

GEMMER/ROSS WORM & ROLLER

Chrysler Corp.
W300
Ford Motor Co.
Bronco, "F" Models 4-WD & "P" Models
International Harvester
Scout II, Terra, Traveler & 200 4-WD
Jeep
Right-Hand Drive Vehicles

DESCRIPTION

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

ADJUSTMENT

WORM BEARING PRELOAD

NOTE — Adjustment of Ford Bronco steering gear requires removal of gear from vehicle. For worm bearing preload adjustment, attach INCH lb. torque wrench to worm shaft instead of steering wheel.

All Models — Disconnect pitman arm from sector shaft. Back out worm and roller mesh preload adjusting screw at least two turns. *NOTE* — See Fig. 1 for location of adjusting screw. Rotate steering wheel to either stop. Remove horn pad and attach an INCH Lb. torque wrench to steering wheel retaining nut. Rotate wheel with torque wrench for 1/2 turn and note torque required. If torque reading is not within specifications, remove worm gear cover and add or remove shims to adjust. After adjustment of shims, recheck preload.

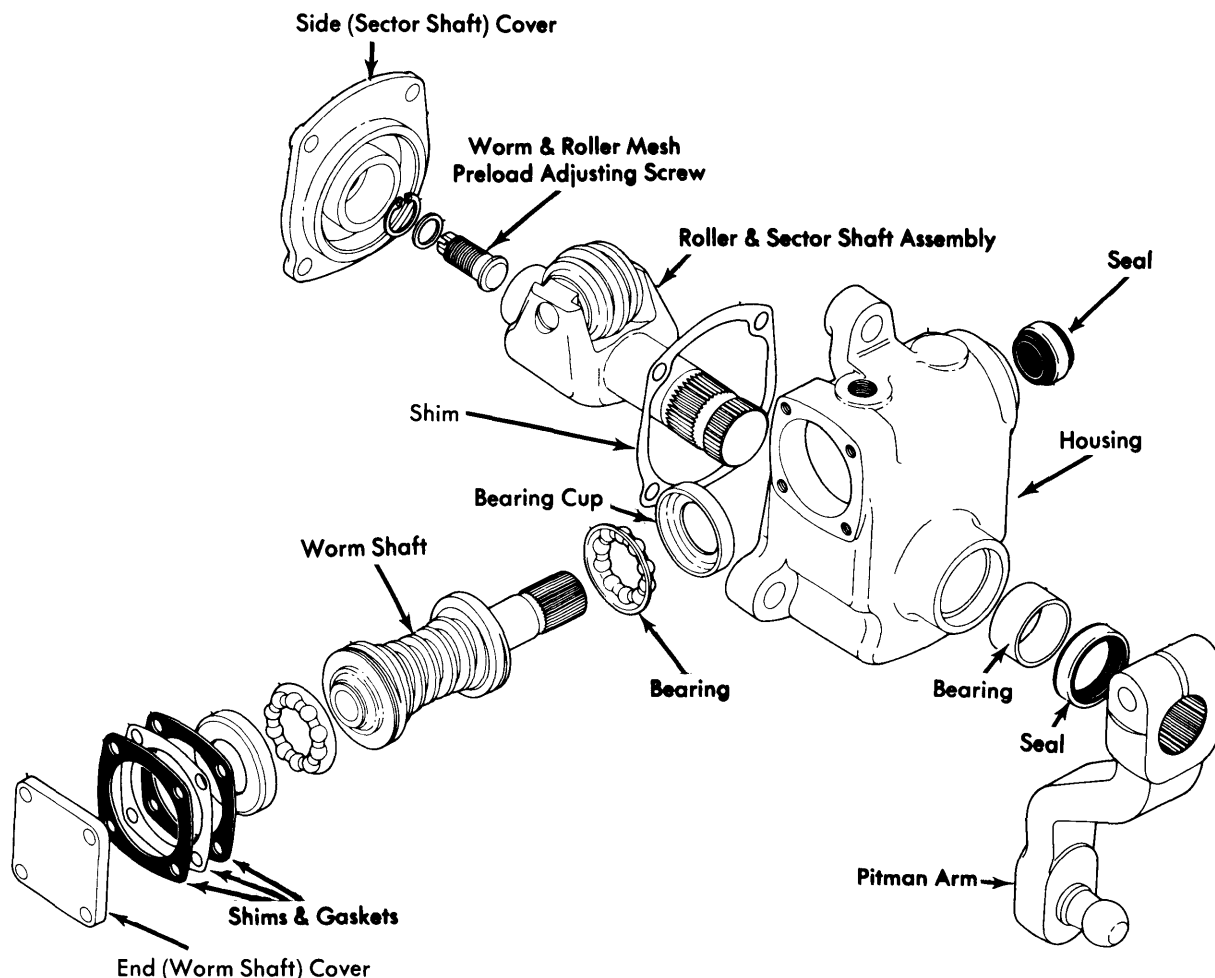


Fig. 1 Disassembled Gemmer/Ross Worm & Roller Steering Gear

Manual Steering Gears

GEMMER/ROSS WORM & ROLLER (Cont.)

Worm Bearing Preload

Application	INCH Lbs.
Chrysler Corp.	7-14
Ford Motor Co.	5-10
International Harvester	
Scout II, Terra & Traveler	1.7-5.6
200 4-WD	5.6-11.2
Jeep	2-5

WORM & ROLLER MESH PRELOAD

NOTE — Adjustment of steering gears on Ford requires removal of gear from vehicle.

NOTE — Worm Bearing Preload must be adjusted before Worm & Roller Mesh Preload is adjusted.

All Models — If steering gear is in vehicle, disconnect drag link from pitman arm. Center sector shaft by rotating worm shaft through full travel while counting number of turns. Rotate worm shaft back half way. Turn adjusting screw clockwise until all lash is removed between worm shaft and sector shaft. Using an INCH Lb. torque wrench, measure torque required to rotate worm shaft across center position. If torque is not within specifications, use adjusting screw to change worm and roller mesh until specified torque is reached. Tighten adjusting screw lock nut.

Worm & Roller Mesh Preload

Application	INCH Lbs.
Chrysler Corp.	27 Max.
Ford Motor Co.	12-21
International Harvester	
Scout II, Terra & Traveler	7-12
200 4-WD	15-29
Jeep	7-12

REMOVAL & INSTALLATION

STEERING GEAR

Chrysler Corp. — Remove bolt from coupling clamp at upper end of steering worm shaft. Disconnect turn signal and horn wire connectors, then move column upward until coupling is free from worm shaft splines. Mark relation of pitman arm to gear shaft before removal of arm. Remove the pitman arm nut and washer from sector shaft, then use a puller (C4150) to remove pitman arm. Remove the three retaining bolts, and then remove gear from vehicle. To install, reverse removal procedure while noting the following: When installing gear, the sector shaft, front wheels, and steering wheel should all be in the straight-ahead position. When installing pitman arm, be sure marks made during removal are aligned.

Ford Motor Co., Bronco & "F" Models 4-WD — Raise vehicle on hoist and remove pitman arm attaching nut and washer. Using suitable puller (T64P-3590-F), remove pitman arm. Remove nuts and bolts that attach gear to frame. Lower vehicle. Remove worm shaft-to-steering clamp shaft bolt and nut,

then loosen the clamp. Push steering shaft up to separate coupling. Remove steering gear from vehicle and discard coupling, nut, and bolt. To install, reverse removal procedure using a new worm shaft-to-steering shaft coupling, nut, and bolt.

Ford Motor Co., "P" Models — Remove steering wheel. Remove bolts from steering column support bracket. Raise front of vehicle 10 inches and install safety stands. Remove pitman arm from sector shaft. Remove bolts attaching steering gear to frame. Loosen steering column lower clamp and disconnect horn wire. Move steering gear to the left and remove it from beneath the vehicle. To install, reverse removal procedure noting the following: When installing steering column support bracket, adjust so that there is $\frac{1}{16}$ inch clearance between the top of the column tube and the steering wheel hub.

International Harvester — **NOTE** — Information was not available from vehicle manufacturer at time of publication.

Jeep — Disconnect steering shaft-to-worm shaft coupling. Disconnect steering linkage from pitman arm. Remove the three bolts that attach steering gear to frame. Remove gear by sliding it slightly forward and to the right, then lifting it out of engine compartment. To install, reverse removal procedure.

OVERHAUL

DISASSEMBLY

1) Drain lubricant and remove pitman arm from sector shaft. Remove side cover attaching screws. Remove side cover with sector shaft from housing. Remove adjusting screw lock nut and turn adjusting screw clockwise until it is completely unthreaded from side cover which will release sector shaft from side cover.

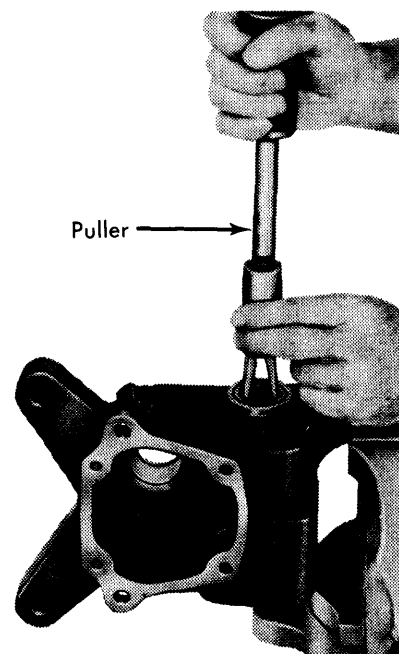


Fig. 2 Removing the Upper Seal

GEMMER/ROSS WORM & ROLLER (Cont.)

2) Remove top cover attaching bolts, top cover and shims.
NOTE — Do not discard shims. Remove worm gear assembly from housing. Remove bearing cups and ball bearings from worm gear assembly. Remove oil seals and discard.

INSPECTION

Use cleaning solvent to clean parts and dry with compressed air, taking care not to spin bearings. Inspect worm gear for chipping, scoring or binelling and condition of splines and threads. Check all bearings and bearing surfaces for wear. Check sector shaft for burrs on splines, twisted splines and wear on bearing surfaces. Check housing for strain at mounting flanges.

REASSEMBLY

1) Install new oil seals with the longer lip of each seal facing into the housing. Install ball bearings and cups on worm gear assembly and lubricate the assembly. Install worm gear assembly into housing. Install shims and top cover. Check worm bearing preload. See *Adjustments*.

2) Thread sector shaft with adjusting screw into side cover until end of shaft just touches inner face of side cover. Install lock nut loosely on adjusting screw and lubricate sector shaft assembly. Install sector shaft assembly with side cover and new gasket in housing. Adjust worm and roller mesh preload. See *Adjustments*. Install pitman arm on sector shaft.

TIGHTENING SPECIFICATIONS

Application	Ft. Lbs.
Sector Shaft Adj. Screw Lock Nut	20
Side (Sector Shaft) Cover Bolts	
$\frac{5}{16}$ " Diameter	20
$\frac{3}{8}$ " Diameter	33
End (Worm Shaft) Cover Bolts	20
Pitman Arm Retaining Nut	
Chrysler Corp.	135
Ford Motor Co.	135
International Harvester	110
Jeep	185
Steering Gear Attaching Bolts	
Chrysler Corp.	
$\frac{7}{16}$ " Diameter	55
$\frac{1}{2}$ " Diameter	85
Ford Motor Co.	65
International Harvester	
200 4-WD	175
Scout II, Terra & Traveler	
Gear-to-Frame	45
Gear-to-Bracket	70
Jeep	70