

2010 Cadillac SRX

2010 TRANSMISSION Transfer Case - Graziano-F46 - SRX

2010 TRANSMISSION**Transfer Case - Graziano-F46 - SRX****SPECIFICATIONS****FASTENER TIGHTENING SPECIFICATIONS**

Application	Specification	
	Metric	English
Transfer Case Bracket-to-Rear Extension Housing Bolts	44 N.m	42 lb ft
Transfer Case Bracket-to-Engine Bolts	22 N.m	16 lb ft
Transfer Case-to-Transmission Bolts	11 N.m	1 lb ft
Transfer Case Oil Fill Plug	44 N.m	3 lb ft
Transfer Case Oil Drain Plug	44 N.m	3 lb ft
Transfer Case Housing-to-Rear Extension Housing Bolts		
• First Pass	3 N.m	22 lb ft
• Second Pass	6 degrees	
Transfer Case Vent Pipe Bolt	22 N.m	1 lb ft

APPROXIMATE FLUID CAPACITIES

Application	Specification	
	Metric	English
Oil - Transfer Case	6.6 L	6 qt

ADHESIVES, FLUIDS, LUBRICANTS, AND SEALERS

Application	Type of Material	GM Part Number	
		United States	Canada
Transfer Case Oil	Lubricant	214	6226
Transfer Case-to-Rear Extension Housing Sealing Surfaces	Sealant	Refer to Electronic Parts Catalog	Refer to Electronic Parts Catalog
Transfer Case Rear Extension Housing Bolt	Threadlock	Refer to Electronic Parts Catalog	Refer to Electronic Parts Catalog
Transfer Case Rear Extension Housing Bolt Holes	Thread Cleaner	Refer to Electronic Parts Catalog	Refer to Electronic Parts Catalog

COMPONENT LOCATOR**TRANSFER CASE DISASSEMBLED VIEW**

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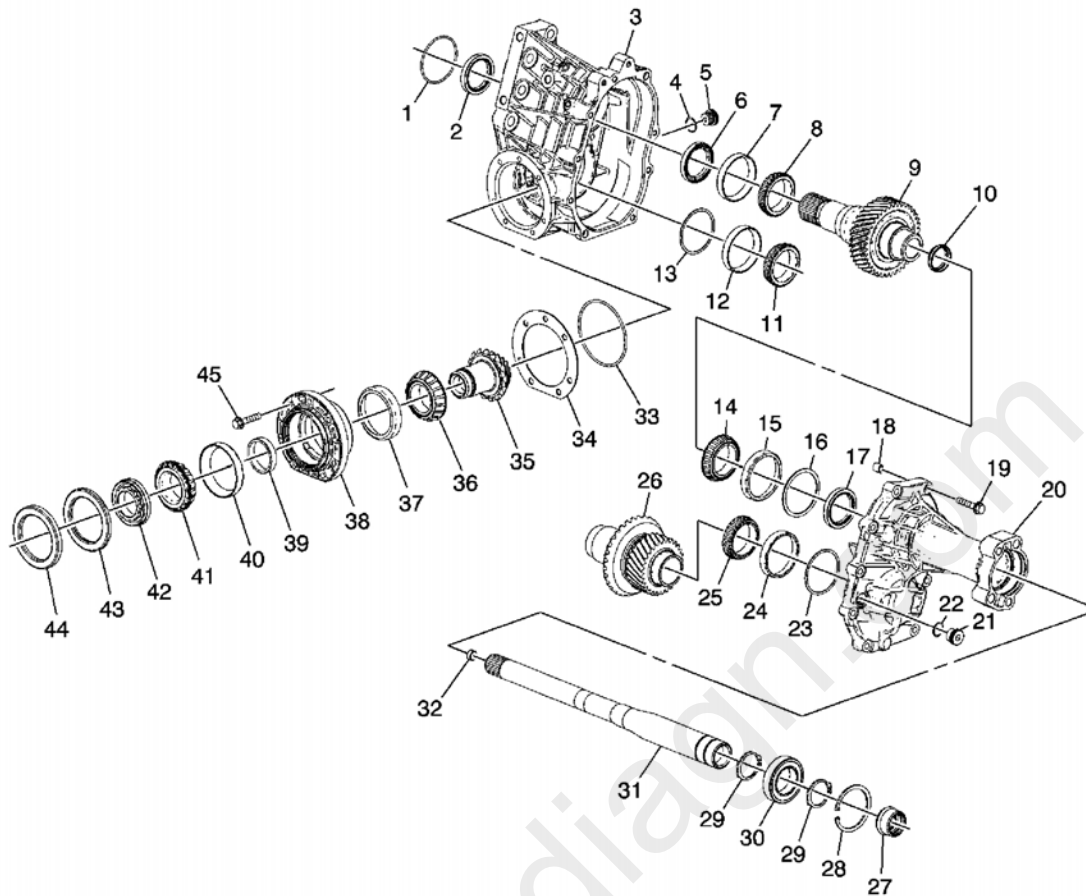


Fig. 1: Disassembled View Of Transfer Case Components
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Transmission-to-Transfer Case O-ring Seal
2	Input Shaft Front Seal
3	Transfer Case Housing
4	Transfer Case Drain Plug Sealing Washer
5	Transfer Case Drain Plug
6	Input Shaft Rear Seal
7	Input Shaft Front Bearing Race
8	Input Shaft Front Bearing
9	Input Shaft
10	Intermediate Shaft Seal
11	Idler Shaft Front Bearing
12	Idler Shaft Front Bearing Race
13	Idler Shaft Front Bearing Shim
14	Input Shaft Rear Bearing

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1 □	Input Shaft Rear Bearing Race
16	Input Shaft Rear Bearing Shim
1 □	Input Shaft Bearing Retainer Rear Seal
1 □	Transfer Case-to-Rear Extension Housing Locating □in
1 □	Transfer Case-to-Rear Extension Housing Bolt
2 □	Rear Extension Housing
21	Transfer Case Fill □lug
22	Transfer Case Fill □lug Sealing Washer
23	Idler Shaft Rear Bearing Shim
24	Idler Shaft Rear Bearing Race
2 □	Idler Shaft Rear Bearing
26	Idler Shaft
2 □	Transfer Case Seal
2 □	Intermediate Shaft Assembly Retaining Ring
2 □	Intermediate Shaft Bearing Retaining Ring
3 □	Intermediate Shaft Bearing
31	Intermediate Shaft
32	Intermediate Shaft □lug
33	Rear Output Shaft Housing O-ring Seal
34	Rear Output Shaft Shim
3 □	Rear Output Shaft
36	Rear Output Shaft Bearing
3 □	Rear Output Shaft Bearing Race
3 □	Rear Output Shaft Housing
3 □	Rear Output Shaft Bearing Spacer
4 □	Rear Output Shaft Bearing Race
41	Rear Output Shaft Bearing
42	Rear Output Shaft Nut
43	Rear Output Shaft Seal
44	Rear Output Shaft Dirt Deflector
4 □	Rear Output Shaft Housing Bolt

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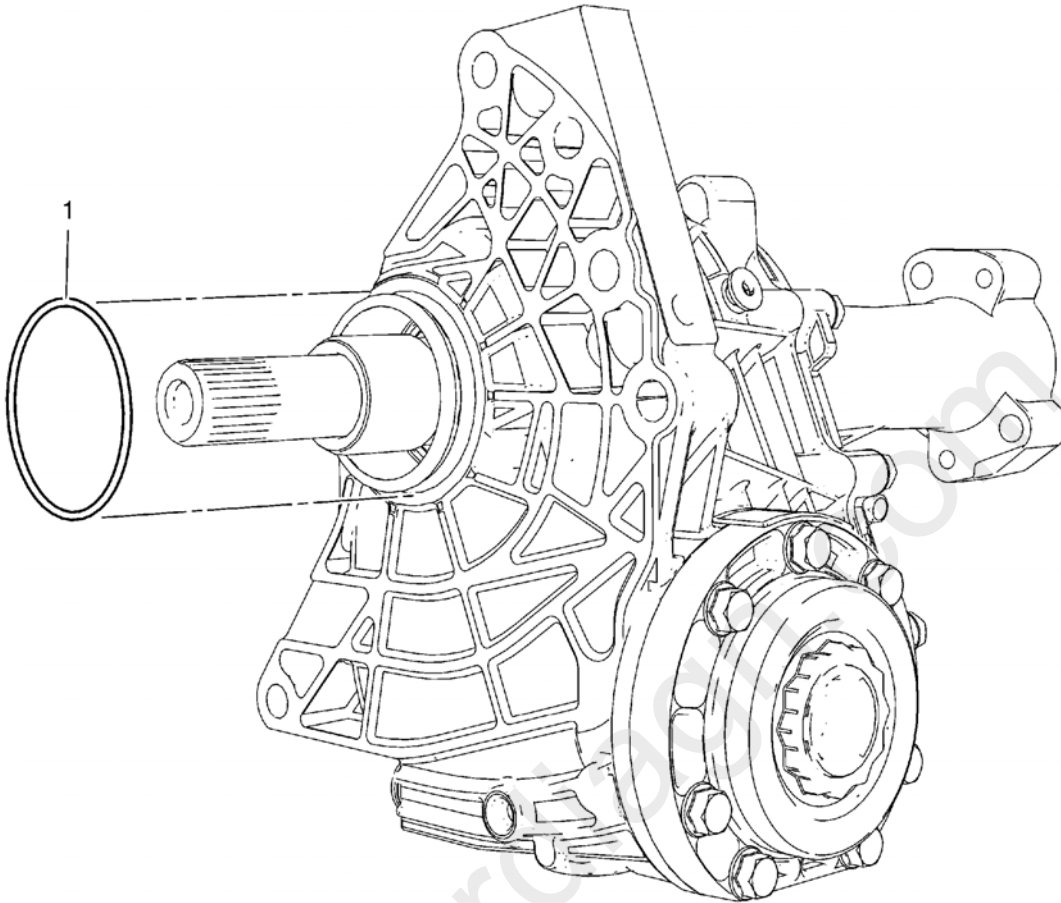


Fig. 2: Transfer Case Seal View
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Transfer Case-to-Transmission Seal

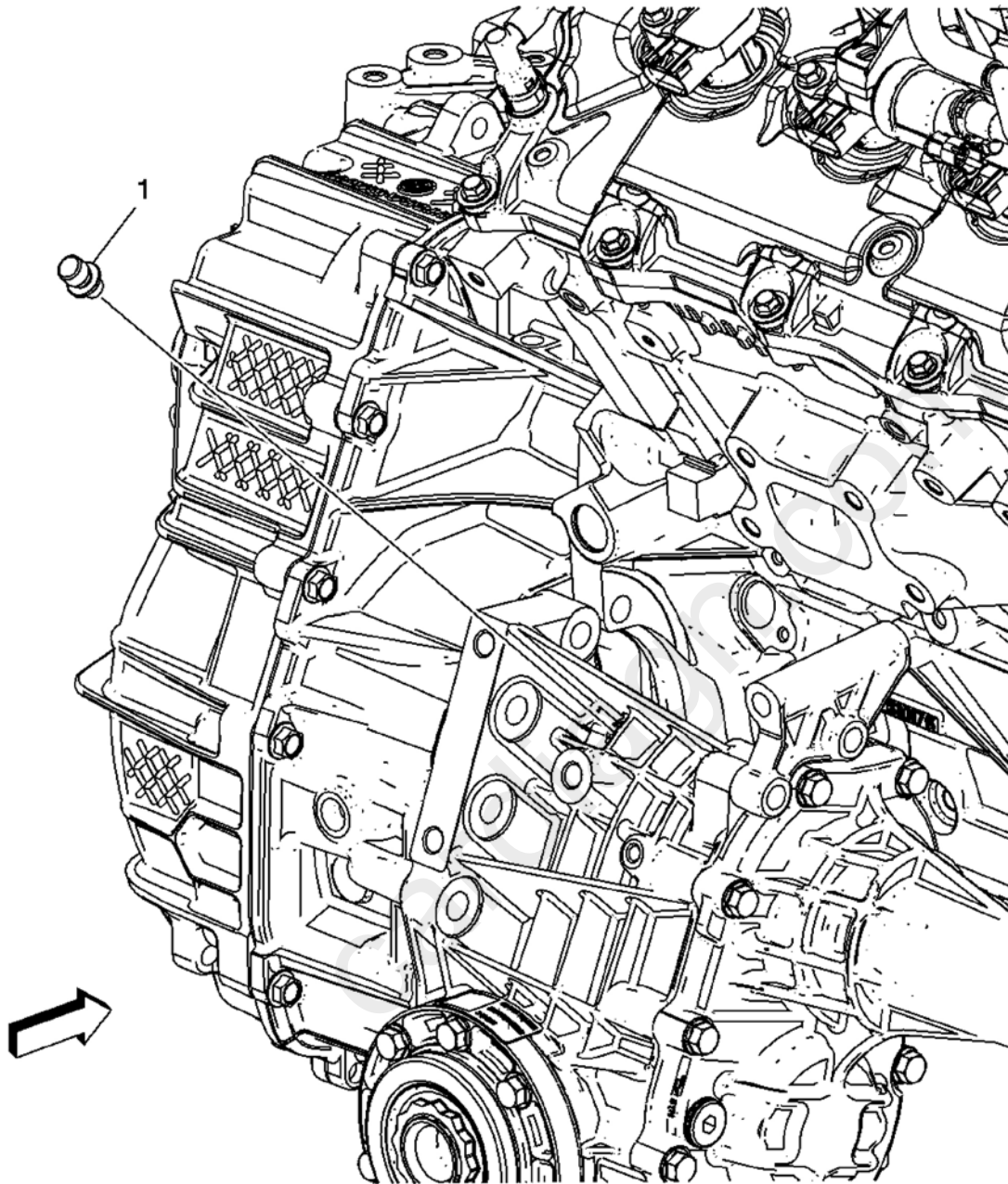


Fig. 3: Identifying Vent Assembly - 1st Design
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Vent Assembly

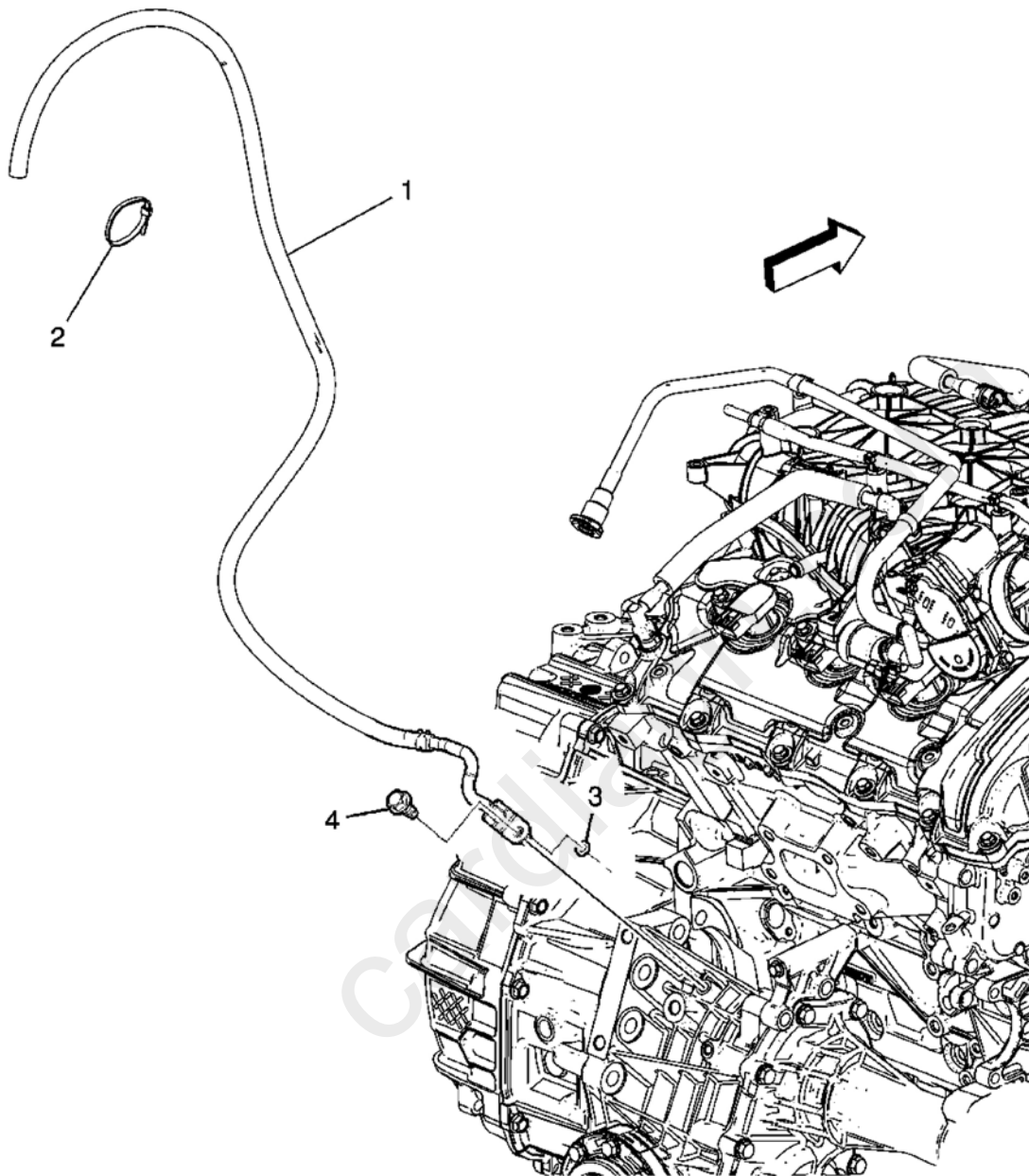


Fig. 4: Identifying Vent Hose Assembly - 2nd Design
 Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Vent Hose Assembly
2	Strap
3	O-ring
4	Bolt

SYMPTOMS - TRANSFER CASE

Strategy Based Diagnostics

Review the system operations in order to familiarize yourself with the system functions. Refer to **Transfer Case Disassembled View** , **Transfer Case Description and Operation** , and **Rear Drive Axle Description and Operation** . 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**
- **Transfer 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 transfer case for leaks, repair as required. Refer to <u>Transfer Case Leak Diagnosis</u> and

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	<u>Adhesives, Fluids, Lubricants, and Sealers</u>
Incorrect gear oil in the transfer case	Replace the gear oil. Refer to <u>Adhesives, Fluids, Lubricants, and Sealers</u> .
Water or contamination within the lubricant	Replace the lubricant and flush the transfer case of the contaminated fluid.
Worn propeller shaft constant velocity joints	Replace propeller shaft assembly. Refer to <u>Propeller Shaft Replacement</u> .
Worn axle shaft constant velocity joints	Replace the constant velocity joints, as required.
Worn bearing in the differential assembly	Repair or replace the assembly.
Bearing noise within the transfer case • A grinding noise that occurs at a specific engine speed, regardless of transmission gear, is not within the transfer case. • A grinding noise that changes as a transmission shift occurs is not within the transfer case. • 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 fluid level. Fill, as required. 2. Identify the location of the noise using the J 39570: Chassis Ears. 3. If the noise continues, repair or replace components, 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 transfer case. • A whine noise that changes as a transmission shift occurs is not within the transfer case. • 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 fluid level. Fill, as required. 2. Identify the location of the noise using the J 39570: Chassis Ears. 3. If the noise continues, repair or replace components, 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 transfer case for leaks, repair as required. Refer to <u>Transfer Case Leak Diagnosis</u> and <u>Adhesives, Fluids, Lubricants, and Sealers</u> .

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Incorrect gear oil in the transfer case case.	Replace the gear oil. Refer to <u>Adhesives, Fluids, Lubricants, and Sealers</u> .
Worn propeller shaft constant velocity joints	Replace the propeller shaft assembly. Refer to <u>Propeller Shaft Replacement</u>
Worn axle shaft constant velocity joints	Replace the constant velocity joints, as required.
Worn bearing in the differential assembly	Repair or replace the assembly as required.
Bearing noise within the transfer case • A grinding noise that occurs at a specific engine speed, regardless of transmission gear, is not within the transfer case. • A grinding noise that changes as a transmission shift occurs is not within the transfer case. • 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 fluid level. Fill, as required. 2. Identify the location of the noise using the J 39570: Chassis Ears. 3. If the noise continues, repair or replace components, 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 transfer case. • A whine noise that changes as a transmission shift occurs is not within the transfer case. • 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 fluid level. Fill, as required. 2. Identify the location of the noise using the J 39570: Chassis Ears. 3. If the noise continues, repair or replace components, 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 transfer case case.	Replace the gear oil. Refer to <u>Adhesives, Fluids, Lubricants, and Sealers</u> .
Transfer case bearing or rear drive axle clutch module. A chatter or ratcheting type noise during hard acceleration on tight turns.	Confirm noise is coming from the transfer case or the rear drive axle clutch module. Repair as required. Refer to <u>Symptoms - Rear Drive Axle</u> .

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CONSTANT NOISE

Cause	Correction
Inspect for the proper transaxle and gear oil levels prior to performing system diagnosis.	
Low gear oil level	Inspect the transfer case for leaks, repair as required. Refer to <u>Transfer Case Leak Diagnosis</u> and <u>Adhesives, Fluids, Lubricants, and Sealers</u> .
Incorrect gear oil in the transfer case	Replace the gear oil. Refer to <u>Adhesives, Fluids, Lubricants, and Sealers</u> .
Worn propeller shaft constant velocity joints	Replace the propeller shaft assembly. Refer to <u>Propeller Shaft Replacement</u> .
Worn bearing in the differential assembly	Repair or replace the assembly as required.
Bearing noise within the transfer case • A grinding noise that occurs at a specific engine speed, regardless of transmission gear, is not within the transfer case. • A grinding noise that changes as a transmission shift occurs is not within the transfer case. • 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 fluid level. Fill, as required. 2. Identify the location of the noise using the J 39570: Chassis Ears. 3. If the noise continues, repair or replace components, 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 transfer case. • A whine noise that changes as a transmission shift occurs is not within the transfer case. • 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 fluid level. Fill, as required. 2. Identify the location of the noise using the J 39570: Chassis Ears. 3. If the noise continues, repair or replace components, as required.

TRANSFER CASE LEAK DIAGNOSIS

Cause	Correction
Drain and fill the unit with new oil with ultraviolet dye J 28431-6 : Fluorescent Oil Dye - 6 1-oz before	

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using the **4-E: High-Intensity Flash Light**, when inspecting for leaks.

Drain plug or fill plug leak	1. Inspect for dirt, worn, scored sealing surfaces, or missing drain and/or fill plug sealing washers. 2. Replace as required.
Restricted or damaged ventilation valve or hose assembly	Replace the ventilation valve or hose assembly as required.
Leaking at the transfer case left side weep hole • transmission oil leak at the transfer case weep hole area may be caused by the front input shaft seal. • gear oil leak at the transfer case weep hole area may be caused by the rear input shaft seal.	Replace components as required. If the leak is transmission or O-ring related, do not replace the transfer case input seal.
Leaking at the right side axle shaft-to-intermediate shaft bearing location • transmission oil leak at the right side axle shaft-to-intermediate shaft bearing location may be caused by the intermediate shaft seal. • gear oil leak at the right side axle shaft-to-intermediate shaft bearing location may be caused by the rear input shaft seal.	Replace the intermediate shaft seal located in the rear extension housing.
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 either the rear output shaft or O-ring seal as required.
Leaking at transmission-to-transfer case interface • transmission oil leak at the transmission-to-transfer case interface or weep hole area may be caused by the transmission to transfer case O-ring seal or the transmission right side drive shaft seal. • gear oil leak at the transmission-to-transfer case interface or weep hole area is caused by the transfer case input seal.	NOTE Inspect for a leak at the axle shaft-to-intermediate shaft bearing location. If a leak is found, replace the intermediate shaft seal. 1. Identify the type of oil leak. 2. Replace components as required.
Case half seam leak	Disassemble the case halves, clean and apply new RTV sealant to the sealing surfaces. Refer to Adhesives, Fluids, Lubricants, and Sealers .
Leaking through case	• Inspect for a cracked case. • Inspect for case porosity.

- Replace the transfer case

REPAIR INSTRUCTIONS - ON VEHICLE

REAR OUTPUT SHAFT SEAL REPLACEMENT

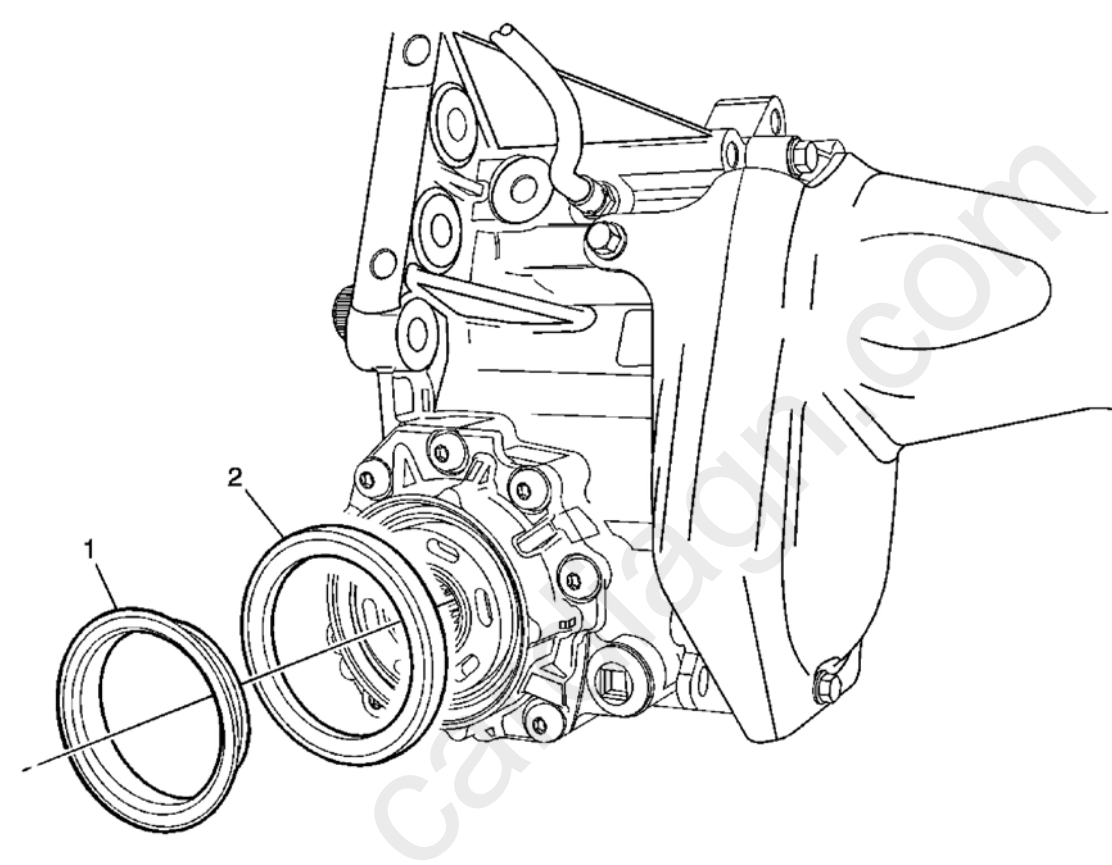


Fig. 5: View Of Rear Output Shaft Seal
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Remove the propeller shaft. Refer to Propeller Shaft Replacement .	
1	Dust Shield Procedure: Install the dust shield using DT-4005: drift. Special Tools: DT-4005: fitting drift or equivalent regional tools, refer to Special Tools .
	Rear Output Shaft Seal Procedure: Install the shaft seal using DT-4007: installer.

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2

Special Tools:

DT-4007: Seal Installer

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

TRANSFER CASE REPLACEMENT

Removal Procedure

1. Remove the propeller shaft. Refer to **Propeller Shaft Replacement** .
2. Drain the oil from the transmission. Refer to **Transmission Fluid Replacement** .
3. Remove the right drive shaft. Refer to **Front Wheel Drive Shaft Replacement - Right Side** .
4. Remove the transmission rear mount bracket. Refer to **Transmission Rear Mount Replacement (FWD)** or **Transmission Rear Mount Replacement (AWD)** .
5. Remove the drivetrain and front suspension frame. Refer to **Drivetrain and Front Suspension Frame Replacement** .

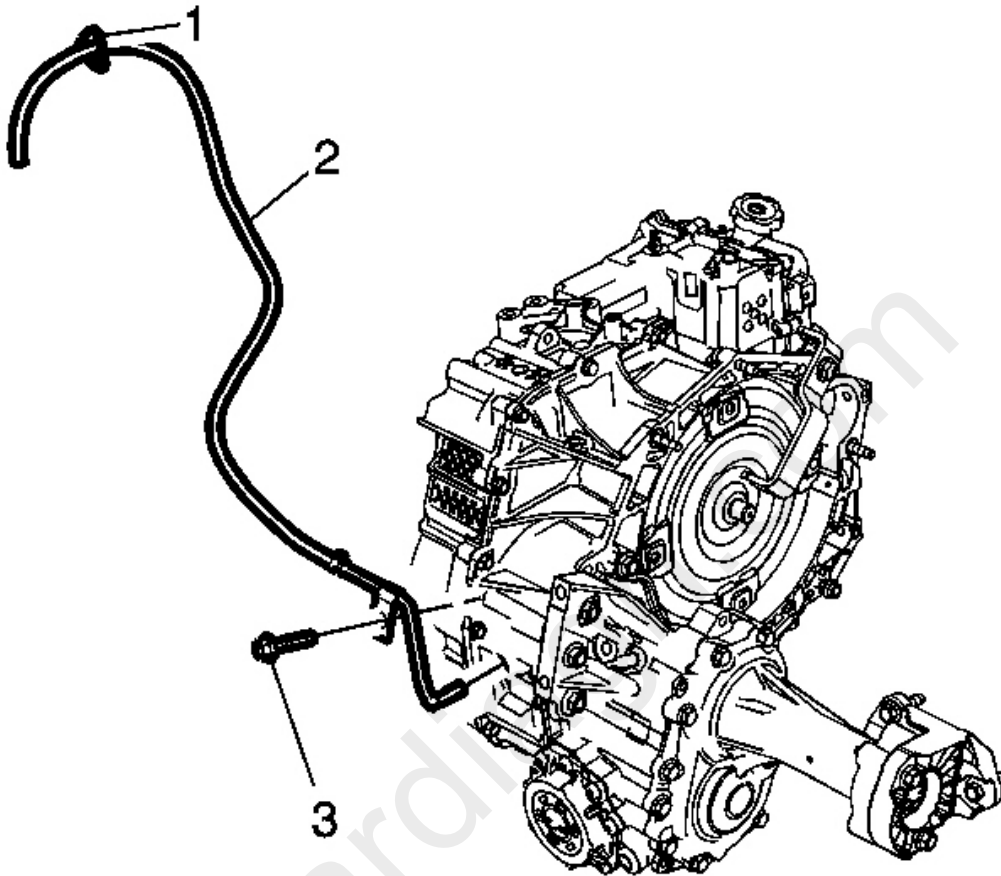


Fig. 6: Identifying Transfer Case Vent Hose, Strap & Bolt
Courtesy of GENERAL MOTORS CORP.

6. Remove the transfer case vent hose strap (1), bolt (3), and hose (2).

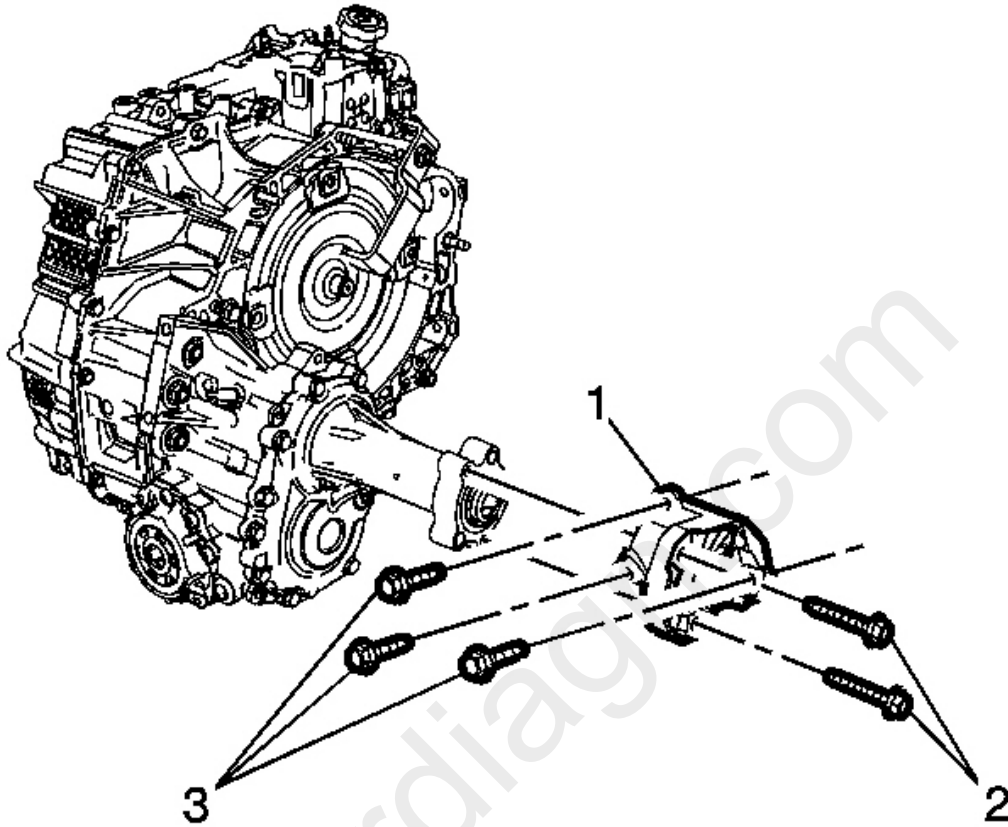


Fig. 7: Identifying Transfer Case Support Bracket-To-Transfer Case Bolts
Courtesy of GENERAL MOTORS CORP.

7. Remove the transfer case support bracket-to-transfer case bolts (2).
8. Remove the transfer case support bracket-to-engine bolts (3).
- ☐ Remove the support bracket (1).
10. Support the transfer case with a suitable jack, and secure with suitable straps.

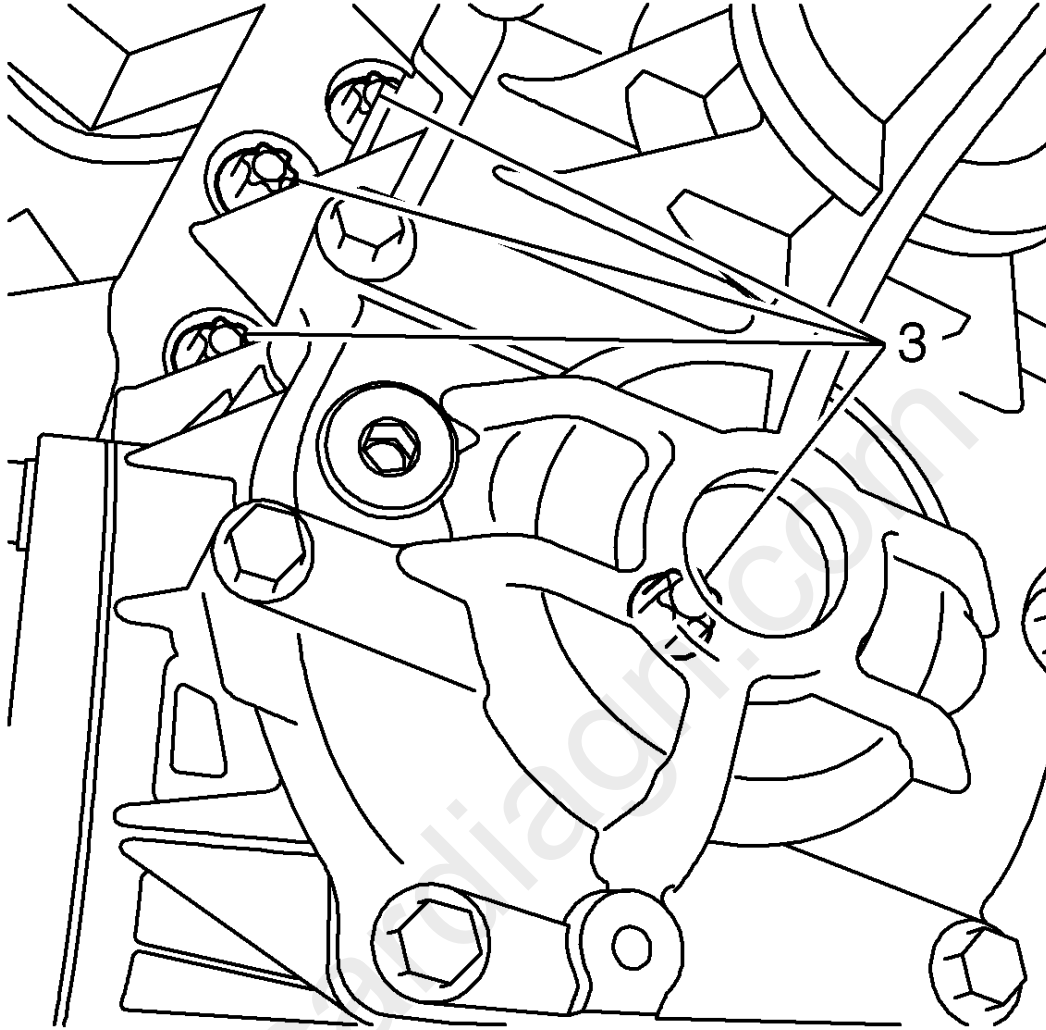


Fig. 8: Locating Transfer Case Fasteners
Courtesy of GENERAL MOTORS CORP.

11. Remove the transfer case-to-transmission center bolt (3). The center bolt is accessed through the opening in the center of the transfer case.

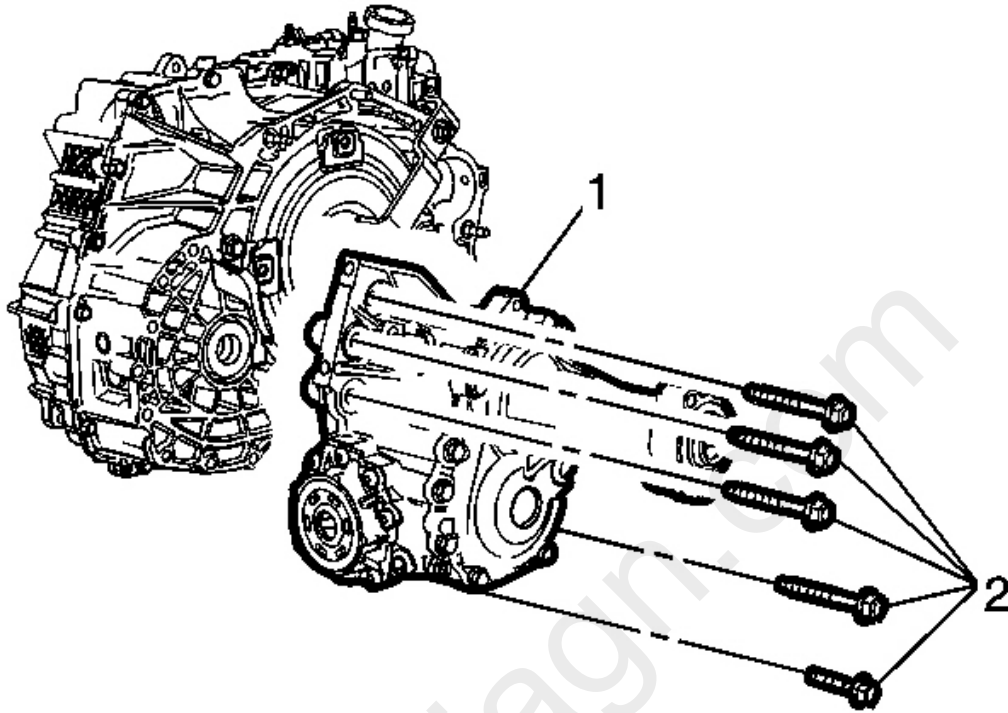


Fig. 9: Identifying Transfer Case-To-Transmission Bolts
Courtesy of GENERAL MOTORS CORP.

12. Remove the remaining transfer case-to-transmission bolts (2).
13. Separate the transfer case (1) from the transmission and remove the transfer case.

Installation Procedure

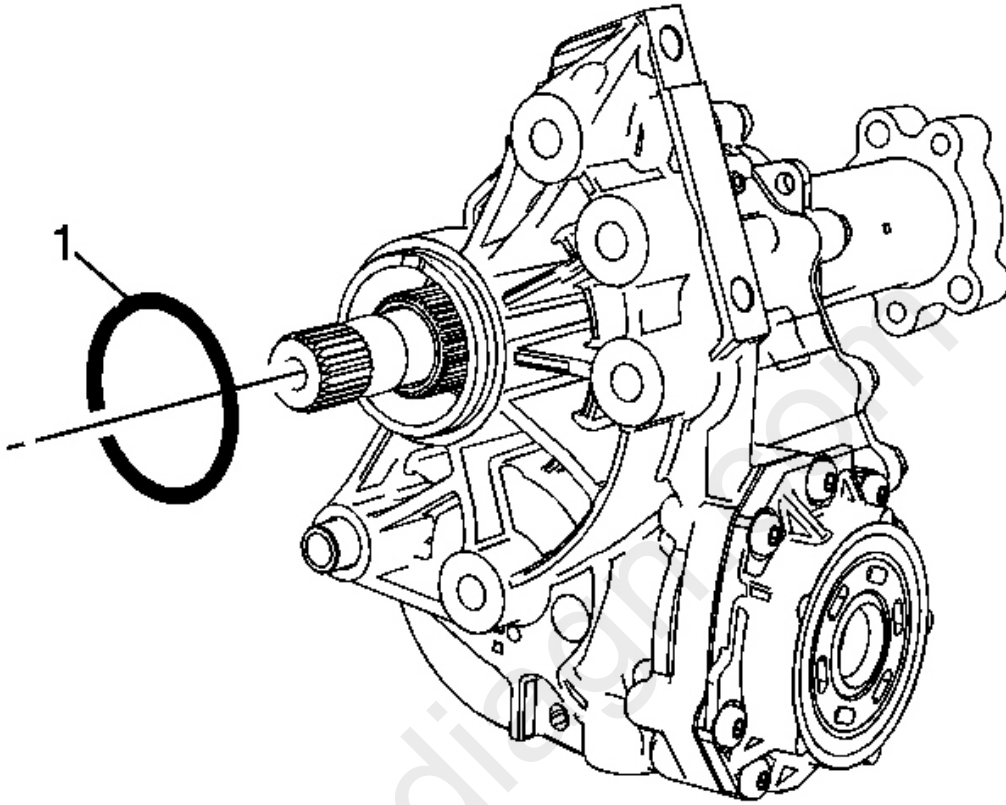


Fig. 10: Identifying Transfer Case-To-Transmission O-Ring
Courtesy of GENERAL MOTORS CORP.

1. Clean the contact surfaces between the transfer case and the transmission. Install a new transfer case-to-transmission O-ring (1).

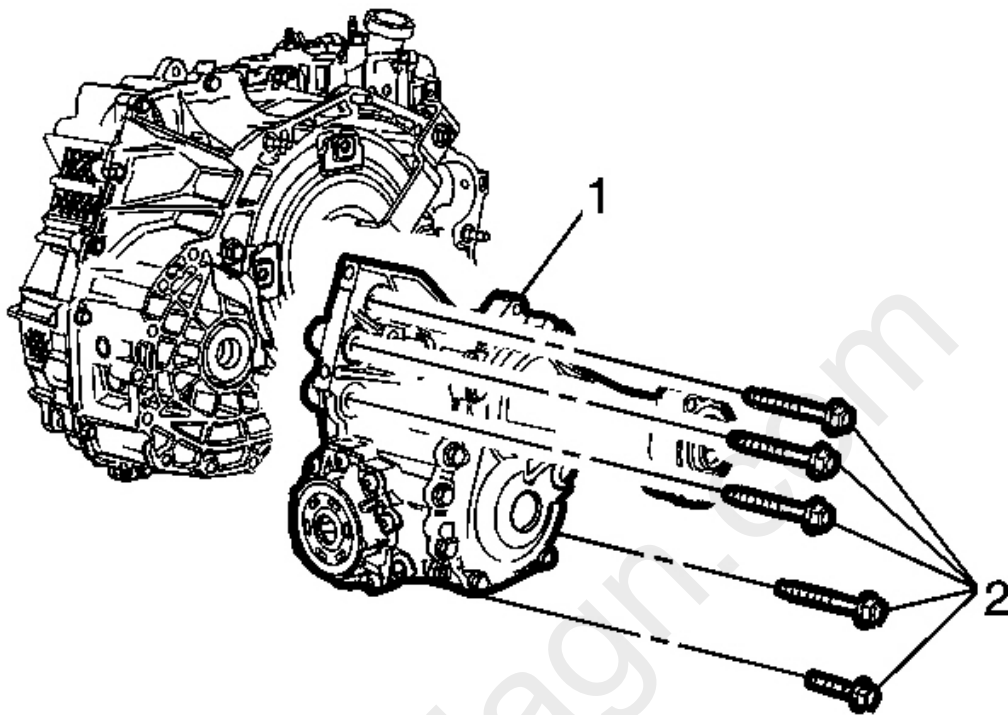


Fig. 11: Identifying Transfer Case-To-Transmission Bolts
Courtesy of GENERAL MOTORS CORP.

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 (1) to the transmission.

CAUTION: Refer to Fastener Caution .

5. Install the transfer case-to-transmission bolts (2).

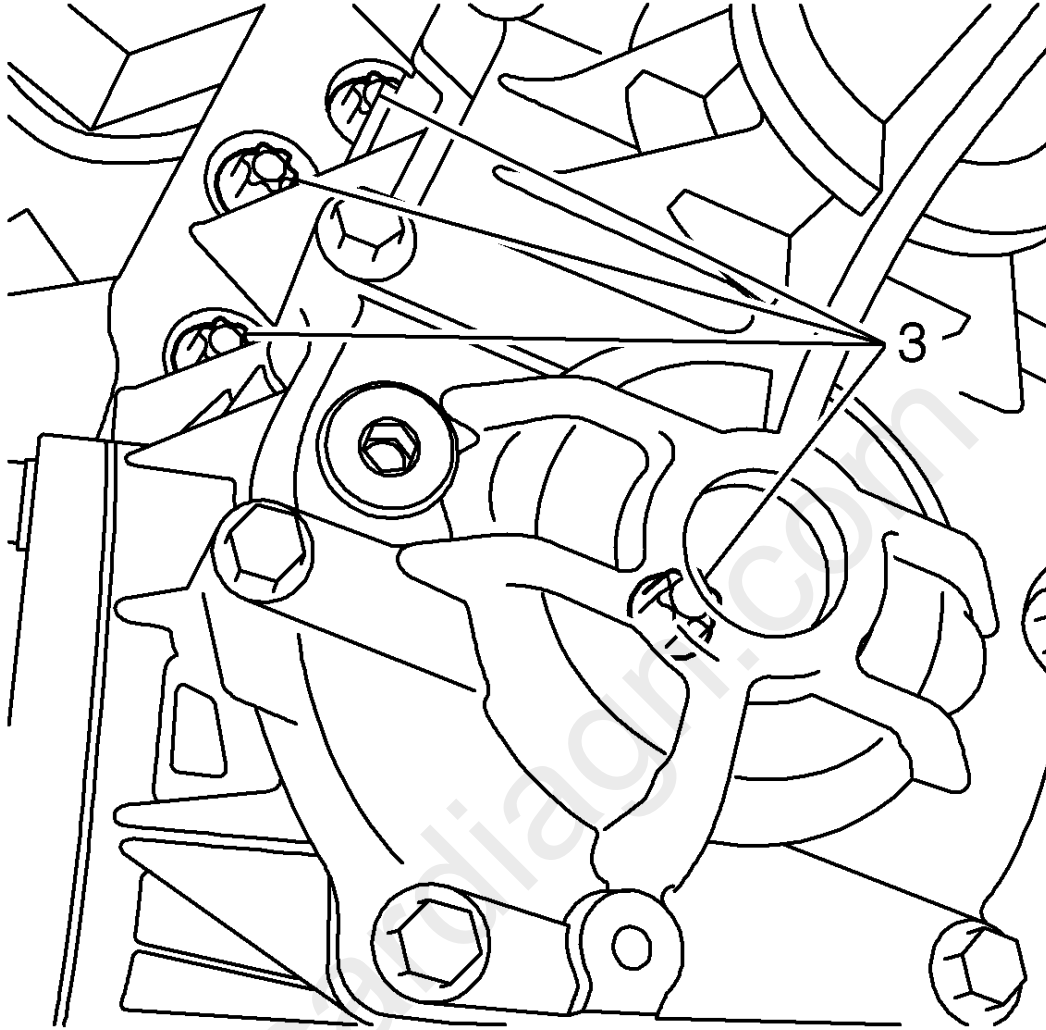


Fig. 12: Locating Transfer Case Fasteners
Courtesy of GENERAL MOTORS CORP.

6. Install the transfer case-to-transmission center bolt (3). The center bolt is accessed through the opening in the center of the transfer case.
7. Tighten the bolts to 110 N.m (81 lb ft).

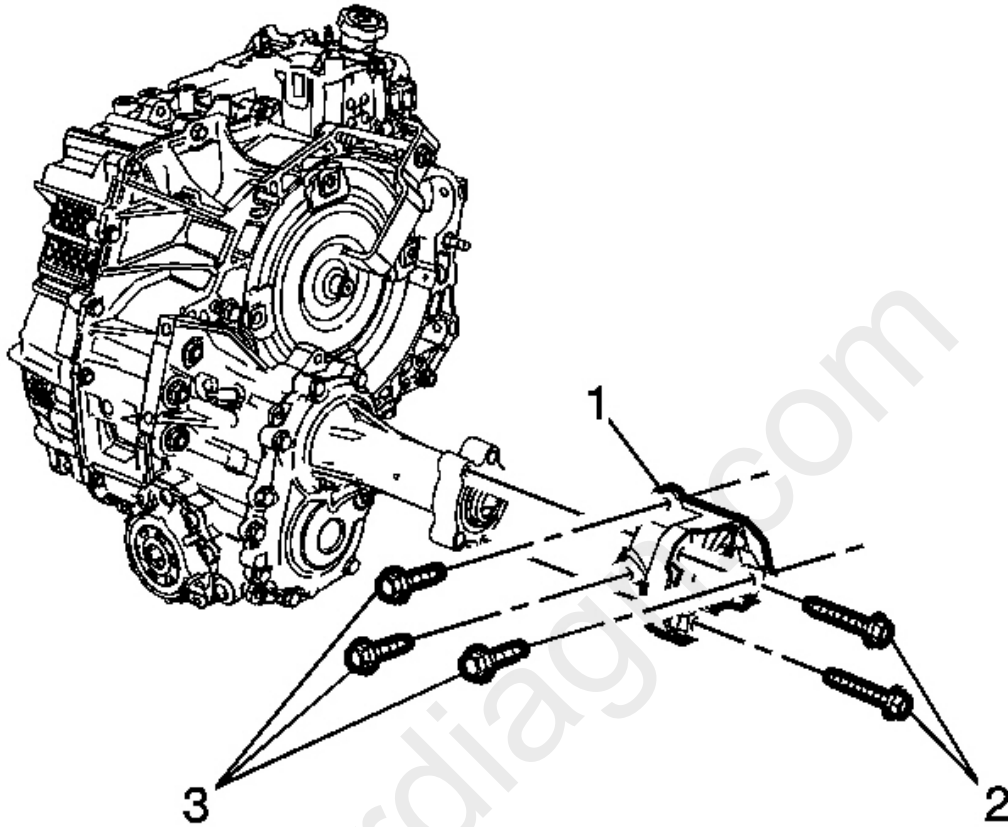


Fig. 13: Identifying Transfer Case Support Bracket-To-Transfer Case Bolts
 Courtesy of GENERAL MOTORS CORP.

- ☐ Install the support bracket (1).
- ☐ Install the transfer case support bracket-to-transfer case bolts (2).
- 1 ☐ Install the transfer case support bracket-to-engine bolts (3).
- 11. Install the support bracket between the transfer case and the engine carefully in three steps to avoid breakage.
 - 1. Tighten the support bracket-to-transfer case bolts (2) to $\frac{1}{4}$ in. (1 lb in).
 - 2. Tighten the support bracket-to-engine bolts (3) to $\frac{1}{4}$ in. (1 lb ft).
 - 3. Tighten the support bracket-to-transfer case fasteners (1) to $\frac{1}{4}$ in. (1 lb ft).
- 12. Install the transmission rear mount bracket.

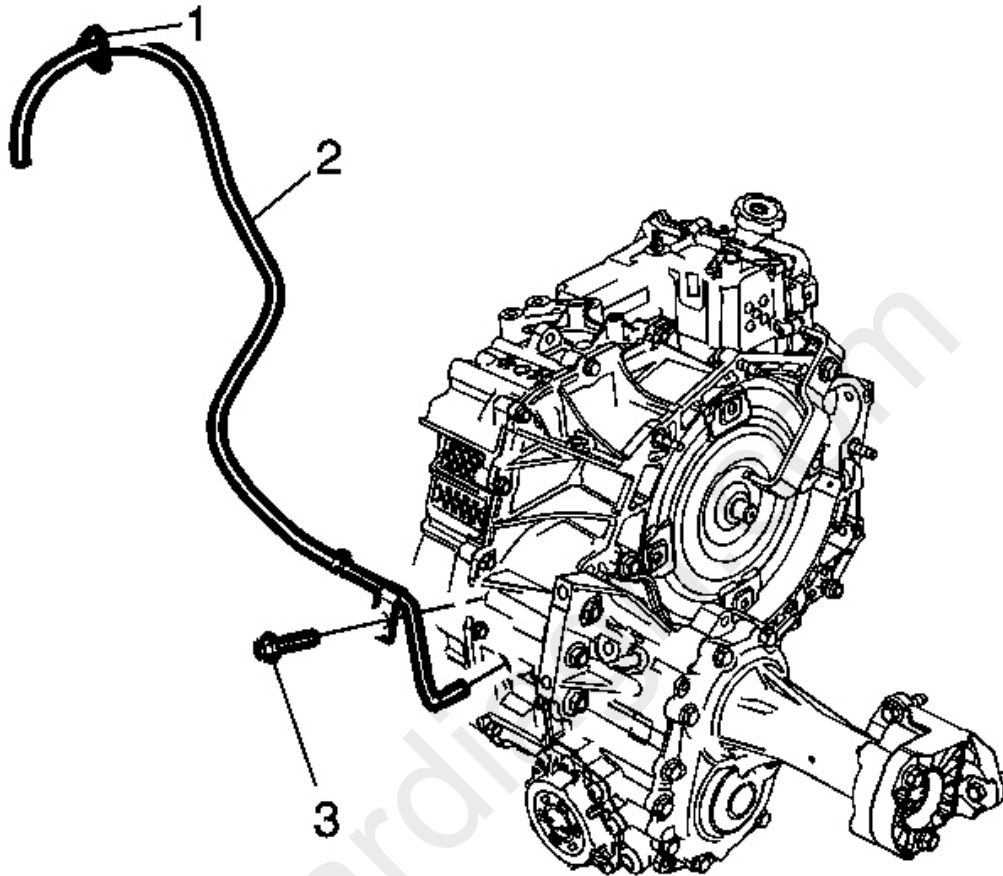


Fig. 14: Identifying Transfer Case Vent Hose, Strap & Bolt
Courtesy of GENERAL MOTORS CORP.

13. Install the transfer case vent hose (2), strap (1), and bolt (3).
- 1□ Tighten the transfer case vent hose bolt, if equipped, to 22 □.m (1□lb ft).
- 1□ Install the drivetrain and front suspension frame. Refer to Transmission Rear Mount Replacement (FWD) or Transmission Rear Mount Replacement (AWD)
- 1□ Install the right drive shaft. Refer to Front Wheel Drive Shaft Replacement - Right Side .
- 1□ Install the propeller shaft. Refer to Propeller Shaft Replacement .
- 1□ Fill the transmission □ith oil. Refer to Transmission Fluid Replacement .
- 1□ Fill □ith transfer case oil. Refer to Approximate Fluid Capacities.

REPAIR INSTRUCTIONS - OFF VEHICLE

TRANSFER CASE DISASSEMBLE

Oil Drain Plug Removal

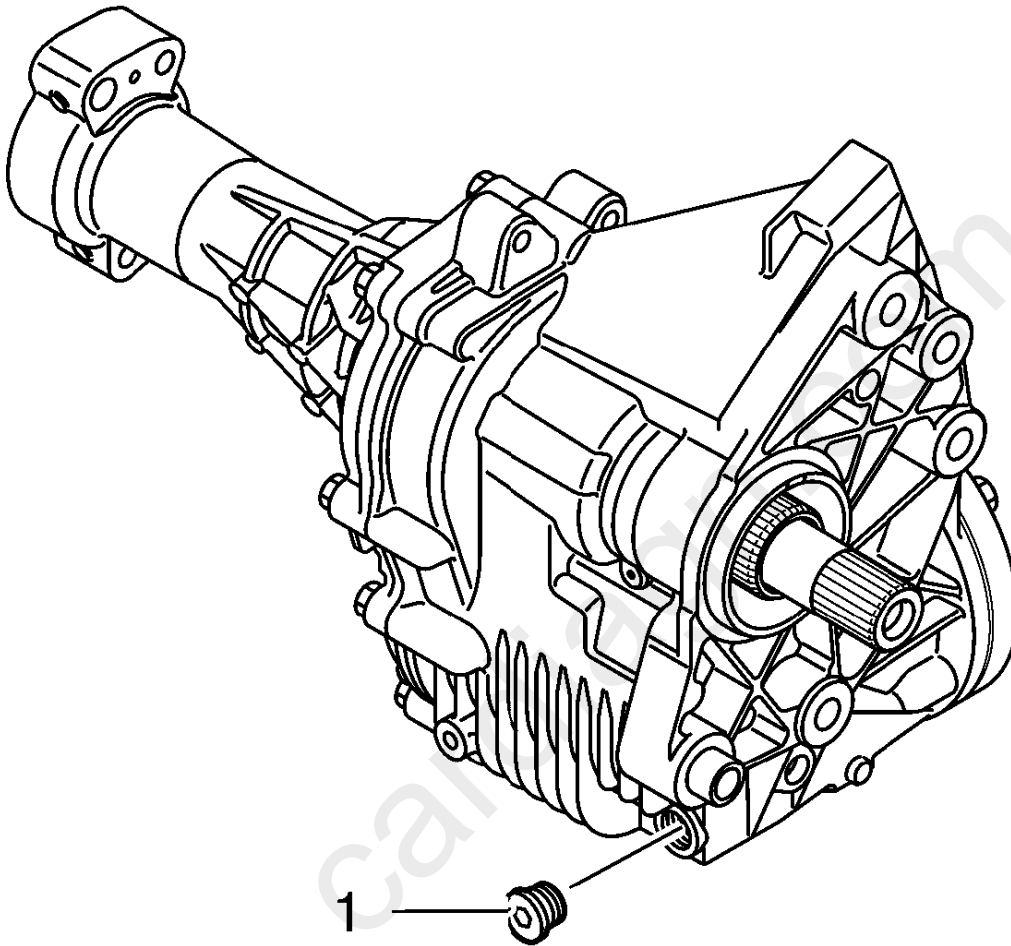


Fig. 15: Identifying Transfer Case Oil Drain Plug & Seal
Courtesy of GENERAL MOTORS CORP.

Remove and ☐S☐AR☐ the transfer case oil drain plug (1) and seal.

Fill Plug Removal

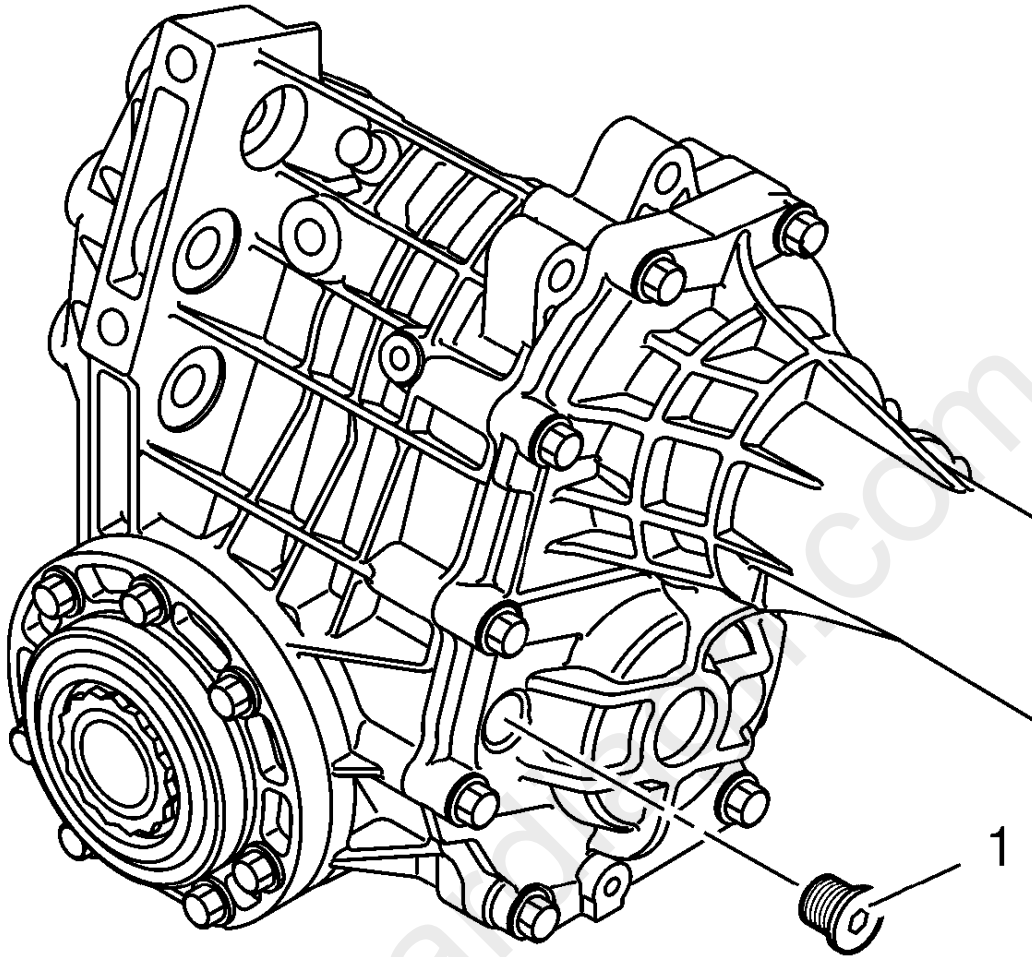


Fig. 16: Identifying Transfer Case Oil Fill Plug & Seal
Courtesy of GENERAL MOTORS CORP.

Remove and ☐S_{AR} the transfer case oil fill plug (1) and seal.

Transfer Case Vent Removal

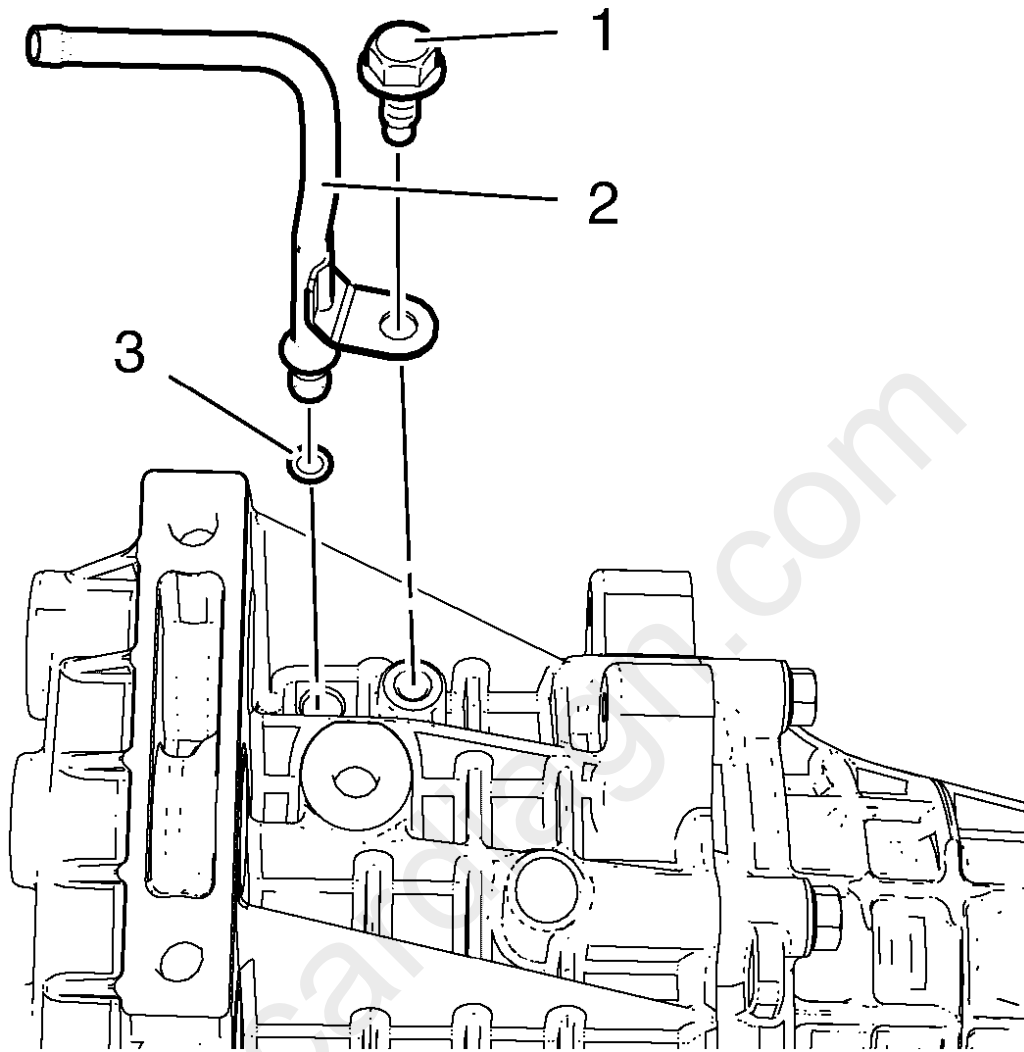


Fig. 17: Identifying Transfer Case Vent Pipe, Bolt & Seal
Courtesy of GENERAL MOTORS CORP.

1. Remove vent pipe bolt (1), if applicable.
2. Remove transfer case vent pipe (2) and vent pipe seal (3), if applicable.

Transfer Case Seal Removal

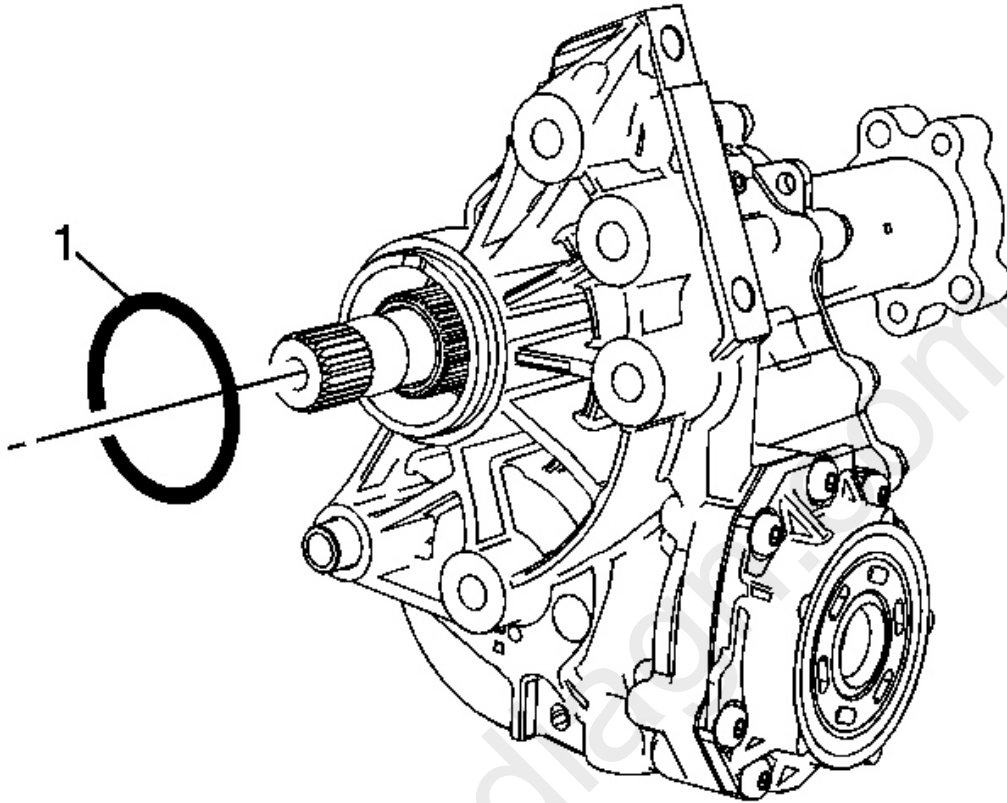


Fig. 1 □ Identifying Transfer Case-To-Transmission O-Ring
Courtesy of GENERAL MOTORS CORP.

Remove the transfer case-to-transmission O-ring seal (1).

Locating Bushing Removal

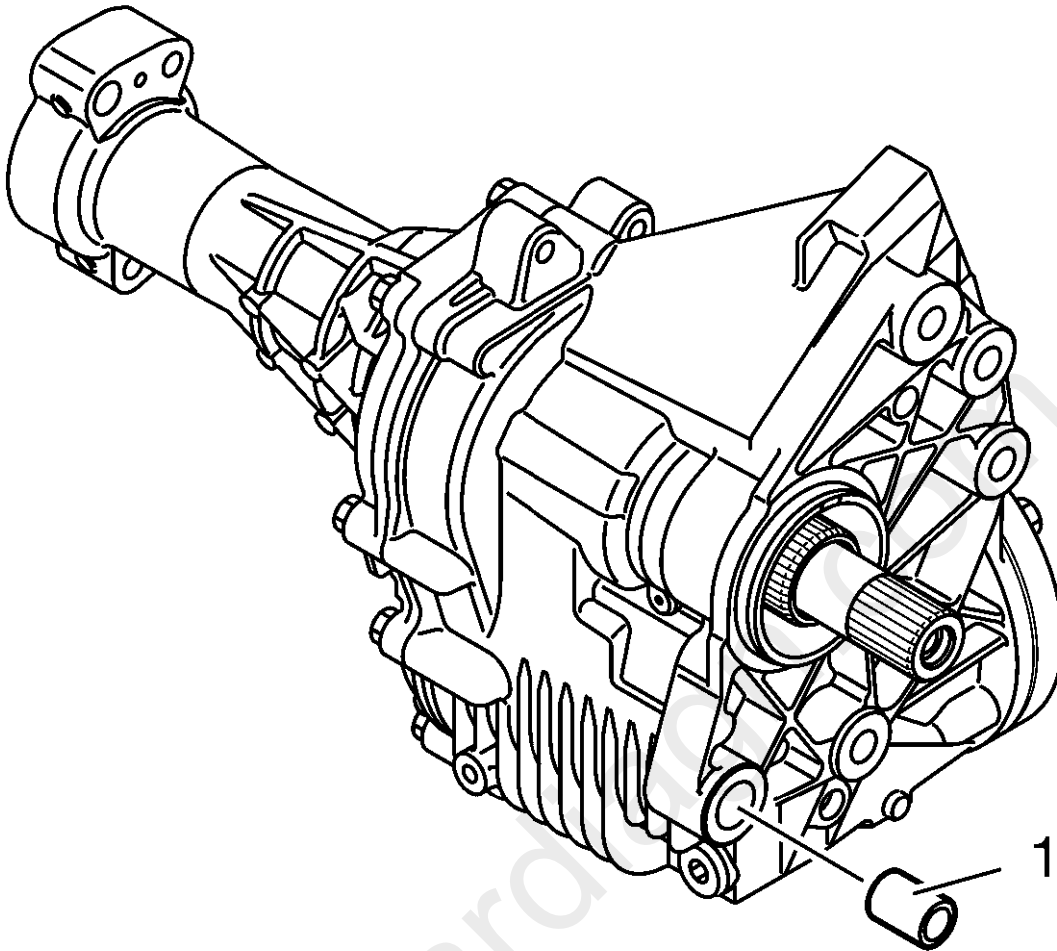


Fig. 19: View Of Transfer Case Location Bushing
Courtesy of GENERAL MOTORS CORP.

Remove the transfer case locating bushing (1) as required using multigrip pliers.

Front Wheel Drive Intermediate Shaft Removal

Special Tools

- **DT-111-A:** Bracket
- **DT-622-A:** Adapter

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

Removal Procedure

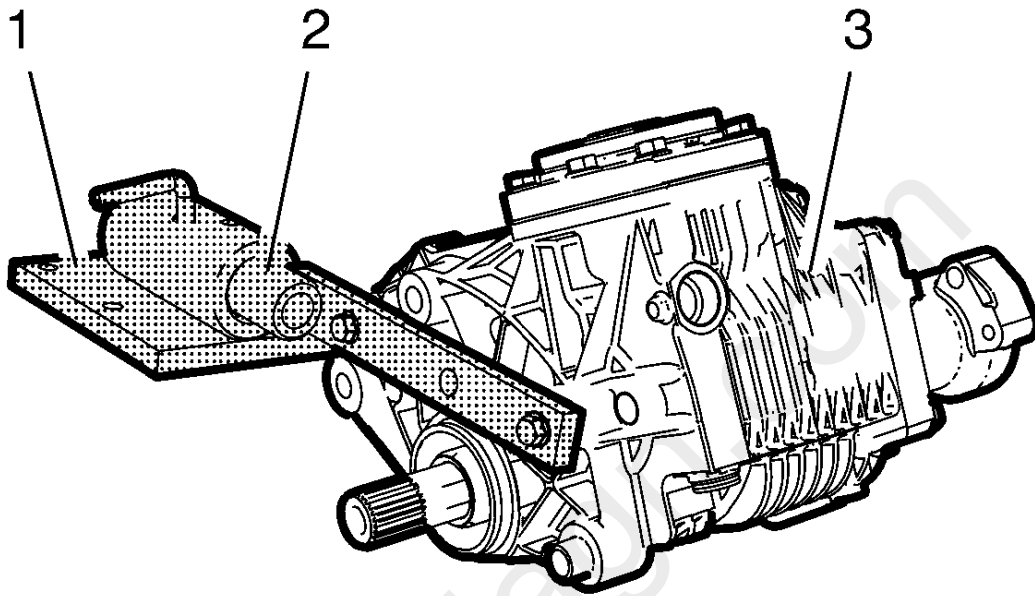


Fig. 20: Identifying Special Tools DT-11-A & DT-622-A
Courtesy of GENERAL MOTORS CORP.

1. Secure the transfer case (3) in **DT-11-A**: bracket (1), using the **DT-622-A**: adapter (2).

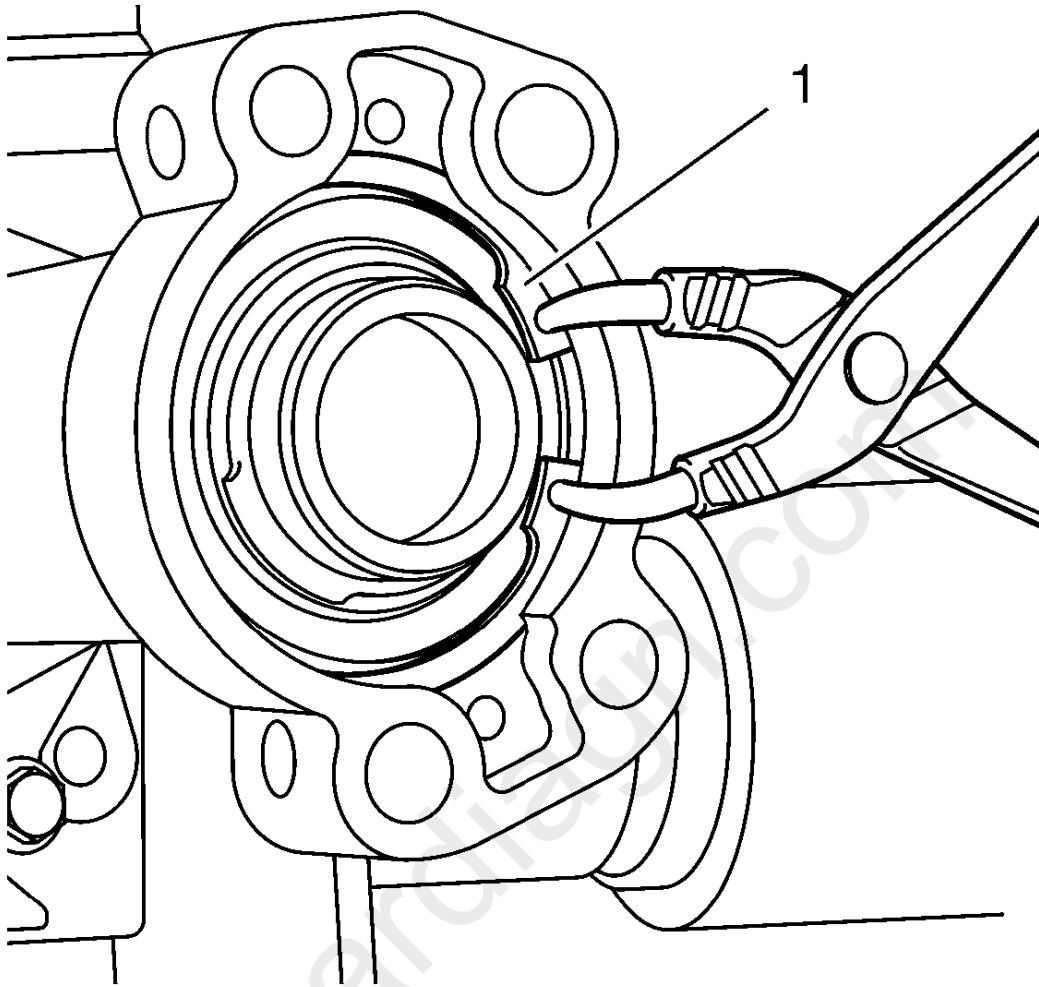


Fig. 21: Identifying Transfer Case Intermediate Shaft Retaining Ring
Courtesy of GENERAL MOTORS CORP.

2. Remove the transfer case intermediate shaft retaining ring (1).

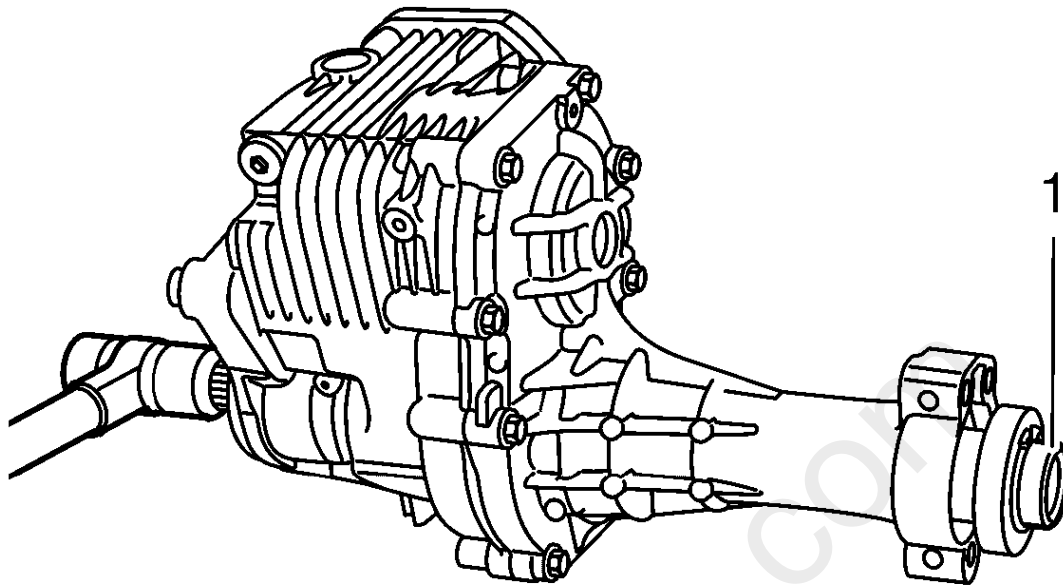


Fig. 22: Identifying Transfer Case Intermediate Shaft
Courtesy of GENERAL MOTORS CORP.

3. Remove the transfer case intermediate shaft (1), using a rubber mallet.

Front Wheel Drive Intermediate Shaft Bearing Removal

Special Tools

DT-101-B: Remover Plate

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

Removal Procedure

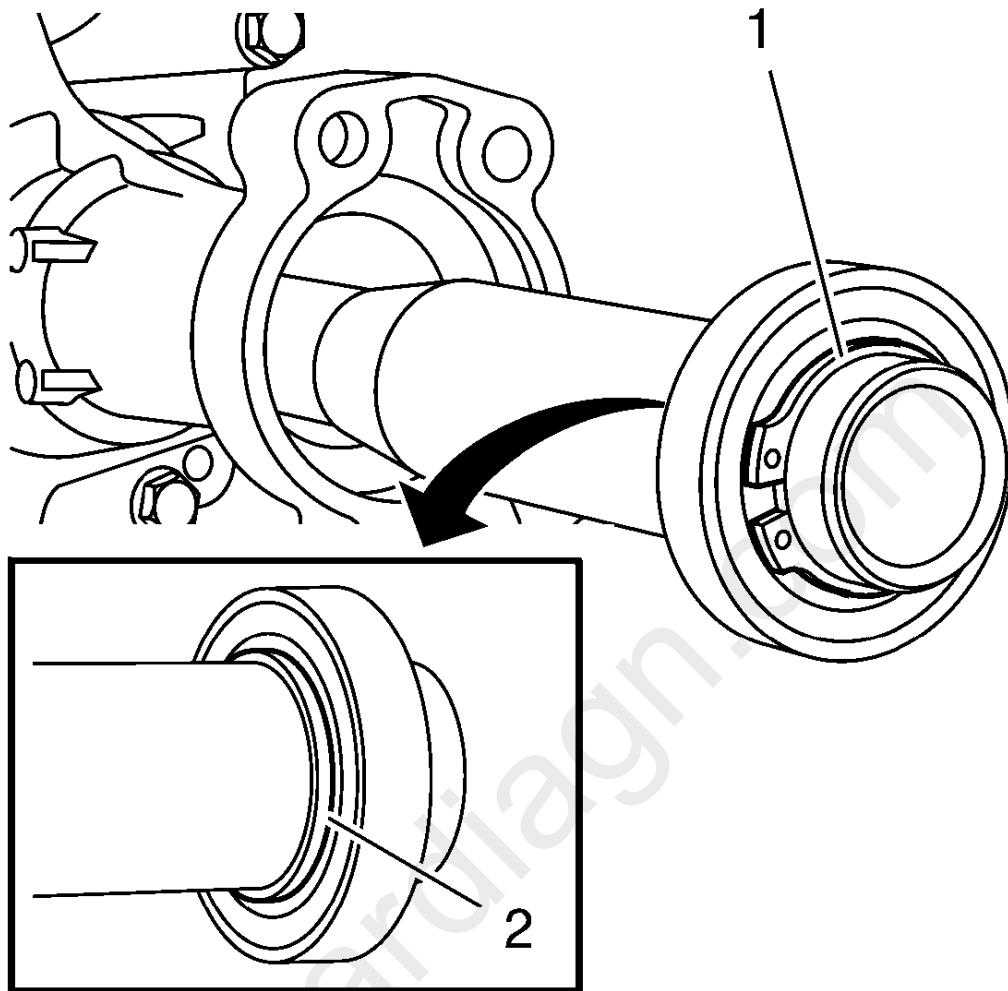


Fig. 23: Identifying Transfer Case Intermediate Gear Bearing Retaining Rings
Courtesy of GENERAL MOTORS CORP.

1. Remove the two transfer case intermediate gear bearing retaining rings (1, 2).

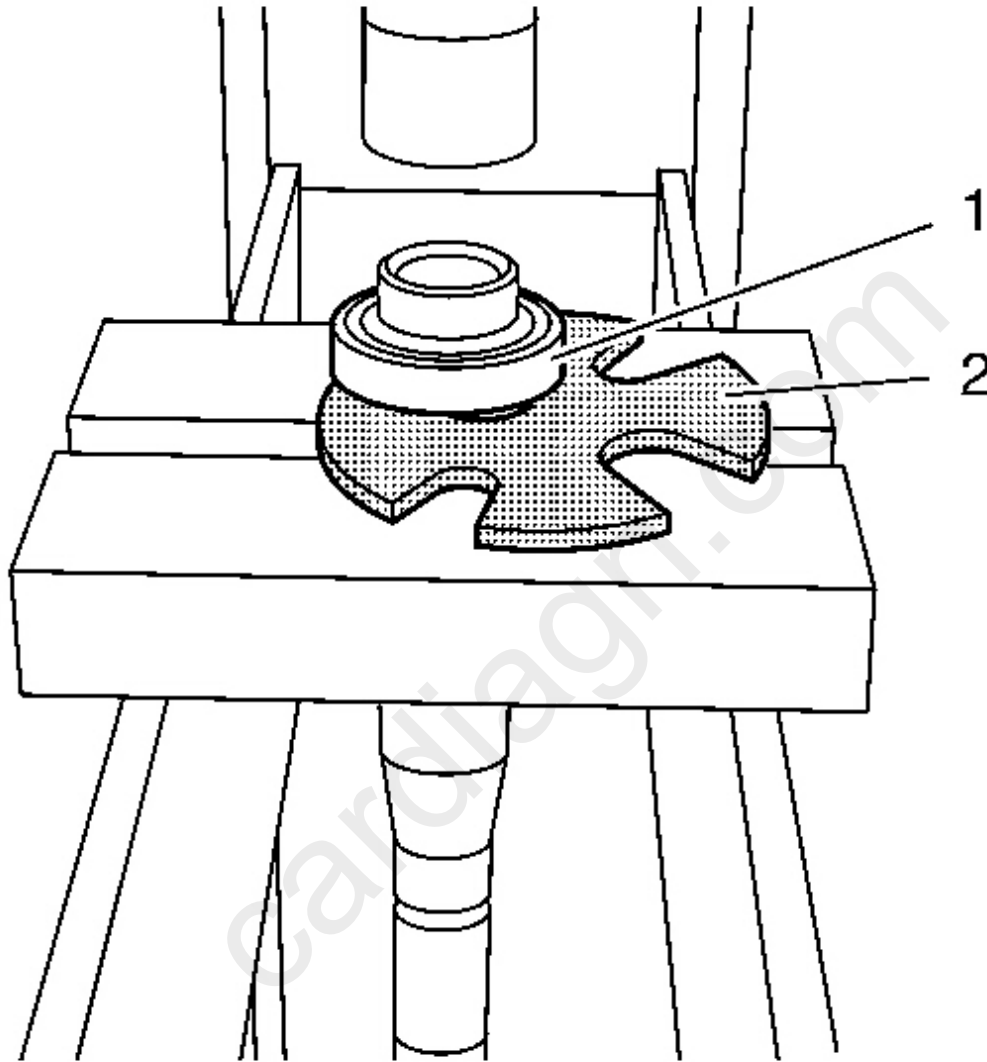


Fig. 2: View Of Transfer Case Intermediate Shaft Bearing Removal
Courtesy of GENERAL MOTORS CORP.

2. Remove the transfer case intermediate shaft bearing (1), using the **DT30B**: remover plate (2) and a hydraulic press.

Rear Output Shaft Seal Dirt Deflector Removal

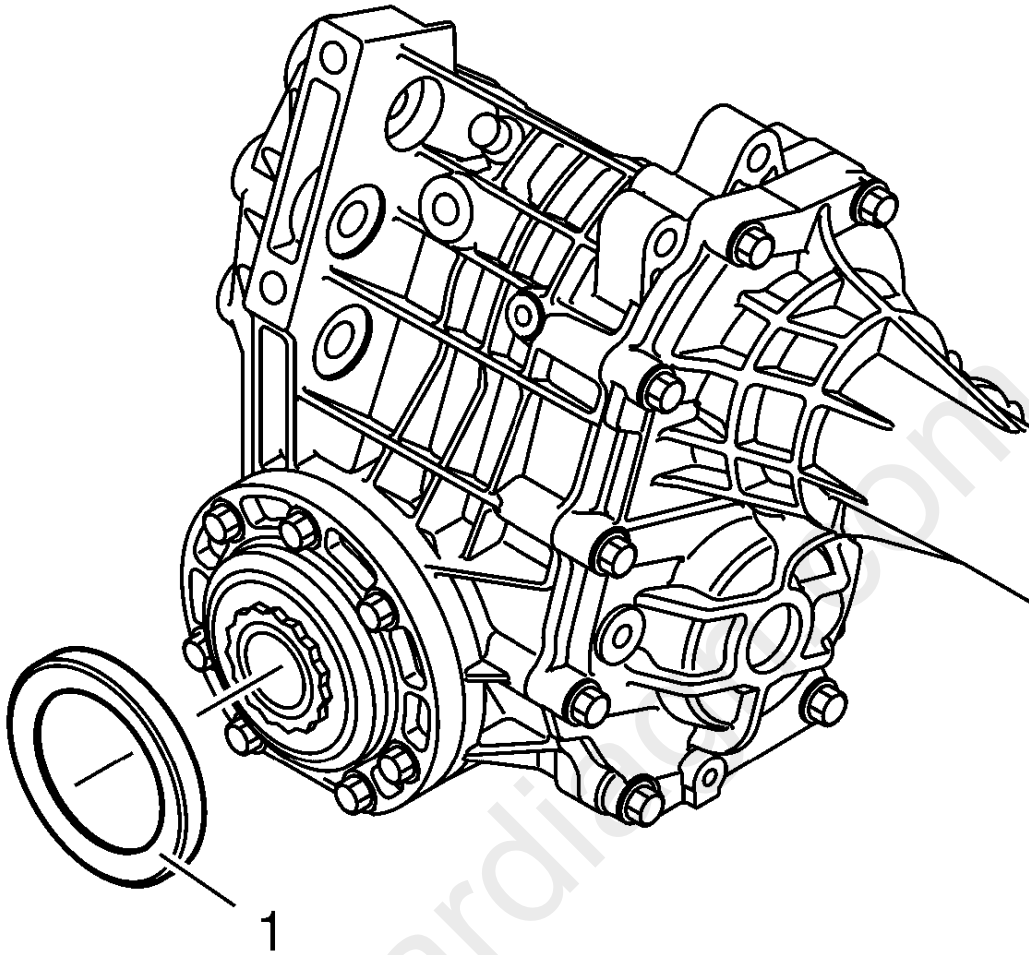


Fig. 2 Identifying Rear Output Shaft Seal Dirt Deflector
Courtesy of GENERAL MOTORS CORP.

Remove the rear output shaft seal dirt deflector (1), using a screw driver.

Rear Output Shaft Seal Removal

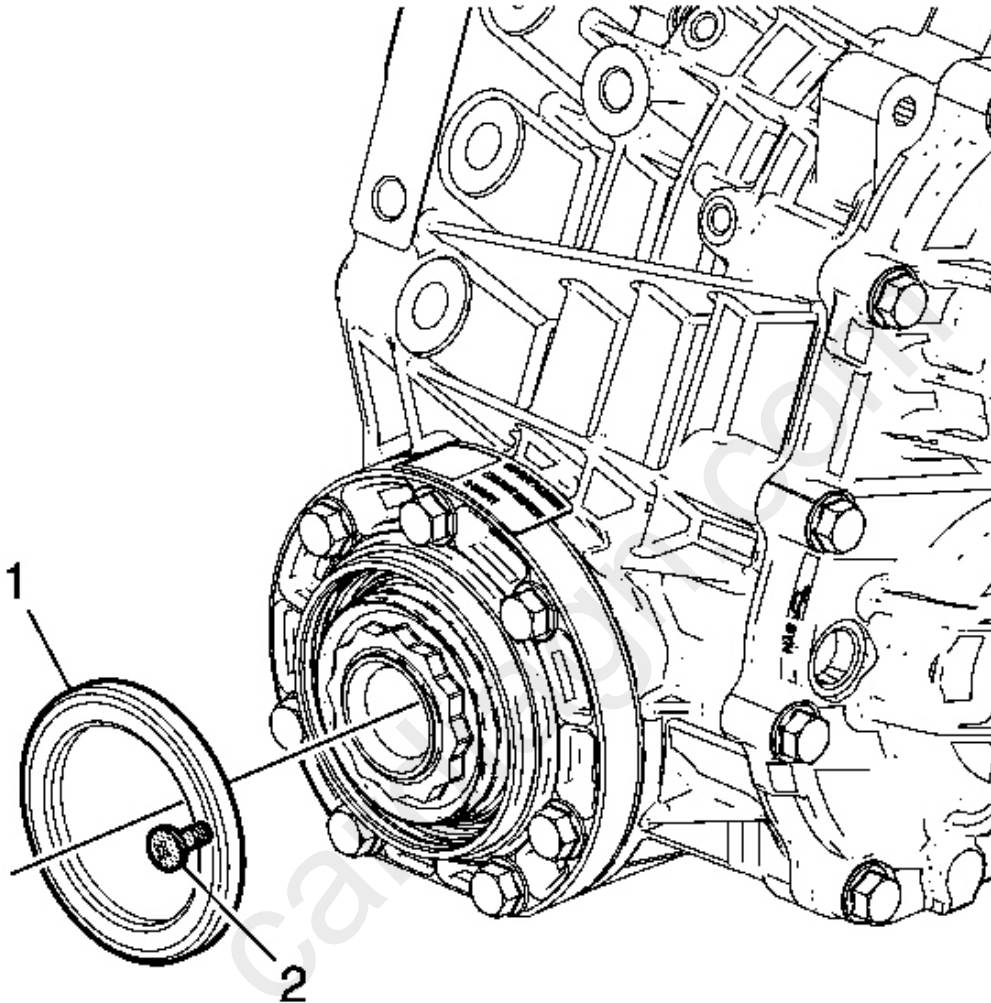


Fig. 2□: Identifying Rear Output Seal
Courtesy of GENERAL MOTORS CORP.

1. Install a sheet metal type screw (2) into the face of the rear output seal.
2. Remove the rear output shaft seal (1) with multigrip pliers.

Rear Output Shaft Housing Seal Removal

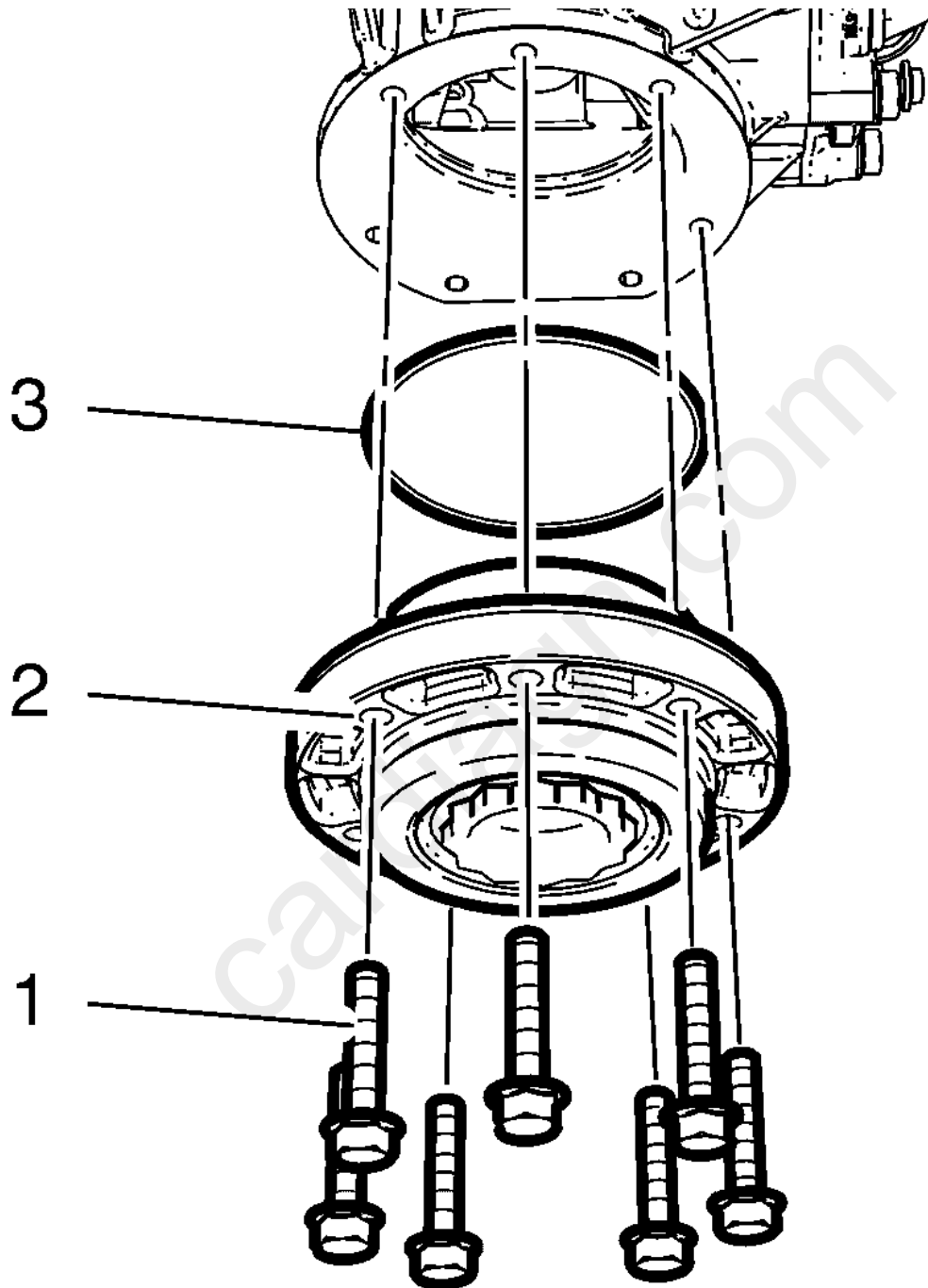


Fig. 2 □ View Of Rear Output Shaft Flange □ Seal & Bolts
Courtesy of GENERAL MOTORS CORP.

1. Remove the 7 transfer case rear output shaft housing bolts (1).
2. Remove the transfer case rear output shaft housing (2).
3. Remove the transfer case rear output shaft housing seal (3).

4. Clean all of the sealing surfaces.

Front Wheel Drive Input Shaft Removal

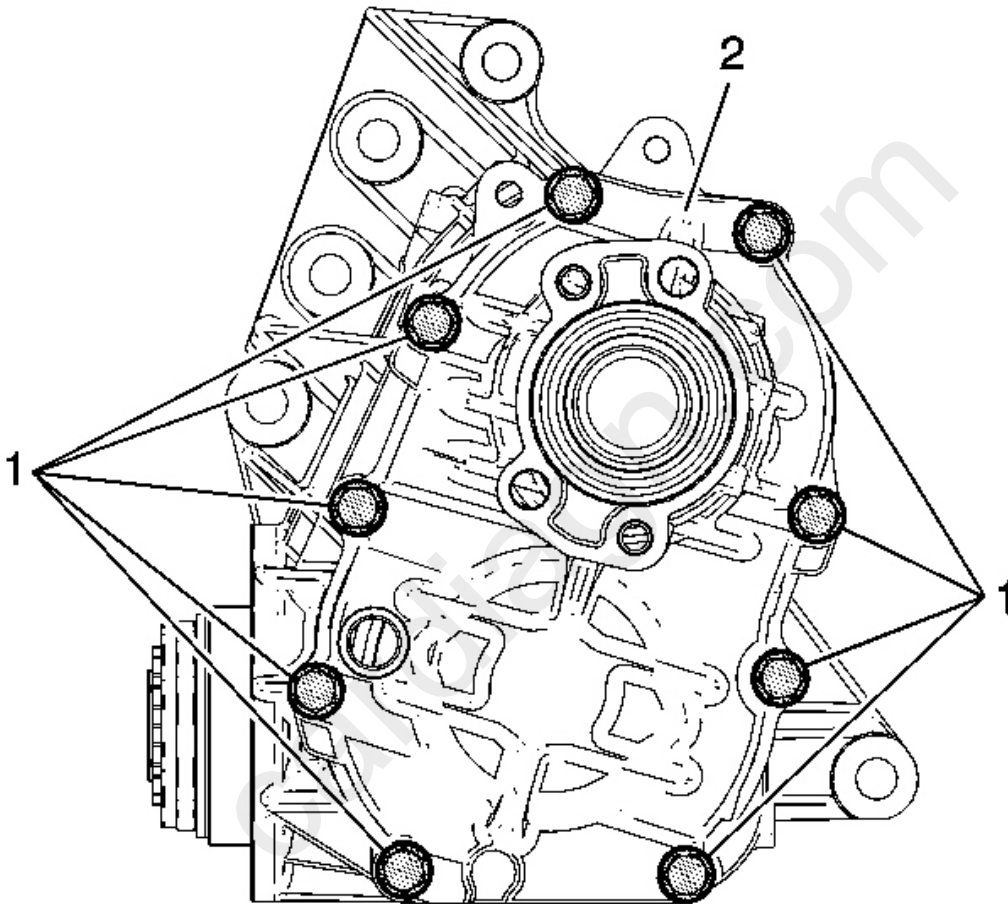


Fig. 28: Identifying Rear Extension Housing & Bolts
Courtesy of GENERAL MOTORS CORP.

1. Remove the transfer case rear extension housing bolts (1) and rear extension housing (2).

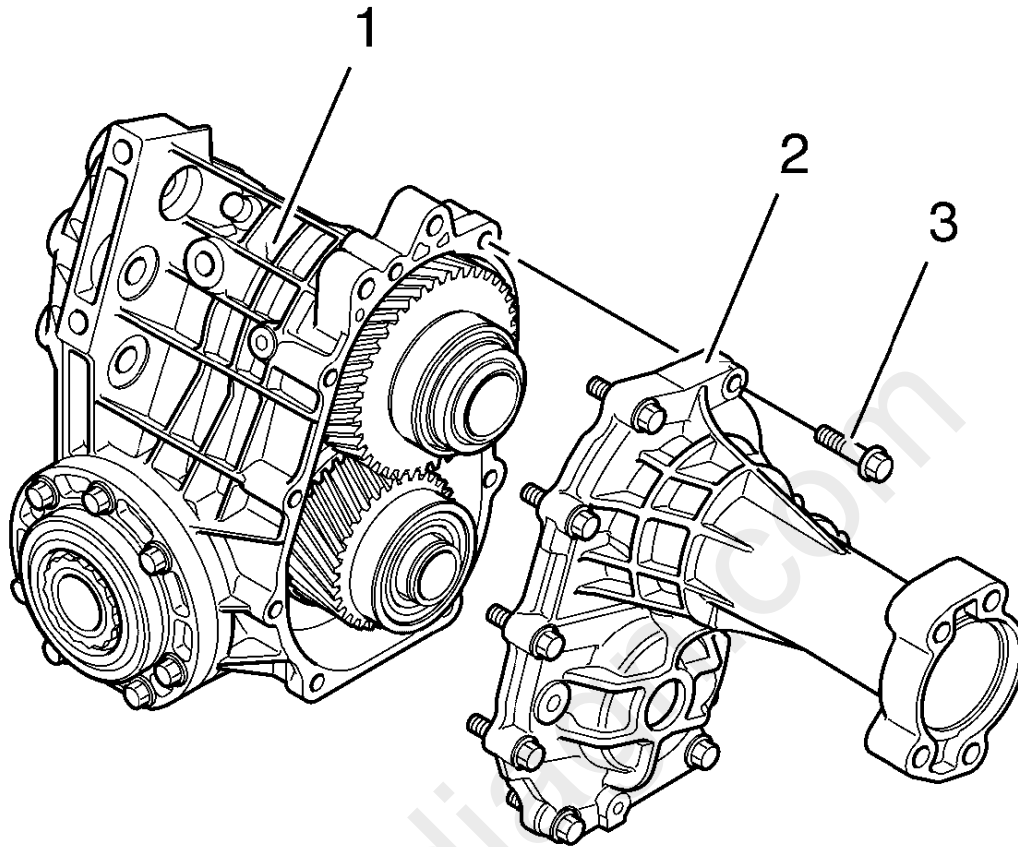


Fig. 29: View Of Transfer Case Housing & Rear Extension Housing
Courtesy of GENERAL MOTORS CORP.

2. Remove the rear extension housing (2) from the transfer case housing (1).

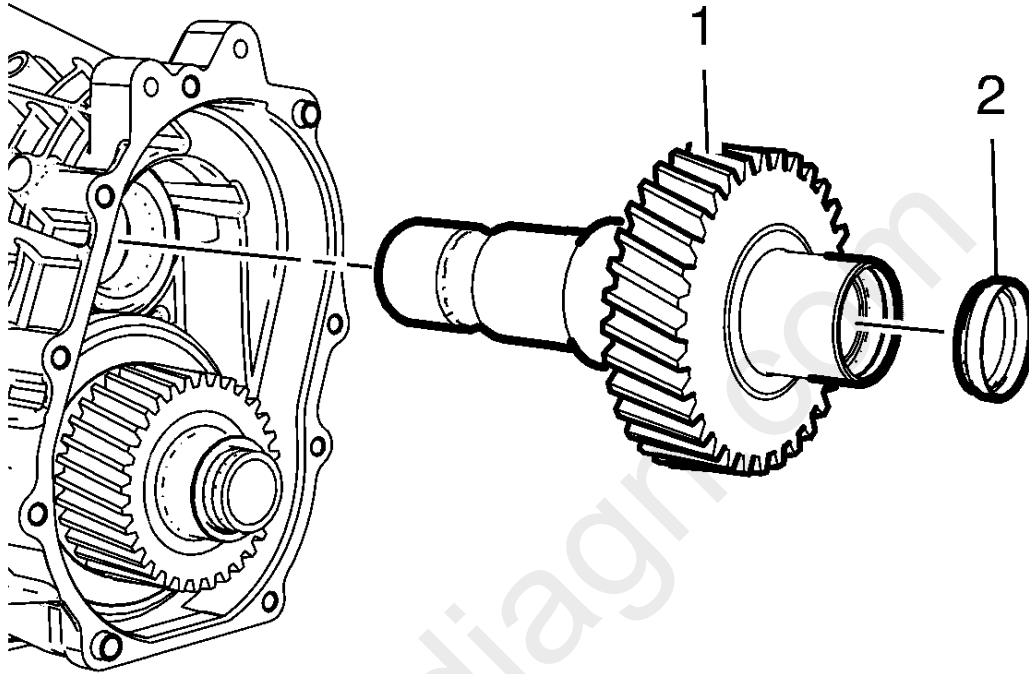


Fig. 30: View Of Front Wheel Drive Input Shaft
Courtesy of GENERAL MOTORS CORP.

3. Remove the front wheel drive input shaft (1).
4. Remove the intermediate shaft seal (2) from the input shaft.

Idler Shaft Removal

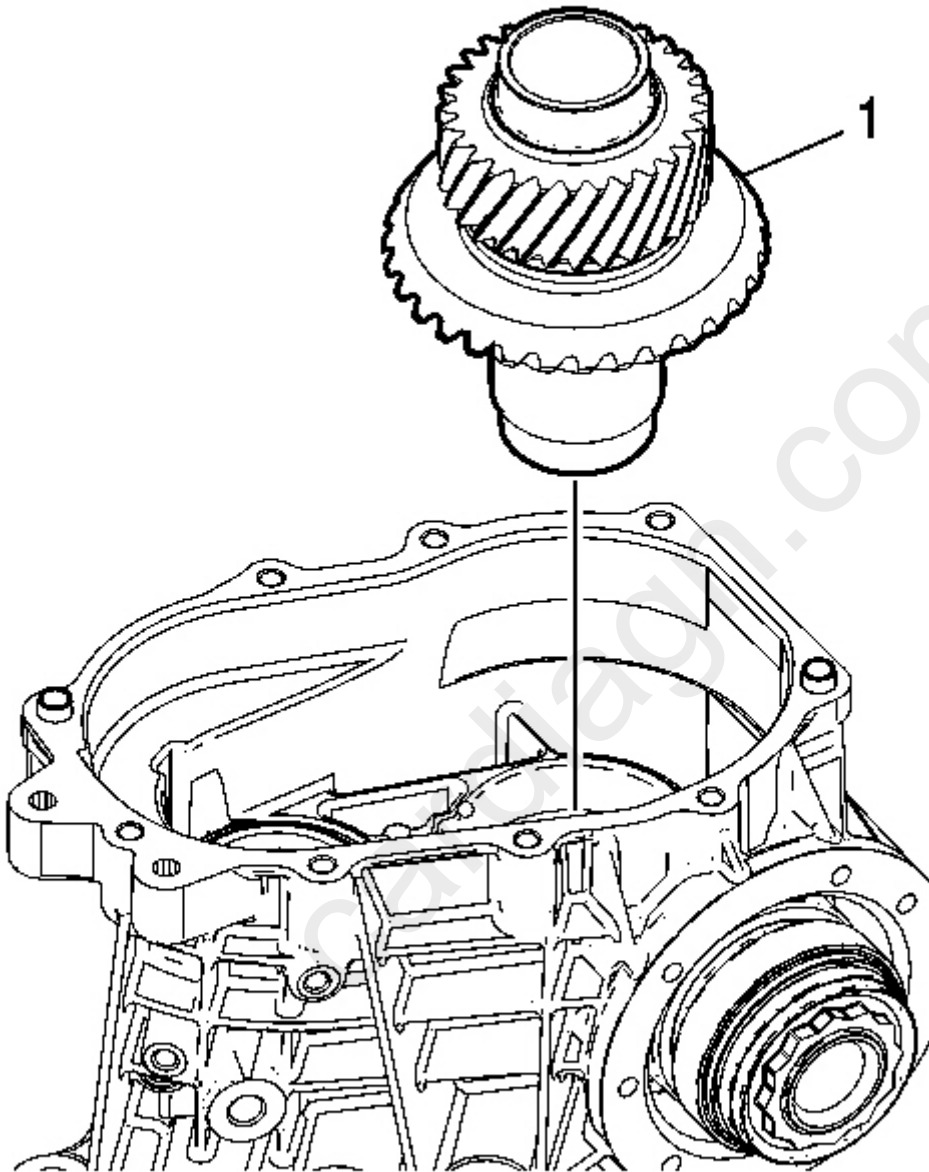


Fig. 31: View Of Idler Shaft

Courtesy of GENERAL MOTORS CORP.

Remove the idler shaft (1) from the housing.

Input Shaft Seal Removal

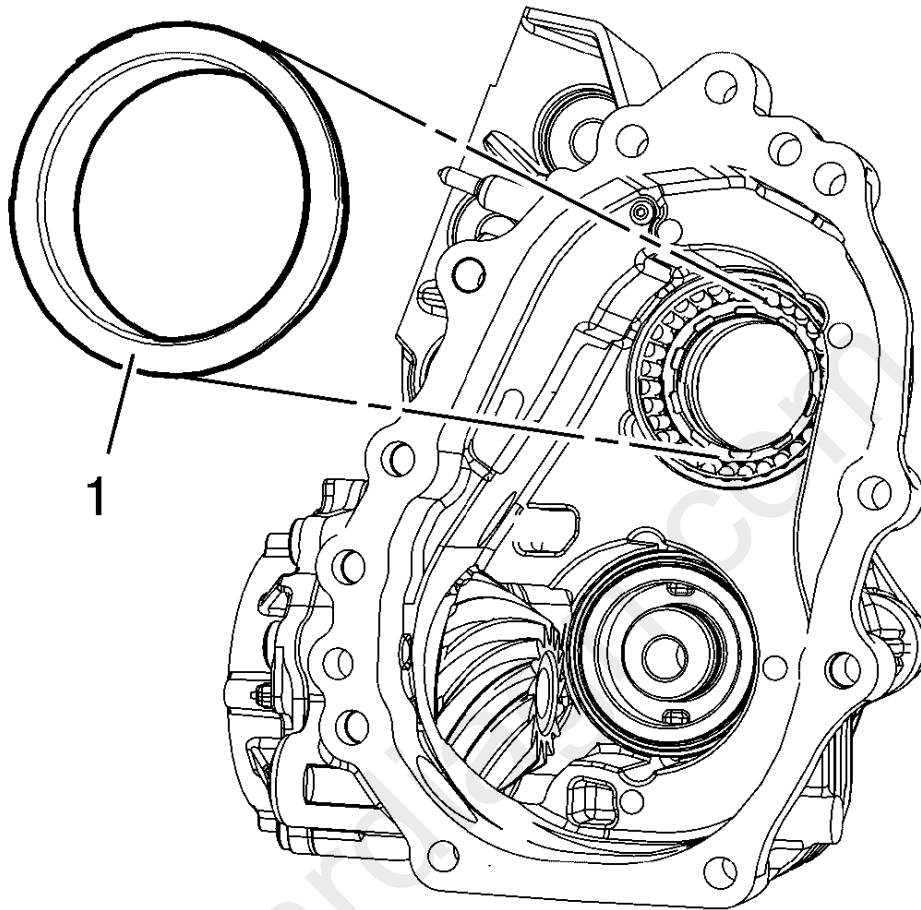


Fig. 32: Identifying Transfer Case Input Shaft Rear Seal
Courtesy of GENERAL MOTORS CORP.

1. Remove the transfer case input shaft rear seal (1) using a suitable screw driver.

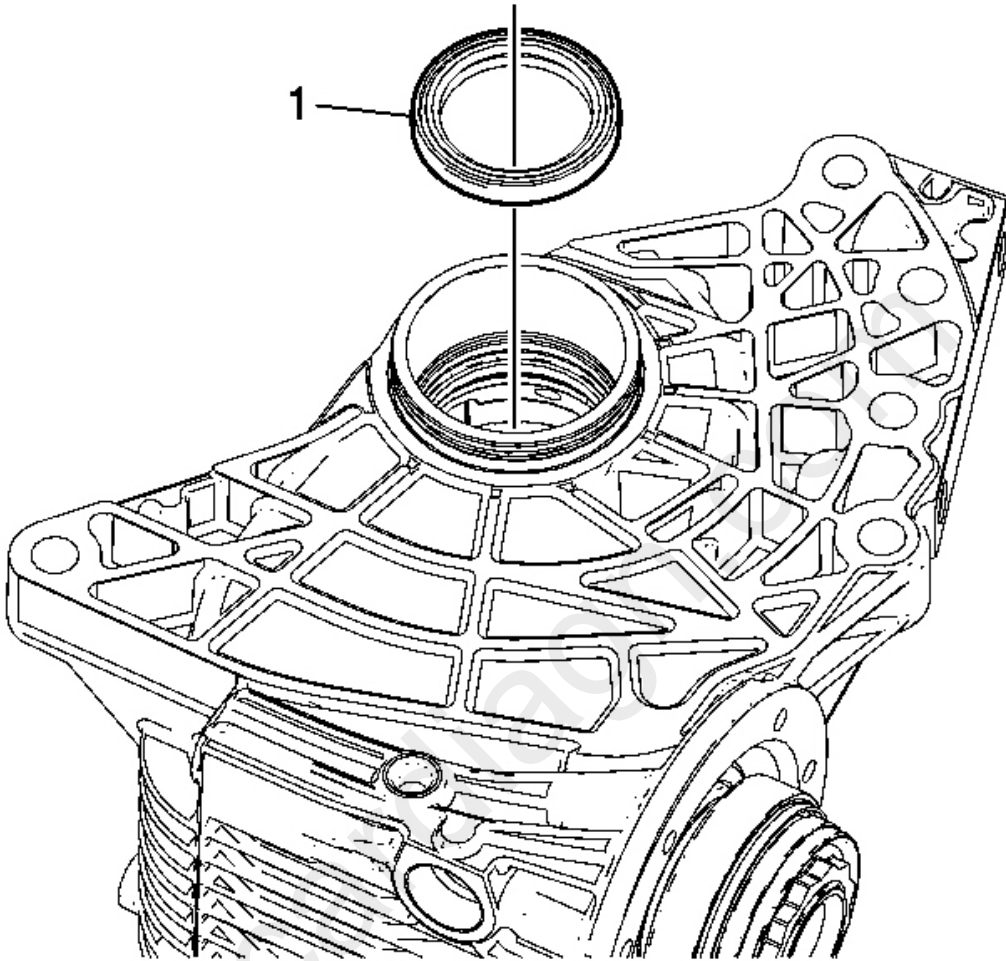


Fig. 33: Identifying Transfer Case Input Shaft Front Seal
Courtesy of GENERAL MOTORS CORP.

2. Remove the transfer case input shaft front seal (1) using a suitable screw driver.

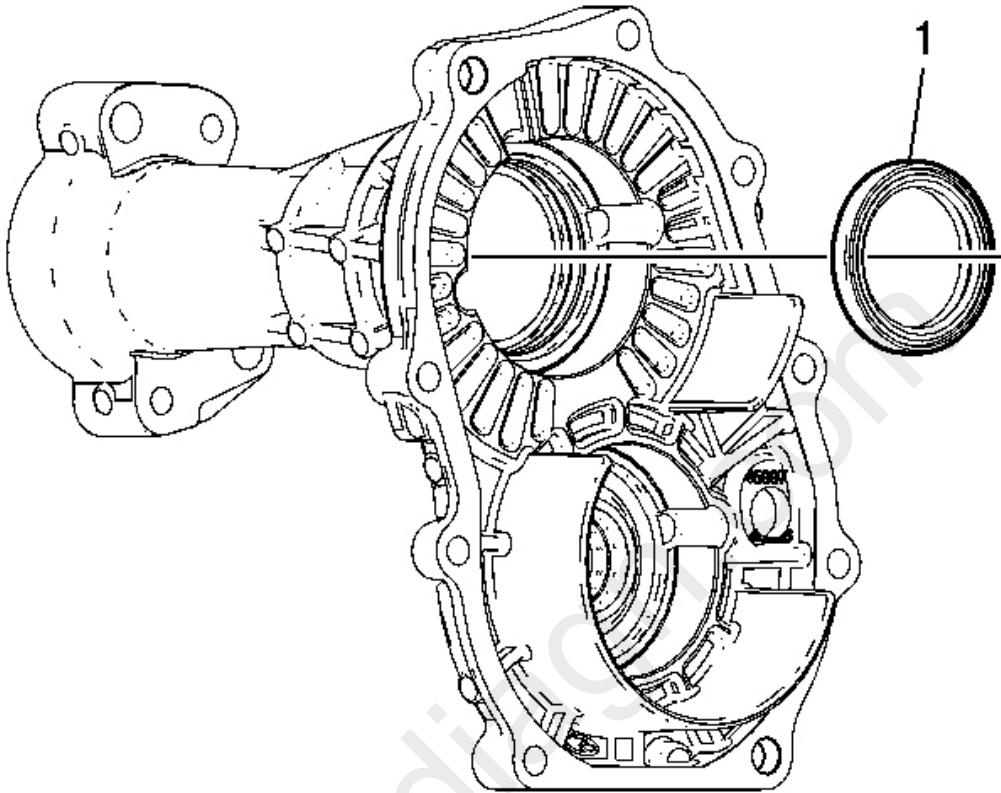


Fig. 34: View Of Input Shaft Seal
Courtesy of GENERAL MOTORS CORP.

NOTE: To avoid damage to the housing, use a brass punch to remove the seal.

3. Remove the transfer case input shaft seal (1) from the rear extension housing.

Rear Extension Locating Pin Removal

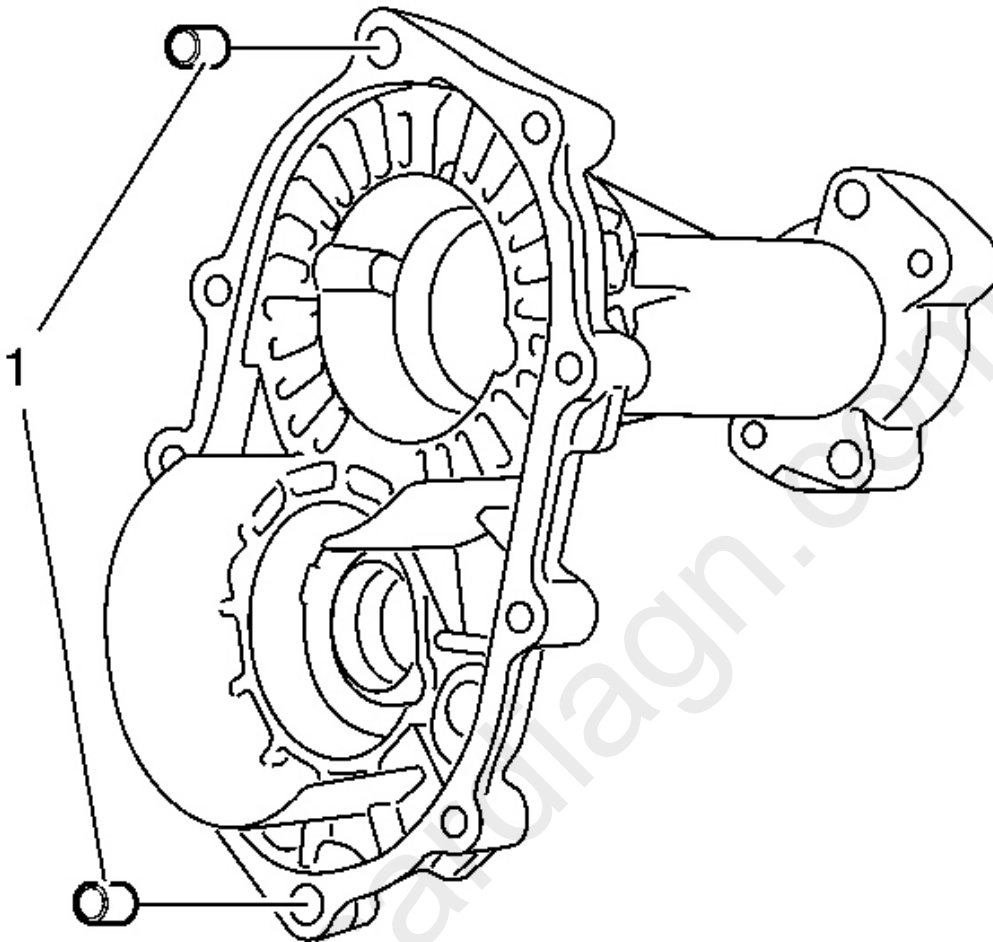


Fig. 35: Identifying Transfer Case Rear Extension Locating Pins
Courtesy of GENERAL MOTORS CORP.

Remove the transfer case to rear extension housing locating pins (1) as required using multigrip pliers.

TRANSFER CASE CLEANING AND INSPECTION

Transfer Case Housing

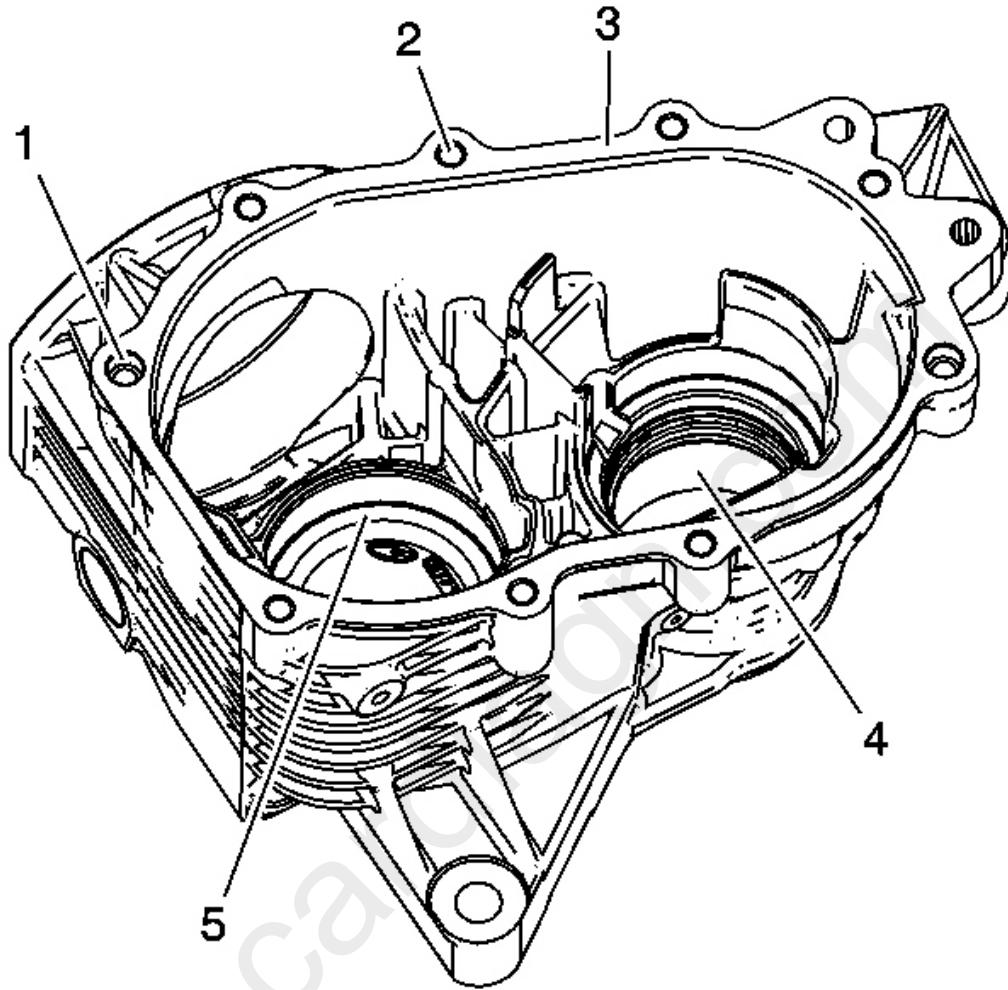


Fig. 36: Identifying Front Case Half Inspection Points
Courtesy of GENERAL MOTORS CORP.

1. Clean the front case half in cleaning solvent and air dry.
2. Remove the metal shavings from the case half bolt holes.

CAUTION: Refer to Machined Surface Damage Caution .

3. Remove the sealer from the case sealing surfaces.
4. Inspect the case for being broken or cracked.

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5. Inspect the input shaft front bearing bore (4) for the following conditions:
 - Scoring
 - Cracks
6. Inspect the idler shaft front bearing bore (5) for the following conditions:
 - Scoring
 - Cracks
7. Replace the front case half if any of the above conditions are found.
8. Inspect the sealing surfaces (3) for damage.
9. Repair small scratches or nicks with a soft stone.
10. Inspect the transfer case housing to transmission case mounting surface for damage.
11. Inspect the case threaded bolt holes (2) for damage.
12. Repair any damaged threads.
13. Inspect the location pins (1) for being loose or missing.
14. Repair or replace any damaged location pins.
15. Inspect the idler shaft bearing and the input shaft bearing for the following conditions:
 - Roughness
 - Brinelling
 - Pitting
16. Replace the bearings if any of the above conditions are found. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble**.

Rear Extension Housing

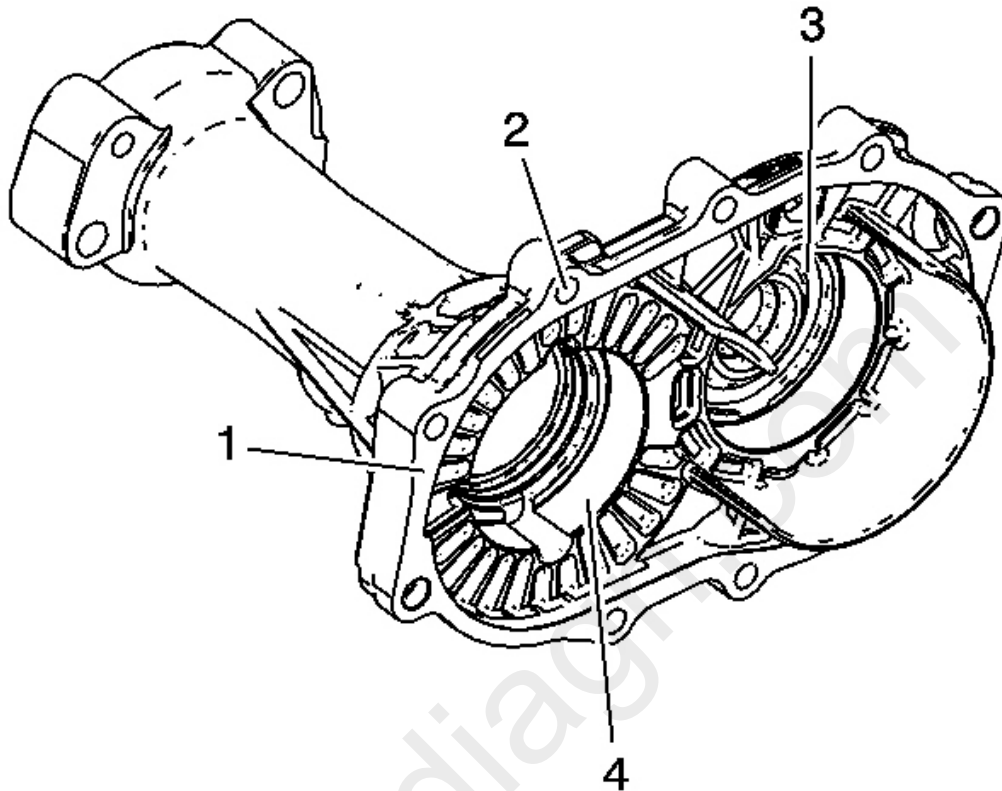


Fig. 37: Identifying Rear Case Half Inspection Points
Courtesy of GENERAL MOTORS CORP.

1. Clean the rear case half cleaning solvent and air dry.

CAUTION: Refer to Machined Surface Damage Caution .

2. Remove the sealer from the case sealing surfaces.
3. Inspect the case for being broken or cracked.
4. Replace the case if it is broken or cracked.
5. Inspect the sealing surfaces (1) for damage.
6. Repair small scratches or nicks with a soft stone.
7. Inspect the case threaded bolt holes (2) for damage.
8. Repair any damaged threads.
9. Inspect the input shaft rear bearing bore (4) for the following conditions:

- Scoring
 - Cracks
10. Inspect the idler shaft rear bearing bore (3) for the following conditions:
- Scoring
 - Cracks
11. Replace the case if any of the above conditions are found.

Input Shaft

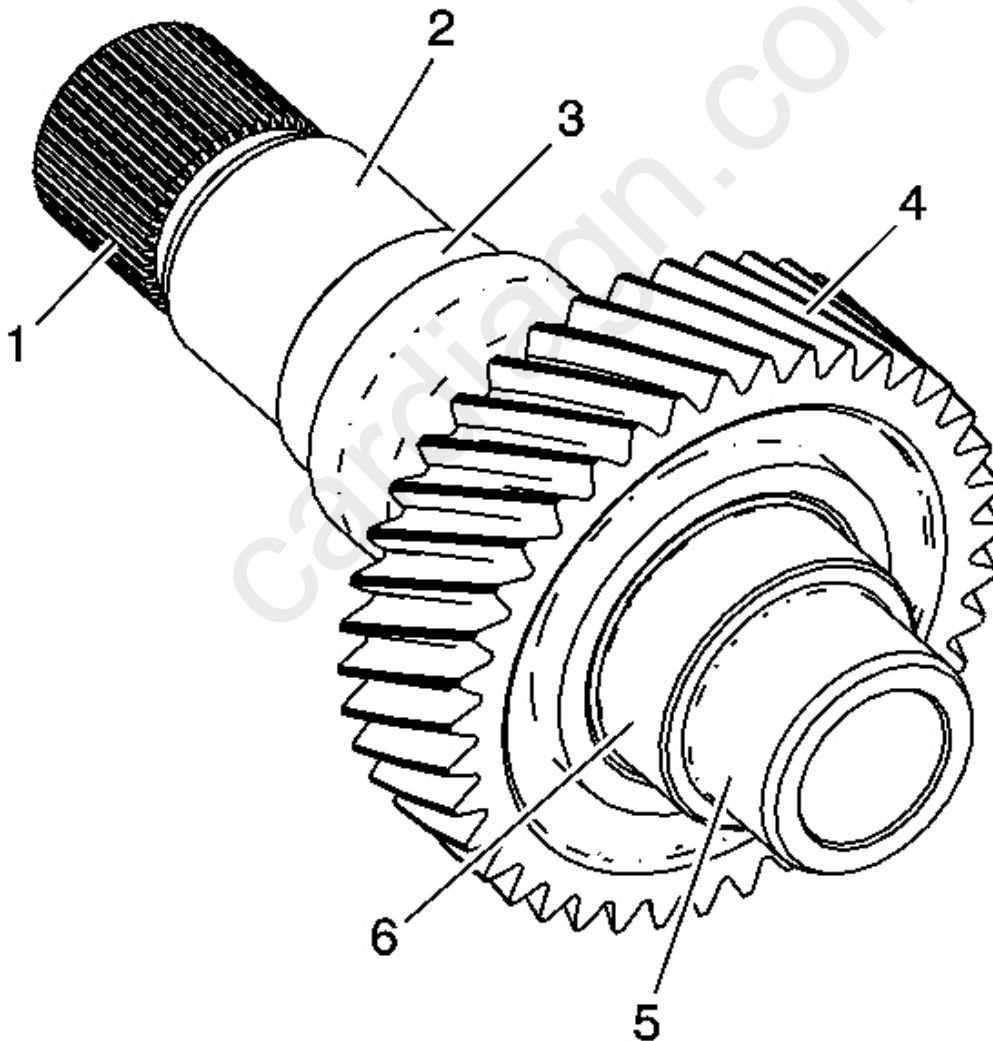


Fig. 38: Identifying Input Shaft Inspection Points

Courtesy of GENERAL MOTORS CORP.

1. Clean the input shaft in cleaning solvent.
2. Inspect the input shaft splines (1) for excessive wear or damage.
3. Inspect the input seal surface (2) for excessive grooves or damage.

NOTE: Do not attempt to smooth any roughness in the bearing journals.

4. Inspect the bearing journals (3 and 6) on the input shaft for the following conditions:
 - Scoring
 - Pitting
 - Brinelling
 - Excessive wear
5. Inspect the input shaft gear teeth (4) for excessive wear or damage.
6. Inspect the input shaft bearing retainer rear seal surface (5) for excessive grooves or damage.
7. Replace the input shaft if any of the above conditions are found.

Idler Shaft

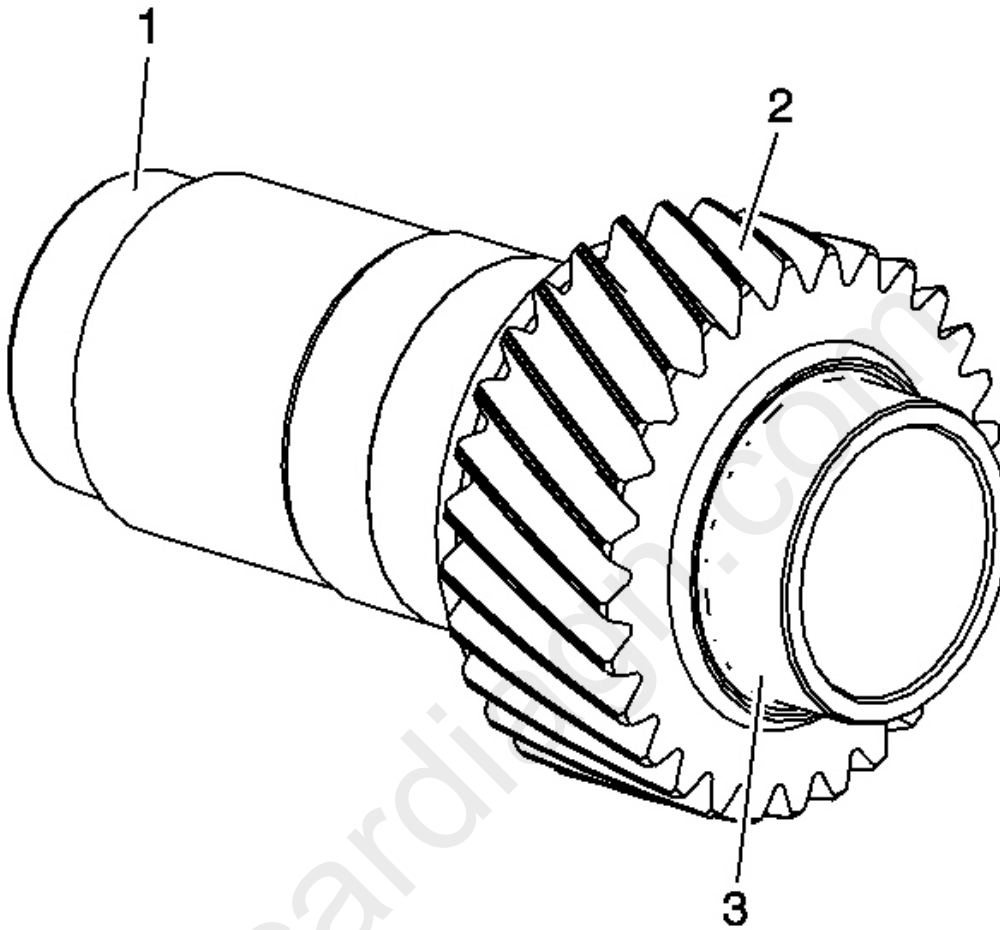


Fig. 39: Identifying Idler Shaft Inspection Points
Courtesy of GENERAL MOTORS CORP.

1. Inspect the bearing journals (1 and 3) on the idler shaft for the following conditions:
 - Scoring
 - Pitting
 - Brinelling
 - Excessive wear
2. Inspect the idler shaft gear teeth (2) for excessive wear or damage.
3. Replace the idler shaft if any of the above conditions are found.

Rear Output Shaft

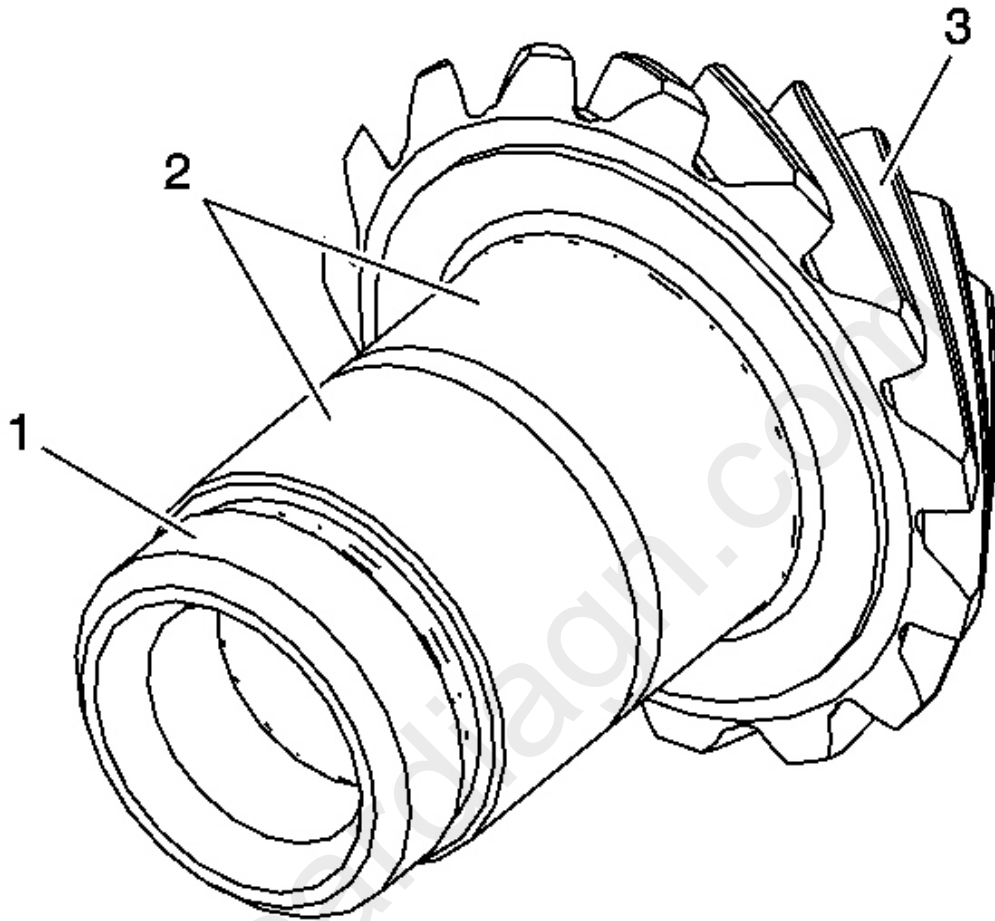


Fig. 40: Identifying Rear Output Shaft Inspection Points
Courtesy of GENERAL MOTORS CORP.

1. Clean the rear output shaft with rear output shaft bearing in cleaning solvent.
2. Air dry and ensure all solvent is removed from the bearing.
3. Inspect the rear output shaft bearing journals (2) for the following conditions:
 - Scoring
 - Pitting
 - Brinelling
 - Excessive wear
4. Inspect the rear output shaft seal surface (1) for excessive grooves or damage.
5. Inspect the rear output shaft gear teeth (3) for excessive wear or damage.

6. Replace the rear output shaft if any of the above conditions are found.

TRANSFER CASE ASSEMBLE

Rear Extension Locating Pin Installation

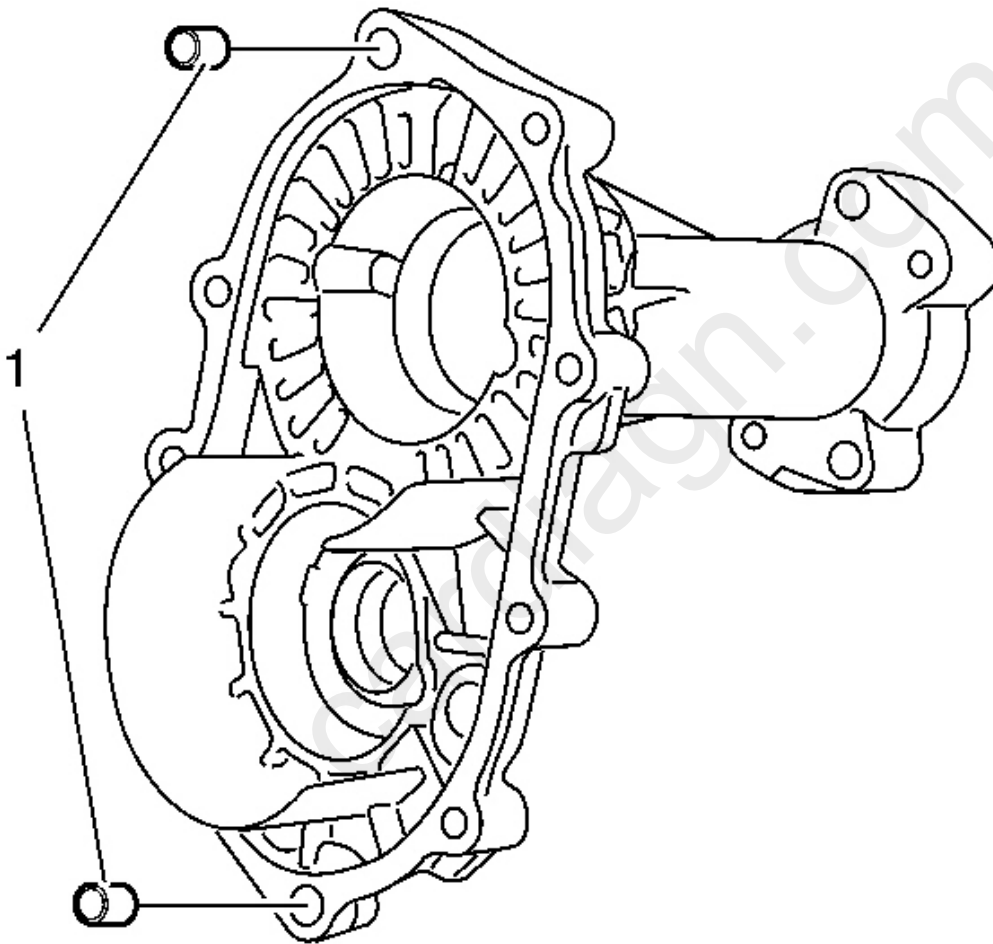


Fig. 4: Identifying Transfer Case Rear Extension Locating Pins
Courtesy of GENERAL MOTORS CORP.

Install the transfer case-to-rear extension housing locating pins (1), as required.

Input Shaft Seal Installation

Special Tools

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- **DT-105:** Remover/Installer
- **DT-49094:** Lifting Lifter
- **DT-4995:** Installer

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

Installation Procedure

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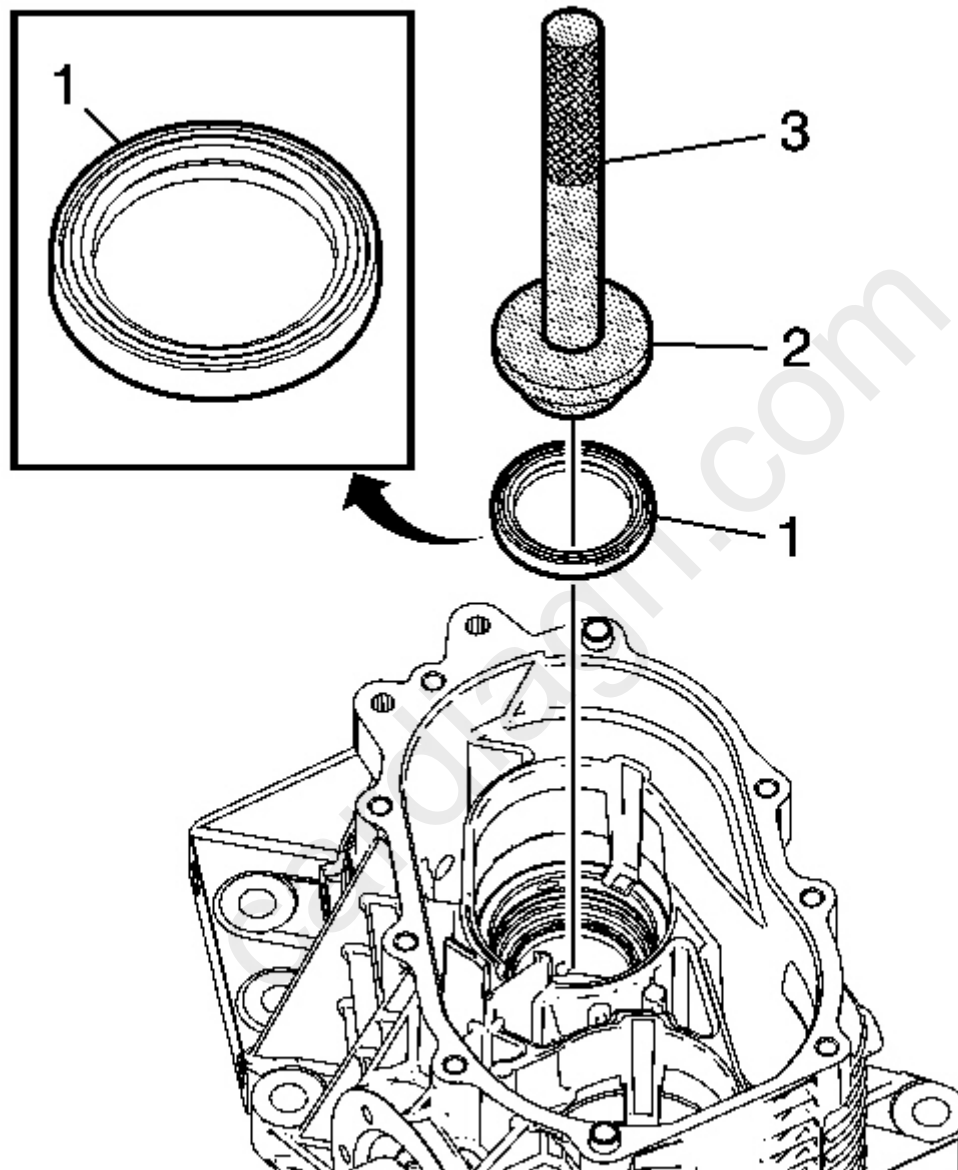


Fig. 4: Identifying Seal & Installation Tool DT-05
Courtesy of GENERAL MOTORS CORP.

NOTE: Install the seal onto the tool so that the flat face of the seal faces away from the tool flange.

1. Install the input shaft rear seal (1) to the transfer case using the **DT-4995** installer (2) and **DT-05** remover/installer (3).

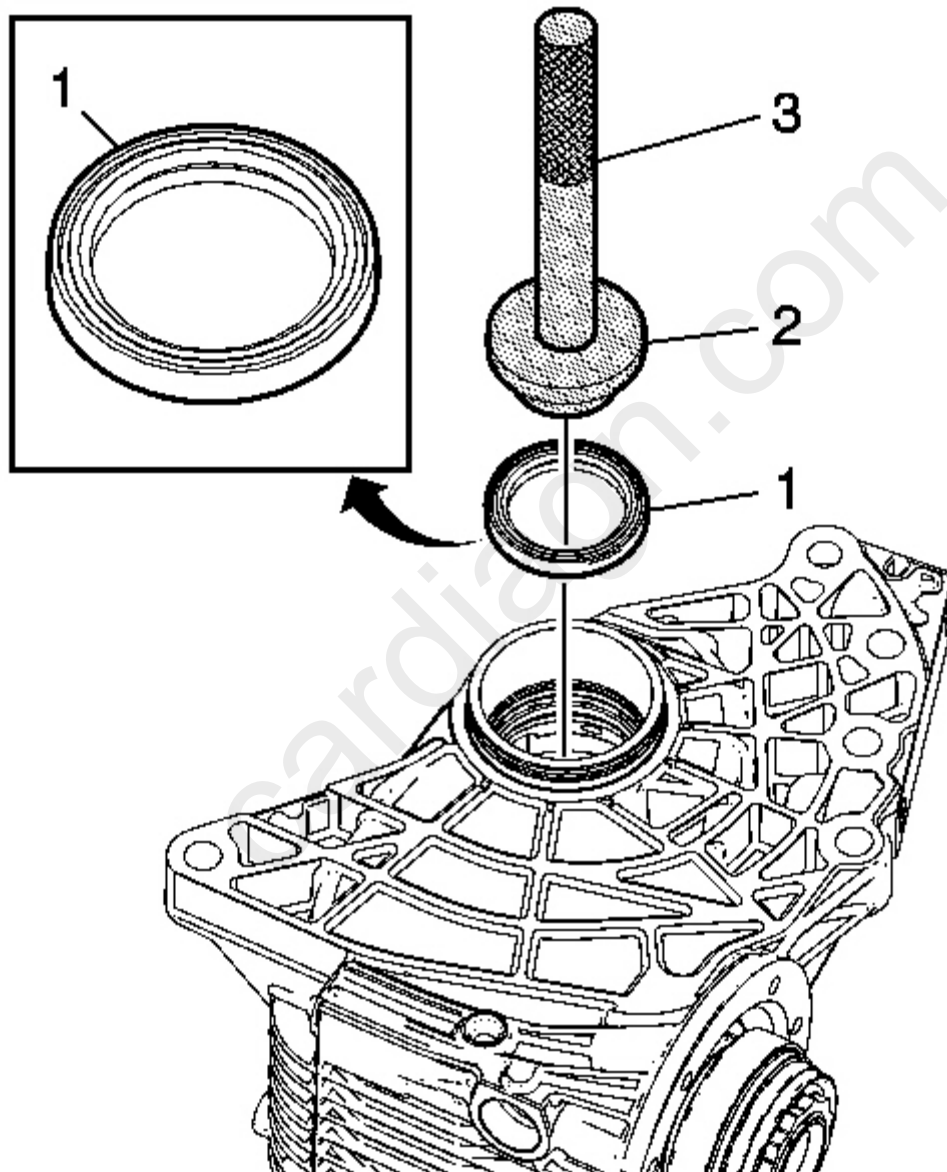


Fig. 4 Identifying Seal & Special Installation Tool DT-05
Courtesy of GENERAL MOTORS CORP.

NOTE: Install the seal onto the tool so that the flat face of the seal faces away from the tool flange.

2. Install the input shaft front seal (1) to the transfer case using the **DT-4995** installer (2) and **DT-05**: remover/installer (3).

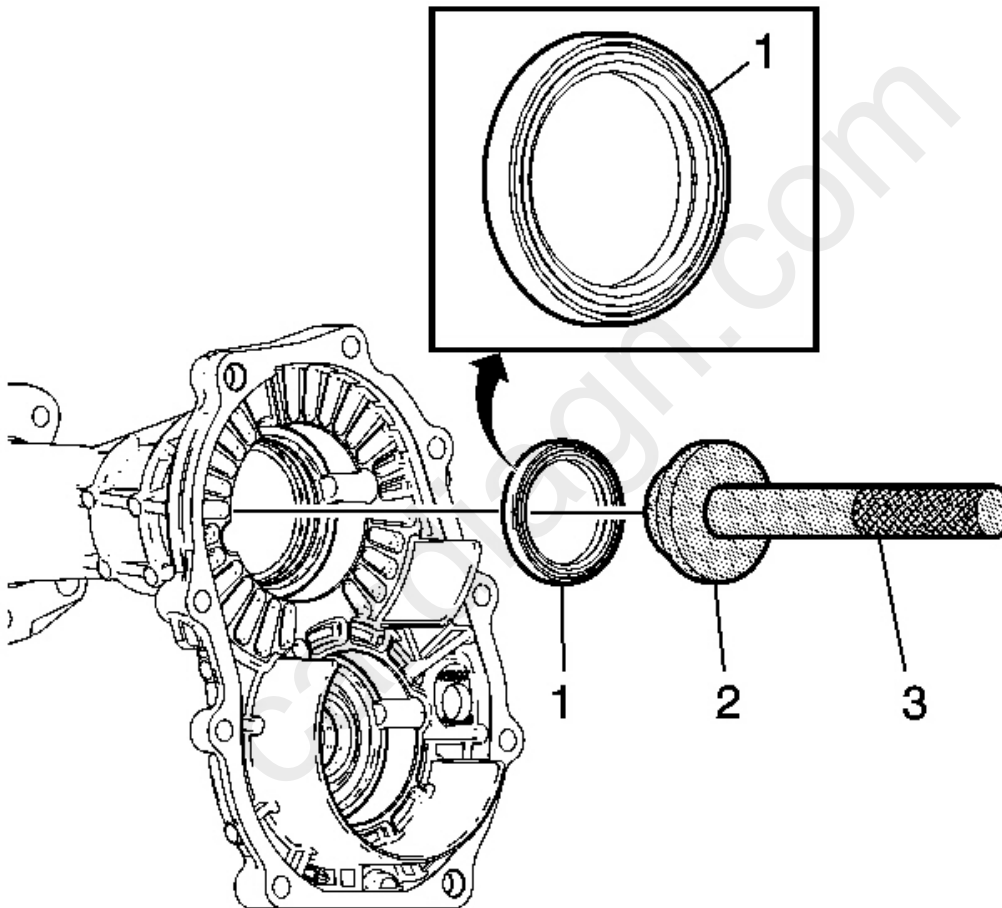


Fig. 44: View Of Intermediate Shaft Seal & Special Tool DT-4995
 Courtesy of GENERAL MOTORS CORP.

NOTE: Install the seal onto the tool so that the flat face of the seal faces away from the tool flange.

3. Install the intermediate shaft seal (1) to the rear extension housing using the **DT-4995** installer (2) and **DT-05**: remover/installer (3).

Idler Shaft Installation

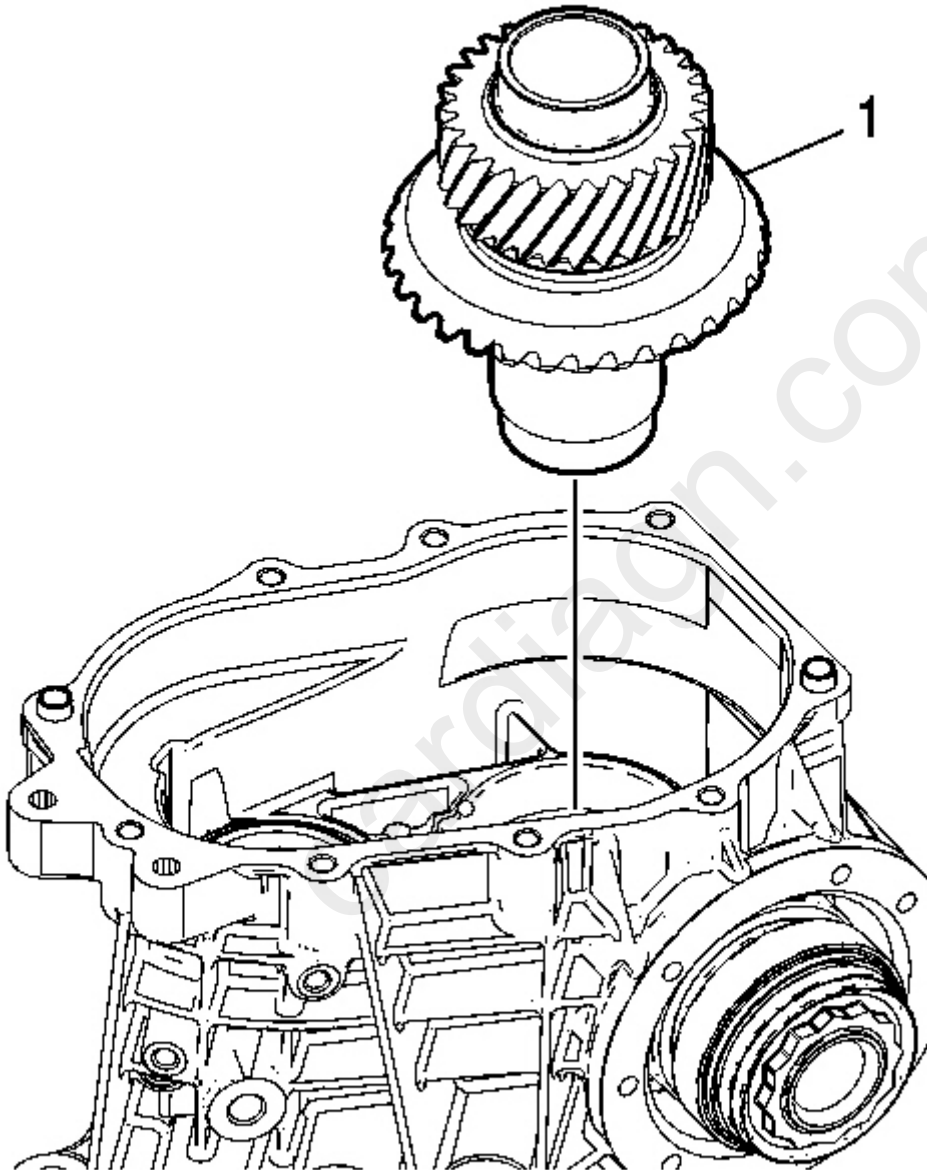


Fig. 45: View Of Idler Shaft
Courtesy of GENERAL MOTORS CORP.

Install the idler shaft (1) to the housing.

Front Wheel Drive Input Shaft Installation

Special Tools

DT-49094: Fitting Drift

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

Installation Procedure

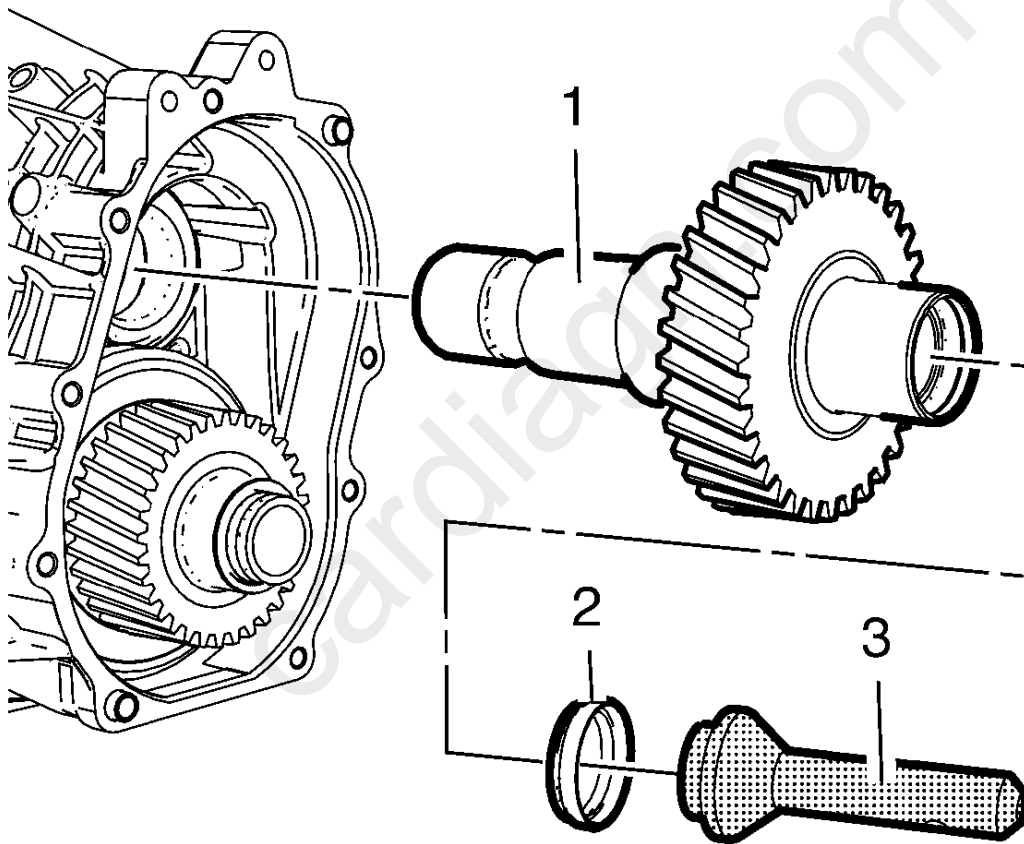


Fig. 46: View Of Front Wheel Input Shaft Seal & Special Tool DT-49094
Courtesy of GENERAL MOTORS CORP.

1. Install the front wheel input shaft seal (2), using the **DT-49094:** drift (3).
2. Install the input shaft (1) to the housing.

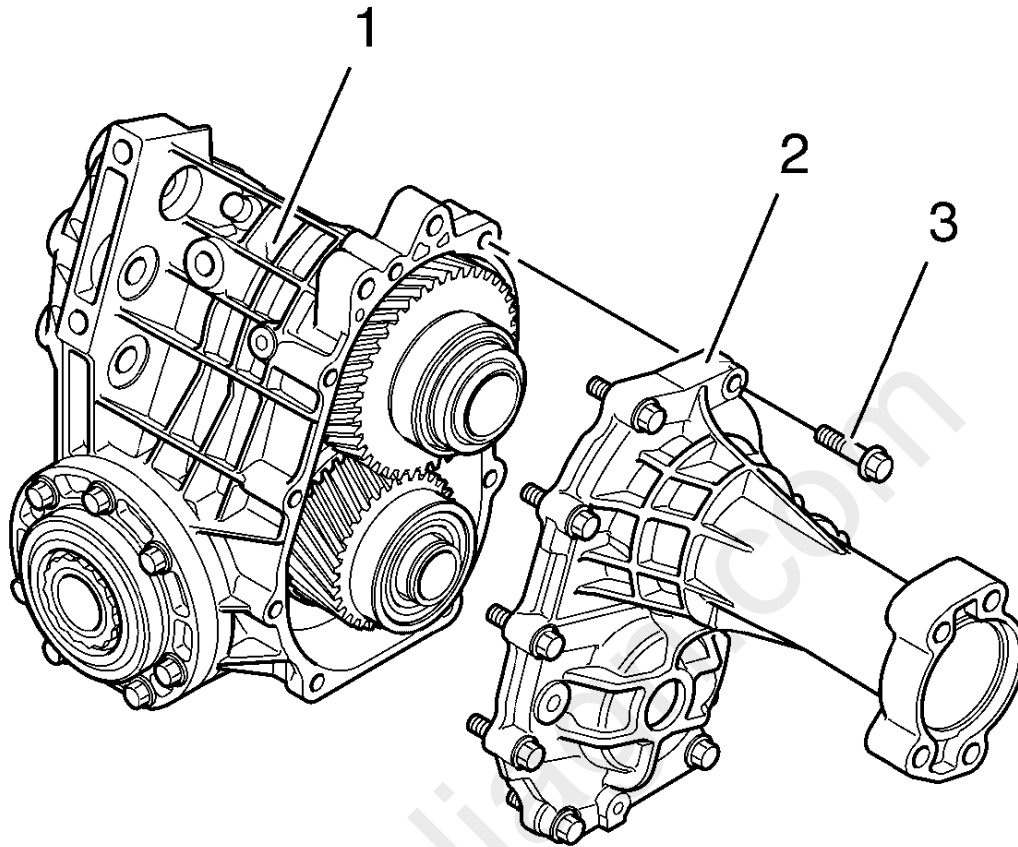


Fig. 47: View Of Transfer Case Housing & Rear Extension Housing
Courtesy of GENERAL MOTORS CORP.

3. Apply 5 mm (0.2 in) bead of RTV 61417 to the sealing surface of the transfer case housing (1). Refer to **Adhesives, Fluids, Lubricants, and Sealers**.
4. Install the rear extension housing (2) onto the transfer case housing.
5. Apply threadlock to the threads of the NEW transfer case to rear extension housing bolts (3). Refer to **Adhesives, Fluids, Lubricants, and Sealers**.

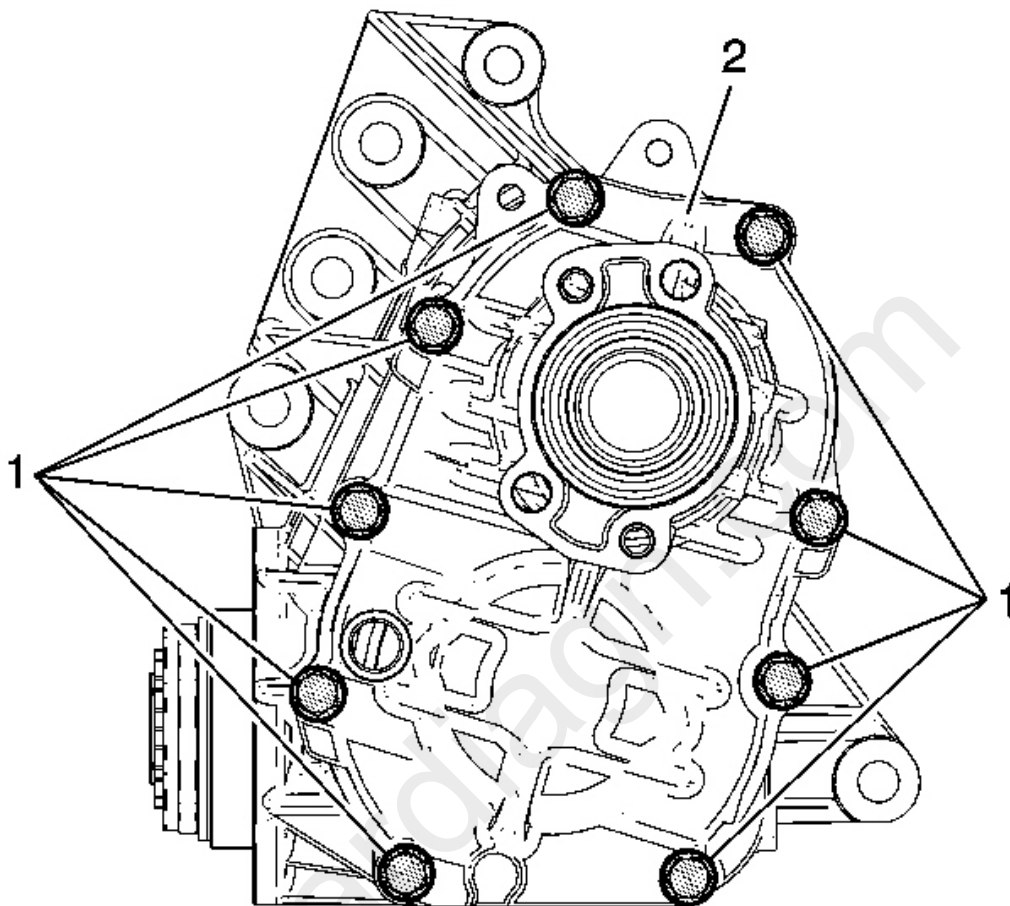


Fig. 48: Identifying Ear Extension Housing & Bolts
Courtesy of GENERAL MOTORS CORP.

CAUTION: Refer to **Fastener Caution** .

6. Install the NEW transfer case to rear extension housing bolts (1).
 1. Tighten the 10 transfer case to rear extension housing bolts (1) a first pass to 30 N.m (22 lb ft).
 2. Tighten the 10 transfer case to rear extension housing bolts (1) a second pass to 60 degrees.

Rear Output Shaft Housing Seal Installation

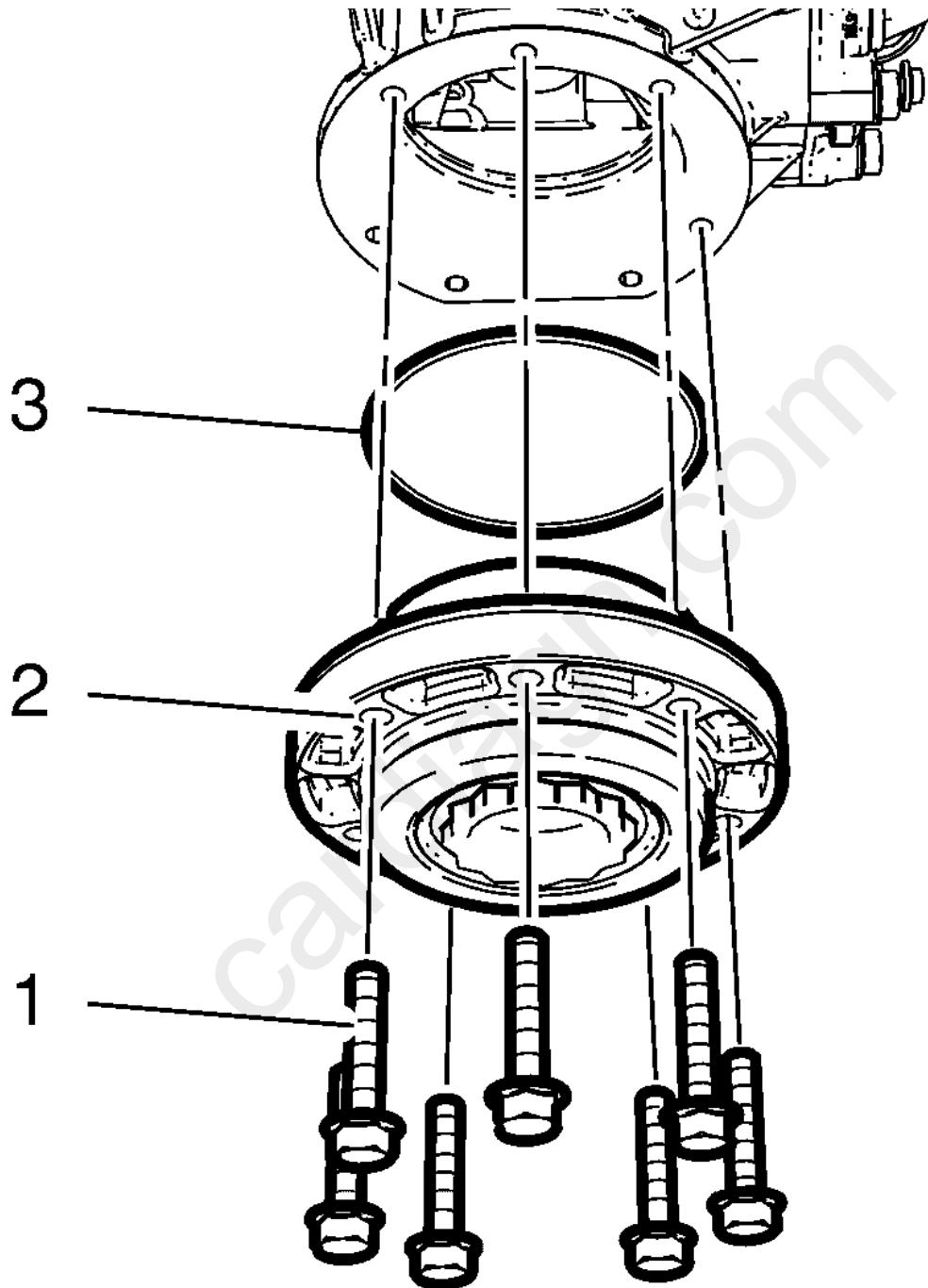


Fig. 49: View Of Rear Output Shaft Flange, Seal & Bolts
Courtesy of GENERAL MOTORS CORP.

1. Clean the transfer case rear output shaft housing bolt holes. Thread repair tool may be used to clean the threads of old threadlock material.
2. Spray thread cleaner into holes. Refer to **Adhesives, Fluids, Lubricants, and Sealers** for recommended

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cleaners.

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

3. Install the transfer case rear output shaft housing seal (3).
4. Install the transfer case rear output shaft housing (2) to the transfer case.

NOTE: Use NEW bolts.

5. Apply threadlock to the threads of the transfer case rear output shaft housing bolts (1). Refer to Adhesives, Fluids, Lubricants and Sealers for recommended thread locking material.

CAUTION: Refer to Fastener Caution.

6. Install the NEW 7 transfer case rear output shaft housing bolts (1).
 1. Tighten the NEW 7 transfer case rear output shaft housing bolts a first pass to 20 N.m (15 lb ft).
 2. Tighten the NEW 7 transfer case rear output shaft housing bolts a second pass to 30 degrees.

Rear Output Shaft Seal Installation

Special Tools

DT-909 Seal Installer

For equivalent regional special tools, refer to Special Tools.

Installation Procedure

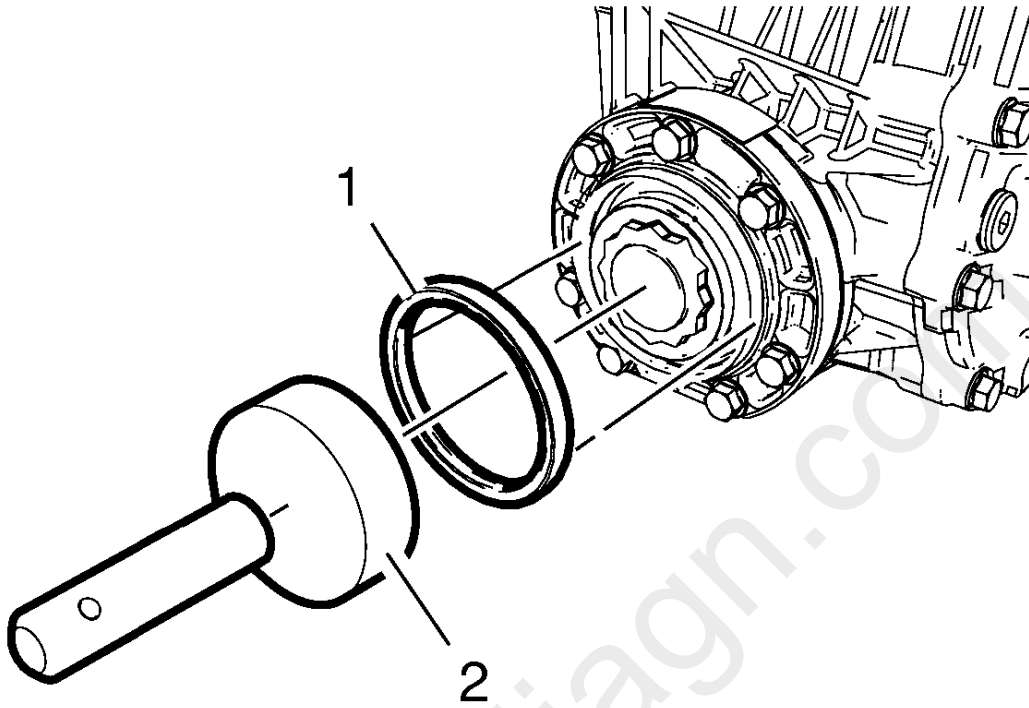


Fig. 50: View Of rear output shaft seal & Special Tool DT-909
Courtesy of GENERAL MOTORS CORP.

Install the rear output shaft seal (1), using the **DT-909** installer (2).

Rear Output Shaft Seal Dirt Deflector Installation

Special Tools

DT-9095: Fitting Drift

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

Installation Procedure

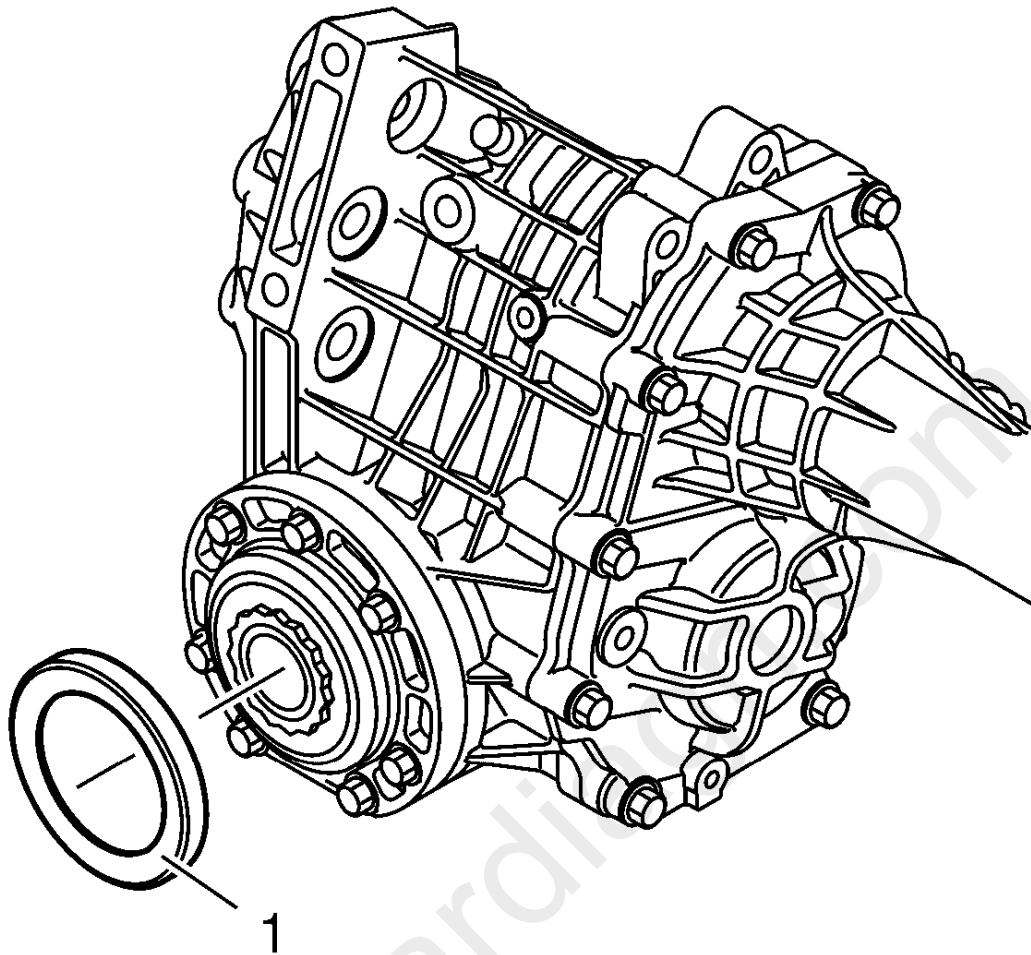


Fig. 51: Identifying Rear Output Shaft Seal Dirt Deflector
Courtesy of GENERAL MOTORS CORP.

Install the rear output shaft seal dirt deflector (1), using the **DT-9095**: drift.

Front Wheel Drive Intermediate Shaft Bearing Installation

Special Tools

DT-9092: Installing Ring

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

Installation Procedure

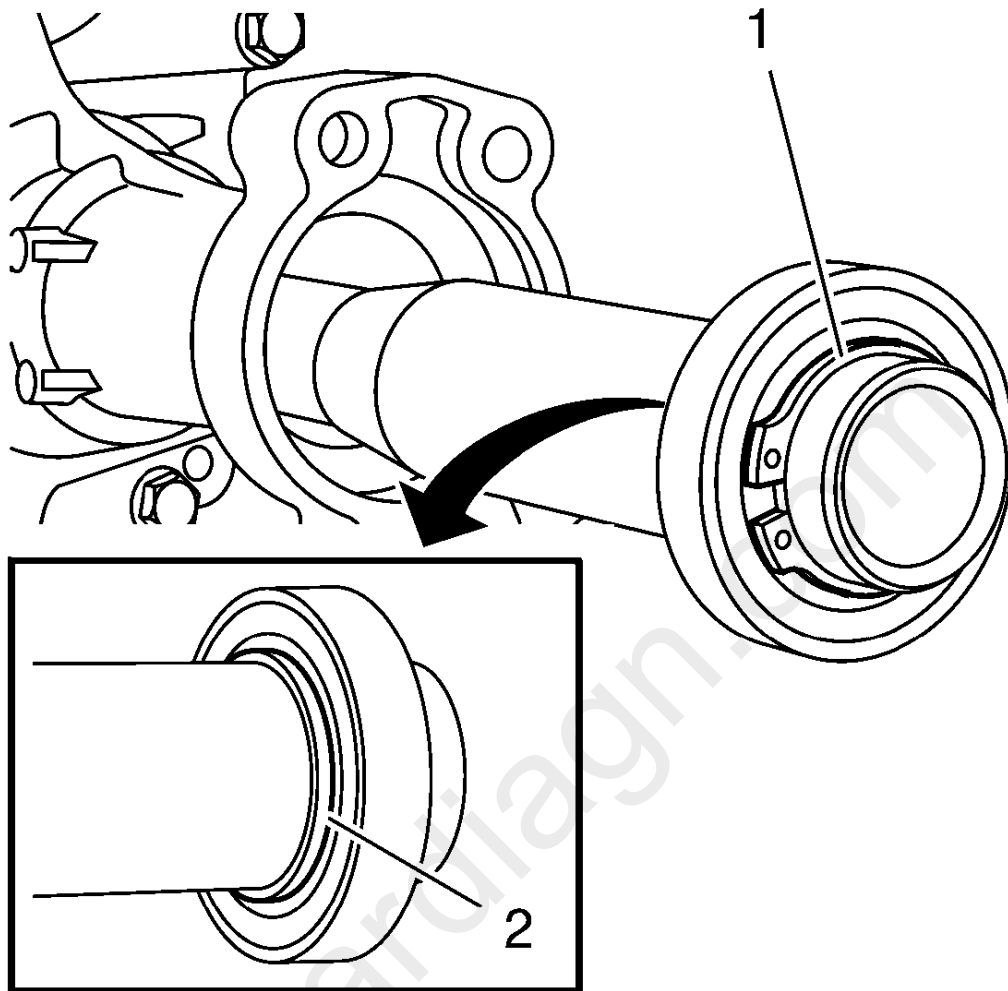


Fig. 52: Identifying Transfer Case Intermediate Gear Bearing Retaining Rings
Courtesy of GENERAL MOTORS CORP.

1. Install the transfer case intermediate shaft bearing retaining ring (2).
2. Press on the intermediate shaft bearing to the intermediate shaft, using **DT-909**: installing ring and a hydraulic press.
3. Install the transfer case intermediate shaft bearing retaining ring (1).

Front Wheel Drive Intermediate Shaft Installation

Special Tools

- **DT-112**: Bracket
- **DT-622-A**: Adapter
- **DT-910**: Fitting Drift
- **DT-910**: Protective Collar

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

Installation Procedure

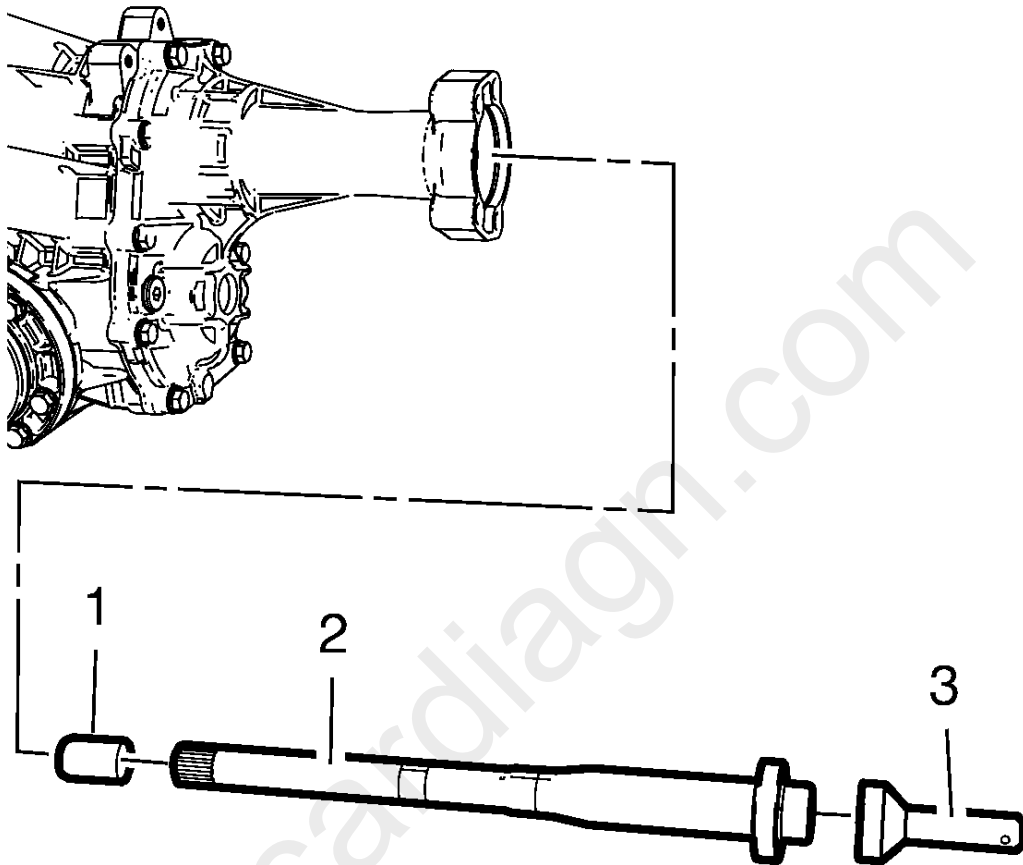


Fig. 5: Identifying Intermediate Shaft & Appropriate Special Tools

Courtesy of GENERAL MOTORS CORP.

1. Install the **DT-910** protective collar (1) to the intermediate shaft (2), and install the intermediate shaft (2) using the **DT-910** fitting drift (3) and a rubber mallet.
2. Remove the **DT-910** protective collar and apply grease to the splines of the shaft. Refer to **Adhesives** **Fluids** **Lubricants** **and Sealers** for the recommended grease.

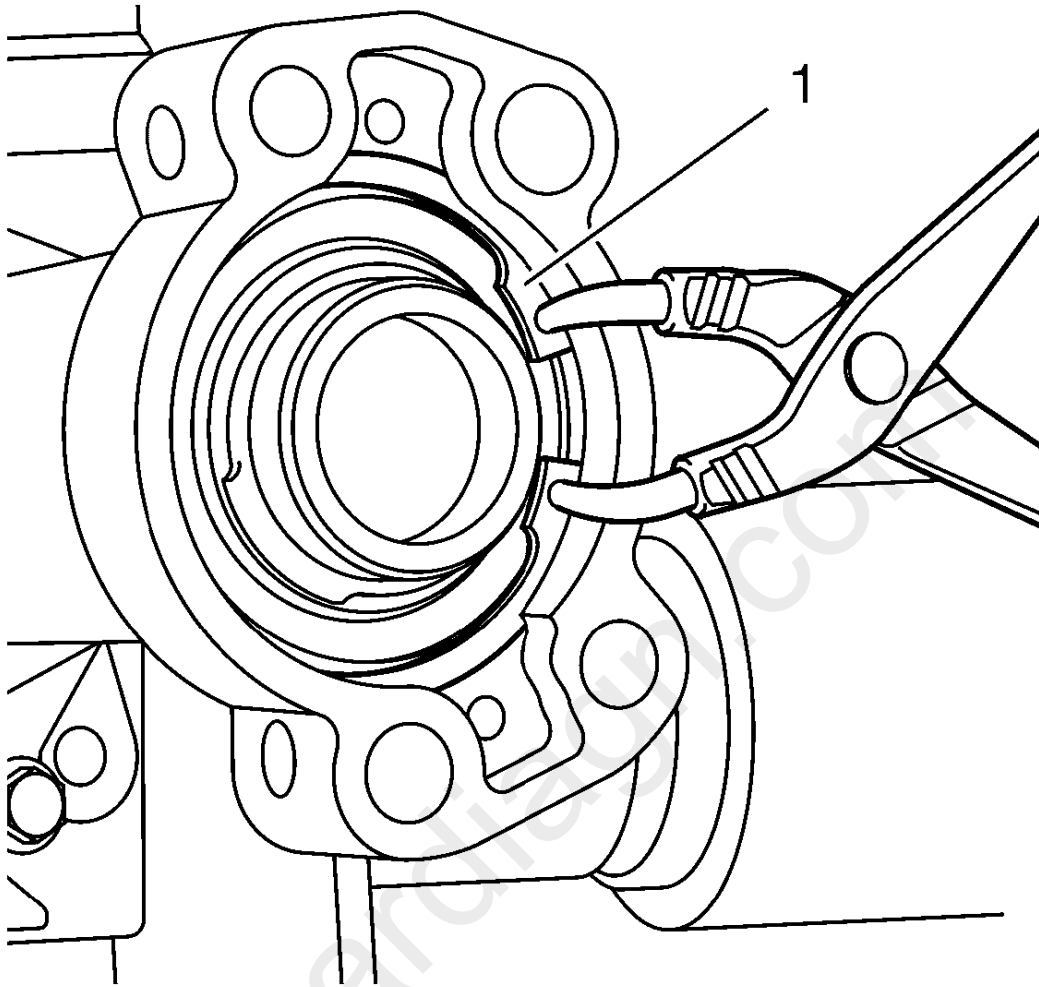


Fig. 5□ Identifying Transfer Case Intermediate Shaft Retaining Ring
Courtesy of GENERAL MOTORS CORP.

3. Install the transfer case intermediate shaft retaining ring (1).

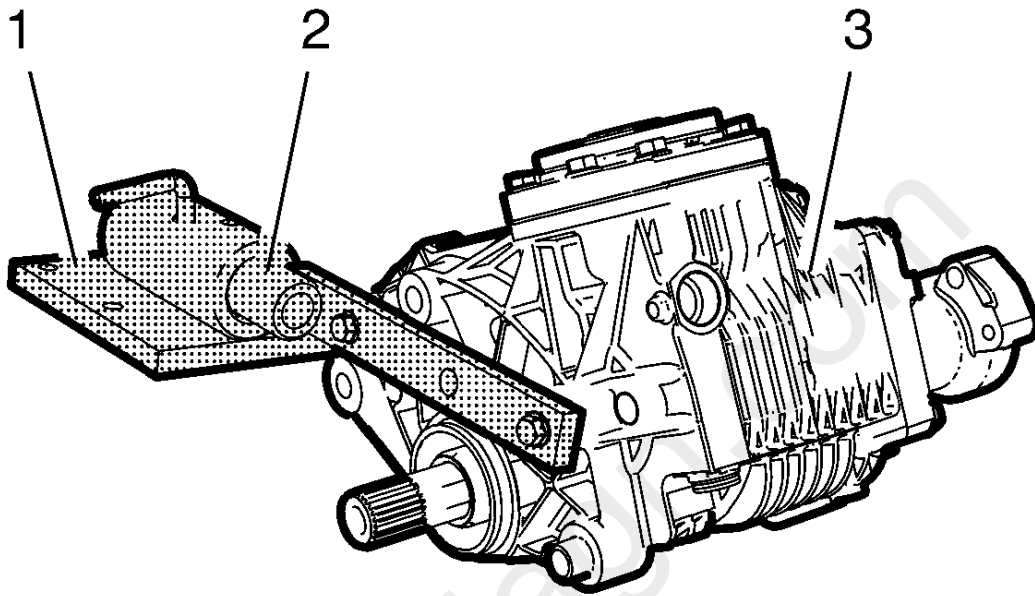


Fig. 55: Identifying Special Tools DT-11-A & DT-622-A
Courtesy of GENERAL MOTORS CORP.

4. Remove the transfer case (3) from **DT-622-A**: adapter (2) and **DT-11-A**: bracket (1).

Locating Bushing Installation

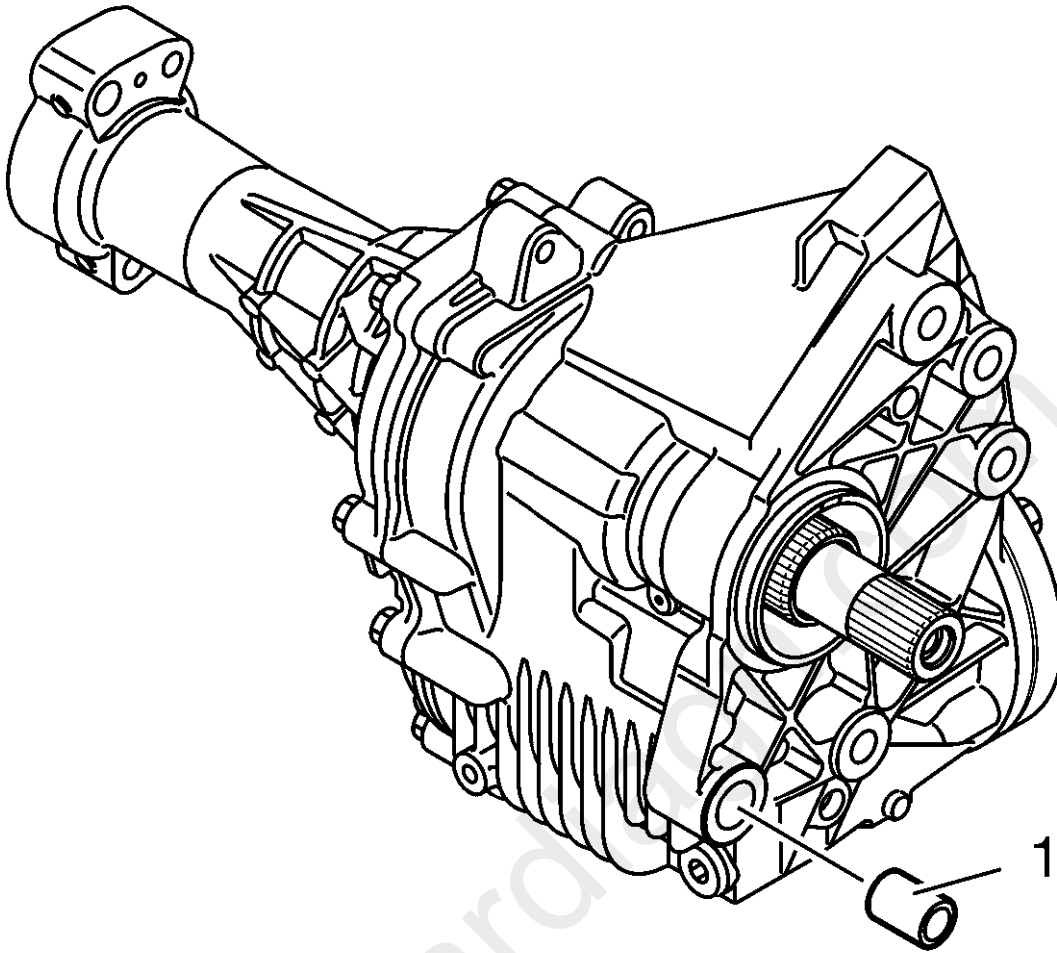


Fig. 56: View Of Transfer Case Location Bushing
Courtesy of GENERAL MOTORS CORP.

Install the transfer case locating bushing (1) as required using a rubber mallet.

Transfer Case Seal Installation

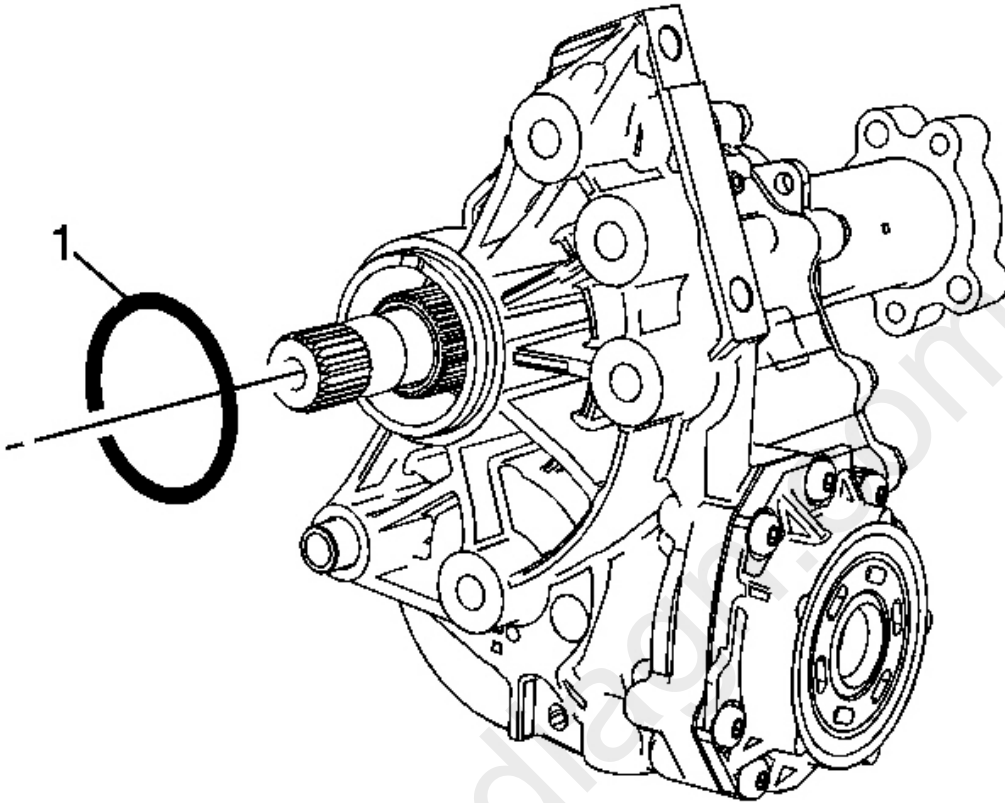


Fig. 5 □ Identifying Transfer Case-To-Transmission O-Ring
Courtesy of GENERAL MOTORS CORP.

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

Transfer Case Vent Installation

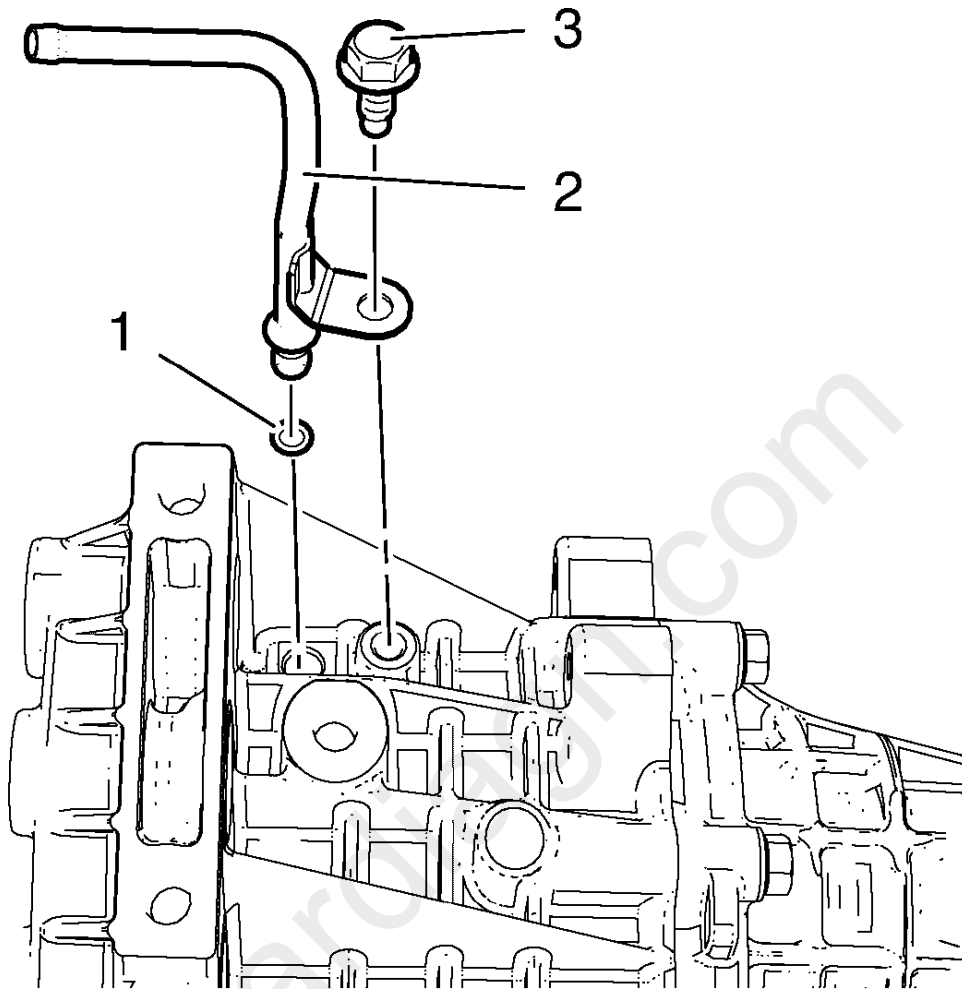


Fig. 5 Identifying Transfer Case Vent Pipe Bolt & Seal
Courtesy of GENERAL MOTORS CORP.

CAUTION: Refer to Fastener Caution .

1. Install transfer case vent pipe (2) with new seal (1) to transfer case if applicable.
2. Install transfer case vent bolt (3) and tighten to 22 N.m (17 lb ft) if applicable.

Fill Plug Installation

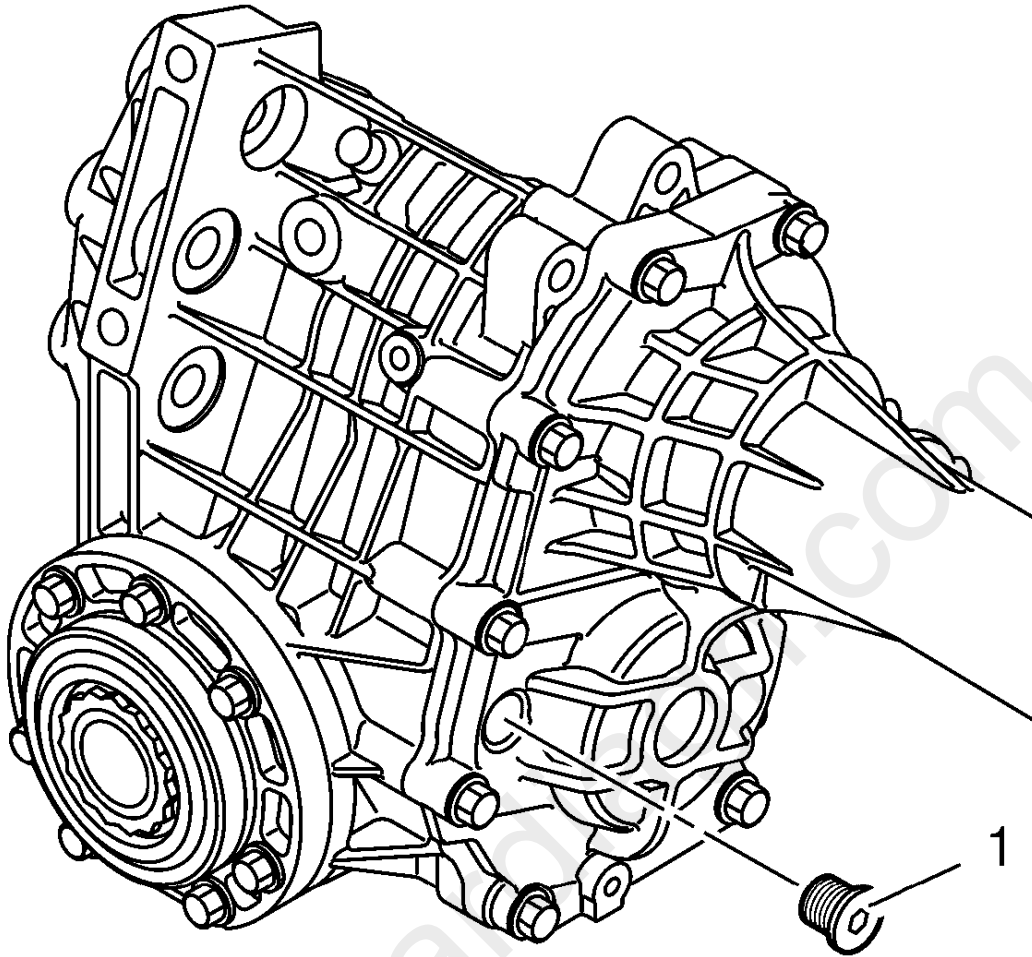


Fig. 59: Identifying Transfer Case Oil Fill Plug & Seal
Courtesy of GENERAL MOTORS CORP.

CAUTION: Refer to Fastener Caution .

Install a NEW transfer case fill plug (1) and seal and tighten to 50 N.m (37 lb ft).

Oil Drain Plug Installation

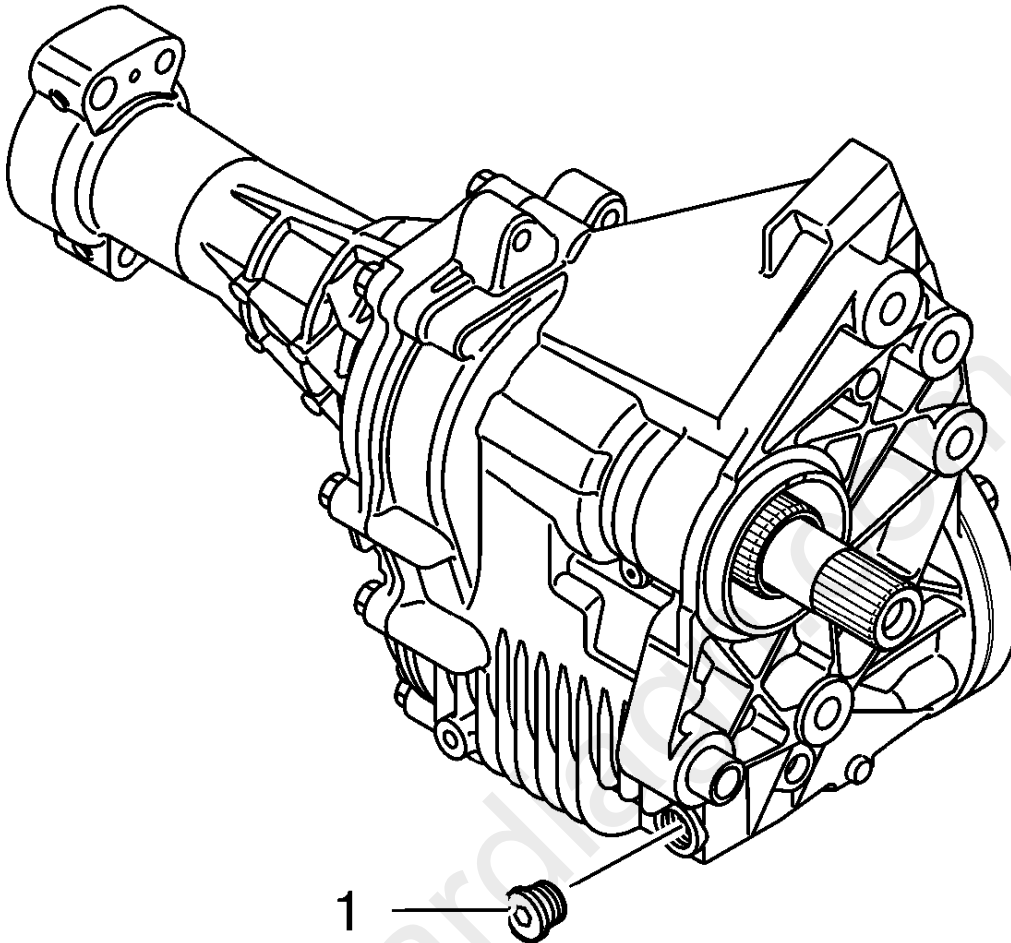


Fig. 60: Identifying Transfer Case Oil Drain Plug & Seal
Courtesy of GENERAL MOTORS CORP.

CAUTION: Refer to Fastener Caution .

Install a NEW oil drain plug (1) and seal and tighten to 50 N.m (37 lb ft).

DESCRIPTION AND OPERATION

TRANSFER CASE DESCRIPTION AND OPERATION

Transfer Case Identification

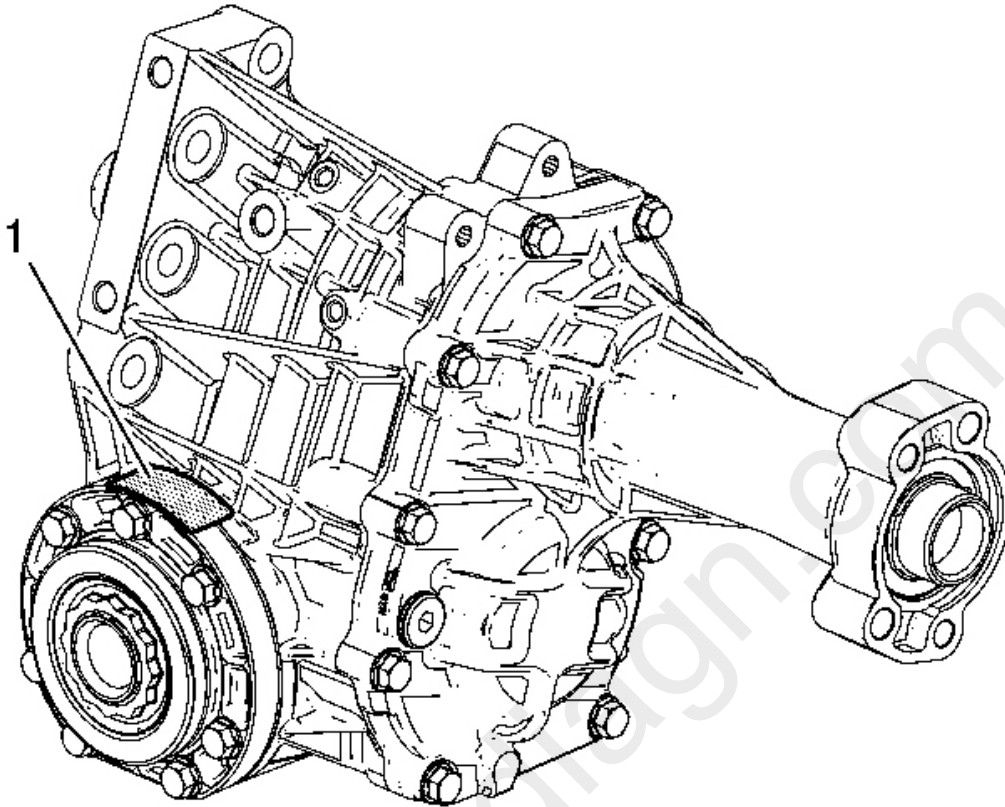


Fig. 61: View Of Transfer Case

Courtesy of GENERAL MOTORS CORP.

The build variation of transfer case can be identified by the assembly part number (1) located on the rear output shaft housing of the transfer case. Refer to the table below for additional Build Variation information.

Transfer Case Build Variations

For 2010 model year the Cadillac SRX was built with multiple versions of the transfer case. Early 2010 model year vehicles were built with either first or second design Graziano supplied assemblies. First design Graziano transfer cases have a pressed into the housing vent assembly. Second design Graziano transfer cases have a bolt-in remote vent hose assembly. Vehicles built later in 2010 model year were produced with one of two versions of the American Axle Manufacturing (AAM) supplied transfer case based on engine and transmission configuration. Both the AAM transfer cases have a press-on clamp-retained remote vent hose assembly. The table below will help you to understand the brand of transfer case and content within. It is important to understand which variation is being serviced because of the different internal and external components and service parts for each. The AAM assembly can be used to replace an earlier design Graziano assembly providing the correct ventilation components are also used.

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Transfer Case Supplier	Transfer Case Assembly Part Number	Vent Assembly/Hose Design	Engine	Transmission	Includes Idler Shaft w/O-ring seals
Graziano	Refer to electronic parts catalog	Vent assembly pressed into housing	LF1	MH4	NO
Graziano	Refer to electronic parts catalog	Bolt in with remote vent hose assembly	LF1	MH4	NO
American Axle Manufacturing (AAM)	Refer to electronic parts catalog	Non-bolt remote vent hose assembly	LAU	MXE	YES
American Axle Manufacturing (AAM)	Refer to electronic parts catalog	Non-bolt remote vent hose assembly	LF1	MH4	NO

General Transfer Case Identification

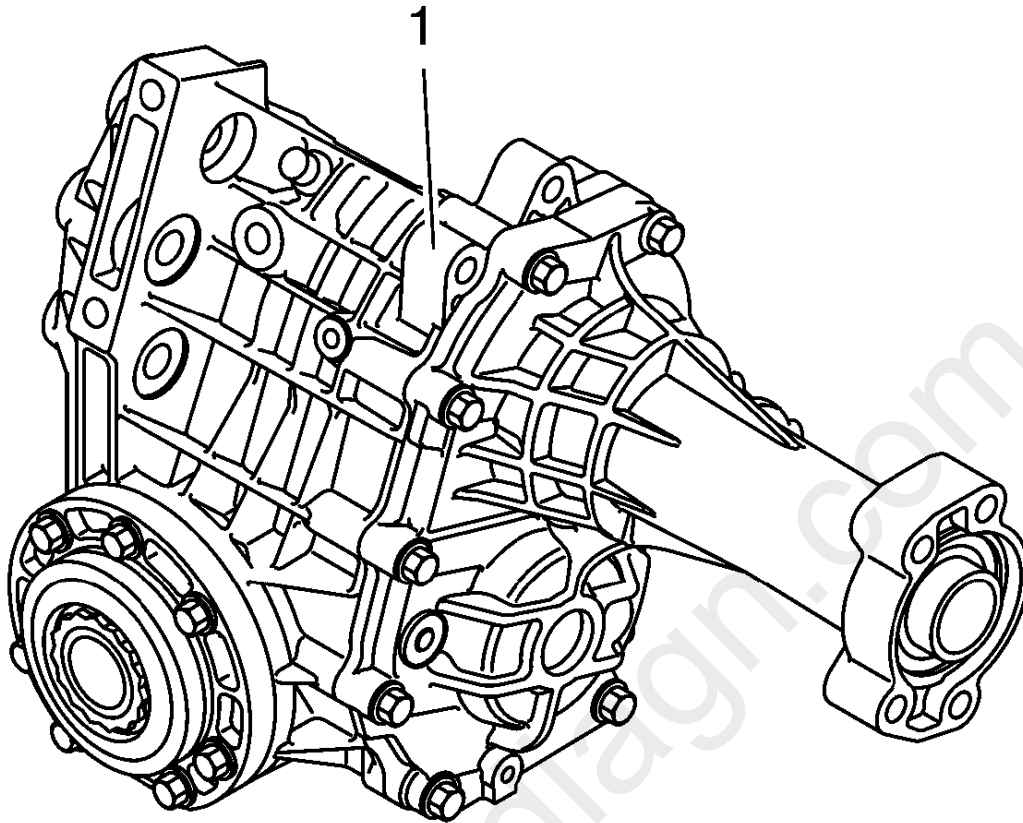


Fig. 62: View Of Transfer Case Assembly
Courtesy of GENERAL MOTORS CORP.

The transfer case (1) is positioned in the right side of the vehicle and bolted to the transmission. Its primary function is to receive power from the transmission and transfer it using helical and hypoid gear sets to the rear differential via the propeller shaft. The internal intermediate shaft transfers power to the right-side front wheel.

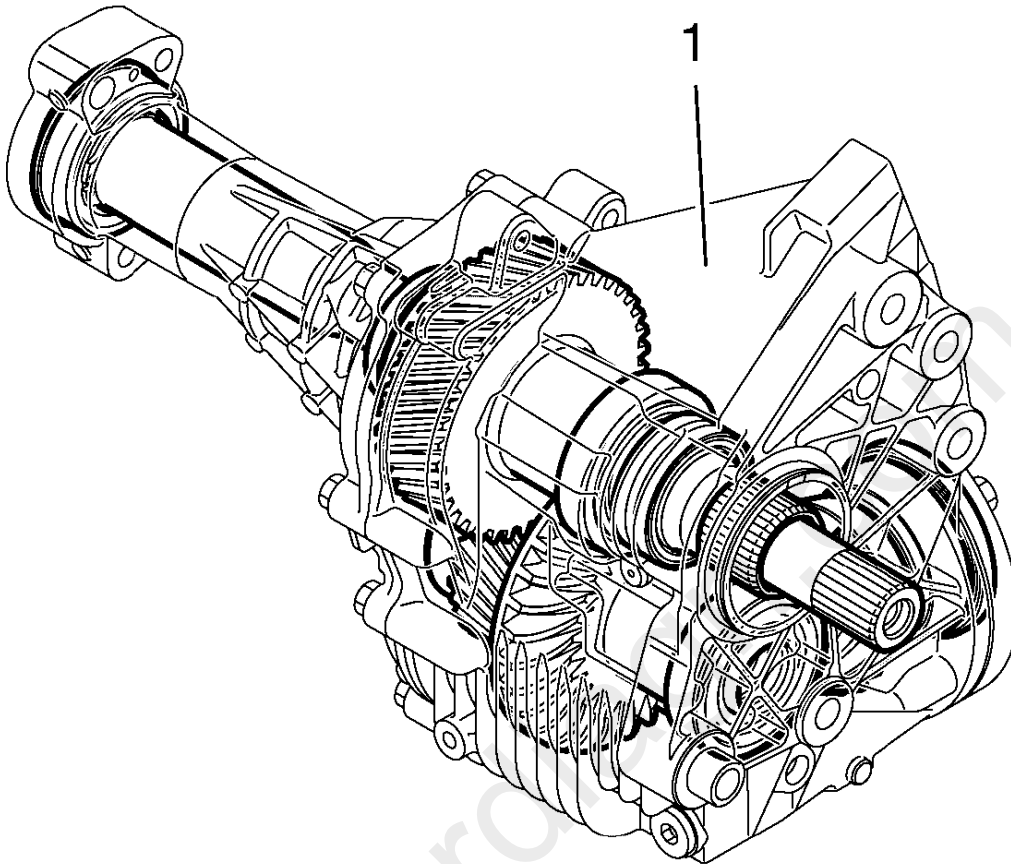


Fig. 6 **Cutaway View Of Transfer Case**
Courtesy of GENERAL MOTORS CORP.

The transfer case (1) is full mechanical and is designed to transfer torque to the rear wheels. The transfer case contains four shafts for torque transfer. The input shaft transfers torque to the secondary or idler shaft. The idler shaft transfers torque and change in rotational direction to the pinion or rear output shaft. The intermediate shaft transfers torque to the right front wheel. The transfer case is sealed and the gears operate in hypoid lube.

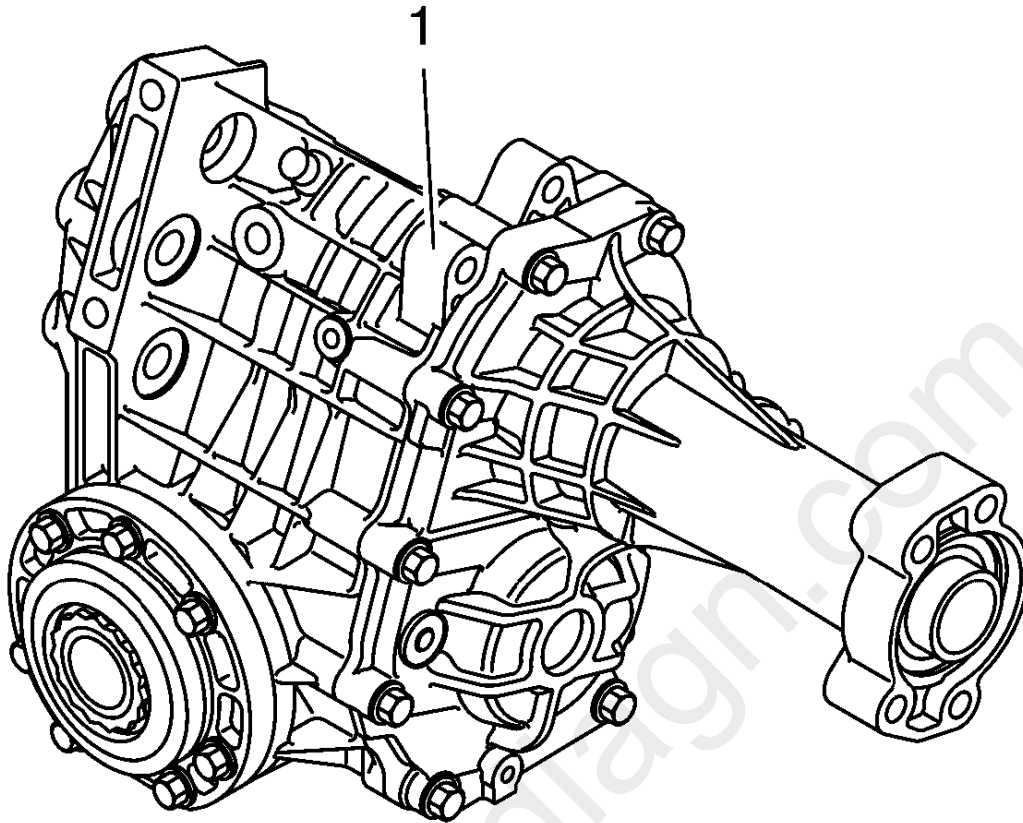


Fig. 6: View Of Transfer Case Assembly
Courtesy of GENERAL MOTORS CORP.

During manufacture the transfer case (1) is filled with oil, which then does not require service interval replacement. The correct type of oil must be used without exception when filling. The incorrect type of oil could lead to transfer case damage. Refer to **Adhesives, Fluids, Lubricants, and Sealers**.

Housing and Cover

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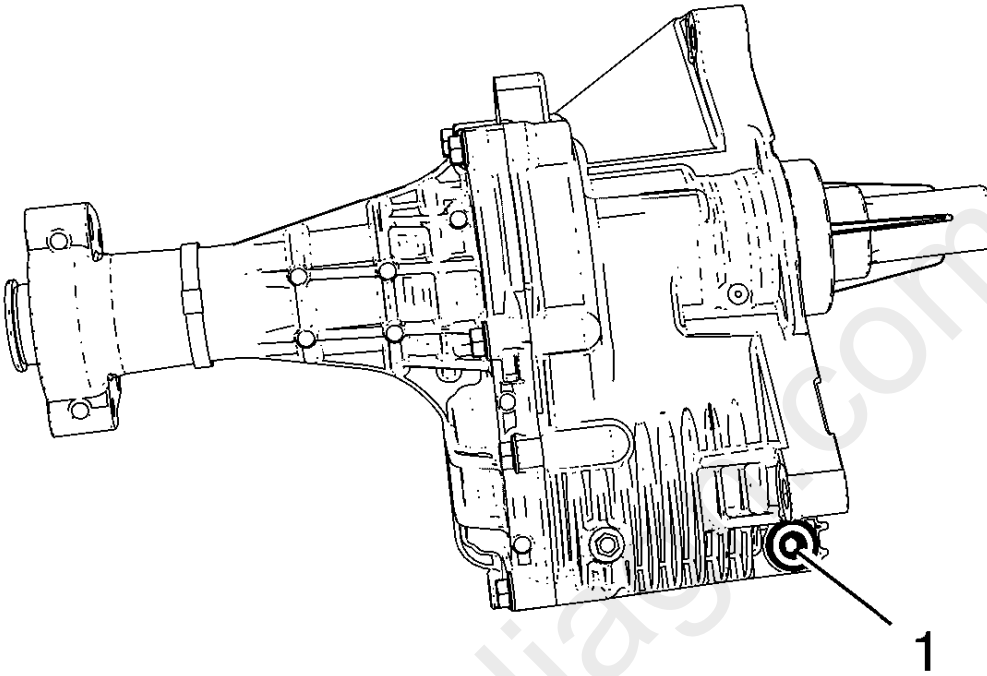


Fig. 6 Locating Transfer Case Oil Drain Plug
Courtesy of GENERAL MOTORS CORP.

The transfer case oil drain plug (1) is located at the front of the assembly.

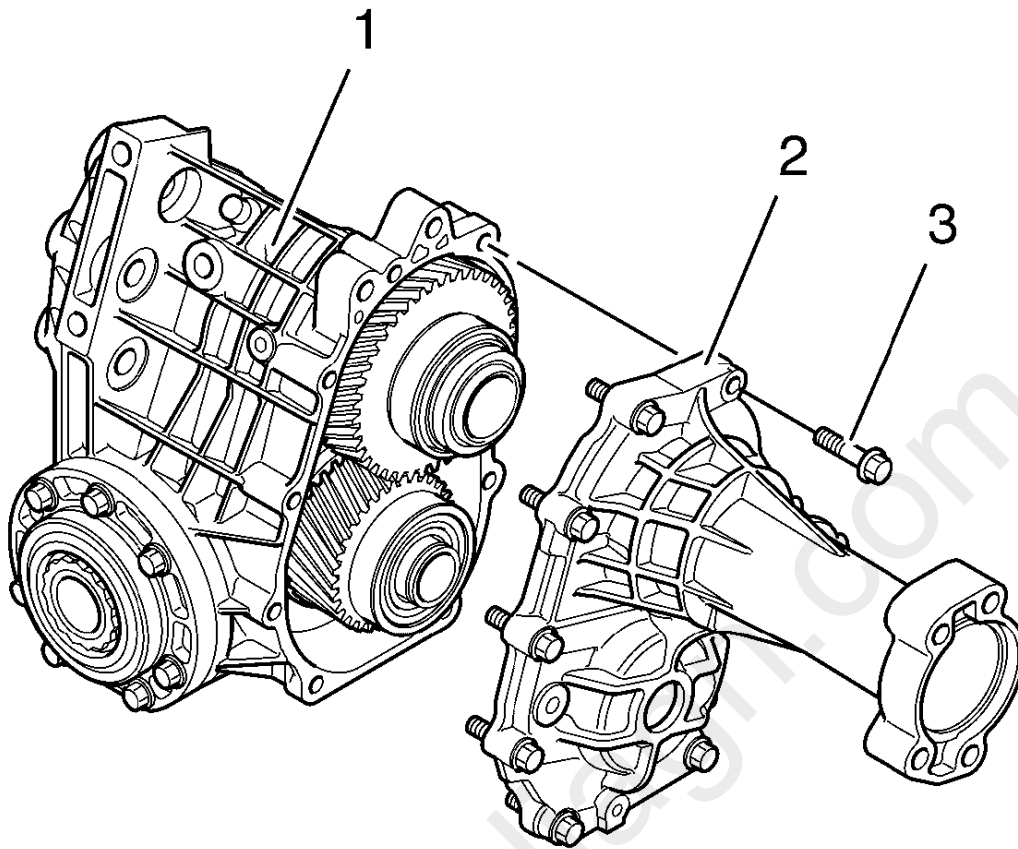


Fig. 66: View Of Transfer Case Housing & Rear Extension Housing
Courtesy of GENERAL MOTORS CORP.

The transfer case housing (1) and rear extension housing (2) are produced from a high-pressure cast aluminum alloy. A number of reinforcement ribs are fitted in suitable locations to strengthen the components. These reinforcement ribs constitute a vital part of the cooling for the transfer case. The transfer case rear extension housing is retained to the transfer case housing with bolts (3). Two dowel pins locate the rear extension housing to the transfer case housing. The mating surfaces of transfer case housing and rear extension housing are sealed with RTV type sealant.

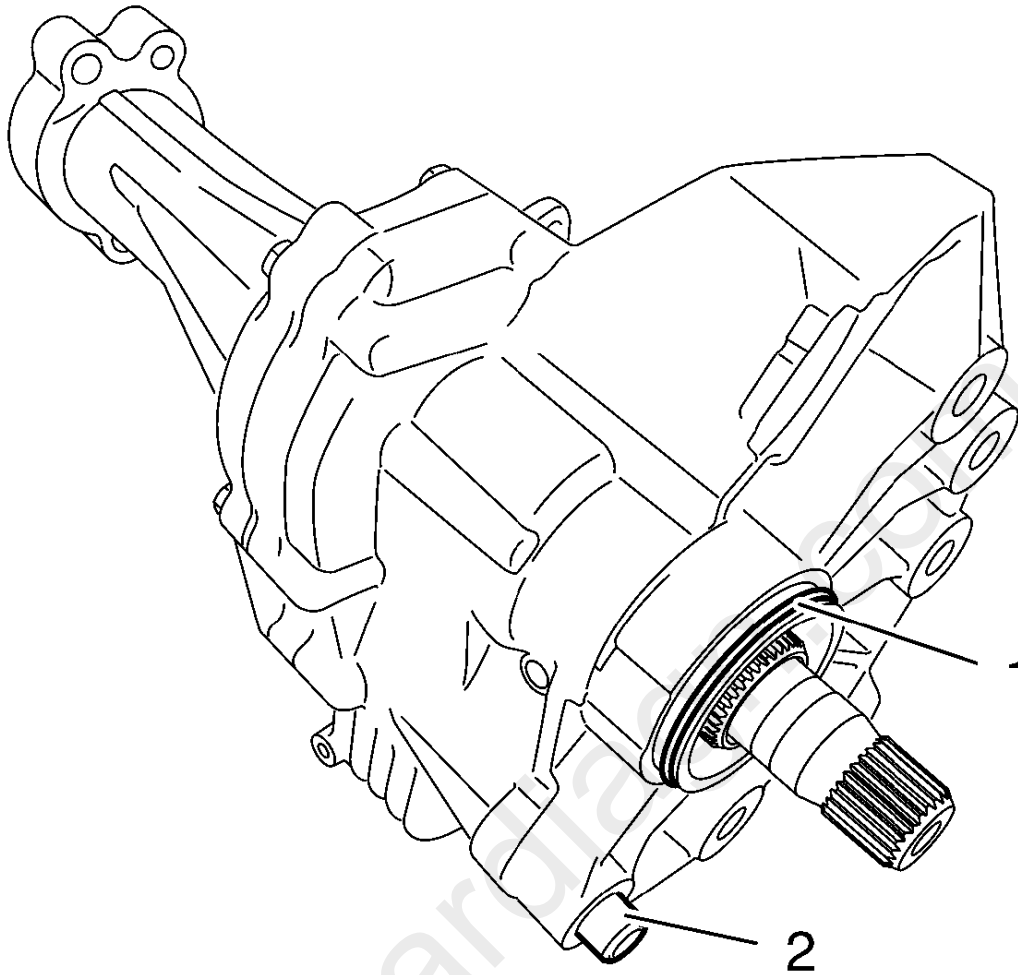


Fig. 67: Identifying Transfer Case Locating Bushing
Courtesy of GENERAL MOTORS CORP.

The transfer case assembly is bolted to the transmission with four transfer case bolts. The locating bushing (2) on the transfer case housing ensures correct installation position. The sealing area between the transfer case housing and the transmission is sealed with serviceable O-ring (1). Two opposite radial seals seal the input shaft, and there is a weep hole in the transfer case housing between the radial seals.

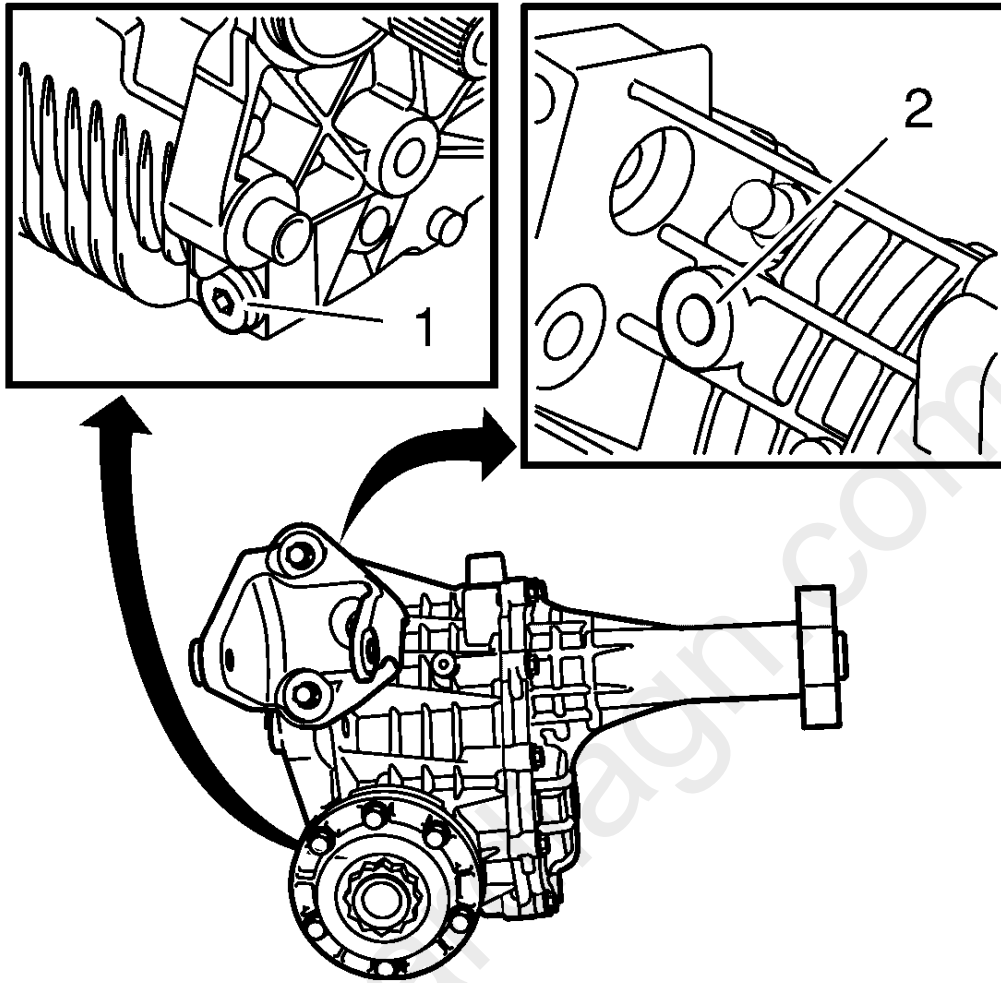


Fig. 68: Locating Transfer Case Vent & Drain Plug
Courtesy of GENERAL MOTORS CORP.

A transfer case vent (2) is located on the top area of the transfer case housing. First design Graziano transfer cases have a pressed into the housing vent assembly. Second design Graziano transfer cases have a bolt-in remote vent hose assembly. Second design vent hose assemblies are routed to vent into the engine compartment. The oil drain plug (1) is magnetic. A mounting bracket retains the output end of the rear extension housing to the engine assembly.

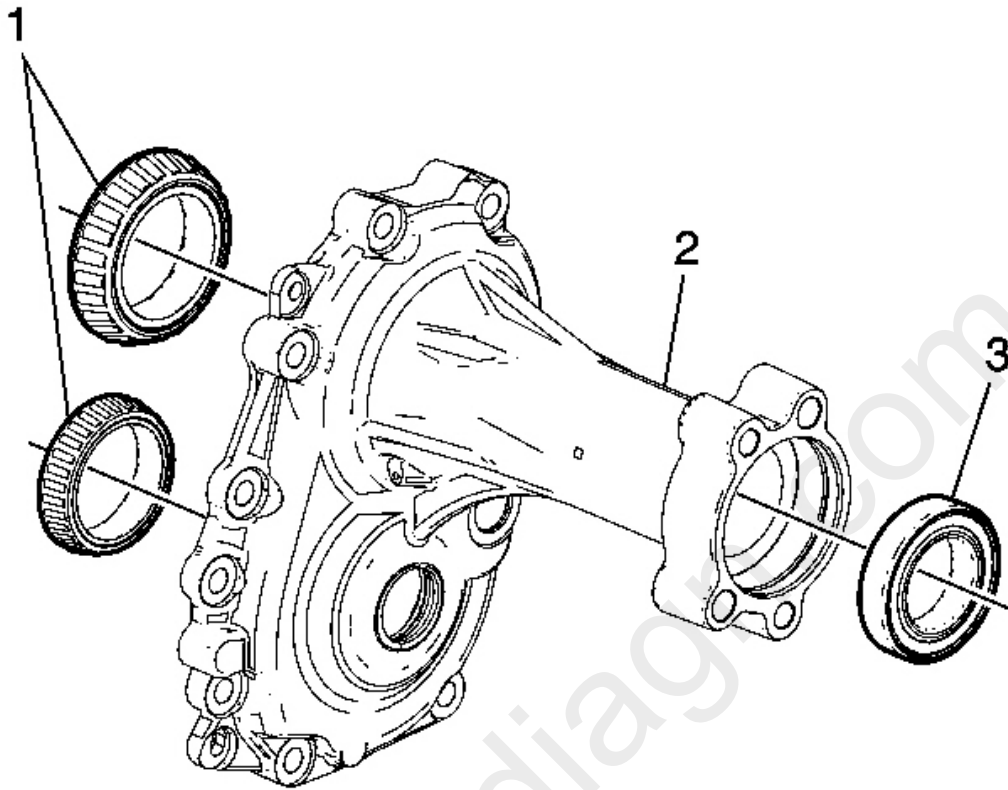


Fig. 69: Identifying Extension Housing, Input & Idler Shafts
Courtesy of GENERAL MOTORS CORP.

The input and idler shafts are supported by tapered bearings (1). The bearing races are located in the transfer case housing and rear extension housing (2). Behind the bearing races are shims to provide the correct bearing preload.

The intermediate shaft is supported within the rear extension housing by a single-row sealed ball type bearing (3). The bearing is retained to the intermediate shaft via retaining rings.

The rear extension housing serves partially as a holder for the intermediate shaft bearing (3) and also as an attachment point for the transfer case to the engine.

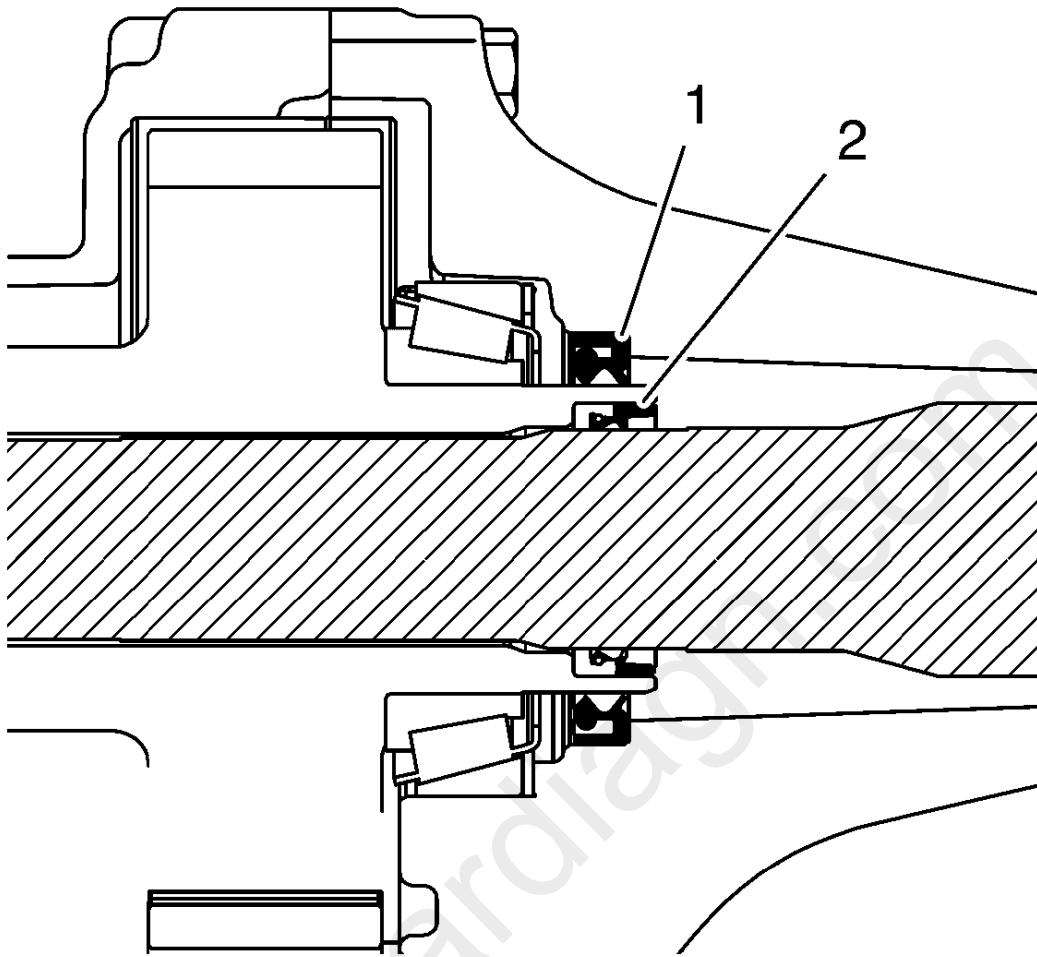


Fig. 70: Identifying Rear Extension Housing Seal
Courtesy of GENERAL MOTORS CORP.

A single lip type radial seal (1) is fitted in the rear extension housing at the input shaft to ensure oil from the transfer case does not seep out of the rear extension housing. The intermediate shaft seal (2) is located in the end of the input shaft.

Input Shaft

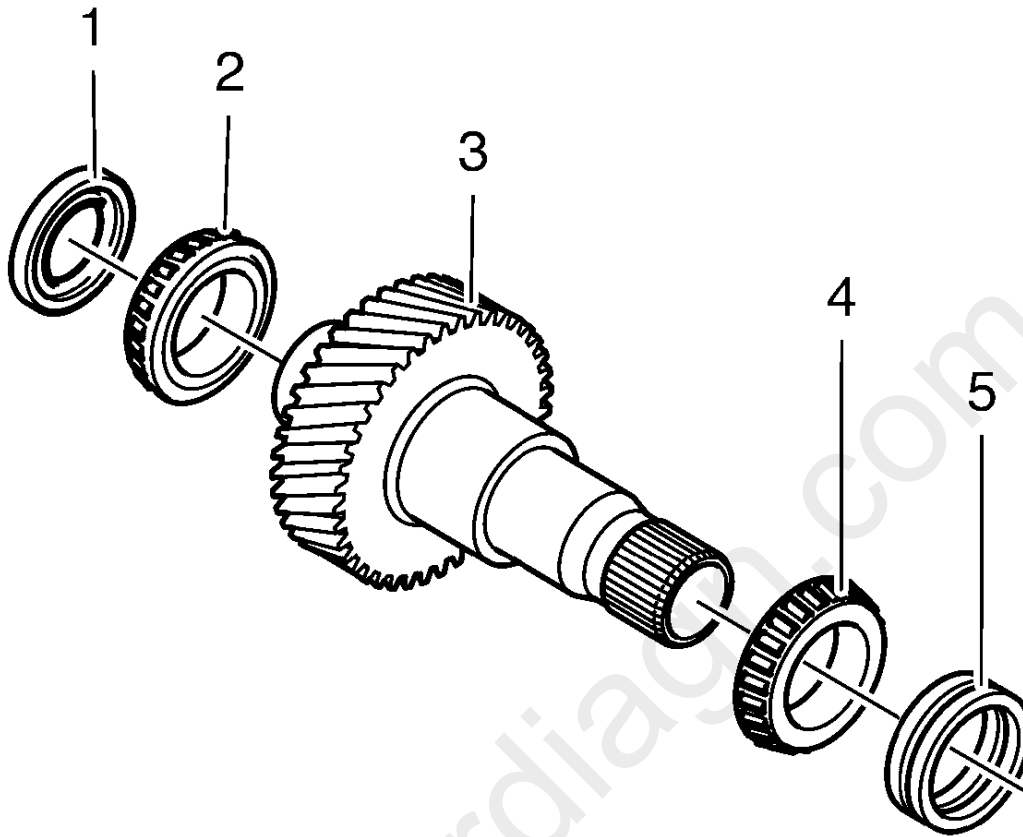


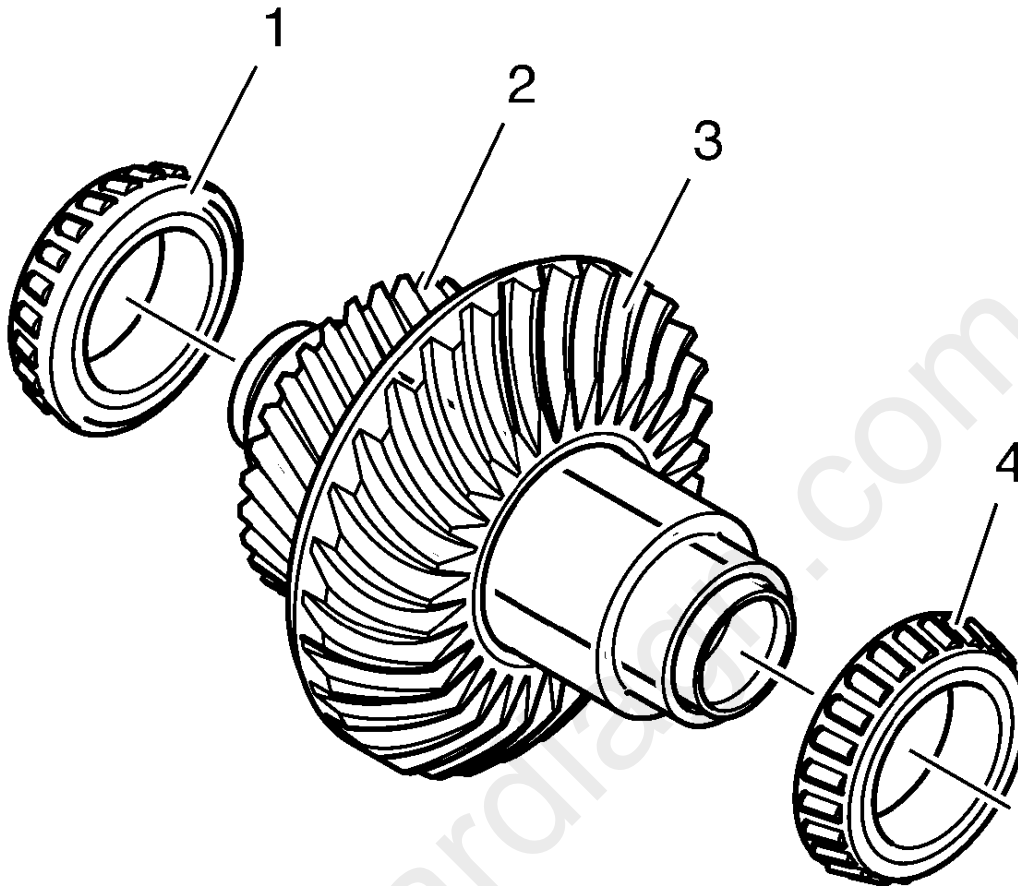
Fig. 71: View Of Input Shaft & Components
Courtesy of GENERAL MOTORS CORP.

The function of the input shaft (3) is to transfer power from the transfer case. In one end the shaft is equipped with splines which are inserted into the transmission differential housing. The rotational speed of the input shaft is the same as the transmission output. Fitted in the transfer case housing are two opposite radial seals (5). The two input shaft seals are designed to restrict transmission oil from entering the transfer case as well as restrict transfer case oil from entering the transmission.

The opposite end of the input shaft is sealed by a single-lip seal that is installed into the rear extension housing. A second seal—the intermediate shaft seal is installed into the rear end of the input shaft. The intermediate shaft seal is designed to keep transmission and transfer case oil from mixing together.

The helical gear teeth of the input shaft are engaged to the helical gear teeth of the idler shaft.

The input shaft is mounted in two tapered roller bearings (2 & 4). The bearings are given the correct preload at manufacture by means of shims fitted behind the bearing races in the housing and cover.

Idler Shaft**Fig. 72: View Of Idler Shaft**

Courtesy of GENERAL MOTORS CORP.

The idler shaft is located under the input shaft and is driven by the helical gear (2) on the input shaft. The idler shaft has a relatively large diameter and is hollow.

The idler shaft consists of a helical gear (2) and a hypoid gear (3). The helical gear is driven by the helical gear of the input shaft. The idler shaft hypoid gear (3) mates to the hypoid gear on the rear output shaft.

The idler shaft is mounted in two tapered roller bearings (1 & 4). The bearings are given the correct preload at manufacture by means of shims being fitted behind the bearing races in housing and cover.

Rear Output Shaft Flange

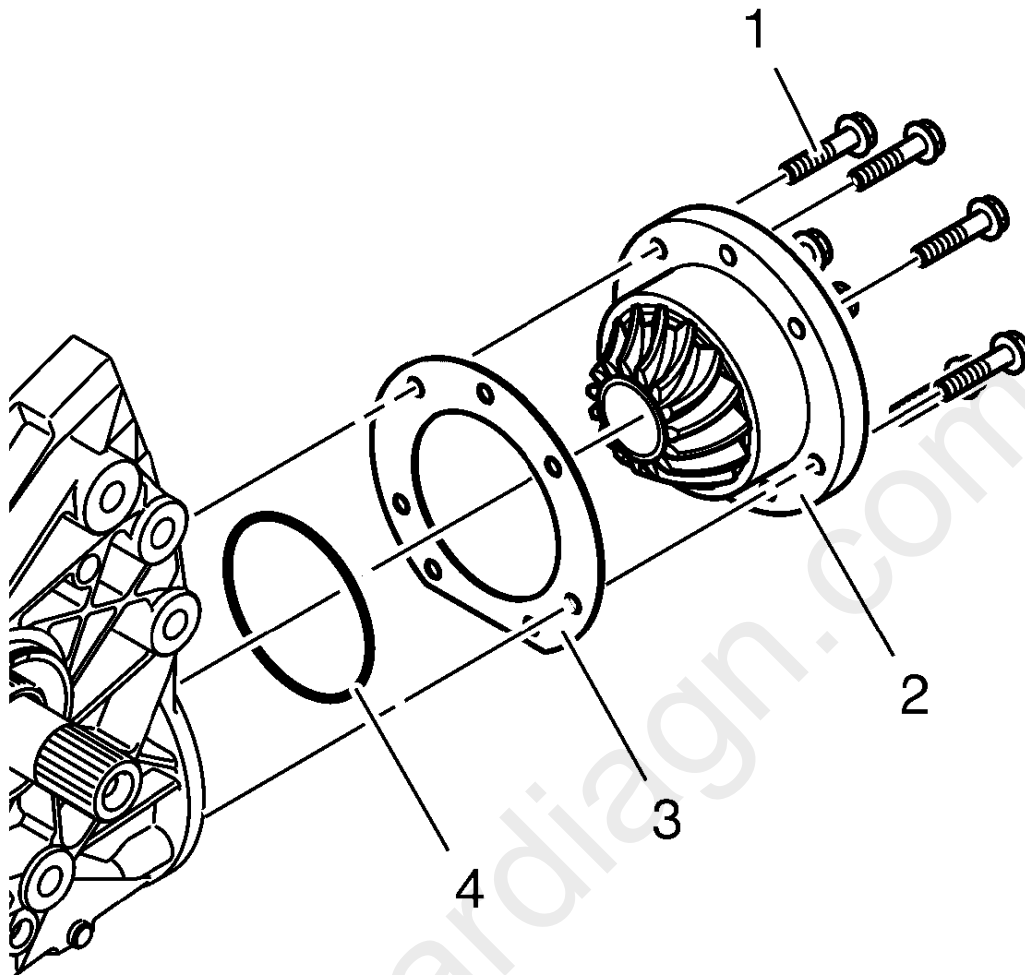


Fig. 73: View Of Rear Output Shaft Flange

Courtesy of GENERAL MOTORS CORP.

The rear output shaft housing (2) is bolted to the transfer case housing with 7 bolts (1) and is sealed to the transfer case housing with a serviceable O-ring (4) seal. A shim (3) adjusts the rear output shaft helical gear to the helical gear of the idler shaft. The rear output shaft flange is hollow and is equipped with internal splines. The splines of the propeller shaft are mated to the rear output shaft. The spline of the propeller shaft is equipped with a spring-loaded retaining ring which retains the propeller shaft in the rear output shaft flange.

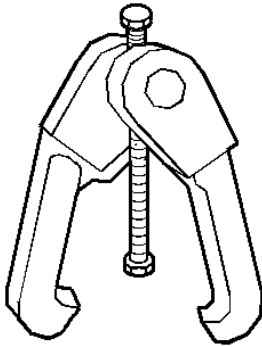
SPECIAL TOOLS AND EQUIPMENT

SPECIAL TOOLS

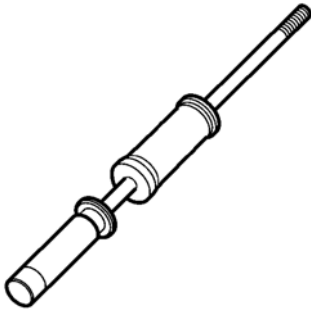
Illustration	Tool Number/Description

2010 Cadillac SRX

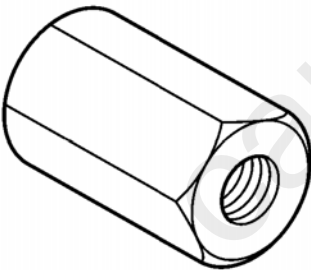
2010 TRANSMISSION Transfer Case - Graziano-F46 - SRX



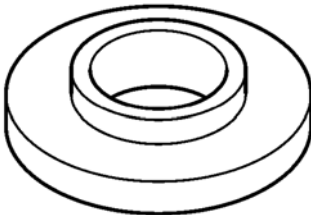
DT-113-2
KM-113-2
Bracket



DT-8390270
83 90 270
Sliding Hammer



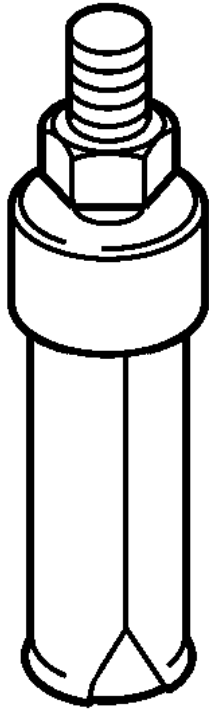
DT-8792319
87 92 319
Adapter 3/8"-M10



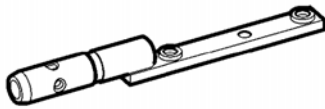
DT-8790982
87 90 982
Installing Ring

2010 Cadillac SRX

2010 TRANSMISSION Transfer Case - Graziano-F46 - SRX



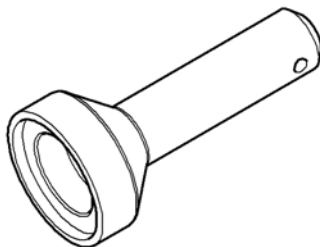
DT-599
MKM-599
87 92 939
Bearing Puller



DT-622-A
KM-622-A
Holder



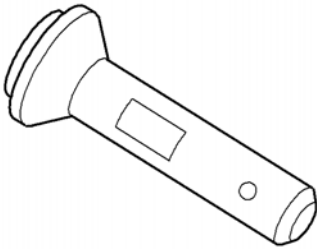
DT 49095
Fitting Drift



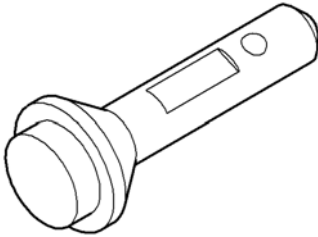
DT-49103
Fitting Drift

2010 Cadillac SRX

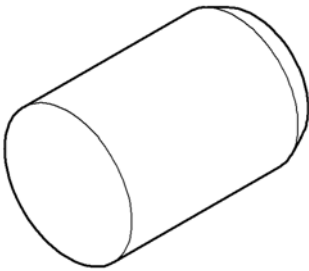
2010 TRANSMISSION Transfer Case - Graziano-F46 - SRX



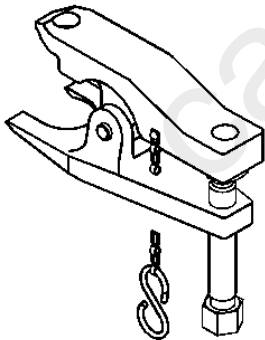
DT-49093
Fitting Drift



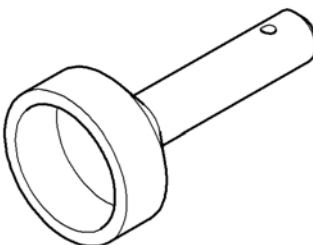
DT-49094
Fitting Drift



DT-49104
Protective Collar



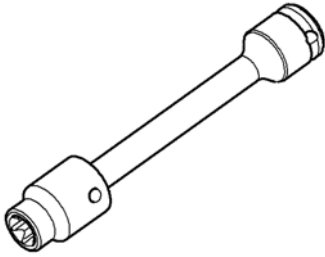
DT-307-B
KM-307-B
Remover Plate



DT-49097
Seal Installer

2010 Cadillac SRX

2010 TRANSMISSION Transfer Case - Graziano-F46 - SRX



DT-32025063
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