

# PART ONE—CHASSIS

## SECTION VI—UNIVERSAL JOINTS AND PROPELLER SHAFT

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### 1. GENERAL INFORMATION

The universal joints used on Plymouth cars are the ball and trunnion type at the front and the cross and roller type at the rear, as shown in Figures 1 and 2.

On the ball and trunnion type, the ball head is an integral part of the tubular shaft and is covered by the joint body. The pin with ball and needle bearings at each end, extends through the ball on the shaft and rides in the channels in the body, controlling movement of the joint. This balanced joint is designed to absorb

the thrust and torque of the drive line.

The cross and roller type universal joint consists of a yoke, steel forged spider and four needle bearing assemblies. See Figure 1. The journals of the spider are drilled to provide a lubricant reservoir. Additional lubrication should be applied each 20,000 miles. The needle bearing assemblies are held in place by a metal retainer and are sealed against lubricant leakage or dirt entering. Two of the bearing assemblies are held in place by bolts, while the other two are held by retainers to the yoke on the propeller shaft.

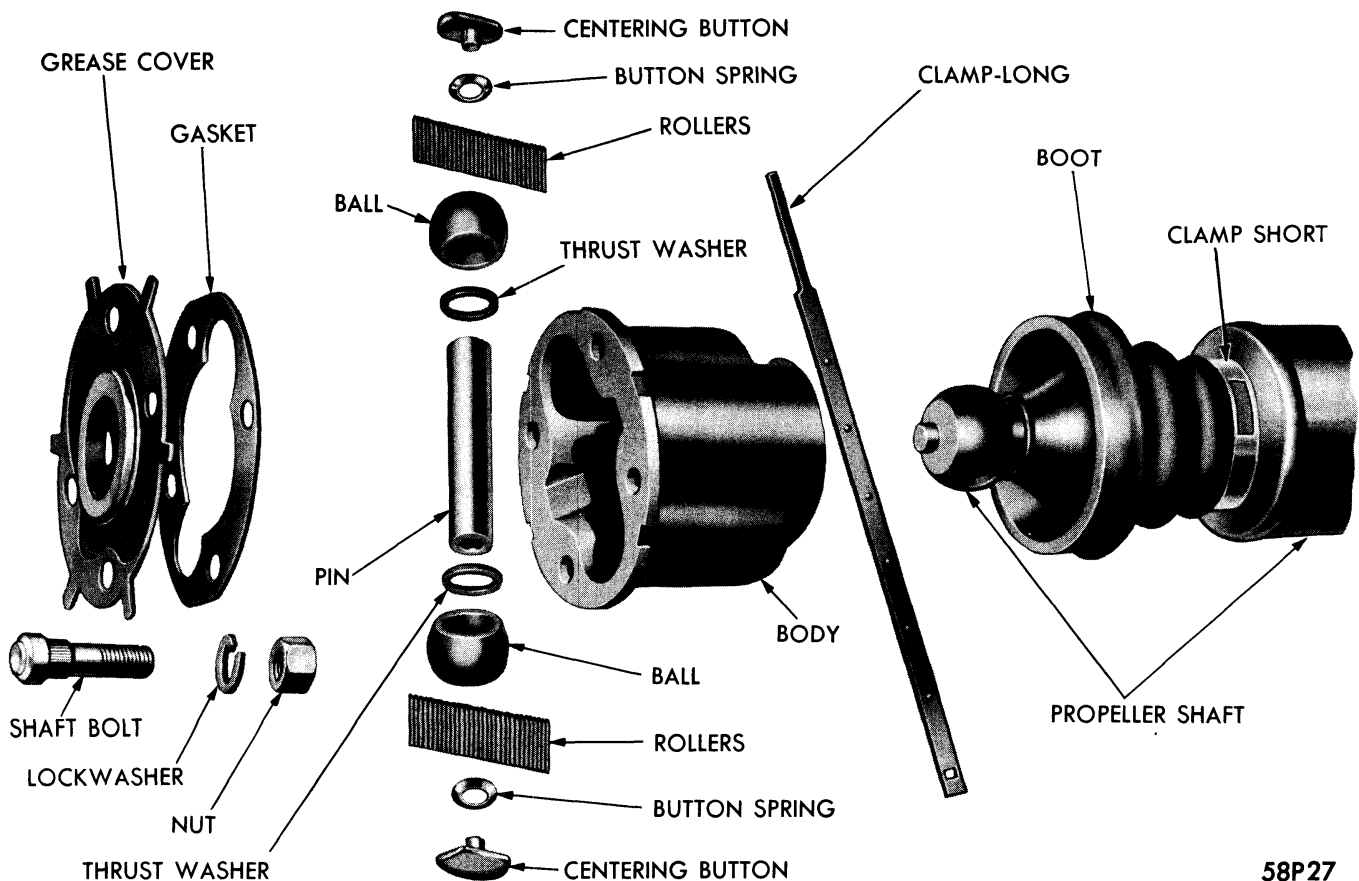


Figure 1—Ball and Trunnion Universal Joint

58P27

## PROPELLER SHAFT AND UNIVERSAL JOINTS DATA AND SPECIFICATIONS

		Models	P-30	LP-1	P-31	LP-2	
Propeller Shaft	Type		Tubular				
	Diameter	Standard Transmission (All exc. Sub.) (Suburban)	3 in. 3 in.	2½ in. 3 in.	¾ in. ¾ in.	¾ in. 3 in.	
		Overdrive (All exc. Sub.) (Suburban)	2¾ in. 3 in.	2¾ in. 3 in.	3 in. 3½ in.	¾ in. ¾ in.	
		PowerFlite (All exc. Sub.)  (Suburban)	2¾ in.  3 in.	2¾ in.  3 in.	2¾ in.  ¾ in.	2¾ in.  ¾ in.	
						3.31-3.54 Axle 3 in. 3.73-4.1 Axle	
		TorqueFlite (All exc. Sub.) (Suburban)	— —	— —	¾ in. ¾ in.	¾ in. ¾ in.	
	Length	Standard Transmission (All exc. Sub.) (Suburban)	58.8 in. 54.8 in.	54.8 in. 58.8 in.	59 in. 55.2 in.	55 in. 59 in.	
		Overdrive (All exc. Sub.) (Suburban)	54.8 in. 58.8 in.	54.8 in. 58.8 in.	55 in. 59 in.	55 in. 59 in.	
		PowerFlite (All exc. Sub.) (Suburban)	54.8 in. 58.8 in.	54.8 in. 58.8 in.	55 in. 59 in.	55 in. 59 in.	
		TorqueFlite (All exc. Sub.) (Suburban)	— —	— —	54.96 in. 58.96 in.	54.96 in. 58.96 in.	
	Universal Joints	Type		Ball and Trunnion—Front Cross Type—Rear			
		Number Used		1 ea.		1 ea.	
Bearing Lubrication			Prepack				
Body (Front) (Rear)			Stamped		Forged		
		Cross-Type					

### TORQUE SPECIFICATIONS

Propeller Shaft Flange Bolt ¾ in. Front	35 ft. lbs.
Propeller Shaft Flange Bolt ¾ in. Rear	20 ft. lbs.

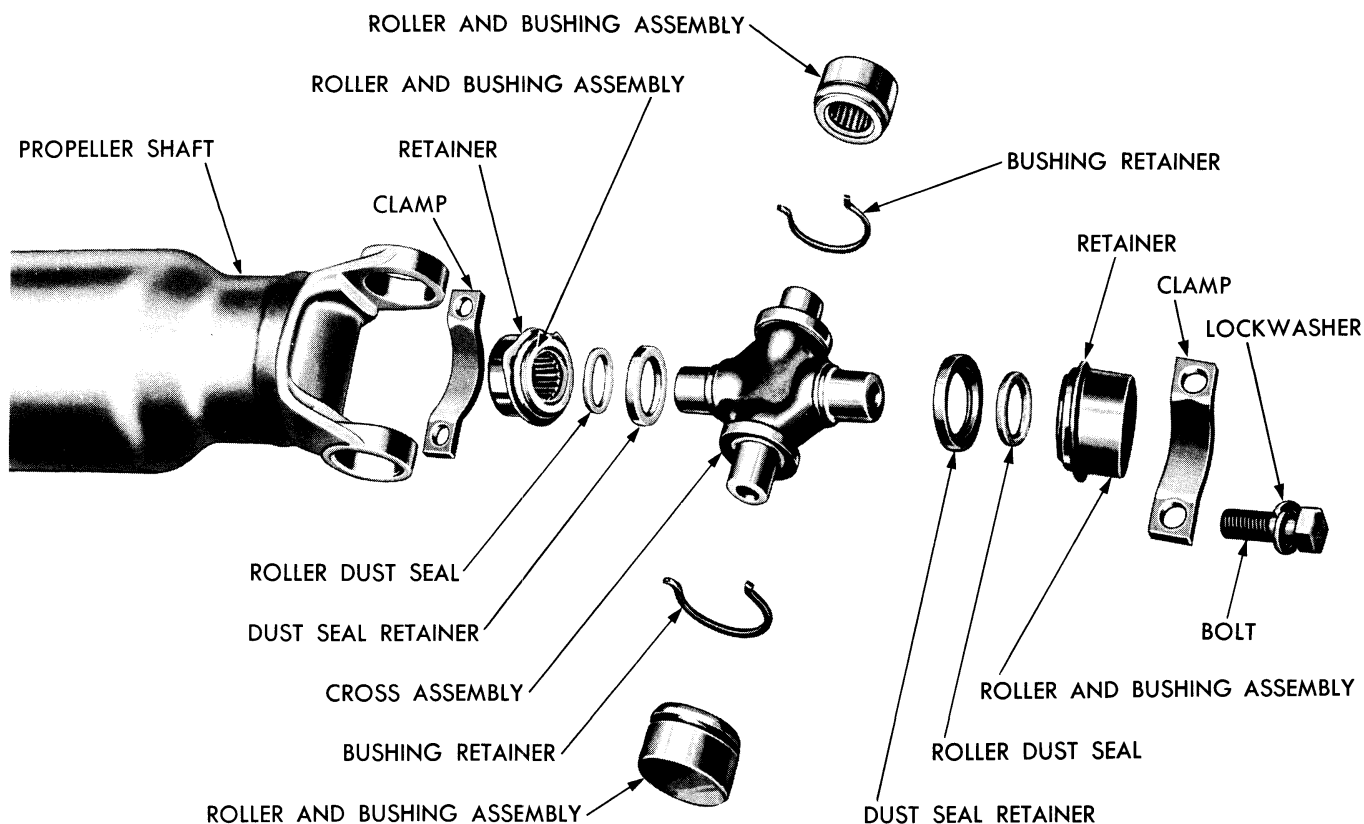
## 2. CHECKING PROPELLER SHAFT ALIGNMENT

The included angle between the propeller shaft and the rear axle pinions in the vertical plane, or looking from the side of the propeller shaft, will remain at 1° to 3°, with 2° preferred. This angle can be measured as follows providing no extra weight is in the car.

Place a spirit level protractor against the back side of the rear axle pinion flange in a vertical position. Adjust the spirit level until the bubble has centered in the sight glass. After the spirit bubble has been centered, note

(on the degree scale) the number of degrees the pinion flange tips down from the true vertical position, see Figure 3.

Place the spirit level protractor on top of, or directly below, the propeller shaft—parallel to the propeller shaft, then adjust the spirit level until the bubble has centered in the sight glass. After the spirit level bubble has been centered, note—on the degree scale—the number of degrees the propeller shaft tips up towards the front of the car from the true horizontal position. See Figure 3.



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Figure 2—Cross and Roller Universal Joint

Add the number of degrees the rear pinion flange is away from the true vertical to the number of degrees the propeller shaft is away from the true horizontal. The total of these two will give the working angle of the rear universal joint, which should be between 1° to 3°.

### 3. BALL AND TRUNNION UNIVERSAL SHAFTS

Disassemble the universal joint for repair or inspection of all component parts, refer to Figure 1. Remove the joint body metal cover and gasket. Slide body down on propeller shaft exposing the two centering buttons and turn so that the body will not spring back over the bearings. Remove the centering buttons from the ends of the trunnion pins.

Now slide the two balls, rollers and thrust-washers off the trunnion pin. Remove trunnion pin from propeller shaft ball, using Tool C-552, pressing pin through and out of shaft ball.

At reassembly, remember that the endwise location of the trunnion pin can affect the runout and balance of the propeller shaft. The trunnion pin should be a very tight fit after assembling in the end of the propeller shaft.

Each end of the trunnion pin should protrude the same distance, or with a variation of not more than .006 inch; otherwise the balance will be destroyed and cause vibration. Tool C-3313, as shown in Figure 4, will facilitate the removal, installation and centering of the trunnion pin.

### 4. UNIVERSAL JOINT DUST COVERS

The one piece synthetic rubber dust cover may be installed without removing the universal joint pin.

To replace universal joint dust covers that are damaged, remove the propeller shaft assembly from the car and clamp lightly on a vise on the bench in a horizontal position. Disassemble joint, removing all parts except the body and pin. Clean body, ballhead and pin thoroughly. A complete coating of grease (or suitable rubber lubricant) must be smeared on the outside and inside of dust cover; and entire surface of the ballhead, pin and inside of body. (It is very important that this instruction be followed.)

Stretch the lubricated dust cover over the pin and ballhead, as shown in Figure 5. Work the dust cover into the body as far as possible (use no tools for this operation). Now with the body in position so the pin can enter

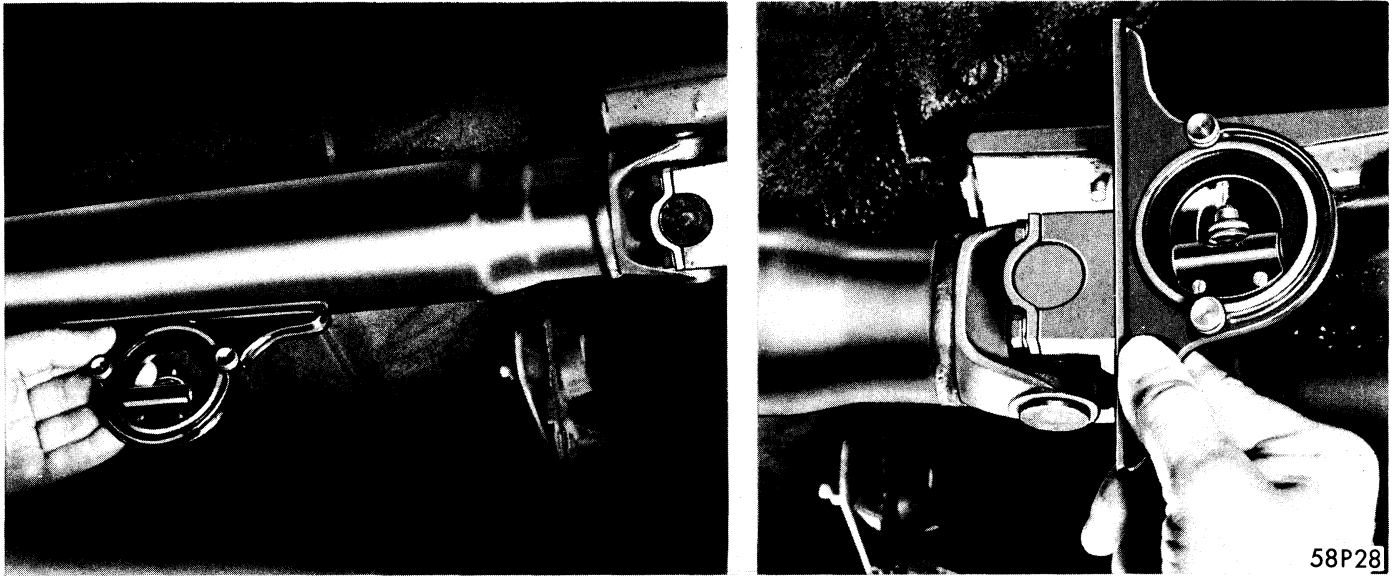


Figure 3—Checking Rear Axle Angularity

the ball channels, pull the body sharply over the pin, thereby forcing the dust cover into the body. With one hand, grip the end of the dust cover protruding through the back end of body. With the other hand, pump the body back and forth, as shown in Figure 6, until the entire dust cover has passed through the body.

During the operation, the cone may reverse itself inside the dust cover. Pull it out of its normal position. Slide dust cover in the ballhead groove and over the neck of the body, then secure with clamps provided.

Insert 1 ½ ounces of heavy fibre universal joint grease in the joint and install the cover. Install shaft, using new lockwashers. Be sure and double check the flange bolts for tightness, 35 foot pounds, to insure against leakage.

#### CAUTION

*Never attempt to use a needle like arrangement for forcing lubricant into the dust cover of the universal joint. Excessive grease can be forced into the cover and cause the shaft to be thrown out of balance, or the lubricant can be lost through the injection hole during high speed operation. The joints must be disassembled and packed with correct type of grease.*

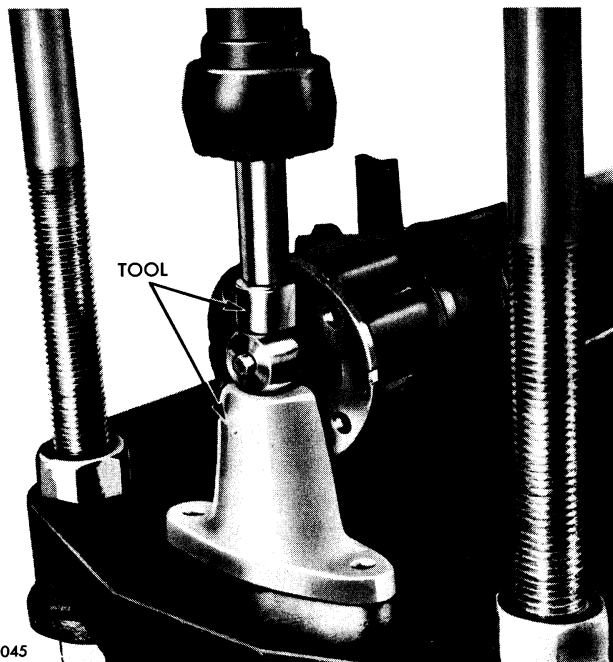


Figure 4—Installing Universal Joint Pin

1—Jig and Locating Bushing (Tool C-3313)

## 5. CROSS AND ROLLER UNIVERSAL JOINT

The universal joint shown in Figure 2 should not be disassembled except for the 20,000 mile lubrication, or unless they have been damaged or excessive wear exists between the cross and rollers. Before disassembling the cross and roller joint, mark the needle bearing assemblies, propeller shaft, cross spider and flange so that all parts, even though some may be new, can be re-assembled in their respective locations.

To disassemble the joint remove the two bearing retainers that hold the assembly to the yoke and the bolts at the flange. Push one bearing assembly toward the spider, forcing out the opposite bearing assembly. Now

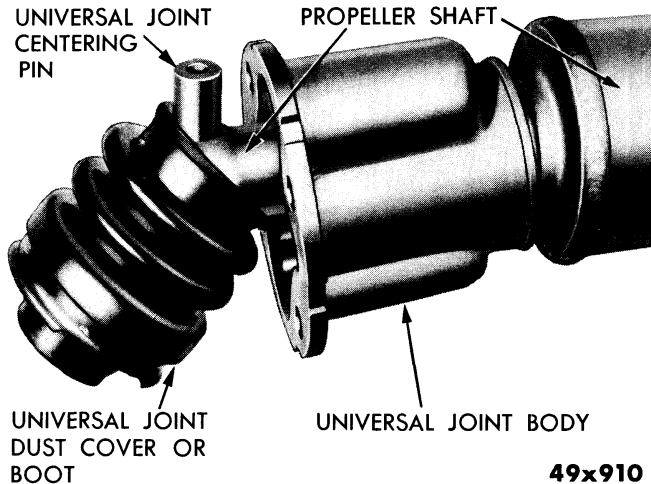


Figure 5—Sliding Cover over Ballhead and Pin

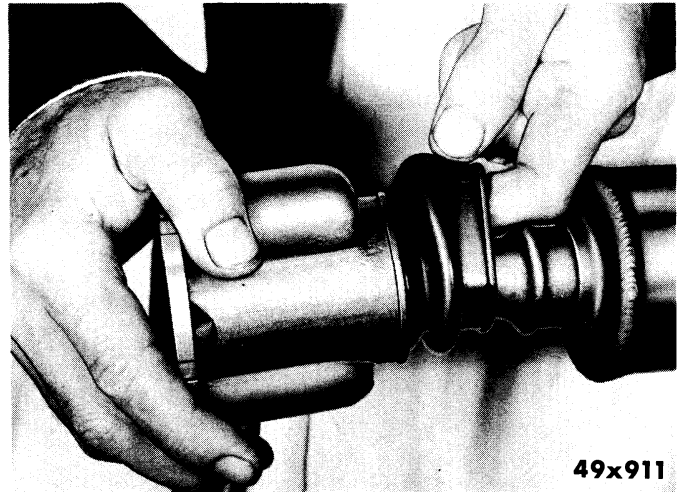


Figure 6—Working Dust Cover Through Body

reverse the procedure and push on the cross spider to remove other bearing assembly. (It may be necessary to remove dust seal from cross spider to remove spider from yoke.)

Clean all parts using a suitable solvent, then inspect for damage and wear. (Clean out lubricant reservoirs in cross.) When reassembling the cross and roller universal joint, be sure and use new seals. Pack each reservoir in cross spider journals with lubricant.

## 6. DIAGNOSIS PROCEDURES

### NOISE

**UNIVERSAL JOINTS**—Check for worn universal joints by turning the propeller shaft by hand. Excessive backlash or looseness can be felt by hand pressure. Inspect for improperly lubricated or worn universal joints. Roughness at low to moderate speeds often indicates worn universal joints.

### VIBRATION

Vibration caused by an unbalanced propeller shaft or

other chassis parts can usually be detected by driving at a speed slightly above the speed where the condition is most noticeable and shifting the transmission into neutral and letting the car slow down. If vibration is still evident, look for the following conditions:

1. **PROPELLER SHAFT**—Inspect the propeller shaft for dents, accumulation of road tar, mud, ice or body undercoating and incorrect propeller shaft angle.
2. **UNIVERSAL JOINTS**—Inspect the trunnion pin for correct installation. If the trunnion pin is installed incorrectly, the propeller shaft balance and runout will be affected.
3. **UNIVERSAL JOINT FLANGES**—Inspect for bent flange on either rear axle or transmission, causing runout of propeller shaft.
4. **WHEELS AND TIRES**—A wheel, brake drum or tire assembly that is out of balance may cause vibration that could be mistaken for propeller shaft vibration. The vibration frequency of an unbalanced propeller shaft is much higher than that of unbalanced wheels, the wheel unbalance being similar in frequency to wheel tramp.