

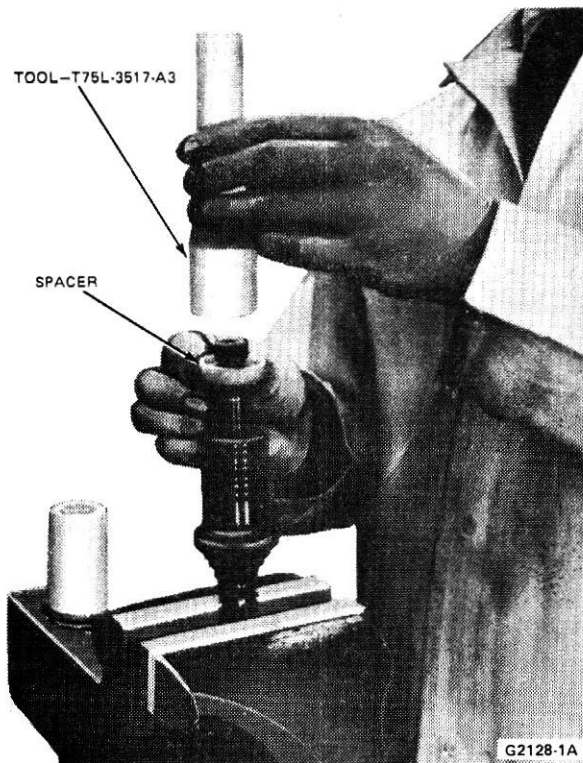


FIG. 17 Adding Spacer to Install Next Ring

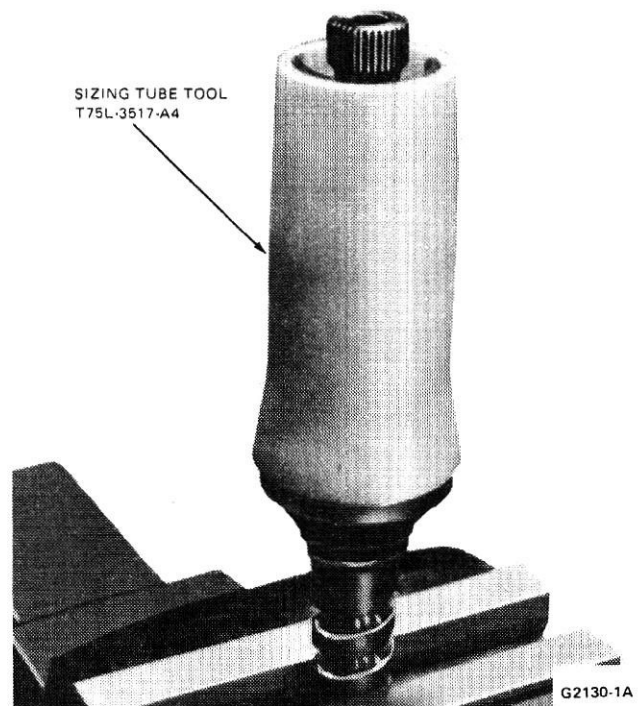


FIG. 19 Sizing Rings—Step 2

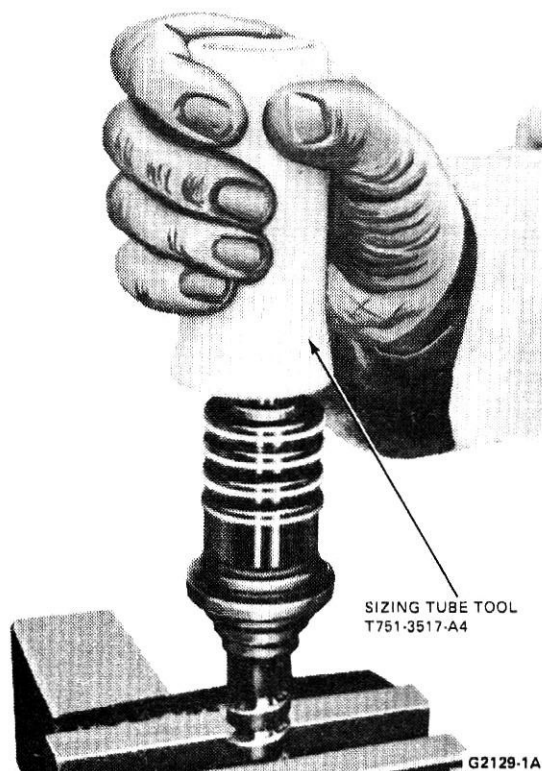


FIG. 18 Sizing Rings—Step 1

PISTON AND BALL NUT

Disassembly and Assembly

1. Remove the plastic ring and the O-ring (Fig. 5) from the piston and ball nut.

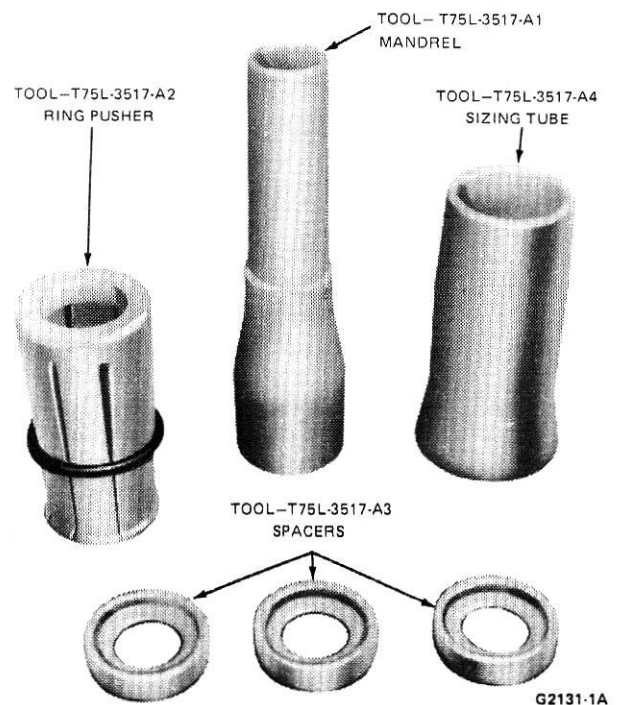


FIG. 20 Rotary Valve Tool Kit T75L-3517-A

2. Dip a new O-ring in gear lubricant and install it on the piston and ball nut.
3. Install a new plastic ring on the piston and ball nut being careful not to stretch it any more than necessary.

FORD INTEGRAL POWER STEERING GEAR SPECIFICATIONS

Description	
Type	Recirc. Ball Torsion Bar
Ratio	17:1
Turns of Steering Wheel (Lock to Lock — Linkage Disconnected)	4
Fluid Capacity (Included in Pump Reservoir Fill)	1.6 Pints (Approximate)
Fluid Specification—Lincoln, Mark V	D2AZ-19582-A
Worm Bearing Preload	4-9 In-Lb
Total Meshload Over Mechanical Center	17 In-Lb (Maximum)
Total Meshload Over Worm Bearing Preload	14-18 In-Lb
Fluid Specification—All Except Lincoln and Mark V	C1AZ-19582-A,C, D-ATF Type F

FORD INTEGRAL POWER STEERING GEAR TORQUE LIMITS (FT-LB)

Description	Torque
Sector Shaft Cover Bolts	55-70
Mesh Load Adjusting Screw Lock Nut	35-45
Ball Return Guide Clamp Screw	42-70 In-Lb
Valve Housing to Gear Housing Screw	35-50
Race Retaining Nut	50①
Set Screw-Race Nut	15-25 In-Lb.
Piston End Cap	70-110
Pressure Hose to Gear	16-25
Return Hose to Gear	25-34
Hose Clamps	1-2

- ① Specified Torque — Because the length of the tool required to torque the nut will affect the observed torque reading on the torque wrench, the torque reading should be computed using the length of the torque wrench and the nominal specified torque as follows:

$$\text{Torque (using tool)} = \frac{\text{Length of Torque Wrench} \times 72 \text{ Ft-Lb}}{\text{Length of Torque Wrench} + 5.5 \text{ Inches}}$$

Example: With 13 inch torque wrench —

$$\frac{13 \text{ In.} \times 72 \text{ Ft-Lb}}{13 \text{ In.} + 5.5 \text{ In.}} = \frac{13 \times 72 \text{ Ft-Lb}}{18.5} = 0.703 \times 72 = 50 \text{ Ft-Lb}$$

SPECIAL SERVICE TOOLS

Tool No.	Description
T56L-33610-D	Pressure Testing Gauge Assembly
T64P-3590-F	Steering Pitman Arm Remover
T57L-500-B	Bench Mounted Holding Fixture
T66P-3553-C	Spacer
T66P-3553-B	Spanner Wrench
T59L-100-B	Slide Hammer — Short
T58L-101-A	Puller Attachment
T65P-3524-A1, A2, A3	Bearing Remover and Installer
T74P-3504-L	Tube Seat Remover
T74P-3504-M	Tube Seat Replacer
T74P-3517-A	Coupling
T74P-3517-B	Pressure Gauge
T74P-3504-L	Brass Tube Seat Remover
T77L-3576-A	Sector Shaft Seal Replacer

Tool No.	Description
T74P-3504-M	Brass Tube Seat Replacer
T74P-3504-R	Pinion Shaft Torque Adapter
T74P-3504-S	Inner Ball Joint Spanner Wrench
T74P-3504-T	Ball Joint Locknut Spanner Wrench
T74P-3504-U	Pinion Housing Yoke Plug Nut Wrench
T74P-3504-W	Pinion Yoke Plug Spanner Wrench
T74P-3504-X	Locknut Pin Staking Tool
T74P-3504-Y	Spring Scale (0-10 lbs)
T74P-3504-Z	Drill Bushing Fixture
T57L-500-B	Bench Mount
T71P-19703-C	O-Ring Remover
T74P-3517-C	Pressure Gauge
T75L-3517-A	Rotary Valve Tool Kit

Integral Power Steering Gear — Saginaw

**PART
13-42**

Applies To LTD II, Cougar, XR7, Thunderbird, Ranchero 5.0/5.8L (302/351WCID) (Except Police and Taxi)

SUBJECT	PAGE	SUBJECT	PAGE
ADJUSTMENTS	42-2	DISASSEMBLY AND ASSEMBLY (Cont'd.)	
DESCRIPTION	42-1	Stub Shaft and Rotary Valve Assembly	42-10
DISASSEMBLY AND ASSEMBLY		REMOVAL AND INSTALLATION	42-5
Adjuster Plug	42-10	SPECIFICATIONS AND SPECIAL TOOLS	42-14
Rack-Piston	42-11		
Steering Gear	42-6		
Steering Gear Housing	42-9		

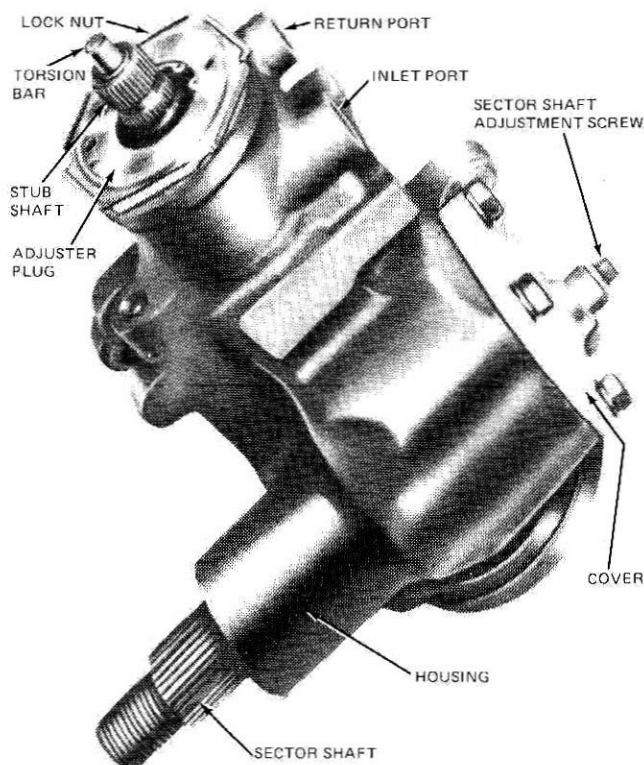
DESCRIPTION

STEERING GEAR

The Rotary Valve Safety power steering gear displaces fluid to provide hydraulic fluid pressure assists when turning. The gear assembly is always filled with fluid and all internal components of the gear are immersed in fluid, making periodic lubrication unnecessary. In addition, the fluid acts as a cushion to absorb road shocks. All fluid passages are internal except the pressure and return hoses between the gear and pump.

The rotary valve provides smooth steering with a minimal effort. A torsion bar transmits road feel to the driver.

A one-piece rack-piston nut is geared to the sector shaft. An adjusting screw on the end of the shaft gear maintains preload between the sector shaft and rack-piston nut (Fig. 1).



G1649-1B

FIG. 1 Saginaw Steering Gear—Exterior View

ADJUSTMENTS

Only the over-center mesh load may be adjusted with the steering gear in the vehicle. Other adjustments require removal of the gear.

THRUST BEARING ADJUSTMENT—GEAR REMOVED

Saginaw power steering gears used on LTD II, Cougar, SR-7, Thunderbird and Ranchero vehicles feature conical races on the input shaft lower thrust bearing. The races are essentially axial spring washers which prevent loss of thrust bearing preload (See Fig. 2).

1. Drain the power steering fluid from the gear by rotating the stub shaft full travel in both directions several times.
2. Loosen and remove the adjuster plug lock nut (see Figs. 3 and 4).
3. Turn the adjuster plug in (clockwise) until the plug and thrust bearing are firmly bottomed, approximately 20 ft-lbs. (see Fig. 5).
4. Mark the housing even with one of the holes in the adjuster plug (see Fig. 6).
5. Measure back (counterclockwise direction) 3/16 to 1/4 inch and remark the housing (see Fig. 7).
6. Rotate the adjuster (counterclockwise) until the hole in the adjuster is in line with the second mark (see Fig. 8).
7. Tighten the lock nut securely. Hold (or have held) the adjuster plug to maintain alignment of the hole with the mark (see Fig. 9).
8. Using a 3/4 inch twelve point deepwell socket and an in-lb torque wrench, turn the stub shaft to the right stop and then back 1/4 turn. Measure the torque. Reading should be taken with the beam of the torque wrench near vertical while turning counterclockwise at an even rate (see Fig. 10). If the reading is less than 4, or more than 10 in-lbs, use the alternate adjustment procedure shown below.

ALTERNATE THRUST BEARING ADJUSTMENT PROCEDURE

1. Drain the gear by rotating the stub shaft from stop to stop several times.
2. Loosen the Pitman shaft preload adjuster screw lock nut and turn the preload adjuster screw 1-1/2 turns counterclockwise. Retighten the locknut (see Fig. 11). (If when turning the preload screw counterclockwise it bottoms, turn back clockwise 1/2 turn.)
3. Loosen (but do not remove) the adjuster plug lock nut (see Fig. 3).
4. Loosen the adjuster plug one turn counterclockwise (see Fig. 12).
5. Turn the stub shaft to the right stop and then back 1/4 turn. Measure the drag torque, using an in-lb torque wrench (see Fig. 10). Bottom the adjuster plug firmly (approximately 20 ft-lbs) by turning it clockwise (see Fig. 13) then back it off until the total-torque reading is 3-4 in-lbs in excess

of the drag torque (i.e., drag torque reading 3 in-lbs, total torque reading with adjuster plug tightened 6-7 in-lbs).

6. Tighten the adjuster plug lock nut securely (Fig. 9).

NOTE: Preload torque tends to drop off when the lock nut is tightened. Therefore, the torque reading must be rechecked with the lock nut tight, and the torque must still be 3-4 in-lbs in excess of the seal drag.

NOTE: It is not possible to properly adjust the thrust bearing preload unless the adjuster plug is firmly bottomed out and the torque set while the adjuster plug is being loosened. Never attempt to adjust the thrust preload while tightening or advancing the adjuster plug into the gear assembly.

MESH LOAD—GEAR REMOVED

1. Turn the stub shaft from stop to stop, counting the total number of turns. Divide this number by 2. Starting at either stop, turn the stub shaft 1/2 turn the total number of turns. This is the "center" of the gear. (The flat on the stub shaft is normally up and parallel with the side cover when the gear is "on center" (see Fig. 13) and the block tooth on the Pitman shaft is in line with the over-center preload adjuster (see Fig. 14).
2. Rotate the torque wrench approximately 45 degrees each side of the center, and "read" near or on center (highest reading)—See Fig. 10. Loosen the lock nut and turn the preload adjusting screw clockwise until the correct "0" center torque, in excess of the reading just taken, is obtained (see Fig. 15).

NOTE: Limits for "new" and "used" gears differ as follows:

- a. "New" gear over-center torque to be 4-8 in-lbs additional torque, but total over-center torque must not exceed 18 in-lbs.
- b. "Used" gear (400 or more miles). Over-center torque to be 4-5 in-lbs additional torque, but total over-center must not exceed 14 in-lbs.

Tighten the lock nut to 35 ft-lbs while holding the preload adjuster screw. Recheck the over-center adjustment.

MESH LOAD—IN VEHICLE

Adjust the total over-center position load (mesh load) to eliminate excessive lash between the sector shaft and rack teeth as follows:

1. Disconnect the Pitman arm from the sector shaft. Remove the steering wheel hub.
2. Disconnect the fluid return line at the reservoir, and cap the reservoir return line pipe.
3. Place the end of the return line in a clean container and turn the steering wheel from left to right to discharge the fluid from the gear
4. Turn the gear one-half turn off center in either direction. Using a 24 in-lb torque wrench on the steering wheel nut, determine the torque required to rotate the shaft slowly through a 20 degree arc.
5. Turn the gear back to center and repeat Step 4. Loosen the adjuster lock nut and turn the screw

inward using a 7/32-inch Allen wrench, until the reading is 6 in-lb greater than the reading taken in Step 4. Retighten the lock nut while holding the screw in place.

6. Recheck the readings and replace the Pitman arm and steering wheel hub.
7. Connect the fluid return line to the reservoir and fill the reservoir with C1AZ-19582-A, C, or -D or equivalent to specification.

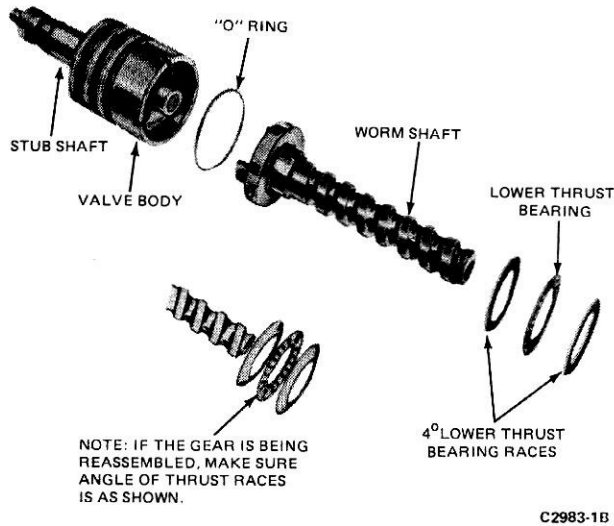


FIG. 2 Conical Thrust Races

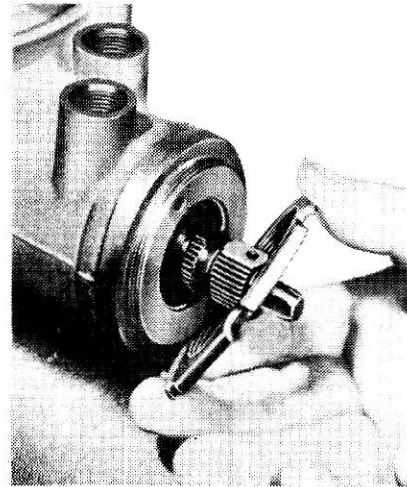


FIG. 4 Removing Adjuster Plug Lock Nut

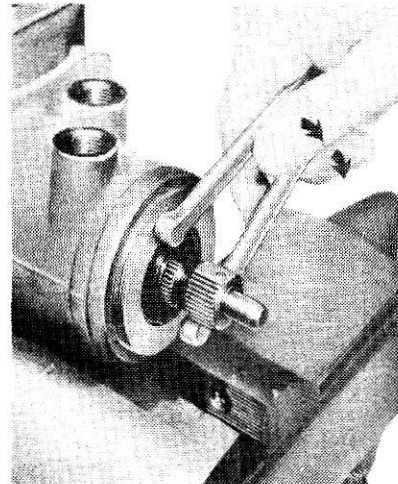


FIG. 5 Bottoming Adjuster Plug

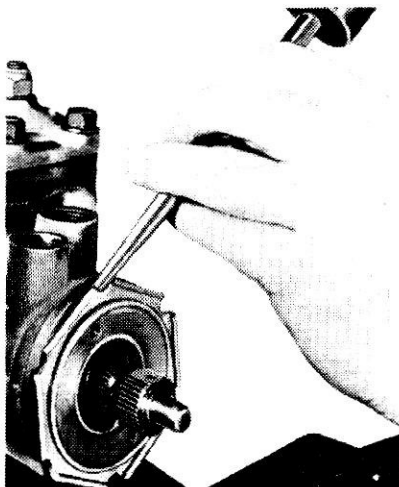


FIG. 3 Loosening Adjuster Plug Lock Nut

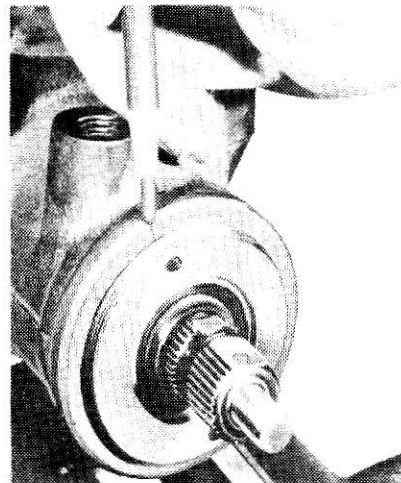


FIG. 6 Marking Housing with Adjuster Plug Bottomed