

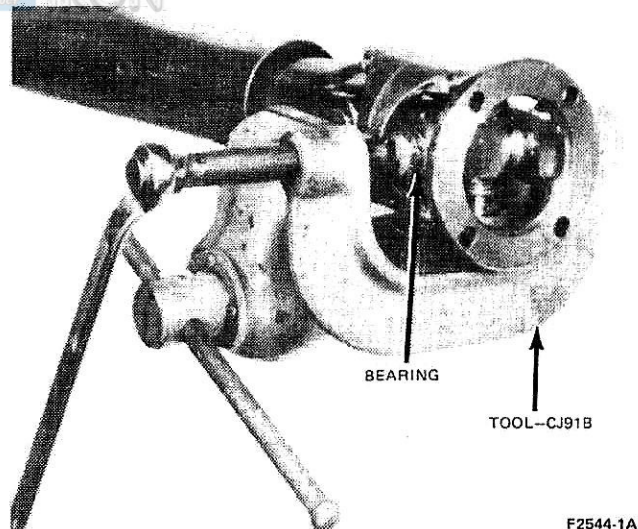


FIG. 4 Partially Pressing Bearing From Center Yoke

7. Remove all of the remains of the sheared plastic retaining rings from the grooves in the yokes. The sheared plastic may prevent the bearing cups from being pressed into place and thus prevent the retaining rings from being properly seated. It is usually easier to remove the plastic if a small pin or punch is driven through the injection holes.

Assembly

1. Making sure that the alignment marks are correctly positioned, install one of the bearing cups part way into one side of the yoke, and turn this yoke ear to the bottom.
2. Insert the spider into the yoke so that the journal seats freely into the bearing cup (Fig. 8).
3. Install the opposite cup part way. Be sure that both spider journals are started straight into both bearing cups (Fig. 9).
4. Using Tools OTC-7025-A, or CJ91B press against both the bearing cups. Work the spider constantly for free movement of the journals in the bearings. If any binding is felt, stop pressing immediately, and check the needle bearings. A probability may exist where one or more of the rollers have been trapped under the end of the spider journals.
5. As soon as one of the retaining ring grooves clears the inside of the yoke, stop pressing and snap the retaining ring into place.
6. Continue to press until the opposite retaining ring can be snapped into place. If any difficulty is encountered, strike the yoke firmly with a hammer to aid in seating the retaining rings. This springs the yoke ears slightly. Figs. 10, 11 and 12 indicate the areas that may be tapped slightly with a hammer to relieve a binding condition.

CENTERING BALL

Disassembly

1. Mark the position of all yokes before disassembly so that they can be reassembled in their original relationship to retain driveshaft balance. (Fig. 5).
2. Support the driveshaft in a horizontal position in a vise. Never clamp the driveshaft tubing in a vise,

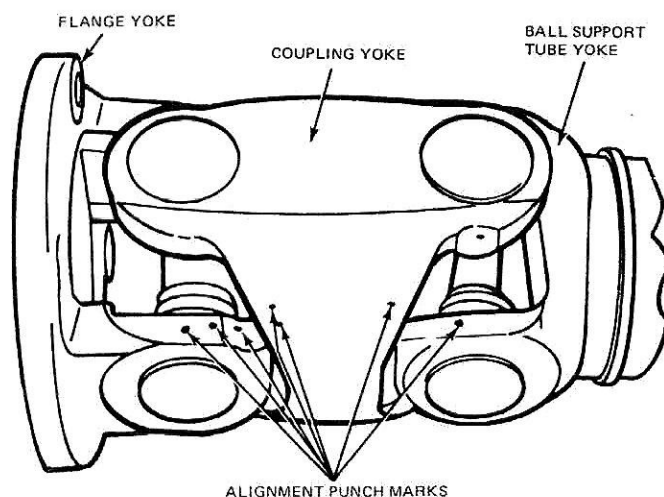


FIG. 5 Punching Alignment Marks

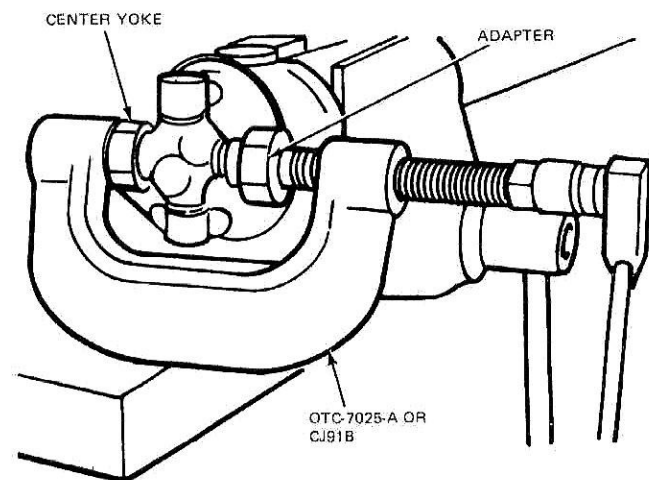
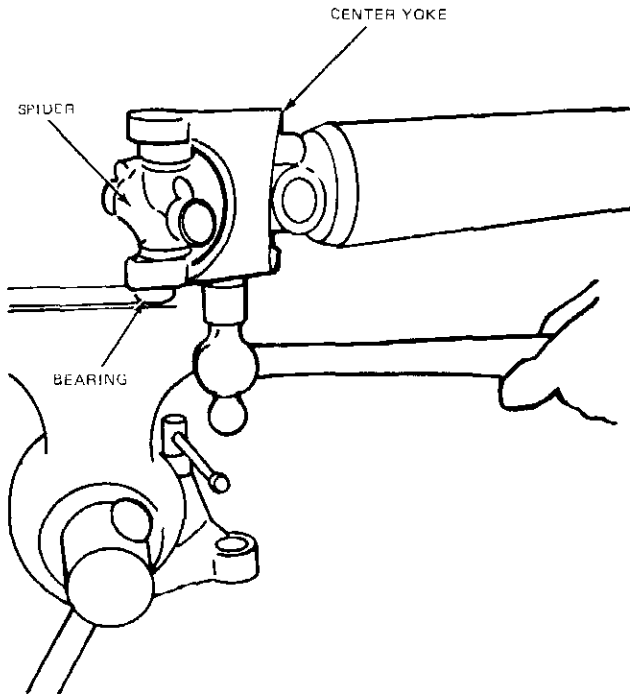


FIG. 6 Shearing Plastic Retainer

always clamp on one of the yokes. Position the tool as shown in (Fig. 6) and tighten the tool clockwise until the plastic retaining the bearing is sheared and the bearing protrudes approximately $\frac{3}{8}$ " out of the yoke.

3. Remove the driveshaft from the vise.
4. Grip the bearing in the vise, and drive on the center yoke as shown in (Fig. 7) to remove the bearing.
5. Reposition the tool on the yoke and move the remaining bearing in the opposite direction so that it protrudes approximately $\frac{3}{8}$ " out of the yoke.
6. Grip the bearing in a vise. Drive on the center yoke to free it from the bearing (Fig. 7).
7. Remove the spider from the flange yoke, and the flange yoke from the coupling yoke. The centering ball is part of the ball support yoke which is welded to the tube (Fig. 13).
8. Using ball remover tool, Part No. J-23996-4, place the fingers of the tool under the ball as shown in (Fig. 14).
9. Place outer cylinder of tool, Part No. J-23996-4, over the outside of the ball (Fig. 15).



F2563-1A

FIG. 7 Removing Bearings

10. Thread nut on tool, Part No. J-23996-4, and draw the ball off the stud using wrench as shown in (Fig. 16).

Assembly

1. Place service replacement ball on stud by hand as shown in (Fig. 17).
2. Using tool, Part No. J-23996-1, drive the ball onto the stud as shown in (Fig. 18). Drive until the ball can be seen to seat firmly against the shoulder at the base of the stud.

BALL SEAT AND SEAL**Disassembly**

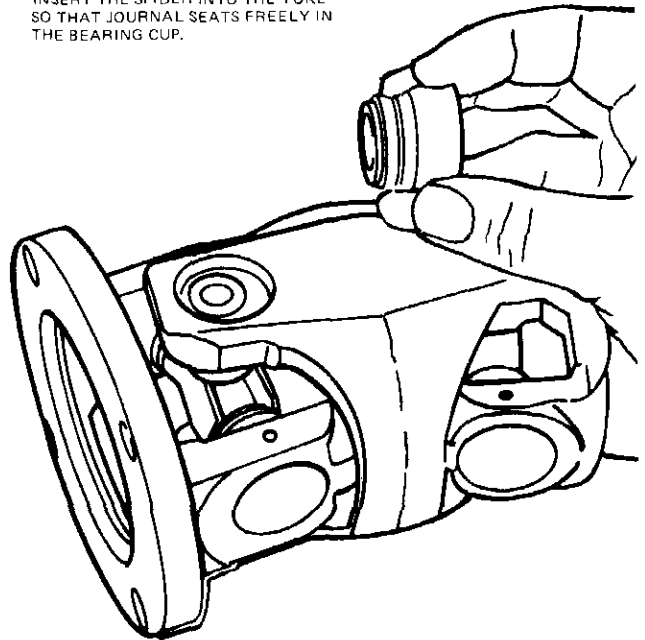
1. Pry the seal from the centering ball cavity and remove the washers, spring, and the three (3) ball seats as shown in (Fig. 19).
2. Clean and inspect the ball seat insert bushing for wear. If the bushing is worn, replace the flange yoke assembly.
3. Clean and inspect the seal and ball seats along with the spring and washers. If any parts show any signs of excessive wear or are broken, replace the entire set with a service kit.

NOTE: Whenever the seal is removed to inspect the ball seat parts, it should be discarded and replaced with a new seal.

Assembly

1. Using the grease provided in the ball seat kit, lubricate all parts and insert them into the clean ball seat cavity in the following order: spring, washer (5m OD), (3) ball seats, with the largest opening outward to receive the ball, washer (large OD) and lastly the seal.

INSERT THE SPIDER INTO THE YOKE
SO THAT JOURNAL SEATS FREELY IN
THE BEARING CUP.



F2564-1A

FIG. 8 Inserting Spider into Yoke

2. Lubricate the seal lip and install the seal flush into the flange yoke, using tool, Part No. J-23694 as shown in (Fig. 20). The sealing lip should tip inward.

SLIP YOKE ASSEMBLY**Disassembly**

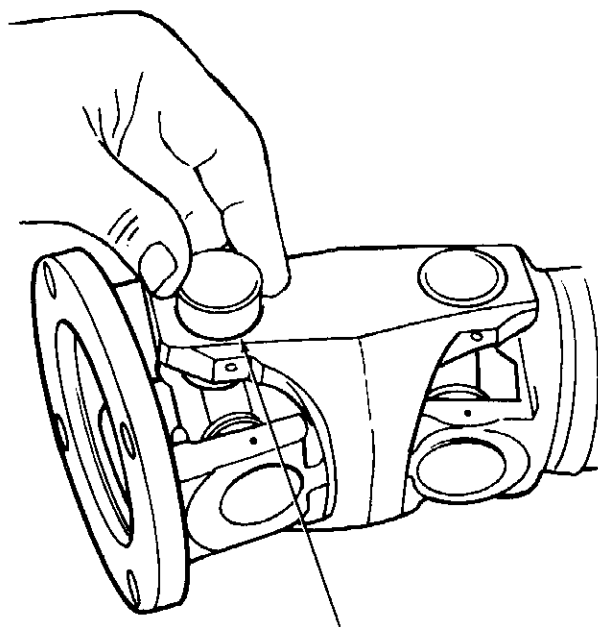
1. Support the driveshaft in a horizontal position in a vise. Position Tools OTC-7025-A or CJ91B (as shown in Fig. 5), and tighten the tool clockwise until the plastic retaining the bearing is sheared, and the bearing protrudes approximately 3/8" out of the slip yoke.

NOTE: Never clamp driveshaft tubing in a vise, always clamp on one of the yokes.

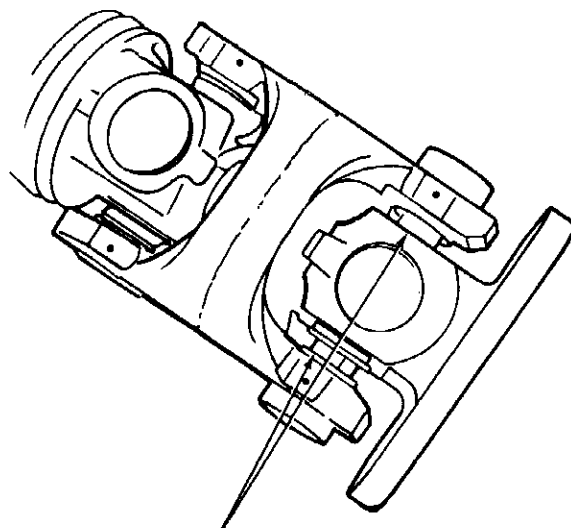
2. Remove the driveshaft from the vise.
3. Grip the bearing in the vise, and drive on the center yoke as shown in (Fig. 6) to remove the bearing.
4. Reposition the tool on the yoke and move the remaining bearing in the opposite direction so that it protrudes approximately 3/8" out of the yoke.
5. Grip the bearing in a vise. Drive on the center yoke to free it from the bearing.
6. Remove all of the remains of the sheared plastic retaining rings from the grooves in the yoke. The sheared plastic may prevent the bearing cups from being pressed into place, and thus preventing the retaining rings from being properly seated. It is usually easier to remove the plastic if a small pin or punch is driven through the injection holes.

Assembly

1. The new slip yoke assembly is serviced with (1) universal joint, (2) bearing cups and (2) retaining rings.

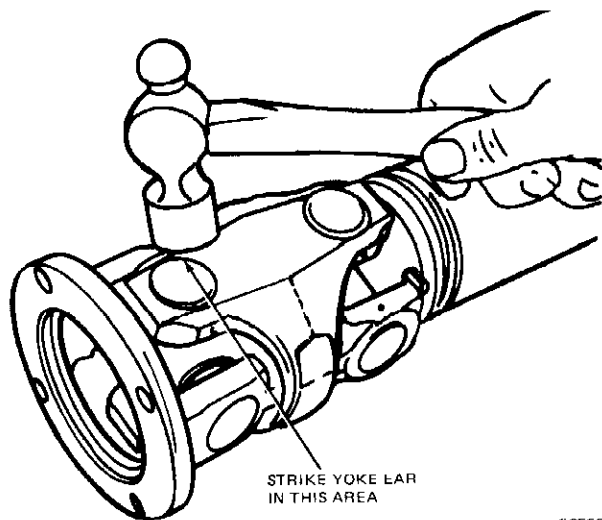


INSTALL THE OPPOSITE BEARING CUP PART WAY



SPIDER JOURNALS STRAIGHT IN BOTH BEARING CUPS

F2565-2A

FIG. 9 Aligning Bearing Cups and JournalsSTRIKE YOKE EAR
IN THIS AREA

F2566-1A

FIG. 10 Relieving Binding Condition—A

2. Install one bearing cup part way into one side of the coupling yoke, then turn this yoke ear to bottom.
3. Insert the slip yoke spider into the yoke so that the spider journal seats freely into the bearing cup.

4. Install the opposite bearing cup part way. Be sure that both spider journals are started straight and true into both bearing cups.
5. Using Tools OTC-7025-A, or CJ91B press against opposite bearing cups and work the spider constantly for free movement of the journals in the bearings. If any binding is felt, stop pressing immediately and check the needle bearings, a possibility may exist where one or more of the rollers have been trapped under the end of the spider journal.
6. As soon as one of the retaining ring grooves clears the inside of the yoke, stop pressing and snap the retaining ring into place.
7. Continue to press until the opposite retaining ring can be snapped into place.
8. If any difficulty is encountered, strike the slip yoke ears firmly with a hammer to aid in seating the retaining rings. This springs the slip yoke ears slightly.

NOTE: All tools with a "J" prefix used in the above service procedure can be purchased commercially from:

Kent-Moore Tool Company
1501 S. Jackson St.
Jackson, Michigan 49202
Phone (517) 784-8561

or and equivalent supplier.

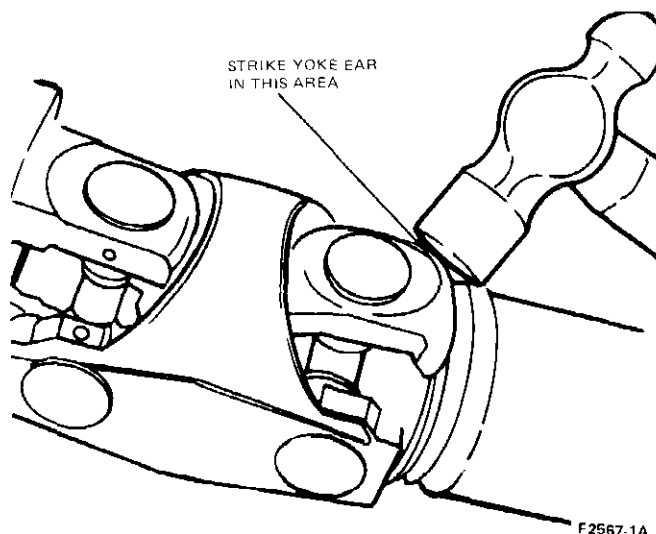


FIG. 11 Relieving Binding Condition—B

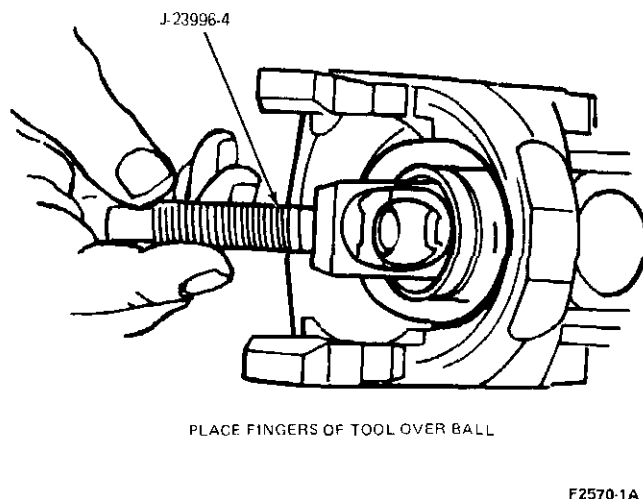


FIG. 14 Installing Ball-Remover Tool

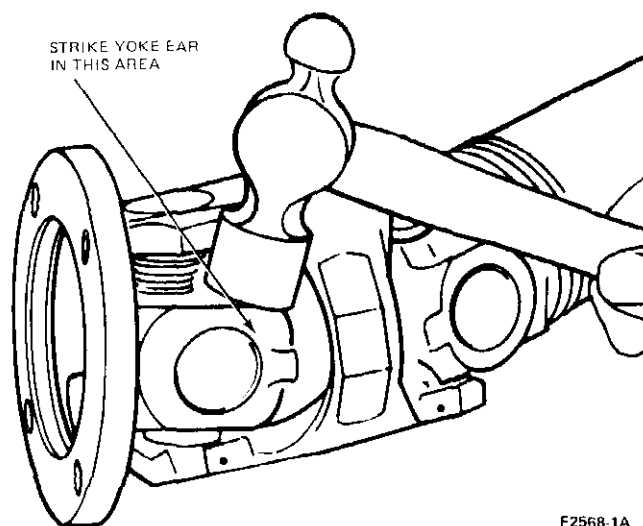


FIG. 12 Relieving Binding Condition—C

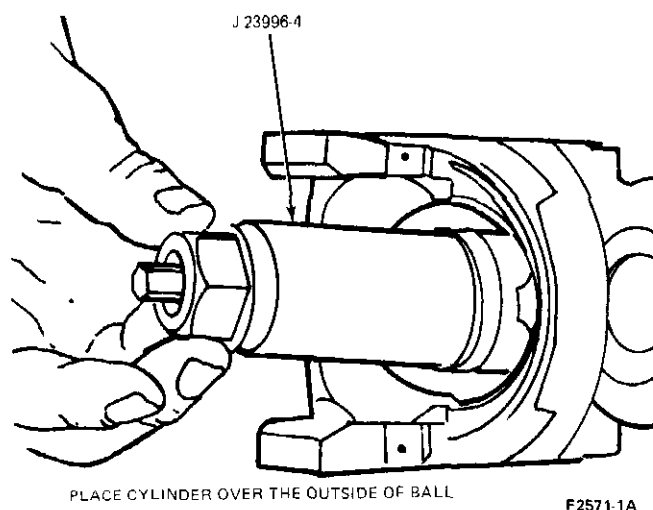


FIG. 15 Positioning Outer Tool Cylinder

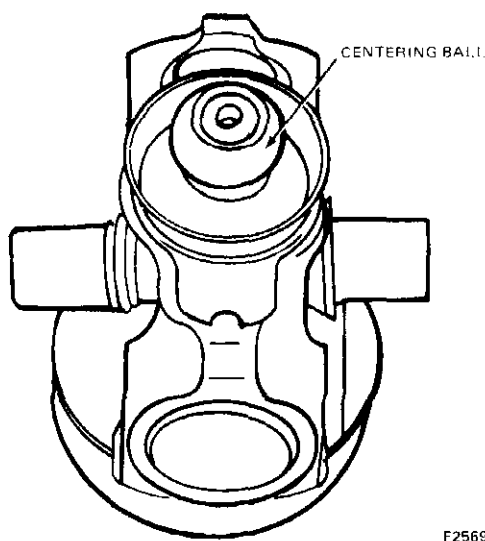


FIG. 13 Centering Ball Location

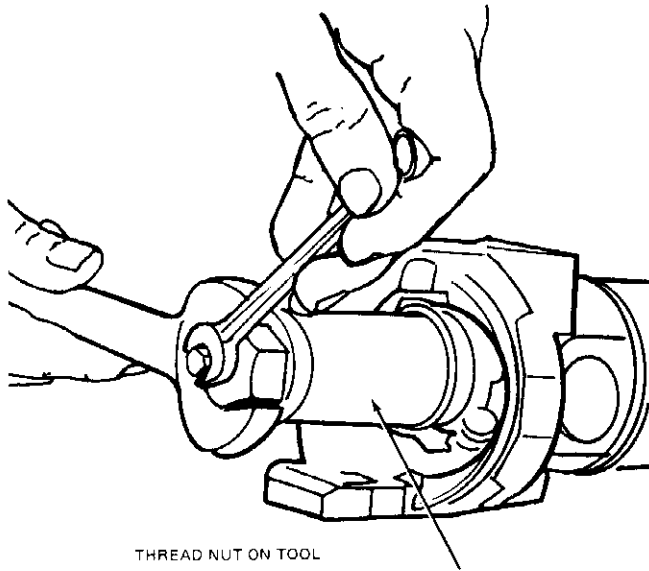


FIG. 16 Removing Ball from Stud

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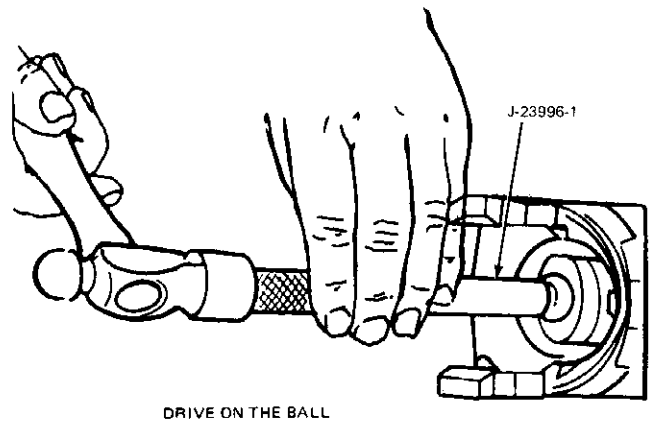
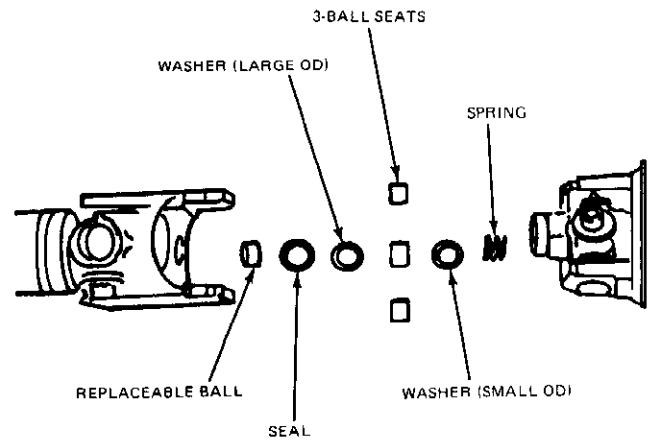


FIG. 18 Driving Ball Into Position

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F2575-1A

FIG. 19 Replacement Parts

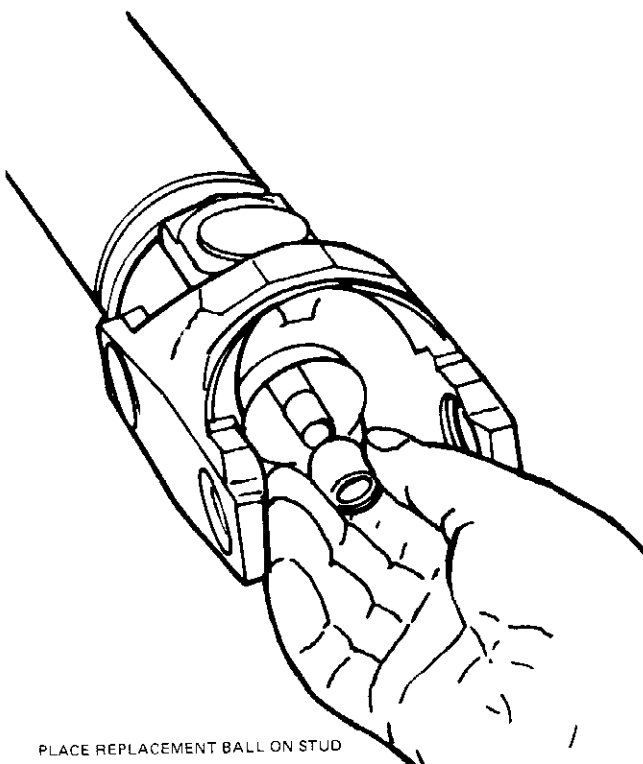


FIG. 17 Positioning Replacement Ball on Stud

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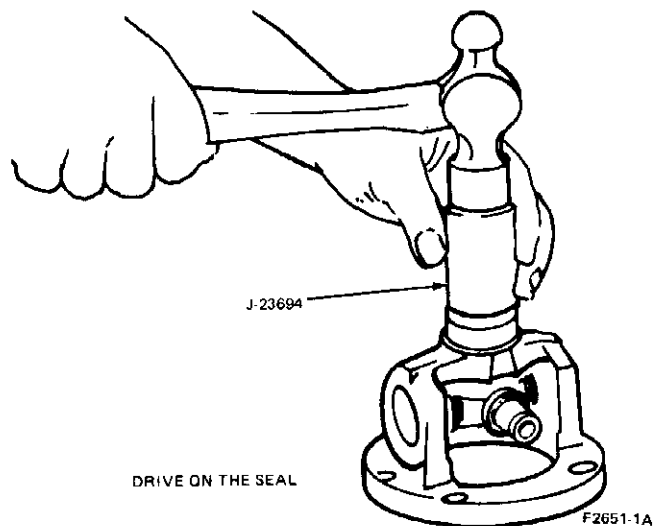


FIG. 20 Installing Seal

F2651-1A

Clutch and Manual Transmission

**GROUP
16**

PART TITLE	PART NO.	PART TITLE	PART NO.
Clutch	16-02	General Manual Transmission Service	16-10
Ford Three-Speed Transmission	16-11	Mechanical Clutch Linkage	16-03
Ford Four-Speed Overdrive Transmission	16-30	Model RAD Four-Speed Transmission	16-28
General Clutch Service	16-01	Model 78ET Four-Speed Transmission	16-29

CC3013-2B

General Clutch Service

**PART
16-01**

Applies to Pinto, Bobcat, Mustang, Fairmont, Zephyr, Granada and Monarch

SUBJECT	PAGE	SUBJECT	PAGE
ADJUSTMENTS		DIAGNOSIS	
Flywheel Housing Alignment	01-3		01-1
CLEANING AND INSPECTION		REMOVAL AND INSTALLATION	
Clutch	01-4	Clutch Pilot Bearings	01-7
		Dowels – Flywheel and Engine	01-7

CC3014-2B

DIAGNOSIS

Refer to the following Clutch Diagnosis Chart for diagnosis.

CLUTCH DIAGNOSIS

COMPLAINT	POSSIBLE CAUSE	RESOLUTION
Clutch "squeaks" or "scrubs" when the pedal is in motion	- Clutch release linkage and/or cable — lack of lubrication, binding, interference, worn or kinked - Lack of lubrication on the clutch release lever pivot and lever tips - Lack of lubrication for the clutch release bearing bore and the transmission bearing retainer - Improperly installed welsh plugs - Flywheel housing out of alignment	- Lubricate, repair or replace as required. - Remove transmission and release bearing. Lubricate accordingly. - Lubricate accordingly. - Inspect. Welsh plugs should be flush or below front face of transmission case. - Check alignment after ascertaining that housing is properly positioned on dowels, and attaching bolts are properly torqued. Replace housing if necessary.
Clutch is noisy after pedal free-travel is taken up. Noise continues as long as the pedal is held down	- Damaged release bearing - Flywheel housing out of alignment - Improper engagement between transmission pilot and flywheel housing	- Remove transmission and replace release bearing. Inspect the release fingers and replace the pressure plate assy. as required. - Check flywheel housing to engine crankshaft alignment. Replace housing if necessary. - Check for proper pilot engagement into flywheel housing. Repair or replace as required.
Clutch slips after the pedal is fully released	- Improper clutch pedal free travel - Release linkage outside flywheel housing binding - Damaged internal components	- Adjust. (Part 16-03). - Lubricate. Repair or replace linkage parts as required. (Part 16-03). - Remove transmission. Repair or Replace release lever, release bearing, transmission input shaft bearing retainer. Check pressure plate and clutch disc for wear and contamination. Replace as required.
Clutch does not disengage properly	- Improper clutch pedal free travel - Release linkage outside flywheel housing worn, cracked or bent - Damaged internal components	- Adjust. (Part 16-03). - Repair or replace linkage parts as required. (Part 16-03). - Remove transmission. Check for damaged or worn clutch, pressure plate, release bearing, release lever or release lever pivot. Check for warped or contaminated clutch disc. Check engine crankshaft pilot bushing for lack of lubrication, damage or binding condition with input shaft. Check clutch disc hub spline for free movement on input shaft spline — lubricate. Repair or replace as required.
Clutch chatters during engagement	- Improper clutch pedal free travel - Loose engine mounts and number 3 crossmember installation - Oil on clutch disc. Burned or glazed	- Adjust (Part 16-03). - Repair as required. Tighten bolts and nuts to specifications. - Install new clutch disc and correct leak. (Part 16-02).

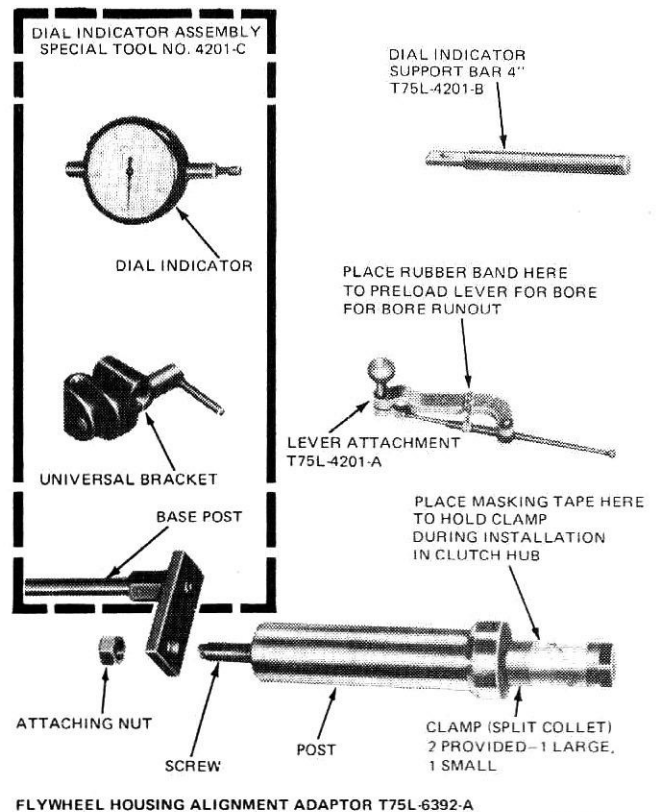
ADJUSTMENTS

FLYWHEEL HOUSING ALIGNMENT

Inspection and/or alignment of the flywheel housing is indicated when symptoms exist of excessive transmission gear wear, transmission jumping out of gear, driveline vibration, clutch pedal vibration or scrubby pedal feel, pilot bearing noise, release bearing noise, or excessive clutch spin time. Common complaint areas or obvious misadjustment should always be checked and corrected prior to checking alignment, to be sure that the basic system is in proper working order.

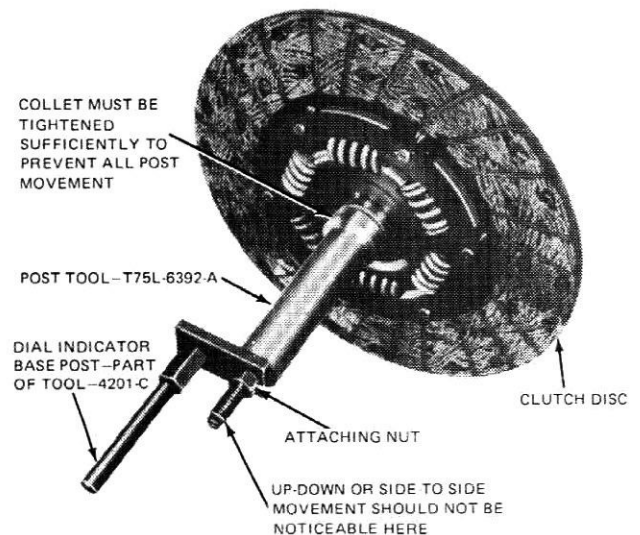
Inspection And Alignment Procedure—All Models

1. Remove the transmission and flywheel housing from the vehicle using existing Ford Car Shop Manual procedures. On Mustangs with Model RAD transmission, and on Pinto and Bobcat vehicles, separate the flywheel housing from the transmission after removal of the assembly.
2. Inspect, clean and/or remove all nicks, burrs, paint and other foreign material from the following:
 - a. Front and rear face of flywheel housing.
 - b. Flywheel housing bore surface.
 - c. Rear face of engine block.
 - d. Rear engine plate.
 - e. Flywheel and engine block dowels (missing or damaged dowels must be replaced). See Removal and Installation Section of this Part for procedure.
3. Install the flywheel housing and rear engine plate to the engine less the transmission and tighten the mounting bolts to specification.
4. Install alignment tool post assembly (Tool T75L-6392-A), with dial indicator base post attached (Fig. 1) through the flywheel housing bore into the clutch disc. Tighten the nut on the end of the post assembly until the clamp (split collet) on the opposite end of the assembly grips the clutch disc splined hub tightly (Fig. 2). Up, down, or side movement of the post assembly must not be evident during the bore and runout test procedure. If any movement is detectable, the nut should be further tightened until movement is stopped, otherwise erratic readings will result. To facilitate installation of the collet to the clutch disc hub, place a short piece of masking tape halfway around the collet to hold it at its smallest diameter until it can be inserted and tightened (Fig. 1).
5. To check face runout, install a dial indicator on the base post using the universal bracket and short extension bar (Tool T75L-4201-B) provided with the alignment kit (Fig. 1). Position the dial indicator so that the indicator button contacts a circumference just outside the transmission pilot hole. Tighten the universal clamp securely (Fig. 3).
6. Push the crankshaft rearward to remove any end play. Set the dial indicator to zero.
7. Holding the crankshaft in the rearward position, rotate the crankshaft through one complete revolution by using a wrench on the crankshaft pulley attaching nut. The dial indicator should return to zero after one revolution unless end play or a loose alignment post has affected the reading.



C2969-1A

FIG. 1 Special Tools—Flywheel Housing Inspection and Alignment



C2970-1A

FIG. 2 Installation of Post Assembly

8. During Step 7, the greatest variation between indicator readings for one revolution should be recorded. A small mirror will be necessary during this procedure to enable reading the indicator through its complete rotation.
9. To verify the reading in Step 8, the procedure should be repeated a second time.
10. After completion of the face runout check, install the dial indicator lever attachment to the dial indicator (Fig. 1) and position the assembly to check