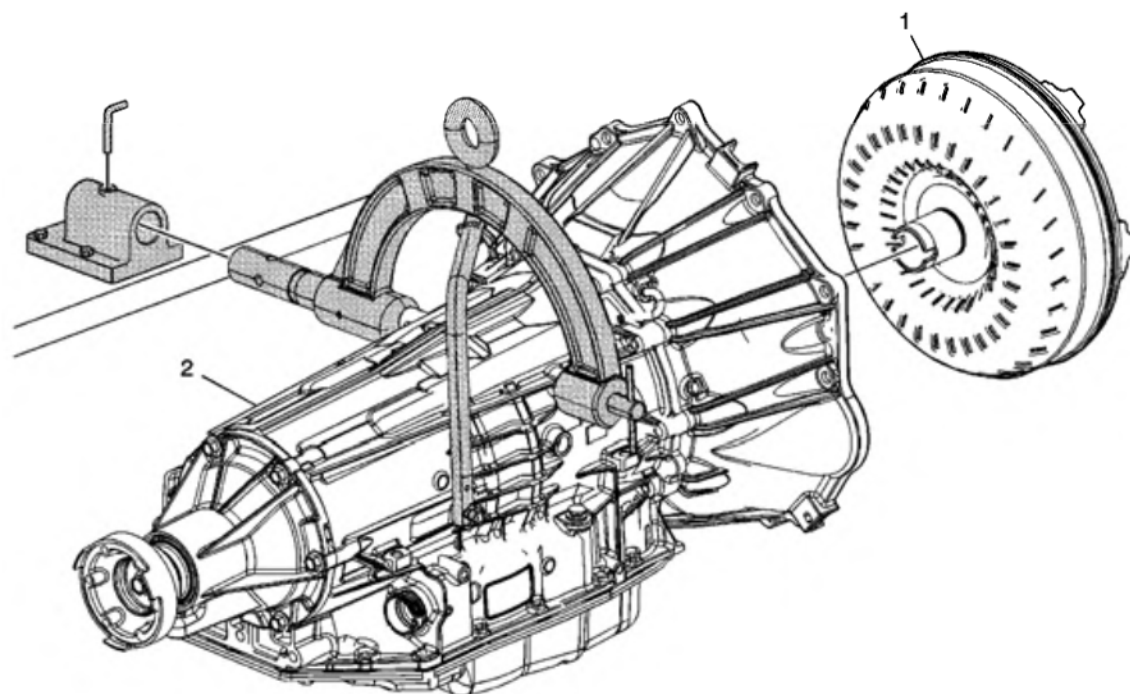
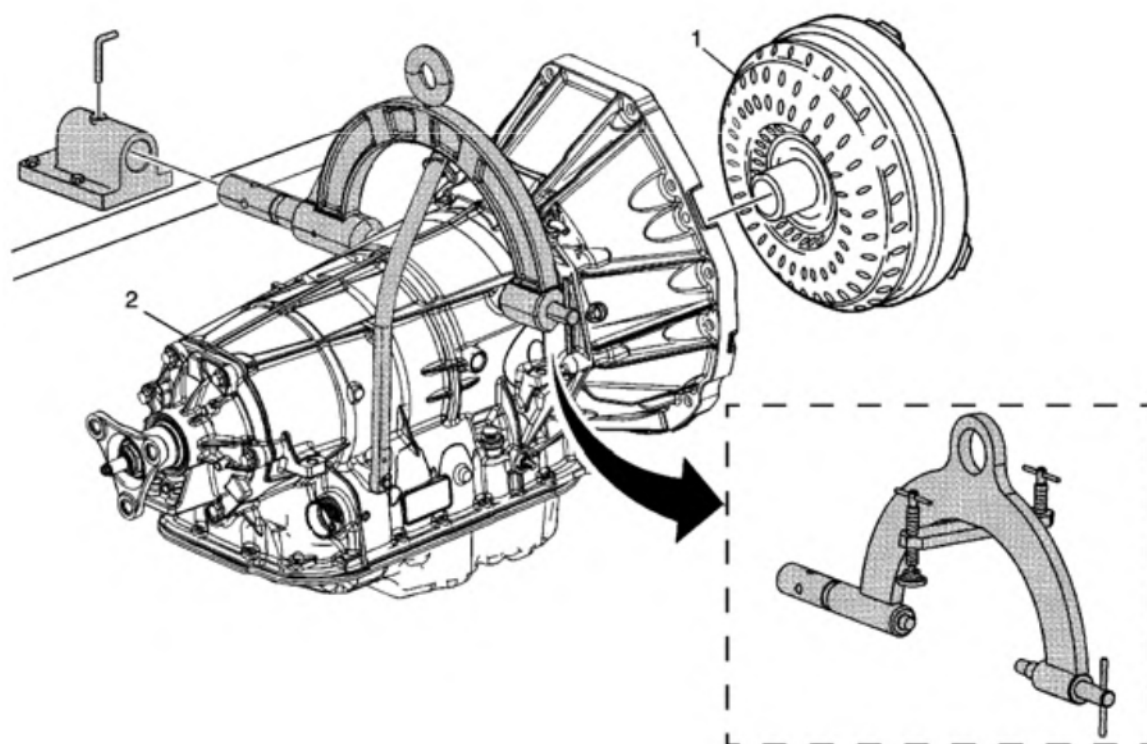


Torque Converter Removal and Holding Fixture Installation (6L90)



Callout	Component Name
1	Torque Converter Assembly
2	Transmission Case Assembly Tip 1. Rotate the transmission so that the converter housing is up and secure with locking pin. 2. Allow any remaining transmission fluid to drain from the case extension. Special Tools • DT 47605 Holding Fixture Adapter • J 3289-20 Holding Fixture Base Assembly • J 8763-B Holding Fixture For equivalent regional tools, refer to Special Tools.

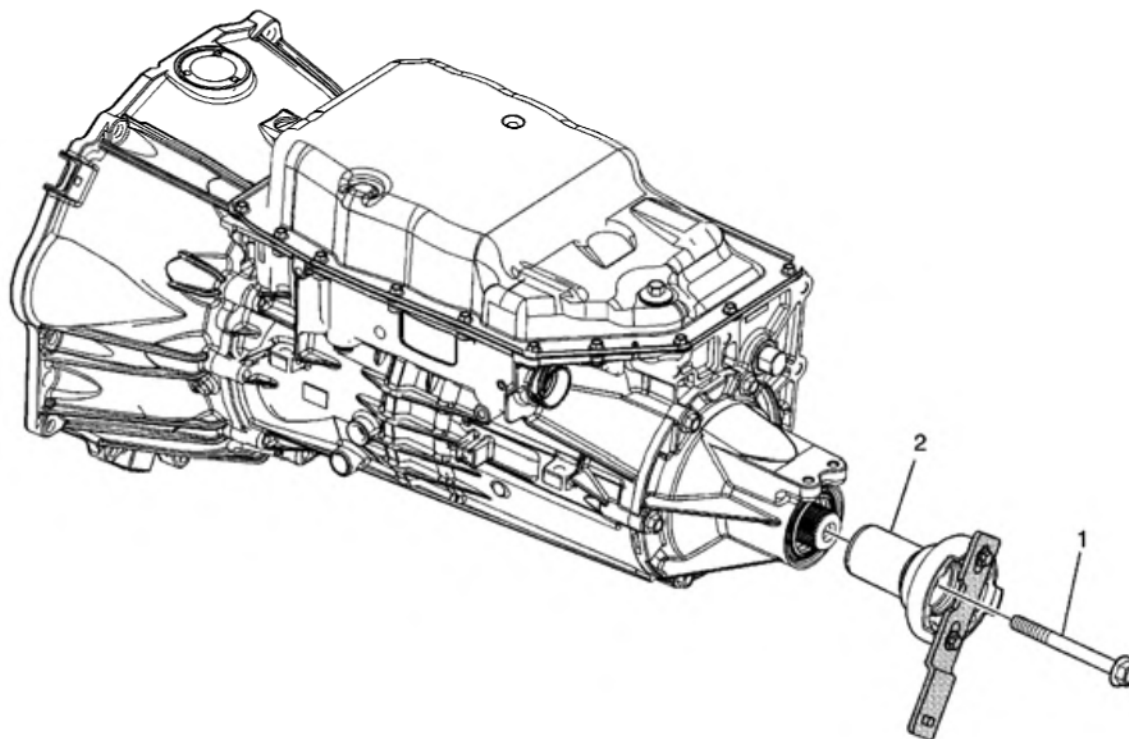
Torque Converter Removal and Holding Fixture Installation (6L50)



Callout	Component Name
1	Torque Converter Assembly
2	Transmission Case Assembly Tip 1. Rotate the transmission so that the converter housing is up and secure with locking pin. 2. Allow any remaining transmission fluid to drain from the case extension. 3. Some transmission cases will not have the boss to enable the use of DT-48989 holding fixture . Special Tools • DT 48067 Holding Fixture Adapter • DT-48989 Holding Fixture • J 3289-20 Holding Fixture Base Assembly • J 8763-B Ho

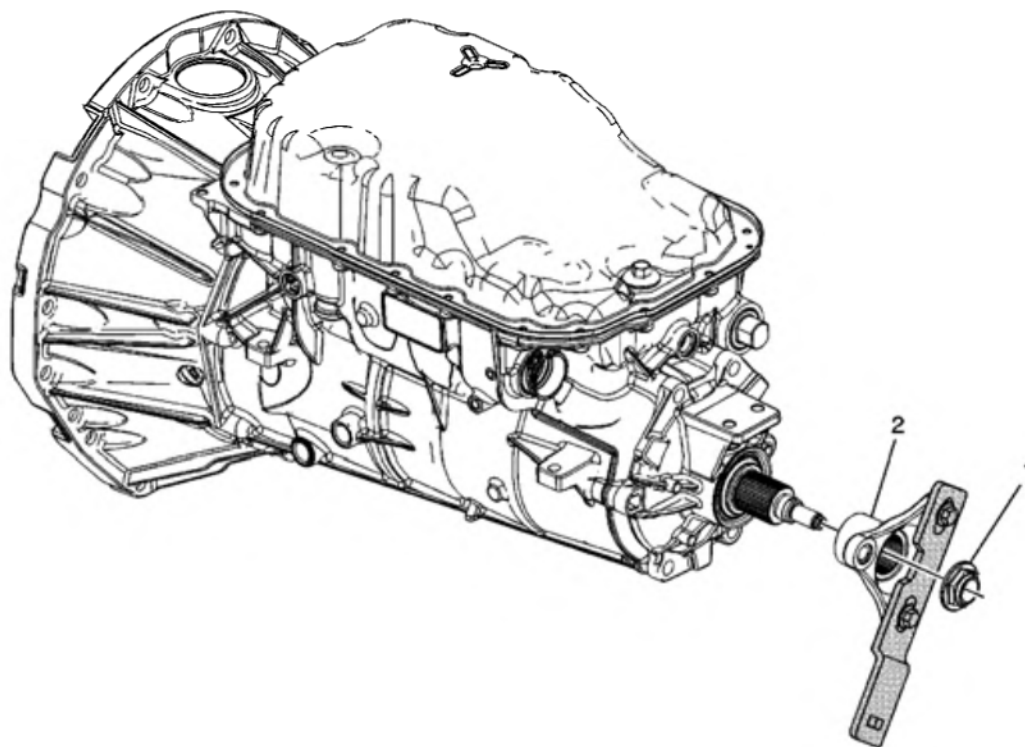
For equivalent regional tools, refer to [Special Tools](#).

Propeller Shaft Transmission Flange Removal (6L90)



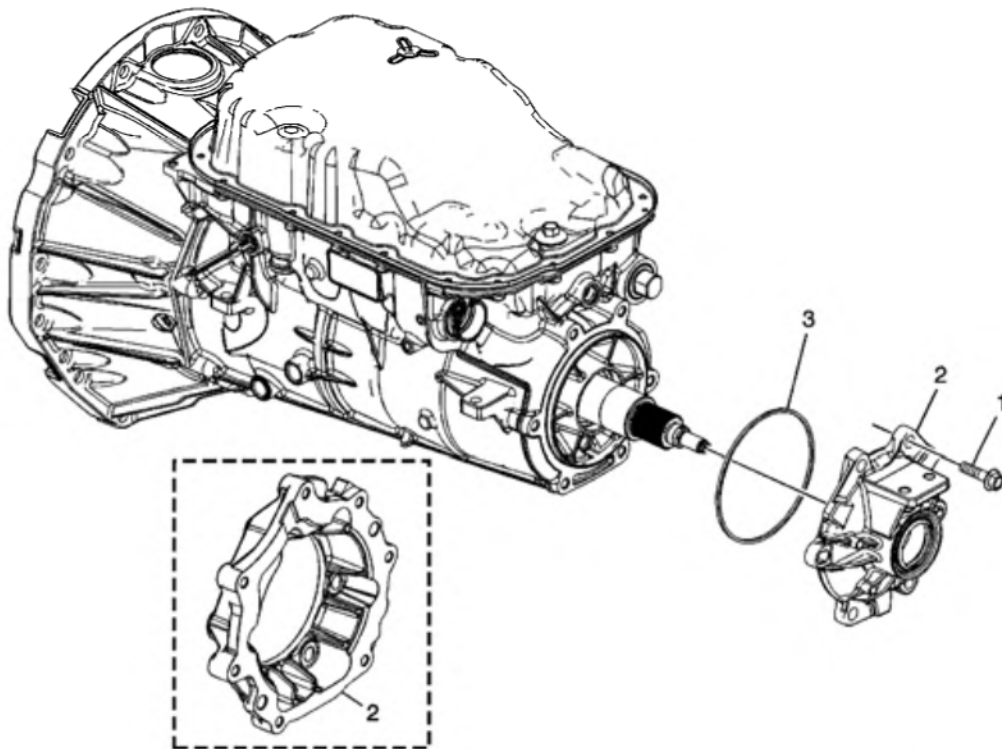
Callout	Component Name
1	Prop Shaft Bolt Special Tool J 45012 Holding Fixture For equivalent regional tools, refer to Special Tools .
2	Front Prop Shaft Flange

Propeller Shaft Transmission Flange Removal (6L50)



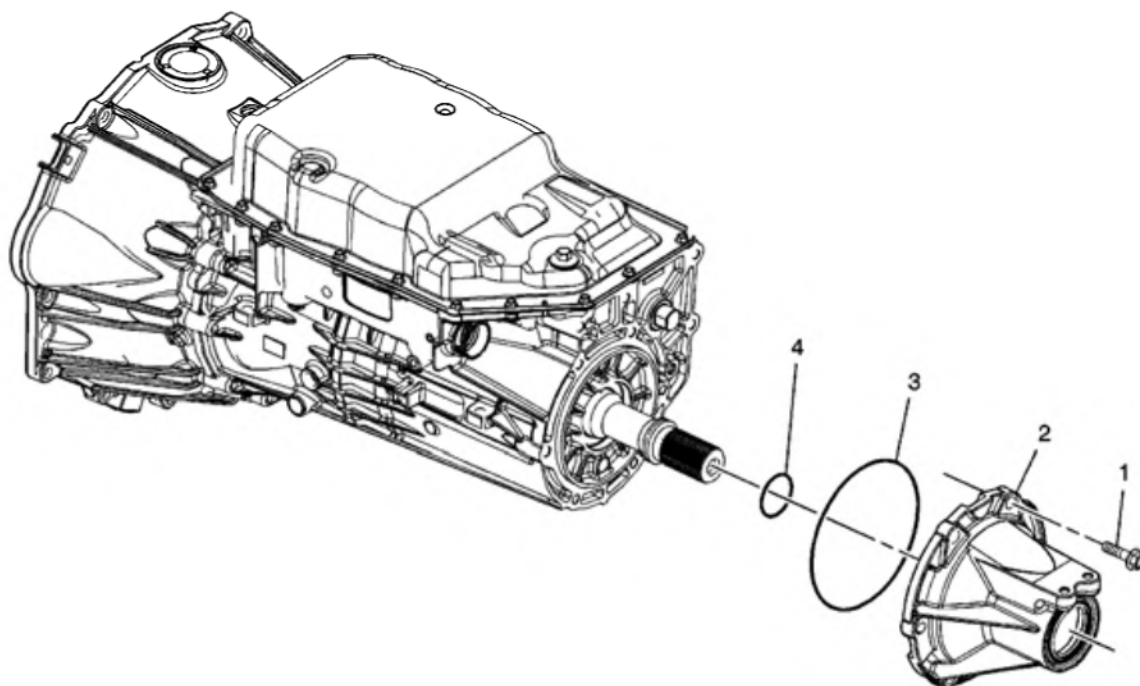
Callout	Component Name
1	Front Prop Shaft Flange Nut Caution: Do not reuse the flange nut. Reusing the flange nut may cause damage to the transmission. Special Tool J 45012 Holding Fixture For equivalent regional tools, refer to Special Tools.
2	Prop Shaft Trans Flange

Case Extension Assembly Removal (6L50)



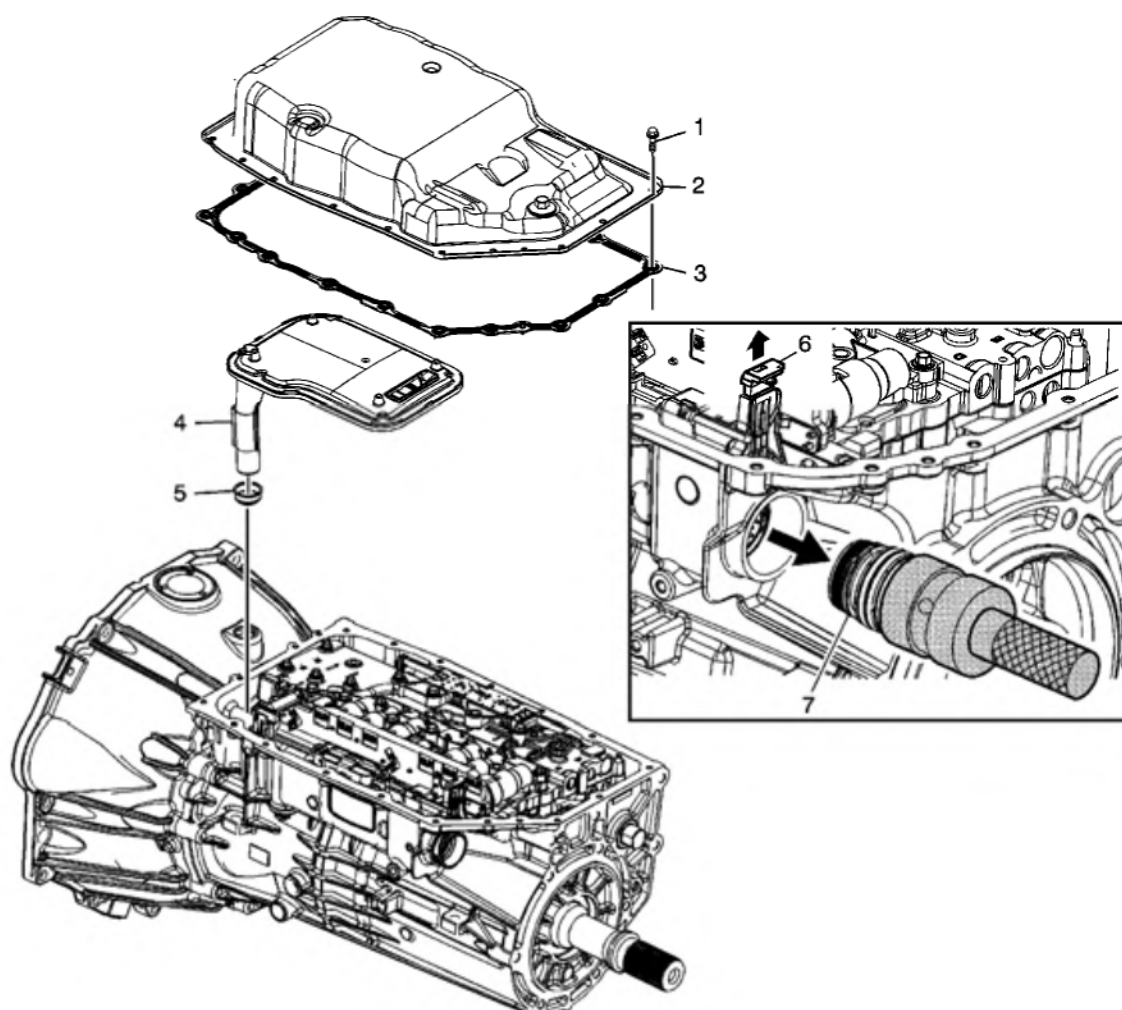
Callout	Component Name
1	Bolt M10 x 40 (Qty: 6)
2	Case Extension Tip Also available as AWD option.
3	Case Extension Seal

Case Extension Assembly Removal (6L90)



Callout	Component Name
1	Bolt M10 x 40 (Qty: 6)
2	Case Extension
3	Case Extension Seal
4	Prop Shaft Trans Flange Seal

Transmission Fluid Pan, Filter and Electrical Connector Passage Sleeve Removal (6L90)

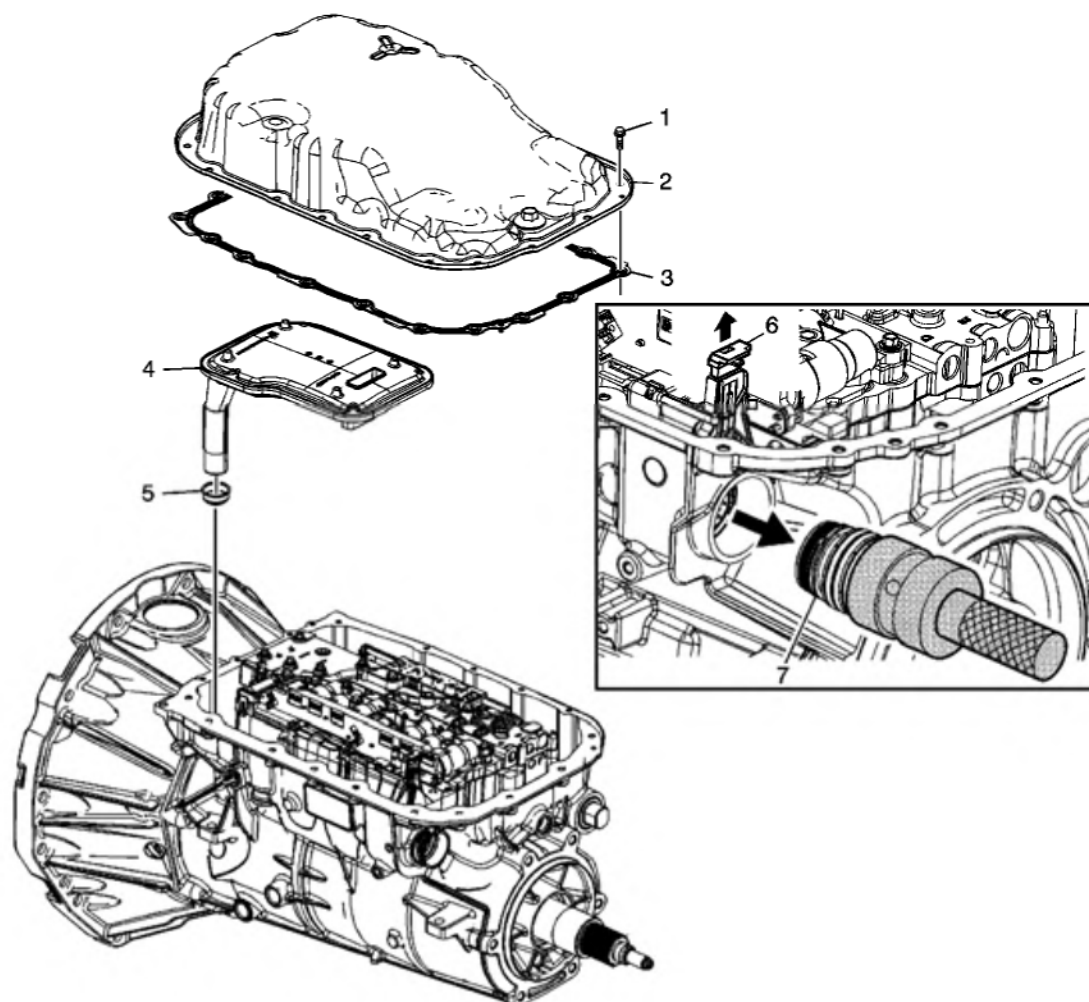


Callout	Component Name
1	Bolt M6 x 20 (Qty: 18)
2	Fluid Pan Assembly
3	Fluid Pan Gasket Tip The fluid pan gasket is reusable. Inspect the gasket to determine if it may be reused. If the gasket is stuck to the case or pan, it should be replaced.
4	Fluid Filter Assembly Caution: Pull the fluid filter assembly straight out to avoid damage. Do not bend or

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	twist the filter neck.
5	Fluid Filter Seal Assembly Caution: Do not damage the case sealing surface when removing the filter seal assembly. Tip Use a screwdriver or snap ring pliers.
6	Electrical Connector Slide Lock Caution: Pull up on the electrical connector slide lock to avoid damage to the connector.
7	Electrical Connector Passage Sleeve Tip Engage <i>DT 47715</i> connector passage sleeve remover/installer on sleeve and pull straight out. Special Tools • <i>DT 47715</i> Electrical Connector Passage Sleeve Remover/Installer • <i>J 42183</i> Driver Handle For equivalent regional tools, refer to Special Tools.

Transmission Fluid Pan, Filter and Electrical Connector Passage Sleeve Removal (6L50)

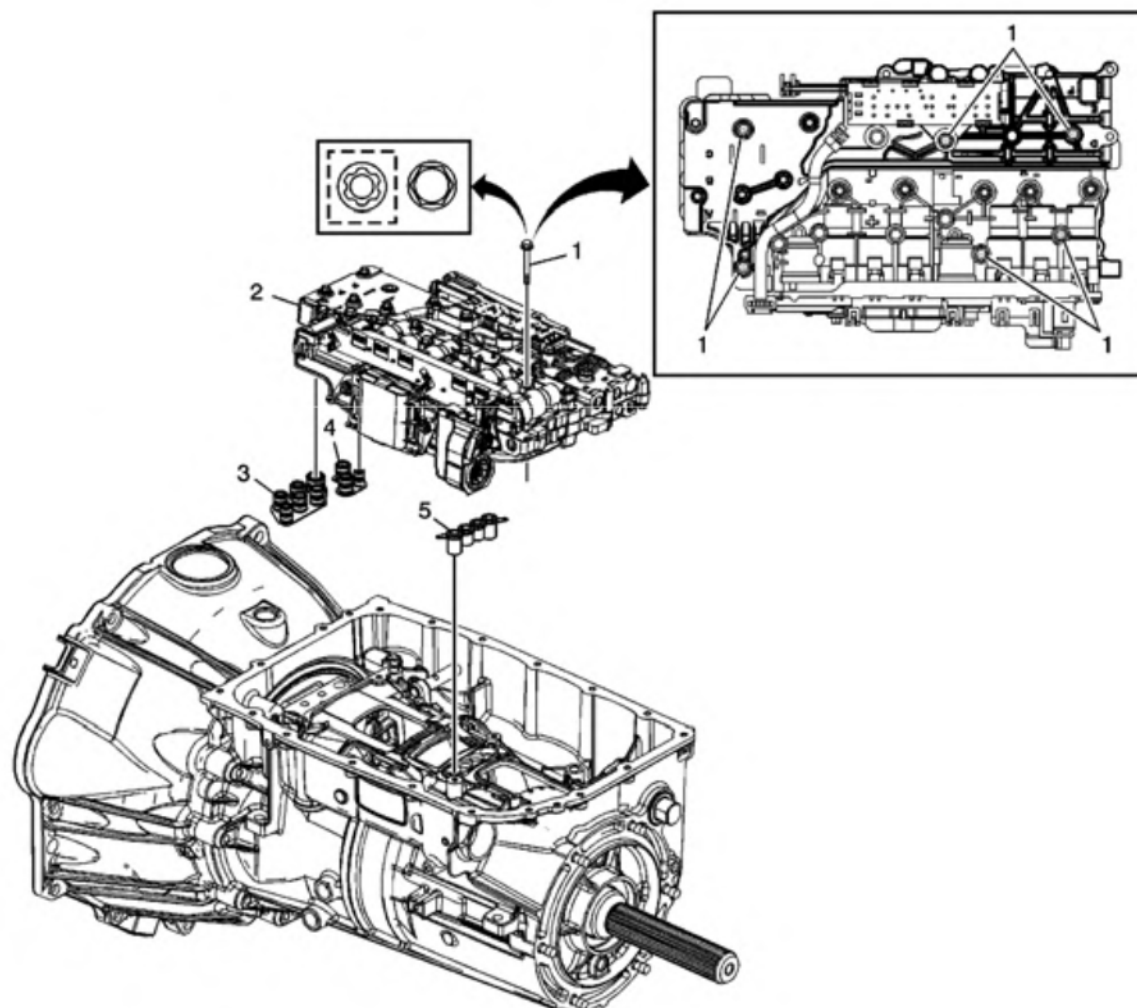


Callout	Component Name
1	Bolt M6 x 20 (Qty: 17)
2	Fluid Pan Assembly
3	Fluid Pan Gasket Tip The fluid pan gasket is reusable. Inspect the gasket to determine if it may be reused. If the gasket is stuck to the case or pan, it should be replaced.
4	Fluid Filter Assembly Caution: Pull the fluid filter assembly straight out to avoid damage. Do not bend or

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	twist the filter neck.
5	Fluid Filter Seal Assembly Caution: Do not damage the case sealing surface when removing the filter seal assembly. Tip Use a screwdriver or snap ring pliers.
6	Electrical Connector Slide Lock Caution: Pull up on the electrical connector slide lock to avoid damage to the connector.
7	Electrical Connector Passage Sleeve Tip Engage <i>DT 47715</i> connector passage sleeve remover/installer on sleeve and pull straight out. Special Tools • <i>DT 47715</i> Electrical Connector Passage Sleeve Remover/Installer • <i>J 42183</i> Driver Handle For equivalent regional tools, refer to Special Tools.

Control Valve Body Assembly Removal

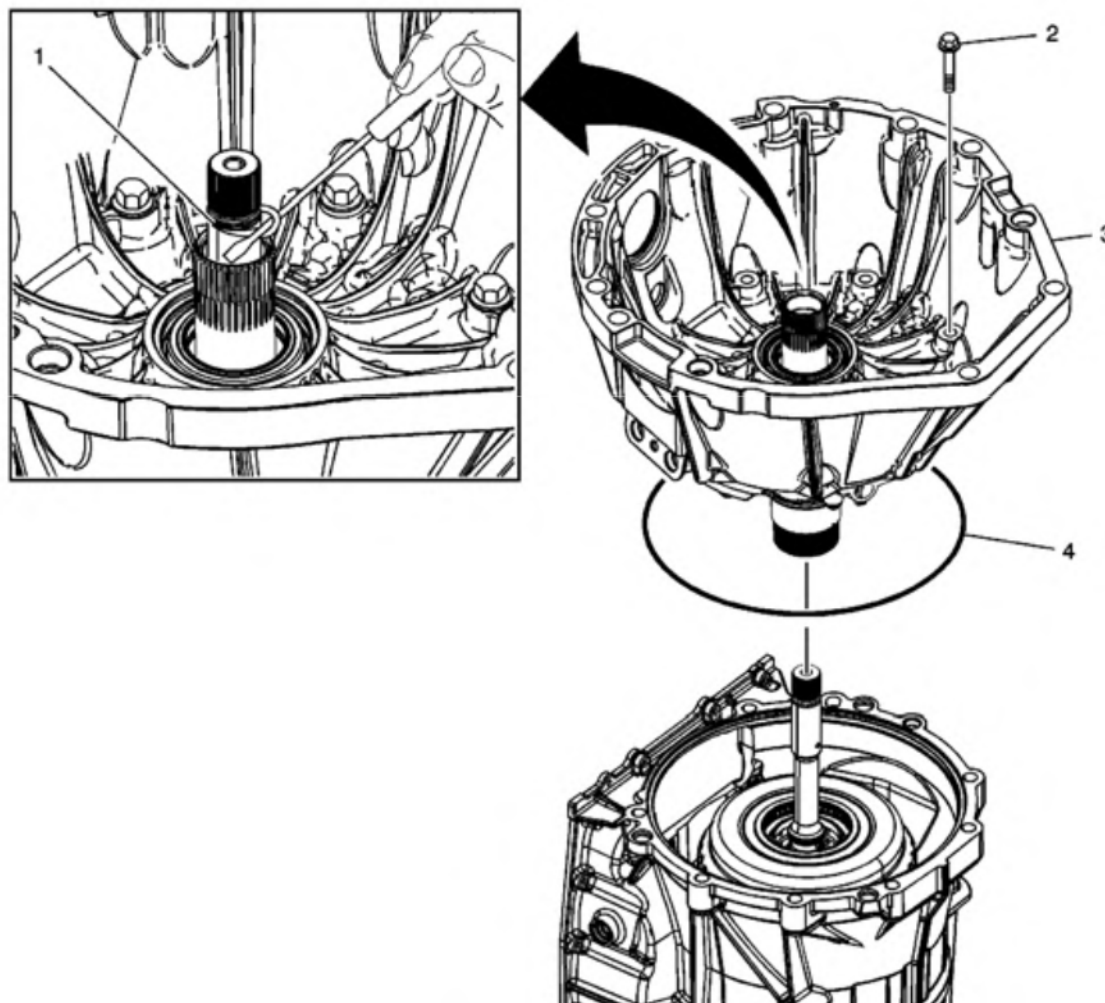


Callout	Component Name
1	Bolt M5 x 73 (Qty: 6) Tip Do not remove all the bolts in the control valve body assembly. Remove only the bolts indicated. Special Tool <i>DT-48285</i> Valve Body Torx Plus Socket (if applicable) For equivalent regional tools, refer to Special Tools.
	Control Valve Body Assembly

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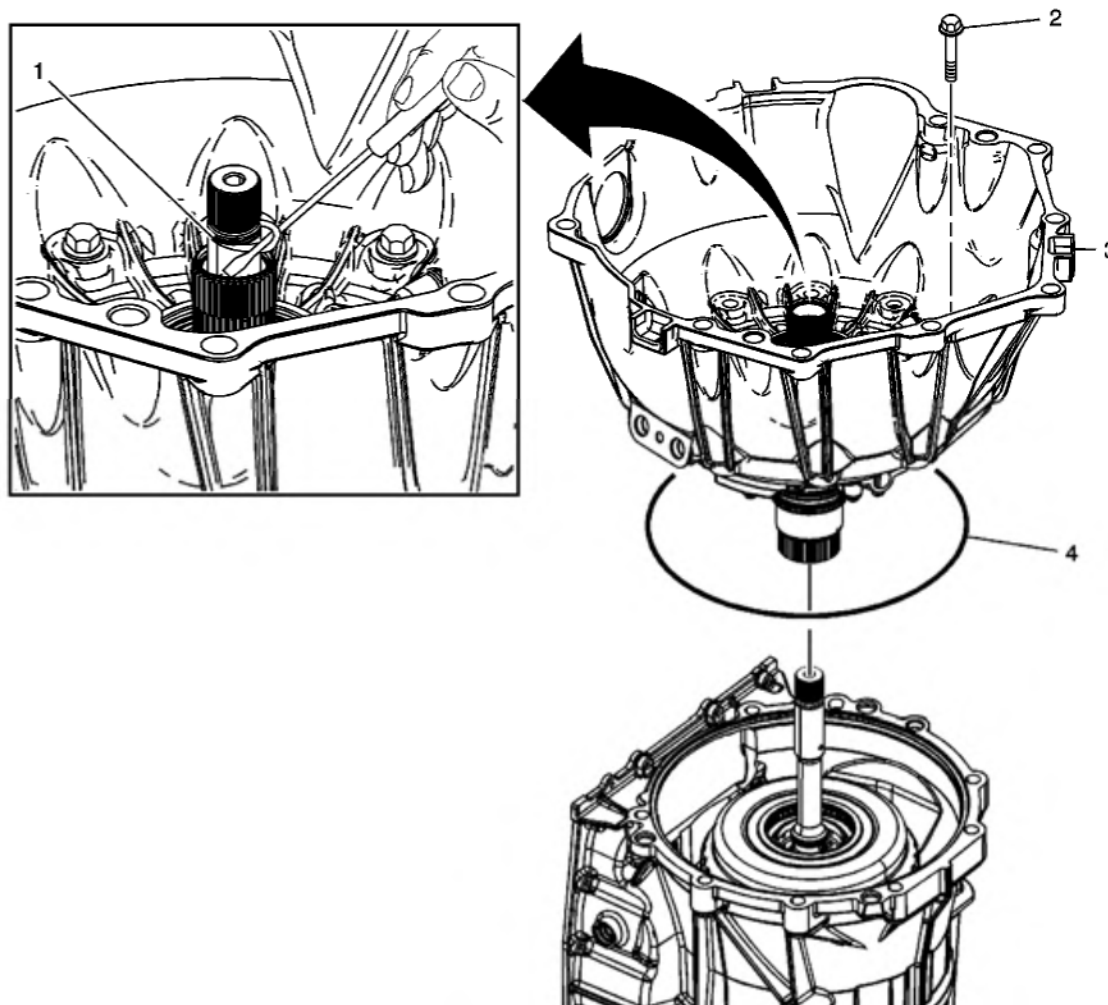
2	Caution: Use care when handling the control valve body assembly. If dropped, damage to the internal components of the control solenoid valve assembly, including the transmission control module (TCM), may result.
3	Fluid Pump Seal Assembly Caution: Refer to Seal Reuse Caution in the Preface section.
4	Fluid Pump Seal Assembly Caution: Refer to Seal Reuse Caution in the Preface section.
5	Center Support Fluid Passage Seal Assembly Caution: Refer to Seal Reuse Caution in the Preface section.

Torque Converter Housing with Fluid Pump Removal (6L50)



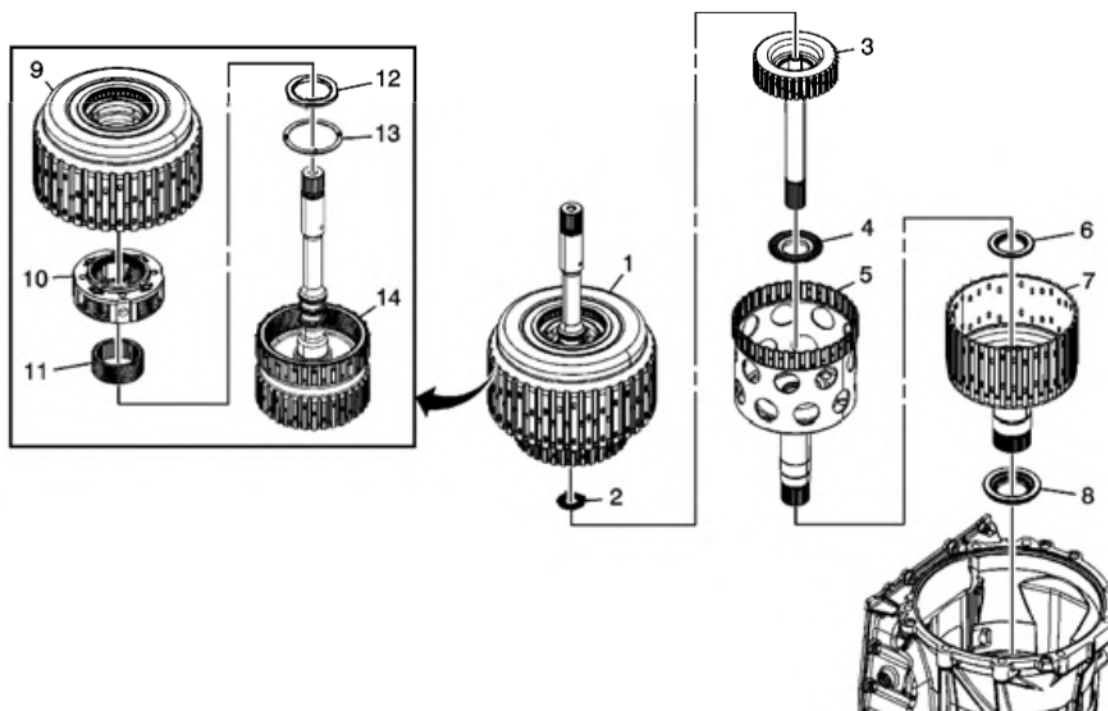
Callout	Component Name
Caution: The valve body assembly must be removed prior to removing the torque converter (with fluid pump) housing assembly. Failure to ensure this will cause severe damage to both fluid pump seal assemblies. Also, the load of the valve body pushing on the seals, which in turn push on the pump, may prevent proper pump installation into the case. Refer to control valve body assembly removal.	
1	Turbine Shaft (O-ring) Seal
2	Bolt M8 x 1.25 x 50 (Qty: 8)
3	Torque Converter (With Fluid Pump) Housing Assembly
4	Fluid Pump Seal

Torque Converter Housing with Fluid Pump Removal (6L90)



Callout	Component Name
Caution: The valve body assembly must be removed prior to removing the torque converter (with fluid pump) housing assembly. Failure to ensure this will cause severe damage to both fluid pump seal assemblies. Also, the load of the valve body pushing on the seals, which in turn push on the pump, may prevent proper pump installation into the case. Refer to control valve body assembly removal.	
1	Turbine Shaft (O-ring) Seal
2	Bolt M10 x 50 (Qty: 9)
3	Torque Converter (With Fluid Pump) Housing Assembly
4	Fluid Pump Seal

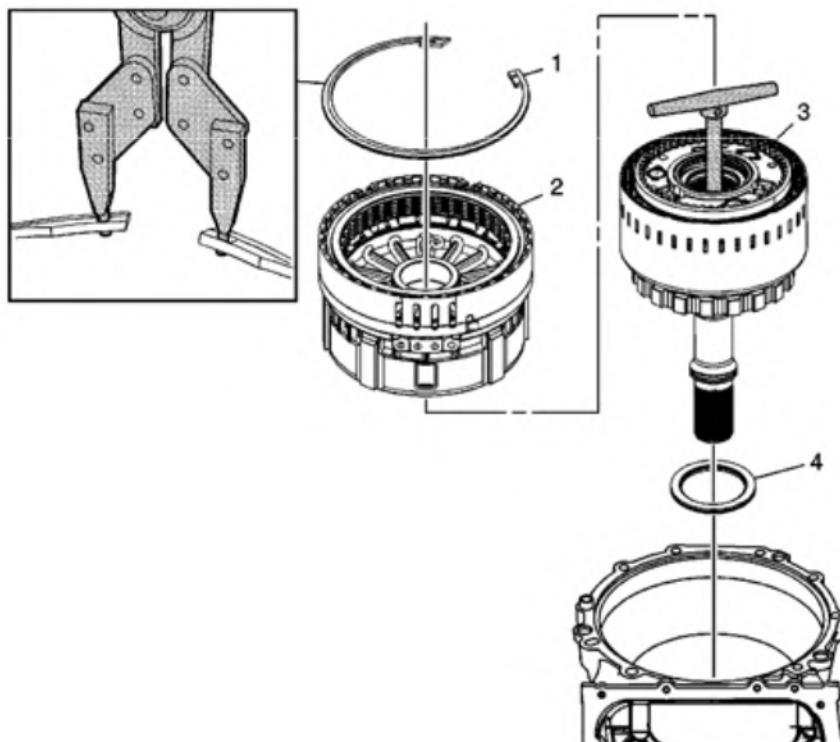
1-2-3-4 and 3-5 Reverse Clutch Assembly and 4-5-6 Clutch Assembly Removal



Callout	Component Name
1	1-2-3-4 and 3-5 Reverse Clutch Assembly and 4-5-6 (With Turbine Shaft) Clutch Assembly
2	Turbine Shaft Thrust Bearing Assembly
3	4-5-6 Clutch (With Output Carrier Shaft and Dampener) Hub Assembly
4	4-5-6 Clutch Hub Thrust Bearing Assembly
5	1-2-3-4 Clutch (With Output Carrier Inner Sun Gear Shaft) Hub Assembly
6	1-2-3-4 Clutch Hub Thrust Bearing Assembly
7	2-6 and 3-5 Reverse Clutch (With Output Carrier Outer Sun Gear Shaft) Hub Assembly
8	2-6 and 3-5 Reverse Clutch Hub Thrust Bearing Assembly
9	1-2-3-4 and 3-5 Reverse Clutch Assembly
10	Input Carrier Assembly
11	Input Sun Gear
12	Input Sun Gear Thrust Bearing
13	Input Sun Gear Thrust Washer

14	4-5-6 (With Turbine Shaft) Clutch Assembly
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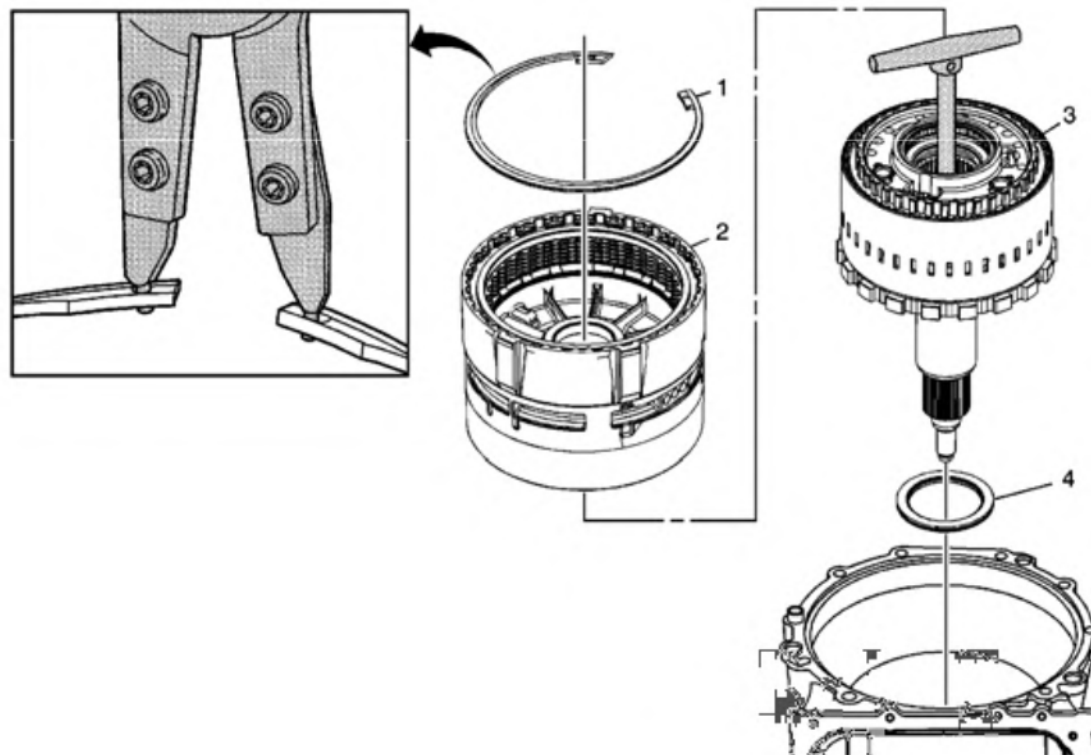
Center Support, Output Carrier and Output Shaft Removal (6L90)



Callout	Component Name
1	Center Support Retaining Ring Warning: Use care when removing or installing the retaining ring. Ensure the J 45126 and DT 47773 are installed properly onto the retaining ring or bodily injury may occur. Tip To release tension on the retaining ring, place the retaining ring flat on the floor and step on it, then remove the tool. Special Tools • DT 47773 Snap Ring Pliers Adapter Set • J 45126 Snap Ring Pliers For equivalent regional tools, refer to Special Tools.
2	Center (with 2-6 Low and Reverse Clutch) Support Assembly

3	Output Carrier Assembly and Output Shaft Assembly Caution: Ensure the DT 47786 is completely threaded into the output shaft assembly. Due to the weight of the assembly, incomplete threading may cause the assembly to break free from the DT 47786, causing component damage. Special Tool DT 47786 Output Carrier/Shaft Lifting Tool For equivalent regional tools, refer to Special Tools.
4	Output Shaft Thrust Bearing Assembly

Center Support, Output Carrier and Output Shaft Removal (6L50)

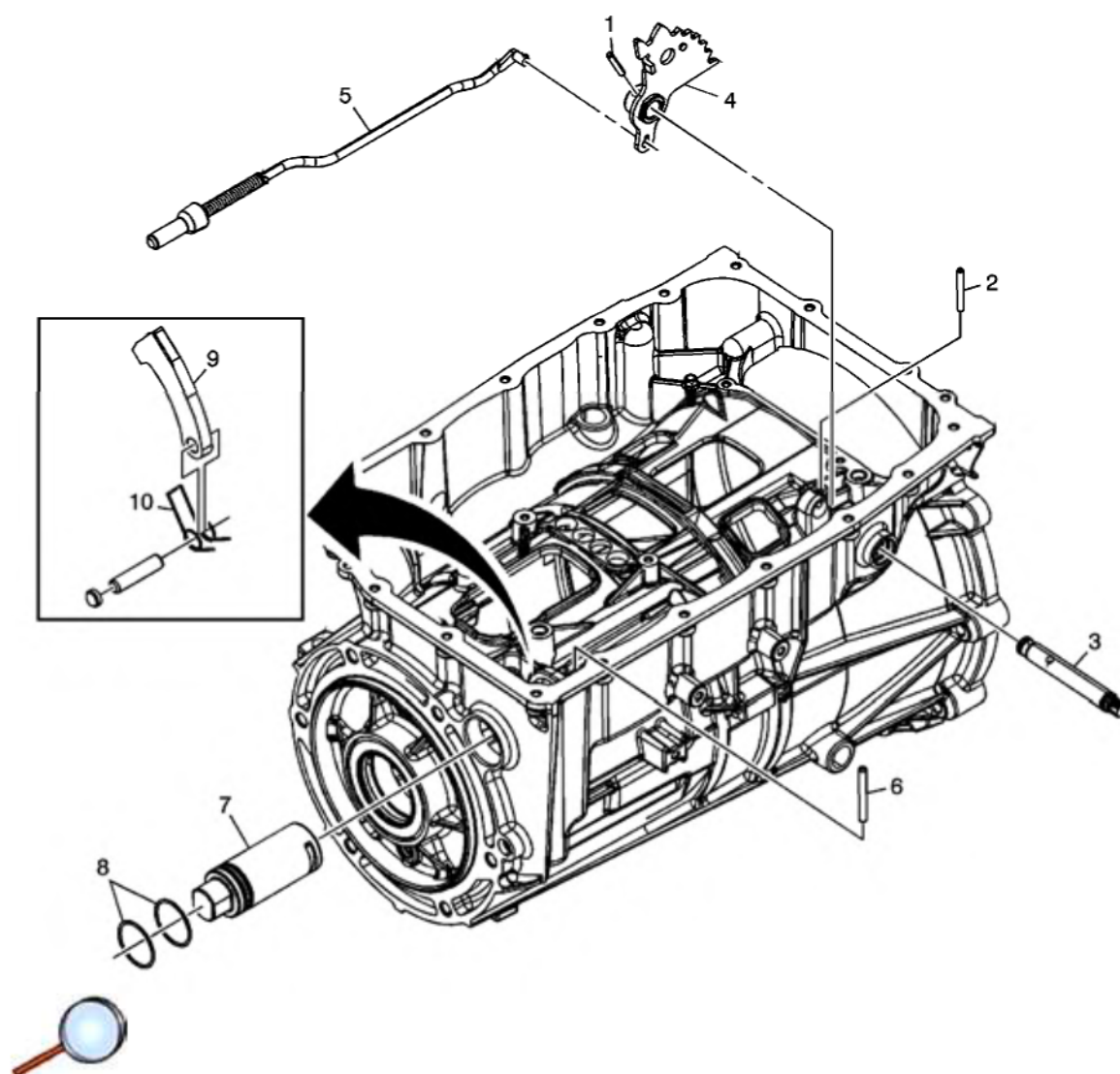


Callout	Component Name
1	Center Support Retaining Ring Warning: Use care when removing or installing the retaining ring. Ensure the J 45126 is installed properly onto the retaining ring or bodily injury may occur. Tip To release tension on the retaining ring, place the retaining ring flat on the floor and step on it, then remove the tool. Special Tool J 45126 Snap Ring Pliers For equivalent regional tools, refer to Special Tools.
2	Center (with 2-6 Low and Reverse Clutch) Support Assembly Output Carrier Assembly and Output Shaft Assembly Caution: Ensure the DT 47786 is completely threaded into the output shaft

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3	assembly. Due to the weight of the assembly, incomplete threading may cause the assembly to break free from the DT 47786, causing component damage. Special Tool <i>DT 47786</i> Output Carrier/Shaft Lifting Tool For equivalent regional tools, refer to Special Tools.
4	Output Shaft Thrust Bearing Assembly

Manual Shift Shaft and Parking System Components Overhaul (6L80 / 6L90)

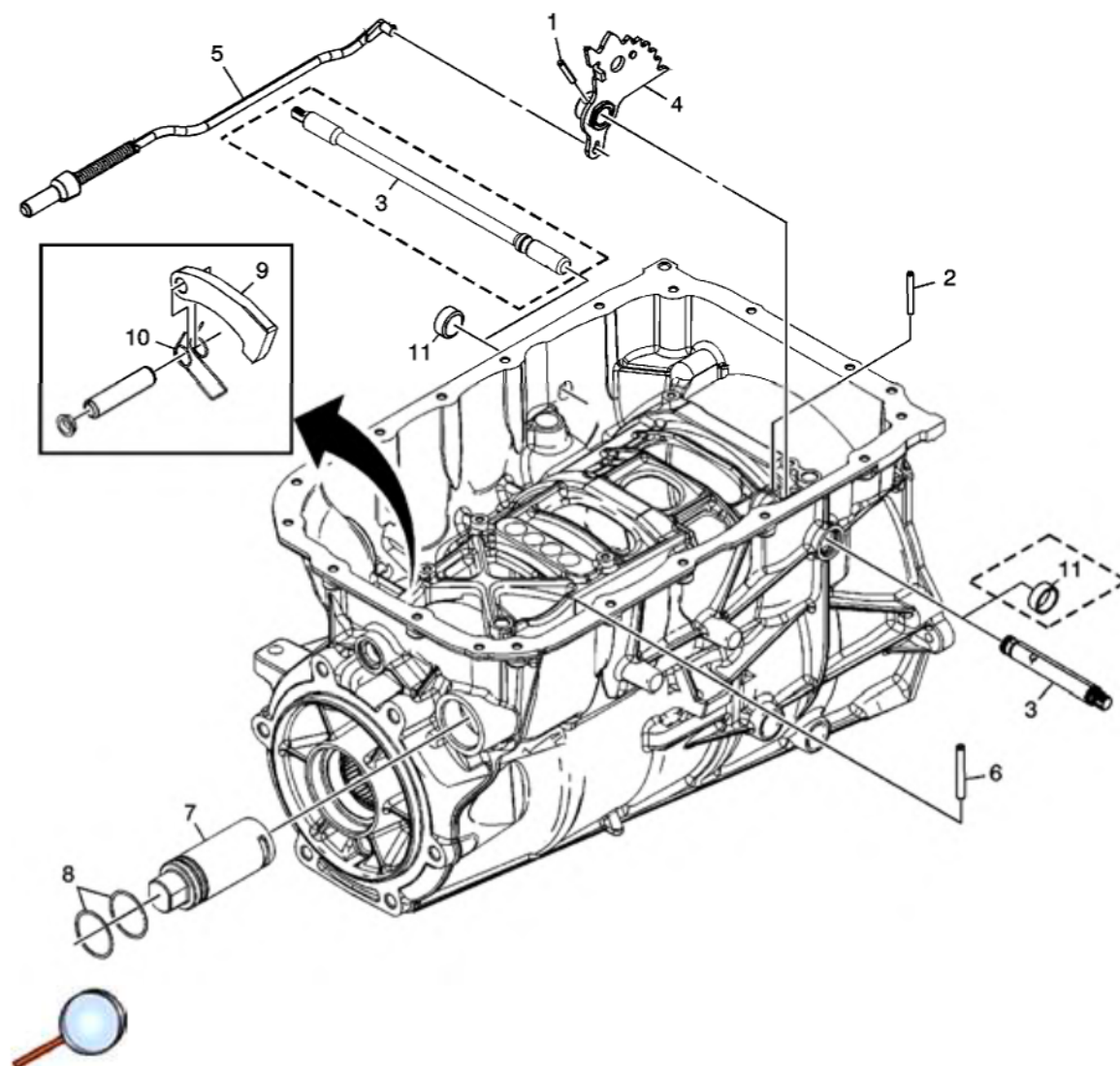


Callout	Component Name
1	Manual Shaft Detent Lever Hub Pin Caution: Refer to Pin Reuse Caution in the Preface section.
2	Manual Shift Shaft Pin Caution: Refer to Pin Reuse Caution in the Preface section.
3	Manual Shift Shaft Caution: Install the gear flat side down. Failure to install the gear flat side down may result in transmission damage.

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	Tip Refer to Manual Shift Shaft Seal Replacement .
4	Manual Shaft Detent Lever Assembly
5	Park Pawl Actuator Assembly
6	Park Pawl Actuator Guide Pin Caution: Refer to Pin Reuse Caution in the Preface section. Tip Use a large pair of side cutters to "walk" the pin out.
7	Park Pawl Actuator Guide
8	Park Pawl Actuator Guide (O-ring) Seals Caution: Refer to Seal Reuse Caution in the Preface section.
9	Park Pawl Tip Inspect for damage only. Do not remove. The park pawl is not a serviceable component.
10	Park Pawl Spring Tip Inspect for damage only. Do not remove. The park pawl spring is not a serviceable component.

Manual Shift Shaft and Parking System Components Overhaul (6L50)

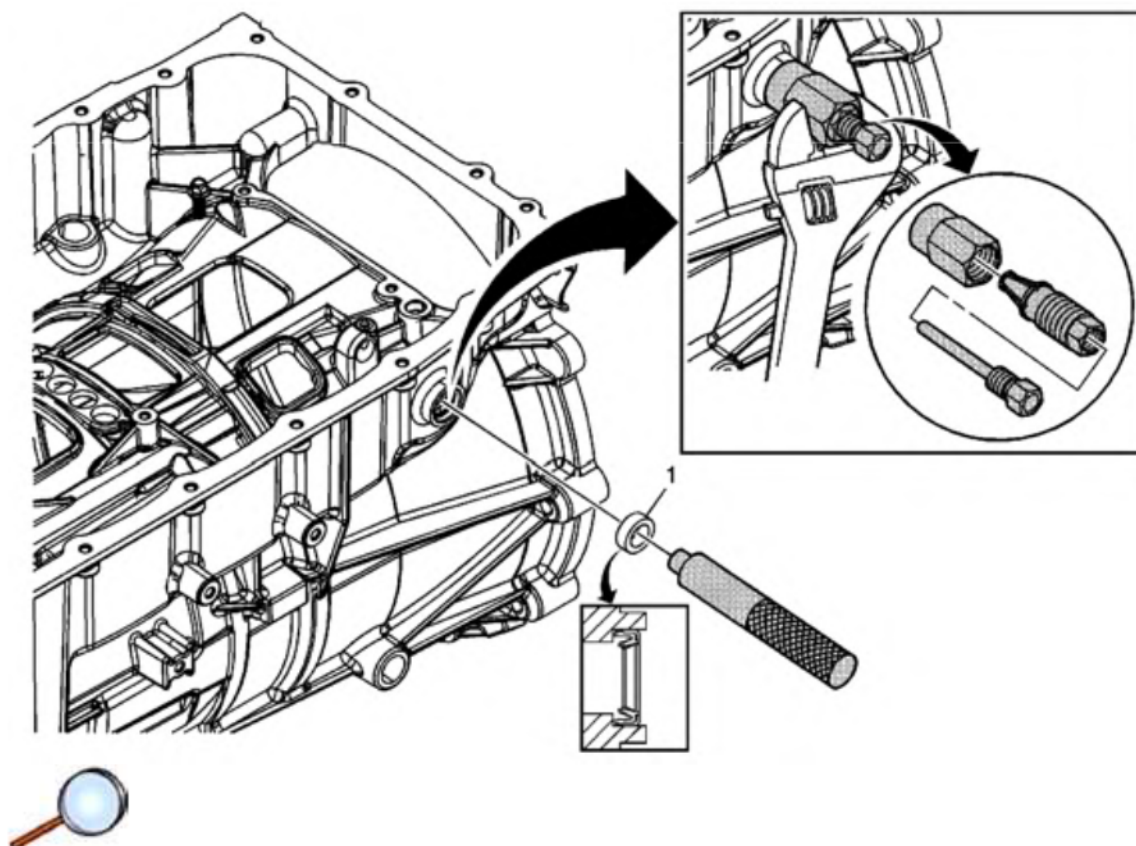


Callout	Component Name
1	Manual Shift Detent Lever Hub Pin Caution: Refer to Pin Reuse Caution in the Preface section.
2	Manual Shift Shaft Pin Caution: Refer to Pin Reuse Caution in the Preface section.
3	Manual Shift Shaft Caution: Install the gear flat side down. Failure to install the gear flat side down may result in transmission damage.

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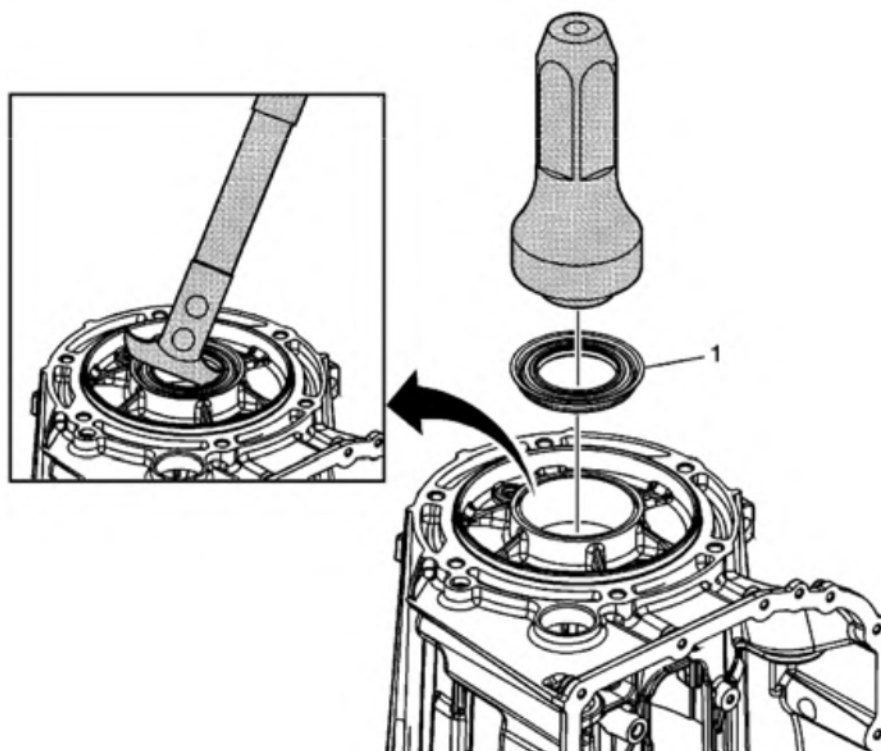
	Tip Refer to Manual Shift Shaft Seal Replacement .
4	Manual Shaft Detent Lever Assembly
5	Park Pawl Actuator Assembly
6	Park Pawl Actuator Guide Pin Caution: Refer to Pin Reuse Caution in the Preface section. Tip Use a large pair of side cutters to "walk" the pin out.
7	Park Pawl Actuator Guide
8	Park Pawl Actuator Guide (O-ring) Seals Caution: Refer to Seal Reuse Caution in the Preface section.
9	Park Pawl Tip Inspect for damage only. Do not remove. The park pawl is not a serviceable component.
10	Park Pawl Spring Tip Inspect for damage only. Do not remove. The park pawl spring is not a serviceable component.
11	Manual Shift Shaft Hole Plug Tip Press plug to seat. Ensure plug is installed evenly.

Manual Shift Shaft Seal Replacement



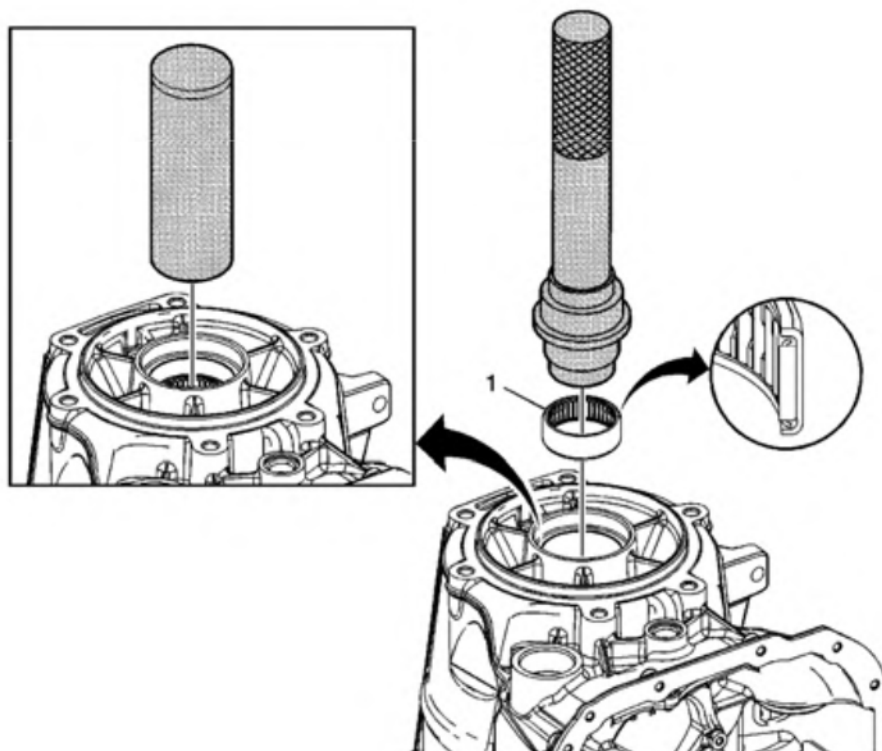
Callout	Component Procedure
	Manual Shift Shaft Seal Caution: Do not damage the case bore during removal of the manual shift shaft seal. Caution: When installing the seal, ensure the seal lip is firmly seated against the case bore surface. Do not allow the seal lip to be crushed, or a leak may result.
1	Caution: Refer to Seal Reuse Caution in the Preface section. Special Tools • DT 47770 Seal Installer • J 45201 Cooler Line Seal Remover For equivalent regional tools, refer to Special Tools.

Output Shaft Seal Replacement (AWD Models Only)



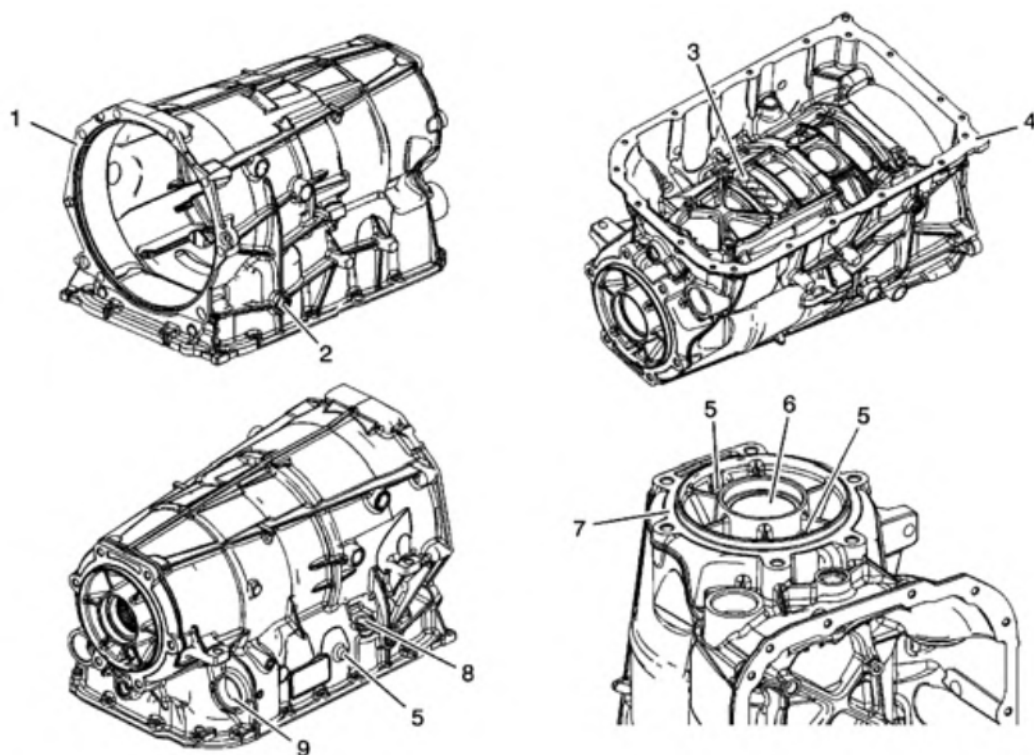
Callout	Component Name
1	Output Shaft Seal Assembly Caution: Refer to Seal Reuse Caution in the Preface section. Special Tool • J 37212 Front Output Shaft Seal Installer (6L50) • J 38693 Seal Installer (6L80) • J 45000 Seal Remover For equivalent regional tools, refer to Special Tools.

Output Shaft Bearing Replacement - Case (6L50)



Callout	Component Name
1	Output Shaft Bearing Assembly Tip Use <i>J 35512</i> bearing installer to remove the bearing and <i>DT 48222</i> bearing installer and <i>J 8092</i> driver handle to install the bearing. Special Tools • <i>DT 48222</i> Bearing Installer • <i>J 8092</i> Driver Handle • <i>J 35512</i> Inner Pinion Bearing Installer For equivalent regional tools, refer to Special Tools.

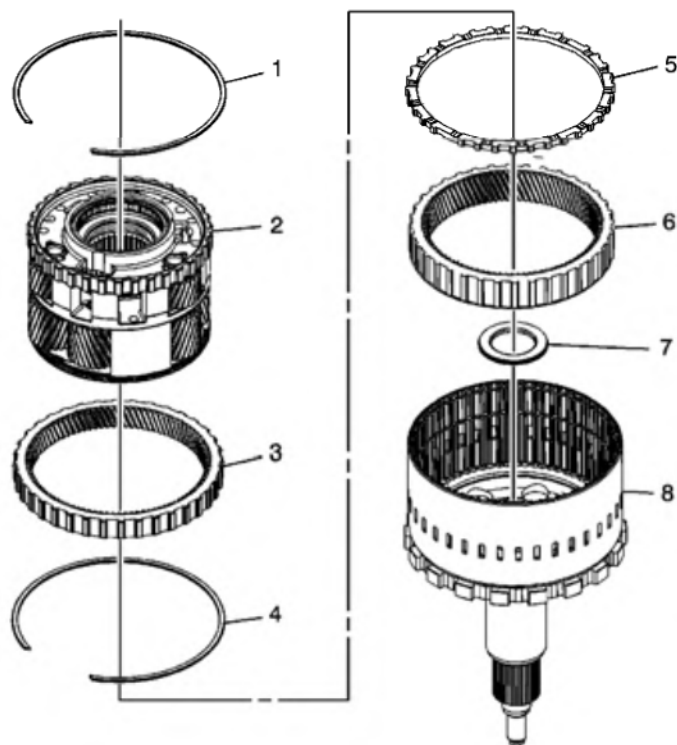
Case Inspection



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 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	Front Case Sealing Surface
2	Manual Shift Shaft Seal
	Tip Refer to Manual Shift Shaft Seal Replacement .
3	Center Support Fluid Passage Seal Bores

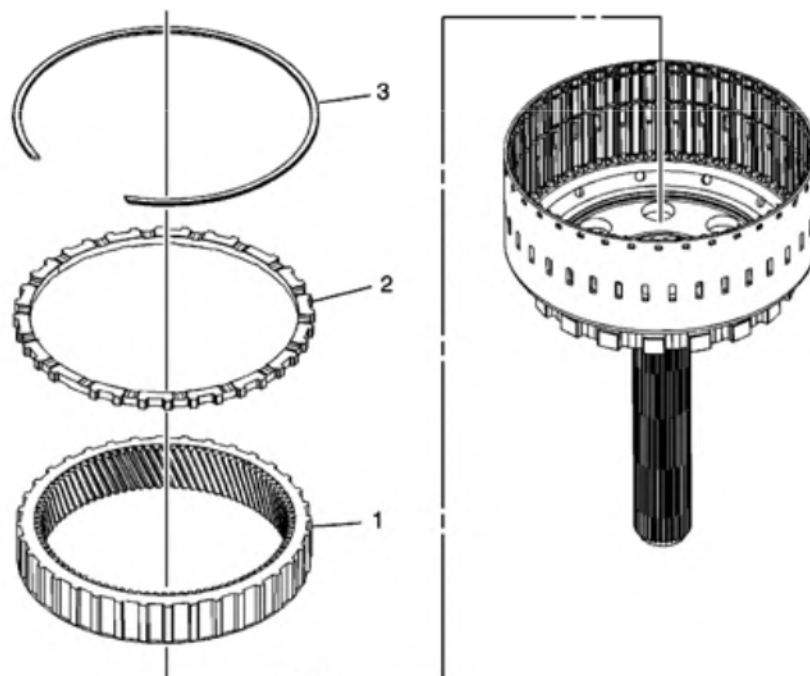
4	Fluid Pan Sealing Surface
5	Case Plugs
6	Output Shaft Bearing Assembly
7	Rear Case Sealing Surface
8	Fill Tube Bore
9	Electrical Connector Passage Sleeve Bore

Output Shaft Disassemble



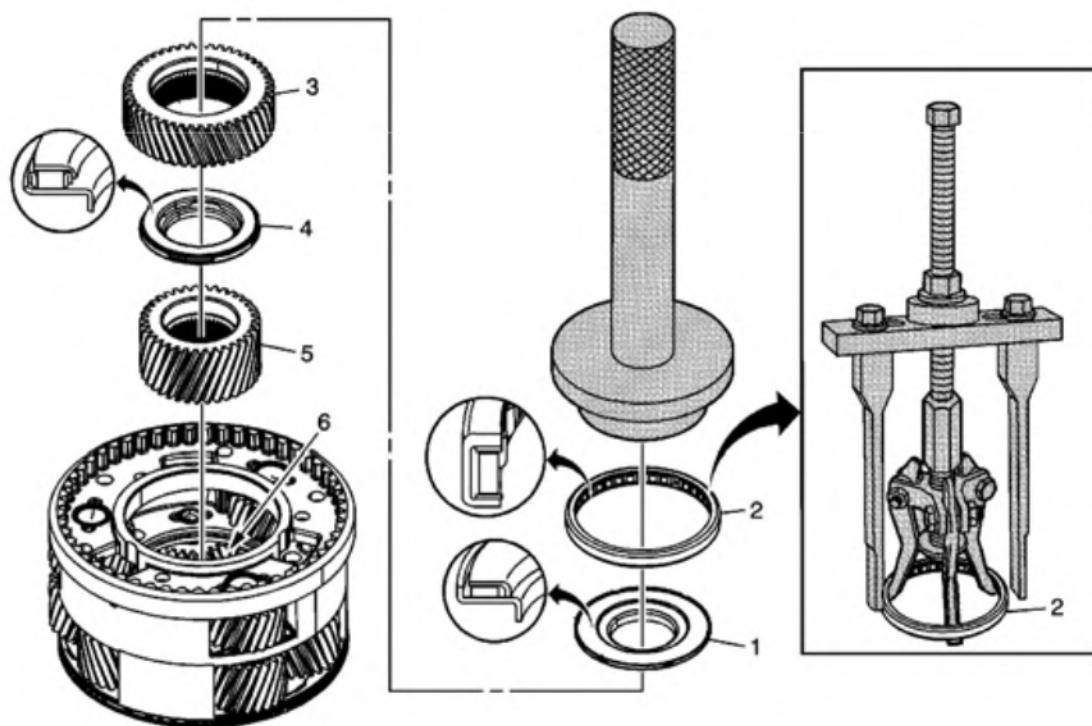
Callout	Component Name
Tip Inspect each component and replace as necessary.	
1	Output Carrier Internal Gear Retaining Ring
2	Output Carrier Assembly
3	Output Carrier Internal Front Gear
4	Output Carrier Internal Gear Retaining Ring
5	Output Carrier Internal Gear Spacer
6	Output Carrier Internal Rear Gear
7	Output Carrier Thrust Bearing Assembly
8	Output Shaft Assembly

Output Shaft Assemble



Callout	Component Name
1	Output Carrier Internal Rear Gear Caution: Install the gear chamfer side down. Failure to install the gear chamfer side down may result in transmission damage.
2	Output Gear Internal Gear Spacer
3	Output Carrier Internal Gear Retaining Ring Tip Do not install the output carrier internal front gear and retaining ring yet. These components will be installed during assembly of the output carrier to the output shaft.

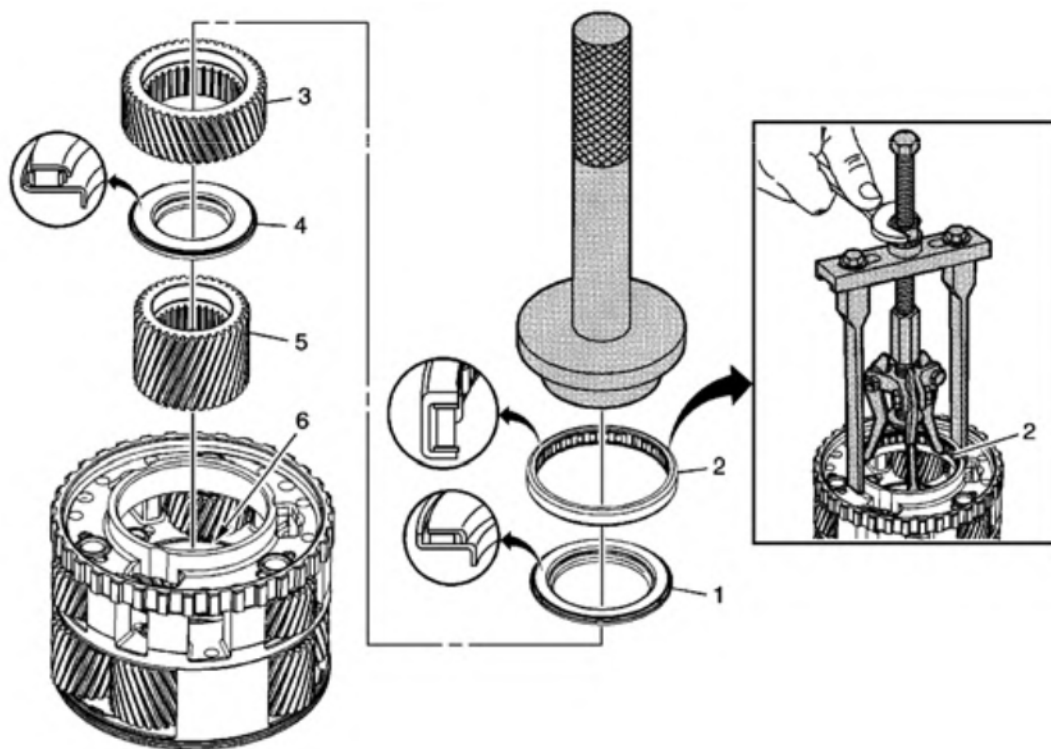
Output Carrier Assembly Overhaul (6L90)



Callout	Component Name
1	Output Carrier Front Sun Gear Thrust Bearing Assembly
2	Center Support Roller Bearing
	Caution: Do not reuse the center support roller bearing. Install a NEW center support roller bearing. Reusing an old bearing may result in damage to the output carrier. Tip The thick side of the bearing shell faces up. Special Tools • DT 47857 Bearing Installer • J 8092 Driver Handle • J 45124 Removal Bridge • DT 47865 Bearing Remover For equivalent regional tools, refer to Special Tools.

3	Output Carrier Front Sun Gear Caution: Install the gear chamfer side up. Failure to install the gear chamfer side up may result in transmission damage.
4	Output Carrier Front Sun Gear Rear Thrust Bearing Assembly
5	Output Carrier Rear Sun Gear Caution: Install the gear chamfer side up. Failure to install the gear chamfer side up may result in transmission damage.
6	Output Carrier Rear Sun Gear Bearing Assembly Tip Inspect for damage only. Do not remove. The bearing assembly is not a serviceable component.

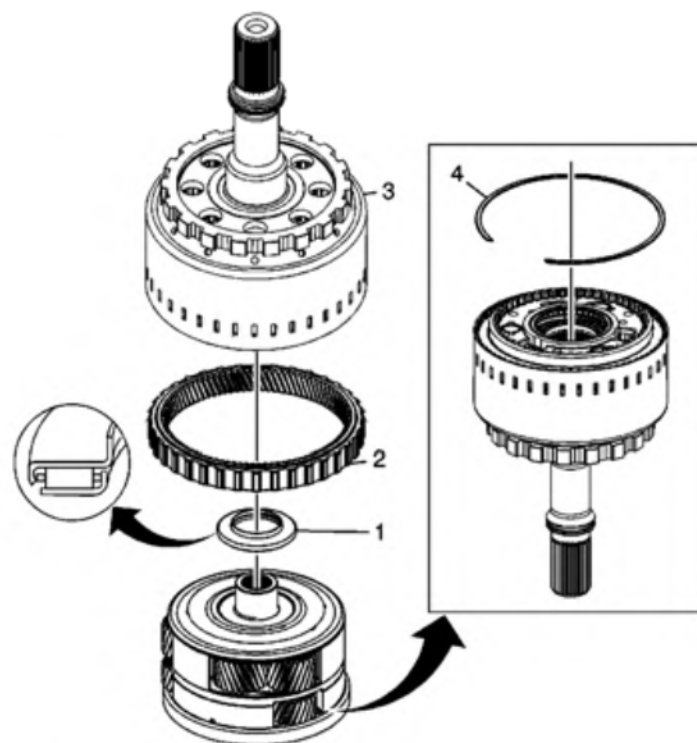
Output Carrier Assembly Overhaul (6L50)



Callout	Component Name
1	Output Carrier Front Sun Gear Thrust Bearing Assembly
2	Center Support Roller Bearing Caution: Do not reuse the center support roller bearing. Install a NEW center support roller bearing. Reusing an old bearing may result in damage to the output carrier. Tip The thick side of the bearing shell faces up. Special Tools • DT 47857 Bearing Installer • DT 47865 Bearing Remover • J 8092 Driver Handle • J 45124 Removal Bridge For equivalent regional tools, refer to Special Tools.

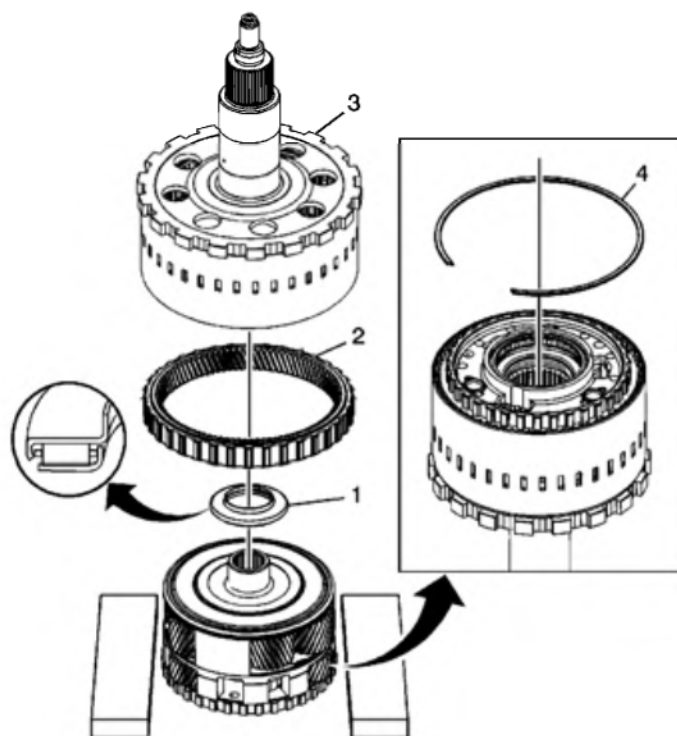
3	Output Carrier Front Sun Gear Caution: Install the gear chamfer side up. Failure to install the gear chamfer side up may result in transmission damage.
4	Output Carrier Front Sun Gear Rear Thrust Bearing Assembly
5	Output Carrier Rear Sun Gear Caution: Install the gear chamfer side up. Failure to install the gear chamfer side up may result in transmission damage.
6	Output Carrier Rear Sun Gear Bearing Assembly Tip Inspect for damage only. Do not remove. The bearing assembly is not a serviceable component.

Output Carrier to Output Shaft Assembly (6L90)



Callout	Component Name
1	Output Carrier Thrust Bearing Assembly
2	Output Carrier Internal Front Gear Caution: Install the gear flat side down. Failure to install the gear flat side down may result in transmission damage.
3	Output Shaft Assembly
4	Output Carrier Internal Gear Retaining Ring Tip Grasp the output shaft and carrier with both hands to turn over.

Output Carrier to Output Shaft Assembly (6L50)



Callout	Component Name
1	Output Carrier Thrust Bearing Assembly
2	Output Carrier Internal Front Gear Caution: Install the gear flat side down. Failure to install the gear flat side down may result in transmission damage. Tip Use 2 small blocks next to the output carrier assembly in order to keep the internal front gear engaged with the front pinion gears.
3	Output Shaft Assembly
4	Output Carrier Internal Gear Retaining Ring Tip Grasp the output shaft and carrier with both hands to turn over.

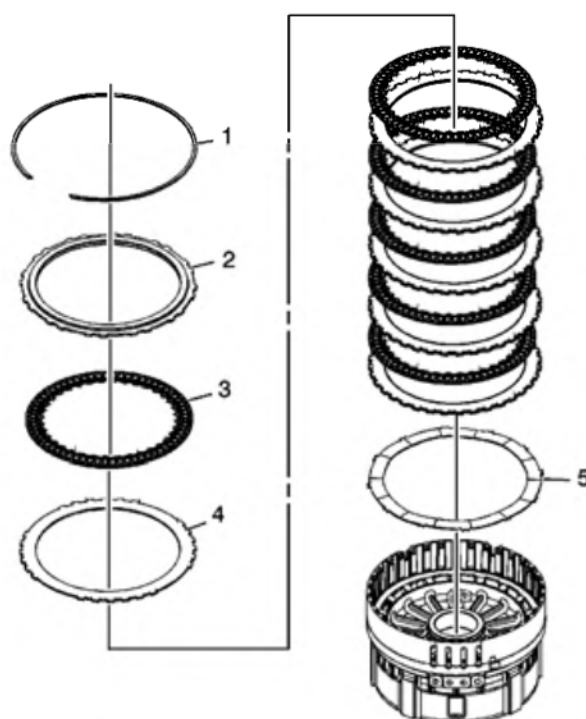
2-6 Clutch Overhaul (6L90)

Table 1: [2-6 Clutch Plates Removal](#)

Table 2: [2-6 Clutch Piston Replacement](#)

Table 3: [2-6 Clutch Plates Installation](#)

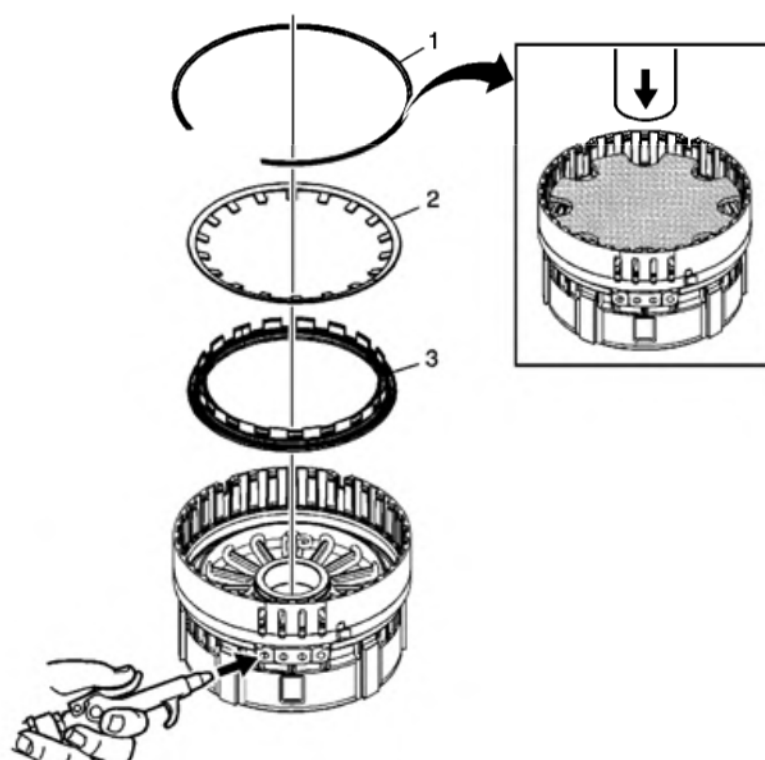
[2-6 Clutch Plates Removal](#)



[2-6 Clutch Plates Removal](#)

Callout	Component Name
1	2-6 Clutch Backing Plate Retaining Ring
2	2-6 Clutch Backing Plate
3	2-6 Clutch Plate Assembly (Qty: 6)
4	2-6 Clutch Plate (Qty: 6)
5	2-6 Clutch (Waved) Plate

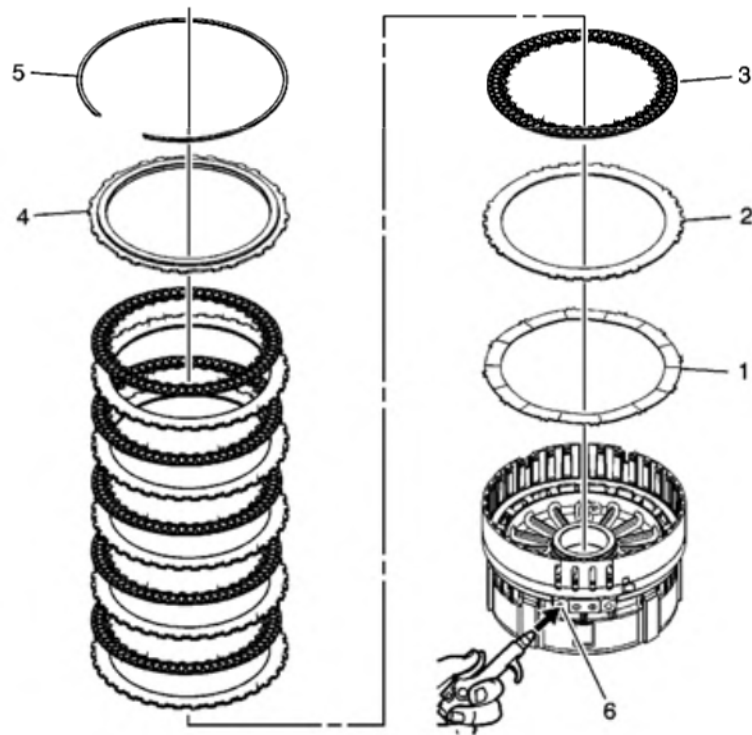
[2-6 Clutch Piston Replacement](#)



2-6 Clutch Piston Replacement

Callout	Component Name
1	2-6 Clutch Spring Retaining Ring Tip Ensure the <i>DT 47761</i> spring compressor is centered over the clutch spring. Special Tool <i>DT 47761</i> Clutch Spring Compressor For equivalent regional tools, refer to Special Tools.
2	2-6 Clutch Spring Caution: Ensure the spring tabs are facing down during installation and that the tabs fit between the teeth on the piston. Failure to do so may cause damage to the clutch assembly.
3	2-6 Clutch Piston Assembly Tip It may be necessary to apply air to the apply passage in order to unseat the piston.

2-6 Clutch Plates Installation



2-6 Clutch Plates Installation

Callout	Component Name
1	2-6 Clutch (Waved) Plate
2	2-6 Clutch Plates (Qty: 6) Tip Alternate between steel and fiber clutch plates.
3	2-6 Clutch Plate Assembly (Qty: 6) Tip Alternate between steel and fiber clutch plates.
4	2-6 Clutch Backing Plate
5	2-6 Clutch Backing Plate Retaining Ring
6	2-6 Clutch Apply Passage Tip Apply air to verify proper installation of all 2-6 clutch components.

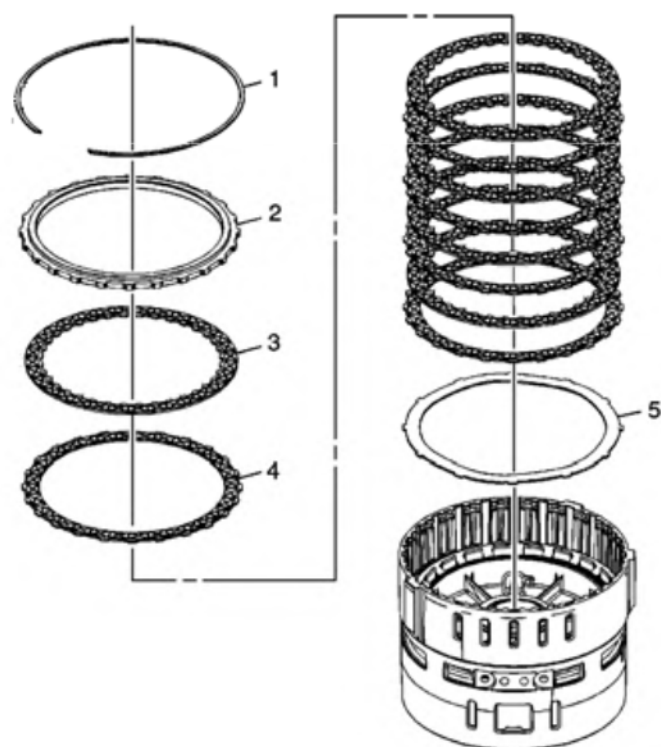
2-6 Clutch Overhaul (6L50)

Table 1: [2-6 Clutch Plates Removal](#)

Table 2: [2-6 Clutch Piston Replacement](#)

Table 3: [2-6 Clutch Plates Installation](#)

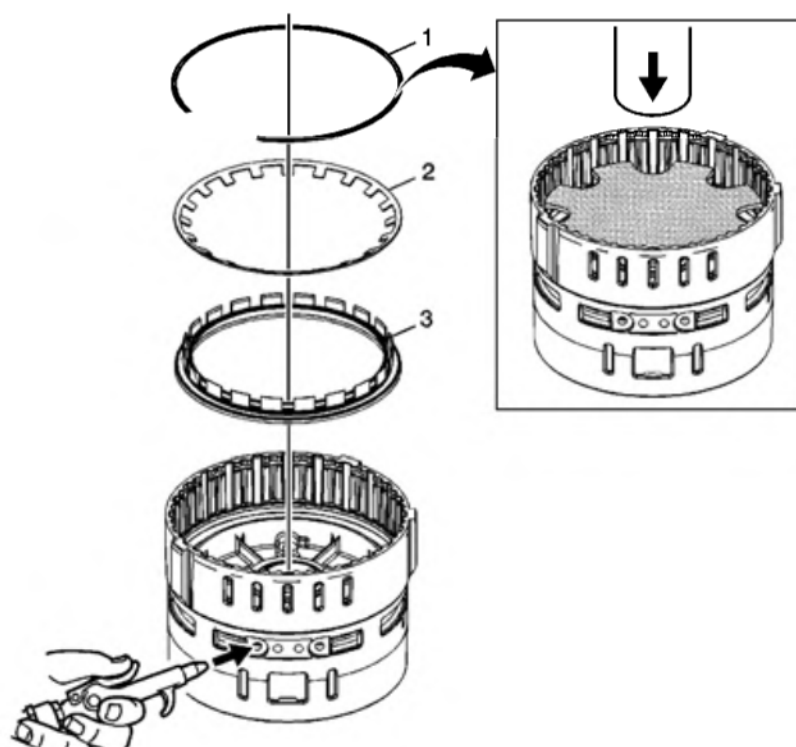
2-6 Clutch Plates Removal



2-6 Clutch Plates Removal

Callout	Component Name
1	2-6 Clutch Backing Plate Retaining Ring
2	2-6 Clutch Backing Plate
3	2-6 Clutch Plate Assembly (Qty: 5)
4	2-6 Clutch Plate (Qty: 5)
5	2-6 Clutch (Waved) Plate

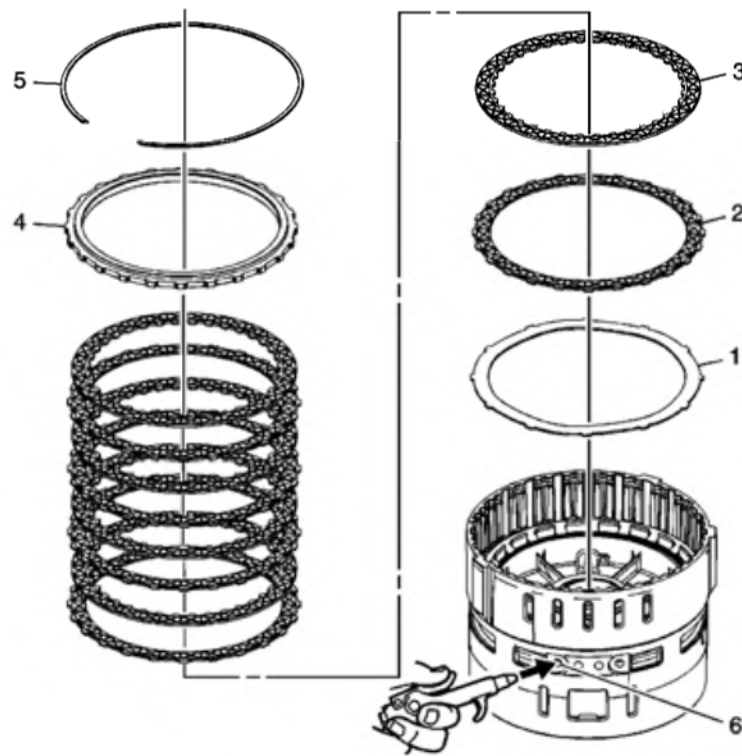
2-6 Clutch Piston Replacement



2-6 Clutch Piston Replacement

Callout	Component Name
1	2-6 Clutch Spring Retaining Ring Tip Ensure the <i>DT-48065</i> spring compressor is centered over the clutch spring. Special Tool <i>DT-48065</i> Clutch Spring Compressor For equivalent regional tools, refer to Special Tools.
2	2-6 Clutch Spring Caution: Ensure the spring tabs are facing down during installation and that the tabs fit between the teeth on the piston. Failure to do so may cause damage to the clutch assembly.
3	2-6 Clutch Piston Assembly Tip It may be necessary to apply air to the apply passage in order to unseat the piston.

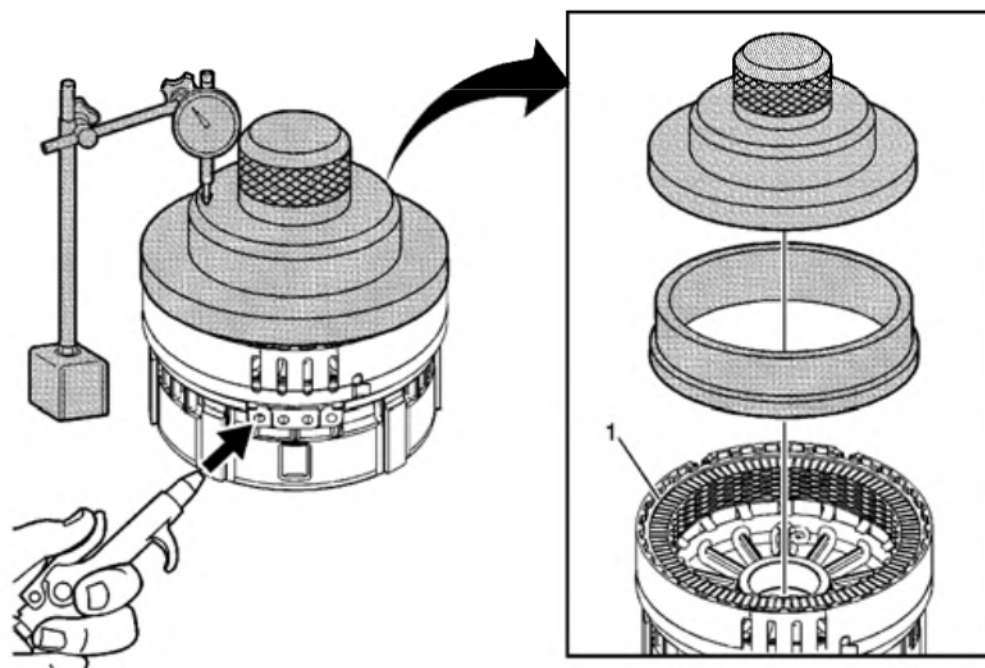
2-6 Clutch Plates Installation



2-6 Clutch Plates Installation

Callout	Component Name
1	2-6 Clutch (Waved) Plate
2	2-6 Clutch Plates (Qty: 5) Tip Alternate between steel and fiber clutch plates.
3	2-6 Clutch Plate Assembly (Qty: 5) Tip Alternate between steel and fiber clutch plates.
4	2-6 Clutch Backing Plate
5	2-6 Clutch Backing Plate Retaining Ring
6	2-6 Clutch Apply Passage Tip Apply air to verify proper installation of all 2-6 clutch components.

2-6 Clutch Backing Plate Retaining Ring Measurement (6L50)



Callout	Component Name
Preliminary Procedures	
1. Install <i>DT 47868-1</i> clutch pack travel weight and <i>DT-47868-4</i> travel weight adapter onto the 2-6 clutch backing plate. 2. Attach the <i>J 8001</i> dial indicator set to the <i>J 26900-13</i> magnetic base and zero out the dial indicator on the <i>DT 47868-1</i> clutch pack travel weight .	
Special Tools	
• <i>DT 47868-1</i> Clutch Pack Travel Weight • <i>DT-47868-4</i> Clutch Travel Weight Adapter • <i>J 8001</i> Dial Indicator Set • <i>J 26900-13</i> Magnetic Base	
For equivalent regional tools, refer to Special Tools .	
2-6 Clutch Apply Passage	

1

Tip

Apply compressed air to the apply passage hole, at least 3 times and observe the dial indicator measurement each time. This action "fluffs" the clutch plates to ensure an accurate measurement. Refer to [Clutch Backing Plate Retaining Ring Specifications](#).

Low and Reverse Clutch Overhaul (6L90)

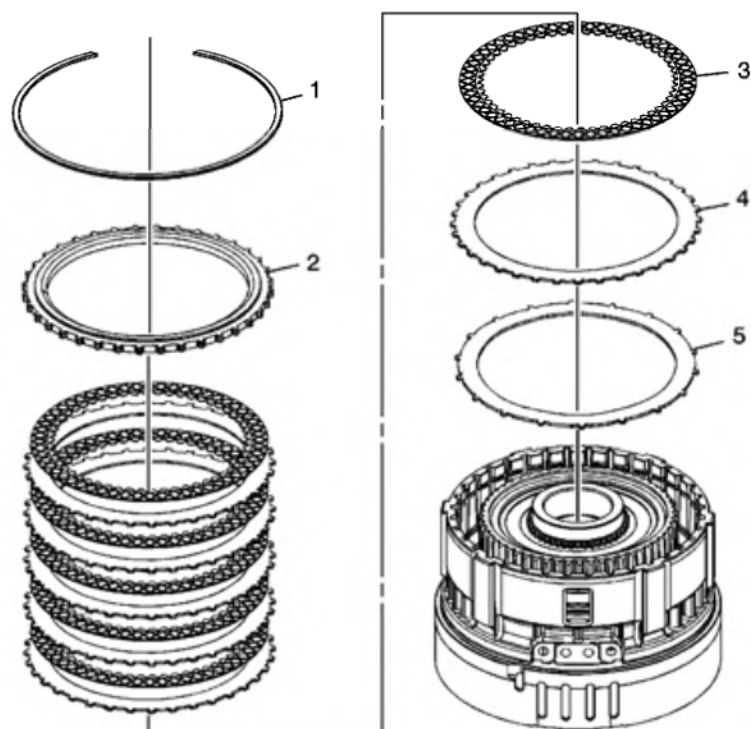
Table 1: [Low and Reverse Clutch Plate Removal](#)

Table 2: [Low and Reverse Clutch Piston Removal](#)

Table 3: [Low and Reverse Clutch Piston Installation](#)

Table 4: [Low and Reverse Clutch Plate Installation](#)

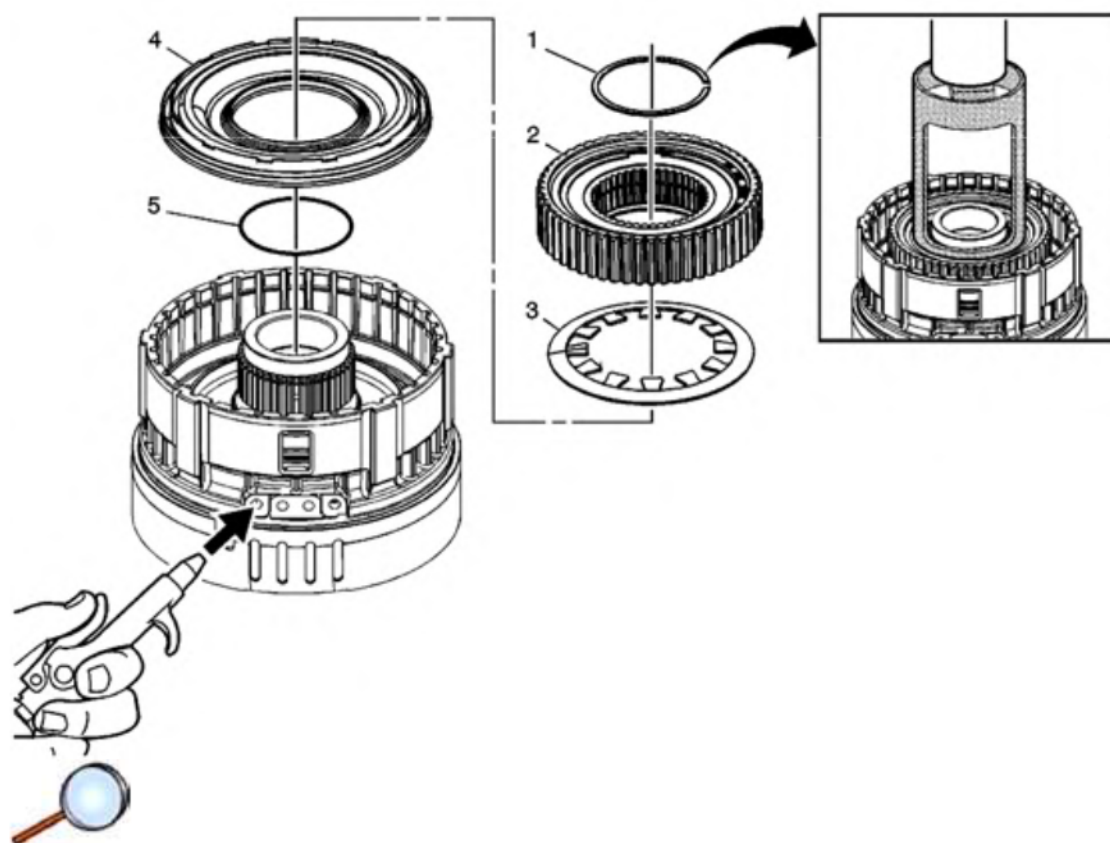
[Low and Reverse Clutch Plate Removal](#)



[Low and Reverse Clutch Plate Removal](#)

Callout	Component Name
1	Low and Reverse Clutch Backing Plate Retaining Ring
2	Low and Reverse Clutch Backing Plate
3	Low and Reverse Clutch Plate Assembly (Qty: 6)
4	Low and Reverse Clutch Plate (Qty: 6)
5	Low and Reverse Clutch (Waved) Plate

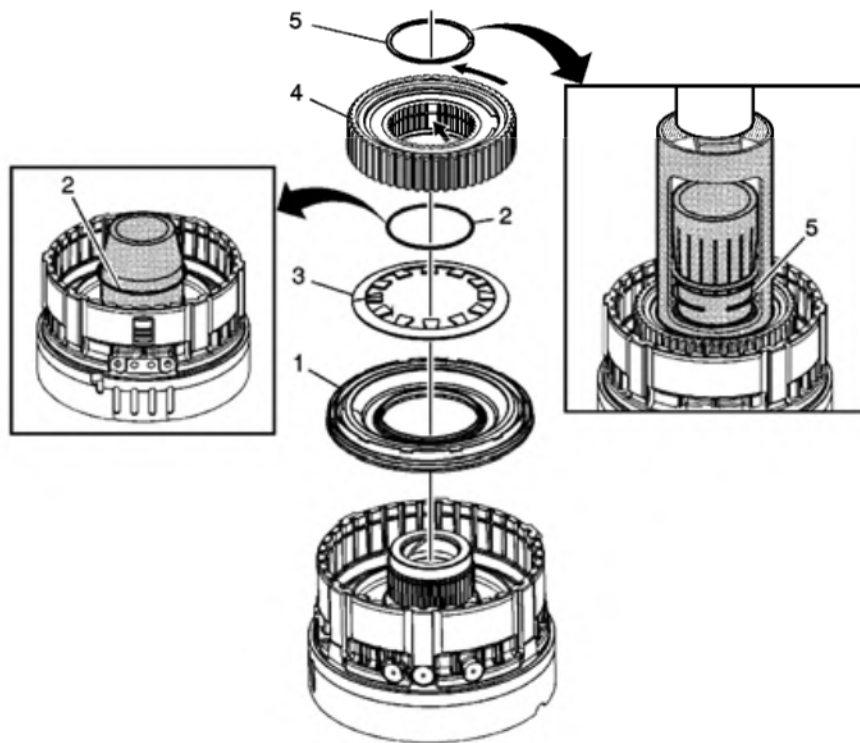
[Low and Reverse Clutch Piston Removal](#)



Low and Reverse Clutch Piston Removal

Callout	Component Name
1	Low and Reverse Clutch Spring Retaining Ring Caution: Ensure the DT 47779 contacts the sprag assembly and not the sprag retaining ring. Damage to the sprag may result. Special Tool DT 47779 Clutch Spring Compressor For equivalent regional tools, refer to Special Tools.
2	Low Clutch Sprag Assembly
3	Low and Reverse Clutch Spring
4	Low and Reverse Clutch Piston Assembly Tip It may be necessary to apply air to the apply passage in order to unseat the piston.
5	Low Clutch Sprag Seal Caution: Refer to Seal Reuse Caution in the Preface section.

Low and Reverse Clutch Piston Installation

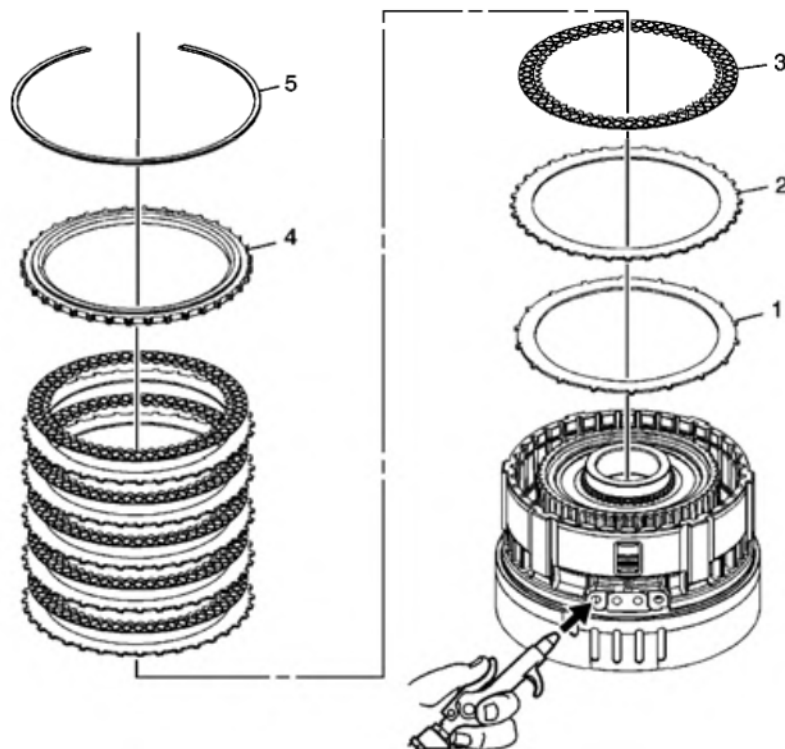


Low and Reverse Clutch Piston Installation

Callout	Component Name
1	Low and Reverse Clutch Piston Assembly Tip Lubricate the inner and outer sealing surfaces of the piston assembly with automatic transmission fluid (ATF) in order to ease installation into the center support assembly.
2	Low Clutch Sprag Seal Caution: Refer to Seal Reuse Caution in the Preface section. Tip Apply ATF to the <i>DT 47780</i> low clutch sprag seal cone to ease seal installation. Special Tool <i>DT 47780</i> Low Clutch Sprag Seal Cone For equivalent regional tools, refer to Special Tools.
3	Low and Reverse Clutch Spring Caution: Ensure the spring tabs are facing up during installation. Failure to do so may cause damage to the clutch assembly.
	Low Clutch Sprag Assembly

4	Tip • Verify that the low clutch sprag is operating correctly. Refer to the illustration for proper freewheel direction. • Ensure the missing splines on the sprag assembly are aligned with the missing splines on the center support hub.
5	Low and Reverse Clutch Spring Retaining Ring Caution: Ensure the DT 47779 contacts the sprag assembly and not the sprag retaining ring. Damage to the sprag may result. Caution: The retaining ring gap must be aligned with the 3 missing splines on the center support hub. Failure to do so may cause damage to the clutch assembly. Special Tools • DT 47778-1 Low Clutch Sprag Retaining Ring Cone • DT 47778-2 Low Clutch Sprag Retaining Ring Pusher • DT 47779 Clutch Spring Compressor For equivalent regional tools, refer to Special Tools.

Low and Reverse Clutch Plate Installation



Low and Reverse Clutch Plate Installation

Callout	Component Name
1	Low and Reverse Clutch (Waved) Plate
2	Low and Reverse Clutch Plate (Qty: 6)
3	Low and Reverse Clutch Plate Assembly (Qty: 6)
4	Low and Reverse Clutch Backing Plate
5	Low and Reverse Clutch Backing Plate Retaining Ring Tip Apply air to verify proper installation of all low and reverse clutch components.

Low and Reverse Clutch Overhaul (6L50)

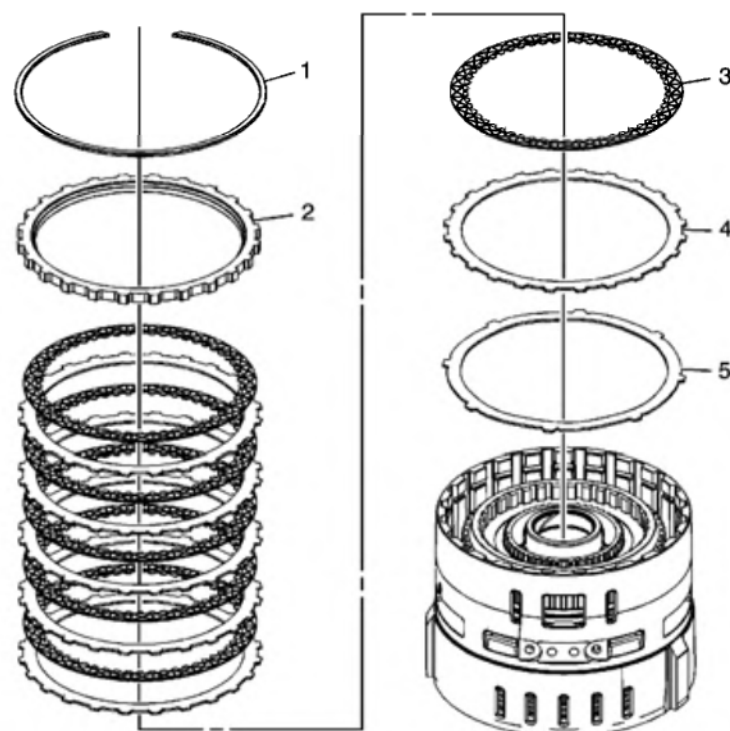
Table 1: [Low and Reverse Clutch Plate Removal](#)

Table 2: [Low and Reverse Clutch Piston Removal](#)

Table 3: [Low and Reverse Clutch Piston Installation](#)

Table 4: [Low and Reverse Clutch Plate Installation](#)

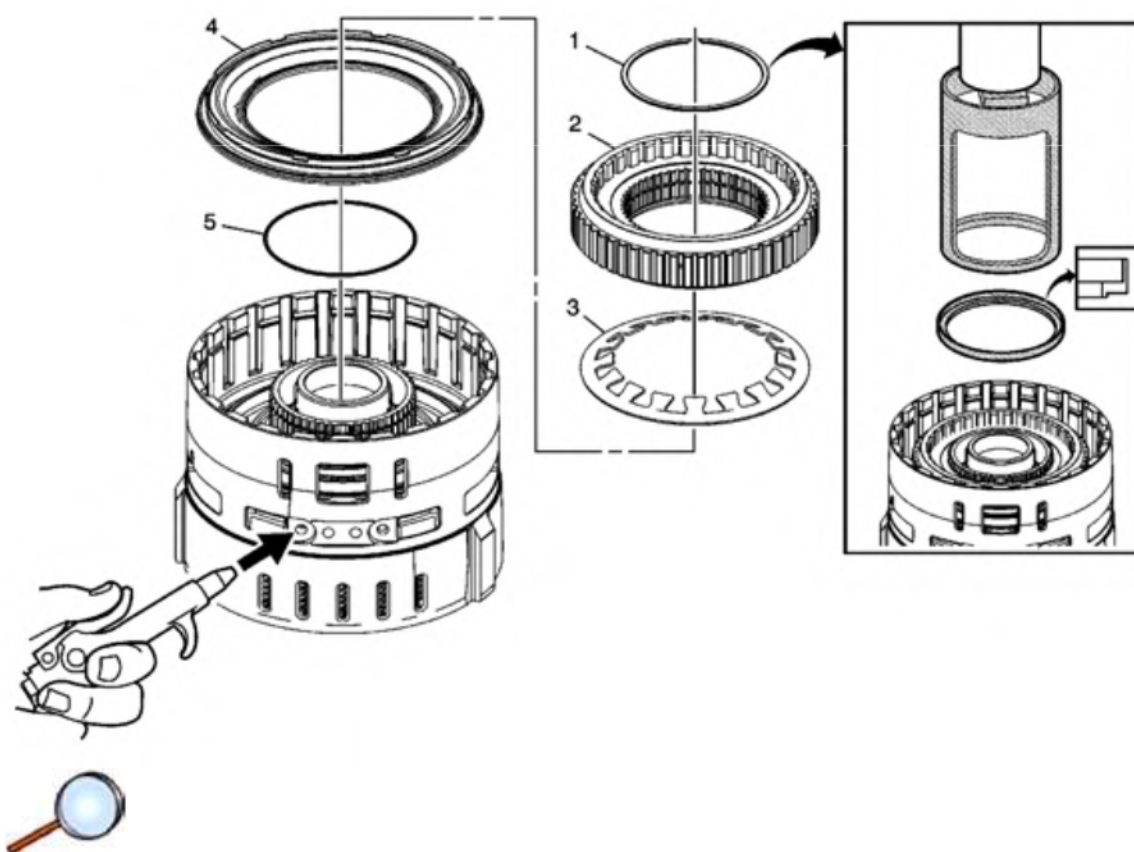
[Low and Reverse Clutch Plate Removal](#)



Low and Reverse Clutch Plate Removal

Callout	Component Name
1	Low and Reverse Clutch Backing Plate Retaining Ring
2	Low and Reverse Clutch Backing Plate
3	Low and Reverse Clutch Plate Assembly (Qty: 6)
4	Low and Reverse Clutch Plate (Qty: 6)
5	Low and Reverse Clutch (Waved) Plate

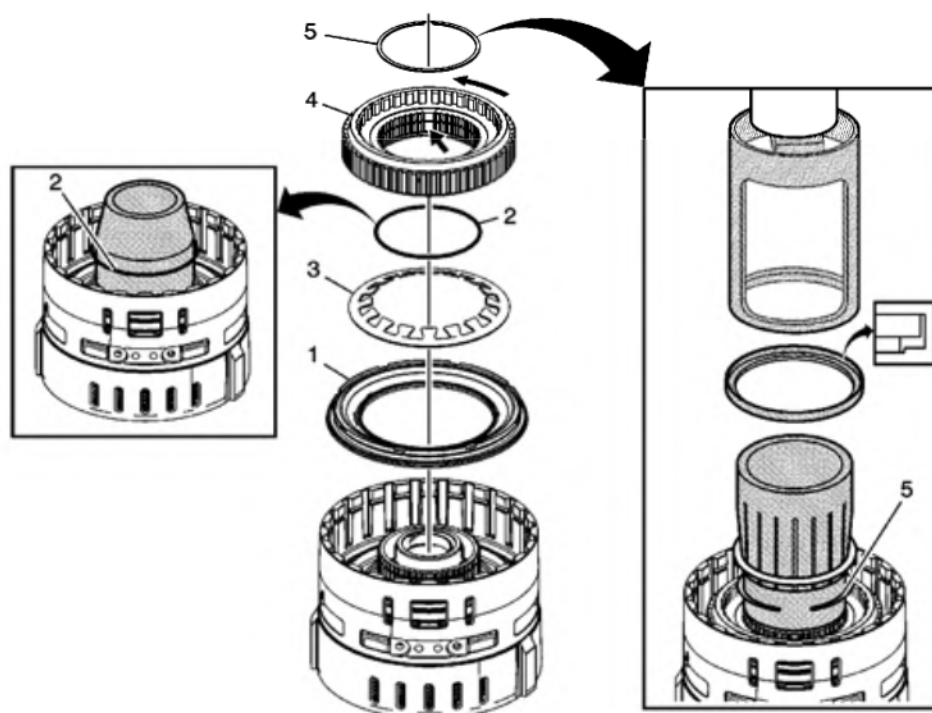
[Low and Reverse Clutch Piston Removal](#)



Low and Reverse Clutch Piston Removal

Callout	Component Name
1	Low and Reverse Clutch Spring Retaining Ring Caution: DT-49122 must be used with the DT-48069 in order to prevent damage to the low clutch sprag retainer. Special Tool • DT-48069 Low Clutch Spring Compressor • DT-49122 Low Clutch Spring Compressor Adapter For equivalent regional tools, refer to Special Tools.
2	Low Clutch Sprag Assembly
3	Low and Reverse Clutch Spring
4	Low and Reverse Clutch Piston Assembly Tip It may be necessary to apply air to the apply passage in order to unseat the piston.
5	Low Clutch Sprag Seal Caution: Refer to Seal Reuse Caution in the Preface section.

Low and Reverse Clutch Piston Installation

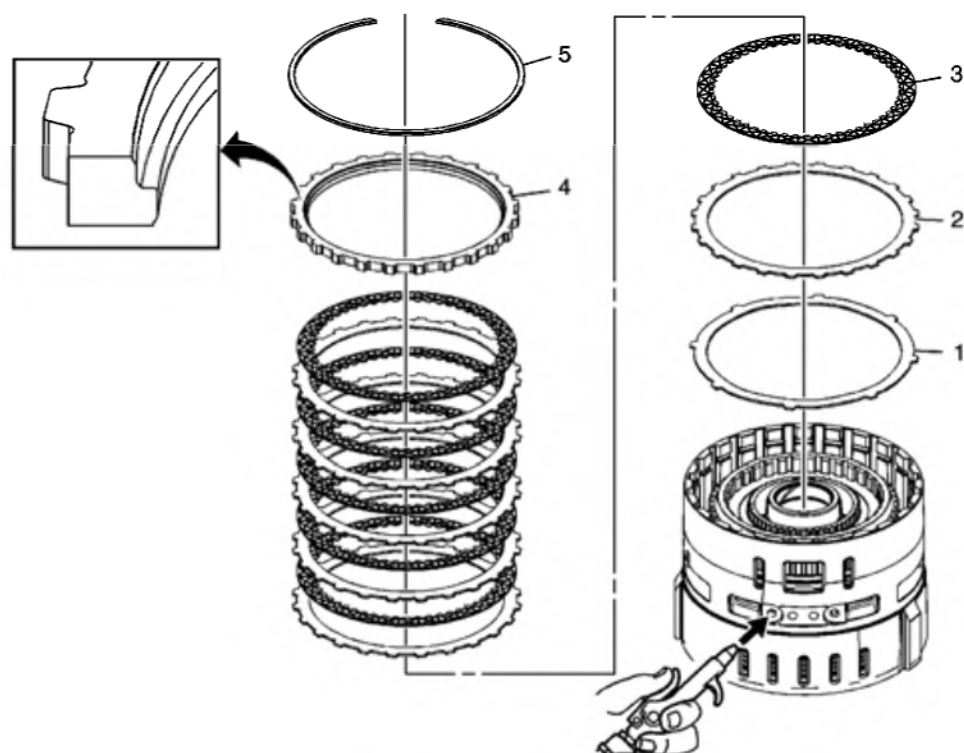


Low and Reverse Clutch Piston Installation

Callout	Component Name
1	Low and Reverse Clutch Piston Assembly Tip Lubricate the inner and outer sealing surfaces of the piston assembly with automatic transmission fluid (ATF) in order to ease installation into the center support assembly.
2	Low Clutch Sprag Seal Caution: Refer to Seal Reuse Caution in the Preface section. Tip Apply ATF to the <i>DT-48070</i> low clutch sprag seal cone to ease seal installation. Special Tool <i>DT-48070</i> Low Clutch Sprag Seal Cone For equivalent regional tools, refer to Special Tools.
3	Low and Reverse Clutch Spring Caution: Ensure the spring tabs are facing up during installation. Failure to do so may cause damage to the clutch assembly.
	Low Clutch Sprag Assembly

4	Tip • Verify that the low clutch sprag is operating correctly. Refer to the illustration for proper freewheel direction. • Ensure the missing splines on the sprag assembly are aligned with the missing splines on the center support hub.
5	Low and Reverse Clutch Spring Retaining Ring Caution: DT-49122 must be used with the DT-48069 in order to prevent damage to the low clutch sprag retainer. Caution: The retaining ring gap must be aligned with the 3 missing splines on the center support hub. Failure to do so may cause damage to the clutch assembly. Special Tools • DT-48068-1 Low Clutch Sprag Retaining Ring Cone • DT-48068-2 Low Clutch Sprag Retaining Ring Pusher • DT-48069 Low Clutch Spring Compressor • DT-49122 Low Clutch Spring Compressor Adapter For equivalent regional tools, refer to Special Tools.

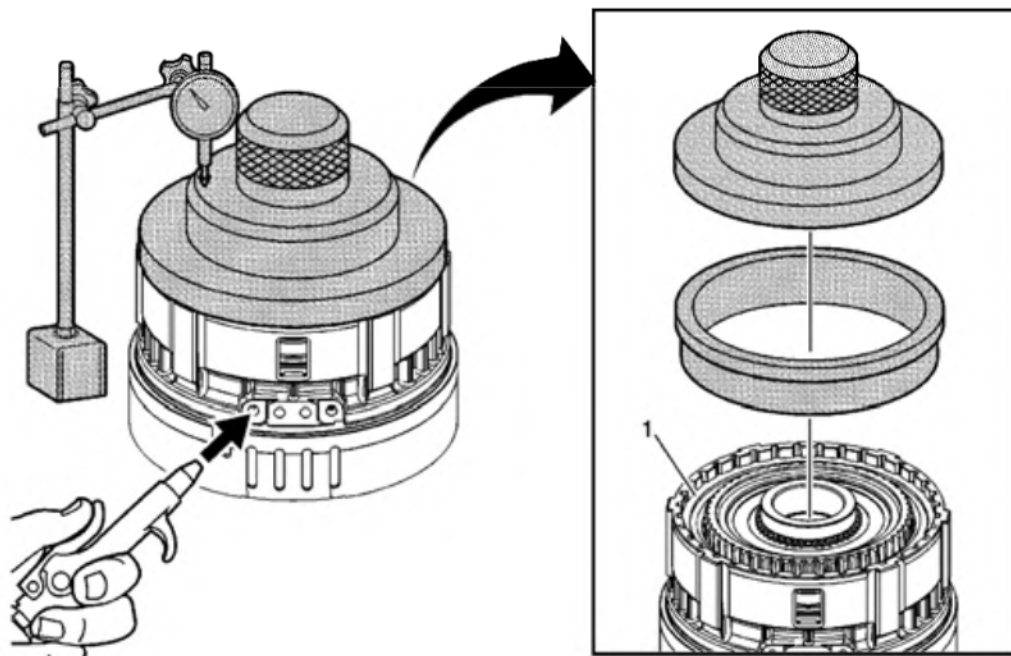
Low and Reverse Clutch Plate Installation



**Low and Reverse Clutch Plate Installation**

Callout	Component Name
1	Low and Reverse Clutch (Waved) Plate
2	Low and Reverse Clutch Plate (Qty: 6)
3	Low and Reverse Clutch Plate Assembly (Qty: 6)
4	Low and Reverse Clutch Backing Plate Tip Install the backing plate with the inner step side up.
5	Low and Reverse Clutch Backing Plate Retaining Ring Tip Apply air to verify proper installation of all low and reverse clutch components.

Low and Reverse Clutch Backing Plate Retaining Ring Measurement



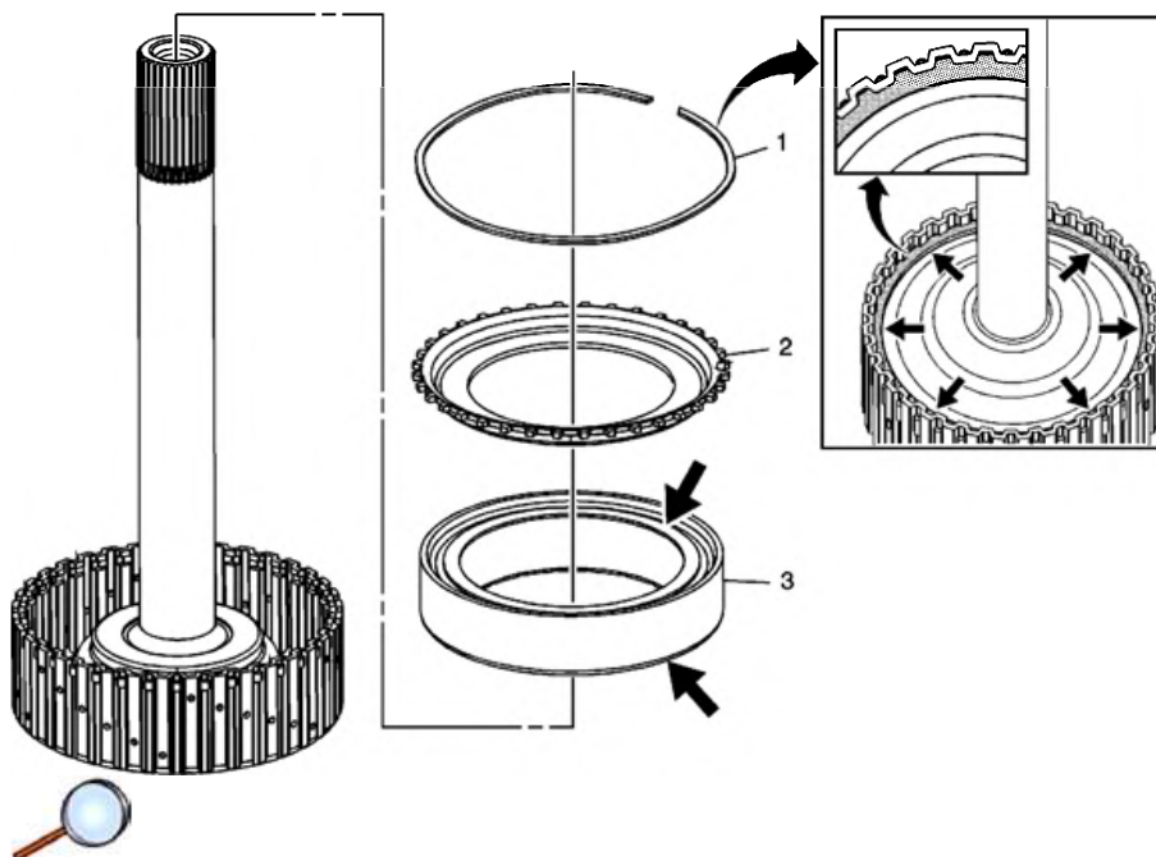
Callout	Component Name
Preliminary Procedures	
1. Install <i>DT-47868-1</i> pack travel weight and <i>DT-47868-4</i> travel weight adapter onto the low and reverse clutch backing plate. 2. Attach the <i>J 8001</i> dial indicator set to the <i>J 26900-13</i> magnetic base and zero out the dial indicator on the <i>DT-47868-1</i> pack travel weight .	
Special Tools	
• <i>DT-47868-1</i> Pack Travel Weight • <i>DT-47868-4</i> Clutch Travel Weight Adapter • <i>J 8001</i> Dial Indicator Set • <i>J 26900-13</i> Magnetic Base	
For equivalent regional tools, refer to Special Tools .	
Low and Reverse Backing Plate Retaining Ring	

1

Tip

Apply compressed air to the apply passage hole, at least 3 times and observe the dial indicator measurement each time. This action "fluffs" the clutch plates to ensure an accurate measurement. Refer to [Clutch Backing Plate Retaining Ring Specifications](#).

4-5-6 Clutch Dampener Overhaul



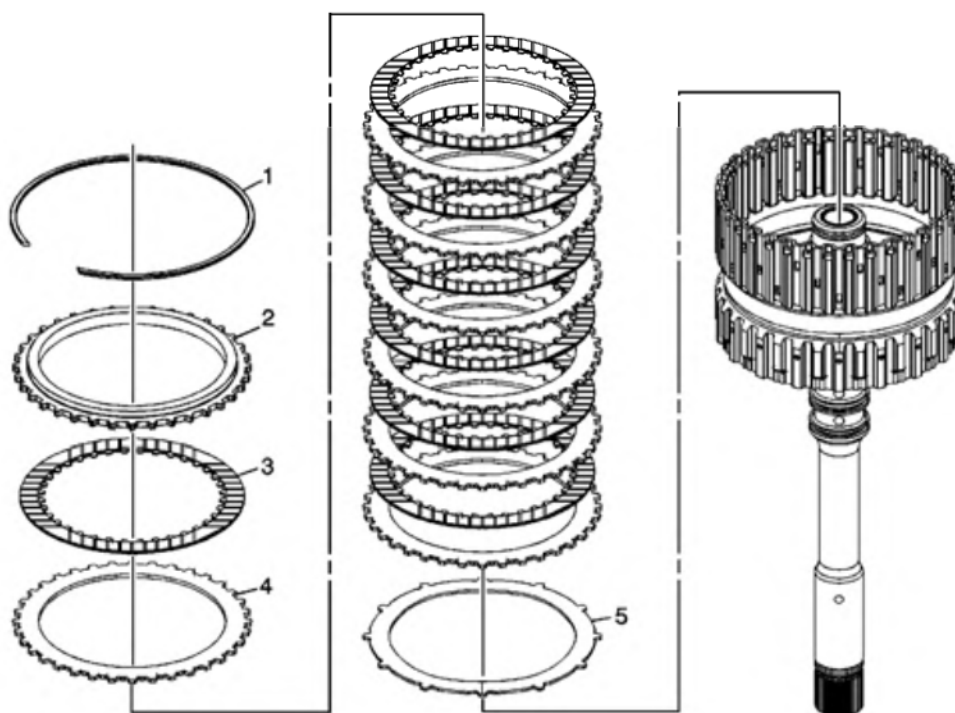
Callout	Component Name
1	4-5-6 Clutch Dampener Retaining Ring Caution: Ensure the retaining ring is installed with the tapered side up, and in the 9 o'clock position from the pan side of the case. Failure to properly install the retaining ring will cause transmission damage.
2	4-5-6 Clutch Dampener Apply Plate
3	4-5-6 Clutch Dampener Tip Dry and inspect the clutch dampener for the following conditions: • Pitting • Flaking • Delamination • Wear • Glazing • Cracking

If any of these conditions are found, replace the dampener.

4-5-6 Clutch Overhaul (6L90)

- Table 1: [4-5-6 Clutch Plates Removal](#)
Table 2: [4-5-6 Clutch Piston Removal](#)
Table 3: [Turbine Shaft Fluid Seal Ring Replacement](#)
Table 4: [4-5-6 Clutch Piston Installation](#)
Table 5: [4-5-6 Clutch Plates Installation](#)

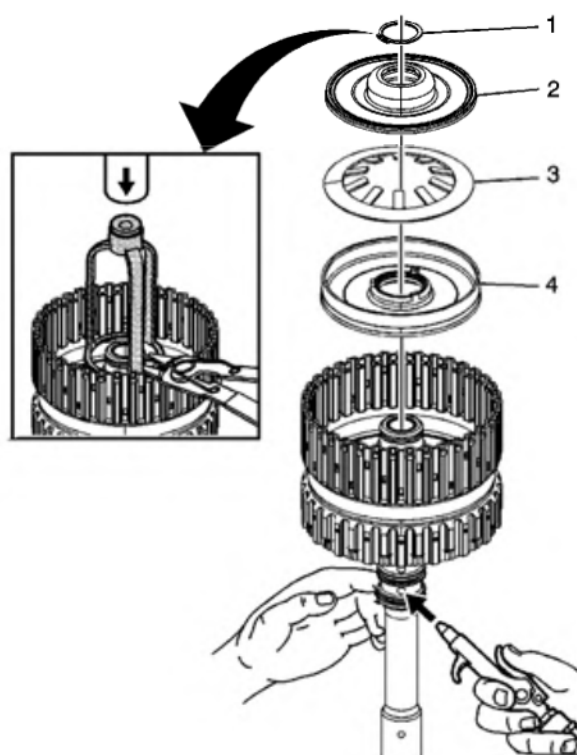
4-5-6 Clutch Plates Removal



4-5-6 Clutch Plates Removal

Callout	Component Name
1	4-5-6 Clutch Backing Plate Retaining Ring
2	4-5-6 Clutch Backing Plate
3	4-5-6 Clutch Plate Assembly (Qty: 7)
4	4-5-6 Clutch Plate (Qty: 7)
5	4-5-6 Clutch (Waved) Plate

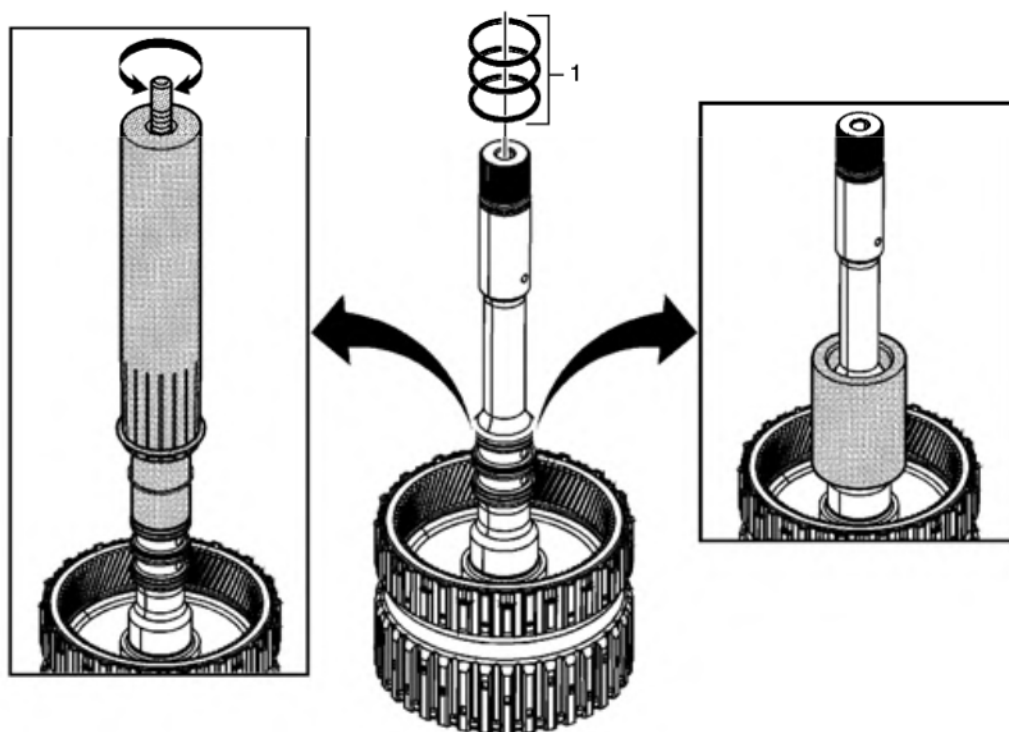
4-5-6 Clutch Piston Removal



4-5-6 Clutch Piston Removal

Callout	Component Name
1	4-5-6 Clutch Piston Dam Retaining Ring Caution: Use care when compressing the 4-5-6 clutch piston assembly, spring and dam assembly. Compressing the dam assembly too much may damage it. Caution: Refer to Retaining Ring Reuse Caution in the Preface section. Special Tool J 43074 Clutch Spring Compressor For equivalent regional tools, refer to Special Tools.
2	4-5-6 Clutch Piston Dam Assembly Tip It may be necessary to apply air pressure to remove the dam and piston.
3	4-5-6 Clutch Spring
4	4-5-6 Clutch Piston Assembly Tip It may be necessary to apply air pressure to remove the piston.

Turbine Shaft Fluid Seal Ring Replacement



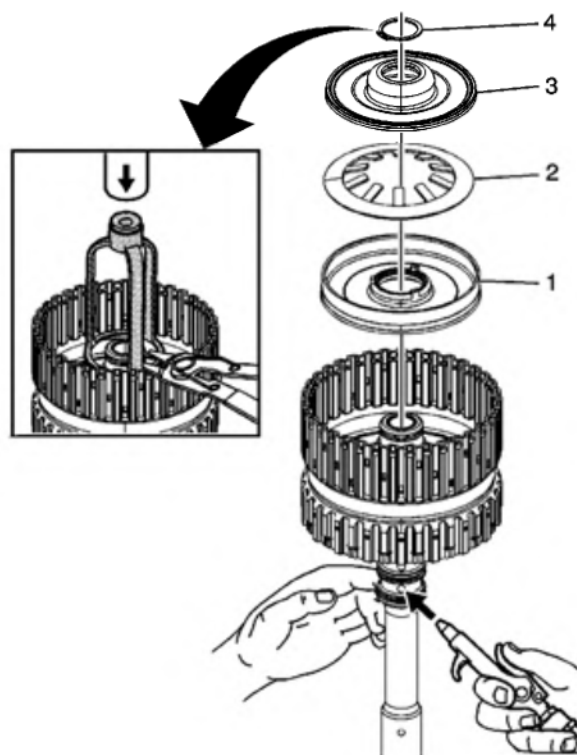
Turbine Shaft Fluid Seal Ring Replacement

Callout	Component Name
Preliminary Procedures • Inspect the turbine shaft fluid passages and splines. • Clean any plugged passages.	
1	Turbine Shaft Fluid Seal Ring (Qty: 3) Caution: Do not use old seal rings. Install NEW seal rings. Reusing old seal rings may cause internal transmission leaks and transmission damage. Caution: Size the fluid seal rings for at least 5 minutes after installation to obtain proper seal ring size. Failure to do so may cause internal transmission leaks and transmission damage. Tip Adjust the turn screw on DT 47768-1 seal protector and install the bottom seal ring first. Special Tools • DT 47768-1 Seal Protector

- DT 47768-2 Seal Pusher
- DT 47768-3 Seal Sizer

For equivalent regional tools, refer to [Special Tools](#).

4-5-6 Clutch Piston Installation



4-5-6 Clutch Piston Installation

Callout	Component Name
1	4-5-6 Clutch Piston Assembly
2	4-5-6 Clutch Spring Caution: Ensure the spring tabs are facing up during installation. Failure to do so may cause damage to the clutch assembly.
3	4-5-6 Clutch Piston Dam Assembly Tip Lubricate the inner and outer sealing surfaces of the dam assembly with automatic transmission fluid (ATF) in order to ease installation into the piston.
	4-5-6 Clutch Piston Dam Retaining Ring Caution: Use care when compressing the 4-5-6 clutch piston assembly, spring and dam assembly. Compressing the dam assembly too much may damage it.

4

Caution: Refer to [Retaining Ring Reuse Caution](#) in the Preface section.

Tip

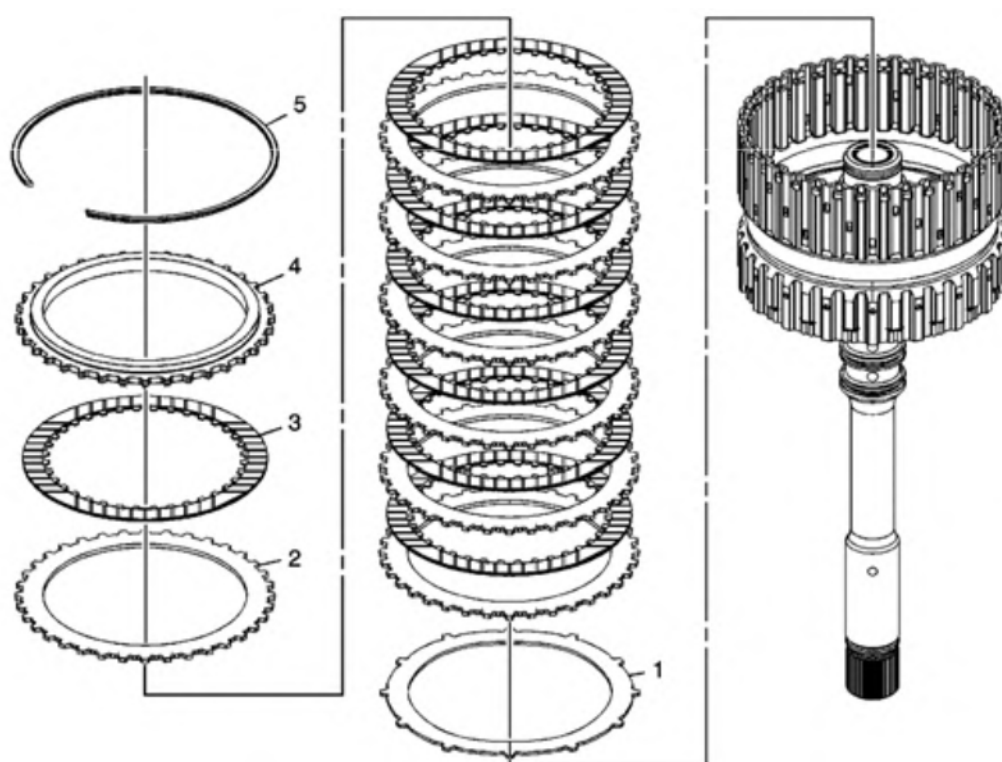
Apply air to verify proper installation of all 4-5-6 clutch components. The piston should apply and release smoothly.

Special Tool

J 43074 Clutch Spring Compressor

For equivalent regional tools, refer to [Special Tools](#).

4-5-6 Clutch Plates Installation



4-5-6 Clutch Plates Installation

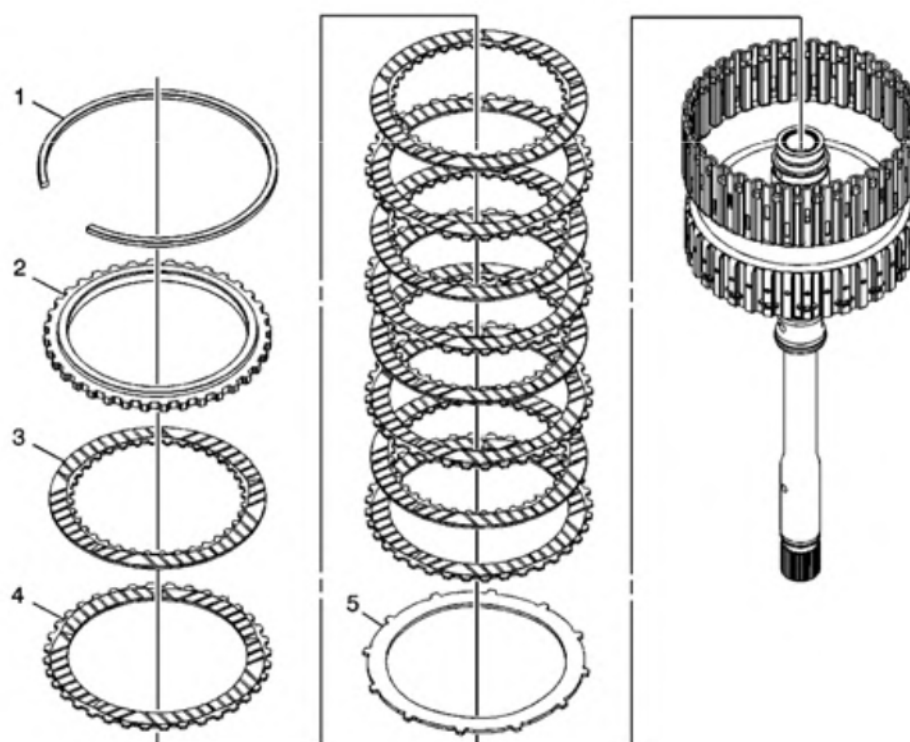
Callout	Component Name
1	4-5-6 Clutch (Waved) Plate
2	4-5-6 Clutch Plate (Qty: 7)
3	4-5-6 Clutch Plate Assembly (Qty: 7)
4	4-5-6 Clutch Backing Plate
5	4-5-6 Clutch Backing Plate Retaining Ring
	Tip

After the retaining ring is installed, determine clutch piston travel in order to verify if the correct selective retaining ring is being used. Refer to [4-5-6 Clutch Backing Plate Retaining Ring Measurement](#).

4-5-6 Clutch Overhaul (6L50)

- Table 1: [4-5-6 Clutch Plates Removal](#)
Table 2: [4-5-6 Clutch Piston Removal](#)
Table 3: [Turbine Shaft Fluid Seal Ring Replacement](#)
Table 4: [4-5-6 Clutch Piston Installation](#)
Table 5: [4-5-6 Clutch Plates Installation](#)

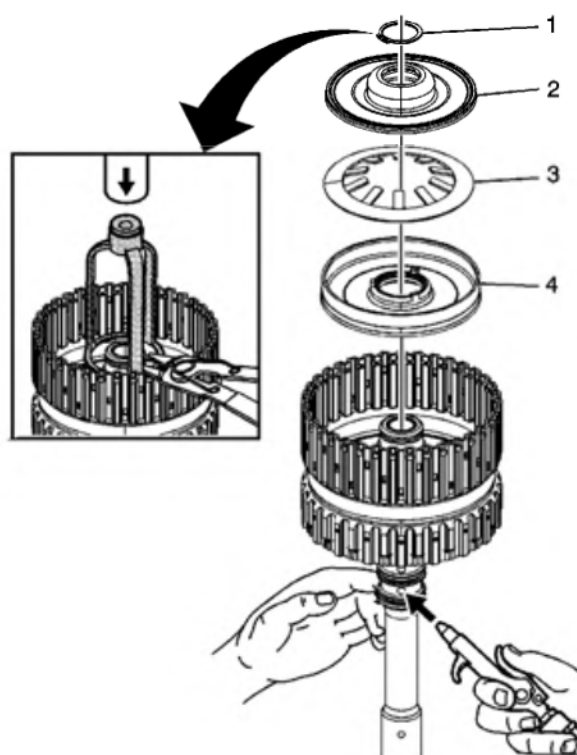
4-5-6 Clutch Plates Removal



4-5-6 Clutch Plates Removal

Callout	Component Name
1	4-5-6 Clutch Backing Plate Retaining Ring
2	4-5-6 Clutch Backing Plate
3	4-5-6 Clutch Plate Assembly (Qty: 5)
4	4-5-6 Clutch Plate (Qty: 5)
5	4-5-6 Clutch (Waved) Plate

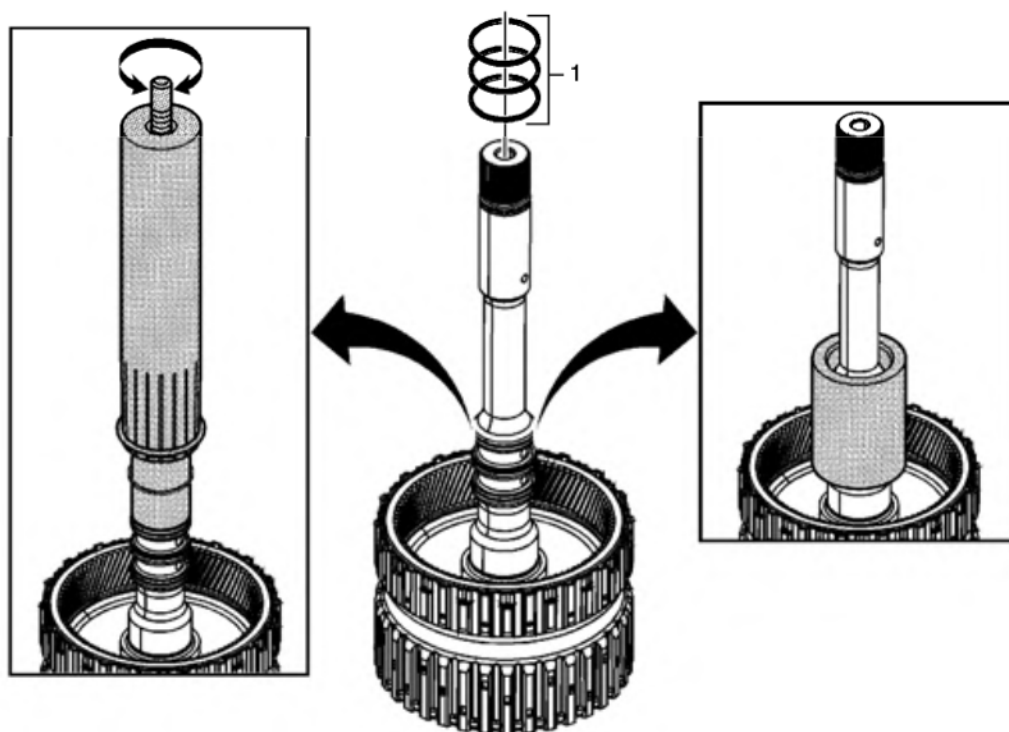
4-5-6 Clutch Piston Removal



4-5-6 Clutch Piston Removal

Callout	Component Name
1	4-5-6 Clutch Piston Dam Retaining Ring Caution: Use care when compressing the 4-5-6 clutch piston assembly, spring and dam assembly. Compressing the dam assembly too much may damage it. Caution: Refer to Retaining Ring Reuse Caution in the Preface section. Special Tool J 43074 Clutch Spring Compressor For equivalent regional tools, refer to Special Tools.
2	4-5-6 Clutch Piston Dam Assembly Tip It may be necessary to apply air pressure to remove the dam and piston.
3	4-5-6 Clutch Spring
4	4-5-6 Clutch Piston Assembly Tip It may be necessary to apply air pressure to remove the piston.

Turbine Shaft Fluid Seal Ring Replacement



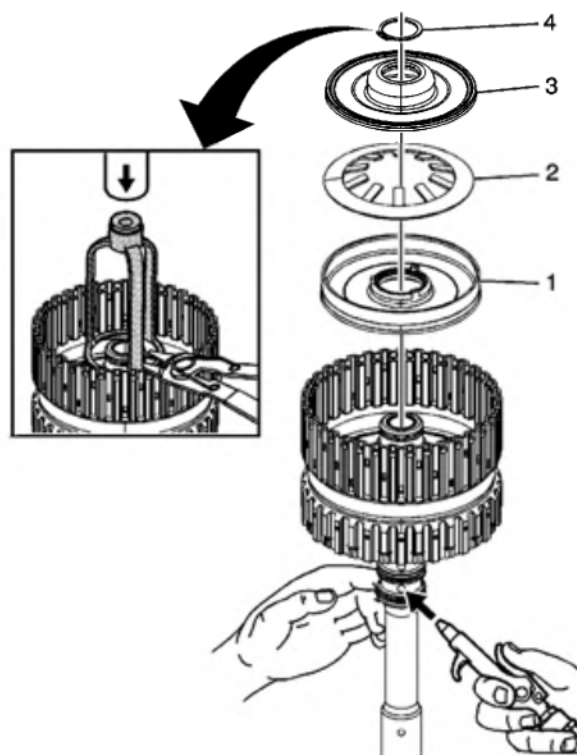
Turbine Shaft Fluid Seal Ring Replacement

Callout	Component Name
Preliminary Procedures • Inspect the turbine shaft fluid passages and splines. • Clean any plugged passages.	
1	Turbine Shaft Fluid Seal Ring (Qty: 3) Caution: Do not use old seal rings. Install NEW seal rings. Reusing old seal rings may cause internal transmission leaks and transmission damage. Caution: Size the fluid seal rings for at least 5 minutes after installation to obtain proper seal ring size. Failure to do so may cause internal transmission leaks and transmission damage. Tip Adjust the turn screw on DT-48066-3 seal protector and install the bottom seal ring first. Special Tools • DT-48066-1 Seal Sizer

- DT-48066-2 Seal Pusher
- DT-48066-3 Seal Protector

For equivalent regional tools, refer to [Special Tools](#).

4-5-6 Clutch Piston Installation



4-5-6 Clutch Piston Installation

Callout	Component Name
1	4-5-6 Clutch Piston Assembly
2	4-5-6 Clutch Spring Caution: Ensure the spring tabs are facing up during installation. Failure to do so may cause damage to the clutch assembly.
3	4-5-6 Clutch Piston Dam Assembly Tip Lubricate the inner and outer sealing surfaces of the dam assembly with automatic transmission fluid (ATF) in order to ease installation into the piston.
	4-5-6 Clutch Piston Dam Retaining Ring Caution: Use care when compressing the 4-5-6 clutch piston assembly, spring and dam assembly. Compressing the dam assembly too much may damage it.

4

Caution: Refer to [Retaining Ring Reuse Caution](#) in the Preface section.

Tip

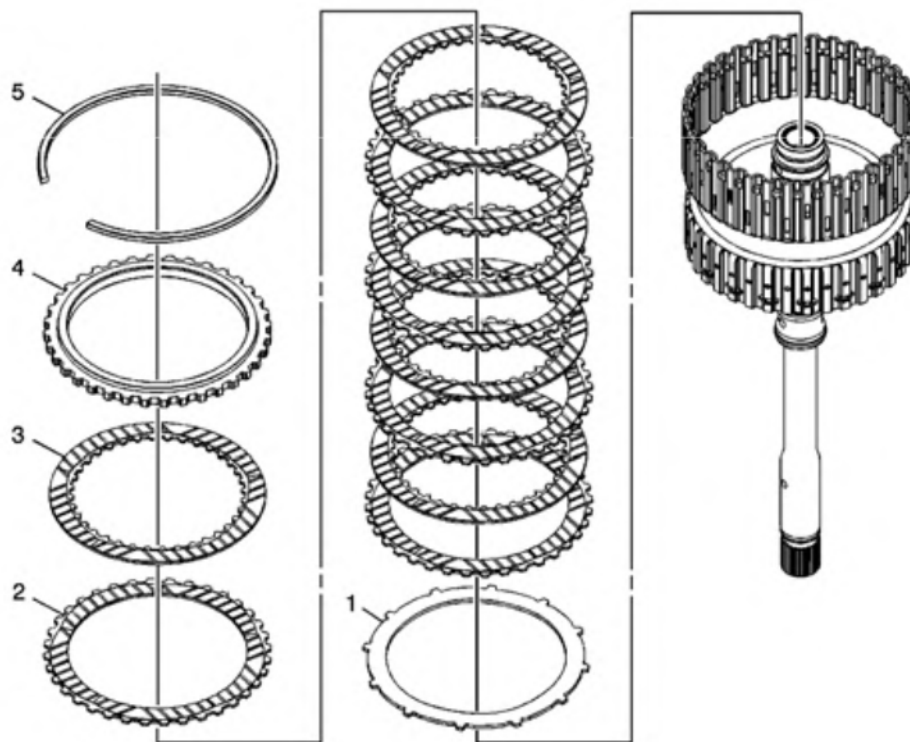
Apply air to verify proper installation of all 4-5-6 clutch components. Piston should apply and release smoothly.

Special Tool

J 43074 Clutch Spring Compressor

For equivalent regional tools, refer to [Special Tools](#).

4-5-6 Clutch Plates Installation



4-5-6 Clutch Plates Installation

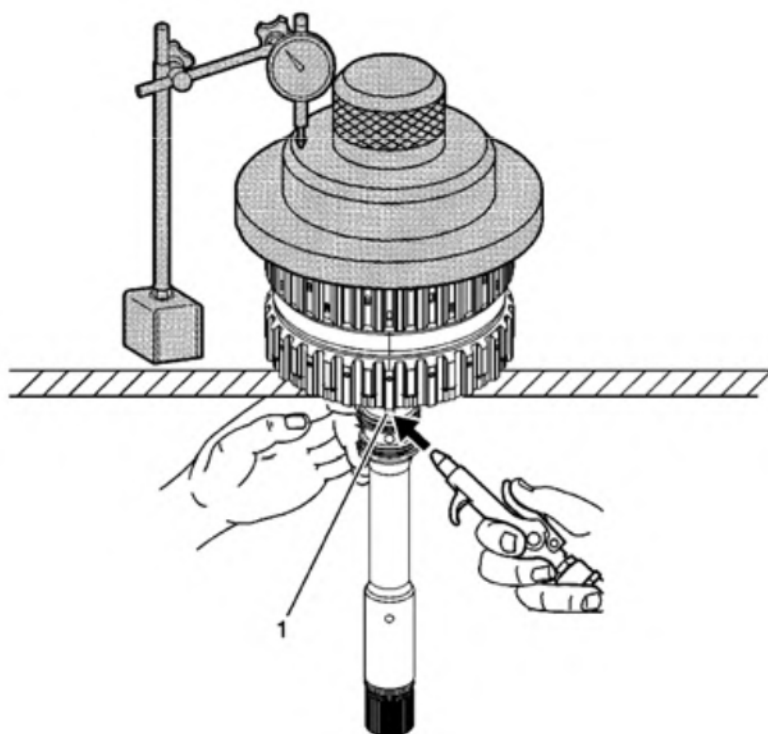
Callout	Component Name
1	4-5-6 Clutch (Waved) Plate
2	4-5-6 Clutch Plate (Qty: 5)
3	4-5-6 Clutch Plate Assembly (Qty: 5)
4	4-5-6 Clutch Backing Plate
	4-5-6 Clutch Backing Plate Retaining Ring

5

Tip

After the retaining ring is installed, determine clutch piston travel in order to verify if the correct selective retaining ring is being used. Refer to [4-5-6 Clutch Backing Plate Retaining Ring Measurement](#).

4-5-6 Clutch Backing Plate Retaining Ring Measurement



Callout	Component Name
Preliminary Procedures 1. Install the clutch assembly into a hole in the workbench 2. Zero out the dial indicator on the <i>DT 47868-1</i> pack travel weight . Special Tools • <i>DT 47868-1</i> Pack Travel Weight • <i>J 8001</i> Dial Indicator Set • <i>J 26900-13</i> Magnetic Base For equivalent regional tools, refer to Special Tools.	
1	4-5-6 Clutch Apply Passage Tip While using one finger to block the top passage hole on the turbine shaft, apply compressed air to the opposite top passage hole, and observe the dial indicator

measurement. Refer to [Clutch Backing Plate Retaining Ring Specifications](#) to determine the correct retainer.

1-2-3-4 and 3-5 Reverse Clutch Overhaul (6L50 / 6L80)

Table 1: [1-2-3-4 and 3-5 Reverse Clutch Plates Removal](#)

Table 2: [1-2-3-4 Clutch Piston Removal](#)

Table 3: [3-5 Reverse Clutch Piston Removal](#)

Table 4: [1-2-3-4 and 3-5 Reverse Clutch Piston Seals Replacement](#)

Table 5: [3-5 Reverse Clutch Piston Installation](#)

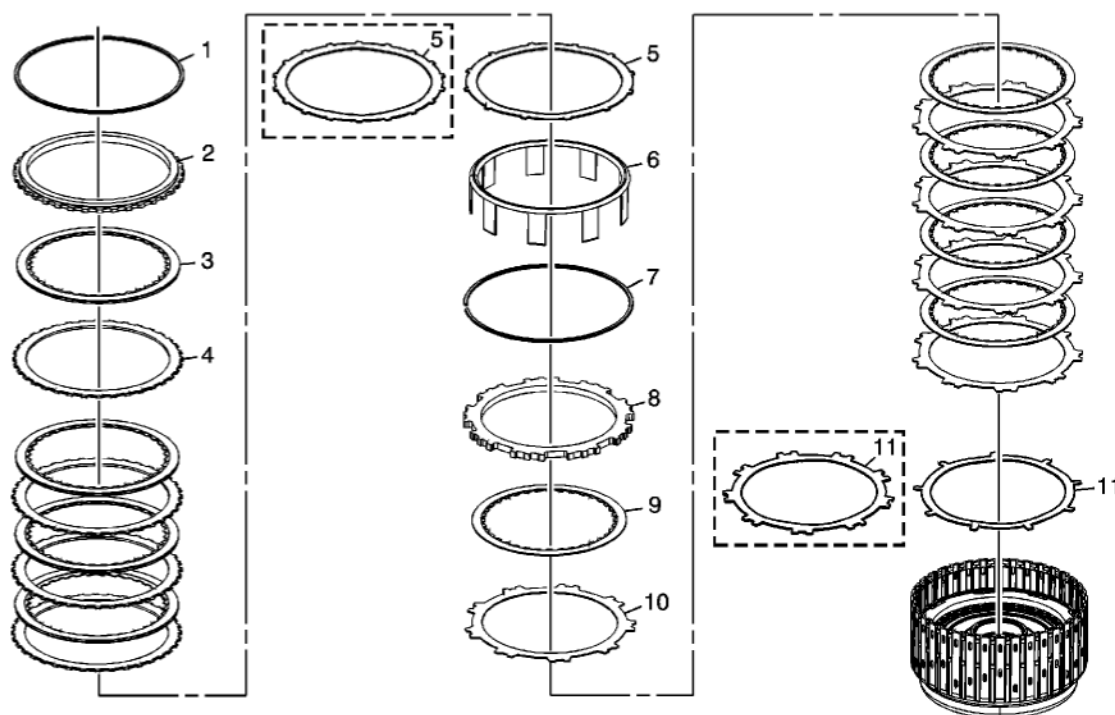
Table 6: [1-2-3-4 Clutch Piston Installation](#)

Table 7: [1-2-3-4 Clutch Plate Installation](#)

Table 8: [3-5 and Reverse Clutch Plate Installation](#)

Table 9: [1-2-3-4 and 3-5 Reverse Clutch Bearing Assembly Replacement](#)

1-2-3-4 and 3-5 Reverse Clutch Plates Removal

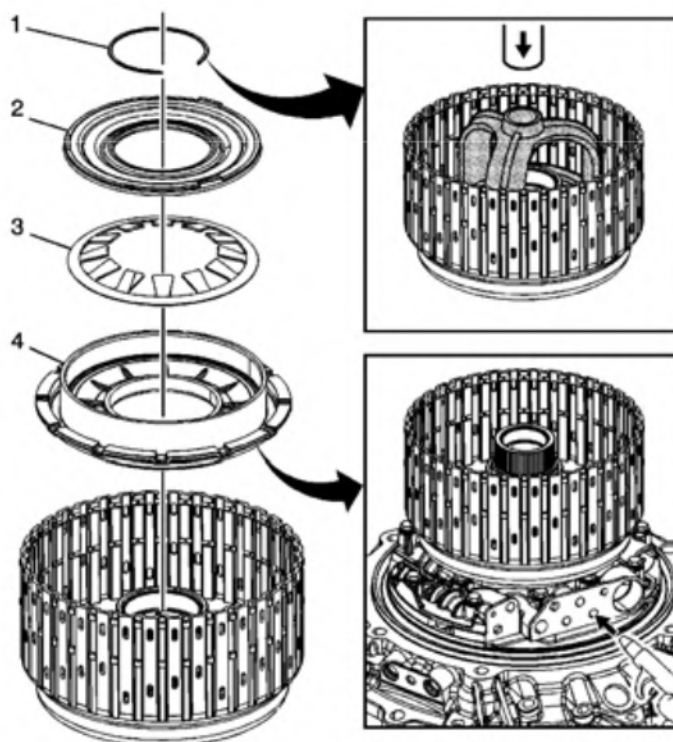


1-2-3-4 and 3-5 Reverse Clutch Plates Removal

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

5	3-5 Reverse Clutch (Waved) Plate
6	3-5 Reverse Clutch Apply Ring
7	1-2-3-4 Clutch Backing Plate Retaining Ring
8	1-2-3-4 Clutch Backing Plate
9	1-2-3-4 Clutch Plate Assembly (Qty: 5)
10	1-2-3-4 Clutch Plate (Qty: 5)
11	1-2-3-4 Clutch (Waved) Plate

1-2-3-4 Clutch Piston Removal

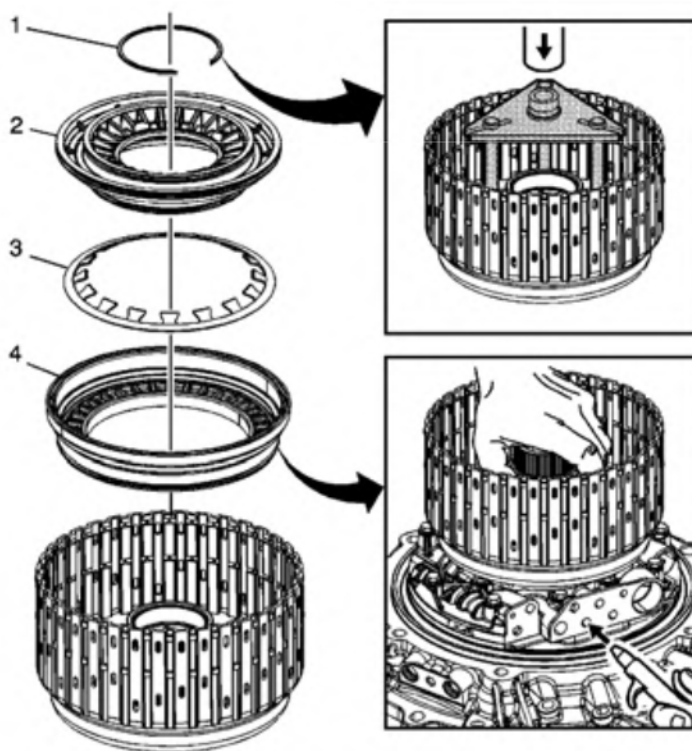


1-2-3-4 Clutch Piston Removal

Callout	Component Name
1	1-2-3-4 Clutch Piston Dam Retaining Ring. Caution: Use care when compressing the 1-2-3-4 clutch spring and dam assembly. Compressing the dam assembly too much may damage it. Caution: Refer to Retaining Ring Reuse Caution in the Preface section. Special Tool J 38734 Intermediate Spring Compressor Adapter

	For equivalent regional tools, refer to Special Tools .
2	1-2-3-4 Clutch Piston Dam Assembly
3	1-2-3-4 Clutch Spring
4	1-2-3-4 Clutch Piston Tip - It may be necessary to apply air to the apply passage in order to remove the piston. Install the 1-2-3-4 clutch housing onto the torque converter (with fluid pump) housing assembly in order to apply air. - After air is applied, it may be necessary to turn the housing assembly upside down and carefully tap the housing against a flat surface in order to release the piston.

3-5 Reverse Clutch Piston Removal

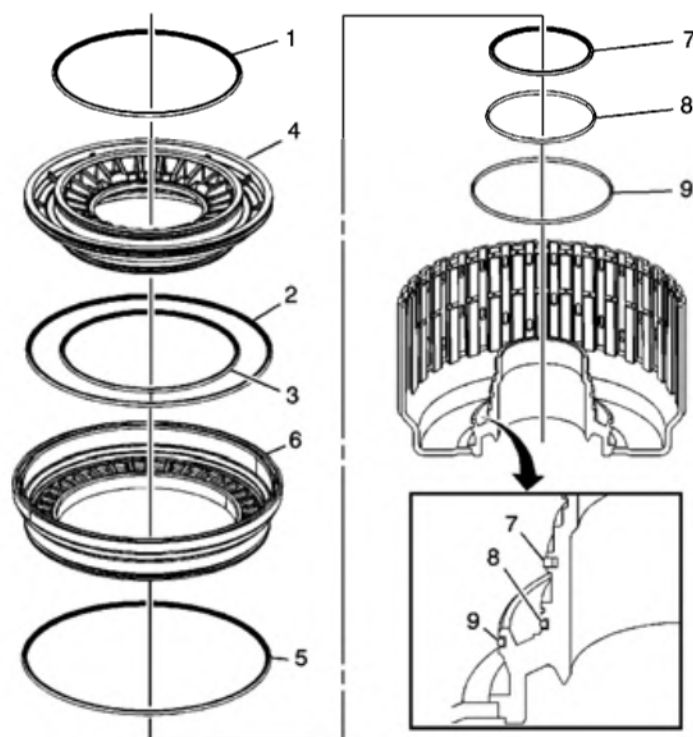


3-5 Reverse Clutch Piston Removal

Callout	Component Name
Preliminary Procedure	
1. Install the 1-2-3-4 and 3-5 reverse clutch housing assembly onto the torque converter (with fluid pump) housing assembly. 2. Apply hand pressure on the 1-2-3-4 clutch piston housing while applying compressed air to the apply passage in order to unseat the 3-5 reverse clutch piston.	

1	1-2-3-4 Clutch Piston Housing Retaining Ring
	Caution: Refer to Retaining Ring Reuse Caution in the Preface section.
1	Special Tool
	DT 47867 Adjustable Clutch Spring Compressor
1	For equivalent regional tools, refer to Special Tools .
2	1-2-3-4 Clutch Piston Housing
3	3-5 Reverse Clutch Spring
4	3-5 Reverse Clutch Piston
	Tip It may be necessary to turn the housing assembly upside down and carefully tap the housing against a flat surface in order to release the piston.

1-2-3-4 and 3-5 Reverse Clutch Piston Seals Replacement



1-2-3-4 and 3-5 Reverse Clutch Piston Seals Replacement

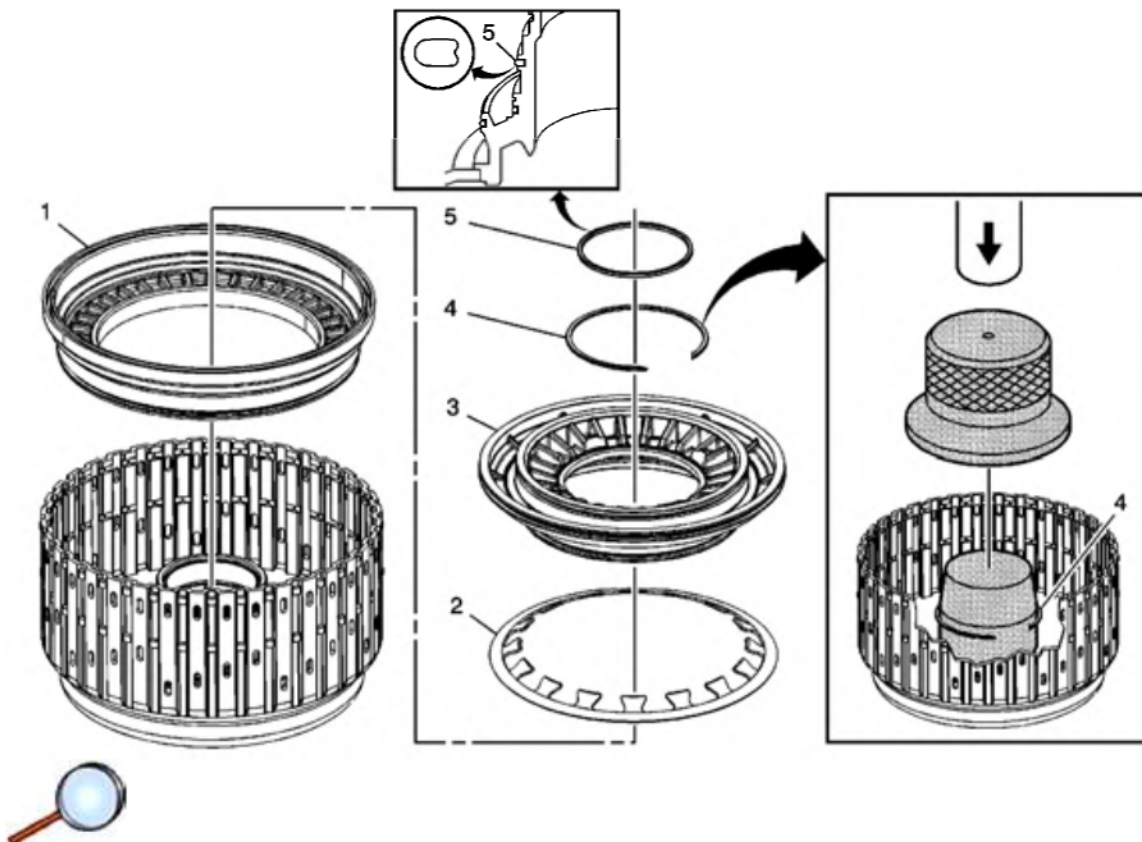
Callout	Component Name
Caution: Refer to Seal Reuse Caution in the Preface section.	

Preliminary Procedure

Lubricate all seals with automatic transmission fluid (ATF) prior to installation.

1	1-2-3-4 Clutch Piston Seal
2	3-5 Reverse Clutch Piston Dam (O-Ring) Seal
3	3-5 Reverse Clutch Piston Inner Seal
4	1-2-3-4 Clutch Piston Housing
5	3-5 Reverse Clutch Piston Outer Seal
6	3-5 Reverse Clutch Piston
7	1-2-3-4 Clutch Piston Inner Seal Caution: Do not install a NEW 1-2-3-4 clutch piston inner seal yet. A special tool used to install the 1-2-3-4 clutch piston housing retaining ring may damage the seal if the seal is installed prior to installing the retaining ring. Refer to 3-5 Reverse Clutch Piston Installation.
8	1-2-3-4 Clutch Piston Housing Seal
9	1-2-3-4 Clutch Piston Housing Seal

3-5 Reverse Clutch Piston Installation

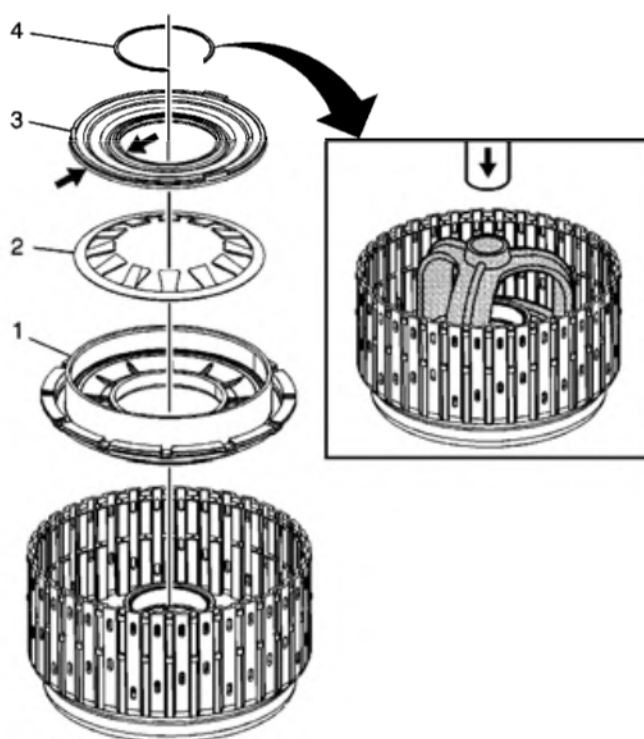


3-5 Reverse Clutch Piston Installation

Callout	Component Name

1	3-5 Reverse Clutch Piston
2	3-5 Reverse Clutch Spring Caution: Ensure the clutch spring is centered on the piston with the tabs facing up. Failure to do so may cause damage to the clutch assembly.
3	1-2-3-4 Clutch Piston Housing
4	1-2-3-4 Clutch Piston Housing Retaining Ring Caution: Before using the DT 47782-2, push the retaining ring over the DT 47782-1 by hand so that the ring is positioned below the tapered area of the DT 47782-1. If the ring is positioned above the tapered area when it is being installed, the ring will become lodged between both tools and damage to the tools, retaining ring, and piston housing will result. Caution: Refer to Retaining Ring Reuse Caution in the Preface section. Caution: Push the retaining ring down over the cone until the ring seats firmly in the retaining ring groove. The retaining ring will make a distinctive click sound when it seats. Failure to properly seat the retaining ring may cause damage to the 3-5 reverse clutch assembly. Tip Use a screwdriver in order to verify the retaining ring is fully seated into the groove. It may appear as though the retaining ring is not fully seated, since the groove is shallow by design. However, this shallow interface is normal. Special Tools • DT 47782-1 Retaining Ring Cone • DT 47782-2 Retaining Ring Installer For equivalent regional tools, refer to Special Tools .
5	1-2-3-4 Clutch Piston Inner Seal Caution: Install a NEW seal and orientate as shown. Failure to do so may cause internal transmission leaks and damage to the transmission.

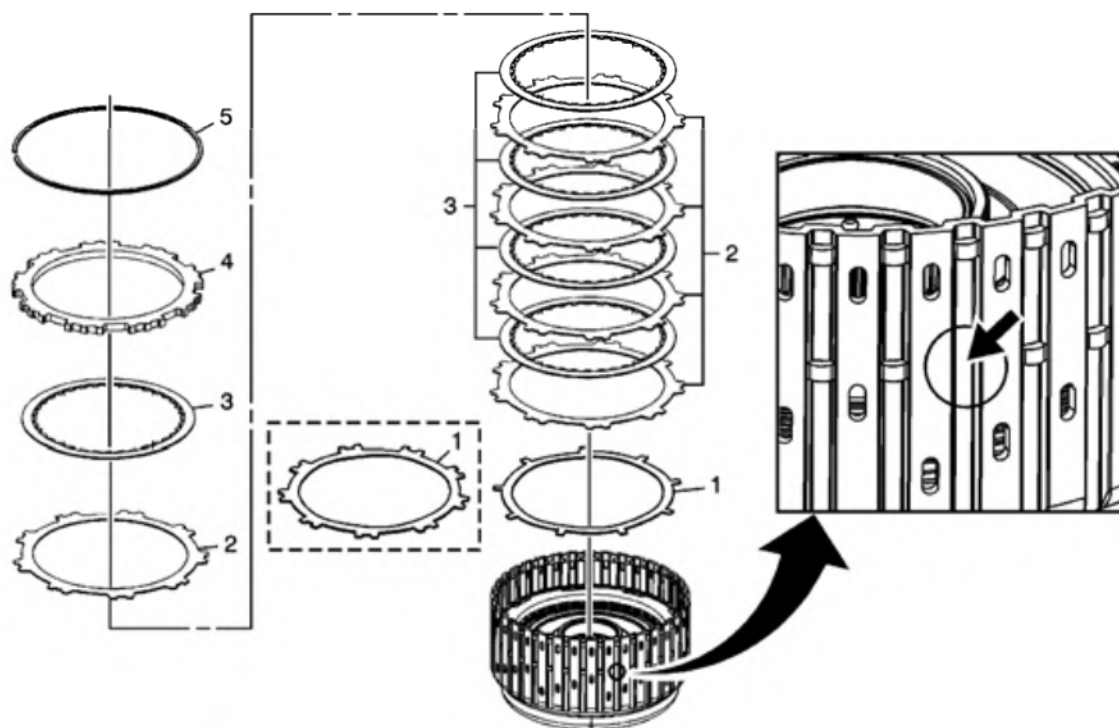
1-2-3-4 Clutch Piston Installation



1-2-3-4 Clutch Piston Installation

Callout	Component Name
1	1-2-3-4 Clutch Piston
2	1-2-3-4 Clutch Spring Caution: Ensure the clutch spring is centered on the piston with the tabs facing up. Failure to do so may cause damage to the clutch assembly.
3	1-2-3-4 Clutch Piston Dam Assembly Tip Lubricate the inner and outer surfaces of the dam assembly with ATF in order to ease installation into the piston. Install the tabs facing up.
4	1-2-3-4 Clutch Piston Dam Retaining Ring Caution: Use care when compressing the 1-2-3-4 clutch spring and dam assembly. Compressing the dam assembly too much may damage it. Caution: Refer to Retaining Ring Reuse Caution in the Preface section. Special Tool <i>J 38734</i> Intermediate Spring Compressor Adapter For equivalent regional tools, refer to Special Tools .

1-2-3-4 Clutch Plate Installation

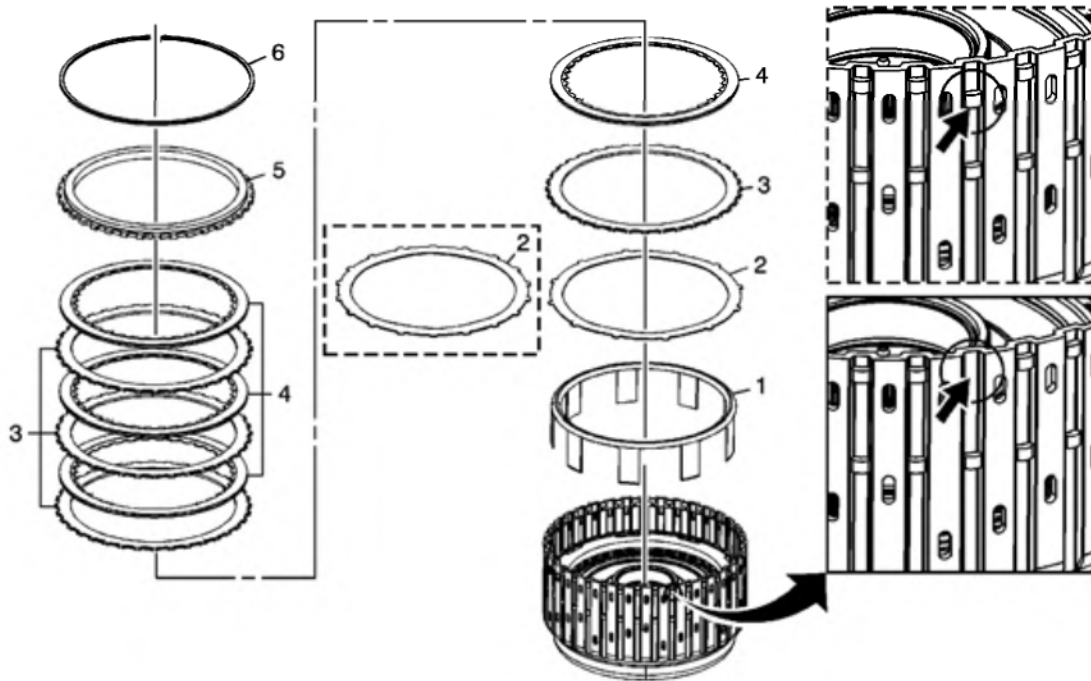


1-2-3-4 Clutch Plate Installation

Callout	Component Name
1	1-2-3-4 Clutch (Waved) Plate 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.
2	1-2-3-4 Clutch Plate (Qty: 5) Caution: Ensure all clutch plates are centered in the housing. When installing the first steel clutch plate, ensure an opening between the external splines is centered over the missing snap ring groove punch in the housing. Align the external splines of each remaining steel clutch plate with the first steel clutch plate. Failure to do so may cause damage to the clutch assembly.
3	1-2-3-4 Clutch Plate Assembly (Qty: 5)
4	1-2-3-4 Clutch Backing Plate Caution: Align the external splines of the backing plate with the external splines of the steel clutch plates. Failure to do so may cause damage to the clutch assembly.
	1-2-3-4 Clutch Backing Plate Retaining Ring Caution: Depending on the housing configuration, align the retaining ring gap with the missing snap ring groove punch in the housing or the offset punch in the housing. Failure to do so may cause damage to the clutch assembly.

- | | |
|---|---|
| 5 | <p>Tip
After the retaining ring is installed, determine clutch piston travel in order to verify if the correct selective retaining ring is being used. Refer to 1-2-3-4 Clutch Backing Plate Retaining Ring Measurement.</p> |
|---|---|

3-5 and Reverse Clutch Plate Installation



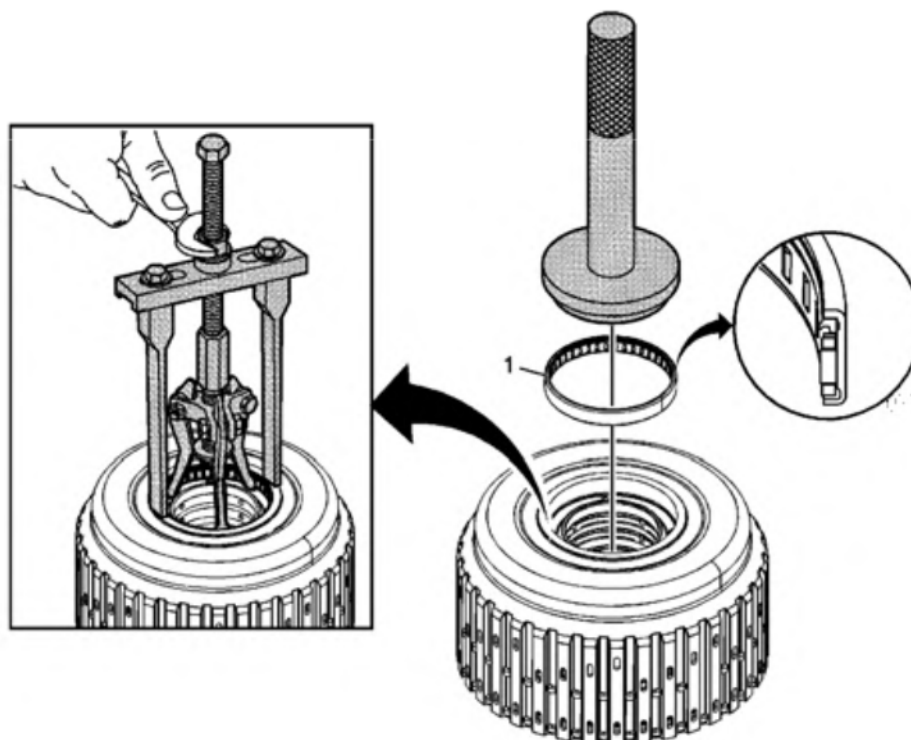
3-5 and Reverse Clutch Plate Installation

Callout	Component Name
1	3-5 Reverse Clutch Apply Ring Caution: Ensure apply ring legs are positioned into the 3-5 reverse clutch piston. Failure to do so may cause damage to the 3-5 reverse clutch assembly.
2	3-5 Reverse Clutch (Waved) Plate
3	3-5 Reverse Clutch Plate (Qty: 4)
4	3-5 Reverse Clutch Plate Assembly (Qty: 4)
5	3-5 Reverse Clutch Backing Plate
6	3-5 Reverse Clutch Backing Plate Retaining Ring Caution: Depending on the housing configuration, align the retaining ring gap with the missing snap ring groove punch in the housing or the offset punch in the housing. Failure to do so may cause damage to the clutch assembly.

Tip

After the retaining ring is installed, determine clutch piston travel in order to verify if the correct selective retaining ring is being used. Refer to [3-5 Reverse Clutch Backing Plate Retaining Ring Measurement](#).

1-2-3-4 and 3-5 Reverse Clutch Bearing Assembly Replacement



1-2-3-4 and 3-5 Reverse Clutch Bearing Assembly Replacement

Callout	Component Name
1	3-5 Reverse Clutch Bearing Caution: Install the NEW bearing assembly with the seal side up. Improper installation of the bearing may cause damage to the transmission. Caution: Do not reuse the bearing. Install a NEW bearing. Reusing an old bearing may cause damage to the transmission. Specification Install the bearing flush to 0.3 mm below the thrust surface. Special Tools • DT 47865 Bearing Remover • DT 47866 Bearing Installer

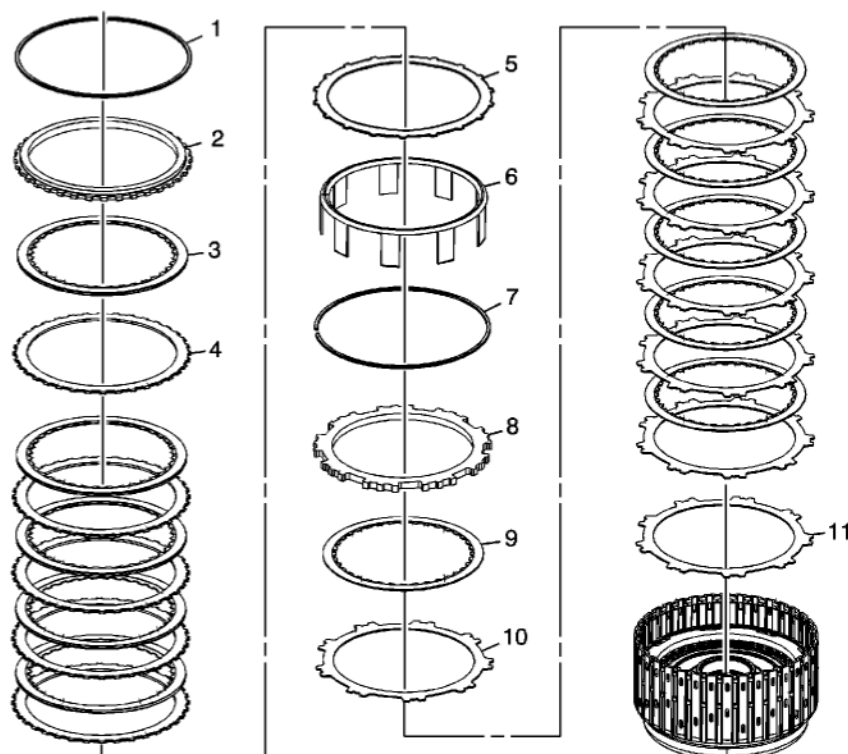
- *J 8092* Driver Handle
- *J 45124* Removal Bridge

For equivalent regional tools, refer to [Special Tools](#).

1-2-3-4 and 3-5 Reverse Clutch Overhaul (6L90)

Table 1:	1-2-3-4 and 3-5 Reverse Clutch Plates Removal
Table 2:	1-2-3-4 Clutch Piston Removal
Table 3:	3-5 Reverse Clutch Piston Removal
Table 4:	1-2-3-4 and 3-5 Reverse Clutch Piston Seals Replacement
Table 5:	3-5 Reverse Clutch Piston Installation
Table 6:	1-2-3-4 Clutch Piston Installation
Table 7:	1-2-3-4 Clutch Plate Installation
Table 8:	3-5 and Reverse Clutch Plate Installation
Table 9:	1-2-3-4 and 3-5 Reverse Clutch Bearing Assembly Replacement

1-2-3-4 and 3-5 Reverse Clutch Plates Removal

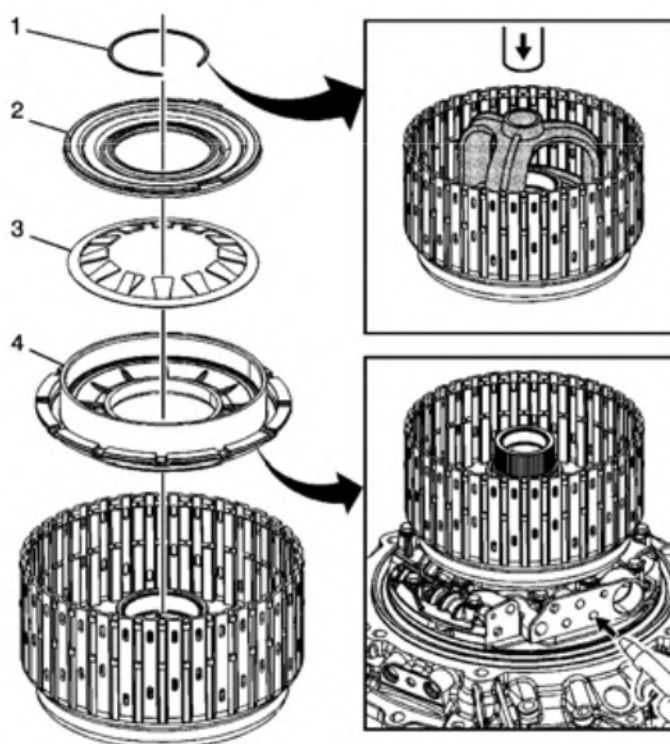


1-2-3-4 and 3-5 Reverse Clutch Plates Removal

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

5	3-5 Reverse Clutch (Waved) Plate
6	3-5 Reverse Clutch Apply Ring
7	1-2-3-4 Clutch Backing Plate Retaining Ring
8	1-2-3-4 Clutch Backing Plate
9	1-2-3-4 Clutch Plate Assembly (Qty: 6)
10	1-2-3-4 Clutch Plate (Qty: 6)
11	1-2-3-4 Clutch (Waved) Plate

1-2-3-4 Clutch Piston Removal

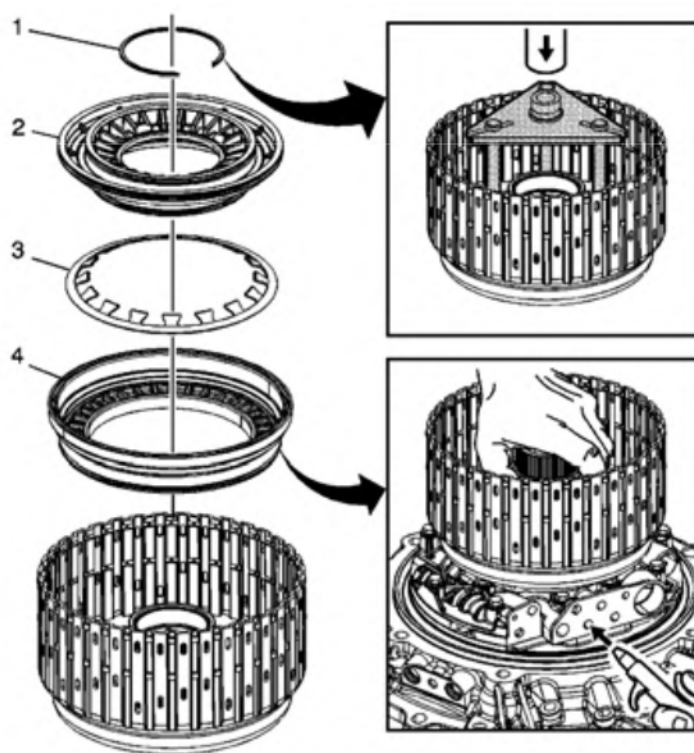


1-2-3-4 Clutch Piston Removal

Callout	Component Name
1	1-2-3-4 Clutch Piston Dam Retaining Ring. Caution: Use care when compressing the 1-2-3-4 clutch spring and dam assembly. Compressing the dam assembly too much may damage it. Caution: Refer to Retaining Ring Reuse Caution in the Preface section. Special Tool J 38734 Intermediate Spring Compressor Adapter

	For equivalent regional tools, refer to Special Tools .
2	1-2-3-4 Clutch Piston Dam Assembly
3	1-2-3-4 Clutch Spring
4	1-2-3-4 Clutch Piston Tip - It may be necessary to apply air to the apply passage in order to remove the piston. Install the 1-2-3-4 clutch housing onto the torque converter (with fluid pump) housing assembly in order to apply air. - After air is applied, it may be necessary to turn the housing assembly upside down and carefully tap the housing against a flat surface in order to release the piston.

3-5 Reverse Clutch Piston Removal

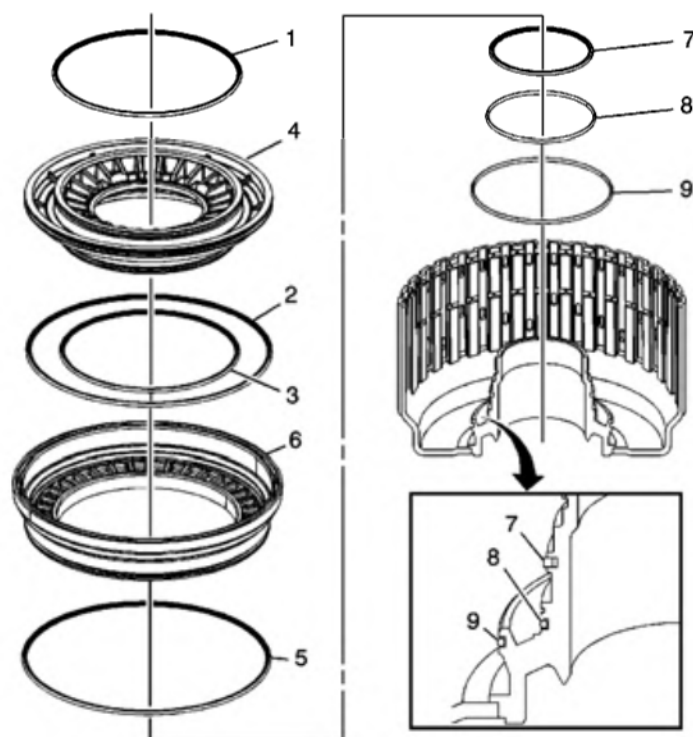


3-5 Reverse Clutch Piston Removal

Callout	Component Name
Preliminary Procedure	
1. Install the 1-2-3-4 and 3-5 reverse clutch housing assembly onto the torque converter (with fluid pump) housing assembly. 2. Apply hand pressure on the 1-2-3-4 clutch piston housing while applying compressed air to the apply passage in order to unseat the 3-5 reverse clutch piston.	

1	1-2-3-4 Clutch Piston Housing Retaining Ring
	Caution: Refer to Retaining Ring Reuse Caution in the Preface section.
	Special Tool
	DT 47867 Adjustable Clutch Spring Compressor For equivalent regional tools, refer to Special Tools .
2	1-2-3-4 Clutch Piston Housing
3	3-5 Reverse Clutch Spring
4	3-5 Reverse Clutch Piston
	Tip It may be necessary to turn the housing assembly upside down and carefully tap the housing against a flat surface in order to release the piston.

1-2-3-4 and 3-5 Reverse Clutch Piston Seals Replacement



1-2-3-4 and 3-5 Reverse Clutch Piston Seals Replacement

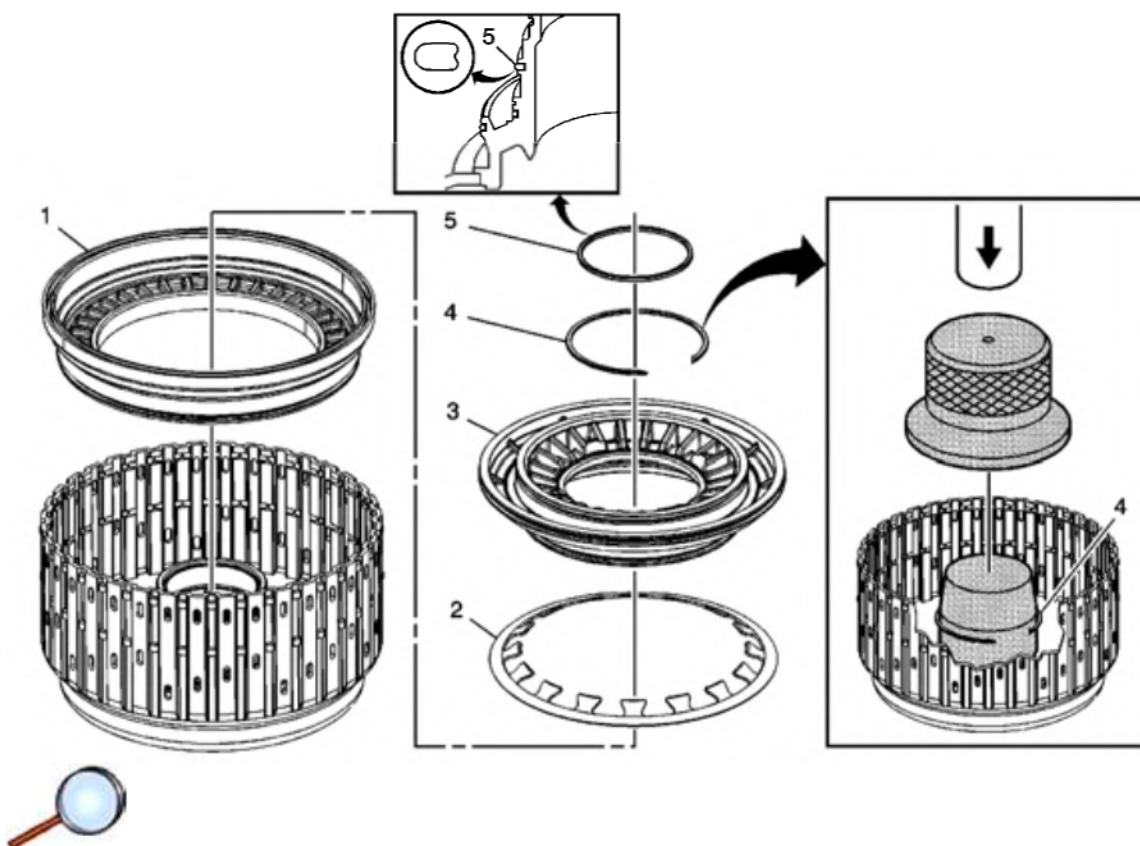
Callout	Component Name
Caution: Refer to Seal Reuse Caution in the Preface section.	

Preliminary Procedure

Lubricate all seals with automatic transmission fluid (ATF) prior to installation.

1	1-2-3-4 Clutch Piston Seal
2	3-5 Reverse Clutch Piston Dam (O-Ring) Seal
3	3-5 Reverse Clutch Piston Inner Seal
4	1-2-3-4 Clutch Piston Housing
5	3-5 Reverse Clutch Piston Outer Seal
6	3-5 Reverse Clutch Piston
7	1-2-3-4 Clutch Piston Inner Seal Caution: Do not install a NEW 1-2-3-4 clutch piston inner seal yet. A special tool used to install the 1-2-3-4 clutch piston housing retaining ring may damage the seal if the seal is installed prior to installing the retaining ring. Refer to 3-5 Reverse Clutch Piston Installation.
8	1-2-3-4 Clutch Piston Housing Seal
9	1-2-3-4 Clutch Piston Housing Seal

3-5 Reverse Clutch Piston Installation

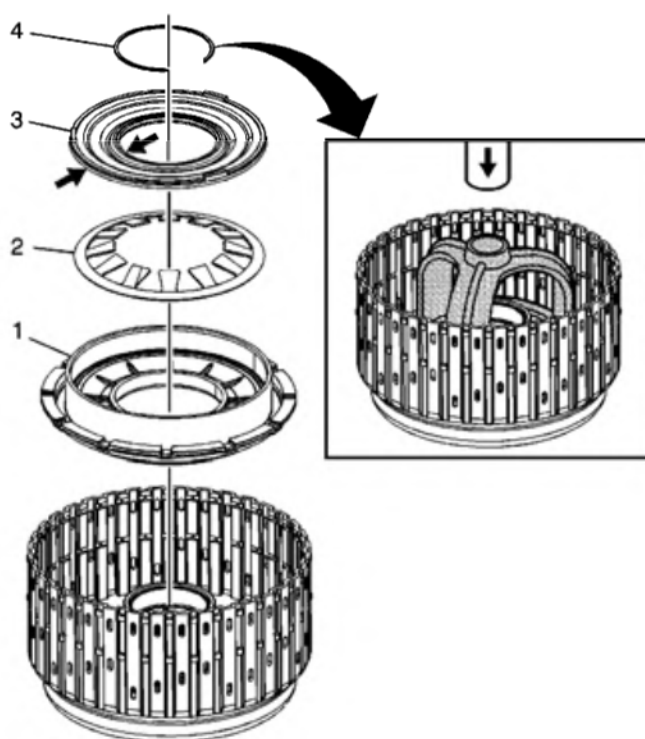


3-5 Reverse Clutch Piston Installation

Callout	Component Name

1	3-5 Reverse Clutch Piston
2	3-5 Reverse Clutch Spring Caution: Use care to avoid damaging pin boot when rotating caliper.
3	1-2-3-4 Clutch Piston Housing
4	1-2-3-4 Clutch Piston Housing Retaining Ring Caution: Before using the DT 47782-2, push the retaining ring over the DT 47782-1 by hand so that the ring is positioned below the tapered area of the DT 47782-1. If the ring is positioned above the tapered area when it is being installed, the ring will become lodged between both tools and damage to the tools, retaining ring, and piston housing will result. Caution: Refer to Retaining Ring Reuse Caution in the Preface section. Caution: Push the retaining ring down over the cone until the ring seats firmly in the retaining ring groove. The retaining ring will make a distinctive click sound when it seats. Failure to properly seat the retaining ring may cause damage to the 3-5 reverse clutch assembly. Tip Use a screwdriver in order to verify the retaining ring is fully seated into the groove. It may appear as though the retaining ring is not fully seated, since the groove is shallow by design. However, this shallow interface is normal. Special Tools • DT 47782-1 Retaining Ring Cone • DT 47782-2 Retaining Ring Installer For equivalent regional tools, refer to Special Tools .
5	1-2-3-4 Clutch Piston Inner Seal Caution: Install a NEW seal and orientate as shown. Failure to do so may cause internal transmission leaks and damage to the transmission.

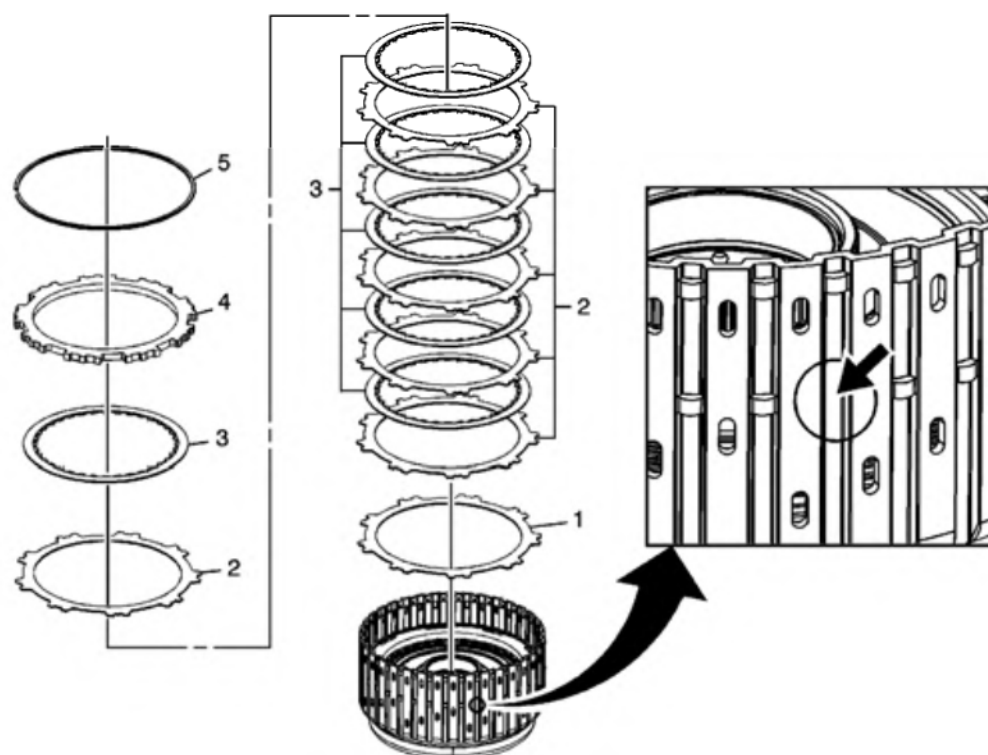
1-2-3-4 Clutch Piston Installation



1-2-3-4 Clutch Piston Installation

Callout	Component Name
1	1-2-3-4 Clutch Piston
2	1-2-3-4 Clutch Spring Caution: Use care to avoid damaging pin boot when rotating caliper.
3	1-2-3-4 Clutch Piston Dam Assembly Tip Lubricate the inner and outer surfaces of the dam assembly with ATF in order to ease installation into the piston. Install the tabs facing up.
4	1-2-3-4 Clutch Piston Dam Retaining Ring Caution: Use care when compressing the 1-2-3-4 clutch spring and dam assembly. Compressing the dam assembly too much may damage it. Caution: Refer to Retaining Ring Reuse Caution in the Preface section. Special Tool <i>J 38734</i> Intermediate Spring Compressor Adapter For equivalent regional tools, refer to Special Tools .

1-2-3-4 Clutch Plate Installation

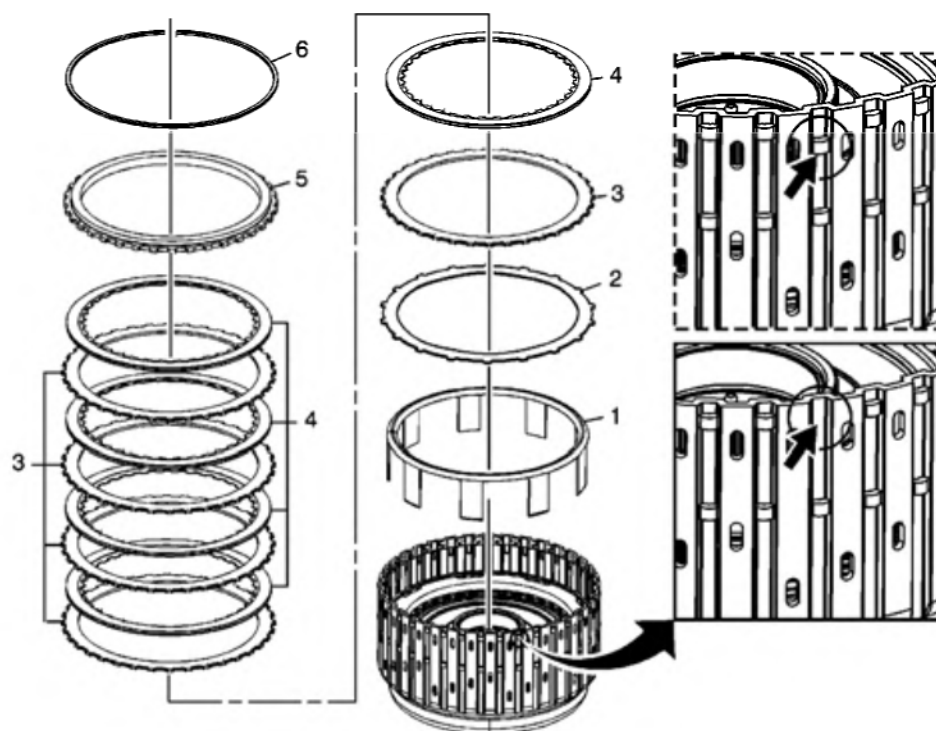


1-2-3-4 Clutch Plate Installation

Callout	Component Name
1	1-2-3-4 Clutch (Waved) Plate 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.
2	1-2-3-4 Clutch Plate (Qty: 6) Caution: Ensure all clutch plates are centered in the housing. When installing the first steel clutch plate, ensure an opening between the external splines is centered over the missing snap ring groove punch in the housing. Align the external splines of each remaining steel clutch plate with the first steel clutch plate. Failure to do so may cause damage to the clutch assembly.
3	1-2-3-4 Clutch Plate Assembly (Qty: 6)
4	1-2-3-4 Clutch Backing Plate Caution: Align the external splines of the backing plate with the external splines of the steel clutch plates. Failure to do so may cause damage to the clutch assembly.
5	1-2-3-4 Clutch Backing Plate Retaining Ring Caution: Depending on the housing configuration, align the retaining ring gap with the missing snap ring groove punch in the housing or the offset punch in the housing. Failure to do so may cause damage to the clutch assembly.
	Tip

After the retaining ring is installed, determine clutch piston travel in order to verify if the correct selective retaining ring is being used. Refer to [1-2-3-4 Clutch Backing Plate Retaining Ring Measurement](#).

3-5 and Reverse Clutch Plate Installation

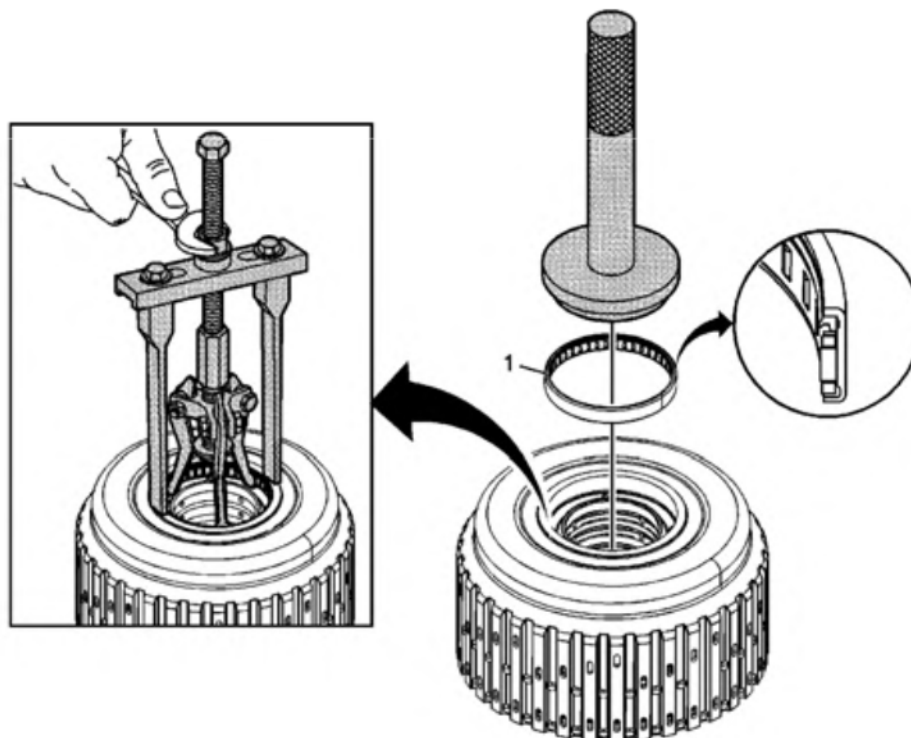


3-5 and Reverse Clutch Plate Installation

Callout	Component Name
1	3-5 Reverse Clutch Apply Ring Caution: Ensure apply ring legs are positioned into the 3-5 reverse clutch piston. Failure to do so may cause damage to the 3-5 reverse clutch assembly.
2	3-5 Reverse Clutch (Waved) Plate
3	3-5 Reverse Clutch Plate (Qty: 5)
4	3-5 Reverse Clutch Plate Assembly (Qty: 5)
5	3-5 Reverse Clutch Backing Plate
6	3-5 Reverse Clutch Backing Plate Retaining Ring Caution: Depending on the housing configuration, align the retaining ring gap with the missing snap ring groove punch in the housing or the offset punch in the housing. Failure to do so may cause damage to the clutch assembly. Tip After the retaining ring is installed, determine clutch piston travel in order to verify

if the correct selective retaining ring is being used. Refer to [3-5 Reverse Clutch Backing Plate Retaining Ring Measurement](#).

1-2-3-4 and 3-5 Reverse Clutch Bearing Assembly Replacement



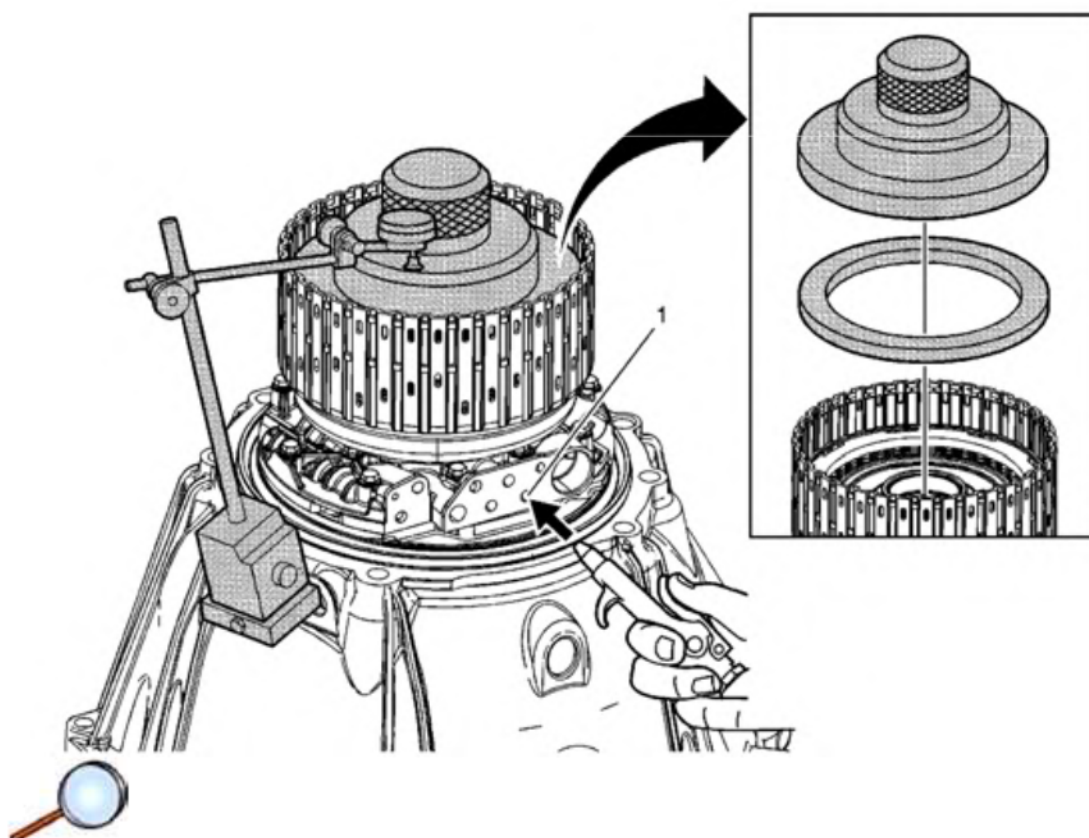
1-2-3-4 and 3-5 Reverse Clutch Bearing Assembly Replacement

Callout	Component Name
1	3-5 Reverse Clutch Bearing Caution: Install the NEW bearing assembly with the seal side up. Improper installation of the bearing may cause damage to the transmission. Caution: Do not reuse the bearing. Install a NEW bearing. Reusing an old bearing may cause damage to the transmission. Specification Install the bearing flush to 0.3 mm below the thrust surface. Special Tools • DT 47865 Bearing Remover • DT 47866 Bearing Installer • J 8092 Driver Handle J 8092

- *J 45124* Removal Bridge

For equivalent regional tools, refer to [Special Tools](#).

1-2-3-4 Clutch Backing Plate Retaining Ring Measurement



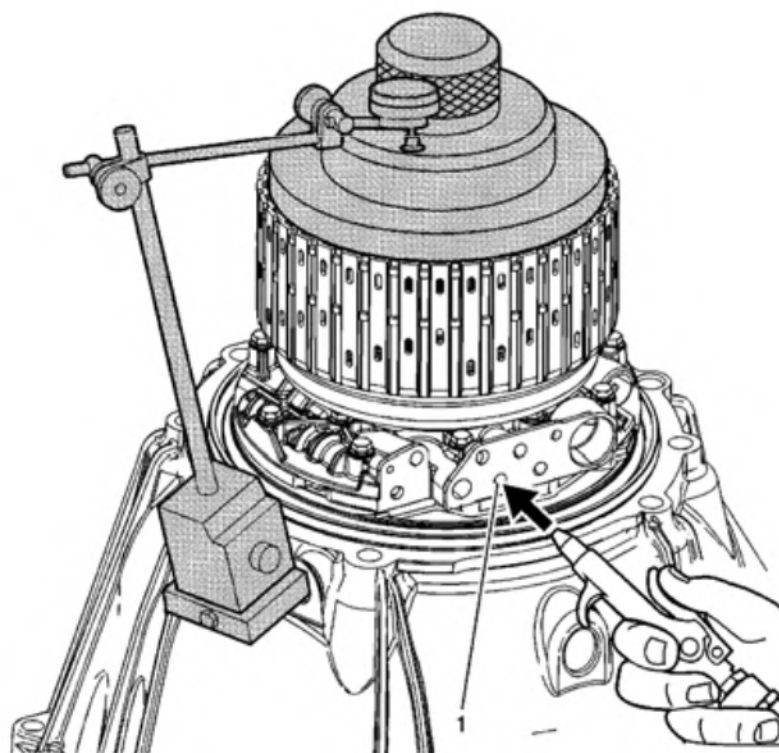
Callout	Component Name
Preliminary Procedures 1. Install the 1-2-3-4 and 3-5 reverse clutch housing with the 1-2-3-4 clutch plates installed, onto the torque converter housing. 2. Install the <i>DT 47868-2</i> magnetic base adapter onto the torque converter housing. 3. Install <i>DT 47868-1</i> pack travel weight and <i>DT-47868-3</i> travel weight adapter onto the 1-2-3-4 clutch backing plate. 4. Install the <i>J 26900-13</i> magnetic base onto <i>DT 47868-2</i> magnetic base adapter . 5. Attach the <i>J 8001</i> dial indicator set to the <i>J 26900-13</i> magnetic base and zero out the dial indicator on the <i>DT 47868-1</i> pack travel weight .	
Special Tools • <i>DT 47868-1</i> Clutch Pack Travel Weight • <i>DT 47868-2</i> Magnetic Base Adapter • <i>DT-47868-3</i> Clutch Travel Weight Adapter • <i>J 8001</i> Dial Indicator Set	

- J 26900-13 Magnetic Base

For equivalent regional tools, refer to [Special Tools](#).

1	1-2-3-4 Clutch Apply Passage Tip Apply compressed air to the apply passage hole, at least 3 times and observe the dial indicator measurement each time. This action "fluffs" the clutch plates to ensure an accurate measurement. Refer to Clutch Backing Plate Retaining Ring Specifications .
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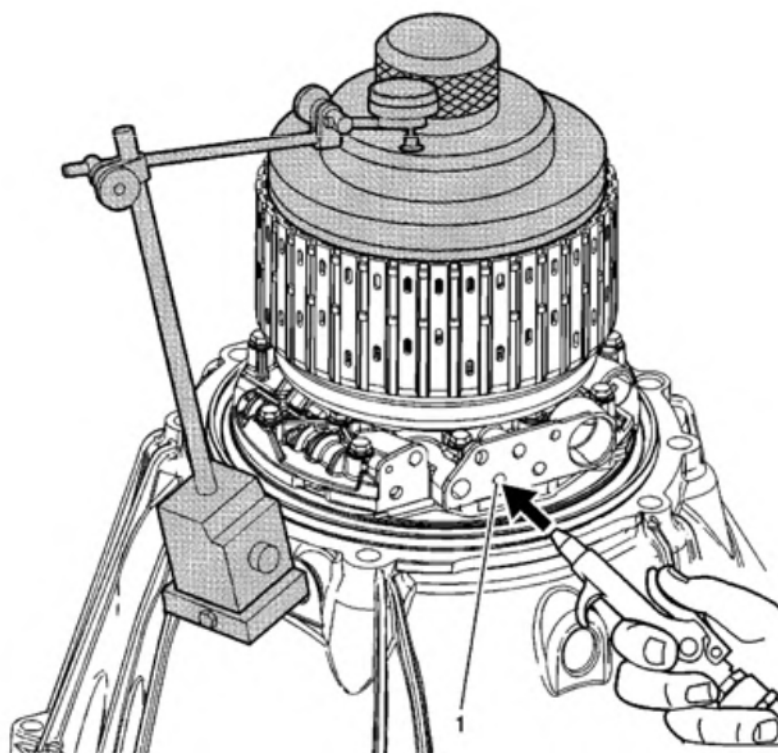
3-5 Reverse Clutch Backing Plate Retaining Ring Measurement (6L80 / 6L90)



Callout	Component Name
Preliminary Procedures	
1. Install the 1-2-3-4 and 3-5 reverse clutch housing with the 1-2-3-4 and 3-5 reverse clutch plates installed, onto the torque converter housing. 2. Install the <i>DT 47868-2</i> magnetic base adapter onto the torque converter housing. 3. Install <i>DT 47868-1</i> clutch pack travel weight onto the 3-5 reverse clutch backing plate. 4. Install the <i>J 26900-13</i> magnetic base onto <i>DT 47868-2</i> magnetic base adapter . 5. Attach the <i>J 8001</i> dial indicator set to the <i>J 26900-13</i> magnetic base and zero out the dial indicator on the <i>DT 47868-1</i> clutch pack travel weight .	
Special Tools	
• <i>DT 47868-1</i> Clutch Pack Travel Weight • <i>DT 47868-2</i> Magnetic Base Adapter • <i>J 8001</i> Dial Indicator Set • <i>J 26900-13</i> Magnetic	

For equivalent regional tools, refer to Special Tools .	
1	3-5 Reverse Clutch Apply Passage Tip Apply compressed air to the apply passage hole, and observe the dial indicator measurement. Refer to Clutch Backing Plate Retaining Ring Specifications .

3-5 Reverse Clutch Backing Plate Retaining Ring Measurement (6L50)



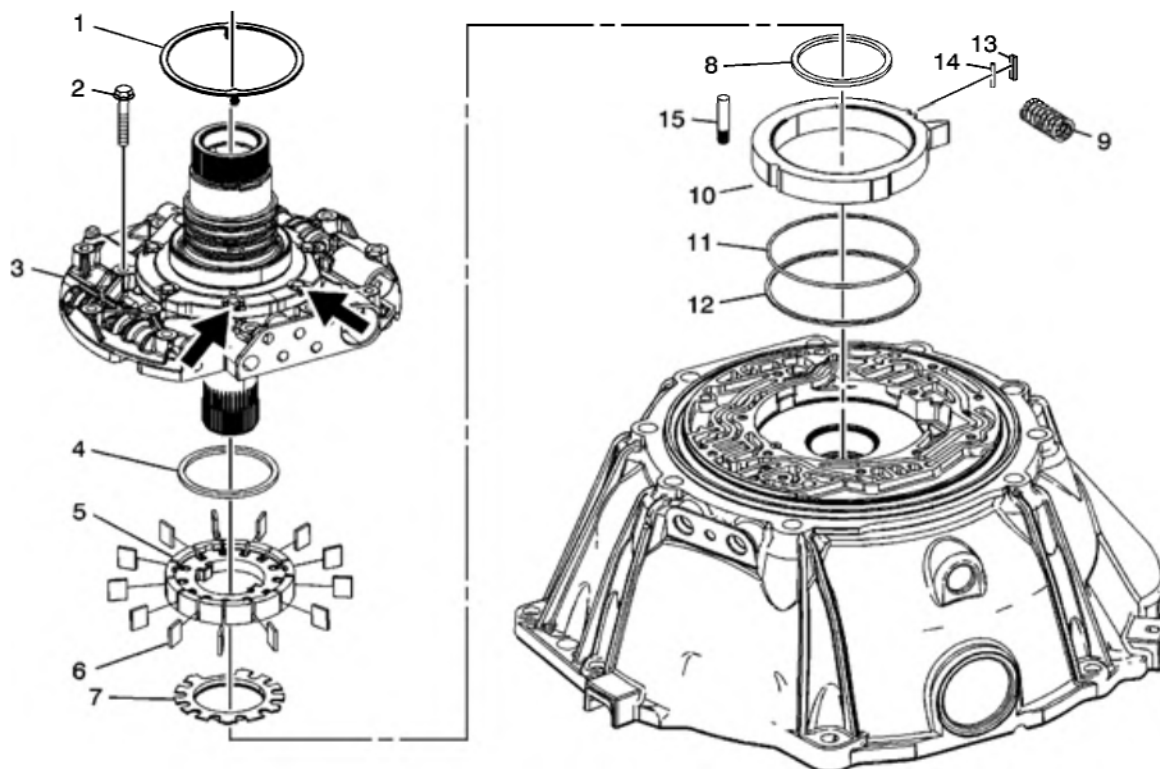
Callout	Component Name
Preliminary Procedures	
1. Install the 1-2-3-4 and 3-5 reverse clutch housing with the 1-2-3-4 and 3-5 reverse clutch plates installed, onto the torque converter housing. 2. Install the <i>DT 47868-2</i> magnetic base adapter onto the torque converter housing. 3. Install <i>DT 47868-1</i> clutch pack travel weight and <i>DT 47868-3</i> clutch travel weight adapter (6L50 applications only) onto the 3-5 reverse clutch backing plate. 4. Install the <i>J 26900-13</i> magnetic base onto <i>DT 47868-2</i> magnetic base adapter . 5. Attach the <i>J 8001</i> dial indicator set to the <i>J 26900-13</i> magnetic base and zero out the dial indicator on the <i>DT 47868-1</i> clutch pack travel weight .	
Special Tools	
• <i>DT 47868-1</i> Clutch Pack Travel Weight • <i>DT 47868-2</i> Magnetic Base Adapter • <i>DT 47868-3</i> Clutch Travel Weight Adapter (6L50 applications only) • <i>J 8001</i> Dial Indicator Set	

- J 26900-13 Magnetic Base

For equivalent regional tools, refer to [Special Tools](#).

1	3-5 Reverse Clutch Apply Passage Tip Apply compressed air to the apply passage hole, and observe the dial indicator measurement. Refer to Clutch Backing Plate Retaining Ring Specifications .
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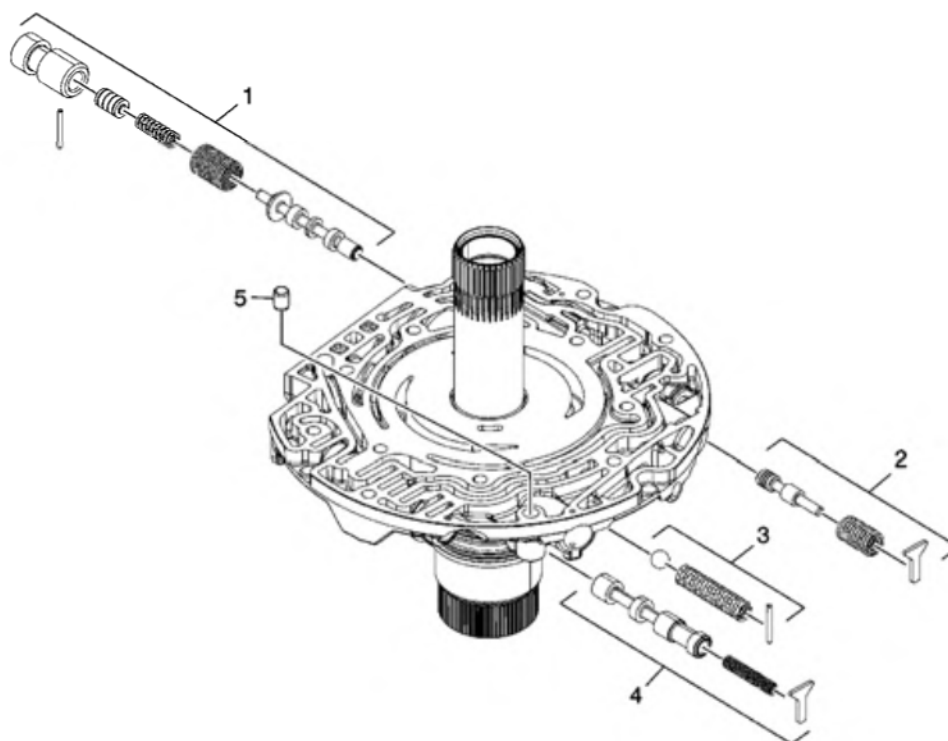
Torque Converter Housing with Fluid Pump Disassemble



Callout	Component Name
Caution: Do not loosen or remove the 6 bolts securing the clutch support to the pump cover assembly. These bolts have been installed and torqued only after specific clutch support rotational requirements have been met. If the clutch support is not installed properly, damage to the transmission will occur.	
1	1-2-3-4 and 3-5 Reverse Clutch Housing Thrust Washer
2	Bolt M6 x 40 (Qty: 13)
3	Fluid Pump Cover Assembly
4	Fluid Pump Vane Ring
5	Fluid Pump Rotor
6	Fluid Pump Vanes (Qty: 13)
7	Fluid Pump Rotor Guide
8	Fluid Pump Vane Ring
9	Fluid Pump Slide Outer Spring
10	Fluid Pump Slide
11	Fluid Pump Slide (O-Ring) Seal

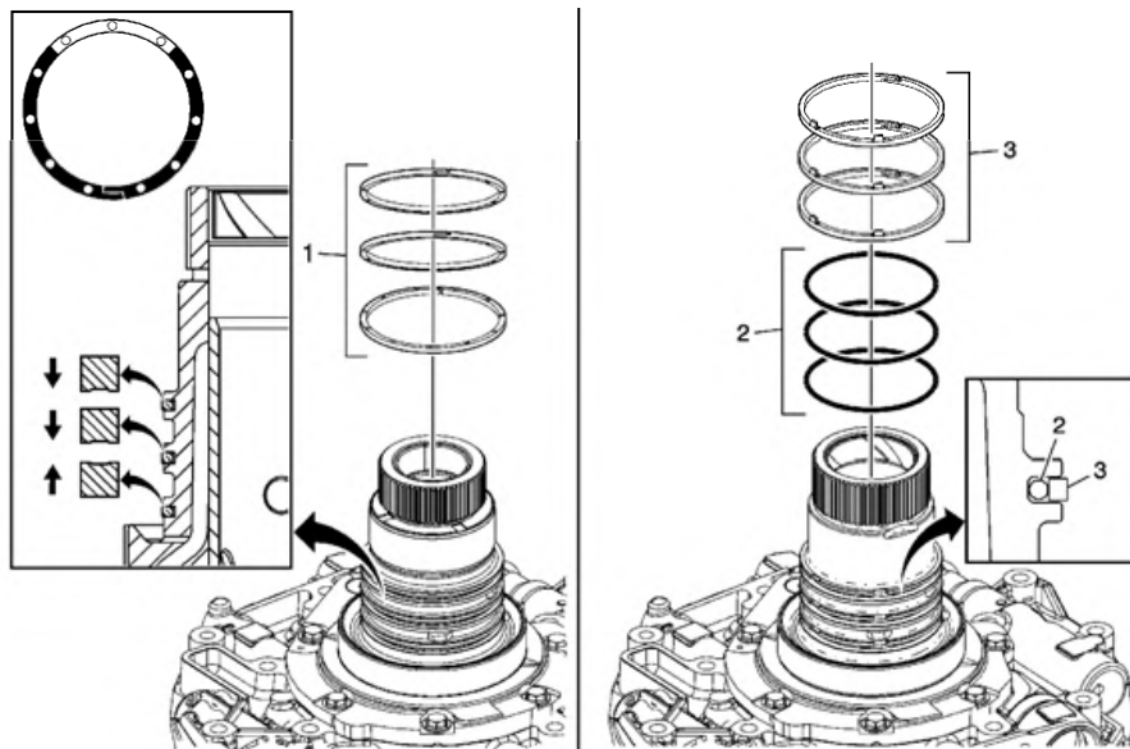
12	Fluid Pump Slide Fluid Seal Ring
13	Fluid Pump Slide Seal
14	Fluid Pump Slide Seal Support
15	Fluid Pump Slide Pivot Pin

Fluid Pump Cover Cleaning and Inspection



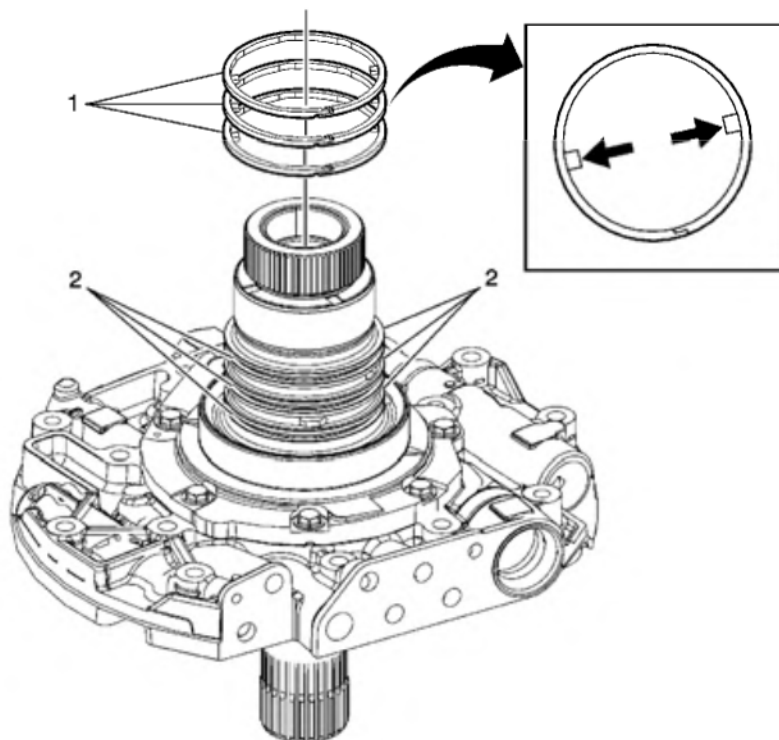
Callout	Component Name
Warning: Valve springs can be tightly compressed. Use care when removing retainers and plugs. Personal injury could result.	
Preliminary Procedure	
Clean and inspect all components and machined surfaces.	
1	Pressure Regulator Valve Train
2	Converter Feed Limit Valve Train
3	Pressure Relief Ball Valve and Spring
4	TCC Control Valve and Spring
5	A/Trans Fluid Pump Locator Pin

1-2-3-4 and 3-5 Reverse Clutch Fluid Seal Ring Installation (6L80 / 6L90)



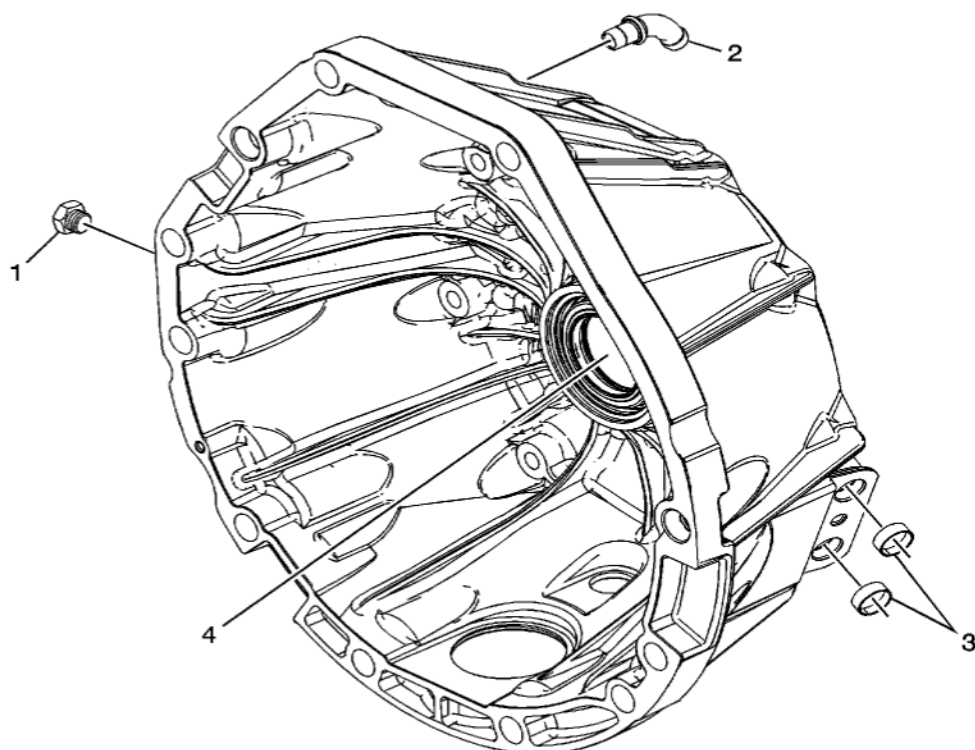
Callout	Component Name
Caution: Do not use old seal rings. Install NEW seal rings. Reusing old seal rings may cause internal transmission leaks and transmission damage. Note: Some models have seal rings with installation identification marks that consist of approximately 11 evenly-spaced injection molding gate trim rings and/or a white stripe printed on one side. This installation orientation must be observed to avoid fluid leakage which may cause shift concerns. Models utilizing an inner O-ring seal have accompanying outer seal rings that contain anti-rotation tabs and can only be installed one way.	
1	1-2-3-4 and 3-5 Reverse Clutch Fluid Seal Rings (Qty: 3) Procedure Install the first seal ring with the identification marks facing up. Then install the remaining two seal rings with the identification marks facing down.
2	1-2-3-4 and 3-5 Reverse Clutch Fluid Seal Rings (Qty: 3) - Inner O-ring
3	1-2-3-4 and 3-5 Reverse Clutch Fluid Seal Rings (Qty: 3) - Outer

1-2-3-4 and 3-5 Reverse Clutch Fluid Seal Ring Installation (6L50)



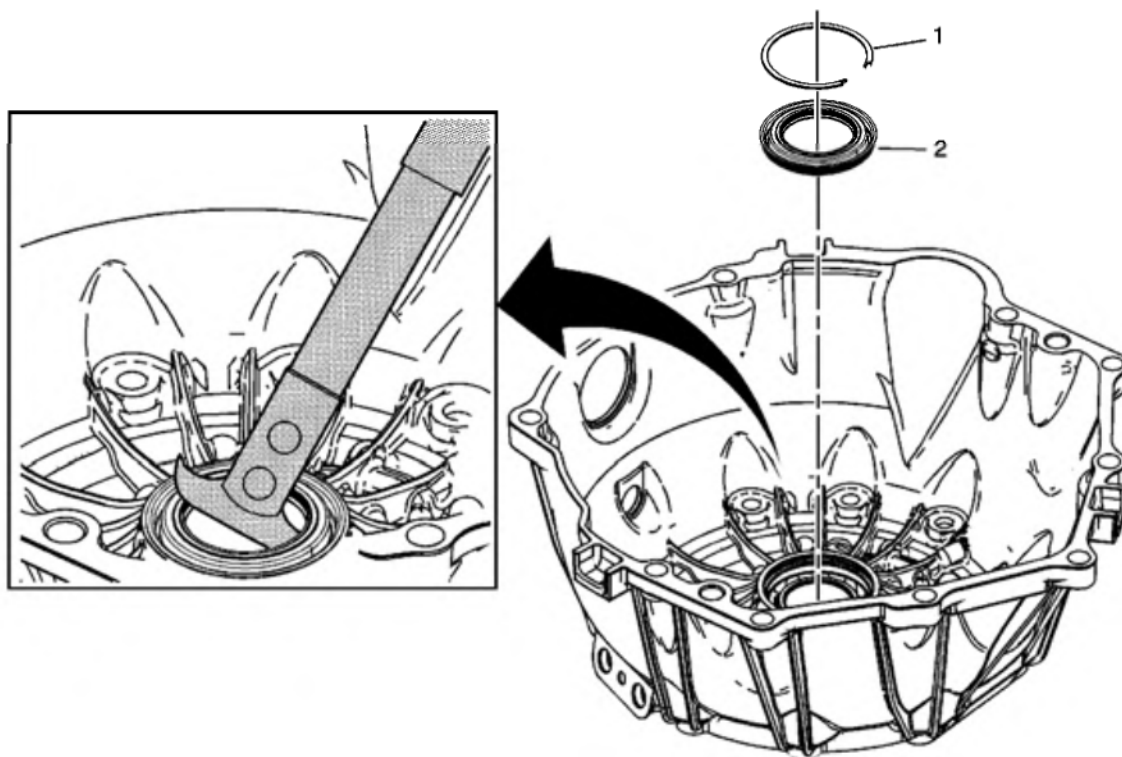
Callout	Component Name
Caution: Do not use old seal rings. Install NEW seal rings. Reusing old seal rings may cause internal transmission leaks and transmission damage.	
1	1-2-3-4 and 3-5 Reverse Clutch Fluid Seal Rings (Qty: 3) Tip Ensure anti-rotation tabs on seal rings align with anti-rotation slots.
2	1-2-3-4 and 3-5 Reverse Clutch Fluid Seal Rings Anti-rotation Slots

Torque Converter Housing Cleaning and Inspection



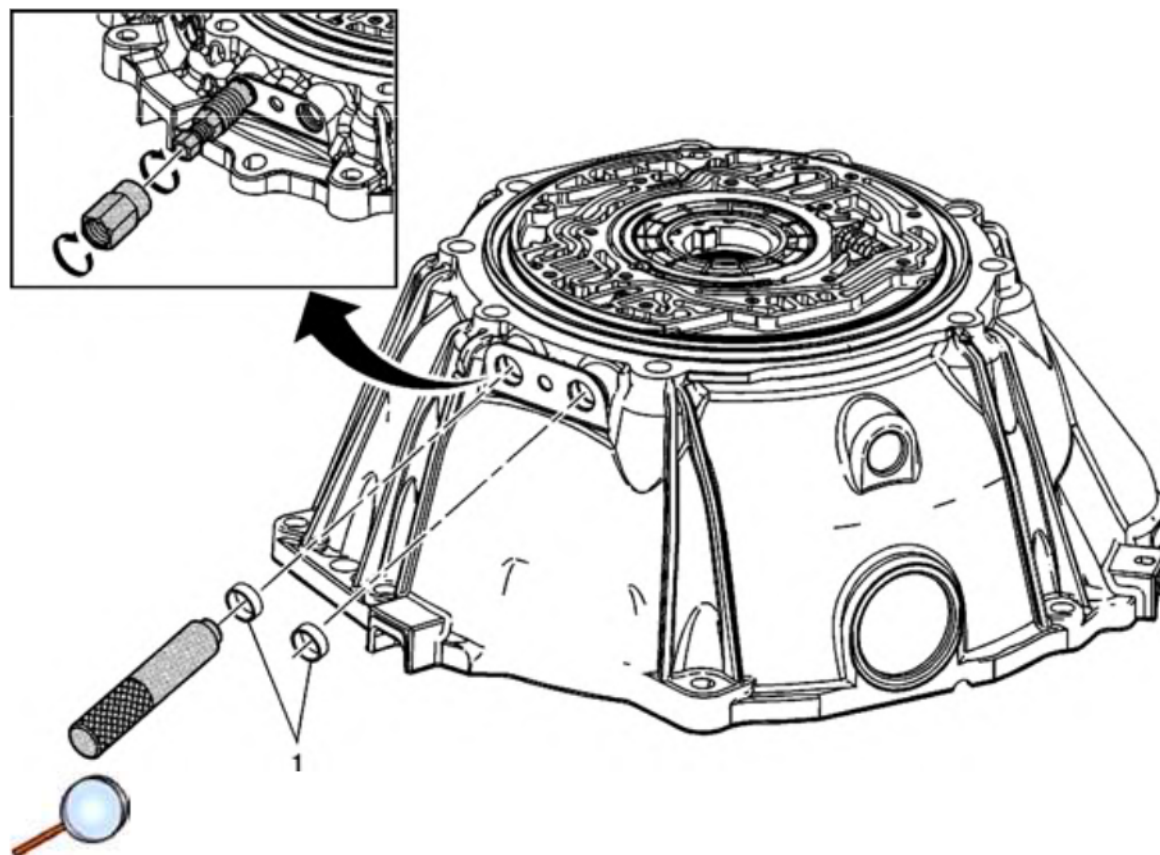
Callout	Component Name
Preliminary Procedures	
1. Thoroughly clean the torque converter housing assembly, including threads, with clean solvent. 2. Clean sealing surfaces. 3. Inspect all threaded holes. If necessary, repair any thread damage.	
1	Line Pressure Test Hole Plug
2	A/Trans Vent Pipe
3	Trans Fluid Cooler Pipe Fitting Seals (Qty: 2) Caution: Refer to Seal Reuse Caution in the Preface section. Tip Refer to Transmission Fluid Cooler Pipe Seal Replacement .
4	Torque Converter Bushing

Torque Converter Fluid Seal Replacement



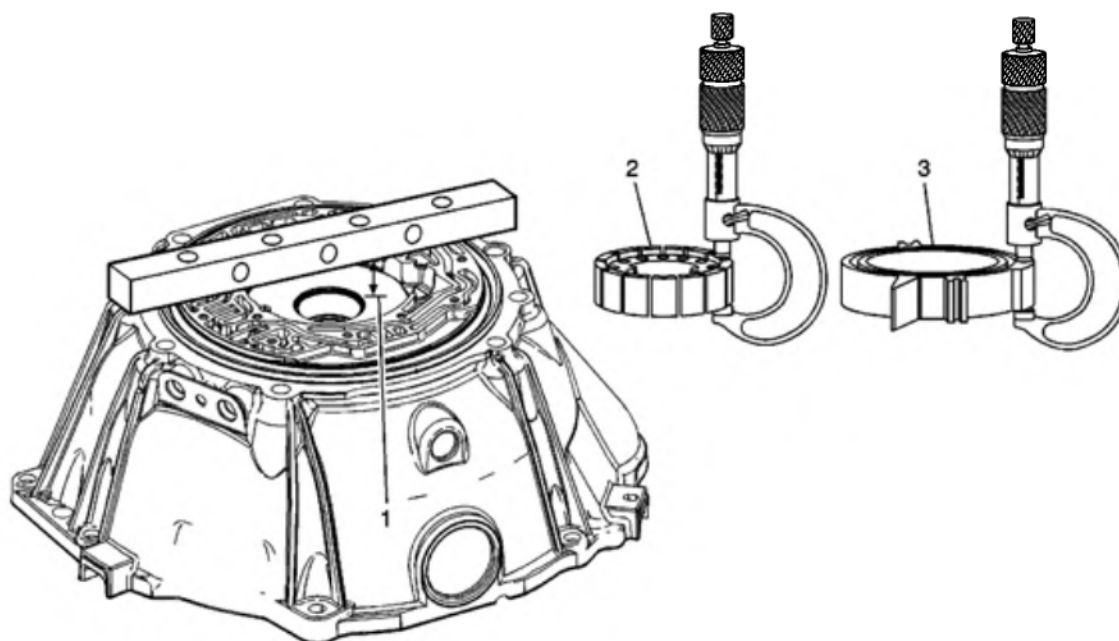
Callout	Component Name
1	Torque Converter Fluid Seal Retaining Ring
2	Torque Converter Fluid Seal Assembly Tip The seal can be installed by hand. Special Tool <i>J 45000</i> Seal Remover For equivalent regional tools, refer to Special Tools.

Transmission Fluid Cooler Pipe Seal Replacement



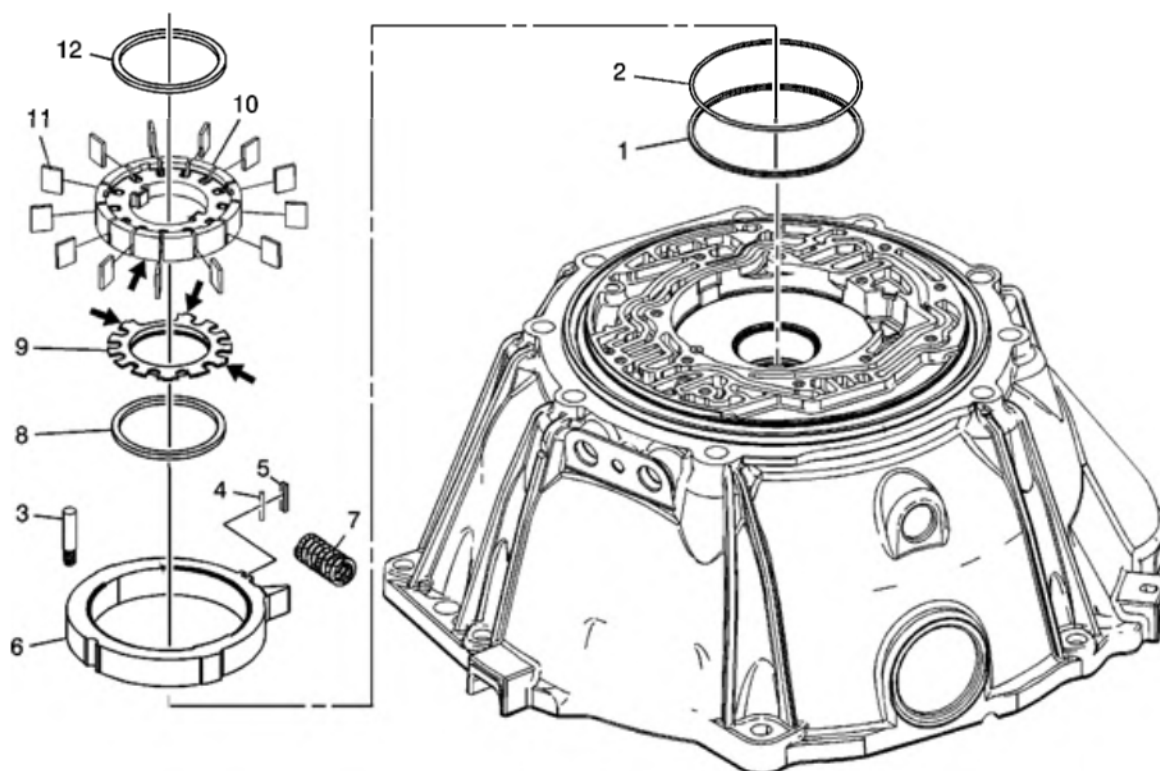
Callout	Component Name
1	Trans Fluid Cooler Pipe Fitting Seals (Qty: 2) Special Tools • DT 47770 Seal Installer • J 45201 Cooler Line Seal Remover For equivalent regional tools, refer to Special Tools.

Fluid Pump Selective Measurement



Callout	Component Name
1	Pump Rotor Cavity Tip Measure the distance from the bottom of the gage bar to the bottom of the pump rotor cavity. Refer to Fluid Pump Selective Specifications.
2	A/Trans Fluid Pump Rotor Tip Refer to Fluid Pump Selective Specifications to select the correct rotor.
3	A/Trans Fluid Pump Slide Tip Refer to Fluid Pump Selective Specifications to select the correct slide.

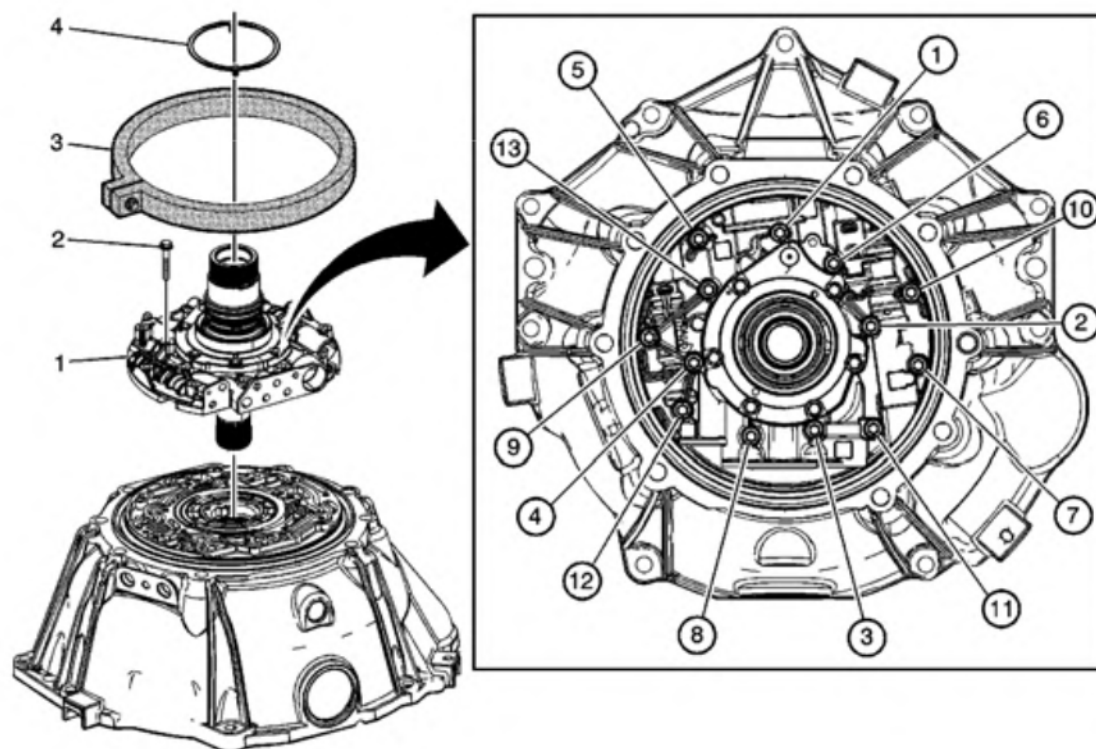
Torque Converter Housing with Fluid Pump Assemble



Callout	Component Name
1	Fluid Pump Slide Fluid Seal Ring
2	Fluid Pump Slide (O-Ring) Seal
3	Fluid Pump Slide Pivot Pin
4	Fluid Pump Slide Seal Support Tip The seal support is circular. The seal is rectangular.
5	Slide Seal
6	Fluid Pump Slide Tip If installing a NEW pump slide into the torque converter housing, ensure to properly select the correct rotor and slide before performing this procedure. Refer to Fluid Pump Selective Measurement and Fluid Pump Selective Specifications .
7	Fluid Pump Slide Outer Spring
8	Fluid Pump Vane Ring
9	Fluid Pump Rotor Guide

	Caution: Align the rotor guide tabs to the notches on the bottom of the rotor. Failure to do so may cause transmission damage.
10	Fluid Pump Rotor Tip If installing a NEW pump rotor into the torque converter housing, ensure to properly select the correct rotor and slide before performing this procedure. Refer to Fluid Pump Selective Measurement and Fluid Pump Selective Specifications .
11	Fluid Pump Vanes (Qty: 13)
12	Fluid Pump Vane Ring

Fluid Pump Cover Installation



Callout	Component Name
1	Fluid Pump Cover Assembly
2	Fluid Pump Cover Bolts M6 x 40 (Qty: 13) Tip Hand tighten only.
3	Alignment Tool and Bolt Caution: Refer to Fastener Caution in the Preface section. Procedure - Center the J 46664 around the fluid pump cover assembly in the 9 o'clock position and tighten the alignment bolt. - Tighten the fluid pump cover bolts in the sequence shown. Tighten 11 N·m (97 lb in) Special Tool

	J 46664 Pump Cover Alignment Tool
	For equivalent regional tools, refer to Special Tools .
4	NEW 1-2-3-4 and 3-5 Reverse Clutch Housing Thrust Washer

Control Valve Body Assembly Disassemble

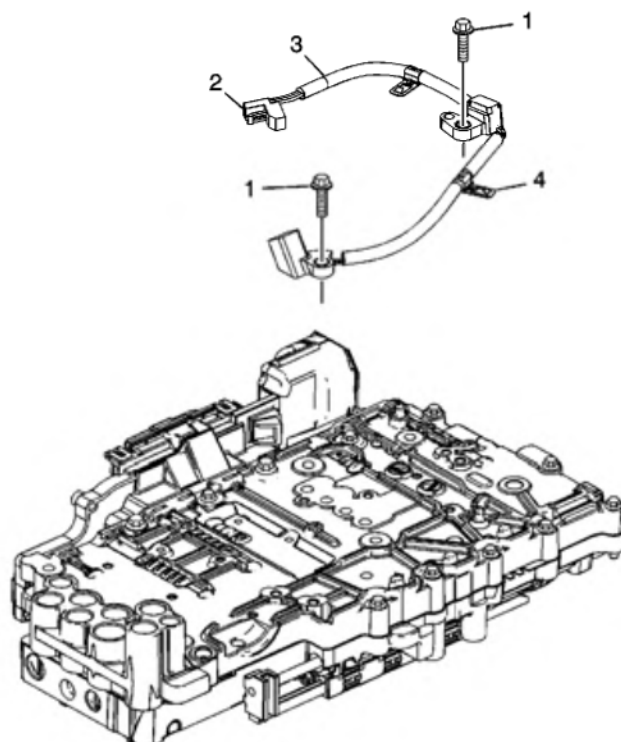
Table 1: [Input and Output Speed Sensor Assembly Removal](#)

Table 2: [Manual Shaft Detent Assembly and Manual Shift Shaft Position Switch Removal](#)

Table 3: [Control Solenoid Valve Assembly Removal](#)

Table 4: [Upper and Lower Valve Bodies Disassemble](#)

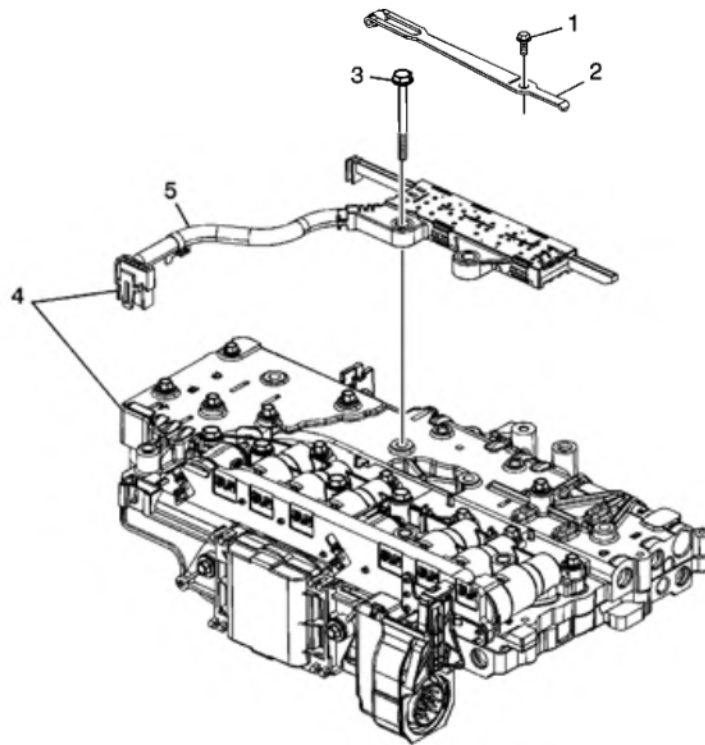
[Input and Output Speed Sensor Assembly Removal](#)



[Input and Output Speed Sensor Assembly Removal](#)

Callout	Component Name
1	Bolt M6 x 20 (Qty: 2)
2	Speed Sensor Electrical Connector Tip Release the connector lock before disconnecting.
3	A/Trans Input and Output Speed Sensor Assembly
4	A/Trans Input and Output Speed Sensor Wiring Harness Clip (Qty: 2) Tip Inspect the clips and replace if damaged.

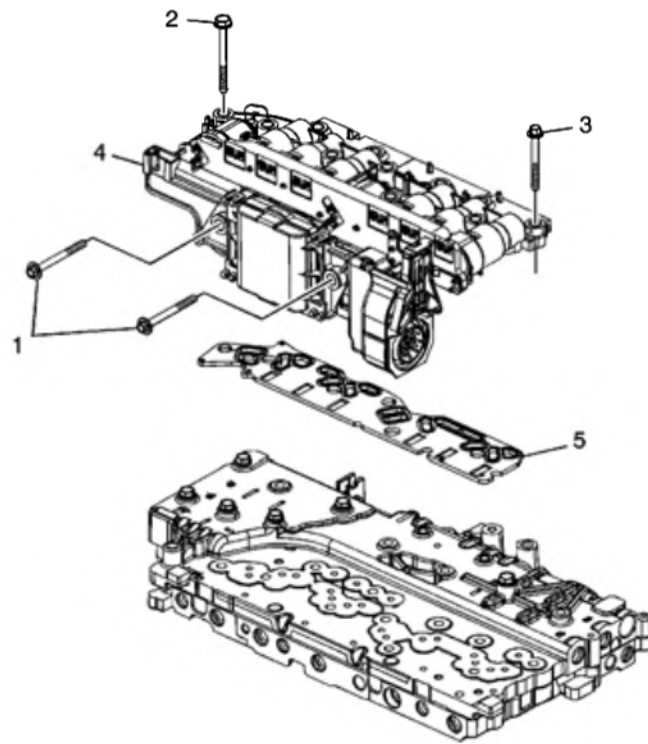
Manual Shaft Detent Assembly and Manual Shift Shaft Position Switch Removal



Manual Shaft Detent Assembly and Manual Shift Shaft Position Switch Removal

Callout	Component Name
1	Bolt M6 x 14.5
2	Manual Shaft Detent Assembly
3	Bolt M5 x 55
4	A/Trans Manual Shift Shaft Position Switch Assembly Electrical Connector Tip Release the connector lock before disconnecting.
5	A/Trans Manual Shift Shaft Position Switch Assembly

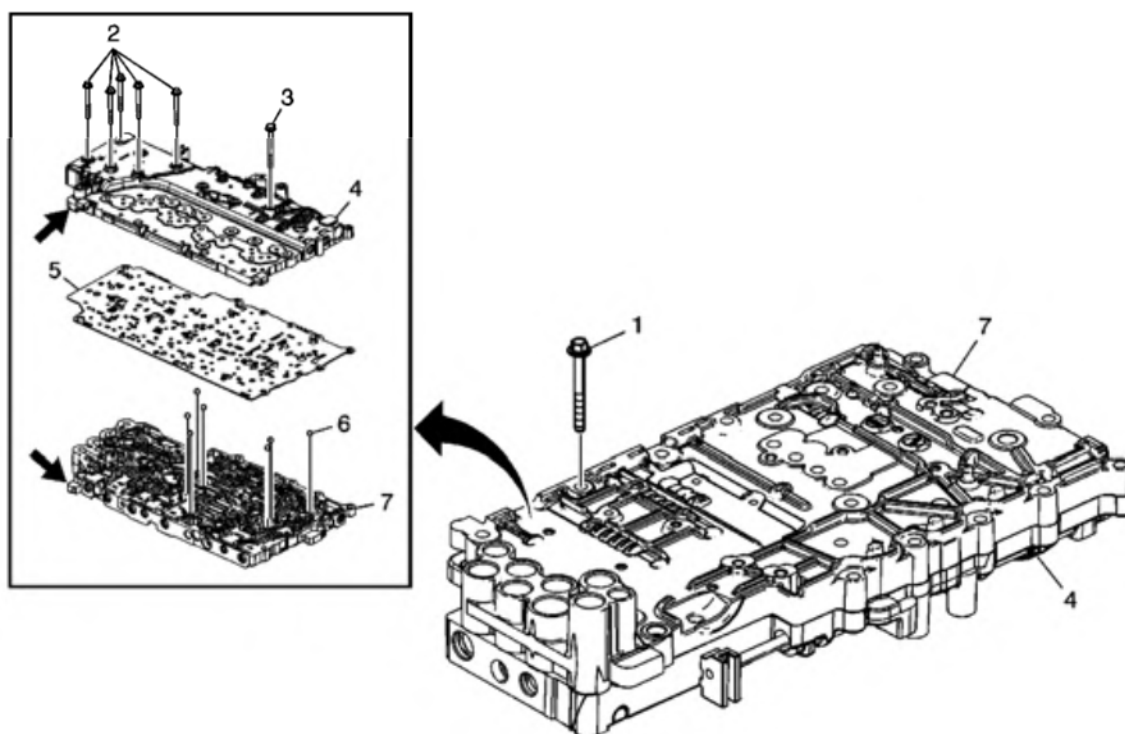
Control Solenoid Valve Assembly Removal



Control Solenoid Valve Assembly Removal

Callout	Component Name
1	Bolt M5 x 53 (Qty: 2)
2	Bolt M5 x 55 (Qty: 4)
3	Bolt M5 x 45 (Qty: 5)
4	Control Solenoid (w/Body and TCM) Valve Assembly Caution: Use care when handling the control valve body assembly. If dropped, damage to the control solenoid valve body assembly internal components, including the transmission control module (TCM), may result.
5	Filter Plate Assembly 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. Caution: Discard the filter plate. Replace with a NEW filter plate. Reusing an old filter plate may cause damage to the control solenoid valve assembly.

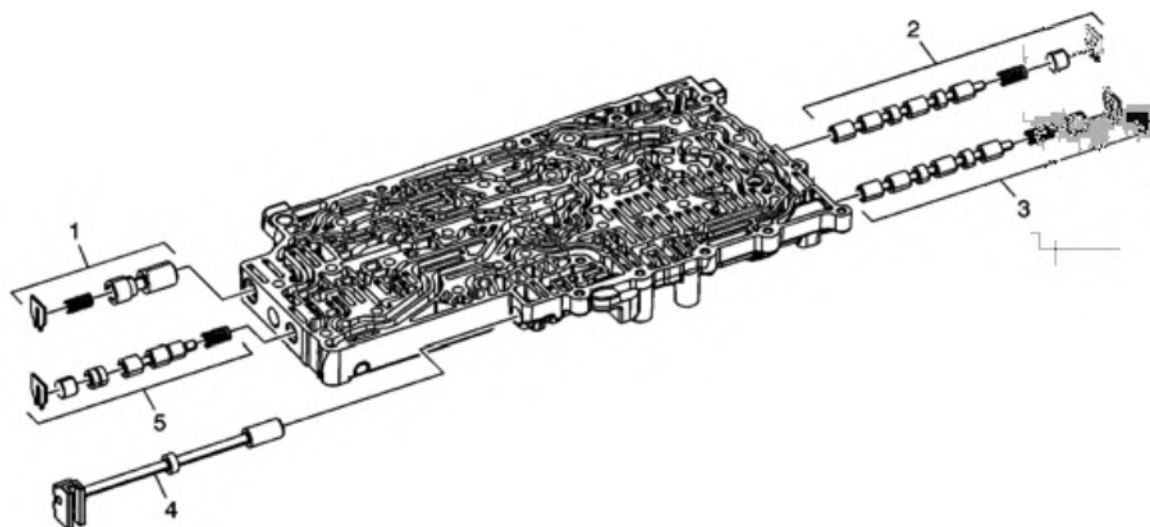
Upper and Lower Valve Bodies Disassemble



Upper and Lower Valve Bodies Disassemble

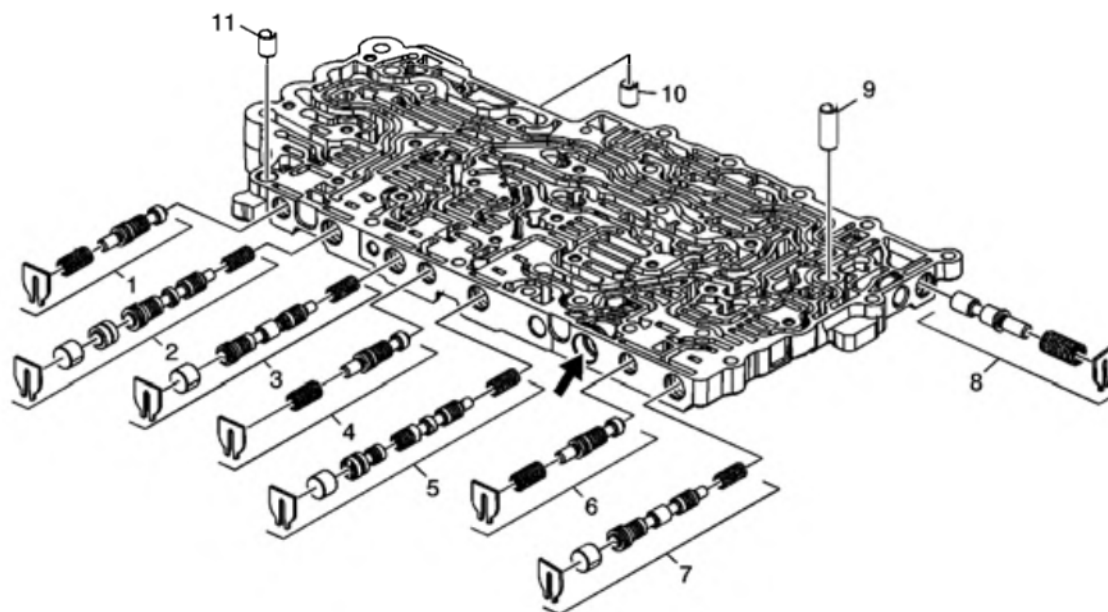
Callout	Component Name
1	Bolt M5 x 36 (Qty: 12)
2	Bolt M5 x 45 (Qty: 5)
3	Bolt M5 x 55
4	Control Valve Lower Body Assembly Tip - Separate the upper and lower valve bodies by carefully prying at the point indicated. - Refer to Control Valve Lower Body Assembly Cleaning and Inspection.
5	Control Valve Body Spacer (w/Gasket) Plate Assembly Caution: Do not use the old spacer plate. Install a NEW spacer plate. Reusing an old spacer plate may cause internal transmission leaks and transmission damage.
6	Control Valve Body Ball Check Valve (Qty: 7) Tip Note the position of the ball check valves.
7	Control Valve Upper Body Assembly Tip Refer to Control Valve Upper Body Assembly Cleaning and Inspection .

Control Valve Lower Body Assembly Cleaning and Inspection



Callout	Component Name
Warning: Valve springs can be tightly compressed. Use care when removing retainers and plugs. Personal injury could result.	
Preliminary Procedure	
Clean and inspect all valve components and the valve body. The control valve lower body is replaceable only as an assembly.	
1	Clutch Piston Dam Feed Regulator Valve Train
2	Clutch Select Solenoid Valve 3 Train
3	Clutch Select Solenoid Valve 2 Train
4	Manual Valve
5	TCC Regulator Apply Valve Train

Control Valve Upper Body Assembly Cleaning and Inspection



Callout	Component Name
Warning: Valve springs can be tightly compressed. Use care when removing retainers and plugs. Personal injury could result.	
Caution: Do not remove the exhaust backfill pressure relief retainer, spring, or ball valve (refer to arrow in above illustration for location). The retainer is set to a precise depth. Replacement of this retainer could cause internal transmission damage.	
Preliminary Procedure	
Clean and inspect all valve components, locating pins, and the valve body. The control valve upper body is replaceable only as an assembly.	
1	Clutch Boost Valve Train
2	1-2-3-4 Clutch Regulator Valve Train
3	3-5 Reverse Clutch Regulator Valve Train
4	Clutch Boost Valve Train
5	2-6 Clutch Regulator Valve Train
6	Clutch Boost Valve Train

7	CBR1/4-5-6 Clutch Regulator Valve Train
8	Actuator Feed Limit Valve Train
9	Control Valve Body Locator Pin
10	Control Valve Body Locator Pin
11	Control Valve Body Locator Pin

Control Valve Body Assembly Assemble

Table 1: [Upper to Lower Control Valve Body Assembly Assemble](#)

Table 2: [Filter Plate Installation](#)

Table 3: [Control Solenoid Valve Assembly Installation](#)

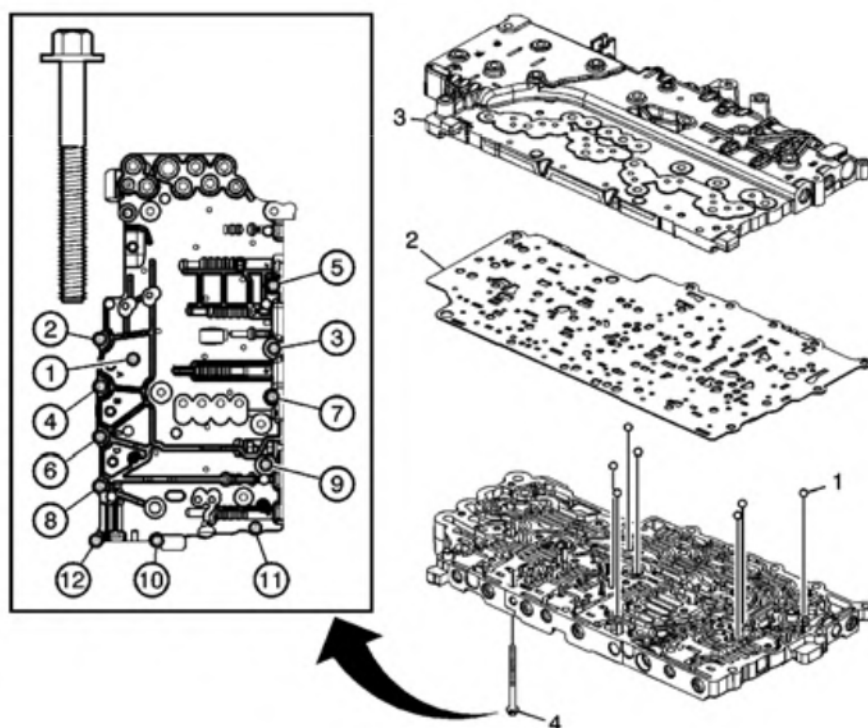
Table 4: [Manual Shift Shaft Position Switch Installation](#)

Table 5: [Valve Body, Control Solenoid Torque Sequence](#)

Table 6: [Control Solenoid Valve Assembly Contact Gap Inspection](#)

Table 7: [Input and Output Speed Sensor Assembly Installation](#)

Upper to Lower Control Valve Body Assembly Assemble

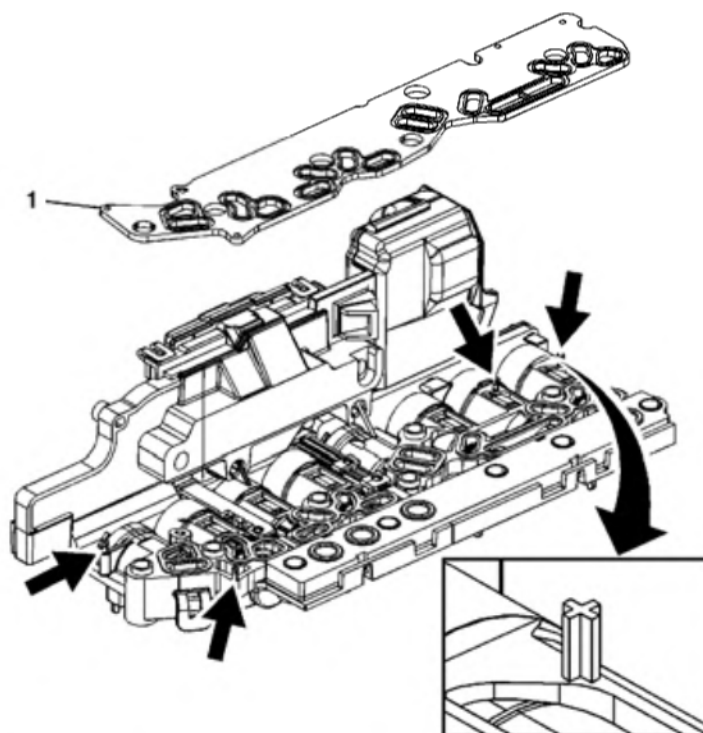


Upper to Lower Control Valve Body Assembly Assemble

Callout	Component Name
1	Control Valve Body Ball Check Valve (Qty: 7) Caution: Do not use any type of grease or other material to hold the check ball valves in place during assembly. Grease will cause the valves to not operate properly, resulting in damage to the transmission. Tip

	Refer to Ball Check Valve Locations .
2	Control Valve Body Spacer (w/Gasket) Plate Assembly Caution: Do not use the old spacer plate. Install a NEW spacer plate. Reusing an old spacer plate may cause internal transmission leaks and transmission damage.
3	Control Valve Lower Body Assembly Tip Turn the valve body assembly over after installing to upper body.
4	Bolt M5 x 36 (Qty: 12) Caution: Refer to Fastener Caution in the Preface section. Procedure Tighten the bolts in the sequence shown. Tighten 8 N·m (71 lb in).

Filter Plate Installation



Filter Plate Installation

Callout	Component Name
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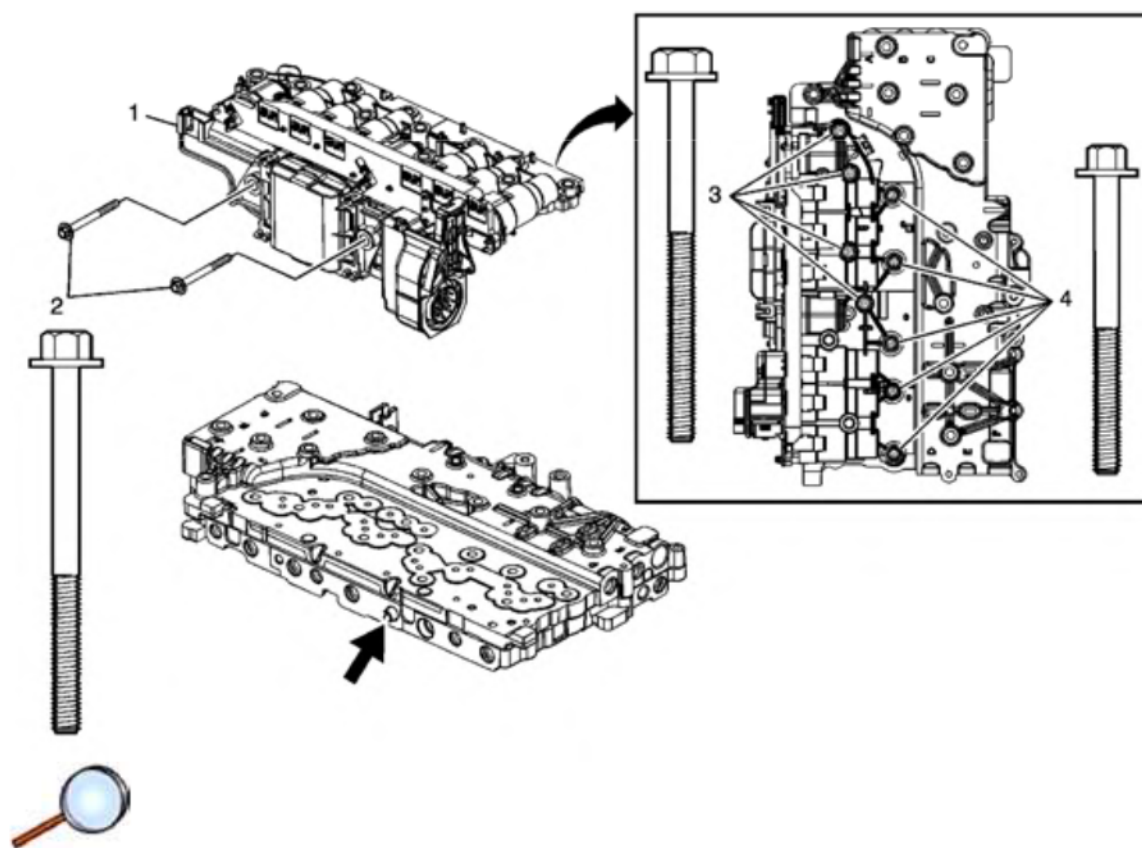
Filter Plate Assembly

- 1 **Caution:** Use care when handling the control valve body assembly. If dropped, damage to the control solenoid valve body assembly internal components, including the transmission control module (TCM), may result.
- Caution:** Discard the filter plate. Replace with a NEW filter plate. Reusing an old filter plate may cause damage to the control solenoid valve assembly.

Tip

Use care when removing or installing the filter plate assembly. However, if a retaining tab is broken or missing, do not replace the control solenoid valve assembly. The filter plate assembly can still be adequately aligned.

Control Solenoid Valve Assembly Installation

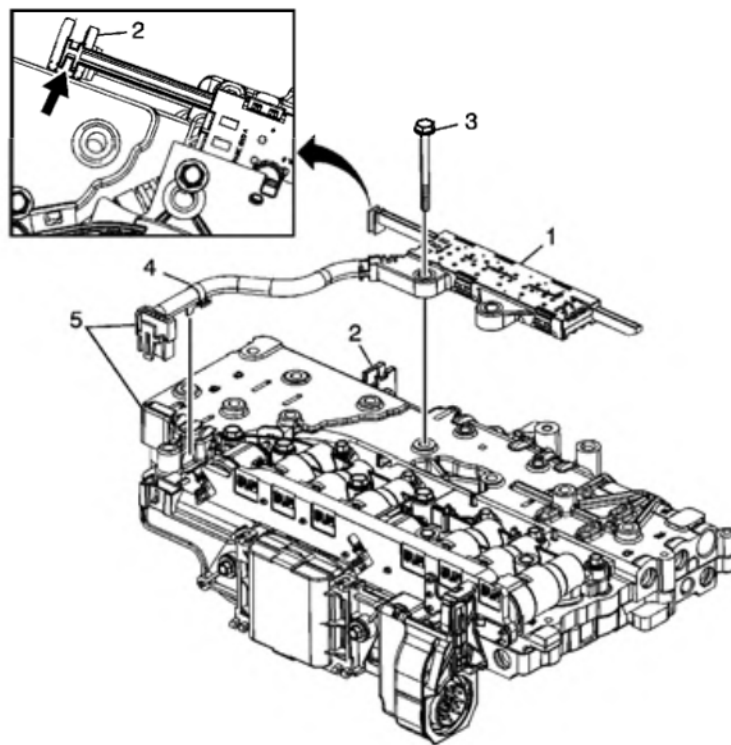


Control Solenoid Valve Assembly Installation

Callout	Component Name
1	Control Solenoid (w/Body and TCM) Valve Assembly
	Tip Note the locator pin on the control valve lower body assembly while aligning the control solenoid valve assembly.
	Bolt M5 x 53 (Qty: 2)

2	Tip Hand tighten only.
3	Bolt M5 x 55 (Qty: 4) Tip Hand tighten only.
4	Bolt M5 x 45 (Qty: 5) Tip Hand tighten only.

Manual Shift Shaft Position Switch Installation

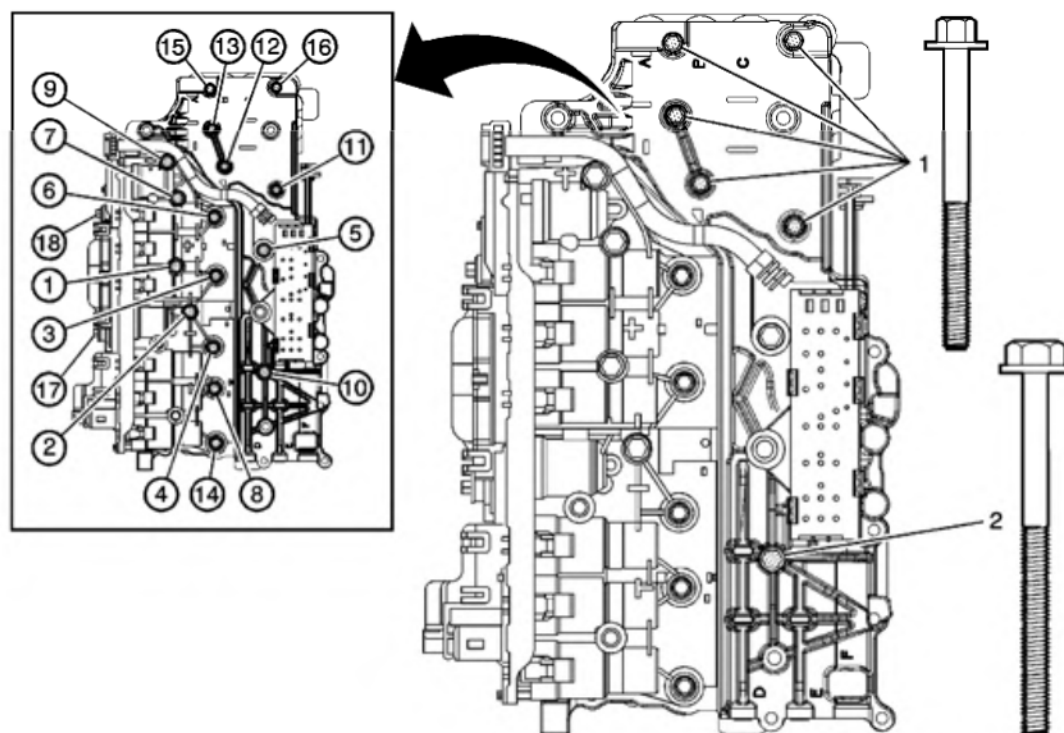


Manual Shift Shaft Position Switch Installation

Callout	Component Name
1	A/Trans Manual Shift Shaft Position Switch Assembly
2	Manual Valve Link Tip Align the switch activator slide with the manual valve link.
3	Bolt M5 x 55 Tip Hand tighten only.

4	A/Trans Manual Shift Shaft Position Switch Harness Clip Tip The wiring harness clip on the manual shift shaft position switch does not need to be replaced if damaged or missing. The clip functions only as a manufacturing assembly aid to keep the harness clear during an automated bolt installation process. If the clip is damaged, simply remove and discard.
5	A/Trans Manual Shift Shaft Position Switch Electrical Connector Tip Connect and lock the manual shift shaft position switch electrical connector to the control solenoid valve assembly.

Valve Body, Control Solenoid Torque Sequence

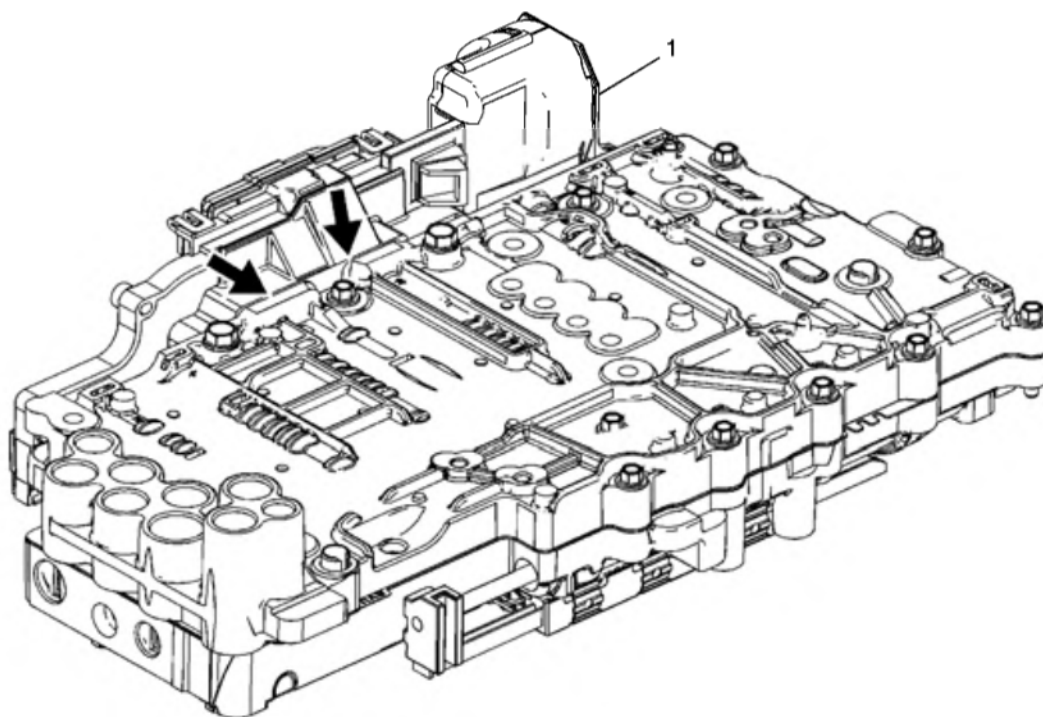


Valve Body, Control Solenoid Torque Sequence

Callout	Component Name
Caution: Bolt torque sequencing is critical to the proper function of the control solenoid valve assembly. Failure to follow the required sequencing may result in transmission malfunction. Preliminary Procedure 1. Hand tighten the last 6 bolts before final torque sequence. 2. The 2 "heat sink" bolts must be tightened last.	

1	Bolts M5 x 45 (Qty: 5)
2	Bolt M5 x 55 Caution: Refer to Fastener Caution in the Preface section. Procedure Tighten all 18 bolts in the sequence shown. Tighten 8 N·m (71 lb in).

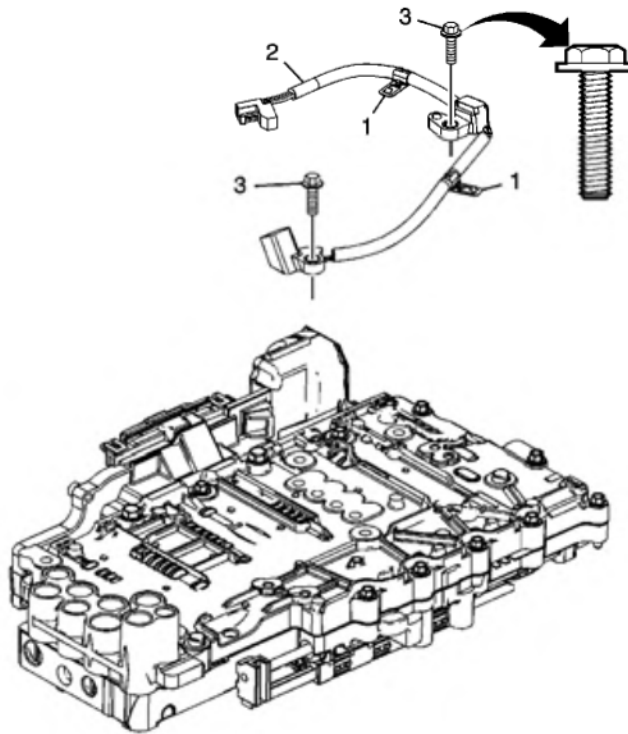
Control Solenoid Valve Assembly Contact Gap Inspection



Control Solenoid Valve Assembly Contact Gap Inspection

Callout	Component Name
1	Control Solenoid (w/Body and TCM) Valve Assembly Tip Inspect the contact area between the "heat sink" area of the control solenoid valve assembly and the valve body. There should be no visible gap. If a gap exists, loosen all 18 bolts and retighten in the required sequence.

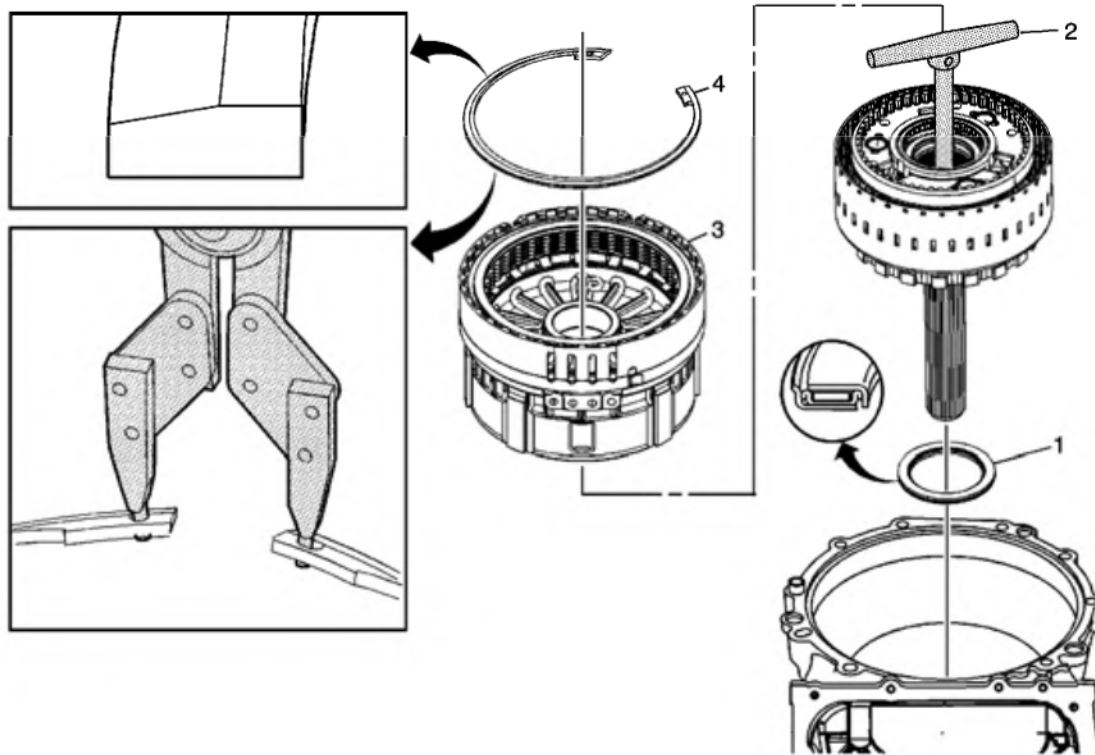
Input and Output Speed Sensor Assembly Installation



Input and Output Speed Sensor Assembly Installation

Callout	Component Name
1	A/Trans Input and Output Speed Sensor Wiring Harness Clip (Qty: 2) Tip Inspect the 2 wiring harness clips for damage. Replace if damaged.
2	A/Trans Input and Output Speed Sensor Assembly
3	Bolt M6 x 20 (Qty: 2) Caution: Refer to Fastener Caution in the Preface section. Tighten 12 N·m (106 lb in)

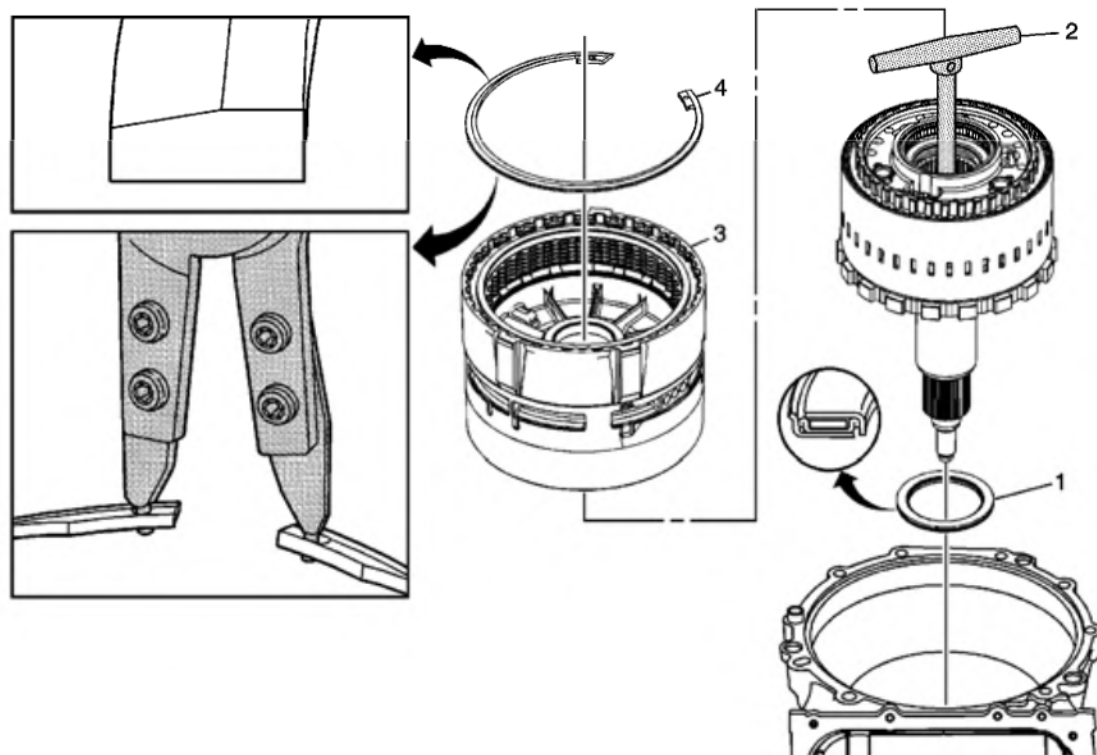
Center Support, Output Carrier and Output Shaft Installation (6L80 / 6L90)



Callout	Component Name
1	Output Shaft Thrust Bearing Assembly
2	Output Carrier Assembly and Output Shaft Assembly Caution: Apply automatic transmission fluid (ATF) to the inside diameter of the output shaft seal before installing the output shaft assembly into the case. Failure to lube the seal may cause the seal to roll during output shaft installation, which will result in transmission damage. Caution: Ensure the DT 47786 is completely threaded into the output shaft assembly. Due to the weight of the assembly, incomplete threading may cause the assembly to break free from the DT 47786, causing component damage. Special Tool DT 47786 Output Carrier/Shaft Lifting Tool
	Center Support Assembly
	Tip

3	• When the center support assembly is properly installed, the fluid passages should align with the fluid passage seal bores in the case assembly. • It may be necessary to rotate the output shaft by hand in order to fully install the center support assembly.
4	Center Support Retaining Ring Warning: Use care when removing or installing the retaining ring. Ensure the J 45126 and DT 47773 are installed properly onto the retaining ring or bodily injury may occur. Caution: Ensure the retaining ring is installed with the tapered side up, and in the 9 o'clock position from the pan side of the case. Failure to properly install the retaining ring will cause transmission damage. Special Tools • DT 47773 Snap Ring Pliers Adapter Set • J 45126 Snap Ring Pliers

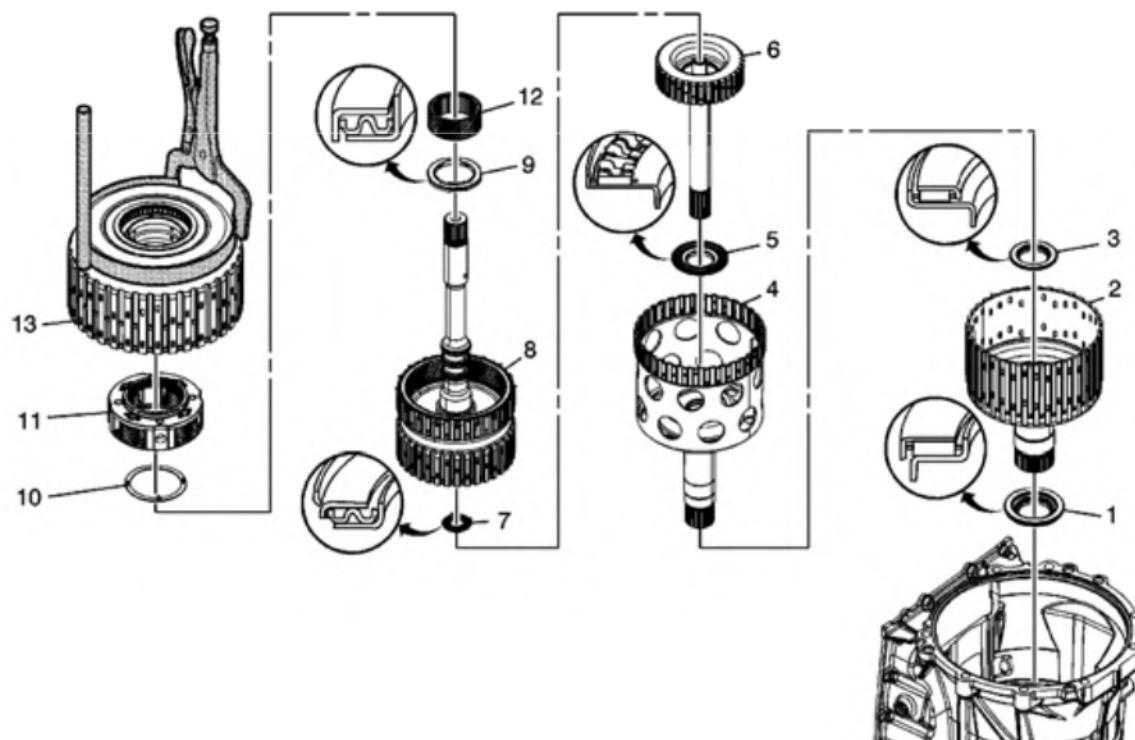
Center Support, Output Carrier and Output Shaft Installation (6L50)



Callout	Component Name
1	Output Shaft Thrust Bearing Assembly
2	Output Carrier Assembly and Output Shaft Assembly Caution: Apply automatic transmission fluid (ATF) to the inside diameter of the output shaft seal before installing the output shaft assembly into the case. Failure to lube the seal may cause the seal to roll during output shaft installation, which will result in transmission damage. Caution: Ensure the DT 47786 is completely threaded into the output shaft assembly. Due to the weight of the assembly, incomplete threading may cause the assembly to break free from the DT 47786, causing component damage. Special Tool DT 47786 Output Carrier/Shaft Lifting Tool For equivalent regional tools, refer to Special Tools.
	Center Support Assembly

3	Tip • When the center support assembly is properly installed, the fluid passages should align with the fluid passage seal bores in the case assembly. • It may be necessary to rotate the output shaft by hand in order to fully install the center support assembly.
4	Center Support Retaining Ring Warning: Use care when removing or installing the retaining ring. Ensure the J 45126 is installed properly onto the retaining ring or bodily injury may occur. Caution: Ensure the retaining ring is installed with the tapered side up, and in the 9 o'clock position from the pan side of the case. Failure to properly install the retaining ring will cause transmission damage. Special Tool J 45126 Snap Ring Pliers For equivalent regional tools, refer to Special Tools.

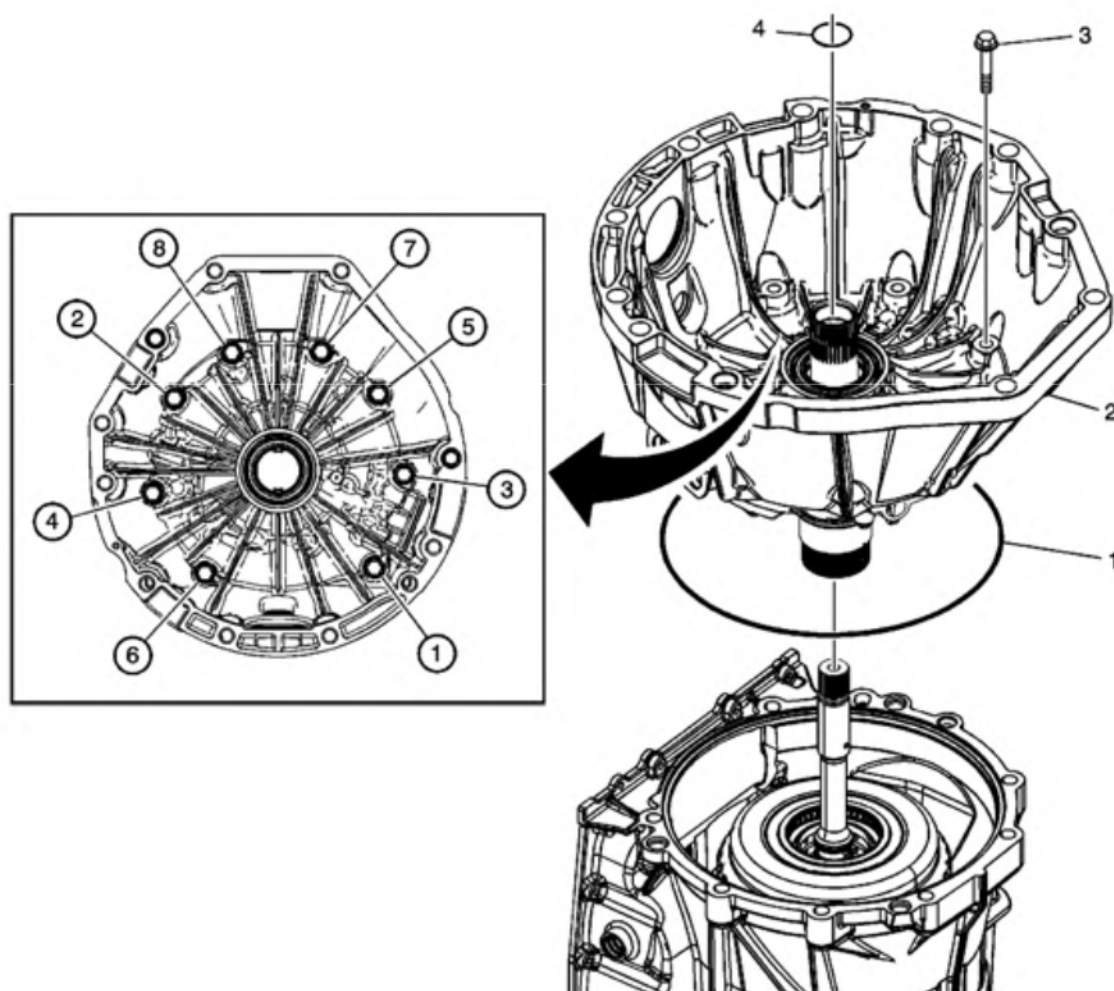
1-2-3-4 and 3-5 Reverse Clutch Assembly and 4-5-6 Clutch Assembly Installation



Callout	Component Name
1	2-6 and 3-5 Reverse Clutch Hub Thrust Bearing Assembly
2	2-6 and 3-5 Reverse Clutch (with Output Carrier Outer Sun Gear Shaft) Hub Assembly
3	1-2-3-4 Clutch Hub Thrust Bearing Assembly
4	1-2-3-4 Clutch (with Output Carrier Inner Sun Gear Shaft) Hub Assembly
5	4-5-6 Clutch Hub Thrust Bearing Assembly
6	4-5-6 Clutch (with Output Carrier Shaft and Dampener) Hub Assembly Tip Refer to 4-5-6 Clutch Dampener Overhaul for complete inspection.
7	Turbine Shaft Thrust Bearing Assembly
8	4-5-6 (with Turbine Shaft) Clutch Assembly
9	Input Sun Gear Thrust Bearing Tip Thrust bearing snaps onto input carrier assembly.

10	Input Sun Gear Thrust Washer
11	Input Carrier Assembly
12	Input Sun Gear
13	1-2-3-4 and 3-5 Reverse Clutch Assembly Tip Wiggle the <i>DT 47781</i> clutch assembly installer in order to align the 1-2-3-4 and 3-5 reverse clutch plates with the external splines of the 4-5-6 clutch assembly. To verify that the 1-2-3-4 and 3-5 reverse clutch assembly is fully installed, lift up on the turbine shaft. There should not be any noticeable slack. Special Tool <i>DT 47781</i> C1234 35R Clutch Assembly Installer For equivalent regional tools, refer to Special Tools.

Torque Converter Housing with Fluid Pump Installation (6L50)

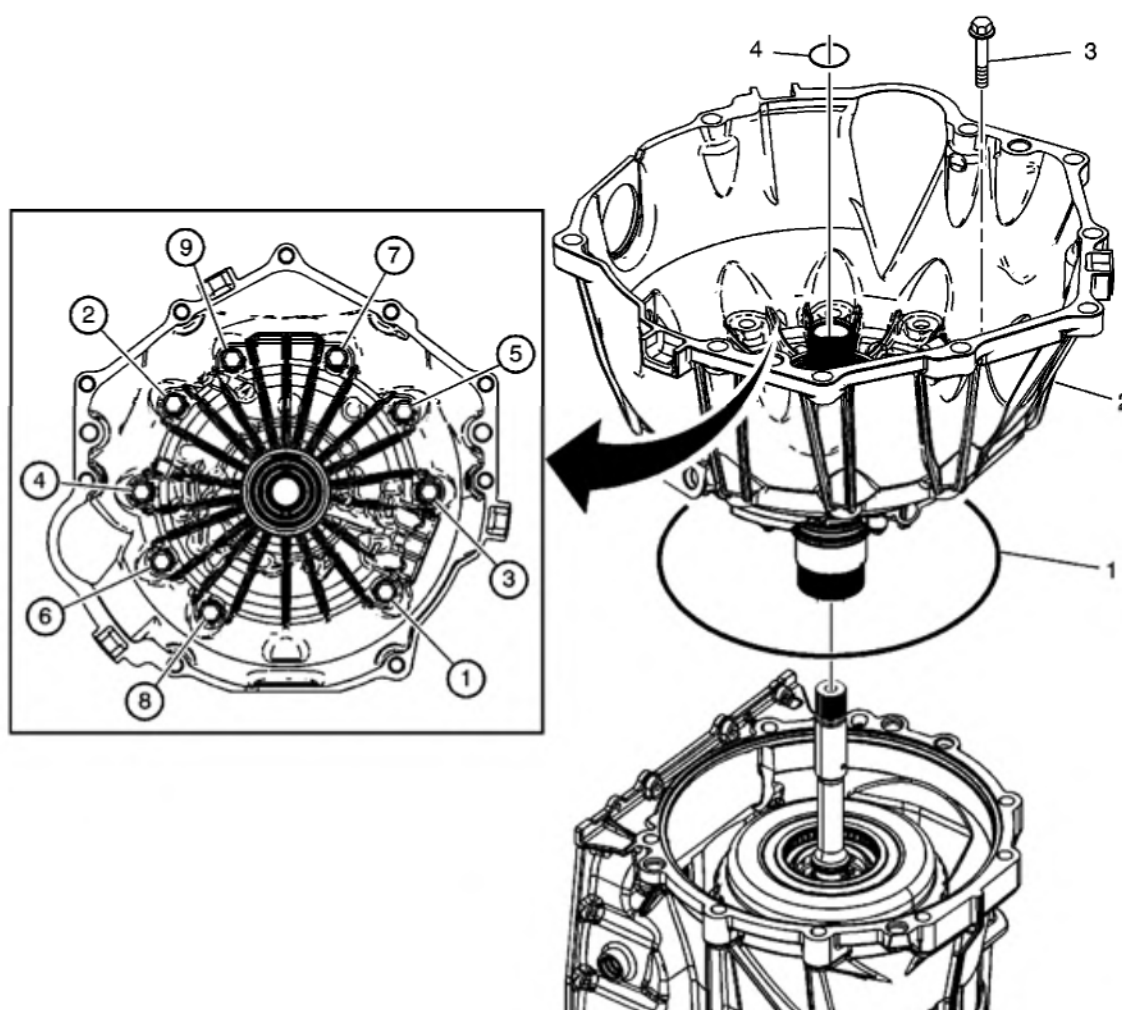


Callout	Component Name
1	NEW Fluid Pump Seal
2	Torque Converter (with Fluid Pump) Housing Assembly Caution: Ensure the turbine shaft (O-ring) seal is not installed prior to installing the torque converter housing assembly. The seal may become cut or damaged during installation of the torque converter housing assembly.
	Bolts M8 x 1.25 x 50 (Qty: 8) Caution: Refer to Fastener Caution in the Preface section.

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3	Procedure Tighten in sequence shown. Tighten 31 N·m (23 lb ft)
4	NEW Turbine Shaft (O-Ring) Seal

Torque Converter Housing with Fluid Pump Installation (6L90)

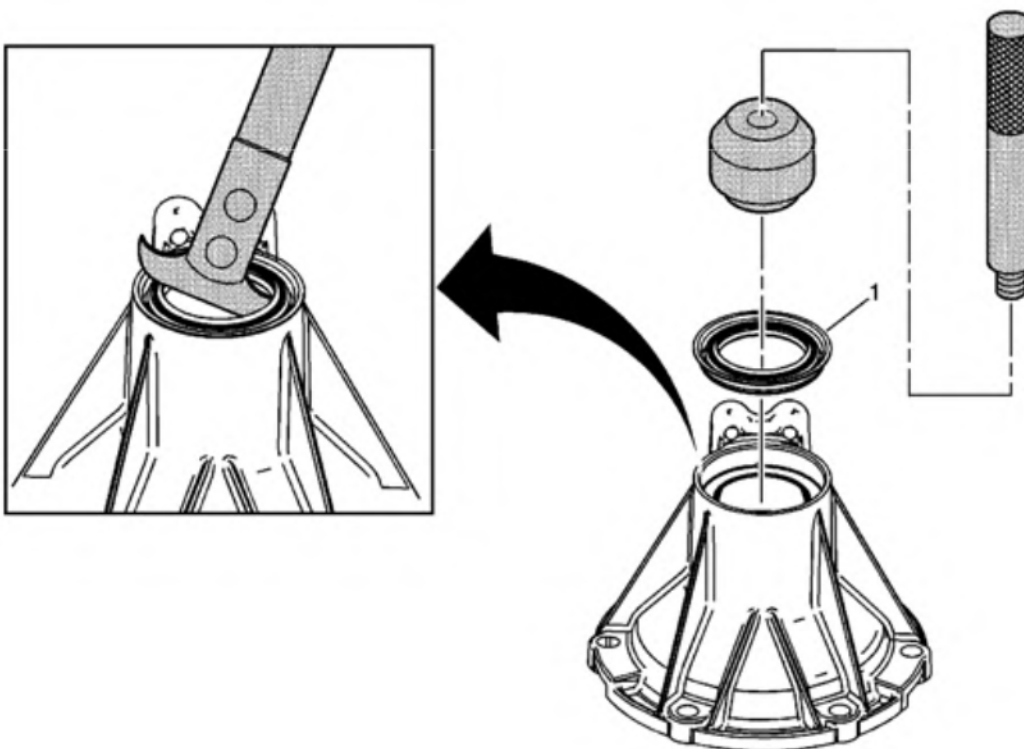


Callout	Component Name
1	NEW Fluid Pump Seal
2	Torque Converter (with Fluid Pump) Housing Assembly Caution: Ensure the turbine shaft (O-ring) seal is not installed prior to installing the torque converter housing assembly. The seal may become cut or damaged during installation of the torque converter housing assembly.
	Bolts M10 x 50 (Qty: 9) Caution: Refer to Fastener Caution in the Preface section.

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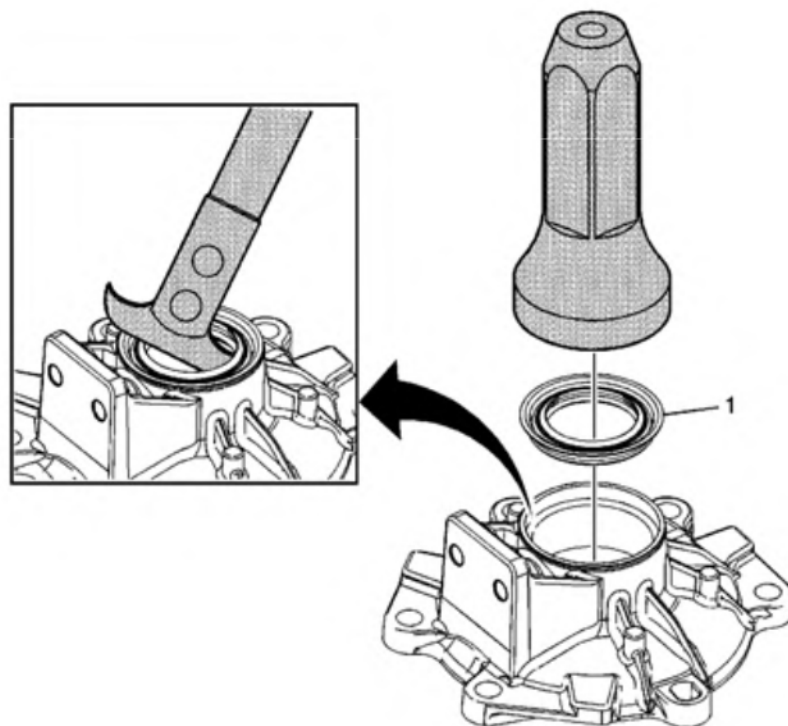
3	Procedure Tighten in the sequence shown. Tighten 72 N·m (53 lb ft)
4	NEW Turbine Shaft (O-Ring) Seal

Output Shaft Seal Replacement (6L90)



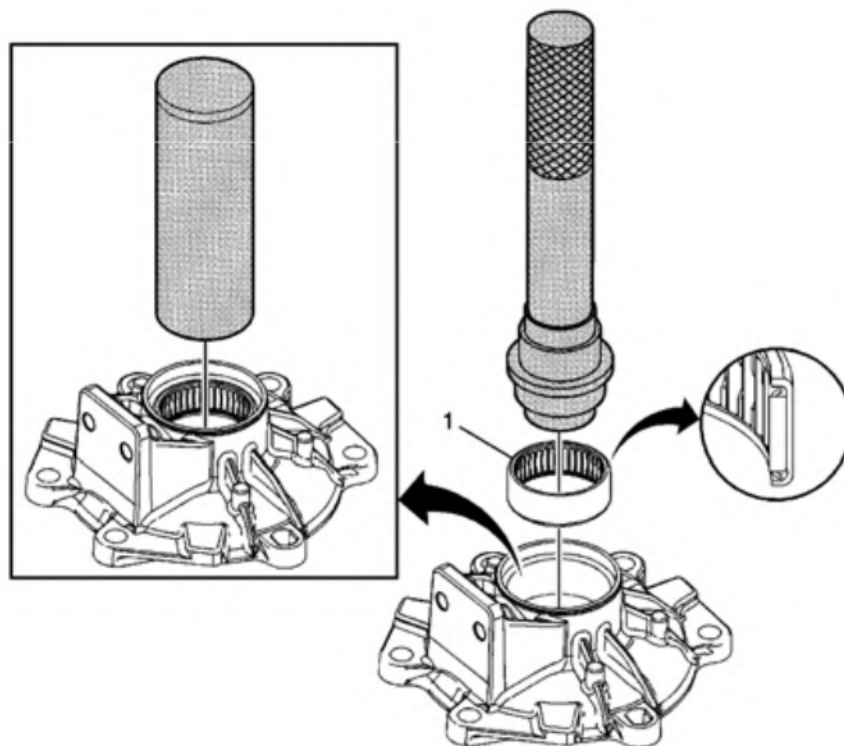
Callout	Component Name
1	Prop Shaft Front Slip Yoke Oil Seal Special Tools • DT-48021 Seal Installer • J 8092 Driver Handle • J 45000 Seal Remover For equivalent regional tools, refer to Special Tools.

Output Shaft Seal Replacement (6L50)



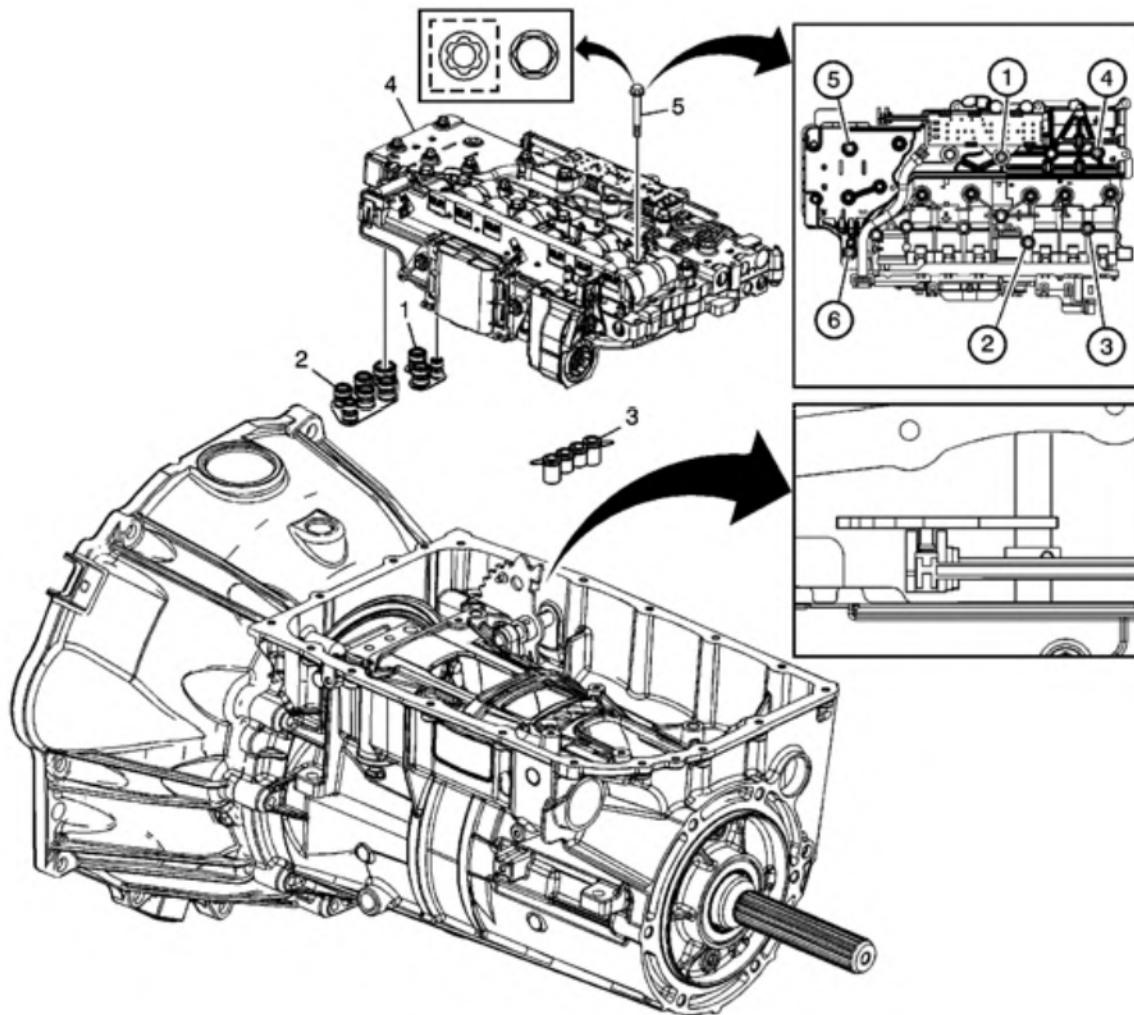
Callout	Component Name
1	Output Shaft Seal Assembly Special Tools • J 37212 Front Output Shaft Seal Installer • J 45000 Seal Remover For equivalent regional tools, refer to Special Tools.

Output Shaft Bearing Replacement - Case Extension (6L50)



Callout	Component Name
1	Output Shaft Bearing Assembly Tip Use <i>J 35512</i> bearing installer to remove the bearing and <i>DT 48222</i> bearing installer and <i>J 8092</i> driver handle to install the bearing. Special Tools • <i>DT 48222</i> Bearing Installer • <i>J 8092</i> Driver Handle • <i>J 35512</i> Inner Pinion Bearing Installer For equivalent regional tools, refer to Special Tools.

Control Valve Body Assembly Installation

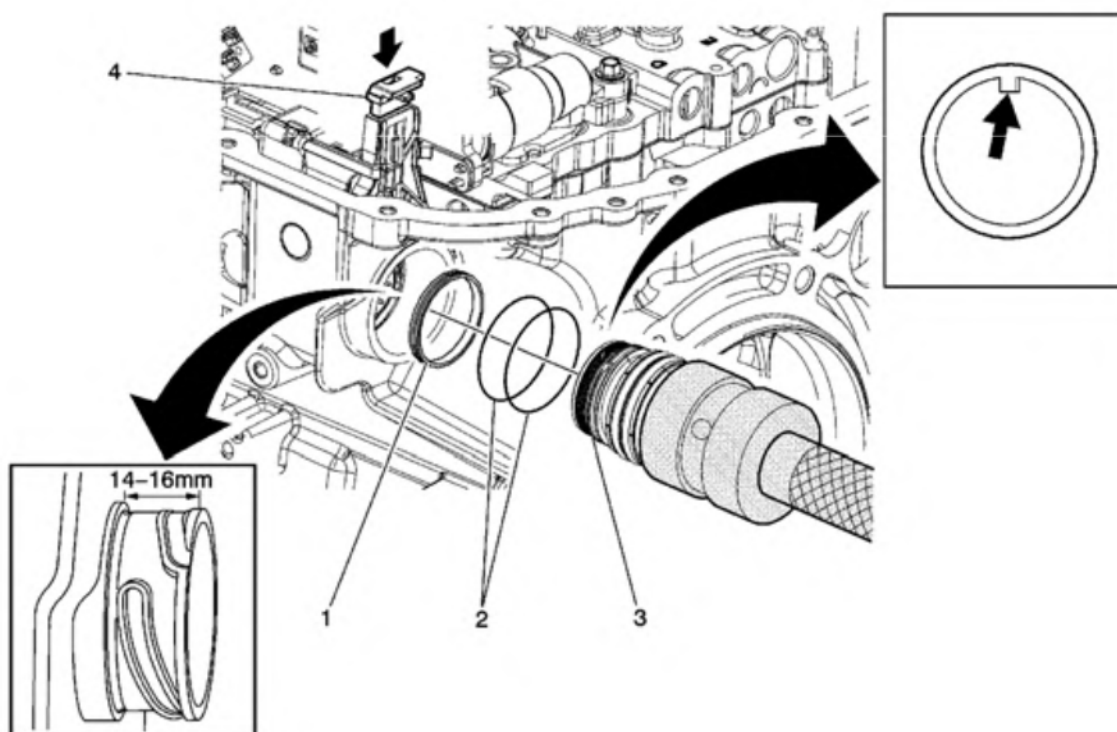


Callout	Component Name
1	NEW Fluid Pump Seal Assembly
2	NEW Fluid Pump Seal Assembly
3	NEW Center Support Fluid Passage Seal Assembly
4	Control Valve Body Assembly Tip Align the manual shift shaft position switch activator slide with the detent lever guide pin.
	Bolts M5 x 73 (Qty: 6) Caution: Refer to Fastener Caution in the Preface section.

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5	Procedure Tighten in the sequence shown. Tighten 8 N·m (71 lb in). Special Tool <i>DT-48285</i> Valve Body Torx Plus Socket (if applicable) For equivalent regional tools, refer to Special Tools.
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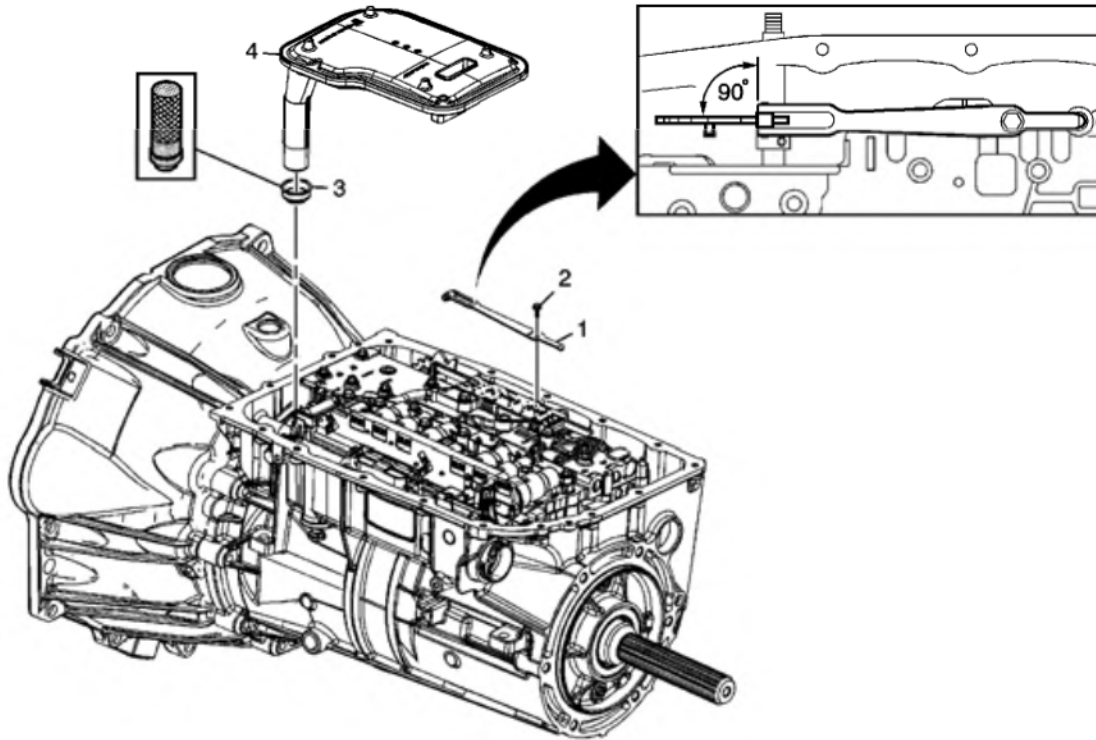
Automatic Transmission Electrical Connector Passage Sleeve Installation



Callout	Component Name
1	NEW Lip Seal
2	NEW O-Ring Seals (Qty: 2)
3	Electrical Connector Passage Sleeve Caution: Orientate the alignment tab inside the passage sleeve with the slot in the electrical connector of the control solenoid valve assembly. Push the sleeve straight into the case bore and connector. Do NOT rotate the sleeve at any time. Ensure the sleeve is fully seated into the case. When the sleeve is properly installed, the distance from the case surface to the end of the sleeve should be 14-16 mm. Even though the correct electrical connections may still be maintained, failure to ensure proper installation of the sleeve may result in a fluid leak around the sleeve lip seal and into the sleeve cavity. Specification 14-16 mm Special Tools

	• <i>DT 47715</i> Electrical Connector Passage Sleeve Remover/Installer • <i>J 42183</i> Driver Handle For equivalent regional tools, refer to Special Tools.
4	Electrical Connector Slide Lock Tip Push down on the electrical connector slide lock to ensure proper installation.

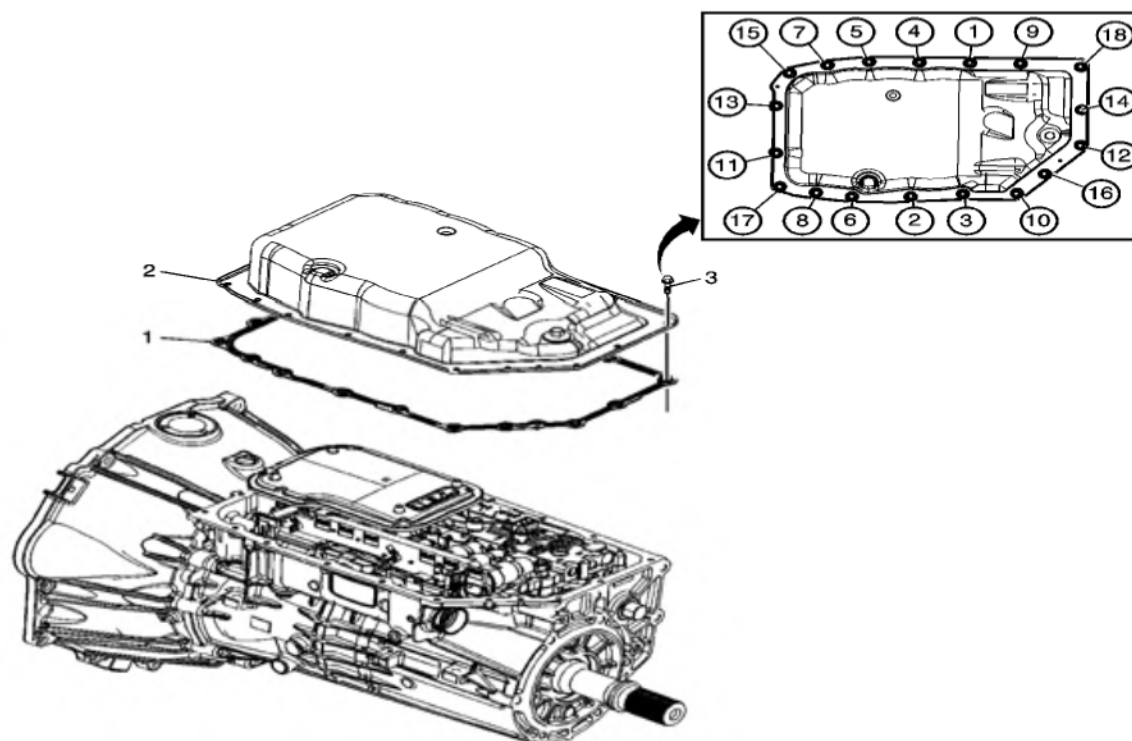
Fluid Filter and Manual Shift Detent Assembly Installation



Callout	Component Name
1	Manual Shaft Detent Assembly Caution: Ensure the manual shaft detent assembly roller is centered over the manual shaft detent lever assembly. Failure to center the roller may cause hard or no shift lever operation.
2	Bolt M6 x 14.5 Caution: Refer to Fastener Caution in the Preface section. Tighten 12 N·m (106 lb in).
3	NEW Fluid Filter Seal Assembly Special Tools • DT 47848 Seal Installer • J 42183 Driv

	For equivalent regional tools, refer to Special Tools .
4	NEW Fluid Filter Assembly

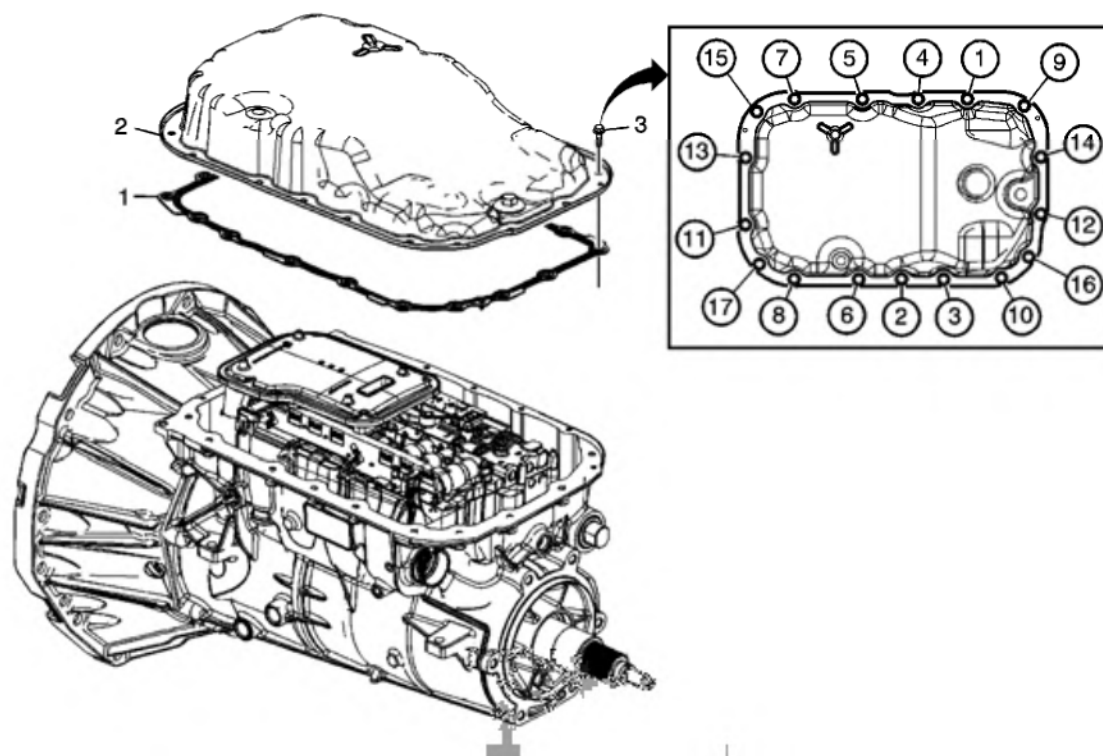
Transmission Fluid Pan Installation (6L90)



Callout	Component Name
1	Fluid Pan Gasket Tip The fluid pan gasket is reusable. Inspect the gasket to determine if it may be reused. If the gasket is stuck to the case or pan, it should be replaced.
2	Fluid Pan Assembly
3	Fluid Pan Bolts M6 x 20 (Qty: 18) Caution: Use the correct fastener in the correct location. Replacement fasteners must be the correct part number for that application. Fasteners requiring replacement or fasteners requiring the use of thread locking compound or sealant are identified in the service procedure. Do not use paints, lubricants, or corrosion inhibitors on fasteners or fastener joint surfaces unless specified. These coatings affect fastener torque and joint clamping force and may damage the fastener. Use the correct tightening sequence and specifications when installing fasteners in order to avoid damage to parts and systems. Procedure Tighten in sequence shown

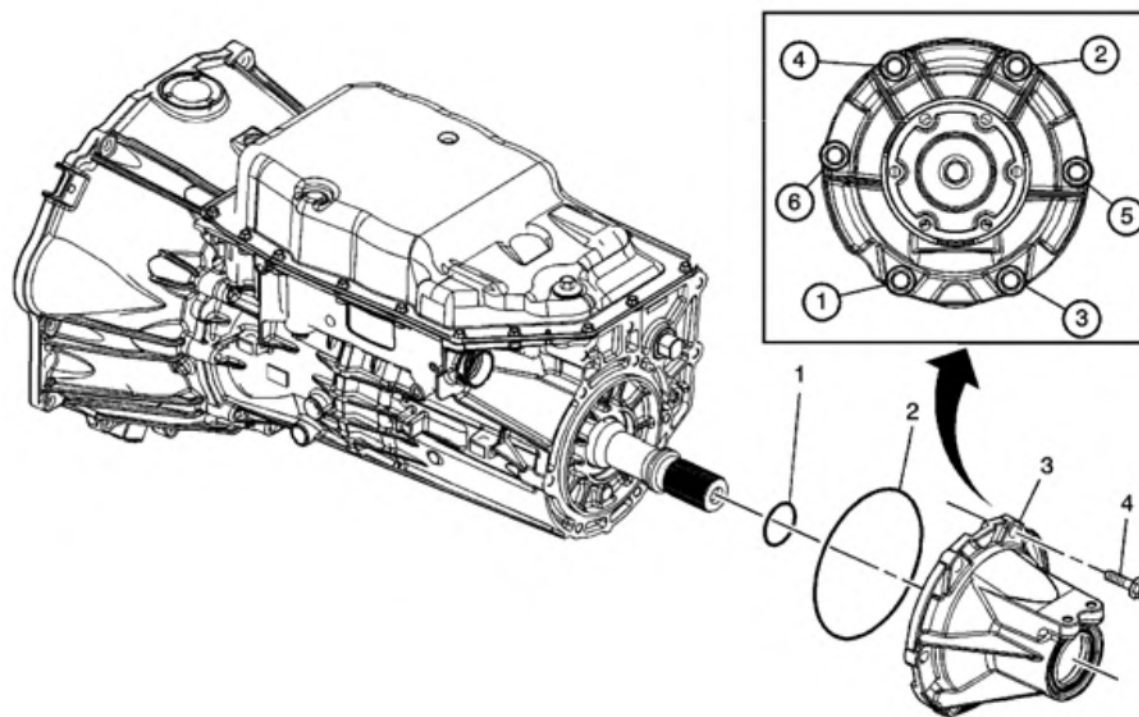
Tighten
9 N·m (80 lb in)

Transmission Fluid Pan Installation (6L50)



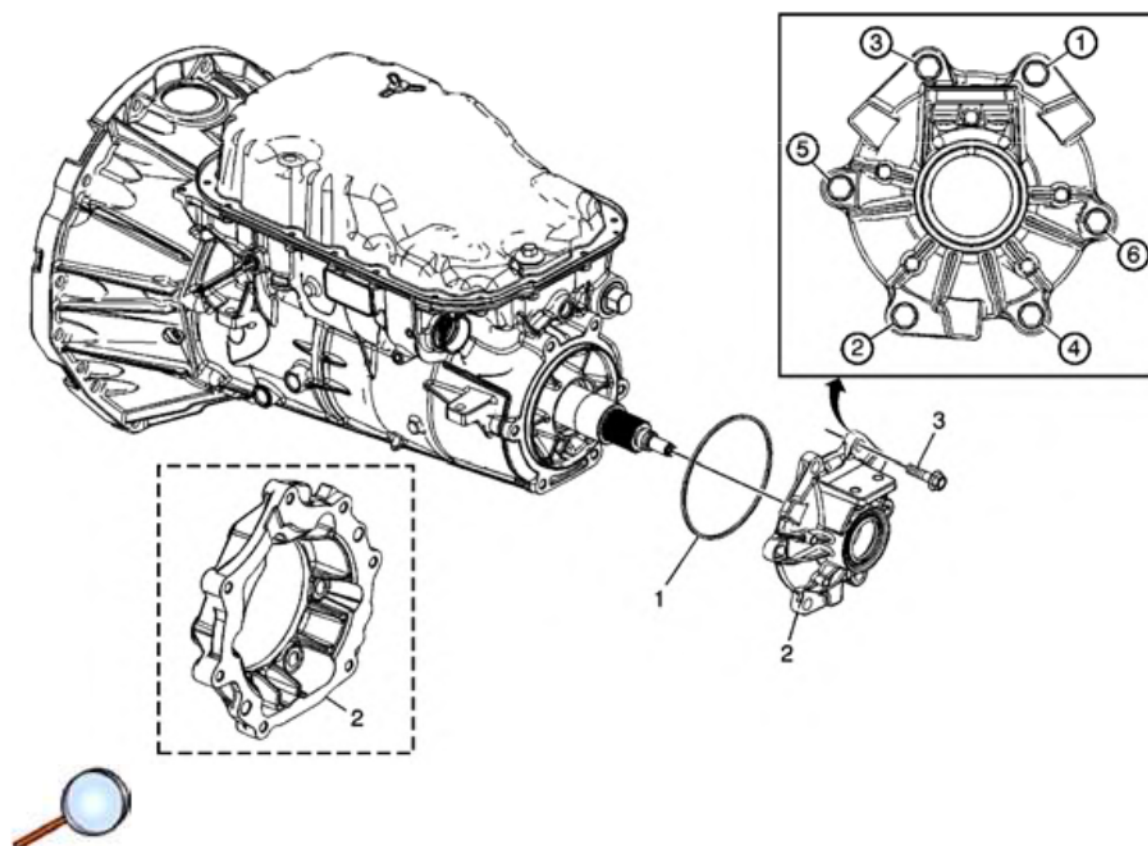
Callout	Component Name
1	Fluid Pan Gasket Tip The fluid pan gasket is reusable. Inspect the gasket to determine if it may be reused. If the gasket is stuck to the case or pan, it should be replaced.
2	Fluid Pan Assembly
3	Fluid Pan Bolts M6 x 20 (Qty: 17) Caution: Refer to Fastener Caution in the Preface section. Procedure: Tighten in sequence shown. Tighten 9 N·m (80 lb in)

Case Extension Assembly Installation (6L90)



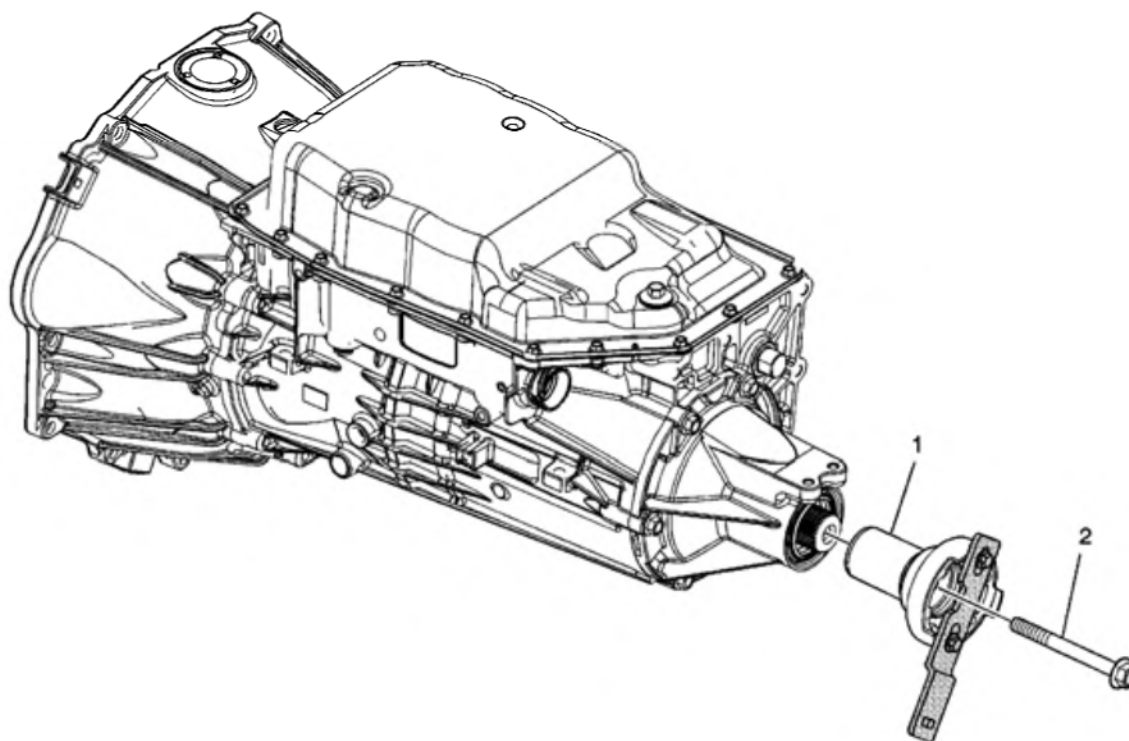
Callout	Component Name
1	NEW Prop Shaft Trans Flange Seal
2	NEW Case Extension Seal
3	Case Extension
4	Bolts M10 x 40 (Qty: 6) Caution: Refer to Fastener Caution in the Preface section. Procedure Tighten in sequence shown. Tighten 55 N·m (41 lb ft)

Case Extension Assembly Installation (6L50)



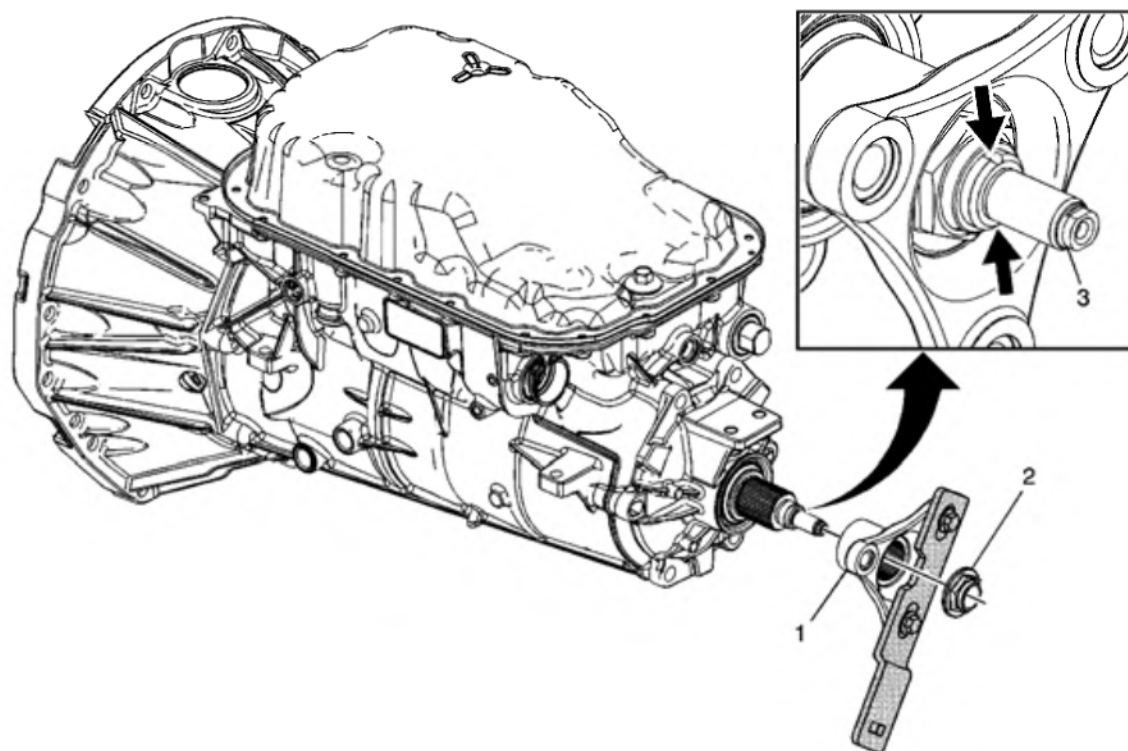
Callout	Component Name
1	NEW Case Extension Seal
2	Case Extension Tip Optional AWD version uses same bolts and torque sequence.
3	Bolts M10 x 40 (Qty: 6) Caution: Refer to Fastener Caution in the Preface section. Procedure: Tighten in sequence shown. Tighten 55 N·m (41 lb ft)

Propeller Shaft Transmission Flange Installation (6L90)



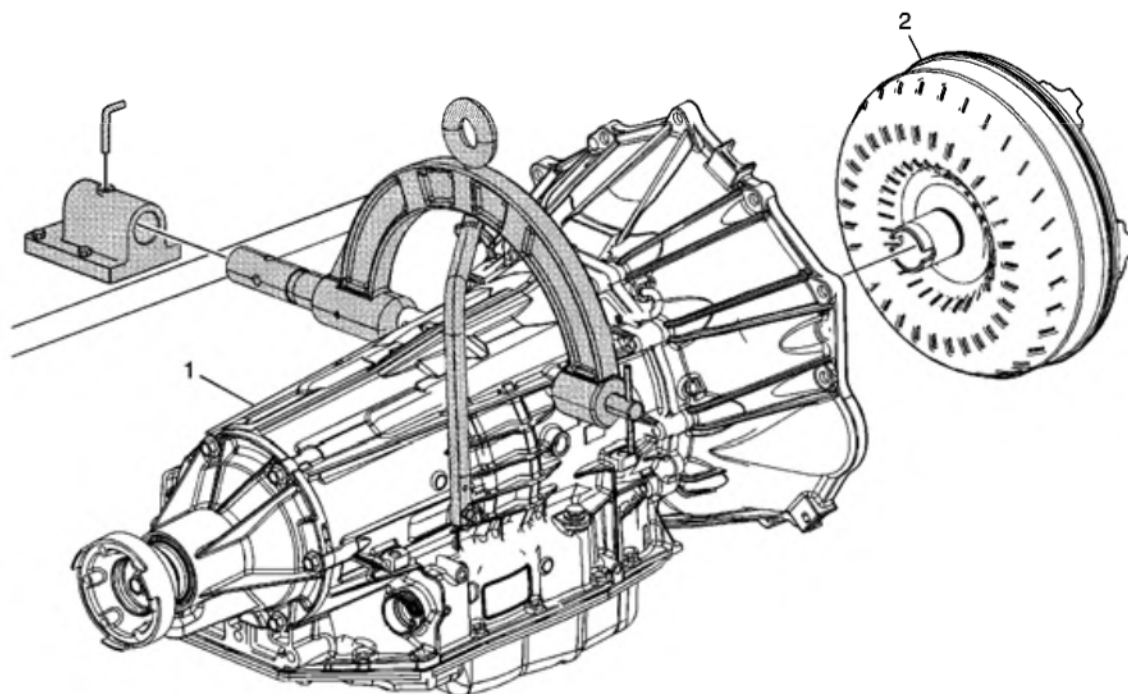
Callout	Component Name
1	Front Prop Shaft Flange
2	Prop Shaft Bolt Caution: Refer to Fastener Caution in the Preface section. Tighten 105 N·m (77 lb ft). Special Tool J 45012 Holding Fixture For equivalent regional tools, refer to Special Tools.

Propeller Shaft Transmission Flange Installation (6L50)



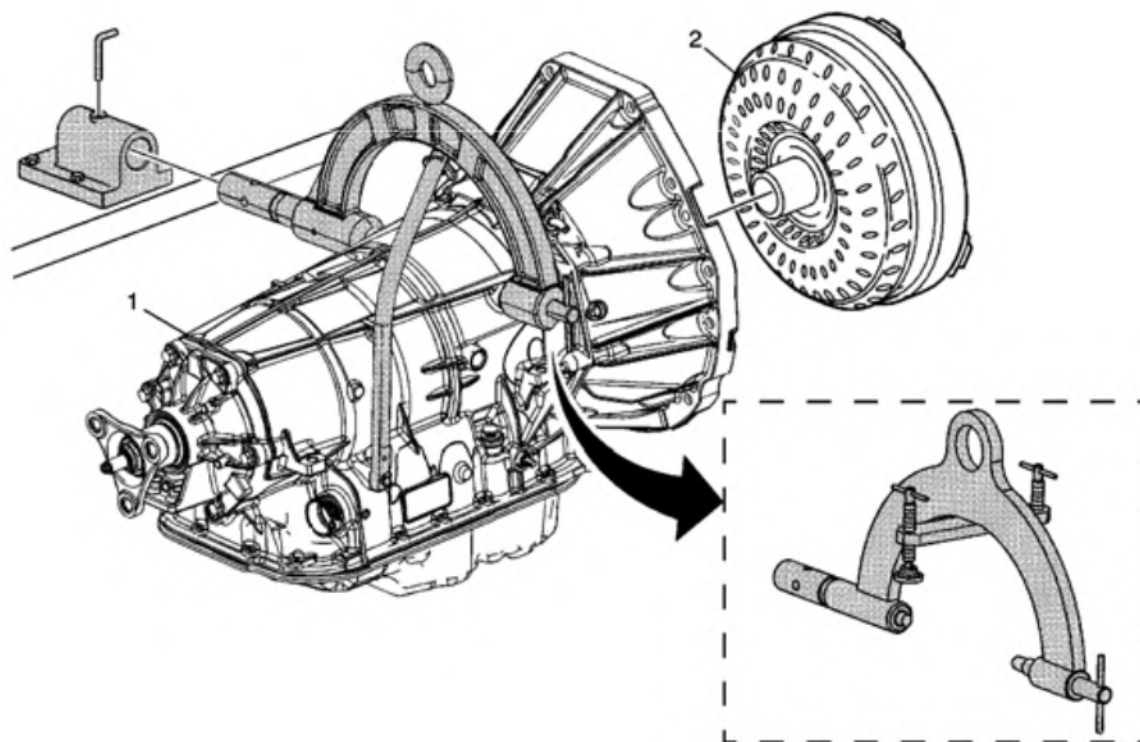
Callout	Component Name
1	Prop Shaft Trans Flange
2	NEW Front Prop Shaft Flange Nut Caution: Refer to Fastener Caution in the Preface section. Tighten 105 N·m (77 lb ft). Special Tool J 45012 Holding Fixture For equivalent regional tools, refer to Special Tools.
3	Output Shaft Caution: Stake the flange nut onto the output shaft. Use the two staking grooves on the shaft to locate the staking points. Failure to stake the flange nut may result in damage to the transmission.

Torque Converter Installation and Holding Fixture Removal (6L90)



Callout	Procedure
Preliminary Procedure	
Rotate the transmission so that the fluid pan assembly is down.	
1	Transmission Case Assembly Special Tools • DT 47605 Holding Fixture Adapter • J 3289-20 Holding Fixture Base Assembly • J 8763-B Holding Fixture For equivalent regional tools, refer to Special Tools.
2	Torque Converter Assembly

Torque Converter Installation and Holding Fixture Removal (6L50)



Callout	Procedure
Tip Rotate the transmission so that the fluid pan assembly is down.	
1	Transmission Case Assembly Special Tools • DT 48067 Holding Fixture Adapter • DT-48989 Holding Fixture • J 3289-20 Holding Fixture Base Assembly • J 8763-B Holding Fixture For equivalent regional tools, refer to Special Tools.
2	Torque Converter Assembly