2007 TRANSMISSION

Transfer Case - Getrag 790 - Outlook

SPECIFICATIONS

APPROXIMATE FLUID CAPACITIES

Approximate Fluid Capacities

Application	Specification	
	Metric	English
Synthetic Lubricant - Transfer Case	0.8 liter	0.85 quart

FASTENER TIGHTENING SPECIFICATIONS

Fastener Tightening Specifications

Application	Specification	
	Metric	English
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: 11)	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

SEALERS, ADHESIVES AND LUBRICANTS

Sealers, Adhesives and Lubricants

Application	Type of Material	GM Part Number	
		United States	Canada
Transfer Case Fill	Synthetic Lubricant	89021677	89021678

SCHEMATIC AND ROUTING DIAGRAMS

ALL-WHEEL DRIVE SCHEMATICS

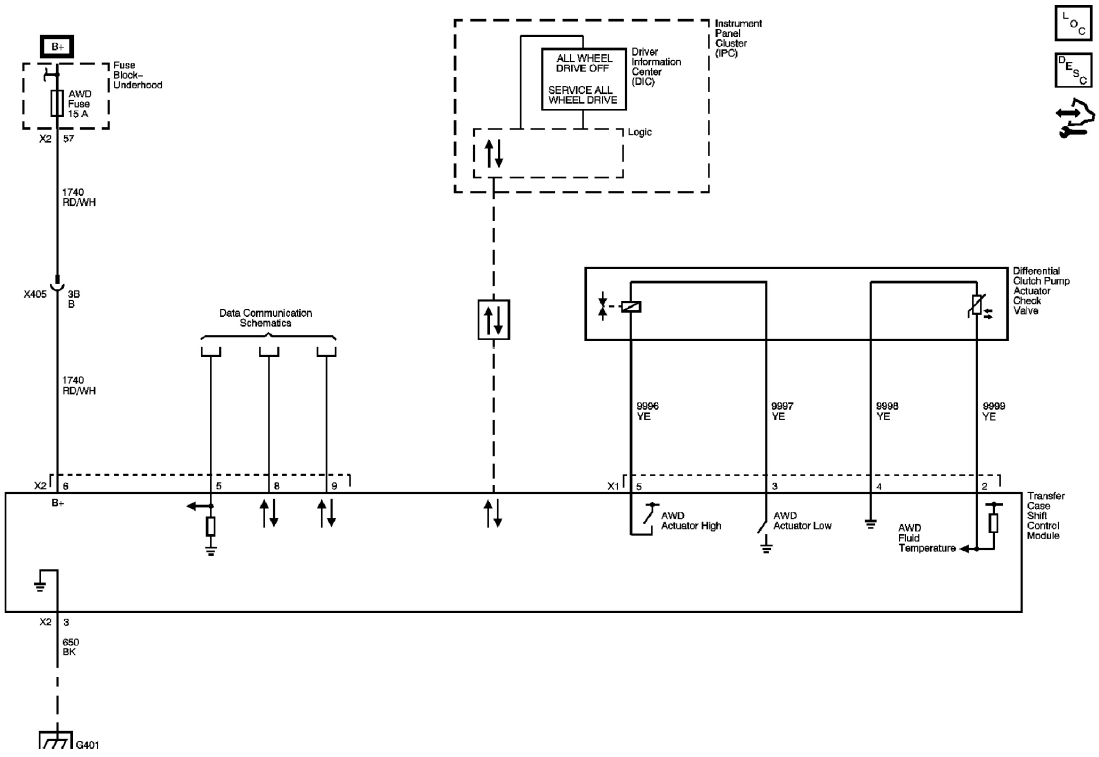


Fig. 1: All-Wheel Drive Schematic (MH6)
Courtesy of GENERAL MOTORS CORP.

COMPONENT LOCATOR

TRANSFER CASE CONTROL COMPONENT VIEWS

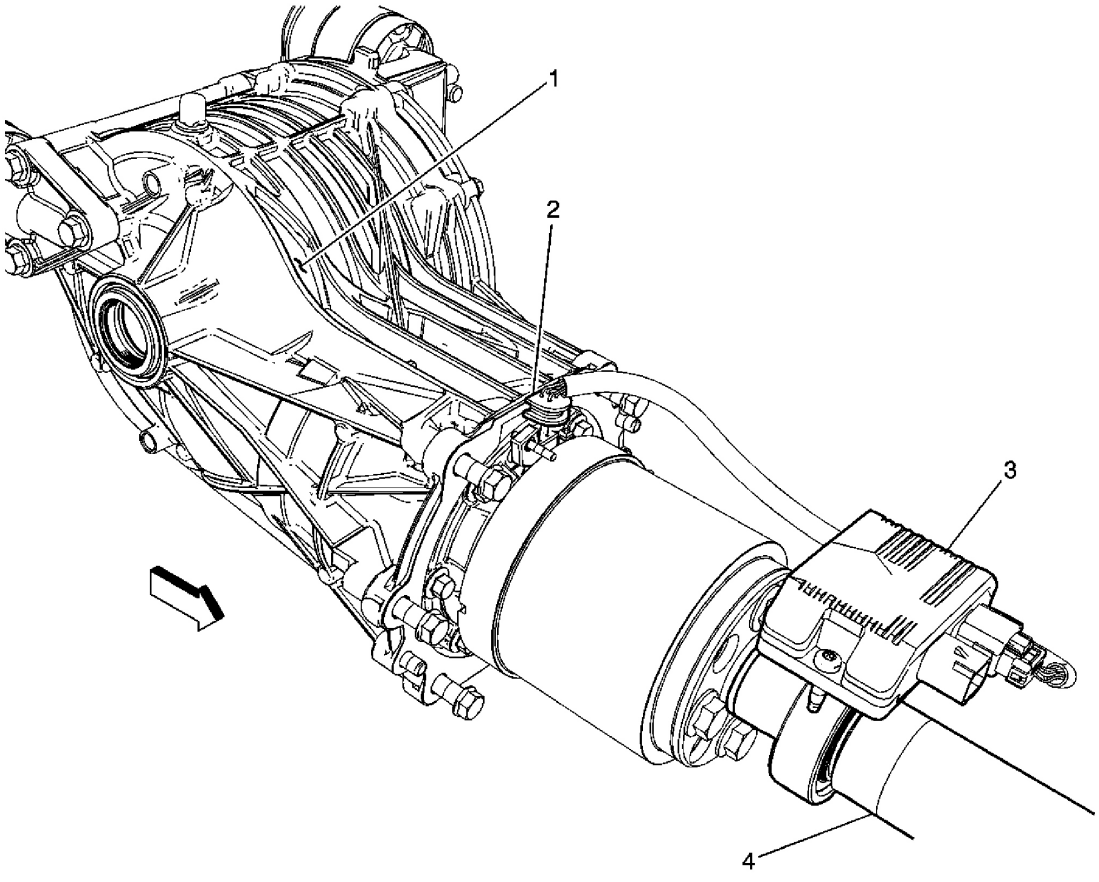


Fig. 2: View Near Rear Differential
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 2

Callout	Component Name
1	Rear Differential
2	Differential Clutch Pump Actuator Check Valve (MH6)
3	Transfer Case Shift Control Module (MH6)
4	Drive Axle

TRANSFER CASE CONTROL CONNECTOR END VIEWS

Transfer Case Shift Control Module X1

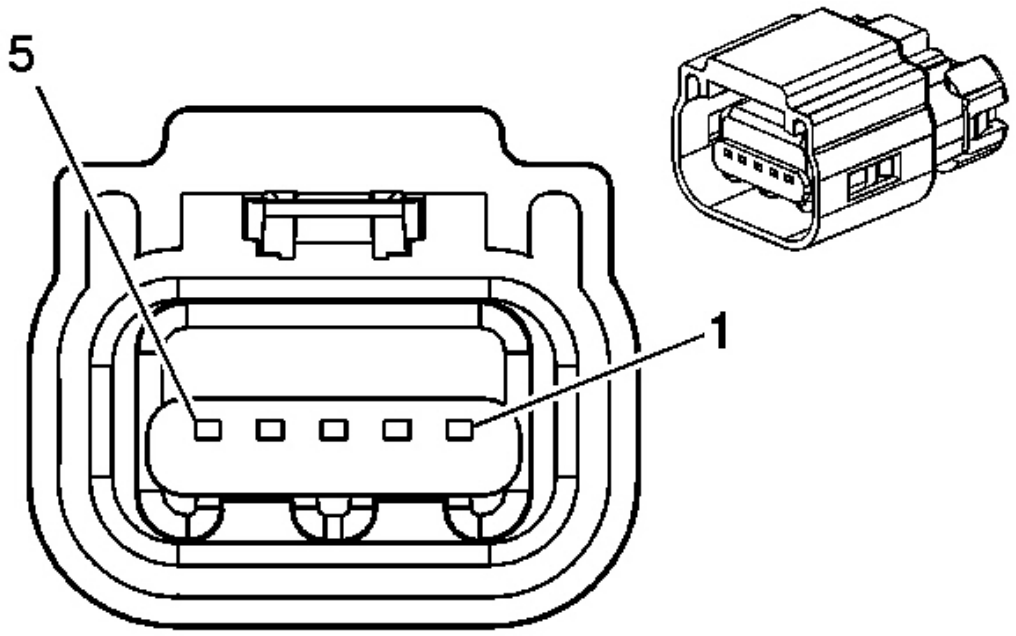


Fig. 3: Transfer Case Shift Control Module X1 Connector End View
Courtesy of GENERAL MOTORS CORP.

Transfer Case Shift Control Module X1 Connector Parts Information

Connector Part Information

- OEM: 89047382
- Service: See Catalog
- Description: 5-Way F (BK)

Terminal Part Information

- Terminal/Tray: See Terminal Repair Kit
- Core/Insulation Crimp: See Terminal Repair Kit
- Release Tool/Test Probe: See Terminal Repair Kit

Transfer Case Shift Control Module X1 Connector Terminal Identification

Pin	Wire	Circuit No.	Function

1	-	-	Not Used
2	0.5 YE	9999	Transfer Case Fluid Temperature Signal
3	0.5 YE	9997	Transfer Case Actuator Low Control
4	0.5 YE	9998	Low Reference
5	0.5 YE	9996	Transfer Case Actuator High Control

Transfer Case Shift Control Module X2

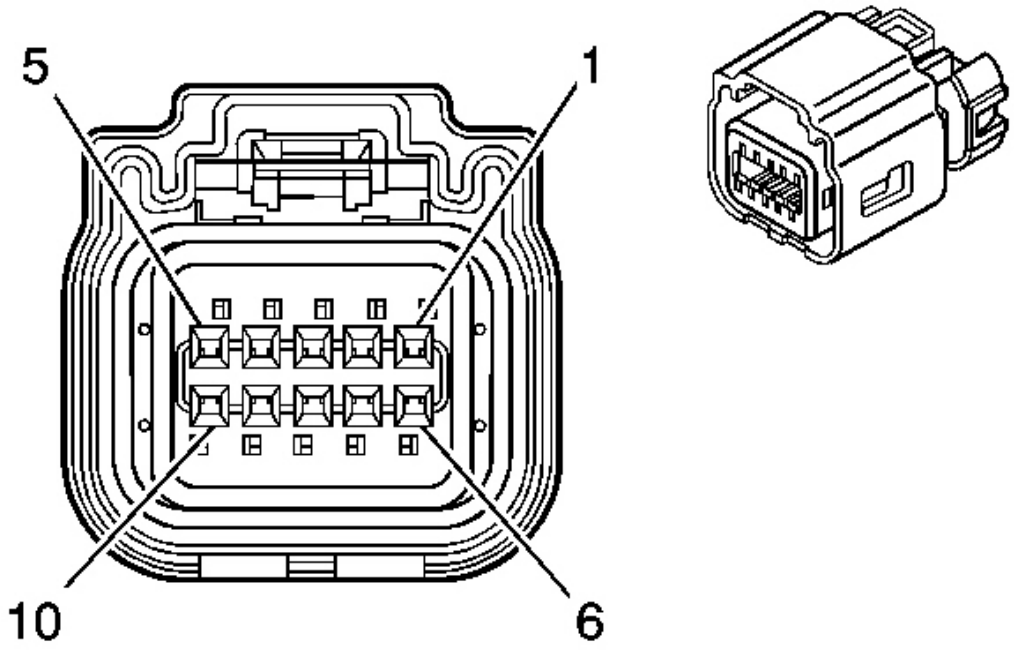


Fig. 4: Transfer Case Shift Control Module X2 Connector End View
Courtesy of GENERAL MOTORS CORP.

Transfer Case Shift Control Module X2 Connector Parts Information

Connector Part Information

- OEM: 13509360
- Service: See Catalog
- Description: 10-Way F Kaizen 0.64 Series, Sealed (BK)

Terminal Part Information

- Terminal/Tray: 7116-4618-02/14
- Core/Insulation Crimp: P/P
- Release Tool/Test Probe: J-38125-215/J-35616-64B (L-BU)

Transfer Case Shift Control Module X2 Connector Terminal Identification

Pin	Wire	Circuit No.	Function
1-2	-	-	Not Used
3	0.5 BK	650	Ground
4	-	-	Not Used
5	0.35 L-BU	5986	Communication Enable
6	0.5 RD/WH	1740	Battery Positive Voltage
7	-	-	Not Used
8	0.35 TN	2501	High Speed GMLAN Serial Data Bus-
9	0.35 TN/BK	2500	High Speed GMLAN Serial Data Bus+
10	-	-	Not Used

TRANSFER CASE DISASSEMBLED VIEW

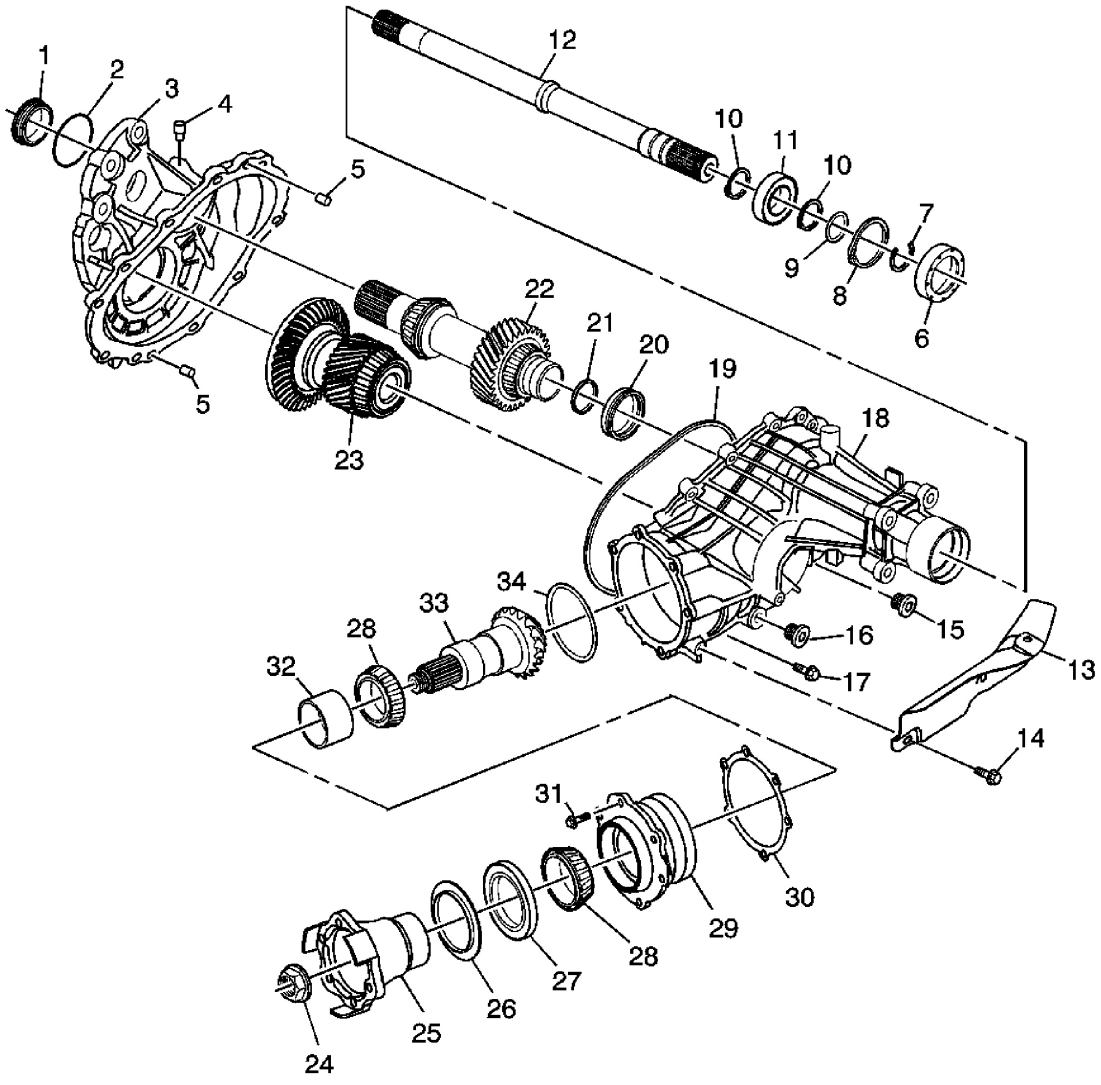


Fig. 5: Exploded View Of Transfer Case
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 5

Callout	Component Name
1	Transfer Case Input Shaft Seal - Left
2	Transfer Case O-Ring Seal
3	Transfer Case - Left
4	Transfer Case Vent Assembly
5	Transfer Case Half Locating Pin (Qty: 2)
5	Transfer Case Half Locating Pin (Qty: 2)

6	Front Wheel Drive Shaft Shield
7	Half Shaft Retainer
8	Front Wheel Drive Retainer
9	O-Ring
10	Front Wheel Drive Intermediate Shaft Bearing Retainer (Qty: 2)
10	Front Wheel Drive Intermediate Shaft Bearing Retainer (Qty: 2)
11	Front Wheel Drive Intermediate Shaft Bearing Assembly
12	Front Wheel Drive Intermediate Shaft
13	Transfer Case Heat Shield
14	Transfer Case Heat Shield Bolt (Qty: 3)
15	Transfer Case Fill Plug
16	Transfer Case Drain Plug
17	Transfer Case Half Bolt (Qty: 11)
18	Transfer Case - Right
19	Transfer Case Seal
20	Transfer Case Input Shaft Seal - Right
21	Front Drive Axle Intermediate Shaft Seal Assembly
22	Transfer Case Input Shaft
23	Transfer Case Rear Output Drive Shaft
24	Transfer Case Rear Output Shaft Nut
25	Transfer Case Rear Output Shaft Flange
26	Transfer Case Rear Output Shaft Oil Slinger
27	Transfer Case Rear Output Shaft Seal
28	Transfer Case Rear Output Shaft Bearing Assembly (Qty: 2)
28	Transfer Case Rear Output Shaft Bearing Assembly (Qty: 2)
29	Transfer Case Rear Output Shaft Housing
30	Transfer Case Rear Output Shim
31	Transfer Case Rear Output Shaft Housing Bolt (Qty: 6)
32	Transfer Case Rear Output Shaft Bearing Spacer
33	Transfer Case Rear Output Shaft
34	Transfer Case Rear Output Shaft Housing Seal O-Ring

DIAGNOSTIC INFORMATION AND PROCEDURES

DIAGNOSTIC STARTING POINT - TRANSFER CASE

Begin the system diagnosis by reviewing the **Transfer Case Disassembled View**, **Transfer Case Description and Operation** and **Rear Drive Axle Description and Operation** . Reviewing the description and operation information helps you determine the correct symptom diagnostic procedure when a malfunction exists. Reviewing the description and operation information also helps you determine if the condition described by the customer is normal operation. Refer to **Symptoms - Transfer Case** in order to identify the correct procedure for diagnosing the system and where the procedure is located.

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 Starting Point - Transfer Case**
- **Diagnostic Starting Point - Rear Differential Carrier**
- **Noisy in Drive**
- **Noisy When Coasting**
- **Intermittent Noise**
- **Constant Noise**
- **Transfer Case Leak Diagnosis**

NOISY IN DRIVE

Noisy in Drive

Cause	Correction
Inspect for the proper transaxle and gear oil levels prior to performing system diagnosis. Refer to **Transfer Case Fluid Replacement**.	
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 **Transfer Case Fluid Replacement**.
Loose propeller shaft mounting bolts	Tighten the bolts, as required. Refer to **Propeller Shaft Replacement** .
Worn propeller shaft constant velocity joints	Replace propeller shaft assembly. Refer to **Propeller Shaft Replacement** .
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 indicate a loose or missing dampener.	Tighten the dampener retaining bolt or replace the torque tube assembly, as required.
Incorrect gear oil in the transfer case	Replace the gear oil. Refer to **Sealers, Adhesives and Lubricants**.

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

Noisy When Coasting

Cause	Correction
Inspect for the proper transaxle and gear oil levels prior to performing system diagnosis. Refer to **Transfer Case Fluid Replacement**.	
Loose propeller shaft mounting bolts	Tighten the bolts, as required. Refer to **Propeller Shaft Replacement** .
Worn propeller shaft constant velocity joints	Replace the propeller shaft assembly. Refer to **Propeller Shaft Replacement** .
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 **Sealers, Adhesives and Lubricants**.
Bearing noise within the transfer case A grinding or roar type noise will increase or	1. Inspect for the proper fluid level. Fill, as required.

decrease relative to the vehicle speed.	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

Intermittent Noise

Cause	Correction
Inspect for the proper transaxle and gear oil levels prior to performing system diagnosis. Refer to **Transfer Case Fluid Replacement**.	
Loose propeller shaft mounting bolts	Tighten the bolts, as required. Refer to **Propeller Shaft Replacement** .
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 **Sealers, Adhesives and Lubricants**.

CONSTANT NOISE

Constant Noise

Cause	Correction
Inspect for the proper transaxle and gear oil levels prior to performing system diagnosis. Refer to **Transfer Case Fluid Replacement**.	
Low gear oil levels	Faulty oil seals or other type of external leaks may contribute to lower than required fluid levels. Refer to **Transfer Case Leak**

	Diagnosis. Fill to proper level with gear oil. Refer to **Sealers, Adhesives and Lubricants**.
Worn propeller shaft constant velocity joints	Replace the propeller shaft assembly. Refer to **Propeller Shaft Replacement** .
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

Transfer Case Leak Diagnosis

Cause	Correction
Drain and fill the unit with new oil with ultraviolet dye **J 28431-6** before using the **J 28428-E** black light, when inspecting for leaks.	
Restricted or damaged ventilation assembly	Replace the ventilation assembly, as required.
Worn, scored or missing drain and/or fill plug sealing washers	Install new drain plugs and tighten the plugs per specifications.
Worn or damaged input or output shaft oil seal	Replace the output shaft oil seal, as required.
Cut or damaged output housing O-ring seal	Replace the O-ring seal, as required.
Worn internal shaft oil seals	Replace the oil seals, as required.

Worn or damaged internal shaft oil seals may be detected by a fluid leak at the vent hole area on the bottom of the cover.	
Worn or damaged right side axle shaft oil seal	Replace the axle shaft oil seal and axle shaft, as required.
Cut or damaged transaxle assembly-to-transfer case O-ring seals	Replace the O-ring seals, as required.
Cases or housings porosity or leaking seal surfaces	Replace the transfer case assembly if it cannot be repaired.

REPAIR INSTRUCTIONS

TRANSFER CASE FLUID REPLACEMENT

Removal Procedure

1. Raise and support the vehicle. Refer to **Lifting and Jacking the Vehicle** .
2. Remove the exhaust flexible pipe. Refer to **Exhaust Flexible Pipe Replacement** .

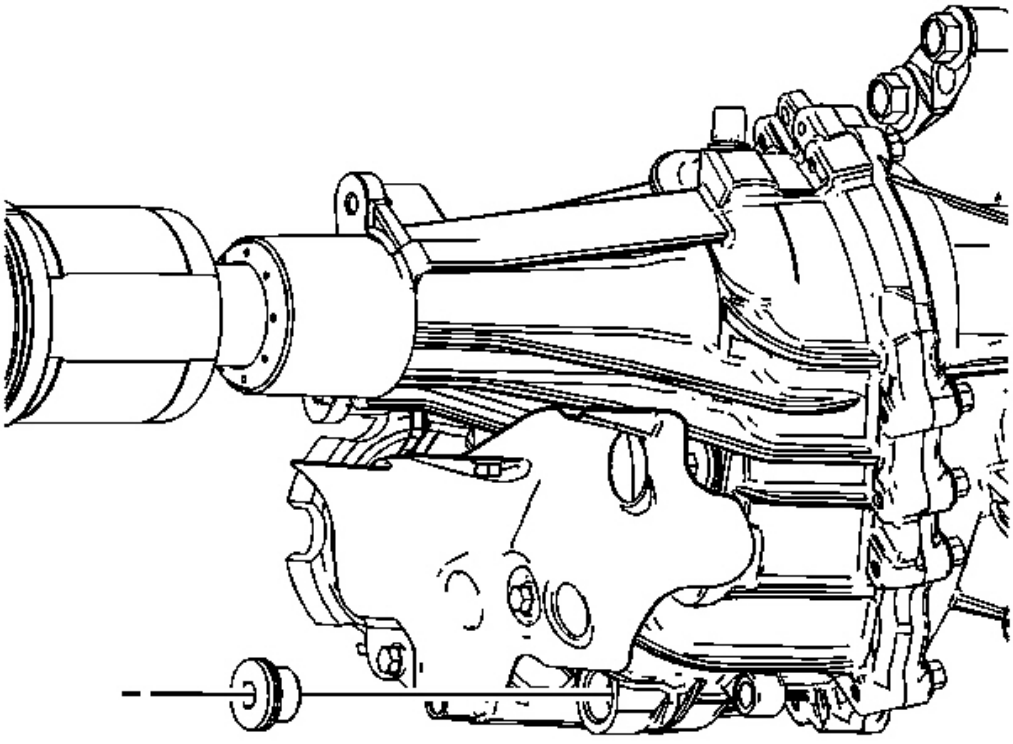


Fig. 6: Identifying Drain Plug
Courtesy of GENERAL MOTORS CORP.

3. Remove the drain plug.

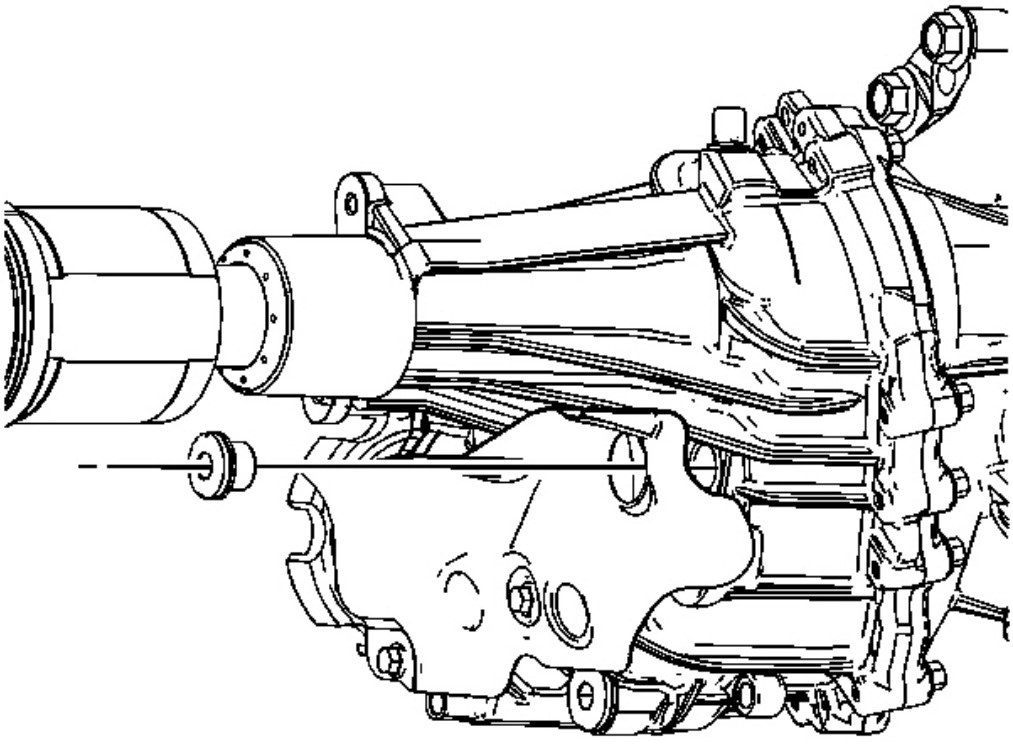


Fig. 7: Identifying Fill Plug
Courtesy of GENERAL MOTORS CORP.

4. Remove the fill plug.

Installation Procedure

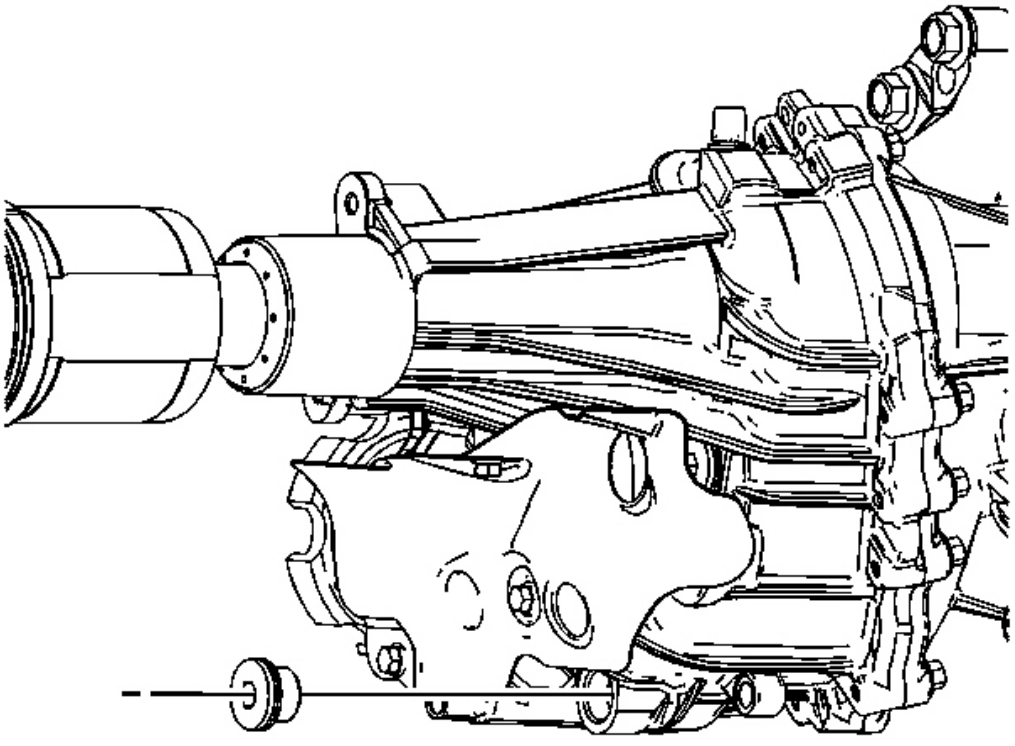


Fig. 8: Identifying Drain Plug
Courtesy of GENERAL MOTORS CORP.

1. Clean the drain plug and apply sealant GM P/N 12346004 (Canadian P/N 10953480) to the threads.

NOTE: Refer to Component Fastener Tightening Notice .

2. Install the drain plug.

Tighten: Tighten the drain plug to 39 N.m (29 lb ft).

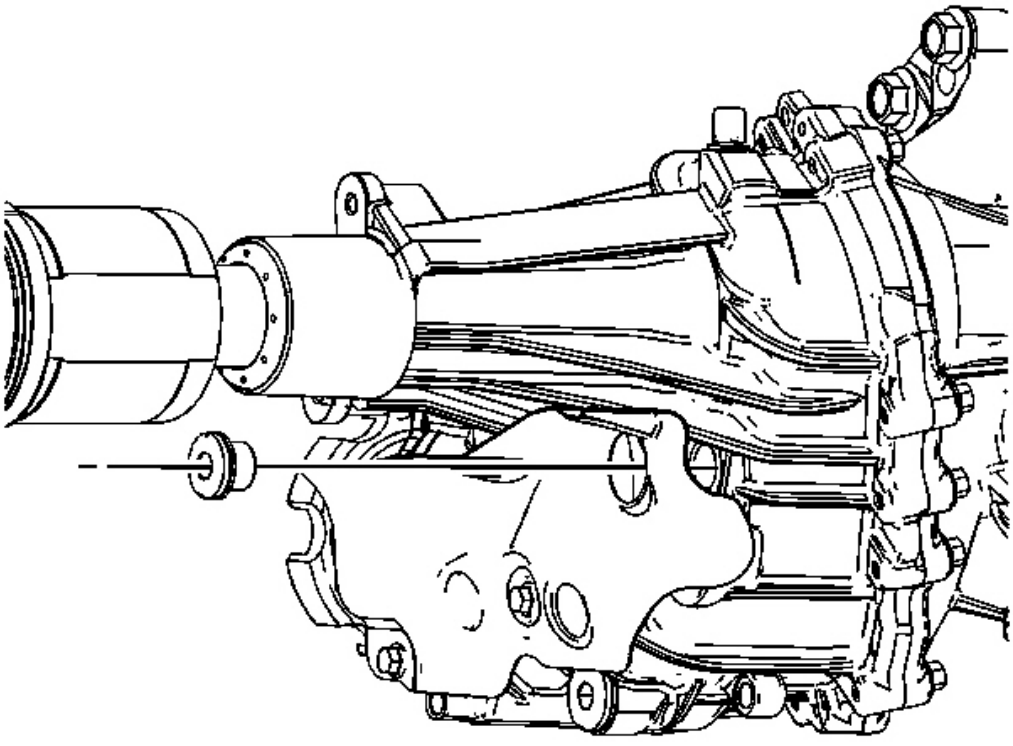


Fig. 9: Identifying Fill Plug
Courtesy of GENERAL MOTORS CORP.

3. Fill the transfer case with synthetic gear lubricant GM P/N 12378514 (Canadian P/N 88901045) to the bottom of the fill plug or 540 ml (18.2 oz.).
4. Clean the fill plug and apply adhesive GM P/N 12345493 (Canadian P/N 10953488) to the threads.
5. Install the fill plug.

   Tighten: Tighten the fill plug to 39 N.m (29 lb ft).

6. Install the exhaust flexible pipe. Refer to **Exhaust Flexible Pipe Replacement** .
7. Lower the vehicle.

TRANSFER CASE ASSEMBLY REPLACEMENT

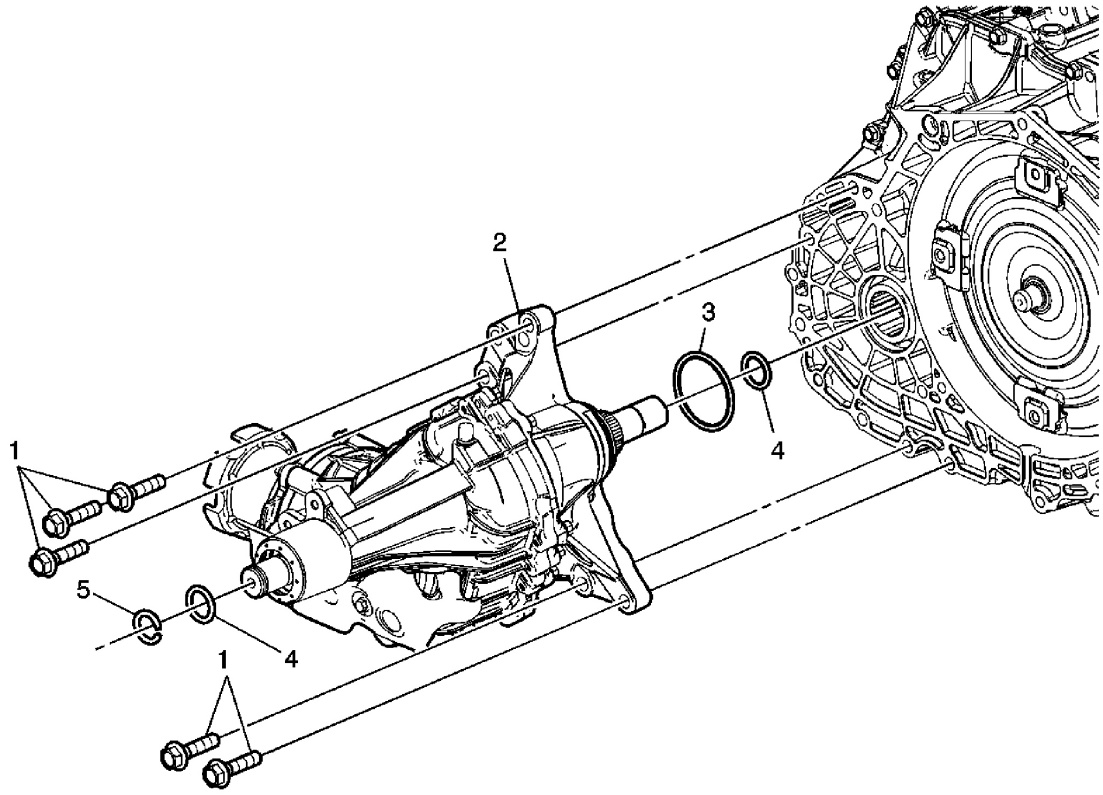


Fig. 10: View Of Transfer Case Assembly
Courtesy of GENERAL MOTORS CORP.

Transfer Case Assembly Replacement

Callout	Component Name
Preliminary Procedures 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 exhaust flexible pipe. Refer to **Exhaust Flexible Pipe Replacement** . 6. Remove the engine front mount bracket. Refer to **Engine Front Mount Bracket Replacement** . 7. Support the transaxle with a jackstand.	
	Transfer Case Bolt (Qty: 5)

1	**NOTE:** **Refer to Fastener Notice .** **Tighten:** 50 N.m (37 lb ft)
2	Transfer Case
3	Transfer Case O-Ring Seal
4	Intermediate Shaft O-Ring Seal (Qty: 2)
5	Half Shaft Retainer

TRANSFER CASE DISASSEMBLE

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

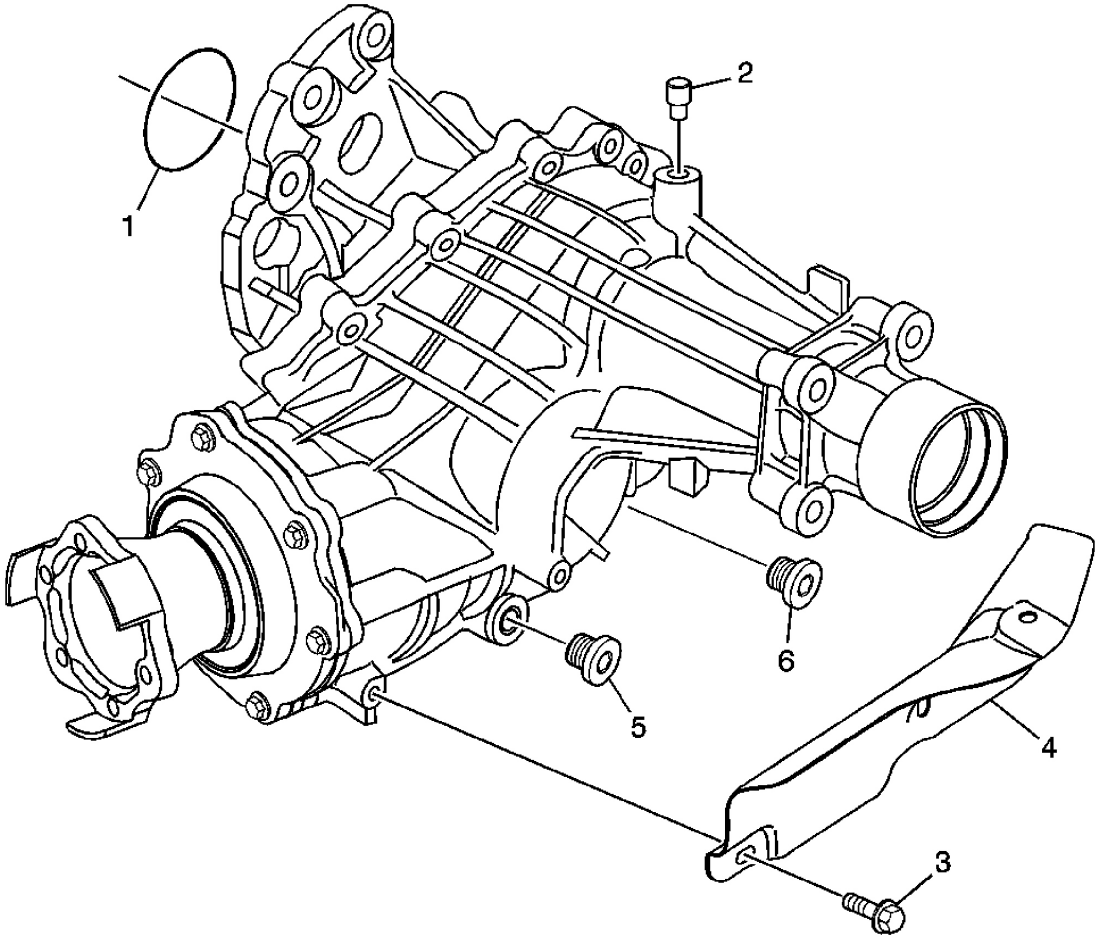


Fig. 11: Identifying Housing O-Ring, Vent Assembly, Drain & Fill Plug
Courtesy of GENERAL MOTORS CORP.

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

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

Intermediate Drive Shaft Removal

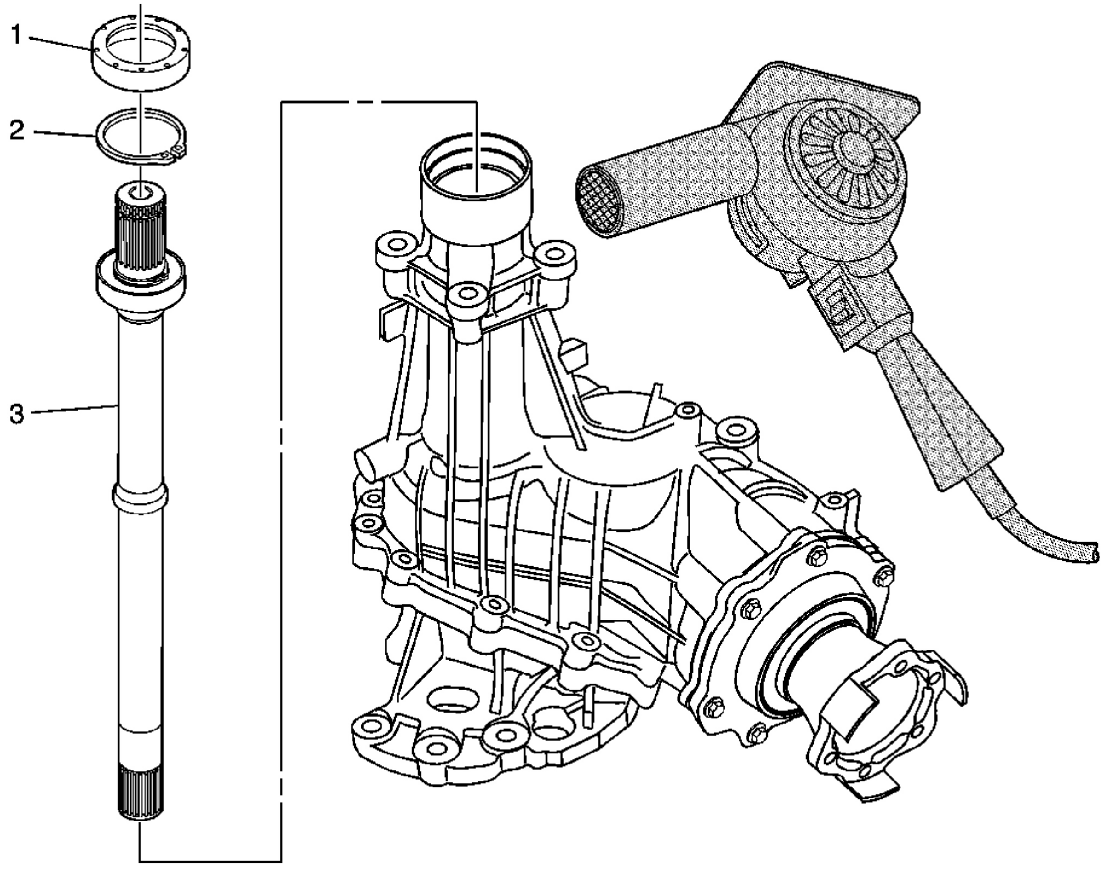


Fig. 12: View Of Intermediate Drive Shaft
Courtesy of GENERAL MOTORS CORP.

Intermediate Drive Shaft Removal

Callout	Component Name

1	Front Wheel Drive Shaft Shield
2	Front Wheel Drive Retainer
3	Front Wheel Drive Intermediate Shaft **Special Tools:** **J 25070** Heat Gun - 500-750F

Rear Output Shaft Housing Removal

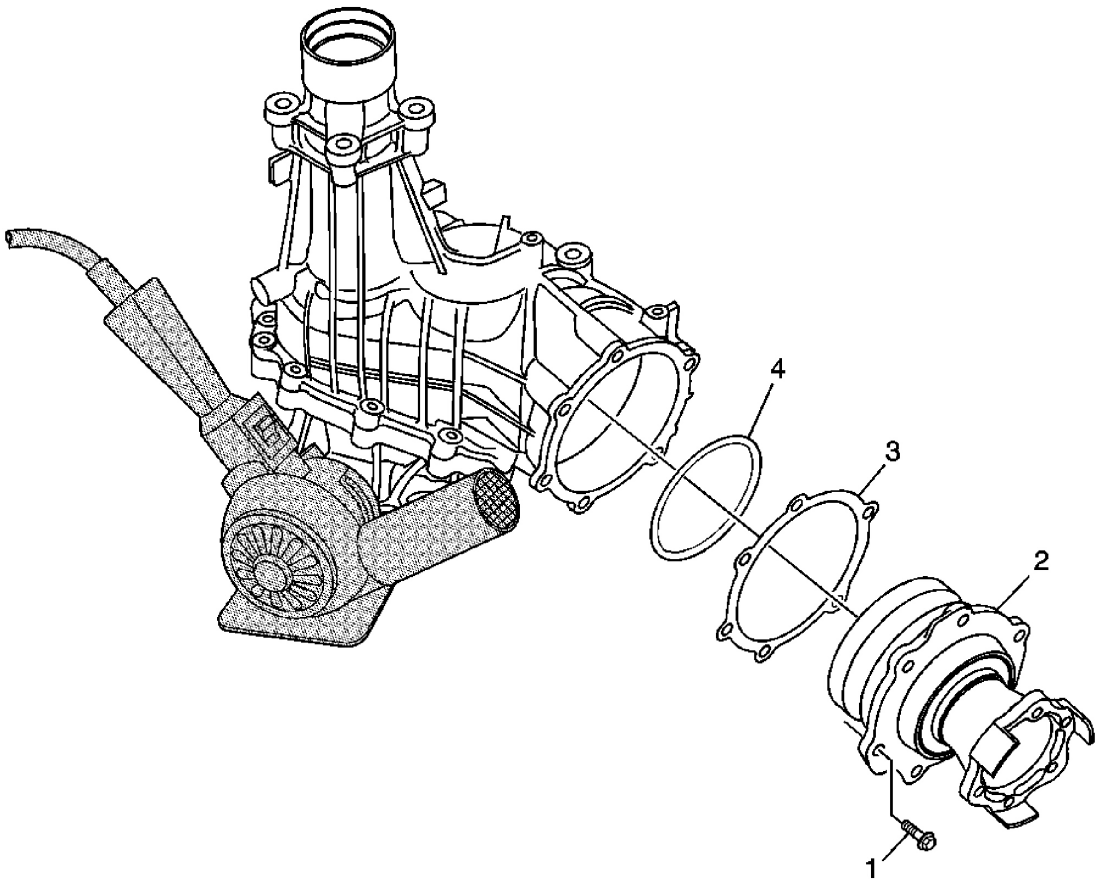


Fig. 13: View Of Rear Output Shaft Housing
Courtesy of GENERAL MOTORS CORP.

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

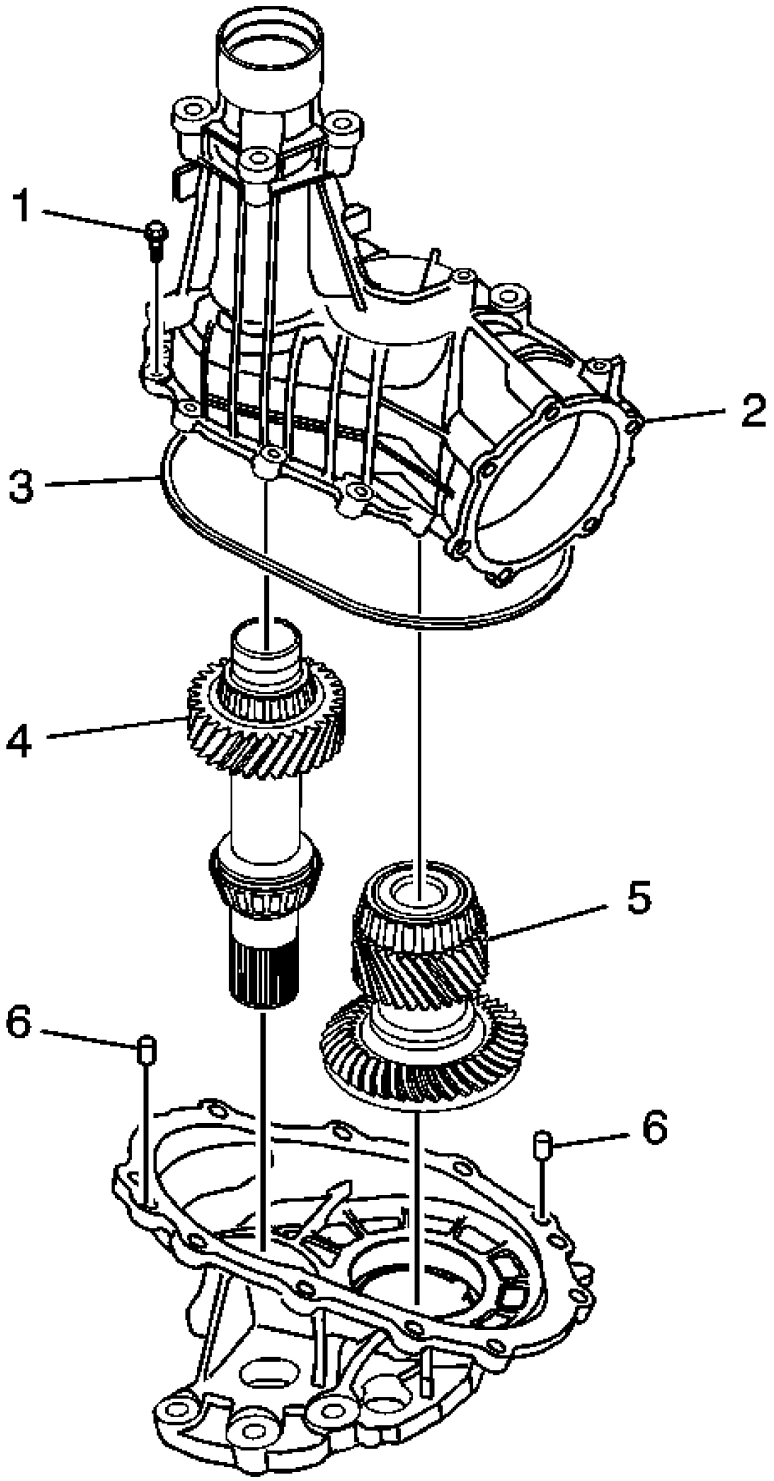


Fig. 14: Identifying Right Transfer Case, Input And Output Drive Shaft
Courtesy of GENERAL MOTORS CORP.

Right Transfer Case, Input and Output Drive Shaft Removal

Callout	Component Name
1	Transfer Case Half Bolt (Qty: 11)
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 Pin (Qty: 2) Refer to **Transfer Case Cleaning and Inspection**. **Tip:** • Remove the pins only if damaged. • Inspect the case for similar damage.

Rear Output Shaft Housing Disassembly

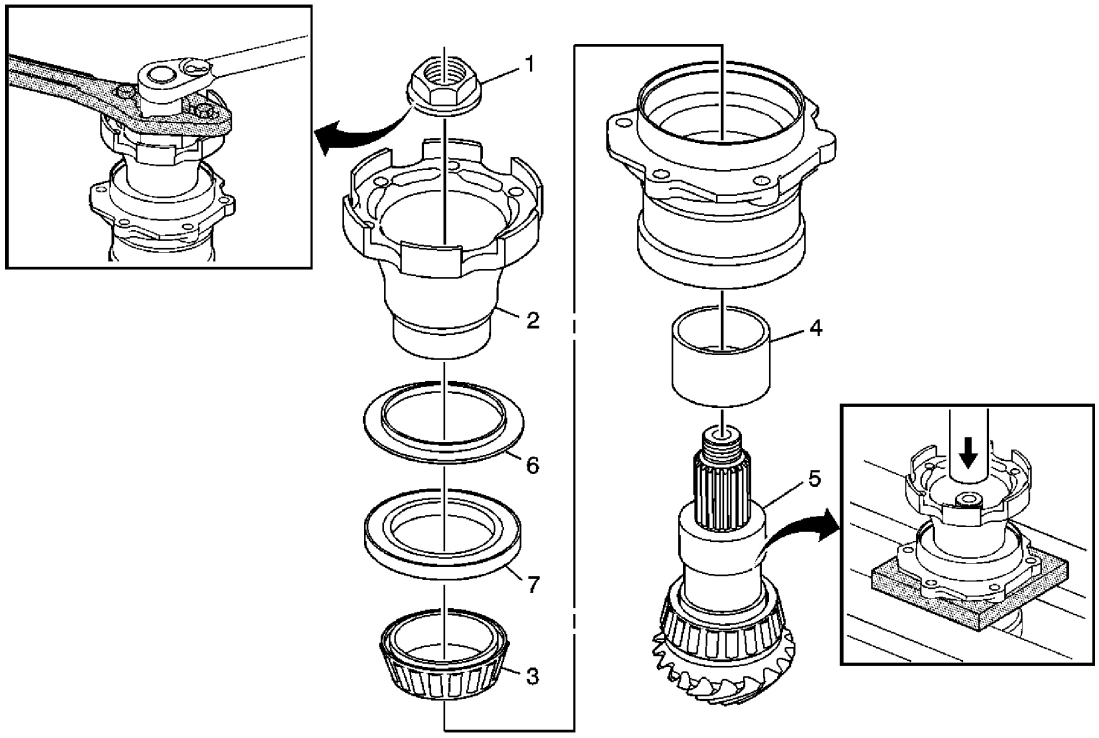


Fig. 15: Exploded View Of Rear Output Shaft Housing
Courtesy of GENERAL MOTORS CORP.

Rear Output Shaft Housing Disassembly

Callout	Component Name

1	Transfer Case Rear Output Shaft Gear Nut **Tip:** Use a 30 mm socket or **J 29873** . **Special Tools:** **J-08614-A** Pinion Flange Holder and Remover. See **Special Tools**.
2	Transfer Case Rear Output Shaft Flange **Special Tools:** **DT-48145** Press Support. See **Special Tools**.
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 Refer to **Rear Output Drive Housing Cleaning and Inspection**. **Tip:** Remove the slinger only if damaged.
7	Transfer Case Rear Output Shaft Seal **Tip:** Discard the seal after removal.

Intermediate Drive Shaft Disassembly

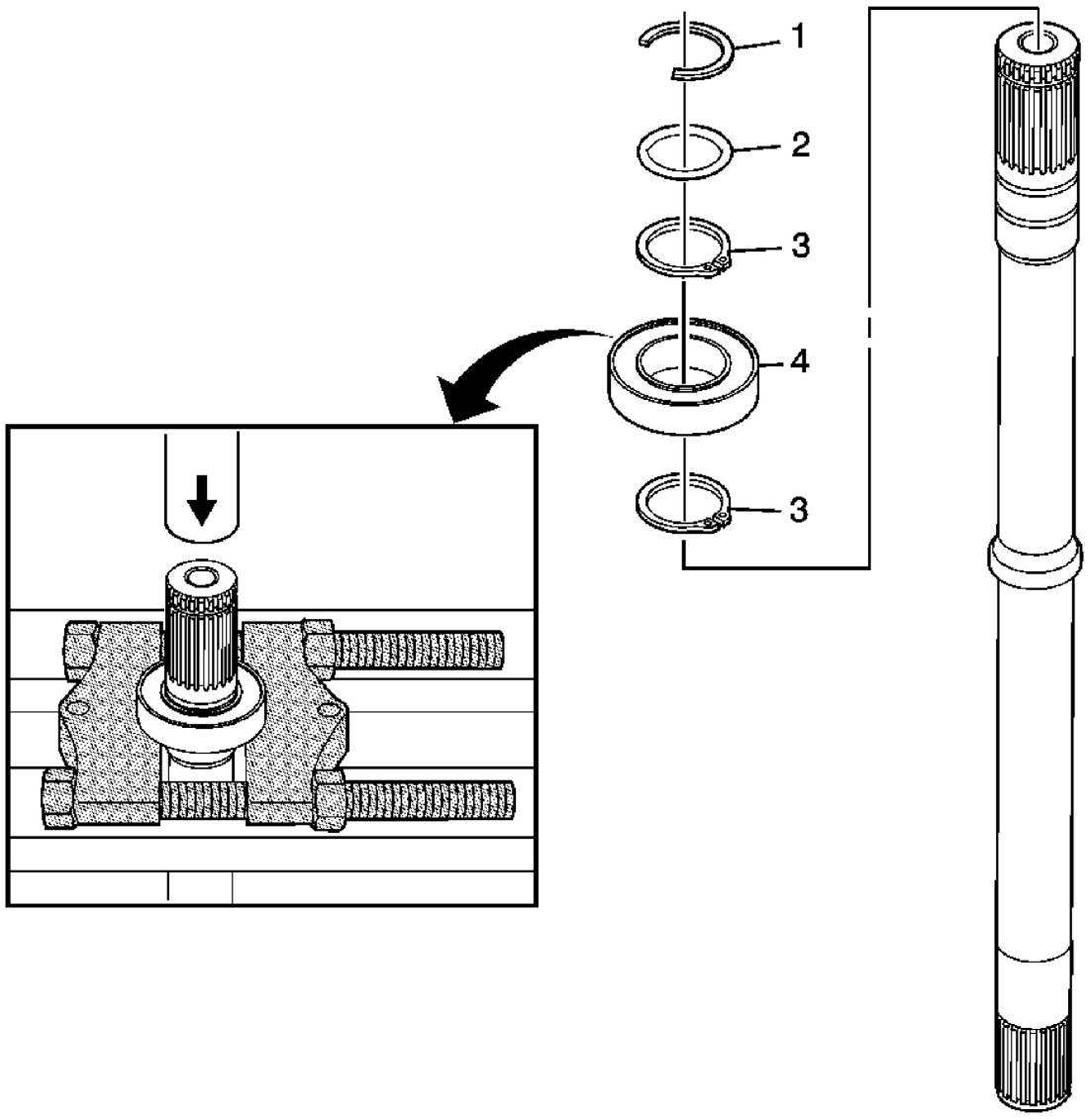


Fig. 16: Identifying Intermediate Drive Shaft
Courtesy of GENERAL MOTORS CORP.

Intermediate Drive Shaft Disassembly

Callout	Component Name
1	Half Shaft Retainer
2	O-Ring
3	Front Wheel Drive Intermediate Shaft Bearing Retainer (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

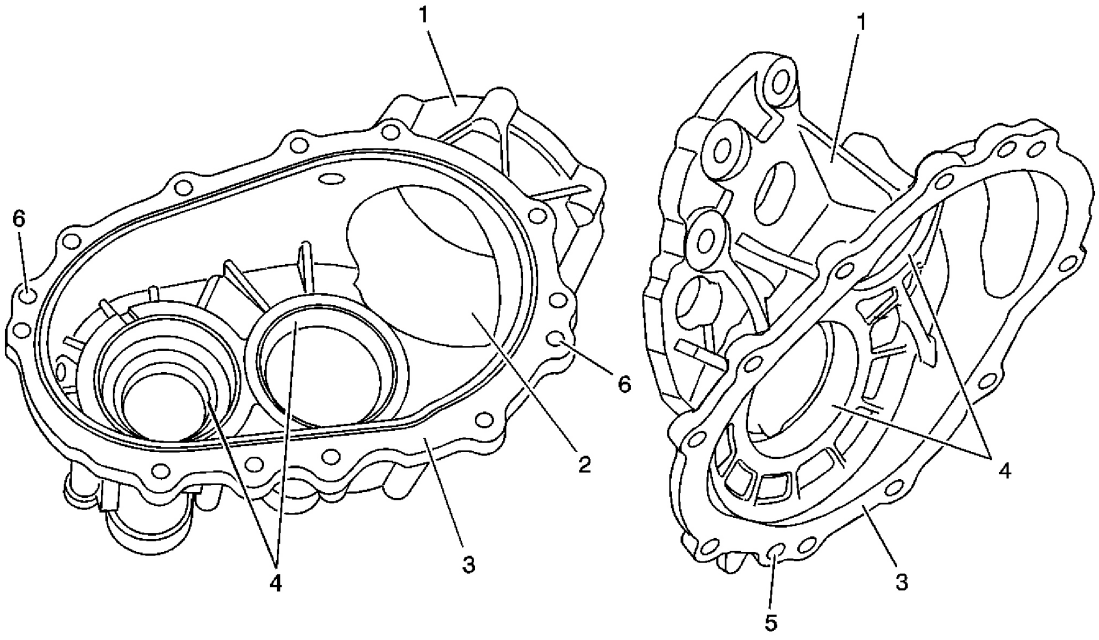


Fig. 17: Identifying Transfer Case Components
Courtesy of GENERAL MOTORS CORP.

Transfer Case Cleaning and Inspection

Callout	Component Name
NOTE: **Refer to Machined Surface Damage Notice .** **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 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

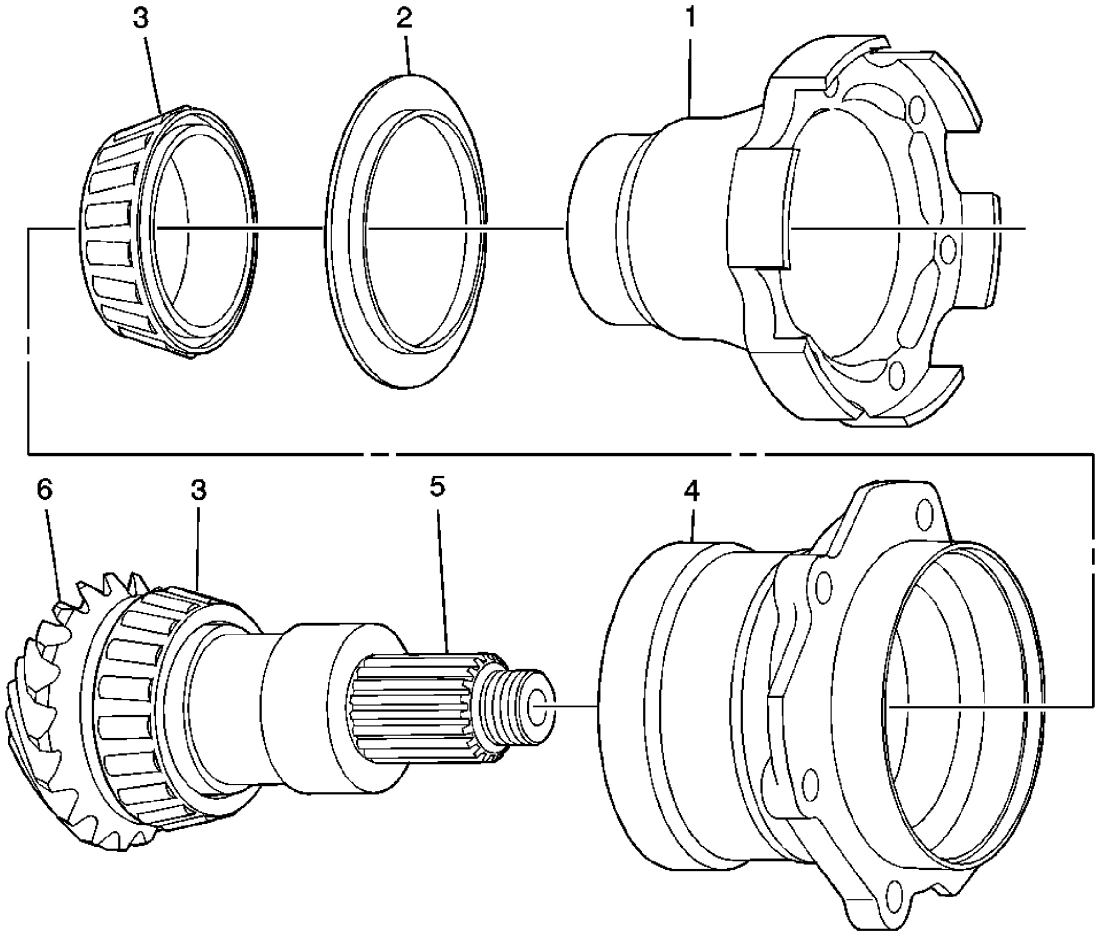


Fig. 18: Exploded View Of Rear Output Drive Housing
Courtesy of GENERAL MOTORS CORP.

Rear Output Drive Housing Cleaning and Inspection

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

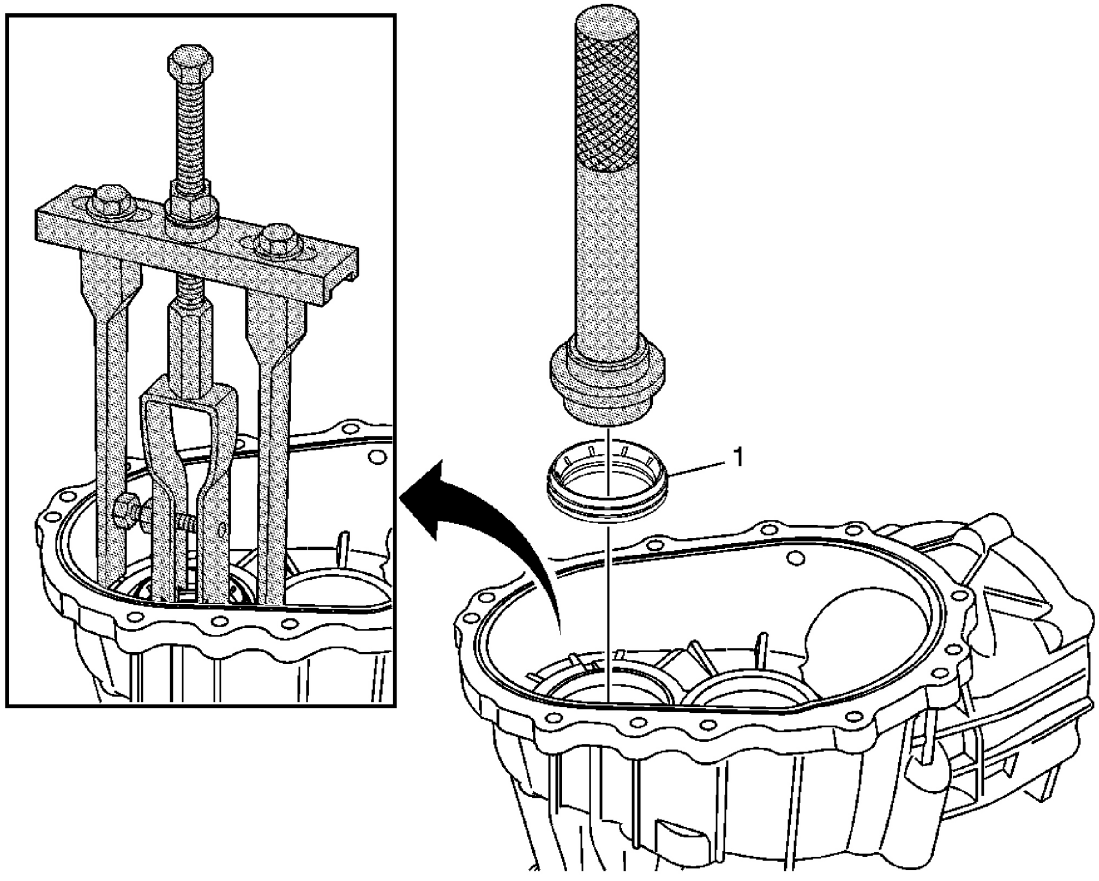


Fig. 19: Identifying Input Shaft Seal - Right
Courtesy of GENERAL MOTORS CORP.

Input Shaft Seal Replacement - Right

Callout	Component Name
1	Transfer Case Input Shaft Seal - Right **NOTE:** **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. See **Special Tools**. • **J 8092** Driver Handle • **J 26941** Bushing and Bearing Remover - 3-4 in. See **Special Tools**.

	• **J 45124** Removal Bridge

INPUT SHAFT SEAL REPLACEMENT - LEFT

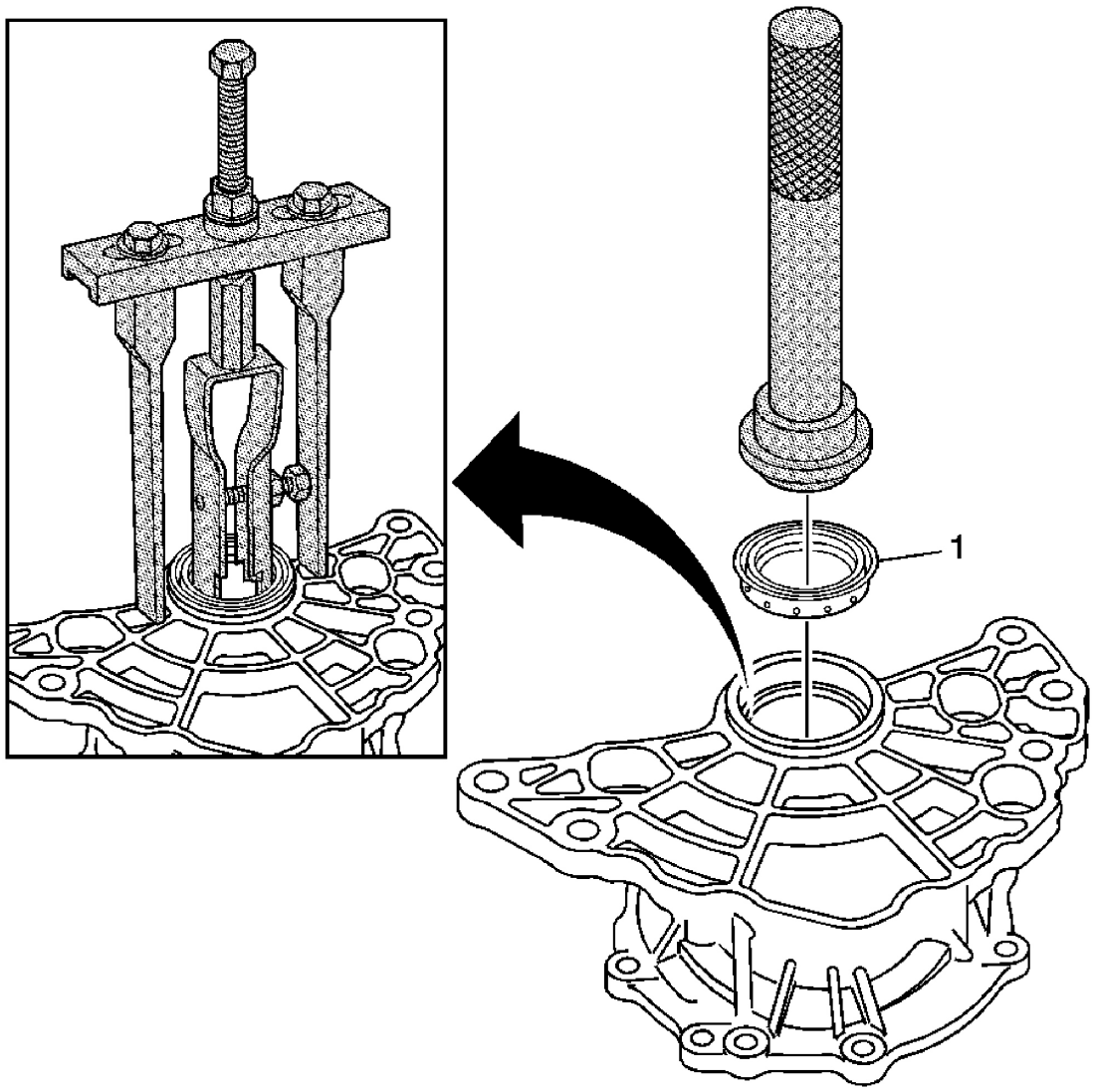


Fig. 20: Identifying Input Shaft Seal - Left
Courtesy of GENERAL MOTORS CORP.

Input Shaft Seal Replacement - Left

Callout	Component Name
	Transfer Case Input Shaft Seal - Left **NOTE:**

1	**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. See **Special Tools**. • **J 8092** Driver Handle • **J 26941** Bushing and Bearing Remover - 3-4 in. See **Special Tools**. • **J 45124** Removal Bridge

FRONT DRIVE AXLE INNER SHAFT SEAL REPLACEMENT

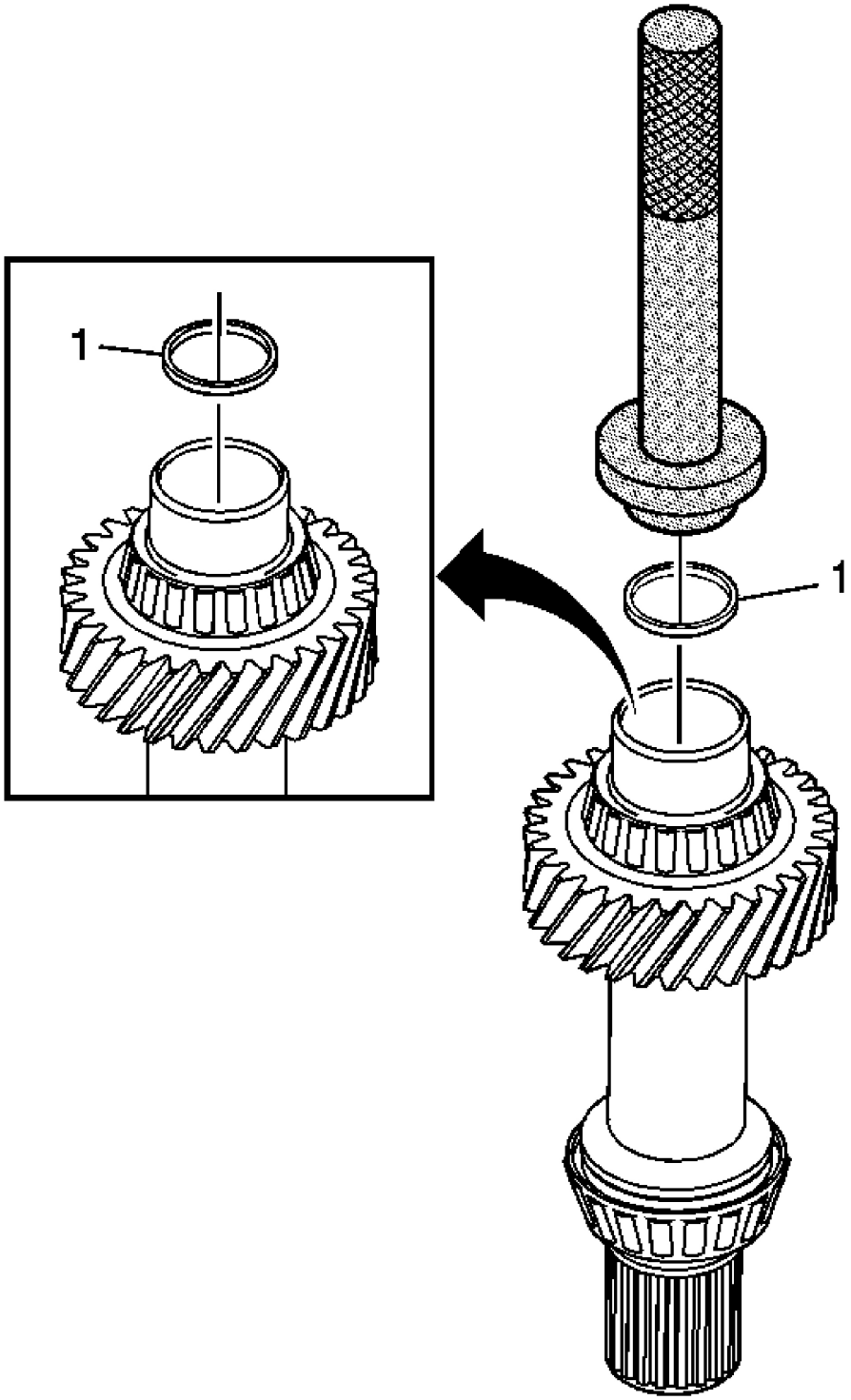


Fig. 21: Locating Front Drive Axle Inner Shaft Seal
Courtesy of GENERAL MOTORS CORP.

Front Drive Axle Inner Shaft Seal Replacement

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

INPUT SHAFT AND REAR OUTPUT DRIVE SHAFT CLEANING AND INSPECTION

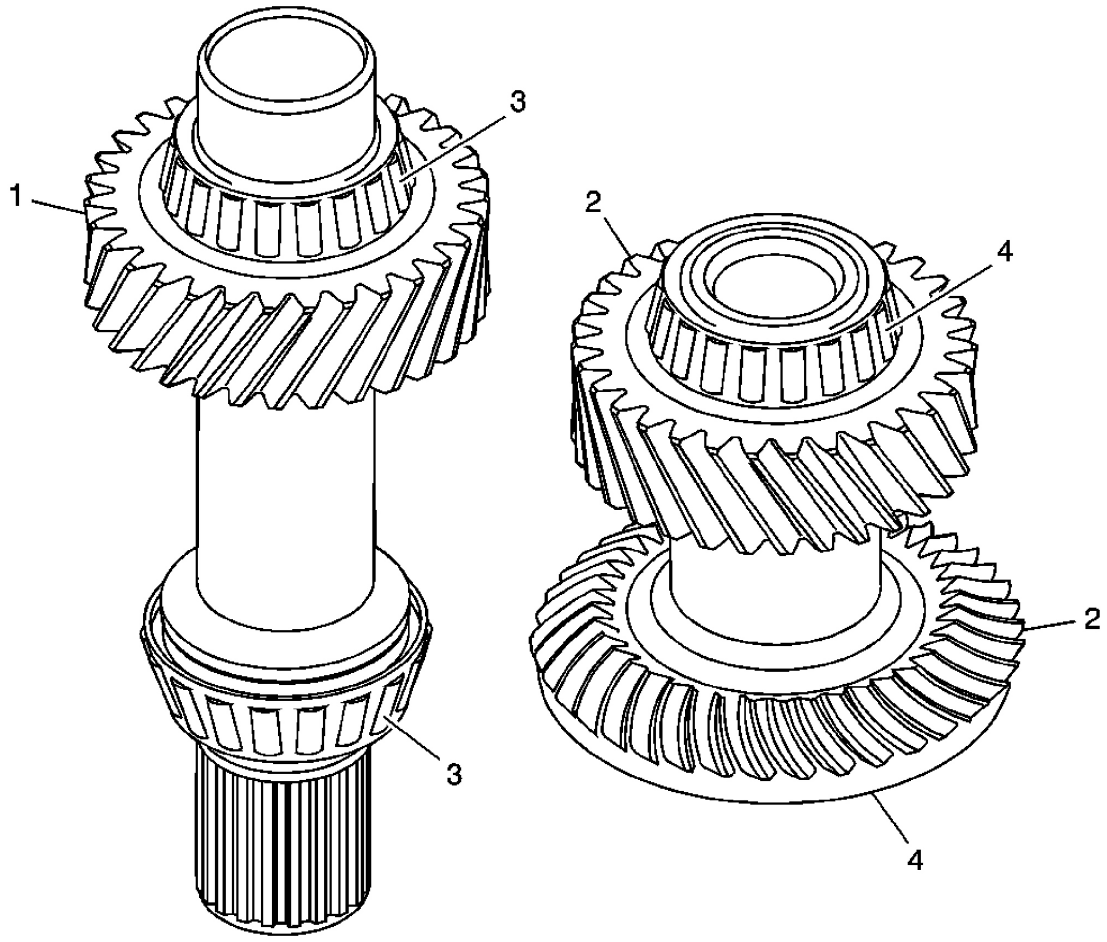


Fig. 22: Identifying Input Shaft And Rear Output Drive Shaft
Courtesy of GENERAL MOTORS CORP.

Input Shaft and Rear Output Drive Shaft Cleaning and Inspection

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

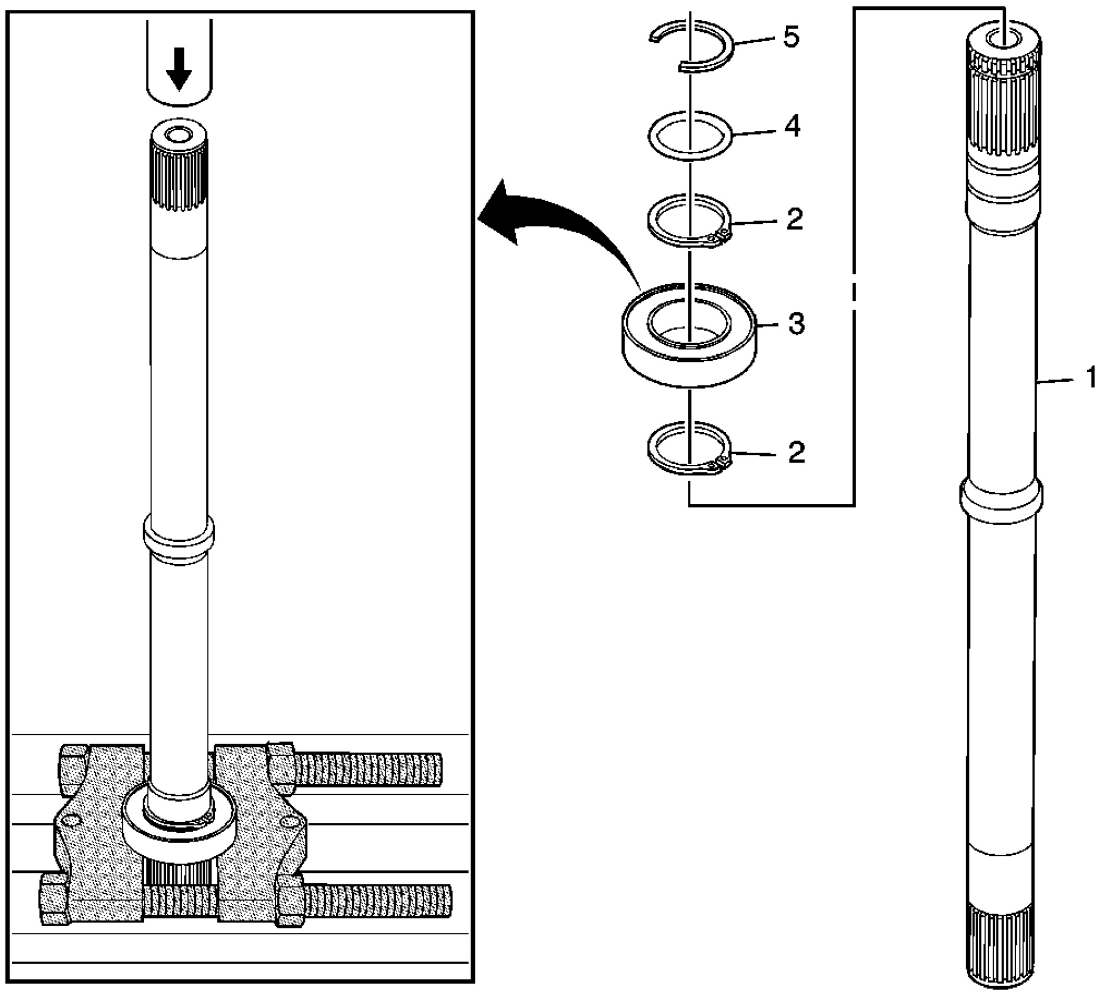


Fig. 23: View Of Intermediate Drive Shaft Components
Courtesy of GENERAL MOTORS CORP.

Intermediate Drive Shaft Assembly

Callout	Component Name
1	Front Wheel Drive Intermediate Shaft
2	Front Wheel Drive Intermediate Shaft Bearing Retainer (Qty: 2)
3	Front Wheel Drive Intermediate Shaft Bearing Assembly **Tip:** Use a press, with the **J 22912-B** 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

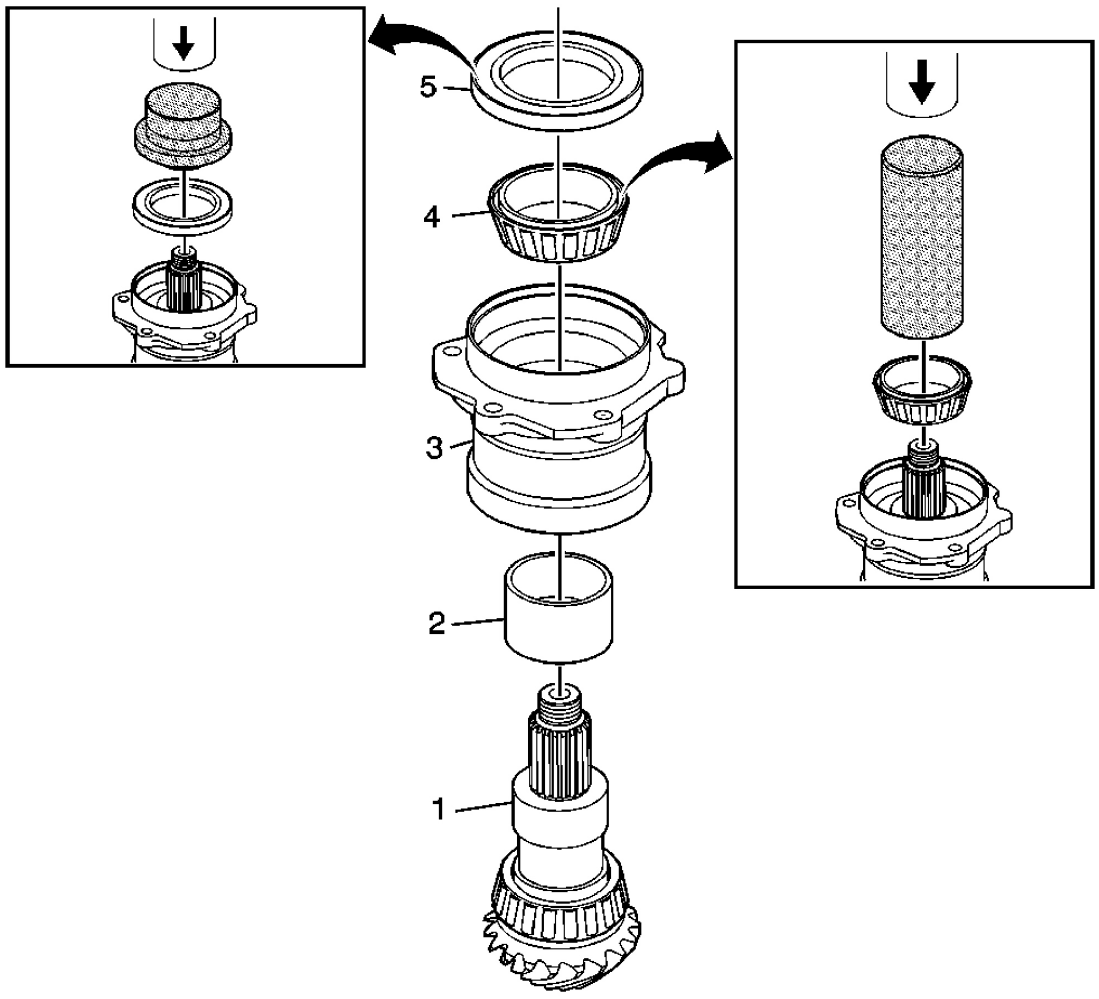


Fig. 24: Identifying Rear Output Shaft Housing Components
Courtesy of GENERAL MOTORS CORP.

Rear Output Shaft Housing Assembly

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** 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** to install the seal. See **Special Tools**. **Special Tools:** **DT-48075** Output Shaft Seal Installer. See **Special Tools**.

Output Flange Installation

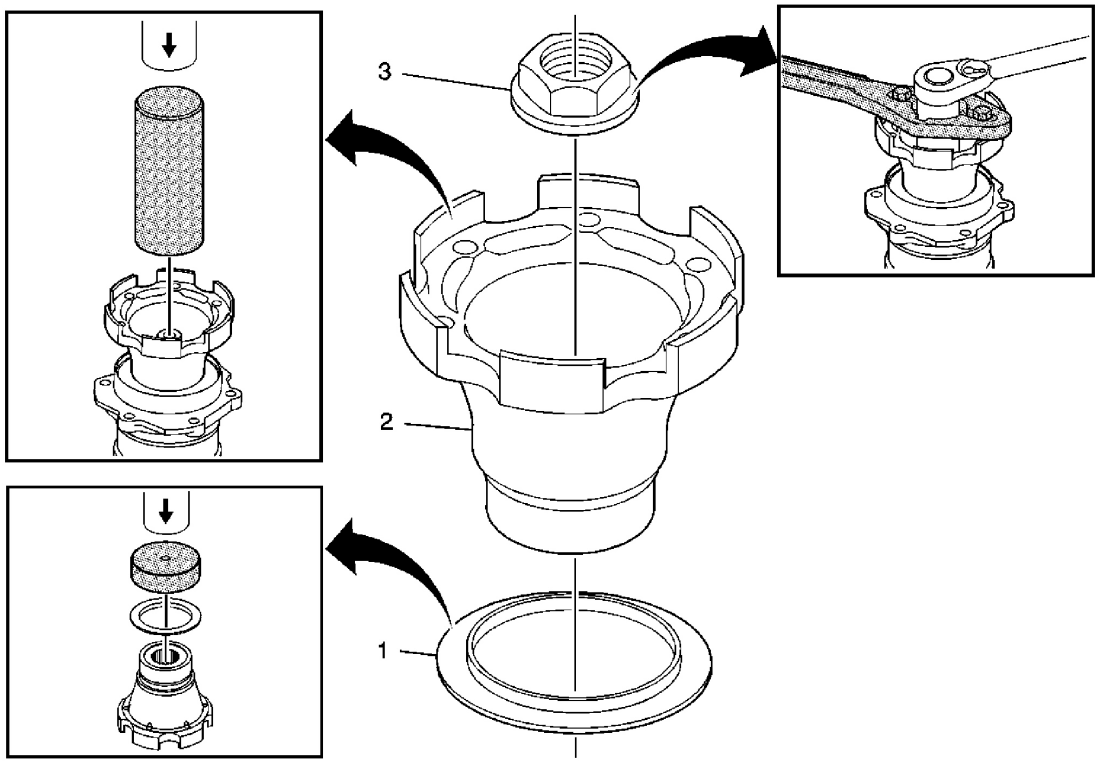


Fig. 25: Exploded View Of Output Flange Components
Courtesy of GENERAL MOTORS CORP.

Output Flange Installation

Callout	Component Name
1	Transfer Case Rear Output Shaft Oil Slinger **Tip:** Use a press with the **DT-48077** in order to install the slinger. See **Special Tools**. **Special Tools:** **DT-48077** Output Shaft Slinger Installer. See **Special Tools**.

2	Transfer Case Rear Output Shaft Flange **Tip:** Use a press with the **J 5590** to install the flange. **Special Tools:** **J 5590** Pinion Bearing Race Installer - Rear
3	Transfer Case Rear Output Shaft Nut **Tip:** Use a 30 mm socket or **J 29873** . **NOTE:** **Refer to Fastener Notice .** **Tighten:** 235 N.m (173 lb ft) **Special Tools:** **J-08614-A** Pinion Flange Holder and Remover. See **Special Tools**.

Right Transfer Case, Input Shaft and Output Drive Shaft Installation

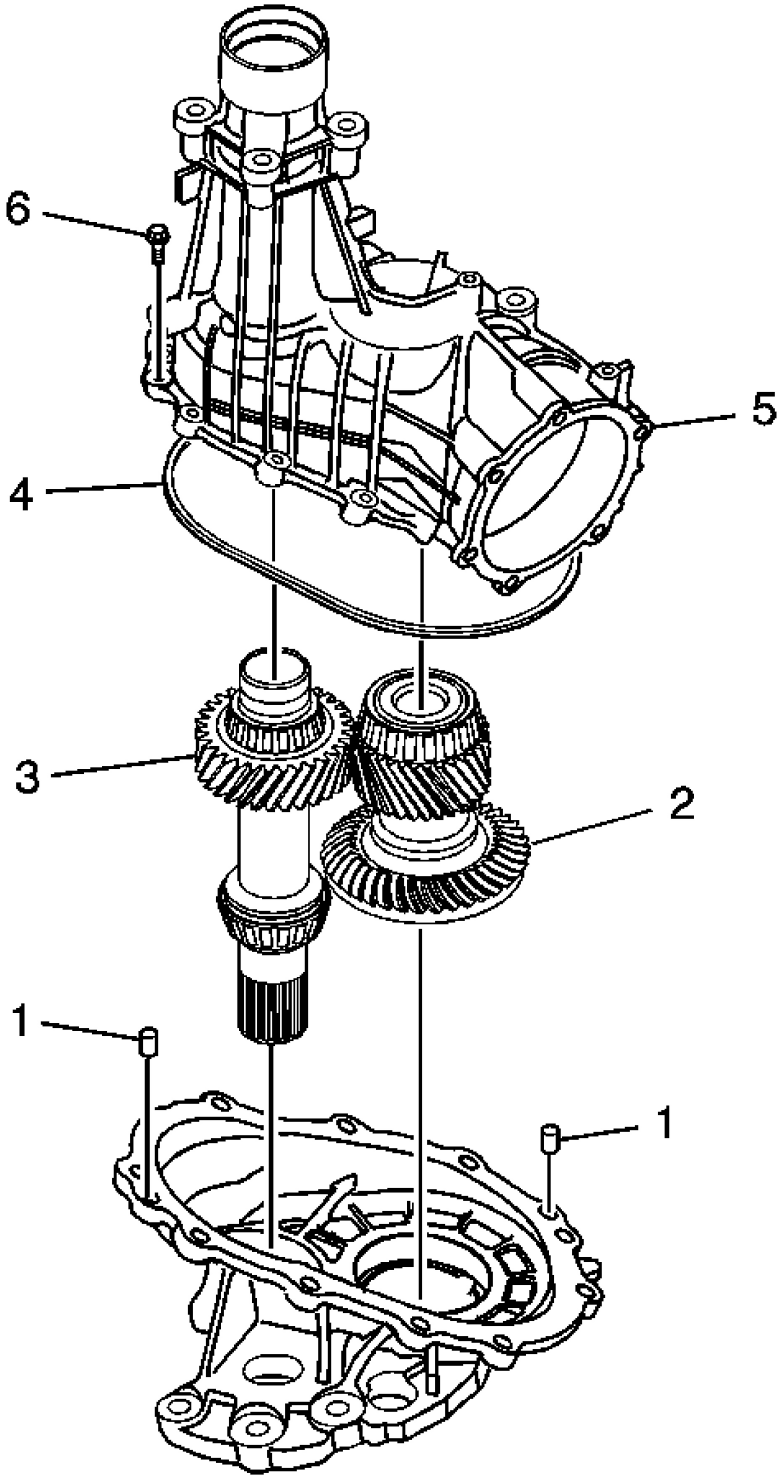


Fig. 26: View Of Right Transfer Case, Input Shaft & Output Drive Shaft
Courtesy of GENERAL MOTORS CORP.

Right Transfer Case, Input Shaft and Output Drive Shaft Installation

Callout	Component Name
1	Transfer Case Half Locating Pin (Qty: 2)
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 Bolt (Qty: 11) **NOTE:** **Refer to Fastener Notice .** **Tighten:** 29 N.m (21 lb ft)

Rear Output Shaft Housing Installation

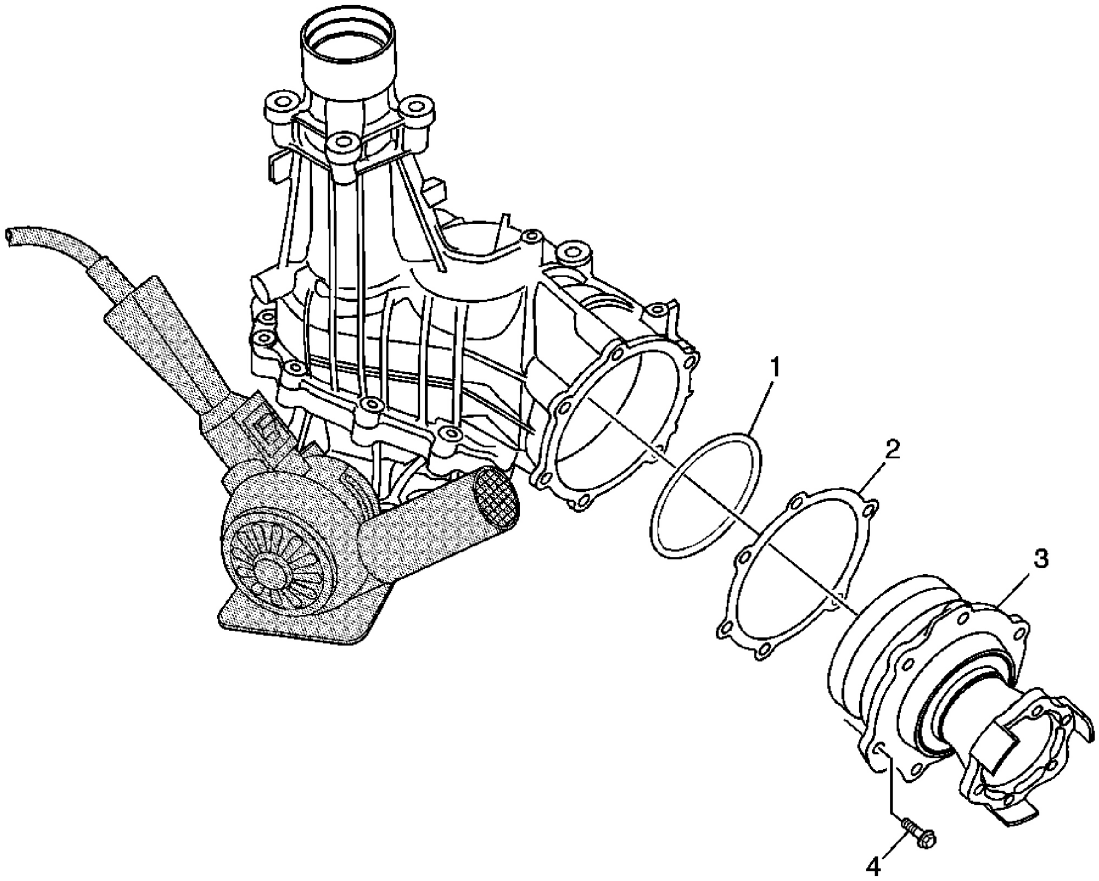


Fig. 27: Identifying Rear Output Shaft Housing

Courtesy of GENERAL MOTORS CORP.

Rear Output Shaft Housing Installation

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 **NOTE:** **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 Bolt (Qty: 6) **NOTE:** **Refer to Fastener Notice .** **Tighten:** 29 N.m (21 lb ft)

Intermediate Drive Shaft Installation

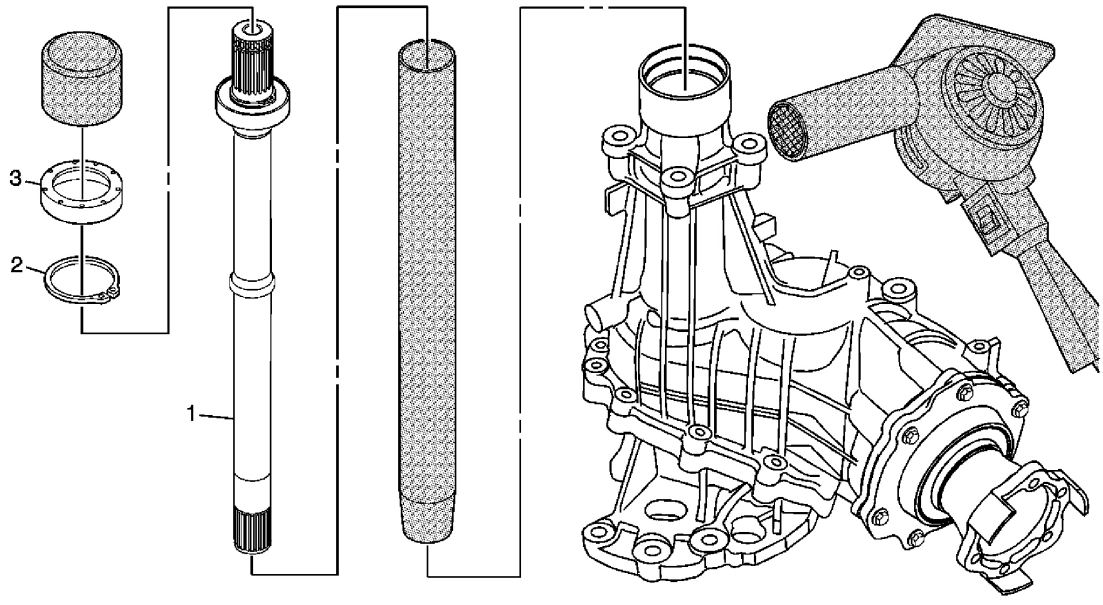


Fig. 28: View Of Intermediate Drive Shaft
Courtesy of GENERAL MOTORS CORP.

Intermediate Drive Shaft Installation

Callout	Component Name
1	Front Wheel Drive Intermediate Shaft **NOTE:** **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. See **Special Tools**. • **J 25070** Heat Gun - 500-750F
2	Front Wheel Drive Retainer
3	Front Wheel Drive Shaft Shield **Special Tools:** **DT-48076** Rock Guard Installer. See **Special Tools**.

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

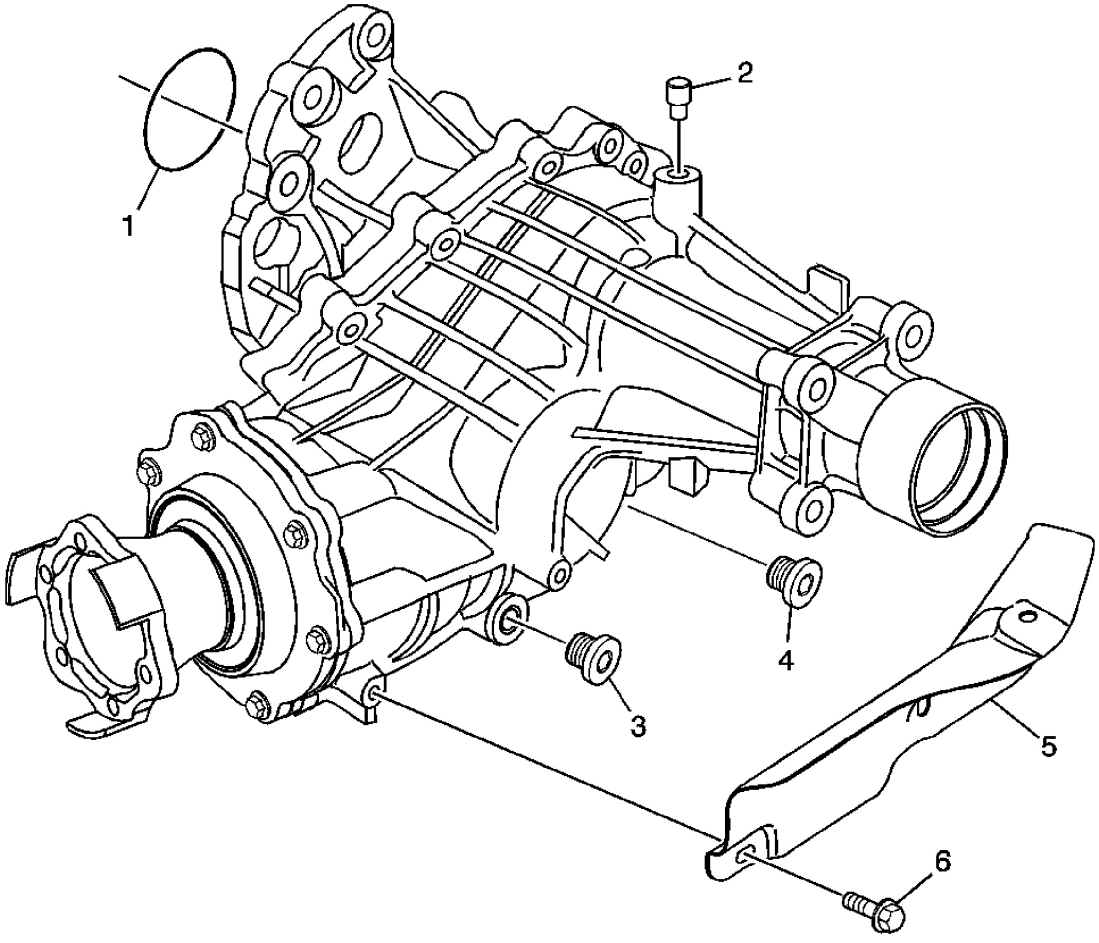


Fig. 29: Locating Housing O-Ring, Vent Assembly, Drain & Fill Plug
Courtesy of GENERAL MOTORS CORP.

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

Callout	Component Name
1	Transfer Case O-Ring Seal
2	Transfer Case Vent Assembly **Tip:** Replace the vent if damaged or blocked.
3	Drain Plug **NOTE:** **Refer to Fastener Notice .** **Tighten:** 39 N.m (29 lb ft)
	Fill Plug

4	**Tighten:** 39 N.m (29 lb ft)
5	Transfer Case Heat Shield
6	Transfer Case Heat Shield Bolt (Qty: 4) **Tighten:** 11 N.m (97 lb in)

DESCRIPTION AND OPERATION

TRANSFER CASE DESCRIPTION AND OPERATION

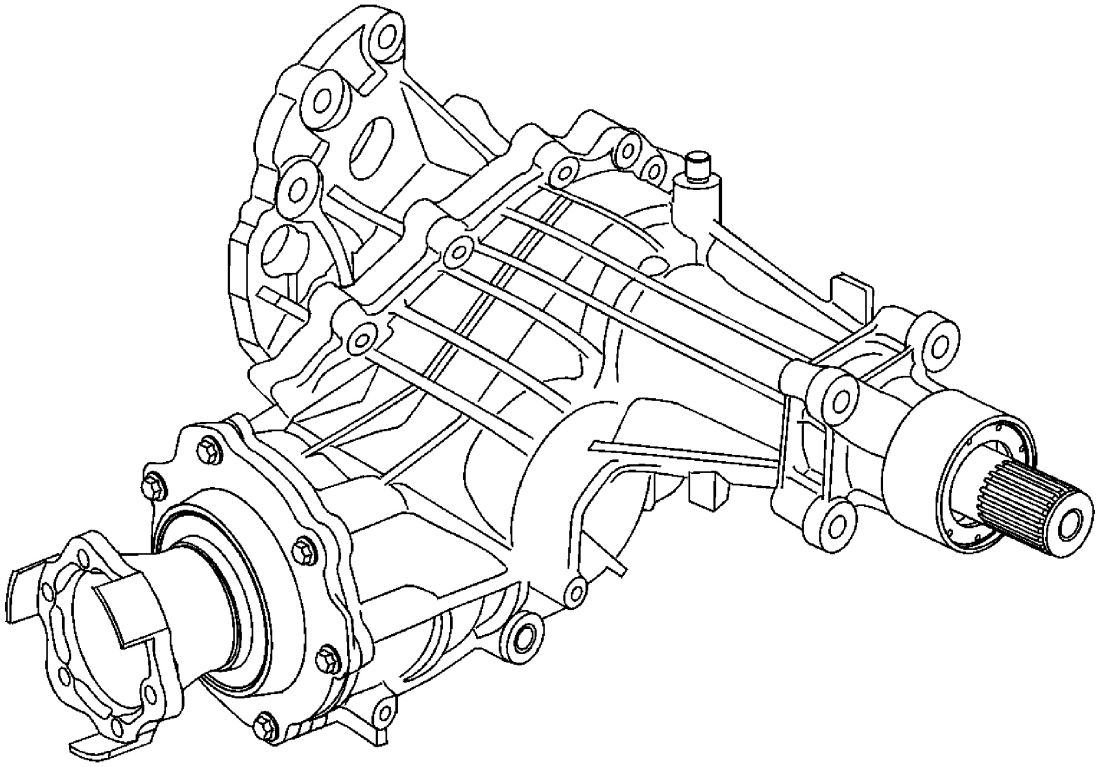


Fig. 30: Identifying Transfer Case
Courtesy of GENERAL MOTORS CORP.

The Getrag 790 transfer case consists of an aluminum housing, input shaft and gear and a ring and pinion power transfer system.

The Getrag 790 transfer case transfers torque/power from the input shaft through the ring and pinion assembly to the rear differential via a 1-piece propeller shaft assembly.

The on-demand rear differential and torque tube assembly distributes variable torque/power to

the rear wheels via individual axle shafts.

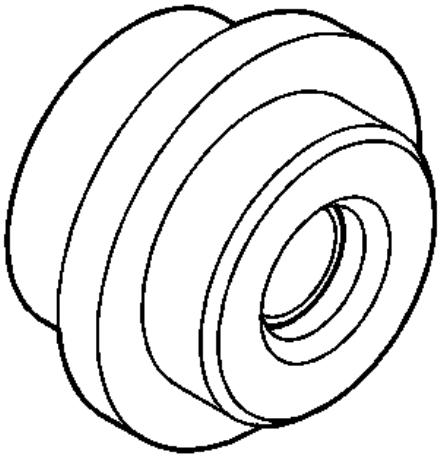
The Getrag 790 transfer case is a single speed unit. Torque transfer is electronically controlled, dependent on the demand of the rear differential.

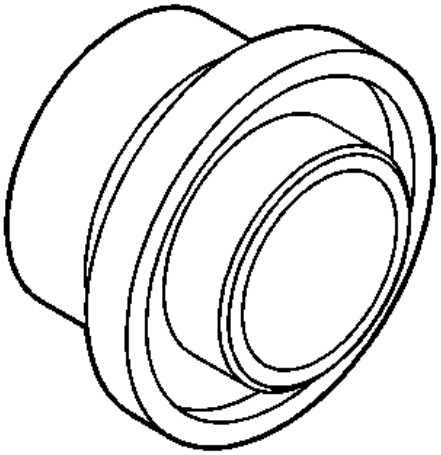
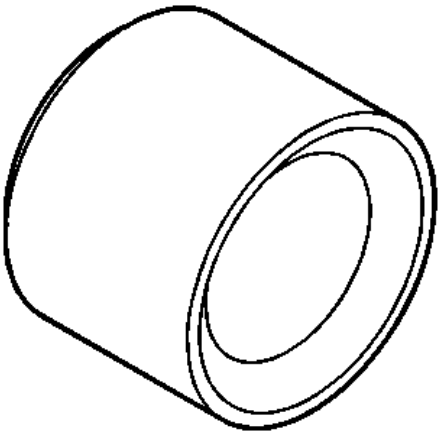
The power take-off unit (PTU) uses synthetic hypoid gear lubricant, which is intended for lifetime service. Full fluid level is at the bottom of the fill plug hole when the vehicle is on a level surface.

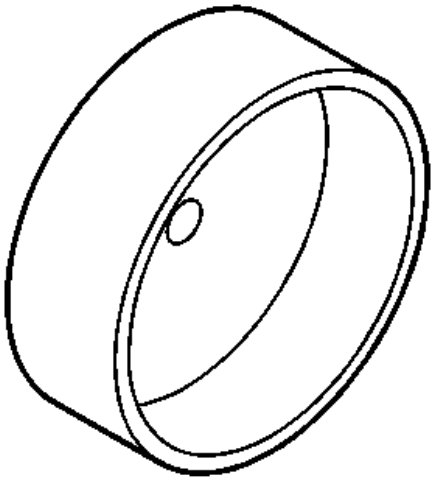
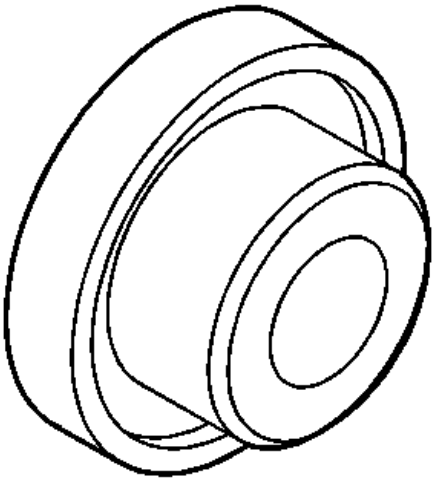
SPECIAL TOOLS AND EQUIPMENT

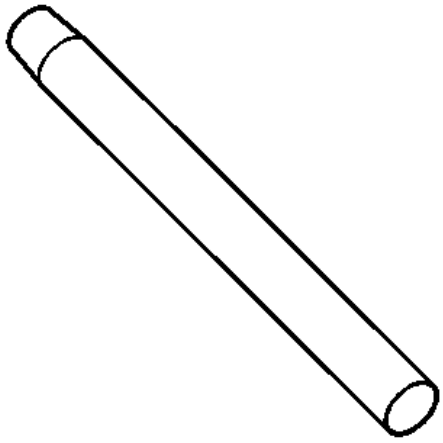
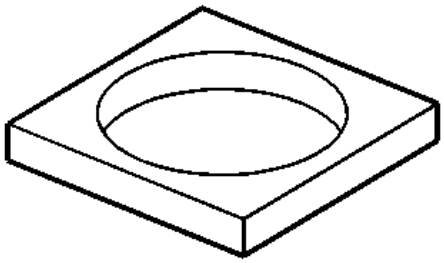
SPECIAL TOOLS

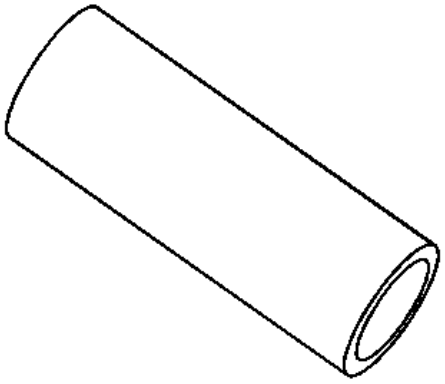
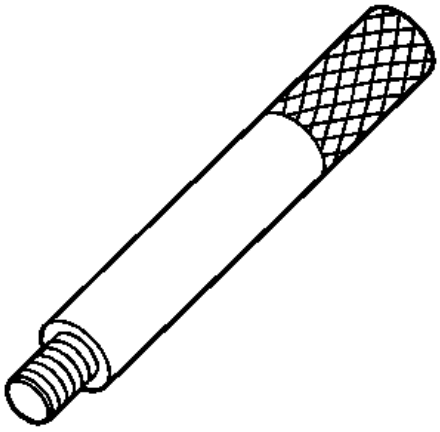
Special Tools

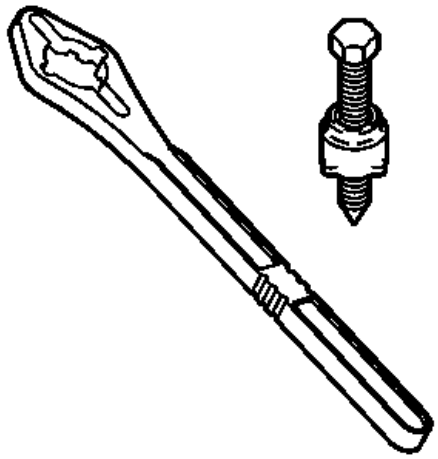
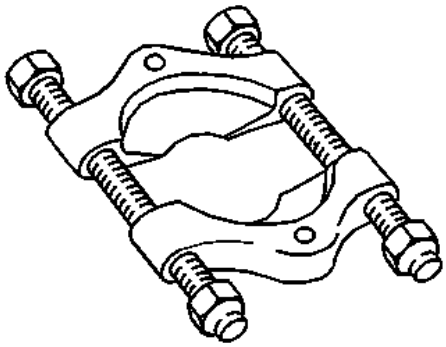
Illustration	Tool Number/Description
	DT-48074 Input and Output Shaft Seal Installer
	DT-48075 Output Shaft Seal Installer

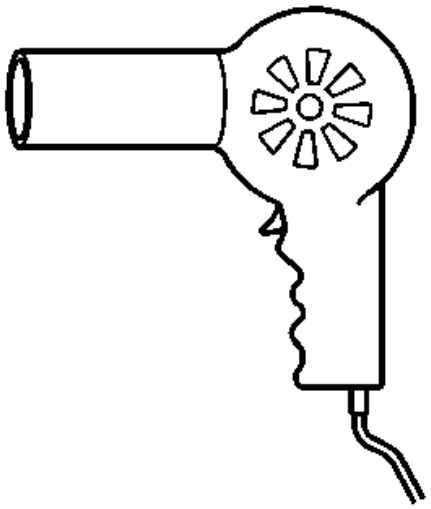
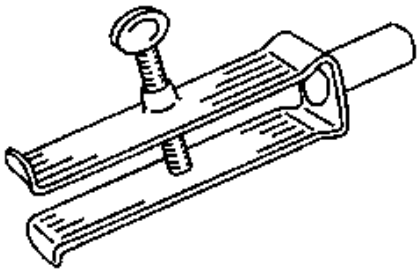
	
	DT-48076 Rock Guard Installer
	DT-48077

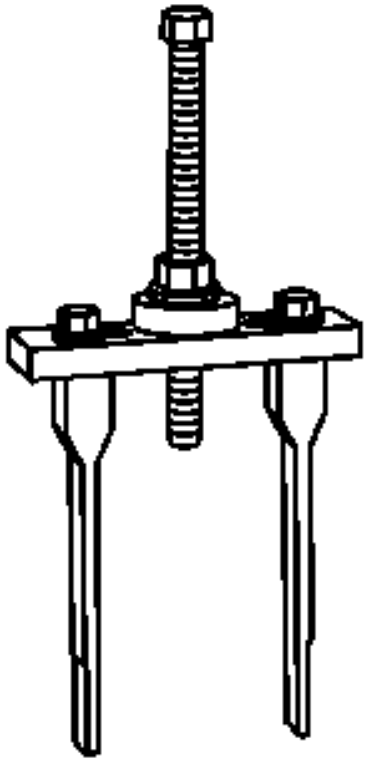
	Output Shaft Slinger Installer
	DT-48078 Inner Drive Shaft Seal Installer

	DT-48094 Inner Drive Shaft Seal Protector
	DT-48145 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