

## GROUP 16 PROPELLER SHAFT AND UNIVERSAL JOINTS

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### SPECIFICATIONS

#### PROPELLER SHAFT

Models.....	VC-1, VC-2, VC-3
Length—Ball and Trunnion Joint Pin Centerline to Cross Centerline.....	58.85"
Diameter—(VC-1, VC-2 Manual Trans.).....	3.00"
(VC-1, VC-2, VC-3 Automatic Trans.).....	2.75"

#### UNIVERSAL JOINTS

Front Joint.....	Ball and Trunnion
Rear Joint.....	Cross Type
Lubrication.....	See Group O, Lubrication and Maintenance

#### PROPELLER SHAFT

Models.....	VY-1
Length—Front Shaft—Cross Centerline to End of Spline.....	25.82"
Rear Shaft—Cross Centerline to Cross Centerline.....	33.06"
Diameter—Both Shafts.....	2.75"

#### UNIVERSAL JOINTS

Front, Center and Rear.....	Cross Type
Lubrication.....	See Group O, Lubrication and Maintenance

### TORQUE REFERENCE

	Foot-Pounds	Inch-Pounds
Center Bearing Housing Nuts.....	35	
Front—Companion Flange Nuts.....	32	
Rear—Clamp Bolts.....		170
Rebound Bumper Plate Bolts.....		200
Rear Spring U Bolt Nuts.....	55	

### SPECIAL TOOLS

C-452.....	Universal Joint Flange or Yoke Puller
C-496.....	Universal Joint Flange or Yoke Installer
C-3339.....	Dial Indicator
C-3567.....	Universal Joint Pin Remover and Installer
J-6485.....	Leveling Gauge

# PROPELLER SHAFT AND UNIVERSAL JOINTS

## PART I

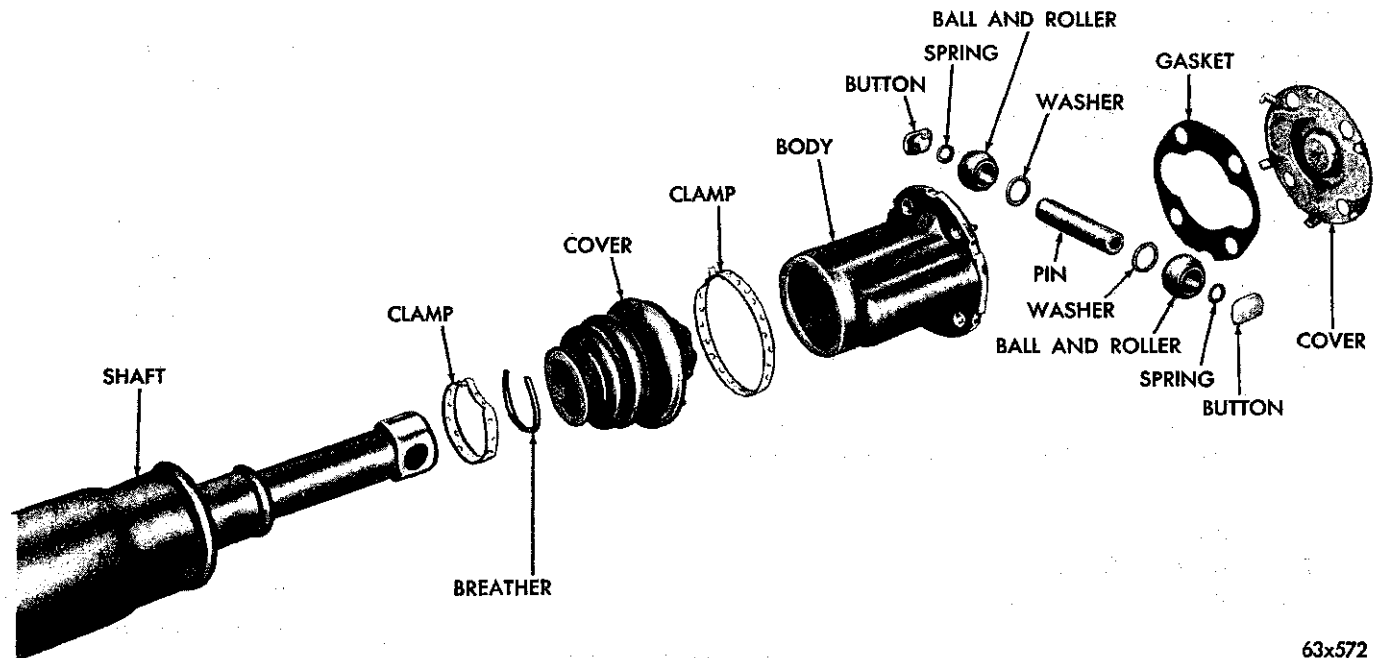
### MODELS VC-1, VC-2, VC-3

The Chrysler propeller shaft has a ball and trunion type universal joint at its forward end (Fig. 1) and a cross and roller type universal joint at the rear (Fig. 6).

All working parts are sealed against road splash, dust, mud and water. The front joint is equipped with a polished jute breather. The breather lengthens the life of the boot by decreasing the flexing

action due to variations of air pressure within the assembly as the shaft moves back and forth in the joint body.

The universal joints are permanently lubricated; however, if the joints are disassembled for any reason, they should be inspected and repacked with Fibrous Universal Joint Lubricant.



63x572

Fig. 1—Ball and Trunion Universal Joint  
(Disassembled)

## SERVICE PROCEDURES

### 1. PROPELLER SHAFT ANGULARITY

The quiet smooth operation of the propeller shaft and universal joints depends upon proper alignment. The propeller shaft and rear axle housing angles may be measured by using an alignment measuring gauge, Tool J-6485 with the vehicle in a level position and no additional weight, except the fuel tank must be full.

**CAUTION:** The vehicle must be supported by the wheels, or front suspension lower control arms and rear axle housing. Do not use a frame contact hoist for measuring propeller shaft angularity.

(1) Use a twin post hoist or drive-on hoist, pit, wheel or frame alignment rack. Level the vehicle. Measure the level at underside of the body sill at the center of the front door.

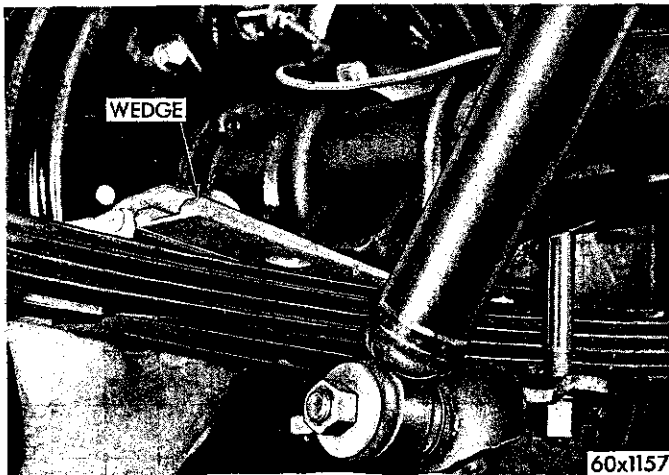


Fig. 2—Installing Tapered Wedges

(2) Remove the rebound plate and bumper assembly from the top of the differential carrier housing.

(3) Hold the gauge, Tool J-6485 on the machined surfaces of the rebound plate bosses (Fig. 9). Adjust the gauge to center the bubble in the spirit level.

**NOTE:** Each time the gauge is used, the level must be on the same side of the propeller shaft.

(4) Hold the gauge on the underside of the propeller shaft near the rear universal joint (Fig. 10), and look for the location of the bubble in the spirit level. The entire bubble should be within three graduations from center.

(5) If the edge of the bubble is forward of the third graduation, the angle of the rear axle housing should be changed. Loosen all "U" bolt nuts and install two-degree tapered wedges between both rear springs and the axle housing pads with the thick end of the wedge toward the front of the vehicle (Fig. 2). Tighten the rear spring "U" bolt nuts to 55 foot-pounds torque.

(6) Remeasure the rear joint angle, then install the rebound bumper and plate assembly on the carrier housing. Tighten the retaining bolts to 200 inch-pounds torque.

## 2. PROPELLER SHAFT

### Removal

(1) Remove both rear universal joint roller and bushing assembly clamps from the pinion yoke. (Do not disturb the retaining strap used to hold the roller assemblies on the universal joint cross.)

(2) Disconnect the front universal joint from the transmission flange.

**CAUTION:** Do not allow the shaft to drop or hang loose on the vehicle from either joint during removal.

### Installation

(1) Connect the front universal joint to the transmission flange and brake drum assembly. Tighten the retaining nuts to 35 foot-pounds torque.

(2) Align the rear of the propeller shaft with the pinion yoke and position the roller and bushing assemblies into the seats of the pinion yoke. Make sure the bushings and yoke seats are clean. Install the bushing clamps and tighten the clamp bolts to 170 inch-pounds torque.

## 3. BALL AND TRUNNION UNIVERSAL JOINT

### Disassembly

(1) Straighten the tabs and remove the grease cover and gasket.

(2) Push the body back and remove the parts from both ends of the trunnion pin.

(3) Remove the clamps and loosen the dust cover. Remove and save the breather (polished jute) located between the shaft and the cover.

(4) Clean and examine the trunnion pin and the raceways in the body for wear. If wear in the body can be felt, it should be replaced. If either part is to be replaced, use Tool C-3567 and a hydraulic press to push the pin out of the shaft.

### Cleaning and Inspection

(1) Clean the parts in kerosene, mineral spirits or other suitable solvents. If the pin, body and dust cover have not been removed, make sure that the body and dust cover are clean inside as well as outside.

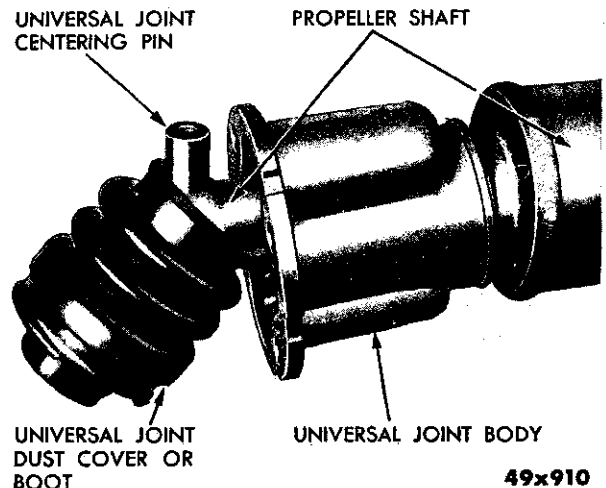


Fig. 3—Sliding the Cover Over the Ballhead and Pin

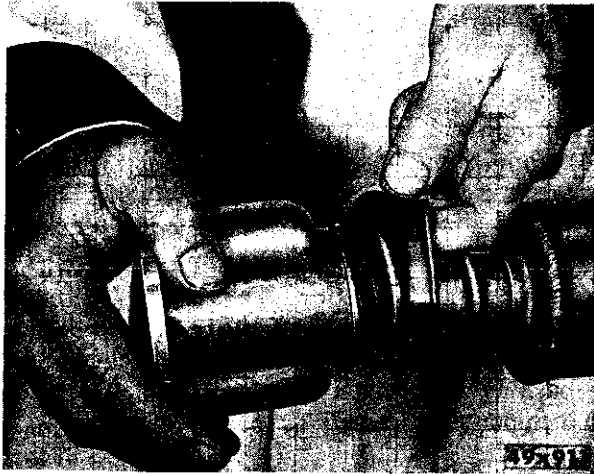


Fig. 4—Working the Dust Cover through the Body

(2) Examine parts for wear or damage. The dust cover should be free from cracks and pin holes.

#### Assembly

When the trunnion pin and body have not been removed, a new dust cover can be installed, after coating all parts with universal joint lubricant (Fig. 3 and Fig. 4). Without using tools, stretch the cover over the pin and work it through the body into position on the shaft.

(1) The trunnion pin must be centered in the propeller shaft. Use Tool C-3567 in a hydraulic press. The pin will be centered when the ram contacts the spacer portion of the tool (Fig. 5).

(2) Install a thrust washer, rollers, ball, button spring and thrust button on each end of the trunnion pin and position the body over the pin assembly.

(3) Position the dust cover on the propeller shaft with the breather (polished jute) parallel to the shaft. Install and tighten the clamp.

(4) Position the dust cover on the joint body and install the clamp.

(5) Lubricate the universal joint with **two ounces** of fibrous universal joint lubricant applied evenly in both raceways, one-half back of the trunnion pin and one-half between the pin and cover.

**NOTE:** Two ounces of universal joint lubricant would be about 1/2 inch deep if placed on the universal joint grease cover. Do not use more than the specified amount. Do not place grease inside the boot.

(6) Place the gasket on the grease cover, then position the cover on the body with the tabs at the grooves in the body. Bend the tabs to tighten in place.

## 4. CROSS AND ROLLER UNIVERSAL JOINT

### Disassembly

(1) Remove retaining strap and slide the two rollers and bushing assemblies from the cross.

(2) Remove the retainers from the bushings in the propeller shaft yoke. Press one roller bushing out of the yoke by pressing in on the opposite bushing.

(3) Press the remaining bushing out by pressing on the end of the cross assembly.

(4) Remove the cross from the yoke. The cross and seal retainers are serviced as an assembly. Do not remove the seal retainers from the cross.

### Cleaning and Inspection

(1) Clean the parts in kerosene, mineral spirits or other suitable solvents and dry with compressed air.

(2) Examine the bearing surfaces of the cross and bushings. The surfaces should be smooth, free from pits and ripples. If the dust seal retainers are damaged replace the assembly.

(3) Examine the roller bearings in the bushings. The bearings that have operated on a worn cross assembly should be replaced. The bearings should have a uniform appearance and should roll freely inside the bushings.

### Assembly

(1) Force fibrous universal joint grease between the rollers in all four bushings. Fill the reservoirs in the ends of the cross.

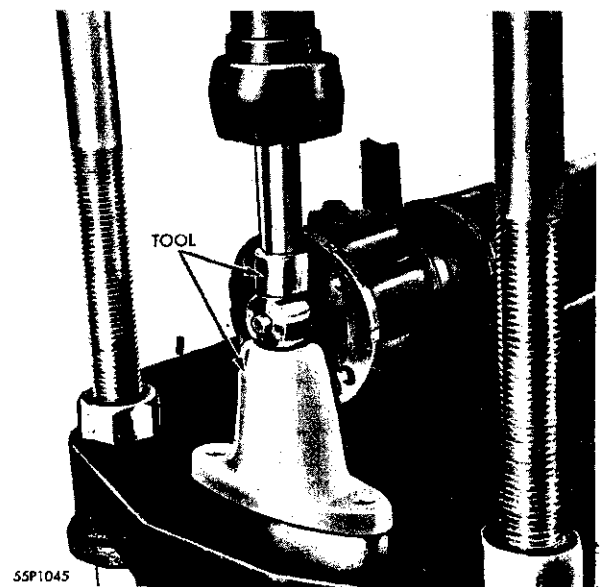


Fig. 5—Installing the Trunnion Pin

(2) Place the cross in the propeller shaft yoke and insert the roller and bushing assemblies in the yoke.

(3) Press the roller and bushing assemblies into the yoke while guiding the cross into both bushings.

(4) Press until both bushing retainers can be installed in the grooves in the bushings.

(5) Position the other two bushings on the cross and install the retainer strap to hold the bushings on the cross during installation in the vehicle.

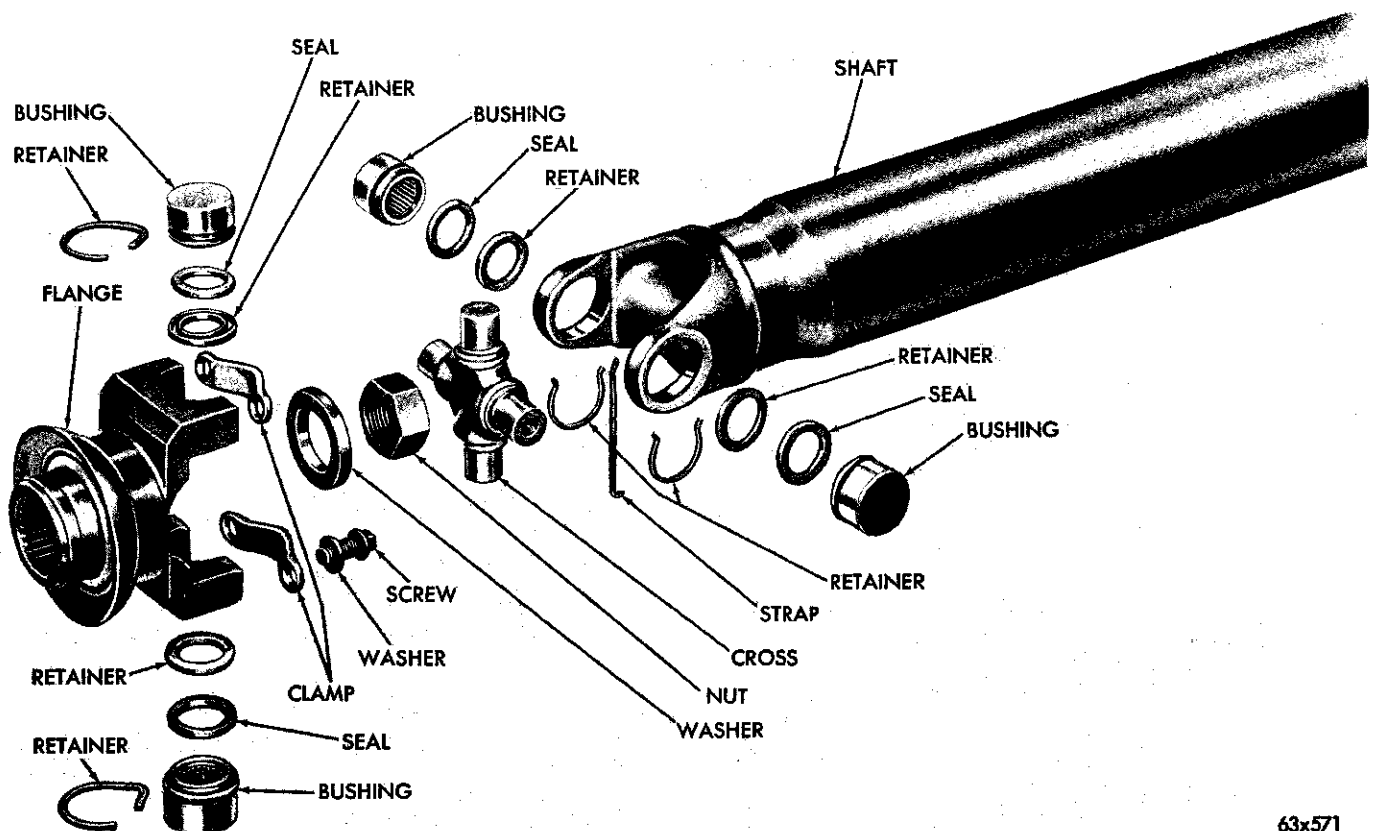
## PART II

### TWO-PIECE PROPELLER SHAFT AND UNIVERSAL JOINTS

#### MODELS VY-1

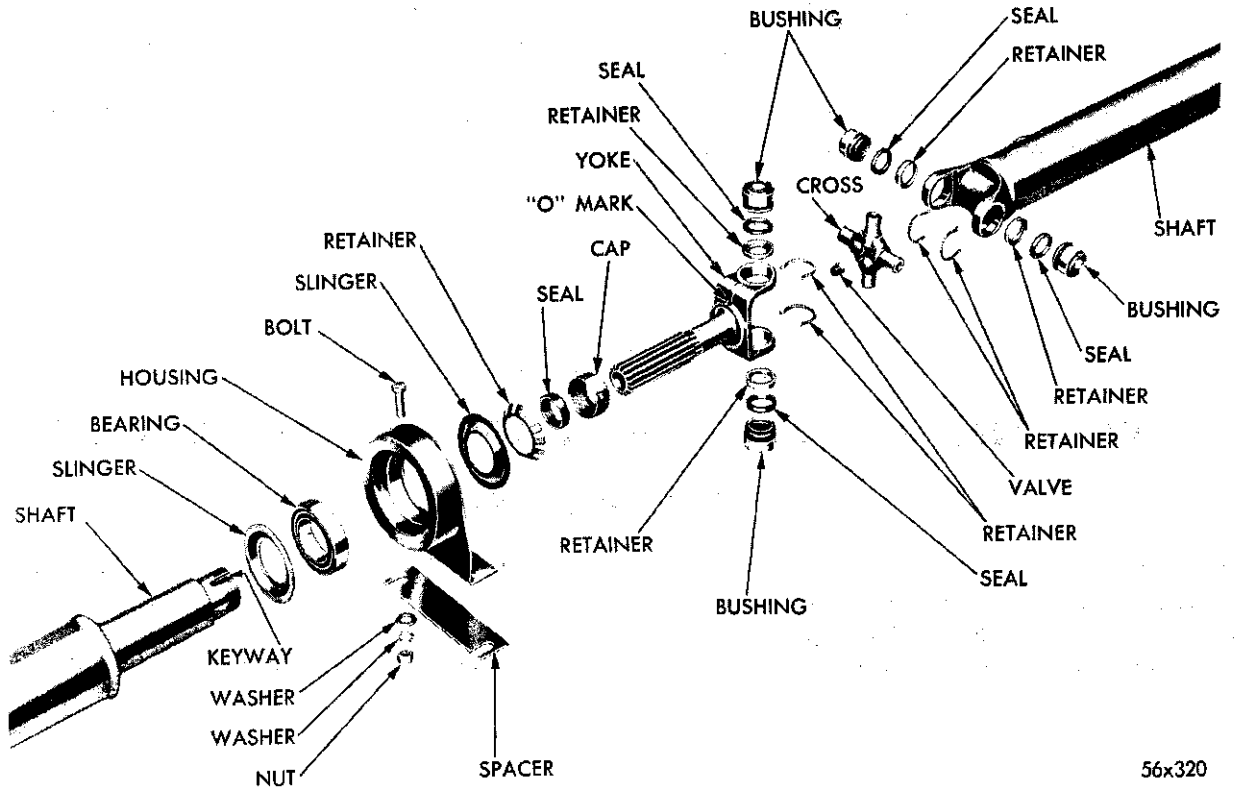
The Imperial two-piece propeller shaft has three cross and roller type universal joints (Fig. 6). The shaft is supported by a ball bearing located ahead of the center universal joint (Fig. 7).

When the vehicle is in motion, the middle universal joint is free to slide fore and aft inside the splines of the front section of the shaft.



63x571

Fig. 6—Cross and Roller Universal Joint (Disassembled)



56x320

Fig. 7—Propeller Shaft and Center Bearing (Disassembled)

## SERVICE PROCEDURES

### 5. PROPELLER SHAFT ANGULARITY

Before measuring the propeller shaft angularity, the vehicle should have the weight of a full tank of fuel. Measure the shaft indexing (Fig. 7) by prying the tang of the retainer out of the seal cap and unscrewing the cap. The "O" mark on the splined yoke should be lined up with the keyway in the shaft.

(1) Place the vehicle on a level platform with the weight of the vehicle on the wheels.

(2) Remove the differential carrier rebound bumper plate.

(3) Remove the shims from both rear axle control strut frame brackets (Fig. 8).

(4) Hold the aligning gauge Tool J-6485 on the machined pads of the differential carrier and adjust the gauge to center the bubble (Fig. 9).

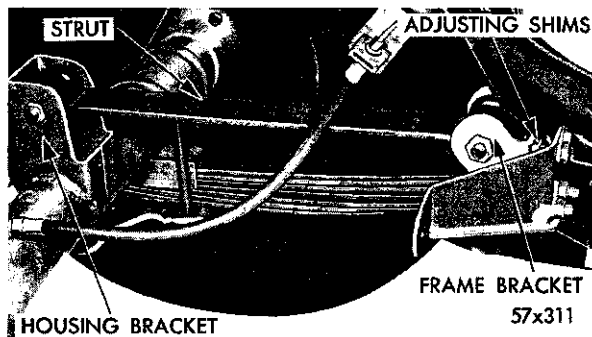


Fig. 8—Rear Axle Control Strut (Typical)

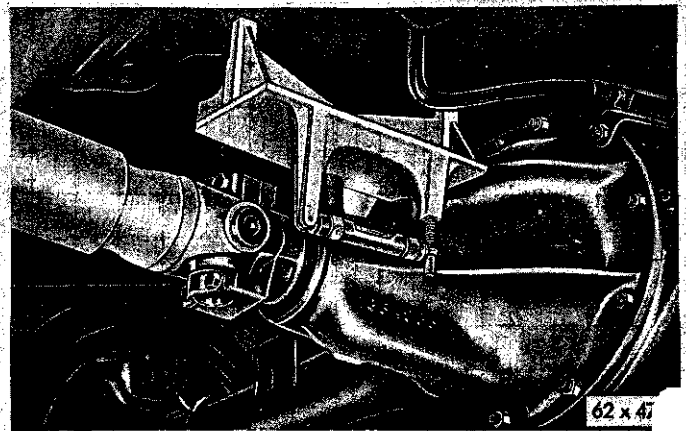


Fig. 9—Measuring Rear Axle Housing Angularity

**NOTE:** Each time the gauge is used, the level must be on the same side of the propeller shaft.

(5) Hold the gauge tool in contact with the propeller shaft, near the rear universal joint (Fig. 10). The entire bubble should be within three graduations from center.

(6) If the edge of the bubble is forward of the third graduation, the angle of the rear axle housing should be changed. Loosen all "U" bolt nuts and install two-degree tapered shims between both rear springs and the rear axle housing pads with the thick end of the shim toward the front of the vehicle. Tighten the "U" bolt nuts to 55 foot-pounds torque.

(7) Install enough shims to fill the space between the struts and the frame brackets. Tighten the bracket bolts.

(8) Remeasure the rear joint angle, then install the rebound bumper plate assembly. Tighten the retaining bolts to 200 inch-pounds torque.

**6. CENTER BEARING HEIGHT**

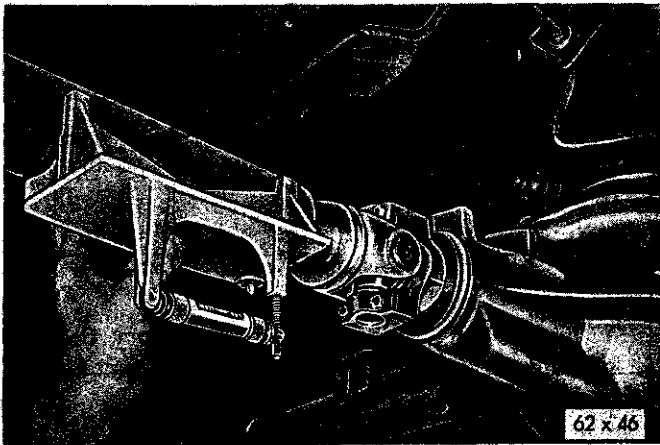
(1) Hold the gauge tool in contact with the rear propeller shaft, near the rear universal joint and adjust the gauge to center the bubble (Fig. 10).

(2) Install the gauge adapter on the front propeller shaft near the front universal joint (Fig. 11).

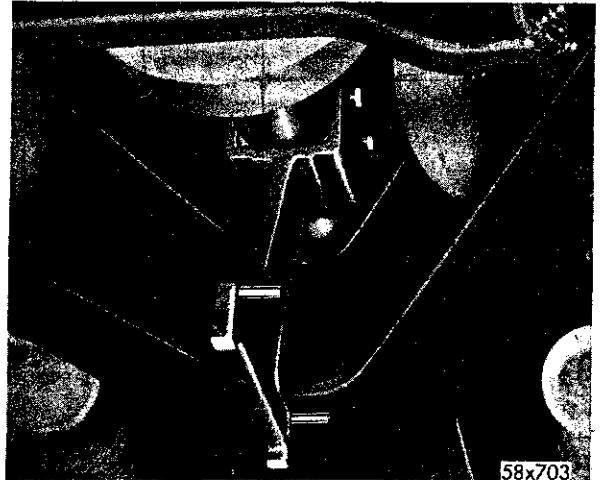
**NOTE:** The gauge adapter must be used on all Imperial models (with or without the frame X member).

(3) Without disturbing the gauge setting (adjusted in step 1), hold the gauge in contact with the bottom of the adapter and the pins on the side of the adapter (Fig. 12). Note the location of the bubble in the spirit level.

**NOTE:** Each time the gauge is used, the level must be on the same side of the propeller shaft.



**Fig. 10—Measuring the Propeller Shaft Angularity**



**Fig. 11—Gauge Adapter Installed (Convertible Only)**

(4) For each graduation, the leading edge of the bubble is forward of center (Fig. 13), add one shim beneath the center bearing support bracket.

(5) For each graduation, the trailing edge of the bubble is the rear of center (Fig. 14), remove one shim from beneath the center bearing bracket.

(6) Tighten the center bearing support bracket retaining bolts to 35 foot-pounds torque.

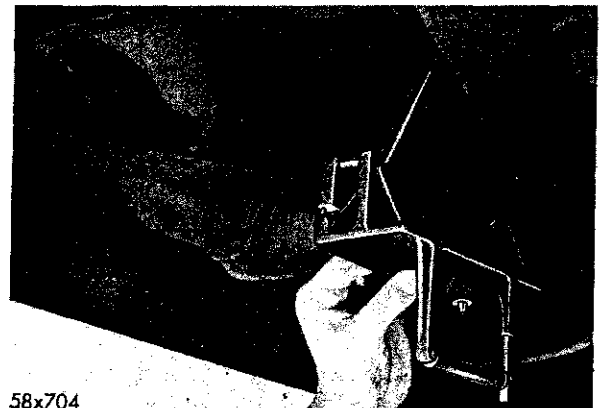
**7. PROPELLER SHAFT**

**Removal**

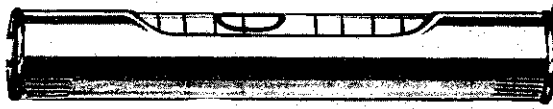
(1) Disconnect the front universal joint adapter flange from the transmission flange.

(2) Remove the rear universal joint clamps from the rear axle pinion shaft yoke. If the bushing retainer is holding the bushings on the cross, it is not necessary to remove the bushings.

(3) Remove the center bearing housing bolts and remove the shims from under the housing.



**Fig. 12—Indexing the Gauge to the Adapter (Convertible Only)**



ADD SHIMS

58x705

**Fig. 13—Bubble Location (Forward of Center)**

(4) Remove the propeller shaft as an assembly, toward the rear of the vehicle.

### Installation

(1) Insert the forward section of the propeller shaft assembly over the body crossmember, and connect the front universal joint adapter flange to the transmission flange. Tighten the retaining nuts to 32 foot-pounds torque.

(2) Connect the rear universal joint to the pinion yoke. Tighten the clamp bolts to 170 inch-pounds torque.

(3) Position the shims under the center bearing housing, install and tighten bolts to 35 foot-pounds torque.

## 8. CENTER BEARING

The center bearing is packed and sealed and needs no further lubrication. To service the center bearing, remove the propeller shaft assembly, as described in Paragraph 7.

### Disassembly

(1) Thoroughly clean the center bearing housing (Note the index marks on the rear of the front shaft and matching mark on the shoulder of the universal yoke.) (Fig. 7).

(2) Straighten the tab of the star washer and unscrew the cap or the seal retainer.

(3) Remove the star washer and slinger.

(4) Pull the yoke, seal retainer and seal from the front shaft.

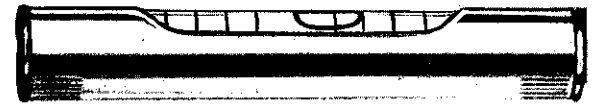
(5) Remove the bearing and housing from the front shaft (front slinger may be left on the shaft).

(6) Press the bearing from the housing.

(7) Remove the seal and retaining cap from the yoke.

### Assembly (Fig. 7)

(1) Clean the lubricant from the internal splines in the front shaft and refill approximately one half full. Use Multi-purpose lubricant with 10% added



SUBTRACT SHIMS

58x706

**Fig. 14—Bubble Location (Rear of Center)**

molybdenum disulfide powder. Install the slinger ring on the front shaft.

(2) Install the bearing in the housing and place on the front shaft.

(3) Install the slinger and the star retaining washer.

(4) Lubricate the inside of the grease seal and install the retainer and seal on the yoke. (Care should be taken to prevent the splines of the yoke from damaging the seal.)

(5) Align the index marks of the shaft and yoke and install the yoke.

(6) Tighten the retaining cap sufficiently to compress the seal firmly on the shaft of the yoke and free enough to permit hand movement of the yoke back and forth in the front shaft. Lock the retaining cap by bending the tab of the washer into the notch in the retaining cap.

(7) Install the propeller shaft assembly in the vehicle, as described in Paragraph 7.

## 9. UNIVERSAL JOINT (VY-1)

### Disassembly

(1) Straighten one end of the bushing retainer strap, and remove it from the bushings. (The universal joint bushing retainer strap is used to hold the bushings on cross during assembly and disassembly.) Remove the universal joint bushings.

(2) Remove the retainers and press the bushing out of the shaft yoke by pushing the opposite bushing in.

(3) Remove the remaining bushing by pushing on the opposite end of the cross.

(4) Remove and discard the old seals from the bushing seal retainers. Do not remove seal retainers from the cross.

(5) Using a small screwdriver, lightly pry the roller retainers out of the bushings and remove the rollers.

(6) Thoroughly clean and air dry all parts and inspect for worn, pitted or brinelled surfaces.



**Assembly**

(1) Coat the inside of the bushings lightly with universal joint grease and line the inside circumference of the bushings with rollers. (Care should be taken that all of the rollers are reinstalled). Reinstall the roller retainers.

(2) Pack the universal joint grease between the rollers of all four bushings and fill the reservoirs in the ends of the cross. Install new seals.

(3) Place the cross in the rear propeller shaft rear yoke and insert the roller and bushing assem-

blies in the yoke. Press the assemblies into the yoke while guiding the cross into the bushings, then install the bushing retainers. Assemble the front yoke (splined yoke) to the rear propeller shaft in the same manner.

(4) Install the cross, roller and bushing assemblies in the front propeller shaft front yoke in the same manner as described in Step 3.

(5) Place the remaining bushings on both end crosses and install the retaining straps to hold the bushings in place during installation in the vehicle.

**SERVICE DIAGNOSIS**

Condition	Possible Cause	Correction
<b>Propeller Shaft Vibration</b>	(a) Excessive grease in the universal joint dust boot (Chrysler).	(a) Remove all grease and pack a total 2 ounces of Fibrous Universal Joint Lubricant, grade 2 evenly fore and aft of the trunnion pin in both raceways.
	(b) Undercoating or other foreign material on shaft.	(b) Clean propeller shaft and wash with solvent.
	(c) Loose universal joint flange bolts.	(c) Tighten the flange bolts.
	(d) Loose universal joint flange.	(d) Install a new flange if worn and tighten to specifications.
	(e) Bent universal joint flange.	(e) Install a new flange.
	(f) Improper height of center bearing (Imperial).	(f) Correct the propeller shaft angularity.
	(g) Improper drive line angularity.	(g) Correct the propeller shaft angularity.
	(h) Rear suspension spring center bolt not in seat.	(h) Loosen the spring clamps and reset the spring center bolt.
	(i) Broken rear spring.	(i) Replace the broken spring.
	(j) Rear springs not matched.	(j) Install the correct spring.
	(k) Worn trunnion pin.	(k) Recondition the universal joint. Install a new trunnion pin.
	(l) Trunnion pin not centered.	(l) Center trunnion pin correctly or replace, using Tool C-3567.
	(m) Worn universal joint bearings or missing needle bearings.	(m) Recondition the universal joint.
(n) Worn universal joint housing.	(n) Recondition the universal joint. Install a new housing.	
(o) Propeller shaft damaged (bent tube) or out of balance.	(o) Install a new propeller shaft.	
<b>Universal Joint Noise</b>	(a) Propeller shaft flange nuts loose.	(a) Tighten to specified torque.
	(b) Lack of lubrication.	(b) Inspect and replace worn parts and lubricate with 2 ounces of Fibrous Universal Joint Lubricant, grade 2.
	(c) Worn universal joint pin or housing.	(c) Replace worn parts.

