

2018 TRANSMISSION**Power Transfer Unit - GKN 761 - Traverse****SPECIFICATIONS****FASTENER SPECIFICATIONS****Single Use Non-Threaded Fasteners/Components****NOTE:**

All fasteners/components listed in this table MUST BE DISCARDED and replaced with NEW after removal.

Application
Power Transfer Unit Adapter Seal
Extension Housing Cover Seal
Power Transfer Unit Face Seal
Power Transfer Unit Half Shaft Seal
Power Transfer Unit Input Shaft Seal
Power Transfer Unit Intermediate Drive Shaft Seal
Power Transfer Unit Intermediate Drive Shaft Clip
Power Transfer Unit Output Shaft Seal
Power Transfer Unit Propeller Shaft Seal
Power Transfer Unit Propeller Shaft Retainer

Single Use Threaded Fastener/Component Tightening Specifications**NOTE:**

All fasteners/components listed in this table MUST BE DISCARDED and replaced with NEW after removal.

Application	Specification
	Metric (English)
Power Transfer Unit Fill Plug	39 N.m (29 lb ft)
Power Transfer Unit Drain Plug	39 N.m (29 lb ft)

Reusable Threaded Fastener Tightening Specifications**NOTE:**

All fasteners listed in this table can be reused after removal.

Application	Specification
	Metric (English)
Transfer Case Bracket Bolt @ Engine	22 N.m (16 lb ft)
Power Transfer Unit Shift Actuator Bolt	10 N.m (89 lb in)
Power Transfer Unit Adapter Bolt	100 N.m (74 lb ft)
Power Transfer Unit Cover Housing Bolt	22 N.m (16 lb ft)
Power Transfer Unit Extension Housing Bolt	22 N.m (16 lb ft)
Power Transfer Unit Rear Pinion Housing Bolt	22 N.m (16 lb ft)
Power Transfer Unit Case @ Transfer Case Bracket Bolt	58 N.m (43 lb ft)
Transfer Case Bracket Bolt @ Power Transfer Unit Extension Housing	58 N.m (43 lb ft)

APPROXIMATE FLUID CAPACITIES

Application	Specification	
	Metric	English
Power Transfer Unit (PTU) GKN		
Power Transfer Unit Oil - 9T65 - RPO M3V	850 milliliters	0.90 quarts

ADHESIVES, FLUIDS, LUBRICANTS, AND SEALERS

Application	Type of Material	GM Part Number	
		United States	Canada
Extension Housing-to-Main Housing Bolts	Threadlocker	19332211	10953488
Intermediate Drive Shaft-to-Axle Half Shaft Splines	Lubricant	1051344	00993037
Main and Extension Housing Threaded Holes	Cleaner	88862650	88901247
Power Transfer Unit Oil	75W-90 Synthetic	19352759	19352760
Propeller Shaft-to-Rear Output Shaft Splines	Lubricant	1051344	00993037

COMPONENT LOCATOR

POWER TRANSFER UNIT CASE DISASSEMBLED VIEW

Power Transfer Unit Components

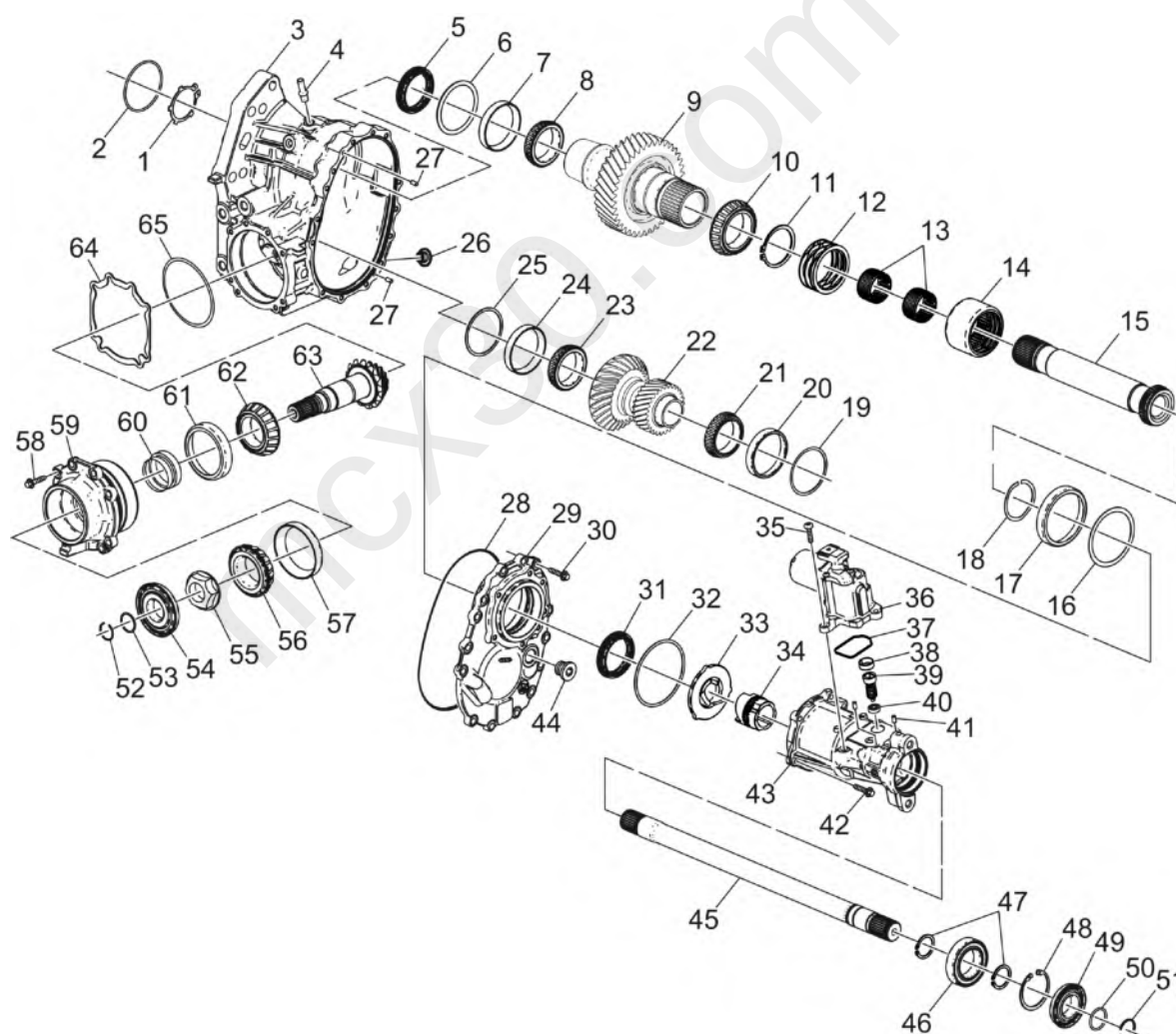


Fig. 1: Exploded View Of Power Transfer Unit Components

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
1	Power Transfer Input Shaft Clip
2	Power Transfer Unit Face Seal - O-Ring
3	Power Transfer Unit Housing
4	Power Transfer Unit Vent Hose Connector
5	Power Transfer Unit Input Shaft Seal - Case

Callout	Component Name
6	Power Transfer Unit Bearing Race Shim
7	Power Transfer Unit Bearing Race
8	Power Transfer Unit Bearing
9	Power Transfer Unit Input Disconnect Shaft
10	Power Transfer Unit Bearing
11	Power Transfer Input Connect Spring Clip
12	Power Transfer Unit Connect Spring
13	Input Disconnect Shaft Needle Bearing [2x]
14	Power Transfer Unit Shift Sleeve
15	Power Transfer Unit Input Shaft
16	Power Transfer Unit Bearing Race Shim
17	Power Transfer Unit Bearing Race
18	Power Transfer Unit Wave Ring
19	Power Transfer Unit Bearing Race Shim
20	Power Transfer Unit Bearing Race
21	Power Transfer Unit Bearing
22	Power Transfer Unit Idler Shaft
23	Power Transfer Unit Bearing
24	Power Transfer Unit Bearing Race
25	Power Transfer Unit Bearing Race Shim
26	Power Transfer Unit Drain Plug
27	Power Transfer Unit Locating Pin [2x]
28	Power Transfer Unit Cover Housing Seal
29	Power Transfer Unit Cover Housing
30	Power Transfer Unit Cover Housing Bolt [13x]
31	Power Transfer Unit Input Shaft Seal - Cover
32	Extension Housing Cover Seal - O-Ring
33	Power Transfer Disconnect Linear Cam
34	Power Transfer Disconnect Rotary Cam
35	Power Transfer Unit Shift Actuator Bolt [3x]
36	Power Transfer Unit Shift Actuator
37	Power Transfer Unit Shift Actuator Seal
38	Power Transfer Unit Actuator Worm Gear Sleeve
39	Power Transfer Unit Actuator Worm Gear
40	Power Transfer Unit Actuator Worm Gear Bearing
41	Power Transfer Unit Locating Pin [2x]
42	Power Transfer Unit Extension Housing Bolt [5x]
43	Power Transfer Unit Extension Housing
44	Power Transfer Unit Fill Plug
45	Power Transfer Unit Intermediate Drive Shaft
46	Power Transfer Unit Intermediate Drive Shaft Bearing
47	Power Transfer Unit Intermediate Drive Shaft Bearing Retaining Ring [2x]
48	Power Transfer Unit Intermediate Drive Shaft Bearing Retainer
49	Power Transfer Unit Intermediate Drive Shaft Seal
50	Power Transfer Unit Half Shaft Seal - O-Ring
51	Power Transfer Unit Intermediate Drive Shaft Clip
52	Power Transfer Unit Propeller Shaft Retainer
53	Power Transfer Unit Propeller Shaft Seal - O-Ring
54	Power Transfer Unit Output Shaft Seal
55	Power Transfer Unit Pinion Preload Nut
56	Power Transfer Unit Rear Output Shaft Bearing
57	Power Transfer Unit Rear Output Shaft Bearing Race
58	Power Transfer Unit Rear Pinion Housing Bolt [8x]

Callout	Component Name
59	Power Transfer Unit Rear Output Shaft Housing
60	Power Transfer Unit Pinion Compression Sleeve
61	Power Transfer Unit Rear Output Shaft Bearing Race
62	Power Transfer Unit Rear Output Shaft Bearing
63	Power Transfer Unit Rear Output Shaft
64	Power Transfer Unit Rear Output Shaft Shim
65	Power Transfer Unit Pinion Seal - O-Ring

Power Transfer Unit Mounting (with Transmission M3W)

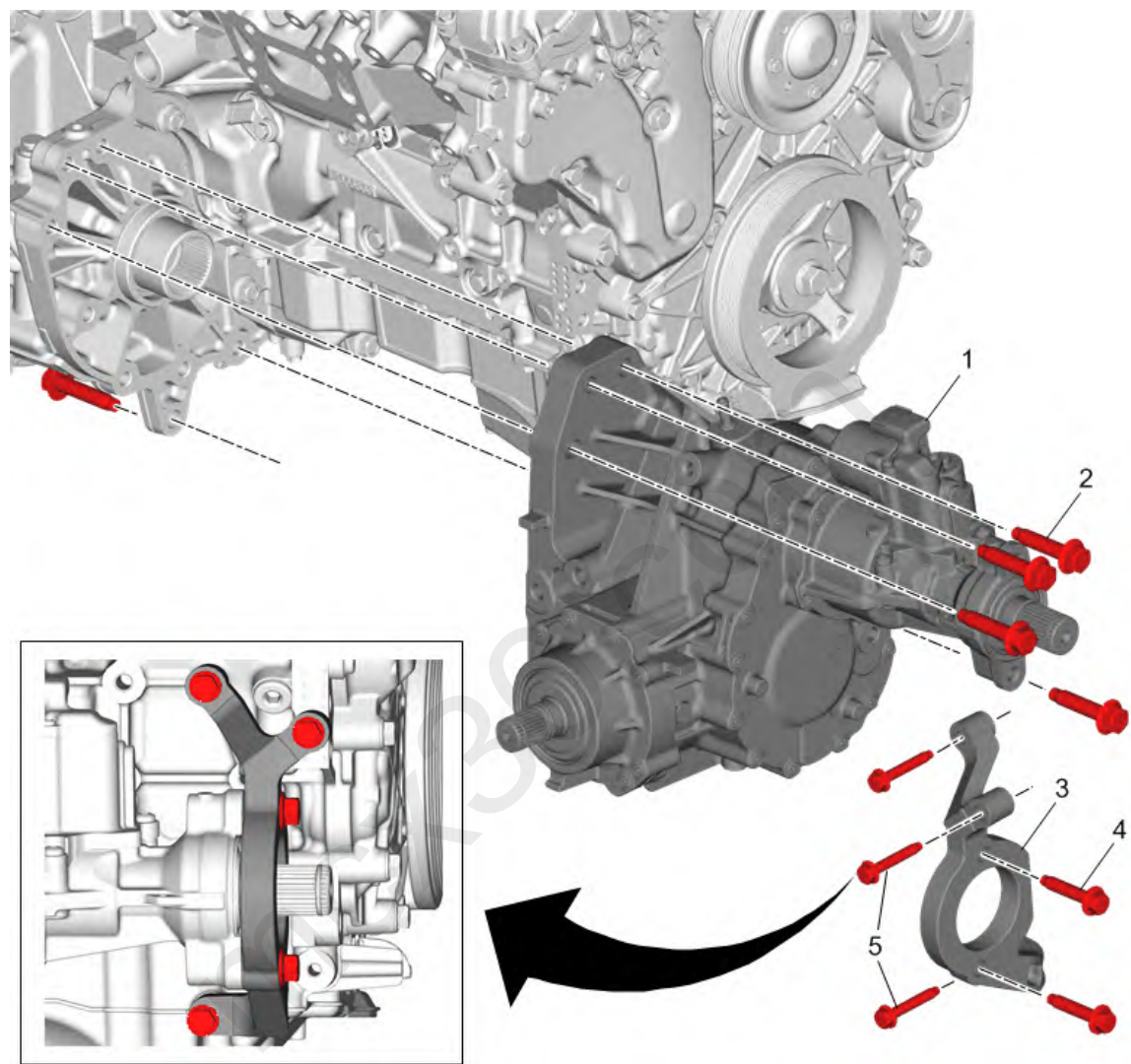
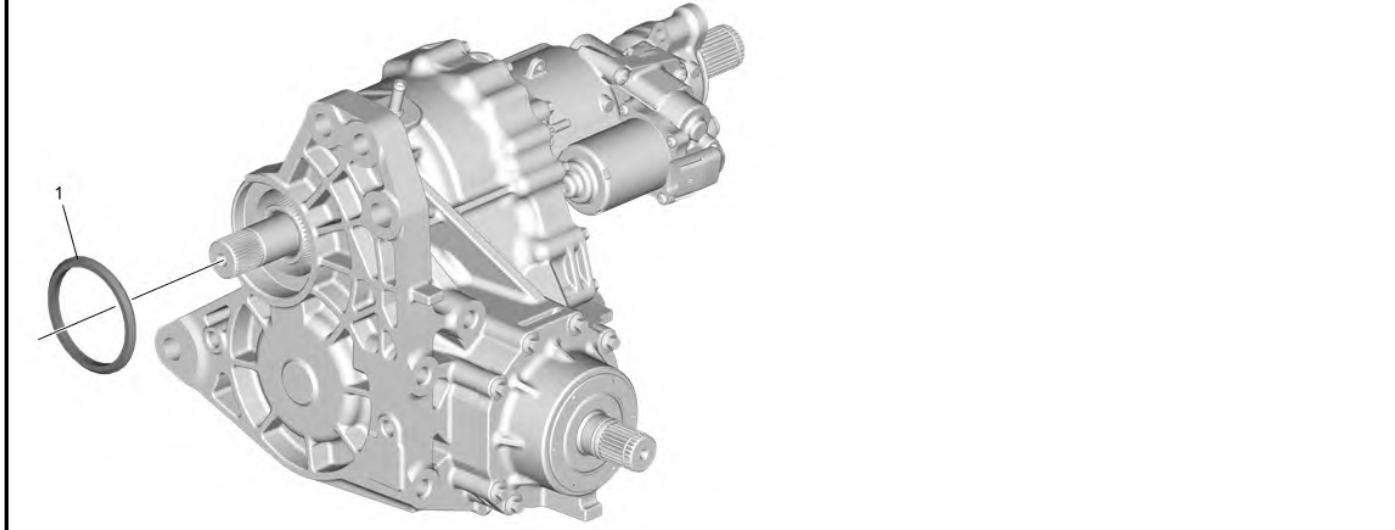


Fig. 2: Exploded View Of Power Transfer Unit Mounting Components (With Transmission M3W)
 Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
1	Power Transfer Unit Case
2	Power Transfer Unit Bolt [5x]
3	Transaxle Brace-to-Engine Bolt
4	Transfer Case-to-Transmission Bolt [3x]
5	Transfer Case-to-Transmission Bolt [2x]

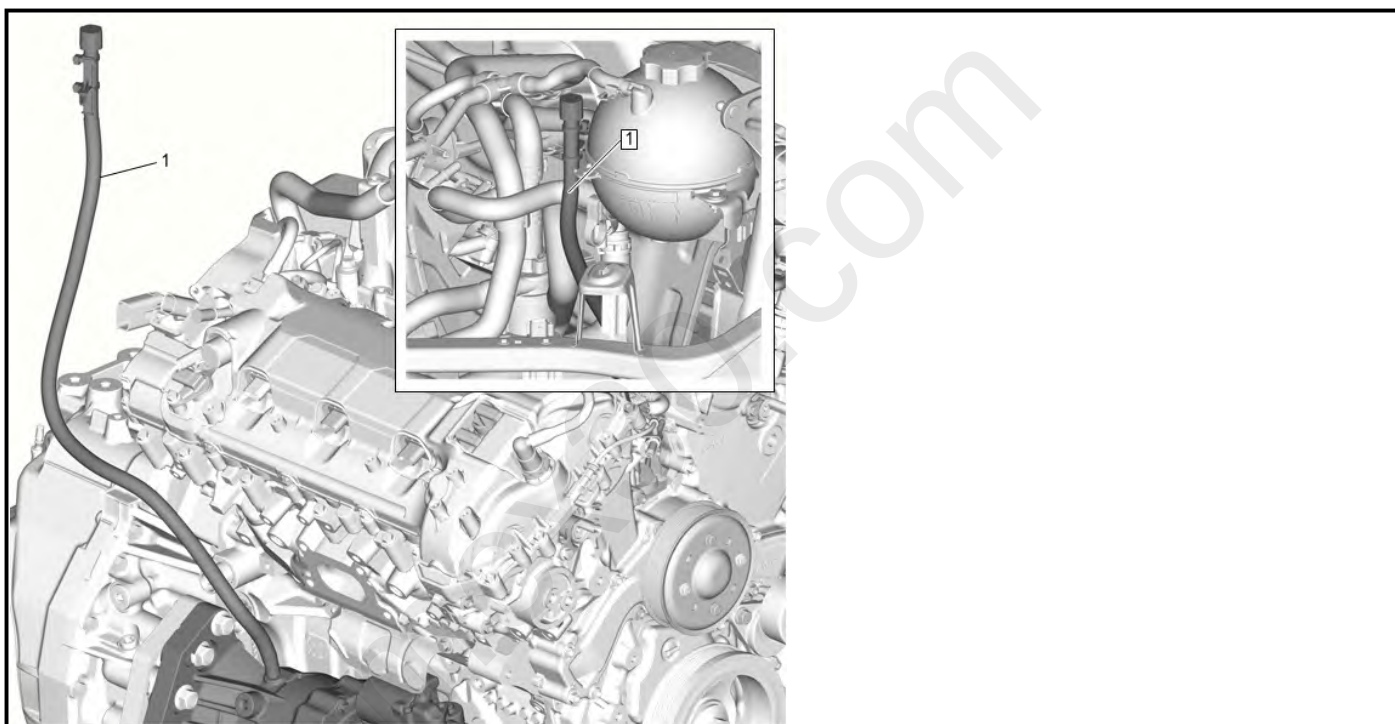
Power Transfer Unit Seal View





Callout	Component Name
1	Power Transfer Unit Face Seal - O-Ring

Power Transfer Unit Vent Hose Assembly



Callout	Component Name
1	Power Transfer Unit Vent Hose

DIAGNOSTIC INFORMATION AND PROCEDURES

SYMPTOMS - POWER TRANSFER UNIT CASE

Strategy Based Diagnostics

Review the system operations in order to familiarize yourself with the system functions. Refer to [Power Transfer Unit Case Disassembled View](#), [Power Transfer Unit Case Description and Operation](#), and [Rear Drive Axle Description and Operation \(With G99\)](#) [Rear Drive Axle Description and Operation \(Without G99\)](#) . All diagnosis on a vehicle should follow a logical process. Strategy based diagnostics is a uniform approach for repairing all systems. The diagnostic flow may always be used in order to resolve a system condition. The diagnostic flow is the place to start when repairs are necessary. For a detailed explanation, refer to [Strategy Based Diagnosis](#) .

Visual/Physical Inspection

- Inspect for aftermarket devices, which could affect the operation of the vehicle. Refer to [Checking Aftermarket Accessories](#) .

- Inspect the easily accessible or visible system components for obvious damage or conditions, which could cause the symptom.
- Inspect for the correct lubricant levels and the proper viscosities.
- Verify the exact operating conditions under which the concern exists. Note factors such as vehicle speed, road conditions, ambient temperature, and other specifics.
- Compare the driving characteristics or sounds, if applicable, to a known good vehicle and ensure you are not trying to correct a normal condition.

Intermittent

Test the vehicle under the same conditions that the customer reported in order to verify the system is operating properly.

Symptom List

Refer to a symptom diagnostic procedure from the following list in order to diagnose the symptom:

- [Diagnostic System Check - Vehicle](#) .
- [Noisy in Drive](#).
- [Noisy When Coasting](#).
- [Intermittent Noise](#).
- [Constant Noise](#).
- [Ratcheting Noise During All-Wheel Drive \(AWD\) Engagement](#).
- [Power Transfer Unit Case Leak Diagnosis](#).

NOISY IN DRIVE

Cause	Correction
Inspect for the proper transaxle and gear oil levels prior to performing system diagnosis.	
Low gear oil level	Inspect the power transfer unit for leaks, repair as required. Refer to <u>Power Transfer Unit Case Leak Diagnosis</u> , and <u>Adhesives, Fluids, Lubricants, and Sealers</u> .
Incorrect gear oil in the power transfer unit	Replace the gear oil. Refer to <u>Adhesives, Fluids, Lubricants, and Sealers</u> .
Water or contamination within the power transfer unit oil	Flush the contaminated fluid from the unit and replace with new oil.
Worn propeller shaft constant velocity joints	Replace propeller shaft assembly. Refer to <u>Two-Piece Propeller Shaft Replacement</u> .
Worn or noisy wheel bearings	Replace the wheel bearings as required. Refer to <u>Wheel Bearings Diagnosis</u> .
Worn wheel drive shaft constant velocity joints	Replace the constant velocity joints, as required. Refer to <u>Front Wheel Drive Shaft Inner Joint and Boot Replacement</u> , <u>Front Wheel Drive Shaft Outer Joint and Boot Replacement</u> , <u>Rear Wheel Drive Shaft Inner Joint and Boot Replacement</u> , and <u>Rear Wheel Drive Shaft Outer Joint and Boot Replacement</u> .

Cause	Correction
Bearing noise within the power transfer unit • A grinding noise that occurs at a specific engine speed, regardless of transmission gear, is not within the power transfer unit. • A grinding noise that changes as a transmission shift occurs is not within the power transfer unit. • A grinding noise that changes as vehicle speed changes may be also caused by worn wheel bearings. • A grinding noise that changes as the vehicle turns may also be caused by worn wheel bearings and/or tires.	1. Inspect for the proper power transfer unit fluid level. Fill, as required. 2. Identify the location of the noise using the J-39570 Chassis Ears. 3. If the noise continues, inspect the power transfer unit internal components. If damage is present, replace the assembly as required.
Gear set whine noise within the power transfer unit • A whine noise that occurs at a specific engine speed, regardless of transmission gear, is not within the power transfer unit. • A whine noise that changes as a transmission shift occurs is not within the power transfer unit. • A whine noise that changes as vehicle speed changes may be also caused by worn wheel bearings. • A whine noise that changes as the vehicle turns may also be caused by worn wheel bearings and/or tires.	1. Inspect for the proper power transfer unit fluid level. Fill, as required. 2. Identify the location of the noise using the J-39570 Chassis Ears. 3. If the noise continues, inspect the power transfer unit internal components. If damage is present, replace the assembly as required.

NOISY WHEN COASTING

Cause	Correction
Inspect for the proper transaxle and gear oil levels prior to performing system diagnosis.	
Low gear oil level	Inspect the power transfer unit for leaks, repair as required. Refer to Power Transfer Unit Case Leak Diagnosis , and Adhesives, Fluids, Lubricants, and Sealers .
Incorrect gear oil in the power transfer unit	Replace the gear oil. Refer to Adhesives, Fluids, Lubricants, and Sealers .
Worn propeller shaft constant velocity joints	Replace propeller shaft assembly. Refer to Two-Piece Propeller Shaft Replacement .
Worn wheel drive shaft constant velocity joints	Replace the constant velocity joints, as required. Refer to Front Wheel Drive Shaft Inner Joint and Boot Replacement , Front Wheel Drive Shaft Outer Joint and Boot Replacement , Rear Wheel Drive Shaft Inner Joint and Boot Replacement , and Rear Wheel Drive Shaft Outer Joint and Boot Replacement .

Cause	Correction
Bearing noise within the power transfer unit - A grinding noise that occurs at a specific engine speed, regardless of transmission gear, is not within the power transfer unit. - A grinding noise that changes as a transmission shift occurs is not within the power transfer unit. - A grinding noise that changes as vehicle speed changes may be also caused by worn wheel bearings. - A grinding noise that changes as the vehicle turns may also be caused by worn wheel bearings and/or tires.	- Inspect for the proper power transfer unit fluid level. Fill, as required. - Identify the location of the noise using the J-39570 Chassis Ears. - If the noise continues, inspect the power transfer unit internal components. If damage is present, replace the assembly as required.
Gear set whine noise within the transfer case - A whine noise that occurs at a specific engine speed, regardless of transmission gear, is not within the power transfer unit. A whine noise that changes as a transmission shift occurs is not within the power transfer unit. - A whine noise that changes as vehicle speed changes may be also caused by worn wheel bearings. - A whine noise that changes as the vehicle turns may also be caused by worn wheel bearings and/or tires.	- Inspect for the proper power transfer unit fluid level. Fill, as required. - Identify the location of the noise using the J-39570 Chassis Ears. - If the noise continues, inspect the power transfer unit internal components. If damage is present, replace the assembly as required.

INTERMITTENT NOISE

Cause	Correction
Inspect for the proper transaxle and gear oil levels prior to performing system diagnosis.	
Incorrect gear oil in the power transfer unit	Replace the gear oil. Refer to Adhesives, Fluids, Lubricants, and Sealers .
Power transfer unit bearing. A chatter or ratcheting type noise during hard acceleration on tight turns.	Confirm noise is coming from the power transfer unit. Repair as required.

CONSTANT NOISE

Cause	Correction
Inspect for the proper transaxle and gear oil levels prior to performing system diagnosis.	

Cause	Correction
Low gear oil level	Inspect the power transfer unit for leaks, repair as required. Refer to Power Transfer Unit Case Leak Diagnosis , and Adhesives, Fluids, Lubricants, and Sealers .
Incorrect gear oil in the power transfer unit	Replace the gear oil. Refer to Adhesives, Fluids, Lubricants, and Sealers .
Worn propeller shaft constant velocity joints	Replace propeller shaft assembly. Refer to Two-Piece Propeller Shaft Replacement .
Bearing noise within the power transfer unit • A grinding noise that occurs at a specific engine speed, regardless of transmission gear, is not within the power transfer unit. • A grinding noise that changes as a transmission shift occurs is not within the power transfer unit. • A grinding noise that changes as vehicle speed changes may be also caused by worn wheel bearings. • A grinding noise that changes as the vehicle turns may also be caused by worn wheel bearings and/or tires.	1. Inspect for the proper power transfer unit fluid level. Fill, as required. 2. Identify the location of the noise using the J-39570 Chassis Ears. 3. If the noise continues, inspect the power transfer unit internal components. If damage is present, replace the assembly as required.
Gear set whine noise within the power transfer unit • A whine noise that occurs at a specific engine speed, regardless of transmission gear, is not within the power transfer unit. • A whine noise that changes as a transmission shift occurs is not within the power transfer unit. • A whine noise that changes as vehicle speed changes may be also caused by worn wheel bearings. • A whine noise that changes as the vehicle turns may also be caused by worn wheel bearings and/or tires.	1. Inspect for the proper power transfer unit fluid level. Fill, as required. 2. Identify the location of the noise using the J-39570 Chassis Ears. 3. If the noise continues, inspect the power transfer unit internal components. If damage is present, replace the assembly as required.

RATCHETING NOISE DURING ALL-WHEEL DRIVE (AWD) ENGAGEMENT

Cause	Correction

Cause	Correction
DEFINITION A clicking or ratcheting noise that can be heard during certain driving conditions. 1. Compare the noise to a similar vehicle to see if a normal condition. 2. Note specifics such as, vehicle speed, road conditions, is the noise present on acceleration, deceleration, coast, turns, or other specifics. Also note if the noise is present in 2WD, AWD-Sport, AWD-off road, or AWD-trailer (model dependent) mode. 3. Identify the source of the noise using chassis ears and refer to the appropriate service information section. 4. If the source of the noise is the power transfer unit, inspect for the correct fluid level. Refer to Power Transfer Unit Case Fluid Replacement. 5. Inspect the drain plug for large metal deposits. Small metal flakes and fine metal dust on the plug magnet are to be considered normal. NOTE: A clicking or ratcheting noise that is heard during AWD engagement or dis-engagement may be related to the AWD disconnect components internal to the power transfer unit. A single light click noise that is heard during AWD engagement is to be considered a normal operating characteristic of the vehicle. Refer to the Symptoms - Power Transfer Unit Case and perform necessary inspections.	
Broken Propeller Shaft-to-PTU Retaining Ring	Inspect for a broken propeller shaft-to- power transfer unit retaining ring. Refer to Two-Piece Propeller Shaft Replacement .
Differential Carrier Assembly - Worn Clutch Plates	A differential carrier assembly with worn clutch plates may not rotate the propeller shaft to the required speed to allow the power transfer unit to shift into AWD mode. Refer to Symptoms - Rear Differential Carrier .
Power Transfer Unit - Shift Components Lube Cycle Click	A clicking or engagement type noise may be periodically present for a short time at vehicle start-up and is to be considered a normal operating characteristic of the vehicle. NOTE: Vehicle calibrations will periodically cycle the power transfer unit internal AWD shift components to ensure the parts are adequately lubed.

POWER TRANSFER UNIT CASE LEAK DIAGNOSIS

Cause	Correction
DEFINITION: A visible indication of an external fluid leak from the power transfer unit. Review the Symptoms - Power Transfer Unit Case , and Power Transfer Unit Case Description and Operation and perform the necessary inspections. See below for suggested diagnostic method(s).	

Cause	Correction
Special Tools • GE-28431-6 Fluorescent Oil Dye • GE-28428-E High Intensity Black Light Kit For equivalent regional tools, refer to Special Tools. Fluorescent Dye Method 1. Add GE-28431-6 Fluorescent dye to the transmission or power transfer unit to determine the source of the leak. 2. Operate the vehicle. 3. Inspect for the presence of dye within the oil leak using the GE-28428-E High Intensity Black Light Kit. A presence or non-presence of dye within the oil leak will indicate which component is the source of the leak. Powder Method CAUTION: Do not clean using brake cleaner or other reactive solvents as these solvents can damage rubber gaskets, seals and bushings. 1. Thoroughly clean the suspected leak area using a rag. 2. Apply an aerosol type leak tracing powder to the suspected leak area. NOTE: Do not drive the vehicle on the freeway as this will splatter oil inhibiting leak diagnosis. 3. Operate the vehicle for 15 - 20 minutes under city driving conditions until normal operating temperatures are reached. 4. Shut OFF the engine. 5. Inspect the suspected leak area. 6. Trace the leak path through the powder in order to find the source of the leak.	
Drain plug or fill plug leak	1. Inspect for dirty, worn, scored sealing surfaces, or missing drain and/or fill plug sealing washers. 2. Replace as required.
Restricted or damaged ventilation hose assembly	Replace the ventilation hose assembly, as required.
Leaking at the power transfer unit left side weep hole	1. Operate the vehicle. 2. Inspect for an oil leak at the weep hole location. Refer to Power Transfer Unit Case Description and Operation for the weep hole location. NOTE: An oil leak at the power transfer unit weep hole location is caused by either the power transfer unit input shaft oil seal-front or the intermediate drive shaft oil seal (located in the right end of input shaft). Replace both seals as required.
Leaking ATF at the right side axle shaft-to-intermediate shaft bearing location.	Replace the intermediate drive shaft seal located in the output end of the extension housing.

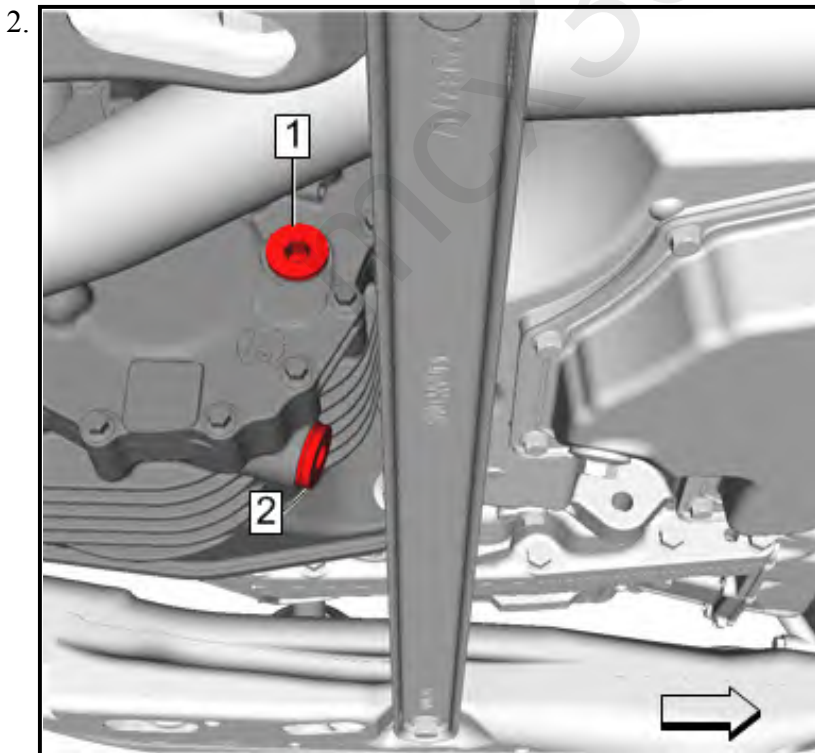
Cause	Correction
Leaking at rear output shaft area A leak at rear output shaft area is caused by either the rear output shaft seal or the rear output shaft housing O-ring seal.	Inspect and replace the rear output shaft seal as required. The O-ring is not serviceable on AAM power transfer unit.
Leaking at transaxle assembly-to-transfer case interface A transmission oil leak at the transmission-to-power transfer unit interface may be caused by the transmission-to-power transfer unit O-ring seal or face seal.	1. Identify the type of oil leak. 2. Replace components as required. NOTE: If the leak is transmission or O-ring or face seal related, do not replace the power transfer unit input shaft seals.
Case half leak at the idler gear shaft tube location	Disassemble and replace the idler gear shaft tube O-ring seals as required.
Case half seam leak AAM	Disassemble and replace the power transfer unit-to-rear extension housing O-ring seal.
Leaking through case	• Inspect for a cracked case. • Inspect for case porosity. Replace the components as required.

REPAIR INSTRUCTIONS - ON VEHICLE

POWER TRANSFER UNIT CASE FLUID REPLACEMENT

Removal Procedure

1. Raise and suitably support the vehicle. [Lifting and Jacking the Vehicle](#) .



NOTE: When performing the following procedure, use only hand tools to remove and install the drain and fill plugs.

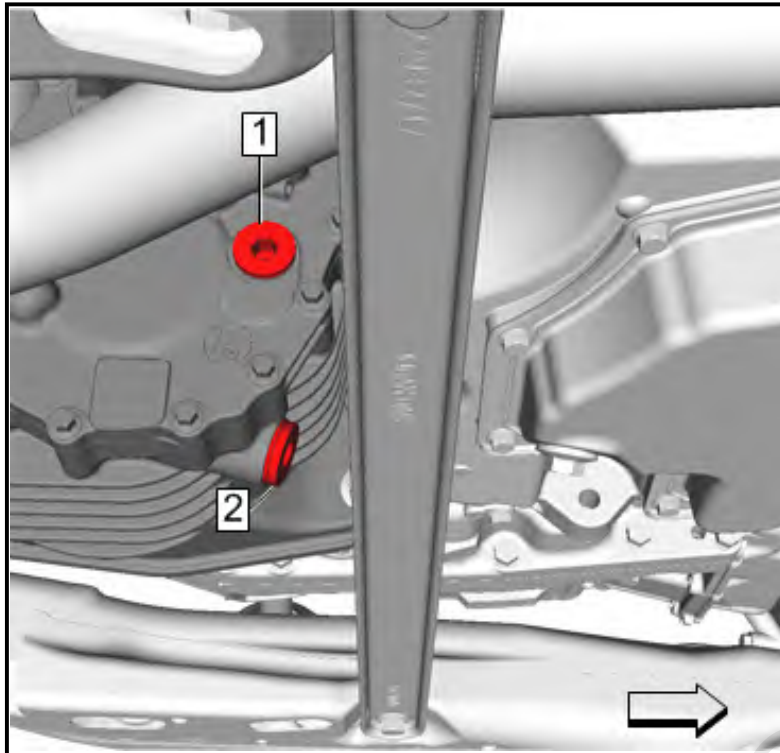
NOTE: Ensure that an approved drain pan is used when draining the transfer case.

Remove and DISCARD the oil drain plug (2) and seal.

3. Remove and DISCARD the fill plug (1) and seal.
4. Allow the transfer case to drain completely.

Installation Procedure

1.



CAUTION: Refer to [Component Fastener Tightening Caution](#) .

Install a NEW drain plug (2) and seal and tighten to 39 N.m (29 lb ft).

2. Fill the transfer case to the bottom of the fill plug hole with the recommended fluid. Refer to [Adhesives, Fluids, Lubricants, and Sealers](#), and [Approximate Fluid Capacities](#).
3. Install a NEW fill plug (1) and seal and tighten to 39 N.m (29 lb ft).
4. Inspect the cross member to ensure that no oil has drained into the cross member cavity. Clean the cross member if necessary.

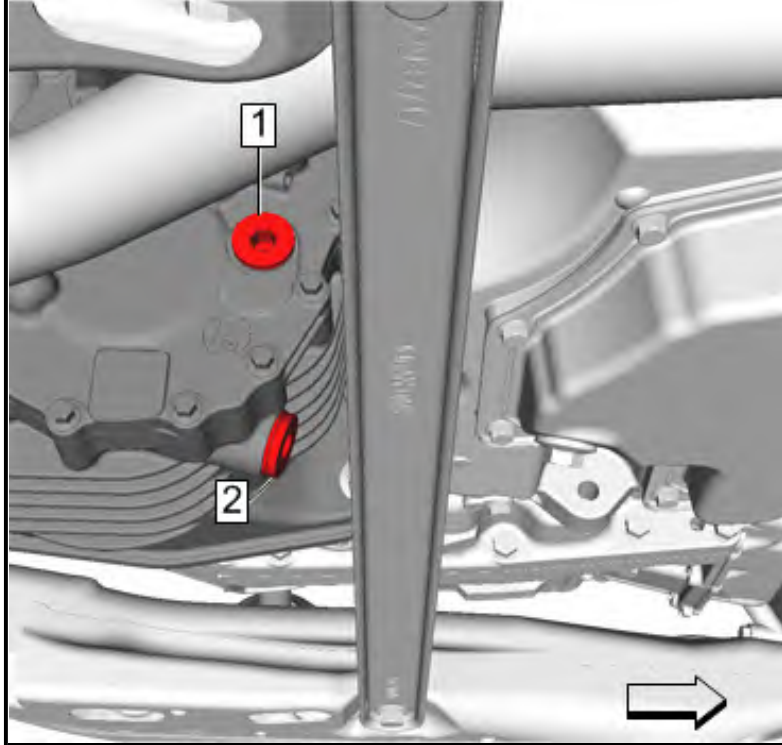
DRAIN PLUG REPLACEMENT

Removal Procedure

1. Raise and suitably support the vehicle. [Lifting and Jacking the Vehicle](#) .

2.





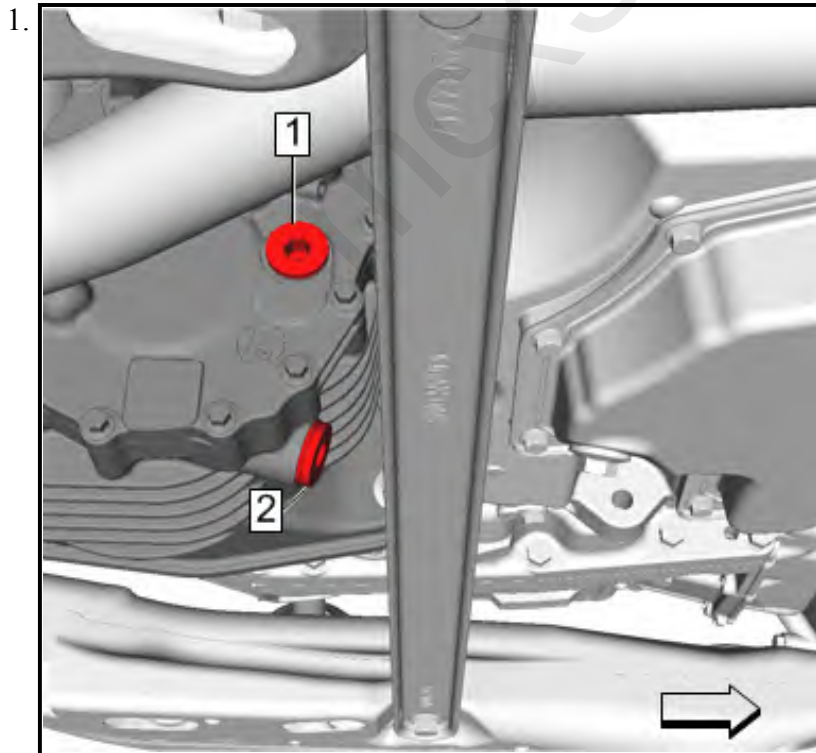
NOTE: When performing the following procedure, use only hand tools to remove and install the drain and fill plugs.

NOTE: Ensure that an approved drain pan is used when draining the transfer case.

Remove and DISCARD the oil drain plug (2) and seal.

3. Remove and DISCARD the fill plug (1) and seal.
4. Allow the transfer case to drain completely.

Installation Procedure



CAUTION: Refer to [Component Fastener Tightening Caution](#) .

Install a NEW drain plug (2) and seal and tighten to 39 N.m (29 lb ft).

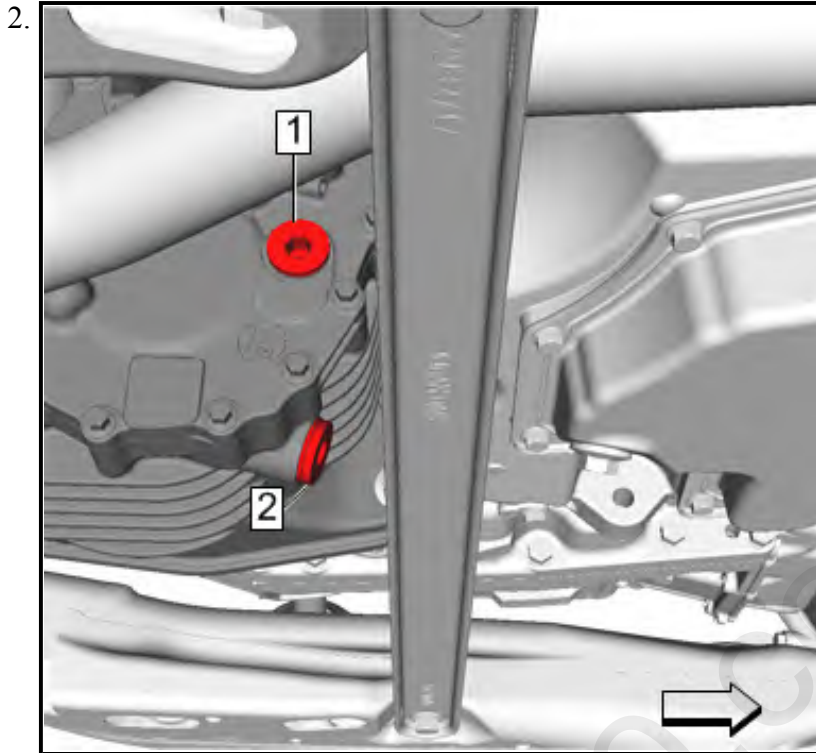
2. Fill the transfer case to the bottom of the fill plug hole with the recommended fluid. Refer to [Adhesives, Fluids, Lubricants, and Sealers](#), and [Approximate Fluid Capacities](#).

3. Install a NEW fill plug (1) and seal and tighten to 39 N.m (29 lb ft).
4. Inspect the cross member to ensure that no oil has drained into the cross member cavity. Clean the cross member if necessary.

FILL PLUG REPLACEMENT

Removal Procedure

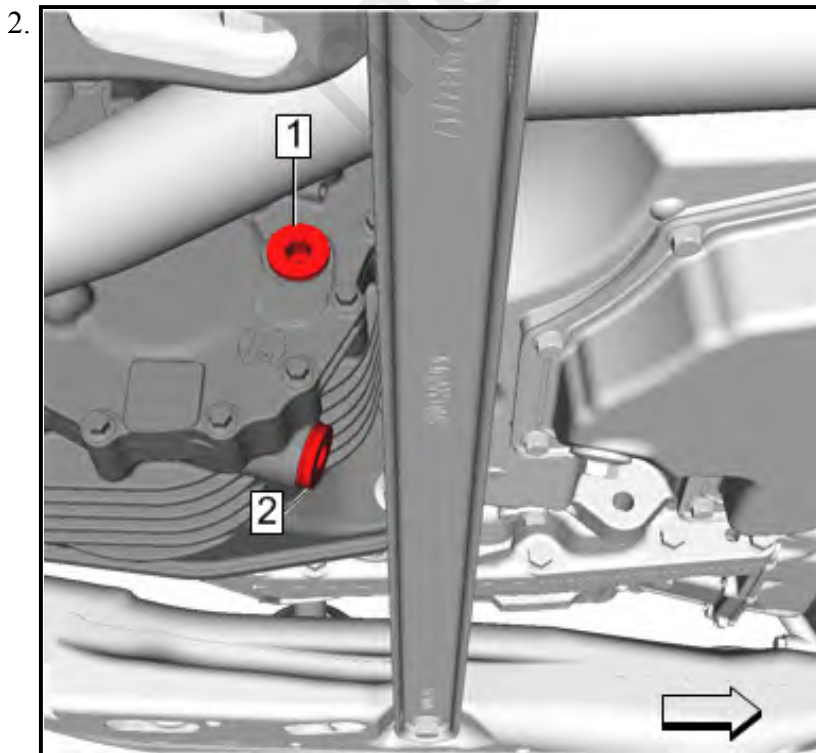
1. Raise and suitably support the vehicle. [Lifting and Jacking the Vehicle](#) .



Remove and DISCARD the fill plug (1) and seal.

Installation Procedure

1. Fill the transfer case to the bottom of the fill plug hole with the recommended fluid. [Adhesives, Fluids, Lubricants, and Sealers](#), and [Approximate Fluid Capacities](#).



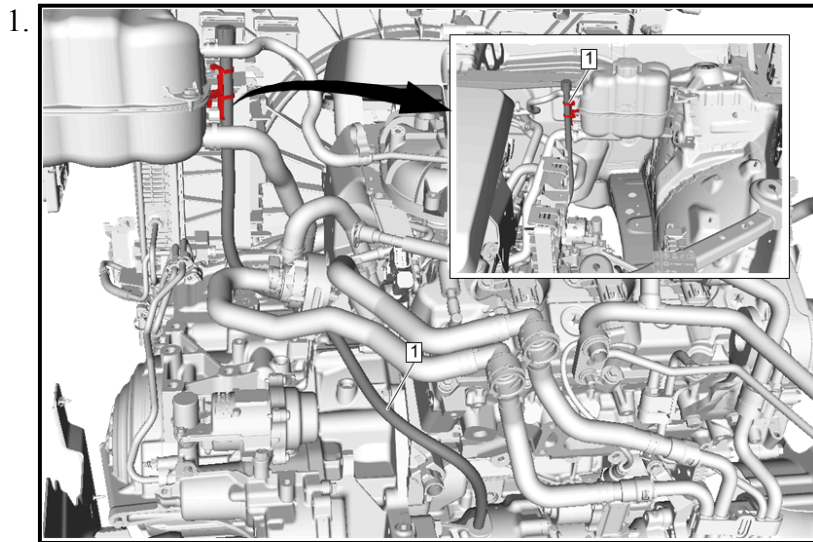
CAUTION: Refer to [Component Fastener Tightening Caution](#) .

Install a NEW fill plug (1) and seal and tighten to 39 N.m (29 lb ft).

3. Lower the vehicle.

POWER TRANSFER UNIT VENT REPLACEMENT

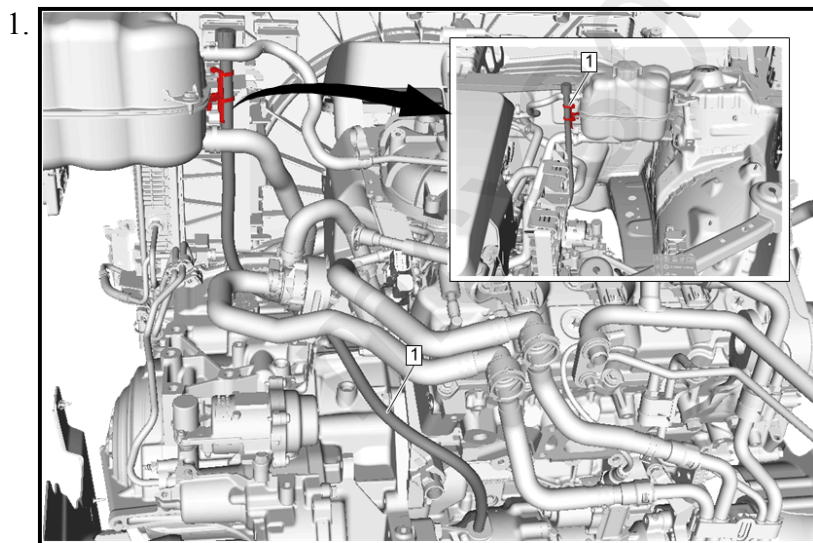
Removal Procedure



Disconnect the power transfer unit vent hose assembly (1) from the radiator surge tank assembly.

2. Disconnect the power transfer vent hose assembly from the power transfer unit.
3. Remove the power transfer unit vent hose assembly (1) from the vehicle.

Installation Procedure



NOTE: Ensure the vent hoses are free of kinks and routed clear of sharp objects.

Connect the power transfer unit vent hose assembly (1) to the radiator surge tank assembly.

2. Connect the power transfer unit vent hose assembly to the power transfer unit.

INTERMEDIATE DRIVE SHAFT REPLACEMENT

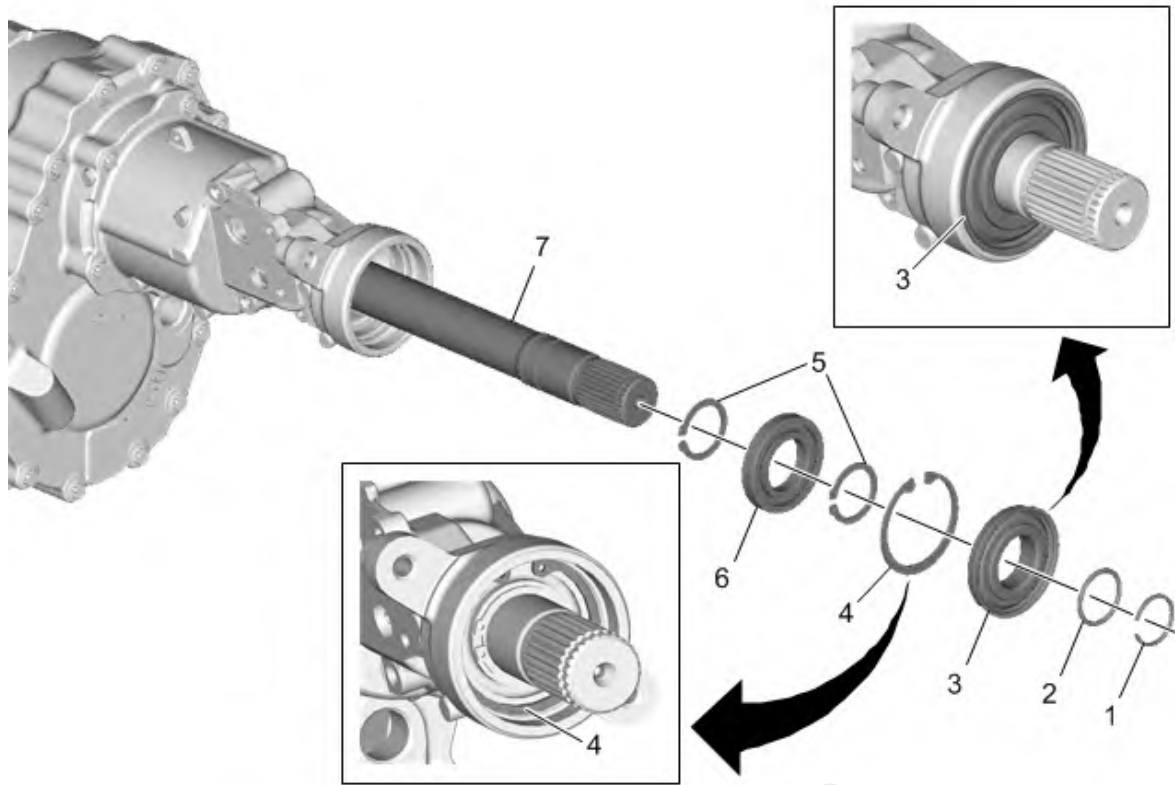


Fig. 3: Exploded View Of Power Transfer Unit Intermediate Drive Shaft Components

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure <u>Power Transfer Unit Case Replacement</u> NOTE: Check power transfer case fluid level. Refer to <u>Approximate Fluid Capacities</u> , and <u>Adhesives, Fluids, Lubricants, and Sealers</u> .	
1	Power Transfer Unit Intermediate Drive Shaft Clip NOTE: Remove and DISCARD the retainer.
2	Power Transfer Unit Half Shaft Seal - O-Ring NOTE: Remove and DISCARD the O-ring seal.

Callout	Component Name
3	Power Transfer Unit Intermediate Drive Shaft Seal CAUTION: When replacing power transfer unit case seals, use appropriate GM tools along with a hydraulic press. Failure to do so may result in misalignment or damage to the seal and/or power transfer unit. NOTE: Remove seal with a thin flat putty knife or equivalent. Inserting the blade of the tool between the outside diameter of the seal and the extension housing surface. CAUTION: Do not nick, scratch or damage the sealing surface. The sealing surface is a machined surface. Damage to the machined surface can cause leakage. Special Tools • DT-51835 Seal Installer • J-42176 Driver Handle Equivalent regional tools: Special Tools.
4	Power Transfer Unit Intermediate Drive Shaft Bearing Retainer
5	Power Transfer Unit Intermediate Drive Shaft Bearing Retaining Ring [2x]
6	Power Transfer Unit Intermediate Drive Shaft Bearing Procedure 1. Use a press and press blocks to install the bearing.
7	Power Transfer Unit Intermediate Drive Shaft

POWER TRANSFER UNIT PROPELLER SHAFT SEAL REPLACEMENT

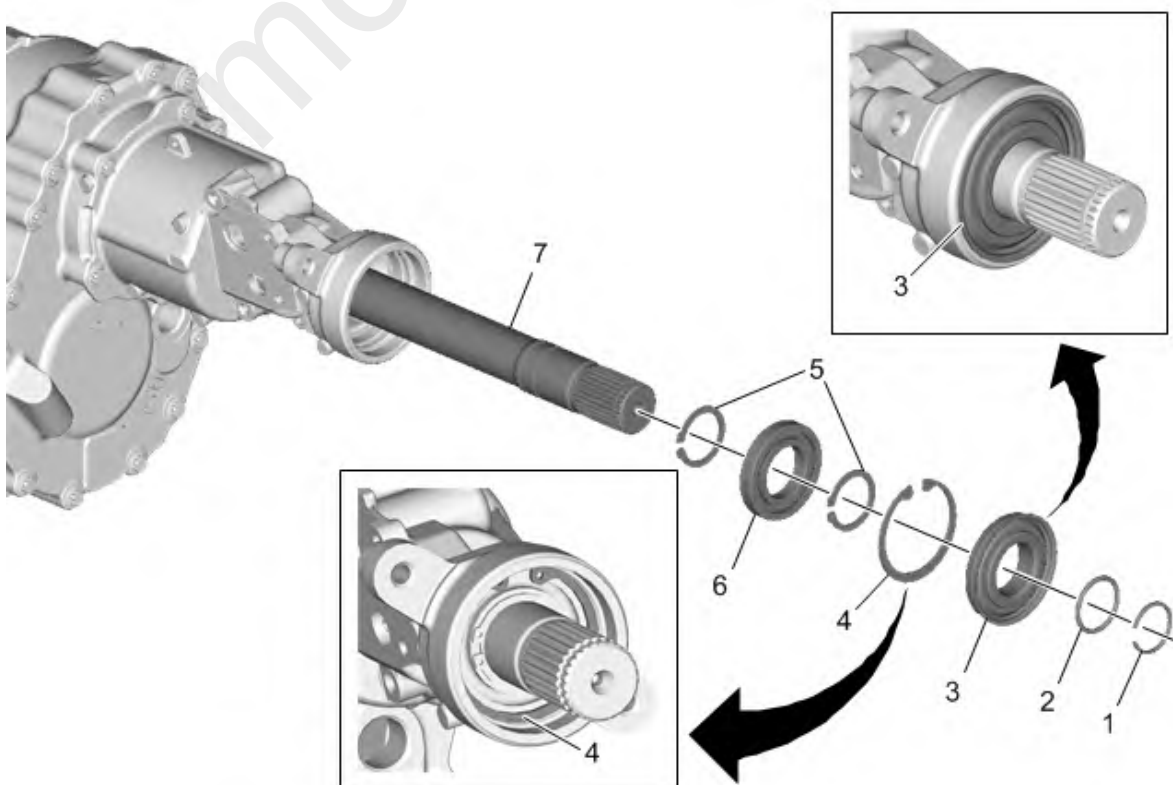


Fig. 4: Exploded View Of Power Transfer Unit Intermediate Drive Shaft Components

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure <u>Power Transfer Unit Case Replacement</u>	
NOTE: Check power transfer case fluid level. Refer to <u>Approximate Fluid Capacities</u> , and <u>Adhesives, Fluids, Lubricants, and Sealers</u> .	
1	Power Transfer Unit Intermediate Drive Shaft Clip NOTE: Remove and DISCARD the retainer.
2	Power Transfer Unit Half Shaft Seal - O-Ring NOTE: Remove and DISCARD the O-ring seal.
3	Power Transfer Unit Intermediate Drive Shaft Seal CAUTION: When replacing power transfer unit case seals, use appropriate GM tools along with a hydraulic press. Failure to do so may result in misalignment or damage to the seal and/or power transfer unit. NOTE: Remove seal with a thin flat putty knife or equivalent. Inserting the blade of the tool between the outside diameter of the seal and the extension housing surface. CAUTION: Do not nick, scratch or damage the sealing surface. The sealing surface is a machined surface. Damage to the machined surface can cause leakage. Special Tools • DT-51835 Seal Installer • J-42176 Driver Handle Equivalent regional tools: <u>Special Tools</u> .
4	Power Transfer Unit Intermediate Drive Shaft Bearing Retainer
5	Power Transfer Unit Intermediate Drive Shaft Bearing Retaining Ring [2x]
6	Power Transfer Unit Intermediate Drive Shaft Bearing Procedure 1. Use a press and press blocks to install the bearing.
7	Power Transfer Unit Intermediate Drive Shaft

INTERMEDIATE DRIVE SHAFT BEARING REPLACEMENT

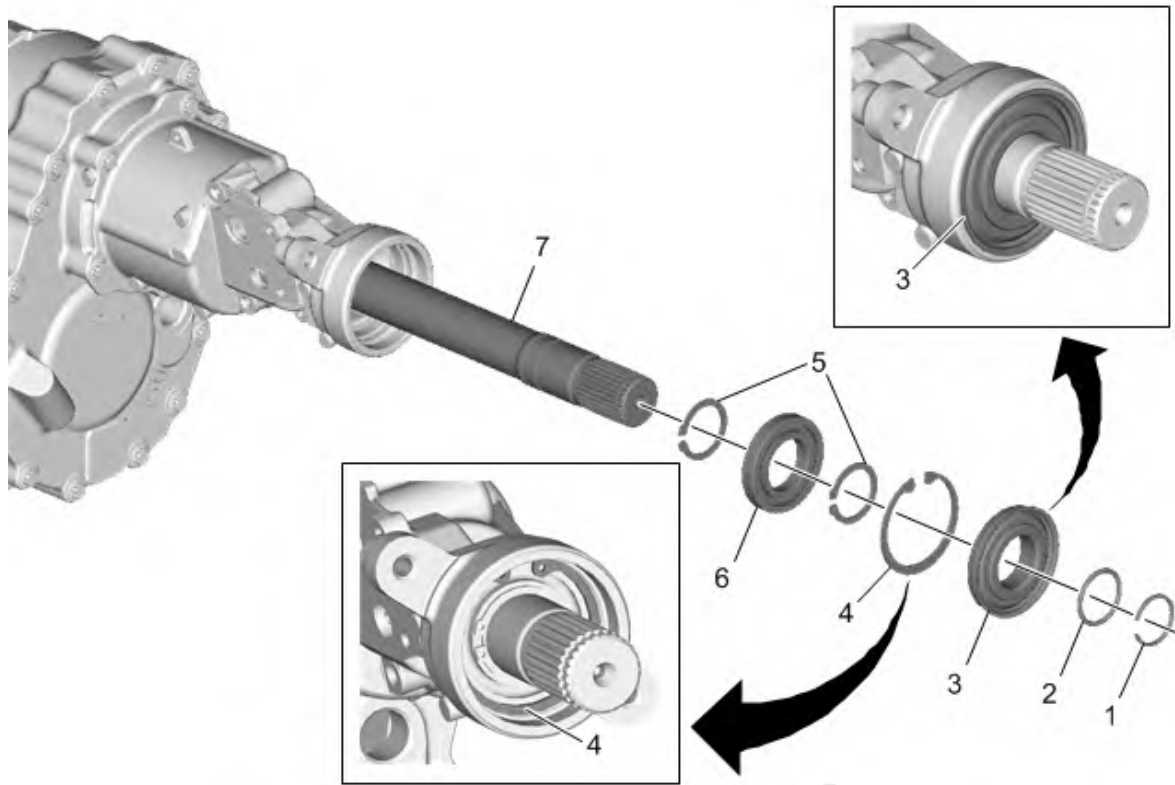


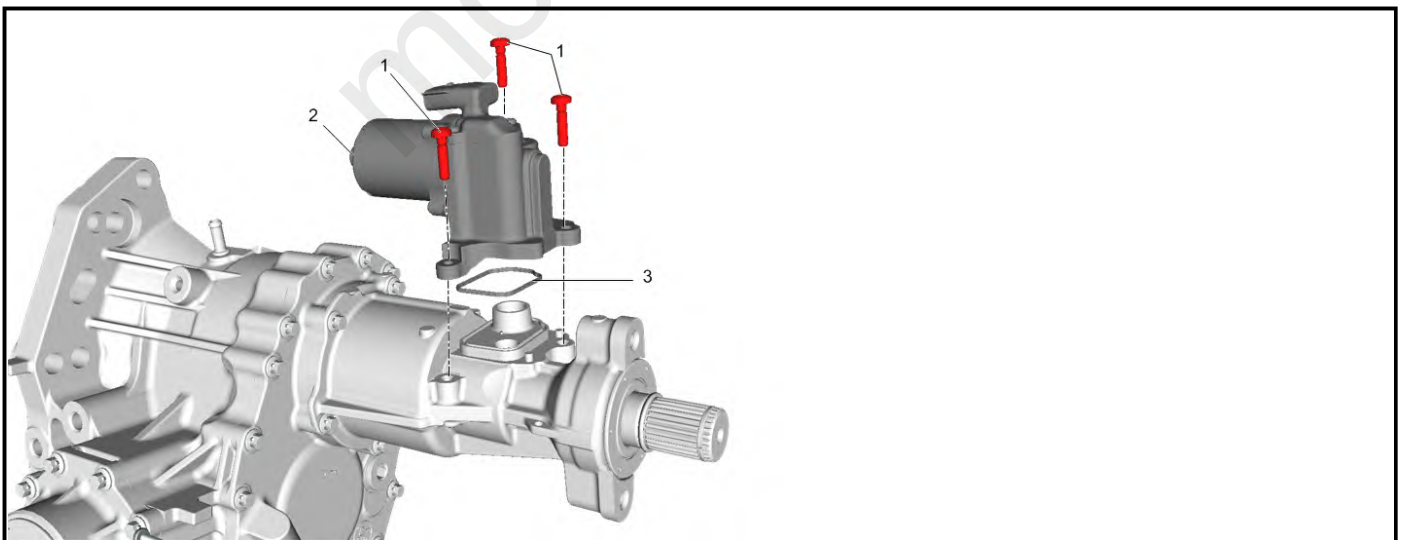
Fig. 5: Exploded View Of Power Transfer Unit Intermediate Drive Shaft Components

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure <u>Power Transfer Unit Case Replacement</u> NOTE: Check power transfer case fluid level. Refer to <u>Approximate Fluid Capacities</u> , and <u>Adhesives, Fluids, Lubricants, and Sealers</u> .	
1	Power Transfer Unit Intermediate Drive Shaft Clip NOTE: Remove and DISCARD the retainer.
2	Power Transfer Unit Half Shaft Seal - O-Ring NOTE: Remove and DISCARD the O-ring seal.

Callout	Component Name
3	Power Transfer Unit Intermediate Drive Shaft Seal CAUTION: When replacing power transfer unit case seals, use appropriate GM tools along with a hydraulic press. Failure to do so may result in misalignment or damage to the seal and/or power transfer unit. NOTE: Remove seal with a thin flat putty knife or equivalent. Inserting the blade of the tool between the outside diameter of the seal and the extension housing surface. CAUTION: Do not nick, scratch or damage the sealing surface. The sealing surface is a machined surface. Damage to the machined surface can cause leakage. Special Tools • DT-51835 Seal Installer • J-42176 Driver Handle Equivalent regional tools: Special Tools.
4	Power Transfer Unit Intermediate Drive Shaft Bearing Retainer
5	Power Transfer Unit Intermediate Drive Shaft Bearing Retaining Ring [2x]
6	Power Transfer Unit Intermediate Drive Shaft Bearing Procedure 1. Use a press and press blocks to install the bearing.
7	Power Transfer Unit Intermediate Drive Shaft

POWER TRANSFER UNIT SHIFT ACTUATOR REPLACEMENT



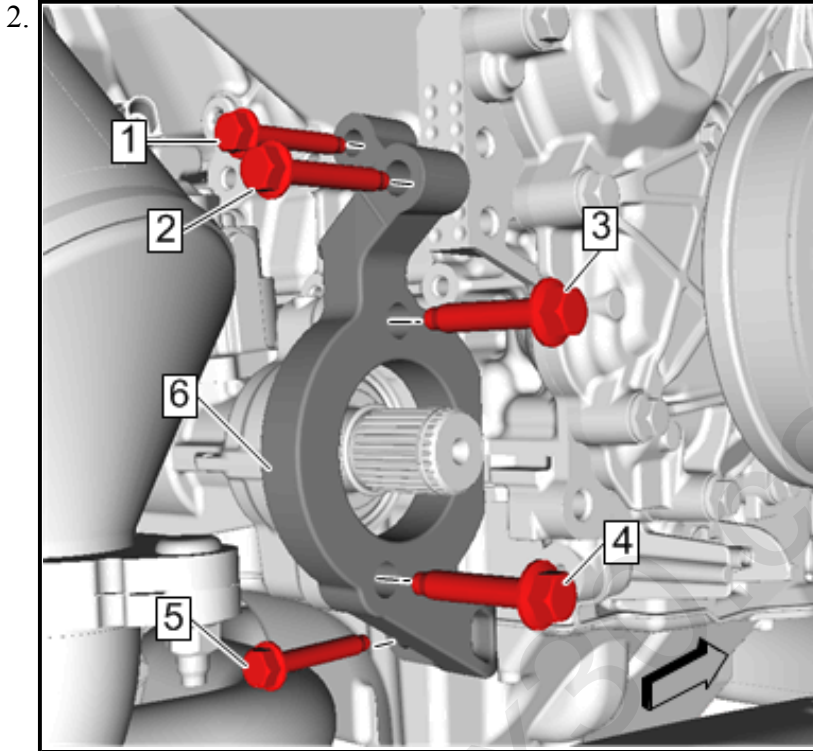
Callout	Component Name
Preliminary Procedure Power Transfer Unit Case Replacement	
1	Power Transfer Unit Shift Actuator Bolt Tighten 10 N.m (88 lb in)
2	Power Transfer Unit Shift Actuator

Callout	Component Name
3	Power Transfer Unit Shift Actuator Seal NOTE: The power transfer unit shift actuator seal is only available with the shift actuator.

TRANSFER CASE BRACKET REPLACEMENT

Removal Procedure

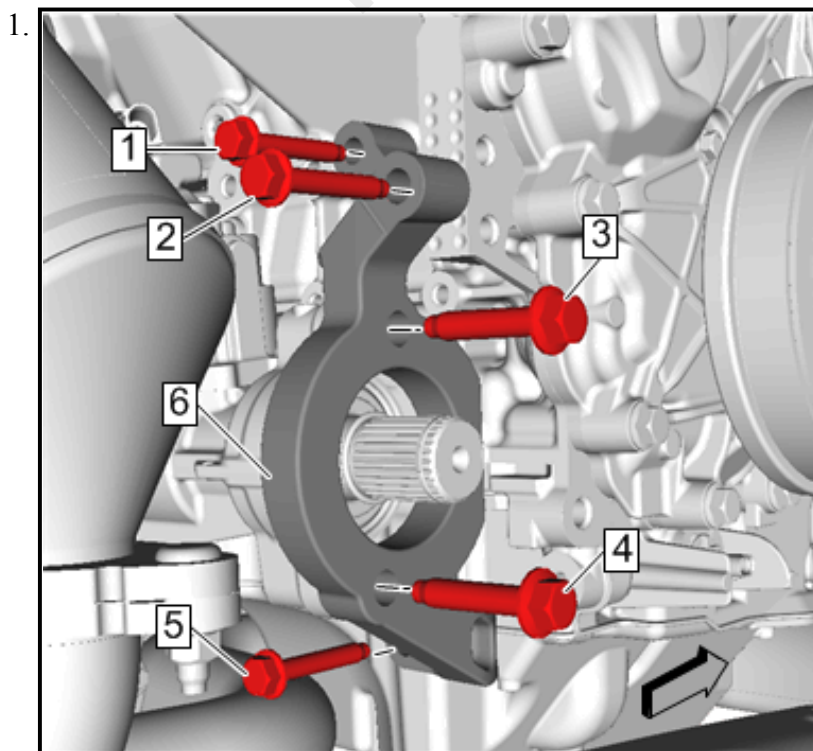
1. Remove the right wheel drive shaft. [Front Wheel Drive Half Shaft Replacement - Right Side \(AWD\)](#).



Remove the transfer case bracket-to-engine and transfer case bolts (1, 2, 3, 4, 5).

3. Remove the bracket (6).

Installation Procedure



Position the bracket (6) to the transfer case.

2. Install all bolts (1, 2, 3, 4, 5) finger tight.

CAUTION: Refer to [Fastener Caution](#) .

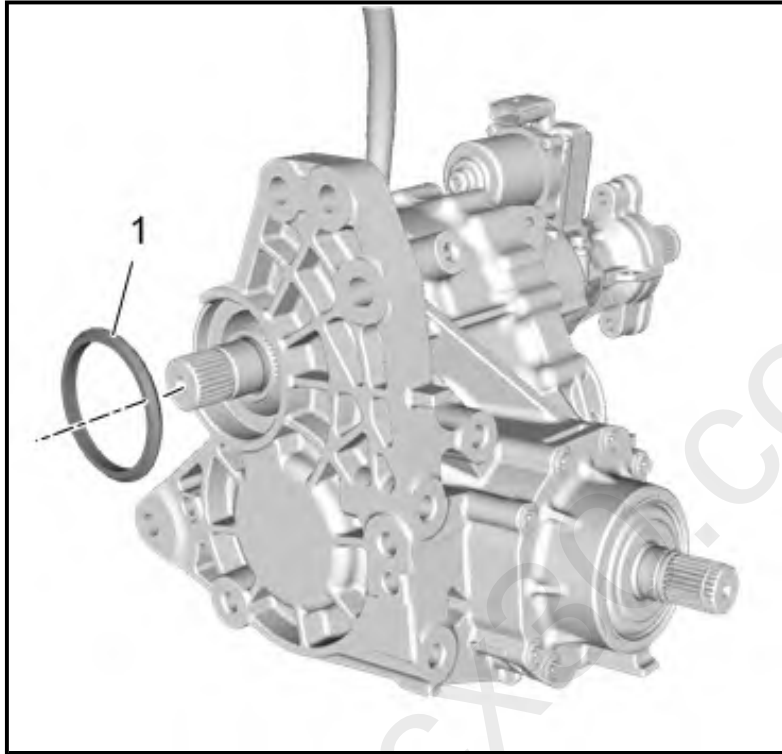
3. Tighten bolts (1, 2, 5) to 22 N.m (16 lb ft).
4. Tighten bolts (3, 4) to 58 N.m (43 lb ft).
5. Install the right wheel drive shaft. [Front Wheel Drive Half Shaft Replacement - Right Side \(AWD\)](#)

POWER TRANSFER UNIT INTERFACE O-RING SEAL REPLACEMENT

Removal Procedure

1. Remove the power transfer unit. [Power Transfer Unit Case Replacement](#)

2.

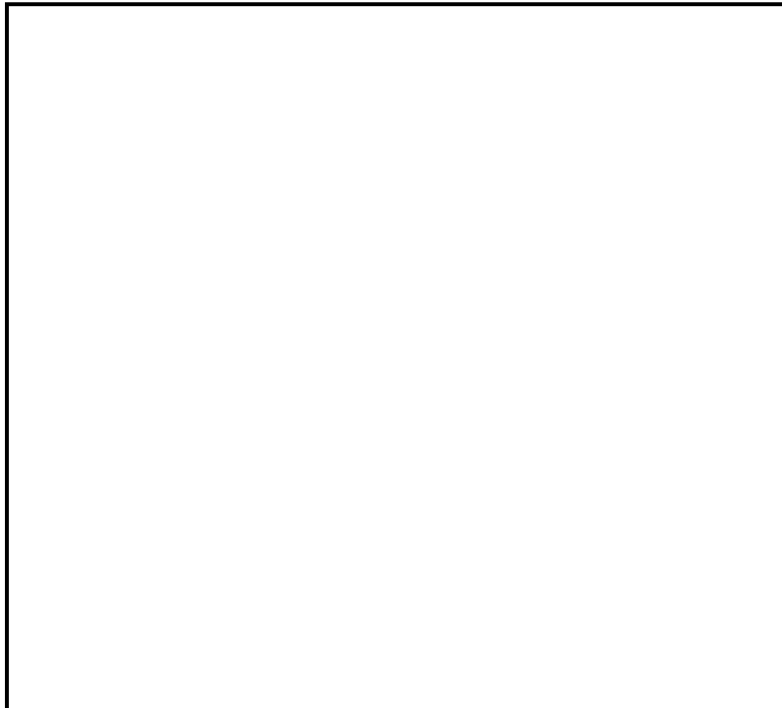


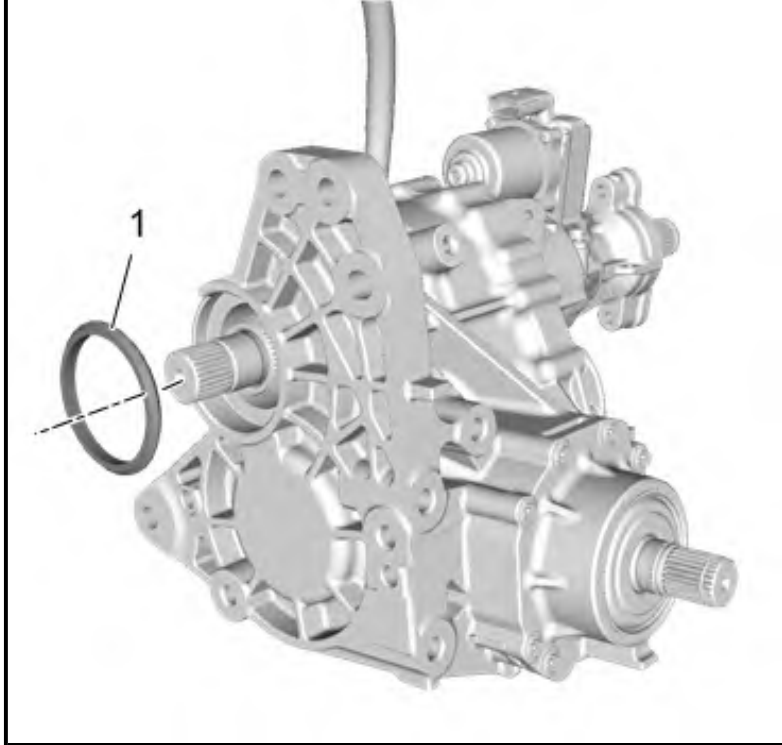
Remove and DISCARD the transmission interface O-ring seal (1).

Installation Procedure

1. Clean the contact surfaces between the transmission and the transfer case.

2.





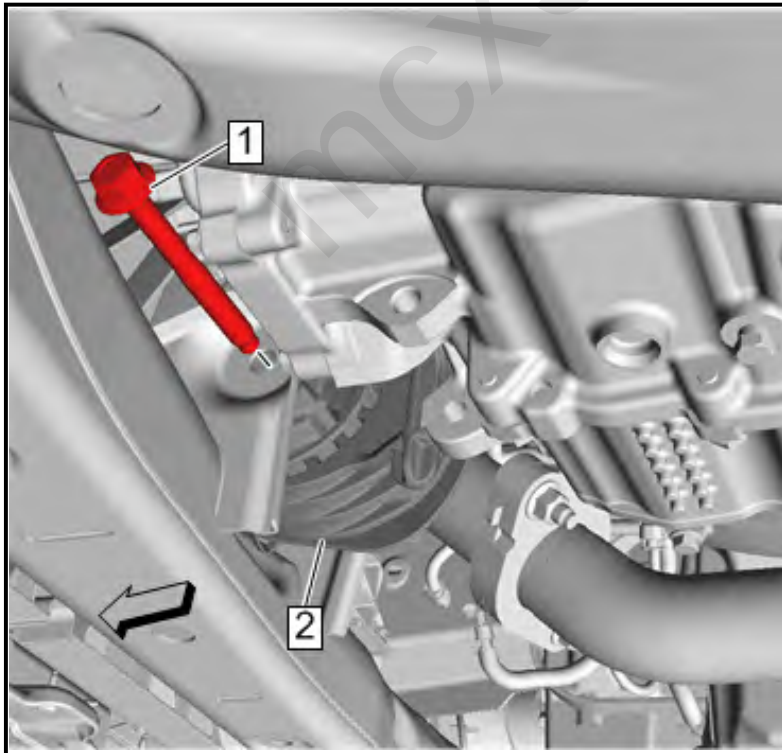
Install a NEW the transfer case to interface O-ring seal (1).

3. Install the power transfer unit. [Power Transfer Unit Case Replacement](#)

POWER TRANSFER UNIT CASE REPLACEMENT

Removal Procedure

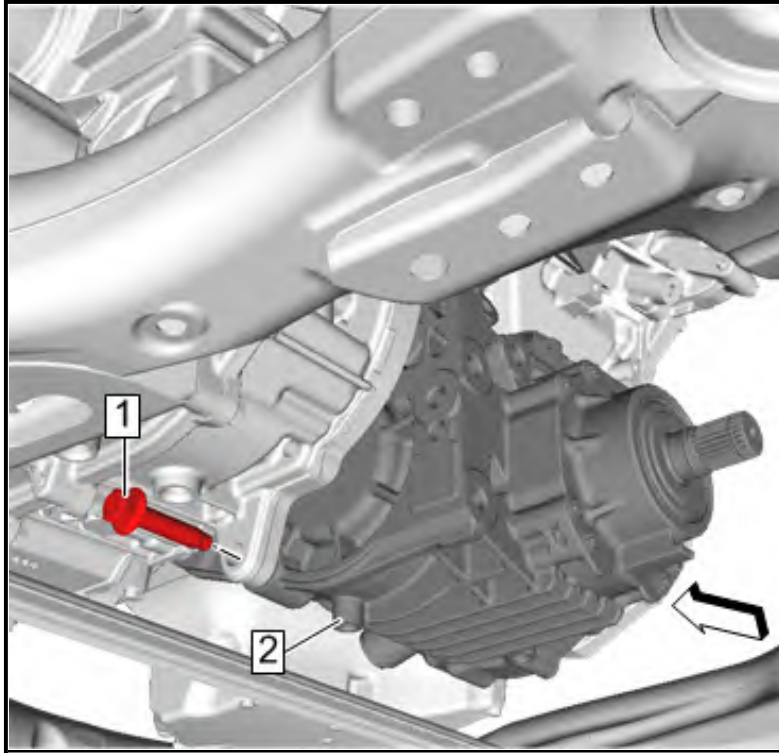
1. Remove the transfer case bracket. [Transfer Case Bracket Replacement](#)
2. Remove the front exhaust pipe. [Exhaust Front Pipe Replacement \(LTG\)](#) [Exhaust Front Pipe Replacement \(LFY\)](#)
3. Disconnect the two piece propeller shaft from the transfer case. [Two-Piece Propeller Shaft Replacement](#)
- 4.



Remove the front transmission mount through bolt. [Transmission Mount Replacement \(Front\)](#)

5. Remove the transmission mount strut bracket. [Transmission Mount Strut Bracket Replacement \(All Wheel Drive\)](#)
6. Disconnect the shift actuator electrical connector.

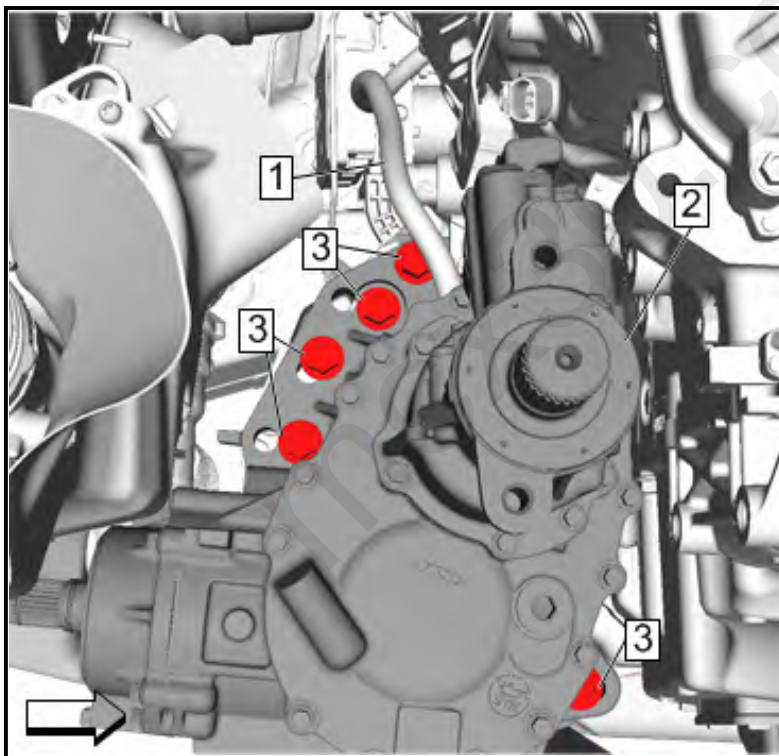
7.



Remove the transmission to transfer case bolt (1).

8. Support the transfer case with a suitable jack, and secure with suitable straps.

9.



Disconnect the transfer case vent hose (1) from the transfer case (2).

10. Remove the remaining transfer case-to-transmission bolts (3).

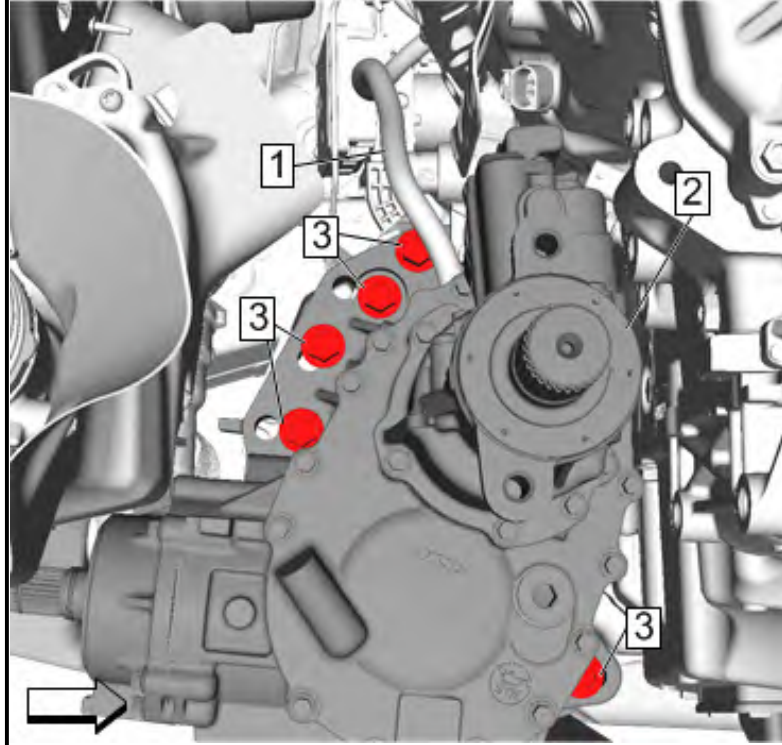
11. Separate the transfer case (2) from the transmission and remove the transfer case.

Installation Procedure

1. Clean the contact surfaces between the transfer case and the transmission.

2.



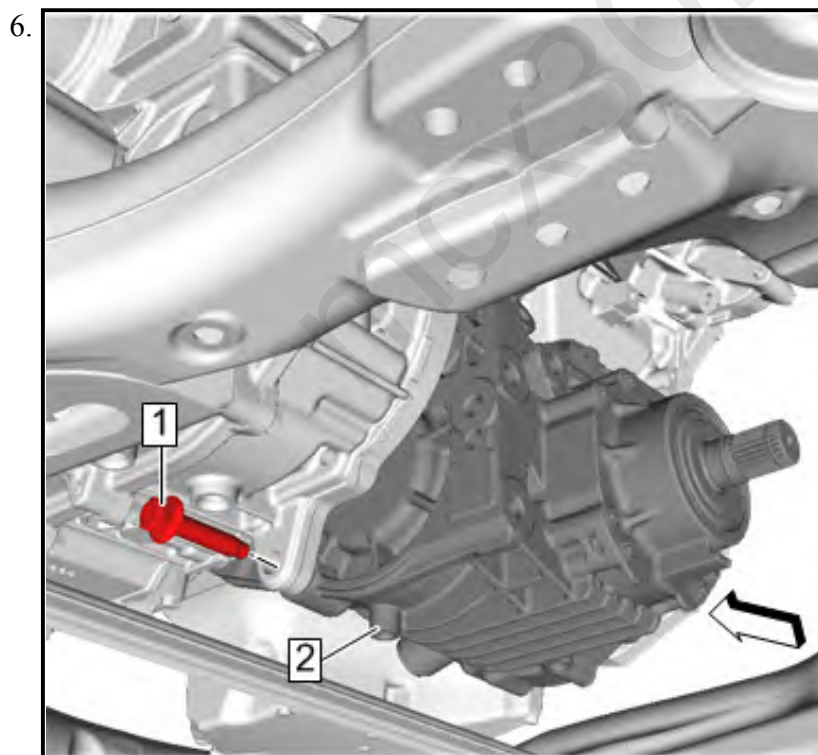


Support the transfer case with a suitable jack, and secure with suitable straps.

3. Raise and align the transfer case in the correct position in relation to the transmission.
4. Install the transfer case (2) to the transmission.

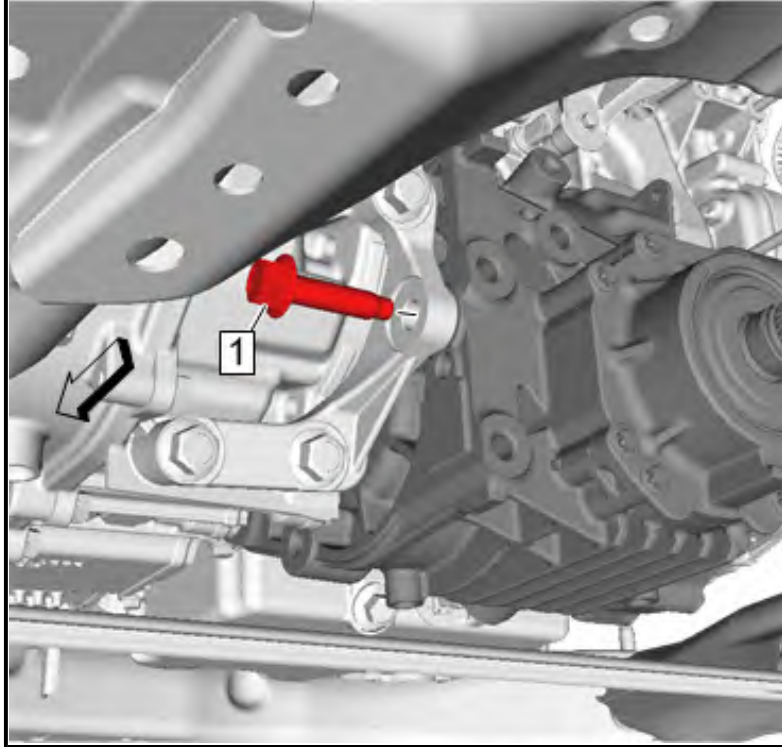
CAUTION: Refer to [Fastener Caution](#) .

5. Install the transfer case-to-transmission bolts (3) and tighten to 100 N.m (74 lb ft).



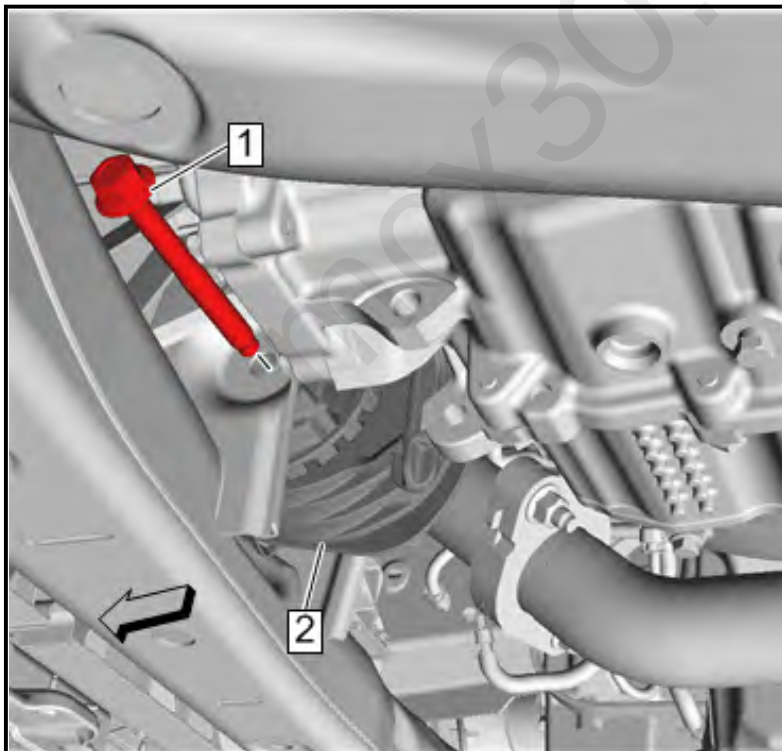
Install the transmission to transfer case bolt (1) and tighten to 100 N.m (74 lb ft).





Install the brace bolt (1) and tighten to 100 N.m (74 lb ft).

8. Connect the shift actuator electrical connector.
9. Connect the transfer case vent hose (1) to the transfer case (2).
10. Install the transfer case bracket. [Transfer Case Bracket Replacement](#)
11. Install the transmission mount strut bracket. [Transmission Mount Strut Bracket Replacement \(All Wheel Drive\)](#)
- 12.



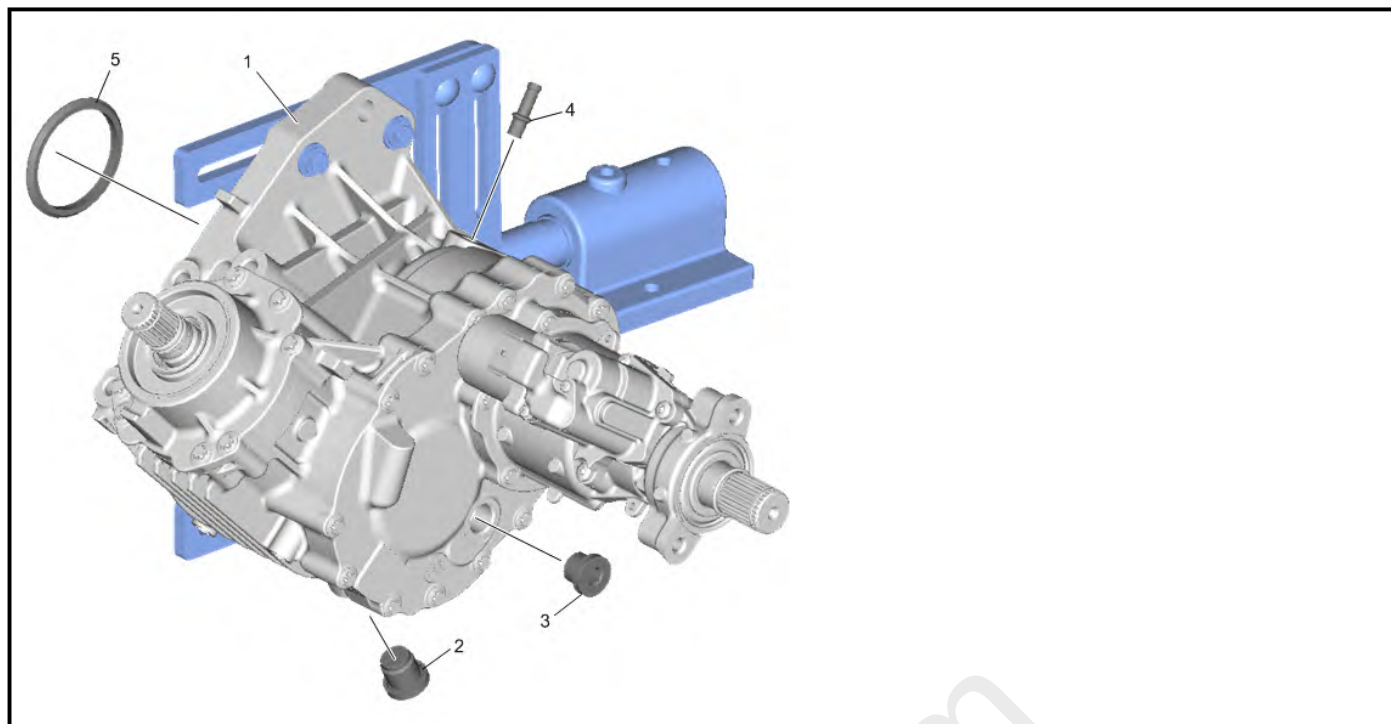
Install the front transmission mount through bolt. [Transmission Mount Replacement \(Front\)](#)

13. Install the front exhaust pipe. [Exhaust Front Pipe Replacement \(LTG\)](#) [Exhaust Front Pipe Replacement \(LFY\)](#)
14. Connect the two piece propeller shaft from the transfer case. [Two-Piece Propeller Shaft Replacement](#)
15. Check power transfer case fluid level. Refer to [Approximate Fluid Capacities](#), and [Adhesives, Fluids, Lubricants, and Sealers](#).

REPAIR INSTRUCTIONS - OFF VEHICLE

POWER TRANSFER UNIT CASE DISASSEMBLE

Power Transfer Unit Case Holding Fixture Installation, Oil Fill Plug, Oil Drain Plug, and Vent Hose Connector Removal



Power Transfer Unit Case Holding Fixture Installation, Oil Fill Plug, Oil Drain Plug, and Vent Hose Connector Removal

Callout	Component Name
1	Power Transfer Unit Case NOTE: • Always secure with the pivot pin after rotating. • The power transfer unit can be rotated 360 degrees to facilitate repair. Special Tools • DT-3289-20 Holding Fixture • DT-36842 Transaxle Holding Fixture Equivalent regional tools: Special Tools.
2	Power Transfer Unit Drain Plug NOTE: The plug and seal are only available as an assembly. Install a NEW plug with seal during assembly.
3	Power Transfer Unit Fill Plug NOTE: The plug and seal are only available as an assembly. Install a NEW plug with seal during assembly.
4	Power Transfer Unit Vent Hose Connector NOTE: Remove the vent hose connector only if replacement is required.

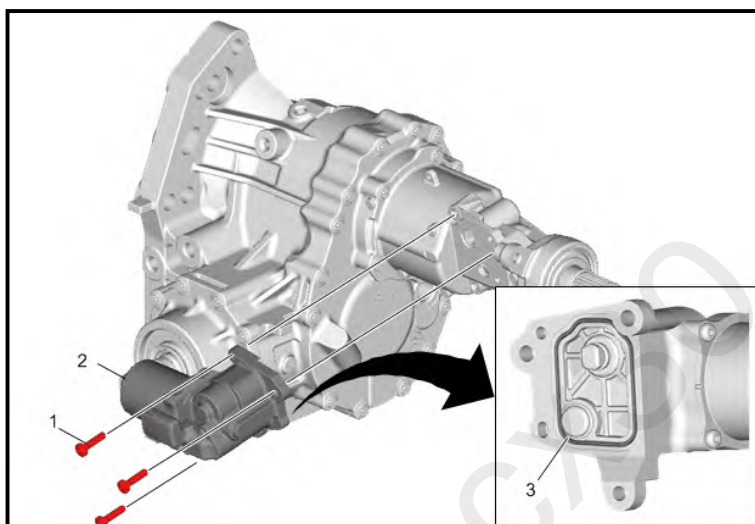
Callout	Component Name
5	Power Transfer Unit Face Seal - O-Ring NOTE: Remove and DISCARD the O-ring seal.

Power Transfer Unit Shift Actuator Removal

Power Transfer Unit Shift Actuator Removal

Callout	Component Name
1	Power Transfer Unit Shift Actuator Bolt
2	Power Transfer Unit Shift Actuator
3	Power Transfer Unit Shift Actuator Seal NOTE: The power transfer unit shift actuator seal is only available with the shift actuator.

Power Transfer Unit Intermediate Drive Shaft Components Removal

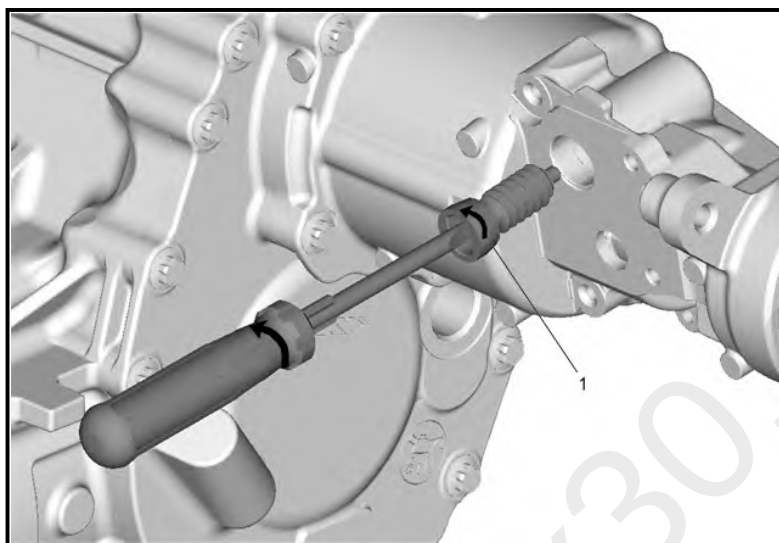


Power Transfer Unit Intermediate Drive Shaft Components Removal

Callout	Component Name
1	Power Transfer Unit Intermediate Drive Shaft Clip NOTE: Remove and DISCARD the retainer.
2	Power Transfer Unit Half Shaft Seal - O-Ring NOTE: Remove and DISCARD the O-ring seal.
3	Power Transfer Unit Intermediate Drive Shaft Seal NOTE: Remove seal with a thin flat putty knife or equivalent. Inserting the blade of the tool between the outside diameter of the seal and the extension housing surface.

Callout	Component Name
4	Power Transfer Unit Intermediate Drive Shaft Bearing Retainer CAUTION: Do not nick, scratch or damage the sealing surface. The sealing surface is a machined surface. Damage to the machined surface can cause leakage.
5	Power Transfer Unit Intermediate Drive Shaft Bearing Retaining Ring [2x]
6	Power Transfer Unit Intermediate Drive Shaft Bearing NOTE: Use a press and press blocks to remove the bearing from the power transfer unit intermediate drive shaft.
7	Power Transfer Unit Intermediate Drive Shaft

Power Transfer Unit Worm Gear Removal



Power Transfer Unit Worm Gear Removal

Callout	Component Name
1	Power Transfer Unit Actuator Worm Gear

Power Transfer Unit Extension Housing Removal

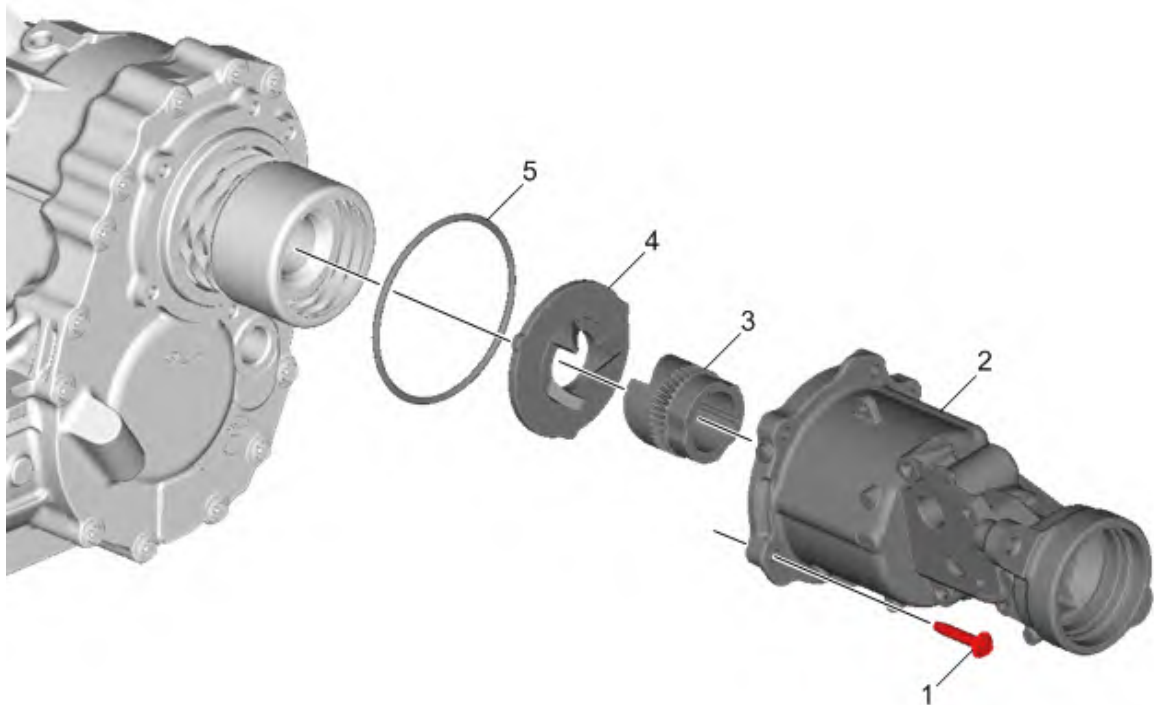


Fig. 6: Exploded View Of Power Transfer Unit Extension Housing Components

Courtesy of GENERAL MOTORS COMPANY

Power Transfer Unit Extension Housing Removal

Callout	Component Name
1	Power Transfer Unit Extension Housing Bolt [5x]
2	Power Transfer Unit Extension Housing Power Transfer Unit Case Cleaning and Inspection
3	Power Transfer Disconnect Rotary Cam
4	Power Transfer Disconnect Linear Cam
5	Extension Housing Cover Seal - O-Ring NOTE: Remove and DISCARD the seal.

Power Transfer Unit Rear Output Shaft Housing Removal

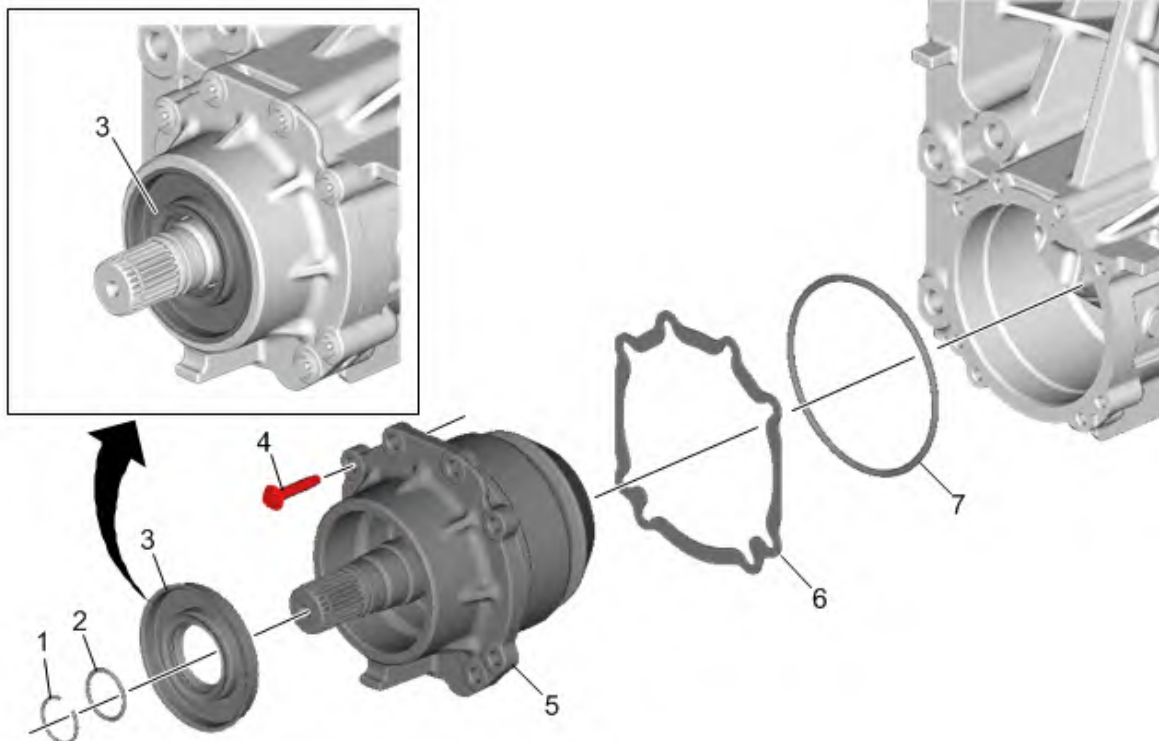


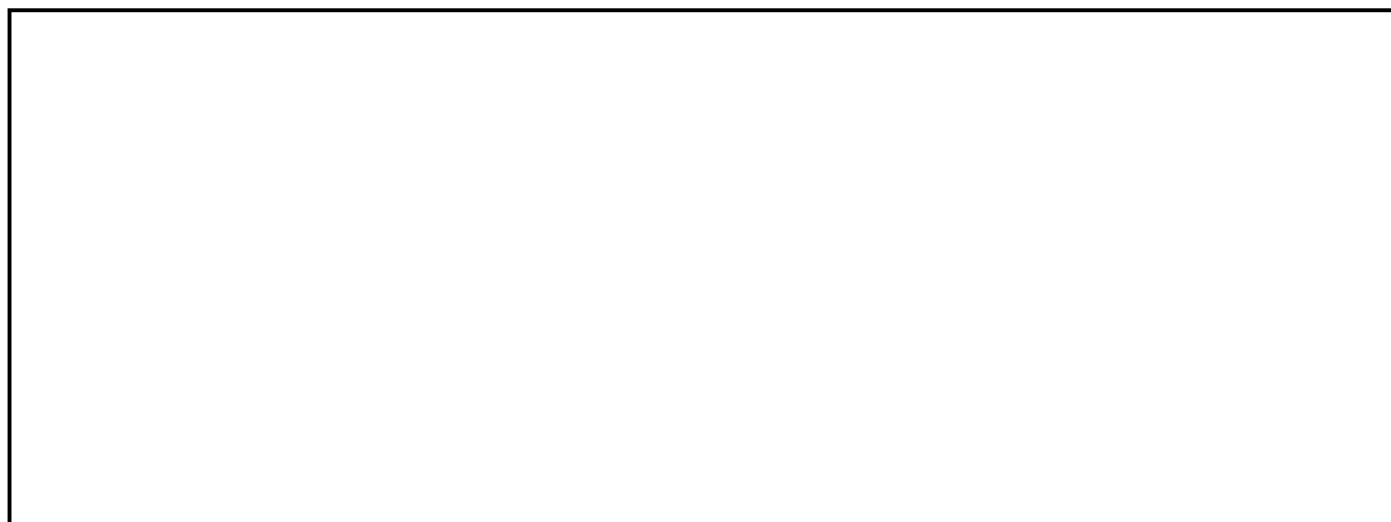
Fig. 7: Exploded View Of Power Transfer Unit Rear Output Shaft Housing Components

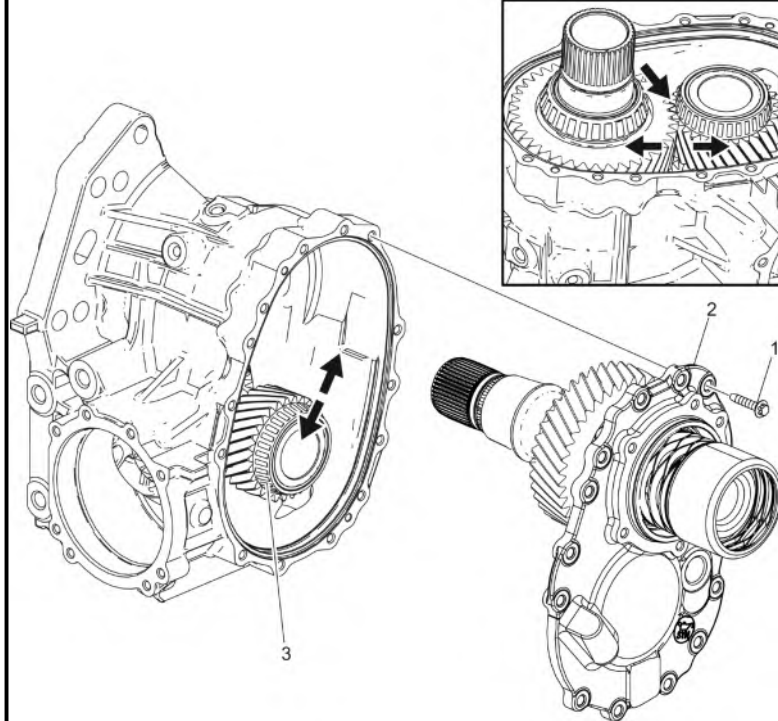
Courtesy of GENERAL MOTORS COMPANY

Power Transfer Unit Rear Output Shaft Housing Removal

Callout	Component Name
1	Power Transfer Unit Propeller Shaft Retainer NOTE: Remove and DISCARD the retainer.
2	Power Transfer Unit Propeller Shaft Seal - O-Ring
3	Power Transfer Unit Output Shaft Seal NOTE: Remove seal with a thin flat putty knife or equivalent. Inserting the blade of the tool between the outside diameter of the seal and the extension housing surface.
4	Power Transfer Unit Rear Pinion Housing Bolt [8x]
5	Power Transfer Unit Rear Output Shaft Housing
6	Power Transfer Unit Rear Output Shaft Shim

Power Transfer Unit Cover Housing, Input Disconnect Shaft, Input Shaft, and Cover Removal





Power Transfer Unit Cover Housing, Input Disconnect Shaft, Input Shaft, and Cover Removal

Callout	Component Name
1	Power Transfer Unit Cover Housing Bolt [14x]
2	Power Transfer Unit Cover Housing NOTE: The gear teeth to the input disconnect shaft are behind the bearing to the idler shaft.
3	Power Transfer Unit Idler Shaft NOTE: Use the rear output shaft hole to move the idler shaft.

Power Transfer Unit Cover Housing, Input Disconnect Shaft, Input Shaft, and Cover Disassemble

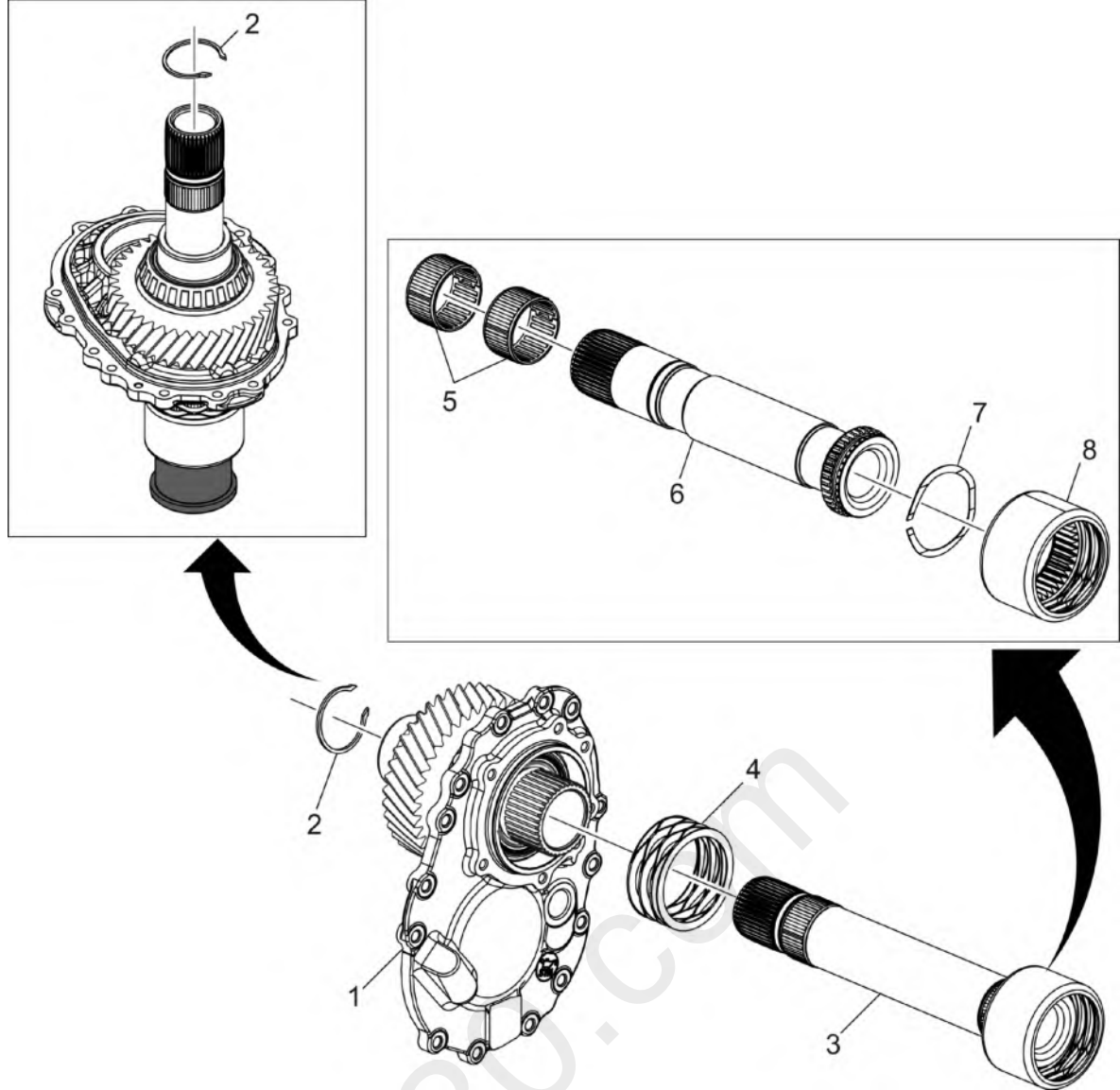


Fig. 8: Exploded View Of Power Transfer Unit Cover Housing, Input Disconnect Shaft, Input Shaft And Cover Components

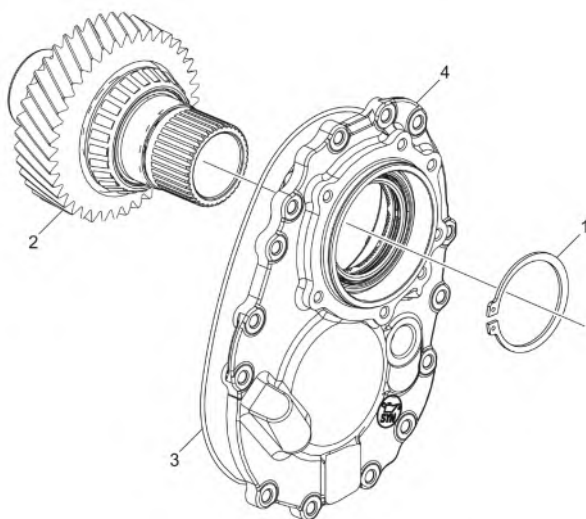
Courtesy of GENERAL MOTORS COMPANY

Power Transfer Unit Cover Housing, Input Disconnect Shaft, Input Shaft, and Cover Disassemble

Callout	Component Name
1	Power Transfer Unit Cover Housing
2	Power Transfer Input Shaft Clip
3	Power Transfer Unit Idler Gear Shaft Access Tube Assembly
4	Power Transfer Unit Connect Spring
5	Input Disconnect Shaft Needle Bearing [2x]
6	Power Transfer Unit Input Shaft
7	Power Transfer Unit Wave Ring
8	Power Transfer Unit Shift Sleeve
	Special Tools
	DT-48022 Output Bushing Installer
	Equivalent regional tools: Special Tools .

Power Transfer Unit Cover Housing Seal and Input Disconnect Shaft Removal

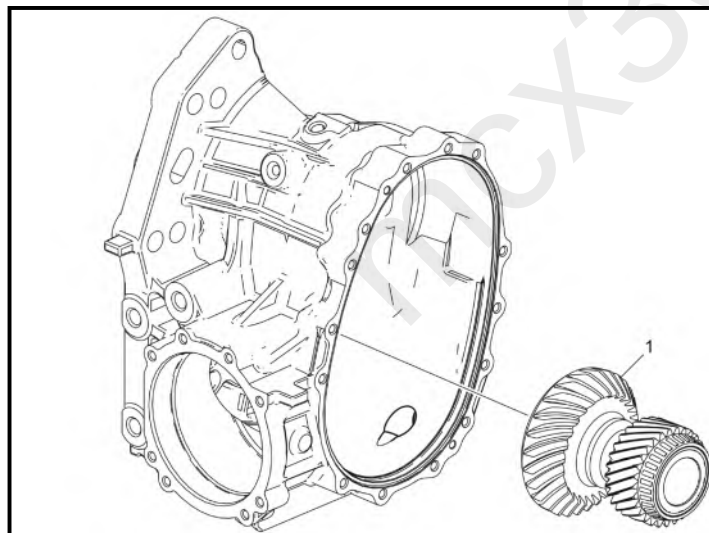




Power Transfer Unit Cover Housing Seal and Input Disconnect Shaft Removal

Callout	Component Name
1	Power Transfer Input Connect Spring Clip
2	Power Transfer Unit Input Disconnect Shaft NOTE: DO NOT remove the input disconnect bearing races from the case half or cover. The case, cover, input disconnect shaft, and input disconnect bearings and races are not available as separate service parts. If component replacement is required, the power transfer unit is to be replaced as an assembly.
3	Power Transfer Unit Cover Housing Seal
4	Power Transfer Unit Cover Housing

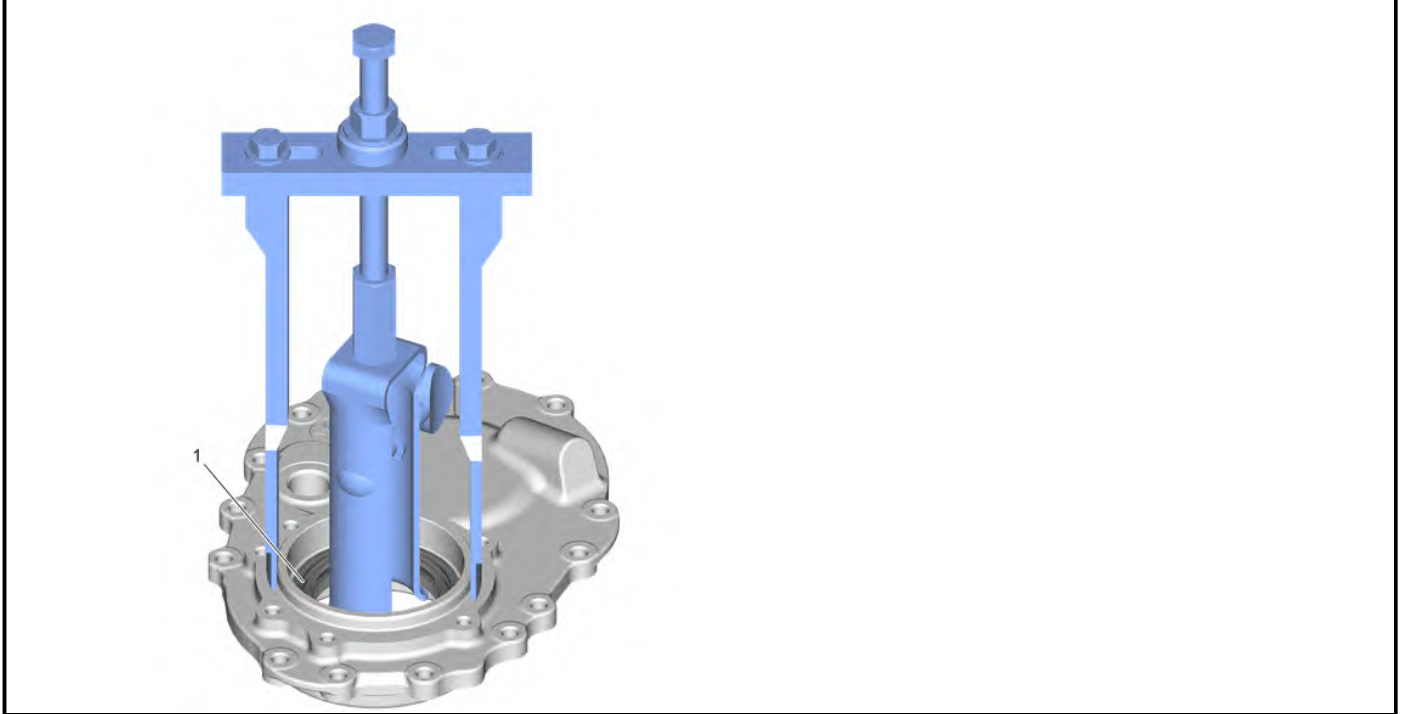
Power Transfer Unit Idler Shaft Removal



Power Transfer Unit Idler Shaft Removal

Callout	Component Name
1	Power Transfer Unit Idler Shaft NOTE: DO NOT remove the idler gear bearing races from the case half or cover. The case, cover, idler gear, and idler gear bearings and races are not available as separate service parts. If component replacement is required, the power transfer unit is to be replaced as an assembly.

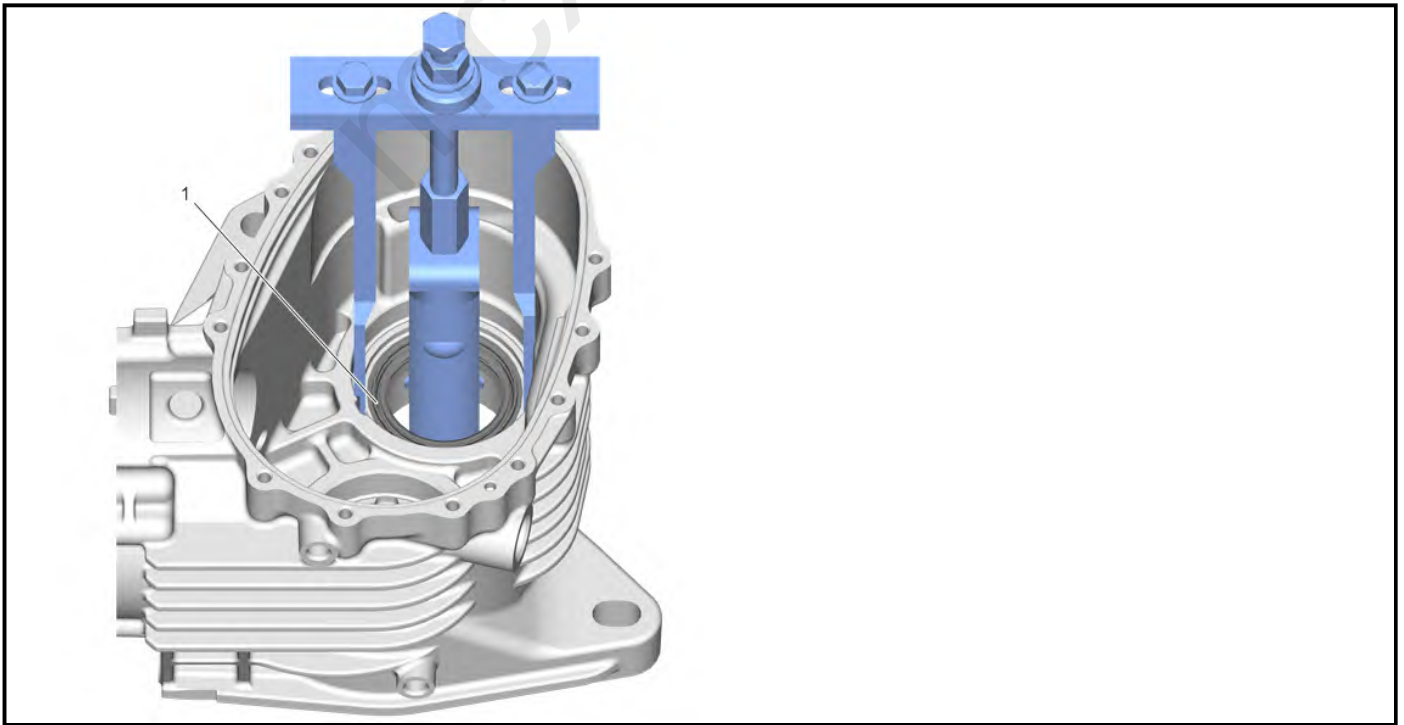
Power Transfer Unit Input Shaft Seal - Cover Removal



Power Transfer Unit Input Shaft Seal - Cover Removal

Callout	Component Name
1	Power Transfer Unit Input Shaft Seal - Cover Special Tools • DT-26941 Bushing and Bearing Remover • DT-45124 Removal Bridge • DT-45124-9 Puller Legs Equivalent regional tools: <u>Special Tools</u> .

Power Transfer Unit Input Shaft Seal - Case Removal



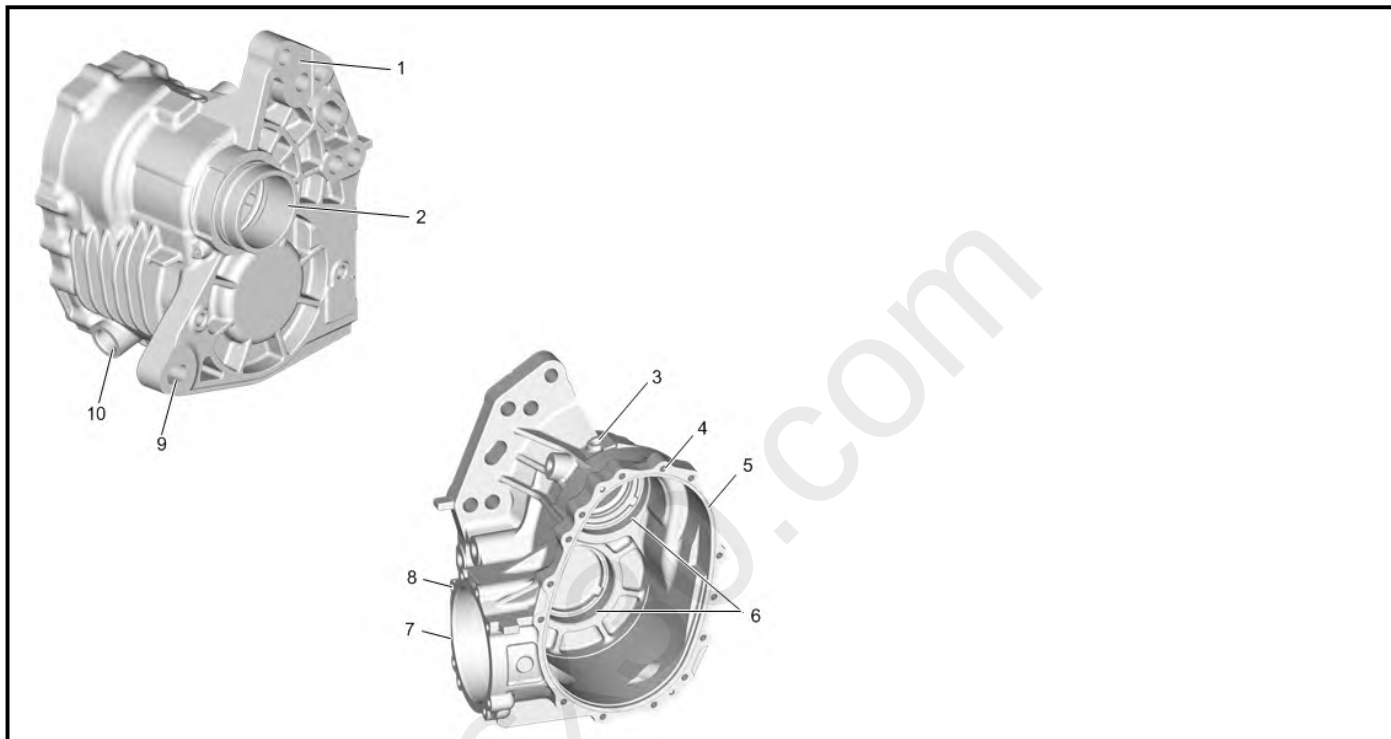
Power Transfer Unit Input Shaft Seal - Case Removal

Callout	Component Name

Callout	Component Name
1	Power Transfer Unit Input Shaft Seal - Case Special Tools • DT-26941 Bushing and Bearing Remover • DT-45124 Removal Bridge • DT-45124-9 Puller Legs Equivalent regional tools: Special Tools .

POWER TRANSFER UNIT CASE CLEANING AND INSPECTION

Power Transfer Unit Case Housing Cleaning and Inspection

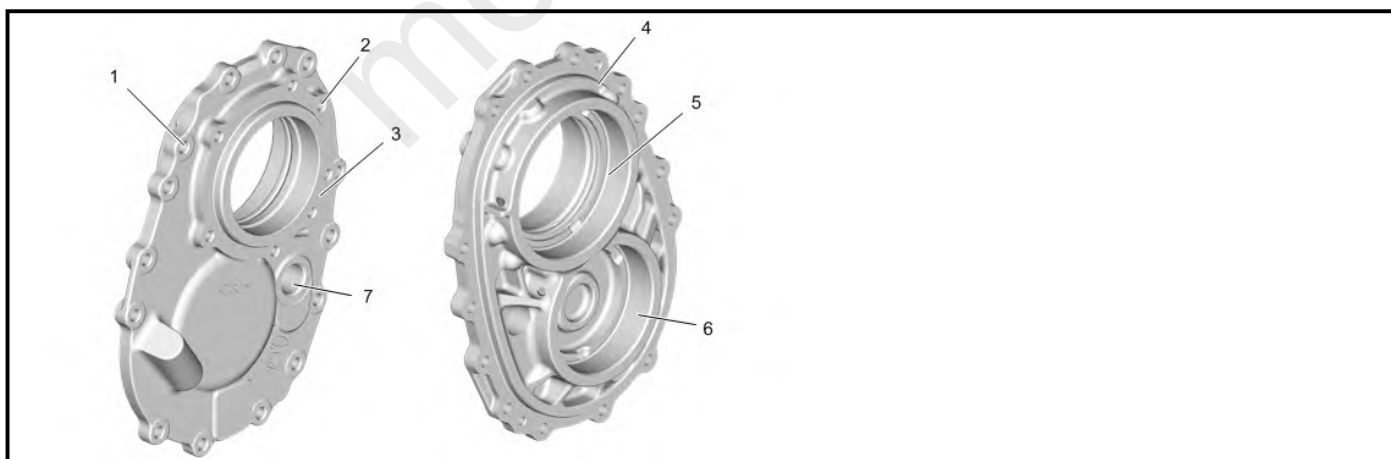


Power Transfer Unit Case Housing Cleaning and Inspection

Callout	Component Name
Preliminary Procedure • Clean the power transfer unit case housing in solvent, air dry. Remove all residual input shaft seal material from the input shaft seal bore. • The case halves, internal gears and bearings are not serviceable components. If damage is present, the power transfer unit must be replaced as an assembly.	
1	Power Transfer Unit Housing - Model Dependent NOTE: Inspect for damage to case.
2	Power Transfer Unit Case Housing Sealing Surface NOTE: • Inspect the input shaft seal ID bore for scoring or damage. • Inspect the face seal/O-ring seal OD sealing surface for scoring or damage.
3	Power Transfer Unit Case Vent Connector Hole

Callout	Component Name
4	Power Transfer Unit Case Housing Threaded Bolt Holes NOTE: Repair any damaged threads.
5	Power Transfer Unit Case Housing Sealing Surface NOTE: Inspect for scoring or damage.
6	Power Transfer Unit Case Housing Bearing Races NOTE: Inspect for brinnelling or excessive wear.
7	Power Transfer Unit Case Housing Sealing Surface NOTE: Inspect for scoring or damage.
8	Power Transfer Unit Case Housing Threaded Bolt Holes NOTE: Inspect for thread damage
9	Power Transfer Unit Case Housing Threaded Bolt Holes
10	Power Transfer Unit Drain Plug Hole NOTE: Inspect for thread damage

Power Transfer Unit Cover Housing Cleaning and Inspection

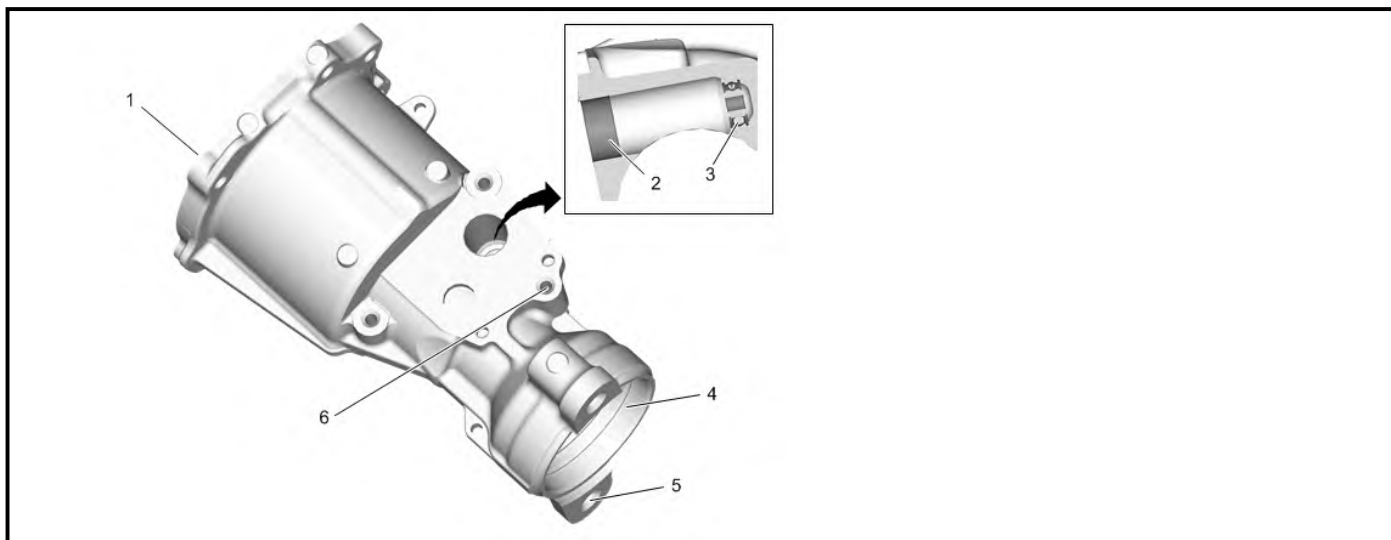


Power Transfer Unit Cover Housing Cleaning and Inspection

Callout	Component Name
Preliminary Procedure	
Clean the power transfer unit case housing in solvent, air dry. Remove all residual input shaft seal material from the input shaft seal bore.	

Callout	Component Name
1	Power Transfer Unit Case Cover Housing Threaded Bolt Holes NOTE: Inspect for damage.
2	Power Transfer Unit Case Extension Housing Threaded Bolt Holes NOTE: Inspect for thread damage
3	Power Transfer Unit Case Extension Housing Sealing Surface NOTE: Inspect for scoring or damage.
4	Power Transfer Unit Case Cover Housing Sealing Surface NOTE: Inspect for scoring or damage.
5	Power Transfer Unit Case Cover Housing Sealing Surface NOTE: Inspect for pitting, excessive wear, or damage.
6	Power Transfer Unit Case Cover Housing Bearing Race NOTE: Inspect for brinnelling or excessive wear.
7	Power Transfer Unit Fill Plug Hole NOTE: Inspect for thread damage or sealing surface.

Power Transfer Unit Case Extension Housing Cleaning and Inspection

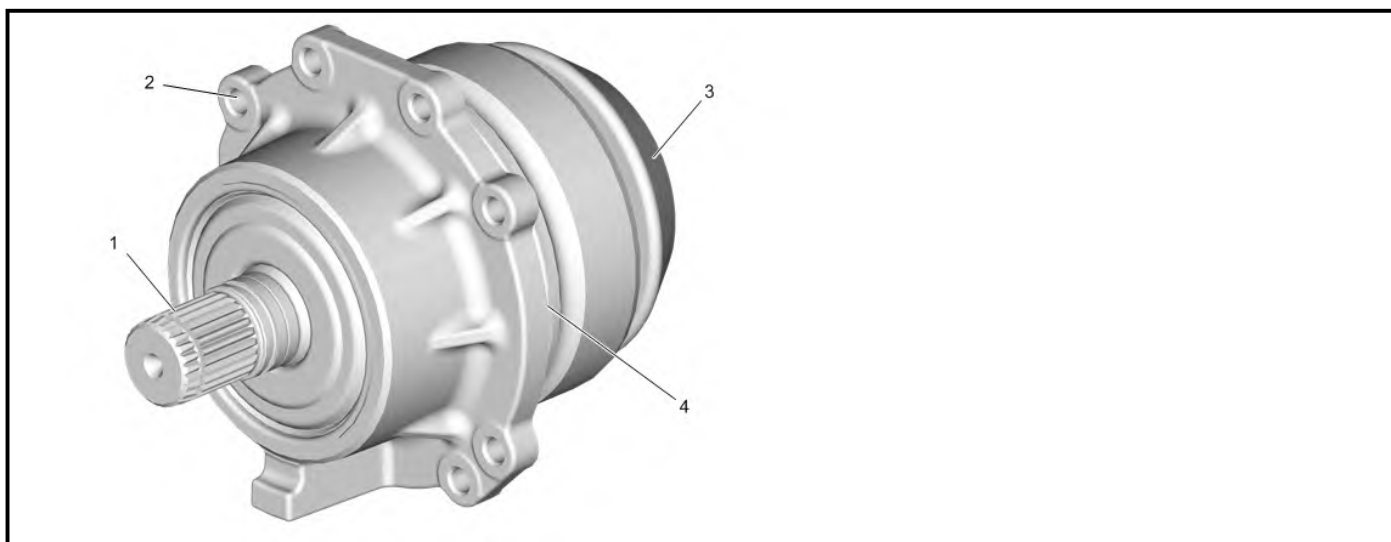


Power Transfer Unit Case Extension Housing Cleaning and Inspection

Callout	Component Name

Callout	Component Name
Preliminary Procedure Clean the power transfer unit case housing in solvent, air dry. Remove all residual input shaft seal material from the input shaft seal bore.	
1	Power Transfer Unit Extension Housing - Model Dependent NOTE: Inspect for excessive wear, cracks, or damage. The power transfer unit case assembly must be replaced if damage is present.
2	Power Transfer Unit Actuator Worm Gear Sleeve NOTE: Inspect for excessive wear or damage. Replace if needed.
3	Power Transfer Unit Actuator Worm Gear Bearing NOTE: Inspect for excessive wear or damage. Replace if needed.
4	Power Transfer Unit Intermediate Drive Shaft Seal Surfaces NOTE: Repair small scratches or nicks with a soft stone.
5	Power Transfer Unit Case Extension Housing Adapter Threaded Bolt Holes NOTE: Repair any damaged threads.
6	Power Transfer Unit Case Extension Housing Threaded Bolt Holes NOTE: Repair any damaged threads.

Power Transfer Unit Rear Output Shaft Housing Cleaning and Inspection



Power Transfer Unit Rear Output Shaft Housing Cleaning and Inspection

Callout	Component Name

Callout	Component Name
Preliminary Procedure Clean the power transfer unit input shaft in cleaning solvent and air dry.	
1	Power Transfer Unit Input Shaft Splines NOTE: Inspect for excessive wear, cracks, or damage.
2	Power Transfer Unit Rear Output Shaft Housing Bolt Holes NOTE: Inspect for excessive wear, cracks, or damage.
3	Power Transfer Unit Rear Output Shaft Splines NOTE: Inspect for excessive wear, cracks, or damage.
4	Power Transfer Unit Rear Output Shaft Housing Surface NOTE: Inspect for pitting, excessive wear, or damage.

Power Transfer Unit Input Shaft Cleaning and Inspection



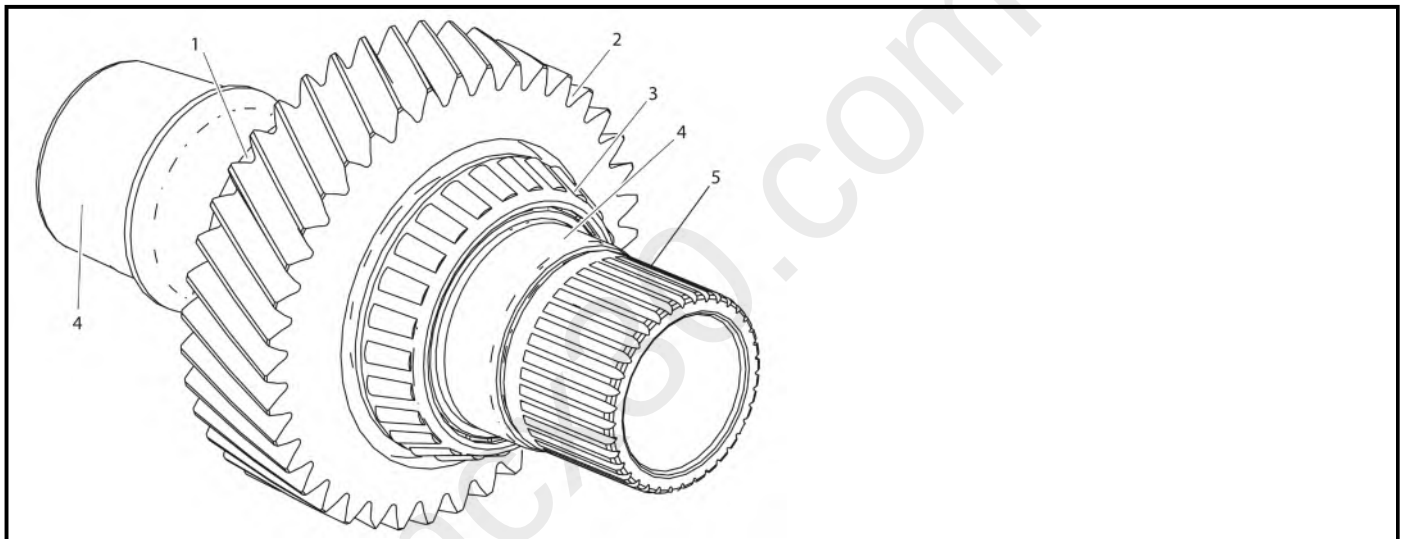
Fig. 9: Exploded View Of Power Transfer Unit Input Shaft Components
 Courtesy of GENERAL MOTORS COMPANY

Power Transfer Unit Input Shaft Cleaning and Inspection

Callout	Component Name
Preliminary Procedure Clean the power transfer unit input shaft in cleaning solvent and air dry.	
1	Input Disconnect Shaft Needle Bearing [2x] NOTE: Inspect for excessive wear or damage.

Callout	Component Name
2	Power Transfer Unit Input Shaft Splines NOTE: Inspect for excessive wear or damage.
3	Power Transfer Unit Input Shaft Gear Teeth NOTE: • Inspect for excessive wear, cracks, or damage. • Minimal wear on the gear teeth should be considered normal.
4	Power Transfer Unit Wave Ring NOTE: Inspect for excessive wear or damage.

Power Transfer Unit Input Disconnect Shaft Cleaning and Inspection

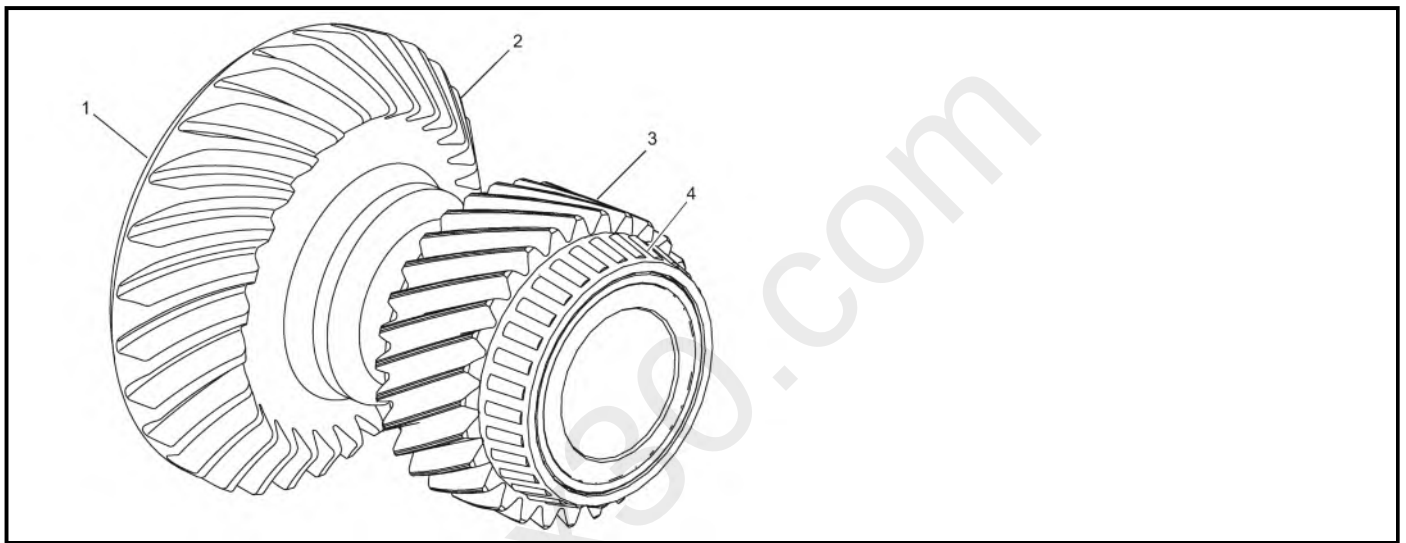


Power Transfer Unit Input Disconnect Shaft Cleaning and Inspection

Callout	Component Name
Preliminary Procedure • Clean the power transfer unit input disconnect shaft in cleaning solvent and air dry. • The case halves, internal gears and bearings are not serviceable components. If damage is present, the transfer case assembly must be replaced.	
1	Power Transfer Unit Input Disconnect Shaft - Front NOTE: Inspect for excessive wear or damage.
2	Power Transfer Unit Input Disconnect Shaft Gear Teeth NOTE: Inspect for excessive wear or damage.

Callout	Component Name
3	Power Transfer Unit Input Disconnect Shaft - Rear NOTE: Inspect for excessive wear or damage.
4	Power Transfer Unit Input Disconnect Shaft Seal Surfaces NOTE: Inspect for scoring or damage.
5	Power Transfer Unit Input Disconnect Shaft Splines NOTE: Inspect for excessive wear or damage.

Power Transfer Unit Idler Shaft Cleaning and Inspection

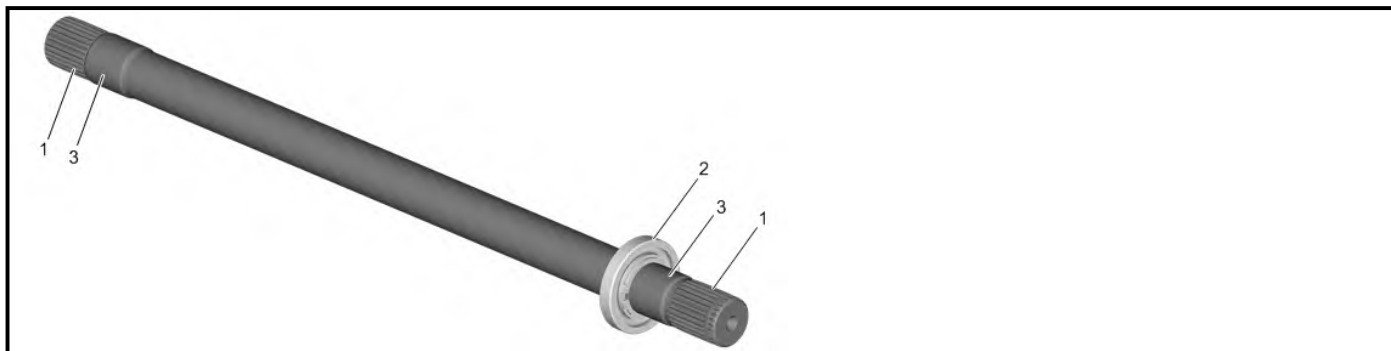


Power Transfer Unit Idler Shaft Cleaning and Inspection

Callout	Component Name
Preliminary Procedure • Clean the power transfer unit idler shaft in cleaning solvent and air dry. • The case halves, internal gears and bearings are not serviceable components. If damage is present, the transfer case assembly must be replaced.	
1	Power Transfer Unit Idler Shaft Bearing - Front NOTE: Inspect for excessive wear or damage.
2	Power Transfer Unit Idler Shaft Gear Teeth NOTE: Inspect for excessive wear or damage.
3	Power Transfer Unit Idler Shaft Bearing - Rear NOTE: Inspect for excessive wear or damage.

Callout	Component Name
4	Power Transfer Unit Idler Shaft Gear Teeth NOTE: Inspect for excessive wear or damage.

Power Transfer Unit Intermediate Drive Shaft Cleaning and Inspection



Power Transfer Unit Intermediate Drive Shaft Cleaning and Inspection

Callout	Component Name
Preliminary Procedure • Clean the power transfer unit intermediate drive shaft in cleaning solvent and air dry. • The case halves, internal gears and bearings are not serviceable components. If damage is present, the transfer case assembly must be replaced.	
1	Power Transfer Unit Intermediate Drive Shaft Splines NOTE: Inspect for excessive wear, cracks, or damage.
2	Power Transfer Unit Intermediate Drive Shaft Bearing NOTE: Inspect for excessive wear or damage.
3	Power Transfer Unit Intermediate Drive Shaft Sealing Surfaces NOTE: Inspect for pitting, excessive wear, or damage.

Power Transfer Unit Shift Components Cleaning and Inspection

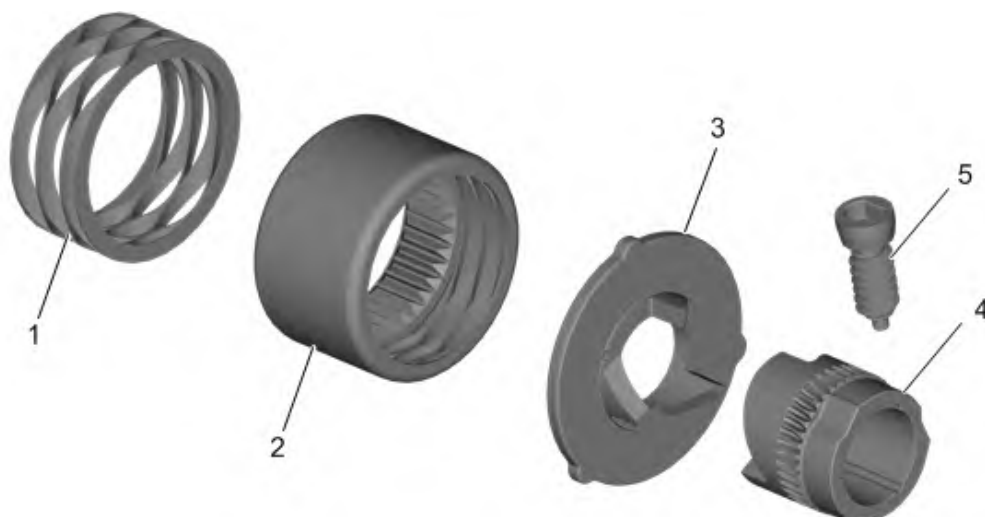


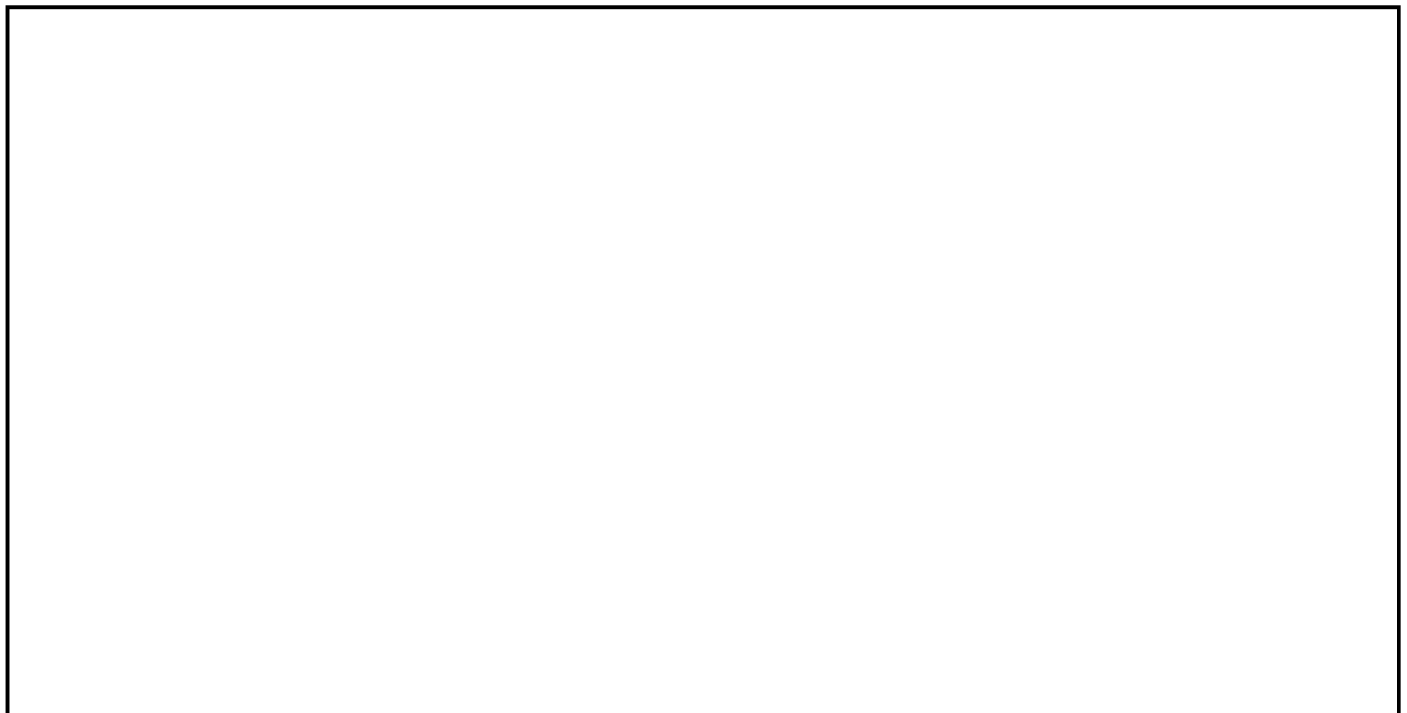
Fig. 10: Exploded View Of Power Transfer Unit Shift Components
Courtesy of GENERAL MOTORS COMPANY

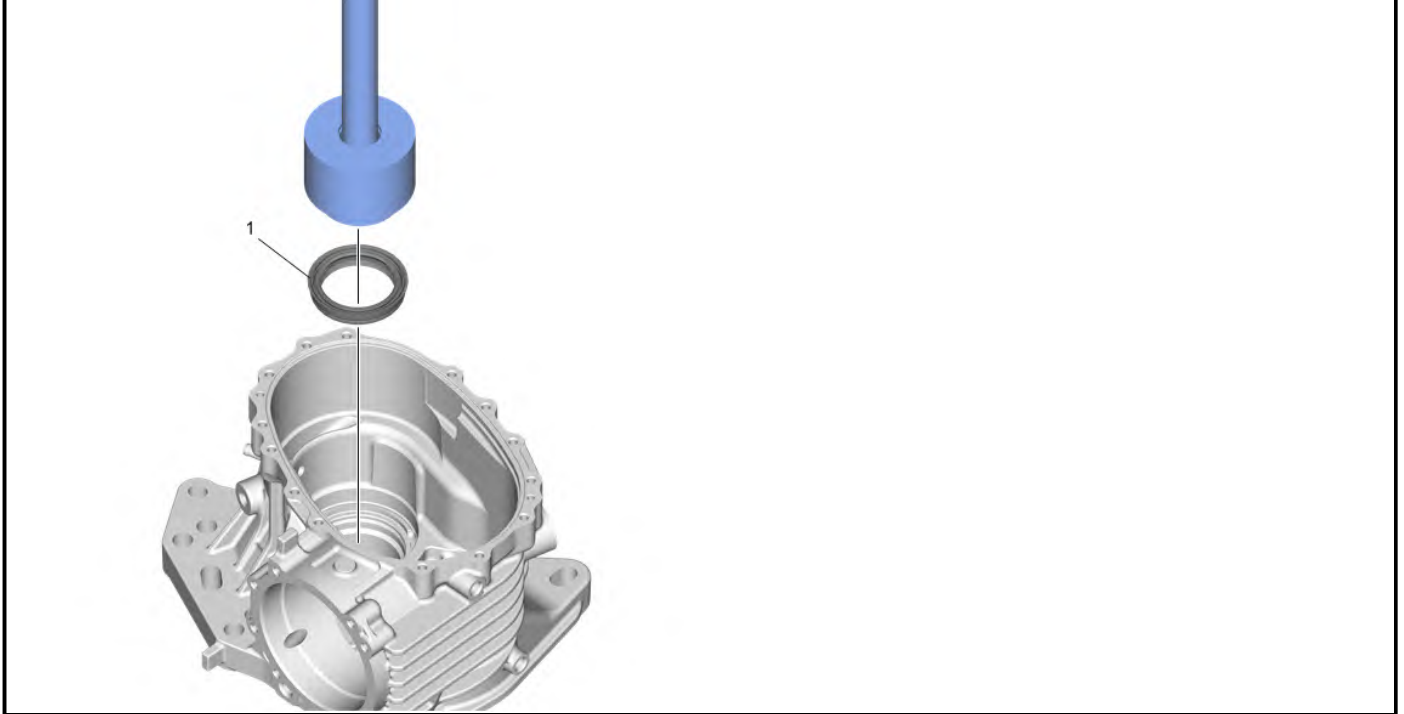
Power Transfer Unit Shift Components Cleaning and Inspection

Callout	Component Name
Preliminary Procedure Clean the power transfer unit shift components in cleaning solvent and air dry. NOTE: Minimal gear tooth wear is to be considered normal.	
1	Power Transfer Unit Connect Spring NOTE: Inspect for excessive wear or damage.
2	Power Transfer Unit Shift Sleeve NOTE: Inspect for excessive gear tooth wear or a broke spring.
3	Power Transfer Disconnect Linear Cam NOTE: Inspect for excessive wear or damage.
4	Power Transfer Disconnect Rotary Cam NOTE: Inspect for excessive wear or damage.
5	Power Transfer Unit Actuator Worm Gear NOTE: Inspect for excessive wear or damage.

POWER TRANSFER UNIT CASE ASSEMBLE

Power Transfer Unit Input Shaft Seal - Case Installation

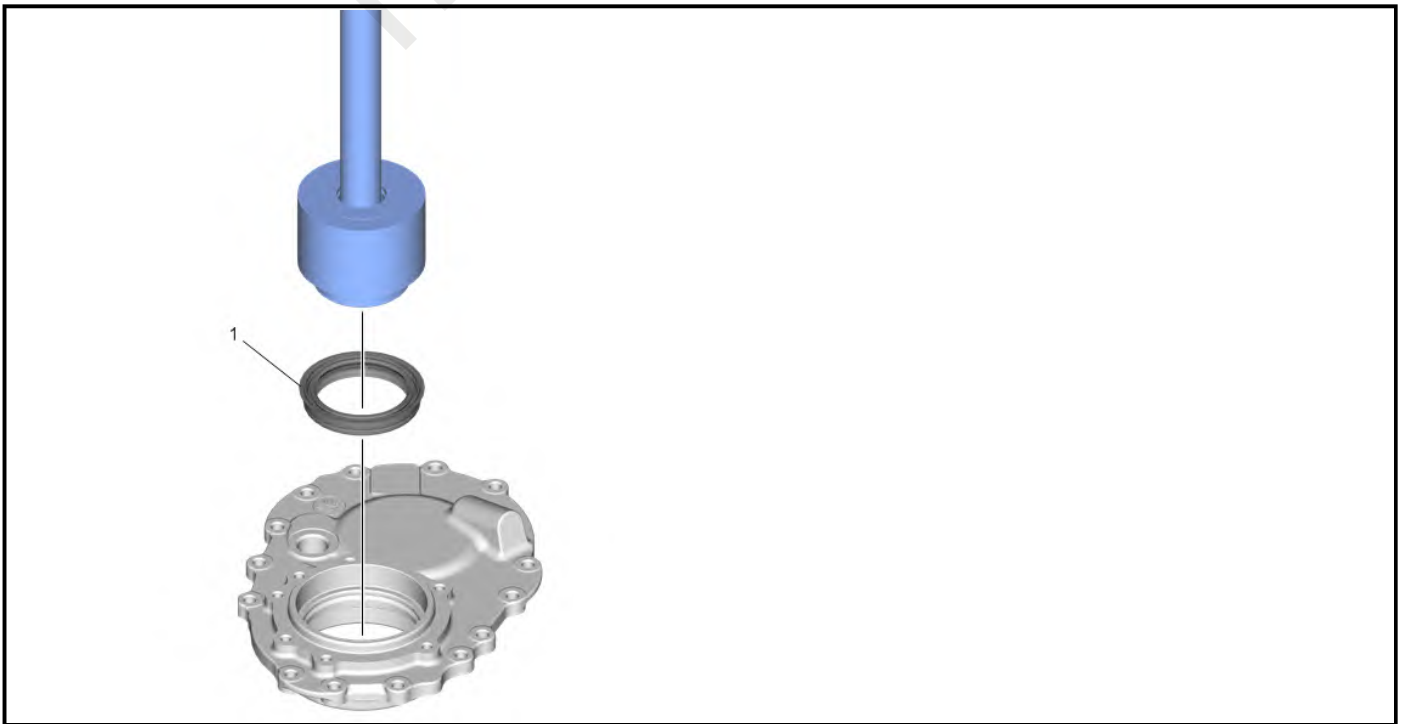




Power Transfer Unit Input Shaft Seal - Case Installation

Callout	Component Name
1	Power Transfer Unit Input Shaft Seal - Case CAUTION: When replacing power transfer unit case seals, use appropriate GM tools along with a hydraulic press. Failure to do so may result in misalignment or damage to the seal and/or power transfer unit. Special Tools • DT-51835 Seal Installer • J-42176 Driver Handle Equivalent regional tools: <u>Special Tools</u>.

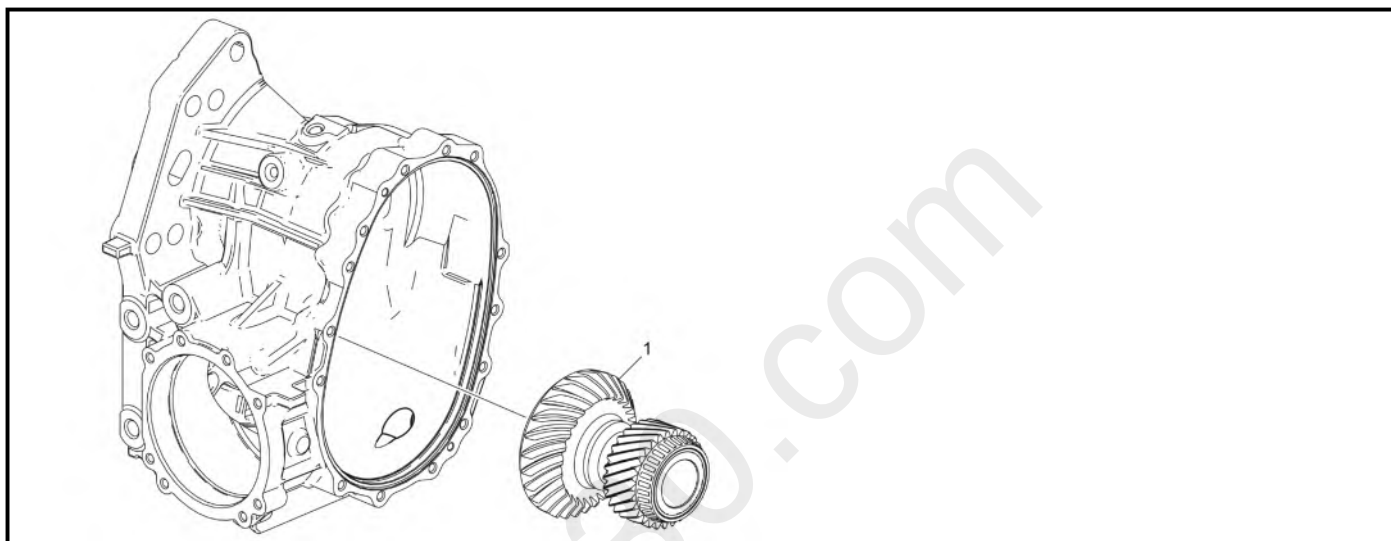
Power Transfer Unit Input Shaft Seal - Cover Installation



Power Transfer Unit Input Shaft Seal - Cover Installation

Callout	Component Name
1	Power Transfer Unit Input Shaft Seal - Cover CAUTION: When replacing power transfer unit case seals, use appropriate GM tools along with a hydraulic press. Failure to do so may result in misalignment or damage to the seal and/or power transfer unit. Special Tools • DT-51834 Seal Installer • J-42176 Driver Handle Equivalent regional tools: <u>Special Tools</u> .

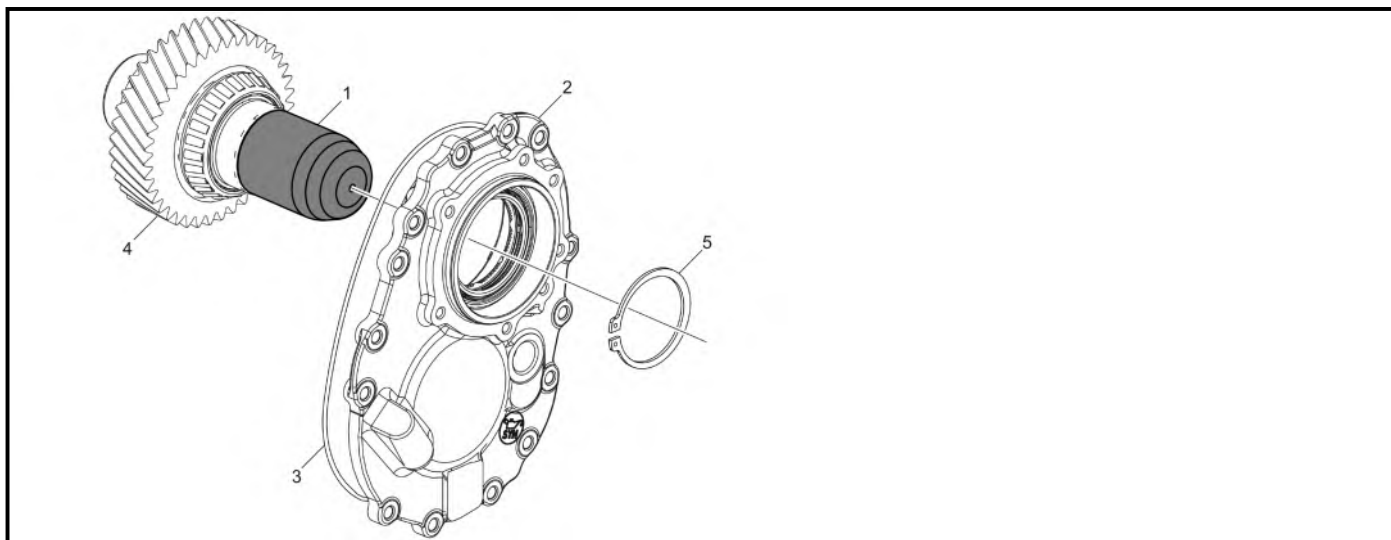
Power Transfer Unit Idler Shaft Installation



Power Transfer Unit Idler Shaft Installation

Callout	Component Name
1	Power Transfer Unit Idler Shaft NOTE: DO NOT remove the input disconnect bearing races from the case half or cover. The case, cover, input disconnect shaft, and input disconnect bearings and races are not available as separate service parts. If component replacement is required, the power transfer unit is to be replaced as an assembly.

Power Transfer Unit Cover Housing Seal and Input Disconnect Shaft Installation



Power Transfer Unit Cover Housing Seal and Input Disconnect Shaft Installation

Callout	Component Name
1	Input Shaft Seal Protector Procedure Lubricate The ID And OD Areas Of The Seal Protectors With Gear Oil Prior To Use. NOTE: Input shaft seal protector tools are provided within the input shaft seals service kit. The seal protectors are designed to be used during input disconnect shaft installation and to protect the seal ID surfaces from damage. The shorter/larger OD seal protector is to be used on the cover side.
2	Power Transfer Unit Cover Housing
3	Power Transfer Unit Cover Housing Seal NOTE: Apply a thin coating of gear oil to the housing O-ring. Refer to Adhesives, Fluids, Lubricants, and Sealers.
4	Power Transfer Unit Input Disconnect Shaft NOTE: DO NOT remove the input disconnect bearing races from the case half or cover. The case, cover, input disconnect shaft, and input disconnect bearings and races are not available as separate service parts. If component replacement is required, the power transfer unit is to be replaced as an assembly.
5	Power Transfer Input Connect Spring Clip

Power Transfer Unit Cover Housing, Input Disconnect Shaft, Input Shaft, and Cover Assemble

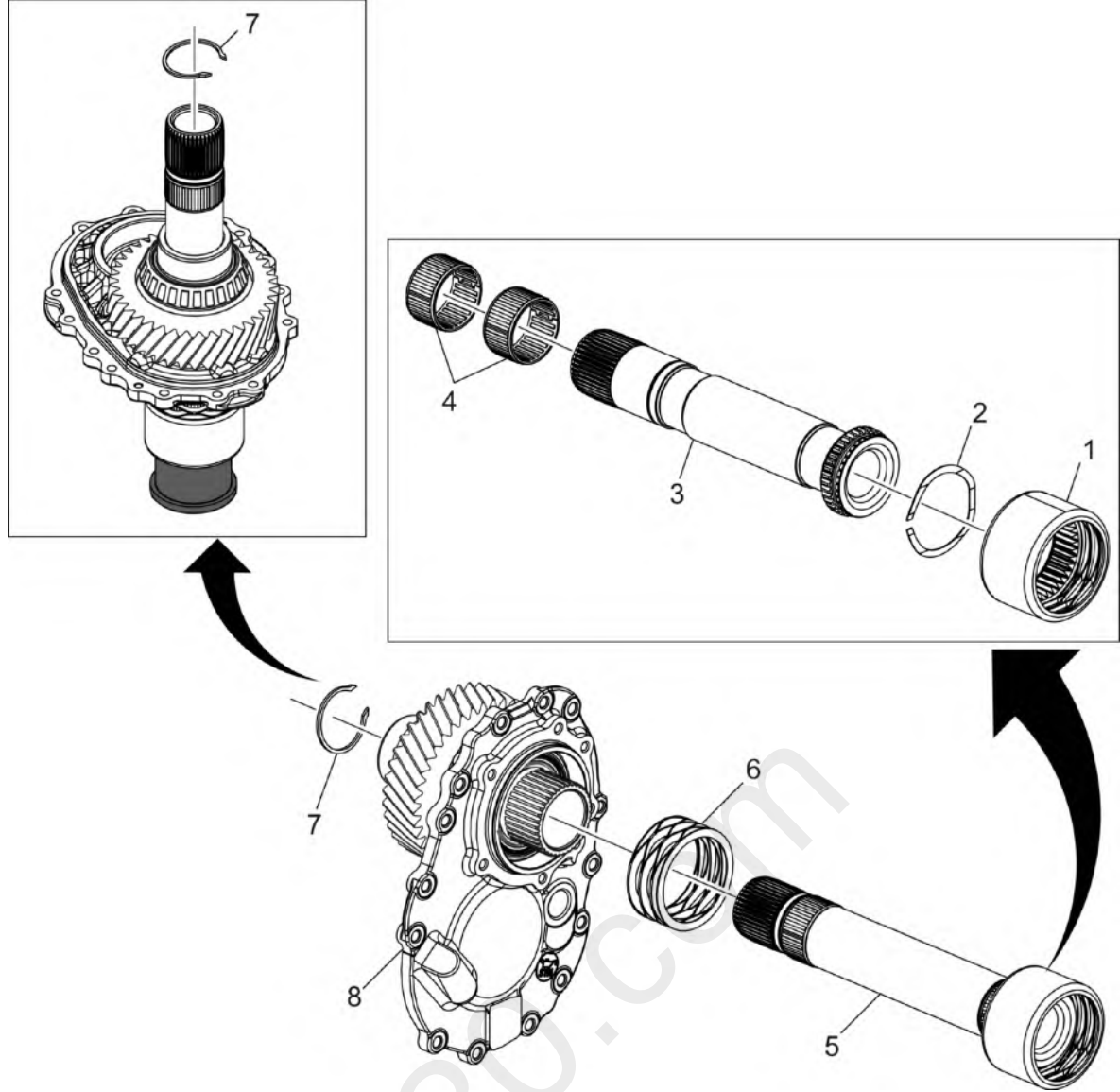


Fig. 11: Exploded View Of Power Transfer Unit Cover Housing, Input Disconnect Shaft, Input Shaft And Cover Components

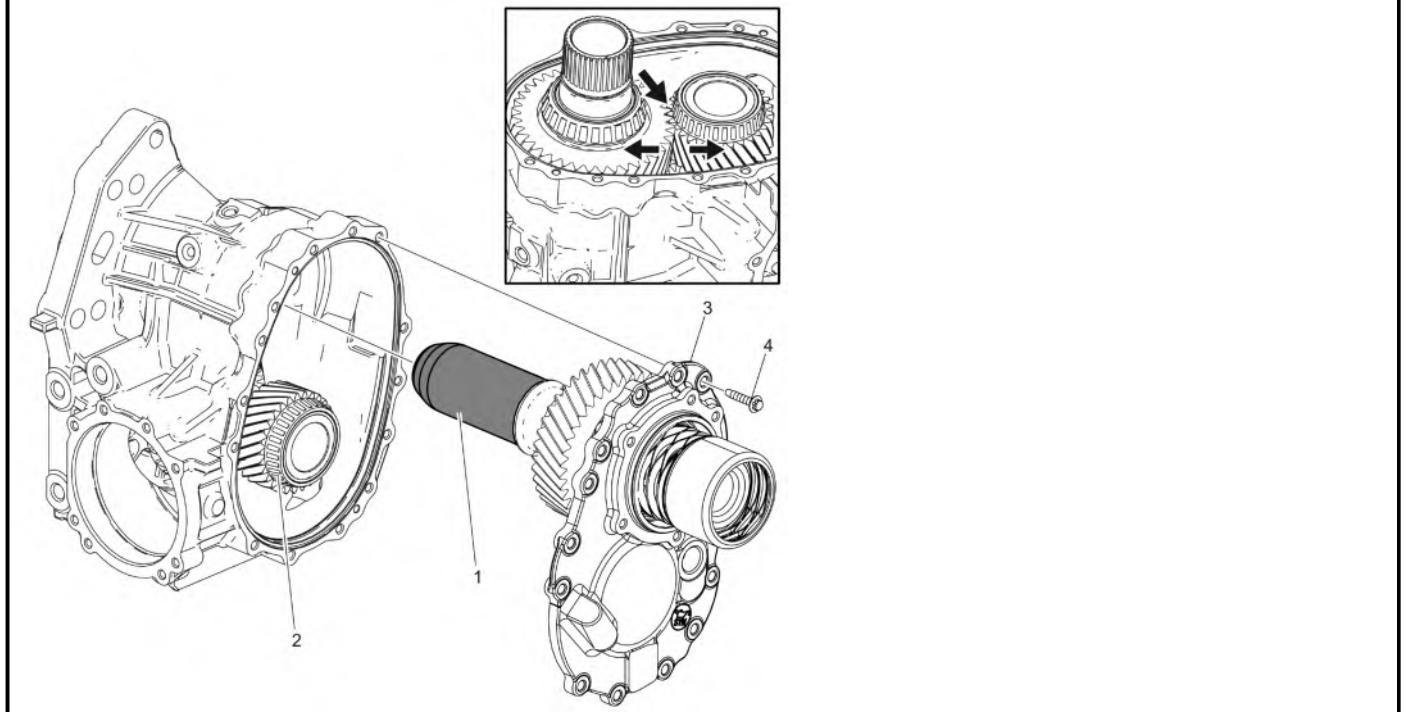
Courtesy of GENERAL MOTORS COMPANY

Power Transfer Unit Cover Housing, Input Disconnect Shaft, Input Shaft, and Cover Assemble

Callout	Component Name
1	Power Transfer Unit Shift Sleeve Special Tools DT-48022 Output Bushing Installer Equivalent regional tools: Special Tools .
2	Power Transfer Unit Wave Ring
3	Power Transfer Unit Input Shaft
4	Input Disconnect Shaft Needle Bearing [2x]
5	Power Transfer Unit Connect Spring
6	Power Transfer Unit Idler Gear Shaft Access Tube Assembly
7	Power Transfer Input Shaft Clip
8	Power Transfer Unit Cover Housing

Power Transfer Unit Cover Housing, Input Disconnect Shaft, Input Shaft, and Cover Installation





Power Transfer Unit Cover Housing, Input Disconnect Shaft, Input Shaft, and Cover Installation

Callout	Component Name
1	Input Shaft Seal Protector Procedure Lubricate The ID And OD Areas Of The Seal Protectors With Gear Oil Prior To Use. NOTE: Input shaft seal protector tools are provided within the input shaft seals service kit. The seal protectors are designed to be used during input disconnect shaft installation and to protect the seal ID surfaces from damage. The larger/smaller OD seal protector is to be used on the case side.
2	Power Transfer Unit Idler Shaft NOTE: Use the rear output shaft hole to move the idler shaft.
3	Power Transfer Unit Cover Housing NOTE: The gear teeth to the input disconnect shaft go behind the bearing to the idler shaft.
4	Power Transfer Unit Cover Housing Bolt [14x] Tighten 22 N.m (16 lb ft)

Power Transfer Unit Rear Output Shaft Housing Installation

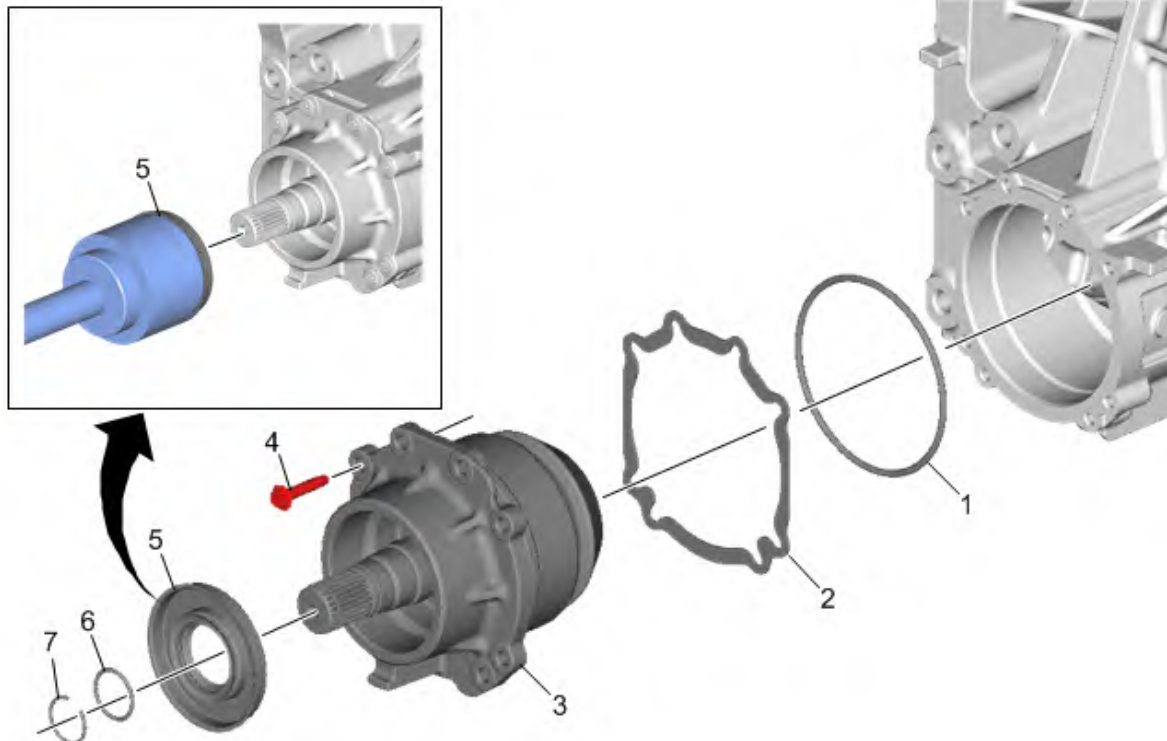


Fig. 12: Exploded View Of Power Transfer Unit Rear Output Shaft Housing Components

Courtesy of GENERAL MOTORS COMPANY

Power Transfer Unit Rear Output Shaft Housing Installation

Callout	Component Name
1	Power Transfer Unit Pinion Seal - O-Ring NOTE: Apply a thin coating of gear oil to the housing O-ring. Refer to Adhesives, Fluids, Lubricants, and Sealers .
2	Power Transfer Unit Rear Output Shaft Shim
3	Power Transfer Unit Rear Output Shaft Housing
4	Power Transfer Unit Rear Pinion Housing Bolt [8x] CAUTION: Refer to Fastener Caution . Tighten 22 N.m (16 lb ft)
5	Power Transfer Unit Output Shaft Seal CAUTION: When replacing power transfer unit case seals, use appropriate GM tools along with a hydraulic press. Failure to do so may result in misalignment or damage to the seal and/or power transfer unit. Special Tools • DT-51834 Seal Installer • J-42176 Driver Handle Equivalent regional tools: Special Tools .
6	Power Transfer Unit Propeller Shaft Seal - O-Ring

Callout	Component Name
7	Power Transfer Unit Propeller Shaft Retainer NOTE: Install a NEW retainer.

Power Transfer Unit Extension Housing Installation

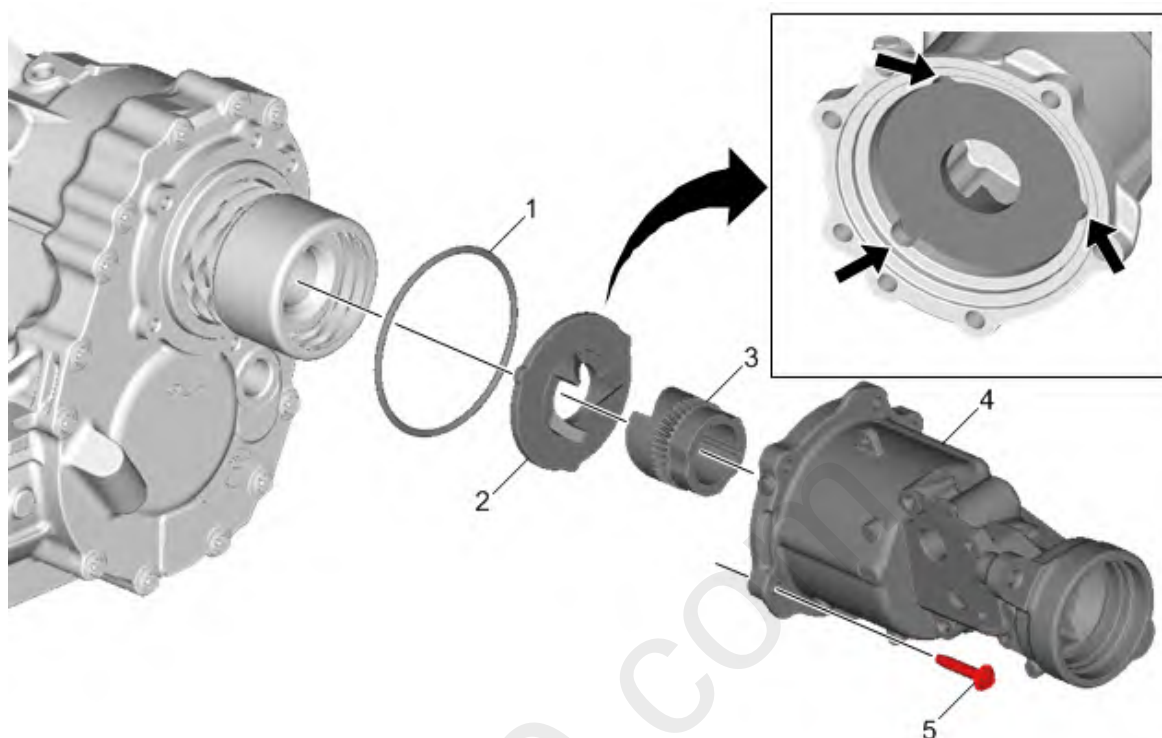


Fig. 13: Exploded View Of Power Transfer Unit Extension Housing Components

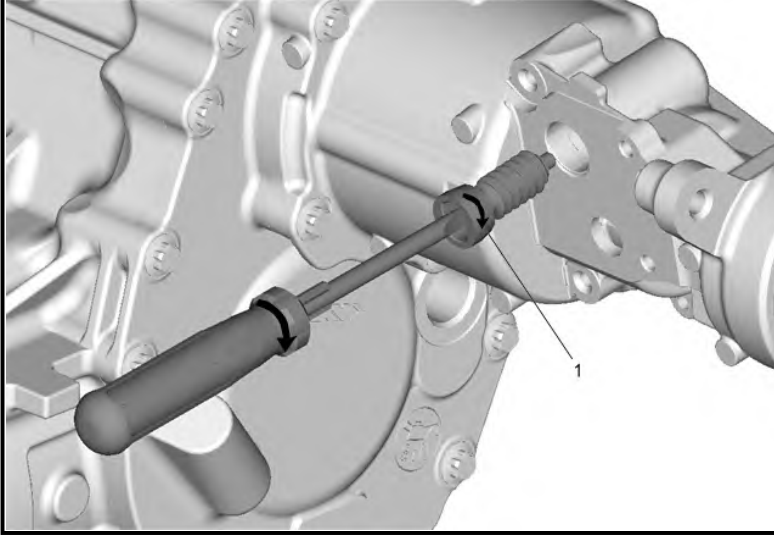
Courtesy of GENERAL MOTORS COMPANY

Power Transfer Unit Extension Housing Installation

Callout	Component Name
1	Extension Housing Cover Seal - O-Ring NOTE: Install a NEW seal.
2	Power Transfer Disconnect Linear Cam NOTE: Ensure the tabs on the OD of cam align into the notched areas of the housing.
3	Power Transfer Disconnect Rotary Cam
4	Power Transfer Unit Extension Housing Power Transfer Unit Case Cleaning and Inspection
5	Power Transfer Unit Extension Housing Bolt [5x] Tighten 22 N.m (16 lb ft)

Power Transfer Unit Worm Gear Installation





Power Transfer Unit Worm Gear Installation

Callout	Component Name
1	Power Transfer Unit Actuator Worm Gear

Power Transfer Unit Intermediate Drive Shaft Components Installation

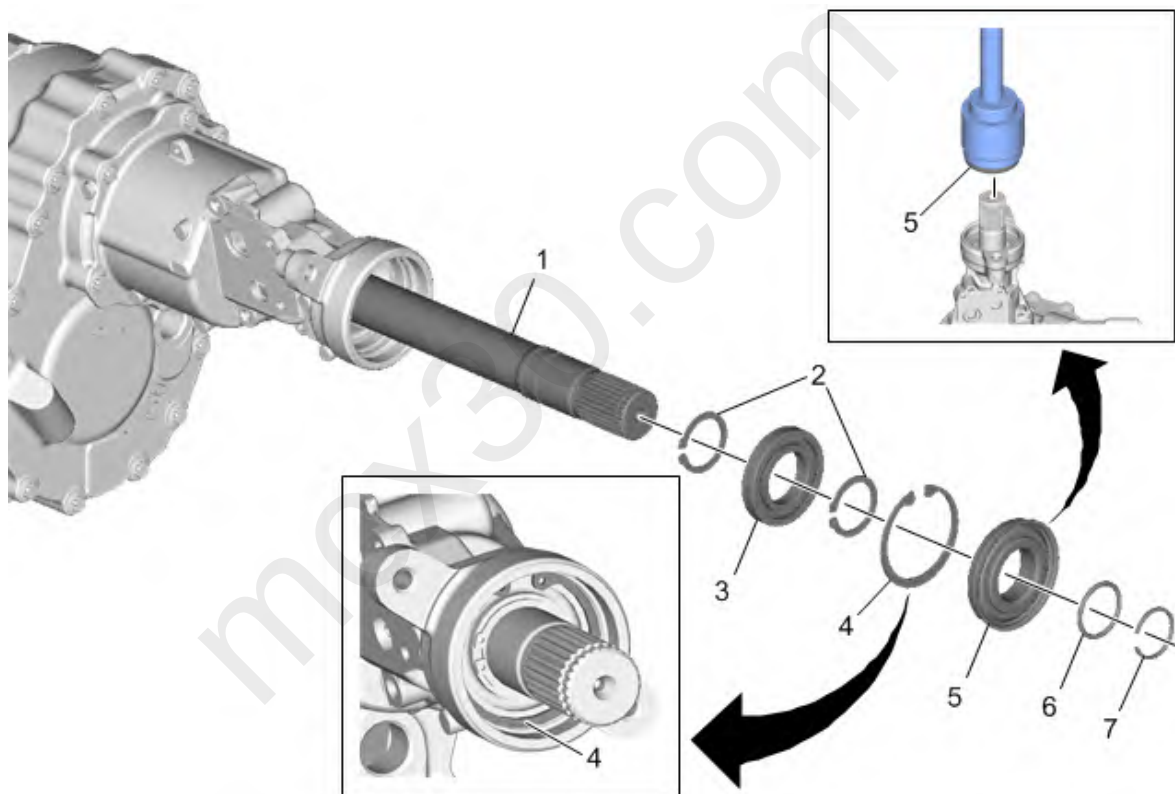


Fig. 14: Exploded View Of Power Transfer Unit Intermediate Drive Shaft Components

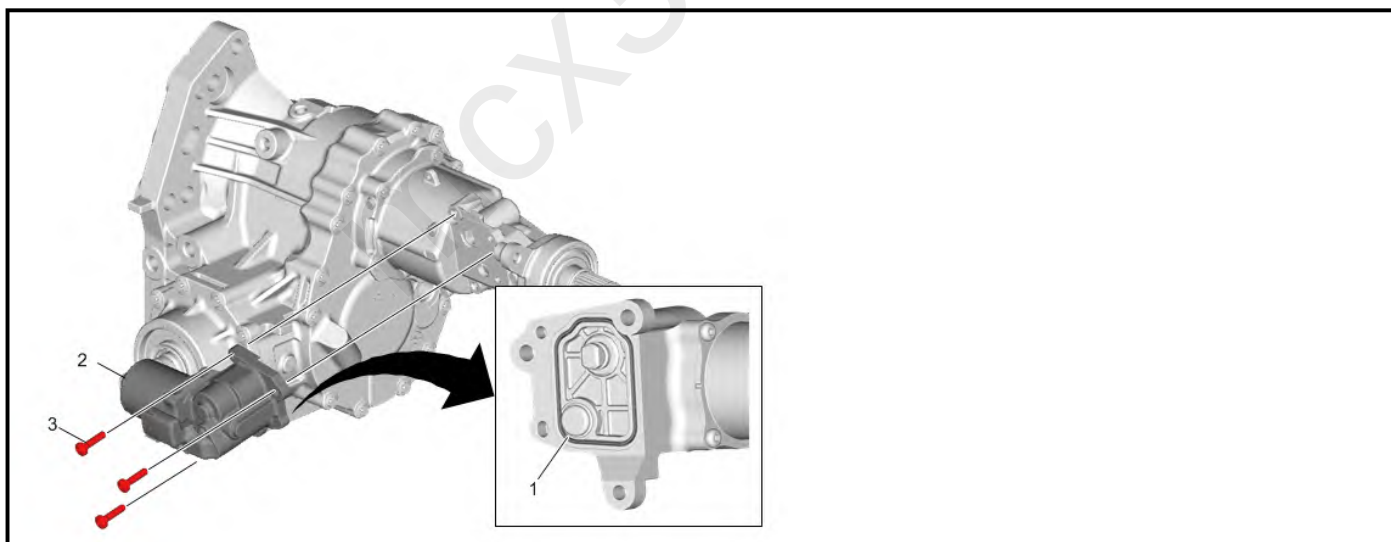
Courtesy of GENERAL MOTORS COMPANY

Power Transfer Unit Intermediate Drive Shaft Components Installation

Callout	Component Name
1	Power Transfer Unit Intermediate Drive Shaft
2	Power Transfer Unit Intermediate Drive Shaft Bearing Retaining Ring [2x]
3	Power Transfer Unit Intermediate Drive Shaft Bearing NOTE: Use a press to install the bearing to the power transfer unit intermediate drive shaft.
4	Power Transfer Unit Intermediate Drive Shaft Bearing Retainer

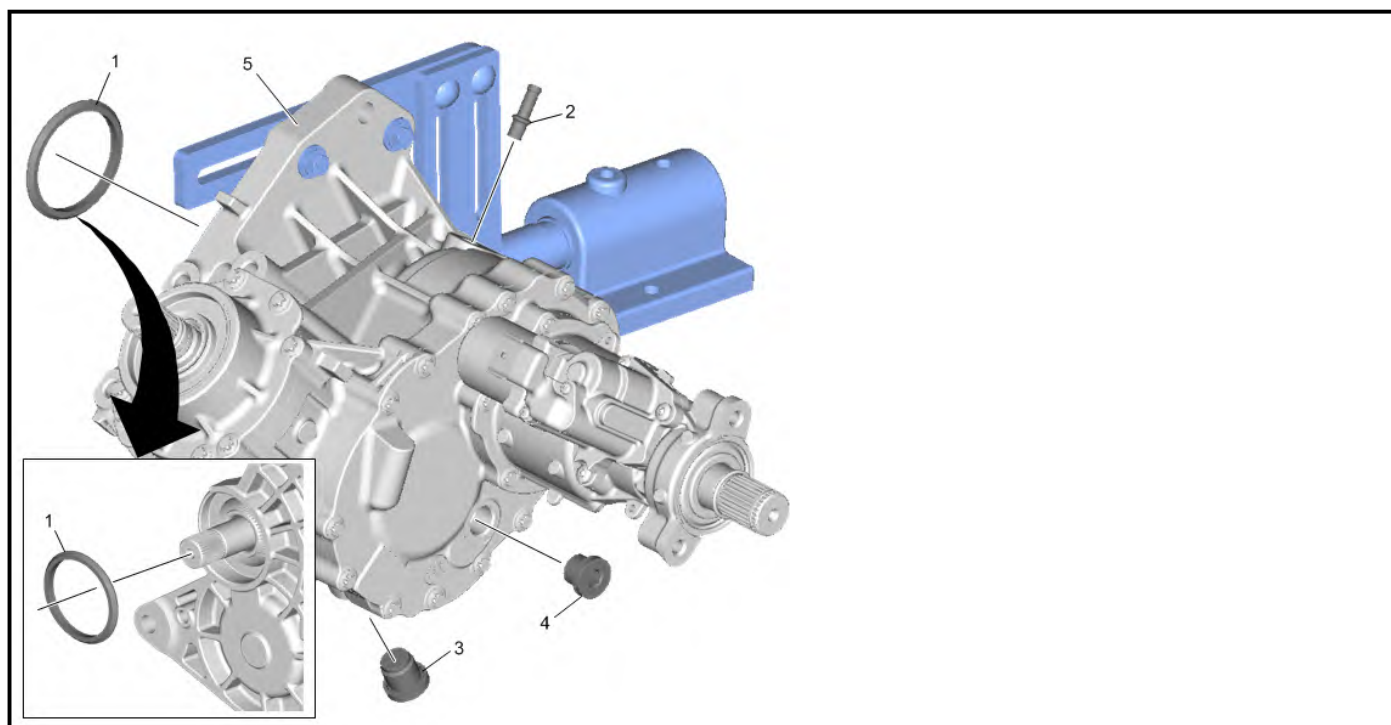
Callout	Component Name
5	Power Transfer Unit Intermediate Drive Shaft Seal CAUTION: When replacing power transfer unit case seals, use appropriate GM tools along with a hydraulic press. Failure to do so may result in misalignment or damage to the seal and/or power transfer unit. CAUTION: Do not nick, scratch or damage the sealing surface. The sealing surface is a machined surface. Damage to the machined surface can cause leakage. Special Tools • DT-51835 Seal Installer • J-42176 Driver Handle Equivalent regional tools: Special Tools.
6	Power Transfer Unit Half Shaft Seal - O-Ring NOTE: Install a NEW seal.
7	Power Transfer Unit Intermediate Drive Shaft Clip NOTE: Install a NEW retainer.

Power Transfer Unit Shift Actuator Installation



Power Transfer Unit Shift Actuator Installation

Callout	Component Name
1	Power Transfer Unit Shift Actuator Seal NOTE: The power transfer unit shift actuator seal is only available with the shift actuator.
2	Power Transfer Unit Shift Actuator
3	Power Transfer Unit Shift Actuator Bolt Tighten 10 N.m (88 lb in)

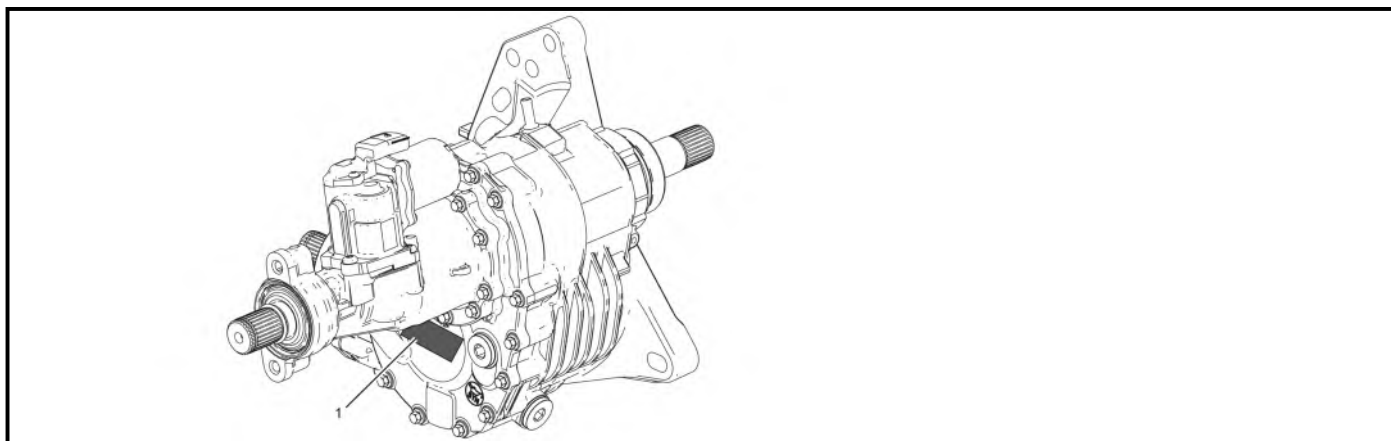


Power Transfer Unit Case Holding Fixture Removal, Oil Fill Plug, Oil Drain Plug, and Vent Hose Connector Installation

Callout	Component Name
1	Power Transfer Unit Face Seal - O-Ring NOTE: Install a NEW seal.
2	Power Transfer Unit Vent Hose Connector NOTE: Replacement is required.
3	Power Transfer Unit Drain Plug Tighten 39 N.m (29 lb ft) NOTE: The plug and seal are only available as an assembly. Install a NEW plug with seal during assembly.
4	Power Transfer Unit Fill Plug Tighten 39 N.m (29 lb ft) NOTE: The plug and seal are only available as an assembly. Install a NEW plug with seal during assembly.
5	Power Transfer Unit Case Special Tools • DT-3289-20 Holding Fixture • DT-36842 Transaxle Holding Fixture Equivalent regional tools: Special Tools.

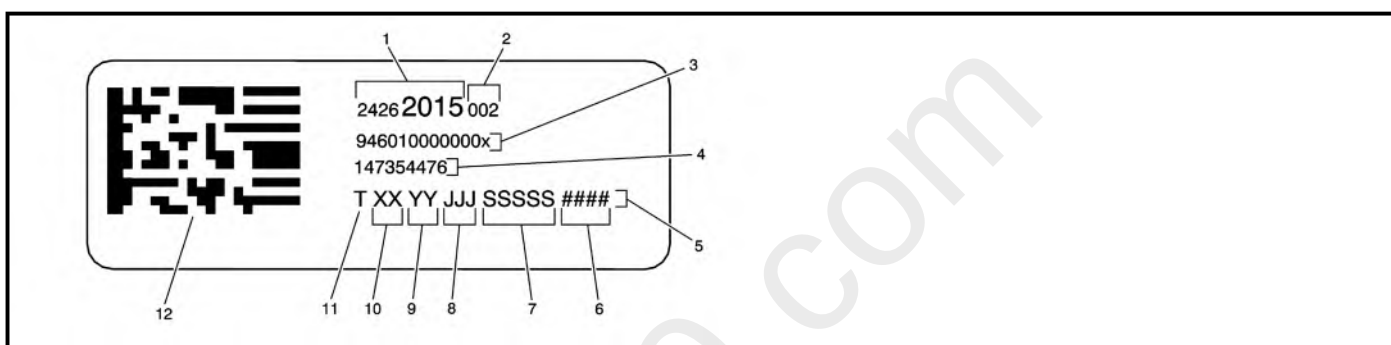
DESCRIPTION AND OPERATION

POWER TRANSFER UNIT CASE IDENTIFICATION



The transfer case identification label (1) is located on the top of the cover housing.

Transfer Case Primary Identification Label



1. GM Part Number
2. GM Revision Level
3. VPPS
4. DUNS Number
5. Trace Code
6. Shift Sequence Number
7. Broadcast Code
8. Julian Date
9. Manufactured/Assembled Year
10. Plant and Shift Location
11. GM Data Identifier
12. Bar Code

POWER TRANSFER UNIT CASE DESCRIPTION AND OPERATION

Driver Mode Control

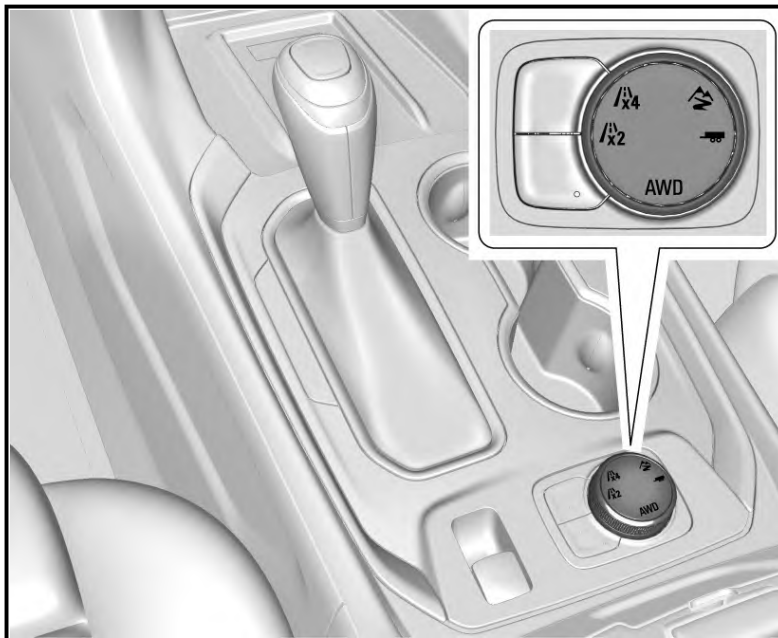
Driver Mode Control has the following modes: Tour, Sport, and All-Wheel Drive (AWD). Change MODE on the switch to make a mode selection. The first change of the switch will show the current mode in the instrument cluster. Continue changing through the available modes

If the vehicle is in Tour or Sport Mode when the engine is turned off, Driver Mode Control will come on in Tour Mode at the next ignition cycle.

If the vehicle is put in AWD Mode, it will remain in AWD through future ignition cycles, until a different mode is selected. When AWD Mode, the light will come on in the AWD indicator below the MODE switch. The indicator light will turn off when Tour Mode is selected.

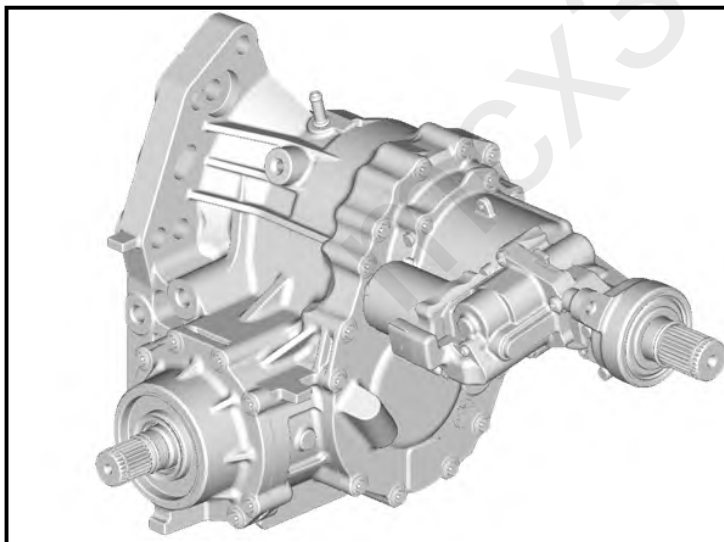
Look in Owner's Manual for more specific information on the operating system for each vehicle.

Driver Mode Control Switch



- **Tour Mode** - Operates in FWD to improve fuel economy. Use this mode during normal driving operations.
- **Sport Mode** - Improves vehicle handling and acceleration on dry pavement. When active, Sport Mode modifies steering efforts, transmission shifting, AWD torque, and suspension tuning, if equipped.
- **AWD Mode** - Provides drive torque to all four wheels. Select AWD to improve traction and control on slippery road surfaces, such as gravel, sand, wet pavement, snow, and ice. When in AWD Mode, the AWD Mode indicator light will be on.
- **Tow/Haul Mode** - This feature can assist when towing or hauling a heavy load. Use this mode to assist in maintaining desired vehicle speeds when driving on downhill grades by using the engine and transmission. For AWD vehicles, choosing Tow/Haul Mode also engages AWD mode.

General Description



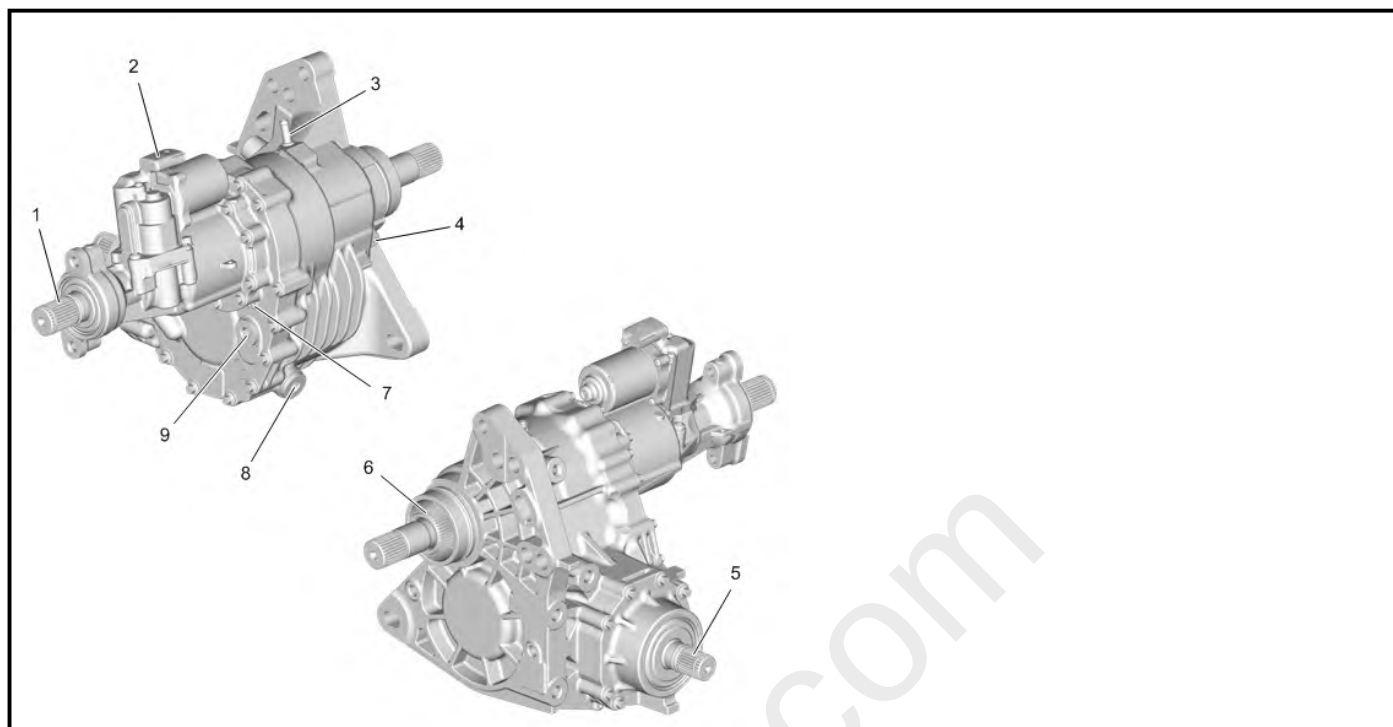
The GKN model 761 power transfer unit (PTU) is positioned in the right side of the vehicle and in model dependent applications is bolted to the transmission via an adapter plate. The primary function of the power transfer unit is to receive power from the transmission and transfer it through the propeller shaft to the rear differential using helical and hypoid gear sets. The power transfer unit housing, cover, extension housing, and rear output shaft housing are a cast aluminum design. Gear tooth clearances and bearing preloads are maintained by shims located behind the bearing races. The housings, internal gears, and bearings are not serviceable components. If housing, gear set, or bearing damage occurs, the assembly must be replaced.

The power transfer unit fluid is fill-for-life with no maintenance fluid change intervals required.

The disconnect-design power transfer unit has the ability to internally engage and send power and torque to the rear propeller shaft, activating AWD mode. Shifting is performed by a PTU mounted actuator motor, internal linear and rotary cams, and shift collar. The actuator motor operates as-directed by the rear differential clutch control module to perform the shifting operations.

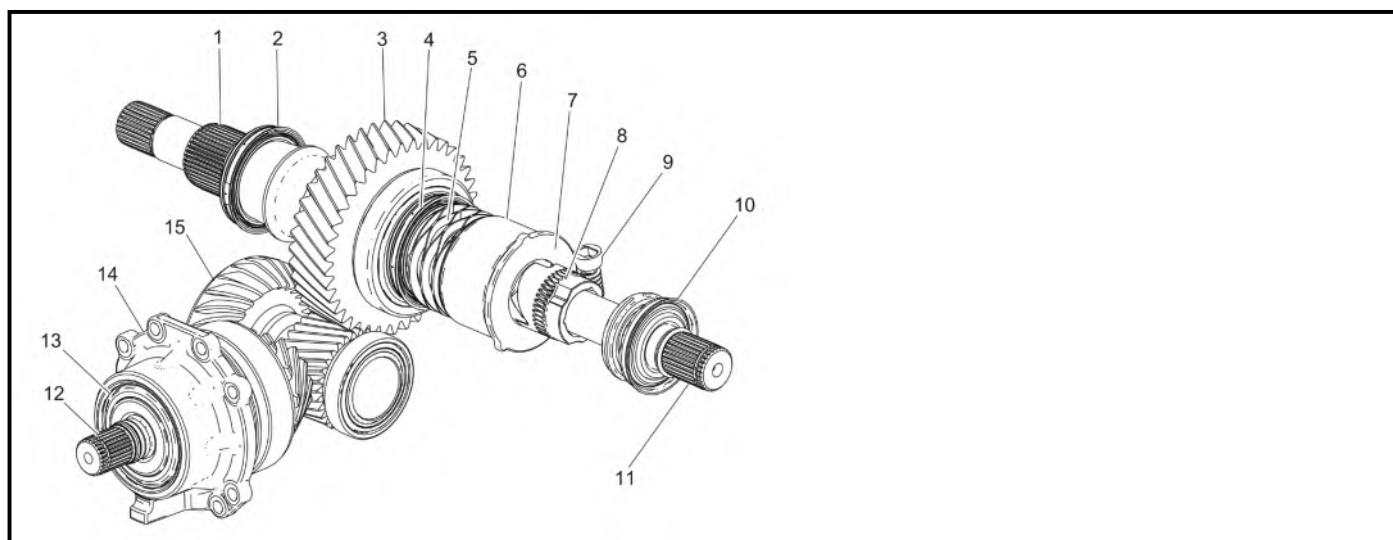
During normal driving situations, the power transfer unit operates in FWD mode with no rotation of the rear propeller shaft. The rear differential clutch control module monitors wheel slip based on the inputs from the wheel speed sensors and/or vehicle speed sensor. When the vehicle experiences a wheel slip condition, the control module sends a pulse width modulated (PWM) signal to the PTU actuator motor. The actuator motor rotates the worm gear and rotary cam, moving the shift collar to engage AWD and propeller shaft rotation. AWD mode will remain active until the slip condition has stopped. The process would repeat if wheel slip is detected again.

External Components



1. Power Transfer Unit Intermediate Drive Shaft
2. Power Transfer Unit Shift Actuator
3. Power Transfer Unit Vent Hose Connector
4. Power Transfer Unit Weep Hole Location - Main Case/Left Input Shaft Seal
5. Power Transfer Unit Rear Output Shaft
6. Power Transfer Unit Input Disconnect Shaft
7. Power Transfer Unit Weep Hole Location - Cover/Right Input Shaft Seal
8. Power Transfer Unit Drain Plug
9. Power Transfer Unit Fill Plug

Internal Components



The OD splines of the input shaft (1) are mated to the ID splines of the transmission output shaft. When commanded by the rear differential clutch control module, the PTU actuator motor rotates the worm gear (9) and rotary cam (8) to engage AWD. The input (1) and input disconnect (3) shafts are mated via the internal teeth of the shift collar (6).

A helical gear set transfers power from the input disconnect shaft (3) to the idler gear shaft (15). A second gear set, the hypoid gear set transfers power and torque from the idler gear shaft (15) to the rear output shaft (12). The propeller shaft is mated to the rear output shaft providing power and torque to the rear drive axle. The OD splines of the intermediate drive shaft (11) mate to the ID splines of the transmission carrier assembly and provide power and torque to the right front axle shaft and wheel.

During normal driving situations, the power transfer unit operates in FWD mode with no rotation of the rear propeller shaft. The rear differential clutch control module monitors wheel slip speed based on the inputs from the wheel speed sensors and/or vehicle speed sensor. When the vehicle experiences a wheel slip condition, the control module sends a pulse width modulated (PWM) signal to the actuator motor to engage AWD mode will remain active until the slip condition has ended. The process would repeat if wheel slip is detected again.

1. Power Transfer Unit Input Shaft
2. Power Transfer Unit Input Shaft Seal - Case
3. Power Transfer Unit Input Disconnect Shaft
4. Power Transfer Unit Input Shaft Seal - Cover
5. Power Transfer Unit Connect Spring
6. Power Transfer Unit Shift Sleeve
7. Power Transfer Disconnect Linear Cam
8. Power Transfer Disconnect Rotary Cam
9. Power Transfer Unit Actuator Worm Gear
10. Power Transfer Unit Intermediate Drive Shaft Seal
11. Power Transfer Unit Intermediate Drive Shaft
12. Power Transfer Unit Rear Output Shaft
13. Power Transfer Unit Output Shaft Seal
14. Power Transfer Unit Rear Output Shaft Housing
15. Power Transfer Unit Idler Shaft

Shift Components and Function

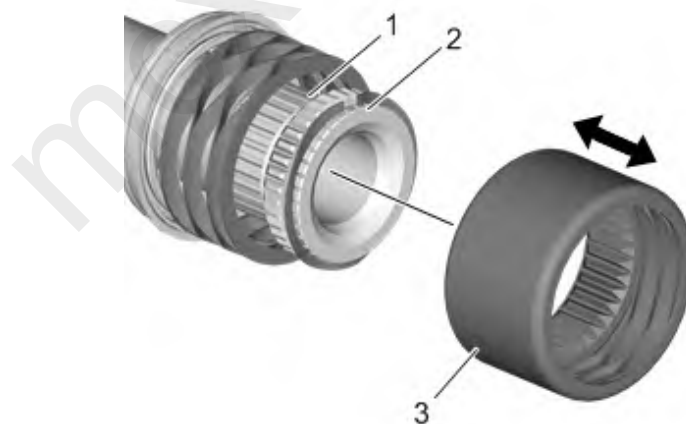
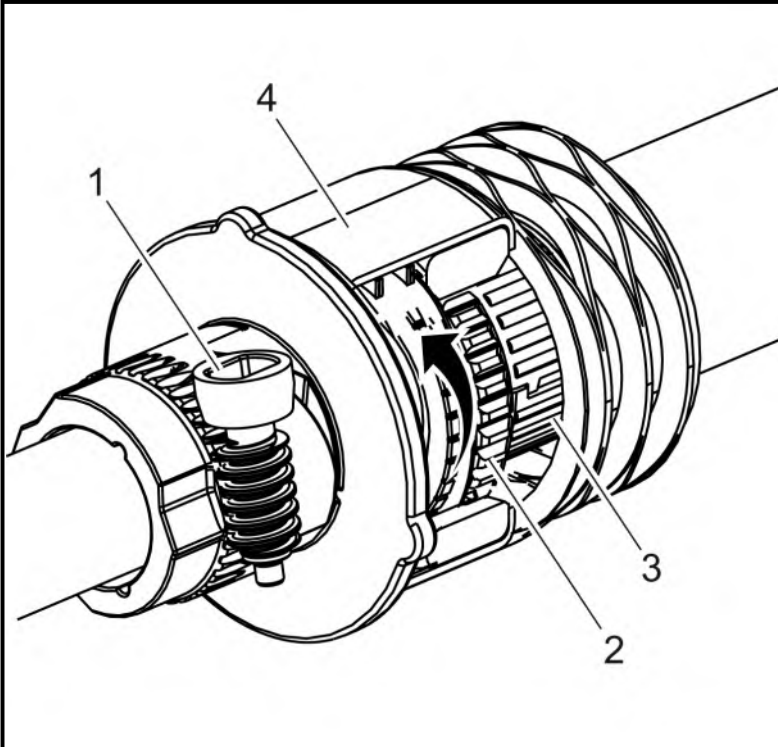


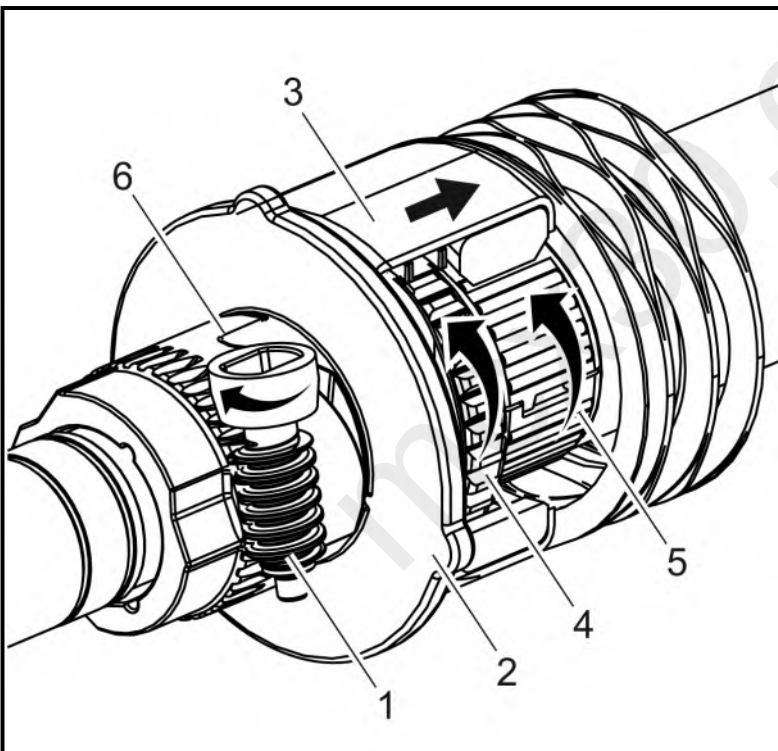
Fig. 15: Exploded View Of Shift Components
Courtesy of GENERAL MOTORS COMPANY

The purpose of a disconnect-design power transfer unit is to disconnect all spinning components except for the input and intermediate drive shafts when in FWD mode. In AWD mode, engagement and disengagement of the rear propeller shaft is achieved via an internally splined, sliding shift sleeve. The axially sliding shift sleeve operates similar to a manual transmission selector sleeve.

The input shaft (2) is driven by the transmission carrier and is rotating when the vehicle is moving. The input disconnect shaft (1) is not rotating in disconnect/FWD mode. When in disconnect/FWD mode, the shift collar (3) internal splines are only engaged to the spinning input shaft (2). When AWD mode is required, the collar slides axially to couple the OD teeth of both the input shaft (2) and input disconnect shaft (1), locking the rotation of both shafts together. The sliding collar is moved using a linear and rotary cam system. With the shafts coupled, the rear propeller shaft is rotated to achieve AWD mode.



In FWD mode, the actuator motor has not been commanded to rotate the worm gear (1) and rotary cam. The ID teeth of the shift sleeve (4) are engaged only to the OD teeth of the rotating input shaft (2). The shift sleeve ID teeth are NOT engaged to the non-rotating OD teeth of the input disconnect shaft (3).



In AWD mode, the actuator motor has been commanded to rotate the worm gear (1) and rotary cam. As the rotary cam rotates, the lugs (6) of the rotary and linear cam (2) are positioned to move the shift sleeve (3) axially. The ID teeth of the shift sleeve are now engaged to the OD teeth of both the input shaft (4) and input disconnect shaft (5). This action couples the two shafts to rotate together. With the input disconnect shaft now rotating, power is transferred to the idler gear shaft and rear output shaft which in turn rotate the propeller shaft sending power to the rear drive module.

Service All Wheel Drive

This message displays if a problem occurs with the All-Wheel-Drive (AWD) system. The vehicle will run in 2WD. This could be caused by:

- An electronics problem
- Worn out or overheated rear axle clutch plates
- Various electrical issues

The system may need service. See your dealer.

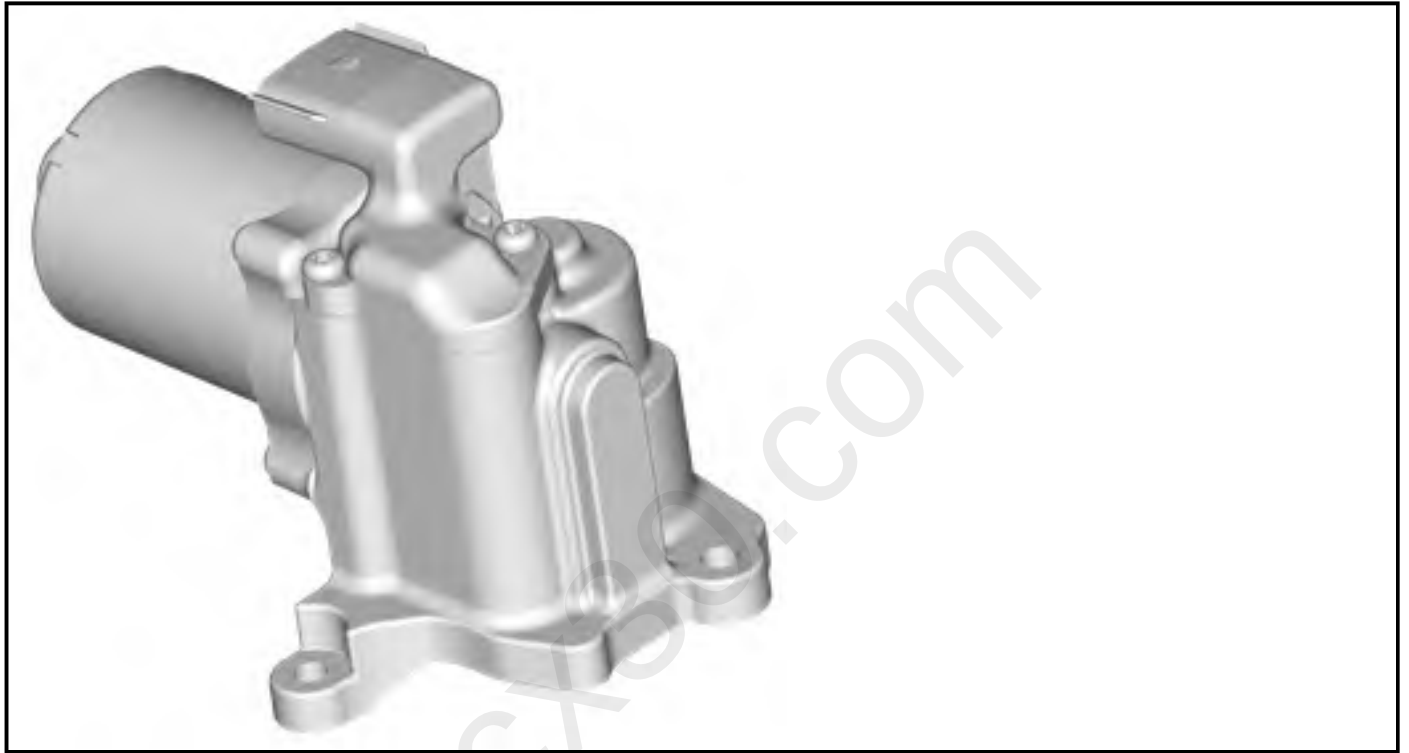
All Wheel Drive Off

If the vehicle has the All-Wheel-Drive (AWD) system, this message displays when there is a temporary condition making the AWD system unavailable. The vehicle will run in 2WD. This could be caused by:

- Loss of wheel or vehicle speed sensor signal
- AWD system overheat condition
- Certain vehicle electrical conditions
- Spare tire installed onto vehicle

This message turns off when the above conditions are no longer present and the warning message is reset.

Power Transfer Case Actuator Motor



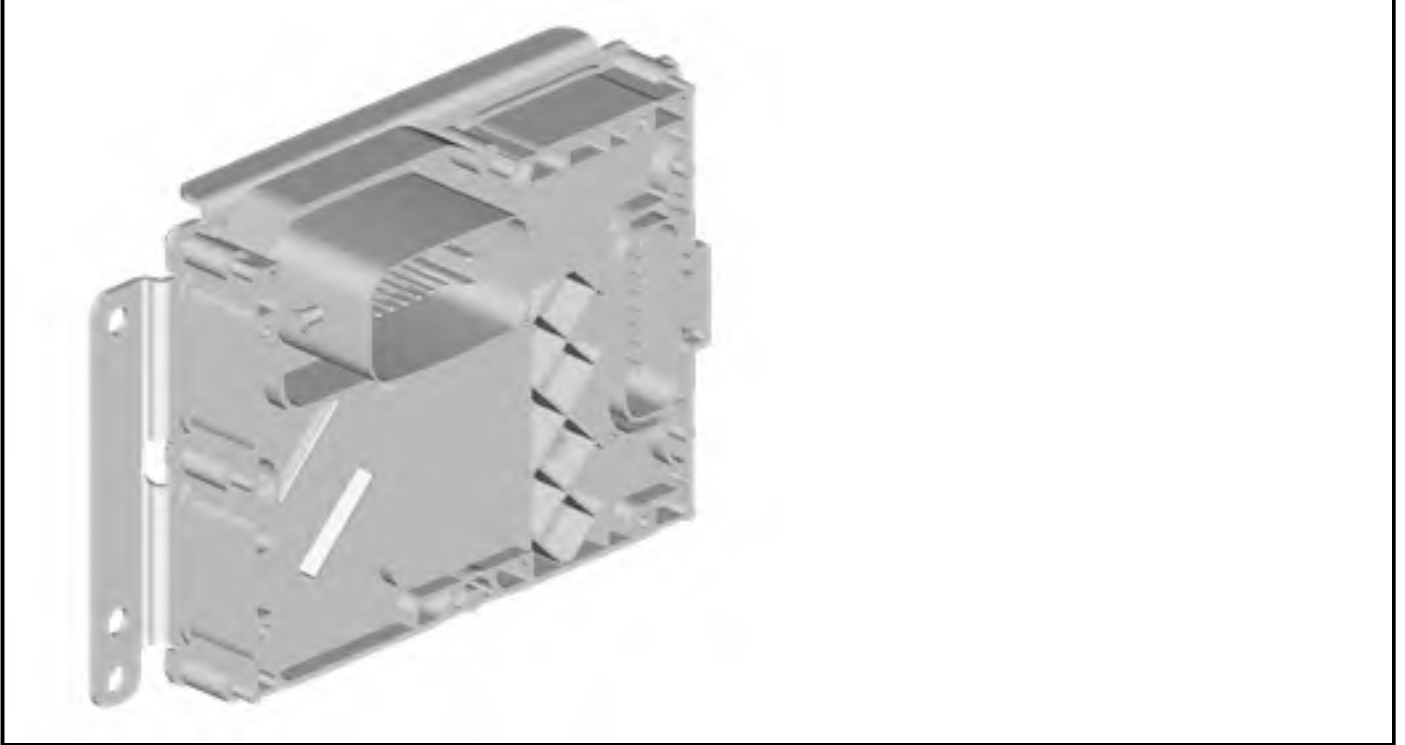
The power transfer case actuator motor consists of a permanent magnet DC motor that is mounted to the PTU extension housing. When commanded by the rear differential clutch control module, it rotates clockwise or counterclockwise, to engage or disengage the rear propeller shaft and AWD mode. The actuator motor is controlled with a PWM signal from the control module. This circuit consists of a driver on both the Motor A and B circuits. The actuator motor is bi-directional in order to allow the motor to engage or disengage AWD. The rotational position sensor is internal to the actuator motor assembly and is not serviced separately.

Power Transfer Case Actuator Motor Rotational Position Sensor

The rotational position sensor is internal to the power transfer unit actuator motor and is replaced with the motor as an assembly. The hall-effect design sensor converts the motor position into an electrical signal and input to the rear differential clutch control module. The module detects what position the power transfer unit is in by monitoring the voltage returned on the rotational impulse signal circuit.

Rear Differential Clutch Control Module





The rear differential clutch control module uses the vehicle identification number (VIN) information for calculations based on axle ratio, transmission, tire size, engine size and other specifics. When wheel slippage is detected, the module sends a signal to the actuator motor which shifts the PTU to engage the rear propeller shaft. The internal shift collar and cams design sends power to the rear propeller shaft and rear axle, transferring torque to the rear wheels. When slip is no longer detected by the module, rear propeller shaft engagement and rotation is discontinued.

SPECIAL TOOLS AND EQUIPMENT

SPECIAL TOOLS

Illustration	Tool Number/Description
	DT-3289-20 J-3289-20 Holding Fixture

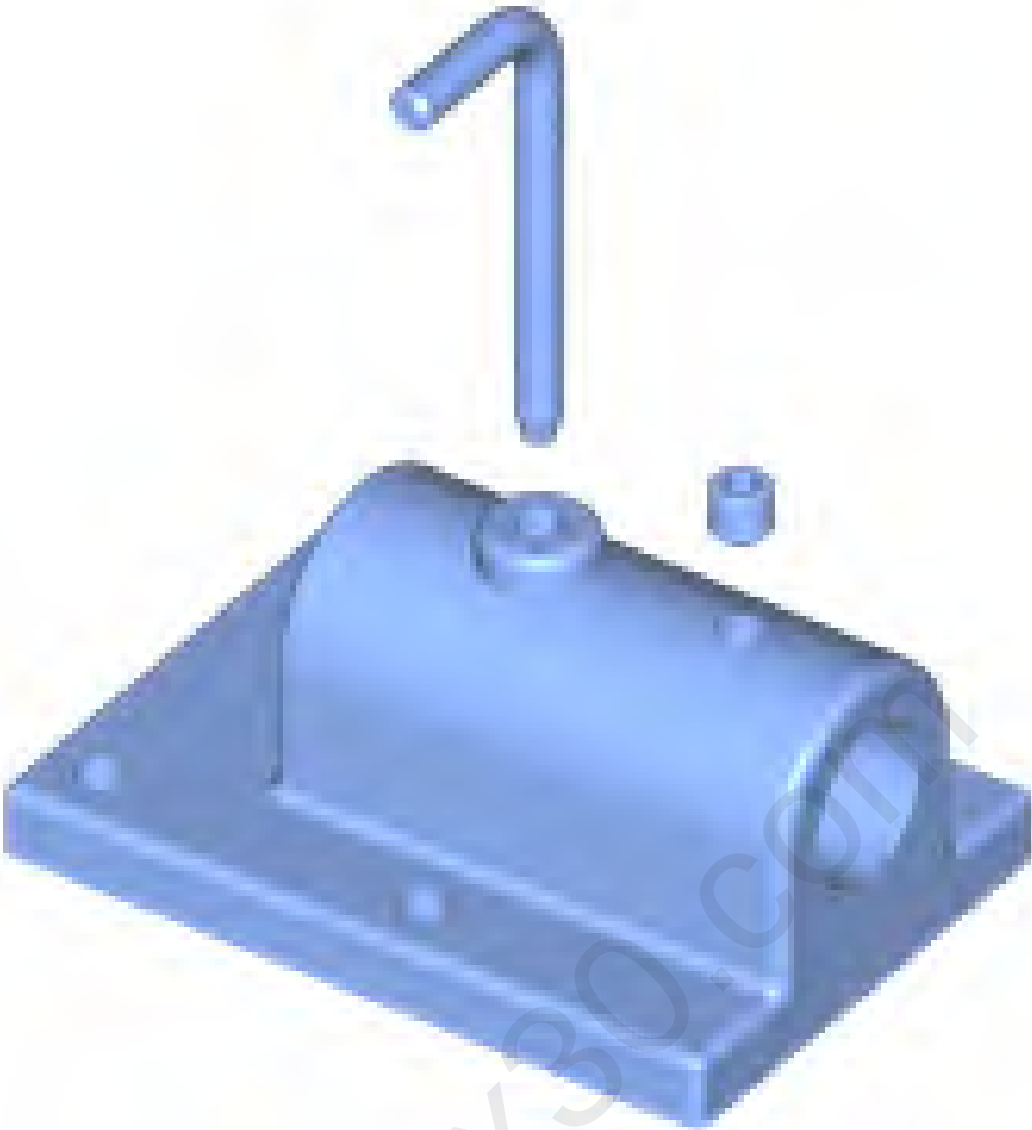
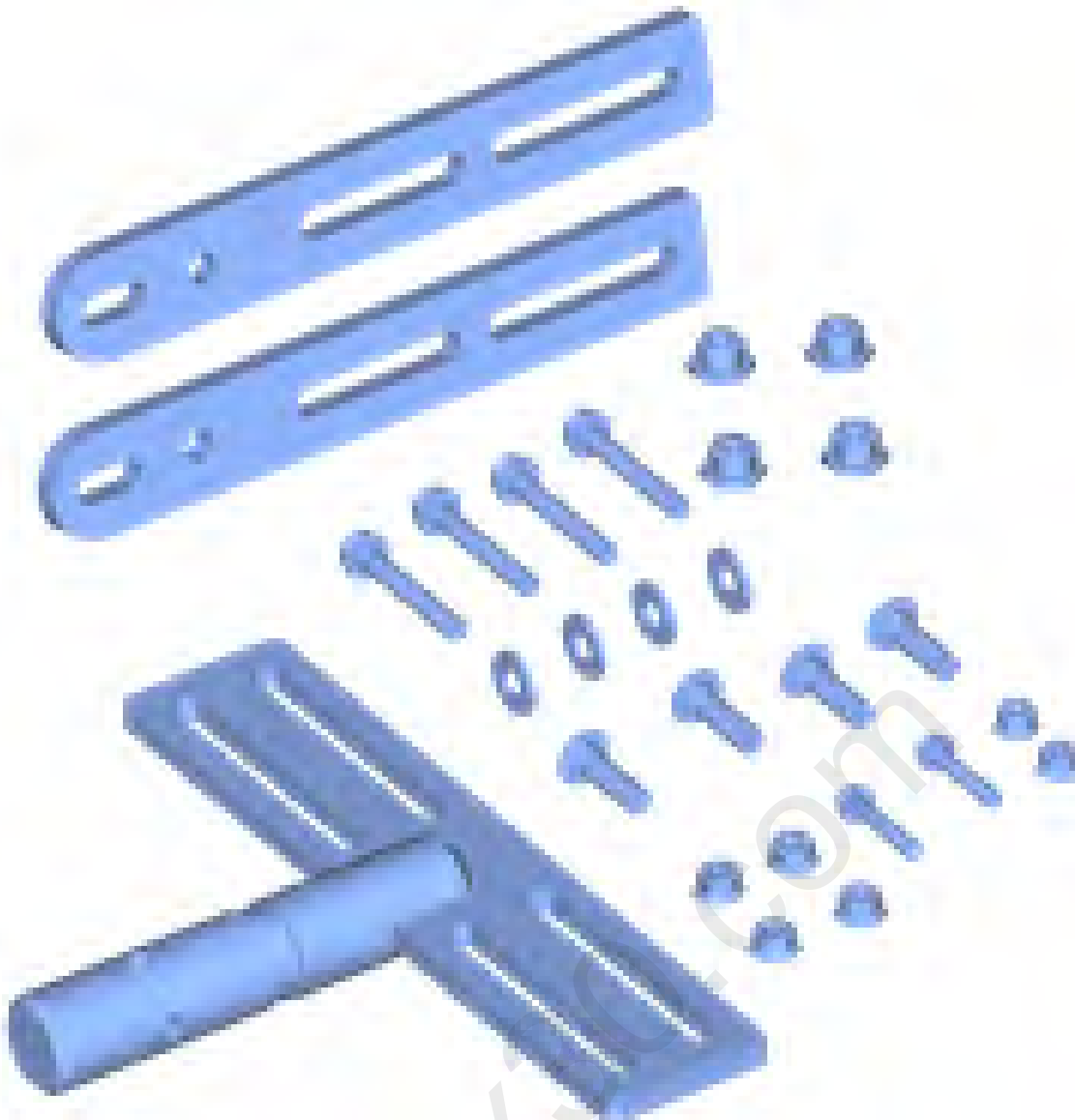
Illustration	Tool Number/Description
	

Illustration	Tool Number/Description
	DT-26941 J-26941 Bushing and Bearing Remover - 3 - 4 in.

Illustration	Tool Number/Description
	DT-36842 J-36842 Transaxle Holding Fixture

mcx.com

Illustration	Tool Number/Description
	DT-45124 J-45124 Removal Bridge

Illustration	Tool Number/Description
	DT-45124-9 J-45124-9 Puller Leg

Illustration	Tool Number/Description
	DT-48022 Output Bushing Installer

Illustration	Tool Number/Description
 A blue, cylindrical seal installer tool. It has a central hole and a flange. The tool is shown from a perspective view, highlighting its cylindrical shape and the central opening.	DT-51834 Seal Installer

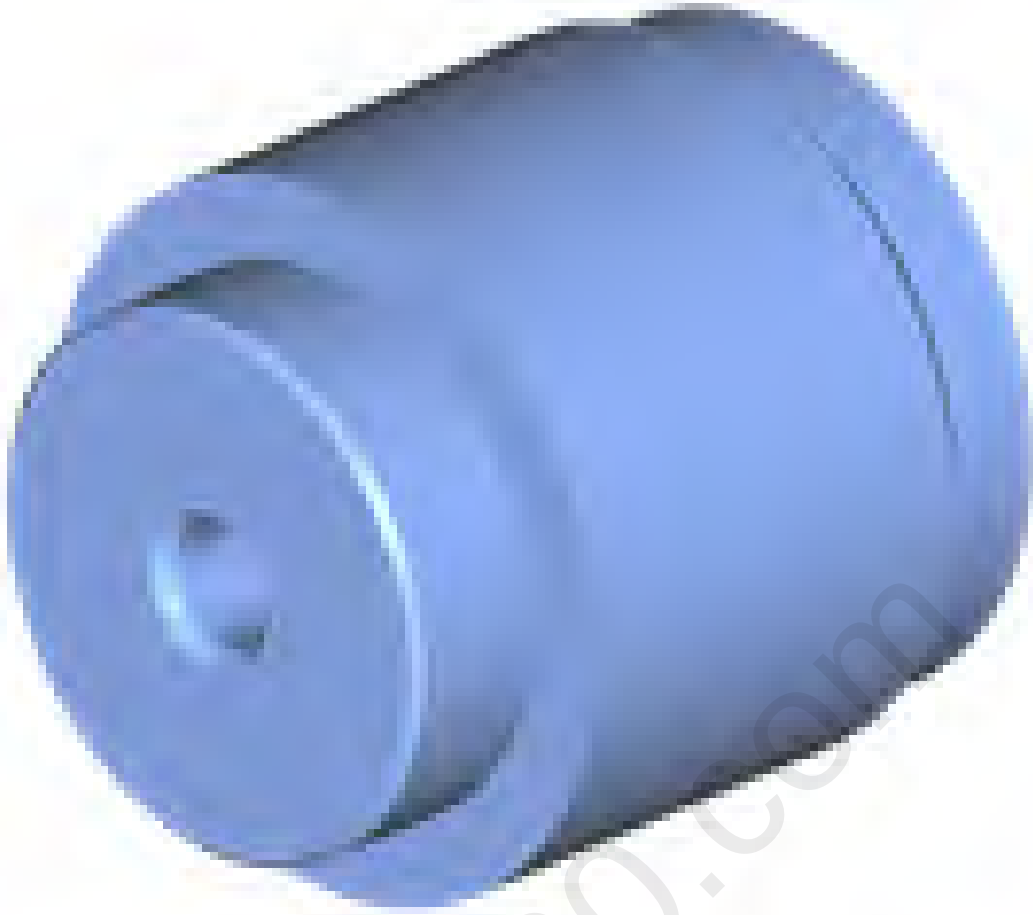
Illustration	Tool Number/Description
	DT-51835 Seal Installer
	GE-28431-6 J-28431-6 Florescent Oil Dye - 6 1 oz.

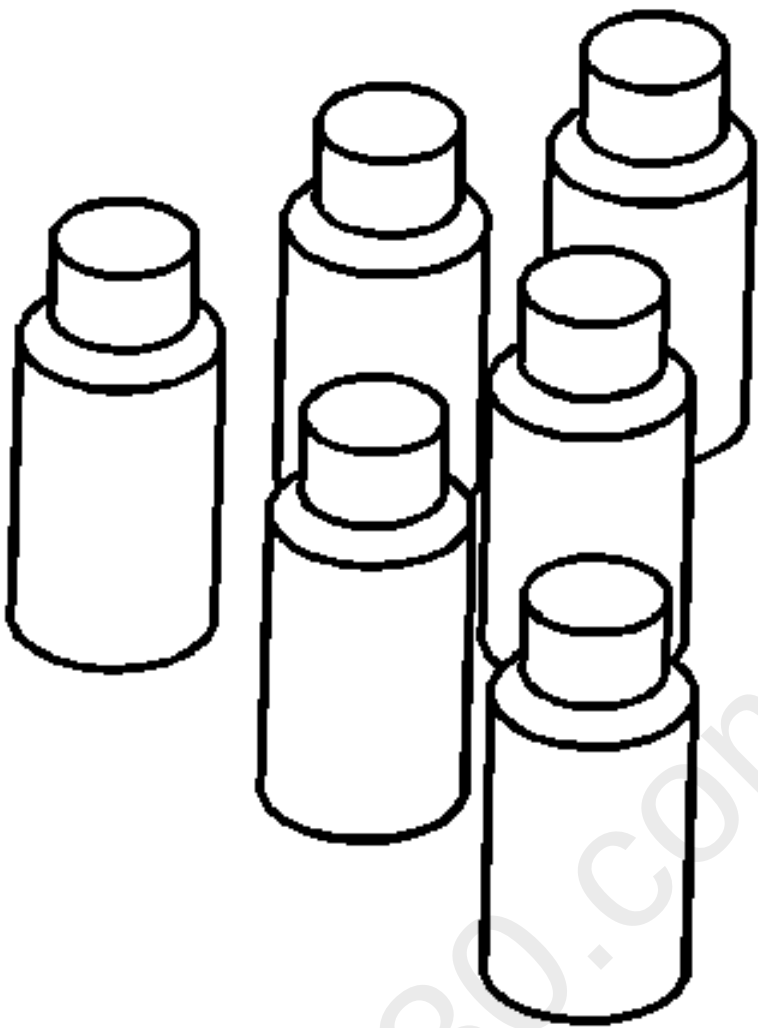
Illustration	Tool Number/Description
	

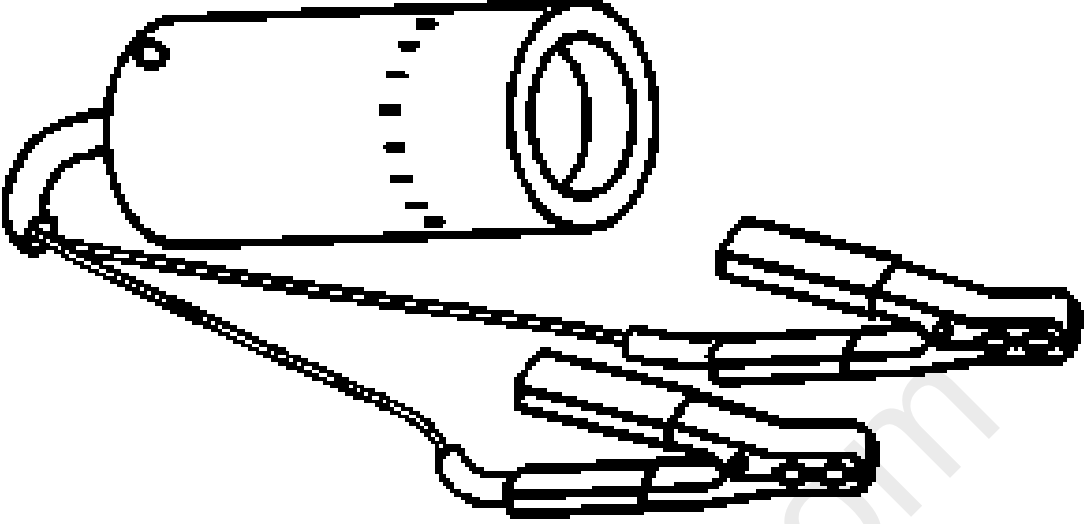
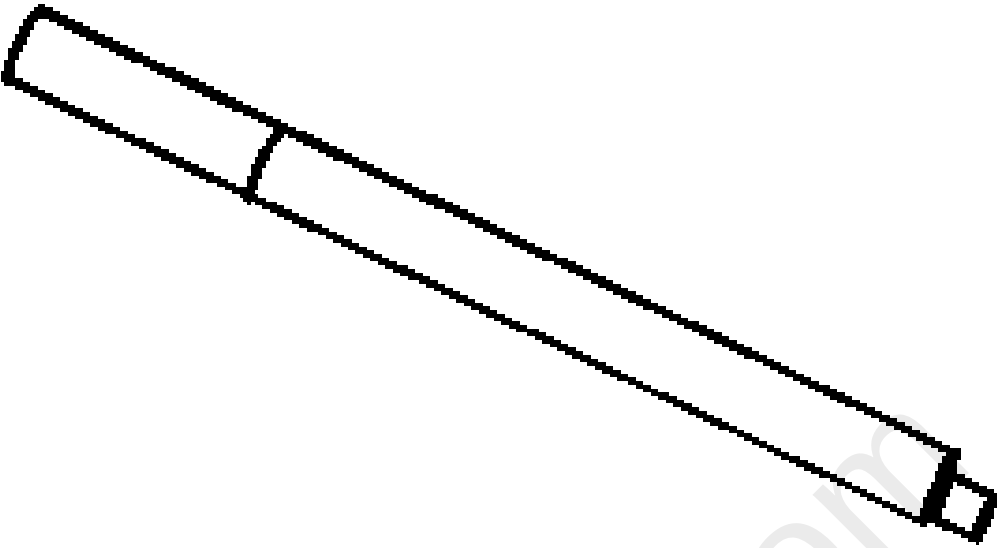
Illustration	Tool Number/Description
 A line drawing of a high-intensity black light kit. It consists of a cylindrical light source with a lens at one end and a power cord at the other. Two flexible gooseneck arms are attached to the power cord, each ending in a clamp. The drawing is oriented diagonally.	GE-42220 J-42220 High-Intensity Black Light Kit

Illustration	Tool Number/Description
	J-42176 Universal Driver Handle