

2007 Hummer H3

2007 Driveline/Axle Propeller Shaft - H3

2007 Driveline/Axle

Propeller Shaft - H3

SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

Fastener Tightening Specifications

Application	Specification	
	Metric	English
Bolt - Front Propeller Shaft CV Joint to Transfer Case Drive Flange (4)	61 N.m	541 lb ft
Bolt - Front Propeller Shaft to Front Pinion Yoke (4)	25 N.m	18 lb ft
Bolt - Rear Propeller Shaft Retainer (8)	25 N.m	18 lb ft

SEALERS, ADHESIVES AND LUBRICANTS

Sealers, Adhesives and Lubricants

Application	Type of Material	GM Part Number
Slip Yoke Splines	Lubricant	12377985 or equivalent

COMPONENT LOCATOR

DRIVELINE DISASSEMBLED VIEWS

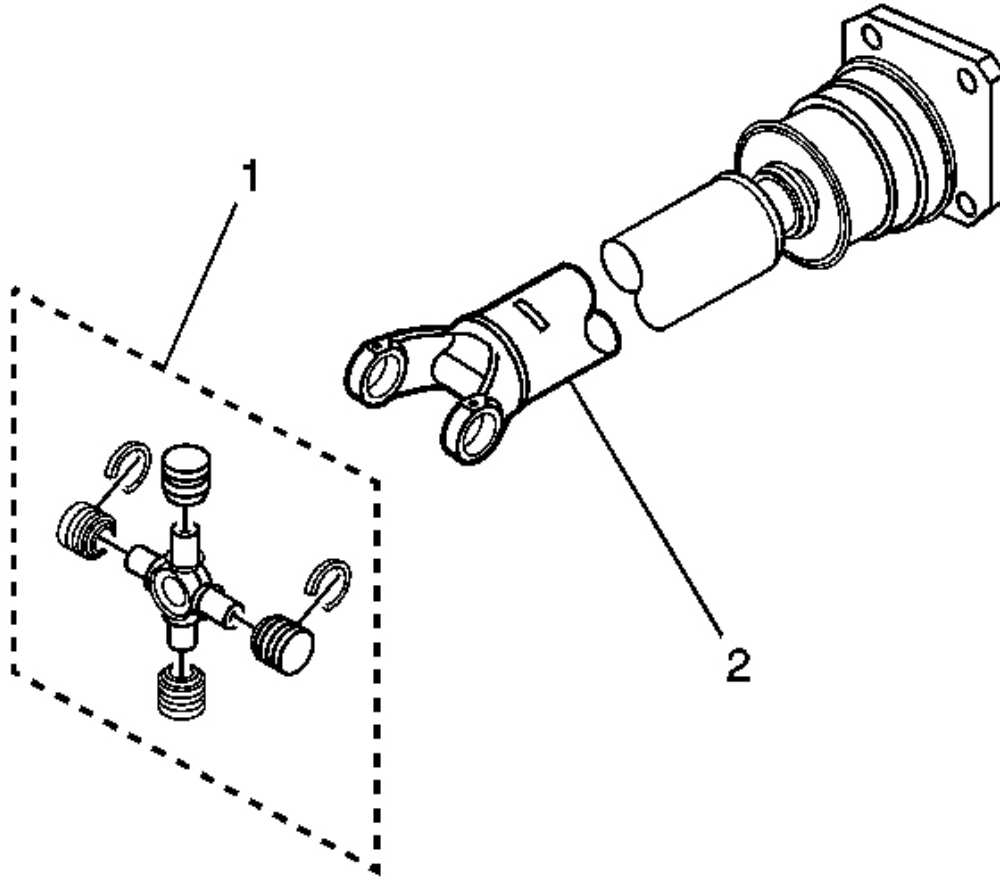


Fig. 1: Front Drive Propeller Shaft Component View
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 1

Callout	Component Name
1	Universal Joint Spider Assembly
2	Propeller Shaft Tube Assembly

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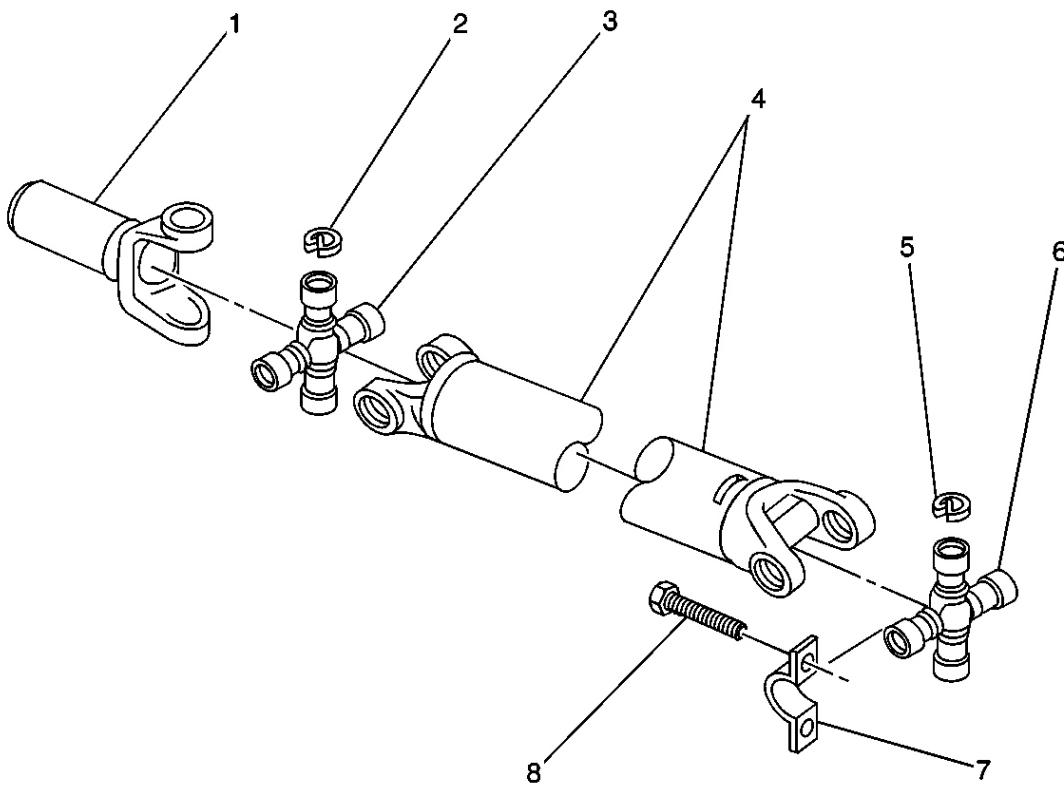


Fig. 2: One-Piece Propeller Shaft Component View
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 2

Callout	Component Name
1	Propeller Shaft Slip Yoke
2	Propeller Shaft Universal Joint Spider Bearing Retainer Ring
3	Propeller Shaft Universal Joint
4	Propeller Shaft Tube
5	Propeller Shaft Universal Joint Spider Bearing Retainer Ring
6	Propeller Shaft Universal Joint
7	Propeller Shaft Bearing Retainer
8	Propeller Shaft Bearing Retainer Bolt

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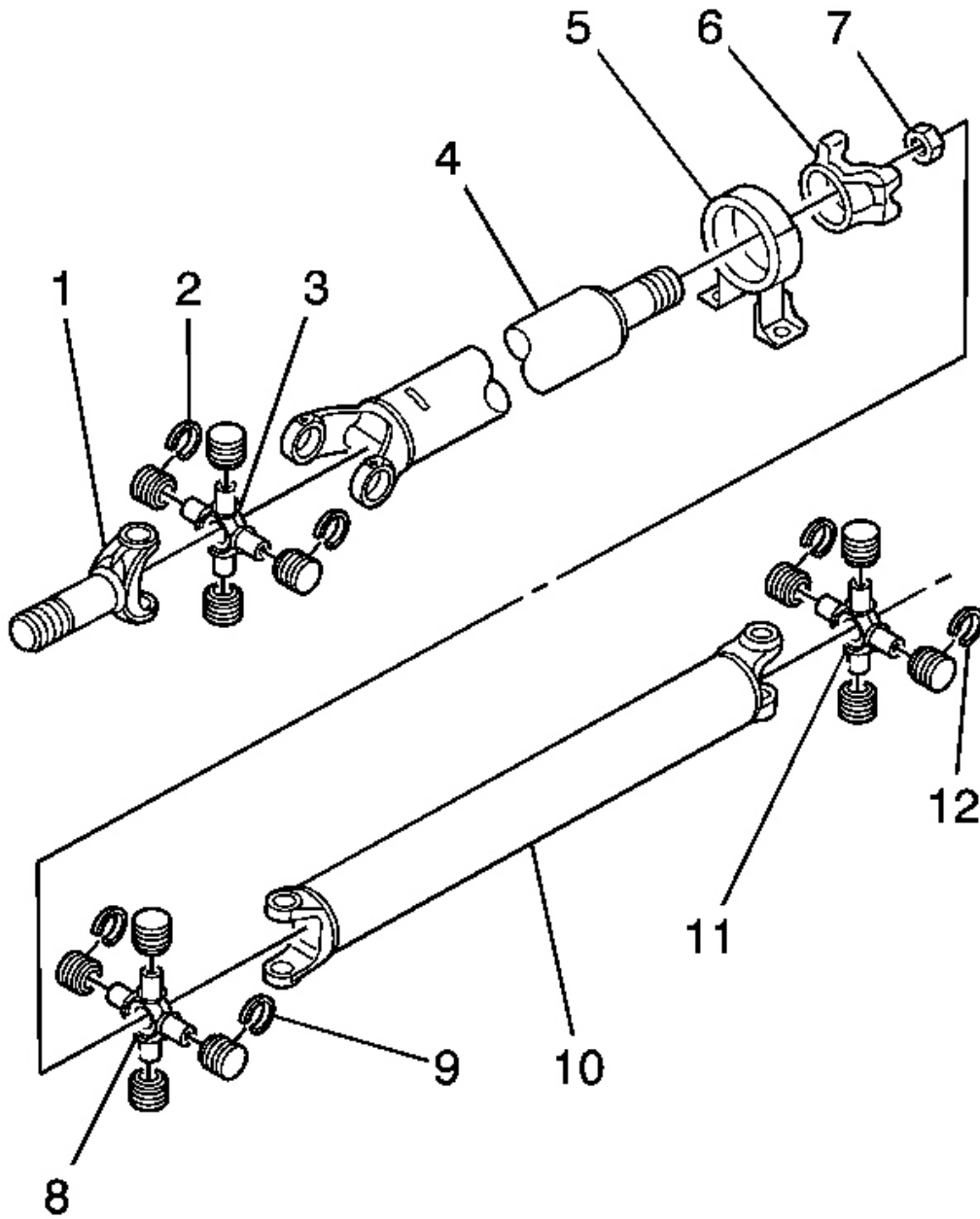


Fig. 3: Two-Piece Propeller Shaft Component View
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 3

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Callout	Component Name
1	Propeller Shaft Slip Yoke
2	Propeller Shaft Universal Joint Spider Bearing Retainer Ring
3	Propeller Shaft Universal Joint and Bearing
4	Propeller Shaft Tube
5	Propeller Shaft Center Bearing
6	Propeller Shaft Yoke
7	Propeller Shaft Yoke Retaining Nut
8	Propeller Shaft Universal Joint and Bearing
9	Propeller Shaft Universal Joint Bearing Retaining Ring
10	Propeller Shaft Tube
11	Propeller Shaft Universal Joint and Bearing
12	Propeller Shaft Universal Joint Bearing Retaining Ring

DIAGNOSTIC INFORMATION AND PROCEDURES

DIAGNOSTIC STARTING POINT - PROPELLER SHAFT

Begin the system diagnosis by reviewing the system Description and Operation. Reviewing the Description and Operation information will help you determine the correct symptom diagnostic procedure when a malfunction exists. Reviewing the Description and Operation information will also help you determine if the condition described by the customer is normal operation. Refer to **Symptoms - Propeller Shaft** in order to identify the correct procedure for diagnosing the system and where the procedure is located.

SYMPTOMS - PROPELLER SHAFT

Before beginning diagnosis, review the system description and operation in order to familiarize yourself with the system function. Refer to **Propeller Shaft Description and Operation**.

Classifying the Symptom

Propeller Shaft symptoms can usually be classified into the following categories:

- Leaks
- Noises
- Vibrations

Leak and noise related symptoms are diagnosed within the Propeller Shaft section. For vibration

related symptoms, refer to **Diagnostic Starting Point - Vibration Diagnosis and Correction** .

Visual/Physical Inspection

- Inspect the system for aftermarket devices which could affect the operation of the Propeller Shaft.
- Inspect the easily accessible or visible system components for obvious damage or conditions which could cause the symptom.

Symptom List

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

- **Leak at Front Slip Yoke**
- **Universal Joint Noise**
- **Ping, Snap or Click Noise**
- **Knock or Clunk Noise**
- **Scraping Noise**
- **Squeak Noise**
- **Shudder on Acceleration at Low Speed**

LEAK AT FRONT SLIP YOKE

Leak at Front Slip Yoke

Checks	Action
DEFINITION: An occasional drop of lubricant leaking from the splined yoke is normal and requires no attention.	
The slip yoke barrel is burred, nicked, corroded or worn.	<ol style="list-style-type: none"> 1. Inspect the slip yoke for burrs. Minor burrs can be removed by careful use of crocus cloth or fine stone honing. 2. If the is badly burred, corroded or worn, replace the yoke. 3. Replace the oil seal. Refer to one of the following: <ul style="list-style-type: none"> • <u>Transfer Case Assembly Replacement</u> • <u>Transmission Housing Oil Seal Replacement -</u>

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	<u>Rear</u>
There is a faulty transmission or transfer case output shaft oil seal.	Replace the oil seal. Refer to one of the following: <ul style="list-style-type: none">• <u>Transfer Case Assembly Replacement</u>• <u>Transmission Housing Oil Seal Replacement - Rear</u>

UNIVERSAL JOINT NOISE

Universal Joint Noise

Problem	Action
One or more of the universal joints are worn or damaged.	Replace the universal joint. Refer to <u>Universal Joint Replacement - External Snap Ring</u> .
One or more of the universal joints have lost lubricant	Replace the universal joint. Refer to <u>Universal Joint Replacement - External Snap Ring</u> .
The yoke retainer strap bolts are loose	Tighten the yoke retainer strap bolts to specifications. Refer to <u>Fastener Tightening Specifications</u> .

PING, SNAP OR CLICK NOISE

Ping, Snap or Click Noise

Checks	Action
DEFINITION: A ping, snap or click is usually heard on initial load after the transmission is in gear, either in forward or reverse.	
The fixed yoke or the pinion yoke is loose.	Tighten the bolts and the pinion nut to specified torque. Refer to <u>Fastener Tightening Specifications</u> .
One or more of the universal joints are worn or damaged.	Replace the universal joint. Refer to <u>Universal Joint Replacement - External Snap Ring</u> .

KNOCK OR CLUNK NOISE

Knock or Clunk Noise

Checks	Action
DEFINITION: Knocking or clunking noise occurs when operating the vehicle in high gear or coasting in neutral at 16 km/h (10 mph).	
One or more of the universal joints are worn or damaged.	Replace the universal joint. Refer to <u>Universal Joint Replacement - External Snap Ring</u> .
The side gear hub counterbore in the	Replace the differential case and/or the side gears. Refer to <u>Differential Replacement</u> .

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differential is worn oversize.

SCRAPING NOISE

Scraping Noise

Checks	Action
DEFINITION: A scraping noise occurs when driving the vehicle at various speeds.	
The pinion flange deflector or the center bearing is rubbing.	Correct the interference as necessary.

SQUEAK NOISE

Squeak Noise

Checks	Action
DEFINITION: When driving the vehicle at various speeds a squeaking sound occurs.	
One or more of the universal joints have lost lubricant.	Replace the universal joint. Refer to <u>Universal Joint Replacement - External Snap Ring</u> .

SHUDDER ON ACCELERATION AT LOW SPEED

Shudder on Acceleration at Low Speed

Checks	Action
DEFINITION: When the vehicle is accelerating at low speed a shudder occurs.	
The yoke retainer strap bolts are loose or missing.	Replace or tighten the yoke retainer strap bolts to specifications. Refer to <u>Fastener Tightening Specifications</u> .
The driveline joint angle is excessive or incorrectly set.	Determine if the driveline angle is incorrect and correct as necessary. Refer to <u>Diagnostic Starting Point - Vibration Diagnosis and Correction</u> .
One or more of the universal joints are worn or damaged.	Replace the universal joint. Refer to <u>Universal Joint Replacement - External Snap Ring</u> .

REPAIR INSTRUCTIONS

FRONT PROPELLER SHAFT REPLACEMENT

Removal Procedure

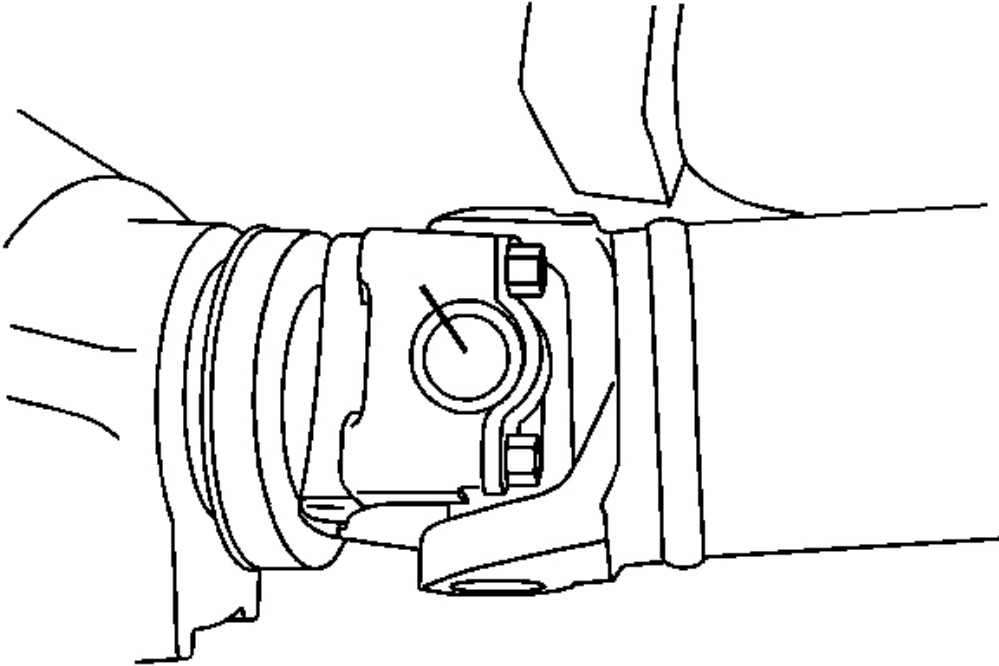


Fig. 4: View Of Marked Rear Universal Joint To Drive Shaft Flange
Courtesy of GENERAL MOTORS CORP.

1. Place the transmission in neutral.
2. Release the park brake, if applied.
3. Raise and support the vehicle. Refer to **Lifting and Jacking the Vehicle** .
4. Mark the front universal joint to the drive shaft flange.

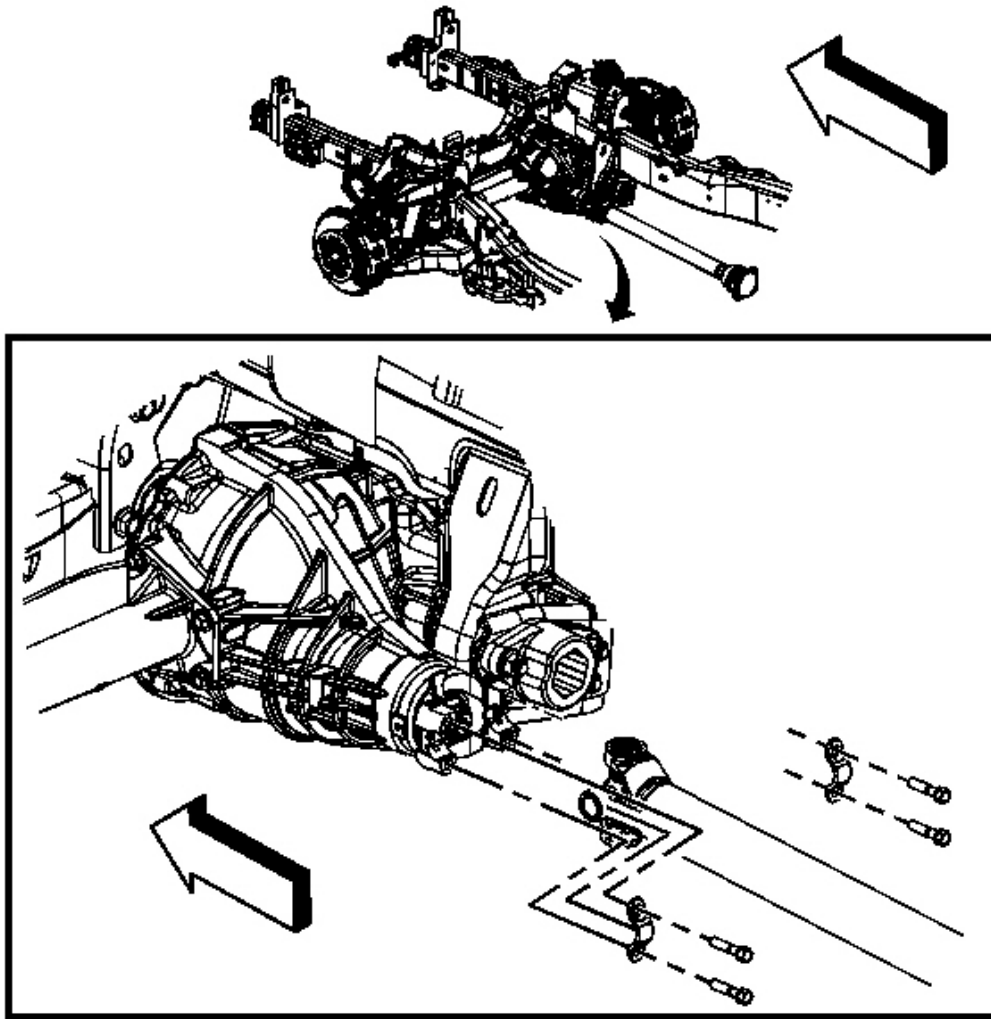


Fig. 5: Removing/Installing Retaining Bolts & Straps
Courtesy of GENERAL MOTORS CORP.

5. Remove the retaining bolts and straps.
6. Remove the propeller shaft from the front pinion drive flange.

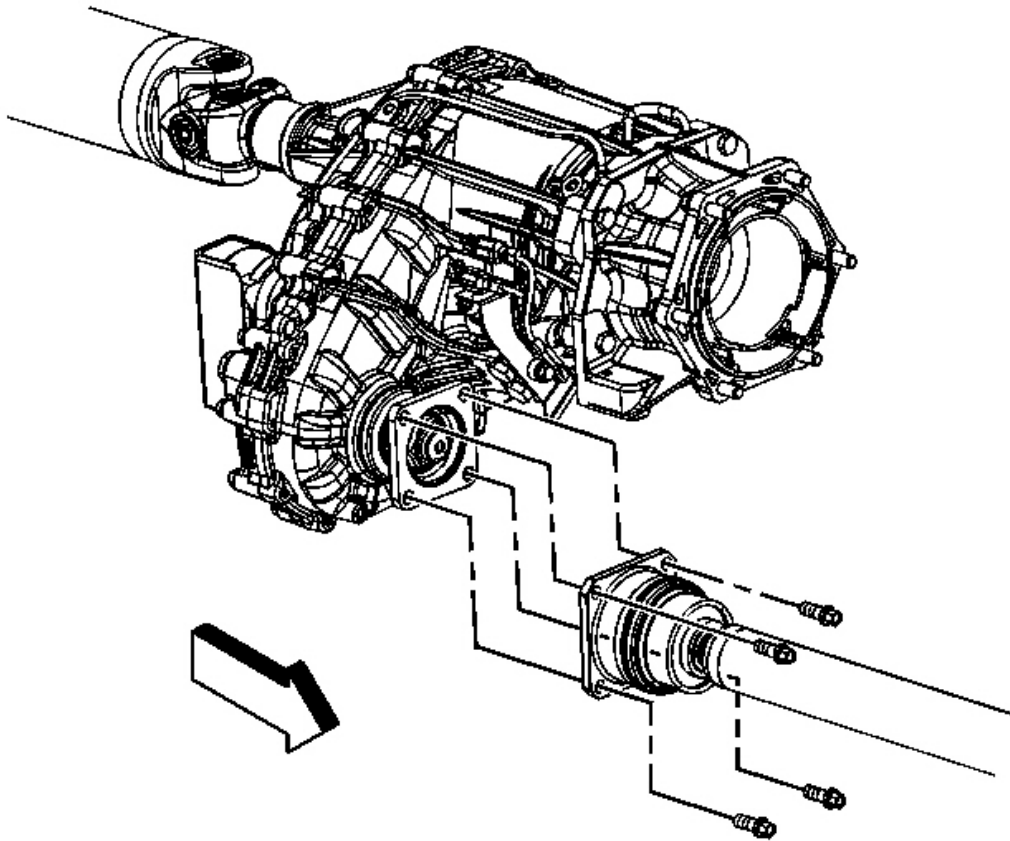


Fig. 6: Removing/Installing Propeller Shaft Retaining Bolts
Courtesy of GENERAL MOTORS CORP.

7. Remove the propeller shaft retaining bolts.
8. Remove the propeller shaft/CV joint from the transmission/transfer case flange.

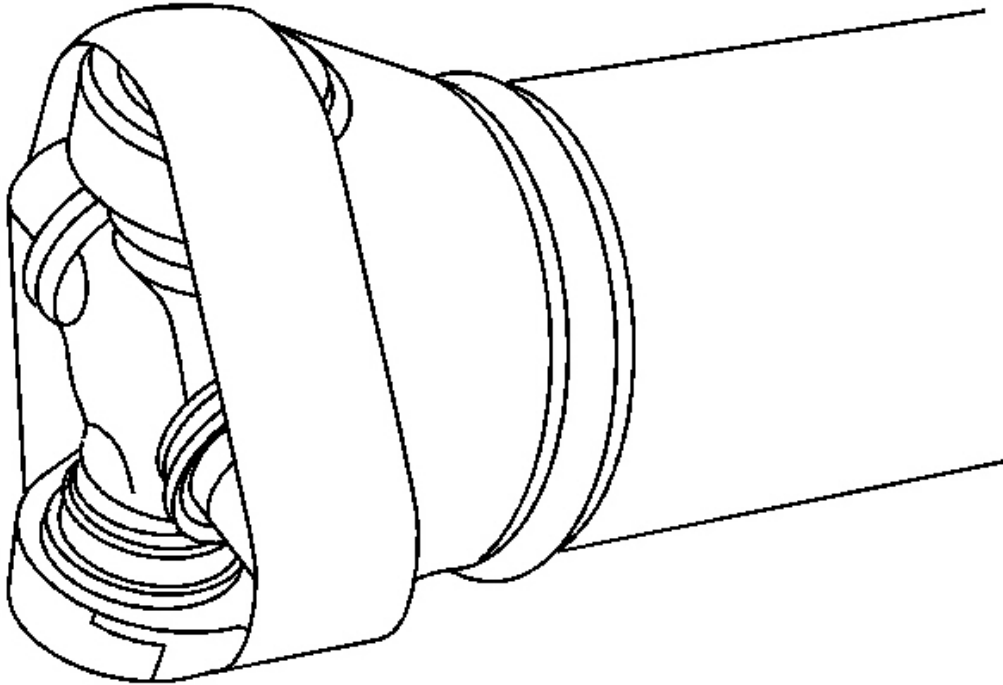


Fig. 7: View Of Wrapped U-Joint Bearing Caps
Courtesy of GENERAL MOTORS CORP.

9. Using tape or a rubber band, wrap the U-Joint bearing caps to ensure the bearing caps do not separate from the U-Joint.

Installation Procedure

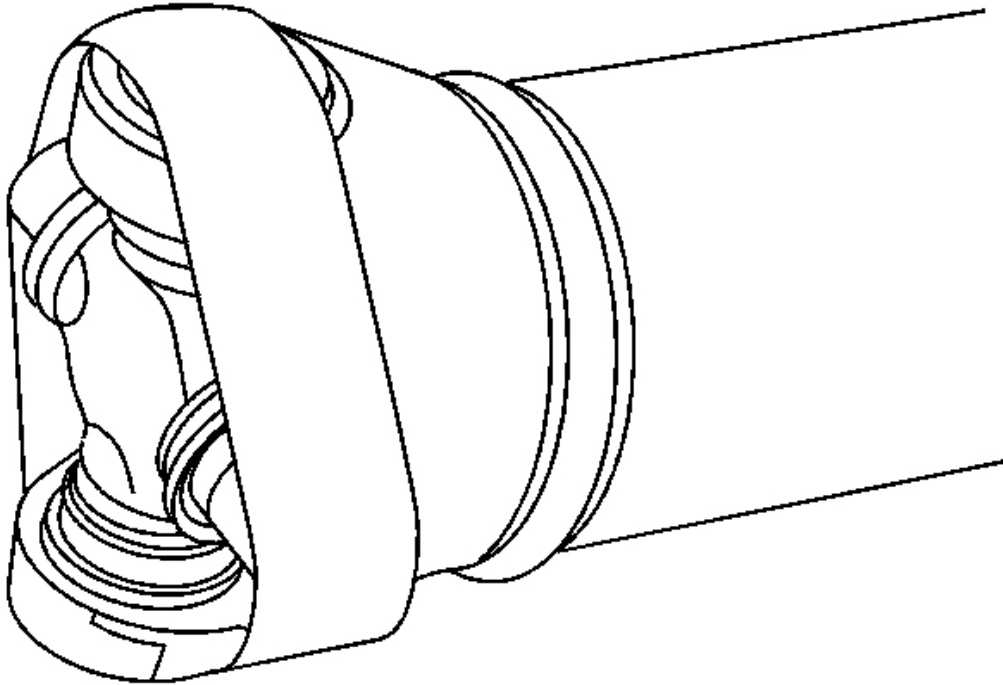


Fig. 8: View Of Wrapped U-Joint Bearing Caps
Courtesy of GENERAL MOTORS CORP.

1. Remove the tape or rubber band from the U-Joint.

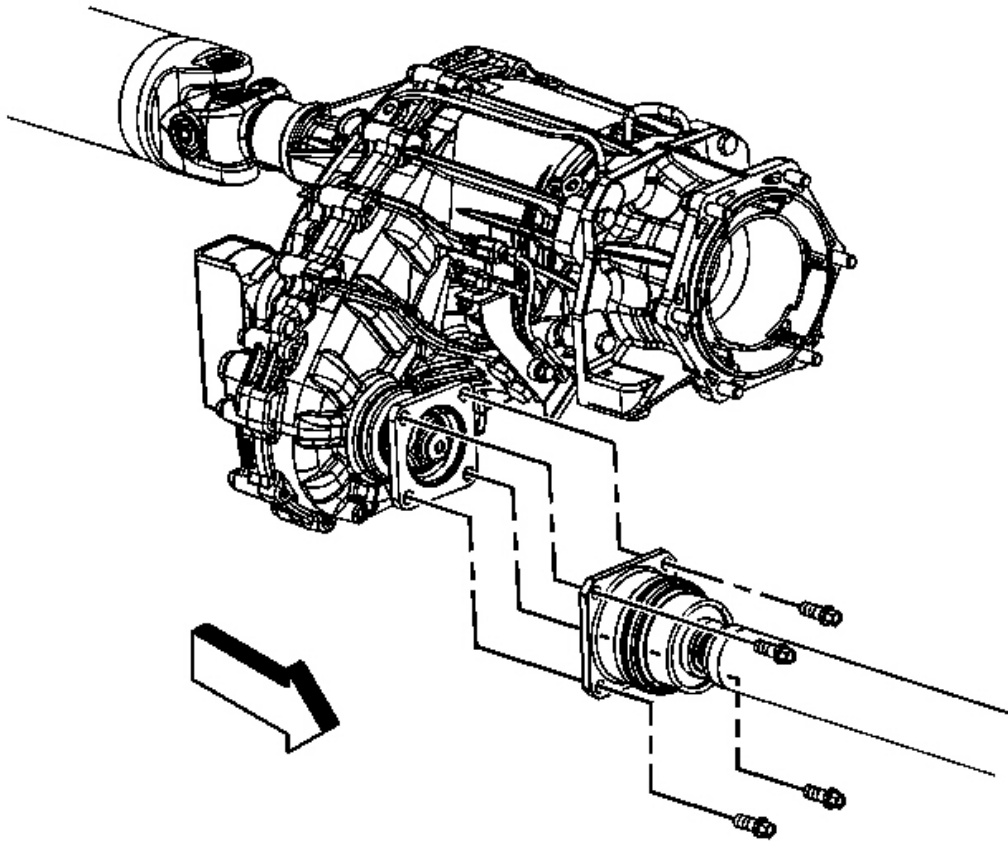


Fig. 9: Removing/Installing Propeller Shaft Retaining Bolts
Courtesy of GENERAL MOTORS CORP.

NOTE: Refer to Fastener Notice .

2. Position the propeller shaft/CV joint to the transmission/transfer case.
3. Install the propeller shaft/CV joint retaining bolts.

Tighten: Tighten the retaining bolts to 70 N.m (51 lb ft).

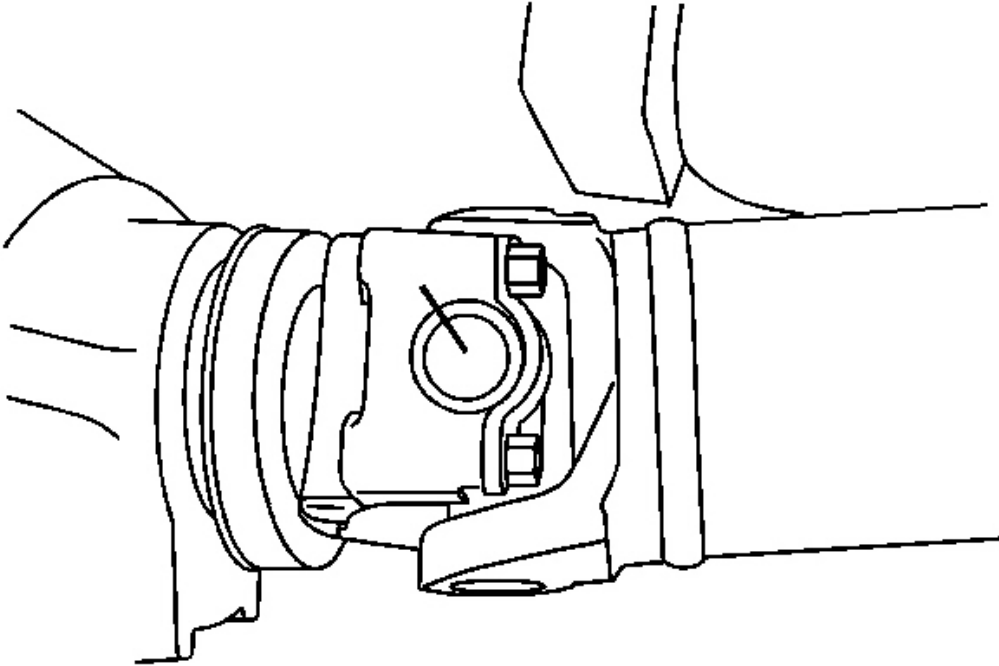


Fig. 10: View Of Marked Rear Universal Joint To Drive Shaft Flange
Courtesy of GENERAL MOTORS CORP.

4. Align the propeller shaft with the reference marks on the pinion flange.

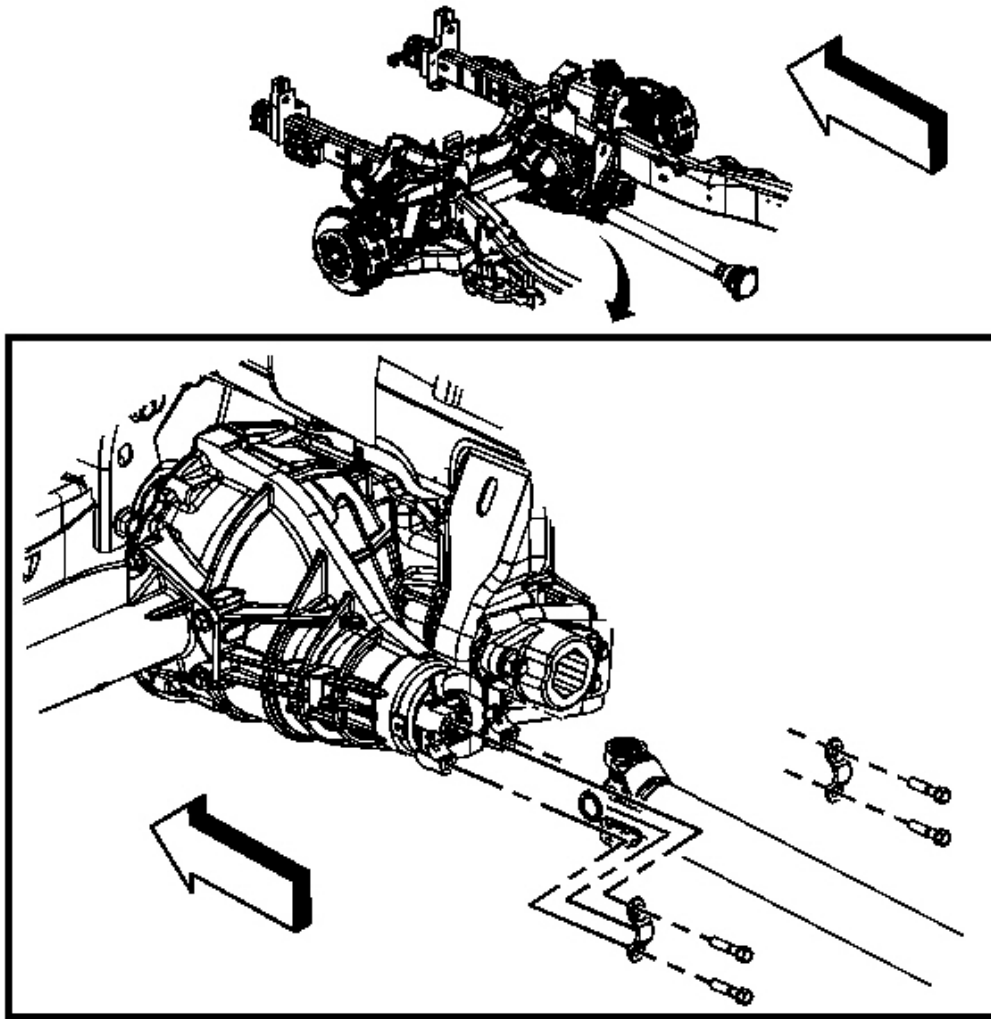


Fig. 11: Removing/Installing Retaining Bolts & Straps
Courtesy of GENERAL MOTORS CORP.

5. Install the straps and retaining bolts.

Tighten: Tighten the retaining bolts to 25 N.m (18 lb ft).

6. Lower the vehicle.

Removal Procedure

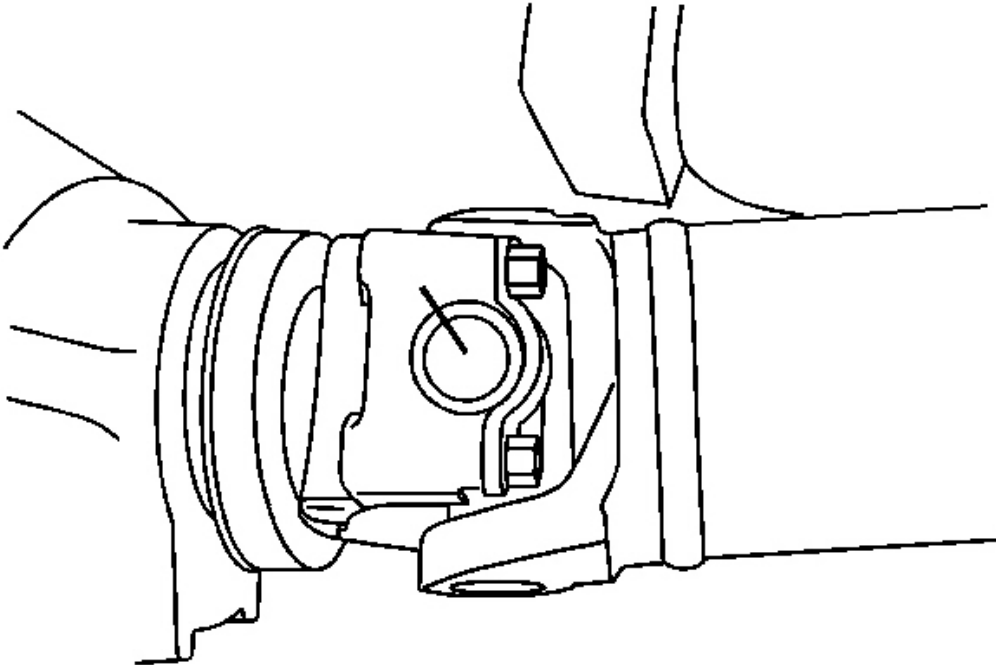


Fig. 12: View Of Marked Rear Universal Joint To Drive Shaft Flange
Courtesy of GENERAL MOTORS CORP.

1. Place the transmission in neutral.
2. Release the park brake, if applied.
3. Raise and support the vehicle. Refer to **Lifting and Jacking the Vehicle** .
4. Mark the rear universal joint to the drive shaft flange.

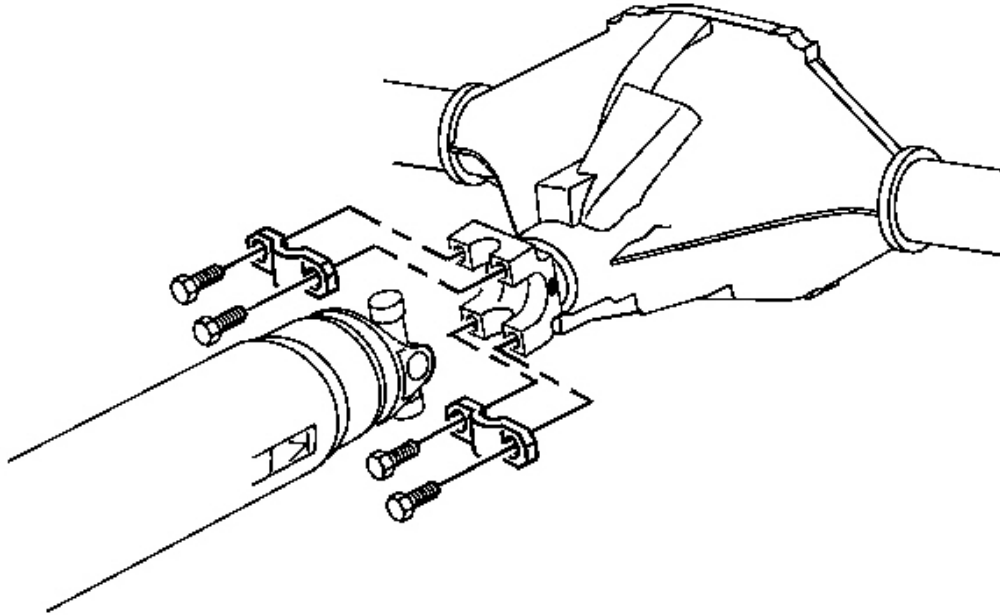


Fig. 13: View Of Propeller Shaft, Retaining Bolts & Clamps
Courtesy of GENERAL MOTORS CORP.

5. Remove the retaining bolts and clamps.
6. Remove the propeller shaft from the pinion drive flange.

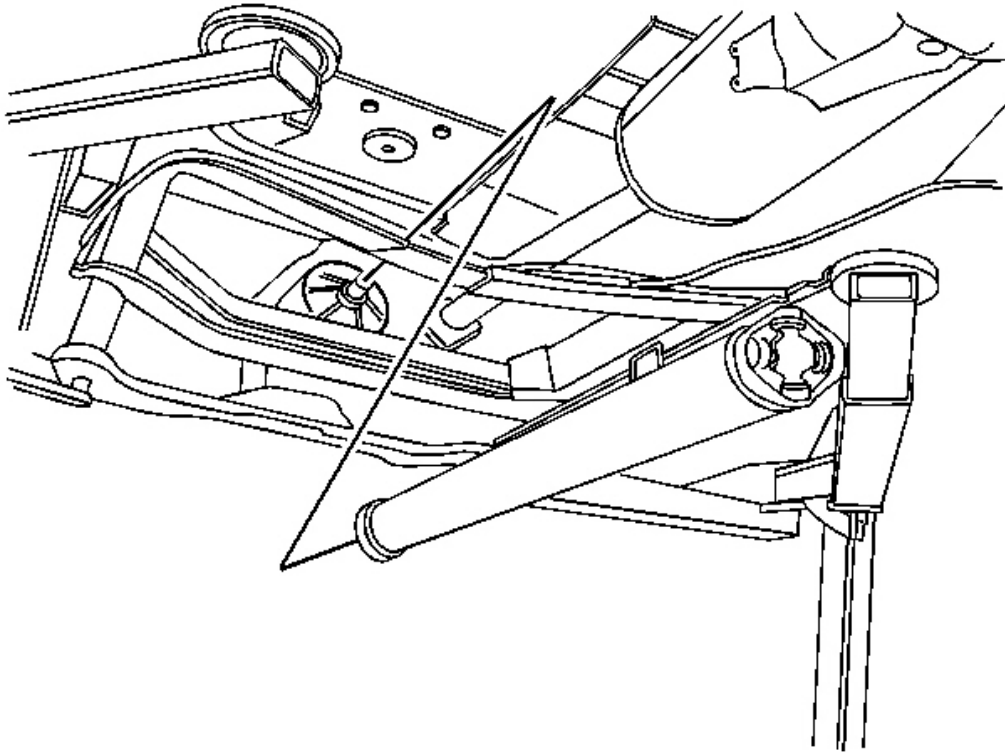


Fig. 14: View Of Propeller Shaft
Courtesy of GENERAL MOTORS CORP.

7. Remove the propeller shaft from the transmission/transfer case.

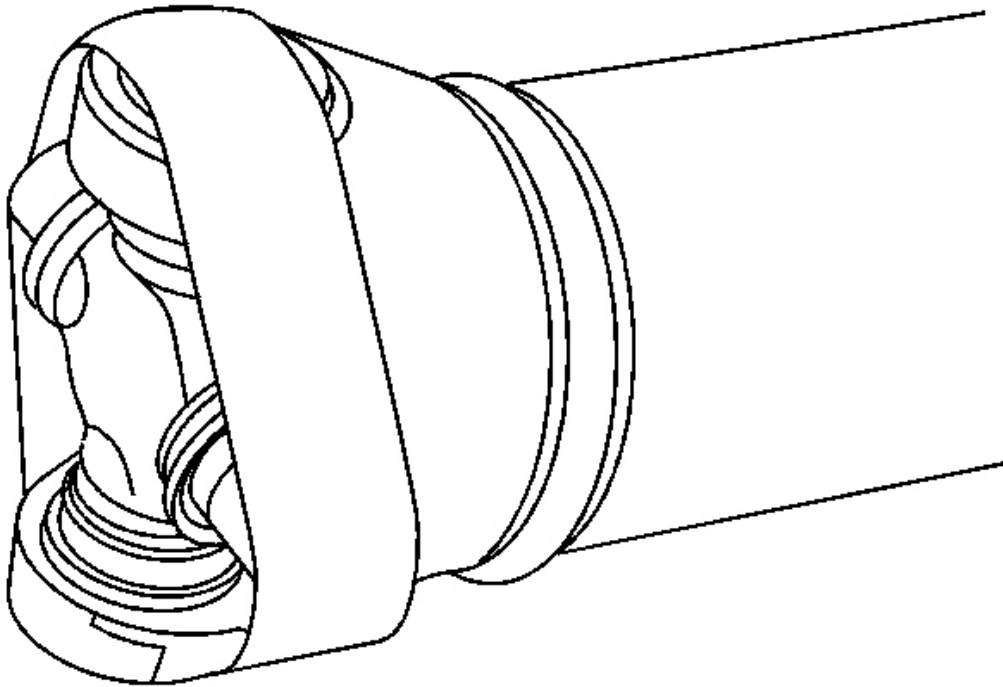


Fig. 15: View Of Wrapped U-Joint Bearing Caps
Courtesy of GENERAL MOTORS CORP.

8. Using tape or a rubber band, wrap the U-Joint bearing caps to ensure the bearing caps do not separate from the U-Joint.

Installation Procedure

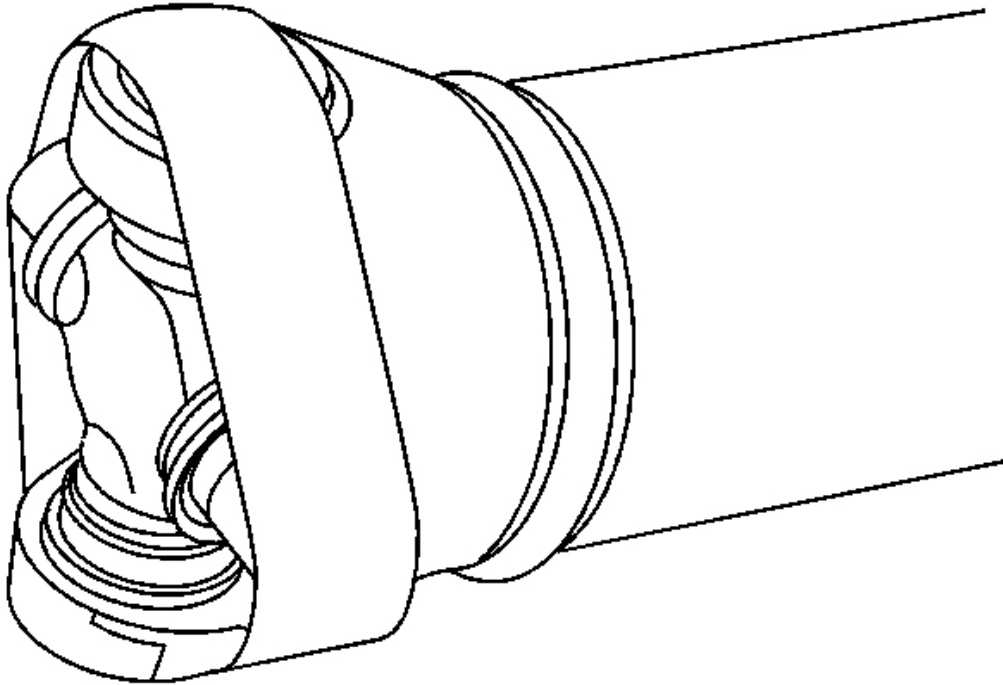


Fig. 16: View Of Wrapped U-Joint Bearing Caps
Courtesy of GENERAL MOTORS CORP.

1. Remove the tape or rubber band from the U-Joint.

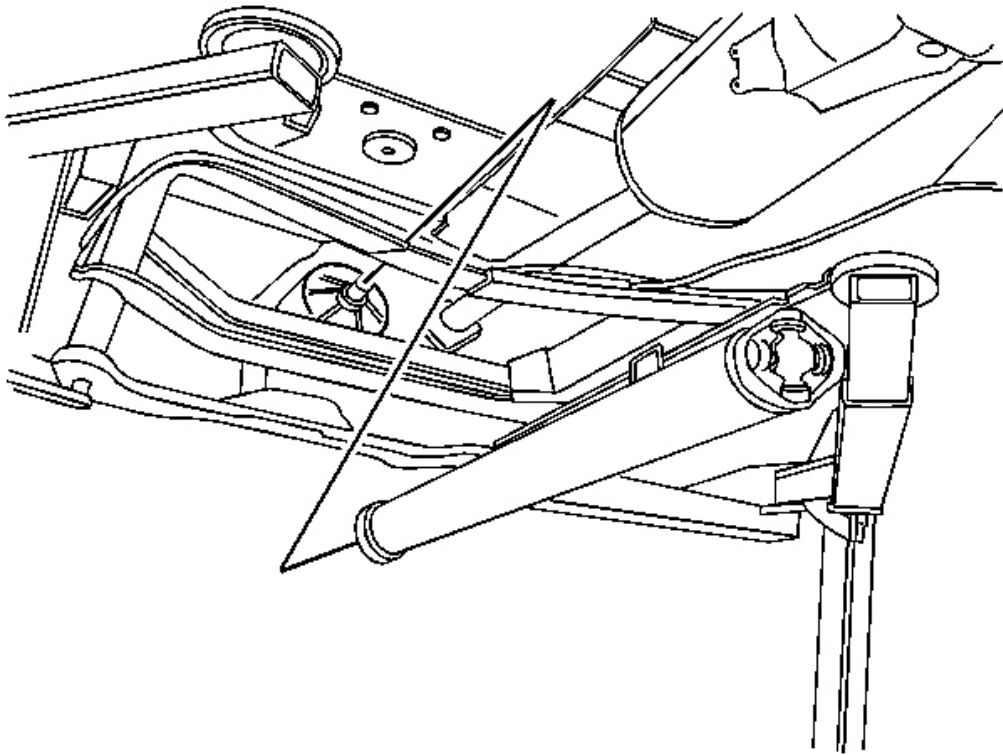


Fig. 17: View Of Propeller Shaft
Courtesy of GENERAL MOTORS CORP.

2. Install the propeller shaft in the transmission/transfer case.

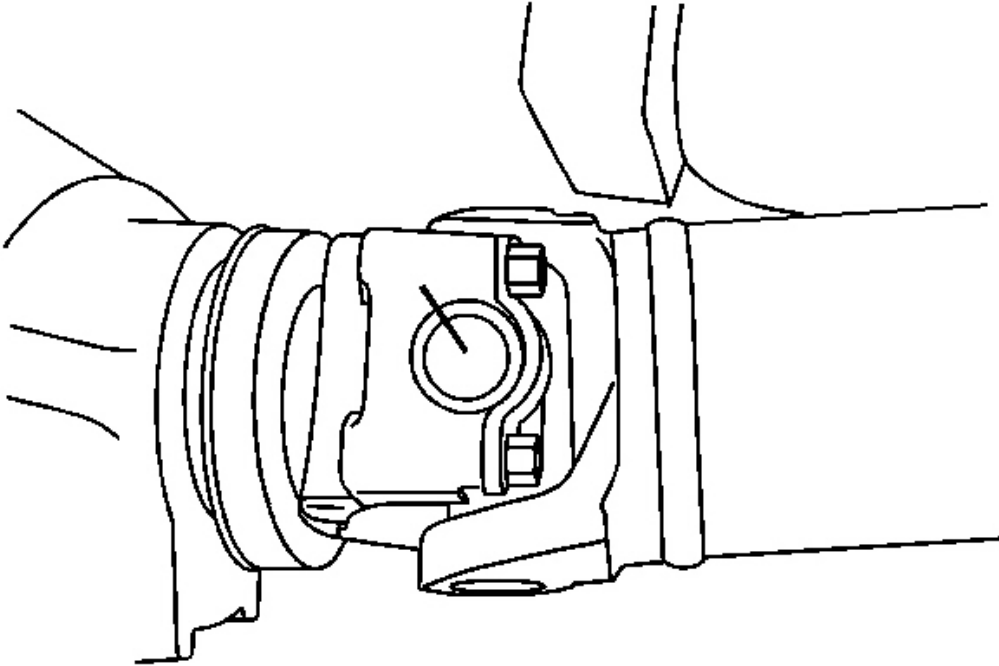


Fig. 18: View Of Marked Rear Universal Joint To Drive Shaft Flange
Courtesy of GENERAL MOTORS CORP.

3. Align the propeller shaft with the reference marks on the pinion flange.

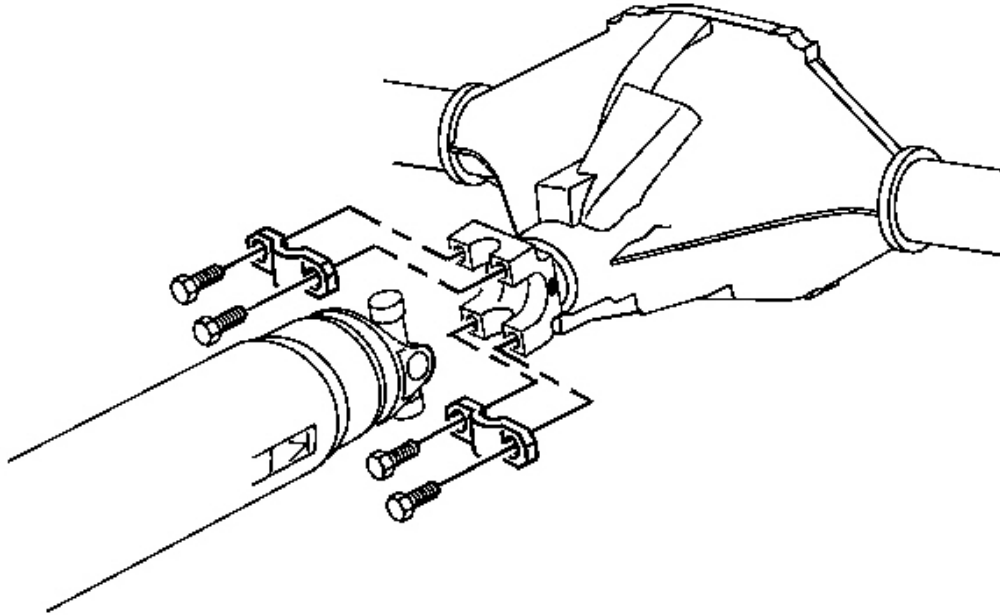


Fig. 19: View Of Propeller Shaft, Retaining Bolts & Clamps
Courtesy of GENERAL MOTORS CORP.

NOTE: Refer to Fastener Notice .

4. Install the clamps and retaining bolts.

Tighten: Tighten the retaining bolts to 25 N.m (18 lb ft).

5. Lower the vehicle.

UNIVERSAL JOINT REPLACEMENT - EXTERNAL SNAP RING

Tools Required

- **J 9522-3** U-Joint Bearing Separator. See Special Tools.
- **J 9522-5** U-Joint Bearing Spacer Remover. See Special Tools.

Disassembly Procedure

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NOTE: **Never clamp propeller shaft tubing in a vise. Clamping could dent or deform the tube causing an imbalance or unsafe condition. Always clamp on one of the yokes and support the shaft horizontally. Avoid damaging the slip yoke sealing surface. Nicks may damage the bushing or cut the lip seal.**

1. Support the propeller shaft in a line horizontal with the table of a press.
2. Mark the propeller shaft in order to show which end connects to the transmission and which end goes to the rear axle.
3. Disassemble the snap rings by pinching the ends together with a pair of pliers.
4. If the ring does not readily snap out of the groove in the yoke, tap the end of the cup lightly in order to relieve the pressure from the ring.

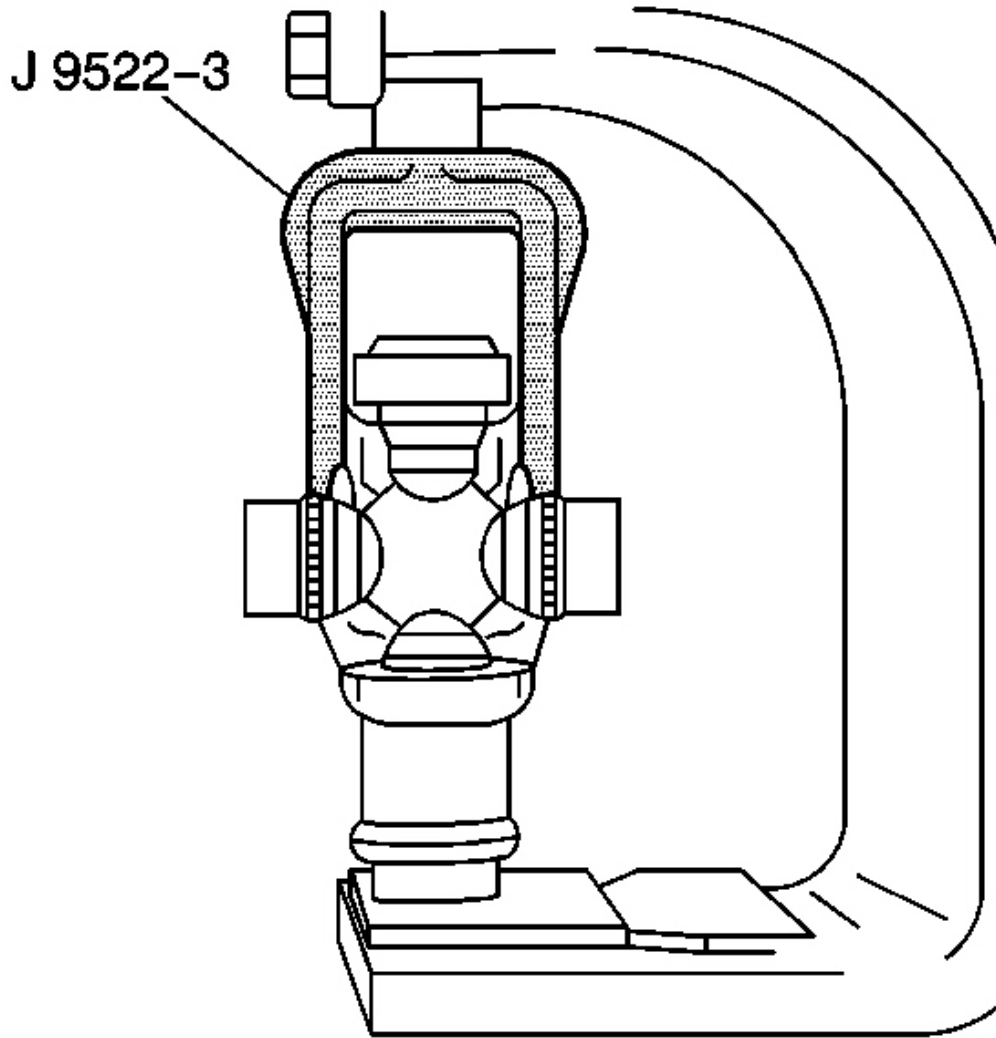


Fig. 20: Disassembling/Assembling Universal Joint
Courtesy of GENERAL MOTORS CORP.

5. Place the universal joint so that the lower ear of the yoke is supported on a 30 mm (1-1/8 in) hex head socket or a 27 mm (1-1/16 in) socket.

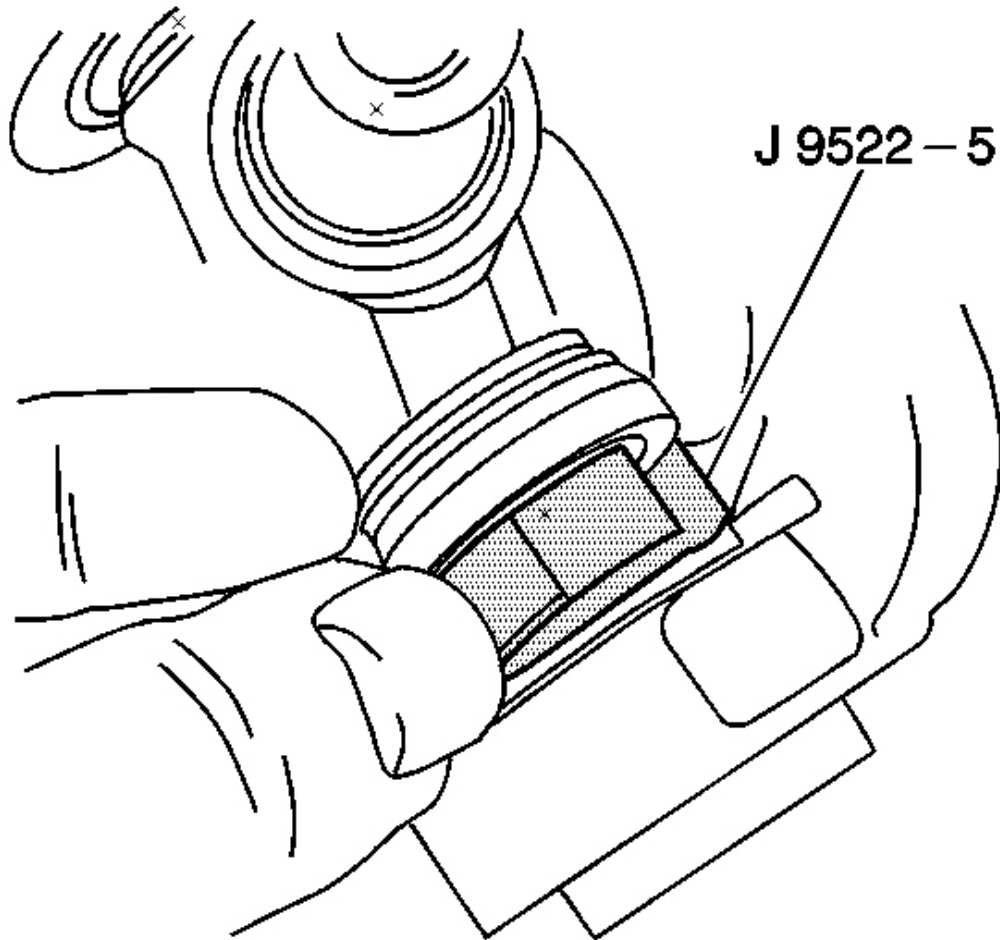


Fig. 21: Placing J 9522-5 Between The Seal & Bearing Cup
Courtesy of GENERAL MOTORS CORP.

6. Place **J 9522-3** on the open horizontal bearing cups. See **Special Tools**. Press the lower bearing cup out of the yoke ear.
7. If you do not completely remove the bearing cup, lift the cross and insert **J 9522-5** between the seal and the bearing cup you are removing. See **Special Tools**. Continue pressing the bearing cup out of the yoke.
8. Rotate the propeller shaft. Press the opposite bearing cup out of the yoke.
9. Mark the orientation of the slip yoke to the tube for proper reassembly.

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10. Remove the cross from the yoke.
11. Remove the remaining universal joint parts from the yoke.
12. If you are replacing the front universal joint, remove the bearing cups in the slip yoke in the same manner.
13. Inspect the retaining ring grooves for dirt, corrosion or pieces of the old ring.
14. Inspect the bearing cup bores for burrs or imperfections.
15. Clean the retaining ring grooves. Corrosion, dirt, rust or pieces of the old retaining ring may prevent the bearing cups from pressing into place or prevent the bearing retainers from properly seating.

Assembly Procedure

1. Remove the bearing cups from the universal joint.

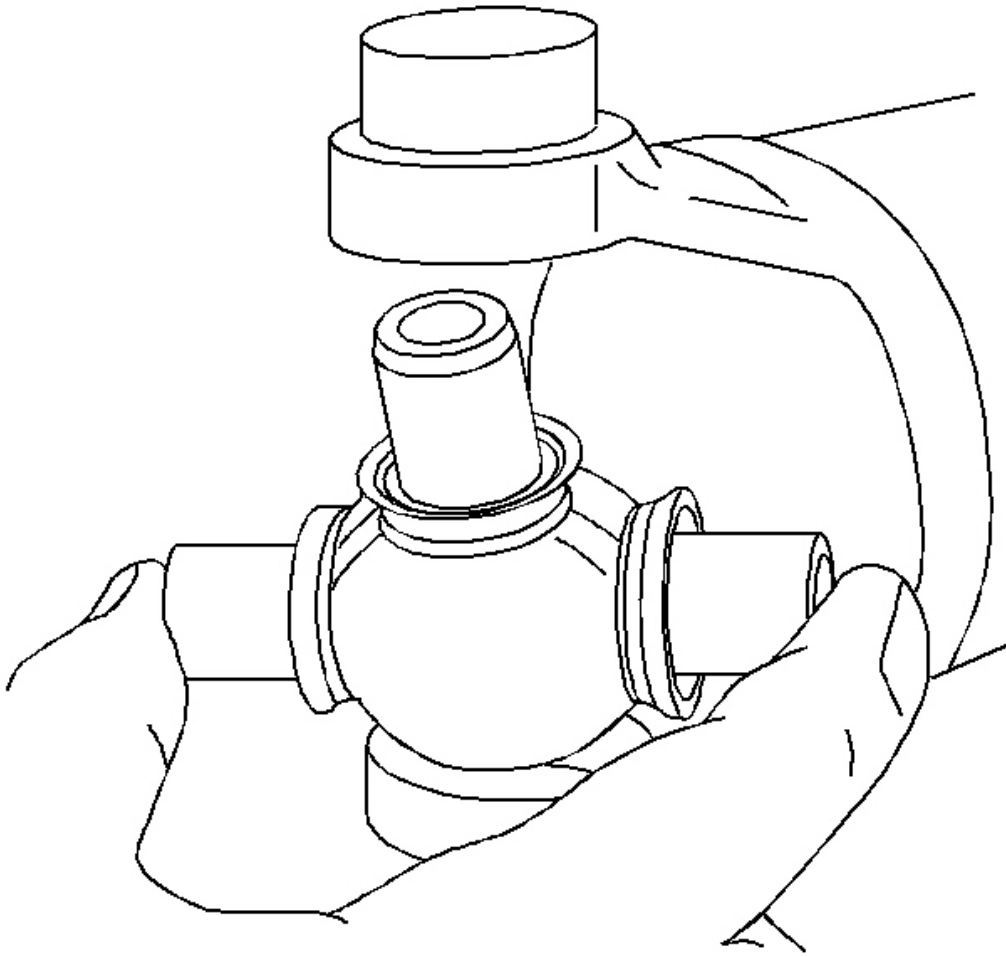


Fig. 22: Assembling Trunnion Into Yoke
Courtesy of GENERAL MOTORS CORP.

2. Assemble 1 bearing cup part way into 1 side of the yoke. Turn the yoke ear toward the bottom.
3. Assemble the cross into the yoke so that the trunnion seats freely into the bearing cup.

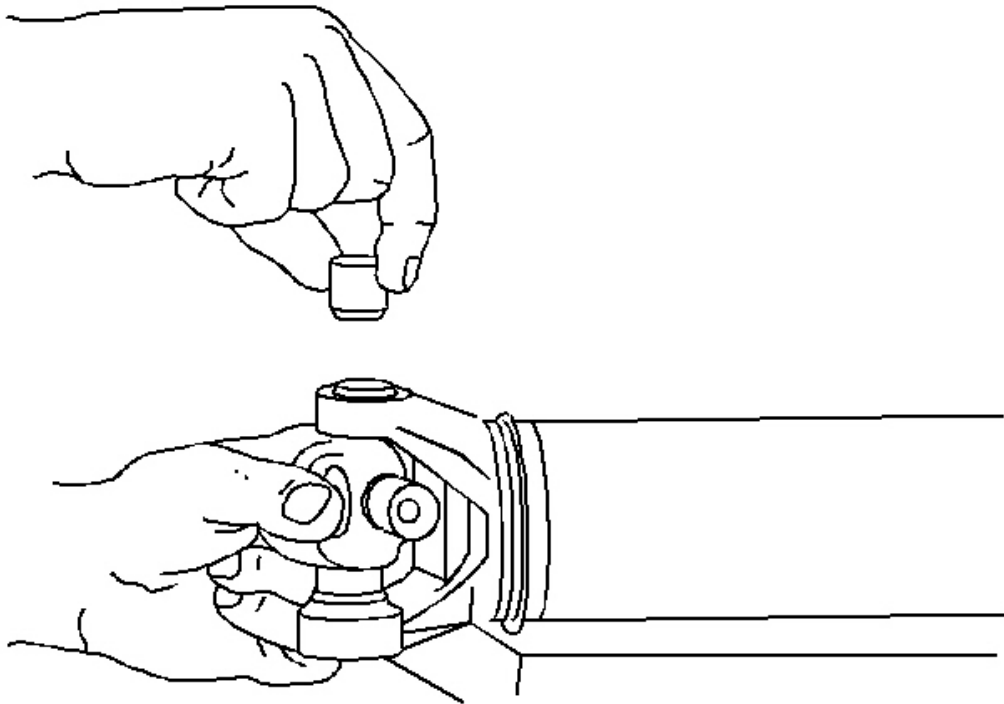


Fig. 23: Installing Bearing Cup Into Yoke Ear
Courtesy of GENERAL MOTORS CORP.

4. With the trunnion seated in the bearing cup, press the bearing cup into the yoke until the bearing cup is flush with the yoke ear.
5. Install the opposite bearing cup part way into the yoke ear.
6. Ensure that the trunnions start straight and true into both bearing cups.
7. Press the opposite bearing cup into the yoke ear while working the cross all the time in order to inspect for free unbinding movement of the trunnions in the bearing cups.

IMPORTANT: If there seems to be a hang up or binding, stop pressing. Inspect the needle bearings for misalignment in the bearing cup.

8. Press the bearing cup into the yoke until the bearing cup retainer groove is visible over the top of the bearing cup.

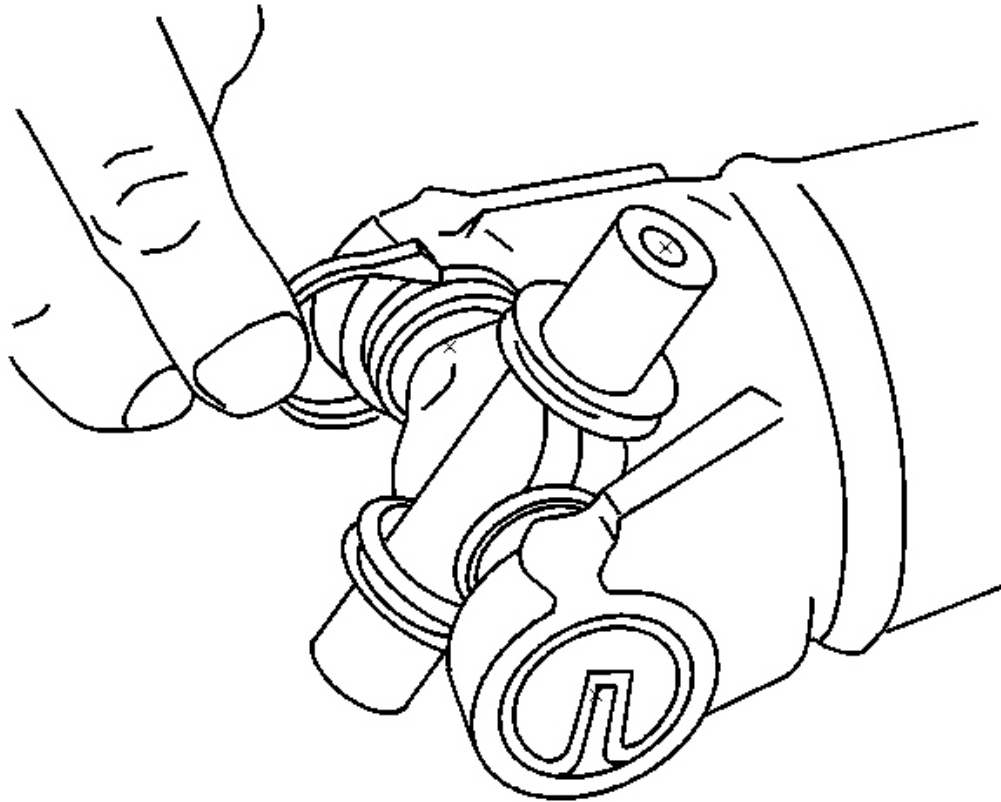


Fig. 24: Assembling Bearing Retainer In Retainer Groove
Courtesy of GENERAL MOTORS CORP.

9. Assemble the bearing retainer in the retainer groove.
10. Continue pressing until both retainers can be snapped into place.

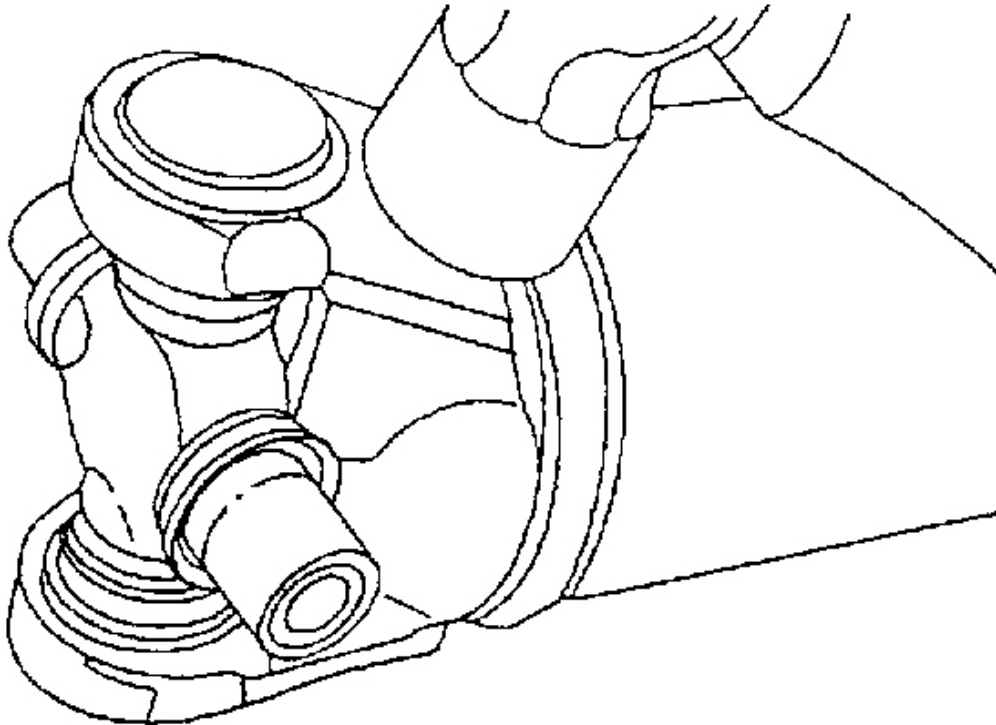


Fig. 25: Seating Retainer Using Hammer (External Snap Ring)
Courtesy of GENERAL MOTORS CORP.

11. If the retainer is difficult to seat, the yoke can be sprung slightly with a firm blow from a dead blow hammer.
12. It may be necessary to lubricate the snap ring with a slight amount of chassis grease so that the snap ring seats in the bearing cup groove.

DESCRIPTION AND OPERATION

PROPELLER SHAFT DESCRIPTION AND OPERATION

The propeller shaft is a tube with universal joints at both ends which do not require periodic maintenance, that transmit power from the transfer case or transmission output shaft to the differential.

Front Propeller Shaft Description

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The front propeller shaft transmits rotating force from the transfer case to the front differential when the transfer case is engaged. The front propeller shaft connects to the transfer case using a splined slip joint.

One Piece Propeller Shaft Description

A 1 piece propeller shaft uses a splined slip joint to connect the driveline to the transmission or transfer case.

Two Piece Propeller Shaft Description

There are 3 universal joints used on the two piece propeller shaft, A center bearing assembly is used to support the propeller shaft connection point and help isolate the vehicle from vibration.

Propeller Shaft Phasing Description

The propeller shaft is designed and built with the yoke lugs (ears) in line with each other. This produces the smoothest running shaft possible. A propeller shaft designed with built in yoke lugs in line is known as in - phase. An out of phase propeller shaft often causes vibration. The propeller shaft generates vibration from speeding up and slowing down each time the universal joint goes around. The vibration is the same as a person snapping a rope and watching the wave reaction flow to the end. An in phase propeller shaft is similar to 2 persons snapping a rope at the same time and watching the waves meet and cancel each other out. A total cancellation of vibration produces a smooth flow of power in the drive line. All splined shaft slip yokes are keyed in order to ensure proper phasing.

Universal Joint Description

The universal joint is connected to the propeller shaft. The universal consist of 4 caps with needle bearings and grease seals mounted on the trunnions of a cross or spider. These bearings and caps are greased at the factory and no periodic maintenance is required. There are 2 universal joints used in a one piece propeller shaft and 3 used in two piece propeller shaft. The bearings and caps are pressed into the yokes and held in place with snap rings, except for 2 bearings on some models witch are strapped onto the pinion flange of the differential. Universal joints are designed to handle the effects of various loads and rear axle windup conditions during acceleration and braking. The universal joint operates efficiently and safely within the designed angle variations. when the design angles are exceeded, the operational life of the joint decreases.

Center Bearing Description

Center bearings support the driveline when using 2 or more propeller shafts. The center bearing is a ball bearing mounted in a rubber cushion that attaches to a frame crossmember. The

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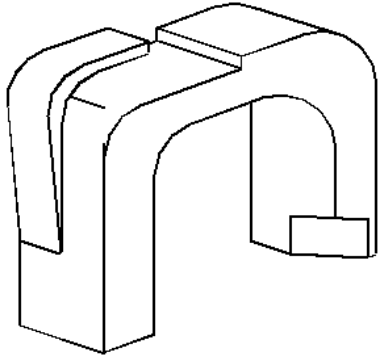
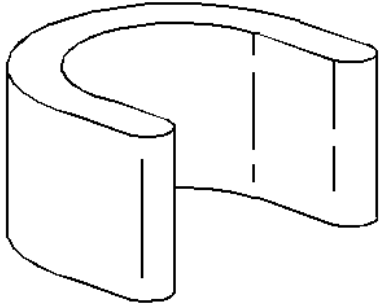
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manufacturer prelubricates and seals the bearing. The cushion allows vertical motion at the driveline and helps isolate the vehicle from vibration.

SPECIAL TOOLS AND EQUIPMENT

SPECIAL TOOLS

Special Tools

Illustration	Tool Number/Description
 A 3D line drawing of a U-joint bearing separator. It consists of two main curved arms that meet at a central point, forming a U-shape. Each arm has a rectangular protrusion at its base, and there is a small rectangular tab extending from the side of one of the arms.	<p>J 9522-3 U-Joint Bearing Separator</p>
 A 3D line drawing of a U-joint bearing spacer remover. It is a single, thick, curved metal piece that forms a U-shape. The ends of the curve are slightly flared outwards.	<p>J 9522-5 U-Joint Bearing Spacer Remover</p>