2011 TRANSMISSION

Automatic Transmission - 4ET50 - Volt

REPAIR INSTRUCTIONS - OFF VEHICLE

HOLDING FIXTURE INSTALLATION

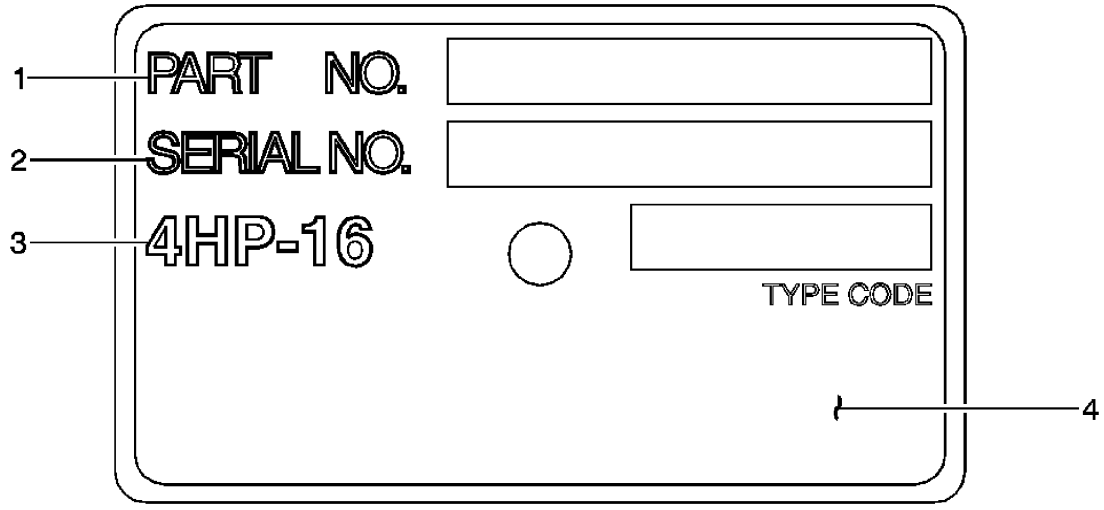


Fig. 1: Holding Fixture
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	DT-46625 Transmission Holding Fixture **WARNING:** **Handle with care, the transmission assembly weighs over 183 Kg (403 lbs). Bodily injury could occur if not handled properly.** **CAUTION:** **Refer to Fastener Caution .** **Tip:** Adjust mounting block on fixture to match bosses on case, then tighten bolts to: **Tighten:** 13 N.m (115 lb in) **Special Tools:**

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	DT-46625: Transmission Holding Fixture For equivalent regional tools, refer to **Special Tools** .
2	DT-42451-1 Engine Support Adapter (Qty: 2) **Special Tools:** **DT-42451-1:** Engine Support Adapter For equivalent regional tools, refer to **Special Tools** .

TORQUE DAMPENER REMOVAL

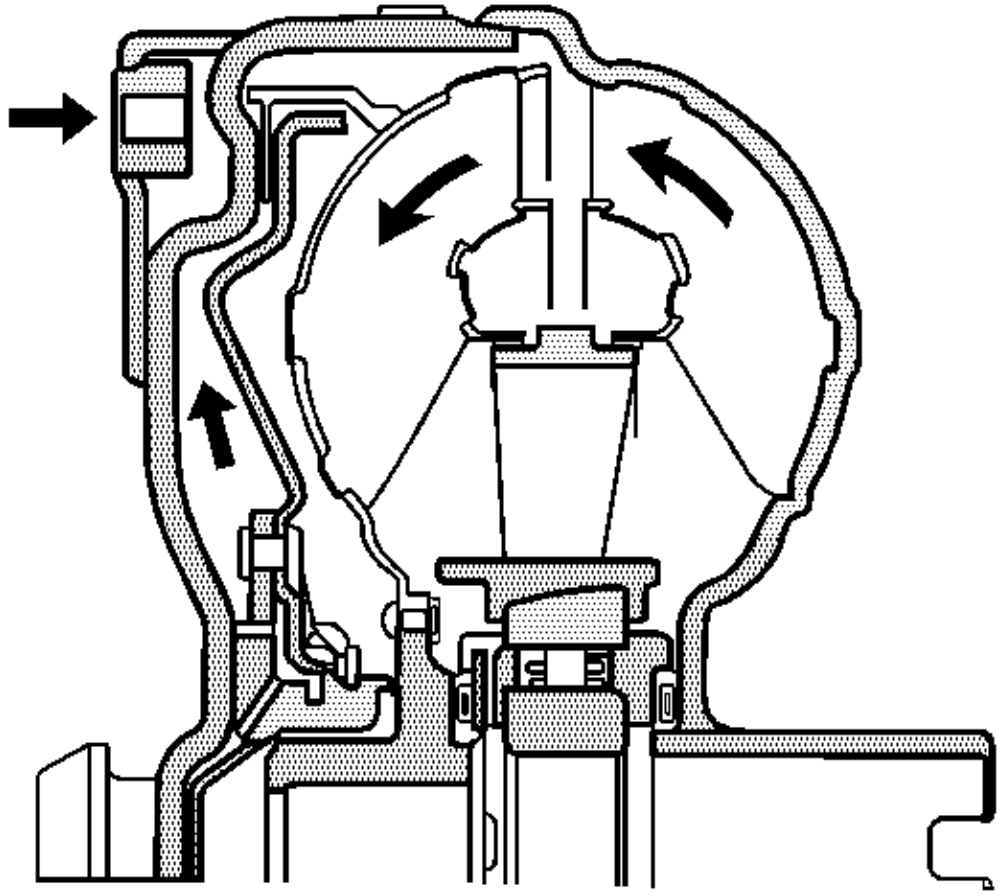


Fig. 2: Torque Dampener
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
	Lock Pin

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1	**WARNING:** **Lock pin must be secured into the bench fixture to hold the transmission and prevent bodily injury.** **WARNING:** **Handle with care, the transmission assembly weighs over 183 Kg (403 lbs). Bodily injury could occur if not handled properly.** **Tip:** Ensure the **GE 3289-20:** holding fixture is mounted to a bench that is properly supported and will support the weight of the transmission assembly without tipping. **DT 39890:** adapter and an engine stand can be used as an alternative method for supporting the transmission during repairs. **Special Tools** • **GE 3289-20:** Holding Fixture Base Assembly • **DT 39890:** Transmission Holding Fixture Adapter For equivalent regional tools, refer to **Special Tools** .
2	Converter Holding Strap **Special Tool:** **DT 2136:** Converter Holding Strap For equivalent regional tools, refer to **Special Tools** .
3	Automatic Transmission Torque Dampener Assembly **CAUTION:** **Failure to raise the torque dampener assembly straight up could damage the torque dampener clutch lip seal inside the torque dampener clutch assembly.**

CONTROL VALVE BODY COVER REMOVAL

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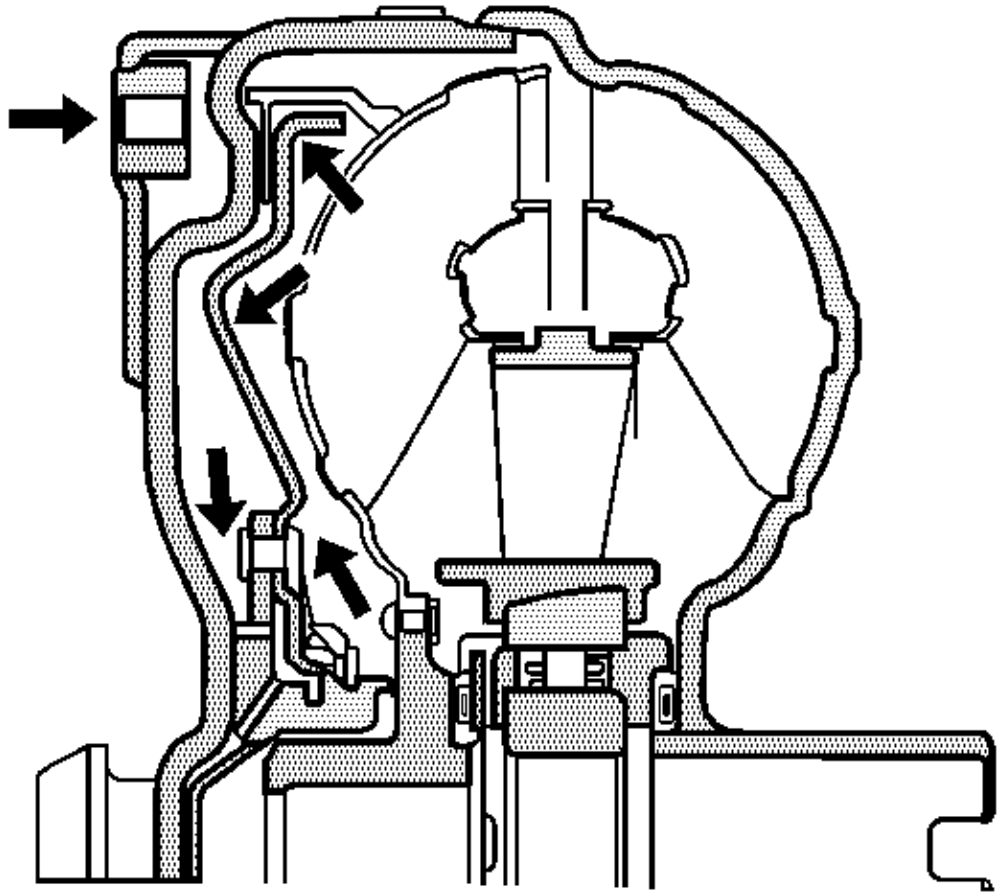


Fig. 3: Control Valve Body Cover
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Control Valve Body Cover Bolt M6 x 35 mm (Qty: 10)
2	Auxiliary Pump Motor Cable Retainer
3	Fluid Level Control Valve Stud M6 x 40 (Qty: 5)
4	Control Valve Body Cover Assembly
5	Control Valve Body Cover Gasket
6	Control Valve Body Cover Wiring Connector Hole Seal **Tip:** Seal may stay with the cover.

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7	Electrical Connector
8	Electrical Connector
9	A/Trans Manual Shift Shaft Position Switch Connector
10	Control Solenoid (w/Body and TCM) TEHCM Valve Assembly Connector
11	Fluid Cooler Outlet Pipe AssemblyBolt M5 x 16 mm (Qty: 2)
12	Variable Drive Pulley Retaining Nut
13	Control Valve Body Bolt M6 x 80 mm (Qty: 1)
14	A/Trans Wiring Extension Harness Assembly **Tip:** The wiring harness is attached to the fluid cooler outlet pipe assembly and will come out together.
15	Transmission Fluid Cooler Outlet Pipe Assembly
16	Nylon O-Ring
17	Transmission Fluid Cooler Outlet Seal **Tip:** Discard seal, it is not reusable.

CONTROL SOLENOID VALVE AND TRANSMISSION CONTROL MODULE ASSEMBLY REMOVAL

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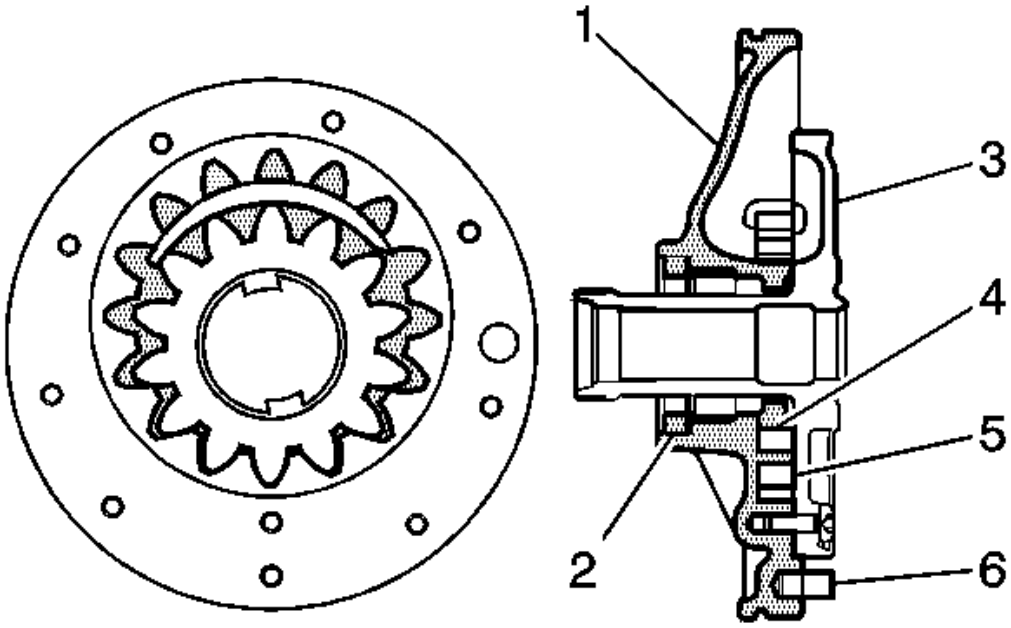


Fig. 4: Control Solenoid Valve and Transmission Control Module Assembly
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Control Valve Body Bolt M6 x 65 mm (Qty: 5)
2	Control Solenoid Valve Spring
3	Control Valve Body Bolt M6 x 75 mm (Qty: 4)
4	Control Valve Body Bolt M6 x 42 mm (Qty: 1)
5	Control Solenoid (w/Body and TCM) TEHCM Valve Assembly

MANUAL SHIFT SHAFT POSITION SWITCH AND FLUID LEVEL CONTROL VALVE REMOVAL

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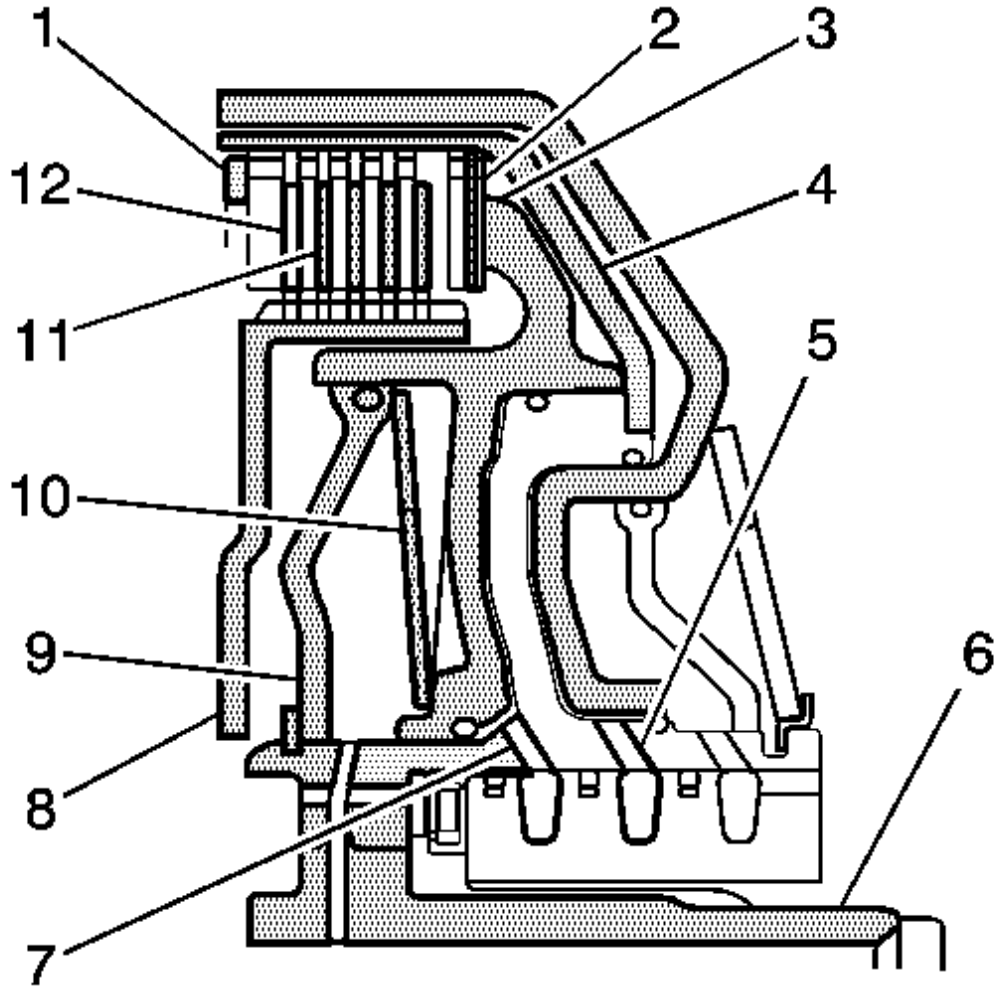


Fig. 5: Manual Shift Shaft Position Switch and Fluid Level Control Valve
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	A/Trans Fluid Level Control Valve Stud M6 x 40 mm (Qty: 2)
2	A/Trans Fluid Level Control Valve
3	A/Trans Manual Shift Shaft Position Switch Bolt M6 x 25 mm (Qty: 2)
4	A/Trans Manual Shift Shaft Position Switch Assembly

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CONTROL VALVE BODY AND CHANNEL PLATE REMOVAL

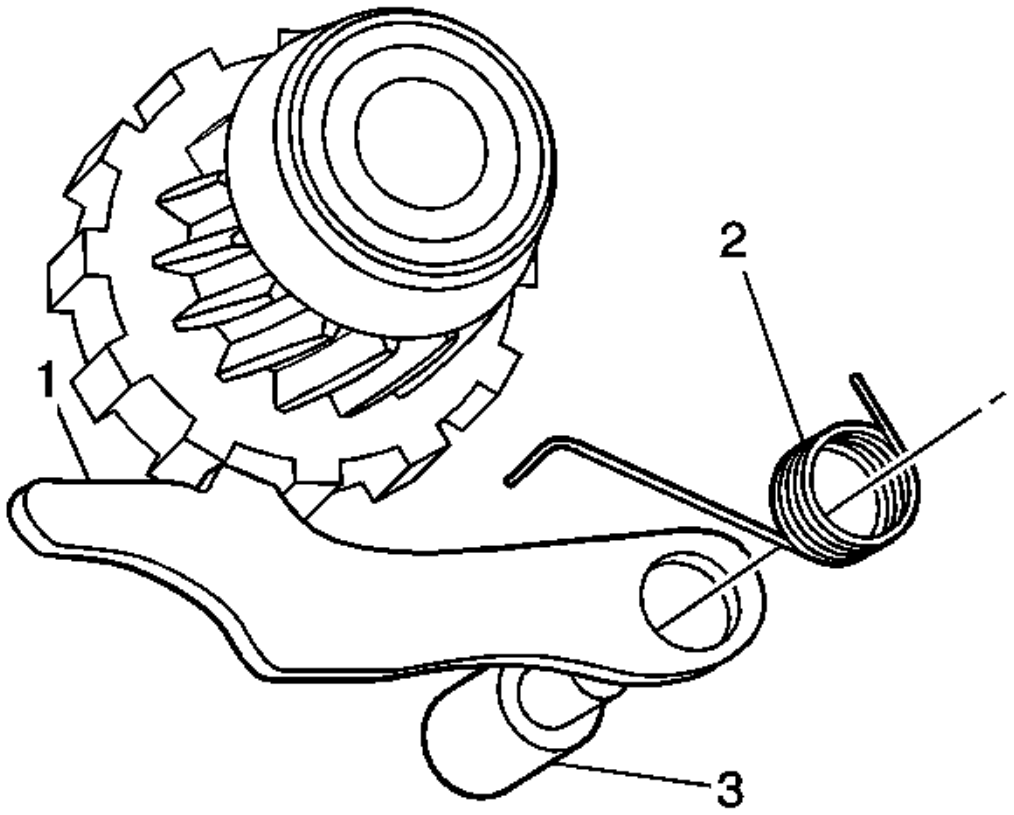


Fig. 6: Control Valve Body and Channel Plate
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Control Valve Body Bolt M6 x 42 mm (Qty: 5)
2	Control Valve Body Bolt M6 x 48 mm (Qty: 12)
3	Control Valve Channel Plate Assembly
4	Control Valve Body
5	Control Valve Body Ball Check Valve (Qty: 2)

OUTPUT SHAFT REMOVAL

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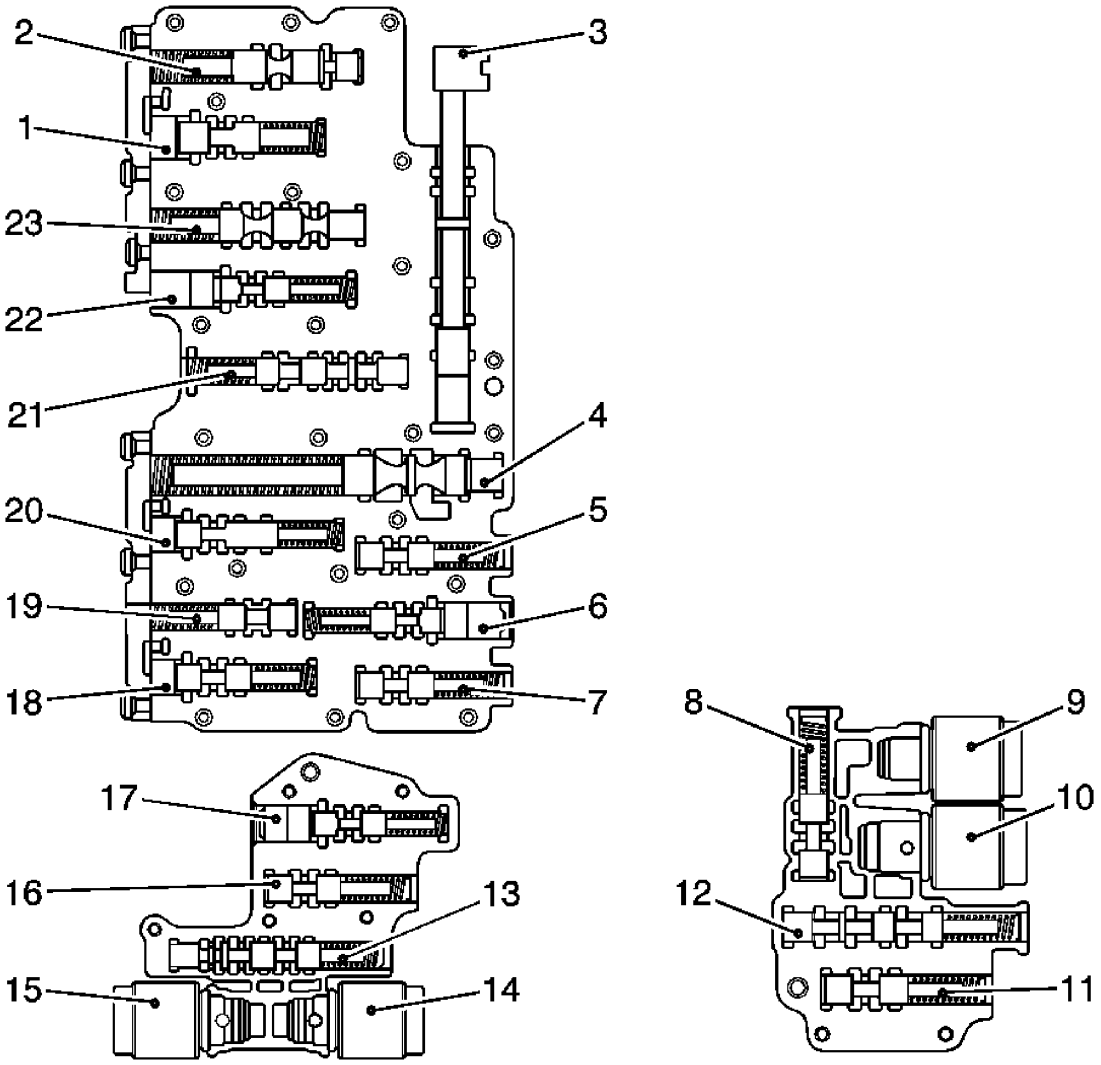


Fig. 7: Output Shaft
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Front Wheel Drive Shaft Retaining Ring **Tip:** Retaining ring is not reusable. Discard after removal.
2	Output Shaft Assembly **Special Tools** • **GE 6125-1B:** Slide Hammer With Adapter • **DT 38868:** Shaft Remover

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	For equivalent regional tools, refer to **Special Tools** .
3	Front Wheel Drive Shaft Retaining Ring **Tip:** Retaining ring is not reusable. Discard after removal.

TORQUE DAMPENER AND DIFFERENTIAL HOUSING WITH FLUID PUMP REMOVAL

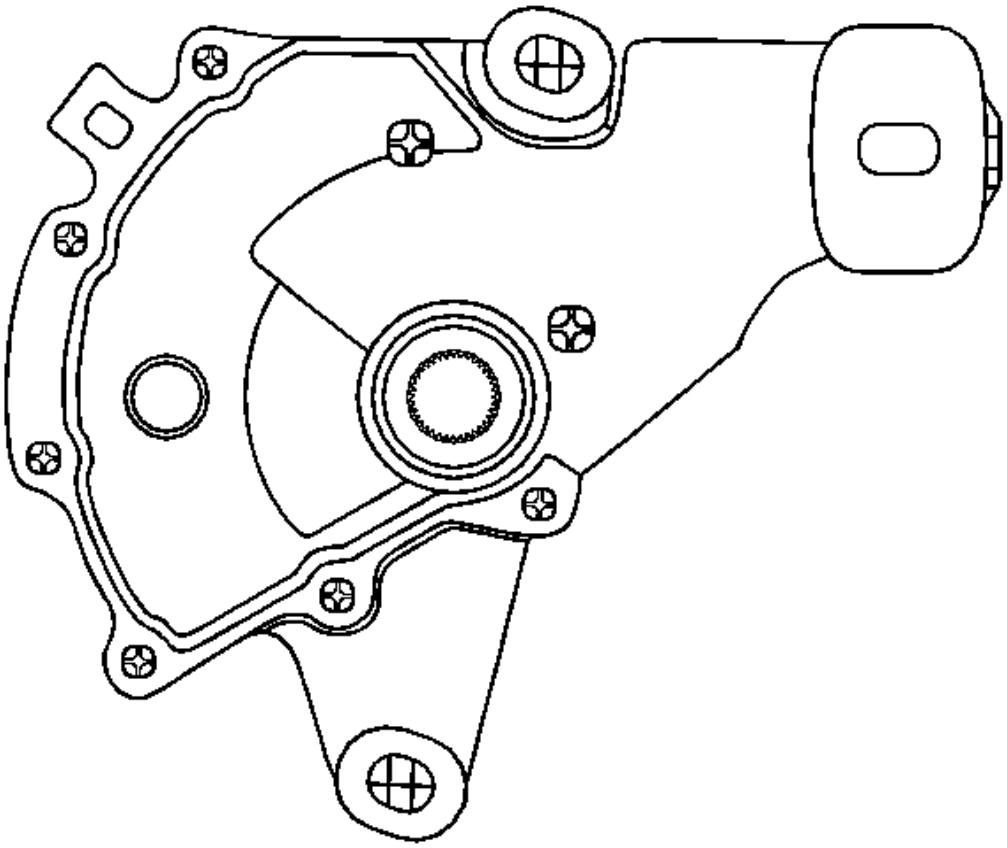


Fig. 8: Torque Dampener and Differential Housing with Fluid Pump
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Torque Dampener and Differential Housing Bolt M10 x 35 mm (Qty: 17)
2	Torque Dampener and Differential (w/Fluid Pump) Housing Assembly

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3	Torque Dampener Housing Outer Seal
4	A/Trans Fluid Outlet Seal Assembly

FRONT DIFFERENTIAL CARRIER ASSEMBLY REMOVAL

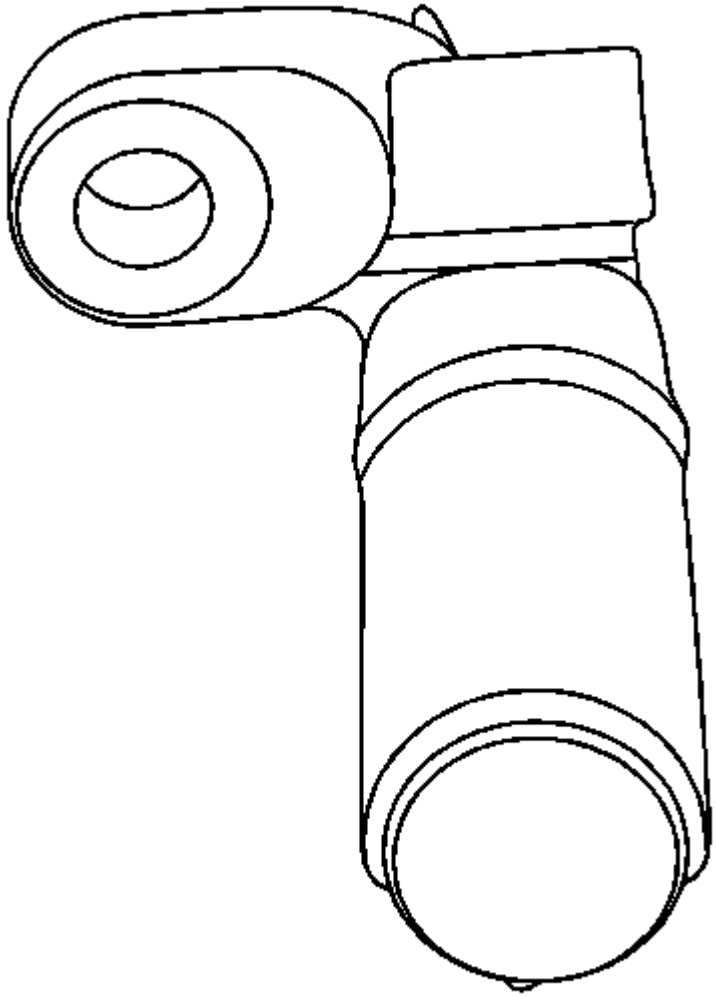


Fig. 9: Front Differential Carrier Assembly
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Front Differential Carrier Assembly (FWD)

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2	Front Differential Carrier Baffle Bolt M6 x 20 mm (Qty: 3)
3	Front Differential Carrier Baffle (Case)

1-3-REVERSE CLUTCH, INPUT CLUTCH HUB, AND HUB SHAFT REMOVAL

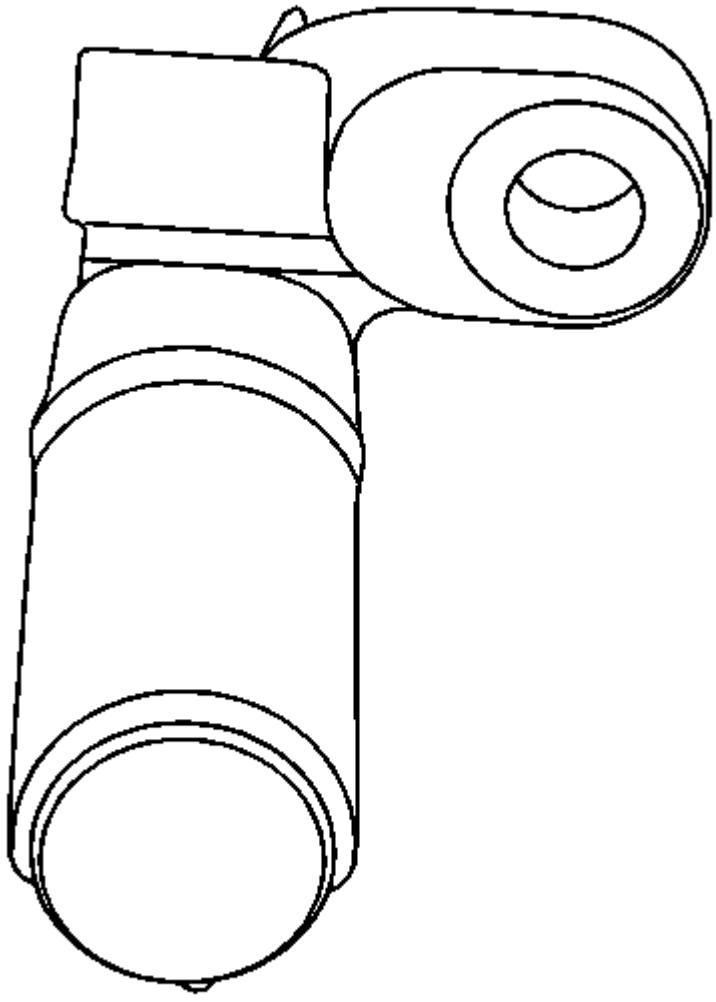


Fig. 10: 1-3-Reverse Clutch, Input Clutch Hub, and Hub Shaft
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	1-3 Reverse Clutch Thrust Bearing Assembly

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2	1-3 Reverse Clutch Assembly
3	Input Carrier Thrust Bearing Assembly
4	Input Clutch Hub
5	Input Clutch Hub Shaft Assembly
6	Input Shaft Retainer
7	Generator/Drive Motor Rotor Hub Shaft
8	Input Clutch Hub Shaft

DRIVE MOTOR GENERATOR ROTOR AND STATOR REMOVAL - UNIT A

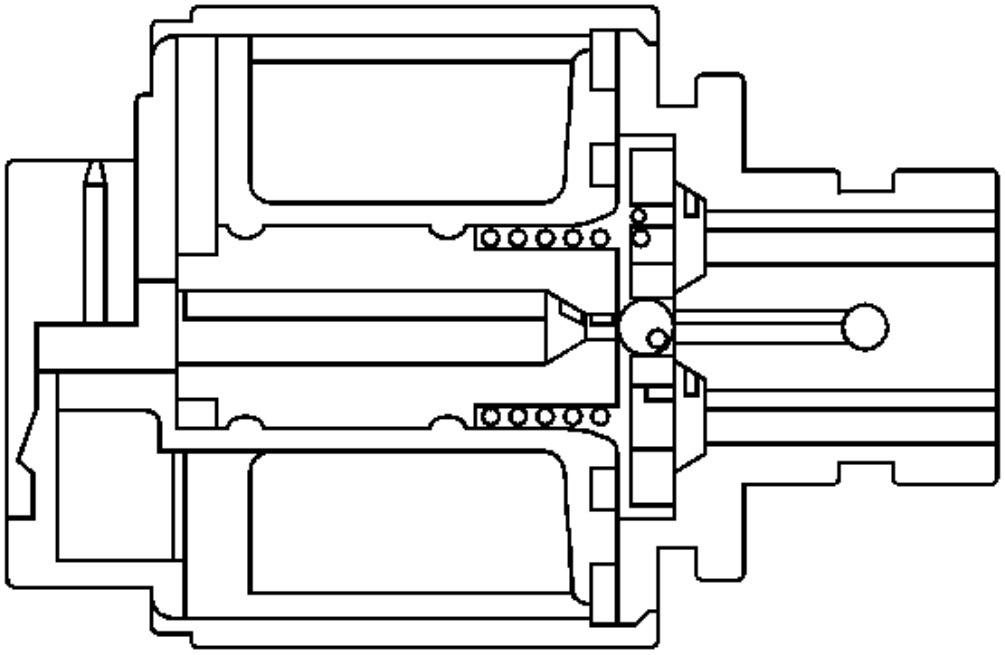


Fig. 11: Drive Motor Generator Rotor and Stator - Unit A
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Drive Motor/Generator Stator Bolt M6 x 20 mm (Qty: 4)
2	Generator/Drive Motor Stator Cooling Tube Assembly (RHS)
3	Drive Motor/Generator Stator Cooling Tube Seal (Qty: 2) **Tip:** Discard seal, it is not reusable.
	Drive Motor/Generator Power Inverter Module Cable

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4	Connector Bolt M6 x 25 mm (Qty: 3) - Internal
5	Auxiliary Pump Motor Cable Retainer
6	Drive Motor/Generator Power Inverter Module Cable Stud M6 x 20 mm (Qty: 3)
7	Drive Motor/Generator Power Inverter Module Cable Assembly - 3 Phase - A
8	Drive Motor/Generator Power Inverter Module Cable Assembly Seal - 3 Phase **Tip:** Discard seal, it is not reusable.
9	Drive Motor/Generator Power Inverter Module Cable Housing Cover Seal **Tip:** Discard seal, it is not reusable.
10	Temperature Sensor Connector
11	Generator/Drive Motor Rotor and Stator Assembly - Unit A **WARNING:** **The generator motor weighs approximately 23 kg (50 lbs). Personal injury may result if you lift the generator motor improperly.**
12	Generator/Drive Motor Stator Cooling Tube Assembly (LHS) **Tip:** This tube assembly may come out with motor.

AUTOMATIC TRANSMISSION WIRING HARNESS AND OUTPUT SPEED SENSOR REMOVAL

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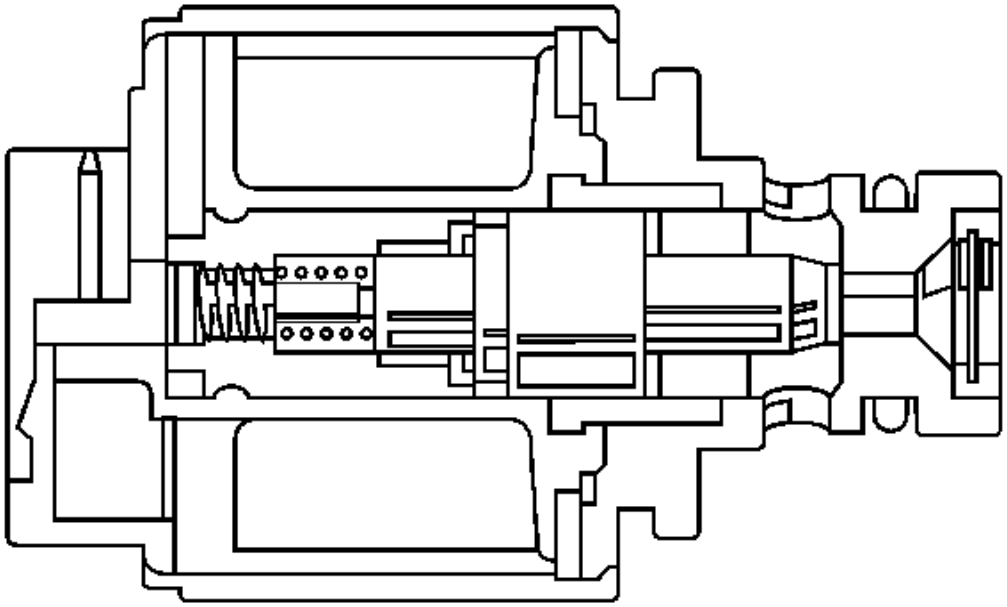


Fig. 12: Automatic Transmission Wiring Harness and Output Speed Sensor
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	A/Trans Output Speed Sensor Bolt M6 x 30 mm (Qty: 1)
2	A/Trans Output Speed Sensor Assembly **Tip:** Speed sensor can be disconnected from harness after removal.
3	A/Trans Wiring Harness Assembly **Tip:** Use a 32 mm socket to release tabs.
4	Wiring Connector Seal **Tip:** Discard seal, it is not reusable.
5	Front Differential Carrier Lube Pipe Bolt M5 x 16 mm (Qty: 1)
6	Front Differential Carrier Lube Pipe
7	Front Differential Carrier Lube Pipe Seal **Tip:** Discard seal, it is not reusable.

PARK PAWL AND MANUAL SHIFT SHAFT REMOVAL

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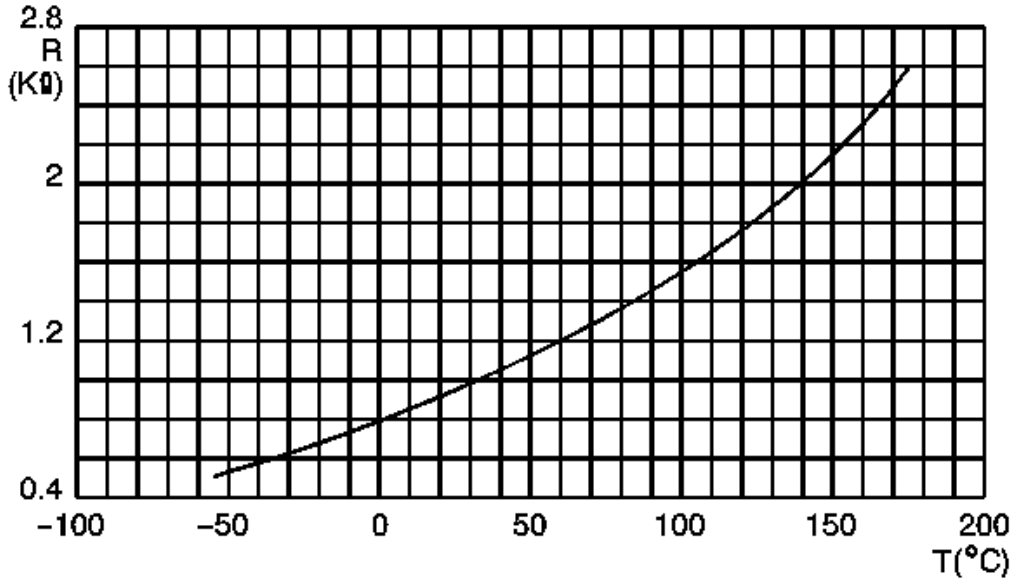


Fig. 13: Park Pawl and Manual Shift Shaft
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Park Pawl Actuator Bolt M6 x 20 mm (Qty: 2)
2	Park Pawl Actuator Bracket
3	Wiring Harness Conduit Bracket
4	Park Pawl Shaft **Tip:** Hold park pawl spring while removing the shaft.
5	Park Pawl Spring
6	Park Pawl
7	Park Pawl Actuator Guide Pin (Qty: 2) **Tip:** Requires a magnet to remove.
8	Park Pawl Actuator Guide
9	Manual Shaft Detent Lever Hub Pin
10	Manual Shift Shaft Pin
11	Manual Shift Shaft
12	Manual Shift Shaft Detent Lever Assembly
13	Park Pawl Actuator Assembly

FRONT DIFFERENTIAL DRIVE PINION GEAR WITH TRANSFER GEAR REMOVAL

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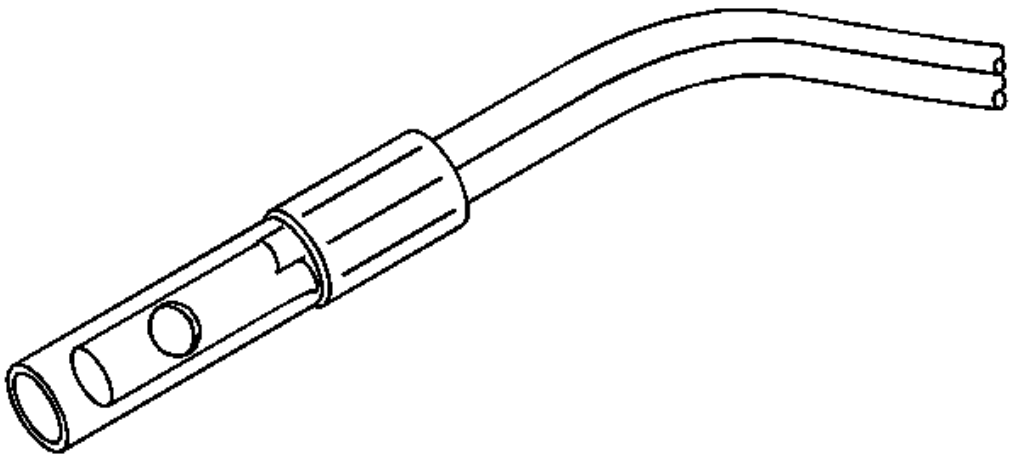


Fig. 14: Front Differential Drive Pinion Gear with Transfer Gear
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Front Differential Transfer Drive Gear Fluid Passage Tube Assembly
2	Front Drive Pinion Gear Shaft Thrust Bearing Assembly - Selective (RHS)
3	Front Differential Drive Pinion Gear Bearing Thrust Washer (RHS)
4	Front Differential Drive Pinion (w/Transfer Gear) Gear Assembly
5	Front Differential Drive Pinion Gear Bearing Thrust Washer - Selective
6	Front Drive Pinion Gear Shaft Thrust Bearing Assembly (LHS)
7	Front Differential Bearing Spacer
8	Stator Assembly - Unit B Connector **Tip:** 1. Disconnect the wiring harness. 2. For ease of disassembly push the connector through case hole.

FRONT WHEEL DRIVE SHAFT SEAL REMOVAL - CASE SIDE

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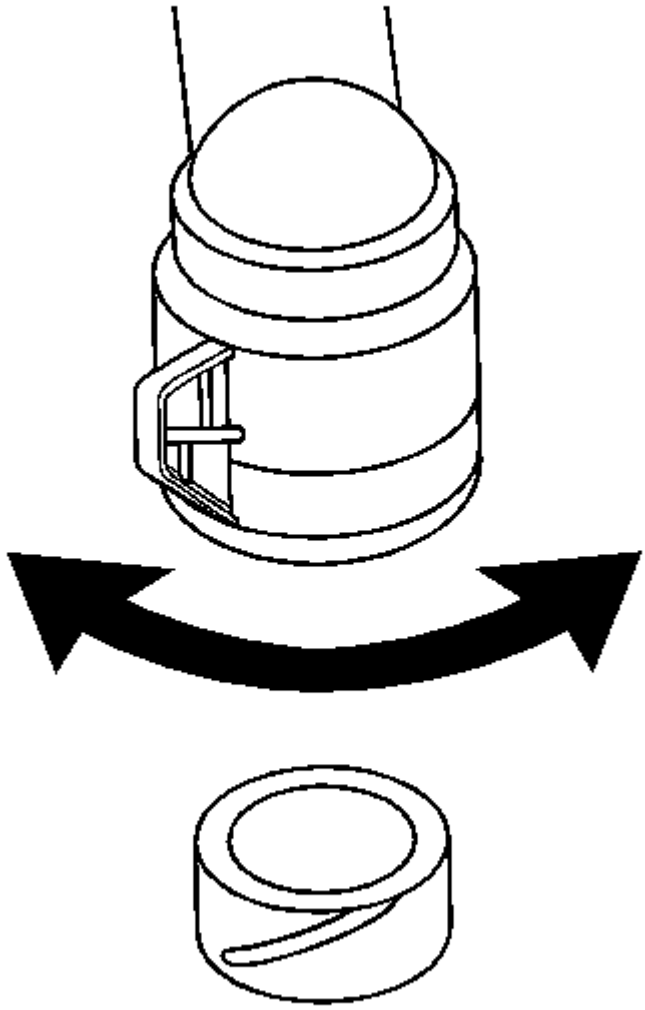


Fig. 15: Front Wheel Drive Shaft Seal - Case Side
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Front Wheel Drive Shaft Oil Seal Assembly (LHS) **Special Tools** • **GE 6125-1B:** Slide Hammer With Adapter • **GE 23129:** Universal Seal Remover

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

CASE EXTENSION ASSEMBLY REMOVAL

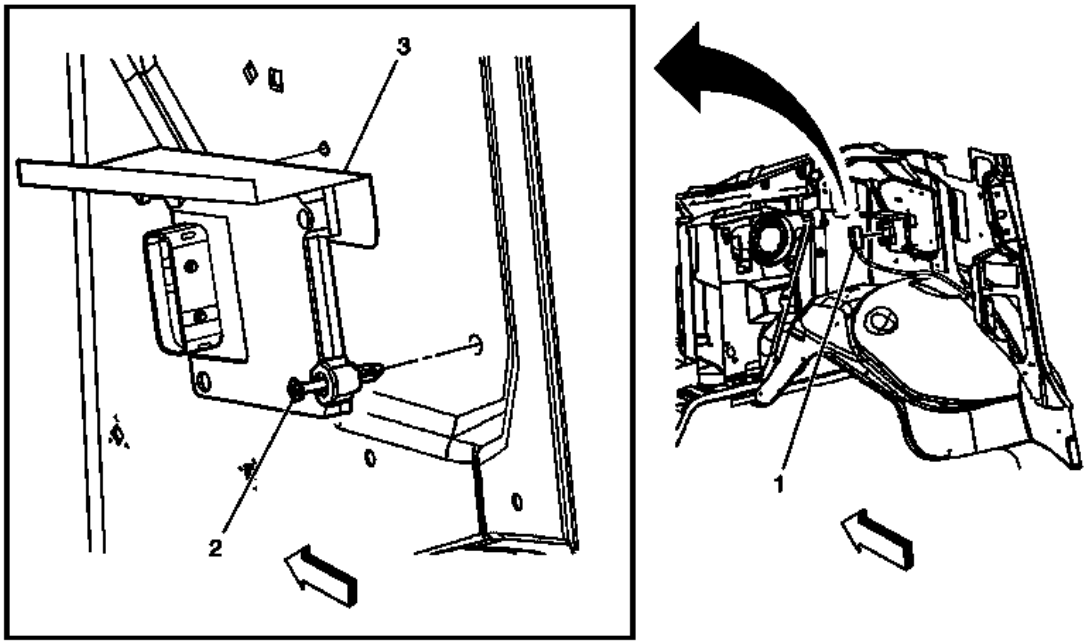


Fig. 16: Case Extension Assembly
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Case Extension Bolt M10 x 25 mm (Qty: 3) **Tip:** May require **GE 23129:** universal seal remover and **GE 6125-1B:** slide hammer with adapter to remove. **Special Tools** • **GE 6125-1B:** Slide Hammer with Adapter • **GE 23129:** Universal Seal Remover
2	Case Extension Assembly
3	A/Trans Case Extension Seal **Tip:** Discard seal, it is not reusable.

CASE COVER REMOVAL

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Fig. 17: Case Cover
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	A/Trans Wiring Harness Shield Bolt M6 x 20 mm (Qty: 1) - External
2	A/Trans Case Cover Bolt M8 x 30 mm (Qty: 9)
3	Case Cover Stud M8 x 30 (Qty: 2)
4	A/Trans Case Cover Assembly
5	A/Trans Case Cover Gasket

DRIVE MOTOR GENERATOR ROTOR AND STATOR REMOVAL - UNIT B

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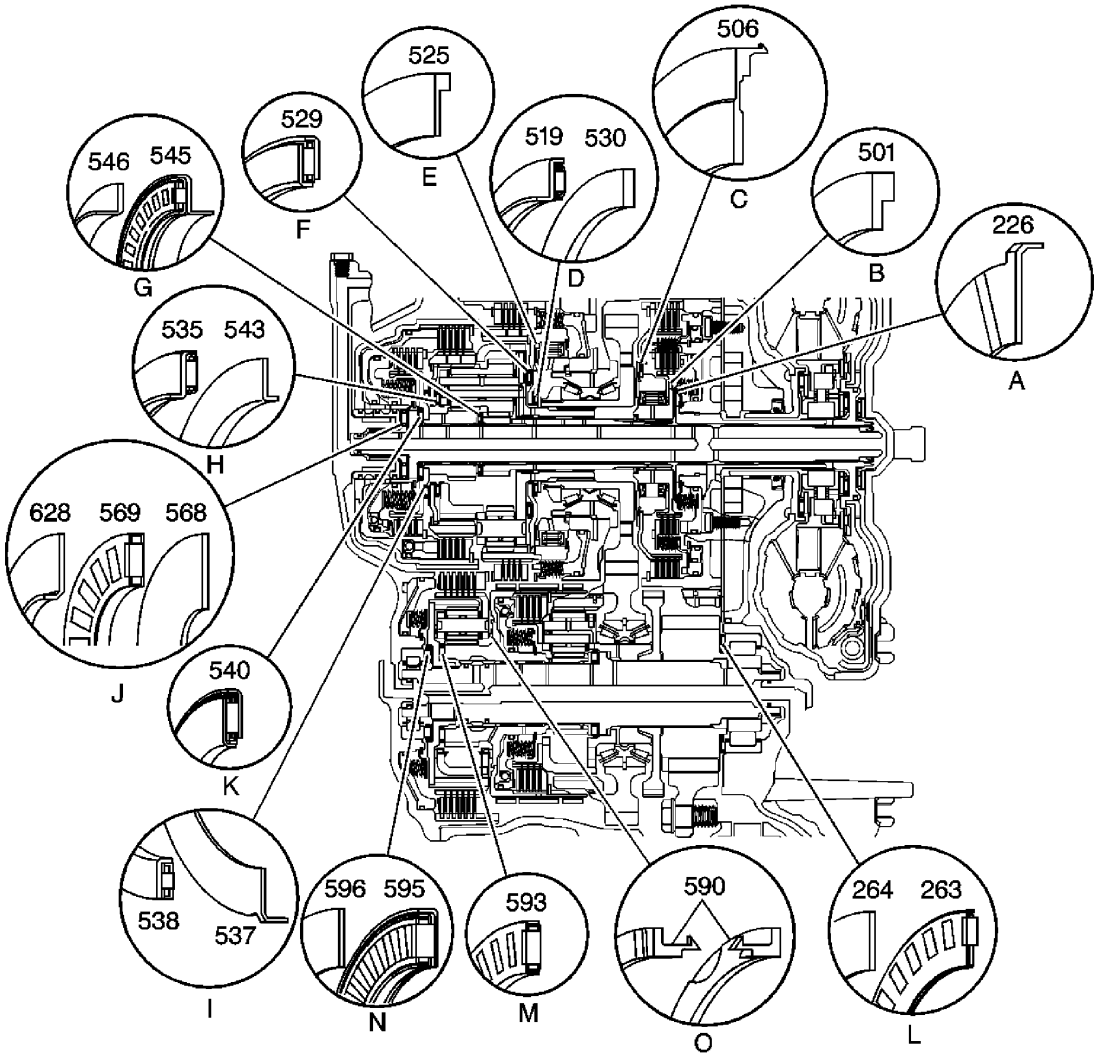


Fig. 18: Drive Motor Generator Rotor and Stator - Unit B
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Drive Motor/Generator Power Inverter Module Cable Connector Bolt M6 x 20 mm (Qty: 3) - Internal
2	Auxiliary Pump Motor Cable Retainer
3	Drive Motor/Generator Power Inverter Module Cable Stud M6 x 20 mm (Qty: 3) - External **Tip:** Remove each cable individually after each bolt is removed.
4	Drive Motor/Generator Power Inverter Module Cable Assembly - 3 Phase - B
5	Drive Motor/Generator Power Inverter Module Cable Assembly Seal - 3 Phase (Qty: 3)

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	Tip: Discard seal, it is not reusable.
6	Drive Motor/Generator Power Inverter Module Cable Housing Cover Seal **Tip:** Discard seal, it is not reusable.
7	Drive Motor/Generator Stator Bolt M6 x 20 mm (Qty: 4)
8	Drive Motor/Generator Stator Assembly - Unit B **WARNING:** **The generator motor weighs approximately 36 kg (80 lbs). Personal injury may result if you lift the generator motor improperly.** **Tip:** The shell and or gearset may slip out of the case while removing the drive motor. **Special Tools:** **DT 50302:** Rotor and Stator Lifter Assembly For equivalent regional tools, refer to **Special Tools** .

OUTPUT SUN GEAR, SUN GEAR SHAFT, CARRIER, AND CARRIER SHELL REMOVAL

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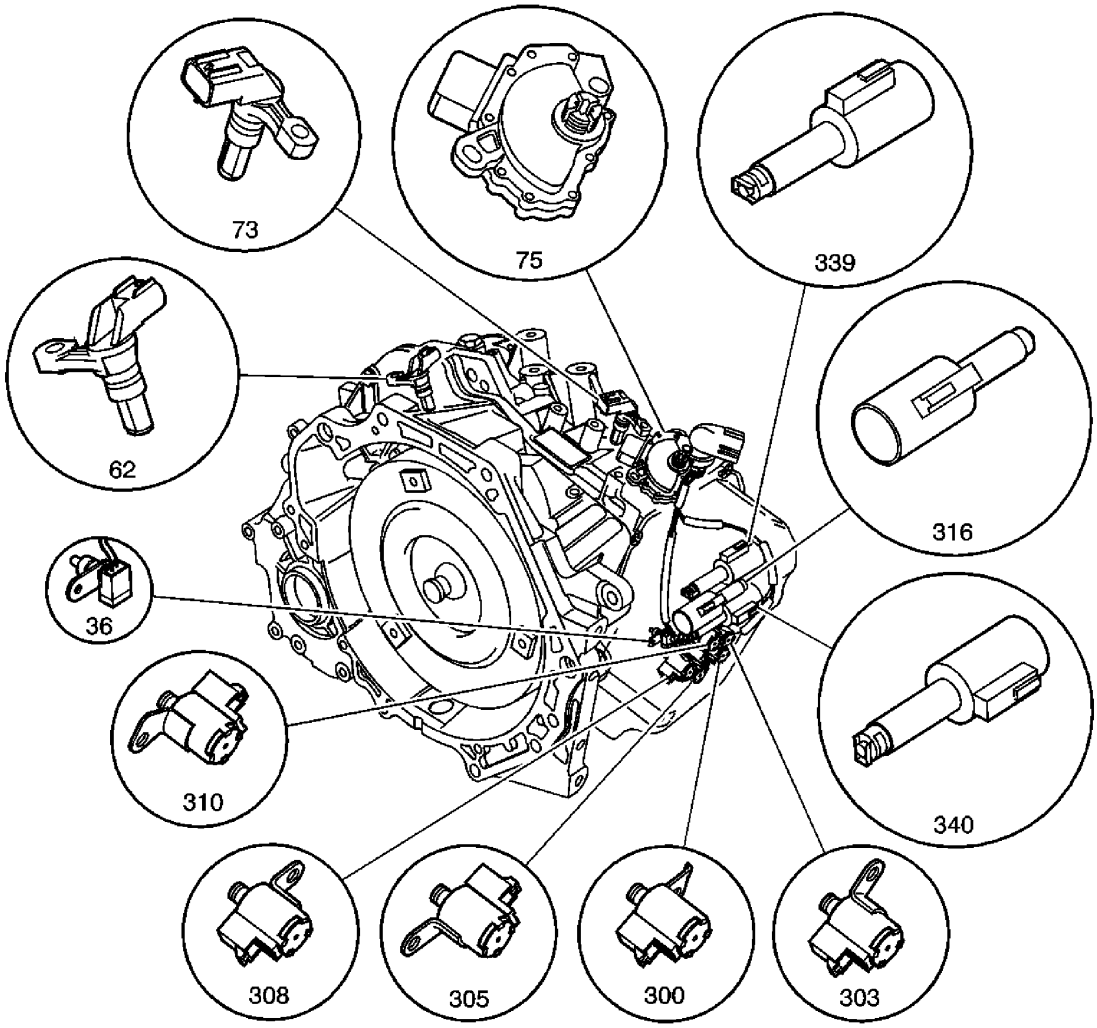


Fig. 19: Output Sun Gear, Sun Gear Shaft, Carrier, and Carrier Shell
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Output Sun Gear Shaft Lube O-ring Seal **Tip:** Discard seal, it is not reusable.
2	Output Sun Gear Shaft
3	Output Sun Gear
4	Output Carrier Assembly - C2
5	Output Carrier Shell

VARIABLE HIGH AND 2-3-4 CLUTCH HUB AND CLUTCH REMOVAL

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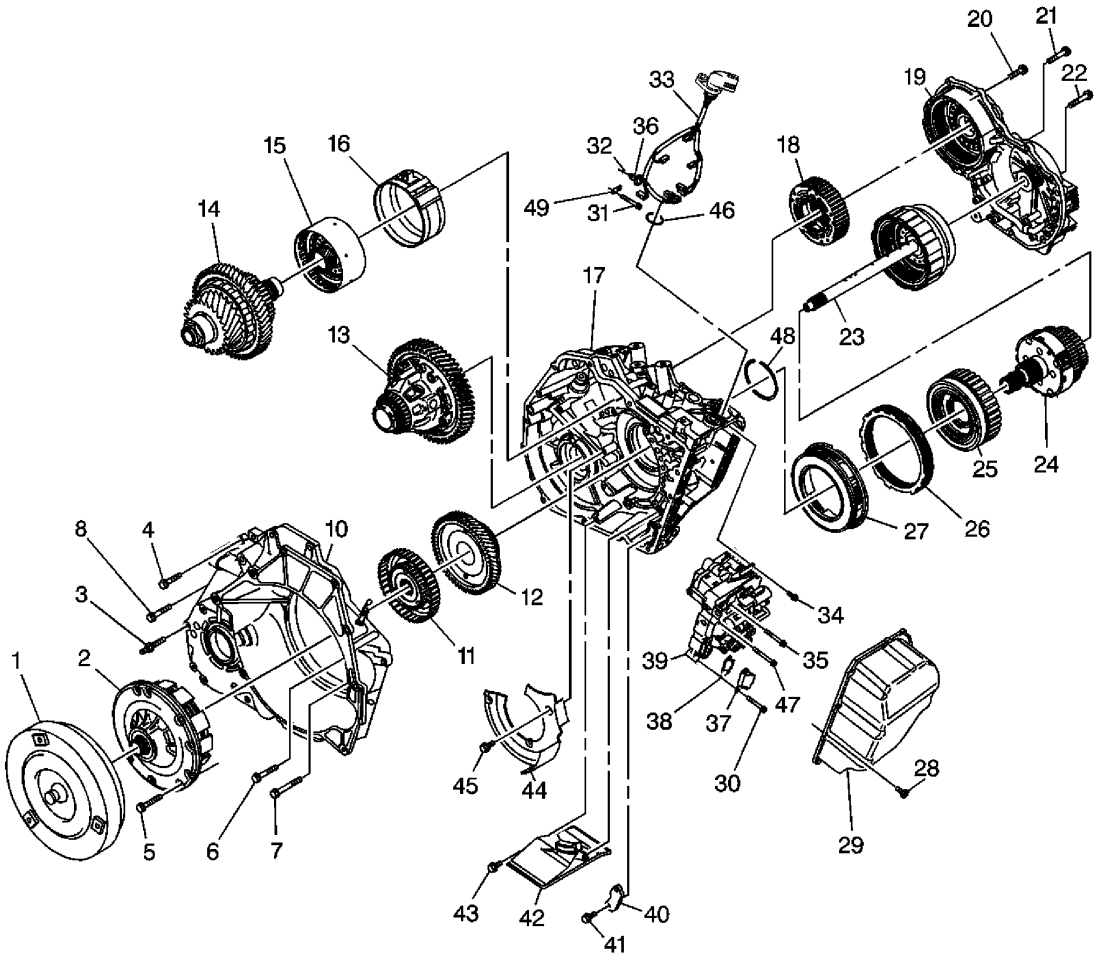


Fig. 20: Variable High and 2-3-4 Clutch Hub and Clutch
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Output Carrier Thrust Bearing Assembly
2	Variable Hi and 2-3-4 Clutch Hub
3	Variable Hi and 2-3-4 Clutch Hub Thrust Bearing Assembly
4	Variable Hi and 2-3-4 Clutch Assembly
5	Variable Hi and 2-3-4 Clutch Housing Thrust Bearing Assembly

CENTER SUPPORT ASSEMBLY REMOVAL

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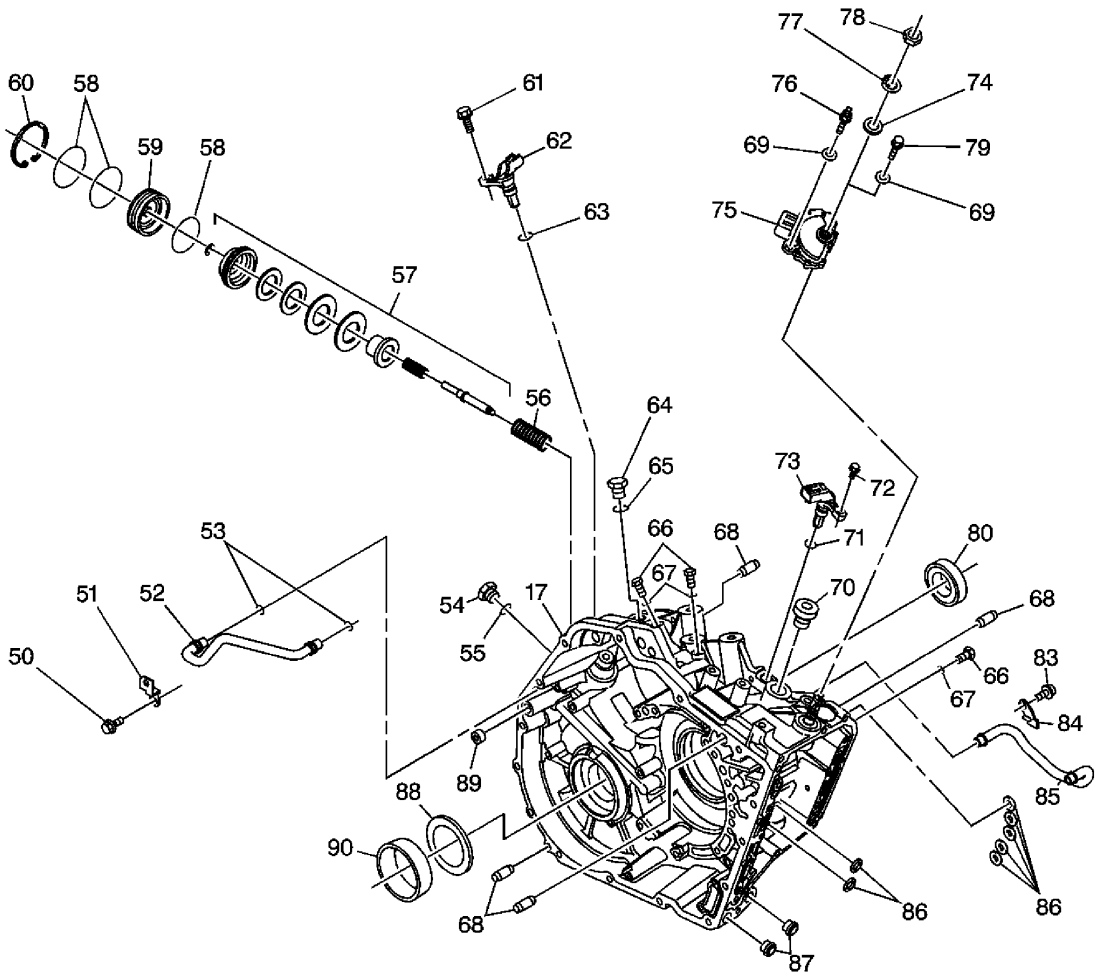


Fig. 21: Center Support Assembly
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Center Support Bolt M10 x 25 mm (Qty: 9)
2	Center (w/Variable Low and 1-2 Reverse Clutch) Support Assembly
3	Center Support Oil Passage Seal **Tip:** May be stuck to the support assembly.

DRIVE MOTOR POWER INVERTER MODULE CABLE TERMINAL INSULATOR BLOCK REMOVAL

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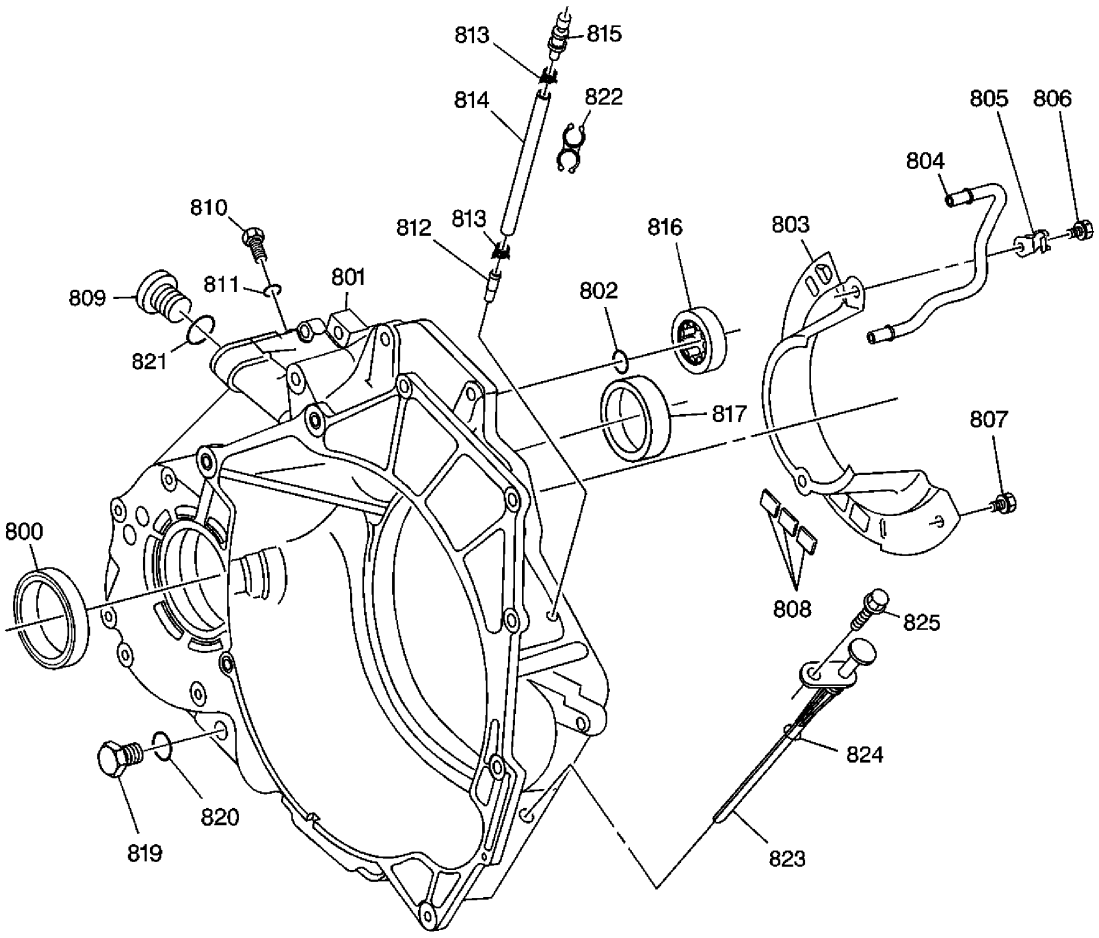


Fig. 22: Drive Motor Power Inverter Module Cable Terminal Insulator Block
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Drive Motor Generator Power Inverter Module Cable Terminal Insulator Block Bolt M6 x 20 mm (Qty: 2)
2	Drive Motor Generator Power Inverter Module Cable Terminal Insulator Block Assembly

VARIABLE HIGH AND 2-3-4, VARIABLE LOW AND 1-2 REVERSE, AND 1-3 REVERSE CLUTCH ACCUMULATOR PISTON REMOVAL

Variable Hi And 2-3-4 And Variable Low And 1-2 Reverse Clutch Accumulator Piston Removal

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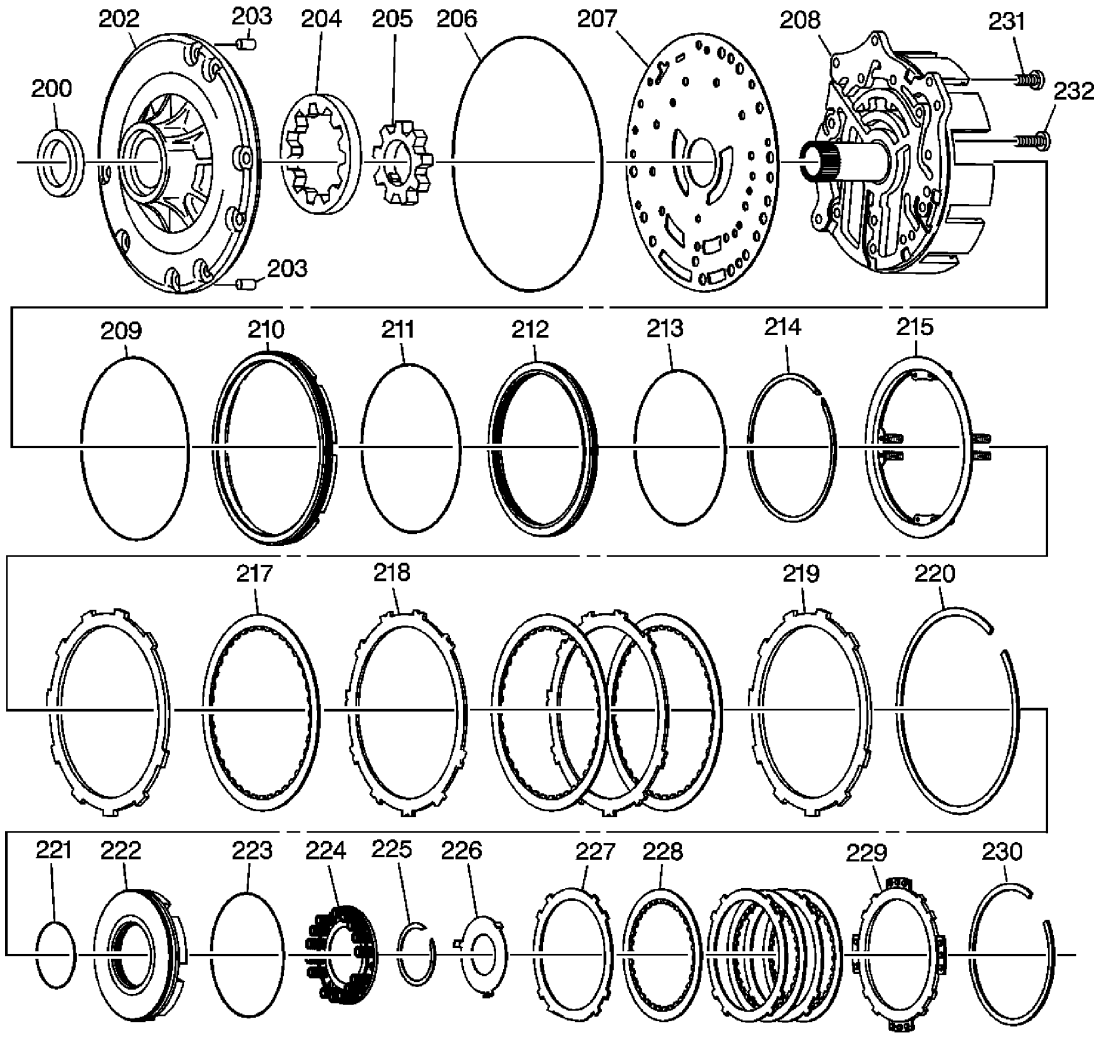


Fig. 23: Variable Hi And 2-3-4 And Variable Low And 1-2 Reverse Clutch Accumulator Piston
Courtesy of GENERAL MOTORS CORP.

Variable Hi and 2-3-4 and Variable Low and 1-2 Reverse Clutch Accumulator Piston Removal

Callout	Component Name
1	Accumulator Piston Retaining Ring
2	Variable Hi and 2-3-4 Clutch Accumulator Piston
3	Variable Hi and 2-3-4 Clutch Accumulator Piston Spring
4	Variable Hi and 2-3-4 Clutch Accumulator Piston Spring - Inner
5	Accumulator Piston Retaining Ring
6	Variable Low and 1-2 Reverse Clutch Accumulator Piston
7	Variable Low and 1-2 Reverse Clutch Accumulator

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	Piston Spring

1-3 Reverse Clutch Accumulator Piston Removal

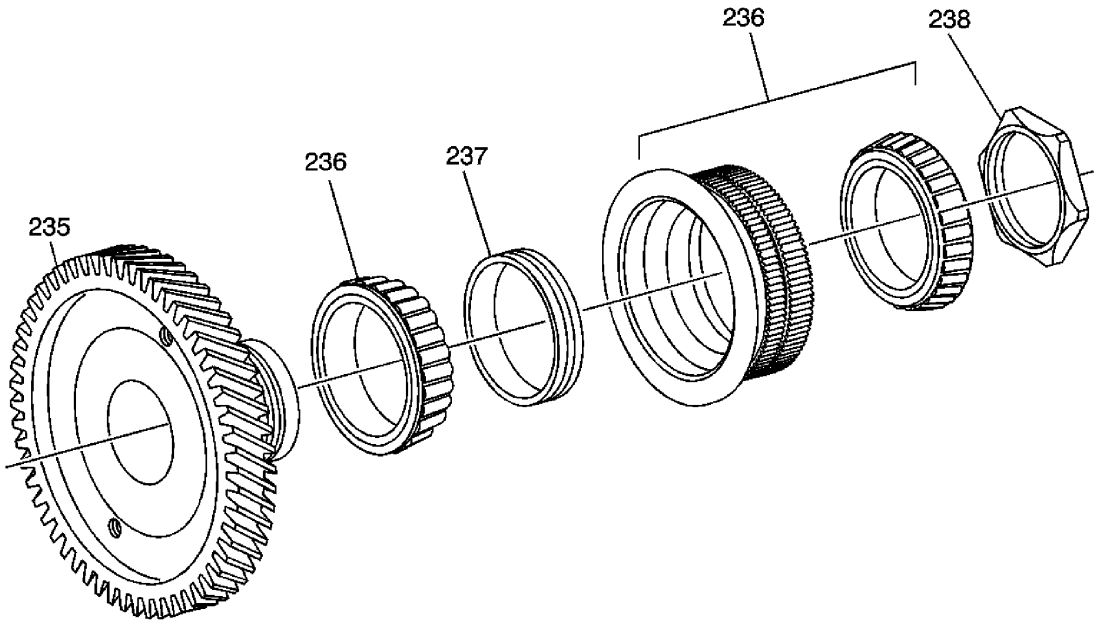


Fig. 24: 1-3 Reverse Clutch Accumulator Piston
Courtesy of GENERAL MOTORS CORP.

1-3 Reverse Clutch Accumulator Piston Removal

Callout	Component Name
1	Accumulator Piston Retaining Ring
2	1-3 Reverse Clutch Accumulator Piston Spring Washer
3	1-3 Reverse Clutch Accumulator Piston Spring - Internal
4	1-3 Reverse Clutch Accumulator Piston Spring - Outer
5	1-3 Reverse Clutch Accumulator Piston

TRANSMISSION CASE CLEANING AND INSPECTION

Torque Dampener And Differential Side

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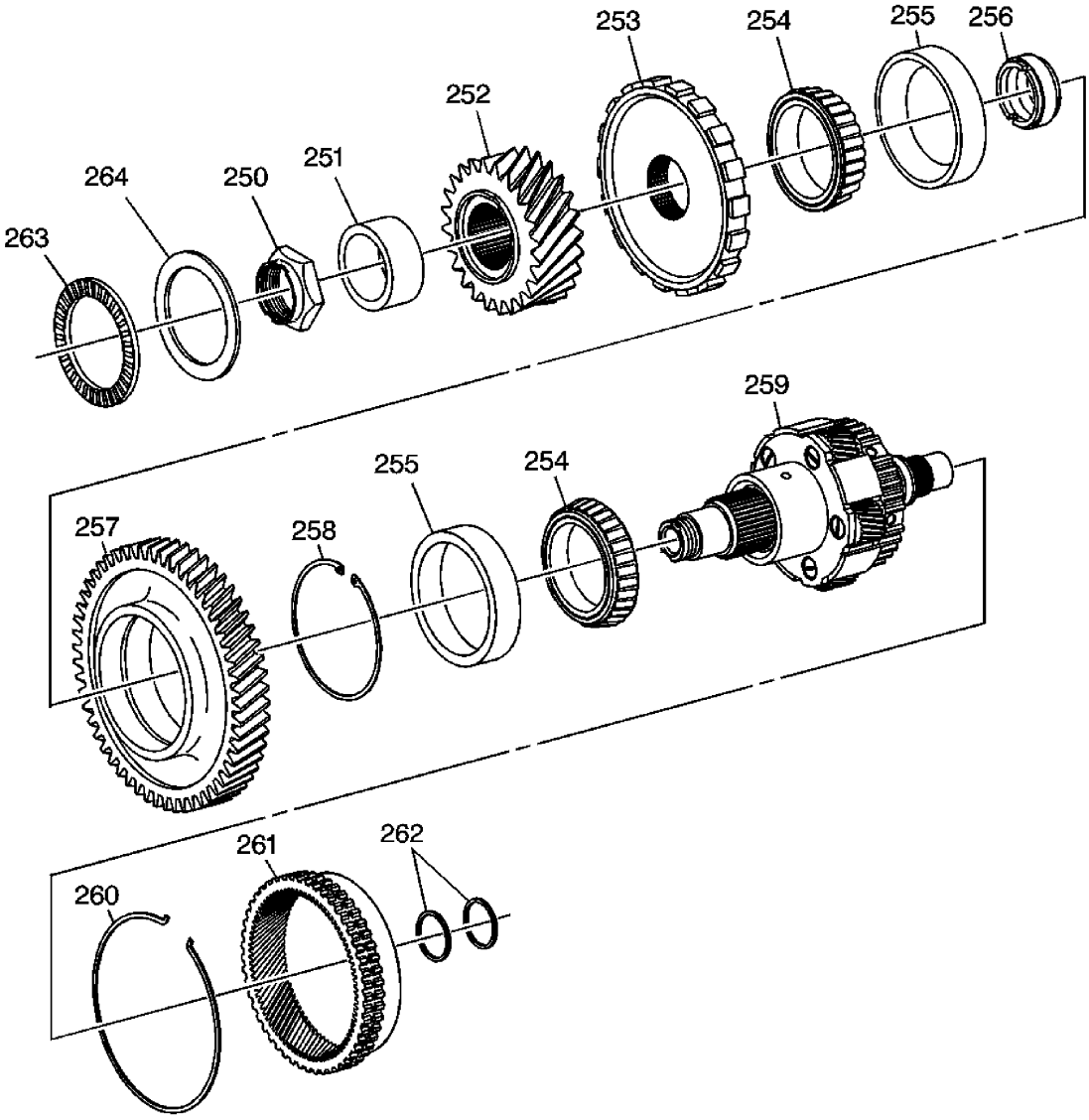


Fig. 25: Torque Dampener And Differential Side
Courtesy of GENERAL MOTORS CORP.

Torque Dampener and Differential Side

Callout	Component Name
CAUTION: **Do not use abrasive pads or bristle devices to clean the sealing surfaces. Abrasive pads produce a fine grit that can effect transmission function. Abrasive pads can also remove enough metal to create oil leaks.** **CAUTION:** **After cleaning the transmission components, allow to air dry. Do not use cloth or paper towels in order to dry any transmission components. Lint from the towels can cause component failure.**	

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CAUTION:
Do not reuse cleaning solvents. Previously used solvents may deposit sediment which may damage the component.

Preliminary Procedures

1. Thoroughly clean the transmission case assembly, including case threads, with clean solvent.
2. Clean gasket sealing surfaces. Remove all residual gasket material.
3. Inspect all threaded holes. If necessary, repair any thread damage.

1	Transmission Case Locator Pin
2	Torque Dampener and Differential Housing Sealing Surface
3	Generator/Drive Motor Stator Locating Pin
4	Transmission Case Locator Pin
5	Generator/Drive Motor Stator Locator Pin
6	A/Trans Vent Assembly
7	Control Valve Body Cover Sealing Surface
8	Manual Shift Shaft Seal Surface
9	Transmission Fluid Drain Plug **CAUTION:** **Refer to Fastener Caution .** **Tighten:** 11 N.m (97.4 lb in)

Case Side Cover

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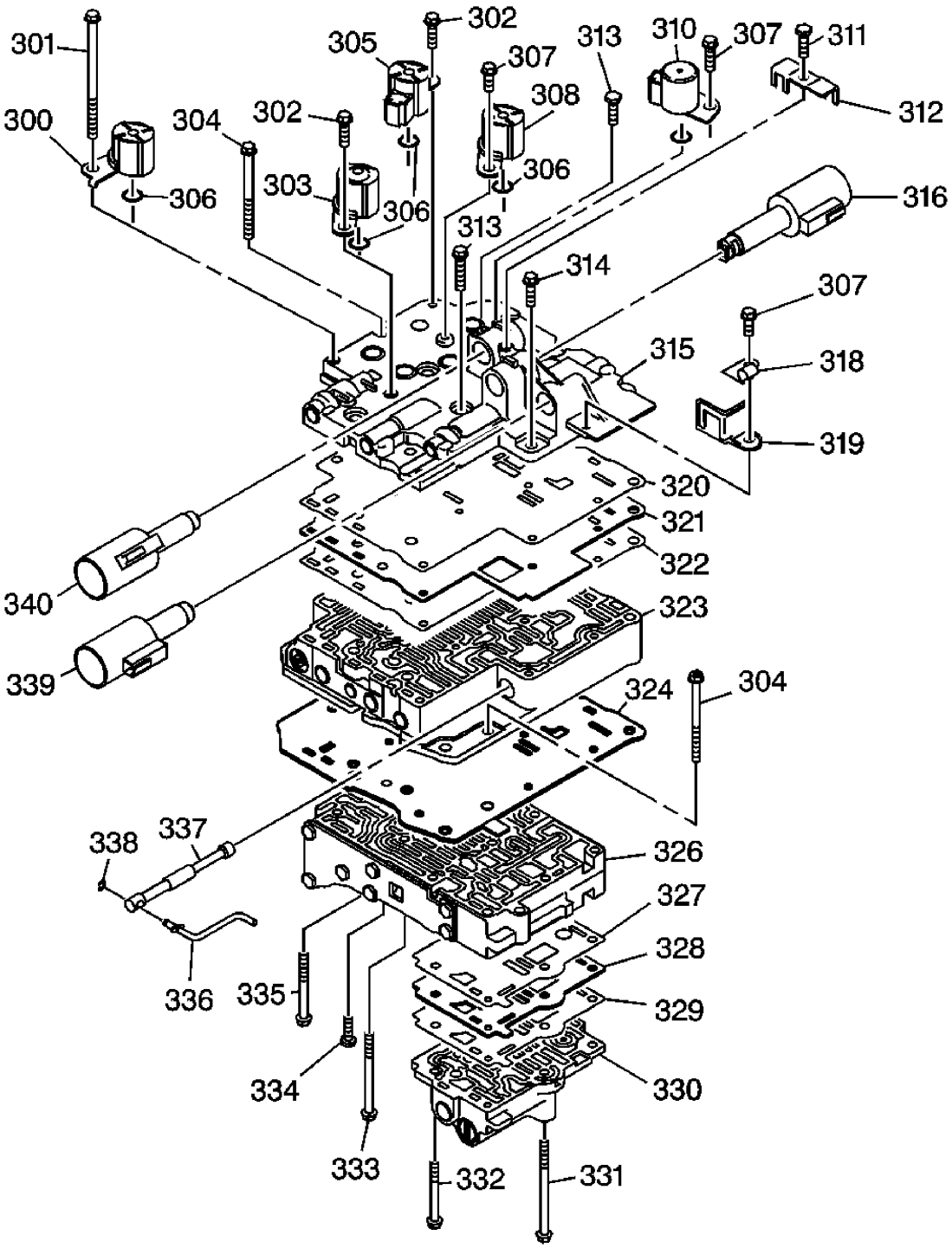


Fig. 26: Case Side Cover
Courtesy of GENERAL MOTORS CORP.

Case Side Cover

Callout	Component Name

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CAUTION:
Do not use abrasive pads or bristle devices to clean the sealing surfaces. Abrasive pads produce a fine grit that can effect transmission function. Abrasive pads can also remove enough metal to create oil leaks.

CAUTION:
After cleaning the transmission components, allow to air dry. Do not use cloth or paper towels in order to dry any transmission components. Lint from the towels can cause component failure.

CAUTION:
Do not reuse cleaning solvents. Previously used solvents may deposit sediment which may damage the component.

Preliminary Procedures

1. Thoroughly clean the transmission case assembly, including case threads, with clean solvent.
2. Clean gasket sealing surfaces. Remove all residual gasket material.
3. Inspect all threaded holes. If necessary, repair any thread damage.

1	Transmission Case Locator Pin
2	Generator/Drive Motor Stator Locator Pin
3	Generator/Drive Motor Stator Locator Pin
4	Case Cover Sealing Surface
5	A/Trans Fluid Level Hole Plug (Qty: 1) **CAUTION:** **Refer to Fastener Caution .** **Tighten:** 11 N.m (97.4 lb in)

MANUAL SHIFT SHAFT SEAL REMOVAL

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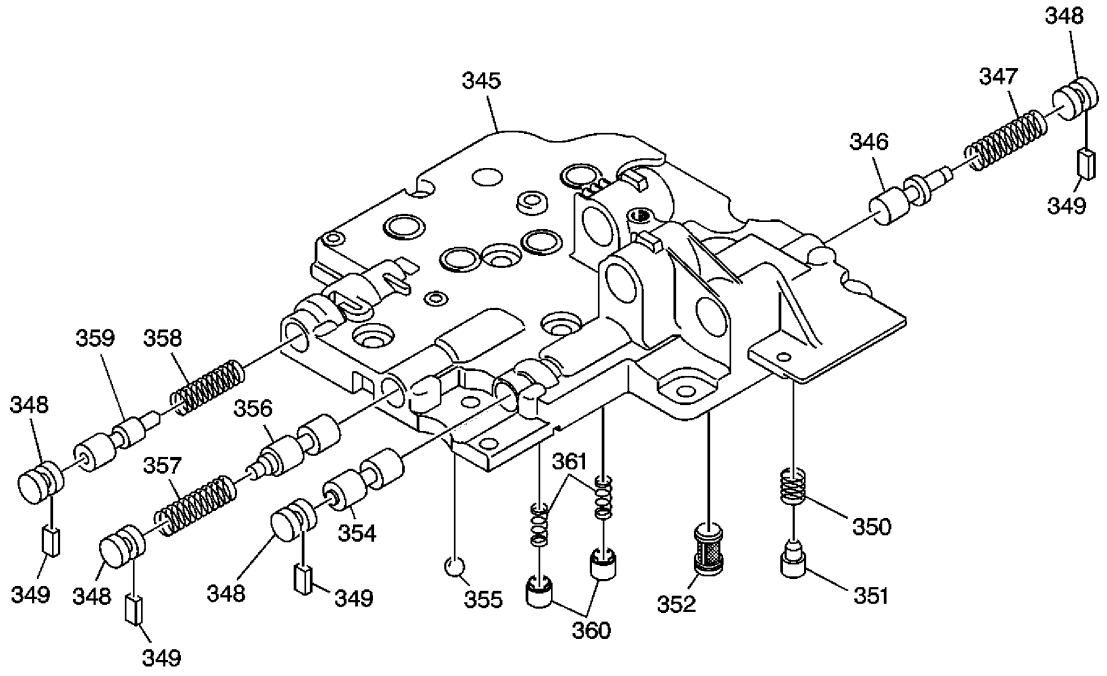


Fig. 27: Manual Shift Shaft Seal
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Manual Shift Shaft Seal **Special Tool:** **DT 45201:** Cooler Line Seal Remover For equivalent regional tools, refer to **Special Tools** .

FRONT DIFFERENTIAL DRIVE PINION GEAR BEARING CUP REPLACEMENT - CASE SIDE

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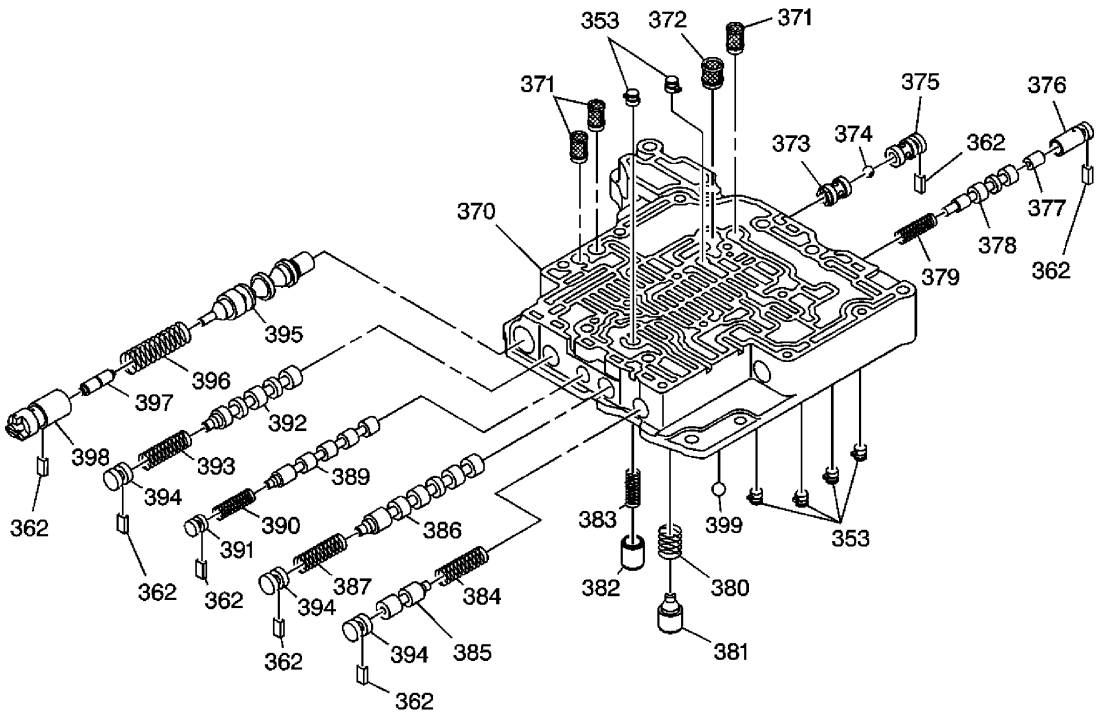


Fig. 28: Front Differential Drive Pinion Gear Bearing Cup - Case Side
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Front Differential Drive Pinion Gear Bearing Cup **CAUTION:** **Support the back side of the torque dampener housing while installing the bearing cup. Install the bearing cup until it stops moving. Applying excessive pressure to the bearing cup once it is seated could cause damage to the torque dampener housing casting.** **CAUTION:** **Failure to apply the lubricant will cause damage to the bolt and nut threads.** **Procedure** 1. Tighten DT 49266 until it fits snugly on the bearing cup. 2. Adjust DT 45124 so it sits on the torque converter housing surface just beyond the bearing cup opening.

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	3. Apply the extreme pressure lubricant DT 23444-A to the puller bolt threads to prevent damage to the bolt threads during bearing cup removal. 4. Hold the puller bridge bolt and turn the nut to remove the bearing cup. 5. Use an arbor press with DT-49263 and GE 8092 to install. **Special Tools** • **DT 45124:** Removal Bridge • **DT-49263:** Bearing Cup Installer • **DT-49266:** Bearing Cup Remover • **GE 8092:** Driver Handle • **DT 23444-A:** Extreme Press Lubricant - 1/4 Ounce Tube For equivalent regional tools, refer to **Special Tools** .

FRONT DIFFERENTIAL DRIVE PINION GEAR ROLLER BEARING AND LUBRICANT DAM REPLACEMENT

Removal

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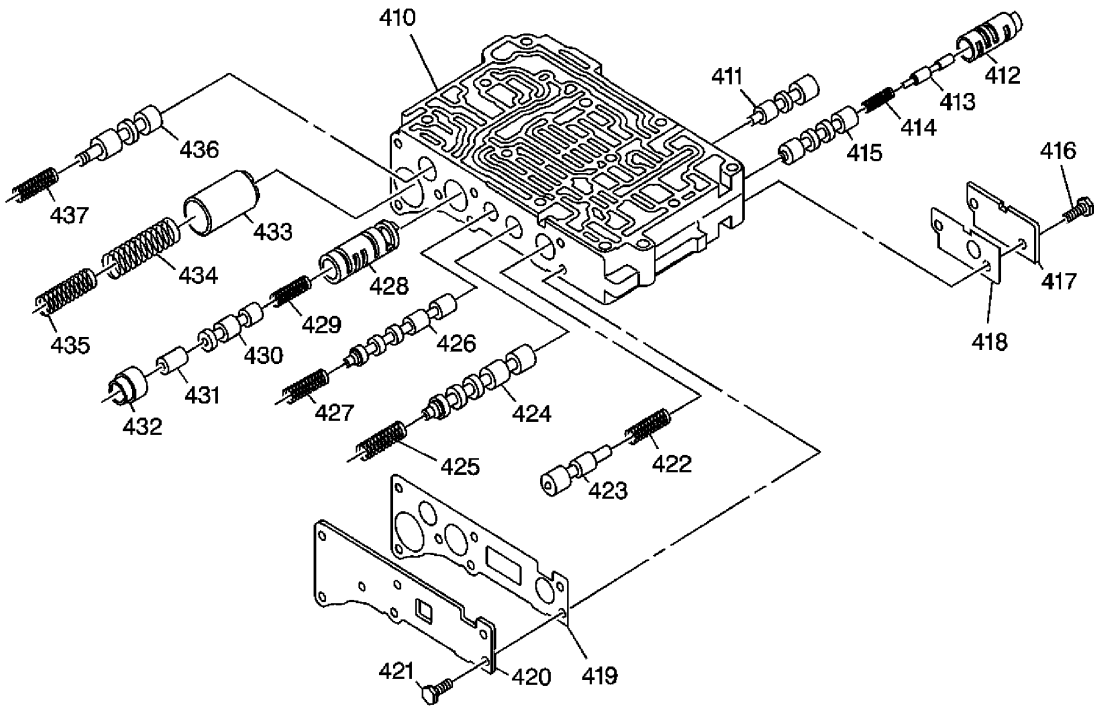


Fig. 29: Front Differential Drive Pinion Gear Roller Bearing And Lubricant Dam
Courtesy of GENERAL MOTORS CORP.

Removal

Callout	Component Name
1	Front Differential Drive Pinion Gear Roller Bearing Assembly **Procedure:** Tighten DT-49230-2 until it fits snugly on the bearing. **Special Tools** • **DT 45124:** Removal Bridge • **DT-49230-2:** Transfer Shaft Bearing Remover For equivalent regional tools, refer to **Special Tools** .
2	Front Differential Drive Pinion Gear Lube Dam **Special Tools** • **DT-48055:** Lube Dam Remover • **GE 6125-1B:** Slide Hammer With Adapter

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

Install

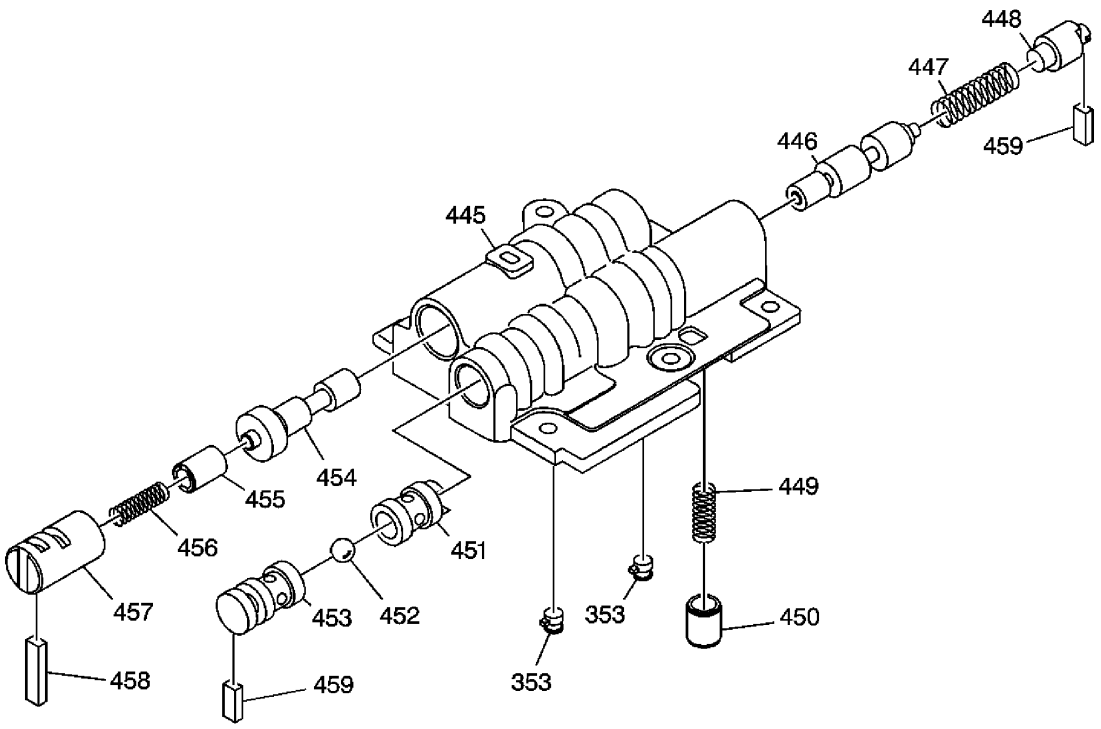


Fig. 30: Special Installation Tools
Courtesy of GENERAL MOTORS CORP.

Install

Callout	Component Name
1	Front Differential Drive Pinion Gear Lube Dam **Special Tools** • **DT-46630:** Lube Dam Installer • **GE 8092:** Driver Handle For equivalent regional tools, refer to **Special Tools** .
2	Front Differential Drive Pinion Gear Roller Bearing Assembly **Special Tools** • **DT-49229:** Transfer Shaft Bearing Installer

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	• **GE 8092:** Driver Handle For equivalent regional tools, refer to **Special Tools** .

VARIABLE HIGH AND 2-3-4, VARIABLE LOW AND 1-2 REVERSE, AND 1-3 REVERSE CLUTCH ACCUMULATOR PISTON INSTALLATION

Variable Hi and 2-3-4 and Variable Low and 1-2 Reverse Clutch Accumulator Piston Installation

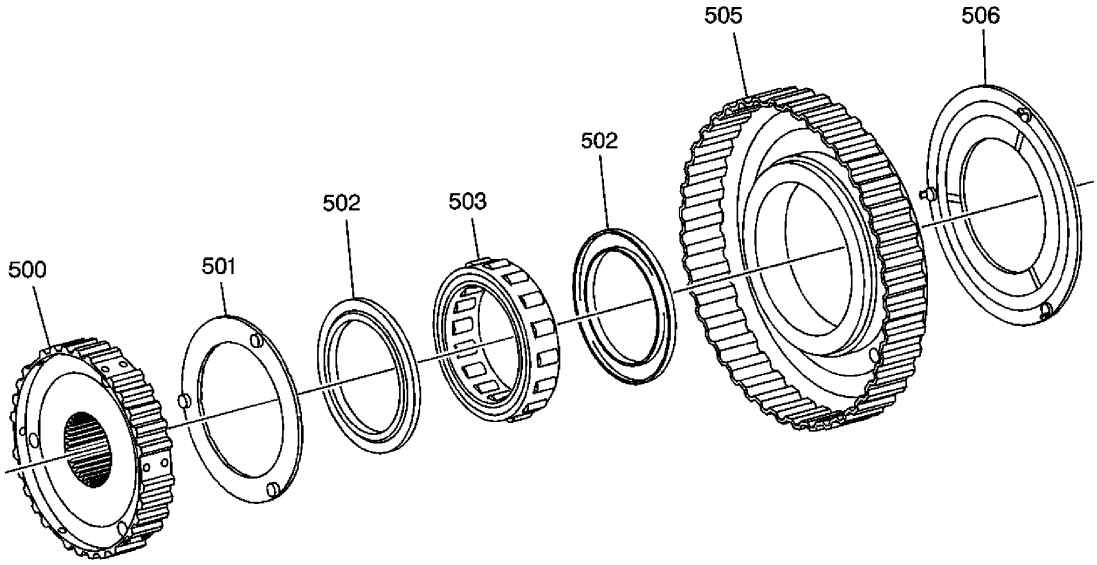


Fig. 31: Variable Hi and 2-3-4 And Variable Low And 1-2 Reverse Clutch Accumulator Piston
Courtesy of GENERAL MOTORS CORP.

Variable Hi and 2-3-4 and Variable Low and 1-2 Reverse Clutch Accumulator Piston Installation

Callout	Component Name
1	Variable Hi and 2-3-4 Clutch Accumulator Piston Spring - Inner
2	Variable Hi and 2-3-4 Clutch Accumulator Piston Spring
3	Variable Hi and 2-3-4 Clutch Accumulator Piston
4	Accumulator Piston Retaining Ring
5	Variable Low and 1-2 Reverse Clutch Accumulator Piston Spring
6	Variable Low and 1-2 Reverse Clutch Accumulator Piston
7	Accumulator Piston Retaining Ring

1-3 Reverse Clutch Accumulator Piston Installation

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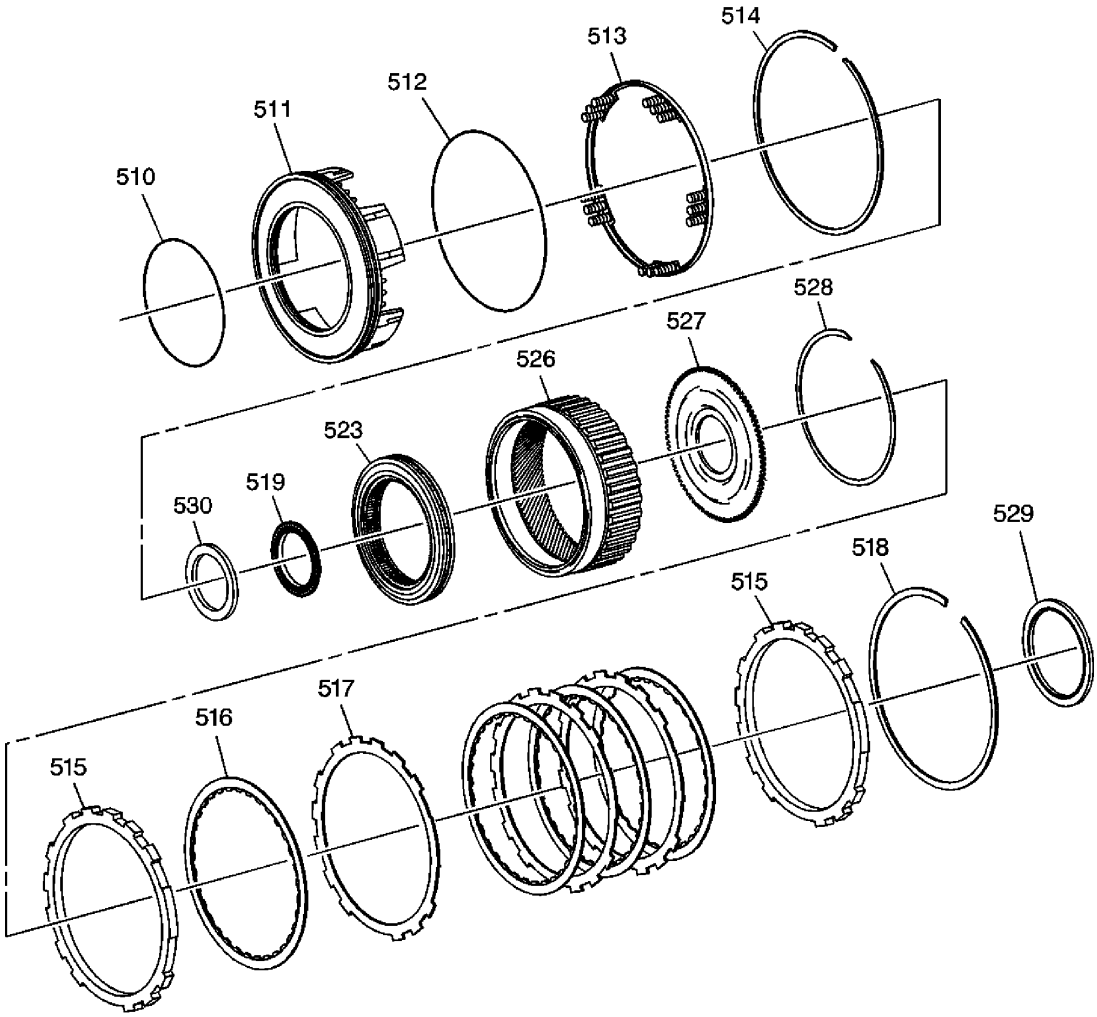


Fig. 32: 1-3 Reverse Clutch Accumulator Piston
Courtesy of GENERAL MOTORS CORP.

1-3 Reverse Clutch Accumulator Piston Installation

Callout	Component Name
1	1-3 Reverse Clutch Accumulator Piston
2	1-3 Reverse Clutch Accumulator Piston Spring - Outer
3	1-3 Reverse Clutch Accumulator Piston Spring - Internal
4	1-3 Reverse Clutch Accumulator Piston Spring Washer
5	Accumulator Piston Retaining Ring

DRIVE MOTOR POWER INVERTER MODULE CABLE TERMINAL INSULATOR BLOCK INSTALLATION

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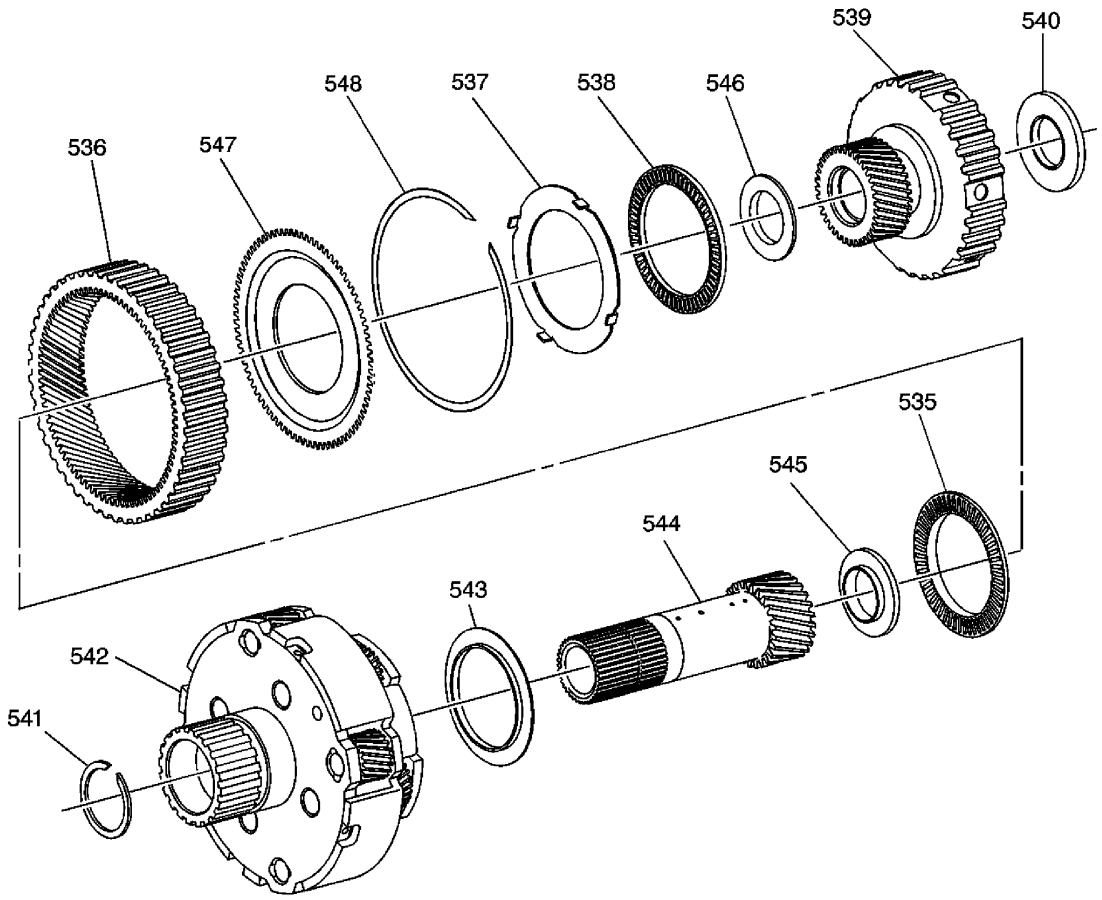


Fig. 33: Drive Motor Power Inverter Module Cable Terminal Insulator Block
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Drive Motor Generator Power Inverter Module Cable Terminal Insulator Block Assembly
2	Drive Motor Generator Power Inverter Module Cable Terminal Insulator Block Bolt M6 x 20 mm (Qty: 2) **CAUTION:** **Use the correct fastener in the correct location. Replacement fasteners must be the correct part number for that application. Fasteners requiring replacement or fasteners requiring the use of thread locking compound or sealant are identified in the service procedure. Do not use paints, lubricants, or corrosion inhibitors on fasteners or fastener joint surfaces unless specified. These coatings affect fastener torque and joint clamping force and may damage the fastener. Use the correct tightening sequence and specifications when installing**

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	fasteners in order to avoid damage to parts and systems. **Tighten:** 9 N.m (80 lb in)

TORQUE DAMPENER AND DIFFERENTIAL HOUSING WITH FLUID PUMP DISASSEMBLE

A/Trans Fluid Pump Assembly Removal

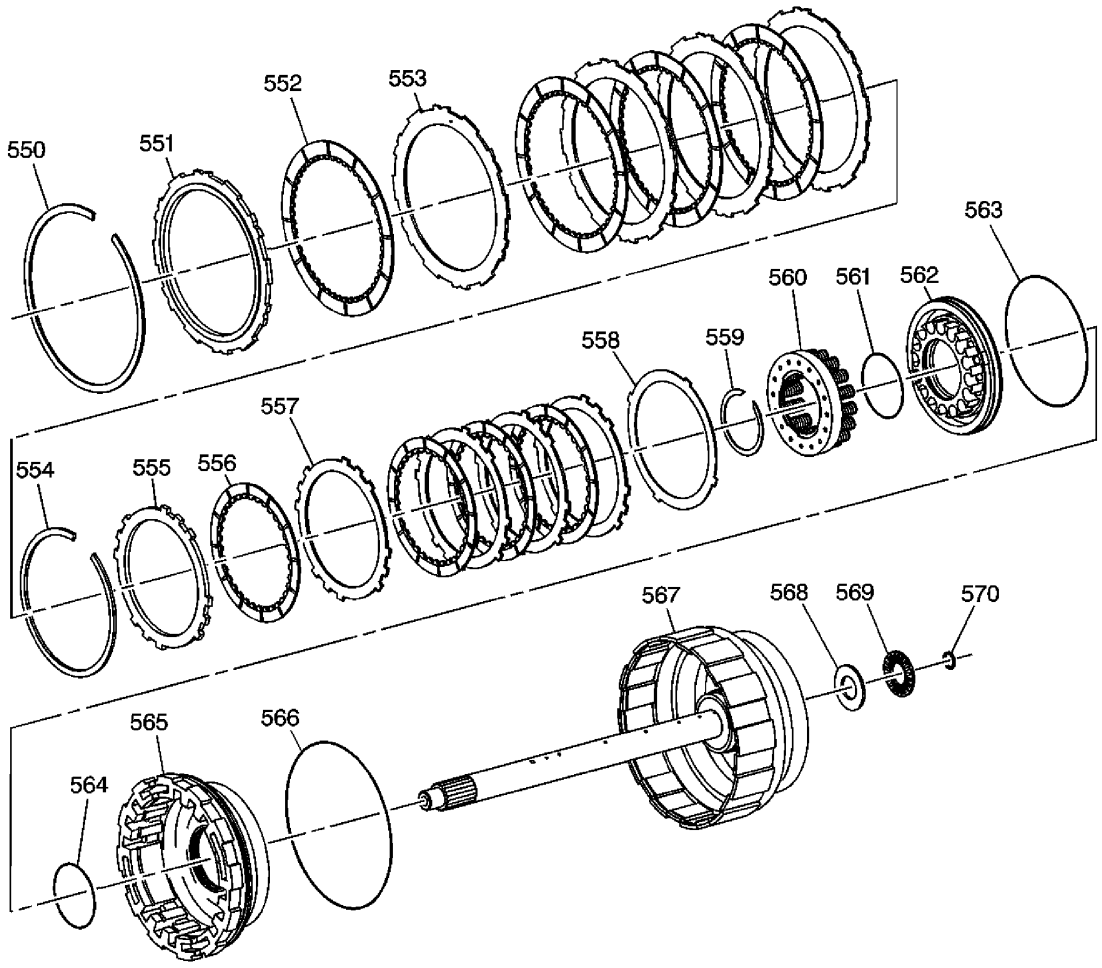


Fig. 34: Automatic Transmission Fluid Pump Assembly
Courtesy of GENERAL MOTORS CORP.

A/Trans Fluid Pump Assembly Removal

Callout	Component Name
1	Auxiliary Fluid Motor Retainer Bolt M6 x 20 mm (Qty: 1)
2	Auxiliary Fluid Motor Retainer

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3	O-Ring Seal **Tip:** Discard seal, it is not reusable.
4	A/Trans Auxiliary Fluid Pump Motor (3 Phase) Cable Retainer M6 x 20 mm (Qty: 1)
5	A/Trans Fluid Pump Bolt M6 x 25 mm (Qty: 8)
6	A/Trans Auxiliary Fluid Pump Connector
7	A/Trans Fluid Pump Assembly
8	A/Trans Fluid Filter **Tip:** Rotate until tab on filter aligns with slot on pump housing.
9	A/Trans Fluid Filter Seal **Tip:** Discard seal, it is not reusable.
10	A/Trans Pump Fluid Outlet Seal Assembly
11	A/Trans Fluid Pump Seal Assembly

Front Differential Carrier Baffle, and Fluid Trough Removal

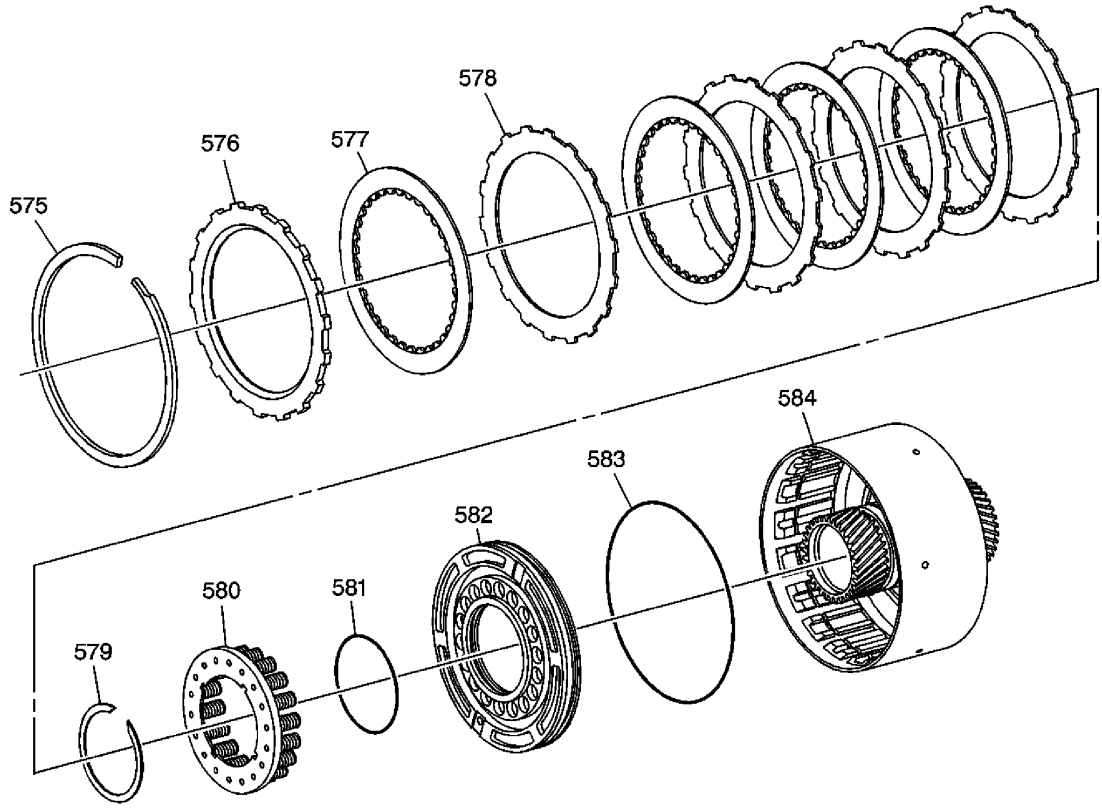


Fig. 35: Front Differential Carrier Baffle And Fluid Trough
Courtesy of GENERAL MOTORS CORP.

Front Differential Carrier Baffle, and Fluid Trough Removal

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Callout	Component Name
1	Front Differential Carrier Baffle Bolt M6 x 20 mm (Qty: 2)
2	Front Differential Carrier Baffle (Housing)
3	A/Trans Fluid Trough Bolt M6 x 20 mm (Qty: 2)
4	A/Trans Fluid Trough Assembly

TORQUE DAMPENER AND DIFFERENTIAL HOUSING CLEANING AND INSPECTION

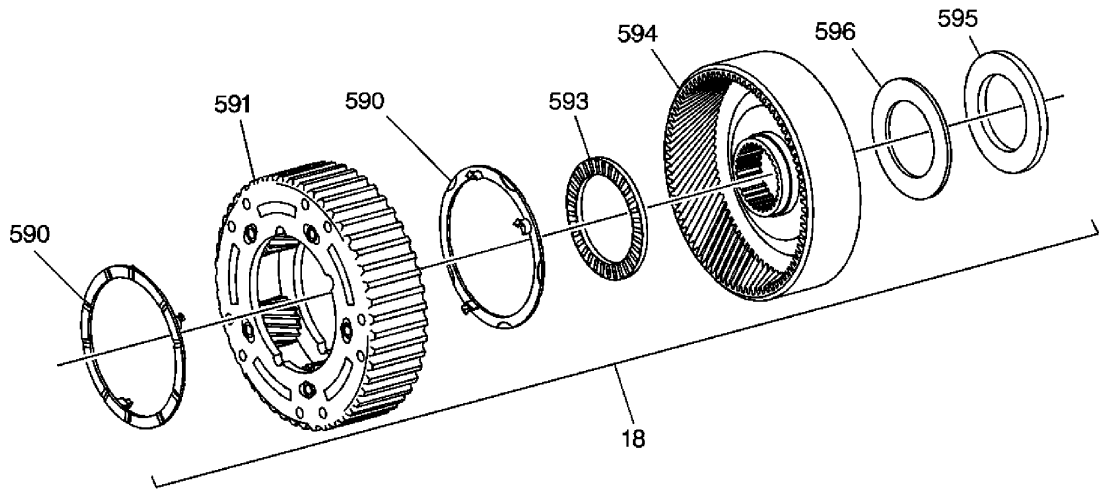


Fig. 36: Torque Dampener and Differential Housing
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name

CAUTION:
Do not use abrasive pads or bristle devices to clean the sealing surfaces. Abrasive pads produce a fine grit that can effect transmission function. Abrasive pads can also remove enough metal to create oil leaks.

CAUTION:
After cleaning the transmission components, allow to air dry. Do not use cloth or paper towels in order to dry any transmission components. Lint from the towels can cause component failure.

CAUTION:
Do not reuse cleaning solvents. Previously used solvents may deposit sediment which may damage the component.

Preliminary Procedures

1. Thoroughly clean the torque dampener and differential housing, including case threads, with clean solvent.

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2. Clean gasket sealing surfaces. Remove all residual gasket material.
3. Inspect all threaded holes. If necessary, repair any thread damage.

1	A/Trans Fluid Pump Locator Pin
2	Auxiliary Pump Press Plug **CAUTION:** **Refer to Fastener Caution .** **Tighten:** 11 N.m (97.4 lb in)
3	Fill Hole Plug **Tighten:** 20 N.m (14.7 lb ft)
4	Fill Hole Plug Seal **Tip:** Discard seal, it is not reusable.
5	A/Trans Fluid Pressure Test Hole Plug **Tighten:** 11 N.m (97.4 lb in)
6	A/Trans Fluid Level Hole Plug (Qty: 1)
7	A/Trans Fluid Passage Plug
8	Torque Dampener and Differential Housing Sealing Surface
9	A/Trans Fluid Level Hole Plug **Tighten:** 11 N.m (97.4 lb in)

FRONT WHEEL DRIVE SHAFT SEAL REPLACEMENT - TORQUE DAMPENER SIDE

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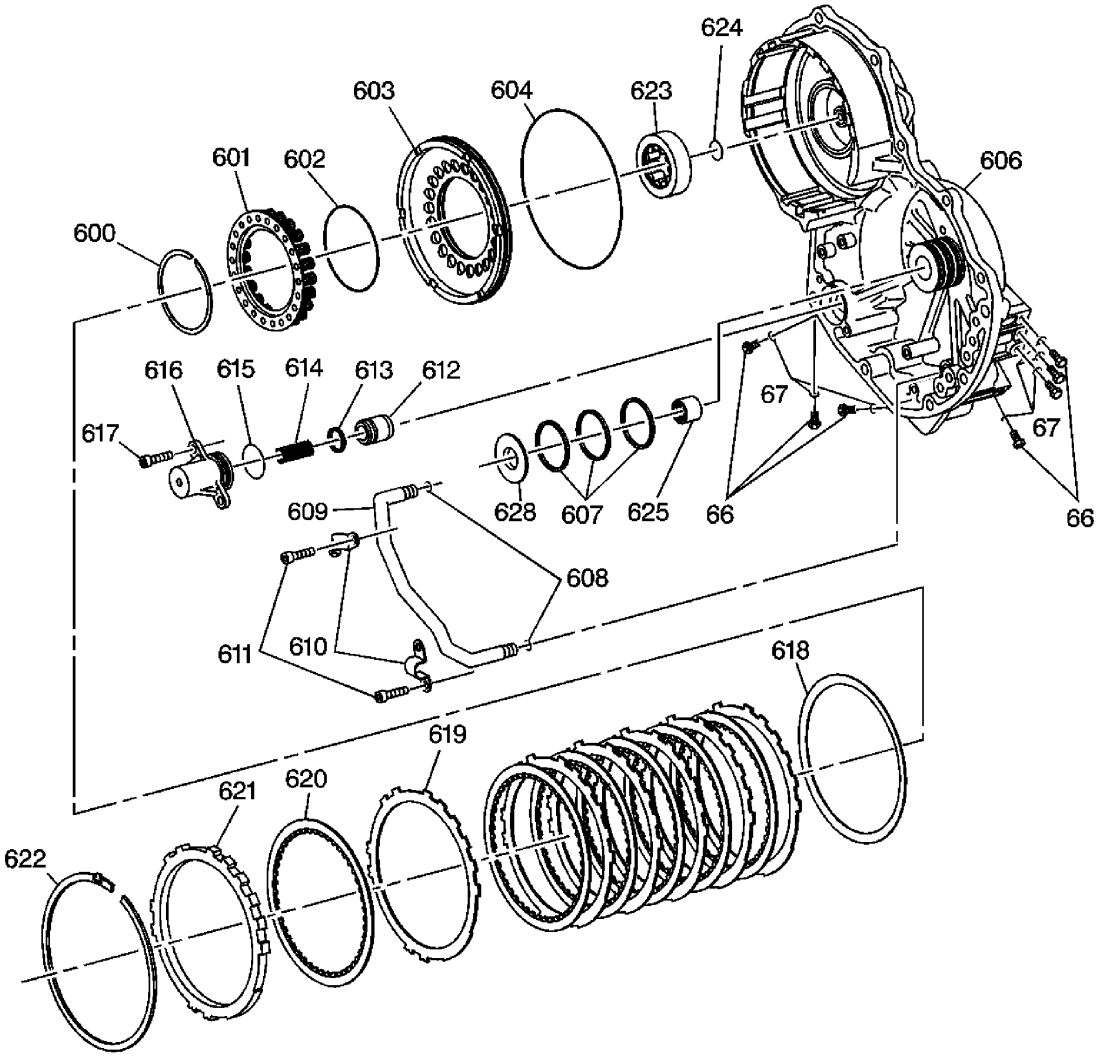


Fig. 37: Special Tool And Front Wheel Drive Shaft Seal - Torque Dampener Side
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Front Wheel Drive Shaft Oil Seal Assembly **Special Tools** • **DT-50301:** Axle Seal Installer • **GE 6125-1B:** Slide Hammer With Adapter • **GE 8092:** Driver Handle or equivalent • **DT 23129:** Universal Seal Remover For equivalent regional tools, refer to **Special Tools** .

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FRONT DIFFERENTIAL DRIVE PINION GEAR BEARING CUP REMOVAL - TORQUE DAMPENER SIDE

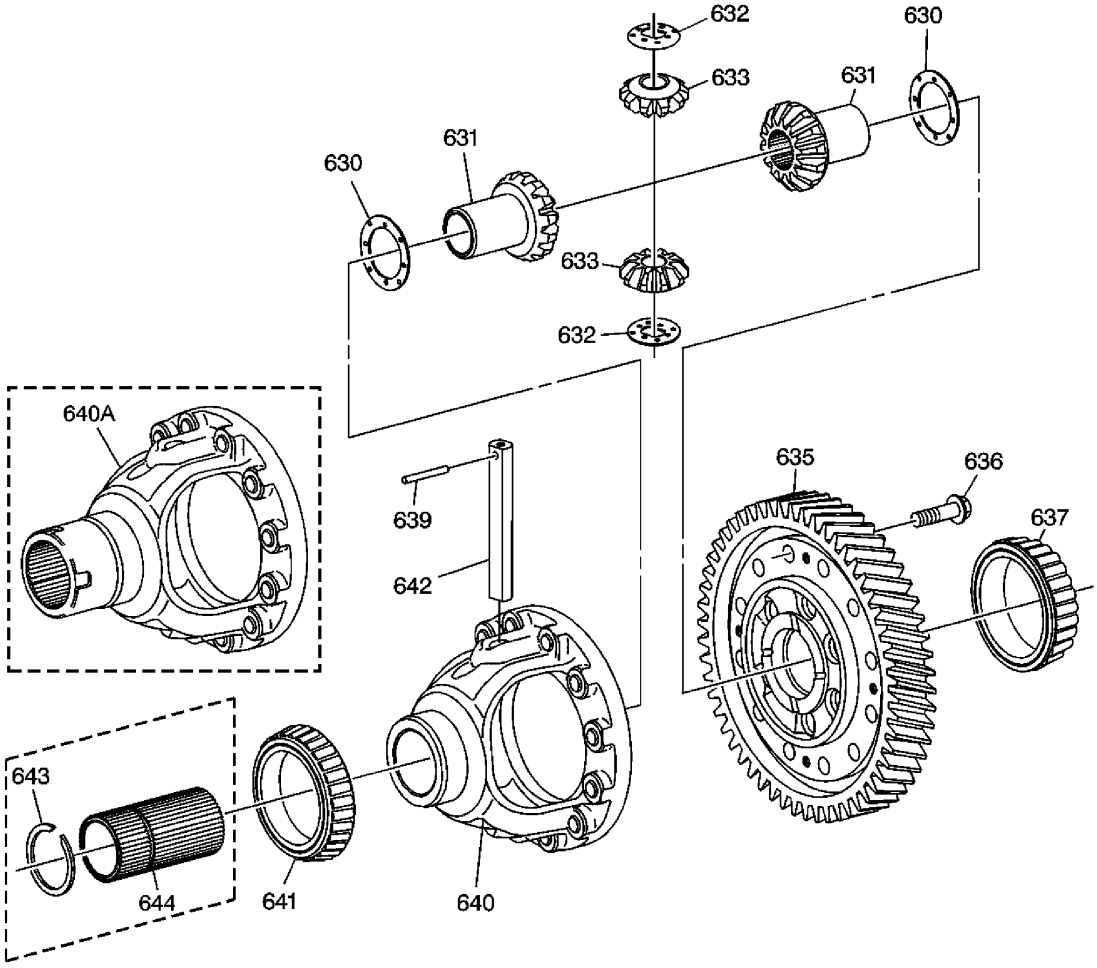


Fig. 38: Special Tool Front Differential Drive Pinion Gear Bearing Cup - Torque Dampener Side
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Do not install the bearing cup until after the selective washer measurement has been performed. Refer to **Front Differential Drive Pinion Gear Bearing Thrust Washer and Front Differential Bearing Washer Measurement**.	
	Front Differential Drive Pinion Gear Bearing Cup **CAUTION:** **Failure to apply the lubricant will cause damage to the bolt and nut threads.** **Procedure**

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1	1. Tighten DT 47927-2 which is part of DT-47927 until it fits snugly on the bearing cup. 2. Adjust DT 45124 so it sits on the torque dampener housing surface just beyond the bearing cup opening. 3. Apply the extreme pressure lubricant supplied with DT 23444-A to the puller bolt threads to prevent damage to the bolt threads during bearing cup removal. 4. Hold the puller bridge bolt and turn the nut to remove the bearing cup. **Special Tools** • **DT 45124:** Removal Bridge • **DT 47927:** Bearing Cup Remover • **DT 23444-A:** Extreme Press Lubricant - 1/4 Ounce Tube For equivalent regional tools, refer to **Special Tools** .
2	Front Differential Bearing Washer - Selective

FRONT DIFFERENTIAL DRIVE PINION GEAR ROLLER BEARING AND LUBRICANT DAM REMOVAL - TORQUE DAMPENER SIDE

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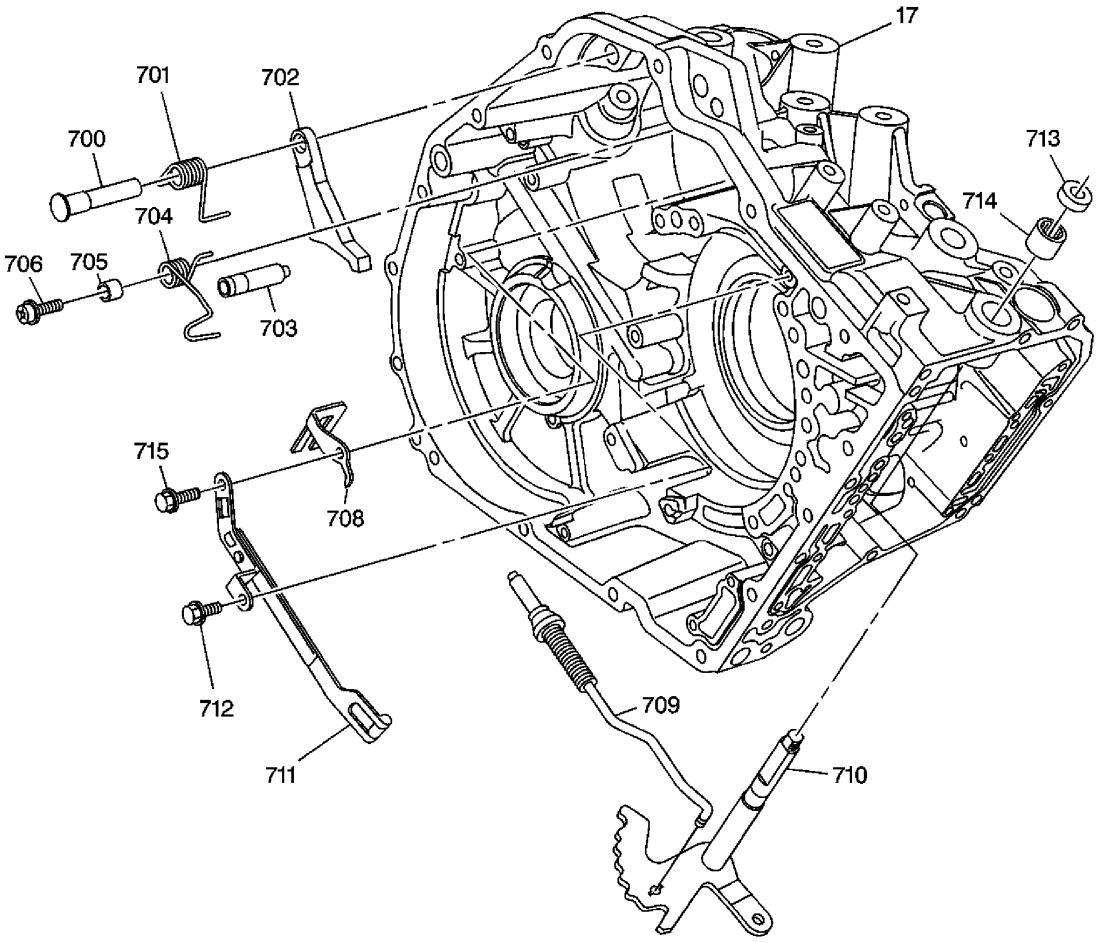


Fig. 39: Front Differential Drive Pinion Gear Roller Bearing and Lubricant Dam - Torque Dampener Side
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
	Front Differential Drive Pinion Gear Roller Bearing Assembly **CAUTION:** **Failure to apply the lubricant will cause damage to the bolt and nut threads.** **Procedure** 1. Tighten DT 49230-1 until it fits snugly on the bearing. 2. Adjust so it sits on the torque dampener housing surface just beyond the bearing opening.

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1	3. Apply the extreme pressure lubricant DT 23444-A to the puller bolt threads to prevent damage to the bolt threads during bearing removal. 4. Hold the puller bridge bolt and turn the nut to remove the bearing. **Special Tools** • **DT 45124:** Removal Bridge • **DT 49230-1:** Bearing Remover • **DT 23444-A:** Extreme Press Lubricant - 1/4 Ounce Tube For equivalent regional tools, refer to **Special Tools** .
2	Front Differential Drive Pinion Gear Lube Dam **Procedure:** Slide axle seal puller downward to penetrate lube dam. Turn counter clockwise to engage threads, then pull with seal puller. **Special Tools** • **DT 48055:** Lube Dam Remover • **GE 6125-1B:** Slide Hammer With Adapter For equivalent regional tools, refer to **Special Tools** .

AUXILIARY FLUID PUMP MOTOR AND FLUID PUMP DISASSEMBLE

Electric Auxiliary Pump Drive Motor Removal

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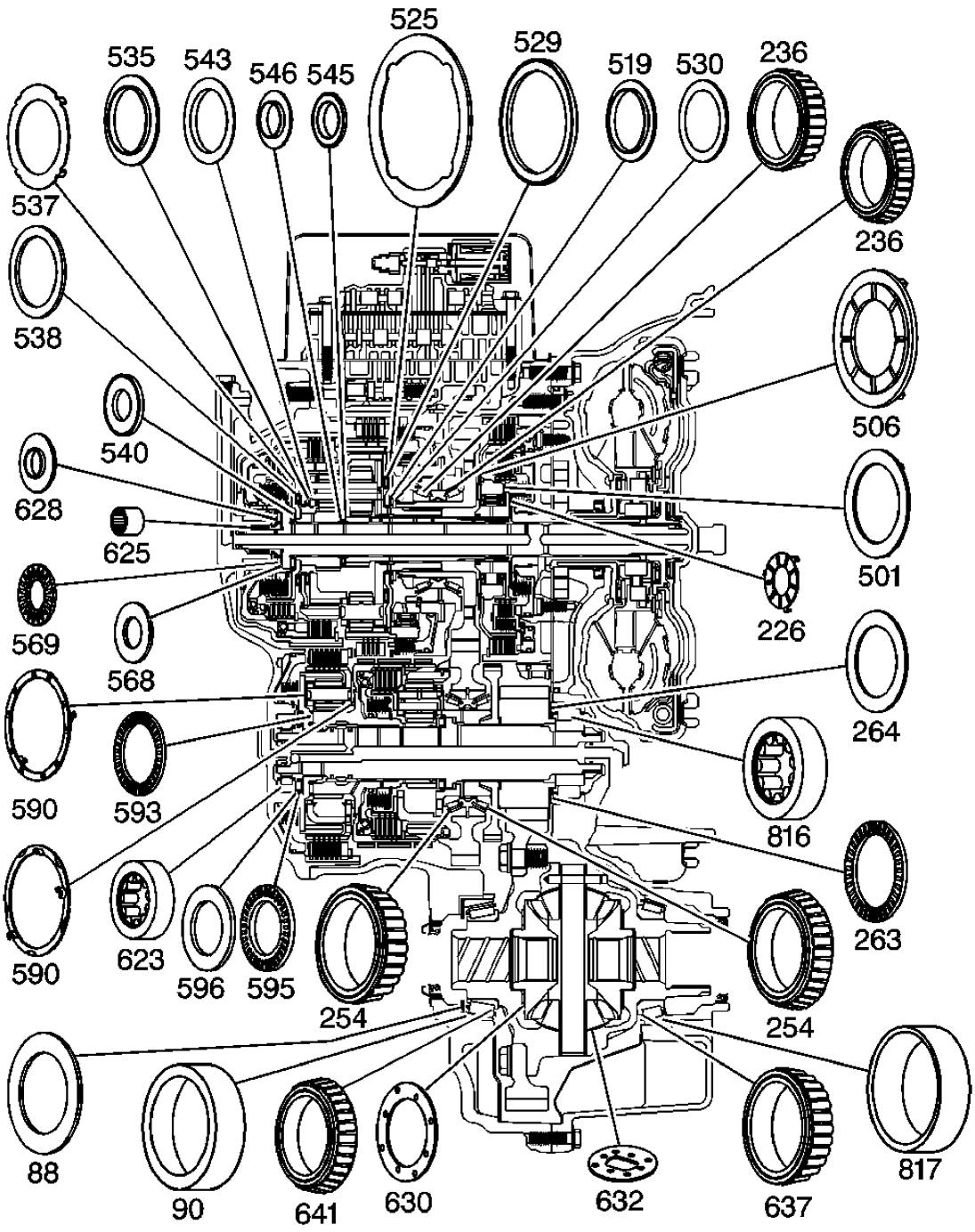


Fig. 40: Electric Auxiliary Pump Drive Motor
Courtesy of GENERAL MOTORS CORP.

Electric Auxiliary Pump Drive Motor Removal

Callout	Component Name
1	A/Trans Auxiliary Fluid Pump Bolt M8 x 51 mm (Qty: 4)

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2	A/Trans Auxiliary Fluid Pump Bolt M5 x 16 (Qty: 1)
3	Electric Auxiliary Pump Drive Motor Assembly
4	A/Trans Auxiliary Fluid Pump Motor Seal

A/Trans Fluid Pump Cover Removal

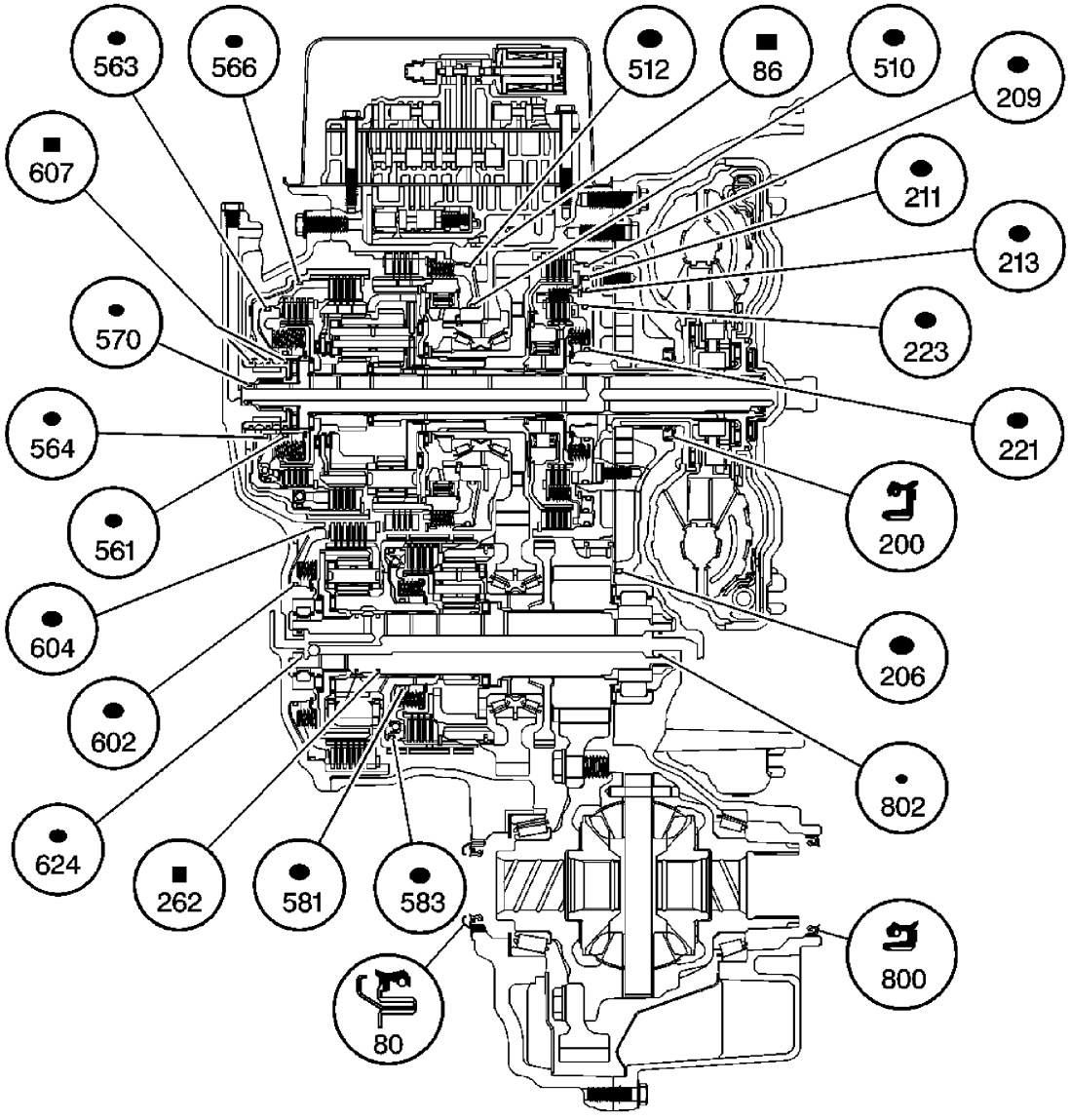


Fig. 41: Automatic Transmission Fluid Pump Cover
Courtesy of GENERAL MOTORS CORP.

A/Trans Fluid Pump Cover Removal

Callout	Component Name

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1	A/Trans Fluid Pump Cover Bolt M6 x 25 mm (Qty: 19)
2	A/Trans Fluid Pump Cover
3	A/Trans Fluid Pump Drive Gear - Selective
4	A/Trans Fluid Pump Driven Gear - Selective
5	A/Trans Fluid Pump (O-Ring) Seal
6	A/Trans Auxiliary Fluid Pump Drive Gear
7	A/Trans Auxiliary Fluid Pump Driven Gear
8	A/Trans Fluid Pump Body Assembly

INPUT SHAFT BEARING REPLACEMENT

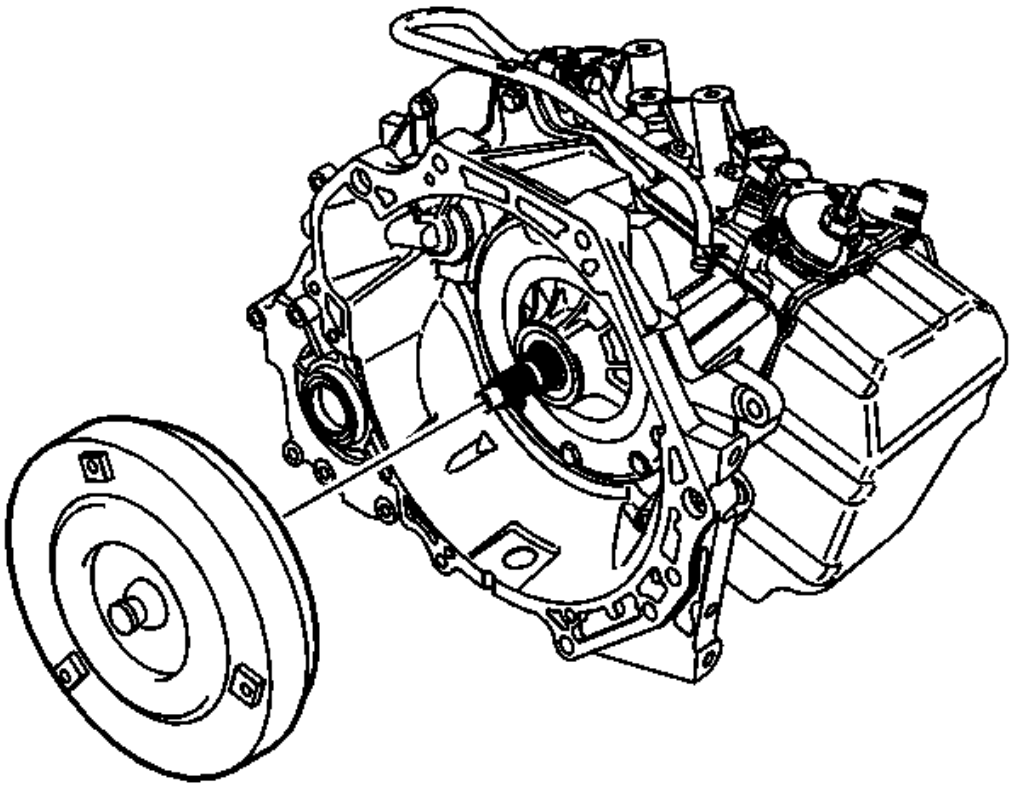


Fig. 42: Input Shaft Bearing And Special Tools
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
	Input Shaft Bearing Assembly

1	**Special Tools** • **DT-49263:** Bearing Installer • **GE 8092:** Driver Handle • **GE 23907-1:** Slide Hammer and Shaft • **GE 26941:** Bushing and Bearing Remover - 3-4 in For equivalent regional tools, refer to **Special Tools** .

1-3-REVERSE CLUTCH HOUSING SEAL REPLACEMENT

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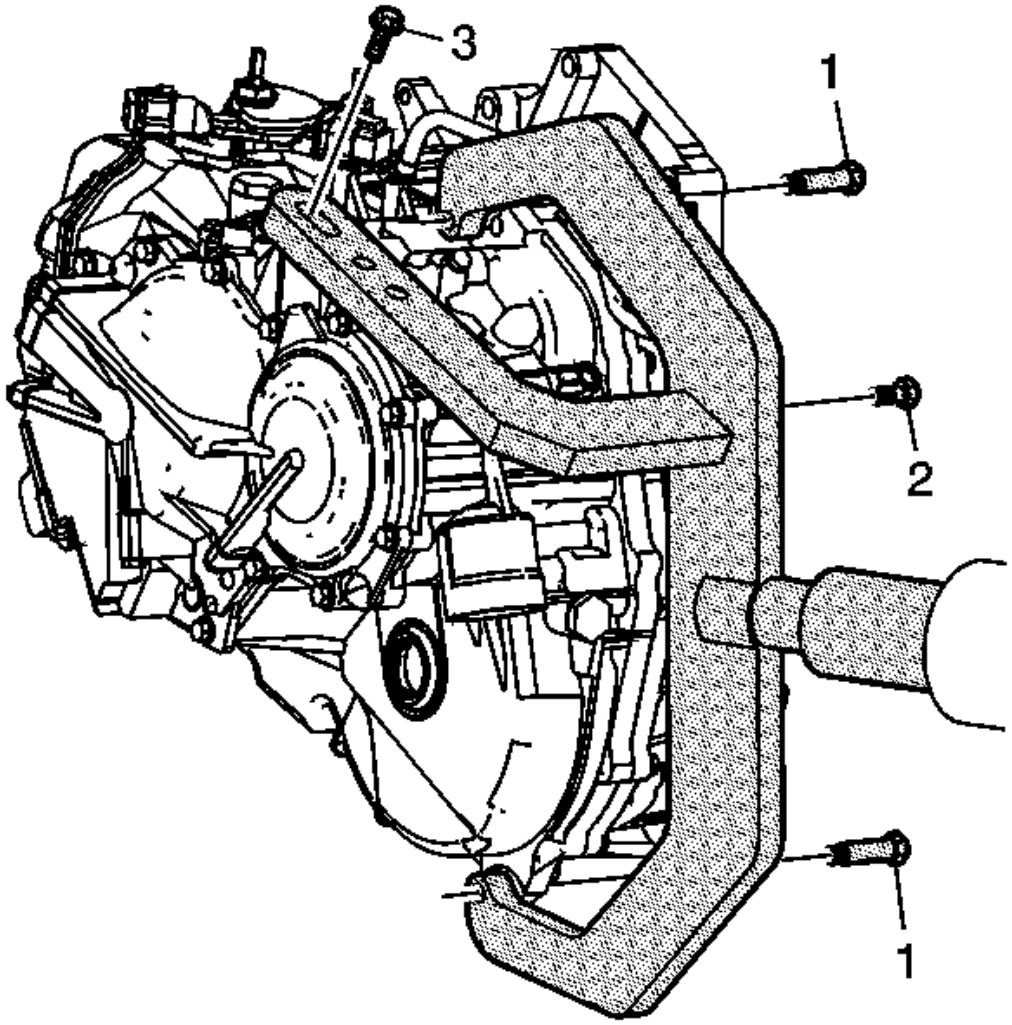


Fig. 43: 1-3-Reverse Clutch Housing Seal
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	1-3 Reverse Clutch Housing Seal (Qty: 2) **Tip:** Discard the seals. They are not reusable. Replace with NEW seals.

FLUID PUMP BODY, TORQUE DAMPENER FLUID SEAL, AND TORQUE DAMPENER BEARING DISASSEMBLE

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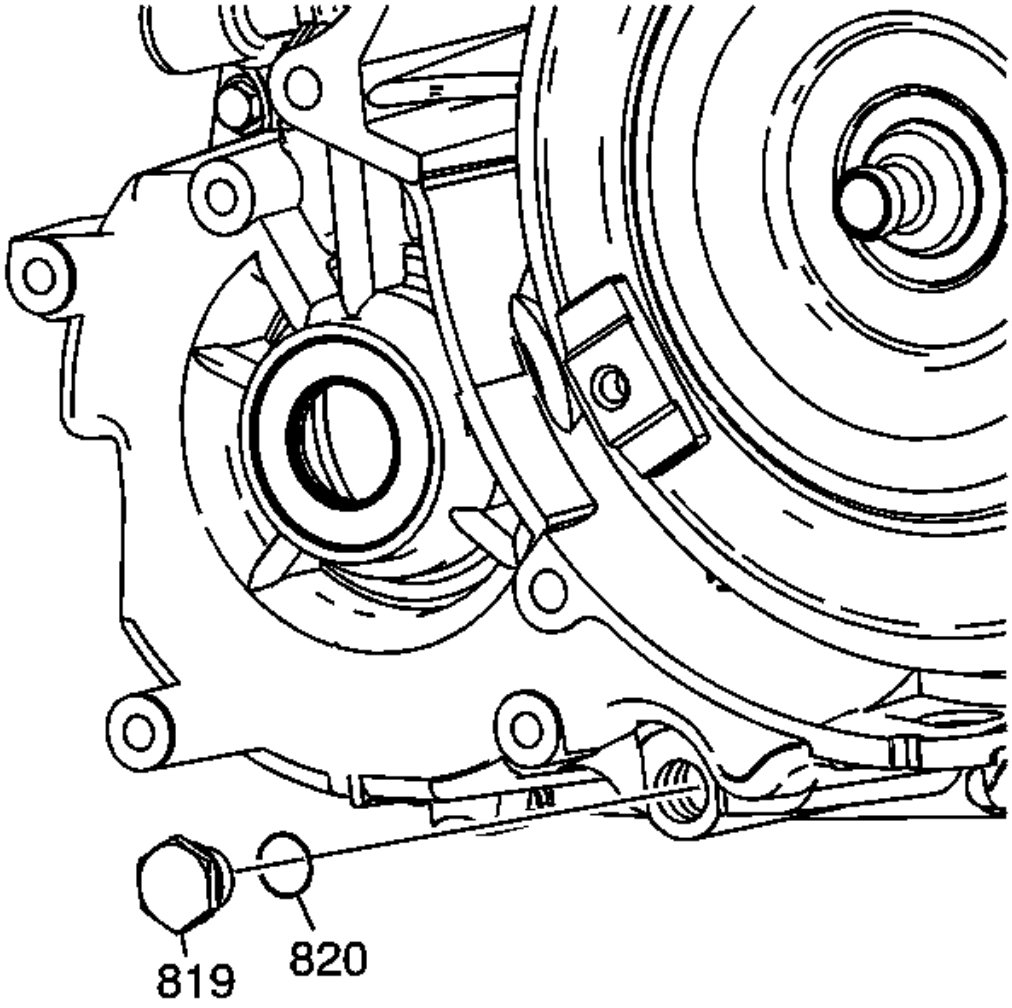


Fig. 44: Fluid Pump Body, Torque Dampener Fluid Seal And Torque Dampener Bearing
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	A/Trans Torque Dampener Seal Retaining Ring
2	A/Trans Torque Dampener Fluid Seal Assembly
3	A/Trans Fluid Pump Seal
4	A/Trans Torque Dampener Bearing Retaining Ring
	A/Trans Torque Dampener Bearing Assembly **Special Tools**

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5	• **GE 23907-1:** Slide Hammer and Shaft • **GE 26941:** Bushing and Bearing Remover 2-3 in For equivalent regional tools, refer to **Special Tools** .
6	A/Trans Torque Dampener Bearing Seal

FLUID PUMP BODY CLEANING AND INSPECTION

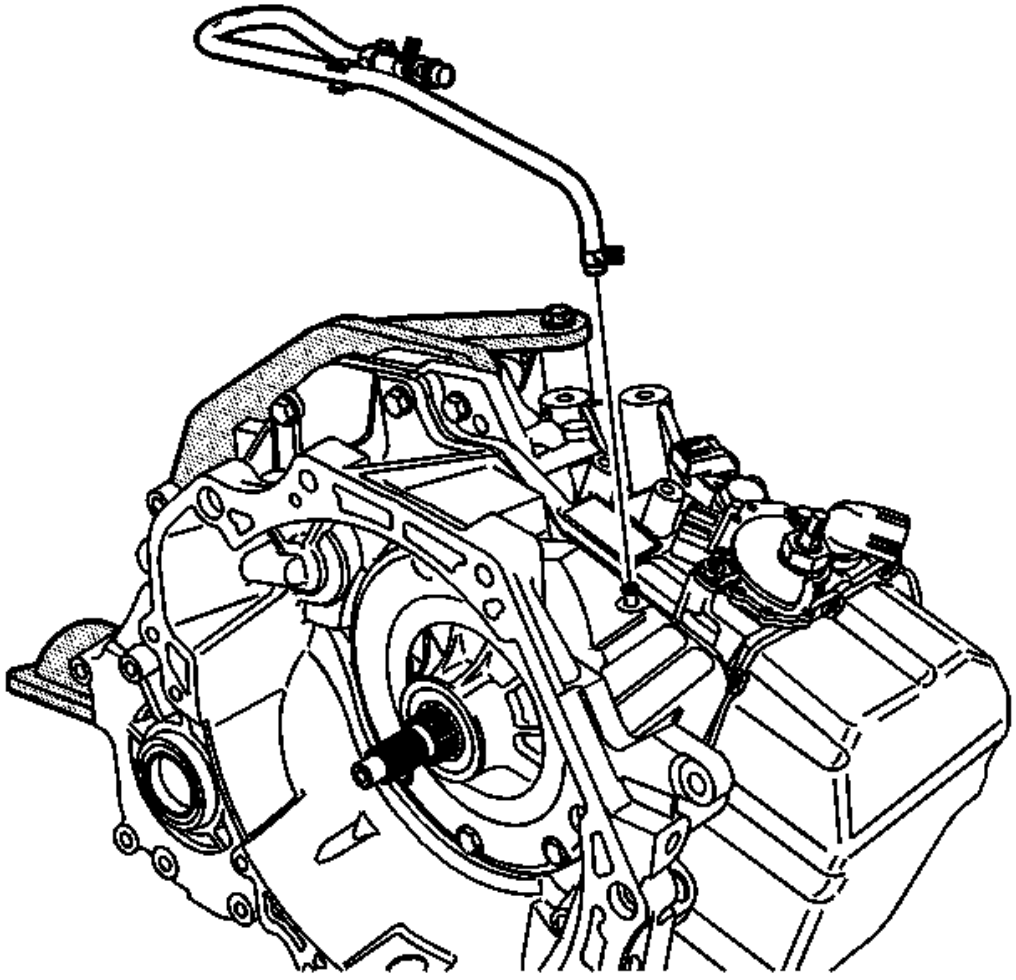


Fig. 45: Fluid Pump Body
Courtesy of GENERAL MOTORS CORP.

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Callout	Component Name
1	Pressure Regulator Valve Body Plug
2	A/Trans Fluid Pump Cutoff Valve
3	Pressure Relief Ball Valve - Main Pump
4	Pressure Relief Ball Valve Spring
5	Cup Plug
6	Control Valve Body Ball Check Valve
7	Control Valve Body Ball Check Valve Spring
8	A/Trans Torque Dampener Pressure Regulator Valve Bore Plug

FLUID PUMP BODY, TORQUE DAMPENER FLUID SEAL, AND TORQUE DAMPENER BEARING ASSEMBLE

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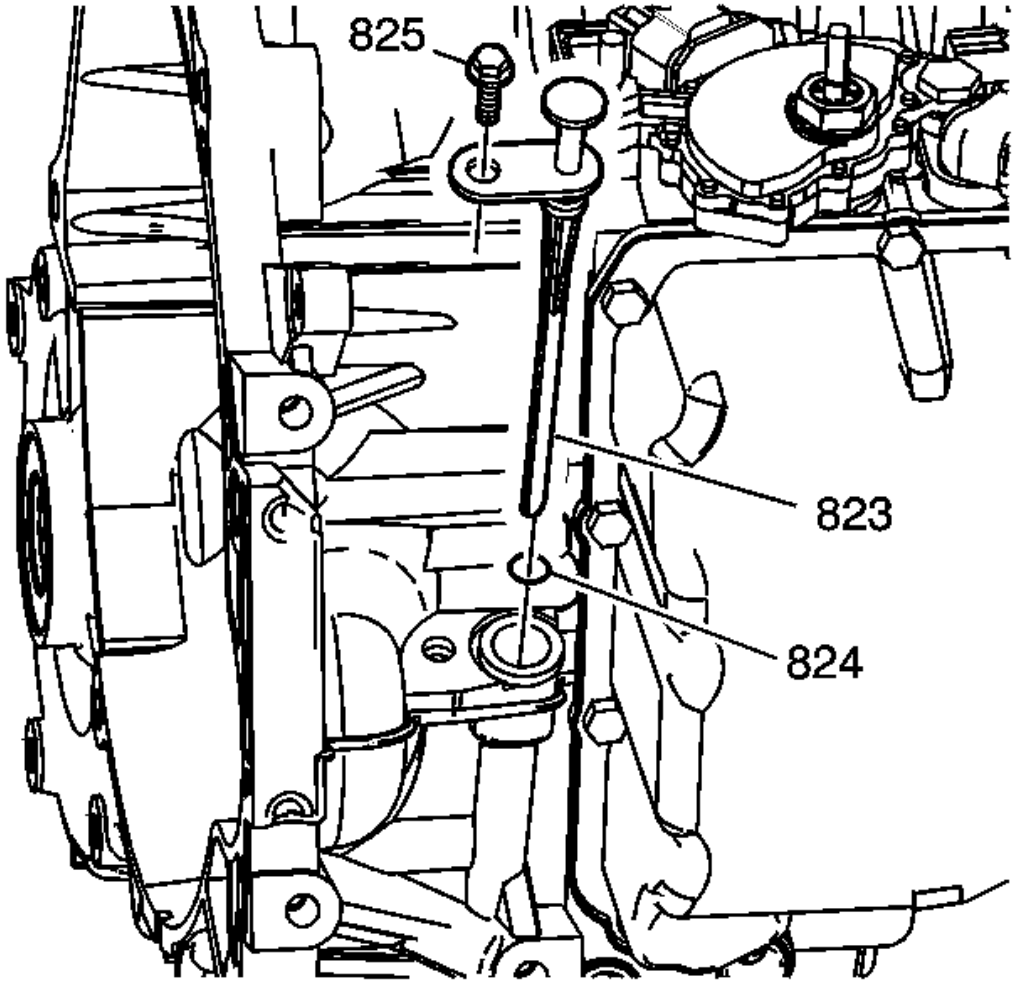


Fig. 46: Fluid Pump Body, Torque Dampener Fluid Seal And Torque Dampener Bearing
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	A/Trans Torque Dampener Bearing Seal
2	A/Trans Torque Dampener Bearing Assembly
3	A/Trans Torque Dampener Bearing Retaining Ring
4	A/Trans Fluid Pump Seal
5	A/Trans Torque Dampener Fluid Seal Assembly
6	A/Trans Torque Dampener Seal Retaining Ring

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FLUID PUMP SELECTIVE MEASUREMENT

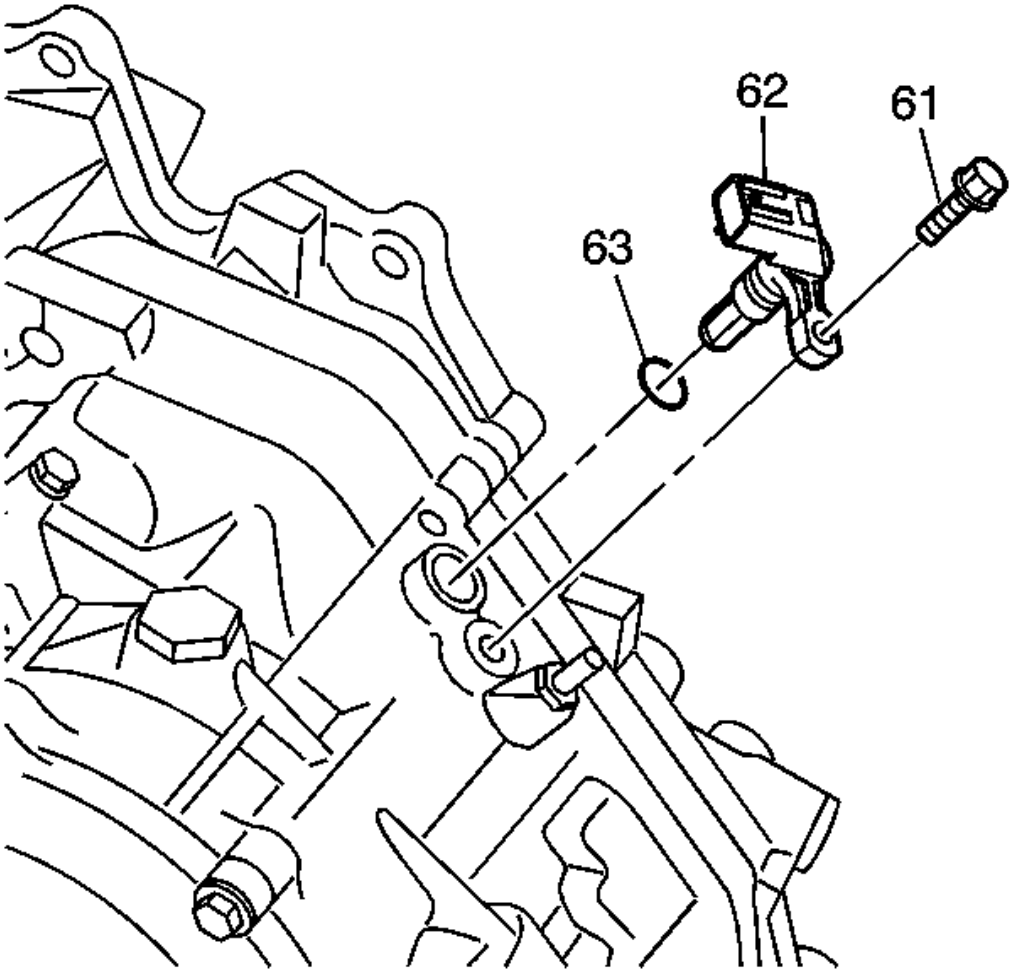


Fig. 47: Measuring Fluid Pump
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	A/Trans Fluid Pump Body **Tip:** Measure the distance from the bottom of the gauge bar to the bottom of the main pump rotor cavity. Refer to **Fluid Pump Selective Specifications** . **Special Tool:** **GE 34673:** Flat Gauge Bar or equivalent For equivalent regional tools, refer to **Special Tools** .

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2	A/Trans Fluid Pump Driven Gear - Selective **Tip:** Refer to **Fluid Pump Selective Specifications** to select the correct gear.
3	A/Trans Fluid Pump Drive Gear - Selective **Tip:** Refer to **Fluid Pump Selective Specifications** to select the correct gear.
4	A/Trans Fluid Pump Body **Tip:** Measure the distance from the bottom of the gauge bar to the bottom of the auxiliary pump rotor cavity. Refer to **Fluid Pump Selective Specifications** . **Special Tool:** **GE 34673:** Flat Gauge Bar or equivalent For equivalent regional tools, refer to **Special Tools** .
5	A/Trans Auxiliary Fluid Pump Driven Gear - Selective
6	A/Trans Auxiliary Fluid Pump Drive Gear - Selective

AUXILIARY FLUID PUMP MOTOR AND FLUID PUMP ASSEMBLE

A/Trans Fluid Pump Cover Assemble

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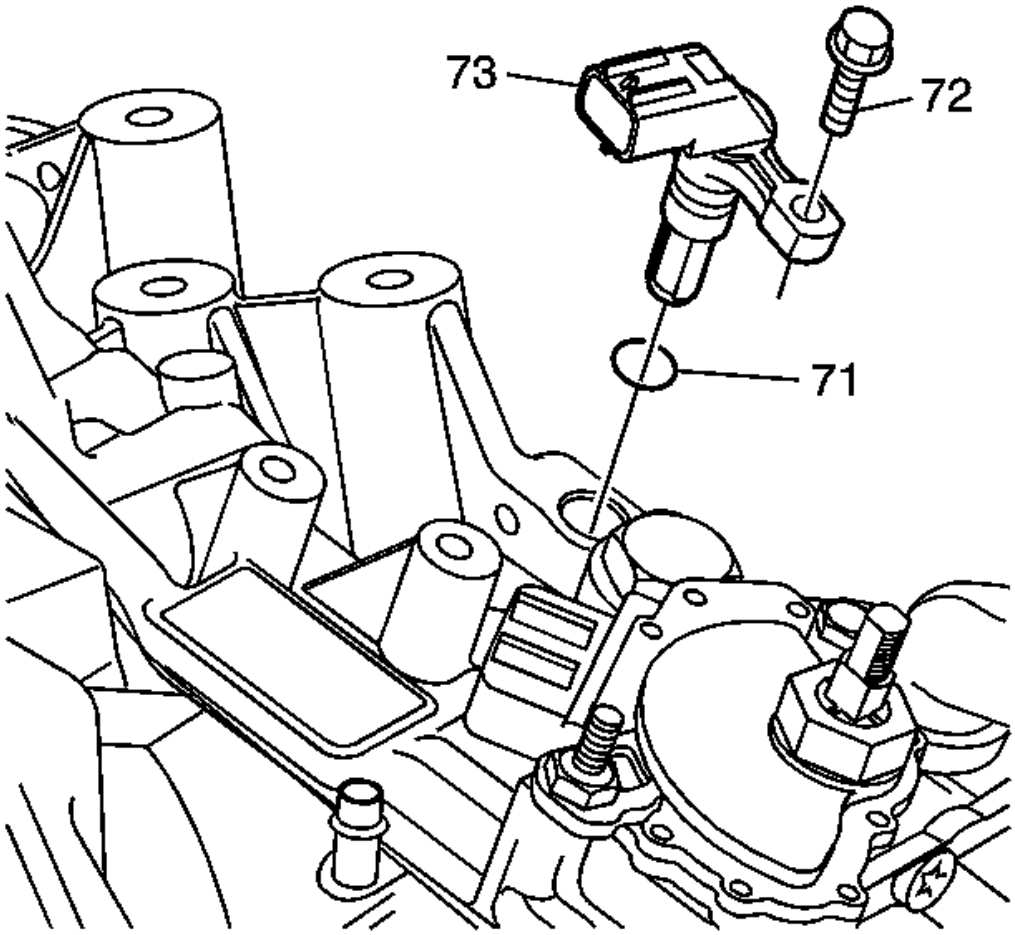


Fig. 48: Auxiliary Fluid Pump Motor and Fluid Pump Tightening Sequence
Courtesy of GENERAL MOTORS CORP.

A/Trans Fluid Pump Cover Assemble

Callout	Component Name
Preliminary Procedure: Before assembly of the pump cover, measure the gears for wear. Refer to **Fluid Pump Selective Specifications** .	
1	A/Trans Fluid Pump Body Assembly
2	A/Trans Auxiliary Fluid Pump Driven Gear - Selective
3	A/Trans Auxiliary Fluid Pump Drive Gear - Selective
4	A/Trans Fluid Pump (O-Ring) Seal

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5	A/Trans Fluid Pump Driven Gear - Selective
6	A/Trans Fluid Pump Drive Gear - Selective
7	A/Trans Fluid Pump Cover
8	A/Trans Fluid Pump Cover Bolt M6 x 25 mm (Qty: 19) **CAUTION:** **Refer to Fastener Caution .** **Procedure:** Tighten in sequence shown. **Tighten:** 9 N.m (80 lb in)

Electric Auxiliary Pump Drive Motor Assemble

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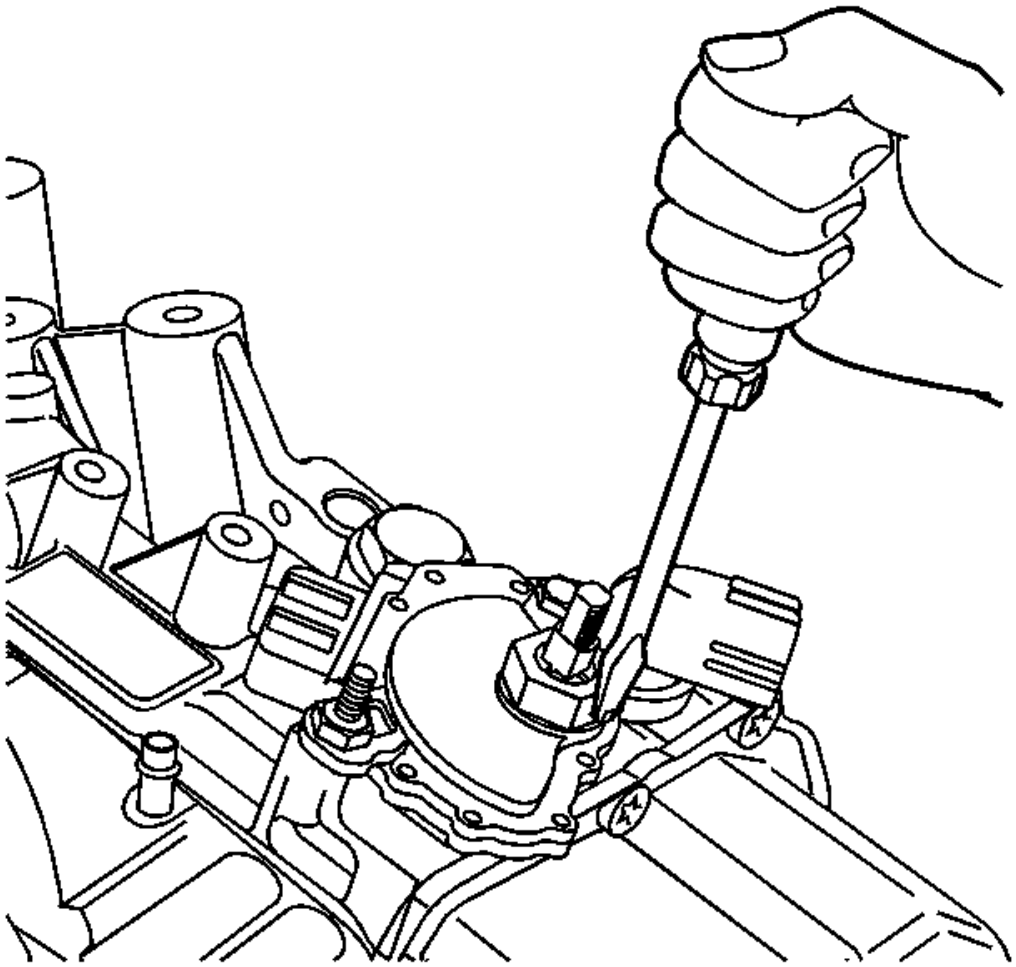


Fig. 49: Electric Auxiliary Pump Drive Motor
Courtesy of GENERAL MOTORS CORP.

Electric Auxiliary Pump Drive Motor Assemble

Callout	Component Name
1	A/Trans Auxiliary Fluid Pump Motor Seal
2	Electric Auxiliary Pump Drive Motor Assembly
3	A/Trans Auxiliary Fluid Pump Bolt M5 x 16 (Qty: 1) **Tighten:** 4 N.m (35.4 lb in)
	A/Trans Auxiliary Fluid Pump Bolt M8 x 51 mm (Qty: 4)

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4	**Procedure:** Tighten the bolts in sequence shown. **Tighten:** 9 N.m (80 lb in)

TORQUE DAMPENER AND DIFFERENTIAL HOUSING WITH FLUID PUMP ASSEMBLE

Front Differential Carrier Baffle Fluid Trough Assemble

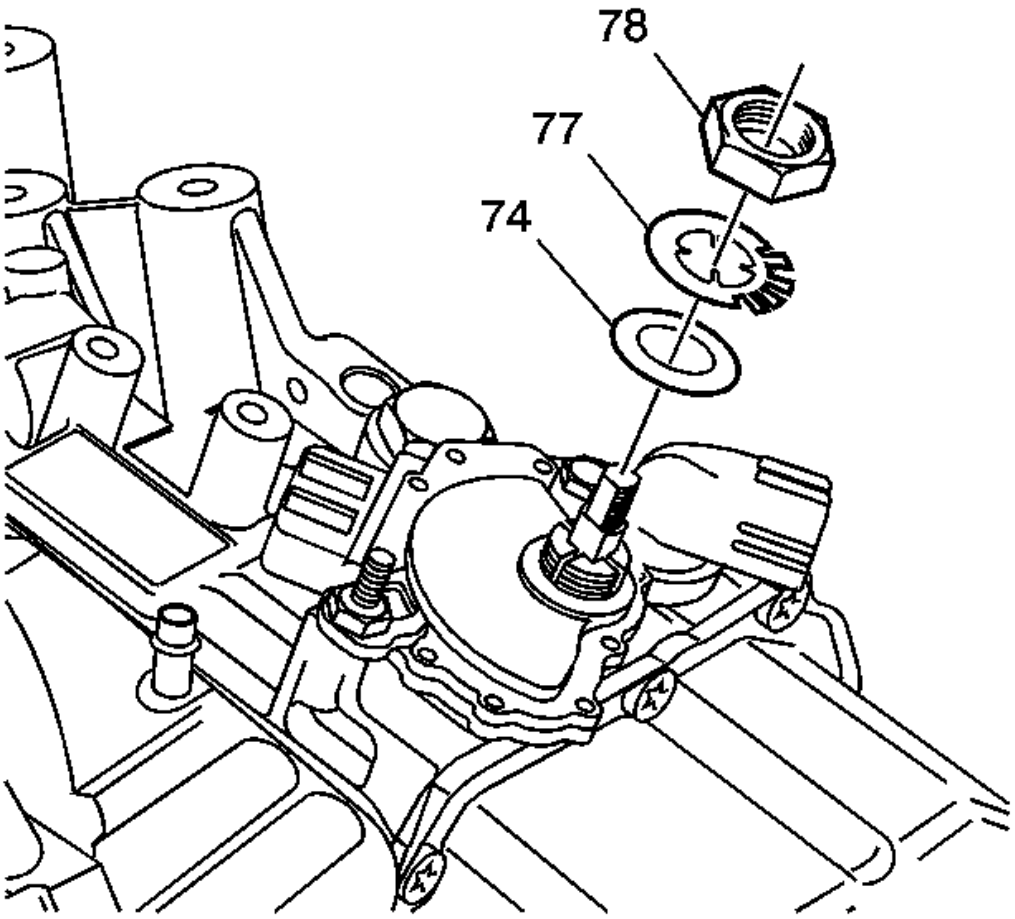


Fig. 50: Front Differential Carrier Baffle Fluid Trough
Courtesy of GENERAL MOTORS CORP.

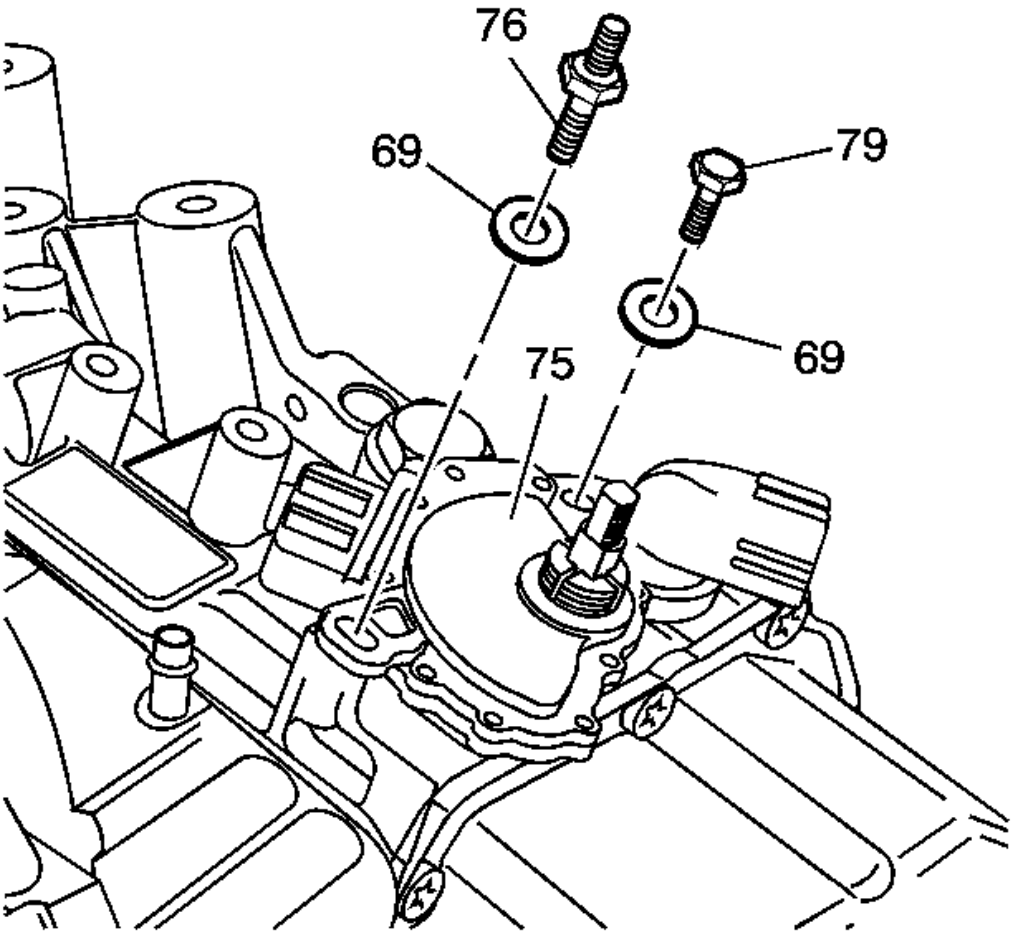
Front Differential Carrier Baffle Fluid Trough Assemble

Callout	Component Name
1	Front Differential Carrier Baffle (Housing)

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2	Front Differential Carrier Baffle Bolt M6 x 20 mm (Qty: 2) **CAUTION:** **Refer to Fastener Caution .** **Tighten:** 9 N.m (80 lb in)
3	A/Trans Fluid Trough Assembly
4	A/Trans Fluid Trough Bolt M6 x 20 mm (Qty: 2) **Tighten:** 9 N.m (80 lb in)

Fluid Pump Assembly Assemble



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Fig. 51: Fluid Pump Assembly
Courtesy of GENERAL MOTORS CORP.

Fluid Pump Assembly Assemble

Callout	Component Name
1	A/Trans Pump Fluid Outlet Seal Assembly
2	A/Trans Fluid Pump Seal Assembly
3	A/Trans Fluid Filter Seal **Tip:** Install a NEW seal. It is not reusable.
4	A/Trans Fluid Filter
5	O-Ring Seal **Tip:** Install a NEW seal. They are not reusable.
6	A/Trans Fluid Pump Assembly
7	A/Trans Fluid Pump Bolt M6 x 25 mm (Qty: 8) **Procedure:** Tighten in sequence shown. **Tighten:** 9 N.m (80 lb in)
8	A/Trans Auxiliary Fluid Pump Motor (3 Phase) Cable Retainer M6 x 20 mm (Qty: 1) **Tighten:** 9 N.m (80 lb in)
9	Auxiliary Fluid Motor Retainer
10	Auxiliary Fluid Motor Retainer Bolt M6 x 20 mm (Qty: 1) **Tighten:** 9 N.m (80 lb in)

DRIVE MOTOR GENERATOR POSITION SENSOR STATOR REMOVAL

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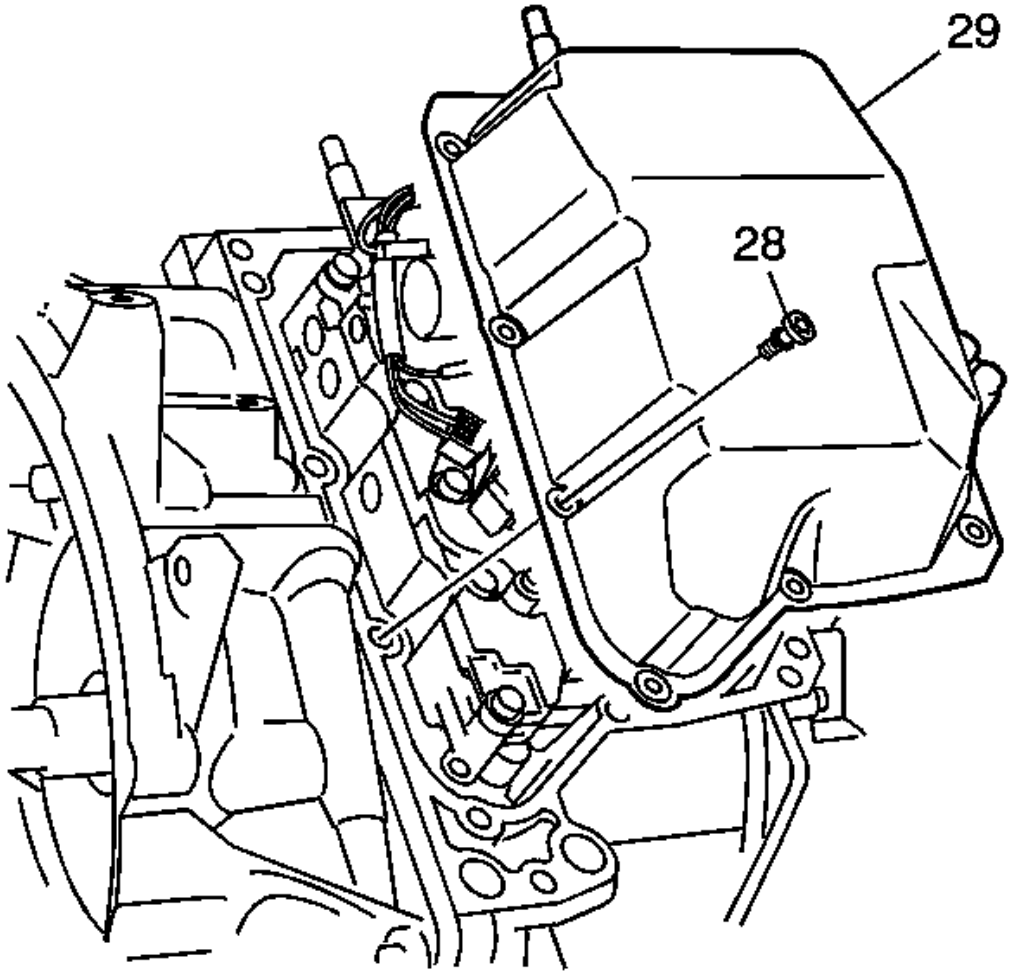


Fig. 52: Drive Motor Generator Position Sensor Stator
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Drive/Motor Generator Position Switch Sensor Bolt M5 x 16 mm (Qty: 3)
2	Generator/Drive Motor Position Sensor Stator Assembly
3	Locating Pin

CENTER SUPPORT ASSEMBLY DISASSEMBLE

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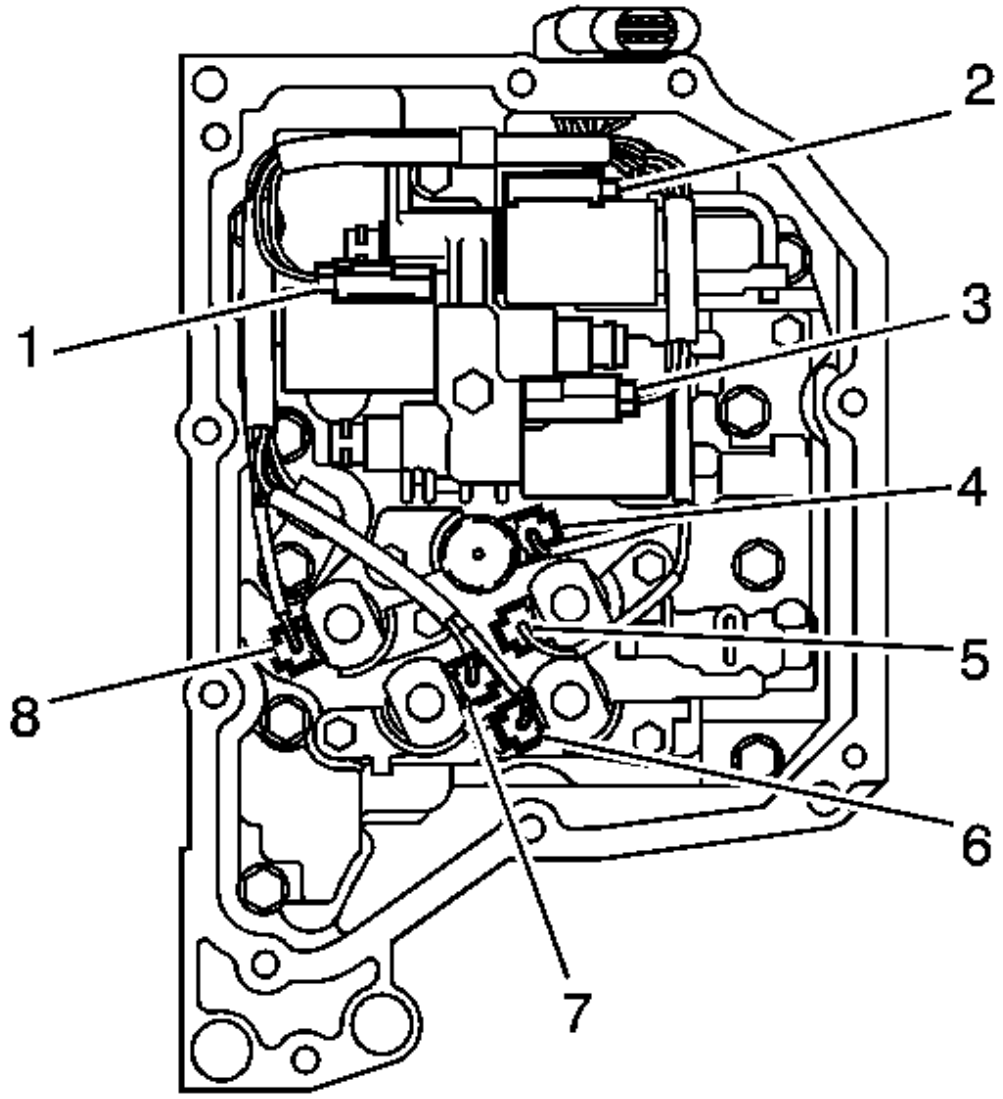


Fig. 53: Center Support Assembly
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Variable Low and 1-2 Reverse Clutch Backing Plate Retaining Ring - Selective **Tip:** Discard this retaining ring. It is not reusable.
2	Variable Low and 1-2 Reverse Clutch Backing

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	Plate
3	Variable Low and 1-2 Reverse Clutch Plate Assembly (Qty: 7)
4	Variable Low and 1-2 Reverse Clutch Plate (Qty: 7)

VARIABLE LOW AND 1-2 REVERSE CLUTCH PISTON REMOVAL

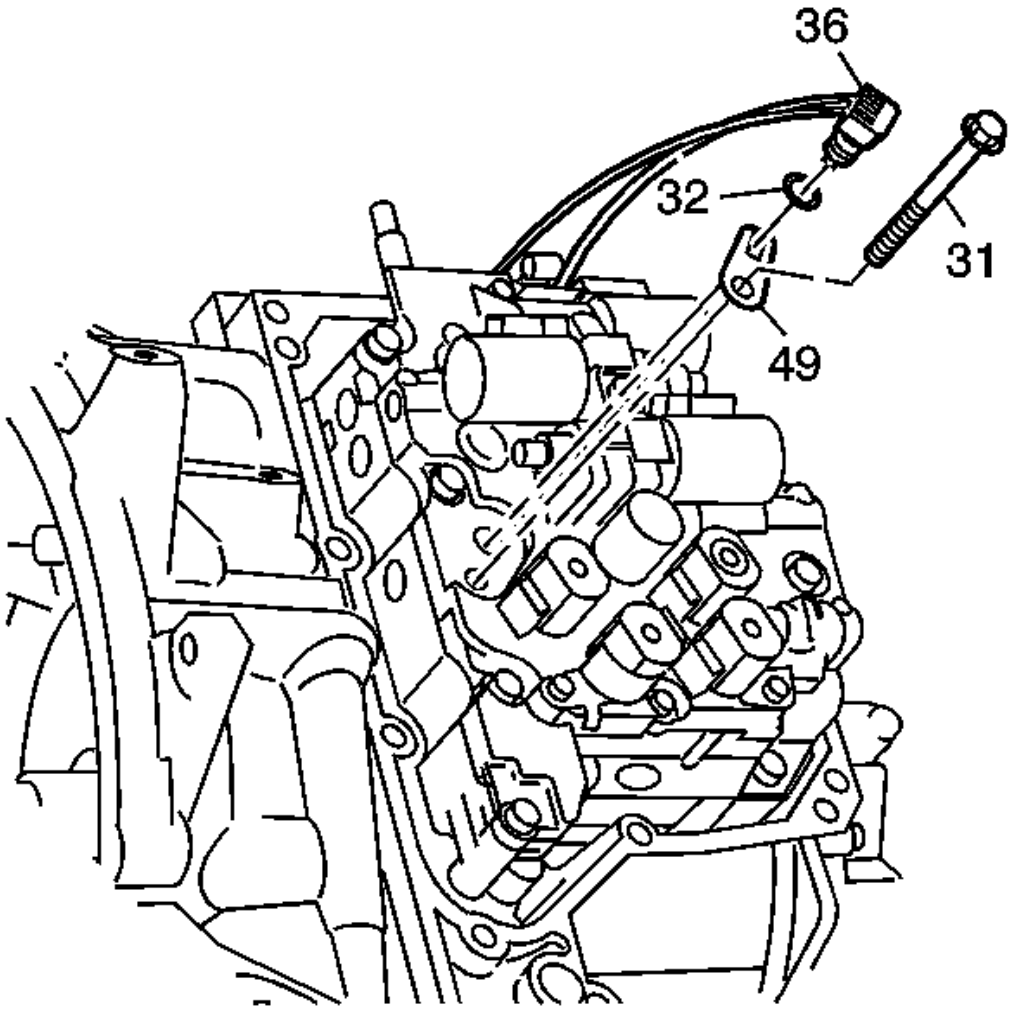


Fig. 54: Variable Low and 1-2 Reverse Clutch Piston
Courtesy of GENERAL MOTORS CORP.

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Callout	Component Name
1	Variable Low and 1-2 Reverse Clutch Spring Retaining Washer Retaining Ring **Tip:** 1. Use DT 21420-2, DT 23327-1 and DT 23327-2 which is part of DT 23327 to compress the Variable Low and 1-2 Reverse Clutch Piston Assembly. 2. Discard this retaining ring. It is not reusable. **Special Tools:** **DT 23327:** Clutch Spring Compressor For equivalent regional tools, refer to **Special Tools** .
2	Variable Low and 1-2 Reverse Clutch Spring Retainer
3	Variable Low and 1-2 Reverse Clutch Spring
4	Variable Low and 1-2 Reverse Clutch Piston Assembly

VARIABLE LOW AND 1-2 REVERSE CLUTCH HOUSING AND FRONT DIFFERENTIAL TRANSFER DRIVE GEAR DISASSEMBLE

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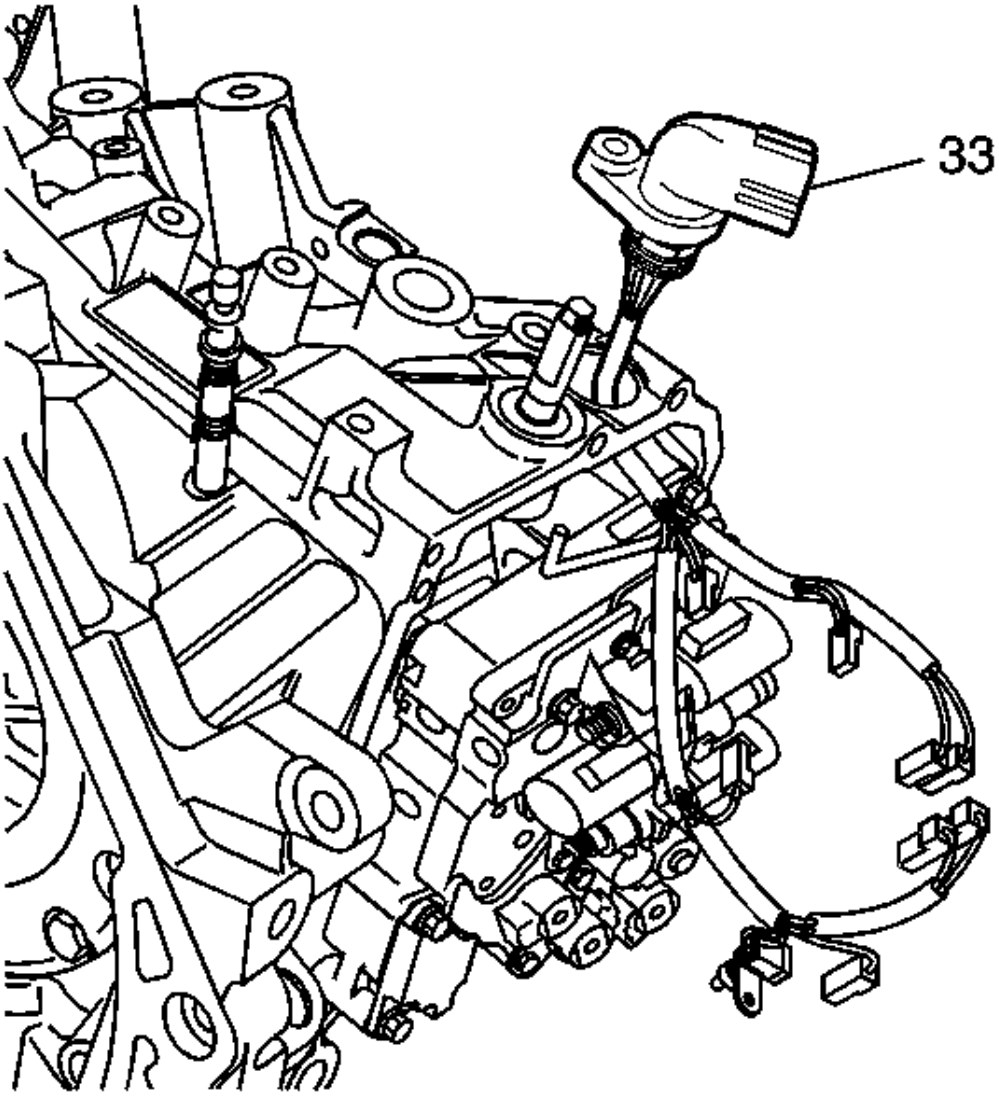


Fig. 55: Variable Low And 1-2 Reverse Clutch Housing And Front Differential Transfer Drive Gear
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Variable Low and 1-2 Reverse Clutch Housing Bolt M6 x 39.5 mm (Qty: 7)
2	Variable Low and 1-2 Reverse Clutch Housing Assembly
	Variable Low and 1-2 Reverse Clutch Housing

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3	(O-ring) Seal
4	Variable Low and 1-2 Reverse Clutch Housing Fluid Passage Seal (Qty: 2)

INPUT SUN GEAR THRUST BEARING REPLACEMENT

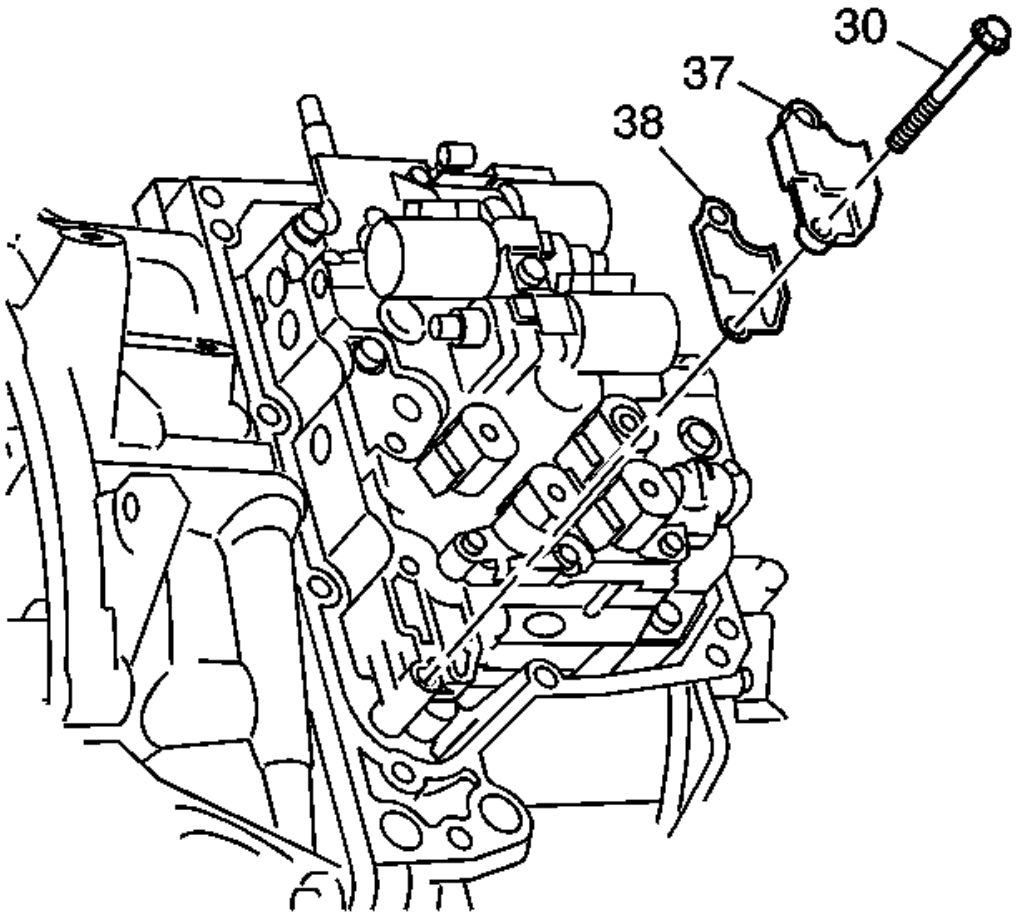


Fig. 56: Input Sun Gear Thrust Bearing
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
	Input Sun Gear Shaft Roller Bearing Assembly **Special Tools**

1	• **DT-49263:** Bearing Installer • **GE 8092:** Driver Handle • **GE 23907-1:** Slide Hammer and Shaft • **GE 29369-2:** Bushing and Bearing Remover 2-3 in For equivalent regional tools, refer to **Special Tools** .

VARIABLE HIGH AND 2-3-4 CLUTCH SEAL INSTALLATION

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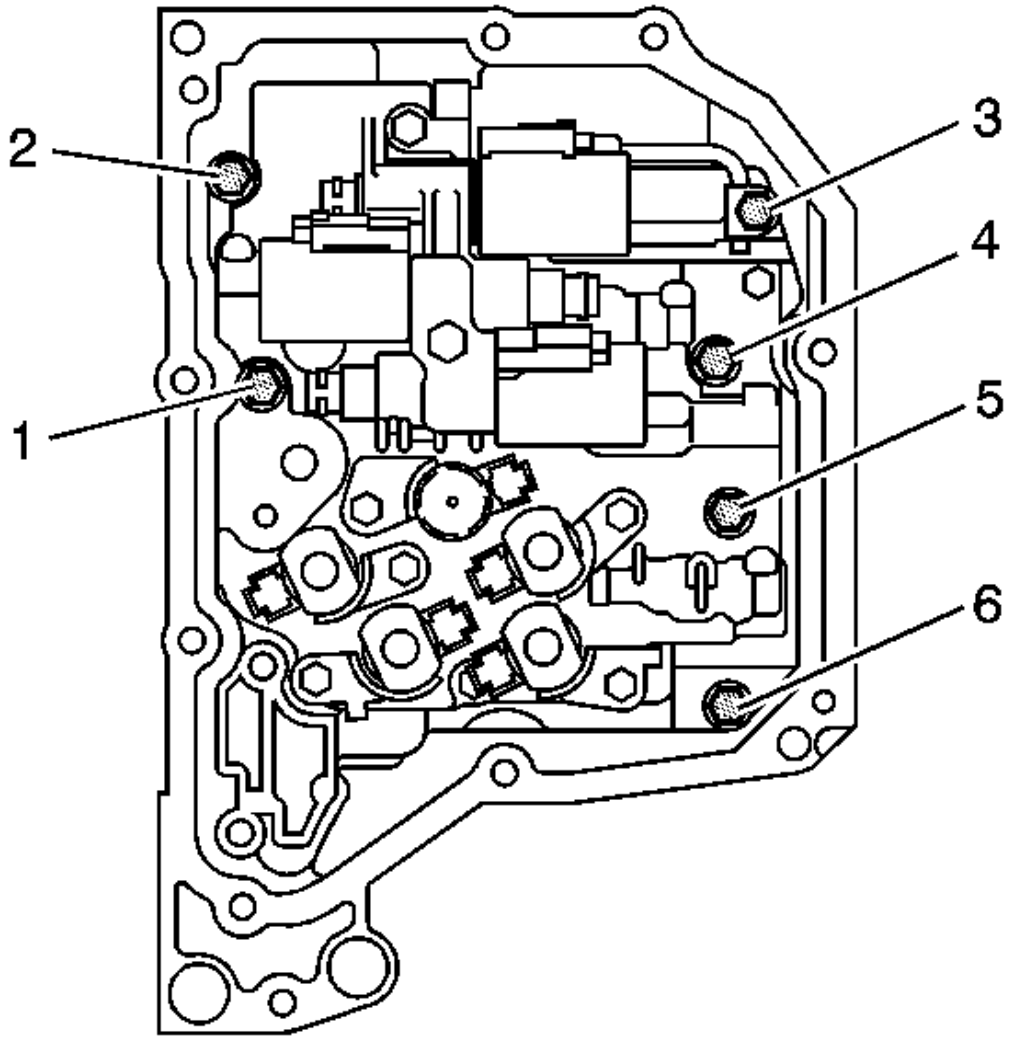


Fig. 57: Variable High and 2-3-4 Clutch Seal
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Variable Hi and 2-3-4 Clutch Seal **Tip:** A NEW seal must be installed.

VARIABLE LOW AND 1-2 REVERSE CLUTCH HOUSING AND FRONT DIFFERENTIAL TRANSFER DRIVE GEAR ASSEMBLE

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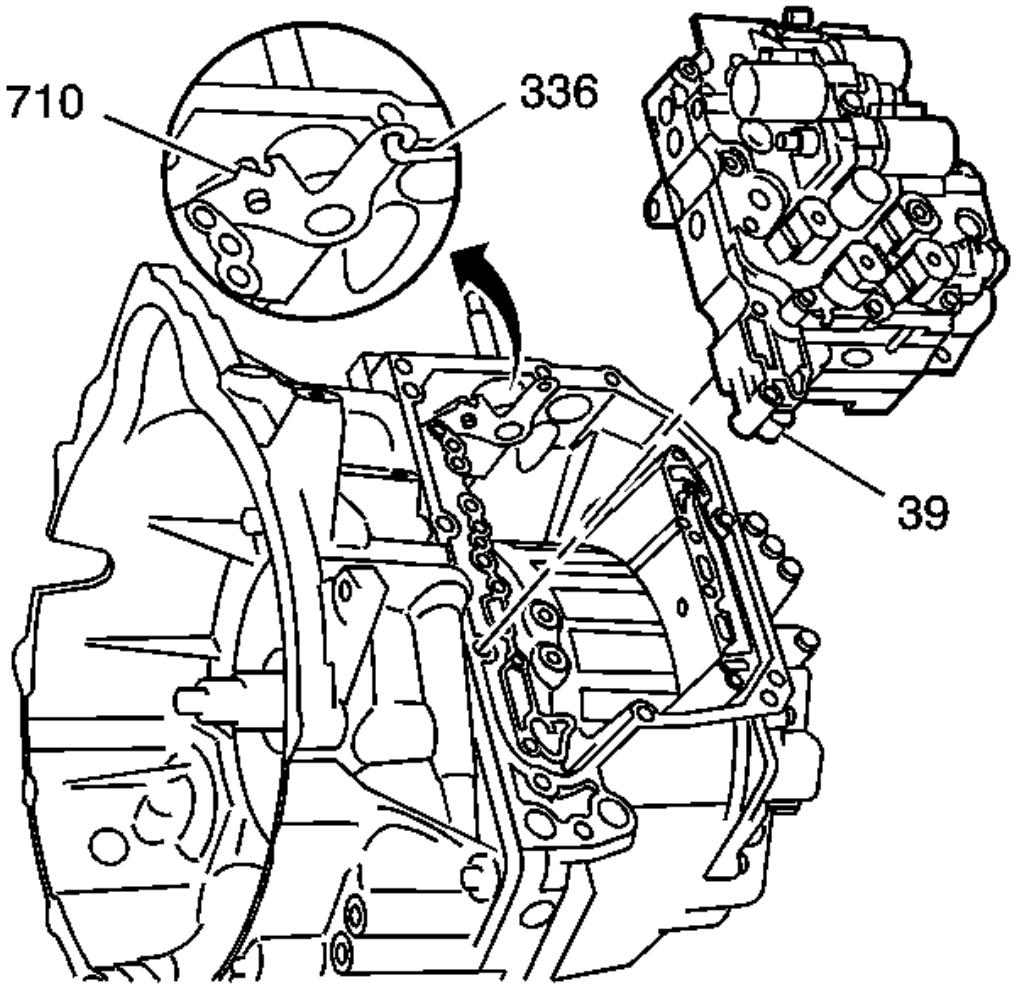


Fig. 58: Variable Low And 1-2 Reverse Clutch Housing And Front Differential Transfer Drive Gear
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedures • Inspect the support assembly for damage or wear to the splines, bushings, machined surfaces and threaded holes. • Inspect the transfer drive gear for damage or wear. • Inspect the transfer drive gear bearing assembly for proper operation. • The bearing should roll smoothly and quietly.	
	Variable Low and 1-2 Reverse Clutch Housing Fluid

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1	Passage Seal (Qty: 2)
2	Variable Low and 1-2 Reverse Clutch Housing (O-ring) Seal **Tip:** Install a NEW seal. It is not reusable.
3	Variable Low and 1-2 Reverse Clutch Housing Assembly
4	Variable Low and 1-2 Reverse Clutch Housing Bolt M6 x 39.5 mm (Qty: 7) **CAUTION:** **Refer to Fastener Caution .** **Procedure** 1. Rotate center support clockwise against clutch housing splines before torquing. 2. Tighten the bolts in sequence shown. **Tighten:** 15 N.m (11 lb ft)

VARIABLE LOW AND 1-2 REVERSE CLUTCH PISTON INSTALLATION

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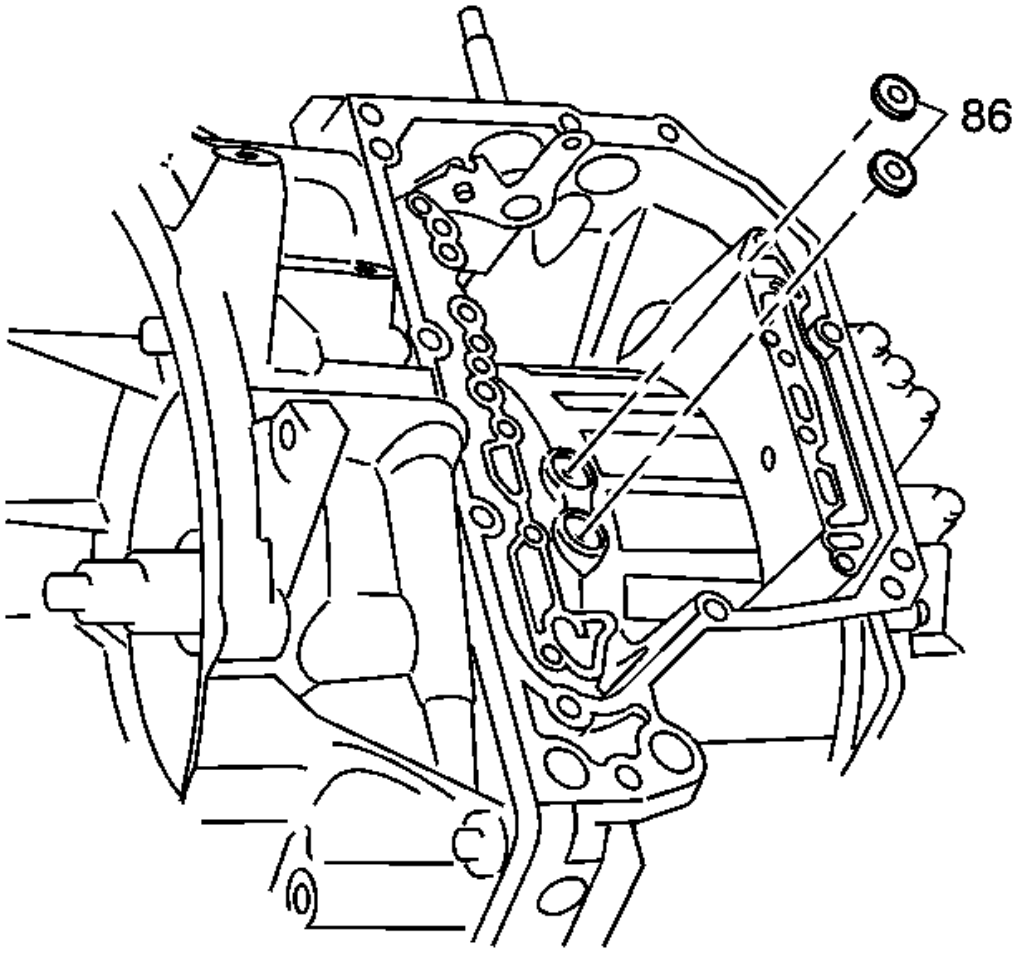


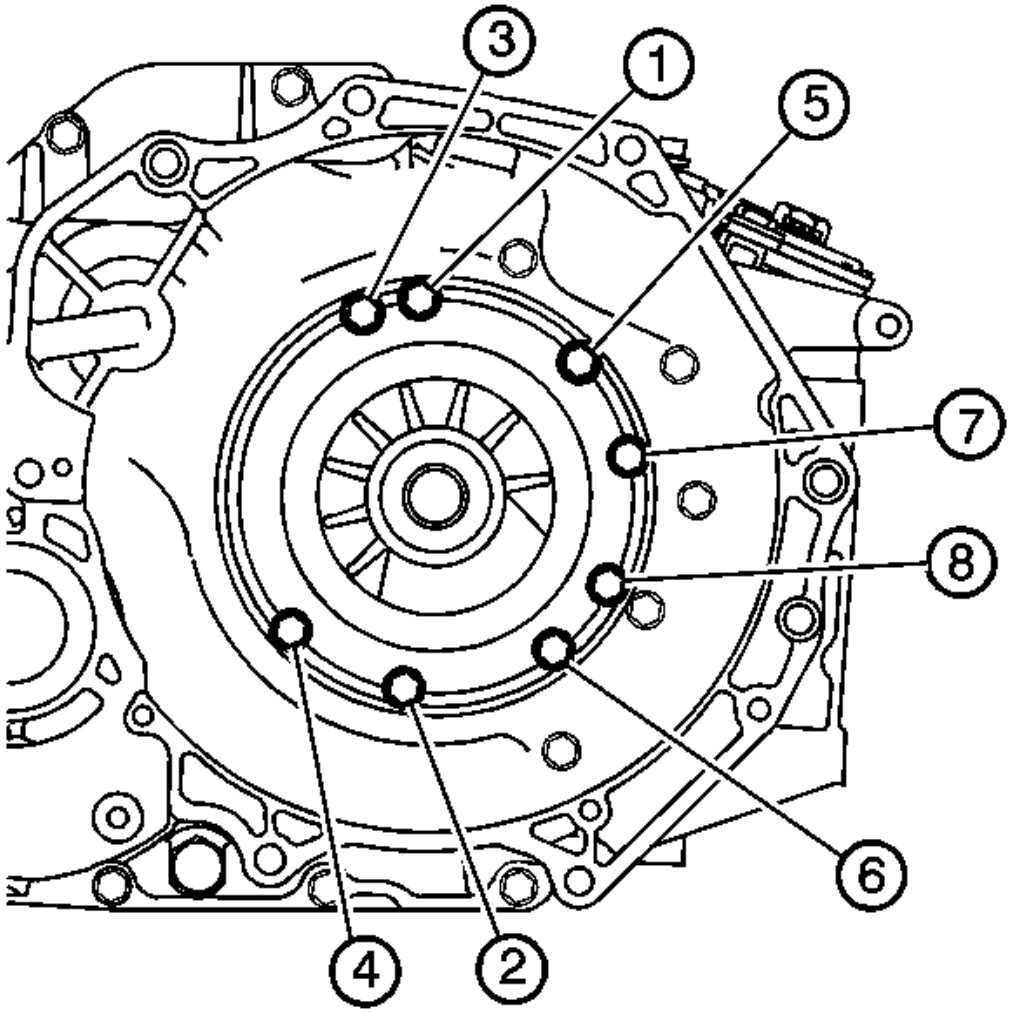
Fig. 59: Variable Low and 1-2 Reverse Clutch Piston
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Clean and inspect all components for damage or wear.	
1	Variable Low and 1-2 Reverse Clutch Piston Assembly
2	Variable Low and 1-2 Reverse Clutch Spring
3	Variable Low and 1-2 Reverse Clutch Spring Retainer
	Variable Low and 1-2 Reverse Clutch Spring Retaining Washer Retaining Ring **Tip:**

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4	1. Install a NEW retaining ring. It is not reusable. 2. Use DT 21420-2, DT 23327-1 and DT 23327-2 which is part of DT 23327 to compress the Variable Low and 1-2 Reverse Clutch Piston Assembly. **Special Tools:** **DT 23327:** Clutch Spring Compressor For equivalent regional tools, refer to **Special Tools** .

CENTER SUPPORT ASSEMBLY ASSEMBLE



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Fig. 60: Center Support Assembly
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Clean and inspect all components for damage or wear.	
1	Variable Low and 1-2 Reverse Clutch Plate (Qty: 7)
2	Variable Low and 1-2 Reverse Clutch Plate Assembly (Qty: 7)
3	Variable Low and 1-2 Reverse Clutch Backing Plate
4	Variable Low and 1-2 Reverse Clutch Backing Plate Retaining Ring - Selective **Tip:** Install a NEW retaining ring. It is not reusable.

VARIABLE LOW AND 1-2 REVERSE CLUTCH PISTON AIR CHECK

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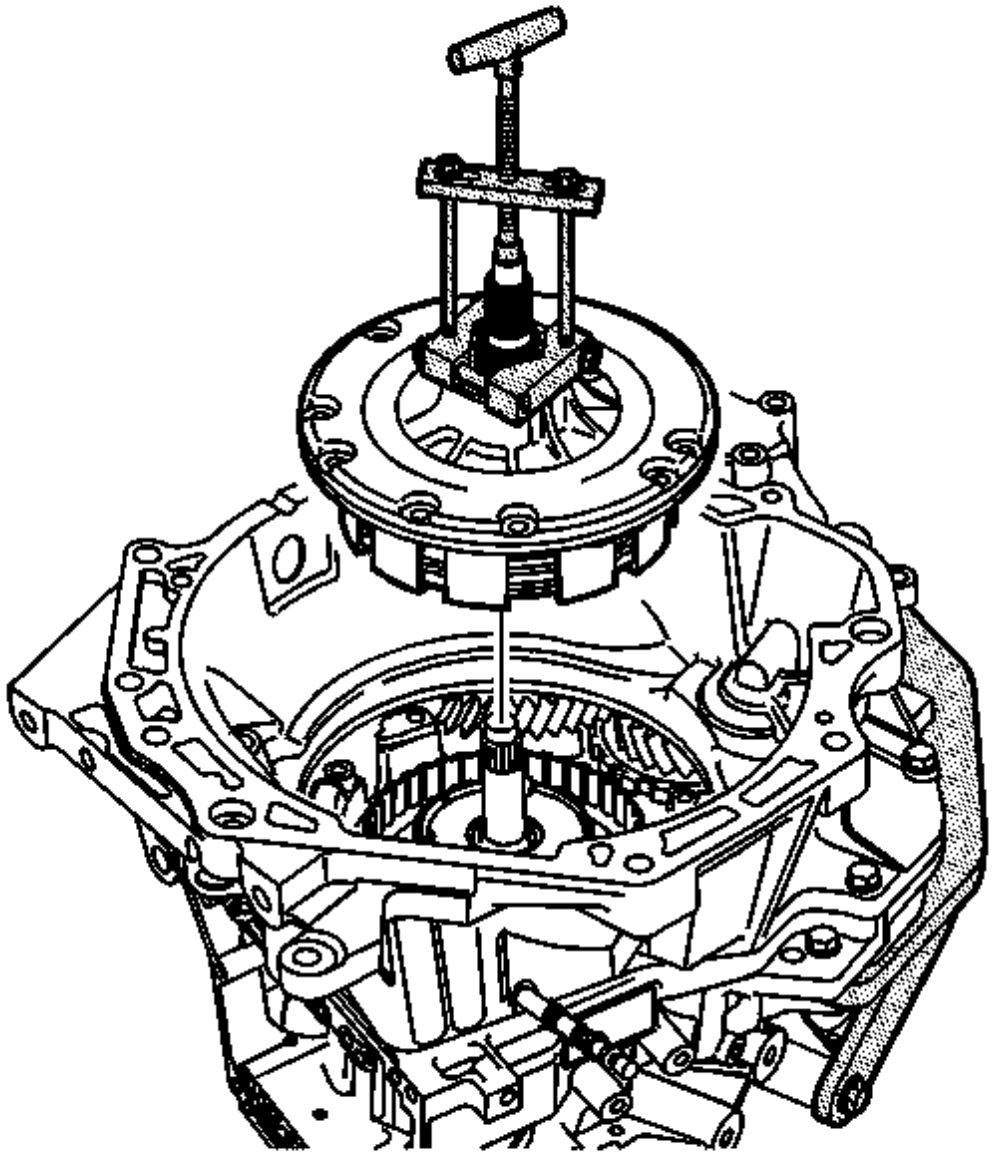


Fig. 61: Checking Variable Low and 1-2 Reverse Clutch Piston With Shop Air
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
	Center (w/Variable Low and 1-2 Reverse Clutch) Support Assembly

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1	**CAUTION:** **Regulate the air pressure to 40 psi maximum. High pressure could cause the piston to over travel and damage the piston seals.** **Procedure** 1. Plug one hole while appling air to the other. 2. Apply shop air to the low and 1-2 reverse clutch fluid passage. Observe the piston movement. **Tip:** Minimal piston movement and excessive air leaking could indicate damage to the piston seals or improper assembly.

DRIVE MOTOR GENERATOR POSITION SENSOR STATOR INSTALLATION

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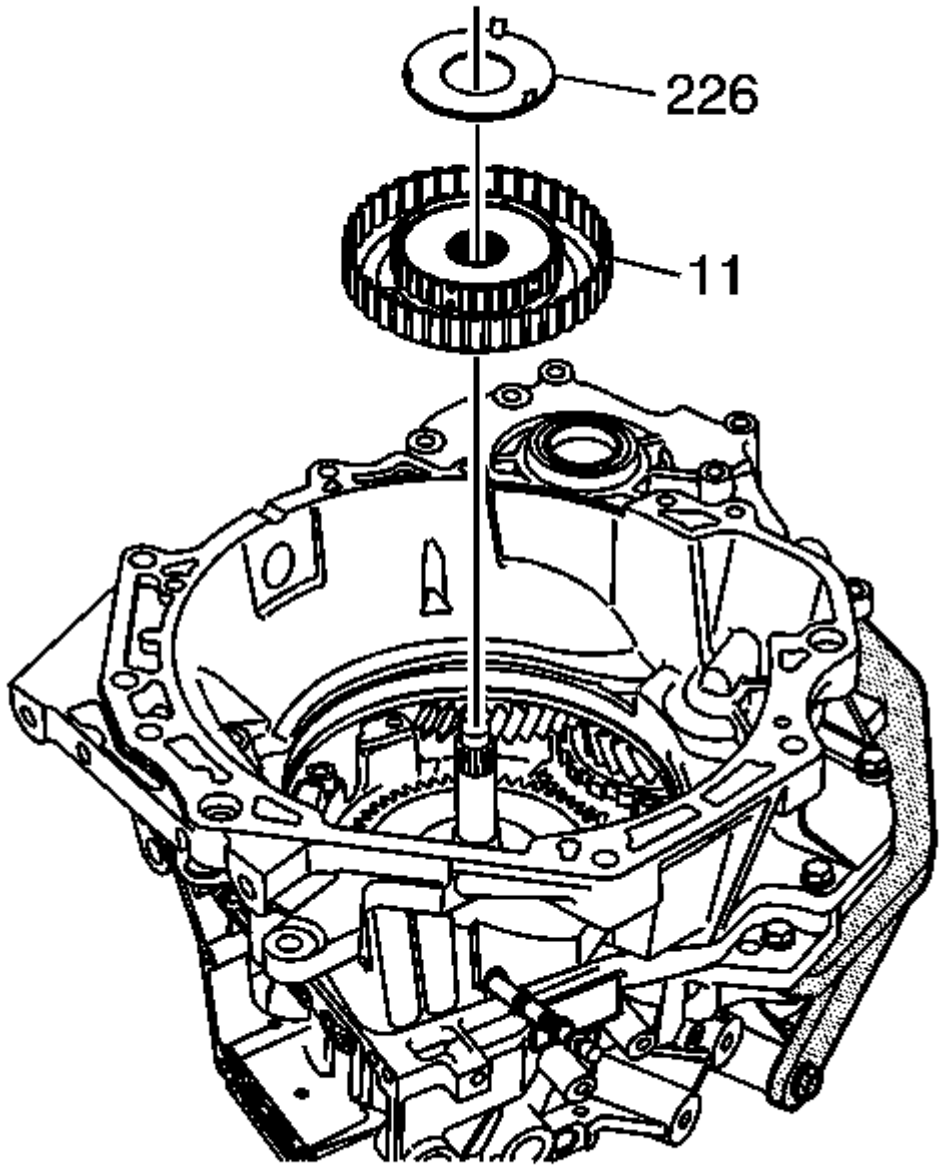


Fig. 62: Drive Motor Generator Position Sensor Stator
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedures	

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• Inspect the support assembly for damage or wear to the splines, bushings, machined surfaces and threaded holes. • Inspect the transfer drive gear for damage or wear. • Inspect the transfer drive gear bearing assembly for proper operation. • The bearing should roll smoothly and quietly.	
1	Locating Pin
2	Generator/Drive Motor Position Sensor Stator Assembly
3	Drive Motor Generator Position Switch Sensor Bolt M5 x 16 mm (Qty: 3) **CAUTION:** **Refer to Fastener Caution .** **Tighten:** 7.25 N.m (64.2 lb in)

VARIABLE HIGH AND 2-3-4 CLUTCH DISASSEMBLE

Output Carrier Internal Gear and Variable Hi and 2-3-4 Clutch Plates Disassemble

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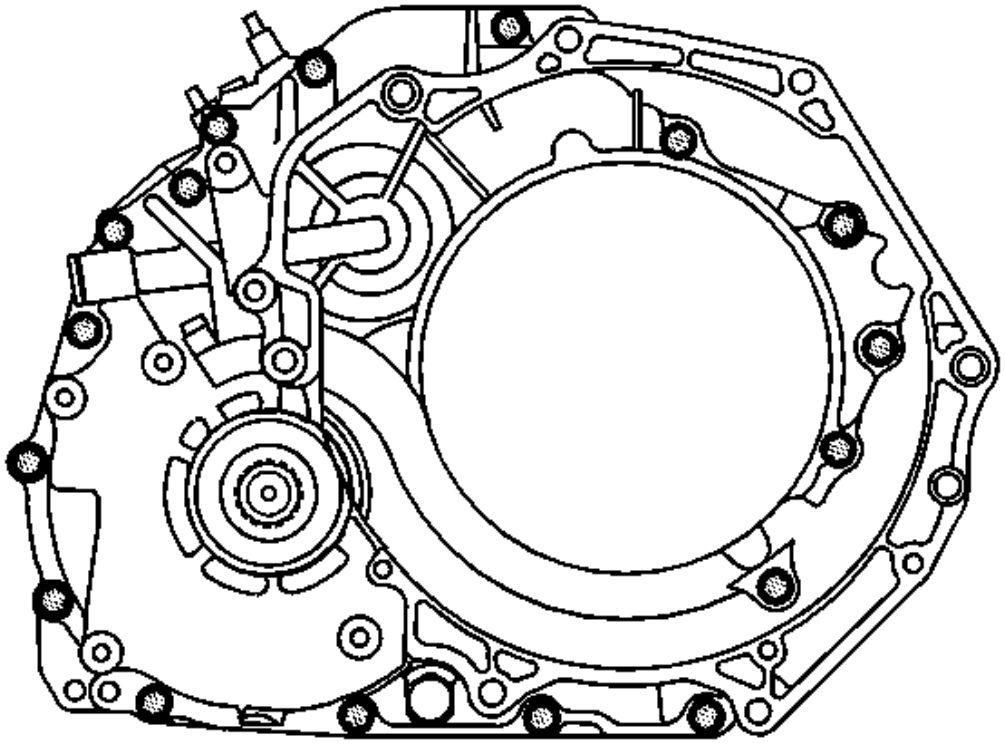


Fig. 63: Output Carrier Internal Gear And Variable Hi And 2-3-4 Clutch Plates
Courtesy of GENERAL MOTORS CORP.

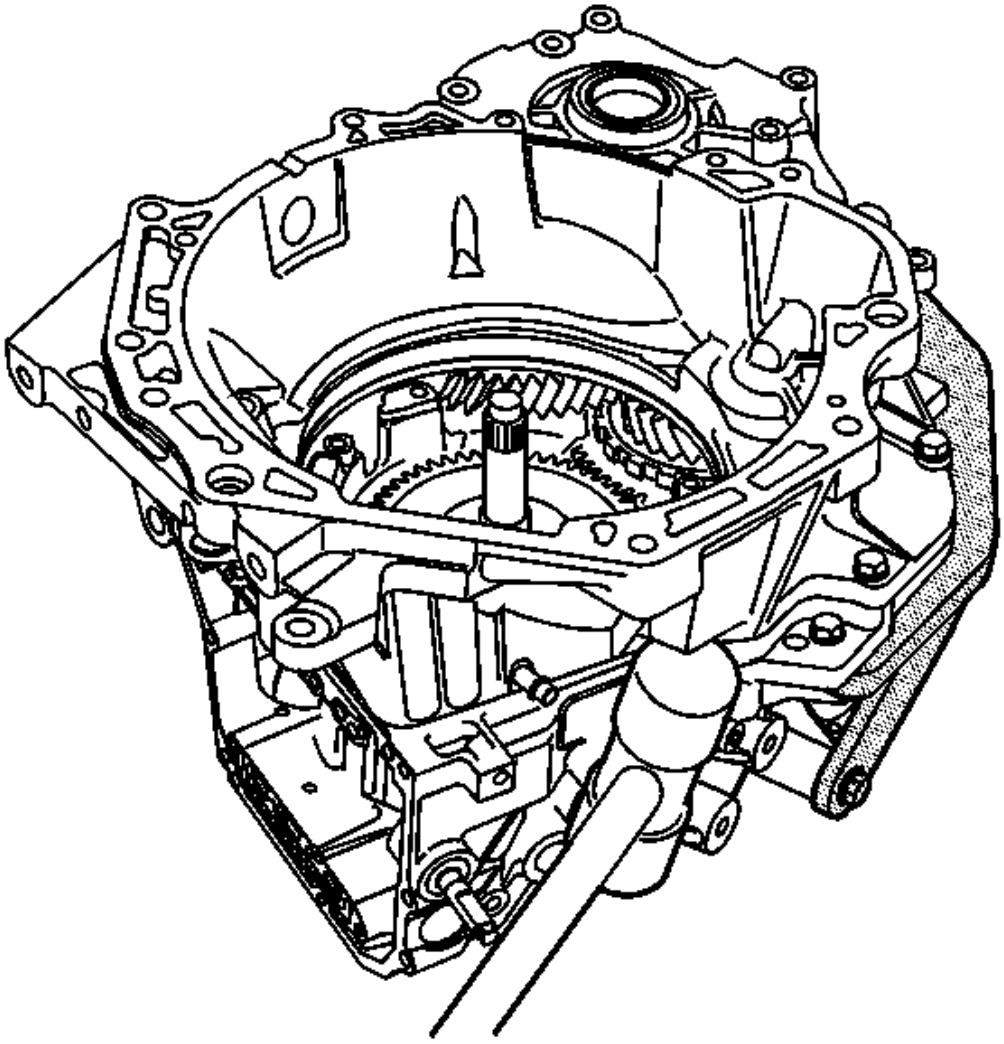
Output Carrier Internal Gear and Variable Hi and 2-3-4 Clutch Plates Disassemble

Callout	Component Name
1	Output Carrier Internal Gear Retaining Ring **WARNING:** **Wear safety glasses in order to avoid eye damage.** **Tip:** Locate retaining ring gap to start the shims insert 5 or 6 evenly spaced. **Special Tools:** **DT-49098:** Input and Output Clutch Pack Retaining Ring Remover For equivalent regional tools, refer to **Special Tools** .

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2	Output Carrier Internal Gear
3	Variable Hi and 2-3-4 Clutch Backing Plate Retaining Ring - Selective **Tip:** Discard the retaining ring. It is not reusable.
4	Variable Hi and 2-3-4 Clutch Backing Plate
5	Variable Hi and 2-3-4 Clutch Plate Assembly - Friction (Qty: 3)
6	Variable Hi and 2-3-4 Clutch Plate (Qty: 3)

Variable Hi and 2-3-4 Clutch Piston Assembly and Spring Disassemble



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Fig. 64: Variable Hi and 2-3-4 Clutch Piston Assembly And Spring
Courtesy of GENERAL MOTORS CORP.

Variable Hi and 2-3-4 Clutch Piston Assembly and Spring Disassemble

Callout	Component Name
1	Variable Hi and 2-3-4 Clutch Spring Retaining Ring **Tip:** Discard this retaining ring. It is not reusable. **Special Tools:** **DT-47693-2:** Compressor For equivalent regional tools, refer to **Special Tools** .
2	Variable Hi and 2-3-4 Clutch Spring Retainer
3	Variable Hi and 2-3-4 Clutch Spring
4	Variable Hi and 2-3-4 Clutch Piston Assembly
5	Variable Hi and 2-3-4 Clutch Housing Valve

CENTER SUPPORT ROLLER BEARING REPLACEMENT

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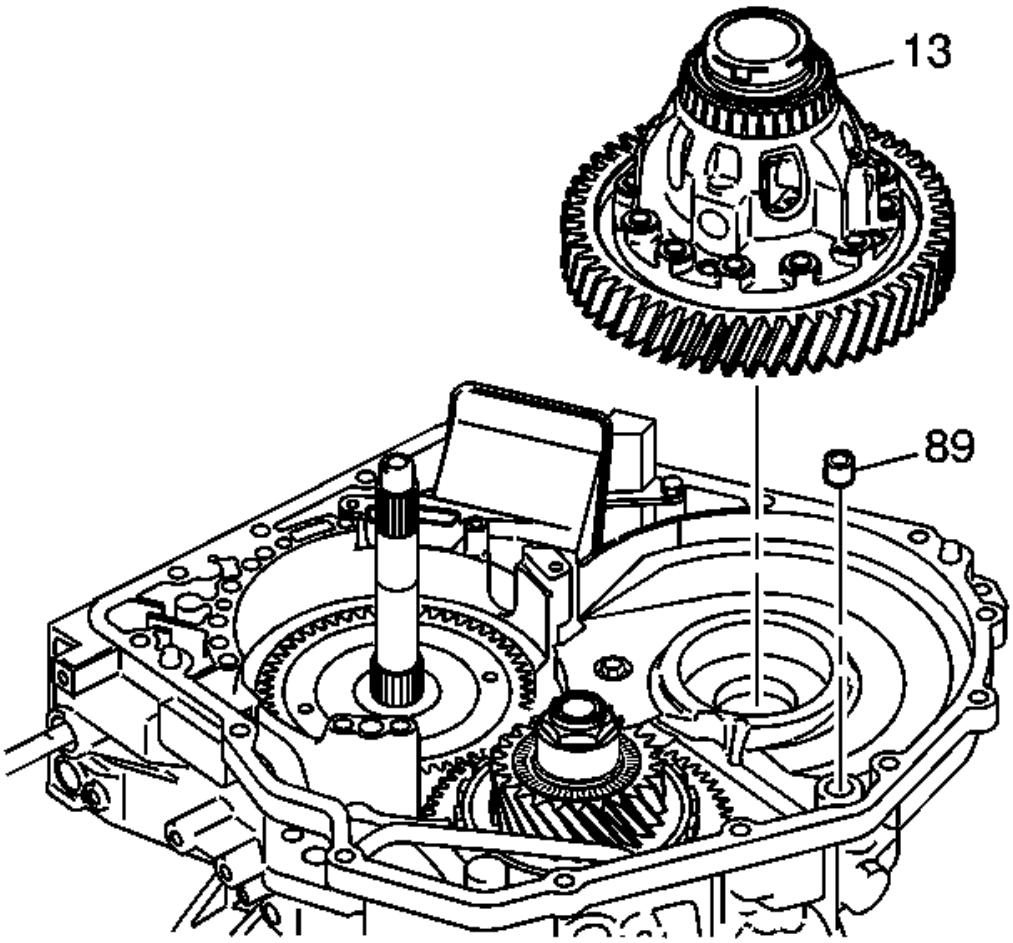


Fig. 65: Center Support Roller Bearing And Special Tool
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Center Support Roller Bearing Assembly **Tip:** To remove the bearing engage the roller bearing not the race with DT 45094 and verify from the bottom side. **Special Tools** • **DT 45094:** Bearing Cup Remover • **DT 45124:** Removal Bridge

	• **DT-49264:** Bearing Cup Installer with Press For equivalent regional tools, refer to **Special Tools** .

VARIABLE HIGH AND 2-3-4 CLUTCH ASSEMBLE

Variable Hi and 2-3-4 Clutch Piston and Spring

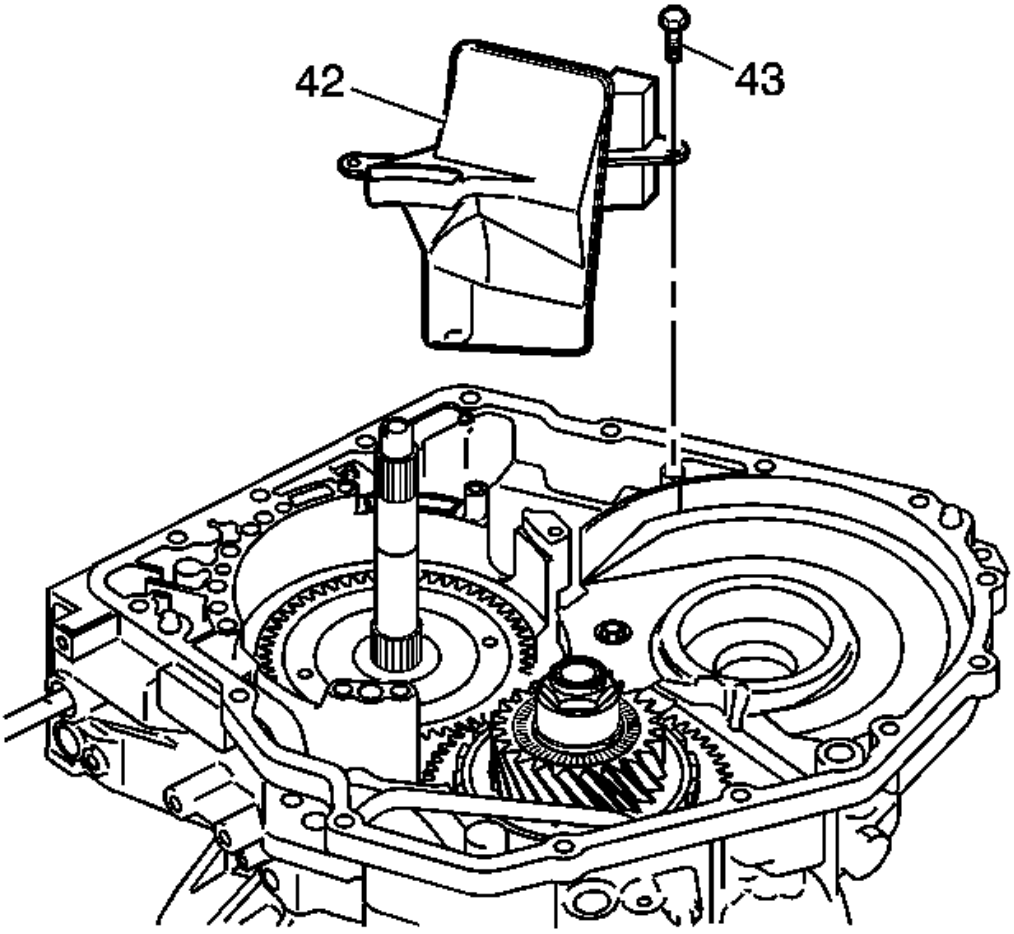


Fig. 66: Variable Hi and 2-3-4 Clutch Piston And Spring
Courtesy of GENERAL MOTORS CORP.

Variable Hi and 2-3-4 Clutch Piston and Spring

Callout	Component Name

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Preliminary Procedure: Clean and inspect all parts for damage or wear.	
1	Variable Hi and 2-3-4 Clutch Housing Valve
2	Variable Hi and 2-3-4 Clutch Piston Assembly
3	Variable Hi and 2-3-4 Clutch Spring
4	Variable Hi and 2-3-4 Clutch Spring Retainer
5	Variable Hi and 2-3-4 Clutch Spring Retaining Ring **Tip:** Install a NEW retaining ring. It is not reusable. **Special Tools:** **DT-47693-2:** Compressor For equivalent regional tools, refer to **Special Tools** .

Output Carrier Internal Gear and Variable Hi and 2-3-4 Clutch Plates Assemble

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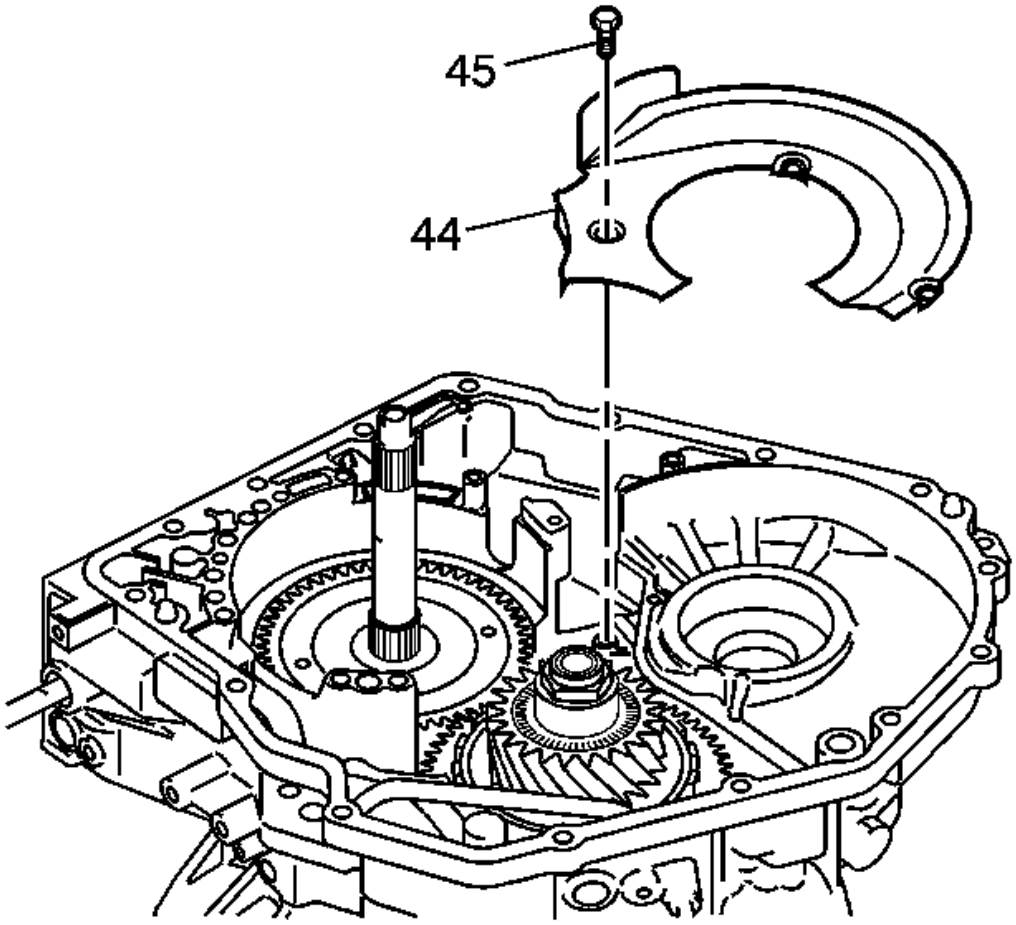


Fig. 67: Output Carrier Internal Gear And Variable Hi and 2-3-4 Clutch Plates Assembly
Courtesy of GENERAL MOTORS CORP.

Output Carrier Internal Gear and Variable Hi and 2-3-4 Clutch Plates Assemble

Callout	Component Name
Preliminary Procedure: Clean and inspect all parts for damage or wear.	
1	Variable Hi and 2-3-4 Clutch Plate (Qty: 3)
2	Variable Hi and 2-3-4 Clutch Plate Assembly - Friction (Qty: 3)
3	Variable Hi and 2-3-4 Clutch Backing Plate
4	Variable Hi and 2-3-4 Clutch Backing Plate Retaining Ring - Selective **Tip:** Install a NEW retaining ring. It is not

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	reusable.
5	Output Carrier Internal Gear
6	Output Carrier Internal Gear Retaining Ring **Tip:** Start the opposite side of the retaining ring gap first then work both ends evenly while pushing the internal gear down. **Special Tools:** **DT-49468:** Retaining Ring Installer For equivalent regional tools, refer to **Special Tools** .

VARIABLE HIGH AND 2-3-4 CLUTCH PISTON AIR CHECK

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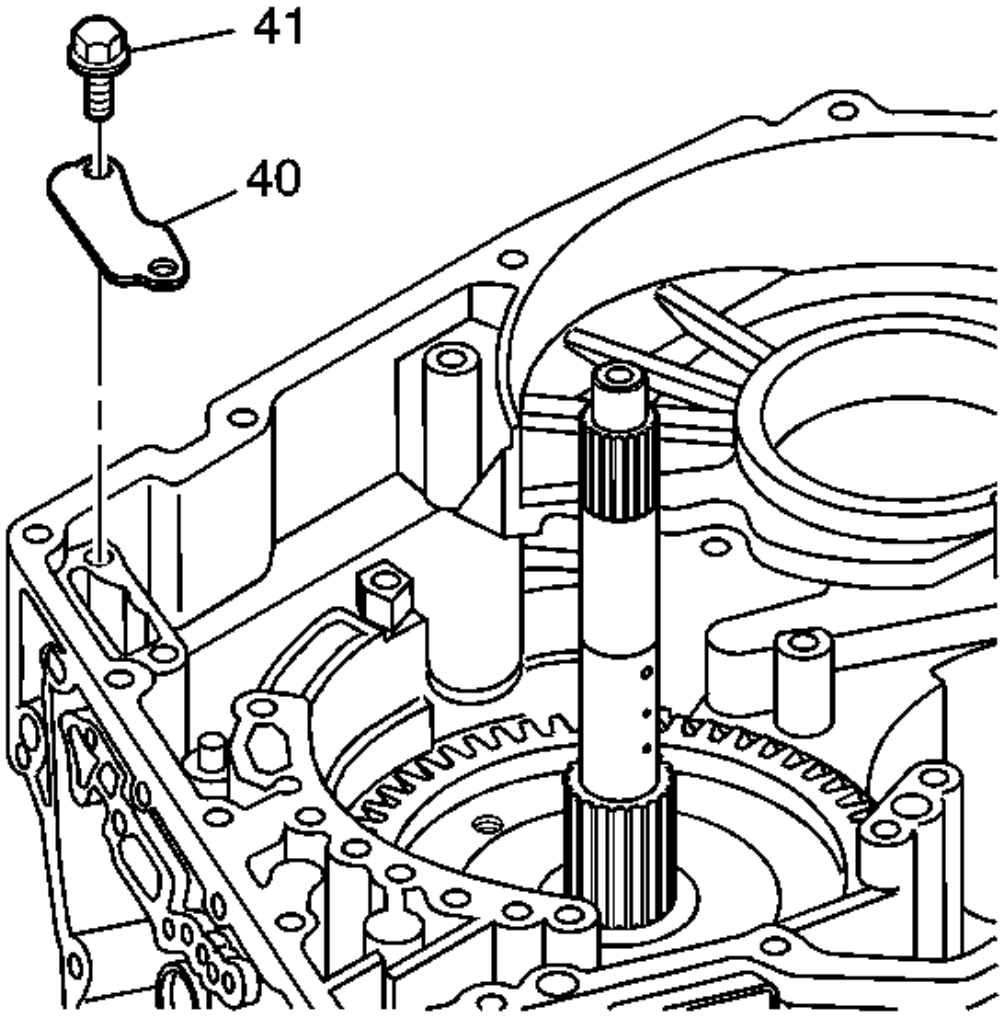


Fig. 68: Checking Variable High And 2-3-4 Clutch Piston With Shop Air
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Install the variable hi and 2-3-4 clutch housing assembly onto the center support assembly.	
	Variable Hi and 2-3-4 Clutch Housing Assembly **CAUTION:** **Regulate the air pressure to 40 psi maximum. High pressure could cause the piston to over**

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	travel and damage the piston seals.
1	**Procedure:** Apply shop air to the variable hi and 2-3-4 clutch housing. Observe the 2-3-4 clutch piston movement.

CENTER SUPPORT ASSEMBLY INSTALLATION

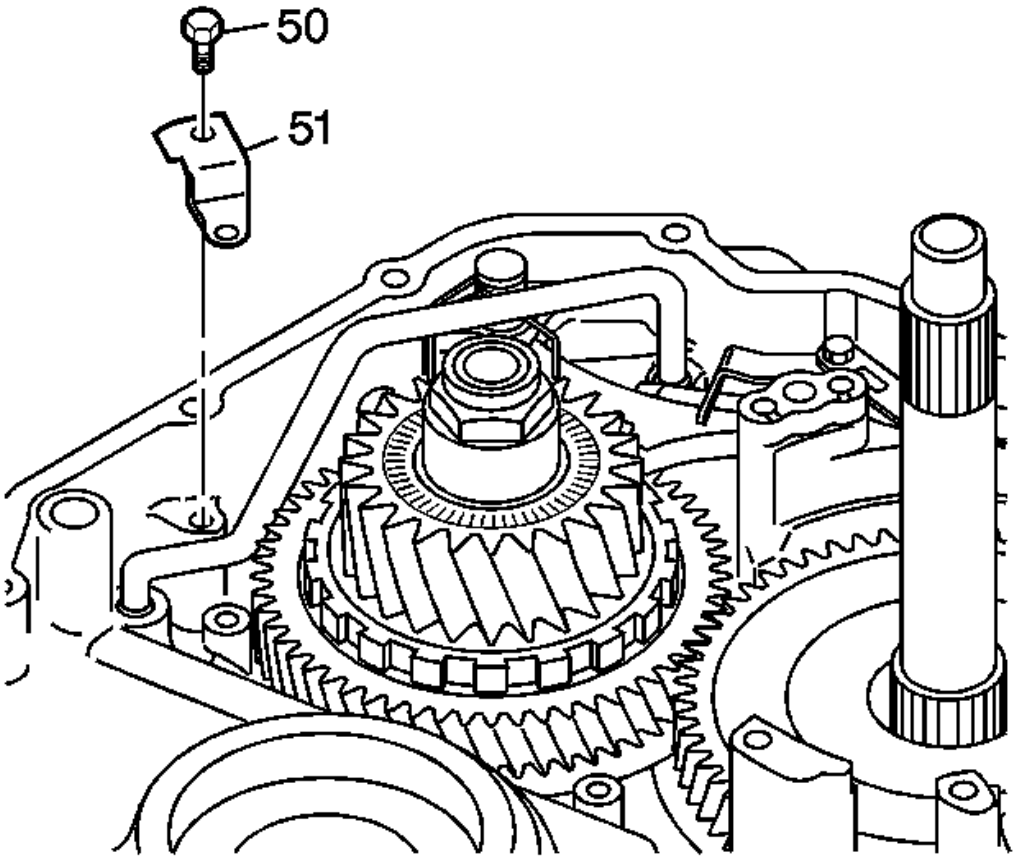


Fig. 69: Center Support Assembly
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Center Support Oil Passage Seal
	Center (w/Variable Low and 1-2 Reverse Clutch)

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2	Support Assembly
3	Center Support Bolt M10 x 25 mm (Qty: 9) **CAUTION:** **Refer to Fastener Caution .** **Procedure:** Tighten bolts in sequence shown. **Tighten:** 58 N.m (43 lb ft)

VARIABLE HIGH AND 2-3-4 CLUTCH AND HUB INSTALLATION

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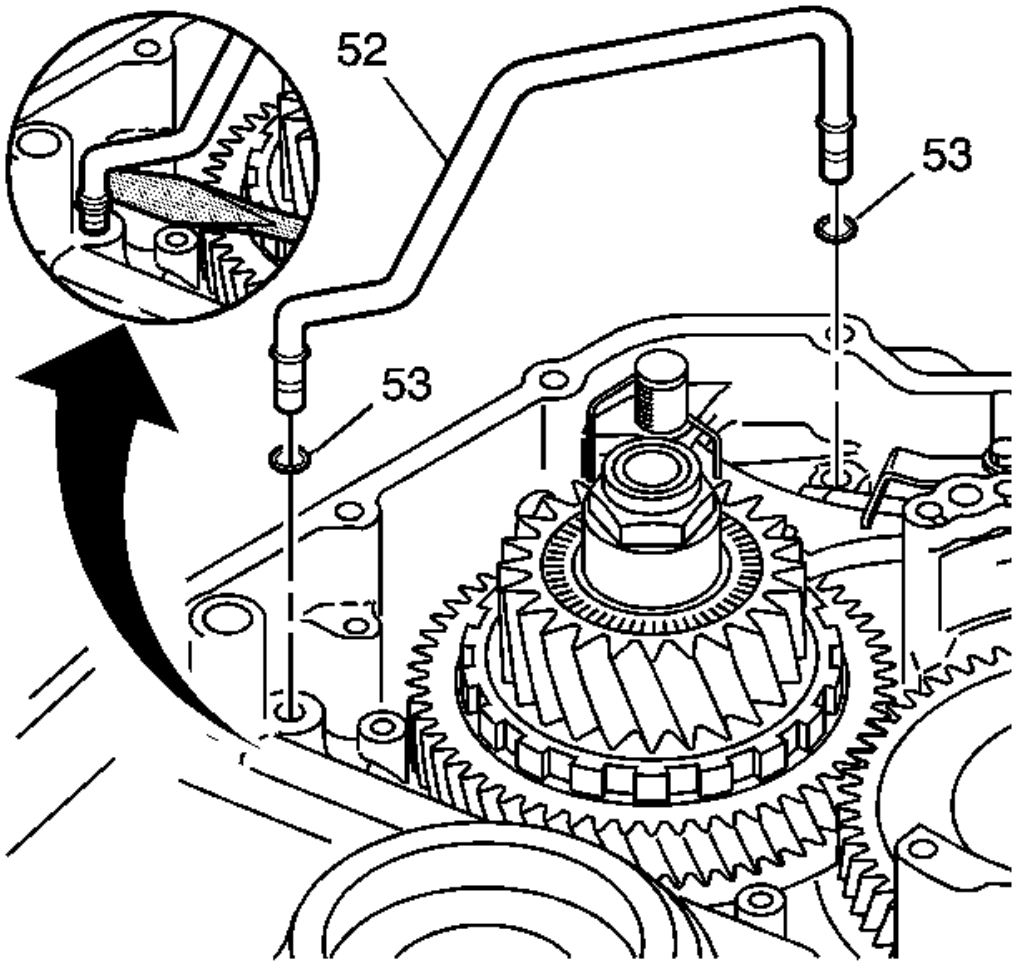


Fig. 70: Variable High and 2-3-4 Clutch And Hub
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Variable Hi and 2-3-4 Clutch Housing Thrust Bearing Assembly
2	Variable Hi and 2-3-4 Clutch Assembly **Tip:** Use **GE 34673:** flat gauge bar to measure for correct installation height. **Specification:** A = 31-33 mm (1.22-1.30 in)

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	Special Tool: **GE 34673:** Flat Gauge Bar For equivalent regional tools, refer to **Special Tools** .
3	Variable Hi and 2-3-4 Clutch Hub Thrust Bearing Assembly
4	Variable Hi and 2-3-4 Clutch Hub **Tip:** Use **GE 34673:** flat gauge bar to measure for correct installation height. **Specification:** B = 30-32 mm (1.18-1.26 in) **Special Tool:** **GE 34673:** Flat Gauge Bar For equivalent regional tools, refer to **Special Tools** .
5	Output Carrier Thrust Bearing Assembly

OUTPUT CARRIER BEARING REPLACEMENT

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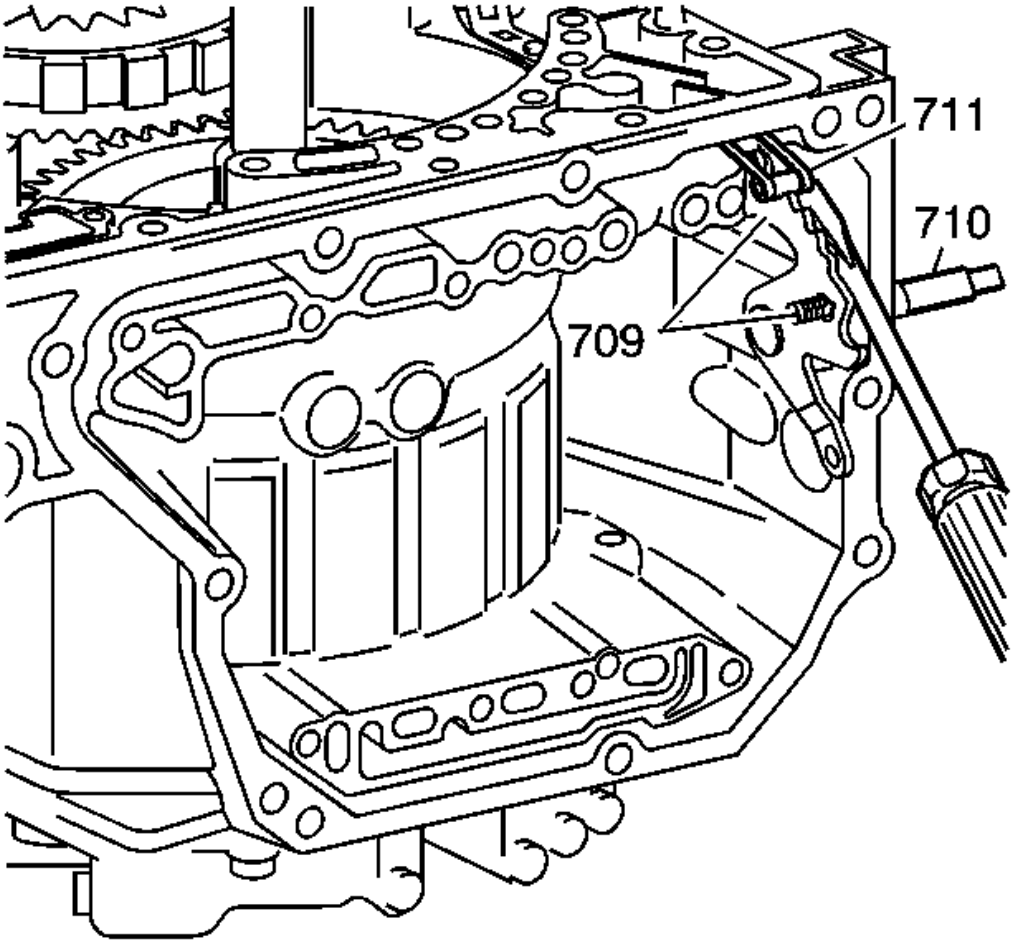


Fig. 71: Output Carrier Bearing
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Output Carrier Assembly - C2 **Special Tools** • **DT-49264:** Bearing Cup Installer with Press • **GE 8092:** Driver Handle For equivalent regional tools, refer to **Special Tools** .
2	Output Carrier Roller Bearing Assembly

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OUTPUT CARRIER SHELL, CARRIER, SUN GEAR, AND SUN GEAR SHAFT INSTALLATION

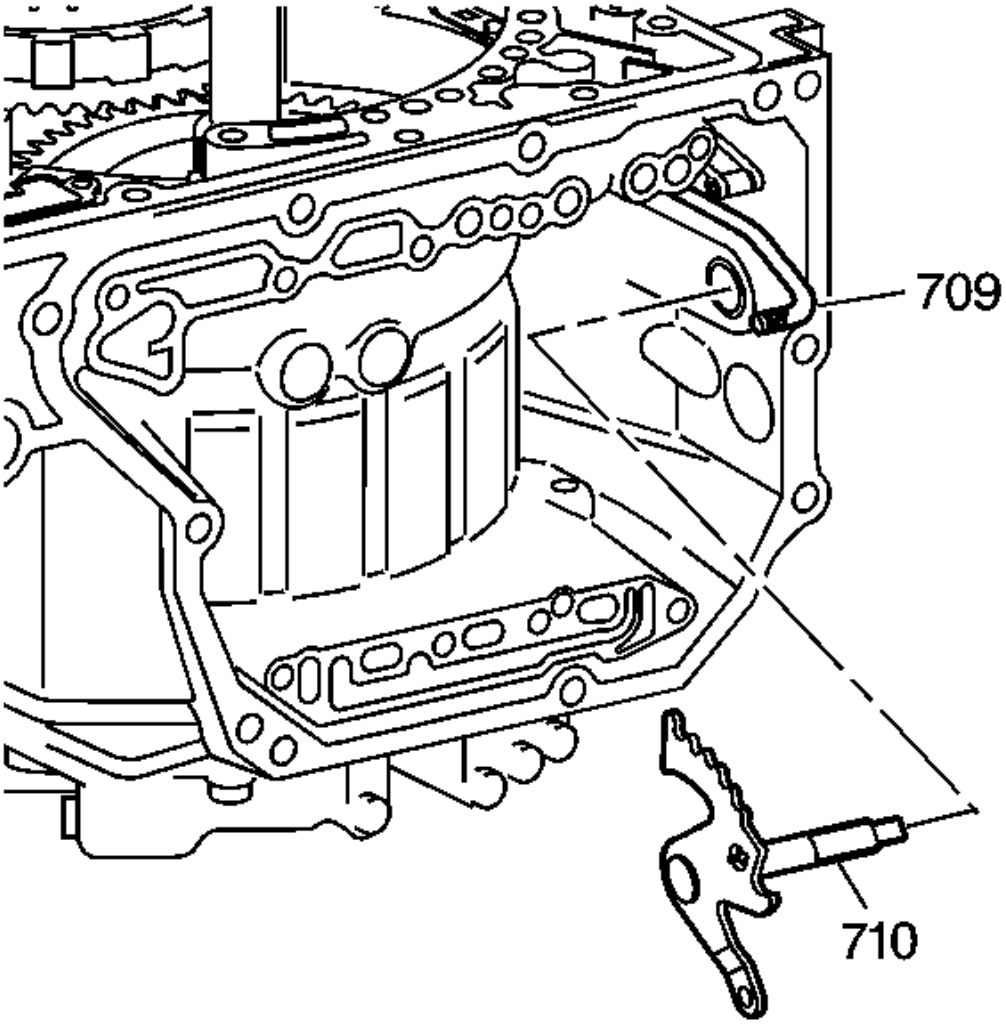


Fig. 72: Output Carrier Shell, Carrier, Sun Gear, And Sun Gear Shaft
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Output Carrier Shell
2	Output Carrier Assembly - C2 **Tip:** Inspect pinions and listen for bearing noise.
3	Output Sun Gear
4	Output Sun Gear Retaining Ring

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5	Output Sun Gear Shaft Lube O-Ring Seal **Tip:** Install a NEW seal. It is not reusable.
6	Output Sun Gear Shaft

DRIVE MOTOR GENERATOR ROTOR AND STATOR INSTALLATION - UNIT B

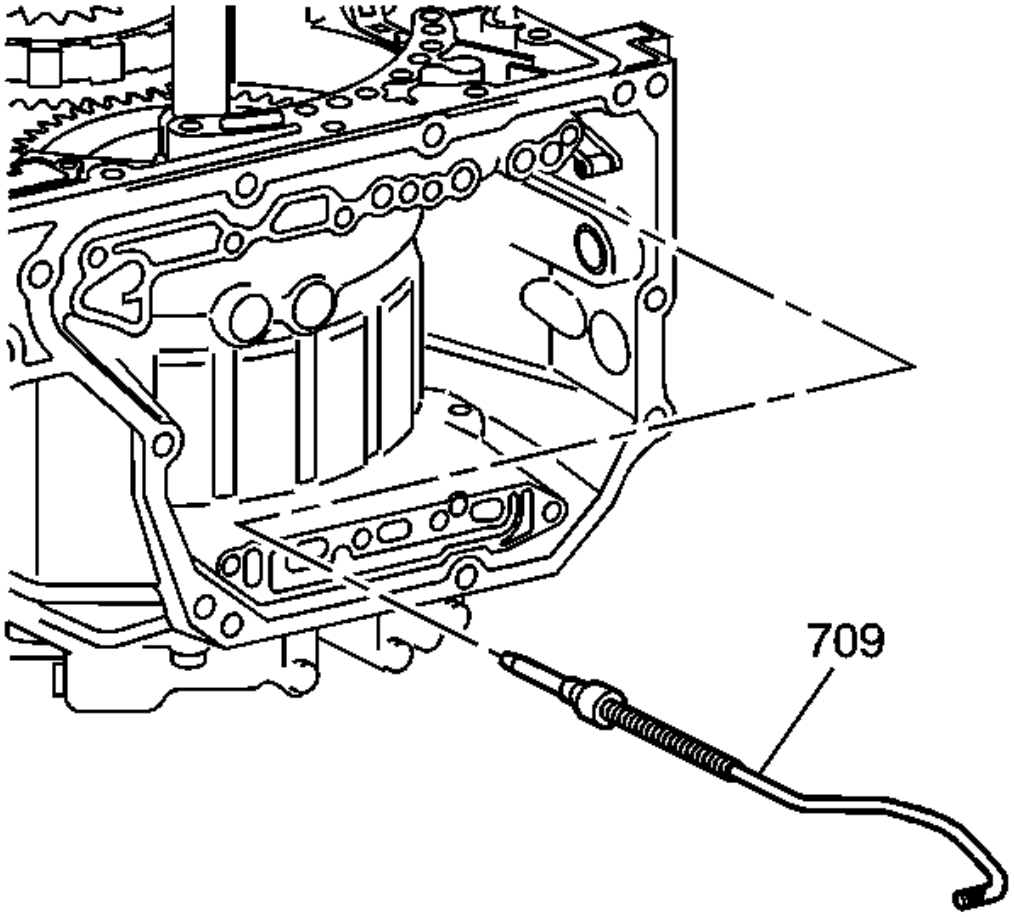


Fig. 73: Drive Motor Generator Rotor And Stator - Unit B
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Drive Motor/Generator Stator Cooling Tube Seal (Qty: 1) **Tip:** Install a NEW seal. It is not reusable.
2	Drive Motor/Generator Stator Cooling Tube Assembly (RHS Unit B)

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3	Drive Motor/Generator Stator Assembly - Unit B
4	Drive Motor/Generator Stator Cooling Tube Seal (Qty: 1) **Tip:** Install a NEW seal. It is not reusable.
5	Drive Motor/Generator Stator Cooling Tube Assembly (LHS Unit B)
6	Drive Motor/Generator Rotor Assembly - Unit B
7	Drive Motor/Generator Rotor Lube Seal **Tip:** Install a NEW seal. It is not reusable.
8	Drive Motor/Generator Stator Cooling Tube Retainer (Qty: 2)
9	Drive Motor/Generator Rotor and Stator Assembly - Unit B **WARNING:** **The generator motor weighs approximately 36 kg (80 lbs). Personal injury may result if you lift the generator motor improperly.** **Tip:** Insert electrical connector through pass through hole in case. **Special Tools:** **DT 50302:** Rotor and Stator Lifter Assembly For equivalent regional tools, refer to **Special Tools** .
10	Drive Motor/Generator Power Inverter Module Cable Assembly Seal **Tip:** Install a NEW seal. It is not reusable.
11	Drive Motor/Generator Power Inverter Module Cable Assembly - 3 Phase - B
12	Drive Motor/Generator Power Inverter Module Cable Stud M6 x 20 mm (Qty: 3) - External **CAUTION:** **Refer to Fastener Caution .** **Tighten:** 9 N.m (80 lb in)
13	Auxiliary Pump Motor Cable Retainer
14	Drive Motor/Generator Power Inverter Module Cable Housing Cover Seal **Tip:** Install a NEW seal, it is not reusable.
15	Drive Motor/Generator Stator Bolt M6 x 20 mm (Qty: 4) **Tighten:** 9 N.m (80 lb in)
16	Drive Motor/Generator Power Inverter Module Cable Connector Bolt M6 x 20 mm (Qty: 3) - Internal

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	Tighten: 9 N.m (80 lb in)

CASE COVER ASSEMBLY DISASSEMBLE

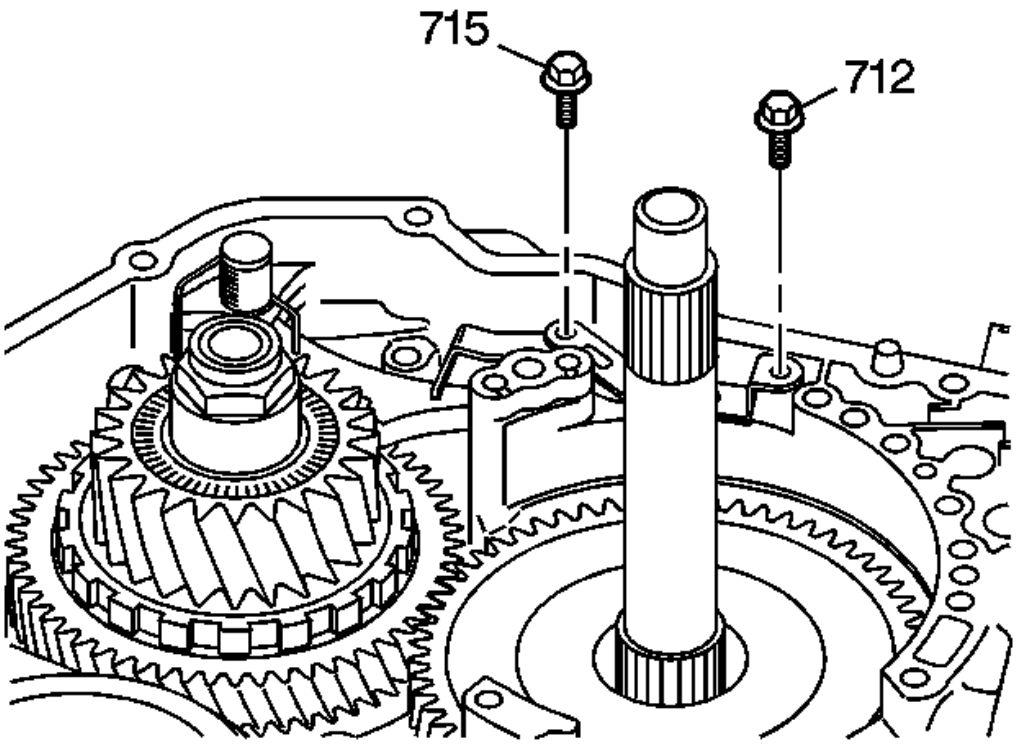


Fig. 74: Case Cover Assembly
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	A/Trans Control Wiring Harness Connector Bracket
2	A/Trans Control Wiring Harness Shield Bolt M6 x 16 mm (Qty: 3) - External
3	A/Trans Control Wiring Harness Shield
4	Generator/Drive Motor Position Sensor Switch Bolt M5 x 16 mm (Qty: 4)
5	Drive Motor/Generator Position Sensor Stator Assembly
6	Drive Motor/Generator Rotor Lube Seal Sleeve
7	Drive Motor/Generator Position Sensor Pin
8	Center Support Fluid Passage Plug

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CASE COVER ASSEMBLY ASSEMBLE

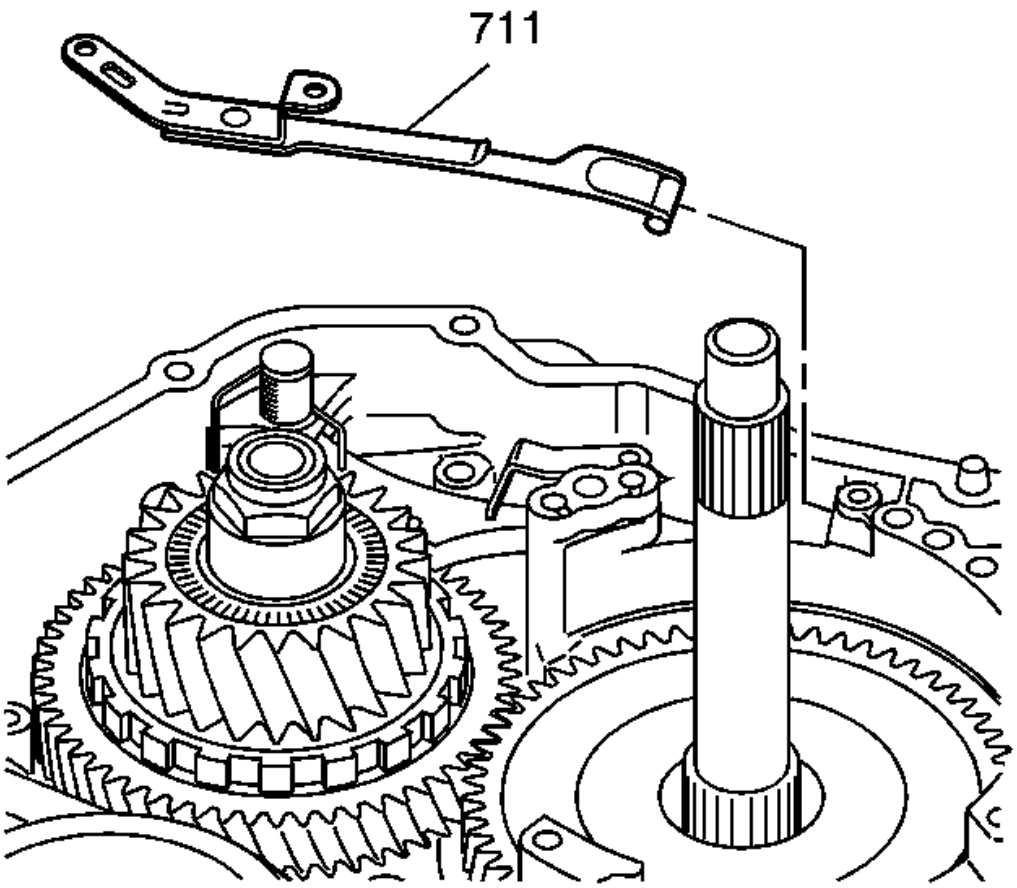


Fig. 75: Case Cover Assembly
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Clean and inspect all parts for wear or damage.	
1	Center Support Fluid Passage Plug
2	Drive Motor/Generator Position Sensor Pin
3	Drive Motor Rotor Lube Seal Sleeve
4	Drive Motor/Generator Position Sensor Stator Assembly
5	Generator/Drive Motor Position Sensor Switch Bolt M5 x 16 mm (Qty: 4) **Procedure:**

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	Tighten the bolts in sequence shown. **Tighten:** 7.25 N.m (64.2 lb in)
6	A/Trans Control Wiring Harness Shield
7	A/Trans Control Wiring Harness Shield Bolt M6 x 16 mm (Qty: 3) - External **CAUTION:** **Refer to Fastener Caution .** **Tighten:** 9 N.m (80 lb in)
8	A/Trans Control Wiring Harness Connector Bracket

CASE COVER ASSEMBLY INSTALLATION

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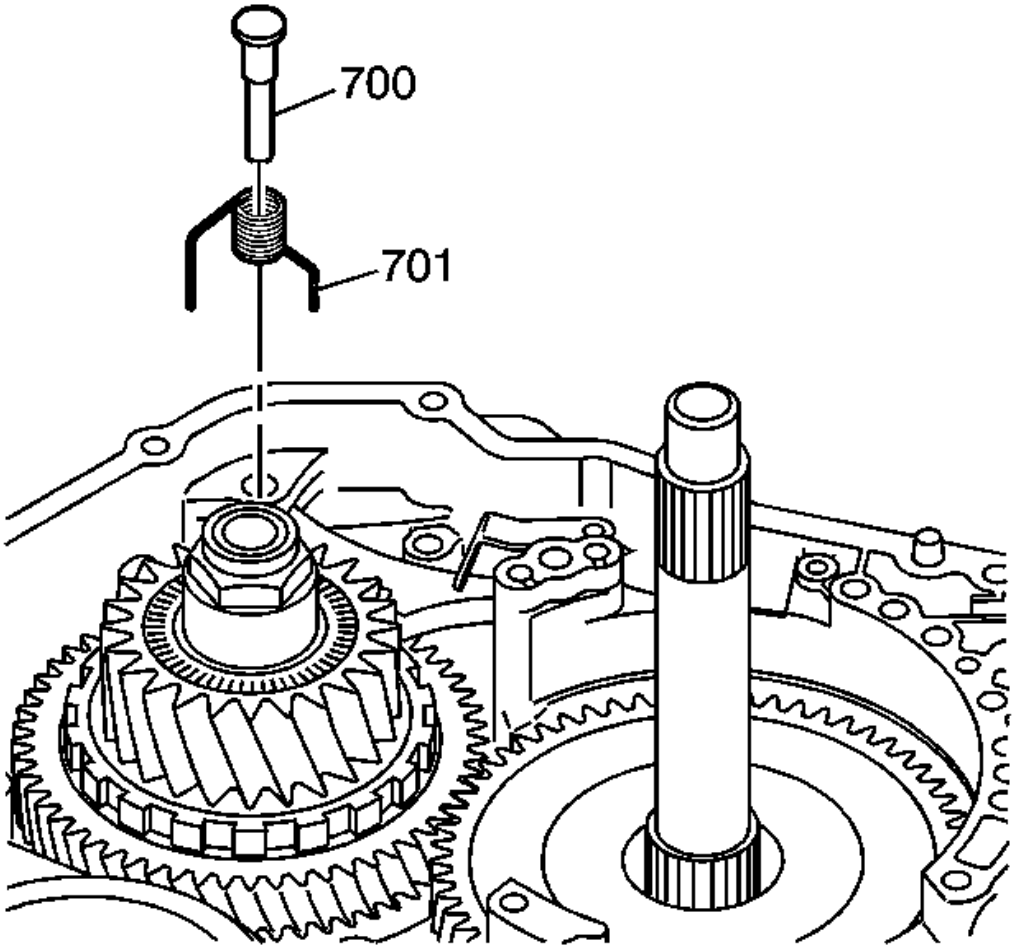


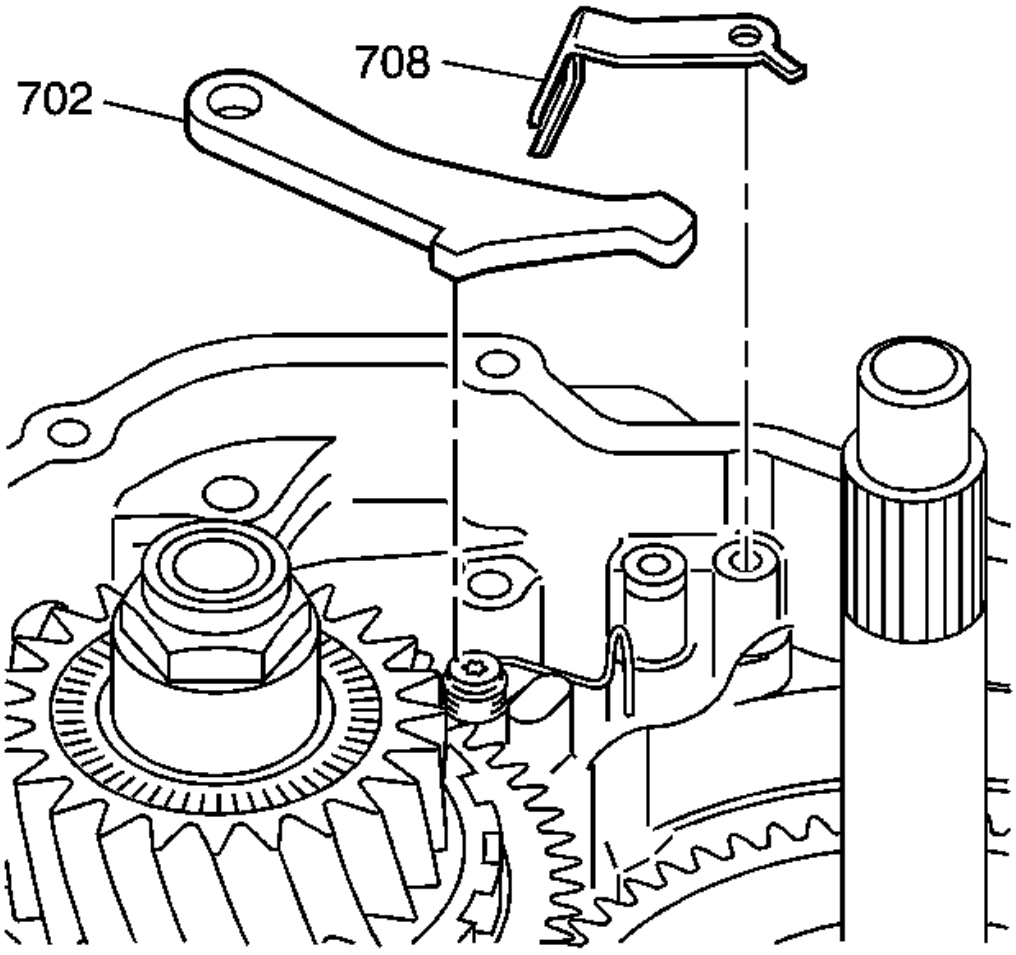
Fig. 76: Case Cover Assembly
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	A/Trans Case Cover Gasket
2	A/Trans Case Cover Assembly **Tip:** May need to align bolt holes.
3	A/Trans Case Cover Bolt M8 x 30 mm (Qty: 9) **CAUTION:** **Refer to Fastener Caution .**

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	Procedure: Tighten the bolts in sequence shown. **Tighten:** 22 N.m (16 lb ft)
4	Case Cover Stud M8 x 30 (Qty: 2) **Tighten:** 22 N.m (16 lb ft)
5	A/Trans Wiring Harness Shield Bolt M6 x 20 mm (Qty: 1) External **Tighten:** 9 N.m (80 lb in)

FRONT WHEEL DRIVE SHAFT BEARING REPLACEMENT



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Fig. 77: Front Wheel Drive Shaft Bearing And Installation Tool
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Front Wheel Drive Shaft Bearing Assembly **Special Tools** • **DT 50301:** Seal and Bearing Installer • **GE 8092:** Driver Handle For equivalent regional tools, refer to **Special Tools** .

CASE EXTENSION ASSEMBLY INSTALLATION

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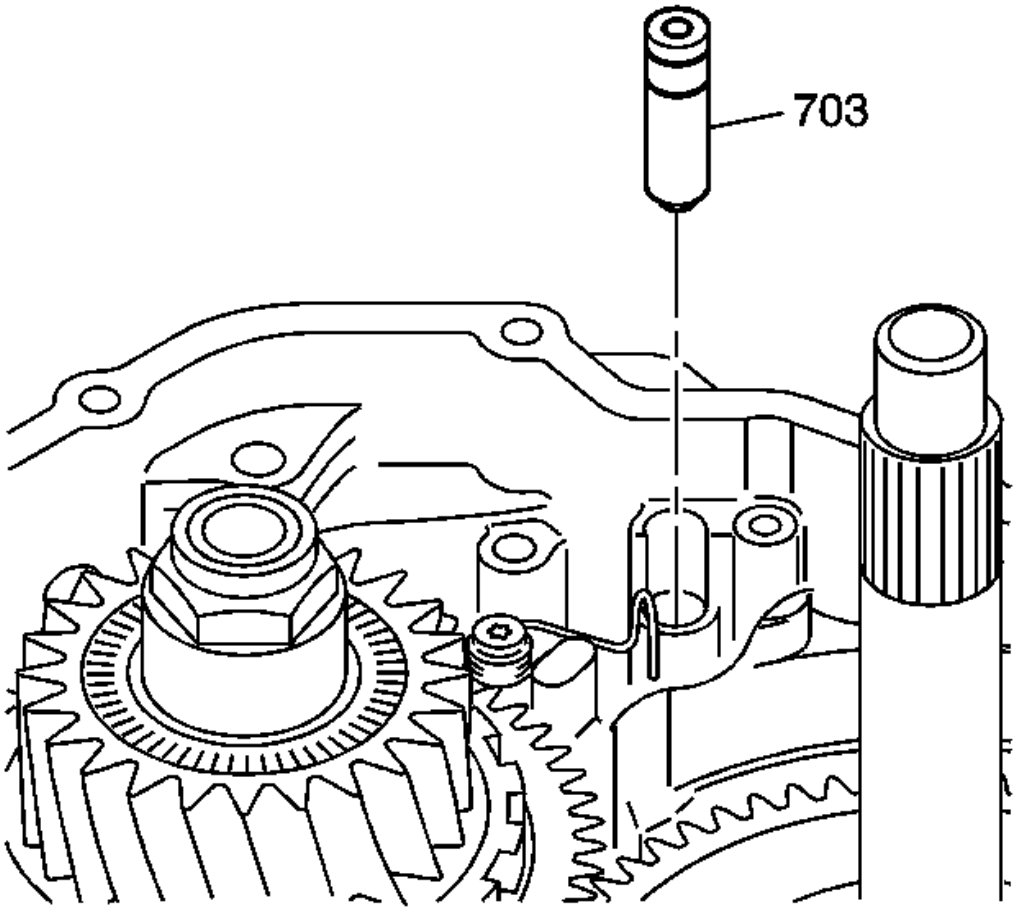


Fig. 78: Case Extension Assembly
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	A/Trans Case Extension Seal (Qty: 2) **Tip:** Install NEW seals. They are not reusable.
2	Case Extension Assembly
3	Case Extension Bolt M10 x 25 mm (Qty: 3) **Tighten:** 22 N.m (16.2 lb ft)

FRONT DIFFERENTIAL DRIVE PINION GEAR WITH TRANSFER GEAR OVERHAUL

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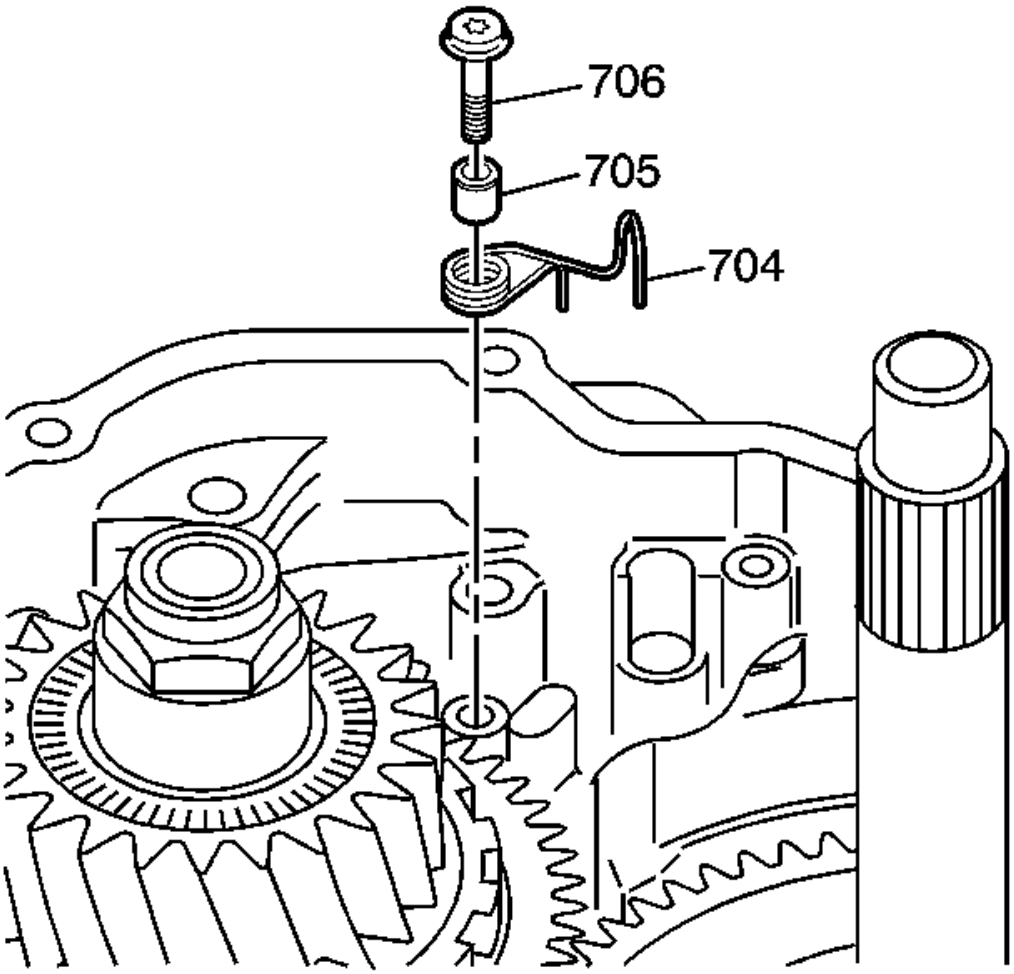


Fig. 79: Front Differential Drive Pinion Gear with Transfer Gear
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Front Differential Transfer Driven Gear Retaining Ring
2	Front Differential Transfer Driven Gear
3	Park Gear
4	Front Differential Drive Pinion Gear

FRONT DIFFERENTIAL CARRIER BEARING REPLACEMENT

Removal

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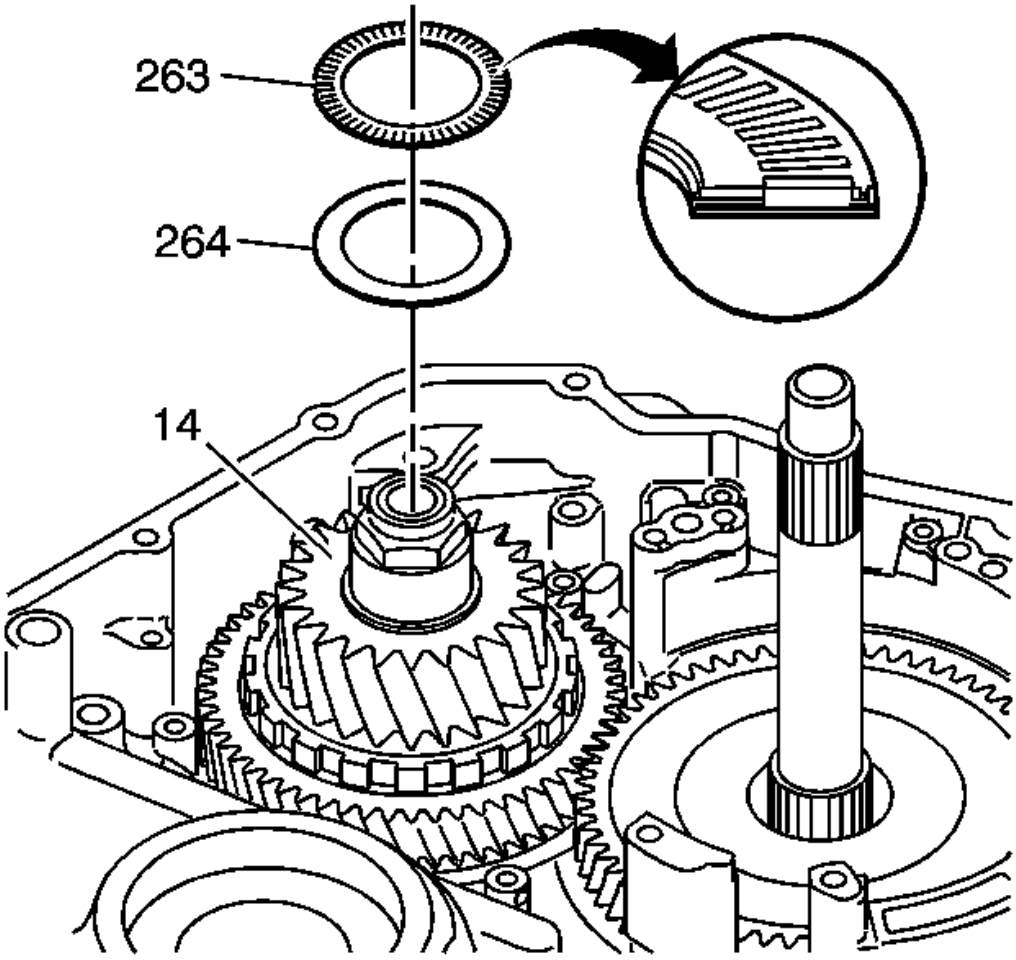


Fig. 80: Front Differential Carrier Bearing And Special Removal Tool
Courtesy of GENERAL MOTORS CORP.

Removal

Callout	Component Name
1	Front Differential Carrier Bearing Assembly (RHS) **Special Tools** • **DT-49830:** Differential Bearing Installer/Pilot • **GE 8433-1:** Puller Bar or equivalent Use with 4-5 in Bolts • **GE 22912-B:** Rear Pinion and Axle Bearing Remover

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	or equivalent For equivalent regional tools, refer to **Special Tools** .
2	Inner Race **Tip:** Ensure all 3 legs of the puller make contact with the inner race of the bearing.
3	Front Differential Carrier Bearing Assembly (LHS) **Tip:** • AWD differential may need longer bolts, 2-3/8 x 5 x 24 thread bolts. • When removing the front differential carrier bearing assembly use DT-47928-2 bearing support which is part of **DT-47928:** bearing installer. **Special Tools** • **DT-47928:** Bearing Installer • **DT-49830:** Differential Bearing Installer/Pilot • **GE 8433-1:** Puller Bar or equivalent Use with 4-5 in Bolts • **GE 22912-B:** Rear Pinion and Axle Bearing Remover or equivalent For equivalent regional tools, refer to **Special Tools** .

Installation

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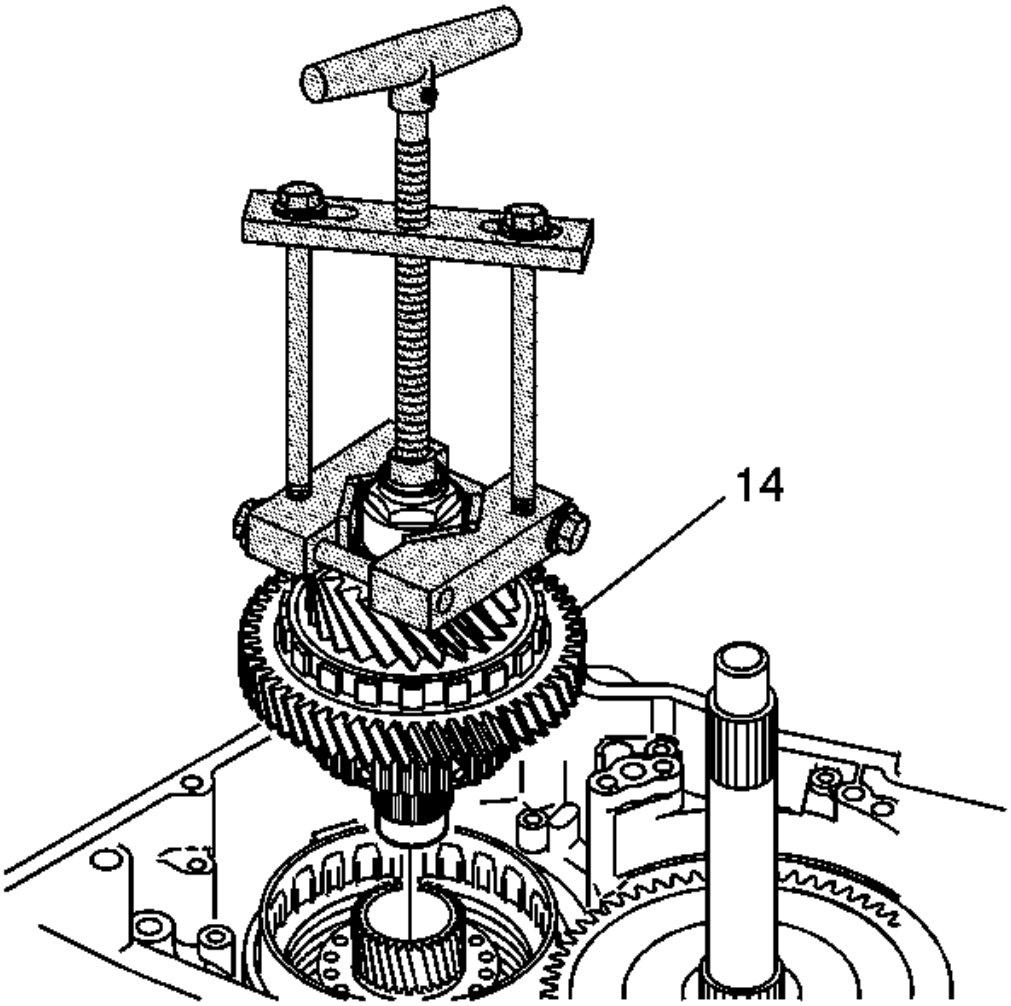


Fig. 81: Front Differential Carrier Bearing And Special Tool
Courtesy of GENERAL MOTORS CORP.

Installation

Callout	Component Name
	Front Differential Carrier Bearing Assembly (LHS) **CAUTION:** **Pressing against the bearing assembly can damage the bearing and cause premature bearing failure.**

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1	**Tip:** When installing the front differential carrier bearing assembly use DT-47928-2 bearing support which is part of **DT-47928:** bearing installer. **Special Tools** • **DT-47928:** Bearing Installer • **DT-49830:** Differential Bearing Installer/Pilot For equivalent regional tools, refer to **Special Tools** .
2	Front Differential Carrier Bearing Assembly (RHS) **CAUTION:** **Pressing against the bearing assembly can damage the bearing and cause premature bearing failure.** **Tip:** When installing the front differential carrier bearing assembly use DT-47928-2 bearing support which is part of **DT-47928:** bearing installer. **Special Tools** • **DT-47928:** Bearing Installer • **DT-49830:** Differential Bearing Installer/Pilot For equivalent regional tools, refer to **Special Tools** .

FRONT DIFFERENTIAL CARRIER CLEANING AND INSPECTION

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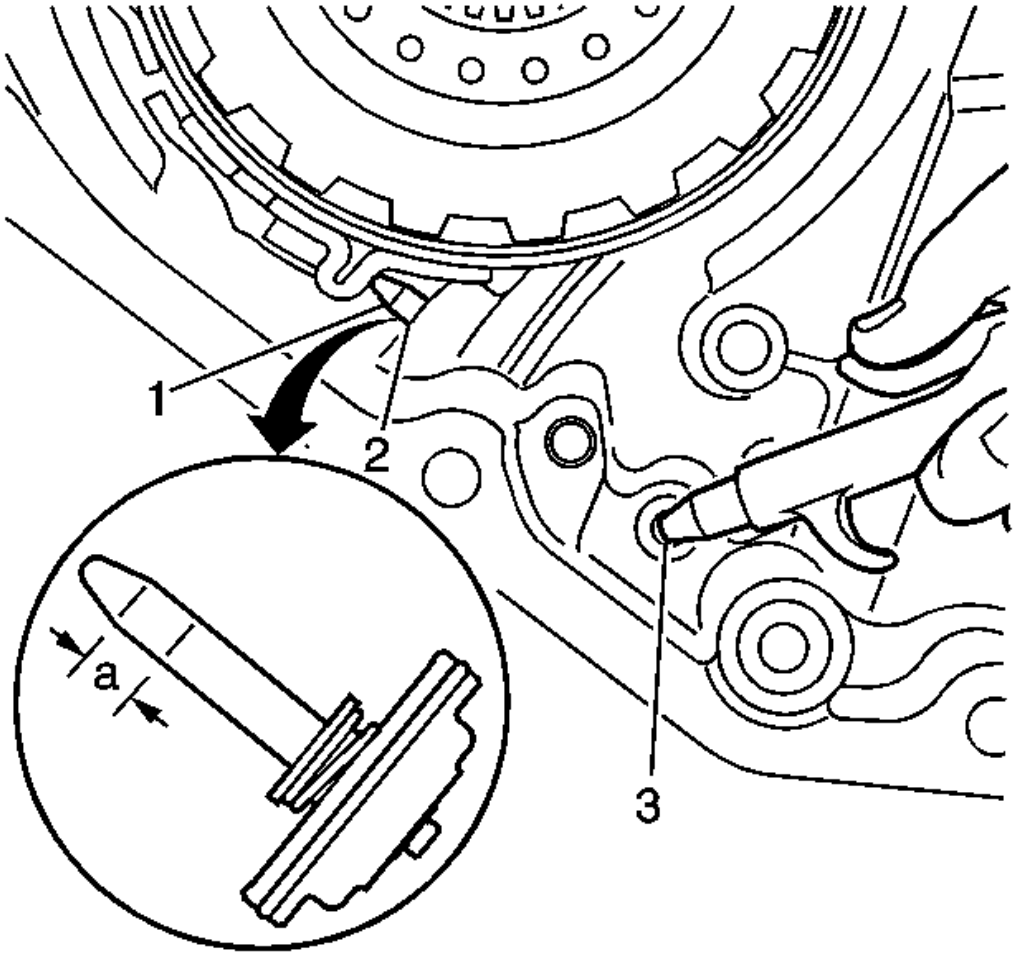


Fig. 82: Front Differential Carrier
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
CAUTION: **After cleaning the transmission components, allow to air dry. Do not use cloth or paper towels in order to dry any transmission components. Lint from the towels can cause component failure.** **CAUTION:** **Do not reuse cleaning solvents. Previously used solvents may deposit sediment which may damage the component.** **CAUTION:**	

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Keep the thrust washers with gear it was matched to. The thrust washers are selective sizes and it is difficult to identify the proper washer thickness. Improper assembly can cause premature failure of the differential assembly.

Preliminary Procedure: Clean and inspect the differential assembly, pinion gears and thrust washers for scoring, wear or damage. The differential assembly is only serviced as an assembly.

1	Differential Carrier Locator Pin **Tip:** • 3/16 in (5 mm) 7 in Punch or equivalent • Discard and use a NEW retainer.
2	Differential Pinion Gear Shaft
3	Differential Pinion Gear
4	Differential Pinion Gear Thrust Washer
5	Differential Side Gear
6	Differential Side Gear Thrust Washer

FRONT DIFFERENTIAL DRIVE PINION GEAR BEARING THRUST WASHER AND FRONT DIFFERENTIAL BEARING WASHER MEASUREMENT

Front Differential Carrier and Front Differential Drive Pinion with Transfer Gear Installation

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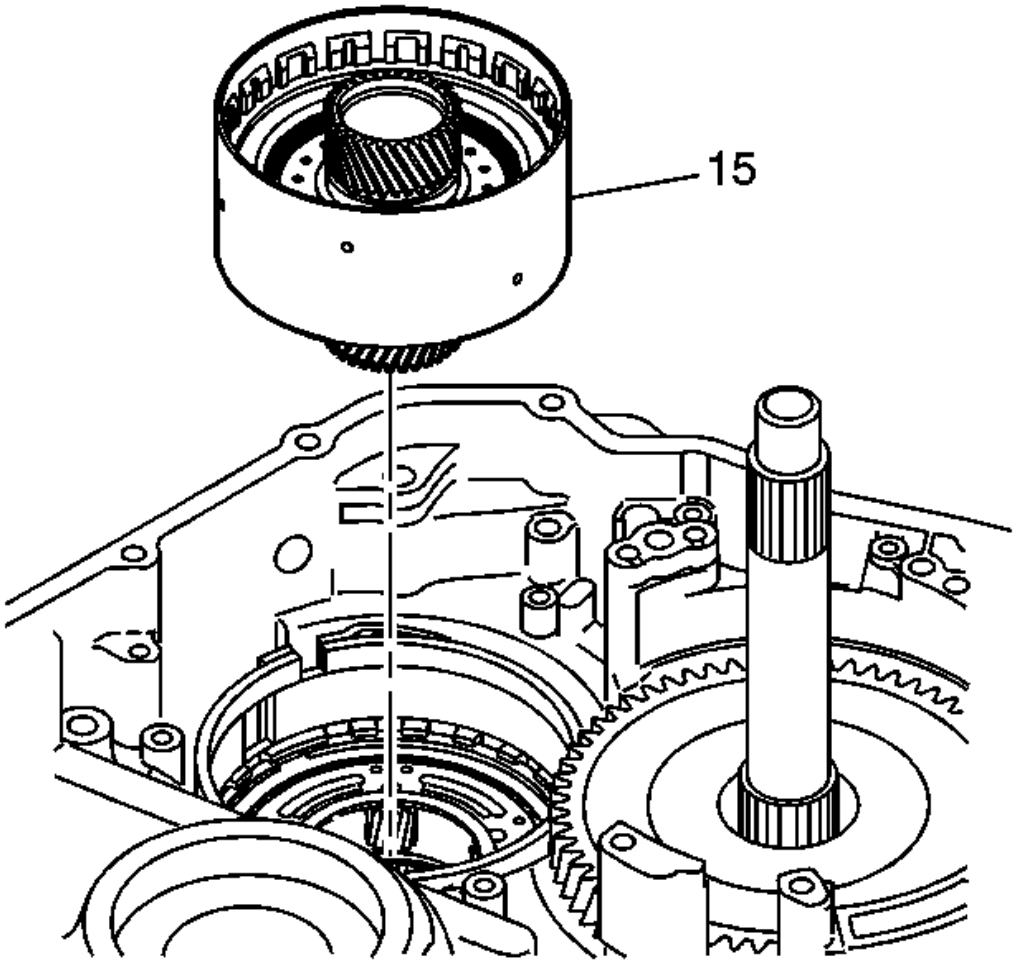


Fig. 83: Front Differential Carrier And Front Differential Drive Pinion With Transfer Gear
Courtesy of GENERAL MOTORS CORP.

Front Differential Carrier and Front Differential Drive Pinion with Transfer Gear Installation

Callout	Component Name
1	Front Differential Bearing Spacer
2	Front Drive Pinion Gear Shaft Thrust Bearing Assembly (LHS)
3	Front Differential Drive Pinion (w/Transfer Gear) Gear Assembly
4	Front Drive Pinion Gear Shaft Thrust Bearing Assembly - Selective (RHS)
5	Front Differential Carrier Assembly (FWD)

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6	Torque Dampener Housing Outer Seal

Differential Thrust Washer Gauge Installation

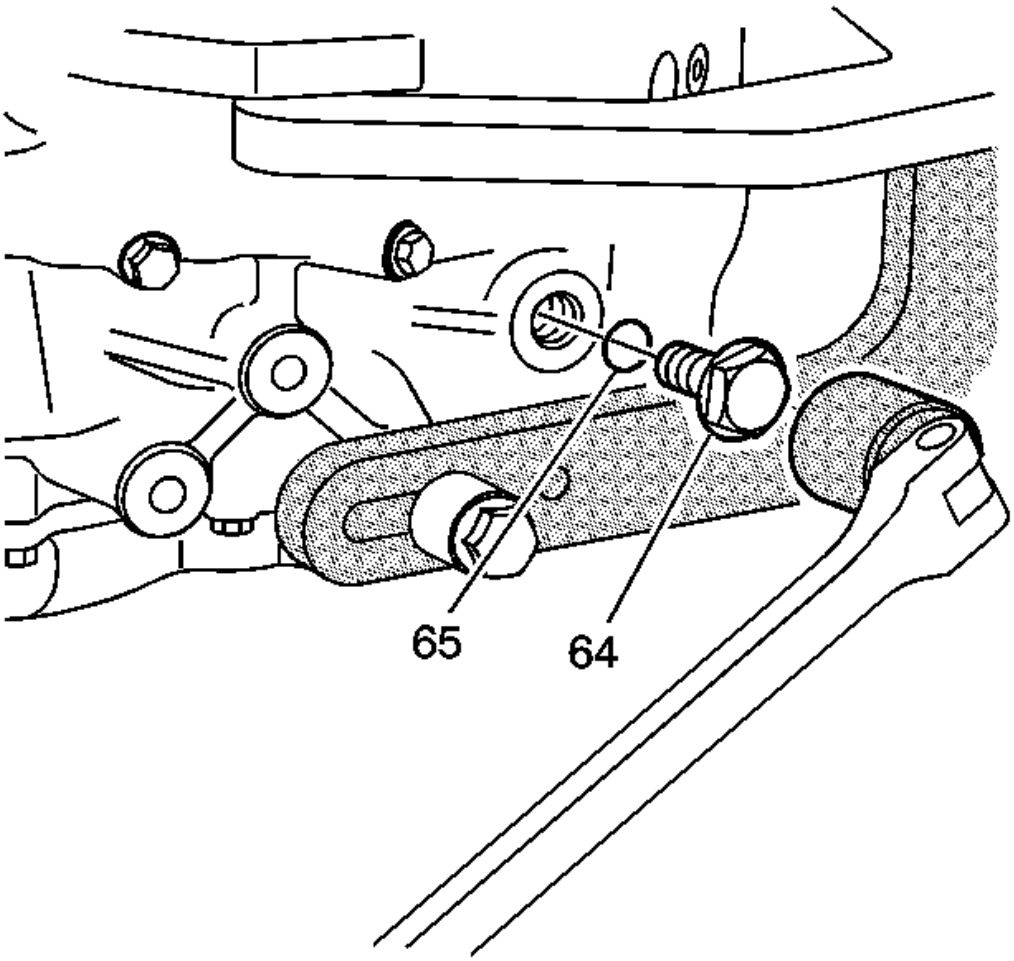


Fig. 84: Differential Thrust Washer Gauge
Courtesy of GENERAL MOTORS CORP.

Differential Thrust Washer Gauge Installation

Callout	Component Name
	Front Differential Drive Pinion Gear Roller Bearing Assembly **Tip:** After placing the bearing cup on the gear, place DT-47800-2 which is part of **DT-47800:** kit, onto the bearing cup.

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1	**Special Tools** • **DT-47800:** Thrust Washer Selection Gauge Kit • **DT-47800-10:** Thrust Washer Selection Bolts, Spacer and Shims For equivalent regional tools, refer to **Special Tools** .
2	Front Differential Drive Pinion Gear Bearing Cup **Tip:** After placing the bearing cup on the gear, place DT-47800-2 which is part of **DT-47800:** kit, onto the bearing cup. **Special Tool:** **DT-47800:** Thrust Washer Selection Gauge Kit For equivalent regional tools, refer to **Special Tools** .
3	Torque Dampener and Differential (w/Fluid Pump) Housing Assembly **Tip:** • Install 2 **DT-47800-10:** thrust washer selection bolts, spacer and shims, into a case threaded hole at approximately 180 degrees apart. • Some alignment of DT-47800-1 and 2 which is part of **DT-47800:** kit, may be required while lowering the housing onto the case. • Install DT-47800-3 which is part of **DT-47800:** kit, spacer over DT-47800-6. **Special Tools** • **DT-47800:** Thrust Washer Selection Gauge Kit • **DT-47800-10:** Thrust Washer Selection Bolts, Spacer and Shims For equivalent regional tools, refer to **Special Tools** .

Torque Sequence

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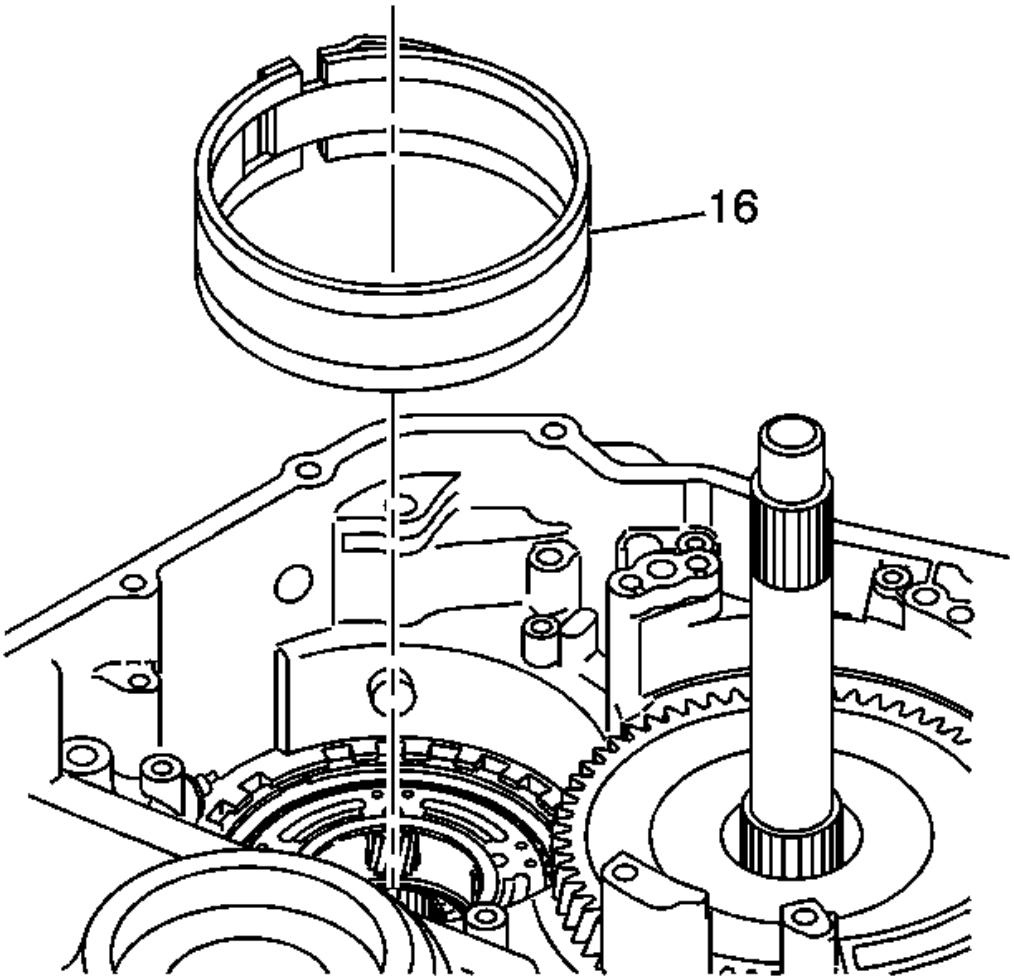


Fig. 85: Front Differential Carrier Cover Bolt Tightening Sequence
Courtesy of GENERAL MOTORS CORP.

Torque Sequence

Callout	Component Name
	Spacer Bolts M8 x 127 mm (Qty: 8) **CAUTION:** **Refer to Fastener Caution .** **Procedure** 1. Install the remaining spacers evenly at every other

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1	bolt hole. 2. Remove the **DT-47800-10:** thrust washer selection bolts, spacer and shims, guide pins and install spacer bolts in all bolt holes at spacer locations. 3. Tighten the bolts in sequence shown. **Tighten:** 30 N.m (22 lb ft) **Special Tools** • **DT-47800:** Thrust Washer Selection Gauge Kit • **DT-47800-10:** Thrust Washer Selection Bolts, Spacer and Shims For equivalent regional tools, refer to **Special Tools** .
2	Front Differential Carrier Assembly **CAUTION:** **If the bearings are not properly seated into the bearing cups, the washer selection will be inaccurate and the bearing pre-load will be set too low. Low bearing pre-load will cause premature failure of the front differential drive pinion gear.** **Tip: DT-47793:** rotating tool can be used to rotate the differential from the case side. **Special Tools:** **DT-47793:** Differential Rotating Tool For equivalent regional tools, refer to **Special Tools** .

Differential Shim Selection

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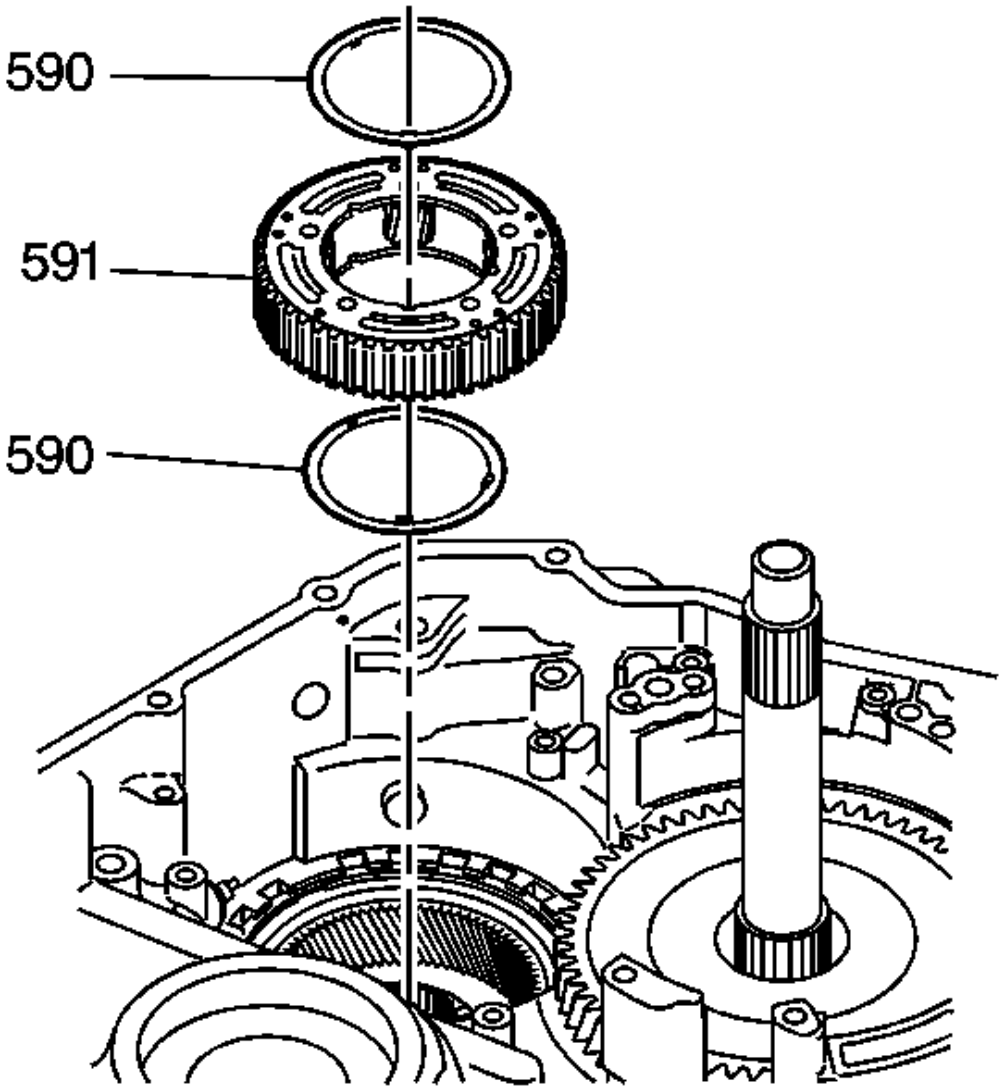


Fig. 86: Selecting Differential Shims
Courtesy of GENERAL MOTORS CORP.

Differential Shim Selection

Callout	Component Name
	Front Differential Bearing Washer **Procedure**

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1	1. Place DT-47800-7 in the gap in DT-47800-2 which are both part of **DT-47800:** kit, to determine the proper thrust washer. Choose the correct thrust washer. Refer to **Taper Bearing Preload Selective Specifications** . 2. Continue trying different sizes of DT-47800-7 which is part of **DT-47800:** kit, until the gauge will no longer fit into the gap. The correct thrust washer size is equal to the largest blade gauge that fits into the gap. 3. Match the sizer of the correct DT-47800-7 blade which is part of **DT-47800:** kit, to the color code in the thrust washer specification chart. The washer color coding is on the outside diameter of the washer. 4. The gap in DT-47800-2 which is part of **DT-47800:** kit, may not be even. Hold the top of the gauge and rotate the bottom of the gauge to even out the gap. Take two gap measurements 180 degrees apart. Average the two measurements and select the thrust washer that is closest to the average. 5. The washer color coding is on the outside diameter of the washer. **Special Tools:** **DT-47800:** Thrust Washer Selective Gauge Kit For equivalent regional tools, refer to **Special Tools** .
2	Front Differential Drive Pinion Gear Bearing Thrust Washer **Procedure** 1. Place DT-47800-7 in the gap in DT-47800-1 which are both part of **DT-47800:** kit, to determine the proper thrust washer. Choose the correct thrust washer. Refer to **Taper Bearing Preload Selective Specifications** . 2. Continue trying different sizes of DT-47800-7 which is part of **DT-47800:** kit, until the gauge will no longer fit into the gap. The correct thrust washer size is equal to the largest blade gauge that fits into the gap. 3. Match the sizer of the correct DT-47800-7 blade which is part of **DT-47800:** kit, to the color code in the thrust washer specification chart. The washer color coding is on the outside diameter of the washer. 4. The gap in DT-47800-1 which is part of **DT-47800:** kit, may not be even. Hold the top of the gauge and rotate the bottom of the gauge to even out the gap. Take two gap measurements 180 degrees apart. Average the two

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	measurements and select the thrust washer that is closest to the average. 5. The washer color coding is on the outside diameter of the washer. **Special Tools:** **DT-47800:** Thrust Washer Selection Gauge Kit For equivalent regional tools, refer to **Special Tools** .
3	Torque Dampener and Differential (w/Fluid Pump) Housing Assembly **Procedure** 1. Remove the DT-47800-3 which is part of **DT-47800:** kit, bolts and spacers. 2. Remove the torque dampener housing. 3. Remove the DT-47800-1 and DT-47800-2 which are both part of **DT-47800:** kit. 4. Remove the torque dampener housing seal. 5. Remove the pinion gear and differential bearing cups. 6. Install the bearing cups and thrust washers into the torque dampener housing per the replacement procedures. Refer to **Front Differential Drive Pinion Gear Bearing Cup Removal - Torque Dampener Side** and **Front Differential Drive Pinion Gear Roller Bearing and Lubricant Dam Replacement**. **Tip:** DT-47800-1 and DT-47800-2 which are both part of **DT-47800:** kit, may stick in the torque dampener housing. Be careful not to drop the gauges. **Special Tool:** **DT-47800:** Thrust Washer Selection Gauge Kit For equivalent regional tools, refer to **Special Tools** .

FRONT DIFFERENTIAL DRIVE PINION GEAR BEARING CUP INSTALLATION - TORQUE DAMPENER SIDE

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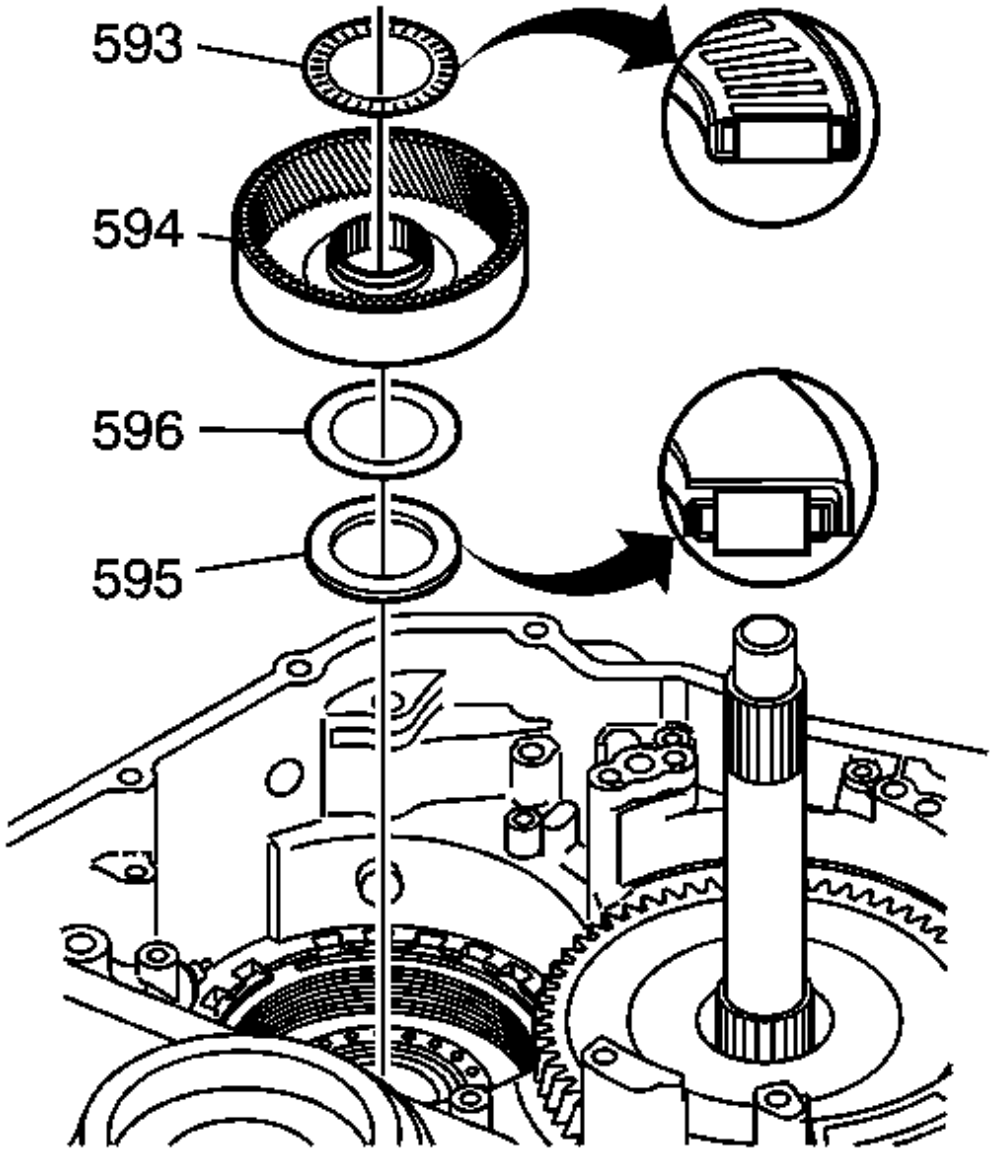


Fig. 87: Front Differential Drive Pinion Gear Bearing Cup - Torque Dampener Side
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedures • Install the correct differential bearing washer as determined by the thrust washer measurement	

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procedure. Refer to **Front Differential Drive Pinion Gear Bearing Thrust Washer and Front Differential Bearing Washer Measurement**. • Do not install the bearing cup until after the selective washer measurement has been performed. Refer to **Front Differential Drive Pinion Gear Bearing Thrust Washer and Front Differential Bearing Washer Measurement**.	
1	Front Differential Bearing Washer - Selective
2	Front Differential Drive Pinion Gear Bearing Cup **CAUTION:** **Support the back side of the torque dampener housing while installing the bearing cup. Install the bearing cup until it stops moving. Applying excessive pressure to the bearing cup once it is seated could cause damage to the torque dampener housing casting.** **Special Tools** • **DT-49263:** Bearing Cup Installer • **GE 8092:** Driver Handle For equivalent regional tools, refer to **Special Tools** .

FRONT DIFFERENTIAL DRIVE PINION GEAR ROLLER BEARING AND LUBRICANT DAM INSTALLATION - TORQUE DAMPENER SIDE

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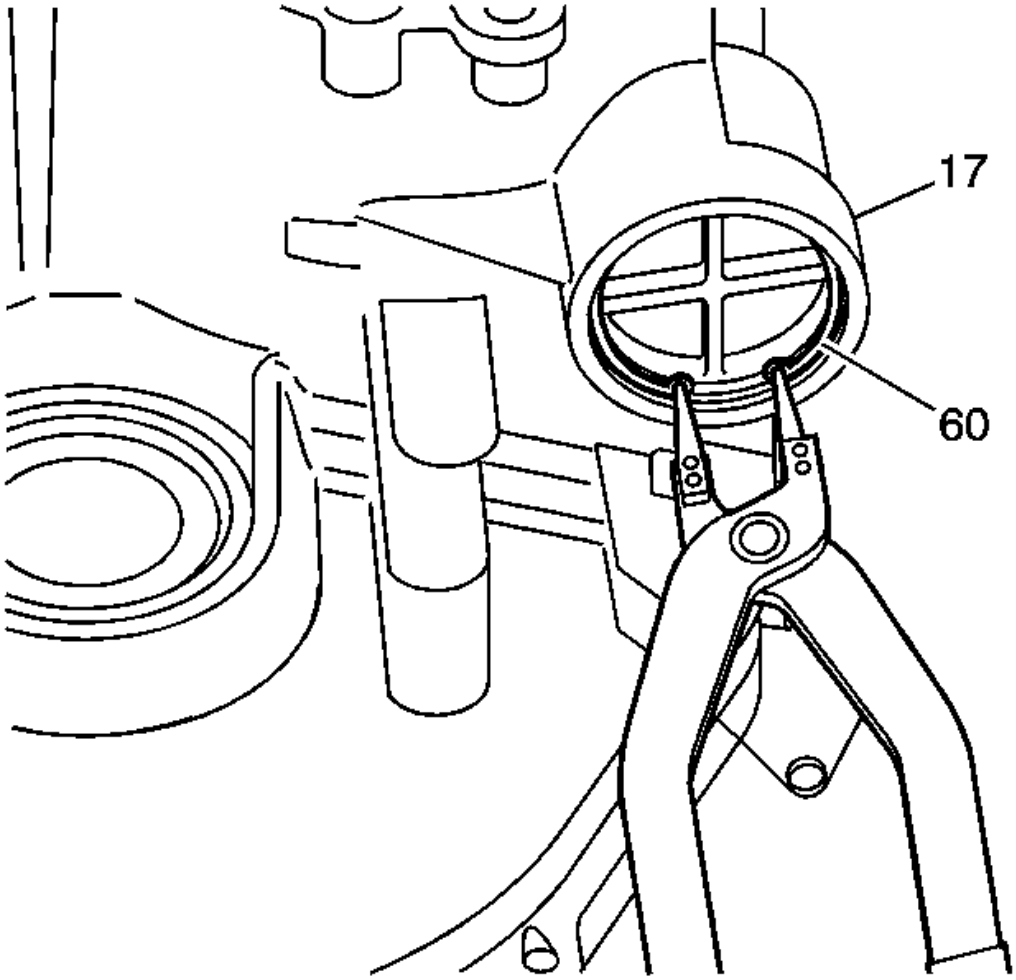


Fig. 88: Front Differential Drive Pinion Gear Roller Bearing And Lubricant Dam With Special Tools - Torque Dampener Side
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Front Differential Drive Pinion Gear Lube Dam **Special Tools** • **DT-46630:** Lube Dam Installer • **GE 8092:** Driver Handle or Equivalent

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	For equivalent regional tools, refer to **Special Tools** .
2	Front Differential Drive Pinion Gear Roller Bearing Assembly **Tip:** Use arbor press to aid installation. **Special Tools** • **DT-49229:** Transfer Shaft Bearing Installer • **GE 8092:** Driver Handle or Equivalent For equivalent regional tools, refer to **Special Tools** .

FRONT DIFFERENTIAL DRIVE PINION GEAR WITH TRANSFER GEAR INSTALLATION

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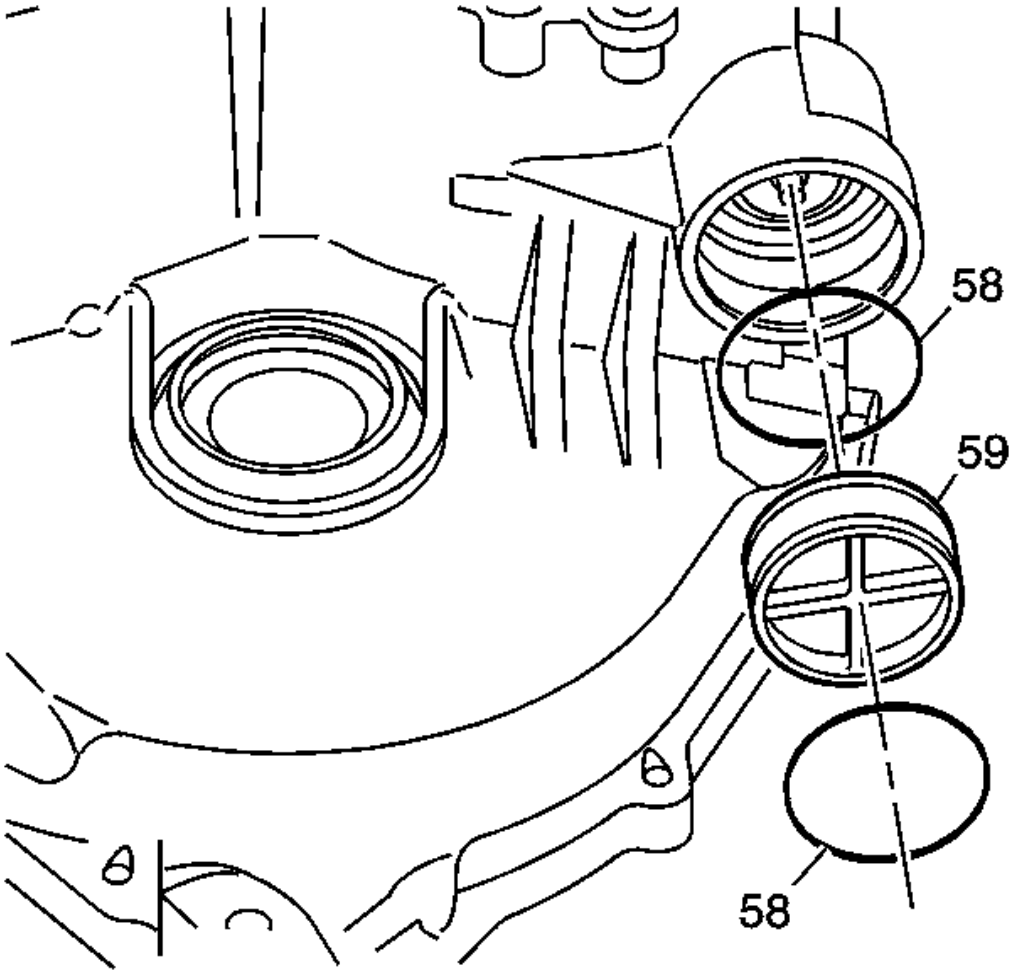


Fig. 89: Front Differential Drive Pinion Gear with Transfer Gear
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Front Differential Bearing Spacer
2	Front Drive Pinion Gear Shaft Thrust Bearing Assembly (LHS)
3	Front Differential Drive Pinion Gear Bearing Thrust Washer Assembly - Selective **Procedure:** For selective washer procedure refer to **Front Differential Drive Pinion Gear Bearing Thrust Washer and Front Differential Bearing Washer**

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	Measurement.
4	Front Differential Drive Pinion (w/Transfer Gear) Gear Assembly
5	Front Differential Drive Pinion Gear Bearing Thrust Washer - Selective (RHS) **Procedure:** For selective washer procedure refer to **Front Differential Drive Pinion Gear Bearing Thrust Washer and Front Differential Bearing Washer Measurement**.
6	Front Drive Pinion Gear Shaft Thrust Bearing Assembly - Selective (RHS) **Procedure:** For selective bearing procedure refer to **Front Differential Drive Pinion Gear Bearing Thrust Washer and Front Differential Bearing Washer Measurement**.
7	Front Differential Transfer Drive Gear Fluid Passage Tube Assembly

PARK PAWL AND MANUAL SHIFT SHAFT INSTALLATION

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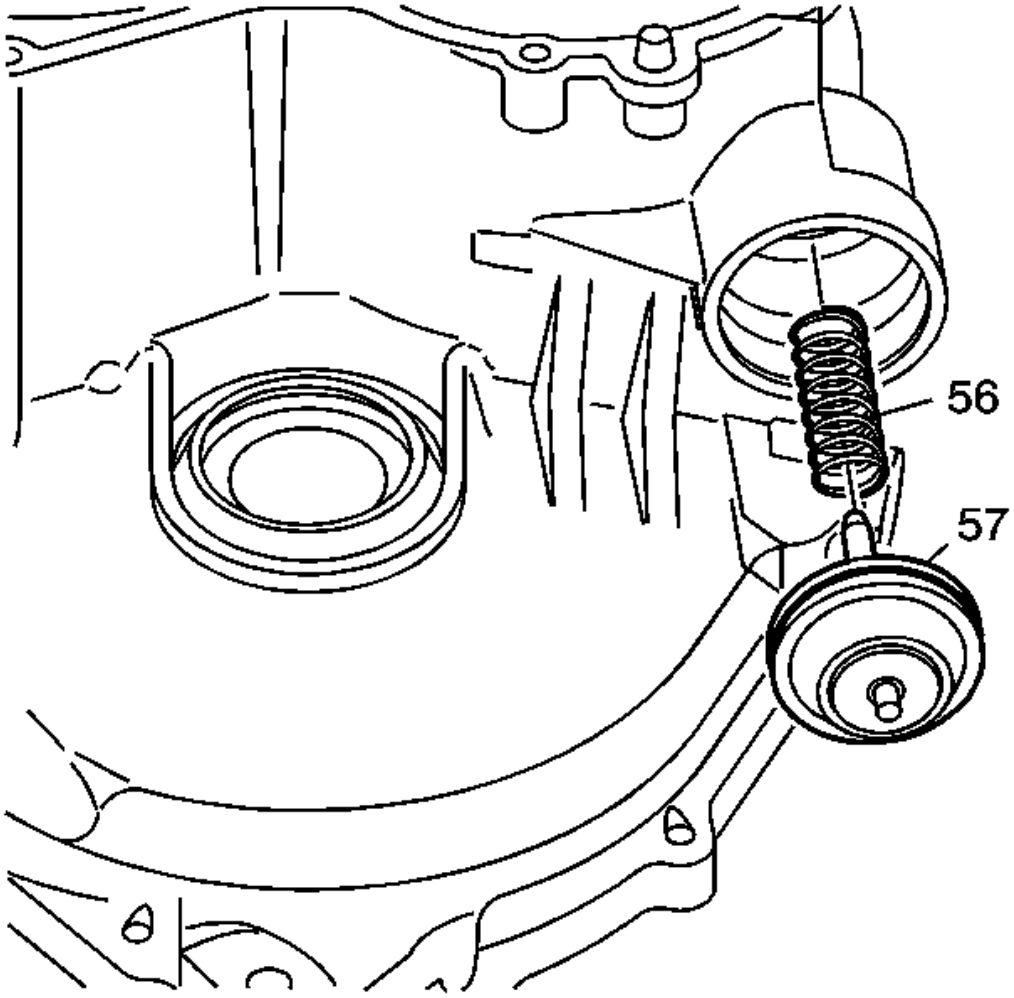


Fig. 90: Park Pawl and Manual Shift
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Manual Shaft Detent Lever Assembly
2	Park Pawl Actuator Assembly
3	Manual Shift Shaft
4	Manual Shift Shaft Detent Lever Hub Pin
5	Manual Shift Shaft Pin
6	Park Pawl
7	Park Pawl Spring

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8	Park Pawl Shaft
9	Park Pawl Actuator Guide
10	Park Pawl Actuator Guide Pin (Qty: 2)
11	Park Pawl Actuator Bracket
12	Park Pawl Actuator Bolt M6 x 20 mm (Qty: 2) **CAUTION:** **Refer to Fastener Caution .** **Tighten:** 9 N.m (80 lb in)
13	Wiring Harness Conduit Bracket

MANUAL SHIFT SHAFT SEAL INSTALLATION

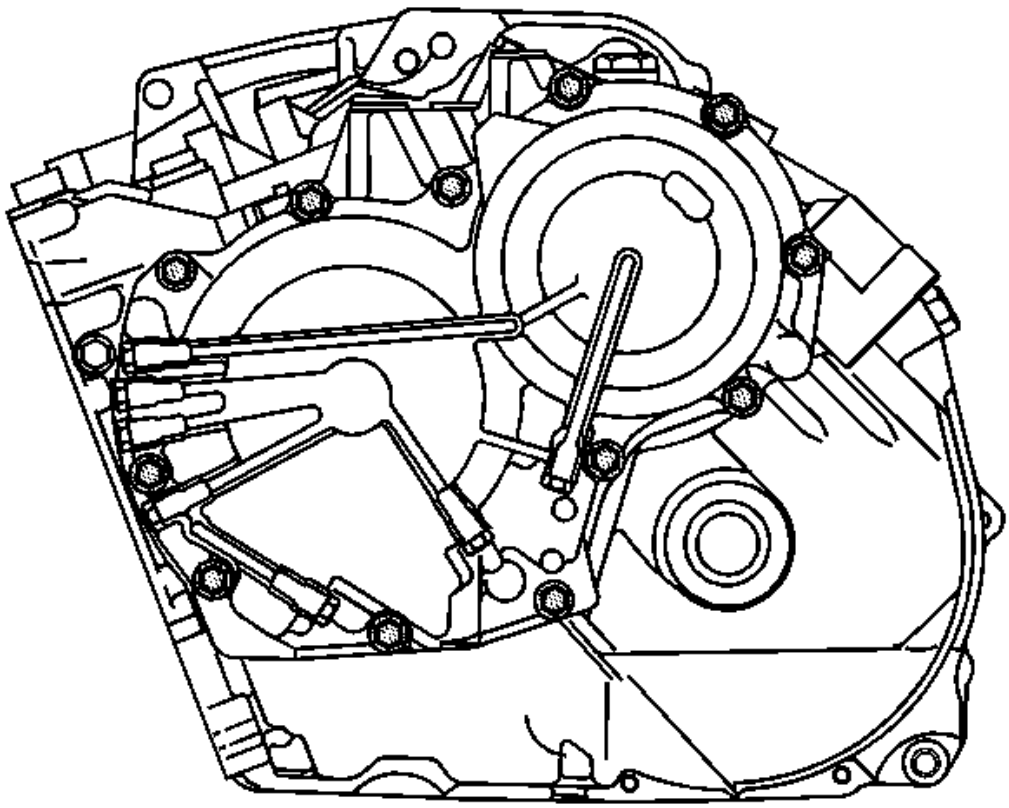


Fig. 91: Manual Shift Shaft Seal
Courtesy of GENERAL MOTORS CORP.

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Callout	Component Name
1	Manual Shift Shaft Seal **Special Tools:** **DT-49101:** Seal Installer For equivalent regional tools, refer to **Special Tools** .

AUTOMATIC TRANSMISSION WIRING HARNESS AND OUTPUT SPEED SENSOR INSTALLATION

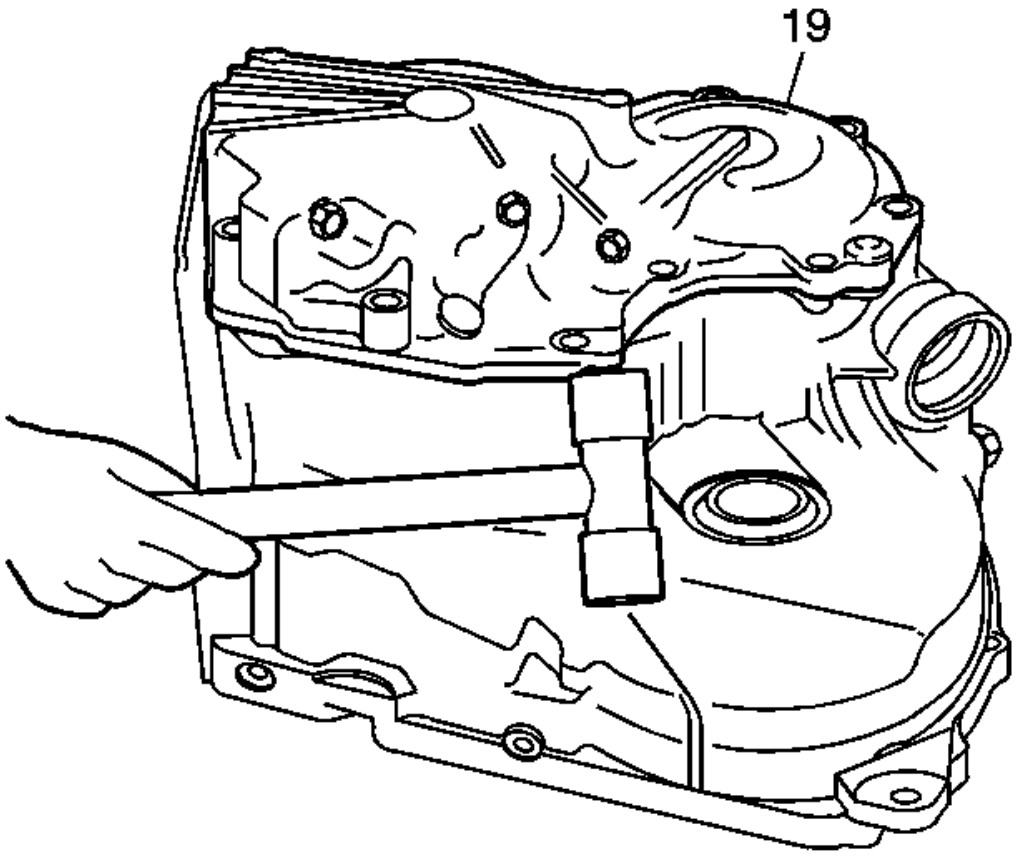


Fig. 92: Automatic Transmission Wiring Harness And Output Speed Sensor
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	A/Trans Output Speed Sensor Assembly
	A/Trans Output Speed Sensor Bolt M6 x 30 mm (Qty:

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2	1) **CAUTION:** **Use the correct fastener in the correct location. Replacement fasteners must be the correct part number for that application. Fasteners requiring replacement or fasteners requiring the use of thread locking compound or sealant are identified in the service procedure. Do not use paints, lubricants, or corrosion inhibitors on fasteners or fastener joint surfaces unless specified. These coatings affect fastener torque and joint clamping force and may damage the fastener. Use the correct tightening sequence and specifications when installing fasteners in order to avoid damage to parts and systems.** **Tighten:** 9 N.m (80 lb in)
3	Front Differential Carrier Lube Pipe Seal **Tip:** Install a NEW seal. It is not reusable.
4	Front Differential Carrier Lube Pipe
5	Front Differential Carrier Lube Pipe Bolt M5 x 16 mm (Qty: 1) **Tip:** Install a NEW seal. It is not reusable. **Tighten:** 7.25 N.m (64.2 lb in)
6	Wiring Connector Seal
7	A/Trans Wiring Harness Assembly

DRIVE MOTOR GENERATOR ROTOR AND STATOR INSTALLATION - UNIT A

Drive Motor Generator Stator Cooling Tubes Replacement

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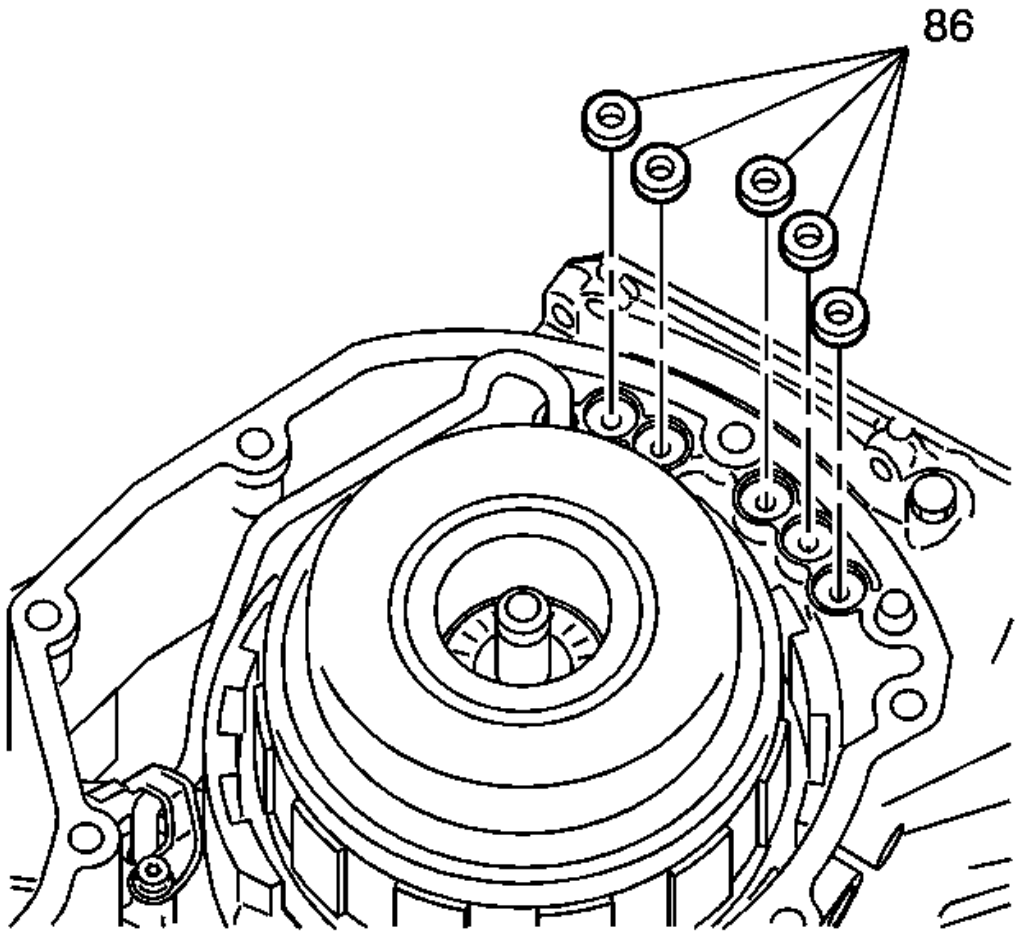


Fig. 93: Drive Motor Generator Stator Cooling Tubes
Courtesy of GENERAL MOTORS CORP.

Drive Motor Generator Stator Cooling Tubes Replacement

Callout	Component Name
1	Generator/Drive Motor Stator Cooling Tube Assembly (RHS) - Unit A
2	Drive Motor/Generator Stator Cooling Tube Seal (Qty: 2) **Tip:** Install a NEW seal. It is not reusable.
3	Generator/Drive Motor Rotor Assembly - Unit A
4	Generator/Drive Motor Stator Cooling Tube Assembly (LHS) - Unit A

Rotor And Stator Installation

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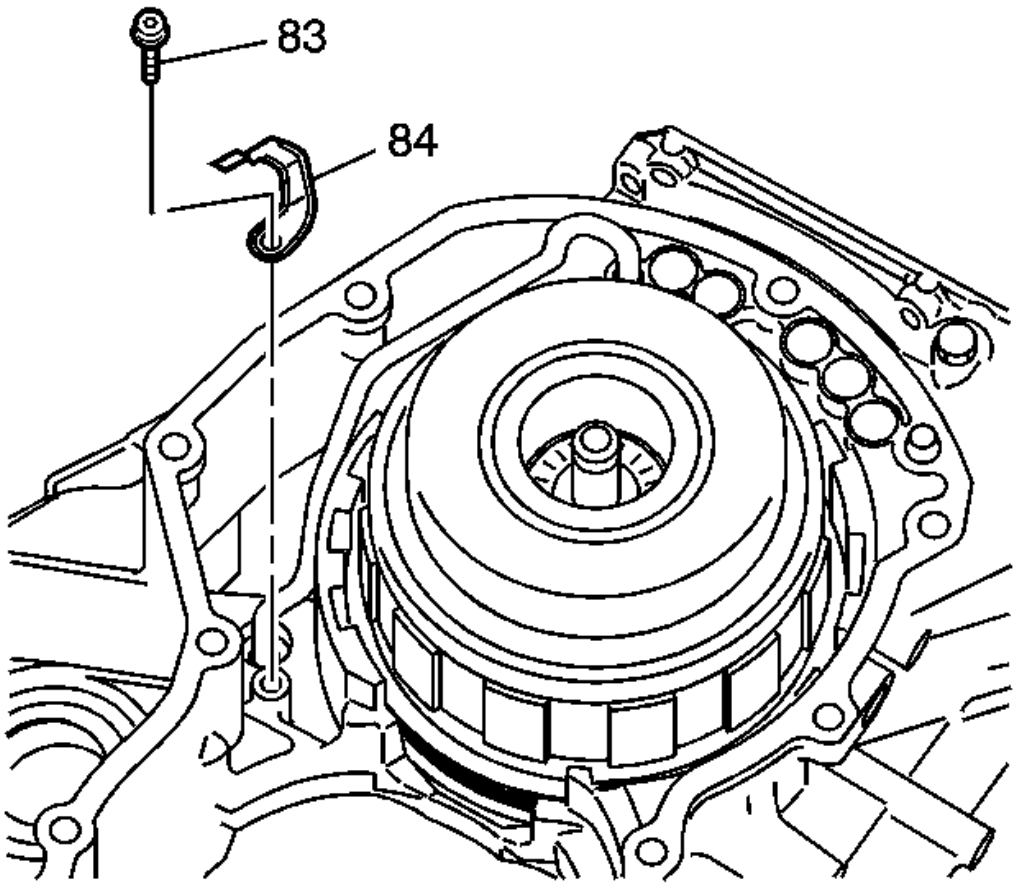


Fig. 94: Rotor And Stator
Courtesy of GENERAL MOTORS CORP.

Rotor and Stator Installation

Callout	Component Name
1	Generator/Drive Motor Rotor and Stator Assembly - Unit A **WARNING:** **The generator motor weighs approximately 23 kg (50 lbs). Personal injury may result if you lift the generator motor improperly.** **Tip:** Attach the temperature sensor connector.
	Drive Motor/Generator Stator Bolt M6 x 20 mm (Qty: 4)

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2	**CAUTION:** **Refer to Fastener Caution .** **Tighten:** 9 N.m (80 lb in)
3	Drive Motor/Generator Power Inverter Module Cable Housing Cover Seal **Tip:** Install a NEW seal, it is not reusable.
4	Drive Motor/Generator Power Inverter Module Cable Assembly - 3 Phase - A
5	Drive Motor/Generator Power Inverter Module Cable Stud M6 x 20 mm (Qty: 3) - External **Tighten:** 9 N.m (80 lb in)
6	Auxiliary Pump Motor Cable Retainer
7	Drive Motor/Generator Power Inverter Module Cable Connector Bolt M6 x 25 mm (Qty: 3) - Internal **Tighten:** 9 N.m (80 lb in)
8	Drive Motor Power Inverter Module Cable Connector Bolt Seal (Qty: 2) **Tip:** Install a NEW seal, it is not reusable.
9	High Voltage Cover to Controller Retaining Bolt

INPUT CLUTCH HUB AND SHAFT INSTALLATION

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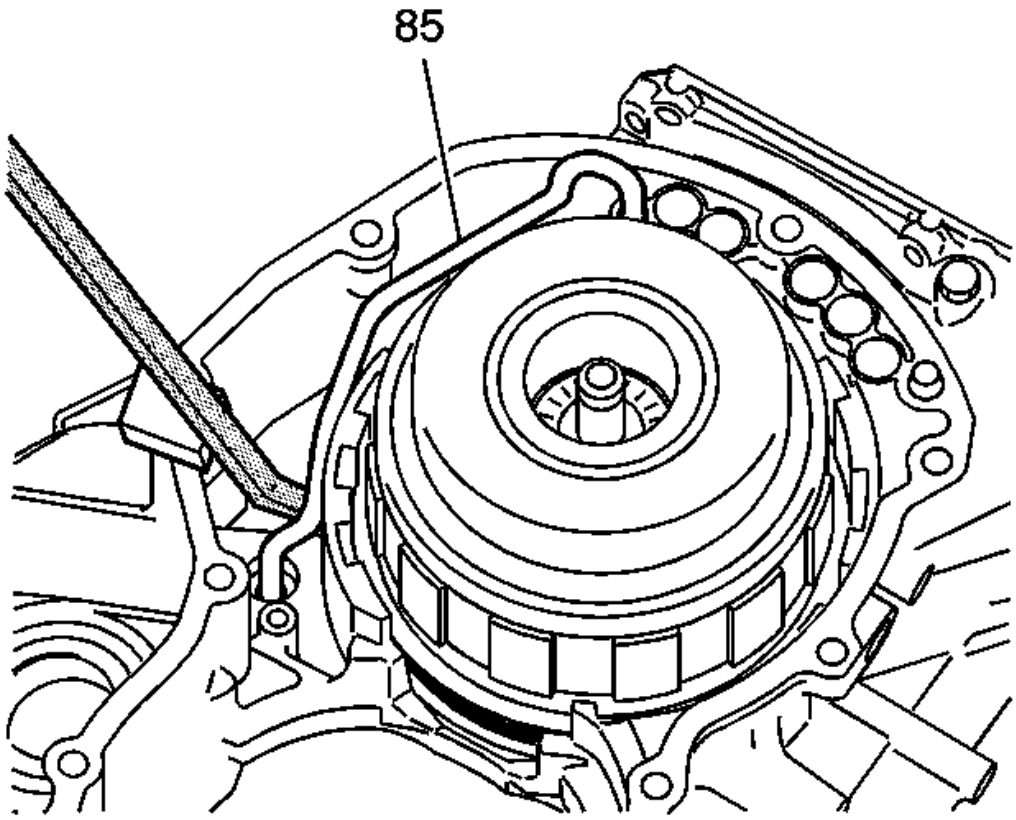


Fig. 95: Input Clutch Hub And Shaft
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Input Clutch Hub Shaft
2	Generator/Drive Motor Rotor Hub Shaft
3	Input Shaft Retainer
4	Input Clutch Hub Shaft Assembly
5	Input Clutch Hub
6	Input Carrier Thrust Bearing Assembly

1-3-REVERSE CLUTCH DISASSEMBLE

1-3 Reverse Clutch (w/Input Shaft) Housing Disassemble

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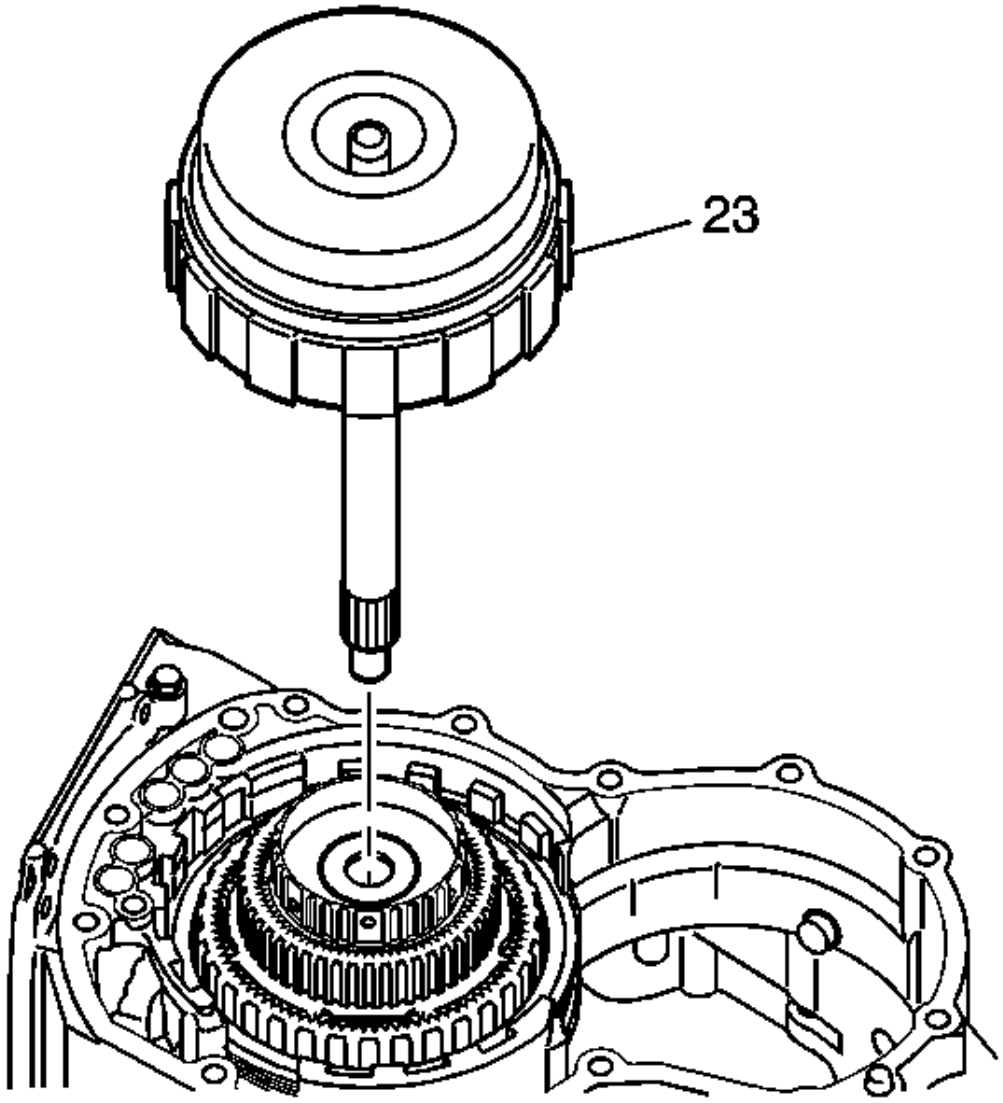


Fig. 96: 1-3 Reverse Clutch (w/Input Shaft) Housing
Courtesy of GENERAL MOTORS CORP.

1-3 Reverse Clutch (w/Input Shaft) Housing Disassemble

Callout	Component Name
1	1-3 Reverse Clutch Backing Plate Retaining Ring - Selective **Tip:** Discard this retaining ring. It is not reusable.
2	1-3 Reverse Clutch Backing Plate

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3	1-3 Reverse Clutch Plate Assembly - Friction (Qty: 3)
4	1-3 Reverse Clutch Plate (Qty: 3)

1-3 Reverse Clutch Piston and Spring Disassemble

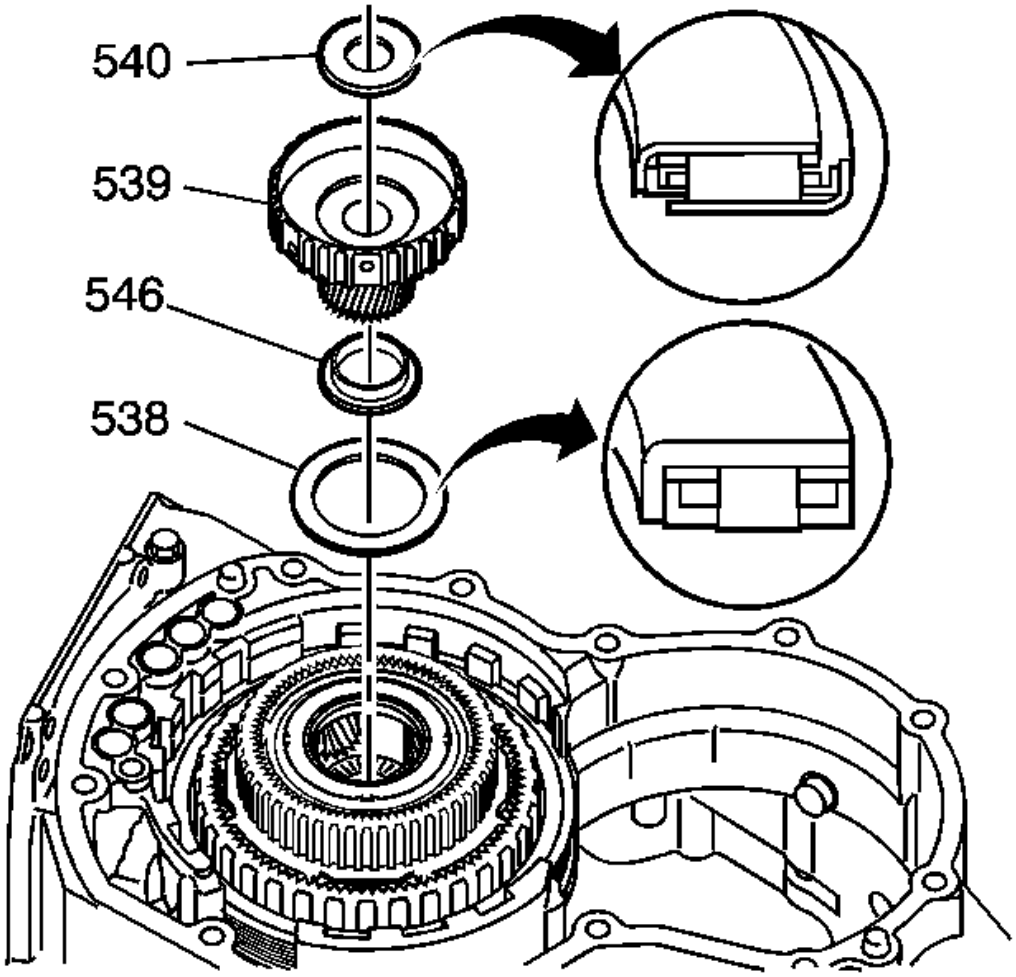


Fig. 97: 1-3 Reverse Clutch Piston And Spring
Courtesy of GENERAL MOTORS CORP.

1-3 Reverse Clutch Piston and Spring Disassemble

Callout	Component Name
	1-3 Reverse Clutch Spring Retaining Ring **Tip:** Discard this retaining ring. It is not reusable.

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1	**Special Tools:** **DT-47693-2:** Compressor For equivalent regional tools, refer to **Special Tools** .
2	1-3 Reverse Clutch Spring
3	1-3 Reverse Clutch Piston
4	1-3 Reverse Clutch Housing Ball Valve
5	Input Shaft Seals (Qty: 2) **Tip:** Discard seals, they are not reusable.
6	Input Shaft Seal (Qty: 2) **Tip:** Discard seals, they are not reusable.

INPUT SHAFT SEAL REPLACEMENT

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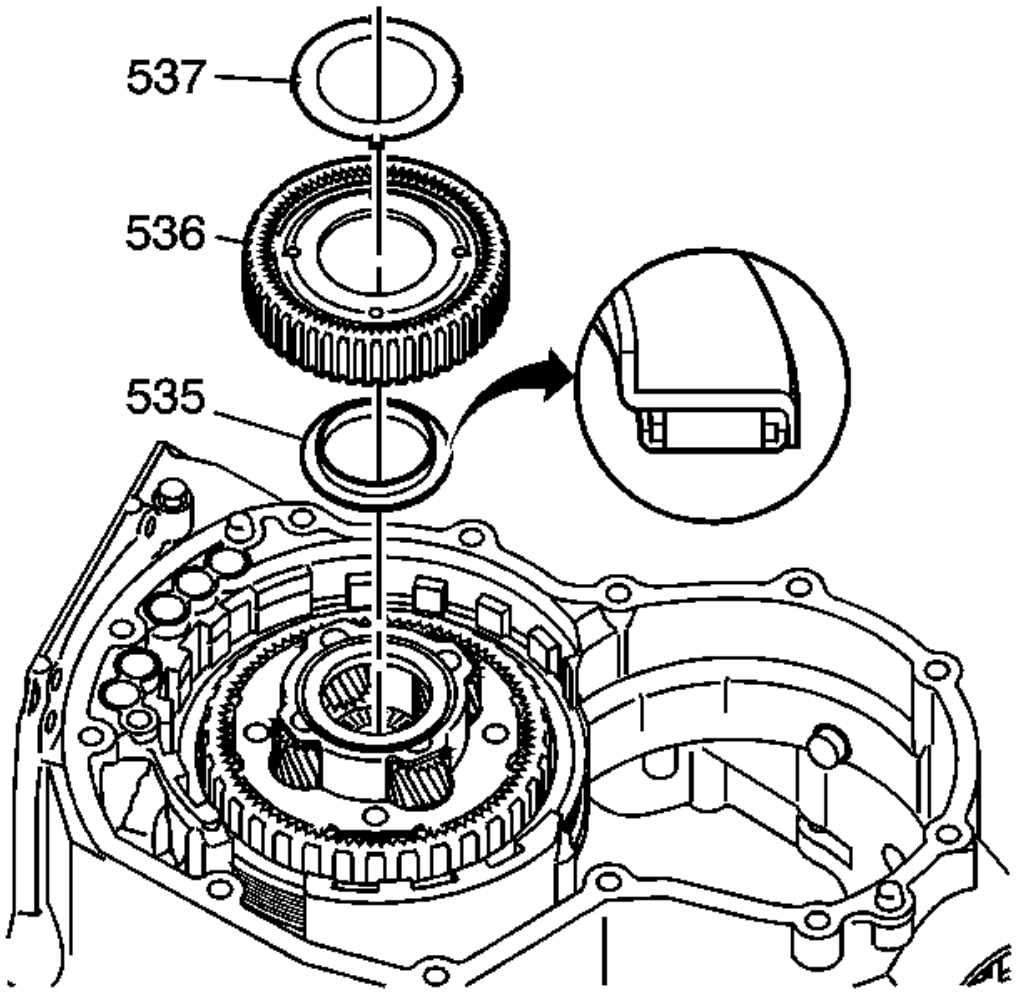


Fig. 98: Input Shaft Seal
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Input Shaft Seal (Qty: 1) **Procedure** 1. Install a NEW seal. It is not reusable. 2. Use DT-49261-1 protector and -4 pusher to install the first lower seal.

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	Special Tools: **DT-49261:** Input Shaft Seal Installer For equivalent regional tools, refer to **Special Tools** .
2	Input Shaft Seal (Qty: 1) **Procedure** 1. Install a NEW seal. It is not reusable. 2. Use DT-49261-2 protector and -4 pusher to install the second upper seal. 3. Size both seals for at least 15 minutes. **Special Tools:** **DT-49261:** Input Shaft Seal Installer For equivalent regional tools, refer to **Special Tools** .

1-3-REVERSE CLUTCH ASSEMBLE

1-3 Reverse Clutch Piston and Spring Assemble

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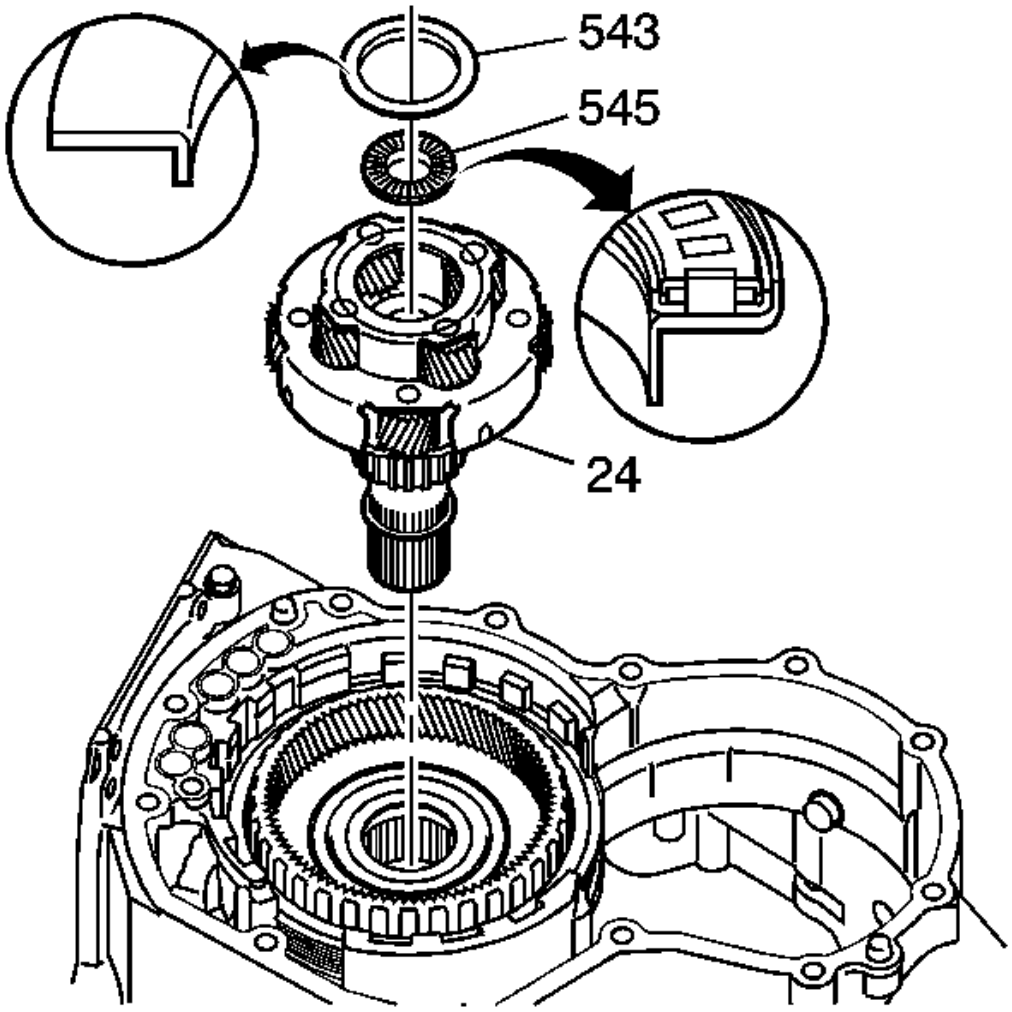


Fig. 99: Assembling 1-3 Reverse Clutch Piston and Spring
Courtesy of GENERAL MOTORS CORP.

1-3 Reverse Clutch Piston and Spring Assemble

Callout	Component Name
1	Input Shaft Seals (Qty: 2) **Tip:** Install NEW seals. They are not reusable.
2	1-3 Reverse Clutch Housing Ball Valve
3	1-3 Reverse Clutch Piston
4	1-3 Reverse Clutch Spring
	1-3 Reverse Clutch Spring Retaining Ring

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5	**Tip:** Install a NEW retaining ring. It is not reusable. **Special Tools:** **DT-47693-2:** Compressor For equivalent regional tools, refer to **Special Tools** .

1-3 Reverse Clutch Assemble

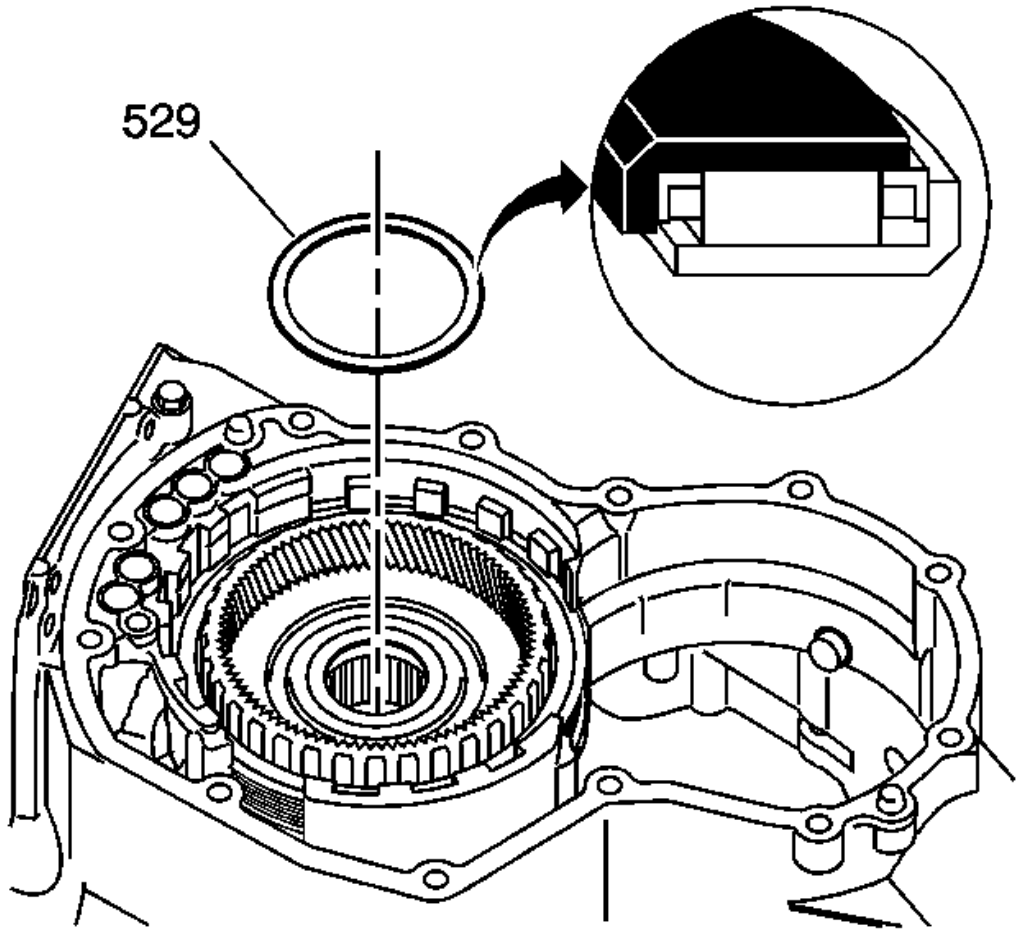


Fig. 100: 1-3 Reverse Clutch Assembly
Courtesy of GENERAL MOTORS CORP.

1-3 Reverse Clutch Assemble

Callout	Component Name

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1	1-3 Reverse Clutch Plate (Qty: 3)
2	1-3 Reverse Clutch Plate Assembly - Friction (Qty: 3)
3	1-3 Reverse Clutch Backing Plate
4	1-3 Reverse Clutch Backing Plate Retaining Ring - Selective **Tip:** Install a NEW retaining ring. It is not reusable.

1-3-REVERSE CLUTCH PISTON AIR CHECK

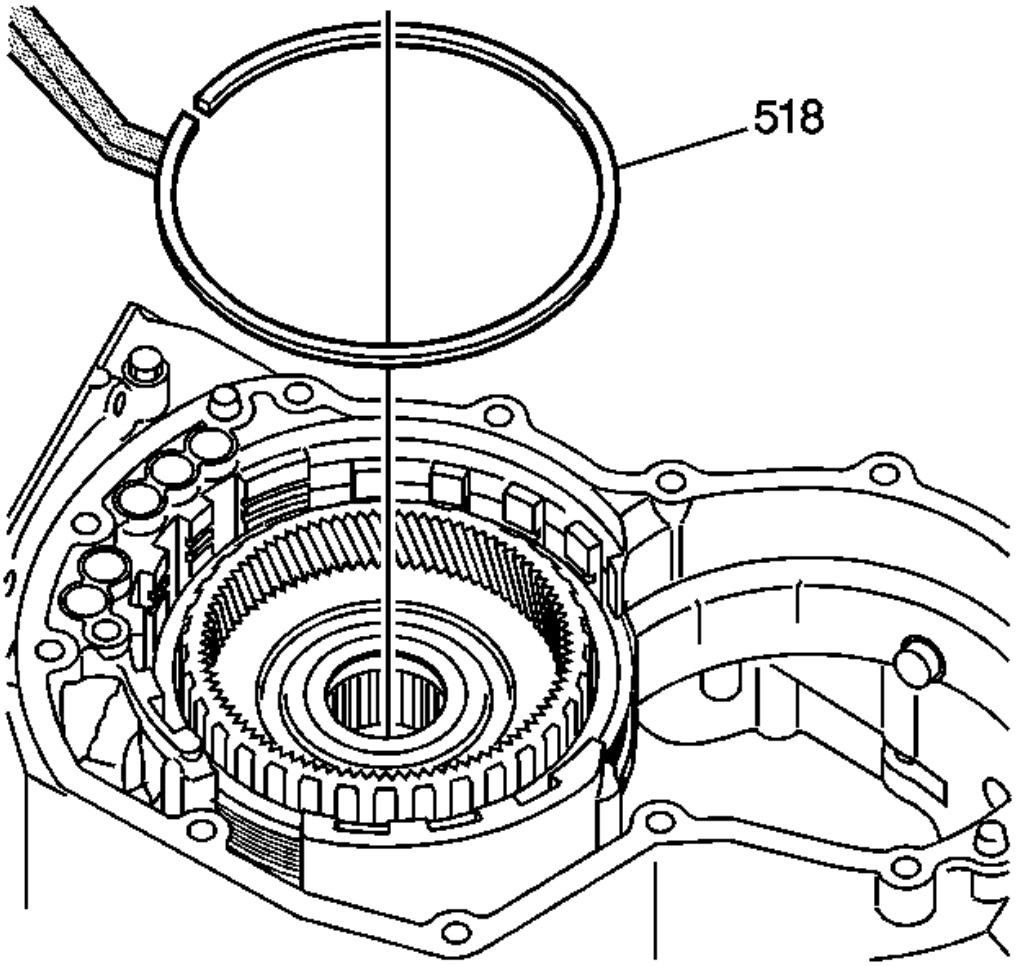


Fig. 101: 1-3-Reverse Clutch Piston Air Check Using Shop Air
Courtesy of GENERAL MOTORS CORP.

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Callout	Component Name
Procedure: Apply shop air to the 1-3 Reverse Clutch. Observe the piston movement.	
1	1-3 Reverse Clutch Assembly **CAUTION:** **Regulate the air pressure to 40 psi maximum. High pressure could cause the piston to over travel and damage the piston seals.** **Tip:** Minimal piston movement and excessive air leaking could indicate damage to the seals or improper assembly.

1-3-REVERSE CLUTCH INSTALLATION

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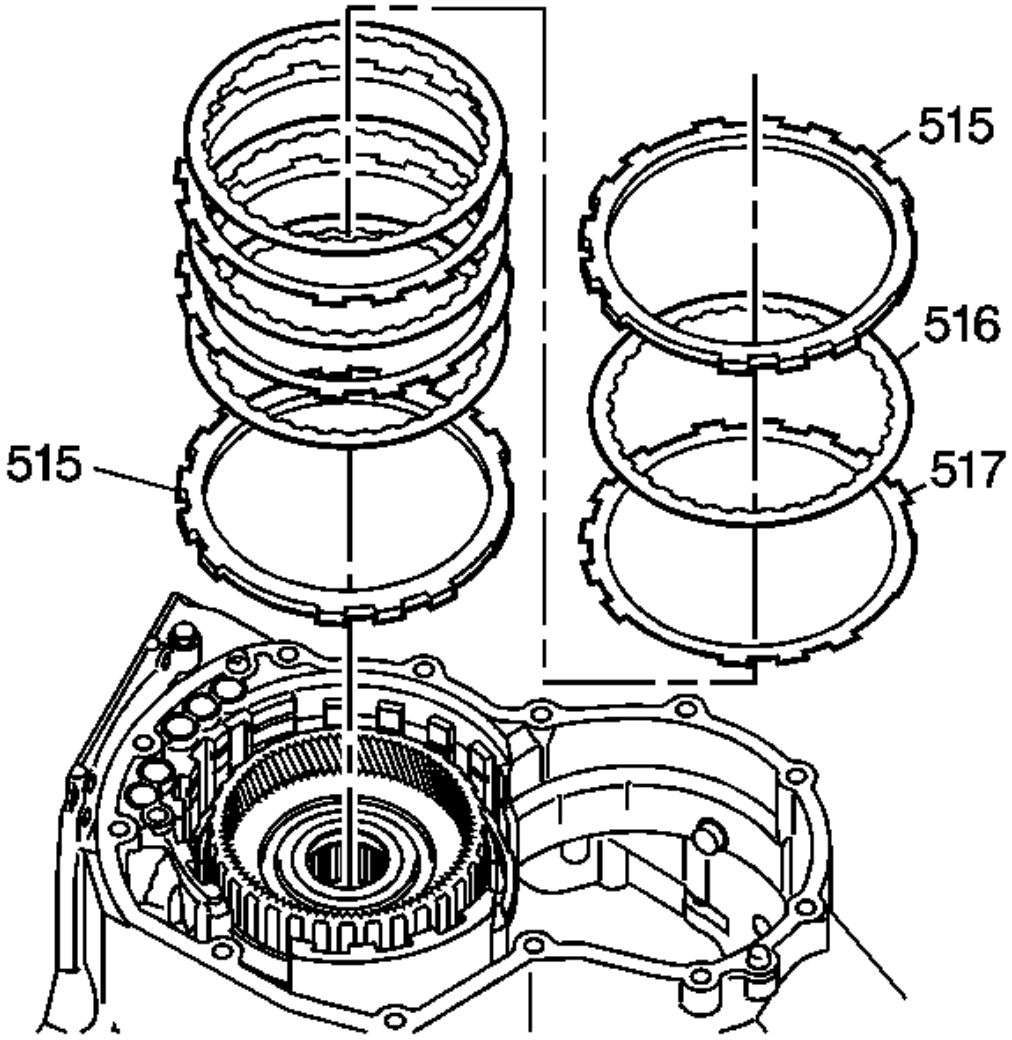


Fig. 102: 1-3-Reverse Clutch
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	1-3 Reverse Clutch Assembly **Tip:** When fully seated the clutch assembly will be flush with the case sealing surface, verify by using a flat bar. **Special Tool:** **GE 34673:** Flat Gauge Bar For equivalent regional tools, refer to **Special**

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	Tools .
2	1-3 Reverse Clutch Thrust Bearing Assembly

FRONT DIFFERENTIAL CARRIER INSTALLATION

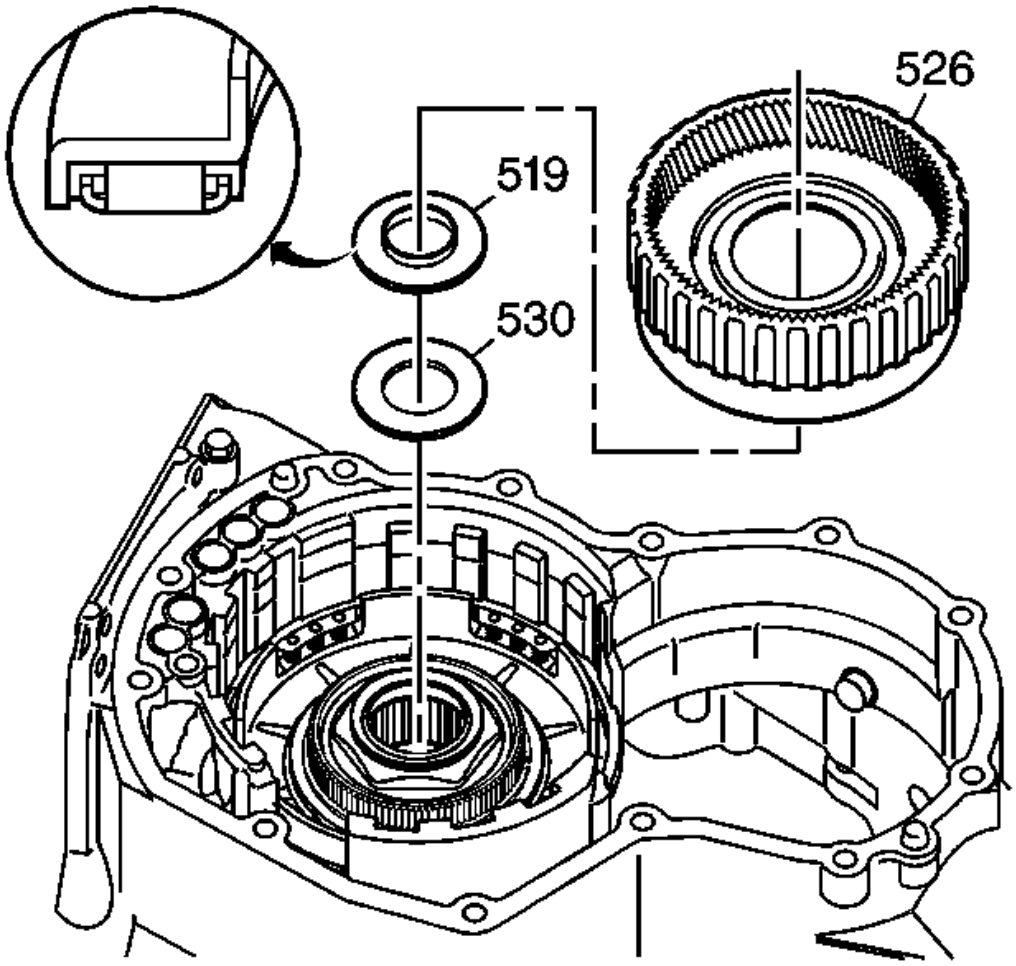


Fig. 103: Front Differential Carrier
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Front Differential Carrier Baffle (Case) **Tip:** Inspect the collection debree magnet before installation located on the underside of the baffle.
	Front Differential Carrier Baffle Bolt M6 x 20 mm

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2	(Qty: 3) **CAUTION:** **Use the correct fastener in the correct location. Replacement fasteners must be the correct part number for that application. Fasteners requiring replacement or fasteners requiring the use of thread locking compound or sealant are identified in the service procedure. Do not use paints, lubricants, or corrosion inhibitors on fasteners or fastener joint surfaces unless specified. These coatings affect fastener torque and joint clamping force and may damage the fastener. Use the correct tightening sequence and specifications when installing fasteners in order to avoid damage to parts and systems.** **Tighten:** 9 N.m (80 lb in)
3	Front Differential Carrier Assembly (FWD)

TORQUE DAMPENER AND DIFFERENTIAL HOUSING WITH FLUID PUMP INSTALLATION

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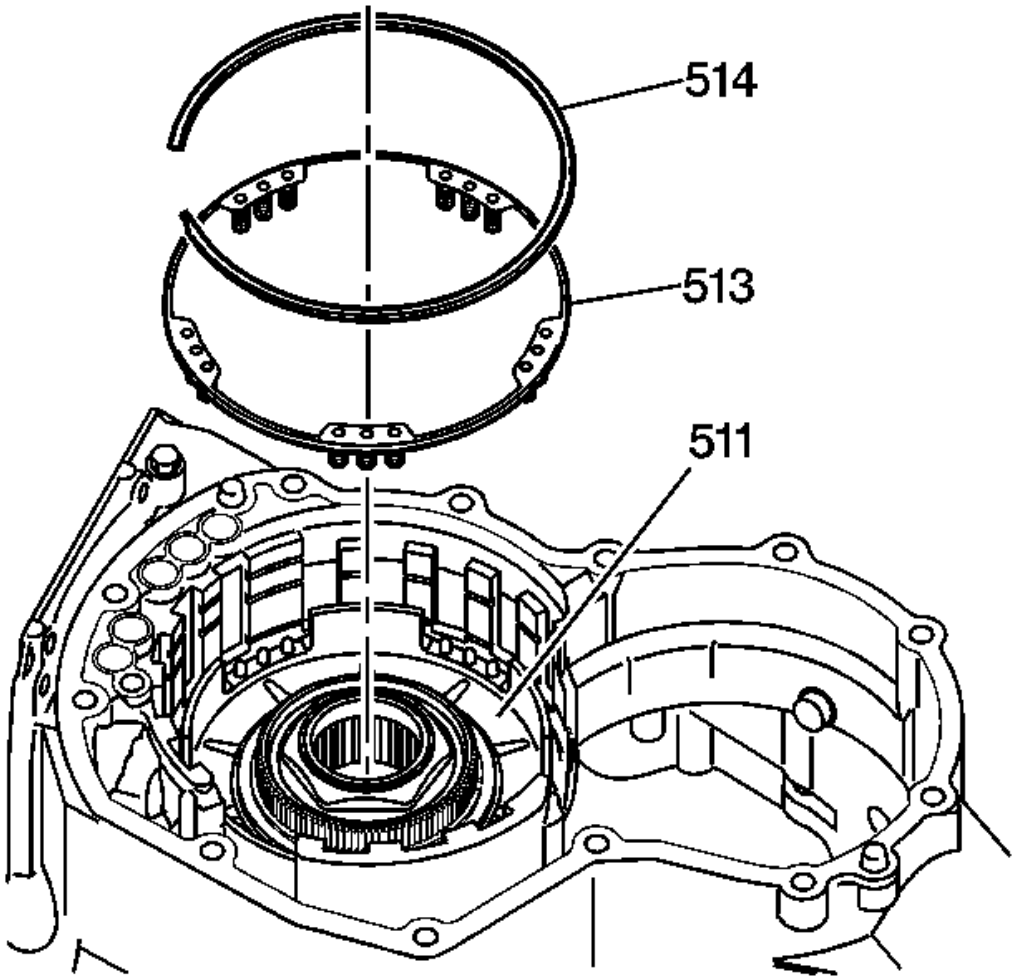


Fig. 104: Torque Dampener and Differential Housing with Fluid Pump
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	A/Trans Pump Fluid Outlet Seal Assembly
2	Torque Dampener Housing Outer Seal
3	Torque Dampener and Differential (w/Fluid Pump) Housing Assembly
	Torque Dampener and Differential Housing Bolt M10 x 35 mm (Qty: 17) **CAUTION:**

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4	**Refer to Fastener Caution .** **Procedure:** Tighten the bolts in sequence shown. **Tighten:** 65 N.m (47.9 lb ft)

FRONT DIFFERENTIAL CARRIER FINAL ROTATIONAL TORQUE MEASUREMENT

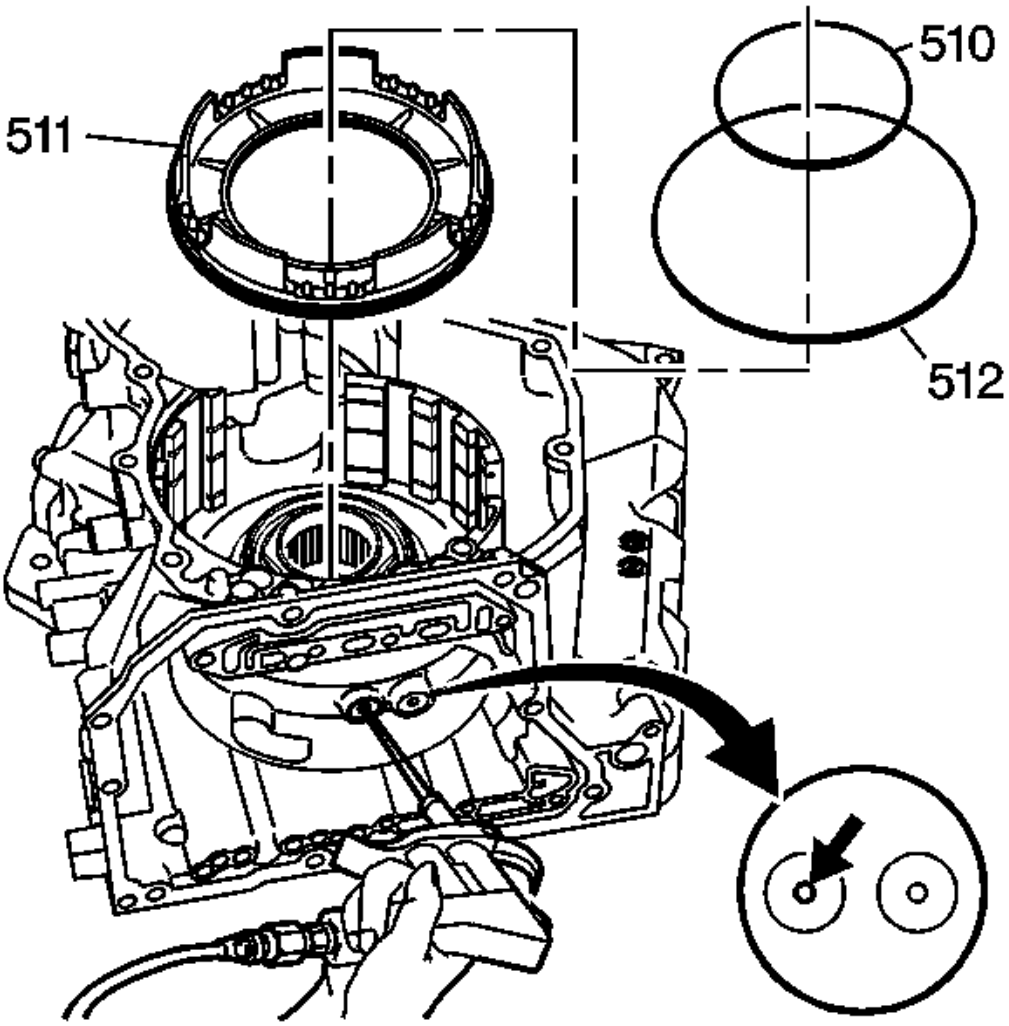


Fig. 105: Measuring Front Differential Carrier Final Rotational Torque

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Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Front Differential Carrier Assembly **CAUTION:** **Low bearing pre-load will cause premature failure of the front differential drive pinion gear.** **Procedure** 1. Use a dial or beam torque wrench with **DT-47793:** rotating tool to measure turning torque. 2. If the turning torque is not within specifications, the transfer gear assembly and differential bearing thrust washer is incorrect and must be corrected. Refer to **Front Differential Drive Pinion Gear Bearing Thrust Washer and Front Differential Bearing Washer Measurement**. **Rotational Torque:** 14-22 N.m (10-16 lb ft) **Special Tools:** **DT-47793:** Differential Rotating Tool For equivalent regional tools, refer to **Special Tools** .

OUTPUT SHAFT INSTALLATION

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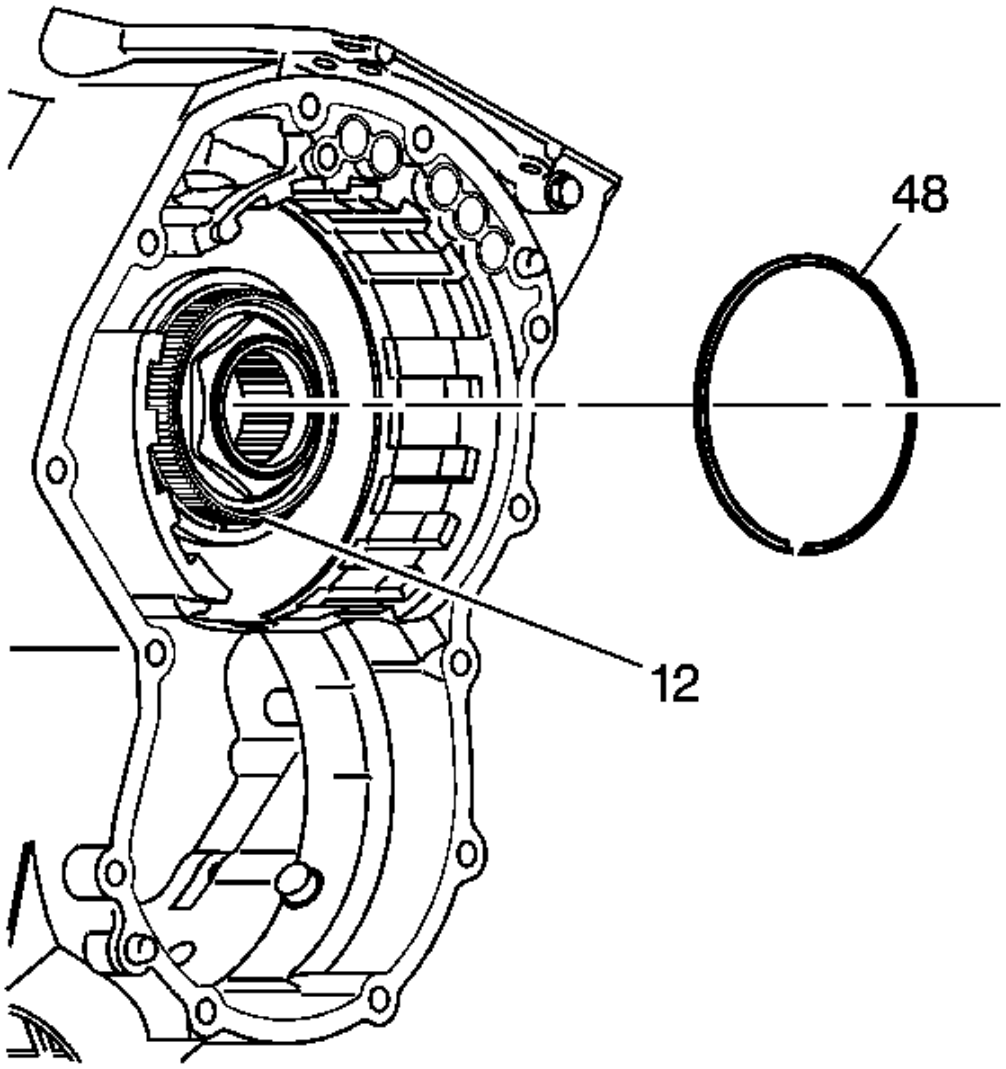


Fig. 106: Output Shaft
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Front Wheel Drive Shaft Retaining Ring **Tip:** Install NEW retaining rings. They are not reusable.
2	Output Shaft Assembly

FRONT WHEEL DRIVE SHAFT SEAL INSTALLATION - CASE SIDE

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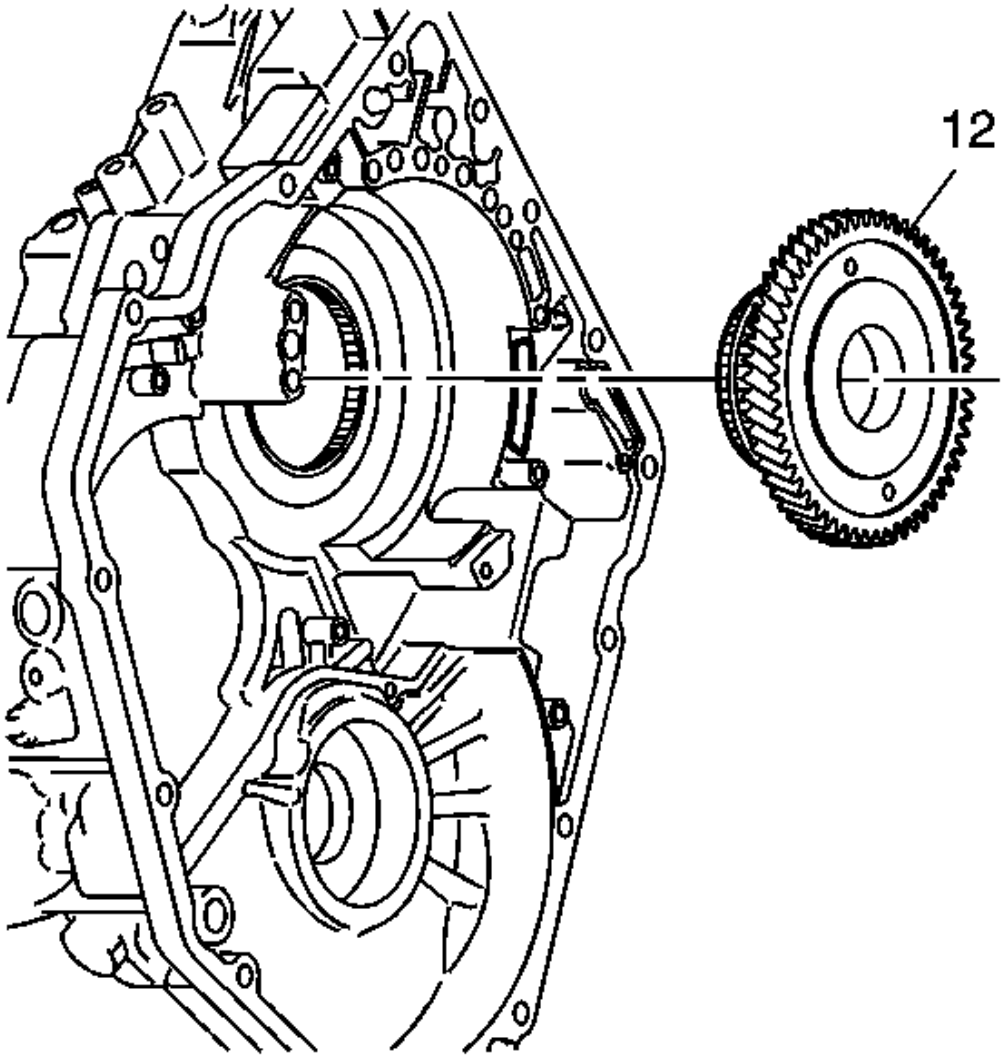


Fig. 107: Front Wheel Drive Shaft Seal - Case Side
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Front Wheel Drive Shaft Oil Seal Assembly (LHS) **Special Tools** • **DT 50301:** Seal and Bearing Installer • **GE 8092:** Driver Handle

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

CONTROL VALVE BODY ASSEMBLY DISASSEMBLE

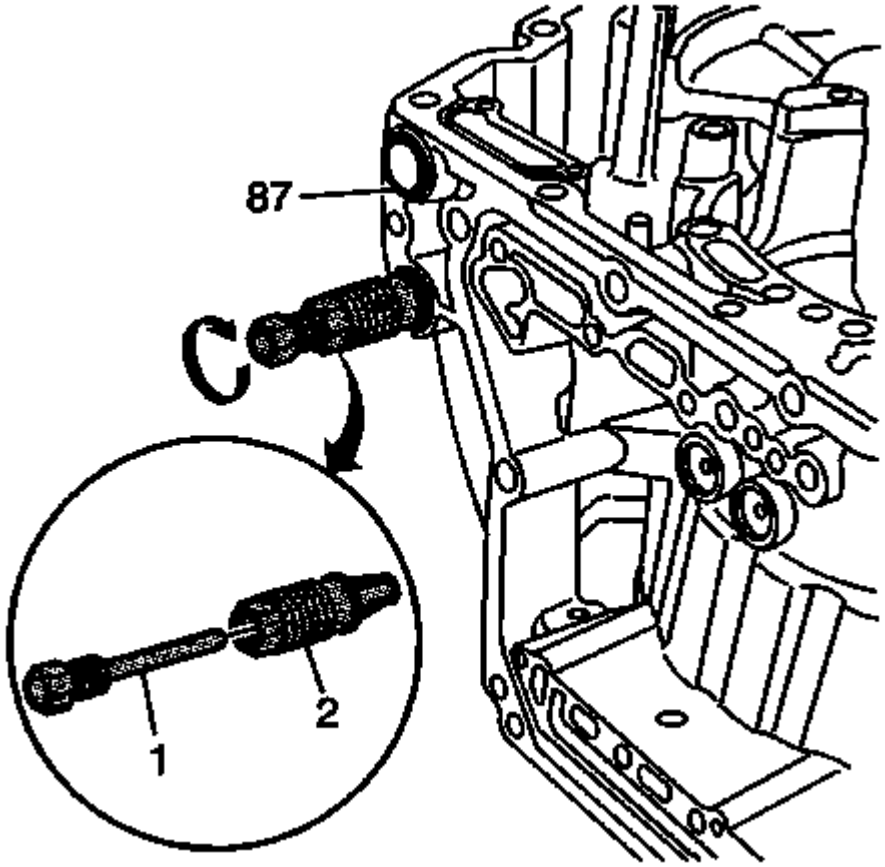


Fig. 108: Control Valve Body Assembly
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Control Valve Channel Plate Bolt M6 x 20 mm (Qty: 3)
2	A/Trans Manual Shift Shaft Position Switch Mounting Bracket Assembly
3	Control Valve Body Spacer Retainer (Qty: 2)
4	Control Valve Body Spacer (w/Gasket) Plate Assembly
5	Control Valve Body Locator Pin (Qty: 4)
6	Manual Shift Shaft Detent Spring Retaining Pin
7	Manual Shift Shaft Detent Assembly

CONTROL VALVE BODY CLEANING AND INSPECTION

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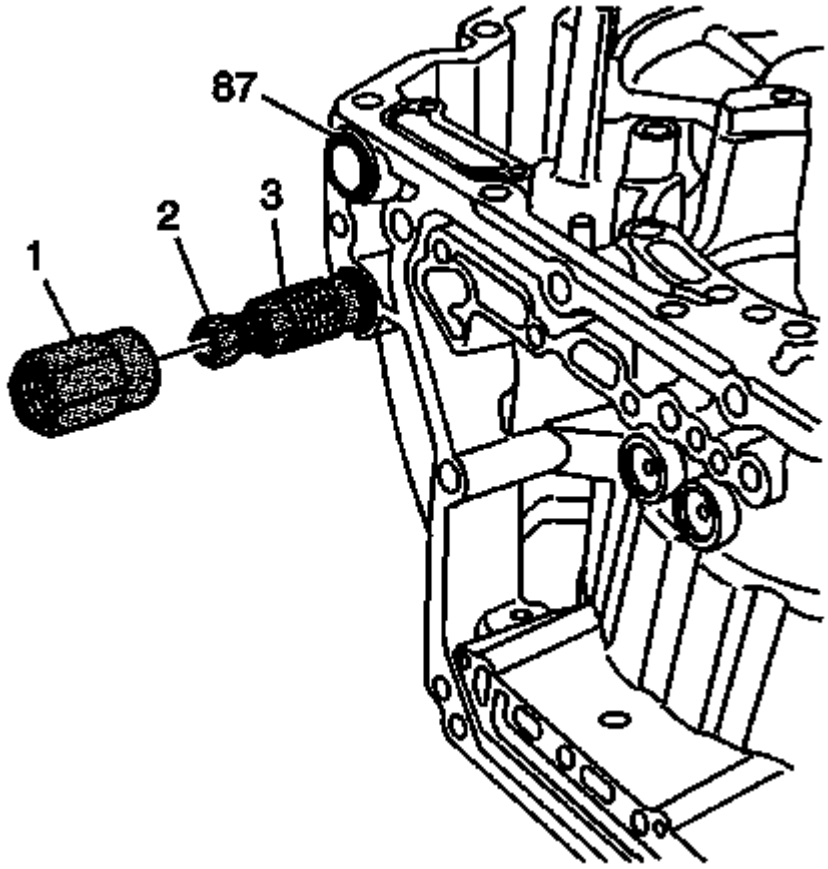


Fig. 109: Exploded View Of Control Valve Body
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Shift Solenoid Valve Train
2	Variable Hi and 2-3-4 Clutch and Drive Motor/Generator Stator Cooling Regulator Boost Valve Train
3	A/Trans Torque Dampener Bypass Clutch Valve Train
4	Actuator Feed Limit Valve Train
5	Cooler Feed Limit Valve Train
6	1-3 Reverse Clutch and Generator/Drive Motor Stator Cooling Regulator Valve Train
7	Variable Hi and 2-3-4 Clutch and Drive Motor/Generator Stator Cooling Regulator Valve Train
8	Variable Low and 1-2 Reverse and 4th Clutch and Drive Motor/Generator Stator Cooling Regulator Valve Train
9	Shift Solenoid Valve Train
10	1-2 Reverse and 4th Clutch Regulator Boost Valve Train
11	Control Valve Body Ball Check Valve
12	Modulated Fluid Pressure Orifice
13	Modulated Fluid Pressure Orifice

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CONTROL VALVE BODY ASSEMBLY ASSEMBLE

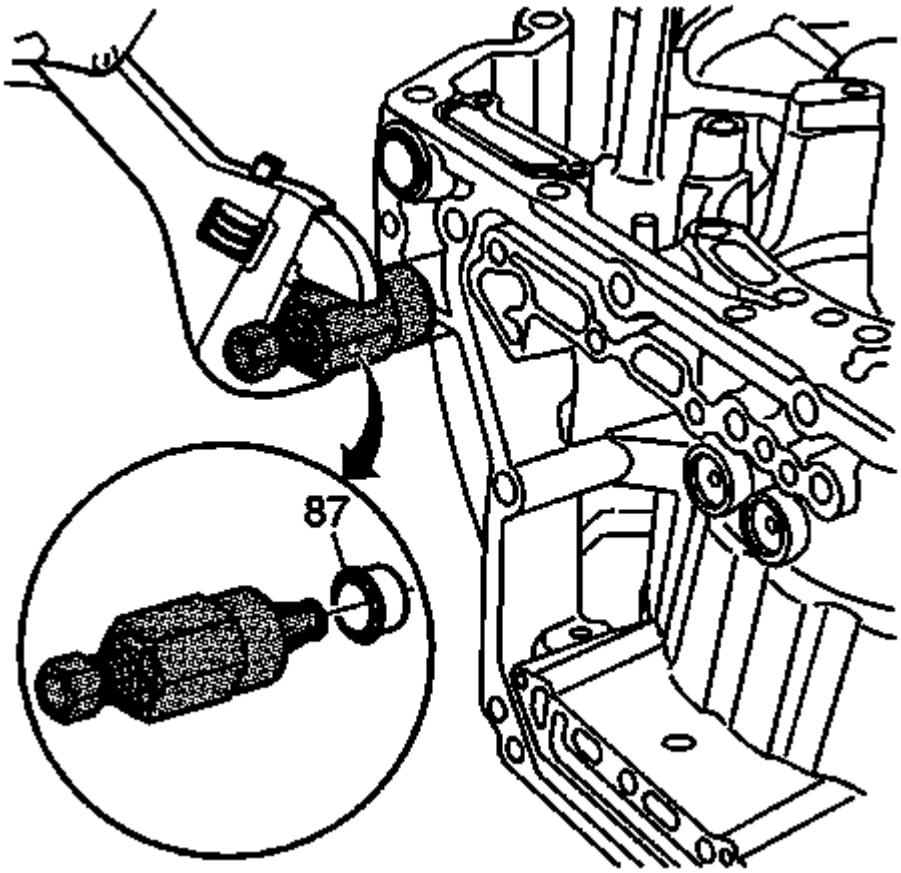


Fig. 110: Control Valve Body Assembly
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Clean and Inspect all parts for damage or wear.	
1	Manual Shift Shaft Detent Assembly
2	Manual Shift Shaft Detent Spring Retaining Pin
3	Control Valve Body Locator Pin (Qty: 4)
4	Control Valve Body Spacer (w/Gasket) Plate Assembly
5	Control Valve Body Spacer Retainer (Qty: 2)
6	A/Trans Manual Shift Shaft Position Switch Mounting Bracket Assembly
	Control Valve Channel Plate Bolt M6 x 20 mm (Qty: 3) **CAUTION:** **Use the correct fastener in the correct location. Replacement fasteners must be the correct part number for that application. Fasteners requiring replacement or fasteners requiring the use of thread**

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7	**locking compound or sealant are identified in the service procedure. Do not use paints, lubricants, or corrosion inhibitors on fasteners or fastener joint surfaces unless specified. These coatings affect fastener torque and joint clamping force and may damage the fastener. Use the correct tightening sequence and specifications when installing fasteners in order to avoid damage to parts and systems.** **Tighten:** 9 N.m (80 lb in)

CONTROL VALVE BODY AND CHANNEL PLATE INSTALLATION

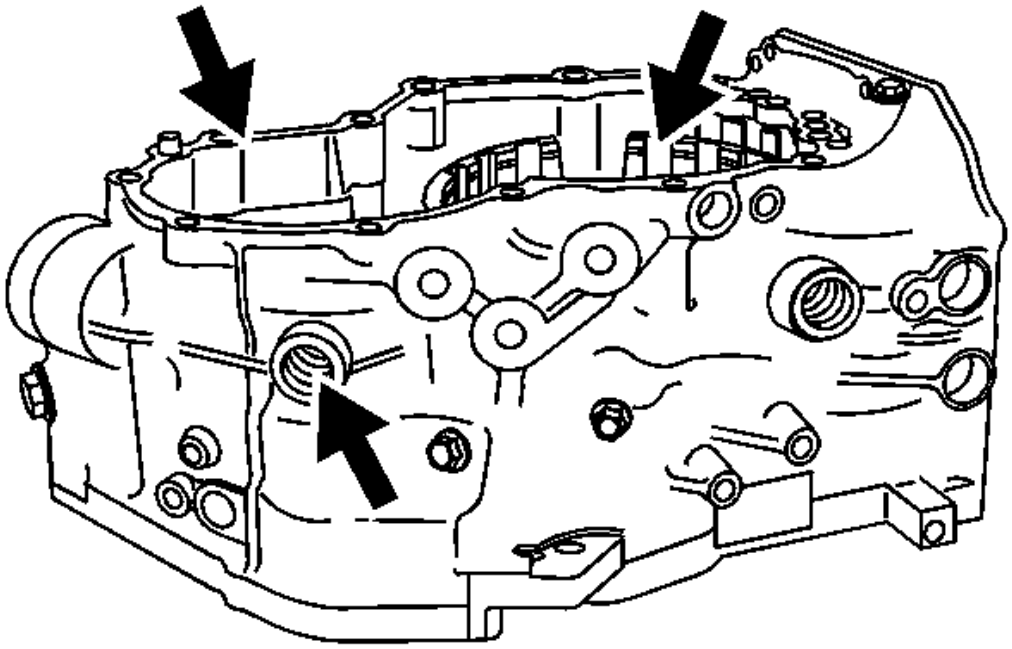


Fig. 111: Control Valve Body And Channel Plate Fastenber Tightening Sequence
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Control Valve Body Ball Check Valve (Qty: 2) **Tip:** Refer to **Ball Check Valve Locations** .
2	Control Valve Body
	Control Valve Body Bolt M6 x 42 mm (Qty: 5)

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3	**CAUTION:** **Refer to Fastener Caution .** **Procedure:** Tighten the bolts in sequence shown. **Tighten:** 9.5 N.m (84 lb in)
4	Control Valve Channel Plate Assembly
5	Control Valve Body Bolt M6 x 48 mm (Qty: 12) **Procedure:** Tighten the bolts in sequence shown. **Tighten:** 9.5 N.m (84 lb in)

MANUAL SHIFT SHAFT POSITION SWITCH AND FLUID LEVEL CONTROL VALVE INSTALLATION

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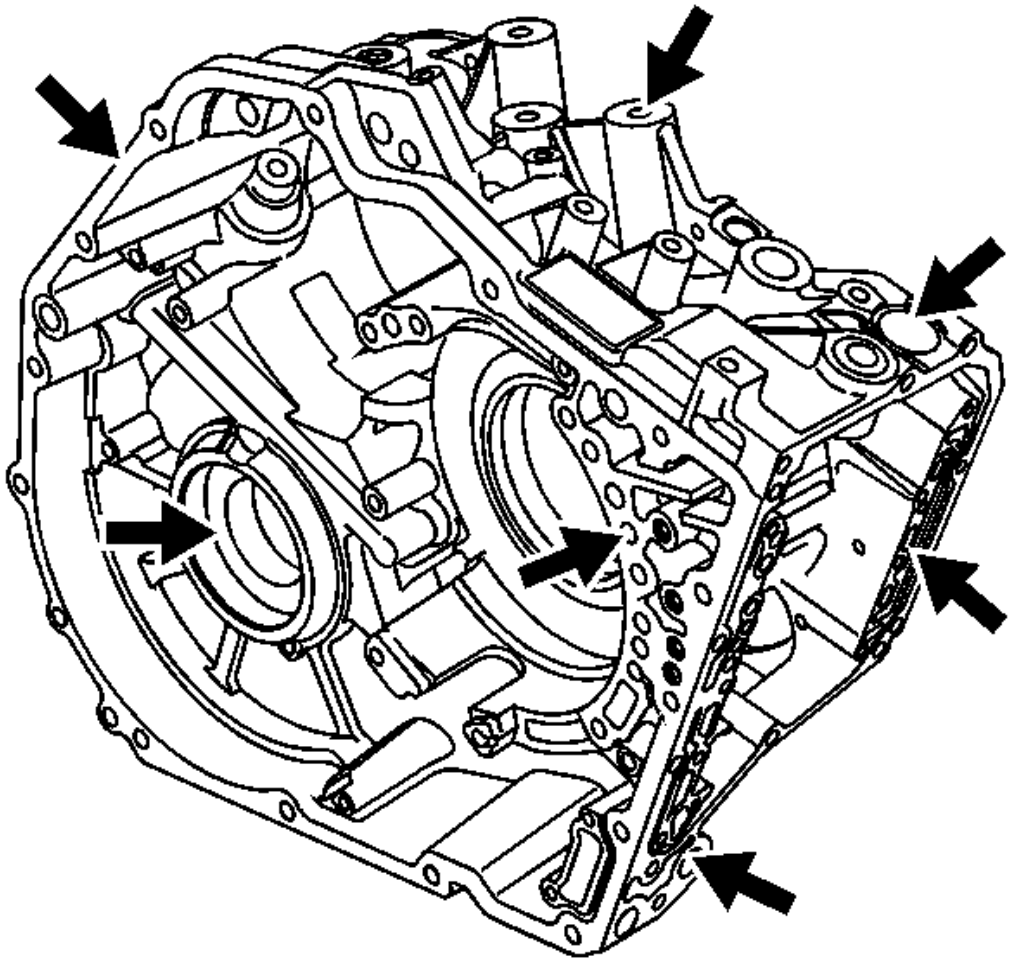


Fig. 112: Manual Shift Shaft Position Switch And Fluid Level Control Valve
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	A/Trans Fluid Level Control Valve
	A/Trans Fluid Level Control Valve Stud M6 x 40 mm (Qty: 2) **CAUTION:** **Use the correct fastener in the correct location. Replacement fasteners must be the correct part number for that application. Fasteners requiring replacement or fasteners requiring the use of thread**

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2	**locking compound or sealant are identified in the service procedure. Do not use paints, lubricants, or corrosion inhibitors on fasteners or fastener joint surfaces unless specified. These coatings affect fastener torque and joint clamping force and may damage the fastener. Use the correct tightening sequence and specifications when installing fasteners in order to avoid damage to parts and systems.** **Tighten:** 9 N.m (80 lb in)
3	A/Trans Manual Shift Shaft Position Switch Assembly **Tip:** Insure the sensor slide is engaged with the pin on the detent lever.
4	A/Trans Manual Shift Shaft Position Switch Bolt M6 x 25 mm (Qty: 2) **Tighten:** 9 N.m (80 lb in)

CONTROL SOLENOID VALVE AND TRANSMISSION CONTROL MODULE ASSEMBLY INSTALLATION

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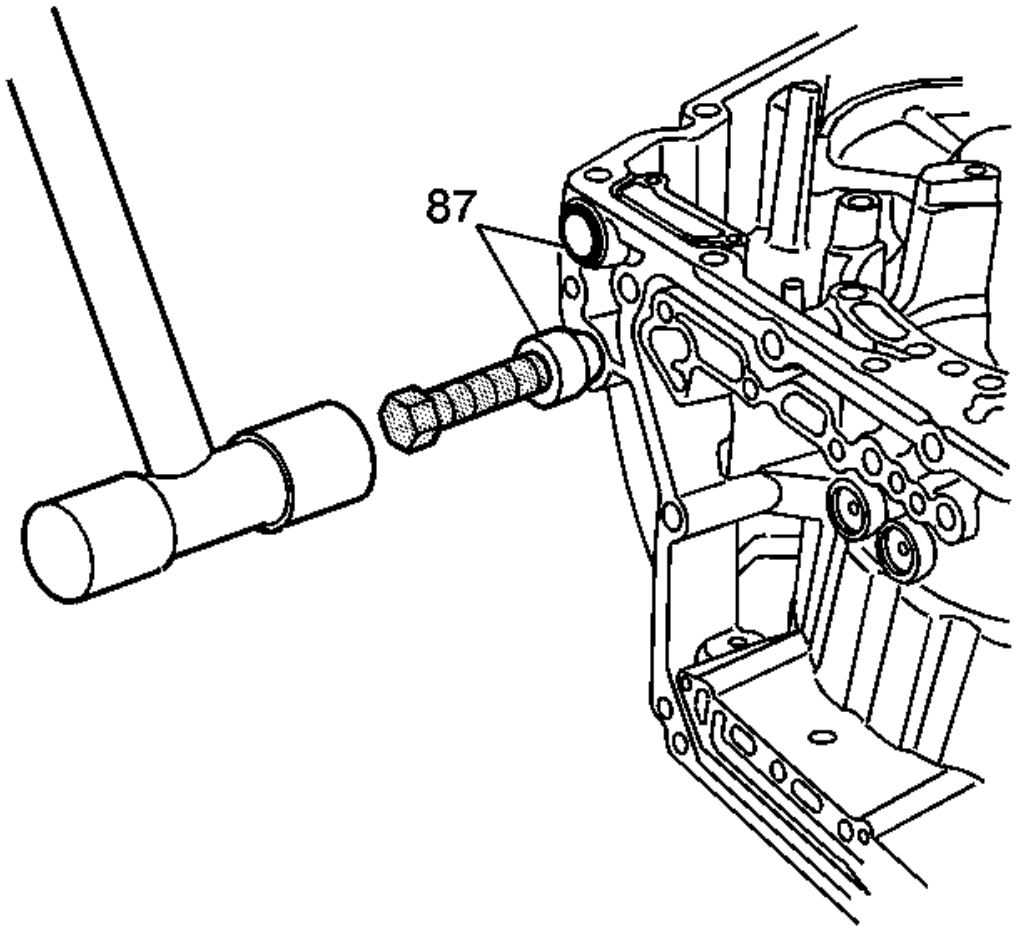


Fig. 113: Control Solenoid Valve And Transmission Control Module Assembly Fastener Tightening Sequence
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Control Solenoid (w/Body and TCM) TEHCM Valve Assembly
2	Control Valve Body Bolt M6 x 42 mm (Qty: 1) **CAUTION:** **Refer to Fastener Caution .** **Procedure:**

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	Tighten the bolt in sequence shown. **Tighten:** 9.5 N.m (84 lb in)
3	Control Valve Body Bolt M6 x 75 mm (Qty: 4) **Procedure:** Tighten the bolt in sequence shown. **Tighten:** 9.5 N.m (84 lb in)
4	Control Solenoid Valve Spring
5	Control Valve Body Bolt M6 x 65 mm (Qty: 5) **Procedure:** Tighten the bolt in sequence shown. **Tighten:** 9.5 N.m (84 lb in)

CONTROL VALVE BODY COVER INSTALLATION

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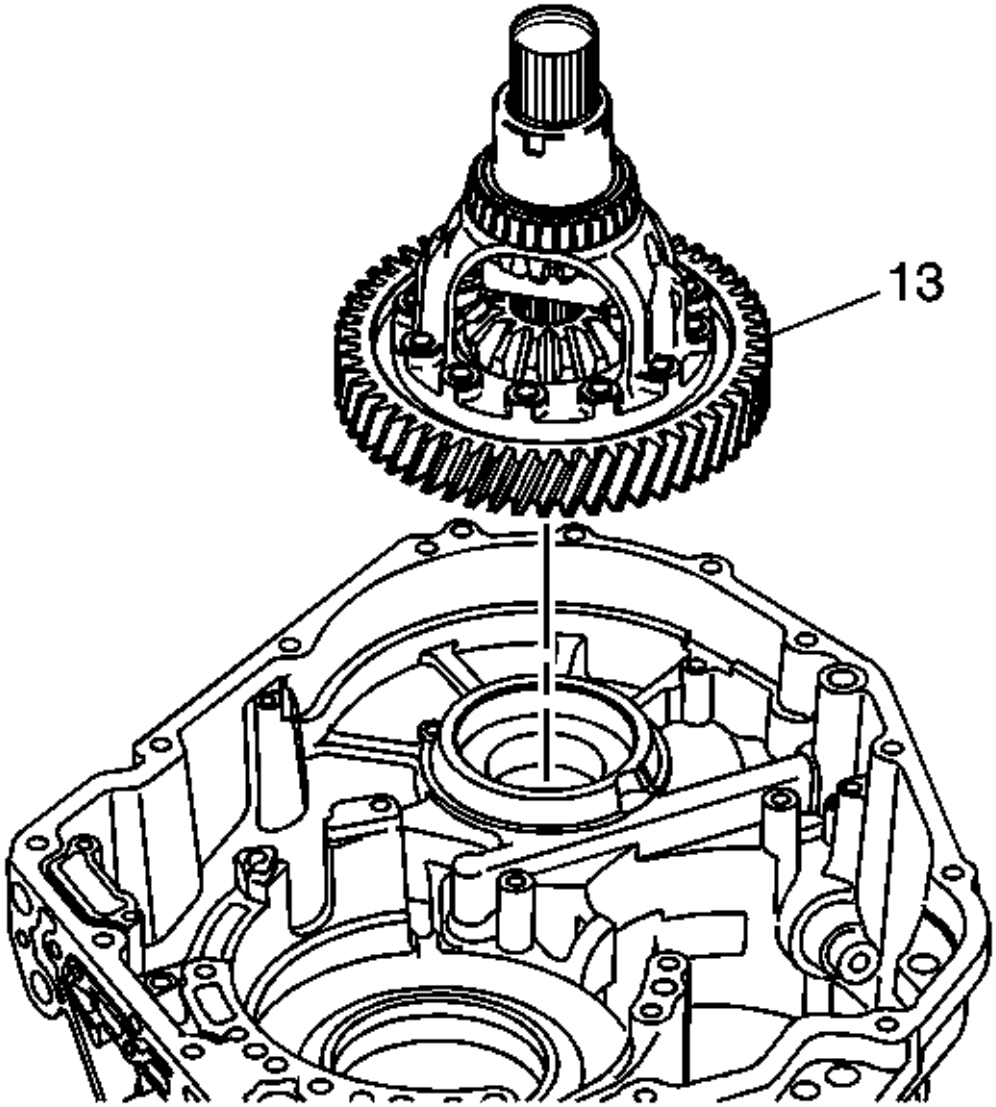


Fig. 114: Control Valve Body Cover Fastener Tightening Sequence
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Transmission Fluid Cooler Outlet Washer
2	Transmission Fluid Cooler Outlet Seal **Tip:** Install a NEW seal. It is not reusable.
	A/Trans Wiring Extension Harness Assembly

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3	**Procedure:** Make sure you connect all four connectors on the wiring harness in the appropriate locations. **Tip:** The wiring harness is attached to the fluid cooler outlet pipe and will come out together.
4	Transmission Fluid Cooler Outlet Pipe Assembly
5	Fluid Cooler Outlet Pipe Assembly Bolt M5 x 16 mm (Qty: 2) **CAUTION:** **Refer to Fastener Caution .** **Tighten:** 7.25 N.m (64.2 lb in)
6	Variable Drive Pulley Retaining Nut **Tighten:** 9 N.m (80 lb in)
7	Control Valve Body Bolt M6 x 80 mm (Qty: 1) **Tighten:** 9.5 N.m (84 lb in)
8	Control Valve Body Cover Wiring Connector Hole Seal
9	Control Valve Body Cover Gasket
10	Control Valve Body Cover Assembly
11	Control Valve Body Cover Bolt M6 x 35 mm (Qty: 10) **Procedure:** Tighten the bolts in sequence shown. **Tighten:** 9 N.m (80 lb in)
12	Fluid Level Control Valve Stud M6 x 40 mm (Qty: 5) **Tighten:** 9 N.m (80 lb in)
13	Auxiliary Pump Motor Cable Retainer

TORQUE DAMPENER INSTALLATION

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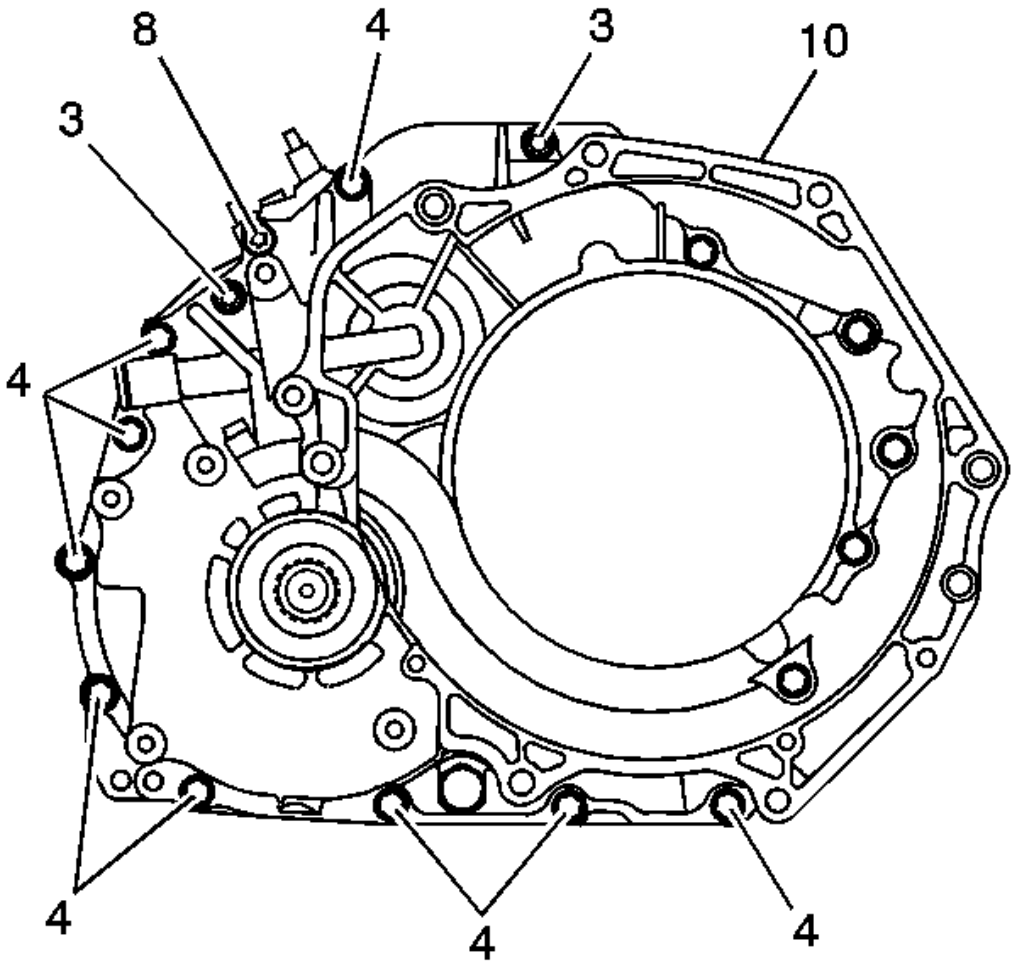


Fig. 115: Torque Dampener
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	A/Trans Torque Dampener Assembly **CAUTION:** **Lower the torque dampener assembly straight down. Failure to lower the torque dampener assembly straight down could damage the torque dampener clutch lip seal inside the torque dampener assembly.**
	DT 21366 Converter Holding Strap

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2	**WARNING:** **The torque dampener must be held to the torque dampener housing by a retaining device such as shipping brackets. Without the retaining device, the torque dampener may slide forward, disengaging the oil pump, or may fall completely out of the transmission causing personal injury and/or property damage.** **Special Tools:** **DT 21366:** Converter Holding Strap For equivalent regional tools, refer to **Special Tools** .
3	Lock Pin

HOLDING FIXTURE REMOVAL

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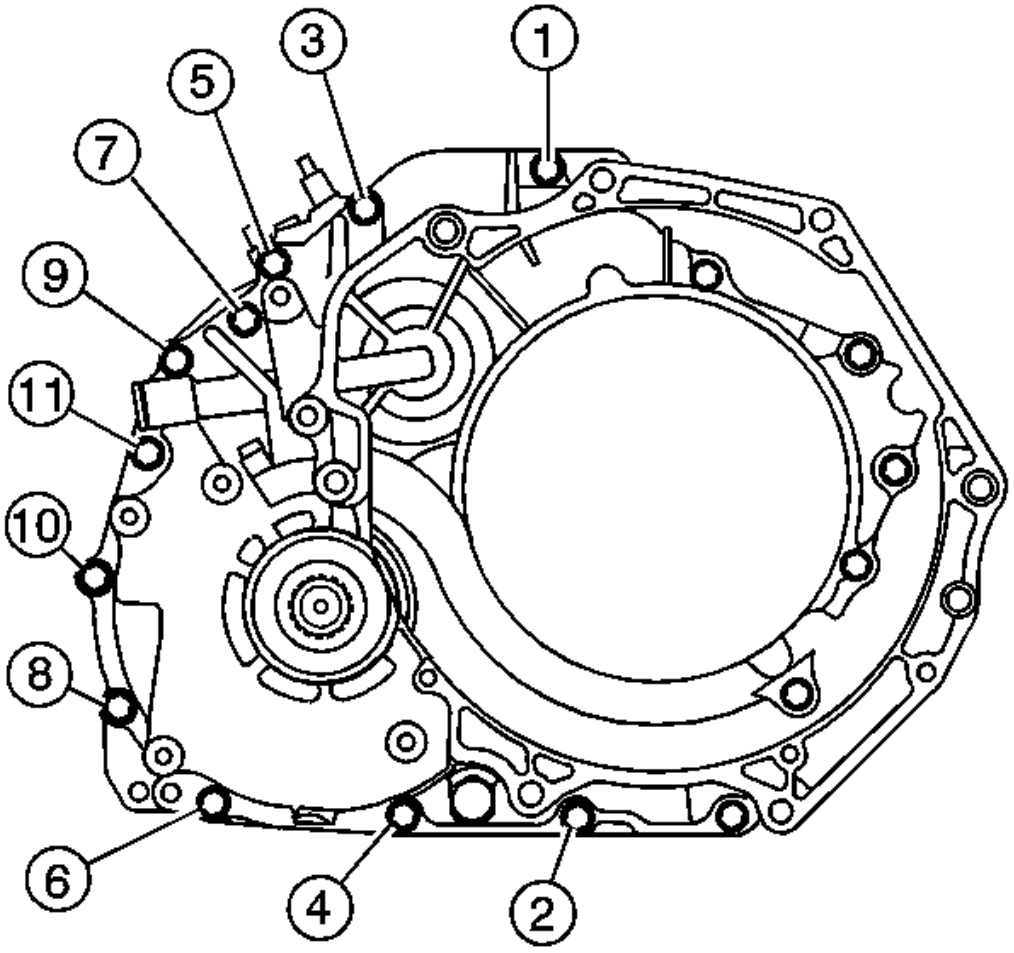


Fig. 116: Holding Fixture
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	DT-46625 Transmission Holding Fixture **Tip:** Raise the transmission in order to remove the holding fixture. **Special Tool:** **DT-46625:** Transmission Holding Fixture For equivalent regional tools, refer to **Special Tools** .
2	DT-42451-1 Engine Support Adapter **Special Tool:** **DT-42451-1:** Engine Support Adapter

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

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