

# SECTION 09: PROPELLER SHAFT

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## Section 09: PROPELLER SHAFT

### 1. PROPELLER SHAFT

#### 1.1 DESCRIPTION

The propeller shaft transmits power from the transmission to the differential (Fig. 1). Refer to paragraph "6. SPECIFICATIONS" at the end of this section for propeller shaft length. The propeller shaft is "Dana 1810" type with tubular shafts. It is provided with two heavy-duty universal joints (Fig. 1).

The propeller shaft has a full round end yoke at one end and a half round end yoke at the other end. The tube yoke is connected to the differential by a full round end yoke with four needle bearings.

The other extremity (slip yoke assembly) is connected to the transmission by a half round end yoke with two needle bearings.

Furthermore, a slip joint on the propeller shaft compensates for variations in distance between the transmission and the differential, or between the output retarder (optional on the automatic transmission) and differential.

The rise and fall of the drive axle bring about these variations as the vehicle passes over uneven surfaces. The slip joint also eases removal of the transmission or the drive axle.

### 2. REMOVAL, DISASSEMBLY, REASSEMBLY AND INSTALLATION

Refer to "SPICER UNIVERSAL JOINTS AND DRIVESHAFTS" annexed to this section, under headings "Heavy Duty - removal, disassembly, reassembly and installation".

Where applicable:

- Remove or install propeller shaft safety guard.
- Screw bolts to the specified torque (Fig. 1).

#### NOTE

Disregard the procedure on "Lock straps" mentioned in the "Spicer Universal Joints and Driveshafts Manual".

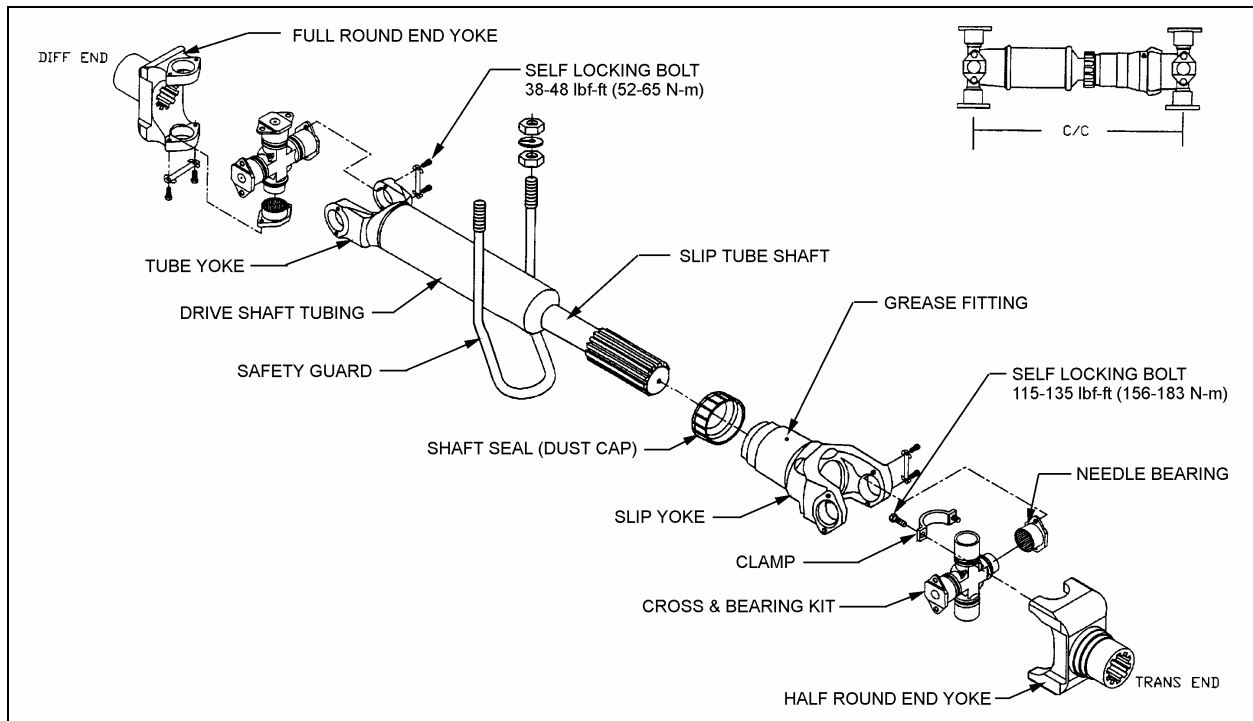


FIGURE 1: PROPELLER SHAFT ASSEMBLY

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### 3. CLEANING, INSPECTION AND LUBRICATION

#### 3.1 CLEANING AND INSPECTION

Thoroughly clean grease from bearings, journal, lubricating grease fittings and other parts. Needle bearing assemblies may be soaked in a cleaning solution to soften hard grease particles. It is extremely important that bearing assemblies be absolutely clean and blown out with compressed air, since small particles of dirt or grit can cause rapid bearing wear. Do not attempt to disassemble needle bearings.

Bearing journal areas should be inspected for roughness or grooving. If light honing does not remove roughness, the entire bearing assembly should be replaced. Excessive wear of the needle bearing is indicated if the needles drop out of the retainer, or if marks are present on the journal bearing surface. In such case, replace bearing assembly. Finally, inspect yokes for cracks, wear or distortion.

<b>NOTE</b>
<i>Repair kits are available for overhaul of the propeller shaft assembly. Refer to the paragraph "6. Specifications" of this section.</i>

#### 3.2 LUBRICATION

Lubricate propeller shaft universal joints and slip yoke periodically, every 6,250 miles (10 000 km) or twice a year, whichever comes first. Apply grease gun pressure to the lube fitting. Use a good quality lithium-base grease such as: NLGI No.2 (suitable for most temperatures) or NLGI No.1 (suitable for extremely low temperatures). Refer to "Spicer Universal Joints and Driveshafts, Service Manual", under heading, "Inspection and Lubrication". See lubrication procedures for U-joints and lubrication for slip splines.

<b>NOTE</b>
<i>Do not assume that bearing cavities have been filled with new grease unless it has expelled around all seals.</i>

### 4. EXPLANATION OF COMMON DAMAGES

**1. Cracks:** Stress lines due to metal fatigue. Severe and numerous cracks will weaken the metal until it breaks.

**2. Galling:** Scraping off of metal or metal displacement due to friction between surfaces. This is commonly found on trunnion ends.

**3. Spalling (surface fatigue):** Breaking off of chips, scales, or flakes of metal due to fatigue rather than wear. It is usually found on splines and U-joint bearings.

**4. Pitting:** Small pits or craters in metal surfaces due to corrosion. If excessive, pitting can lead to surface wear and eventual failure.

**5. Brinelling:** Surface wear failure due to the wearing of grooves in metal. It is often caused by improper installation procedures. Do not confuse the polishing of a surface (false brinelling), where no structural damage occurs, with actual brinelling.

**6. Structural Overloading:** Failure caused by a load greater than the component can stand. A structural overload may cause propeller shaft tubing to twist under strain or it may cause cracks or breaks in U-joints and spline plugs.

### 5. TROUBLESHOOTING

Refer to "Spicer Service Manual - Universal Joints and Driveshafts" under heading "Troubleshooting".

**6. SPECIFICATIONS**

**PROPELLER SHAFT**

**X3-45 COACHES EQUIPPED WITH ALLISON WORLD TRANSMISSION**

Make ..... Hayes-Dana Inc.  
Series..... 1810  
Supplier number ..... 819299-1  
Prevost number .....580075

**X3-45 COACHES EQUIPPED WITH ZF TRANSMISSION**

Make ..... Hayes-Dana Inc.  
Series..... 1810  
Supplier number (Traction) ..... 17937CCF  
Prevost number .....580083

**Repair kits**

Make ..... Hayes-Dana Inc.  
U-joint kit (tube yoke), Supplier number ..... 5-281X  
U-joint kit (tube yoke), Prevost number .....580043  
U-joint kit (slip yoke), Supplier number ..... 5-510X  
U-joint kit (slip yoke), Prevost number .....580062  
Cap and bolt kit, bolt torque 115-135 lbf•ft (156-183 N•m), Supplier number ..... 6.5-70-18X  
Cap and bolt kit, bolt torque 115-135 lbf•ft (156-183 N•m), Prevost number .....580063  
Bolts kit, bolt torque 38-48 lbf•ft (52-65 N•m), Supplier number ..... 6-73-209  
Bolts kit, bolt torque 38-48 lbf•ft (52-65 N•m), Prevost number .....580071

**Half Round End Yoke**

Make ..... Covington Detroit Diesel  
Supplier number .....29511516

<b><i>NOTE</i></b>
<i>U-joint kits will come equipped with the serrated bolt and lock patch and will no longer contain a lock strap.</i>