

DRIVELINE/AXLE

Rear Drive Axle - Corvette

SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

Fastener Tightening Specifications

Application	Specification	
	Metric	English
Differential Case Bolt M8 x 105 (Qty: 10) ¹	35 N.m ¹	26 lb ft ¹
Differential Drive Pinion Gear Bearing Housing Bolt (Qty: 8) ¹	25 N.m ¹	18 lb ft ¹
Differential Drive Pinion Gear Bearing Retaining Nut ¹	680 N.m ¹	502 lb ft ¹
Differential Carrier Cover Bolt M6 x 20 (Qty: 6) ¹	7 N.m ¹	62 lb in ¹
Differential Carrier Cover Bolt M10 x 40 (Qty: 9) ¹		
• First Pass	38 N.m ¹	28 lb ft ¹
• Final Pass	70 N.m ¹	52 lb ft ¹
Differential Carrier Stud M6 x 42 (Qty: 2) ¹	7 N.m ¹	62 lb in ¹
Differential Ring Gear Bolt M12 x 27 (Qty: 10 - 2.56 & 2.73 ratio) (Qty: 6 - 3.42 ratio) ¹	145 N.m ¹	107 lb ft ¹
Differential Ring Gear Bolt M12 x 41.5 (Qty: 4 - 3.42 ratio) ¹	145 N.m ¹	107 lb ft ¹
Rear Axle Housing Cover Bolt M8 x 35 (Qty: 7) ¹	28 N.m ¹	21 lb ft ¹
Rear Axle Housing Drain Plug	27 N.m	20 lb ft
Rear Axle Housing Fill Plug	27 N.m	20 lb ft
1. Use NEW fastener.		

LUBRICATION SPECIFICATIONS

Lubrication Specifications

Application	Quantity	
	Metric	English
2.56 mLSD	2.4 liters	2.53 quarts
3.42 mLSD	2.4 liters	2.53 quarts
3.42 mLSD with Cooler	2.75 liters	2.96 quarts
2.73 eLSD	2.75 liters	2.96 quarts
3.42 eLSD	2.75 liters	2.96 quarts
eLSD Clutch System	0.235 liters	0.248 quarts

REAR AXLE SPECIFICATIONS

Rear Axle Specifications

Application	Specification	
	Metric	English
Differential Bearing Shim	0.5334 mm	0.02100 in
	0.5588 mm	0.02200 in
	0.5842 mm	0.02300 in
	0.6096 mm	0.02400 in
	0.6350 mm	0.02500 in
	0.6604 mm	0.02600 in
	0.6858 mm	0.02700 in
	0.7112 mm	0.02800 in
	0.7366 mm	0.02900 in
	0.7620 mm	0.03000 in
	0.7874 mm	0.03100 in
	0.8128 mm	0.03200 in
	0.8382 mm	0.03300 in
	0.8636 mm	0.03400 in
	0.8890 mm	0.03500 in
	0.9144 mm	0.03600 in
	0.9398 mm	0.03700 in
	0.9652 mm	0.03800 in
	0.9906 mm	0.03900 in
	1.0160 mm	0.04000 in
	1.0414 mm	0.04100 in
	1.0668 mm	0.04200 in
	1.0922 mm	0.04300 in
	1.1176 mm	0.04400 in
	1.1430 mm	0.04500 in
	1.1684 mm	0.04600 in
	1.1938 mm	0.04700 in
	1.2192 mm	0.04800 in
	1.2446 mm	0.04900 in
	1.2700 mm	0.05000 in
	1.2954 mm	0.05100 in
	26.150 mm	1.0295 in
	26.162 mm	1.0300 in
	26.174 mm	1.0305 in
	26.186 mm	1.0309 in
	26.198 mm	1.0314 in

Differential Drive Pinion Gear Bearing Spacer

26.210 mm	1.0319 in
26.222 mm	1.0324 in
26.234 mm	1.0328 in
26.246 mm	1.0333 in
26.258 mm	1.0338 in
26.270 mm	1.0342 in
26.282 mm	1.0347 in
26.294 mm	1.0352 in
26.306 mm	1.0357 in
26.318 mm	1.0361 in
26.330 mm	1.0366 in
26.342 mm	1.0370 in
26.354 mm	1.0376 in
26.366 mm	1.0380 in
26.378 mm	1.0385 in
26.390 mm	1.0390 in
26.402 mm	1.0394 in
26.414 mm	1.0400 in
26.426 mm	1.0403 in
26.438 mm	1.0409 in
26.450 mm	1.0413 in
26.462 mm	1.0481 in
26.474 mm	1.0423 in
26.486 mm	1.0428 in
26.498 mm	1.0432 in
26.510 mm	1.0437 in
26.522 mm	1.0441 in
26.534 mm	1.0446 in
26.546 mm	1.0451 in
26.558 mm	1.0456 in
26.570 mm	1.0460 in
26.582 mm	1.0465 in
26.594 mm	1.0470 in
26.606 mm	1.0475 in
26.618 mm	1.0480 in
26.630 mm	1.0484 in
26.642 mm	1.0489 in
26.654 mm	1.0494 in
26.666 mm	1.0499 in
26.678 mm	1.0503 in
26.690 mm	1.0508 in

26.702 mm	1.0513 in
26.714 mm	1.0517 in
26.726 mm	1.0522 in
26.738 mm	1.0527 in
26.750 mm	1.0531 in
26.762 mm	1.0536 in
26.774 mm	1.0541 in
26.786 mm	1.0546 in
26.798 mm	1.0550 in
26.810 mm	1.0555 in
26.822 mm	1.0560 in
26.834 mm	1.0565 in
26.846 mm	1.0570 in
26.858 mm	1.0574 in
26.870 mm	1.0579 in
26.882 mm	1.0583 in
26.894 mm	1.0588 in
26.906 mm	1.0593 in
26.918 mm	1.0600 in
26.930 mm	1.0602 in
26.942 mm	1.0607 in
26.954 mm	1.0612 in
26.966 mm	1.0620 in
26.978 mm	1.0621 in
26.990 mm	1.0630 in
27.002 mm	1.0630 in
27.014 mm	1.0635 in
27.026 mm	1.0640 in
27.038 mm	1.0645 in
27.050 mm	1.0650 in
27.062 mm	1.0654 in
0.7620 mm	0.03000 in
0.7874 mm	0.03100 in
0.8128 mm	0.03200 in
0.8382 mm	0.03300 in
0.8636 mm	0.03400 in
0.8890 mm	0.03500 in
0.9144 mm	0.03600 in
0.9398 mm	0.03700 in
0.9652 mm	0.03800 in
0.9906 mm	0.03900 in

Differential Pinion Gear Shim

	1.0160 mm	0.04000 in
	1.0414 mm	0.04100 in
	1.0668 mm	0.04200 in
	1.0922 mm	0.04300 in
	1.1176 mm	0.04400 in
	1.1430 mm	0.04500 in
	1.1684 mm	0.04600 in
	1.1938 mm	0.04700 in
	1.2192 mm	0.04800 in
	1.2446 mm	0.04900 in
	1.2700 mm	0.05000 in
	1.2954 mm	0.05100 in
	1.3208 mm	0.05200 in
	1.3462 mm	0.05300 in
	1.3716 mm	0.05400 in
	1.3970 mm	0.05500 in
	1.4224 mm	0.05600 in
	1.4478 mm	0.05700 in
	1.4732 mm	0.05800 in
	1.4986 mm	0.05900 in
	1.5240 mm	0.06000 in
	1.5494 mm	0.06100 in
	1.5748 mm	0.06200 in
	1.6002 mm	0.06300 in
	1.6256 mm	0.06400 in
	1.6510 mm	0.06500 in
	1.6764 mm	0.06600 in
	1.7018 mm	0.06700 in
	1.7272 mm	0.06800 in
	1.7526 mm	0.06900 in
	1.7780 mm	0.07000 in
Pinion Preload Torque to Turn	1.7 - 2.3 N.m	15.04 - 20.36 lb in
Ring Gear/Pinion Backlash	0.127 - 0.229 mm	0.005 - 0.009 in

REAR AXLE USAGE

Available Axle Ratios

GM P/N	Axle Ratio	Transmission
24255985	2.56	Automatic
24255986	2.73	Automatic
24255987	3.42	Manual

ADHESIVES, FLUIDS, LUBRICANTS AND SEALERS

Adhesives, Fluids, Lubricants and Sealers

Application	Type of Material	GM Part Numbers	
		United States	Canada
Differential Fill	DEXRON® LS Gear Oil	88862624	88862625
Differential Ring Gear Bolt	Threadlocker	89021297	10953488
Differential Ring Gear	Marking Compound	1052351	10953497
eLSD Fill	DEXRON® VI	88861037	19264717

SCHEMATIC WIRING DIAGRAMS

REAR AXLE WIRING SCHEMATICS

Electronic Limited-Slip Rear Axle (G96) Wiring Schematics

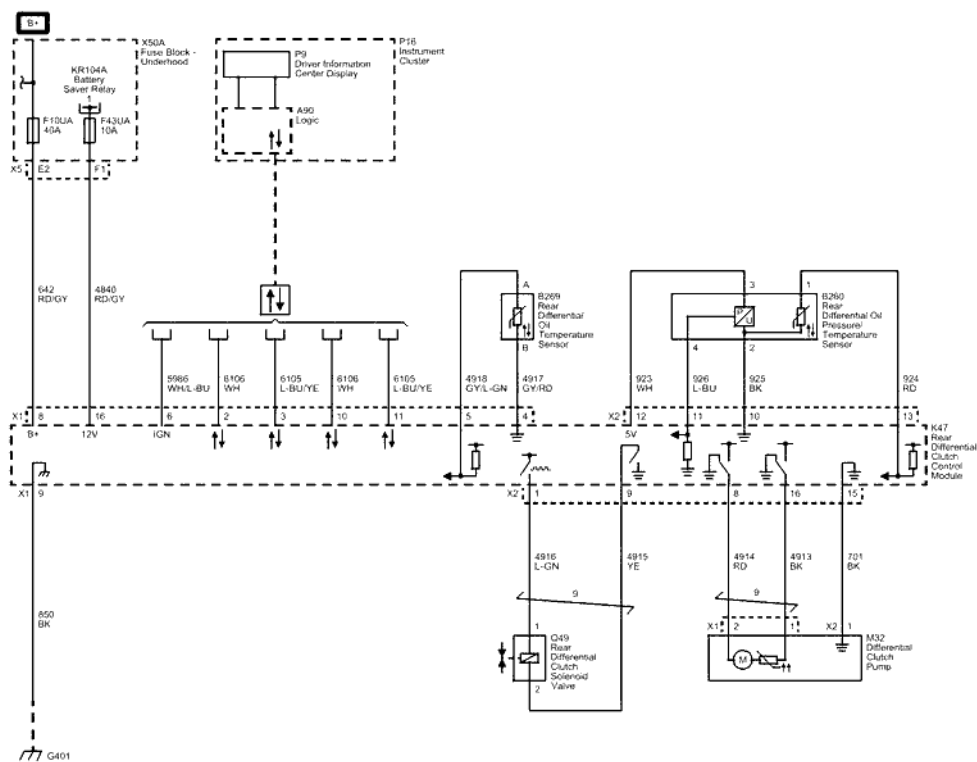


Fig. 1: Electronic Limited-Slip Rear Axle (G96) Wiring Schematic
 Courtesy of GENERAL MOTORS COMPANY

Differential Carrier Housing Assembly

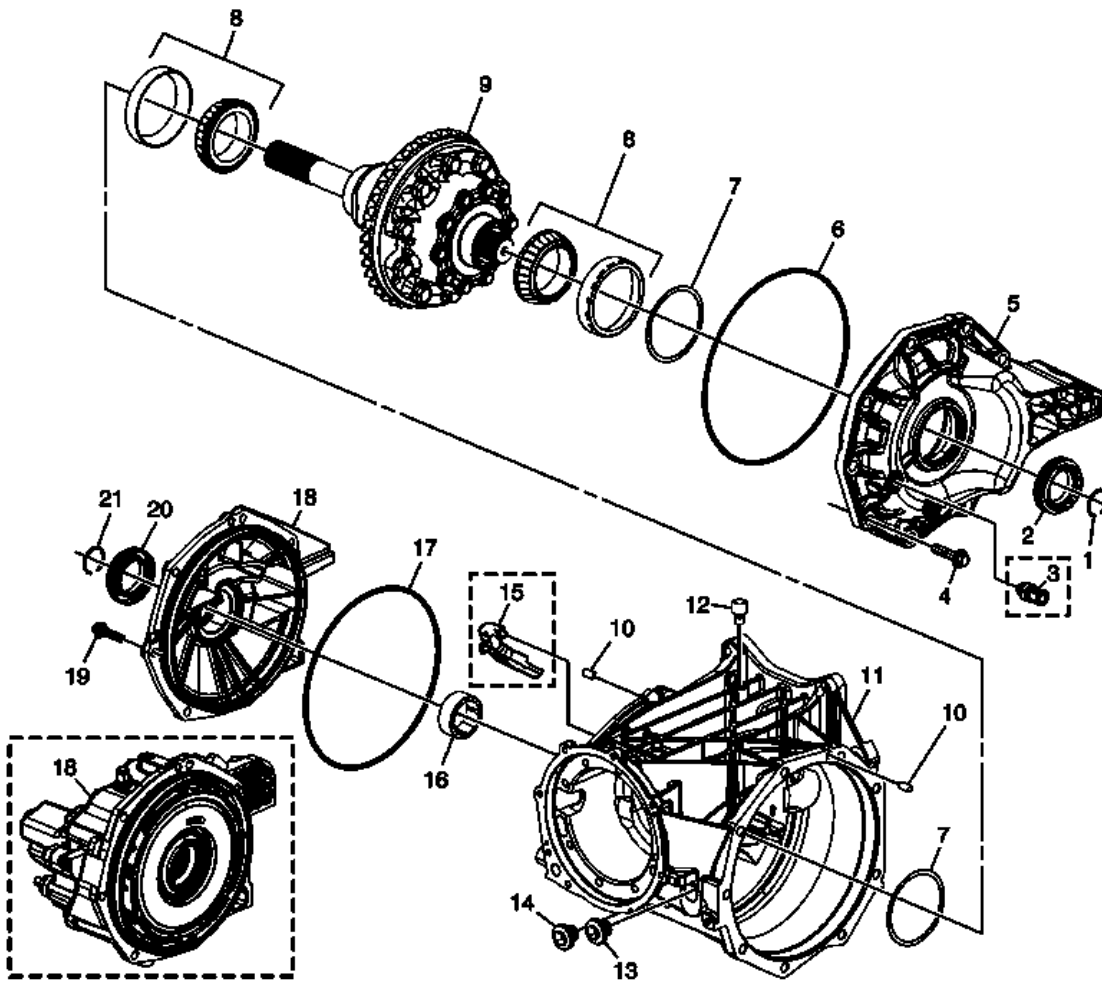


Fig. 2: Differential Carrier Housing Assembly
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
1	Rear Axle Shaft Lock
2	Rear Axle Shaft Seal (Right Side)
3	Differential (with Cooler Pump) Nut (3/8 Quick Connect) - Model Dependent
4	Differential Carrier Cover Bolt M10 x 40 (Qty: 9)
5	Differential Carrier Cover (RH) - Model Dependent
6	Differential Carrier Cover Seal (RH D-ring)
7	Differential Bearing Shim - Selective
8	Differential Bearing Assembly

9	Differential Case Assembly
10	Rear Axle Housing Locating Pin
11	Rear Wheel Drive Differential Carrier Housing
12	Differential Carrier Vent
13	Rear Axle Housing Fill Plug
14	Rear Axle Housing Drain Plug
15	Differential Oil Trough - Model Dependent
16	Differential Carrier Bushing
17	Differential Carrier Cover Seal (LH D-ring)
18	Rear Axle Housing Cover - Model Dependent
19	Rear Axle Housing Cover Bolt M8 x 35 (Qty: 7)
20	Rear Axle Shaft Seal (Left Side)
21	Rear Axle Shaft Lock

Differential Case Assembly (mLSD)

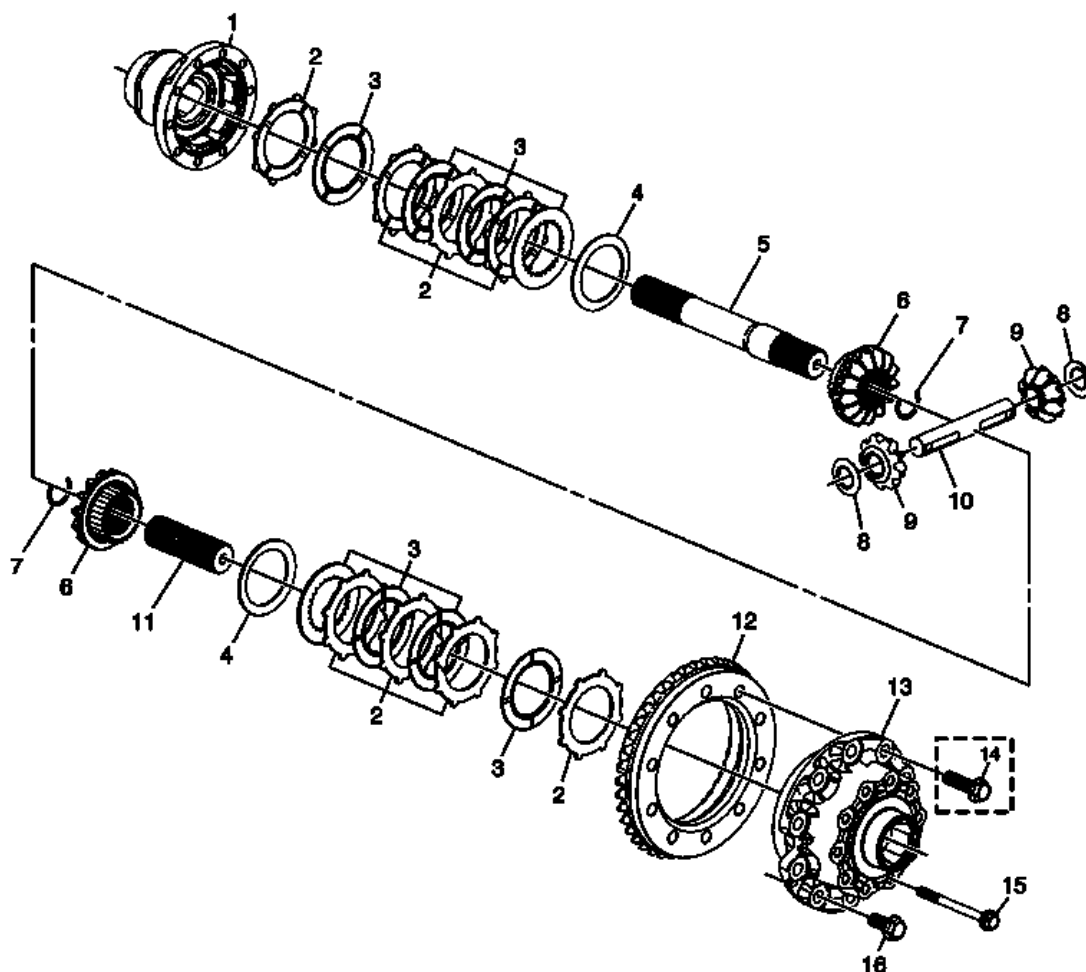


Fig. 3: Differential Case Assembly (mLSD)

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
1	Differential Case (Flanged Half)
2	Differential Clutch Disc - Steel
3	Differential Clutch Disc - Friction
4	Locking Differential Clutch Disc Thrust Washer
5	Rear Axle Shaft (LH Output)
6	Differential Side Gear
7	Rear Axle Shaft Bearing Retaining Ring
8	Differential Pinion Gear Thrust Washer
9	Differential Pinon Gear
10	Differential Pinion Gear Shaft
11	Rear Axle Shaft (RH Output)
12	Differential Ring Gear
13	Differential Case (Plain Half)
14	Differential Ring Gear Bolt M12 x 41.5 (Qty: 4 - 3.42 ratio)
15	Differential Case Bolt M8 x 105 (Qty: 10)
16	Differential Ring Gear Bolt M12 x 27 (Qty: 10 - 2.56 & 2.73 ratio) (Qty: 6 - 3.42 ratio)

Differential Case Assembly (eLSD)

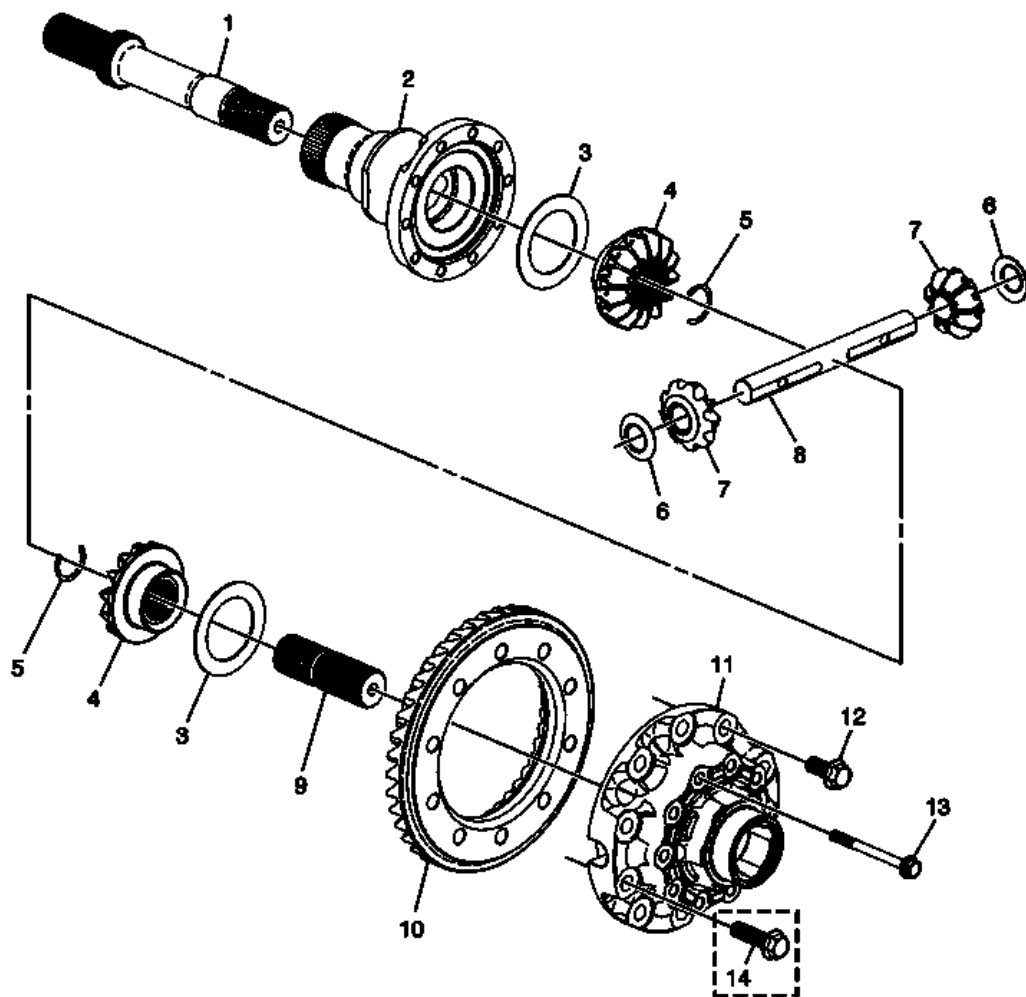


Fig. 4: Differential Case Assembly (eLSD)
 Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
1	Rear Axle Shaft (LH Output)
2	Differential Case (Flanged Half)
3	Differential Case Thrust Washer
4	Differential Side Gear
5	Rear Axle Shaft Bearing Retaining Ring
6	Differential Pinion Gear Thrust Washer
7	Differential Pinon Gear
8	Differential Pinion Gear Shaft
9	Rear Axle Shaft (RH Output)
10	Differential Ring Gear
11	Differential Case (Plain Half)
12	Differential Ring Gear Bolt M12 x 27 (Qty: 10 - 2.56 & 2.73 ratio) (Qty: 6 - 3.42 ratio)

13	Differential Case Bolt M8 x 85 (Qty: 10)
14	Differential Ring Gear Bolt M12 x 41.5 (Qty: 4 - 3.42 ratio)

Differential Pinion Assembly

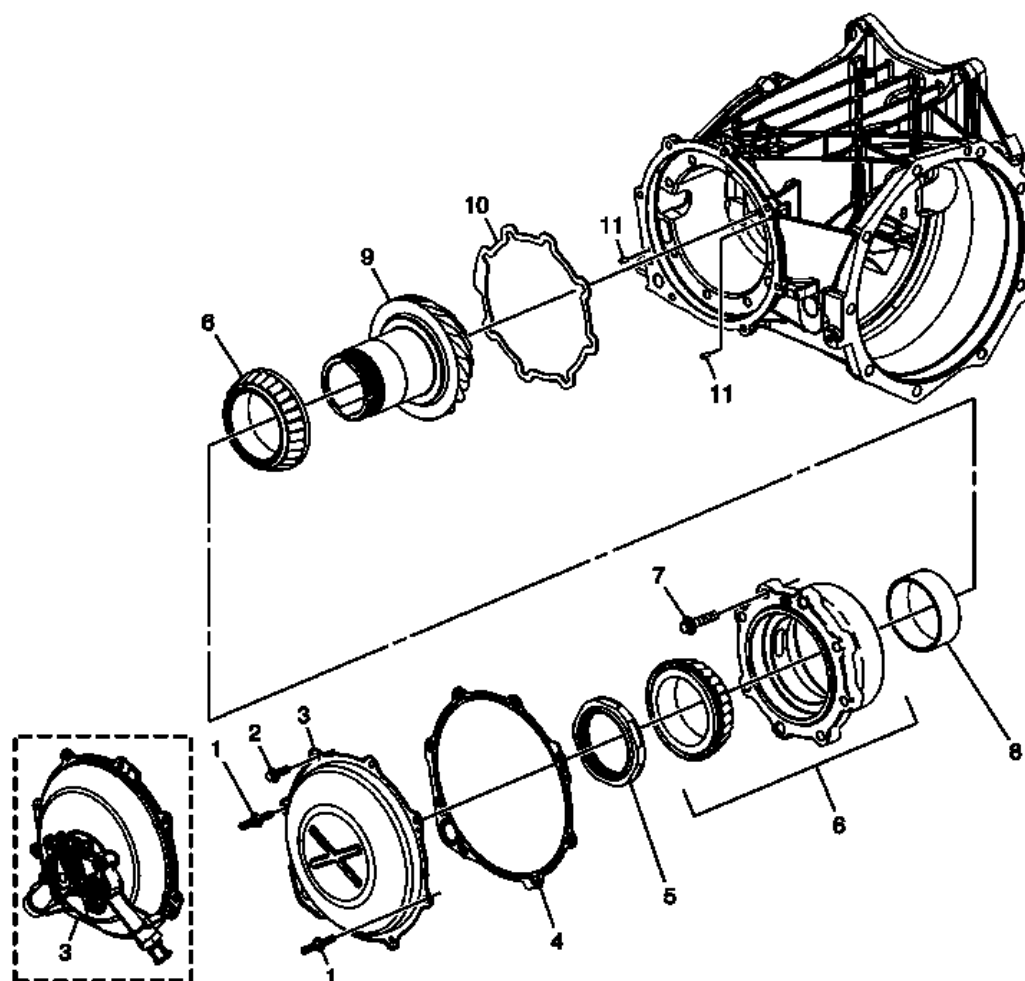


Fig. 5: Differential Pinion Assembly
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
1	Differential Carrier Stud M6 x 42 (Qty: 2)
2	Differential Carrier Cover Bolt M6 x 20 (Qty: 6)
3	Rear Axle Housing Cover - Model Dependent
4	Rear Axle Housing Cover Gasket
5	Differential Drive Pinion Gear Bearing Retaining Nut
6	Differential Drive Pinion Gear Bearing Housing Assembly
7	Differential Drive Pinion Gear Bearing Housing Bolt
8	Differential Drive Pinion Gear Bearing Spacer - Selective

9	Differential Pinion Gear
10	Differential Pinion Shim - Selective
11	Rear Axle Housing Cover Locating Pin

DIAGNOSTIC INFORMATION AND PROCEDURES

DIAGNOSTIC CODE INDEX

DIAGNOSTIC CODE INDEX

DTC	Description
<u>DTC C0393</u>	DTC C0393 Rear Axle Clutch Solenoid Valve Control Circuit
<u>DTC C0394</u>	DTC C0394 Rear Differential Sump Temperature Sensor Circuit
<u>DTC C0407</u>	DTC C0407: Differential Oil Pump Motor
<u>DTC C0411</u>	DTC C0411 Rear Differential Pressure Sensor Circuit
<u>DTC C0412</u>	DTC C0412 Rear Differential Clutch Temperature Sensor Circuit
<u>DTC C0413</u>	DTC C0413 Rear Differential Hydraulic System Bleed Not Performed
<u>DTC C0414</u>	DTC C0414 Rear Differential Hydraulic System
<u>DTC C0418</u>	DTC C0418 Rear Drive Clutch Classification Not Programmed
<u>DTC C0870</u>	DTC C0870 Control Module Voltage Reference Output Circuit

DTC C0393: REAR AXLE CLUTCH SOLENOID VALVE

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC C0393

Rear Axle Clutch Solenoid Valve Control Circuit

For symptom byte information, refer to **Symptom Byte List**

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Control - Terminal 1	C0393 02	C0393 04	C0393 01	-
Control - Terminal 2	C0393 02	C0393 04	C0393 01	-

Circuit/System Description

The rear differential clutch control module detects a short to battery, a short to ground, an open line on the solenoid circuit or a frozen (immobile) solenoid. It also detects a solenoid over temperature condition. When the solenoid is electrically energized the hydraulic circuit is blocked and pressure can build in the piston cavity.

Conditions for Running the DTC

- The ignition is ON.
- Battery voltage is between 9-16 volts.
- DTC C0800 is not current.

Conditions for Setting the DTC

- An open is detected on the high or low solenoid control circuits.
- A short to ground is detected on the high or low solenoid control circuits.
- A short to voltage is detected on the high solenoid control circuits.
- A stuck solenoid valve is detected.

Action Taken When the DTC Sets

One or more of the following actions may occur:

- The Electronic Limited Slip system is disabled for the duration of the key cycle.
- Service Rear Axle will be displayed in the driver information center.

Conditions for Clearing the DTC

- The condition for the DTC is no longer present.
- The DTC is not detected in 40 consecutive drive cycles.

Reference Information

Schematic Reference

Rear Axle Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Rear Drive Axle Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

1. Ignition OFF, disconnect the harness connector at the Q49 Rear Axle Clutch Solenoid Valve, ignition ON.
2. Test for 3-5 V between the control circuit terminal 1 and ground.
 - **If less than 3 V**
 1. Ignition OFF, disconnect the X2 harness connector at the K47 Rear Differential Clutch Control Module.
 2. Test for infinite resistance between the control circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 ohms in the control circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K47 Rear Differential Clutch Control Module.
 - **If greater than 5 V**
 1. Ignition OFF, disconnect the X2 harness connector at the K47 Rear Differential Clutch Control Module, ignition ON.
 2. Test for less than 1 V between the control circuit and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K47 Rear Differential Clutch Control Module.
 - **If between 3-5 V**
3. Test for less than 1 V between the control circuit terminal 2 and ground.
 - **If 1 V or greater**
 1. Ignition OFF, disconnect the X2 harness connector at the K47 Rear Differential Clutch

2. Test for less than 1 V between the control circuit and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less the 1 V, replace the K47 Rear Differential Clutch Control Module.
 - **If less than 1 V**
4. Ignition OFF, connect the harness connector at the Q49 Rear Axle Clutch Solenoid Valve. Disconnect the X2 harness connector at the K47 Rear Differential Clutch Control Module.
5. Test for infinite resistance between the control circuit terminal 2 and ground.
 - **If less than infinite resistance**
 1. Ignition OFF, disconnect the harness connector at the Q49 Rear Axle Clutch Solenoid Valve.
 2. Test for infinite resistance between the control circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the Q49 Rear Axle Clutch Solenoid Valve.
 - **If infinite resistance**
6. Test for 8-10 ohms between the control circuit terminal 1 and the control circuit terminal 2.
 - **If not between 8-10 ohms**
7. Ignition OFF, disconnect the harness connector at the Q49 Rear Axle Clutch Solenoid Valve.
 1. Test for less than 2 ohms between the K47 Rear Differential Clutch Control Module control circuit terminal 9 and the Q49 Rear Axle Clutch Solenoid Valve control circuit terminal 2.
 - If 2 ohms or greater, repair the open/high resistance on the circuit.
 - If less than 2 ohms, test or replace the Q49 Rear Axle Clutch Solenoid Valve.
 - **If between 8-10 ohms**
8. Replace the K47 Rear Differential Clutch Control Module.

Component Testing

Static Test

1. Ignition OFF, disconnect the harness at the Q49 Rear Axle Clutch Solenoid Valve.
2. Test for 8-10 ohms between the control circuit terminal 1 and the control circuit terminal 2.
 - **If not between 8-10 ohms**

Replace the Q49 Rear Axle Clutch Solenoid Valve.
 - **If between 8-10 ohms**
3. Test for infinite resistance between each terminal and the Q49 Rear Axle Clutch Solenoid Valve case.
 - **If not infinite resistance**

Replace the Q49 Rear Axle Clutch Solenoid Valve.

- If infinite resistance

4. All OK.

Repair Instructions

Perform the Diagnostic Repair Verification after completing the repair.

- Rear Axle Differential Lock Switch Replacement
- Control Module References for rear differential clutch control module replacement, programming and setup

DTC C0394: REAR DIFFERENTIAL SUMP TEMPERATURE SENSOR

Diagnostic Instructions

- Perform the Diagnostic System Check - Vehicle prior to using this diagnostic procedure.
- Review Strategy Based Diagnosis for an overview of the diagnostic approach.
- Diagnostic Procedure Instructions provides an overview of each diagnostic category.

DTC Descriptors

DTC C0394

Rear Differential Sump Temperature Sensor Circuit

For symptom byte information, refer to Symptom Byte List

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Signal	C0394 06	-	C0394 05	C0394 08
Low Reference	-	-	-	-

Circuit/System Description

The clutch temperature sensor outputs a voltage that represents the physical temperature of the clutch sump fluid. The rear differential clutch control module detects a short to ground, a short to battery or a break on the signal line. It also detects an invalid signal (out of range) on the output signal.

Conditions for Running the DTC

- The ignition is ON.
- DTC C0800 is not current.

Conditions for Setting the DTC

An open or short to ground is detected on the temperature sensor circuits.

Action Taken When the DTC Sets

One or more of the following actions may occur:

- The drivers information center may display Service Rear Axle.

Conditions for Clearing the DTC

- The condition for the DTC is no longer present.
- The DTC is not detected in 40 consecutive drive cycles.

Reference Information

Schematic Reference

Rear Axle Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

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- Circuit Testing
- Connector Repairs
- Testing for Intermittent Conditions and Poor Connections
- Wiring Repairs

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

1. Ignition OFF and all vehicle systems OFF, disconnect the harness connector at the B269 Rear Differential Oil Temperature Sensor. It may take up to 2 min for all vehicle systems to power down.
2. Test for less than 5 ohms between the low reference circuit terminal B and ground.

- **If 5 ohms or greater**
- 1. Ignition OFF, disconnect the harness connector at the K47 Rear Differential Clutch Control Module.
- 2. Test for less than 2 ohms in the low reference circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K47 Rear Differential Clutch Control Module.
- **If less than 5 ohms**
- 3. Ignition ON.
- 4. Verify the scan tool Rear Differential Oil Temperature parameter is less than -39°C (-38°F).
 - **If greater than -39°C (-38°F)**
 - 1. Ignition OFF, disconnect the harness connector at the K47 Rear Differential Clutch Control Module.
 - 2. Test for infinite resistance between the signal circuit terminal A and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the K47 Rear Differential Clutch Control Module.
 - **If less than -39°C (-38°F)**
- 5. Install a 3 A fused jumper wire between the signal circuit terminal A and the low reference circuit terminal B.
- 6. Verify the scan tool Rear Differential Oil Temperature sensor parameter is greater than 185°C (365°F).
 - **If less than the 185°C (365°F)**
 - 1. Ignition OFF, remove the jumper wire, disconnect the harness connector at the K47 Rear Differential Clutch Control Module, ignition ON.
 - 2. Test for less than 1 V between the signal circuit and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V
 - 3. Ignition OFF
 - 4. Test for less than 2 ohms in the signal circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K47 Rear Differential Clutch Control Module.
 - **If greater than 149°C (300°F)**
- 7. Test or replace the B269 Rear Differential Oil Temperature Sensor.

Component Testing

- 1. Ignition OFF, disconnect the harness connector at the B269 Rear Differential Oil Temperature Sensor.
- 2. Test for 1.5-2.5K ohms between the signal terminal A and the low reference circuit terminal B.
 - **If not between 1.5-2.5K ohms**

Replace the B269 Rear Differential Oil Temperature Sensor.

- **If between 1.5-2.5K ohms**

3. Test for infinite resistance between each terminal and the sensor housing/case.

- **If less than infinite resistance**

Replace the B269 Rear Differential Oil Temperature Sensor.

- **If infinite resistance**

4. All OK

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

- **Differential Temperature Sensor Replacement.**
- **Control Module References** for rear differential clutch control module replacement, programming and setup.

DTC C0407: DIFFERENTIAL OIL PUMP MOTOR

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC C0407

Differential Oil Pump Motor

For symptom byte information, refer to **Symptom Byte List**

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Control - Terminal 1	C0407 02	C0407 04	C0407 01	-
Control - Terminal 2	C0407 02	C0407 04	C0407 01	-

Circuit/System Description

The rear differential clutch control module detects a short to battery, a short to ground, an open line

on the motor control circuit or a frozen (immobile) actuator motor. This DTC also detects a motor over-temperature condition.

The pressure in the hydraulic circuit is controlled by the Motor/Pump system. The motor is a brushed, PMDC motor and the pump is a radial piston pump. The PMDC motor/pump unit is increasing or decreasing the pressure in the system according to the torque request signal as controlled by the rear differential clutch control module.

Conditions for Running the DTC

- The ignition is ON.
- Operating temperature range 0-140°C (32-284°F).
- DTC C0800 is not current.

Conditions for Setting the DTC

C0407 01

The differential clutch pump voltage is greater than 15 V for 30 s.

C0407 02

The differential clutch pump current is greater than 9 A in 20 consecutive test cycles. The current will be retested every 30 s.

C0407 04

The differential clutch pump current is less than 0.3 A for 30 s.

C0407 54

The differential clutch pump motor calculated temperature is greater than 140°C (284°F).

C0407 61

The rear differential clutch control module determines the pump motor is stuck.

Action Taken When the DTC Sets

- Electronic limited slip is disabled
- Symptom bytes 01, 02, 04 and 61 will display the SERVICE REAR AXLE message in the driver information center.
- Symptom byte 54 will display the REAR AXLE DISABLED message in the driver information center.

Conditions for Clearing the DTC

- The condition for setting the DTC is no longer present.
- The DTC is not detected in 40 consecutive ignition cycles.

Reference Information

Schematic Reference

Rear Axle Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Rear Drive Axle Description and Operation

Electrical Information Reference

- Circuit Testing
- Connector Repairs
- Testing for Intermittent Conditions and Poor Connections
- Wiring Repairs

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Verify that DTC C0407 54 is not set.
 - **If DTC C0407 54 is set.**

Verify there are no internal/external leaks or mechanical damage and that all differential fluid levels are at the proper levels. Refer to **Rear Axle Lubricant Level Inspection.**

1. Clear DTCs and road test the vehicle.
2. Verify that DTC C0407 is not set.
 - If the DTC is set, replace the K47 Rear Differential Clutch Control Module.
 - **If the DTC is not set.**
2. All OK.
 - **If DTC C0407 with symptom byte 54 is not set.**
3. Connect a scan tool and command the rear differential clutch pump motor ON and OFF with a scan tool. Listen for the pump motor to run.

- **If the rear differential clutch pump motor is not heard when being commanded by a scan tool.**
- 4. Refer to Circuit/System Testing.
 - **If the rear differential clutch pump motor is heard when being commanded by a scan tool.**
- 5. All OK.

Circuit/System Testing

1. Ignition OFF, disconnect the X2 harness connector at the K47 Rear Differential Clutch Control Module.
2. Test for less than 1 V between the each control circuit on the harness side and ground.
 - **If greater than 1 V**
3. Repair the short to voltage on that circuit
 - **If less than 1V**
4. Connect a test lamp between control circuit terminal 1 and control circuit terminal 2, ignition ON.
5. Verify the test lamp turns ON when commanding the pump motor ON and OFF with a scan tool.
 - **If the test lamp remains OFF during either of the commands**
 1. Ignition OFF, remove the test lamp, disconnect the harness connector at the K47 Rear Differential Clutch Control Module.
 2. Test for infinite resistance between each control circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the K47 Rear Differential Clutch Control Module.
 - **If the test lamp turns ON during each of the commands**
6. Test or replace the M32 Differential Clutch Pump.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

- **Differential Clutch Pump Replacement**
- **Control Module References** for rear differential clutch control module replacement, programming and setup.

DTC C0411: REAR DIFFERENTIAL PRESSURE SENSOR

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC C0411

Rear Differential Pressure Sensor Circuit

For symptom byte information, refer to **Symptom Byte List**

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
5 V Reference	C0411 06	-	C0411 05	-
Signal	C0411 06	C0870 00	C0411 05	C0411 08
Low Reference	-	-	-	-

Circuit/System Description

The Rear Differential Pressure Sensor outputs a voltage that represents the physical pressure within the hydraulic circuit piston cavity. This DTC detects a voltage below threshold (Short to Ground / Open Supply), a voltage above threshold (Short to Battery / Open Ground) or a break on the signal line. It also detects an invalid signal (out of range) on the output signal.

Conditions for Running the DTC

- The ignition is ON.
- DTC C0800 is not current.

Conditions for Setting the DTC

C0411 05

- An open or short to ground is detected on the pressure sensor circuits.

C0411 06

- An open or short to battery is detected on the pressure sensor circuits.

C0411 08, C0411 58

- An invalid signal is detected on the pressure sensor circuits.

C0411 5A

- A plausibility error is detected on the pressure sensor signals.

No indicator light or DIC message. System will operate as normal.

Conditions for Clearing the DTC

- The condition for the DTC is no longer present.
- The DTC is not detected in 40 consecutive drive cycles.

Reference Information

Schematic Reference

Rear Axle Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Rear Drive Axle Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Diagnostic Aids

DTC C0411 will not set for too low or high differential pressure.

Circuit/System Testing

1. Ignition OFF and all vehicle systems OFF, disconnect the X1 harness connector at the B260 Rear Differential Pressure/Temperature Sensor. It may take up to 2 min for all vehicle systems to power down.
2. Test for less than 10 ohms between the low reference circuit terminal 10 and ground.
 - **If 10 ohms or greater**
 - 1. Ignition OFF, disconnect the X2 harness connector at the K47 Rear Differential Clutch Control Module.

2. Test for less than 2 ohms in the low reference circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K47 Rear Differential Clutch Control Module.
 - **If less than 10 ohms**
3. Ignition ON.
4. Test for 4.8-5.2 V between the 5 V reference circuit terminal 3 and ground.
 - **If less than 4.8 V**
 1. Ignition OFF, disconnect the X2 harness connector at the 47 Rear Differential Clutch Control Module.
 2. Test for infinite resistance between the 5 V reference circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 ohms in the 5 V reference circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K47 Rear Differential Clutch Control Module.
 - **If greater than 5.2 V**
 1. Ignition OFF, disconnect the X2 harness connector at the K47 Rear Differential Clutch Control Module, ignition ON.
 2. Test for less than 1 V between the 5 V reference circuit and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K47 Rear Differential Clutch Control Module.
 - **If between 4.8-5.2 V**
5. Test for 4.8-5.2 V between the 5 V reference circuit terminal 12 and the signal circuit terminal 11.
 - **If less than 4.8 V**
 1. Ignition OFF, disconnect the harness connector at the K47 Rear Differential Clutch Control Module.
 2. Test for less than 2 ohms in the signal circuit end to end.
 - If greater than 2 ohms, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K47 Rear Differential Clutch Control Module.
 - **If greater than 5.2 V**
 1. Ignition OFF, disconnect the harness connector at the K47 Rear Differential Clutch Control Module, ignition ON.
 2. Test for less than 1 V between the signal circuit and ground.
 - If greater than 1 V, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K47 Rear Differential Clutch Control Module.
 - **If between 4.8-5.2 V**
6. Test or replace the B260 Rear Differential Oil Pressure/Temperature sensor.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

- **Transmission Fluid Pressure Sensor Replacement**
- **Control Module References** for rear differential clutch control module replacement, programming and setup.

DTC C0412: REAR DIFFERENTIAL CLUTCH TEMPERATURE SENSOR

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC C0412

Rear Differential Clutch Temperature Sensor Circuit

For symptom byte information, refer to **Symptom Byte List**

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Temperature Sensor Signal	C0412 06	-	C0412 05	C0412 08
Low Reference	-	C0412 06	-	-

Circuit/System Description

The rear differential clutch hydraulic sump temperature sensor outputs a voltage that represents the physical temperature of the hydraulic sump fluid. The rear differential clutch control module detects a short to ground, a short to battery or a break on the signal line. It also detects an invalid signal (out of range) on the output signal.

Conditions for Running the DTC

- The ignition is ON.
- DTC C0870 is not current.

Conditions for Setting the DTC

C0412 05

- An open or short to battery is detected on one of the temperature sensor circuits.

C0412 06

- An open or short to ground is detected on one of the temperature sensor circuits.

C0412 08

- An invalid signal is detected on the temperature sensor circuit.

Action Taken When the DTC Sets

No indicator light or driver information center message. System will operate as normal.

Conditions for Clearing the DTC

- The condition for the DTC is no longer present.
- The DTC is not detected in 40 consecutive drive cycles.

Reference Information

Schematic Reference

Rear Axle Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Rear Drive Axle Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

1. Ignition OFF and all vehicle systems OFF, disconnect the harness connector at the B260 Rear Differential Oil Pressure/Temperature Sensor. It may take up to 2 min for all vehicle systems to power down.
2. Test for less than 5 ohms between the low reference circuit terminal 10 and ground.
 - **If 5 ohms or greater**
 1. Ignition OFF, disconnect the harness connector at the K47 Rear Differential Clutch Control Module.
 2. Test for less than 2 ohms in the low reference circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K47 Rear Differential Clutch Control Module.
 - **If less than 5 ohms**
3. Ignition ON.
4. Verify the scan tool Rear Differential Oil Temperature parameter is less than -39°C (-38°F).
 - **If greater than -39°C (-38°F)**
 1. Ignition OFF, disconnect the harness connector at the K47 Rear Differential Clutch Control Module.
 2. Test for infinite resistance between the signal circuit terminal 13 and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the K47 Rear Differential Clutch Control Module.
 - **If less than -39°C (-38°F)**
5. Install a 3 A fused jumper wire between the signal circuit terminal 13 and the low reference circuit terminal 10.
6. Verify the scan tool Rear Differential Oil Temperature sensor parameter is greater than 185°C (365°F).
 - **If less than the 185°C (365°F)**
 1. Ignition OFF, remove the jumper wire, disconnect the harness connector at the K47 Rear Differential Clutch Control Module, ignition ON.
 2. Test for less than 1 V between the signal circuit and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V
3. Ignition OFF
4. Test for less than 2 ohms in the signal circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K47 Rear Differential Clutch Control Module.
- **If greater than 149°C (300°F)**
7. Test or replace the B260 Rear Differential Oil Pressure/Temperature Sensor.

Repair Instructions

- **Transmission Fluid Pressure Sensor Replacement**.
- **Control Module References** for rear differential clutch control module replacement, programming and setup.

DTC C0413: REAR DIFFERENTIAL HYDRAULIC SYSTEM BLEED NOT PERFORMED

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provide an overview of each diagnostic category.

DTC Descriptors

DTC C0413

Rear Differential Hydraulic System Bleed Not Performed

For symptom byte information, refer to **Symptom Byte List** .

Circuit/System Description

The rear differential clutch control module detects if the initial bleed routine has not been performed correctly. No external circuit diagnosis is involved.

Conditions for Running the DTC

- Ignition ON.
- DTC C0800 is not current.

Conditions for Setting the DTC

The rear differential clutch control module detects that the service bleed has not been performed.

Action Taken When the DTC Sets

- The electronic limited slip control is disabled.
- REAR AXLE DISABLED will be displayed in the Driver Information Center.

Conditions for Clearing the DTC

- The rear differential clutch control module clears the history DTC when a current DTC is not detected in 40 ignition cycles.
- The condition for the DTC is no longer present.

Reference Information

Schematic Reference

Rear Axle Schematics.

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX .

Description and Operation

Limited Slip Differential Description and Operation.

Electrical Information Reference

- Circuit Testing .
- Testing for Intermittent Conditions and Poor Connections .
- Wiring Repairs .
- Connector Repairs

Scan Tool Reference

Control Module References for scan tool information.

Circuit/System Verification

1. Ignition ON.
2. Verify that DTC C0413 is not set.
 - **If the DTC is set**
 1. Perform the Rear Differential Hydraulic System Service Bleed procedure with a scan tool. Refer to **Rear Differential Hydraulic System Service Fill/Bleed.**
 - If the DTC is still set, replace the K47 Rear Differential Clutch Control Module.
 - If the DTC is not set
 2. All OK.
 - **If the DTC is not set**
3. All OK.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair

- **Control Module References** for rear differential clutch control module replacement, programming and setup.

DTC C0414: REAR DIFFERENTIAL HYDRAULIC SYSTEM

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC C0414

Rear Differential Hydraulic System

For symptom byte information, refer to **Symptom Byte List**

Circuit/System Description

The rear differential clutch control module monitors the amount of torque transferred through the rear axle. If there is a mechanical malfunction that inhibits the torque transfer process the module will then set DTC C0414.

Conditions for Running the DTC

- The ignition is ON.
- DTC C0800 is not current.

Conditions for Setting the DTC

A mechanical malfunction exists that inhibits the torque transfer process.

Action Taken When the DTC Sets

One or more of the following actions may occur:

- Electronic limited slip is disabled.
- For symptom byte 54, the REAR AXLE DISABLED message is displayed in the drivers information center.
- For symptom byte 58, the SERVICE REAR AXLE message is displayed in the drivers information center.

Conditions for Clearing the DTC

- The condition for setting the DTC is no longer present.
- The DTC is not detected in 40 consecutive ignition cycles.

Diagnostic Aids

Excessive Differentiation (wheel/tire slip) can cause high temperatures in the rear drive axle and DTC C0414 may set.

Reference Information

Schematic Reference

Rear Axle Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Rear Drive Axle Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Engine running and vehicle stationary.
2. Verify the scan tool Rear Drive Clutch Status parameter is not Temporarily Limited.
 - **If Temporarily Limited**
 - 1. Verify that DTC C0393, C0403, C0407 or C0411 is not set.
 - If any of the DTCs are set, refer to **Diagnostic Trouble Code (DTC) List - Vehicle**.
 - If none of the DTCs are set
 - 2. Verify there are no internal/external leaks or mechanical damage and that all differential fluid levels are at the proper levels. Refer to **Rear Axle Lubricant Level Inspection** and **Differential Clutch Oil Inspection**.
 - If internal/external leaks or mechanical damage is found, repair as necessary.
 - 3. Clear DTCs and road test the vehicle.
 - 4. Verify that DTC C0414 is not set.
 - If the DTC is set, replace the rear differential assembly.

5. All OK.

- **If not Temporarily Limited**

3. All OK.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

Differential Replacement

DTC C0418: REAR DRIVE CLUTCH CLASSIFICATION NOT PROGRAMMED

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provide an overview of each diagnostic category.

DTC Descriptors

DTC C0418

Rear Drive Clutch Classification Not Programmed

For symptom byte information, refer to **Symptom Byte List** .

Circuit/System Description

The rear differential clutch control module detects if the initial clutch classification procedure has not been performed or has not been performed correctly. No external circuit diagnosis is involved.

Conditions for Running the DTC

Ignition ON.

Conditions for Setting the DTC

The rear differential clutch control module detects that the clutch classification has not been programmed correctly.

Action Taken When the DTC Sets

- The electronic limited slip control is disabled.
- Service Rear Axle will be displayed in the Driver Information Center.

Conditions for Clearing the DTC

- The rear differential clutch control module clears the history DTC when a current DTC is not detected in 40 ignition cycles.
- The condition for the DTC is no longer present.

Reference Information

Schematic Reference

Rear Axle Schematics.

Connector End View Reference

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Description and Operation

Limited Slip Differential Description and Operation.

Electrical Information Reference

- Circuit Testing .
- Testing for Intermittent Conditions and Poor Connections .
- Wiring Repairs .
- Connector Repairs

Scan Tool Reference

Control Module References for scan tool information.

Circuit/System Verification

1. Ignition ON.
2. Verify that DTC C0418 is not set.
 - **If the DTC is set**
 1. Program the K47 Rear Differential Clutch Control Module.
 - If the DTC is still set, replace the K47 Rear Differential Clutch Control Module.
 - If the DTC is not set
 2. All OK.
 - **If the DTC is not set**
3. All OK.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair

Control Module References for rear differential clutch control module replacement, programming and setup.

DTC C0870: CONTROL MODULE VOLTAGE REFERENCE OUTPUT CIRCUIT

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC C0870

Control Module Voltage Reference Output Circuit

For symptom byte information, refer to **Symptom Byte List**

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
5 V Reference	C0411 06	C0870 00	C0411 05	-
Signal	C0411 06	-	C0411 05	C0411 08
Low Reference	-	-		-

Circuit/System Description

The rear differential clutch control module provides a common regulated 5 volt reference to the rear differential oil pressure/temperature sensor. The rear differential clutch control module monitors this power supply for a malfunction that could prevent it from correctly regulating the supply voltage.

Conditions for Running the DTC

- Battery voltage is between 9-16 volts
- Ignition is ON

Conditions for Setting the DTC

- The rear differential clutch control module senses suspension position sensor supply voltage less than 3.75 V or greater than 5.625 V.
- The condition is detected for 1 s in 4 consecutive ignition cycles.

Action Taken When the DTC Sets

- The electronic limited slip differential becomes inoperative.
- The rear differential clutch control module sends a message to the instrument cluster to display SERVICE REAR AXLE message.

Conditions for Clearing the DTC

- A history DTC will clear after 40 consecutive ignition cycles if the condition for the malfunction is no longer present.
- The rear differential clutch control module senses the correct sensor supply voltage.

Reference Information

Schematic Reference

Rear Axle Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Limited Slip Differential Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References scan tool information

Circuit/System Verification

1. Ignition ON, observe the scan tool rear differential clutch 5 V Reference parameter. The parameter should be 4.8-5.2 V.
 - **If not within 4.8-5.2 V.**

Refer to Circuit/System Testing
 - **If within 4.8-5.2 V.**
2. All OK.

Circuit/System Testing

1. Ignition OFF and all vehicle systems OFF, disconnect the harness connector at the B260 Rear Differential Oil Pressure/Temperature sensor. It may take up to 2 minutes for all vehicle systems to power down.
2. Test for less than 20 ohms between the low reference circuit terminal 2 and ground.
 - **If 20 ohms or greater**
 1. Ignition Off, disconnect the harness connector at the K47 Rear Differential Clutch Control Module.
 2. Test for less than 2 ohms in the low reference circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K47 Rear Differential Clutch Control Module.
 - **If less than 20 ohms**
3. Ignition ON.
4. Test for 4.8-5.2 V between the 5 V reference circuit terminal 3 and ground.
 - **If less than 4.8 V**
 1. Ignition OFF, disconnect the X2 harness connector at the K47 Rear Differential Clutch Control Module.
 2. Test for infinite resistance between the 5 V reference circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test to less than 2 ohms in the 5 V reference circuit end to end.
 - If 2 ohms for greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K47 Rear Differential Clutch Control Module.
 - **If greater than 5.2 V**
 1. Ignition OFF, disconnect the harness connector at the K47 Rear Differential Clutch Control Module, ignition ON.
 2. Test for less than 1 V between the 5 V reference circuit terminal 12 and ground
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K47 Rear Differential Clutch Control Module.
 - **If between 4.8-5.2 V**
5. Test for 4.8-5.2 V between the 5 V reference circuit terminal 12 and the signal circuit terminal 11.
 - **If less than 4.8 V**
 1. Ignition OFF, disconnect the harness connector at the K47 Rear Differential Clutch Control Module.
 2. Test for less than 2 ohms in the signal circuit end to end.
 - If greater than 2 ohms, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K47 Rear Differential Clutch Control Module.

1. Ignition OFF, disconnect the harness connector at the K47 Rear Differential Clutch Control Module, ignition ON.
2. Test for less than 1 V between the signal circuit and ground.
 - If greater than 1 V, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K47 Rear Differential Clutch Control Module.
 - **If between 4.8-5.2 V**
6. Test or replace the B260 Rear Differential Oil Pressure/Temperature sensor.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

- **Transmission Fluid Pressure Sensor Replacement**
- **Control Module References** for rear differential clutch control module replacement, programming and setup.

SYMPTOMS - REAR DRIVE AXLE

Strategy Based Diagnostics

Review the system operations in order to familiarize yourself with the system functions. Refer to **Rear Axle Disassembled Views** and **Rear Drive Axle Description and Operation** and **Wheel Drive Shafts 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 level and the proper viscosity.
- 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 make sure 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**
- **Transmission Noisy**
- **Symptoms - Propeller Shaft**
- **Clutch Noisy**
- **Noisy in Drive**
- **Noisy When Coasting**
- **Constant Noise**
- **Noisy on Turns**
- **Rear Axle Lubricant Leak Diagnosis**

NOISY IN DRIVE

Noisy in Drive

Cause	Correction
DEFINITION: A noise heard during acceleration load.	
IMPORTANT: Inspect for the proper gear oil levels prior to performing system diagnosis. Refer to <u>Rear Axle Lubricant Level Inspection</u> .	
Worn clutch disc and/or pressure plate assembly	Repair or replace, as required. Refer to <u>Clutch Noisy</u> .
Transmission noise	Repair or replace, as required. Refer to <u>Transmission Noisy</u> and <u>Diagnostic System Check - Vehicle</u> .
Driveline assembly noise	Repair or replace, as required. Refer to <u>Symptoms - Propeller Shaft</u> .
Worn axle shaft constant velocity joints	Replace the constant velocity joints, as required.
Worn, loose or damaged axle mount and/or bracket	Repair or replace the axle mount and/or bracket, as required.
Bearing noise within the differential assembly	A grinding or roar type noise increases or decreases relative to the vehicle speed. 1. Inspect for the proper fluid level. Fill, as required. 2. If the noise continues, repair or replace the unit, as required.
Gear set whine noise within the differential assembly	A whine type noise increases or decreases relative to the vehicle speed, approximately 80-96 km/h (50-60 mph). Typical causes of a gear set whine type noise may include incorrect backlash and/or pinion depth adjustment or

	worn or scored gear set teeth. 1. Inspect for the proper fluid level. Fill, as required. 2. Repair or replace the unit, as required.
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NOISY WHEN COASTING

Noisy When Coasting

Cause	Correction
IMPORTANT: Inspect for the proper gear oil levels prior to performing system diagnosis. Refer to <u>Rear Axle Lubricant Level Inspection</u> .	
Worn axle shaft constant velocity joints	Replace the constant velocity joints as required.
Worn, loose or damaged axle mount and/or bracket	Repair or replace the axle mount and/or bracket as required.
Bearing noise within the differential assembly	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 unit as required.
Gear set whine noise within the differential assembly	A whine type noise will increase or decrease relative to the vehicle speed, approximately 80-97 km/h (50-60 mph). Typical causes of a gear set whine type noise may include incorrect backlash and/or pinion depth adjustment or worn or scored gear set teeth. 1. Inspect for the proper fluid level. Fill as required. 2. Repair or replace the unit as required.

CONSTANT NOISE

Constant Noise

Cause	Correction
IMPORTANT: Inspect for the proper gear oil levels prior to performing system diagnosis. Refer to <u>Rear Axle Lubricant Level Inspection</u> .	
Low gear oil levels	Faulty oil seals or other type leaks may contribute to lower than required fluid levels. Refer to <u>Rear Axle Lubricant Leak Diagnosis</u>.

	Fill to the proper level with the correct gear oil and friction modifier additive. Refer to <u>Adhesives, Fluids, Lubricants and Sealers</u> and <u>Differential Oil Replacement</u> .
Worn, loose or damaged axle mount and/or bracket	Repair or replace the axle mount and/or bracket as required.
Bearing noise within the differential assembly	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 unit as required.
Gear set whine noise within the differential assembly	A whine type noise will increase or decrease relative to the vehicle speed, approximately 31-37 km/h (50-60 mph). Typical causes of a gear set whine type noise may include incorrect backlash and/or pinion depth adjustment or worn or scored gear set teeth. 1. Inspect for the proper fluid level. Fill as required. 2. Repair or replace the unit as required.

NOISY ON TURNS

Noisy on Turns

Cause	Correction
DEFINITION: A noise is present only when the vehicle turns.	
IMPORTANT: • Inspect for the proper gear oil levels prior to performing system diagnosis. Refer to <u>Rear Axle Lubricant Level Inspection</u>. • Operate the vehicle turning in tight circles in both left and right directions. A chatter type concern may indicate an incorrect type gear oil, lack of the friction modifier additive or worn friction discs and/or plates.	
Worn or loose rear axle mount and/or bracket	Repair or replace, as required.
Worn axle shaft constant velocity joints	Replace the constant velocity joints, as required.
Worn wheel bearings	Replace the wheel bearings, as required.
Incorrect gear oil	Drain and fill to the proper level with the correct gear oil and friction modifier additive. Adding friction modifier to the existing fluid without draining, will not correct this condition. Refer to <u>Adhesives, Fluids, Lubricants and Sealers</u> and <u>Differential Oil Replacement</u>.

Worn clutch plates	Replace the friction discs and plates, as required.
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REAR AXLE LUBRICANT LEAK DIAGNOSIS

Rear Axle Lubricant Leak Diagnosis

Cause	Correction
IMPORTANT: Upon completion of all repairs, refill the axle with the proper amounts of axle lubricant and friction modifier additive. Refer to Differential Oil Replacement and Lubrication Specifications .	
Restricted or damaged vent valve assembly	Replace the vent valve.
Worn, scored or missing drain and/or fill plug sealing washers	Install new sealing washers and tighten the plugs per specifications.
Damaged speed sensor and/or O-ring seal	Replace the speed sensor and/or the O-ring seal as required.
Rear cover gasket	Replace the rear cover gasket.
Left or right side cover O-ring seal	Replace the side cover O-ring seal as required.
Worn or damaged axle shaft oil seals	Replace the axle shaft oil seals as required.
Worn or damaged carrier seal plate O-ring or oil seal- automatic transmission only	Replace the O-ring and oil seal as required.
Housing or side cover porosity	Replace the housing and/or the covers as required.

REPAIR INSTRUCTIONS

REAR WHEEL DRIVE MODULE REPLACEMENT

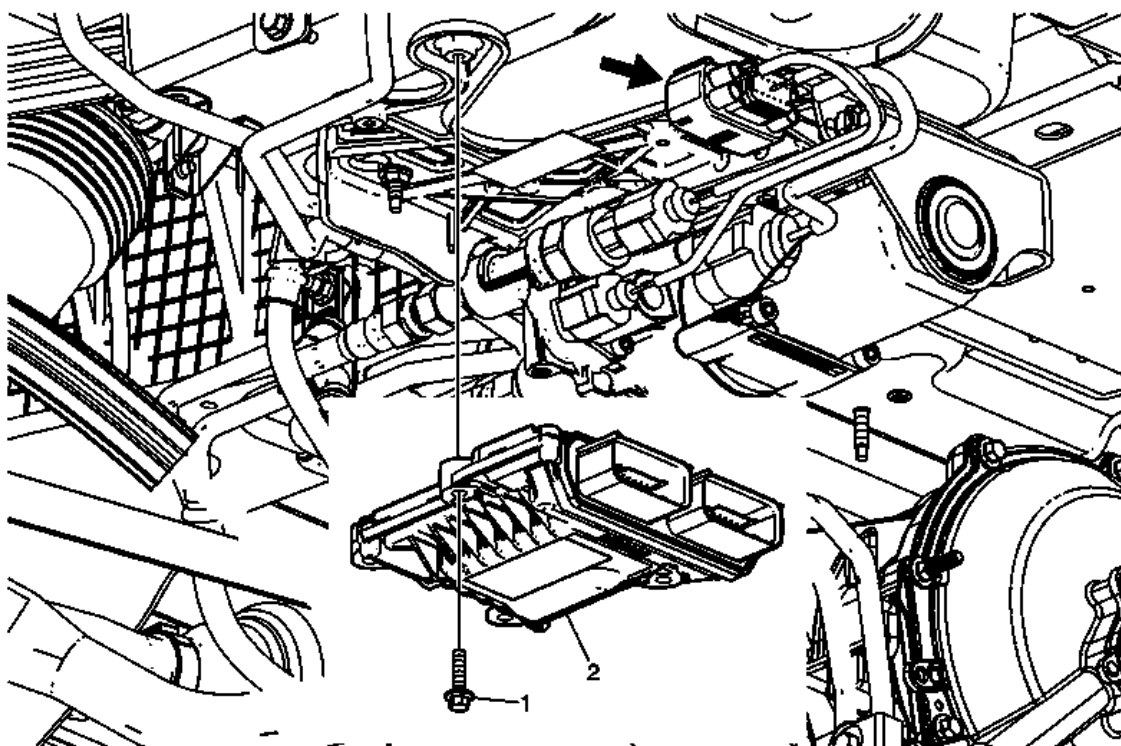


Fig. 6: Rear Wheel Drive Module
 Courtesy of GENERAL MOTORS COMPANY

Rear Wheel Drive Module Replacement

Callout	Component Name
Preliminary Procedure	
1. Remove the rear bumper fascia. Refer to Rear Bumper Fascia Replacement . 2. Disconnect the rear axle differential lock switch connector before removal.	
1	Rear Wheel Drive Module Bolt (Qty: 4) CAUTION: Refer to Fastener Caution . Tighten 6 (53 lb in)
2	Rear Wheel Drive Module

ELECTRIC DIFFERENTIAL DRIVE MOTOR OUTLET HOSE REPLACEMENT

Removal Procedure

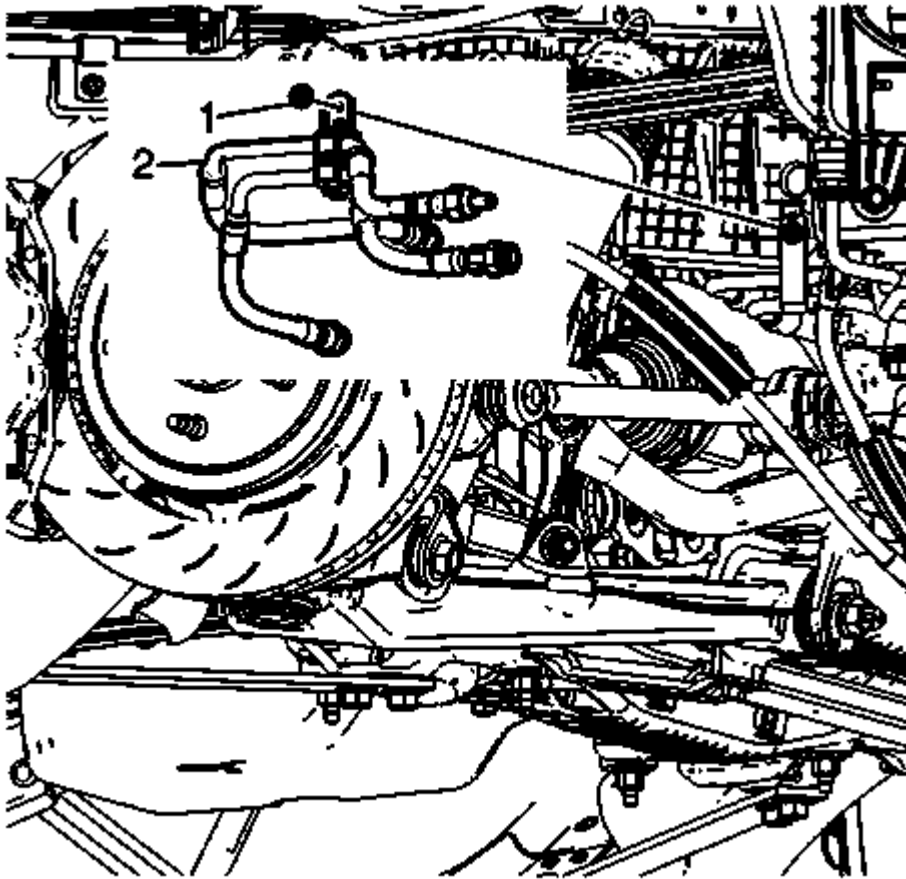


Fig. 7: Electric Differential Drive Motor Outlet Hose Assembly Bracket Bolt And Electric Differential Drive Motor Outlet Hose Assembly
Courtesy of GENERAL MOTORS COMPANY

1. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle .
2. Lower and support the rear of the exhaust system.
3. Install a drain pan under the vehicle.
4. Remove the rear bumper fascia. Refer to Rear Bumper Fascia Replacement .
5. Remove the electric differential drive motor outlet hose assembly bracket bolt (1).
6. Remove the electric differential drive motor outlet hose assembly (2).

Installation Procedure

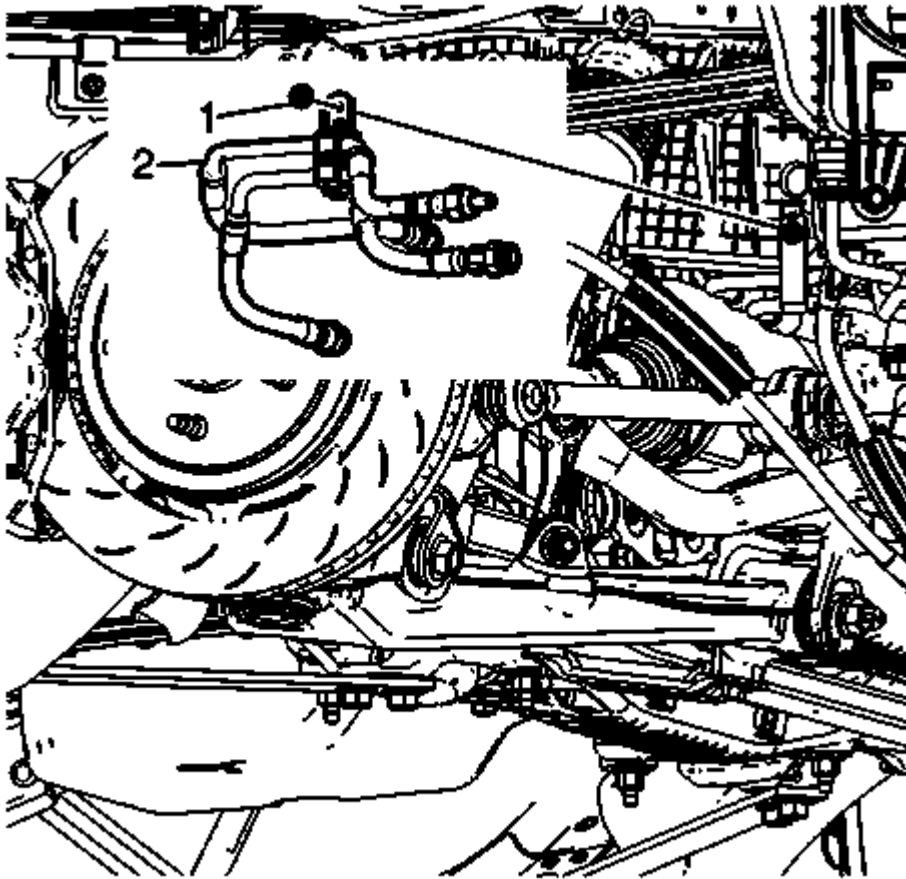


Fig. 8: Electric Differential Drive Motor Outlet Hose Assembly Bracket Bolt And Electric Differential Drive Motor Outlet Hose Assembly
Courtesy of GENERAL MOTORS COMPANY

1. Install the electric differential drive motor outlet hose assembly (2).
2. Install the electric differential drive motor outlet hose assembly bracket bolt (1). Tighten the bolt (1) to 10 N.m (89 lb in).
3. Complete the Rear Differential Hydraulic System Service Fill/Bleed. Refer to **Rear Differential Hydraulic System Service Fill/Bleed**.
4. Install the rear bumper fascia. Refer to **Rear Bumper Fascia Replacement** .
5. Remove the drain pan from under the vehicle.
6. Raise and secure the rear of the exhaust system.
7. Lower the vehicle. Refer to **Lifting and Jacking the Vehicle** .

REAR AXLE LUBRICANT LEVEL INSPECTION

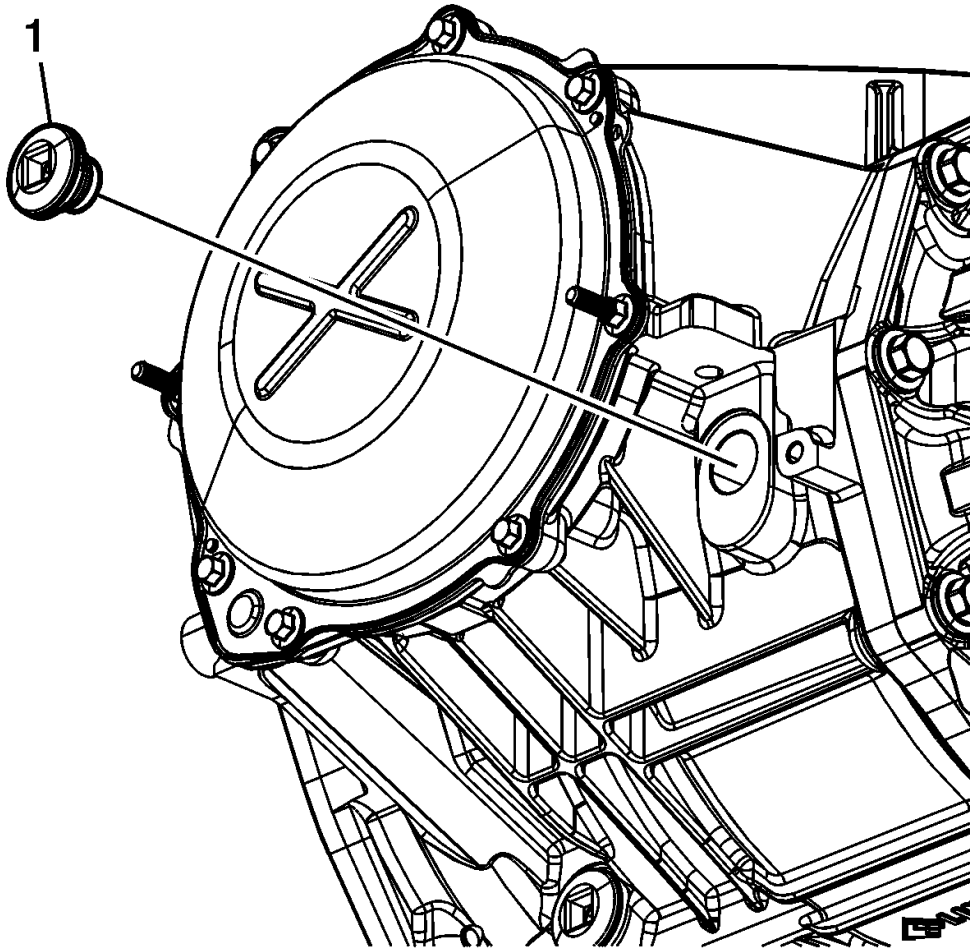


Fig. 9: Fill Plug
Courtesy of GENERAL MOTORS COMPANY

1. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle .
2. Clean any dirt from around the differential fill plug.
3. Remove the fill plug (1) from the differential.
4. Check the differential fluid level. it should be even with the bottom of the fill plug hole to no lower than 6 mm (0.25 in) below the opening.
5. Add new fluid if necessary. For the recommended fluid, refer to Lubrication Specifications.

CAUTION: Refer to Fastener Caution .

6. Install the fill plug (1) to the differential. Tighten to 27 N.m (20 lb ft).
7. Lower the vehicle.

DIFFERENTIAL CLUTCH OIL INSPECTION

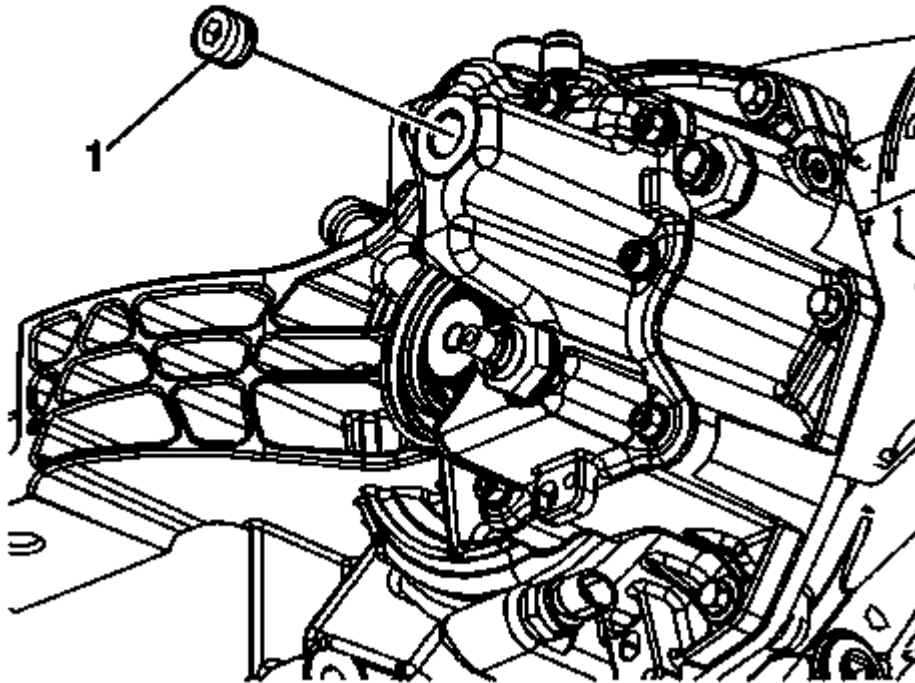


Fig. 10: Differential Clutch Cover Plug
Courtesy of GENERAL MOTORS COMPANY

1. Raise and support the vehicle. Refer to **Lifting and Jacking the Vehicle** .
2. Clean any dirt from around the differential clutch cover plug.
3. Remove the differential clutch cover plug (1) from the differential clutch cover.
4. Check the differential clutch fluid level. it should be even with the bottom of the plug hole to no lower than 6 mm (0.25 in) below the opening.
5. Add new fluid if necessary. For the recommended fluid, refer to **Lubrication Specifications**.

CAUTION: Refer to Fastener Caution .

6. Install the differential clutch cover plug (1) to the differential clutch cover. Tighten to 12 N.m (106 lb in).
7. Perform the Rear Differential Hydraulic System Service Fill/Bleed Procedure. Refer to **Rear Differential Hydraulic System Service Fill/Bleed**.
8. Lower the vehicle.

DIFFERENTIAL OIL REPLACEMENT

Draining Procedure

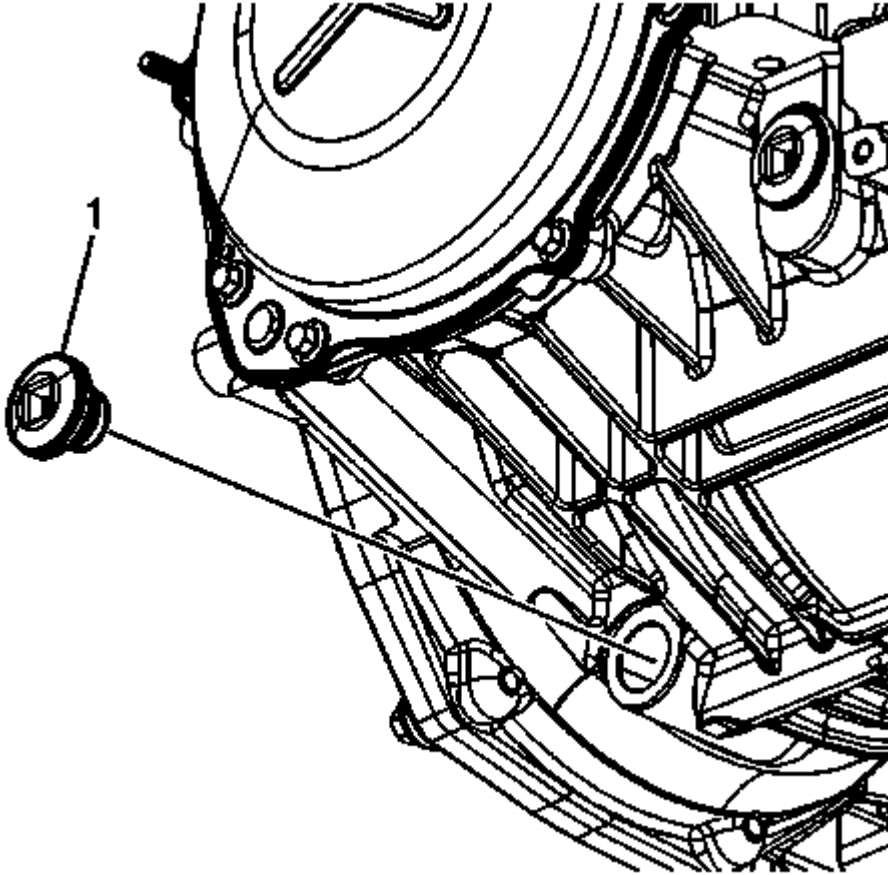


Fig. 11: Drain Plug

Courtesy of GENERAL MOTORS COMPANY

1. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle .
2. Clean any dirt from around the differential drain plug.
3. Remove the drain plug (1) from the differential.

Filling Procedure

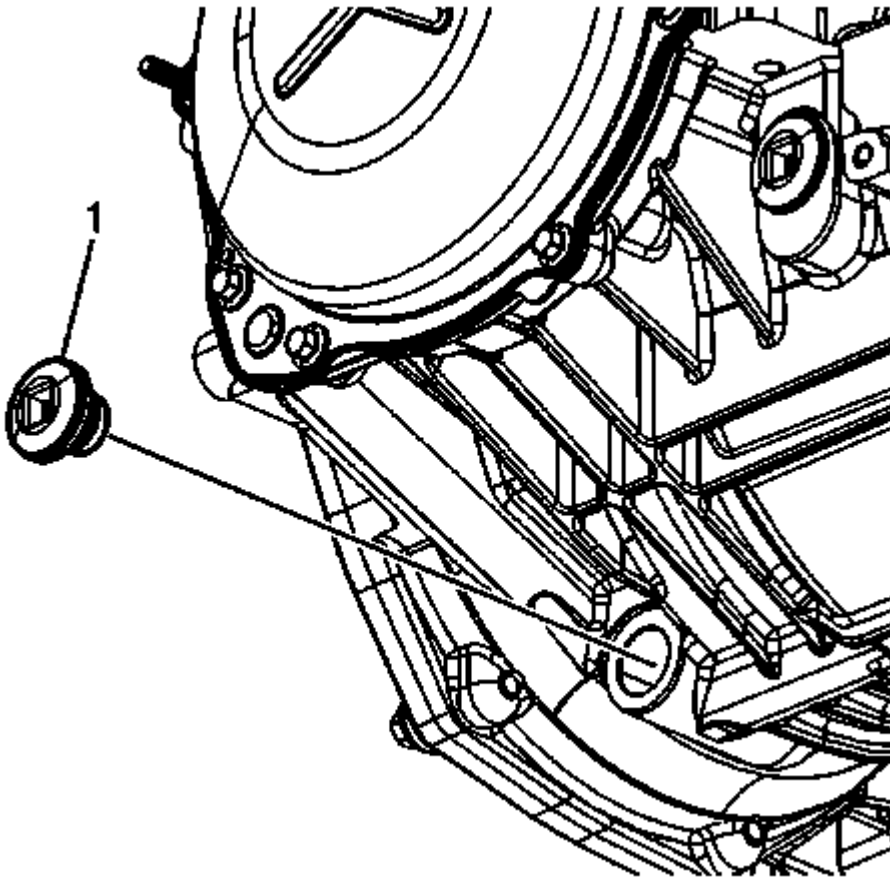


Fig. 12: Drain Plug

Courtesy of GENERAL MOTORS COMPANY

CAUTION: Refer to Fastener Caution .

1. Install the drain plug (1) to the differential and tighten the differential drain plug to 27 N.m (20 lb ft).
2. Fill the differential with axle lubricant. Refer to Lubrication Specifications.

NOTE: **The following service procedures are for vehicles equipped with the differential cooling system.**

3. Raise the vehicle so the wheels are about a foot off the floor. Make sure the wheels can spin freely without obstruction from the hoist or any nearby items.
4. Start the vehicle and put the transmission in second gear. Slowly accelerate to 10 mph and hold this speed for one minute.
5. Turn the vehicle off.
6. Raise the vehicle.

7. Check the fluid level in the differential. Add fluid until the recommended level is reached.
8. Lower the vehicle.

DIFFERENTIAL OIL COOLER REPLACEMENT

Removal Procedure

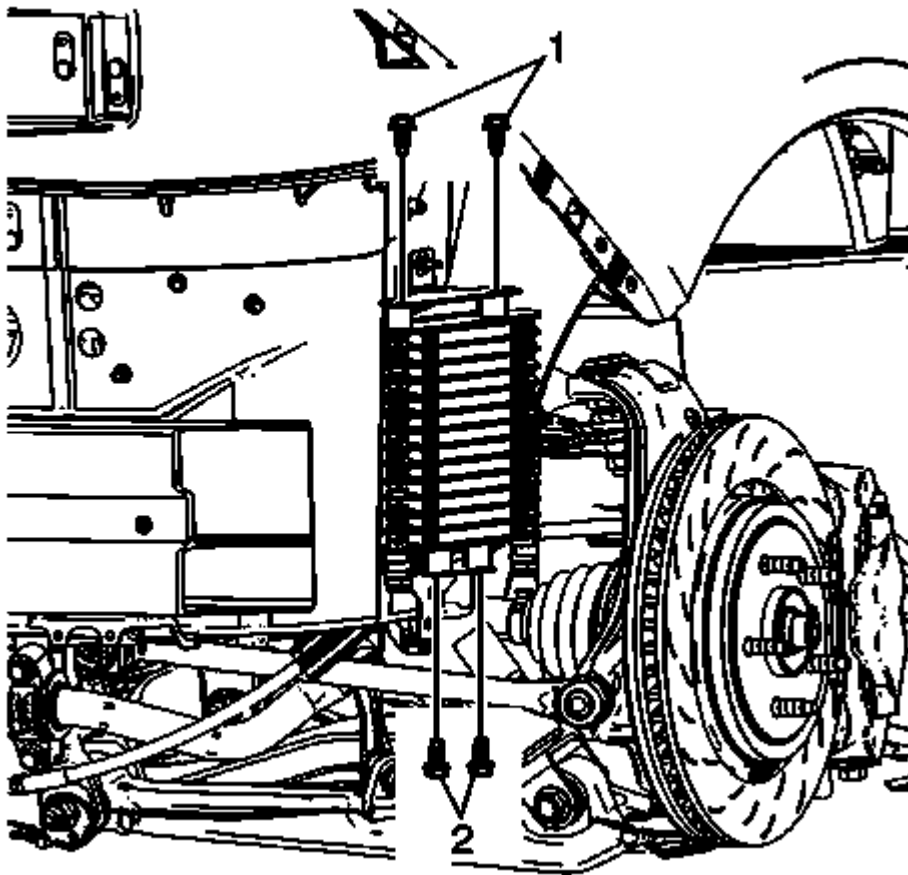


Fig. 13: Removing Oil Cooler Bolts
Courtesy of GENERAL MOTORS COMPANY

1. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle .
2. Lower and support the rear of the exhaust system.
3. Install a drain pan under the vehicle.
4. Remove the rear bumper fascia. Refer to Rear Bumper Fascia Replacement .
5. Remove the differential oil pump inlet hose. Refer to Differential Oil Pump Inlet Hose Replacement.
6. Remove the differential oil cooler inlet hose. Refer to Differential Oil Cooler Inlet Hose Replacement.
7. Remove the oil cooler bolts (1 and 2).

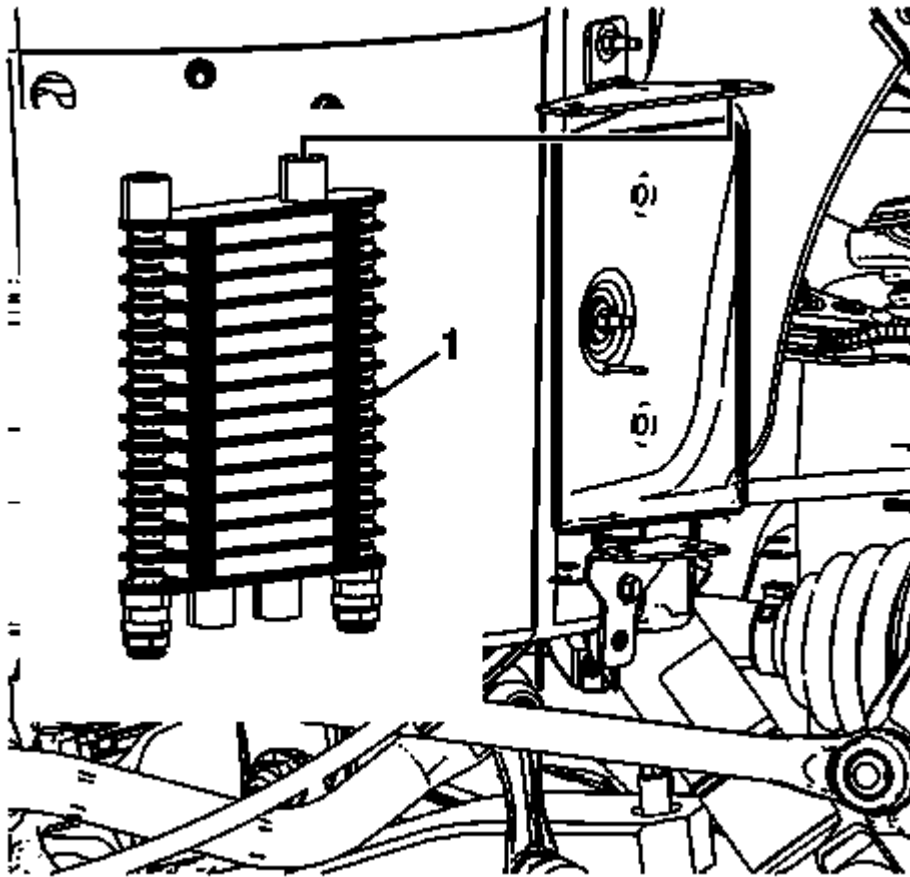


Fig. 14: Oil Cooler

Courtesy of GENERAL MOTORS COMPANY

8. Remove the oil cooler (1).

Installation Procedure

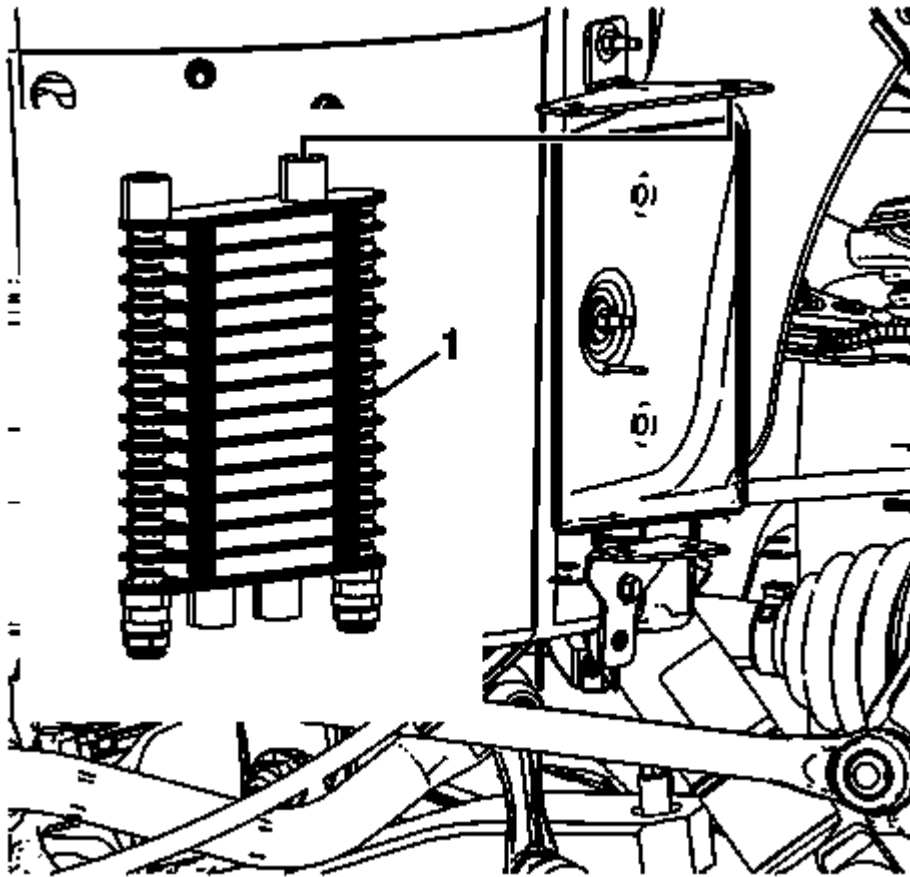


Fig. 15: Oil Cooler
Courtesy of GENERAL MOTORS COMPANY

1. Install the oil cooler (1).

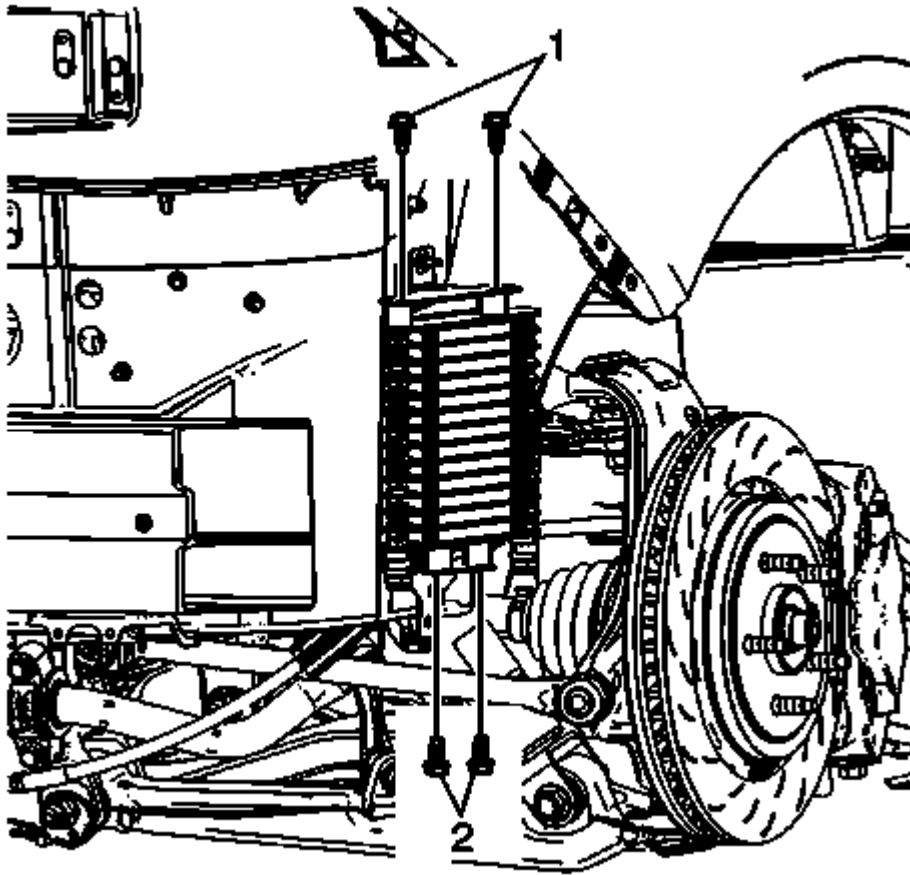


Fig. 16: Removing Oil Cooler Bolts
Courtesy of GENERAL MOTORS COMPANY

2. Install the oil cooler bolts (1 and 2). Tighten to 9 N.m (80 lb ft).
3. Install the differential oil cooler inlet hose. Refer to **Differential Oil Cooler Inlet Hose Replacement**.
4. Install the differential oil pump inlet hose. Refer to **Differential Oil Pump Inlet Hose Replacement**.
5. Install the rear bumper fascia. Refer to **Rear Bumper Fascia Replacement**.
6. Fill the differential fluid. Refer to **Rear Axle Lubricant Level Inspection**.
7. Remove the drain pan from under the vehicle.
8. Raise and secure the rear of the exhaust system.
9. Lower the vehicle. Refer to **Lifting and Jacking the Vehicle**.

DIFFERENTIAL OIL COOLER BAFFLE REPLACEMENT

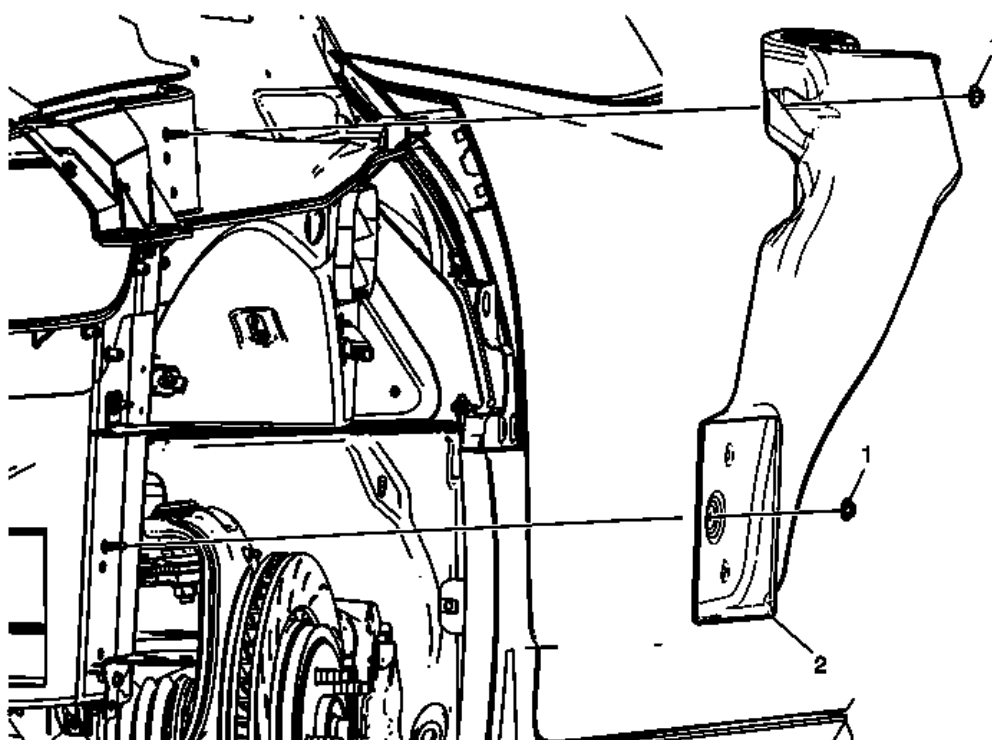


Fig. 17: Differential Oil Cooler Baffle
 Courtesy of GENERAL MOTORS COMPANY

Differential Oil Cooler Baffle Replacement

Callout	Component Name
Preliminary Procedures 1. Remove the right quarter outer panel. Refer to <u>Quarter Outer Panel Replacement - Right Side (Coupe)</u> , <u>Quarter Outer Panel Replacement - Right Side (Convertible)</u> . 2. Remove the quarter panel air scoop. Refer to <u>Quarter Panel Air Scoop Replacement</u> . 3. Remove the differential oil cooler. Refer to <u>Differential Oil Cooler Replacement</u>.	
1	Differential Oil Cooler Baffle Nut CAUTION: Refer to <u>Fastener Caution</u> . Tighten 7 (62 lb in)
2	Differential Oil Cooler Baffle

DIFFERENTIAL OIL COOLER INLET HOSE REPLACEMENT

Removal Procedure

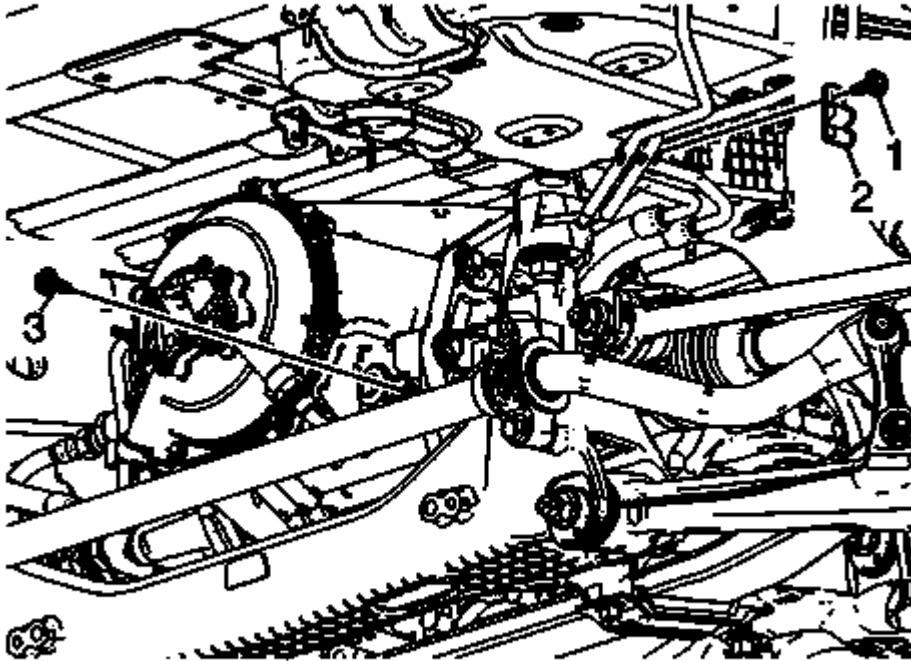


Fig. 18: Differential Oil Cooler Inlet Hose Bracket
Courtesy of GENERAL MOTORS COMPANY

1. Raise and support the vehicle. Refer to **Lifting and Jacking the Vehicle** .
2. Lower and support the rear of the exhaust system.
3. Install a drain pan under the vehicle.
4. Remove the rear bumper fascia. Refer to **Rear Bumper Fascia Replacement** .
5. Remove the differential oil cooler inlet hose bracket bolts (1 and 3). Remove the differential oil cooler inlet hose bracket (2).

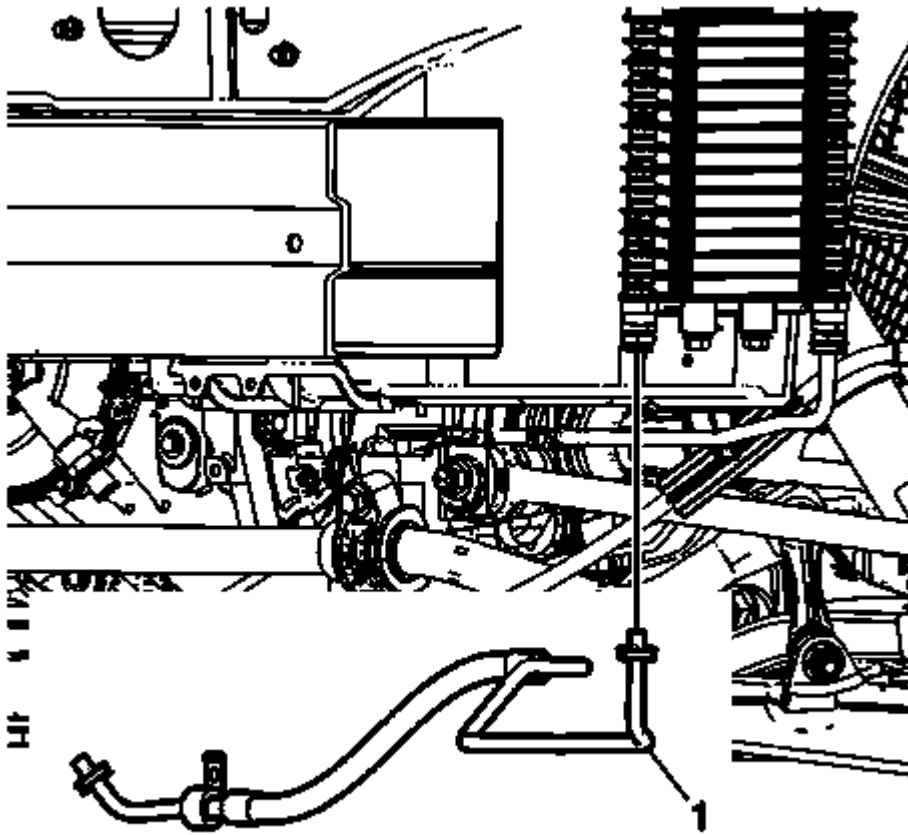


Fig. 19: Differential Oil Cooler Inlet Hose
Courtesy of GENERAL MOTORS COMPANY

6. Disconnect the differential oil cooler inlet hose from the differential oil cooler and the rear axle housing. Refer to **Differential Cooler Hose/Pipe Quick Connect Fitting**.
7. Remove the differential oil cooler inlet hose (1) from the vehicle.

Installation Procedure

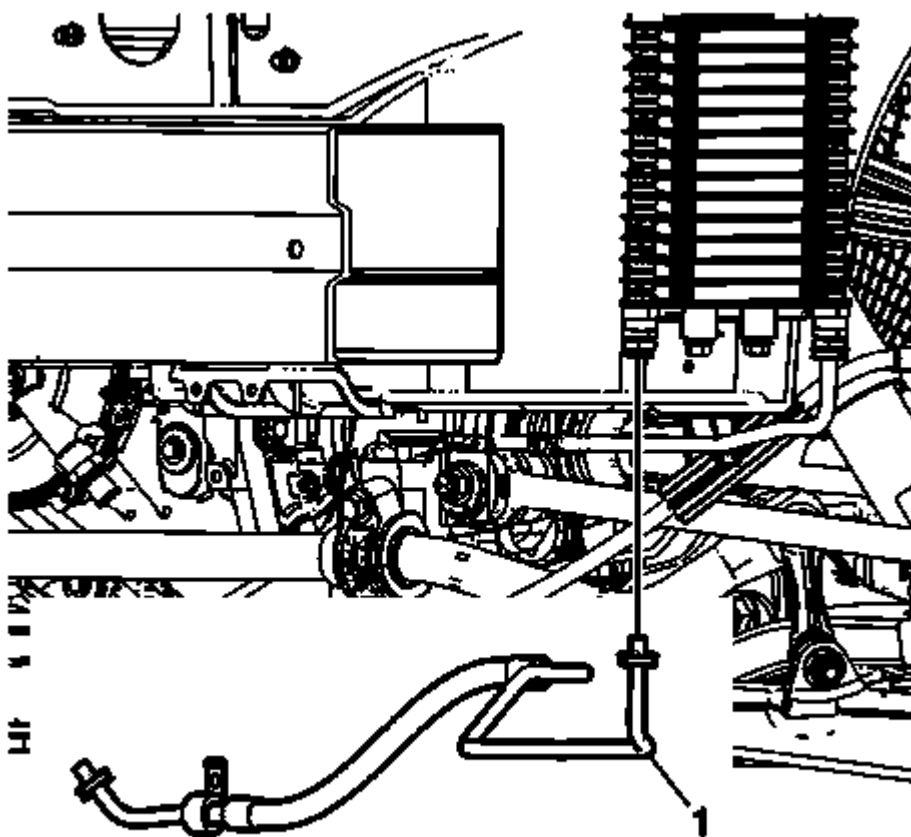


Fig. 20: Differential Oil Cooler Inlet Hose
Courtesy of GENERAL MOTORS COMPANY

1. Install the differential oil cooler inlet hose (1) to the vehicle.
2. Connect the differential oil cooler inlet hose to the differential oil cooler and the rear axle housing. Refer to **Differential Cooler Hose/Pipe Quick Connect Fitting**.

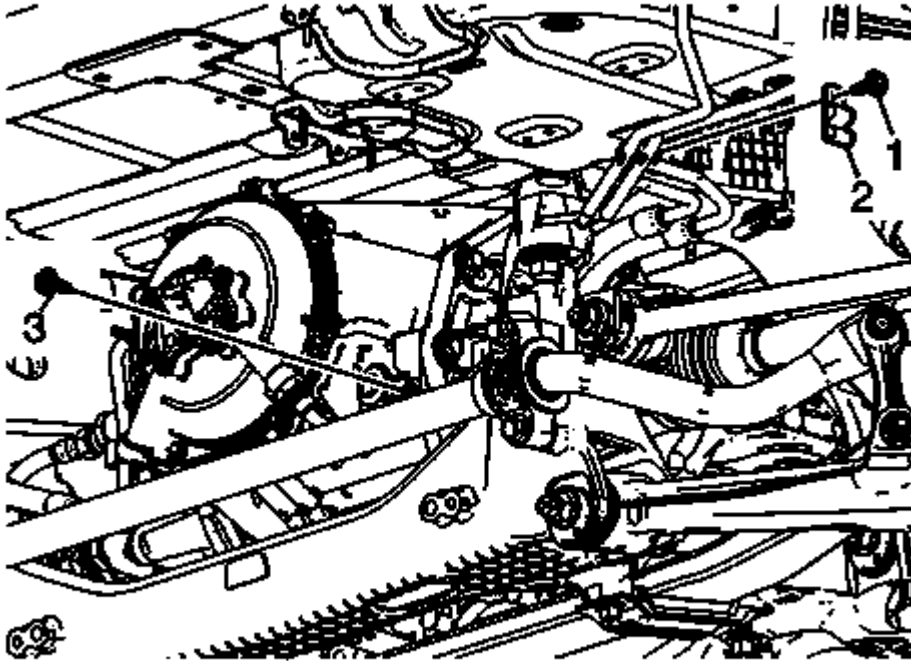


Fig. 21: Differential Oil Cooler Inlet Hose Bracket
Courtesy of GENERAL MOTORS COMPANY

3. Install the differential oil cooler inlet hose bracket (2). Install the differential oil cooler inlet hose bracket bolts (1 and 3).
4. Install the rear bumper fascia. Refer to **Rear Bumper Fascia Replacement** .
5. Fill the differential fluid. Refer to **Rear Axle Lubricant Level Inspection**.
6. Remove the drain pan from under the vehicle.
7. Raise and secure the rear of the exhaust system.
8. Lower the vehicle. Refer to **Lifting and Jacking the Vehicle** .

DIFFERENTIAL OIL PUMP INLET HOSE REPLACEMENT

Removal Procedure

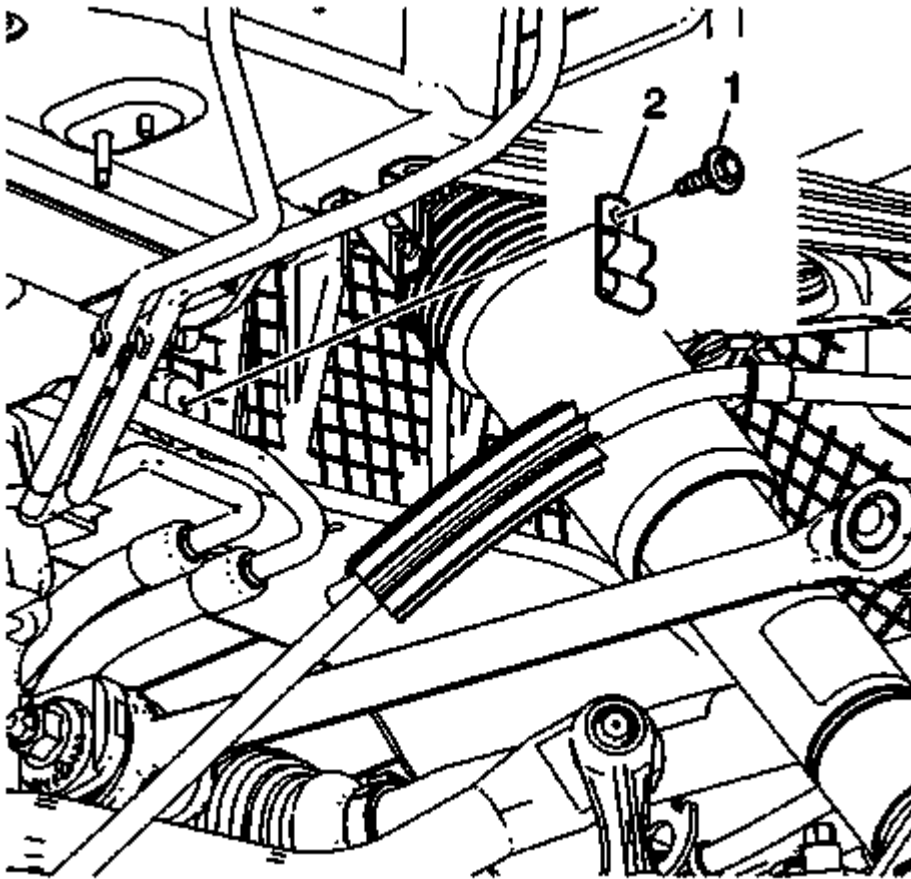


Fig. 22: Differential Oil Pump Inlet Hose Bracket Bolt
Courtesy of GENERAL MOTORS COMPANY

1. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle .
2. Lower and support the rear of the exhaust system.
3. Install a drain pan under the vehicle.
4. Remove the rear bumper fascia. Refer to Rear Bumper Fascia Replacement .
5. Remove the differential oil pump inlet hose bracket bolt (1). Remove the differential oil pump inlet hose bracket (2).

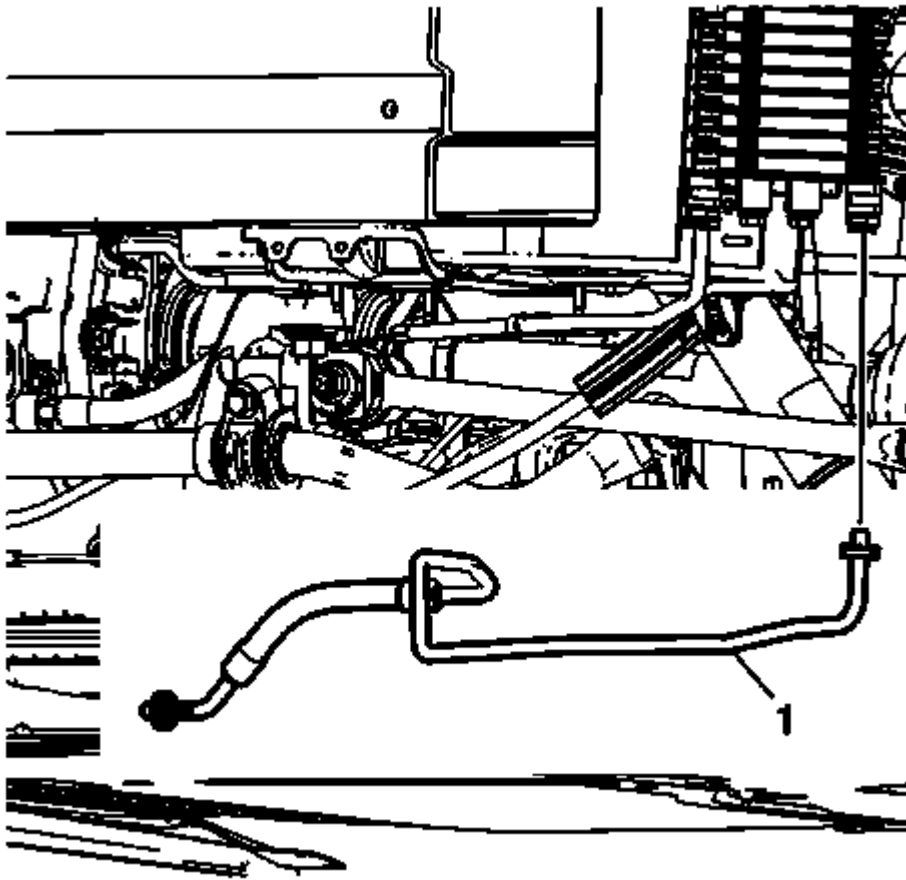


Fig. 23: Differential Oil Pump Inlet Hose And Vehicle
Courtesy of GENERAL MOTORS COMPANY

6. Disconnect the differential oil pump inlet hose from the differential oil cooler and the rear axle housing. Refer to **Differential Cooler Hose/Pipe Quick Connect Fitting**.
7. Remove the differential oil pump inlet hose (1) from the vehicle.

Installation Procedure

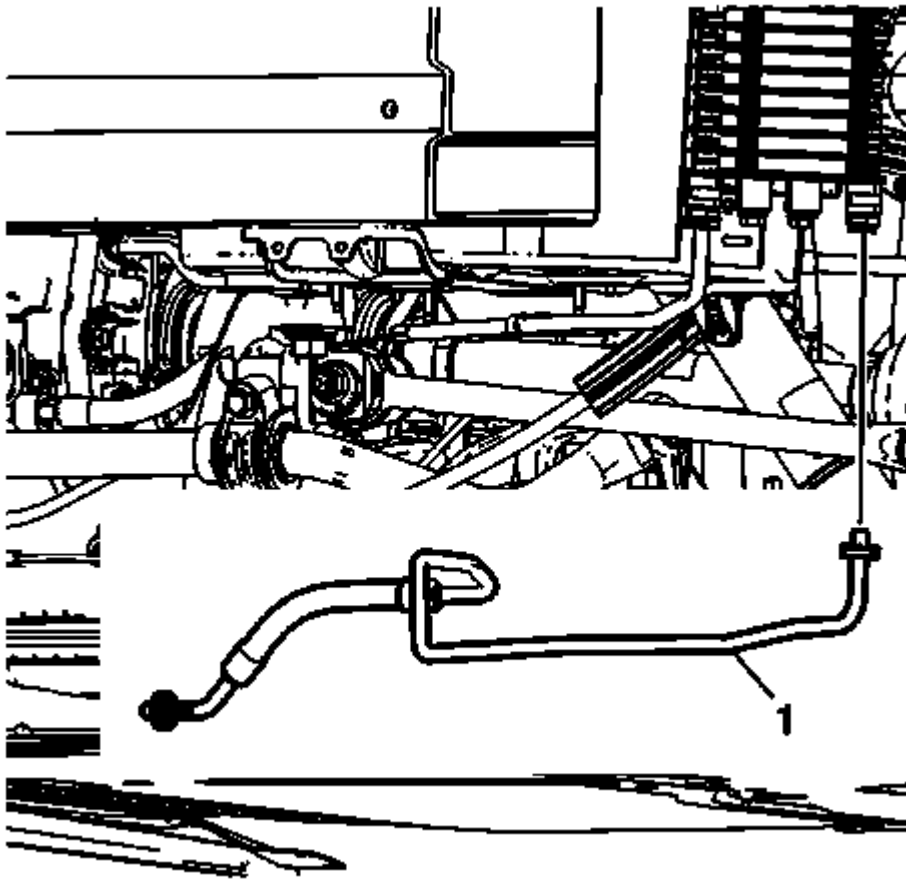


Fig. 24: Differential Oil Pump Inlet Hose And Vehicle
Courtesy of GENERAL MOTORS COMPANY

1. Install the differential oil pump inlet hose (1) to the vehicle.
2. Connect the differential oil pump inlet hose to the differential oil cooler and the rear axle housing. Refer to **Differential Cooler Hose/Pipe Quick Connect Fitting**.

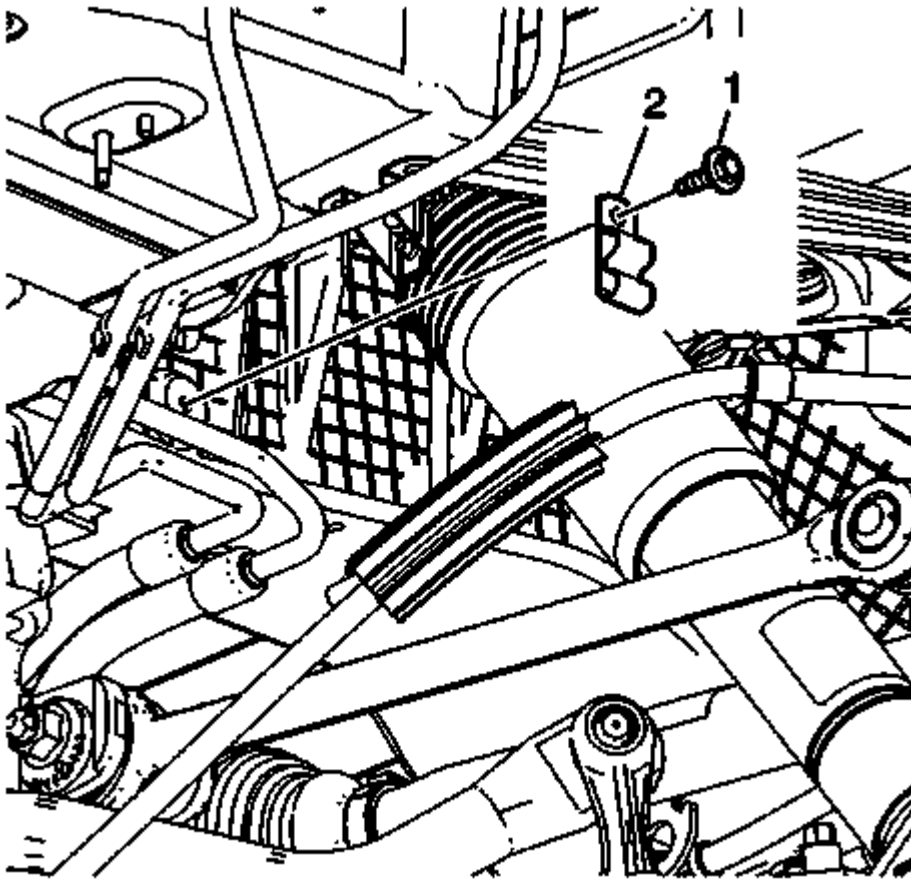


Fig. 25: Differential Oil Pump Inlet Hose Bracket Bolt
Courtesy of GENERAL MOTORS COMPANY

3. Install the differential oil pump inlet hose bracket (2). Install the differential oil pump inlet hose bracket bolts (1).
4. Install the rear bumper fascia. Refer to **Rear Bumper Fascia Replacement** .
5. Fill the differential fluid. Refer to **Rear Axle Lubricant Level Inspection**.
6. Remove the drain pan from under the vehicle.
7. Raise and secure the rear of the exhaust system.
8. Lower the vehicle. Refer to **Lifting and Jacking the Vehicle** .

DIFFERENTIAL TEMPERATURE SENSOR REPLACEMENT

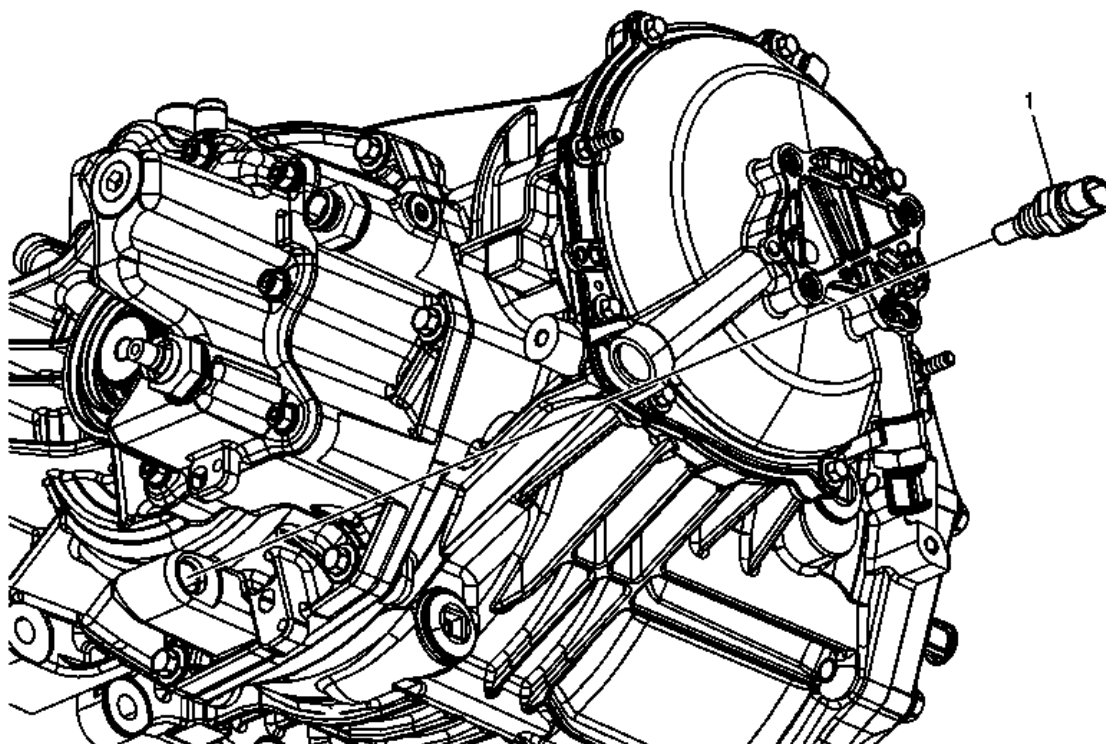


Fig. 26: Differential Temperature Sensor
 Courtesy of GENERAL MOTORS COMPANY

Differential Temperature Sensor Replacement

Callout	Component Name
Preliminary Procedure 1. Raise and support the vehicle. Refer to <u>Lifting and Jacking the Vehicle</u> . 2. Install a Drain Pan under the vehicle. 3. Drain the differential oil. Refer to <u>Differential Oil Replacement</u>.	
1	Differential Temperature Sensor CAUTION: Refer to <u>Fastener Caution</u> . Procedure 1. Clean any dirt from around the differential temperature sensor. 2. Remove the temperature sensor and replace with the NEW one. 3. Fill the differential with oil. Refer to <u>Lubrication Specifications</u>. Tighten 10 (89 lb in)

DIFFERENTIAL COOLER FITTING REPLACEMENT

Removal Procedure

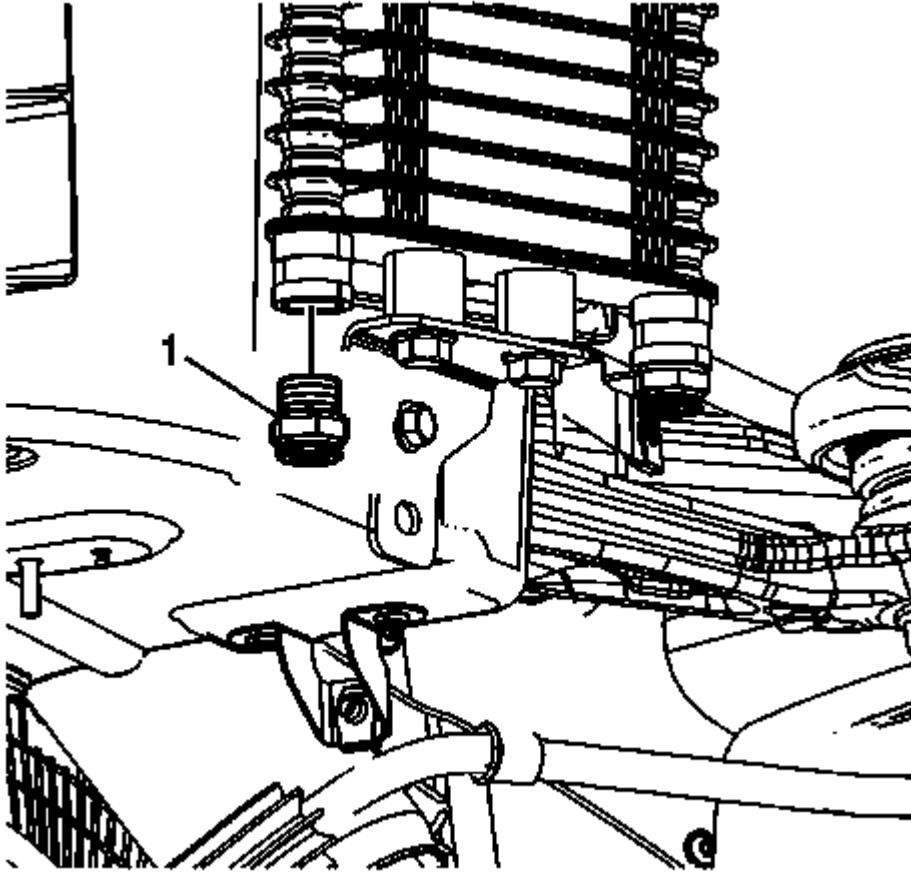


Fig. 27: Oil Cooler Fitting
Courtesy of GENERAL MOTORS COMPANY

1. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle .
2. Lower and support the rear of the exhaust system.
3. Install a drain pan under the vehicle.
4. Remove the rear bumper lower fascia. Refer to Rear Bumper Lower Fascia Replacement .
5. Remove the differential oil pump inlet hose. Refer to Differential Oil Pump Inlet Hose Replacement.
6. Remove the differential oil cooler inlet hose. Refer to Differential Oil Cooler Inlet Hose Replacement.
7. Remove the oil cooler fitting (1).

Installation Procedure

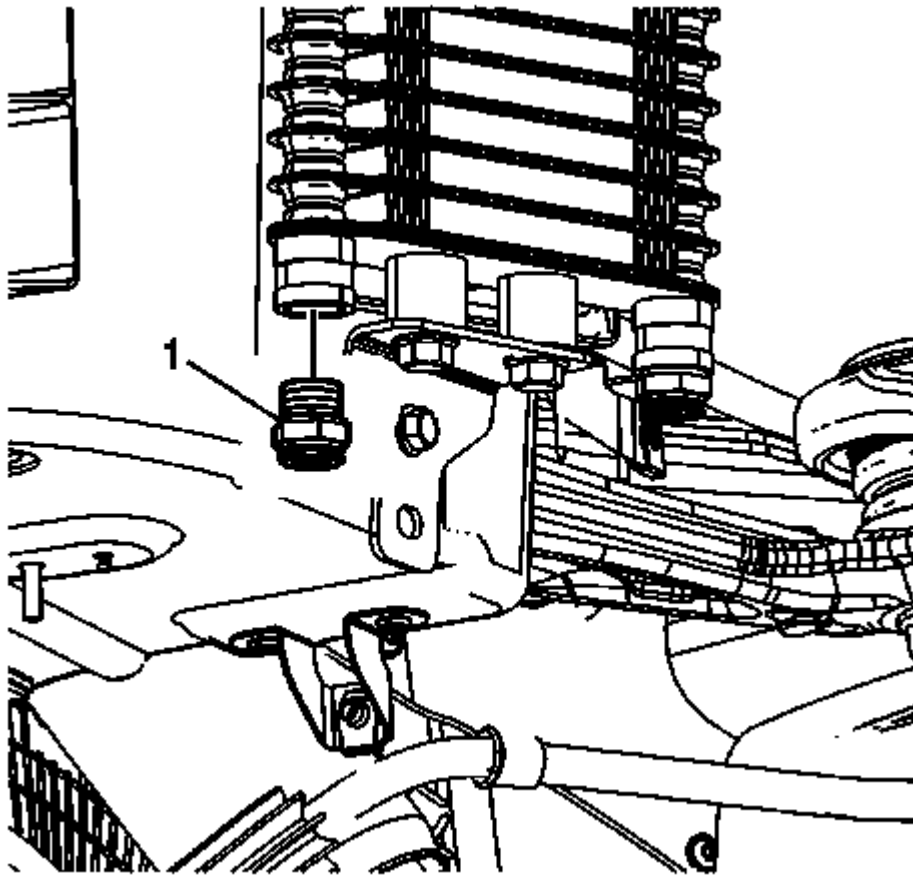


Fig. 28: Oil Cooler Fitting

Courtesy of GENERAL MOTORS COMPANY

1. Install the oil cooler fitting (1). Tighten to 18 N.m (13 lb ft).
2. Install the differential oil cooler inlet hose. Refer to Differential Oil Cooler Inlet Hose Replacement.
3. Install the differential oil pump inlet hose. Refer to Differential Oil Pump Inlet Hose Replacement.
4. Install the rear bumper lower fascia. Refer to Rear Bumper Lower Fascia Replacement.
5. Fill the differential fluid. Refer to Rear Axle Lubricant Level Inspection.
6. Remove the drain pan from under the vehicle.
7. Raise and secure the rear of the exhaust system.
8. Lower the vehicle. Refer to Lifting and Jacking the Vehicle.

DIFFERENTIAL COOLER HOSE/PIPE QUICK CONNECT FITTING

Special Tools

- J 41623-B Cooler Quick Connect Tool

Removal Procedure

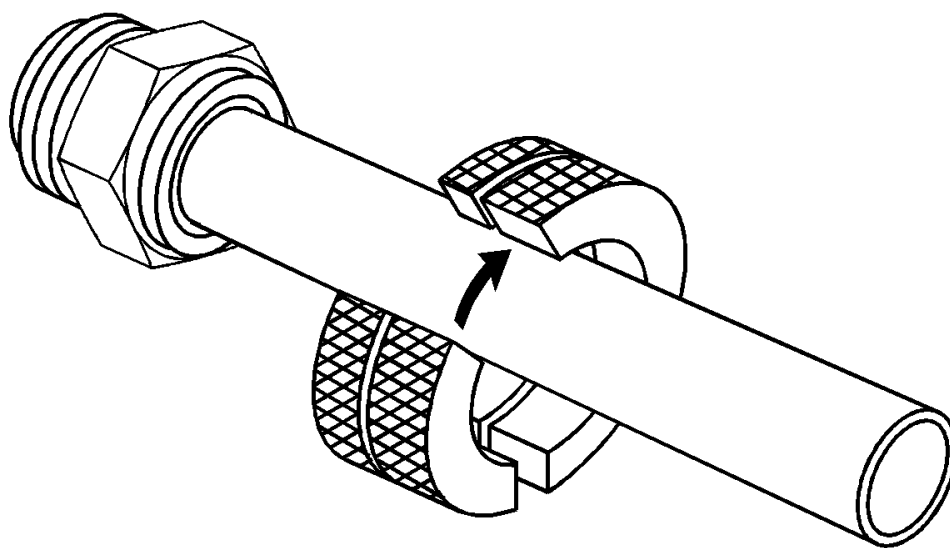


Fig. 29: View Of J 41623-B & Generator Cooling Inlet Pipe
Courtesy of GENERAL MOTORS COMPANY

1. Install the **J 41623-B** Cooler Quick Connect Tool or the **DT-47731** 1/2 Inch Quick Connect Release Tool onto the differential oil cooler (DOC) pipe.

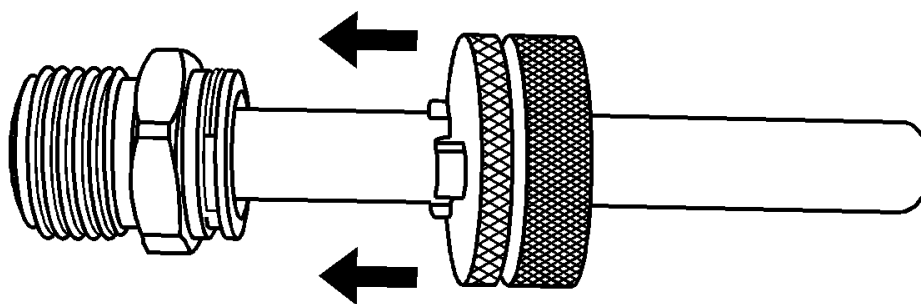


Fig. 30: Sliding J 41623-B Toward Generator Cooling Inlet Pipe Fitting
Courtesy of GENERAL MOTORS COMPANY

2. Slide the **J 41623-B** Cooler Quick Connect Tool or the **DT-47731** 1/2 Inch Quick Connect Release Tool toward the DOC pipe fitting.

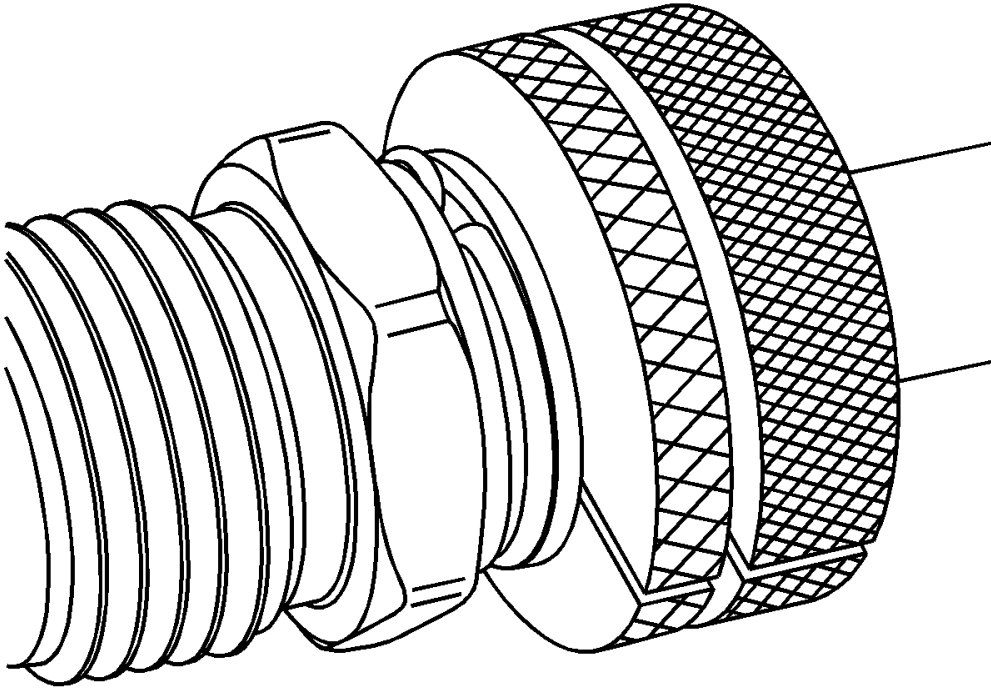


Fig. 31: Rotating Quick-Connect On Coolant Pipe
Courtesy of GENERAL MOTORS COMPANY

IMPORTANT: Rotate the J 41623-B Cooler Quick Connect Tool or the DT-47731 1/2 Inch Quick Connect Release Tool to engage the DOC pipe fitting's retainer slots.

The J 41623-B Cooler Quick Connect Tool or the DT-47731 1/2 Inch Quick Connect Release Tool should be nearly flush with the fitting.

3. Connect the **J 41623-B** Cooler Quick Connect Tool or the **DT-47731** 1/2 Inch Quick Connect Release Tool onto the DOC pipe fitting.

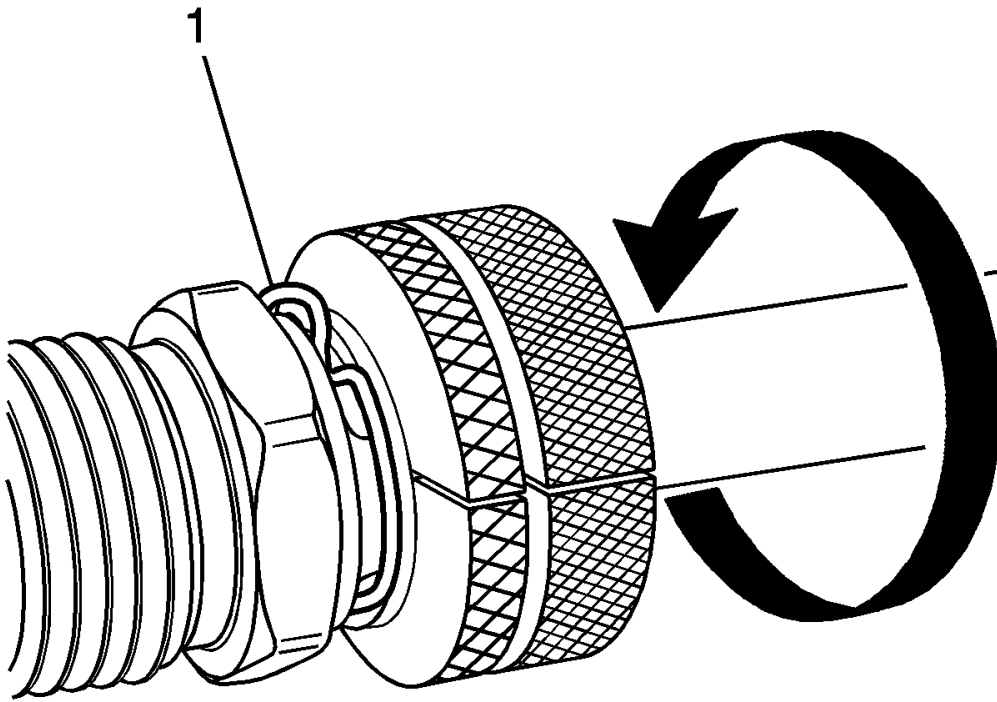


Fig. 32: Rotating Quick-Connect Until Retainer Clip Rises Above Fitting Retainer Seat
Courtesy of GENERAL MOTORS COMPANY

4. Rotate the **J 41623-B** Cooler Quick Connect Tool or the **DT-47731** 1/2 Inch Quick Connect Release Tool until the retainer clip (1) rises above the fitting retainer seat.

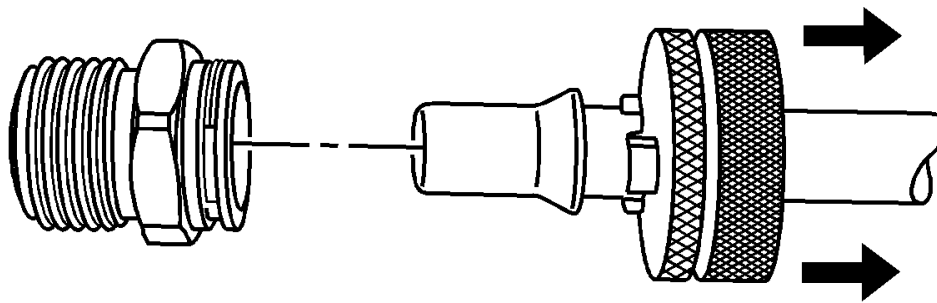


Fig. 33: View Of J 41623-B & Generator Cooling Inlet Pipe
Courtesy of GENERAL MOTORS COMPANY

5. Pull back on the DOC pipe to disengage the pipe from the DOC pipe fitting.
6. Remove the **J 41623-B** Cooler Quick Connect Tool or the **DT-47731** 1/2 Inch Quick Connect Release Tool from the DOC pipe.

Installation Procedure

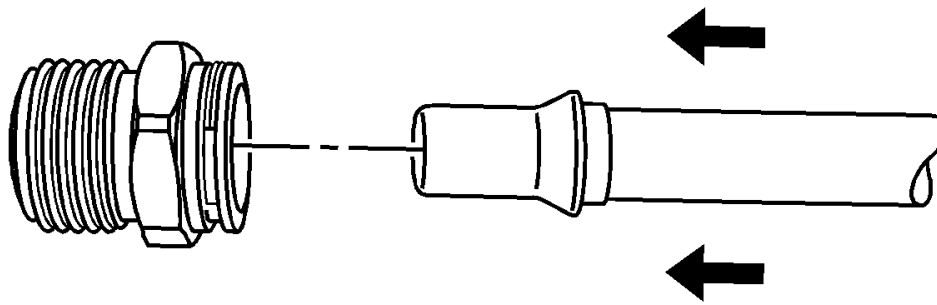


Fig. 34: View Of Generator Cooling Inlet Pipe & Generator Cooling Inlet Pipe Fitting
Courtesy of GENERAL MOTORS COMPANY

IMPORTANT: Inspect the DOC pipe fitting and retaining clip for signs of wear or damage. Replace the components if necessary.

1. Install the DOC pipe into the DOC pipe fitting.

A distinct snap should be heard or felt when assembling the DOC pipe to the fitting.

2. To ensure the cooler line is properly installed, give the cooler pipe a gentle pull.

TRANSMISSION FLUID PRESSURE SENSOR REPLACEMENT

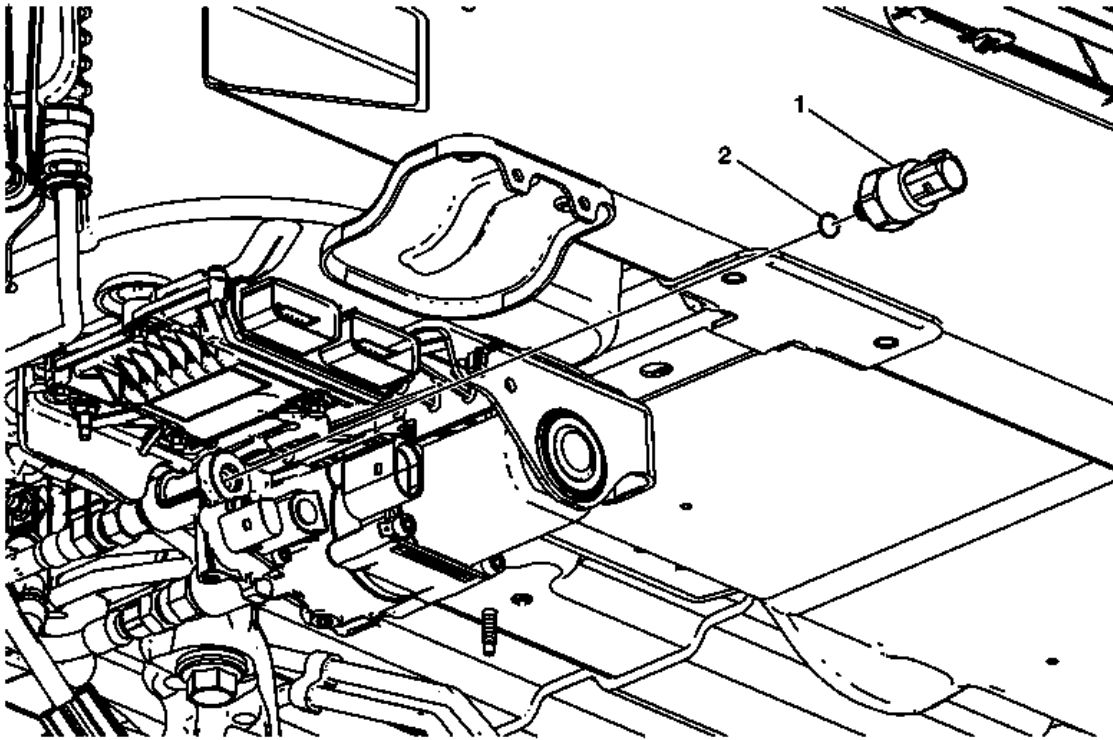


Fig. 35: Transmission Fluid Pressure Sensor
 Courtesy of GENERAL MOTORS COMPANY

Transmission Fluid Pressure Sensor Replacement

Callout	Component Name
Preliminary Procedure	
1. Remove the rear bumper fascia. Refer to <u>Rear Bumper Fascia Replacement</u> . 2. Disconnect the rear axle differential lock switch connector before removal. Refer to <u>Rear Axle Differential Lock Switch Replacement</u>. 3. Install a Drain Pan under the vehicle.	
	Transmission Fluid Pressure Sensor CAUTION: Refer to <u>Fastener Caution</u> . Procedure
1	1. Remove the Transmission Fluid Pressure Sensor. 2. Install the NEW Transmission Fluid Pressure Sensor. 3. Fill the Differential Clutch System. Refer to <u>Rear Differential Hydraulic System Service Fill/Bleed</u>.

	10 (89 lb in)
2	Transmission Fluid Pressure Sensor Seal

REAR AXLE HOUSING COVER AND GASKET REPLACEMENT

Removal Procedure

1. Raise the vehicle. Refer to Lifting and Jacking the Vehicle .
2. Drain the rear axle. Refer to Differential Oil Replacement.
3. Remove the rear mufflers.
 - For the left rear muffler, refer to Exhaust Muffler Replacement - Left Side .
 - For the right rear muffler, refer to Exhaust Muffler Replacement - Right Side .

NOTE: Steps 4 and 5 are for models with differential oil pump.

4. Remove the cooler inlet pipe. Refer to Differential Oil Pump Inlet Hose Replacement.
5. Remove the cooler outlet pipe. Refer to Differential Oil Cooler Inlet Hose Replacement.

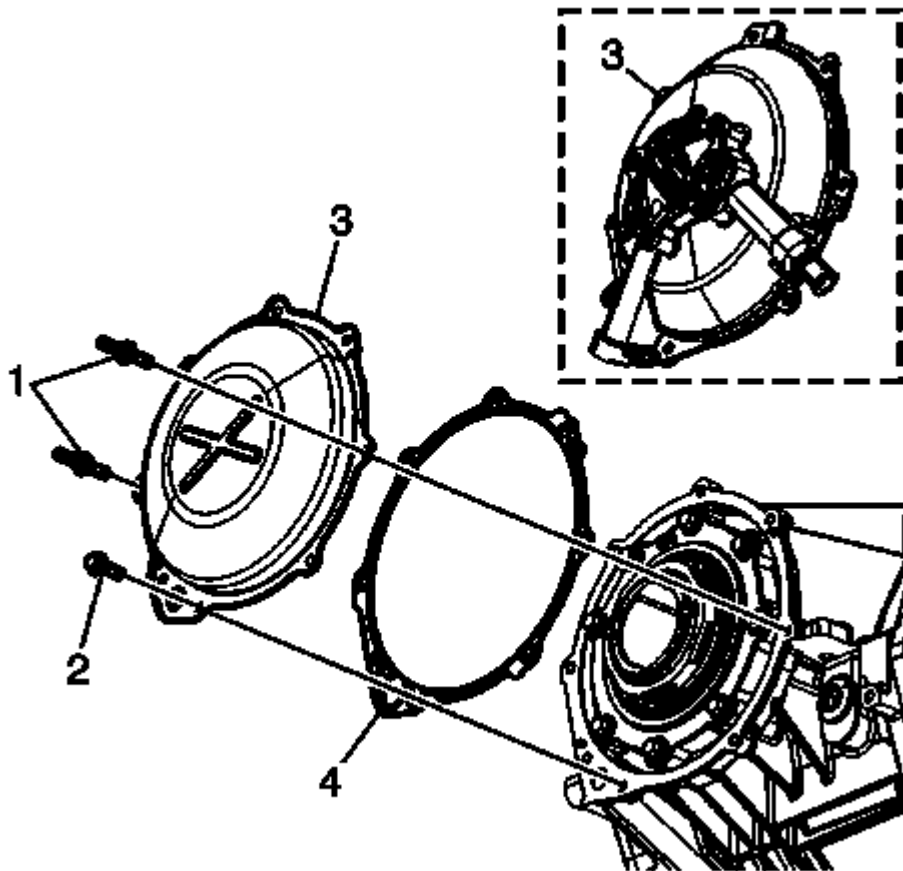


Fig. 36: Mounting Studs And Bolts

NOTE: For models with pump. Note the location of the cover rear bolt/stud for assembly and the alignment of the outshaft of the differential and the input shaft for the pump.

6. Remove the mounting studs (1) and bolts (2) for the rear axle housing cover (3).
7. Remove the rear axle housing cover (3).
8. Remove the gasket (4).

Installation Procedure

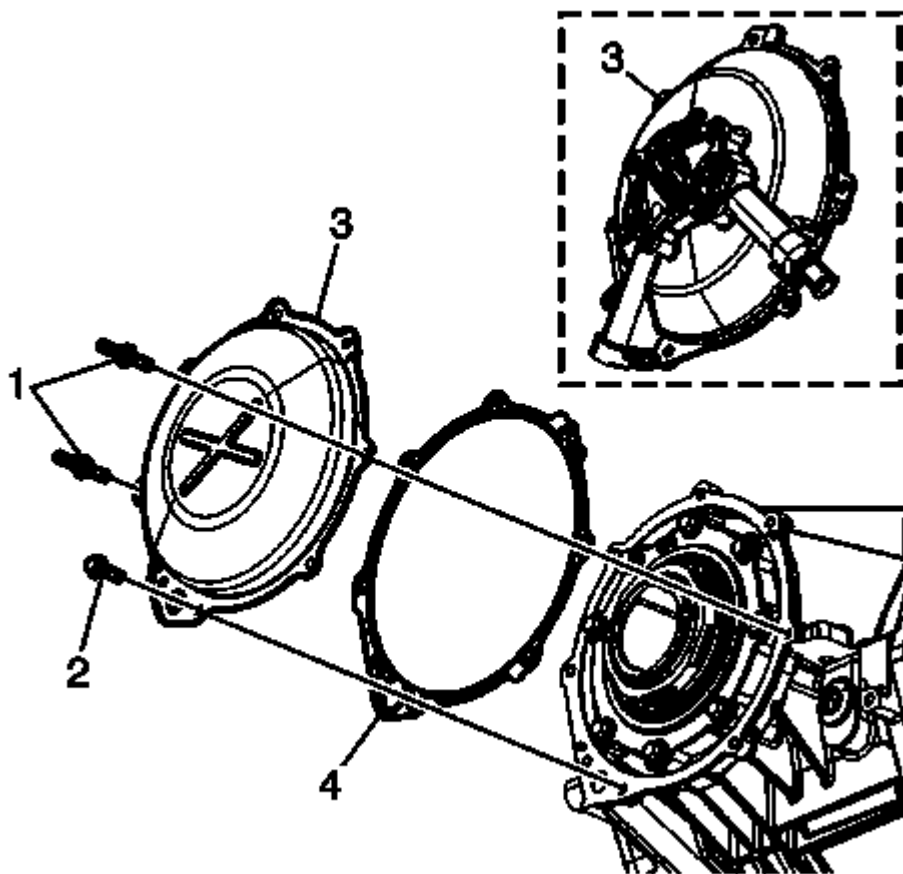


Fig. 37: Mounting Studs And Bolts
Courtesy of GENERAL MOTORS COMPANY

1. Install the gasket (4).

NOTE: For models with pump. Note the alignment of the pinion shaft and input shaft of the pump. If the shafts do not line up, rotate the input shaft for the pump. If they are not aligned properly, the pump will not be seated correctly in the differential housing. Also, note the location of the bolt/stud for the proper installation.

2. Install the rear axle housing cover (3).

CAUTION: Refer to Fastener Caution .

3. Install the studs (1) and bolts (2). Tighten to 7 N.m (62 lb in).
4. Install the cooler outlet pipe. Refer to Differential Oil Pump Inlet Hose Replacement.
5. Install the cooler inlet pipe. Refer to Differential Oil Cooler Inlet Hose Replacement.
6. Install the rear mufflers.
 - For the left rear muffler, refer to Exhaust Muffler Replacement - Left Side .
 - For the right rear muffler, refer to Exhaust Muffler Replacement - Right Side .
7. Fill the differential assembly. Refer to Differential Oil Replacement.
8. Lower the vehicle.

DIFFERENTIAL CARRIER COVER AND SEAL REPLACEMENT - LEFT SIDE

Removal Procedure

1. Raise and suitably support the vehicle. Refer to Lifting and Jacking the Vehicle .
2. Remove the LH rear tire and wheel assembly. Refer to Tire and Wheel Removal and Installation .
3. Remove the LH wheel drive shaft. Refer to Rear Wheel Drive Shaft Replacement .
4. Remove the LH muffler assembly. Refer to Exhaust Muffler Replacement - Left Side .
5. Drain the fluid from the differential. Refer to Differential Oil Replacement.
6. If equipped, remove the electric differential drive motor outlet hose assembly. Refer to Electric Differential Drive Motor Outlet Hose Replacement.
7. Support the differential assembly.
8. Remove the LH transmission/axle mount. Refer to Transmission Mount Replacement .
9. Clean any dirt or debris from around the differential cover (left).

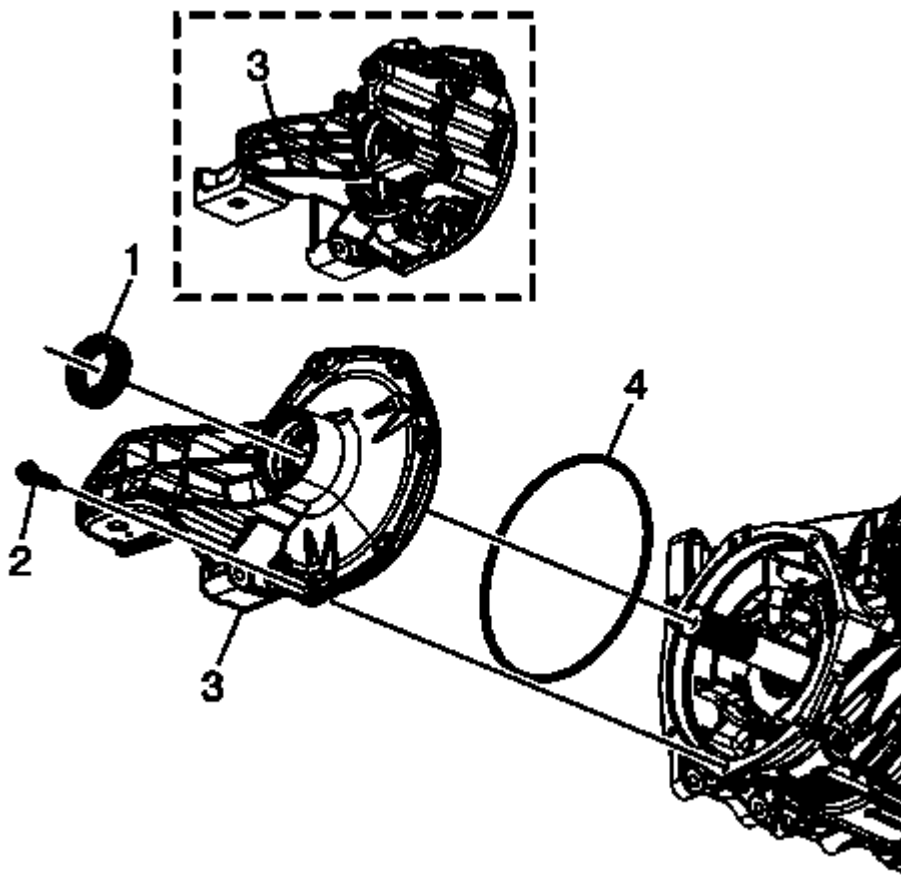


Fig. 38: Rear Axle Shaft Seal And Differential Cover
Courtesy of GENERAL MOTORS COMPANY

10. Remove the bolts (2) retaining the differential cover.
11. Remove the differential cover (3) from the differential.
12. Remove and discard the rear axle shaft seal (1). Refer to **Rear Axle Shaft Seal Replacement**.
13. Remove and discard the D-ring (4).

Installation Procedure

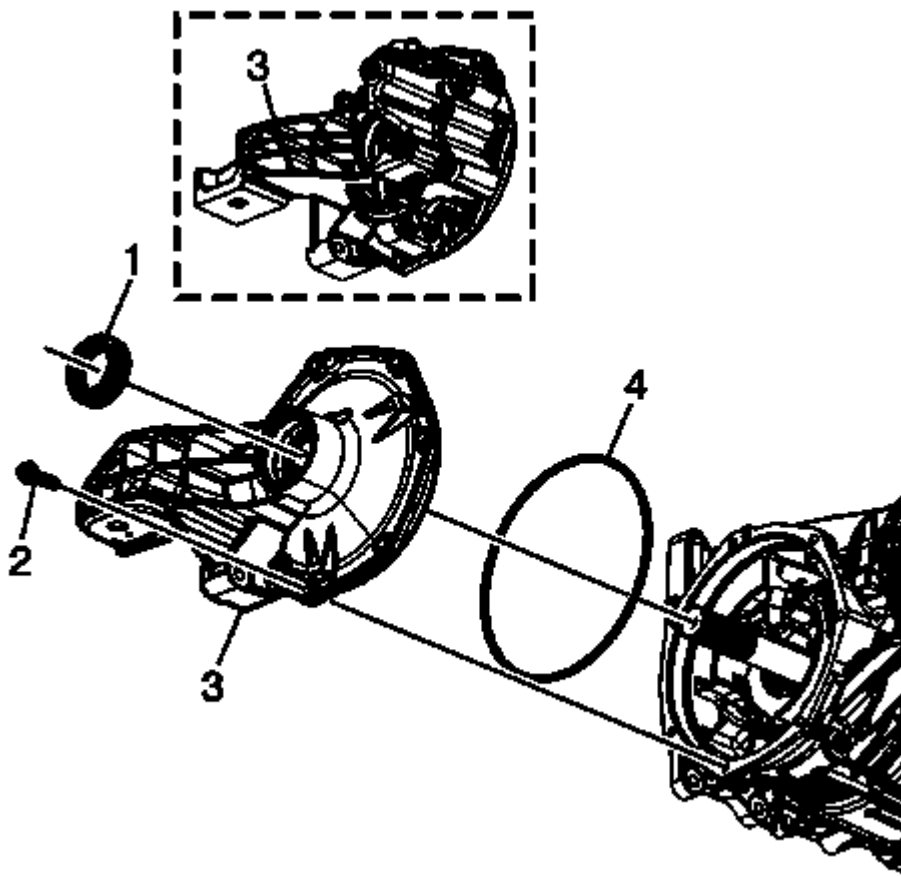


Fig. 39: Rear Axle Shaft Seal And Differential Cover
Courtesy of GENERAL MOTORS COMPANY

1. Clean the D-ring sealing surface on the differential cover and the differential housing.
2. Install a new D-ring (4) to the differential cover.
3. Install the differential cover (3) assembly to the differential.

CAUTION: Refer to Fastener Caution .

4. Install the differential cover bolts (2). Tighten to 28 N.m (21 lb ft).
5. Install the NEW rear axle shaft seal (1). Refer to **Rear Axle Shaft Seal Replacement**.
6. Install the LH transmission/axle mount. Refer to **Transmission Mount Replacement** .
7. Fill the differential with the proper fluids and to the proper level. Refer to **Differential Oil Replacement**.
8. If equipped, install the electric differential drive motor outlet hose assembly. Refer to **Electric Differential Drive Motor Outlet Hose Replacement**.
9. Install the LH muffler assembly. Refer to **Exhaust Muffler Replacement - Left Side** .
10. Install the L H wheel drive shaft Refer to

11. Install the LH rear tire and wheel assembly. Refer to **Tire and Wheel Removal and Installation** .
12. Lower the vehicle.

DIFFERENTIAL CARRIER COVER AND SEAL REPLACEMENT - RIGHT SIDE

Special Tools

- **DT-51255** Bearing Cup Remover
- **DT-45010** Bearing and Race Installer
- **DT-45124** Removal Bridge

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

Removal Procedure

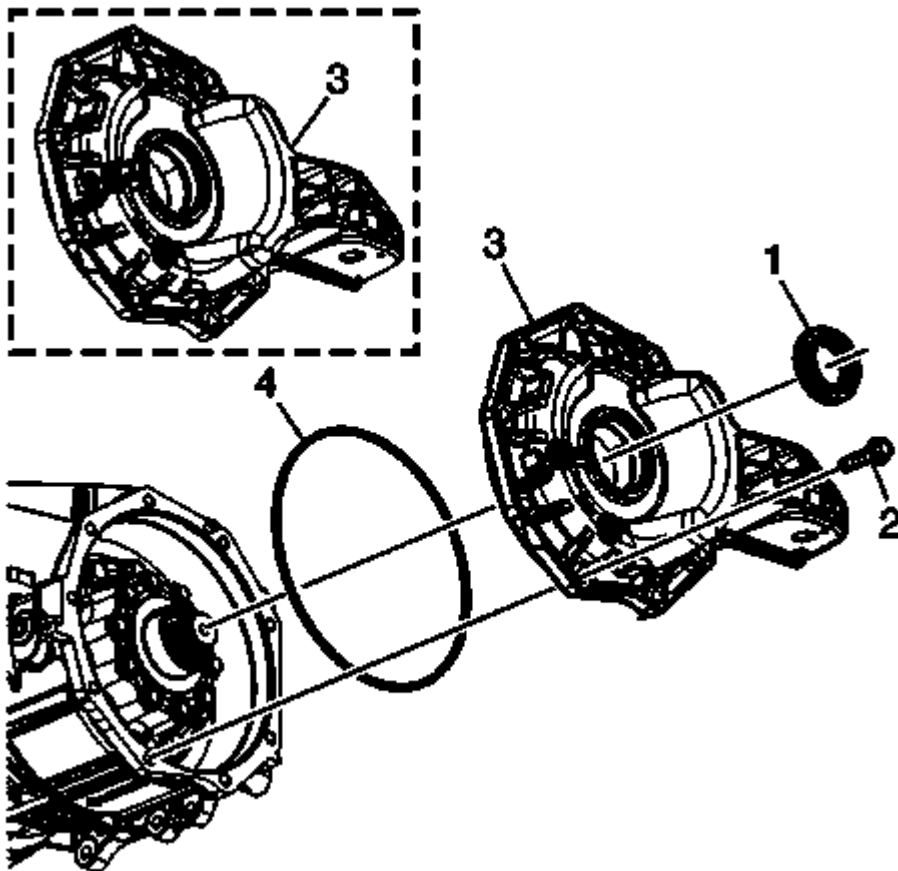


Fig. 40: Discard Rear Axle Shaft Seal And Retaining Bolts
Courtesy of GENERAL MOTORS COMPANY

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

2. Remove the RH rear tire and wheel assembly. Refer to **Tire and Wheel Removal and Installation** .
3. Remove the RH wheel drive shaft. Refer to **Rear Wheel Drive Shaft Replacement** .
4. Remove the RH rear muffler assembly. Refer to **Exhaust Muffler Replacement - Right Side** .
5. Drain the differential fluid. Refer to **Differential Oil Replacement**.
6. If equipped, remove the differential oil pump inlet hose. Refer to **Differential Oil Pump Inlet Hose Replacement**.
7. Support the differential assembly.
8. Remove the RH transmission axle mount. Refer to **Transmission Mount Replacement** .
9. Remove the retaining bolts (2).
10. Remove the differential cover (3).
11. Remove and discard the rear axle shaft seal (1). Refer to **Rear Axle Shaft Seal Replacement**.
12. Remove and discard the D-ring (4).

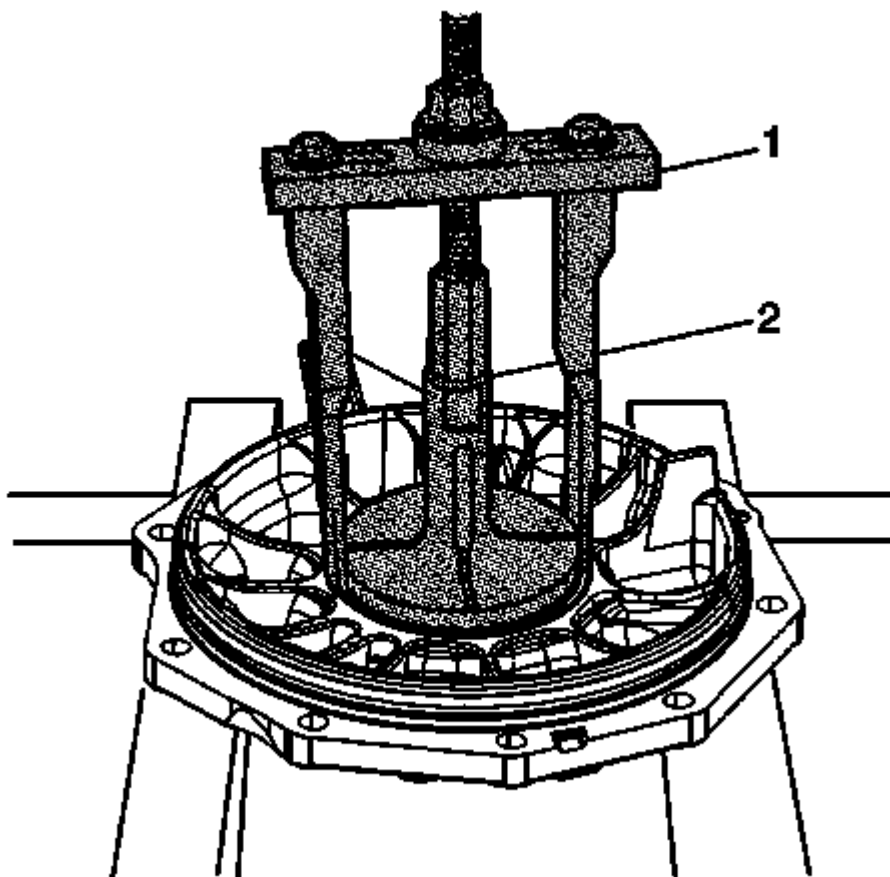


Fig. 41: Installing DT-51255 Remover Into Right Cover
Courtesy of GENERAL MOTORS COMPANY

13. Install the **DT-51255** remover (2) into the right cover. Tighten securely into the bearing cup.

Install the supplied bolt, nut thrust and washer. Hold the bolt and tighten the nut to remove the bearing cup and shim.

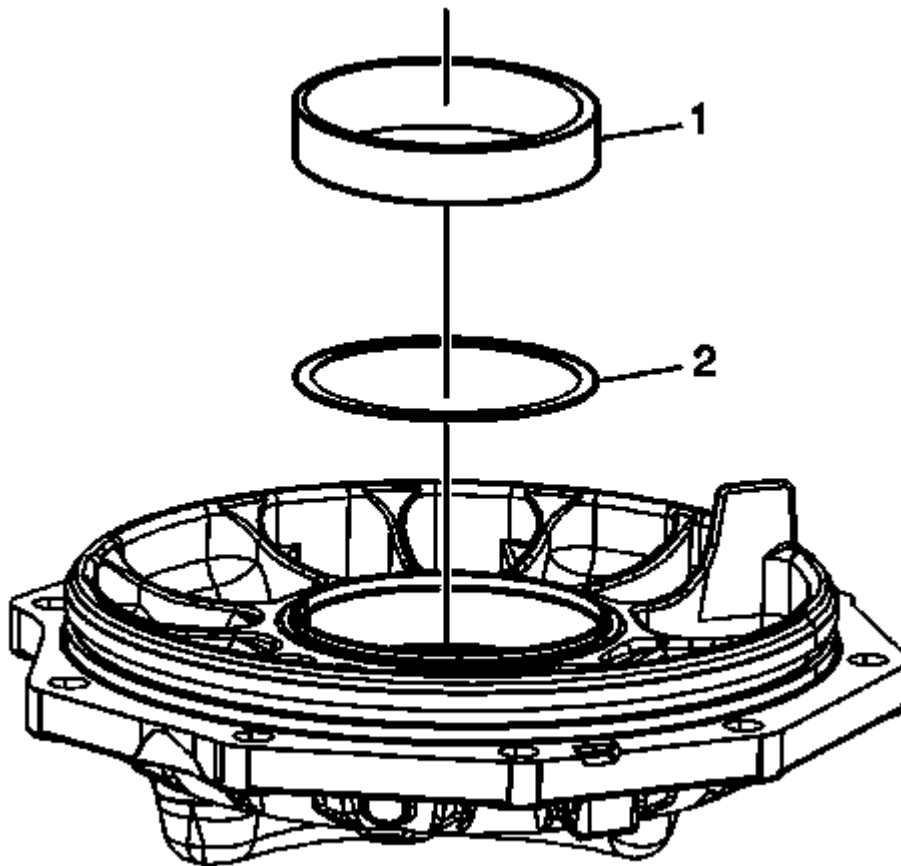


Fig. 42: Marking Shim For Assembly
Courtesy of GENERAL MOTORS COMPANY

15. Mark or tag the shim (2) for assembly.

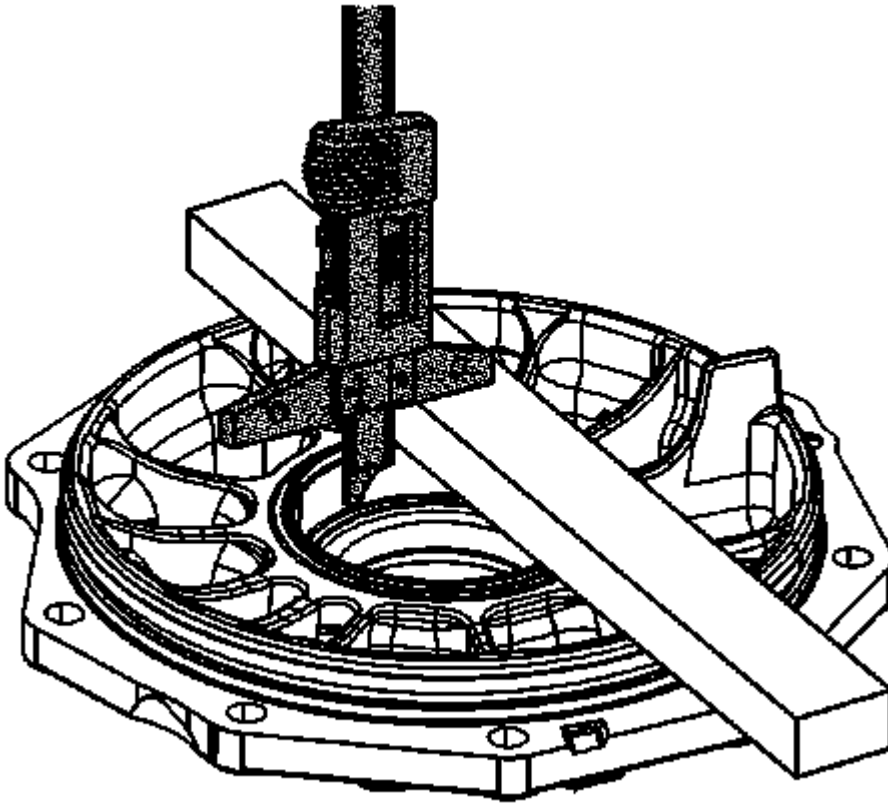


Fig. 43: Measuring NEW Differential Cover Bore Dimension
Courtesy of GENERAL MOTORS COMPANY

NOTE: Whenever service requires the replacement of the right side differential cover, the covers **MUST** be measured and the right shim pack adjusted to compensate for machining tolerances between the two components. Failure to perform this measurement procedure may result in improper differential bearing preload.

16. Using a caliper and a straight edge, measure the NEW differential cover bore dimension. Record the measurement as value A.
17. Using the caliper and a straight edge, measure the old differential cover bore dimension. Record the measurement as value B.
18. Subtract value B from value A. If the computation is a positive value, add shims equal to the value, to the existing shim pack. If the computations a negative value, subtract shims equal to the value, from the existing shim pack.

Installation Procedure

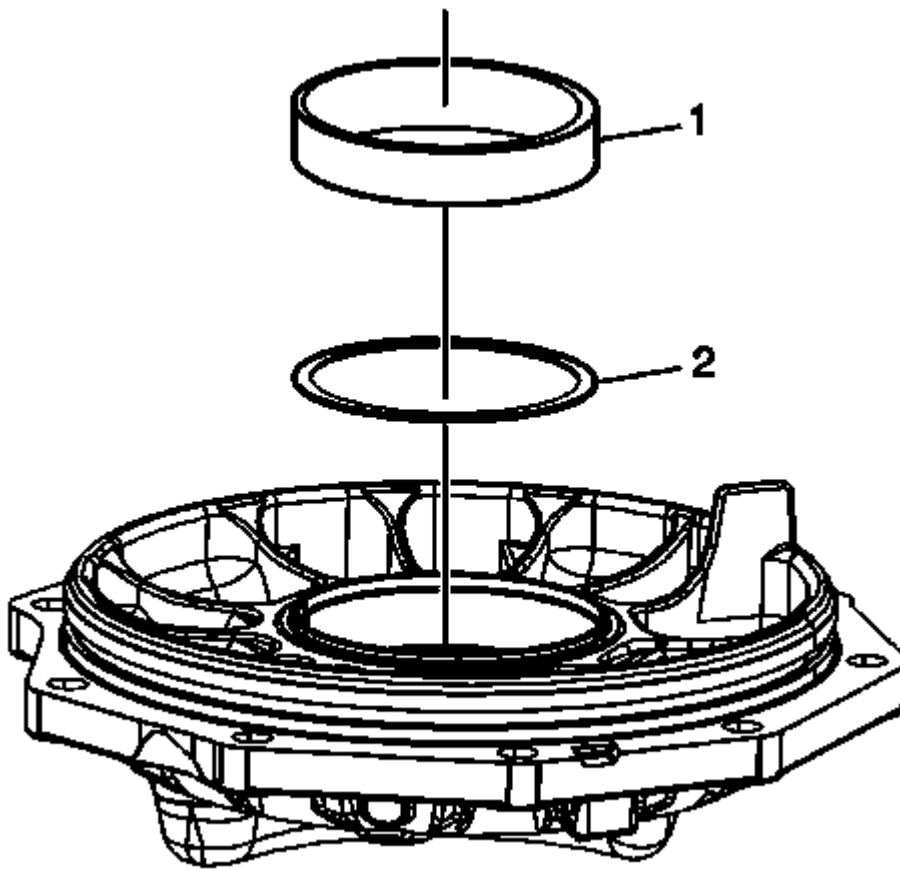


Fig. 44: Marking Shim For Assembly
Courtesy of GENERAL MOTORS COMPANY

1. Install the selected shims (2) and the bearing race (1) to the new cover.

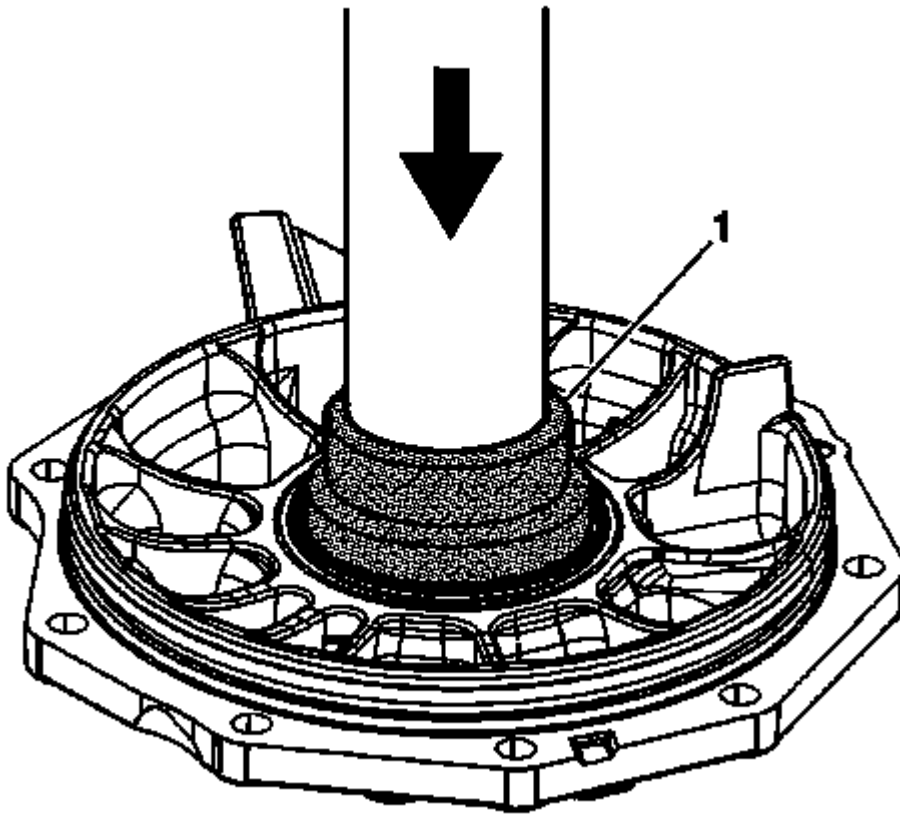


Fig. 45: Installing Shims And Bearing Race Into New Cover
Courtesy of GENERAL MOTORS COMPANY

2. Using the **DT-45010** installer and a hydraulic press, install the shims and bearing race into the new cover.

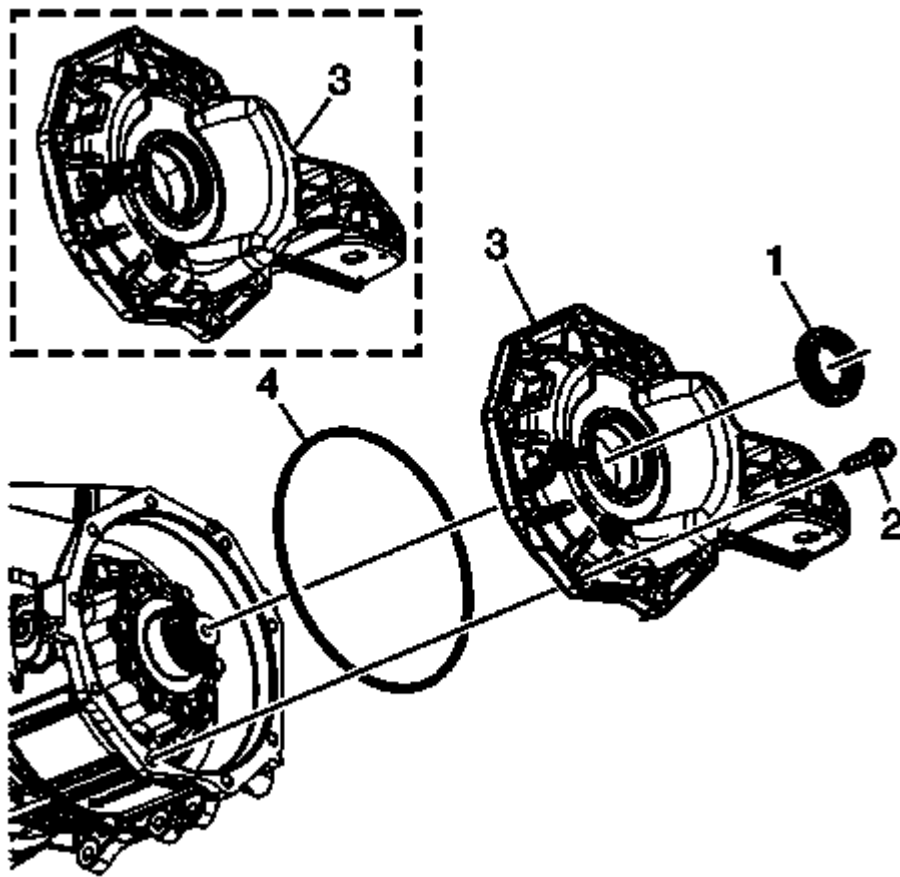


Fig. 46: Discard Rear Axle Shaft Seal And Retaining Bolts
Courtesy of GENERAL MOTORS COMPANY

3. Clean the D-ring sealing surface on the differential cover and the differential housing.
4. Install a NEW D-ring (4) to the differential cover (3).
5. Install the differential cover (3).

CAUTION: Refer to Fastener Caution .

6. Install the differential cover retaining bolts (2) and tighten to 70 N.m (52 lb ft).
7. Install the NEW rear axle shaft seal (1). Refer to **Rear Axle Shaft Seal Replacement**.
8. Install the RH transmission/axle mount. Refer to **Transmission Mount Replacement** .
9. If equipped, install the differential oil pump inlet hose. Refer to **Differential Oil Pump Inlet Hose Replacement**.
10. Fill the rear axle differential with the proper fluid and level. Refer to **Differential Oil Replacement**.
11. Install the RH muffler assembly. Refer to **Exhaust Muffler Replacement - Right Side** .
12. Install the RH wheel drive shaft. Refer to

13. Install the RH rear tire and wheel assembly. Refer to **Tire and Wheel Removal and Installation** .
14. Lower the vehicle.

REAR AXLE SHAFT SEAL REPLACEMENT

Special Tools

- **DT-48076** Rock Guard Installer
- **DT-45000** Seal Remover

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

Removal Procedure

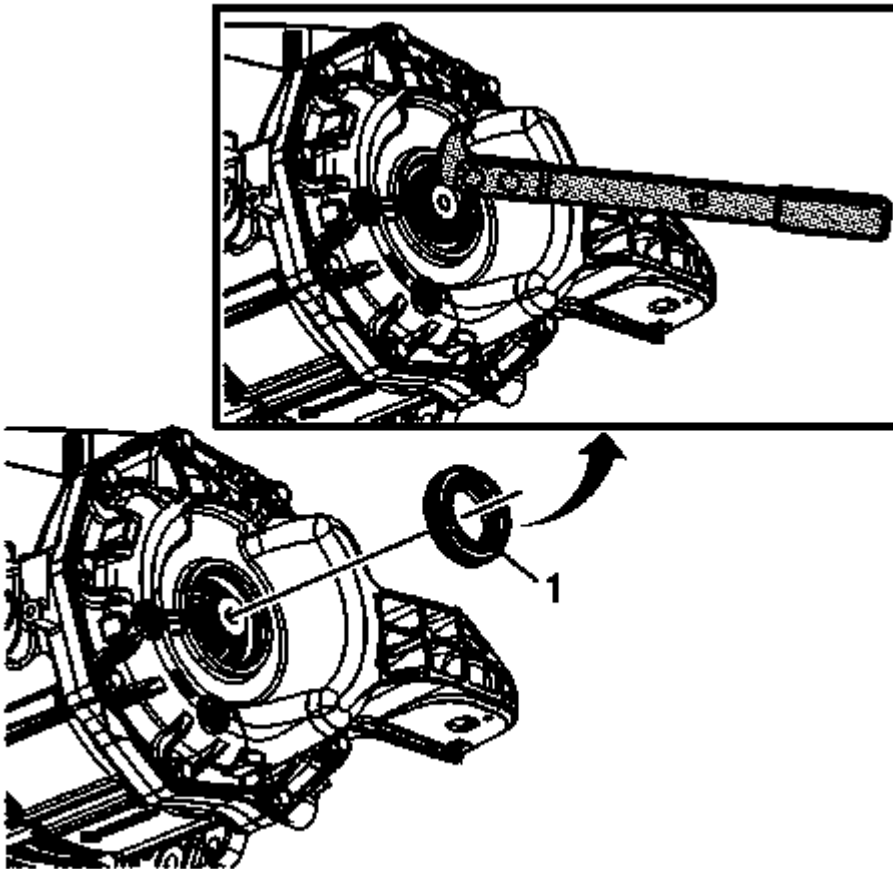


Fig. 47: Differential Rear Axle Shaft Seal
Courtesy of GENERAL MOTORS COMPANY

1. Raise and suitably support the vehicle. Refer to **Lifting and Jacking the Vehicle** .
2. Remove the appropriate rear tire and wheel assembly. Refer to **Tire and Wheel Removal and**

3. Remove the appropriate drive shaft. Refer to **Rear Wheel Drive Shaft Replacement** .

NOTE: Take care not to damage any sealing surfaces when removing the differential output shaft seal.

4. Using **DT-45000** seal remover remove the differential rear axle shaft seal (1).

Installation Procedure

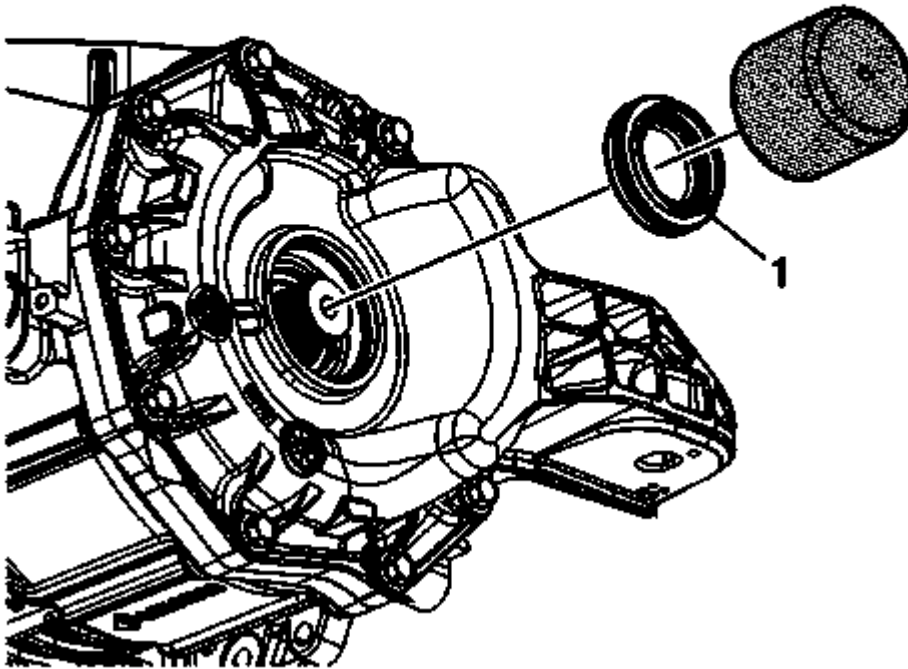


Fig. 48: Installing Rear Axle Shaft Seal
Courtesy of GENERAL MOTORS COMPANY

1. Using the **DT-48076** installer install the rear axle shaft seal.
2. Install the drive shaft. Refer to **Rear Wheel Drive Shaft Replacement** .
3. Install the rear tire and wheel assembly. Refer to **Tire and Wheel Removal and Installation** .
4. Lower the vehicle.

DIFFERENTIAL REPLACEMENT

Removal Procedure

WARNING: Refer to Battery Disconnect Warning .

1. Disconnect the negative battery cable.
2. Raise and suitably support the vehicle. Refer to Lifting and Jacking the Vehicle .
3. Remove the rear tire and wheel assemblies. Refer to Tire and Wheel Removal and Installation .
4. Remove the rear mufflers.
 - For the left rear muffler, refer to Exhaust Muffler Replacement - Left Side .
 - For the right rear muffler, refer to Exhaust Muffler Replacement - Right Side .

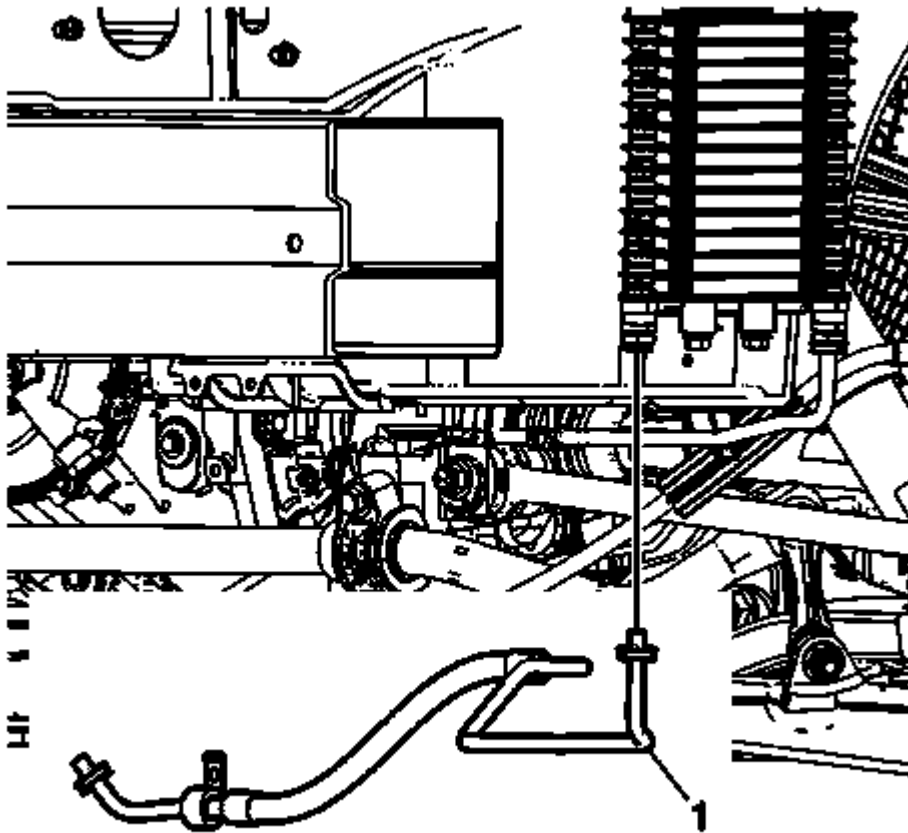


Fig. 49: Differential Oil Cooler Inlet Hose
Courtesy of GENERAL MOTORS COMPANY

NOTE: Steps 5 and 6 are for models with differential oil pump and cooler.

5. Remove the differential oil cooler inlet hose. Refer to Differential Oil Cooler Inlet Hose Replacement.

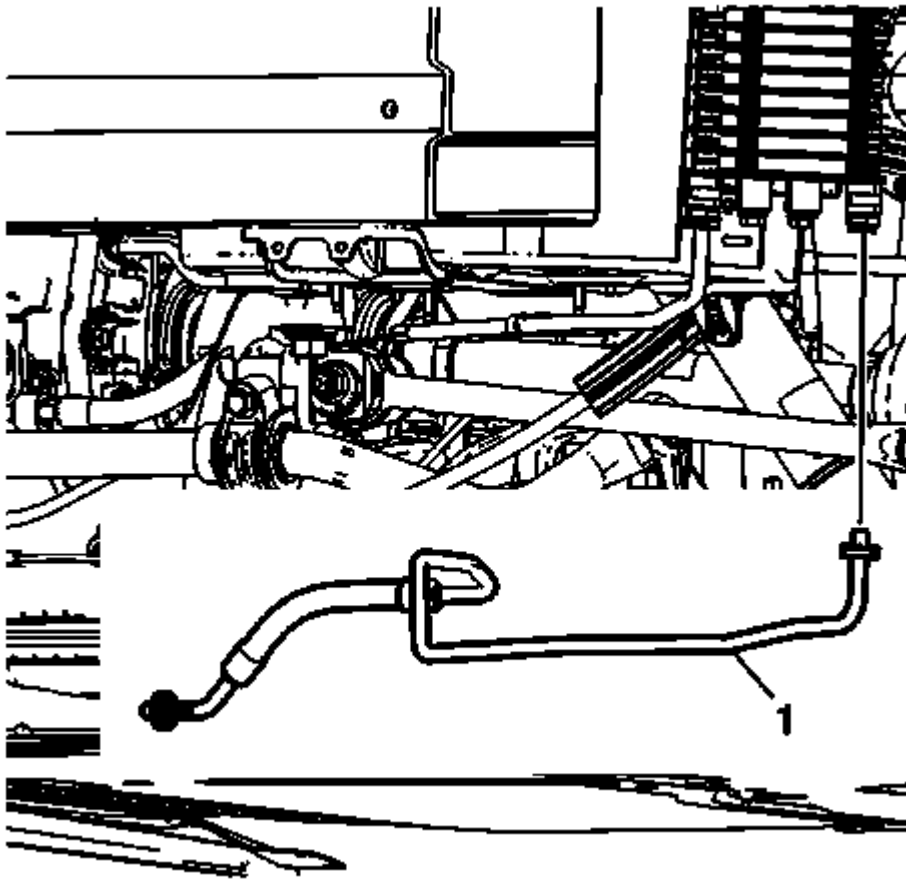


Fig. 50: Differential Oil Pump Inlet Hose And Vehicle
Courtesy of GENERAL MOTORS COMPANY

6. Remove the differential oil pump inlet hose. Refer to **Differential Oil Pump Inlet Hose Replacement**.

NOTE: Step 7 is for models equipped with an electronic limited slip differential.

7. Remove the electronic differential drive motor outlet hoses. Refer to **Electric Differential Drive Motor Outlet Hose Replacement**.

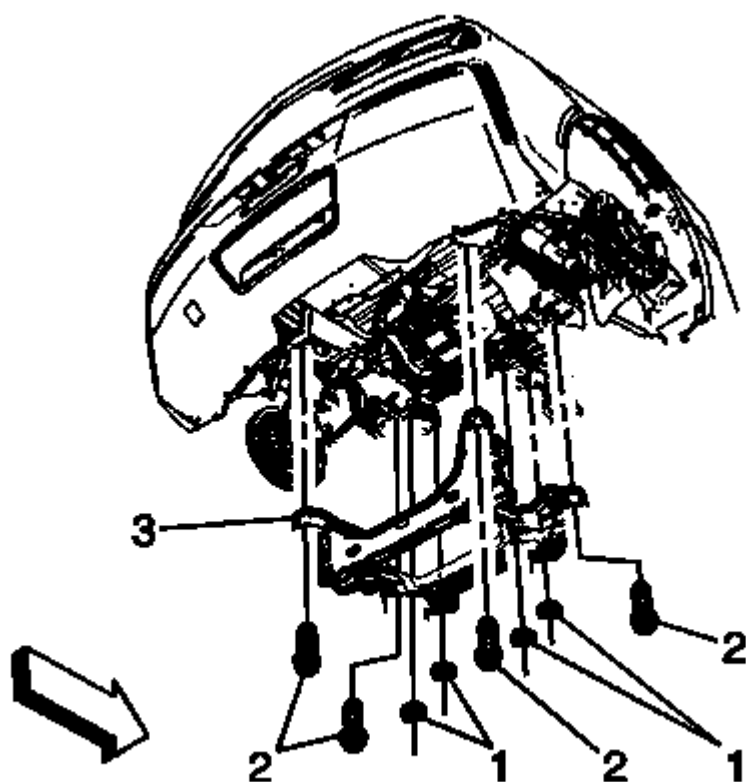


Fig. 51: Rear Crossmember Mounting Bolts And Rear Crossmember
Courtesy of GENERAL MOTORS COMPANY

8. Remove the rear crossmember from the vehicle. Refer to **Rear Crossmember Replacement** .

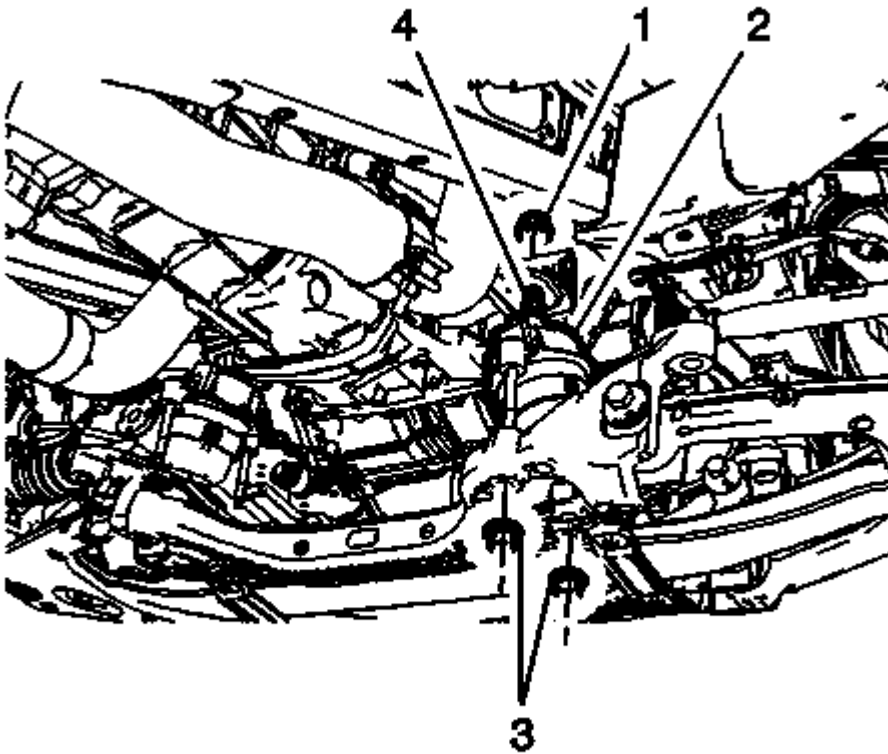


Fig. 52: Transmission Mounts

Courtesy of GENERAL MOTORS COMPANY

9. Remove the transmission mounts. Refer to **Transmission Mount Replacement** .

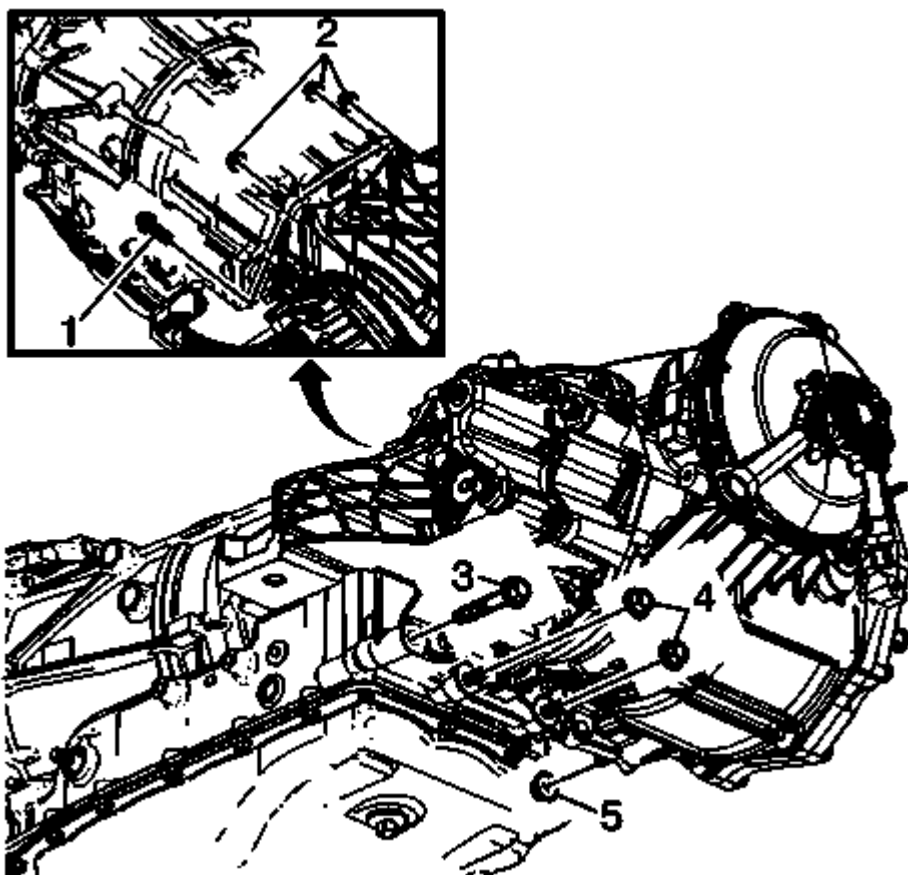


Fig. 53: Fasteners

Courtesy of GENERAL MOTORS COMPANY

10. Remove the fasteners (1-5) securing the differential to the transmission.

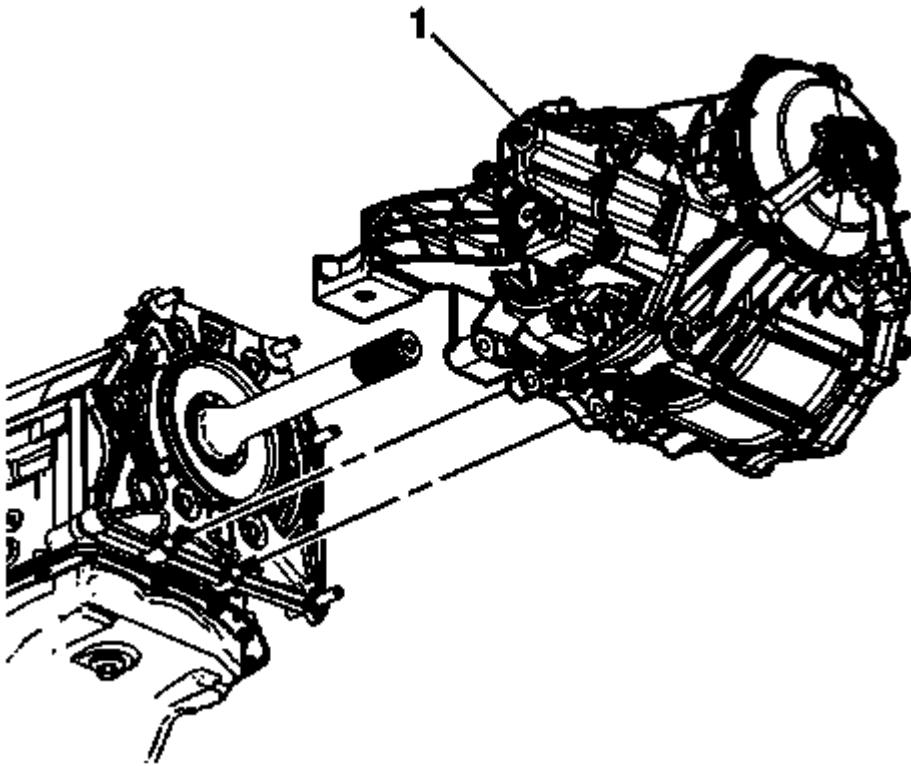


Fig. 54: Removing Differential And Transmission
Courtesy of GENERAL MOTORS COMPANY

11. Remove the differential (1) from the transmission.

Installation Procedure

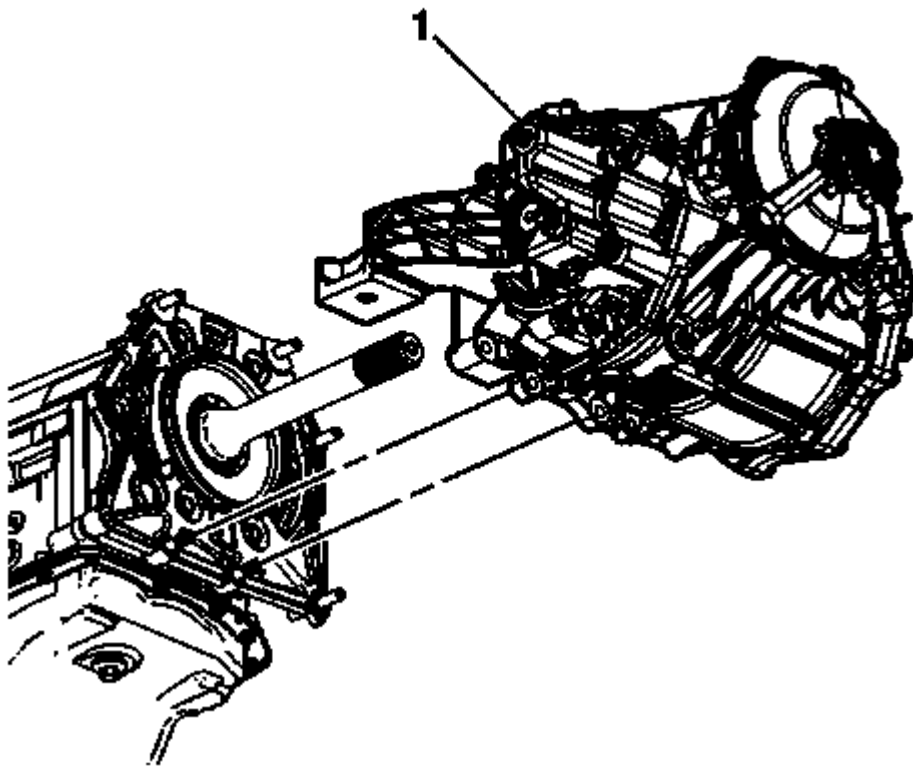


Fig. 55: Removing Differential And Transmission
Courtesy of GENERAL MOTORS COMPANY

1. Install the differential (1) to the transmission.

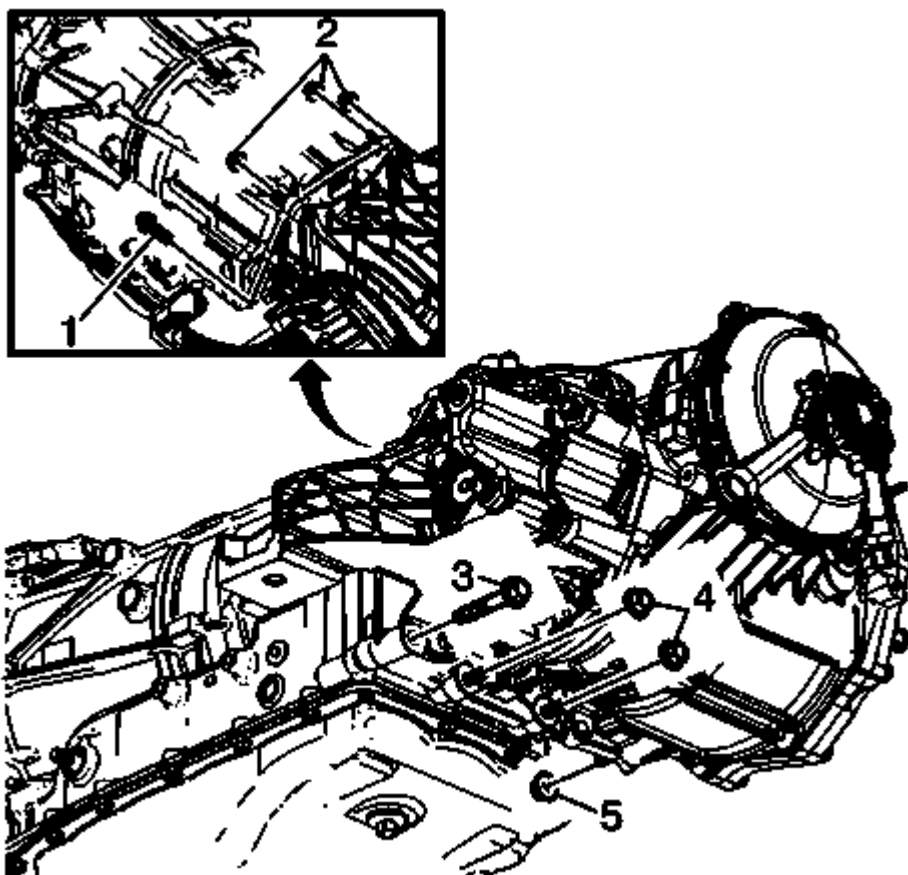


Fig. 56: Fasteners

Courtesy of GENERAL MOTORS COMPANY

2. Install the fasteners (1-5) securing the differential to the transmission. Tighten to 50 N.m (37 lb ft).

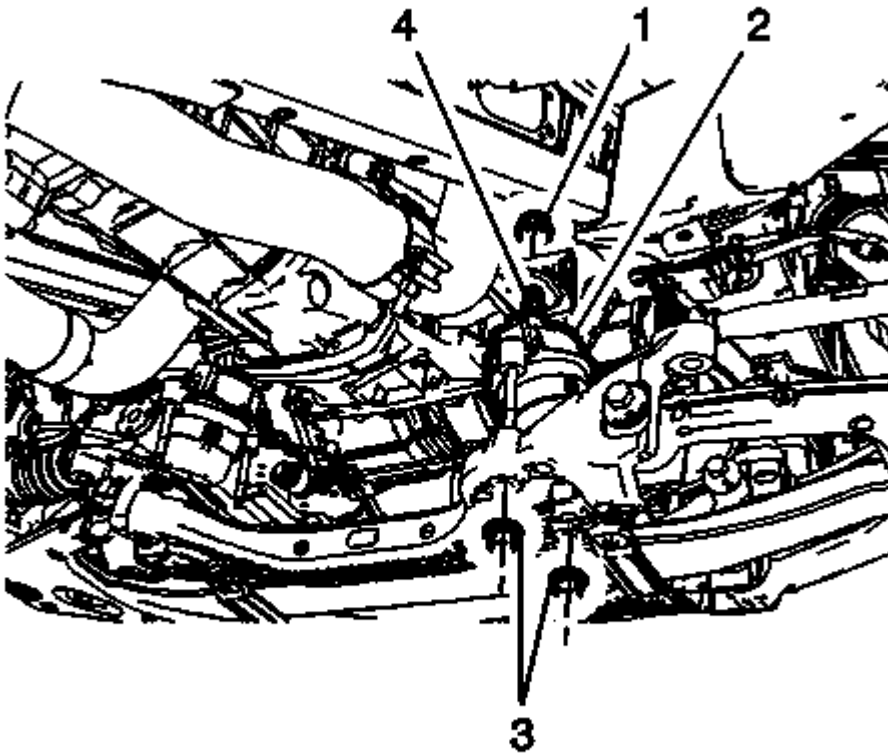


Fig. 57: Transmission Mounts

Courtesy of GENERAL MOTORS COMPANY

3. Install the transmission mounts. Refer to **Transmission Mount Replacement** .

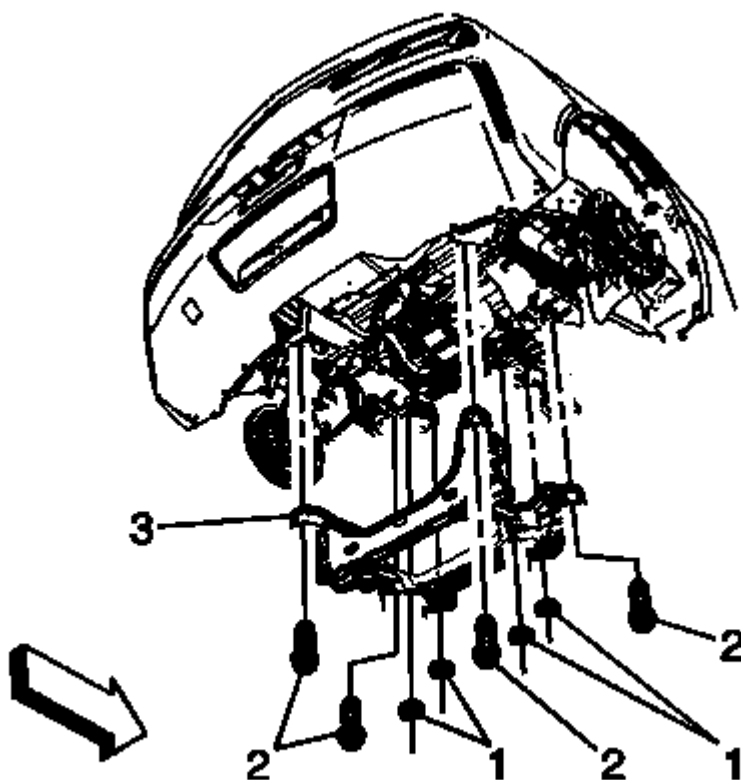


Fig. 58: Rear Crossmember Mounting Bolts And Rear Crossmember
Courtesy of GENERAL MOTORS COMPANY

4. Install the rear crossmember to the vehicle. Refer to Rear Crossmember Replacement .

NOTE: Step 5 is for models equipped with an electronic limited slip differential.

5. Install the electronic differential drive motor outlet hoses. Refer to Electric Differential Drive Motor Outlet Hose Replacement.

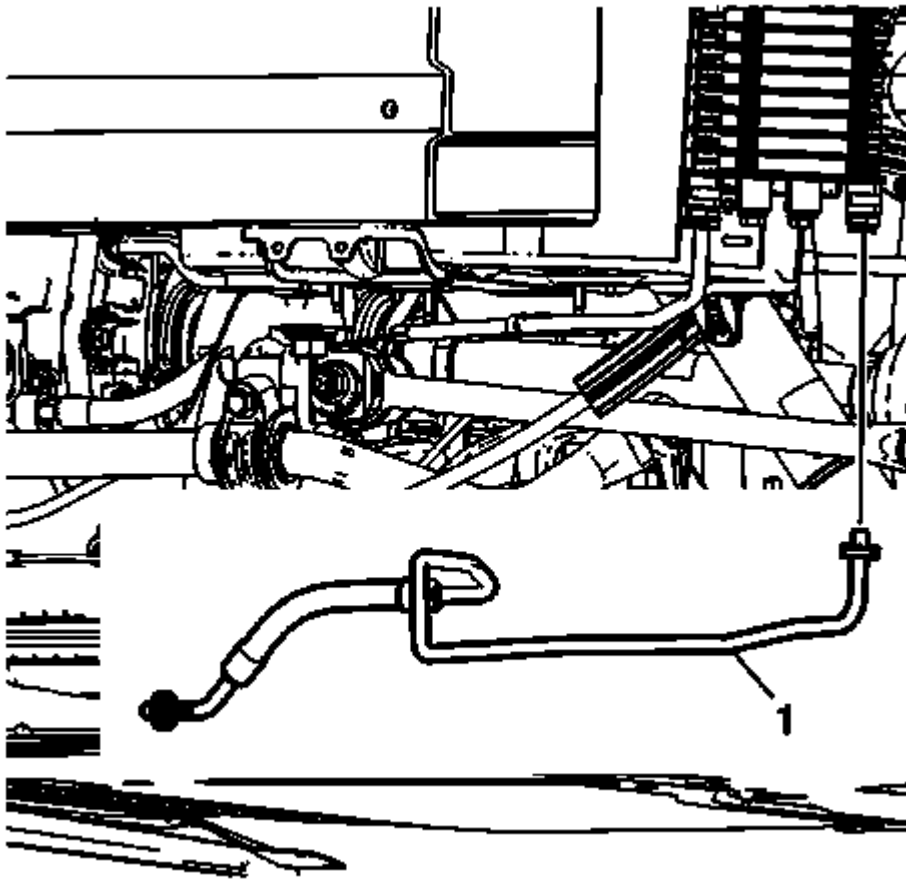


Fig. 59: Differential Oil Pump Inlet Hose And Vehicle
Courtesy of GENERAL MOTORS COMPANY

NOTE: Steps 6 and 7 are for models with differential oil pump and cooler.

6. Install the differential oil pump inlet hose. Refer to **Differential Oil Pump Inlet Hose Replacement**.

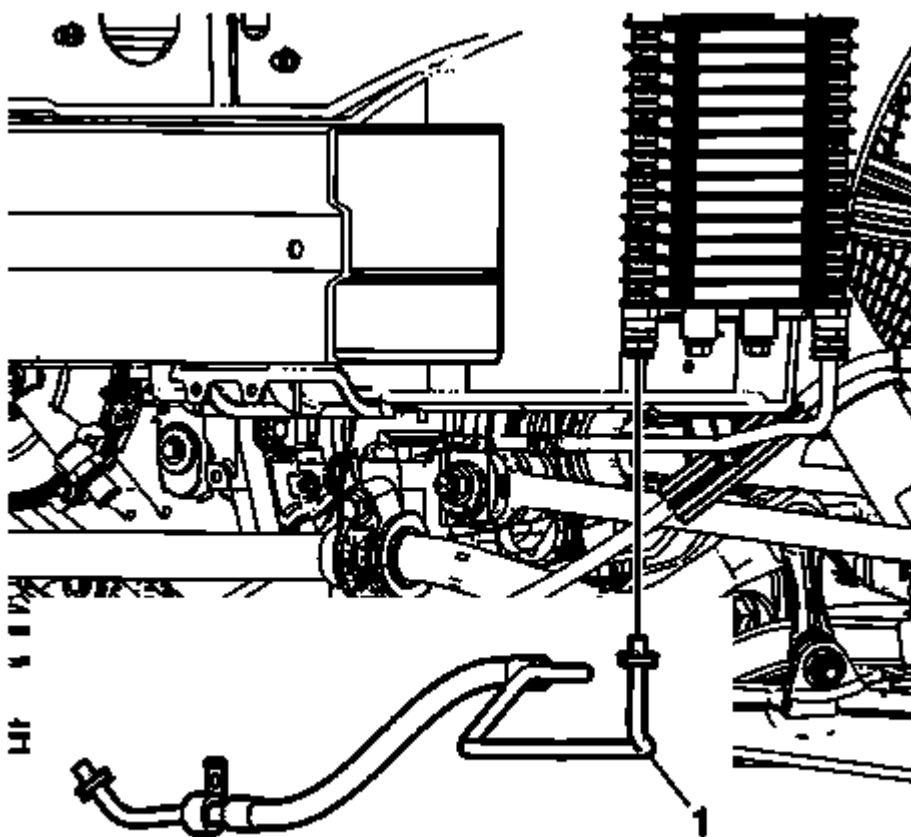


Fig. 60: Differential Oil Cooler Inlet Hose
Courtesy of GENERAL MOTORS COMPANY

7. Install the differential oil cooler inlet hose. Refer to Differential Oil Cooler Inlet Hose Replacement.
8. Install the rear mufflers.
 - For the left rear muffler, refer to Exhaust Muffler Replacement - Left Side .
 - For the right rear muffler, refer to Exhaust Muffler Replacement - Right Side .
9. Fill the differential assembly. Refer to Differential Oil Replacement.
10. Install the tire and wheel assemblies. Refer to Tire and Wheel Removal and Installation .
11. Lower the vehicle.

REAR AXLE DIFFERENTIAL LOCK SWITCH REPLACEMENT

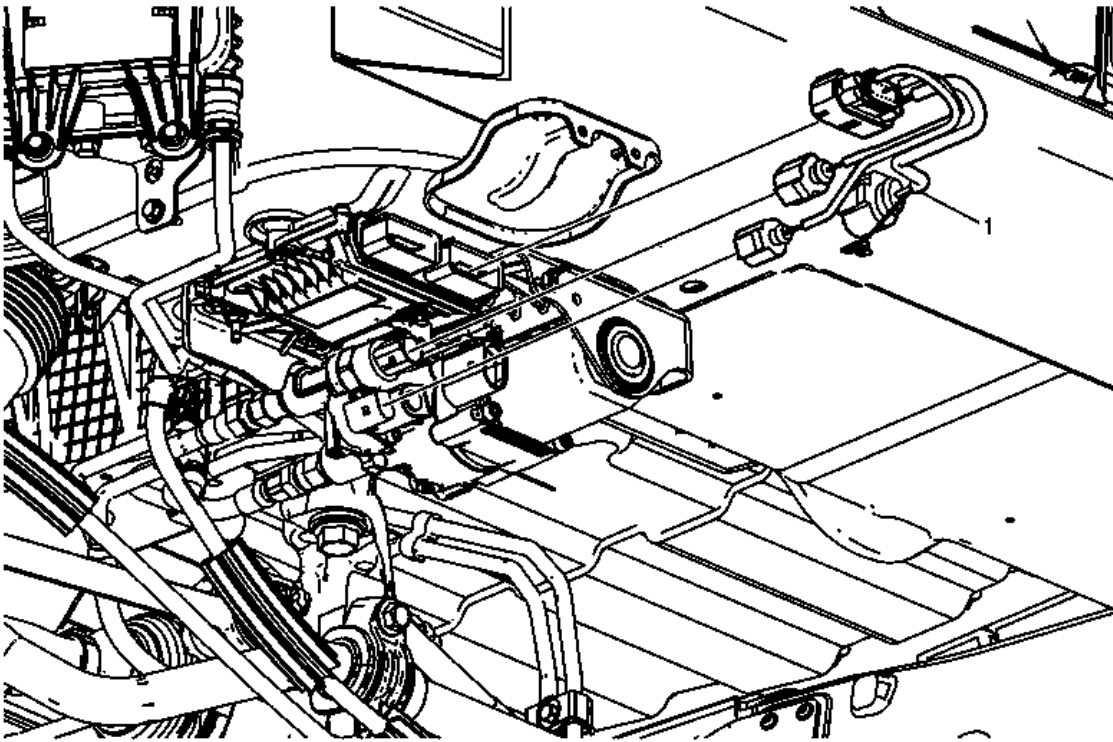


Fig. 61: Rear Axle Differential Lock Switch
Courtesy of GENERAL MOTORS COMPANY

Rear Axle Differential Lock Switch Replacement

Callout	Component Name
Preliminary Procedure	
Remove the rear bumper fascia. Refer to Rear Bumper Fascia Replacement .	
1	Rear Axle Differential Lock Switch

LIMITED SLIP DIFFERENTIAL CLUTCH PIPE CONNECTOR DISCONNECTION AND CONNECTION

Special Tools

J-45666 Air Line Release Tool

For equivalent or regional tools. Refer to **Special Tools**.

Removal Procedure

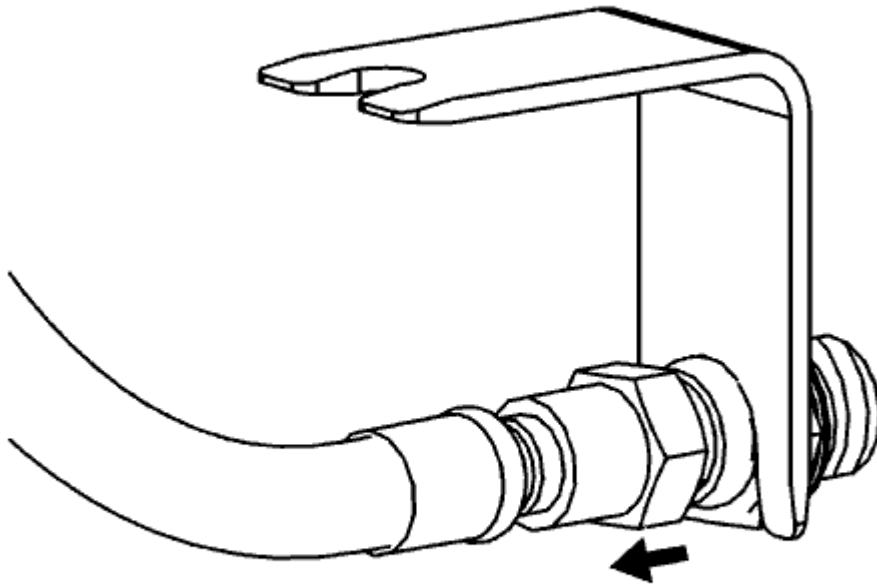


Fig. 62: Air Line Release Tool

Courtesy of GENERAL MOTORS COMPANY

1. Install the **J-45666** air line release tool onto the differential oil cooler or differential oil pump pipe.

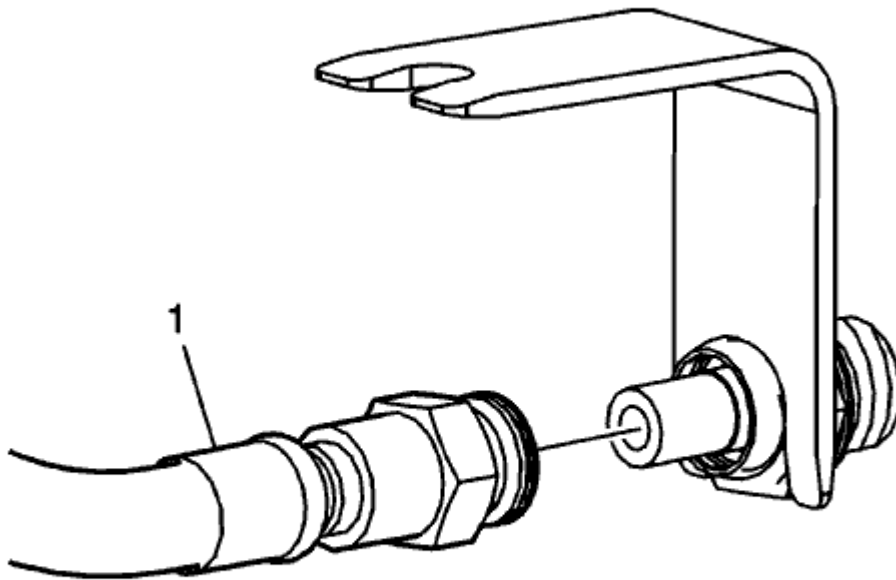


Fig. 63: Disconnected Pipe Fitting
Courtesy of GENERAL MOTORS COMPANY

NOTE: Do not use the tool to pry the hose away from the fitting.

2. Pull rearward on the pipe (1) to disconnect from the pipe fitting.
3. Remove **J-45666** air line release tool from the pipe fitting.

Installation Procedure

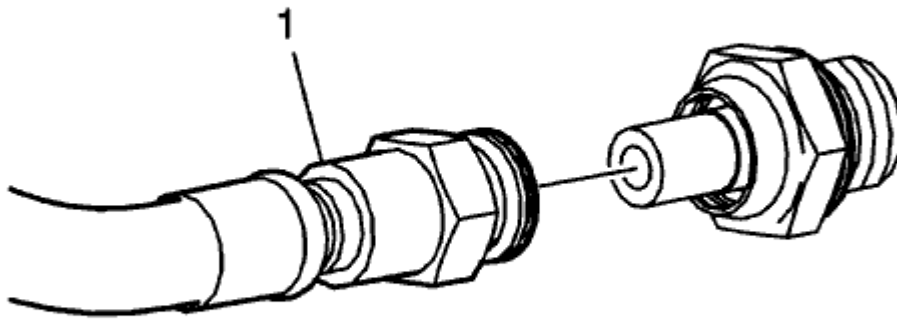


Fig. 64: Disconnected Pipe Fitting
Courtesy of GENERAL MOTORS COMPANY

IMPORTANT: Inspect the pipe fitting and retaining clip for signs of wear or damage.
Replace the components if necessary.

1. Install the pipe (1) by pressing the pipe onto the pipe fitting.

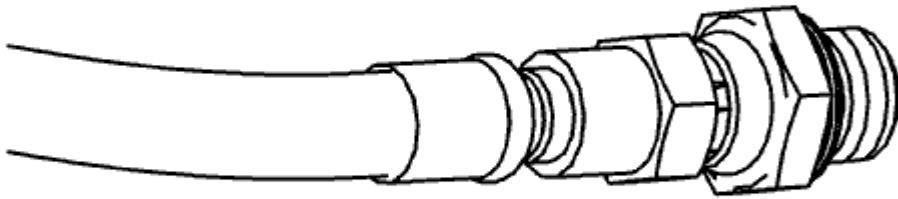


Fig. 65: Assembled Pipe Fitting
Courtesy of GENERAL MOTORS COMPANY

2. A distinct snap should be heard or felt when assembling the pipe to the fitting.
3. To ensure the cooler line is properly installed, give the cooler pipe a gentle pull.

LIMITED SLIP DIFFERENTIAL CLUTCH VALVE REPLACEMENT

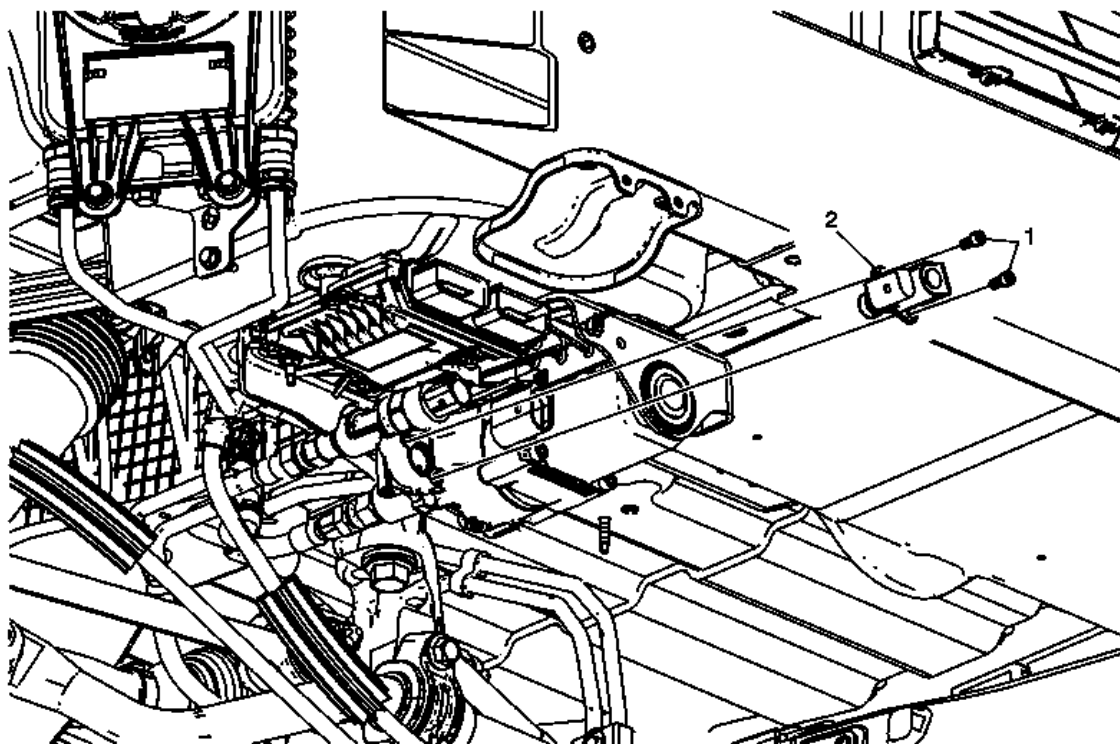


Fig. 66: Limited Slip Differential Clutch Valve
 Courtesy of GENERAL MOTORS COMPANY

Limited Slip Differential Clutch Valve Replacement

Callout	Component Name
Preliminary Procedure 1. Remove the rear bumper fascia. Refer to Rear Bumper Fascia Replacement . 2. Disconnect the rear axle differential lock switch connector before removal. Refer to Rear Axle Differential Lock Switch Replacement. 3. Install a Drain Pan under the vehicle.	
1	Limited Slip Differential Clutch Valve Bolts CAUTION: Refer to Fastener Caution . Tighten 3 (27 lb in)
2	Limited Slip Differential Clutch Valve Procedure 1. Remove the Limited Slip Differential Clutch Valve.

3. Fill the Differential Clutch System. Refer to **Rear Differential Hydraulic System Service Fill/Bleed**.

DIFFERENTIAL CLUTCH PUMP REPLACEMENT

Removal Procedure

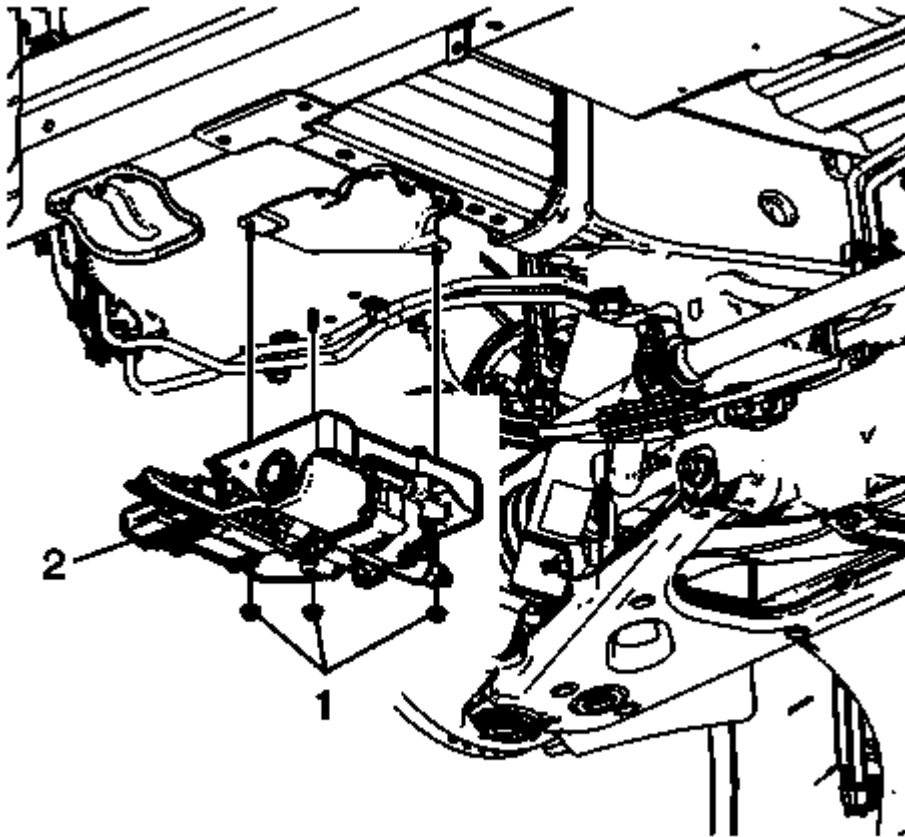


Fig. 67: Differential Clutch Pump Bracket Bolts
Courtesy of GENERAL MOTORS COMPANY

1. Raise and support the vehicle. Refer to **Lifting and Jacking the Vehicle** .
2. Lower and support the rear of the exhaust system.
3. Install a drain pan under the vehicle.
4. Remove the rear bumper fascia. Refer to **Rear Bumper Fascia Replacement** .
5. Remove the electronic differential drive motor outlet hose assembly. Refer to **Electric Differential Drive Motor Outlet Hose Replacement**.
6. Remove the differential clutch pump bracket bolts (1) and the differential clutch pump assembly (2).

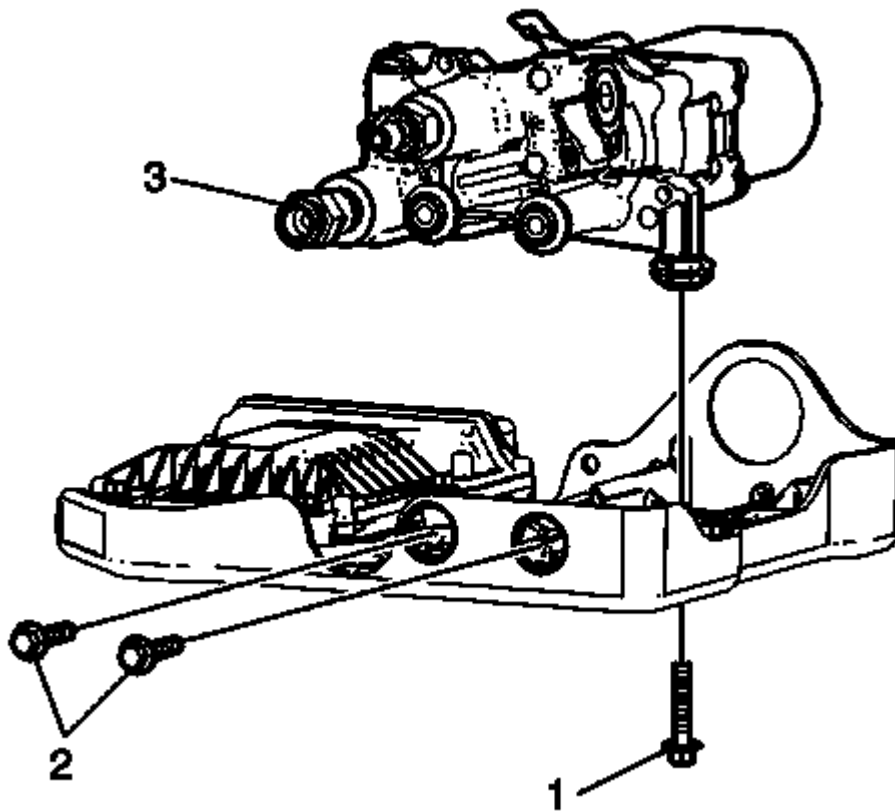


Fig. 68: Differential Clutch Pump Bolts
Courtesy of GENERAL MOTORS COMPANY

7. Remove the differential clutch pump bolts (1 and 2).

NOTE: Must disconnect the rear axle differential lock switch connector from the rear wheel drive module before removing the differential clutch pump from the bracket.

8. Remove the differential clutch pump (3) from the bracket.

Installation Procedure

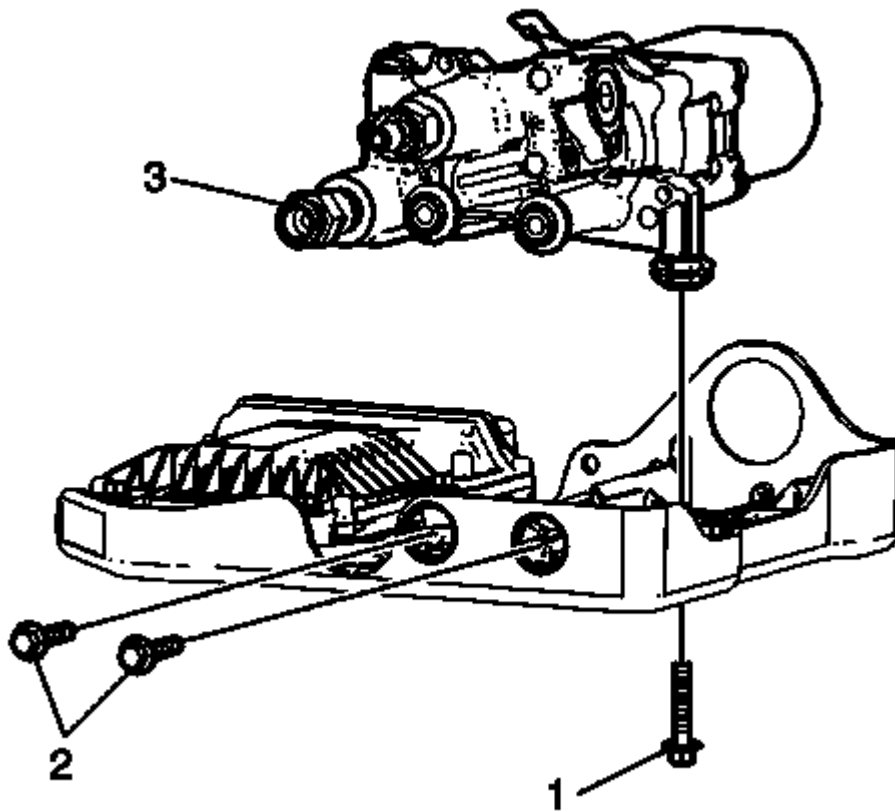


Fig. 69: Differential Clutch Pump Bolts
Courtesy of GENERAL MOTORS COMPANY

NOTE: Make sure to reconnect the rear axle differential lock switch connector to the rear wheel drive module after installation.

1. Install the differential clutch pump into the bracket (3).
2. Install the differential clutch pump bolts (1 and 2). Tighten to 9 N.m (80 lb ft).

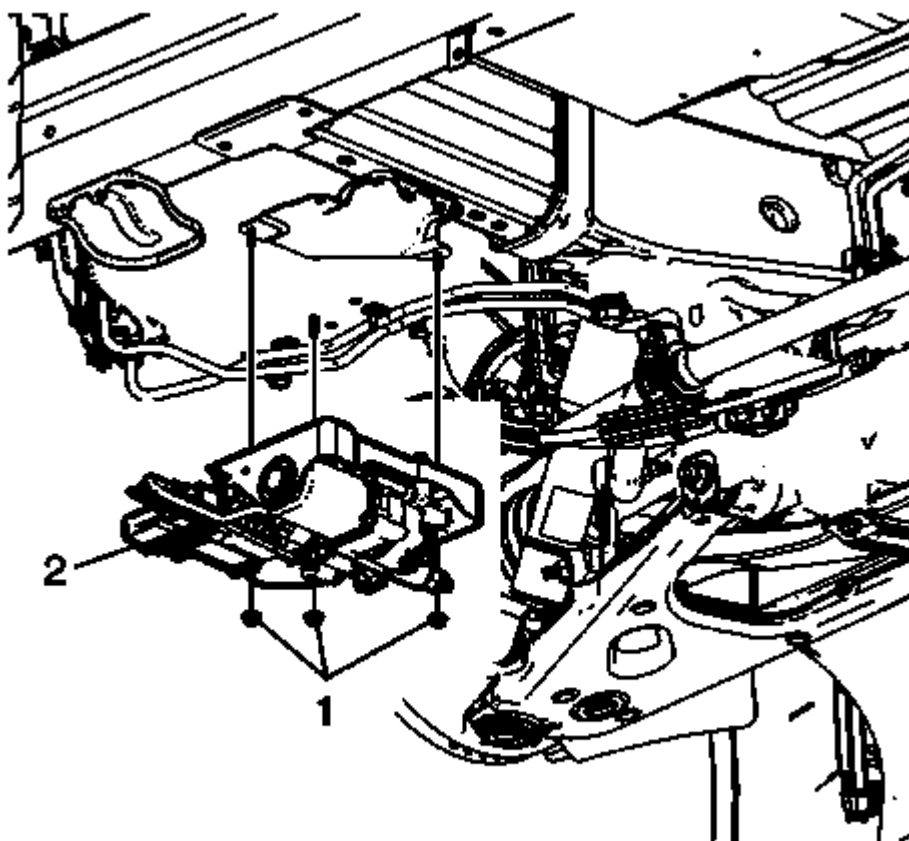


Fig. 70: Differential Clutch Pump Bracket Bolts
Courtesy of GENERAL MOTORS COMPANY

3. Install the differential clutch pump assembly (2) and bolts (1). Tighten the bolts (1) to 15 N.m (11 lb ft).
4. Install the electronic differential drive motor outlet hose assembly. Refer to **Electric Differential Drive Motor Outlet Hose Replacement**.
5. Install the rear bumper fascia. Refer to **Rear Bumper Fascia Replacement**.
6. Remove the drain pan from under the vehicle.
7. Raise and secure the rear of the exhaust system.
8. Lower the vehicle. Refer to **Lifting and Jacking the Vehicle**.

DIFFERENTIAL CLUTCH OIL FILTER REPLACEMENT

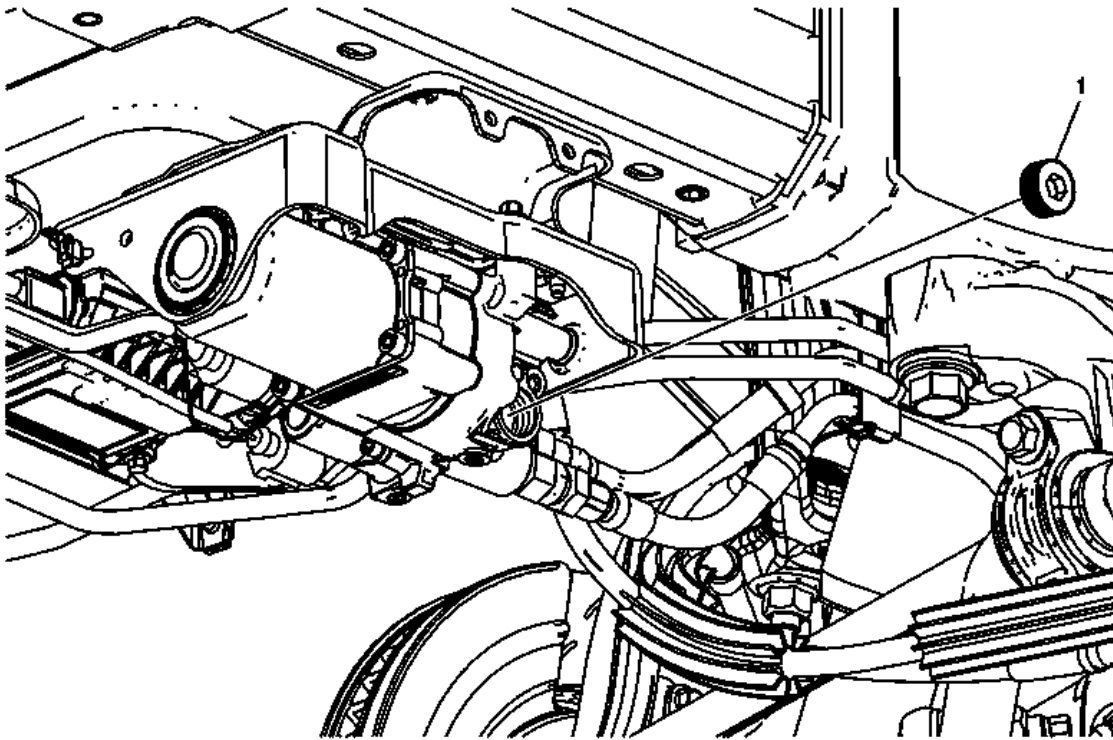


Fig. 71: Differential Clutch Oil Filter
 Courtesy of GENERAL MOTORS COMPANY

Differential Clutch Oil Filter Replacement

Callout	Component Name
Preliminary Procedure	
1. Remove the rear bumper fascia. Refer to <u>Rear Bumper Fascia Replacement</u> . 2. Install a Drain Pan under the vehicle.	
	Differential Carrier Drain Plug CAUTION: Refer to <u>Fastener Caution</u> .
	Procedure
1	1. Remove the differential carrier drain plug. 2. Remove the differential clutch oil filter. 3. Install the NEW differential clutch oil filter. 4. Install the differential carrier drain plug. 5. Fill the differential clutch system. Refer to <u>Rear Differential Hydraulic System Service Fill/Bleed</u> .

Tighten
16 (12 lb ft)

REAR AXLE DISASSEMBLE

Rear Axle Housing Drain and Fill Plug Removal

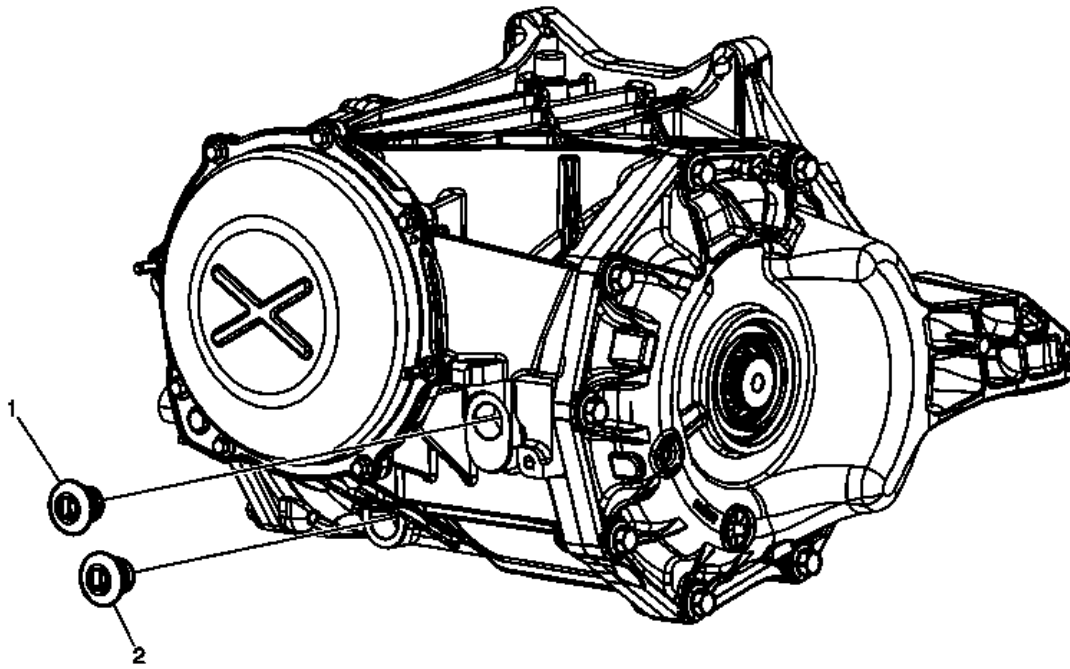


Fig. 72: Rear Axle Housing Drain and Fill Plug
Courtesy of GENERAL MOTORS COMPANY

Rear Axle Housing Drain and Fill Plug Removal

Callout	Component Name
1	Rear Axle Housing Fill Plug
2	Rear Axle Housing Drain Plug

Rear Axle Housing Cover Removal

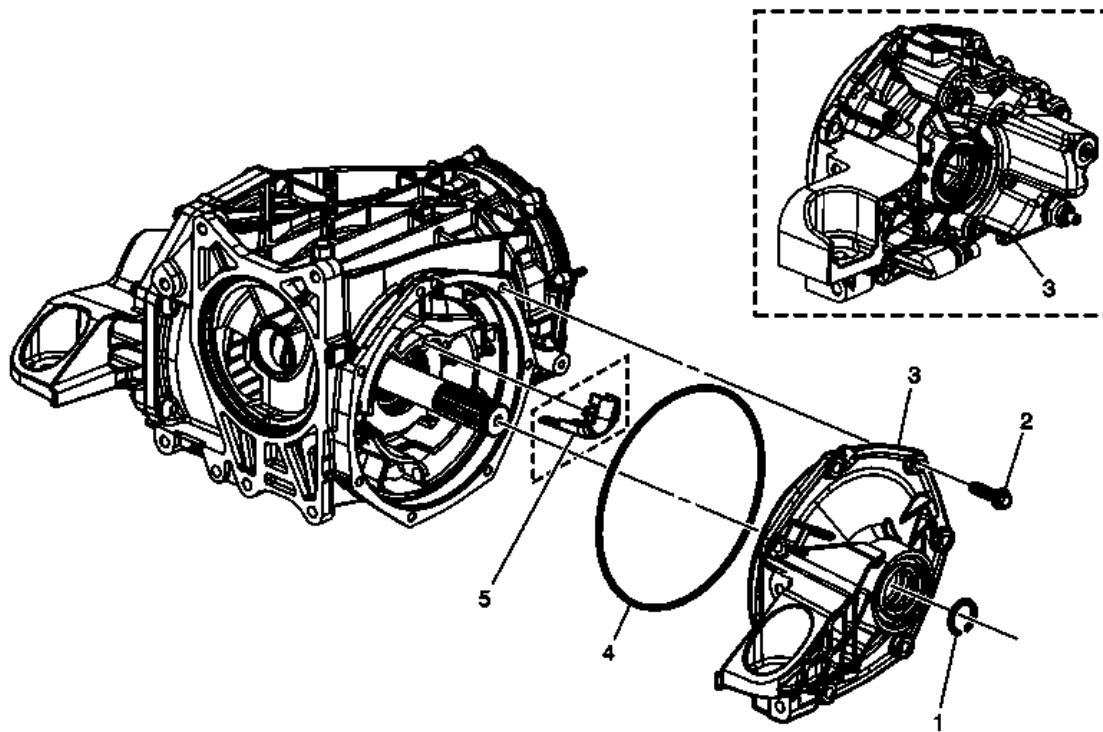


Fig. 73: Rear Axle Housing Cover
 Courtesy of GENERAL MOTORS COMPANY

Rear Axle Housing Cover Removal

Callout	Component Name
1	Rear Axle Shaft Lock
2	Rear Axle Housing Cover Bolt M8 x 35 (Qty: 7) NOTE: Discard the bolts, they are not reusable.
3	Rear Axle Housing Cover - Model Dependent
4	Differential Carrier Cover Seal (LH D-ring) NOTE: Discard the seal, it is not reusable.
5	Differential Oil Trough - Model Dependent

Rear Axle Housing Cover Removal

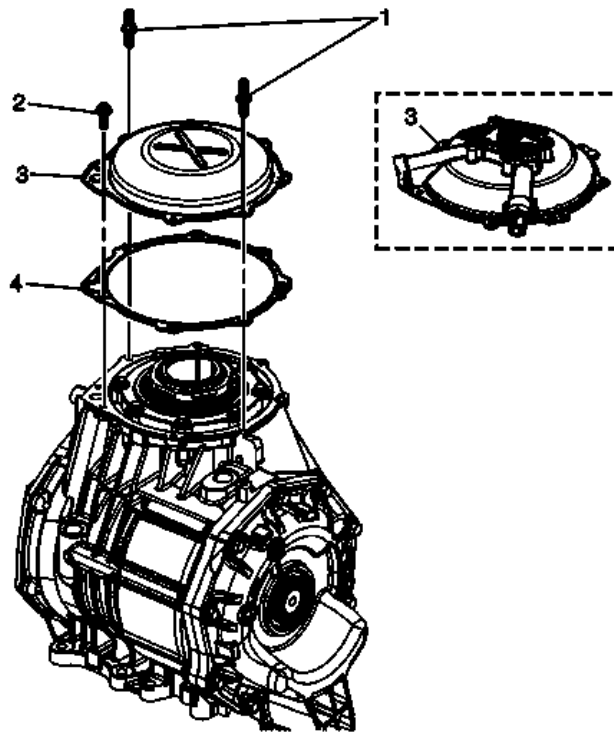


Fig. 74: Rear Axle Housing Cover
 Courtesy of GENERAL MOTORS COMPANY

Rear Axle Housing Cover Removal

Callout	Component Name
1	Differential Carrier Stud M6 x 42 (Qty: 2) NOTE: Discard the bolts, they are not reusable.
2	Differential Carrier Cover Bolt M6 x 20 (Qty: 6) NOTE: Discard the bolts, they are not reusable.
3	Rear Axle Housing Cover - Model Dependent
4	Rear Axle Housing Cover Gasket NOTE: The gasket is reusable up to 3 times. Inspect the gasket and replace as required.

Differential Drive Pinion Gear Bearing Housing and Gear Assembly Removal

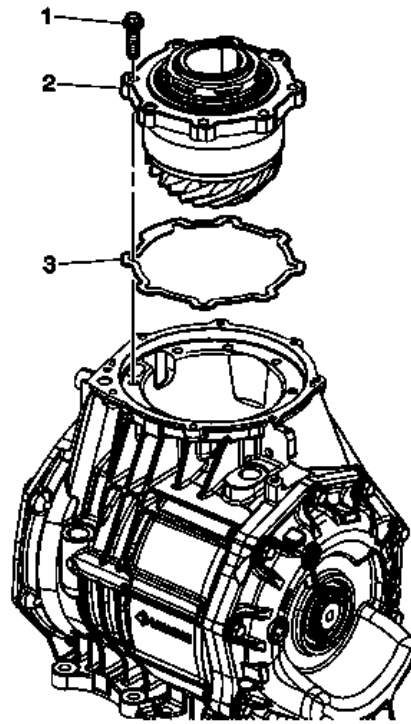


Fig. 75: Differential Drive Pinion Gear Bearing Housing and Gear Assembly
 Courtesy of GENERAL MOTORS COMPANY

Differential Drive Pinion Gear Bearing Housing and Gear Assembly Removal

Callout	Component Name
1	Differential Drive Pinion Gear Bearing Housing Bolt (Qty: 8) NOTE: Discard the bolts, they are not reusable.
2	Differential Drive Pinion Gear Bearing Housing and Gear Assembly NOTE: Use jack screws if necessary to aid in removal.
3	Differential Pinion Gear Shim

Differential Carrier Cover Removal

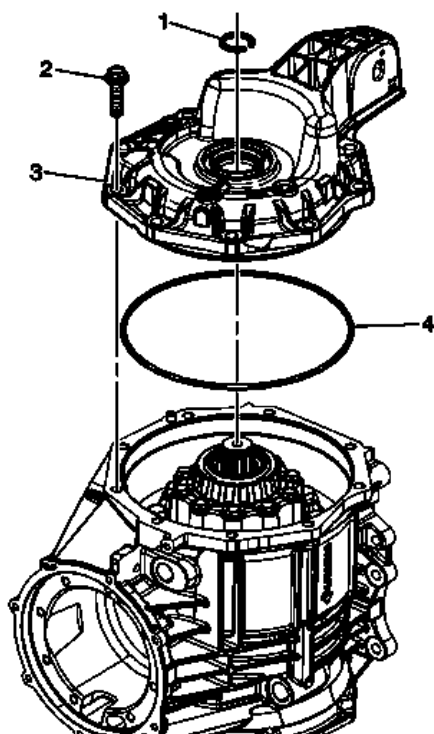


Fig. 76: Differential Carrier Cover
 Courtesy of GENERAL MOTORS COMPANY

Differential Carrier Cover Removal

Callout	Component Name
1	Rear Axle Shaft Lock
2	Differential Carrier Cover Bolt M10 x 40 (Qty: 9) NOTE: Discard the bolts, they are not reusable.
3	Differential Carrier Cover (RH)
4	Differential Carrier Cover Seal (RH D-ring) NOTE: Discard the seal, it is not reusable.

Differential Case Assembly Removal

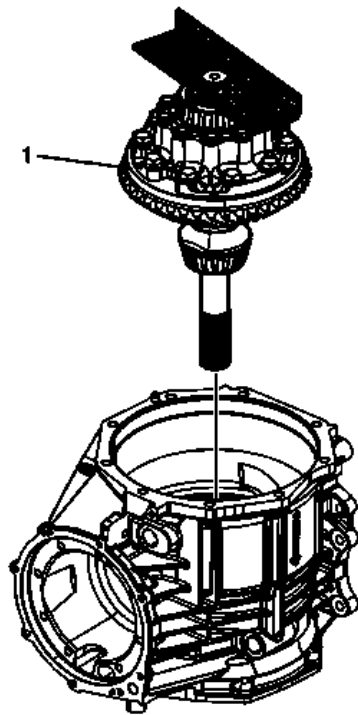


Fig. 77: Differential Case Assembly
Courtesy of GENERAL MOTORS COMPANY

Differential Case Assembly Removal

Callout	Component Name
1	Differential Case Assembly Special Tools DT-42155 Axle Differential Housing Lifting Tool For equivalent regional tools, refer to Special Tools .

Differential Carrier Housing Bearing Cup Removal

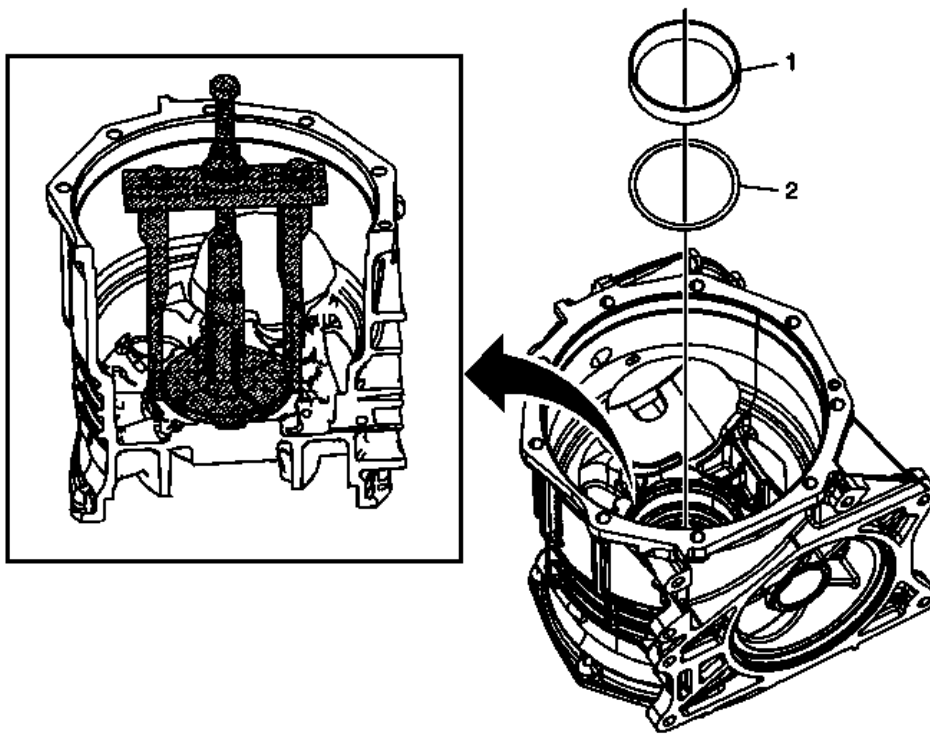


Fig. 78: Differential Carrier Housing Bearing Cup
 Courtesy of GENERAL MOTORS COMPANY

Differential Carrier Housing Bearing Cup Removal

Callout	Component Name
1	Differential Bearing Cup
	Special Tools • DT-51255 Bearing Cup Remover • DT-45124 Removal Bridge
	For equivalent regional tools, refer to Special Tools .
2	Differential Bearing Shim - Selective

Differential Carrier Cover Bearing Cup Removal

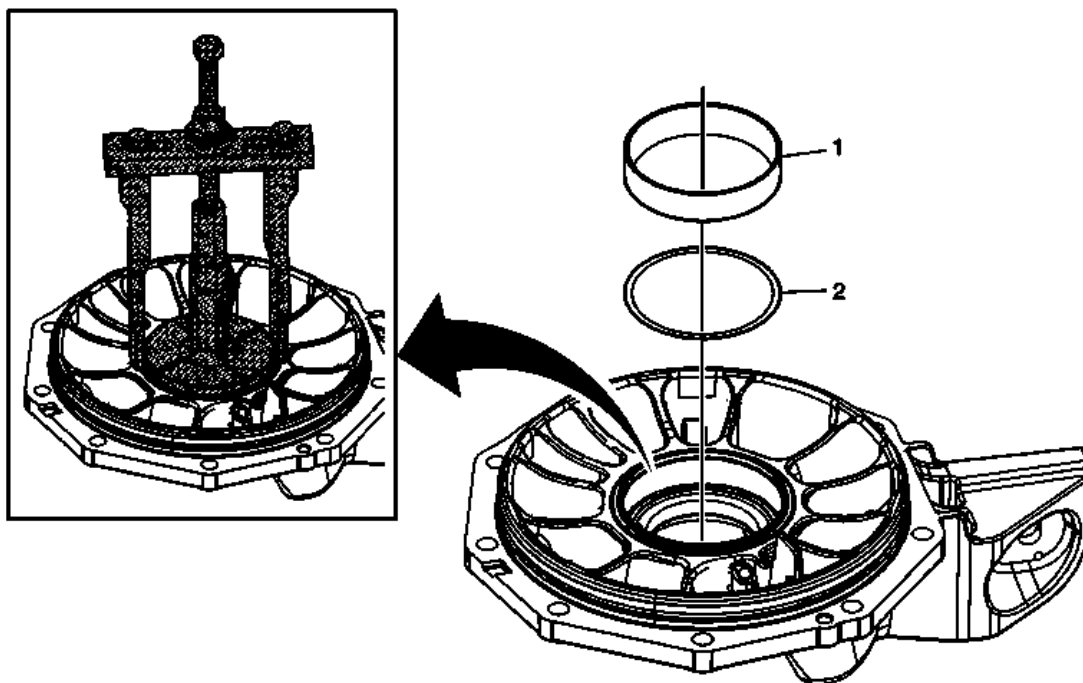


Fig. 79: Differential Carrier Cover Bearing Cup
Courtesy of GENERAL MOTORS COMPANY

Differential Carrier Cover Bearing Cup Removal

Callout	Component Name
1	Differential Bearing Cup Special Tools • DT-51255 Bearing Cup Remover • DT-45124 Removal Bridge For equivalent regional tools, refer to Special Tools .
2	Differential Bearing Shim - Selective

DIFFERENTIAL CASE DISASSEMBLE (MLSD)

Differential Ring Gear Removal

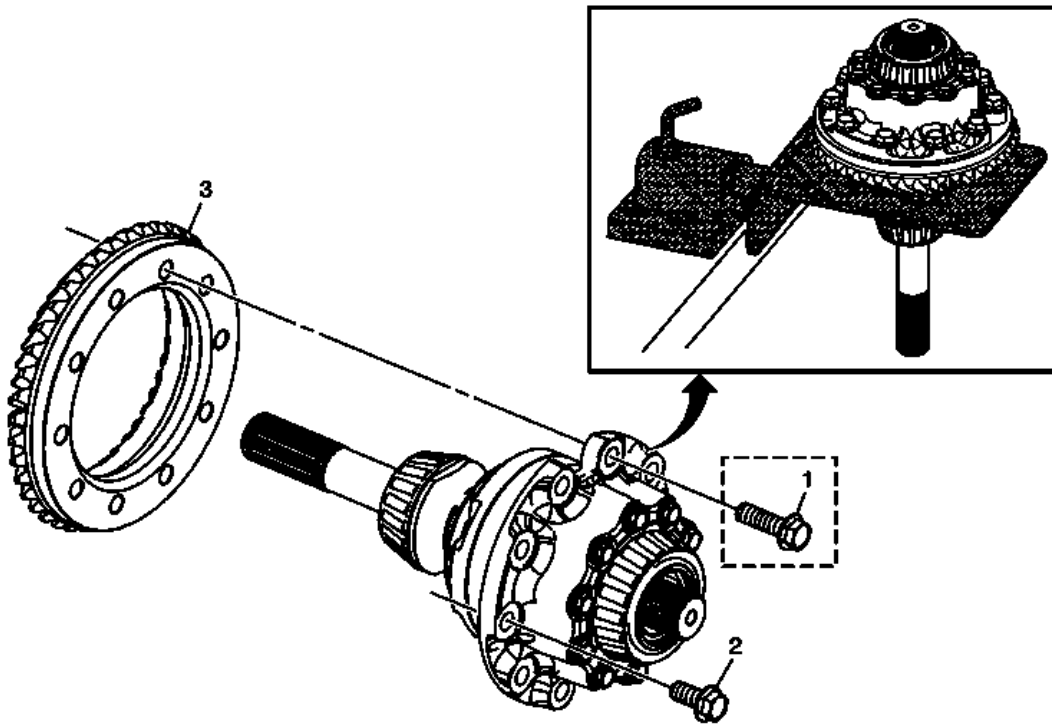


Fig. 80: Differential Ring Gear
 Courtesy of GENERAL MOTORS COMPANY

Differential Ring Gear Removal

Callout	Component Name
1	Differential Ring Gear Bolt M12 x 41.5 (Qty: 4 - 3.42 ratio) Procedure Place the differential assembly into DT-03289-20 fixture to hold it in place while removing the bolts. NOTE: Discard the bolts, they are not reusable. Special Tools • DT-03289-20 Holding Fixture • DT-42173-A Differential Holding Fixture For equivalent regional tools, refer to Special Tools.
2	Differential Ring Gear Bolt M12 x 27 M12 x 27 (Qty: 10 - 2.56 & 2.73 ratio) (Qty: 6 - 3.42 ratio) NOTE: Discard the bolts, they are not reusable.

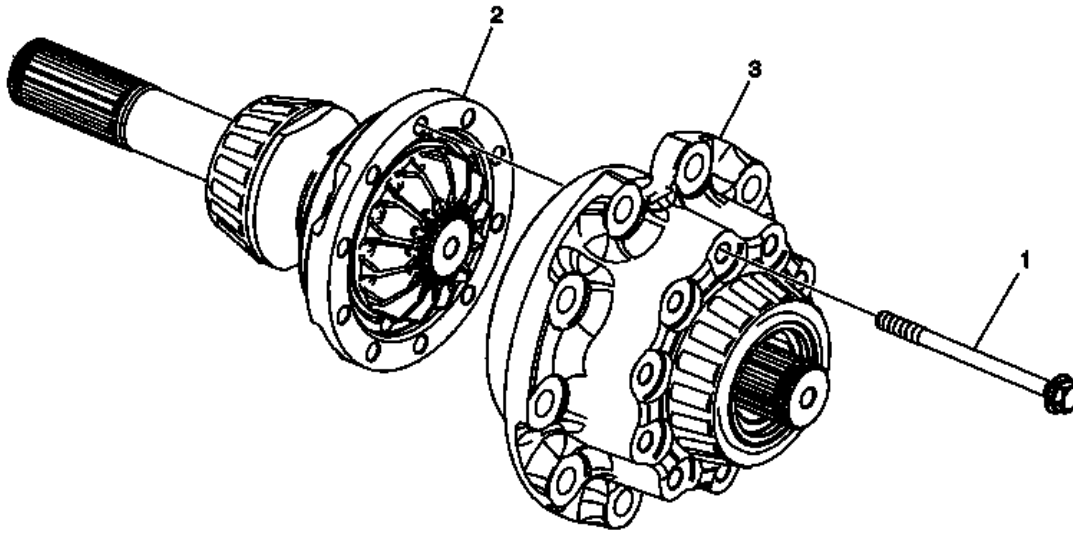
Differential Case Disassemble

Fig. 81: Differential Case
Courtesy of GENERAL MOTORS COMPANY

Differential Case Disassemble

Callout	Component Name
1	Differential Case Bolt M8 x 105 (Qty: 10) NOTE: Discard the bolts, they are not reusable.
2	Differential Case (Flanged Half)
3	Differential Case (Plain Half)

Differential Case (Flanged Half) Disassemble

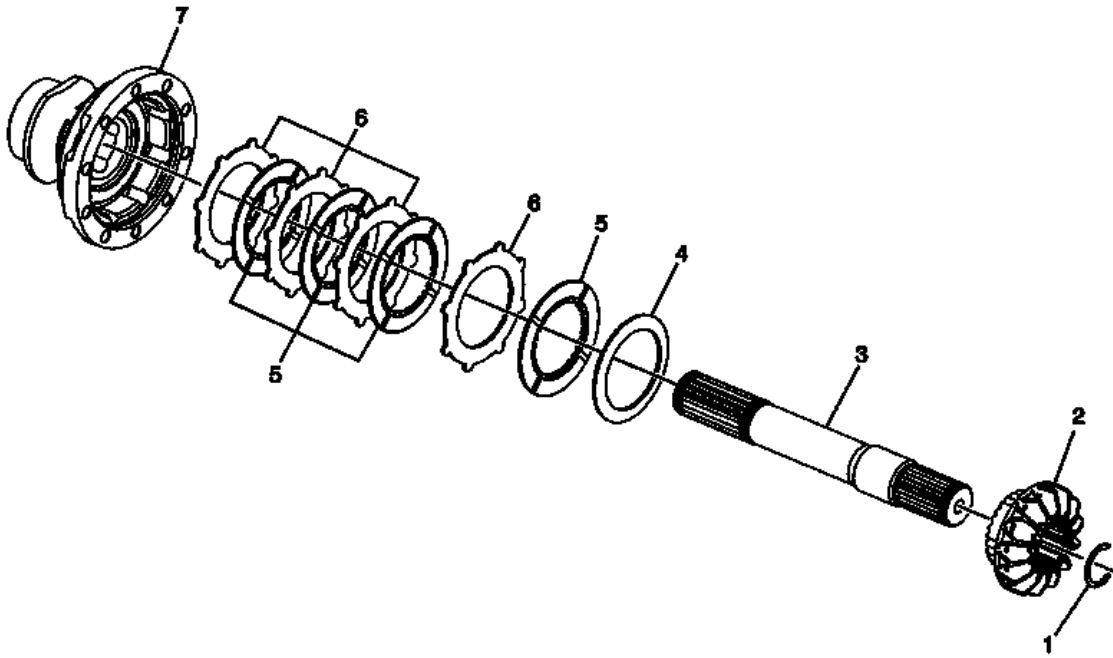


Fig. 82: Differential Case (Flanged Half)
 Courtesy of GENERAL MOTORS COMPANY

Differential Case (Flanged Half) Disassemble

Callout	Component Name
1	Rear Axle Shaft Bearing Retaining Ring
2	Differential Side Gear
3	Rear Axle Shaft (LH Output)
4	Locking Differential Clutch Disc Thrust Washer
5	Differential Clutch Disc - Friction
6	Differential Clutch Disc - Steel
7	Differential Case (Flanged Half)

Differential Case (Plain Half) Disassemble

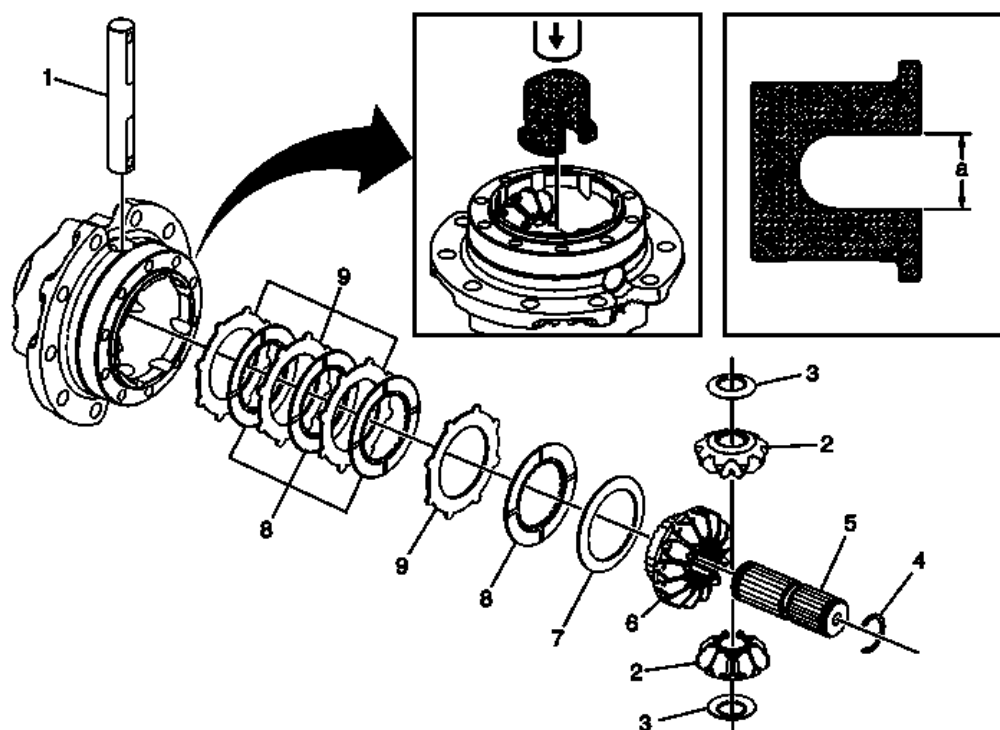


Fig. 83: Differential Case (Plain Half)
Courtesy of GENERAL MOTORS COMPANY

Differential Case (Plain Half) Disassemble

Callout	Component Name
1	Differential Pinion Gear Shaft Procedure Compress the clutch pack using the modified DT-42162-A compressor and remove the pinion gear shaft. NOTE: The inner diameter of DT-42162-A compressor must be increased to 21.3 mm (0.084 in) (a) using a hand held grinder. Once the necessary dimension is reached, paint the exposed metal to prevent corrosion. Special Tools DT-42162-A Axle Side Gear Compressor - Modified For equivalent regional tools, refer to Special Tools.
2	Differential Pinion Gear
3	Differential Pinion Gear Thrust Washer
4	Rear Axle Shaft Bearing Retaining Ring
5	Rear Axle Shaft (RH Output)
6	Differential Side Gear
7	Locking Differential Clutch Disc Thrust Washer

8	Differential Clutch Disc - Friction
9	Differential Clutch Disc - Steel

DIFFERENTIAL CASE DISASSEMBLE (ELSD)

Differential Ring Gear Removal

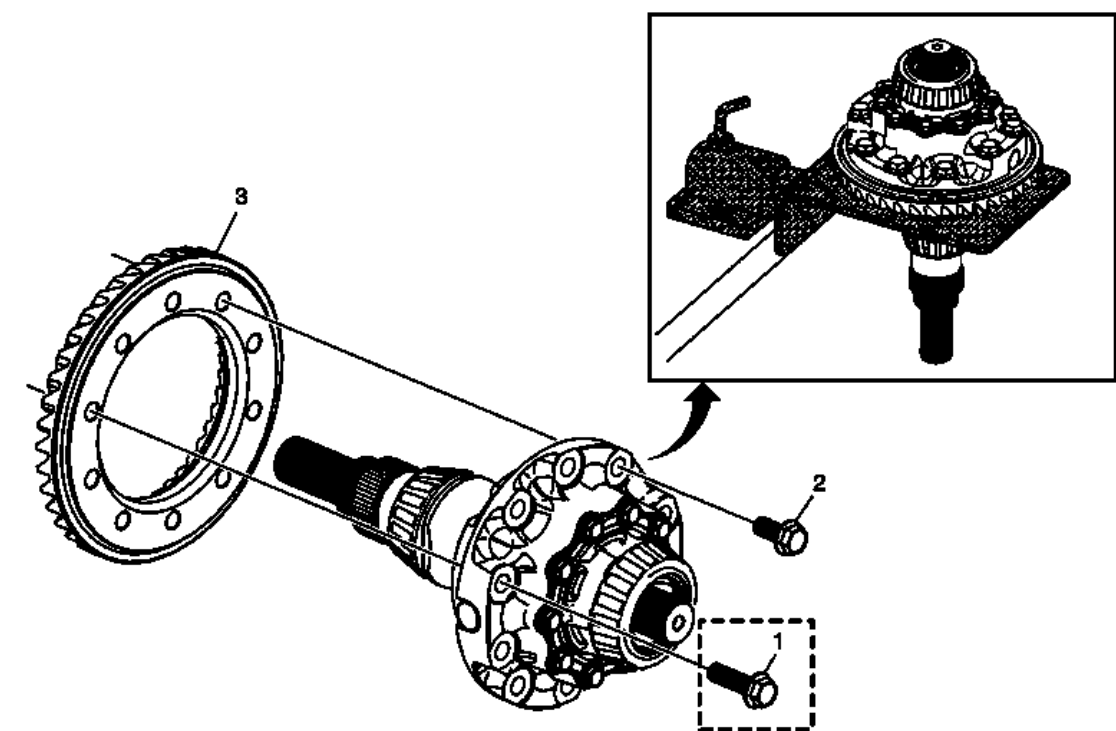


Fig. 84: Differential Ring Gear
Courtesy of GENERAL MOTORS COMPANY

Differential Ring Gear Removal

Callout	Component Name
1	Differential Ring Gear Bolt M12 x 41.5 (Qty: 4 - 3.42 ratio) Procedure Place the differential assembly into DT-03289-20 fixture to hold it in place while removing the bolts. NOTE: Discard the bolts, they are not reusable. Special Tools DT-03289-20 Holding Fixture

	For equivalent regional tools, refer to Special Tools .
2	Differential Ring Gear Bolt M12 x 27 M12 x 27 (Qty: 10 - 2.56 & 2.73 ratio) (Qty: 6 - 3.42 ratio) NOTE: Discard the bolts, they are not reusable.
3	Differential Ring Gear

Differential Case Disassemble

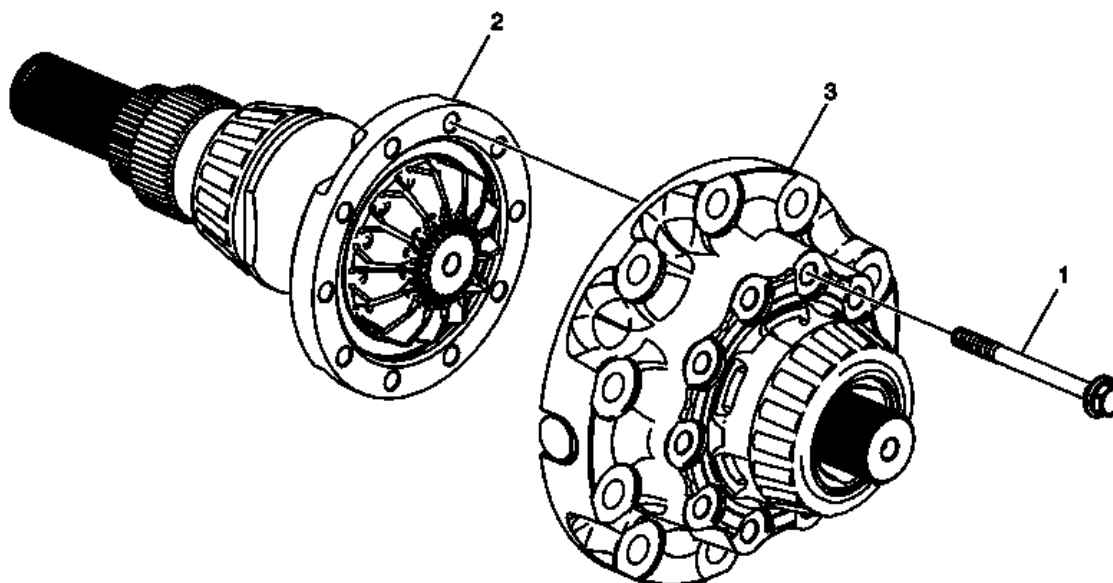


Fig. 85: Differential Case
Courtesy of GENERAL MOTORS COMPANY

Differential Case Disassemble

Callout	Component Name
1	Differential Case Bolt M8 x 105 (Qty: 10) NOTE: Discard the bolts, they are not reusable.
2	Differential Case (Flanged Half)
3	Differential Case (Plain Half)

Differential Case (Flanged Half) Disassemble

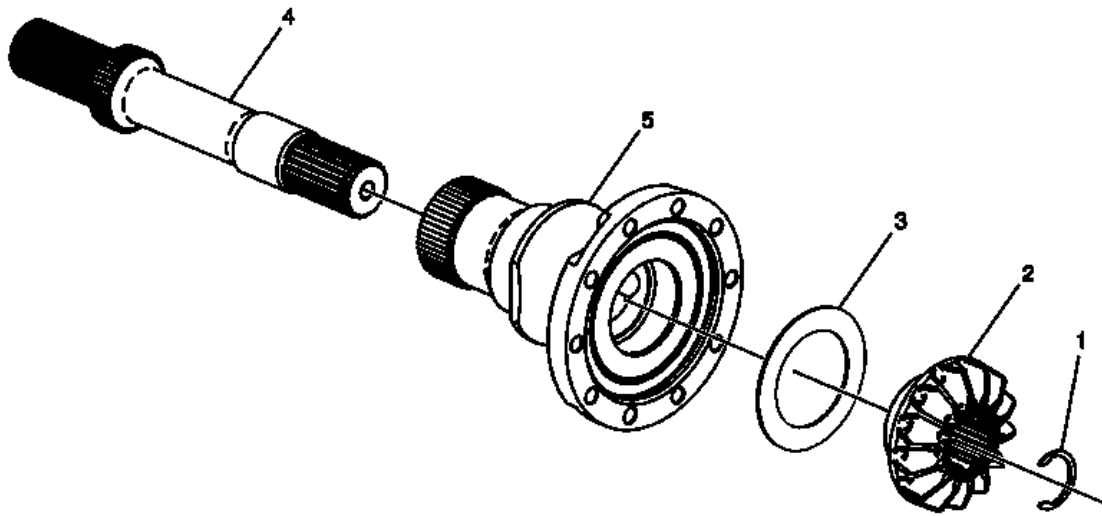


Fig. 86: Differential Case (Flanged Half)
 Courtesy of GENERAL MOTORS COMPANY

Differential Case (Flanged Half) Disassemble

Callout	Component Name
1	Rear Axle Shaft Bearing Retaining Ring NOTE: The retaining ring must be removed before the axle shaft can be removed from the differential case.
2	Differential Side Gear
3	Locking Differential Clutch Disc Thrust Washer
4	Rear Axle Shaft (LH Output)
5	Differential Case (Flanged Half)

Differential Case (Plain Half) Disassemble

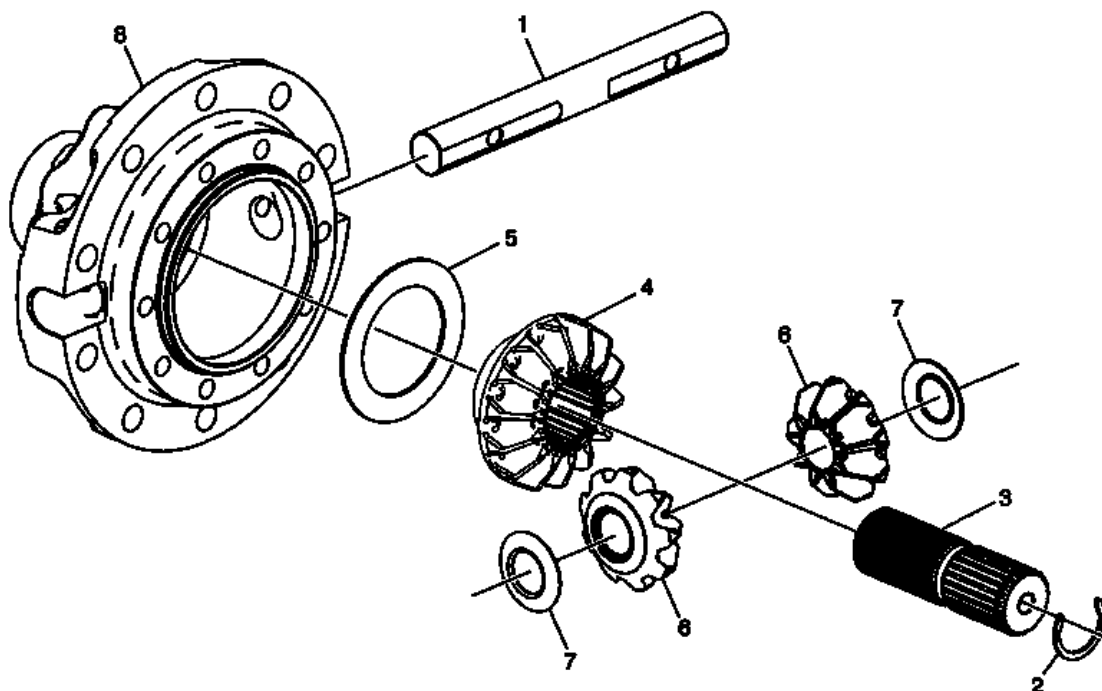


Fig. 87: Differential Case (Plain Half)
Courtesy of GENERAL MOTORS COMPANY

Differential Case (Plain Half) Disassemble

Callout	Component Name
1	Differential Pinion Gear Shaft
2	Rear Axle Shaft Bearing Retaining Ring
3	Rear Axle Shaft (RH Output)
4	Differential Side Gear
5	Locking Differential Clutch Disc Thrust Washer
6	Differential Pinion Gear
7	Differential Pinion Gear Thrust Washer
8	Differential Case (Plain Half)

DIFFERENTIAL DRIVE PINION GEAR BEARING HOUSING DISASSEMBLE

Pinion Gear Bearing Retaining Nut Removal

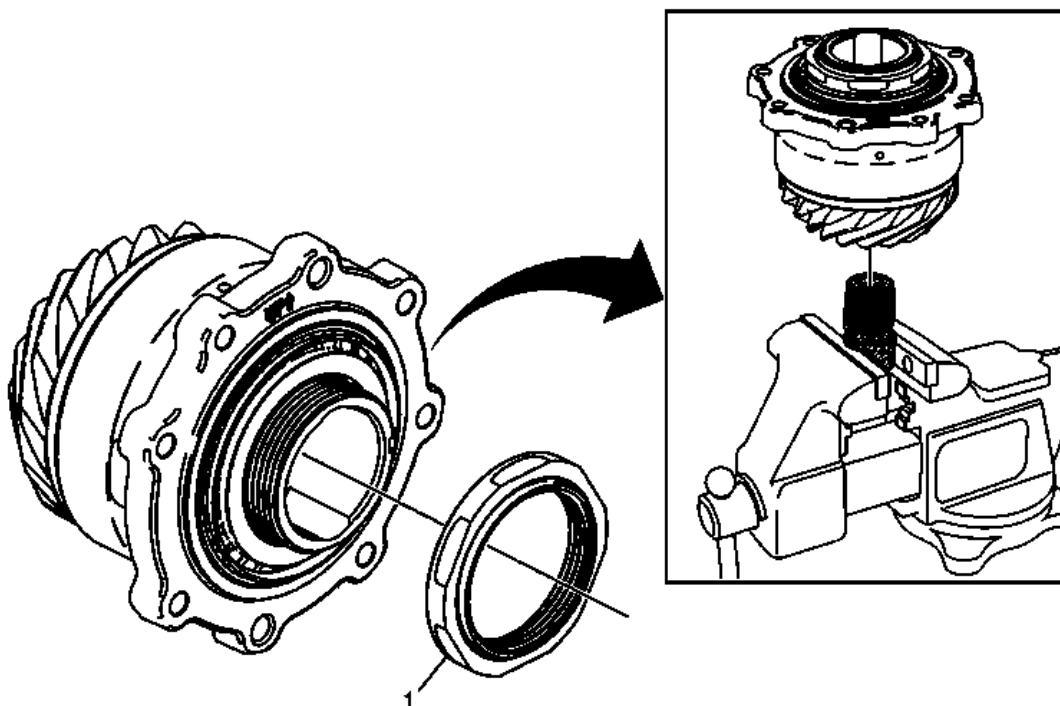


Fig. 88: Pinion Gear Bearing Retaining Nut
Courtesy of GENERAL MOTORS COMPANY

Pinion Gear Bearing Retaining Nut Removal

Callout	Component Name
1	Differential Drive Pinion Gear Bearing Retaining Nut Procedure 1. Use a bench vise and DT-48007 holder in the splines of the pinion gear to hold it in place while removing the retaining nut. 2. Use a 3 3/8 in socket to remove the retaining nut. NOTE: Discard the retaining nut, it is not reusable. Special Tools DT-48007 Spline Holder For equivalent regional tools, refer to Special Tools.

Pinion Gear Bearing Housing Disassemble

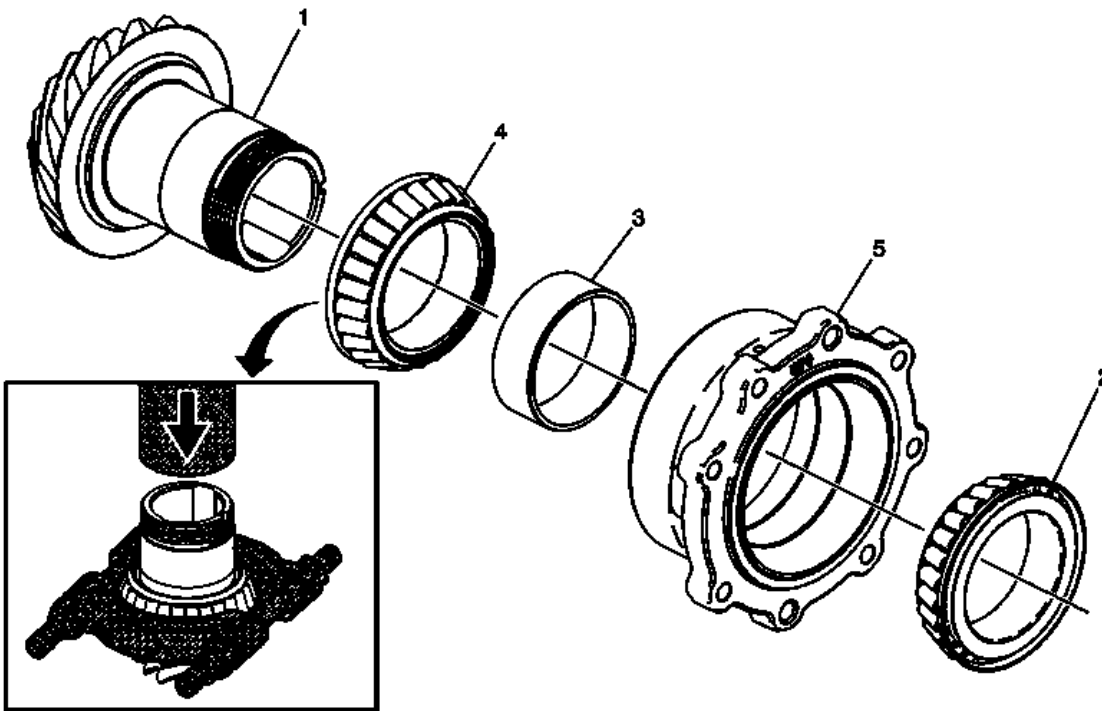


Fig. 89: Pinion Gear Bearing Housing
Courtesy of GENERAL MOTORS COMPANY

Pinion Gear Bearing Housing Disassemble

Callout	Component Name
1	Differential Pinion Gear
2	Differential Drive Pinion Gear Outer Bearing
3	Differential Drive Pinion Gear Bearing Spacer
4	Differential Drive Pinion Gear Inner Bearing Procedure Use DT-22912-B split plate and a press to remove the bearing. Special Tools DT-22912-B Split Plate Bearing Puller For equivalent regional tools, refer to Special Tools .
5	Differential Drive Pinion Gear Bearing Housing

DIFFERENTIAL CASE CLEANING AND INSPECTION

Differential Case

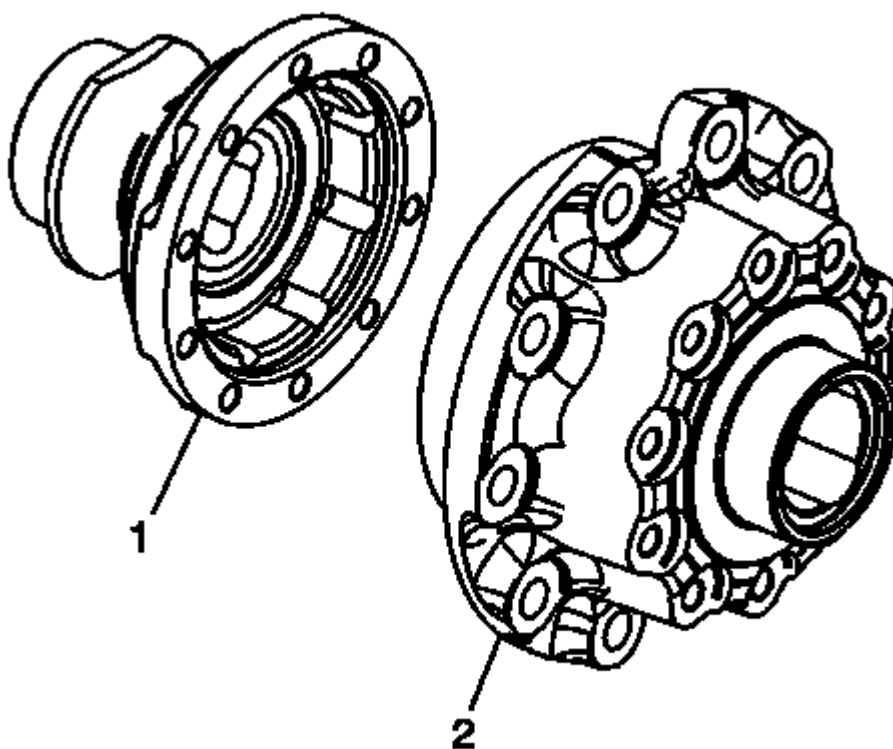


Fig. 90: Differential Case (Flanged Half) And Differential Case (Plain Half)
Courtesy of GENERAL MOTORS COMPANY

1. Clean the differential case (flanged half) (1) and differential case (plain half) (2) in solvent.
2. Inspect the case halves for the following conditions:
 - Cracks or other damage
 - Damage to threaded bolt holes
 - Unusual wear, scoring or grooves in the clutch pack area
 - Scored or damaged differential bearing mounting flanges

Gears and Shafts

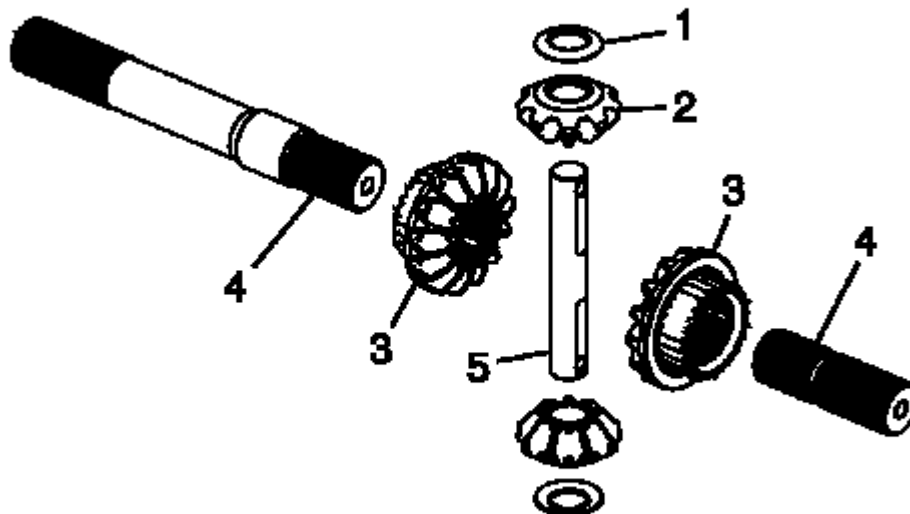


Fig. 91: Pinion Gear Pin Bores And Differential Pinion Gear Shaft
Courtesy of GENERAL MOTORS COMPANY

1. Clean the gears and shafts with solvent.
2. Inspect the gears for the following conditions:
 - Chips or cracks
 - Pitting
 - Heat discoloration
 - Unusual wear
 - Excessive wear or scoring in the pinion gear (2) pin bores
 - Wear, grooves or scoring on the differential pinion gear shaft (5)
 - Scored or worn pinion gear thrust washers (1)
 - Unusual wear or grooves on the differential side gear (3) splines
3. Inspect the shafts (4) for the following conditions:
 - Unusual wear
 - Grooved, worn or damaged splines
 - Damaged retaining ring grooves

Clutch Discs

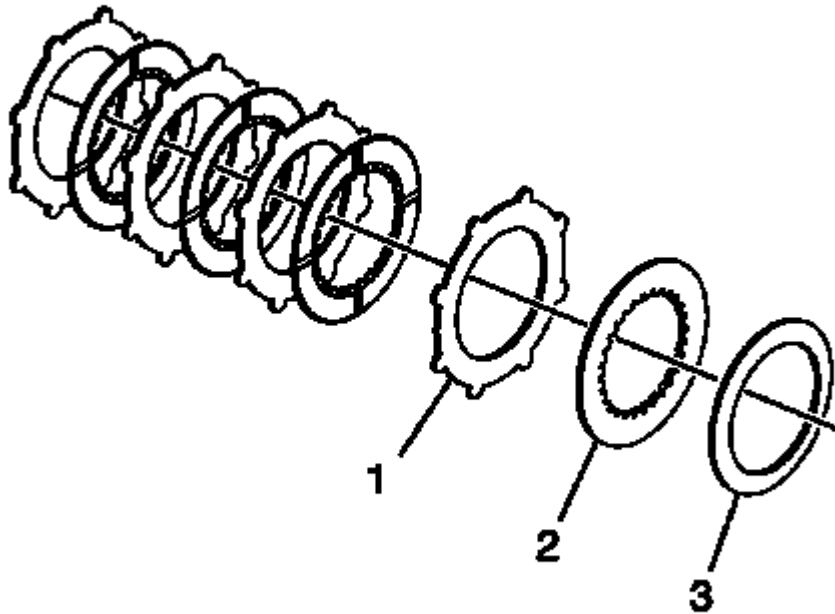


Fig. 92: Steel Clutch Discs Friction Surfaces
Courtesy of GENERAL MOTORS COMPANY

1. Clean the discs with solvent.
2. Inspect the discs for the following conditions:
 - Unusual wear, scoring or grooves on the steel clutch discs (1) friction surfaces
 - Friction clutch discs (2) with uneven wear or worn friction material

If any one disc in either the left or right pack show signs of wear or scoring replace the complete pack on both sides.

- Bent or warped plates or discs

Lay the plates and discs on a flat surface and inspect for warpage

- A worn, scored or collapsed clutch disc thrust washer (3)

Bearings and Races

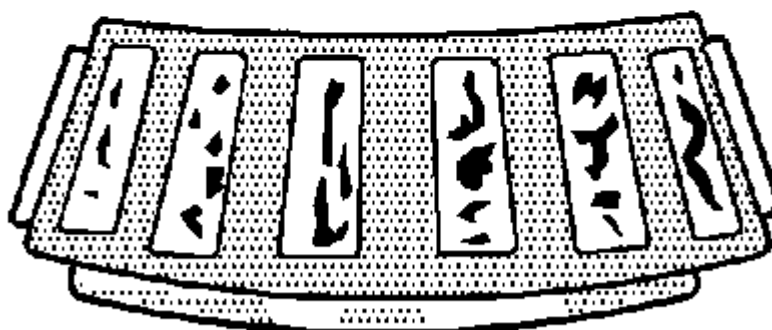


Fig. 93: Inspecting Bearing Rollers & Races For Pitting, Grooves, Spalling & Excessive Wear

Courtesy of GENERAL MOTORS COMPANY

1. Inspect the bearing rollers and cups for the following conditions:
 - Pitting
 - Scoring or grooves
 - Excessive wear or other damage

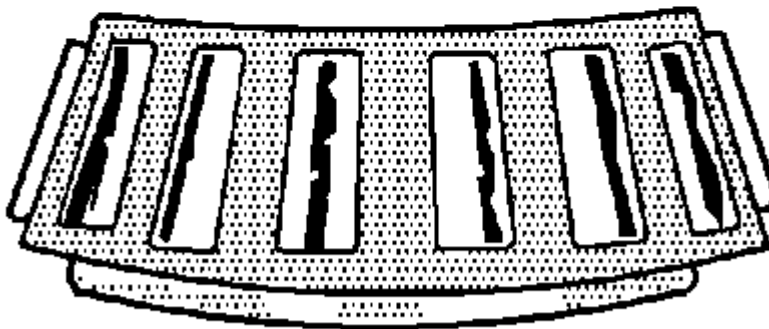
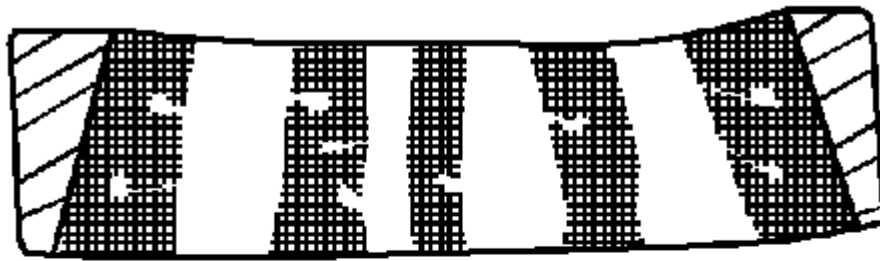


Fig. 94: Inspecting Bearing Rollers & Races For Heat Discoloration
Courtesy of GENERAL MOTORS COMPANY

2. Inspect the bearing rollers and cups for heat discoloration.

Heat discoloration ranges from a faint yellow to a dark blue color. This discoloration may result from an overload or improper lubrication. Excessive heat causes softening of the rollers and cups. Bearings or cups with sign of heat discoloration must be replaced.

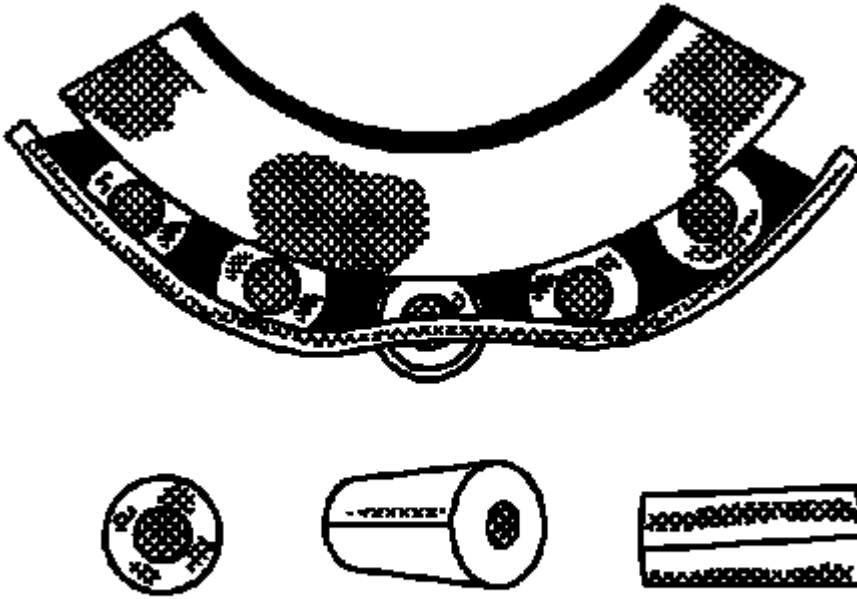


Fig. 95: Identifying Bent Roller Cage
Courtesy of GENERAL MOTORS COMPANY

3. Inspect for bent bearing cages.

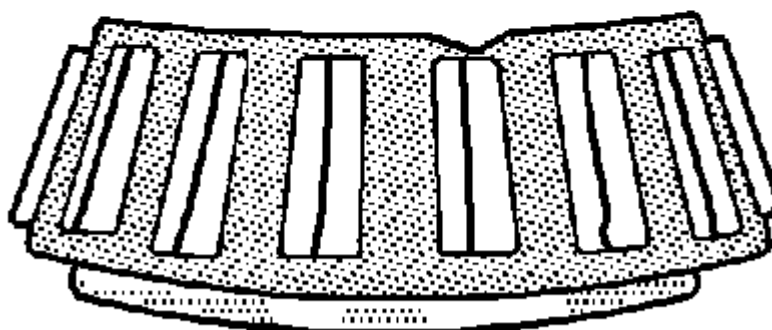
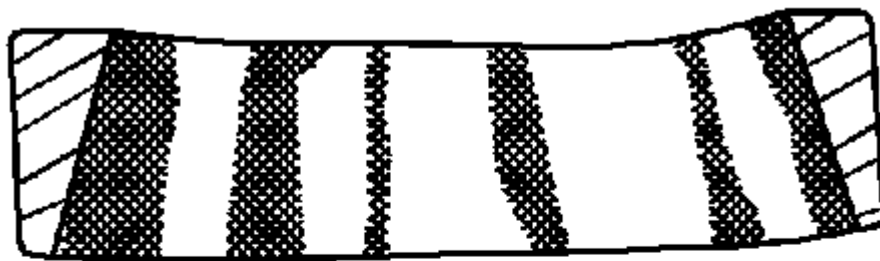


Fig. 96: Inspecting For Damaged Bearing Cages
Courtesy of GENERAL MOTORS COMPANY

4. Inspect for damaged bearing cages.

REAR WHEEL DRIVE DIFFERENTIAL CARRIER HOUSING CLEANING AND INSPECTION

Differential Carrier Housing

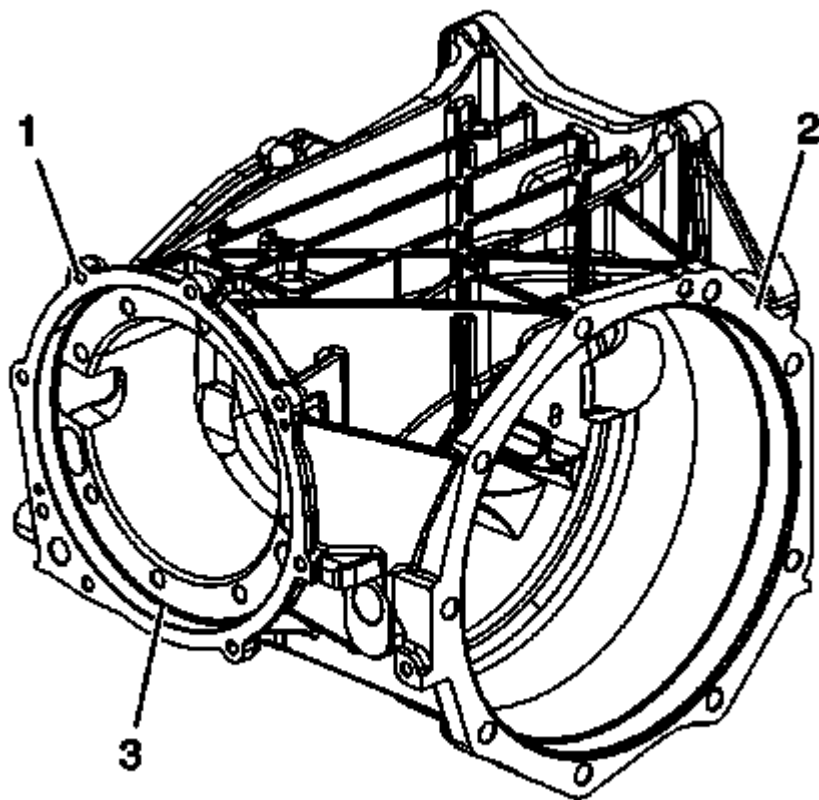


Fig. 97: Threaded Bolt Holes And Flanges
Courtesy of GENERAL MOTORS COMPANY

1. Clean the differential carrier housing in solvent.
2. Inspect for the following conditions:
 - Damage to threaded bolt holes (1)
 - Broken flanges (2)
 - Restrictions within the internal oil passages
 - Damaged case or cover sealing surfaces
 - Damage to the D-ring seal grooves (3)
 - Porosity

Differential Carrier Covers

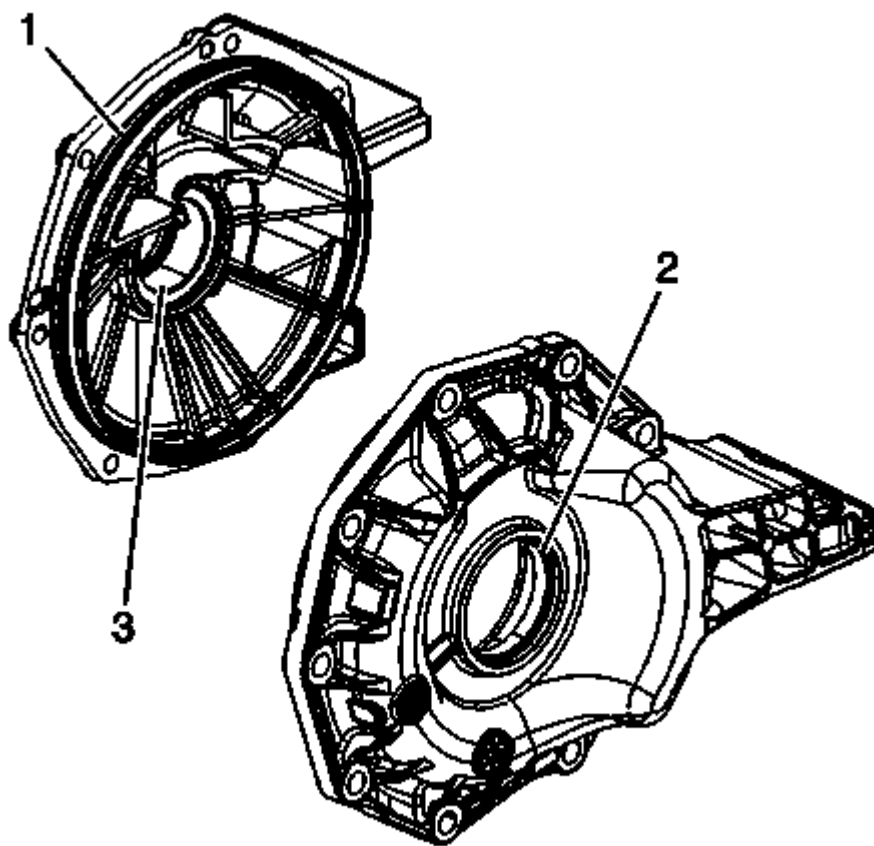


Fig. 98: Left Side Cover Output Shaft Bushing
Courtesy of GENERAL MOTORS COMPANY

1. Clean the covers in solvent.
2. Inspect the left side cover output shaft bushing (3) for damage or excessive wear.
3. Inspect the covers for the following conditions:
 - Damage to the D-ring seal surface (1)
 - Damage to the axle shaft seal bores (2)
 - Restrictions within the internal oil passages
 - Porosity
 - Dents or damage to the exterior of the rear cover that may create interference with the pinion shaft

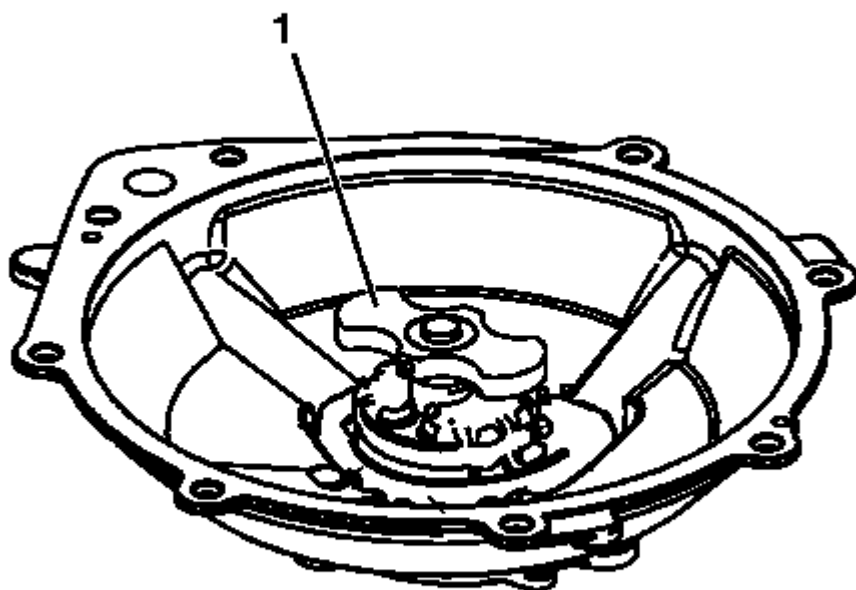


Fig. 99: Pump Assembly

Courtesy of GENERAL MOTORS COMPANY

4. Inspect the pump assembly (1) for damage, if applicable. The pump should turn freely without noise.

Differential Pinion Cleaning and Inspection

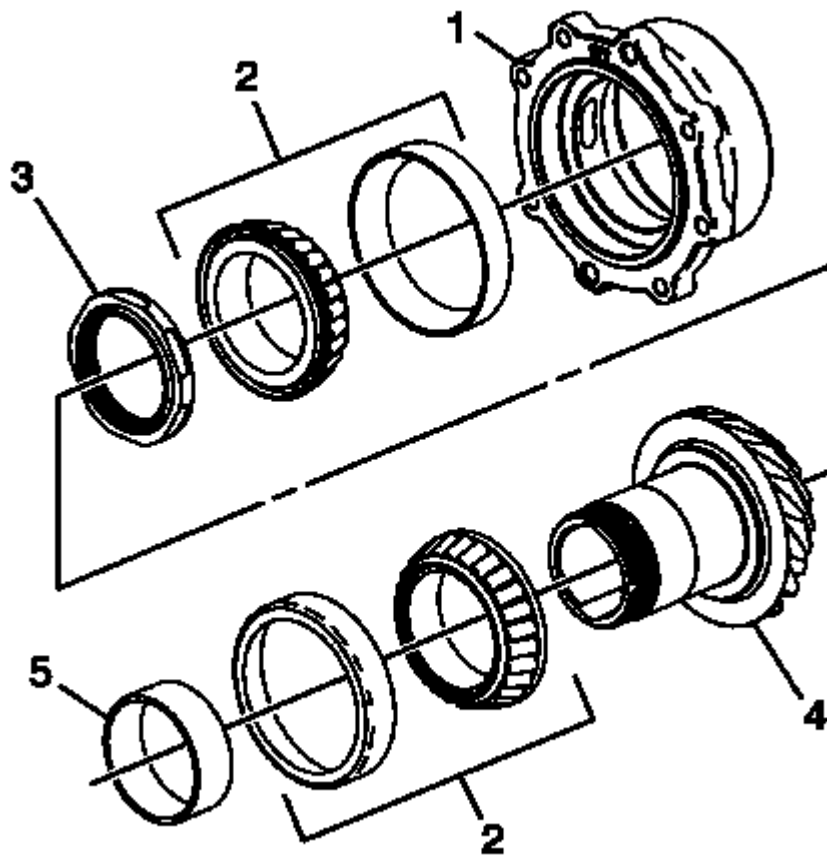


Fig. 100: Nut Threads And Pinion Gear Bearing Spacer
Courtesy of GENERAL MOTORS COMPANY

1. Clean the pinion components in solvent.
2. Inspect for the following conditions:
 - Damage to the nut threads (3)
 - Worn or scored bearings (2)
 - The pinion gear bearing housing (1) for damaged bolt holes, broken flanges, restrictions within the oil passages, worn or loose bearing races and/or race bores
 - The pinion gear (4) for damaged threads, worn splines or worn or scored gear teeth
 - The pinion gear bearing spacer (5) for scoring or damage.

DIFFERENTIAL PINION GEAR SHIM SELECTION

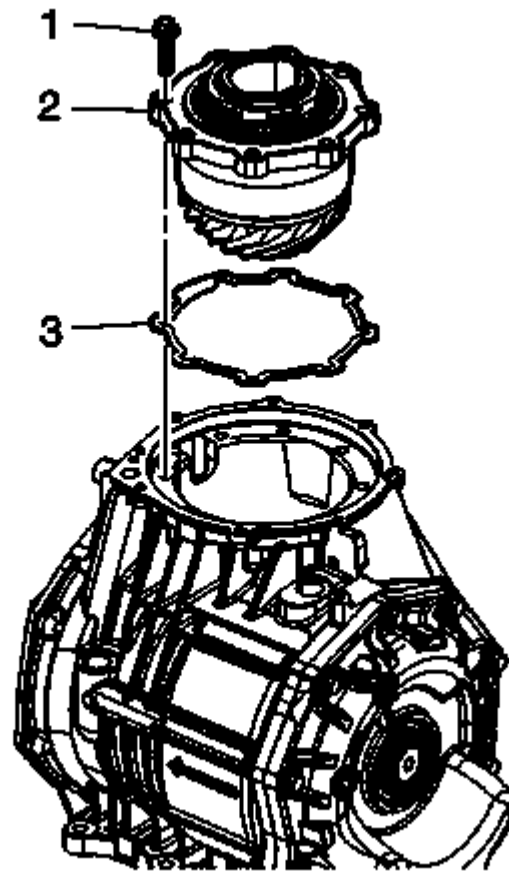


Fig. 101: Rear Axle Components As Necessary
Courtesy of GENERAL MOTORS COMPANY

1. Disassemble the rear axle components as necessary. Refer to **Rear Axle Disassemble**.
2. Use a medium stiff brush in order to sparingly apply gear marking compound to all the ring gear teeth. Refer to **Adhesives, Fluids, Lubricants and Sealers**.
3. Install the original pinion shim (3), pinion gear housing assembly (2) and pinion gear housing bolts (1).
4. Tighten the pinion gear housing bolts (1) to 25 N.m (18 lb ft).
5. Rotate the pinion gear so that the ring gear rotates 3 full revolutions.
6. Rotate the pinion gear in the opposite direction so that the ring gear rotates 3 full revolutions in the opposite direction.
7. Remove the pinion gear housing bolts (1), pinion gear housing assembly (2) and pinion shim (3).
8. Observe the pattern on the ring gear teeth. Refer to **Gear Tooth Contact Pattern Inspection**.
9. Adjust the pinion depth accordingly by using the appropriate pinion gear shim. Refer to **Rear Axle Specifications**.
10. Repeat steps 2 - 9 using the selected pinion gear shim until the correct contact pattern is achieved.

11. When the correct contact pattern is achieved, use a suitable solvent to clean the ring gear of gear marking compound. Carefully clean each tooth of the ring gear and air dry all parts.
12. Assemble the rear axle components as necessary. Refer to **Rear Axle Assemble**.

DIFFERENTIAL CASE ASSEMBLE (MLSD)

Differential Case (Plain Half) Assemble

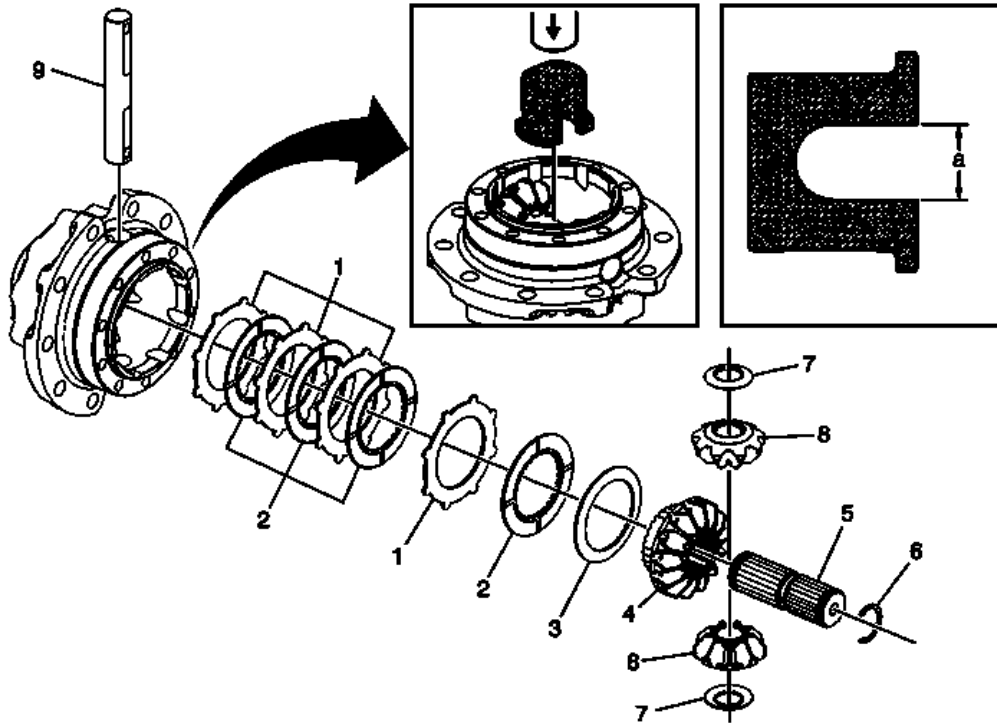


Fig. 102: Differential Case (Plain Half) Assemble
Courtesy of GENERAL MOTORS COMPANY

Differential Case (Plain Half) Assemble

Callout	Component Name
1	Differential Clutch Disc - Steel
2	Differential Clutch Disc - Friction
3	Locking Differential Clutch Disc Thrust Washer
4	Differential Side Gear
5	Rear Axle Shaft (RH Output)
6	Rear Axle Shaft Bearing Retaining Ring
7	Differential Pinion Gear Thrust Washer
8	Differential Pinion Gear
	Differential Pinion Gear Shaft
	Procedure

the pinion gear shaft.

NOTE:

The inner diameter of DT-42162-A compressor must be increased to 21.3 mm (0.084 in) (a) using a hand held grinder. Once the necessary dimension is reached, paint the exposed metal to prevent corrosion.

Special Tools

DT-42162-A Axle Side Gear Compressor - Modified
For equivalent regional tools, refer to **Special Tools**.

Differential Case (Flanged Half) Assemble

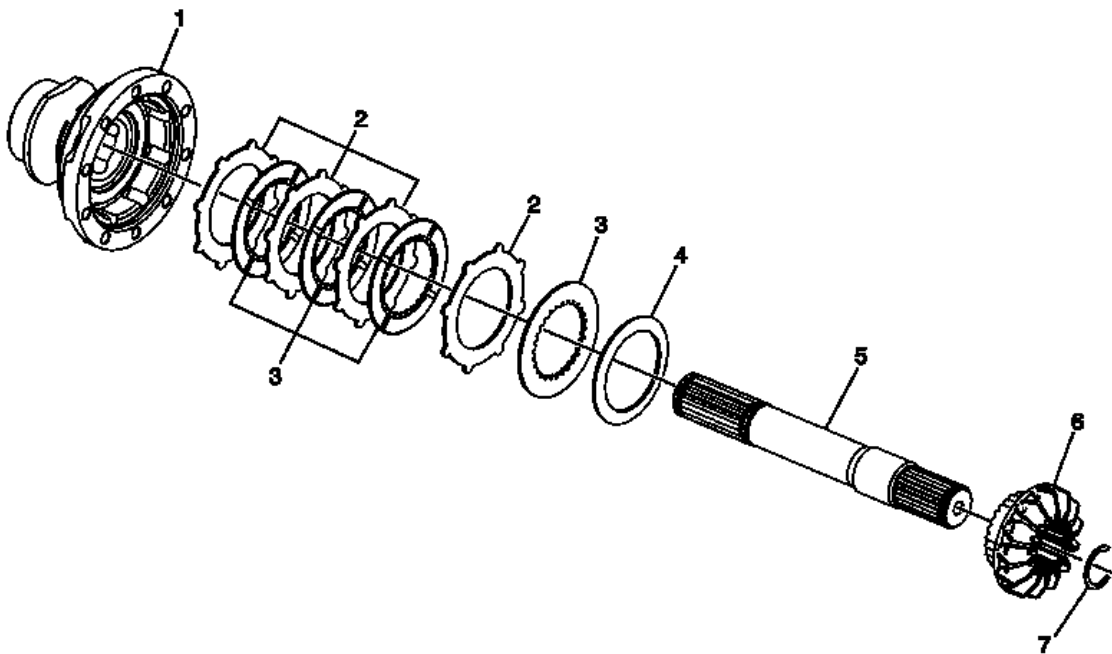


Fig. 103: Differential Case (Flanged Half) Assemble
Courtesy of GENERAL MOTORS COMPANY

Differential Case (Flanged Half) Assemble

Callout	Component Name
1	Differential Case (Flanged Half)
2	Differential Clutch Disc - Steel
3	Differential Clutch Disc - Friction
4	Locking Differential Clutch Disc Thrust Washer
5	Rear Axle Shaft (LH Output)
6	Differential Side Gear

7

Rear Axle Shaft Bearing Retaining Ring

Procedure

Compress the clutch pack using **DT-42162-A** compressor and install the retaining ring.

Special Tools

DT-42162-A Axle Side Gear Compressor

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

Differential Case Assemble

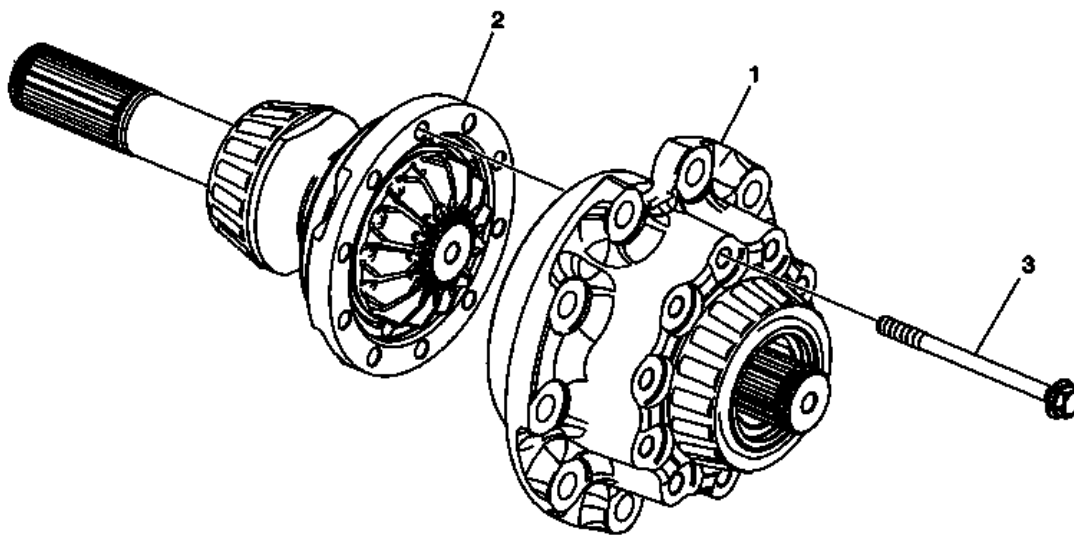


Fig. 104: Differential Case Assemble
Courtesy of GENERAL MOTORS COMPANY

Differential Case Assemble

Callout	Component Name
1	Differential Case (Plain Half)
2	Differential Case (Flanged Half)
3	Differential Case Bolt M8 x 105 (Qty: 10) CAUTION: Refer to <u>Fastener Caution</u> . NOTE:

Tighten
35 N.m (26 lb ft)

Differential Ring Gear Installation

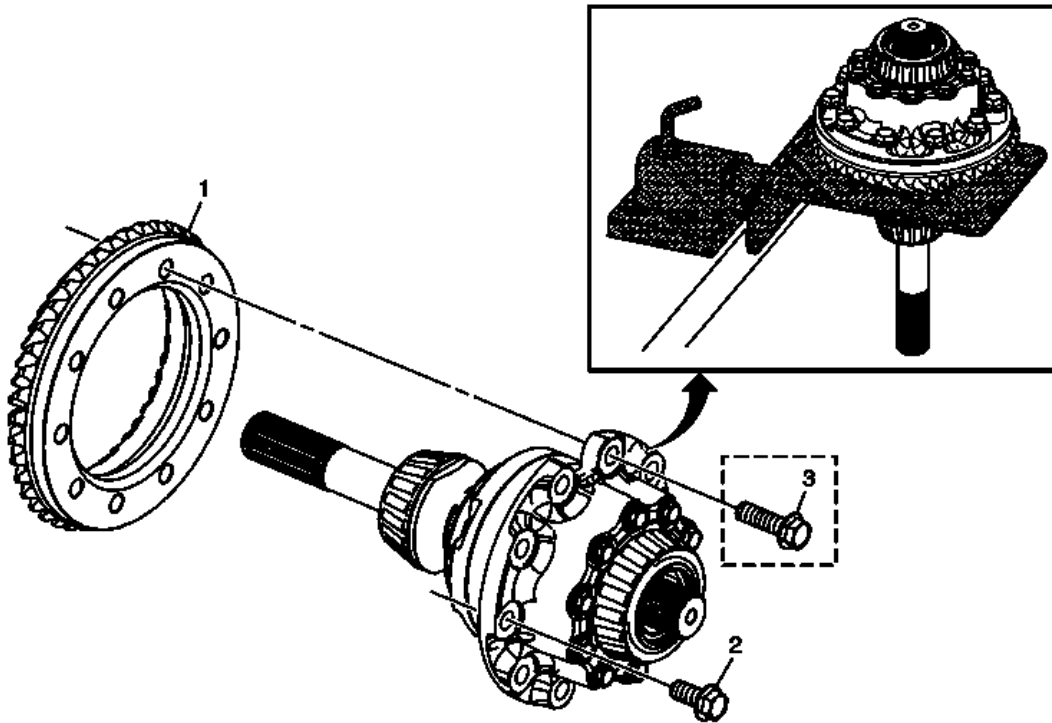


Fig. 105: Differential Ring Gear
Courtesy of GENERAL MOTORS COMPANY

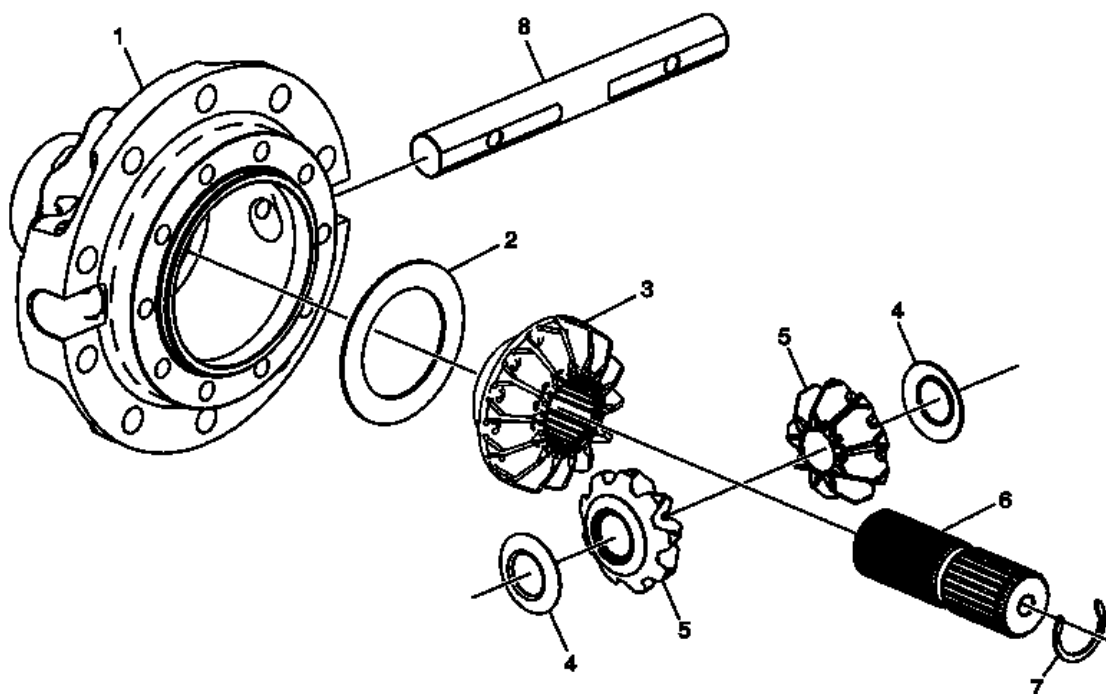
Differential Ring Gear Installation

Callout	Component Name
1	Differential Ring Gear
2	Differential Ring Gear Bolt M12 x 27 M12 x 27 (Qty: 10 - 2.56 & 2.73 ratio) (Qty: 6 - 3.42 ratio) Procedure 1. Apply threadlocker to the bolts. Refer to <u>Adhesives, Fluids, Lubricants and Sealers</u>. 2. Place the differential assembly into DT-03289-20 fixture to hold it in place while installing the bolts. NOTE:

	Special Tools • DT-03289-20 Holding Fixture • DT-42173-A Differential Holding Fixture For equivalent regional tools, refer to <u>Special Tools</u>. Tighten 145 N.m (107 lb ft)
3	Differential Ring Gear Bolt M12 x 41.5 (Qty: 4 - 3.42 ratio) Procedure Apply threadlocker to the bolts. Refer to <u>Adhesives, Fluids, Lubricants and Sealers</u>. NOTE: Install NEW bolts. Tighten 145 N.m (107 lb ft)

DIFFERENTIAL CASE ASSEMBLE (ELSD)

Differential Case (Plain Half) Assemble



Courtesy of GENERAL MOTORS COMPANY

Differential Case (Plain Half) Assemble

Callout	Component Name
1	Differential Case (Plain Half)
2	Locking Differential Clutch Disc Thrust Washer
3	Differential Pinion Gear
4	Differential Pinion Gear Thrust Washer
5	Differential Side Gear
6	Rear Axle Shaft (RH Output)
7	Rear Axle Shaft Bearing Retaining Ring
8	Differential Pinion Gear Shaft

Differential Case (Flanged Half) Assemble

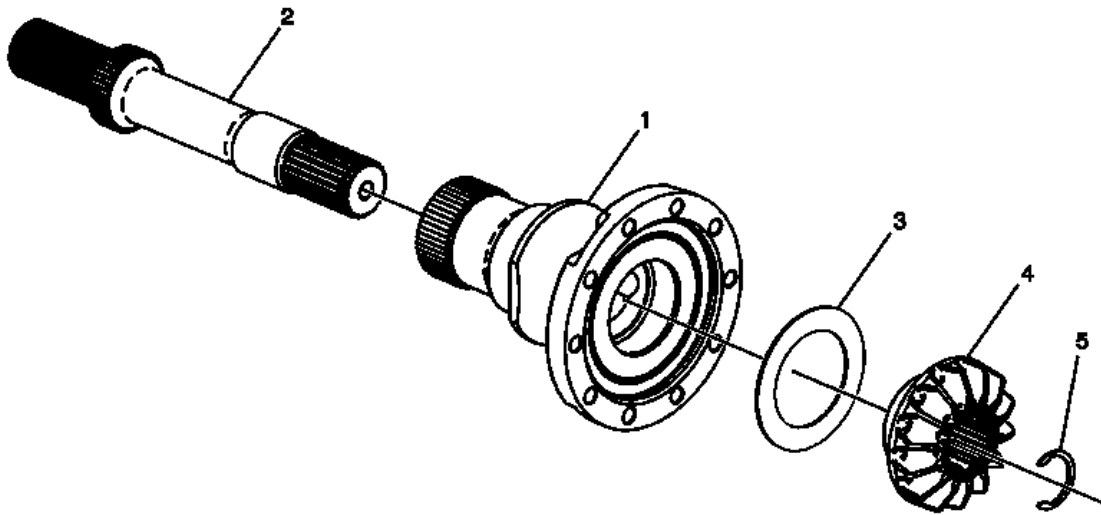


Fig. 107: Differential Case (Flanged Half)
Courtesy of GENERAL MOTORS COMPANY

Differential Case (Flanged Half) Assemble

Callout	Component Name
1	Differential Case (Flanged Half)
2	Rear Axle Shaft (LH Output)
3	Locking Differential Clutch Disc Thrust Washer
4	Differential Side Gear

Differential Case Assemble

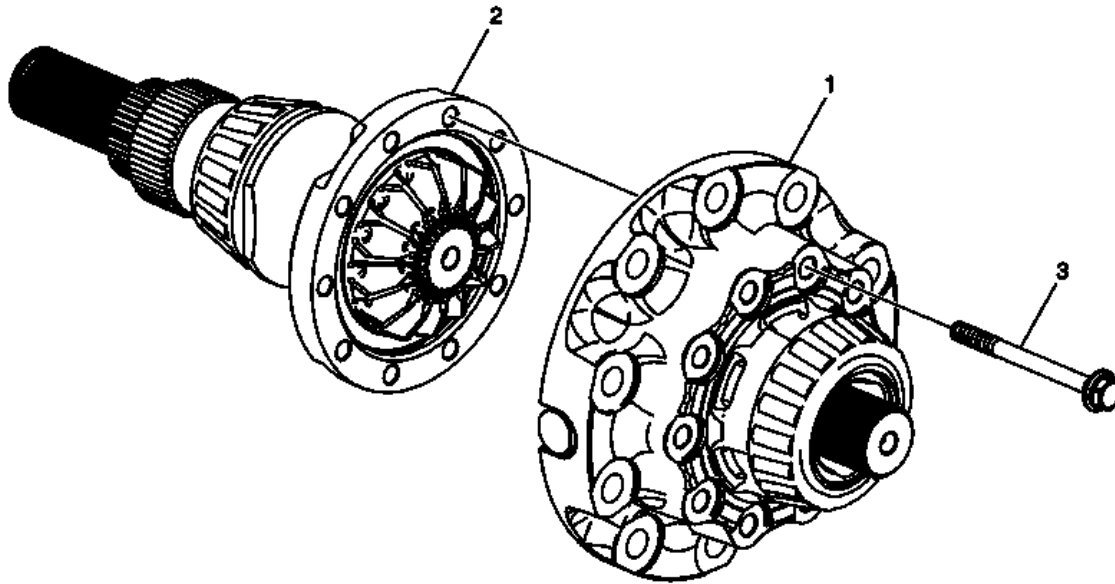


Fig. 108: Differential Case
 Courtesy of GENERAL MOTORS COMPANY

Differential Case Assemble

Callout	Component Name
1	Differential Case (Plain Half)
2	Differential Case (Flanged Half)
3	Differential Case Bolt M8 x 105 (Qty: 10) CAUTION: Refer to <u>Fastener Caution</u> . NOTE: Install NEW bolts. Tighten 35 N.m (26 lb ft)

Differential Ring Gear Installation

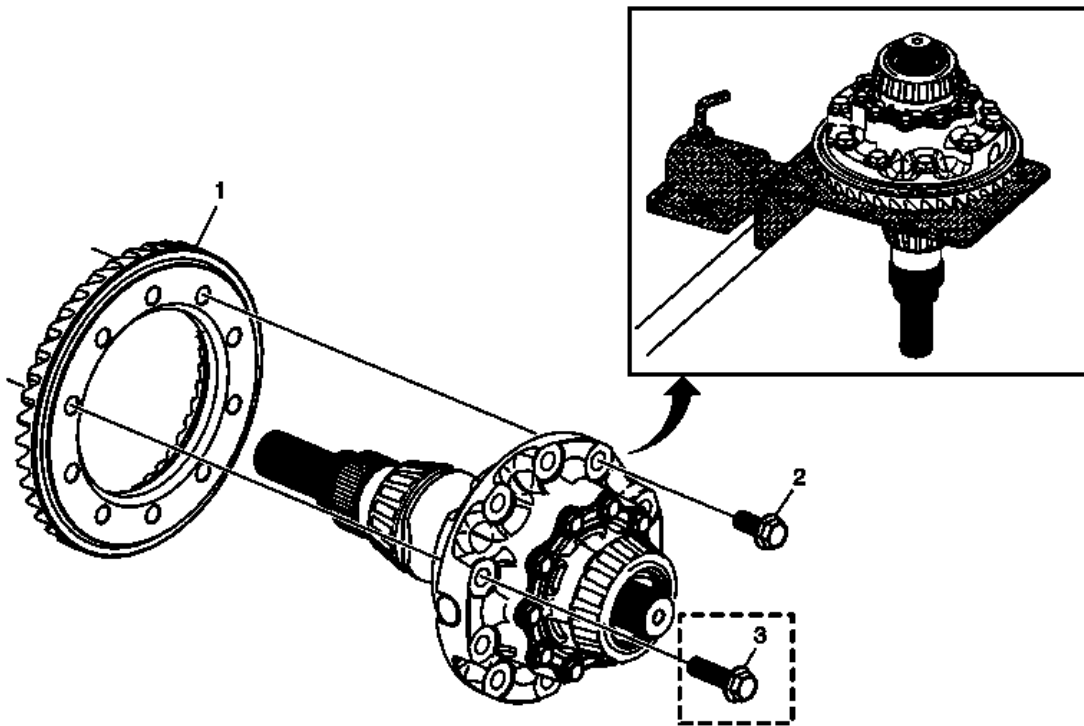


Fig. 109: Differential Ring Gear
 Courtesy of GENERAL MOTORS COMPANY

Differential Ring Gear Installation

Callout	Component Name
1	Differential Ring Gear
2	Differential Ring Gear Bolt M12 x 27 M12 x 27 (Qty: 10 - 2.56 & 2.73 ratio) (Qty: 6 - 3.42 ratio) Procedure 1. Apply threadlocker to the bolts. Refer to <u>Adhesives, Fluids, Lubricants and Sealers</u>. 2. Place the differential assembly into DT-03289-20 fixture to hold it in place while installing the bolts. NOTE: Install NEW bolts. Special Tools • DT-03289-20 Holding Fixture • DT-42173-A Differential Holding Fixture

	For equivalent regional tools, refer to Special Tools . Tighten 145 N.m (107 lb ft)
3	Differential Ring Gear Bolt M12 x 41.5 (Qty: 4 - 3.42 ratio) Procedure Apply threadlocker to the bolts. Refer to Adhesives, Fluids, Lubricants and Sealers . NOTE: Install NEW bolts. Tighten 145 N.m (107 lb ft)

DIFFERENTIAL DRIVE PINION GEAR BEARING HOUSING ASSEMBLE

Pinion Gear Bearing Housing Assemble

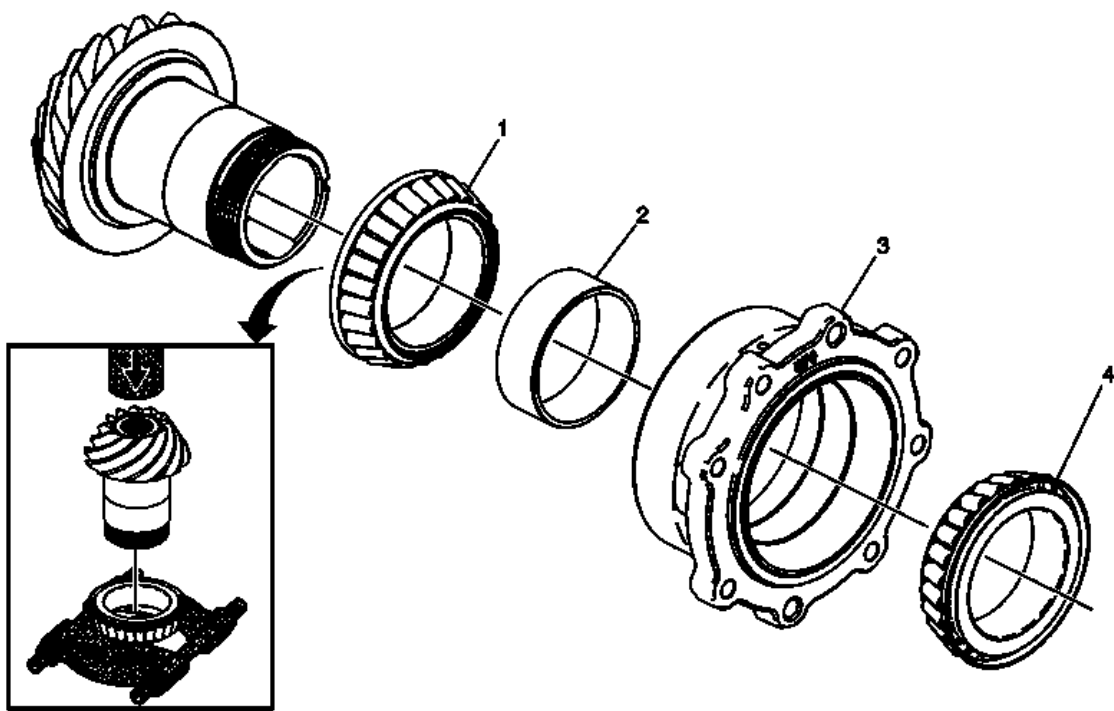


Fig. 110: Pinion Gear Bearing Housing
Courtesy of GENERAL MOTORS COMPANY

Pinion Gear Bearing Housing Assemble

Callout	Component Name

1	Procedure Use DT-22912-B split plate and a press to install the bearing.
	Special Tools DT-22912-B Split Plate Bearing Puller For equivalent regional tools, refer to Special Tools .
2	Differential Drive Pinion Gear Bearing Spacer
3	Differential Drive Pinion Gear Bearing Housing
4	Differential Drive Pinion Gear Outer Bearing

Pinion Gear Bearing Retaining Nut Installation

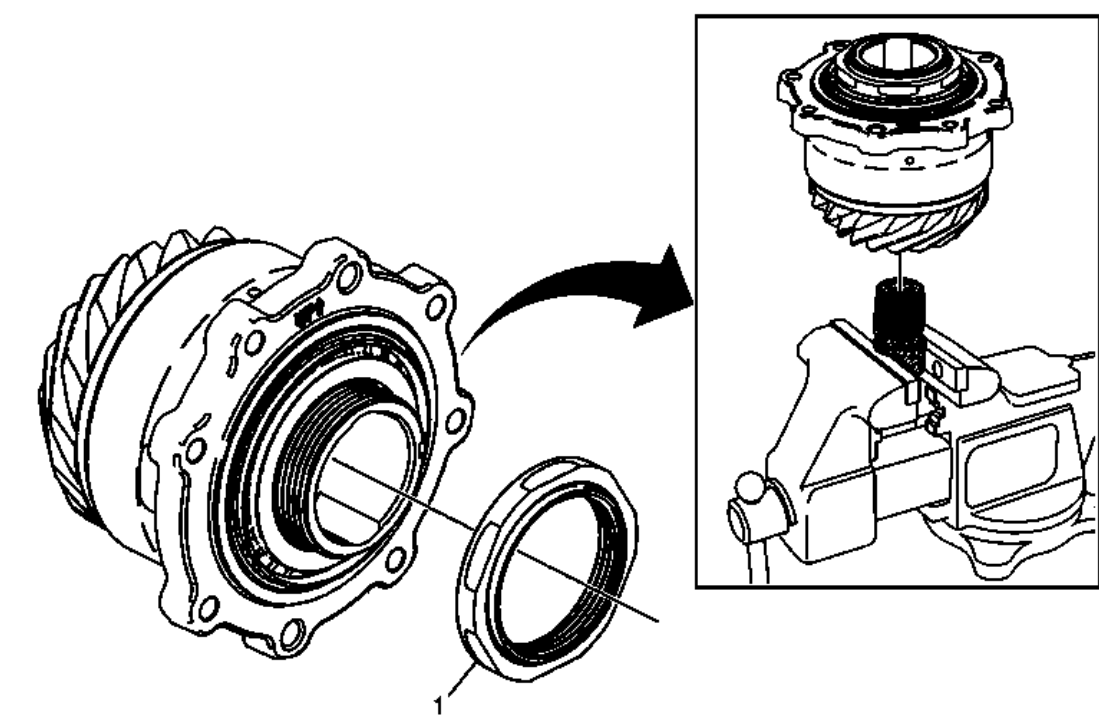


Fig. 111: Pinion Gear Bearing Retaining Nut
Courtesy of GENERAL MOTORS COMPANY

Pinion Gear Bearing Retaining Nut Installation

Callout	Component Name
	Differential Drive Pinion Gear Bearing Retaining Nut
	CAUTION: Refer to Fastener Caution .
	Procedure 1. Use a bench vise and DT-48007 holder in the splines of the pinion gear to

1

2. Use a 3 3/8 in socket to install the retaining nut.
3. Stake the retaining nut after torquing to specification.

NOTE:

Use a **NEW** retaining nut.

Special Tools

DT-48007 Spline Holder

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

Tighten

680 N.m (502 lb ft)

REAR AXLE ASSEMBLY

Differential Carrier Cover Bearing Cup Installation

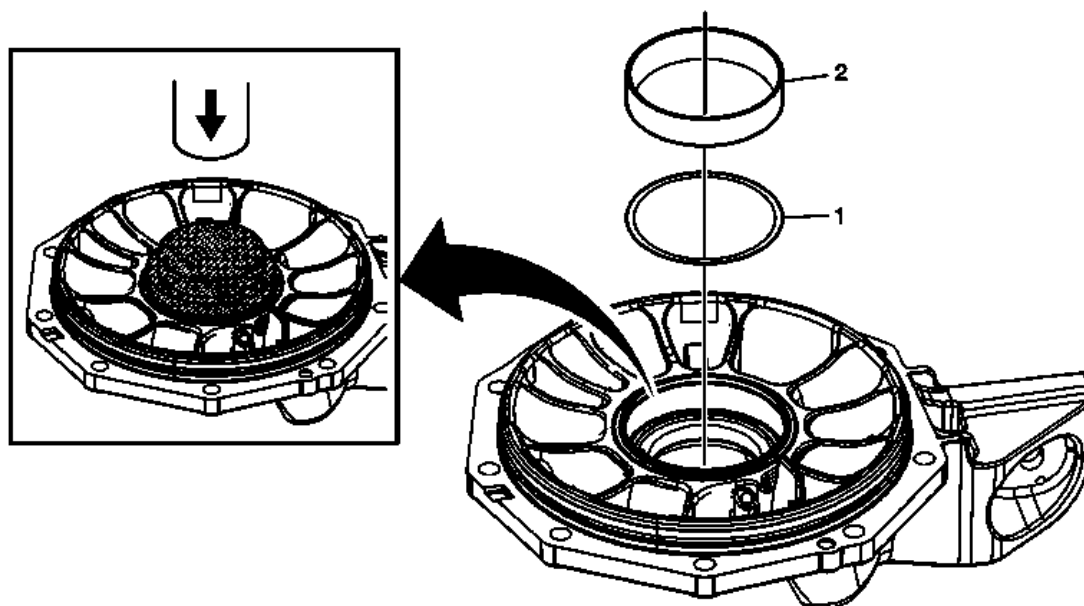


Fig. 112: Differential Carrier Cover Bearing Cup

Courtesy of GENERAL MOTORS COMPANY

Differential Carrier Cover Bearing Cup Installation

Callout	Component Name
1	Differential Bearing Shim - Selective
	Differential Bearing Cup

Differential Carrier Housing Bearing Cup Installation

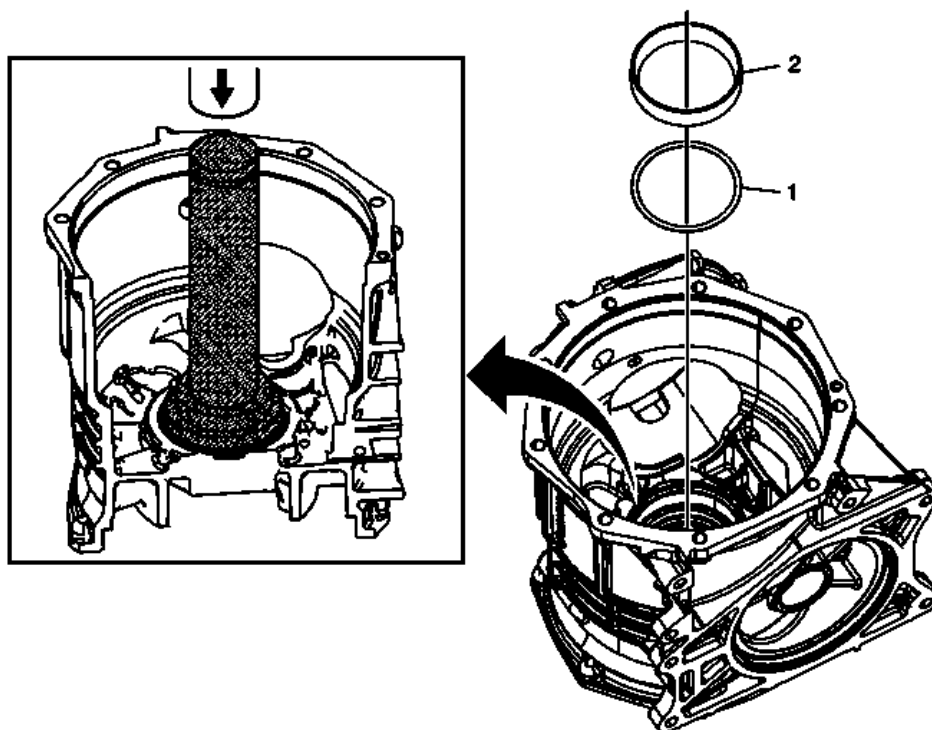


Fig. 113: Differential Carrier Housing Bearing Cup
Courtesy of GENERAL MOTORS COMPANY

Differential Carrier Housing Bearing Cup Installation

Callout	Component Name
1	Differential Bearing Shim - Selective
	Differential Bearing Cup
	Special Tools
2	• DT-5590 Bearing Installer • DT-45010 Axle Bearing Race Installer
	For equivalent regional tools, refer to Special Tools .

Differential Case Assembly Installation

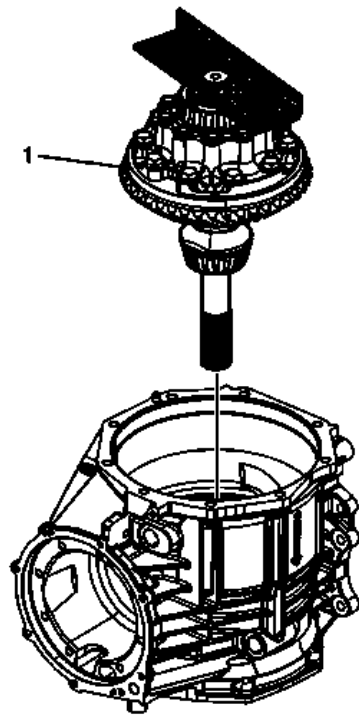


Fig. 114: Differential Case Assembly
Courtesy of GENERAL MOTORS COMPANY

Differential Case Assembly Installation

Callout	Component Name
1	Differential Case Assembly Special Tools DT-42155 Axle Differential Housing Lifting Tool For equivalent regional tools, refer to Special Tools .

Differential Carrier Cover Installation

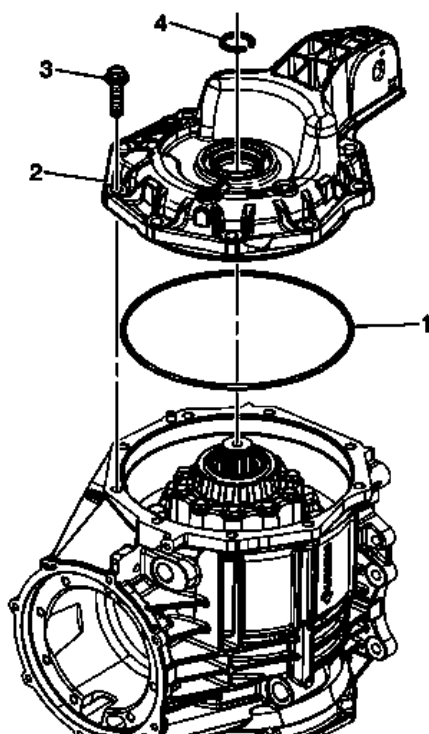


Fig. 115: Differential Carrier Cover
 Courtesy of GENERAL MOTORS COMPANY

Differential Carrier Cover Installation

Callout	Component Name
1	Differential Carrier Cover Seal (RH D-ring) NOTE: Install a NEW seal.
2	Differential Carrier Cover (RH)
3	Differential Carrier Cover Bolt M10 x 40 (Qty: 9) CAUTION: Refer to Fastener Caution . Procedure Tighten the bolts in two passes. 1. Tighten the bolts a first pass to 38 N.m (28 lb ft). 2. Tighten the bolts a final pass to 70 N.m (52 lb ft) NOTE: Install NEW bolts.

Differential Drive Pinion Gear Bearing Housing and Gear Assembly Installation

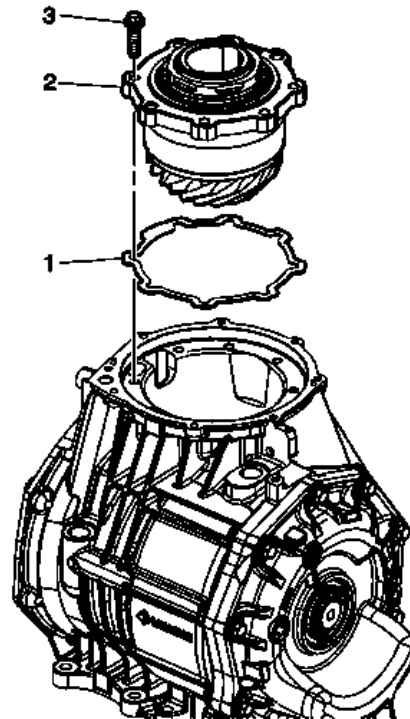


Fig. 116: Differential Drive Pinion Gear Bearing Housing and Gear Assembly
Courtesy of GENERAL MOTORS COMPANY

Differential Drive Pinion Gear Bearing Housing and Gear Assembly Installation

Callout	Component Name
1	Differential Pinion Gear Shim - Selective
2	Differential Drive Pinion Gear Bearing Housing and Gear Assembly
3	Differential Drive Pinion Gear Bearing Housing Bolt (Qty: 8) NOTE: Install NEW bolts. Tighten 25 N.m (18 lb ft)

Rear Axle Housing Cover Installation

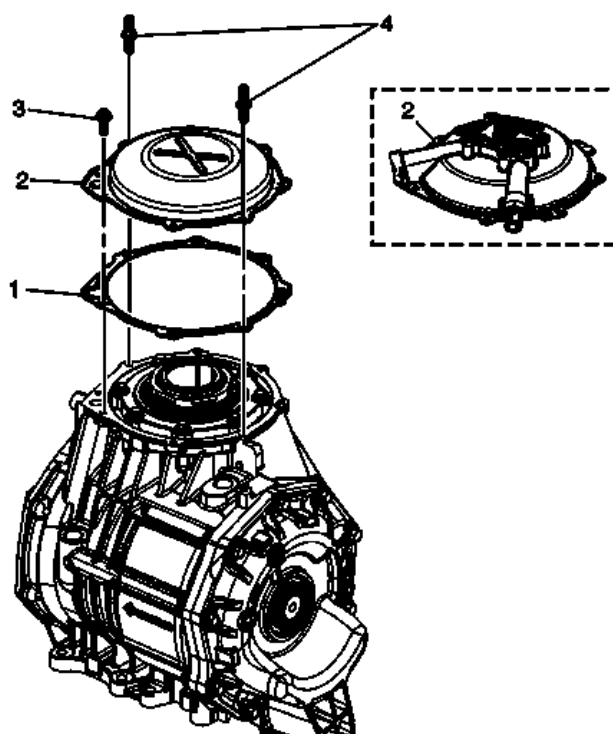


Fig. 117: Rear Axle Housing Cover
 Courtesy of GENERAL MOTORS COMPANY

Rear Axle Housing Cover Installation

Callout	Component Name
1	Rear Axle Housing Cover Gasket NOTE: The gasket is reusable up to 3 times. Inspect the gasket and replace as required.
2	Rear Axle Housing Cover - Model Dependent
3	Differential Carrier Cover Bolt M6 x 20 (Qty: 6) NOTE: Install NEW bolts. Tighten 7 N.m (62 lb in)
4	Differential Carrier Stud M6 x 42 (Qty: 2) NOTE: Install NEW bolts.

7 N.m (62 lb in)

Rear Axle Housing Cover Installation

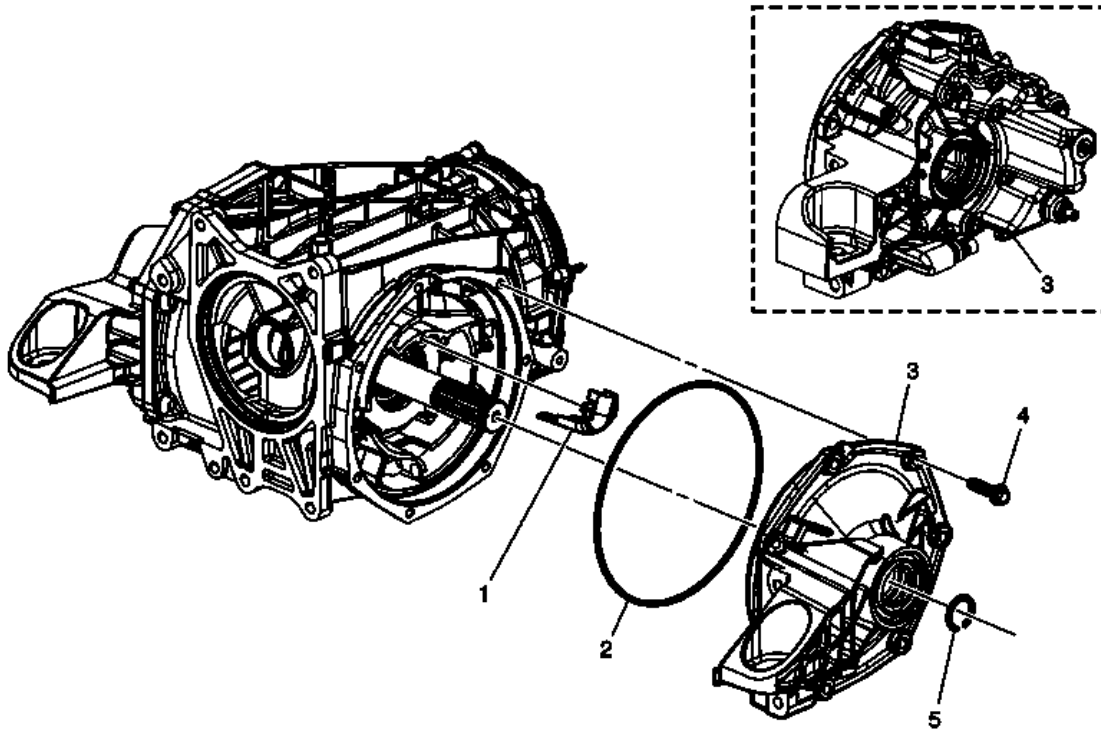


Fig. 118: Rear Axle Housing Cover
Courtesy of GENERAL MOTORS COMPANY

Rear Axle Housing Cover Installation

Callout	Component Name
1	Differential Oil Trough - Model Dependent
2	Differential Carrier Cover Seal (LH D-ring) NOTE: Install a NEW seal..
3	Rear Axle Housing Cover - Model Dependent
4	Rear Axle Housing Cover Bolt M8 x 35 (Qty: 7) NOTE: Install NEW bolts. Tighten 28 N.m (21 lb ft)
5	Rear Axle Shaft Lock

Rear Axle Housing Drain and Fill Plug Installation

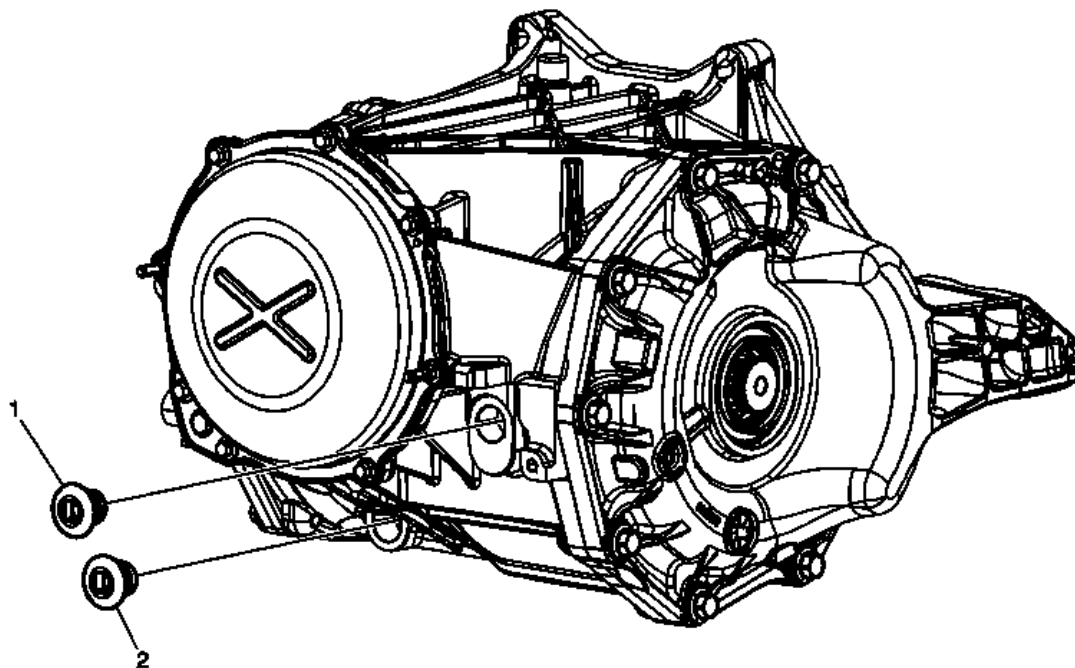


Fig. 119: Rear Axle Housing Drain and Fill Plug
Courtesy of GENERAL MOTORS COMPANY

Rear Axle Housing Drain and Fill Plug Installation

Callout	Component Name
1	Rear Axle Housing Fill Plug Tighten 27 N.m (20 lb ft)
2	Rear Axle Housing Drain Plug Tighten 27 N.m (20 lb ft)

BACKLASH ADJUSTMENT

Special Tools

DT-8001 Dial Indicator Set

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

NOTE: The following adjustment procedure applies to both left and right differential bearings.

2. The difference between the backlash at all the measuring points should not vary by more than 0.05 mm (0.002 in).
3. If the difference between the backlash at all of the measuring points varies by more than 0.05 mm (0.002 in), inspect for the following conditions:
 - Burrs
 - A distorted case flange
 - Uneven bolting
4. The backlash should be 0.127 - 0.229 mm (0.005 - 0.009 in).
5. If the backlash is within specifications, proceed to step 13.
6. If the backlash is not within specifications, proceed to step 7.

NOTE:

- **Adjust the thickness of the shim pack on each side of the differential in equal amounts. This will maintain the correct axle side bearing preload.**
- **Moving 0.05 mm (0.002 in) of shim thickness from one side of the differential to the other will change the backlash adjustment approximately 0.03 mm (0.001 in)**

7. Remove the differential bearing cups and shims as necessary. Refer to **Rear Axle Disassemble**.

NOTE: Measure each shim separately.

8. Measure the thickness of the left and right shim packs in 3 locations.

NOTE: The combined average shim measurement is the thickness for the shim pack.

9. Calculate the average of the 3 measurements for each shim.
10. Assemble a new shim pack of the appropriate size. Refer to **Rear Axle Specifications**.

NOTE: The service shim must be installed between the differential bearing cup and the differential carrier housing or carrier cover (RH).

11. Install the new shims and bearing cups as necessary. Refer to **Rear Axle Assemble**.
12. Recheck the backlash and adjust if necessary.
13. Once backlash is correct, perform a gear tooth contact pattern check in order to ensure proper alignment between the ring gear and pinion. Refer to **Gear Tooth Contact Pattern Inspection**.

GEAR TOOTH CONTACT PATTERN INSPECTION

Use this method in order to verify the correct running position of the ring gear and the drive pinion.

Gear sets which are not positioned properly may be noisy and/or have a short life span. A pattern check ensures that when best contact has been obtained between the ring gear and the drive pinion, the system will produce low noise and have a long life.

Drive Pinion and Ring Gear Identification

Production drive pinion and ring gears are manufactured by using a 2-cut or a 5-cut method. The 2-cut drive pinions and ring gears can be identified by having a groove cut into the outside edge of the ring gear and a ring on the stem of the drive pinion. The gear tooth contact patterns that are produced from each style of gear set differ slightly. A 2-cut gear will produce a pattern that is bias from the toe to the heel of the tooth (drive side), while a 5-cut gear set will produce a square pattern from the toe to the heel of the tooth (drive side). When diagnosing the gear tooth contact pattern, regardless of what type of gear set it is, a correct pattern will be centered within the area of the tooth, from toe to heel and from top to bottom.

Gear Tooth Nomenclature

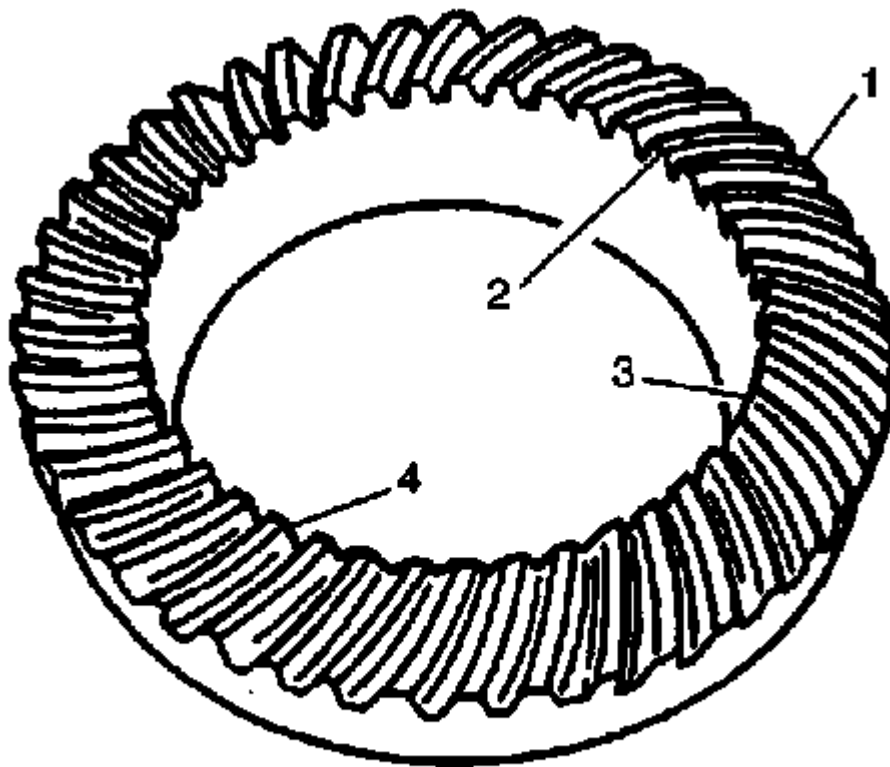


Fig. 120: Defining Gear Tooth Nomenclature
Courtesy of GENERAL MOTORS COMPANY

The side of the ring gear tooth which curves outward or is convex, is the drive side (4). The concave side is the coast side (3). The end of the tooth nearest the center of the ring gear is the toe end (2).

The end of the tooth farthest away from the center is the heel end (1).

Adjustments Affecting Tooth Contact

The following 2 adjustments affect the tooth contact pattern:

- Backlash adjustment
- Pinion depth adjustment

The effects of bearing preloads are not readily apparent on hand-loaded tooth contact pattern tests. However, bearing preloads should be within specifications before proceeding with backlash and pinion depth adjustments.

Backlash Adjustment

The backlash can be adjusted by varying the thickness of the differential bearing shims from side to side. By adjusting the shim thickness the differential case and ring gear assembly will move closer to or further away from the pinion. In most cases, adjusting the backlash will correct an abnormal contact pattern. This adjustment will also be used to set the side bearing preload.

- If the thickness of the right shim is increased along with an equal decrease in the thickness of the left shim the backlash will increase.
- If the thickness of the left shim is increased along with an equal decrease in the thickness of the right shim the backlash will decrease.

Pinion Depth Adjustment

Adjust the position of the pinion by increasing or decreasing the distance between the pinion head and the centerline of the ring gear by varying the thickness of the differential pinion shim. Decreasing the distance moves the pinion closer to the centerline of the ring gear. Increasing the distance moves the pinion farther away from the centerline of the ring gear.

Testing Procedure

1. Wipe clean the differential case, the ring gear and the differential carrier housing of lubricant. Carefully clean each tooth of the ring gear.

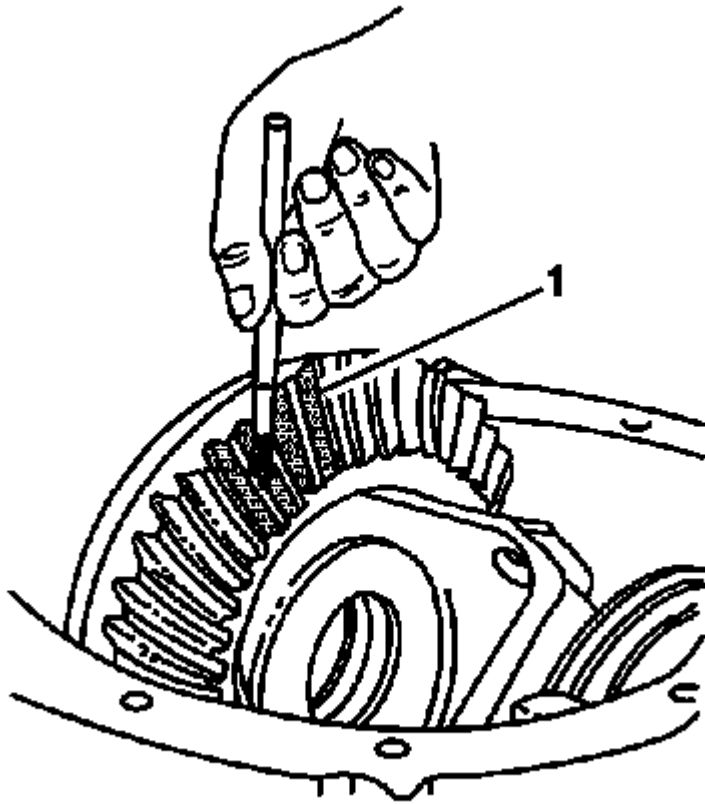


Fig. 121: Applying Gear Marking Compound To Ring Gear Teeth
Courtesy of GENERAL MOTORS COMPANY

2. Use a medium stiff brush in order to sparingly apply gear marking compound to all of the ring gear teeth. Refer to **Adhesives, Fluids, Lubricants and Sealers**.

NOTE: Performing a test without loading the gears will not produce a satisfactory pattern.

3. Using the appropriate tool, hold the ring gear until a torque load of 14 N.m (10 lb ft) is achieved in order to turn the pinion.

NOTE: Avoid turning the ring gear excessively.

4. Using a wrench, turn the differential pinion so that the ring gear rotates 3 full revolutions.
5. Turn the differential pinion in the opposite direction so that the ring gear rotates 3 full revolutions in the opposite direction.
6. Observe the pattern on the ring gear teeth. Compare the pattern with the following illustrations.
7. When correct contact pattern is achieved using a suitable solvent clean the differential case, the ring gear and the axle housing of gear marking compound. Carefully clean each tooth of the ring

gear and air dry all the parts.

Correct Contact Pattern

Condition

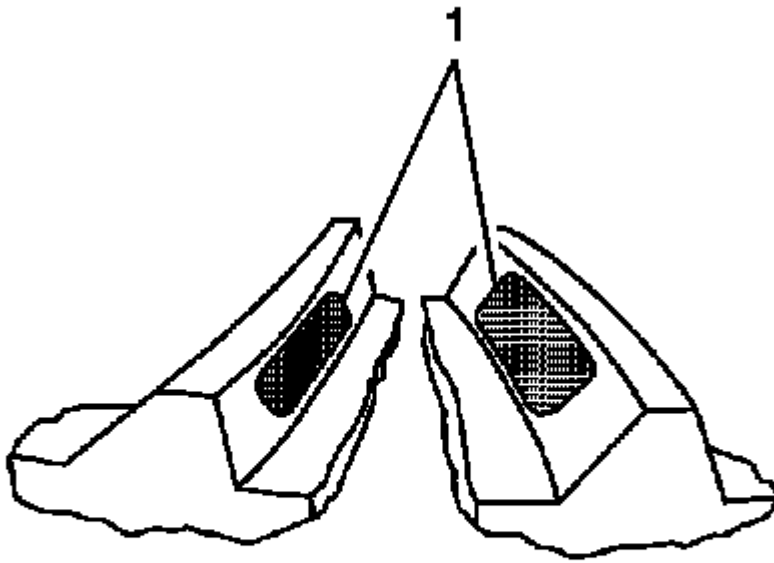


Fig. 122: Identifying Correct Gear Tooth Contact Pattern
Courtesy of GENERAL MOTORS COMPANY

The backlash and pinion depth is correct.

Correction

None required.

Service Hints

Loose bearings on the drive pinion or in the differential case may cause patterns that vary. If the contact pattern varies, inspect the following preload settings:

- Total assembly

- Differential case
- Pinion

If these settings are correct, inspect for damage or incorrectly assembled parts.

Drive Side Heel - Coast Side Toe Contact Pattern

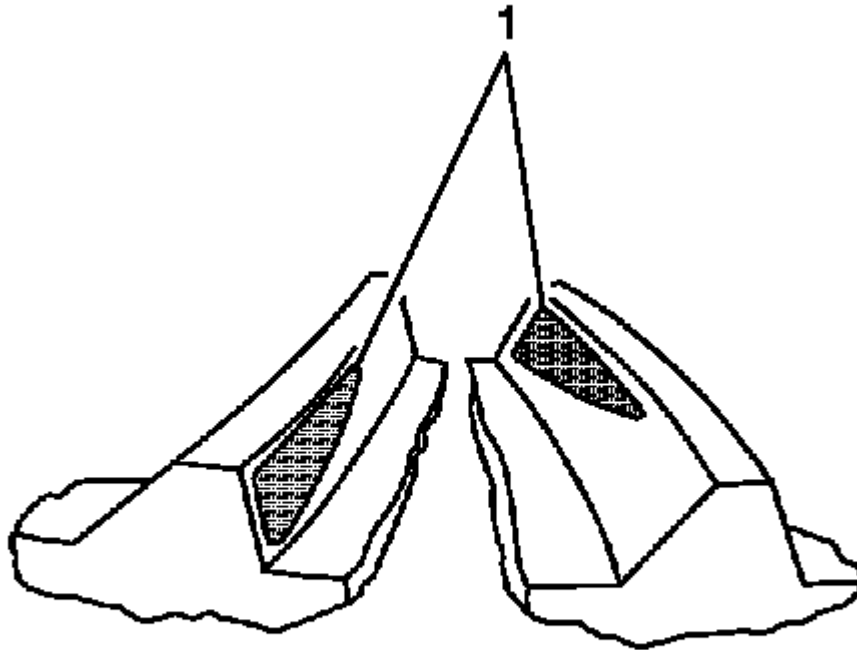


Fig. 123: Identifying Drive Side Heel - Coast Side Toe Contact Pattern
 Courtesy of GENERAL MOTORS COMPANY

Condition

The backlash is incorrect. The ring gear is too far away from the pinion.

Correction

Decrease the backlash. Move the ring gear closer to the pinion by adjusting the differential bearing shim thickness. Refer to **Backlash Adjustment**.

Drive Side Toe - Coast Side Heel Contact Pattern

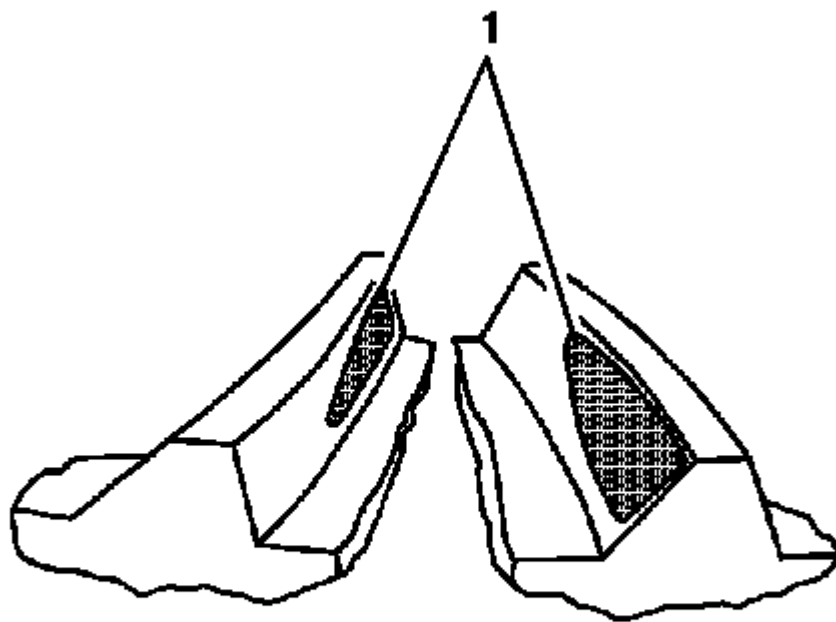


Fig. 124: Identifying Drive Side Toe - Coast Side Heel Contact Pattern
Courtesy of GENERAL MOTORS COMPANY

Condition

The backlash is incorrect. The ring gear is too close to the drive pinion.

Correction

Increase the backlash. Move the ring gear away from the pinion by adjusting the differential bearing shim thickness. Refer to **Backlash Adjustment**.

Drive Side Heel - Coast Side Heel Contact Pattern

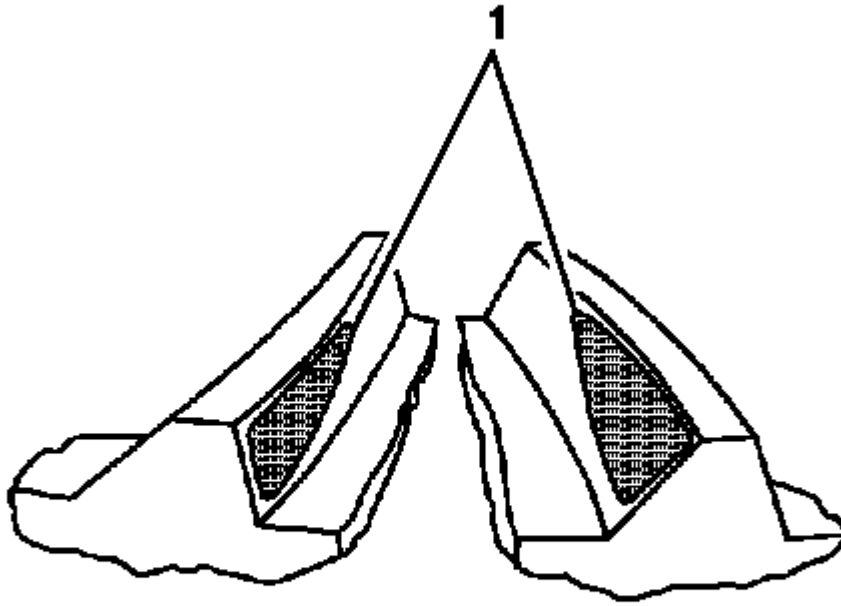


Fig. 125: Identifying Drive Side Heel - Coast Side Heel Contact Pattern
Courtesy of GENERAL MOTORS COMPANY

Condition

The backlash is incorrect. The ring gear is too far away from the pinion.

Correction

Decrease the backlash. Move the ring gear closer to the pinion by adjusting the differential bearing shim thickness. Refer to **Backlash Adjustment**.

Drive Side Toe - Coast Side Toe Contact Pattern

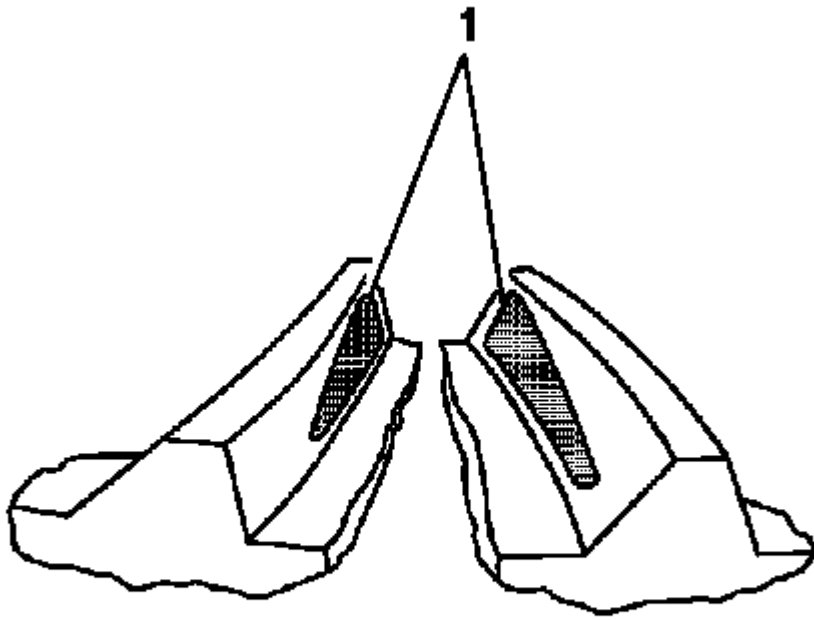


Fig. 126: Identifying Drive Side Toe - Coast Side Toe Contact Pattern
Courtesy of GENERAL MOTORS COMPANY

Condition

The backlash is incorrect. The ring gear is too close to the drive pinion.

Correction

Increase the backlash. Move the ring gear away from the pinion by adjusting the differential bearing shim thickness. Refer to **Backlash Adjustment**.

High Flank Contact Pattern

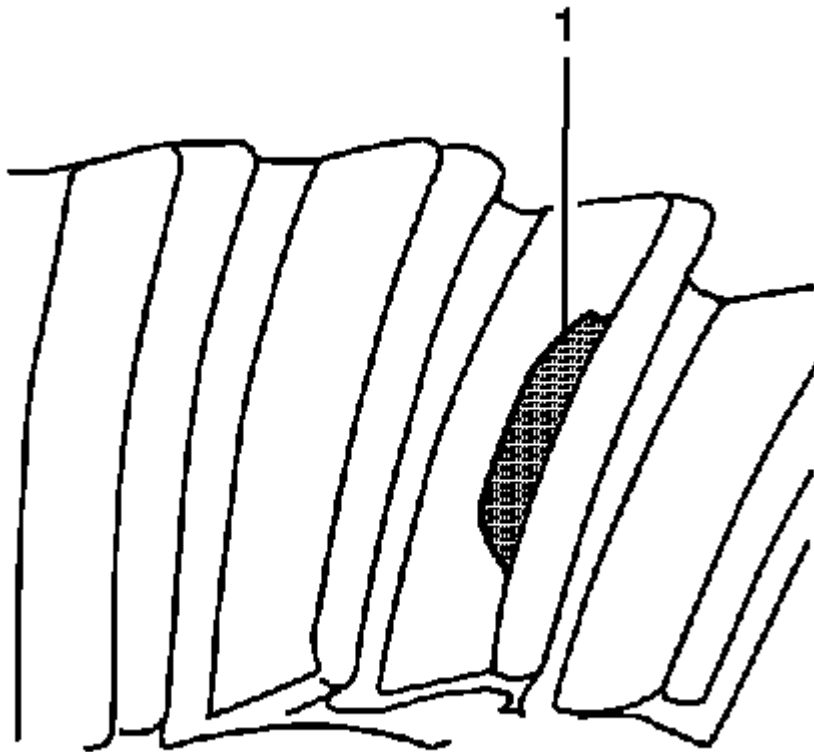


Fig. 127: Identifying High Flank Contact Pattern
Courtesy of GENERAL MOTORS COMPANY

Condition

The pinion depth is incorrect. The pinion gear is too far away from the ring gear.

Correction

Increase the pinion depth. Move the pinion gear closer to the ring gear by increasing the pinion shim thickness. Refer to **Differential Pinion Gear Shim Selection**.

Low Flank Contact Pattern

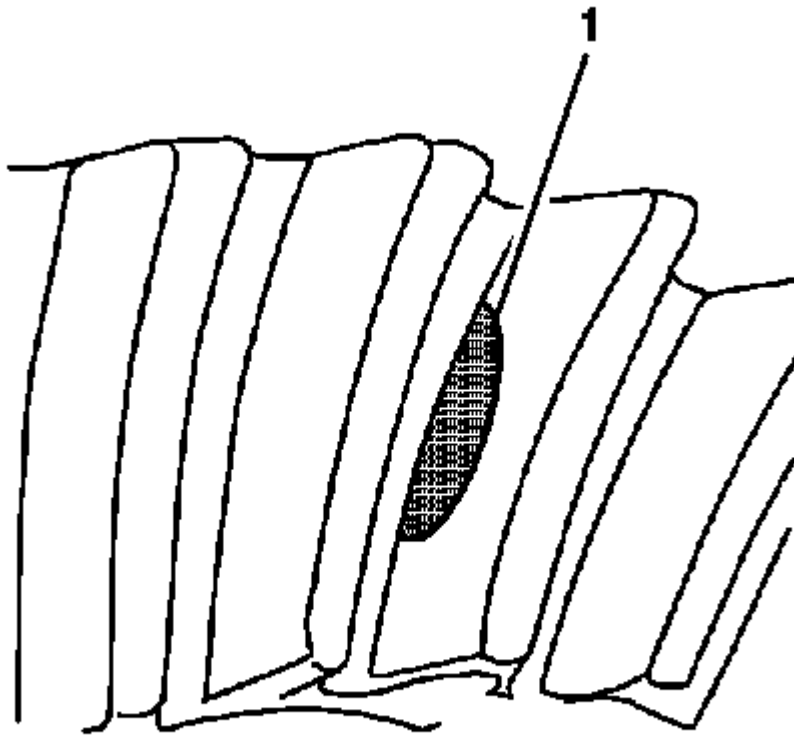


Fig. 128: Identifying Low Flank Contact Pattern
Courtesy of GENERAL MOTORS COMPANY

Condition

The pinion depth is incorrect. The pinion gear is too close to the ring gear.

Correction

Decrease the pinion depth. Move the pinion gear away from the ring gear by decreasing the pinion shim thickness. Refer to **Differential Pinion Gear Shim Selection**.

REAR DIFFERENTIAL HYDRAULIC SYSTEM SERVICE FILL/BLEED

Rear Differential Hydraulic System Service Fill/Bleed Procedure

The rear differential hydraulic system service bleed is used to remove air from the system, check for proper system and solenoid function and determine if full pressure can be achieved at the apply piston. Any time a rear differential hydraulic line is disconnected or any repairs are made, this procedure must be performed.

DT-51381 ELSD Air Bleed Adapter

1. Connect scan tool and check the rear differential clutch control module for any DTCs and perform repairs as necessary. The scan tool may not allow the hydraulic system service fill/bleed if certain DTCs are present.
2. Raise vehicle. Refer to **Lifting and Jacking the Vehicle** .
3. Remove the left rear tire and wheel assembly. Refer to **Tire and Wheel Removal and Installation** .
4. Remove the rear stabilizer shaft clamps and pull shaft backwards for clearance. Refer to **Stabilizer Shaft Replacement (with FE3 and FE4)** .

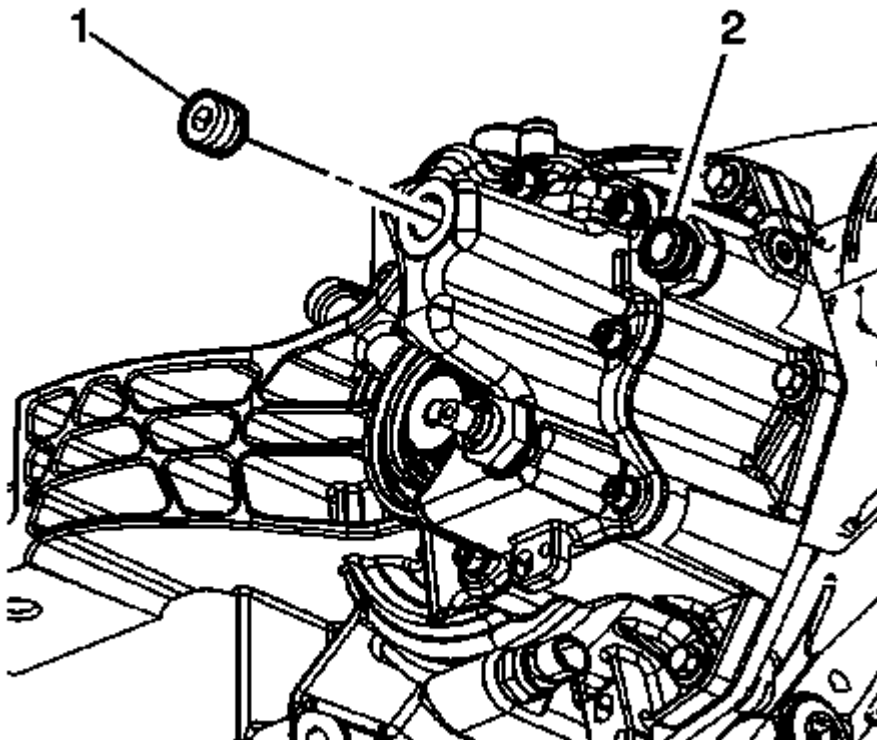


Fig. 129: High Pressure Line On Clutch Pack
Courtesy of GENERAL MOTORS COMPANY

- 5.
6. Disconnect high pressure line on the clutch pack (2). Refer to **Limited Slip Differential Clutch Pipe Connector Disconnection and Connection**
7. Attach the DT-51381 to the high pressure line. Lead the high pressure line to a drain pan.
8. Remove the fill plug (1). Refer to **Differential Clutch Oil Inspection**
9. Top off Rear Drive Clutch fill hole with the appropriate fluid. Refer to

Lubricants and Sealers

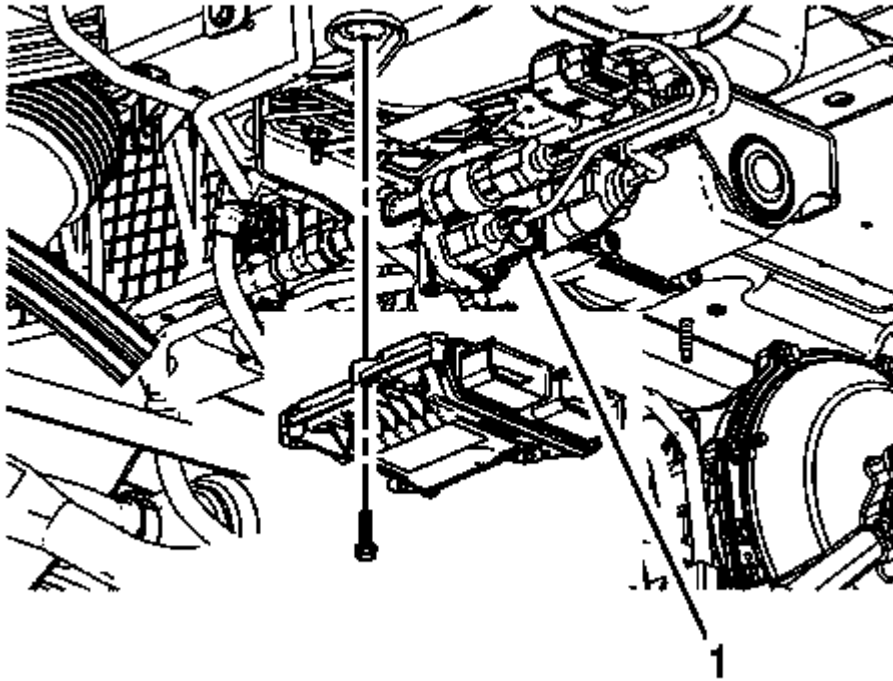


Fig. 130: Q49 Rear Differential Clutch Solenoid Valve
Courtesy of GENERAL MOTORS COMPANY

- 10.
11. Disconnect the Q49 Rear Differential Clutch Solenoid Valve (1).

WARNING: While engine is operating, the exhaust system will become extremely hot. To prevent burns avoid contacting a hot exhaust system.

12. Start engine.
13. Reconnect the Q49 Rear Differential Clutch Solenoid Valve.
14. From the scan tool menu, select Rear Differential Clutch Control Module, then select Control Functions, then Rear Differential Hydraulic Line Fill.

NOTE: Status will change to "Complete" when done.

15. Top off Rear Drive Clutch fill hole again with appropriate fluid and repeat Rear Differential

Hydraulic Line Fill with scan tool once more.

16. Turn engine off.
17. Remove DT-51381. Reattach high pressure line to clutch pack.
18. Top off Rear Drive Clutch fill hole again with appropriate fluid. Install fill plug
19. Reattach the rear stabilizer shaft clamps. Refer to **Stabilizer Shaft Replacement (with FE3 and FE4)**
20. Install the left rear tire and wheel assembly. Refer to **Tire and Wheel Removal and Installation**
21. Lower vehicle back down.
22. Restart engine.
23. From the scan tool menu, select Rear Differential Clutch Control Module, then select Control Functions, then Rear Differential Hydraulic System Service Bleed.

NOTE: **The Rear Differential Clutch Control Module can run this procedure up to 3 attempts to get a Pass. If this step does not pass, repeat procedure from step 2.**

NOTE: **Status will change to "Complete" when done.**

DESCRIPTION AND OPERATION

LIMITED SLIP DIFFERENTIAL DESCRIPTION AND OPERATION

Rear Drive Axle Block Diagram

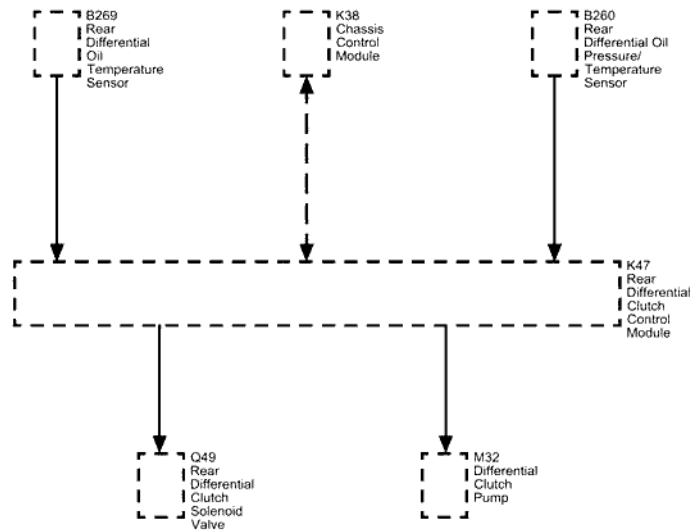


Fig. 131: Rear Drive Axle Block Diagram
 Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
HW	Hard-Wired
HW	Hard-Wired
HW	Hard-Wired
HW	Hard-Wired
DD	Serial Data - GMLAN High Speed
B269	Rear Differential Oil Temperature Sensor
X84	X84 Data Link Connector
B260	Rear Differential Oil Pressure/Temperature Sensor
K47	K47 Rear Differential Clutch Control Module
Q49	Q49 Rear Differential Clutch Solenoid Valve
M32	M32 Differential Clutch Pump

The rear differential clutch control module function is to control the electronic limited slip differential. The rear differential control module receives a torque command signal from the Chassis Control Module (CCM) according to the driving situation to achieve vehicle dynamics and traction.

The electronic limited slip differential system contains the following main components:

- The rear differential control module
- The rear differential pressure/temperature sensor
- The differential clutch pump
- The rear differential clutch solenoid valve
- The rear differential oil temperature sensor

When the torque signal is received, the rear differential control module actuates the following components:

- Electric Motor (bi-directional rotary piston pump)
- Solenoid (fail-safe pressure relief)

The electro-hydraulic piston actuation engages the limited slip clutch to allow active variable locking torque transfer to the left and right half shafts.

The rear differential control module monitors voltage levels, hydraulic and clutch sump temperatures, over-current and circuit failures.

There are 2 fluid types used in the Rear Drive axle. The rear differential and limited slip clutches use Dexron LS hypoid gear oil. The hydraulic-actuation System uses Dexron IV.

Whenever a hydraulic line to the electronic limited slip differential system is opened, a service bleed procedure with a scan tool needs to be performed to remove any air from the system.

REAR DRIVE AXLE DESCRIPTION AND OPERATION

Linamar Differential

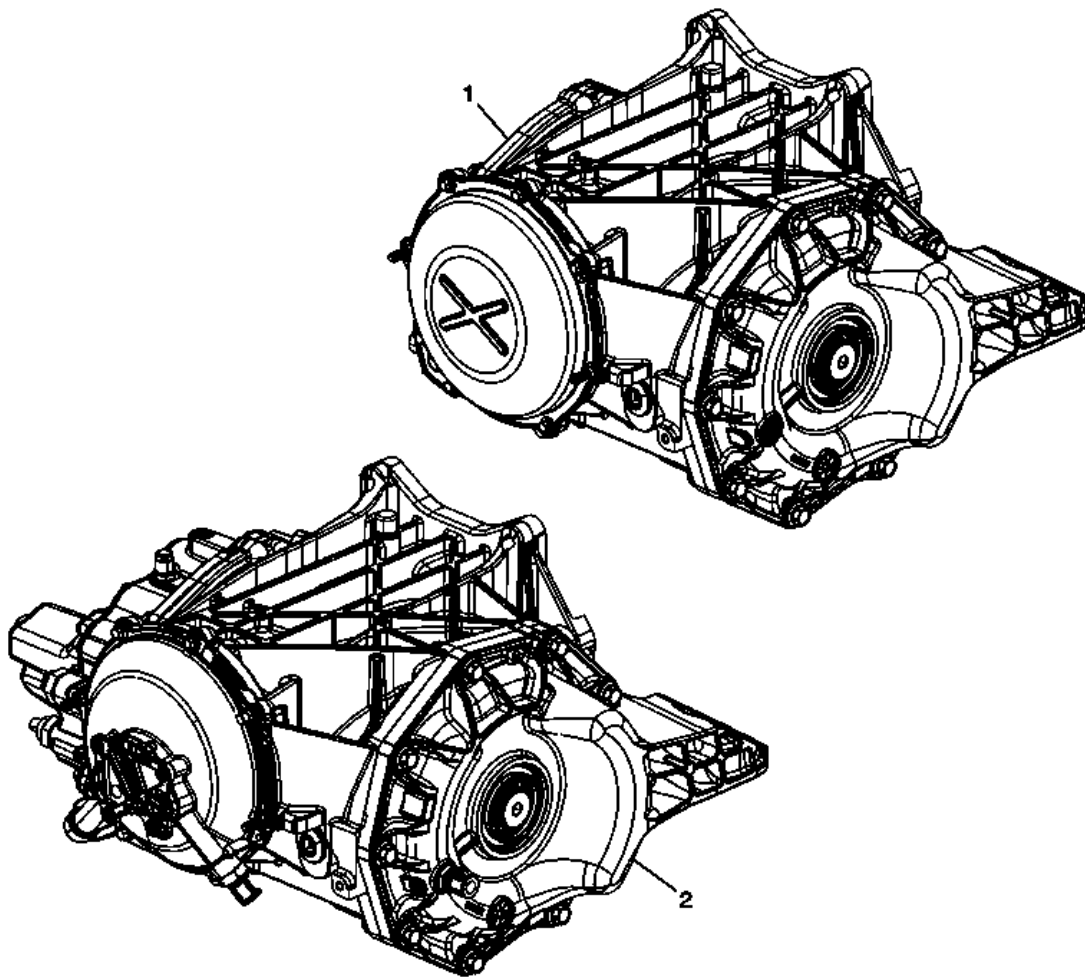


Fig. 132: Linamar Differential
Courtesy of GENERAL MOTORS COMPANY

The vehicle is powered by a 6.2L LT1 V8 engine. Motion is transferred from the engine crankshaft/flywheel through the driveline support, propeller shaft, assembly to either the 6L80-E (MYC) automatic transmission or the Tremec 7-speed manual transmission. The splined output shaft of the transmission drives the pinion, which in turn, rotates the ring gear and differential case assembly. The limited slip differential distributes torque/power to the rear wheels via individual axle shaft assemblies.

The differential carrier housing, carrier covers, pinion gear bearing housing and differential case halves are constructed of cast aluminum. The internal components incorporate a hypoid gear set, ring and pinion, carrier assembly and pinion housing assembly. The pinion is supported in a pinion housing by tapered roller bearings. The pinion is positioned rearward of the ring gear centerline.

Pinion position, ring gear position and carrier bearing preload are determined by shimming procedures.

There are 2 variations of the differential assembly, manual limited slip differential (MLSD) (1) and

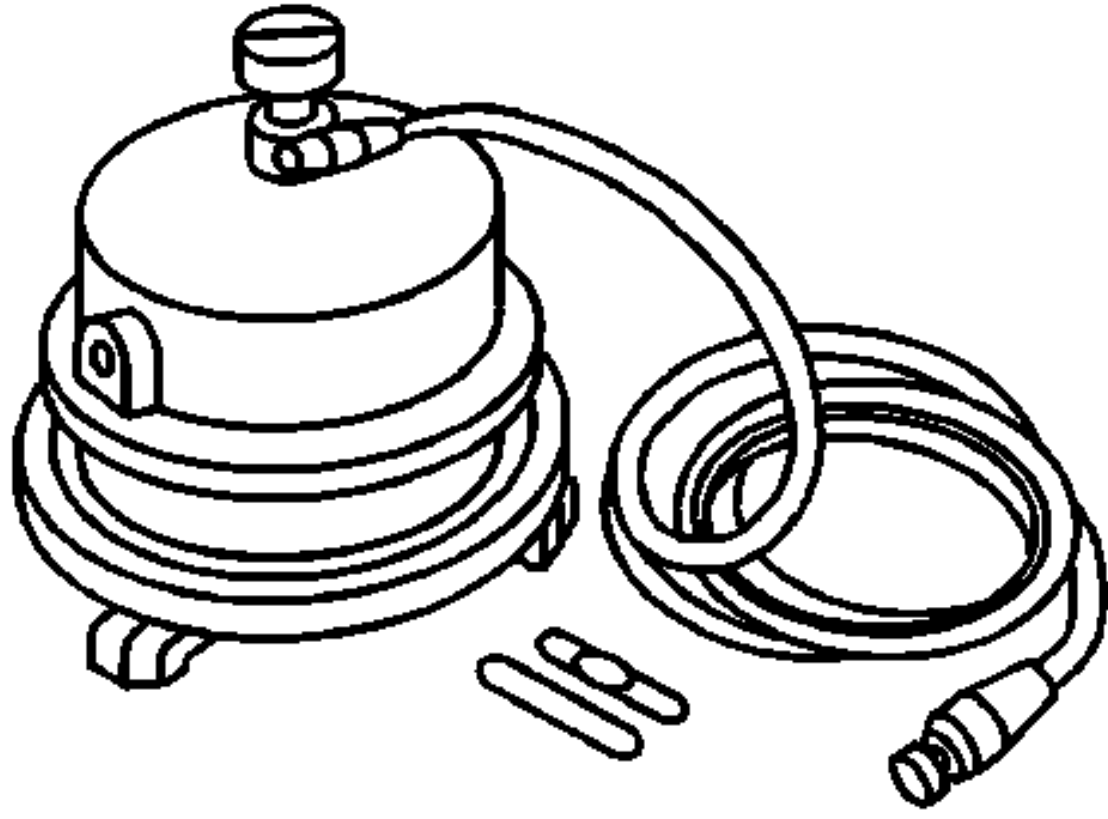
electronic limited slip differential (ELSD) (2). The differential assembly is available in 3 gear ratios, 2.56, 2.73 and 3.42. The 3.42 ratio axle is used in all manual transmission applications. The 2.56 ratio axle is standard equipment for automatic applications.

Some models have a differential lubricant pump and cooler. Oil is pulled through an external oil pipe into the pump. Oil is pumped through an external oil pipe to the cooler. The oil is cooled by dissipating heat with oil returning from the cooler.

SPECIAL TOOLS AND EQUIPMENT

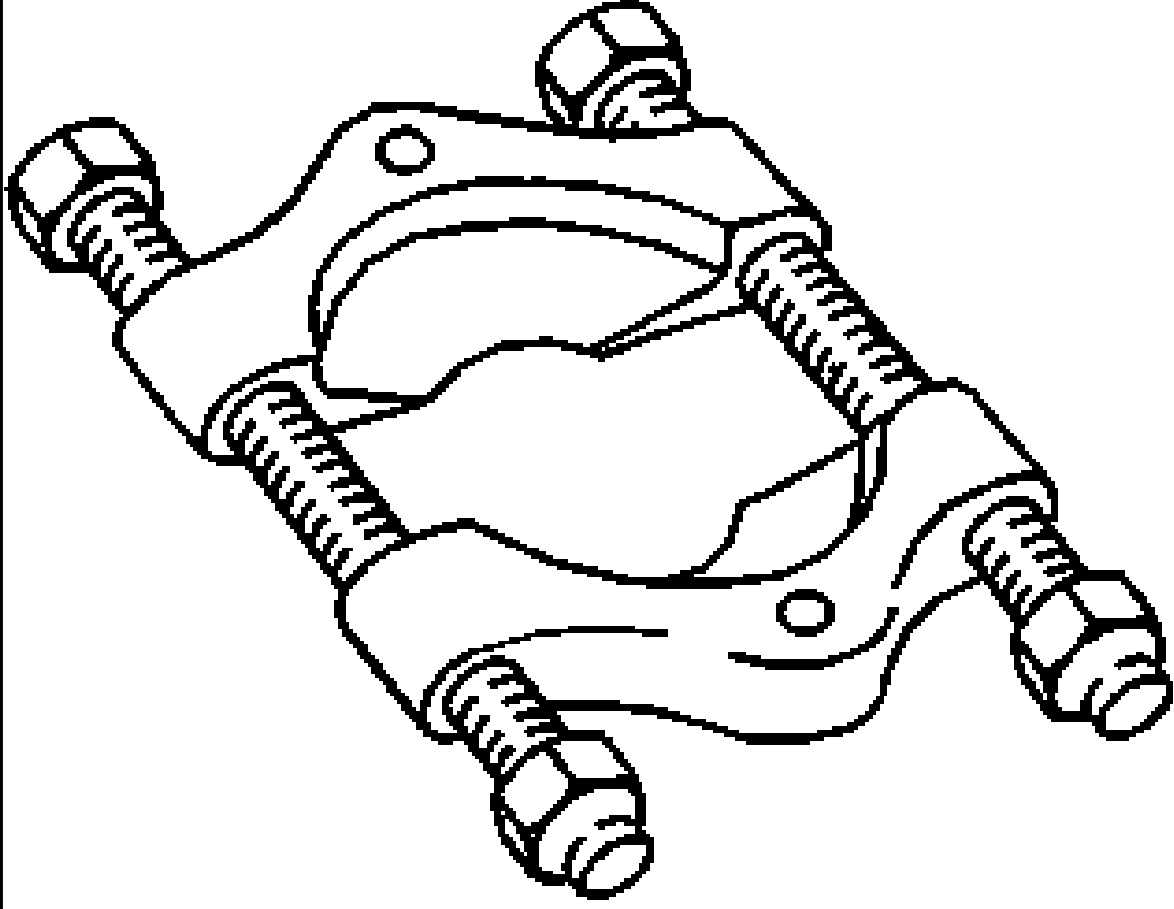
SPECIAL TOOLS

Illustration	Tool Number/Descript
	DT-03289-20 J-3289-20 Holding Fixture



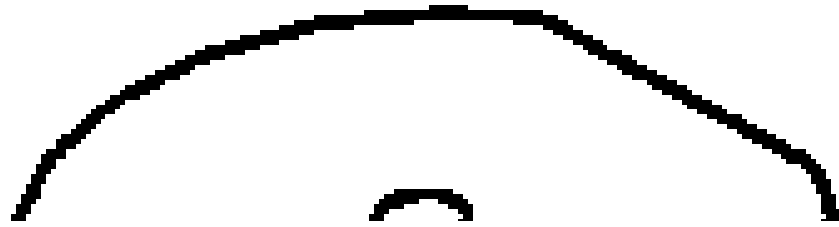
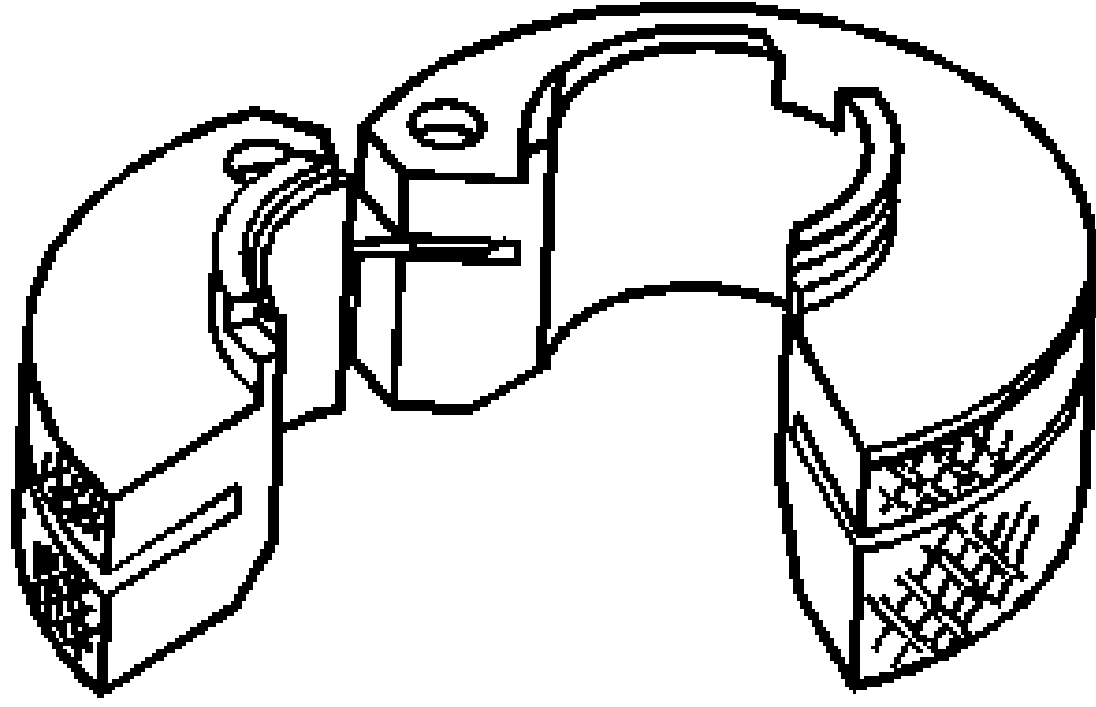
DT-5590
J-5590
Bearing Installer

DT-22912-B
J-22912-B
Split Plate Bearing
Puller



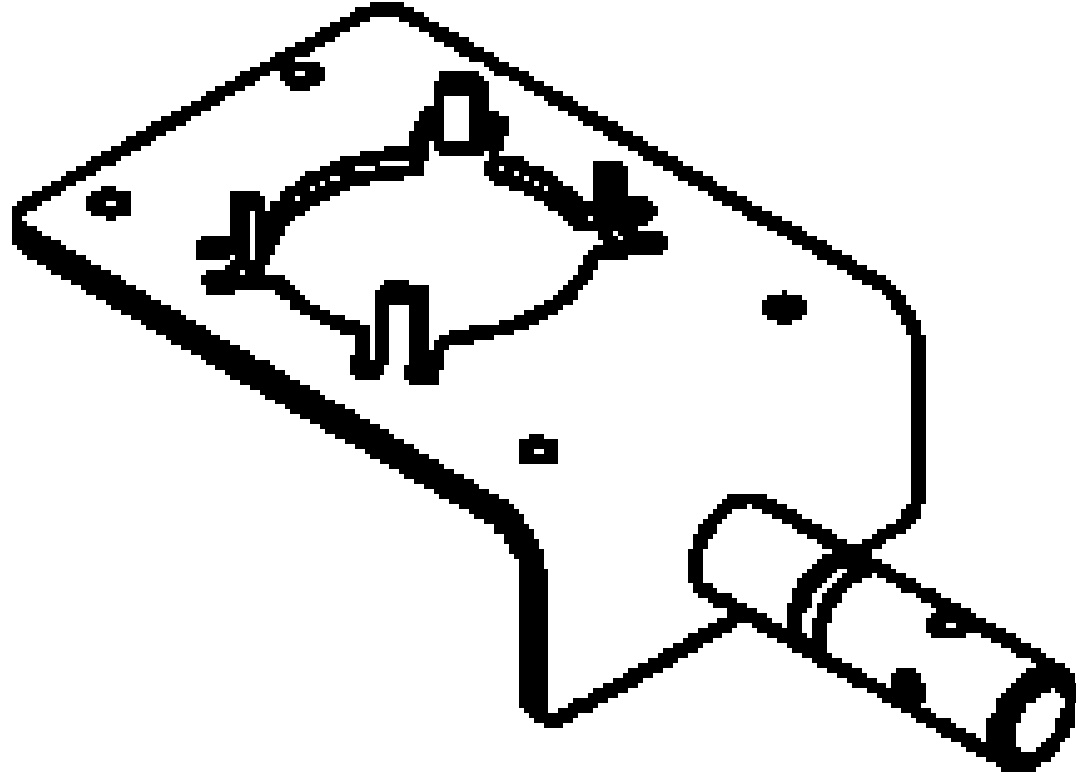
DT-42155
J-42155
Getrag Axle
Differential Housi
Lifting Tool

DT-41623-B
J-41623-B
Cooler Quick
Connect Tool



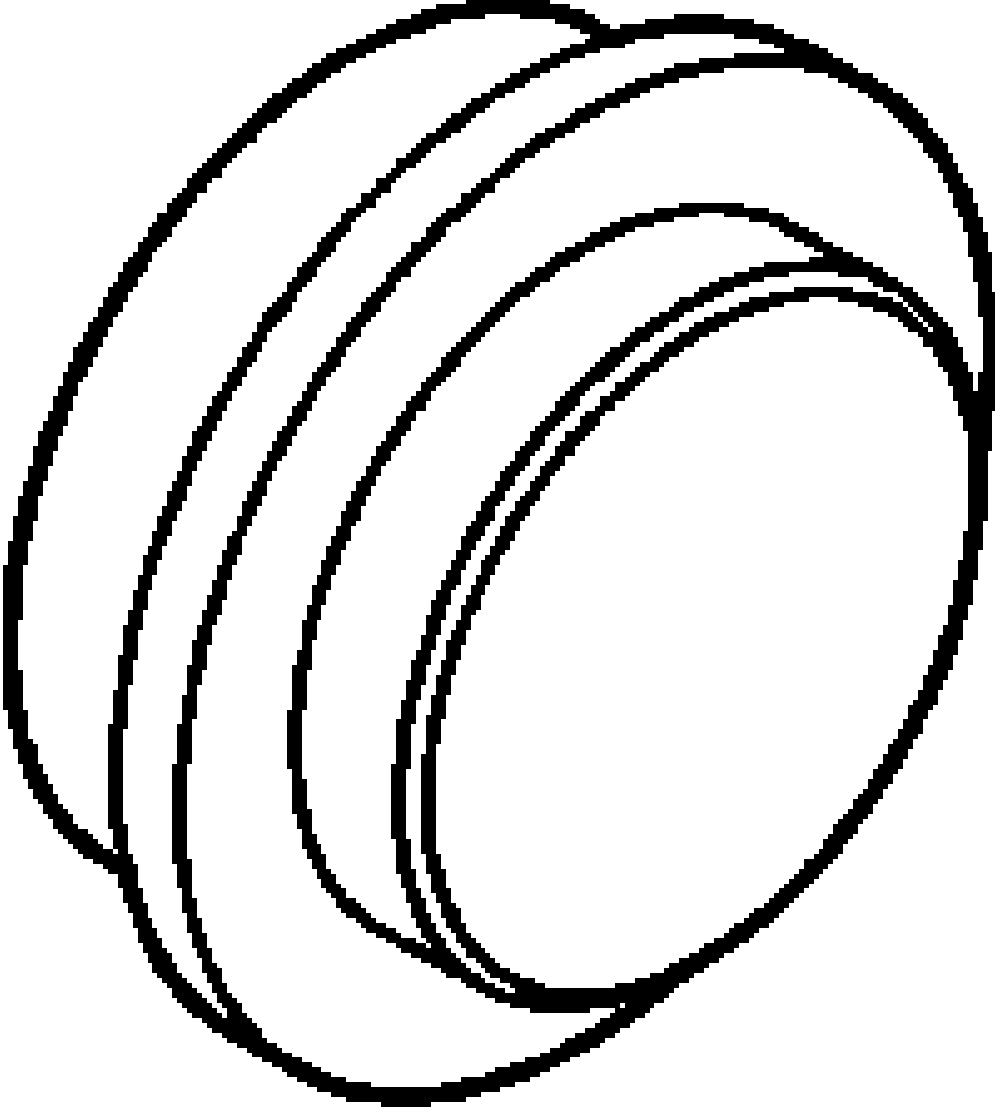
DT-42162-A
J-42162-A
Getrag Axle Side
Gear Compressor

DT-42173-A
J-42173-A
Differential Holding
Fixture



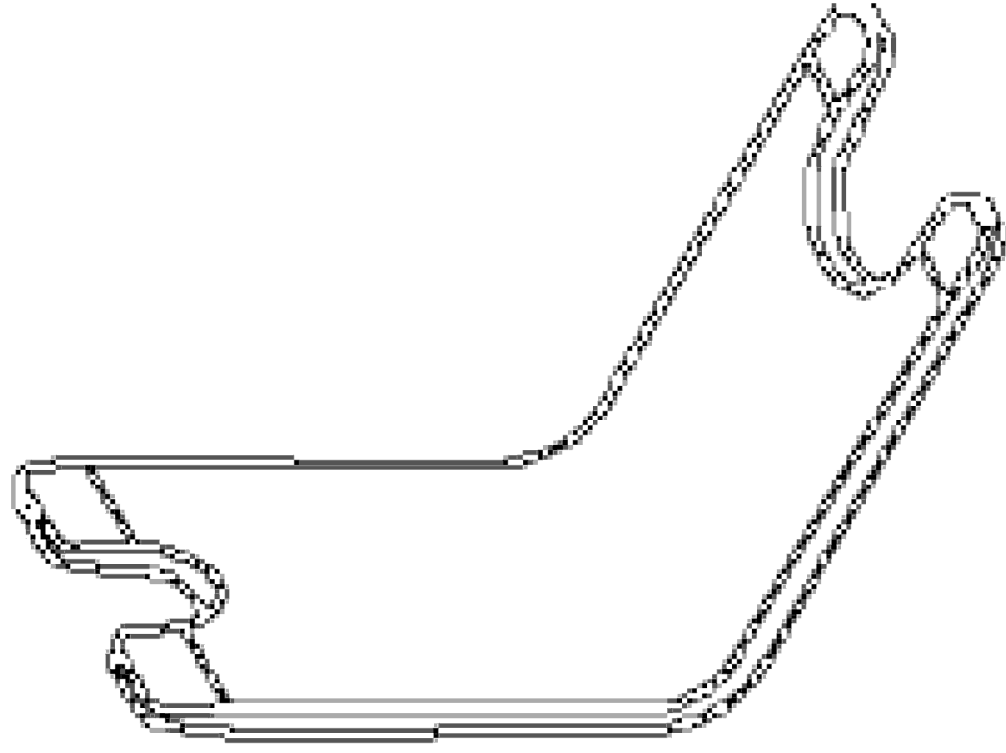
DT-45000
J-45000
Seal Remover

DT-45010
J-45010
Getrag Axle Bear
Race Installer



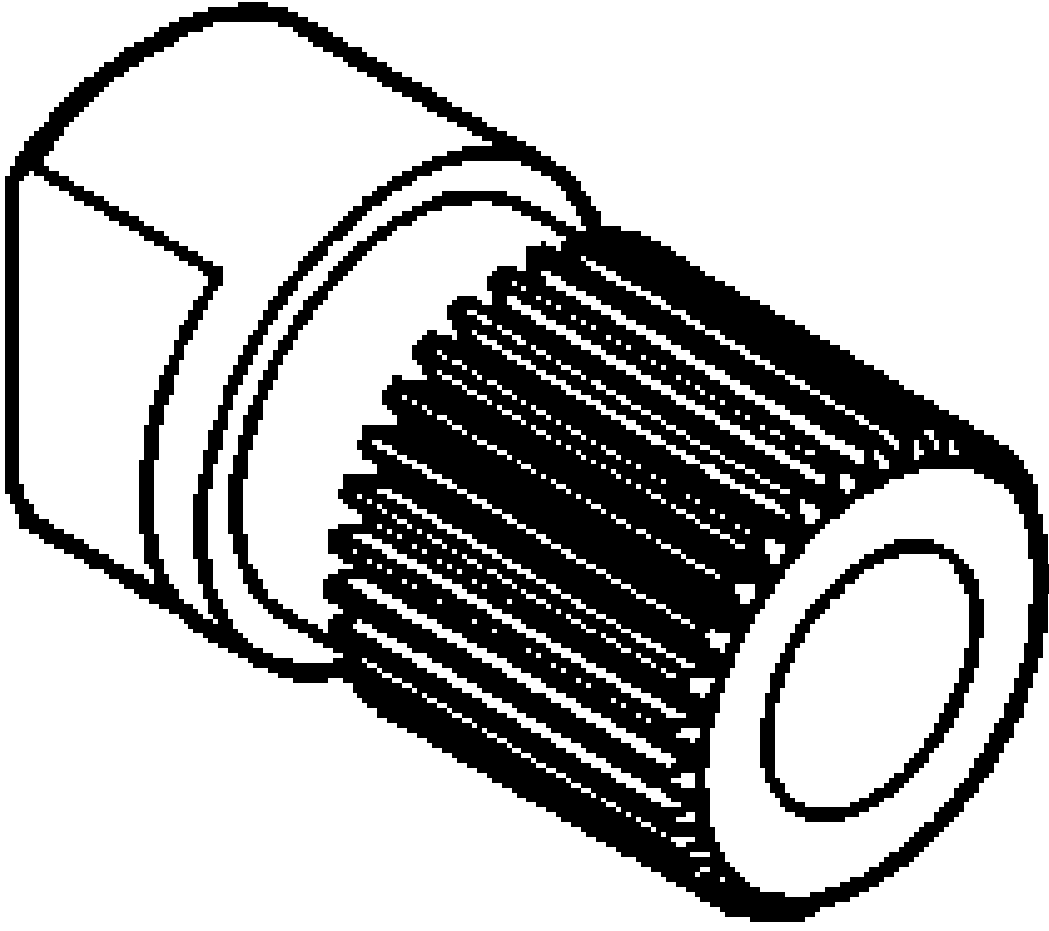
DT-45124
J-45124
Removal Bridge

J-45666
Air Line Release
Tool



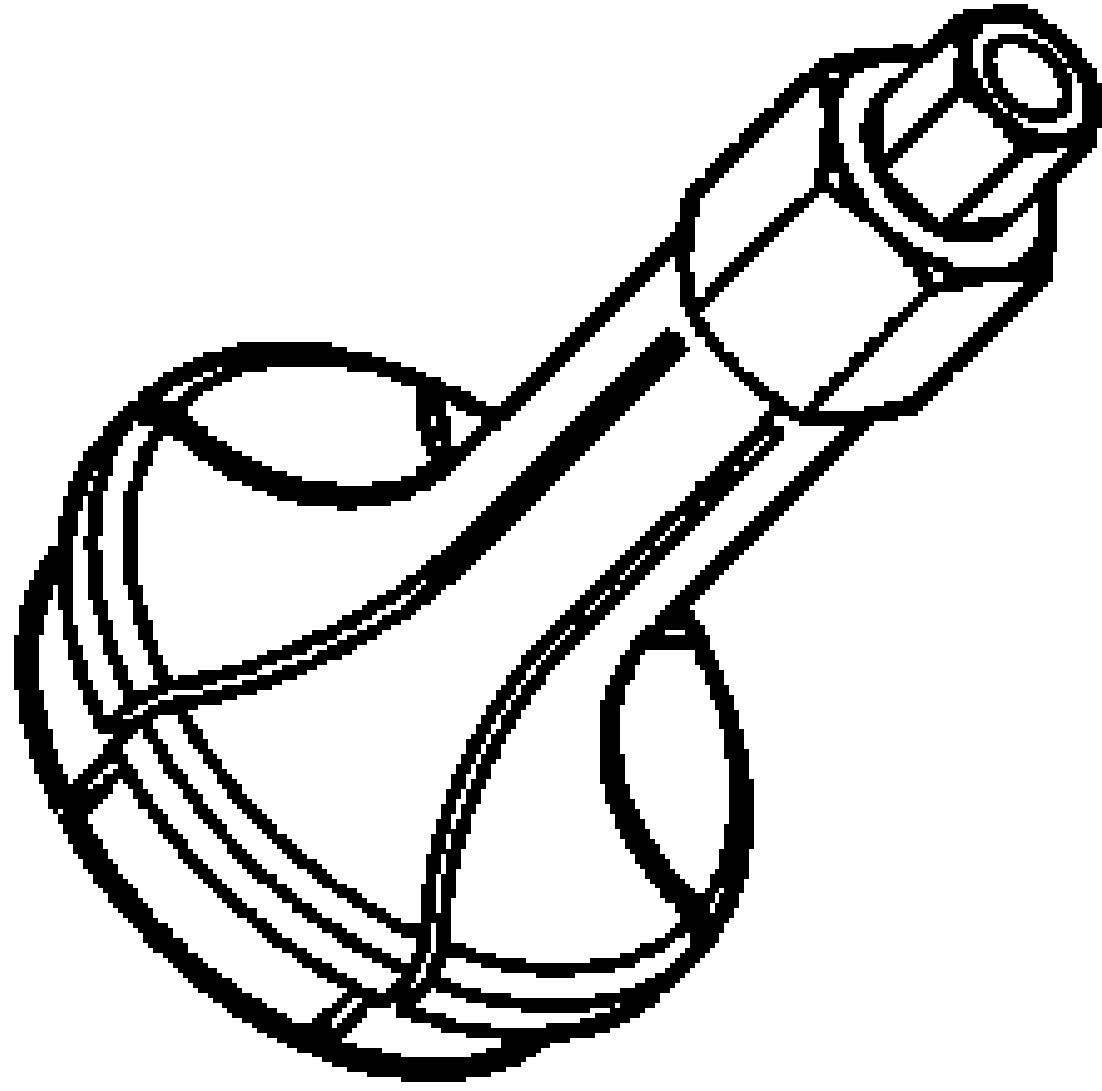
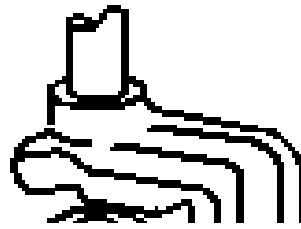
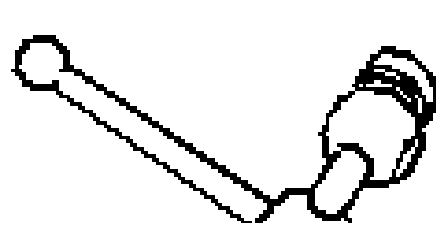
DT-47731
1/2 Inch Quick
Connect Releas
Tool

DT-48007
Spline Holder



DT-48076
Rock Guard Insta

DT-51255
Bearing Cup
Remover



DT-8001
J-8001
Dail Indicator Se

DT-51381
Limited Slip
Differential Clutc
Pipe Connector

