

Propeller Shaft Description and Operation

The propeller shaft is a two piece tube supported by a sealed for life centre bearing and non-servicable universal joint. It has a rubber coupling at each end joining the propeller shaft to the transmission and the differential. All propeller shafts are fixed to the rubber couplings by 3 bolts and 3 torque prevailing nuts which are discarded when removed. Torque prevailing nuts have a low friction coating to ensure no damage to the coupling when assembled, correct nuts must be used. The rubber couplings are then mounted to the differential with 3 bolts and the transmission with 3 bolts and 3 torque prevailing nuts which are also discarded when removed. The centre bearing assembly is fixed to the body with 2 bolts. The two-piece propeller shaft is used to transmit power from the transmission to the differential. The centre bearing and rubber couplings are used to support and connect the propeller shaft and decrease vibration, noise and harshness.

Symptoms - Propeller Shaft

Before beginning diagnosis, review the system Description and Operation in order to familiarise 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:

- Noises.
- Vibrations.

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:

- [Universal Joint Noise](#).
- [Ping, Snap, or Click Noise](#).
- [Knock or Clunk Noise](#).
- [Scraping Noise](#).
- [Squeak Noise](#).

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Universal Joint Noise

Universal Joint Noise

Problem	Action
One or more of the universal joints are worn or damaged.	Replace the propeller shaft assembly. Refer to Propeller Shaft Replacement .
One or more of the universal joints have lost lubricant.	Replace the propeller shaft assembly. Refer to Propeller Shaft Replacement .
Rubber coupling bolts loose at transmission or axle flange.	Tighten the bolts to specifications. Refer to Fastener Tightening Specifications .
Rubber couple are excessively worn or damaged transmission or rear drive axle flange.	Replace the propellers shaft couplers. Refer to Fastener Tightening Specifications .
Bolts loose at propeller shaft flange and coupling.	Tighten the bolts to specifications. Refer to Fastener Tightening Specifications .

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 propeller shaft yoke or the differential pinion nut is loose.	Tighten the rubber coupling to propeller shaft yoke retaining bolt and nuts and/or the pinion nut to specified torque. Refer to Propeller Shaft Replacement .
The rubber coupling is damaged.	Replace the rubber coupling. Refer to Propeller Shaft Replacement .
The rubber coupling to propeller shaft retaining bolts and nuts are loose.	Tighten the bolts to specifications. Refer to Propeller Shaft Replacement .
The rubber coupling is damaged.	Replace the rubber coupling. Refer to Propeller Shaft Replacement .
The center bearing is damaged.	Replace the center bearing. Refer to Propeller Shaft Replacement .
The universal joint is worn or damaged.	Replace the complete propeller shaft. Refer to Propeller Shaft Replacement .

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).	
The universal joint is worn or damaged.	Replace the complete propeller shaft. Refer to Propeller Shaft Replacement .
The rubber front or rear coupling is damaged or worn.	Replace the rubber coupling. Refer to Propeller Shaft Replacement .
The rubber couplings to propeller shaft retaining bolts and nuts are loose.	Tighten the bolts to specifications. Refer to Fastener Tightening Specifications .
The center bearing is damaged.	Replace the center bearing. Refer to Propeller Shaft Replacement .
The side gear in the differential is worn or oversize.	Replace the differential case and/or the side gears. Refer to Differential Replacement .

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Scraping Noise

Scraping Noise

Checks	Action
DEFINITION: A scraping noise occurs when driving the vehicle at various speeds.	
The heat shield, exhaust or other part is touching the propeller shaft.	Correct the interference as necessary.
The pinion flange slinger or the center bearing is rubbing.	Correct the interference as necessary.

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Squeak Noise

Squeak Noise

Checks	Action
DEFINITION: When driving the vehicle at various speeds a squeaking sound occurs.	
The universal joint is worn or damaged.	Replace the complete propeller shaft. Refer to Propeller Shaft Replacement .

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 center bearing rubber cushion is worn or damaged.	Replace the center bearing assembly. Refer to Propeller Shaft Replacement .
The universal joint is worn, damaged or too stiff.	Replace the center bearing assembly. Refer to Propeller Shaft Replacement .
The rubber couplings to propeller shaft retaining nuts and bolts are loose.	Tighten the rubber couplings to propeller shaft retaining nuts and bolts to specifications. Refer to Fastener Tightening Specifications .
The angle across the universal joints is too high.	Determine the cause of the excessive driveline angle. Check engine and transmission mounts, centre bearing mounting bracket, subframe and differential mounts.

Propeller Shaft Replacement

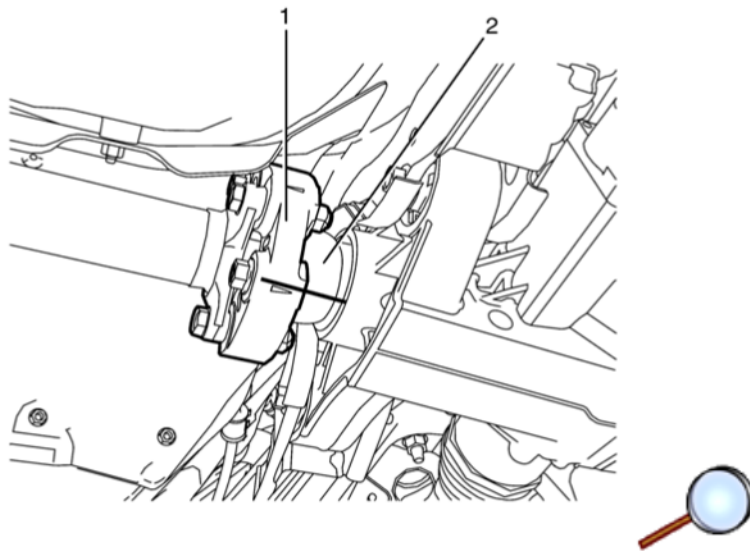
Removal Procedure

1. Select park/1st gear position in the transmission and apply the park brake.

Danger: 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.

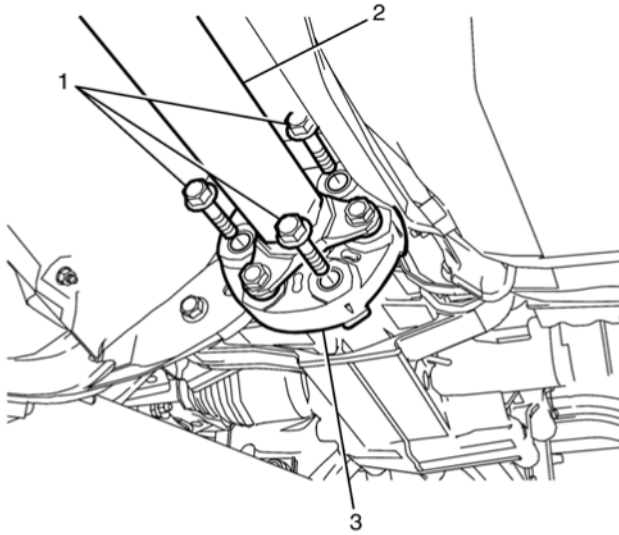
Warning: Refer to [Safety Glasses Warning](#).

2. Raise and support the vehicle. Refer to [Lifting and Jacking the Vehicle](#).
3. Remove the exhaust cross over pipe assembly. Refer to [Exhaust Crossover Pipe Replacement](#).
4. Remove the center heat shield assembly. Refer to [Exhaust Heat Shield Replacement - Center](#).

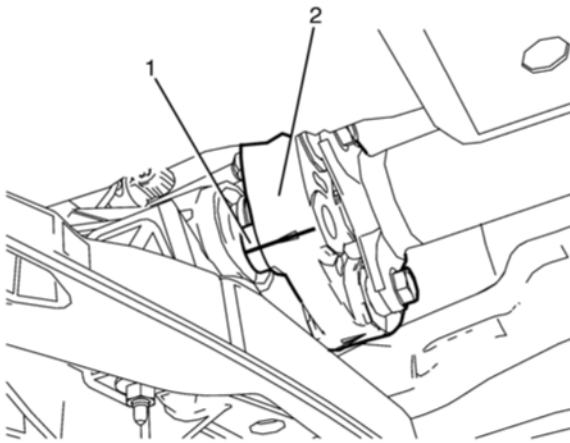


Note: Observe the orientation of the propeller shaft couplings with reference to the differential flange and the transmission flange. This will minimize the potential of incorrect propeller shaft installation.

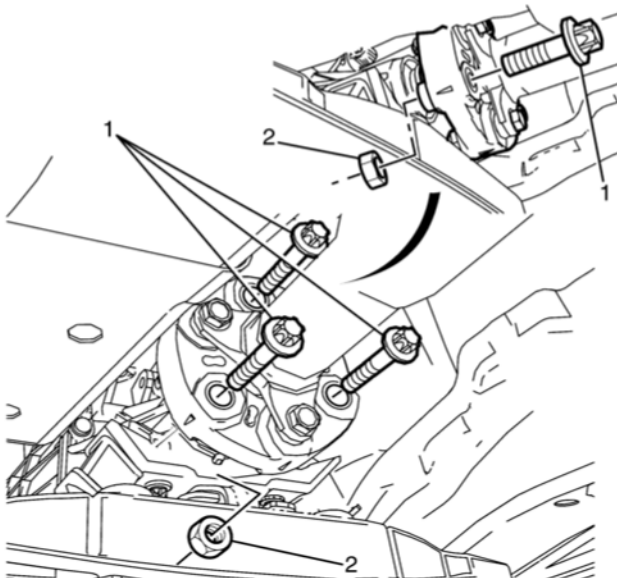
5. Mark the propeller shaft coupling (1) in relation to the differential flange (2).



- Note:** With the aid of an assistant or suitable jack support the propeller shaft (2).
6. Remove the propeller shaft coupling to differential flange retaining bolts (1).



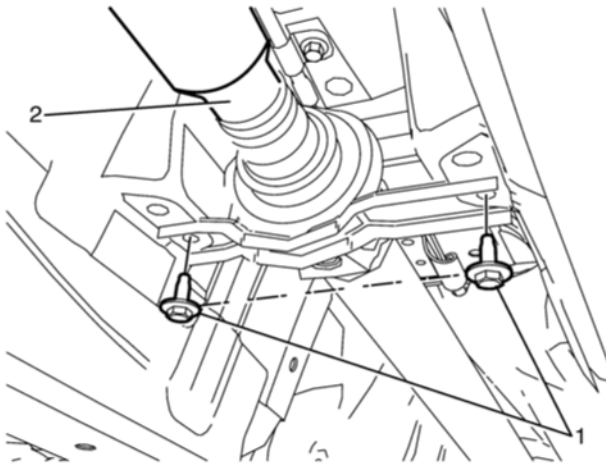
- Note:** Observe the orientation of the rubber couplings with reference to the differential flange and the transmission flange. This recommendation will minimise the potential of incorrect propeller shaft installation.
7. Mark the propeller shaft coupling (2) in relation to the transmission flange (1).



Note: With the aid of an assistant or suitable jack support the propeller shaft.

Note: The nuts and bolts are part of a torque prevailing system and are single use parts. They must be discarded and NOT re-used.

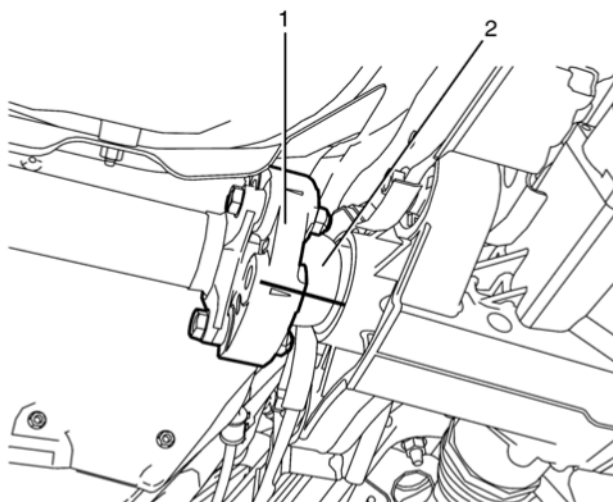
8. Remove and discard the torque prevailing nuts (2). Replace with NEW only.
9. Remove the propeller shaft coupling to transmission flange retaining bolts (1)



Note: With the aid of an assistant or suitable jack support the propeller shaft (2).

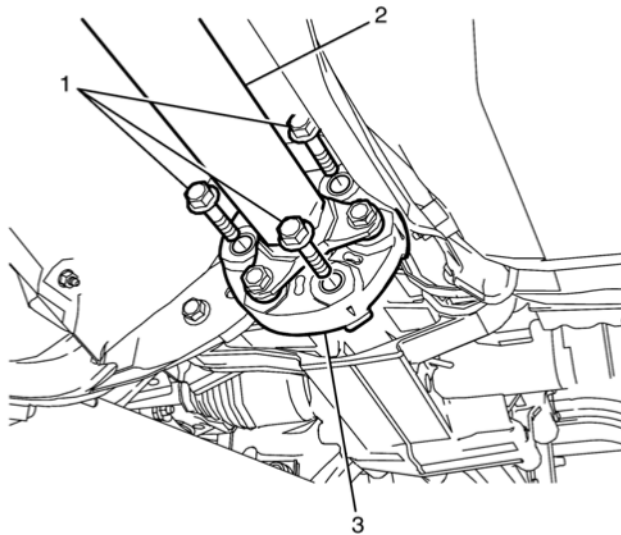
10. Remove the center support bearing to body retaining bolts (1).
11. Disconnect the propeller shaft (2) from the differential flange.
12. Remove the propeller shaft (2) from the vehicle.
13. Inspect the propeller shaft (2) assembly for excessive wear and/or damage. Inspect the following:
 - Propeller shaft coupling. For replacement refer to [Propeller Shaft Coupling Replacement](#).
 - Propeller shaft center support bearing. For replacement refer to [Propeller Shaft Center Support Bearing Replacement](#).
 - Universal joint if loose or damaged, it will be necessary to replace the propeller shaft assembly. The universal joint is not serviceable.

Installation Procedure



Note: Align the marks on the rubber coupling (1) to differential flange (2) made prior to removal.

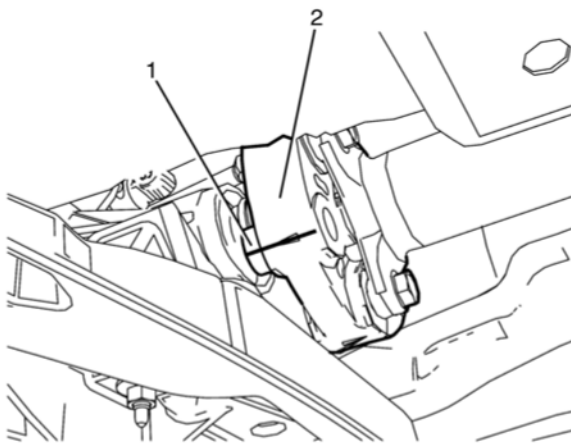
1. Connect the rubber coupling (1) to the differential flange (2).



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

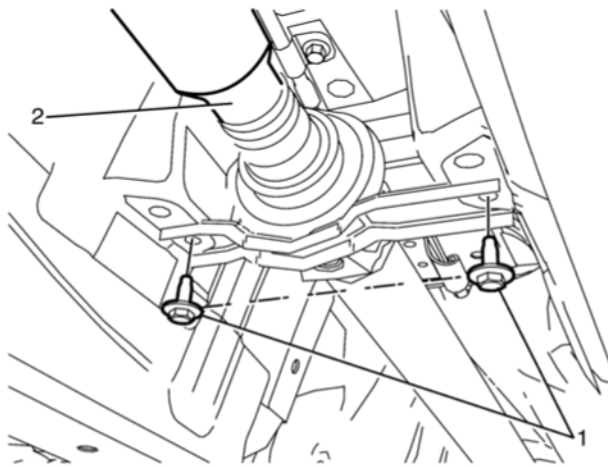
Note: With the aid of an assistant or suitable jack support the propeller shaft (2) to the differential flange (3).

2. Install the propeller shaft coupling to differential flange retaining bolts (1) and tighten to:
 - First Pass: **90 N•m (66 lb ft)**
 - Final Pass: **plus 43 degrees**



Note: Align the marks on the rubber coupling (2) to transmission flange (1) made prior to removal.

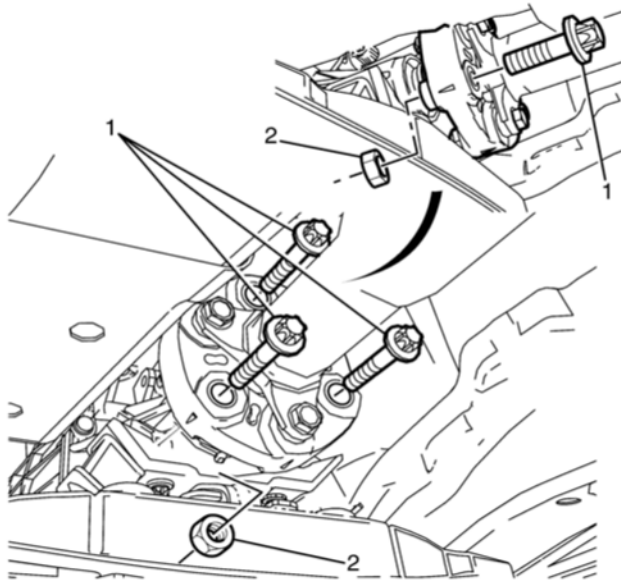
3. Connect the propeller shaft coupling (2) to transmission flange (1).



Note: With the aid of an assistant or suitable jack support the propeller shaft (2).

Note: The center bearing to body retaining bolts (1) must not be fully tightened at this stage.

4. Install the propeller shaft center support bearing to body retaining bolts (1).



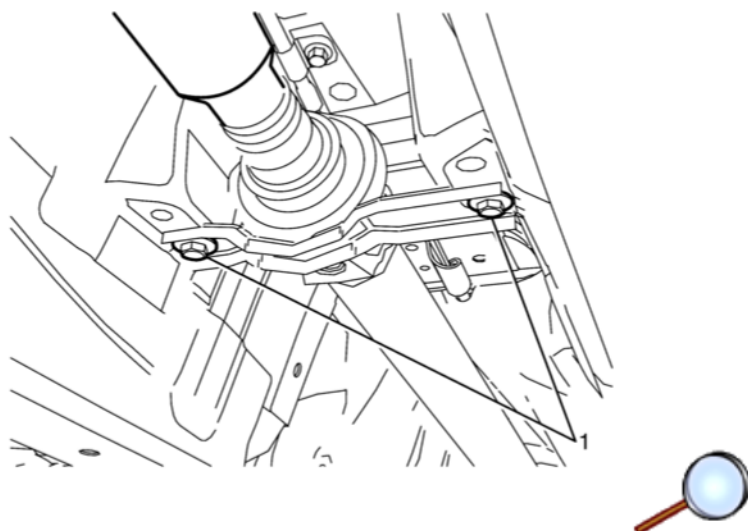
Note: With the aid of an assistant or suitable jack support the propeller shaft.

5. Install the NEW propeller shaft coupling to transmission flange bolts (1).

Note: Hold the bolt while tightening the nut to specifications.

6. Install the NEW torque prevailing nuts (2) and tighten to :

- First Pass: **90 N•m (66 lb ft)**
- Final Pass: **plus 43 degrees**



7. Tighten the propeller shaft center support bearing to body retaining bolts (1) and tighten to **22 N•m (16 lb ft)**.
8. Install the center exhaust heat shield. Refer to [Exhaust Heat Shield Replacement - Center](#).
9. Install the exhaust cross over pipe assembly. Refer to [Exhaust Crossover Pipe Replacement](#).
10. Remove the safety stands.
11. Lower the vehicle to the ground.

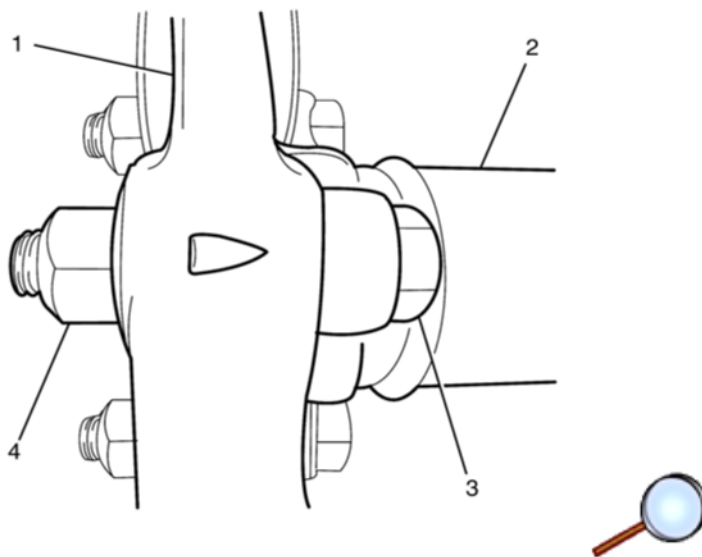
Propeller Shaft Coupling Replacement

Removal Procedure

Danger: 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](#).

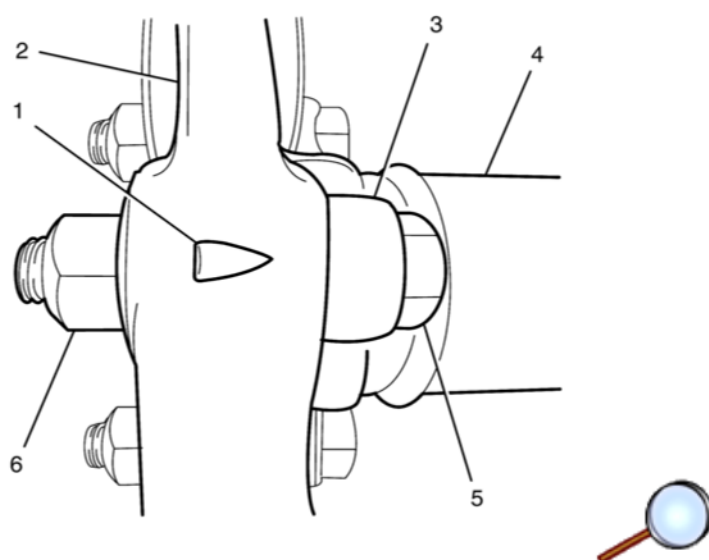
1. Raise and support the vehicle. Refer to [Lifting and Jacking the Vehicle](#).
2. Remove the propeller shaft from the vehicle. Refer to [Propeller Shaft Replacement](#).



Note: The nuts and bolts are part of a torque prevailing system and are single use parts. They must be discarded and NOT re-used.

3. Remove and discard the torque prevailing nuts (4).
4. Remove the and discard rubber coupling to propeller shaft retaining bolts (3).
5. Remove the rubber coupling (1) from the propeller shaft (2).

Installation Procedure



Note: The triangular mark (1) on the rubber coupling (2) must face towards the propeller shaft flange lug (3).

1. Install the rubber coupling (2) to the propeller shaft (4).

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

Note: Hold the bolt when torque the nut to the proper specifications.

2. Install the NEW rubber coupling to propeller shaft retaining bolts (5) and NEW torque prevailing nuts (6).
3. Tighten the NEW nuts to:
 - First Pass: **65 N•m (50 lb ft)**.
 - Final Pass: **plus 40 degrees**.
4. Install the propeller shaft to the vehicle. Refer to [Propeller Shaft Replacement](#).
5. Remove the safety stands.
6. Lower the vehicle to the ground.

Propeller Shaft Center Support Bearing Replacement

Special Tools

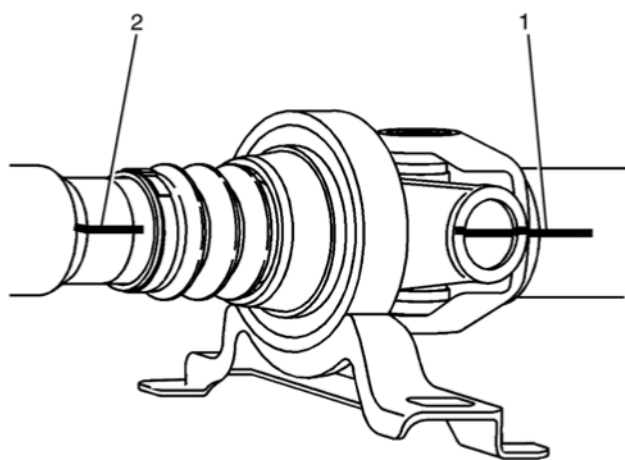
- J 5590 Bearing and Seal Driver
- J 21426 Installer
- J 22610 Keystone Pliers
- J 22912-B Rear Pinion and Axle Bearing Remover

Removal Procedure

Danger: 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](#).

1. Raise and support the vehicle. Refer to [Lifting and Jacking the Vehicle](#).
2. Remove the propeller shaft from the vehicle. Refer to [Propeller Shaft Replacement](#).

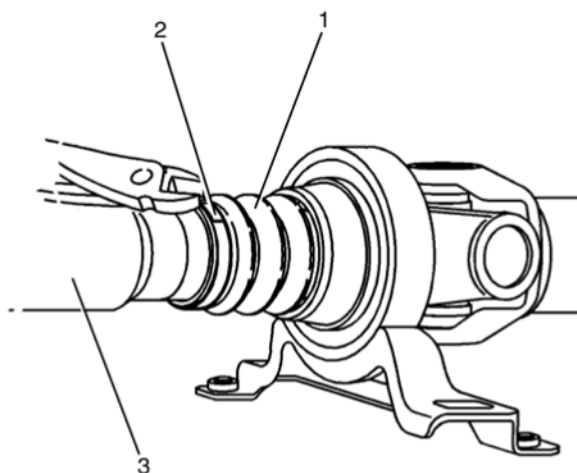


Note: Never clamp the propeller shaft tubing in a vise. Clamping the propeller shaft tubing in a vise could dent or deform the tube causing an imbalance or unsafe condition. Always clamp on one of the propeller shaft yokes and support the propeller shaft horizontally.

Note: Correct alignment during assembly is critical in order to maintain correct balance.

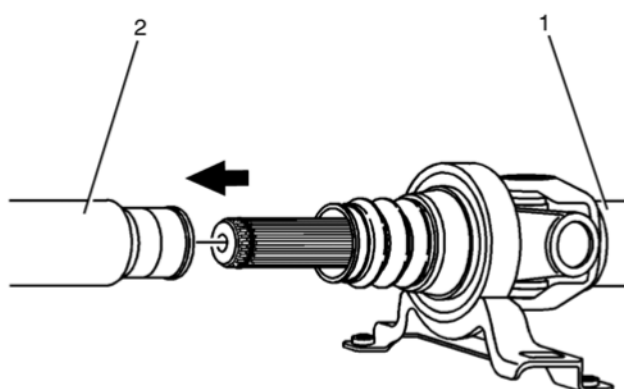
Note: The propeller shaft splines are not keyed, therefore, alignment marks are necessary for assembly.

3. Mark the position of the propeller shaft rear section (1) in relation to the propeller shaft front section (2).

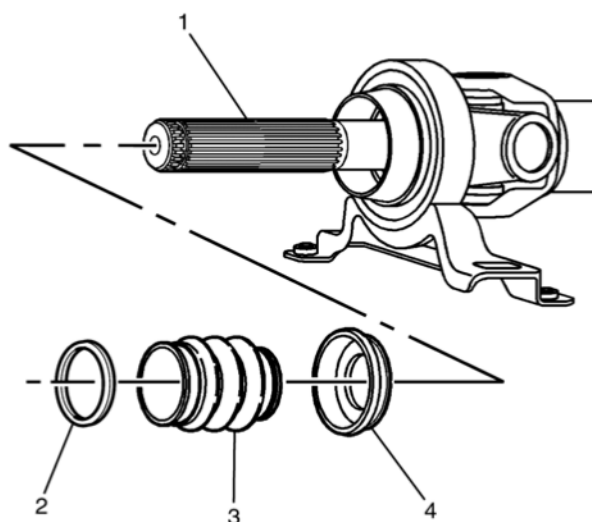


Note: The dust boot clamp is a single use part and must be discarded after use.

4. Remove the dust boot to propeller shaft front section clamp (2).
Discard the dust boot clamp.
5. Detach the dust boot (1) from the propeller shaft (3).



6. Separate the propeller shaft rear section (1) from the propeller shaft front section (2).



Note: The spline retention O-ring (2) is a single use part and must be discarded after use.

7. Remove the spline retention O-ring (2) from the propeller shaft (1).

Discard the spline retention O-ring.

Note: The dust boot (3) is a single use part and must be discarded after use.

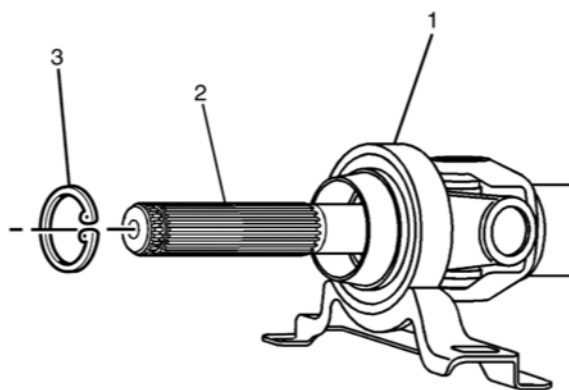
8. Remove the dust boot (3) from the propeller shaft (1).

Discard the dust boot.

Note: The centre bearing slinger (4) is a single use part and must be discarded after use.

9. Remove the centre bearing slinger (4) from the propeller shaft (1).

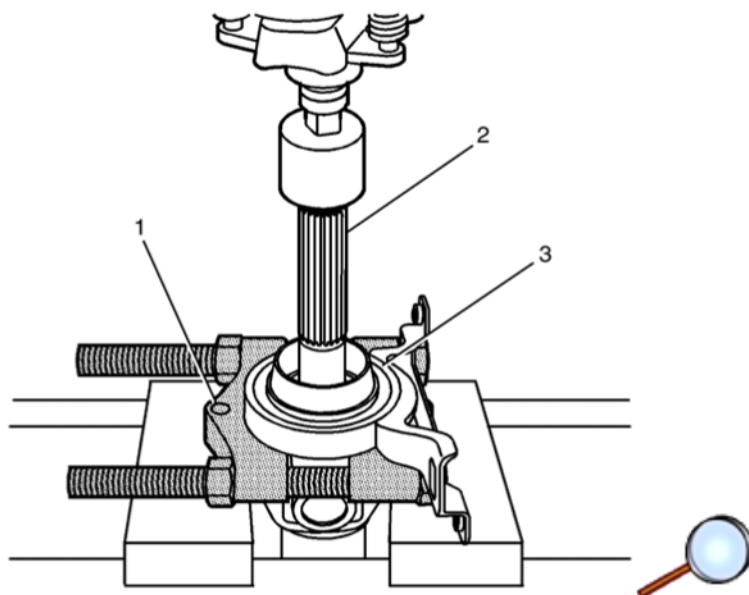
Discard the centre bearing slinger.



Note: The circlip (3) is a single use part and must be discarded after use.

10. Remove the propeller shaft (2) to centre bearing (1) retaining circlip (3).

Discard the circlip.

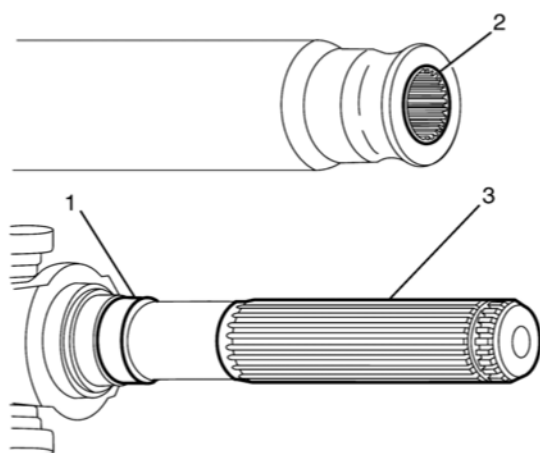


Note: Observe the orientation and depth of the centre bearing (3) in relation to the propeller shaft (2).

Note: Install the J 22912-B rear pinion and axle bearing remover (1) to the rear propeller shaft (2) behind the centre bearing (3). Place the rear propeller shaft (2) in a suitable press and remove the centre bearing (3).

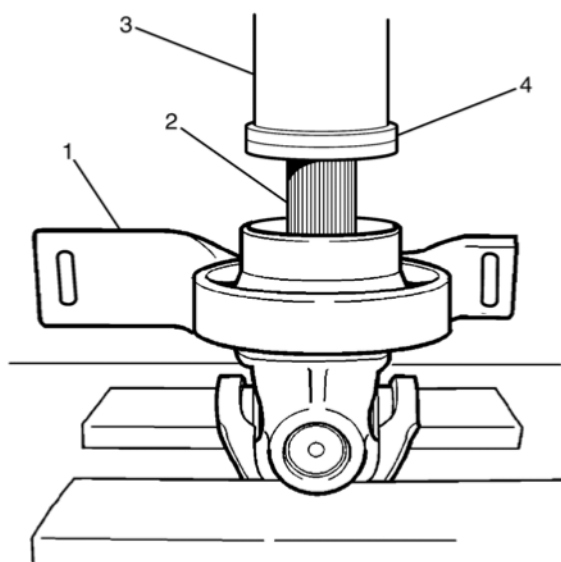
11. Remove the centre bearing (3) from the propeller shaft (2).

Clean and Inspect



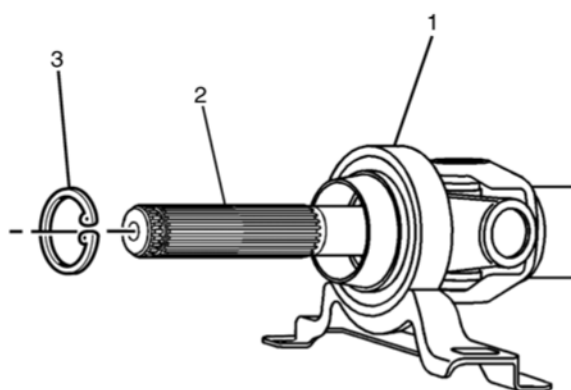
1. Clean the grease from the front propeller shaft spline (2) and rear propeller shaft spline (3).
2. Check the front propeller shaft spline (2) and rear propeller shaft spline (3) for damage and/or wear.
3. Remove any corrosion or debris from the bearing area (1).

Installation Procedure

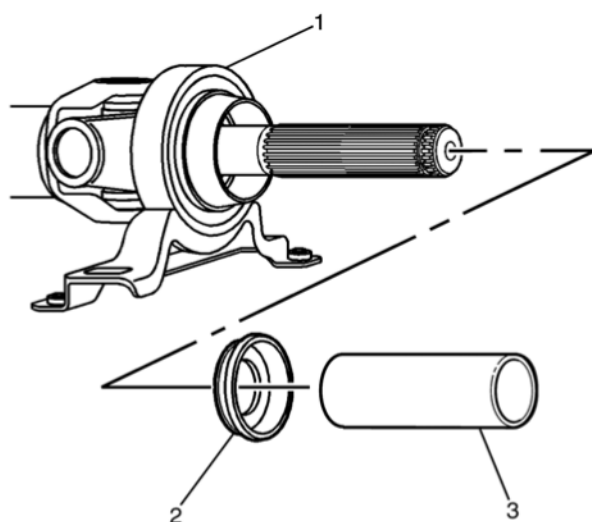


Note: Use a suitable press to install the centre bearing (1) with J 5590 bearing and seal driver (3) and adaptor (4) until it seats and the circlip groove is visible.

1. Install the centre bearing (1) to the propeller shaft (2).

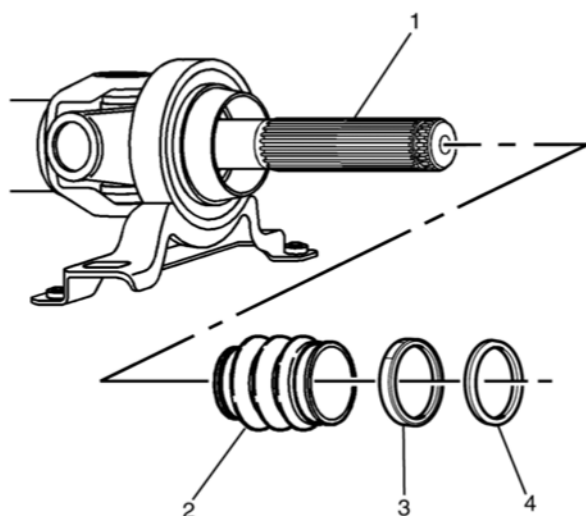


2. Install the propeller shaft (2) to centre bearing (1) NEW retaining circlip (3).



Note: Install the centre bearing slinger (1) with J 21426 installer (3) until it seats fully onto the centre bearing (1).

3. Install the NEW centre bearing slinger (2).



Note: Lubricate the propeller shaft splines (1) with 1–2 grams of molybdenum disulphide grease. Refer to [Adhesives, Fluids, Lubricants, and Sealers](#).

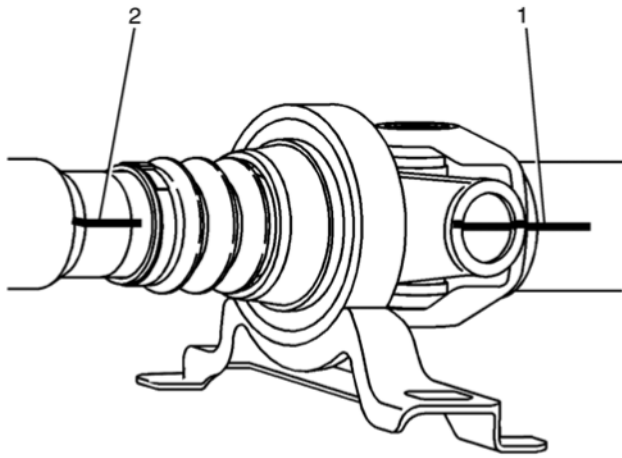
4. Lubricate the propeller shaft splines (1).

Note: The NEW dust boot clamp (3) must not to be fully tightened at this stage.

5. Install the NEW dust boot (2) and NEW dust boot clamp (3) to propeller shaft rear section (1). Do not fully tighten the dust boot clamp.

Note: The O-ring must be located into the groove on the spline.

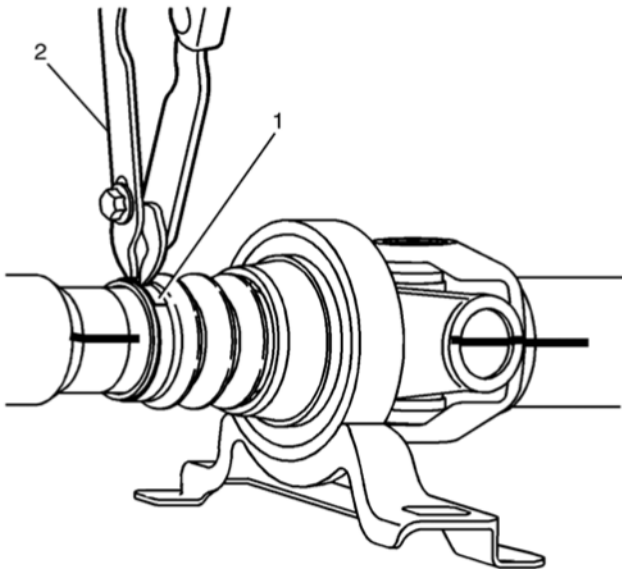
6. Install the NEW spline sealing O-ring (4) to the propeller shaft (1).



Note: Correct alignment during assembly is critical in order to maintain correct balance.

Note: Align the marks on the rear propeller shaft (1) and the front propeller shaft (2) made prior to ensure correct assembly balance.

7. Connect the propeller shaft rear section (1) to the propeller shaft front section (2).
8. Attach the NEW dust boot to the propeller shaft front section (2).



9. Tighten the NEW dust boot clamp (1) using J 22610 keystone pliers (2).
10. Install the propeller shaft to the vehicle. Refer to [Propeller Shaft Replacement](#).
11. Remove the safety stands.
12. Lower the vehicle to the ground.

Fastener Tightening Specifications

Fastener Tightening Specifications

Application	Specification	
	Metric	English
Center Bearing to Body Retaining Bolts	22 N•m	16 lb ft
Propeller Shaft Coupling to Differential Flange Retaining Bolts		
• First Pass	90 N•m	66 lb ft
• Final Pass	plus 43 degrees	
Propeller Shaft Rubber Coupling to Propeller Shaft Retaining Nuts		
• First Pass	65 N•m	48 lb ft
• Final Pass	plus 40 degrees	
Propeller Shaft Rubber Coupling to Propeller Shaft Yoke Retaining Nuts		
• First Pass	65 N•m	48 lb ft
• Final Pass	plus 40 degrees	
Propeller Shaft Rubber Coupling to Transmission Flange Retaining Nuts		
• First Pass	90 N•m	66 lb ft
• Final Pass	plus 45 degrees	

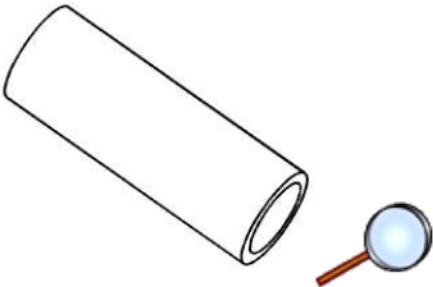
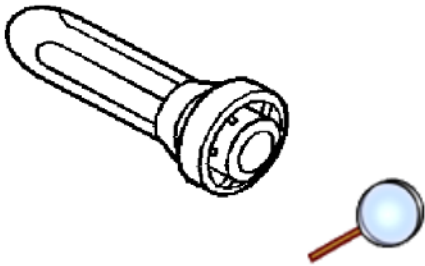
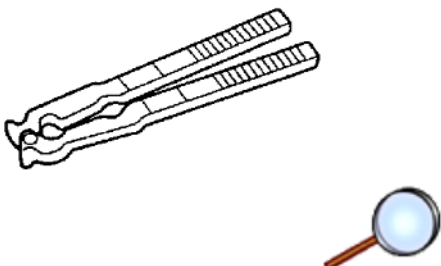
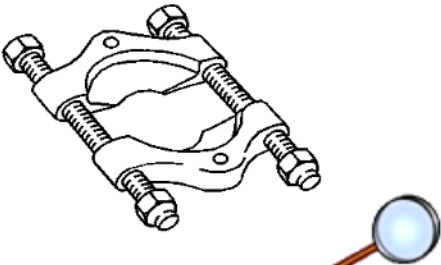
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Adhesives, Fluids, Lubricants, and Sealers

Adhesives, Fluids, Lubricants, and Sealers

Application	Type of Material
Slip Yoke Splines	Molybdenum Disulphide Grease

Special Tools

Illustration	Tool Number/Description
	J 5590 Bearing and Seal Driver
	J 21426 Installer
	J 22610 Keystone Clamp Pliers
	J 22912-B Rear Pinion and Axle Bearing Remover