

2017 DRIVELINE/AXLE**Rear 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 Carrier Cover Seal	
Rear Axle Shaft Retaining Clip	
Rear Wheel Drive Shaft Flange Ring	

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)
Rear Wheel Drive Shaft Flange Nut	
First Pass	Tighten nut slowly until pinon endplay is just taken up.
Final Pass	0.40-0.57 N.m (36-60 lb in) of rotational torque.

Reusable Threaded Fastener Tightening Specifications

NOTE: <i>All fasteners listed in this table can be reused after removal.</i>	
Application	Specification
	Metric (English)
Differential Carrier Cover Bolts (200 mm Axle)	38 N.m (28 lb ft)
Differential Carrier Cover Bolts - Torx® Bolts (225 mm Axle)	105 N.m (77 lb ft)
Differential Carrier Cover Bolts - Hex Bolts (225 mm Axle)	
First Pass	90 N.m (66 lb ft)
Final Pass	plus 40 degrees
Differential Carrier Cover Bolt - Left Side (226 mm eLSD)	52 N.m (38 lb ft)
Differential Carrier Front Mounting Bolts	

NOTE:

All fasteners listed in this table can be reused after removal.

Application	Specification
	Metric (English)
• First Pass	50 N.m (37 lb ft)
• Final Pass	plus 90 degrees
Differential Carrier Rear Mounting Bolt	
• First Pass	220 N.m (162 lb ft)
• Final Pass	plus 60 degrees
Differential Clutch Cover Plug	19 N.m (14 lb ft)
Drain Plug (200/225 mm Axle)	45 N.m (33 lb ft)
Drain Plug (226 mm eLSD)	33 N.m (24 lb ft)
Fill Plug (200/225 mm Axle)	45 N.m (33 lb ft)
Fill Plug (226 mm eLSD)	33 N.m (24 lb ft)
Limited Slip Differential Clutch Bolt	20 N.m (15 lb ft)
Limited Slip Differential Clutch Pipe Connector - Female 16 mm	28 N.m (21 lb ft)
Limited Slip Differential Clutch Pipe Connector - Male 18 mm	31 N.m (23 lb ft)
Limited Slip Differential Clutch Valve Bolt	3 N.m (27 lb in)
Oil Cooler Fittings - 19 mm (225 mm mLSD Axle)	22 N.m (16 lb ft)
Rear Axle Vent (200/225 mm Axle)	50 N.m (37 lb ft)
Rear Axle Vent (226 mm eLSD)	10 N.m (89 lb in)

APPROXIMATE FLUID CAPACITIES

Application	Quantity	
	Metric	English
Rear Differential Module (200 mm Axle)	0.5 liters	0.53 quarts
Rear Differential Module (225 mm Axle)	1.1 liters	1.2 quarts
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	Brazil
Rear Differential Module (200 mm Axle) 4 CYL (LTG) & 6 CYL (LGX) with A/T (M5T)	Dexron Gear 75W90	88863089	88863090	Refer to Owner's Manual and Electronic Parts Catalog.
Rear Differential Module (225 mm Axle mLSD) 4 CYL (LTG) & 6 CYL (LGX) with M/T (M13) V8 CYL (LT1) with A/T (M5U) and M/T (MM6)	Dexron LS Gear 75W90	88862624	88862625	Refer to Owner's Manual and Electronic Parts Catalog.

VISUAL IDENTIFICATION

REAR AXLE IDENTIFICATION

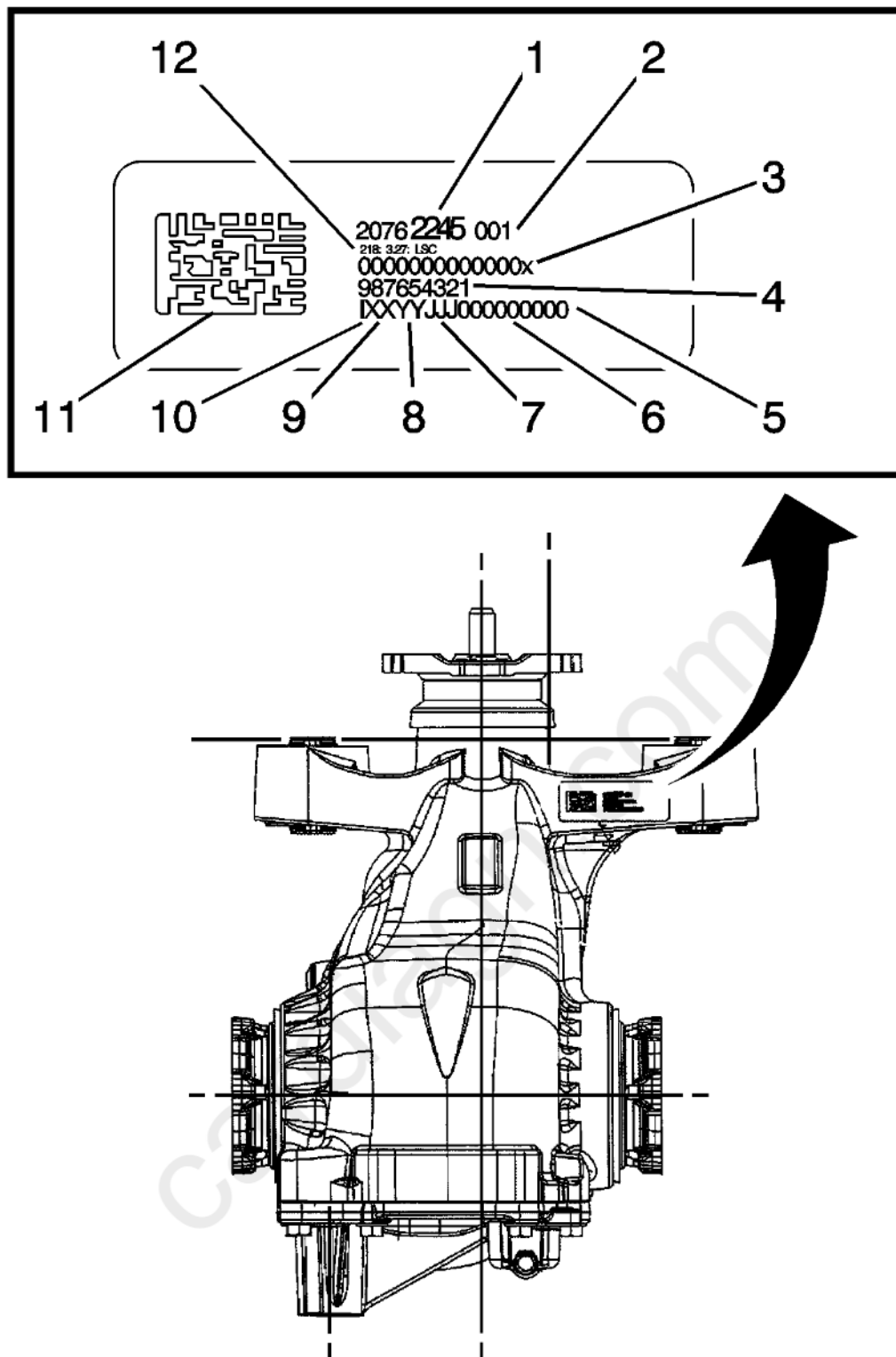


Fig. 1: Rear Axle Identification Information
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
1	GM 8-Digit Part Number
2	Revision Level
3	Vehicle Partitioning Product Structure (VPPS) Code
4	DUNS Number
5	Trace Code
6	8-Digit Unique Serial Number
7	Julian Date
8	Manufactured/Assembled Date
9	Plant and Shift Identifier

Callout	Component Name
10	Data Identifier
11	2D Bar Code
12	Gear OD/Ratio/Differential Type

DIAGNOSTIC INFORMATION AND PROCEDURES

SYMPTOMS - REAR DRIVE AXLE

Review the system and operation in order to familiarize yourself with the system functions. Refer to [Differential Carrier Assembly Description](#).

Rear Axle Noise

The proper diagnosis is an important part of rear axle repair. In axle work, one of the most difficult conditions to diagnose is noise. Locating a broken axle shaft or broken differential gear presents little or no problems, but locating and isolating axle noise can be an entirely different matter.

Any gear driven unit, especially an automotive drive axle where the engine torque multiplication occurs at a 90 degree turn in the driveline, produces a certain amount of noise. Therefore, an interpretation must be made for each vehicle in order to determine where the noise is normal or if a problem actually exists. A certain amount of noise must be expected and cannot be eliminated by conventional repairs or adjustment.

Normal axle noise can be described as a slight noise heard only at a certain speed or under unusual or remote conditions. For example, the noise tends to reach a peak at speeds from 60-100 km/h (40-60 mph) depending on road and load conditions or on gear ratio and tire size. This slight noise is in no way indicative of trouble in the axle assembly.

Driveline noises may confuse even the best technician. Vehicle noises coming from tires, transmission, propeller shaft, universal joints and front or rear wheel bearings are often mistaken for axle noise.

Visual/Physical Inspection

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

Symptom List

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

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

REAR 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 either ring and pinion gear replacement or adjustment, depending on the mileage of the gearset.

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 rear axle side bearing. This noise can be confused with rear wheel bearing noise. Inspect and replace the bearings and the affected components as required.

Rear Wheel Bearing Noise

A rough rear wheel bearing produces a noise which continues with the car 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/noisy rear wheel bearing can be heard by spinning the rear 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 differential case and replace the components as necessary.

Backlash Clunk

Excessive backlash clunk under acceleration or deceleration 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 Rear Axle Lubricant Level Inspection .	
Transmission noise	Repair or replace as required. Refer to Transmission Replacement (LGW Engine) , Transmission Replacement (LTG Engine) and/or Transmission Replacement (LGX Engine) .
Worn axle shaft constant velocity joints	NOTE: The outer joint is serviceable. If the inner joint is worn or damaged the entire wheel drive shaft must be replaced. Replace the constant velocity joints as required. Refer to Rear Wheel Drive Shaft Replacement - Left Side (LTG) , Rear Wheel Drive Shaft Replacement - Left Side (LGX, LGW) or Rear Wheel Drive Shaft Replacement - Right Side .
Worn, loose or damaged axle mount and/or bracket	Repair or replace the axle mount and/or bracket as required.

Cause	Correction
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. Refer to Rear Axle Lubricant Level Inspection. 2. If the noise continues, replace the differential carrier assembly. Refer to 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. Refer to Rear Axle Lubricant Level Inspection. 2. If the noise continues, replace the differential carrier assembly. Refer to Differential Carrier Assembly Replacement.

NOISY WHEN COASTING

Cause	Correction
IMPORTANT: Inspect for the proper gear oil levels prior to performing system diagnosis. Refer to Rear Axle Lubricant Level Inspection.	
Worn axle shaft constant velocity joints	NOTE: The outer joint is serviceable. If the inner joint is worn or damaged the entire wheel drive shaft must be replaced. Replace the constant velocity joints as required. Refer to Rear Wheel Drive Shaft Replacement - Left Side (LTG) , Rear Wheel Drive Shaft Replacement - Left Side (LGX, LGW) or Rear Wheel Drive Shaft Replacement - Right Side .
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. Check for the proper fluid level. Refer to Rear Axle Lubricant Level Inspection. 2. If the noise continues, replace the differential carrier assembly. Refer to Differential Carrier Assembly Replacement.

Cause	Correction
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. Refer to Rear Axle Lubricant Level Inspection. 2. If the noise continues, replace the differential carrier assembly. Refer to Differential Carrier Assembly Replacement.

INTERMITTENT NOISE

Cause	Correction
IMPORTANT: Inspect for the proper gear oil levels prior to performing system diagnosis. Refer to Rear Axle 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 and friction modifier additive. Refer to Adhesives, Fluids, Lubricants and Sealers .

CONSTANT NOISE

Cause	Correction
IMPORTANT: Inspect for the proper gear oil levels prior to performing system diagnosis. Refer to Rear Axle Lubricant Level Inspection. DEFINITION: A noise heard in the rear axle during all driving conditions. This noise may increase or decrease in volume based on different driving maneuvers and speeds.	
Low gear oil levels	Faulty oil seals or other type leaks may contribute to lower than required fluid levels. Refer to Rear Axle Lubricant Leak Diagnosis. Fill to the proper level with the correct gear oil and friction modifier additive. Refer to Adhesives, Fluids, Lubricants and Sealers and Rear Axle Lubricant Level Inspection.
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. Check for the proper fluid level. Refer to Rear Axle Lubricant Level Inspection. 2. If the noise continues, replace the differential carrier assembly. Refer to Differential Carrier Assembly Replacement.

Cause	Correction
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. Refer to Rear Axle Lubricant Level Inspection. 2. If the noise continues, replace the differential carrier assembly. Refer to Differential Carrier Assembly Replacement.

NOISY ON TURNS

Cause	Correction
IMPORTANT: • Inspect for the proper gear oil levels prior to performing system diagnosis. Refer to Rear Axle Lubricant Level Inspection. • 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. DEFINITION: A noise is present only when the vehicle turns.	
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 and friction modifier additive. Refer to Adhesives, Fluids, Lubricants and Sealers and Rear Axle Lubricant Level Inspection .

REAR AXLE LUBRICANT LEAK DIAGNOSIS

Rear axle lubricant leaks can occur at the following locations:

- Axle tube to differential carrier housing joint
- Axle shaft oil seal
- Axle housing porosity
- Differential housing cover gasket
- Drain plug
- Fill plug
- Pinion yoke oil seal
- Vent tube

Determining the Cause

While most rear 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.

Gaskets

A leak at a gasket is usually caused by a poor fit of the components on each side of the gasket surface. Inspect each component for distortion and for nicks or gouges that may prohibit the gasket from sealing properly.

Rear Axle Housing

Rear axle housing lubricant leaks usually occur at the following locations:

- Drain Plug
- Fill Plug

Drain and fill plug leaks are usually caused by a loose plug. These leaks can be repaired by either tightening the plug or by using an approved sealer on the threads on the plug.

Other leaks such as axle tube to differential carrier housing or porosity leaks require the replacement of the rear axle housing.

REPAIR INSTRUCTIONS

REAR AXLE LUBRICANT LEVEL INSPECTION

Inspection Procedure

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

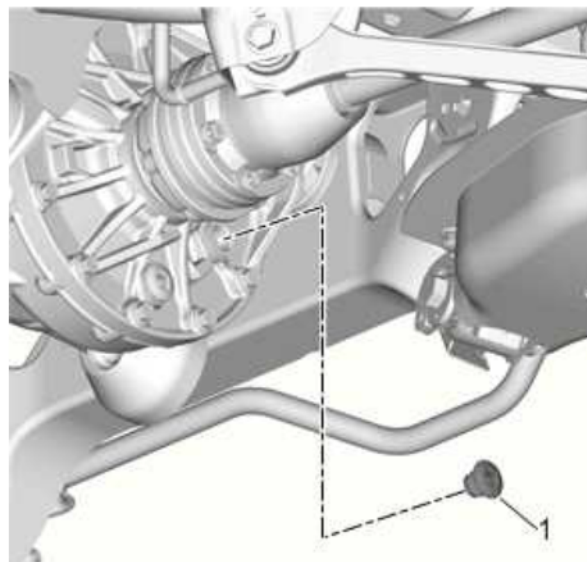


Fig. 2: Differential Fill Plug

Courtesy of GENERAL MOTORS COMPANY

2. Clean any dirt from around the differential fill plug (1).
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 2 mm (0.08 in) below the opening.
5. Add new fluid if necessary. Refer to [Adhesives, Fluids, Lubricants and Sealers](#).
6. Install the differential fill plug (1) to the differential and tighten to 45 N.m (33 lb ft).

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

7. Remove the support and lower the vehicle.

DIFFERENTIAL OIL REPLACEMENT

Removal Procedure

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

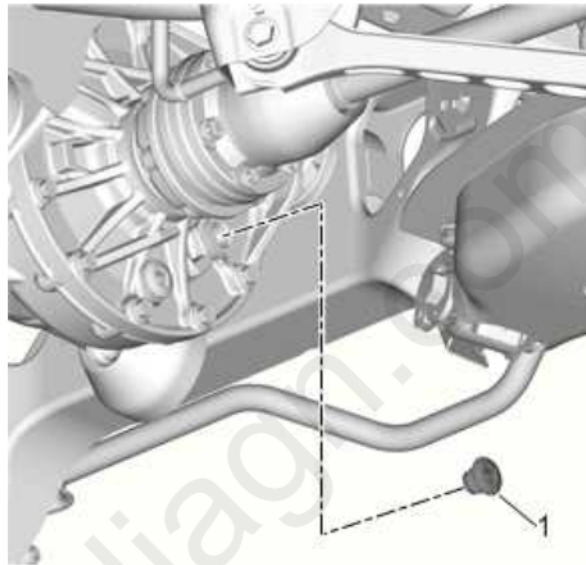


Fig. 3: Differential Fill Plug

Courtesy of GENERAL MOTORS COMPANY

3. Place a drain pan under the vehicle.

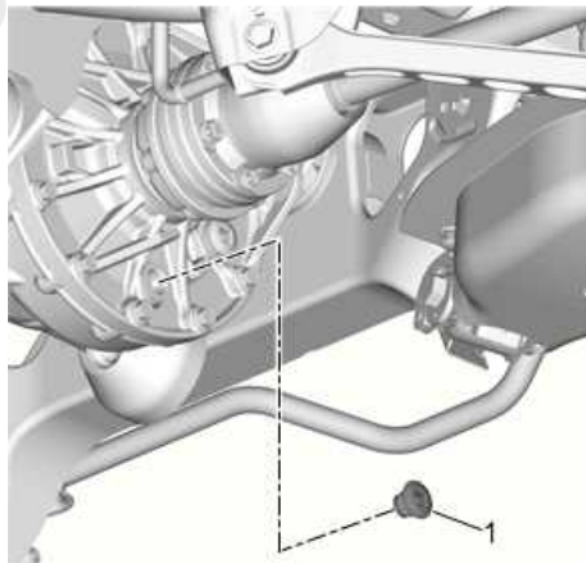


Fig. 4: Differential Fill Plug

Courtesy of GENERAL MOTORS COMPANY

4. Remove the drain plug (1).
5. Allow the differential to drain completely.

Installation Procedure

1. Install the drain plug (1) and tighten to 45 N.m (33 lb ft).

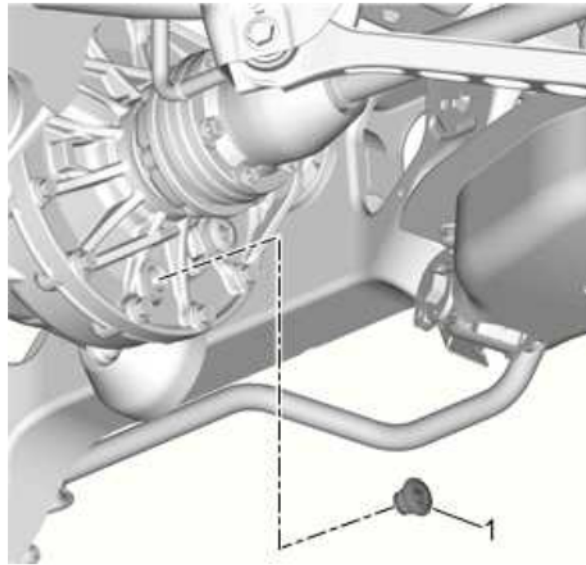


Fig. 5: Differential Fill Plug

Courtesy of GENERAL MOTORS COMPANY

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

2. Fill the rear differential to the proper level with the proper fluid. Refer to [Rear Axle Lubricant Level Inspection](#) and [Adhesives, Fluids, Lubricants and Sealers](#).
3. Install the rear differential fill plug (1) and tighten to 45 N.m (33 lb ft).

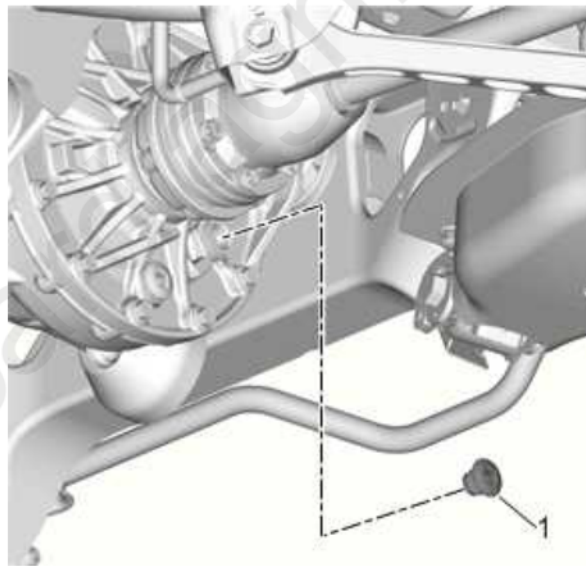


Fig. 6: Differential Fill Plug

Courtesy of GENERAL MOTORS COMPANY

4. Remove the support and lower the vehicle.

DIFFERENTIAL CARRIER BUSHING REPLACEMENT - FRONT (LEFT)

Special Tools

- CH-50342 Threaded Rod
- DT-48060-A Bushing Installer and Remover

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

Removal Procedure

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

WARNING: To avoid any vehicle damage, serious personal injury or death when major components are removed from the vehicle and the vehicle is supported by a hoist, support the vehicle with jack stands at the opposite end from which the components are being removed and strap the vehicle to the hoist.

WARNING: Refer to [Safety Glasses Warning](#) .

NOTE: All three bushings of the differential are different although they appear the same. Make sure that the correct part number is used. Mount orientation is critical for noise and vibration performance.

NOTE: The left differential carrier bushing has to be pressed in the opposite direction to the right due to clearance.

2. Remove the rear wheel assemblies. Refer to [Tire and Wheel Removal and Installation](#) .
3. Remove the wheel drive shaft assemblies. Refer to [Rear Wheel Drive Shaft Replacement - Left Side \(LTG\)](#) and/or [Rear Wheel Drive Shaft Replacement - Left Side \(LGX, LGW\)](#) .
4. Remove the differential assembly. Refer to [Differential Carrier Assembly Replacement](#) .
5. Remove the left front bushing from the differential using the **CH-50342** threaded rod (1) and the **DT-48060-A** bushing remover/installer (2).

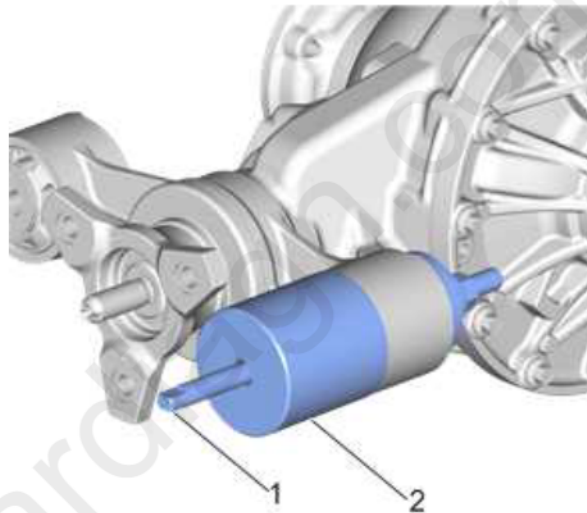


Fig. 7: Threaded Rod And Bushing Remover/Installer

Courtesy of GENERAL MOTORS COMPANY

NOTE: Observe and mark the orientation of the bushing with reference to the original position. This will minimize the potential of incorrect bushing installation.

NOTE: The left front bushing is a single use part and must be discarded after use.

Discard the bushing.

Installation Procedure

1. Pull the left front bushing into the differential using the **CH-50342** threaded rod (1) and the **DT-48060-A** bushing remover/installer (2).

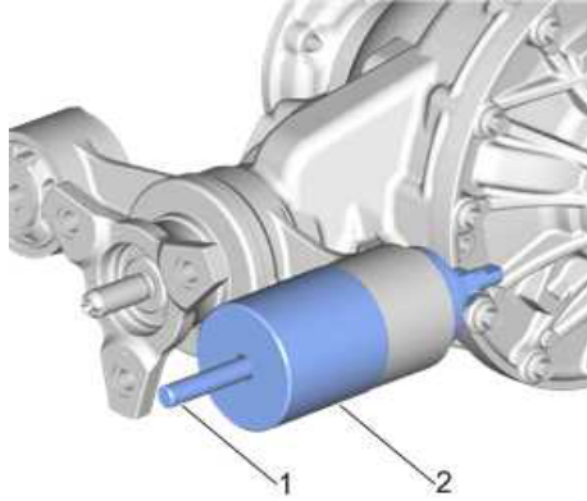


Fig. 8: Threaded Rod And Bushing Remover/Installer

Courtesy of GENERAL MOTORS COMPANY

NOTE: Before installing, the bushing must be correctly aligned and oriented. Mount orientation is critical for noise and vibration performance.

2. Pull the left front bushing until it is flush fitted.
3. Install the differential assembly. Refer to [Differential Carrier Assembly Replacement](#).
4. Install the wheel drive shaft assemblies. Refer to [Rear Wheel Drive Shaft Replacement - Left Side \(LTG\)](#) and/or [Rear Wheel Drive Shaft Replacement - Left Side \(LGX, LGW\)](#).
5. Install the rear wheel assemblies. Refer to [Tire and Wheel Removal and Installation](#).
6. Remove the safety stands.
7. Lower the vehicle to the ground.

DIFFERENTIAL CARRIER BUSHING REPLACEMENT - FRONT (RIGHT)

Special Tools

- CH-50342 Threaded Rod
- DT-48060-A Bushing Installer and Remover

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

Removal Procedure

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

WARNING: To avoid any vehicle damage, serious personal injury or death when major components are removed from the vehicle and the vehicle is supported by a hoist, support the vehicle with jack stands at the opposite end from which the components are being removed and strap the vehicle to the hoist.

WARNING: Refer to [Safety Glasses Warning](#).

NOTE: All three bushings of the differential are different although they appear the same. Make sure that the correct part number is used. Mount orientation is critical for noise and vibration performance.

NOTE: The left differential carrier bushing has to be pressed in the opposite direction to the right due to clearance.

2. Remove the rear wheel assemblies. Refer to [Tire and Wheel Removal and Installation](#).

3. Remove the wheel drive shaft assemblies. Refer to [Rear Wheel Drive Shaft Replacement - Right Side](#).
4. Remove the differential assembly. Refer to [Differential Carrier Assembly Replacement](#).
5. Remove the left front bushing from the differential using the **CH-50342** threaded rod (1) and the **DT-48060-A** bushing remover/installer (2).

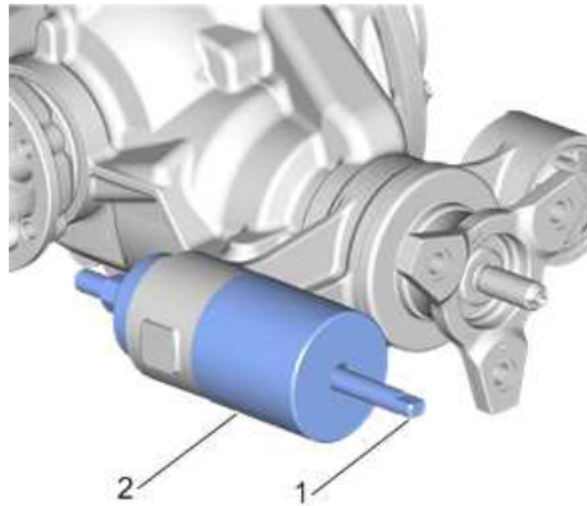


Fig. 9: Threaded Rod And Bushing Remover/Installer

Courtesy of GENERAL MOTORS COMPANY

NOTE: Observe and mark the orientation of the bushing with reference to the original position. This will minimize the potential of incorrect bushing installation.

NOTE: The left front bushing is a single use part and must be discarded after use.

Discard the bushing.

Installation Procedure

1. Pull the left front bushing into the differential using the **CH-50342** threaded rod (1) and the **DT-48060-A** bushing remover/installer (2).

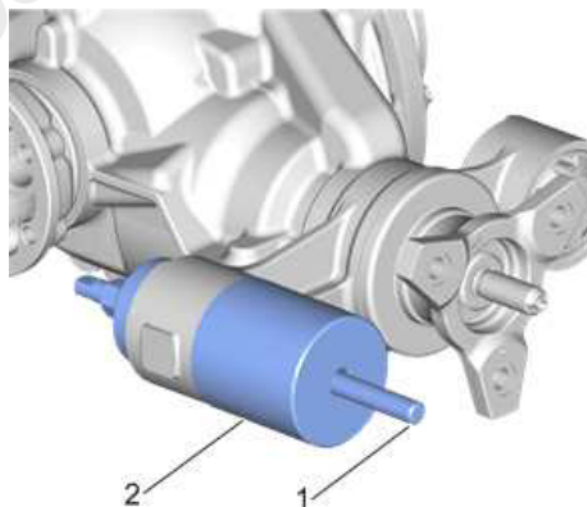


Fig. 10: Threaded Rod And Bushing Remover/Installer

Courtesy of GENERAL MOTORS COMPANY

NOTE: Before installing, the bushing must be correctly aligned and oriented. Mount orientation is critical for noise and vibration performance.

2. Pull the left front bushing until it is flush fitted.
3. Install the differential assembly. Refer to [Differential Carrier Assembly Replacement](#).
4. Install the wheel drive shaft assemblies. Refer to [Rear Wheel Drive Shaft Replacement - Right Side](#).
5. Install the rear wheel assemblies. Refer to [Tire and Wheel Removal and Installation](#).
6. Remove the safety stands.
7. Lower the vehicle to the ground.

DIFFERENTIAL CARRIER BUSHING REPLACEMENT - REAR

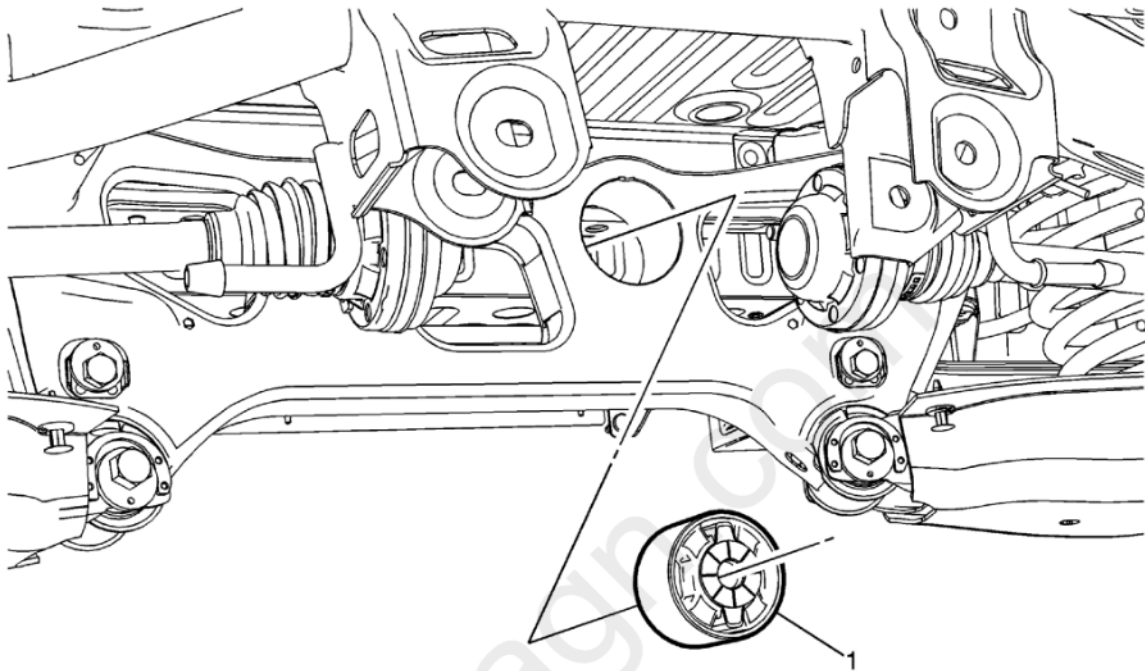


Fig. 11: Differential Carrier Bushing - Rear
 Courtesy of GENERAL MOTORS COMPANY

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 Differential Carrier Assembly Replacement	

Callout	Component Name
1	Differential Housing Support Bushing Rear Procedure 1. Mark the orientation of the bushing in the rear cradle assembly on both sides of the cradle and on the new bushing. 2. Measure the depth of the installed bushing prior to removal. 3. Mark the new bushing keeping the same orientation. 4. Using the DT-50806-5 installer and remover and DT-50806-3 installer and remover, remove and install the support bushing to the same orientation and depth. Special Tools DT-50806 Bushing Replacer For regional equivalent tools, refer to Special Tools.

REAR AXLE VENT REPLACEMENT

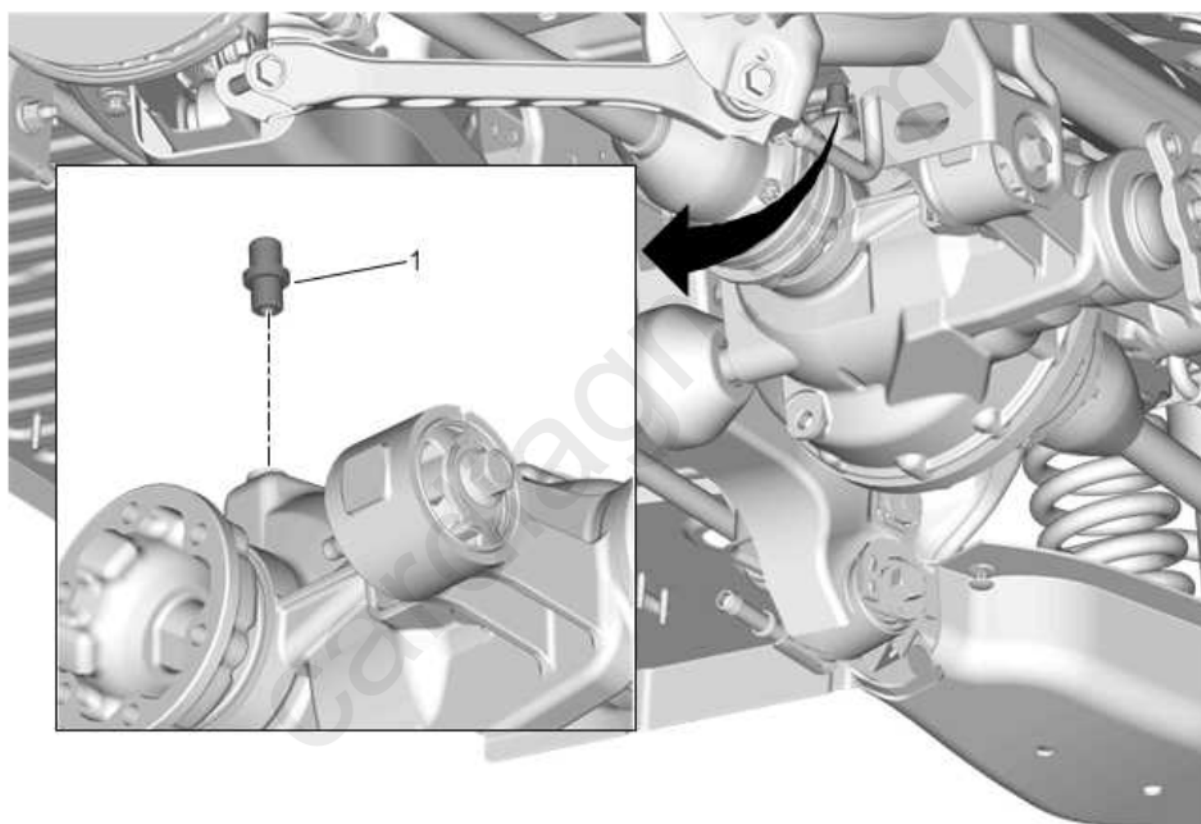


Fig. 12: Rear Axle Vent

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle .	
1	Rear Axle Vent CAUTION: Refer to Component Fastener Tightening Caution . Tighten 50 N.m (37 lb ft)

DIFFERENTIAL CARRIER COVER AND SEAL REPLACEMENT (200 MM AXLE)

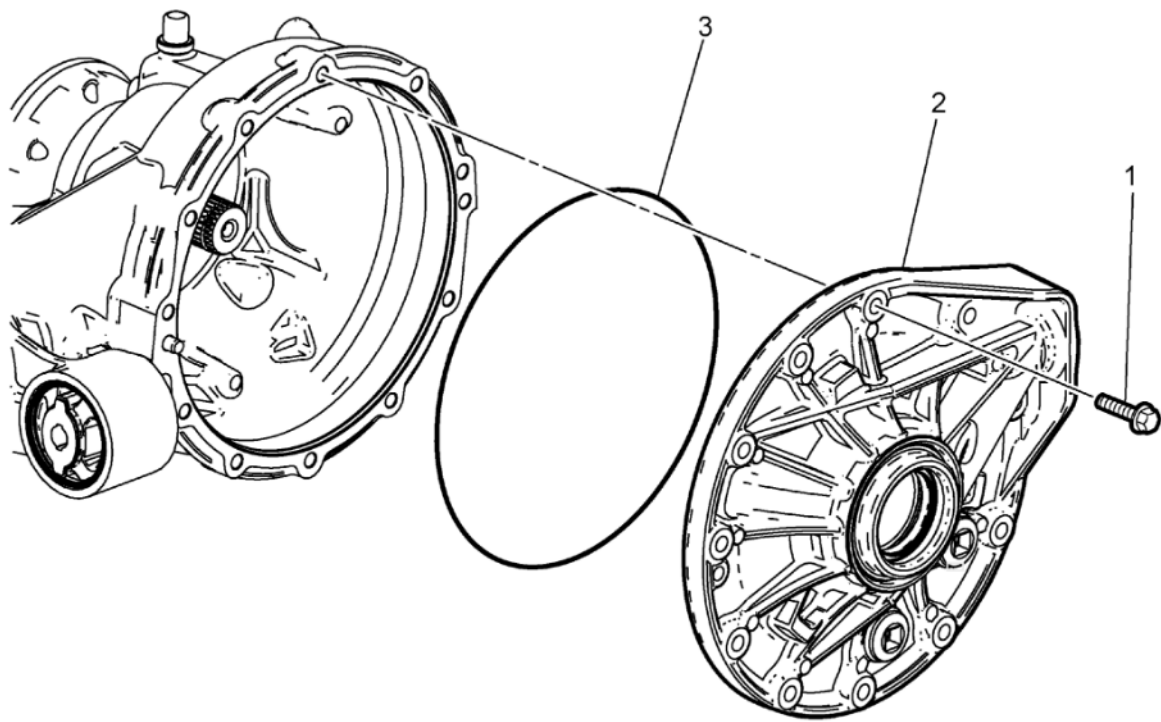


Fig. 13: Differential Carrier Cover and Seal Replacement (200 mm Axle)

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure 1. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle . 2. Remove the differential carrier assembly. Refer to Differential Carrier Assembly Replacement.	
1	Differential Carrier Cover Bolt (Qty: 11) CAUTION: Refer to Fastener Caution . Tighten 38 N.m (28 lb ft)
2	Differential Carrier Cover
3	Differential Carrier Cover Seal NOTE: DISCARD the seal.

DIFFERENTIAL CARRIER COVER AND SEAL REPLACEMENT (225 MM AXLE)

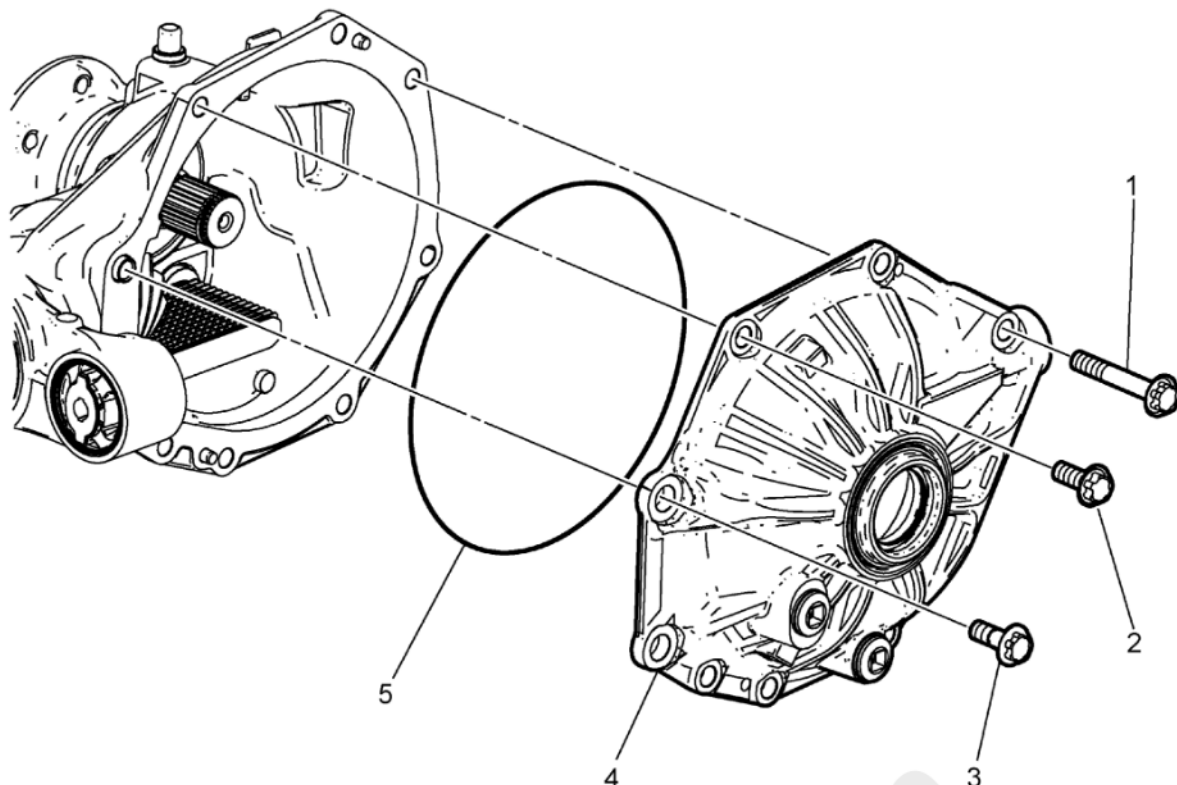


Fig. 14: Differential Carrier Cover and Seal (225 mm Axle)

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure 1. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle . 2. Remove the differential carrier assembly. Refer to Differential Carrier Assembly Replacement.	
1	Differential Carrier Cover Bolt (Qty: 1) CAUTION: Refer to Fastener Caution . Tighten 105 N.m (77 lb ft)
2	Differential Carrier Cover Bolt (Qty: 6) Tighten 105 N.m (77 lb ft)
3	Differential Carrier Cover Bolt (Qty: 2) Tighten First Pass: 90 N.m (66 lb ft) Final Pass: 40 degrees
4	Differential Carrier Cover
5	Differential Carrier Cover Seal NOTE: DISCARD the seal.

REAR AXLE SHAFT REPLACEMENT

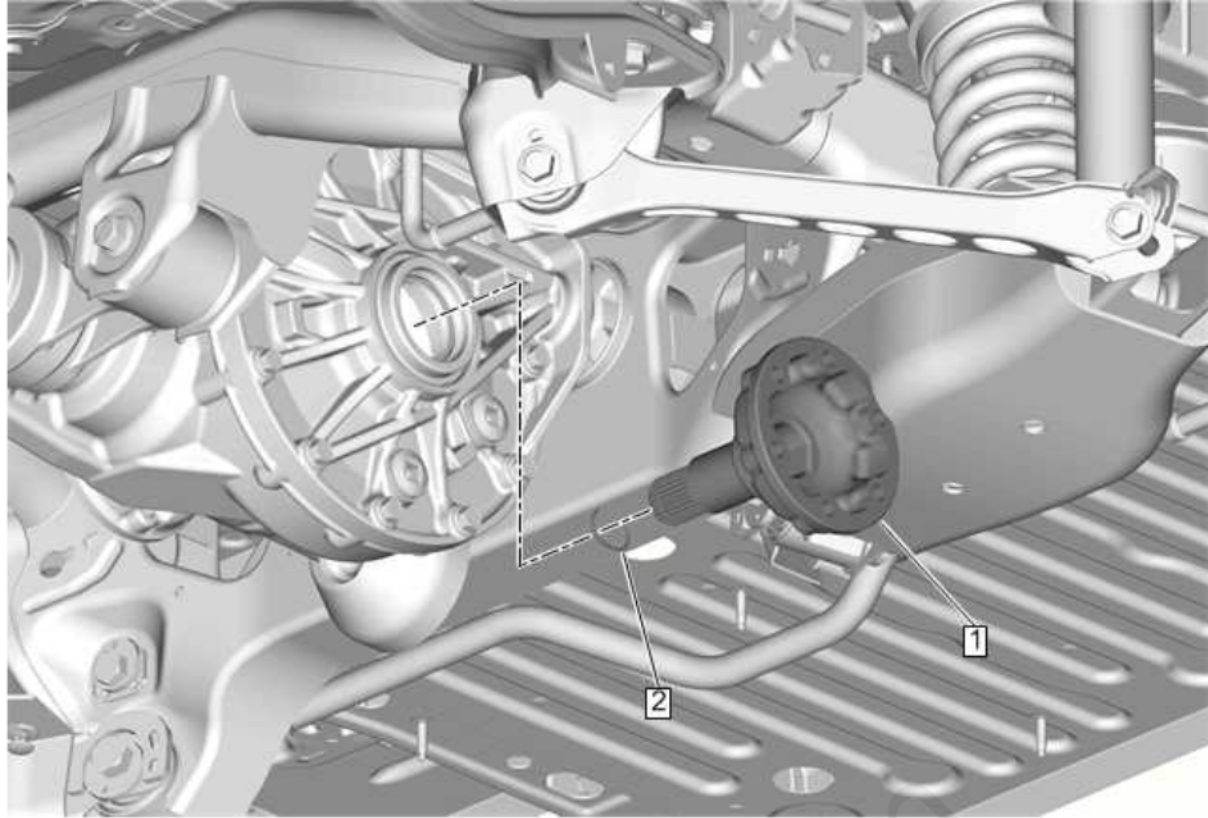


Fig. 15: Rear Axle Shaft

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure 1. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle . 2. Remove the rear wheel drive shaft. Refer to Rear Wheel Drive Shaft Replacement - Left Side (LTG) , Rear Wheel Drive Shaft Replacement - Left Side (LGX, LGW) or Rear Wheel Drive Shaft Replacement - Right Side .	
1	Rear Axle Shaft Procedure 1. Using the J-02619-A slide hammer and the J-45859 adapter, remove the rear axle shaft. 2. Using the appropriate tool, install the rear axle shaft Special Tools • J-02619-A Slide Hammer • J-45859 Adapter For regional equivalent tool, refer to Special Tools.
2	Rear Axle Shaft Retaining Clip Procedure Remove and discard the retaining clip. Replace with NEW only.

REAR AXLE SHAFT SEAL REPLACEMENT

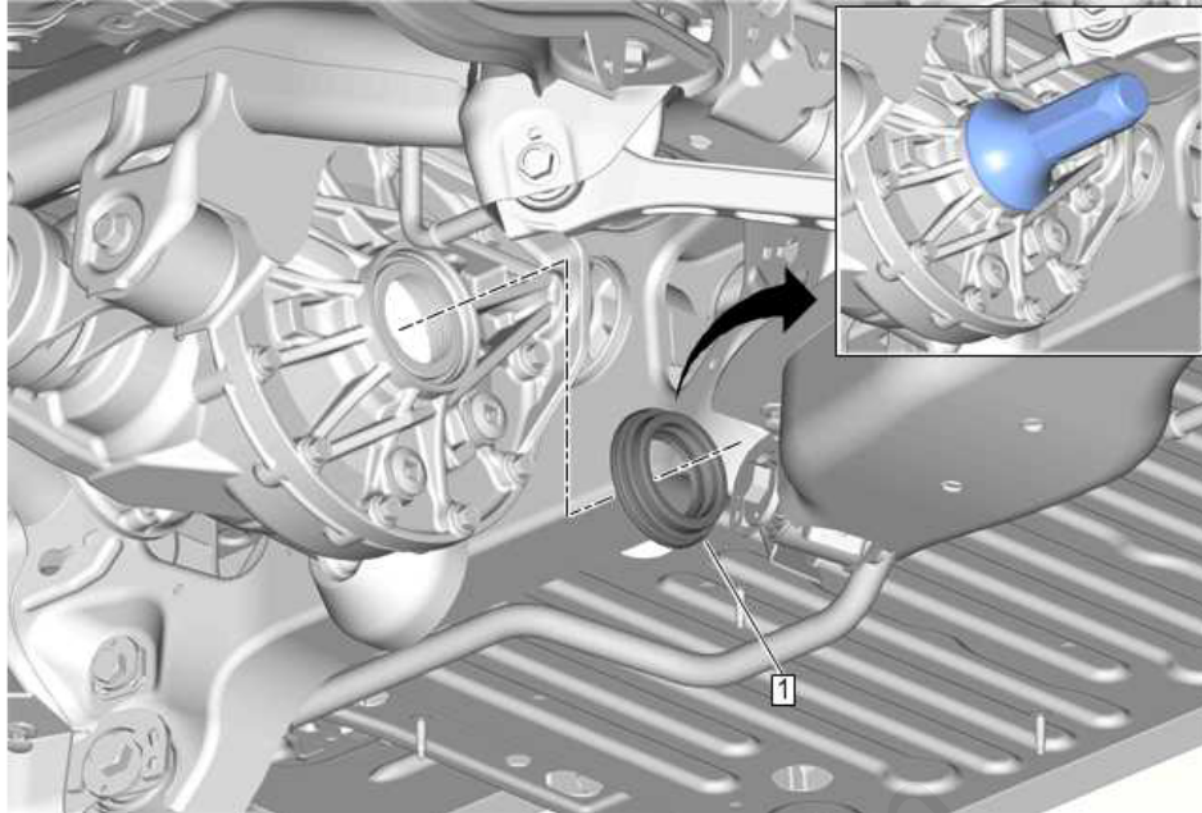


Fig. 16: Rear Axle Shaft Seal

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure 1. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle. 2. Remove the rear axle shaft. Remove to Rear Axle Shaft Replacement.	
1	Rear Axle Shaft Seal NOTE: • Prior to replacing the rear axle seal, due to leakage, inspect the rear axle vent to ensure the vent and area around the vent are free of debris. Debris that accumulates on and around the vent can inhibit the proper function of the vent and cause pressure to build up inside the axle causing lubricant to be pushed out and past the rear axle seal. • If debris is found, clean the vent, the area around the vent and the leakage from around the seal. Verify the rear axle lubricant level and add the proper lubricant if required. Re-inspect the rear axle seals for lubricant leakage when the vehicle returns for the next service. Procedure 1. Using a suitable tool, remove the rear axle shaft seal. 2. Using the J-28540-A installer, install the rear axle shaft seal. 3. Check the differential carrier for the proper fluid level. Refer to Rear Axle Lubricant Level Inspection. Special Tools J-28540-A Seal Installer For regional equivalent tools, refer to Special Tools.

REAR WHEEL DRIVE SHAFT FLANGE REPLACEMENT

Special Tools

- EN-24420-A Crankshaft Balancer Puller
- DT-51263 Flange Tool
- DT-52058 Pinion Shaft Protector

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

Removal Procedure

1. Raise and support the vehicle. Refer to [Lifting and Jacking the Vehicle](#).
2. Disconnect the propeller shaft assembly from the rear wheel drive shaft flange. Refer to [Propeller Shaft Replacement](#)

CAUTION: Do NOT allow the propeller shaft to hang from the center bearing assembly. Support the propeller shaft if the coupler is disconnected from the rear drive module input flange. Failure to support the propeller shaft may lead to damage to the center support assembly.

3. Ensure the area (1) is clear of all debris and corrosion prior to the retaining ring removal and EN-24420-A puller usage.

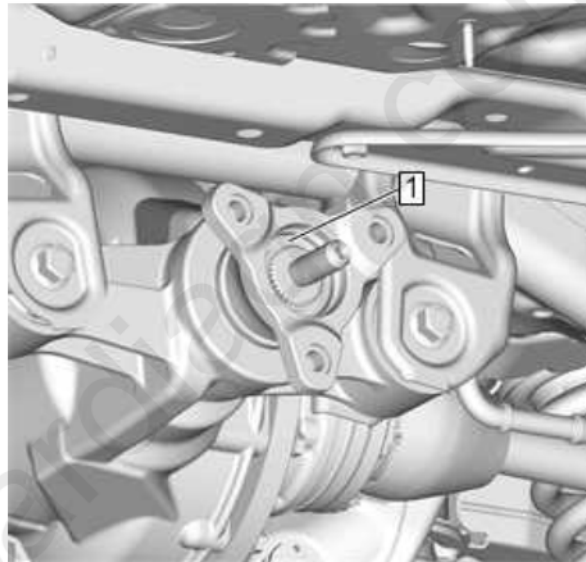


Fig. 17: Wheel Drive Shaft Flange
Courtesy of GENERAL MOTORS COMPANY

4. Remove and discard the rear wheel drive shaft flange ring (1). Replace with NEW only.

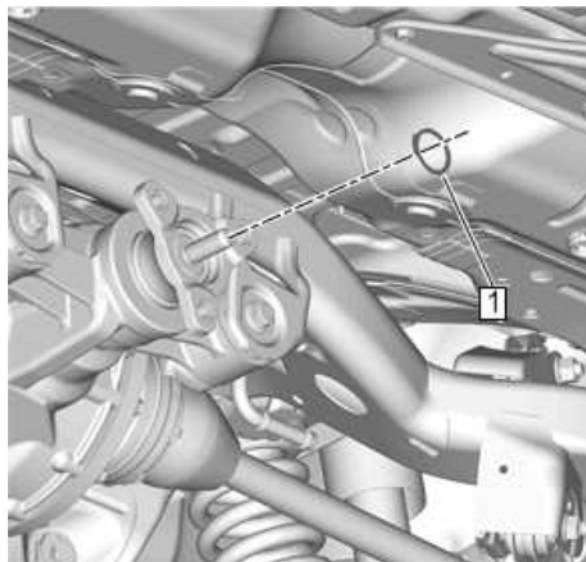


Fig. 18: Rear Wheel Drive Shaft Flange Ring
Courtesy of GENERAL MOTORS COMPANY

5. The pinion and rear wheel drive shaft flange are a balanced assembly. Prior to disassembly, mark both components (1) to ensure reassembly in original orientation.

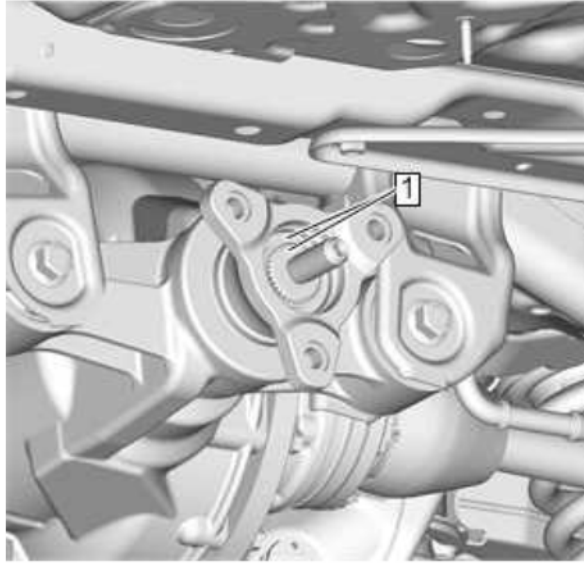


Fig. 19: Pinion And Rear Wheel Drive Shaft Flange
Courtesy of GENERAL MOTORS COMPANY

6. Using the **EN-24420-A** puller (1) and the **DT-52058** pinion shaft protector (2), remove the rear wheel drive shaft flange.

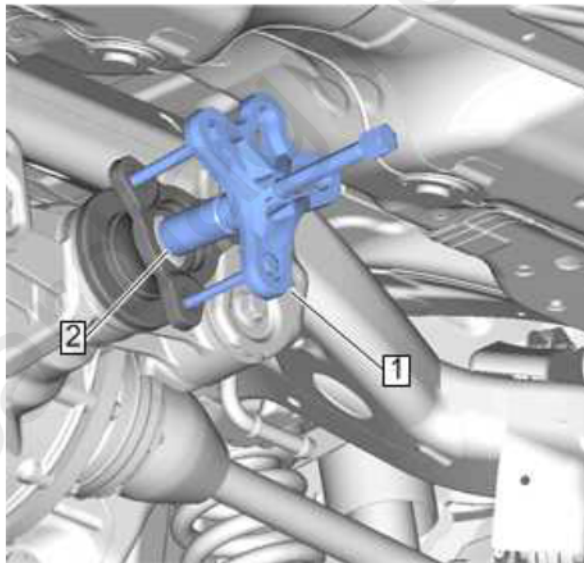


Fig. 20: Puller And Pinion Shaft Protector
Courtesy of GENERAL MOTORS COMPANY

Installation Procedure

1. Prior to reassembly ensure the following areas are free of debris and corrosion:

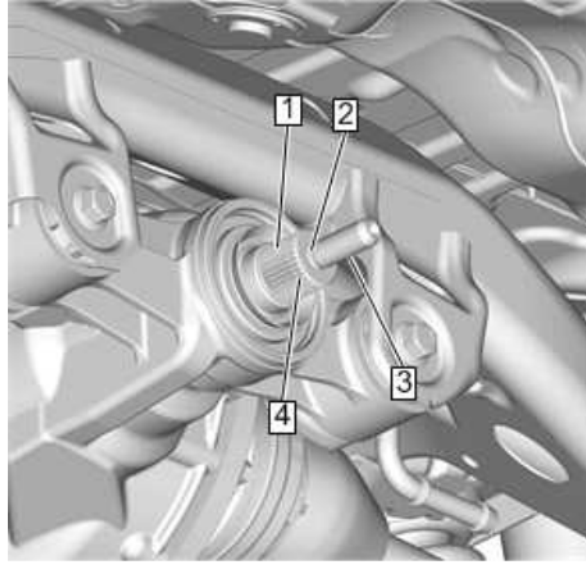


Fig. 21: Rear Wheel Drive Shaft Flange Components

Courtesy of GENERAL MOTORS COMPANY

1. Pinion spline-to-rear wheel drive shaft flange spline interface (1).
 2. Rear wheel drive shaft flange installation tool engagement groove (2).
 3. Pinion gear pilot stem shaft (3).
 4. Rear wheel drive shaft flange retaining ring groove (4).
2. Position the rear wheel drive shaft flange (1) on the pinion shaft.

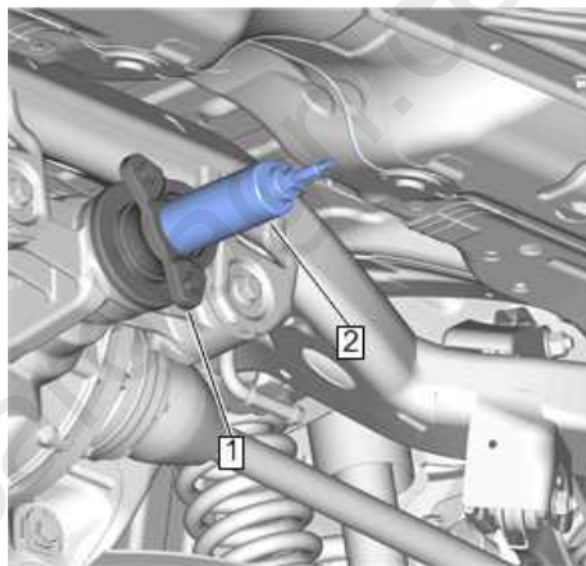


Fig. 22: Rear Wheel Drive Shaft Flange And Flange Tool

Courtesy of GENERAL MOTORS COMPANY

3. Using the **DT-51263** flange tool (2), install the rear wheel drive shaft flange until the pinion shaft end play is just taken up.
4. Install the NEW rear wheel drive shaft flange retaining ring (1)

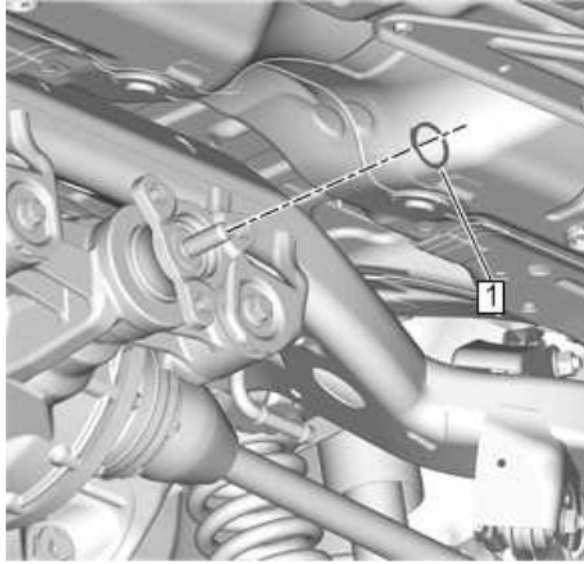


Fig. 23: Rear Wheel Drive Shaft Flange Ring
Courtesy of GENERAL MOTORS COMPANY

5. Check the fluid level of the rear drive axle. Refer to [Rear Axle Lubricant Level Inspection](#).
6. Install the propeller shaft assembly. Refer to [Propeller Shaft Replacement](#)
7. Remove the support and lower the vehicle.

DIFFERENTIAL CARRIER ASSEMBLY REPLACEMENT

Removal Procedure

1. Raise and support the vehicle. Refer to [Lifting and Jacking the Vehicle](#)
2. If necessary, drain the rear differential carrier assembly. Refer to [Differential Oil Replacement](#)
3. Remove the propeller shaft. Refer to [Propeller Shaft Replacement](#)
4. Separate the rear wheel drive shafts from the differential carrier assembly. Refer to [Rear Wheel Drive Shaft Replacement - Left Side \(LTG\)](#) , [Rear Wheel Drive Shaft Replacement - Left Side \(LGX, LGW\)](#) and/or [Rear Wheel Drive Shaft Replacement - Right Side](#)

NOTE: It is not necessary to completely remove the wheel drive axles from the vehicle. Only separate the rear wheel drive shafts from the differential carrier assembly and not from the wheel bearing and hub assembly.

5. Support the differential carrier assembly with a suitable hydraulic jack stand (1).

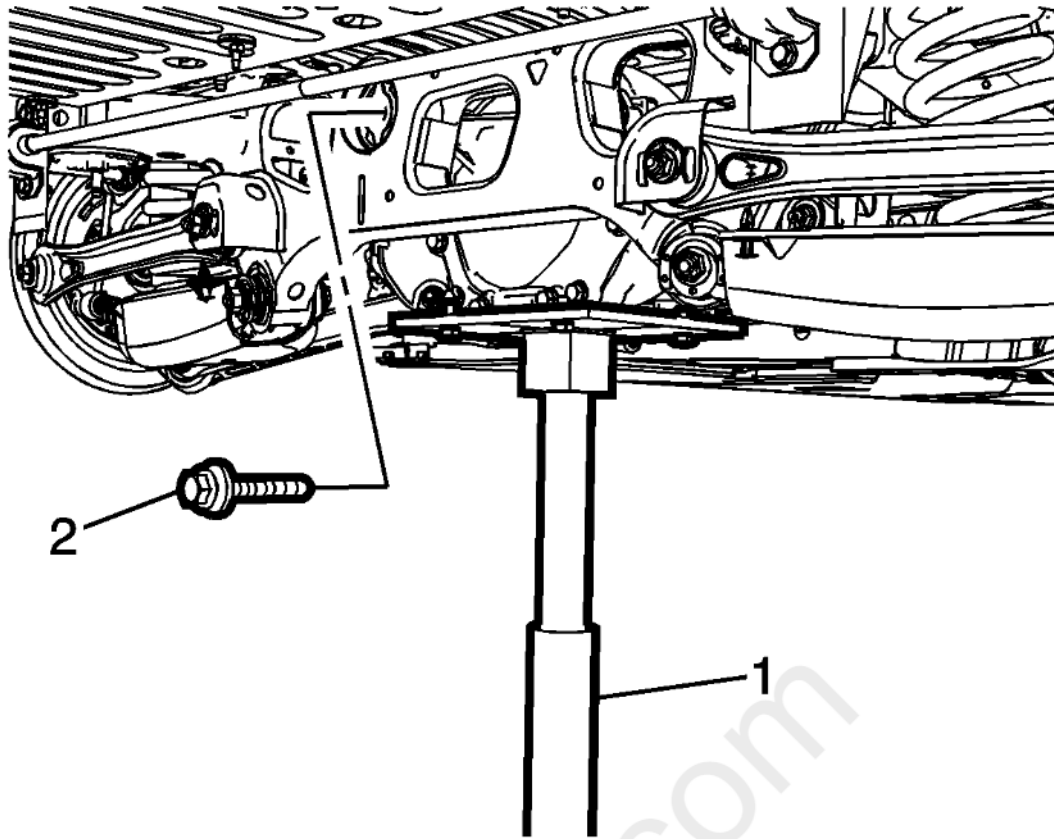


Fig. 24: Differential Carrier Rear Bolt & Washer

Courtesy of GENERAL MOTORS COMPANY

6. Remove the differential carrier rear bolt and washer (2).
7. Remove the 2 differential carrier front bolts (1).

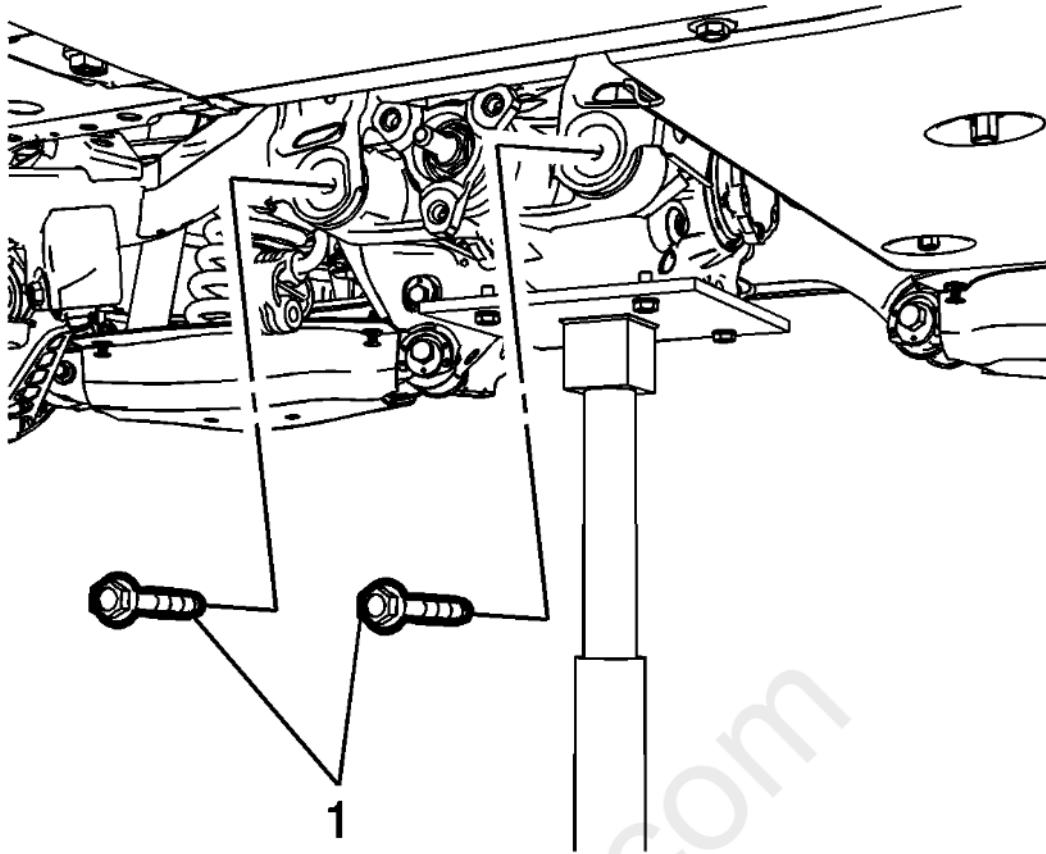


Fig. 25: Differential Carrier Front Bolts

Courtesy of GENERAL MOTORS COMPANY

8. Using the hydraulic jack stand, lower and remove the differential carrier assembly (1).

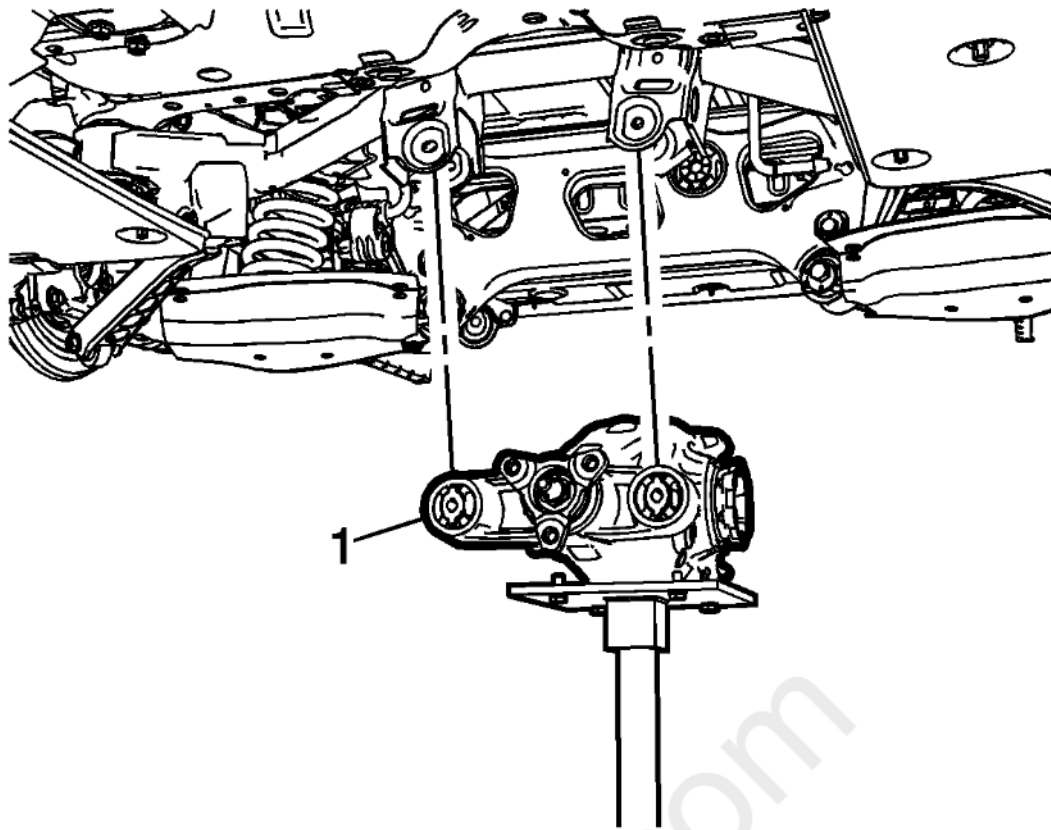


Fig. 26: Differential Carrier Assembly
Courtesy of GENERAL MOTORS COMPANY

Installation Procedure

1. Raise the differential carrier assembly (1) into position.

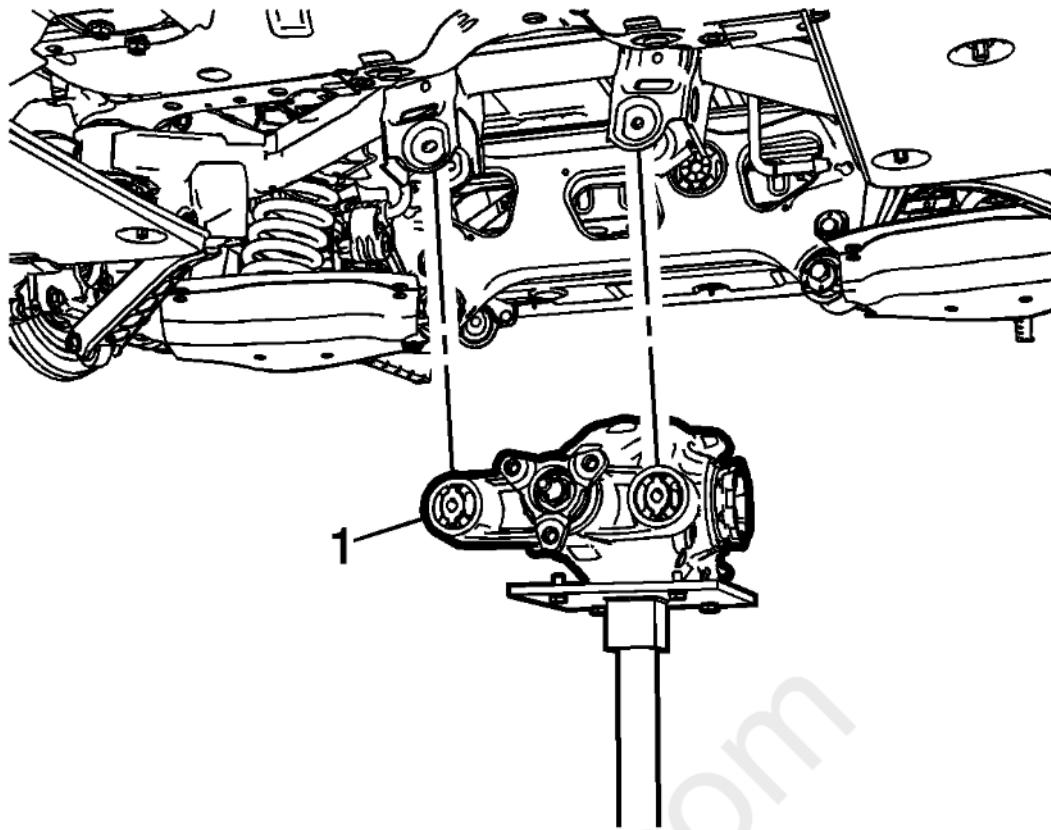


Fig. 27: Differential Carrier Assembly

Courtesy of GENERAL MOTORS COMPANY

2. Install the differential carrier rear bolt (1) and tighten to:

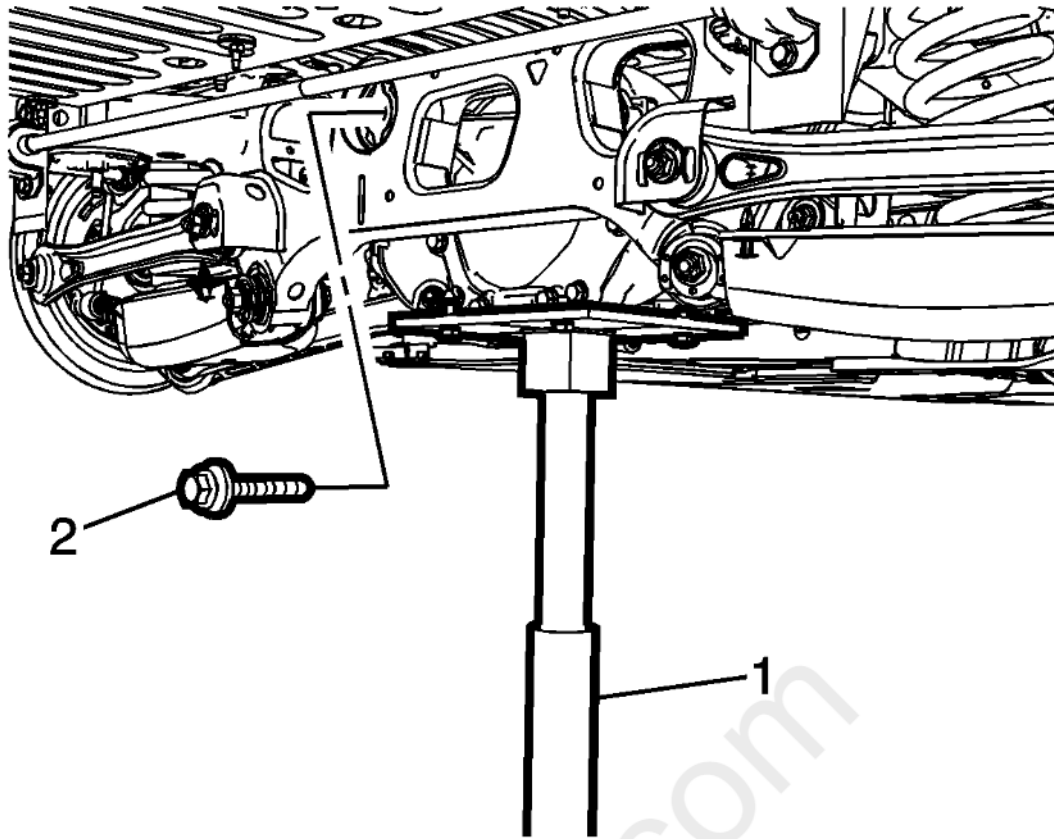


Fig. 28: Differential Carrier Rear Bolt & Washer

Courtesy of GENERAL MOTORS COMPANY

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

- First Pass: 220 N.m (162 lb ft)
- Final Pass: plus 60 degrees

3. Install the 2 differential carrier front bolts (1) and tighten to:

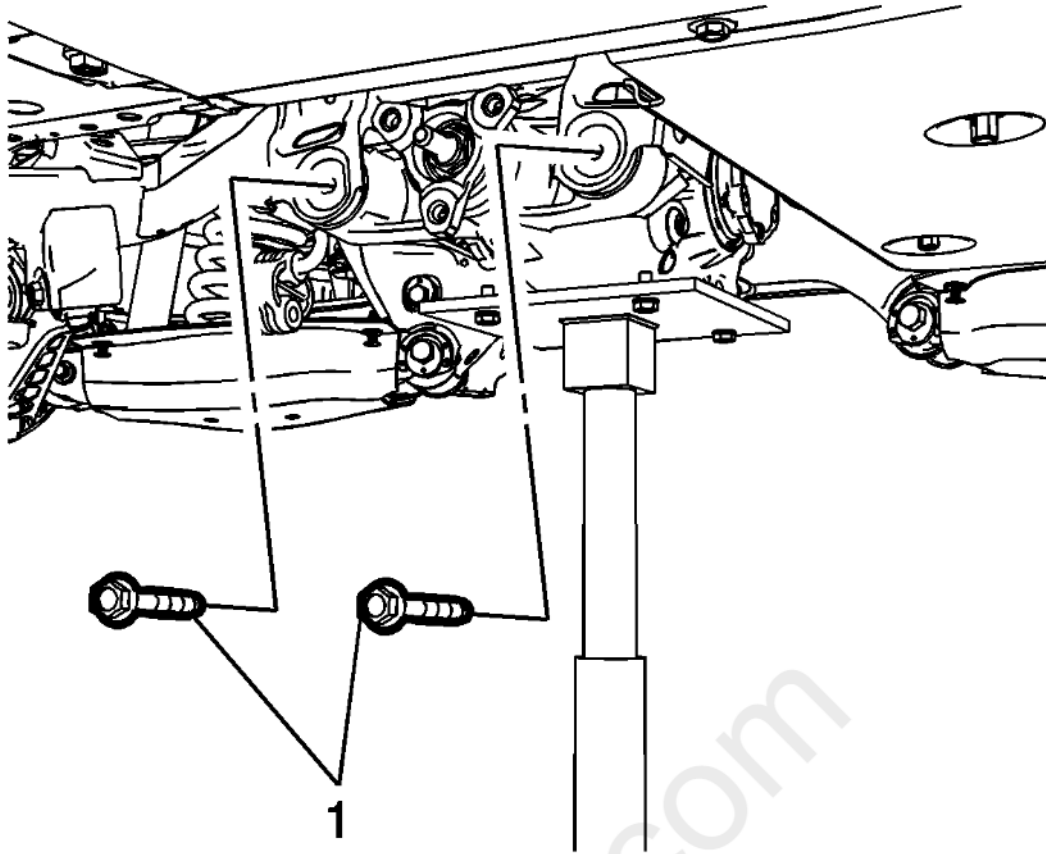


Fig. 29: Differential Carrier Front Bolts

Courtesy of GENERAL MOTORS COMPANY

- First Pass: 50 N.m (37 lb ft).
 - Final Pass: plus 90 degrees
4. Install the rear wheel drive shafts to the differential carrier assembly. Refer to [Rear Wheel Drive Shaft Replacement - Left Side \(LTG\)](#) , [Rear Wheel Drive Shaft Replacement - Left Side \(LGX, LGW\)](#) and/or [Rear Wheel Drive Shaft Replacement - Right Side](#)
 5. Install the propeller shaft. Refer to [Propeller Shaft Replacement](#)
 6. Fill the differential with the proper fluid. Refer to [Differential Oil Replacement](#)
 7. Remove the supports and lower the vehicle.

DIFFERENTIAL DRIVE PINION GEAR SEAL REPLACEMENT

Special Tools

- DT-51750 Seal Installer
- J-5590 Bearing and Seal Driver

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 rear wheel drive shaft flange. Refer to [Rear Wheel Drive Shaft Flange Replacement](#).
3. Using the appropriate tool, remove the differential drive pinion gear seal (1).

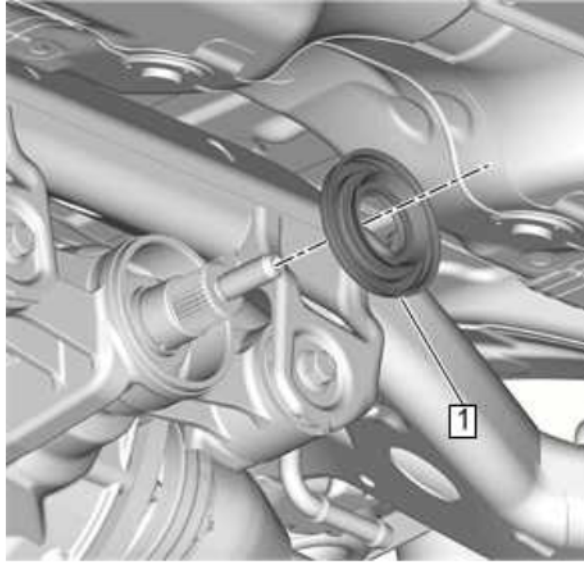


Fig. 30: Differential Drive Pinion Gear Seal

Courtesy of GENERAL MOTORS COMPANY

4. Do not tamper with the pinion gear nut (1). The pinion gear nut and internal components are not serviceable.

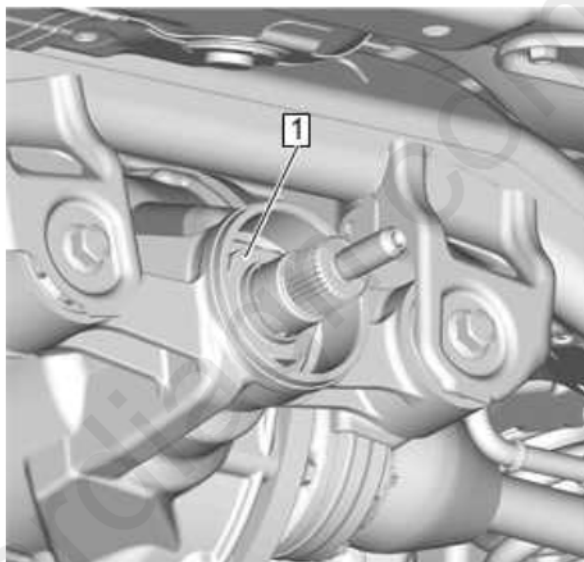


Fig. 31: Pinion Gear Nut

Courtesy of GENERAL MOTORS COMPANY

Installation Procedure

1. Prior to reassembly ensure the following areas are free of debris and corrosion:

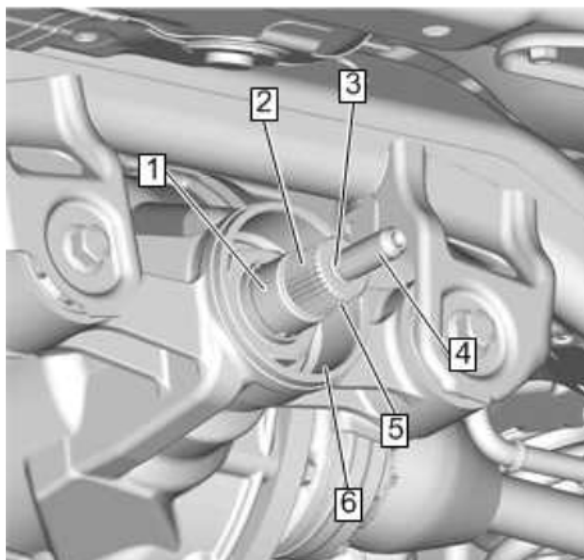


Fig. 32: Differential Drive Pinion Gear Seal Components
Courtesy of GENERAL MOTORS COMPANY

1. Pinion gear seal contact area (1)
 2. Pinion spline-to-rear wheel drive shaft flange spline interface (2)
 3. Rear wheel drive shaft flange installation tool engagement groove (3)
 4. Pinion gear pilot stem shaft (4)
 5. Rear wheel drive shaft flange retaining ring groove (5)
 6. RDM bore for pinion gear seal (6).
2. Using the **J-5590** bearing and seal driver with the **DT-51750** installer (1), install the differential drive pinion gear seal.

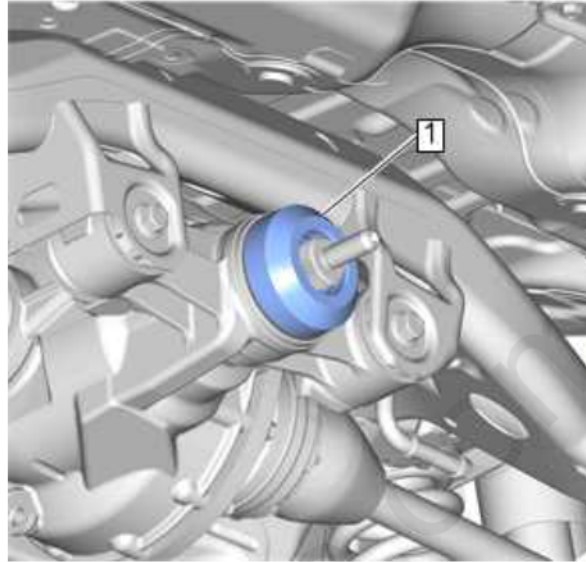


Fig. 33: Differential Drive Pinion Gear Seal Installer
Courtesy of GENERAL MOTORS COMPANY

3. Install the rear wheel drive shaft flange. Refer to [Rear Wheel Drive Shaft Flange Replacement](#).
4. Check the fluid level of the rear drive axle. Refer to [Rear Axle Lubricant Level Inspection](#).
5. Remove the support and lower the vehicle.

DESCRIPTION AND OPERATION

DIFFERENTIAL CARRIER ASSEMBLY DESCRIPTION

The rear axle for this vehicle consist of the following components:

- Cast iron Differential Carrier Housing
- Aluminum Differential Carrier Housing Cover
- Differential Case Assembly (Open or Locking)
- Ring Gear and Drive Pinion Shaft
- Fill Plug
- Drain Plug

The 200 mm rear axle is an open differential which can be identified by the cast iron differential carrier housing and aluminum housing cover. The aluminum cover has 11 hex head bolts, two drain/fill plugs and a left output drive axle seal. The cast iron carrier housing has two mount bushings, a right output drive axle seal, an axle vent and an input flange seal.

The input flange is held in place with a snap ring to the pinion. Special tooling is required to remove and install the input flange and the mount bushings. The output shafts are removed with an adapter and slide hammer.

The rear axle receives power from the propeller shaft and transfers it to the drive pinion through the universal joint and the pinion yoke, which is attached to the drive pinion. The drive pinion transfers the

power to the ring gear which is splined to the drive pinion at a 90 degree angle. The ring gear is attached to the differential case which contains four gears inside of it. Two of the gears are side gears and two are pinion gears. Each side gear is splined to an axle shaft so each axle shaft turns when its side gear rotates. The pinion gears are mounted on a differential pinion shaft and the pinion gears are free to rotate on this shaft. The pinion shaft is fitted into a bore in the differential case and is at right angles to the axle shafts. Power is transmitted through the differential as follows: the drive pinion rotates the ring gear. The ring gear rotates the differential case. The ring gear, as it rotates with the differential case, forces the pinion gears against the side gears. The side gears rotate the axle shafts to which the wheels are attached to. When both wheels have an equal amount of traction, the pinion gears do not rotate on the pinion shaft because of input force on the pinion gears is equally divided between the two side gears. Therefore, the pinion gears revolve with the pinion shaft, but do not rotate around the shaft itself. The addition of the two pinion gears and the two side gears are needed to allow the wheel drive shafts to turn at different speeds. When the vehicle turns a corner, the inner wheel turns slower than the outer wheel. The amount slower the inner wheel spins is equal to the same amount the outer wheel spins faster, as compared to the straight line speed. When this happens, the pinion gears rotate around the pinion shaft and allow the wheels to spin at different speeds.

SPECIAL TOOLS AND EQUIPMENT

SPECIAL TOOLS

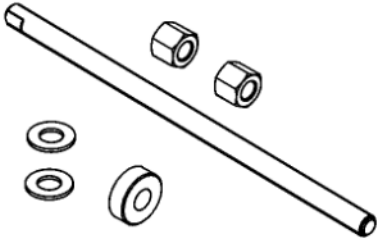
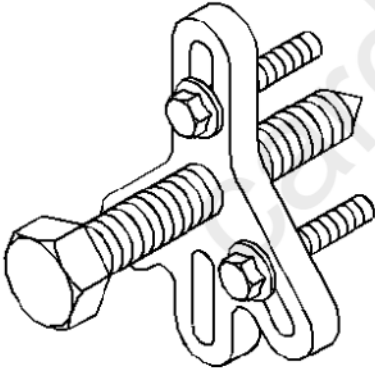
Illustration	Tool Number/Description
	CH-50342 Threaded Rod
	EN 24420-C J 24420-C Crankshaft Balancer Puller
	DT-52058 Stem Protector Sleeve

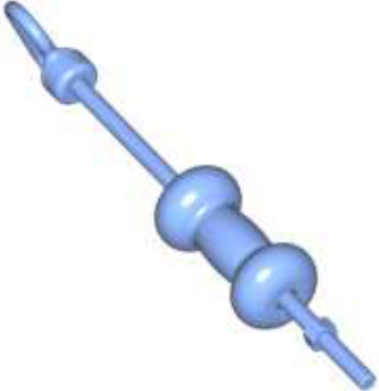
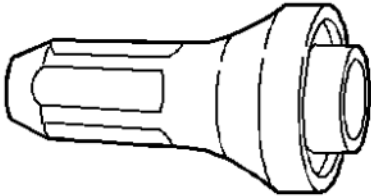
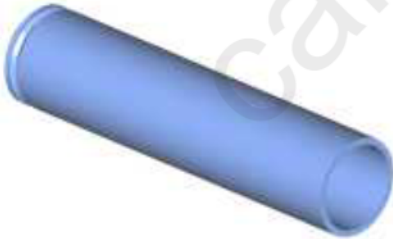
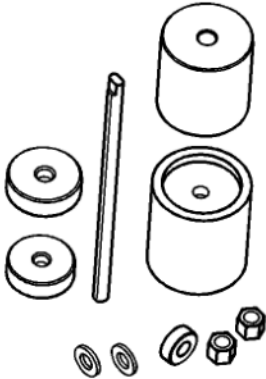
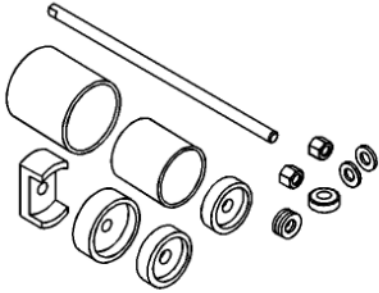
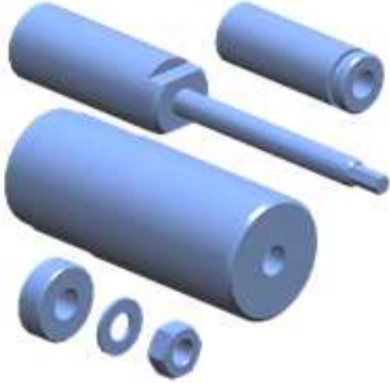
Illustration	Tool Number/Description
	J 2619-01 Slide Hammer
	J-28540-A Seal Installer
	J-45859 Adapter
	J-5590 Bearing and Seal Driver
	DT-48060-A Bushings Installer and Remover

Illustration	Tool Number/Description
	DT 50806 Bushings Replacer
	DT-51263 Flange Installer
	DT-51750 Pinion Seal Installer