

2010 Transmission

Transfer Case - Getrag 760 - Equinox & Terrain

SPECIFICATIONS

APPROXIMATE FLUID CAPACITIES

Application	Specification	
	Metric	English
Synthetic Lubricant - Transfer Case	1.0 liter	1.06 quart

FASTENER TIGHTENING SPECIFICATIONS

Application	Specification	
	Metric	English
Transfer Case Bracket-to-Engine Bolt - Hole 4	50 N.m	37 lb ft
Transfer Case Bracket-to-Engine Bolts - Holes 1, 2, and 3	23 N.m	17 lb ft
Transfer Case Bracket-to-Transfer Case Bolts - Holes 5 and 6	50 N.m	37 lb ft
Transfer Case Drain Plug	39 N.m	29 lb ft
Transfer Case Fill Plug	39 N.m	29 lb ft
Transfer Case Half Bolts (Qty: 12)	29 N.m	21 lb ft
Transfer Case Heat Shield Bolts (Qty: 3)	11 N.m	97 lb in
Transfer Case Rear Output Drive Gear Nut (Qty: 1)	235 N.m	173 lb ft
Transfer Case Rear Output Drive Shaft Housing Bolts (Qty: 6)	29 N.m	21 lb ft

ADHESIVES, FLUIDS, LUBRICANTS, AND SEALERS

Application	Type of Material	GM Part Number	
		United States	Canada
Rear Output Shaft Nut	Retaining Compound	12345382	10953489
Transfer Case Fill	Synthetic Lubricant	89021677	89021678

COMPONENT LOCATOR

TRANSFER CASE DISASSEMBLED VIEW

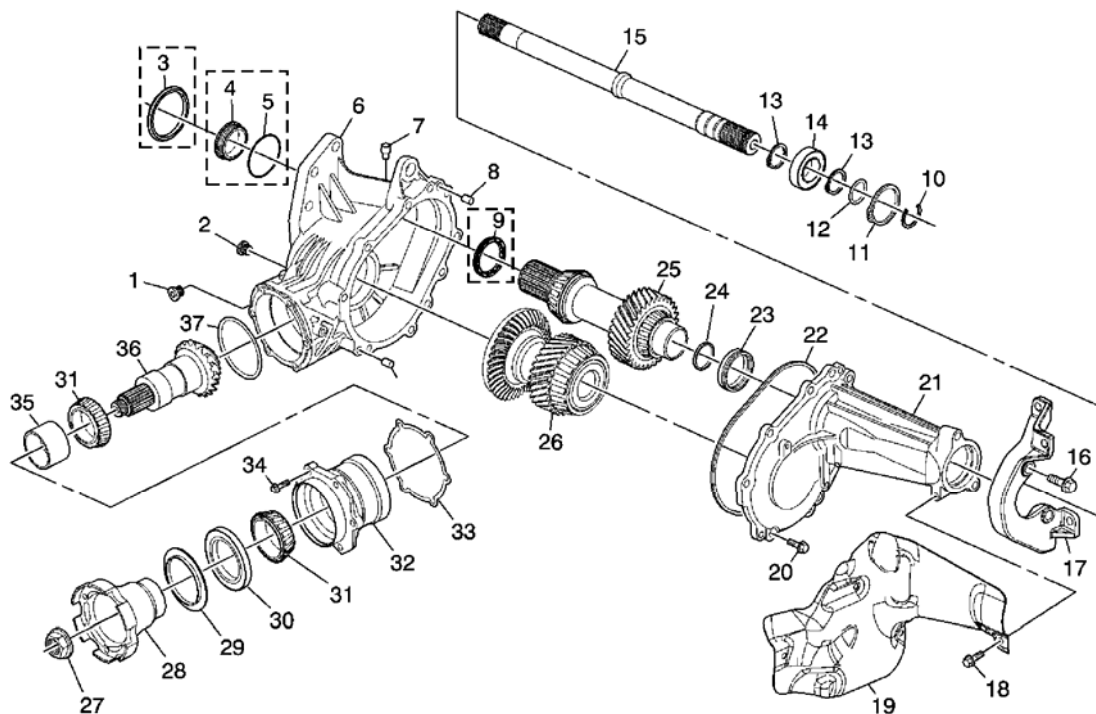


Fig. 1: Transfer Case Components
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Transfer Case Drain Plug
2	Transfer Case Fill Plug
3	Transfer Case Input Shaft Face Seal, RPO MHC
4	Transfer Case Input Shaft Seal - Left, RPO MH4
5	Transfer Case O-Ring Seal
6	Transfer Case - Left
7	Transfer Case Vent Assembly
8	Transfer Case Half Locating Pin (Qty: 2)
8	Transfer Case Half Locating Pin (Qty: 2)
9	Transfer Case Input Shaft Seal - Left, RPO MHC
10	Half Shaft Retainer
11	Front Wheel Drive Retainer
12	O-Ring
13	Front Wheel Drive Intermediate Shaft Bearing Retainer (Qty: 2)
13	Front Wheel Drive Intermediate Shaft Bearing Retainer (Qty: 2)
14	Front Wheel Drive Intermediate Shaft Bearing Assembly
15	Front Wheel Drive Intermediate Shaft
16	Transfer Case Mounting Bracket Bolt (Qty: 6)

17	Transfer Case Mounting Bracket
18	Transfer Case Heat Shield Bolt (Qty: 3)
19	Transfer Case Heat Shield
20	Transfer Case Half Bolt (Qty: 12)
21	Transfer Case - Right
22	Transfer Case Seal
23	Transfer Case Input Shaft Seal - Right
24	Front Drive Axle Intermediate Shaft Seal Assembly
25	Transfer Case Input Shaft
26	Transfer Case Rear Output Drive Shaft
27	Transfer Case Rear Output Shaft Nut
28	Transfer Case Rear Output Shaft Flange
29	Transfer Case Rear Output Shaft Oil Slinger
30	Transfer Case Rear Output Shaft Seal
31	Transfer Case Rear Output Shaft Bearing Assembly (Qty: 2)
31	Transfer Case Rear Output Shaft Bearing Assembly (Qty: 2)
32	Transfer Case Rear Output Shaft Housing
33	Transfer Case Rear Output Shim
34	Transfer Case Rear Output Shaft Housing Bolt (Qty: 6)
35	Transfer Case Rear Output Shaft Bearing Spacer
36	Transfer Case Rear Output Shaft
37	Transfer Case Rear Output Shaft Housing Seal O-Ring

DIAGNOSTIC INFORMATION AND PROCEDURES

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. Refer to <u>Transfer Case Fluid Replacement</u> .	
Water or contamination within the lubricant Water or contamination within the lubricant, causing excessive torque converter clutch slip rate, may create a grind, growl, or moan in the rear differential or torque tube under light or steady load conditions.	Replace the lubricant and flush the transfer case of the contaminated fluid. Refer to Internal Components Cleaning and Inspection.
Loose propeller shaft mounting bolts	Tighten the bolts, as required. Refer to <u>Propeller Shaft Replacement</u> .
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.
Loose rear axle torque tube bracket or a worn bracket bushing	Tighten the bracket bolts or replace the bracket, as required.
Worn bearing in the rear differential torque tube assembly	Replace the torque tube assembly.
Torque tube dampener loose or missing A moan or exhaust leak type noise at higher engine speeds, approximately 2,000-2,500 RPM, may	Tighten the dampener retaining bolt or replace the torque tube assembly, as required.

indicate a loose or missing dampener.	
Incorrect gear oil in the transfer case	Replace the gear oil. Refer to <u>Adhesives, Fluids, Lubricants, and Sealers.</u>
Bearing noise within the transfer case A grinding or roar type noise will increase or decrease relative to the vehicle speed.	1. Inspect for the proper fluid level. Fill, as required. 2. If the noise continues, repair or replace the internal components, as required.
Gear set whine noise within the transfer case Whine type noises will increase or decrease relative to the vehicle speed.	1. Inspect for the proper fluid level. Fill, as required. 2. If the noise continues, repair or replace the internal components, as required. Contributing factors may include: • Incorrect backlash between the gear sets • Worn or damaged gear teeth • Transaxle assembly noise • Rear differential noise

NOISY WHEN COASTING

Cause	Correction
Inspect for the proper transaxle and gear oil levels prior to performing system diagnosis. Refer to <u>Transfer Case Fluid Replacement.</u>	
Loose propeller shaft mounting bolts	Tighten the bolts, as required. Refer to <u>Propeller Shaft Replacement .</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.
Loose rear differential torque tube bracket or a damaged bracket bushing	Tighten the bracket bolts or replace the bracket, as required.
Worn bearing in the rear axle torque tube assembly	Replace the torque tube assembly.
Incorrect gear oil in the transfer case	Replace the gear oil. Refer to <u>Adhesives, Fluids, Lubricants, and Sealers.</u>
Bearing noise within the transfer case A grinding or roar type noise will increase or decrease relative to the vehicle speed.	1. Inspect for the proper fluid level. Fill, as required. 2. If the noise continues, repair or replace the internal components, as required.
Gear set whine noise within the transfer case Whine type noises will increase or decrease relative to the vehicle speed.	1. Inspect for the proper fluid level. Fill, as required. 2. If the noise continues, repair or replace the internal components, as required.

Contributing factors may include:

- Incorrect backlash between the gear sets
- Worn or damaged gear teeth
- Transaxle assembly noise
- Rear differential noise

INTERMITTENT NOISE

Cause	Correction
Inspect for the proper transaxle and gear oil levels prior to performing system diagnosis. Refer to <u>Transfer Case Fluid Replacement</u> .	
Loose propeller shaft mounting bolts	Tighten the bolts, as required. Refer to <u>Propeller Shaft Replacement</u> .
Loose torque tube bracket or a damaged bracket bushing	Tighten the bracket bolts or replace the bracket, as required.
Incorrect gear oil	Replace the gear oil. Refer to <u>Adhesives, Fluids, Lubricants, and Sealers</u> .

CONSTANT NOISE

Cause	Correction
Inspect for the proper transaxle and gear oil levels prior to performing system diagnosis. Refer to <u>Transfer Case Fluid Replacement</u> .	
Low gear oil levels	Faulty oil seals or other type of external leaks may contribute to lower than required fluid levels. Refer to <u>Transfer Case Leak Diagnosis</u> . Fill to proper level with 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 rear differential torque tube assembly	Replace the torque tube assembly.
Bearing noise within the transfer case A grinding or roar type noise will increase or decrease relative to the vehicle speed.	1. Inspect for the proper fluid level. Fill, as required. 2. If the noise continues, repair or replace the internal components, as required.
Gear set whine noise within the transfer case A whine type noise will increase or decrease relative to the vehicle speed.	1. Inspect for the proper fluid level. Fill, as required. 2. If the noise continues, repair or replace the internal components, as required. Contributing factors may include:

- Incorrect backlash between the gear sets
- Worn or damaged gear teeth
- Transaxle assembly noise
- Rear differential noise

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 using the J 28428-E: High-Intensity Black Light Kit , when inspecting for leaks.	
Drain plug or fill plug leak	1. Inspect for worn, scored, or missing drain and/or fill plug sealing washers. 2. Replace as required. Refer to <u>Transfer Case Fluid Replacement</u>.
Restricted or damaged ventilation assembly	Replace the ventilation assembly, as required.
Leaking at either of the two weep holes	• Left input shaft seal leak will be noticed from weep hole on transaxle side of the power take-off unit (PTU). • IDS seal leak will be noticed as transmission fluid from weep hole on half-shaft side of the PTU. • Right input shaft seal leak will be noticed as gear oil from weep hole on half-shaft side of the PTU. • Transfer case overfilled Inspect for the correct transfer case fluid level. Refer to <u>Transfer Case Fluid Replacement</u>.
Leaking at rear output shaft	• Damaged rear output shaft housing O-ring seal • Damaged rear output shaft seal
Leaking at transaxle assembly-to-transfer case interface	Replace the O-ring seal. Refer to <u>Transfer Case Disassemble</u> and <u>Transfer Case Assemble</u> .
Case half seam leak	Disassemble and replace transfer case seal. Refer to <u>Transfer Case Disassemble</u> and <u>Transfer Case Assemble</u> .
Leaking through case	• Inspect for a cracked case. • Inspect for case porosity. • Replace the PTU.

REPAIR INSTRUCTIONS - ON VEHICLE

TRANSFER CASE FLUID REPLACEMENT

Removal Procedure

1. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle .

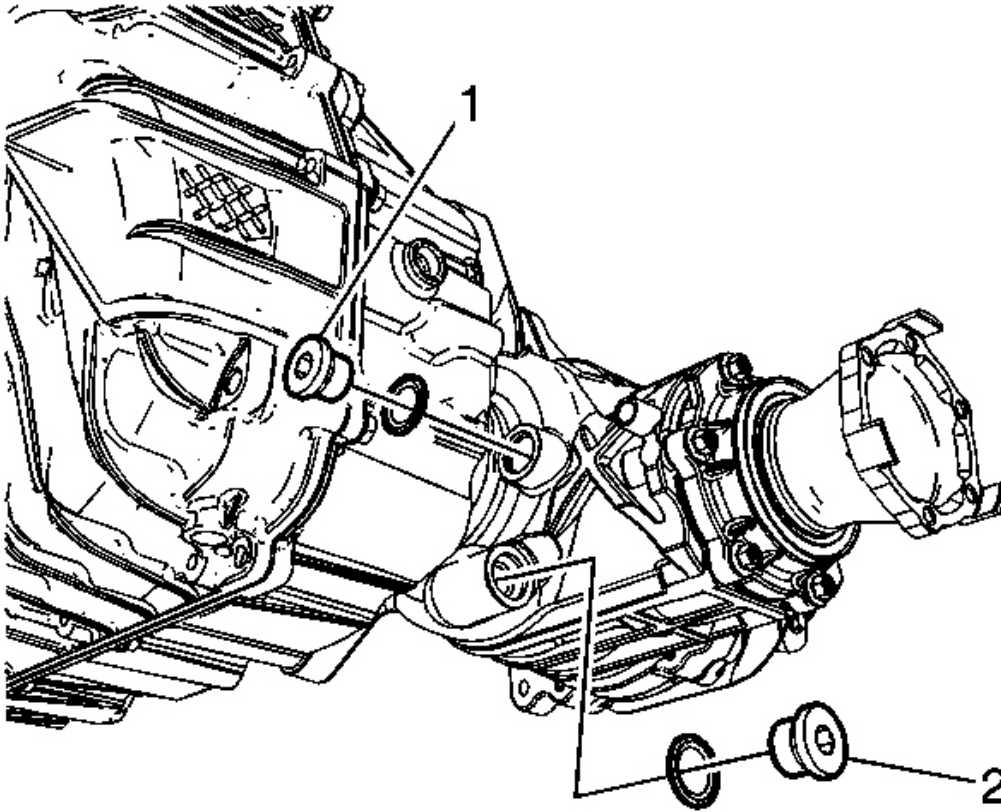


Fig. 2: Identifying Fill Plug & Drain Plug
Courtesy of GENERAL MOTORS CORP.

2. Remove the drain plug (2).
3. Remove the fill plug (1).

Installation Procedure

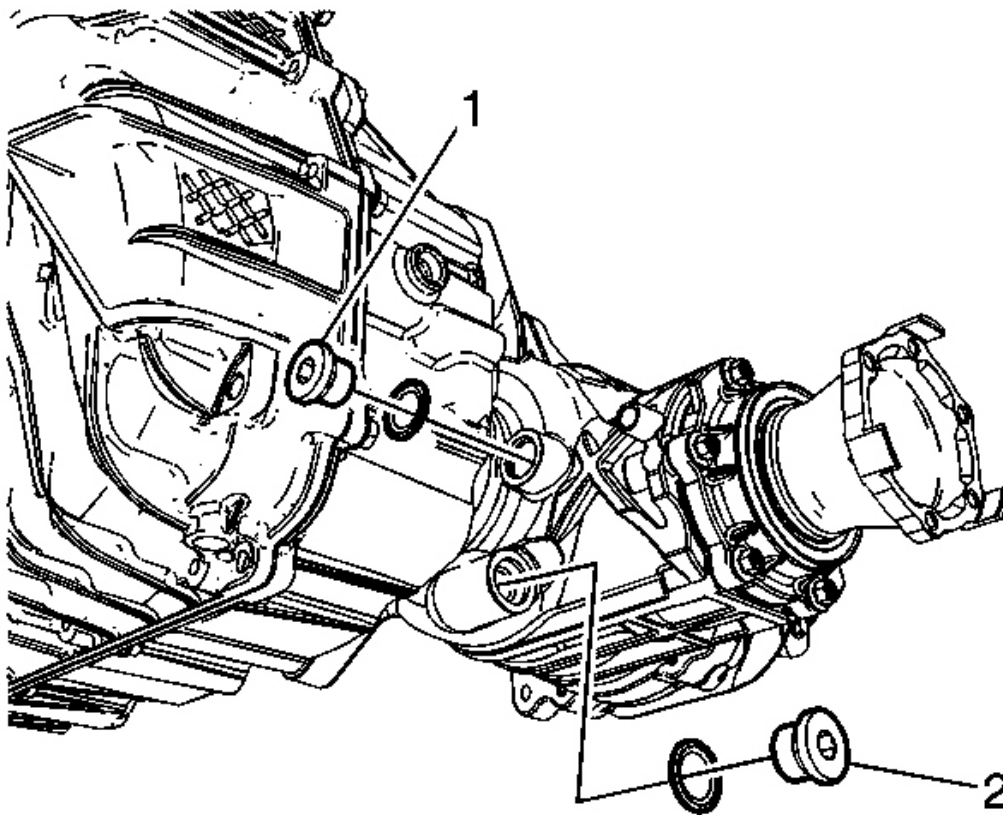


Fig. 3: Identifying Fill Plug & Drain Plug
Courtesy of GENERAL MOTORS CORP.

1. Clean the drain plug.

CAUTION: Refer to Component Fastener Tightening Caution .

2. Install the drain plug (2) and tighten to 39 N.m (29 lb ft).
3. Fill the transfer case with synthetic gear lubricant GM P/N 89021677 (Canadian P/N 89021678) to the bottom of the fill plug, or 0.80 L (0.85 qt).
4. Install the fill plug (1) and tighten to 39 N.m (29 lb ft).
5. Lower the vehicle.

TRANSFER CASE BRACE REPLACEMENT (LF1 ENGINE)

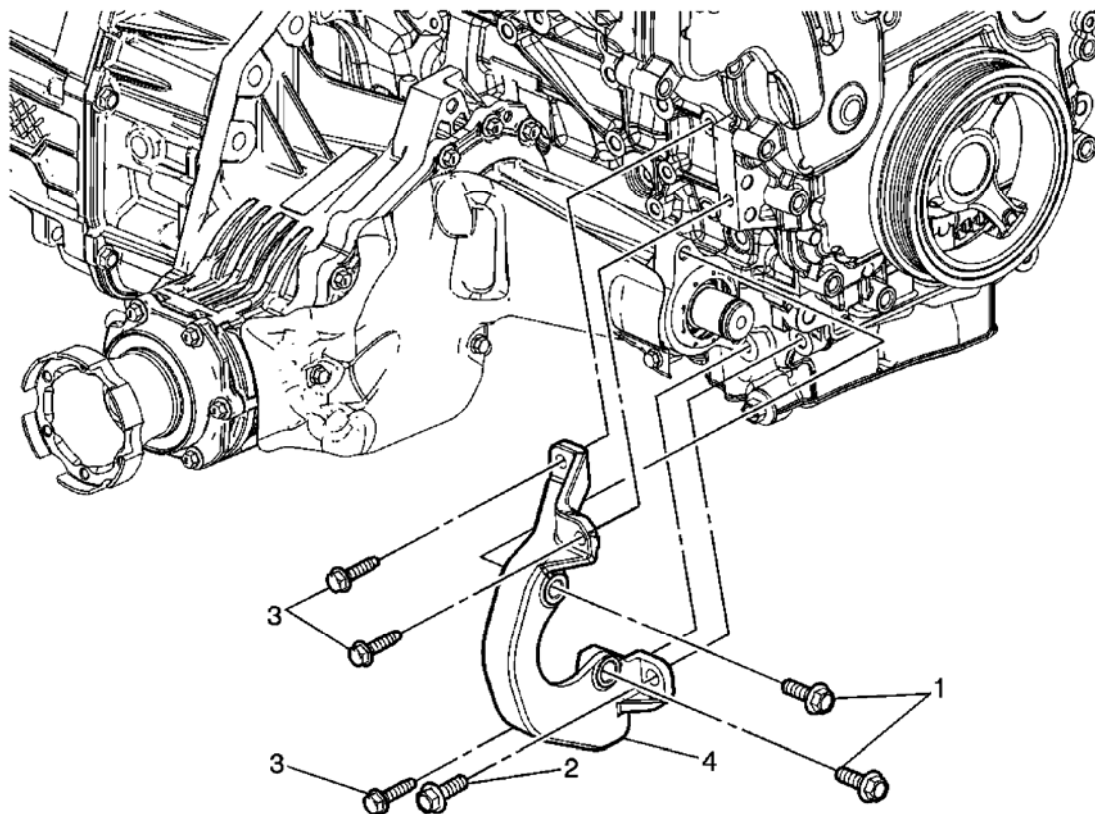


Fig. 4: Transfer Case Brace (LF1 Engine)
 Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure	
1. Raise the vehicle. Refer to <u>Lifting and Jacking the Vehicle</u> . 2. Remove the right wheel drive shaft. Refer to <u>Front Wheel Drive Shaft Replacement</u> .	
1	Transfer Case Brace Bolt (Qty: 2) CAUTION: Refer to <u>Fastener Caution</u> . Tighten: 50 N.m (37 lb ft)
2	Transfer Case Brace Bolt Tighten: 50 N.m (37 lb ft)
3	Transfer Case Brace Bolt (Qty: 3) Tighten: 23 N.m (17 lb ft)
4	Transfer Case Brace

TRANSFER CASE BRACE REPLACEMENT (LAF ENGINE)

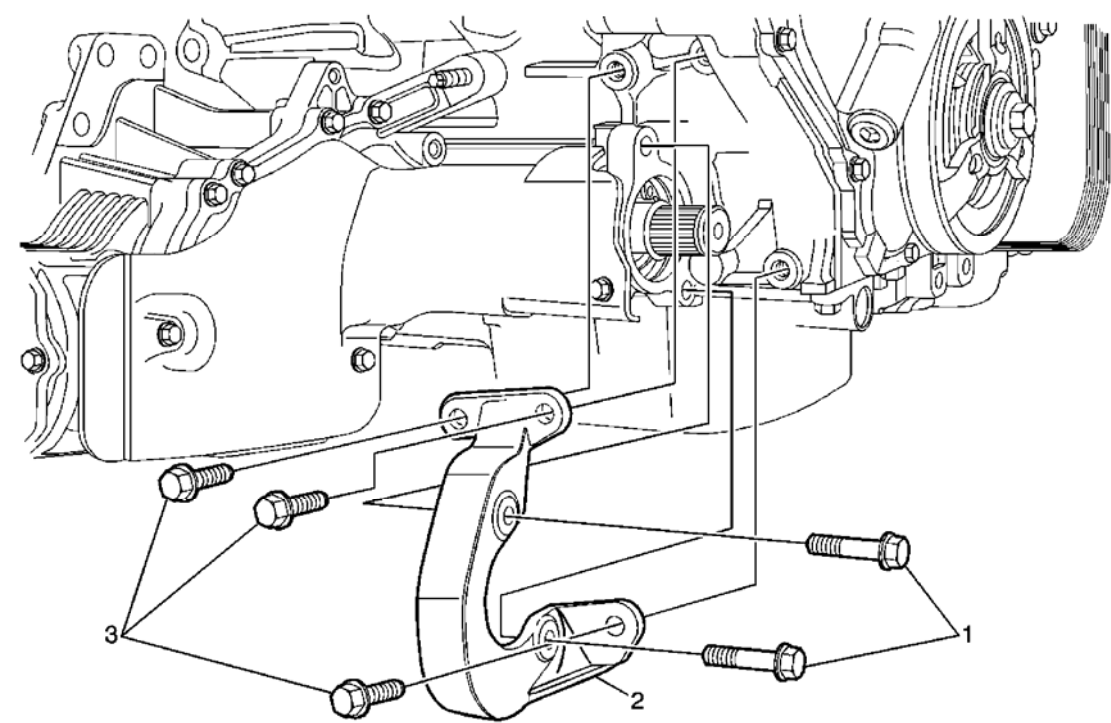


Fig. 5: Transfer Case Brace (LAF Engine)
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure	
1. Raise the vehicle. Refer to Lifting and Jacking the Vehicle .	
2. Remove the right wheel drive shaft. Refer to Front Wheel Drive Shaft Replacement .	
1	Transfer Case Brace Bolt (Qty: 2) CAUTION: Refer to <u>Fastener Caution</u> . Tighten: 50 N.m (37 lb ft)
2	Transfer Case Brace
3	Transfer Case Brace Bolt (Qty: 3) Tighten: 23 N.m (17 lb ft)

TRANSFER CASE ASSEMBLY REPLACEMENT

Removal Procedure

1. Raise and support the vehicle. Refer to **Lifting and Jacking the Vehicle** .
2. Drain the transfer case fluid. Refer to **Transfer Case Fluid Replacement**.
3. Remove the propeller shaft. Refer to **Propeller Shaft Replacement** .
4. Remove the right wheel drive shaft. Refer to **Front Wheel Drive Shaft Replacement** .
5. Remove the catalytic converter. For the LF1 engine, refer to **Catalytic Converter Replacement - Right Side (LF1)** and for the LAF engine refer to **Catalytic Converter Replacement (LAF)** .

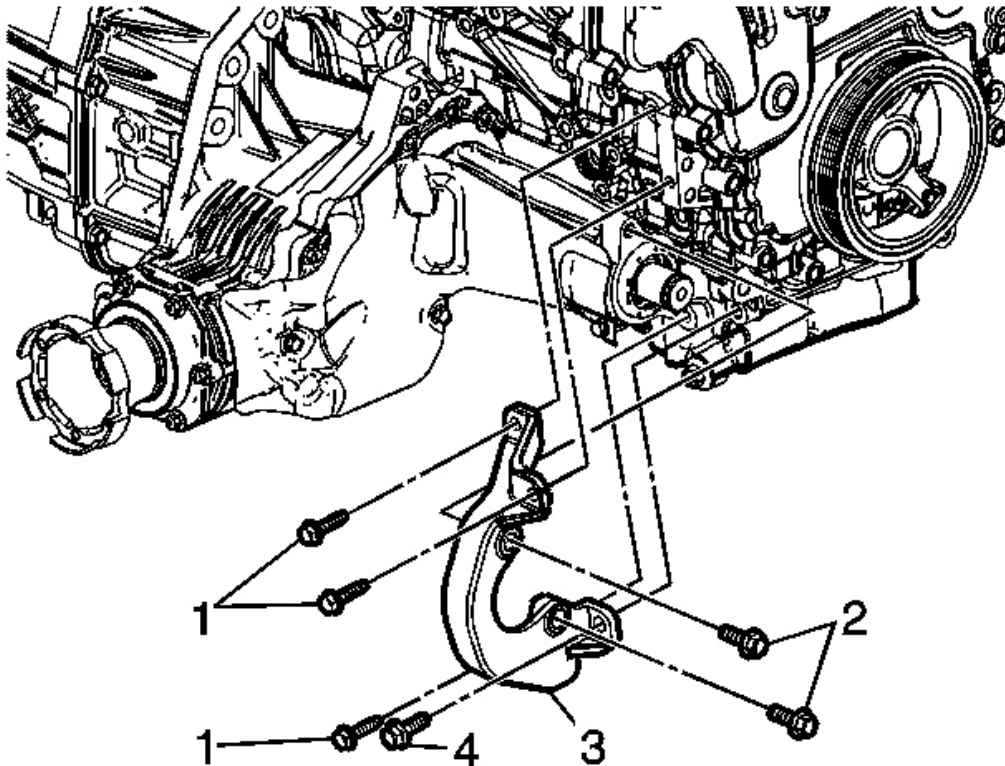


Fig. 6: Identifying Transfer Case Mounting Bracket & Bolts
Courtesy of GENERAL MOTORS CORP.

6. Remove the transfer case brace (3). Refer to **Transfer Case Brace Replacement (LF1 Engine)** or **Transfer Case Brace Replacement (LAF Engine)**.
7. Remove the transfer case mounting bracket (3).
8. Support the transaxle with a jackstand.
9. Remove the rear transmission mount and bracket. Refer to **Transmission Rear Mount Bracket Replacement (AWD)** or **Transmission Rear Mount Bracket Replacement (FWD)** .

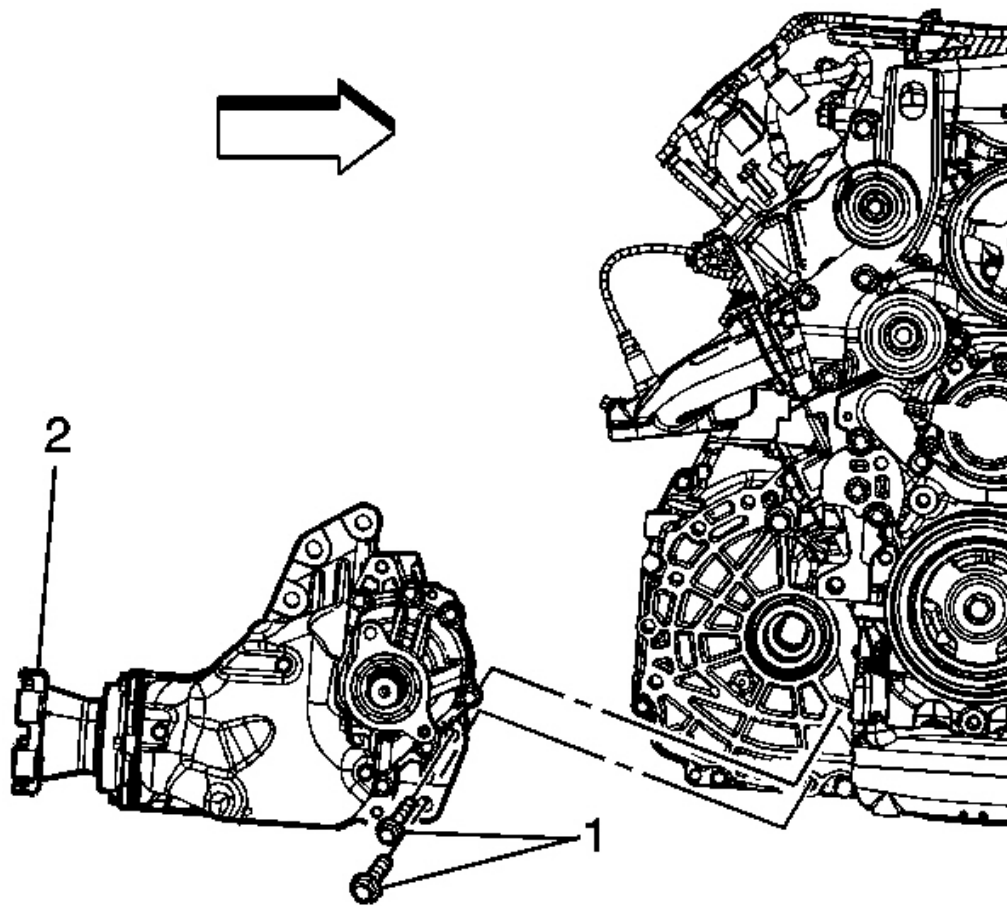


Fig. 7: Identifying Transfer Case & Bolts
Courtesy of GENERAL MOTORS CORP.

10. Remove the bolts (1) securing the transfer case to the transaxle.
11. Remove the transfer case (2) from the transaxle.
12. Remove the transfer case to transmission O-ring for (LF1) engine or the gasket for (LAF) engine.

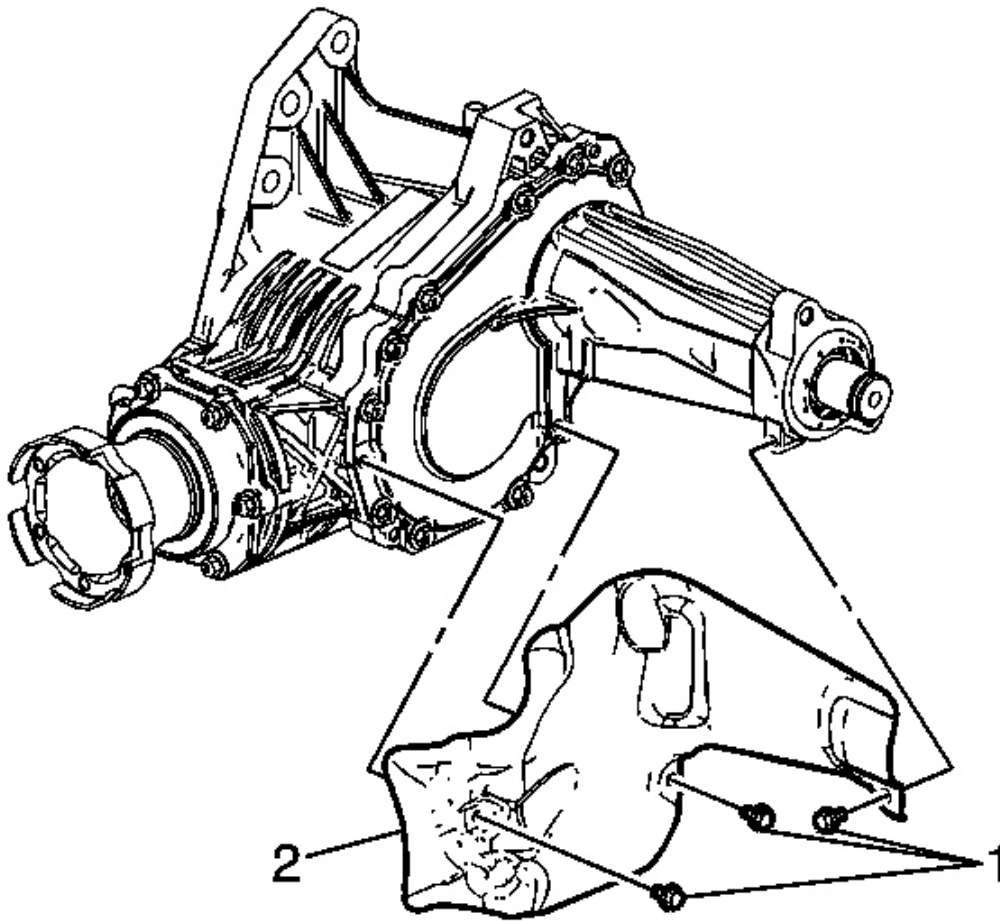


Fig. 8: Identifying Transfer Case Heat Shield & Bolts
Courtesy of GENERAL MOTORS CORP.

13. If replacing the transfer case, complete the following steps.
- Remove the transfer case heat shield bolts (1).
 - Remove the transfer case heat shield (2).

Installation Procedure

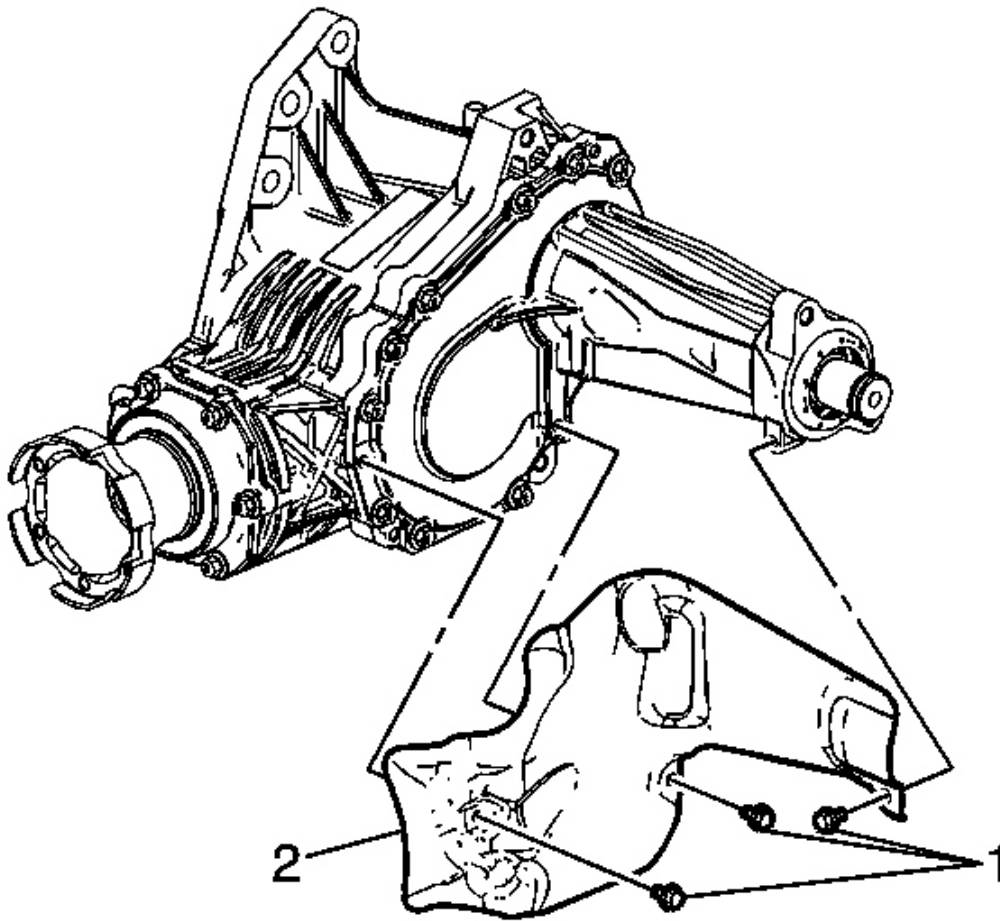


Fig. 9: Identifying Transfer Case Heat Shield & Bolts
Courtesy of GENERAL MOTORS CORP.

CAUTION: Refer to Fastener Caution .

1. If the transfer case heat shield was previously removed, complete the following steps.
 - Install the transfer case heat shield (2).
 - Install the transfer case heat shield bolts (1) and tighten to 10 N.m (89 lb in).
 - Install a NEW the transfer case to transmission O-ring for (LF1) engine or NEW gasket for (LAF) engine.

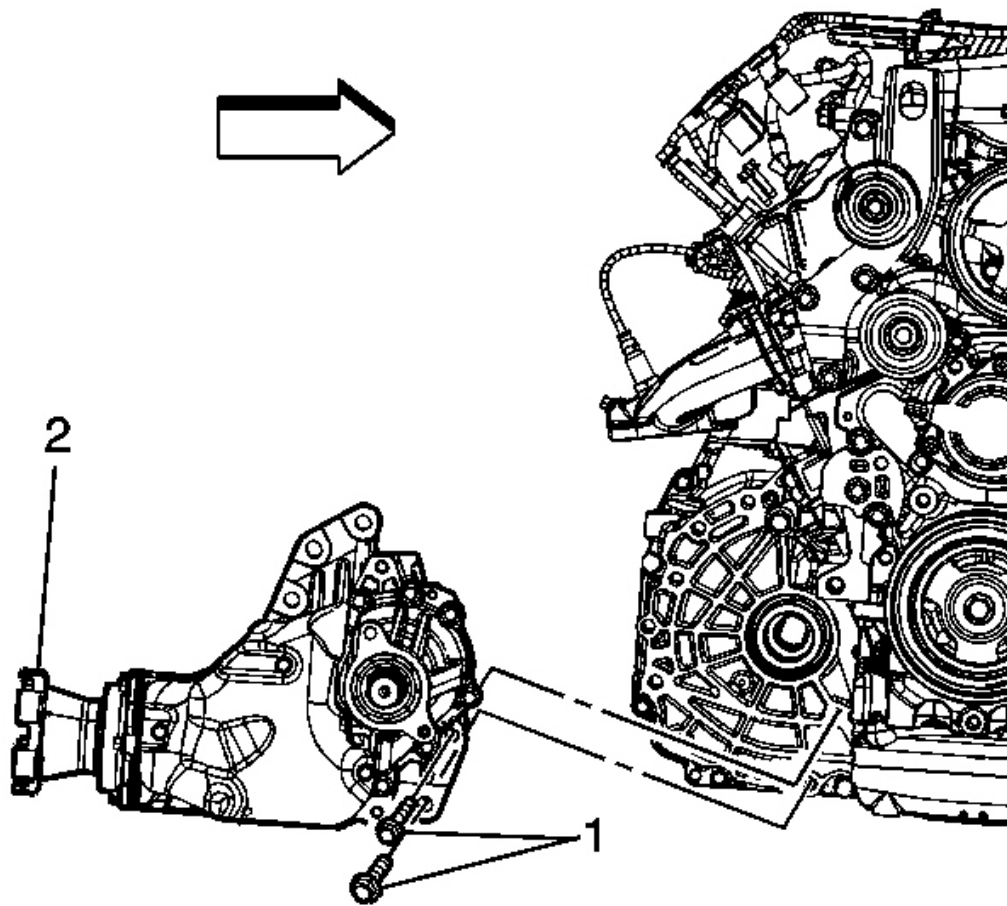


Fig. 10: Identifying Transfer Case & Bolts
Courtesy of GENERAL MOTORS CORP.

2. Install the transfer case (2) to the transaxle.
3. Install the bolts (1) securing the transfer case to the transaxle and tighten the bolts to 50 N.m (37 lb ft).
4. Install the rear transmission mount and bracket. Refer to **Transmission Rear Mount Bracket Replacement (AWD)** or **Transmission Rear Mount Bracket Replacement (FWD)** .
5. Remove the jackstand supporting the transaxle.

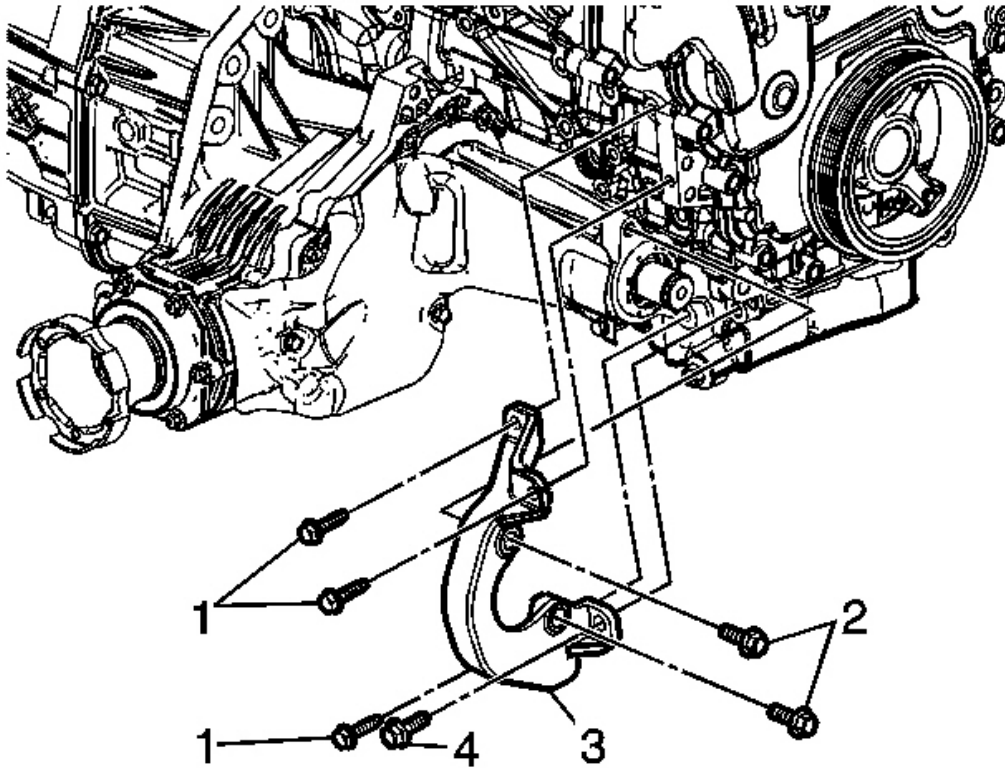


Fig. 11: Identifying Transfer Case Mounting Bracket & Bolts
 Courtesy of GENERAL MOTORS CORP.

NOTE: Tighten bolts in specified sequential order.

6. Install the transfer case brace (3). Refer to **Transfer Case Brace Replacement (LF1 Engine)** or **Transfer Case Brace Replacement (LAF Engine)**.
7. Install the catalytic converter. For the LF1 engine, refer to **Catalytic Converter Replacement - Right Side (LF1)** and for the LAF engine refer to **Catalytic Converter Replacement (LAF)**.
8. Install the right wheel drive shaft. Refer to **Front Wheel Drive Shaft Replacement**.
9. Install the propeller shaft. Refer to **Propeller Shaft Replacement**.
10. Fill the transfer case with fluid. Refer to **Transfer Case Fluid Replacement**.
11. Lower the vehicle.

REPAIR INSTRUCTIONS - OFF VEHICLE

TRANSFER CASE DISASSEMBLE

Housing O-Ring, Vent Assembly, Drain and Fill Plug Removal

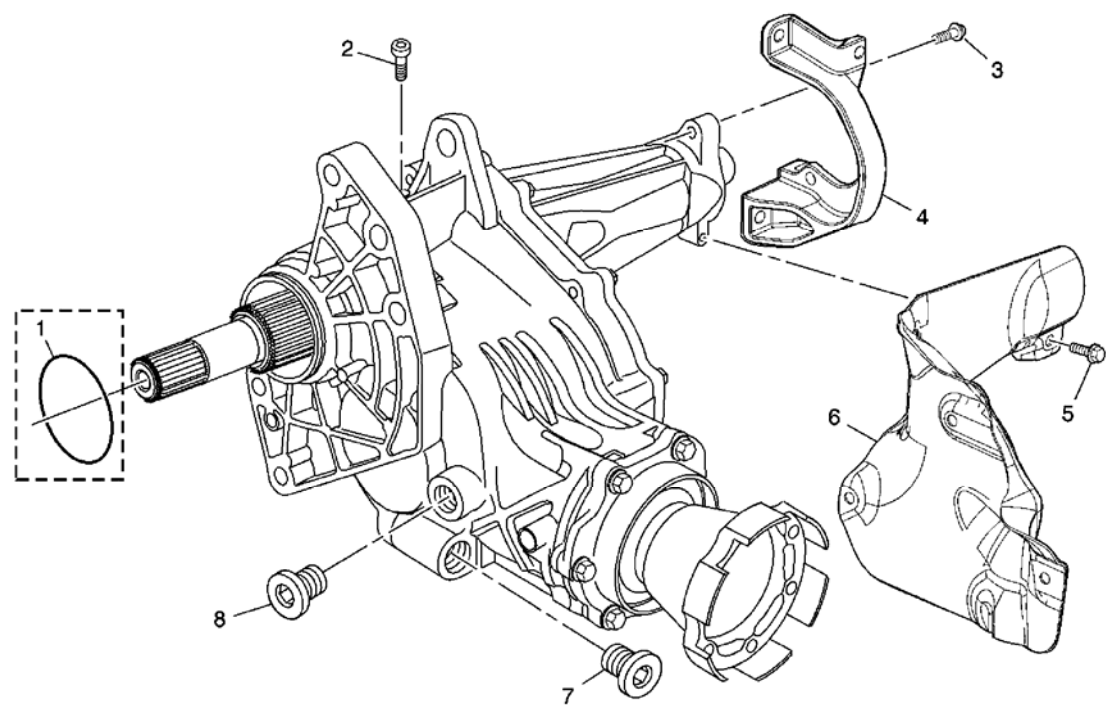


Fig. 12: Housing O-Ring, Vent Assembly, Drain & Fill Plug
Courtesy of GENERAL MOTORS CORP.

Housing O-Ring, Vent Assembly, Drain and Fill Plug Removal

Callout	Component Name
1	Transfer Case O-Ring Seal - RPO MH4
2	Transfer Case Vent Assembly Tip: Remove the vent only if damaged or blocked.
3	Transfer Case Bracket Bolts (Qty: 6)
4	Transfer Case Bracket
5	Transfer Case Heat Shield Bolts (Qty: 3)
6	Transfer Case Heat Shield
7	Transfer Case Drain Plug
8	Transfer Case Fill Plug

Intermediate Drive Shaft Removal

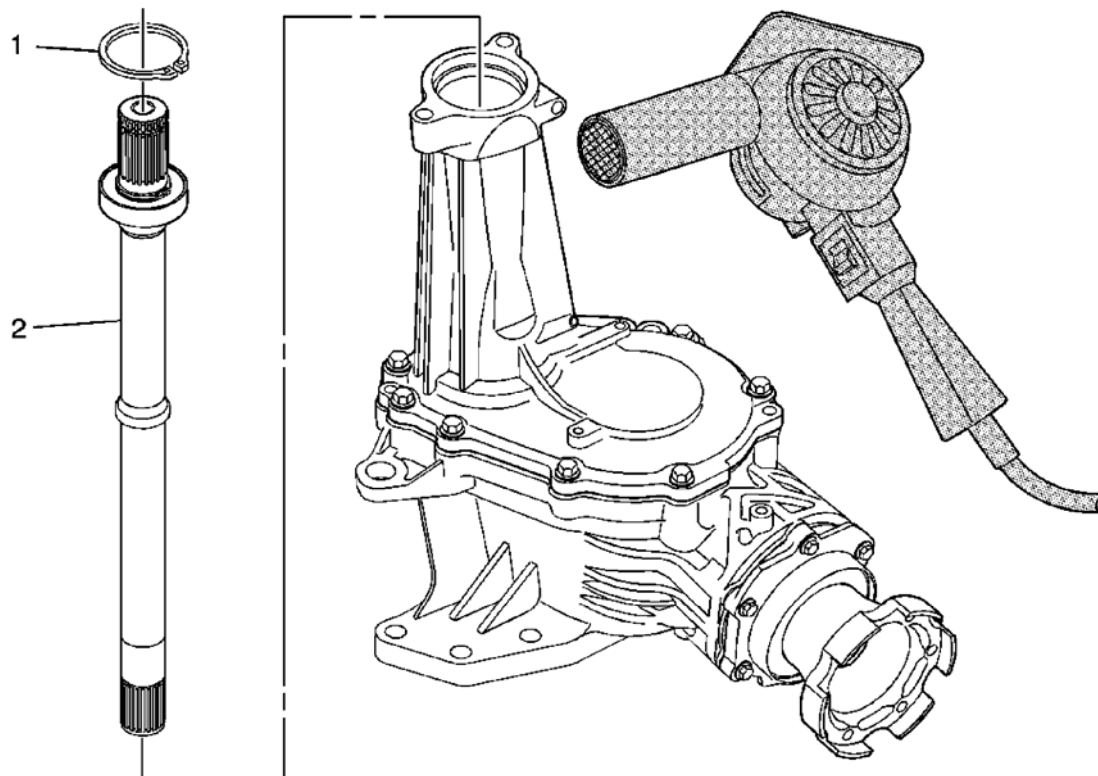


Fig. 13: Intermediate Drive Shaft
 Courtesy of GENERAL MOTORS CORP.

Intermediate Drive Shaft Removal

Callout	Component Name
1	Front Wheel Drive Retainer
2	Front Wheel Drive Intermediate Shaft
Special Tools: J 25070 Heat Gun - 500-750F	

Rear Output Shaft Housing Removal

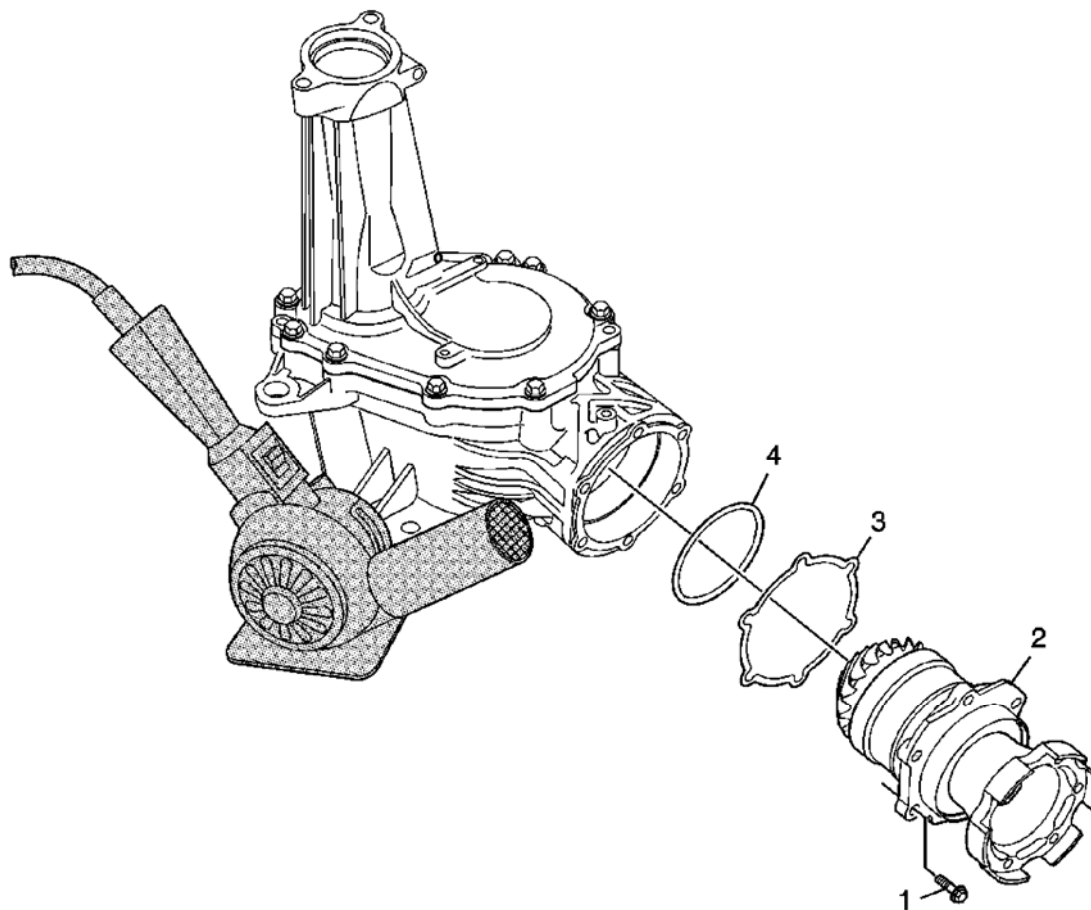


Fig. 14: Identifying Rear Output Shaft Housing Components
 Courtesy of GENERAL MOTORS CORP.

Rear Output Shaft Housing Removal

Callout	Component Name
1	Transfer Case Rear Output Shaft Housing Bolt (Qty: 6)
2	Transfer Case Rear Output Shaft Housing Tip: Locate 2 screwdrivers or prybars to the flange area of the housing to ease removal. Special Tools: J 25070 Heat Gun - 500-750F
3	Transfer Case Rear Output Shim
4	Transfer Case Rear Output Shaft Housing Seal O-Ring Tip: Discard the O-ring after removal.

Right Transfer Case, Input and Output Drive Shaft Removal

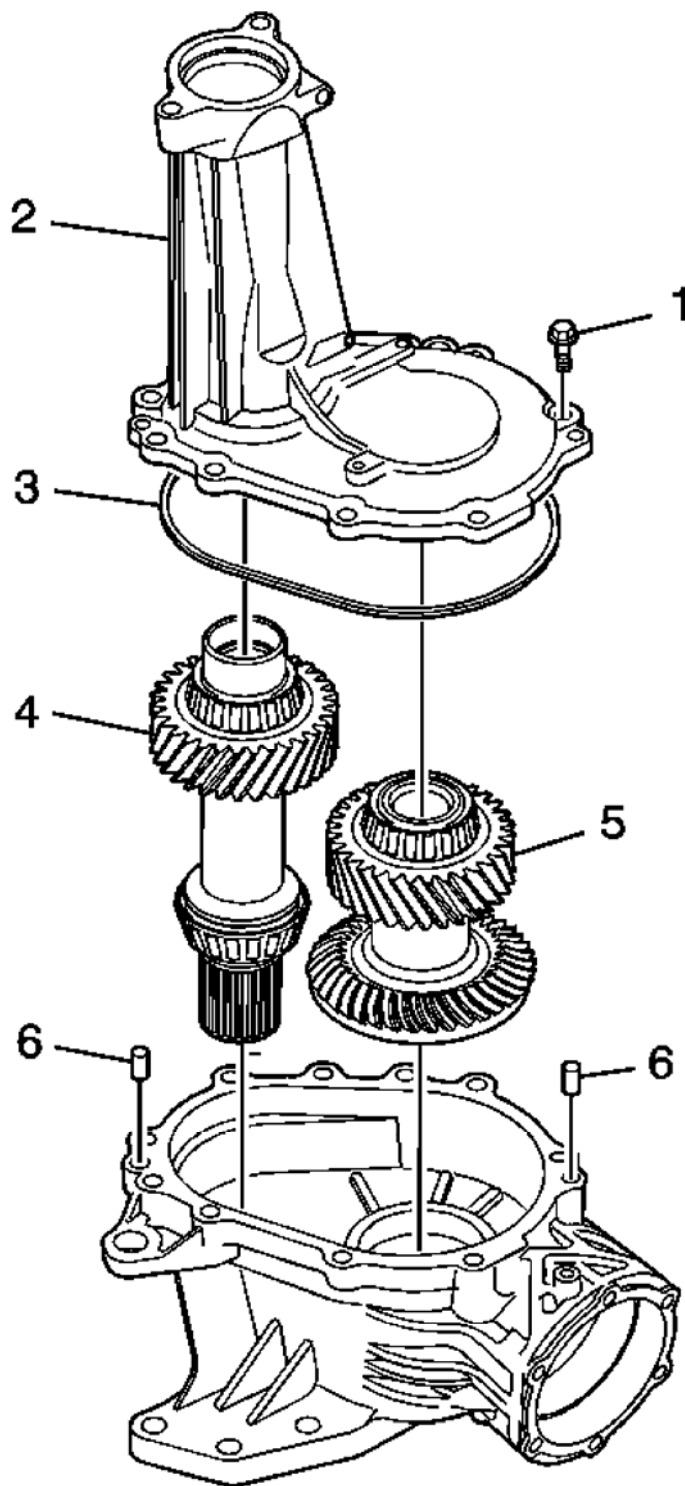


Fig. 15: Identifying Right Transfer Case, Input & Output Drive Shaft Components
Courtesy of GENERAL MOTORS CORP.

Right Transfer Case, Input and Output Drive Shaft Removal

Callout	Component Name
1	Transfer Case Half Bolts (Qty: 12)
2	Transfer Case - Right
3	Transfer Case Seal
4	Transfer Case Input Shaft
5	Transfer Case Rear Output Drive Shaft
6	Transfer Case Half Locating Pins (Qty: 2)
	Tip: • Remove the pins only if damaged. • Inspect the case for similar damage. Refer to <u>Transfer Case Cleaning and Inspection</u>.

Rear Output Shaft Housing Disassembly

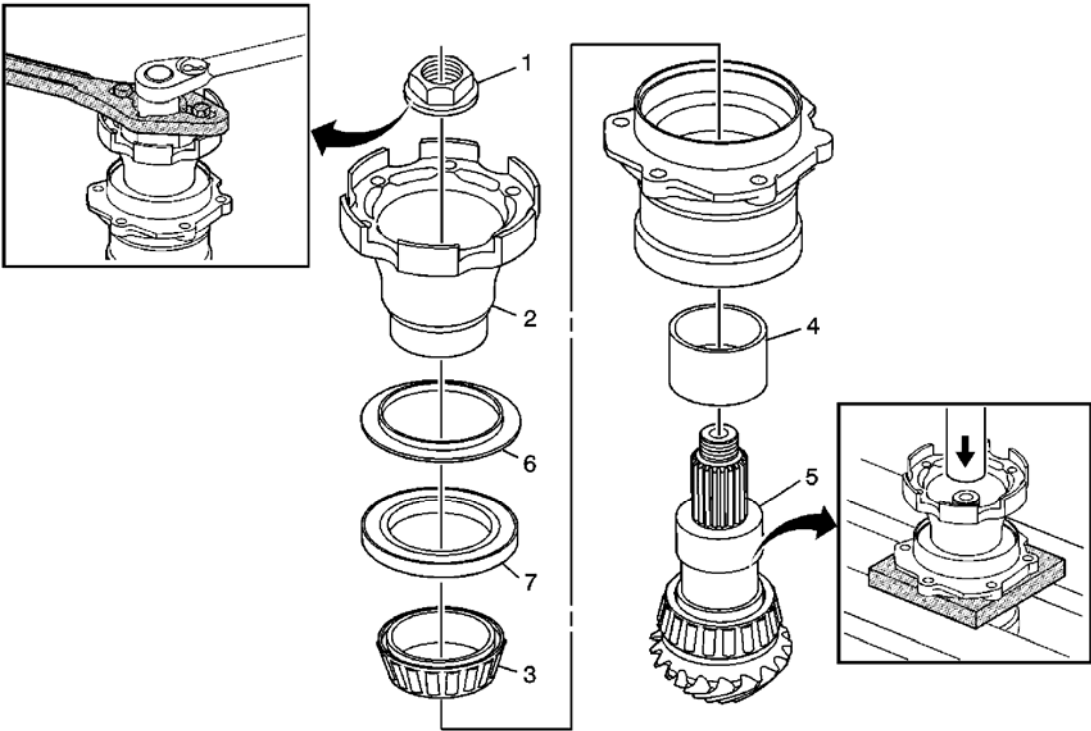


Fig. 16: Exploded View Of Rear Output Shaft Housing
Courtesy of GENERAL MOTORS CORP.

Rear Output Shaft Housing Disassembly

Callout	Component Name
	Transfer Case Rear Output Drive Gear Nut

1	Tip: Use a 30 mm socket or J 29873 . Special Tools: J-08614-A Pinion Flange Holder and Remover. See <u>Special Tools</u> .
2	Transfer Case Rear Output Shaft Flange Special Tools: DT-48146 Press Support. See <u>Special Tools</u> .
3	Transfer Case Rear Output Shaft Bearing Assembly Tip: Use a press to remove the output shaft from the housing.
4	Transfer Case Rear Output Shaft Bearing Spacer
5	Transfer Case Rear Output Shaft
6	Transfer Case Rear Output Shaft Oil Slinger Tip: Remove the slinger only if damaged. Refer to <u>Rear Output Drive Housing Cleaning and Inspection</u> .
7	Transfer Case Rear Output Shaft Seal Tip: Discard the seal after removal.

Intermediate Drive Shaft Disassembly

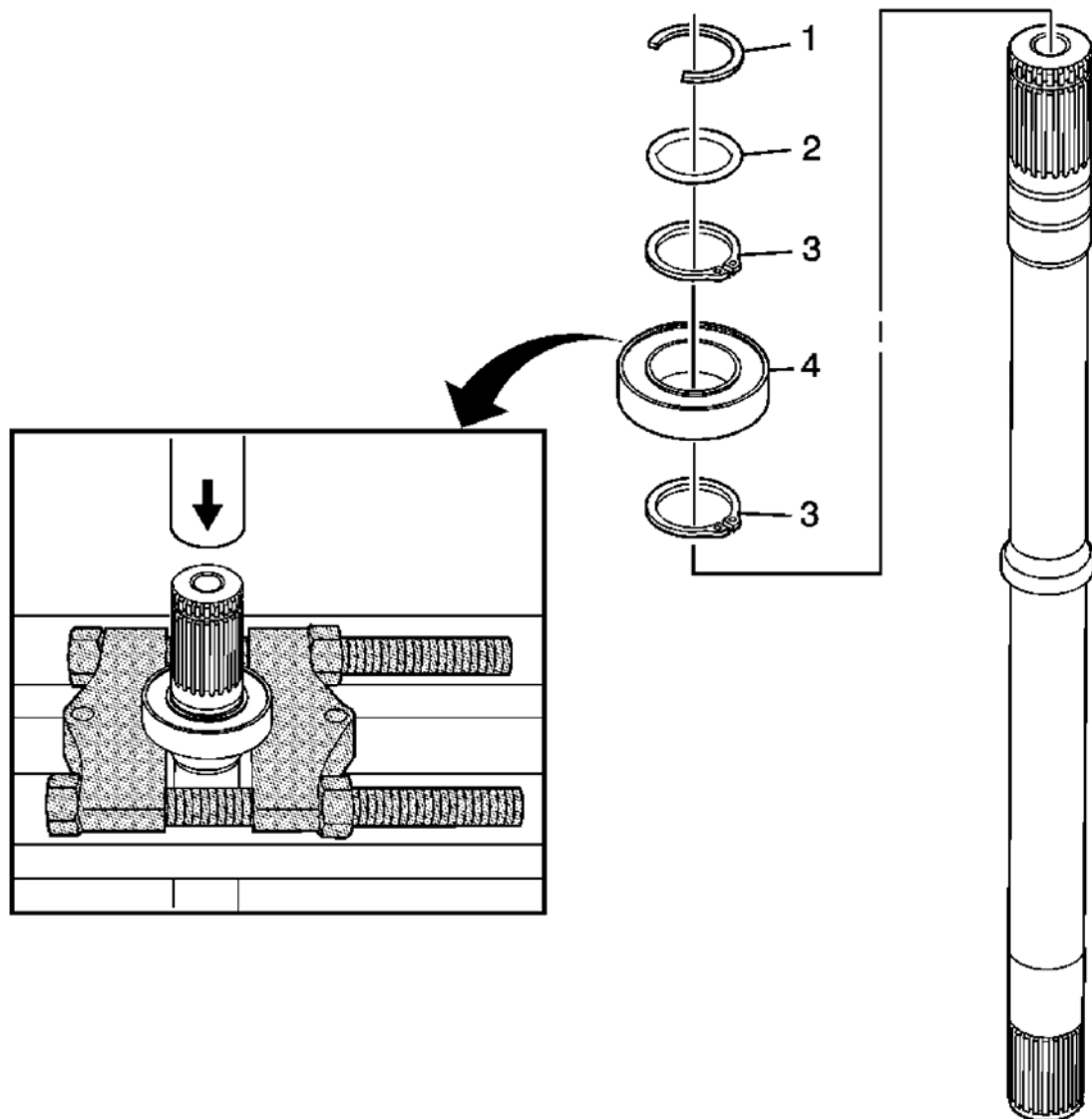


Fig. 17: Identifying Intermediate Drive Shaft
 Courtesy of GENERAL MOTORS CORP.

Intermediate Drive Shaft Disassembly

Callout	Component Name
1	Half Shaft Retainer
2	O-Ring
3	Front Wheel Drive Intermediate Shaft Bearing Retainers (Qty: 2)
4	Front Wheel Drive Intermediate Shaft Bearing Assembly Tip: Use a press, with the J 22912-B flat side up, in order to remove the bearing assembly. Special Tools: J 22912-B Rear Pinion and Axle Bearing Remover

TRANSFER CASE CLEANING AND INSPECTION

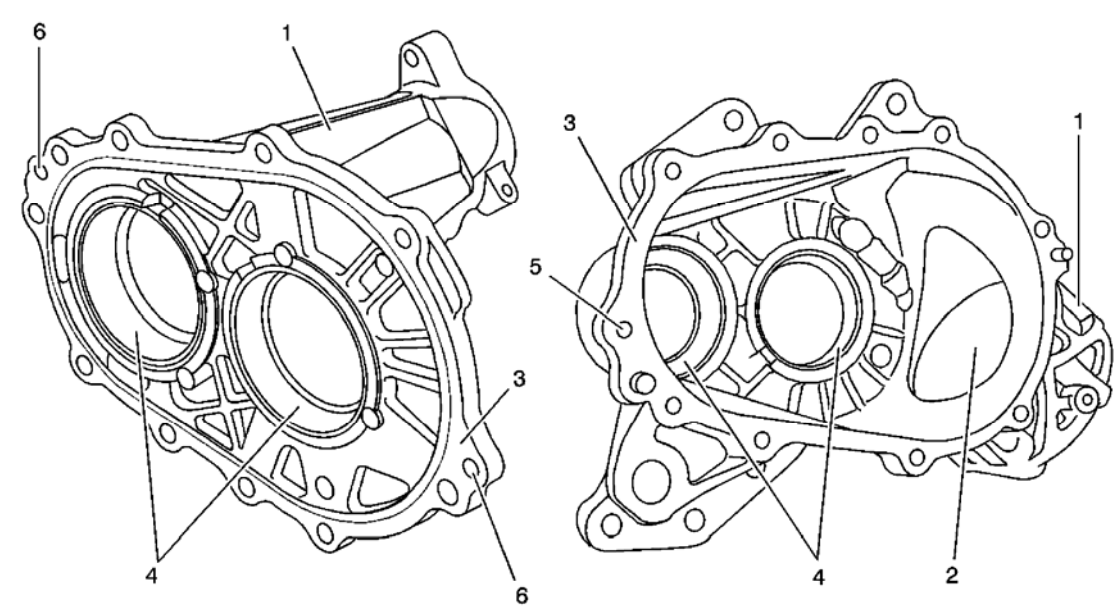


Fig. 18: Identifying Transfer Case
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
CAUTION: Refer to <u>Machined Surface Damage Caution</u> .	
Preliminary Procedure	
1. Inspect all components or sub-components and perform any repair procedure necessary to fix the damage. If the damage cannot be repaired, replace the component or sub-component as indicated. 2. Clean the left and right transfer case in cleaning solvent and air dry.	
1	Transfer Case - Left and Right Tip: Inspect for cracks, broken areas, or other damage. The transfer case assembly must be replaced if damage is found.
2	Transfer Case Rear Output Drive Housing Bore Tip: Repair small scratches or nicks with light sanding.
3	Case Sealing Surface Tip: Repair small scratches or nicks with a soft stone.
4	Transfer Case Bearing Races Tip: Replace the transfer case assembly if a bearing has spun or if cracks are detected.
5	Transfer Case Thread Bolt Holes Tip: Repair any damaged threads.
6	Transfer Case Half Locating Pin Holes

REAR OUTPUT DRIVE HOUSING CLEANING AND INSPECTION

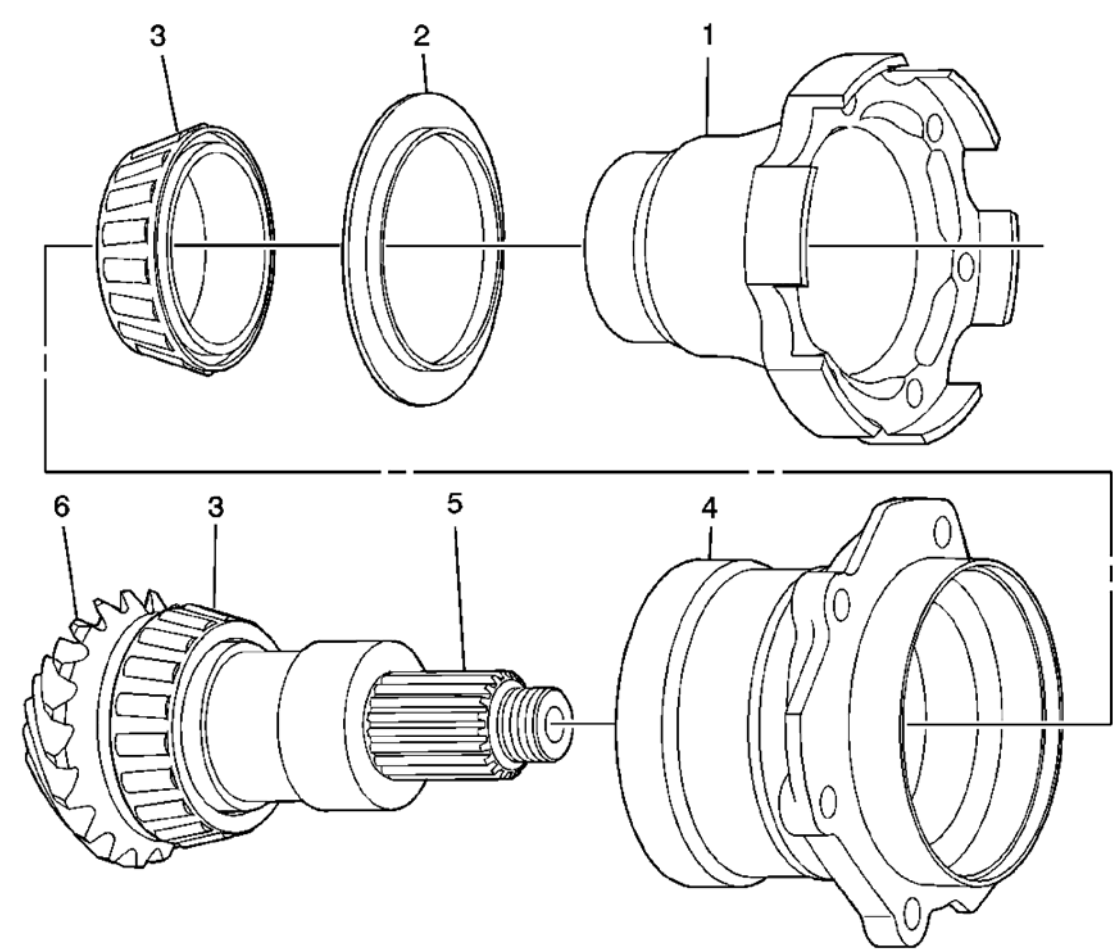


Fig. 19: Exploded View Of Rear Output Drive Housing
 Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedures 1. Inspect all components or sub-components and perform any repair procedure necessary to fix the damage. If the damage cannot be repaired, replace the component or sub-component as indicated. 2. Clean all components in cleaning solvent and air dry. 3. The transfer case rear output drive housing is not serviced. If damage cannot be repaired, the transfer case must be replaced.	
1	Transfer Case Rear Output Shaft Flange Tip: • Replace if flange, threaded holes, or splines are damaged. • Inspect sealing surface for corrosion, excessive wear, or damage.

2	Transfer Case Rear Output Shaft Oil Slinger Tip: Replace the slinger if damaged, cracked, loose, or distorted.
3	Transfer Case Rear Output Shaft Bearing Assembly Tip: Inspect bearings for roughness, spalling, or pitting.
4	Transfer Case Rear Output Shaft Housing Tip: • Inspect for cracks, broken areas, or other damage. • Inspect bearing races for roughness, brinelling, or pitting. • Inspect the O-ring channel for porosity or damage. • Scratches or nicks in other areas may be repaired with light sanding.
5	Transfer Case Rear Output Shaft Splines Tip: Inspect for damage and press fit to flange.
6	Transfer Case Rear Output Shaft Tip: Inspect for pitting, excessive wear, or damage.

INPUT SHAFT SEAL REPLACEMENT - RIGHT

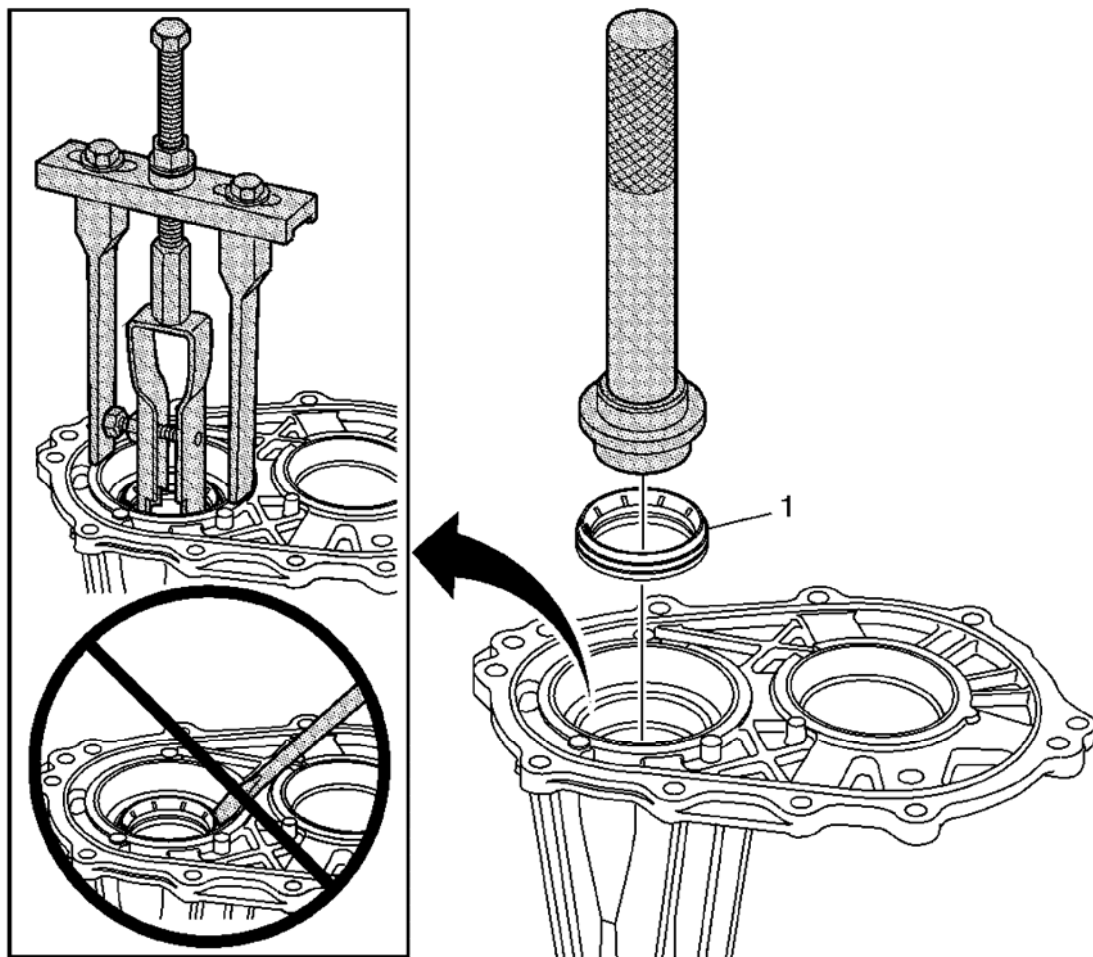


Fig. 20: Identifying Right Transfer Case Input Shaft Seal
 Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Transfer Case Input Shaft Seal - Right CAUTION: Do not use a screwdriver or punch to remove the seal. Using a screwdriver or punch to remove the seal may damage the aluminum housing sealing surface. Special Tools • DT-48074: Input and Output Shaft Seal Installer • J-8092: Driver Handle • J-26941: Bushing and Bearing Remover - 3-4 in • J-45124: Removal Bridge

INPUT SHAFT SEAL REPLACEMENT - LEFT (RPO MH4)

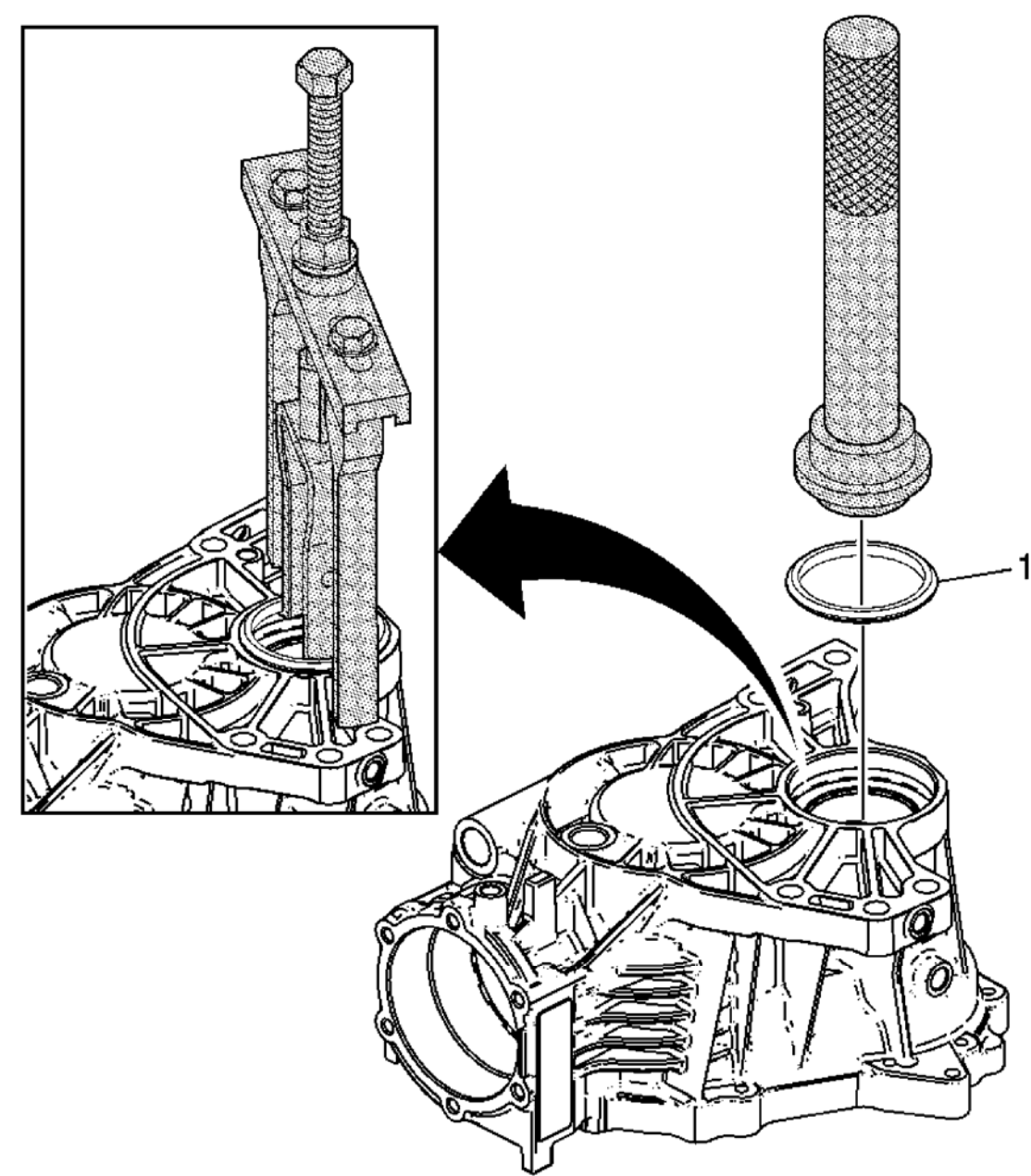


Fig. 21: Input Shaft Seal - Left (RPO MH4)
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
	Transfer Case Input Shaft Seal - Left
	CAUTION:

Do not use a screwdriver or punch to remove or install the seal. Using a screwdriver or punch to remove or install the seal may damage the aluminum housing sealing surface.

Procedure

- Lightly lubricate the outer diameter (OD) of the seal with clean gear lube prior to installation.
- To ensure proper alignment and depth of the seal, take four measurements every 90 degrees around the seal circumference, verifying uniform depth. The distance from the top face of the machined surface of the bore to the metal flange of the seal should be 17.7 +/- 0.1 mm (0.697 +/- 0.004 in). Failure to follow these instructions will result in replacement seal failure.

Tip: Alignment of seal is critical and use of correct tool is necessary. The machined surface of the bore must be clean and free from scratches or nicks.

Special Tools

- **DT-48074:** Input and Output Shaft Seal Installer
- **J-8092:** Driver Handle
- **J-26941:** Bushing and Bearing Remover - 3-4 in
- **J-45124:** Removal Bridge

INPUT SHAFT SEAL REPLACEMENT - LEFT (RPO MHC)

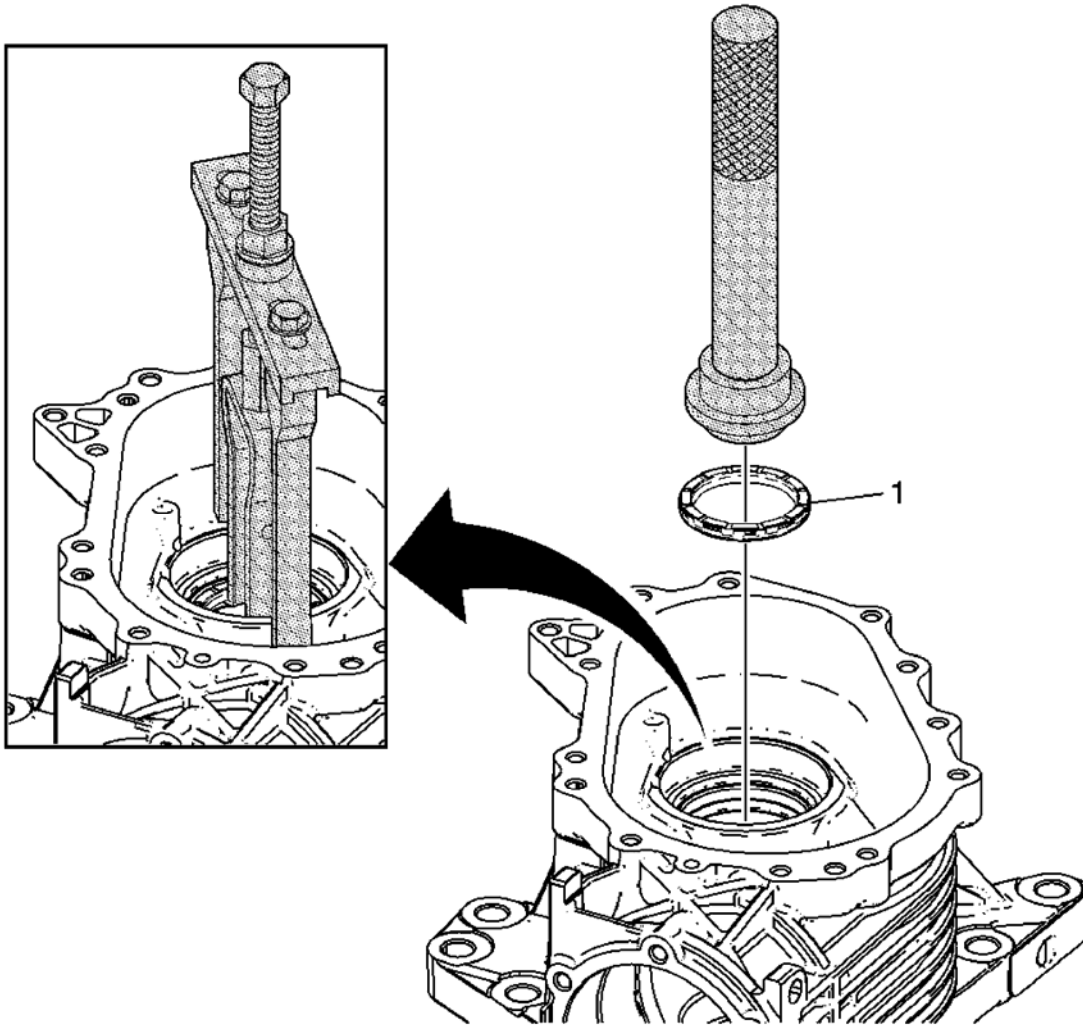


Fig. 22: Input Shaft Seal - Left (RPO MHC)
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
	Transfer Case Input Shaft Seal - Left CAUTION: Do not use a screwdriver or punch to remove or install the seal. Using a screwdriver or punch to remove or install the seal may damage the aluminum housing sealing surface. Procedure • Lightly lubricate the outer diameter (OD) of the seal with clean gear lube prior to installation. • To ensure proper alignment and depth of the seal, take four

1	measurements every 90 degrees around the seal circumference, verifying uniform depth. The distance from the top face of the machined surface of the bore to the metal flange of the seal should be 17.7 +/- 0.1 mm (0.697 +/- 0.004 in). Failure to follow these instructions will result in replacement seal failure. Tip: Alignment of seal is critical and use of correct tool is necessary. The machined surface of the bore must be clean and free from scratches or nicks. Special Tools • DT-48074: Input and Output Shaft Seal Installer • J-8092: Driver Handle • J-26941: Bushing and Bearing Remover - 3-4 in • J-45124: Removal Bridge
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FRONT DRIVE AXLE INNER SHAFT SEAL REPLACEMENT

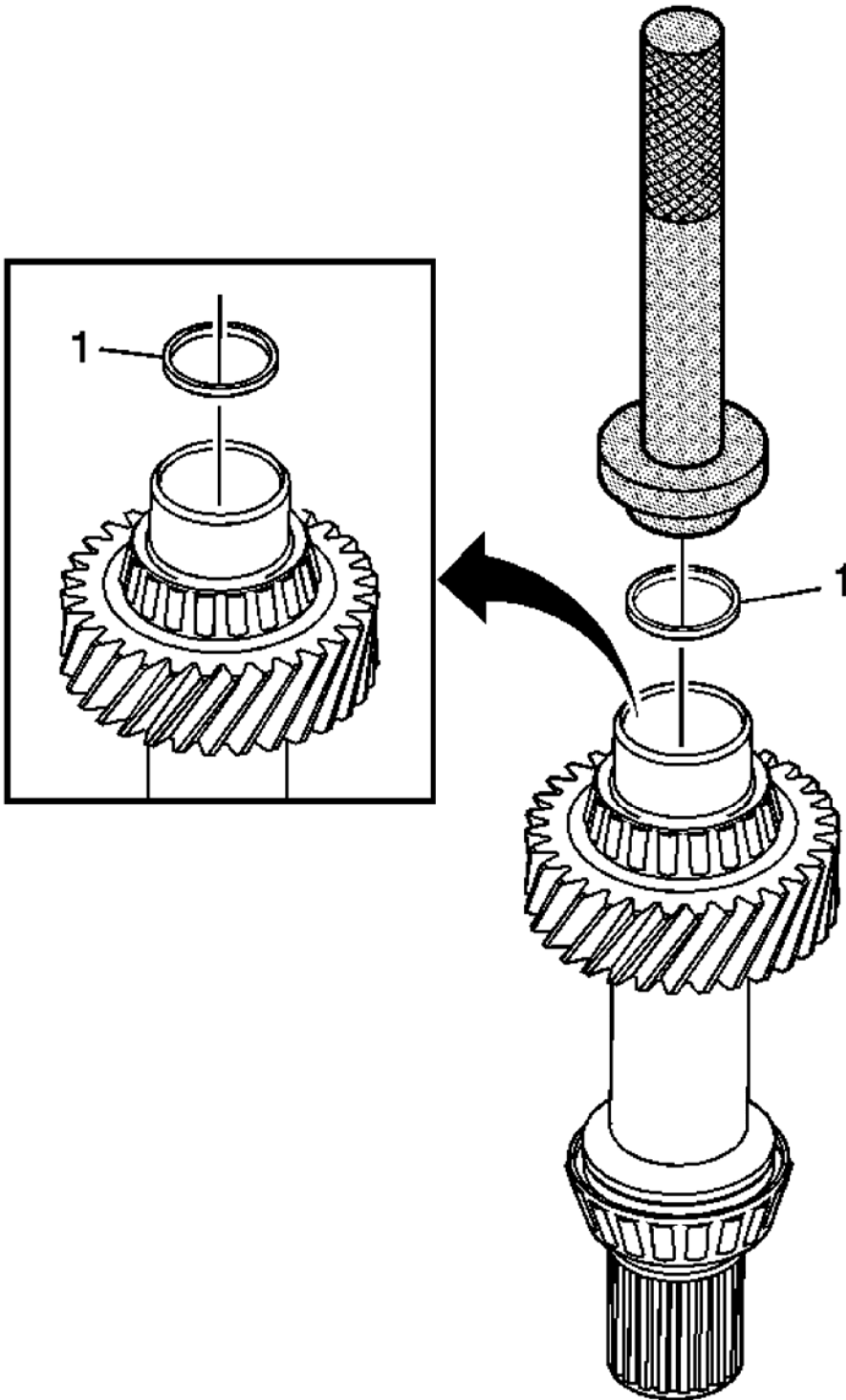


Fig. 23: Front Drive Axle Inner Shaft Seal
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name

1	Front Drive Axle Intermediate Shaft Seal Assembly Tip: DT-48078 seats the seal to a specific depth. See Special Tools. Other installation methods may set the seal to a non-functional depth. Special Tools • DT-48078 Inner Drive Shaft Seal Installer. See Special Tools. • J 8092 Driver Handle
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INPUT SHAFT AND REAR OUTPUT DRIVE SHAFT CLEANING AND INSPECTION

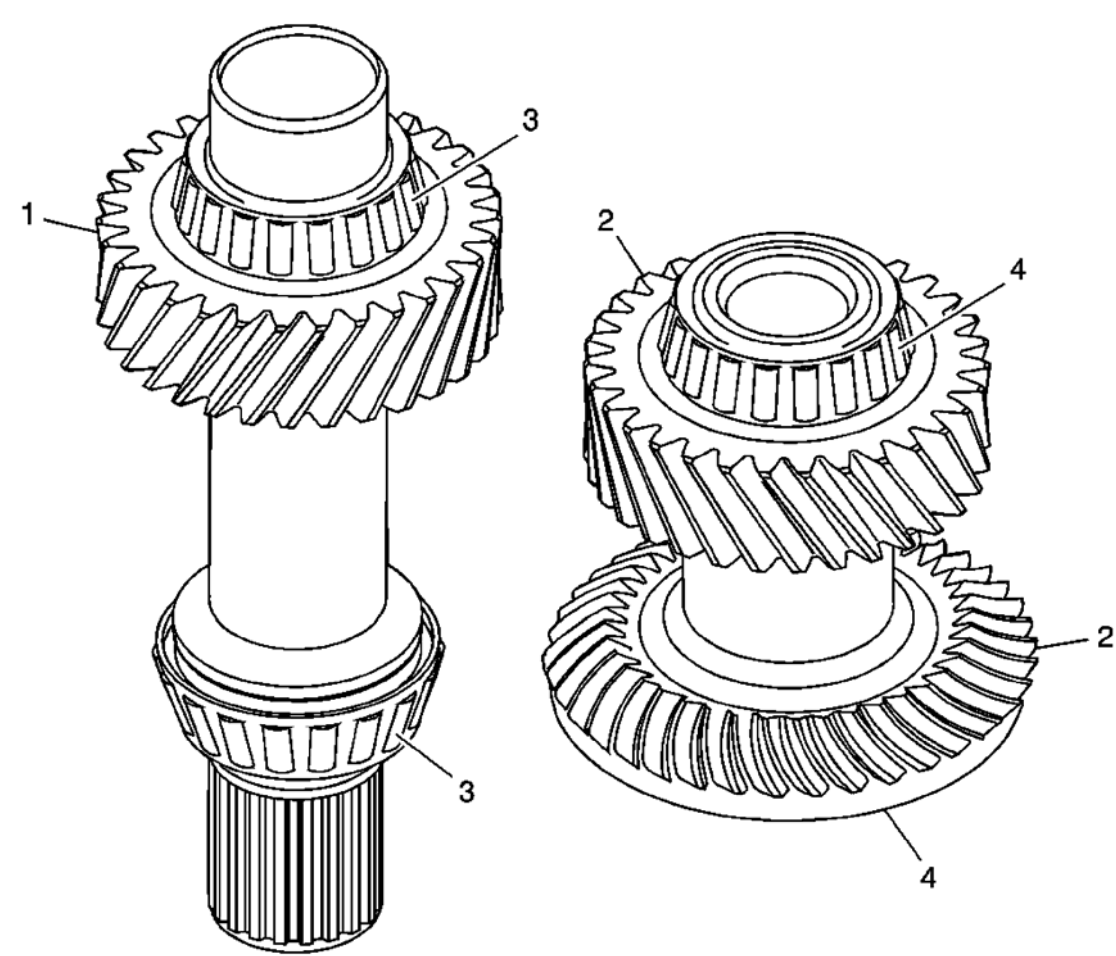


Fig. 24: Input Shaft & Rear Output Drive Shaft
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedures 1. Inspect all components or sub-components and perform any repair procedure necessary to fix the	

damage. If the damage cannot be repaired, replace the component or sub-component as indicated.

- 2. Clean all components in cleaning solvent and air dry.
- 3. The transfer case input shaft and transfer case rear output drive shaft is not serviced. If damage cannot be repaired, the transfer case must be replaced.

1	Transfer Case Input Shaft Gear Tip: Inspect for pitting, excessive wear, or damage.
2	Transfer Case Rear Output Drive Shaft Gear Tip: Inspect for pitting, excessive wear, or damage.
3	Transfer Case Input Shaft Bearing Assembly Tip: Inspect bearings for roughness, spalling, or pitting.
4	Transfer Case Rear Output Drive Shaft Bearing Assembly Tip: Inspect bearings for roughness, spalling, or pitting.

TRANSFER CASE ASSEMBLE

Intermediate Drive Shaft Assembly

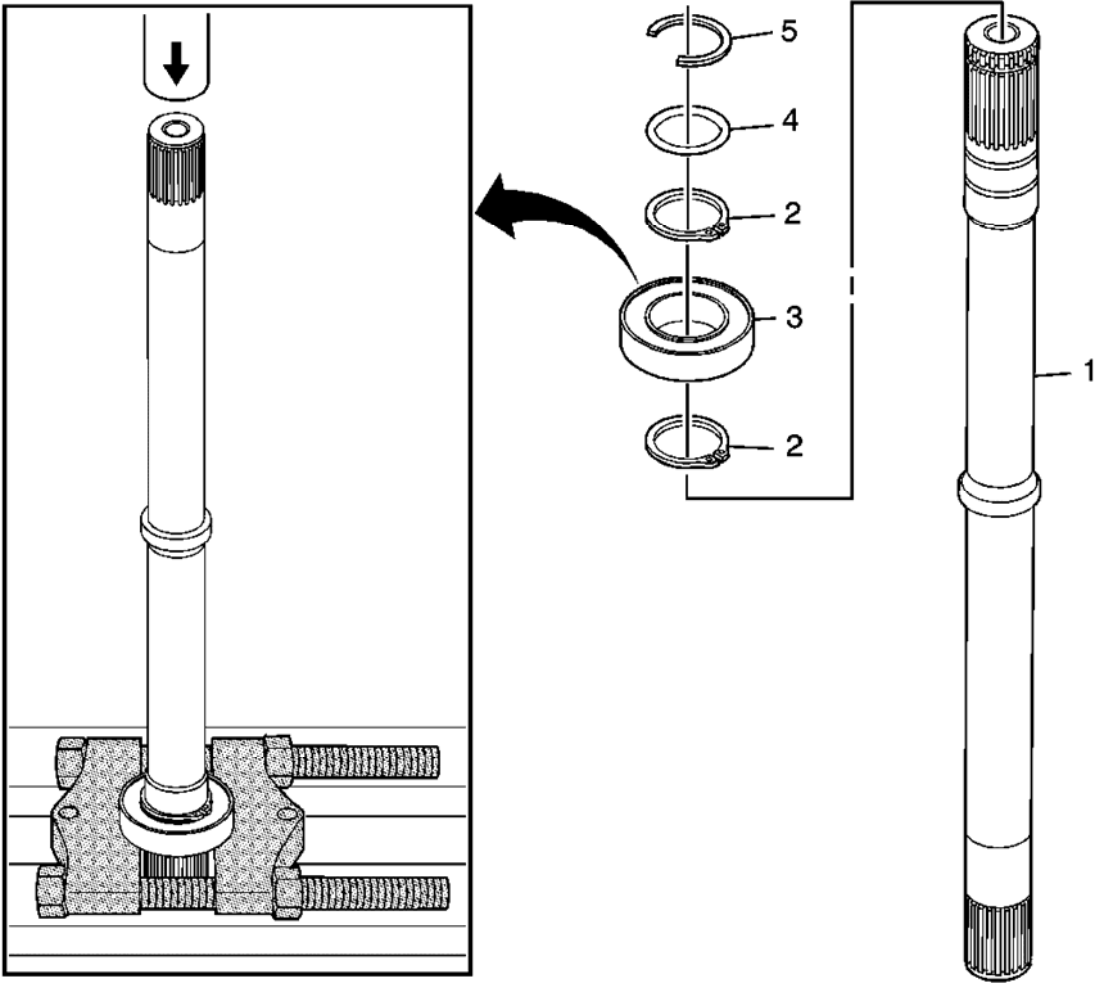


Fig. 25: Intermediate Drive Shaft
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Front Wheel Drive Intermediate Shaft
2	Front Wheel Drive Intermediate Shaft Bearing Retainers (Qty: 2)
3	Front Wheel Drive Intermediate Shaft Bearing Assembly Tip: Use a press, with the J-22912-B: rear pinion and axle bearing remover flat side up, in order to install the bearing assembly. Special Tools: J-22912-B: Rear Pinion and Axle Bearing Remover
4	O-Ring
5	Half Shaft Retainer

Rear Output Shaft Housing Assembly

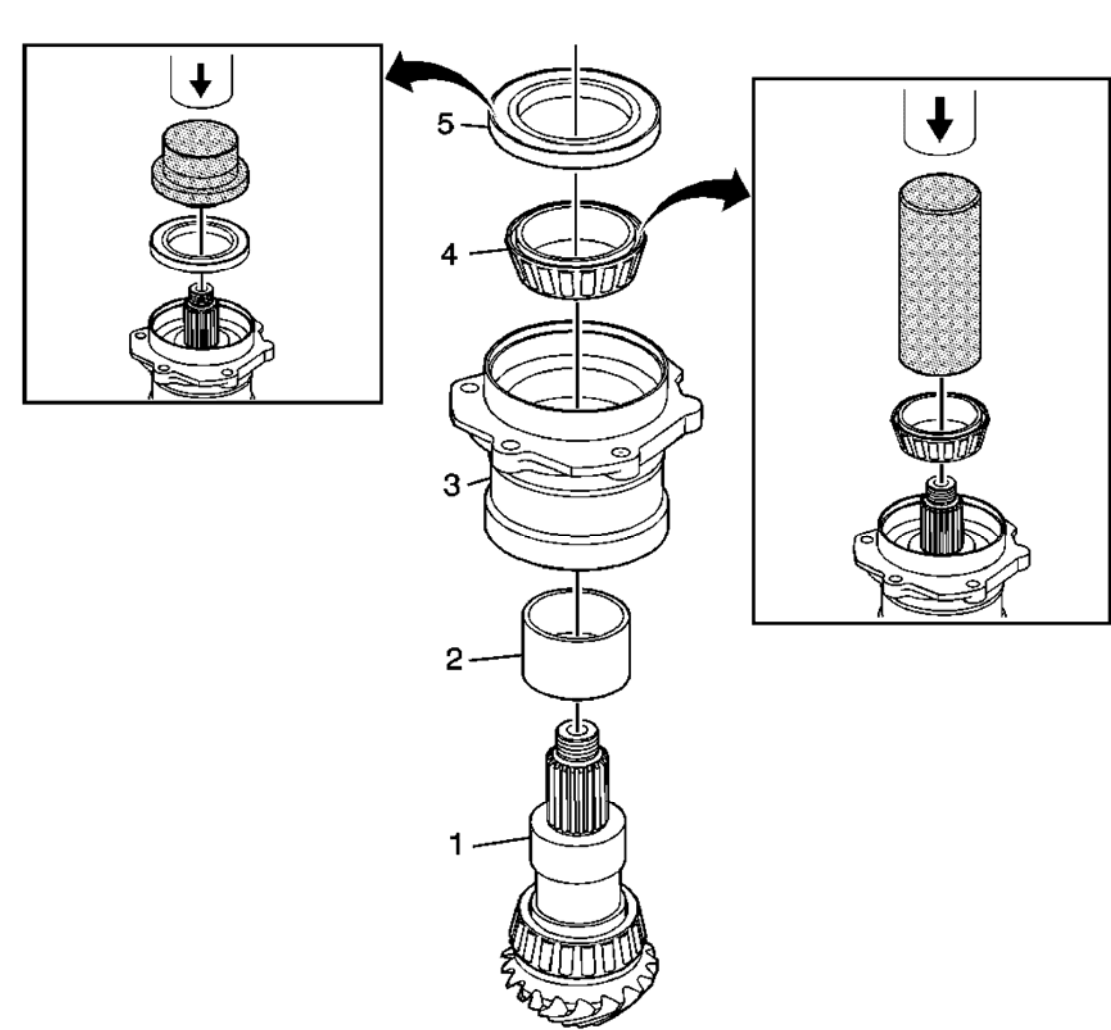


Fig. 26: Identifying Rear Output Shaft Housing Components

Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Transfer Case Rear Output Shaft
2	Transfer Case Rear Output Shaft Bearing Spacer
3	Transfer Case Rear Output Shaft Housing
4	Transfer Case Rear Output Shaft Bearing Assembly Tip: Use a press with the J-5590: pinion bearing race installer - rear to install the housing and bearings to the output shaft. Special Tools: J-5590: Pinion Bearing Race Installer - Rear
5	Transfer Case Rear Output Shaft Seal Tip: Use a press with the DT-48075: output shaft seal installer to install the seal. Special Tools: DT-48075: Output Shaft Seal Installer

Output Flange Installation

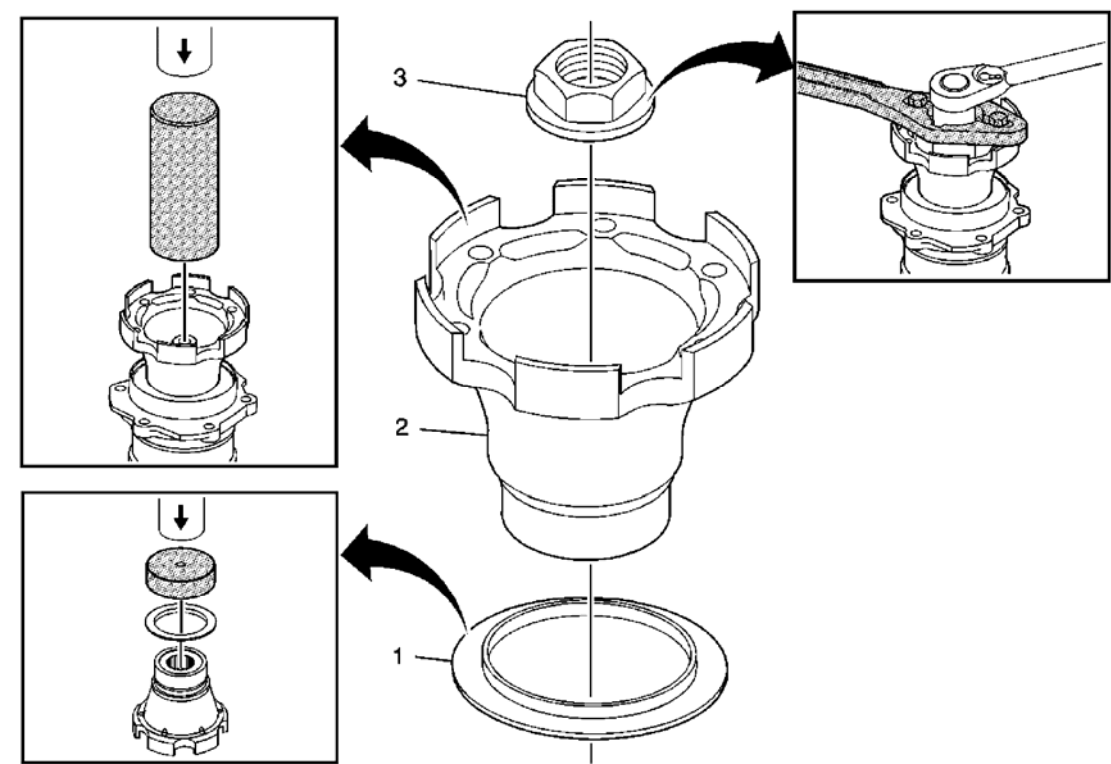


Fig. 27: Exploded View Of Output Flange Components
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
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1	Transfer Case Rear Output Shaft Oil Slinger Tip: Use a press with the DT-48077: output shaft slinger installer in order to install the slinger. Special Tools: DT-48077: Output Shaft Slinger Installer
2	Transfer Case Rear Output Shaft Flange Tip: Use a press with the J-5590: pinion bearing race installer - rear to install the flange. Special Tools: J-5590: Pinion Bearing Race Installer - Rear
3	Transfer Case Rear Output Shaft Nut CAUTION: Refer to <u>Fastener Caution</u> . Tip: • The rear output shaft nut is supplied with a dry retaining compound patch. If reusing the nut, apply GM P/N 12345382 (Canadian P/N 10953489) to the threads. • Use a 30 mm socket or the J 29873 and the J-08614-A . See <u>Special Tools</u>. Tighten: 235 N.m (173 lb ft) Special Tools: J-08614-A: Pinion Flange Holder and Remover

Right Transfer Case, Input Shaft, and Output Drive Shaft Installation

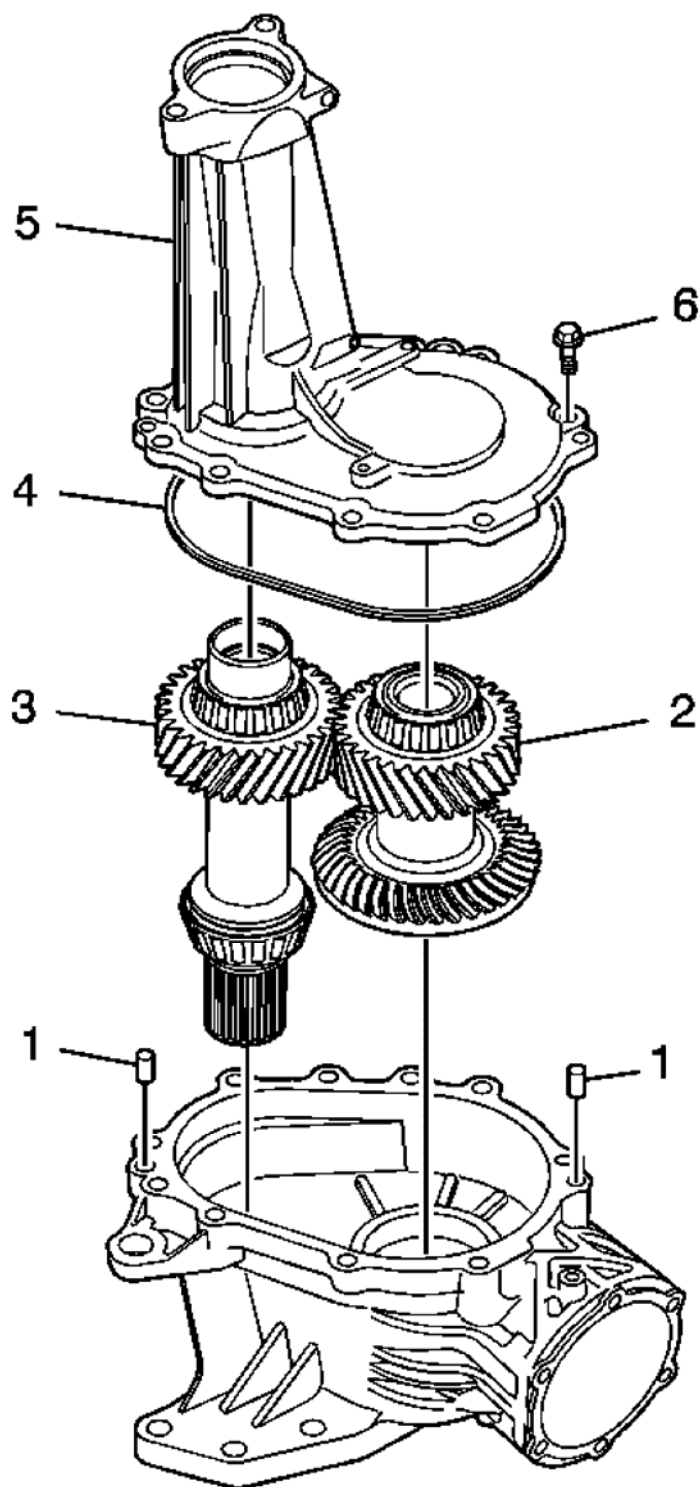


Fig. 28: Identifying Right Transfer Case, Input Shaft & Output Drive Shaft Components
 Courtesy of GENERAL MOTORS CORP.

Callout	Component Name

1	Transfer Case Half Locating Pins
2	Transfer Case Rear Output Drive Shaft
3	Transfer Case Input Shaft Tip: Install the input and output shafts as a set with the splines engaged.
4	Transfer Case Seal
5	Transfer Case - Right
6	Transfer Case Half Bolts (Qty: 12) CAUTION: Refer to <u>Fastener Caution</u> . Tighten: 29 N.m (21 lb ft)

Rear Output Shaft Housing Installation

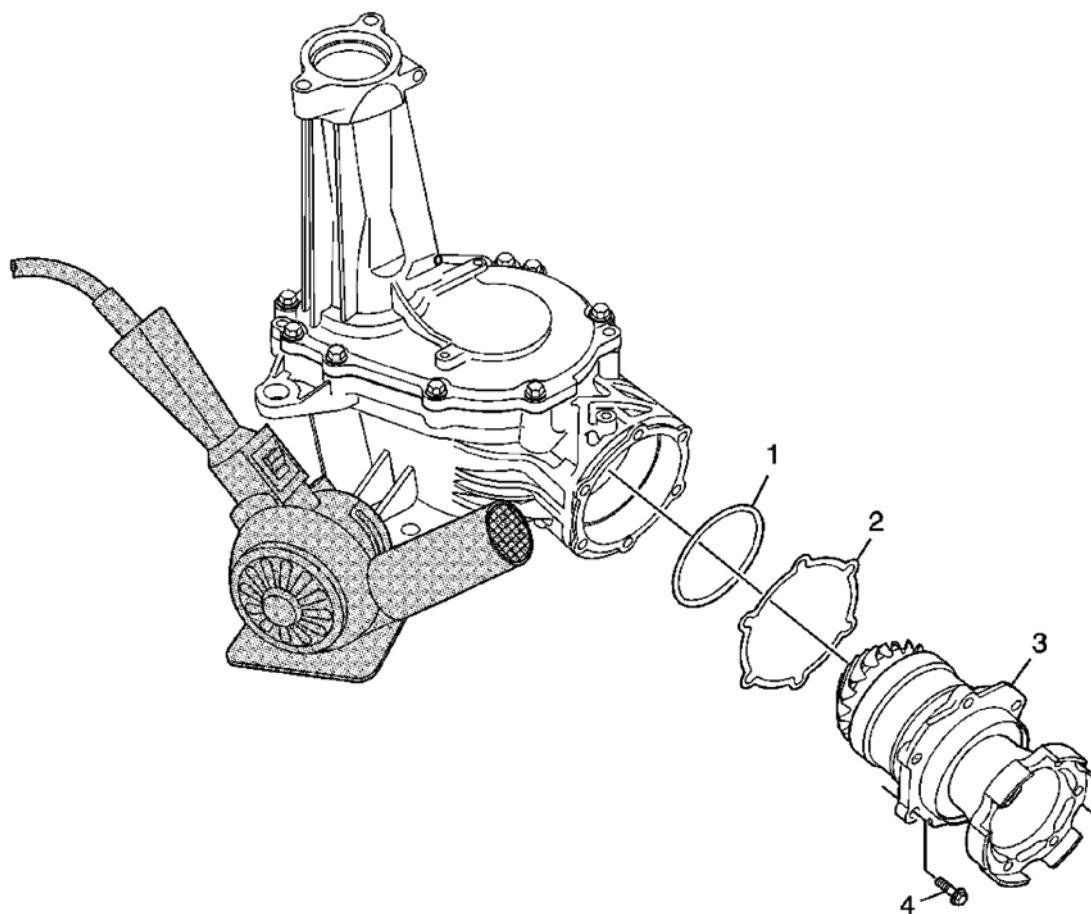


Fig. 29: Identifying Rear Output Shaft Housing Components
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Transfer Case Rear Output Shaft Housing Seal O-Ring
2	Transfer Case Rear Output Shim
3	Transfer Case Rear Output Shaft Housing CAUTION: Do not use a drive hammer when the splines are not engaged. Use of a drive hammer when the splines are not engaged will damage the output shaft teeth. Tip: • Use of a heat gun allows easy alignment of the bolt holes to the housing during assembly. • Rotate the pinion gear during assembly to engage the gear teeth. Special Tools: J-25070: Heat Gun - 500-750F
4	Transfer Case Rear Output Shaft Housing Bolts (Qty: 6) CAUTION: Refer to <u>Fastener Caution</u> . Tighten: 29 N.m (21 lb ft)

Intermediate Drive Shaft Installation

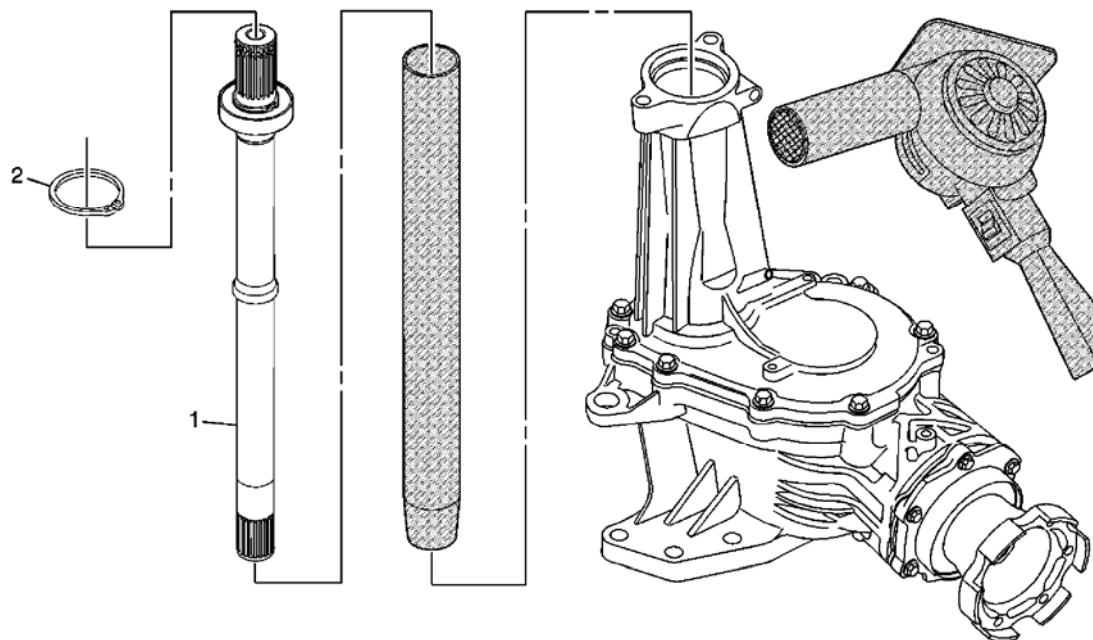


Fig. 30: Intermediate Drive Shaft
 Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Front Wheel Drive Intermediate Shaft CAUTION: DT-48094 must be used over the intermediate shaft prior to installation in order to protect the intermediate shaft seal from damage. Special Tools • DT-48094: Inner Drive Shaft Seal Protector • J-25070: Heat Gun - 500-750F
2	Front Wheel Drive Retainer

Housing O-Ring, Vent Assembly, Drain and Fill Plug Installation

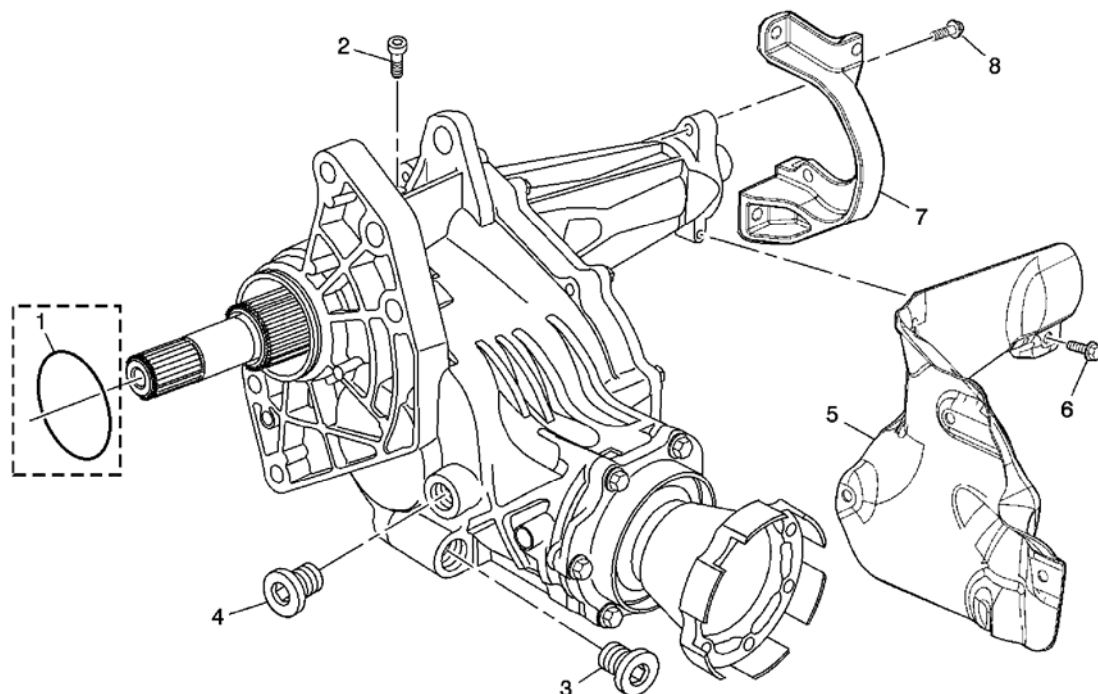


Fig. 31: Housing O-Ring, Vent Assembly, Drain and Fill Plug
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Transfer Case O-Ring Seal - RPO MH4
2	Transfer Case Vent Assembly Tip: Replace the vent if damaged or blocked.
3	Drain Plug CAUTION: Refer to <u>Component Fastener Tightening Caution</u> . Tighten: 39 N.m (29 lb ft)
4	Fill Plug Tighten: 39 N.m (29 lb ft)
5	Transfer Case Heat Shield
6	Transfer Case Heat Shield Bolts (Qty: 3) CAUTION: Refer to <u>Fastener Caution</u> . Tighten: 11 N.m (97 lb in)
7	Transfer Case Bracket

Transfer Case Bracket Bolts (Qty: 2)

Tip: Tighten the bracket bolts to light assembly torque. Tighten to specification after the transfer case is mounted in the vehicle. Refer to **Fastener Tightening Specifications**.

DESCRIPTION AND OPERATION

TRANSFER CASE DESCRIPTION AND OPERATION

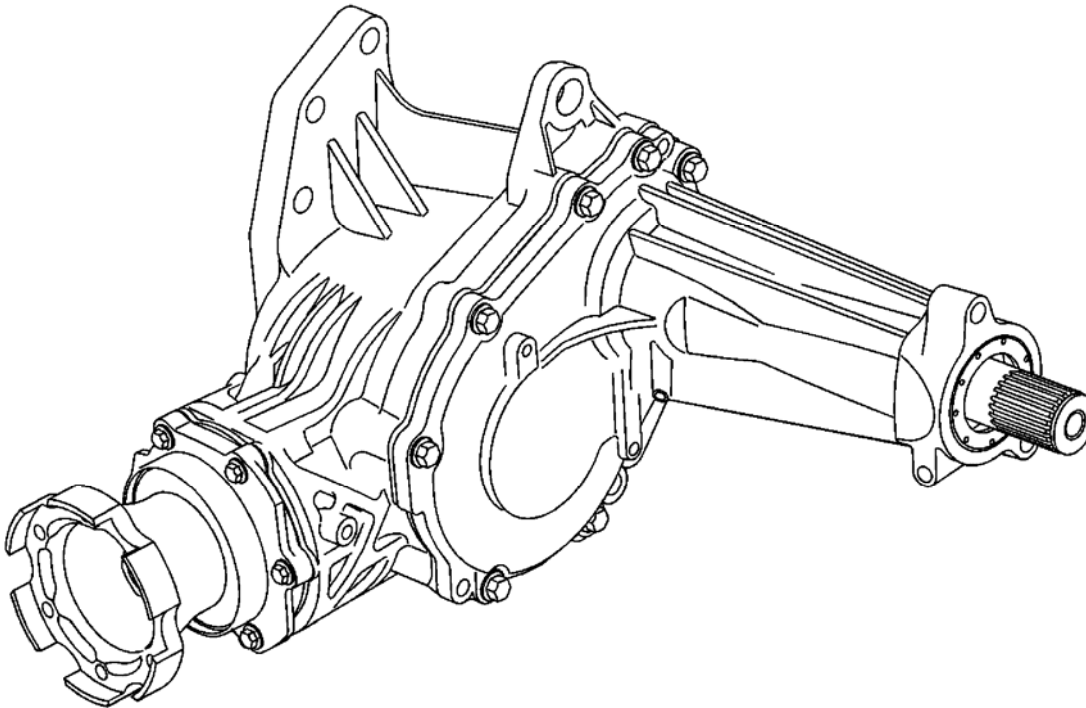


Fig. 32: Transfer Case

Courtesy of GENERAL MOTORS CORP.

Power Take-Off Unit (PTU) Operation

The transfer case PTU in this vehicle consists of an aluminum housing and a ring and pinion power transfer system.

The PTU transfers torque/power using an active on-demand coupling built into the rear differential design via a 1-piece propshaft assembly.

The on-demand rear differential distributes variable torque/power to the rear wheels via individual axle shafts.

The on-demand system operates as follows: the control system of the coupling monitors vehicle conditions, such as vehicle speed and wheel speeds, and commands torque to the rear wheels when depending on these variables. Typical conditions when torque is applied are during vehicle launches, even without wheel slip, and

when there is front wheel slippage relative to the rear wheels. The amount of torque depends on the vehicle speed and the amount of wheel slippage.

PTU Fluid

The PTU uses a specifically developed synthetic hypoid gear lubricant, which is intended for lifetime service. Full fluid level is at the bottom of the fill plug hole.

TRANSFER CASE IDENTIFICATION



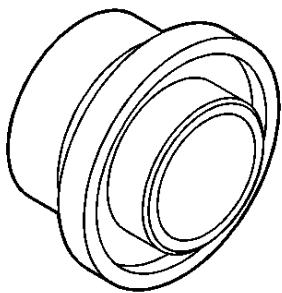
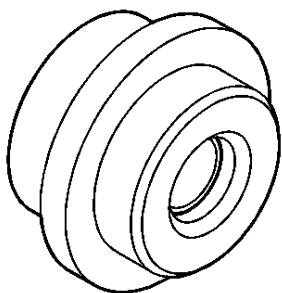
Fig. 33: Identification Tag
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	GM Part Number
2	Getrag Serial Number

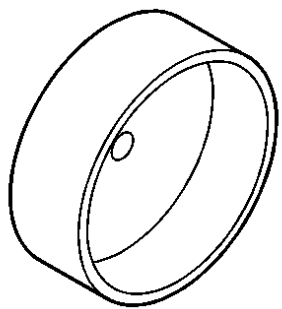
SPECIAL TOOLS AND EQUIPMENT

SPECIAL TOOLS

Illustration	Tool Number/Description
	DT-48074 Input and Output Shaft Seal Installer

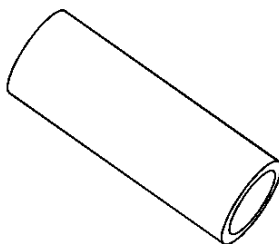
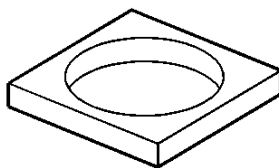
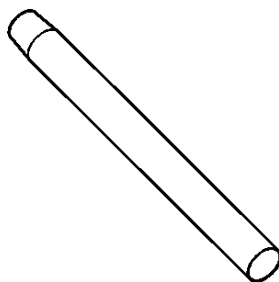
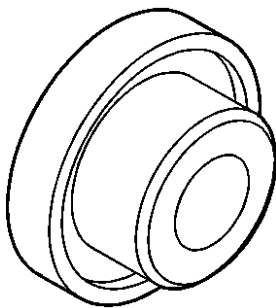


DT-48075
Output Shaft Seal Installer



DT-48077
Output Shaft Slinger Installer

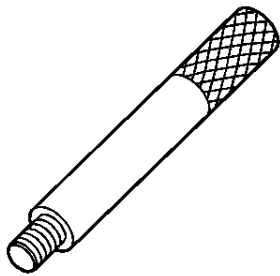
DT-48078
Inner Drive Shaft Seal Installer



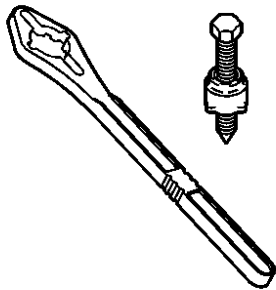
DT-48094
Inner Drive Shaft Seal Protector

DT-48146
Press Support

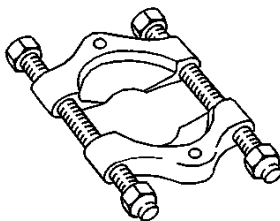
J 5590
Pinion Bearing Race Installer - Rear



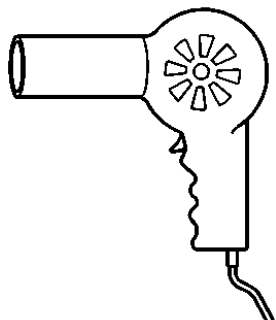
J 8092
Driver Handle



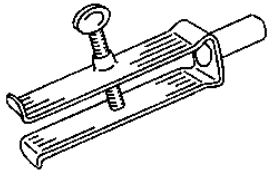
J-08614-A
Pinion Flange Holder and Remover



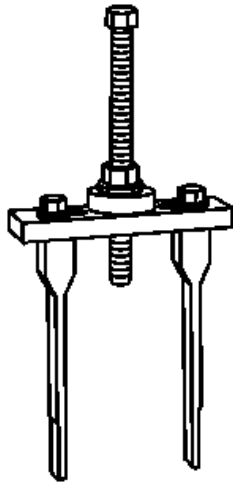
J 22912-B
Rear Pinion and Axle Bearing Remover



J 25070
Heat Gun - 500-750F



J 26941
Bushing and Bearing Remover - 3-4 in



J 45124
Removal Bridge