

2017 DRIVELINE/AXLE**Front Drive Axle - CT6****SPECIFICATIONS****FASTENER SPECIFICATIONS****Single Use Non-Threaded Fasteners/Components**

NOTE: <i>All fasteners/components listed in this table MUST BE DISCARDED and replaced with NEW after removal.</i>	
Application	
Differential Drive Pinion Gear Seal	
Front Wheel Drive Intermediate Shaft Retaining Ring	
Front Wheel Drive Intermediate Shaft Seal	

Single Use Threaded Fastener/Component Tightening Specifications

NOTE: <i>All fasteners/components listed in this table MUST BE DISCARDED and replaced with NEW after removal.</i>	
Application	Specification
	Metric (English)
Pinion Nut	<u>Differential Drive Pinion Gear Seal Replacement</u>

Reusable Threaded Fastener Tightening Specifications

NOTE: <i>All fasteners listed in this table can be reused after removal.</i>	
Application	Specification
	Metric (English)
Front Differential Carrier Cover Bolt	54 N.m (40 lb ft)
Front Differential Carrier Mounting Bolts - Front	
• First Pass:	30 N.m (22 lb ft)
• Final Pass:	180 degrees
Front Differential Carrier Mounting Bolts - Rear	
• First Pass:	30 N.m (22 lb ft)
• Final Pass:	180 degrees
Drain Plug	33 N.m (24 lb ft)
Fill Plug	33 N.m (24 lb ft)
Intermediate Shaft Housing Bolts	58 N.m (43 lb ft)

APPROXIMATE FLUID CAPACITIES

Application	Quantity	
	Metric	English
Front Drive Axle	0.5 L	0.53 qt
When filled, fluid level should be 1.0 mm (0.04 in) below the bottom of the fill hole.		

ADHESIVES, FLUIDS, LUBRICANTS AND SEALERS

Application	Type of Material	GM Part Number	
		US	Canada
Differential Drive Pinion Gear Seal	Multi-Purpose Lubricant, Superlube	12346241	10953474
Front Differential Lubricant	Dexron Gear 75w90	88863089	88863090
Intermediate Wheel Drive Shaft Splines	Lubricant	01051344	993037
Front Differential Carrier Cover	Sealant	19330905	19330906
Pinion Nut Threads	Threadlocker	12345382	10953489

VISUAL IDENTIFICATION

FRONT AXLE IDENTIFICATION

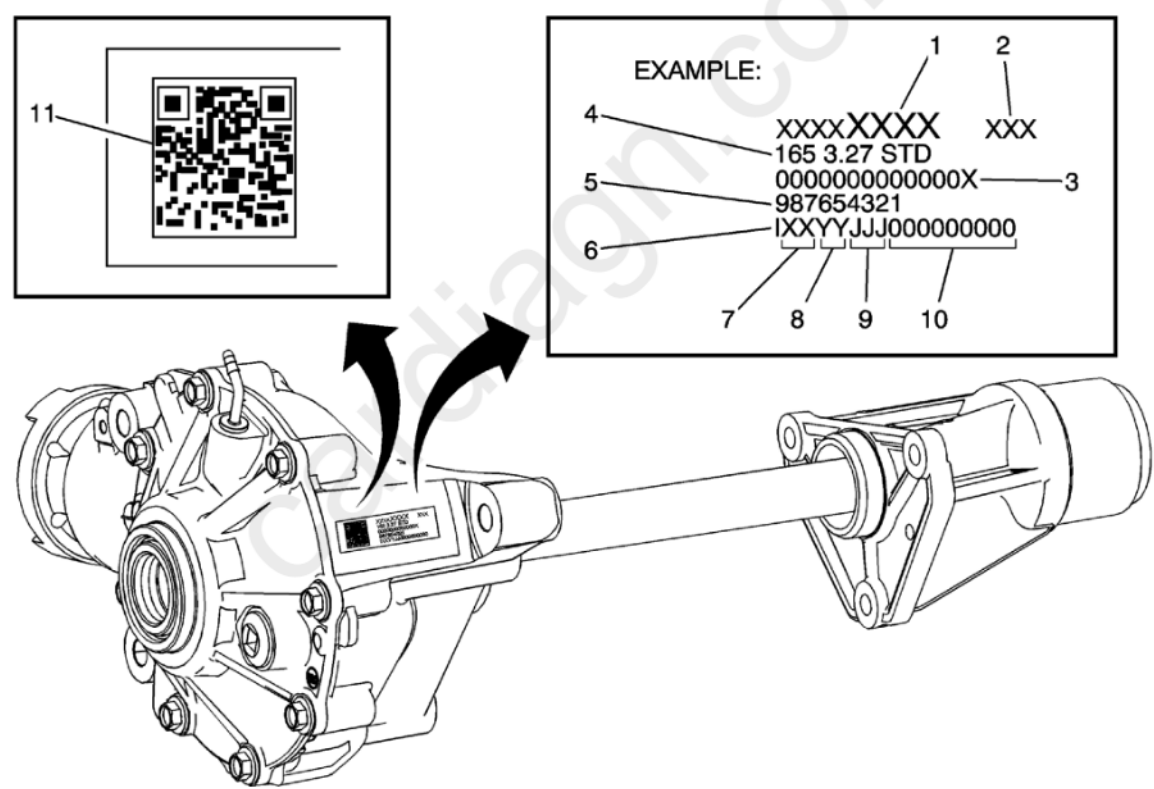


Fig. 1: Front Axle Identification Points
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
1	8-Digit Part Number
2	Revision Level
3	Vehicle Partitioning Product Structure (VPPS) Code
4	Gear Ratio and Differential Type
5	DUNS Number
6	Trace Code
7	Plant Code
8	Manufactured Year

Callout	Component Name
9	Julian Date
10	Serial Number
11	2D Bar Code

DIAGNOSTIC INFORMATION AND PROCEDURES

SYMPTOMS - FRONT DRIVE AXLE

Before beginning diagnosis, review the system description and operation in order to familiarize yourself with the system functions. Refer to [Front Drive Axle Description and Operation](#).

Noise Diagnosis

Any gear-driven unit produces a certain amount of noise that is normal and that conventional repairs or adjustment cannot eliminate. Slight noise that is heard only at a certain speed or under unusual or remote conditions is acceptable. For example, this noise tends to reach a peak at speeds from 60-100 km/h (40-60 mph) depending upon road and load conditions or upon gear ratio and tire size. Noise of this kind does not indicate trouble in the axle assembly.

When an axle is suspected of being noisy, make a thorough test in order to determine whether the noise originates in the tires, road surface, wheel bearings, engine, transmission, propeller shaft or axle assembly.

Classifying the Symptom

Front Drive Axle symptoms can usually be classified into the following categories:

- Leaks
- Noises
- Vibrations

Leak and noise related symptoms are diagnosed within the Front Drive Axle section. For vibration related symptoms, refer to [Vibration Diagnosis, Starting Point and Correction](#).

Visual/Physical Inspection

- Inspect the system for loose or missing fasteners.
- Inspect the system for loose or leaking components.
- Inspect the system for obvious damage or conditions which may cause the symptom.

Symptoms List

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

- [Front Drive Axle Noises](#)
- [Noisy in Drive](#)
- [Noisy When Coasting](#)
- [Intermittent Noise](#)
- [Constant Noise](#)
- [Noisy on Turns](#)
- [Front Axle Lubricant Leak Diagnosis](#)

FRONT DRIVE AXLE NOISES

Gear Noise

Gear noise or whine is audible from 32-89 km/h (20-55 mph) under 4 driving conditions:

- Drive - Acceleration or heavy pull
- Road Load - Vehicle driving load or constant speed

- Float - Using enough throttle to keep the vehicle from driving the engine, the vehicle slows down gradually but the engine still pulls slightly.
- Coast - Throttle is closed and the vehicle is in gear.

Gear noise most frequently has periods where the noise is more prominent, usually between 48-64 km/h (30-40 mph) and 80-85 km/h (50-53 mph). Gear whine is corrected by ring and pinion gear replacement or adjustment, depending on the mileage of the gear set.

Bearing Noise

Faulty bearings produce a rough growl or grating sound, rather than the whine typical of gear noise. Bearing noise (hum) will pulsate at a constant vehicle speed. This indicates a bad pinion or a bad front axle side bearing. This noise can be confused with front wheel bearing noise. Inspect and replace the bearings and the affected components as required.

Front Wheel Bearing Noise

A rough front wheel bearing produces a noise which continues with the vehicle coasting at low speed and the transmission in neutral. The noise may diminish some when the brakes are gently applied. The noise may also change when performing side-to-side maneuvers with the vehicle.

A rough and/or noisy wheel bearing can be heard by spinning the wheels by hand and listening at the hubs for the noise. Inspect and replace the bearings and the affected components as needed.

Knock at Low Speeds

A low speed knock can be caused by a differential case side gear bore that has worn oversize. Inspect the side gears and the differential case assembly and replace the components as necessary.

Backlash Clunk

Excessive backlash clunk under acceleration or de-acceleration can be caused by any of the following:

- Worn differential pinion shaft
- Worn differential pinion and/or side gear teeth
- Worn thrust washers
- Excessive clearance between the side gears and the axle shafts
- Excessive clearance between differential side gears and the bore in the case
- Excessive drive pinion and ring gear backlash

Inspect, adjust or replace the affected components as necessary.

NOISY IN DRIVE

Cause	Correction
Inspect for the proper gear oil levels prior to performing system diagnosis. Refer to Front Differential Carrier Lubricant Level Inspection .	
Transmission noise	Repair or replace as required. Refer to Noise and Vibration Analysis .
Driveline assembly noise	Repair or replace as required. Refer to Symptoms - Propeller Shaft .
Worn wheel drive shaft constant velocity joints	Replace the wheel drive shafts as required. Refer to Front Wheel Drive Shaft Replacement - Right Side or Front Wheel Drive Shaft Replacement - Left Side .

Cause	Correction
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, replace the carrier unit. Refer to Front Differential Carrier Assembly Replacement.
Gear set whine noise within the differential assembly	A whine type noise will increase or decrease 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. Replace the carrier unit. Refer to Front Differential Carrier Assembly Replacement.

NOISY WHEN COASTING

Cause	Correction
NOTE: Inspect for the proper gear oil levels prior to performing system diagnosis. Refer to Front Differential Carrier Lubricant Level Inspection	
Worn wheel drive shaft constant velocity joints	Replace the wheel drive shafts as required. Refer to Front Wheel Drive Shaft Replacement - Left Side or Front Wheel Drive Shaft Replacement - Right Side.
Bearing noise within the differential assembly	A grinding or roar type noise will increase or decrease relative to the vehicle speed. 1. Check for the proper fluid level. Fill as required. 2. If the noise continues, replace the carrier unit. Refer to Front Differential Carrier Assembly Replacement.
Gear set whine noise within the differential assembly	A whine type noise will increase or decrease 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. Check for the proper fluid level. Fill as required. 2. Replace the carrier unit. Refer to Front Differential Carrier Assembly Replacement.

INTERMITTENT NOISE

Cause	Correction
IMPORTANT: Inspect for the proper gear oil levels prior to performing system diagnosis. Refer to Front Differential Carrier Lubricant Level Inspection .	
Worn, loose or damaged axle mount and/or bracket	Repair or replace the axle mount and/or bracket as required.
Incorrect gear oil	Replace with the correct gear oil. Refer to Adhesives, Fluids, Lubricants and Sealers .

CONSTANT NOISE

Cause	Correction
NOTE: Inspect for the proper gear oil levels prior to performing system diagnosis. Refer to Front Differential Carrier Lubricant Level Inspection	
Low gear oil levels	Faulty oil seals or other type leaks may contribute to lower than required fluid levels. Refer to Front Axle Lubricant Leak Diagnosis . Fill to the proper level with the correct gear oil. Refer to Adhesives, Fluids, Lubricants and Sealers and Front Differential Carrier Lubricant Level Inspection .
Bearing noise within the differential assembly	A grinding or roar type noise will increase or decrease relative to the vehicle speed. 1. Check for the proper fluid level. Fill as required. 2. If the noise continues, replace the carrier unit. Refer to Front Differential Carrier Assembly Replacement.
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. Check for the proper fluid level. Fill as required. 2. Replace the carrier unit. Refer to Front Differential Carrier Assembly Replacement.

NOISY ON TURNS

Cause	Correction
IMPORTANT: Inspect for the proper gear oil levels prior to performing system diagnosis. Refer to Front Differential Carrier Lubricant Level Inspection .	
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	Fill to the proper level with the correct gear oil. Refer to Adhesives, Fluids, Lubricants and Sealers and Front Differential Carrier Lubricant Level Inspection .

FRONT AXLE LUBRICANT LEAK DIAGNOSIS

Front axle lubricant leaks can occur at the following locations:

- Axle shaft oil seals
- Differential carrier assembly mating surface
- Drain plug
- Fill plug
- Inner axle tube assembly to differential carrier assembly mating surface
- Pinion yoke oil seal
- Vent tube and/or connector

Determining the Cause

While most front axle leaks may be easy to find, determining the cause may not be. A thorough inspection of the area around the leak may assist in determining the cause of the leak.

Oil Seals

Lubricant leaks from a oil seal may be caused by any of the following:

- An improperly installed seal
- A distorted seal
- A worn seal
- A worn shaft
- A brittle seal lip
- A hardened seal lip

To determine the actual cause of the leak, clean the area around the leak. Observe the area of the leak and determine if the seal or another component is causing the leak. A worn seal surface will cause a leak at the sealing lip while a misaligned seal or a seal installed into a housing with an excessive bore will cause the seal to leak at the outside surface of the seal. Hardened or cracked seal lips usually indicate the axle is operating beyond the normal temperature limits for the axle. A seal whose sealing surface has been nicked or cut may indicate that the shaft has a rough, burred or gouged surface and will need to be inspected before the seal can be replaced.

Sealing Surfaces

Front axles are assembled using specific sealers. A leak at a surface sealed with sealant is usually caused by a poor fit of the components but can also be caused by the use of the wrong sealant. When correcting a sealant leak, inspect each component for distortion and for nicks or gouges that may prohibit the sealant from sealing properly and when re-assembling the component, use the proper sealant.

Differential Carrier Assembly

Lubricant leaks at the differential carrier assembly can occur at the following locations:

- Drain plug
- Fill plug
- Vent tube

Drain and fill plug leaks are usually caused by a loose plug. A vent tube leak can be caused by a loose fitting vent hose or by a vent tube assembly whose interior shield is stuck in the upside down position. Inspect the vent plug's interior shield for unrestricted movement, repair or replace the plug as necessary. Drain or fill plug leaks can be repaired by either tightening the plug or by using an approved sealer on the threads on the plug.

REPAIR INSTRUCTIONS

FRONT DIFFERENTIAL CARRIER LUBRICANT REPLACEMENT

Draining Procedure

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

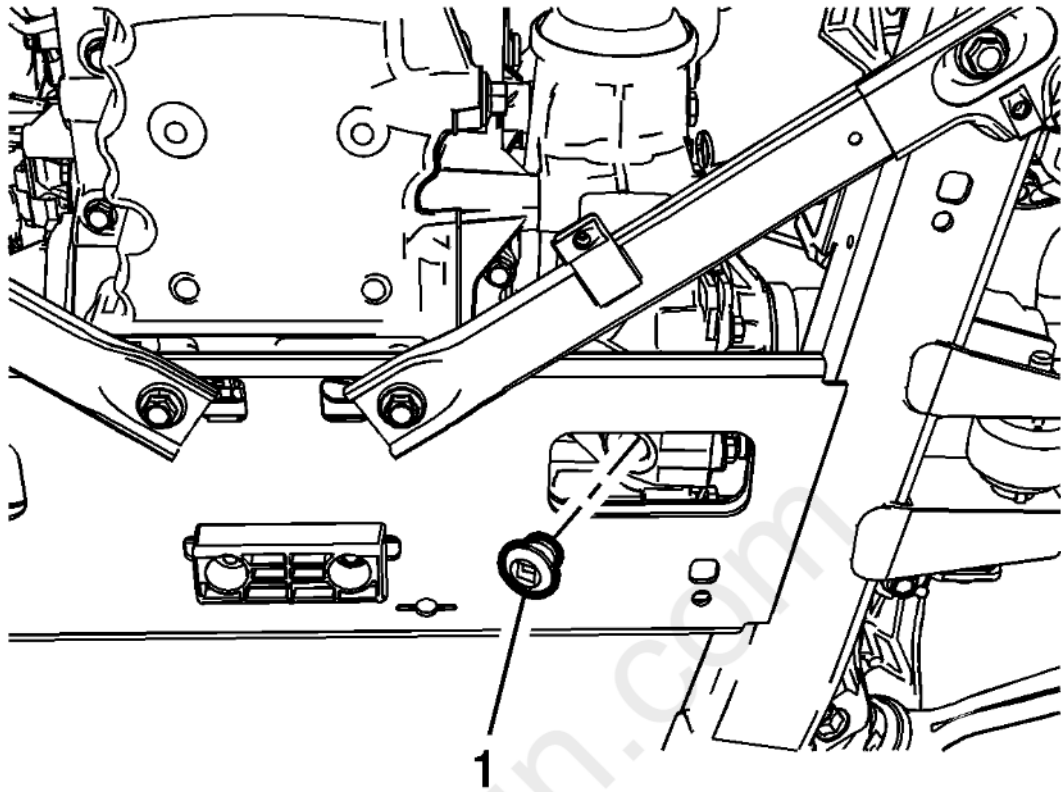


Fig. 2: Front Axle Drain Plug

Courtesy of GENERAL MOTORS COMPANY

2. Clean any dirt from around the differential drain plug (1).
3. Position a drain pan under drain plug.
4. Remove the drain plug (1) from the differential and drain the fluid.

Filling Procedure

1. Install the drain plug (1) to the differential and tighten to 33 N.m (24 lb ft).

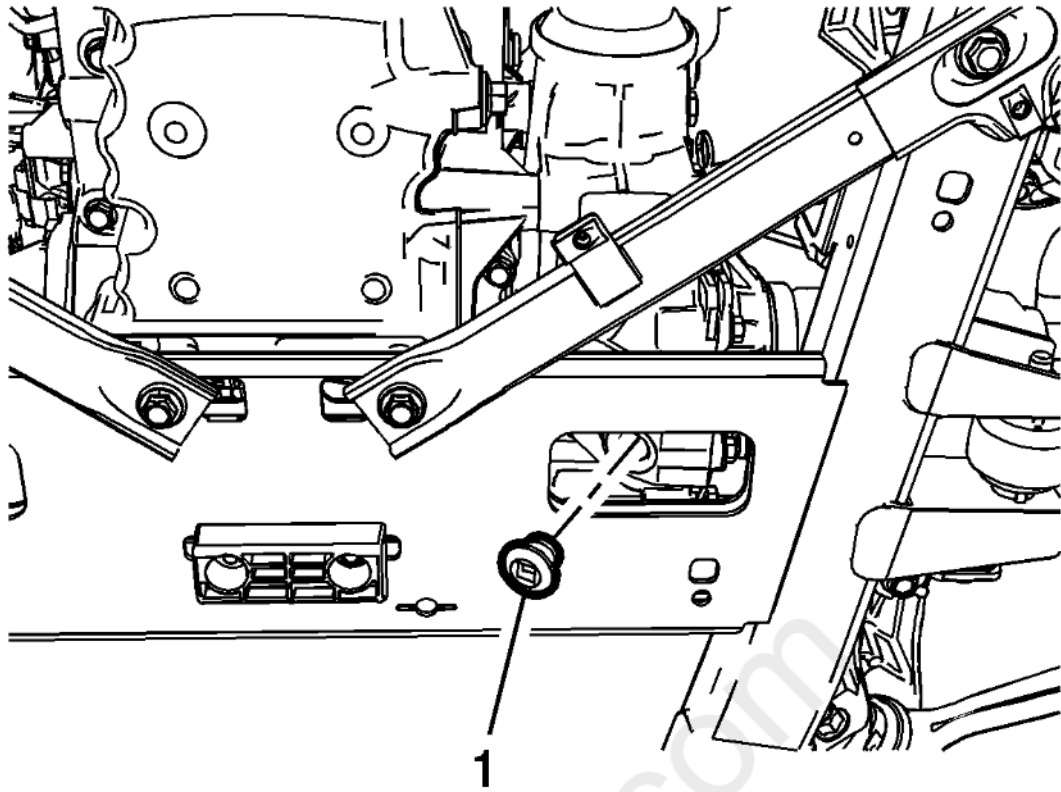


Fig. 3: Front Axle Drain Plug

Courtesy of GENERAL MOTORS COMPANY

CAUTION: Refer to Component Fastener Tightening Caution .

2. Clean any dirt from around the differential fill plug (1).

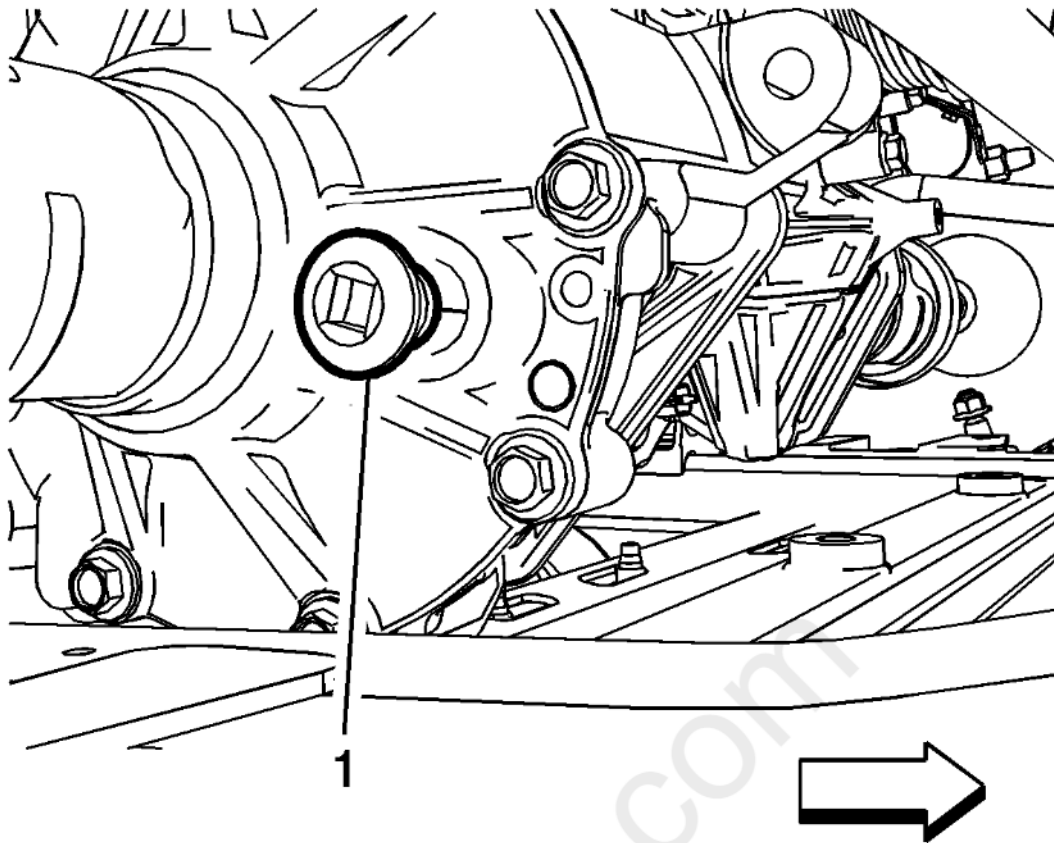


Fig. 4: Front Axle Fill Plug

Courtesy of GENERAL MOTORS COMPANY

3. Remove the fill plug from the differential.
4. Fill the differential with axle lubricant. Refer to [Adhesives, Fluids, Lubricants and Sealers](#) and [Approximate Fluid Capacities](#).
5. Inspect the gear lubricant level to ensure it is level with the bottom of the fill plug hole.

NOTE: Do NOT overfill the front differential. Overfilling the front differential can cause leakage out the differential housing vent.

6. Install the fill plug (1) to the differential and tighten to 33 N.m (24 lb ft).
7. Lower the vehicle.

FRONT WHEEL DRIVE INTERMEDIATE SHAFT REPLACEMENT

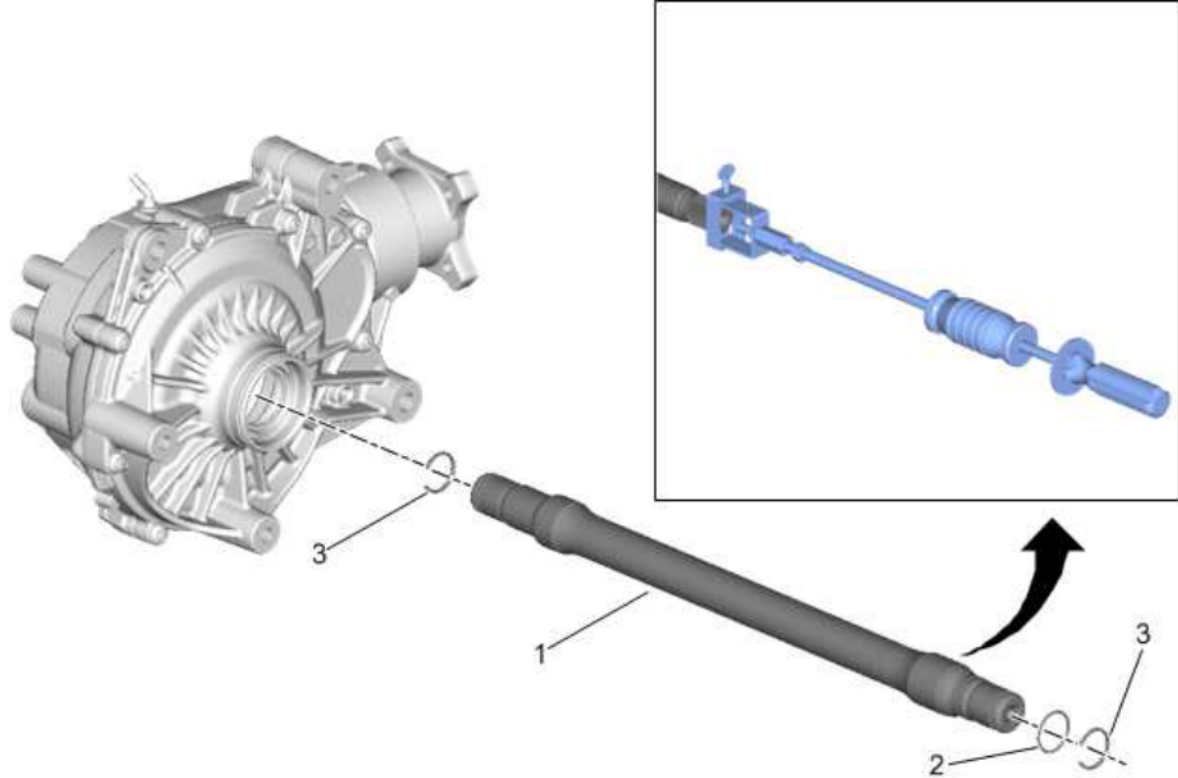


Fig. 5: Front Wheel Drive Intermediate Shaft
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure 1. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle 2. Removal the differential carrier assembly. Refer to Front Differential Carrier Assembly Replacement.	
1	Front Wheel Drive Intermediate Shaft Procedure 1. Attach the J-44467 output shaft assembly remover/installer to the shaft. 2. Attache the GE-6125-1B slide hammer to the J-44467 output shaft assembly remover/installer. 3. Using the tools remove the shaft from the front drive unit. Special Tools • J-44467 Output Shaft Assembly Remover/Installer • GE-6125-1B Slide Hammer
2	Front Wheel Drive Intermediate Shaft Seal NOTE: Use a NEW O-ring seal.
3	Front Wheel Drive Intermediate Shaft Retaining Ring NOTE: Use a NEW retaining ring.

FRONT WHEEL DRIVE INTERMEDIATE SHAFT HOUSING REPLACEMENT

Special Tools

J 45019 Flange and Pinion Cage Remover

For equivalent regional tools, refer to [Special Tools](#).

Removal Procedure

1. Raise and support the vehicle. Refer to [Lifting and Jacking the Vehicle](#).
2. Remove the left front wheel drive shaft. Refer to [Front Wheel Drive Shaft Replacement - Left Side](#).
3. Remove and discard the intermediate wheel drive shaft retaining ring (1) and the O-ring (2).

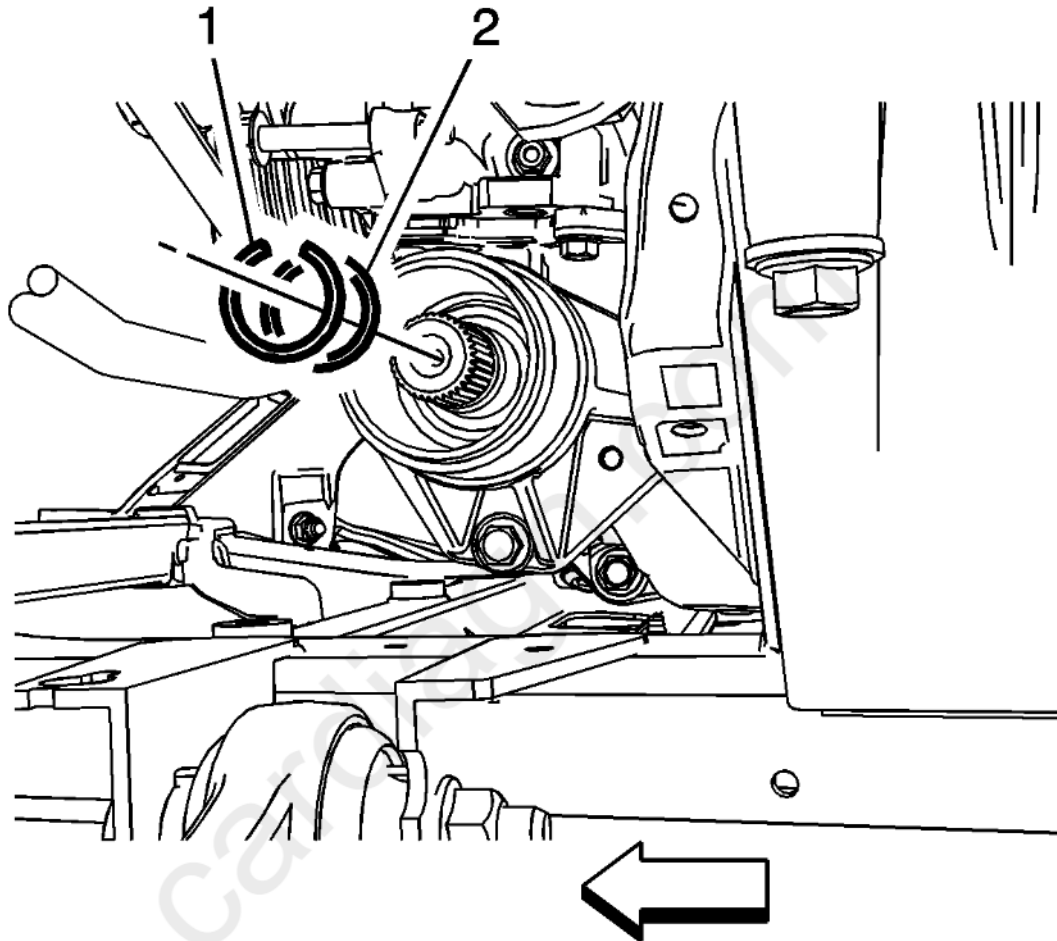


Fig. 6: Wheel Drive Shaft Retaining Ring & O-Ring
Courtesy of GENERAL MOTORS COMPANY

4. If applicable, remove transmission cooler line, harness bolt and bracket. Refer to [Transmission Fluid Cooler Inlet and Outlet Pipe Replacement \(LTG\)](#), [Transmission Fluid Cooler Inlet and Outlet Pipe Replacement \(LTG With HP9\)](#), [Transmission Fluid Cooler Inlet and Outlet Pipe Replacement \(LGW\)](#).
5. Remove the intermediate shaft housing assembly mounting bolts (1).

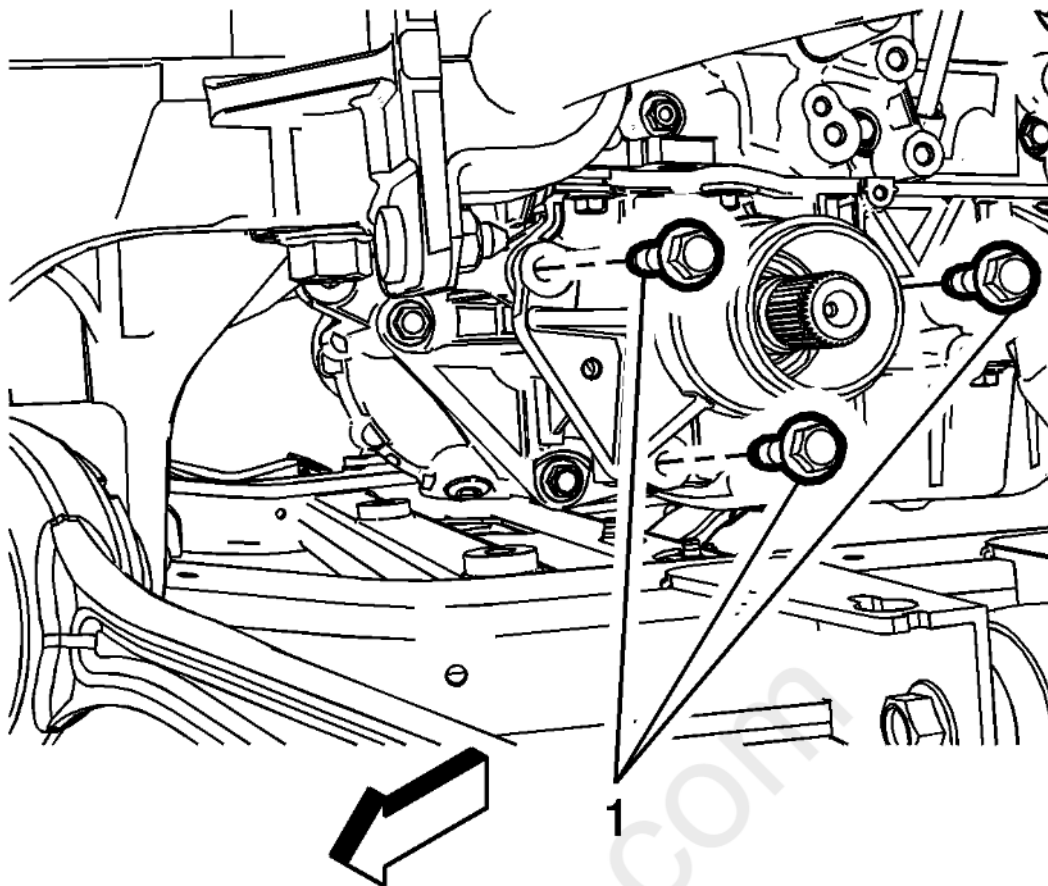


Fig. 7: Intermediate Shaft Housing Assembly Mounting Bolts

Courtesy of GENERAL MOTORS COMPANY

6. Install **J 45019** remover (1) into the threaded holes in the intermediate shaft housing assembly (2).

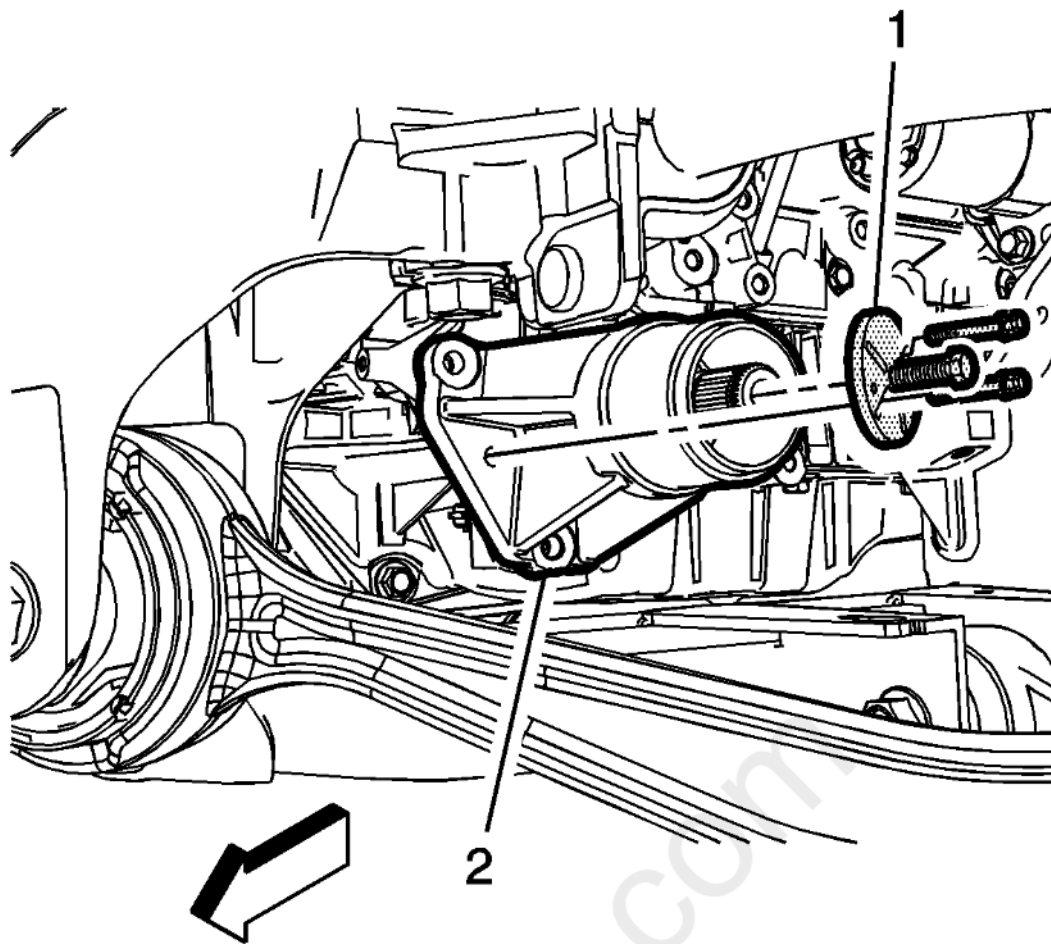


Fig. 8: Using Special Tool To Remove Intermediate Shaft Housing Assembly
Courtesy of GENERAL MOTORS COMPANY

7. Using the **J 45019** remover, remove the intermediate shaft housing assembly.
8. Remove **J 45019** remover from the intermediate shaft housing.
9. Thoroughly clean and inspect the intermediate shaft housing for damage, if damaged replace the intermediate shaft housing.

NOTE: The intermediate shaft bearing is not serviced separately. If the bearing is worn or damaged, replace the housing assembly.

Installation Procedure

1. Install the intermediate shaft housing assembly (1) to the intermediate wheel drive shaft.

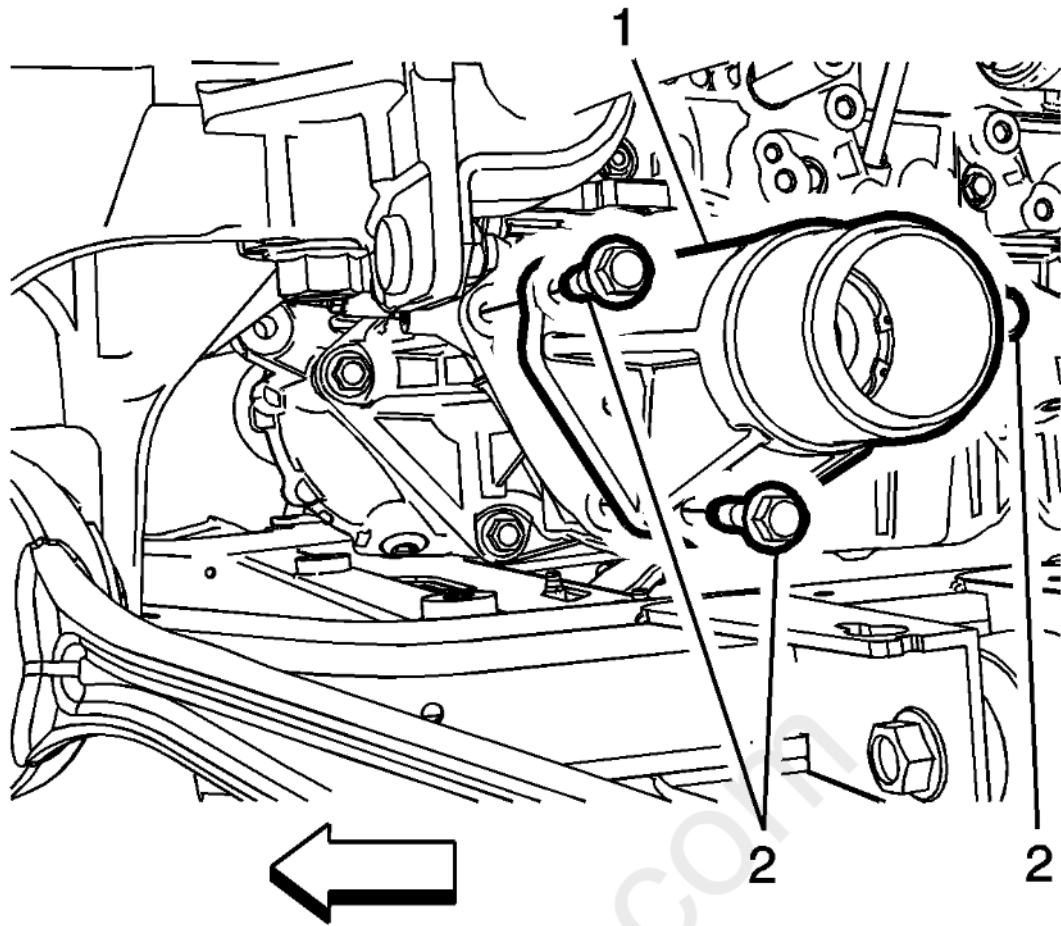


Fig. 9: Intermediate Shaft Housing Assembly & Mounting Bolts

Courtesy of GENERAL MOTORS COMPANY

2. Install the intermediate shaft housing mounting bolts (2) to the oil pan. Tighten the intermediate shaft housing assembly mounting bolts to 58 N.m (43 lb ft).

CAUTION: Refer to **Fastener Caution** .

3. Apply a small amount of lubricant to the intermediate wheel drive shaft splines. Refer to **Adhesives, Fluids, Lubricants and Sealers**.

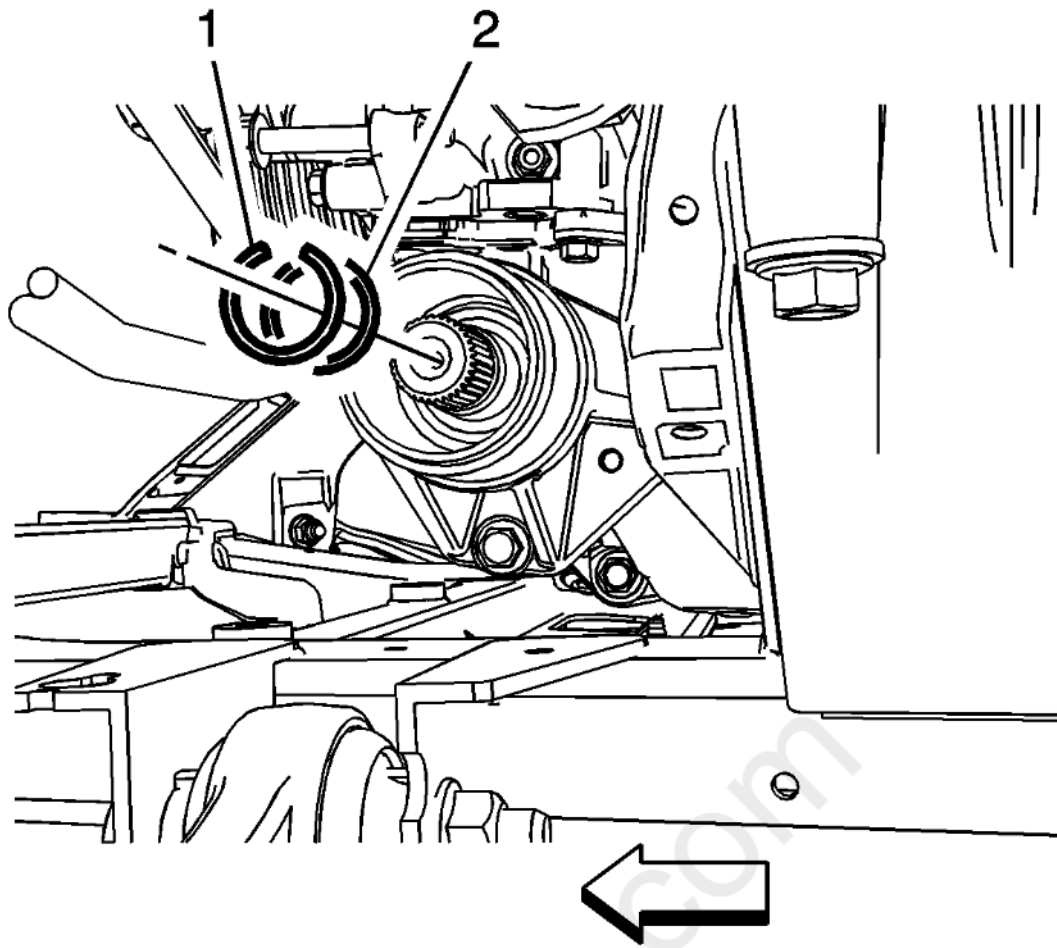


Fig. 10: Wheel Drive Shaft Retaining Ring & O-Ring
Courtesy of GENERAL MOTORS COMPANY

4. Install a new O-ring (2) and the new wheel drive shaft retaining ring (1).
5. If applicable, install the transmission cooler line, harness bolt and bracket. Refer to [Transmission Fluid Cooler Inlet and Outlet Pipe Replacement \(LTG\)](#) [Transmission Fluid Cooler Inlet and Outlet Pipe Replacement \(LTG With HP9\)](#) [Transmission Fluid Cooler Inlet and Outlet Pipe Replacement \(LGW\)](#) .
6. Install the left front wheel drive shaft. Refer to [Front Wheel Drive Shaft Replacement - Left Side](#) .
7. Lower the vehicle.

FRONT AXLE SHAFT SEAL REPLACEMENT - LEFT SIDE

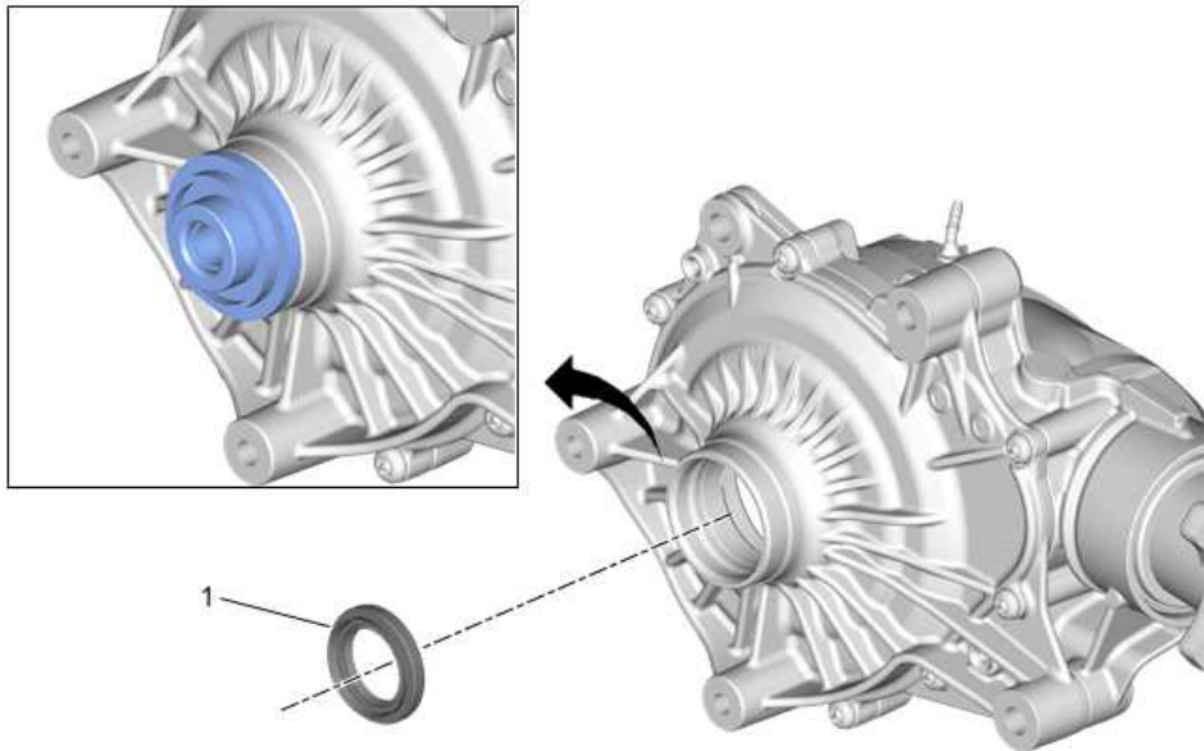
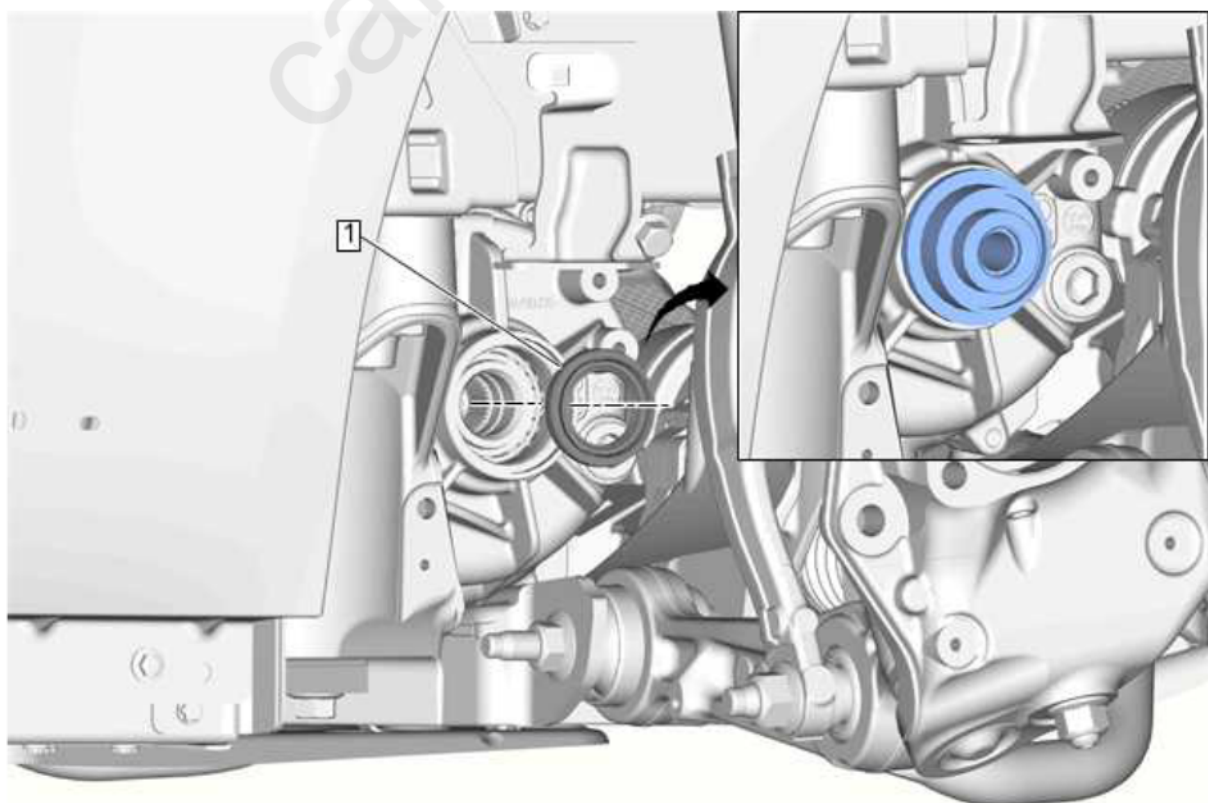


Fig. 11: Front Axle Shaft Seal - Left Side
 Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Remove the front differential carrier assembly from the vehicle. Refer to Front Differential Carrier Assembly Replacement	
1	Front Axle Shaft Seal Special Tools DT-51976 Seal Installer Equivalent regional tools: Refer to Special Tools .

FRONT AXLE SHAFT SEAL REPLACEMENT - RIGHT SIDE



Callout	Component Name
Preliminary Procedure Remove the front differential carrier assembly from the vehicle. Refer to Front Wheel Drive Shaft Replacement - Right Side	
1	Front Axle Shaft Seal Special Tools DT-51976 Seal Installer Equivalent regional tools: Refer to Special Tools .

FRONT DIFFERENTIAL CARRIER ASSEMBLY REPLACEMENT

Special Tools

EN-45059 Torque Angle Sensor Kit

For equivalent regional tools, refer to [Special Tools](#).

Removal Procedure

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

NOTE: **The intermediate wheel drive shaft and the front differential carrier are to be removed as an assembly.**

2. Drain the differential assembly. Refer to [Front Differential Carrier Lubricant Replacement](#).
3. Lower the drivetrain and front suspension frame assembly. Refer to [Drivetrain and Front Suspension Cradle Removal and Installation](#) .
4. Remove the front propeller shaft from the differential and position out of the way. Refer to [Front Axle Propeller Shaft Replacement \(LGX, LGW\)](#) .
5. Remove the left front wheel drive shaft. Refer to [Front Wheel Drive Shaft Replacement - Left Side](#) .
6. Remove the right front wheel drive shaft. Refer to [Front Wheel Drive Shaft Replacement - Right Side](#) .
7. Remove the front wheel drive intermediate shaft housing. Refer to [Front Wheel Drive Intermediate Shaft Housing Replacement](#).
8. Remove the heater coolant pump bracket bolts and reposition the pump from the differential. Refer to [Heater Coolant Pump Replacement \(LTG without HP9\)](#) [Heater Coolant Pump Replacement \(LGW\)](#) [Heater Coolant Pump Replacement \(LGX\)](#) [Heater Coolant Pump Replacement \(LTG with HP9\)](#) .
9. Using the engine support fixture, carefully lower the engine assembly enough to allow the front differential carrier assembly to be removed through the right wheel opening.
10. Position a transmission jack beneath the front differential carrier (2).

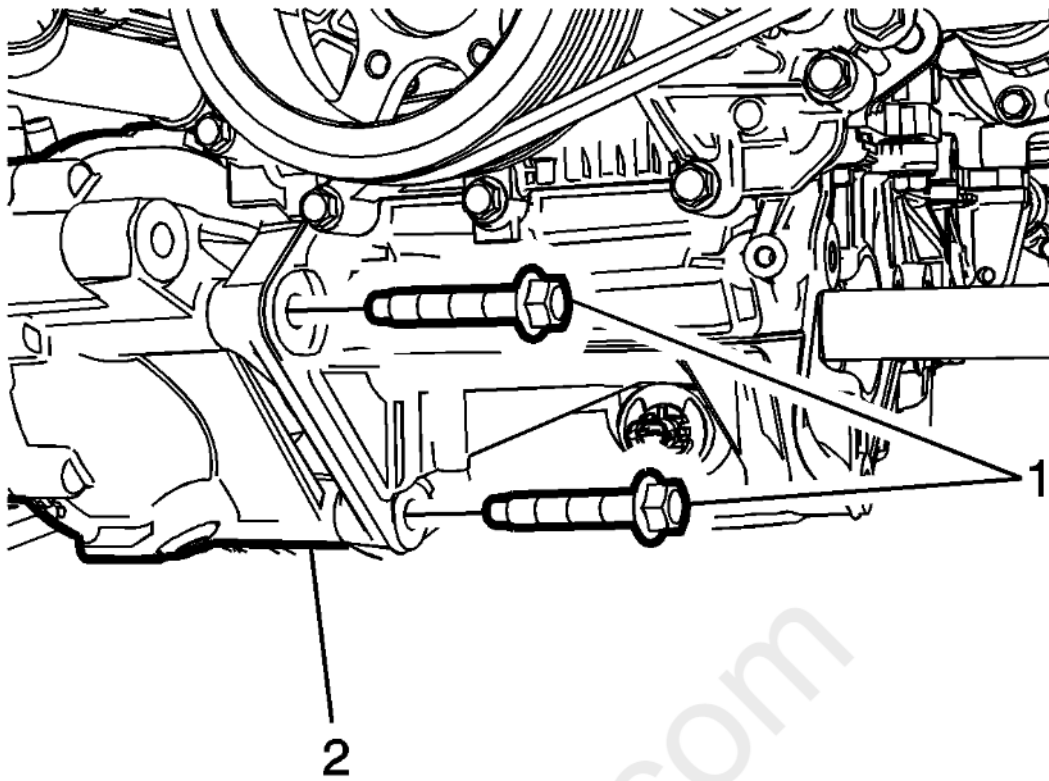


Fig. 13: Front Differential Carrier & Front Oil Pan Mounting Bolts
Courtesy of GENERAL MOTORS COMPANY

11. Firmly secure the front differential carrier to the transmission jack.
12. Remove the front differential carrier (2) to front oil pan mounting bolts (1).
13. Remove the front differential carrier (2) to rear oil pan mounting bolts (1).

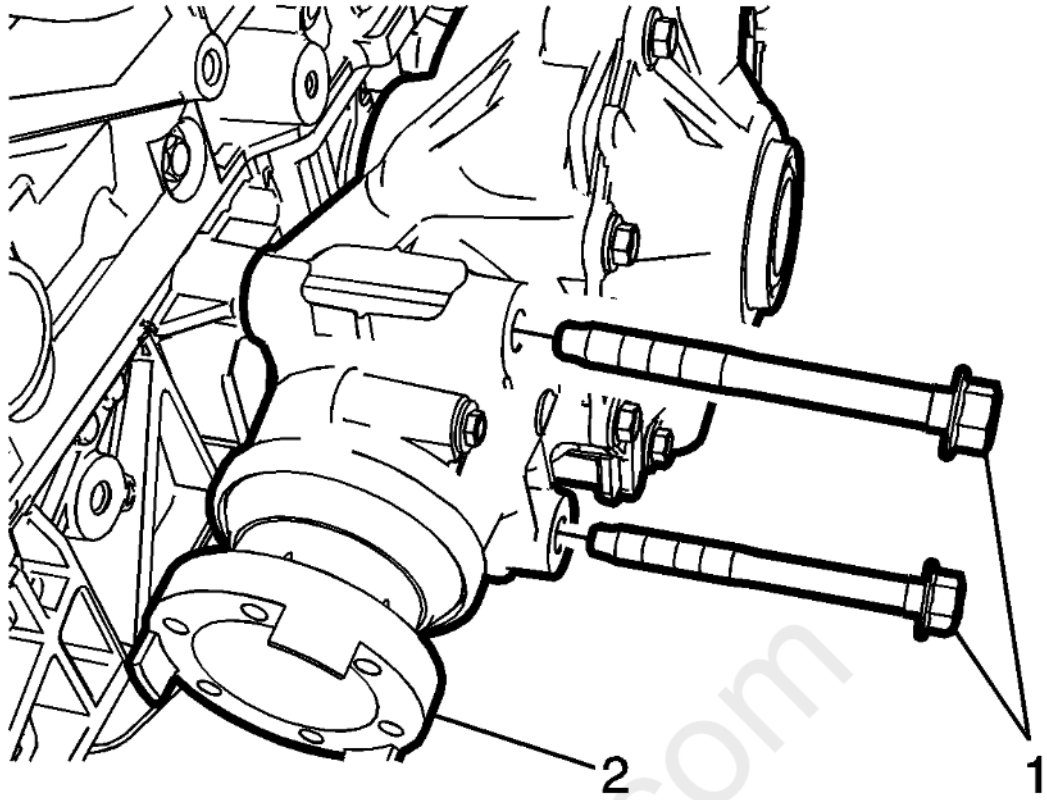


Fig. 14: Front Differential Carrier To Rear Oil Pan Mounting Bolts
Courtesy of GENERAL MOTORS COMPANY

14. Remove the intermediate wheel drive shaft (2) and the front differential carrier assembly (1) from the oil pan (3).

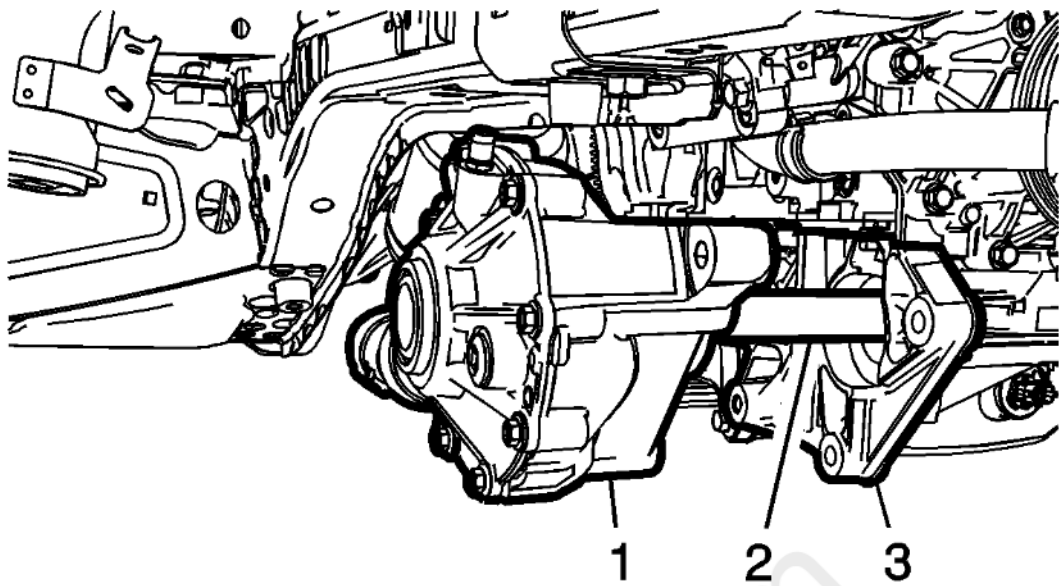


Fig. 15: Intermediate Wheel Drive Shaft, Front Differential Carrier Assembly And Oil Pan
Courtesy of GENERAL MOTORS COMPANY

15. Remove the front differential carrier assembly from the vehicle.

Installation Procedure

1. Position the front differential carrier (1) on a transmission jack.

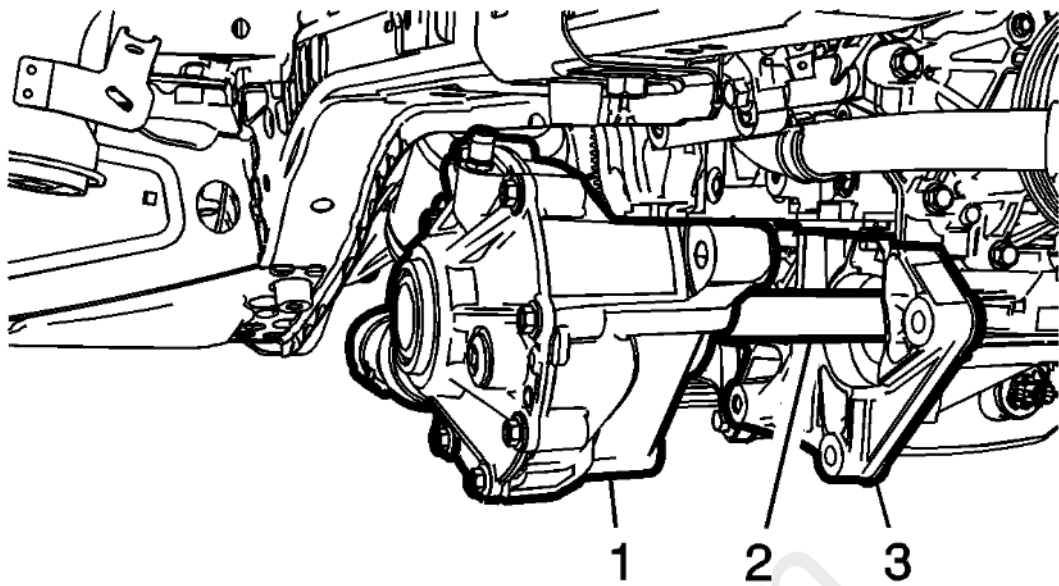


Fig. 16: Intermediate Wheel Drive Shaft, Front Differential Carrier Assembly And Oil Pan
Courtesy of GENERAL MOTORS COMPANY

NOTE: The intermediate wheel drive shaft and front differential carrier are to be installed as a assembly.

2. Firmly secure the differential to the transmission jack.
3. With the front differential carrier firmly attached to the jack, install the intermediate wheel drive shaft (2) and the front differential carrier (1) to the oil pan (3).
4. Install the front differential carrier (2) to the rear oil pan mounting bolts (1) hand tight.

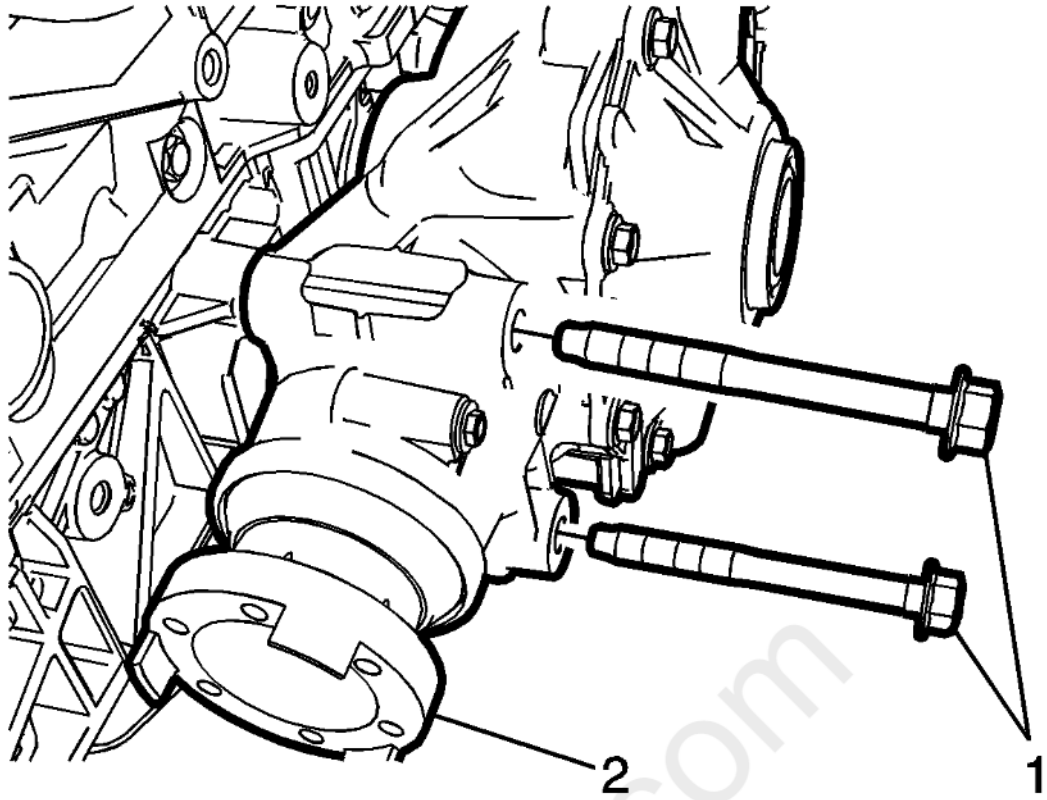


Fig. 17: Front Differential Carrier To Rear Oil Pan Mounting Bolts

Courtesy of GENERAL MOTORS COMPANY

5. Install the front differential carrier (2) to the front oil pan mounting bolts (1) hand tight.

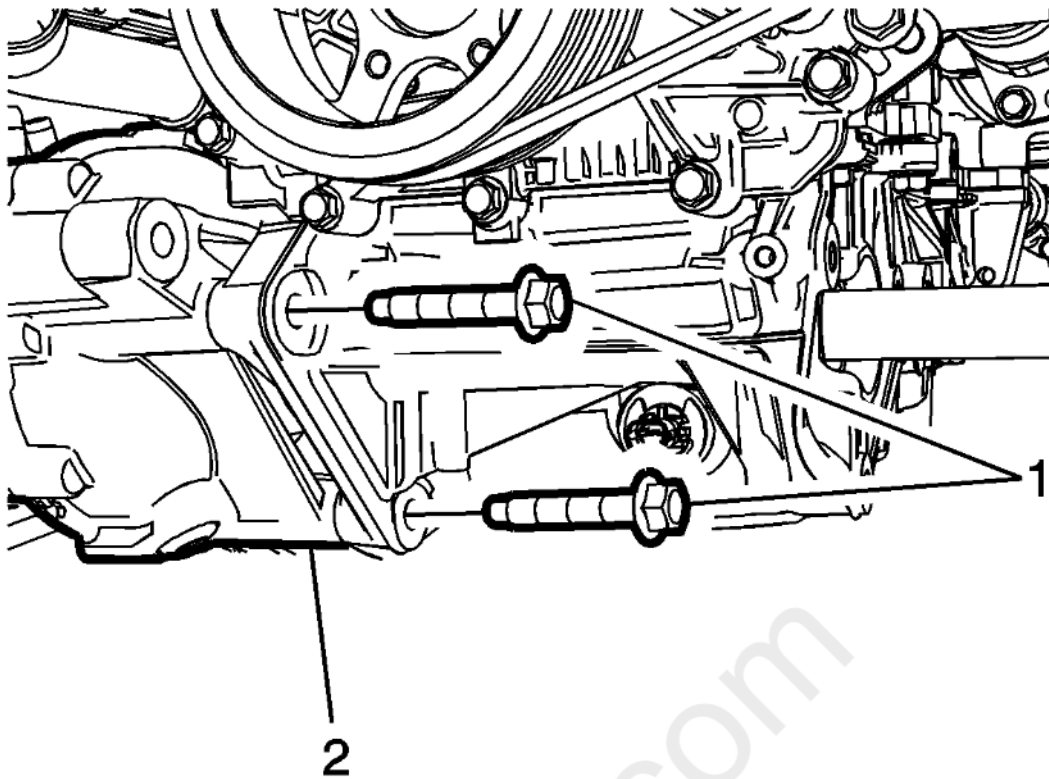


Fig. 18: Front Differential Carrier & Front Oil Pan Mounting Bolts
 Courtesy of GENERAL MOTORS COMPANY

6. Tighten the front differential carrier front and rear bolts as follows:

CAUTION: Refer to **Fastener Caution** .

1. Tighten the front differential carrier bolts first pass evenly to 30 N.m (22 lb ft).
2. Tighten the front differential carrier bolts a second pass an additional 180 degrees using the **EN-45059** sensor.
3. Tighten the rear differential carrier bolts first pass evenly to 30 N.m (22 lb ft).
4. Tighten the front differential carrier bolts a second pass an additional 90 degrees using the **EN-45059** sensor.
7. Remove the transmission jack from the front differential carrier.
8. Using the engine support fixture, carefully raise the engine assembly to it's original position.
9. Install the front wheel drive intermediate shaft housing. Refer to **Front Wheel Drive Intermediate Shaft Housing Replacement**.
10. Install the heater coolant pump bracket bolts and reposition the pump from the differential. Refer to **Heater Coolant Pump Replacement (LTG without HP9)** **Heater Coolant Pump Replacement (LGW)** **Heater Coolant Pump Replacement (LGX)** **Heater Coolant Pump Replacement (LTG with HP9)** .
11. Install the left front wheel drive shaft. Refer to **Front Wheel Drive Shaft Replacement - Left Side** .
12. Install the right front wheel drive shaft. Refer to **Front Wheel Drive Shaft Replacement - Right Side** .
13. Install the front propeller shaft. Refer to **Front Axle Propeller Shaft Replacement (LGX, LGW)**

14. Install the drivetrain and front suspension frame assembly. Refer to [Drivetrain and Front Suspension Cradle Removal and Installation](#).
15. Fill the front differential. Refer to [Front Differential Carrier Lubricant Level Inspection](#).
16. Lower the vehicle.

FRONT DIFFERENTIAL CARRIER COVER AND GASKET REPLACEMENT

Removal Procedure

1. Remove the front differential carrier assembly. Refer to [Front Differential Carrier Assembly Replacement](#)
2. Remove the carrier side cover bolts (1).

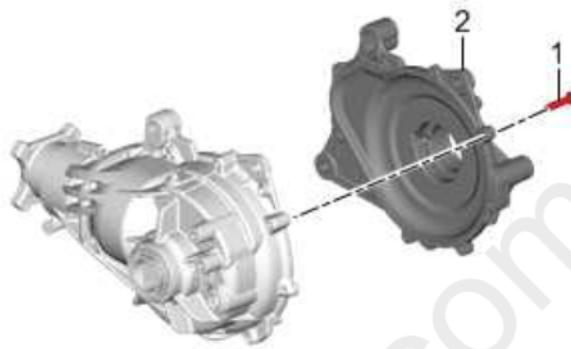


Fig. 19: Carrier Side Cover Bolts

Courtesy of GENERAL MOTORS COMPANY

3. Using the appropriate tool in the pry tabs, remove the carrier side cover (2).

Installation Procedure

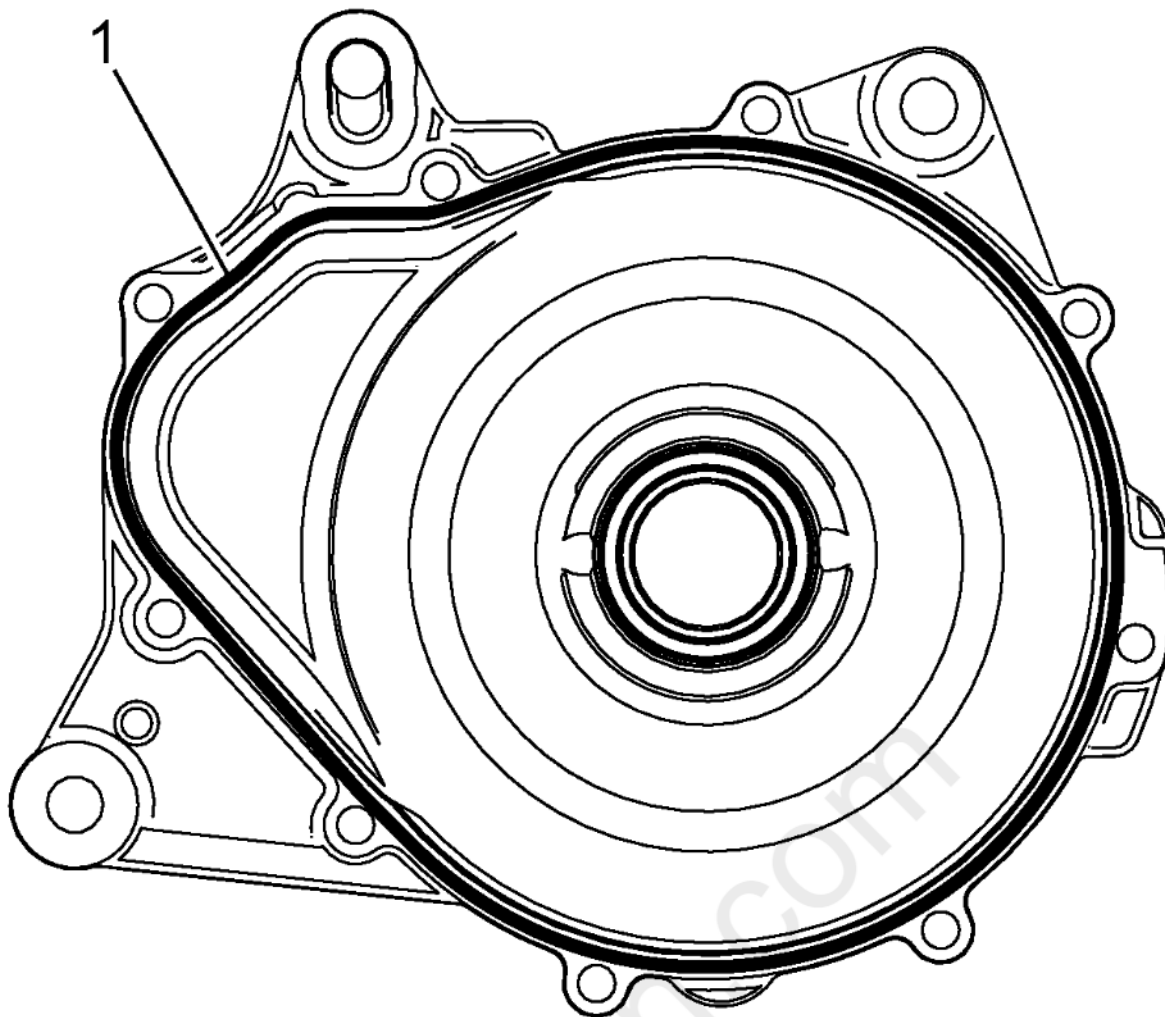


Fig. 20: RTV Sealant

Courtesy of GENERAL MOTORS COMPANY

1. Apply a 3 mm (0.118 in) bead of RTV sealant (1) on the carrier cover before Installation. Refer to [Adhesives, Fluids, Lubricants and Sealers](#)
2. Align the bolt holes and push the carrier side cover (2) onto the differential carrier evenly.

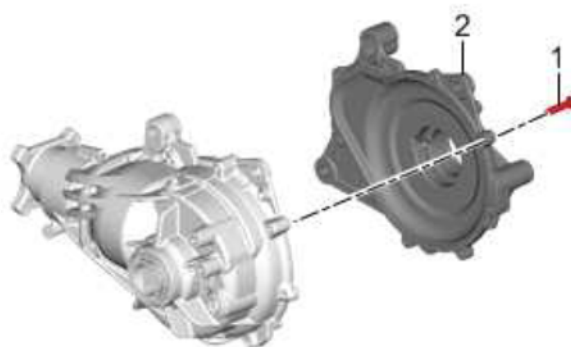


Fig. 21: Carrier Side Cover Bolts

Courtesy of GENERAL MOTORS COMPANY

3. Start the cover bolts (1) and hand tighten.
4. Tighten the side cover retaining bolts (1) to 54 N.m (40 lb ft) in a criss-cross pattern.

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

5. Install the front differential carrier assembly. Refer to [Front Differential Carrier Assembly Replacement](#)
6. Install the right front wheel drive shaft. Refer to [Front Wheel Drive Shaft Replacement - Right Side](#)
7. Fill the differential with fluid. Refer to [Front Differential Carrier Lubricant Replacement](#)

DIFFERENTIAL DRIVE PINION GEAR SEAL REPLACEMENT

Special Tools

DT-51977 Seal Installer

Equivalent regional tools: [Special Tools](#)

Removal Procedure

1. Raise and support the vehicle. Refer to [Lifting and Jacking the Vehicle](#)
2. Remove the axle assembly from the vehicle. Refer to [Front Differential Carrier Assembly Replacement](#)
3. Using a torque wrench, measure and record the pinion rotational torque.

NOTE: Torque reading must be taken with a constant rotational speed. Do not measure break away torque.

4. Apply an alignment mark (3) on the pinion flange nut (1), the pinion shaft (2) and the pinion flange (4).

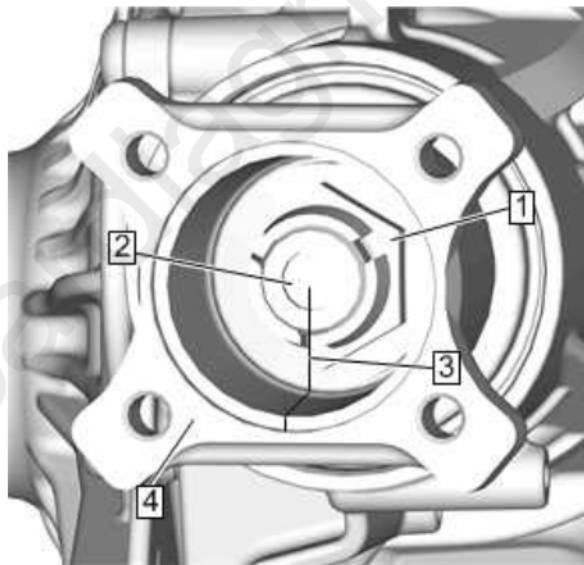


Fig. 22: Pinion Flange Nut And Pinion Shaft

Courtesy of GENERAL MOTORS COMPANY

NOTE: Due to axle imbalance concerns, it is necessary to make sure, pinion nut-to-shaft orientation is maintained. If alignment marks are not visible, apply appropriate marks before removing pinion nut.

5. Use a flange wrench, remove the pinion flange nut (1).

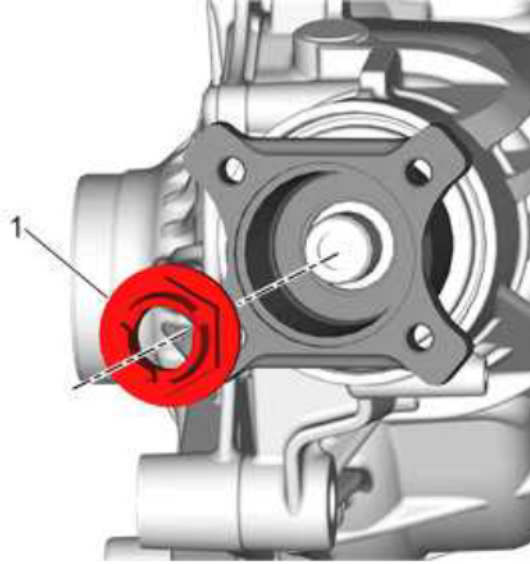


Fig. 23: Pinion Flange Nut

Courtesy of GENERAL MOTORS COMPANY

6. Apply an alignment mark (2) on the pinion flange (3) to the pinion shaft (1) and should be aligned after nut has been removed.

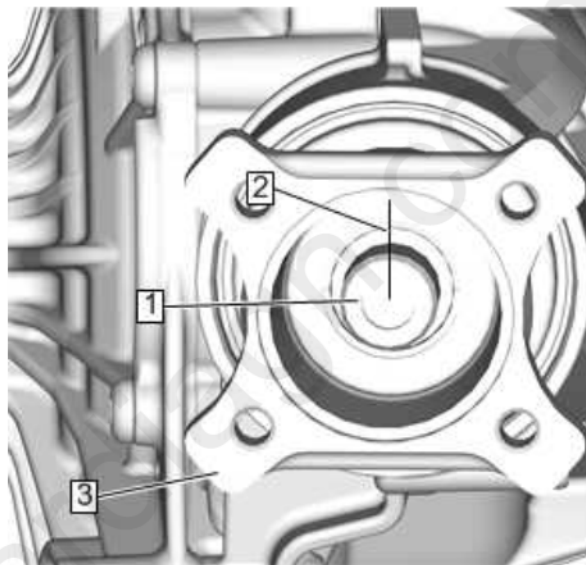


Fig. 24: Pinion Flange And Pinion Shaft

Courtesy of GENERAL MOTORS COMPANY

NOTE: Due to axle imbalance concerns, it is necessary to make sure pinion flange-to shaft orientation is maintained. If alignment marks are not visible, apply appropriate marks before removing pinion flange.

7. Using puller tool, remove pinion flange (1) from pinion shaft.

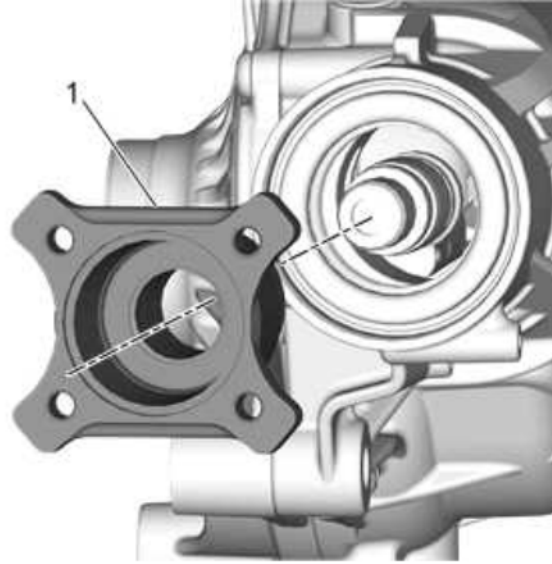


Fig. 25: Pinion Flange

Courtesy of GENERAL MOTORS COMPANY

8. Using a suitable tool, remove pinion seal (1) and discard.

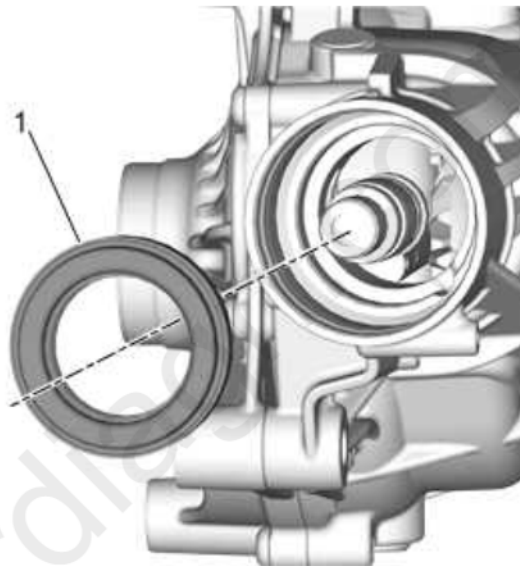


Fig. 26: Pinion Seal

Courtesy of GENERAL MOTORS COMPANY

Installation Procedure



Fig. 27: Drive Pinion Seal

Courtesy of GENERAL MOTORS COMPANY

1. Lubricate the drive pinion flange sealing surface of the drive pinion seal (1) with lubricant. Refer to [Adhesives, Fluids, Lubricants and Sealers](#)

NOTE: The area between the dust lip and sealing lip on input shaft seal has to be filled by 50 percent with lubricant.

2. Using the **DT-51977** seal installer (1), install the new pinion seal in the pinion housing.

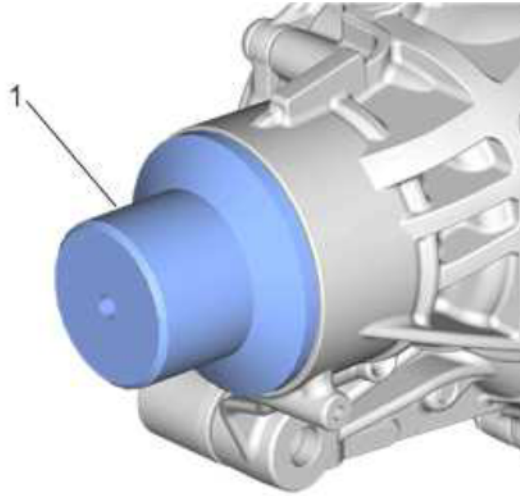


Fig. 28: DT-51977 Seal Installer
Courtesy of GENERAL MOTORS COMPANY

3. Install pinion flange into position. Align index marks between pinion flange and pinion stem to maintain assembly balance and so that bearing preload is not exceeded.

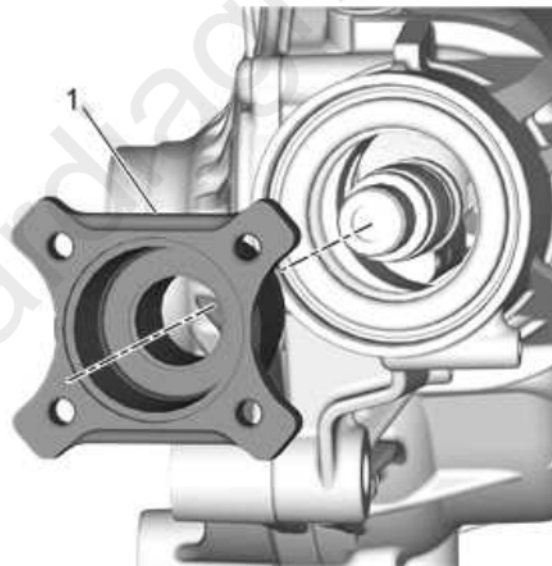


Fig. 29: Pinion Flange
Courtesy of GENERAL MOTORS COMPANY

4. Use installer tool, lightly tap on pinion flange until adequate pinion shaft threads are exposed.
5. Clean any thread locker from pinion flange nut and the pinion shaft threads. Apply thread locker to the threads. Refer to [Adhesives, Fluids, Lubricants and Sealers](#)
6. Install pinion flange nut. Apply axle grease to the pinion nut washer face prior to assembly. Using a flange wrench, hold flange and tighten the pinion flange nut in small increments until the pinion nut index mark aligns with the index marking on the pinion stem.

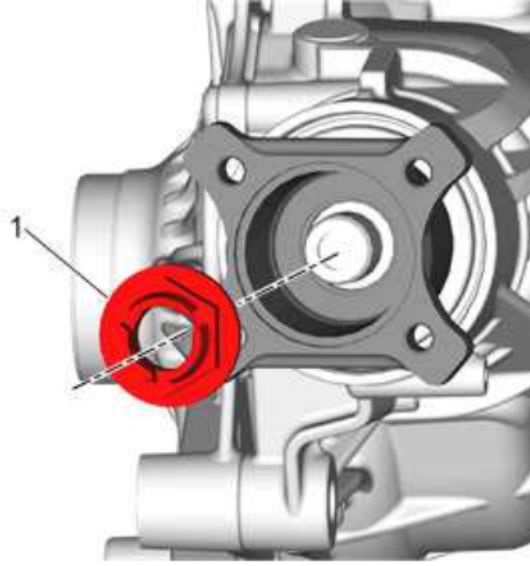


Fig. 30: Pinion Flange Nut

Courtesy of GENERAL MOTORS COMPANY

NOTE: If pinion nut index mark exceeds the pinion stem index mark, the unit must be discarded. If the pinion nut index mark falls short of the pinion stem index mark the unit will possibly generate an NVH concern.

7. Use a torque wrench, measure and record the pinion rotational torque.

NOTE: Torque reading must be taken with a constant rotational speed. Do not measure break away torque.

8. After torque reading has been obtained, compare reading to the recorded reading when removing the pinion flange. Difference in reading should be within $0 \text{ } \hat{A}, \hat{A} \pm 0.2$ ($0 \text{ } \hat{A}, \hat{A} \pm 1.7$ in lb). Value after repair should be higher due to tighter fit of new seal.

9. Install the front differential carrier assembly. Refer to [Front Differential Carrier Assembly Replacement](#)

10. Inspect the fluid level. Refer to [Front Differential Carrier Lubricant Level Inspection](#)

11. Lower the vehicle.

FRONT DIFFERENTIAL CARRIER LUBRICANT LEVEL INSPECTION

1. Raise and support the vehicle. Refer to [Lifting and Jacking the Vehicle](#) .
2. Clean any dirt from around the differential fill plug.

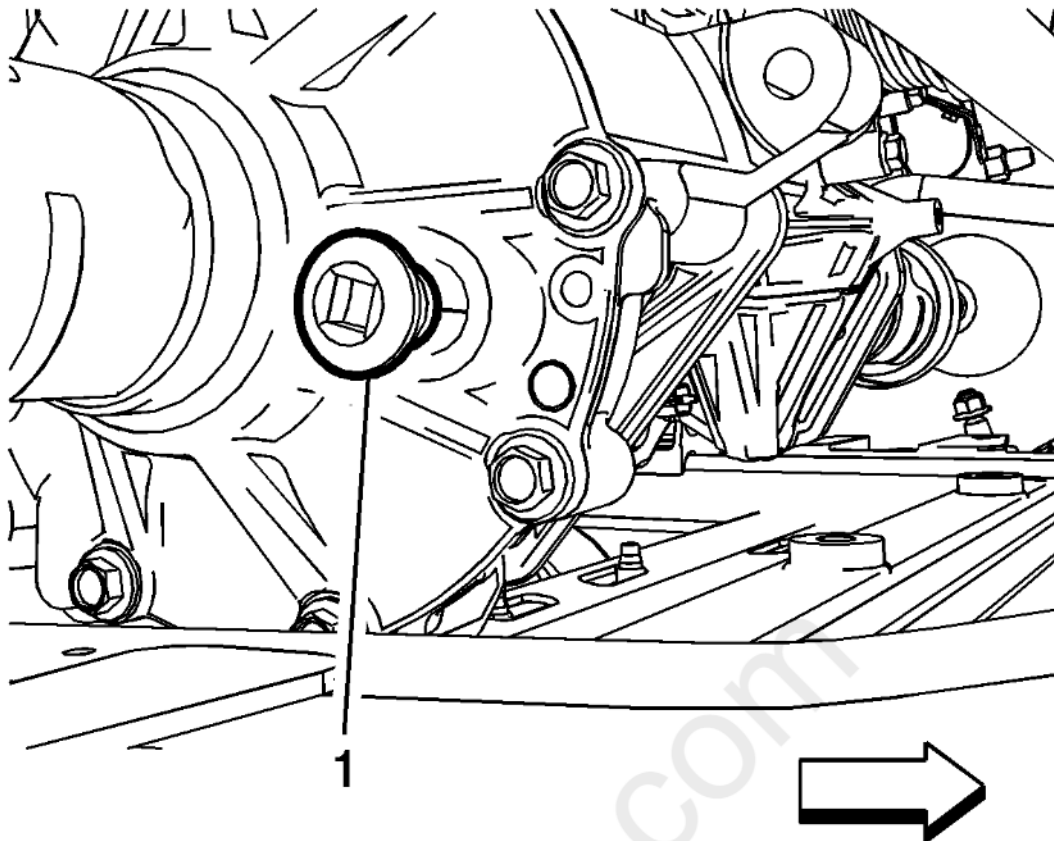


Fig. 31: Front Axle Fill Plug

Courtesy of GENERAL MOTORS COMPANY

3. Remove the fill plug (1) from the differential.
4. Check the differential fluid level, it should be 4 mm (0.16 in) below the bottom of the fill plug hole to no lower than 6 mm (0.25 in) below the opening.

NOTE: Do NOT overfill the front differential. Overfilling the front differential can cause leakage out the differential housing vent.

5. Add new fluid as necessary.
6. Fill the differential with the appropriate synthetic axle lubricant. Refer to [Approximate Fluid Capacities](#).
7. Install the differential fill plug to the differential and tighten to 33 N.m (24 lb ft).

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

8. Lower the vehicle.

DESCRIPTION AND OPERATION

FRONT DRIVE AXLE DESCRIPTION AND OPERATION

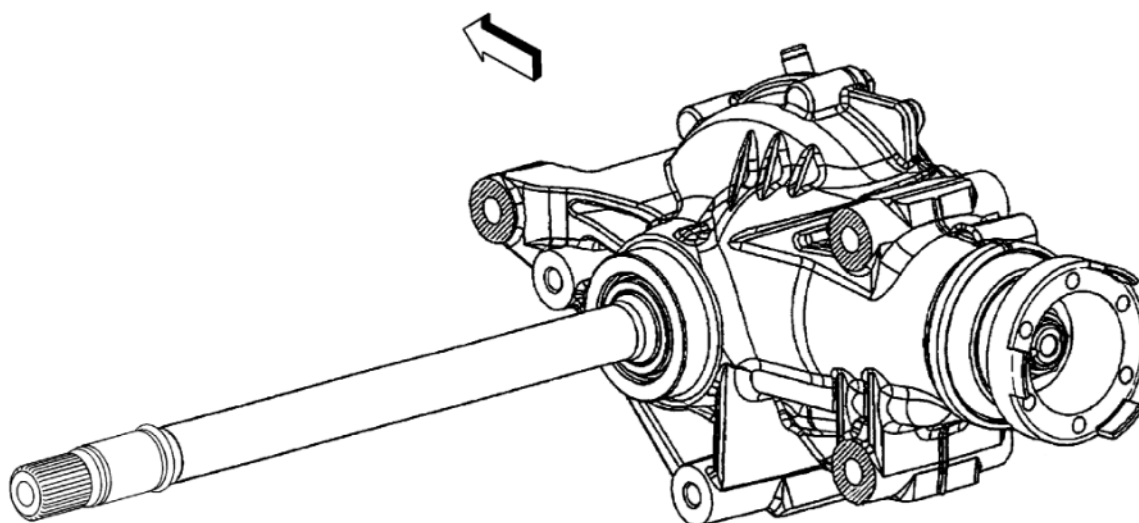


Fig. 32: Front Drive Axle

Courtesy of GENERAL MOTORS COMPANY

The differential housing, side cover and pinion housing 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 a tapered roller bearings. The pinion is positioned forward of the ring gear centerline. All models have a 7 5/8 inch ring gear.

SPECIAL TOOLS AND EQUIPMENT

SPECIAL TOOLS

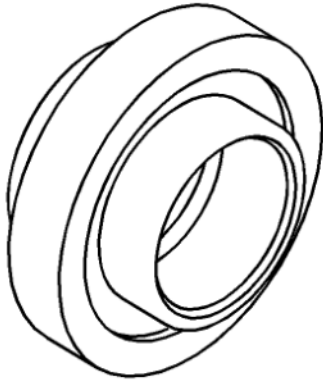
Illustration	Tool Number/Description
	DT-36366 J-36366 Pinion Seal Installer

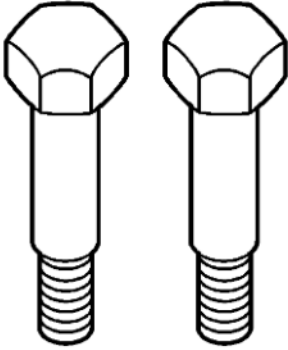
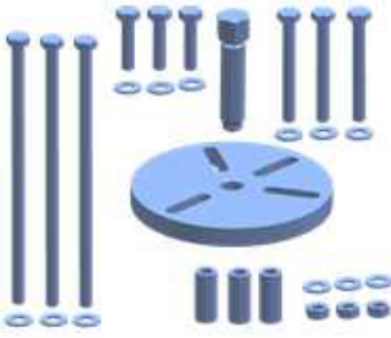
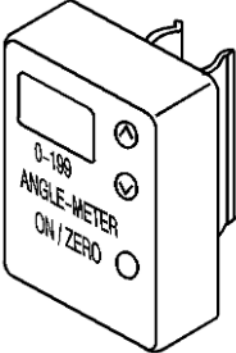
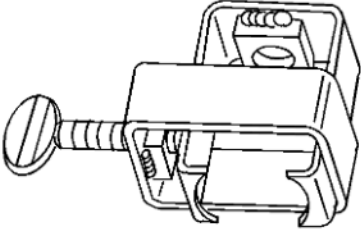
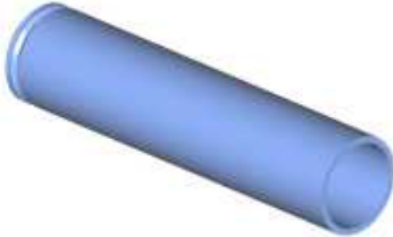
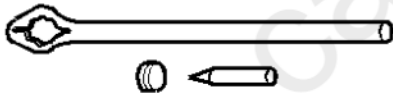
Illustration	Tool Number/Description
	DT-44873-2 J-44873-2 Shoulder Bolts
	DT-45019 J-45017 Flange and Pinion Cage Remover
	DT-51976 Seal Installer
	DT-51977 Seal Installer
	EN-45059 J-45059 Torque Angle Sensor Kit

Illustration	Tool Number/Description
	GE-6125-1B J-6125-1B Slide Hammer
	J-44467 Output Shaft Assembly Remover/Installer
	J-5590 Bearing and Seal Driver
	J-8614-01 Flange and Pulley Holding Tool