PART 13-04 Manual Steering

| COMPONENT INDEX Applies Only To Models Indicated | All Models | Ford | Mercury | Meteor | Cougar | Fairlane | Falcon | Maverick | Montego | Mustang |
|--|------------|-------|---------|--------|--------|----------|--------|----------|---------|---------|
| STEERING GEAR | | | | | | | | | | 1 |
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DESCRIPTION

STEERING GEAR

The steering gear (Fig. 1) is of the worm and recirculating ball type. The sector shaft is straddle mounted having a bushing located in the cover above the gear and a roller bearing in the housing below the gear.

The worm bearing preload is controlled by the large adjusting nut



which is threaded into the housing. The sector shaft mesh load is controlled by an adjusting screw located in the housing cover.

The steering linkage consists of the Pitman arm, steering-arm-to-idler arm rod, idler arm and the spindle connecting rods (tie rods).

A steering gear identification tag is provided under one of the cover attaching bolts (Fig. 2).

SERVICE IDENTIFICATION

CODE NUMBER

G 1626-A

2 IN-VEHICLE ADJUSTMENTS AND REPAIRS



FIG. 3—Steering Gear Adjustments—Typical

STEERING WORM AND SECTOR

GEAR ADJUSTMENTS

The ball nut assembly and the sector gear must be adjusted properly to maintain minimum steering shaft end play (a factor of preload adjustment) and minimum backlash between sector gear and ball nut. There are only two possible adjustments within the recirculating ball-type steering gear.



FIG. 4—Checking Steering Gear Preload—Typical

and these should be made in the following order to avoid damage or gear failure.

 Disconnect the Pitman arm from the steering Pitman-to-idler arm rod.

2. Loosen the nut which locks the sector adjusting screw (Fig. 3), and turn the adjusting screw counterclockwise. (On models equipped with the Cobra Jet engine, it may be necessary to use a suitable holding tool with an extension and a long screwdriver to make the gear adjustment).

3. Measure the worm bearing preload by attaching an in-b torque wrench to the steering wheel nut (Fig. 4). With the steering wheel off centre, read the pull required to rotate the input shaft approximately 1 1/2 turns either side of center. If the torque or preload is not within specification, ajust as explained in the next step.

4. Loosen the steering shaft bearing adjuster lock nut, and tighten or back off the bearing adjuster (Fig. 1) to bring the preload within the specified limits.

 Tighten the steering shaft bearing adjuster lock nut, and recheck the preload.

6. Turn the steering wheel slowly to either stop. Turn gently against the stop to avoid possible damage to the ball return guides. Then rotate the wheel 2-3/4 turns to center the ball nut.

 Turn the sector adjusting screw clockwise until the specified torque is necessary to rotate the worm past its center (high spot) (Fig. 1).

 While holding the sector adjusting screw, tighten the sector adjusting screw locknut to specification, and recheck the backlash adjustment.

9. Connect the Pitman arm to the steering arm-to-idler arm rod.

3 REMOVAL AND INSTALLATION

STEERING GEAR

REMOVAL

1. Remove the bolt(s) that retains the flex coupling to the steering shaft.

 Remove the nut and lock washer that secures the Pitman arm to the sector shaft using Tool T64P-3590-F (Fig. 5).
To obtain clearance on some

3. To obtain clearance on some models equipped with standard transmission, it may be necessary to disconnect the clutch linkage. On some 8-cylinder models, it may be necessary to lower the exhaust system.

4. Remove the steering gear-to-side rail bolts and remove the gear.

INSTALLATION

 Position the steering gear and flex coupling in place; then, install and torque the steering gear-to-side rail bolts to specification (50-65 ft-lb).

 If the clutch linkage has been disconnected, reposition, install and adjust it. If the exhaust system has been lowered, reinstall it to its proper position.

3. Position the Pitman arm and the sector shaft and install the attaching nut and lock washer. Torque the nut to 150-225 ft-lb.

4. Install and connect the flex coupling attaching nut(s) and torque it to specification. See Steering Column Installation, Part 13-02.



FIG. 5-Removing Pitman Arm

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4 MAJOR REPAIR OPERATIONS

STEERING GEAR

DISASSEMBLY

1. Rotate the steering shaft 3 turns from either stop.

 After removing the sector adjusting screw locknut and the housing cover bolts (Fig. 6), remove the sector shaft with the cover. Remove the cover from the shaft by turning the screw clockwise. Keep the shim with the screw.

 Loosen the worm bearing adjuster nut, and remove the adjuster assembly and the steering shaft upper bearing (Fig. 7).

4. Carefully pull the steering shaft and ball nut from the housing, and remove the steering shaft lower bearing. To avoid possible damage to the ball return guides, keep the ball nut from running down to either end of the worm.

Disassemble the ball only if there is indication of binding or tightness.

 Remove the ball return guide clamp and the ball return guides from the ball nut. Keep the ball nut clamp side up until ready to remove the balls.

6. Turn the ball nut over, and rotate the worm shaf. ∰rom side to side until all 50 balls have dropped out of the nut into a clean pan. With the balls removed, the ball nut will slide off the worm.

 Remove the upper bearing cup from the bearing adjuster and the lower cup from the housing. It may be necessary to tap the housing or the adjuster on a block of wood to jar the bearing cups loose.

8. If the preliminary inspection shows damage, press the sector shaft bearing and the oil seal from the housing (Fig. 8).

ASSEMBLY

 If the sector shaft bearing and oil seal have been removed, press a new bearing into the housing and install a new oil seal. Do not clean, wash or soak seals in cleaning solvent (Fig. 7). Apply the recommended steering gear lubricant to the bearing and seals.

2. Install a bearing cup in the lower end of the housing and in the adjuster.

3. If the seal in the bearing adjuster was removed, install a new seal,

4. Insert the ball guides into the









holes of the ball nut, tapping them lightly with a wood handle of a screw. driver if necessary to seat them.

5. Insert 25 balls into the hole in the top of each ball guide. It may be necessary to rotate the shaft slightly one way, then in the opposite direction to distribute the balls in the circuit.

 After the 50 balls are installed, install the ball guide clamp. Torque the screws to specification. Check the worm shaft to make sure that it rotates freely.

7. Coai the threads of the steering shaft bearing adjuster, the housing cover bolts, and the sector adjusting screw with a suitable oil-resistant sealing compound. Do not apply sealer to female threads and especially avoid getting any sealer on the steering shaft bearings.

8. Coat the worm bearings, sector shaft bearings, and gear teeth with steering gear lubricant.

 Clamp the housing in a vise, with the sector shaft axis horizontal, and position the steering shaft lower bearing in its cup.

 Position the steering shaft and ball nut assemblies in the housing.



FIG. 8—Removing Oil Seal and Bearing

11. Position the steering shaft upper bearing on the top of the



FIG. 9—Checking Steering Shaft Bearing Preload

worm, and install the steering shaft bearing adjuster and the adjuster nut and bearing cup. Leave the nut loose.

 Adjust the worm bearing preload, using an in-lb torque wrench (Fig. 9). See the Specifications section for the specified preload.

13. Position the sector adjusting screw and adjuster shim, and check the end clearance which should not exceed 0.002 inch between the screw head and the end of the sector shaft. If clearance is greater than 0.002 inch, add enough shims to reduce the end play to within the 0.002 inch tolerance.

14. Start the sector shaft adjusting screw into the housing cover.

15. Install a new gasket on the housing cover.

16. Rotate the steering shaft until the ball nut teeth are in position to mesh with the sector gear, tilting the housing so that the ball will tip toward the housing cover opening.

17. Lubricate the sector shaft journal and install the sector shaft and cover.

18. With the housing cover turned out of the way fill the gear with the specified amount of gear lubricant. Push the housing cover and sector shaft assemblies into place, and install the two top housing cover bolts. Do not tighten the cover bolts until it is certain that there is some lash between ball nut and sector gear texth. Hold or push the cover away from the ball nut, then torque the bolts to socification.

19. After loosely installing the sector shaft adjusting screw lock nut, adjusting sector shaft mesh load. See the Specifications section for the specified mesh load; then, tighten the adjusting screw lock nut.

5 SPECIFICATIONS

MANUAL STEERING GEAR SPECIFICATIONS

| Vehicle | Ford, Mercury, Meteor | | Falcon, Montego, Fairlane | | | |
|---------------------------------------|-----------------------------|-----------|---------------------------------|--|-----------|--|
| Model | SMA-D-1 | SMB-D | SMB-K (1) | SMB-FO | SMA-F | |
| Gear Ratio | 24:1 | 19.9:1 | 16:1 | 16:1 | 22:1 | |
| Turns of Strg. Gr. (Lock to Lock)@ | 6-2/5 | 4-5/8 | 3-3/4 | 3-3/4 | 5-1/2 | |
| Lube Type | | A | ESW-M1C87-A | | | |
| Lube Capacity | .97 ± .07 | .55 ± .05 | .55 ± .05 | .55 ± .05 | .87 ± .07 | |
| Worm Bearing Preload (In Lb)@ | 4-5 | 4-5 | 3-4€ | 4-5 | 4-5 | |
| Total Center Meshload (In Lb)® | 9-10 | 9-10 | 8-9@ | 9-10 | 9-10 | |
| Adjustments (All Modeis) | | | Adjusting screw to bottom | of sector shaft T slot clearan DOD002 | nce: | |

@Production only - for service, use Model SMB-K.

OWhen used for improved or competition handling, worm bearing preload must be adjusted to 4-5 In Lb and total center meshload must be adjusted to 9-10 In Lb.

@Gear only - not attached to Pitman arm.

©Torque required to rotate input shaft at approximately 1-1/2 turns either side of center (gear out of vehicle or Pitman arm disconnected). ©Required to rotate input shaft and worm assembly past the center high point.

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