PROPELLER SHAFT AND UNIVERSAL JOINTS

CONTENTS

GENERAL INFORMATION

The propeller shaft and universal joint applications on the Chrysler model vehicles incorporate an internally splined yoke at the front universal joint. The sliding splined yoke slides fore and aft on the transmission output shaft to compensate for the movement of the rear axle. A bellows type rubber seal on the transmission extension, with a nylon ring which fits over the sliding yoke is used to exclude road splash and other foreign material (Fig. 1).

The universal joints and sliding spline yoke are permanently lubricated. The universal joints should be inspected every time the vehicle is serviced, for external seal leakage. The joints need not be disassembled or relubricated unless seal leakage is evident. If the cross and roll universal joints are repacked with the recommended lubricant, see "Lubrication", Group 0 of this manual (Figs. 2, 3).

All Chrysler models except the Imperial use a propeller shaft which incorporates an internal vibration absorber inside the shaft in the location of the front universal joint. The servicing of the propeller shaft and universal joints are the same in all respects.

A single one piece propeller shaft will be used on the Imperial models, with a constant velocity universal joint at each end.

Both constant velocity universal joints incorporate a centering ball and socket arrangement, in which the centering balls are located between the yokes of each joint to maintain the relative position of the two joints. The centering balls cause each of the two joints to operate through exactly one half of the complete angle between the two joints (Fig. 4).

The constant velocity universal joints and centering ball and sockets are permanently lubricated and should not be disturbed unless external leakage is evident. See "Constant Velocity Universal Joint" for servicing instructions.

SERVICE DIAGNOSIS

Condition	Possible Cause	Correction
PROPELLER SHAFT VIBRATION	(a) Undercoating or other foreign matter on shaft.	(a) Clean exterior of shaft and wash with solvent.
	(b) Loose universal joint flange bolts.	(b) Tighten bolt nuts to specific torque.
	(c) Loose or bent universal joint flange or high runout.	(c) Install new flange. Tighten to specifications.
	(d) Improper drive line angularity.	(d) Correct angularity. See "Propeller Shaft Angularity."
	(e) Rear spring center bolt not in seat.	(e) Loosen spring U-bolts, reseat center bolt and tighten U-bolts to specified torque.
	(f) Worn universal joint bearings or missing rollers.	(f) Recondition universal joint.
	(g) Propeller shaft damaged (bent tube) or out of balance.	(g) Install new propeller shaft.
	(h) Broken rear spring.	(h) Replace rear spring.
	(i) Excessive runout or unbalance condition.	(i) Reindex propeller shaft 180°, reride and correct as necessary.
UNIVERSAL JOINT NOISE	(a) Propeller shaft flange bolts nuts loose.	(a) Tighten nuts to specified torque.
	(b) Lack of lubrication.	(b) Recondition universal joint.

SERVICE PROCEDURES

PROPELLER SHAFT ANGULARITY

The increased emphasis on the need for a quiet, smooth operating drive line in all cars require that the universal joint angles be maintained within acceptable tolerances. Propeller shaft and rear axle

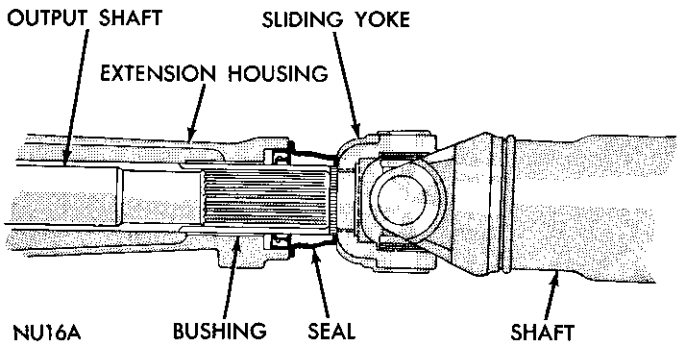


Fig. 1—Front Universal Joint Sliding Yoke

housing angularity may be measured by using the Propeller Shaft Angularity Tool C-3976A (Fig. 5). This tool makes it possible to check the angularity at the engine and differential and carrier.

All joint angle measurements on the vehicle should be made with the car supported by the tires if possible; such as, on an alignment pit or a platform hoist. A two post hoist may be used where other means are not available. The vehicle should be approximately level when taking angle measurements with any heavy items removed from the luggage compartment or passenger compartment. The fuel tank should be full or the equivalent weight simulated.

When using a twin post hoist, the vehicle must be supported by the lower control arms and rear axle housing. **DO NOT USE A FRAME CONTACT HOIST WHEN MEASURING PROPELLER SHAFT ANGULARITY.**

FRONT UNIVERSAL JOINT ANGLE

(1) Attach engine adapter SP-5046 to gauge SP-5060.

(2) Position gauge on left side of engine so that adapter pins contact flat surface of engine oil pan flange adjacent to vertical wall of the oil pan (Fig. 6). The gauge must be held vertical as shown with arrow on gauge SP-5060 pointing toward the front of car.

(3) Adjust position of bubble in spirit level in accordance with the listing for appropriate car model as shown in Chart (Fig. 12).

(4) Remove engine adapter SP-5046 and gauge SP-5060 from flange adjacent to the vertical wall of oil pan and separate the gauge from engine adapter.

(5) With gauge SP-5060 adjusted for the correct engine angle reference, position gauge SP-5060 squarely and firmly along underside of the propeller shaft (Fig. 7). Make sure Veeway is in alignment and that both adapter pins are contacting propeller shaft. Be sure arrow on gauge is pointing toward the front of car.

(6) Observe position of bubble in spirit level and compare the position with that shown on Chart (Fig. 12) for front joint angle. A normal joint angle will cause bubble to position itself within the acceptable range. If bubble is found to be slightly forward of the acceptable tolerance range, this means that the angle is actually smaller than that specified and does not need correcting. If bubble in spirit level is found to be rearward of the acceptable range, the angle is too large, and must be corrected. To reduce front universal joint angle, install a flat shim between the transmission extension housing and rear engine mount (Fig. 8). Flat shims 1/8 inch in thickness are required to move the bubble in spirit level one graduation.

(7) To install shim, loosen bolts in rear mount to

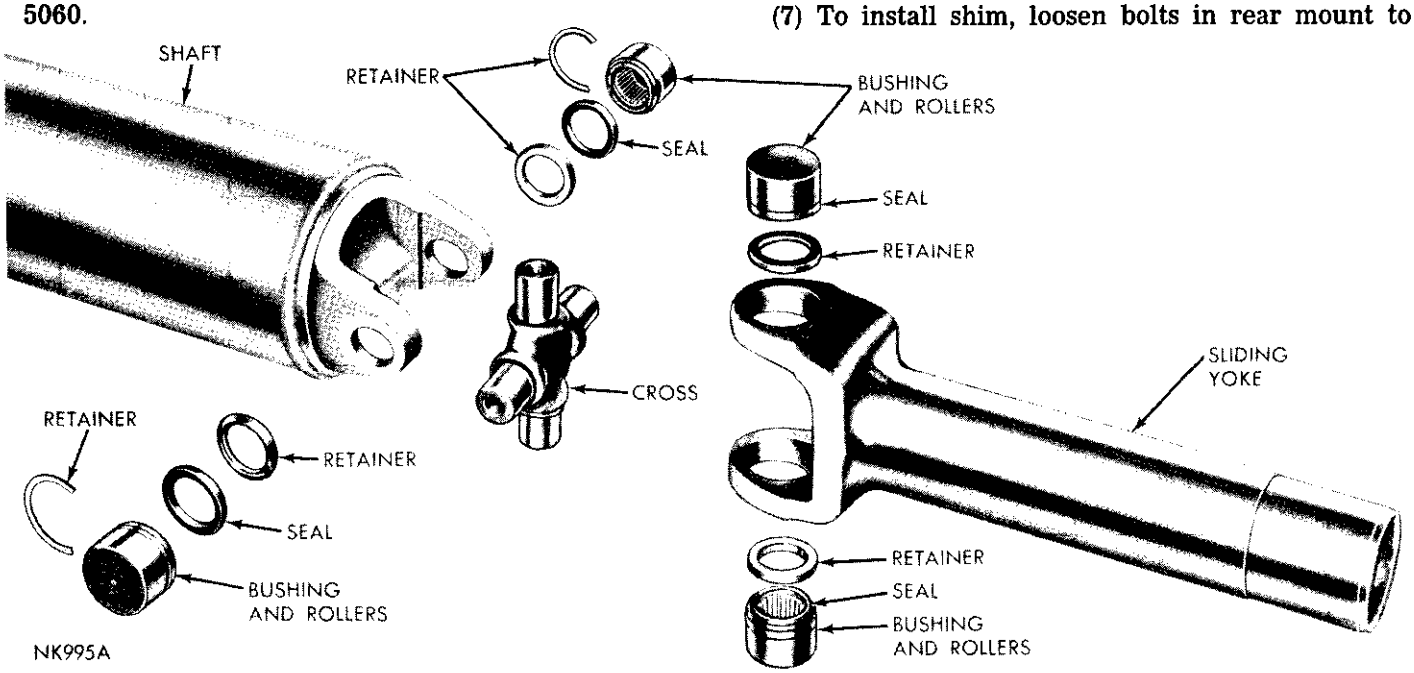


Fig. 2—Cross and Roller Universal Joint—Front

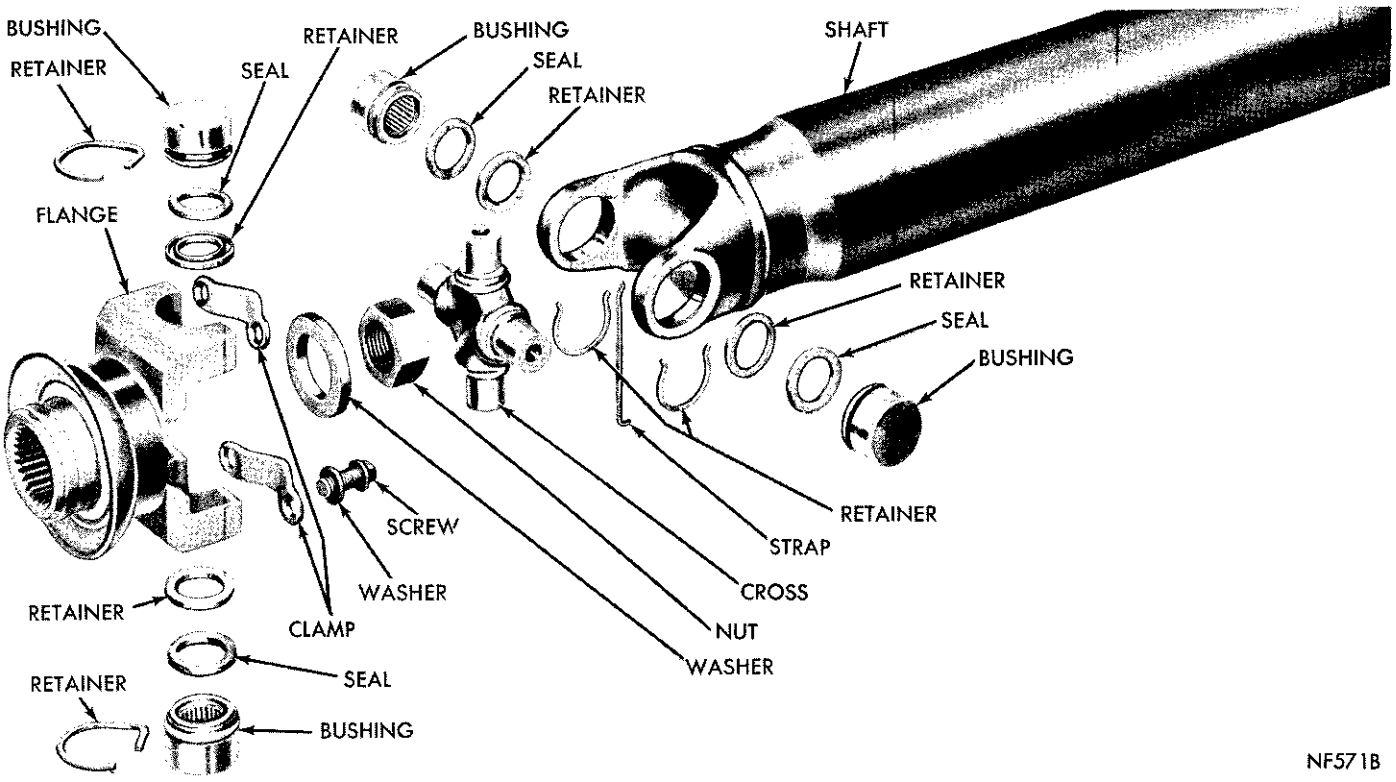


Fig. 3—Cross and Roller Universal Joint—Rear

transmission extension housing.

(8) Raise transmission sufficiently using a floor stand and block of wood beneath transmission oil pan.

(9) Install 1/8″ shim, lower transmission, remove floor stand and tighten bolts in rear mount to transmission extension housing to specifications.

(10) Recheck front joint angle, starting with step (1) of "Procedure."

CAUTION: If a great amount of shimming is required at the transmission extension rear mount, make sure extension housing and propeller shaft will not make contact with floor pan or make interference with seat belt mounting bolts.

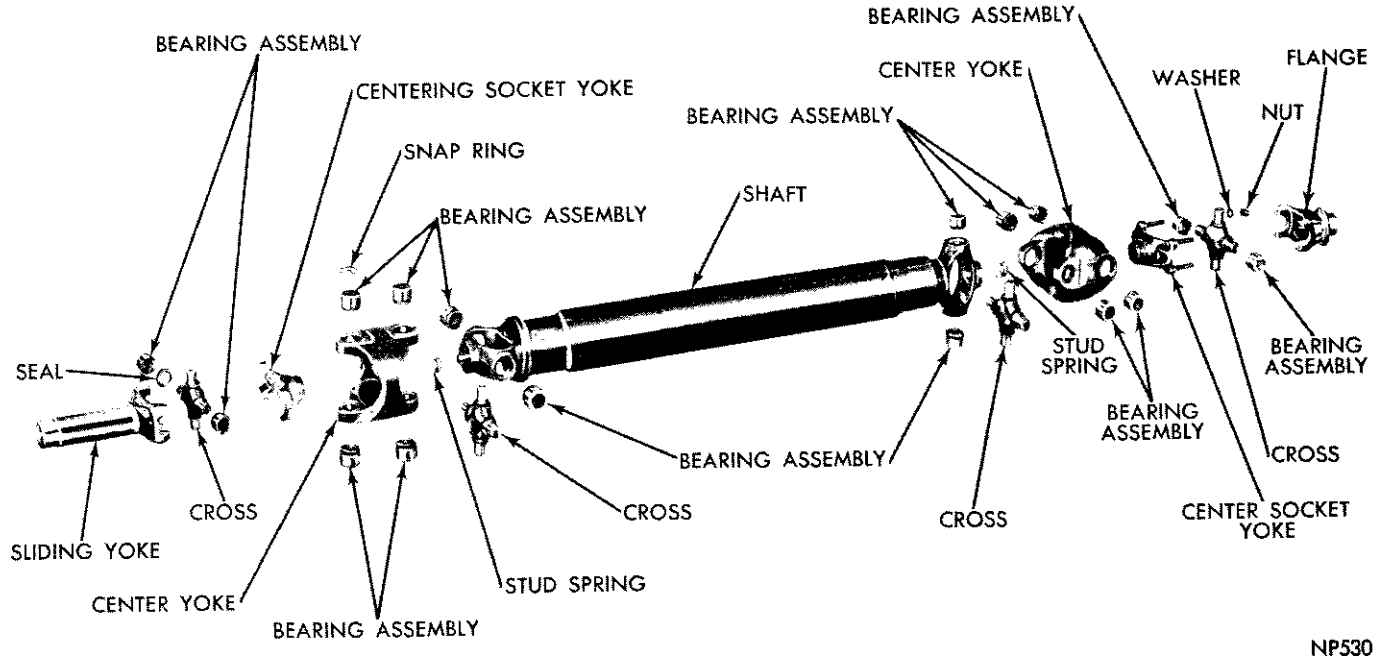


Fig. 4—Propeller Shaft and Constant Velocity Universal Joints (Imperial)

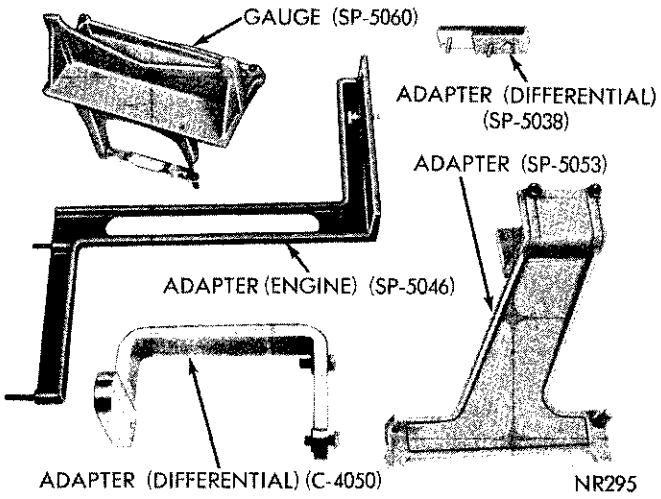


Fig. 5—Propeller Shaft Angularity Tool C3976A

REAR UNIVERSAL JOINT ANGLE

(1) Remove pinion bumper plate from differential and carrier housing and position gauge SP-5060 on the machined pads with locating pin in rear bolt hole (Fig. 9).

(2) Adjust position of bubble in spirit level in accordance with the listing for appropriate car model as shown in Chart (Fig. 13).

(3) Remove gauge SP-5060 from differential and carrier assembly and position it squarely and firmly along underside of propeller shaft (Fig. 10). Make sure Veeway is in alignment and that both adapter pins are contacting shaft. Be sure arrow on gauge is pointing toward the front of car.

(4) Observe position of bubble in spirit level and compare the position with that shown on Chart (Fig. 13) for rear joint angle. A normal joint angle will cause the bubble to position itself within the acceptable range.

(5) If bubble in spirit level is found outside the acceptable range indicated on Chart (Fig. 12), you will have to install a wedge type shim between both rear springs and the axle housing pads to bring position of bubble within the acceptable range.

To make sure shims are installed properly, remember this rule. If bubble is too far forward, insert shim with thick end toward front of car. If bubble is too far to rear, the nose of differential is too high, so thick end of shim goes toward rear of car (Fig. 11). A 1°

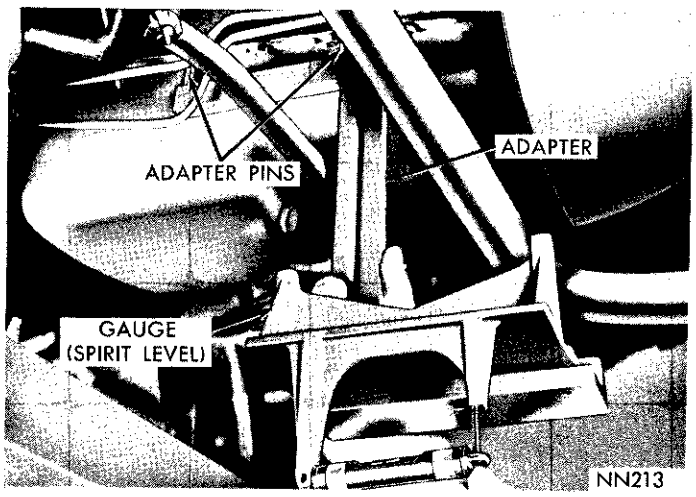


Fig. 6—Adjusting Gauge on Engine (Front Joint Angle Reference)

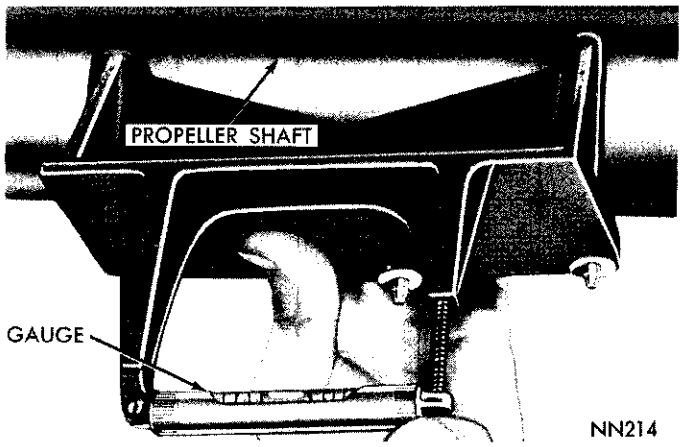


Fig. 7—Measuring Front Universal Joint Angle

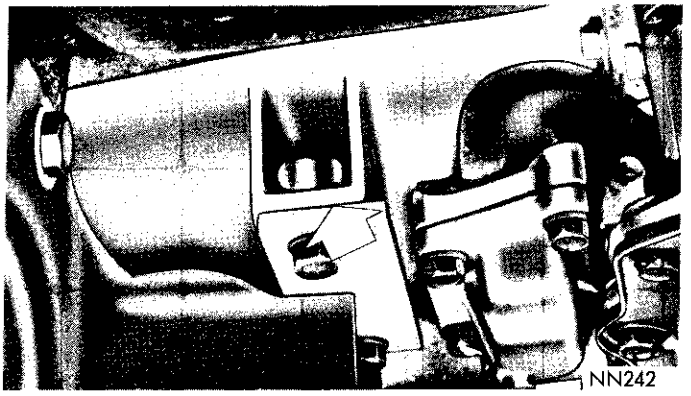


Fig. 8—Shim Location (Front Universal Joint Angle Correction)

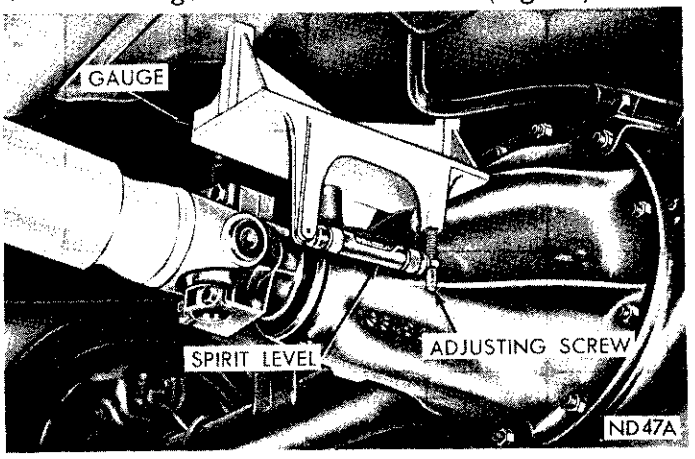


Fig. 9—Adjusting Gauge on Differential (Rear Joint Angle Reference)

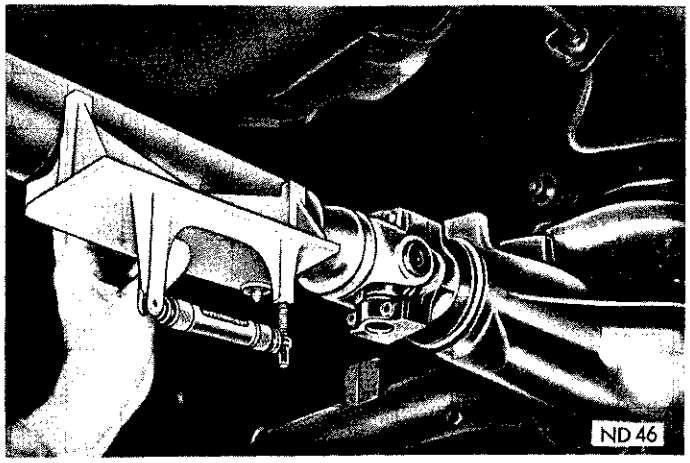


Fig. 10—Measuring Rear Universal Joint Angle

shim will move bubble in spirit level about 3 graduations forward or rearward, depending on which way the thick end is installed.

Presently, there are a number of makes of wedge type shims available commercially. Always make sure shims you use are made of steel and are the same width as the springs on the car. Chrysler Parts Division has made available steel shims in varying angles of 1/2°, 1°, 2°, and 3° making it possible with these combinations to set the rear universal joint angle within 1/2° of a perfect angle.

(6) To install shims, loosen spring "U" bolt nuts and install shims between rear springs and axle housing spring pads.

(7) Tighten spring "U" bolt nuts to proper specifications.

(8) Recheck rear universal joint angle after installation of wedge type shim, to make sure position of bubble in spirit level is within the acceptable range.

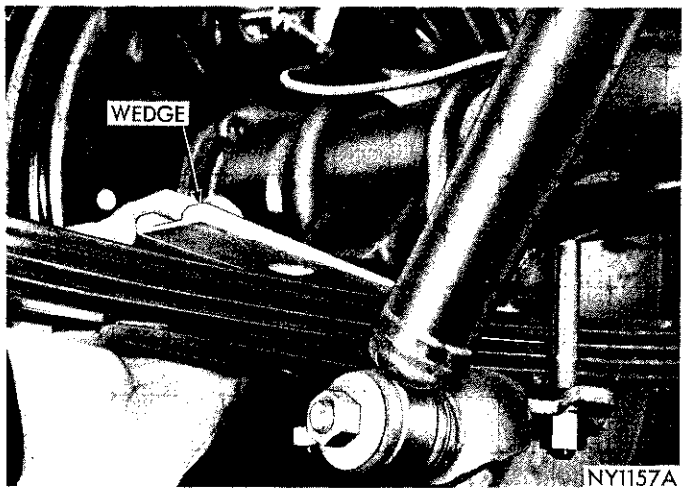


Fig. 11—Tapered Wedge Location (Rear Universal Joint Angle Correction)

(9) Reinstall rebound bumper and plate assembly on differential carrier, tighten screws to 200 inch-pounds.

CAUTION: Under no circumstances should a shim pack be used that is over 1/4 inch thick at the center. If that much shimming is required, look for a possible broken rear spring, mislocated spring seat, etc.

PROPELLER SHAFT

Removal—Rear Joint

(1) Remove both rear universal joint roller and bushing assembly clamps from rear axle drive pinion

ANGULARITY MEASUREMENT AND CORRECTION CHART

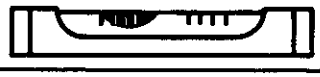
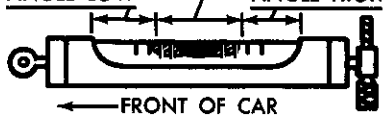
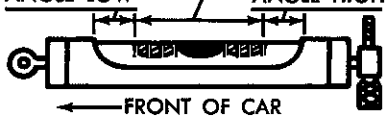
UNIVERSAL JOINT	FRONT JOINT ANGLE	REAR JOINT ANGLE
CAR TYPE AND WHEELBASE	ADJUST POSITION OF BUBBLE WITH GAUGE AT ENGINE OIL PAN FLANGE.	ADJUST POSITION OF BUBBLE WITH GAUGE ON DIFFERENTIAL CARRIER.
CHRYSLER 124" W.B. EXCEPT STATION WAGON	←FRONT OF CAR 	←FRONT OF CAR 
CHRYSLER 122" W.B. STATION WAGON		
FINAL READING ON PROPELLER SHAFT (ALL MODELS)	ACCEPTABLE REGION ANGLE LOW / ANGLE HIGH  ←FRONT OF CAR	ACCEPTABLE REGION ANGLE LOW / ANGLE HIGH  ←FRONT OF CAR
CORRECTION PROCEDURE	ADD SHIMS AT ENGINE REAR MOUNT (1/8" FOR EACH GAUGE DIVISION) TO REDUCE FRONT JOINT ANGLE. CORRECT LOW ANGLES ONLY IF FLOOR PAN INTERFERENCE IS ENCOUNTERED.	ADD SHIMS AT REAR AXLE HOUSING SPRING SEATS. 1° WEDGE SHIM MOVES BUBBLE 3 TO 4 GAUGE DIVISIONS. TO REDUCE ANGLE, INSTALL THICK END OF WEDGE TO FRONT OF CAR. PY269

Fig. 12—Universal Joint Angularity Reference Chart

flange (Fig. 3). **Do not disturb the retaining strap used to hold bushing assemblies on universal joint cross, if so equipped.**

CAUTION: Do not allow propeller shaft to drop or hang loose from either joint during removal. Wire up or otherwise support the loose end of shaft to prevent damage to joint.

Before removing propeller shaft with sliding yoke from Transmission, the vehicle front end should be lowered slightly to prevent the loss of Transmission Fluid.

Front Joint

(1) Slide propeller shaft with the front yoke from the transmission output shaft (Fig. 2). Be careful not to damage splines on output shaft or yoke. Examine sliding yoke seal for evidence of leakage. If no leakage is evident, do not disturb the seal. If necessary to replace the seal, see Transmission Group, 21.

CAUTION: It is important to protect the machined surface of the sliding yoke from damage after propeller shaft has been removed.

Installation—Front Joint

(1) Before installing propeller shaft, wipe sliding yoke clean and inspect machined surface for scratches, nicks, burrs and correct as necessary.

(2) Engage the yoke splines on end of output shaft, being careful not to burr the splines (Fig. 2).

Rear Joint

(1) Install rear universal joint cross and roller bushings in the seats of drive pinion flange. Install bushing clamps and attaching screws (Fig. 3). Tighten clamp screws to 170 inch-pounds on all models.

CROSS AND ROLLER UNIVERSAL JOINT

Disassembly

(1) **Before disassembling universal joint, mark yoke, cross and bushings to facilitate reassembly if inspection discloses parts are serviceable.**

(2) Remove four bushing retainers from universal joint cross assembly. Using a socket approximately the same diameter as bushing, press one bushing and roller assembly out of yoke by pressing opposite bushing in.

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

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

Cleaning and Inspection

(1) Clean all parts in a suitable solvent and dry with compressed air. Examine bearing surfaces of cross. They should be smooth and free from ripples and pits. If bearing surfaces or seal retainers are damaged, replace cross assembly.

(2) Examine rollers in bushings. Rollers that have operated on a worn cross should be replaced. Rollers should have a uniformly good appearance and roll freely inside bushings.

Assembly

(1) Lubricate bushing and roller assemblies with Multi-Purpose Grease NLGI Grade 2 EP or Multi Mileage Lubricant part number 2525035 or equivalent. Also, fill reservoirs in the ends of the cross.

(2) Place cross in propeller shaft yoke, observing identification marks made at disassembly. Install bushing and roller assemblies in yoke, matching identifying marks.

(3) Press both bushing assemblies into yoke while guiding cross into bushings. Correctly position bushings so retainers can be installed.

(4) Position remaining two bushing assemblies on cross. Install retainer strap to hold bushings on cross during installation of shaft on drive pinion flange. Lightly tap outer ends of bushings while rotating cross to be sure cross and bushings operate freely.

CONSTANT VELOCITY UNIVERSAL JOINT

IMPERIAL MODELS

PROPELLER SHAFT ANGULARITY

Due to the constant velocity universal joints being able to operate through greater angles, thus eliminating most driveline disturbances, resulting from excess angularity, it will not be necessary to check and adjust the propeller shaft angularity on Imperial models.

Removal

(1) Loosen and remove nuts and lockwashers attaching rear constant velocity universal joint to rear axle pinion flange (Fig. 13).

Before removing propeller shaft with sliding yoke from Transmission, the vehicle front end should be lowered slightly to prevent the loss of Transmission Fluid.

(2) Slide propeller shaft as far forward as possible until studs clear pinion flange and remove propeller shaft as an assembly toward rear of vehicle. **If interference between rear universal joint studs and pinion flange is encountered, it will therefore be necessary to disconnect the front universal joint from sliding yoke to remove propeller shaft. When rein-**

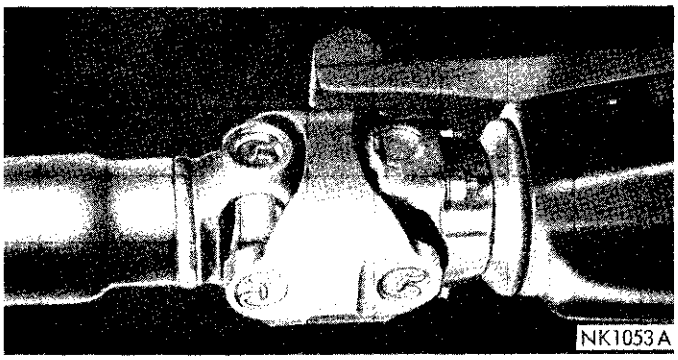


Fig. 13—Rear Constant Velocity Universal Joint

stalling, install in same manner as propeller shaft was removed.

CAUTION: Under no circumstances should propeller shaft be allowed to drop or hang by either universal joint during removal, as this can damage the centering ball arrangement. Tie up or otherwise support propeller shaft to prevent damage to universal joints.

Installation

(1) Before installing propeller shaft, wipe sliding yoke clean and inspect machined surface for scratches, nicks and burrs, correct as necessary.

(2) Engage sliding yoke on transmission output shaft splines being careful not to burr splines.

(3) Slide propeller shaft as far forward as possible and engage rear constant velocity universal joint studs into position through holes of rear axle pinion flange. Install lockwashers, nuts and tighten 300 inch-pounds. **Before disassembling joint, mark all parts for easy identification at reassembly.**

Disassembly

(1) Remove four screws and lockwashers which attach spline yoke to constant velocity joint and remove spline yoke (Fig. 4). Slide the two loose bearings from centering socket yoke.

(2) Remove snap rings securing the two bearings in front bores of center yoke.

CAUTION: If joints are heavily coated with rust or corrosion, apply penetrating oil in bearing bores before attempting to press out the bearings.

(3) Press bearing assemblies from yokes in following manner: Use a short length of round bar stock 3/4 inch in diameter, or a 3/4 inch socket as a remover. As a receiver on the opposite bearing, use a short length of pipe or a socket with an inside diameter of not less than 1-1/16 inch. Clamp the joint with remover and receiver in a vise (Fig. 14) and press one of the rear yoke bearings approximately 3/8 inch out of yoke.

(4) Securely clamp the exposed bearing in vise and drive yoke from bearing, using a brass drift (Fig. 15). Apply only light blows on drift.

(5) Using same procedure, press exposed end of cross to force bearing on opposite end approximately

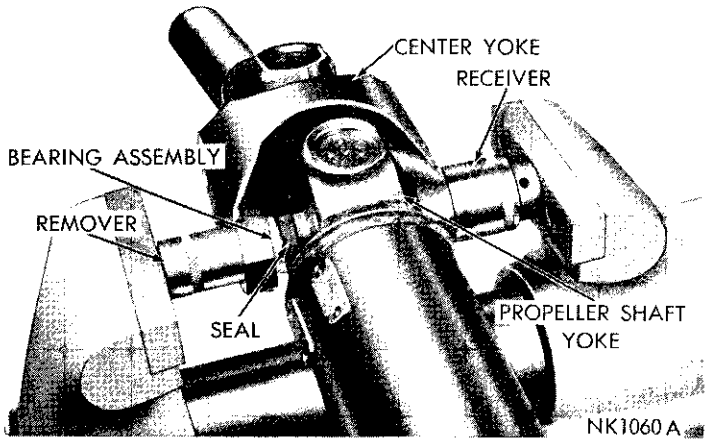


Fig. 14—Pressing Bearing from Center Yoke

3/8 inch out of yoke. Remove bearing from yoke, using brass drift as previously described.

(6) With propeller shaft firmly held in vise, press in on cross and centering socket yoke and remove cross and socket yoke assembly from center yoke.

(7) Remove remaining four bearings from rear bores of center yoke and propeller shaft yoke in manner described in steps 3, 4, and 5.

(8) Remove cross from propeller shaft yoke. Remove spring from centering stud (Fig. 4).

CAUTION: Be careful to avoid damaging cross seals and center stud yoke slinger.

Centering Socket Yoke Assembly

(1) Carefully pry centering ball seal assembly from socket yoke.

(2) Remove seal and bearing rollers from centering ball assembly.

(3) Fill cavity behind centering ball and inside the

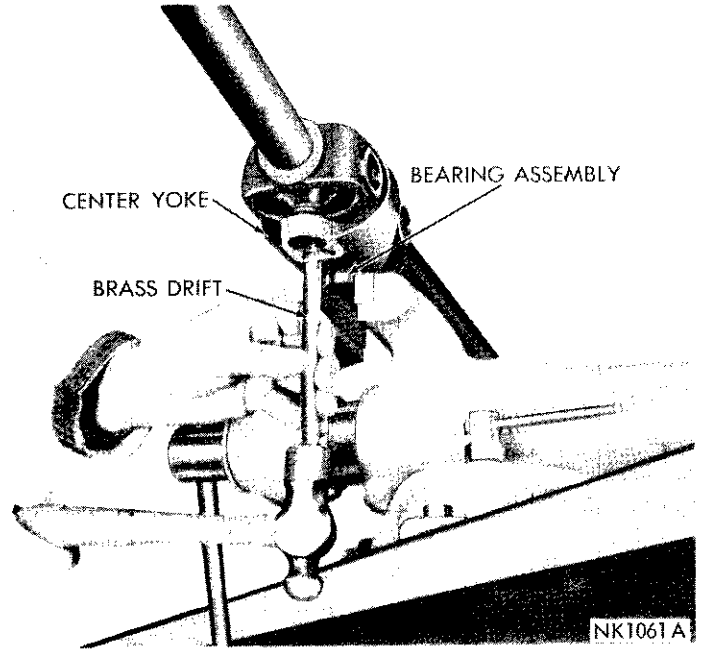


Fig. 15—Removing Bearing from Center Yoke

ball with Multi-Purpose Grease, NLGI grade 2 EP. Multi-Mileage Lubricant Part Number 2525035 is suitable for this application.

(4) Insert a rod, slightly smaller than inside diameter of centering ball, into ball and strike it sharply with a hammer (Fig. 16). The force applied by initial hammer blow will force the ball and retainer assembly from yoke.

Cleaning and Inspection

(1) Clean all parts in a suitable solvent and blow dry.

(2) Carefully examine all parts for excessive wear or damage. Discard parts that are not serviceable. Examine bearing races for grooves and ridges. Rollers that have been operating in damaged races should not be reused. Examine seals on cross assemblies for damage. Seals are not serviced separately. They are included in the cross assembly. Replace with parts contained in replacement packages. **All parts in the package should be used.** If propeller shaft is damaged, replace the shaft assembly to be assured of a balanced assembly.

Assembly

(1) Position the centering assembly in yoke with large diameter hole up and press it firmly to its seat.

(2) Apply a film of Multi-Purpose Grease, NLGI grade 2 EP. Multi Mileage Lubricant Part Number 2525035 is suitable for this application, on the inside surface of centering ball. Install rollers (34 required). Install centering stud seal in ball.

(3) Install centering ball seal assembly on yoke and press firmly in place.

(4) Coat the inside surfaces of bearing races with Multi-Purpose Grease, NLGI grade 2 EP. Multi-Mileage Lubricant Part Number 2525035 is suitable for this application, and install rollers (32 are required). Also, pack reservoirs in ends of cross with same lubricant.

(5) Place the cross in shaft yoke. Insert one bearing assembly in bearing bore of shaft yoke. Using bar stock or socket used as a remover when disassembling joint, press bearing into bore, at the same time guiding cross into bearing. Press bearing into yoke approximately 3/16 inch or far enough to install snap ring. Install snap ring. Reverse the position of yoke and install bearing and snap ring in opposite bore in same manner.

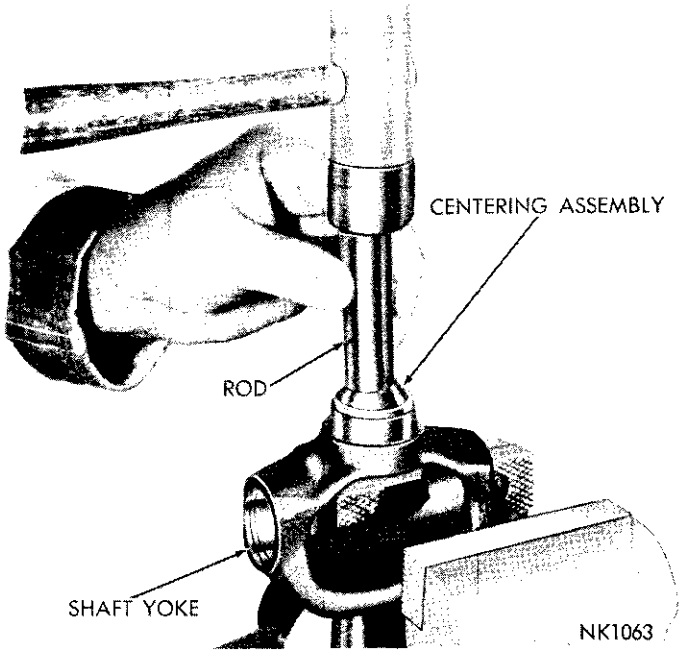


Fig. 16—Removing Centering Ball and Socket Assembly

(6) Install the two bearings in rear bores of center yoke and on cross, as previously described. Install two snap rings.

(7) Install centering stud spring on centering stud, large end first. Apply a film of Multi-Purpose Grease NLGI grade 2 EP. Multi-Mileage Lubricant Part Number 2525035 is suitable for this application, on stud.

(8) Install two slip spline yoke bearing assemblies on cross and assemble in bearing bores of centering yoke.

(9) Install centering yoke and cross as an assembly in center yoke, guiding centering ball on stud.

(10) Apply slight pressure on cross to align cross in front bores of center yoke. Insert one bearing in yoke and guide the end of cross into bearing.

(11) Press bearing into bore and install snap ring.

(12) Install remaining bearing in center yoke. Install snap ring.

(13) Install slip spline yoke on the constant velocity joints with screws and lockwashers and tighten to 300 inch-pounds.

SPECIFICATIONS

CHRYSLER

Model Application	*Length-Inches	Diameter-Inches		
PROPELLER SHAFT				
Type				
AXLE RATIO		2.76	2.94	3.23
MANUAL TRANSMISSION 3-SPEED (A-230)				
383 C. I. Engine 2BBL—Except Station Wagon	58.17			3.25 (IVA)
AUTOMATIC TRANSMISSION (A-727)				
383 C. I. Engine 2BBL—Except Station Wagon	58.17	3.25 (IVA)		3.25 (IVA)
383 C. I. Engine 4BBL—except Station Wagon	57.93	3.25 (IVA)		3.25 (IVA)
383, 440 C. I. Engine Station Wagon	55.68	3.25 (IVA)	3.25 (IVA)	3.25 (IVA)
440 C. I. Engine—except Station Wagon	57.93	3.25 (IVA)		3.25 (IVA)
440 C. I. Engine H.P.—except Station Wagon	57.93			3.25 (IVA)
UNIVERSAL JOINTS				
Type—Front		Sliding Spline Cross and Roller		
Rear		Cross and Roller		

*From Centerline of front yoke bearing bores to Centerline of rear bearing bores.
(IVA) Interval Vibration Absorber at front joint of propeller shaft.

IMPERIAL

AUTOMATIC TRANSMISSION (A-727)			
440 C. I. Engine—All models	52.57		3.25 (CV)
UNIVERSAL JOINTS			
Type—Front		Constant Velocity	
Rear		Constant Velocity	

(CV) Constant Velocity universal joints.

TIGHTENING REFERENCE

	Pounds Foot	Pounds Inch
Front-Transmission Flange Clamp Screw		170
Rear-Pinion Flange Clamp Screw		170
Rear-Pinion Yoke Stud Nuts (Imperial)		300
Pinion Bumper Plate Screw		200
Rear Spring "U" Bolt Nuts	45	