

Manual Steering Gears

FORD MOTOR CO. (GEMMER/ROSS) WORM & ROLLER

F100/250 - 4WD - (1965-74)
 F350 (1965-66)
 P100 (1965-68)
 P350 (1965-74)
 P3500 (1965-71)
 U100 (1966-74)

DESCRIPTION

Worm & Roller type manual steering gear consists of a worm gear, sector shaft assembly, and steering linkage. Worm gear, which is part of the input shaft, rotates on ball bearings. Roller, which rides on worm gear, is mounted to sector shaft. Sector shaft and roller assembly rotates as a unit in bushings mounted in lower part of housing. Rotation of worm gear is transmitted to sector shaft through roller assembly, and is then relayed to steering linkage through pitman arm.

ADJUSTMENT

WORM BEARING PRELOAD

U100 - Remove steering gear from vehicle, and loosen mesh adjuster lock nut. Using an INCH lb. torque wrench, attached to input shaft, measure torque required to rotate shaft 1½ turns either side of center. If bearing preload is not correct, remove housing end cover and add or remove shims as necessary to obtain correct preload. Adjust worm and roller mesh preload.

All Other Models - Disconnect pitman arm from sector shaft. Disconnect wire connector at horn relay, and remove horn button and spring from steering wheel. Turn steering wheel to either right or left stop, and attach an INCH lb. torque wrench to steering wheel attaching nut. Measure torque required to keep steering wheel rotating at an even rate through ¼ to ½ turn. Remove housing end cover and add or remove shims as necessary to obtain correct preload. After adjusting preload, turn gear to opposite stop and recheck preload. *NOTE - If erratic readings are obtained, disconnect steering shaft at steering gear, and measure torque required to turn shaft. Add this reading to worm bearing preload specification.*

Worm Bearing Preload

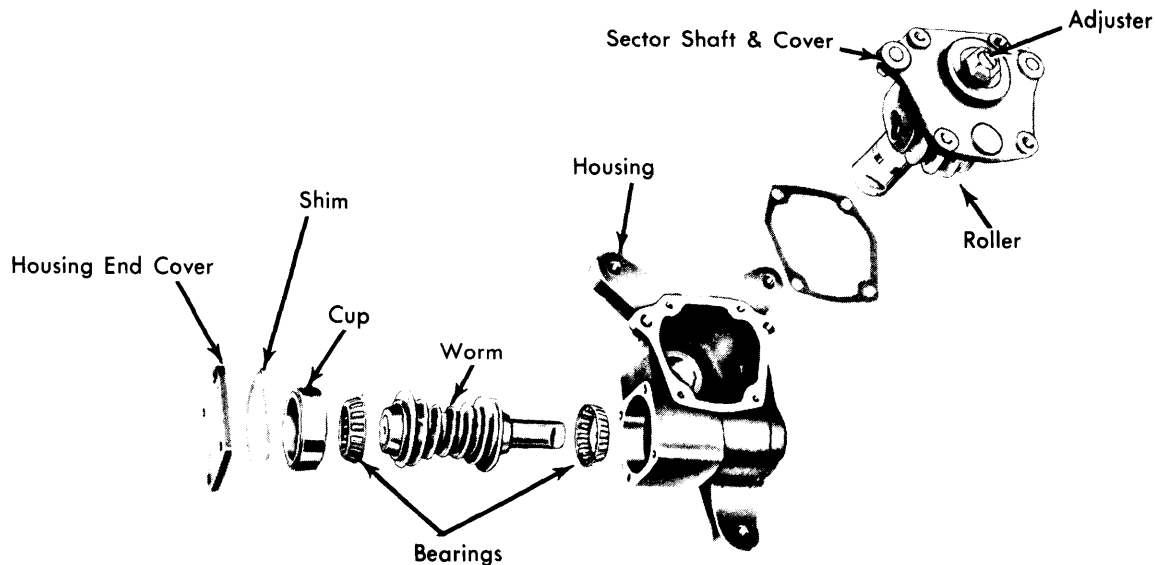
Application	INCH Lbs.
F100 4x4	
1965.....	4½ -9
1966-74	5-10
F250 4x4	
1965-69	4½ -9
1970-74	7-11
F350.....	4½ -9
P100.....	4½ -9
P350.....	4½ -9
P3500.....	4½ -9
U100.....	5-10

WORM & ROLLER MESH PRELOAD

With worm bearing preload properly adjusted, and steering gear removed from vehicle, attach an INCH lb. torque wrench to steering gear input shaft. Center steering gear, then measure torque required to rotate input shaft through center position. Loosen mesh adjuster lock nut, and turn mesh adjuster as necessary to obtain correct preload. Hold adjuster and tighten lock nut, then recheck mesh preload.

Worm & Roller Mesh Preload

Application	INCH Lbs.
F100 4x4	
1965.....	13½ -22
1966-74	12-21
F250 4x4	
1965-69	13½ -22
1970-74	16-29
F350.....	13½ -22
P100.....	13½ -22
P350.....	13½ -22
P3500.....	13½ -22
U100.....	12-21



GEMMER/ROSS WORM & ROLLER STEERING GEAR ASSEMBLY

4FO01

FORD MOTOR CO. (GEMMER/ROSS) WORM & ROLLER (Cont.)

REMOVAL & INSTALLATION

Removal & Installation (F350) – 1) Disconnect battery ground cable, and horn wire connector. Loosen lower steering column clamp and slide clamp out of the way. If vehicle is equipped with column mounted transmission linkage, disconnect control rod(s) at shift lever(s). Remove steering wheel, then remove upper bushing spring, and bushing.

2) Disconnect directional signal wires at instrument panel bracket. Remove steering column bracket clamps and rubber sleeve. If vehicle equipped with floor mounted shift lever, remove steering column tube from steering shaft. If vehicle equipped with column mounted shift linkage, remove steering column shields from floor pan. On vehicles with V-8 engines, remove oil filter. On 6 cylinder vehicles, disconnect exhaust pipe at exhaust manifold. On vehicles with manual transmissions, remove clutch retracting spring, and clutch equalizer shaft.

3) Disconnect pitman arm at sector shaft. Remove steering gear attaching bolts and remove steering gear from vehicle. To install, reverse removal procedure, and adjust steering column tube to provide $\frac{1}{16}$ " clearance between tube and steering wheel hub.

Removal & Installation ("P" Models) – Remove steering wheel, then remove steering column tube bracket bolts from instrument panel. Raise and support front of vehicle, and remove pitman arm from sector shaft. Remove steering gear attaching bolts, loosen steering column lower clamp, and disconnect horn connector. Move steering gear to the left, and remove from vehicle. To install, reverse removal procedure, and adjust steering column tube to provide $\frac{1}{16}$ " clearance between tube and steering wheel hub.

Removal & Installation (All Other Models) – Raise and support vehicle under frame, and remove pitman arm from sector shaft. Remove steering gear attaching bolts, and lower vehicle. Remove flexible coupling clamp bolt, and loosen clamp on steering shaft at end of steering column. Separate coupling from input shaft by pushing steering shaft upward. Remove coupling clamp from input shaft, and remove steering gear from vehicle. To install, reverse removal procedure.

OVERHAUL

Disassembly – Clamp steering gear housing in a soft-jawed vise, and center gear. Loosen sector shaft adjuster lock nut, remove housing end cover, and drain gear. Remove sector shaft cover attaching screws, and remove cover and shaft as an assembly. Remove housing end cover, and remove bearing and cup from housing. Remove worm shaft from housing, and remove bearing from shaft. Remove remaining cup from housing. Remove sector shaft and worm shaft oil seals from housing. Remove housing from vise, and clamp sector shaft cover in vise. Remove adjuster lock nut, turn adjuster screw in, and remove sector shaft from cover. Remove sector shaft bushing from cover.

Reassembly – If clearance between sector shaft and bushing exceeds .010", install new bushing in sector shaft cover. Install sector shaft and adjuster screw in sector shaft cover, and loosely install lock nut. Install worm shaft bearing cup in housing, and position bearing on worm shaft. Install worm shaft in housing, then install remaining worm shaft bearing and cup. Install housing end cover, using same thickness of shims as was removed. Check worm bearing preload, using an INCH lb. torque wrench attached to input shaft. Install worm shaft oil seal, then install sector shaft and cover assembly into housing. Install sector shaft seal in sector shaft cover, and adjust worm bearing preload, and worm and roller mesh preload. Remove filler plug and fill housing with suitable lubricant.

TIGHTENING SPECIFICATIONS

Application	Ft. Lbs.
Housing End Cover Bolts	
F100 (1965).....	24-35
F250 (1965-69).....	24-35
F350 (1965-66).....	24-35
All Others	18-22
Sector Shaft Cover Bolts	
F100 (1965).....	30-35
F250 (1965-69).....	30-35
F350 (1965-66).....	30-35
All Others	18-22
Sector Adjuster Screw Lock Nut.....	16-20