2010 TRANSMISSION

Automatic Transmission - 6T70/6T75 - Acadia, Enclave, Outlook & Traverse

REPAIR INSTRUCTIONS - OFF VEHICLE

LIFT PLATE AND HOLDING FIXTURE INSTALLATION

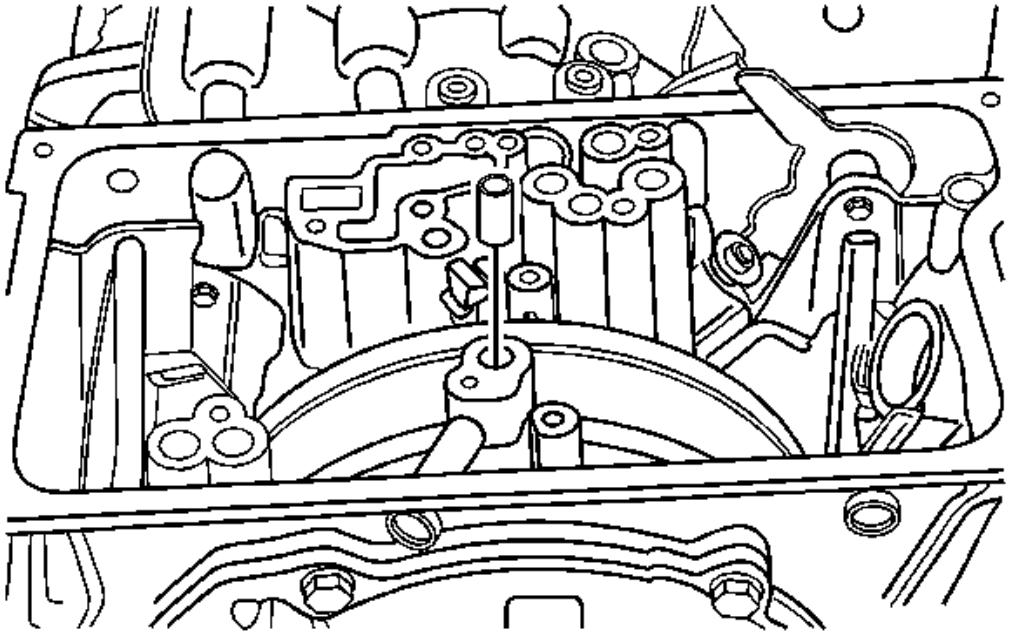

Fig. 1: Identifying Lift Plate & Holding Fixture
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	**DT-47811-A:** Transmission Lift Plate **WARNING:** **Handle with care, the transmission assembly weighs over 200 lbs. Bodily injury could occur if not handled properly.** **Tip:** After Installation of lift plate, raise the transmission with an overhead hoist.

	Tighten: 12 N.m (9 lb ft) **Special Tools:** **DT-47811-A:** Transmission Lift Plate For equivalent regional tools, refer to **Special Tools** .
2	**J-46625:** Transmission Holding Fixture **CAUTION:** **Refer to Fastener Caution .** **Tip:** Adjust mounting block on fixture to match bosses on case, then tighten bolts to: **Tighten:** 13 N.m (10 lb ft) **Special Tools:** **J-46625:** Transmission Holding Fixture For equivalent regional tools, refer to **Special Tools** .

TORQUE CONVERTER REMOVAL

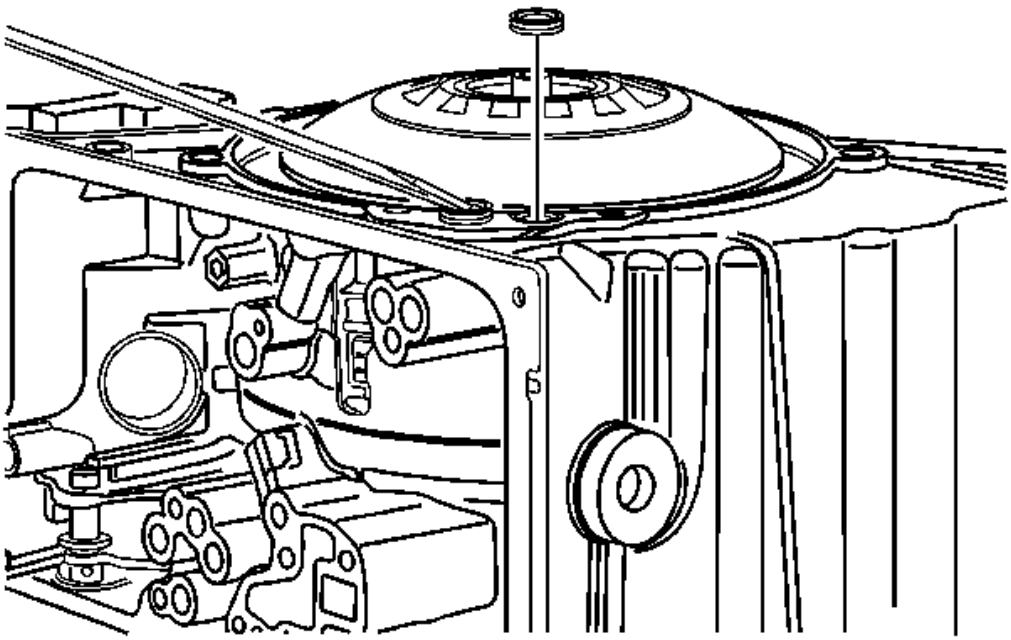

Fig. 2: View Of Torque Converter
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Lock Pin **WARNING:** **Lock pin must be secured into the bench fixture to hold the transmission and prevent bodily injury.** **Tip:** Ensure the **J 3289-20:** holding fixture is mounted to a bench that is properly supported and will support the weight of the transmission assembly without tipping. **J-39890:** holding fixture adapter and an engine stand can be used as an alternative method for supporting the transmission assembly during repairs. **Special Tools** • **J 3289-20:** Holding Fixture • **J-39890:** Transmission Holding Fixture Adapter

	For equivalent regional tools, refer to **Special Tools** .
2	**J 21366:** Converter Holding Strap For equivalent regional tools, refer to **Special Tools** .
3	Dust Cover Bolts M10 x 25, model dependent (Qty: 2)
4	Dust Cover Push Pin, model dependent
5	Dust Cover, model dependent
6	Torque Converter Assembly **CAUTION:** **Only install the lift assist handles until it stops. Do not tighten. Over tightening the lift assist handles can cause damage to the torque converter.** **Tip:** Failure to raise the torque converter straight up could damage the torque converter clutch lip seal inside the torque converter clutch assembly. **Special Tools:** **J 46409:** Torque Converter Lifting Handles For equivalent regional tools, refer to **Special Tools** .

CONTROL VALVE BODY ASSEMBLY REMOVAL

Control Valve Body Cover Removal

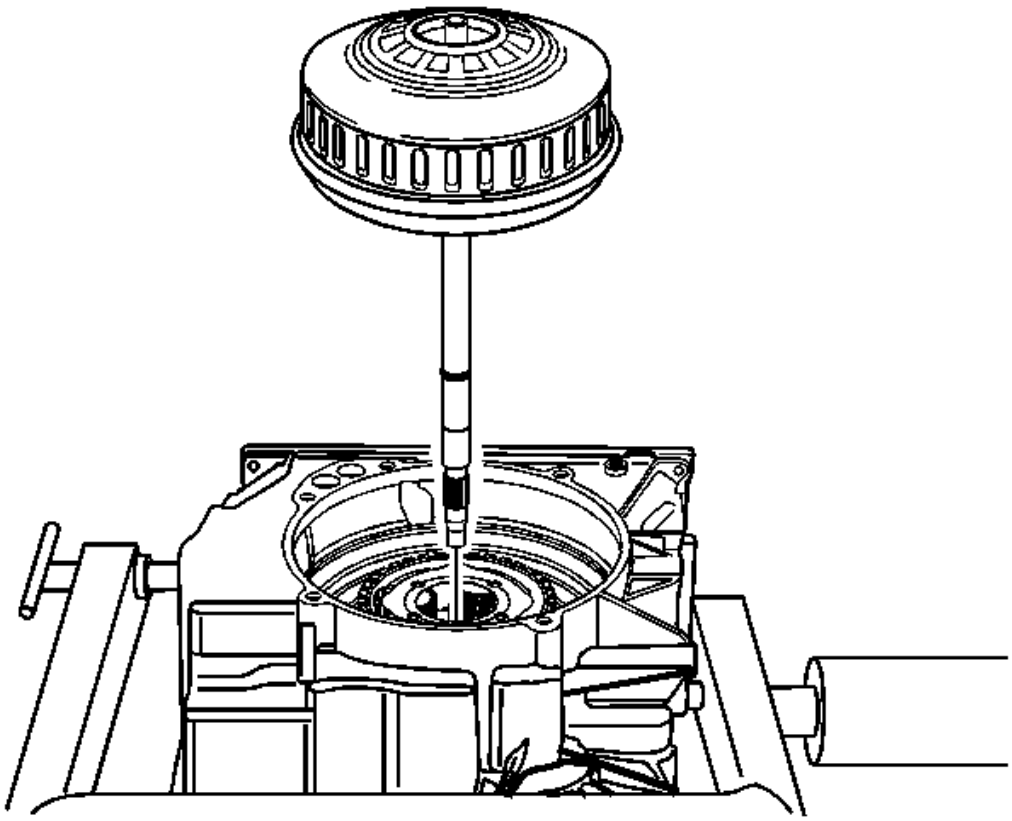

Fig. 3: Identifying Control Valve Body Cover
Courtesy of GENERAL MOTORS CORP.

Control Valve Body Cover Removal

Callout	Component Name
1	Control Valve Body Cover Stud M6 x 30 (Qty: 2)
2	Control Valve Body Cover Bolt M6 x 30 (Qty: 12)
3	Control Valve Body Cover
4	Control Valve Body Cover Gasket **Tip:** Do not re-use the valve body cover gasket.
5	Control Valve Body Cover Wiring Connector Hole Seal **CAUTION:** **Support the control solenoid valve assembly around the connector when removing the seal. Excessive pulling force can damage the internal**

	electrical connections.
6	Shift Position Switch Connector
7	Output Speed Sensor Connector
8	Input Speed Sensor Connector

Control Solenoid (w/Body and TCM) Valve Assembly Removal

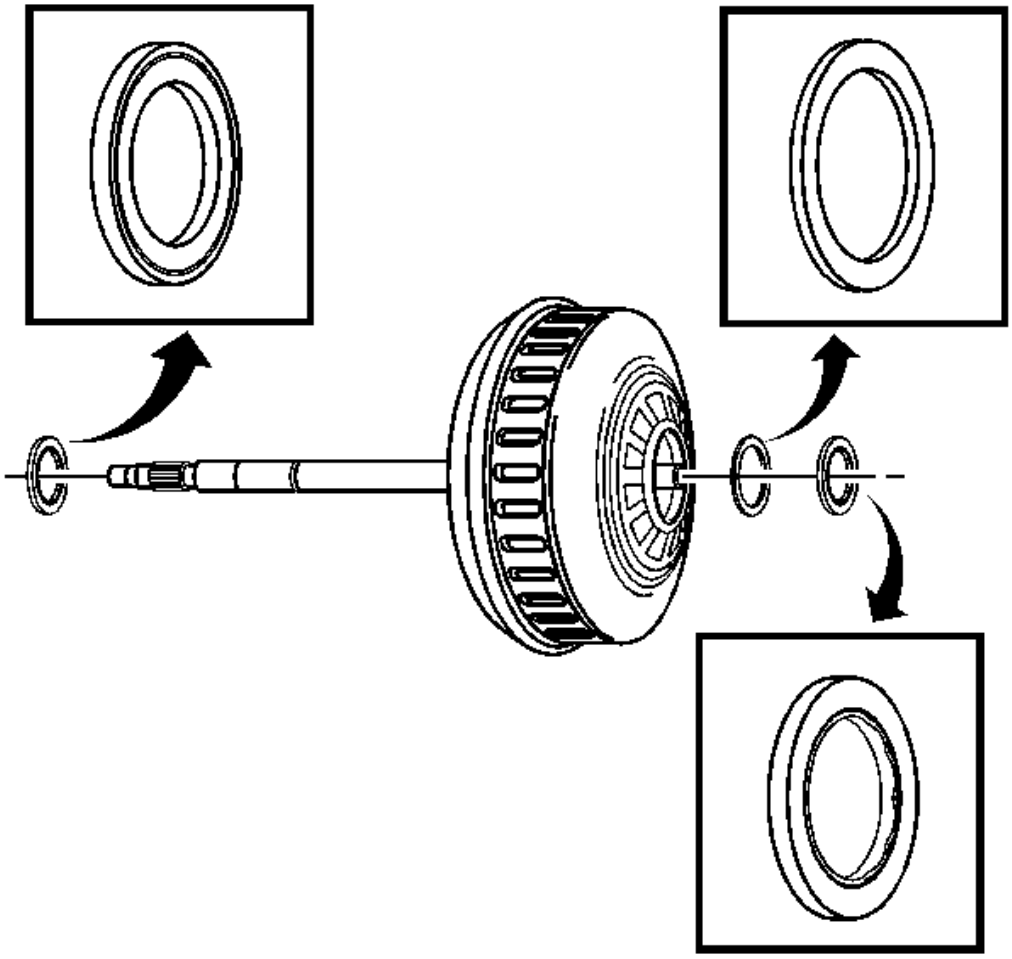

Fig. 4: Identifying Control Solenoid (w/Body & TCM) Valve Assembly
Courtesy of GENERAL MOTORS CORP.

Control Solenoid (w/Body and TCM) Valve Assembly Removal

Callout	Component Name

1	Control Valve Body Bolt M6 x 80 (Qty: 4)
2	Control Solenoid Valve Spring
3	Control Valve Body Bolt M6 x 65 (Qty: 2)
4	Control Valve Body Bolt M6 x 42 (Qty: 1)
5	Control Valve Body Bolt M6 x 95 (Qty: 3)
6	Control Valve Body Bolt M6 x 55 (Qty: 1)
7	Control Solenoid (w/Body and TCM) Valve Assembly
8	Control Solenoid Valve Assembly Filter Plate **CAUTION:** **Use care when removing or installing the filter plate assembly. A broken or missing retaining tab may not adequately secure the filter plate to the control solenoid valve assembly, resulting in possible damage or contamination.** **Tip:** • Discard the filter plate. It is not reusable. • Inspect the pressure switch manifold seals for damage. Replace the control valve assembly as necessary.

Control Valve Body Assembly and Output Speed Sensor Removal

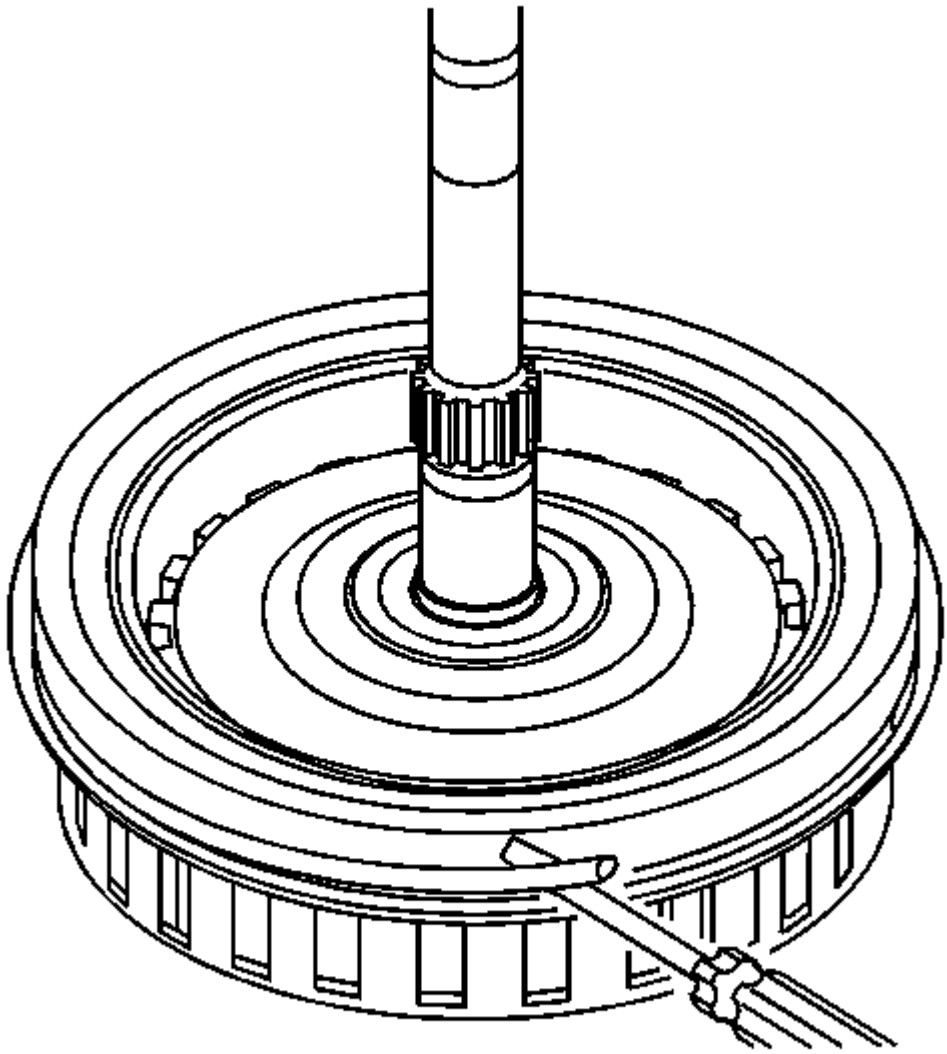

Fig. 5: Identifying Control Valve Body Assembly & Output Speed Sensor
Courtesy of GENERAL MOTORS CORP.

Control Valve Body Assembly and Output Speed Sensor Removal

Callout	Component Name
1	Control Valve Body Bolt M6 x 65 (Qty: 8)
2	Control Valve Body Bolt M6 x 55 (Qty: 2)
3	Manual Shaft Detent Assembly
4	Control Valve Body Assembly

5	A/Trans Output Speed Sensor Bolt M6 x 25
6	A/Trans Output Speed Sensor
7	1-2-3-4 Clutch Fluid Passage Seal **Tip:** The seal is not reusable.

CASE COVER AND 3-5-REVERSE AND 4-5-6 CLUTCH HOUSING REMOVAL

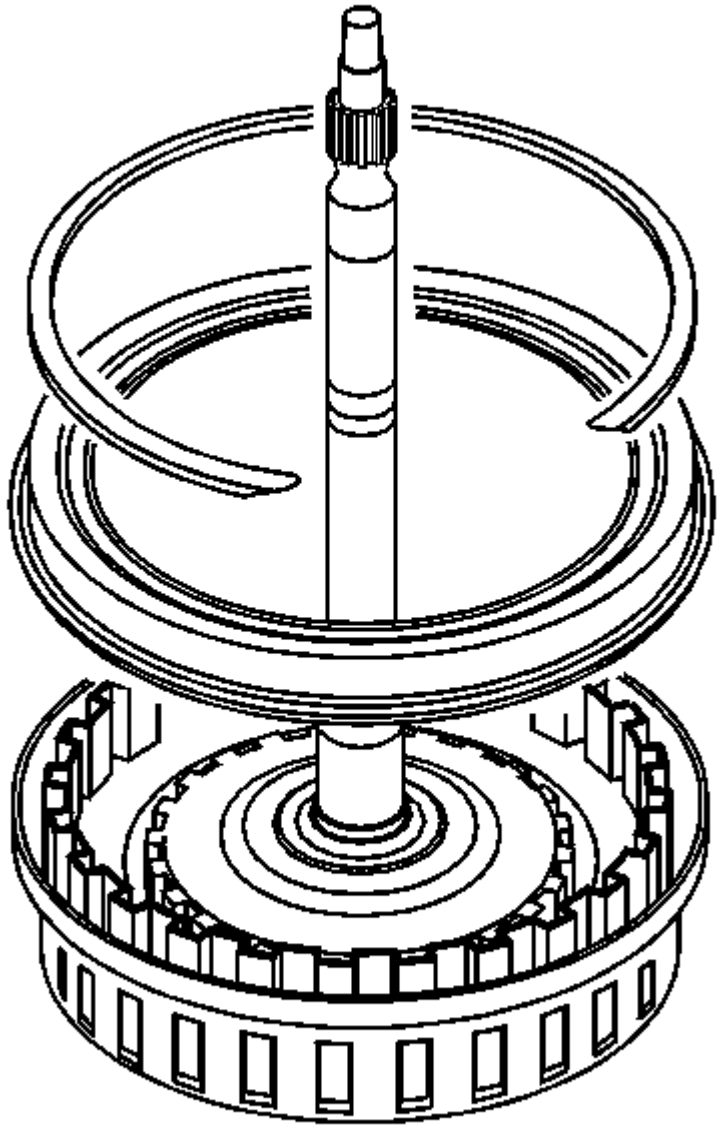

Fig. 6: Identifying Case Cover, 3-5-Reverse & 4-5-6 Clutch Housing
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	A/Trans Case Cover Assembly Bolt M6 x 30 (Qty: 10)
2	A/Trans Case Cover Assembly **CAUTION:** **Use care when pulling the input speed sensor wire harness through the case to avoid damaging the harness.**
3	A/Trans Case Cover Gasket **Tip:** The gasket is not reusable.
4	Input Shaft Thrust Bearing Assembly **Tip:** The bearing may be stuck to the case cover.
5	3-5 Rev/4-5-6 Clutch Housing Assembly

REACTION CARRIER HUB AND 2-6 CLUTCH PLATE REMOVAL

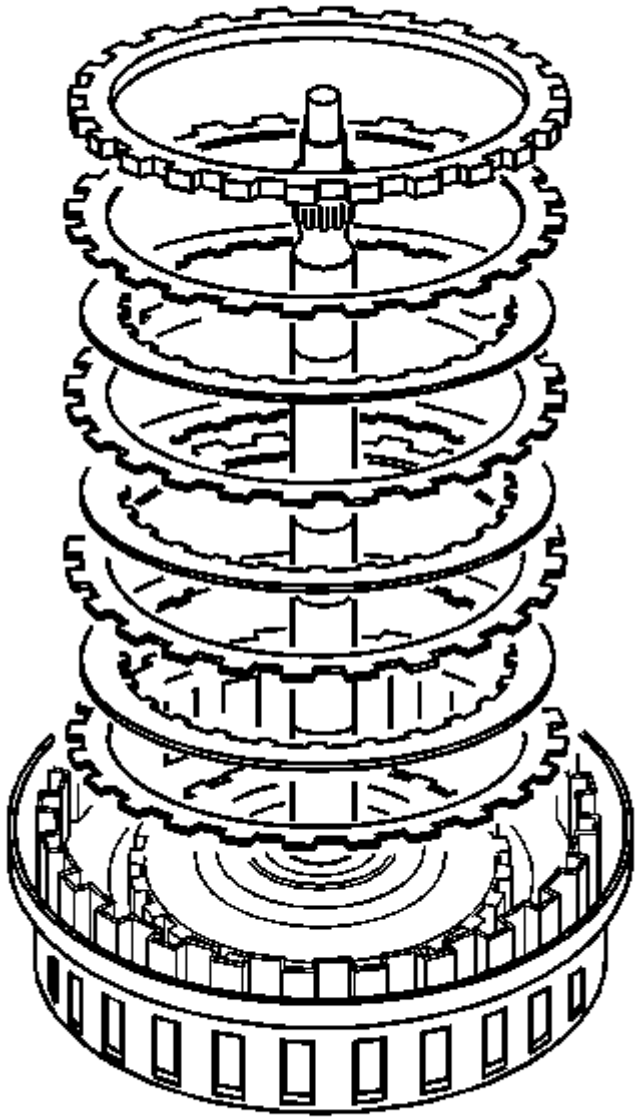

Fig. 7: Identifying Reaction Carrier Hub & 2-6 Clutch Plate
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	2-6 Clutch Hub Thrust Bearing Assembly **Tip:** The 2-6 clutch hub thrust bearing assembly may be stuck to the reaction carrier hub assembly.
2	Reaction Sun Gear Assembly

3	2-6 Clutch Cushion Spring
4	2-6 Clutch Plate (Qty: 3)
5	2-6 Clutch (w/Friction Material) Plate Assembly (Qty: 3)
6	2-6 Clutch Backing Plate

INPUT, REACTION, AND OUTPUT CARRIER REMOVAL

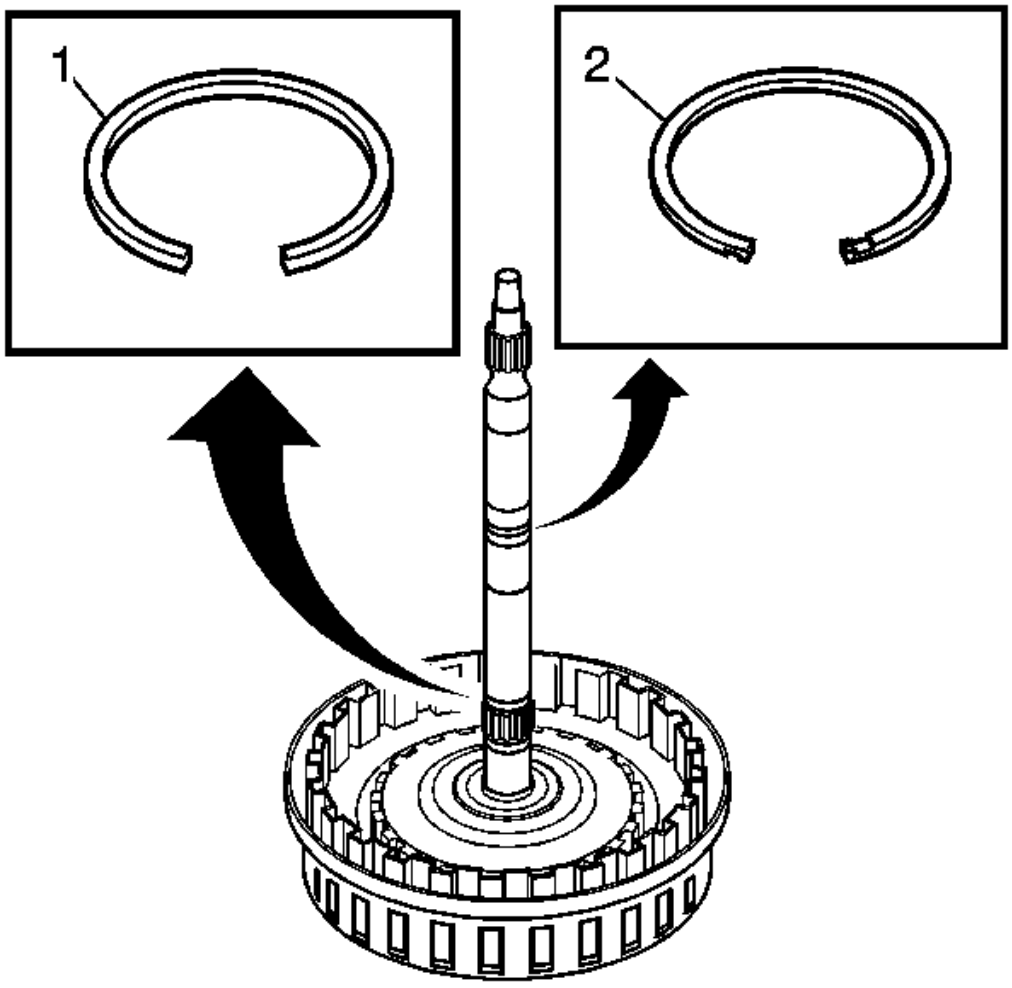

Fig. 8: View Of Input, Reaction & Output Carriers
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name

1	Reaction (w/Input Internal Gear) Carrier Assembly
2	Input Carrier Thrust Bearing Assembly
3	Input Sun Gear Thrust Bearing Assembly
4	Input (w/Output Internal Gear) Carrier Assembly
5	Input Sun Gear
6	Output Carrier Thrust Bearing Assembly
7	Output Carrier Thrust Bearing Assembly
8	Output Carrier Assembly
9	Output Sun Gear Assembly
10	Front Differential Transfer Drive Gear Input Hub Bearing Assembly
11	Output Carrier Transfer Drive Gear Hub Assembly
12	Output Carrier Transfer Drive Gear Hub Bearing Assembly **Tip:** The bearing may be stuck to the support assembly.

LOW AND REVERSE CLUTCH PLATE REMOVAL

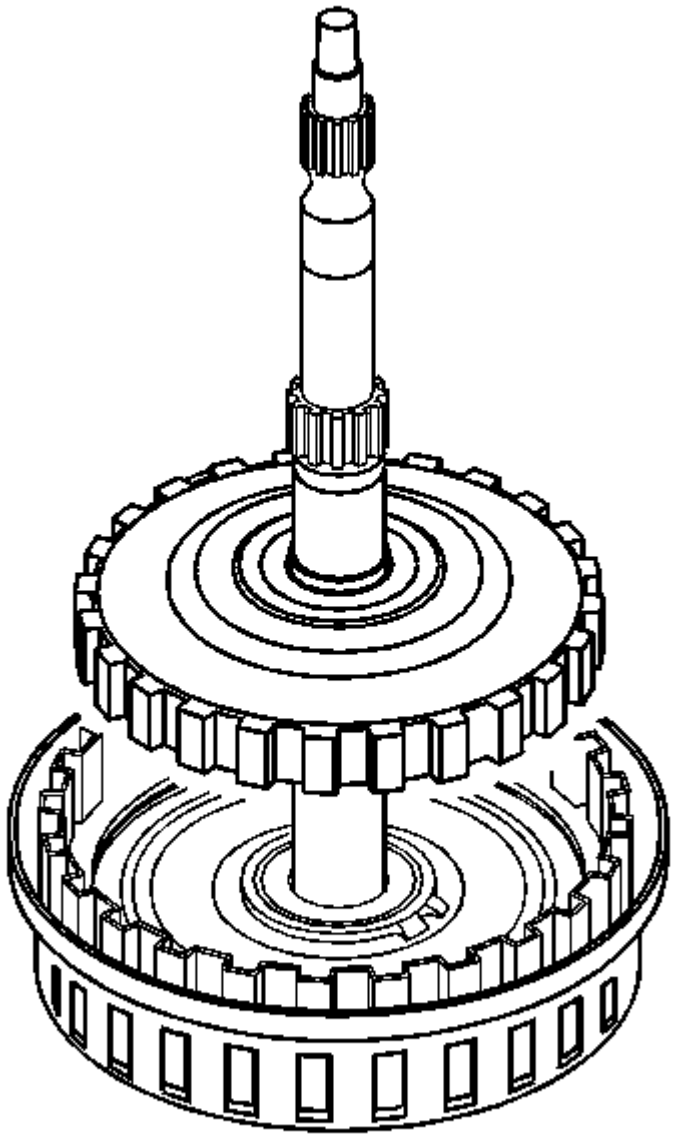

Fig. 9: Identifying Low & Reverse Clutch Plate
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Low and Reverse Clutch Cushion (Waved) Spring
2	Low and Reverse Clutch Apply Plate
	Low and Reverse Clutch (w/Friction Material)

3	Plate Assembly (Qty: 4)
4	Low and Reverse Clutch Plate (Qty: 3)
5	Low and Reverse Clutch Backing Plate

LOW AND REVERSE CLUTCH AND 1-2-3-4 CLUTCH PLATE REMOVAL

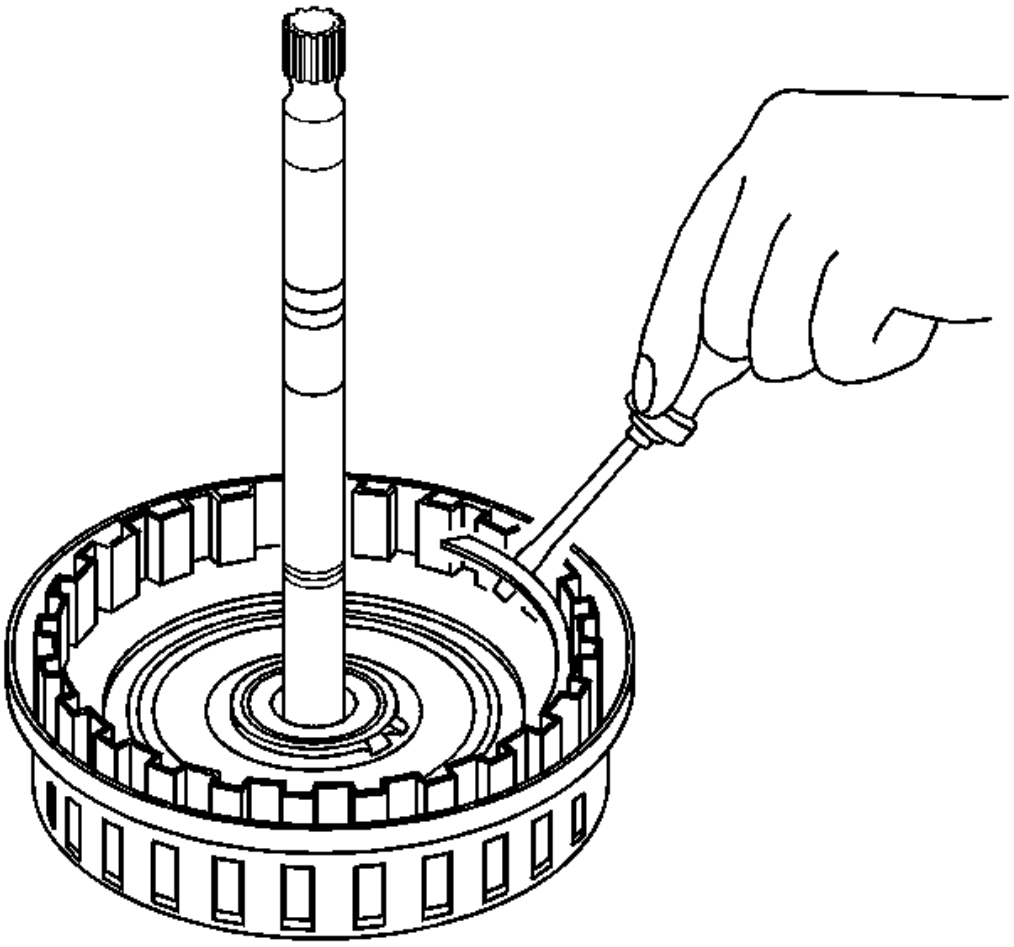

Fig. 10: Identifying Low, Reverse Clutch & 1-2-3-4 Clutch Plates
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Low and Reverse Clutch Retainer Ring
2	Low and Reverse Clutch Assembly
	1-2-3-4 Clutch (w/Friction Material) Plate Assembly

3	(Qty: 2)
4	1-2-3-4 Clutch Plate (Qty: 2)
5	1-2-3-4 Clutch (Waved) Plate
6	1-2-3-4 Clutch Spring Retainer Ring
7	1-2-3-4 Clutch Spring
8	1-2-3-4 Clutch Piston **Tip:** • Use pliers to remove the piston. • Inspect the piston seals for damage and/or wear. The piston is reusable.

TORQUE CONVERTER AND DIFFERENTIAL HOUSING, FRONT DIFFERENTIAL TRANSFER DRIVE GEAR, AND FRONT DIFFERENTIAL CARRIER REMOVAL

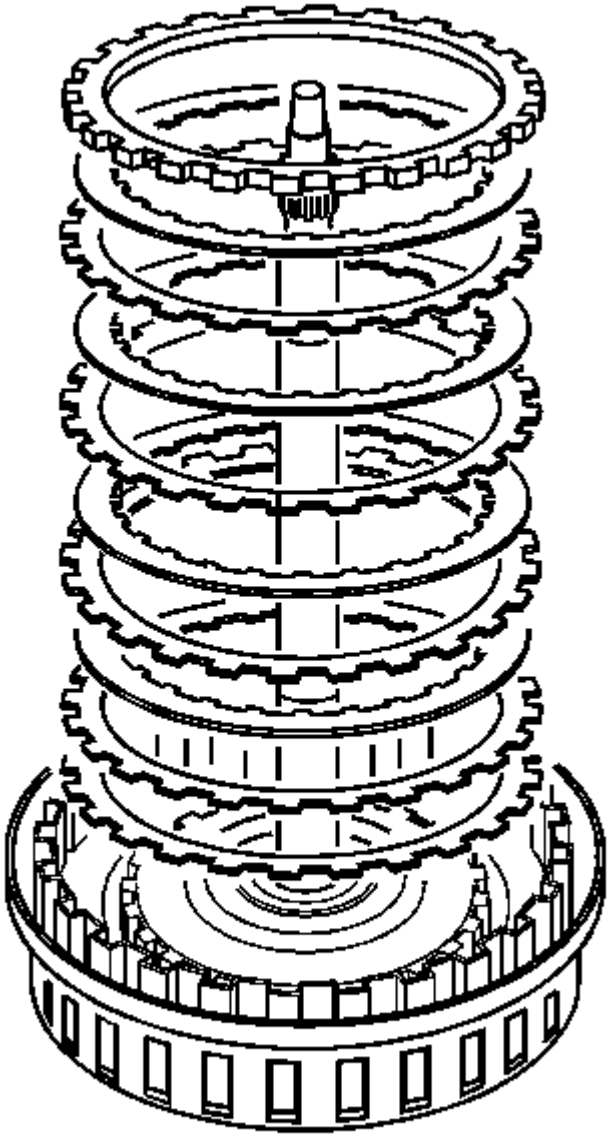

Fig. 11: Identifying Torque Converter, Differential Housing, Front Differential Transfer Drive Gear & Front Differential Carrier
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Torque Converter and Differential Housing Bolt M8 x 35 (Qty: 17)

2	Torque Converter, Support and A/Trans Fluid Pump Housing Assembly
3	Torque Converter Housing Outer Seal **Tip:** The seal is not reusable.
4	Front Differential Drive Pinion Gear Lube Tube
5	Front Differential Drive Pinion (w/Transfer Gear) Gear Assembly
6	Front Differential Carrier Assembly

FLUID TROUGH REMOVAL

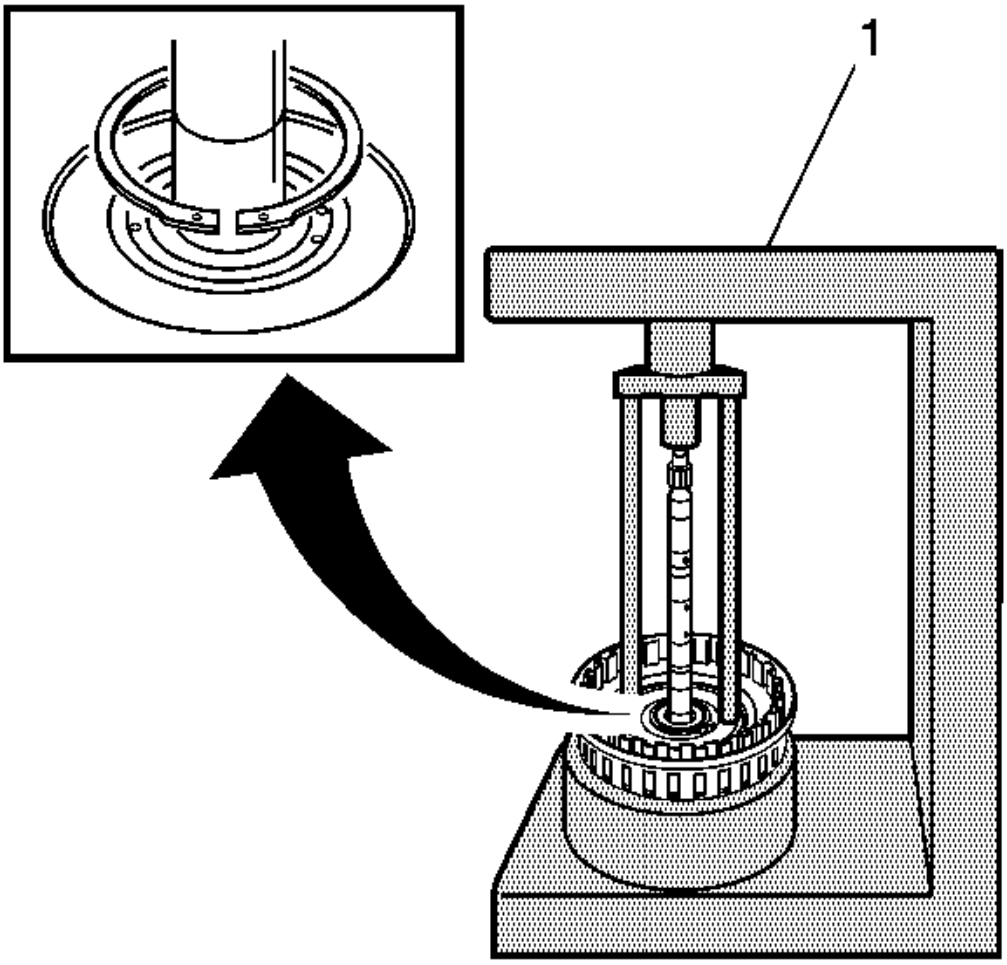

Fig. 12: Identifying Fluid Trough
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	A/Trans Fluid Trough Bolt M6 x 25 (Qty: 1)
2	A/Trans Fluid Trough
3	A/Trans Fluid Trough (O-Ring) Seal
4	A/Trans Fluid Pump Outlet Seal Assembly **Tip:** The seal assembly is not reusable.

MANUAL SHIFT DETENT LEVER WITH SHAFT POSITION SWITCH ASSEMBLY AND PARK PAWL ACTUATOR REMOVAL

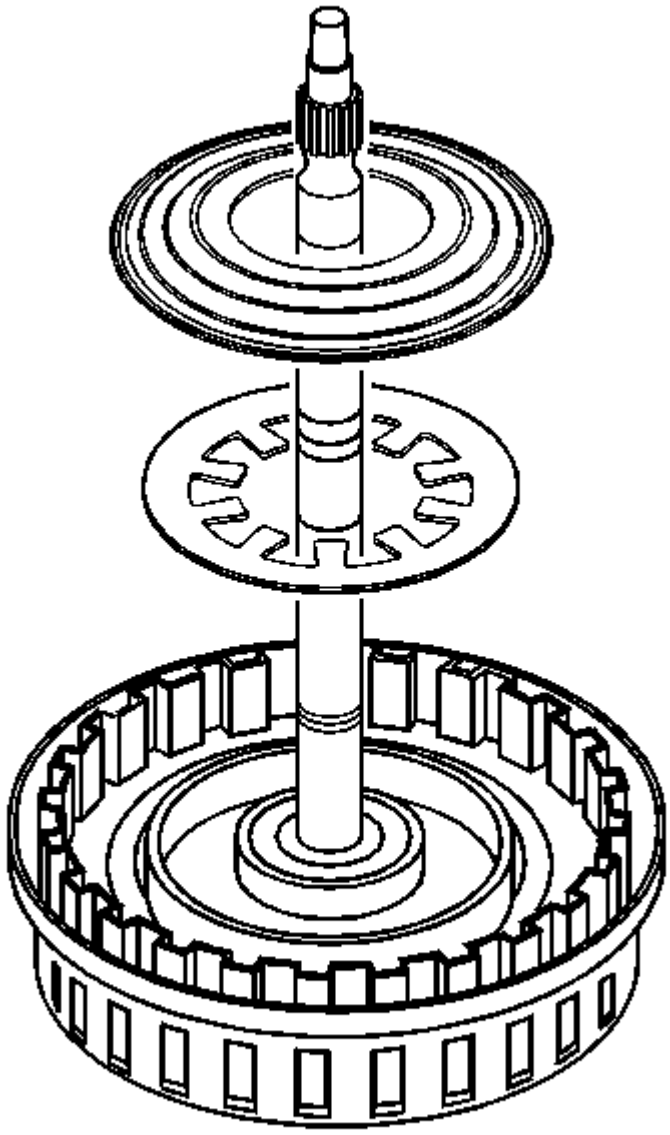

Fig. 13: Identifying Manual Shift Detent Lever With Shaft Position Switch Assembly & Park Pawl Actuator
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Park Pawl Actuator Bracket Bolt M6 x 25 (Qty: 2)
2	Park Pawl Actuator Bracket

3	Park Pawl Shaft
4	Park Pawl
5	Park Pawl Spring
6	Park Pawl Actuator Guide Pin
7	Park Pawl Actuator Guide
8	Manual Shift Detent Lever Pin **Tip:** • Use a small nail puller or other suitable tool. • Discard the pin. The pin is not reusable. **Special Tools** • **J 6125-1B:** Slide Hammer with Adapter • **J 23129:** Universal Seal Remover For equivalent regional tools, refer to **Special Tools** .
9	Manual Shaft Detent (w/Shift Position Switch) Lever Assembly **Tip:** Rotate the assembly counterclockwise so the actuator rod will fit through the case opening.
10	Park Pawl Actuator Assembly

MANUAL SHIFT SHAFT SEAL REPLACEMENT

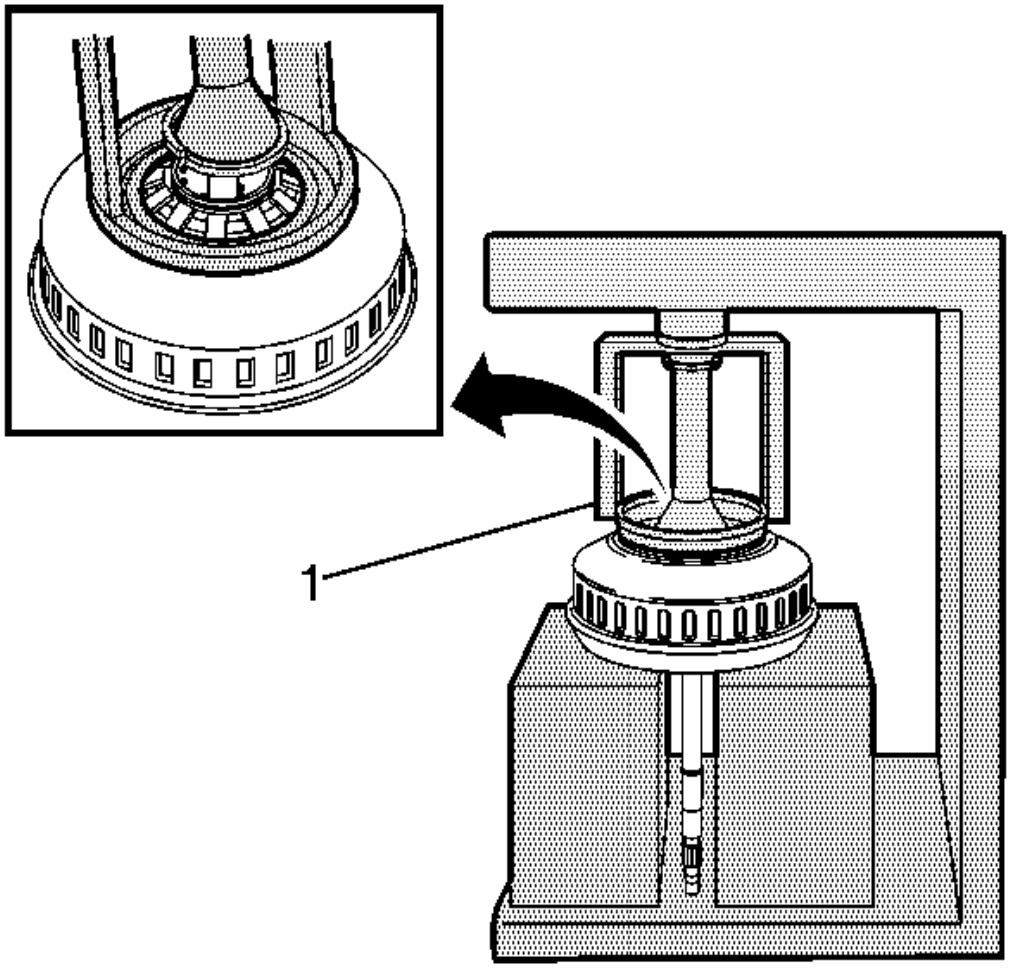

Fig. 14: Identifying Manual Shift Shaft Seal
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Manual Shift Shaft Seal **Special Tools** • **J 45201:** Cooler Line Seal Remover • **J 46626:** Seal Installer For equivalent regional tools, refer to **Special Tools** .

FRONT WHEEL DRIVE SHAFT SEAL REPLACEMENT - CASE SIDE

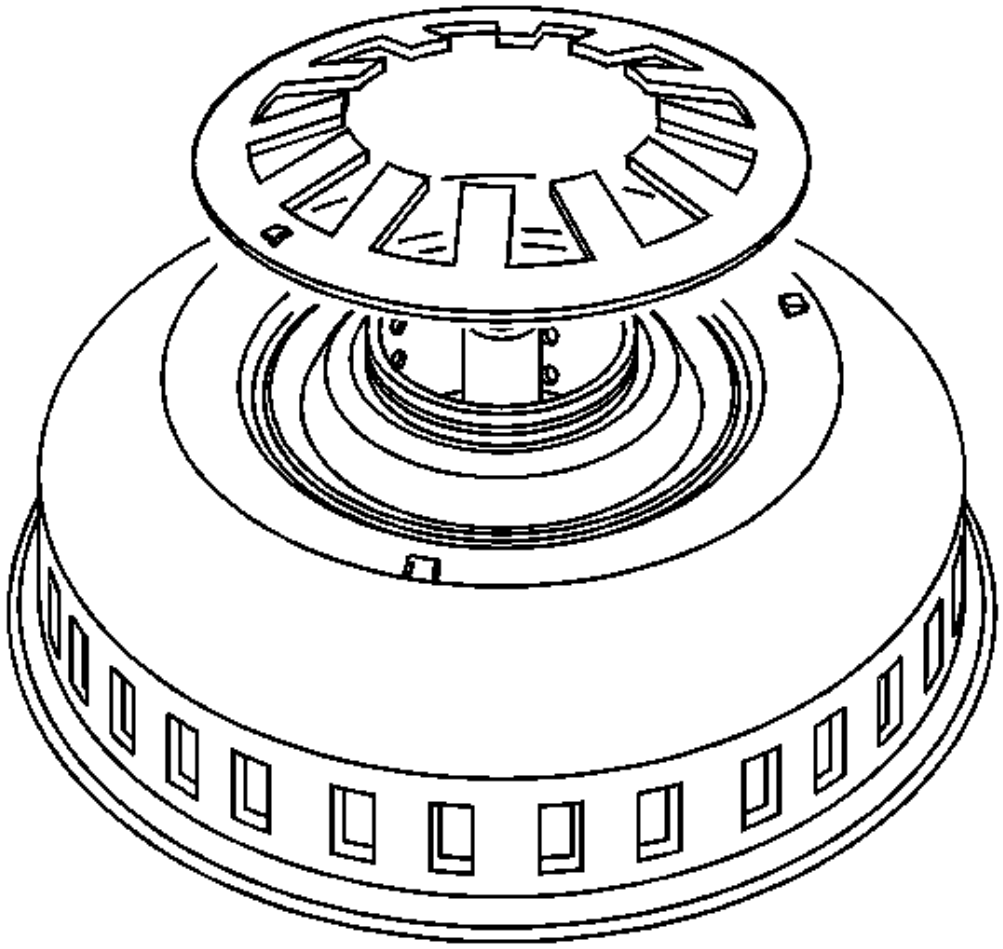

Fig. 15: Identifying Front Wheel Drive Shaft Oil Seal
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Front Wheel Drive Shaft Oil Seal Assemble **Tip:** Use the flat side of **J 46629-A:** seal installer to seat the seal to the case surface. **Special Tools** • **J 6125-1B:** Slide Hammer

	• **J 8092:** Driver Handle • **J 23129:** Universal Seal Remover • **J 46629-A:** Seal Installer For equivalent regional tools, refer to **Special Tools** .

FRONT DIFFERENTIAL CARRIER BEARING CUP REPLACEMENT - CASE SIDE

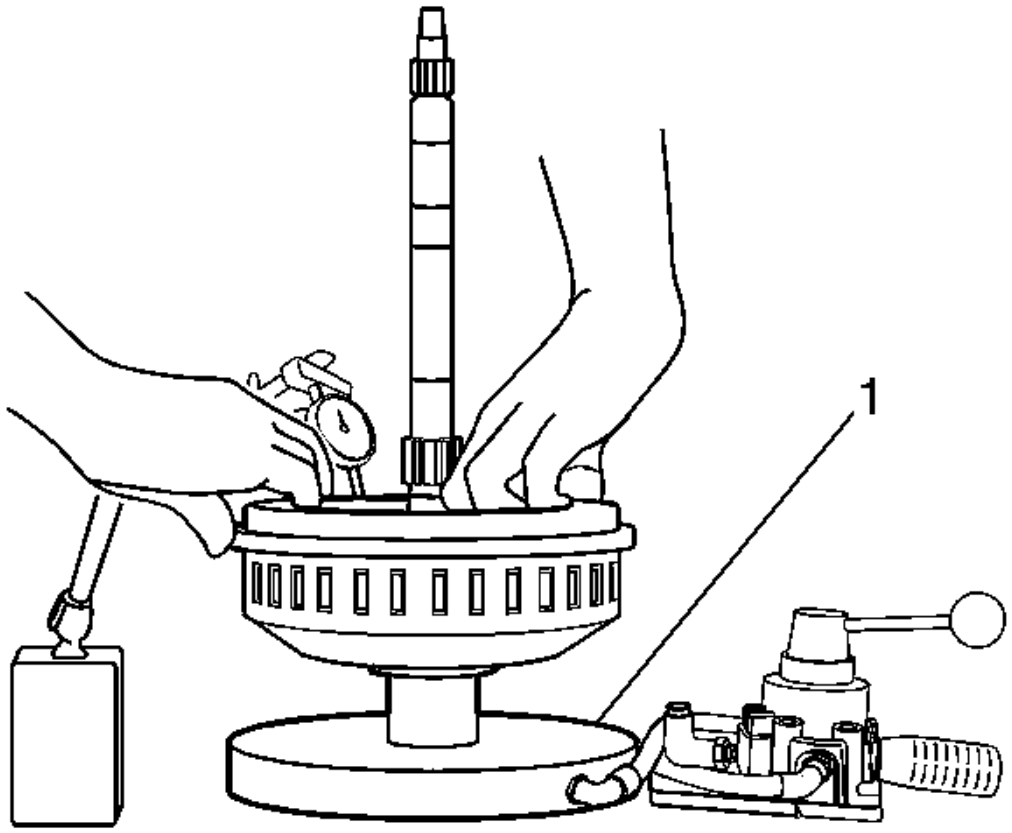

Fig. 16: Identifying Front Differential Carrier Bearing Cup
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
	Front Differential Bearing Cup

1	**CAUTION:** **Support the back side of the case before installing the bearing cup. Apply a light coating of transmission fluid to the bore before pressing the cup into position. Install the bearing cup until it stops moving. Applying excessive pressure to the bearing cup once it is seated could cause damage to the case casting.** **CAUTION:** **An unseated or improperly installed bearing cup will result in premature bearing failure. Visually inspect the bearing cup to insure there is "no gap" between the case, thrust washer, and the bearing cup. Use of a feeler gage may assist in identifying a bearing cup that is not fully seated.** **CAUTION:** **Failure to apply the lubricant will cause damage to the bolt and nut threads.** **Tip:** • Tighten DT-47927-2 which is part of **DT-47927:** cup remover until it fits snugly on the bearing cup. • Adjust **J 45124:** removal bridge so it sits on the torque converter housing surface just beyond the bearing cup opening. • Apply the extreme pressure lubricant **J 23444-A:** extreme press lubricant to the puller bolt threads to prevent damage to the bolt threads during bearing cup removal. • Hold the puller bridge bolt and turn the nut to remove the bearing cup. **Special Tools** • **DT-47927:** Bearing Cup Remover • **J 23444-A:** Extreme Press Lubricant - 1/4 Ounce Tube • **J 45124:** Removal Bridge • **J-45087:** Bearing Cup Installer For equivalent regional tools, refer to **Special Tools** .

FRONT DIFFERENTIAL DRIVE PINION GEAR BEARING CUP AND LUBRICANT DAM REPLACEMENT

Removal

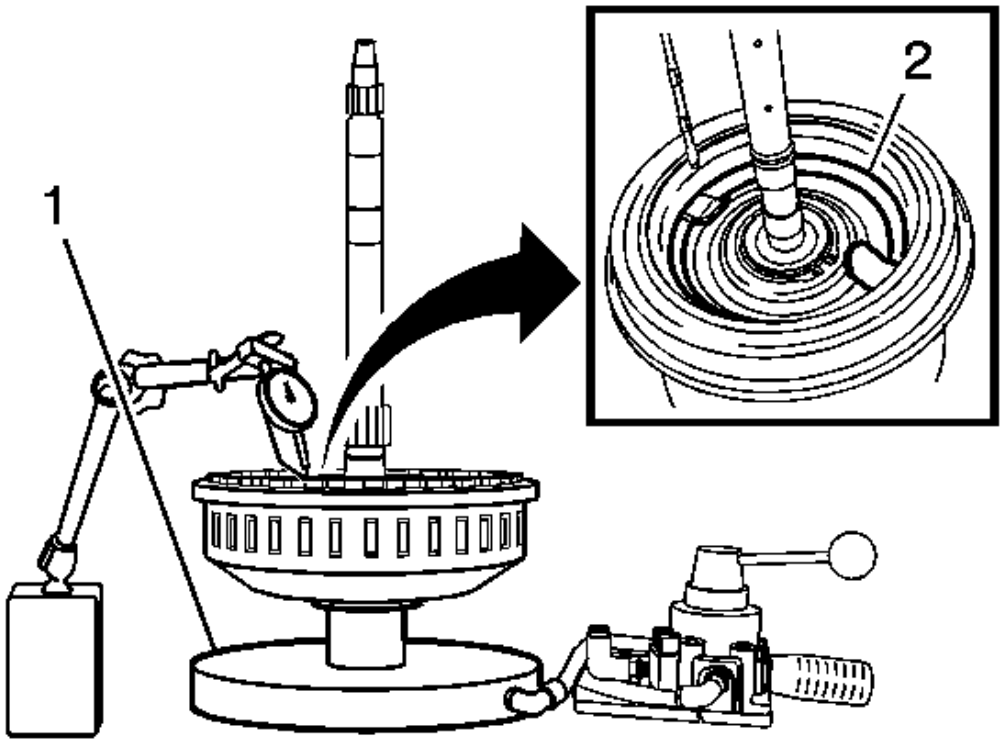

Fig. 17: Identifying Front Differential Drive Pinion Gear Bearing Cup & Lube Dam
Courtesy of GENERAL MOTORS CORP.

Removal

Callout	Component Name
	Front Differential Drive Pinion Gear Bearing Cup **CAUTION:** **Failure to apply the lubricant will cause damage to the bolt and nut threads.** **Tip:**

1	• Tighten **J-45094:** cup remover until it fits snugly on the bearing cup. • Adjust **J 45124:** removal bridge so it sits on the case surface just beyond the bearing cup opening. • Apply the extreme pressure lubricant **J 23444-A:** extreme press lubricant to the puller bolt threads to prevent damage to the bolt threads during bearing cup removal. • Hold the puller bridge nut and turn the bolt to remove the bearing cup. **Special Tools** • **J 23444-A:** Extreme Press Lubricant - 1/4 Ounce Tube • **J-45094:** Bearing Cup Remover • **J 45124:** Removal Bridge For equivalent regional tools, refer to **Special Tools** .
2	Front Differential Drive Pinion Gear Lube Dam **Special Tools** • **J 6125-1B:** Slide Hammer with Adapter • **DT-48055:** Lube Dam Removal For equivalent regional tools, refer to **Special Tools** .

Installation

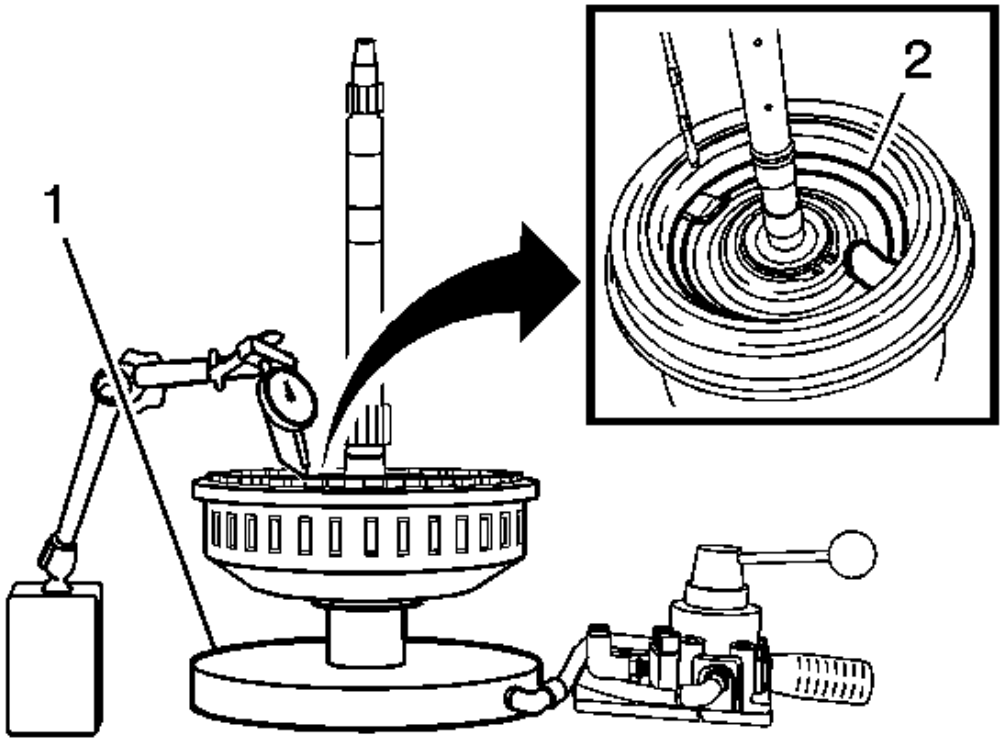

Fig. 18: View Of Front Differential Drive Pinion Gear Bearing Cup & Lube Dam
Courtesy of GENERAL MOTORS CORP.

Installation

Callout	Component Name
1	Front Differential Drive Pinion Gear Lube Dam **Special Tools** • **J 8092:** Driver Handle • **J-46630:** Lube Dam Installer For equivalent regional tools, refer to **Special Tools** .
	Front Differential Drive Pinion Gear Bearing Cup **CAUTION:** **Support the back side of the case before installing**

2	**the bearing cup. Apply a light coating of transmission fluid to the bore before pressing the cup into position. Install the bearing cup until it stops moving. Applying excessive pressure to the bearing cup once it is seated could cause damage to the case casting.** **CAUTION:** **An unseated or improperly installed bearing cup will result in premature bearing failure. Visually inspect the bearing cup to insure there is "no gap" between the case, thrust washer, and the bearing cup. Use of a feeler gage may assist in identifying a bearing cup that is not fully seated.** **Special Tools:** **J-45087:** Bearing Cup Installer For equivalent regional tools, refer to **Special Tools** .

TRANSMISSION CASE CLEANING AND INSPECTION

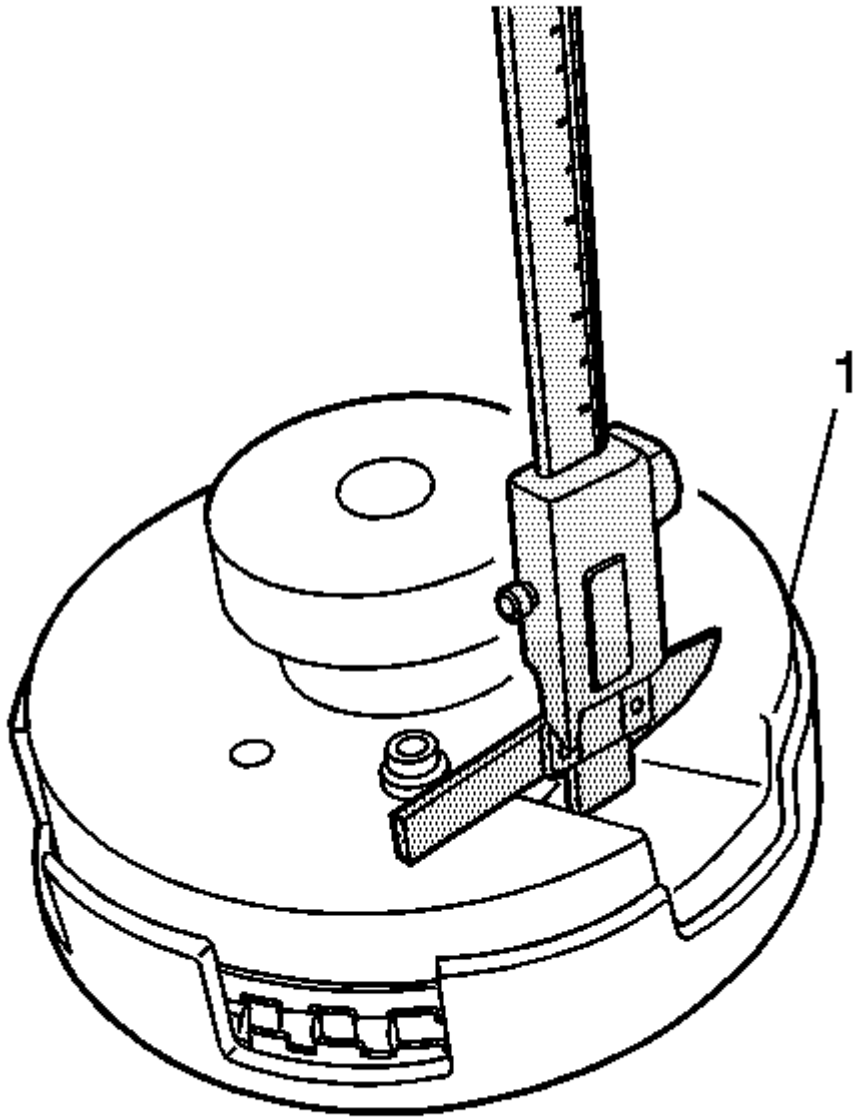

Fig. 19: Identifying Transmission Case Components
Courtesy of GENERAL MOTORS CORP.

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 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	Case Cover Sealing Surface
2	Manual Shift Shaft Seal Surface **Tip:** Refer to **Manual Shift Shaft Seal Replacement**.
3	Fluid Pressure Test Plug
4	Fluid Drain Plug
5	Control Valve Body Cover Sealing Surface
6	Torque Converter Housing Sealing Surface
7	Transmission Fluid Cooler Pipe Stud M8 x 30.5 (Qty: 2) **CAUTION:** **Refer to Fastener Caution .** **Tighten:** 12 N.m (106 lb in)
8	Transmission Case Cover Locator Pin **Procedure:** Inspect the locating pins to be fully seated in case.

MANUAL SHIFT DETENT LEVER WITH SHAFT POSITION SWITCH ASSEMBLY AND PARK PAWL ACTUATOR INSTALLATION

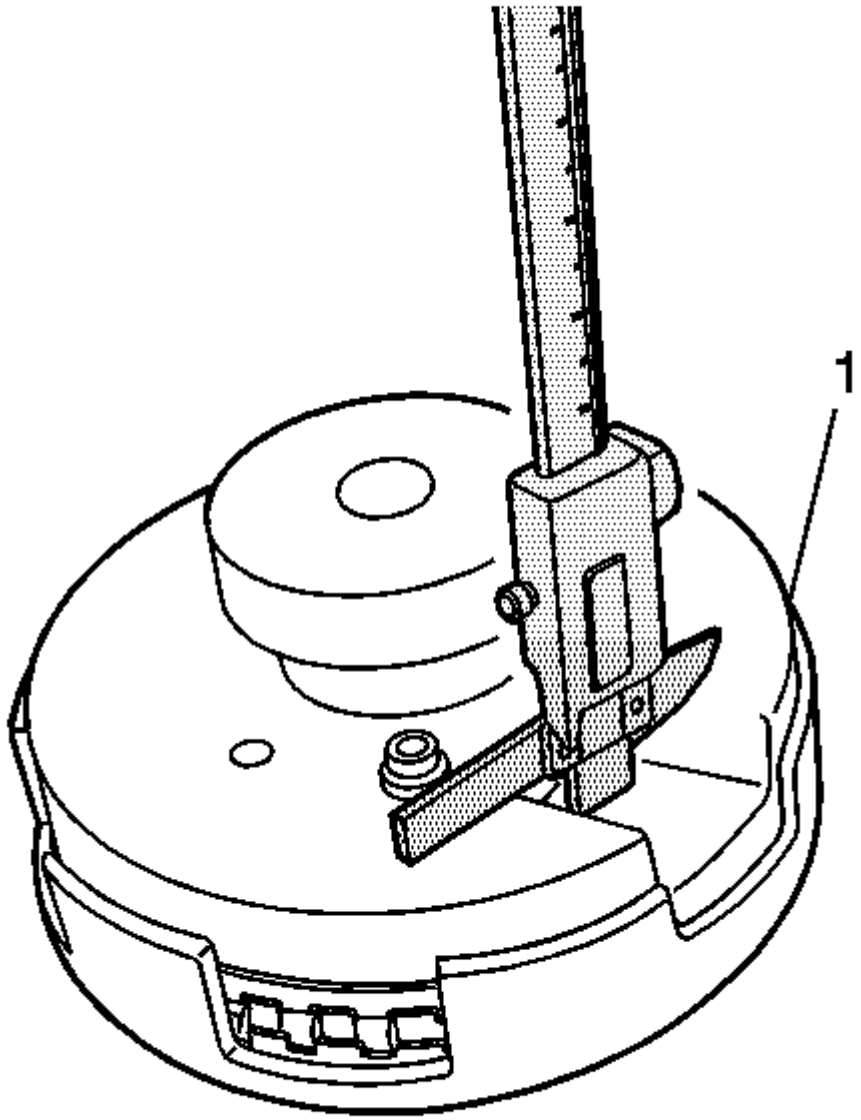

Fig. 20: Identifying Manual Shift Detent Lever With Shaft Position Switch Assembly & Park Pawl Actuator
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Park Pawl Actuator Guide
2	Park Pawl Actuator Guide Pin

3	Park Pawl
4	Park Pawl Shaft
5	Park Pawl Spring
6	Park Pawl Actuator Bracket
7	Park Pawl Actuator Bracket Bolt M6 x 25 (Qty: 2) **CAUTION:** **Refer to Fastener Caution .** **Tighten:** 12 N.m (106 lb in).
8	Park Pawl Actuator Assembly **Tip:** Install the park pawl actuator assembly onto the detent lever assembly.
9	Manual Shaft Detent (w/Shift Position Switch) Lever Assembly **Tip:** • Rotate the assembly clockwise so the actuator rod will fit through the case opening. • Lubricate shaft with ATF to prevent damage to the manual shift shaft seal.
10	Manual Shift Shaft Pin **CAUTION:** **Use J 41229 to install the manual shaft pin at the correct height in order to properly secure the manual shaft. If you install the pin too deep, the case bore may crack.** **Procedure** 1. Use a NEW pin to ensure proper engagement to the case. 2. Inspect pin installed height is within 6.5-7.5 mm (0.25-0.30 in). **Special Tools:** **J 41229:** Manual Shaft Pin Installer For equivalent regional tools, refer to **Special Tools** .

FLUID TROUGH INSTALLATION

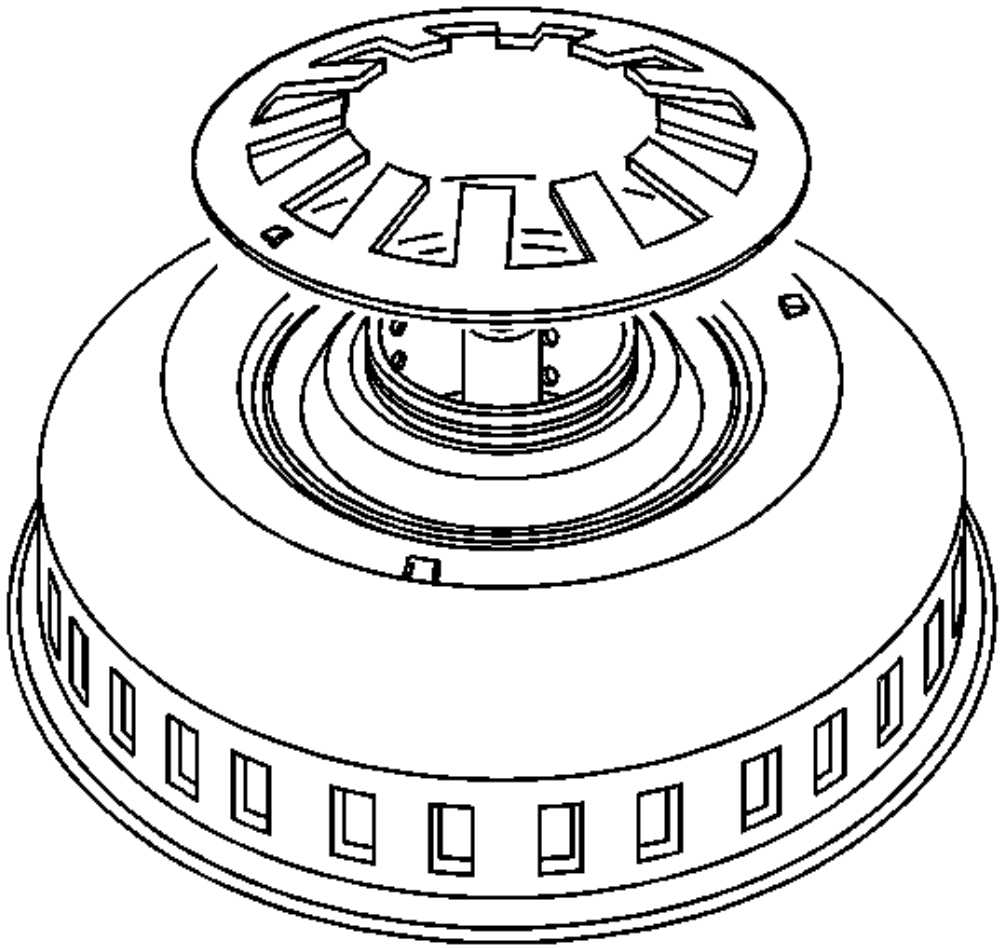

Fig. 21: Identifying Fluid Trough Components
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	A/Trans Fluid Pump Outlet Seal Assembly
2	A/Trans Fluid Trough (O-ring) Seal
3	A/Trans Fluid Trough
4	A/Trans Fluid Trough Bolt M6 x 25 (Qty: 1) **CAUTION:** **Refer to Fastener Caution .**

	Tighten: 12 N.m (106 lb in).

TORQUE CONVERTER AND DIFFERENTIAL HOUSING ASSEMBLY DISASSEMBLE

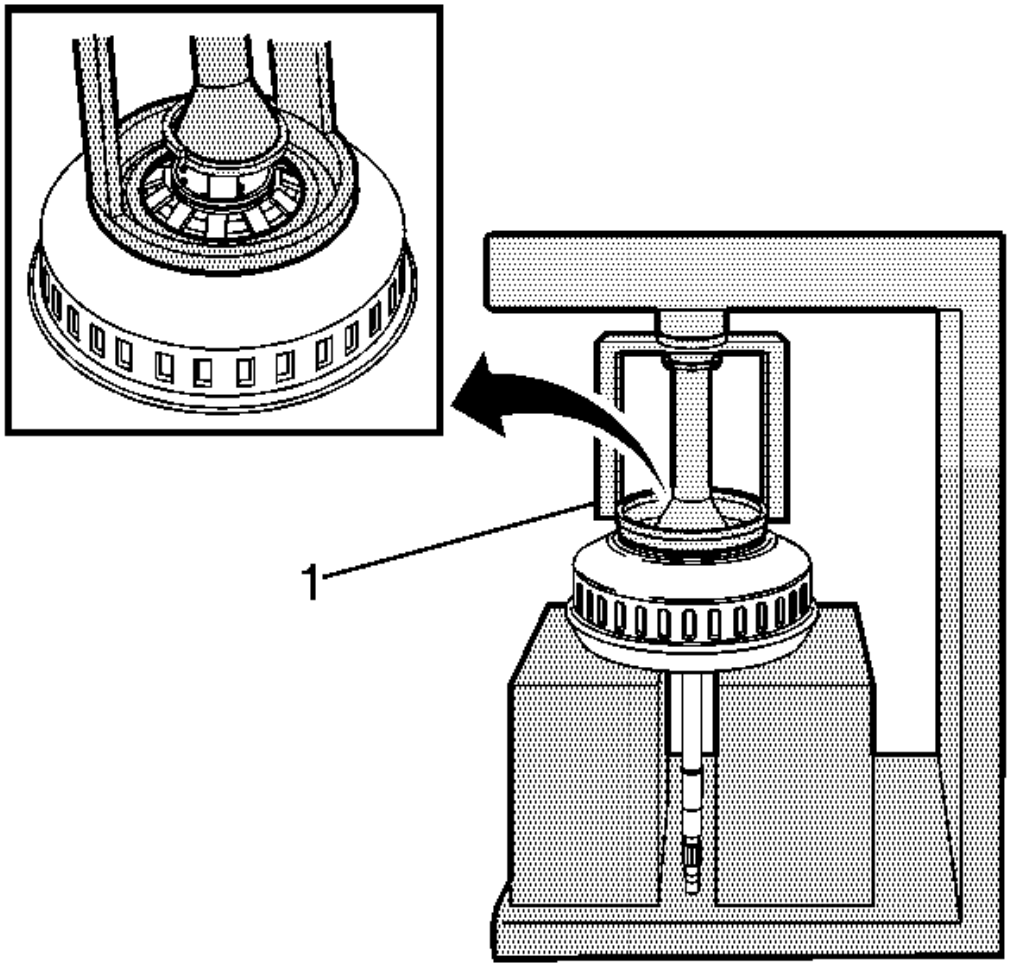

Fig. 22: Identifying Torque Converter & Differential Housing Assembly Components
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Front Differential Carrier Baffle Bolt M6 x 25
2	Front Differential Carrier Baffle
3	Front Differential Transfer Drive Gear Support Bolt M8 x 25 (Qty: 9)

4	Front Differential Transfer Drive Gear Support Assembly
5	Drive Sprocket Thrust Washer
6	A/Trans Fluid Pump Bolt M6 x 25 (Qty: 3)
7	A/Trans Fluid Pump Assembly
8	Drive Link Assembly **Tip:** Link and sprockets will be removed as an assembly.
9	Drive Sprocket Thrust Washer **Tip:** Drive sprocket thrust washer may be stuck to the torque converter housing.
10	Driven Sprocket Thrust Washer

FRONT DIFFERENTIAL CARRIER BEARING CUP AND WASHER REPLACEMENT - TORQUE CONVERTER HOUSING SIDE

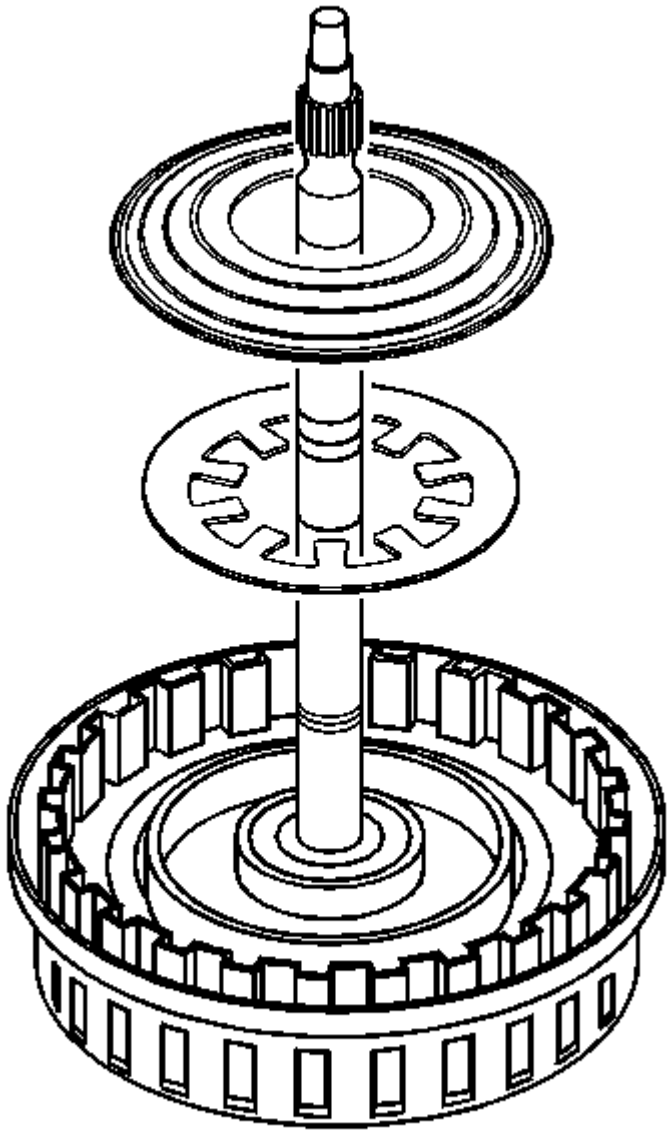

Fig. 23: Identifying Front Differential Carrier Bearing Cup & Washer
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedures • Do not install the bearing cup until after the selective washer measurement has been performed.	

- Install the correct differential bearing washer as determined by the thrust washer measurement procedure. Refer to **Front Differential Drive Pinion Gear Bearing Thrust Washer and Front Differential Bearing Washer Measurement**.

1	Front Differential Bearing Thrust Washer
2	Front Differential Carrier Bearing Cup **CAUTION:** **Support the back side of the torque converter housing before installing the bearing cup. Apply a light coating of transmission fluid to the bore before pressing the cup into position. 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 converter housing casting.** **CAUTION:** **An unseated or improperly installed bearing cup will result in premature bearing failure. Visually inspect the bearing cup to insure there is "no gap" between the converter housing, thrust washer, and the bearing cup. Use of a feeler gage may assist in identifying a bearing cup that is not fully seated.** **CAUTION:** **Failure to apply the lubricant will cause damage to the bolt and nut threads.** **Procedure** 1. Tighten DT 47927-1 which is part of **DT-47927:** bearing cup remover until it fits snugly on the bearing cup. 2. Adjust **J 45124:** remover bridge so it sits on the torque converter housing surface just beyond the bearing cup opening. 3. Apply the extreme pressure lubricant supplied with **J 23444-A:** extreme press lubricant 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-47927:** Bearing Cup Remover • **J 23444-A:** Extreme Press Lubricant - 1/4 Ounce

	Tube • **J-45087:** Bearing Cup Installer • **J 45124:** Remover Bridge For equivalent regional tools, refer to **Special Tools** .

FRONT DIFFERENTIAL DRIVE PINION BEARING CUP, WASHER, AND LUBRICANT DAM REPLACEMENT - TORQUE CONVERTER HOUSING SIDE

Bearing Cup, Washer and Lubricant Dam Removal

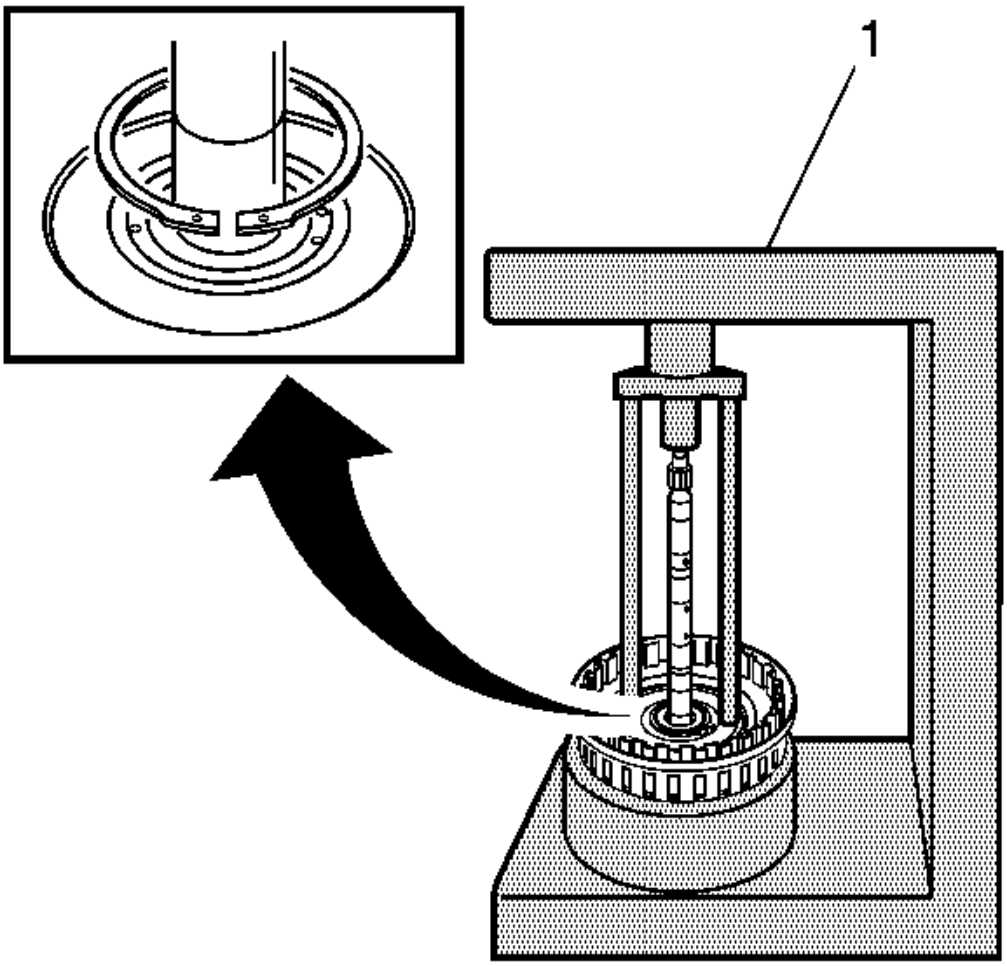

Fig. 24: View Of Front Differential Drive Pinion Bearing Cup, Washer & Lube Dam

Courtesy of GENERAL MOTORS CORP.

Bearing Cup, Washer and Lubricant Dam Removal

Callout	Component Name
Preliminary Procedure: Do not install the bearing cup until after the selective washer measurement has been performed.	
1	Front Differential Drive Pinion Gear Bearing Cup **CAUTION:** **Failure to apply the lubricant will cause damage to the bolt and nut threads.** **Procedure** 1. Tighten **J-45094:** bearing cup remover until it fits snugly on the bearing cup. 2. Adjust **J 45124:** removal bridge so it sits on the torque converter housing surface just beyond the bearing cup opening. 3. Apply the extreme pressure lubricant **J 23444-A:** extreme press lubricant 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 removal the bearing cup. **Special Tools** • **DT-47927:** Bearing Cup Remover • **J 23444-A:** Extreme Press Lubricant - 1/4 Ounce Tube • **J-45087:** Transfer Shaft and Differential Bearing Cup Installer • **J-45094:** Bearing Cup Remover • **J 45124:** Removal Bridge For equivalent regional tools, refer to **Special Tools** .
2	Front Differential Drive Pinion Gear Bearing Thrust Washer
	Front Differential Drive Pinion Gear Lube Dam **Special Tools** • **DT-48055:** Lube Dam Remover

3	• **J 6125-1B:** Slide Hammer with Adapter or equivalent For equivalent regional tools, refer to **Special Tools** .

Bearing Cup, Washer and Lubricant Dam Installation

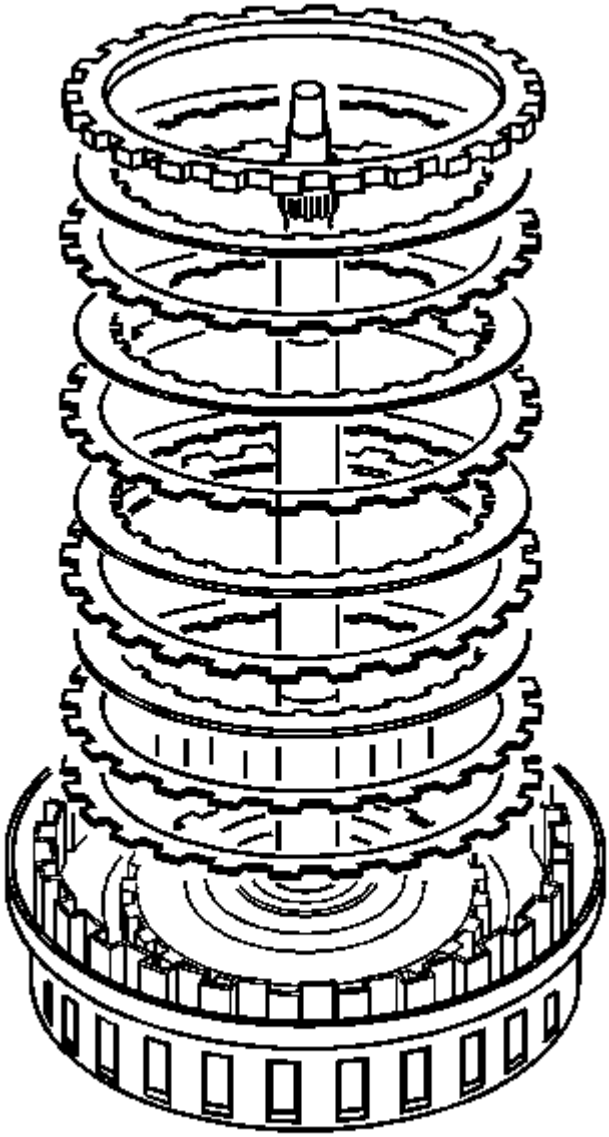

Fig. 25: Identifying Front Differential Drive Pinion Bearing Cup, Washer & Lube Dam
Courtesy of GENERAL MOTORS CORP.

Bearing Cup, Washer and Lubricant Dam Installation

Callout	Component Name
Preliminary Procedure: Do not install the bearing cup until after the selective washer measurement has been performed.	

1	Front Differential Drive Pinion Gear Lube Dam **Special Tools** • **J 8092:** Driver Handle • **J-46630:** Lube Dam Installer For equivalent regional tools, refer to **Special Tools** .
2	Front Differential Drive Pinion Gear Bearing Thrust Washer **Tip:** Install the correct drive pinion gear bearing thrust washer as determined by the thrust washer measurement procedure. Refer to **Front Differential Drive Pinion Gear Bearing Thrust Washer and Front Differential Bearing Washer Measurement**.
3	Front Differential Drive Pinion Gear Bearing Cup **CAUTION:** **Support the back side of the torque converter housing before installing the bearing cup. Apply a light coating of transmission fluid to the bore before pressing the cup into position. 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 converter housing casting.** **CAUTION:** **An unseated or improperly installed bearing cup will result in premature bearing failure. Visually inspect the bearing cup to insure there is "no gap" between the converter housing, thrust washer, and the bearing cup. Use of a feeler gage may assist in identifying a bearing cup that is not fully seated.** **Special Tools:** **J-45087:** Bearing Cup Installer For equivalent regional tools, refer to **Special Tools** .

FRONT WHEEL DRIVE SHAFT SEAL REPLACEMENT - TORQUE CONVERTER HOUSING SIDE

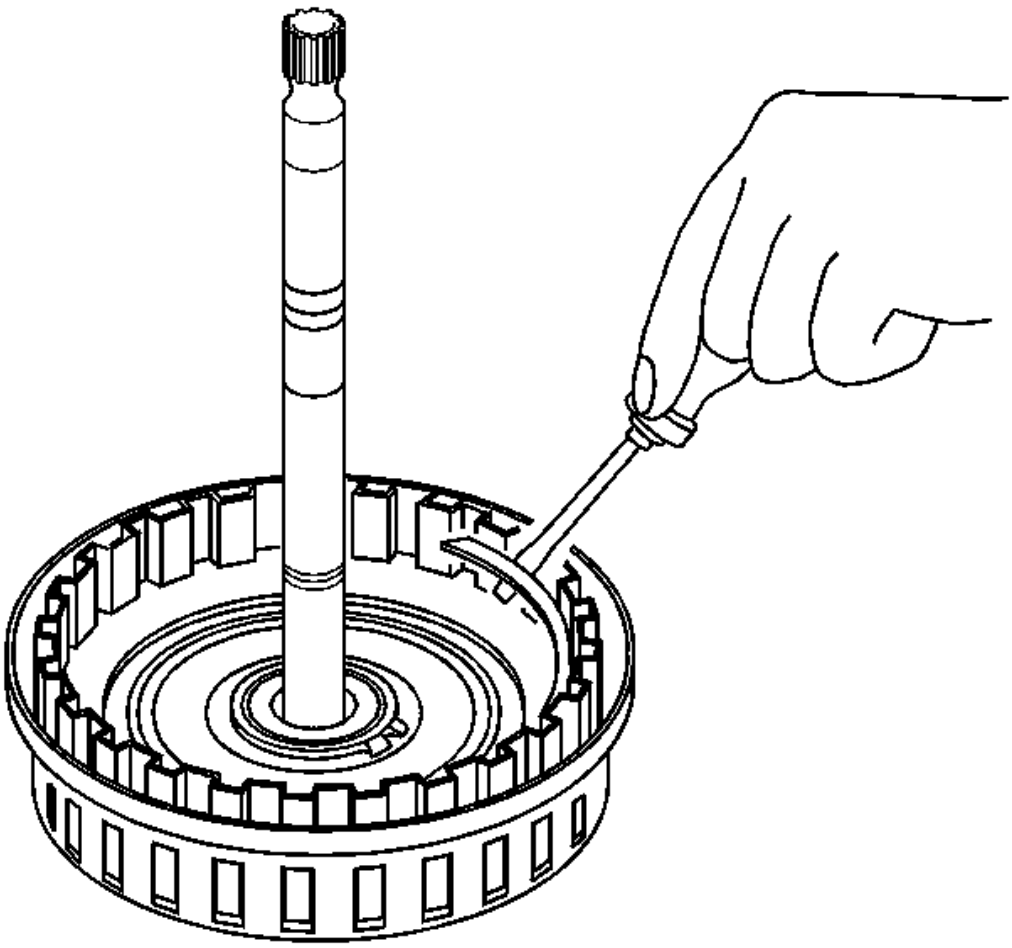

Fig. 26: Identifying Front Wheel Drive Shaft Oil Seal
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Torque Converter - Front Wheel Drive Shaft Oil Seal Assembly **Tip:** Use the open side of **J 46629-A:** seal installer to avoid seal lip damage and to install the seal to the proper depth. **Special Tools** • **J 6125-1B:** Slide Hammer with Adapter • **J 8092:** Driver Handle

	• **J 23129:** Universal Seal Remover • **J 46629-A:** Seal Installer For equivalent regional tools, refer to **Special Tools** .

TORQUE CONVERTER HOUSING CLEANING AND INSPECTION

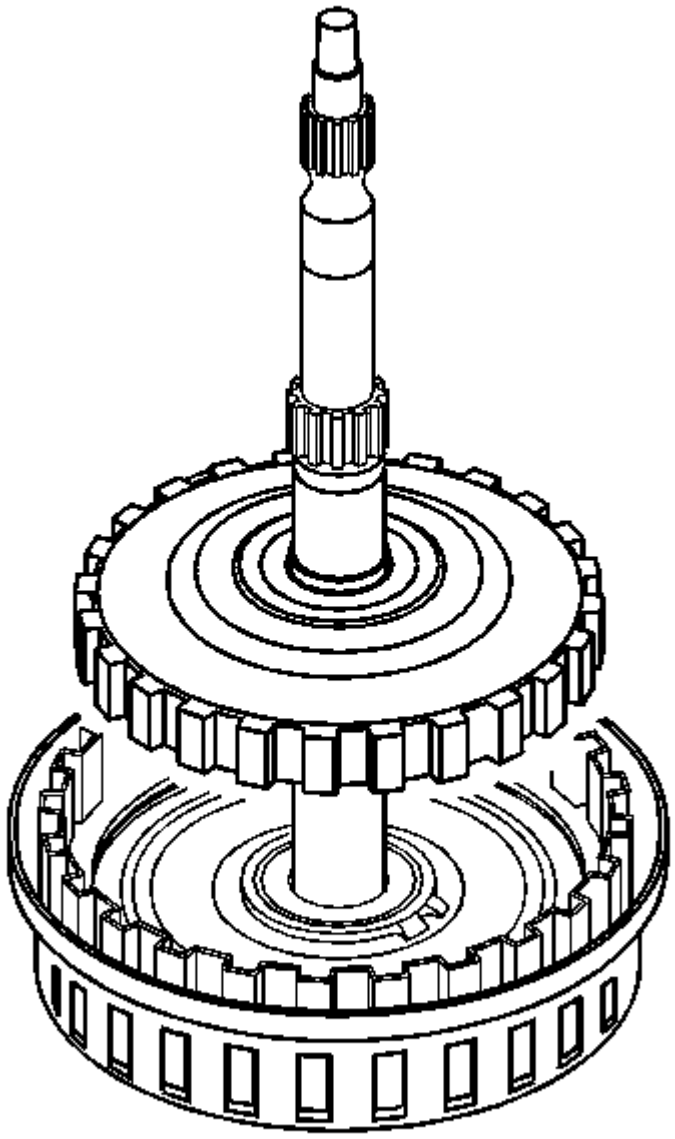

Fig. 27: Identifying Torque Converter Housing
Courtesy of GENERAL MOTORS CORP.

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:
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.

Preliminary Procedure: Thoroughly clean the torque converter and differential housing, including threads, with clean solvent.

1	Threaded Holes
2	Gasket Sealing Surfaces

TORQUE CONVERTER FLUID SEAL REPLACEMENT

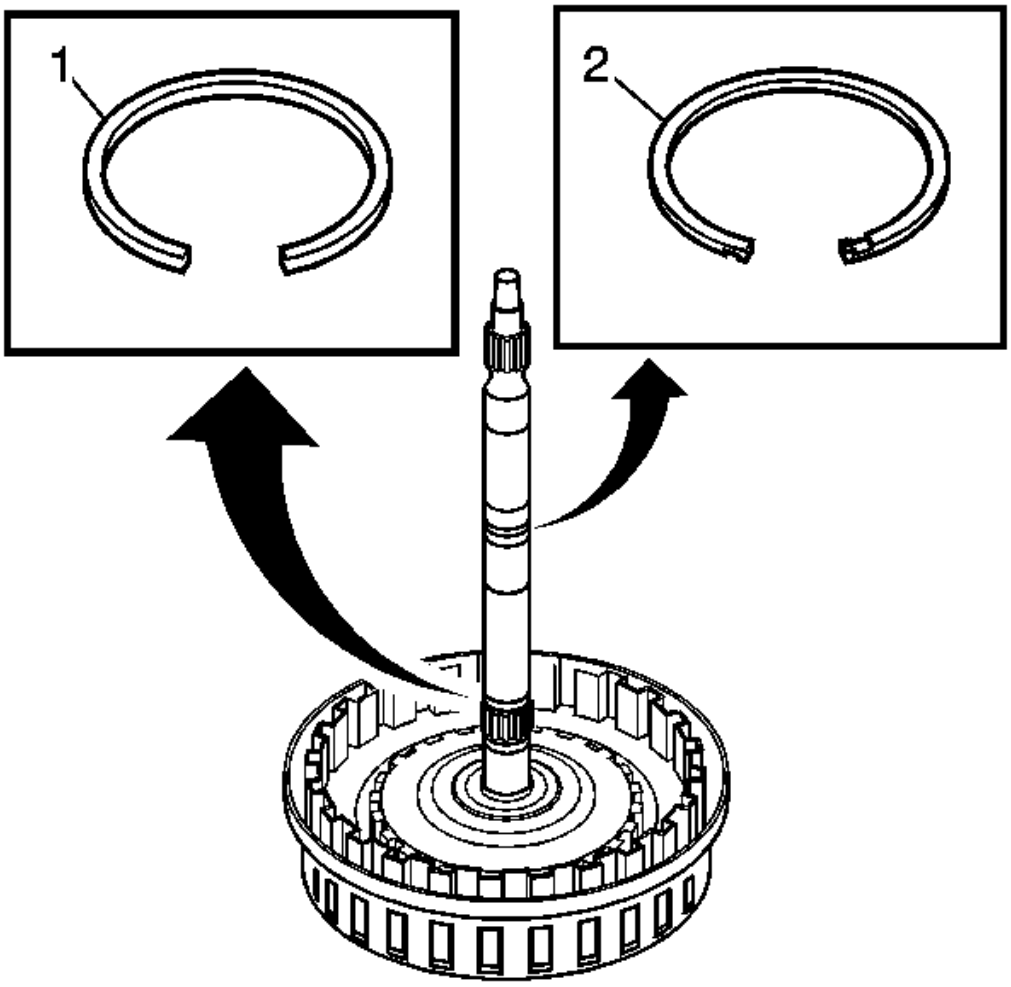

Fig. 28: Identifying Torque Converter Fluid Seal
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
	Torque Converter Fluid Seal **CAUTION:** **Support the back side of the torque converter housing while installing the seal. Install the seal until it stops moving. Applying excessive pressure to the seal once it is seated could cause damage to the torque converter housing casting.**

1	**Special Tools** • **J 6125-1B:** Slide Hammer with Adapter or equivalent • **J 23129:** Universal Seal Remover • **DT 49861:** Seal Installer For equivalent regional tools, refer to **Special Tools** .

FRONT DIFFERENTIAL TRANSFER DRIVE GEAR SUPPORT ASSEMBLY DISASSEMBLE

Seal Removal

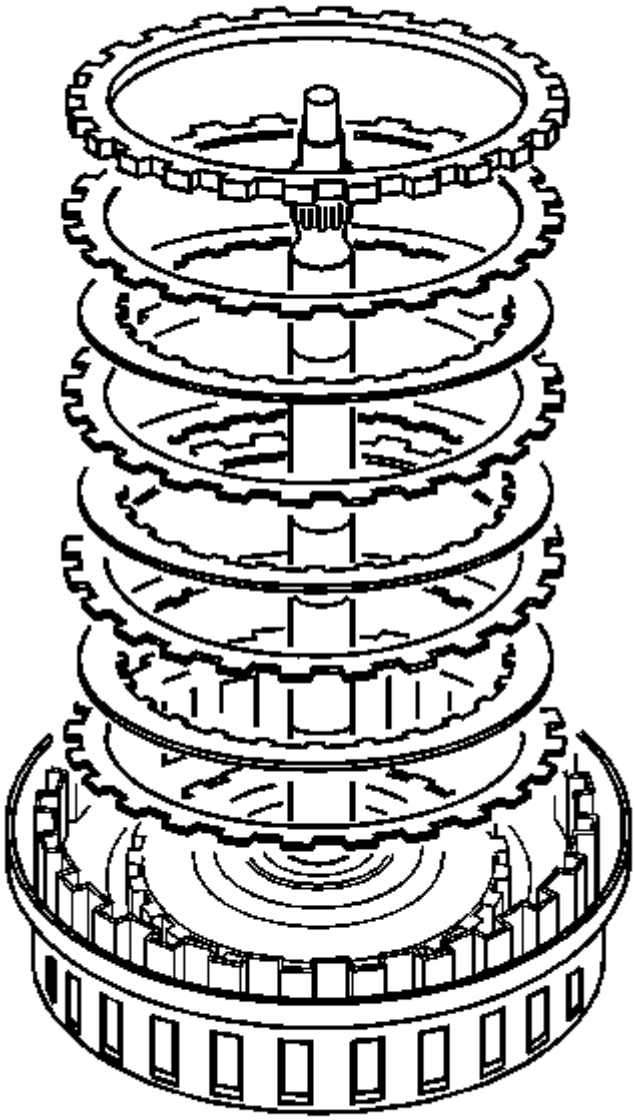

Fig. 29: Identifying Front Differential Transfer Drive Gear Support Seal
Courtesy of GENERAL MOTORS CORP.

Seal Removal

Callout	Component Name
CAUTION: **Do not remove the transfer drive gear bearing retaining nut. The drive gear and bearing are not serviceable. Removing the retaining nut will damage the support.**	

Preliminary Procedure • 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	Front Differential Transfer Drive Gear Support Seal **Special Tools** • **J 6125-1B:** Slide Hammer with Adapter or equivalent • **J 23129:** Universal Seal Remover For equivalent regional tools, refer to **Special Tools** .
2	Front Differential Transfer Drive Gear Support Torque Converter Fluid Seal Assembly

Fluid Passage Tube Removal

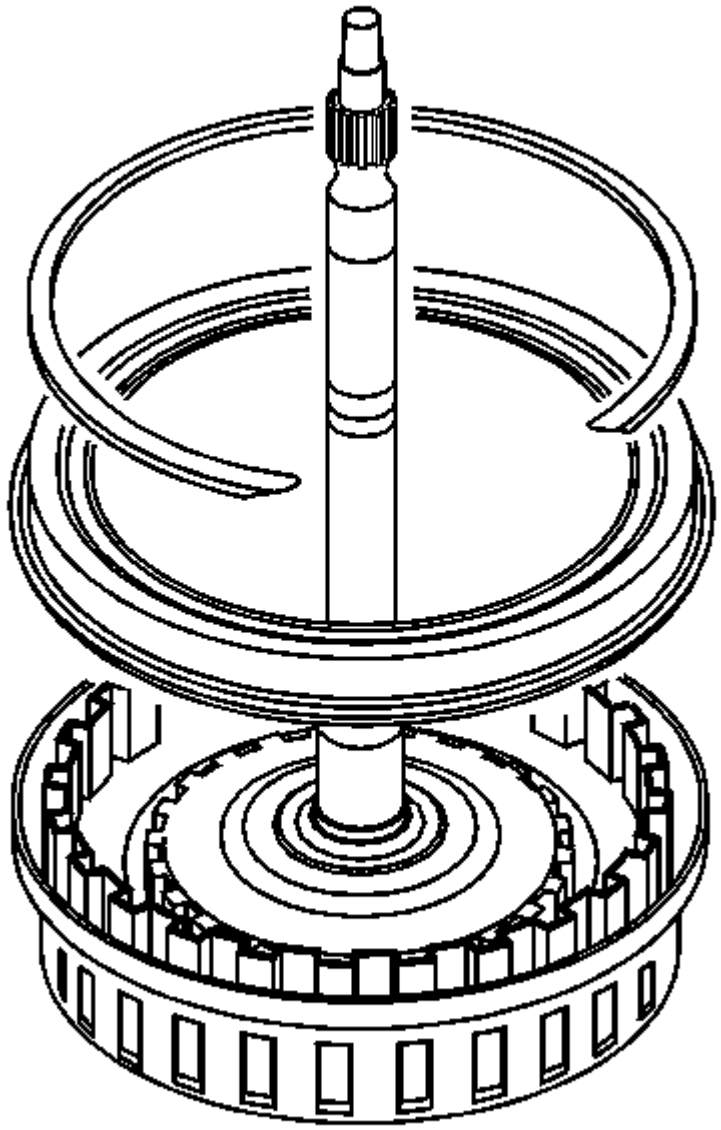

Fig. 30: Identifying Fluid Passage Tube Assembly
Courtesy of GENERAL MOTORS CORP.

Fluid Passage Tube Removal

Callout	Component Name
CAUTION: **Do not remove the transfer drive gear bearing retaining nut. The drive gear and bearing are not**	

serviceable. Removing the retaining nut will damage the support.

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.

1	Front Differential Transfer Drive Gear Fluid Passage Tube Bolt M6 x 15 (Qty: 2)
2	Front Differential Transfer Drive Gear Fluid Passage Tube Bolt M5 x 12 (Qty: 2)
3	Fluid Passage Tube Assembly **Tip:** Inspect the tubes for damage, wear or cracked welds.
4	Front Differential Transfer Drive Gear Support Fluid Passage Tube Gasket
5	Front Differential Transfer Drive Gear Support Seal

FRONT DIFFERENTIAL TRANSFER DRIVE GEAR SUPPORT ASSEMBLY ASSEMBLE

Drive Support Seal Installation

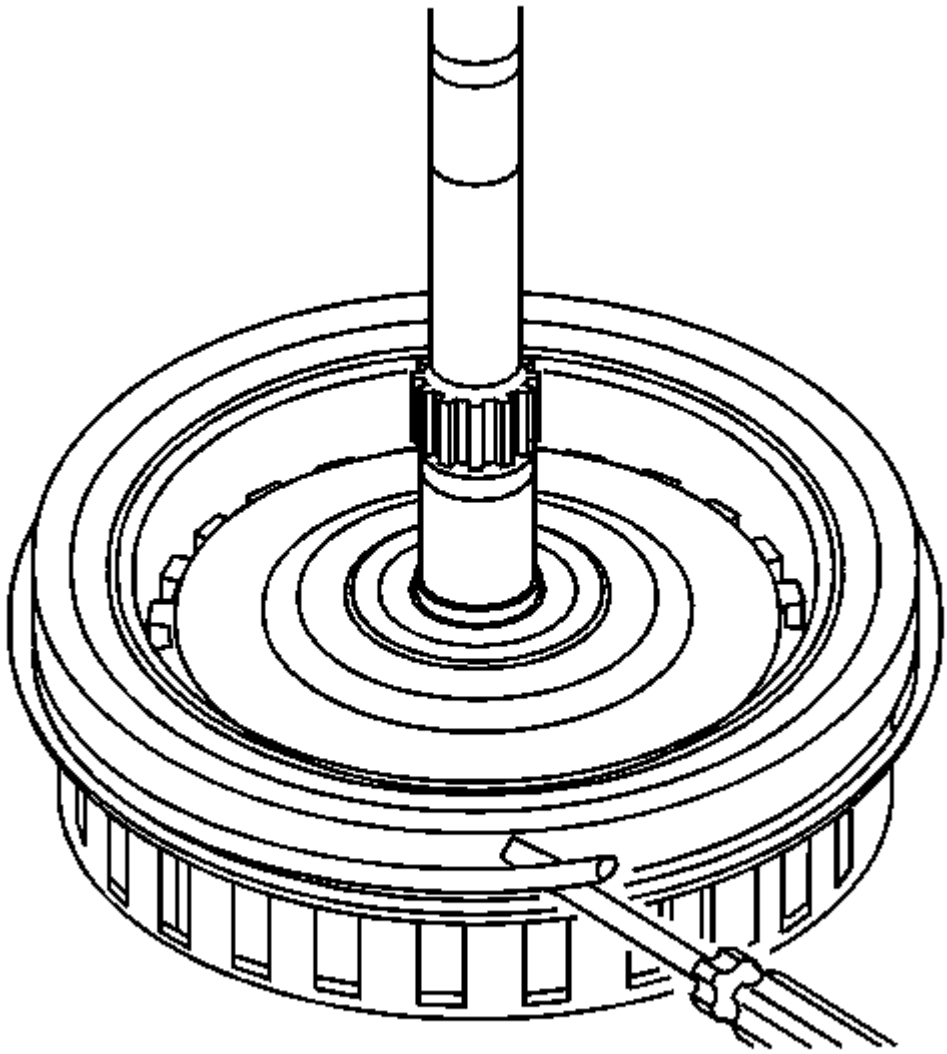

Fig. 31: Identifying Front Differential Transfer Drive Gear Support Seal
Courtesy of GENERAL MOTORS CORP.

Drive Support Seal Installation

Callout	Component Name
1	Front Differential Transfer Drive Gear Support Seal **Tip:** A NEW seal must be installed. **Special Tools:** **J-46624:** Support Seal Installer

	For equivalent regional tools, refer to **Special Tools** .
2	Small Chamfer Faces Up **CAUTION:** **To avoid damaging the seal, first place J 46624-1 with the small chamfer end facing up and leave in place for at least 60 seconds.**
3	Large Chamfer Faces Up **Tip:** Turn J 46624-1 which is part of **J-46624:** seal installer, over with the large chamfer end facing up for 60 seconds to ensure that the seal has been properly sized.

Fluid Passage Tube Installation

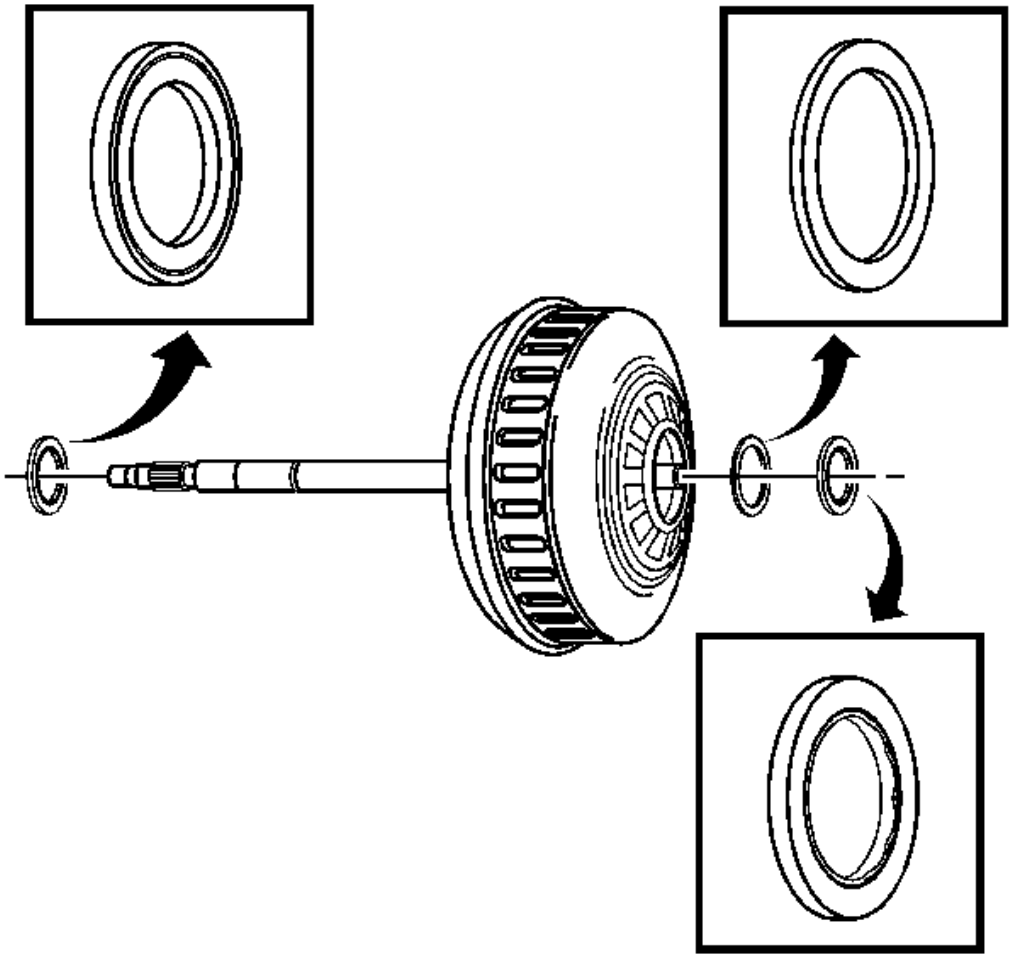

Fig. 32: Identifying Front Differential Transfer Drive Gear Support Fluid Passage Tube
Courtesy of GENERAL MOTORS CORP.

Fluid Passage Tube Installation

Callout	Component Name
1	Front Differential Transfer Drive Gear Support Fluid Passage Tube Gasket
2	Fluid Passage Tube Assembly
3	Front Differential Transfer Drive Gear Fluid Passage Tube Bolt M6 x 15 (Qty: 2) **CAUTION:** **Refer to Fastener Caution .**

	Tighten: 12 N.m (106 lb in)
4	Front Differential Transfer Drive Gear Fluid Passage Tube Bolt M5 x 12 (Qty: 2) **Tighten:** 7 N.m (62 lb in)

Seal Installation

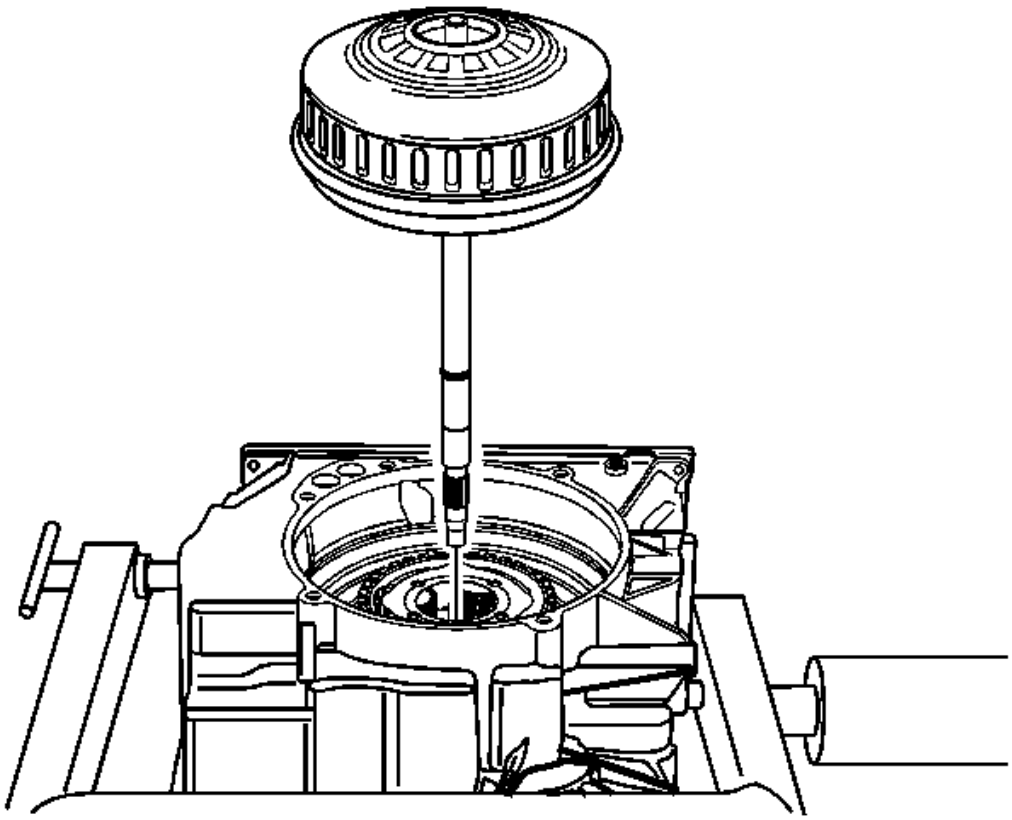

Fig. 33: Installing Front Differential Transfer Drive Gear Support Seal
Courtesy of GENERAL MOTORS CORP.

Seal Installation

Callout	Component Name
	Front Differential Transfer Drive Gear Support Seal

1	**CAUTION:** • **Ensure staking does not line up with lubrication holes or the holes may be damaged.** • **Stop driving the seal once it bottoms out to avoid seal damage.** **Tip:** The fluid seal assembly must be staked in place using **DT-49131:** seal staking tool to ensure proper seal retention. **Special Tools** • **J-46627-A:** Seal Installer • **DT-49131:** Seal Staking Tool For equivalent regional tools, refer to **Special Tools** .
2	Front Differential Transfer Drive Gear Support Torque Converter Fluid Seal Assembly

TRANSMISSION FLUID PUMP CLEANING AND INSPECTION

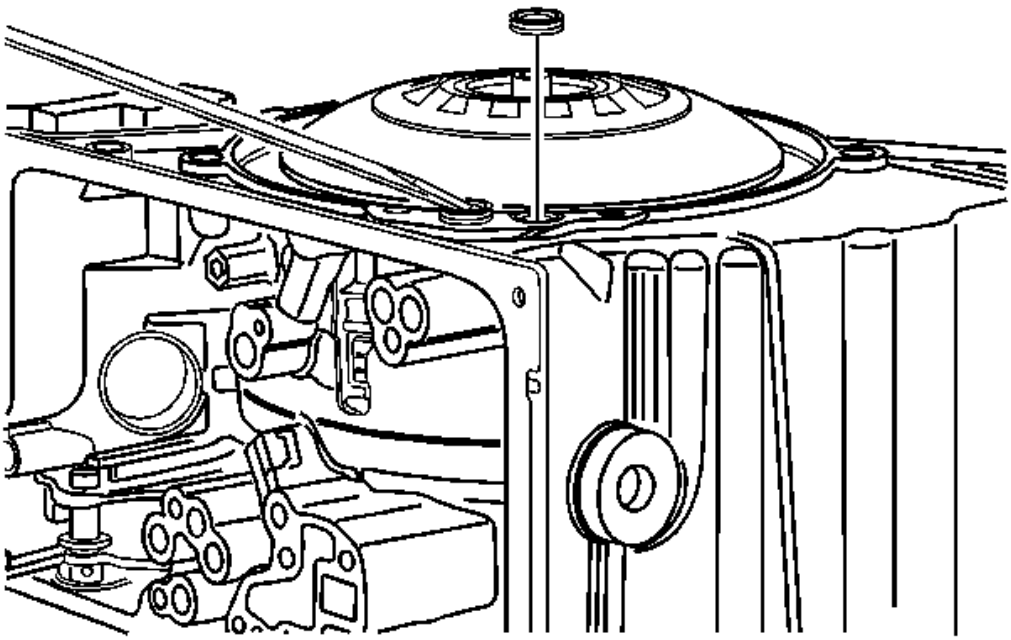

Fig. 34: Identifying Fluid Pump Components
Courtesy of GENERAL MOTORS CORP.

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.** **Preliminary Procedure:** The fluid pump assembly is not serviceable.	
1	Filter Neck Seal **Tip:** Install a NEW filter neck seal. **Special Tools:** **28585:** Snap ring Remover or equivalent For equivalent regional tools, refer to **Special Tools** .
2	A/Trans Fluid Filter Assembly **Tip:** Install a NEW fluid filter assembly.
	Fluid Pump Drive Shaft **Tip:**

3	• Inspect the fluid pump drive shaft splines for damage or wear. • Rotate the fluid pump drive shaft for free operation.

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

Differential Thrust Washer Gage Installation

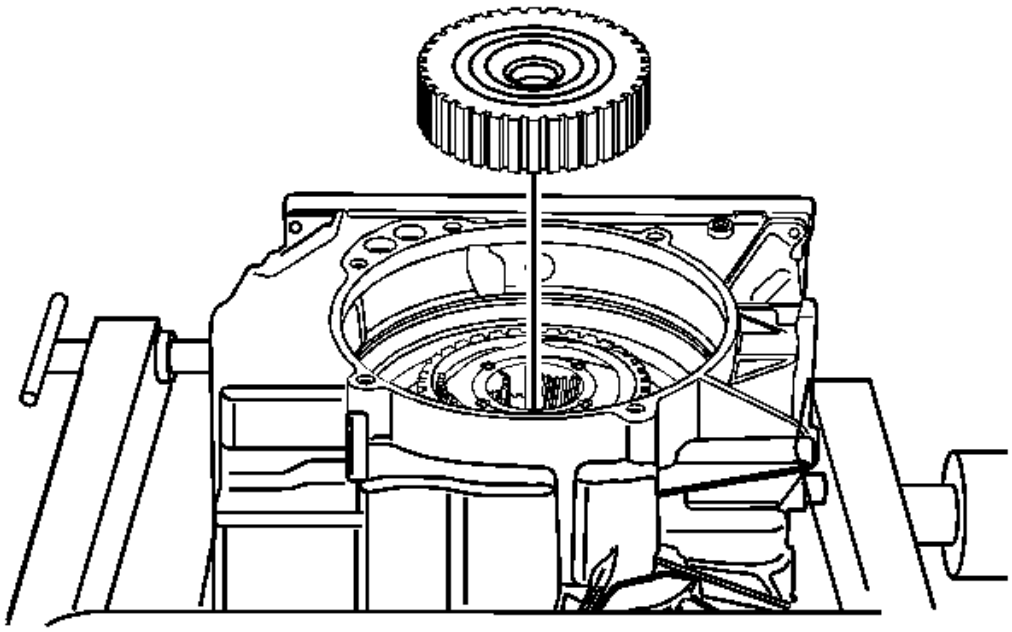

Fig. 35: Identifying Differential Thrust Washer Gage
Courtesy of GENERAL MOTORS CORP.

Differential Thrust Washer Gage Installation

Callout	Component Name
1	Front Differential Carrier Assembly **Tip:** Install the differential assembly and the pinion gear assembly together to avoid interference with the gears during installation.
	Front Differential Drive Pinion (w/Transfer Gear) Gear Assembly

2	**Tip:** Install the differential assembly and the pinion gear assembly together to avoid interference with the gears during installation.
3	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:** selection gage kit, onto the bearing cup. **Special Tools:** **DT-47800:** Thrust Washer Selection Gage Kit For equivalent regional tools, refer to **Special Tools** .
4	Front Differential Carrier Bearing Cup **Tip:** After placing the bearing cup on the gear, place DT 47800-1 which is part of **DT-47800:** selection gage kit, onto the bearing cup. **Special Tools:** **DT-47800:** Thrust Washer Selection Gage Kit For equivalent regional tools, refer to **Special Tools** .
5	Torque Converter Housing Outer Seal
6	Torque Converter and Support and A/Trans Fluid Pump Housing Assembly **Tip:** • Install 2 DT 47800-6 which is part of **DT-47800:** selection gage kit, into a case threaded hole at approximately 180 degrees apart. • Some alignment of DT 47800-1 and 2 which is part of **DT-47800:** selection gage kit, may be required while lowering the TC housing onto the case. • Install DT 47800-3 which is part of **DT-47800:** selection gage kit, spacer over DT 47800-6. **Special Tools:** **DT-47800:** Thrust Washer Selection Gage Kit For equivalent regional tools, refer to **Special Tools** .

Torque Sequence

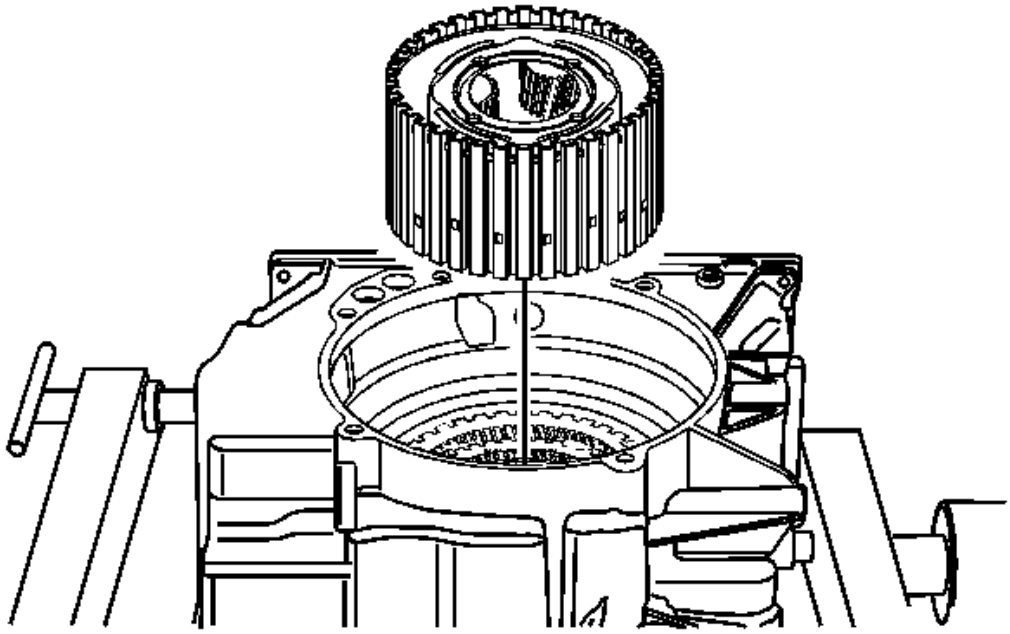

Fig. 36: Identifying Front Differential Carrier Assembly Torque Sequence
Courtesy of GENERAL MOTORS CORP.

Torque Sequence

Callout	Component Name
1	Spacer Bolt M8 x 127 (Qty: 8) **CAUTION:** **Refer to Fastener Caution .** **Procedure** 1. Install the remaining spacers evenly at every other bolt hole. 2. Remove the DT 47800-6 which is part of **DT-47800:** selection gage kit, guide pins and install spacer bolts in all bolt holes at spacer locations. 3. Tighten the bolts in sequence. **Tighten:** 30 N.m (22 lb ft)

	Special Tools: **DT-47800:** Thrust Washer Selection Gage Kit 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.** Rotate the differential assembly 10 revolutions to allow the bearings to seat into the cups. **Tip:** Differential rotating tool **DT-47793:** differential 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 Thrust Washer Selection

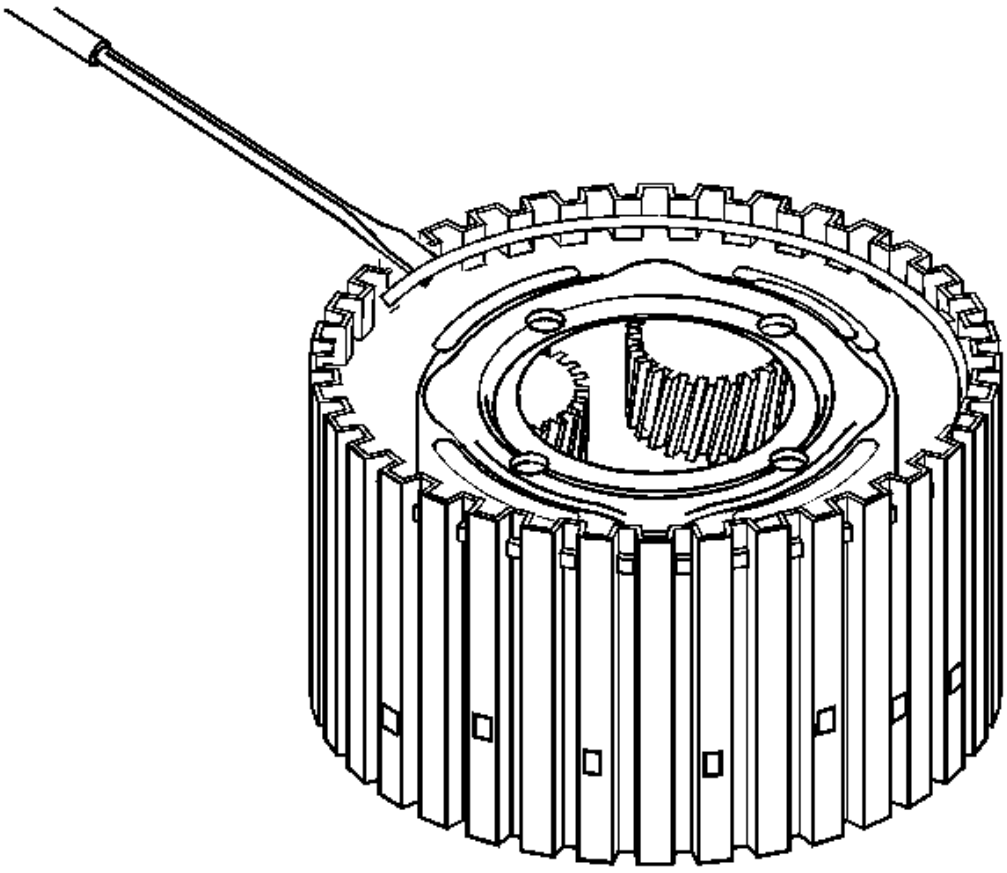

Fig. 37: Identifying Differential Thrust Washer Selection
Courtesy of GENERAL MOTORS CORP.

Differential Thrust Washer Selection

Callout	Component Name
CAUTION: **Improper thrust washer selection can cause insufficient taper bearing pre-load which will cause premature failure of the front differential drive pinion gear.**	
	Front Differential Bearing Washer **Procedure:** Place DT 47800-7 in the gap in DT 47800-2 which are both part of **DT-47800:** selection gage kit, to determine the proper thrust washer. Choose the correct thrust washer. Refer to **Taper Bearing Preload Selective Specifications** . **Tip:**

1	• Continue trying different sizes of DT 47800-7 which is part of **DT-47800:** selection gage kit, until the gage will no longer fit into the gap. The correct thrust washer size is equal to the largest blade gage that fits into the gap. • Match the size of the correct DT 47800-7 blade which is part of **DT-47800:** selection gage kit, to the color code in the thrust washer specification chart. The washer color coding is on the outside diameter of the washer. • The gap in DT 47800-2 which are both part of **DT-47800:** selection gage kit may not be even. Hold the top of the gage and rotate the bottom of the gage 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. • The washer color coding is on the outside diameter of the washer. **Special Tools:** **DT-47800:** Thrust Washer Selection Gage Kit For equivalent regional tools, refer to **Special Tools** .
2	Front Differential Drive Pinion Gear Bearing Thrust Washer **Procedure:** Place DT 47800-7 in the gap in DT 47800-1 which are both part of **DT-47800:** selection gage kit, to determine the proper thrust washer. Choose the correct thrust washer. Refer to **Taper Bearing Preload Selective Specifications** . **Tip:** • Continue trying different sizes of DT 47800-7 which is part of **DT-47800:** selection gage kit, until the gage will no longer fit into the gap. The correct thrust washer size is equal to the largest gage that fits into the gage. • Match the size of the correct DT 47800-7 blade which is part of **DT-47800:** selection gage kit to the color code in the thrust washer selection chart. • The gap in DT 47800-1 which is part of **DT-47800:** selection gage kit may not be even. Hold the top of the gage and rotate the bottom of the gage 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. • The washer color coding is on the outside diameter of the washer.

	Special Tools: **DT-47800:** Thrust Washer Selection Gage Kit For equivalent regional tools, refer to **Special Tools** .
3	Torque Converter and Support and A/Trans Fluid Pump Housing Assembly **Procedure** 1. Remove DT 47800-3 which are both part of **DT-47800:** selection gage kit, bolts and spacers. 2. Remove the torque converter housing. 3. Remove DT 47800-1 and DT 47800-2 which are both part of **DT-47800:** selection gage kit. 4. Remove the torque converter housing seal. 5. Remove the pinion gear and differential bearing cups. 6. Install the bearing cups and thrust washers into the torque converter housing per the replacement procedures. Refer to **Front Differential Carrier Bearing Cup and Washer Replacement - Torque Converter Housing Side** and **Front Differential Drive Pinion Bearing Cup, Washer, and Lubricant Dam Replacement - Torque Converter Housing Side**. **Tip:** DT 47800-1 and DT 47800-2 which are both part of **DT-47800:** selection gage kit, may stick in the torque converter housing. Be careful not to drop the gages. **Special Tools:** **DT-47800:** Thrust Washer Selection Gage Kit For equivalent regional tools, refer to **Special Tools** .

TORQUE CONVERTER AND DIFFERENTIAL HOUSING ASSEMBLY ASSEMBLE

Pump Assembly Installation

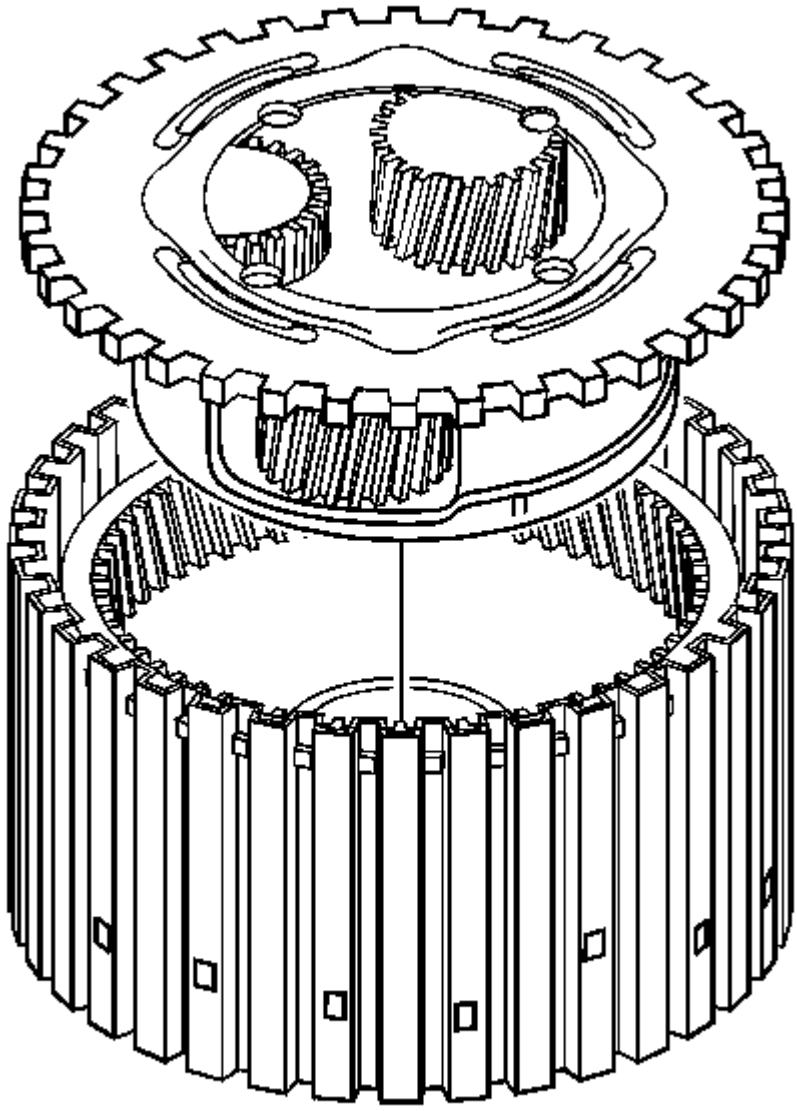

Fig. 38: View Of Pump Assembly
Courtesy of GENERAL MOTORS CORP.

Pump Assembly Installation

Callout	Component Name
1	Driven Sprocket Thrust Washer
2	Drive Sprocket Thrust Washer
	Install Drive Link Assembly

3	**Tip:** Install as an assembly.
4	A/Trans Fluid Pump Assembly **Tip:** Rotating the drive sprocket and link assembly while installing the oil pump will aid in aligning the driven sprocket and oil pump drive shaft splines.
5	A/Trans Fluid Pump Bolt M6 x 25 (Qty: 3) **CAUTION:** **Refer to Fastener Caution .** **Procedure:** Tighten in sequence shown. **Tighten:** 12 N.m (106 lb in).

Transfer Drive Gear Assembly Installation

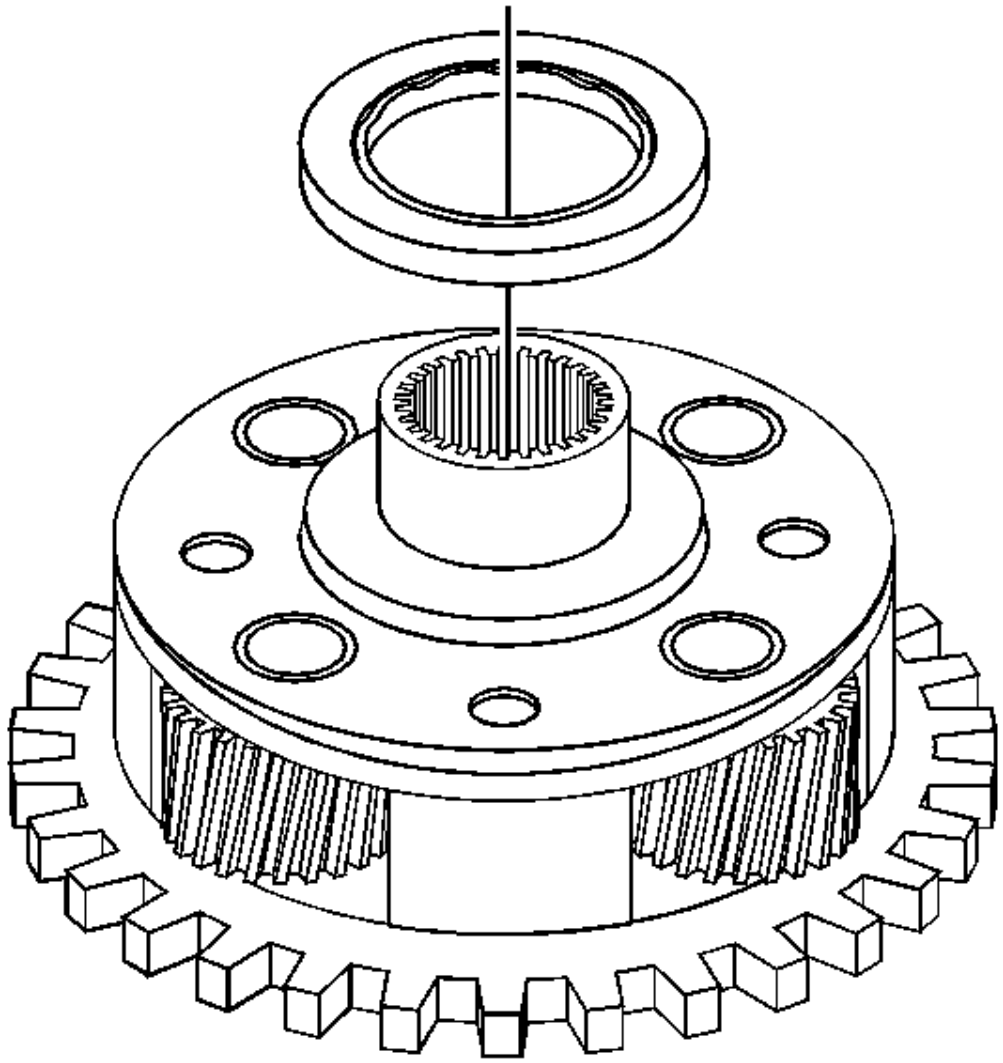

Fig. 39: Transfer Drive Gear Assembly
Courtesy of GENERAL MOTORS CORP.

Transfer Drive Gear Assembly Installation

Callout	Component Name
1	Drive Sprocket Thrust Washer
2	Front Differential Transfer Drive Gear Support Assembly
	Front Differential Transfer Drive Gear Support Bolt M8 x 25 (Qty: 9)

3	**CAUTION:** **Refer to Fastener Caution .** **Procedure:** Tighten in sequence shown. **Tighten:** 10 N.m (89 lb in) plus 50 degrees ± 4 degrees. **Special Tools:** **J 45059:** Angle Meter For equivalent regional tools, refer to **Special Tools** .
4	Front Differential Carrier Baffle
5	Front Differential Carrier Baffle Bolt M6 x 25 **Tighten:** 12 N.m (106 lb in).

FRONT DIFFERENTIAL DRIVE PINION GEAR BEARING REPLACEMENT

Removal

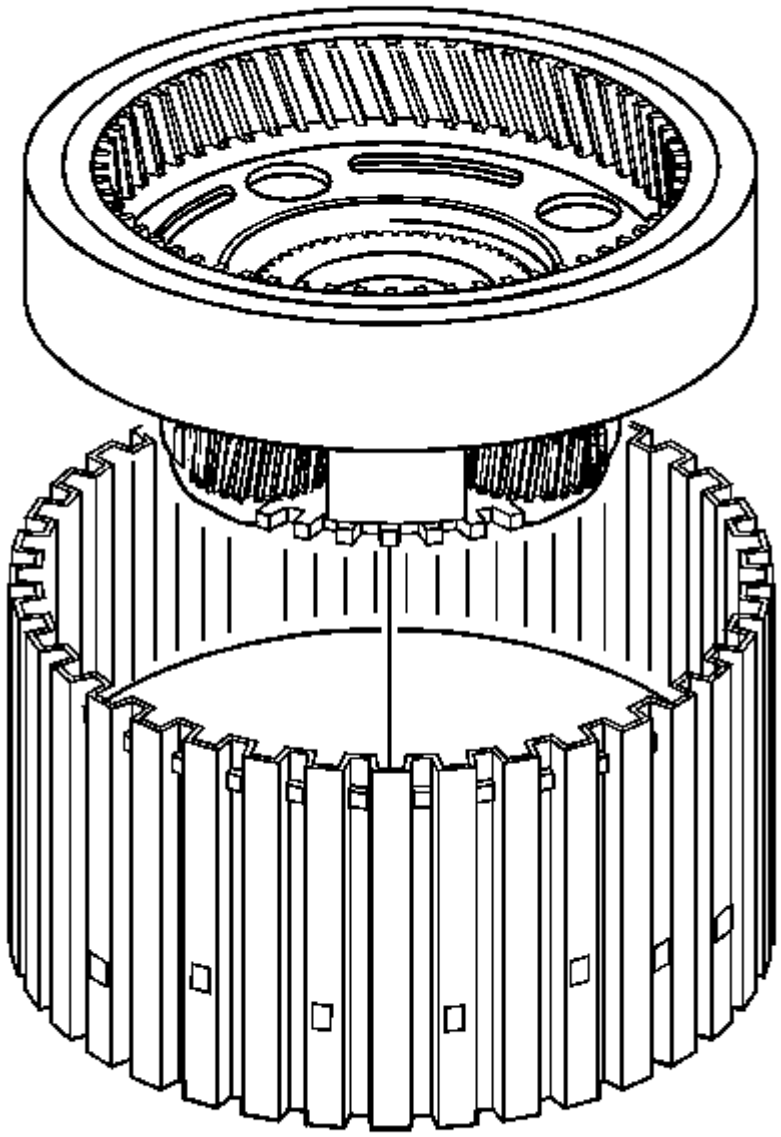

Fig. 40: View Of Front Differential Drive Pinion Gear Bearing
Courtesy of GENERAL MOTORS CORP.

Removal

Callout	Component Name
	Front Differential Drive Pinion Gear Bearing **Tip:**

1	• When removing the front differential drive pinion gear bearing use **J 41816-2:** step plate. • Use **J 8433-1:** puller bar or equivalent with bolts 2-3/8 x 3 x 24. **Special Tools** • **J 8433-1:** Puller Bar or equivalent • **J 22912-B:** Split Plate Bearing Remover or equivalent • **J 41816-2:** Step Plate For equivalent regional tools, refer to **Special Tools** .

Installation

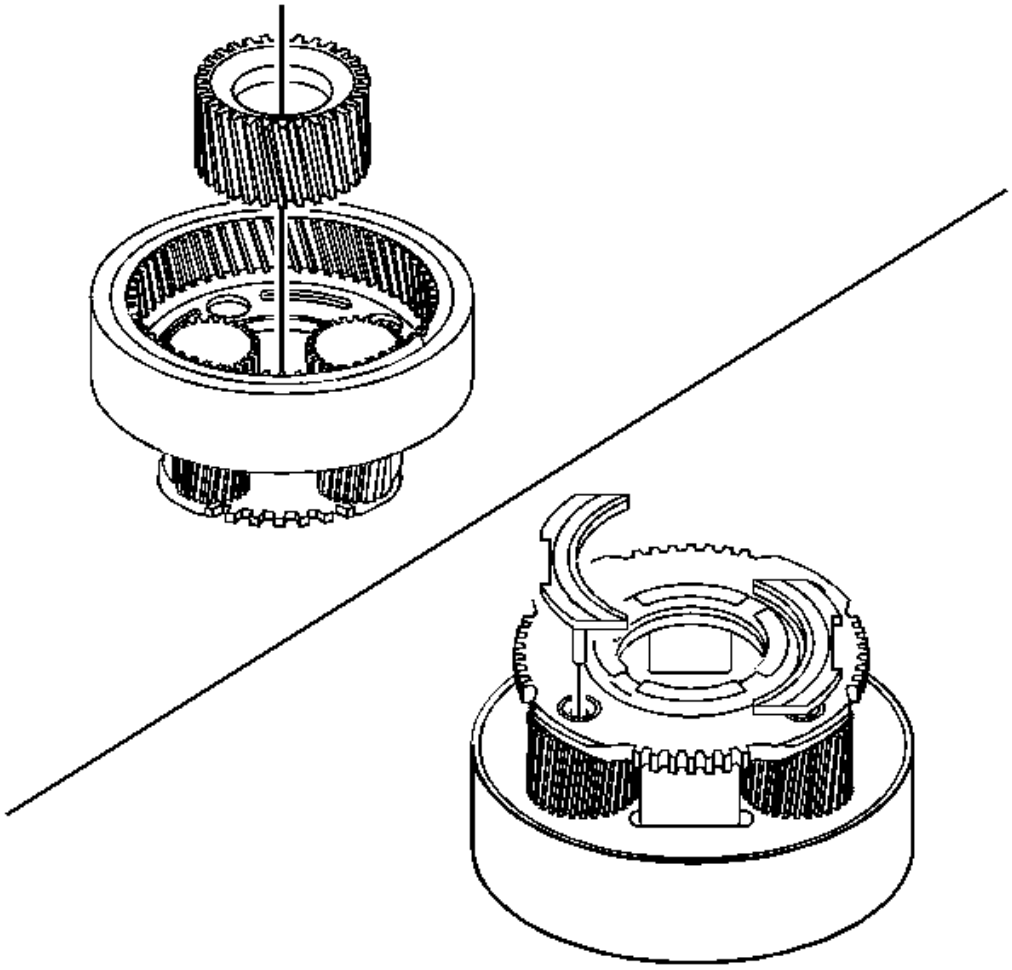

Fig. 41: Identifying Front Differential Drive Pinion Gear Bearing
Courtesy of GENERAL MOTORS CORP.

Installation

Callout	Component Name
1	Front Differential Drive Pinion Gear Bearing **CAUTION:** **Pressing against the bearing assembly can damage the bearing and cause premature bearing failure.**

	Special Tools: **DT-47928:** Bearing Installer For equivalent regional tools, refer to **Special Tools** .

FRONT DIFFERENTIAL CARRIER BEARING REPLACEMENT

Removal

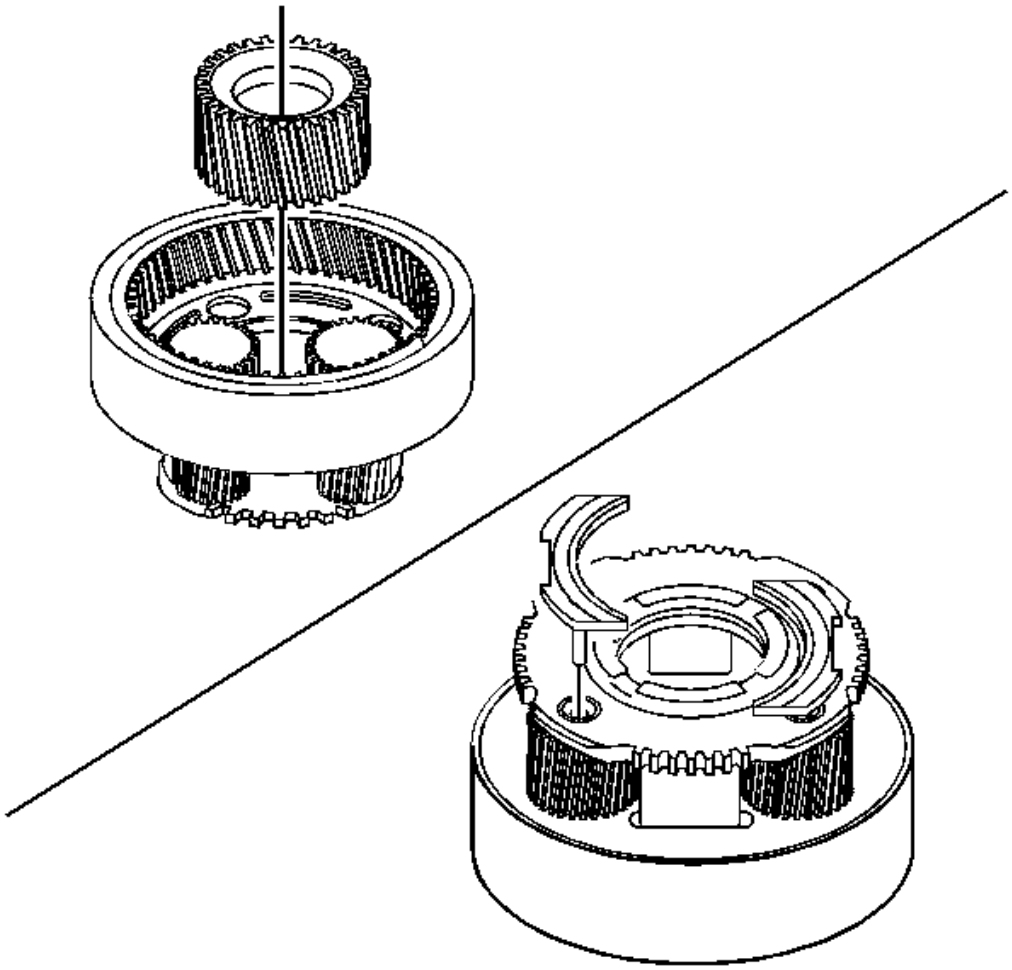

Fig. 42: Identifying Front Differential Carrier Bearing
Courtesy of GENERAL MOTORS CORP.

Removal

Callout	Component Name
1	Front Differential Carrier Bearing Assembly **Special Tools** • **J-41816:** Three Legged Puller • **J 41816-2:** Step Plate 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 **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 **J 41816-2:** step plate. **Special Tools** • **J 8433-1:** Puller Bar or equivalent • **J 22912-B:** Split Plate Bearing Remover or equivalent • **J 41816-2:** Step Plate For equivalent regional tools, refer to **Special Tools** .

Installation

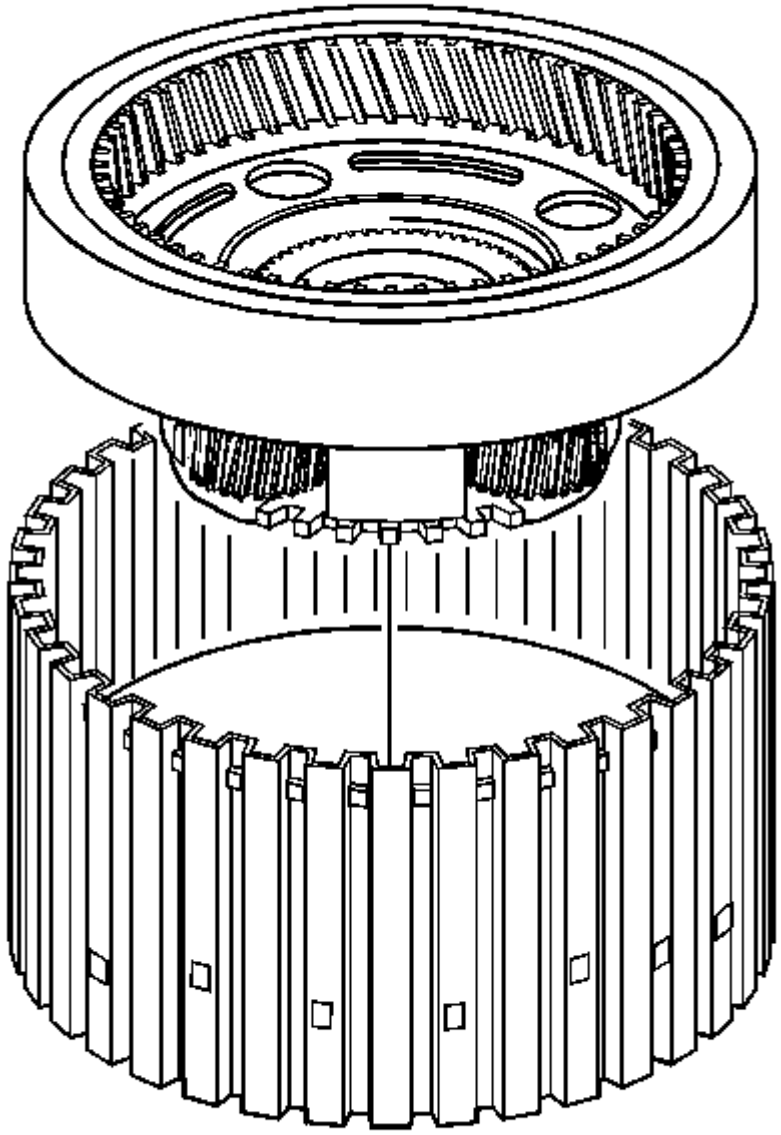

Fig. 43: View Of Front Differential Carrier Bearing
Courtesy of GENERAL MOTORS CORP.

Installation

Callout	Component Name
	Front Differential Carrier Bearing Assembly

1	**CAUTION:** **Pressing against the bearing assembly can damage the bearing and cause premature bearing failure.** **Special Tools:** **DT-47928:** Bearing Installer For equivalent regional tools, refer to **Special Tools** .
2	Front Differential Carrier Bearing Assembly **CAUTION:** **Pressing against the bearing assembly can damage the bearing and cause premature bearing failure.** **Special Tools:** **DT-47928:** Bearing Installer For equivalent regional tools, refer to **Special Tools** .

FRONT DIFFERENTIAL CARRIER CLEANING AND INSPECTION

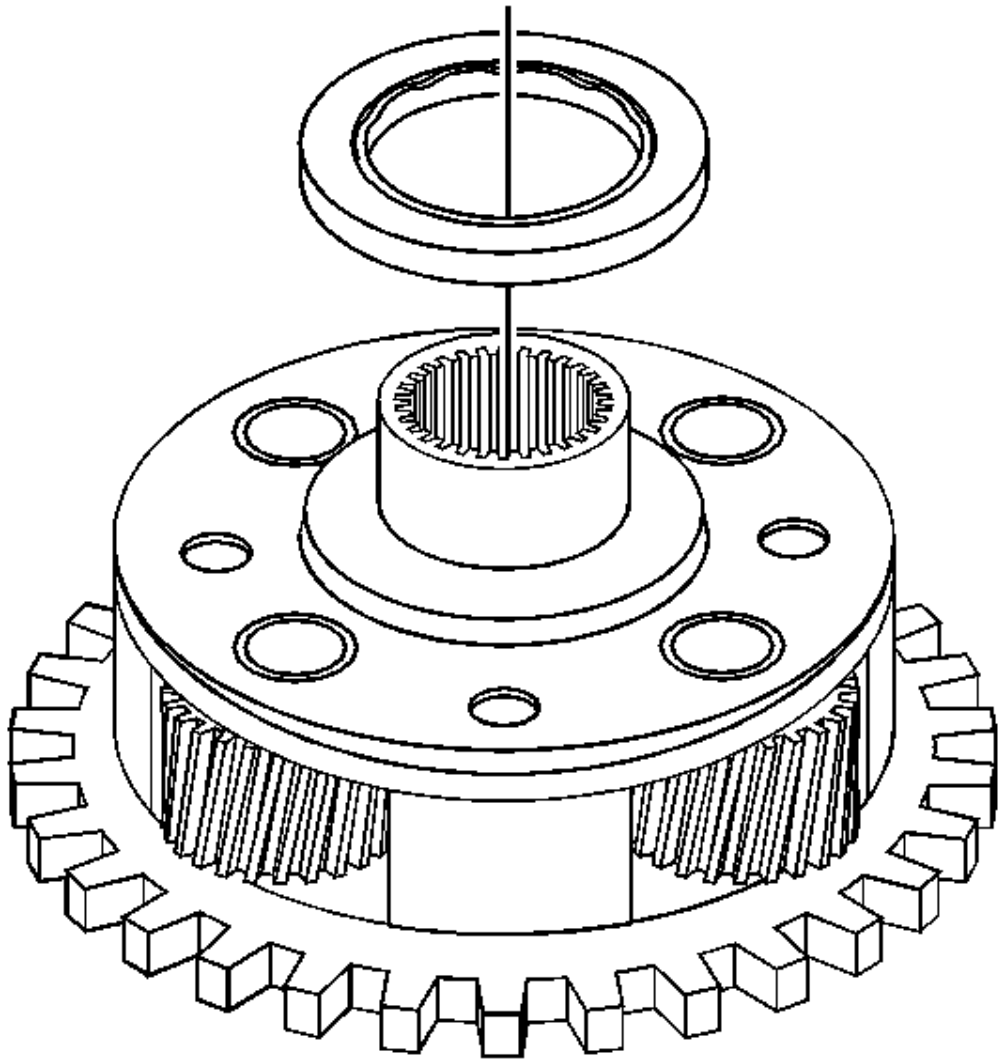

Fig. 44: Identifying Front Differential Carrier Components
Courtesy of GENERAL MOTORS CORP.

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:
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	Front Differential Pinion Gear Shaft Retainer **Tip:** Discard and use a new retainer. **Special Tools:** 3/16 in (5 mm) 7 in Punch or equivalent For equivalent regional tools, refer to **Special Tools** .
2	Front Differential Pinion Gear Shaft
3	Front Differential Pinion Gears
4	Front Differential Carrier Thrust Washers
5	Front Differential Pinion Side Gears
6	Front Differential Side Gear Thrust Washer

FRONT DIFFERENTIAL DRIVE PINION GEAR AND CARRIER INSTALLATION

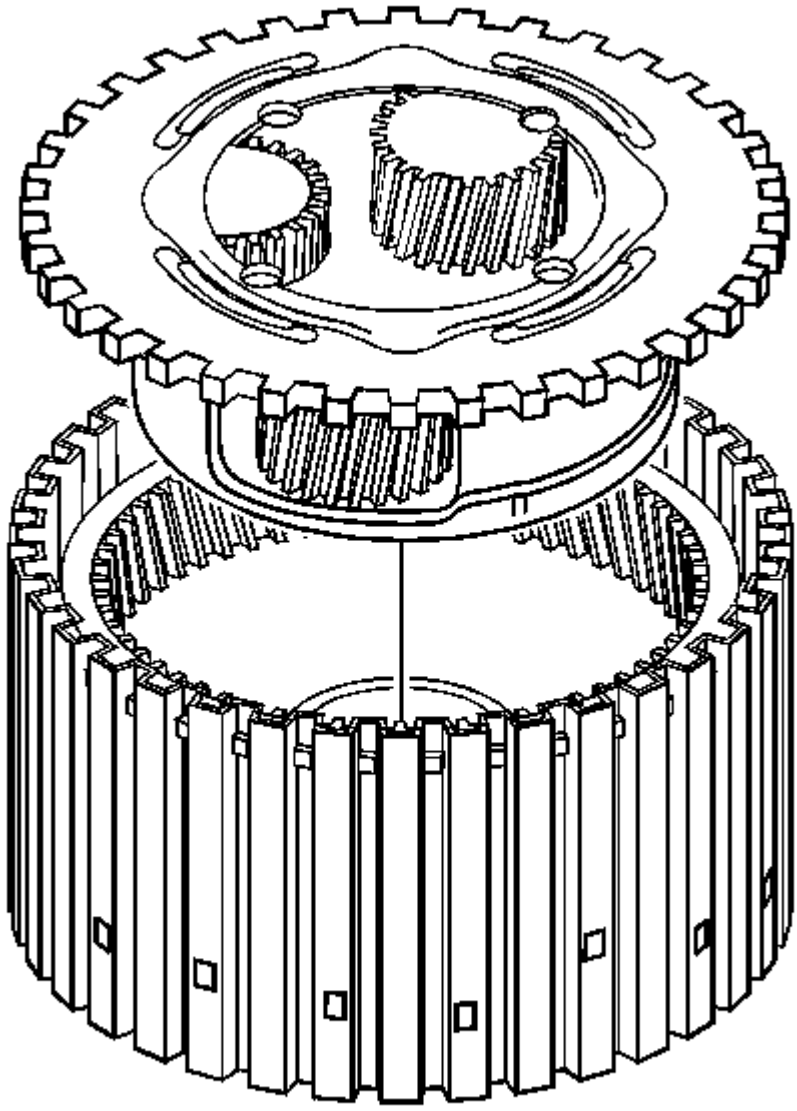

Fig. 45: Identifying Front Differential Carrier Assembly
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Front Differential Carrier Assembly **Tip:** Install the differential assembly and the pinion gear assembly together to avoid interference with the gears during installation.

2	Front Differential Drive Pinion (w/Transfer Gear) Gear Assembly
3	Front Differential Drive Pinion Gear Lube Tube

TORQUE CONVERTER AND DIFFERENTIAL HOUSING INSTALLATION

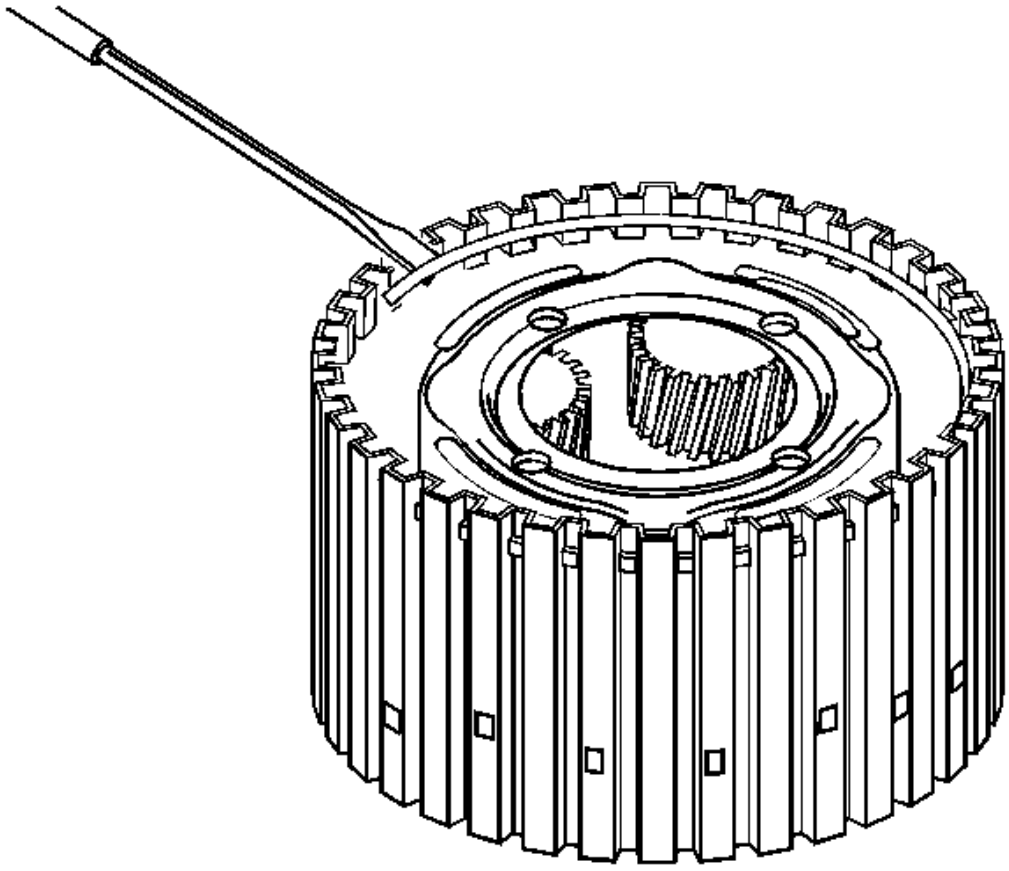

Fig. 46: Identifying Torque Converter & Differential Housing
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Torque Converter Housing Outer Seal
2	Torque Converter and Support and A/Trans Fluid Pump Housing Assembly
	Torque Converter and Differential Housing Bolts M8 x 35 (Qty: 17)

3	**CAUTION:** **Some bolt torques specifications are different. Over tightening the bolts at the 12, 15 and 17 positions in the sequence could cause damage to the case threads.** **CAUTION:** **Refer to Fastener Caution .** **Procedure:** Tighten in sequence shown. **Tighten:** • Bolts 1-11, 13-14 and 16 to 36 N.m (27 lb ft) • Bolts 12, 15 and 17 to 30 N.m (22 lb ft)

FRONT DIFFERENTIAL CARRIER PRELIMINARY ROTATIONAL TORQUE MEASUREMENT

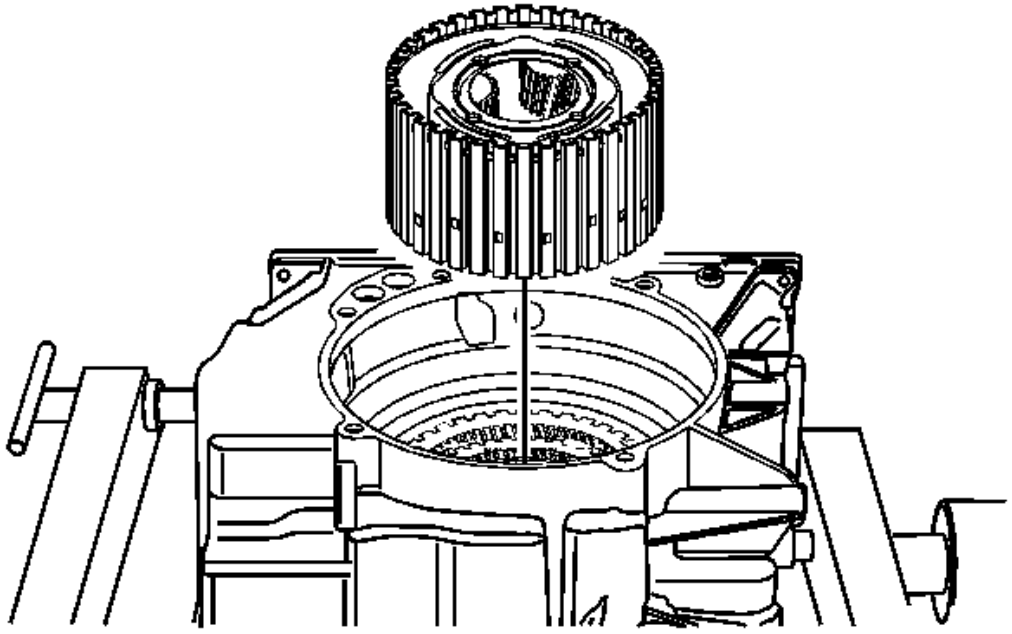

Fig. 47: Identifying Special Tool - DT-47793

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.** **CAUTION:** **Refer to Fastener Caution .** **Tip:** • 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**. • Use a dial or beam torque wrench with **DT-47793:** differential rotating tool to measure turning torque. **Tighten:** 4-12 N.m (35-106 lb in) **Special Tools:** **DT-47793:** Differential Rotating Tool For equivalent regional tools, refer to **Special Tools** .

1-2-3-4 CLUTCH PLATE AND LOW AND REVERSE CLUTCH INSTALLATION

Piston and Spring Installation

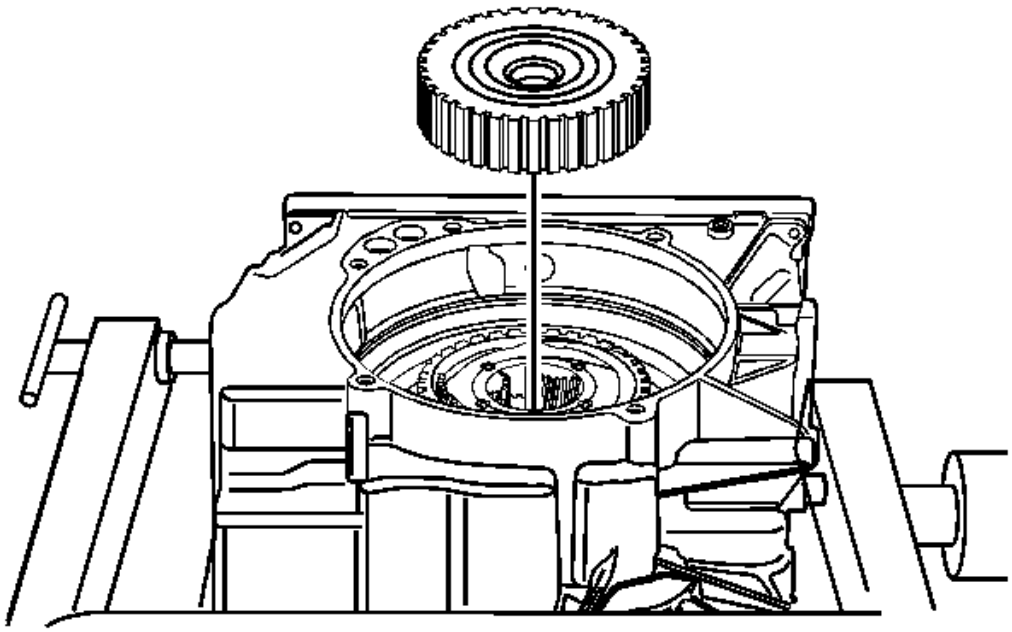

Fig. 48: Identifying 1-2-3-4 Clutch Components
Courtesy of GENERAL MOTORS CORP.

Piston and Spring Installation

Callout	Component Name
1	1-2-3-4 Clutch Piston **Tip: J-46623:** seal protector prevents the piston seal lip from damage during installation. Apply a thin coat of ATF to the I.D. of **J-46623:** seal protector to ease the installation of the piston. **Special Tools:** **J-46623:** Piston Seal Protector For equivalent regional tools, refer to **Special Tools** .
2	1-2-3-4 Clutch Spring
	1-2-3-4 Clutch Spring Retainer Ring **CAUTION:** **Refer to Fastener Caution .** **Procedure:** 1. The retainer opening should be supported by a spline

3	tooth of the case. 2. Install **J-46632:** spring compressor and **DT-48056:** spring compressor bridge and retain to the case using 2 case cover assembly bolts. **Tighten:** 12 N.m (9 lb ft). 3. Turn the **DT-48056:** spring compressor bridge compressor bolt to compress the 1-2-3-4 Clutch Spring until the retaining ring groove is exposed. 4. Push retainer ring into the groove. 5. Remove **DT-48056:** spring compressor bridge and **J-46632:** spring compressor. 6. Air check the piston operation by applying air to the 1-2-3-4 clutch feed passage in the case. 7. Excessive air leaks indicate damage to the clutch piston seal. **Special Tools** • **DT-48056:** Spring Compressor Bridge • **J-46632:** Piston Spring Compressor For equivalent regional tools, refer to **Special Tools** .

1-2-3-4 Clutch Plates and Low Reverse Clutch Installation

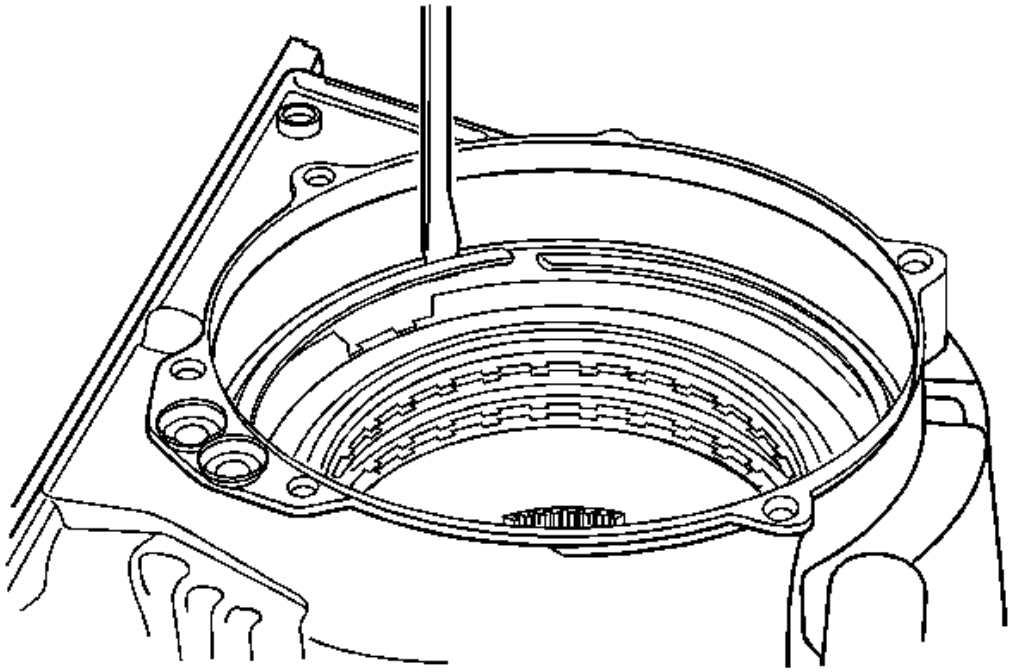

Fig. 49: Identifying 1-2-3-4 Clutch Plates & Low Reverse Clutch Installation Order
Courtesy of GENERAL MOTORS CORP.

1-2-3-4 Clutch Plates and Low Reverse Clutch Installation

Callout	Component Name
1	1-2-3-4 Clutch (Waved) Plate **Tip:** The tab on the clutch plate faces the bottom of the case.
2	1-2-3-4 Clutch Plate (Qty: 2) **Tip:** The tab on the clutch plate faces the bottom of the case.
3	1-2-3-4 Clutch (w/Friction Material) Plate Assembly (Qty: 2)
4	Low and Reverse Clutch Assembly
5	Low and Reverse Clutch Retaining Ring **Tip:** The retaining ring opening should face the control side of the case (9 o'clock). Do not align the retainer opening with other retaining ring openings.

Low and Reverse Clutch Plate Installation

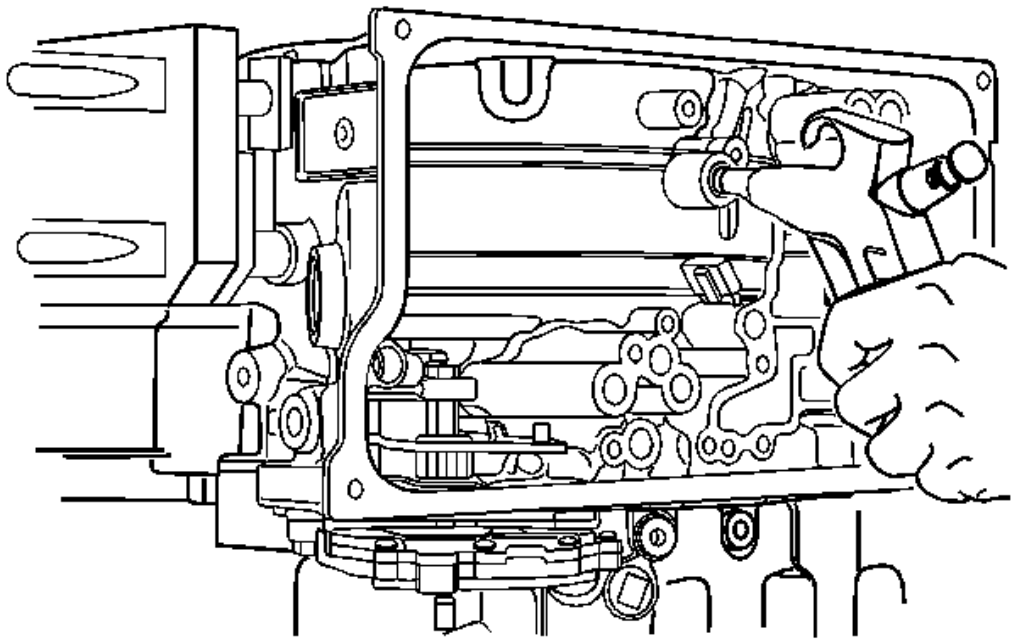

Fig. 50: Identifying Low & Reverse Clutch Plate
Courtesy of GENERAL MOTORS CORP.

Low and Reverse Clutch Plate Installation

Callout	Component Name
1	Low and Reverse Clutch Backing Plate **Tip:** The tab on the clutch plate faces the bottom of the case.
2	Low and Reverse Clutch (w/Friction Material) Plate Assembly (Qty: 4)
3	Low and Reverse Clutch Plate (Qty: 3) **Tip:** The tab on the clutch plate faces the bottom of the case.
4	Low and Reverse Clutch Apply Plate **Tip:** The tab on the clutch plate faces the bottom of the case.
5	Low and Reverse Clutch Cushion (Waved) Spring **Tip:** The tab on the clutch plate faces the bottom of the case.

REACTION CARRIER CLEANING AND INSPECTION

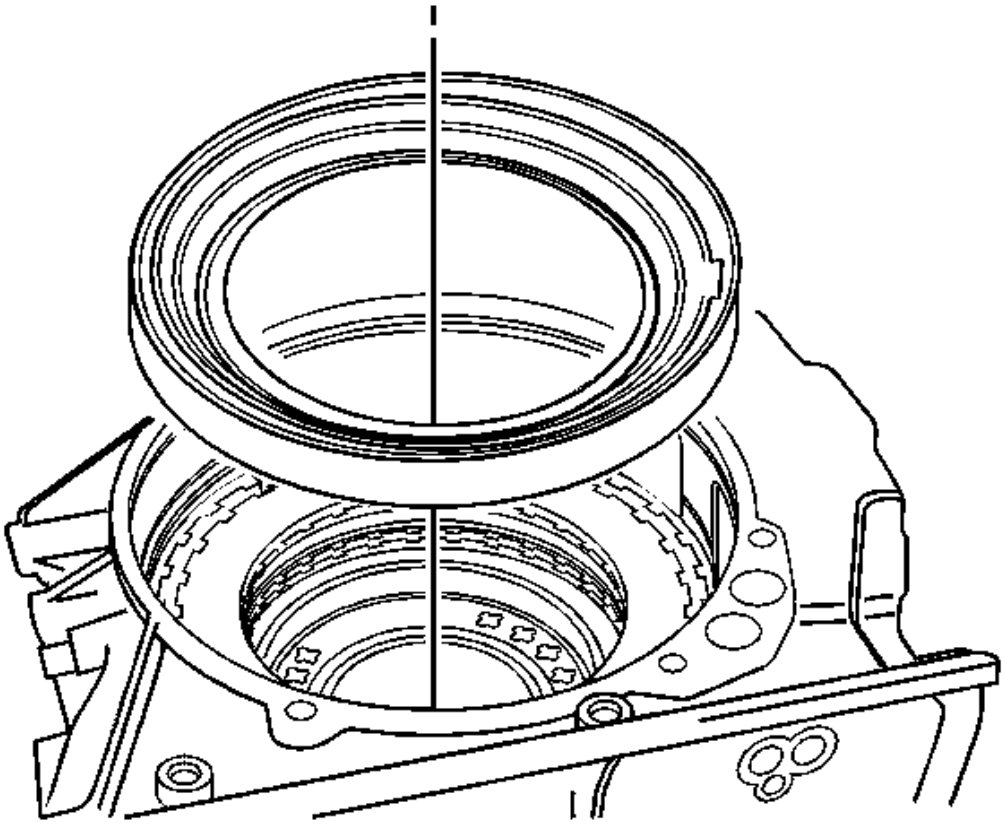

Fig. 51: Reaction Carrier
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedures: Clean and Inspect the carrier as an assembly. If wear or damage is found disassemble to replace the affected component.	
1	Input Internal Gear Retaining Ring
2	Input Internal Gear
3	Reaction Carrier Assembly

OUTPUT CARRIER CLEANING AND INSPECTION

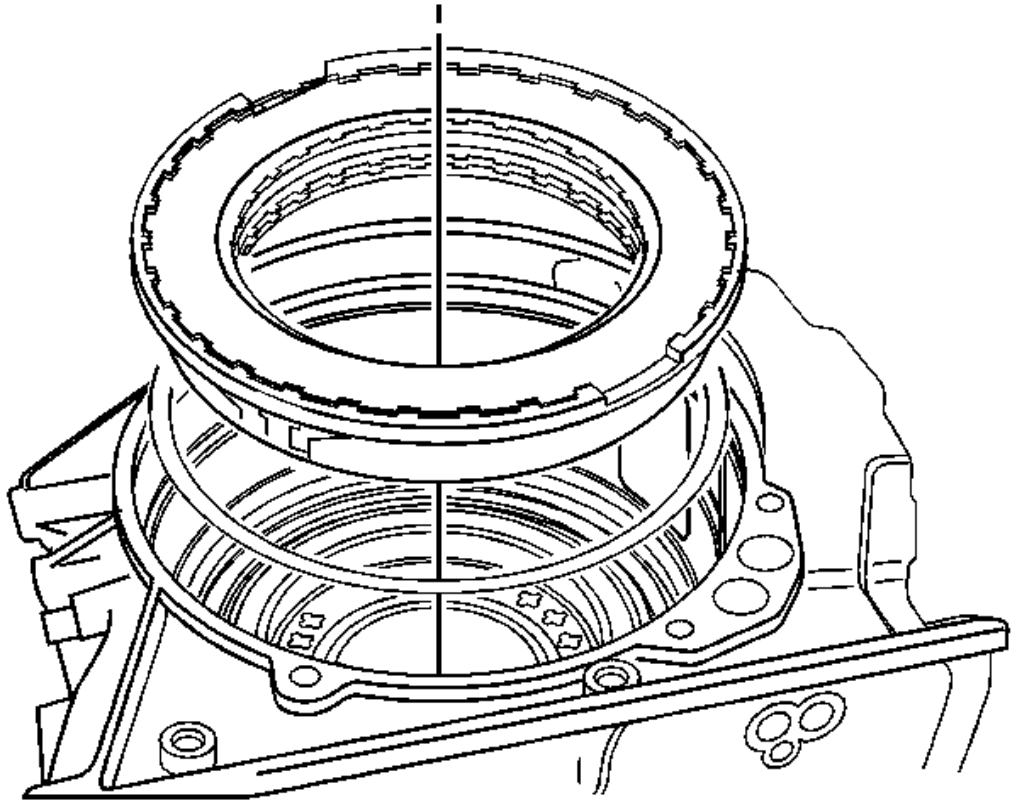

Fig. 52: Output Carrier
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedures: Clean and Inspect the carrier as an assembly. If wear or damage is found disassemble to replace the affected component.	
1	Reaction Internal Gear Retaining Ring
2	Reaction Carrier Internal Gear
3	Output Carrier Assembly

INPUT, REACTION, AND OUTPUT CARRIER INSTALLATION

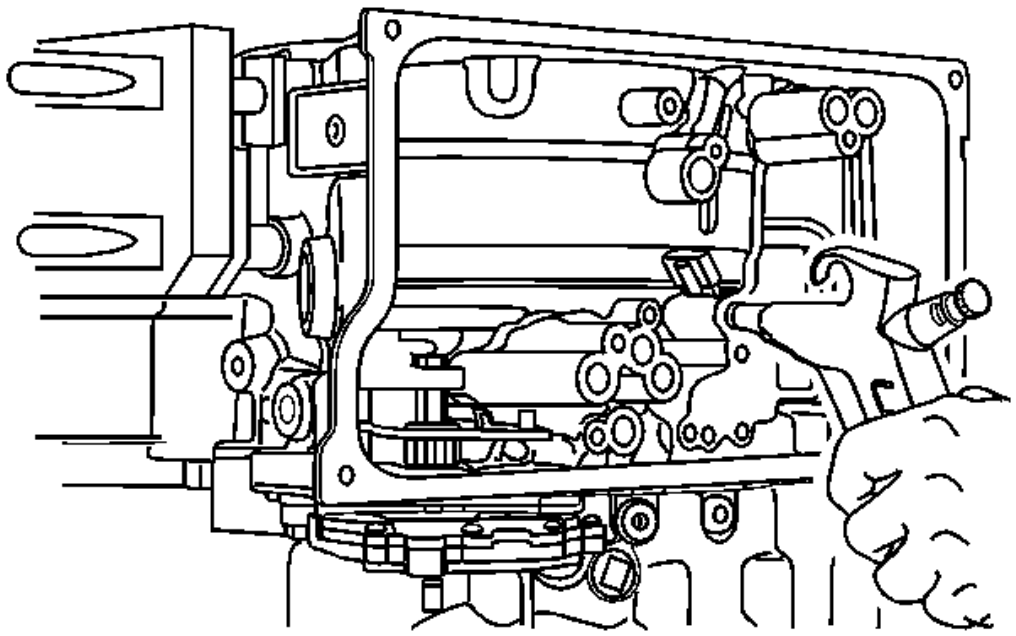

Fig. 53: Identifying Input, Reaction & Output Carrier
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Note location of the orientation lip on bearings. All thrust bearings can only be assembled one way.	
1	Input Shaft Thrust Bearing Assembly
2	Output Carrier Transfer Drive Gear Hub Assembly
3	Front Differential Transfer Drive Gear Input Hub Bearing Assembly
4	Output Sun Gear Assembly
5	Output Carrier Assembly
6	Output Carrier Thrust Bearing Assembly
7	Output Carrier Thrust Bearing Assembly
8	Input (w/Output Internal Gear) Carrier Assembly
9	Input Sun Gear
10	Input Sun Gear Thrust Bearing Assembly
11	Input Carrier Thrust Bearing Assembly
12	Reaction (w/Input Internal Gear) Carrier Assembly

2-6 CLUTCH PLATE INSTALLATION

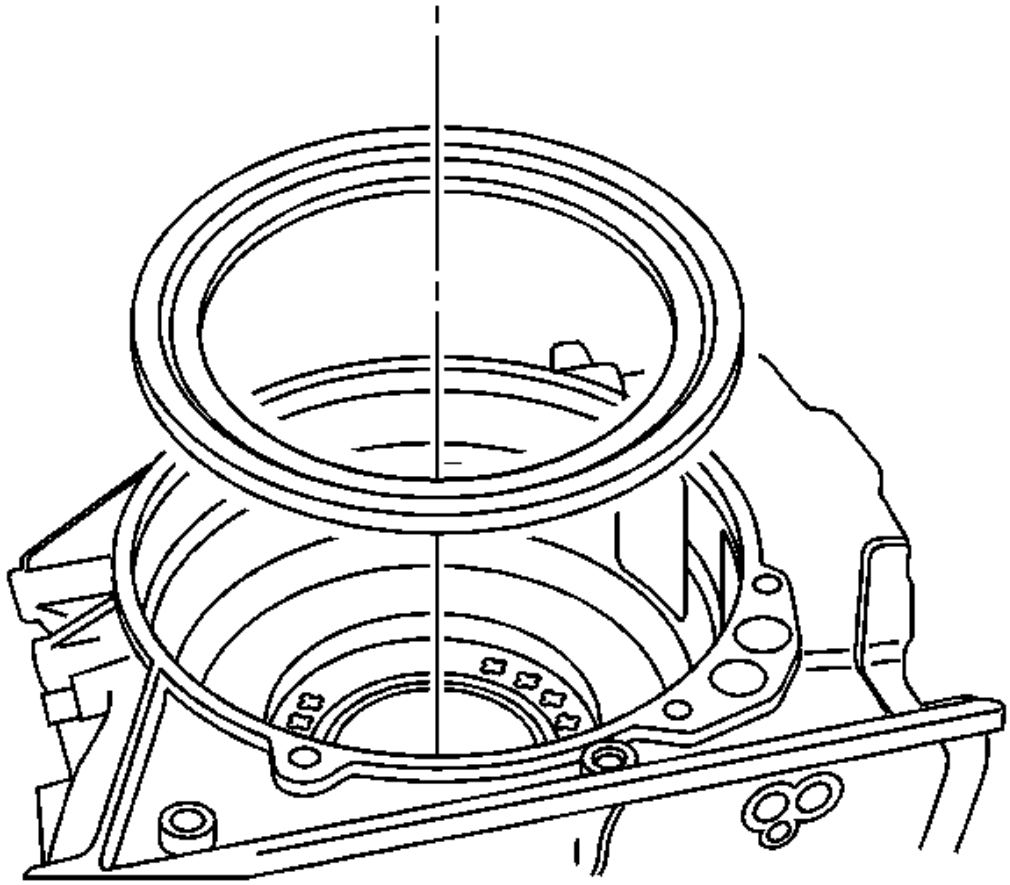

Fig. 54: Identifying 2-6 Clutch Plate
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	2-6 Clutch Backing Plate **Tip:** The tab on the clutch plate faces the bottom of the case.
2	2-6 Clutch (w/Friction Material) Plate Assembly (Qty: 3)
3	2-6 Clutch Plate (Qty: 3) **Tip:** The tab on the clutch plate faces the bottom of the case.
4	2-6 Clutch Cushion Spring

5	Reaction Sun Gear Assembly
6	2-6 Clutch Hub Thrust Bearing Assembly **Tip:** Note location of the orientation lip on bearing. All thrust bearings can only be assembled one way.

3-5-REVERSE AND 4-5-6 CLUTCH HOUSING DISASSEMBLE

Reluctor Wheel and Piston Removal

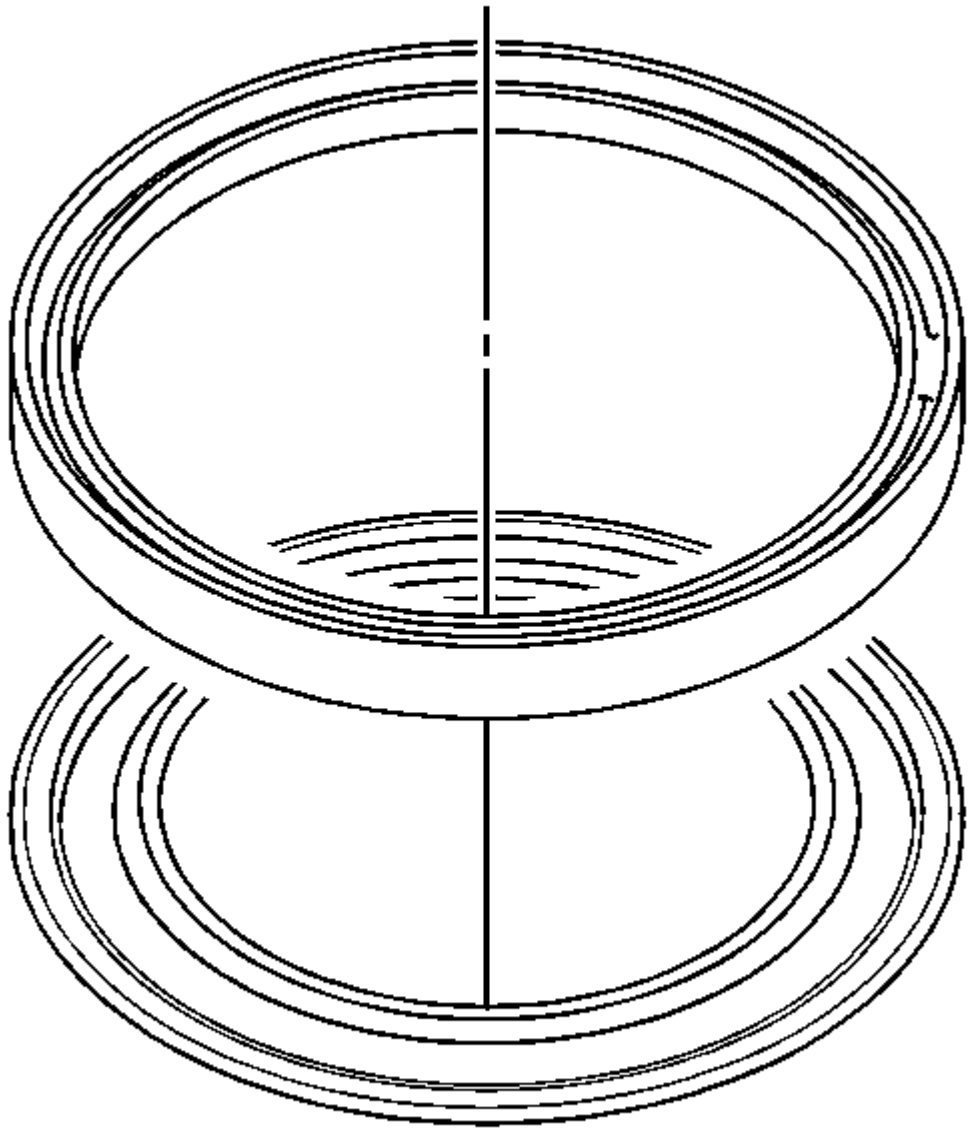

Fig. 55: View Of Input Shaft Speed Sensor Reluctor Wheel Piston & 3-5 Reverse Clutch Piston
Courtesy of GENERAL MOTORS CORP.

Reluctor Wheel and Piston Removal

Callout	Component Name
	A/Trans Input Shaft Speed Sensor Reluctor Ring Retaining Ring

1	**CAUTION:** **Compress the reluctor wheel just enough to clear the retainer. Over compressing the reluctor wheel will break the alignment tab and the clutch housing.** **Special Tools:** **DT-47694:** Piston Spring Compressor For equivalent regional tools, refer to **Special Tools** .
2	A/Trans Input Shaft Speed Sensor Reluctor Wheel
3	3-5 Reverse Clutch Piston **Tip:** Inspect piston seals for damage and/or wear. Piston is reusable.
4	3-5 Reverse Clutch Spring Assembly
5	3-5 Reverse Clutch Piston Inner Seal (Orange)
6	3-5 Reverse Clutch Piston Inner Seal (Black)
7	3-5 Reverse Clutch Piston Dam Seal

Clutch Plate Removal

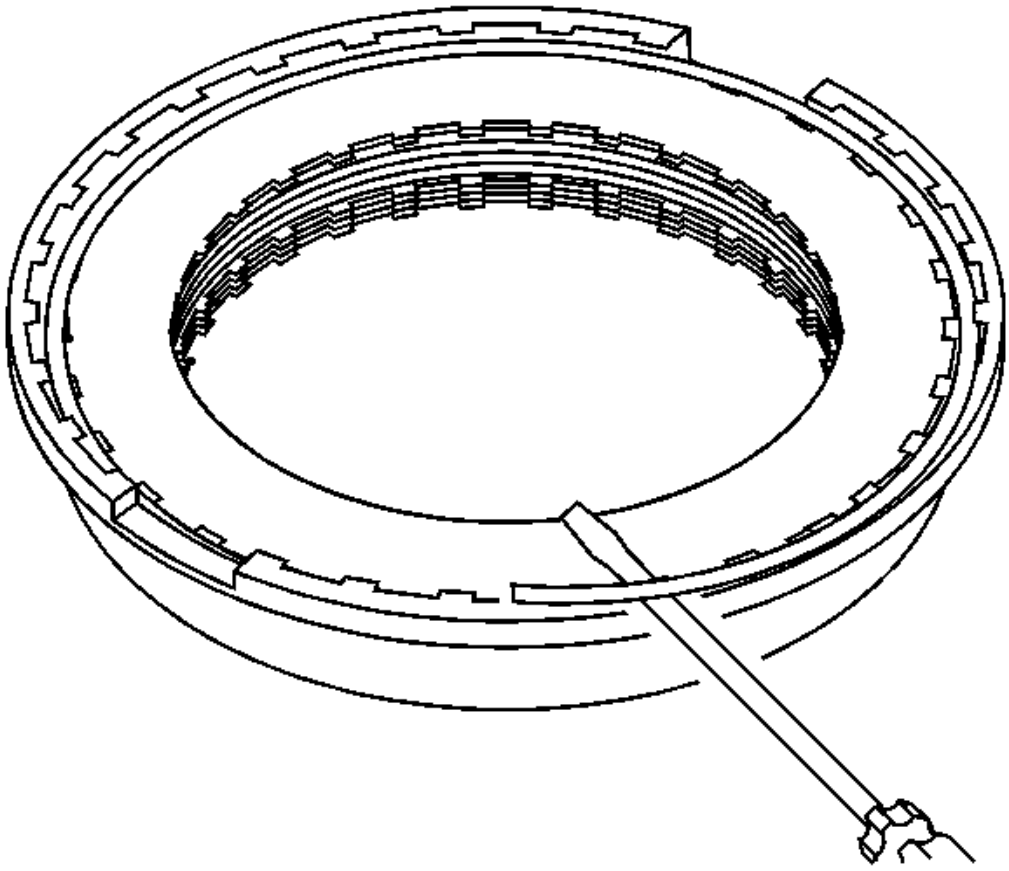

Fig. 56: View of 3-5 Reverse Clutch Plate
Courtesy of GENERAL MOTORS CORP.

Clutch Plate Removal

Callout	Component Name
1	3-5 Reverse Clutch Backing Plate Retaining Ring
2	3-5 Reverse Clutch Backing Plate
3	3-5 Reverse Clutch (w/Friction Material) Plate Assembly (Qty: 4)
4	3-5 Reverse Clutch Plate (Qty: 4)
5	3-5 Reverse Clutch (Waved) Plate

4-5-6 Clutch Hub Removal

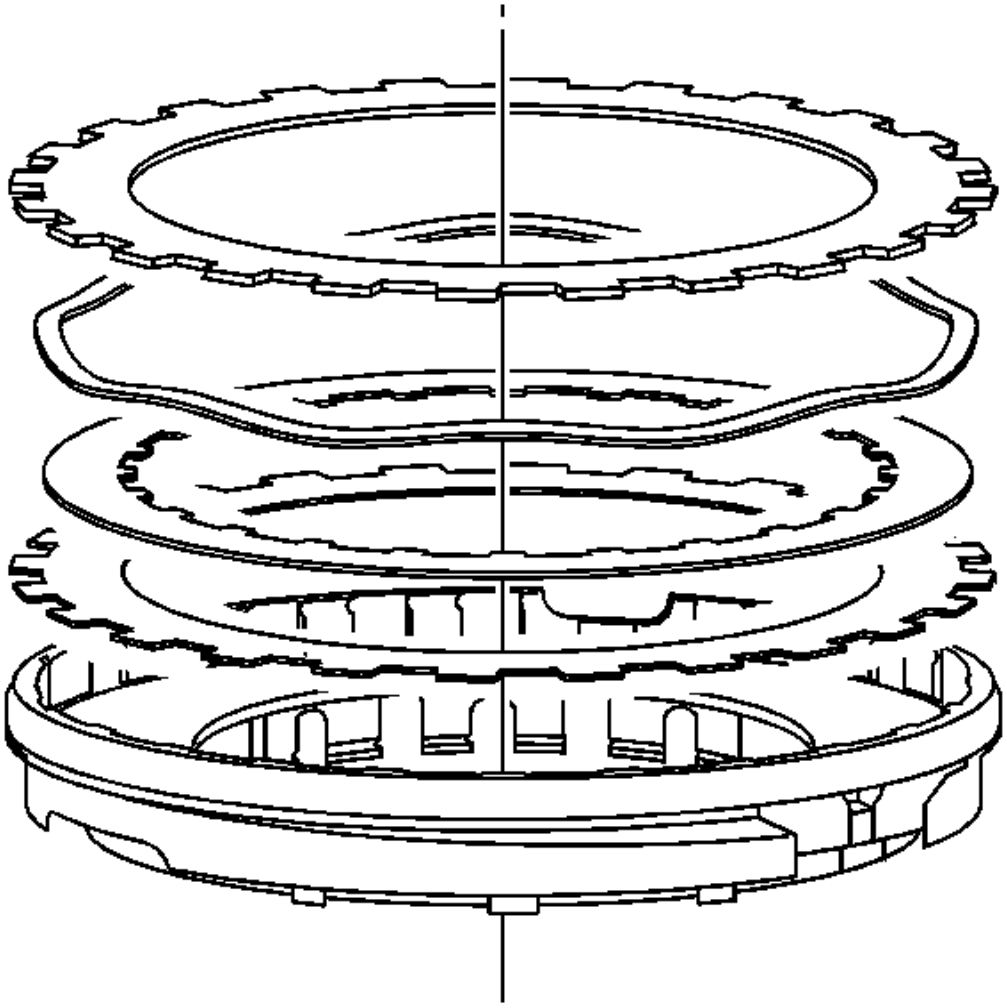

Fig. 57: View Of Reaction Carrier Hub Assembly
Courtesy of GENERAL MOTORS CORP.

4-5-6 Clutch Hub Removal

Callout	Component Name
1	4-5-6 Backing Plate Retaining Ring **Tip:** Gently push down on the backing plate to get enough clearance between the backing plate and retainer.
2	Reaction Carrier Hub Assembly **Tip:** The clutch plates will come out of the housing with the hub assembly.

3	4-5-6 Clutch Backing Plate
4	4-5-6 Clutch Plate (Qty: 6)
5	4-5-6 Clutch (w/Friction Material) Plate Assembly (Qty: 6)
6	4-5-6 Clutch Hub Thrust Bearing Assembly **Tip:** The bearing may stick to the reaction carrier hub.

4-5-6 Clutch Piston Removal

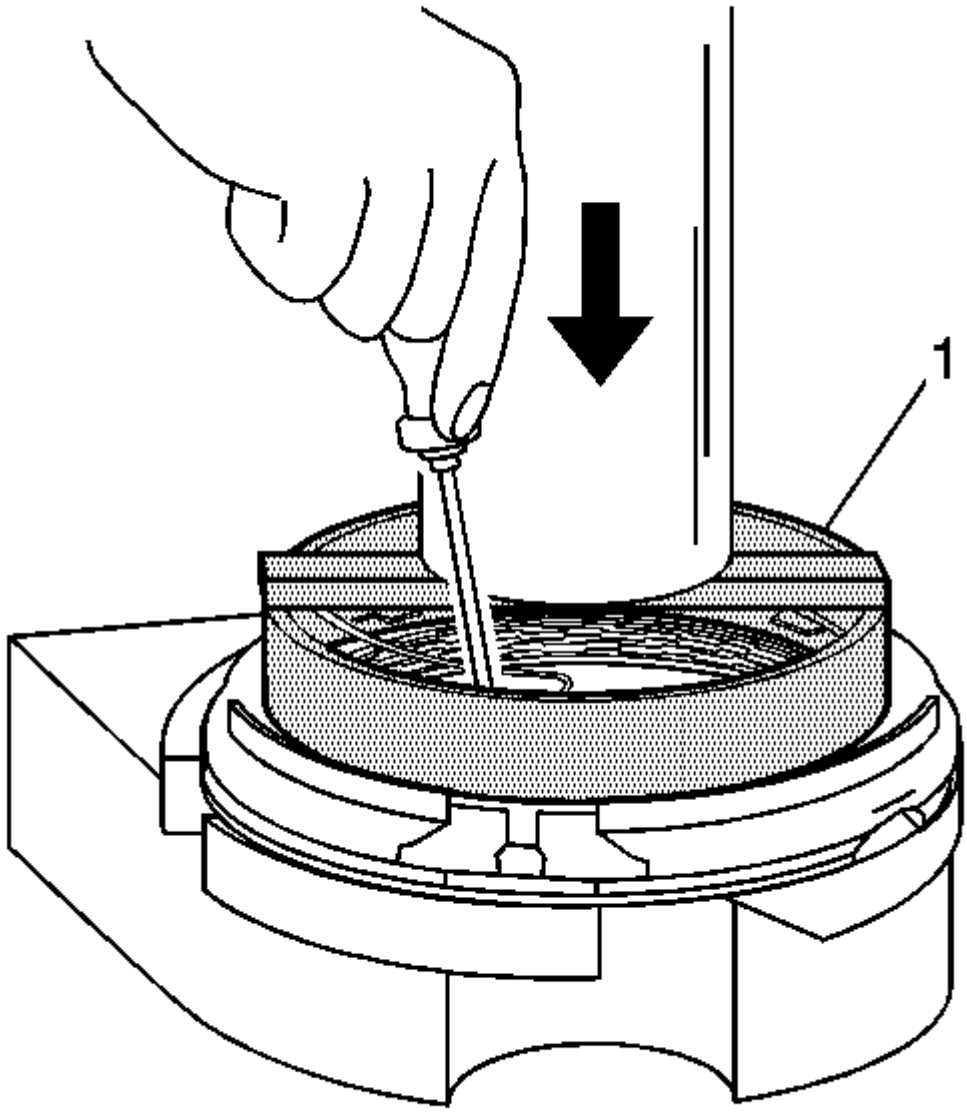

Fig. 58: Identifying 4-5-6 Clutch Piston
Courtesy of GENERAL MOTORS CORP.

4-5-6 Clutch Piston Removal

Callout	Component Name
	4-5-6 Clutch Dam Retaining Ring **Special Tools**

1	• **DT-47693:** Dam Protector • **J 8059:** Snap Ring Pliers-Parallel Jaw or equivalent For equivalent regional tools, refer to **Special Tools** .
2	4-5-6 Clutch Piston Fluid Dam **Procedure:** 1. Place the 3-5-R and 4-5-6 clutch housing onto the case cover assembly. 2. Apply shop air to the 4-5-6 clutch feed hole using a rubber tipped air gun to dislodge the dam piston and the 4-5-6 clutch piston from the clutch housing.
3	4-5-6 Clutch Spring Assembly
4	4-5-6 Clutch Piston
5	4-5-6 Clutch Piston Outer Seal (Stepped)
6	4-5-6 Clutch Piston Outer Seal (Rounded)
7	4-5-6 Clutch Piston Inner Seal

3-5-REVERSE AND 4-5-6 CLUTCH HOUSING ASSEMBLE

4-5-6 Clutch Piston Installation

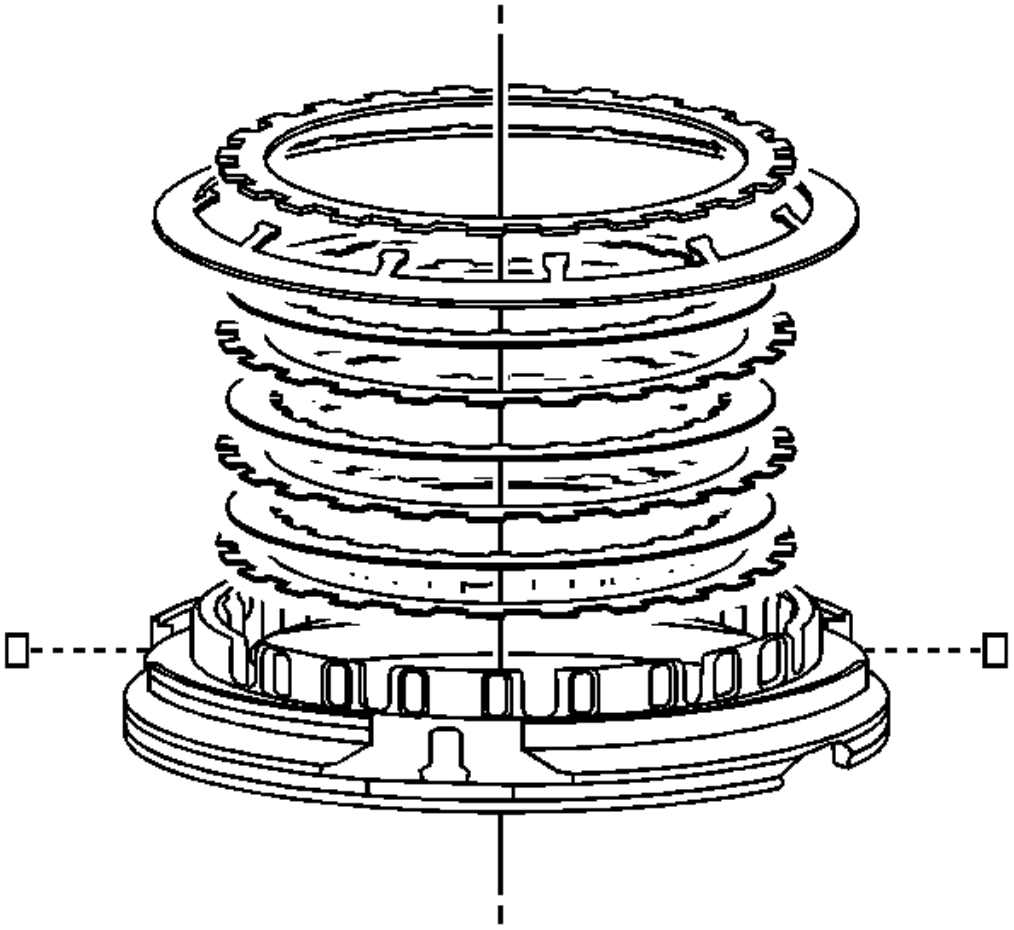

Fig. 59: Identifying 4-5-6 Clutch Piston
Courtesy of GENERAL MOTORS CORP.

4-5-6 Clutch Piston Installation

Callout	Component Name
1	4-5-6 Clutch Piston Inner Seal
2	4-5-6 Clutch Piston Outer Seal (Rounded)
3	4-5-6 Clutch Piston Outer Seal (Stepped) (Orange)
	4-5-6 Clutch Piston **Tip: DT-47859:** outer seal protector prevents the piston seal lip from damage during installation. Apply a thin coat of ATF to the I.D. of **DT-47859:** outer seal protector to ease the installation

4	of the piston. **Special Tools:** **DT-47859:** Piston Outer Seal Protector For equivalent regional tools, refer to **Special Tools** .

4-5-6 Clutch Dam Installation

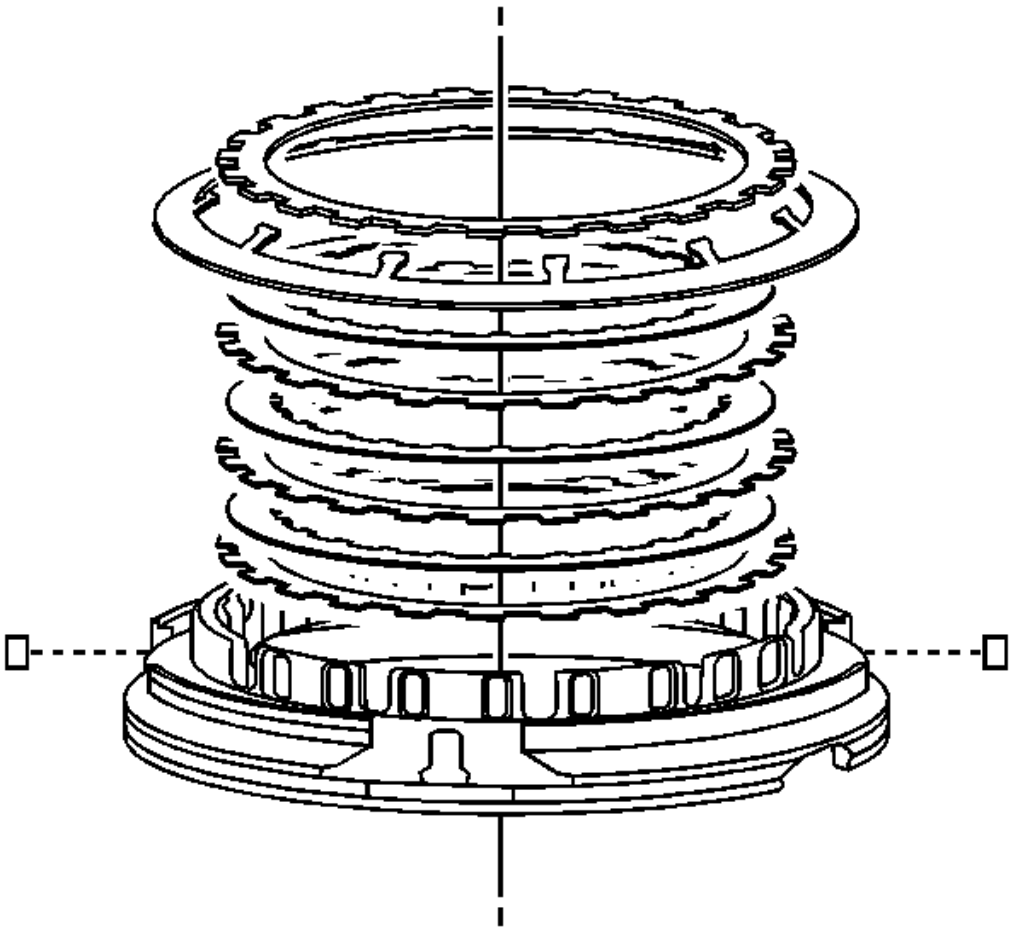

Fig. 60: View Of 4-5-6 Clutch Dam
Courtesy of GENERAL MOTORS CORP.

4-5-6 Clutch Dam Installation

Callout	Component Name
1	4-5-6 Clutch Spring

2	4-5-6 Clutch Piston Fluid Dam **Tip:** DT 47693-1 which is part of **DT-47693:** dam protector prevents the dam seal lip from damage during installation. Apply a thin coat of ATF to the I.D. of DT 47693-1 which is part of **DT-47693:** dam protector to ease the installation of the dam. **Special Tools:** **DT-47693:** Dam Protector For equivalent regional tools, refer to **Special Tools** .
3	4-5-6 Clutch Dam Retaining Ring **Special Tools** • DT 47693-2 Clutch Spring Compressor which is part of **DT-47693:** dam protector • **J 8059:** Snap Ring Pliers-Parrallel Jaw or equivalent For equivalent regional tools, refer to **Special Tools** .

4-5-6 Clutch Plates Installation

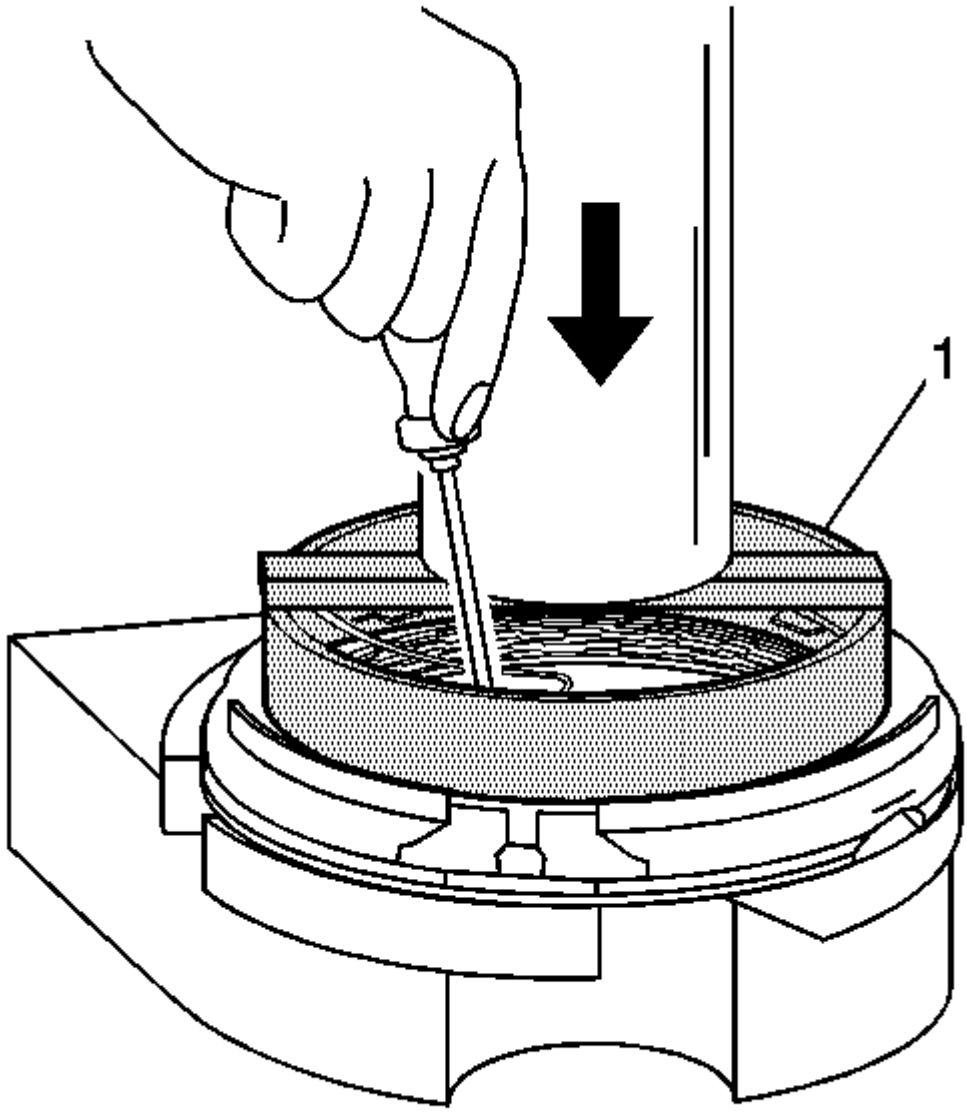

Fig. 61: Locating 4-5-6 Clutch Plates
Courtesy of GENERAL MOTORS CORP.

4-5-6 Clutch Plates Installation

Callout	Component Name
1	4-5-6 Clutch Hub Thrust Bearing **Tip:** Note location of the orientation lip on bearing. All thrust bearings can only be assembled one way.

2	Reaction Carrier Hub Assembly **CAUTION:** **Failure to use DT 48551 could cause damage to the hub assembly bushings which could cause premature transmission failure.** **Special Tools:** **DT-48551:** Reaction Hub Bushing Protector For equivalent regional tools, refer to **Special Tools** .
3	4-5-6 Clutch Plate (Qty: 6)
4	4-5-6 Clutch (w/Friction Material) Plate Assembly (Qty: 6)
5	4-5-6 Clutch Backing Plate
6	4-5-6 Clutch Backing Plate Retaining Ring **Tip:** Gently push down on the backing plate to get enough clearance between the backing plate and retainer.

3-5 Reverse Clutch Plates Installation

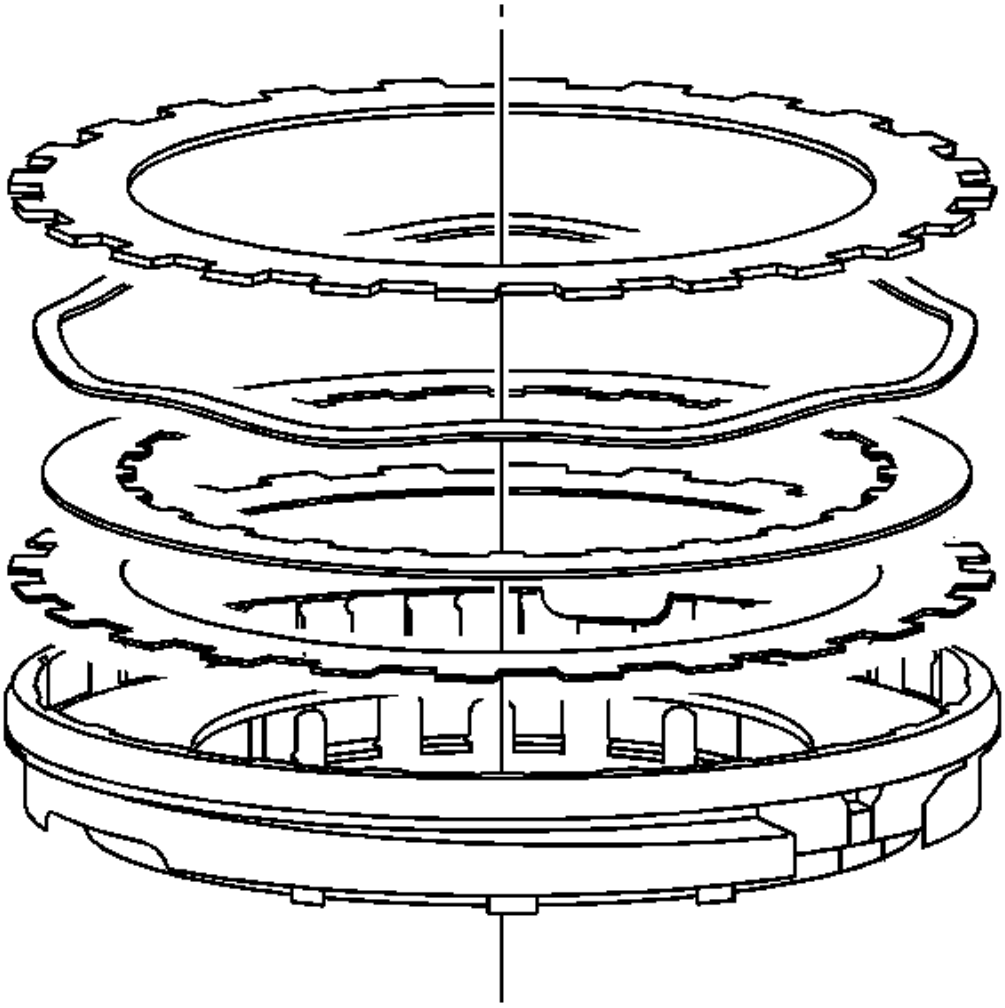

Fig. 62: Identifying 3-5 Reverse Clutch Plates
Courtesy of GENERAL MOTORS CORP.

3-5 Reverse Clutch Plates Installation

Callout	Component Name
1	3-5 Reverse Clutch (Waved) Plate
2	3-5 Reverse Clutch Plate (Qty: 4)
3	3-5 Reverse Clutch (w/Friction Material) Plate Assembly (Qty: 4)
4	3-5 Reverse Clutch Backing Plate
5	3-5 Reverse Clutch Backing Plate Retaining Ring

Piston and Reluctor Wheel Installation

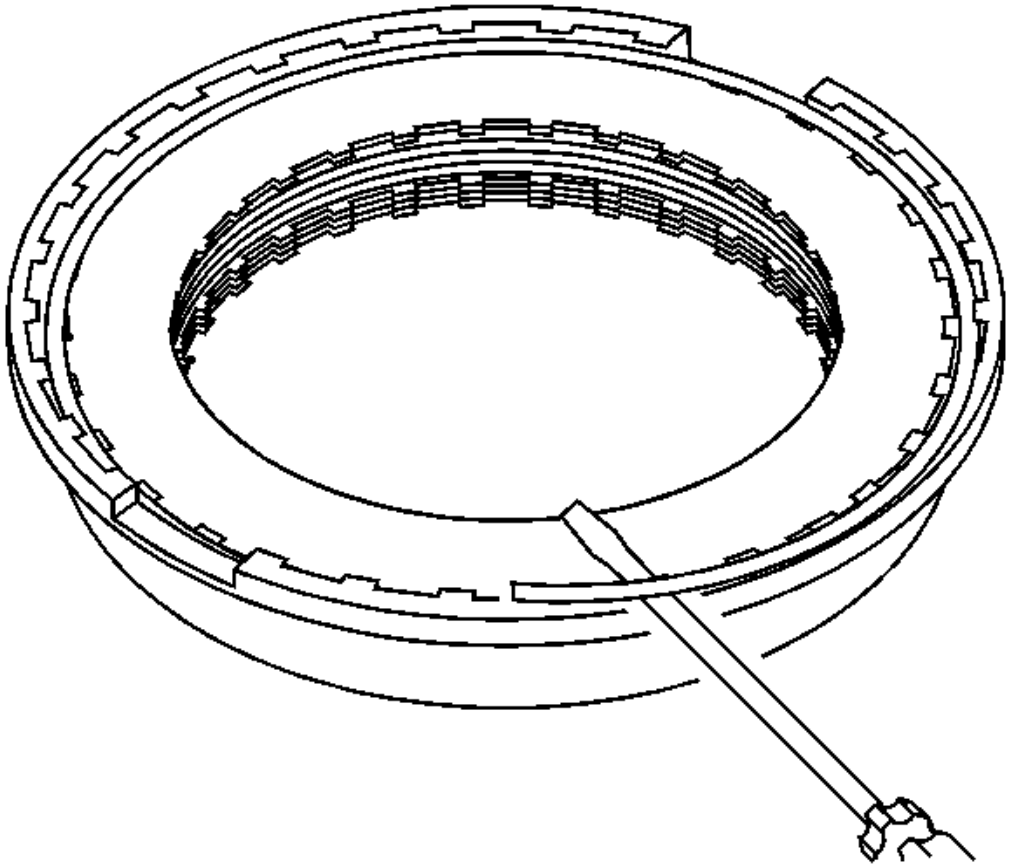

Fig. 63: View Of Piston & Reluctor Wheel
Courtesy of GENERAL MOTORS CORP.

Piston and Reluctor Wheel Installation

Callout	Component Name
1	3-5 Reverse Clutch Piston Dam Seal
2	3-5 Reverse Clutch Piston Inner Seal (Black) **Tip:** Apply a thin coat of ATF to the seal to ease the installation of the piston.
3	3-5 Reverse Clutch Piston Inner Seal (Orange) **Tip:** Apply a thin coat of ATF to the seal to ease the installation of the piston.
4	3-5 Reverse Clutch Spring Assembly

5	3-5 Reverse Clutch Piston **Tip:** • **J-46622:** seal protector prevents the piston seal lip from damage during installation. Apply a thin coat of ATF to the I.D. of **J-46622:** seal protector to ease the installation of the piston. • Install **J-46622:** seal protector onto the speed sensor reluctor wheel. Push the 3-5 Reverse Clutch piston into the reluctor wheel until it stops against **J-46622:** seal protector. Remove **J-46622:** seal protector by separating it at the opening. **Special Tools:** **J-46622:** Piston Seal Protector For equivalent regional tools, refer to **Special Tools** .
6	A/Trans Input Shaft Speed Sensor Reluctor Wheel
7	A/Trans Input Shaft Speed Sensor Reluctor Wheel Retaining Ring **CAUTION:** **Compress the reluctor wheel just enough to clear the retainer ring groove. Over compressing the reluctor wheel will break the alignment tab and the clutch housing.** **Special Tools:** **DT-47694:** Piston Spring Compressor For equivalent regional tools, refer to **Special Tools** .

3-5-R and 4-5-6 Clutch Piston Air Check

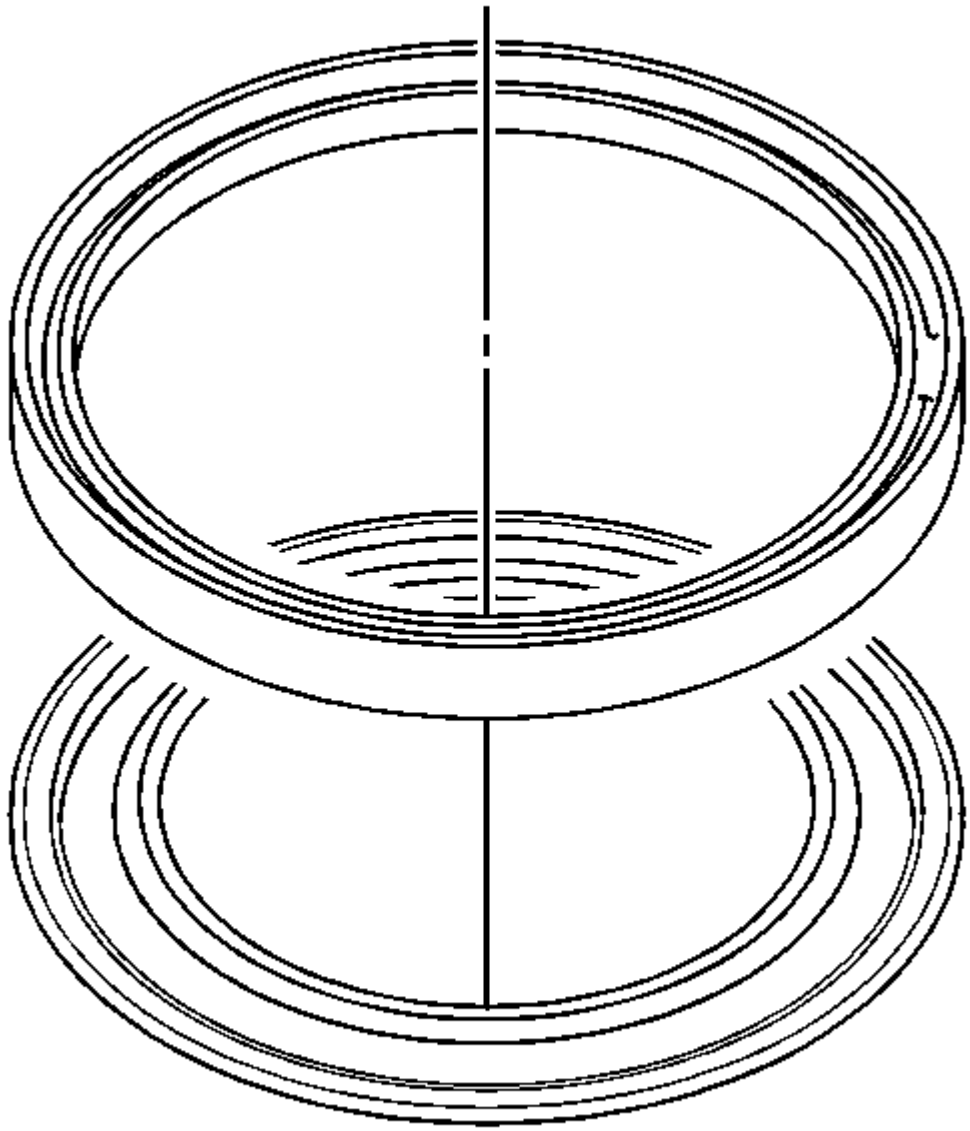

Fig. 64: 35R and 456 Clutch Piston Air Check
Courtesy of GENERAL MOTORS CORP.

3-5-R and 4-5-6 Clutch Piston Air Check

Callout	Component Name
1	Case Cover Assembly **Tip:** The fluid seal rings should be in place and not

	damaged.
2	4-5-6 Clutch Feed Fluid Passage **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. Apply shop air to the 4-5-6 clutch feed passage. 2. Observe the 4-5-6 piston movement. **Tip:** Minimal piston movement and excessive air leaking could indicate damage to the 4-5-6 piston seals or improper assembly.
3	3-5 Rev Clutch Feed Fluid Passage **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. Apply shop air to the 3-5-Rev clutch feed passage. 2. Observe the 3-5-Rev piston movement. **Tip:** Minimal piston movement and excessive air leaking could indicate damage to the 3-5-Rev piston seals or improper assembly.

3-5-REVERSE AND 4-5-6 CLUTCH HOUSING INSTALLATION

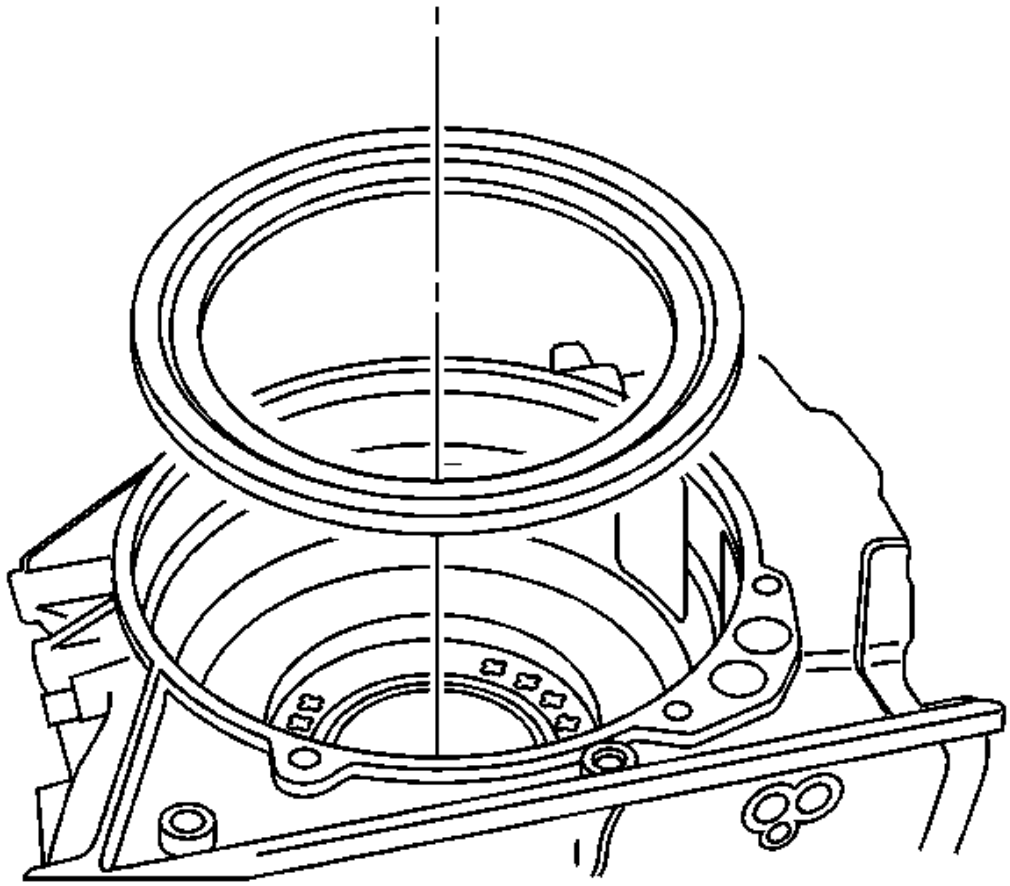

Fig. 65: Identifying 3-5 Reverse & 4-5-6 Clutch Housing
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	3-5 Reverse and 4-5-6 Clutch Assembly **Tip:** Rotate the assembly back and forth to align the 3-5 reverse clutch plates with the reaction sun gear housing.

CASE COVER ASSEMBLY DISASSEMBLE

ISS Removal

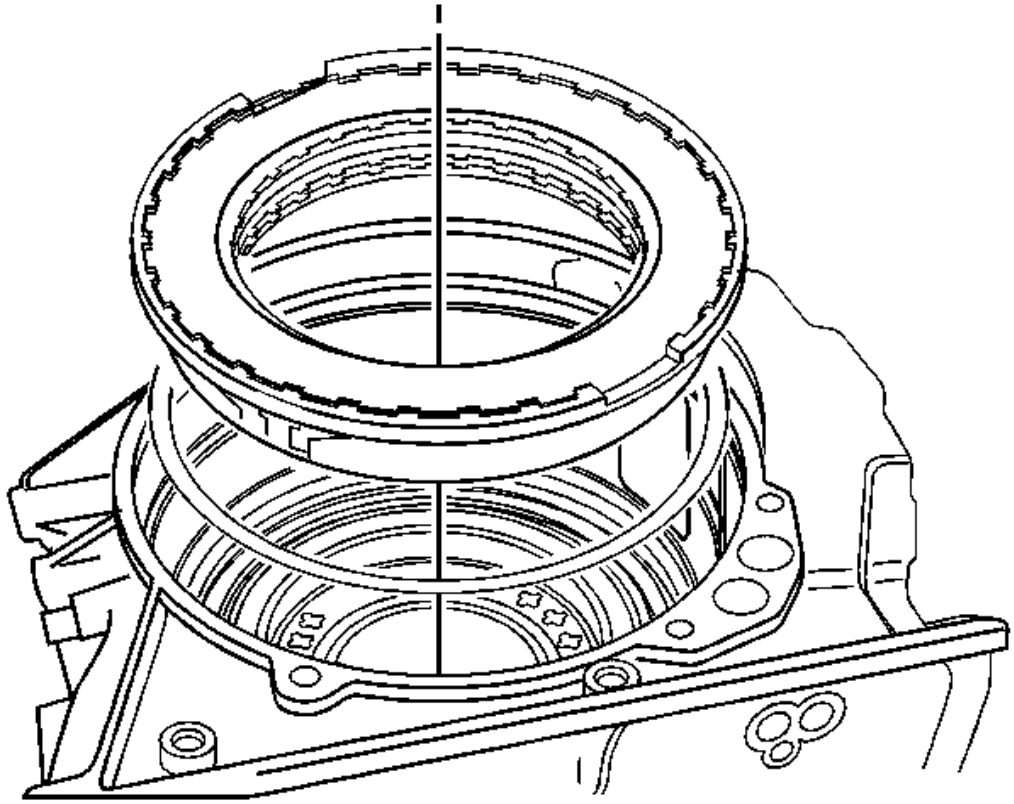

Fig. 66: View Of 3-5 Reverse & 4-5-6 Clutch Fluid Seal Ring
Courtesy of GENERAL MOTORS CORP.

ISS Removal

Callout	Component Name
1	A/Trans Input Speed Sensor Bolt M6 x 25
2	A/Trans Input Speed Sensor
3	A/Trans Input Speed Sensor Seal **Tip:** Discard the seal.
4	3-5 Reverse and 4-5-6 Clutch Fluid Seal Ring **Tip:** Discard the seals.

Low and Reverse Clutch Piston Removal

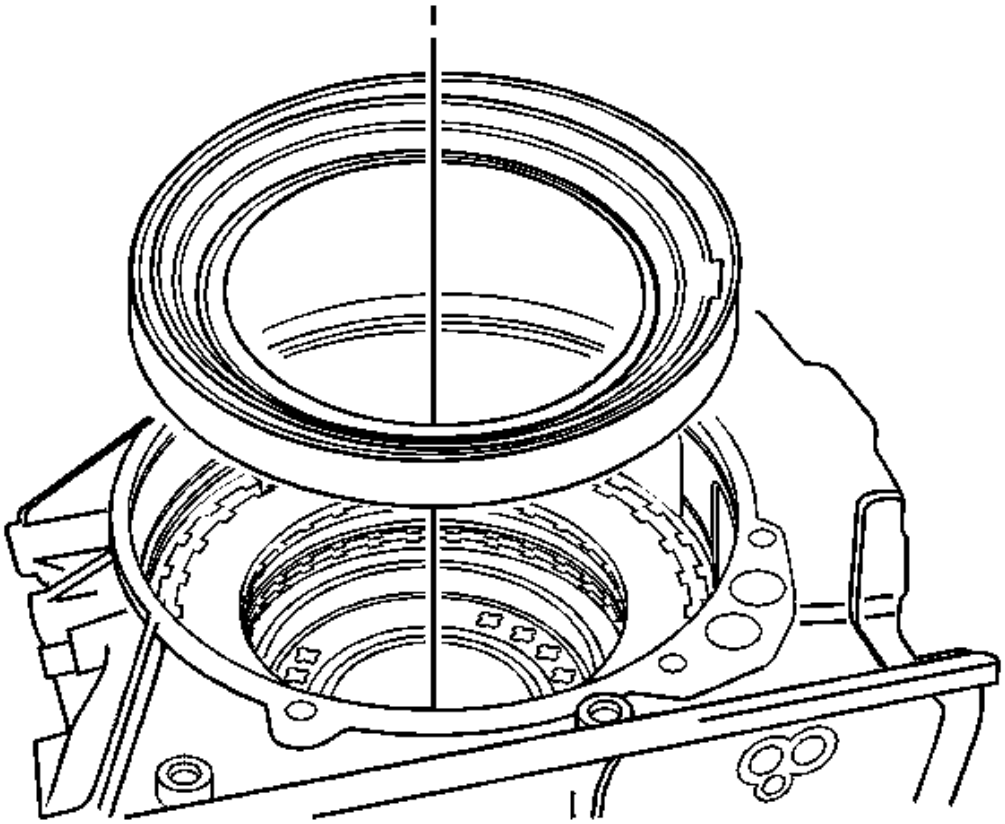

Fig. 67: Identifying Low & Reverse Clutch Piston
Courtesy of GENERAL MOTORS CORP.

Low and Reverse Clutch Piston Removal

Callout	Component Name
1	Low and Reverse Clutch Spring Retaining Ring
2	Low and Reverse Clutch Spring
3	Low and Reverse Clutch Piston Assembly **Tip:** Inspect piston seals for damage and/or wear. Piston is reusable.

2-6 Clutch Piston Removal

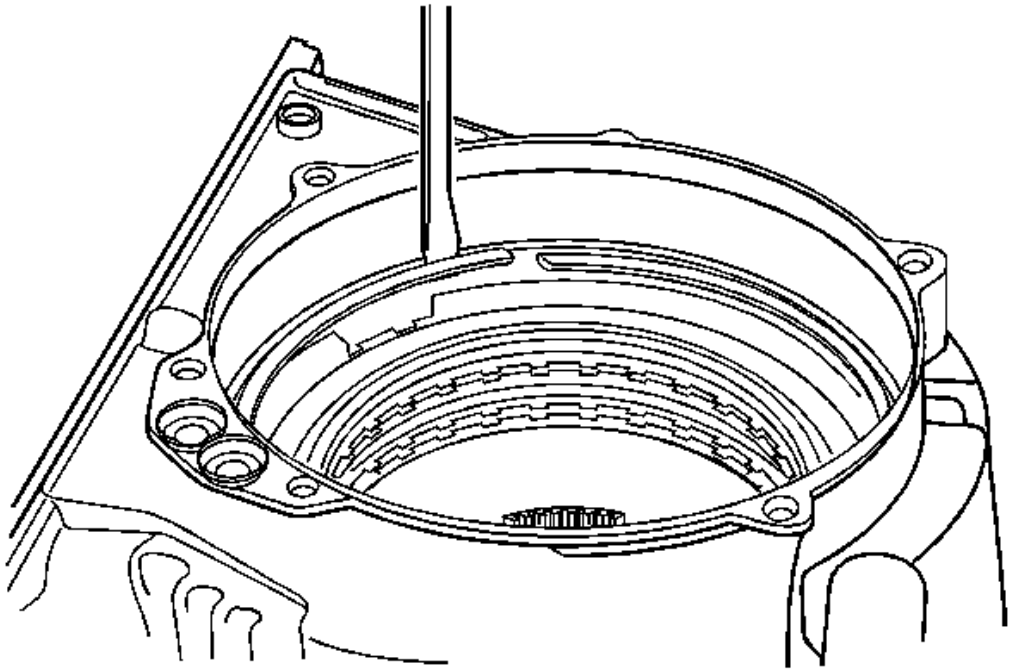

Fig. 68: View Of 2-6 Clutch Piston
Courtesy of GENERAL MOTORS CORP.

2-6 Clutch Piston Removal

Callout	Component Name
1	2-6 Clutch Spring Retaining Ring **Special Tools:** **J-46632:** Spring Compressor For equivalent regional tools, refer to **Special Tools** .
2	2-6 Clutch Spring Assembly
3	2-6 Clutch Piston **Tip:** Inspect piston seals for damage and/or wear. Piston is reusable.

Clean and Inspect

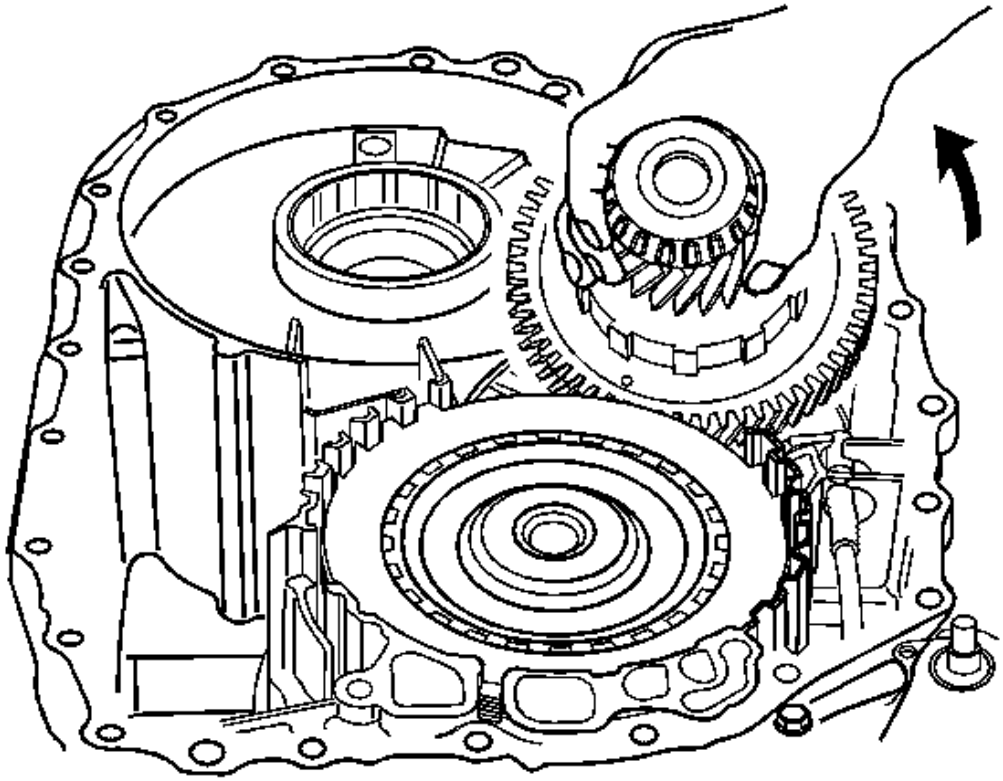

Fig. 69: Identifying Case Cover Assembly Components
Courtesy of GENERAL MOTORS CORP.

Clean and Inspect

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.

Preliminary Procedures

1. Thoroughly clean the case cover assembly, including 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	Gasket Sealing Surface
2	Fluid Passages
3	Piston Bores
4	Cover to Case Passages
5	A/Trans Input Speed Sensor Assembly Bore
6	Cover Casting
7	Passage Cup Plugs
8	Input Shaft Support Bolts **Procedure:** Tightened bolts in sequence. **Tighten:** 12 N.m (106 lb in).

CASE COVER ASSEMBLY ASSEMBLE

Fluid Seal Ring Installation

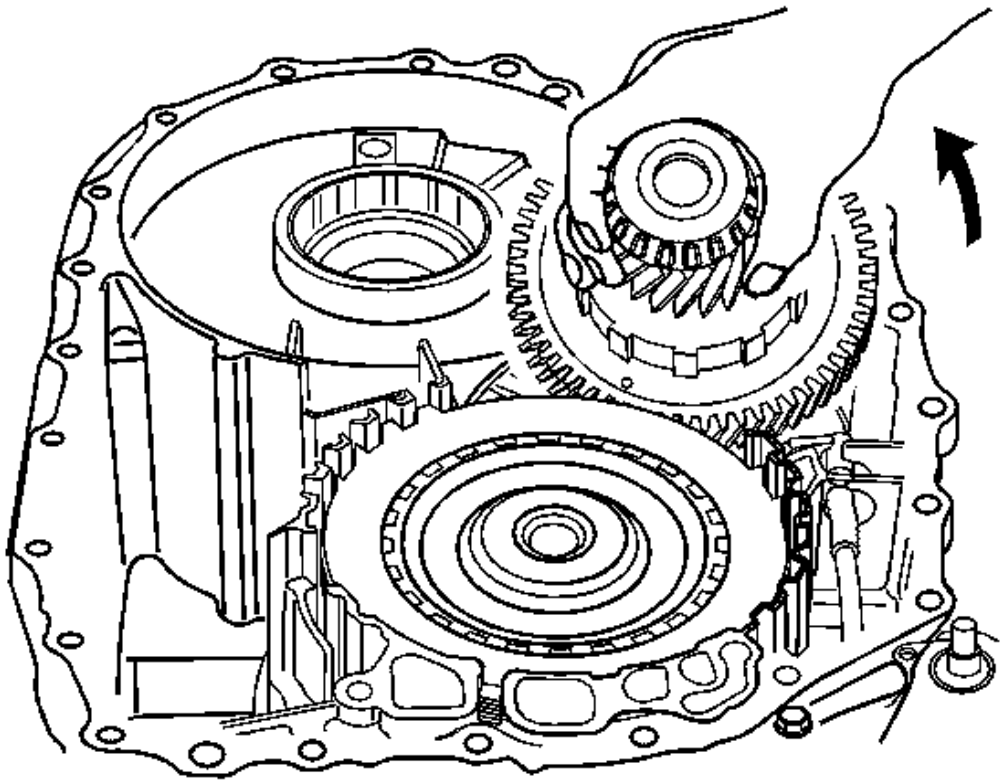

Fig. 70: Identifying Fluid Seal Ring
Courtesy of GENERAL MOTORS CORP.

Fluid Seal Ring Installation

Callout	Component Name
1	3-5 Reverse and 4-5-6 Clutch Fluid Seal Ring **Procedure** 1. Place J 46620-3 which is part of **J-46620:** seal installer over the case cover hub and adjust it so that only the bottom seal ring is exposed. 2. Place a NEW fluid seal ring onto J 46620-3 which is part of **J-46620:** seal installer. 3. Use J 46620-2 which is part of **J-46620:** seal installer to push the fluid seal ring down over J 46620-3 which is part of **J-46620:** seal installer into

	the hub ring groove. 4. Repeat the above steps to install all 4 seal rings, adjusting J 46620-3 which is part of **J-46620:** seal installer to the appropriate ring groove. **Special Tools:** **J-46620:** Seal Installer For equivalent regional tools, refer to **Special Tools** .
2	Small Chamfer Up **CAUTION:** **Do not force J 46620-1 down over the seals as this will roll and damage the seals. The large chamfer is designed to fit over the over stretched seal. Use a hand to help shrink the seal if J 46620-1 is difficult to install over the seal rings.** **Procedure:** Install J 46620-1 which is part of **J-46620:** seal installer with the large chamfer end down over the fluid seal rings and leave J 46620-1 which is part of **J-46620:** seal installer on the seals for at least 60 seconds.
3	Large Chamfer Up **Procedure** 1. Install J 46620-1 which is part of **J-46620:** seal installer with the small chamfer end facing down for at least 60 seconds. This will properly size the bottom seal ring. 2. Leaving J 46620-1 which is part of **J-46620:** seal installer on the fluid seal rings for an extended period of time could cause a fluid leak on the initial clutch piston circuit until the seal rings warm up and expand to the proper dimension.

2-6 Clutch Piston Installation

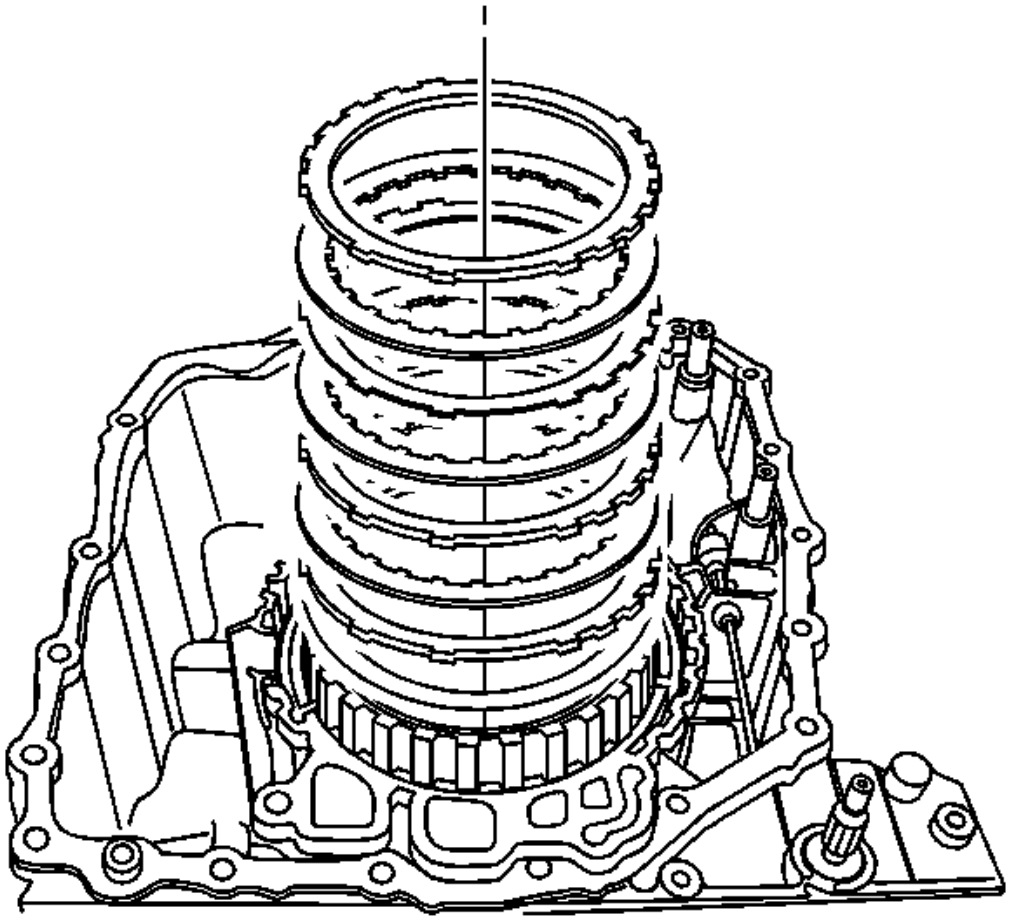

Fig. 71: View Of 2-6 Clutch Piston
Courtesy of GENERAL MOTORS CORP.

2-6 Clutch Piston Installation

Callout	Component Name
1	2-6 Clutch Piston **Procedure:** **J-46621:** seal protector prevents the piston seal lip from damage over the retaining ring groove during installation. Apply a thin coat of ATF to the O.D. of **J-46621:** seal protector to ease the installation of the piston. **Special Tools:** **J-46621:** Seal Protector For equivalent regional tools, refer to **Special Tools** .

2	2-6 Clutch Spring Assembly
3	2-6 Clutch Spring Assembly **Procedure** 1. Install the retaining ring with the opening positioned to the top of the case cover. 2. Place the retainer ring inside **J-46632:** spring compressor prior to placing **J-46632:** spring compressor onto the spring. **Special Tools:** **J-46632:** Spring Compressor For equivalent regional tools, refer to **Special Tools** .

Low and Reverse Clutch Piston Installation

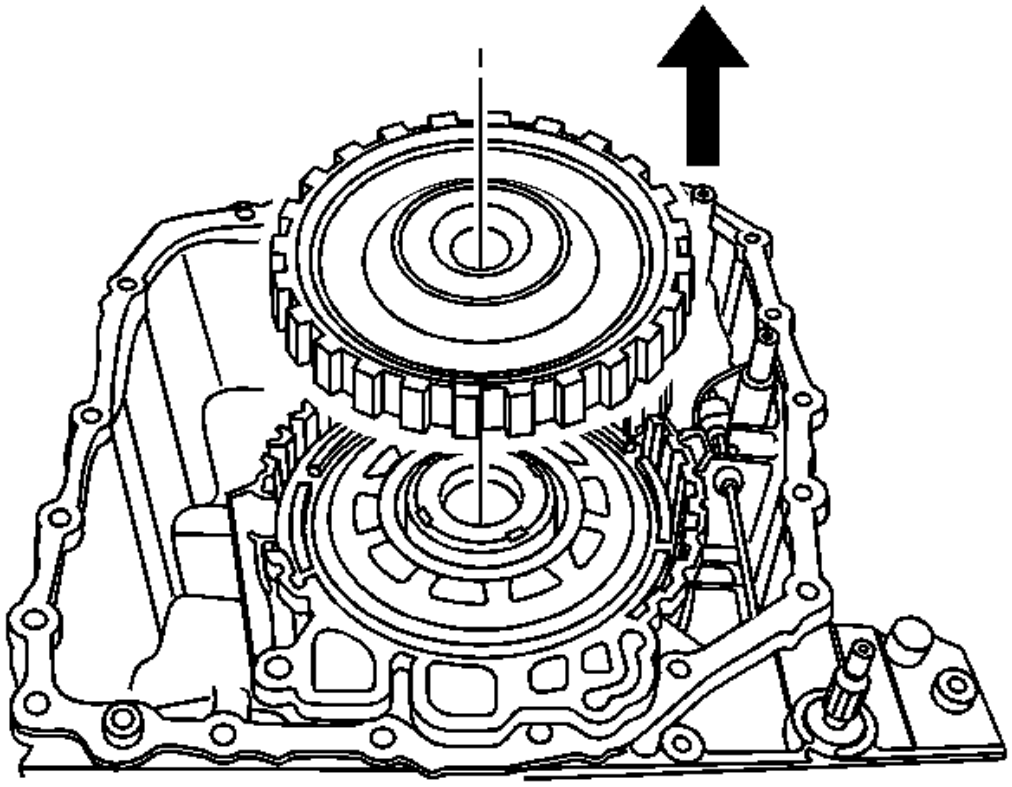

Fig. 72: Identifying Low & Reverse Clutch Piston
Courtesy of GENERAL MOTORS CORP.

Low and Reverse Clutch Piston Installation

Callout	Component Name
1	Low and Reverse Clutch Piston Assembly **Procedure** 1. Install the L/R piston with the air bleed positioned at the alignment feature on the cover, using **J-46628-1:** seal protector. This will orient the piston fingers with the openings in the case. 2. **J-46628-1:** seal protector prevents the piston seal lip from damage during installation. Apply a thin coat of ATF to the I.D. of **J-46628-1:** seal protector to ease the installation of the piston. **Special Tools:** **J-46628-1:** Piston Seal Protector For equivalent regional tools, refer to **Special Tools** .
2	Low and Reverse Clutch Spring
3	Low and Reverse Clutch Spring Retaining Ring **Tip:** Do not align the retainer opening with other retaining ring openings. **Special Tools:** **J-46628-2:** Spring Compressor For equivalent regional tools, refer to **Special Tools** .

2-6 and Low-Reverse Piston Function Inspection

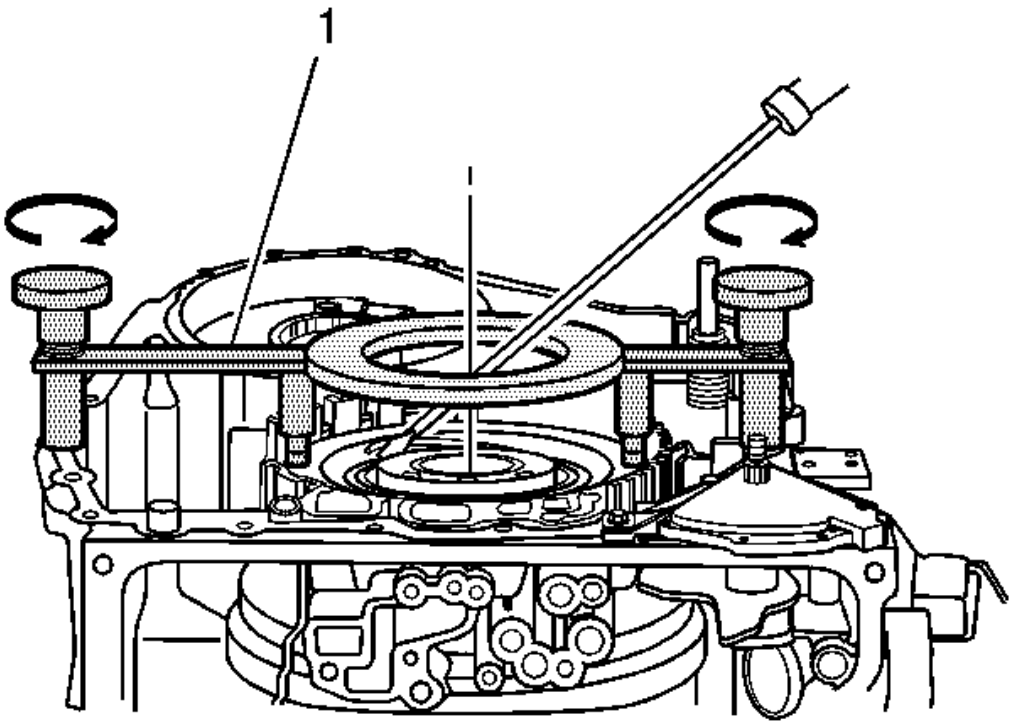

Fig. 73: 2-6 and Low-Reverse Piston Function Inspection
Courtesy of GENERAL MOTORS CORP.

2-6 and Low-Reverse Piston Function Inspection

Callout	Component Name
1	Case Cover Assembly **Tip:** The fluid seal rings should be in place and not damaged.
2	2-6 Clutch Feed Passage **CAUTION:** **Regulate the air pressure to 40 psi maximum. High pressure could cause the piston to over travel and damage the piston seals.** **Procedure:** Apply shop air to the 2-6 clutch feed. Observe the 2-6 piston movement. **Tip:** Minimal piston movement and excessive air

	leaking could indicate damage to the 2-6 piston seals or improper assembly.
3	Low and Reverse Clutch Feed Passage **CAUTION:** **Regulate the air pressure to 40 psi maximum. High pressure could cause the piston to over travel and damage the piston seals.** **Procedure:** Apply shop air to the Low and Reverse clutch feed. Observe the Low and Reverse piston movement. **Tip:** Minimal piston movement and excessive air leaking could indicate damage to the Low and Reverse piston seals or improper assembly.

Input Speed Sensor Installation

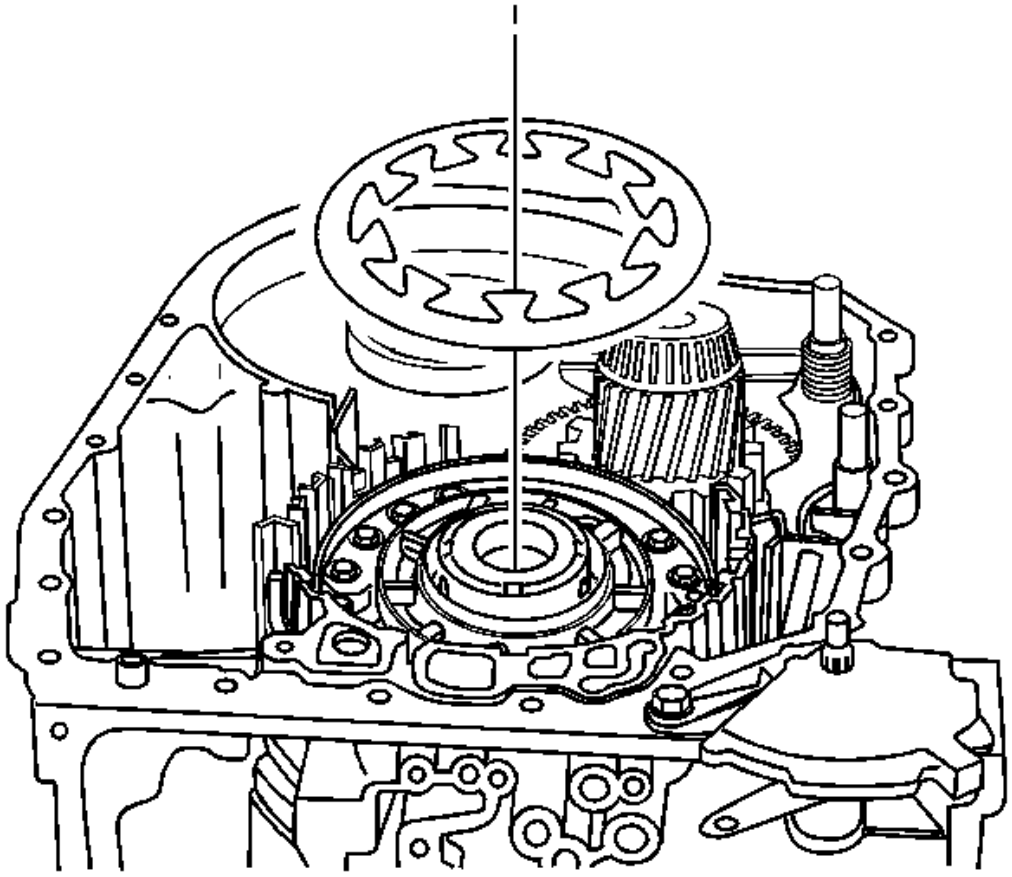

Fig. 74: View Of Input Speed Sensor
Courtesy of GENERAL MOTORS CORP.

Input Speed Sensor Installation

Callout	Component Name
1	Input Speed Sensor Seal
2	A/Trans Input Speed Sensor Assembly
3	A/Trans Input Speed Sensor Bolt M6 x 25 **CAUTION:** **Refer to Fastener Caution .** **Procedure:** Apply threadlocker GM P/N 12345382 (Canadian

	P/N 10953489) or equivalent to the input speed sensor bolt. **Tip:** The seal is coated with a dry lubricant. If the coating is missing, lubricate the seal with automatic transmission fluid prior to installation. **Tighten:** 9 N.m (7 lb ft)

CASE COVER ASSEMBLY INSTALLATION

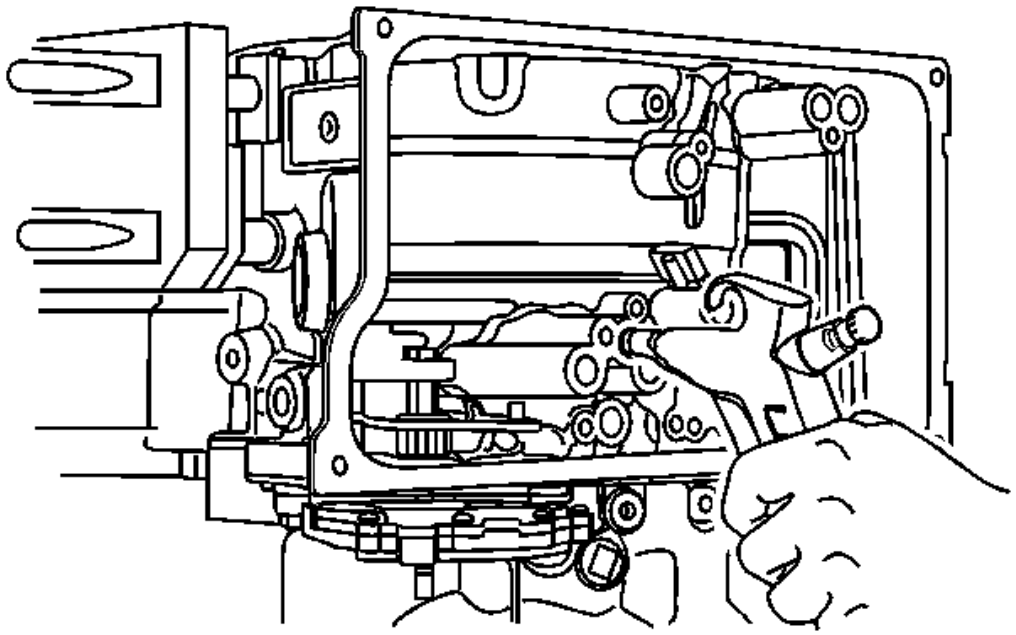

Fig. 75: Identifying Case Cover Assembly Components
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Input Shaft Thrust Bearing **Tip:** Note location of the orientation lip on bearing. All thrust bearings can only be assembled one way.
2	A/Trans Case Cover Gasket
3	Input Speed Sensor Wire Harness **Tip:** Route the input speed sensor wire harness through the case passage.
	A/Trans Case Cover Assembly

4	**Procedure** 1. Use guide pins to install the case cover assembly to prevent damage to the input shaft thrust bearing. 2. Pull the input speed sensor wire harness through the case passage while lowering the cover assembly onto the case. **Special Tools:** **39068:** Guide Pins For equivalent regional tools, refer to **Special Tools** .
5	A/Trans Case Cover Assembly Bolt M6 x 30 (Qty: 10) **CAUTION:** **Refer to Fastener Caution .** **Procedure:** Tighten in sequence shown. **Tighten:** 12 N.m (106 lb in)

FRONT DIFFERENTIAL CARRIER FINAL ROTATIONAL TORQUE MEASUREMENT

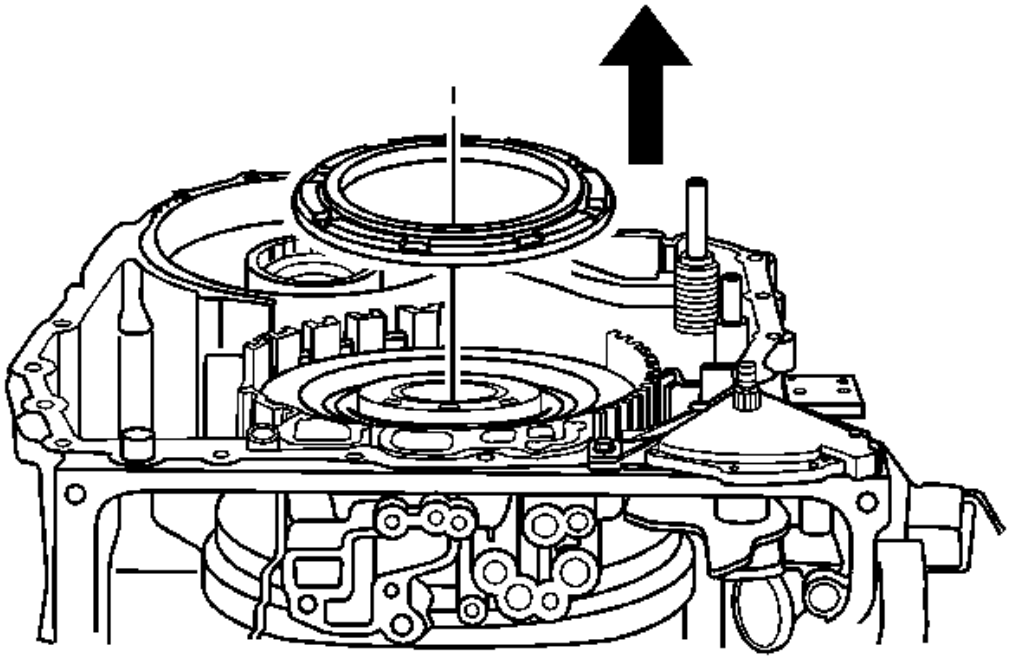

Fig. 76: Identifying Special Tool - DT-47793
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Front Differential Carrier Assembly **CAUTION:** **Low bearing pre-load will cause premature failure of the front differential drive pinion gear.** **CAUTION:** **Refer to Fastener Caution .** **Tip:** • 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. • Use a dial or beam torque wrench with **DT-47793:** differential rotating tool to measure turning torque. **Tighten:** 14-22 N.m (10-16 lb ft) **Special Tools:** **DT-47793:** Differential Rotating Tool For equivalent regional tools, refer to **Special Tools** .

CONTROL VALVE BODY ASSEMBLY DISASSEMBLE

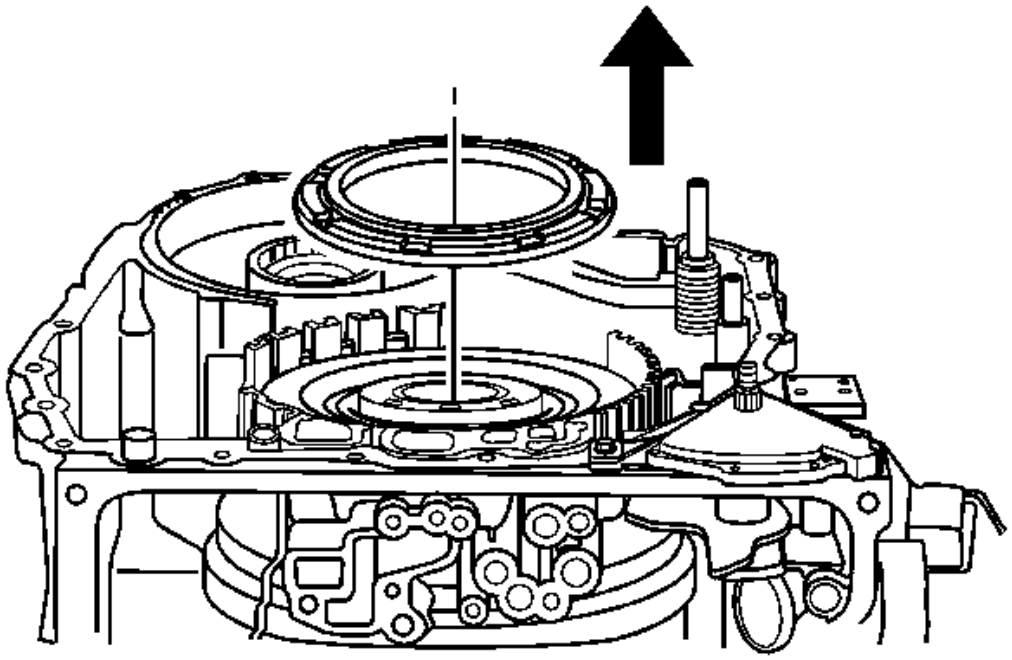

Fig. 77: Identifying Control Valve Body Assembly Components
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Control Valve Body Bolt M6 x 65 (Qty: 5)
2	Control Valve Body Bolt M6 x 35 (Qty: 3)
	Control Valve Channel Upper Plate Assembly **Tip:** Inspect the upper channel plate bolt pass

3	through holes for damage or burnelling. Any damage near the PCS feed hole could cause leaking around the PCS switch seal. Replace as necessary.
4	Control Valve Body Bolt M6 x 55 (Qty: 2)
5	Control Valve Body Bolt M6 x 55 (Qty: 1)
6	Control Valve Channel Plate Assembly
7	Control Valve Body Ball Check Valve (Qty: 9)
8	Control Valve Upper Body Assembly
9	Control Valve Lower Body Spacer Plate Assembly **Tip:** Discard the spacer plate assembly.
10	Control Valve Lower Body Assembly

CONTROL VALVE LOWER BODY ASSEMBLY CLEANING AND INSPECTION

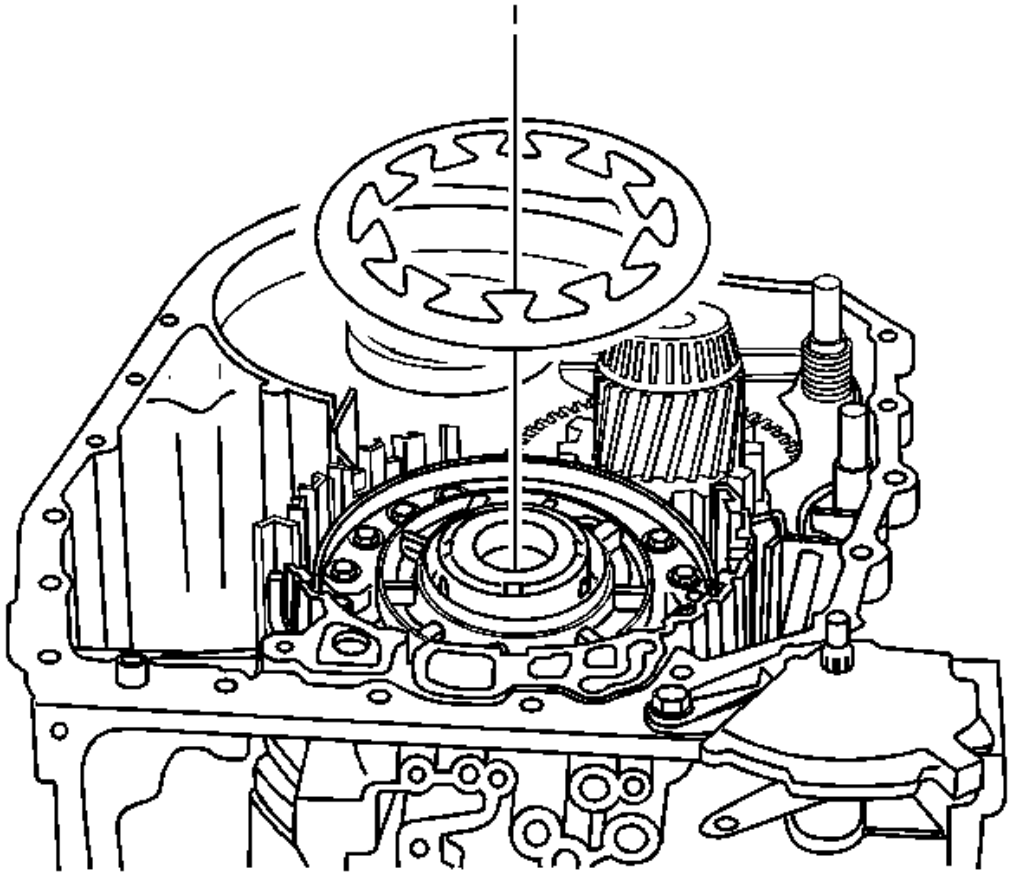

Fig. 78: Identifying Control Valve Lower Body Assembly Components
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name

WARNING:
Valve springs can be tightly compressed. Use care when removing retainers and plugs. Personal injury could result.

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 Procedure: Clean and inspect all valve components and the valve body. The control valve lower body is replaceable only as an assembly.	
1	3-5 Reverse Clutch Boost Valve Train
2	Accumulator Feed Limit Valve Train
3	4-5-6 Clutch Boost Valve Train
4	4-5-6 Clutch Accumulator Piston Assembly
5	1-2-3-4 Clutch Boost Valve Train
6	1-2-3-4 Clutch Regulator Valve Train
7	Control Valve Body Locating Pins (Qty: 2) **Tip:** Inspect Valve Body locating pins for proper installed height of 4.25 mm (0.17 in).

CONTROL VALVE UPPER BODY ASSEMBLY CLEANING AND INSPECTION

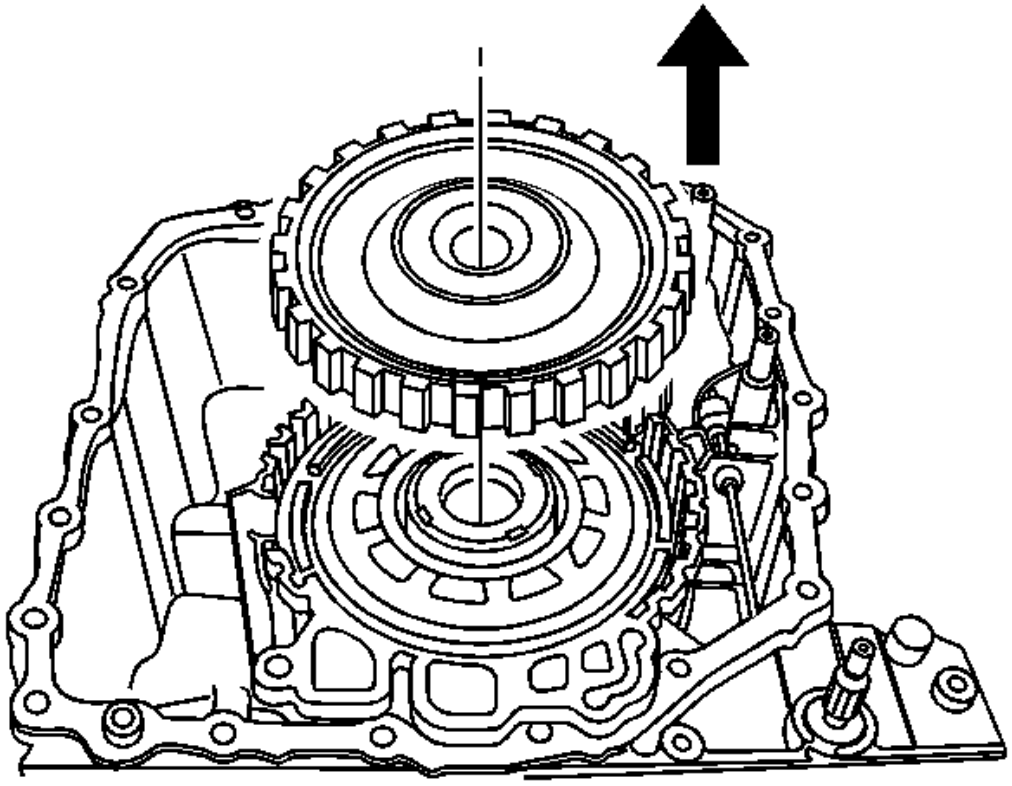

Fig. 79: Identifying Control Valve Upper Body Assembly Components
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
WARNING: **Valve springs can be tightly compressed. Use care when removing retainers and plugs. Personal injury could result.** **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 Procedure:** Clean and inspect all valve components and the valve body. The control valve upper body is replaceable only as an assembly.	
1	1st Reverse and 4-5-6 Clutch Regulator Valve Train
2	TCC Regulator Apply Valve Train
3	2-6 Clutch Regulator Valve Train
4	3-5 Reverse Clutch Regulator Valve Train
5	Pressure Regulator Valve Train
6	Isolator Valve Train
7	TCC Control Valve Train
8	Clutch Select Solenoid #3 Valve Train
9	Clutch Select Solenoid #2 Valve Train
10	Manual Valve

CONTROL VALVE CHANNEL PLATE CLEANING AND INSPECTION

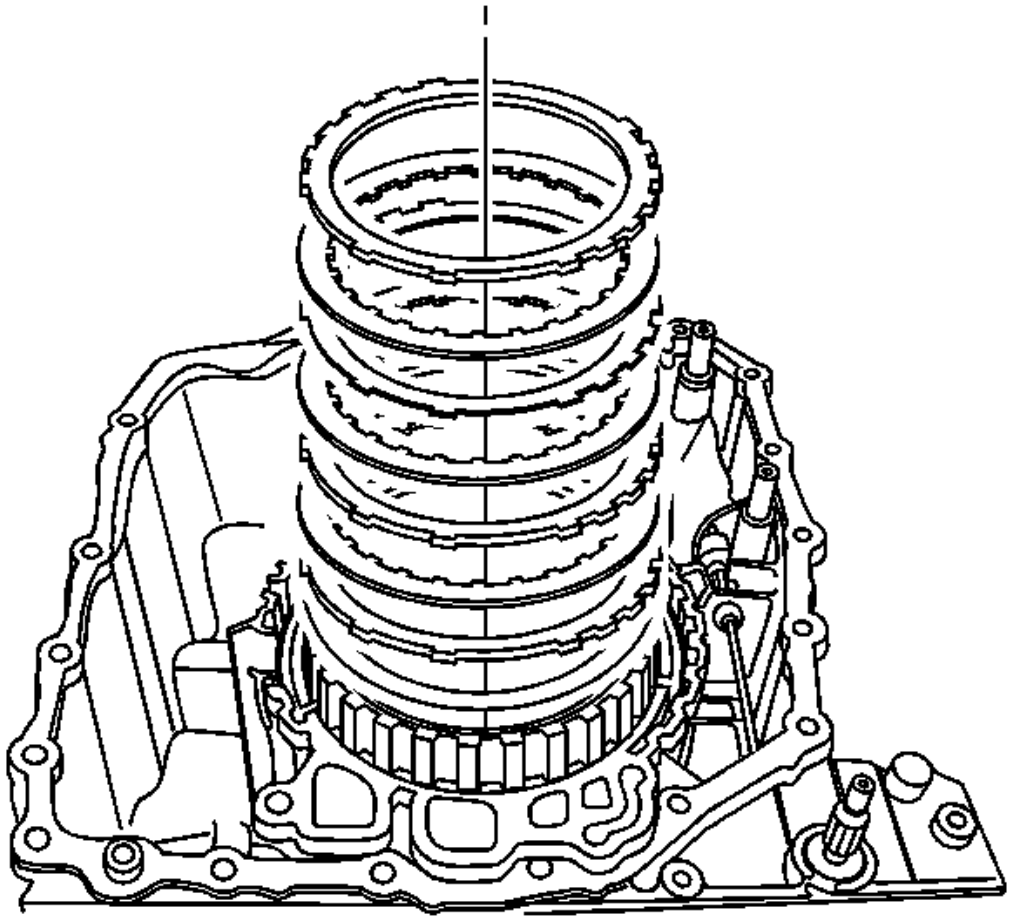

Fig. 80: Identifying Control Valve Channel Plate Components
Courtesy of GENERAL MOTORS CORP.

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.**	
1	Control Valve Body Spacer Plate Retainer (Qty: 2)
2	Control Valve Upper Body Spacer Plate Assembly

3	Actuator Feed Accumulator Spring (Qty: 3)
4	Actuator Feed Accumulator Piston (Qty: 3)
5	Control Valve Body Locating Pin (Qty: 2) **Tip:** Inspect locating pins for proper installed height of 4.25 mm (0.17 in).

CONTROL VALVE BODY ASSEMBLY ASSEMBLE

Lower and Upper Body Assemble

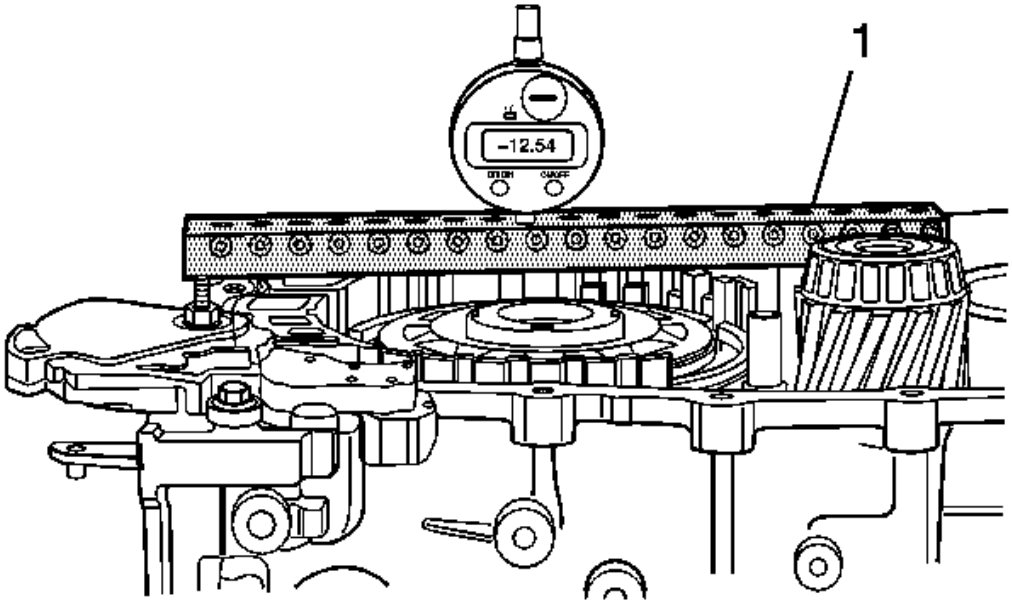

Fig. 81: Identifying Control Valve Body & Bolt
Courtesy of GENERAL MOTORS CORP.

Lower and Upper Body Assemble

Callout	Component Name
1	Control Valve Lower Body Spacer Plate Assembly **Tip:** Inspect the upper channel plate bolt through holes for damage or burnelling. Any damage around the PCS switch feed holes could cause leakage around the PCS switch seals. Replace as necessary.
2	Control Valve Upper Body Assembly

3	Control Valve Body Ball Check Valve (Qty: 9)
4	Control Valve Channel Plate Assembly
5	Control Valve Body Bolt 6 x 55 (Qty: 1) **CAUTION:** **Refer to Fastener Caution .** **Tighten:** 12 N.m (9 lb ft)

Channel Plate and Upper Channel Plate Assemble

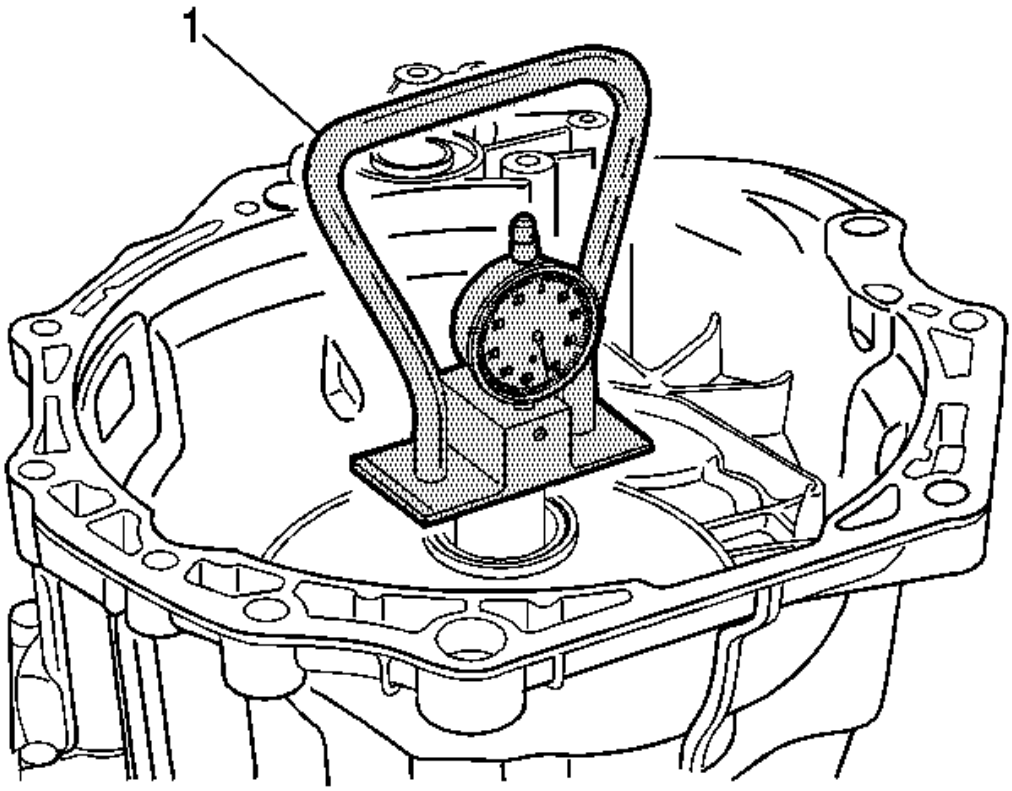

Fig. 82: Identifying Control Valve Channel Upper Plate Assembly
Courtesy of GENERAL MOTORS CORP.

Channel Plate and Upper Channel Plate Assemble

Callout	Component Name
	Control Valve Channel Upper Plate Assembly

1	**Tip:** Inspect the upper channel plate bolt pass through holes for damage or burnelling. Any damage near the PCS feed holes could cause leaking around the PCS switch seal. Replace as necessary.
2	Control Valve Body Bolt M6 x 35 (Qty: 3) **CAUTION:** **Refer to Fastener Caution .** **Procedure:** Hand tighten for alignment, then tighten in sequence, after all bolts are installed. **Tighten:** 12 N.m (9 lb ft)
3	Control Valve Body Bolt M6 x 65 (Qty: 5) **Procedure:** Tighten in sequence. **Tighten:** 12 N.m (9 lb ft)
4	Control Valve Body Bolt M6 x 55 (Qty: 2) **Procedure:** Tighten in sequence. **Tighten:** 12 N.m (9 lb ft)

CONTROL VALVE BODY ASSEMBLY INSTALLATION

Output Speed Sensor and Valve Body Installation

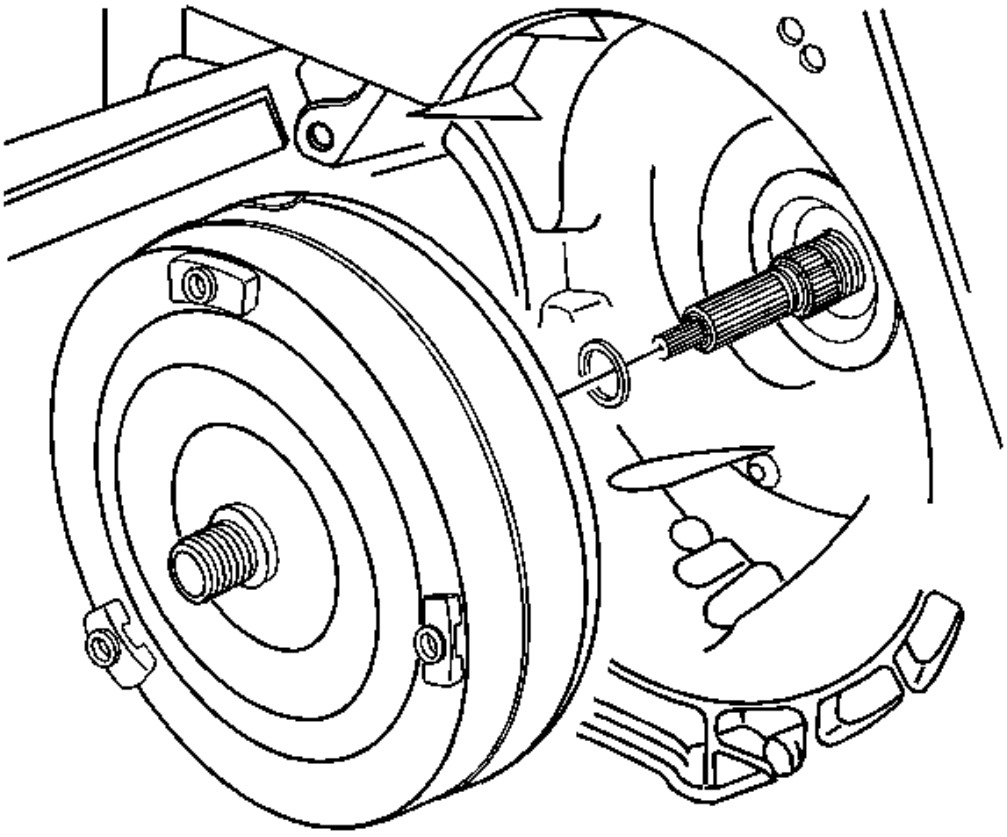

Fig. 83: View Of Output Speed Sensor & Valve Body
Courtesy of GENERAL MOTORS CORP.

Output Speed Sensor and Valve Body Installation

Callout	Component Name
1	1-2-3-4 Clutch Fluid Passage Seal
2	A/Trans Output Speed Sensor Assembly
3	A/Trans Output Speed Sensor Assembly Bolt M6 x 25 **CAUTION:** **Refer to Fastener Caution .** **Tighten:** 12 N.m (9 lb ft)
4	Control Valve Body Assembly
	Manual Valve **Tip:**

5	• Align the manual valve to the detent lever assembly. • Removing the manual shaft assembly pin will aid in aligning the manual valve to the detent lever. Install the manual shaft pin after the valve body assembly is installed using **J 41229:** pin installer, if it was not installed previously. Refer to **Manual Shift Detent Lever with Shaft Position Switch Assembly and Park Pawl Actuator Removal**. **Special Tools:** **J 41229:** Manual Shaft Pin Installer For equivalent regional tools, refer to **Special Tools** .

Control Valve Body Bolts Installation

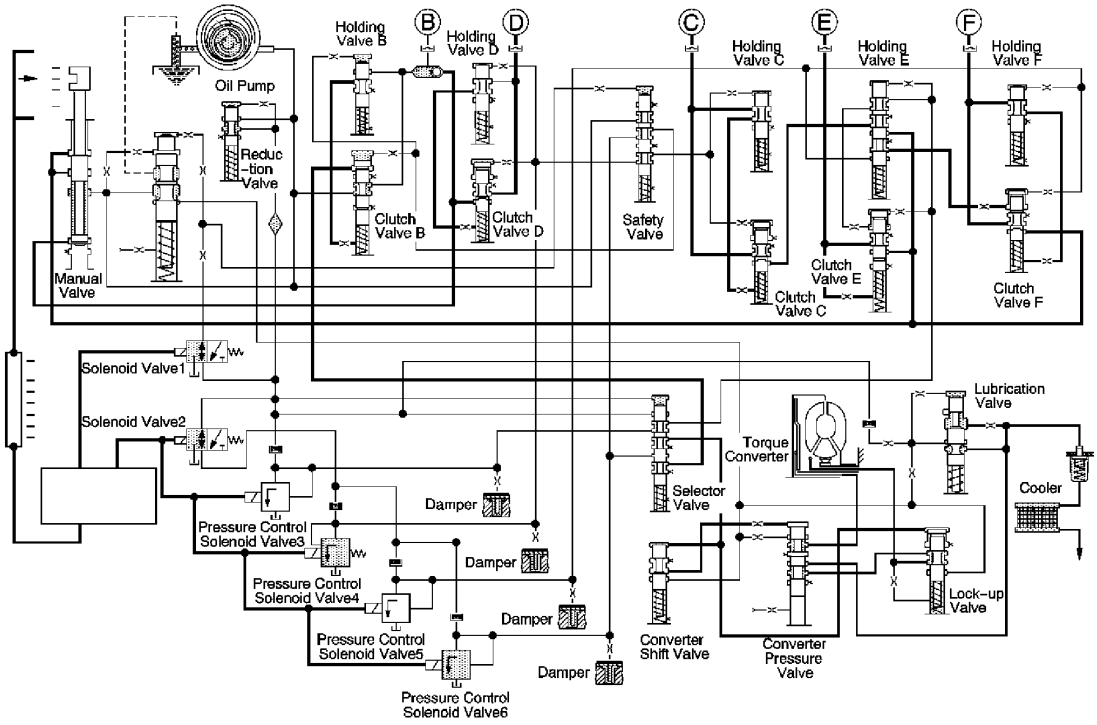

Fig. 84: Identifying Control Valve Body Bolts
Courtesy of GENERAL MOTORS CORP.

Control Valve Body Bolts Installation

Callout	Component Name
	Manual Shaft Detent Assembly **Tip:** Ensure proper alignment of the detent assembly to the detent lever assembly with

1	position switch while tightening the bolt. The detent assembly can move and hit the valve body assembly that could cause improper engagement with the detent lever assembly.
2	Control Valve Body Bolt M6 x 65 (Qty: 8) **CAUTION:** **Refer to Fastener Caution .** **Procedure:** Tighten in sequence. **Tighten:** 12 N.m (9 lb ft).
3	Control Valve Body Bolt M6 x 55 (Qty: 2) **Procedure:** Tighten in sequence. **Tighten:** 12 N.m (9 lb ft).

Filter Plate Installation

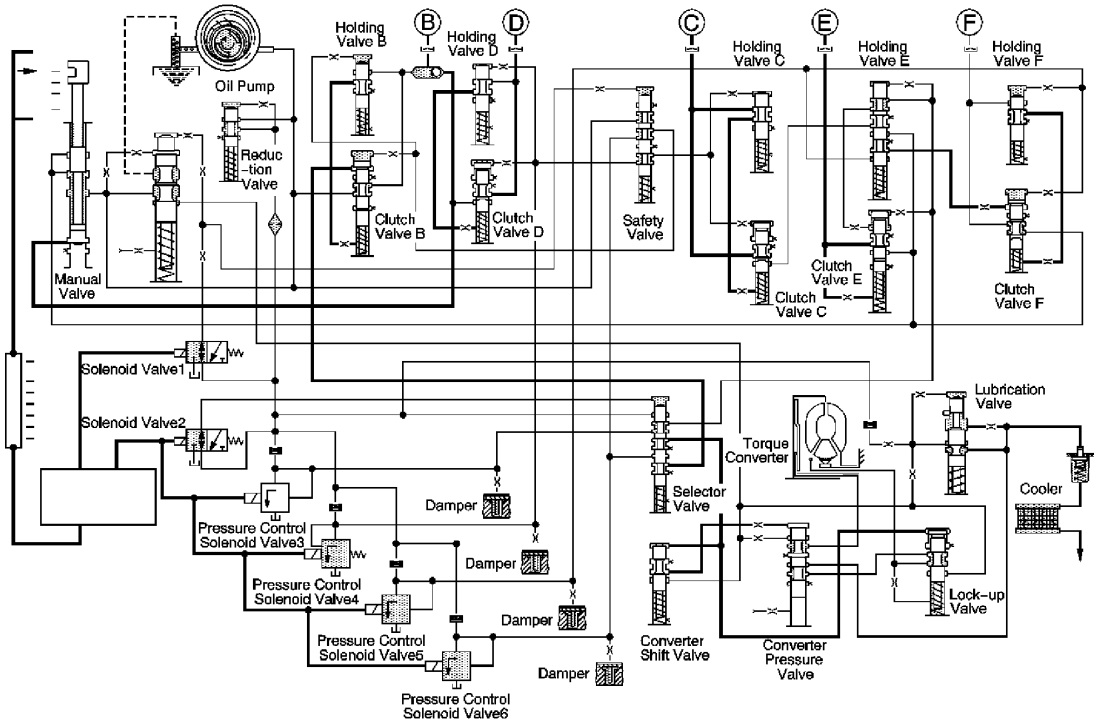

Fig. 85: View Of Filter Plate
Courtesy of GENERAL MOTORS CORP.

Filter Plate Installation

Callout	Component Name
1	Control Solenoid Valve Assembly Filter Plate **CAUTION:** **Use care when removing or installing the filter plate assembly. A broken or missing retaining tab may not adequately secure the filter plate to the control solenoid valve assembly, resulting in possible damage or contamination.** **Tip:** Install a NEW filter plate to prevent fluid leaks past the oil seals.

Control Solenoid (w/Body and TCM) Valve Assembly Installation

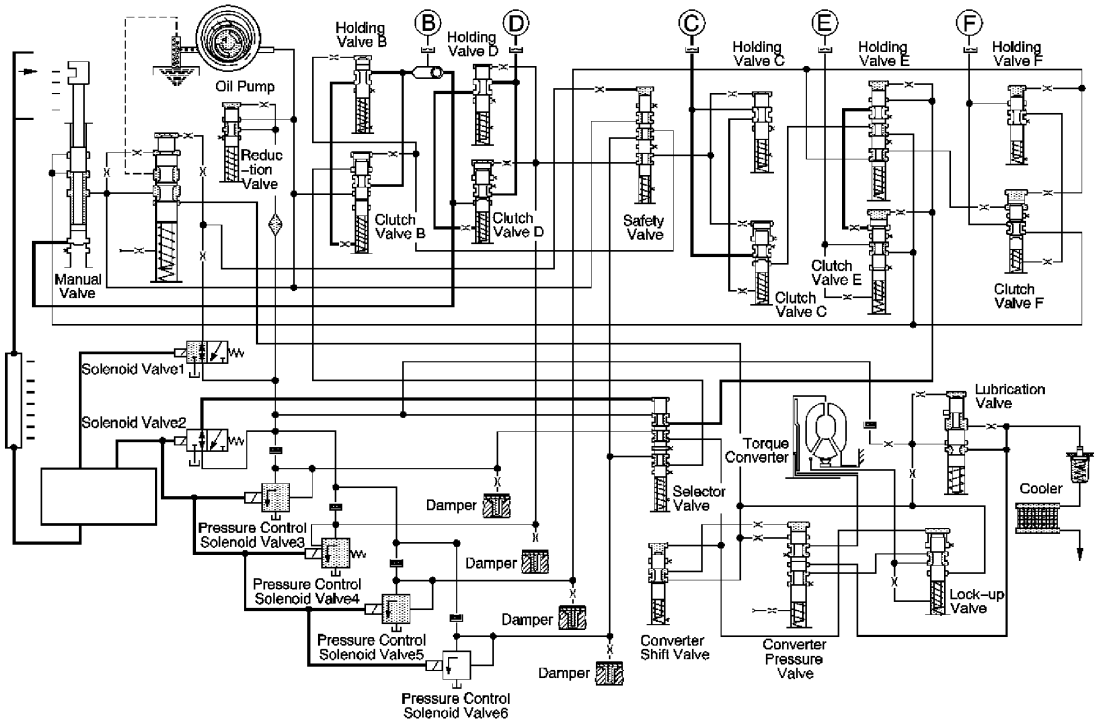

Fig. 86: Identifying Control Solenoid Valve Assembly (with Body Control Module & with TCM)
Courtesy of GENERAL MOTORS CORP.

Control Solenoid (w/Body and TCM) Valve Assembly Installation

Callout	Component Name
CAUTION: **Refer to Fastener Caution .**	

Preliminary Procedure: Install all bolts before tightening, then tighten in sequence to 12 N.m (9 lb ft).	
1	Control Solenoid (w/Body and TCM) Valve Assembly **CAUTION:** **Do not drop the control solenoid with body and transmission control module (TCM) valve assembly. Internal damage can occur if the control solenoid with body and TCM valve assembly is dropped. DO NOT reuse the control solenoid with body and TCM valve assembly if it is dropped.**
2	Control Solenoid Valve Spring **Tip:** • If the control solenoid spring is missing or improperly installed, the TCM may overheat causing the TCM to shut down. The transmission will default to 3rd or 5th gear. • Insert tab of spring into slot on spacer plate, then rotate into position.
3	Control Valve Body Bolt M6 x 80 (Qty: 4)
4	Control Valve Body Bolt M6 x 55 (Qty: 1)
5	Control Valve Body Bolt M6 x 95 (Qty: 3)
6	Control Valve Body Bolt M6 x 42 (Qty: 1)
7	Control Valve Body Bolt M6 x 65 (Qty: 2)

Wire Routing and Connector Locations

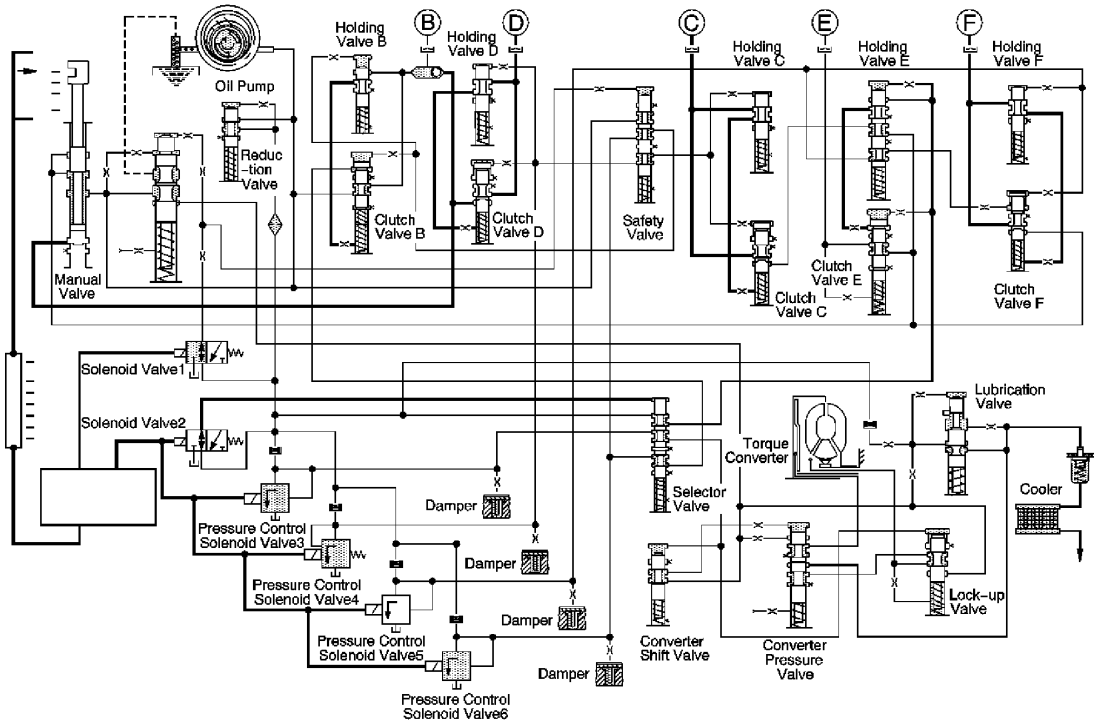

Fig. 87: Identifying Wire Routing & Connector Locations
Courtesy of GENERAL MOTORS CORP.

Wire Routing and Connector Locations

Callout	Component Name
Preliminary Procedure: Route all wires as shown.	
1	Shift Position Switch Connector
2	Output Speed Sensor Connector
3	Input Speed Sensor Connector

Control Valve Body Cover Installation

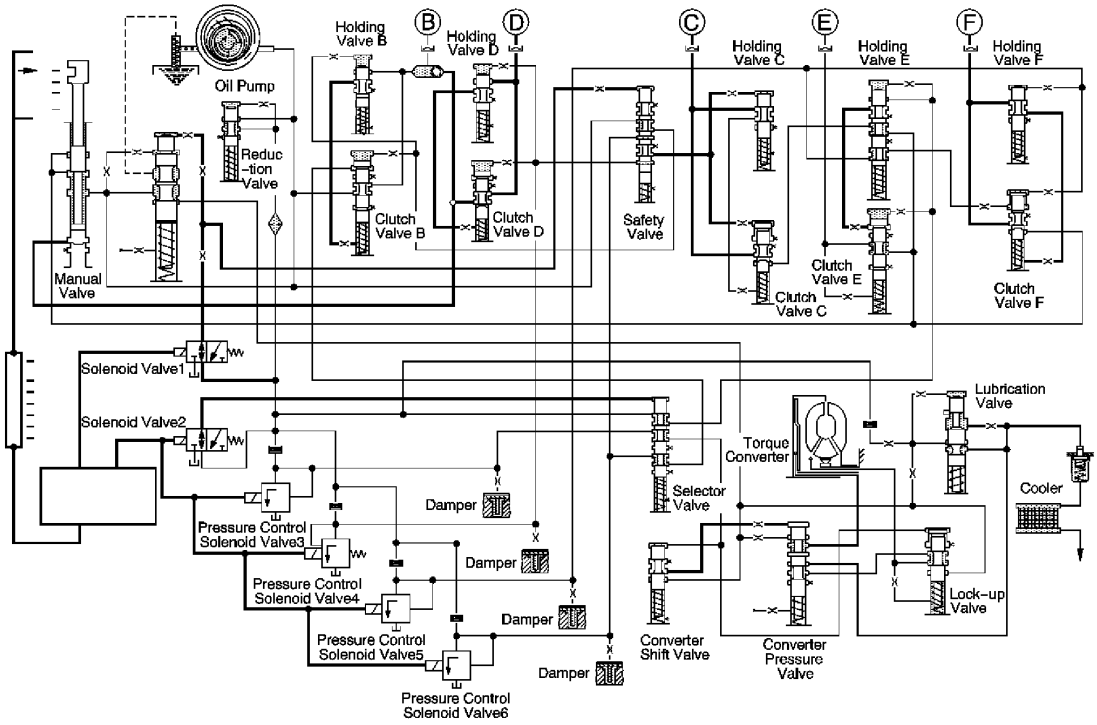

Fig. 88: Identifying Control Valve Body Cover Wiring Connector Hole Seal
Courtesy of GENERAL MOTORS CORP.

Control Valve Body Cover Installation

Callout	Component Name
1	Control Valve Body Cover Wiring Connector Hole Seal **Tip:** Holes in the seal must face down.
2	Control Valve Body Cover Assembly Gasket
3	Control Valve Body Cover Assembly
4	Control Valve Body Cover Bolt M6 x 30 (Qty: 12) **CAUTION:** **Refer to Fastener Caution .** **Procedure:** Tighten in sequence. **Tighten:** 12 N.m (9 lb ft).
5	Control Valve Body Cover Stud M6 x 30 (Qty: 2) **Procedure:** Tighten in sequence.

	Tighten: 12 N.m (9 lb ft).

TORQUE CONVERTER INSTALLATION

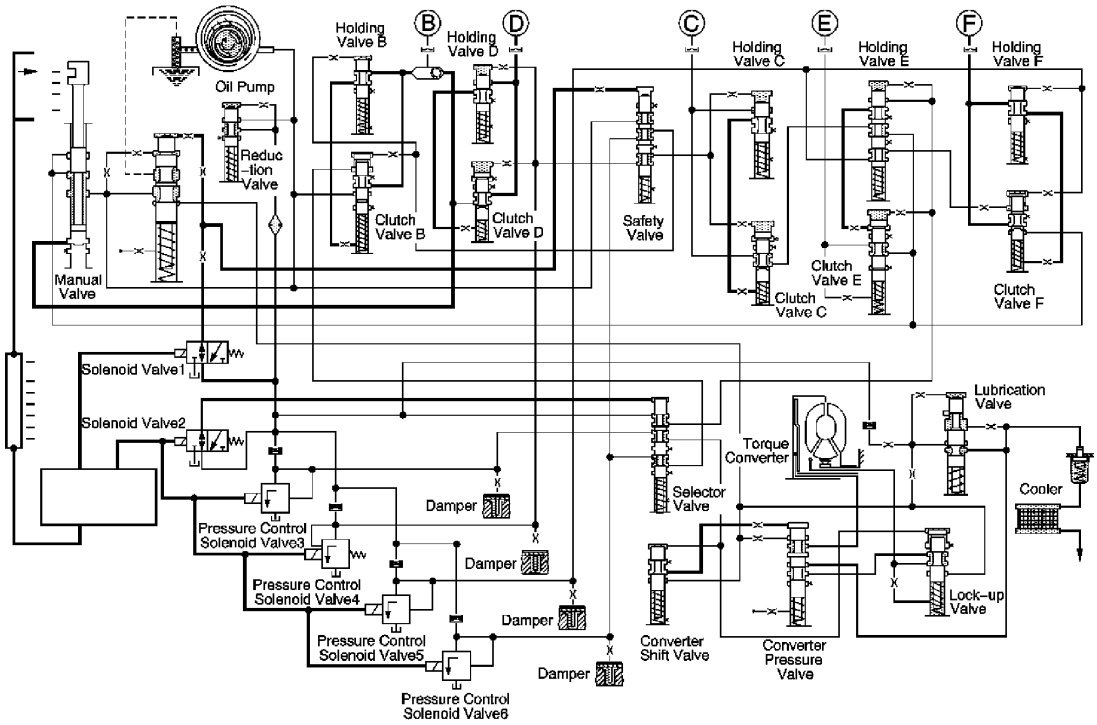

Fig. 89: View Of Torque Converter
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Torque Converter Assembly **CAUTION:** **Lower the torque converter straight down. Failure to lower the torque converter straight down could damage the torque converter clutch lip seal inside the torque converter clutch assembly.** **Special Tools:** **J 46409:** Torque Converter Lifting Handles For equivalent regional tools, refer to **Special Tools** .
	J 21366: Converter Holding Strap **WARNING:** **The torque converter must be held to the torque**

2	**converter housing by a retaining device such as shipping brackets. Without the retaining device, the torque converter may slide forward, disengaging the oil pump, or may fall completely out of the transmission causing personal injury and/or property damage.**
3	Dust Cover - Model Dependent
4	Dust Cover Push Pin - Model Dependent (Qty: 2)
5	Dust Cover Bolt - Model Dependent **CAUTION:** **Refer to Fastener Caution .** **Tighten:** 75 N.m (37 lb ft)

LIFT PLATE AND HOLDING FIXTURE REMOVAL

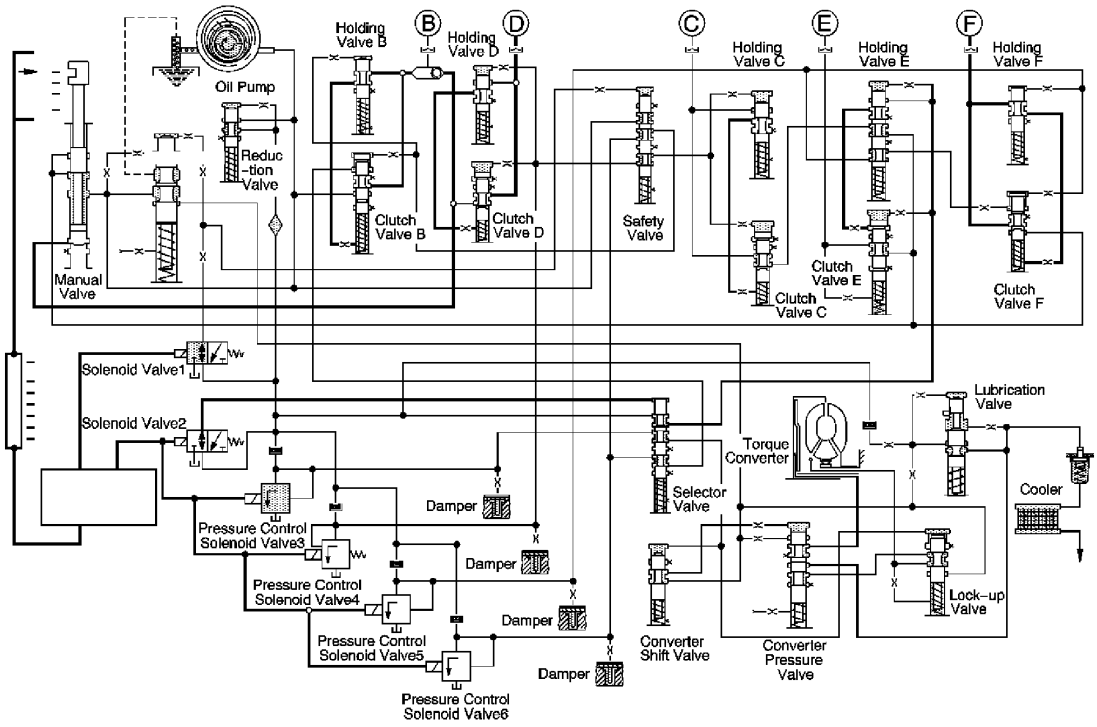

Fig. 90: Identifying Lift Plate & Holding Fixture
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	**J 46625:** Transmission Holding Fixture **Tip:** Raise the transmission in order to remove the holding fixture.

	For equivalent regional tools, refer to **Special Tools** .
2	**DT-47811-A:** Lift Plate **Tip:** Lower the transmission assembly onto the transmission jack in order to remove the lift plate. For equivalent regional tools, refer to **Special Tools** .

