Oil Seal Rings & Protector

Courtesy of GENERAL MOTORS COMPANY

18. Install the **J 34741-1** seal protector over the input shaft. Adjust the tool so that the bottom of the **J 34741-1** seal protector matches the correct oil seal ring groove.
19. Lubricate the oil seal ring (614) with transmission fluid, and position the ring on the **J 34741-1** seal protector.
20. Using the **J 34741-2** seal pusher, quickly slide the oil seal ring (614) into the oil seal ring groove.
21. Readjust the **J 34741-1** seal protector to the second oil seal ring groove.
22. Lubricate the second oil seal ring (614) with transmission fluid, and position the ring on the **J 34741-1** seal protector.
23. Using the **J 34741-2** seal pusher, quickly slide the oil seal ring (614) into the oil seal ring groove.

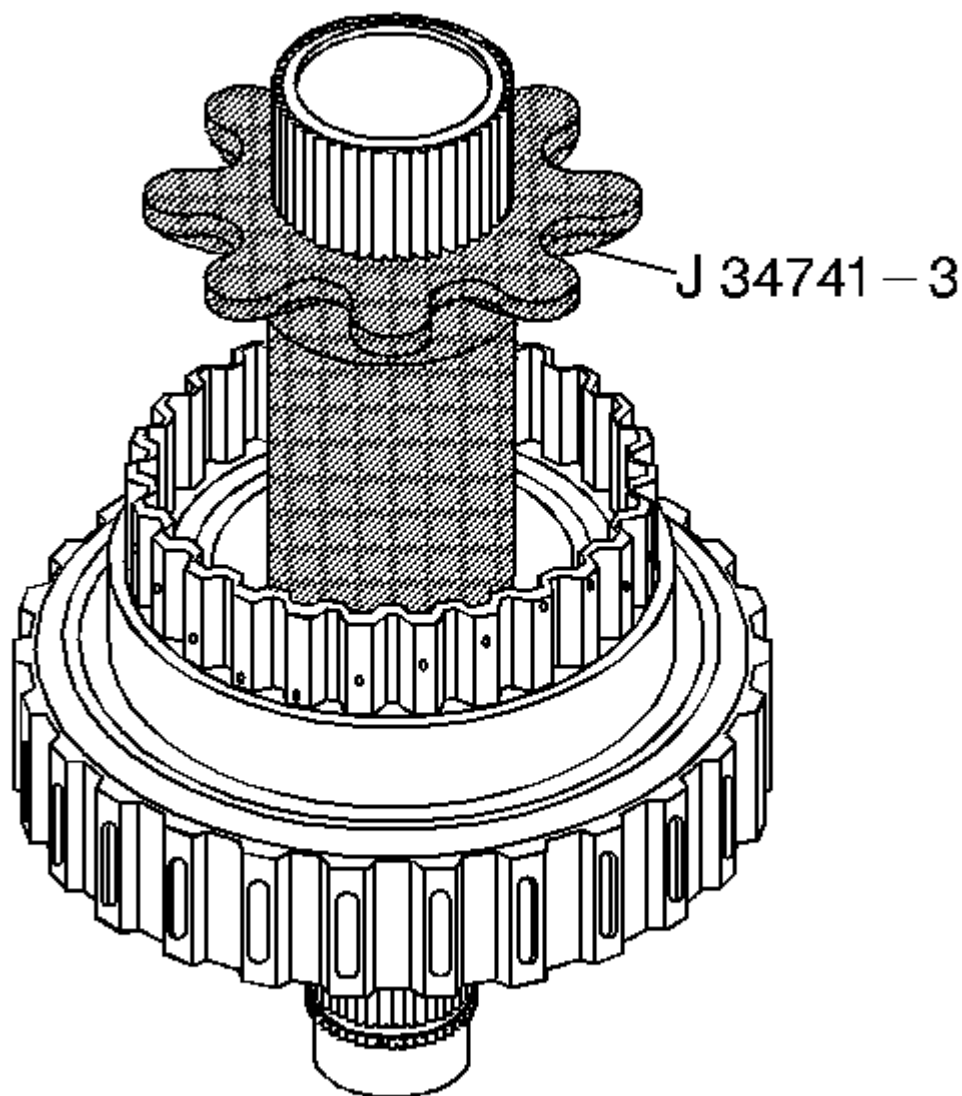


Fig. 121: Sizing Oil Seal Rings

Courtesy of GENERAL MOTORS COMPANY

24. Size the oil seal rings with the **J 34741-3** seal sizer.
25. Leave the **J 34741-3** seal sizer in place for at least five minutes.
26. Remove the **J 34741-3** seal sizer.

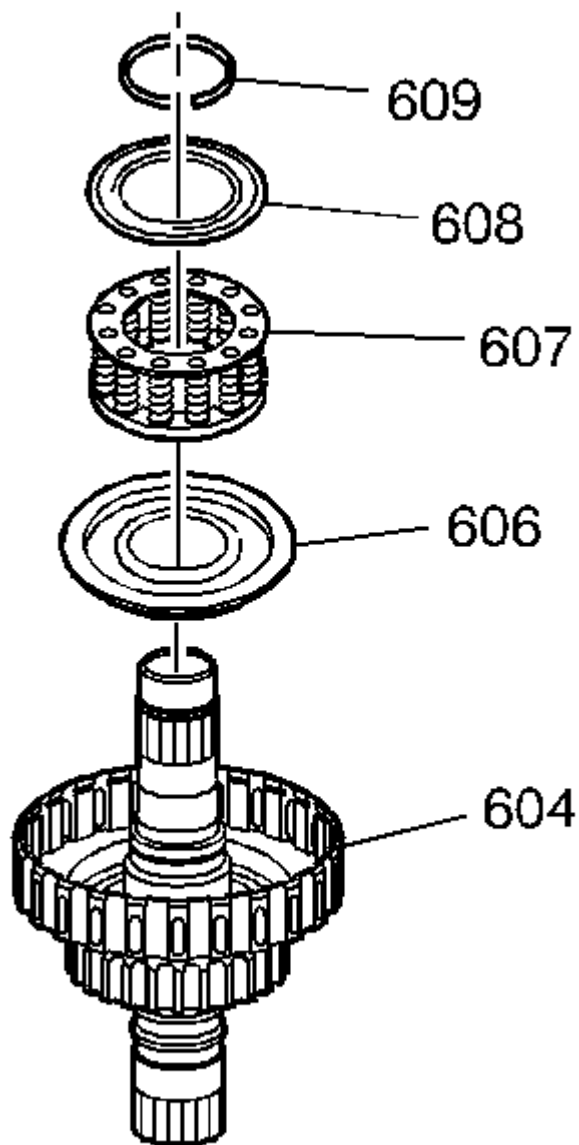


Fig. 122: Locating 3rd Clutch Piston Assembly
Courtesy of GENERAL MOTORS COMPANY

27. Lubricate the 3rd clutch piston seals with a light coating of **J 36850** assembly lubricant or equivalent.
28. Install the 3rd clutch piston assembly (606) into the bottom side of the 3rd clutch housing (604). Use a twisting motion when pushing the piston into the housing.
29. Install the spring and retainer assembly (607), and install the snap ring retainer (608).

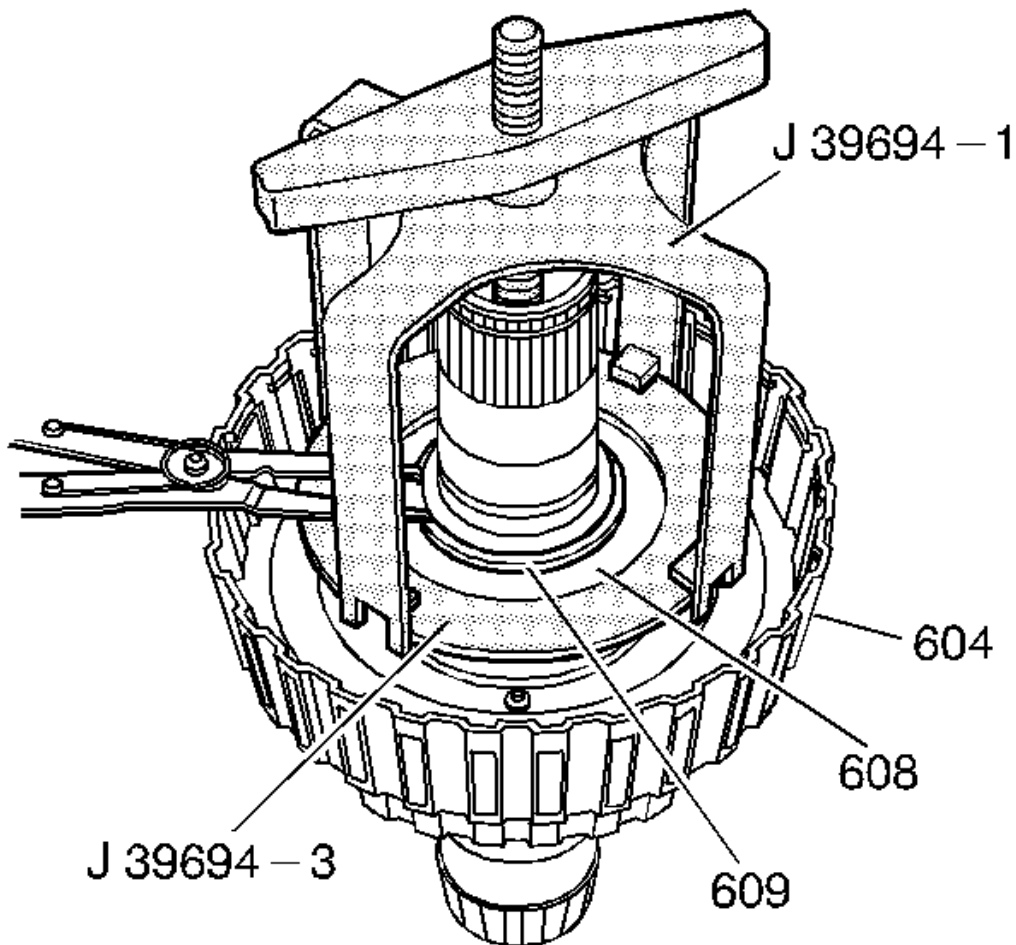


Fig. 123: Identifying Clutch Spring Compressor & Compress Spring With J 39694
Courtesy of GENERAL MOTORS COMPANY

30. Install the **J 39694** clutch compressor-1 and the **J 39694** clutch compressor-3 and compress the spring and retainer assembly.
31. Install the snap ring (609).
32. Remove the **J 39694** clutch compressor-1 and the **J 39694** clutch compressor-3.

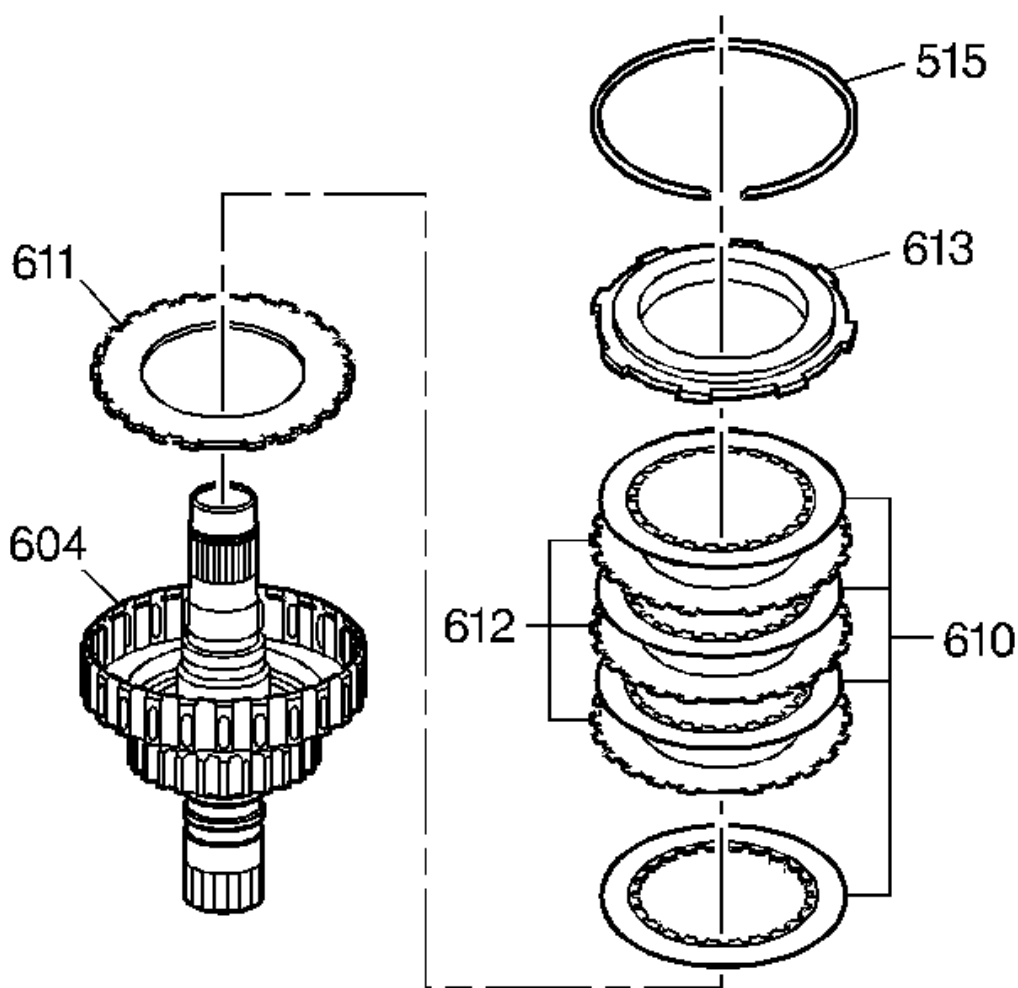


Fig. 124: View Of Third Clutch Plates
Courtesy of GENERAL MOTORS COMPANY

33. Install the following parts:
- The apply plate (611)
 - The four fiber clutch plates (610)
 - The three steel clutch plates (612)

NOTE: The backing plate (613) must be installed with the stepped side up.

34. Install the backing plate (613).
35. Install the snap ring (515).

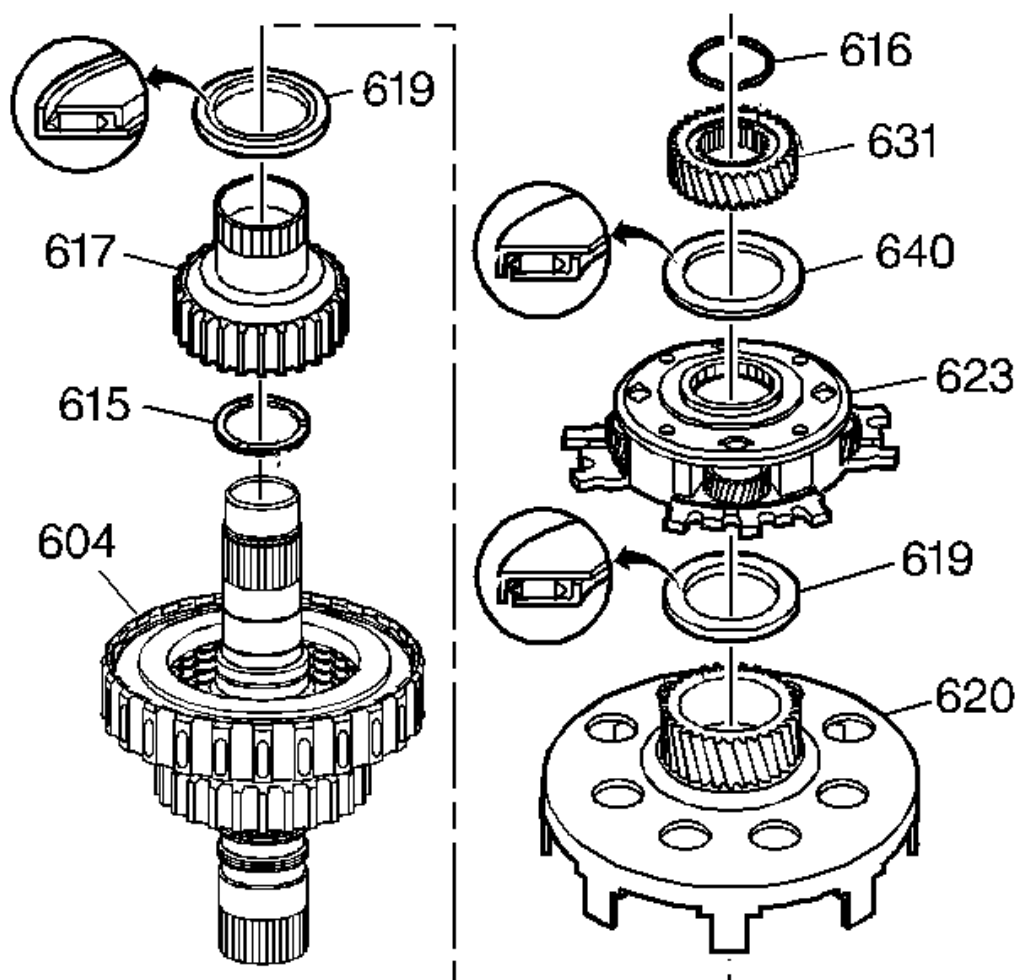


Fig. 125: Identifying Reaction Sun Gear And Shell Assembly, Reaction Carrier Assembly, Third Clutch Housing & Input Sun Gear
 Courtesy of GENERAL MOTORS COMPANY

36. Install the following parts:

- The thrust washer (615)
- The third clutch hub and bushing assembly (617)

NOTE: Make sure that the rolled inner lip of the thrust bearing (619) is facing toward the clutch pack.

- The thrust bearing (619).

37. Install the reaction sun gear and shell assembly (620). If the thrust bearing (619) was removed, install this bearing inside the reaction carrier assembly (623).
38. Install the reaction carrier assembly (623).

NOTE: **Make sure that the thrust bearing (640) is installed with the black surface toward the clutch pack.**

39. Install the thrust bearing (640).
40. Install the input sun gear (631). The sun gear can be assembled in either direction.
41. Install the snap ring (616).

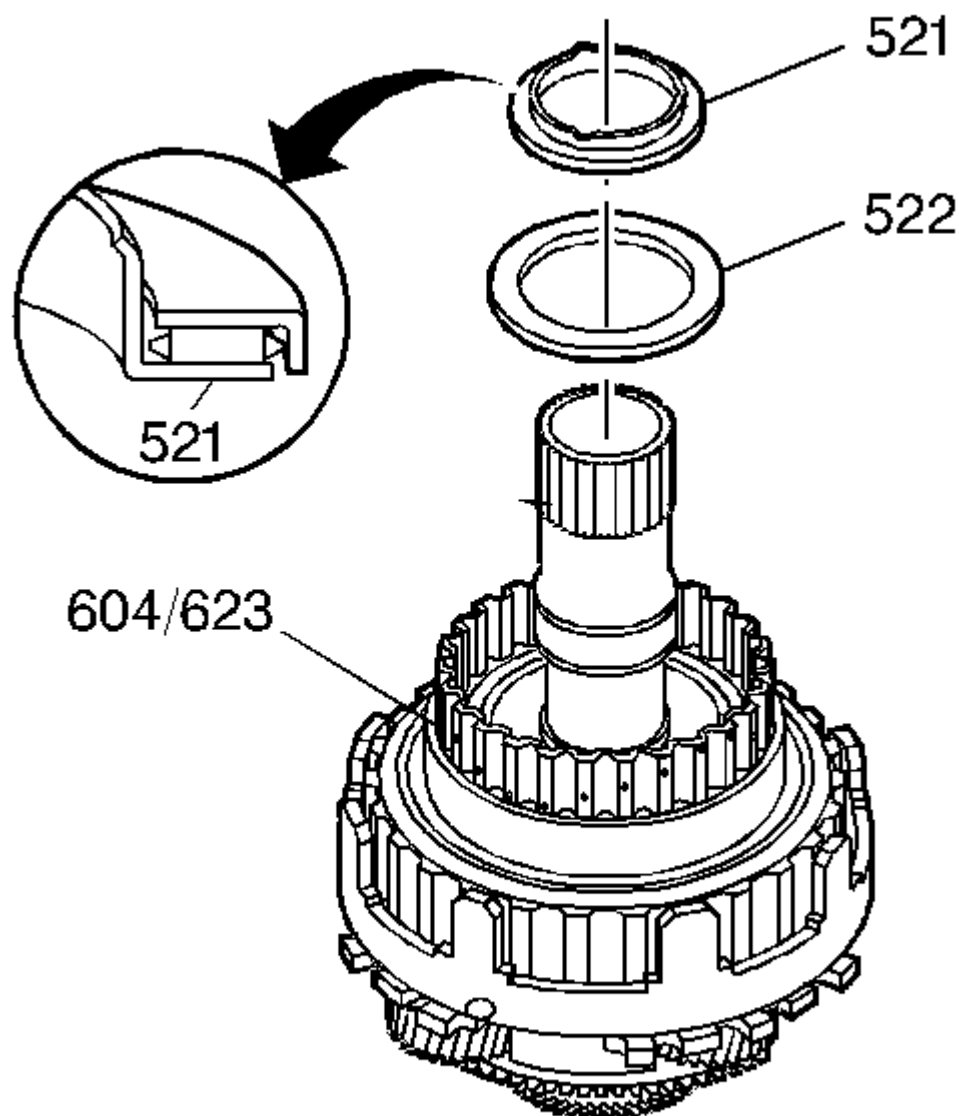


Fig. 126: Locating Selective Washer & Thrust Bearing
Courtesy of GENERAL MOTORS COMPANY

42. Install the selective washer (522) and the thrust bearing (521). Secure the washer and the bearing to the top of the clutch housing with J 36850 assembly lubricant or equivalent.

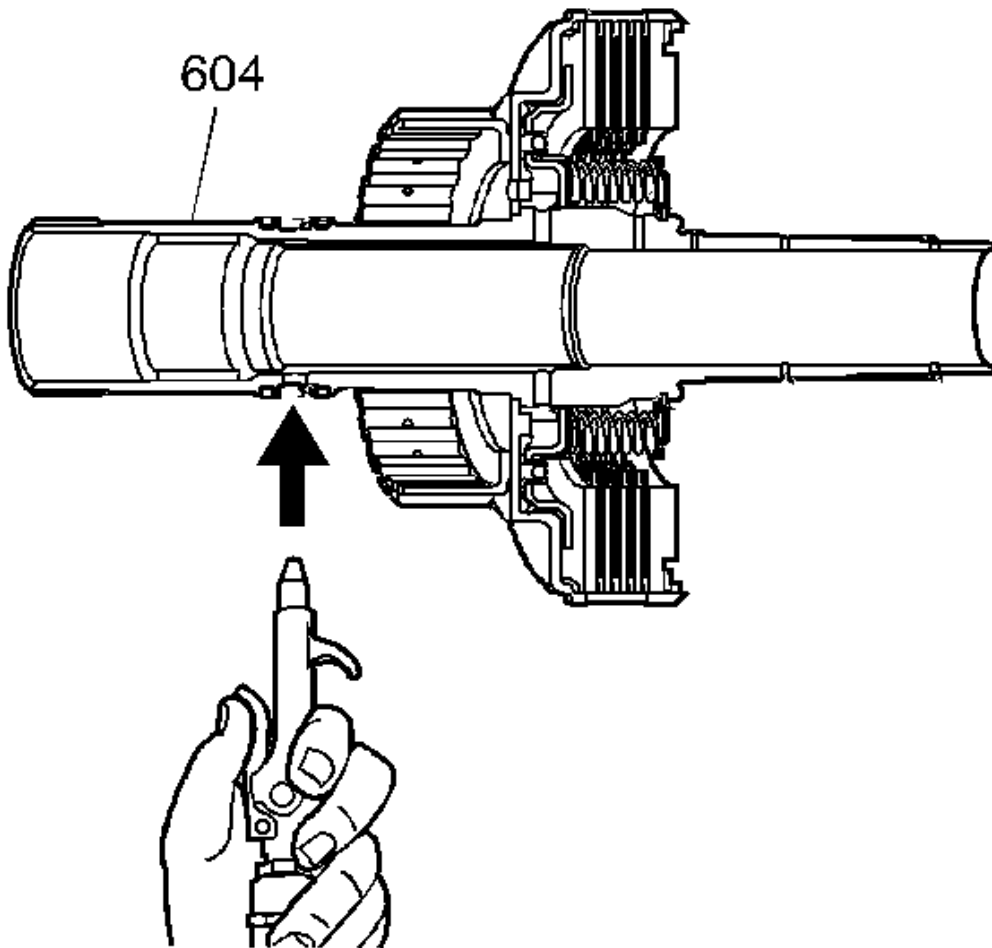


Fig. 127: Blowing Air In The Input Shaft Orifice
Courtesy of GENERAL MOTORS COMPANY

43. Air check the 3rd clutch assembly by applying 50-60 psi of air to the proper orifice in the input shaft while blocking the orifice on the other side of the input shaft and 3rd clutch housing assembly (604).

REACTION CARRIER/SHELL AND THIRD CLUTCH INSTALLATION

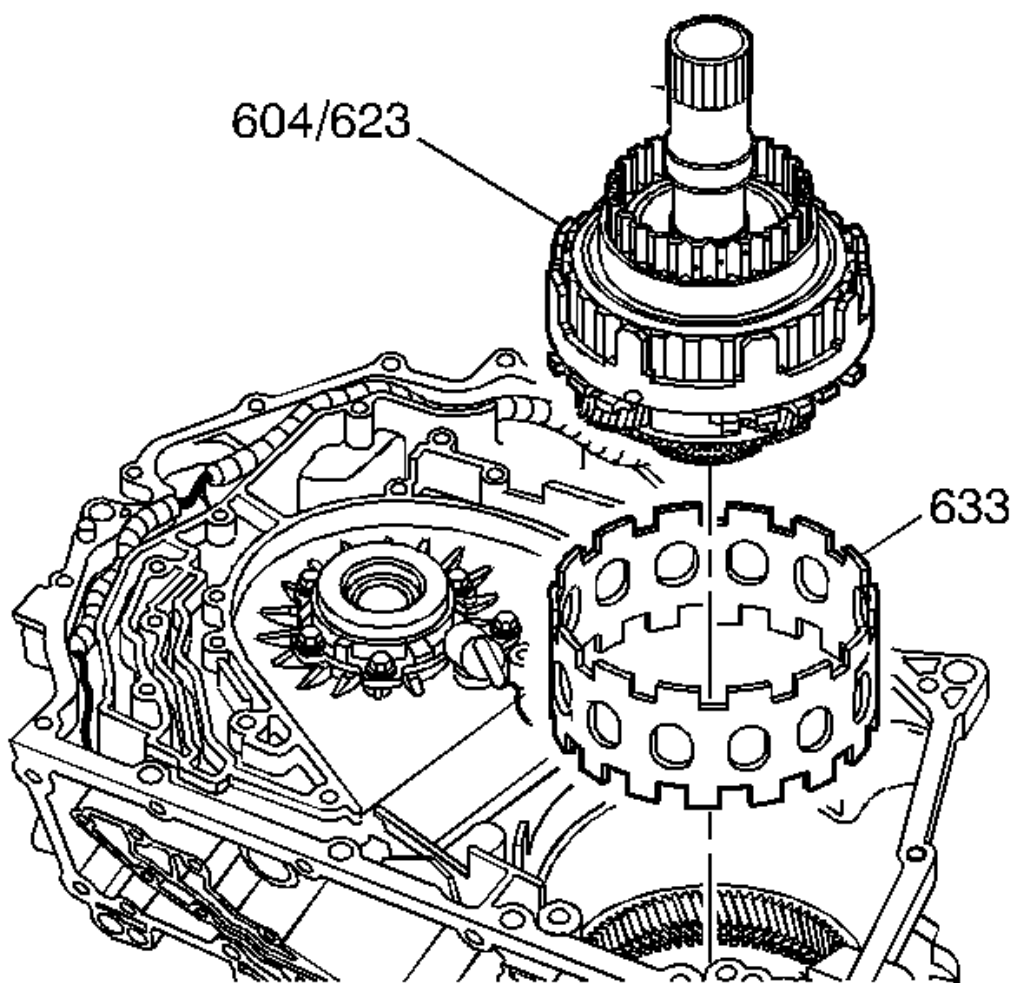


Fig. 128: View Of Reaction Carrier/Shell And Third Clutch
Courtesy of GENERAL MOTORS COMPANY

1. Inspect the reaction shell (633) for damage or wear.
2. Install the reaction shell (633) into the forward clutch housing, with the small teeth facing down.

NOTE: Following installation, the reaction carrier teeth must seat in the reaction shell.

3. Install the third clutch housing and reaction carrier assembly (604/623) into the case. Twist the housing to install and to insure proper seating.

4TH BAND INSTALLATION

Special Tools

J 34741-3 Input Shaft Seal Sizer

For equivalent regional tools, refer to **Special Tools** .

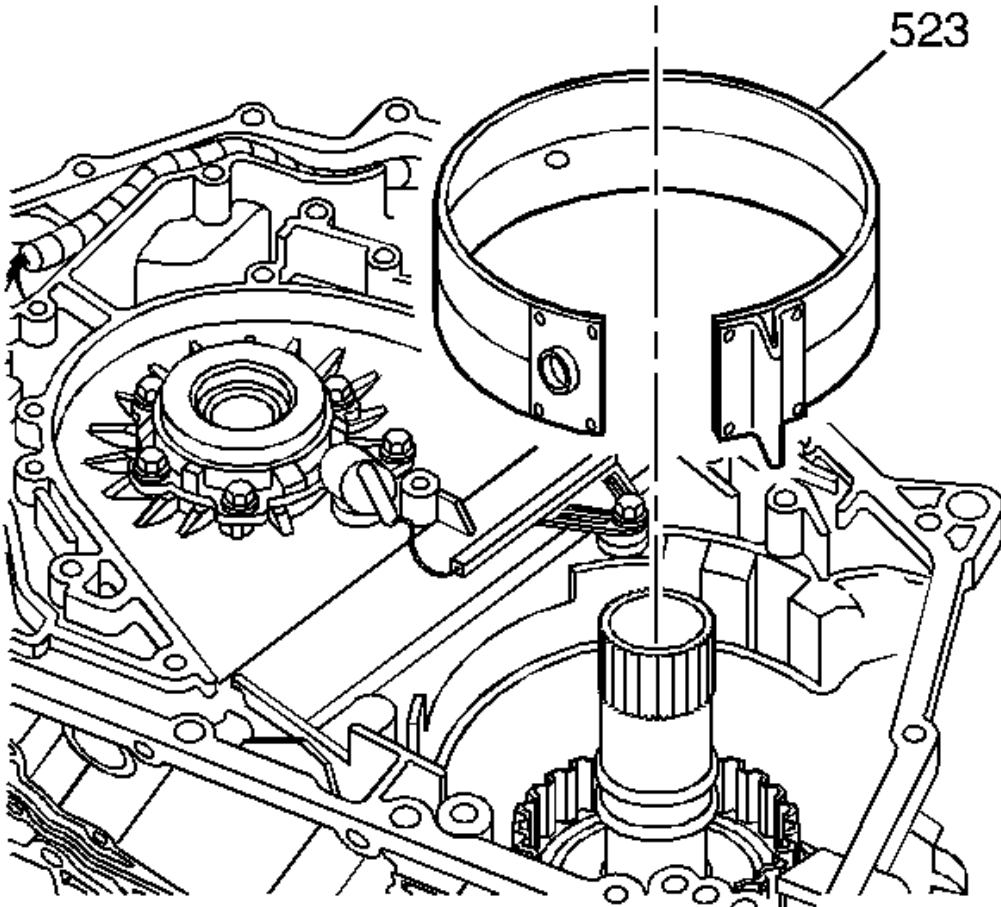


Fig. 129: Fourth Band

Courtesy of GENERAL MOTORS COMPANY

1. Install the fourth band (523) into the case. Seat the band properly onto the anchor pin with the seat of the servo pin toward the servo bore in the case.

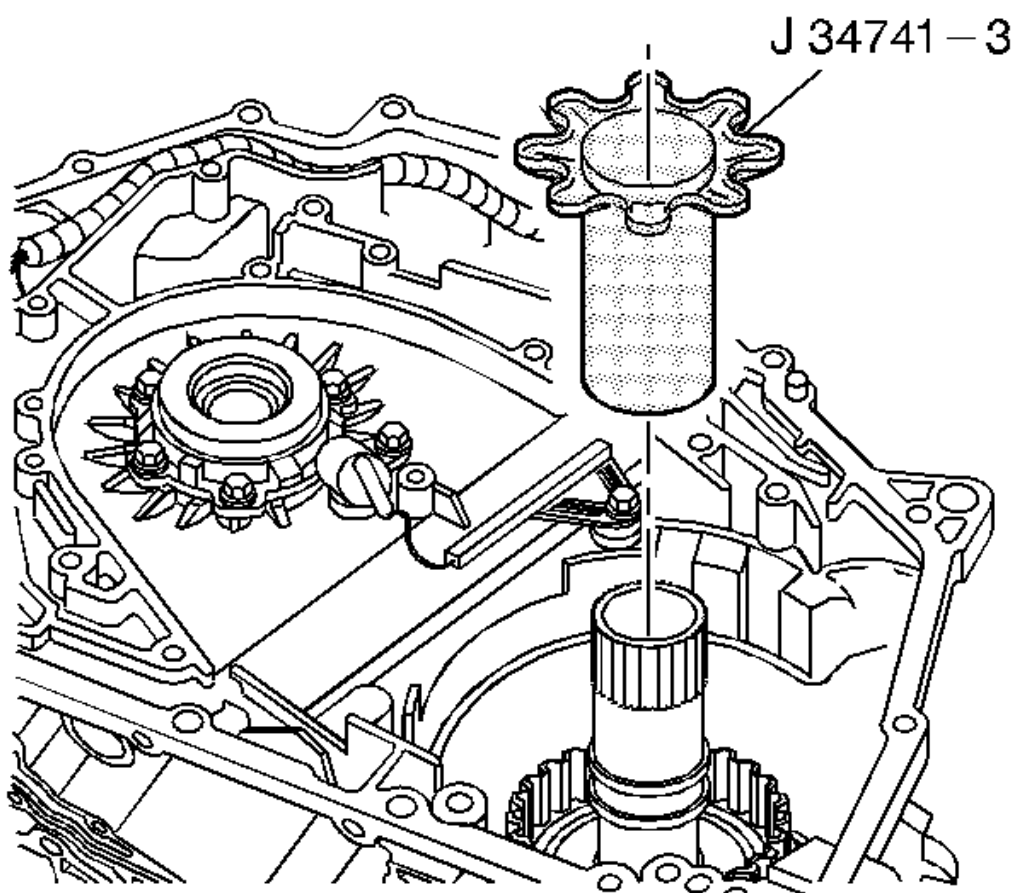


Fig. 130: Input Shaft Seal Sizer

Courtesy of GENERAL MOTORS COMPANY

NOTE: Leave the J 34741-3 seal sizer in place until the reverse clutch and housing assembly is ready to be installed.

2. Install the J 34741-3 seal sizer over the input shaft oil seal rings. Use a twisting motion to install the J 34741-3 seal sizer. The J 34741-3 seal sizer must contact the third clutch housing hub.

REVERSE CLUTCH HOUSING AND SECOND SPRAG DISASSEMBLE

Special Tools

J 39694 Spring Compressor

For equivalent regional tools, refer to **Special Tools** .

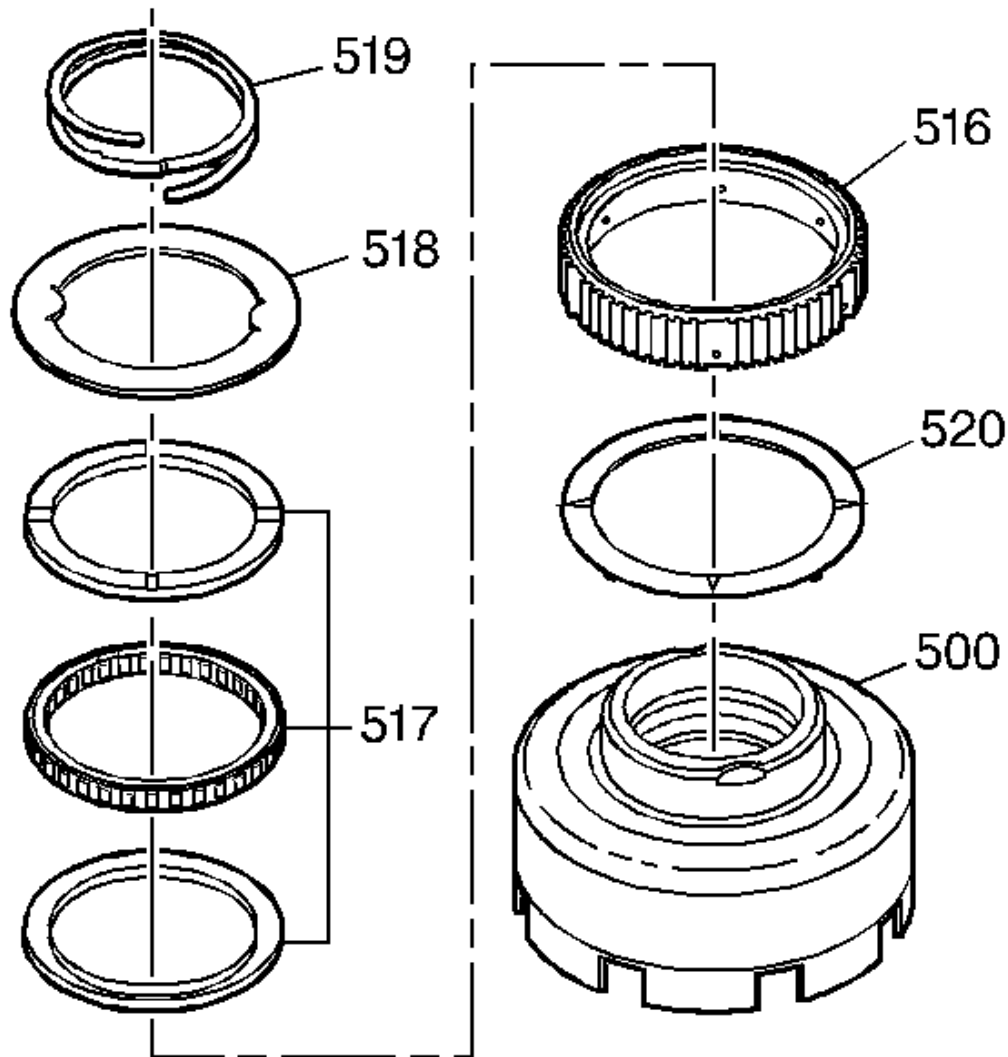


Fig. 131: Second Sprag Components
Courtesy of GENERAL MOTORS COMPANY

1. Remove the spiral snap ring (519). Discard the snap ring, which is not reusable.
2. Remove the following parts:
 - The sprag clutch retainer (518)
 - The second sprag outer race

- The second sprag clutch (516-517)
- The second sprag outer race thrust washer (520)

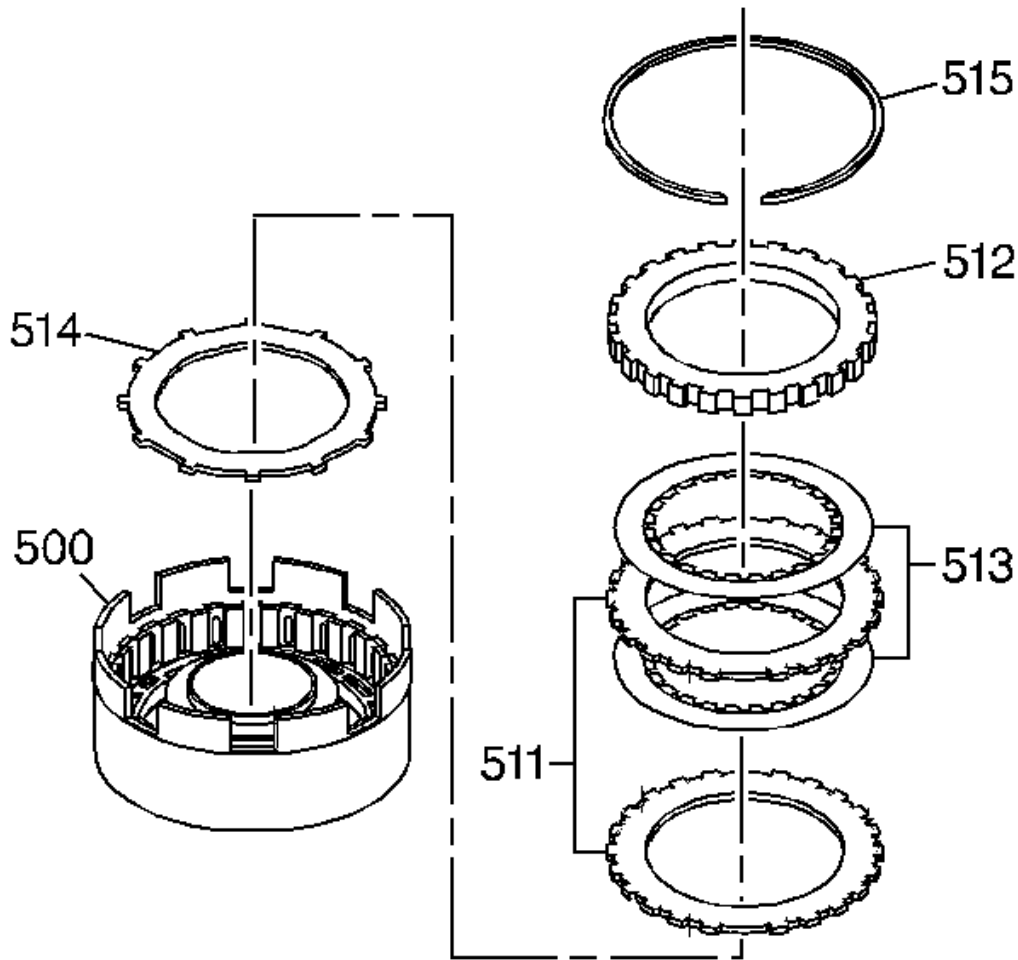


Fig. 132: View Of Reverse Clutch Plates
 Courtesy of GENERAL MOTORS COMPANY

3. Remove the following parts:
 - The reverse clutch snap ring (515)
 - The reverse clutch backing plate (512)
 - All of the fiber (513) and steel (511) clutch plates
 - The reverse clutch waved plate (514)

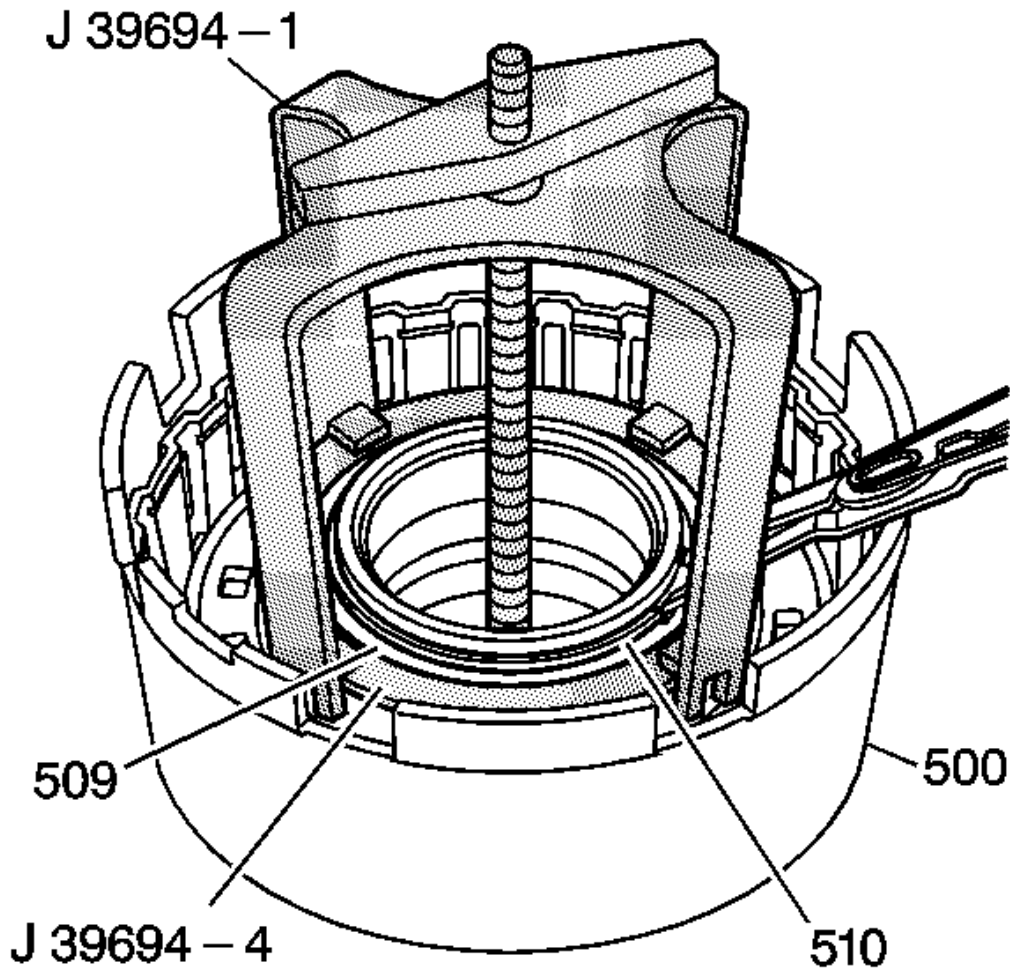


Fig. 133: Compressing Spring & Retainer Assembly
Courtesy of GENERAL MOTORS COMPANY

4. Install the **J 39694** spring compressor and compress the spring and retainer assembly (509). Then remove the snap ring (510).

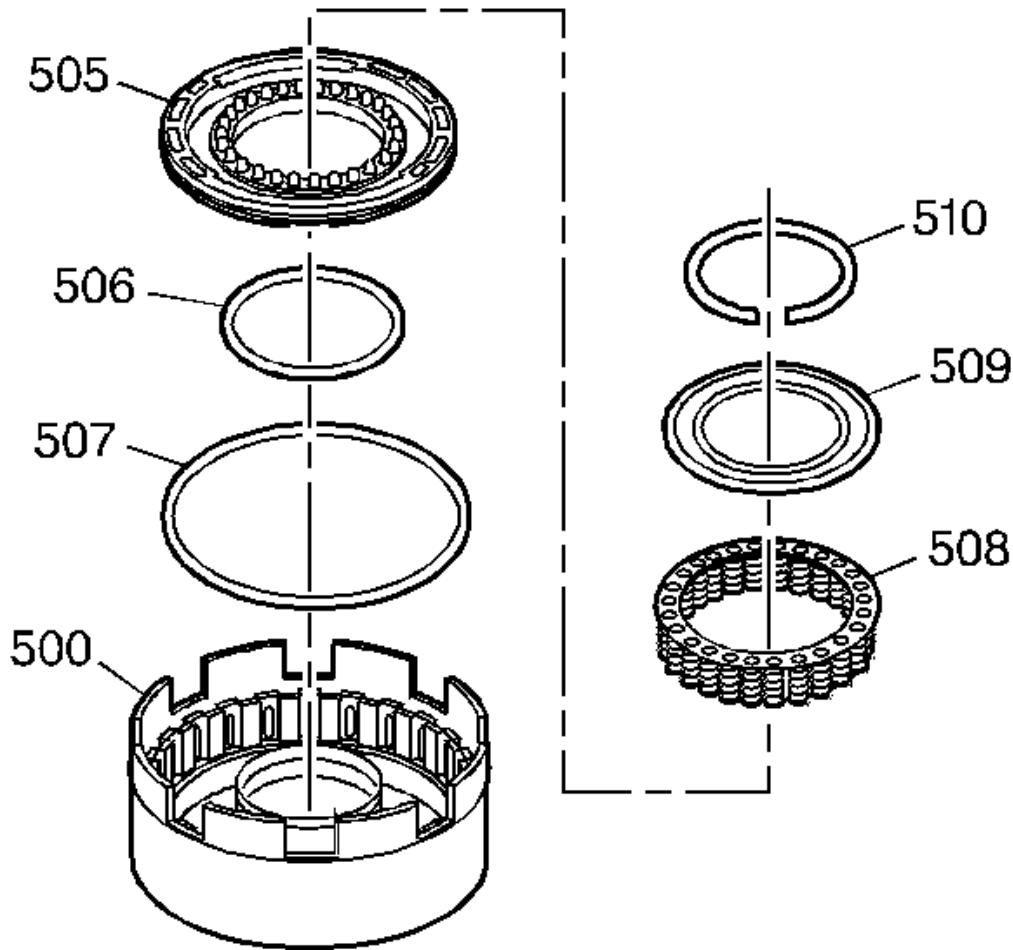


Fig. 134: Identifying Spring & Retainer Assembly
 Courtesy of GENERAL MOTORS COMPANY

5. Remove the following parts:
 - The snap ring retainer (509)
 - The spring and retainer assembly (508)
 - The piston assembly (505)

REVERSE CLUTCH HOUSING AND SECOND SPRAG ASSEMBLE

Special Tools

- **J 39694** Spring Compressor

- **J 39054** Reverse Clutch Seal Protector

For equivalent regional tools, refer to **Special Tools** .

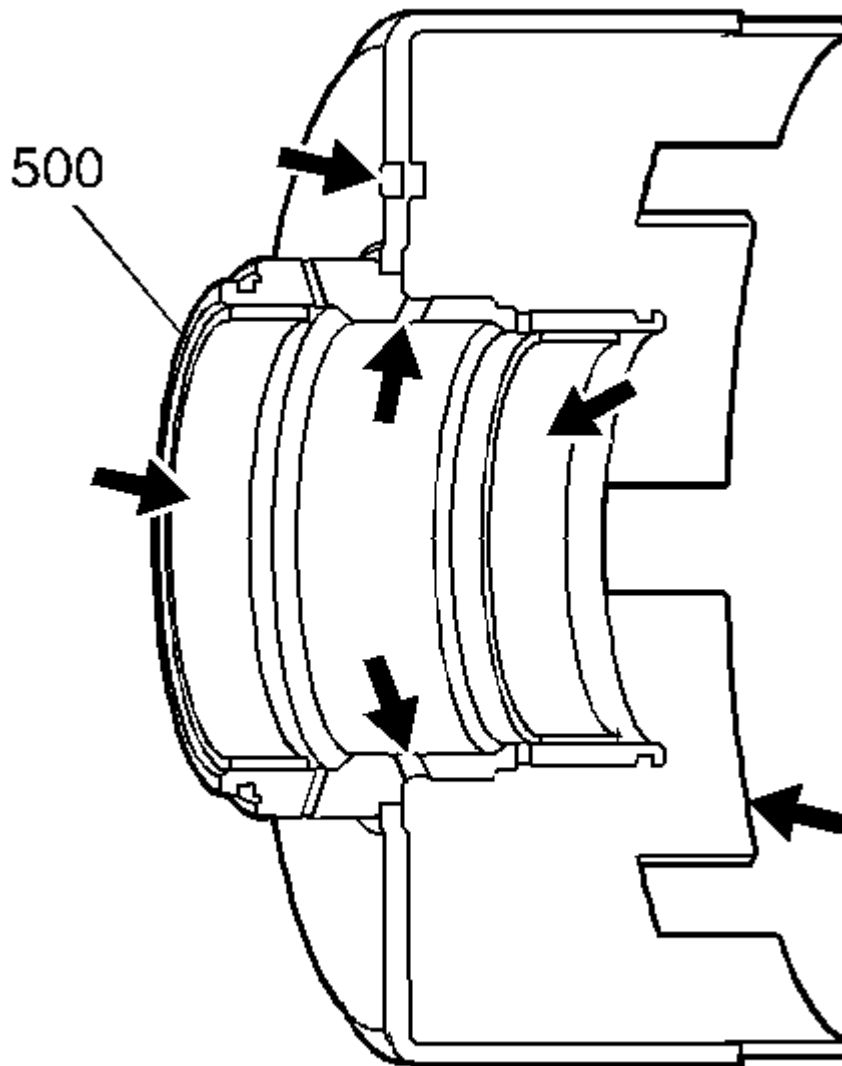


Fig. 135: Identifying Inspection Areas On Reverse Clutch Housing
Courtesy of GENERAL MOTORS COMPANY

1. Inspect the reverse clutch housing (500) for the following:
 - Plugged feed holes

- Snap ring for overexpansion
- Outer surface for scoring or burning
- Reverse clutch housing checkball for damage, the checkball should move freely in the capsule.

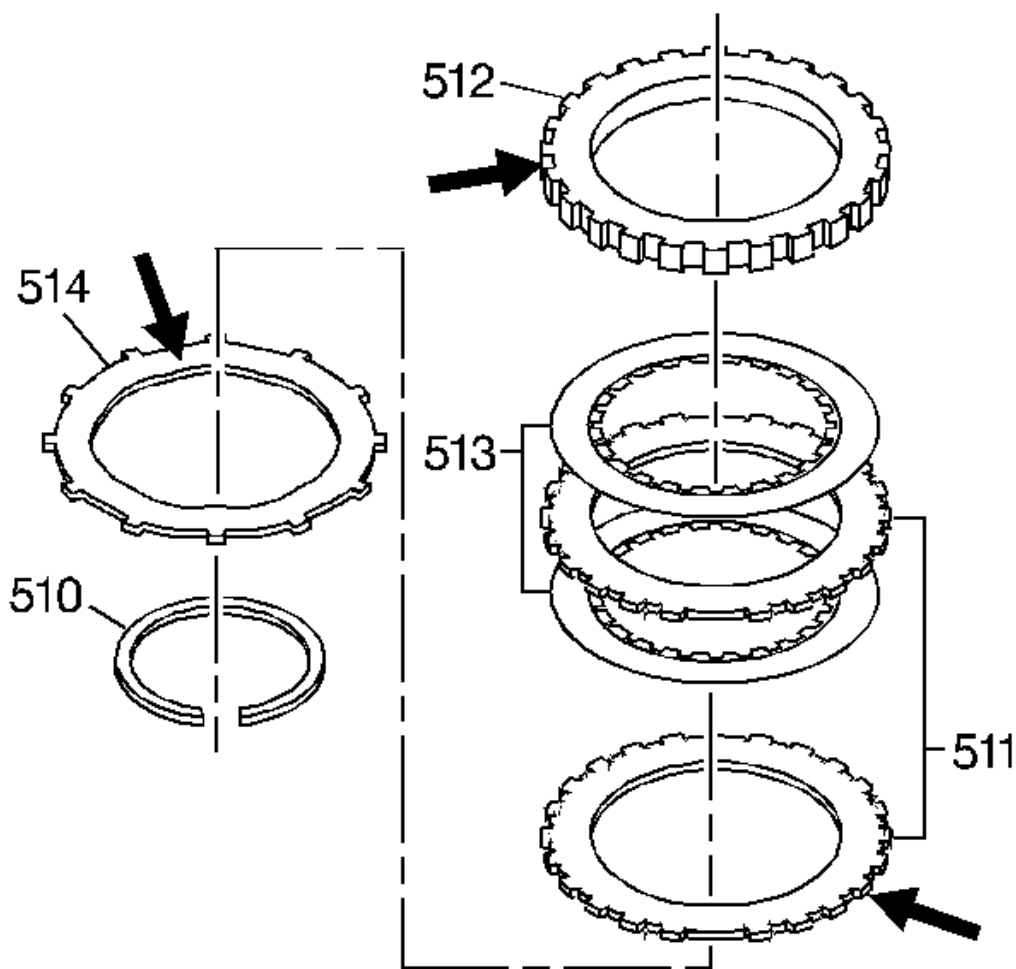


Fig. 136: View Of Reverse Plates Inspection Areas
 Courtesy of GENERAL MOTORS COMPANY

2. Inspect the reverse clutch steel plates (511), the backing plate (512) and the waved plate (514) for scoring or burning.
3. Inspect the snap ring (510) for overexpansion.
4. Replace all of the fiber clutch plate assemblies (513).

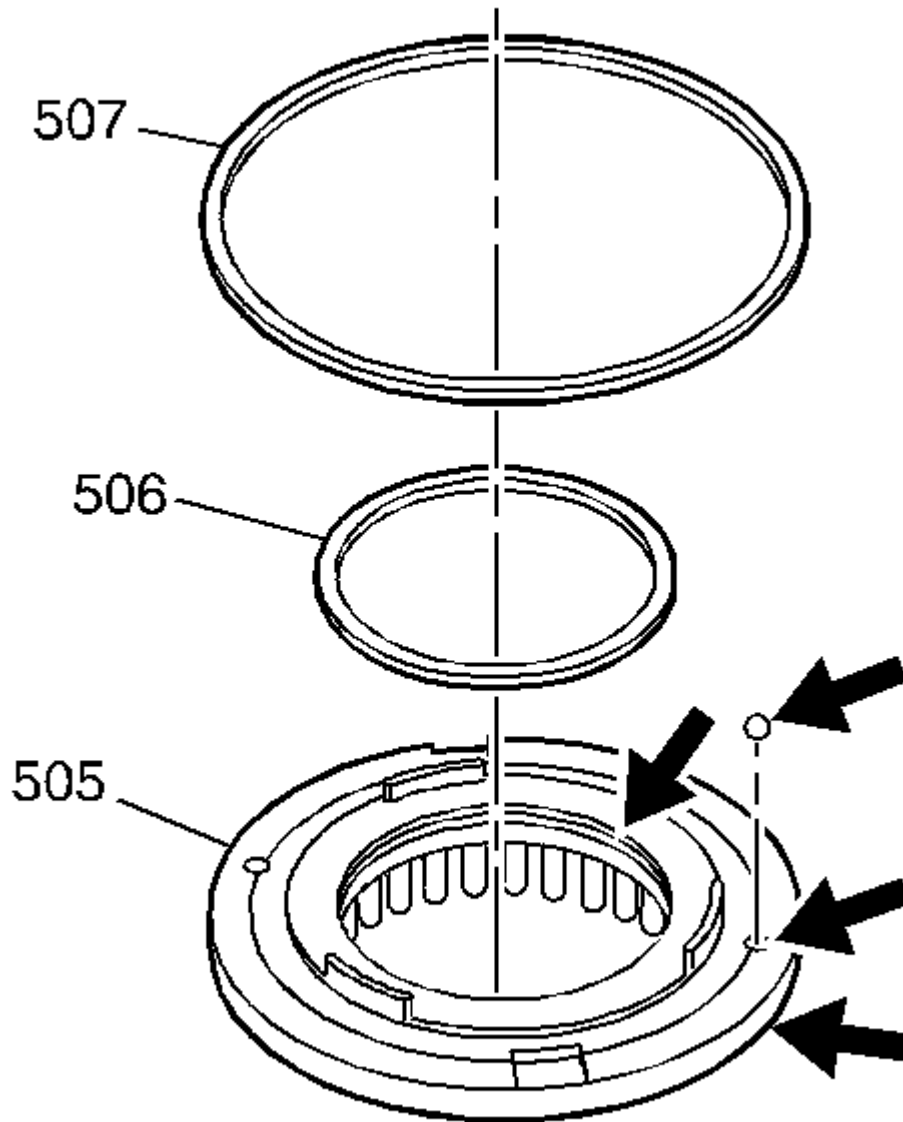


Fig. 137: Locating Reverse Clutch Piston Inner & Outer Seal Damage
 Courtesy of GENERAL MOTORS COMPANY

5. Inspect the reverse clutch piston inner seal (506) and outer seal (507) for damage.
6. Inspect the checkball orifices on the reverse clutch piston assembly (505) for damage caused by peening. The checkball should move freely in the piston capsule.

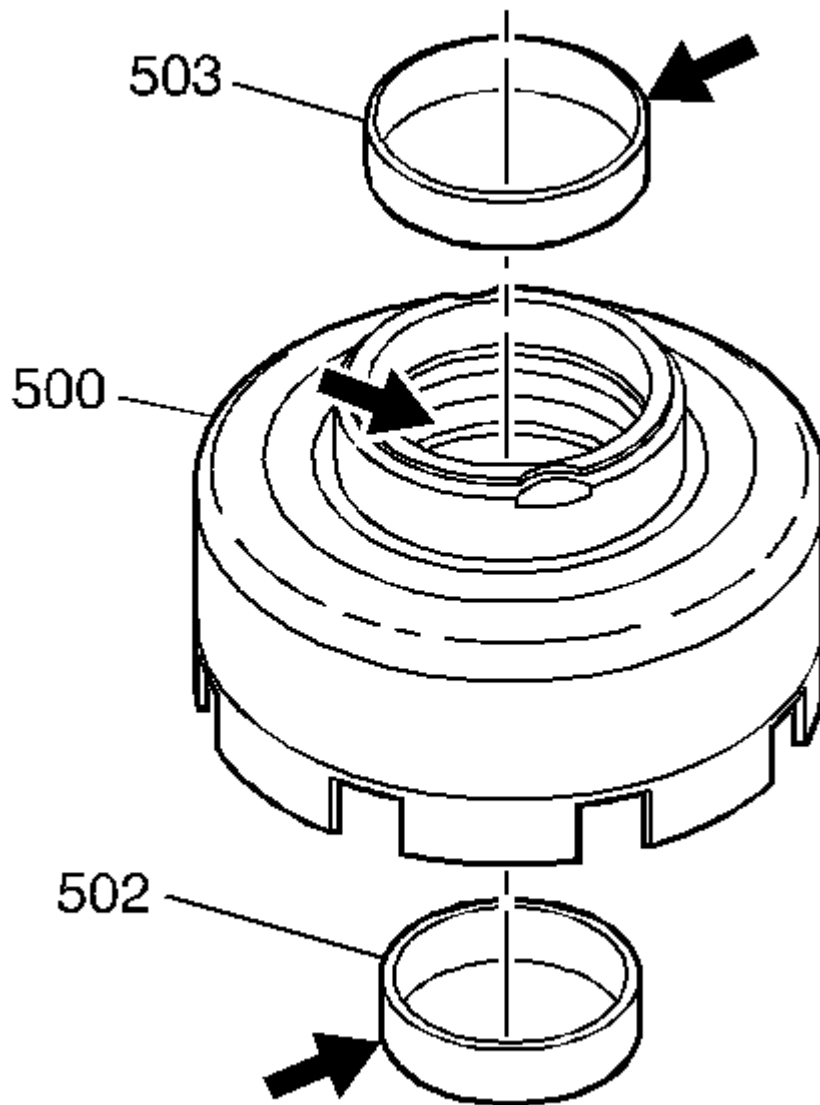


Fig. 138: Identifying Reverse Clutch Housing Bushings
 Courtesy of GENERAL MOTORS COMPANY

7. Inspect the reverse clutch housing bushings (502, 503) for damage.

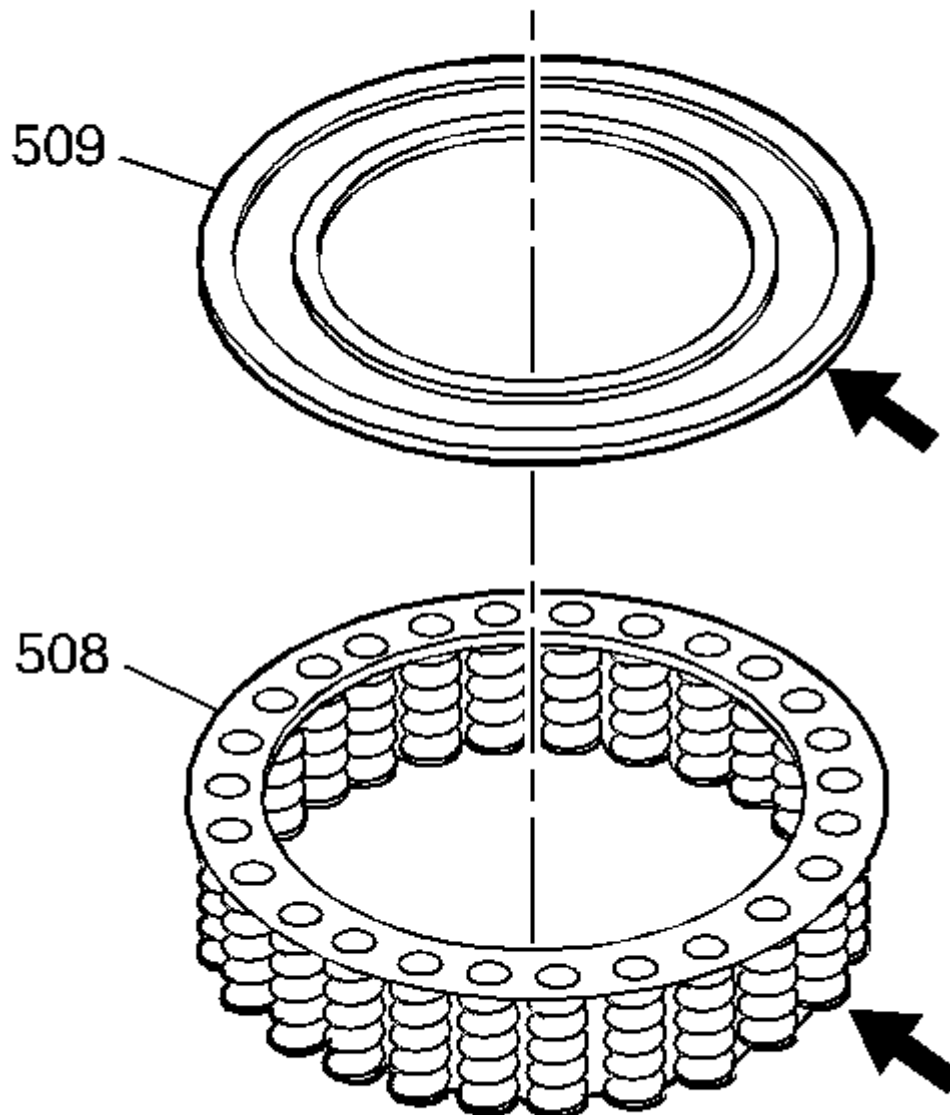


Fig. 139: View Of Spring And Retainer Assembly
Courtesy of GENERAL MOTORS COMPANY

8. Inspect the spring and retainer assembly (508) for damaged or missing springs.

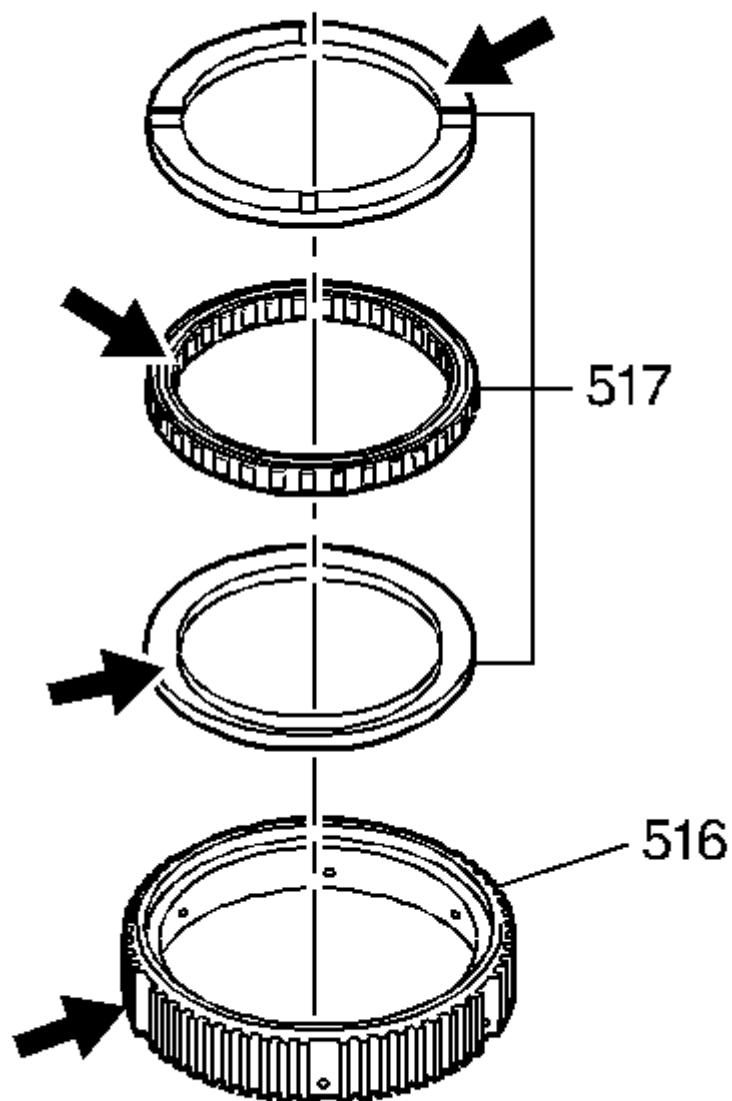


Fig. 140: Identifying Second Sprag & Races For Wear
Courtesy of GENERAL MOTORS COMPANY

9. Inspect the second sprag (517) for flipped or damaged sprags. Inspect both of the second sprag races for damage.

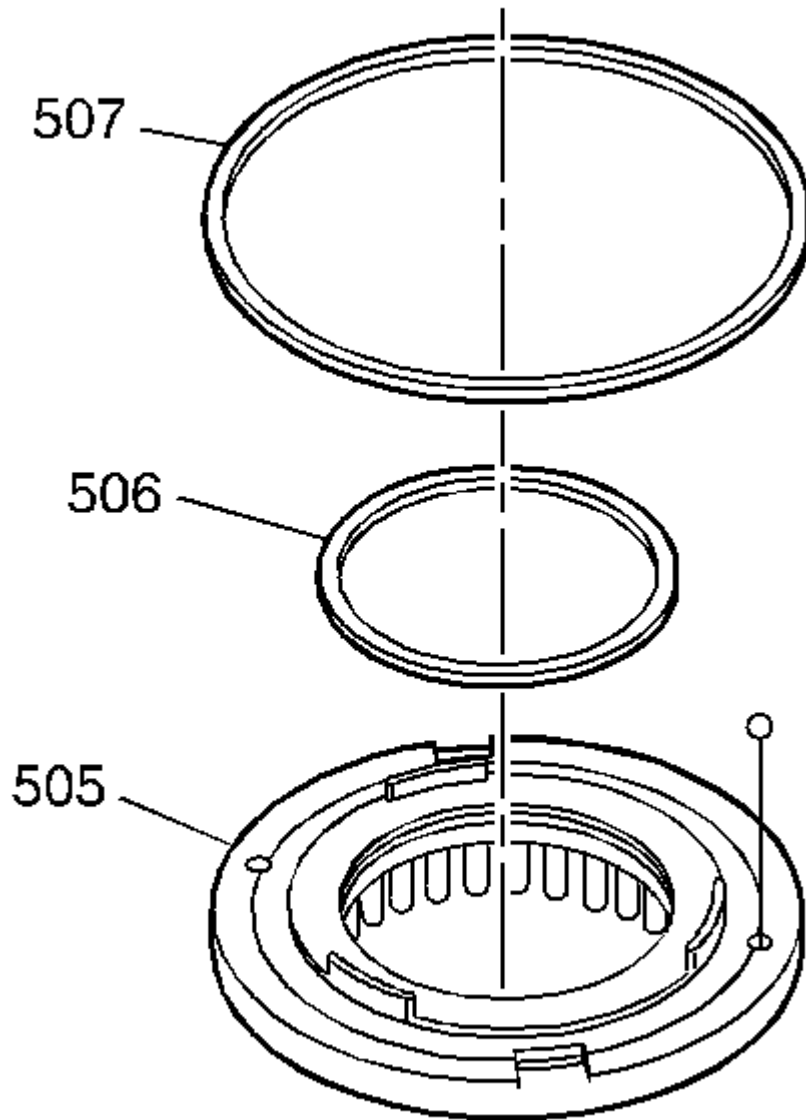


Fig. 141: Reverse Piston Seals

Courtesy of GENERAL MOTORS COMPANY

10. Install new seals (506, 507) on the reverse piston (505).

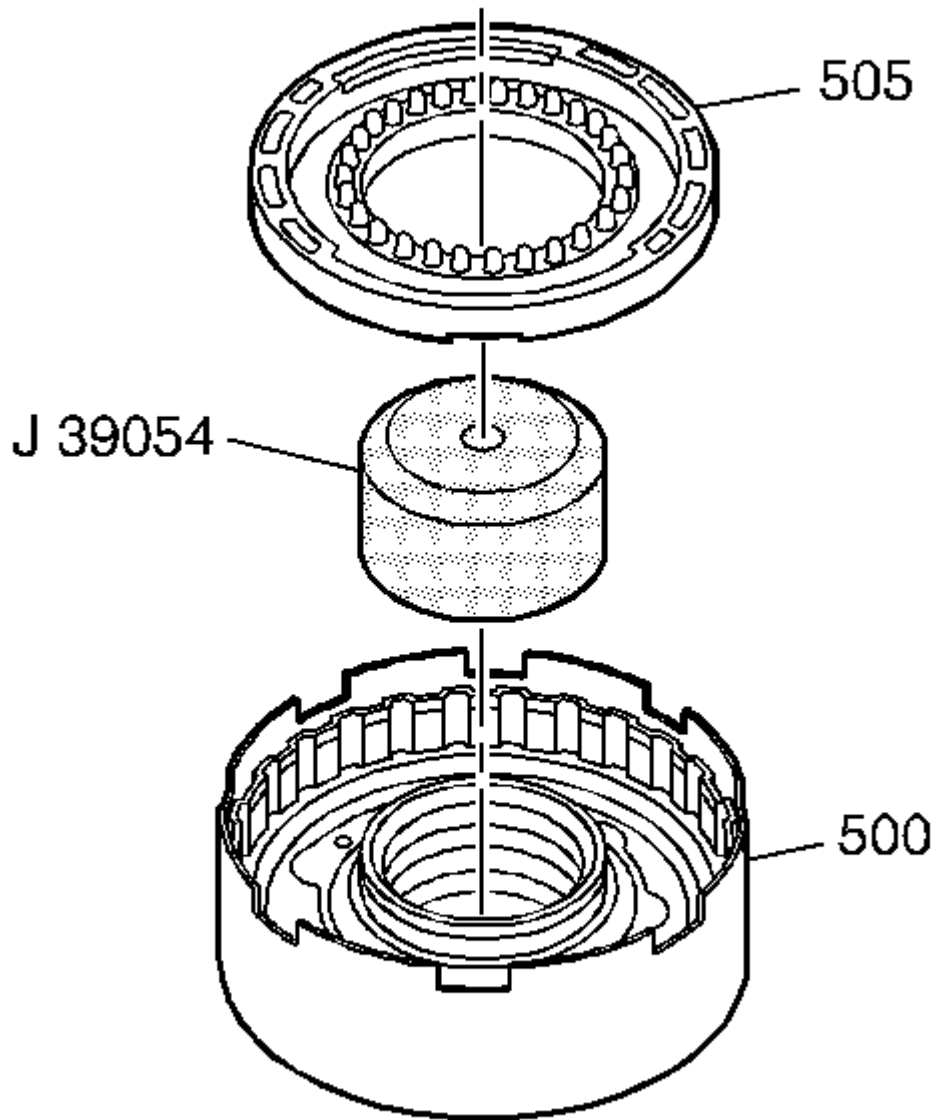


Fig. 142: Reverse Clutch Piston, Housing & Seal Protector
Courtesy of GENERAL MOTORS COMPANY

11. Install the reverse clutch piston (505) into the reverse clutch housing. Install the **J 39054** seal protector in order to protect the inner seal. Make sure that the outer seal does not roll backwards. Apply a light coating of Transjel™ so that the seal will slide easily.

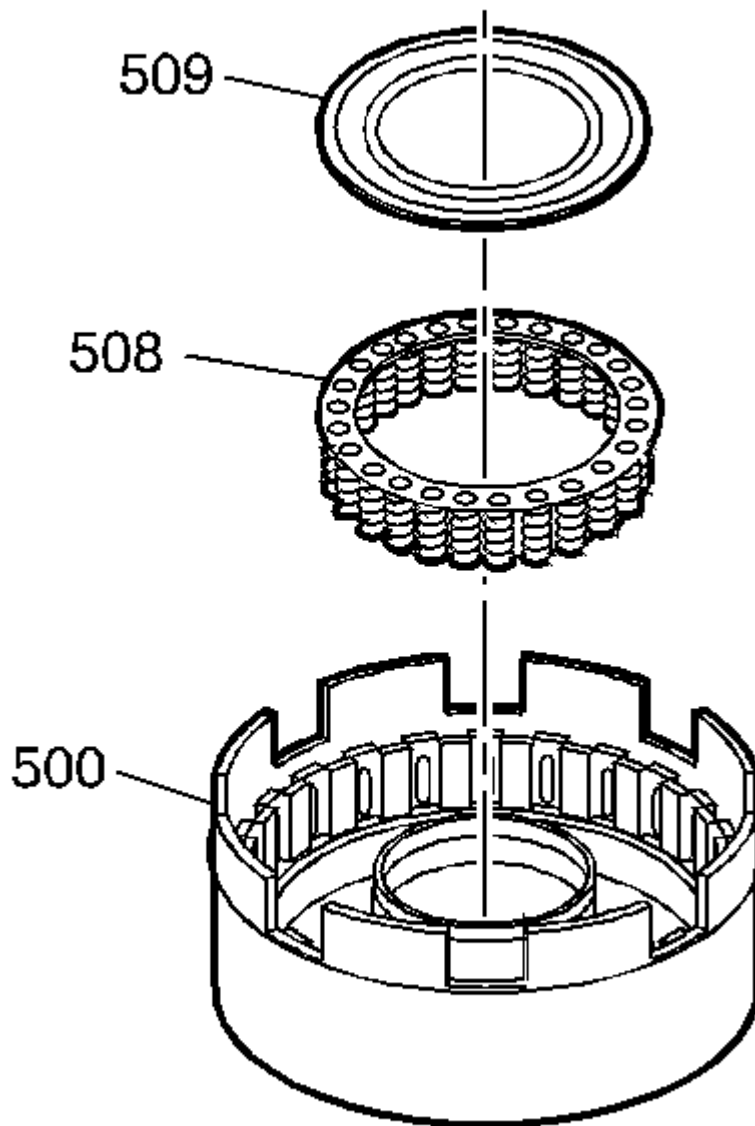


Fig. 143: Locating Spring And Retainer Assembly Into The Reverse Clutch Housing
Courtesy of GENERAL MOTORS COMPANY

12. Install the spring and retainer assembly (508, 509) into the reverse clutch housing (500).

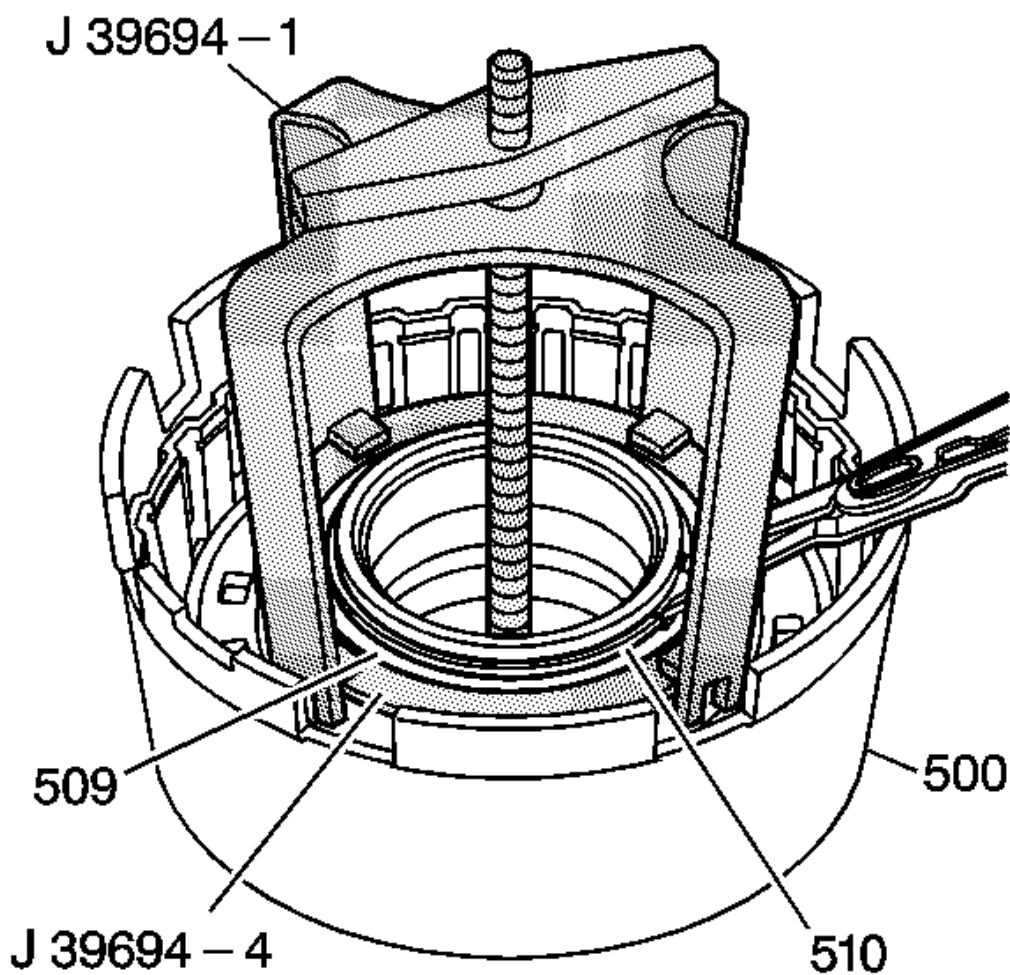


Fig. 144: Compressing Spring & Retainer Assembly
Courtesy of GENERAL MOTORS COMPANY

13. Use the **J 39694** spring compressor to compress the spring and install the snap ring (510). Remove the compressor tool.

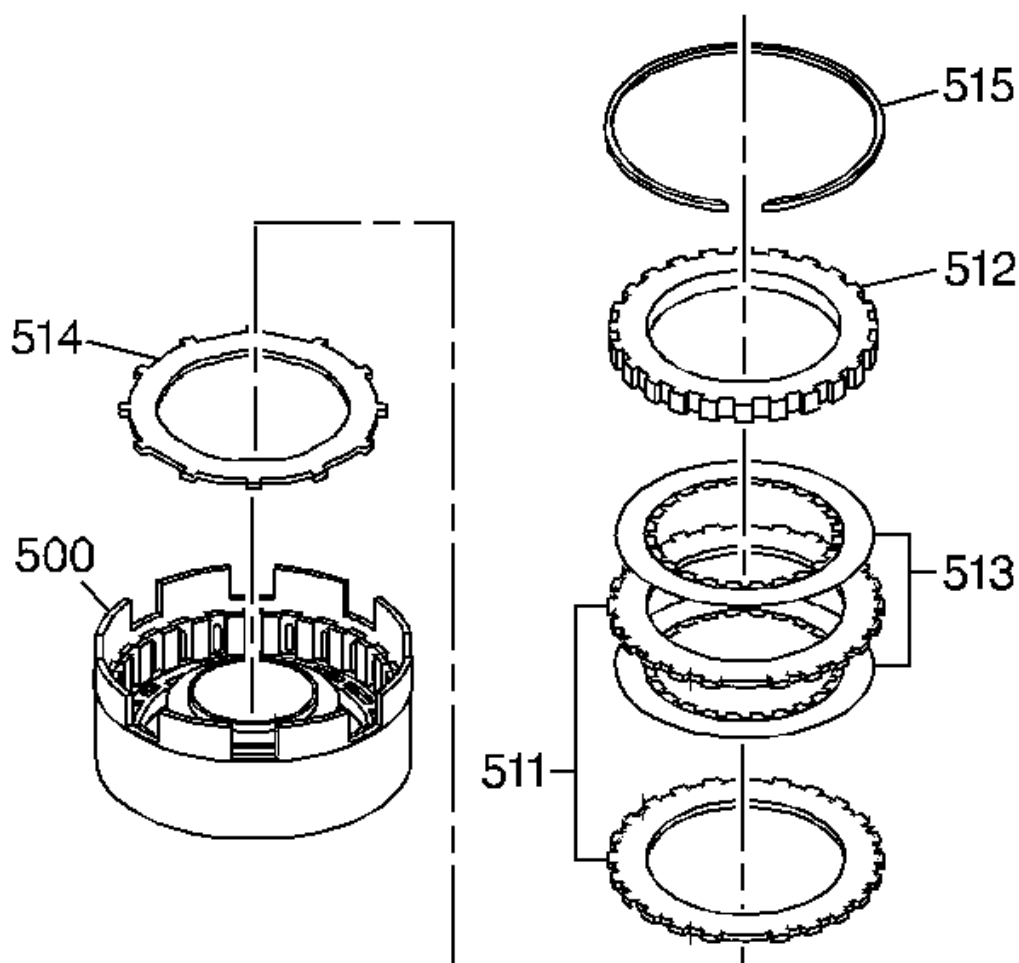


Fig. 145: View Of Reverse Clutch Plates

Courtesy of GENERAL MOTORS COMPANY

14. Install the following parts:

1. The waved plate (514). Align the waved plate tangs with the inserts in the reverse clutch piston.
2. The two steel (511) and the two fiber (513) clutch plates, starting with steel and alternating with fiber
3. The apply plate (512) with the stepped side up
4. The snap ring (515)

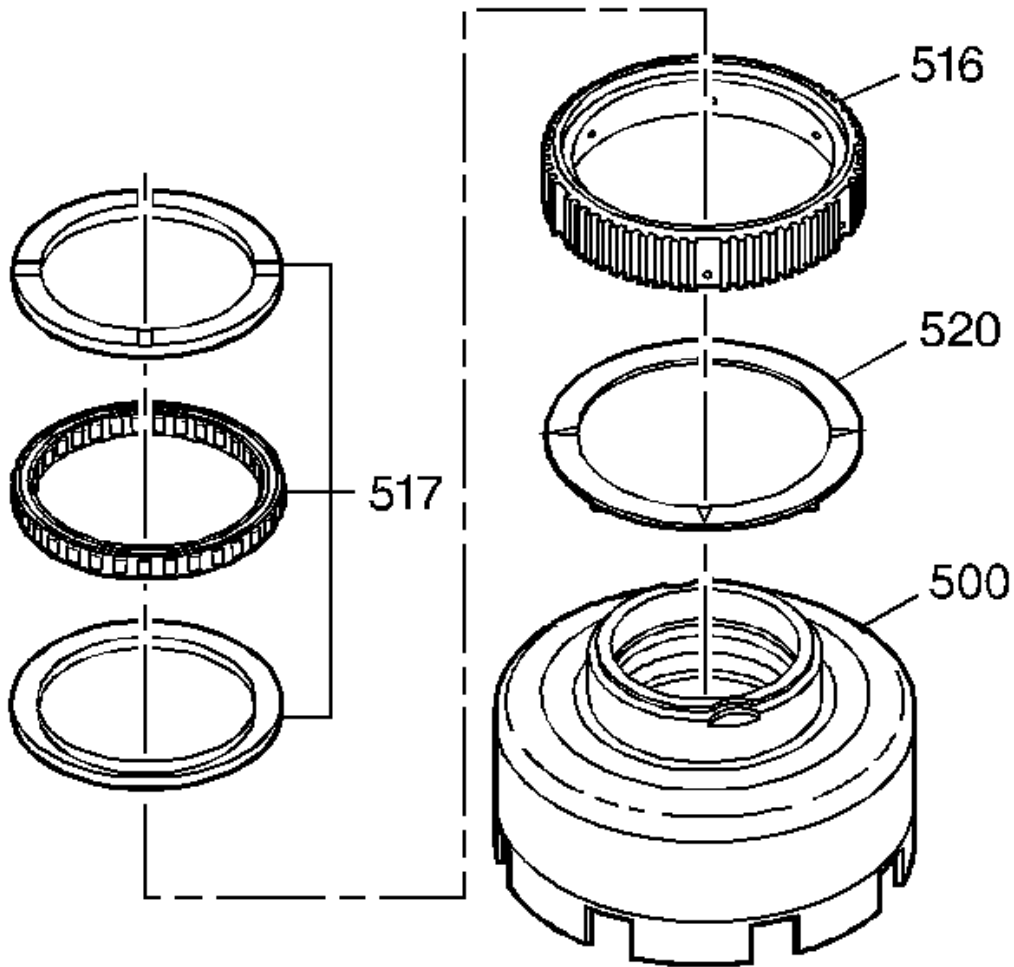


Fig. 146: Identifying 2nd Sprag Race & Clutch Assembly
 Courtesy of GENERAL MOTORS COMPANY

15. Install the following parts:

1. The 2nd clutch outer race thrust washer (520)
2. The 2nd sprag clutch assembly (517) into the 2nd sprag outer race (516)
3. The 2nd sprag race and clutch assembly onto the reverse clutch housing (500)



Fig. 147: Identifying Second Sprag Freewheel
Courtesy of GENERAL MOTORS COMPANY

16. Verify that the second sprag freewheels only in a clockwise direction.

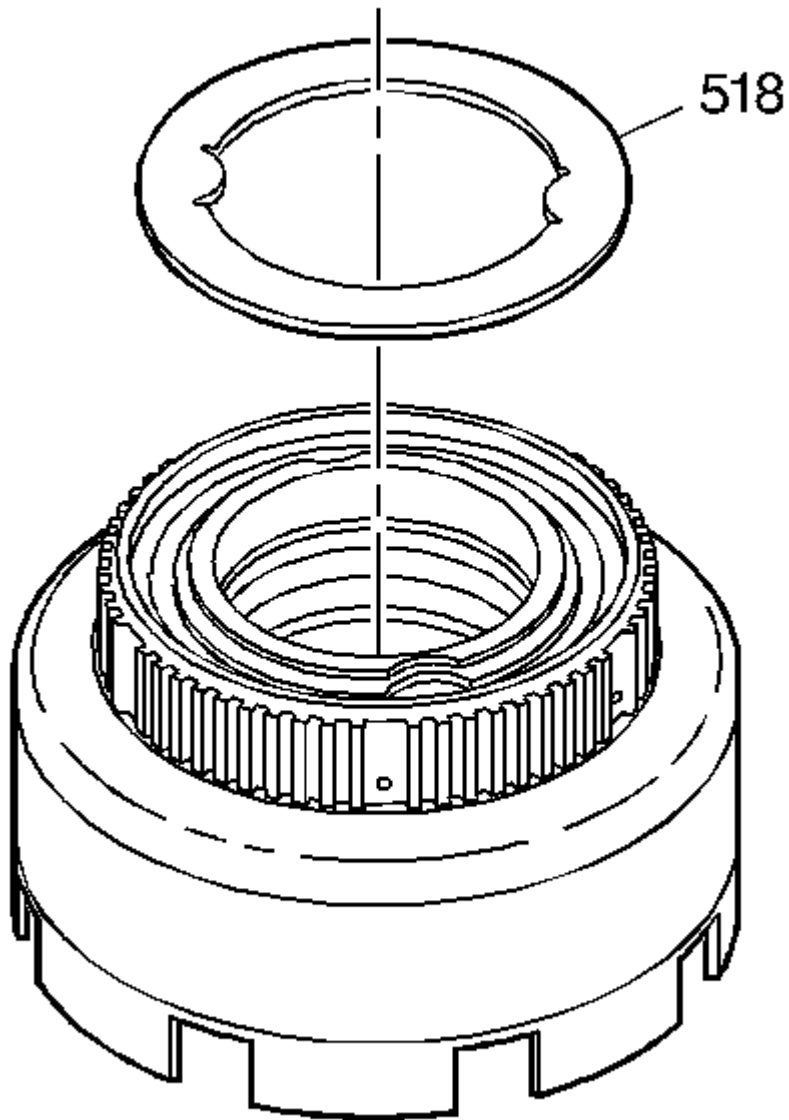


Fig. 148: Identifying Sprag Clutch Retainer
Courtesy of GENERAL MOTORS COMPANY

17. Install the sprag clutch retainer (518).

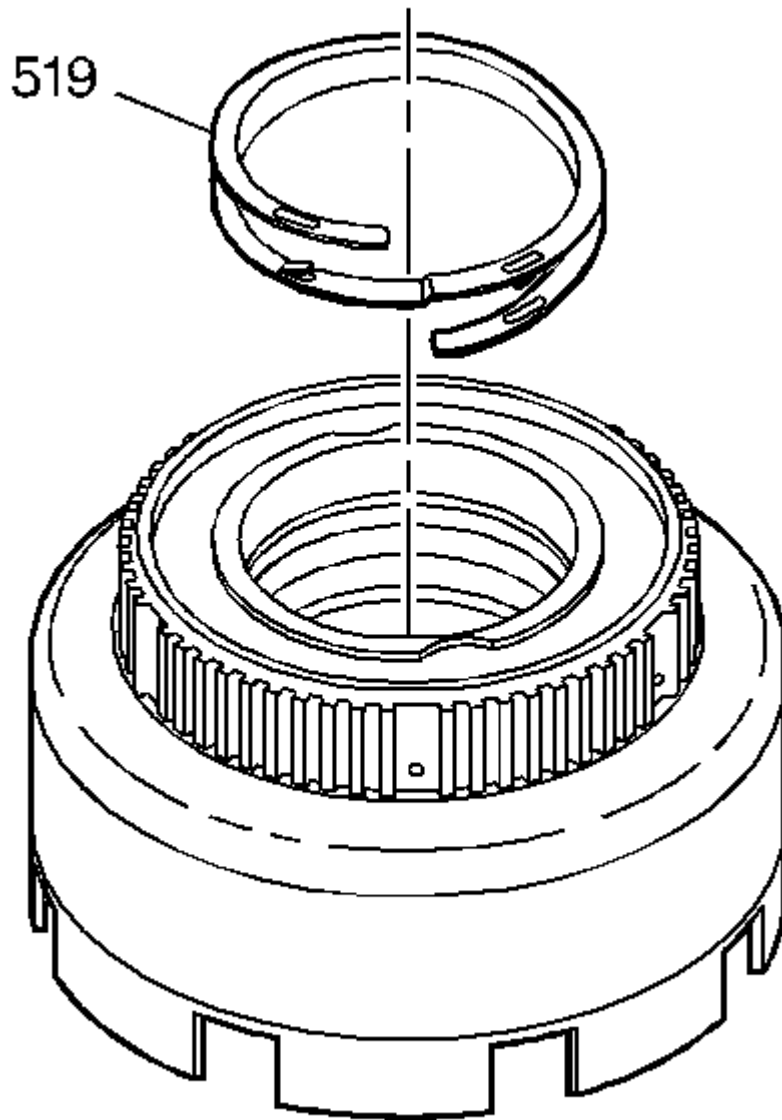


Fig. 149: Locating Spiral Snap Ring
Courtesy of GENERAL MOTORS COMPANY

18. Install the new spiral snap ring (519). Verify that the spiral snap ring tabs lock into place and that the snap ring is properly seated.

REVERSE CLUTCH HOUSING INSTALLATION

Special Tools

J 34741-3 Input Shaft Seal Sizer

For equivalent regional tools, refer to **Special Tools** .

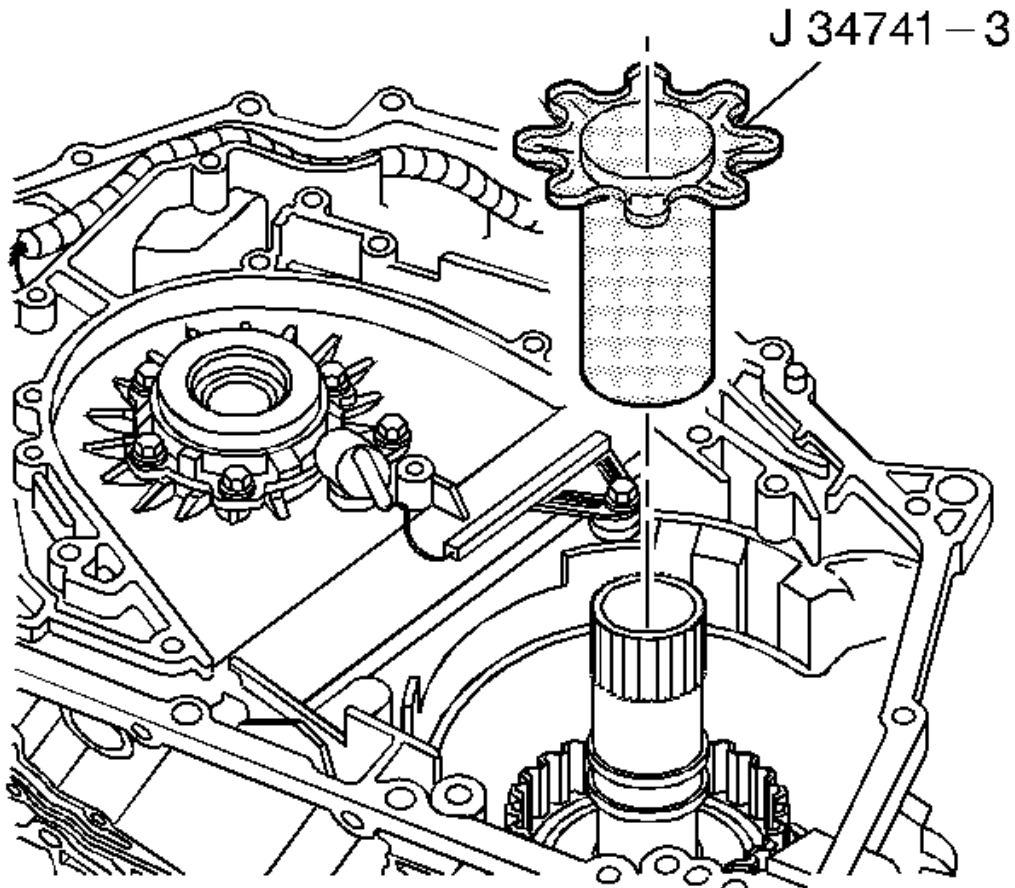


Fig. 150: Input Shaft Seal Sizer

Courtesy of GENERAL MOTORS COMPANY

1. Remove the J 34741-3 Input Shaft Seal Sizer.

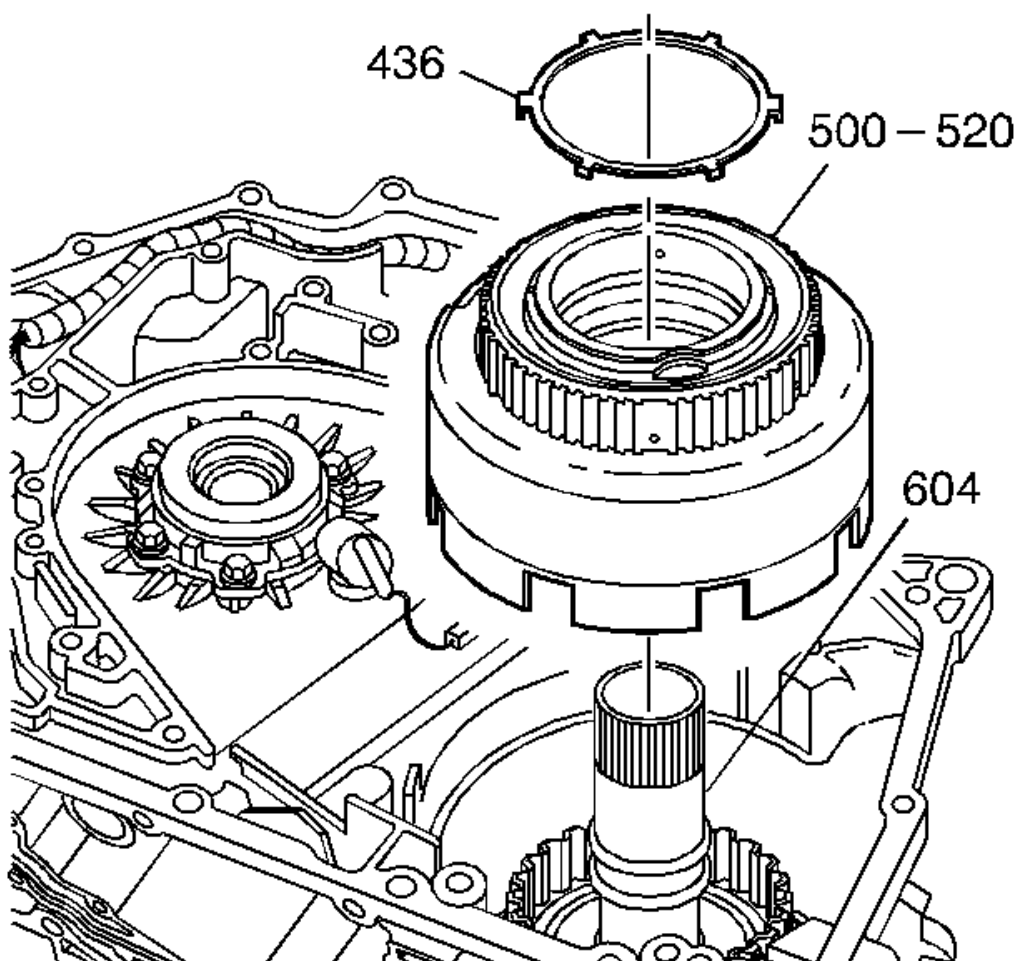


Fig. 151: Reverse Clutch Housing & Second Sprag Assembly
Courtesy of GENERAL MOTORS COMPANY

2. Install the reverse clutch housing and the second sprag assembly (500-520) onto the reaction carrier assembly (604). The teeth on the reverse clutch housing must seat into the reaction sun shell. Twist the reverse housing to install and insure proper seating.
3. Install the thrust washer (436) on top of the reverse clutch housing with the tabs pointing down.

SECOND CLUTCH PLATES INSTALLATION

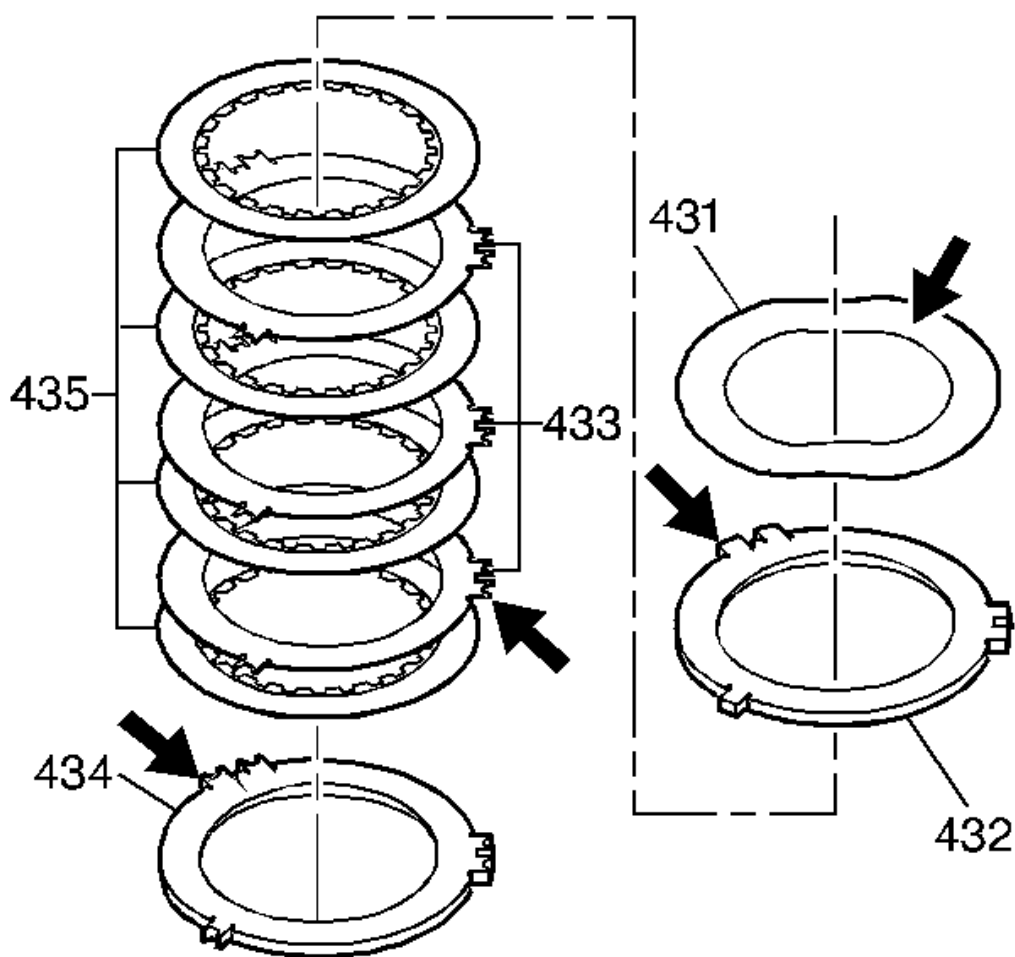


Fig. 152: Locating Inspection Points On Second Clutch Plates
Courtesy of GENERAL MOTORS COMPANY

1. Inspect the second clutch wave plate (431) and all of the steel plates (433) for burning or damage.

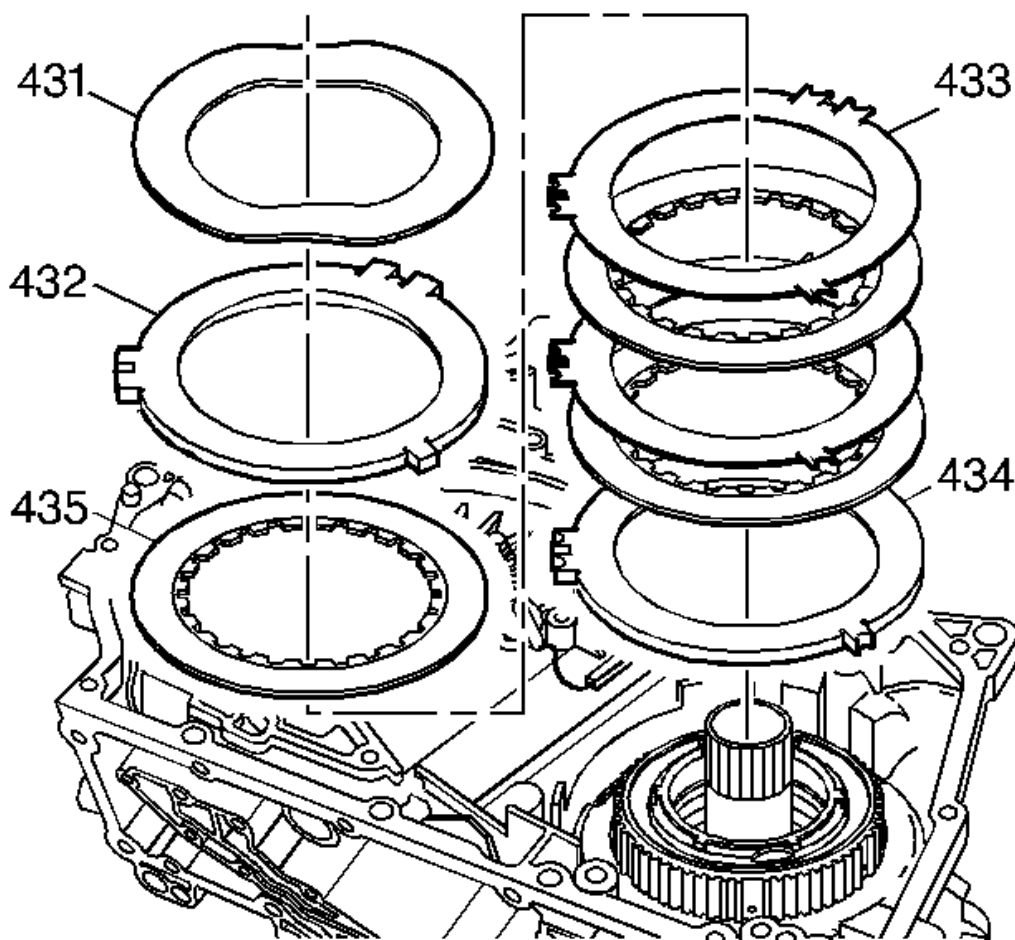


Fig. 153: Second Clutch Plates

Courtesy of GENERAL MOTORS COMPANY

2. Install the following parts:
 1. The second clutch backing plate (434) with flat side facing up
 2. The four fiber clutch plates (435)
 3. The four steel clutch plates (433)
 4. The backing plate (432)
 5. The wave plate (431)

CLUTCH AIR CHECK

The following is the recommended procedure for air checking the 2nd clutch (430), 3rd clutch (606) and reverse

clutch (505) assemblies. This procedure is used to apply a clutch assembly during disassembly and or reassembly of the Hydramatic 4T80-E transaxle. To properly perform this procedure, you will need a rubber tipped air nozzle and filtered compressed shop air. The recommended line pressure of the compressed shop air is at least 90 psi.

WARNING: Wear safety glasses when using compressed air in order to prevent eye injury.

NOTE: The 2nd clutch (430) can be seen when it applies. If unable to verify that a clutch or clutches applies with the compressed shop air, then inspect the following components for possible causes.

With the 2nd clutch (430), reverse clutch (505) and 3rd clutch (606) installed in the case, apply 50-60 psi of filtered compressed shop air to the appropriate passages located in the driven sprocket support (418), passage 39 for the 2nd clutch, passage 40 for the 3rd clutch and passage 33 for the reverse clutch. If the clutches are assembled properly and sealing, you should be able to hear them apply and release.

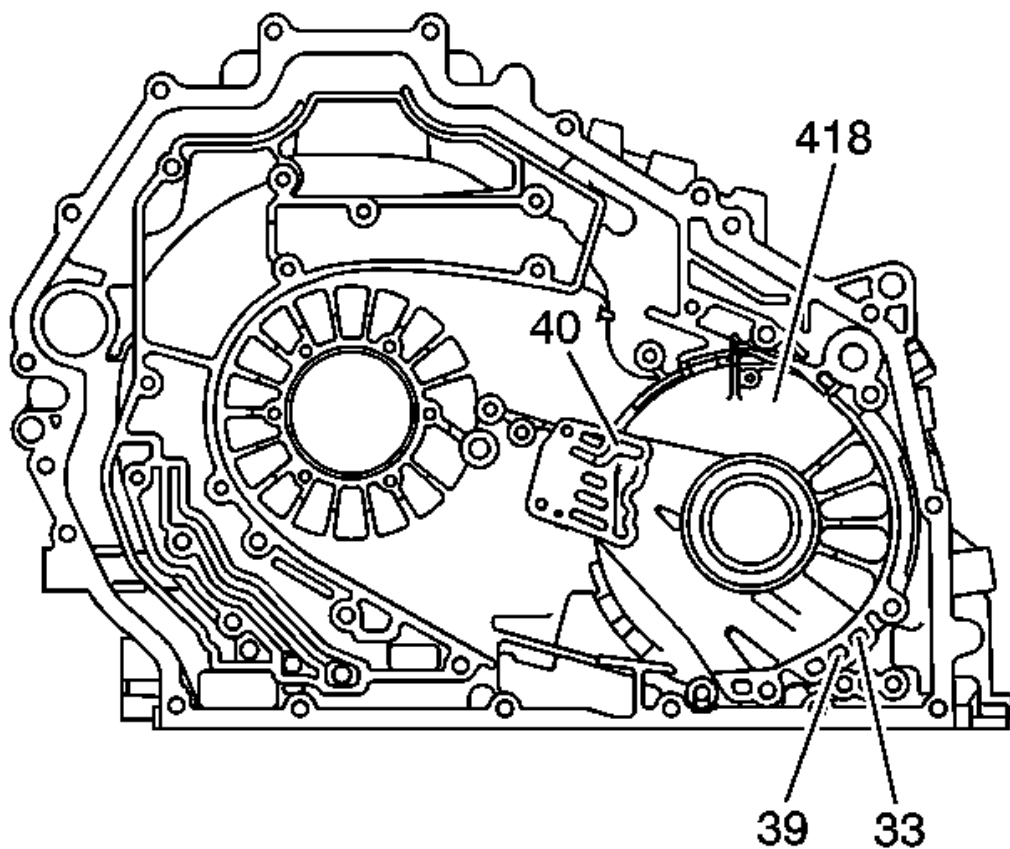


Fig. 154: View Of Inspection Areas In Driven Sprocket Support
Courtesy of GENERAL MOTORS COMPANY

1. Inspect the driven sprocket support (418) for the following:
 - Oil rings (422) sealing surface damaged and or missing
 - Lobe seal rings (423) damaged sealing surface and or missing
2. Inspect the reverse clutch assembly (505) for the following:
 - Piston inner (506) or outer (507) seal damaged sealing surface and or missing
 - Piston (505) physical damage and or checkball damage or missing
 - Spring and retainer assembly (508) damage
 - Reverse clutch housing (500) for physical damage or a poor sealing surface finish
 - Clutch plates (511, 512, 513, 514) damaged and or missing the correct number of plates.
3. Inspect the 2nd clutch for the following:
 - 2nd clutch piston (430) physical damage

- Oil transfer sleeve (419) damage or restricted passage
 - 2nd clutch plates (431, 432, 433, 434, 435) damaged and or missing the correct number of plates
4. Inspect the 3rd clutch for the following:
- 3rd clutch piston assembly (606) physical damage
 - 3rd clutch piston assembly (606) checkball (2) damaged and or missing
 - Oil seal rings (614) damaged sealing surface and or missing
 - Transfer sleeve (603) damage and or restricted oil passage.
 - Clutch plates (610, 611, 612, 613) damage and or missing the correct number of plates

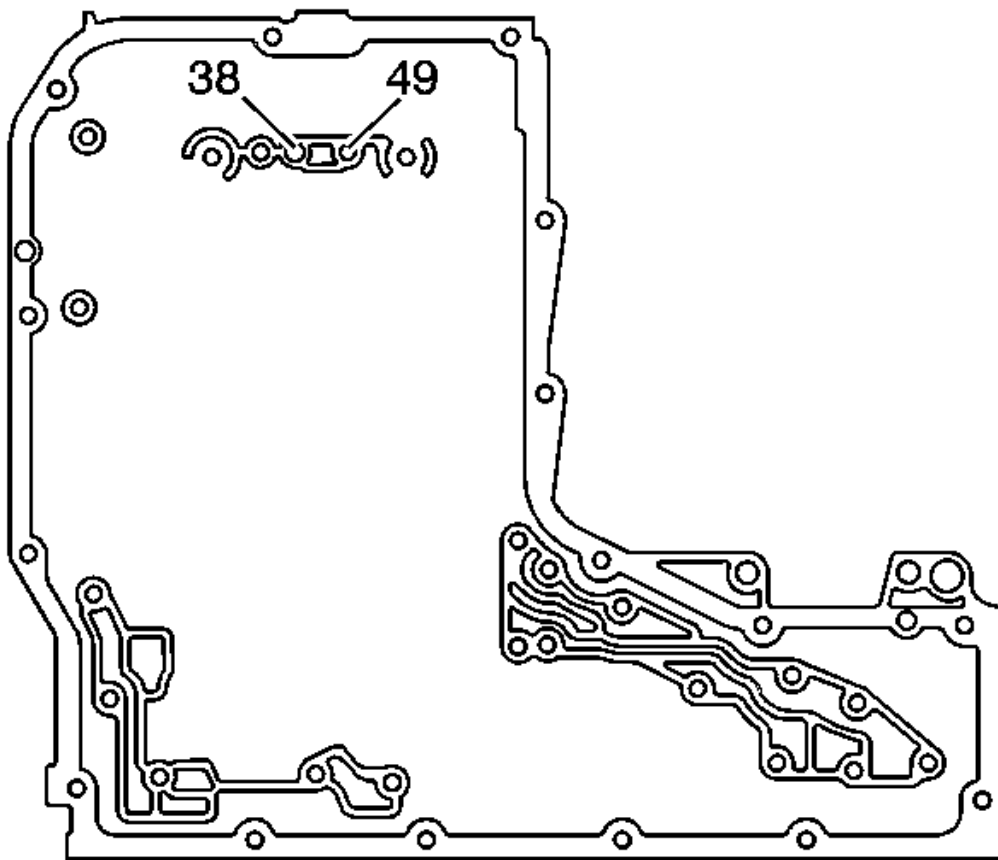


Fig. 155: Blowing Air In Passages To Forward Clutch & Coast Clutch
 Courtesy of GENERAL MOTORS COMPANY

5. To check the forward and coast clutch assemblies, apply 50-60 psi of filtered compressed shop air pressure to the appropriate passages located in the lower case to the forward clutch support assembly,

passage (38) for the forward clutch and passage (49) for the coast clutch. You should be able to hear the clutches apply. If not, inspect the following for possible causes.

6. Inspect the forward coast clutch for the following:

- Forward clutch piston (807) inner (808) and or outer (809) seals, for damaged sealing surface and or missing
- Coast clutch piston assembly (810) physical damage
- Forward piston (807) physical damage
- Clutch plates (812, 813, 814, 816, 817, 819) damage and or missing the correct number of plates
- Forward clutch apply ring (811) damage and or missing

7. Inspect the forward/coast clutch support for the following:

- Support/housing oil seal rings (829) damaged sealing surface and or missing
- Oil Transfer sleeve (824) physical damage and or restricted oil passages

DRIVEN SPROCKET SUPPORT DISASSEMBLE

Special Tools

J 39694 Second Clutch Spring Compressor

For equivalent regional tools, refer to **Special Tools** .

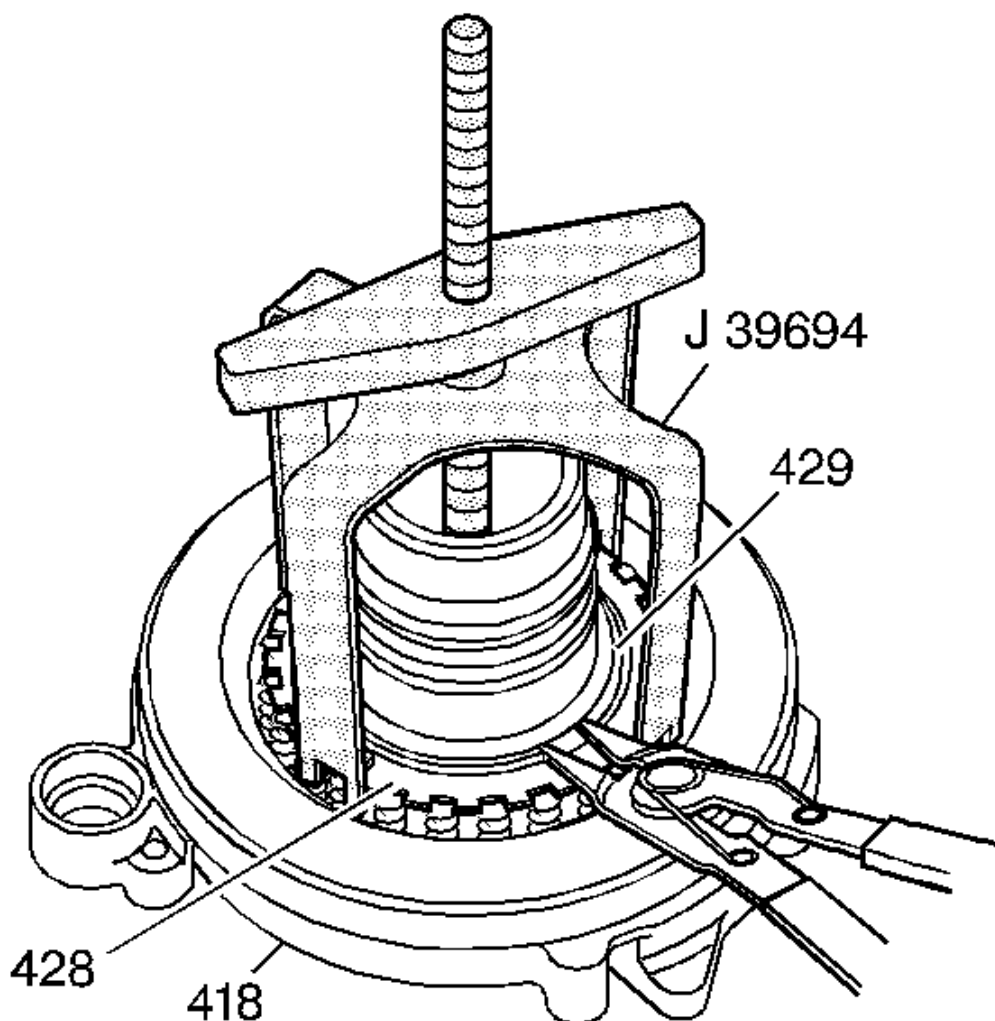


Fig. 156: Compressing Second Clutch Spring
 Courtesy of GENERAL MOTORS COMPANY

1. Use the **J 39694** spring compressorsecond clutch spring compressor to compress the spring and remove the snap ring (429). Then remove the spring compressor.

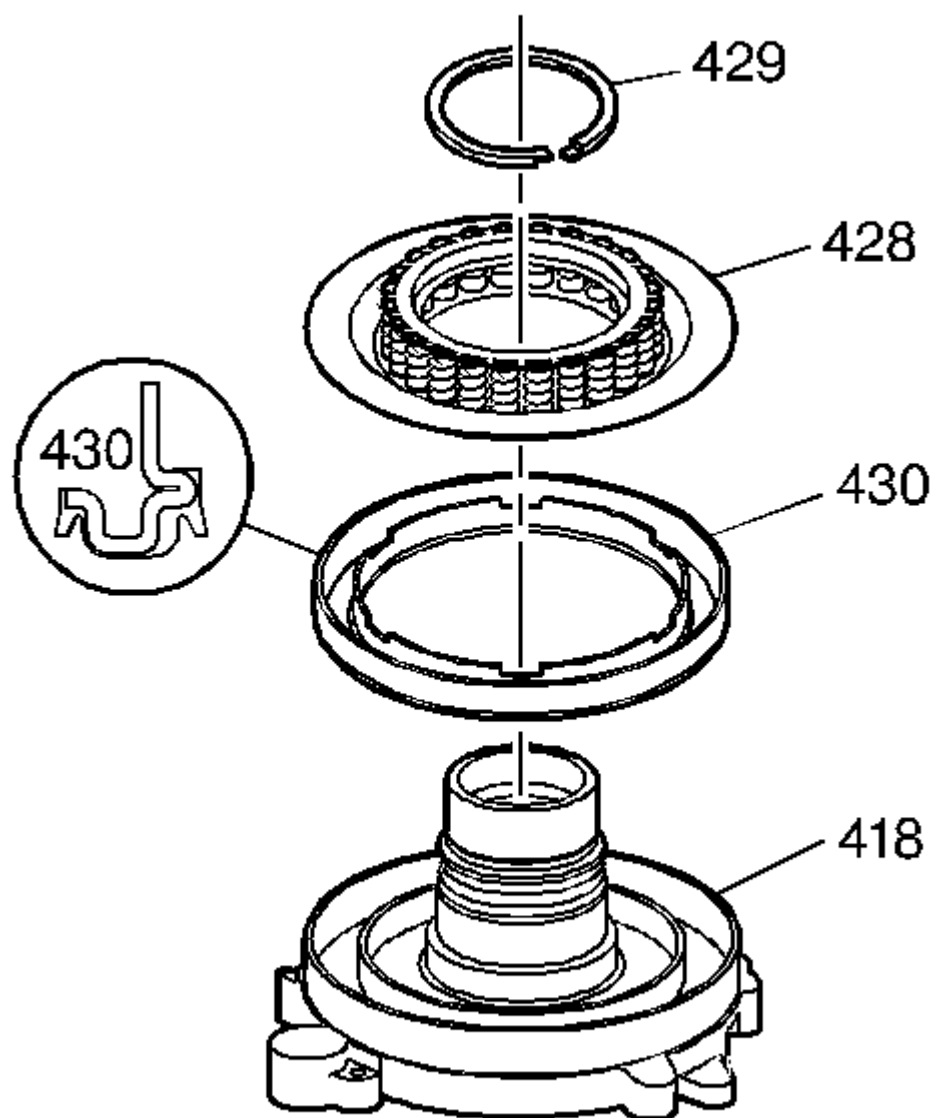


Fig. 157: Piston Assembly & Return Spring And Retainer Assembly Inspection Points
Courtesy of GENERAL MOTORS COMPANY

2. Remove the return spring and retainer assembly (428), and remove the piston assembly (430).

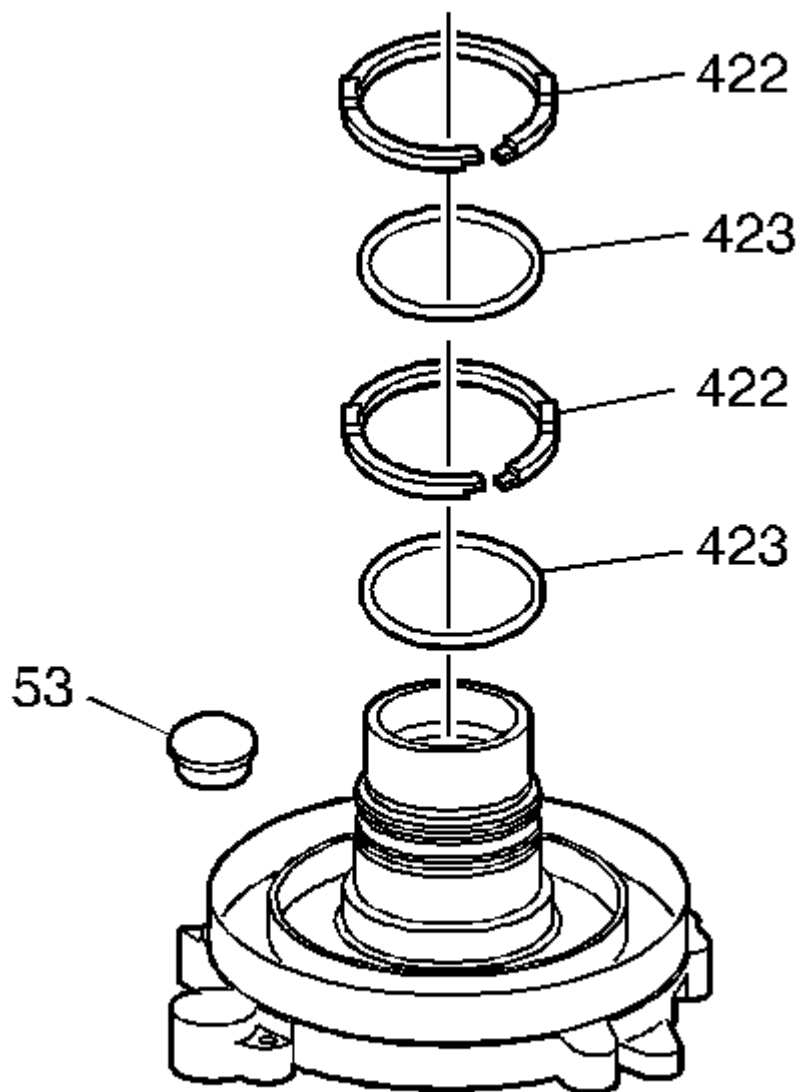


Fig. 158: Identifying Oil Ring & Scavenge Tube Seal Inspection Areas
Courtesy of GENERAL MOTORS COMPANY

3. Remove the following parts:

- The two sealing rings (423)
- The two oil rings (422)
- The scavenge tube seal (53)

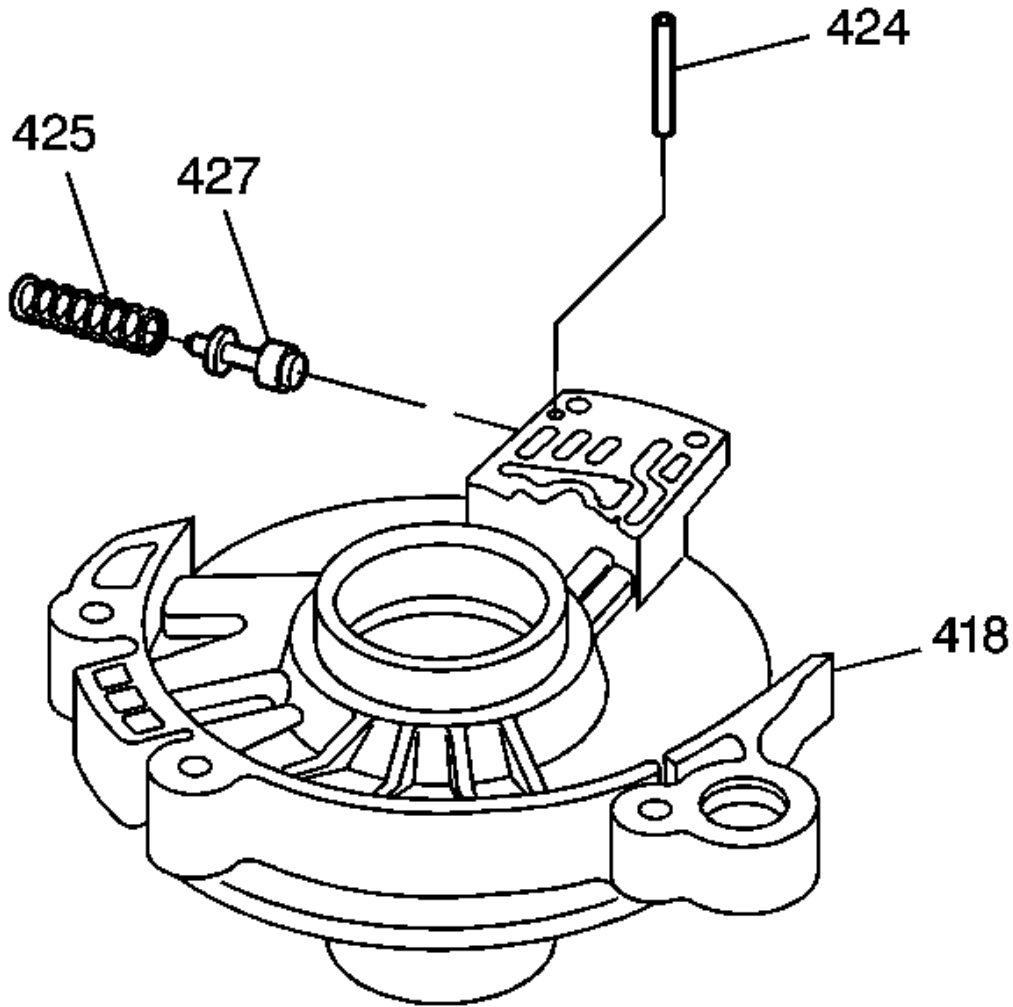


Fig. 159: Locating Third Clutch Exhaust Valve, Spring, And Pin
 Courtesy of GENERAL MOTORS COMPANY

4. Remove the following parts:
 - The third clutch exhaust valve spring retaining pin (424)
 - The third clutch exhaust valve spring (425)
 - The third clutch exhaust valve (427)

DRIVEN SPROCKET SUPPORT ASSEMBLY

Special Tools

- **J 36850** Assembly Lubricant
- **J 39694** Spring Compressor

For equivalent regional tools, refer to **Special Tools** .

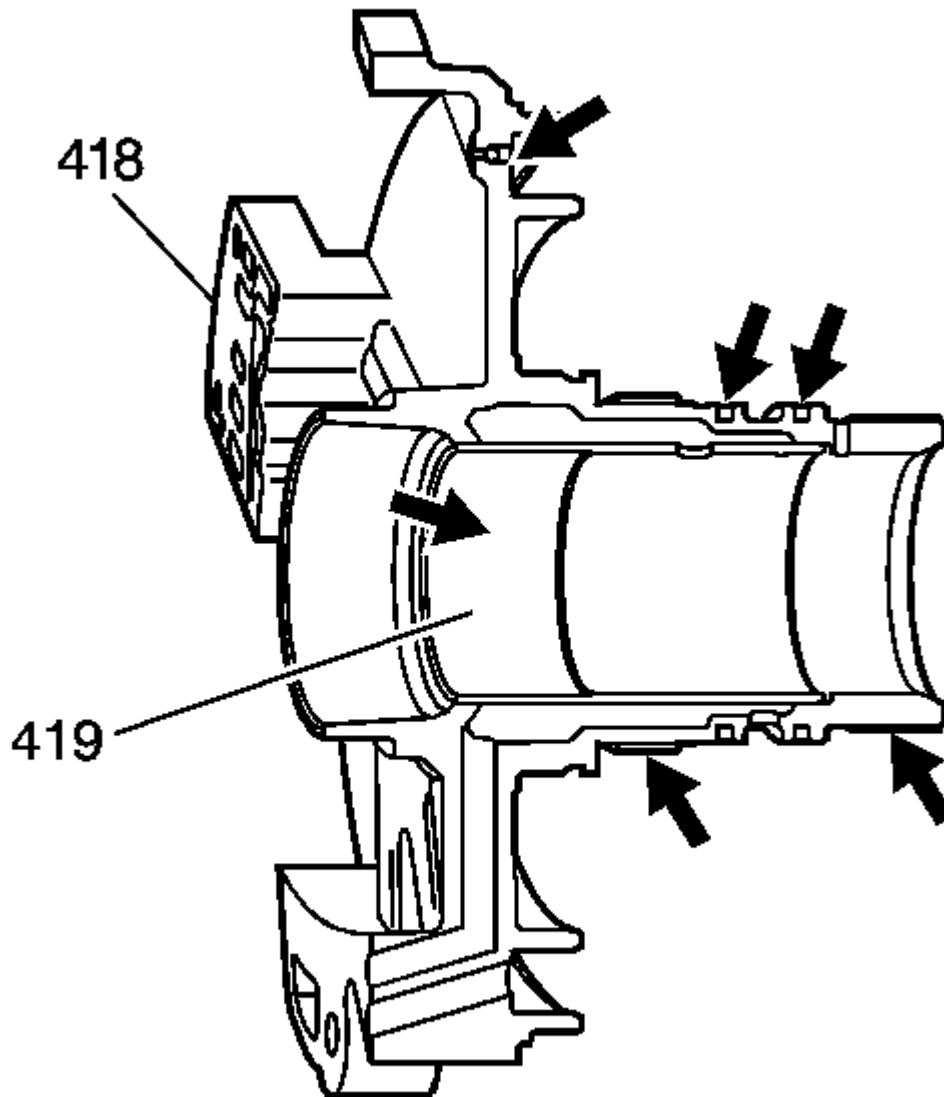


Fig. 160: View Of Inspection Areas On Oil Transfer Sleeve
Courtesy of GENERAL MOTORS COMPANY

1. Inspect the driven sprocket support (418) for the following:
 - Hub nicks, burrs, or damage
 - Plugged feed holes
 - Worn or damaged splines
 - Bushings for nicks, scratches, or wear
 - The checkball for movement
 - The seal ring grooves for damage
2. Inspect the oil transfer sleeve (419) for scoring or internal damage. If damaged replace the driven sprocket support (418).

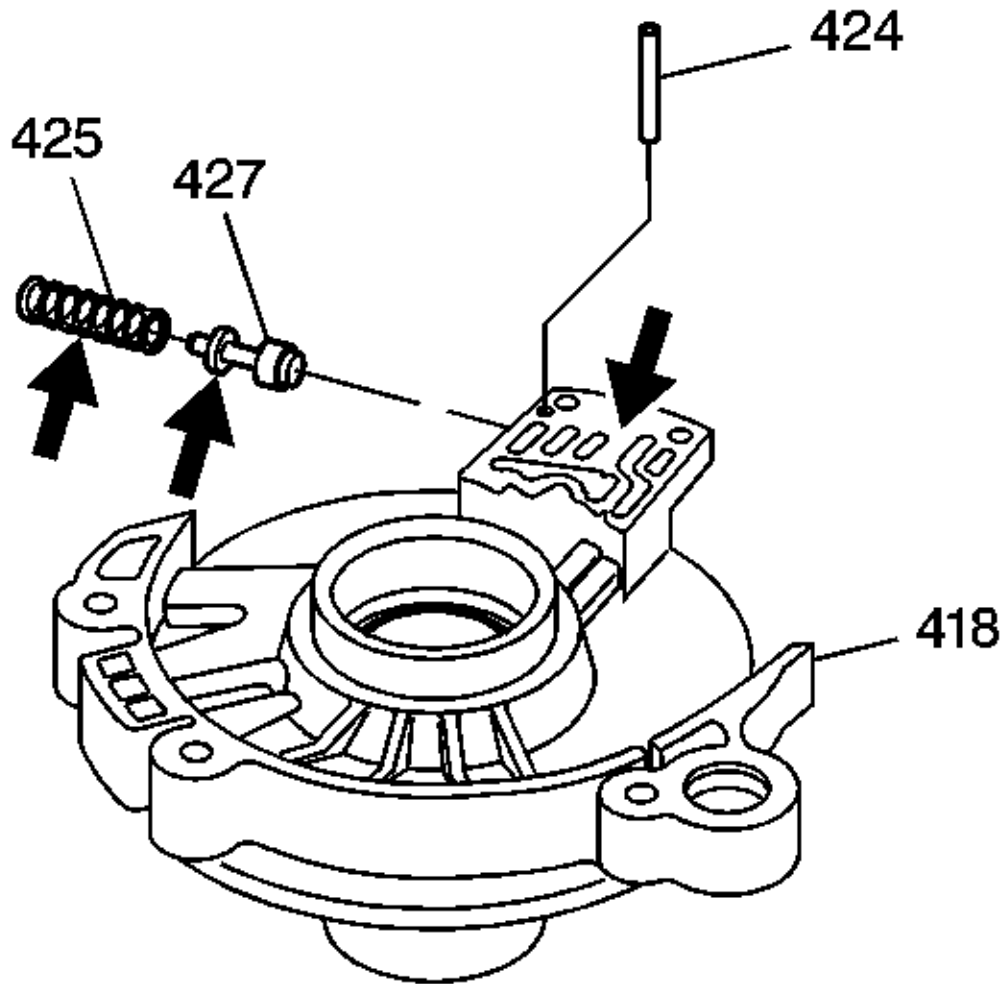


Fig. 161: Identifying Exhaust Valve Spring Inspection Points
Courtesy of GENERAL MOTORS COMPANY

3. Inspect the following parts for damage:
 - The third clutch exhaust valve (427)
 - The exhaust valve spring (425)

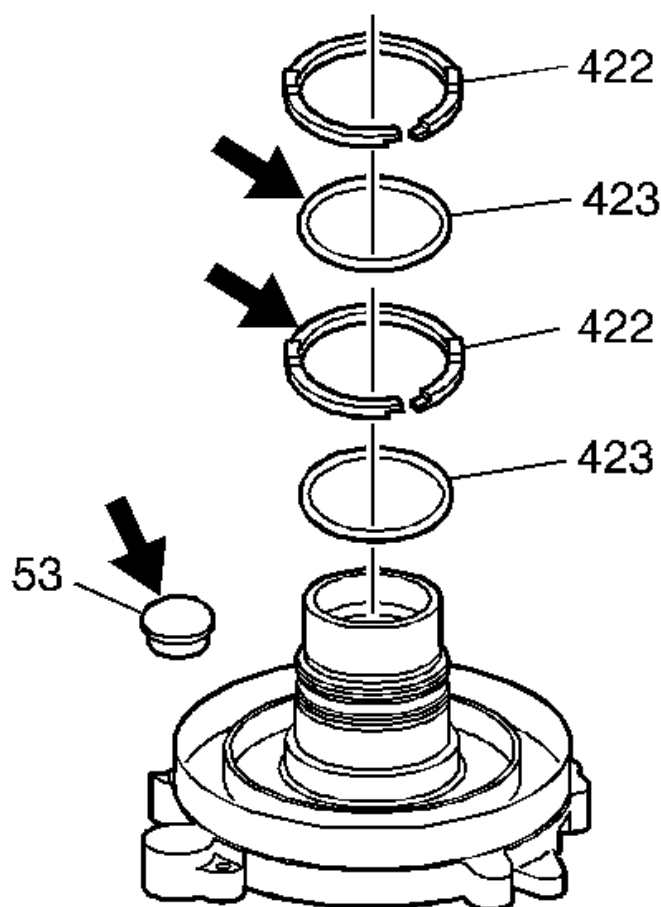


Fig. 162: Locating Inspection Points On Sealing Rings & Scavenge Tube Seal
Courtesy of GENERAL MOTORS COMPANY

4. Inspect the two sealing rings (423) and the two oil rings (422). Replace any damaged rings.
5. Inspect the scavenge tube seal (53). If the seal is damaged, replace the seal.

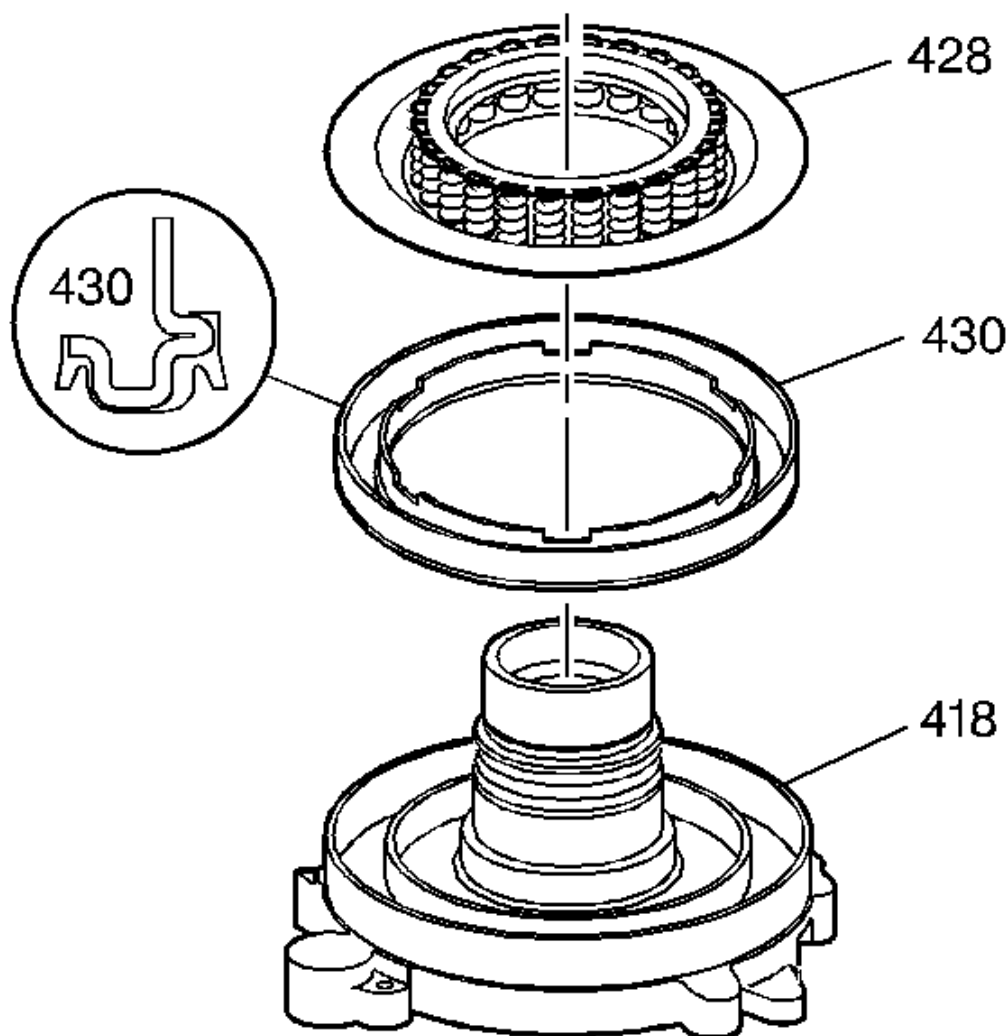


Fig. 163: View Of Second Clutch Piston And Seal Assembly
Courtesy of GENERAL MOTORS COMPANY

6. Inspect the second clutch piston and seal assembly (430). Inspect the second clutch spring and retainer assembly (428) for damage. Replace any damaged part.

CAUTION: Do not roll the seals when installing the second clutch piston assembly (430), or damage may occur.

7. Install the second clutch piston assembly (430). Twist and push the piston simultaneously. Use a light coating of **J 36850** assembly lubricant or equivalent.

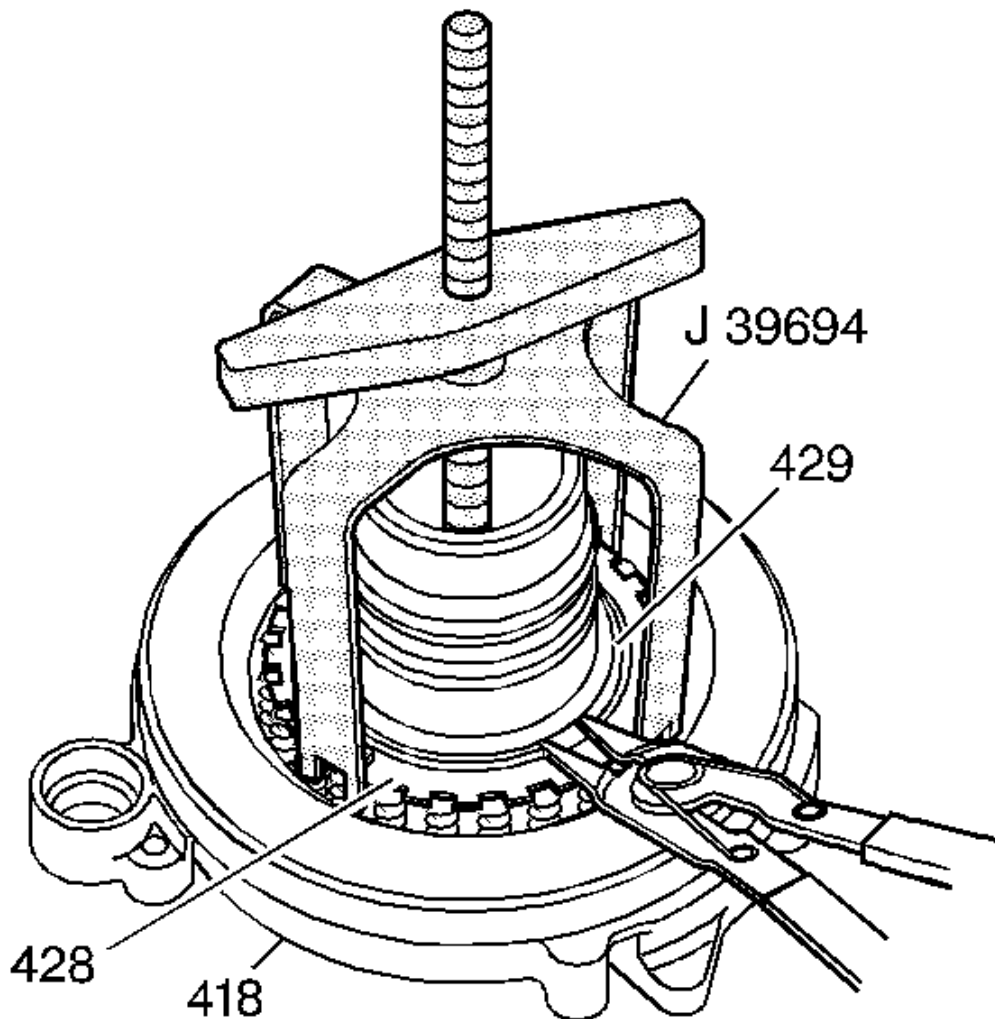


Fig. 164: Compressing Second Clutch Spring
Courtesy of GENERAL MOTORS COMPANY

8. Use the **J 39694** spring compressor to compress the spring and retainer assembly (428).
9. Install the snap ring (429).

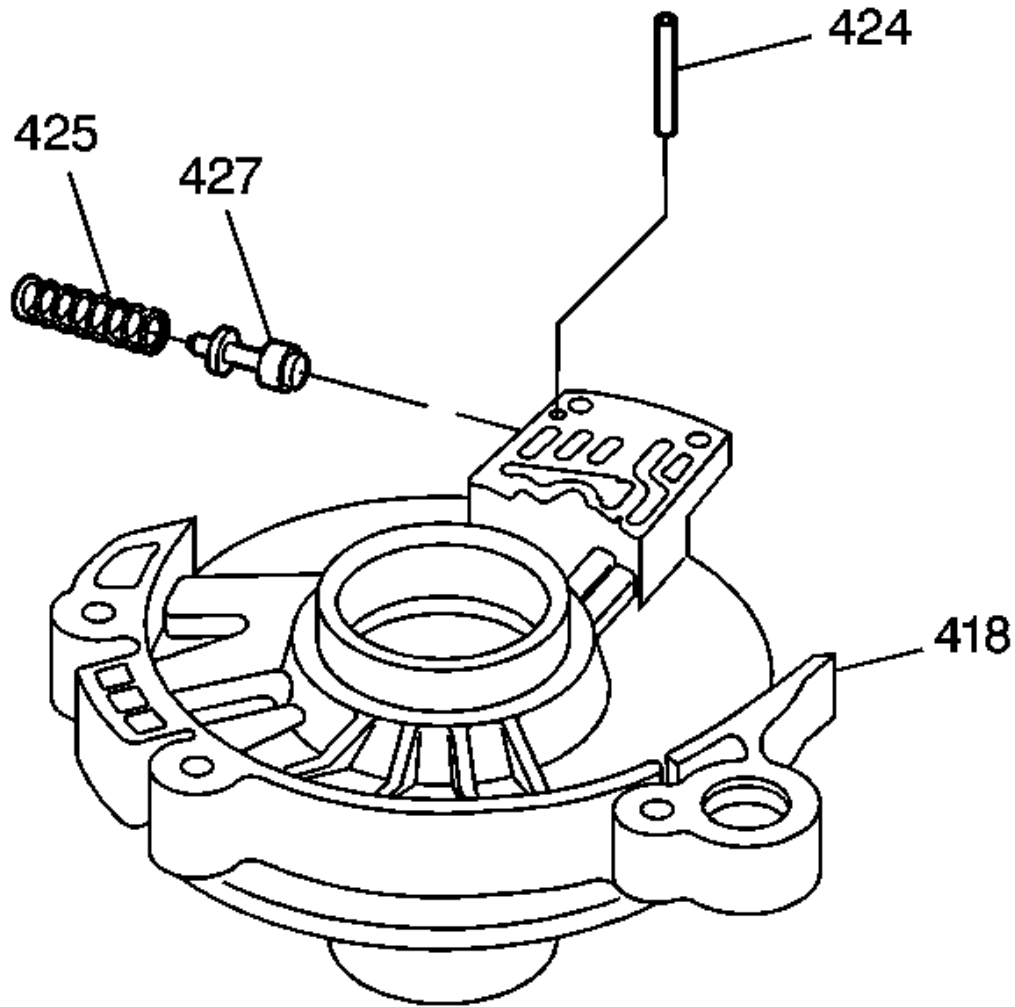


Fig. 165: Locating Third Clutch Exhaust Valve, Spring, And Pin
 Courtesy of GENERAL MOTORS COMPANY

10. Install the following parts:

- The third clutch exhaust valve (427)
- The third clutch exhaust valve spring (425)
- The spring pin (424)

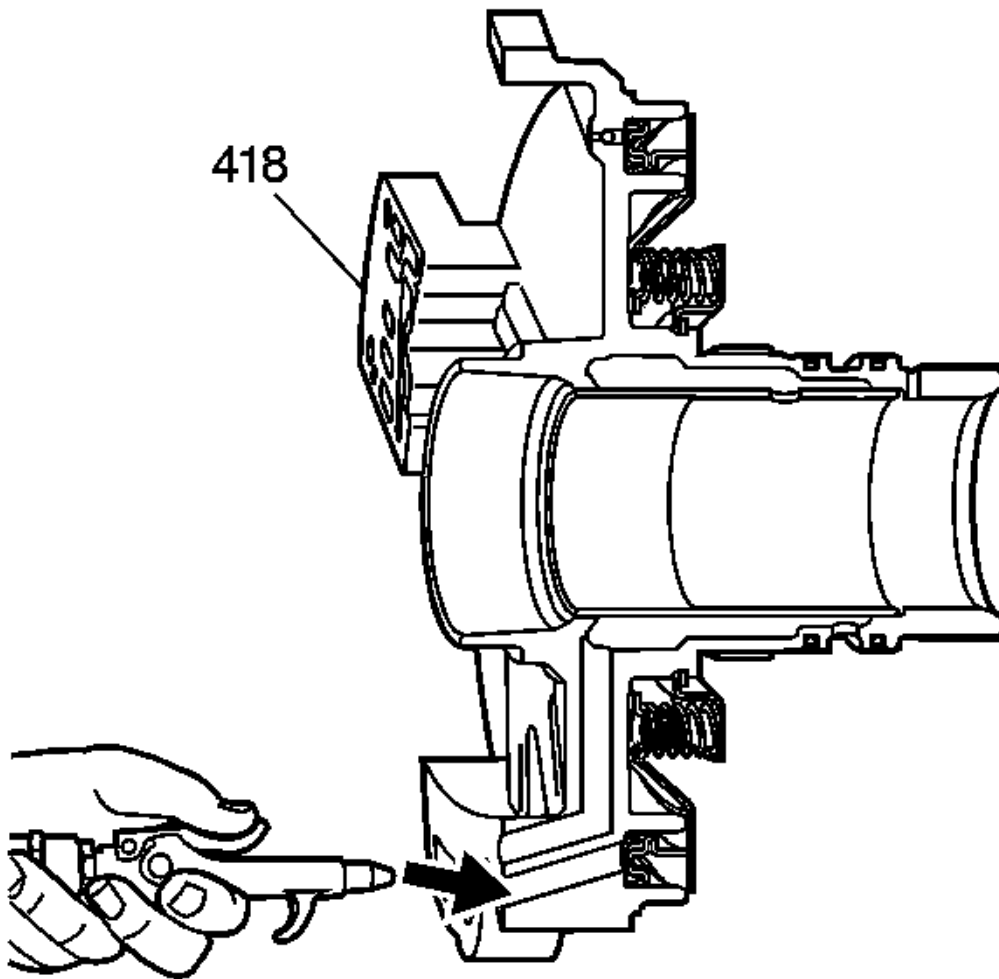


Fig. 166: Blowing Air Into Driven Sprocket Support
Courtesy of GENERAL MOTORS COMPANY

11. Air check the second clutch piston by applying air through the driven sprocket support (418).

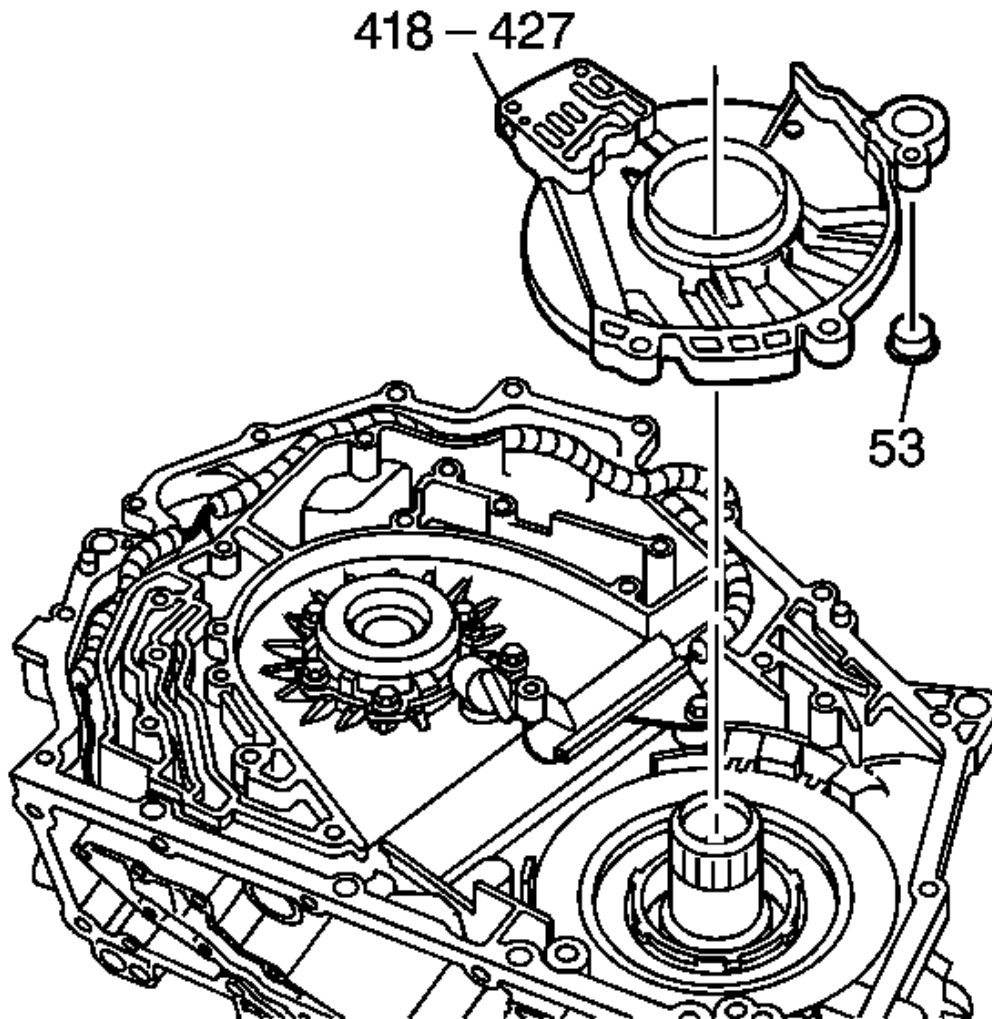


Fig. 167: Identifying Driven Sprocket Support
 Courtesy of GENERAL MOTORS COMPANY

12. Install the driven sprocket support (418-427) over the input shaft. When seated, the support will be flush with the case line surface.

DRIVE SPROCKET, DRIVEN SPROCKET, AND DRIVE LINK AND ASSEMBLE

Special Tools

- **J 39064-1** Drive Sprocket Shaft Seal Pusher

- **J 39064-2** Drive Sprocket Shaft Seal Sizer
- **J 39064-3** Drive Sprocket Shaft Seal Protector

For equivalent regional tools, refer to **Special Tools** .

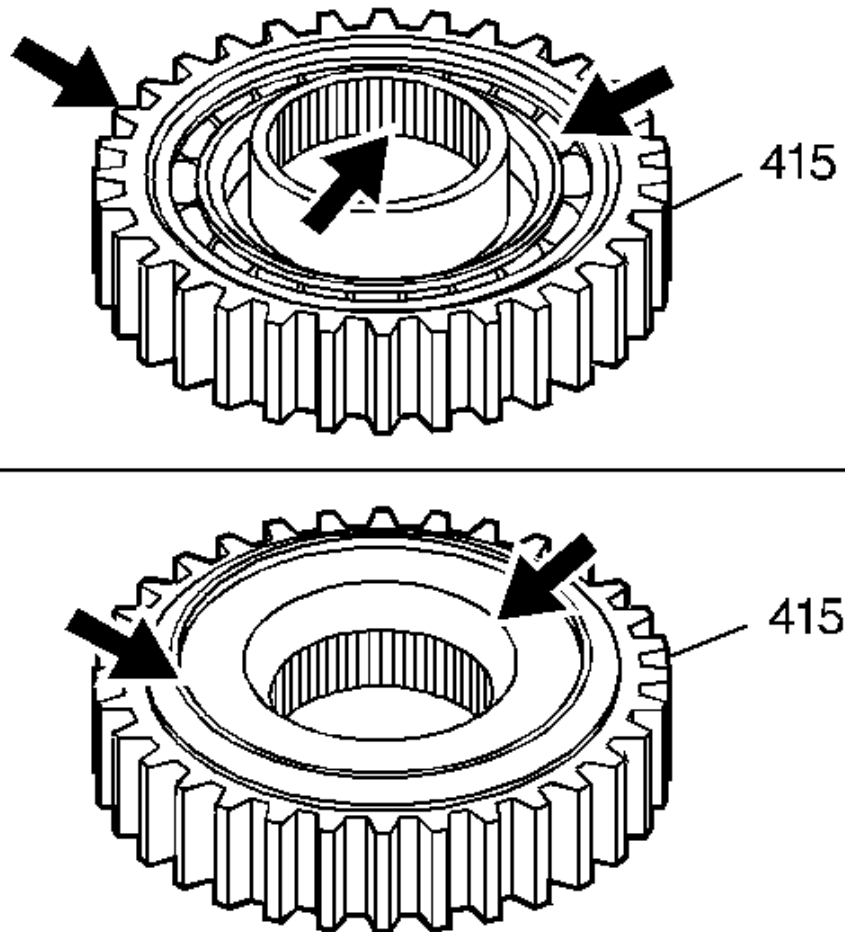


Fig. 168: Inspection Areas On Driven Sprockets
 Courtesy of GENERAL MOTORS COMPANY

1. Inspect the driven sprocket (415) for chipped teeth, worn splines, or a rough bearing.

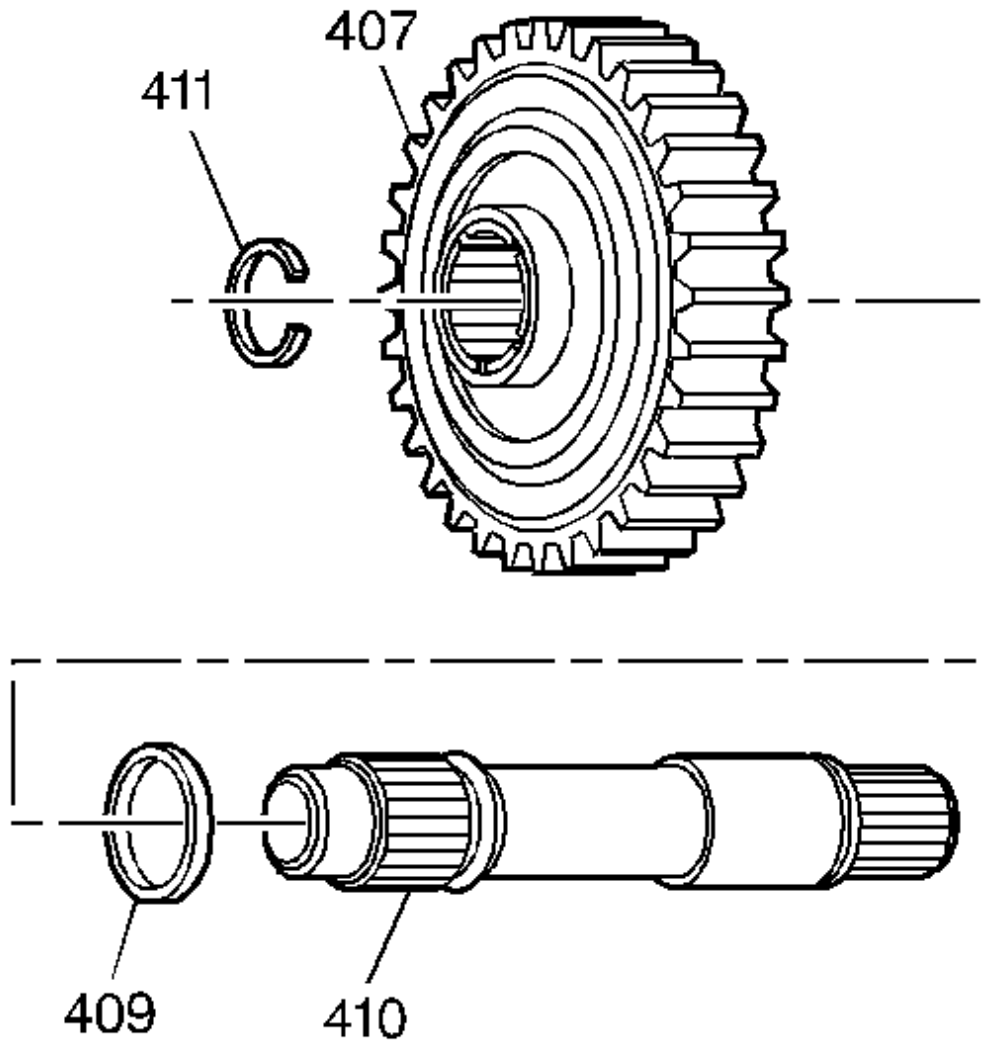


Fig. 169: Locating Drive Sprocket, Turbine Shaft & Snap Ring
Courtesy of GENERAL MOTORS COMPANY

2. Remove the following parts from the turbine shaft (410):
 - The turbine shaft snap ring (411)
 - The drive sprocket (407)
 - The drive sprocket oil seal ring (409)

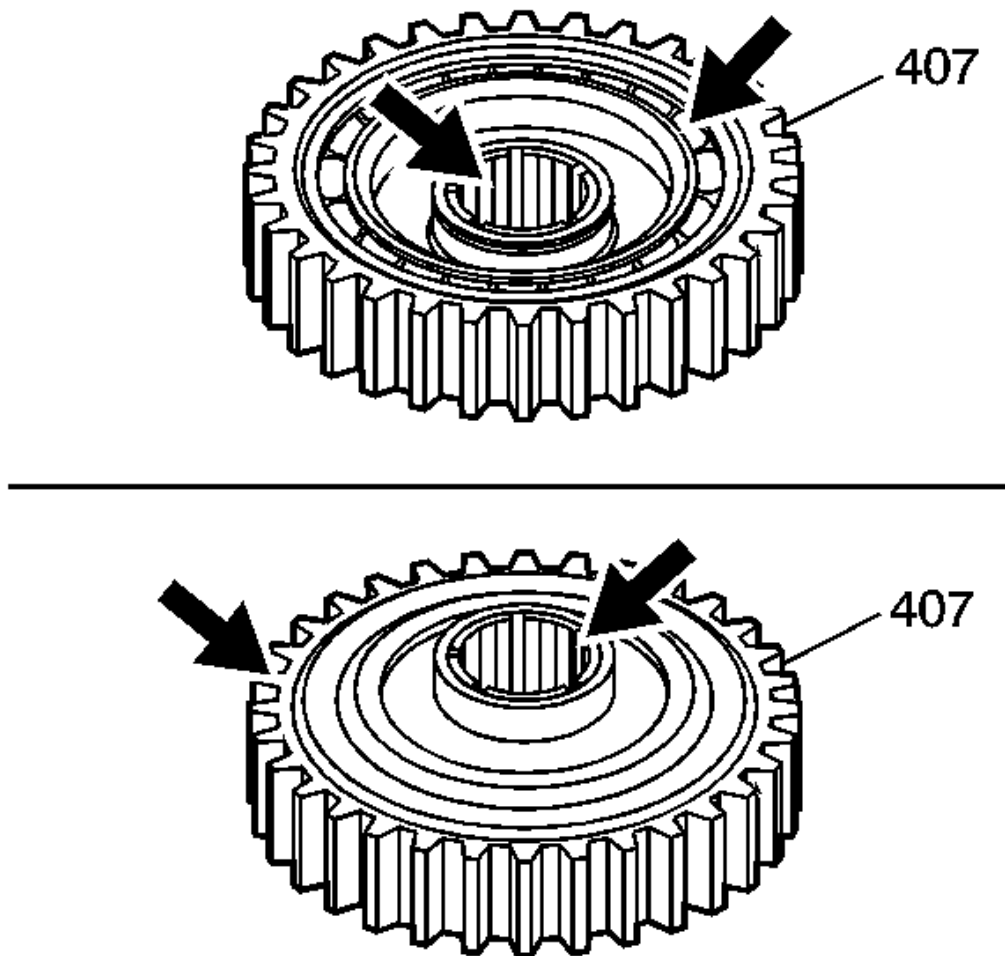


Fig. 170: View Of Drive Sprocket Inspection Areas
Courtesy of GENERAL MOTORS COMPANY

3. Inspect the drive sprocket (407) for chipped teeth, worn splines, or a rough bearing.

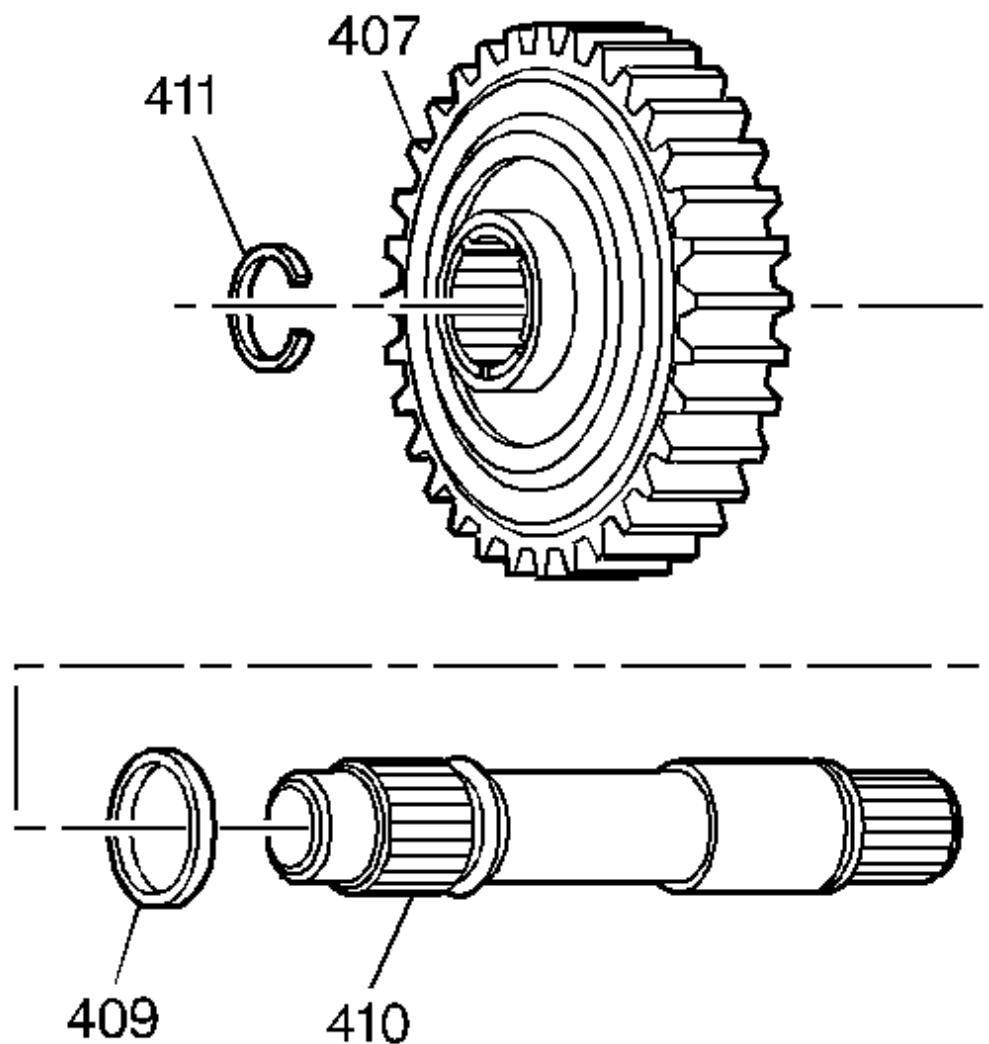


Fig. 171: Locating Drive Sprocket, Turbine Shaft & Snap Ring
 Courtesy of GENERAL MOTORS COMPANY

4. Install the drive sprocket (407) onto the turbine shaft (410), then install the turbine shaft snap ring (411)

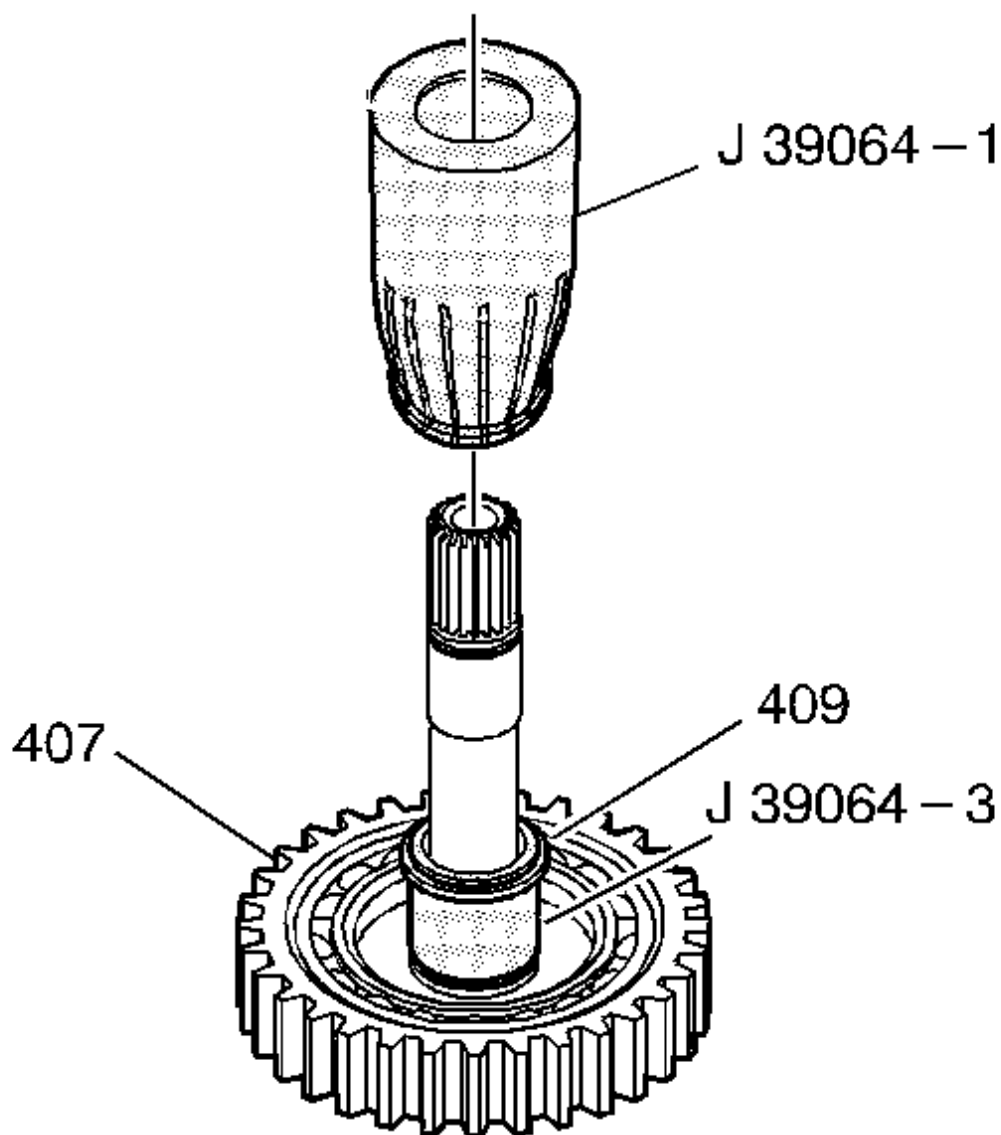


Fig. 172: Drive Sprocket Oil Seal Ring & Seal Protector
Courtesy of GENERAL MOTORS COMPANY

5. Lubricate the drive sprocket oil seal ring (409) with transmission fluid.
6. Install the drive sprocket oil seal ring (409) onto the **J 39064-3** seal protector.
7. Place the **J 39064-3** seal protector onto the drive sprocket (407). Using the **J 39064-1** seal pusher, quickly push down and install the drive sprocket oil seal ring (409).

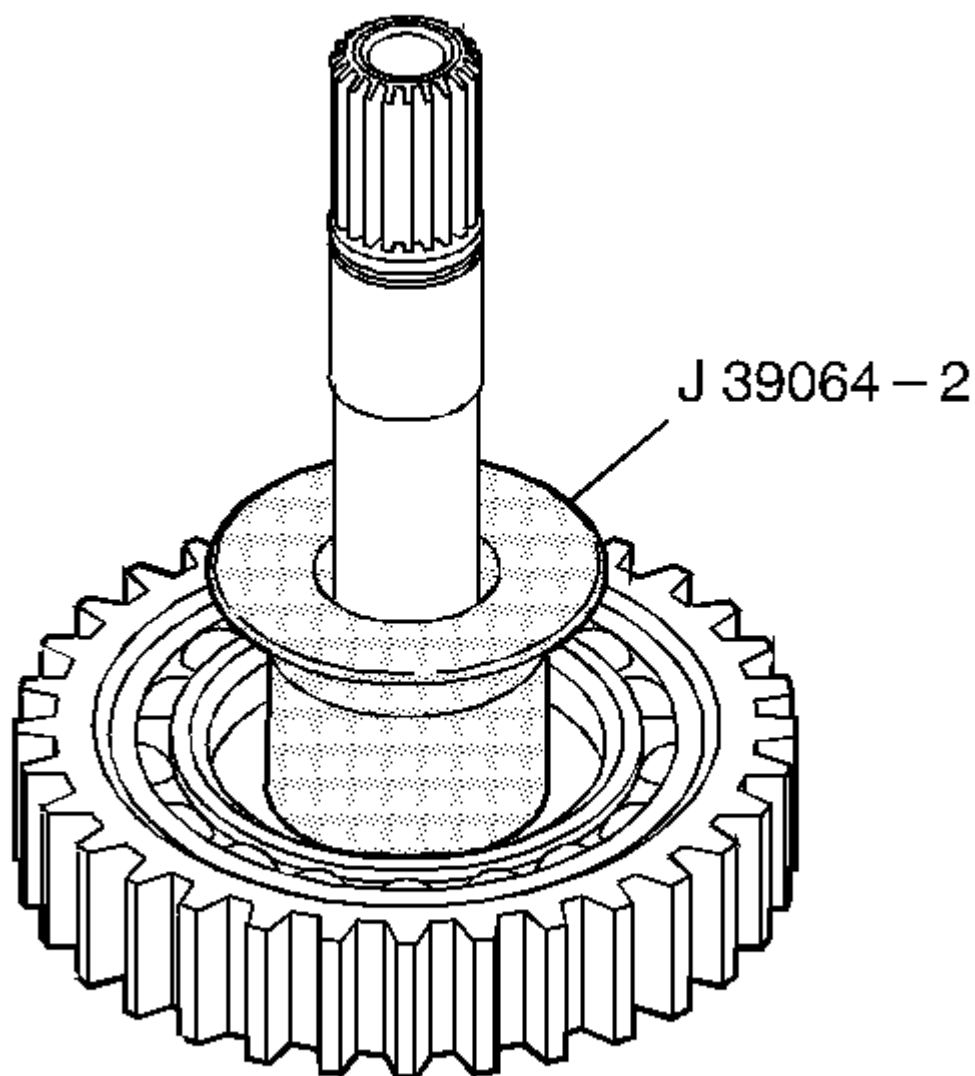


Fig. 173: Seal Sizer Over The Drive Sprocket Oil Seal Ring
Courtesy of GENERAL MOTORS COMPANY

8. Remove the **J 39064-1** seal pusher. Place the **J 39064-2** seal sizer over the drive sprocket oil seal ring. Leave the **J 39064-2** seal sizer in place until ready to install the turbine shaft into the drive sprocket support.

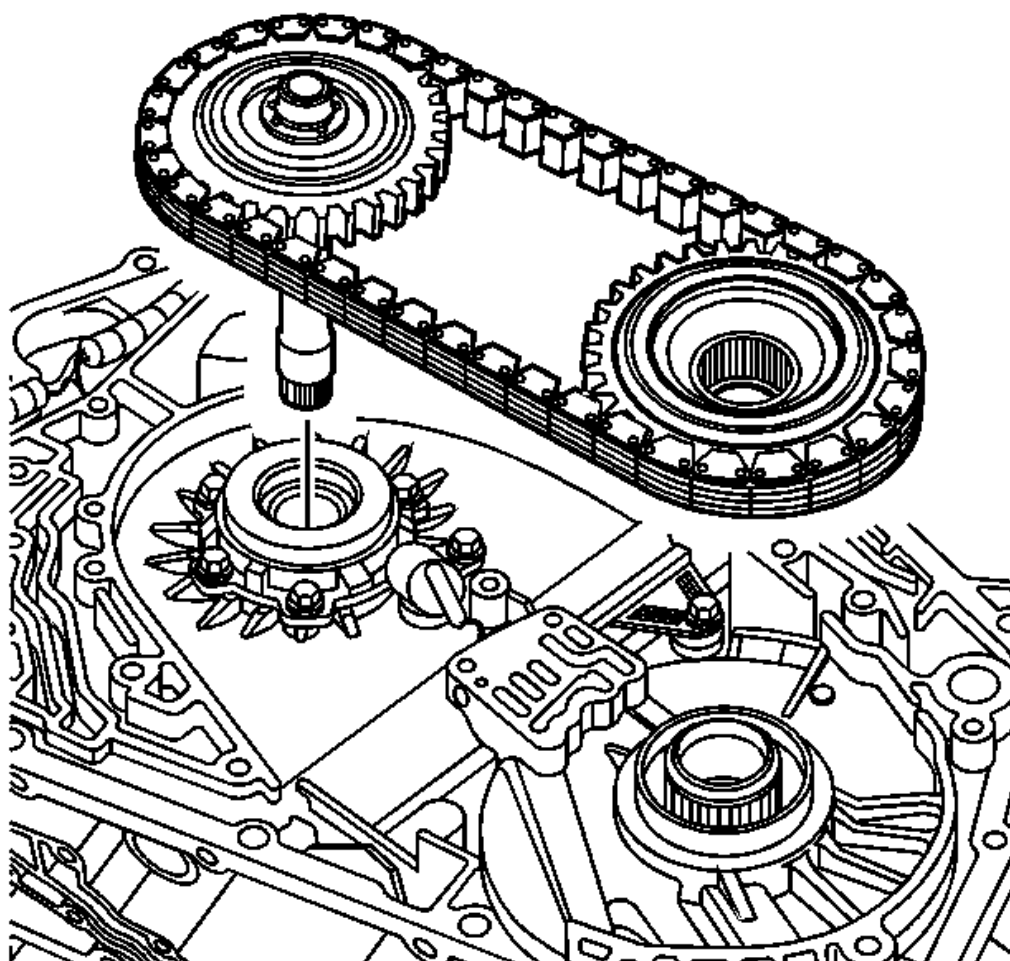


Fig. 174: View Of Drive Chain To The Drive And Driven Sprockets
Courtesy of GENERAL MOTORS COMPANY

9. Remove the **J 39064-2** seal sizer from the drive sprocket oil seal ring.

NOTE: The drive chain must be oriented in the same direction it was in when removed.

10. Attach the drive chain to the drive and driven sprockets.
11. Install the drive sprocket and turbine shaft into the drive sprocket support. Line up the driven sprocket splines with the input shaft and evenly tap the drive and driven sprockets into place until seated.

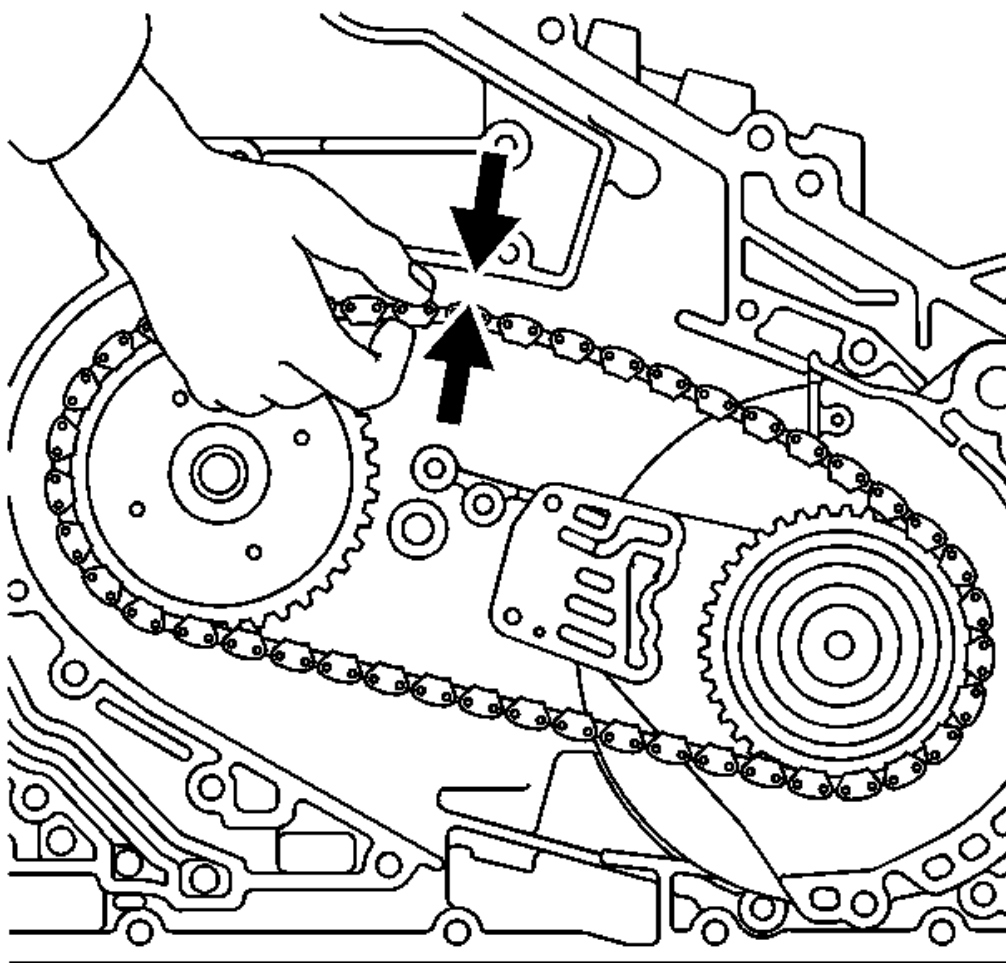


Fig. 175: Measuring Drive Chain To Case Rib Clearance

Courtesy of GENERAL MOTORS COMPANY

NOTE: If the clearance is less than 12.7 mm (0.5 in), replace the drive chain.

12. Measure the drive chain to case rib clearance. The clearance should be no less than 12.7 mm (0.5 in).

THRUST BEARINGS INSTALLATION

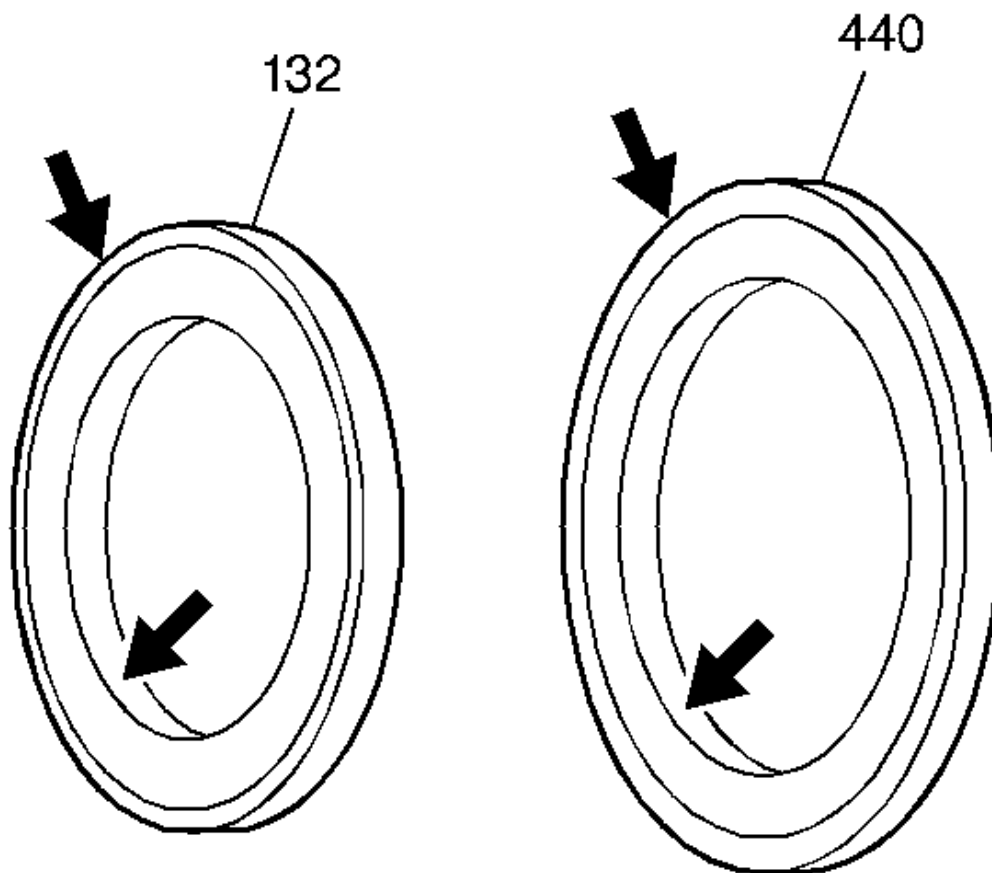


Fig. 176: View Of Drive & Driven Sprocket Thrust Bearing
Courtesy of GENERAL MOTORS COMPANY

1. Inspect the drive sprocket thrust bearing (132) and the driven sprocket thrust bearing (440) for damage.

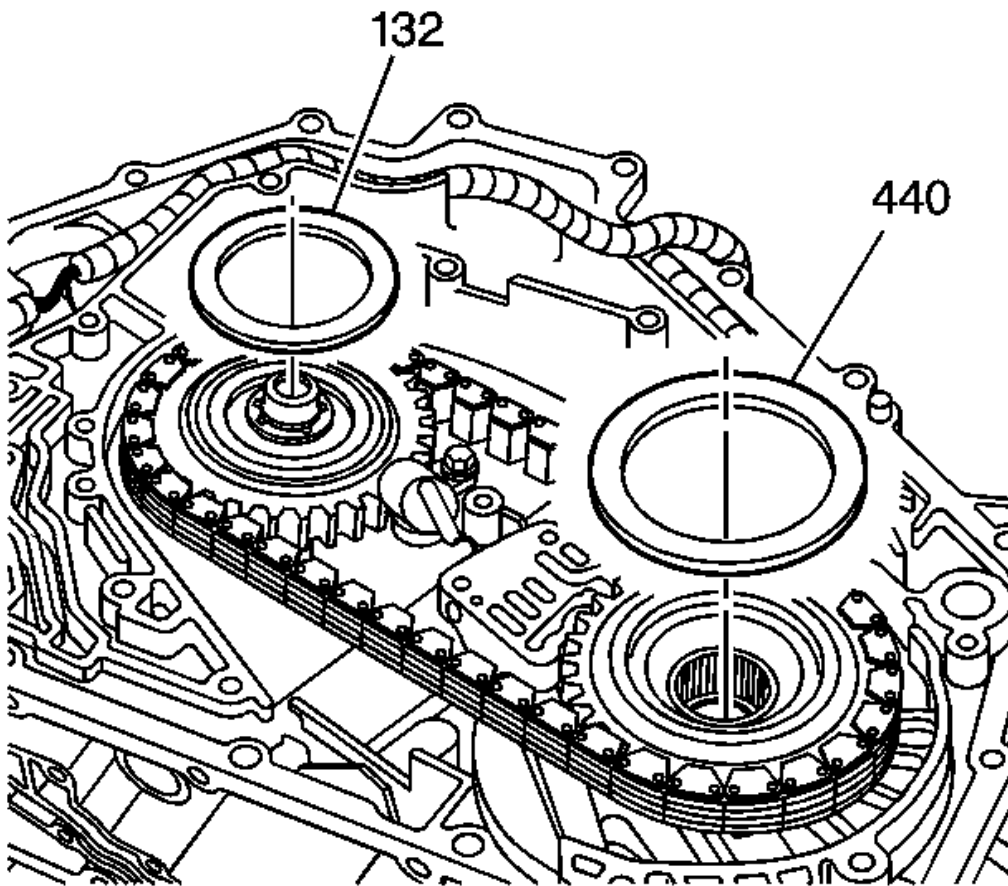


Fig. 177: Locating Drive And Driven Sprocket Thrust Bearings
Courtesy of GENERAL MOTORS COMPANY

2. Install the drive and driven sprocket thrust bearings (132, 440) onto the sprockets.

TURBINE SHAFT SEAL REPLACEMENT - SHAFT TO CASE COVER

Special Tools

- **J 7079-2** Universal Driver Handle-Non Threaded
- **J 8092** Driver Handle
- **J 39062** Turbine Shaft Seal Tool
- **J 39648** Drive Sprocket Seal Installer

For equivalent regional tools, refer to **Special Tools** .

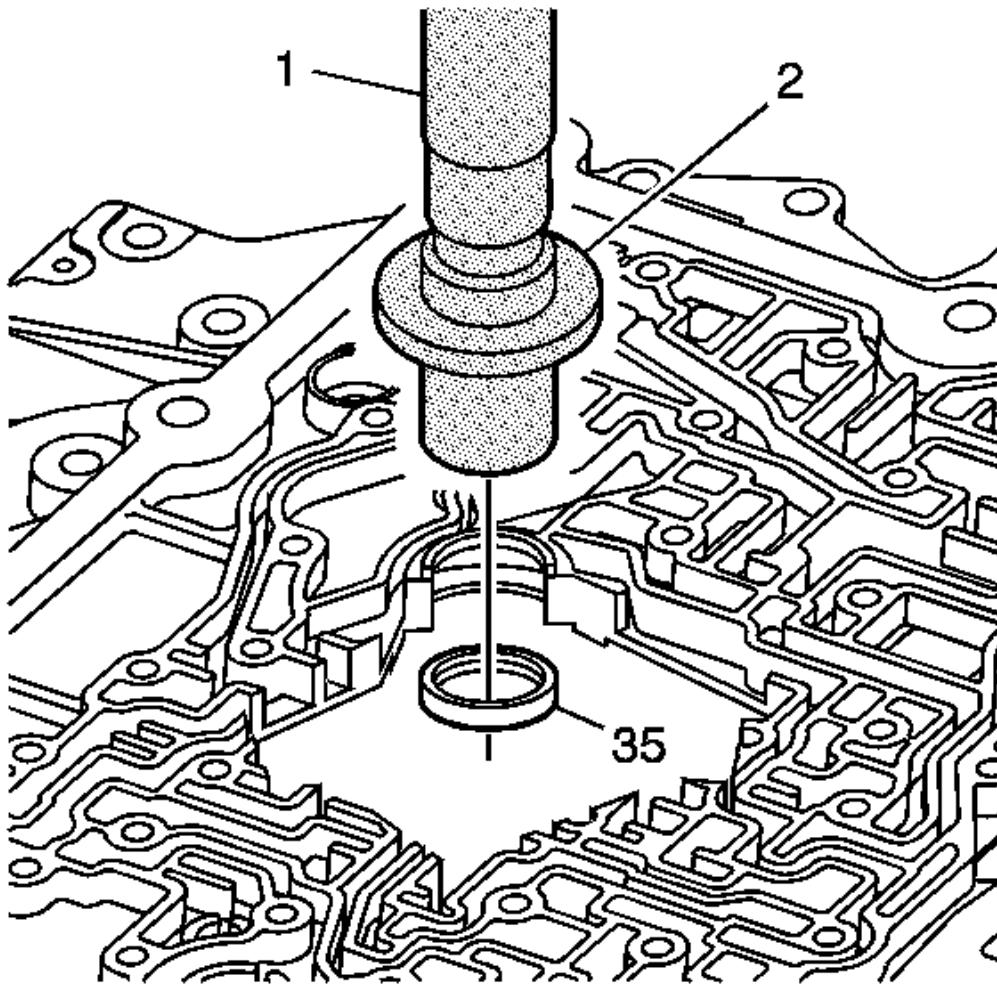


Fig. 178: Identifying Case Cover To Turbine Shaft Seal, J 7079-2 & J 39062
 Courtesy of GENERAL MOTORS COMPANY

1. Using **J 7079-2** universal driver handle-non threaded (1) and the remover side of the **J 39062** Turbine Shaft Seal Tool (2), remove the case cover to turbine shaft seal (35).

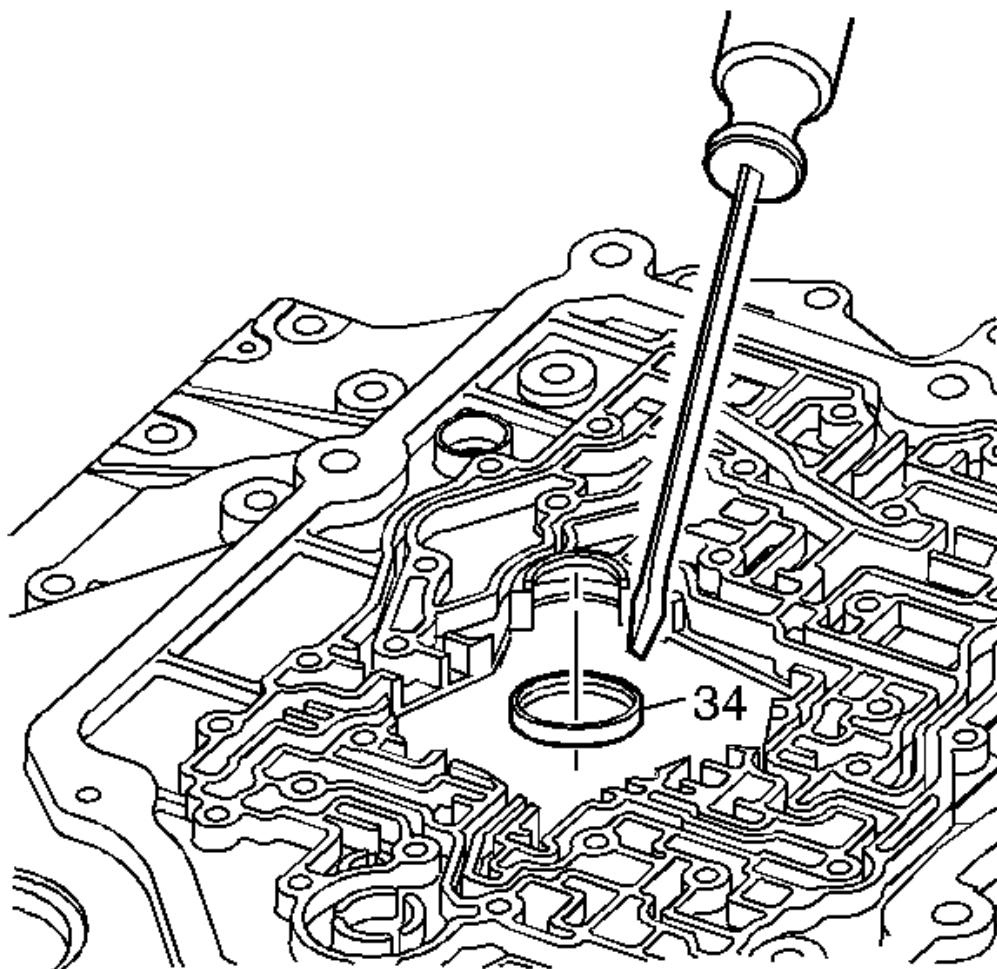


Fig. 179: Drive Sprocket Seal Case Cover
Courtesy of GENERAL MOTORS COMPANY

2. Using a small screwdriver, remove the case cover to drive sprocket seal (34) by tapping the seal out through the slots in the case cover.

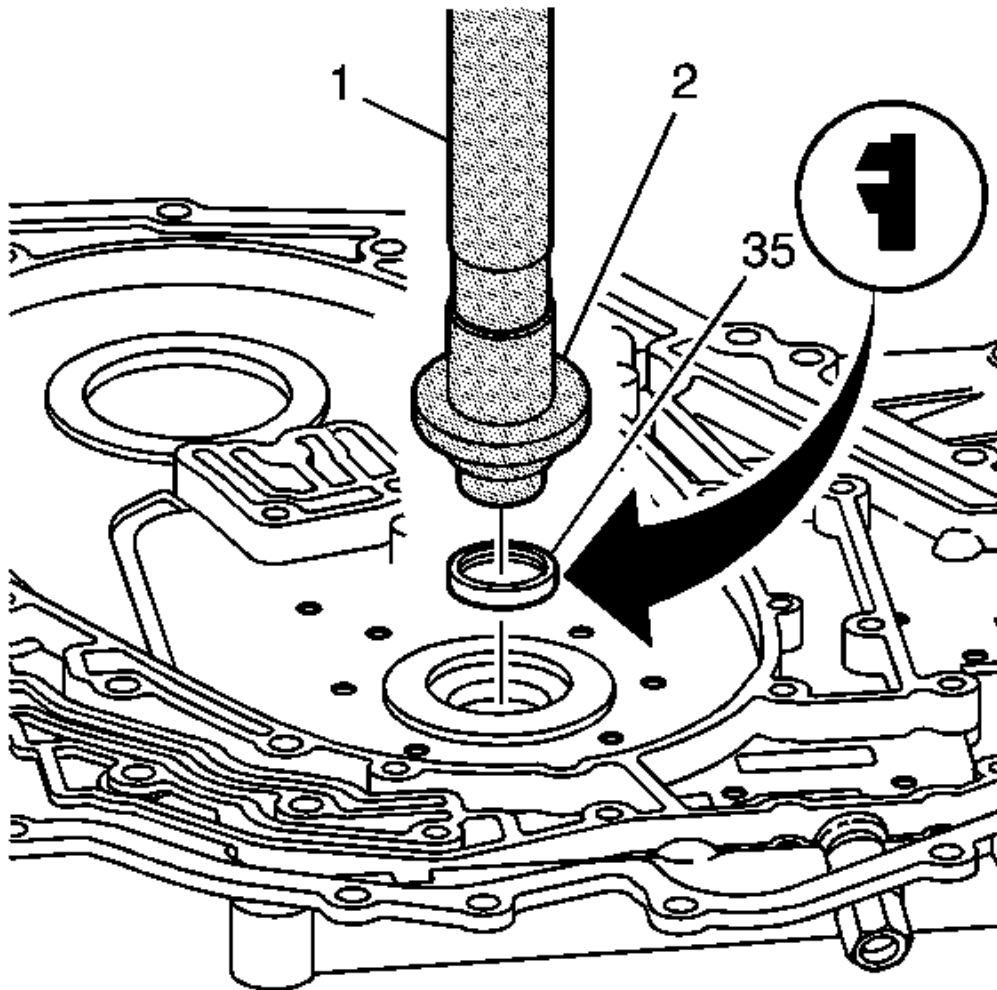


Fig. 180: Identifying Case Cover To Turbine Shaft Seal With J 7079-2 & J 39062
 Courtesy of GENERAL MOTORS COMPANY

3. Using **J 7079-2** universal driver handle-non threaded (1) the installer side of the **J 39062** Turbine Shaft Seal Tool (2), install the case cover to turbine shaft seal (35).

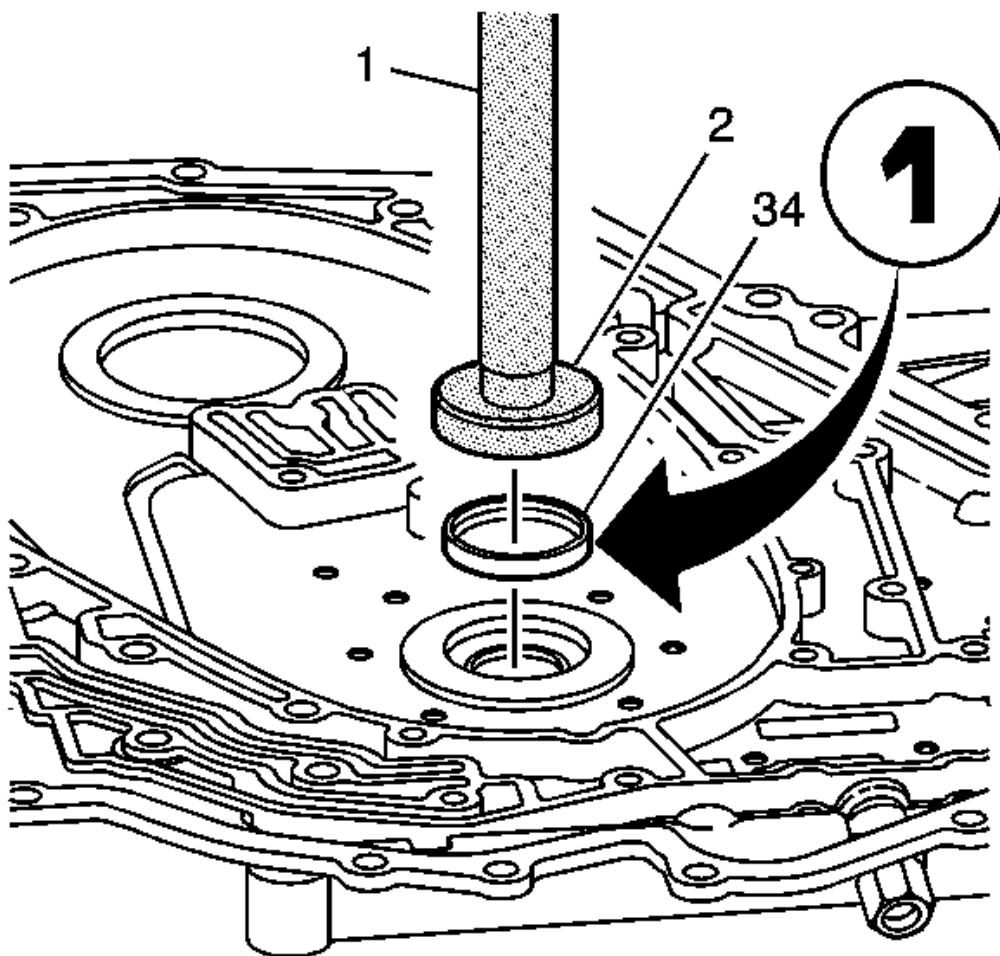


Fig. 181: Drive Sprocket Seal, Driver Handle & Seal Installer
Courtesy of GENERAL MOTORS COMPANY

4. Using **J 8092** Driver Handle (1) and **J 39648** seal installer (2), install the case cover to drive sprocket seal (34).

CASE COVER ASSEMBLY INSTALLATION

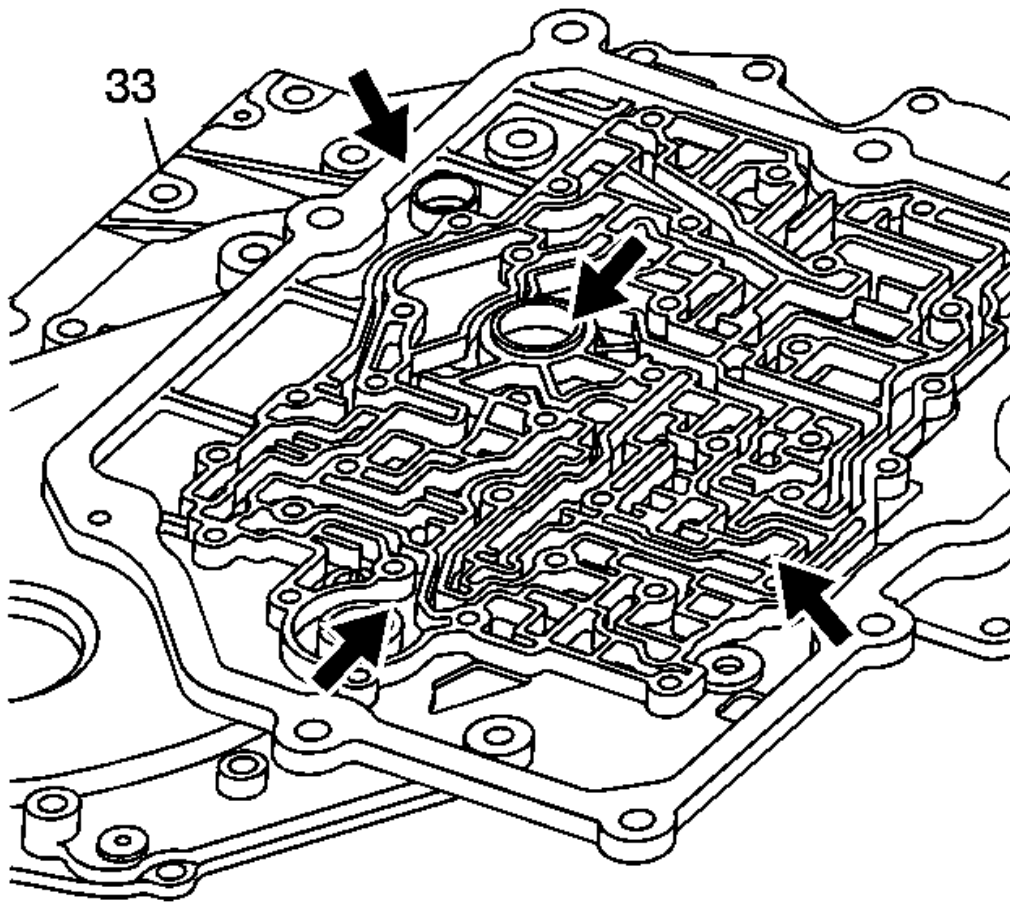


Fig. 182: Identifying Case Cover Mating Surface Inspection Areas
 Courtesy of GENERAL MOTORS COMPANY

1. Inspect the case cover (33) mating surfaces for nicks, burrs, or damage.

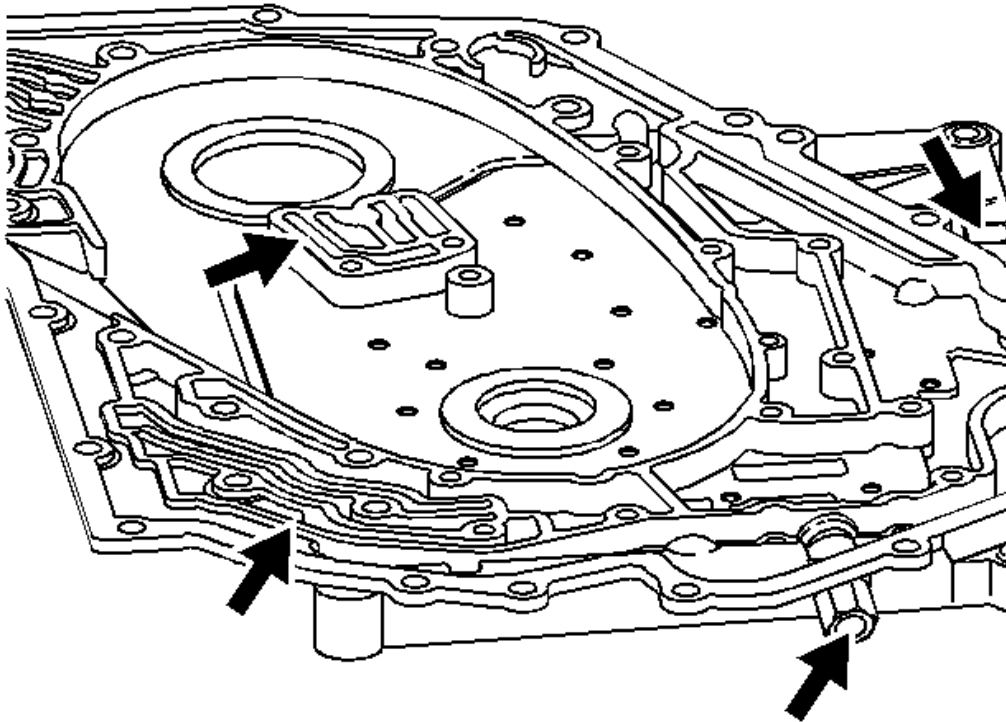


Fig. 183: Case Cover Inspection Points
Courtesy of GENERAL MOTORS COMPANY

2. Inspect the case cover to case mating surfaces for nicks, burrs, or damage.
3. Inspect the cooler fitting and inspect the seal for damage.

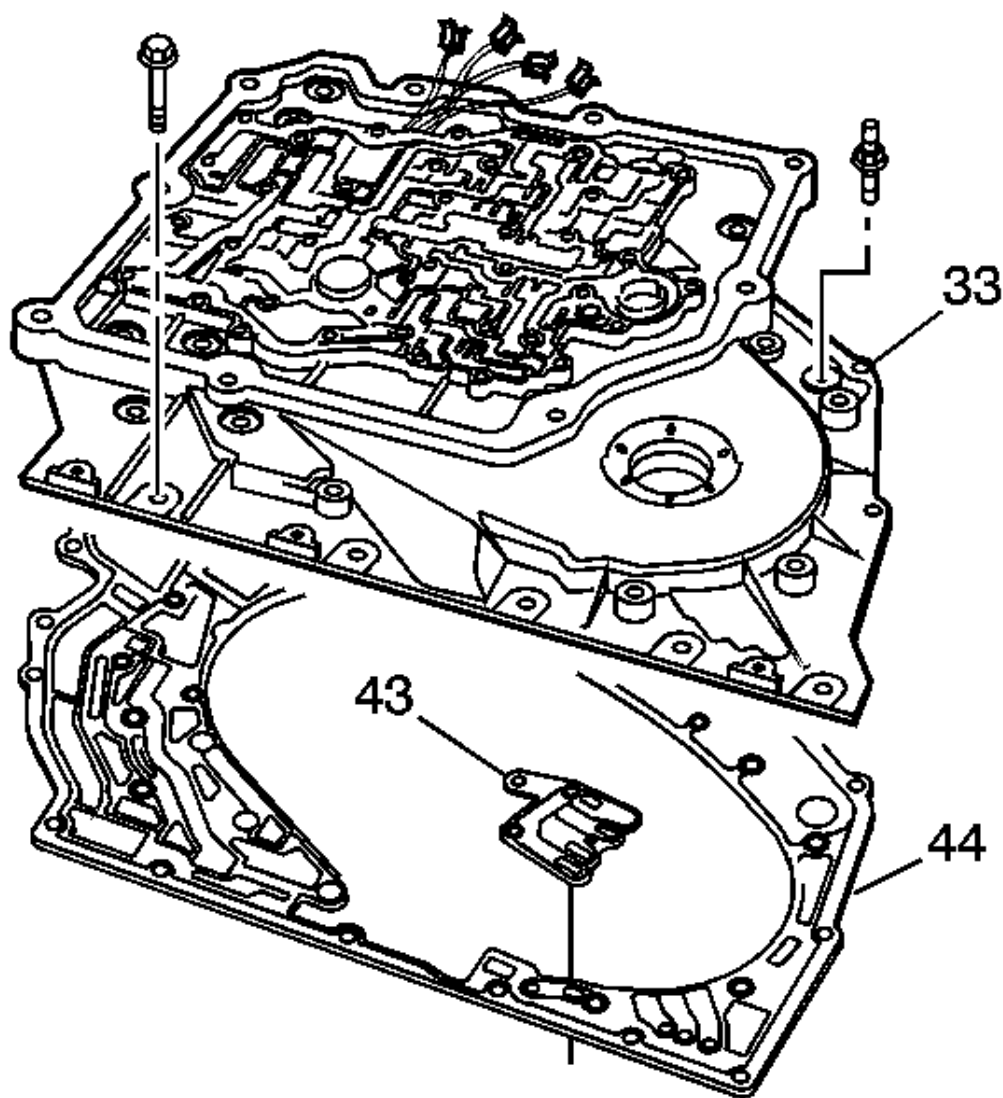


Fig. 184: View Of Island Gasket & Case Cover Gasket
Courtesy of GENERAL MOTORS COMPANY

4. Install the new island gasket (43) and the new case cover gasket (44) over the dowel pins on the case. Pass the wiring harness through the large opening at the top of the case cover gasket. Make sure that the wiring harness remains under the gasket, except for the portion where the connectors are attached.
5. Install the case cover assembly (33). Pass the wiring harness assembly through the opening at the top of the case cover. Do not pinch the wires.

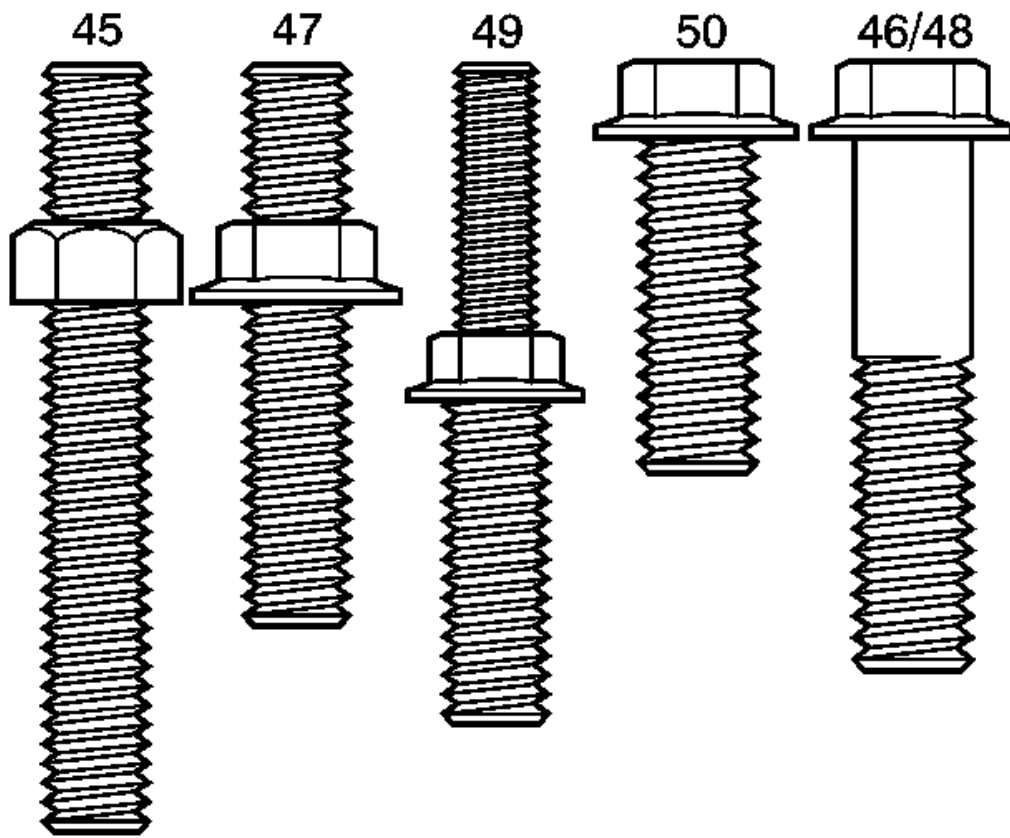


Fig. 185: Identifying Case Cover Bolts
 Courtesy of GENERAL MOTORS COMPANY

6. Install the case cover bolts (45-50), and hand tighten the bolts.

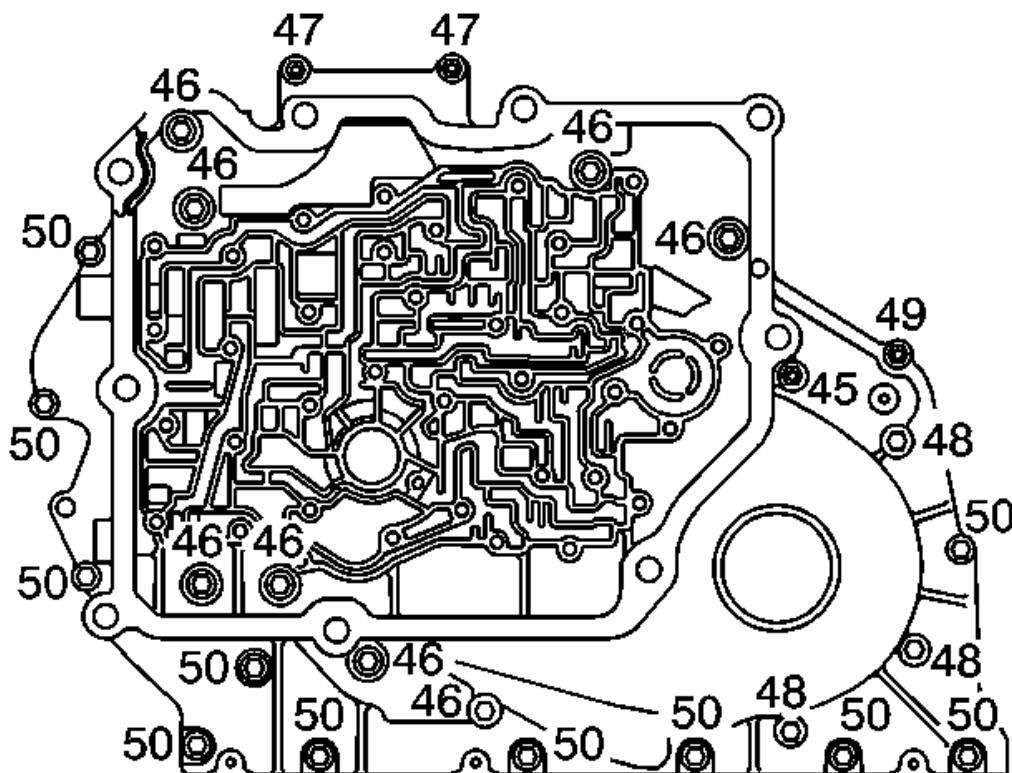


Fig. 186: Identifying Case Cover Bolt/Stud Locations
Courtesy of GENERAL MOTORS COMPANY

CAUTION: Refer to Fastener Caution .

7. Tighten the case cover to case bolts.

- Tighten case cover to case stud (45) to 20-27 N.m (15-20 lb ft).
- Tighten case cover to case bolt (46) to 20-27 N.m (15-20 lb ft).
- Tighten case cover to case stud (47) to 27-31 N.m (20-23 lb ft).
- Tighten case cover to driven sprocket support bolt (48) to 20-27 N.m (15-20 lb ft).
- Tighten case cover to case stud (49) to 27-31 N.m (20-23 lb ft).
- Tighten case cover to case bolt (50) to 27-31 N.m (20-23 lb ft).

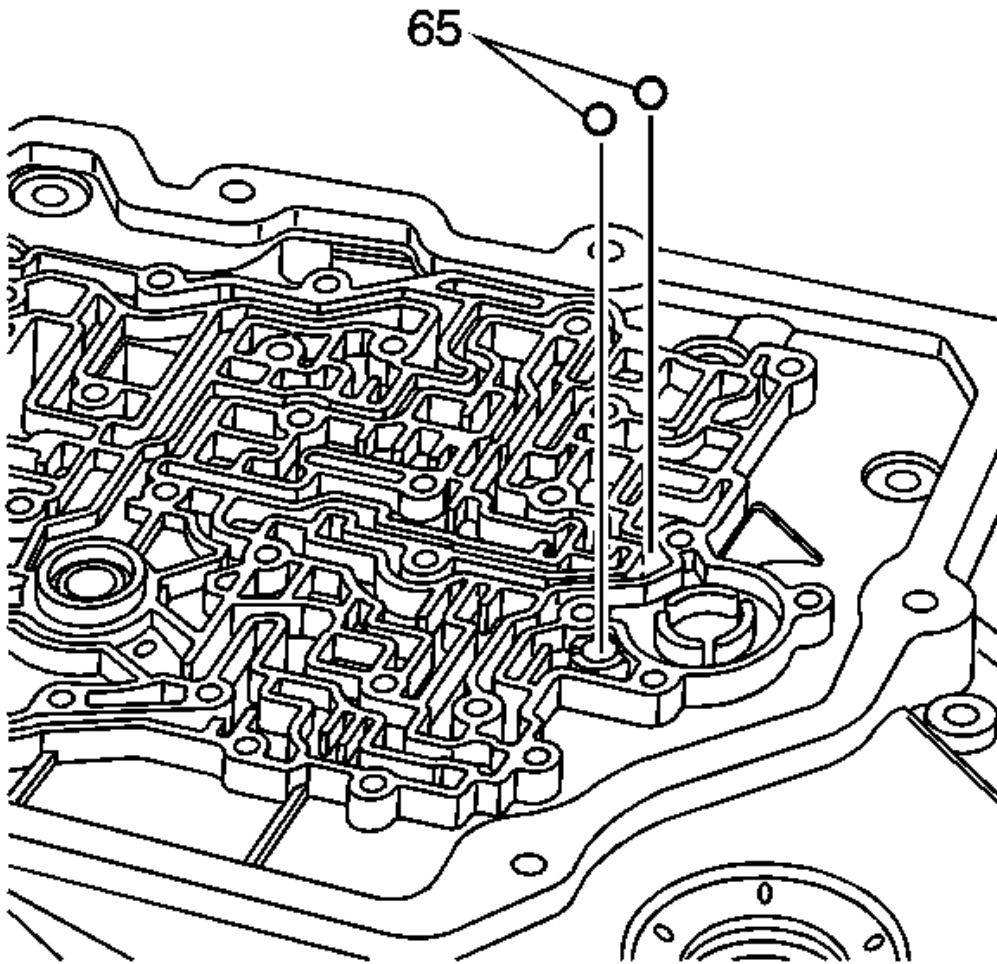


Fig. 187: Identifying Case Cover Checkballs
 Courtesy of GENERAL MOTORS COMPANY

8. Install the two checkballs (65).

ASSEMBLY END PLAY MEASUREMENT

Special Tools

- **J 39686** Input End Play Check Tool
- **J 8001** Dial Indicator Set

For equivalent regional tools, refer to **Special Tools** .

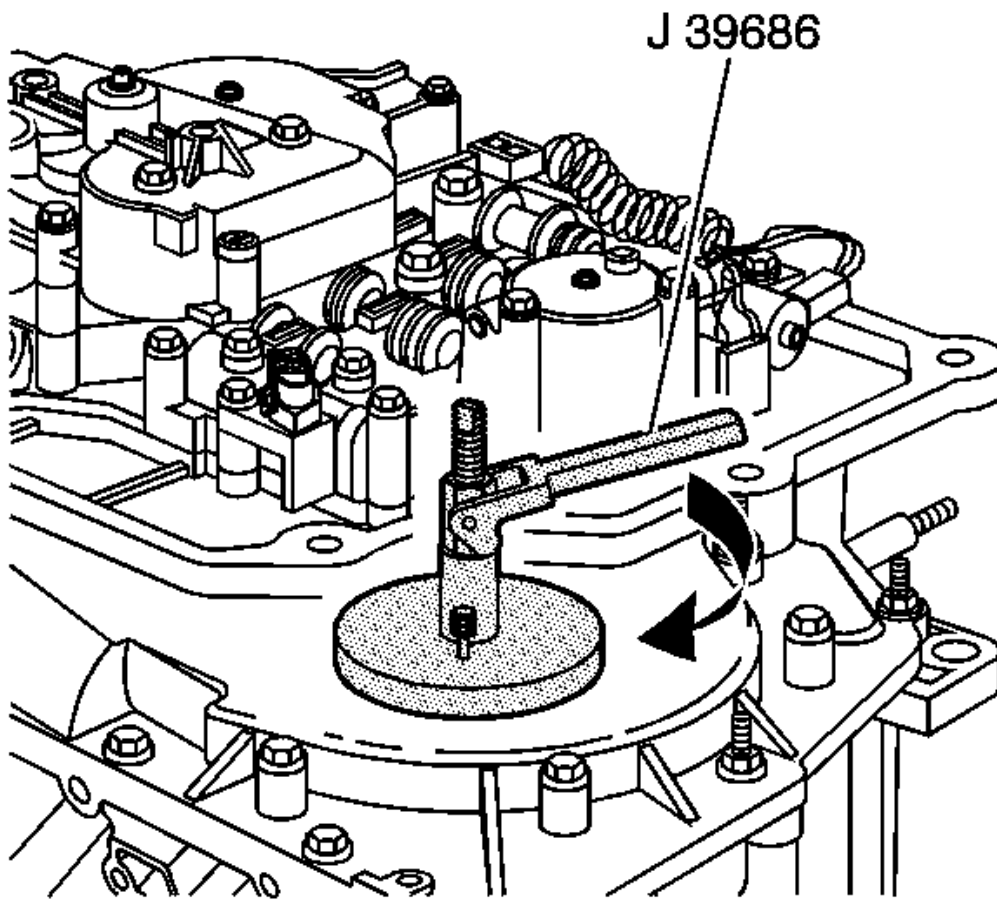


Fig. 188: Identifying J 39686 With Case Barrel
 Courtesy of GENERAL MOTORS COMPANY

1. Install the **J 39686** input end play check tool into the case barrel and install the post.

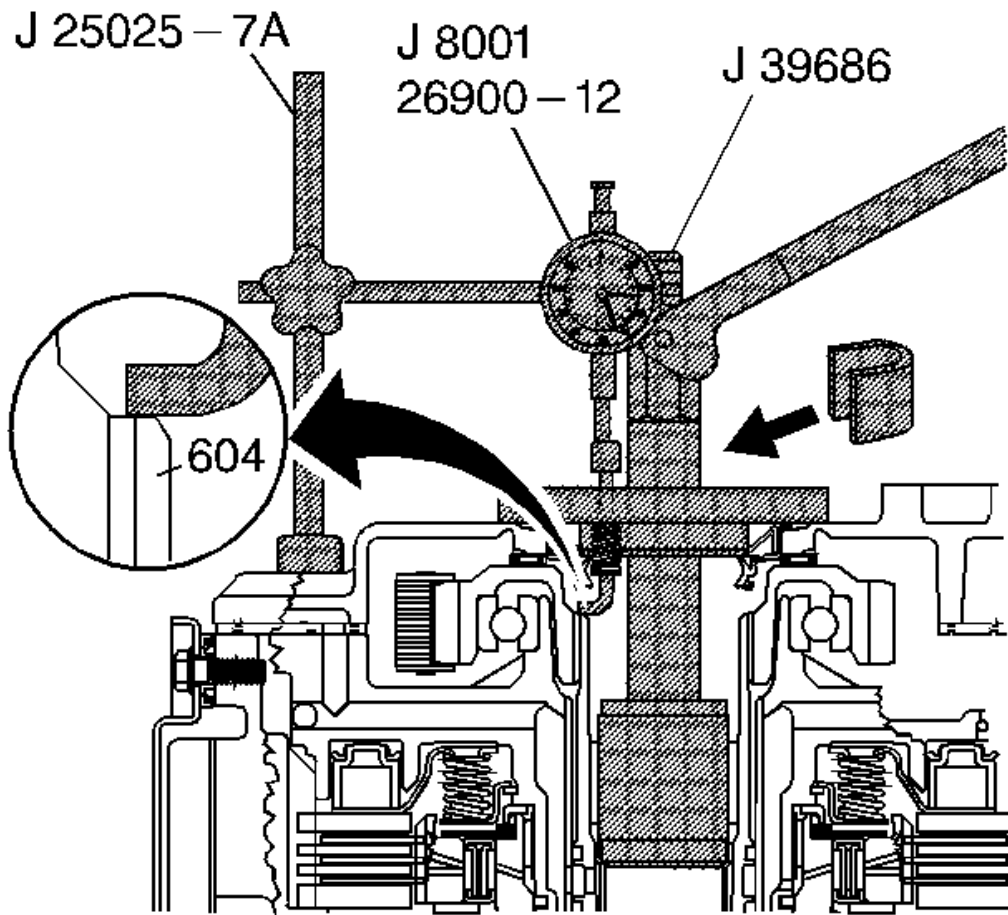


Fig. 189: Locating The J Tab On The Input Shaft
 Courtesy of GENERAL MOTORS COMPANY

2. Locate the J tab on the input shaft (604). The arrow on the tab should have a 90 degree orientation.
3. The washer must rest flat on the case cover seal. Rotate the threaded shaft clockwise until tight. Leave enough space for the collar.
4. Insert the collar. Install the **J 8001** dial indicator set.

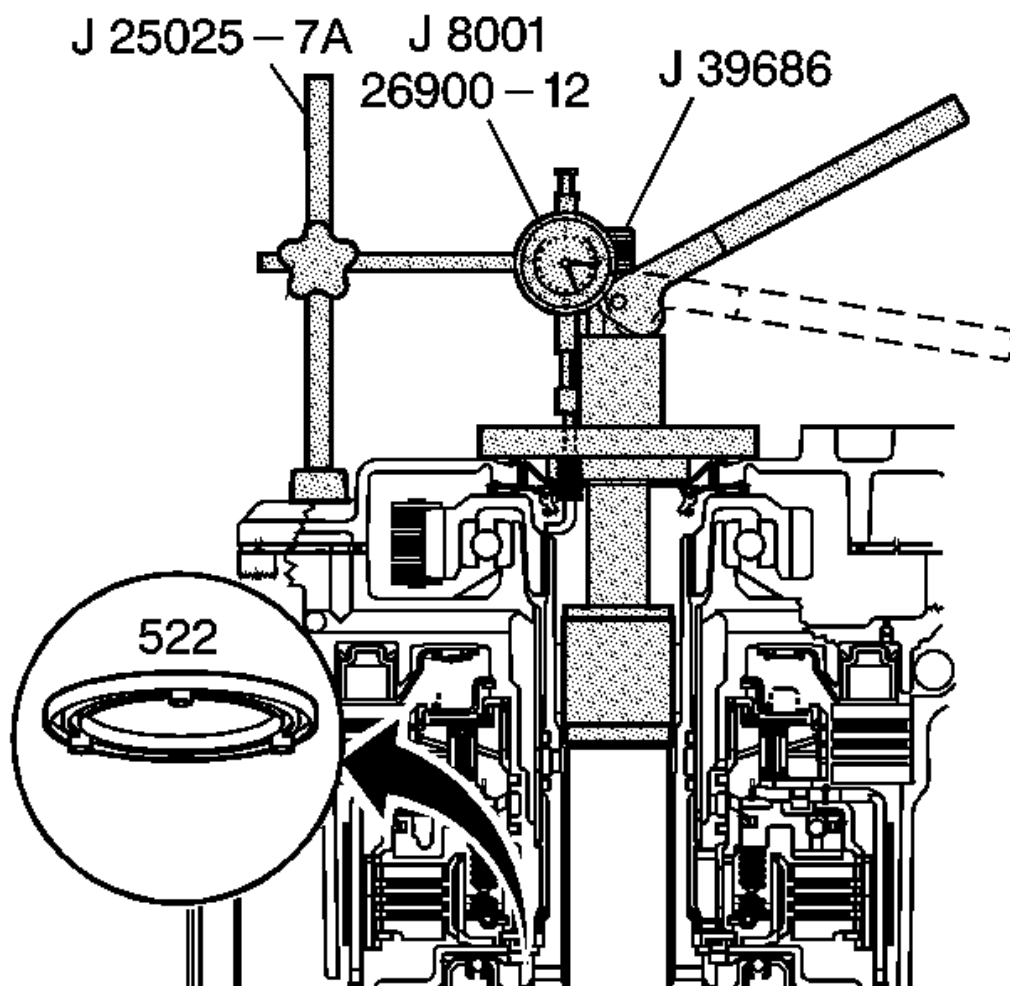


Fig. 190: Checking Input Shaft End Play
Courtesy of GENERAL MOTORS COMPANY

5. Push down on the handle and check the end play. The end play specification is 0.10-0.85 mm (0.004-0.033 in).

If the measurement is out of the specification range, determine the appropriate selective thrust washer (522) for installation upon reassemble.

6. Remove the dial indicator and the post.

CONTROL VALVE UPPER BODY DISASSEMBLE

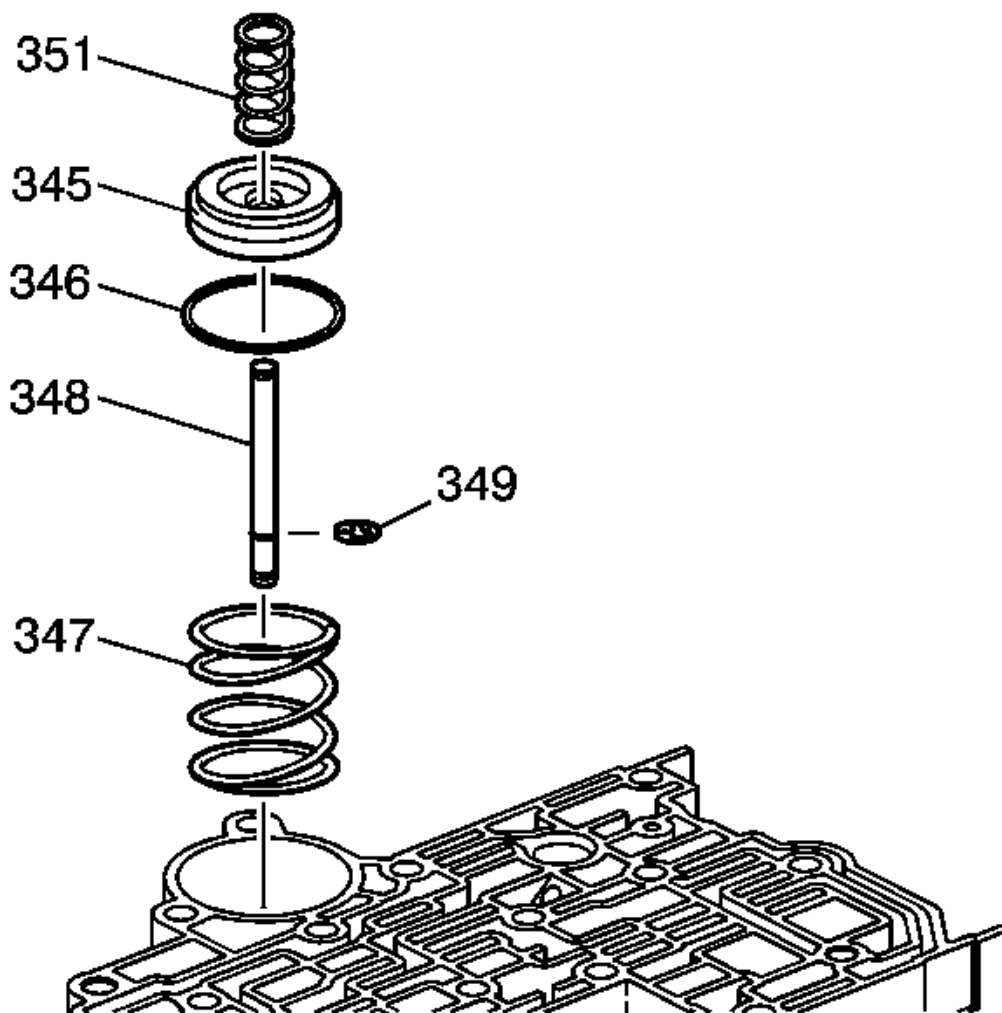


Fig. 191: Identifying 2-3 Accumulator Piston Components
Courtesy of GENERAL MOTORS COMPANY

1. Remove the 2-3 piston cushion spring (351). Inspect the spring for damage.
2. Remove the 2-3 accumulator piston (345) and seal (346). Inspect the seal for roll over or any other type of damage. Inspect the piston for nicks or scratches.
3. Remove the snap ring (349), remove the 2-3 accumulator pin (348), and the 2-3 accumulator piston spring. Inspect the snap ring and the piston pin for damage.

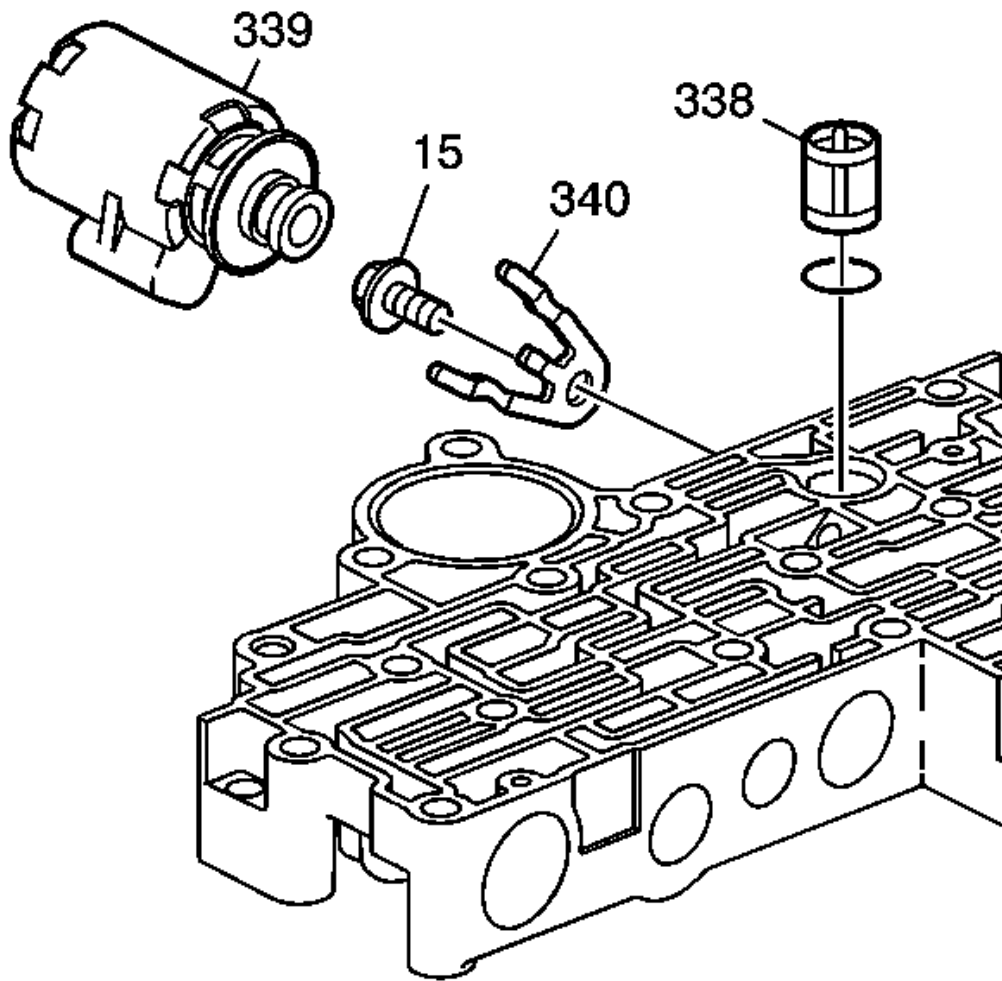


Fig. 192: Locating Pressure Control Solenoid Filter, Valve & Seal
 Courtesy of GENERAL MOTORS COMPANY

4. Remove the pressure control solenoid clamp bolt (15), the pressure control solenoid clamp (340), and the pressure control solenoid valve (339). Inspect the pressure control solenoid seals for damage.
5. Remove the pressure control solenoid filter and seal (338). Inspect the filter seal for damage.

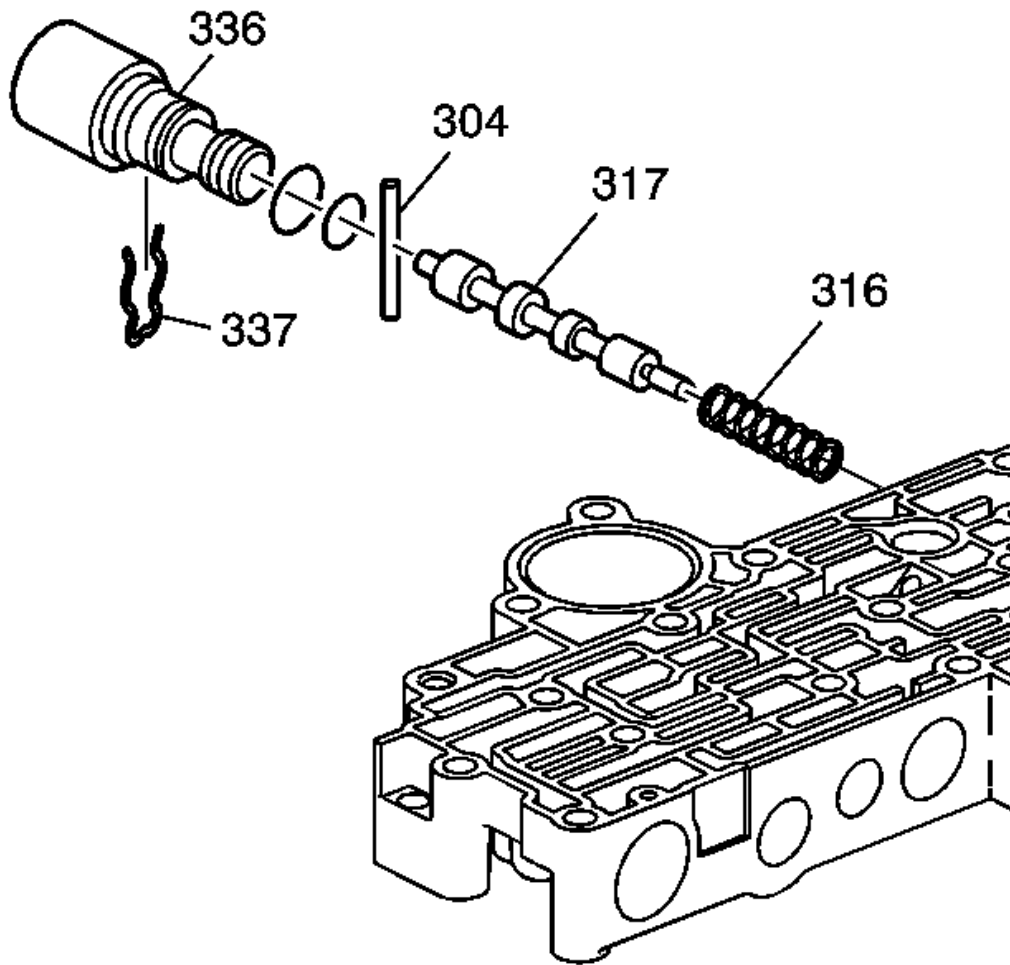


Fig. 193: Torque Converter Clutch Solenoid Valve
Courtesy of GENERAL MOTORS COMPANY

6. Remove the spring retainer clip (337), then remove the torque converter clutch solenoid valve (336). Inspect the seals on the torque converter clutch solenoid valve for damage.
7. Remove the coiled spring pin (304), the converter clutch control valve (317), and the converter clutch control valve spring (316). Inspect the valve and bore for nicks, scratches, or wear.

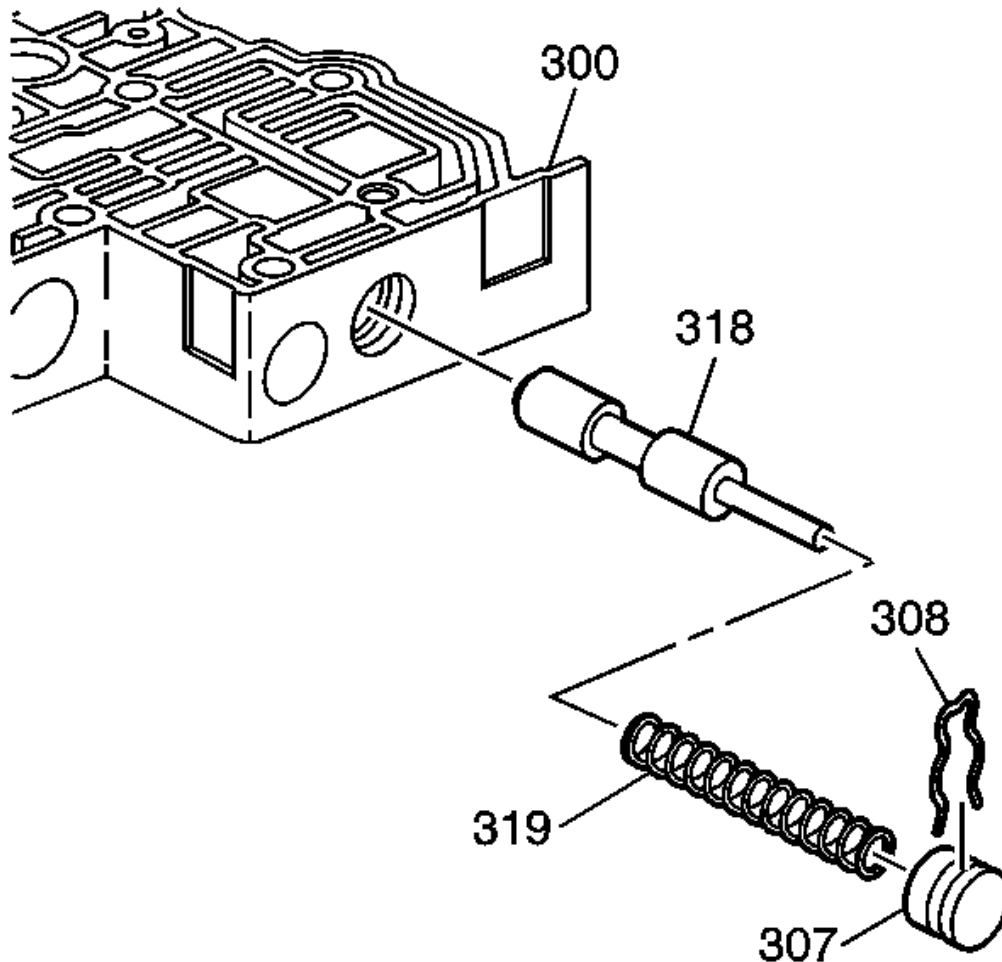


Fig. 194: View Of Converter Regulator Valve
 Courtesy of GENERAL MOTORS COMPANY

8. Remove the retainer clip (308), the bore plug (307), the converter clutch regulator valve spring (319), and the converter regulator valve (318). Inspect the converter regulator valve and bore for nicks, scratches, or wear.

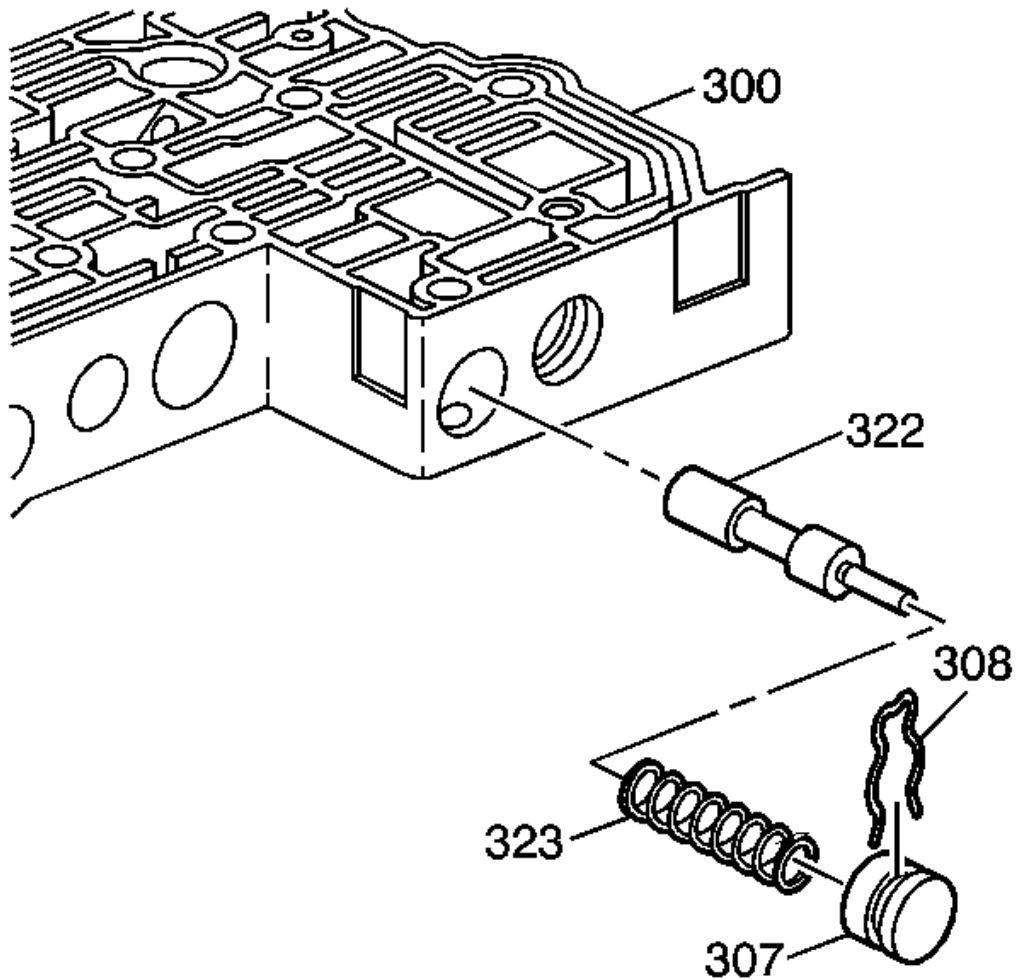


Fig. 195: Locating Torque Converter Clutch Enable Valve
Courtesy of GENERAL MOTORS COMPANY

9. Remove the retainer clip (308), the bore plug (307), the torque converter clutch enable spring (323) and the torque converter clutch enable valve (322). Inspect the torque converter clutch enable valve and bore for nicks, scratches, or wear.

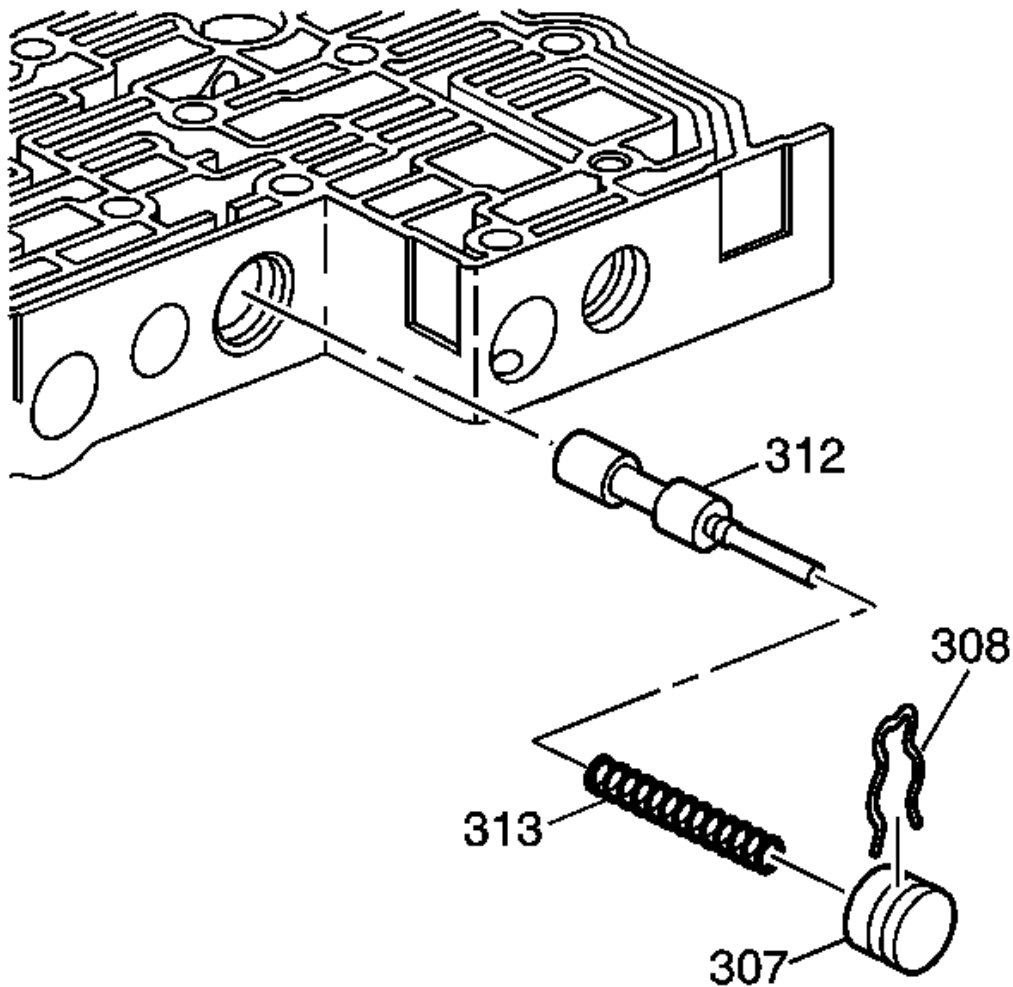


Fig. 196: Identifying Converter Feed Limit Valve
 Courtesy of GENERAL MOTORS COMPANY

10. Remove the retainer clip (308), the bore plug (307), the converter feed limit spring (313), and the converter feed limit valve (312). Inspect the converter feed limit valve and bore for nicks, scratches, or wear.

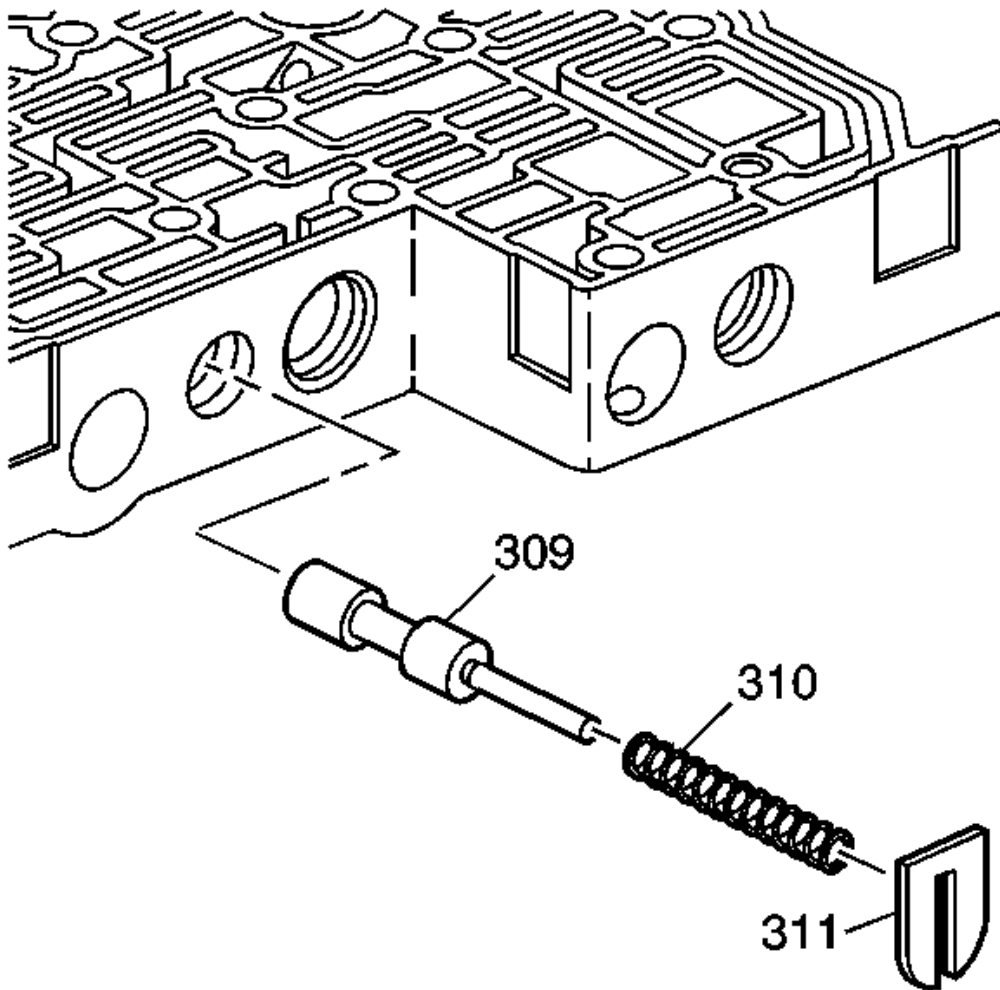


Fig. 197: View Of Actuator Feed Limit Valve
Courtesy of GENERAL MOTORS COMPANY

11. Remove the spring retainer plate (311), the actuator feed limit spring (310), and the actuator feed limit valve (309). Inspect the feed limit valve and bore for nicks, scratches, or wear.

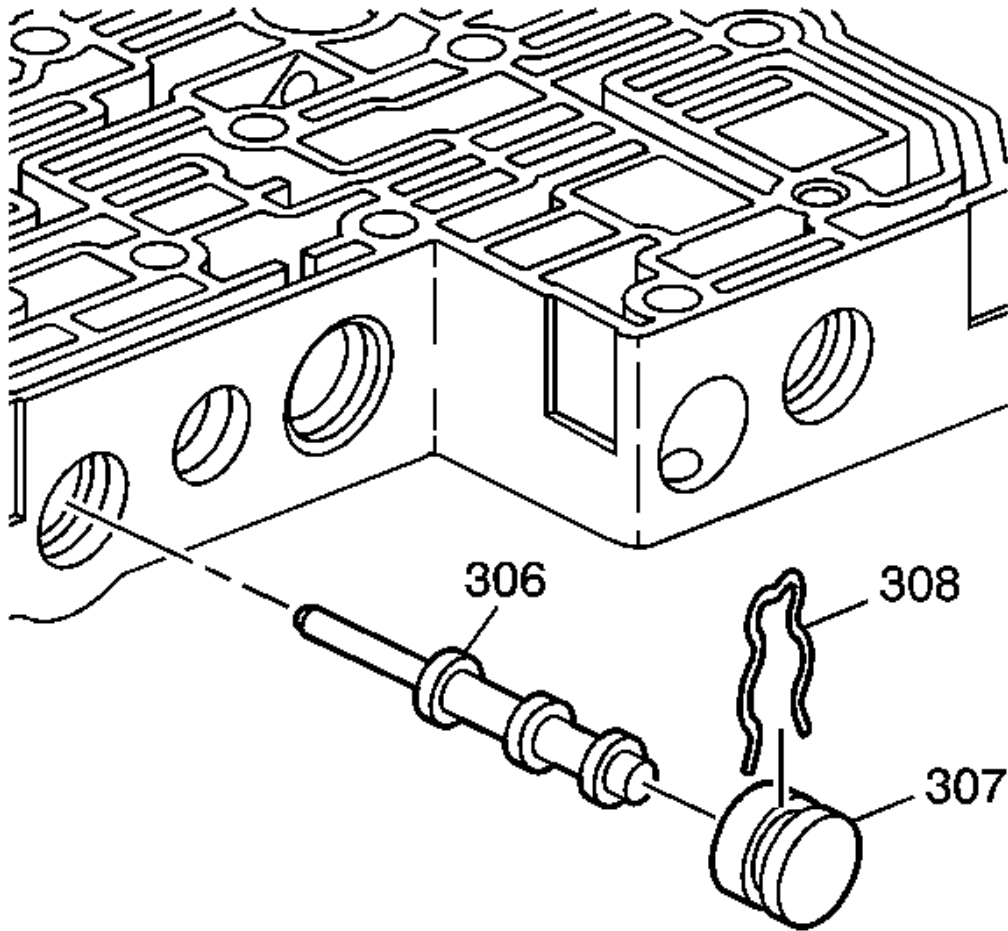


Fig. 198: Locating 2-3 Accumulator Valve
 Courtesy of GENERAL MOTORS COMPANY

12. Remove the retainer clip (308), the bore plug (307), and the 2-3 accumulator valve (306). Inspect the 2-3 accumulator valve and bore for nicks, scratches, or wear.

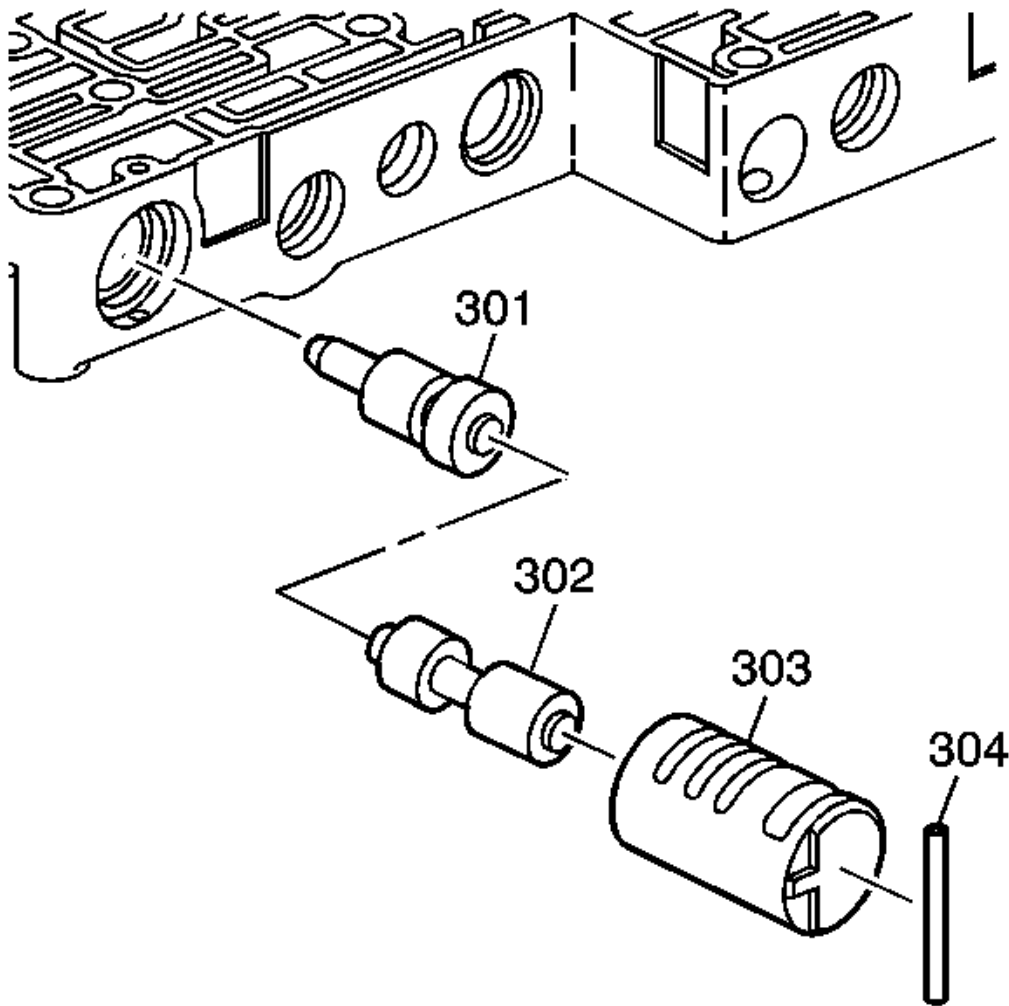


Fig. 199: Identifying 1-2, 3-4 Accumulator Valves
 Courtesy of GENERAL MOTORS COMPANY

13. Remove the coiled spring pin (304), the 1-2, 3-4 accumulator bushing (303), and the accumulator valves (301, 302). Inspect the valves for nicks, scratches, or wear.

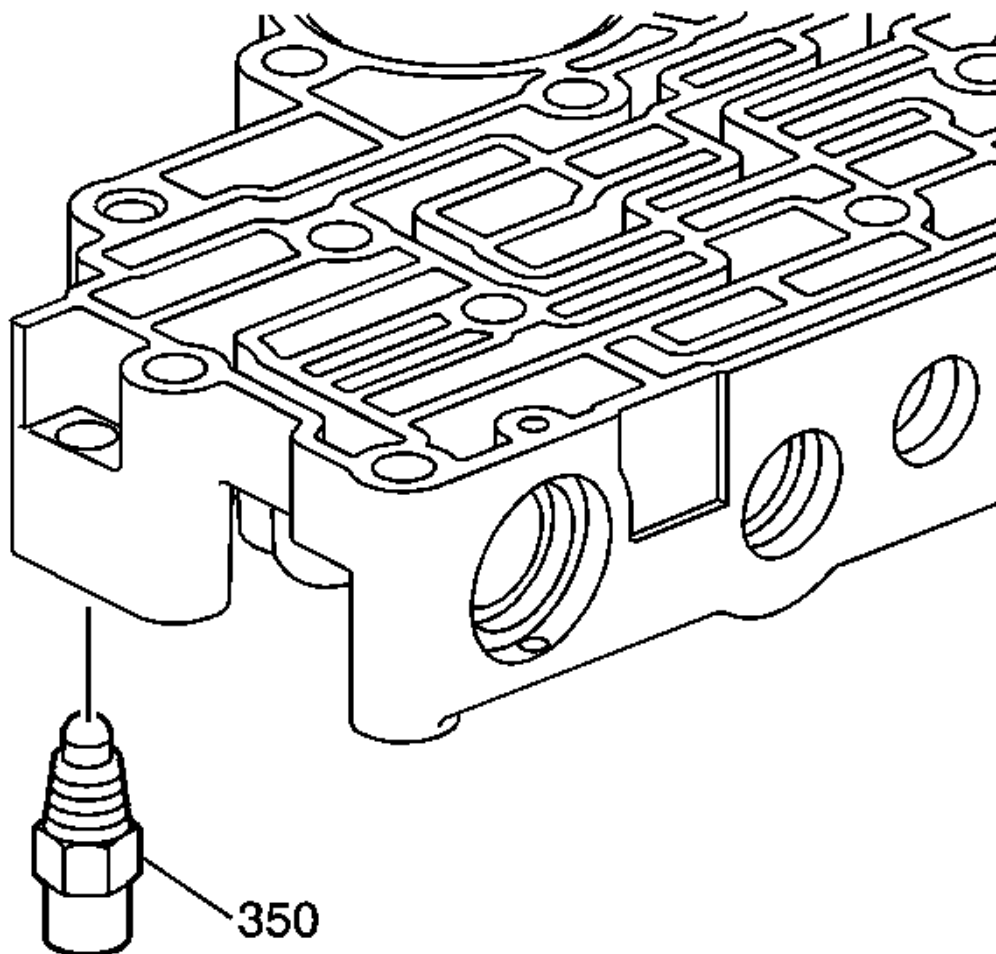


Fig. 200: View Of Automatic Transmission Fluid Temperature Sensor
Courtesy of GENERAL MOTORS COMPANY

14. Remove the automatic transmission fluid temperature sensor (350).

CONTROL VALVE UPPER BODY ASSEMBLE

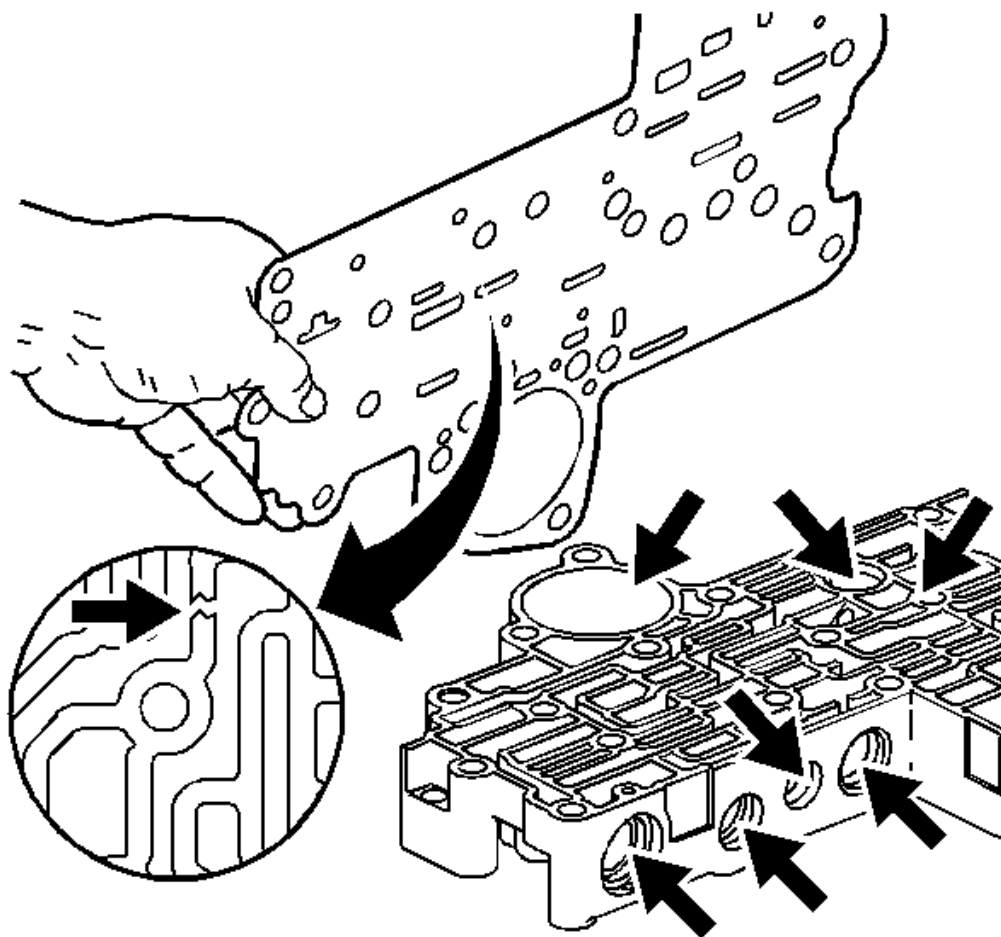


Fig. 201: Identifying Upper Control Valve Body Gasket Damage
Courtesy of GENERAL MOTORS COMPANY

1. Inspect all valve body passages for debris, and then inspect the gasket for damage.

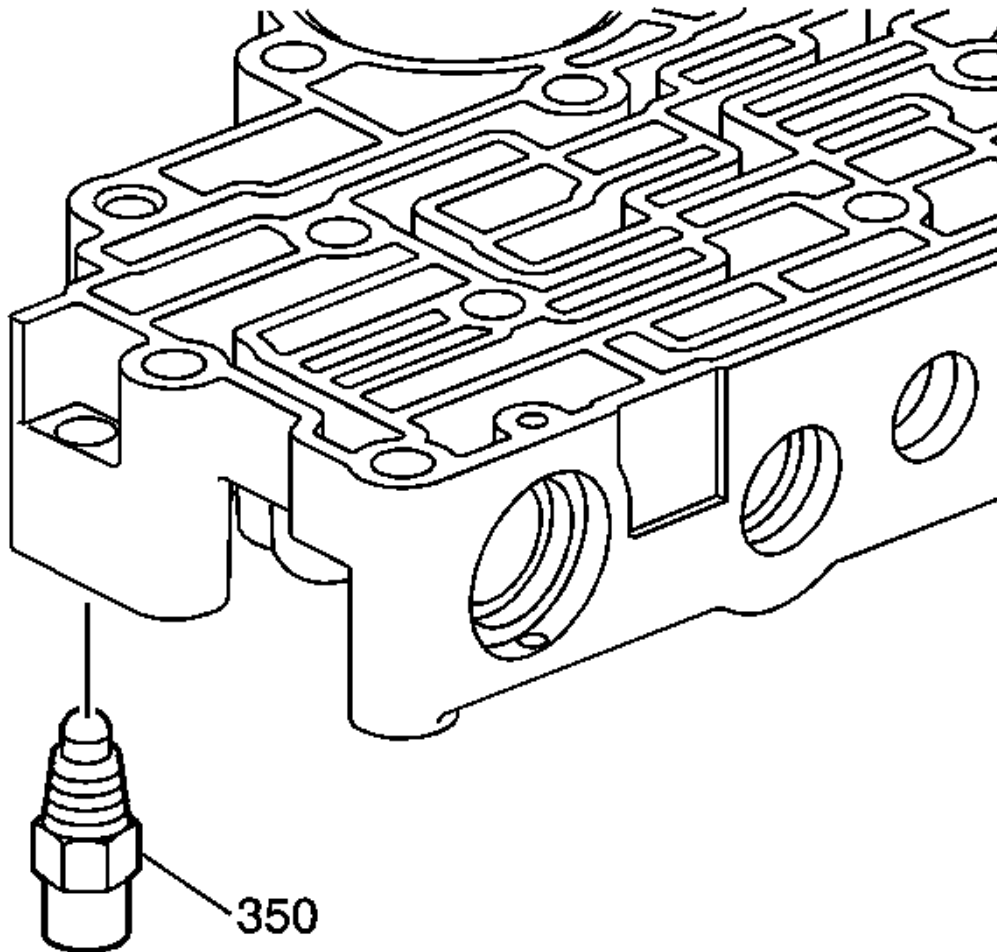


Fig. 202: View Of Automatic Transmission Fluid Temperature Sensor
Courtesy of GENERAL MOTORS COMPANY

CAUTION: Refer to Fastener Caution .

2. Install the automatic transmission fluid temperature sensor (350) and tighten to 3.4 N.m (30 lb in).

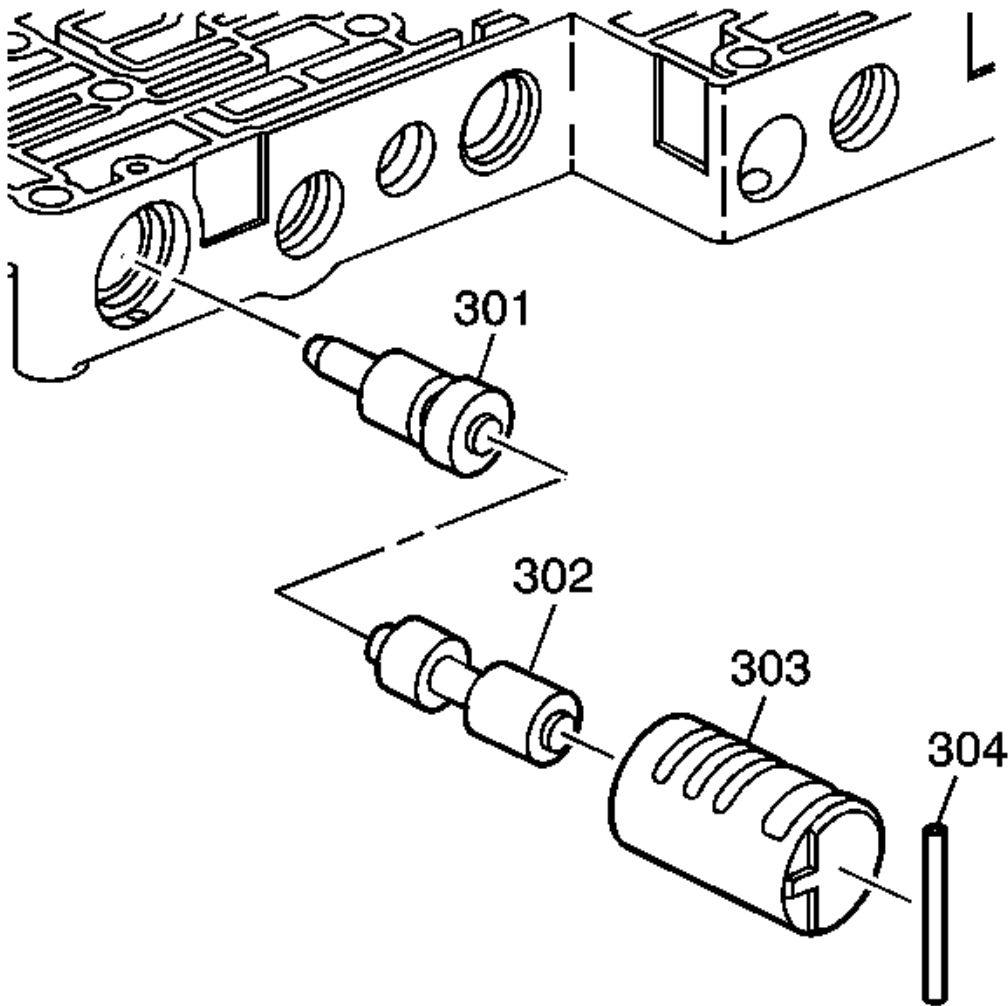


Fig. 203: Identifying 1-2, 3-4 Accumulator Valves
 Courtesy of GENERAL MOTORS COMPANY

3. Install the following parts:
 - The 1-2, 3-4 accumulator valves (301, 302)
 - The bushing (303)
 - The coiled spring pin (304)

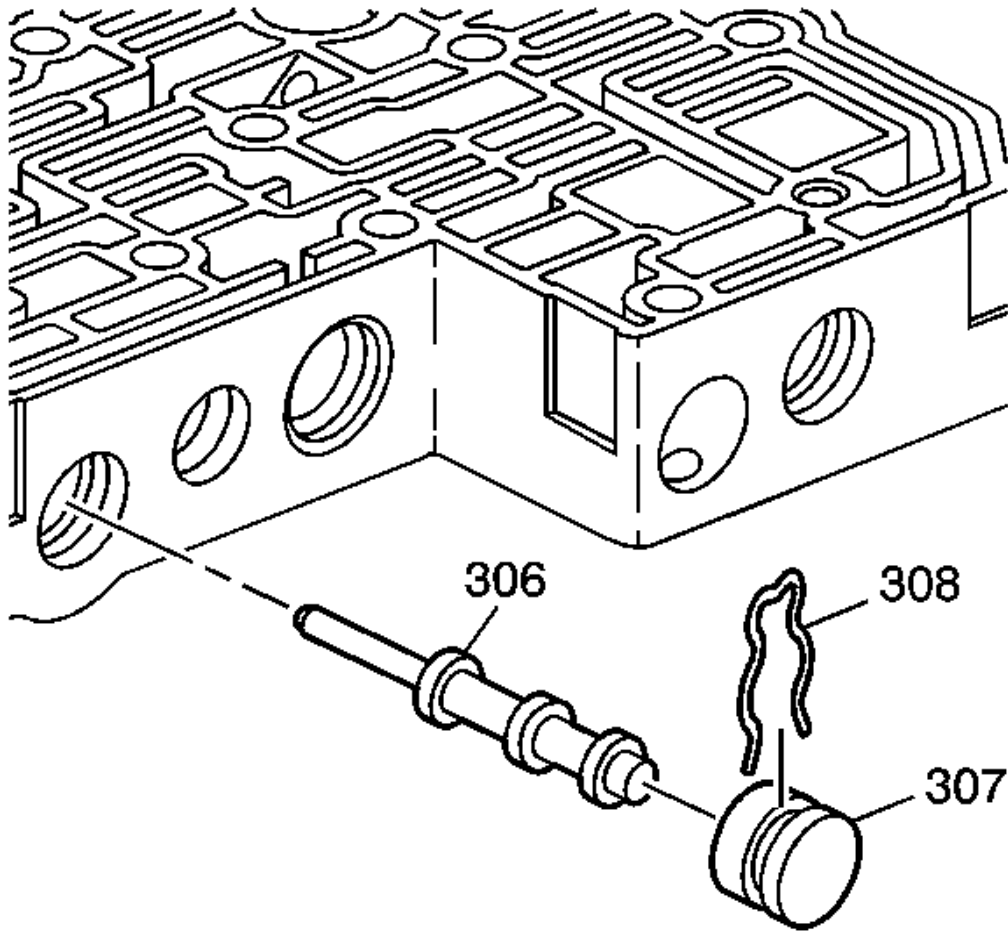


Fig. 204: Locating 2-3 Accumulator Valve
 Courtesy of GENERAL MOTORS COMPANY

4. Install the following parts:
 - The 2-3 accumulator valve (306)
 - The bore plug (307)
 - The retainer clip (308)

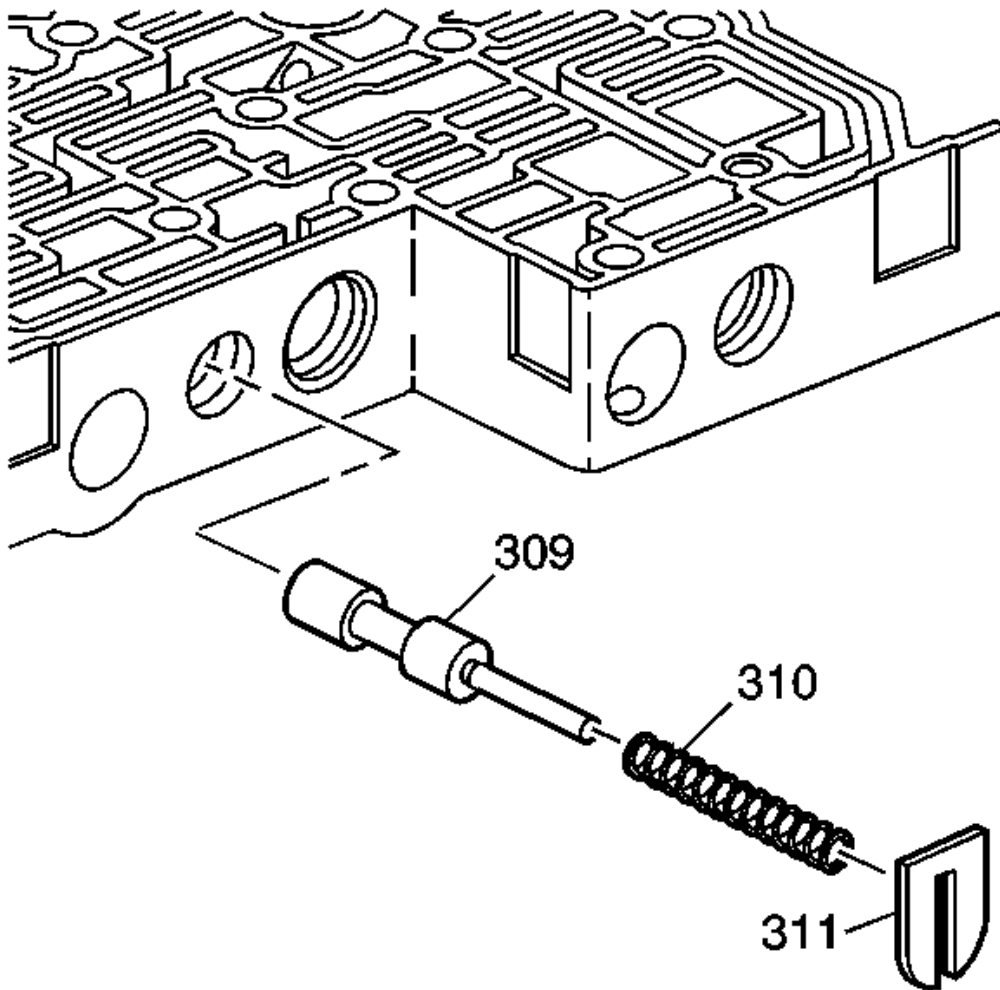


Fig. 205: View Of Actuator Feed Limit Valve
Courtesy of GENERAL MOTORS COMPANY

5. Install the following parts:
 - The actuator feed limit valve (309)
 - The actuator feed limit valve spring (310)
 - The spring retaining plate (311)

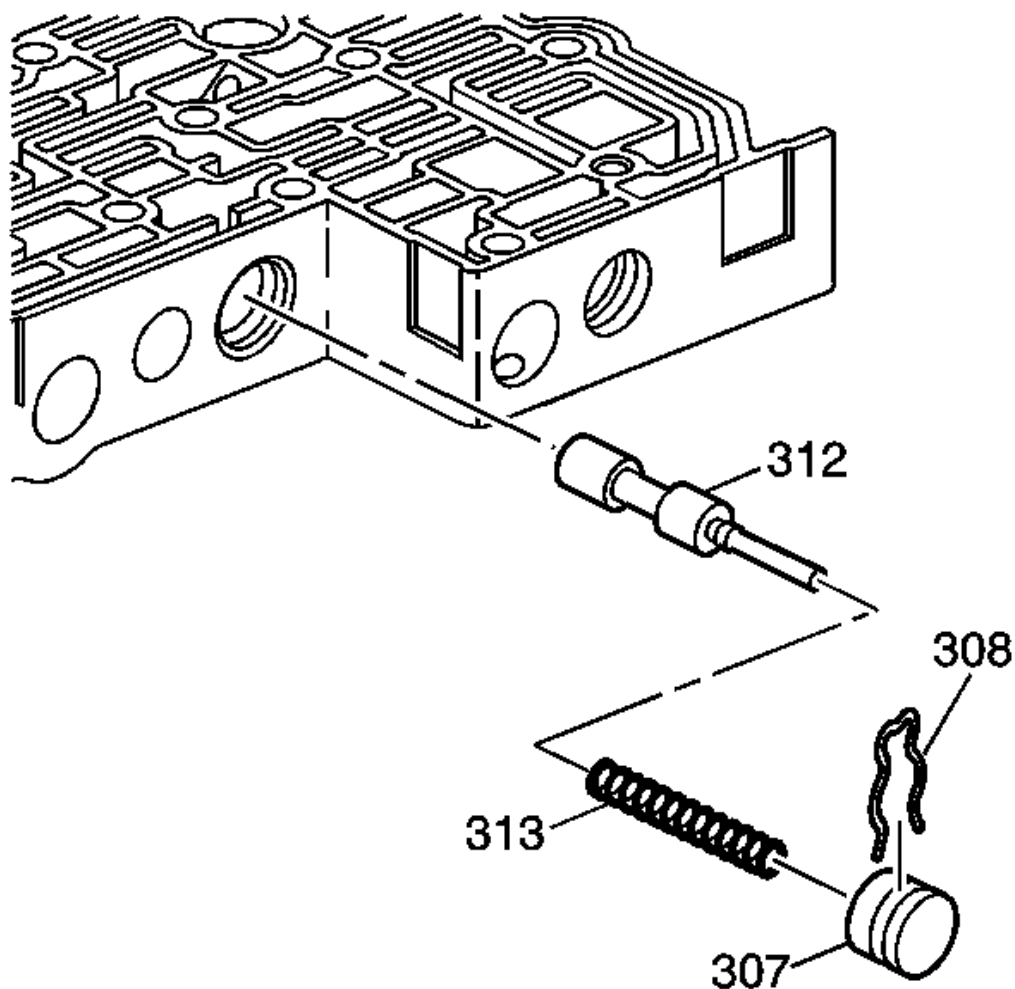


Fig. 206: Identifying Converter Feed Limit Valve
Courtesy of GENERAL MOTORS COMPANY

6. Install the following parts:

- The converter feed limit valve (312)
- The converter feed limit valve spring (313)
- The bore plug (307)
- The retaining clip (308)

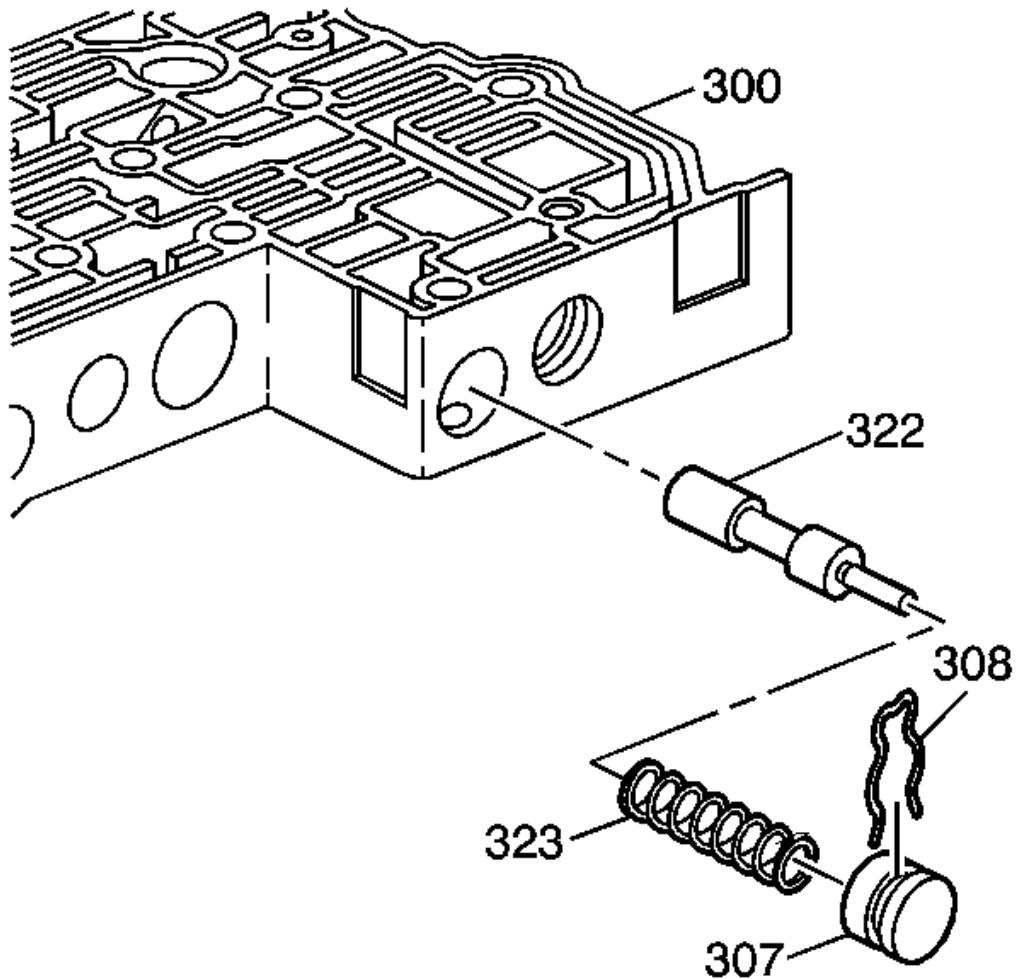


Fig. 207: Locating Torque Converter Clutch Enable Valve
Courtesy of GENERAL MOTORS COMPANY

7. Install the following parts:

- The torque converter clutch enable valve (322)
- The torque converter clutch enable valve spring (323)
- The bore plug (307)
- The retainer clip (308)

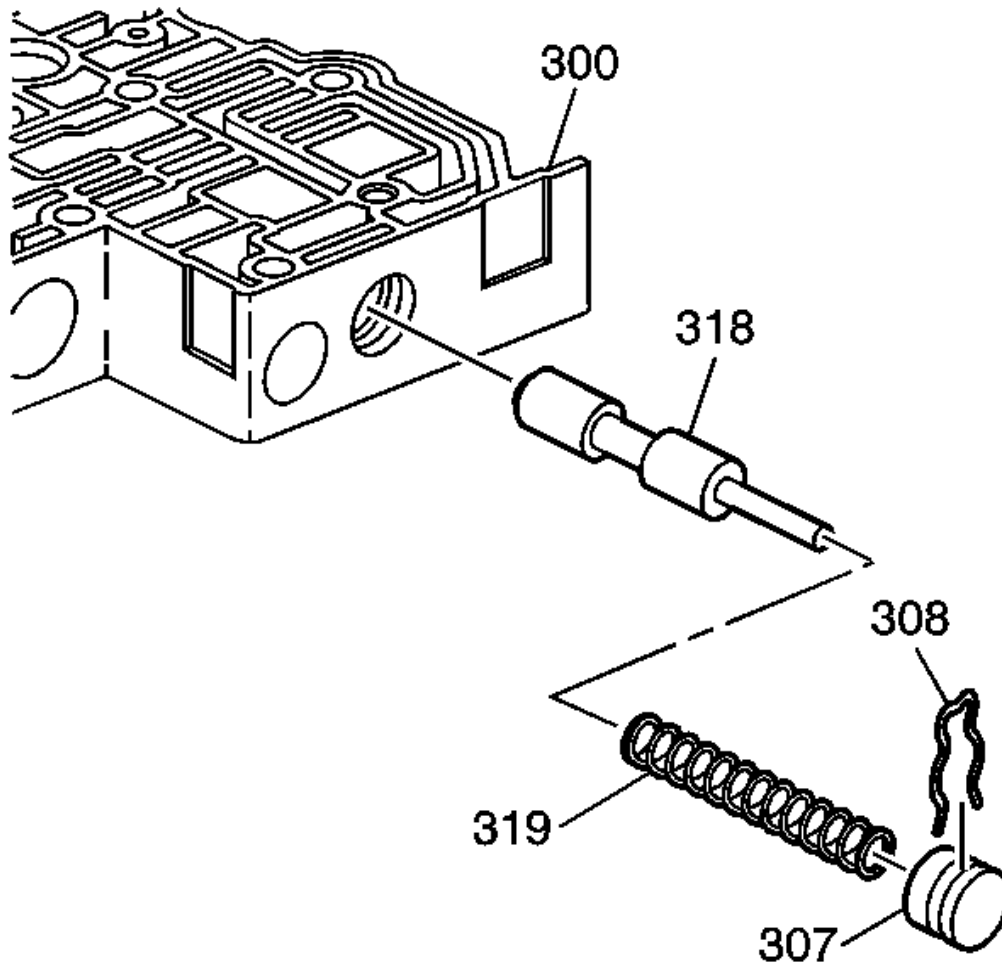


Fig. 208: View Of Converter Regulator Valve
 Courtesy of GENERAL MOTORS COMPANY

8. Install the following parts:
 - The converter regulator valve (318)
 - The converter regulator valve spring (319)
 - The bore plug (307)
 - The retainer clip (308)

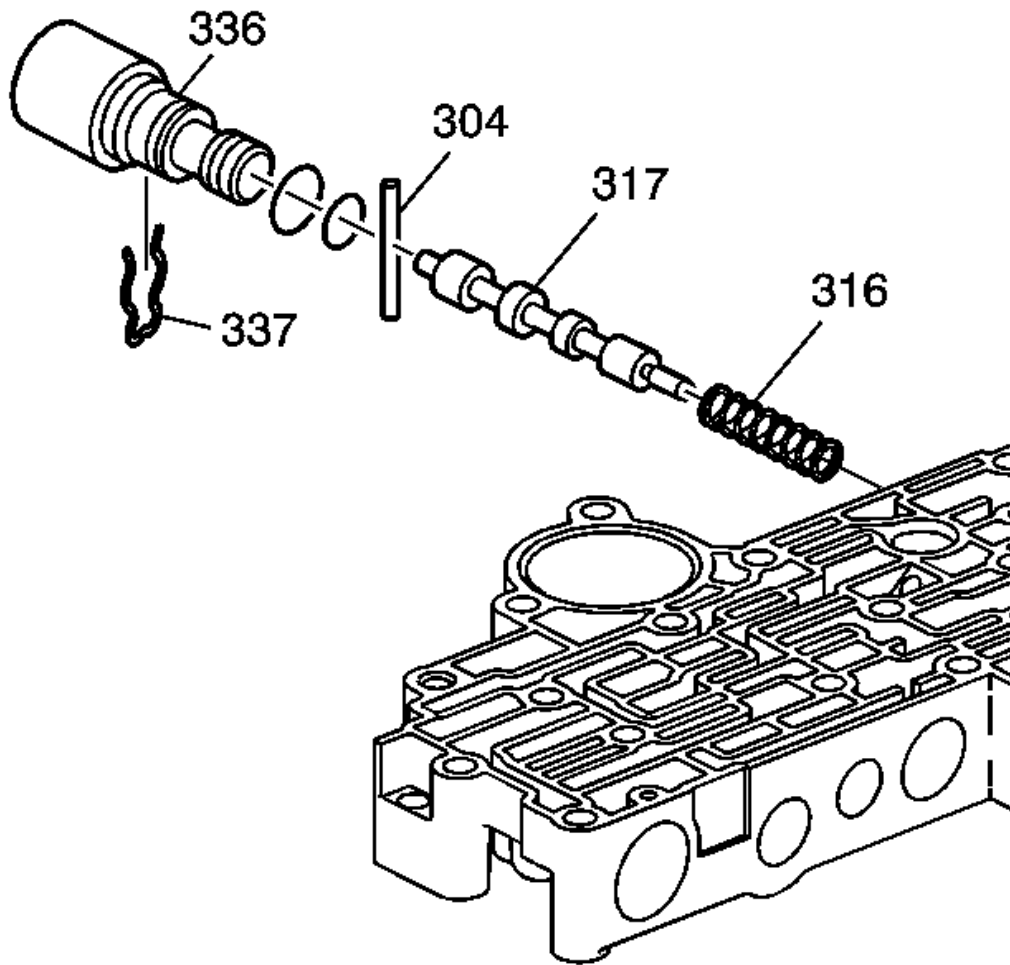


Fig. 209: Torque Converter Clutch Solenoid Valve
 Courtesy of GENERAL MOTORS COMPANY

9. Install the following parts:

- The converter clutch control spring (316)
- The converter clutch control valve (317)
- The coiled spring pin (304)
- The torque converter clutch solenoid valve (336)
- The spring retainer clip from the torque converter clutch solenoid valve (337)

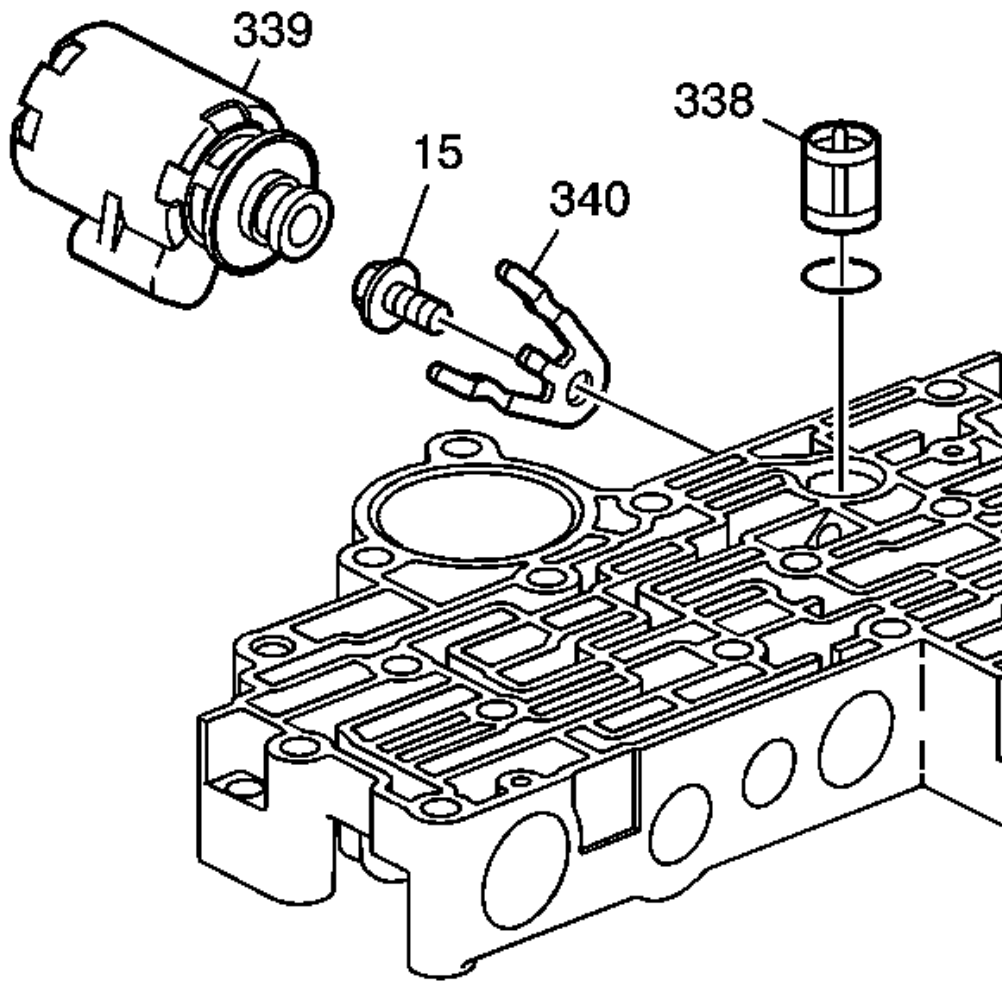


Fig. 210: Locating Pressure Control Solenoid Filter, Valve & Seal
Courtesy of GENERAL MOTORS COMPANY

10. Install the following parts:
 - The pressure control solenoid filter and seal (338)
 - The pressure control solenoid valve (339)
 - The pressure control solenoid clamp (340)
11. Install the clamp bolt (15) and tighten to 11-13 N.m (8.0-9.5 lb ft).

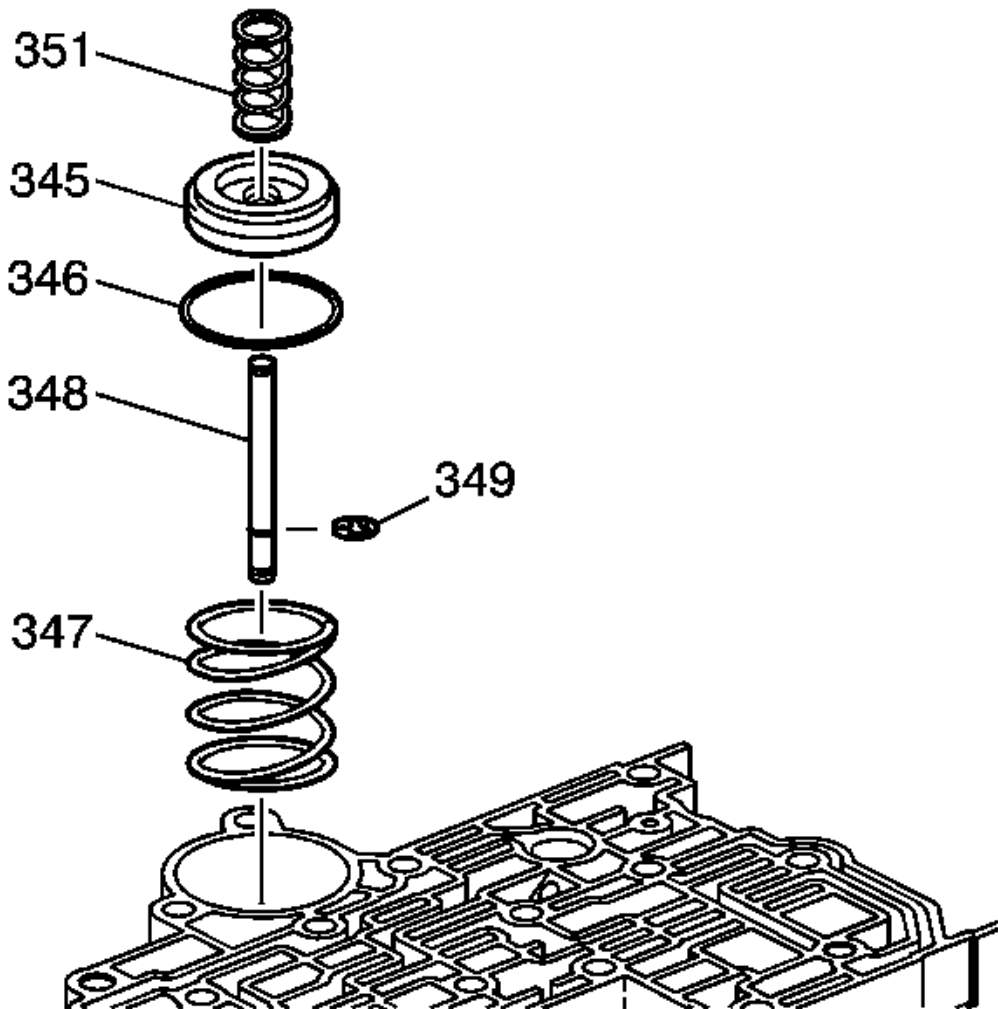


Fig. 211: Identifying 2-3 Accumulator Piston Components
 Courtesy of GENERAL MOTORS COMPANY

12. Install the following parts:

- The 2-3 accumulator pin (348)
- The snap ring (349)
- The 2-3 accumulator piston spring (347)
- The accumulator piston and seal (345, 346)
- The 2-3 piston cushion spring (351)

AUXILIARY CONTROL VALVE BODY ASSEMBLY INSTALLATION

Special Tools

J 39068 Pump Assembly Guide Pins

For equivalent regional tools, refer to Special Tools .

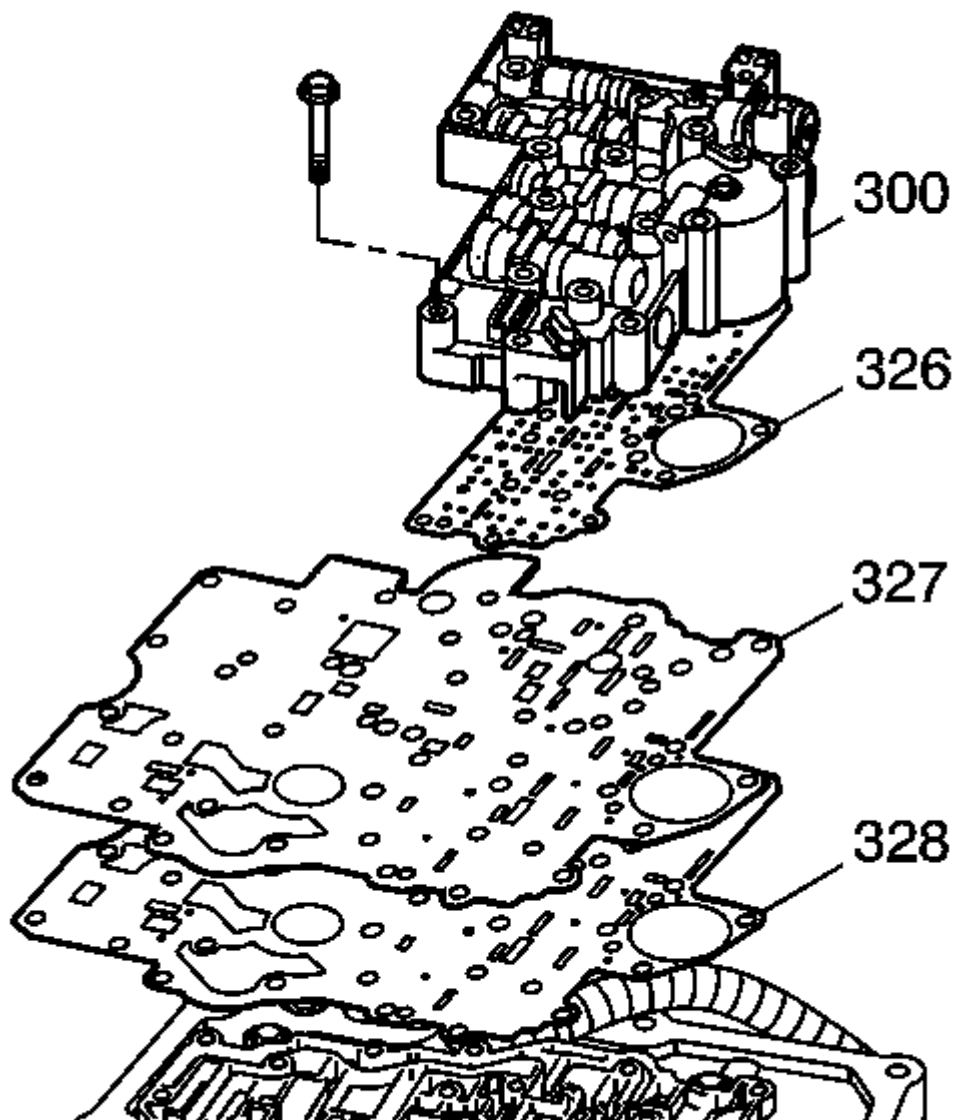


Fig. 212: View Of Upper Control Valve Assembly Components
Courtesy of GENERAL MOTORS COMPANY

1. Install the **J 39068** guide pins for the upper valve body. Install the following parts:

- The spacer plate to case cover gasket (328)
- The case cover spacer plate (327)
- The valve body to spacer plate gasket (326)
- The upper control valve body (300)

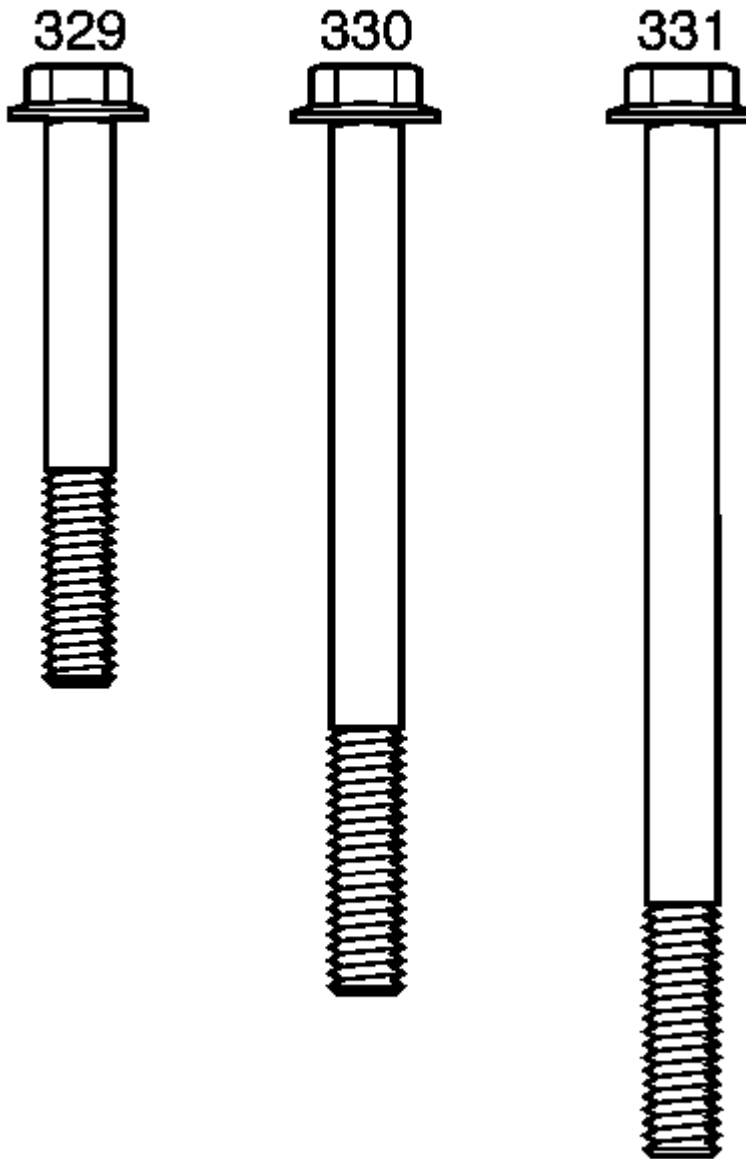
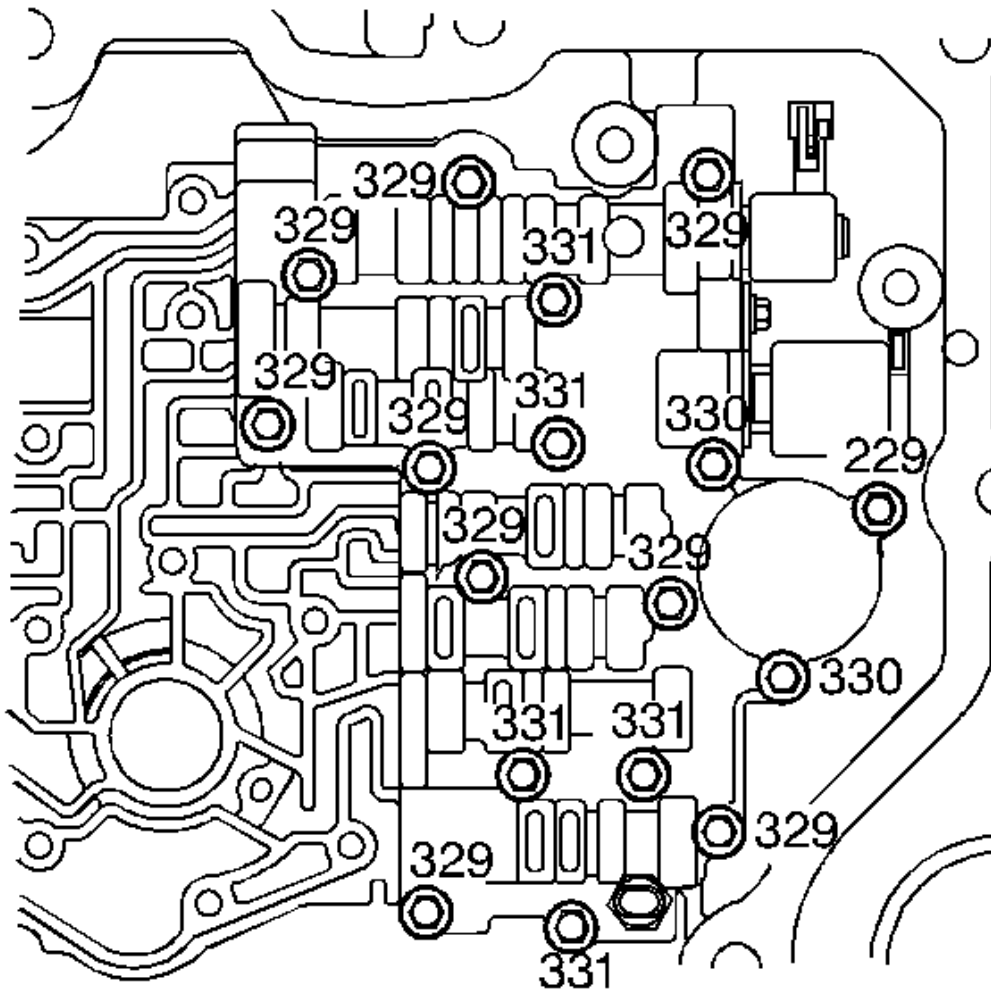


Fig. 213: Identifying Upper Control Valve Body Bolts

Courtesy of GENERAL MOTORS COMPANY

2. Apply pipe thread sealant, GM P/N 12346004 to upper control valve body bolt threads.
3. Install the upper control valve body bolts (229, 329, 330, 331) and hand tighten.

**Fig. 214: Locating Upper Control Valve Body Bolts**

Courtesy of GENERAL MOTORS COMPANY

CAUTION: Refer to Fastener Caution .

4. Remove the guide pins, install the remaining bolt and tighten to 11-13 N.m (8.0-9.5 lb ft).

PUMP DISASSEMBLE

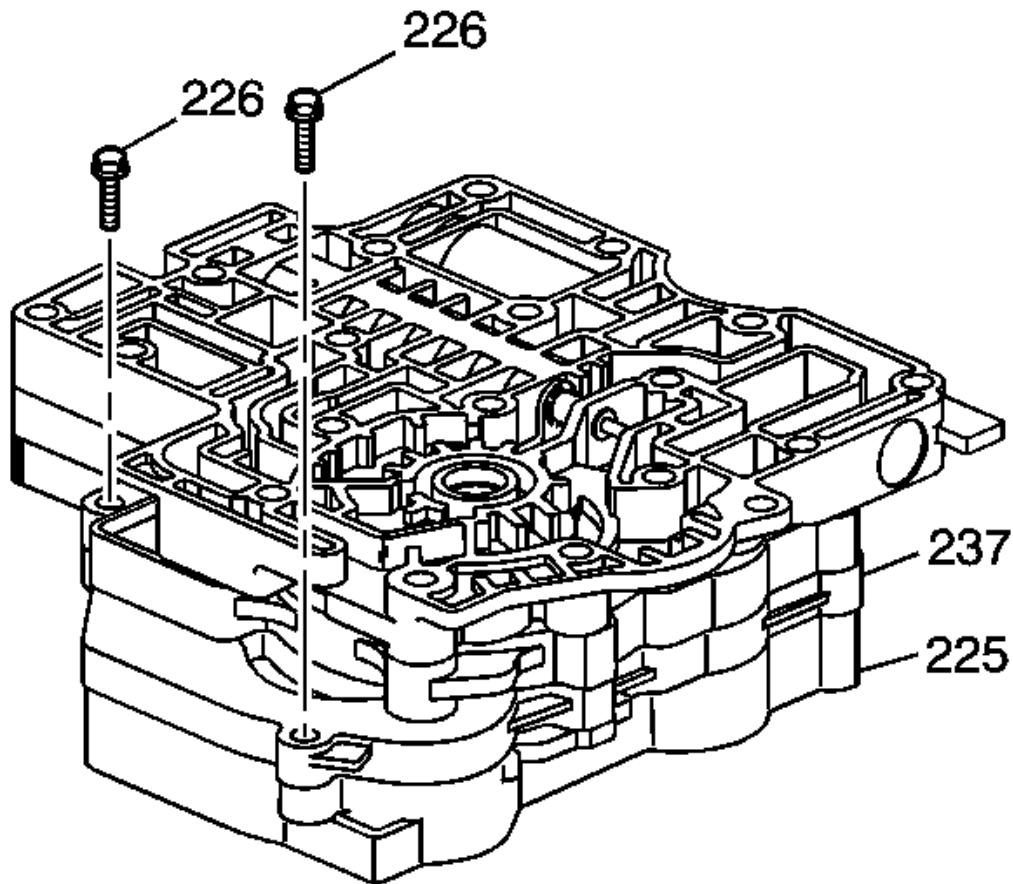


Fig. 215: Locating Scavenge Pump Cover Retaining Bolts
Courtesy of GENERAL MOTORS COMPANY

1. Remove the two 10-mm bolts (226) from under the scavenge pump cover (237) and scavenge pump body (225).

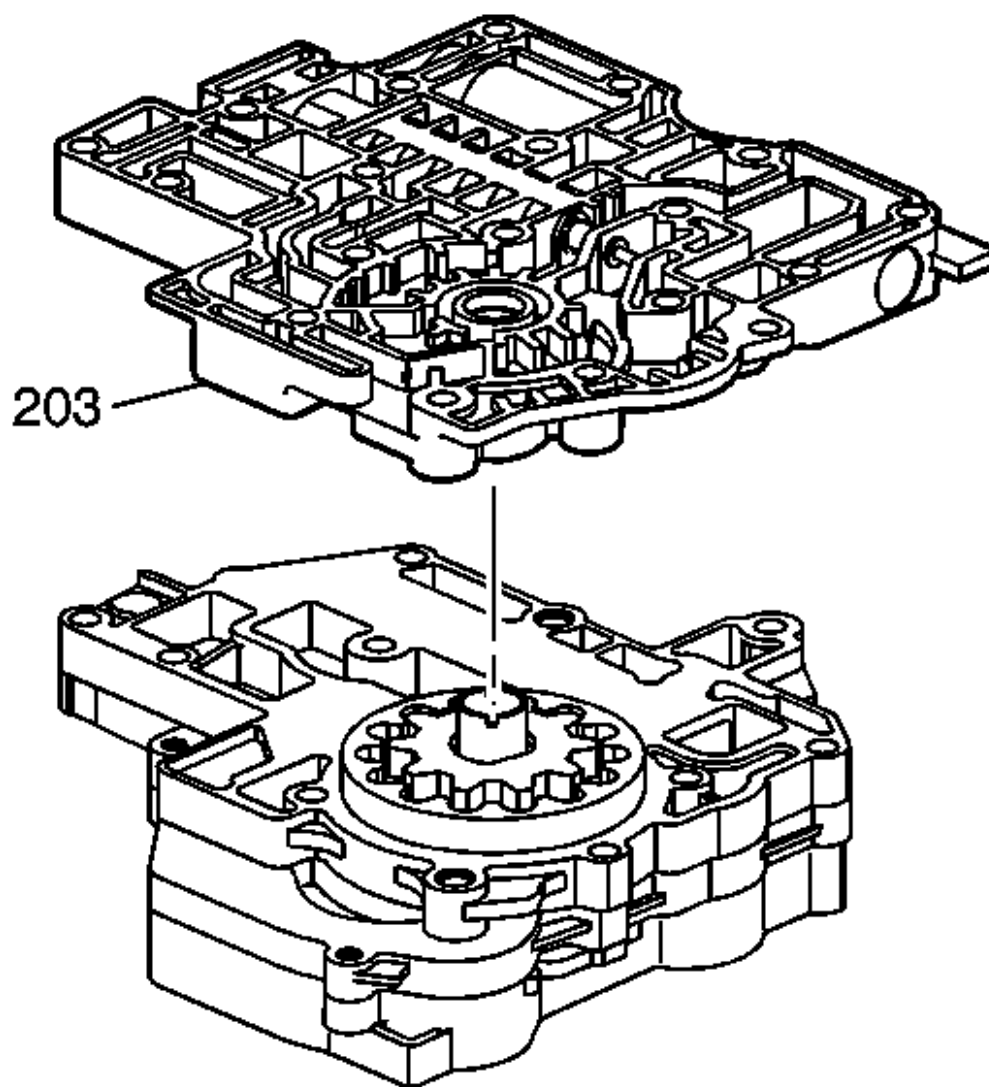


Fig. 216: Secondary Pump Body

Courtesy of GENERAL MOTORS COMPANY

2. Remove the secondary pump body (203) from the pump assembly. This is a snug fit due to the use of two dowel pins.

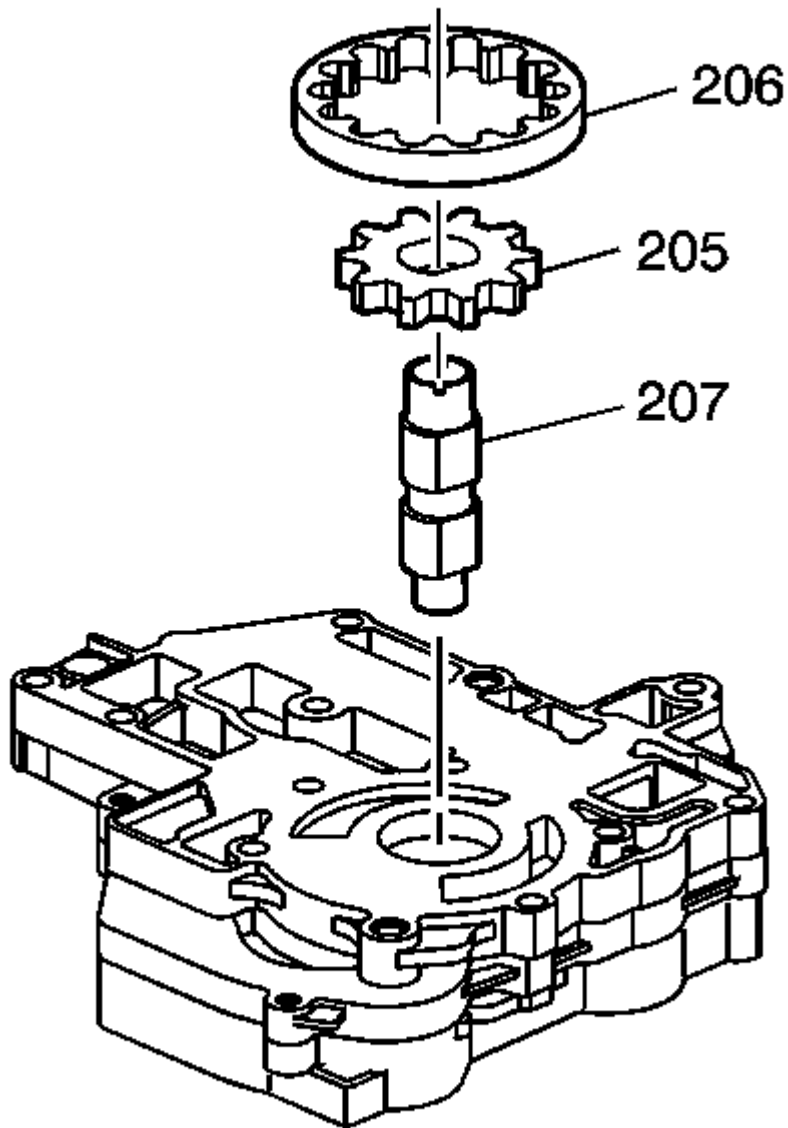


Fig. 217: View Of Oil Pump Drive Shaft & Secondary Pump Gears
 Courtesy of GENERAL MOTORS COMPANY

3. Remove the oil pump drive shaft (207), and the secondary pump gears (205, 206).

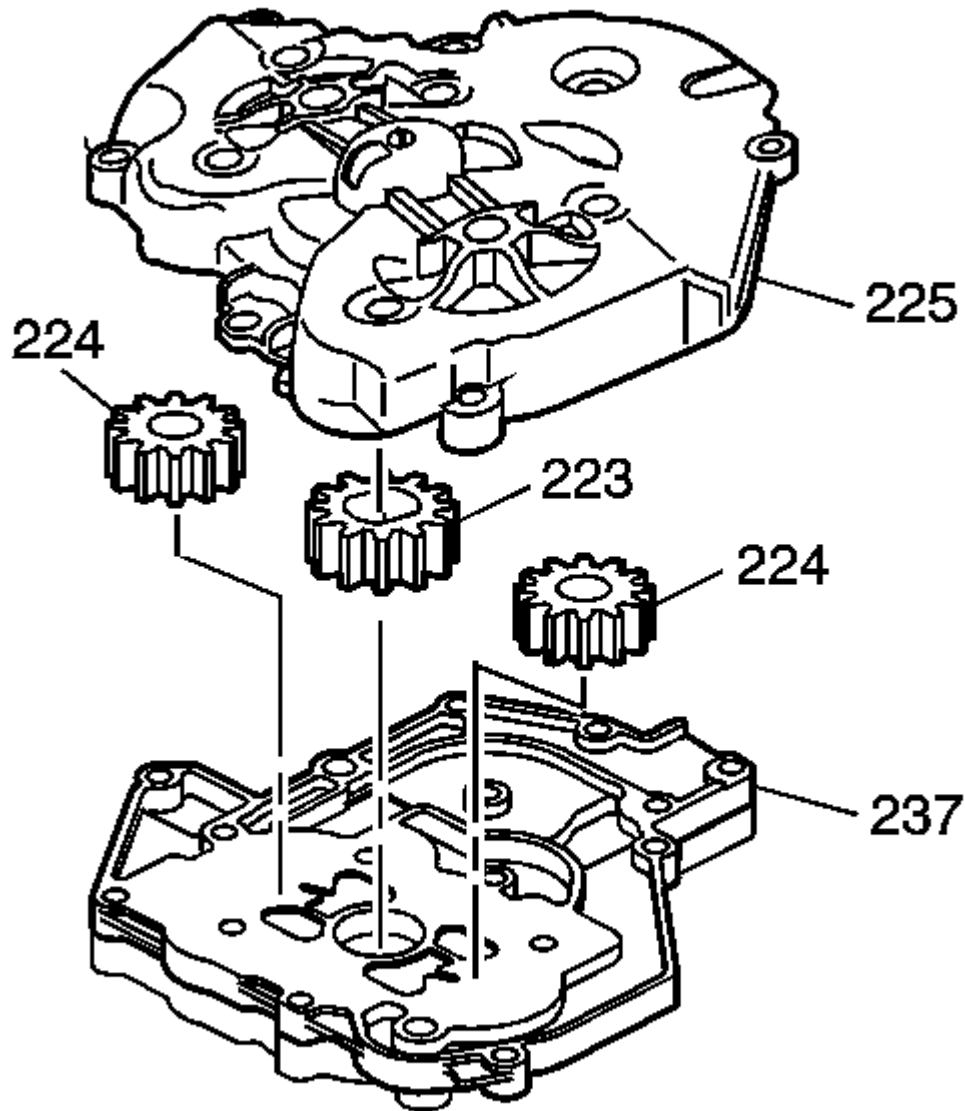


Fig. 218: Identifying Scavenge Pump Gears
Courtesy of GENERAL MOTORS COMPANY

4. Remove the scavenge pump body (225) from the scavenge pump cover (237).
5. Remove the scavenge pump gears (223, 224).

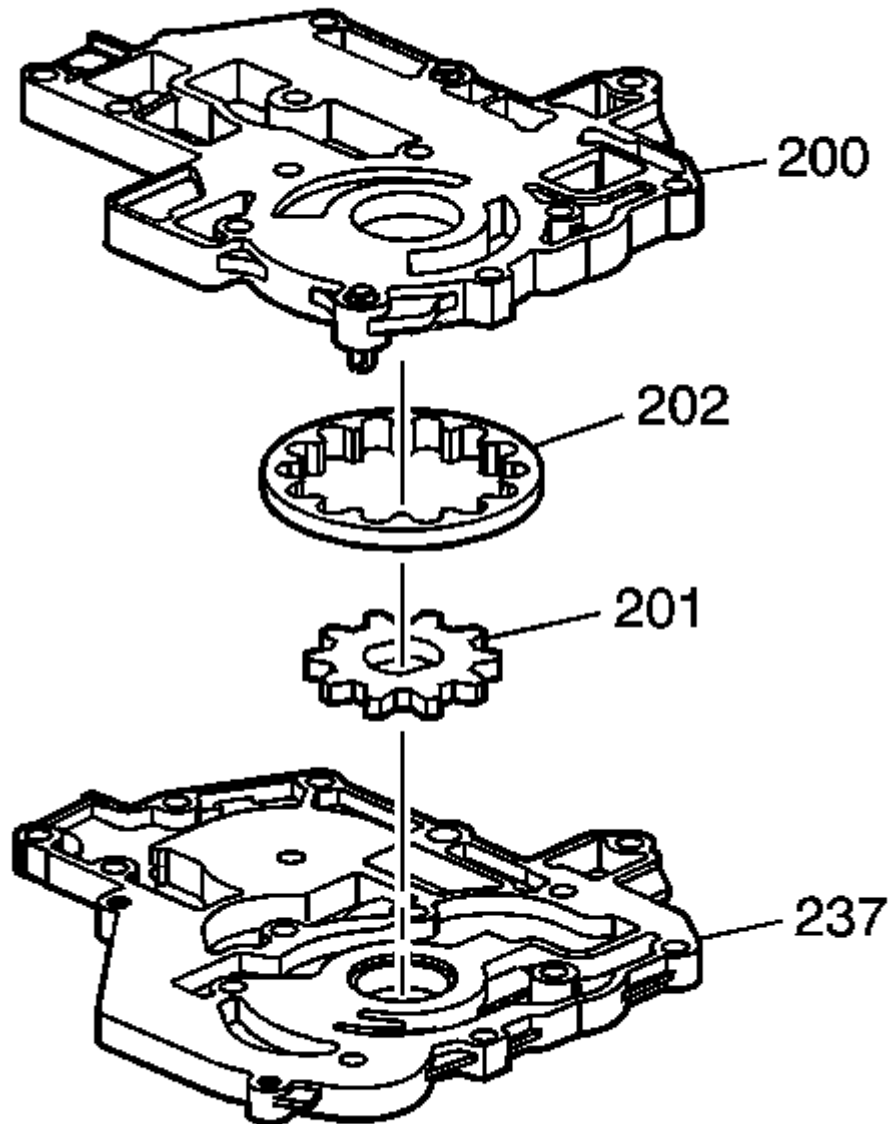


Fig. 219: Primary Pump Gears

Courtesy of GENERAL MOTORS COMPANY

6. Remove the primary pump body (200) from the scavenge pump cover (237).
7. Remove the primary pump gears (201, 202).

SECONDARY PUMP DISASSEMBLE

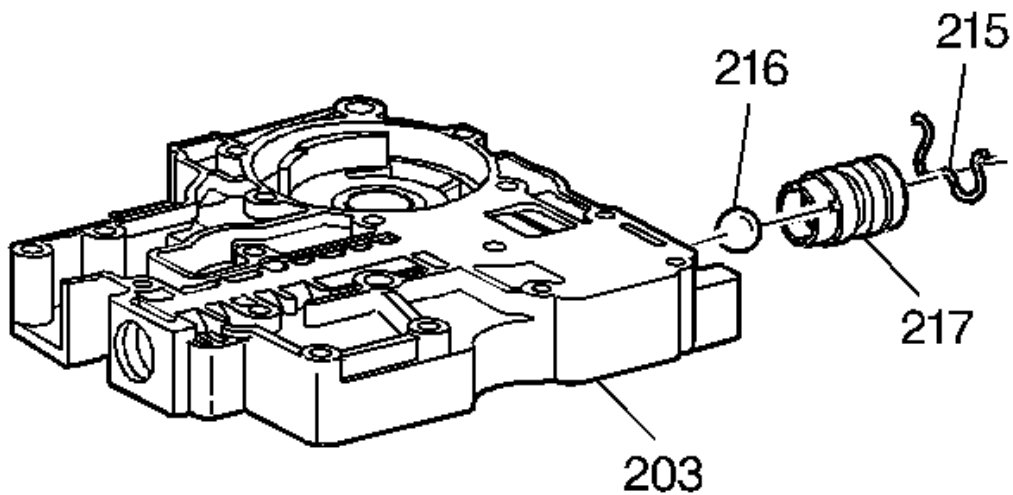


Fig. 220: Locating Pump Secondary Ball Seat
Courtesy of GENERAL MOTORS COMPANY

1. Remove the following parts:
 - The retainer clip (215)
 - The pump ball seat (217)
 - The cut off ball (216)

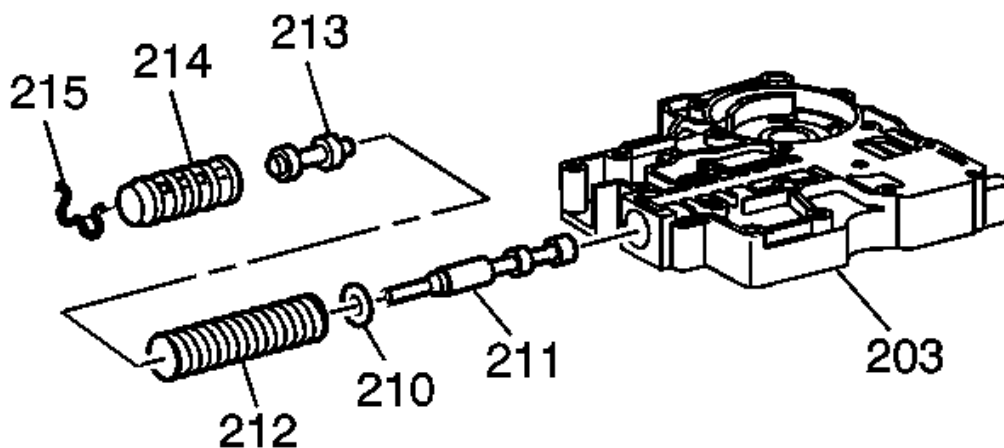


Fig. 221: Identifying Pressure Regulator Boost Valve & Pressure Regulator Valve
Courtesy of GENERAL MOTORS COMPANY

2. Remove the following parts:
- The retainer clip (215)
 - The pressure regulator boost valve sleeve (214)
 - The pressure regulator boost valve (213)
 - The pressure regulator valve spring (212)
 - The pressure regulator spring retainer (210)
 - The pressure regulator valve (211)

SECONDARY PUMP ASSEMBLE

CAUTION: Use J 36850 or equivalent during assembly in order to retain checkballs or to lubricate components. Lubricants other than the recommended assembly lube changes the transmission fluid characteristics and causes undesirable shift conditions or filter clogging.

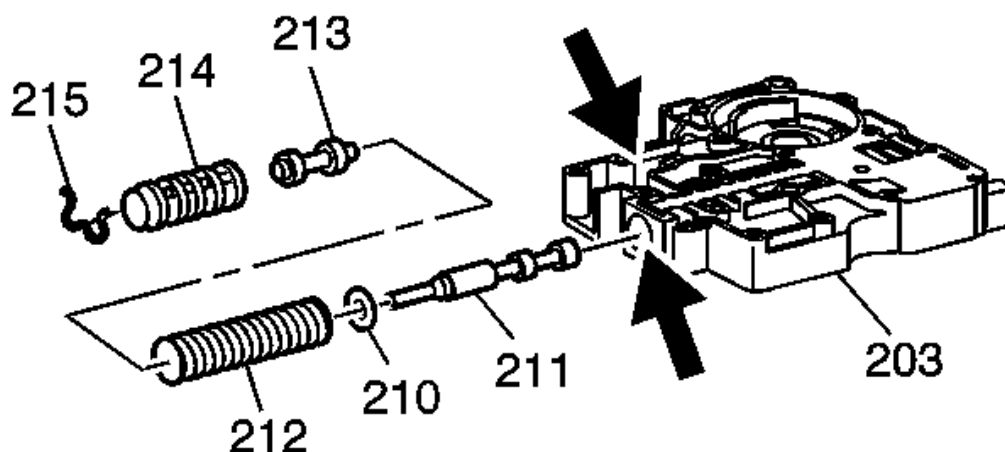


Fig. 222: Pressure Regulator Valve Bore Inspection Areas
 Courtesy of GENERAL MOTORS COMPANY

1. Inspect the pressure regulator valve bore for nicks or scoring.
2. Install the following parts:
 - The pressure regulator valve (211)
 - The pressure regulator spring retainer (210)
 - The pressure regulator valve spring (212)
 - The pressure regulator boost valve (213)
 - The pressure regulator boost valve sleeve (214)
 - The retainer clip (215)

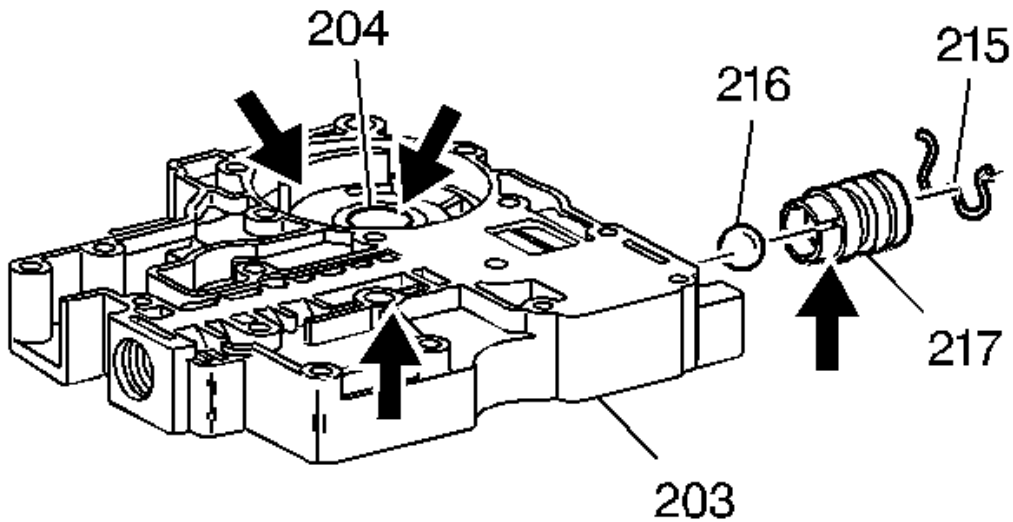


Fig. 223: Inspection Areas On Scavenge Pump
Courtesy of GENERAL MOTORS COMPANY

3. Inspect the following for damage or nicks:
 - The scavenge pump bushing (204)
 - The secondary pump cover (203)
 - The pump ball seat (217)
4. Install the following parts:
 - The secondary pump cutoff ball (216)
 - The pump ball seat (217)
 - The retainer clip (215)

PUMP ASSEMBLY

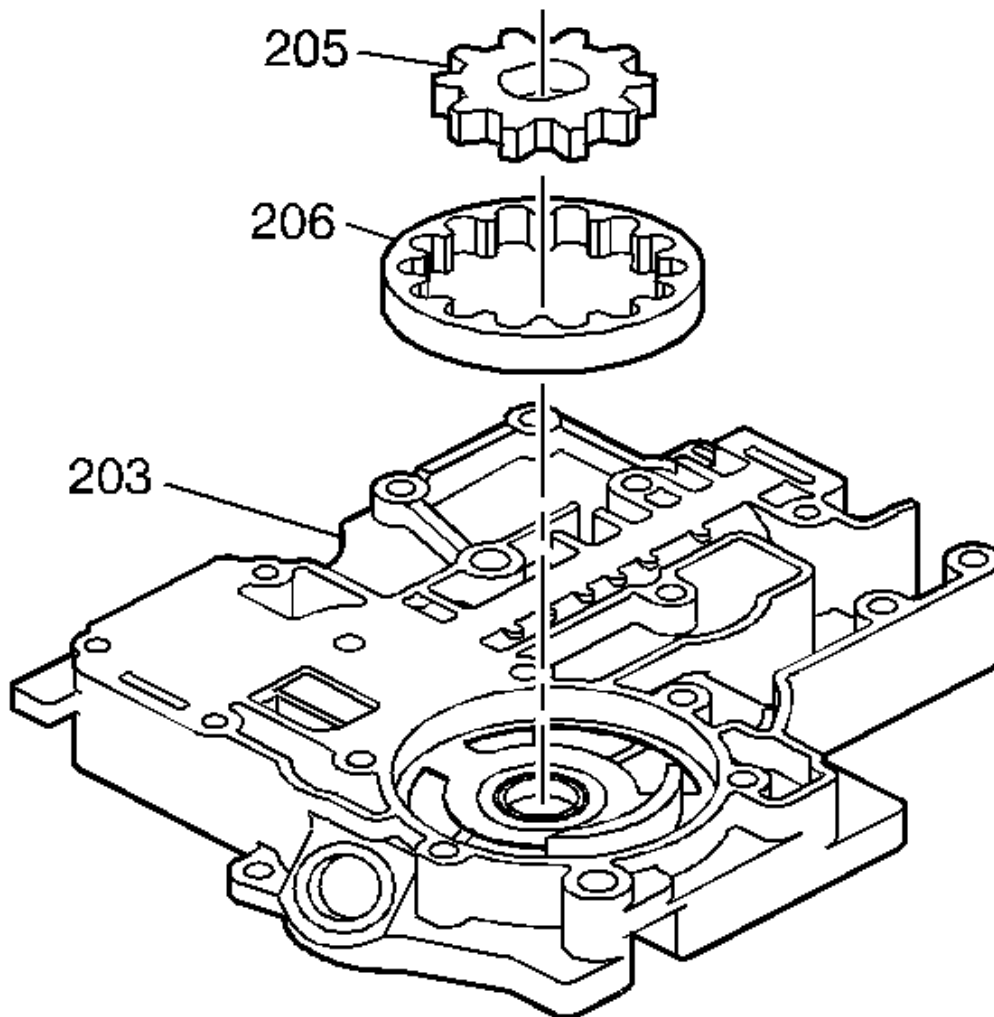


Fig. 224: Locating Secondary Pump Gears
Courtesy of GENERAL MOTORS COMPANY

1. Install the secondary pump gears (205, 206) into the secondary pump body (203).

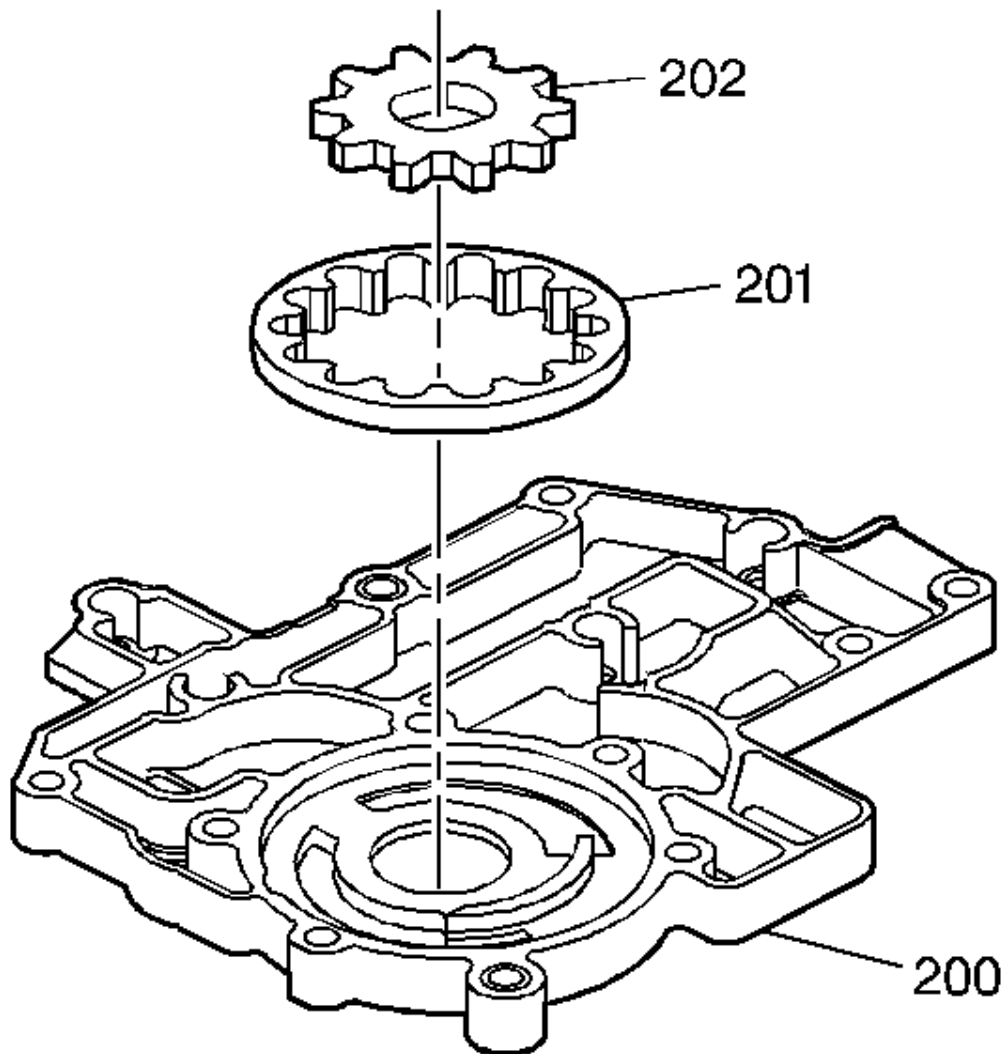


Fig. 225: Installing Primary Pump Gears
Courtesy of GENERAL MOTORS COMPANY

2. Install the primary pump gears (201, 202) into the primary pump body (200).

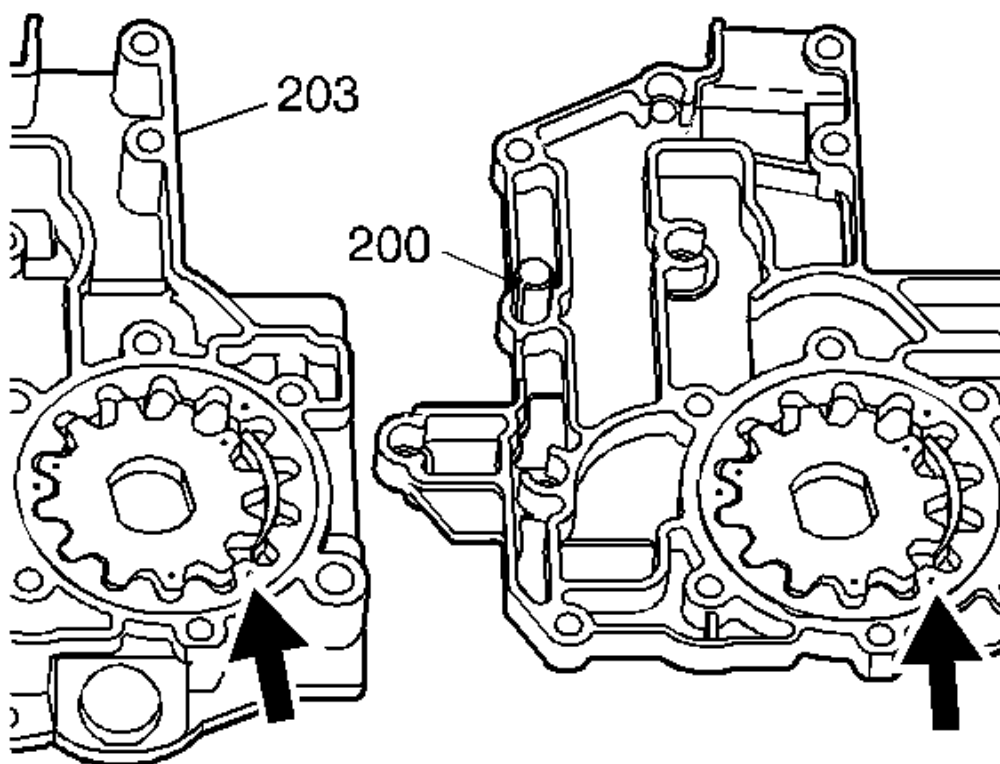


Fig. 226: Locating Dimples On Pump Gears
Courtesy of GENERAL MOTORS COMPANY

3. Inspect the pump gears (201, 202, 205, 206). These gears must be installed with the dimples facing up.

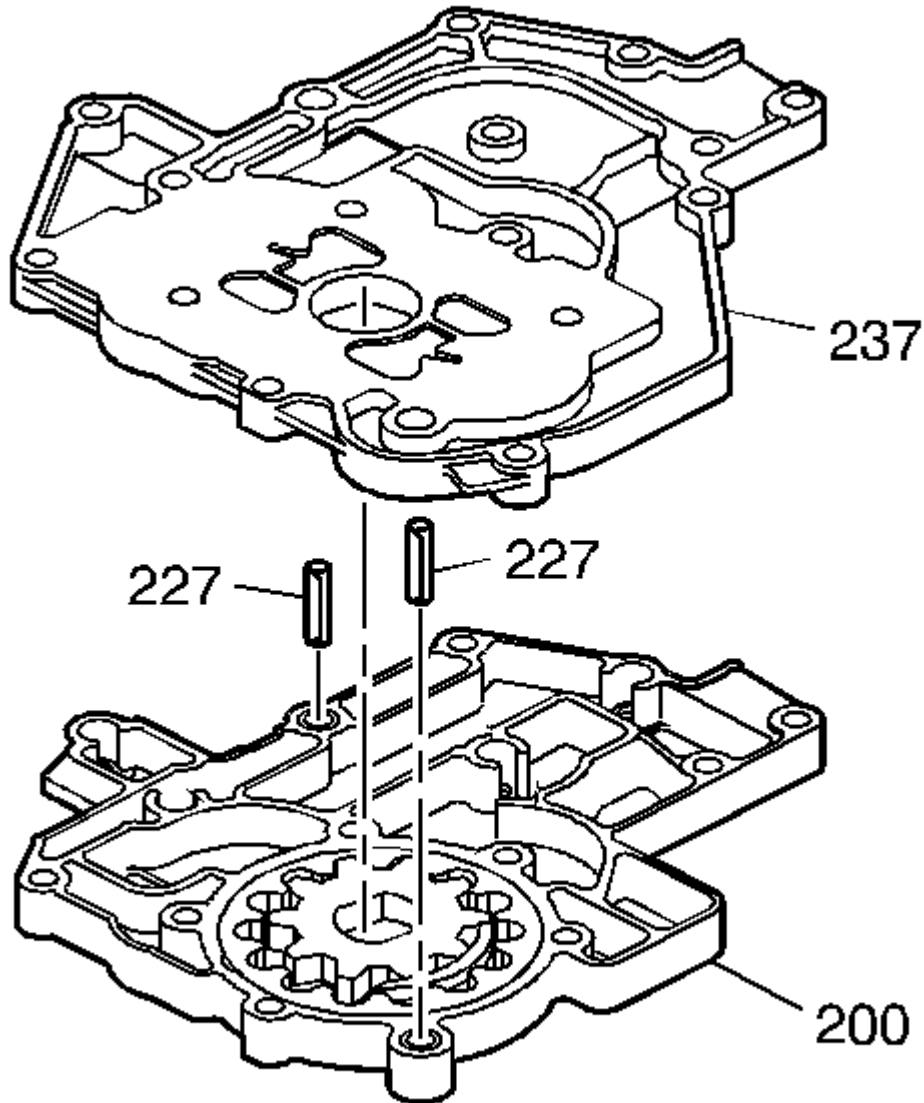


Fig. 227: Installing Scavenge Pump Cover Onto Primary Pump Body
 Courtesy of GENERAL MOTORS COMPANY

4. Install the scavenge pump cover (237) onto the primary pump body (200) over the dowel bushings (227). Tap the dowels in place so that they stick out of both the primary pump body and the scavenge cover.

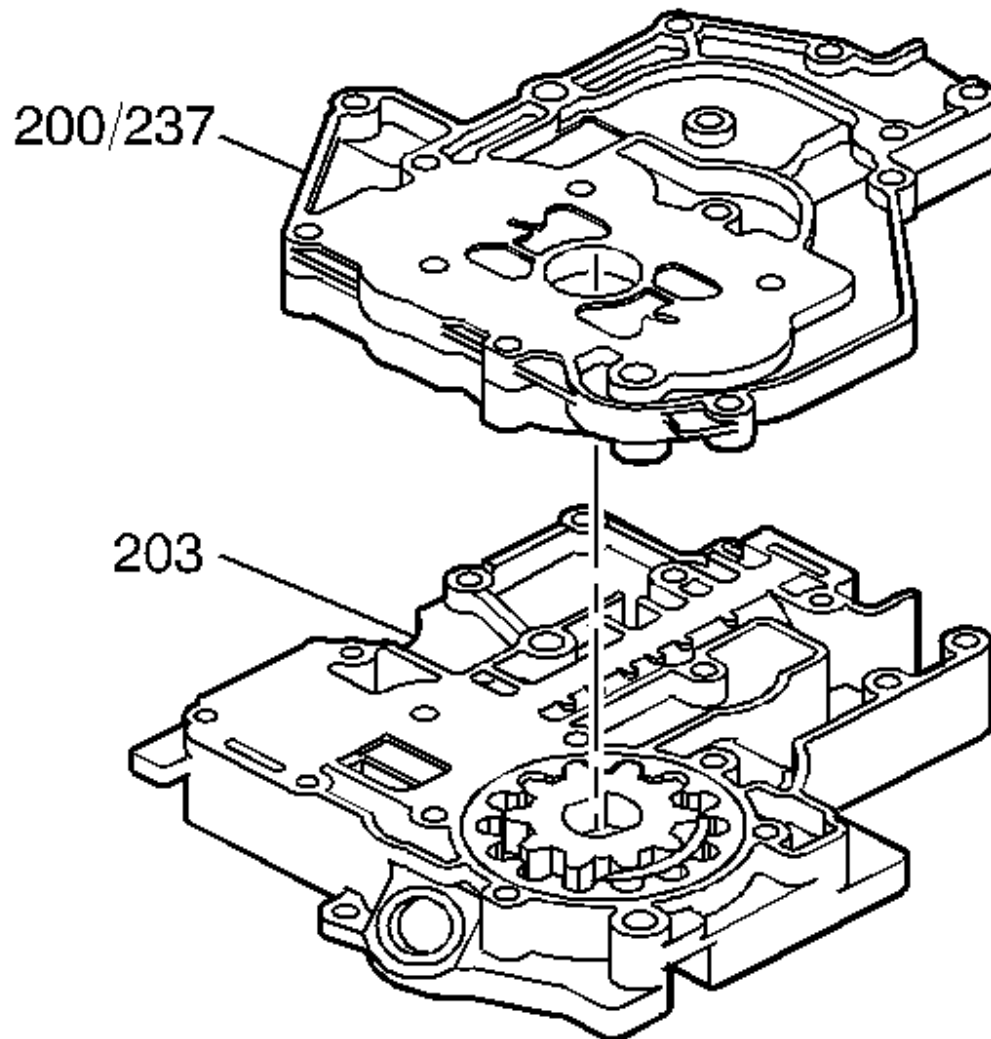


Fig. 228: View Of Scavenge Pump Cover, Primary Body Assembly & Secondary Pump Body
Courtesy of GENERAL MOTORS COMPANY

5. Install the scavenge pump cover and primary body assembly (200/237) onto the secondary pump body (203). Press the entire assembly firmly together.

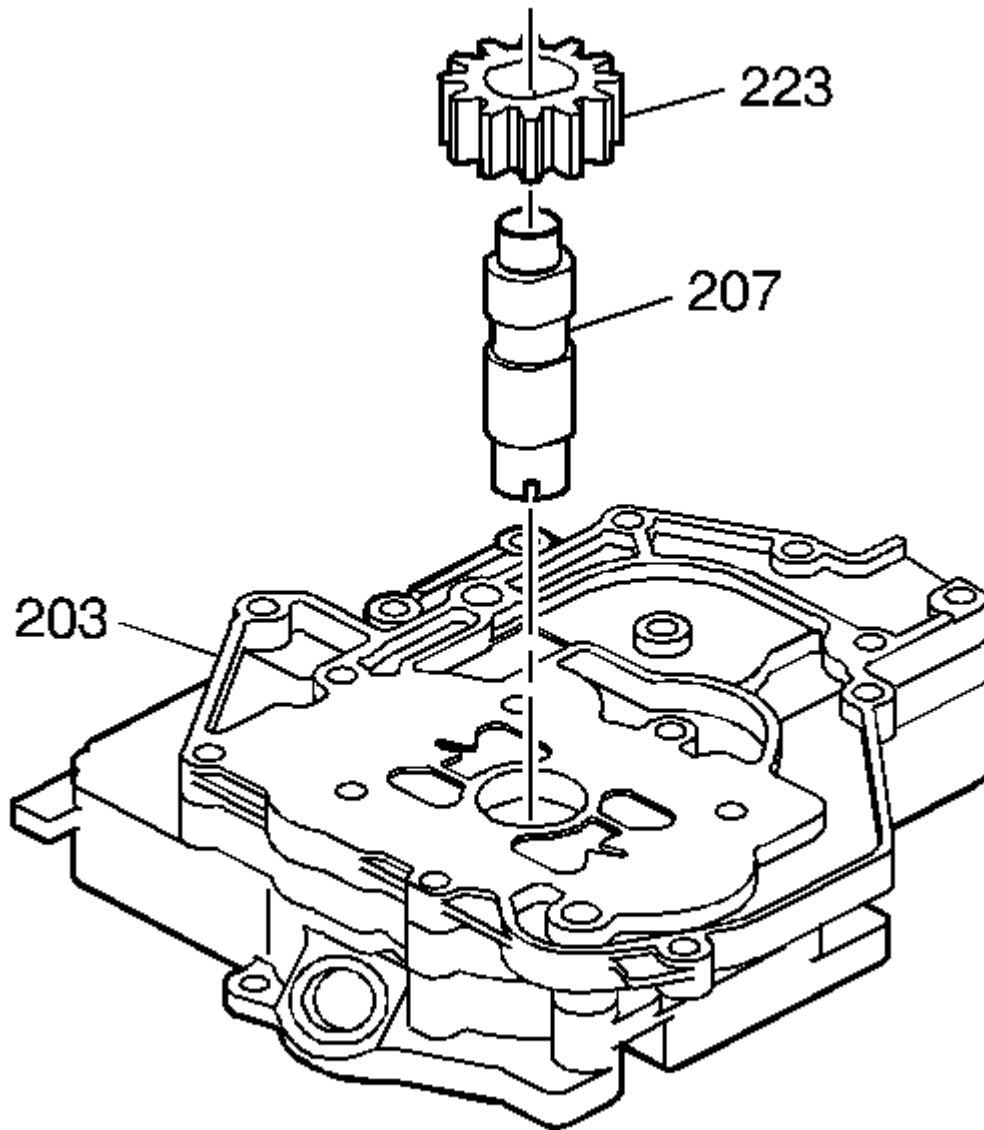


Fig. 229: Oil Pump Driven Shaft & Scavenge Pump Drive Gear
Courtesy of GENERAL MOTORS COMPANY

6. Install the oil pump driven shaft (207) into the pump assembly. The end of the shaft with the four notches is located in the secondary pump.
7. Install the scavenge pump drive gear (223) over the pump driven shaft.

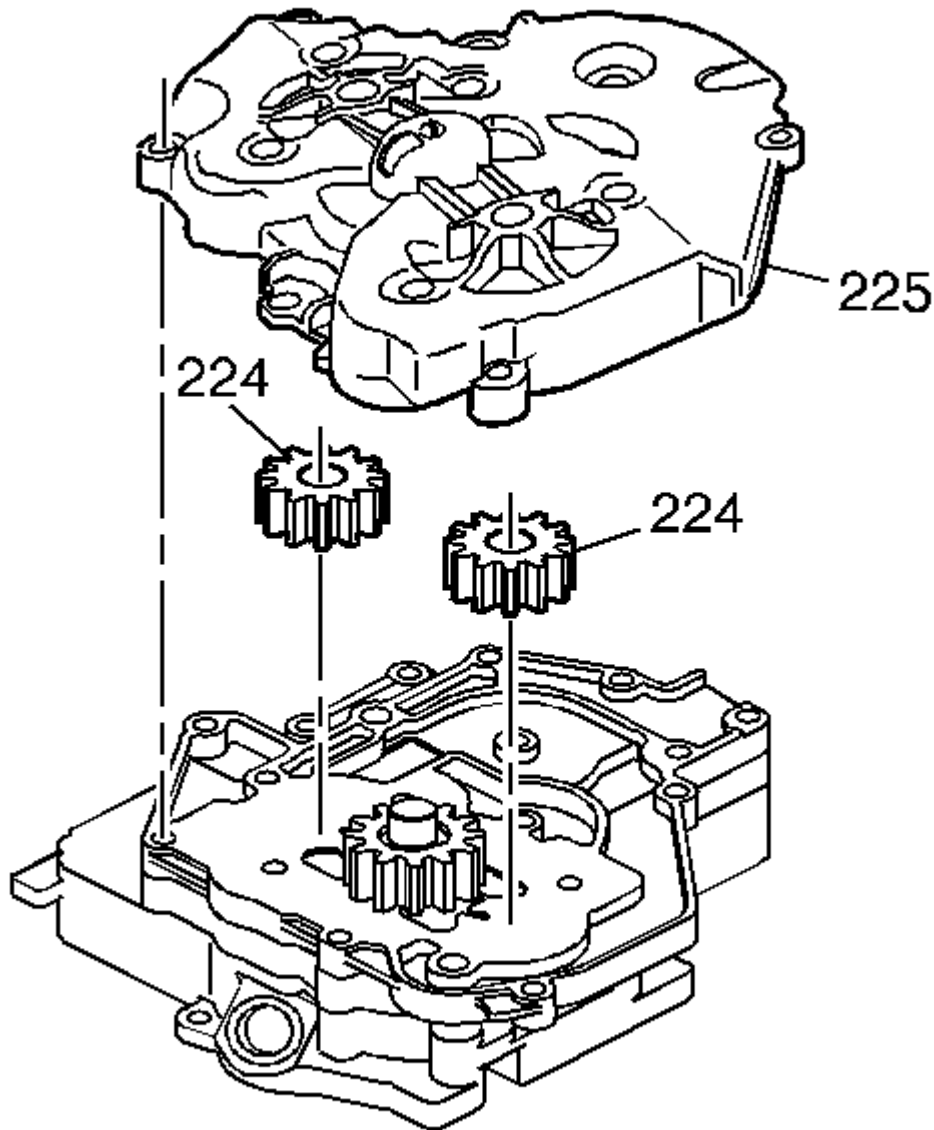


Fig. 230: View Of Scavenge Pump Driven & Drive Gears
Courtesy of GENERAL MOTORS COMPANY

8. Align the scavenge pump driven gears (224) next to the drive gear (223). Install the scavenge pump body (225) onto the scavenge pump cover. Locate the scavenge pump driven gear pins into the scavenge pump driven gears (224). Press firmly into position.

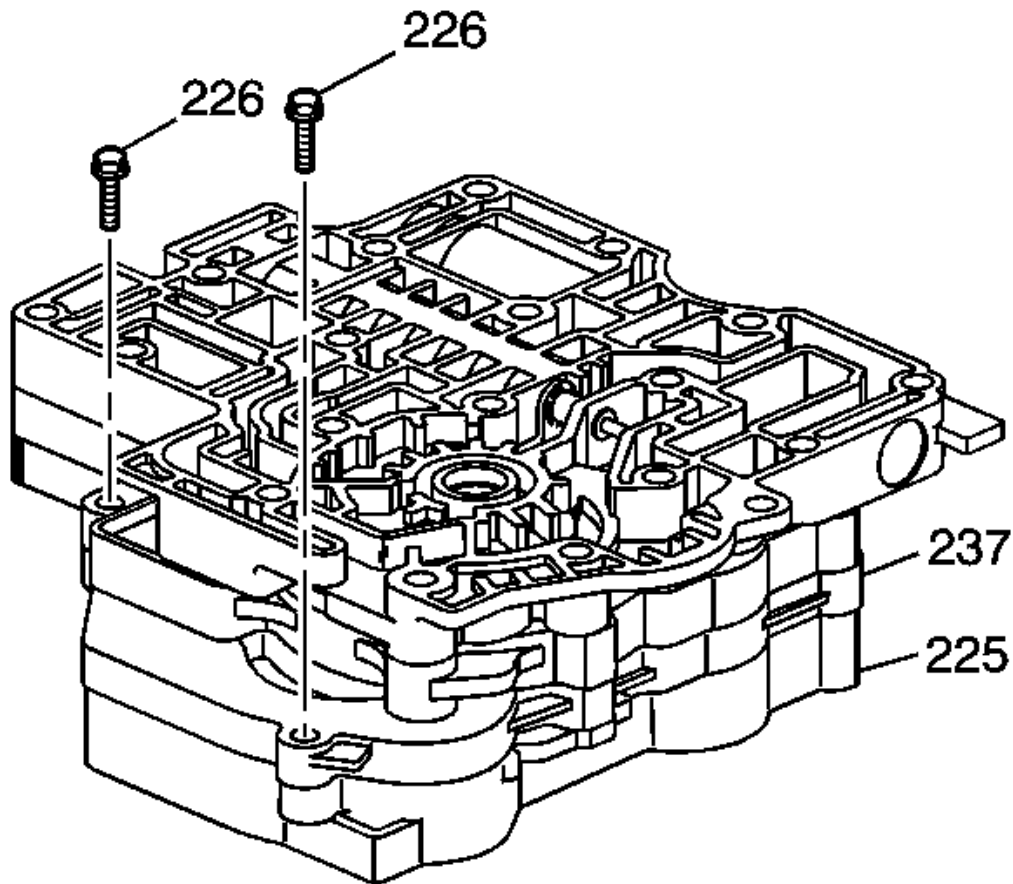


Fig. 231: Locating Scavenge Pump Cover Retaining Bolts
Courtesy of GENERAL MOTORS COMPANY

CAUTION: Refer to Fastener Caution .

9. Install the two 10-mm bolts (226) through the scavenge pump cover (237) to the scavenge pump body (225) and tighten to 11-13 N.m (8.0-9.5 lb ft).

PUMP INSTALLATION

Special Tools

J 39068 Pump Assembly Guide Pins

For equivalent regional tools, refer to Special Tools .

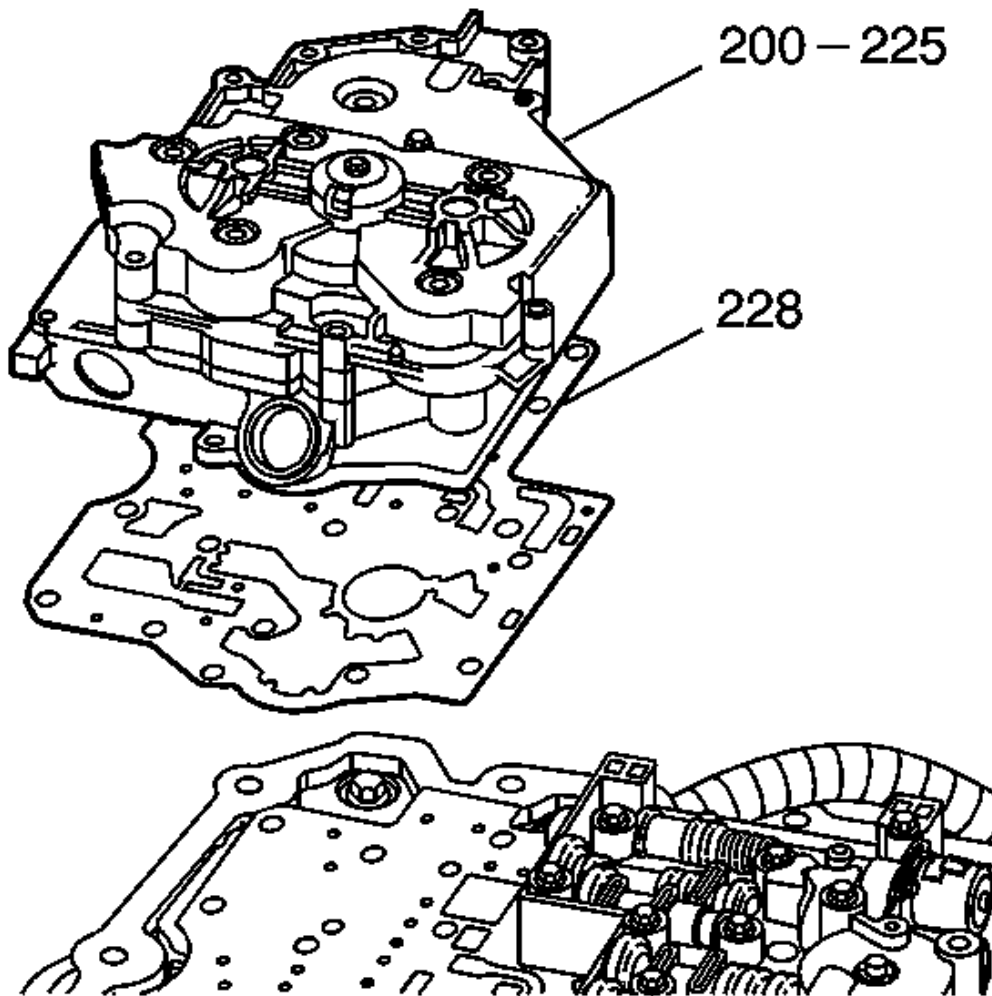


Fig. 232: View Of Scavenge, Primary And Secondary Pump Assemblies
 Courtesy of GENERAL MOTORS COMPANY

1. Install the **J 39068** guide pins into the case.
2. Install the new gasket (228).
3. Install the pump assembly (200-225).

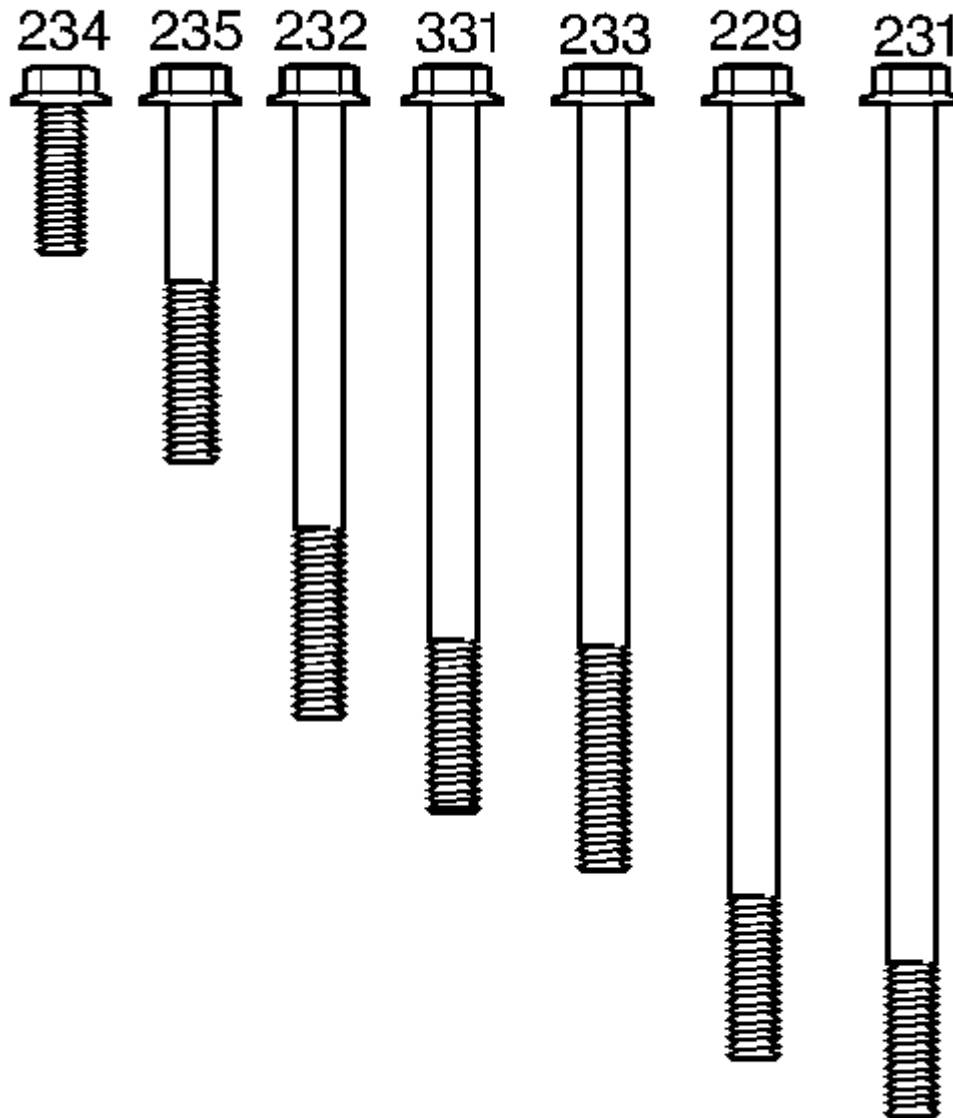


Fig. 233: Identifying Scavenge Pump Bolts
Courtesy of GENERAL MOTORS COMPANY

4. Apply pipe thread sealant, GM P/N 12346004 to pump bolt threads before installation.
5. Hand start all of the bolts (229, 231, 232, 233, 234, 235, 331).

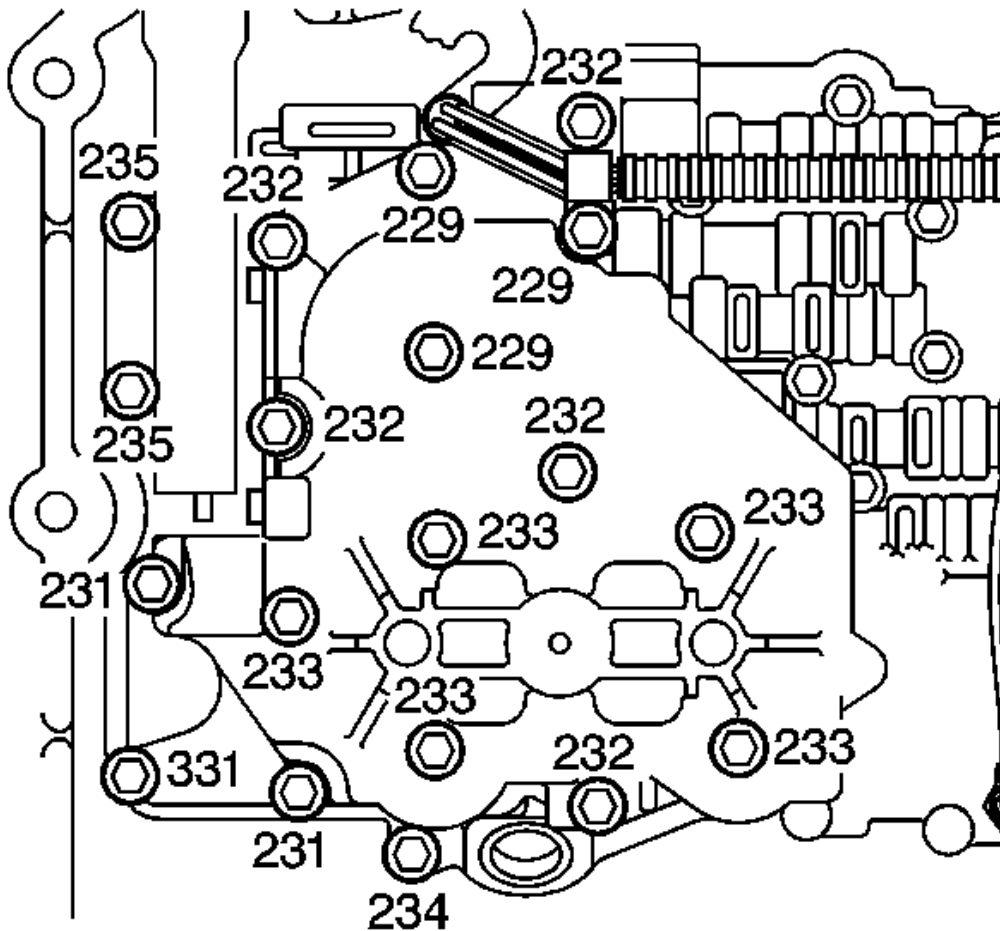


Fig. 234: Identifying Pump Housing Bolts
Courtesy of GENERAL MOTORS COMPANY

CAUTION: Refer to Fastener Caution .

6. Remove the guide pins, install the remaining bolts and tighten to 11-13 N.m (8.0-9.5 lb ft).

TEMPERATURE SENSOR, TORQUE CONVERTER CLUTCH SOLENOID VALVE, AND PRESSURE CONTROL SOLENOID VALVE ASSEMBLE

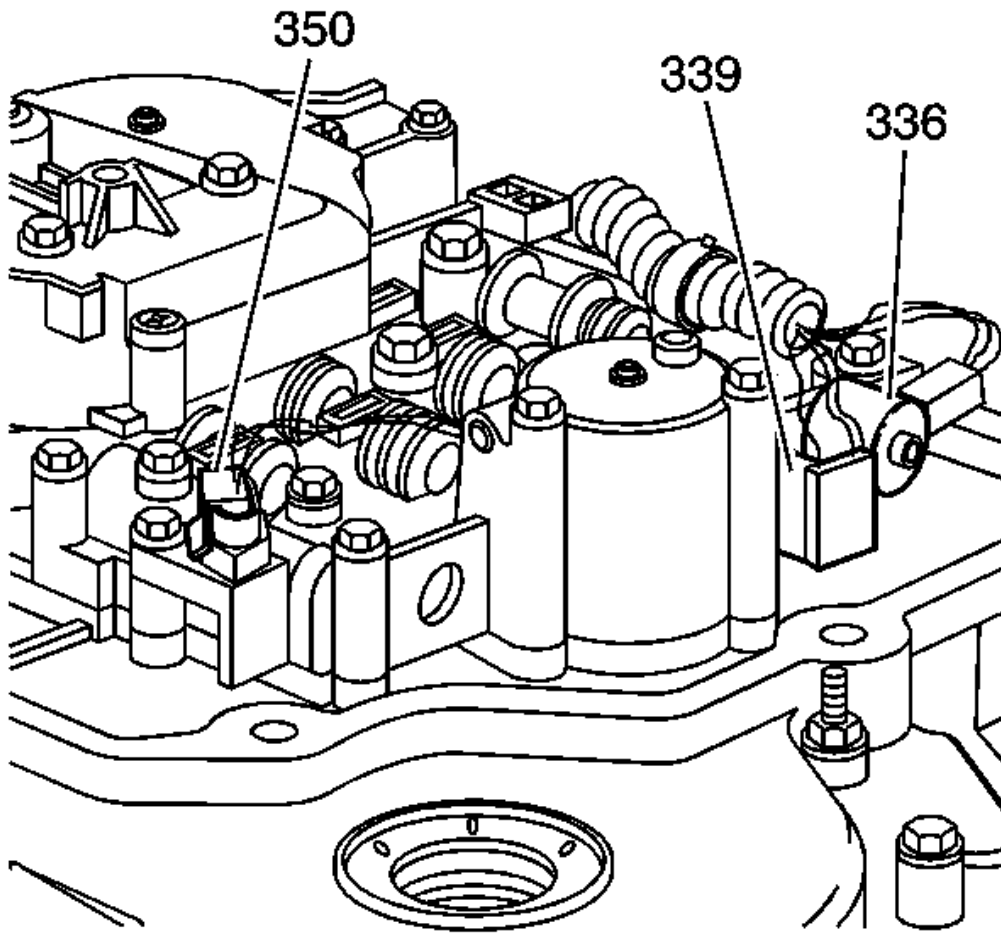


Fig. 235: View Of Pressure Control Solenoid Valve, Torque Converter Clutch Solenoid Valve & Transmission Temperature Sensor Electrical Connectors
 Courtesy of GENERAL MOTORS COMPANY

Connect the wiring harness to the following:

- The pressure control solenoid valve (339)
- The torque converter clutch solenoid valve (336)
- The temperature sensor (350)

OIL FILTER AND SIDE COVER INSTALL

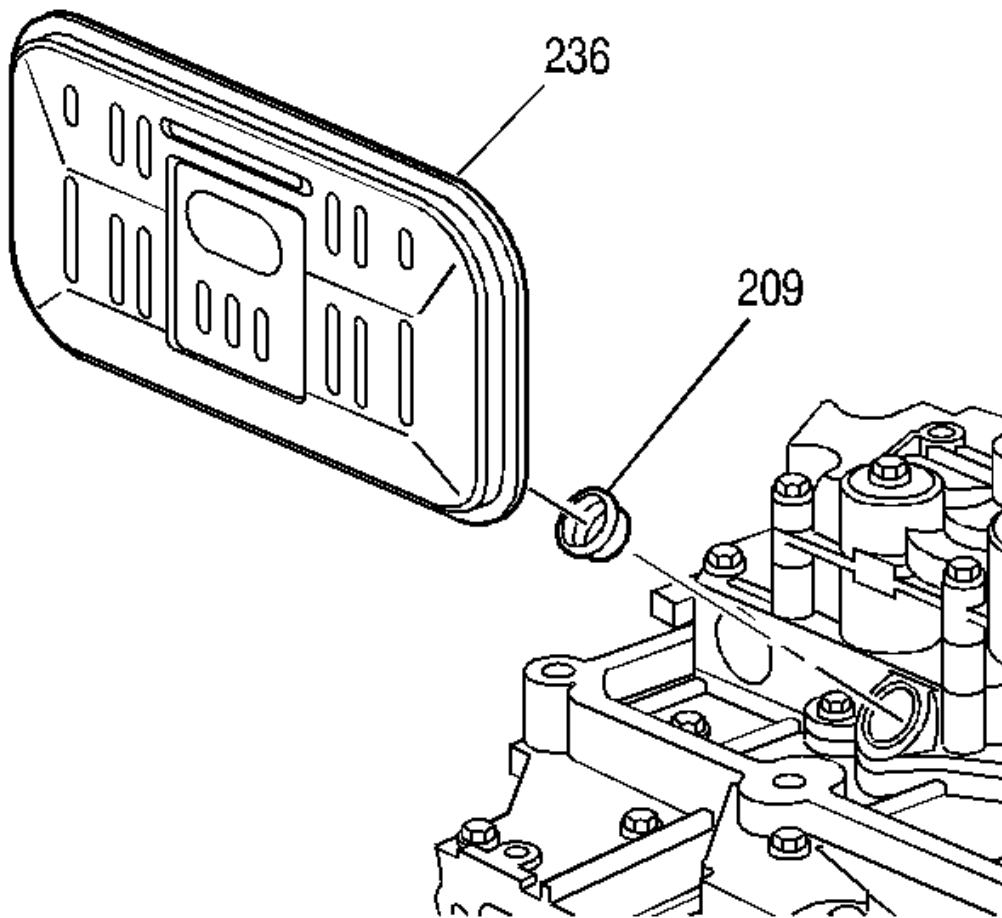


Fig. 236: View Of Oil Filter & Seal
Courtesy of GENERAL MOTORS COMPANY

1. Install the new filter seal (209) and the new oil filter (236).

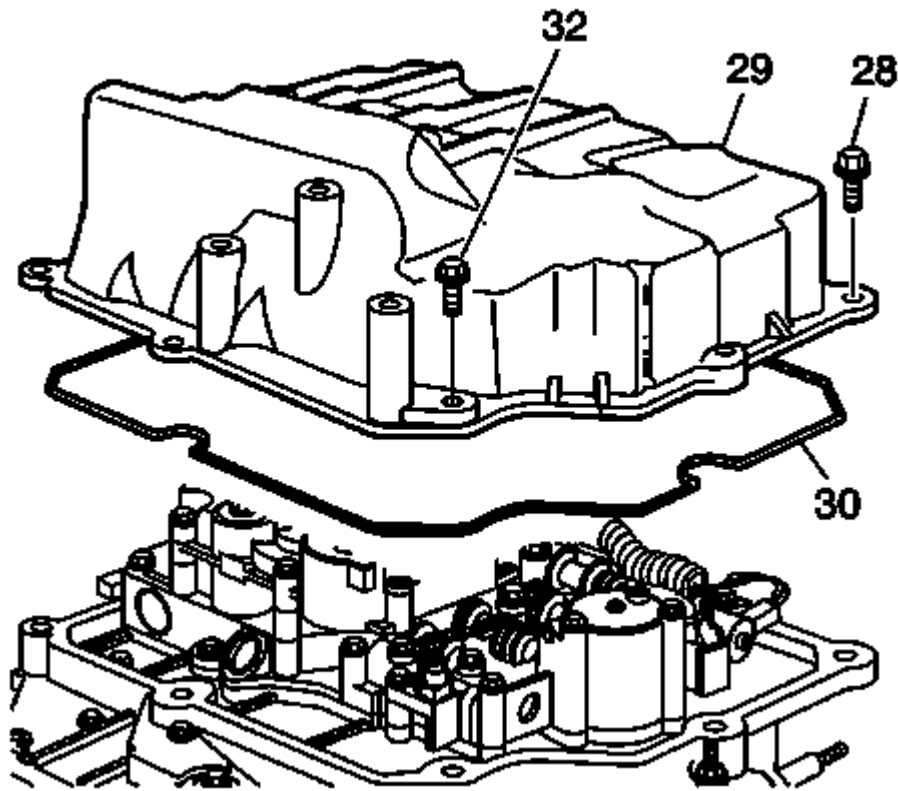


Fig. 237: Locating Side Cover & Gasket
 Courtesy of GENERAL MOTORS COMPANY

2. Install the gasket (30) into the side cover (29).
3. Install the side cover (29) onto the case cover.

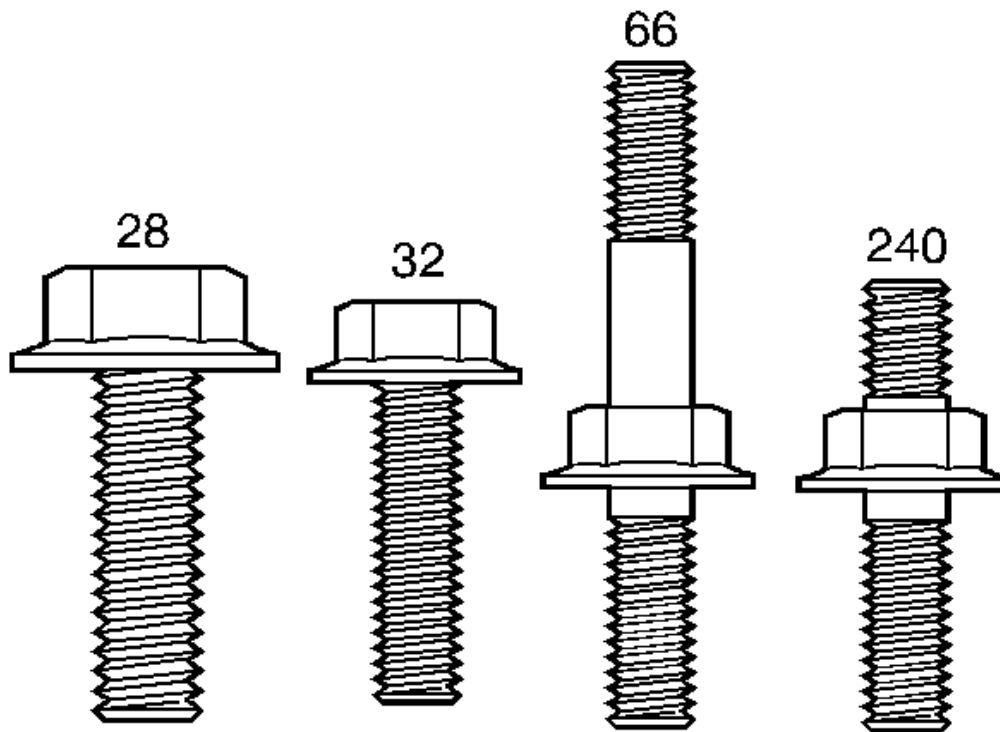


Fig. 238: Identifying Side Cover Bolts
Courtesy of GENERAL MOTORS COMPANY

4. Install the side cover bolts (28, 32).
5. Some models may also use stud bolts (66 or 240).

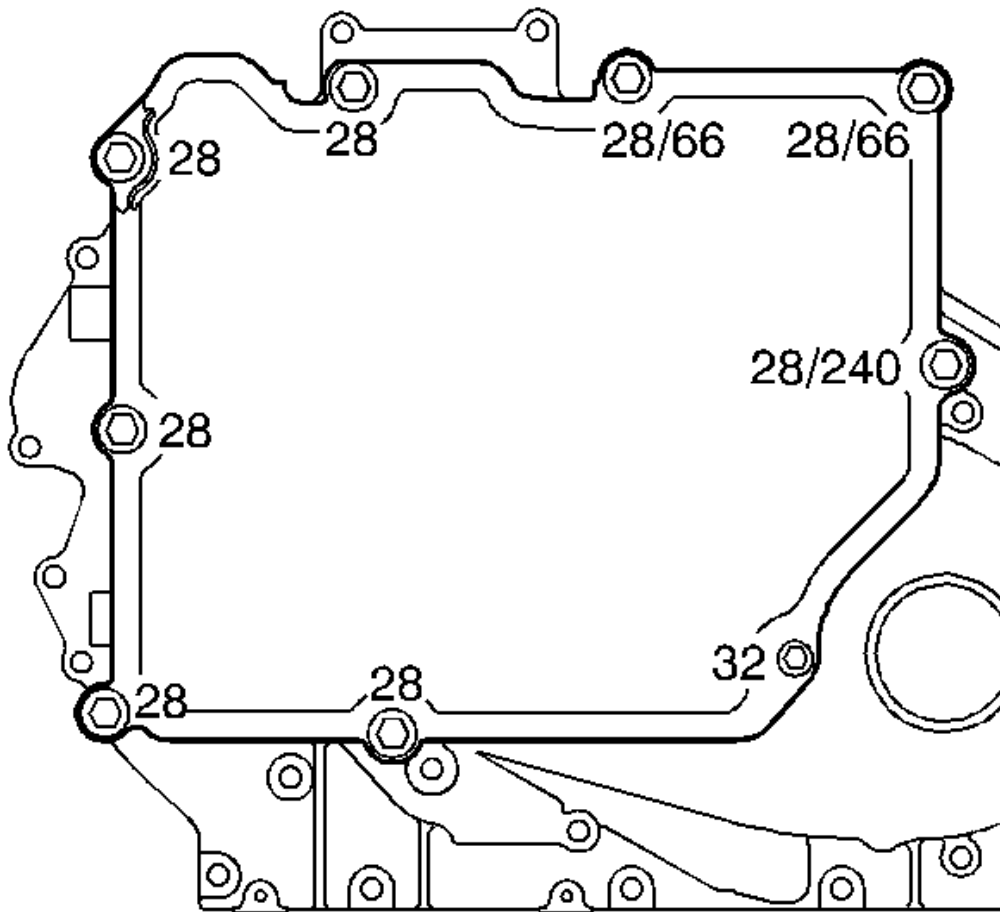


Fig. 239: Identifying Side Cover Bolts

Courtesy of GENERAL MOTORS COMPANY

CAUTION: Refer to Fastener Caution .

6. Apply GM sealing adhesive GM P/N 12346004 before installing the bolt (32) and tighten to 20-27 N.m (15-20 lb ft) and bolts (28, 66, 240) to 50-55 N.m (37-40 lb ft).

CHANNEL PLATE, CONTROL VALVE BODY, AND ACCUMULATOR DISASSEMBLE

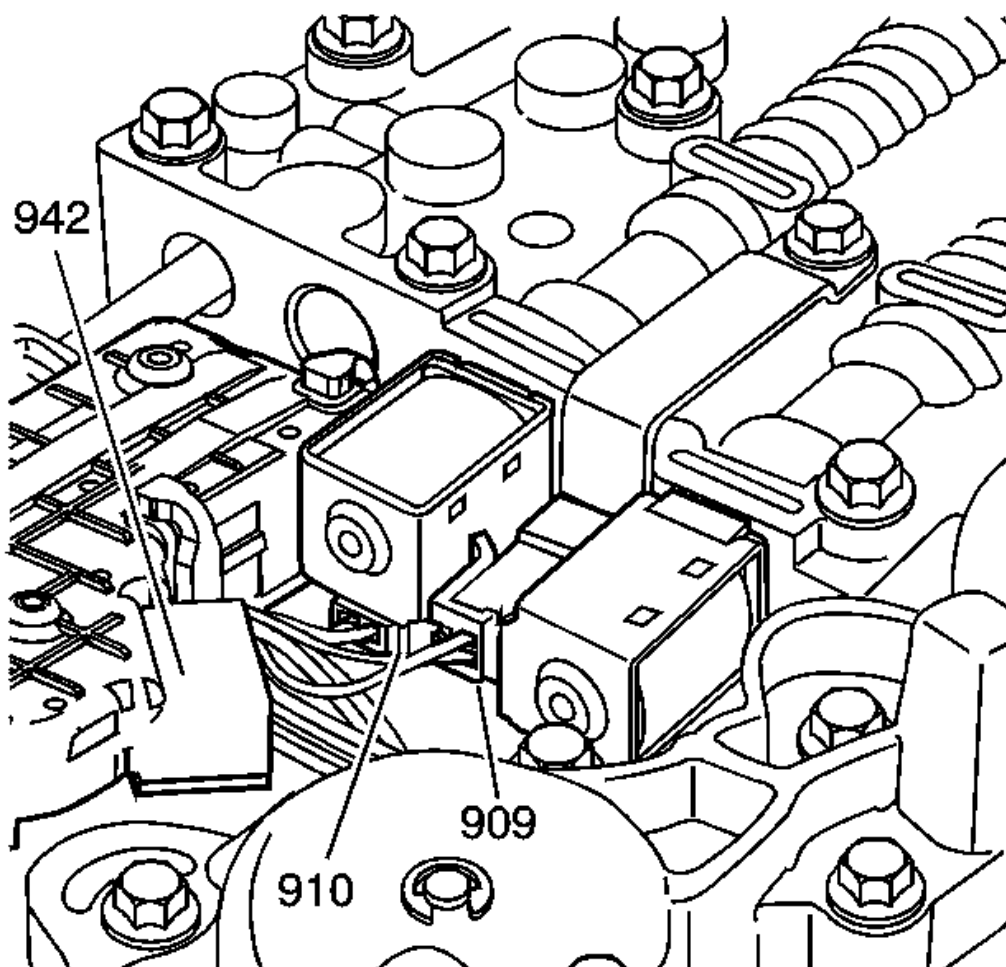


Fig. 240: Internal Mode Switch

Courtesy of GENERAL MOTORS COMPANY

1. Use a small screwdriver in order to disconnect the electrical connectors from the following parts:
 - 1-2 shift solenoid valve (909)
 - 2-3 shift solenoid valve (910)
 - Internal mode switch (IMS) (942)

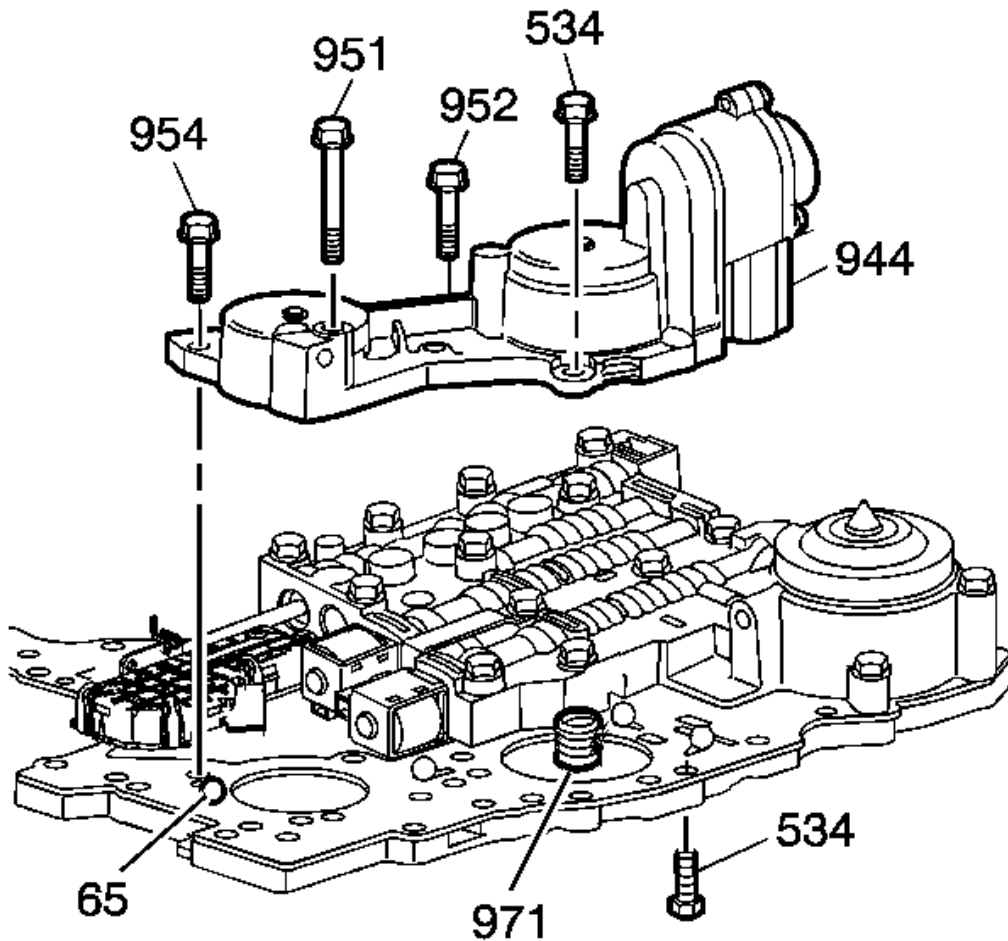


Fig. 241: Accumulator Housing

Courtesy of GENERAL MOTORS COMPANY

2. Remove the 3, 10 mm bolts (534) from the channel plate side.
3. Remove the 6, 10 mm bolts (534, 951, 952, 954) from the accumulator housing.

NOTE: There are 4 checkballs (65) and a spring (971) under the accumulator housing (944).

4. Remove the accumulator housing (944) from the channel plate.

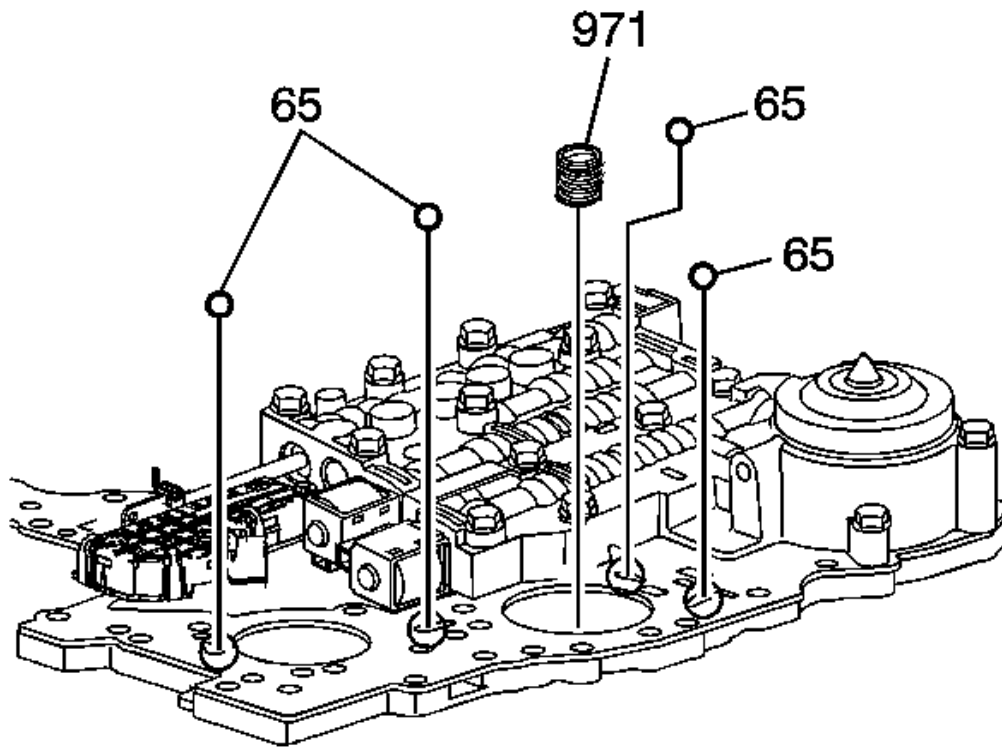


Fig. 242: Channel Plate
 Courtesy of GENERAL MOTORS COMPANY

5. Remove the 4 checkballs (65) and the spring (971) from the channel plate.

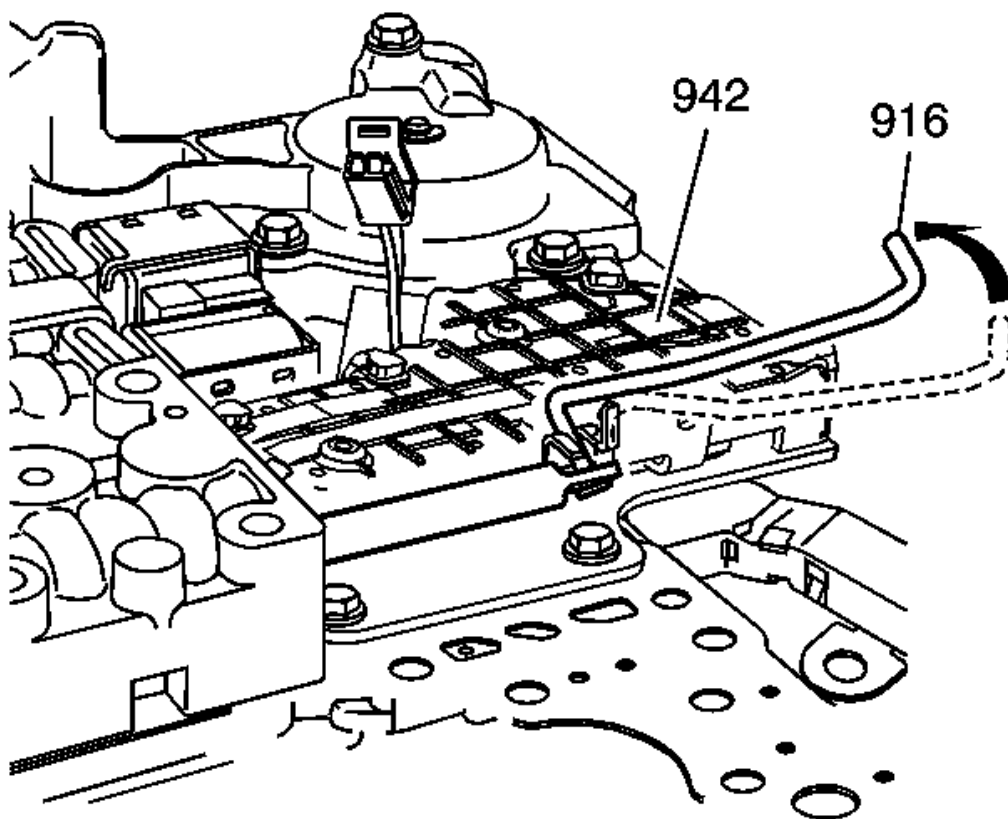


Fig. 243: Link Assembly & Internal Mode Switch
 Courtesy of GENERAL MOTORS COMPANY

6. In order to disconnect the manual valve and link assembly (916) from the internal mode switch (IMS) (942), rotate the manual valve and link assembly (916) toward the IMS (942).

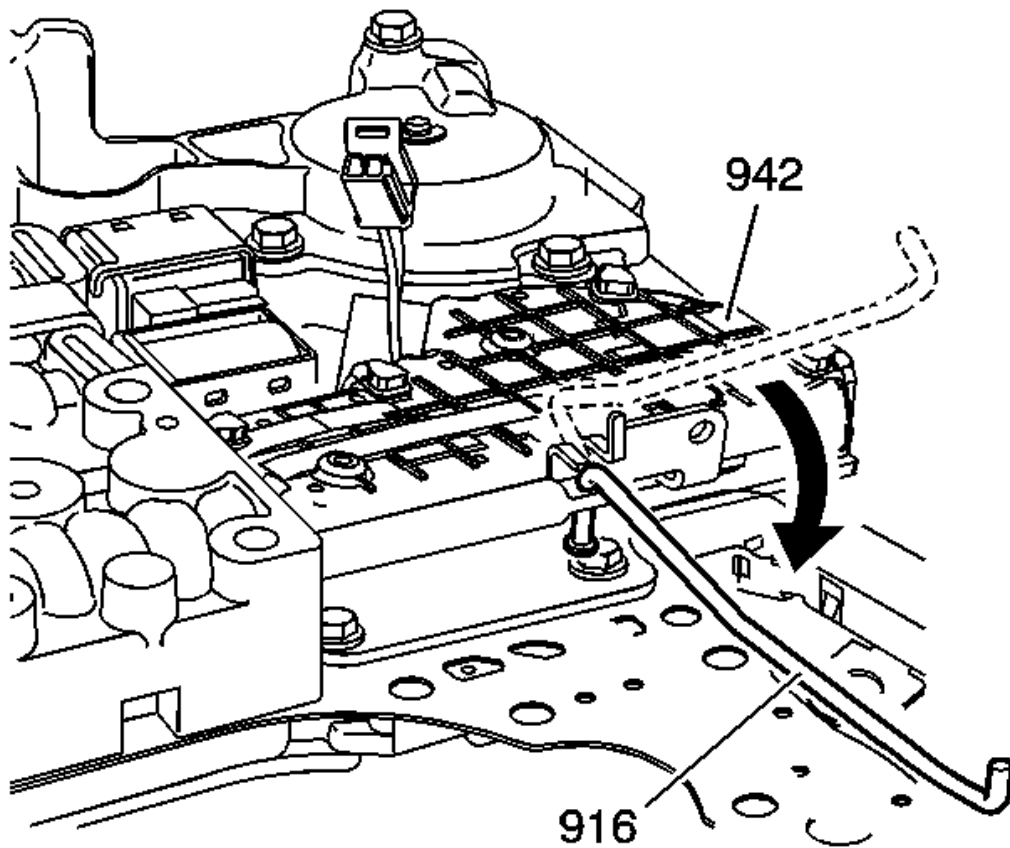


Fig. 244: Internal Mode Switch (IMS)

Courtesy of GENERAL MOTORS COMPANY

7. Turn the manual valve link 90 degrees and rotate the manual valve and link assembly (916) away from the IMS (942).

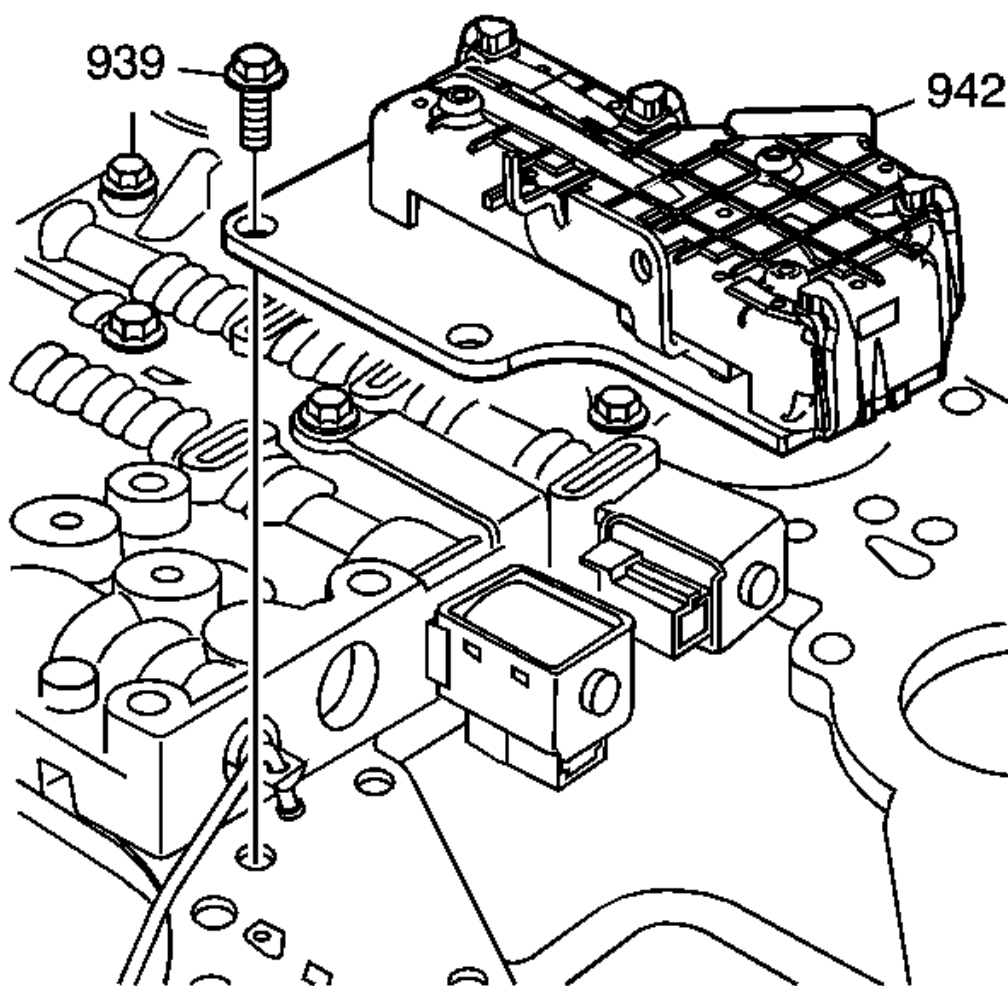


Fig. 245: Internal Mode Switch (IMS) Bolt
 Courtesy of GENERAL MOTORS COMPANY

8. Remove the 3, 8 mm bolts (939) from the internal mode switch (IMS) (942).
9. Remove the IMS (942).

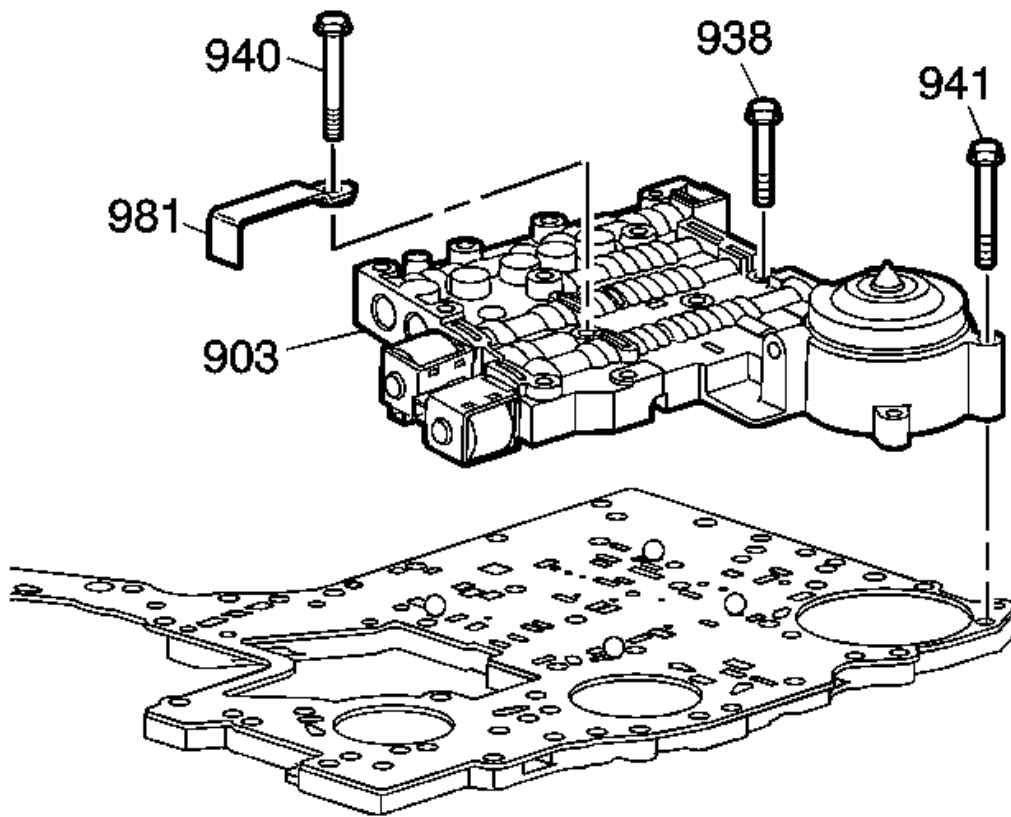


Fig. 246: Identifying Lower Control Valve Assembly Retaining Bolts
 Courtesy of GENERAL MOTORS COMPANY

10. Remove the 15, 10 mm bolts (938, 940, 941) from the lower control valve body.
11. Remove the solenoid valve fluid filter retainer (981).
12. Remove the lower control valve assembly (903) from the channel plate.

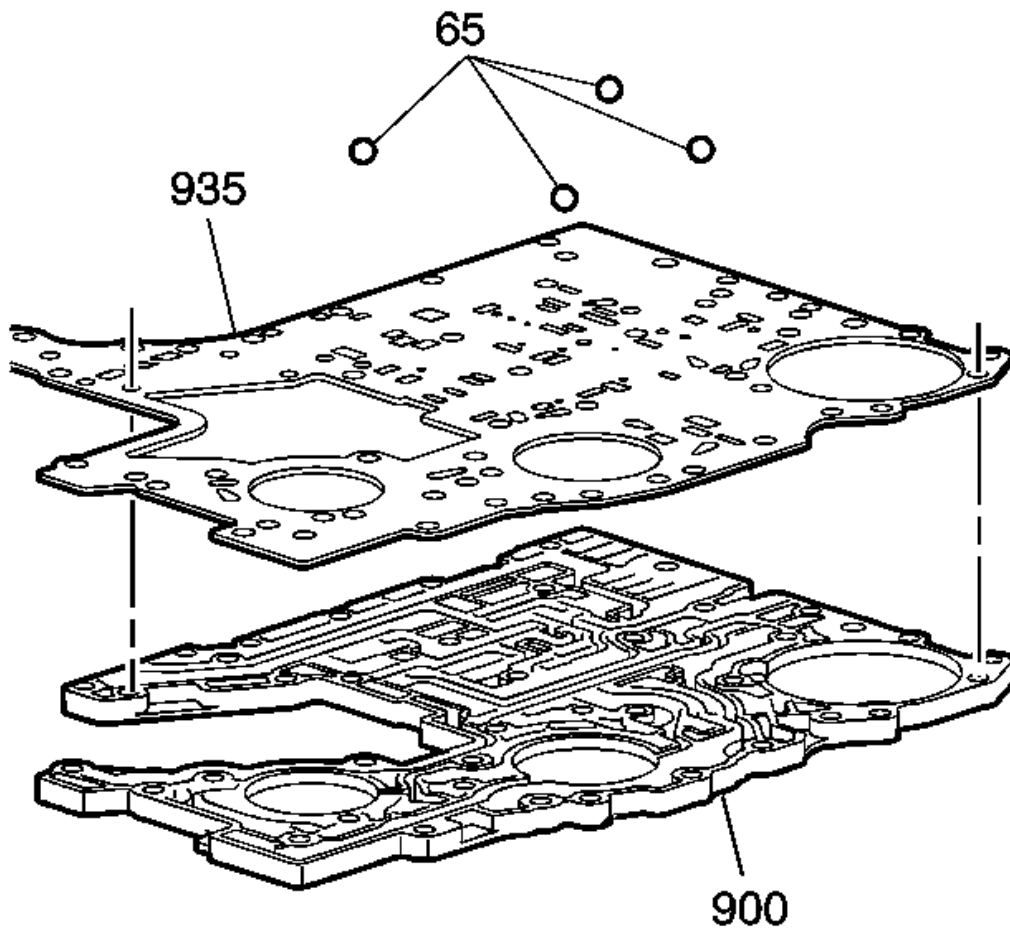


Fig. 247: View Of Channel Plate & Spacer Plate
 Courtesy of GENERAL MOTORS COMPANY

13. Remove the 4 checkballs (65).
14. Remove the spacer plate and gasket assembly (935) from the channel plate (900).

CONTROL VALVE LOWER BODY DISASSEMBLE

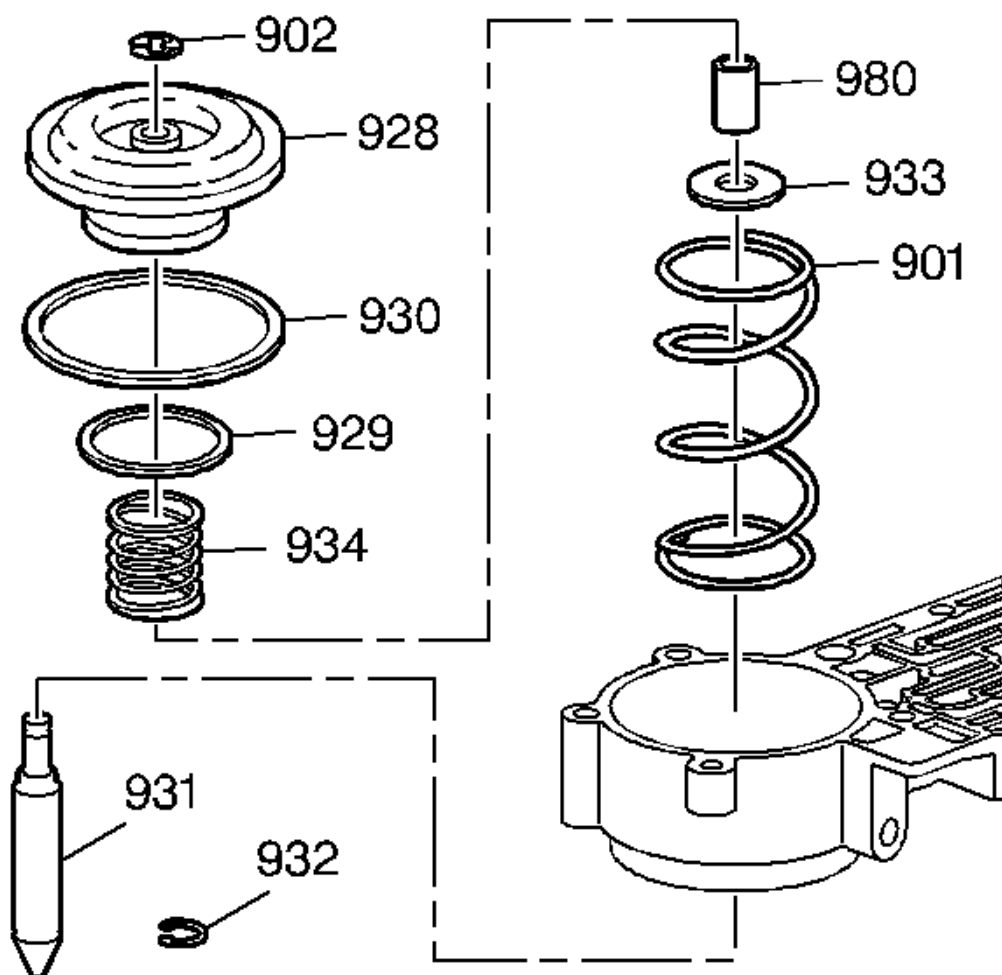


Fig. 248: View Of Low/Reverse Servo Components
 Courtesy of GENERAL MOTORS COMPANY

1. Remove the low/reverse servo piston retaining ring (932).
2. Push on the low/reverse apply pin (931) to remove the low/reverse servo assembly from the control valve body.
3. Remove the return spring (901).
4. Remove the retaining ring (902) from the low/reverse servo assembly and push out the servo pin (931).
5. Remove the following parts:
 - The servo cushion spring (934)
 - The sleeve (980)

- The spring washer (933)
6. Inspect the following items for damage:
- The low/reverse servo piston (928)
 - The low/reverse servo seals (929, 930)

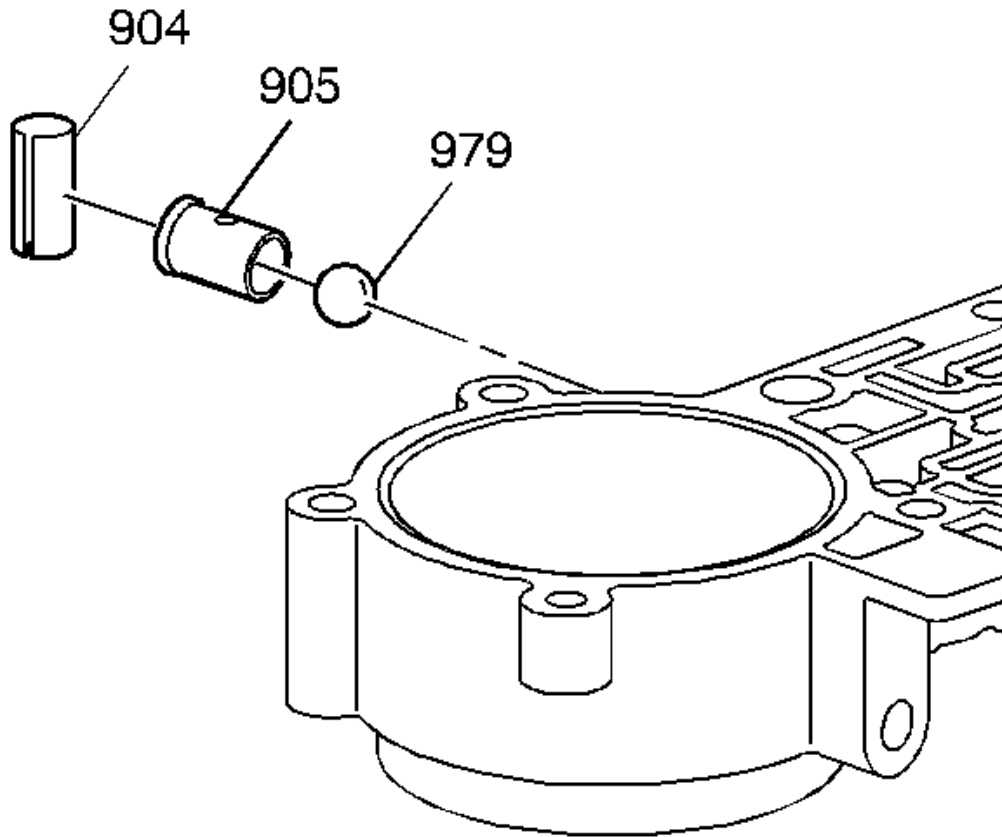


Fig. 249: Identifying Ball Check Capsule
 Courtesy of GENERAL MOTORS COMPANY

7. Remove the following parts:
- The spring retainer (904)
 - The ball check capsule (905)
 - The ball (979)
8. Inspect all parts for scratches, debris, and damage.

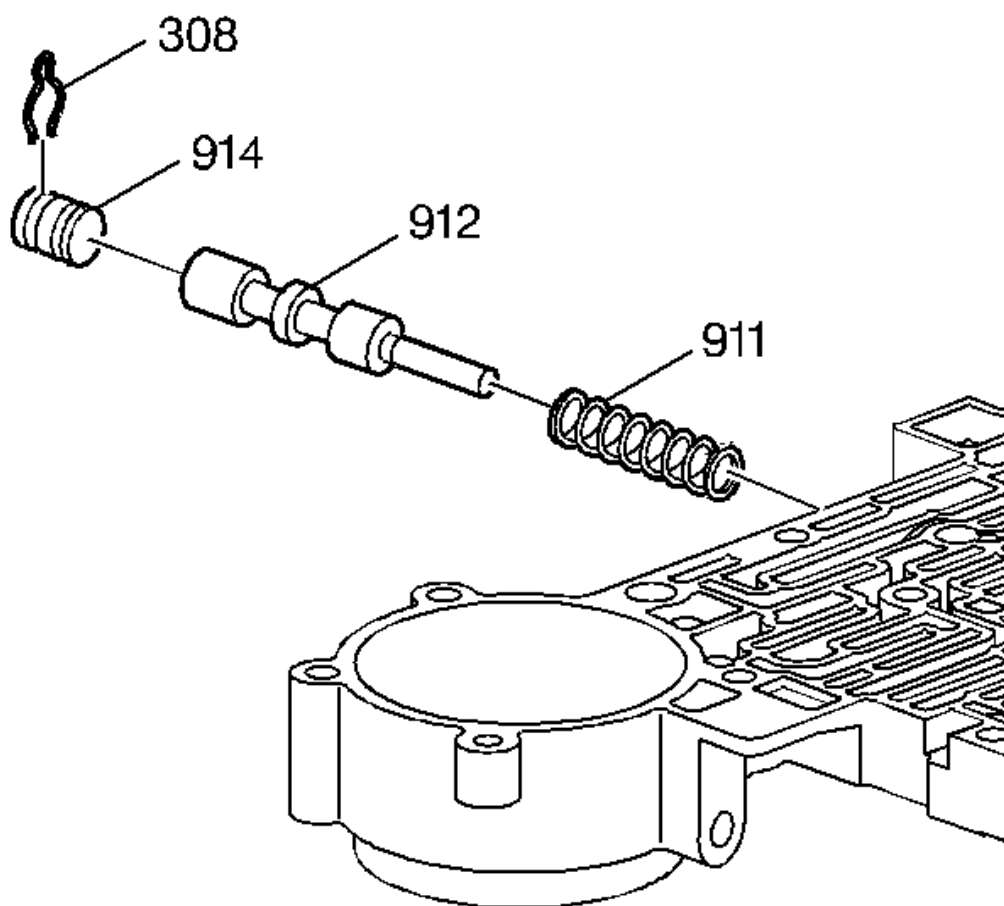


Fig. 250: Locating 3-4 Shift Valve Assembly
Courtesy of GENERAL MOTORS COMPANY

9. Remove the following parts:
 - The retainer clip (308)
 - The bore plug (914)
 - The 3-4 shift valve (912)
 - The 3-4 shift valve spring (911)
10. Inspect the 3-4 shift valve (912) for scratches or debris.

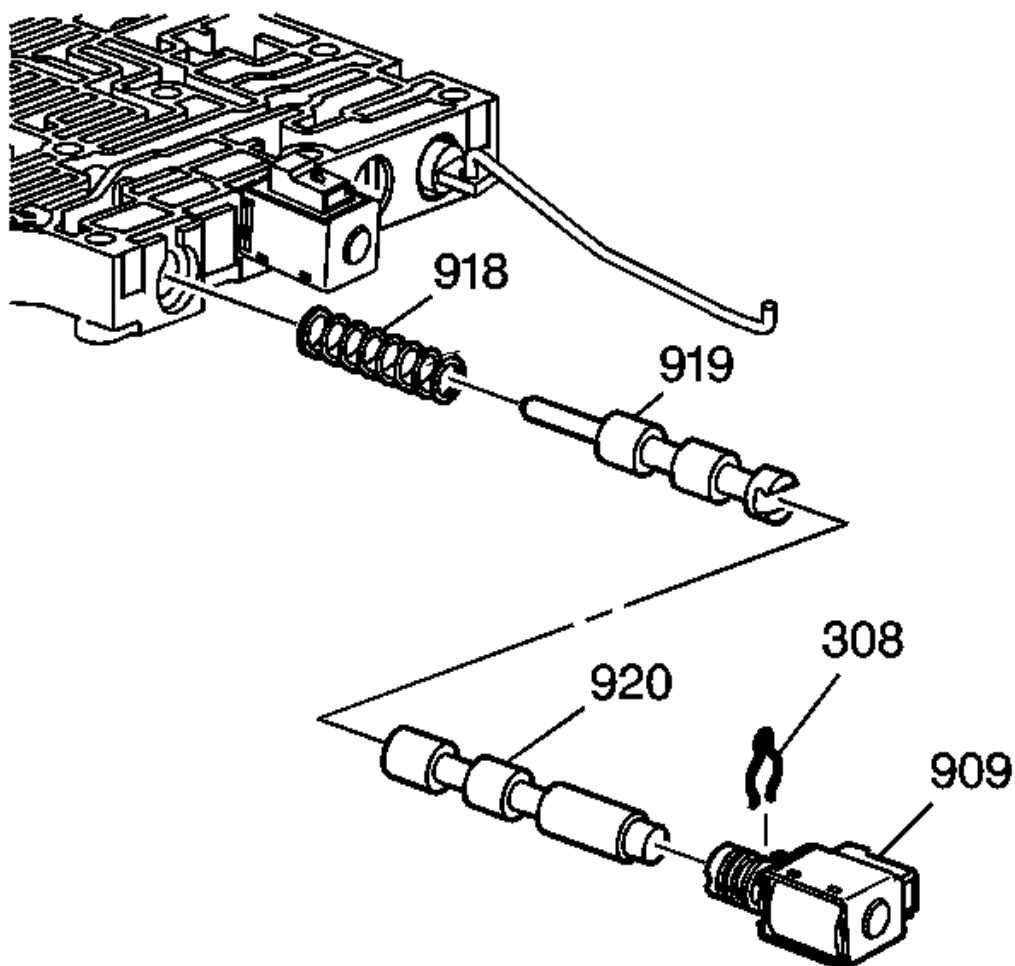


Fig. 251: 1-2 Shift Solenoid Valve
Courtesy of GENERAL MOTORS COMPANY

11. Remove the following parts:
 - The retainer clip (308)
 - The 1-2 shift solenoid valve (909)
 - The 1-2 shift valve B (920)
 - The 1-2 shift valve A (919),
 - The 1-2 shift valve spring (918)
12. Inspect the 1-2 shift solenoid valve (909) for damage.
13. Inspect the 1-2 shift valves A and B (919, 920) for scratches or debris.

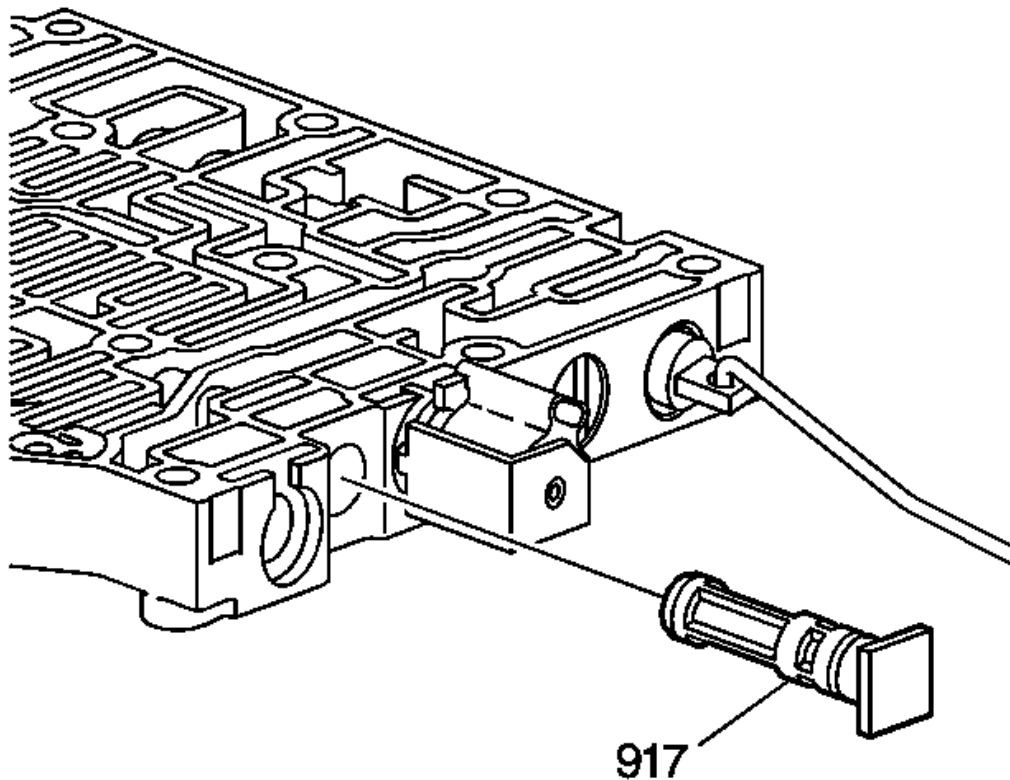


Fig. 252: Solenoid Screen Assembly
Courtesy of GENERAL MOTORS COMPANY

14. Remove the solenoid screen assembly (917).
15. Inspect the solenoid screen assembly (917) for excessive debris.

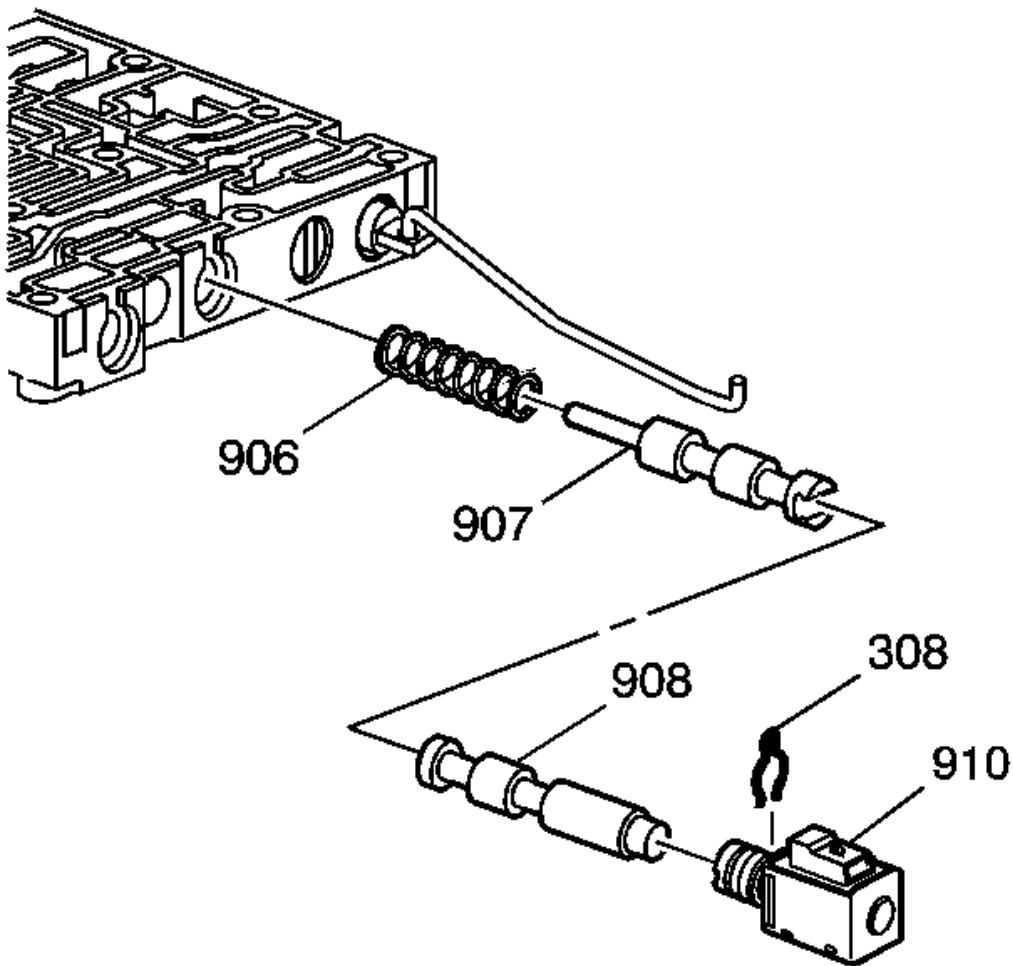


Fig. 253: 2-3 Shift Solenoid Valve

Courtesy of GENERAL MOTORS COMPANY

16. Remove the following parts:
 - The retainer clip (308)
 - The 2-3 shift solenoid valve (910)
 - The 2-3 shift valve D (908)
 - The 2-3 shift valve C (907)
 - The 2-3 shift valve spring (906)
17. Inspect the 2-3 shift solenoid valve (910) for damage.
18. Inspect the 2-3 shift valves C and D (907, 908) for scratches or debris.

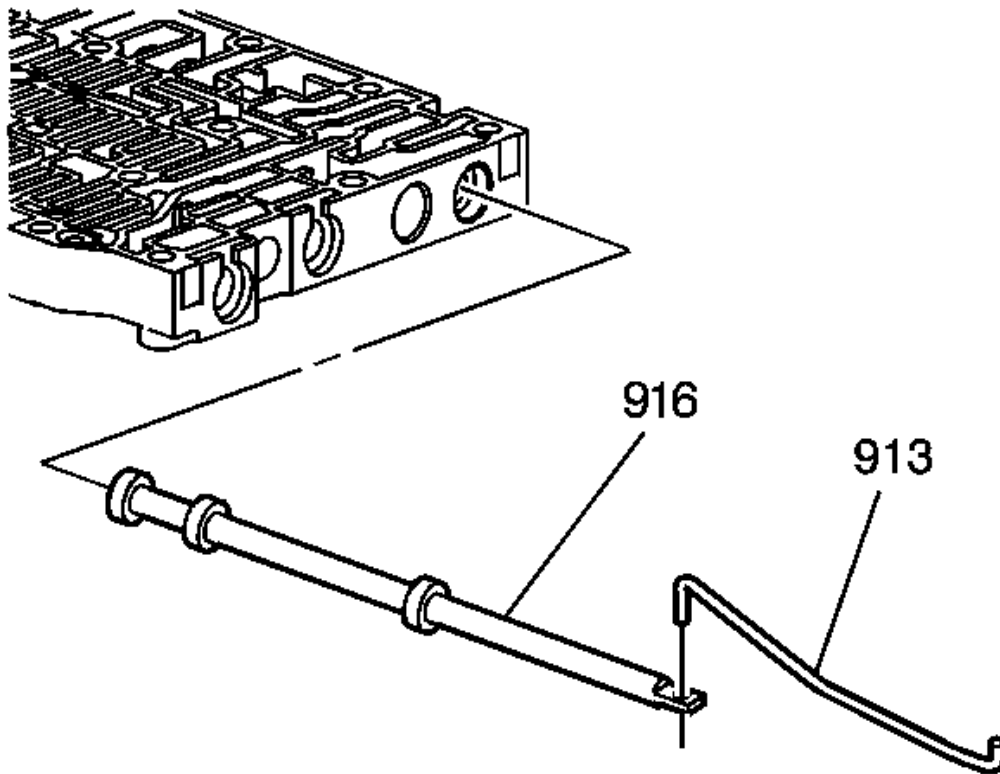


Fig. 254: Manual Valve & Link
Courtesy of GENERAL MOTORS COMPANY

19. Remove the manual valve link (913) and the manual valve (916).
20. Inspect the manual valve (916) for scratches or damage.

CONTROL VALVE LOWER BODY ASSEMBLE

Special Tools

J 36850 Assembly Lubricant(or equivalent)

For equivalent regional tools, refer to **Special Tools** .

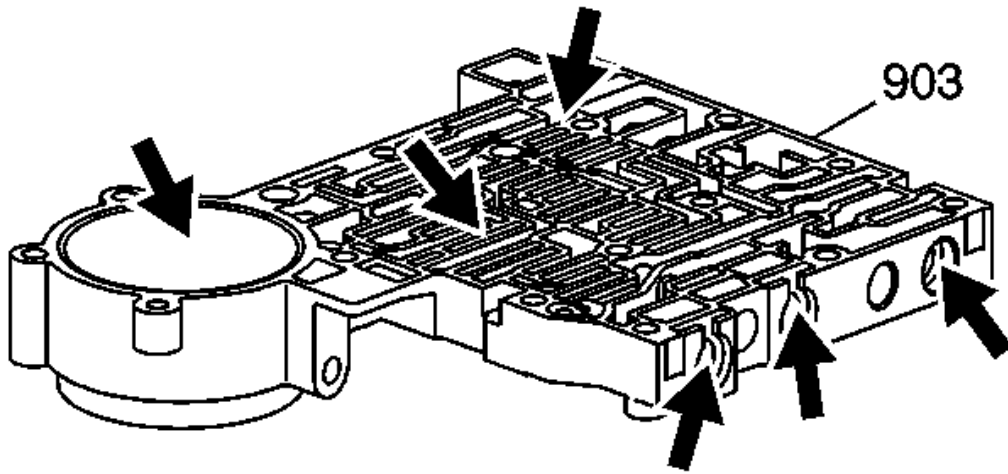


Fig. 255: Inspection Areas On Lower Control Valve Body
Courtesy of GENERAL MOTORS COMPANY

1. Inspect the lower control valve body (903) for scratches or debris in the valve bores.
2. Inspect the mating surfaces for damage.
3. Inspect the servo bore for damage.
4. Inspect all fluid passages for debris.

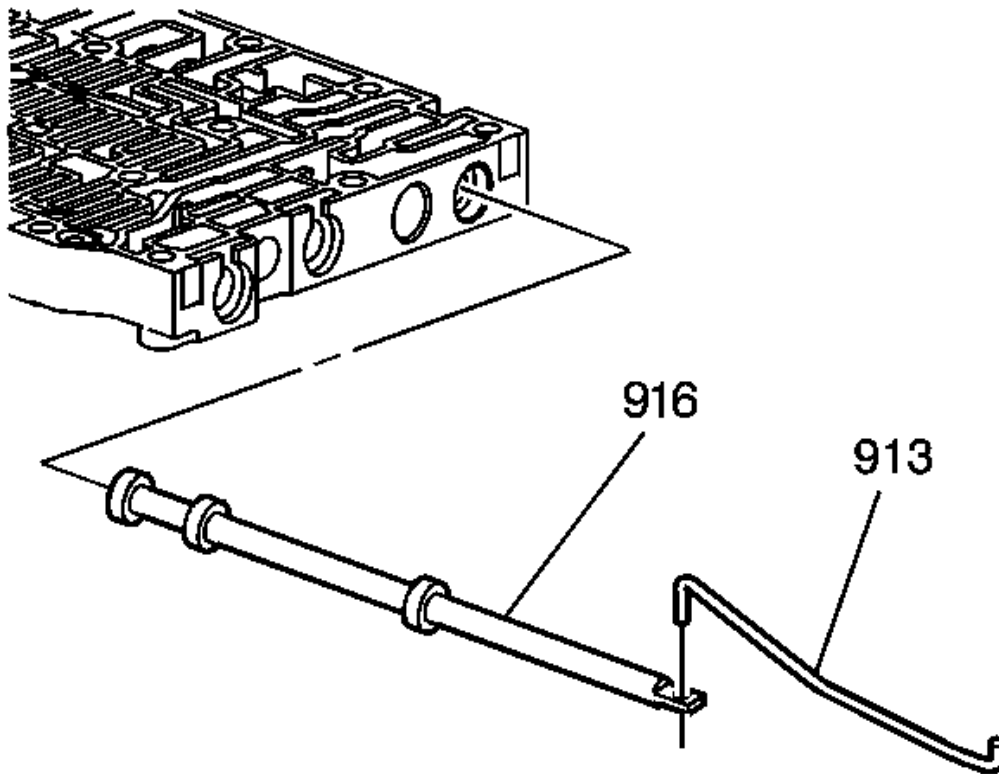


Fig. 256: Manual Valve & Link

Courtesy of GENERAL MOTORS COMPANY

5. Attach the manual valve link (913) onto the manual valve (916). Install the manual valve and link assembly into the lower control valve body.

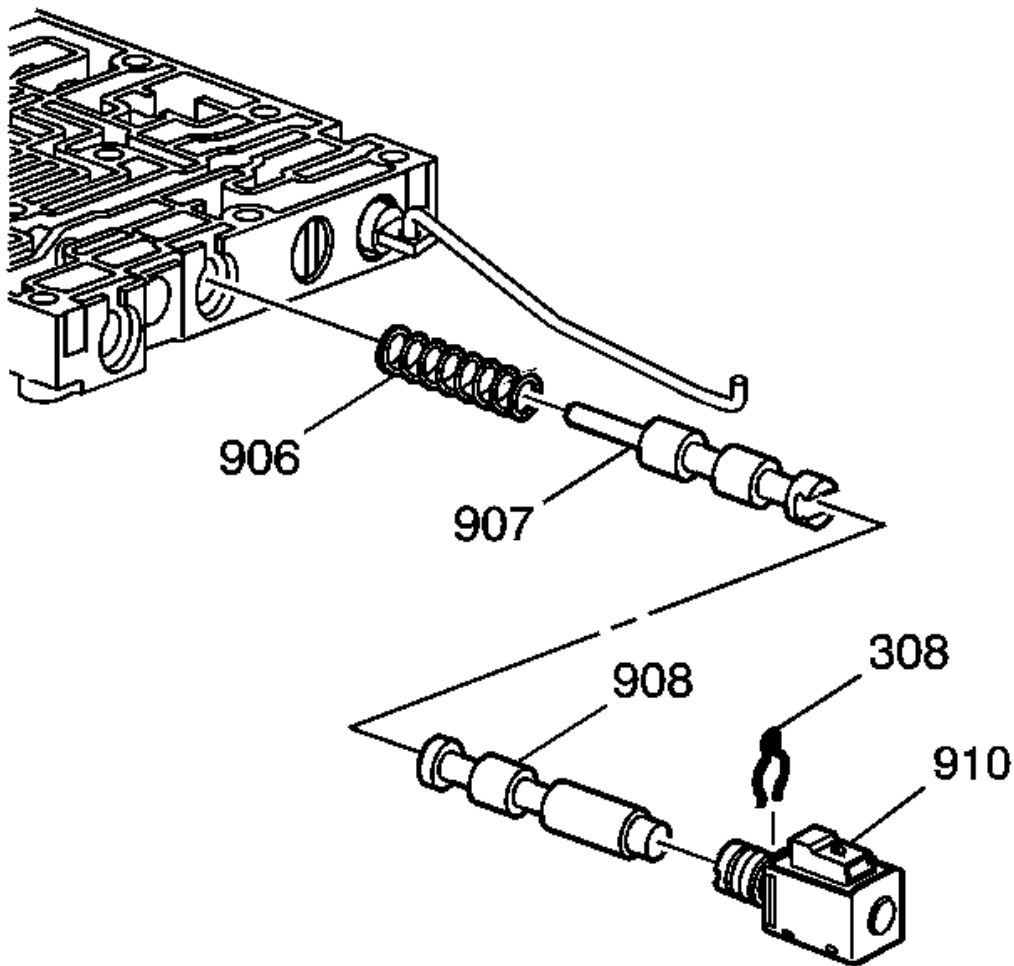


Fig. 257: 2-3 Shift Solenoid Valve

Courtesy of GENERAL MOTORS COMPANY

6. Install the following parts:
 1. The 2-3 shift valve spring (906)
 2. The 2-3 shift valve C (907)
 3. The 2-3 shift valve D (908)
 4. The 2-3 shift solenoid valve (910)
 5. The 2-3 shift solenoid valve retainer clip (308)

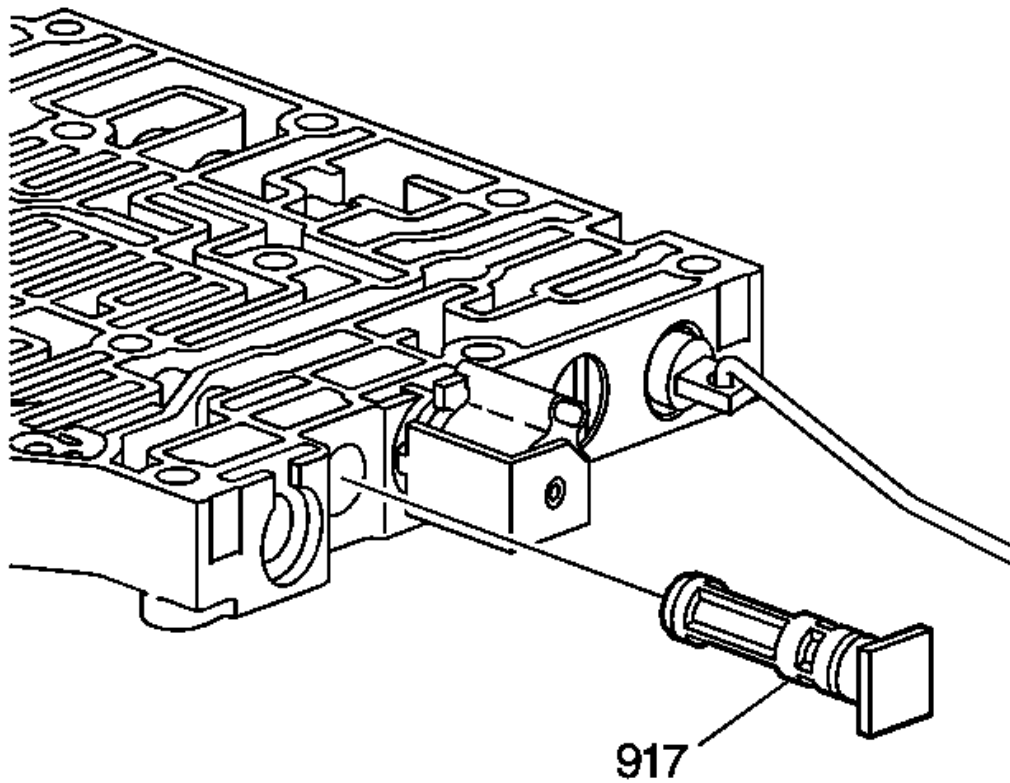


Fig. 258: Solenoid Screen Assembly
Courtesy of GENERAL MOTORS COMPANY

7. Install the solenoid screen assembly (917).

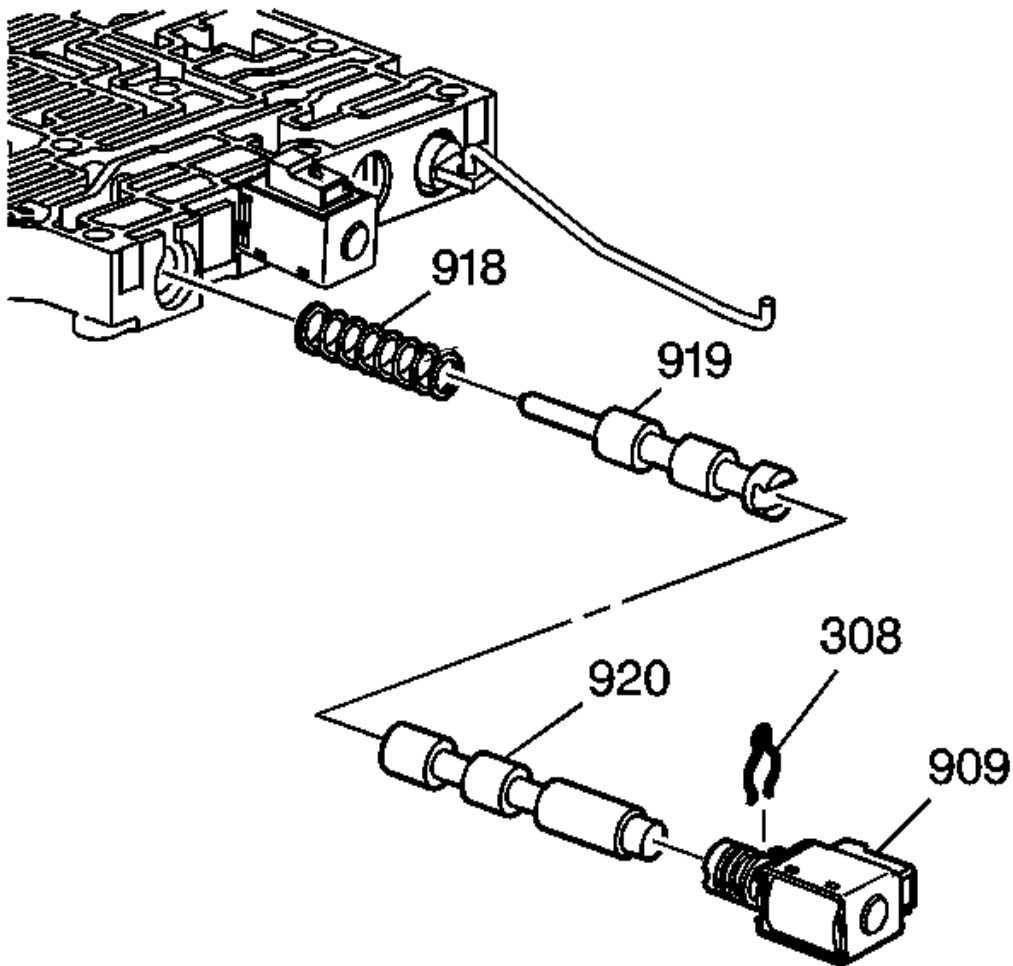


Fig. 259: 1-2 Shift Solenoid Valve
Courtesy of GENERAL MOTORS COMPANY

8. Install the following parts:
 1. The 1-2 shift valve spring (918)
 2. The 1-2 shift valve A (919)
 3. The 1-2 shift valve B (920)
 4. The 1-2 shift solenoid valve (909)
 5. The 1-2 shift solenoid valve retainer clip (308)

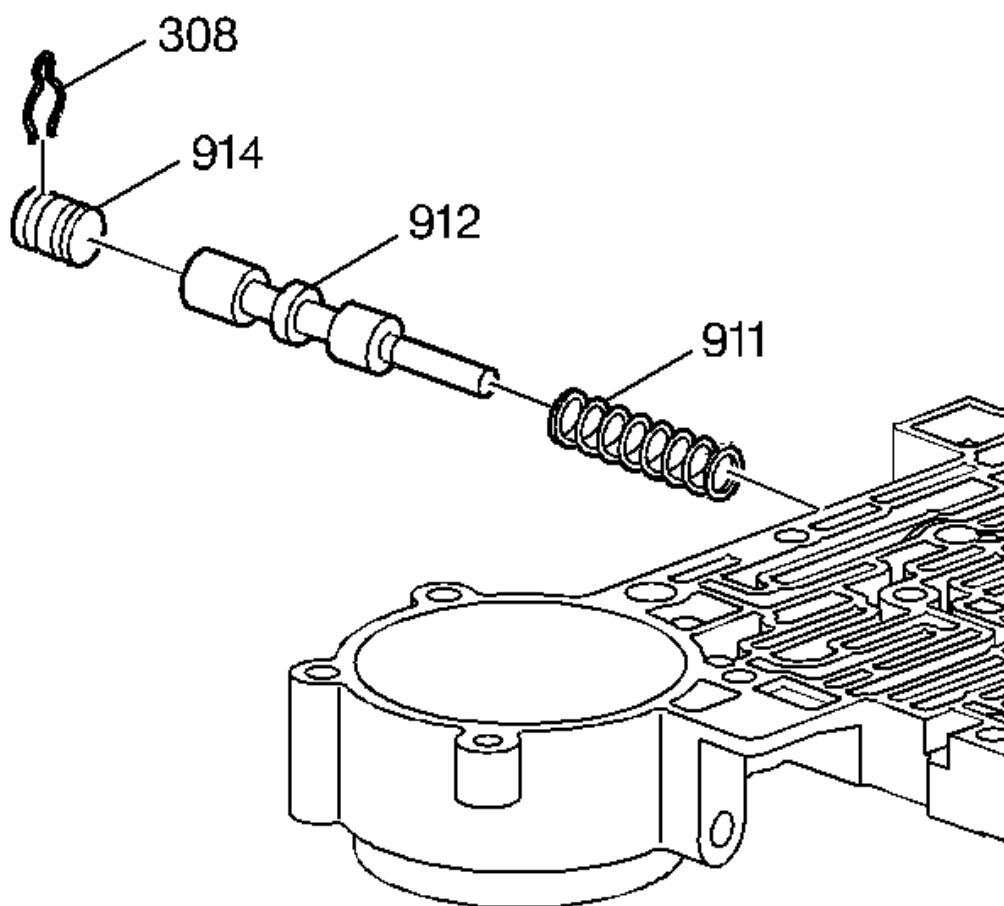


Fig. 260: Locating 3-4 Shift Valve Assembly
 Courtesy of GENERAL MOTORS COMPANY

9. Install the following parts:
 1. The 3-4 shift valve spring (911)
 2. The 3-4 shift valve (912)
 3. The bore plug (914)
 4. The bore plug retainer clip (308)

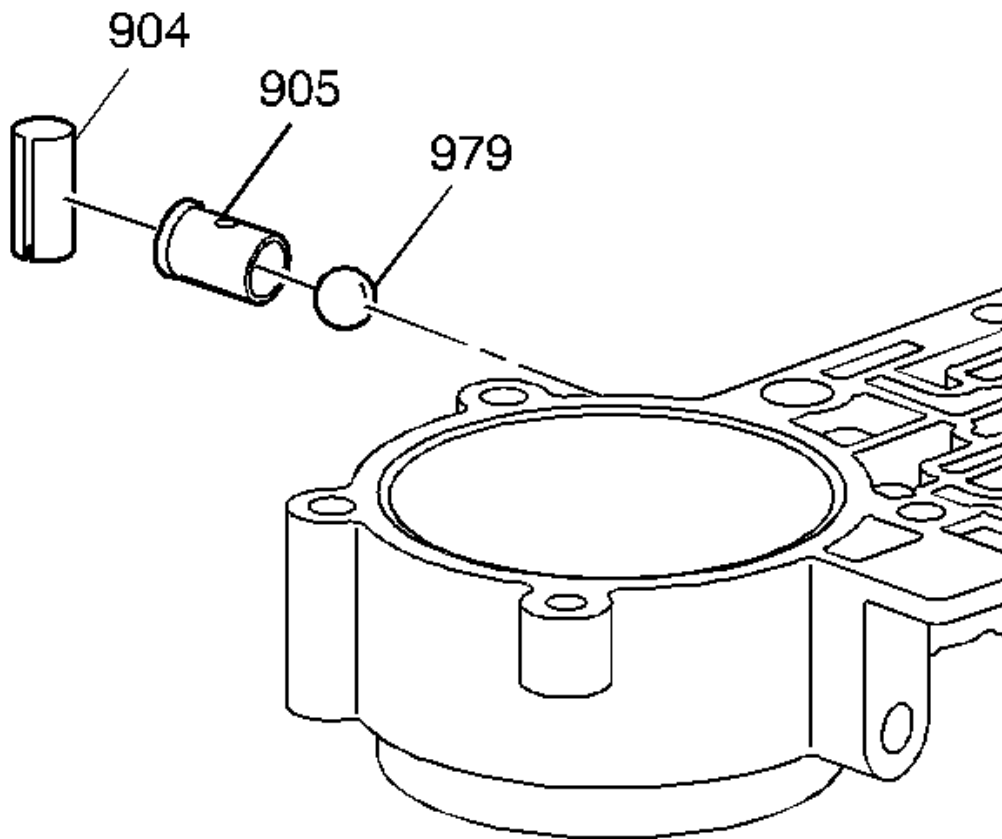


Fig. 261: Identifying Ball Check Capsule
 Courtesy of GENERAL MOTORS COMPANY

10. Install the following parts:
 1. The ball (979)
 2. The ball check capsule (905)
 3. The spring retainer (904)

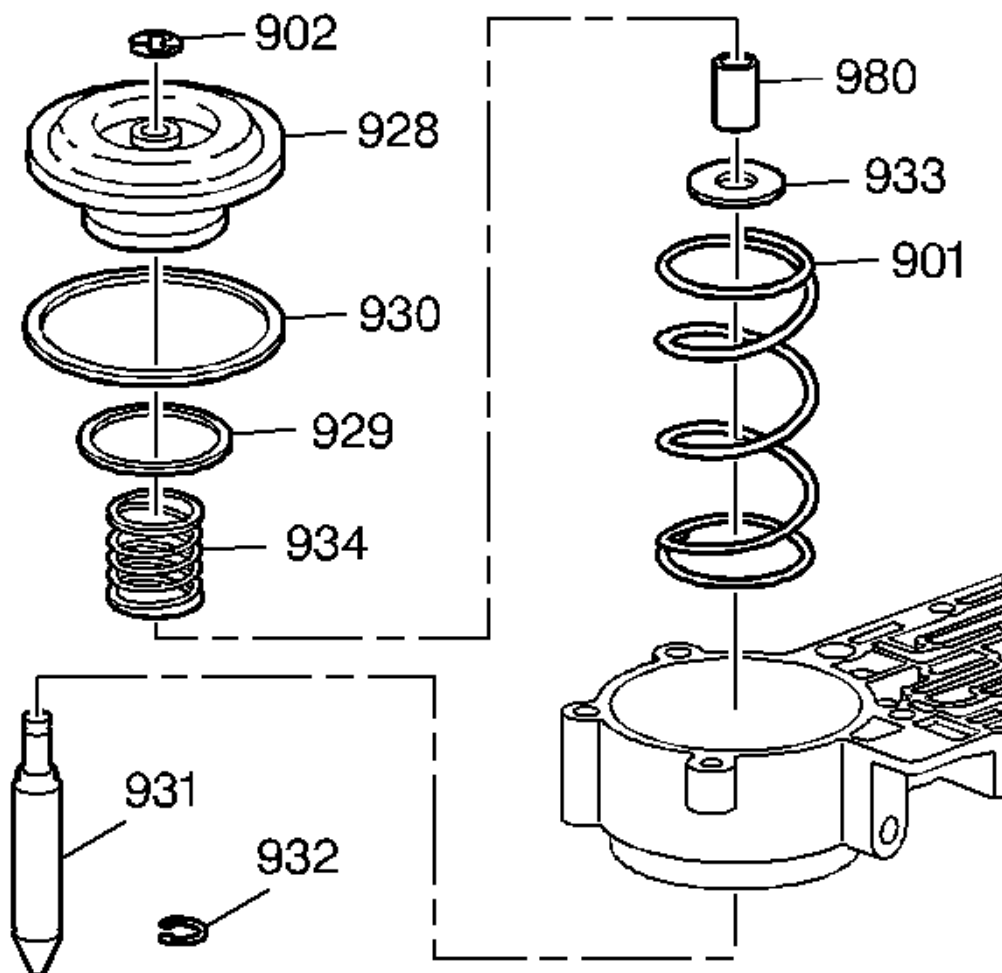


Fig. 262: View Of Low/Reverse Servo Components
Courtesy of GENERAL MOTORS COMPANY

11. Install the washer (933) and the sleeve (980) onto the servo apply pin (931).
12. Install the servo cushion spring (934) into the low/reverse servo piston (928).
13. Install the servo apply pin (931) into the low/reverse piston (928).
14. Install the retaining ring (902) onto the servo apply pin (931).
15. Place the return spring (901) into the low/reverse servo bore.
16. Place new seals (929, 930) on the low/reverse servo piston (928), and install the low/reverse servo assembly into the servo bore. Attach the retaining ring (932) to the servo apply pin (931).

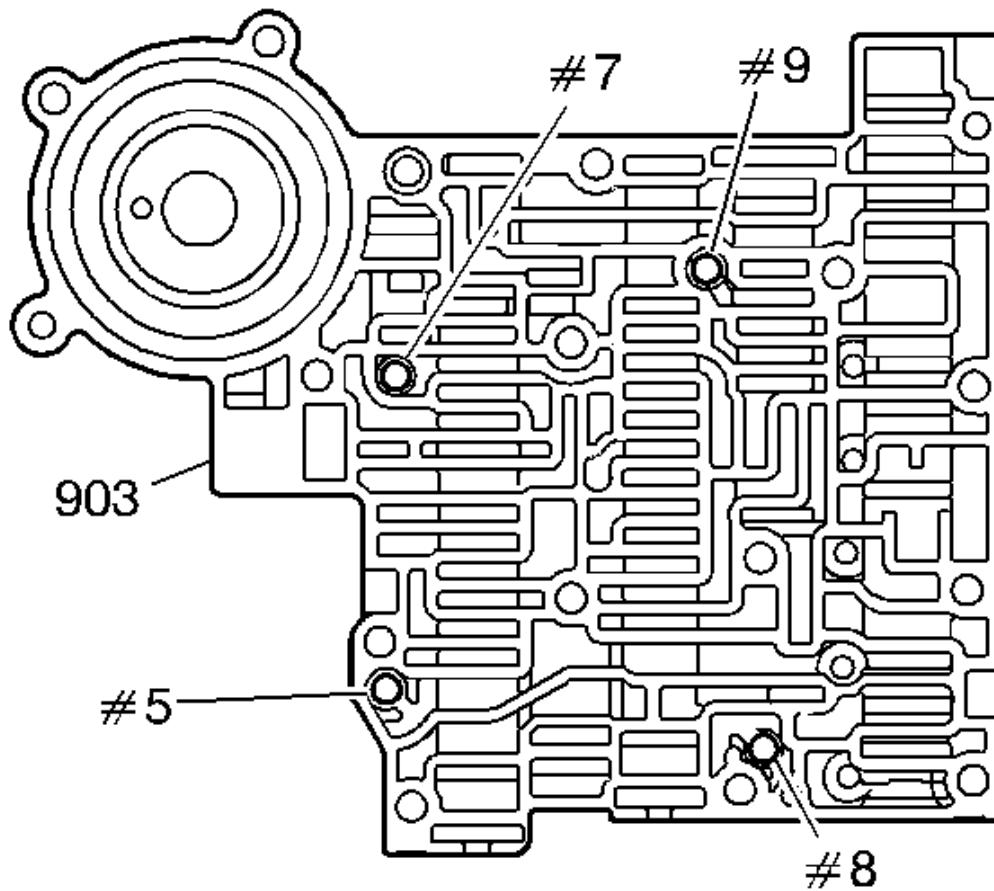


Fig. 263: View Of Checkball Cavities In Lower Control Valve Body
Courtesy of GENERAL MOTORS COMPANY

17. Install the checkballs (#5, #7, #8, #9) into the lower control valve body (903). Retain the checkballs in position with **J 36850** assembly lubricant or equivalent.

CHANNEL PLATE ASSEMBLE

Special Tools

- **J 39630-1** Guide Pins
- **J 39630-2** Guide Pins

For equivalent regional tools, refer to **Special Tools** .

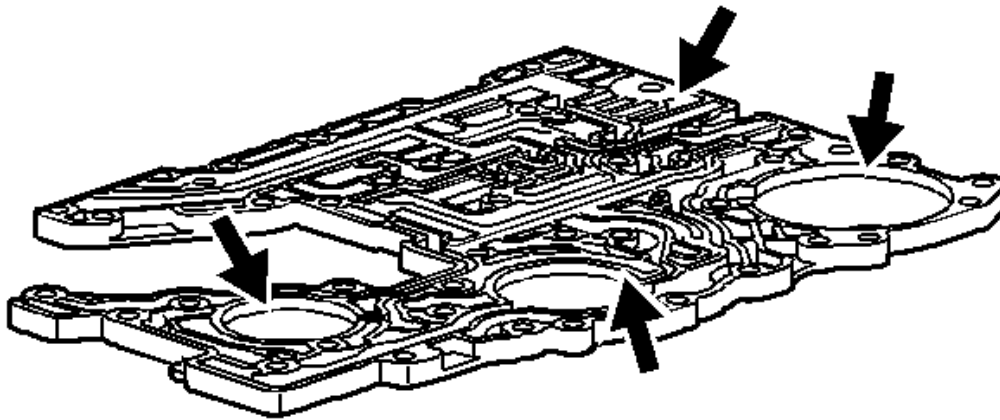


Fig. 264: Locating Lower Channel Plate Accumulator Bores & Mating Surfaces
Courtesy of GENERAL MOTORS COMPANY

1. Inspect the lower channel plate accumulator bores and mating surfaces for scratches or damage.

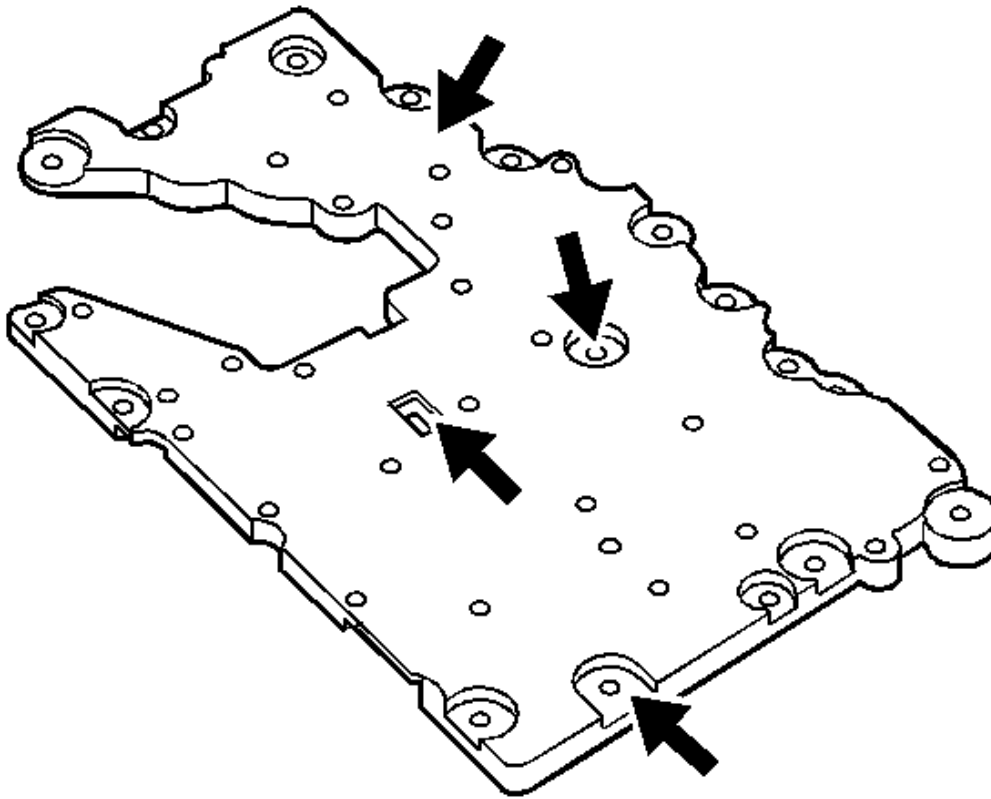


Fig. 265: Inspection Areas On Lower Channel Plate
Courtesy of GENERAL MOTORS COMPANY

2. Inspect the bottom side of the lower channel plate for damage to the bolt holes or debris in passages.

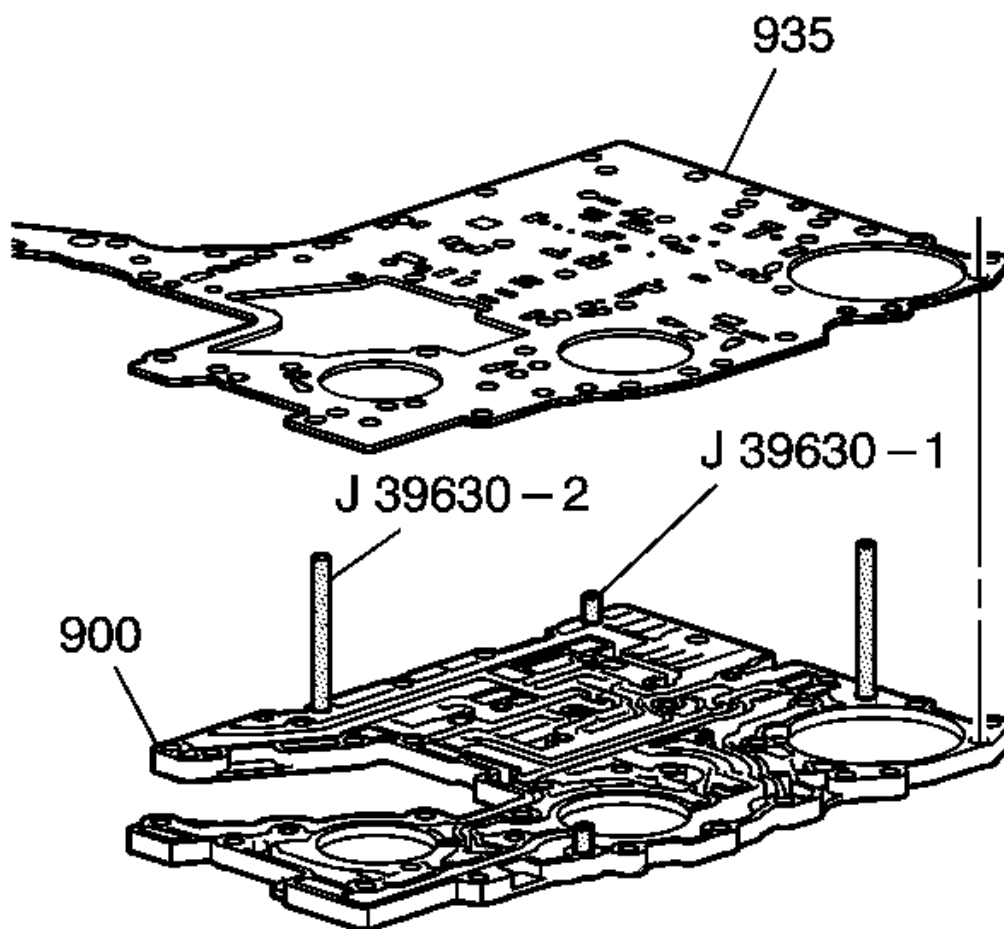


Fig. 266: Installing The Spacer Plate And Gasket Assembly (935) Onto The Lower Channel Plate Using J 39630-1 & J 39630-2

Courtesy of GENERAL MOTORS COMPANY

3. Insert the **J 39630-1** guide pins into the lower channel plate (900) and rest the channel plate on the guide pin heads.
4. Install the **J 39630-2** guide pins into the lower channel plate (900).
5. Install the spacer plate and gasket assembly (935) onto the lower channel plate (900).

LOWER CONTROL VALVE BODY AND INTERNAL MODE SWITCH INSTALLATION

Special Tools

- **J 39630-1** Lower Control/Valve Body Gasket Guide Pins

- **J 39630-2** Lower Control/Valve Body Gasket Guide Pins
- **DT-47707-R1** Internal Mode Switch Alignment Tool

For equivalent regional tools, refer to **Special Tools** .

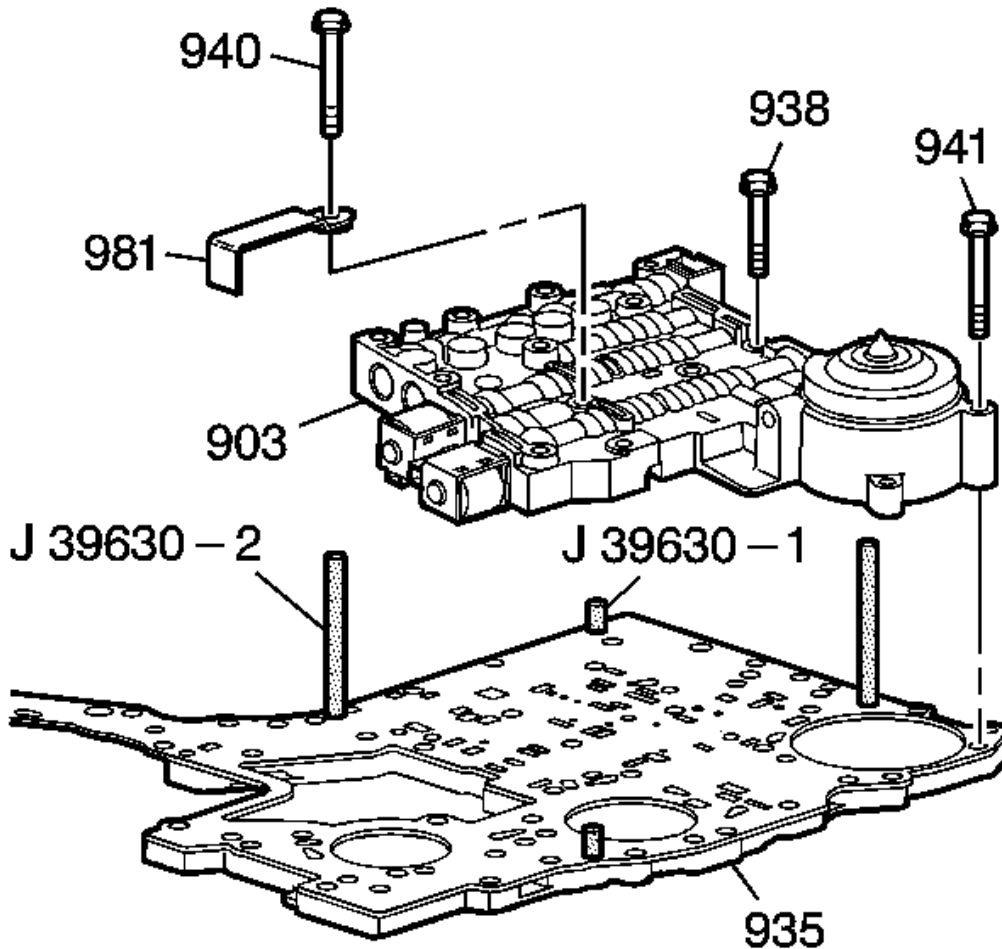


Fig. 267: Identifying Lower Control Valve Body Over J 39630-2
 Courtesy of GENERAL MOTORS COMPANY

1. Install the lower control valve body (903) over the **J 39630-2** guide pins.

CAUTION: Refer to Fastener Caution .

2. Position the solenoid valve fluid filter retainer (981) onto the lower control valve body (903) and install some of the valve body bolts (938, 940, 941) and hand tighten them.
3. Remove the **J 39630-2** guide pins and tighten the bolts (938, 940, 941) in a star pattern to 8-14 N.m (6-10 lb ft).

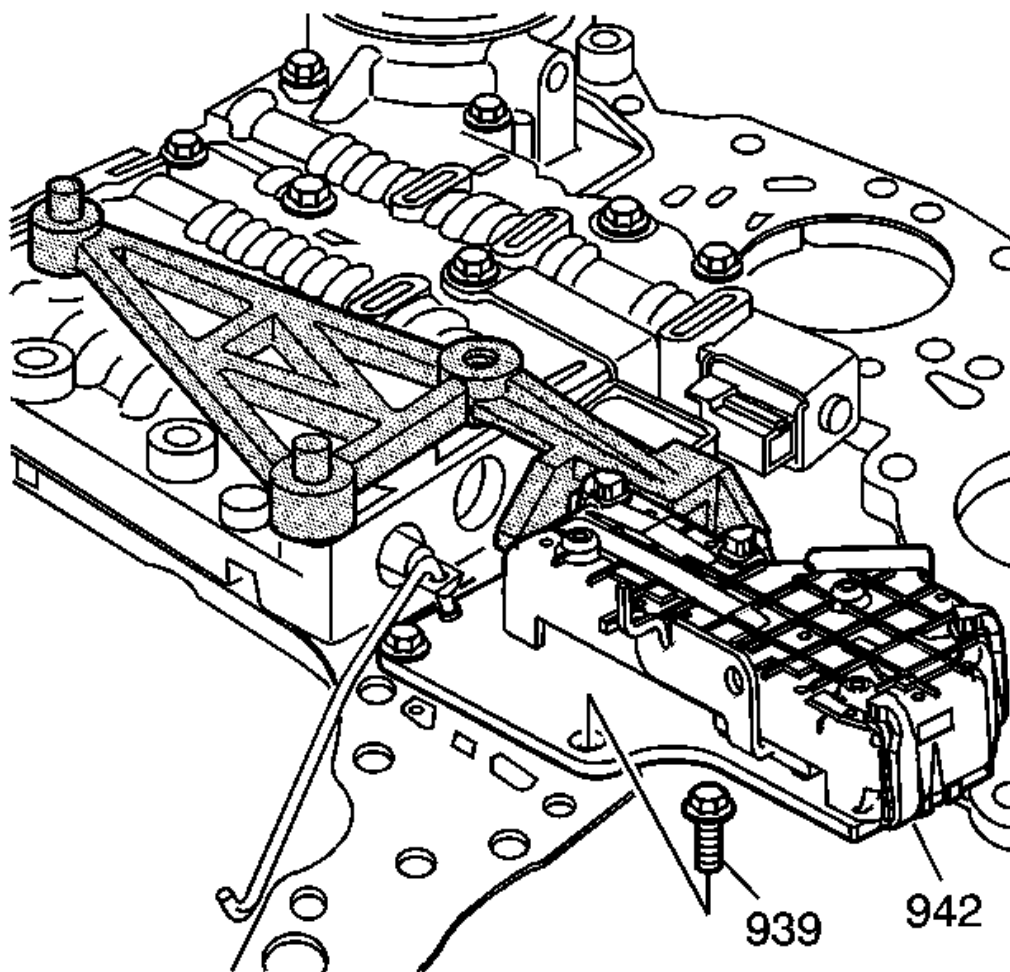


Fig. 268: DT-47707-R1

Courtesy of GENERAL MOTORS COMPANY

4. Position the **DT-47707-R1** alignment tool onto the lower control valve body, next to the 2-3 shift solenoid valve, and install the two **J 39630-1** guide pins.

NOTE: Hold the **IMS (942)** against the **DT-47707-R1** alignment tool while tightening the bolts.

5. Locate the internal mode switch (IMS) (942) against the **DT-47707-R1** alignment tool, install the three 8 mm bolts (939) and tighten to 8-14 N.m (6-10 lb ft).
6. Remove the **DT-47707-R1** alignment tool and the **J 39630-1** guide pins.

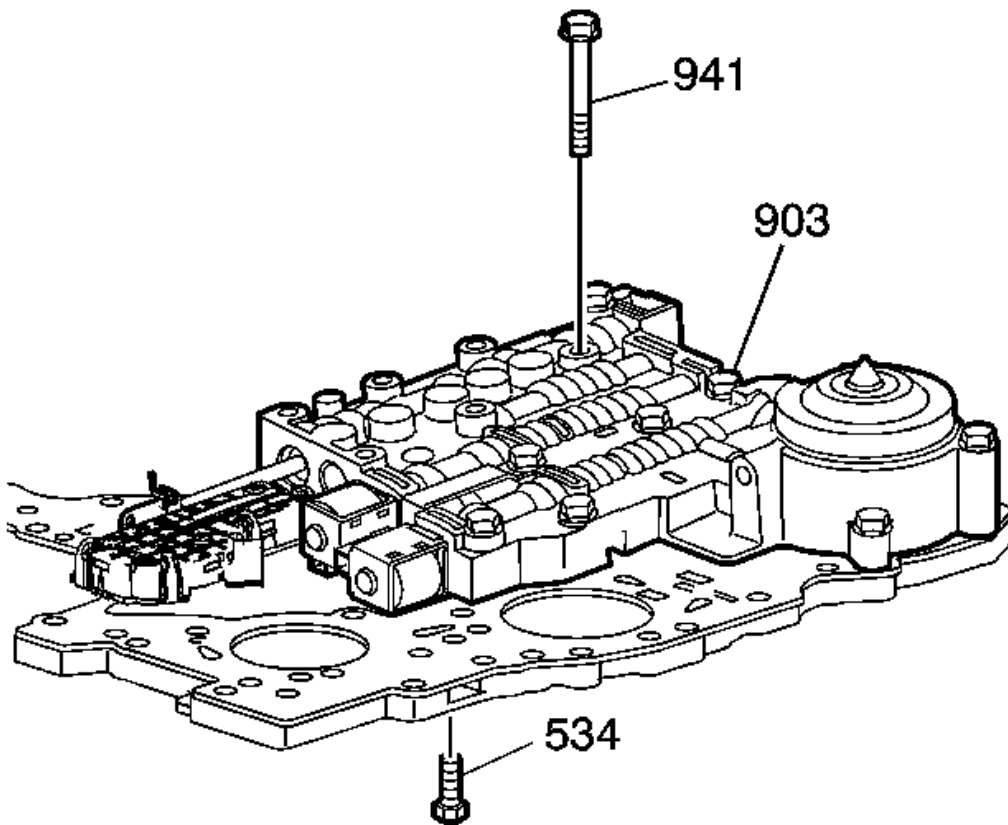


Fig. 269: Lower Control Valve Body
Courtesy of GENERAL MOTORS COMPANY

7. Install the remaining bolts (941) into the lower control valve body (903) and tighten to 8-14 N.m (6-19 lb ft).

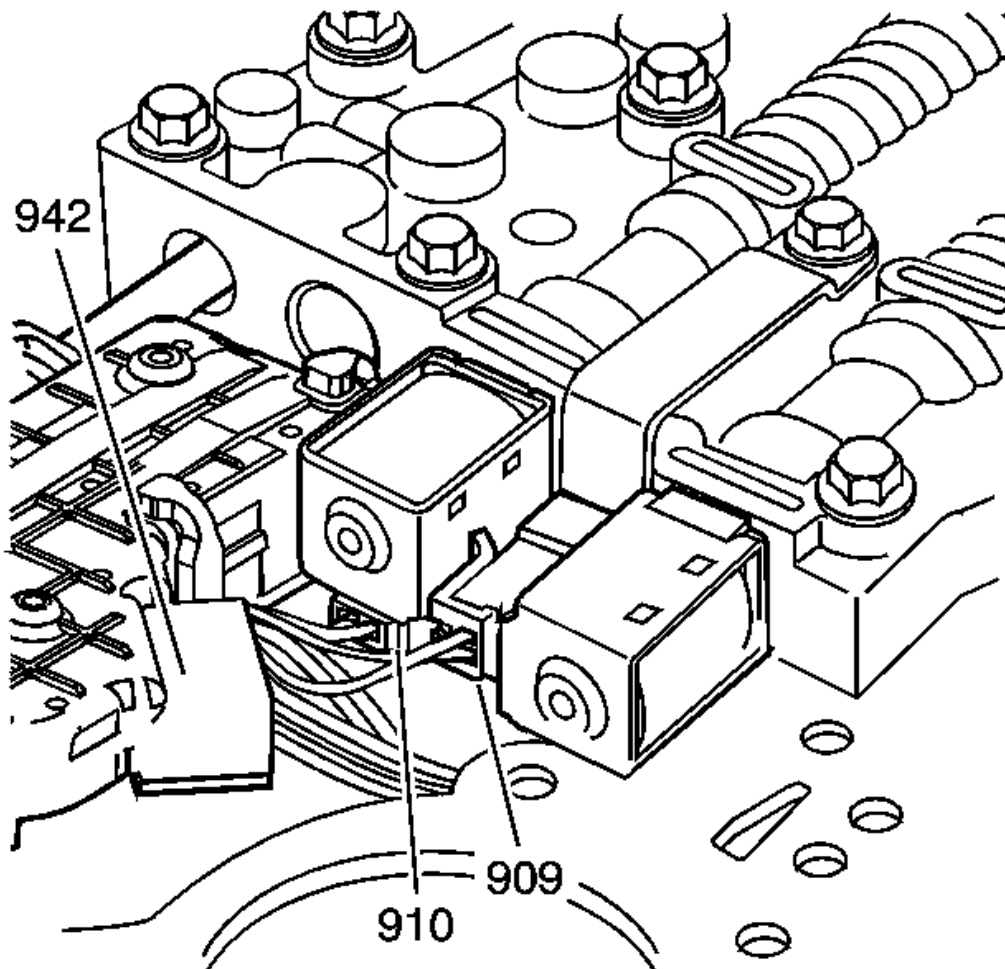


Fig. 270: Lower Control Valve Body Wire Harness
 Courtesy of GENERAL MOTORS COMPANY

8. Connect the lower control valve body wire harness (943) to the following parts:
 - 1-2 shift solenoid valve (909)
 - 2-3 shift solenoid valve (910)
 - Internal mode switch (IMS) (942)

ACCUMULATOR HOUSING DISASSEMBLE

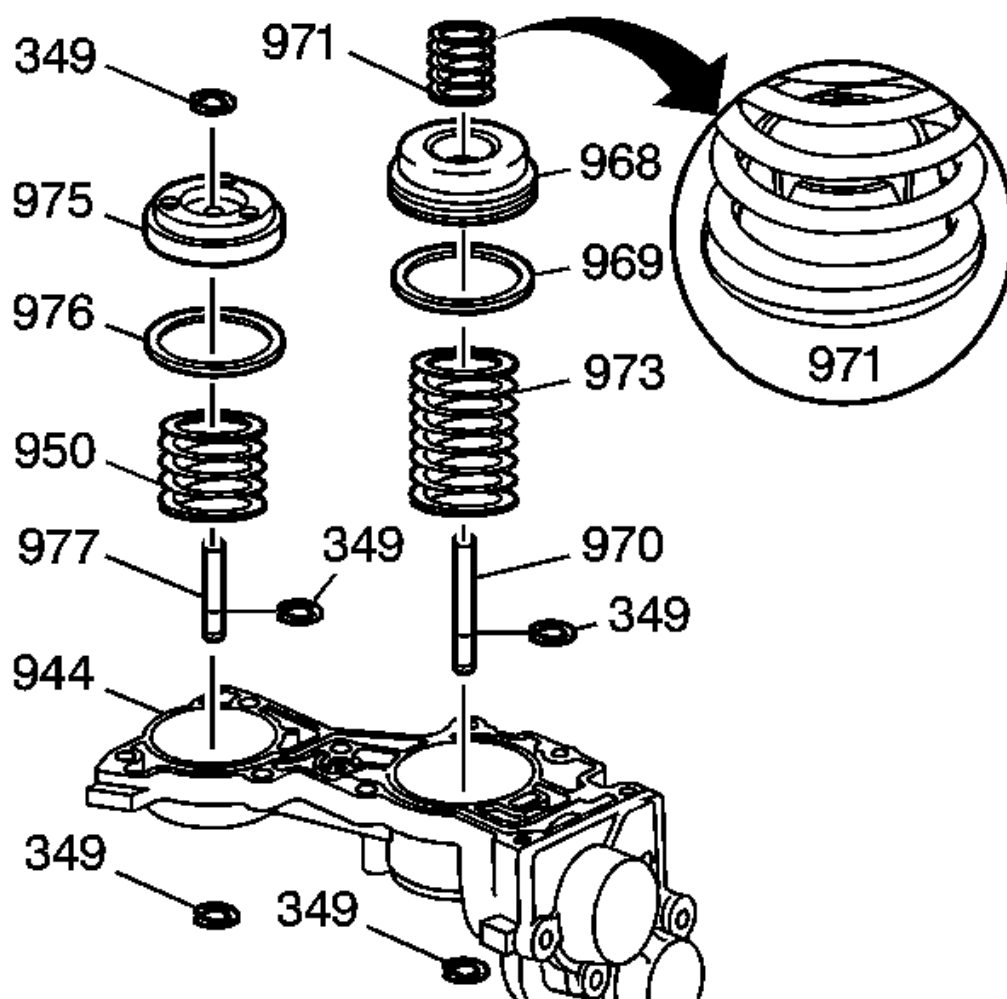


Fig. 271: Identifying 1-2 Accumulator Assembly & 3-4 Accumulator Assembly
 Courtesy of GENERAL MOTORS COMPANY

1. Remove the following parts:
 - The two snap rings (349) from the top side of the accumulator housing (944)
 - The 1-2 accumulator assembly (968-970, 973)
 - The 3-4 accumulator assembly (975-977, 950)
2. Inspect the accumulator pistons for scratches or damage. Inspect the accumulator piston pins for scoring.

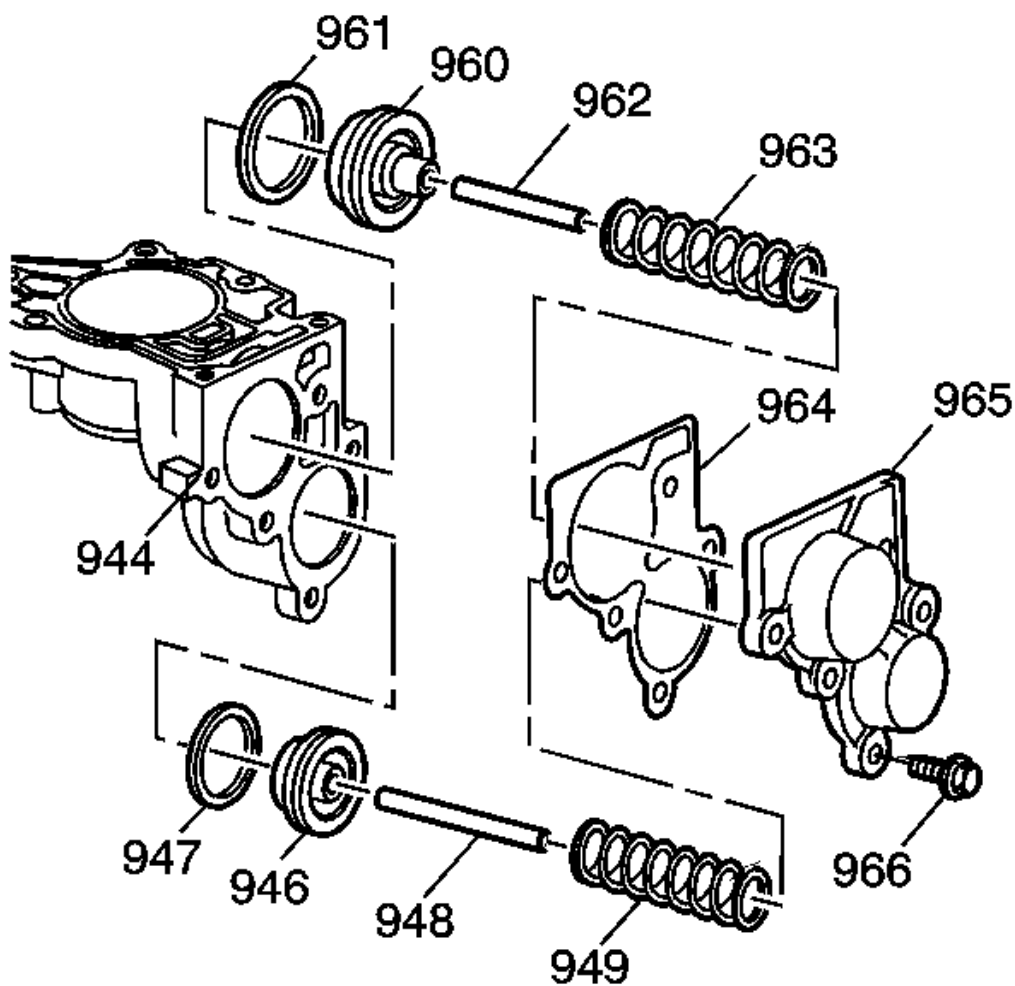


Fig. 272: View Of Forward Accumulator Assembly & Reverse Accumulator Assembly
 Courtesy of GENERAL MOTORS COMPANY

3. Remove the following parts:
 - The five 8-mm cover bolts (966)
 - The accumulator housing cover (965)
 - The gasket (964)
 - The forward accumulator assembly (960-963)
 - The reverse accumulator assembly (946-949)
4. Inspect the accumulator pistons (946, 960) and the accumulator piston pins (948, 962) for scoring or damage.

ACCUMULATOR HOUSING ASSEMBLE

Special Tools

- **J 39630-2** Lower Control/Valve Body Gasket Guide Pins
- **J 36850** Assembly Lubricant(or equivalent)

For equivalent regional tools, refer to **Special Tools** .

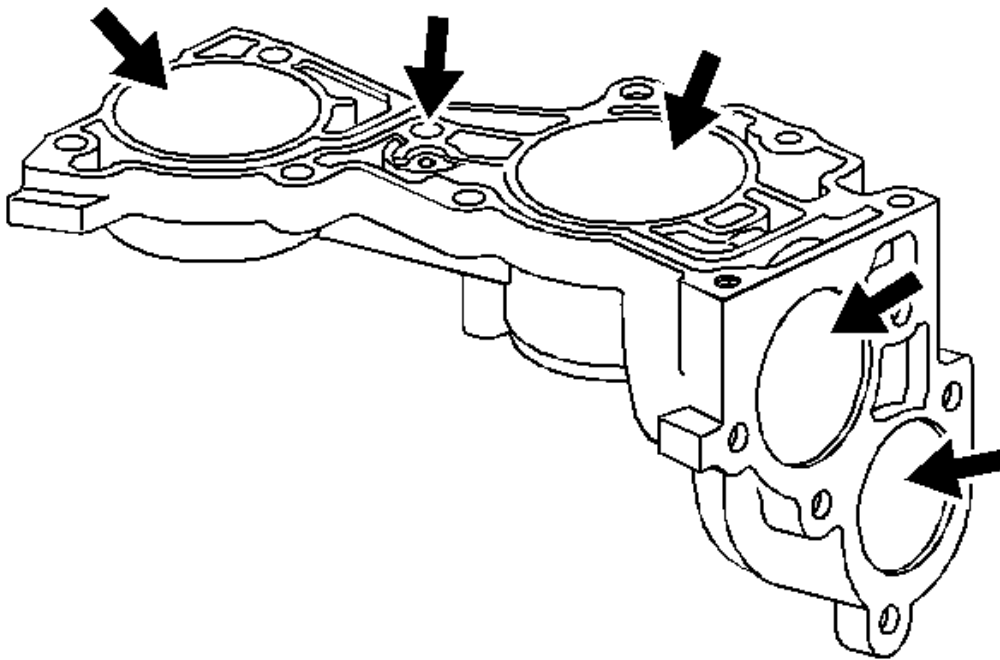


Fig. 273: Identifying Inspection Points On Accumulator Housing
Courtesy of GENERAL MOTORS COMPANY

1. Inspect the accumulator housing for damage or scoring in the bores.
2. Inspect all fluid passages for debris.

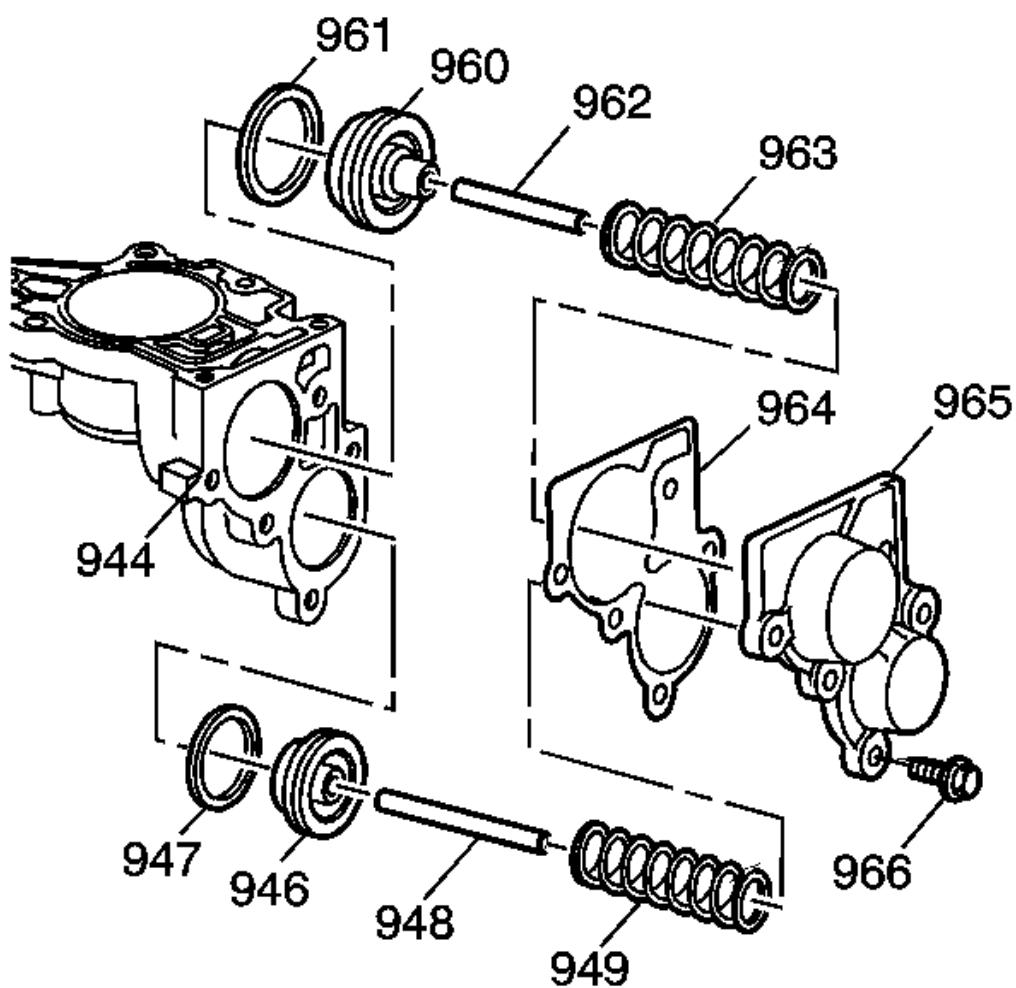


Fig. 274: View Of Forward Accumulator Assembly & Reverse Accumulator Assembly
Courtesy of GENERAL MOTORS COMPANY

3. Install new seals (947, 961) onto the accumulator pistons (946, 960).
4. Install the following parts:
 1. The forward accumulator pin (962) into the accumulator housing (944)
 2. The forward accumulator piston (960)
 3. The spring (963)
5. Install the following parts:
 1. The reverse accumulator pin (948)
 2. The reverse accumulator piston (946)

3. The reverse accumulator spring (949)
6. Install the following parts:
 1. The accumulator housing cover gasket (964)
 2. The accumulator housing cover (965)

CAUTION: Refer to Fastener Caution .

3. The five 8 mm accumulator housing cover bolts (966) and tighten to 8-14 N.m (6-10 lb ft).

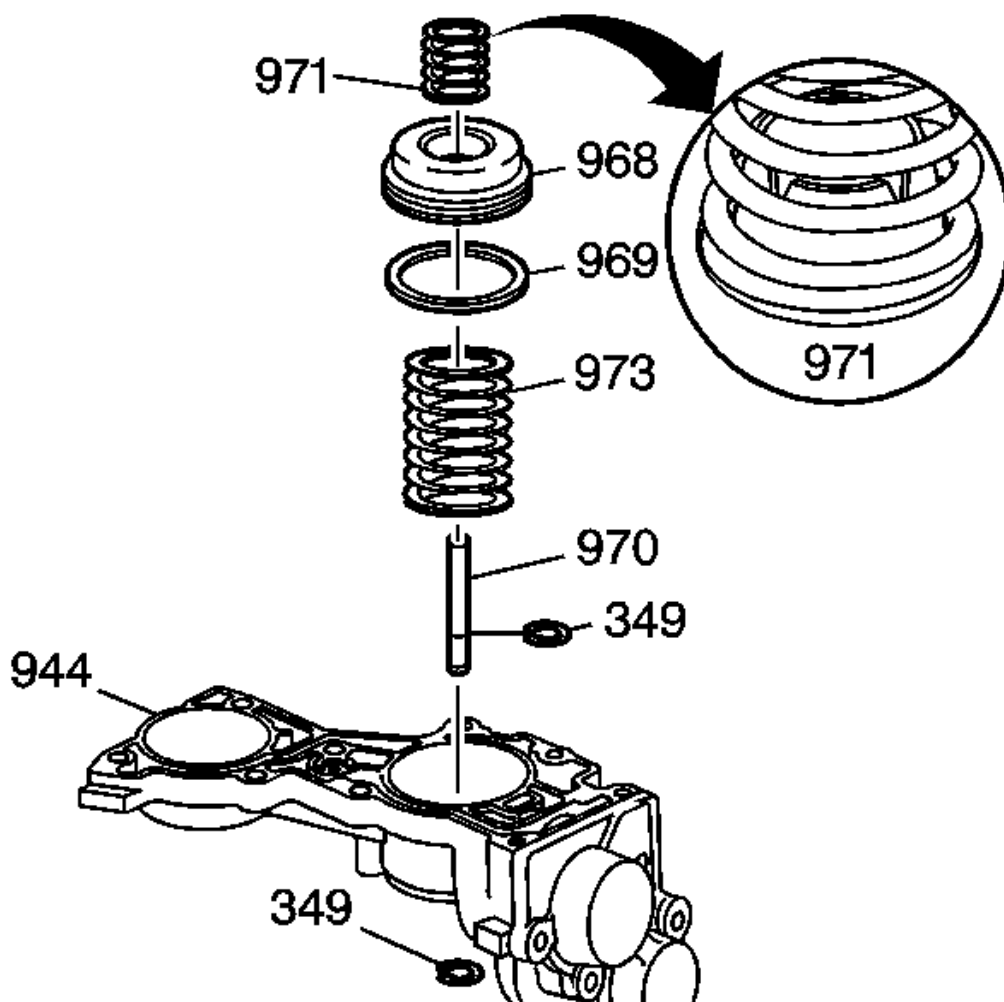


Fig. 275: Expanded View Of 1-2 Accumulator Assembly

Courtesy of GENERAL MOTORS COMPANY

7. Install a new seal (969) onto the 1-2 accumulator piston (968).
8. Install the following parts:
 - The 1-2 accumulator spring (973)
 - The 1-2 accumulator pin (970)
 - The 1-2 accumulator piston (968)
 - The snap ring (349). Install the snap ring onto the 1-2 accumulator pin (970) after you have passed the pin through the top of the accumulator housing (944).
 - The 1-2 accumulator inner spring assembly (971)

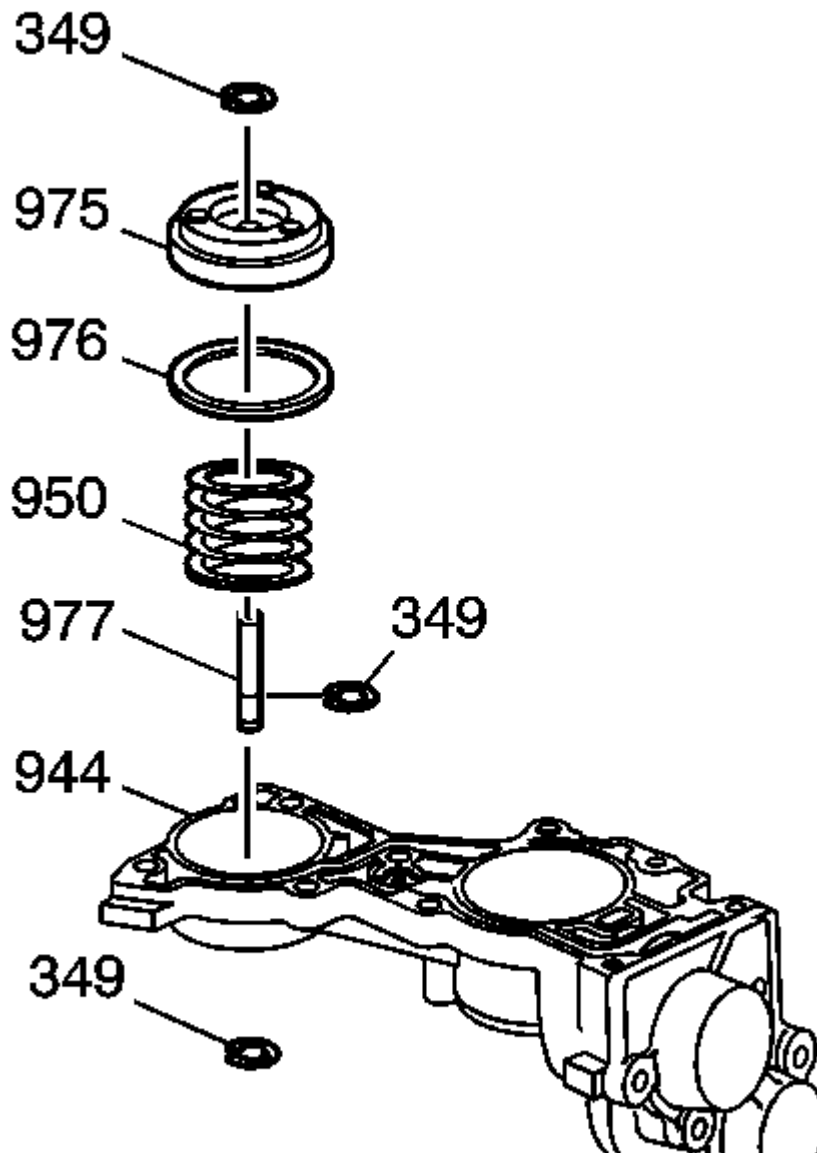


Fig. 276: 3-4 Accumulator Housing Components
Courtesy of GENERAL MOTORS COMPANY

9. Install the following parts:

- The 3-4 accumulator spring (950)
- The 3-4 accumulator pin (977)

- The 3-4 accumulator piston (975)
- The snap ring (349). Install the snap ring onto the 3-4 accumulator pin (977) after you have passed the pin through the top of the accumulator housing (944).

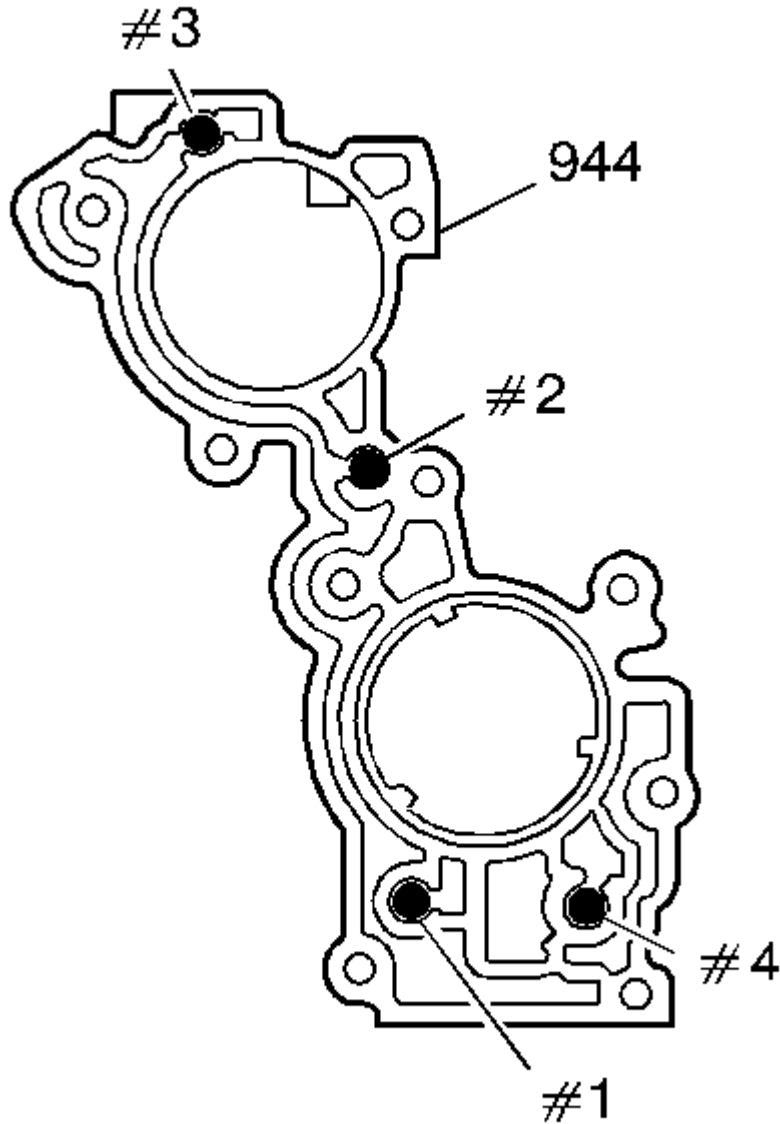


Fig. 277: Identifying Checkball Cavities
 Courtesy of GENERAL MOTORS COMPANY

10. Install the checkballs (#1-4) into their proper cavities in the accumulator housing (944). Retain the checkballs with **J 36850** Assembly Lubricantor equivalent.

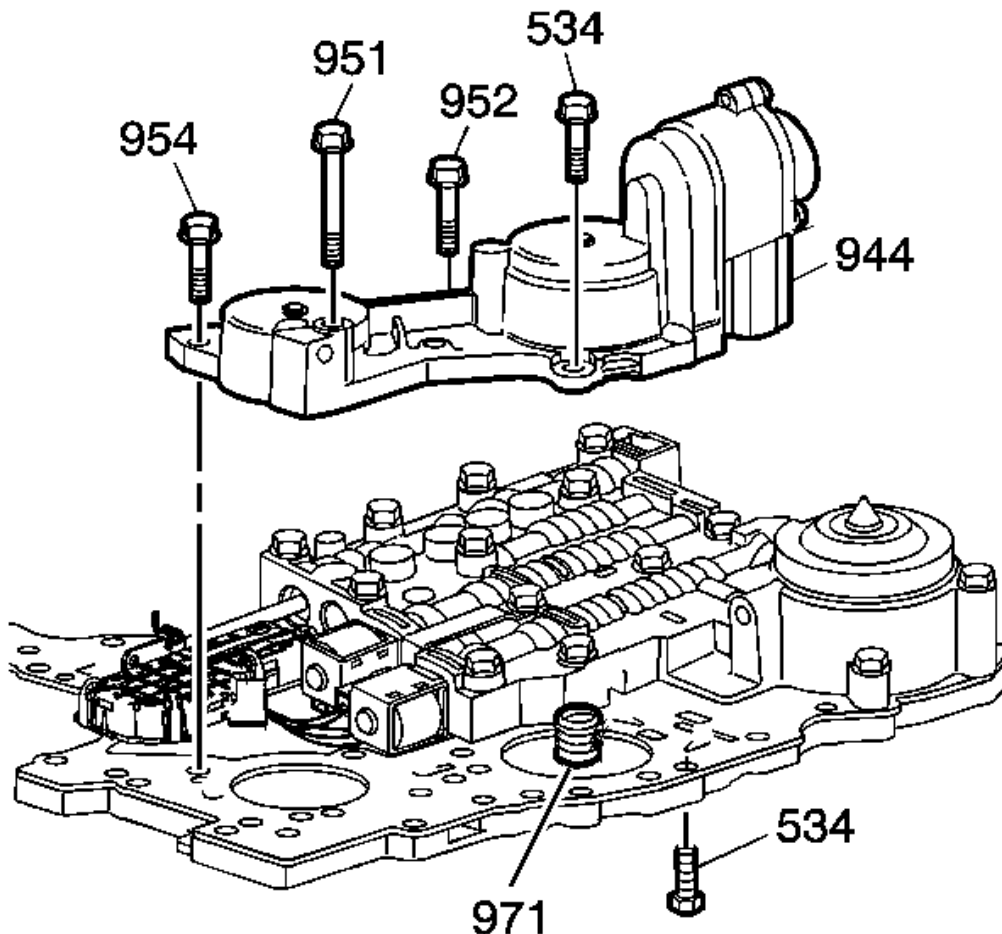


Fig. 278: Accumulator Housing

Courtesy of GENERAL MOTORS COMPANY

11. Install the **J 39630-2** guide pins into the lower control valve body gasket for the accumulator housing. Make sure that the 1-2 accumulator inner spring assembly (971) goes into the channel plate washer side down.
12. Install the accumulator housing (944) onto the lower channel plate and install the bolts (534, 951, 952, 954) and hand tighten.
13. Remove the **J 39630-2** guide pins, install the rest of the accumulator housing bolts, including bolts (534) from the channel plate side and tighten to 8-14 N.m (6-10 lb ft).

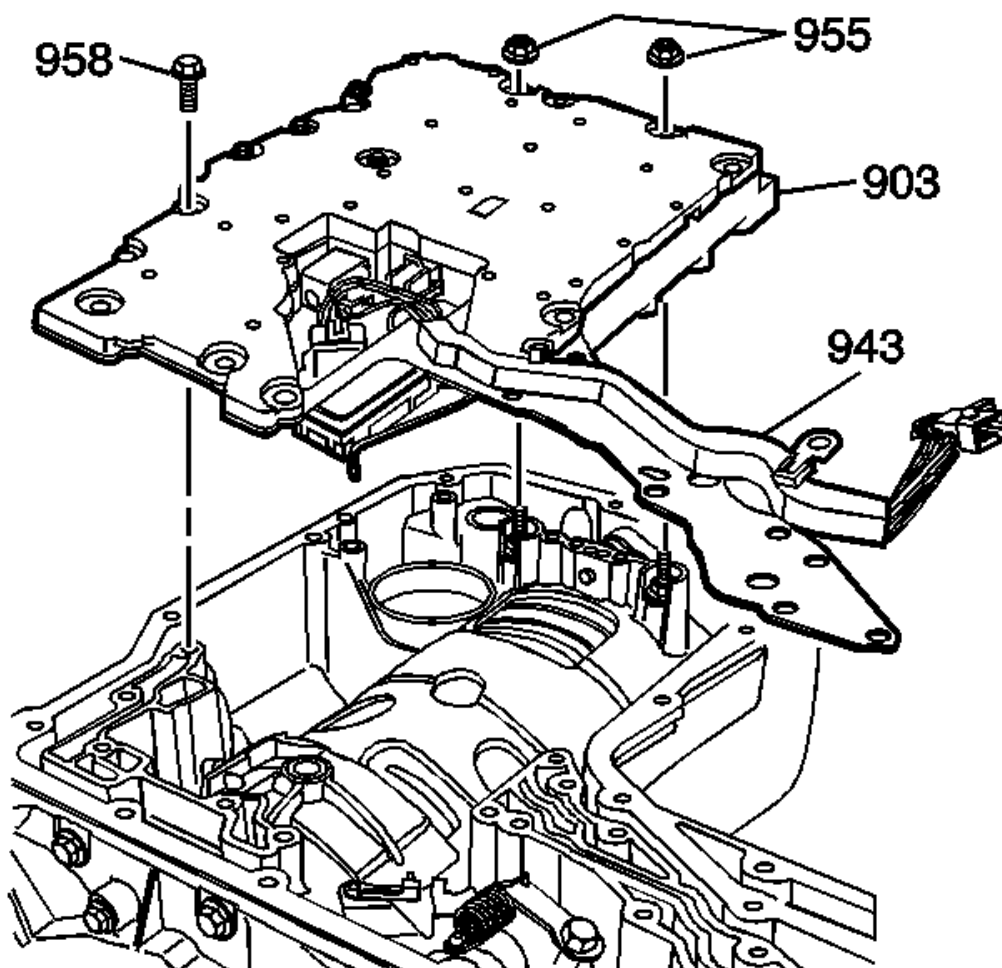
LOWER CONTROLS ASSEMBLY INSTALLATION

Fig. 279: Identifying Lower Channel Plate, Control Valve Body And Accumulator Assembly, And Lower Control Valve Body Wire Harness Extension
Courtesy of GENERAL MOTORS COMPANY

1. Place the lower controls assembly over the forward support studs.

NOTE: The bolts (958) without the flange are located next to the oil transfer plate.

2. Hand start the bolts (534, 958) into the channel plate.
3. Install the two nuts (955) on the forward support studs.

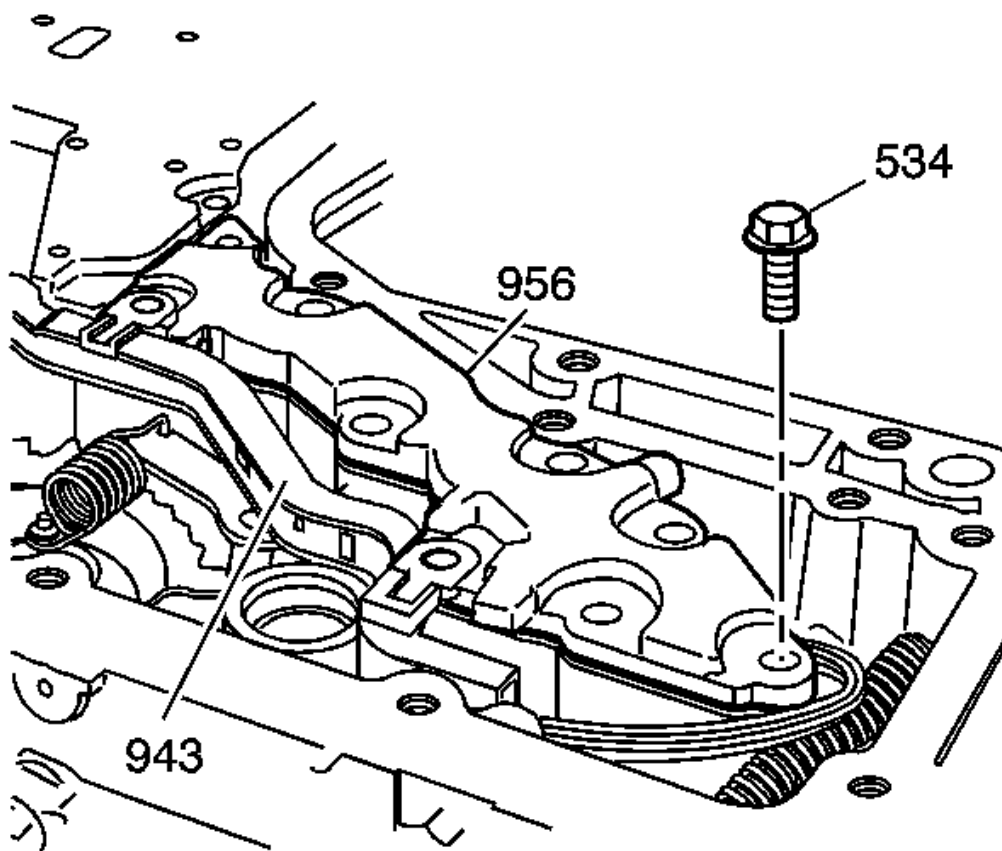


Fig. 280: Identifying Oil Transfer Plate Bolts
Courtesy of GENERAL MOTORS COMPANY

4. Place the oil transfer plate (956) over the open gasket area.
5. Position the lower control valve body wire harness retaining clips (943).

CAUTION: Refer to Fastener Caution .

6. Hand start the bolts (534) to hold the oil transfer plate (956) in place with the lower control valve body wire harness retaining clips (943) attached properly, then tighten the bolts and nuts (534) to 8-14 N.m (6-10 lb ft).

MANUAL LINK AND WIRE HARNESS CONNECTION

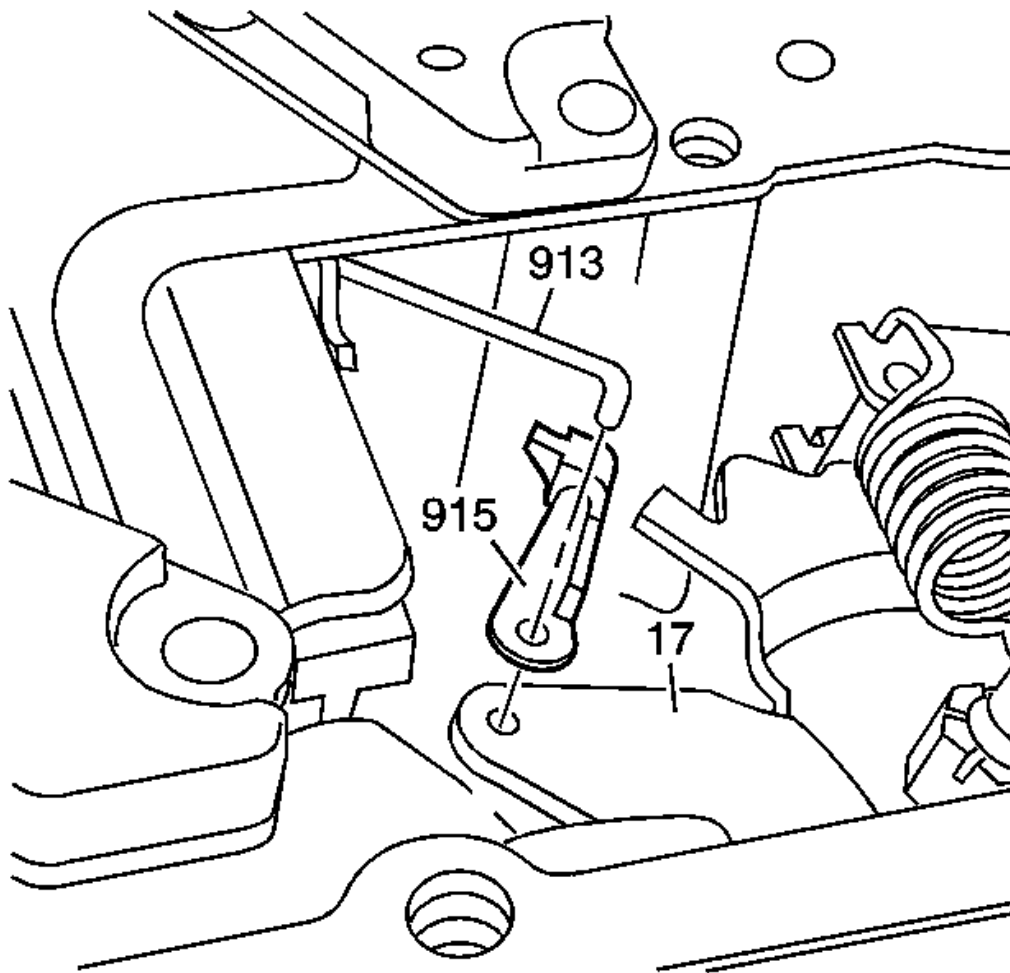


Fig. 281: Locating Manual Valve Link & Detent Lever
 Courtesy of GENERAL MOTORS COMPANY

NOTE: Failure to use a new manual valve link retainer may cause the manual valve link assembly to become disconnected.

1. Install a new manual valve link retainer (915) onto the detent lever (17).
2. Connect the manual valve link (913) to the detent lever (17).

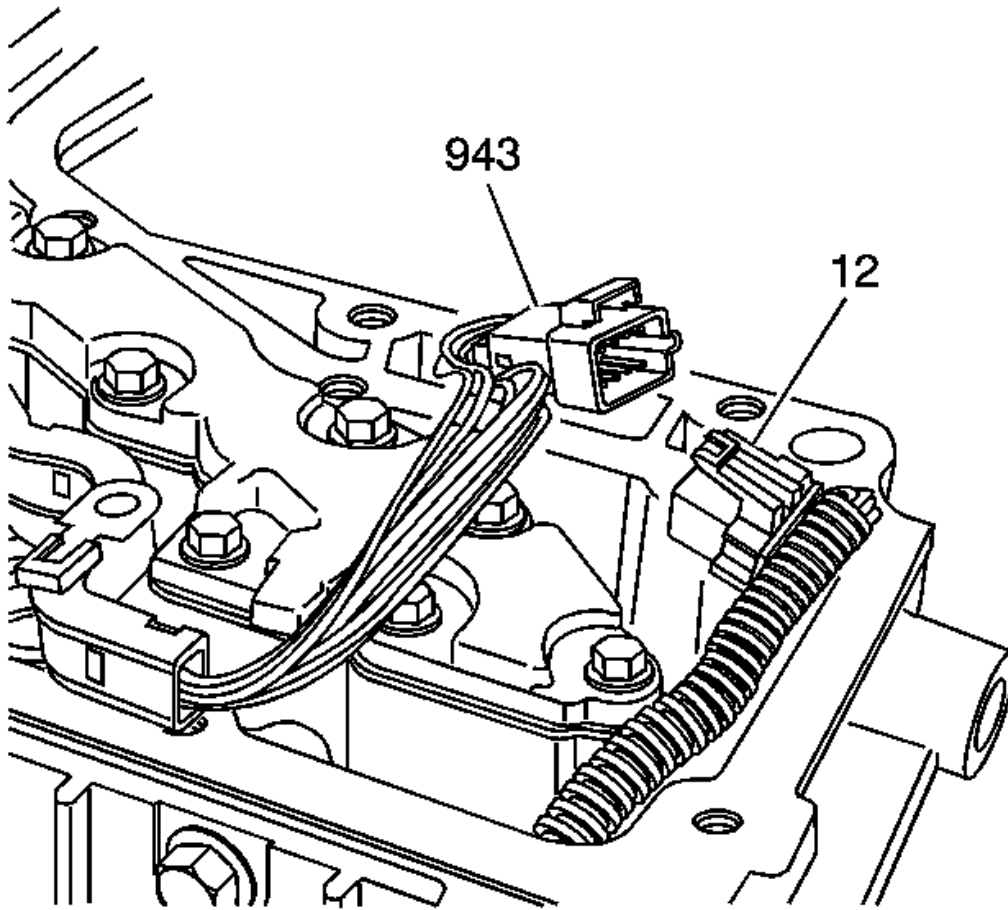


Fig. 282: View Of Wire Harness Extension & Upper Control Wire Harness
Courtesy of GENERAL MOTORS COMPANY

3. Connect the wire harness extension (943) to the upper control wire harness (12).
4. Tuck the harness and connectors into the case cavity.

SCAVENGE SCREENS/SEALS, BOTTOM PAN INSTALLATION

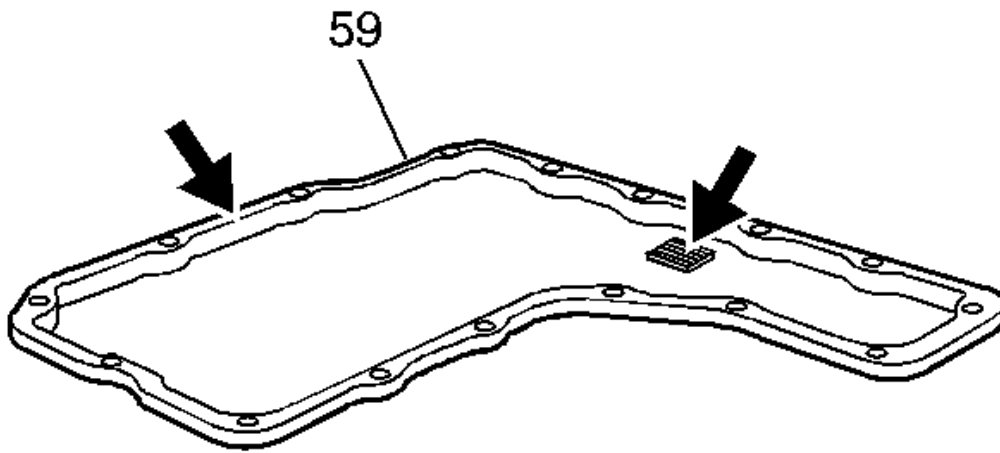


Fig. 283: Locating Inspection Areas On Sealing Surface & Bottom Pan Magnet
Courtesy of GENERAL MOTORS COMPANY

1. Inspect the bottom pan (59) sealing surface for damage and inspect the bottom pan magnet for excessive metal filings. Clean if necessary.

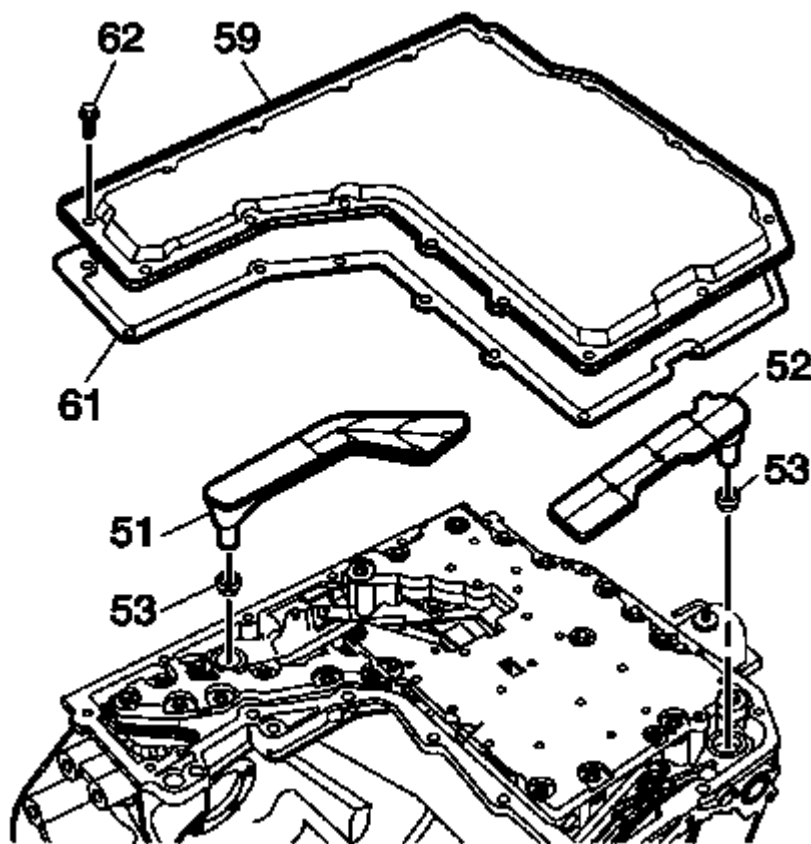


Fig. 284: View Of Bottom Pan, Scavenge Screens & Gasket
 Courtesy of GENERAL MOTORS COMPANY

2. Install the scavenge screen seals (53) into the case (6) and install the new scavenge screens (51, 52) into the seals.
3. Remove any residual oil from the gasket surface of the case (6), from the bottom pan (59) and from the bolts (62).

CAUTION: Completely dry all bottom pan bolts (62) before installation or fluid leaks may occur.

4. The bottom pan bolt threads in the case must be completely free of transmission fluid. Use a rubber tipped air hose to dry, if necessary.
5. Install the new gasket (61) and install the bottom pan (59).

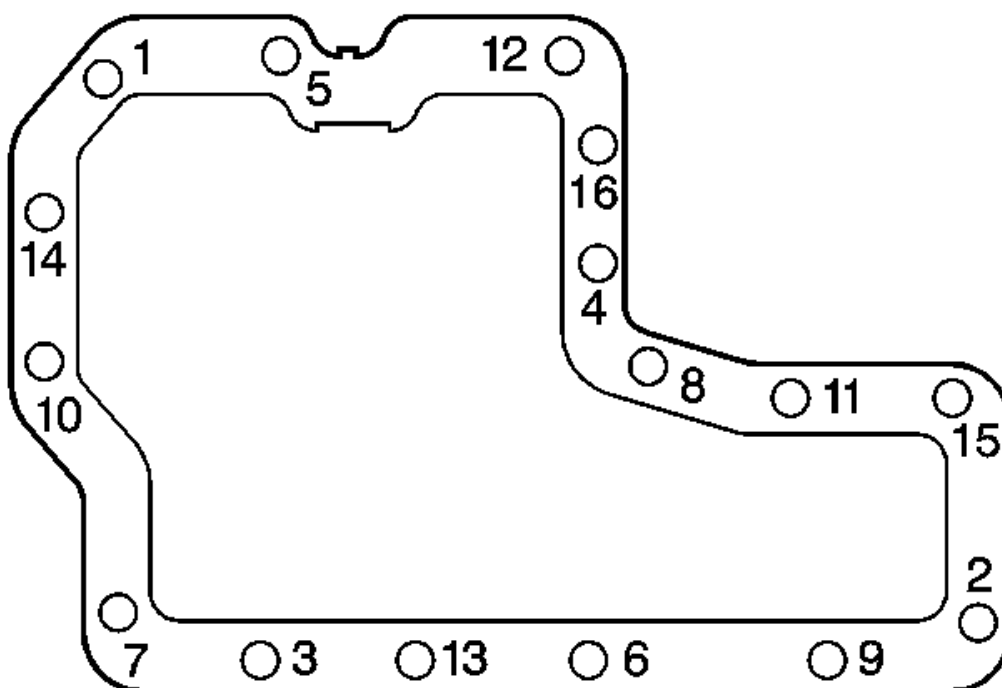


Fig. 285: View Of Pan Bolt Tightening Sequence
Courtesy of GENERAL MOTORS COMPANY

CAUTION: Refer to Fastener Caution .

6. Hand start the bottom pan bolts (62) and then tighten in the sequence pattern shown in illustration.
 - Tighten the bolts first to 3 N.m (26.5 lb in).
 - Then tighten the bolts to 6 N.m (53.1 lb in).
 - Finally tighten the bolts to 10-12 N.m (8-9 lb ft).

FINAL DRIVE CARRIER INSPECT

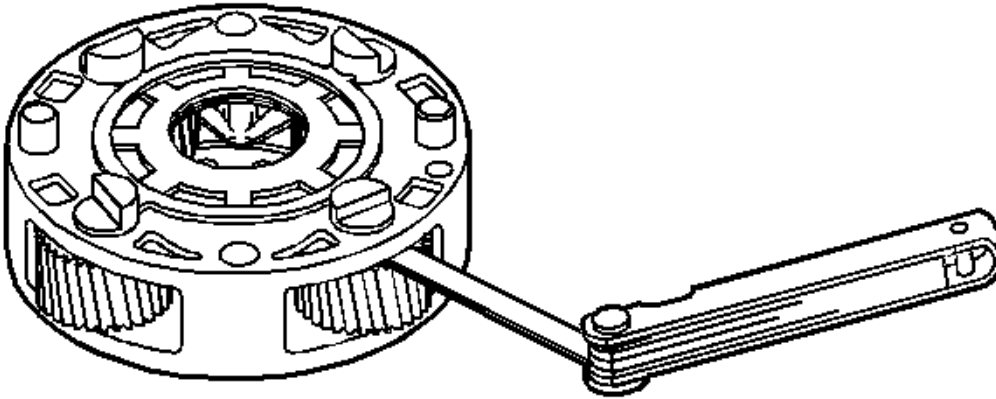


Fig. 286: Checking Final Drive Planet Pinion To Carrier Clearance
Courtesy of GENERAL MOTORS COMPANY

1. Inspect the pinion gear teeth for chips or damage.

NOTE: The final drive carrier (100) must be replaced if the gears are out of specification.

2. Inspect the final drive planet pinion to carrier clearance. The final drive planet pinion to carrier clearance should be 0.20-0.30 mm (0.008-0.012 in).

DIFFERENTIAL CARRIER OVERHAUL

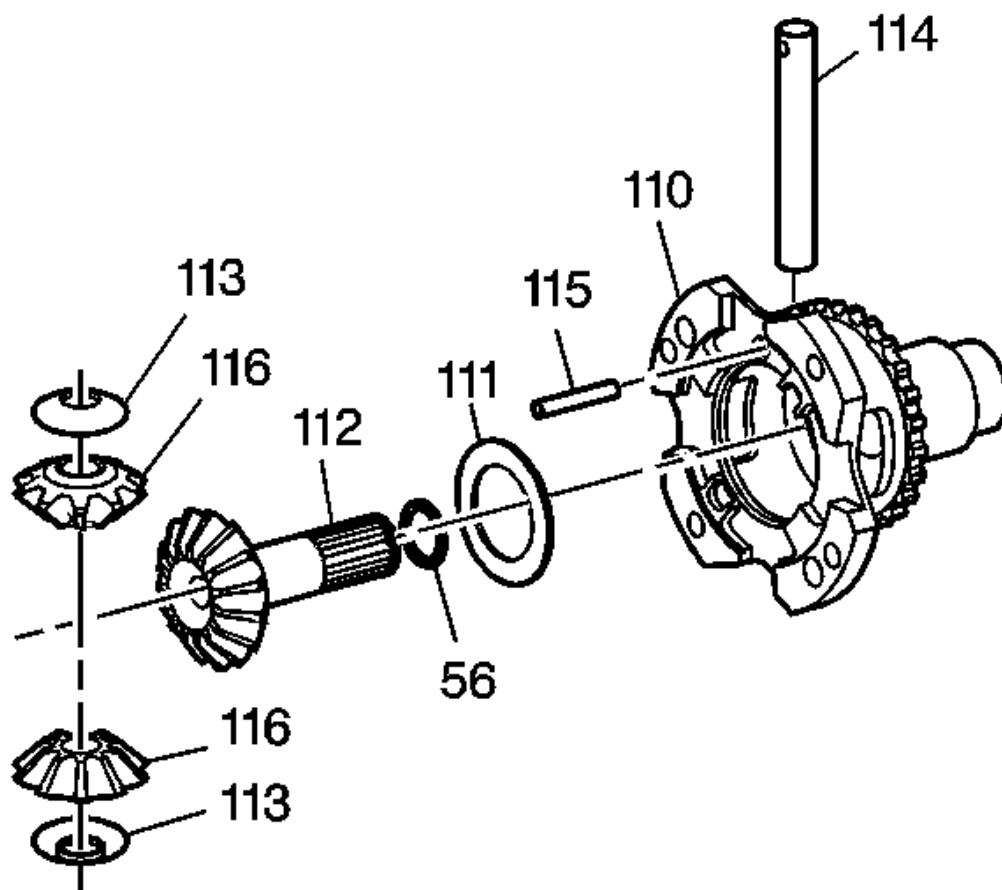


Fig. 287: View Of Differential Carrier Components

Courtesy of GENERAL MOTORS COMPANY

1. Use a pin punch to drive out the differential pinion shaft retaining pin (115). Remove the following parts:
 - The differential pinion shaft (114)
 - The two pinion gears (116)
 - The two pinion thrust washers (113)
2. Remove the right differential side gear and output shaft (112). Remove the differential thrust washer (111).
3. Inspect the gears and the thrust washers for burrs or damage.
4. Install the following parts:
 - The differential thrust washer (111)
 - The right differential side gear and output shaft (112)

- The output shaft snap ring (56)
- The two pinion thrust washers (113)

The two pinion gears (116)

5. Install the differential pinion shaft (114).
6. Install the differential pinion shaft retaining pin (115).

FINAL DRIVE CARRIER/DIFFERENTIAL CARRIER INSTALL

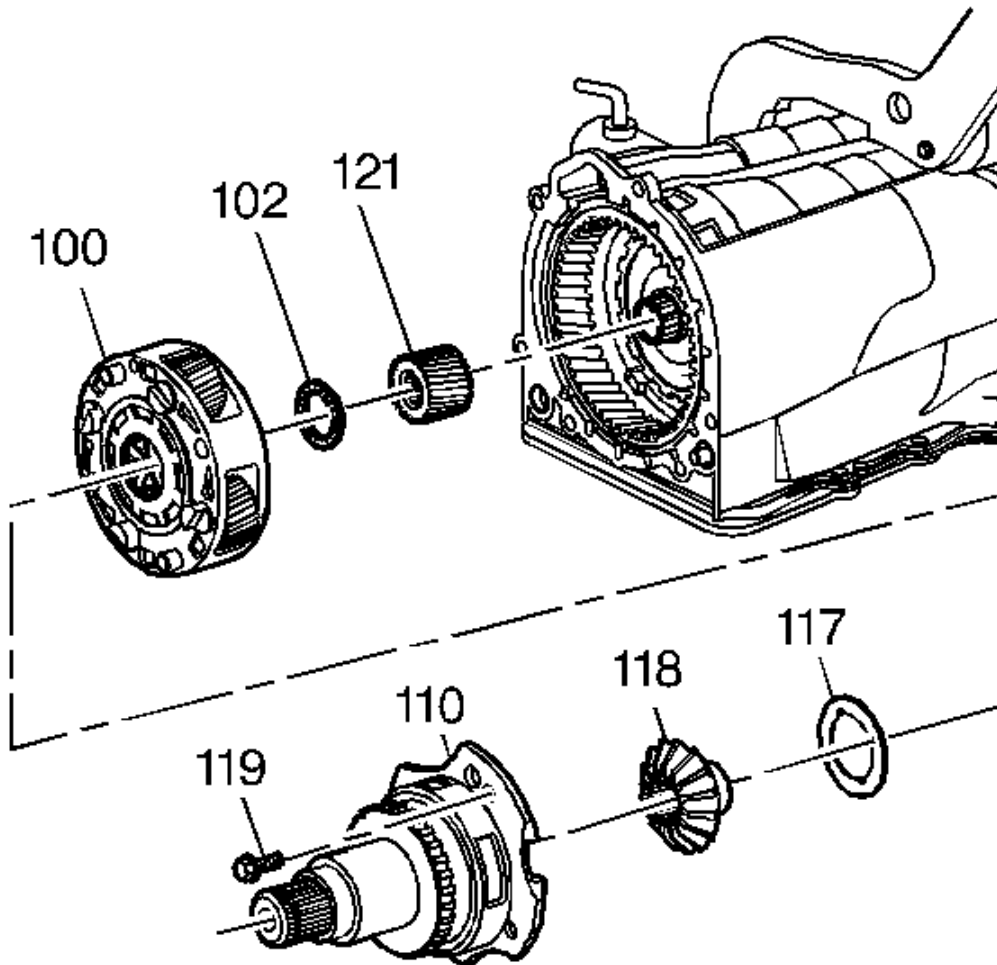


Fig. 288: View of Drive Carrier & Differential Carrier
 Courtesy of GENERAL MOTORS COMPANY

1. Install the sun gear (121) with the bushing side facing the differential (110).
2. Install the final drive carrier (100) with the thrust bearing (102) secured on the sun gear side. Turn the unit until the unit meshes with the sun gear and the internal gear teeth.
3. Install the left thrust washer (117). Install the left differential side gear (118).

CAUTION: Refer to Fastener Caution .

4. Place the transmission in Park using the manual shaft. Align the differential housing (110) locating dowels into holes in the differential carrier (100) for proper assembly. Attach the differential housing (110) with four bolts (119) and tighten using a star pattern to 70-76 N.m (52-56 lb ft).

OUTPUT SHAFT INSTALLATION

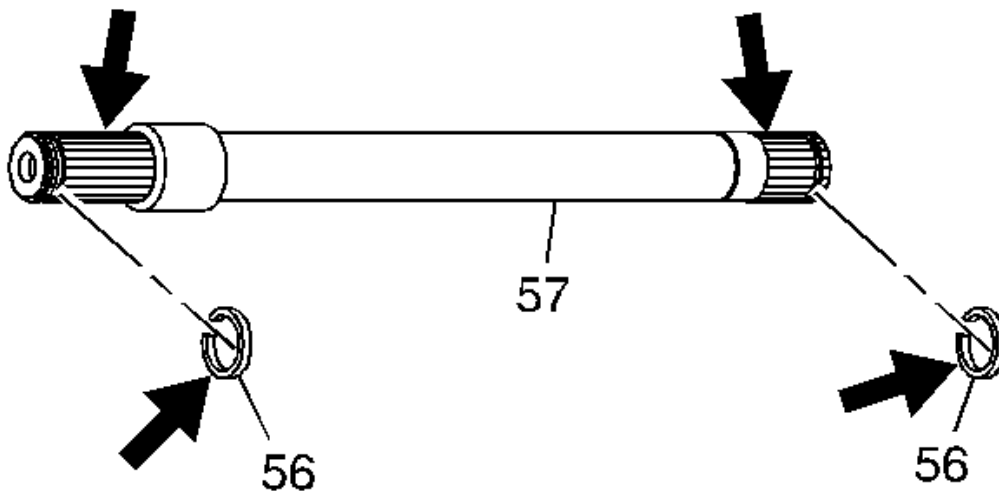


Fig. 289: Identifying Output Shaft & Snap Rings
 Courtesy of GENERAL MOTORS COMPANY

1. Inspect the output shaft (57) splines for burrs or damage. Inspect the snap rings (56) for overexpansion.

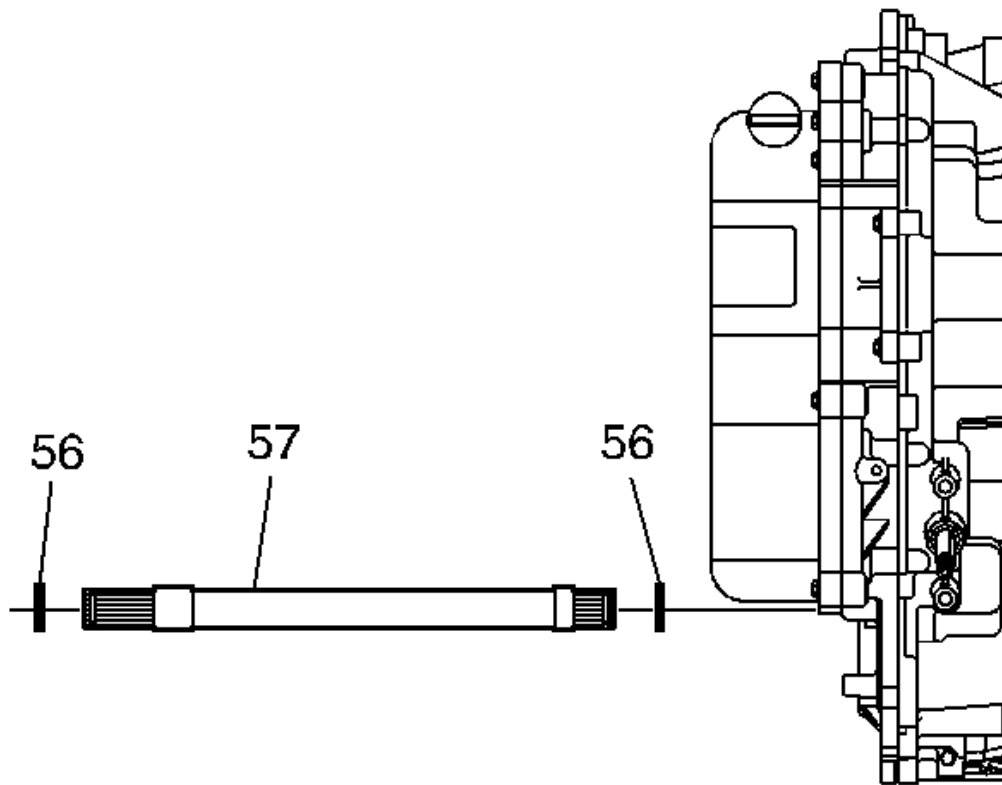


Fig. 290: Installing Snap Rings to Output Shaft
Courtesy of GENERAL MOTORS COMPANY

2. Install the snap rings (56) onto the output shaft and install the output shaft (57) from the channel plate side of the transmission.

SCAVENGE PIPE INSTALLATION

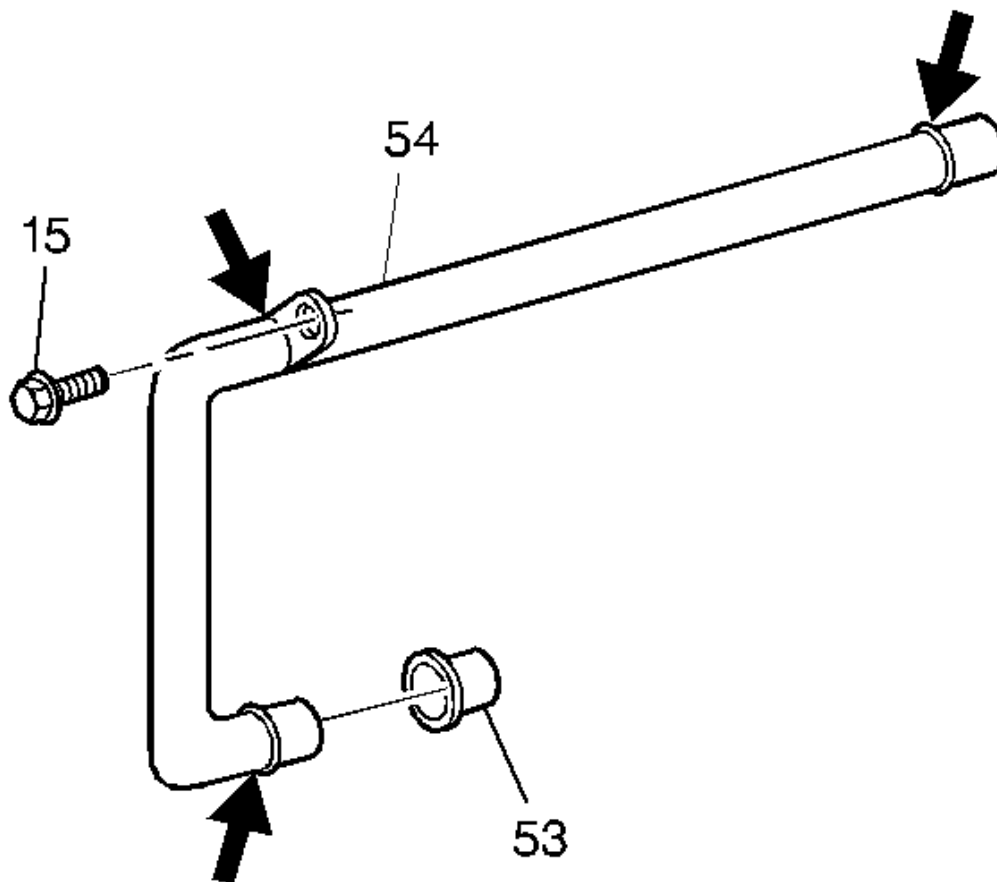


Fig. 291: View of Scavenge Tube

Courtesy of GENERAL MOTORS COMPANY

1. Inspect the scavenge tube (54) for damage and clogging.

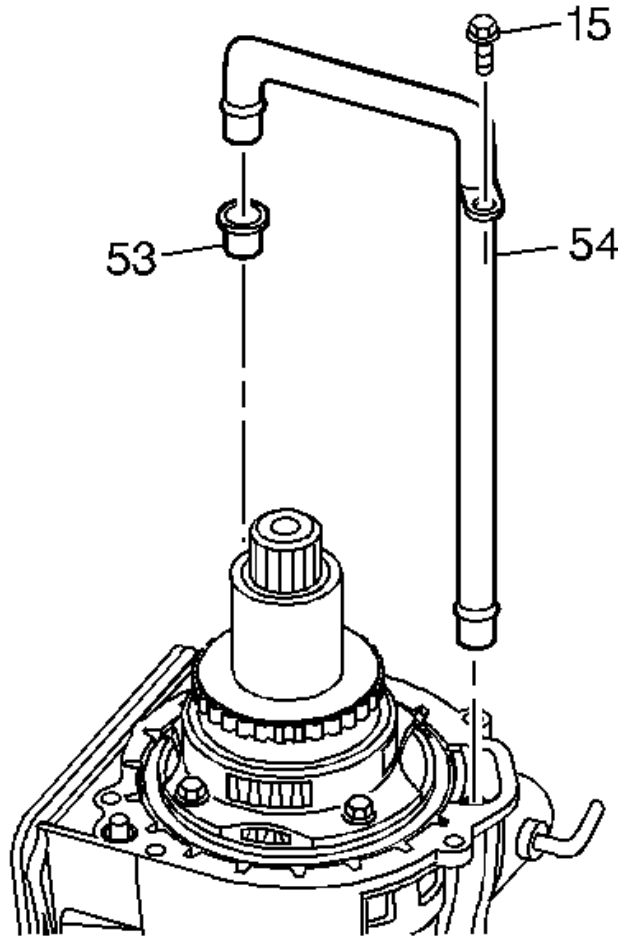


Fig. 292: Identifying Scavenge Tube & Seals
 Courtesy of GENERAL MOTORS COMPANY

2. Install the scavenge tube seal (53) into the case.
3. Install the scavenge tube (54) into the scavenge tube seals (53) located in the case and in the driven sprocket support. Tap the scavenge tube (54) lightly with a plastic hammer to ensure a tight fit in both seals.

CAUTION: Refer to Fastener Caution .

4. Install the scavenge tube bolt (15) and tighten to 8-14 N.m (6-10 lb ft).

CASE EXTENSION INSTALL/FINAL DRIVE END PLAY CHECK**Special Tools**

- **J 25025-7A** Dial Indicator Post
- **J 28585** Snap Ring Remover
- **J 8001** Dial Indicator

For equivalent regional tools, refer to **Special Tools** .

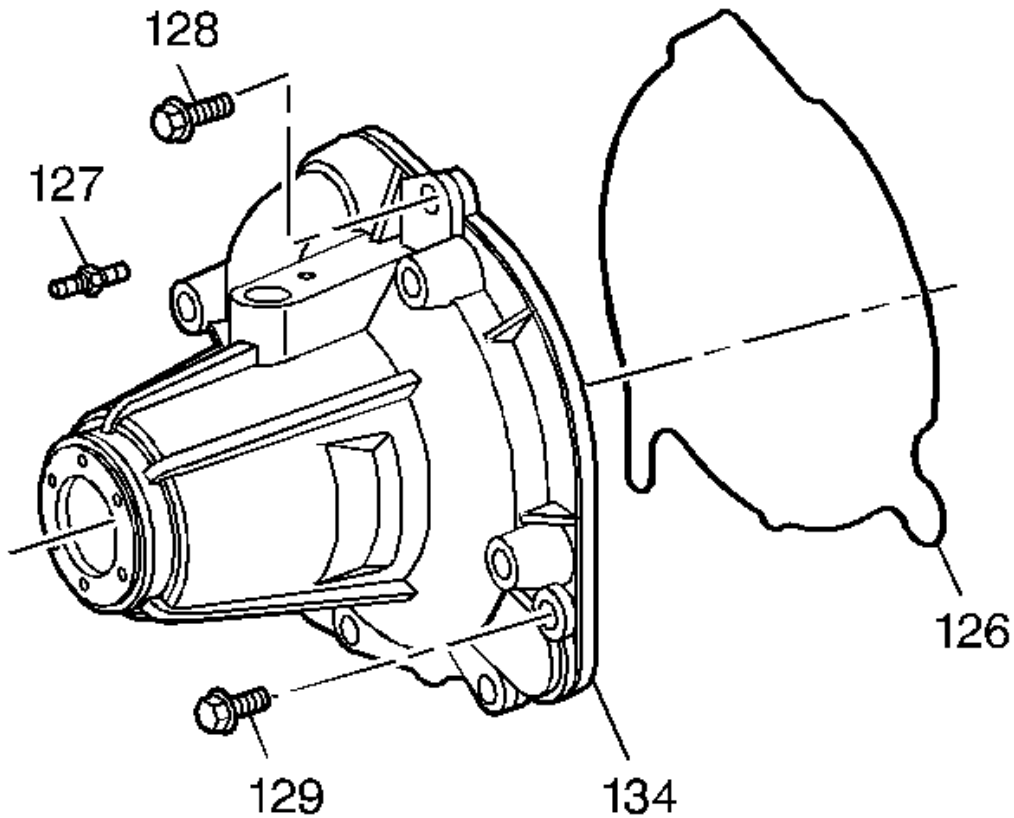


Fig. 293: View of Case Extension Seal
Courtesy of GENERAL MOTORS COMPANY

1. Inspect the case to case extension seal (126).
2. Inspect the case extension mating surface for damage.

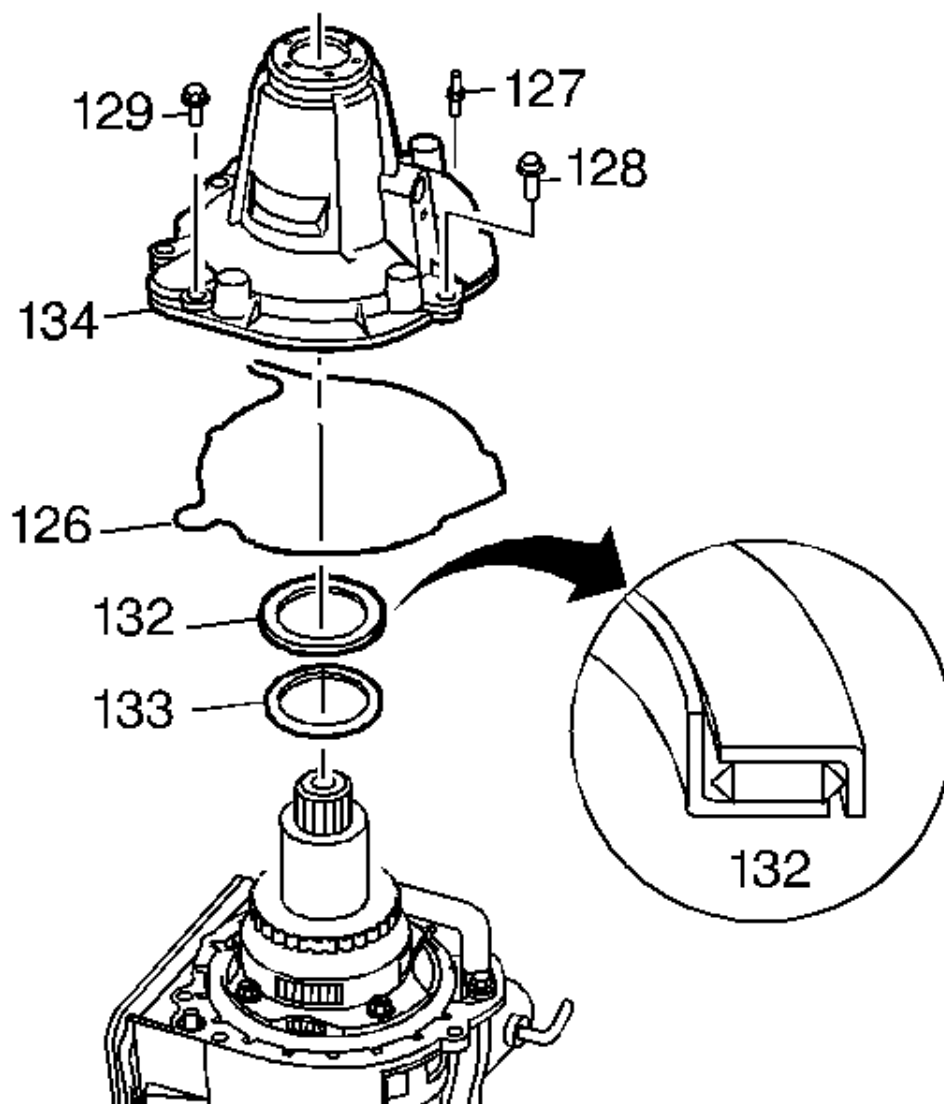


Fig. 294: View Of Case Extension Components
Courtesy of GENERAL MOTORS COMPANY

3. Install the following parts:
- The selective washer (133)
 - The thrust washer (132)
 - The case extension seal (126)
 - The case extension (134)

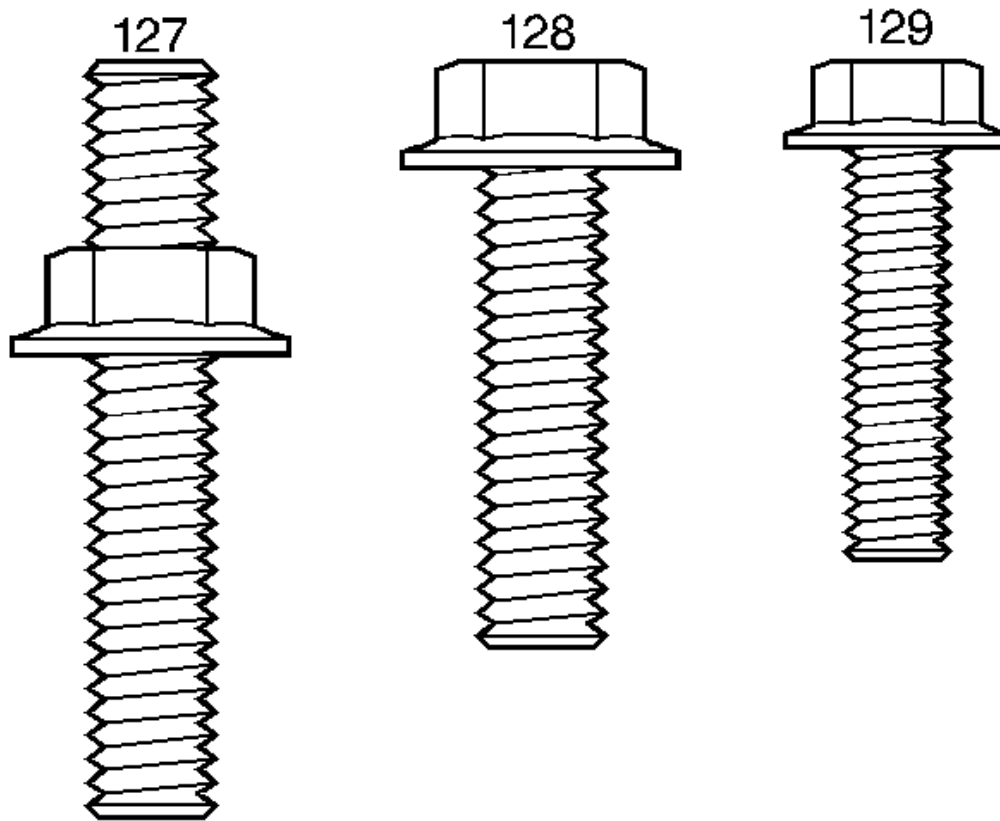


Fig. 295: Identifying Case Extension Bolts

Courtesy of GENERAL MOTORS COMPANY

4. Apply pip thread sealant GM P/N 12346004 to bolt threads before installation. Install the case extension bolts (128, 129).
5. Hand tighten bolts (128, 129) until case extension (134) is seated onto case.

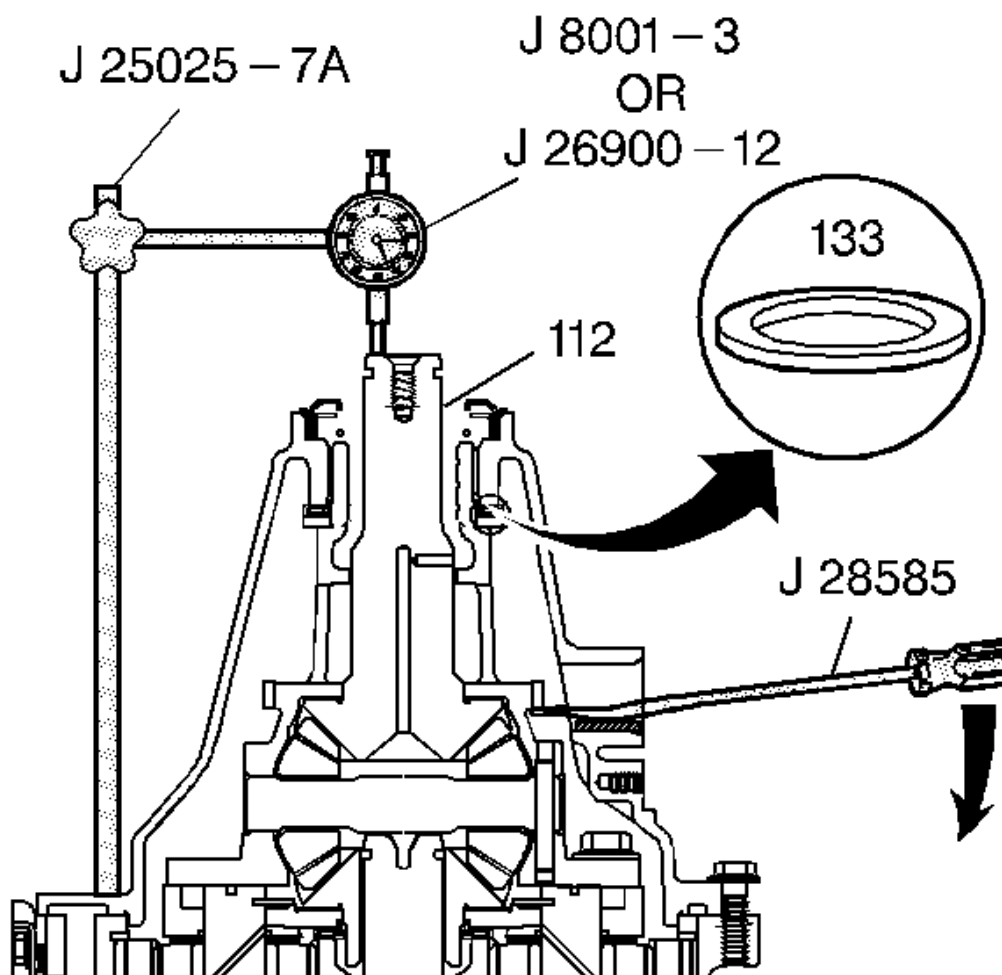


Fig. 296: View Of Case Extension Components & Tools
Courtesy of GENERAL MOTORS COMPANY

CAUTION: Failure to ensure that proper end play clearance exists, could lead to internal component damage.

6. Install the long **J 25025-7A** dial indicator post and the **J 8001** dial indicator.
7. Position the dial indicator with the stem contacting the output shaft (112). Set the dial indicator to zero.
8. Insert the **J 28585** snap ring remover through the vehicle speed sensor bore and lift the speed sensor rotor for measurement. Protect the bore with a piece of wood or a suitable piece of plastic.
9. Proper end play clearance is 0.15-0.65 mm (0.006-0.255 in).

10. Record measured specification and, if necessary, adjust the clearance with the proper thickness selective thrust washer on reassembly. Refer to step 3.
11. Remove the dial indicator set and the post.

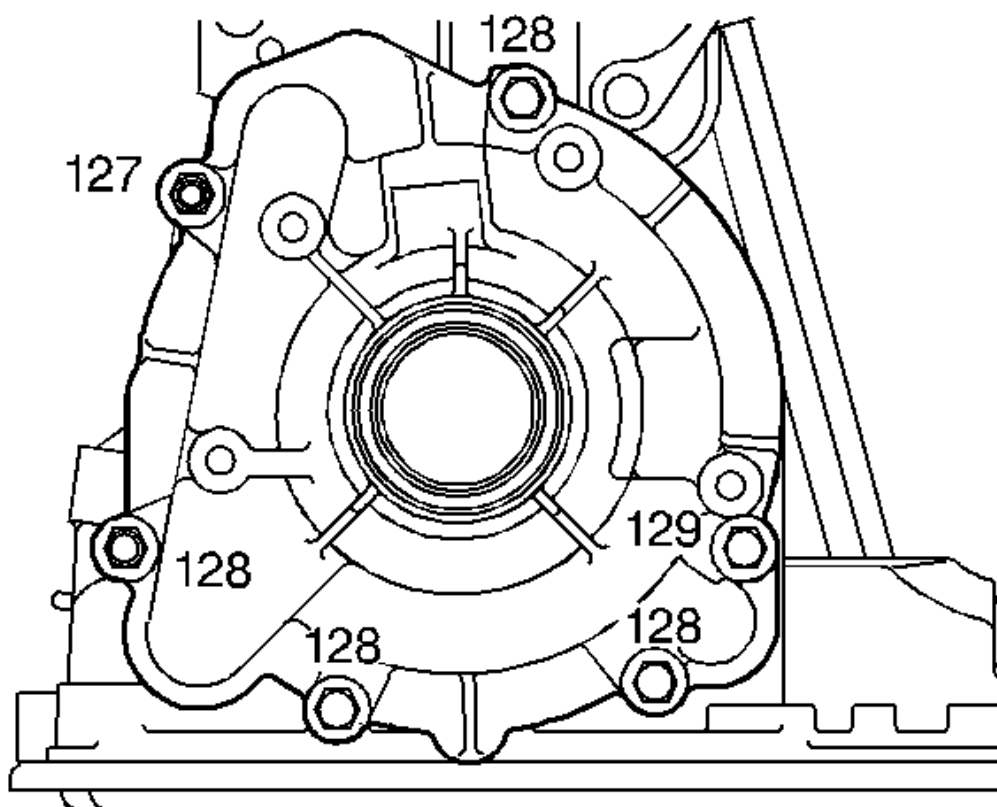


Fig. 297: Identifying Case Extension Bolts & Studs
Courtesy of GENERAL MOTORS COMPANY

CAUTION: Refer to Fastener Caution .

12. Install the stud (127).
 - Tighten the bolt (128) and the stud (127) to 50-55 N.m (37-40 lb ft).
 - Tighten the bolt (129) to 20-27 N.m (15-20 lb ft).

FOURTH SERVO OVERHAUL

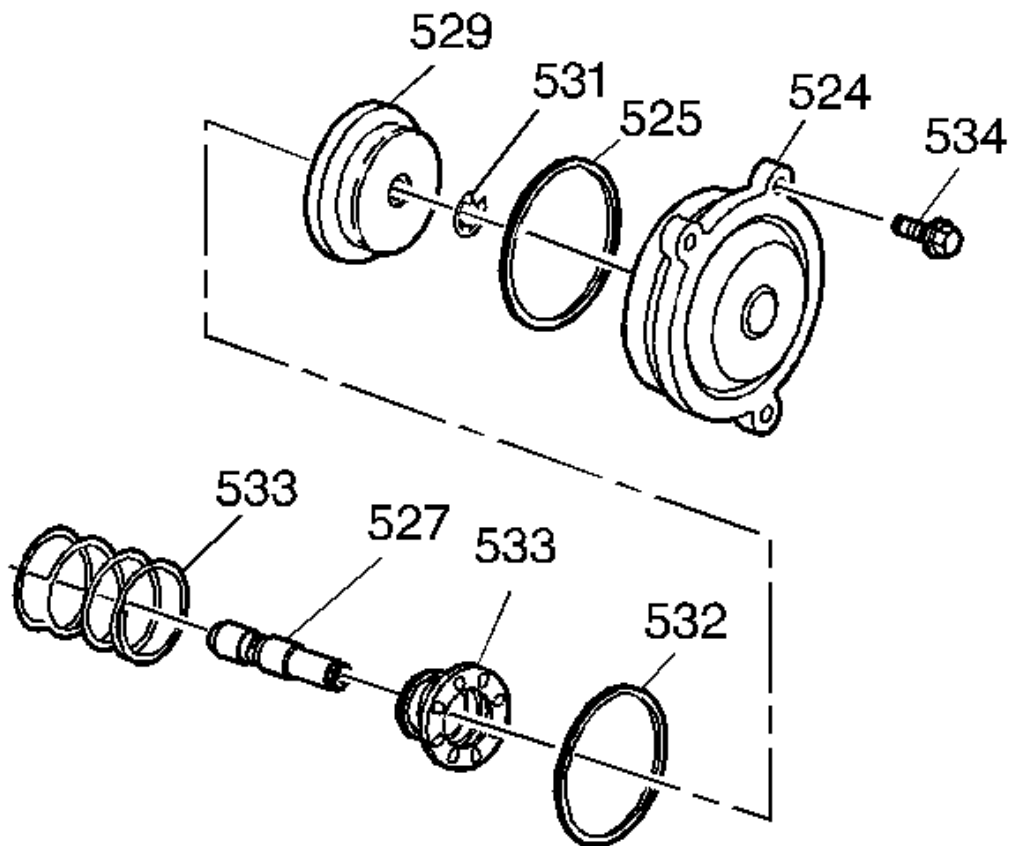


Fig. 298: View Of 4th Servo Piston Components
Courtesy of GENERAL MOTORS COMPANY

1. Remove the following parts:
 - The 4th servo piston seals (532, 525)
 - The snap ring (531)
 - The apply pin (527)
 - The spring and retainer assembly (533)

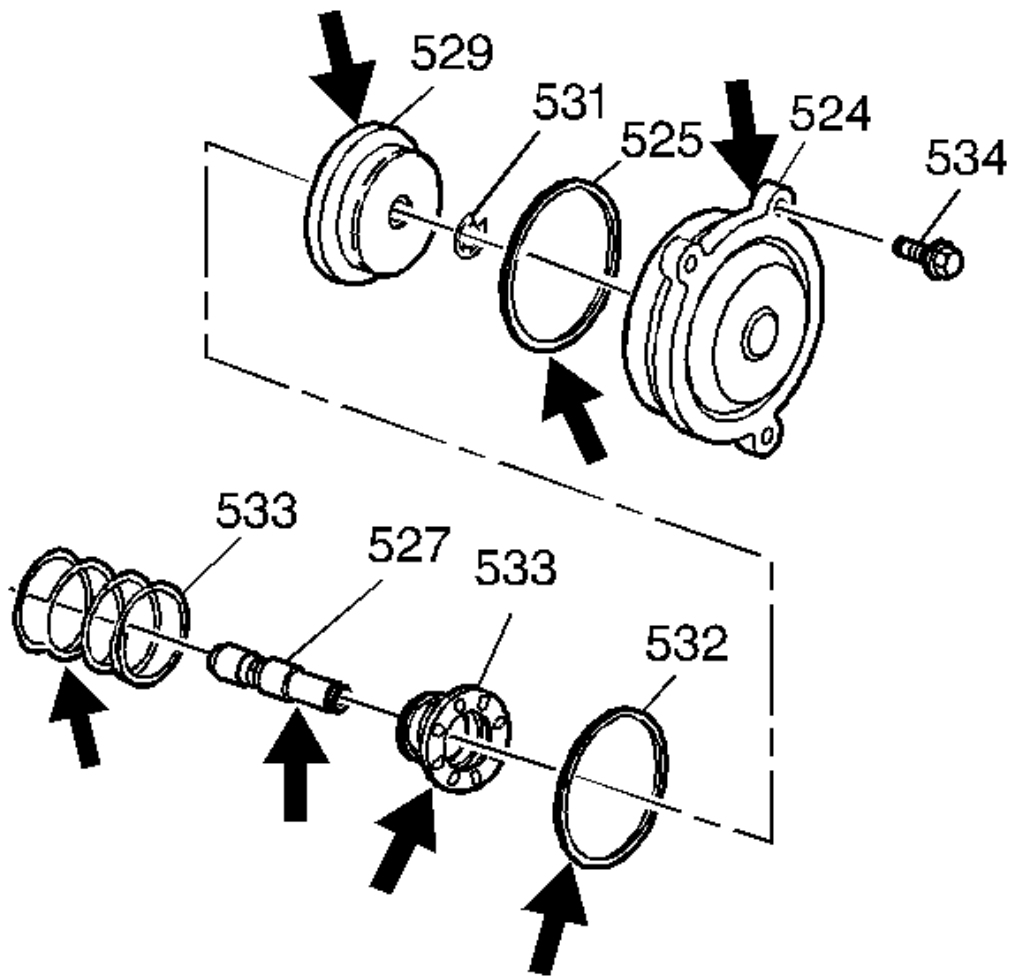


Fig. 299: 4th Servo Piston Components Inspection Areas
 Courtesy of GENERAL MOTORS COMPANY

2. Inspect the following parts:
 - The 4th servo piston (529) for cracks
 - The apply pin (527) for damage
 - The spring and retainer assembly (533) for damage
 - The servo cover (524) for damage

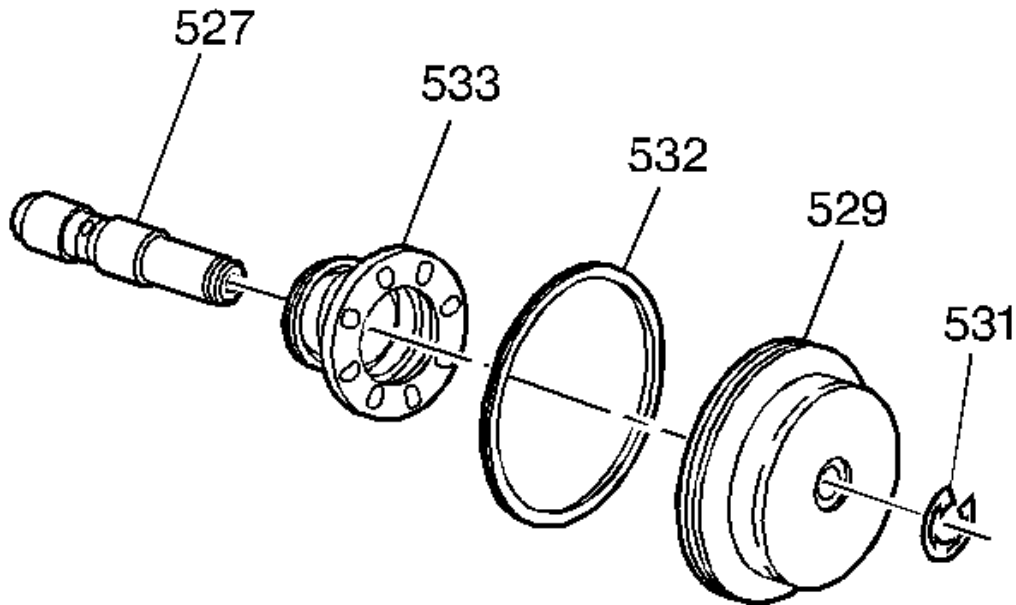


Fig. 300: Identifying 4th Servo Piston Components
 Courtesy of GENERAL MOTORS COMPANY

3. Install the following parts:

- The new piston seal (532) onto the 4th servo piston (529)
- The apply pin (527)
- The spring retainer (533) into the 4th servo piston (529)
- Attach the snap ring (531) to the apply pin (527).

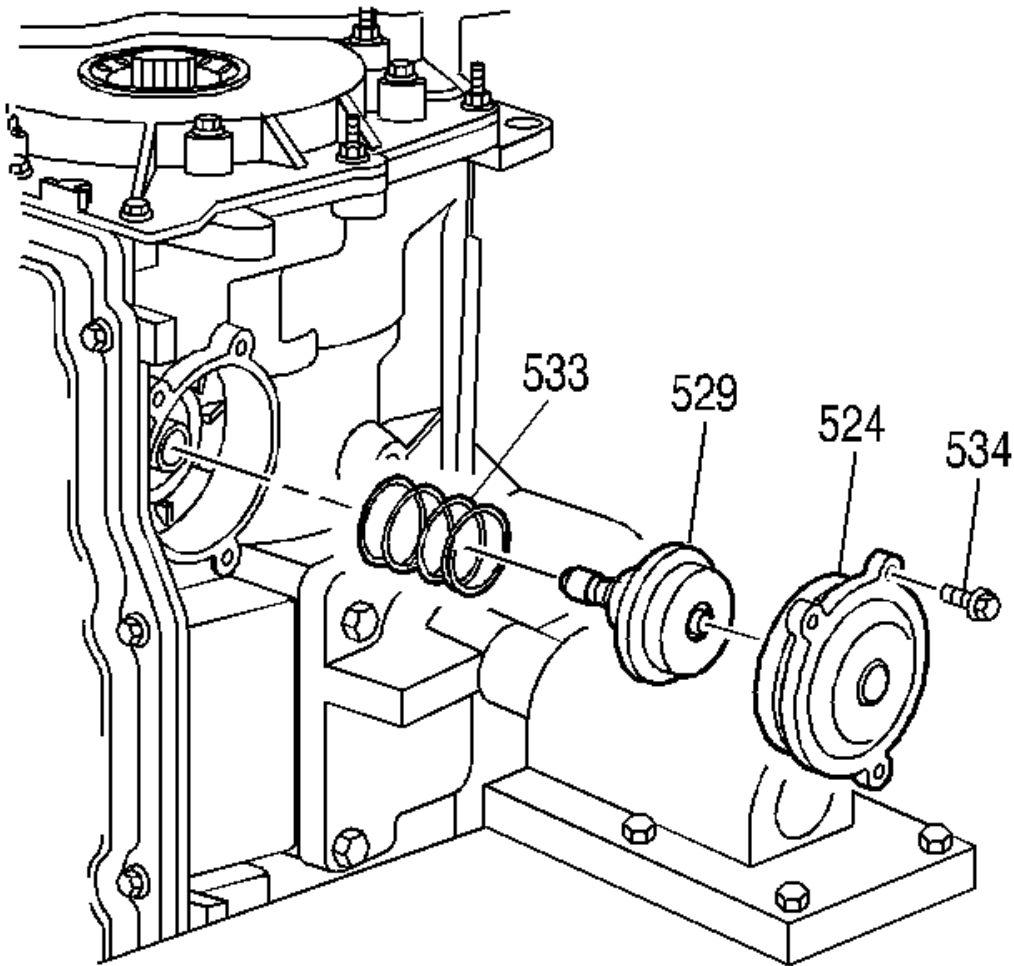


Fig. 301: Identifying 4th Servo Piston Assembly And Cover
 Courtesy of GENERAL MOTORS COMPANY

4. Install the 4th servo piston assembly (529) and the spring (533) into the 4th servo cover (524).

Apply pipe thread sealant GM P/N 12346004 to bolt threads before installation.

5. Install the 4th servo piston and cover assembly into the case.

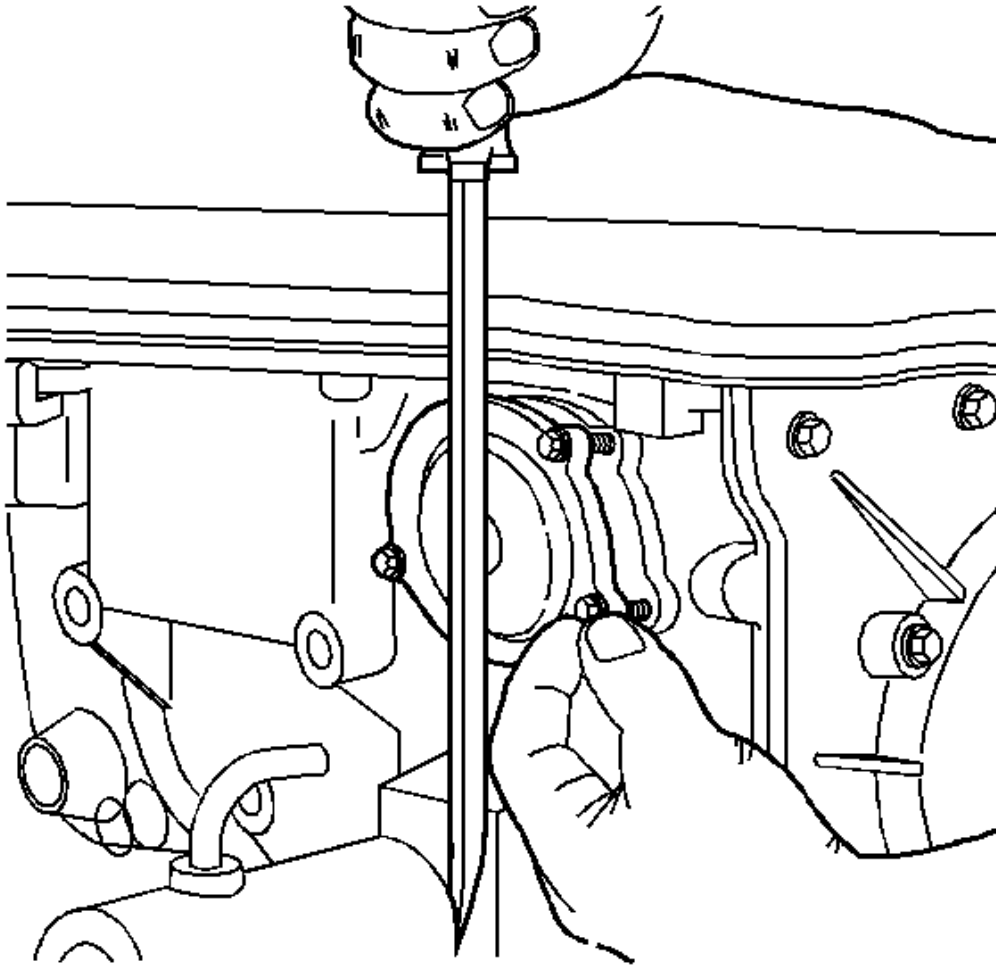


Fig. 302: Installing 4th Servo Cover Bolts While Compressing Piston
Courtesy of GENERAL MOTORS COMPANY

CAUTION: Refer to Fastener Caution .

6. Install the 4th servo cover bolts into the case. Hand tighten the bolts while holding the piston compressed, then tighten in a star pattern to 8-14 N.m (6-10 lb ft).

VEHICLE SPEED SENSOR AND TRANSMISSION FLUID COOLER PIPE FITTING INSTALLATION

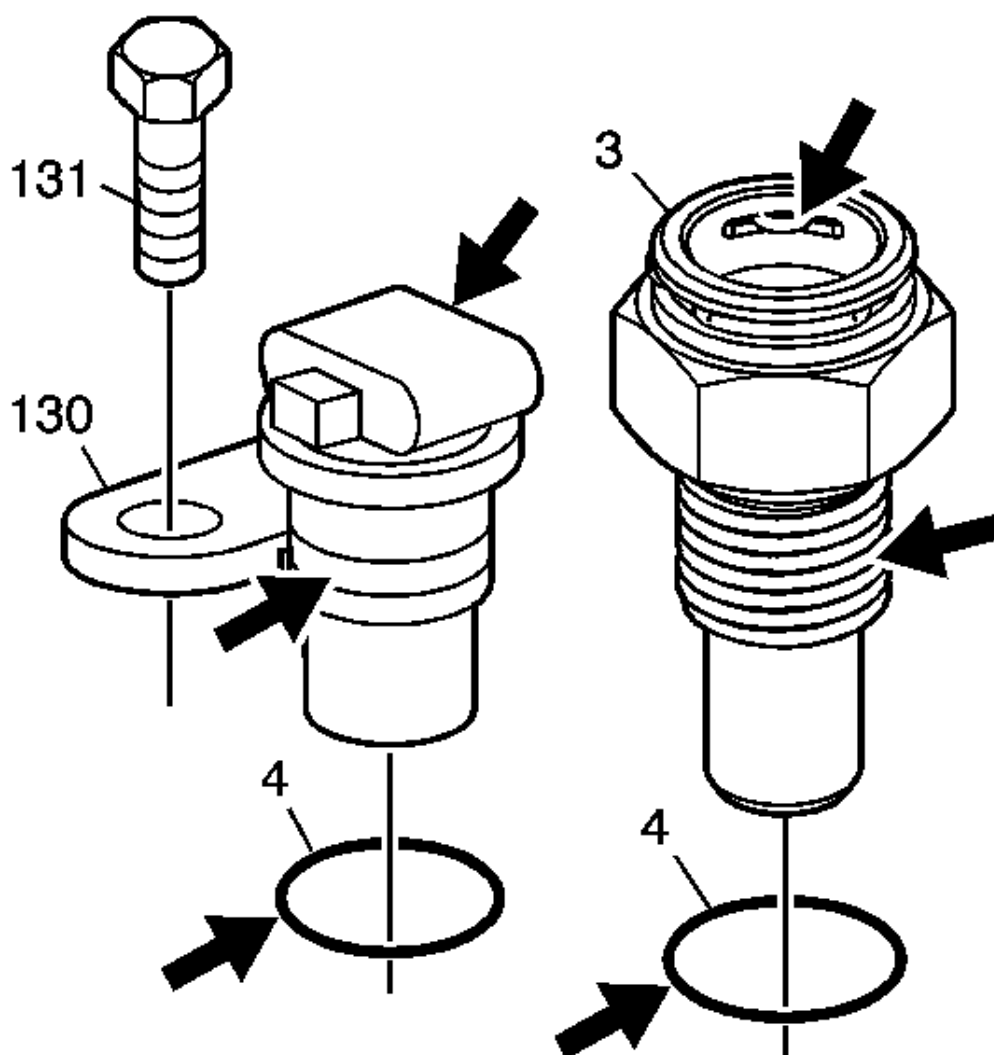


Fig. 303: Output Speed Sensor (OSS)

Courtesy of GENERAL MOTORS COMPANY

1. Inspect the output speed sensor (130) for damage or a cut seal (4).
2. Inspect the cooler connector (3) for damaged threads, clogging, or a cut seal (4).

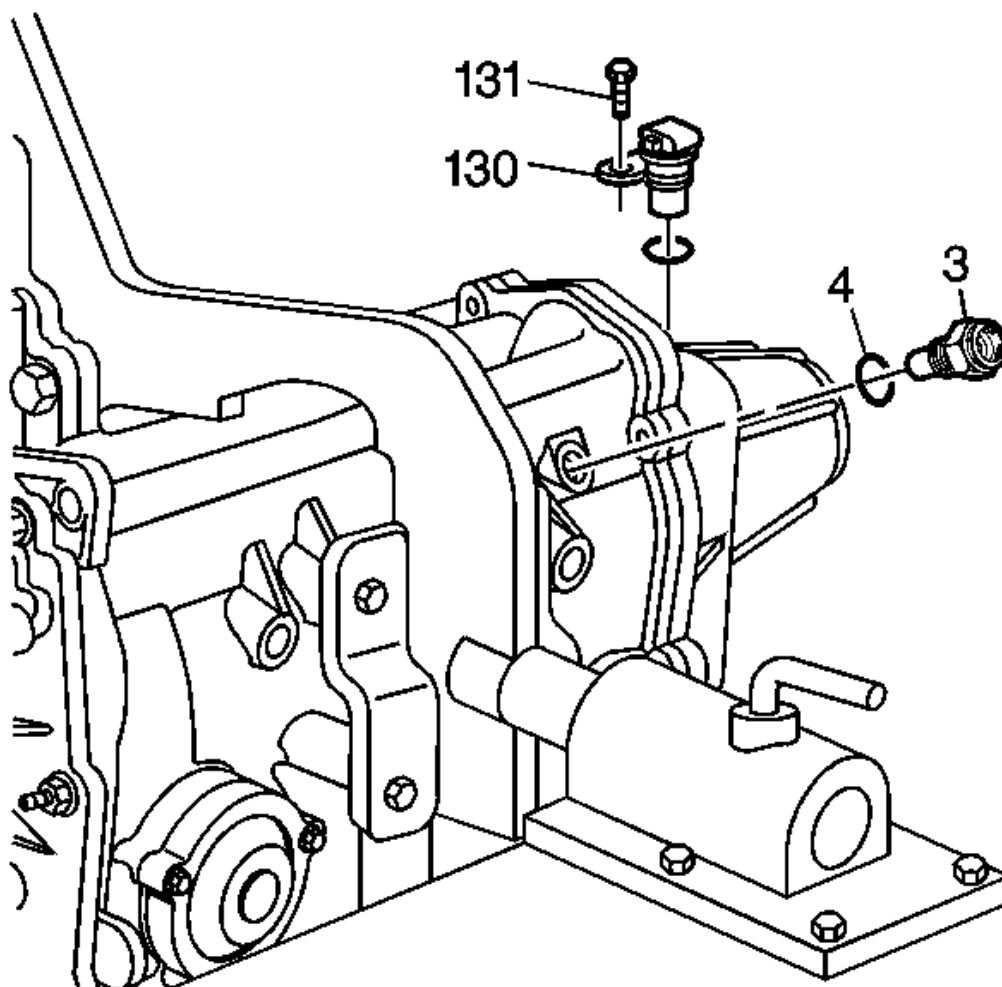


Fig. 304: Output Speed Sensor & Seal
Courtesy of GENERAL MOTORS COMPANY

3. Install the output speed sensor (130) and the seal (4).

CAUTION: Refer to Fastener Caution .

4. Install the output speed sensor bolt (131) and tighten to 8-14 N.m (6-10 lb ft).
5. Install the cooler fitting (3) and the new seal (4) or fitting (38) and seal (39) into the case.
6. Tighten the cooler fitting to 25-29 N.m (19-21 lb ft).

AXLE SEALS REPLACEMENT

Special Tools

- J 39051-1 Right Seal Driver
- J 39051-2 Left Seal Driver

For equivalent regional tools, refer to **Special Tools** .

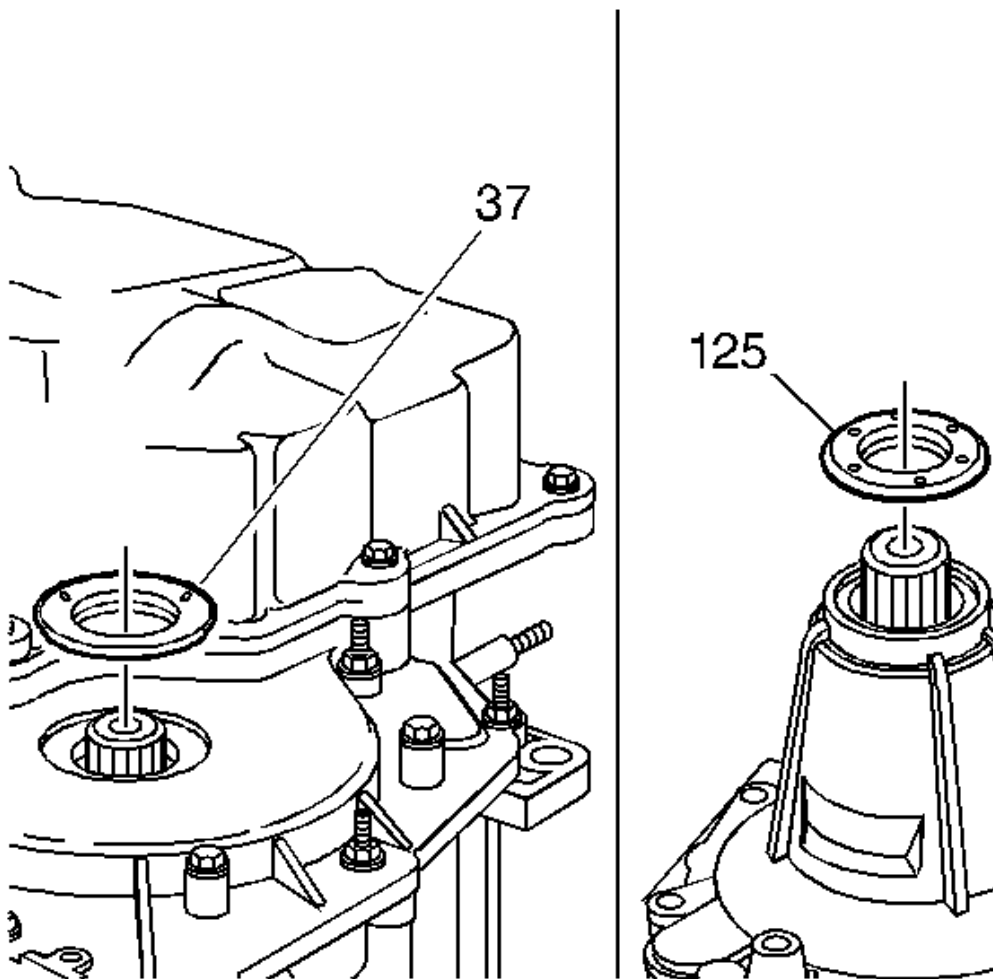


Fig. 305: Prying Out Right And Left Axle Seals
Courtesy of GENERAL MOTORS COMPANY

1. Using a screw driver remove the right and left axle seals (37, 125) by prying them out.

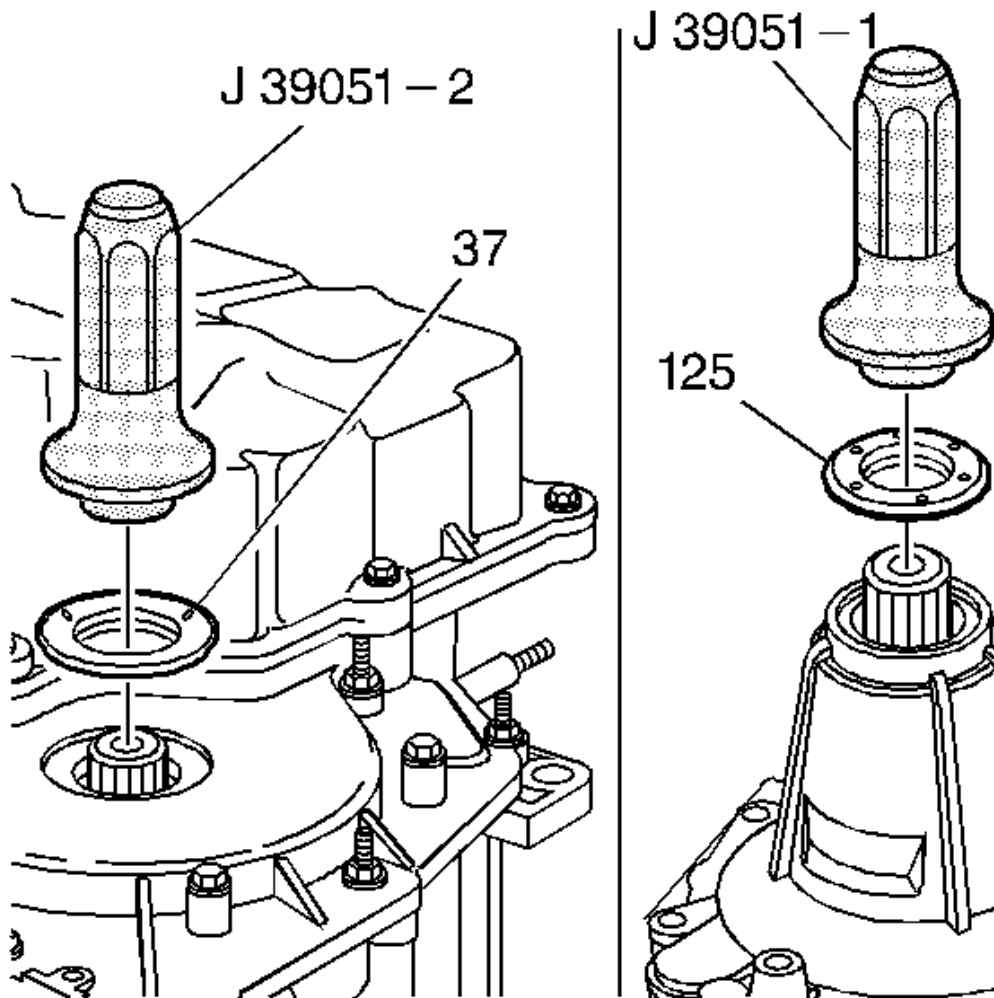


Fig. 306: Installing Axle Seals With J 39051-1 & J 39051-2
 Courtesy of GENERAL MOTORS COMPANY

- Using the **J 39051-1** right seal driver and the **J 39051-2** left seal driver, install the new axle seals (37, 125). Use the output shaft (57) to pilot the seals and the tool into the case. Ensure that the snap rings are installed on the output shaft.

TORQUE CONVERTER AND OIL PUMP DRIVE SHAFT INSTALL

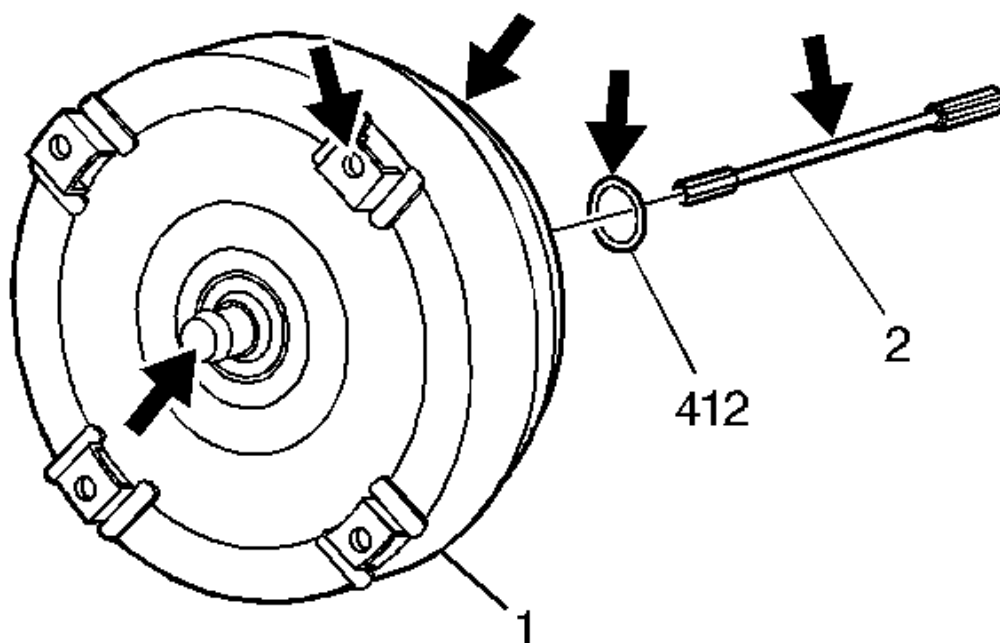


Fig. 307: Locating Inspection Points On Torque Converter
Courtesy of GENERAL MOTORS COMPANY

1. Inspect the torque converter (1) lugs for damage and inspect the oil pump driven shaft for damage. Replace the turbine shaft seal (412).

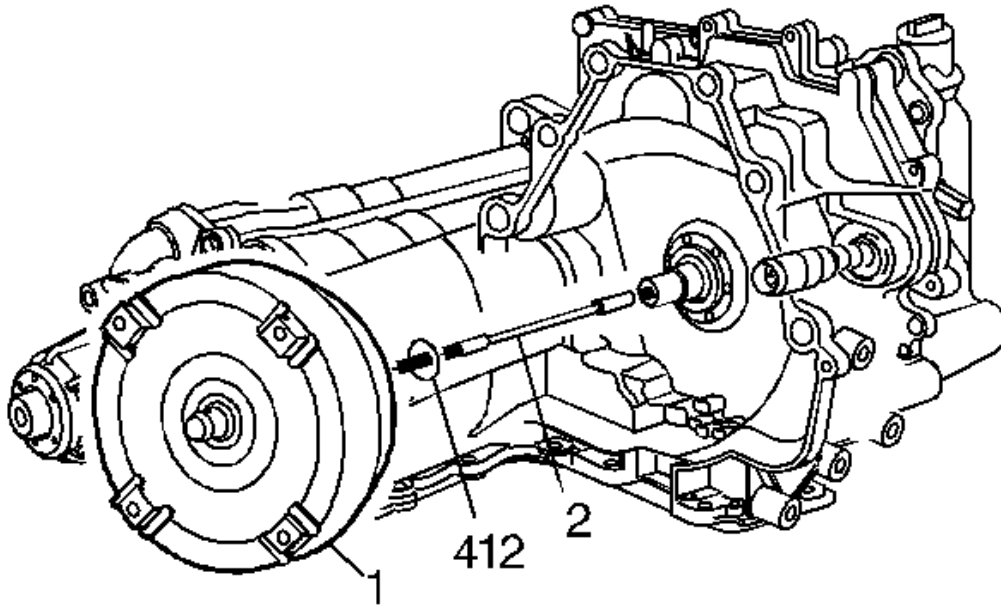


Fig. 308: Oil Pump Driven Shaft & Torque Converter
Courtesy of GENERAL MOTORS COMPANY

2. Install the following parts:
 - The oil pump driven shaft (2) into the turbine shaft
 - The new turbine shaft O-ring seal (412)
 - The torque converter (1)
3. Remove the transmission from the base and then remove the holding fixture from the transmission.