

SECTION 4A

PROPELLER SHAFT

NOTICE: When fasteners are removed, always reinstall them at the same location from which they were removed. If a fastener needs to be replaced, use the correct part number fastener for that application. If the correct part number fastener is not available, a fastener of equal size and strength (or stronger) may be used. Fasteners that are not reused, and those requiring thread locking compound will be called out. The correct torque value must be used when installing fasteners that require it. If the above conditions are not followed, parts or system damage could result.

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GENERAL DESCRIPTION

PROPELLER SHAFT ASSEMBLIES

Figure 1

Torque is transmitted from the transmission assembly to the rear axle assembly through one or more of the propeller shaft assemblies (5, 6 and 10) and universal joint assemblies. The 3.4L L32 engine utilizes a two-piece propeller shaft assembly (6 and 10), while the 5.7L LT1 engine utilizes a one-piece propeller shaft assembly (5).

All propeller shaft assemblies (5, 6 and 10) have universal joints to accommodate angle variations between the transmission assembly and the rear axle assembly and/or the rear axle assembly position caused by suspension motion. The propeller shaft assemblies (5, 6 and 10) are connected to the transmission assembly with a splined slip yoke assembly (1 or 24) and to the rear axle assembly with a companion flange (fixed yoke). On the two-piece propeller shaft assembly (6 and 10), the rear portion of the front propeller shaft assembly (6) contains the center support bearing (7) and spline coupling. The spline coupling has internal splines which accept the rear propeller shaft assembly (10). The center support bearing (7) is pressed onto the OD of the coupling. On the front of the rear propeller shaft assembly (10) there is a propeller shaft joint (9) (sometimes called a constant velocity (CV) joint) that fits into the spline coupling of the front propeller shaft assembly (6).

NOTICE: If a vehicle is to be undercoated, the propeller shaft assembly must be kept free of undercoating material. Undercoating material or any other foreign material will upset the propeller shaft balance and produce serious vibration.

Important

- Before propeller shaft assembly removal, reference mark the propeller shaft assembly to ensure phased installation alignment. Some propeller shaft assemblies have alignment marks or arrows stamped on the shaft at the time of production.

CENTER SUPPORT BEARING

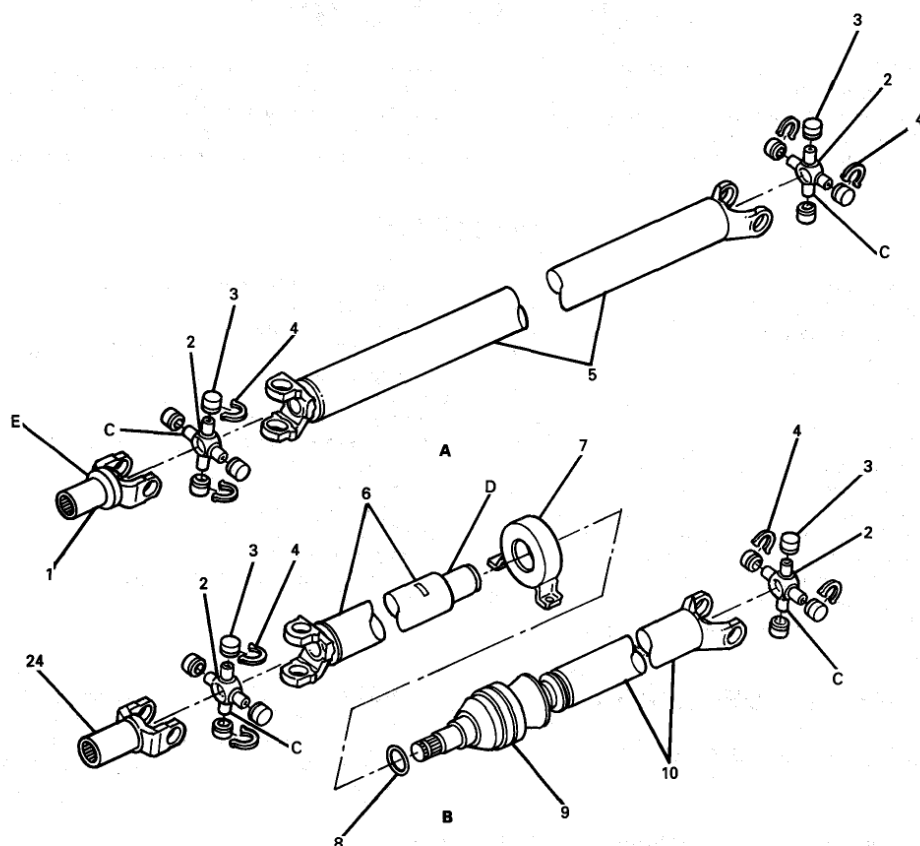
Figure 1

The center support bearing (7) supports the driveline when the two-piece propeller shaft assembly (6 and 10) are used. The center support bearing (7) is a ball-type bearing mounted in a rubber cushion that is mounted to the torque arm assembly. The center support bearing (7) is pre-lubricated and sealed by the manufacturer.

UNIVERSAL JOINT

Figure 1

The universal joint is basically two Y-shaped yokes connected by a crossmember called a spider (2). The spider (2) is shaped like a cross having arms of equal length



- A SHAFT ASSEMBLY, ONE-PIECE PROPELLER
- B SHAFT ASSEMBLY, TWO-PIECE PROPELLER
- C TRUNNIONS
- D COUPLING, SPLINE
- E DAMPER, PROPELLER SHAFT SLIP YOKE ASSEMBLY
- 1 YOKE ASSEMBLY, PROPELLER SHAFT DAMPER AND SLIP
- 2 SPIDER, PROPELLER SHAFT UNIVERSAL JOINT
- 3 BEARING, PROPELLER SHAFT UNIVERSAL JOINT SPIDER
- 4 RING, PROPELLER SHAFT UNIVERSAL JOINT SPIDER BEARING RETAINER
- 5 SHAFT ASSEMBLY, PROPELLER
- 6 SHAFT ASSEMBLY, FRONT PROPELLER
- 7 BEARING, PROPELLER SHAFT CENTER SUPPORT
- 8 SEAL, REAR PROPELLER SHAFT
- 9 JOINT, PROPELLER SHAFT
- 10 SHAFT ASSEMBLY, REAR PROPELLER
- 24 YOKE ASSEMBLY, PROPELLER SHAFT FRONT SLIP

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Figure 1 – Propeller Shaft Assembly Components

called trunnions. The spider (2) allows the two yoke shafts to operate at any angle to each other. Universal joints are lubricated for life.

When torque is transmitted through any ordinary universal joint, the drive pinion gear yoke fluctuates slightly in speed. In other words, although the propeller shaft slip yoke assembly (1 or 24) rotates at a constant speed, the differential drive pinion gear yoke speeds up and slows down twice per revolution. This fluctuation of the pinion gear yoke is in direct proportion to the angle through which the universal joint is operating; the greater the angle, the greater the fluctuation.

Whenever two universal joints are used, this fluctuation effect can be eliminated by staggering the joints so that the two yokes are 90 degrees apart, provided the two joints are transmitting torque through the same angle.

Therefore, when two universal joints are used, the angles through which they operate must be very nearly the same. This allows the alternate acceleration and deceleration of one joint to be offset by the alternate deceleration and acceleration of the second joint. When the two joints do not run at approximately the same angle, operation is rough and an objectionable vibration is produced.

Universal joints are designed to handle the effects of various loadings and rear axle windup during acceleration. Within the designed angle variations the universal joint will operate efficiently and safely. When the design angle is changed or exceeded, the operational life of the joint may decrease.

The universal joint spider bearings (3) used are the needle roller type. The needle roller bearings are held in place on the trunnions by round bearing caps. Production universal joint spider bearings (3) are retained by nylon injected rings instead of conventional retainer (snap) rings (4). All service replacement universal joints use retainer (snap) rings (4).

If it becomes necessary to replace a universal joint, the entire propeller shaft assembly (5, 6 or 10) must be removed from the vehicle. Care should be taken to avoid jamming or bending any parts of the assembly.

PROPELLER SHAFT JOINT

Figure 1

The propeller shaft joint (9) (sometimes called a constant velocity (CV) joint) is used on the two-piece propeller shaft assembly (6 and 10). The propeller shaft joint (9) allows the driveline angle to be adjusted according to the up and down movement of the vehicle without disturbing the power flow.

DIAGNOSIS

The following major component groups are usually the cause of or are related to vibration:

- Engine assembly and mounts.
- Transmission assembly.
- Tires, wheels and brake drum assemblies.
- Propeller shaft assemblies and universal joints.

Before road testing a vehicle, check the following:

- All fasteners for tightness at universal joint, wheel nuts and engine mounts.
- Tire air pressure.
- Load conditions.

ROAD TEST

Figure 2

Road test the vehicle to verify the complaint. Record the speed and rpm at which the greatest vibration occurs. The vibration is likely to be in the steering wheel or in the seat bottom. The road test can be helpful in locating the vibration source.

COAST TEST

Figure 2

NOTICE: When performing a "Coast Test" on a vehicle equipped with an automatic transmission assembly, caution must be taken when returning selector lever from "NEUTRAL" to "DRIVE" to avoid transmission damage. When shifting from "NEUTRAL" to "DRIVE," remember to:

1. Maintain engine speed at 1500 rpm.
2. Brake to 40 km/h (25 mph).
3. Return selector to "DRIVE."

Drive the vehicle past the vibration speed, shift into "NEUTRAL" and coast back through the vibration speed. During a coast test, two kinds of vibration normally occur: a shaking or a buzzing. A shaking vibration is usually a problem with the tires or a wheel and brake drum or brake rotor assembly. A buzzing vibration is usually a driveline problem.

To determine whether a propeller shaft assembly is causing the problem, drive the vehicle through the speed range and note at which speed (vehicle and/or engine) the problem is most pronounced. A tachometer may be used. Shift the transmission assembly into a lower gear range and drive the vehicle at the same engine speed as when the problem was most pronounced in direct drive. Note the effect on the problem.

To determine the engine speed if a tachometer is not used, divide vehicle speed by the transmission gear ratio in which the problem occurs.

Example: With the HYDRA-MATIC 4L60 automatic transmission in 2 range, divide by 1.63. If the problem is most pronounced in direct drive at 88 km/h (55 mph) the same engine speed would be produced in 2 range at 55 km/h ($55/1.63 = 34$ mph).

If the problem is still present at the same engine speed whether in direct drive or in the lower gear range, a propeller shaft assembly cannot be at fault since a propeller shaft speed varies. If the problem decreases or is eliminated in a different gear range at the same engine speed, a propeller shaft assembly may be at fault. Refer to "Propeller Shaft Assembly Runout Measurement," "Diagnosis of Propeller Shaft Assembly and Universal Joint" and Figure 2.

PROPELLER SHAFT ASSEMBLY DIAGNOSIS

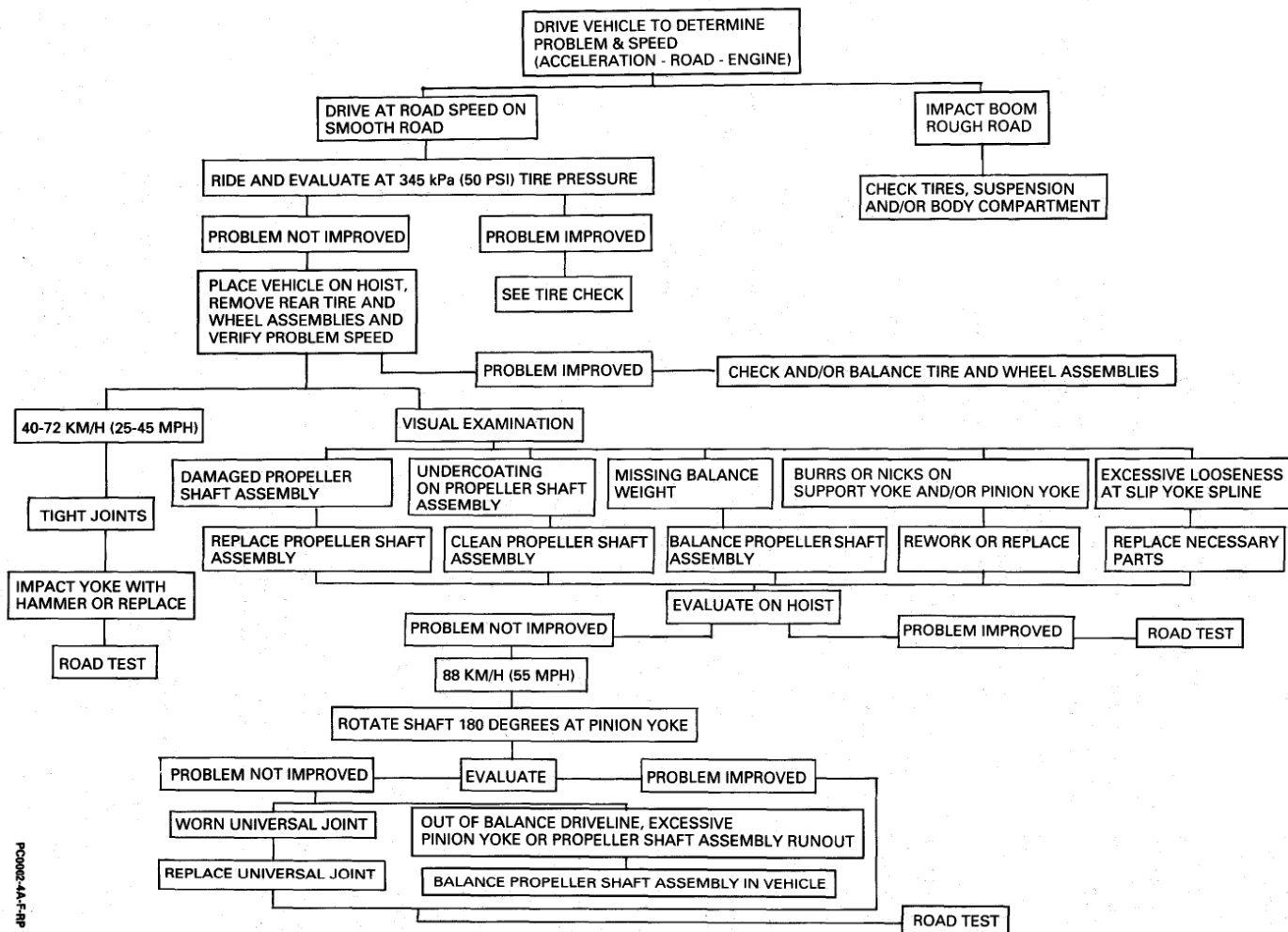


Figure 2 – Propeller Shaft Assembly Diagnostic Chart

DIAGNOSIS OF PROPELLER SHAFT ASSEMBLY AND UNIVERSAL JOINT

PROBLEM	POSSIBLE CAUSE	CORRECTION
Leak at front propeller shaft (An occasional drop of lubricant leaking from the slip yoke is normal and requires no attention.)	1. Rough outside surface on propeller shaft slip yoke.	1. Replace transmission seal if cut by burrs on slip yoke. Minor burrs can be smoothed by careful use of crocus cloth or honing with a fine stone. Replace slip yoke if outside surface is rough or burred badly.
	2. Fault rear transmission oil seal.	2. Replace the rear transmission oil seal. Bring transmission fluid up to proper level after correction.
Knock in driveline; clunking noise when vehicle is operated under float condition at 16 km/h (10 mph) in high gear or "NEUTRAL."	1. Worn or damaged universal joints.	1. Replace universal joints.
	2. Differential side gears worn.	2. Replace differential side gears as required.
Ping, snap, or clinking noise in driveline.	1. Loose rear axle upper or lower control arm bolt/screw.	1. Tighten bolt/screw to specified torque.
	2. Worn or damaged universal joints.	2. Replace universal joints.
Scraping noise	1. Slinger rubbing on rear axle assembly.	1. Straighten slinger to remove interference.
	2. Brake drum assembly, if equipped, contacting backing plate.	2. Replace brake drum assembly or backing plate.

ON-VEHICLE SERVICE

Important

- The driveline components in this vehicle have been factory system balanced. System balance provides a smoother running driveline operation. However, it is essential that the positions of all driveline components relative to the propeller shaft assembly and rear axle assembly be observed and **ACCURATELY REFERENCE MARKED PRIOR TO DISASSEMBLY**. These components include the propeller shaft assemblies, rear axle assemblies, differential drive pinion gear yoke, output shaft, etc. **ALL COMPONENTS MUST BE REASSEMBLED INTO THE EXACT RELATIONSHIP TO EACH OTHER AS THEY WERE WHEN REMOVED**. Additionally, the published specifications and torque values, as well as any measurements made prior to disassembly must be followed to maintain the factory balance.

PROPELLER SHAFT ASSEMBLY RUNOUT MEASUREMENT

Figure 3

Tool Required:

J 8001 Dial Indicator Set

Noise or vibration at high speed could be caused by a bent propeller shaft assembly. The propeller shaft assembly could have been damaged by rough handling or a collision. Check for propeller shaft assembly straightness.

- Raise vehicle on a twin post hoist so that the rear is supported on the rear axle housing assembly and the wheels can spin. Refer to SECTION 0A.
- Mount J 8001 on a movable support that is high enough to permit contact of the indicator button with the propeller shaft assembly (5, 6 or 10), or mount J 8001 to a magnetic base and attach to a smooth place on the vehicle underbody. Readings are to be taken at points indicated in Figure 3.
- With transmission in "NEUTRAL," check for runout by turning a rear wheel to rotate the propeller shaft assembly (5 or 6 and 10).
- If runout exceeds 1.40 mm (0.055 inch), disconnect propeller shaft assembly (5 or 10) at differential drive pinion gear yoke and rotate the propeller shaft assembly (5 or 10) 180 degrees. Reinstall propeller shaft assembly (5 or 10). Check runout again.
- If runout is still over specifications at the differential drive pinion gear yoke end, differential drive pinion gear yoke runout should be measured. Refer to "Differential Drive Pinion Gear Yoke Runout Measurement" in the following procedure. If run-out is still over specifications, replace the propeller shaft assembly (5, 6 or 10), but only after checking for vibration or noise.
- Lower vehicle.

DIFFERENTIAL DRIVE PINION GEAR YOKE RUNOUT MEASUREMENT

Figure 4

Tools Required:

J 35819 Runout Gage

J 8001 Dial Indicator Set

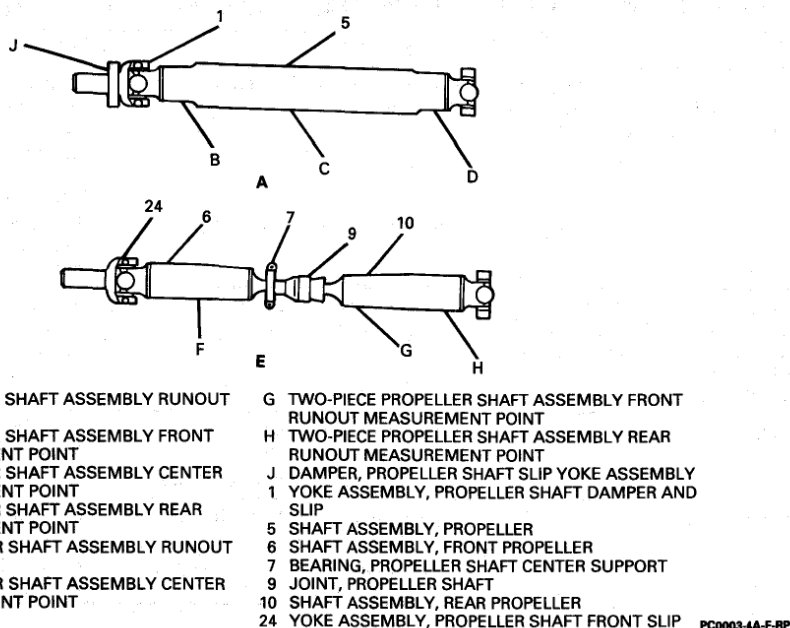


Figure 3 – Checking Propeller Shaft Assembly Runout

1. Raise the vehicle on a twin post hoist so the rear is supported on the rear axle housing and the wheels can spin. Refer to SECTION 0A.
2. Remove propeller shaft assembly. Refer to "One and Two-Piece Propeller Shaft Replacement" in this section.
3. Measure pinion gear yoke runout using J 35819 and J 8001. Record runout and mark high and low points of pinion gear yoke.
4. If pinion gear yoke runout is 0.15 mm (0.006 inch) or less, remove the pinion gear yoke balance weight, if used. No further action is required.
5. If pinion gear yoke runout is greater than 0.15 mm (0.006 inch), but less than 0.28 mm (0.011 inch) and the balance weight is at or near the low point of pinion gear yoke runout, no further action is required. If balance weight is not at or near the low point of pinion gear yoke runout, remove the weight.
6. If pinion gear runout is over 0.28 mm (0.011 inch), but no greater than 0.38 mm (0.015 inch) and the balance weight is at or near the low point of pinion gear yoke runout, no further action is required.
7. If the balance weight is not at or near the low point of pinion gear runout, remove the weight and rotate the pinion gear yoke until runout is 0.25 mm (0.010 inch) or less.
8. If impossible to achieve 0.25 mm (0.010 inch) or less runout, install a new pinion gear yoke and recheck for 0.25 mm (0.010 inch) or less runout.

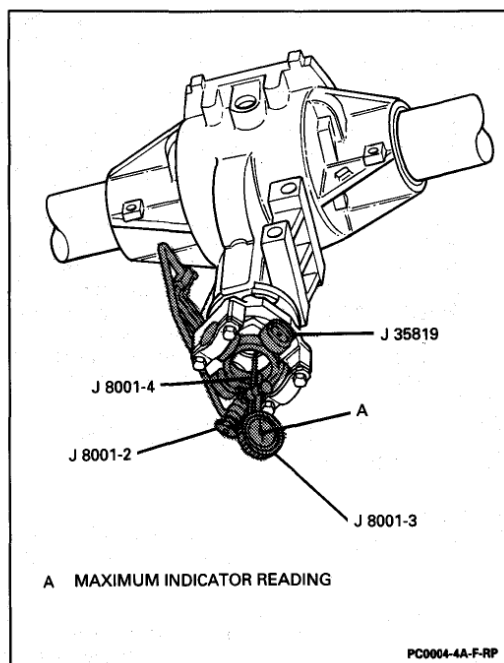


Figure 4 – Differential Drive Pinion Gear Yoke Runout

Refer to SECTION 4B for pinion gear yoke replacement.

- Service replacement pinion gear yoke may be equipped with balance weights. These weights should not be removed.
- 9. Install propeller shaft assembly. Refer to "One and Two-Piece Propeller Shaft Assembly Replacement" in this section.
- 10. Lower vehicle.

PROPELLER SHAFT ASSEMBLY BALANCE CHECK

Remove or Disconnect

NOTICE: See "Notice" on page 4A-1 of this section.

1. Raise vehicle on twin post hoist so wheels can spin. Refer to SECTION 0A.
2. Both rear tire and wheel assemblies. Refer to SECTION 3E.
3. Install wheel nuts with flat sides against rear brake drum or rotor assemblies.

Inspect

- A. Propeller shaft assembly, universal joint, and attachments for mud, undercoating or loose fasteners.

Clean

- Propeller shaft assembly, universal joint, and attachments.

Tighten

- Any loose attachments or fasteners to specifications. Refer to "Specifications" in this section.

CAUTION: Do not run the vehicle faster than 88 km/h (55 mph). Stay clear of the universal joint and balance weight areas to avoid possible personal injury. Do not run the vehicle on the hoist for extended periods due to the danger of overheating the transmission assembly or engine assembly.

- B. Run vehicle in gear at speed where disturbance peaks. Observe intensity of disturbance.

NOTICE: On vehicles with an automatic transmission assembly, allow the driveline components to stop rotating with the transmission assembly in "NEUTRAL" before placing the transmission assembly in "PARK" or parts may be damaged.

- C. Stop engine assembly.

4. Propeller shaft assembly from pinion gear yoke only. Refer to "One and Two-Piece Propeller Shaft Assembly Replacement" in this section.

- Rotate propeller shaft assembly 180 degrees from original position.

Install or Connect

1. Propeller shaft to pinion gear yoke. Refer to "One and Two-Piece Propeller Shaft Assembly Replacement" in this section.
2. Remove wheel nuts.
3. Tire and wheel assemblies. Refer to SECTION 3E.
4. Determine position that gives best driveline response by road testing vehicle for final check of propeller shaft balance.
5. If balance is unacceptable, refer to "Propeller Shaft Assembly Balancing" in this section.

PROPELLER SHAFT ASSEMBLY BALANCING

Hose Clamp Method

Figures 5 through 7

1. Place vehicle on twin post hoist so that rear of vehicle is supported on rear axle housing and rear wheels are free to rotate. Refer to SECTION 0A.
2. Remove both rear tire and wheel assemblies. Refer to SECTION 3E. Install wheel nuts with flat sides next to rear brake drum or rotor assemblies.
3. Mark and number propeller shaft assembly (5) at four points, 90 degrees apart, at rear of propeller shaft assembly (5) just forward of balance weight.
4. Install two clamps (11) on rear of propeller shaft assembly (5) and slide them rearward until clamps (11) stop at nearest balance weight welded to tube.
 - Align both clamps (11) at any one of four marks made on propeller shaft assembly (5) in step 3 and tighten.

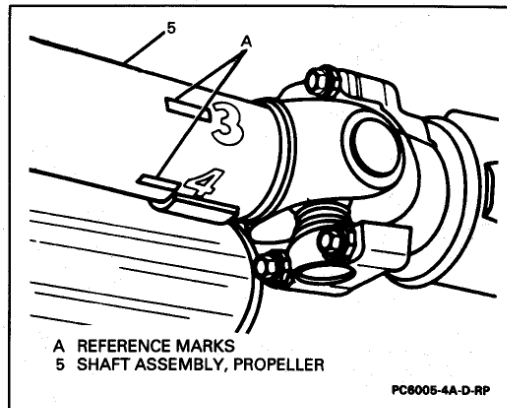


Figure 5 – Propeller Shaft Assembly Reference Marks
(One-Piece Propeller Shaft Assembly Shown, Two-Piece Propeller Shaft Assembly Similar)

CAUTION: Do not run the vehicle faster than 88 km/h (55 mph). Stay clear of the universal joint and balance weight areas to avoid possible personal injury. Do not run the vehicle on the hoist for extended periods due to the danger of overheating the transmission assembly or engine assembly.

5. Run vehicle through speed range to 81-88 km/h (50-55 mph). Note amount of imbalance felt at front of rear axle housing assembly.
6. Loosen clamps (11) and rotate clamp heads 90 degrees to next mark on propeller shaft assembly (5). Tighten clamps (11) and repeat step 5.
7. Repeat step 6 until vehicle has been run with clamp heads located at all four marks on propeller shaft assembly (5).

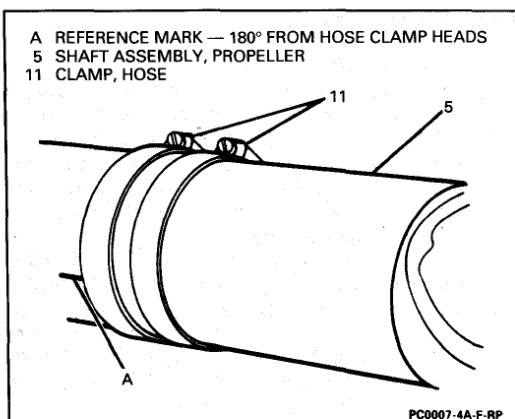


Figure 6 – Balance Hose Clamps (One-Piece Propeller Shaft Assembly Shown, Two-Piece Propeller Shaft Assembly Similar)

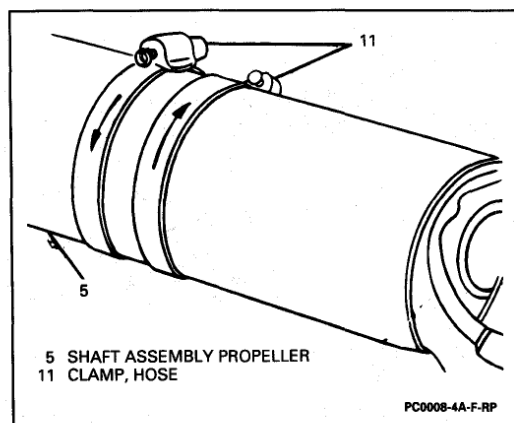


Figure 7 – Rotating Balance Hose Clamps (One-Piece Propeller Shaft Assembly Shown, Two-Piece Propeller Shaft Assembly Similar)

8. Position clamps (11) at point of least imbalance. Rotate clamp heads away from each other 45 degrees, one on each side of the position.
 - A. Run vehicle and note if balance has improved.
 - B. In some cases it may be necessary to use one clamp (11) or possibly three clamps (11) in order to obtain good balance.
 - C. Replace propeller shaft assembly (5) if three clamps (11) do not improve balance.
9. Continue to rotate clamps (11) apart in smaller angular increments until imbalance is at its minimum.
10. Remove wheel nuts.
11. Install tire and wheel assemblies. Refer to SECTION 3E.
12. Lower vehicle.
13. Road test vehicle to check final balance.
 - A small vibration felt while vehicle is on hoist may not be noticed on road test.

Strobe Light Method

Figures 5 through 9

If a strobe-light type wheel balancer is used, it will help in the balancing of the propeller shaft assembly. The balance pick-up unit should be placed directly under the nose of the rear axle housing assembly and as far forward as possible. Make up an extension for the balance pick-up unit by using 3/8-inch tube and compression fittings (Figure 8).

1. Place vehicle on twin post hoist so rear of vehicle is supported on rear axle housing assembly and rear wheels are free to rotate. Lower rear hoist and allow rear axle assembly to rest on jackstands.
2. Remove both rear tire and wheel assemblies. Refer to SECTION 3E. Install wheel nuts with flat sides next to rear brake drum or rotor assemblies. System is now released and free to respond to propeller shaft assembly (5).
3. Mark and number propeller shaft assembly (5) at four points, 90 degrees apart, at rear of propeller shaft assembly (5) just forward of balance weights.
4. Place strobe light wheel balancer pick-up under pinion gear yoke in contact with rear axle housing assembly and as far forward as possible.

CAUTION: Do not run the vehicle faster than 88 km/h (55 mph). Stay clear of the universal joint and balance weight areas to avoid possible personal injury. Do not run the vehicle on the hoist for extended periods due to the danger of overheating the transmission or the engine assemblies.

5. Run vehicle in gear at speed where disturbance is at its peak.
6. Allow driveline to stabilize by holding at steady speed.
7. Point strobe light up at spinning propeller shaft assembly (5) and note position of one of the reference numbers.

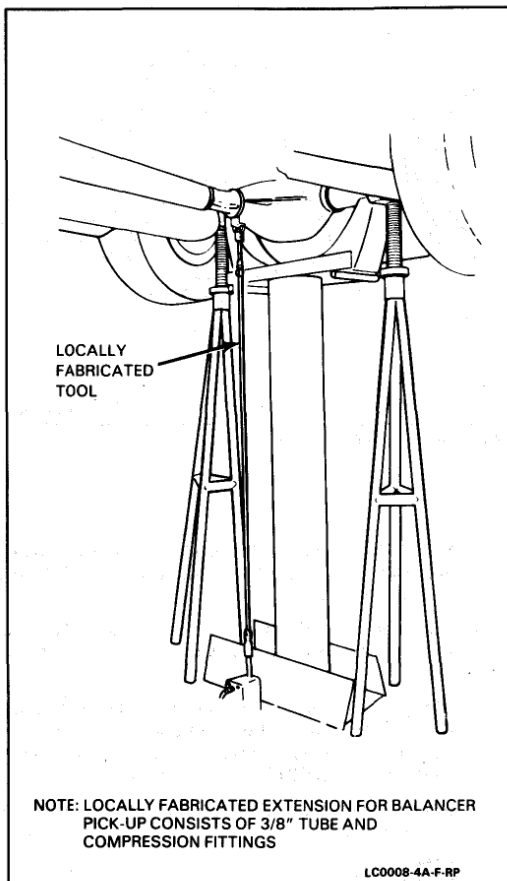


Figure 8 – Pick-Up Unit at Differential Drive Pinion Gear Yoke

NOTICE: On vehicles with an automatic transmission assembly, allow the driveline components to stop rotating with the transmission assembly in “NEUTRAL” before placing the transmission assembly in “PARK” or parts may be damaged.

8. Shut off engine assembly.
9. Position propeller shaft assembly (5) so reference numbers will be in same position as was noted while propeller shaft assembly (5) was rotating.
 - When strobe light flashed, heaviest point of propeller shaft assembly (5) was at bottom (6 o'clock). To balance propeller shaft assembly (5), it would be necessary to apply balancing weights (hose clamps) 180 degrees away from heaviest point or at top of propeller shaft assembly (5) (12 o'clock).
10. Install two screw-type clamps (11) on propeller shaft assembly (5) as close to rear as possible. Position both clamp heads 180 degrees from heaviest point of propeller shaft assembly (5) as indicated by strobe light. Tighten clamps (11).

11. Run vehicle through speed range 81-88 km/h (50-55 mph).
 - A. If disturbance is not gone and strobe light shows clamp heads at bottom (6 o'clock) of propeller shaft assembly (5), go to step 12.
 - B. If strobe light shows two clamp heads at top of propeller shaft assembly (5), add one more clamp (11) and check.
 - C. If strobe light shows three clamp heads at top of propeller shaft assembly (5), remove propeller shaft assembly (5) and rotate 180 degrees on pinion gear yoke (14). Check again, without clamps (11).
 - D. Repeat balancing, starting with step 10.

Important

- Do not use more than three clamps (11) to balance propeller shaft assembly (5).
- E. If propeller shaft assembly (5) still needs more than three clamps (11) at same clock position, replace propeller shaft assembly (5).
 - F. If clamps (11) are also 180 degrees from their original position after rotating propeller shaft assembly (5) 180 degrees, pinion gear yoke (14) is out of balance and must be replaced.
 - G. If strobe light shows clamps (11) at bottom of propeller shaft assembly (5), but disturbance still exists, go to step 12.
12. Rotate two of clamps (11) equally away from each other toward top (one on each side of the position) in small increments until best balance is achieved. In some cases it may be necessary to use one clamp (11) or possibly three clamps (11) in order to obtain good balance. Replace propeller shaft assembly (5) if three clamps (11) do not correct problem.
 13. Remove wheel nuts.
 14. Install tire and wheel assemblies. Refer to SECTION 3E.
 15. Remove strobe light and lower vehicle.
 16. Road test vehicle to check final balance.
 - A small vibration felt while vehicle is on hoist, may not be noticed on road test.

ONE AND TWO-PIECE PROPELLER SHAFT ASSEMBLY REPLACEMENT

Figure 10

Remove or Disconnect

NOTICE: Do not strike or drop the propeller shaft assembly, or allow the universal joints to bend to extreme angles, as this might fracture a joint internally.

1. Raise and suitably support vehicle. Refer to SECTION 0A.
2. Mark relationship of propeller shaft assembly (5 or 10) to pinion gear yoke (14).
3. Bolts/screws (16) from center support bearing (7), if removing two-piece propeller shaft assembly.

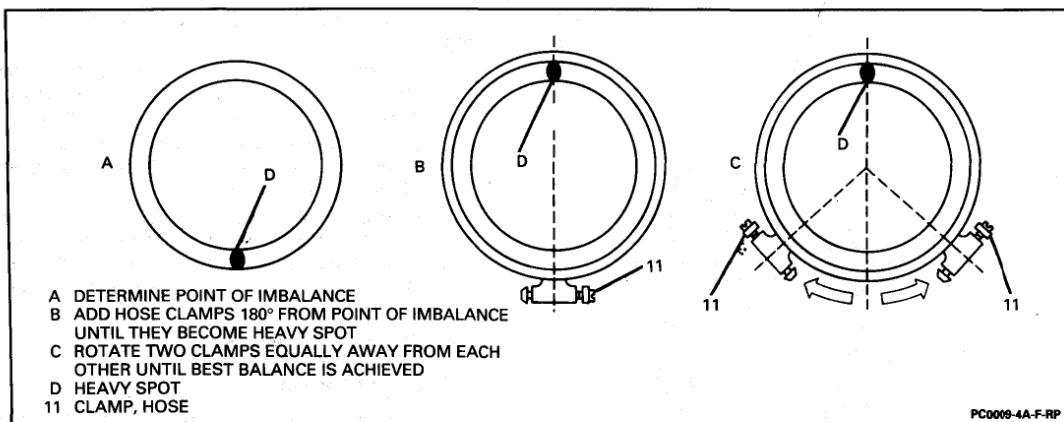


Figure 9 – Positioning Hose Clamps to Achieve Best Balance

4. Center support bearing (7) and washers (17) from torque arm assembly (18), if removing two-piece propeller shaft assembly.
5. Four bolts/screws (12).
6. Two retainers (13).
7. Propeller shaft assembly (5 or 6 and 10) by withdrawing slip yoke assembly (1 or 24) from transmission assembly, moving propeller shaft assembly (5 or 6 and 10) rearward and passing it under housing assembly (15).
 - Support propeller shaft assembly (5 or 6 and 10) during removal.
 - If bearing caps are loose, tape them together to prevent dropping and losing needle roller bearings.
8. Separate two-piece propeller shaft assembly, if necessary. Refer to "Two-Piece Propeller Shaft Assembly" in this section.

Inspect

1. Transmission output shaft splines for burrs.
2. Outer diameter of slip yoke assembly (1 or 24) for burrs.
3. Splines of slip yoke assembly (1 or 24) for damage, twisting or wear. They should agree in number and fit with transmission output shaft splines.
4. Pinion gear yoke (14) at universal joint cap connecting surface for burrs or foreign material.

Install or Connect

NOTICE: See "Notice" on page 4A-1 of this section.

NOTICE: The propeller shaft assemblies must be supported carefully during handling to avoid jamming or bending any of the parts.

NOTICE: To prevent transmission seal damage, do not place any tool between the propeller shaft slip yoke and splines.

1. Assemble two-piece propeller shaft assembly. Refer to "Two-Piece Propeller Shaft Assembly" in this section.
2. Slip yoke assembly (1 or 24) onto transmission output shaft after lubricating spline with approximately 18 gm (0.6 ounce) of propeller shaft slip yoke lubricant GM P/N 1050169, or equivalent.
3. Rear of propeller shaft assembly (5 or 10) to pinion gear yoke (14).

Important

- When making the rear propeller shaft assembly connection, be sure to align the mark on pinion gear yoke (14) with the mark on propeller shaft assembly (5 or 10).

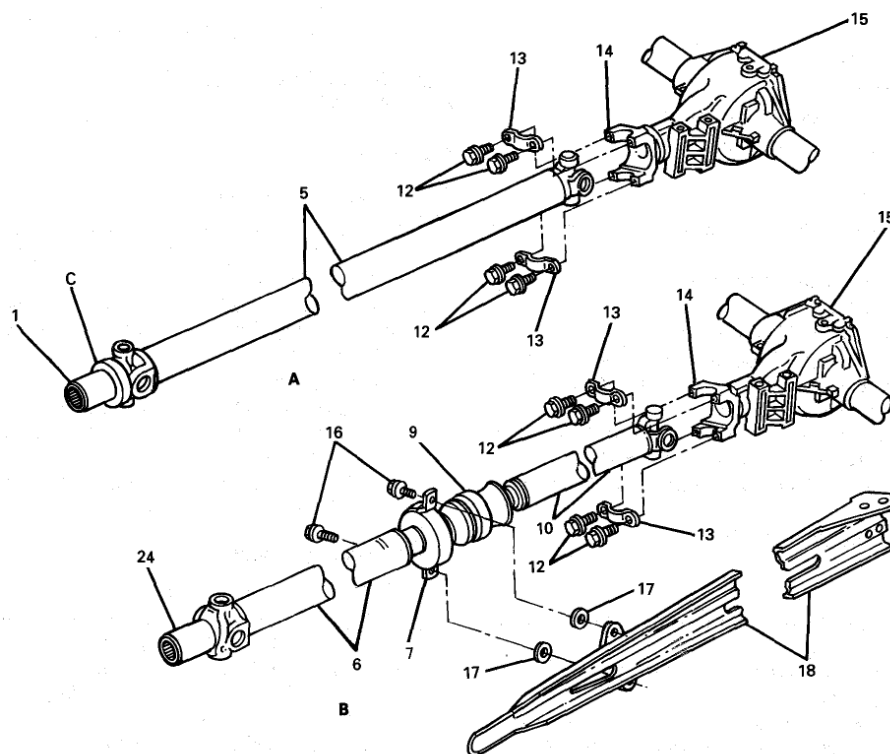
4. Rear universal joint to pinion gear yoke (14), making sure bearing caps are properly seated.
5. Two retainers (13).
6. Four bolts/screws (12).

Tighten

- Bolts/screws (12) evenly to 22 N•m (16 lb. ft.).
7. Washers (17) and center support bearing (7) to torque arm assembly (18), if installing two-piece propeller shaft assembly.
 8. Bolts/screws (16) to center support bearing (7), if installing two-piece propeller shaft assembly.

Tighten

- Bolts/screws (16) to 50 N•m (37 lb. ft.).
9. Lower vehicle.



- A SHAFT ASSEMBLY, ONE-PIECE PROPELLER
- B SHAFT ASSEMBLY, TWO-PIECE PROPELLER
- C DAMPER, PROPELLER SHAFT SLIP YOKE ASSEMBLY
- 1 YOKE ASSEMBLY, PROPELLER SHAFT DAMPER AND SLIP
- 5 SHAFT ASSEMBLY, PROPELLER
- 6 SHAFT ASSEMBLY, FRONT PROPELLER
- 7 BEARING, PROPELLER SHAFT CENTER SUPPORT
- 9 JOINT, PROPELLER SHAFT
- 10 SHAFT ASSEMBLY, REAR PROPELLER
- 12 BOLT/SCREW, PROPELLER SHAFT
- 13 RETAINER, PROPELLER SHAFT
- 14 YOKE, DIFFERENTIAL DRIVE PINION GEAR
- 15 HOUSING ASSEMBLY, REAR AXLE
- 16 BOLT/SCREW, PROPELLER SHAFT
- 17 WASHER, PROPELLER SHAFT
- 18 ARM ASSEMBLY, REAR AXLE TORQUE
- 24 YOKE ASSEMBLY, PROPELLER SHAFT FRONT SLIP

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Figure 10 – Propeller Shaft Assemblies

UNIT REPAIR

TWO-PIECE PROPELLER SHAFT ASSEMBLY

Figures 1 and 11

Tools Required:

J 33008 Axle Shaft Remover

J 2619-01 Slide Hammer



Disassemble

- Place propeller shaft assembly (6) horizontally in a vise.
- Propeller shaft assembly (6) from propeller shaft assembly (10).
 - Screw J 33008 onto J 2619-01.
 - Place J 33008 on propeller shaft joint (9) between propeller shaft joint bell area and propeller shaft assembly (6).
 - Using J 2619-01, drive propeller shaft assembly (10) from propeller shaft assembly (6).
- Shaft seal (8) from rear propeller shaft assembly (10).
 - Discard shaft seal (8).



Assemble

- New shaft seal (8) to rear propeller shaft assembly (10).
- Propeller shaft assembly (6) to propeller shaft assembly (10).
 - Align propeller shaft assemblies (6 and 10) and push them together by hand. If propeller shaft assemblies (6 and 10) can be separated by hand, then snap ring on propeller shaft joint (9)

has not engaged into groove in propeller shaft assembly (6). Again, align propeller shaft assemblies (6 and 10) and push them together by hand.

- Remove propeller shaft assembly (6) from vise.

CENTER SUPPORT BEARING REPLACEMENT

Figure 11



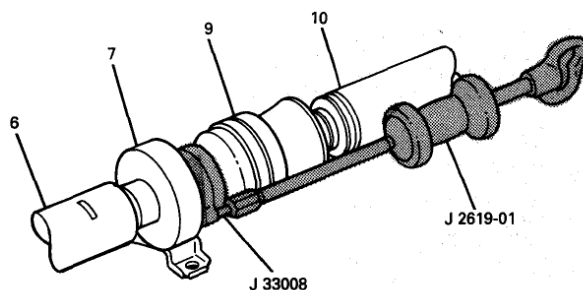
Remove or Disconnect

- Two-piece propeller shaft assembly. Refer to "One and Two-Piece Propeller Shaft Assembly Replacement" in this section.
- Front propeller shaft assembly from rear propeller shaft assembly. Refer to "Two-Piece Propeller Shaft Assembly" in this section.
- Center support bearing (7).
 - Stand propeller shaft assembly (6) on end in press with center support bearing (7) supported by press bars.
 - Press propeller shaft assembly (6) down and off center support bearing (7).



Install or Connect

- Center support bearing (7).
 - Press center support bearing (7) onto propeller shaft assembly (6) using press.
- Front propeller shaft assembly to rear propeller shaft assembly. Refer to "Two-Piece Propeller Shaft Assembly" in this section.
- Two-piece propeller shaft assembly. Refer to "One and Two-piece Propeller Shaft Assembly Replacement" in this section.



- 6 SHAFT ASSEMBLY, FRONT PROPELLER
 7 BEARING, PROPELLER SHAFT CENTER SUPPORT
 9 JOINT, PROPELLER SHAFT
 10 SHAFT ASSEMBLY, REAR PROPELLER

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Figure 11 – Separating the Two-Piece Propeller Shaft Assembly

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UNIVERSAL JOINTS

When taking apart a propeller shaft assembly, two types of universal joints may be found: nylon injected ring and snap ring.

NOTICE: Never clamp propeller shaft tubing in a vise, as the tube may be dented. Always clamp on one of the yokes and support the shaft horizontally. Avoid damaging the propeller shaft slip yoke sealing surface. Nicks may damage the bushing or cut the transmission extension housing seal. Mark the slip joint and propeller shaft to ensure correct reassembly.

Nylon Injected Ring Type

Figures 12 through 14

Tools Required:

J 9522-3 U-Joint Bearing Separator

J 9522-5 U-Joint Bearing Spacer Remover

Disassemble

1. Support propeller shaft assembly in a horizontal position in line with base plate of a press.
2. Place universal joint so that lower ear of shaft yoke is supported on a 1 1/8-inch socket.
3. Lower bearing cap (19) out of yoke ear by placing J 9522-3 on open horizontal bearing caps (19) and pressing lower bearing cap (19) out of yoke ear. This shears nylon injected ring on lower bearing cap (19). If bearing cap (19) is not completely removed, lift J 9522-3 and insert J 9522-5 between seal (23) and bearing cap (19). Complete removal of bearing cap (19) by pressing it out of yoke.
4. Rotate propeller shaft assembly. Shear opposite nylon injected ring.
5. Opposite bearing cap (19) out of yoke.
6. Spider (2) from yoke.

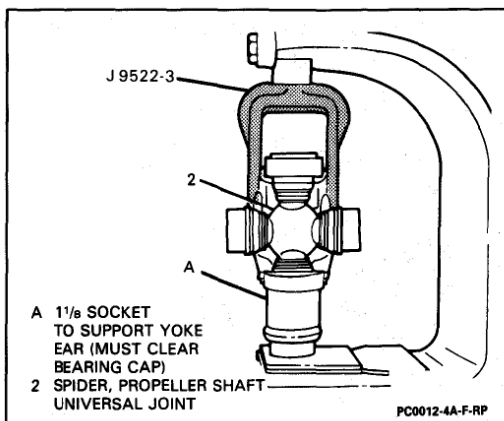


Figure 12 – Pressing Out Universal Joint Bearing

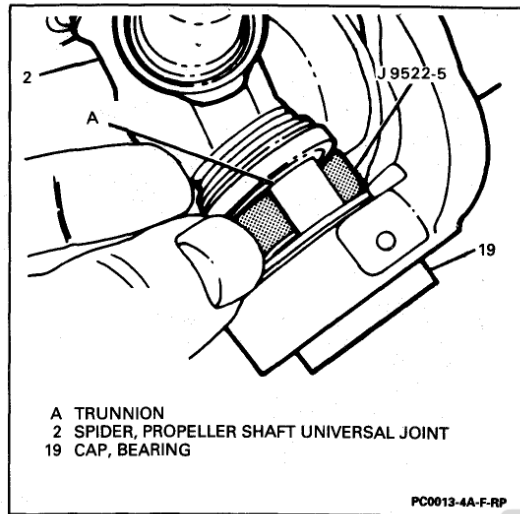


Figure 13 – Installing Universal Joint Bearing Spacer Remover

- There are no bearing retainer grooves in production bearing caps (19), therefore, they cannot be reused.
- If front universal joint is being replaced, remove pair of bearing caps (19) from propeller shaft slip yoke in same manner.

Clean

- Yoke in area locating retainer ring (4) to insure proper assembly.
- All sheared nylon from universal joint cup bore

Important

- Production universal joints of this type cannot be reassembled. Nylon injected ring types are replaced by external snap ring types.

When reassembling a propeller shaft assembly, always install a complete universal joint service kit. This kit includes one pregreased spider (2), four service bearing cap assemblies with seals (23), needle roller bearings (21), delrin round washers (20), delrin flat washers (22), grease and four retainer rings (4). Make sure that the seals (23) are in place on the service bearing caps (19) to hold the needle roller bearings (21) in place during handling.

Assemble

For universal joint assembly procedure, refer to "Snap Ring Type" in the following procedure.

Snap Ring Type

Figures 12 through 17

Tools Required:

J 9522-3 U-Joint Bearing Separator

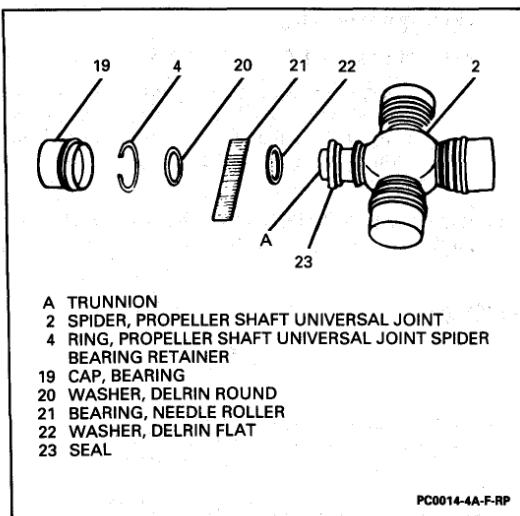


Figure 14 - Service Universal Joint

J 9522-5 U-Joint Bearing Spacer Remover

NOTICE: Use care not to loosen or damage dust seals. If dust seals are loose or damaged, replace the entire universal joint.

These universal joints are designed for extended life and do not require periodic inspections or lubrication. When these joints are taken apart, repack bearings and lubricant reservoir at the end of trunnions with chassis lubricant GM P/N 1052356 or GM P/N 1052497, or equivalent.



Disassemble

1. Retainer rings (4). If retainer ring (4) does not readily snap out of grooves, tap end of bearing cap (19) lightly to relieve pressure against retainer ring (4).

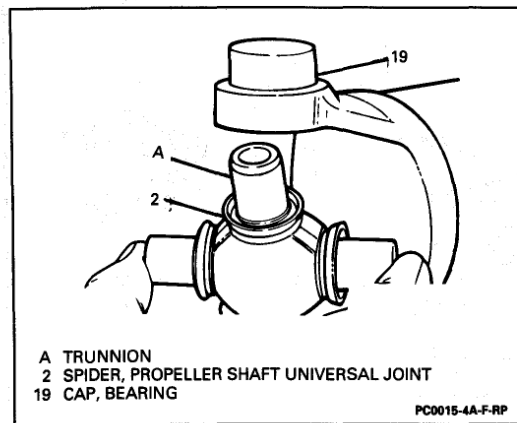


Figure 15 - Partially Inserted Bearing Cap

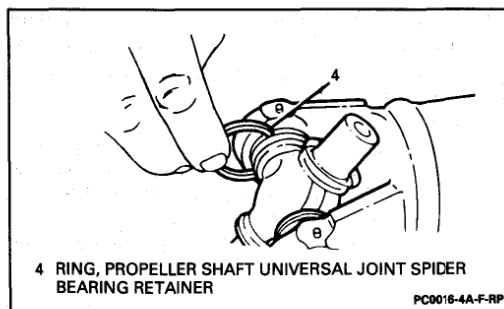


Figure 16 - Installing Propeller Shaft Universal Joint Spider Bearing Retainer Ring

2. Support propeller shaft assembly in a horizontal position in line with base plate of a press.
3. Place universal joint so lower ear of yoke is supported on a 1 1/8-inch socket.
4. Lower bearing cap (19) out of yoke ear. Place J 9522-3 on open horizontal bearing cap (19). If bearing cap (19) is not completely removed, lift J 9522-3 and insert J 9522-5 between seal (23) and bearing cap (19) being removed. Complete removal of bearing cap (19) by pressing it out of yoke.
5. Rotate propeller shaft assembly and press opposite bearing cap (19) out of yoke.
6. Spider (2) from yoke.



Assemble

1. One bearing cap (19) part way into one side of yoke. Turn this yoke ear to the bottom.
 - Insert J 9522-3 seating trunnion in bearing cap (19).
2. Opposite bearing cap (19) part way.



Inspect

- Both trunnions to ensure positioning is straight and true into bearing caps (19).

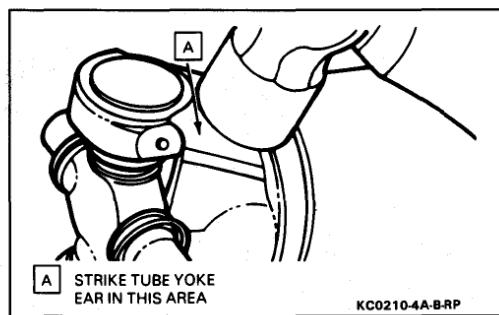


Figure 17 - Seating Propeller Shaft Universal Joint Spider Bearing Retainer Ring

3. Press against opposite bearing caps (19), working spider (2) all of the time to ensure free movement of trunnions in bearings.

Inspect

- Needle roller bearings (21) for binding. If binding, one or more needle roller bearings (21) has probably tipped under end of trunnion.
4. Stop pressing when one bearing retainer groove

clears inside of yoke.

5. Retainer ring (4) by pressing into place.

- Continue pressing until opposite side can be snapped into place. If needed, strike yoke firmly with a hammer to aid in seating the retainer rings (4). This springs yoke ears slightly.

6. Repeat steps 1 through 5 for other half of universal joint.

SPECIFICATIONS

GENERAL SPECIFICATIONS

One-Piece Propeller Shaft Assembly Runout	
Front Propeller Shaft Assembly Runout	1.40 mm (0.055")
Center Propeller Shaft Assembly Runout	1.40 mm (0.055")
Rear Propeller Shaft Assembly Runout	1.40 mm (0.055")
Two-Piece Propeller Shaft Assembly Runout	
Front Propeller Shaft Assembly Center Runout	1.40 mm (0.055")
Rear Propeller Shaft Assembly Front Runout	1.40 mm (0.055")
Rear Propeller Shaft Assembly Rear Runout	1.40 mm (0.055")

FASTENER TIGHTENING SPECIFICATIONS

Propeller Shaft-to-Center Support Bearing Bolt/Screw	50 N•m (37 lb. ft.)
Propeller Shaft-to-Differential Yoke Bolt/Screw	22 N•m (16 lb. ft.)

SPECIAL TOOLS

