

2013 DRIVELINE/AXLE

Wheel Drive Shafts - Malibu

SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

Fastener Tightening Specifications

Application	Specification	
	Metric	English
Front Wheel Drive Shaft Nut		
• First Pass	150 N.m	111 lb ft
• Release	45°	
• Third Pass	250 N.m	184 lb ft
Front Wheel Intermediate Shaft Bracket Bolt	58 N.m	43 lb ft
Front Wheel Intermediate Shaft Flange Bolt	22 N.m	16 lb ft

ADHESIVES, FLUIDS, LUBRICANTS, AND SEALERS

Adhesives, Fluids, Lubricants, and Sealers

Application	Type of Material	GM Part Number
Wheel Drive Shaft	Grease	1051344 (Canadian P/N 993037)

DIAGNOSTIC INFORMATION AND PROCEDURES

SYMPTOMS - WHEEL DRIVE SHAFTS

NOTE: Complete the following steps prior to beginning the wheel drive shaft diagnosis.

1. Review the Symptoms - Vibration Diagnosis and Correction.
2. Perform the Vibration Analysis - Road Testing in order to effectively diagnose the concern.
3. Review the system operation in order to become familiar with the system function. Refer to Wheel Drive Shafts Description and Operation.

Visual/Physical Inspection

- Inspect for aftermarket equipment and modifications which could affect the operation of the wheel drive shafts or other rotating components.
- Inspect the easily accessible or visible system components for obvious damage or conditions which could cause the symptom.
- Thoroughly inspect the entire wheel drive shaft for visible damage, leaking joint seals, and missing seal

clamps.

- Inspect the wheel drive shaft seals for cuts, tears, or other damage which may allow the loss of lubricant and the entry of contaminants.

Symptom List

After performing the Visual/Physical Inspection and no visual signs of damage or other interference impairing the wheel drive shaft function is apparent, it may be necessary to remove the wheel drive shaft from the vehicle and manipulate the joints manually. Any binding or otherwise impeded movement of the joints may indicate damage which could contribute to the concern. Refer to the following:

- **Click Noise In Turns**
- **Clunk When Accelerating from Coast**
- **Shudder or Vibration During Acceleration**

CLICK NOISE IN TURNS

A click noise occurring during turns may be caused by a worn or damaged wheel drive shaft outer joint. This may be more apparent while simultaneously turning and accelerating. This click is caused by wear and/or damage to the constant velocity joint bearings and/or races. Commonly, this damage or wear is caused by the loss of lubricating grease from the constant velocity joint and the entry of foreign material or contaminants.

Carefully inspect the wheel drive shaft seals for cuts, tears or other damage which may allow the lubricating grease to escape. The loss of this grease will cause damage to the wheel drive shaft constant velocity joint in a very short period of time.

If inspection reveals no visual evidence of wear or damage, it may be necessary to remove the wheel drive shaft from the vehicle and manipulate the outer joint manually. Any binding or impeded movement of the joint may indicate damage which could contribute to the concern.

CLUNK WHEN ACCELERATING FROM COAST

A clunk noise occurring when accelerating from coast or a standing start may be caused by a worn or damaged wheel drive shaft inner joint. The common cause of wheel drive shaft inner joint damage is the loss of lubricating grease and/or the presence of foreign material and contaminants in the joint. This usually occurs as a result of a torn or damaged inner joint seal.

Carefully inspect the wheel drive shaft seal for cuts, tears or other damage that may allow the loss of the lubricating grease and/or the entry of contaminants.

If inspection reveals no visual evidence of wear or damage, it may be necessary to remove the wheel drive shaft from the vehicle and manipulate the inner joint manually. Do not allow the joint to separate from the wheel drive shaft bar. Any binding or impeded movement of the joint may indicate damage which could contribute to the concern.

SHUDDER OR VIBRATION DURING ACCELERATION

In order to diagnose a shudder or vibration during acceleration, refer to [Symptoms - Vibration Diagnosis and Correction](#) .

REPAIR INSTRUCTIONS

FRONT WHEEL DRIVE INTERMEDIATE SHAFT REPLACEMENT

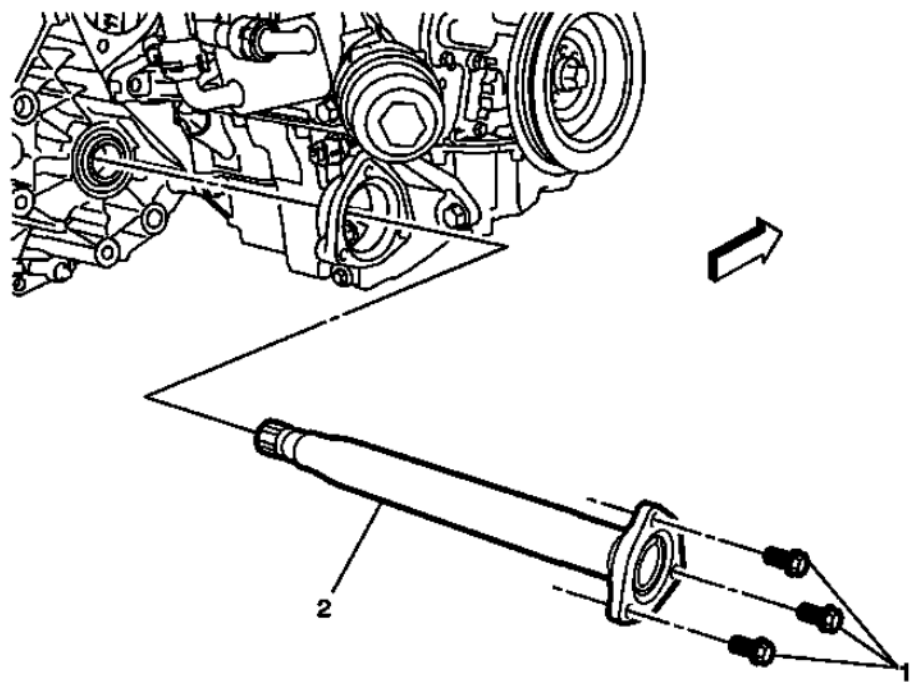


Fig. 1: Front Wheel Drive Intermediate Shaft
Courtesy of GENERAL MOTORS COMPANY

Front Wheel Drive Intermediate Shaft Replacement

Callout	Component Name
Preliminary Procedure Remove the right front wheel driveshaft. Refer to Front Wheel Drive Shaft Replacement - Right Side .	
1	Front Wheel Drive Intermediate Shaft Flange Bolt (Qty: 3) CAUTION: Refer to Fastener Caution Tighten 22 (16 lb ft)
	Front Wheel Drive Intermediate Shaft

CAUTION:

Wheel drive shaft seal protector must be installed into the differential output shaft seal prior to removing and installing the wheel drive shaft. Failure to install the wheel drive shaft seal protector as indicated may cause the splines of the wheel drive shaft to cut the differential output seal.

Procedure

2

1. Insert intermediate shaft into the transaxle until seated.
2. Refill transmission fluid. Refer to **Transmission Fluid Drain and Fill** , or **Transmission Fluid Level and Condition Check** .

NOTE:

If servicing the wheel drive shaft, the DT-44394-A can remain in place until after the wheel drive shaft has been serviced.

Special Tools

DT-44394-A Seal Protector

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

FRONT WHEEL DRIVE INTERMEDIATE SHAFT BRACKET REPLACEMENT (LUK AND LEA)

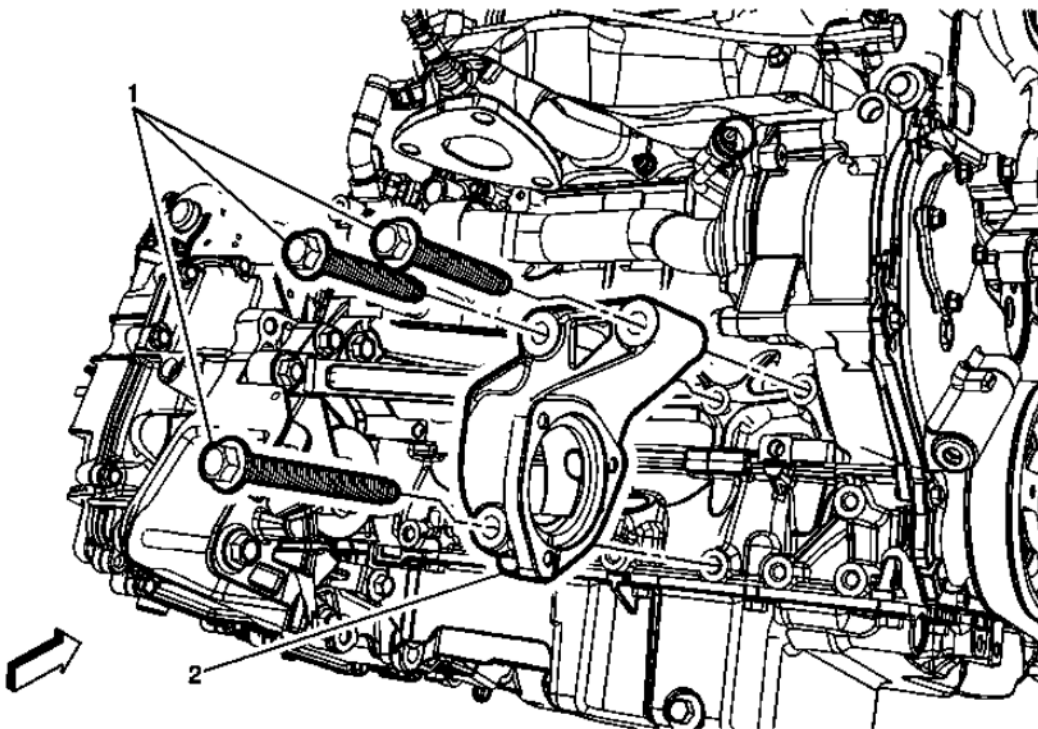


Fig. 2: Front Wheel Drive Intermediate Shaft Bracket & Bolts

Courtesy of GENERAL MOTORS COMPANY

Front Wheel Drive Intermediate Shaft Bracket Replacement (LUK and LEA)

Callout	Component Name
Preliminary Procedure Remove the front wheel drive intermediate shaft. Refer to Front Wheel Drive Intermediate Shaft Replacement .	
1	Front Wheel Drive Intermediate Shaft Bracket Bolts (Qty: 3) CAUTION: Refer to Fastener Caution . Tighten 58 N.m (43 lb ft)
2	Front Wheel Drive Intermediate Shaft Bracket

FRONT WHEEL DRIVE INTERMEDIATE SHAFT BRACKET REPLACEMENT (LCV AND LTG)

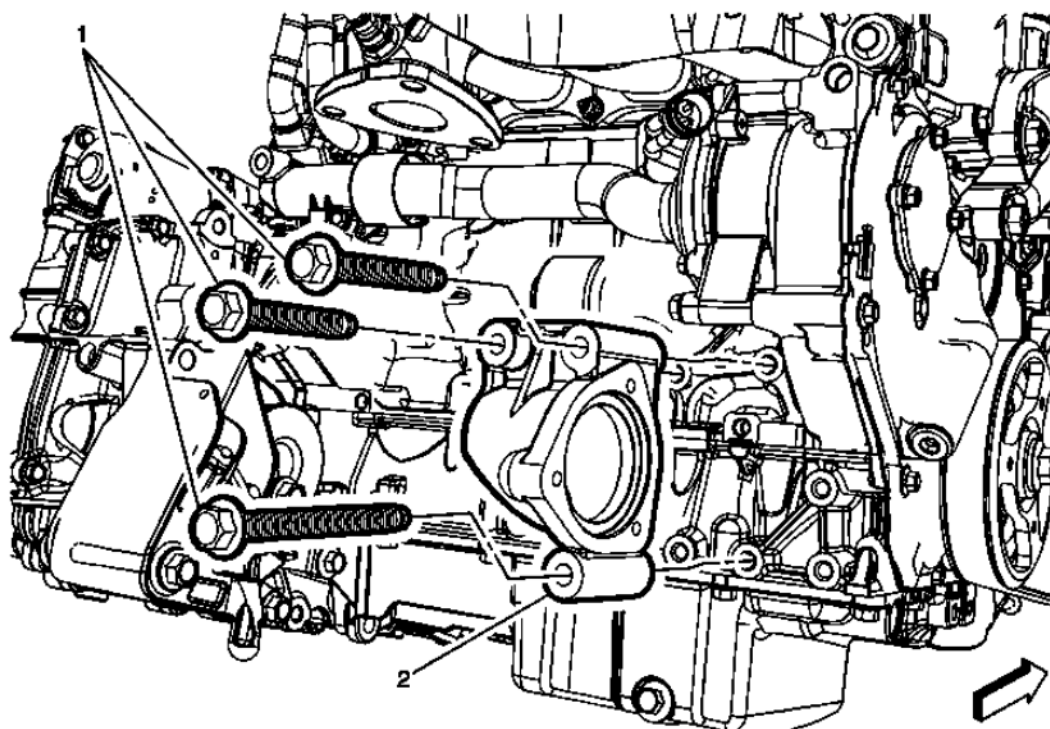


Fig. 3: Front Wheel Drive Intermediate Shaft Bracket (LCV and LTG)

Courtesy of GENERAL MOTORS COMPANY

Front Wheel Drive Intermediate Shaft Bracket Replacement (LCV and LTG)

Callout	Component Name

Preliminary Procedure

Remove the intermediate shaft. Refer to **Front Wheel Drive Intermediate Shaft Replacement**.

1	Front Wheel Drive Intermediate Shaft Bracket Bolts (Qty: 3) CAUTION: Refer to <u>Fastener Caution</u> . Tighten 58 N.m (43 lb ft)
2	Front Wheel Drive Intermediate Shaft Bracket

FRONT WHEEL DRIVE SHAFT REPLACEMENT - LEFT SIDE

Special Tools

- **J-45859** Hub Spindle Remover
- **DT-44394-A** Seal Protector

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

Removal Procedure

WARNING: To prevent personal injury and/or component damage, do not allow the weight of the vehicle to load the front wheels, or attempt to operate the vehicle, when the wheel drive shaft(s) or wheel drive shaft nut(s) are removed. To do so may cause the inner bearing race to separate, resulting in damage to brake and suspension components and loss of vehicle control.

CAUTION: Wheel drive shaft boots, seals and clamps should be protected from sharp objects any time service is performed on or near the wheel drive shaft(s). Damage to the boot(s), the seal(s) or the clamp(s) may cause lubricant to leak from the joint and lead to increased noise and possible failure of the wheel drive shaft.

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

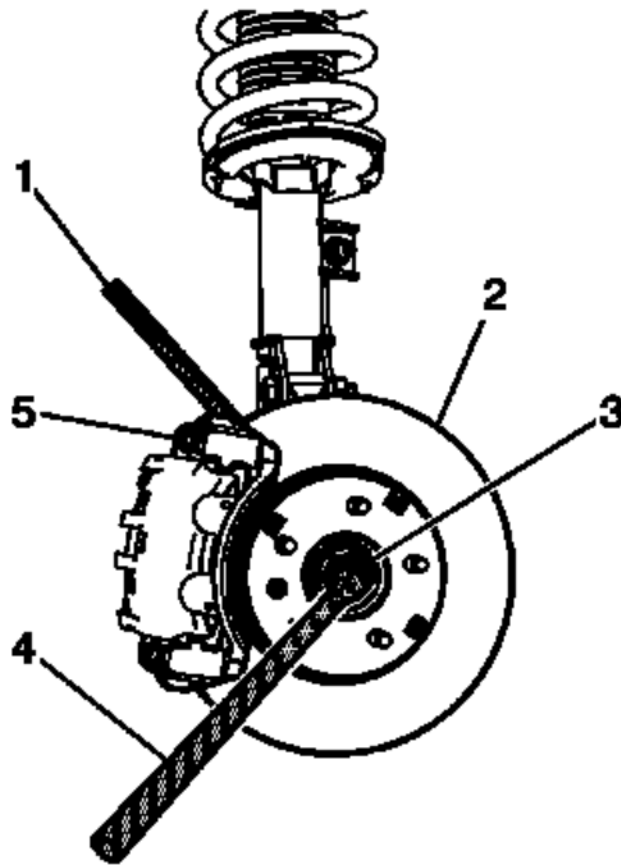


Fig. 4: View Of Brake Rotor, Caliper & Axle Nut
Courtesy of GENERAL MOTORS COMPANY

CAUTION: Make sure that the wheel drive shaft nut is fully un-staked to avoid damage to the wheel drive shaft threads during the removal of the wheel drive shaft nut. Failure to follow these instructions could result in wheel, nut, and/or stud damage.

3. Insert a brass drift or punch (1) in the cooling fins of the front brake rotor (2).
4. Rotate the brake rotor until it comes in contact with the brake caliper mount bracket (5).
5. Using the proper size socket (3) and a breaker bar (4), loosen the wheel drive shaft nut.

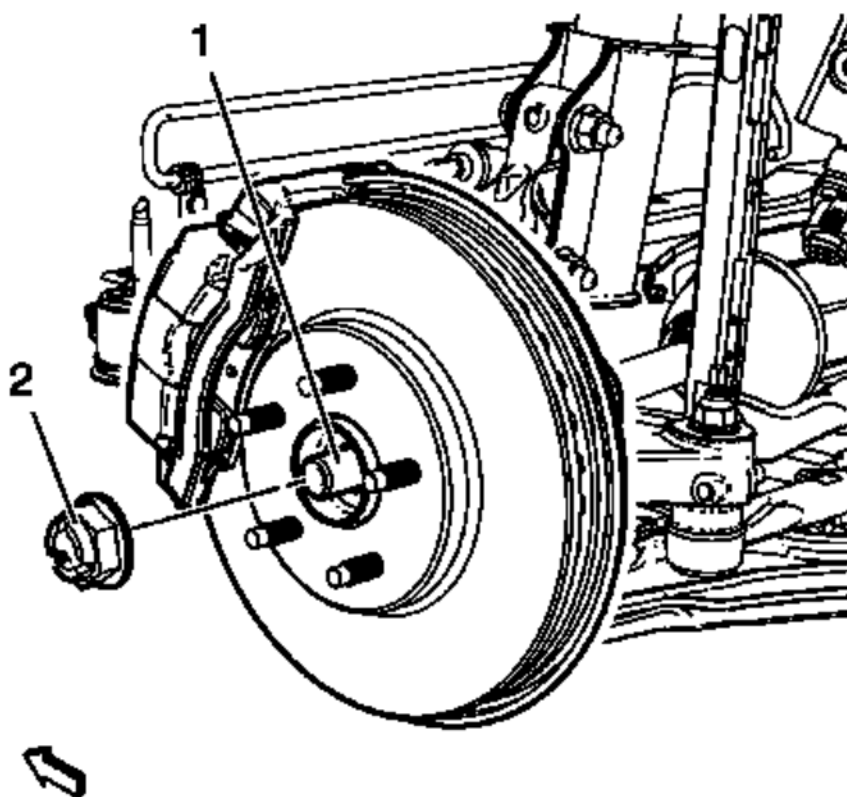


Fig. 5: Wheel Drive Shaft And Nut
Courtesy of GENERAL MOTORS COMPANY

NOTE: DO NOT re-use the wheel drive shaft nut. Discard the nut and replace with NEW.

6. Remove the wheel drive shaft nut (2) from the wheel drive shaft (1).

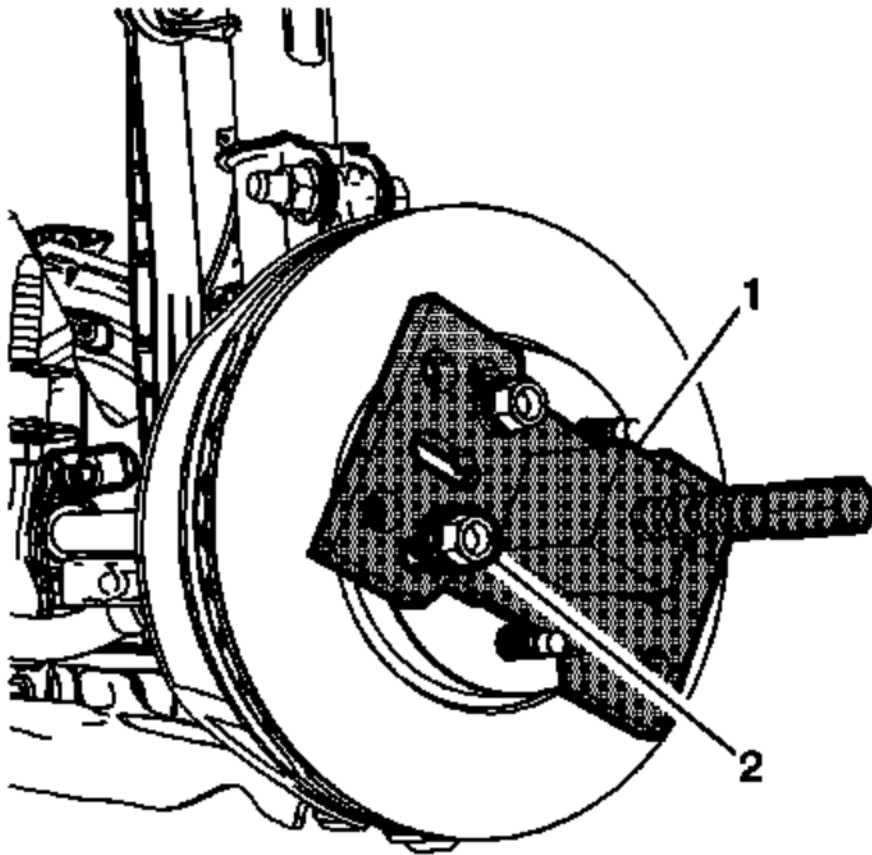


Fig. 6: Wheel Lug Nuts & Remover
Courtesy of GENERAL MOTORS COMPANY

NOTE: Reverse the wheel lug nuts and washers so the flat part of the wheel nut is facing the washers.

7. Attach the **J-45859** remover (1) to the wheel hub using the wheel lug nuts (2).
8. Using the **J-45859** remover (1), separate the wheel drive shaft from the wheel bearing/hub.
9. Remove the outer tie rod assembly from the steering knuckle. Refer to **Steering Linkage Outer Tie Rod Replacement**.
10. Remove the ball joint from the steering knuckle. Refer to **Lower Control Arm Replacement**.

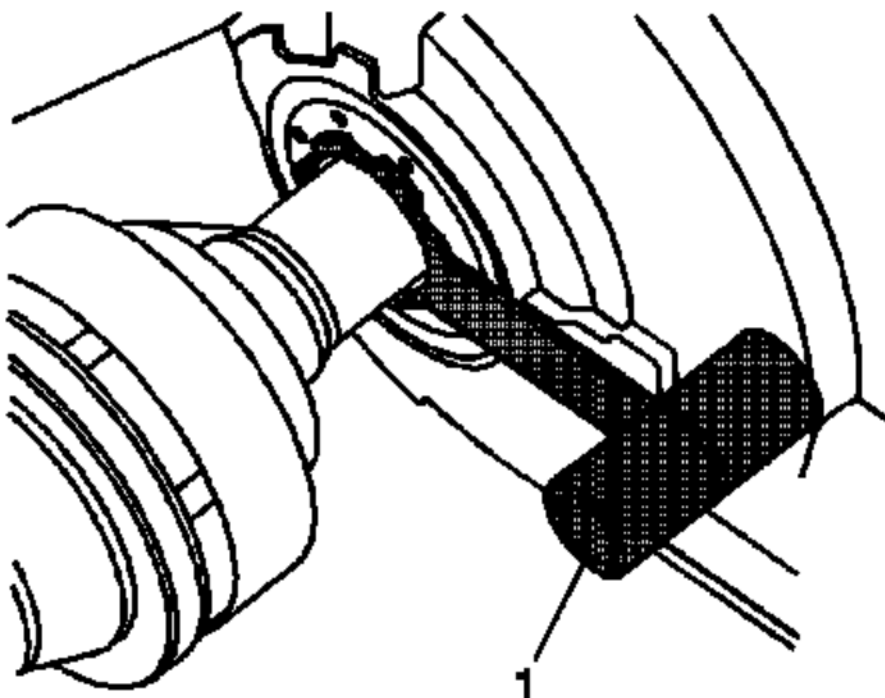


Fig. 7: View Of J 44394 Installed Into The Differential Output Shaft Seal
Courtesy of GENERAL MOTORS COMPANY

CAUTION: J-44394 must be installed into the differential output shaft seal prior to removing and installing the wheel drive shaft. Failure to install J-44394 as indicated may cause the splines of the wheel drive shaft to cut the differential output seal.

11. Carefully install the **DT-44394-A** protector (1) over the wheel drive shaft and slide into the transmission.

NOTE: If servicing the wheel drive shaft, the **DT-44394-A** can remain in place until after the wheel drive shaft has been serviced.

12. Remove the wheel drive shaft from the vehicle.

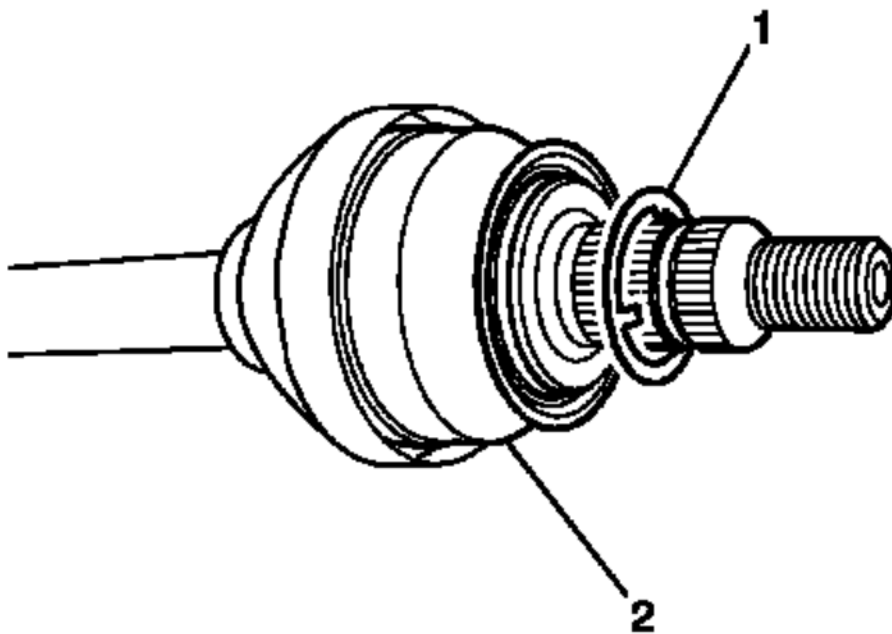


Fig. 8: Wheel Drive Shaft And Washer
Courtesy of GENERAL MOTORS COMPANY

13. Remove and discard the washer (1) on the wheel drive shaft (2). DO NOT re-use. Replace with NEW only.

Installation Procedure

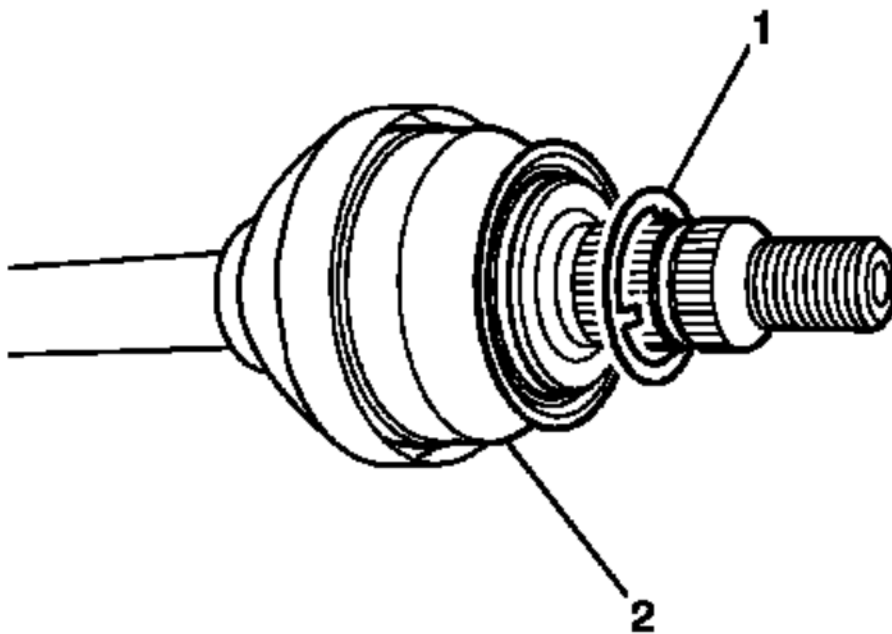


Fig. 9: Wheel Drive Shaft And Washer
Courtesy of GENERAL MOTORS COMPANY

NOTE: The washer must be installed on the wheel drive shaft.

1. Install the NEW washer (1) on the wheel drive shaft (2).

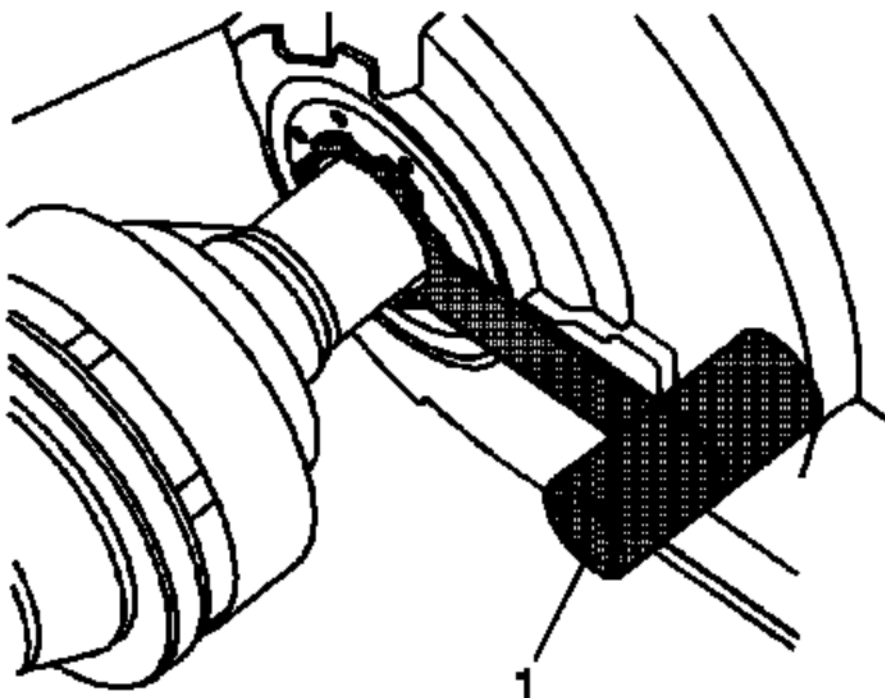


Fig. 10: View Of J 44394 Installed Into The Differential Output Shaft Seal
Courtesy of GENERAL MOTORS COMPANY

CAUTION: J-44394 must be installed into the differential output shaft seal prior to removing and installing the wheel drive shaft. Failure to install J-44394 as indicated may cause the splines of the wheel drive shaft to cut the differential output seal.

NOTE: Ensure that the wheel drive shaft is fully seated in the transmission.

2. Carefully install the wheel drive shaft into the differential until the splines are past the **DT-44394-A** protector (1).

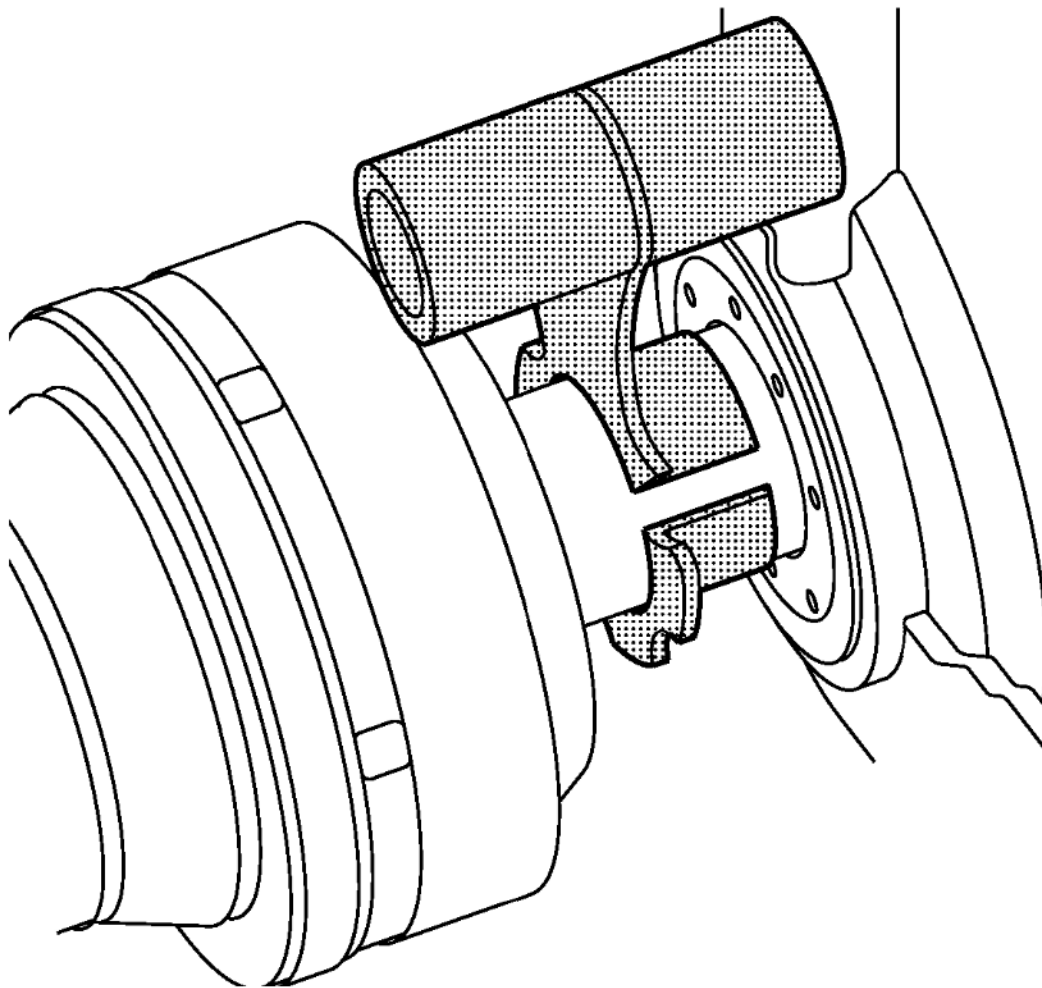


Fig. 11: Special Output Shaft Protector Tool
Courtesy of GENERAL MOTORS COMPANY

3. Remove the **DT-44394-A** protector from the differential output shaft seal.
4. Install the front wheel drive shaft into the front wheel bearing/hub.
5. Install the ball joint to the steering knuckle. Refer to **Lower Control Arm Replacement** .
6. Install the outer tie rod assembly at the steering knuckle. Refer to **Steering Linkage Outer Tie Rod Replacement** .

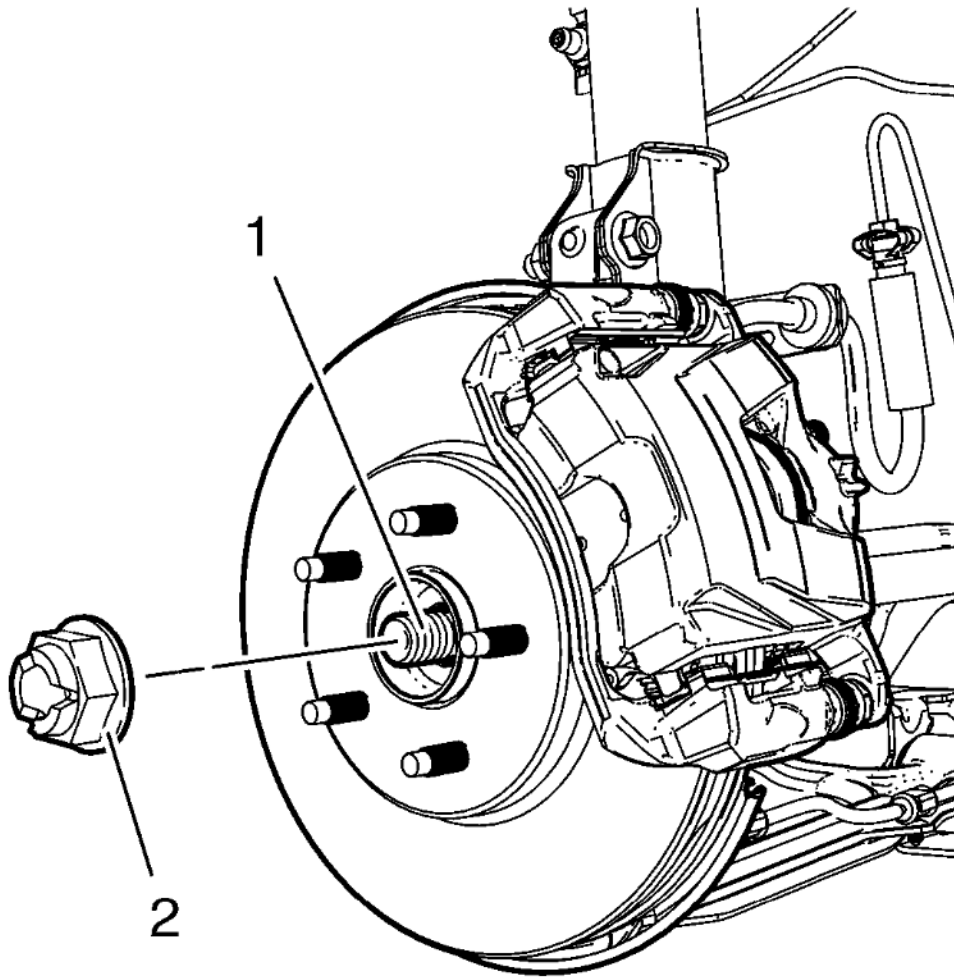


Fig. 12: Wheel Drive Shaft And Nut
Courtesy of GENERAL MOTORS COMPANY

7. Install the NEW wheel drive shaft nut (2) to the wheel drive shaft.

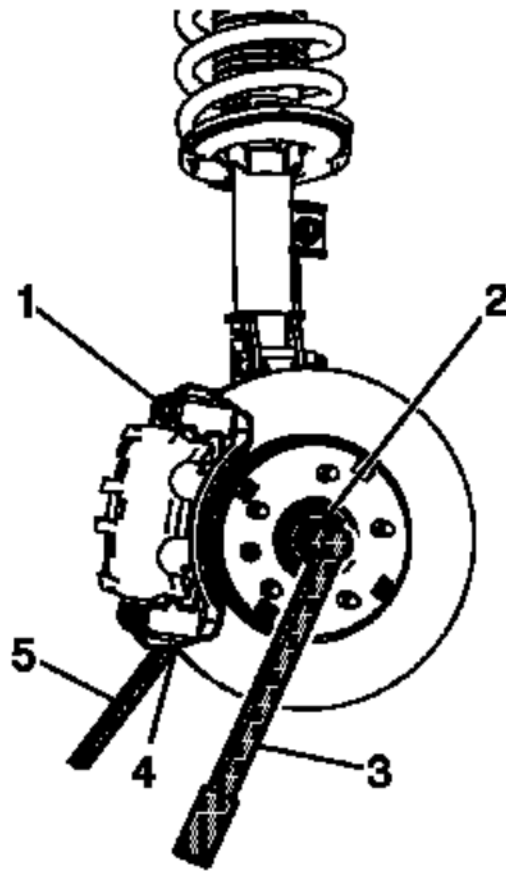


Fig. 13: View Of Tightening Wheel Drive Shaft Nut
 Courtesy of GENERAL MOTORS COMPANY

CAUTION: Refer to Fastener Caution .

NOTE: The wheel drive shaft must be tightened in the following manner to ensure the proper wheel bearing preload.

8. Insert a brass drift or punch (5) in the cooling fins of the front brake rotor (4) and a torque wrench (3) with the proper size socket (2).
9. Rotate the brake rotor (4) until it comes in contact with the brake caliper mount bracket (1), tighten the NEW wheel drive shaft nut to 150 N.m (111 lb ft).
10. Loosen the NEW wheel drive shaft nut 45 degrees and re-tighten to 250 N.m (184 lb ft).
11. Install the tire and wheel assembly. Refer to Tire and Wheel Removal and Installation .
12. Lower the vehicle.
13. Inspect the transaxle fluid level. Refer to Transmission Fluid Drain and Fill .

FRONT WHEEL DRIVE SHAFT REPLACEMENT - RIGHT SIDE

Special Tools

- **J-45859** Axle Puller

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 tire and wheel assembly. Refer to Tire and Wheel Removal and Installation .

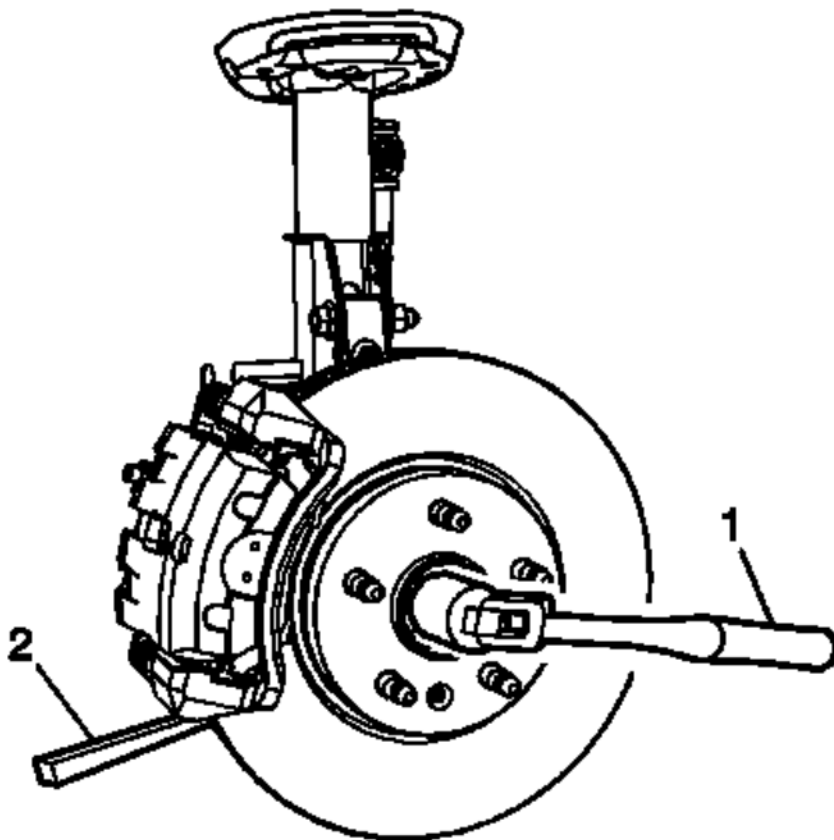


Fig. 14: Tightening Wheel Drive Shaft Nut
Courtesy of GENERAL MOTORS COMPANY

3. Insert a drift or punch (2) in the cooling fins of the brake rotor.
4. Rotate the brake rotor until the drift or punch contacts the brake caliper mounting bracket.
5. Using a breaker bar (1), loosen the wheel drive shaft nut.

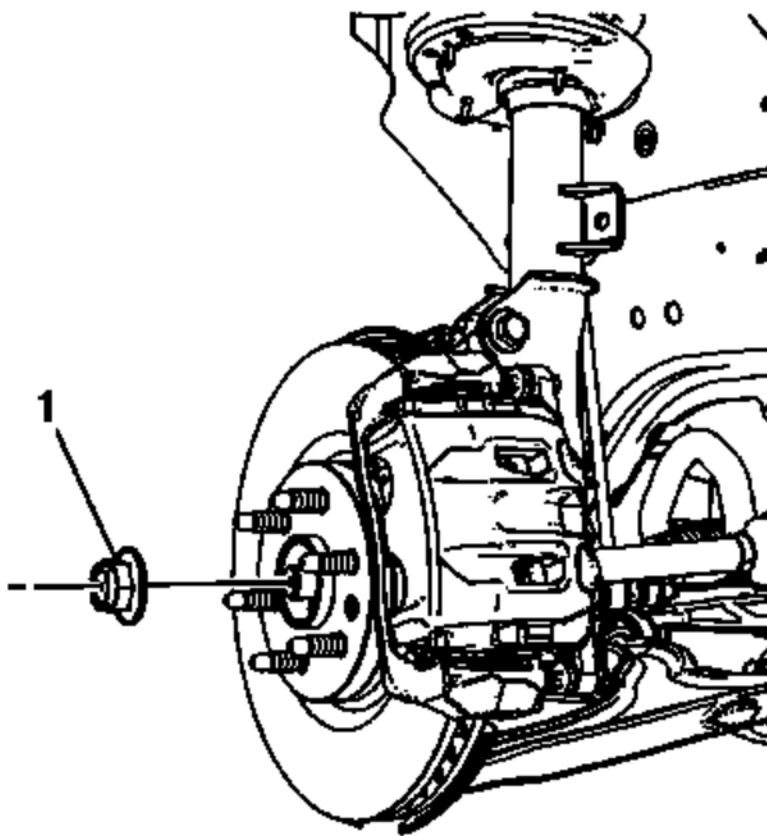


Fig. 15: Wheel Drive Shaft Nut
Courtesy of GENERAL MOTORS COMPANY

6. Remove the wheel drive shaft nut (1).
7. Using the **J-45859** puller, separate the wheel drive shaft from the knuckle assembly.
8. Remove the lower control arm from the knuckle. Refer to **Lower Control Arm Replacement** .
9. Remove the outer tie rod end from the knuckle. Refer to **Steering Linkage Outer Tie Rod Replacement** .

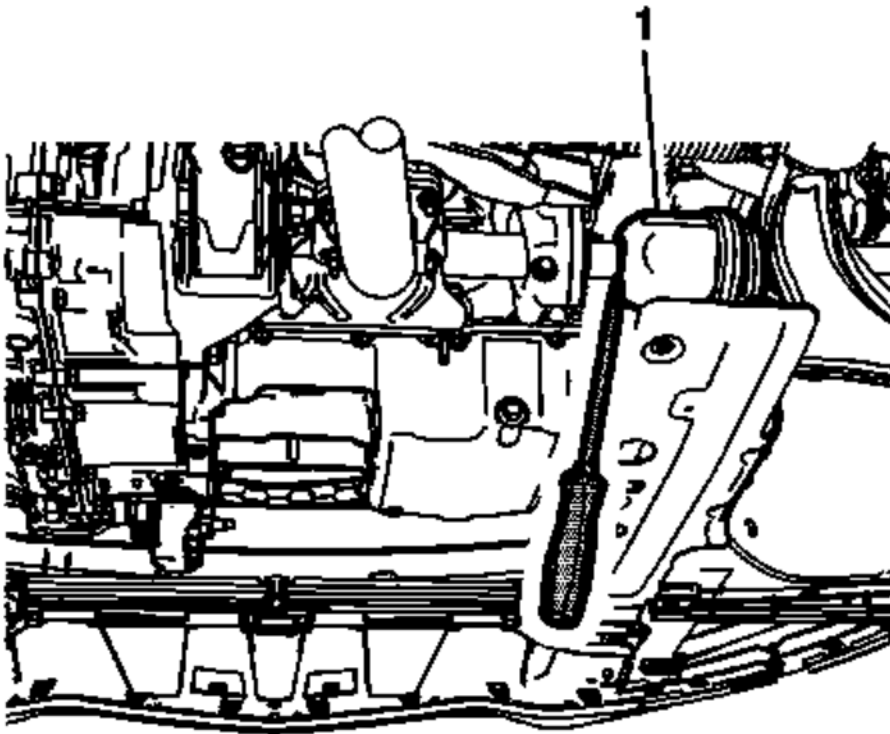


Fig. 16: Knuckle Assembly Puller

Courtesy of GENERAL MOTORS COMPANY

NOTE:

- It may be necessary to have an assistant hold the knuckle assembly while removing the wheel drive shaft.
- If removing the wheel drive shaft to service other suspension or driveline components, use care when removing or installing the wheel drive shaft so as not to damage the wheel drive shaft boots.

10. Using an appropriate tool, remove the wheel drive shaft (1) from the intermediate shaft.

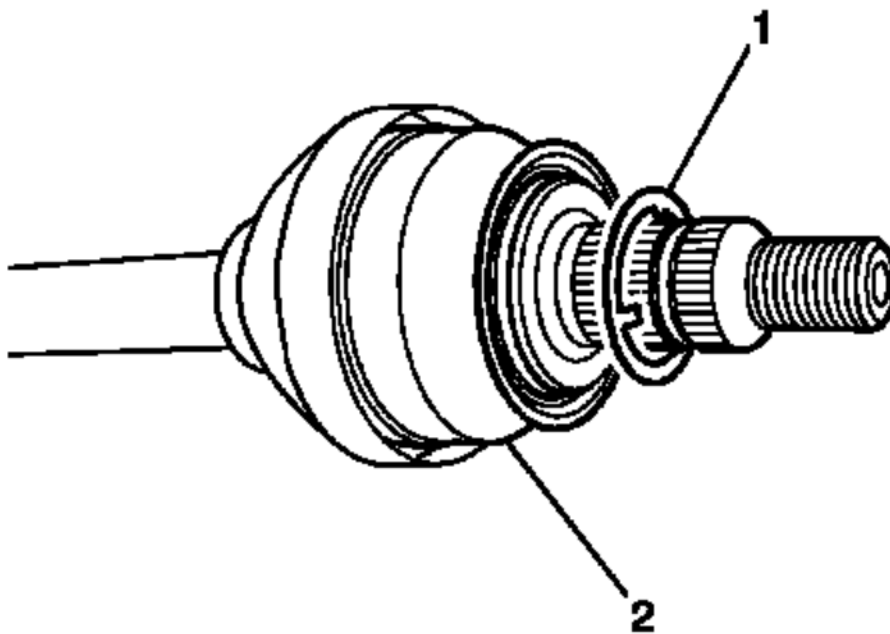


Fig. 17: Wheel Drive Shaft And Washer
Courtesy of GENERAL MOTORS COMPANY

NOTE: If there is no washer on the wheel drive shaft, install a **NEW** washer.

11. Remove and discard the washer (1) from the wheel drive shaft (2). DO NOT re-use the washer, replace with NEW only.

Installation Procedure

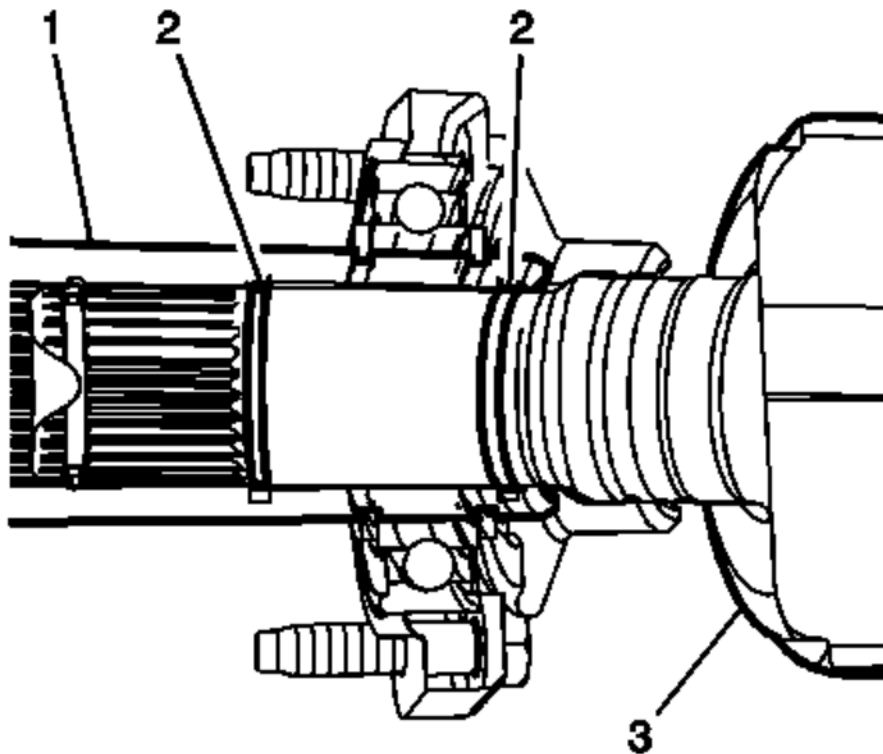


Fig. 18: Intermediate Shaft, Wheel Drive Shaft & O-Rings
Courtesy of GENERAL MOTORS COMPANY

1. If removing or replacing the drive shaft, replace the o-rings (2).
2. Apply a very small amount of grease to the splines of the wheel drive shaft inner joint. Refer to **Adhesives, Fluids, Lubricants, and Sealers**.
3. Install the wheel drive shaft (3) into the intermediate shaft (1) until fully seated.

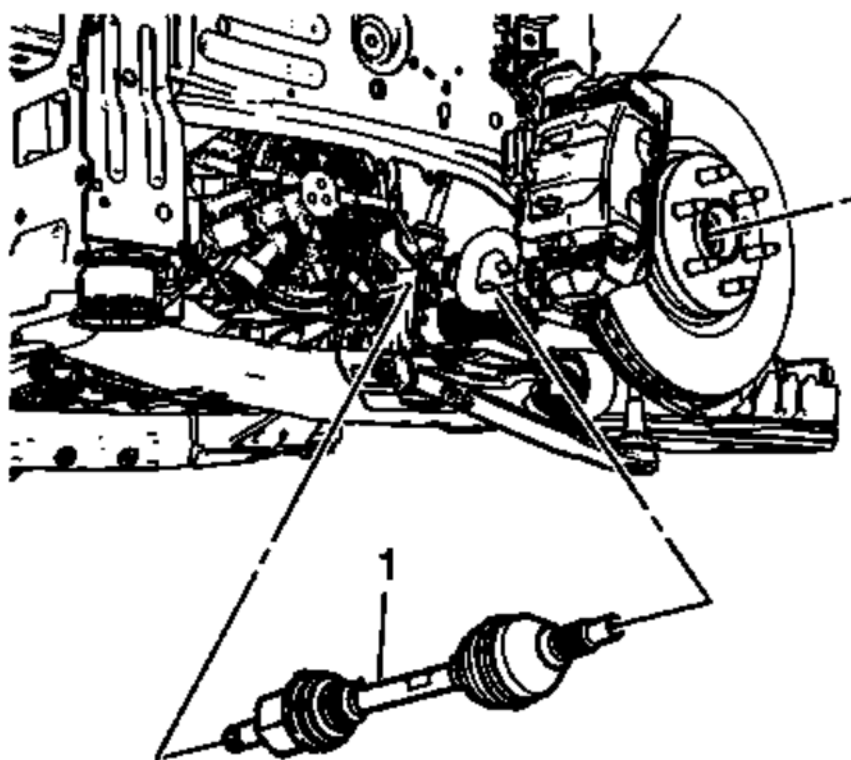


Fig. 19: Wheel Drive Shaft

Courtesy of GENERAL MOTORS COMPANY

4. Insert the wheel drive shaft (1) in the front wheel bearing/hub.
5. Install the lower control arm in the knuckle. Refer to **Lower Control Arm Replacement** .
6. Install the outer tie rod end in the knuckle. Refer to **Steering Linkage Outer Tie Rod Replacement** .

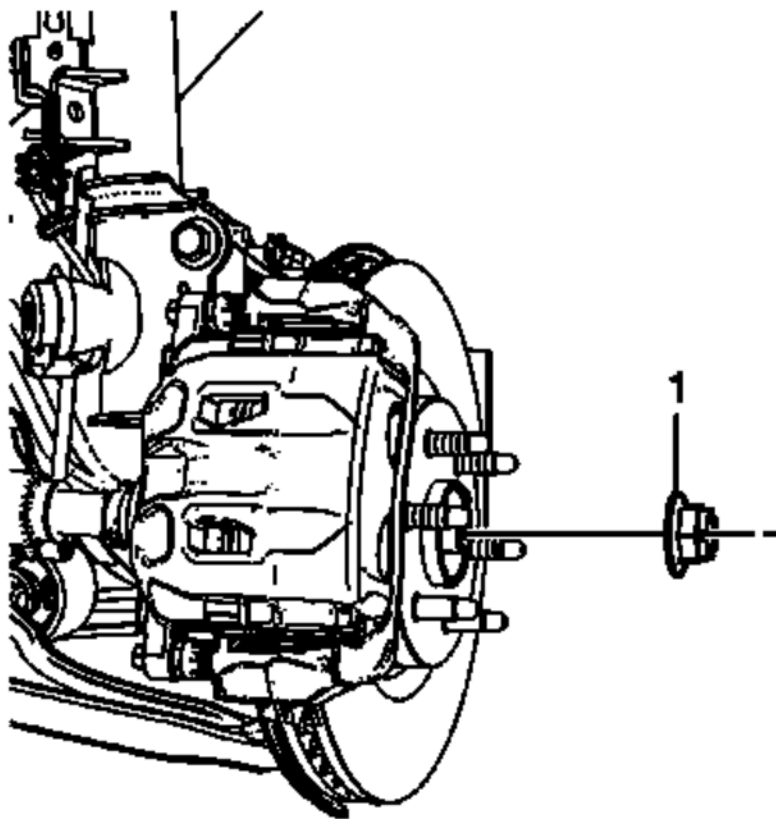


Fig. 20: Wheel Drive Shaft Nut
Courtesy of GENERAL MOTORS COMPANY

7. Install the wheel drive shaft nut (1).

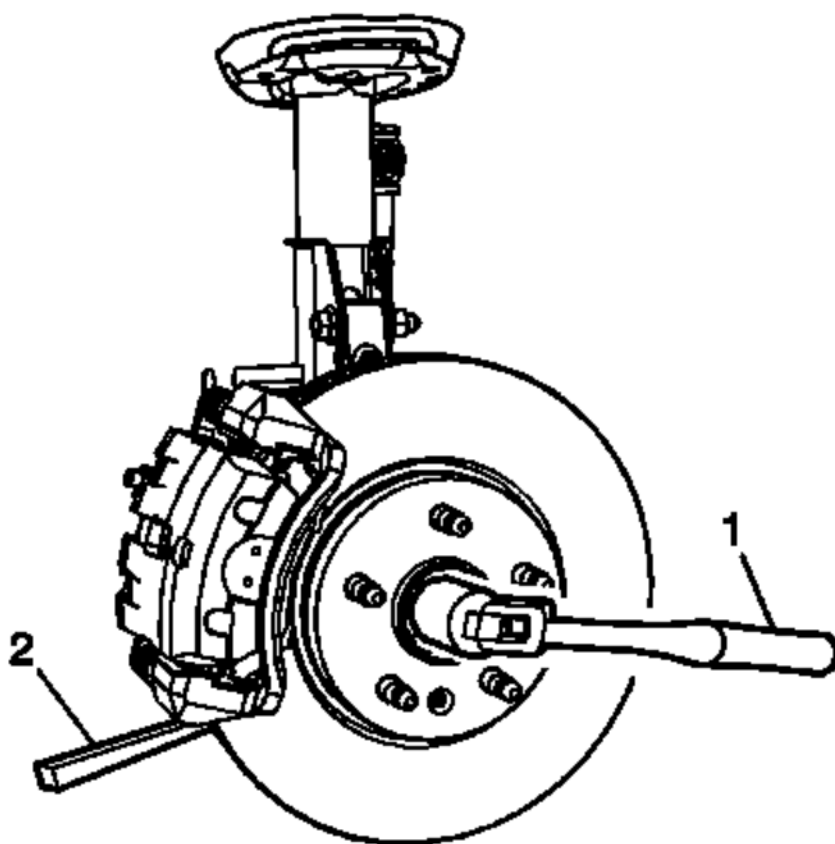


Fig. 21: Tightening Wheel Drive Shaft Nut
Courtesy of GENERAL MOTORS COMPANY

8. Insert a drift or punch (2) in the cooling fins of the brake rotor.
9. Rotate the brake rotor until the drift or punch contacts the brake caliper mounting bracket.

CAUTION: Refer to Fastener Caution .

10. Using a torque wrench (1), tighten the wheel drive shaft nut to :
 - First Pass: 150 N.m (111 lb ft)
 - Second Pass: loosen 45 degrees
 - Final Pass: re-tighten to 250 N.m (184 lb ft)
11. Install the tire and wheel assembly. Refer to Tire and Wheel Removal and Installation .
12. Remove the support and lower the vehicle.

FRONT WHEEL DRIVE SHAFT INNER JOINT AND BOOT REPLACEMENT

Special Tools

DT 35910 Drive Axle Seal Clamp Pliers

For equivalent regional tools, refer to Special Tools.

NOTE: The tripot assembly and the internal parts for the tripot assembly are not serviceable. If the tripot assembly is found to have excessive wear or damage, replace the wheel drive shaft as an assembly.

Disassemble Procedure

1. Remove the wheel drive shaft from the vehicle. Refer to Front Wheel Drive Shaft Replacement - Left Side, and Front Wheel Drive Shaft Replacement - Right Side.

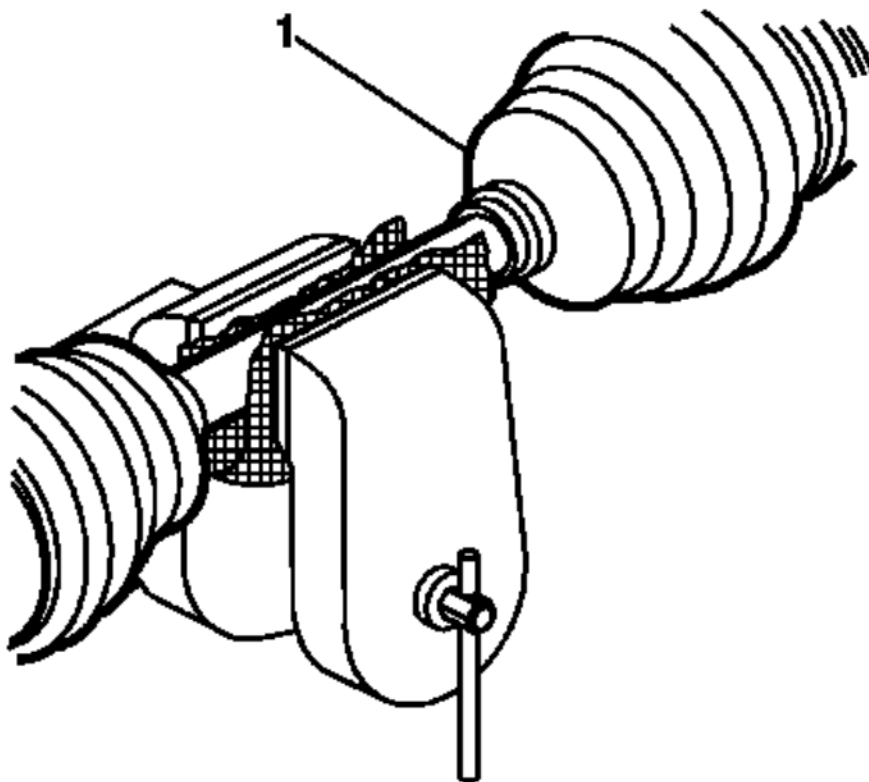


Fig. 22: View Of Front Wheel Drive Shaft Inner Joint
Courtesy of GENERAL MOTORS COMPANY

2. Position the wheel drive shaft in a soft jawed vise and clamp securely.

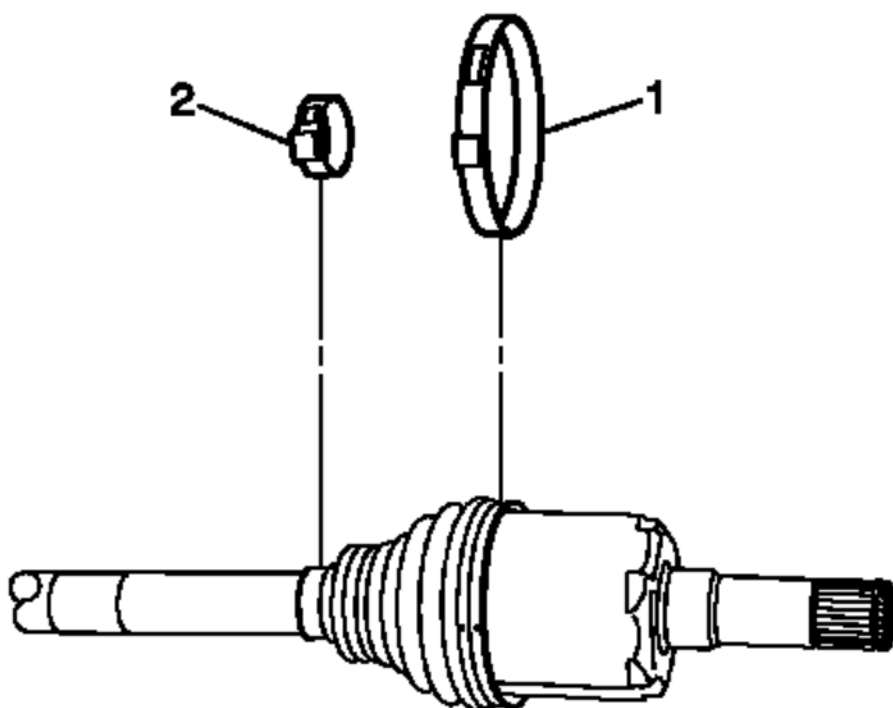


Fig. 23: View Of Boot Retaining Clamps
Courtesy of GENERAL MOTORS COMPANY

3. Using the appropriate tool, remove the boot retaining clamp (2).
4. Using the appropriate tool, remove the boot clamp (1).

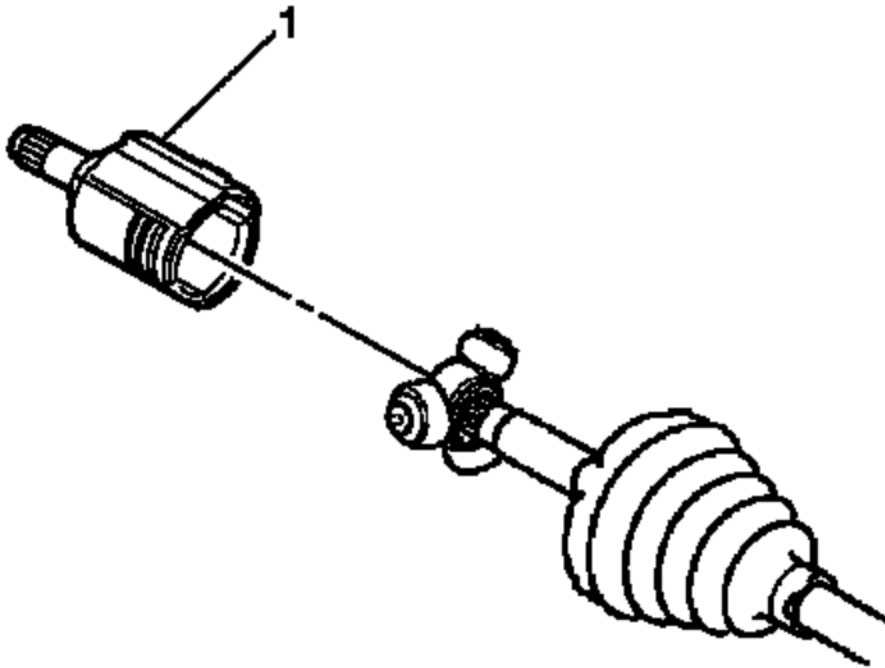


Fig. 24: Tripot Housing

Courtesy of GENERAL MOTORS COMPANY

NOTE: The tripot housing may be staked at the end to prevent removal. The staking will need to be ground down to allow removal.

5. Remove the tripot housing (1) from the wheel drive shaft.

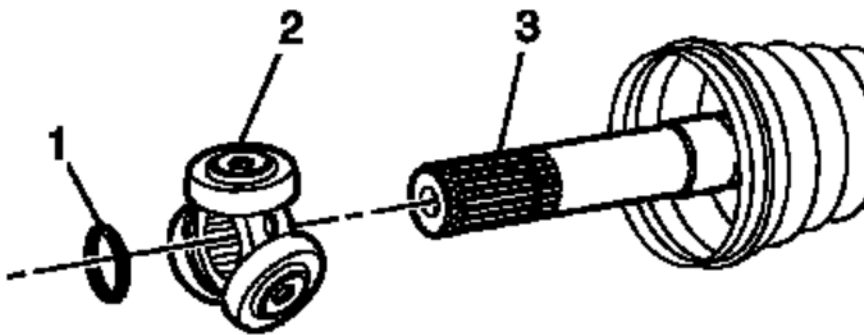


Fig. 25: View Of Wheel Drive Shaft, Tripod Spider And Retaining Clip
Courtesy of GENERAL MOTORS COMPANY

6. Remove the retaining clip (1) and the tripod spider (2) from the wheel drive shaft (3).

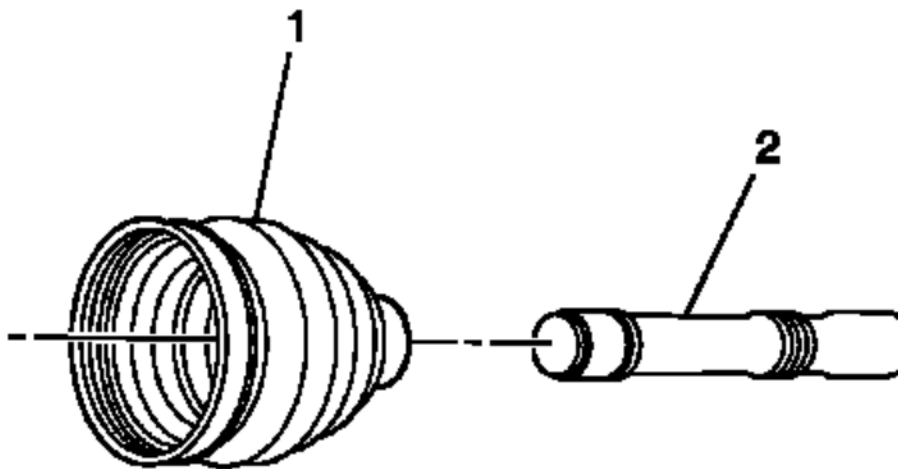


Fig. 26: Identifying Wheel Drive Shaft Boot
Courtesy of GENERAL MOTORS COMPANY

7. Remove the boot (1) from the wheel drive shaft (2).

Assemble Procedure

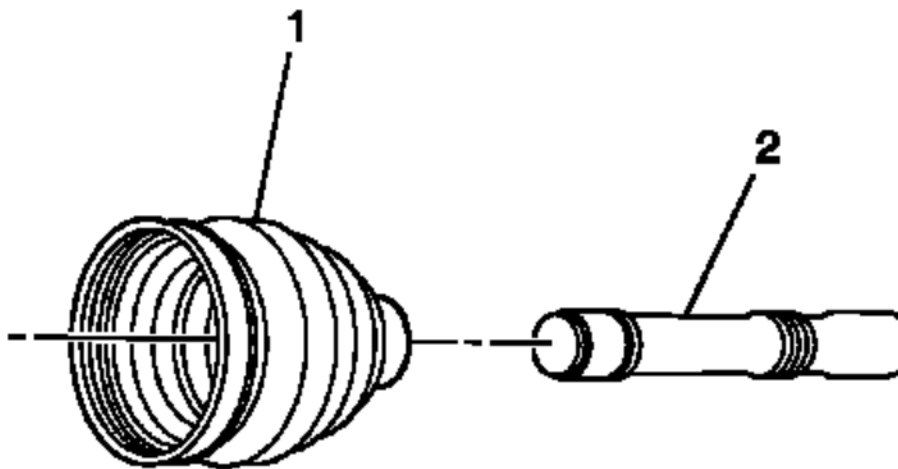


Fig. 27: Identifying Wheel Drive Shaft Boot
Courtesy of GENERAL MOTORS COMPANY

NOTE: Ensure the boot clamp is positioned correctly in the seal groove.

1. Position the boot (1) on the wheel drive shaft (2).

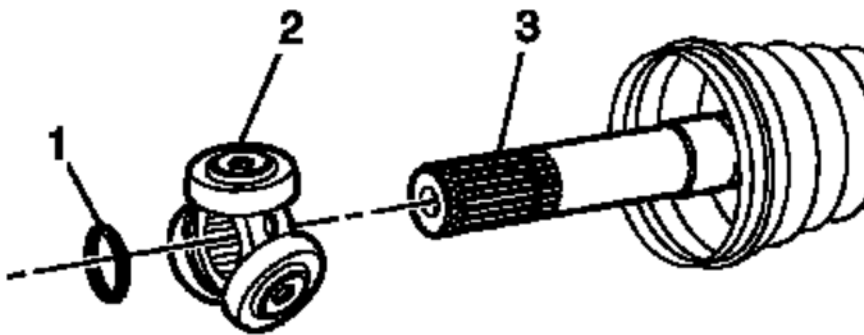


Fig. 28: View Of Wheel Drive Shaft, Tripod Spider And Retaining Clip
Courtesy of GENERAL MOTORS COMPANY

2. Install the tripod spider assembly (2) to the wheel drive shaft (3), until seated against the shoulder.
3. Install the retaining ring (1) in the wheel drive shaft (3).
4. Place approximately half of the grease in the kit into the boot and place the remainder in the tripod housing.

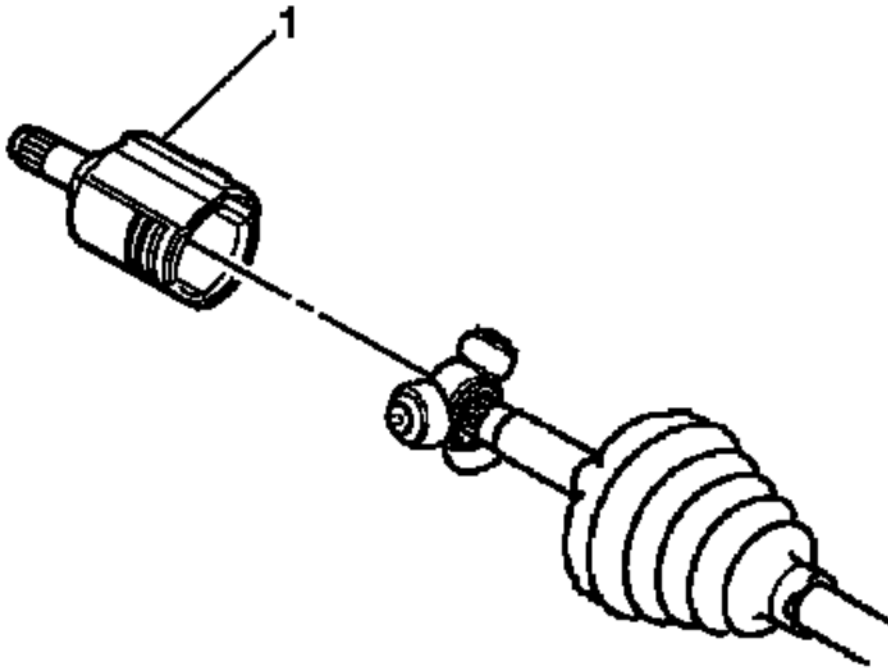


Fig. 29: Tripot Housing

Courtesy of GENERAL MOTORS COMPANY

5. Install the tripot housing (1) on the wheel drive shaft.

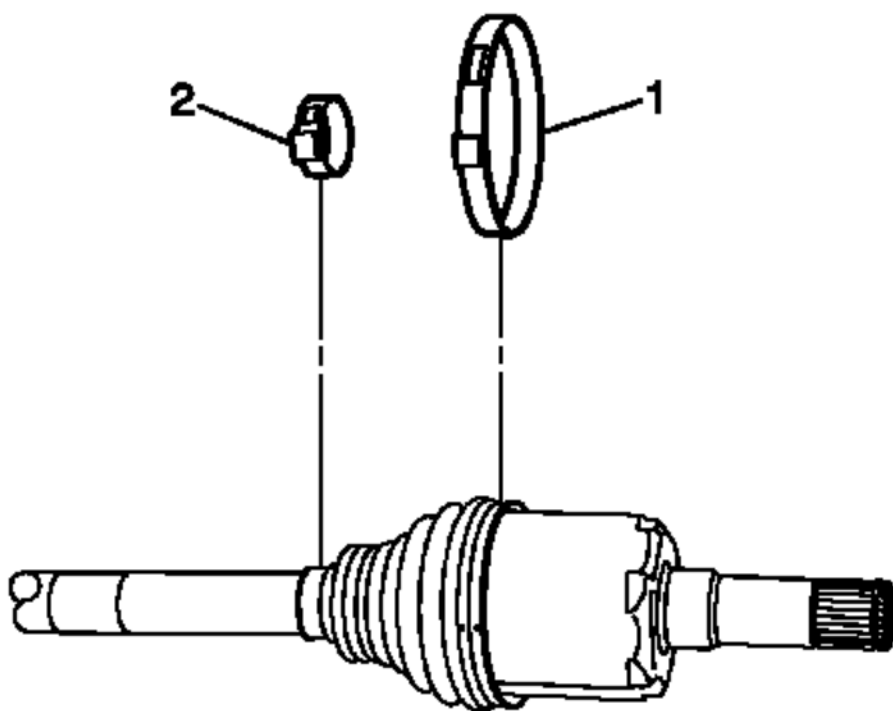


Fig. 30: View Of Boot Retaining Clamps
Courtesy of GENERAL MOTORS COMPANY

6. Install the inboard boot clamp (2).
7. Install the outboard boot clamp (1).

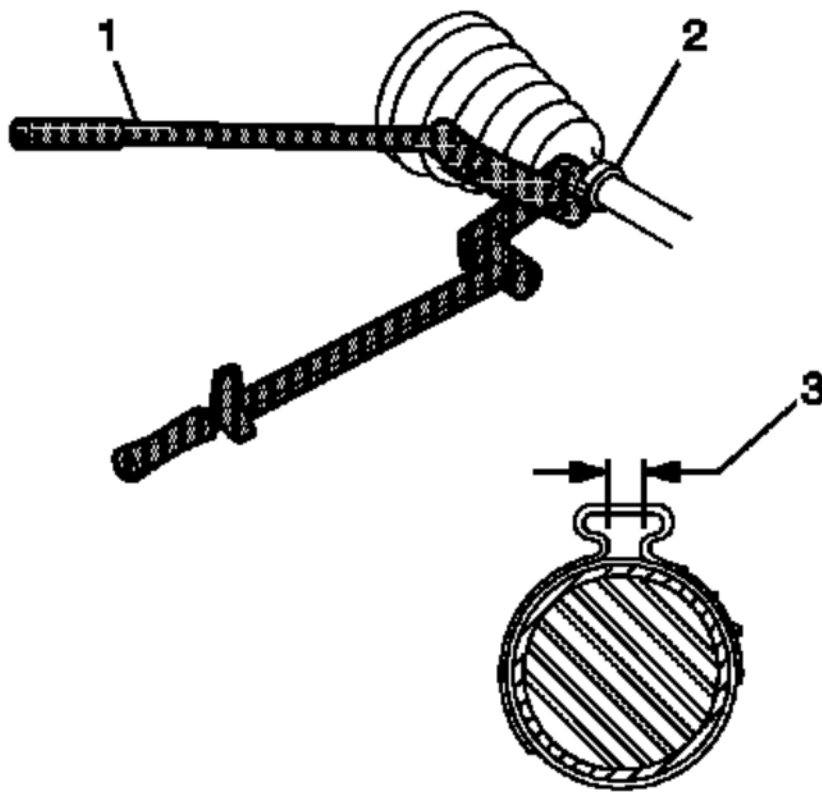


Fig. 31: Identifying Pliers Breaker Bar, Torque Wrench, Ratchet & Gap Measurement
Courtesy of GENERAL MOTORS COMPANY

8. Using the **DT 35910** pliers, breaker bar, torque wrench and or ratchet (1), close the boot clamp (2) until the gap (3) measures 2.15 mm (0.085 in).

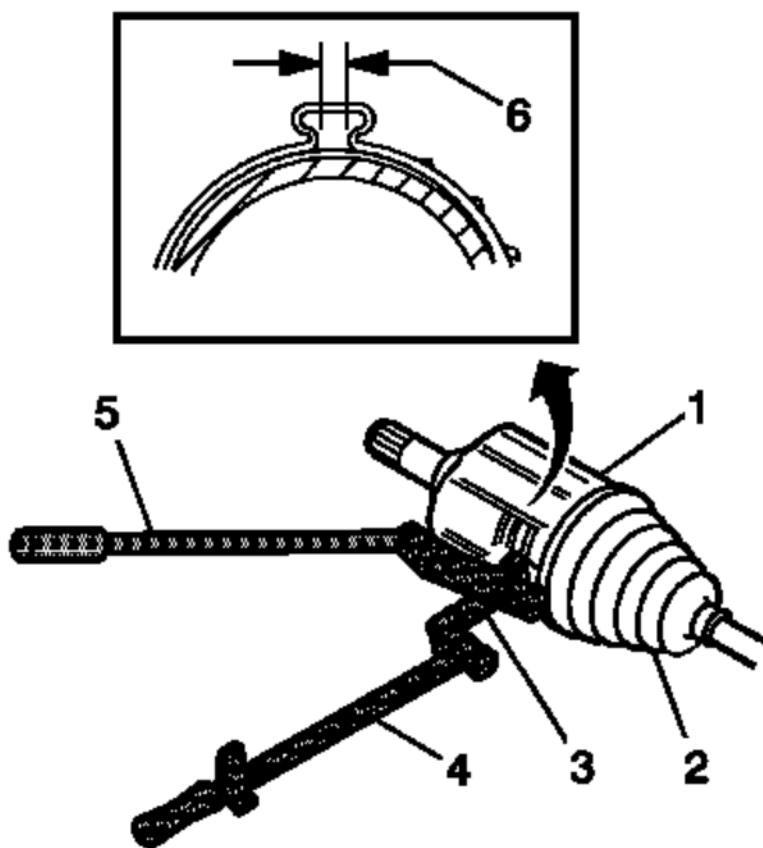


Fig. 32: Measuring Boot Clamp Gap
 Courtesy of GENERAL MOTORS COMPANY

9. Using the **DT 35910** pliers (3), breaker bar (5), torque wrench and or ratchet (4), close the clamp until the gap (6) measures 1.9 mm (0.070 in).
10. Rotate the housing in a circular motion to distribute the grease in the tripot joint.
11. Install the wheel drive shaft to the vehicle. Refer to **Front Wheel Drive Shaft Replacement - Left Side**, and **Front Wheel Drive Shaft Replacement - Right Side**.

FRONT WHEEL DRIVE SHAFT OUTER JOINT AND BOOT REPLACEMENT

Special Tools

- **CH 48894** Wheel Drive Shaft Boot Clamp Pliers
- **DT 35910** Drive Axle Seal Clamp Pliers

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

NOTE: The outer Constant Velocity Joint is not serviced separately. If the CV joint is found to have excessive wear or damage, replace the wheel drive shaft as an assembly.

Disassemble Procedure

1. Remove the wheel drive shafts from the vehicle. Refer to Front Wheel Drive Shaft Replacement - Left Side, and Front Wheel Drive Shaft Replacement - Right Side.

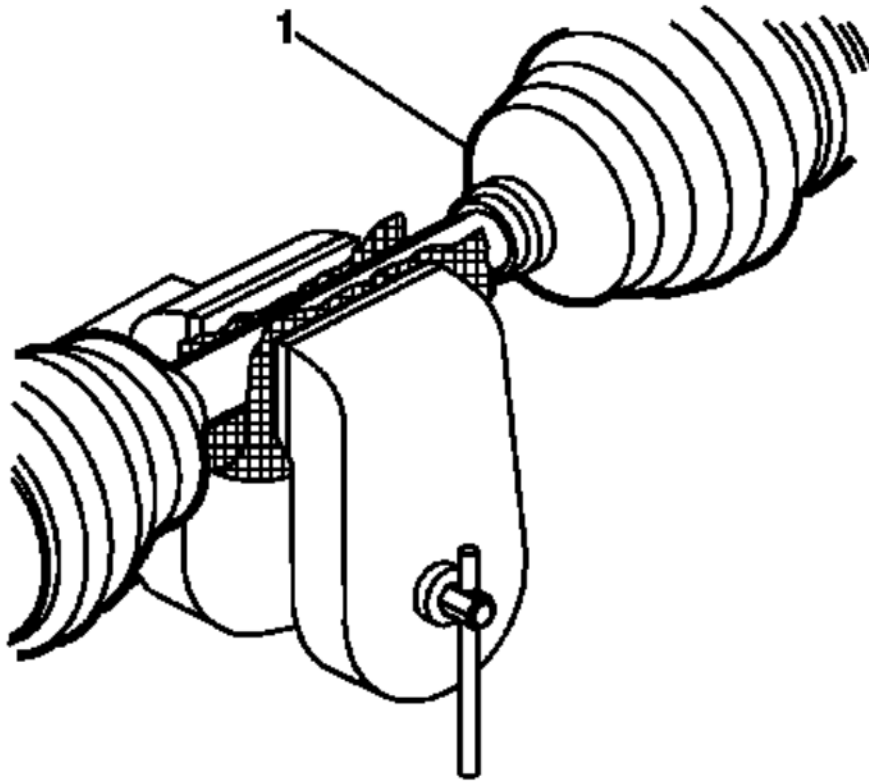


Fig. 33: View Of Front Wheel Drive Shaft Inner Joint
Courtesy of GENERAL MOTORS COMPANY

2. Clamp the drive axle shaft in a soft jawed vice.

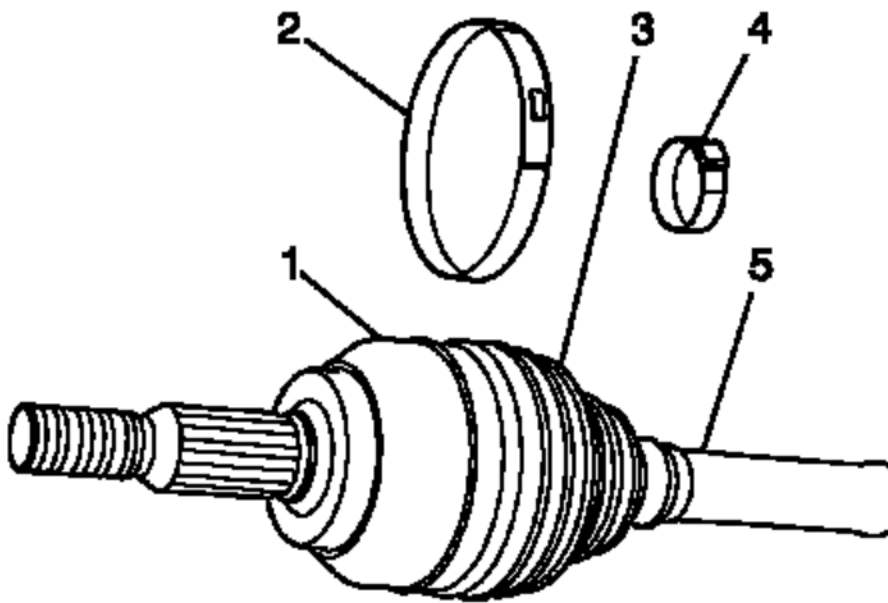


Fig. 34: Identifying Boot Clamps

Courtesy of GENERAL MOTORS COMPANY

CAUTION: Do not cut through the wheel drive shaft inboard or outboard boot during service. Cutting through the boot may damage the sealing surface of the housing and the tripot or the constant velocity joint bushing. Damage to the sealing surface may lead to water and dirt intrusion and premature wear of the constant velocity joint.

3. Using the appropriate tool, remove the boot clamp (2) from the constant velocity (CV) joint (1) and the boot (3).
4. Using the appropriate tool, remove and discard the boot clamp (4) from the boot (3) and the wheel drive shaft (5). Replace with NEW clamps.

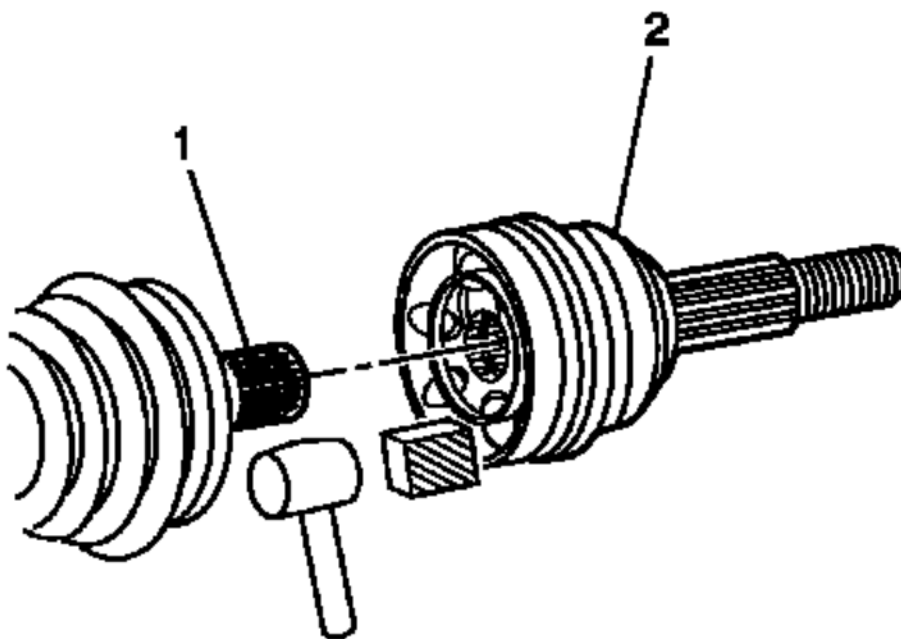


Fig. 35: Separating CV Joint From Axle Shaft
Courtesy of GENERAL MOTORS COMPANY

5. Using a block of wood and a hammer, remove the CV joint (2) from the wheel drive shaft (1).

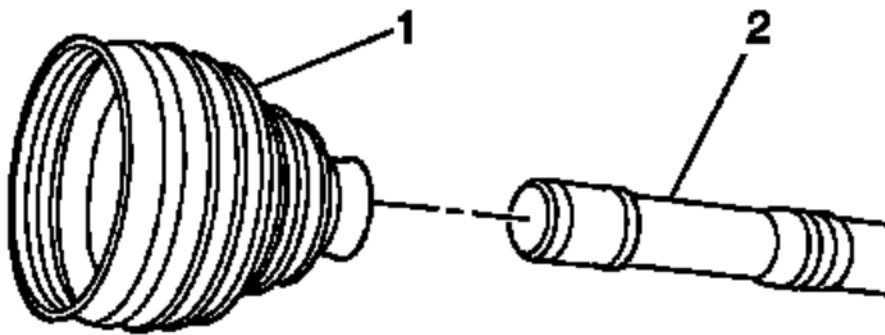


Fig. 36: Identifying Clamp & Wheel Drive Shaft
Courtesy of GENERAL MOTORS COMPANY

6. Remove the boot (1) from the wheel drive shaft (2).

Assemble Procedure

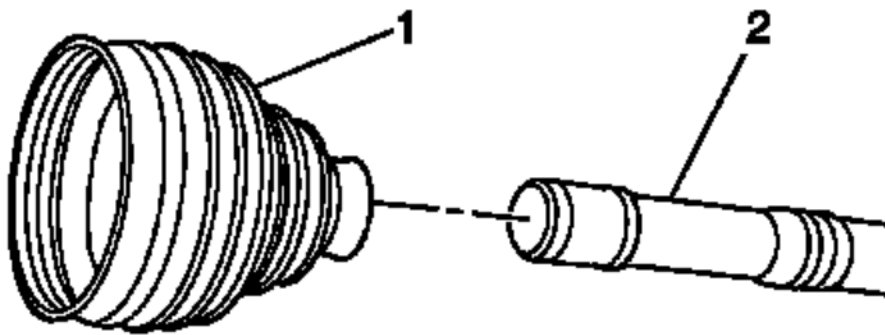


Fig. 37: Identifying Clamp & Wheel Drive Shaft
Courtesy of GENERAL MOTORS COMPANY

1. Position the boot (1) on the wheel drive shaft (2).

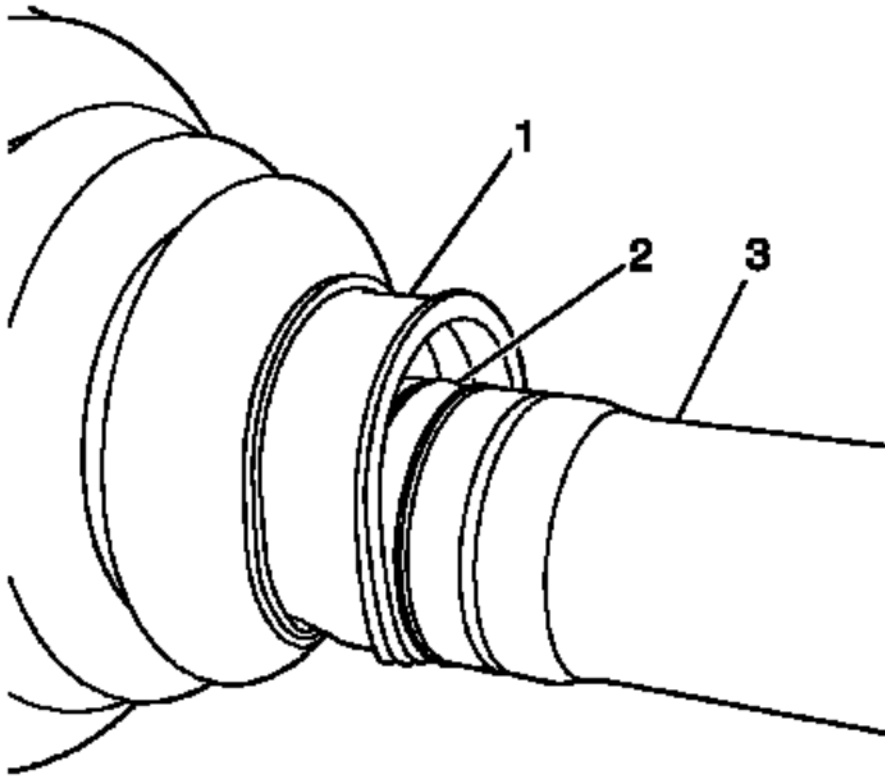


Fig. 38: Identifying Groove In Wheel Drive Shaft
Courtesy of GENERAL MOTORS COMPANY

2. Ensure that the boot (1) is properly seated in the groove (2) in the wheel drive shaft (3).

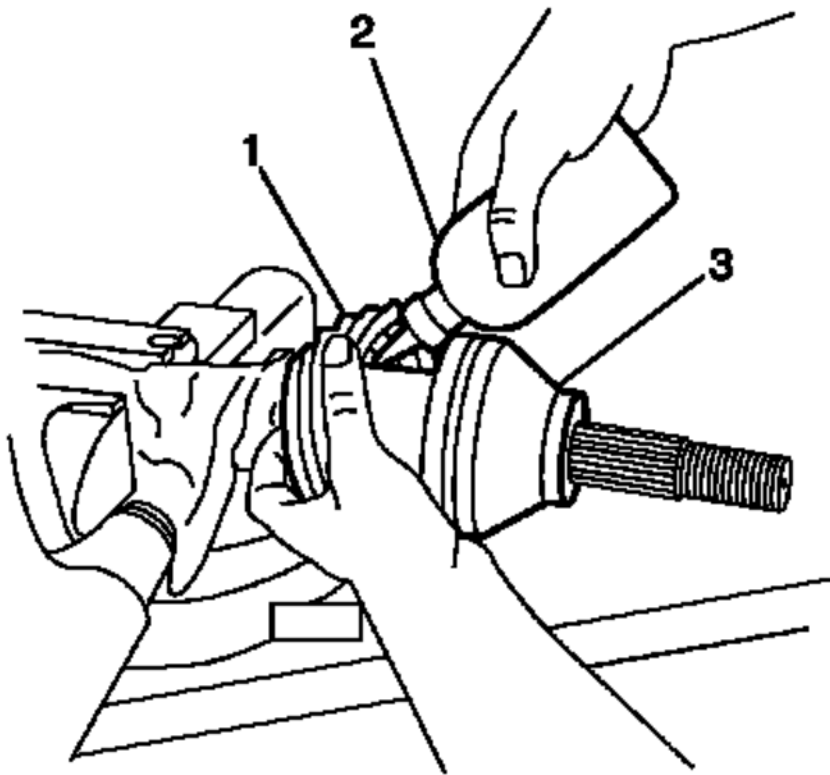


Fig. 39: Lubricating Boot Of Tripot Housing
Courtesy of GENERAL MOTORS COMPANY

3. Place approximately half the lubricant (2) inside the CV joint boot (1) and the other half in the CV joint (3).

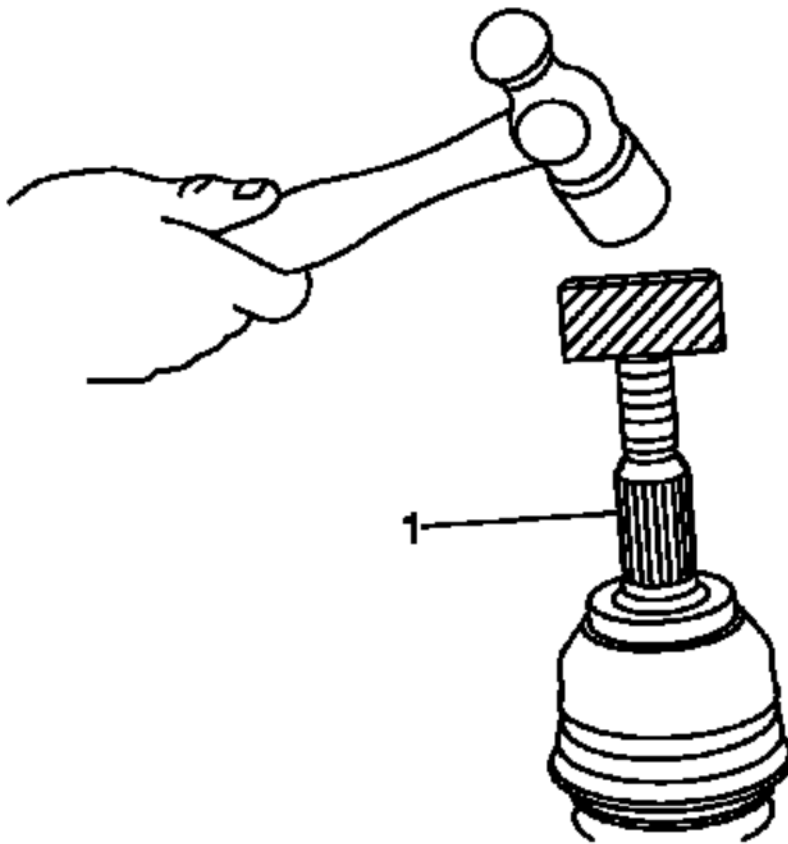


Fig. 40: Installing CV Joint

Courtesy of GENERAL MOTORS COMPANY

4. Using a block of wood and a hammer, install the CV joint on the wheel drive shaft (1).

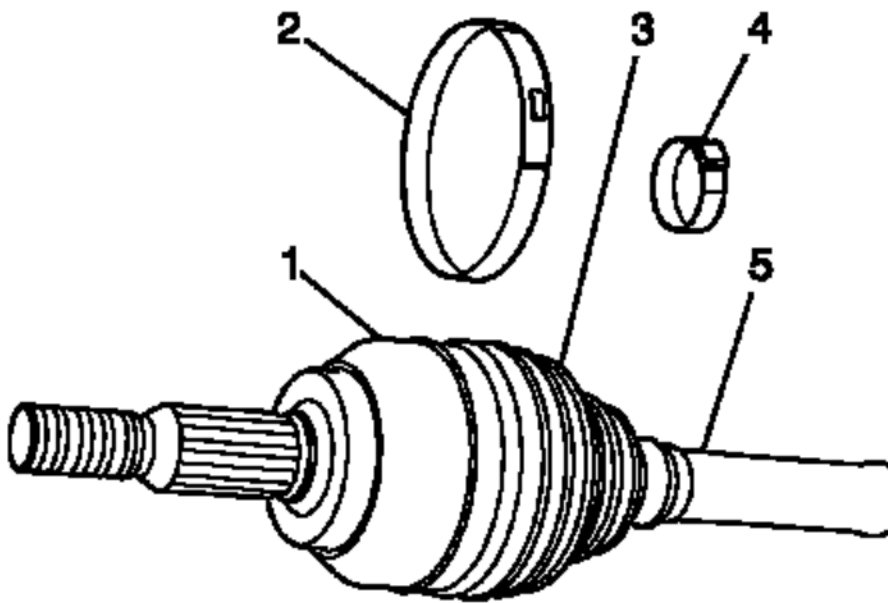


Fig. 41: Identifying Boot Clamps

Courtesy of GENERAL MOTORS COMPANY

5. Install the inboard boot clamp (4) on the boot (3) and the wheel drive shaft (5).
6. Install the outboard boot clamp (2) on the boot (3) and the CV joint housing (1).

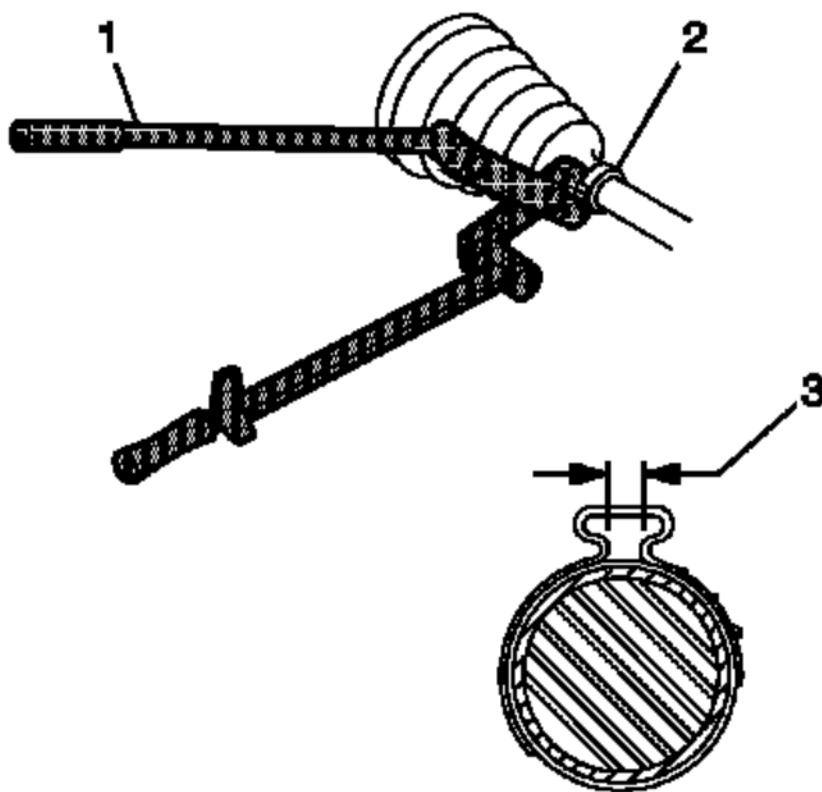


Fig. 42: Identifying Pliers Breaker Bar, Torque Wrench, Ratchet & Gap Measurement
Courtesy of GENERAL MOTORS COMPANY

NOTE: Ensure that the boot clamp is properly positioned around the entire circumference of the boot.

7. Using the **DT 35910** pliers (1), close the clamp (2) until the gap (3) measures 2.15 mm (0.85 in).

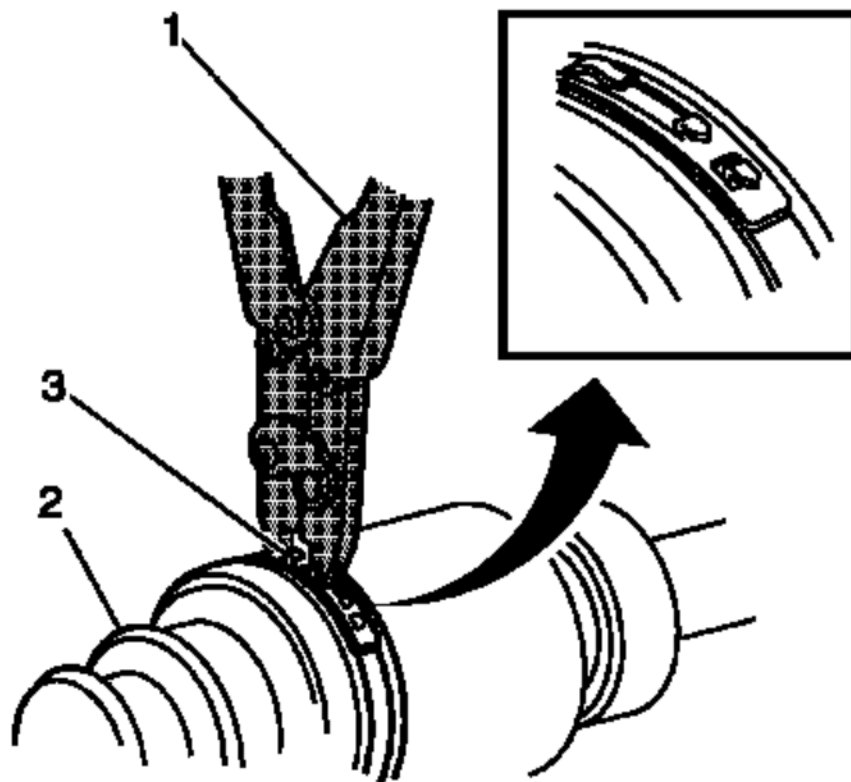


Fig. 43: Latching Large Seal Retaining Clamp
 Courtesy of GENERAL MOTORS COMPANY

NOTE: Ensure that the boot clamp is properly positioned around the entire circumference of the boot.

8. Using the **CH 48894** pliers (1), close the boot clamp (3).
9. Remove the wheel drive shaft from the bench vise.
10. Move the CV joint in a circular motion 4 to 5 times to distribute the lubricant.
11. Install the wheel drive shaft in the vehicle. Refer to **Front Wheel Drive Shaft Replacement - Left Side**, and **Front Wheel Drive Shaft Replacement - Right Side**.

DESCRIPTION AND OPERATION

WHEEL DRIVE SHAFTS DESCRIPTION AND OPERATION

Wheel drive shafts are flexible assemblies consisting of an inner joint and an outer constant velocity joint connected by an axle shaft. The inner joint is completely flexible, and can plunge in and out. The outer joint is also flexible, but cannot plunge in and out. These drive axles are used to transmit rotational force from the transaxle to the front tire and wheel assemblies.

Seal and Clamp

The wheel drive shafts use inboard and outboard joint seals made of thermoplastic material, and clamps made of stainless steel. The functions of the seals are as follows:

- The seals protect the internal parts of the inboard and outboard joints.
 - They protect the joint lubricating grease from surrounding detrimental atmospheric conditions; such as extreme temperatures, ozone gas, etc.
 - They protect the joint lubricating grease from foreign materials; such as stones, dirt, water, salt, etc.
- The seals facilitate angular movement of the outboard joint.
- The seals facilitate angular and axial movement of the inboard joint.

The function of the clamps is as follows:

Provide a leak proof connection at both the housing and the axle shaft for the inboard and outboard joints.

The thermoplastic material performs well against normal handling, operational wear and conditions. This material however, is not strong enough to withstand abusive handling or damage due to objects such as sharp tools or the sharp edge of any other surrounding component on the vehicle.

Inner Joint

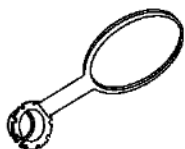
The inner joints are of the tripot or CV-joint design without an over-extension limitation retainer. The inner joints incorporate a male spline which interlocks with the transaxle using snap rings.

Outer Joint

The outer joints are of the Rzeppa, constant velocity joint design. The shaft end which mates with the wheel bearing and hub assembly, incorporates a helical spline to assure a tight, press-type fit. This design assures that no end play will exist between the hub bearing and the drive shaft assembly for added durability and reduced bearing noise.

SPECIAL TOOLS AND EQUIPMENT

SPECIAL TOOLS

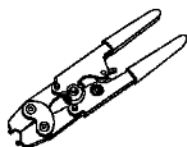
Illustration	Tool Number/Description
	DT-44394-A DT-49613 KM-6332 J-44394-A J-44394 SA91112T Seal Protector
	CH-313



KM-313
Slide Hammer



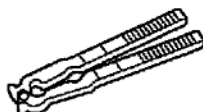
CH-6003
KM-6003
Axle Shaft Remover



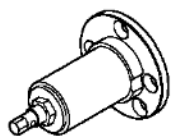
CH-48894
Wheel drive Shaft Boot Clamp Pliers



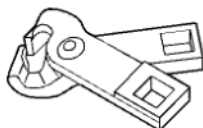
CH-49376
CH-6610
KM-6610
Holding Wrench



CH-22610
KM-J 22610
Keystone Clamp Pliers



CH-49400
KM-6282
89 96 951
Removal Tool



DT-35910
J-35910
CH-804
MKM-804
Drive Axle Seal Clamp Pliers



EN-956
KM-956
Extension