

## VOLVO 140 WORM & ROLLER

### 140 Series

**NOTE** — Volvo 140 also uses power steering as optional equipment. On 164 models, power steering is standard equipment. See appropriate article under POWER STEERING in this section.

### DESCRIPTION

#### STEERING GEAR

Manual steering gear used on these models is a worm and roller type, with a gear ratio of 17.5:1. Worm is held in proper position by adjusting shims, and proper mesh between worm and roller is manipulated with an adjusting screw.

#### STEERING LINKAGE

Steering wheel movement is transmitted to the front wheels through steering gear, pitman arm, tie rod, two steering rods, idler arm, steering knuckles, and thus to the wheels.

### ADJUSTMENT

**NOTE** — Steering gear adjustments are made during gear Overhaul. See procedure outlined below. No adjustments to the steering linkage may be made.

### REMOVAL & INSTALLATION

#### STEERING GEAR

**Removal** — Raise and support front of vehicle. Release pinch bolt at lower flange (below coupling disc). Unscrew nuts from coupling disc and push lower part of disc down as far as possible onto worm splines. Remove pitman arm from roller shaft. Unbolt and remove gear assembly.

**Installation** — To install, reverse removal procedure, noting the following: When attaching pitman arm, note alignment marks on arm and roller shaft. Set gear and steering wheel in straight-ahead position before connecting worm shaft to coupling pinch clamp. Ensure a distance of .81-1.19" (22-32 mm) exists between gear housing and lower flange.

#### STEERING LINKAGE

Steering rod ball joints and steering rods are made as one unit; therefore, they are replaced as complete assemblies. To facilitate replacement, the units are marked "R" and "L" at outer ends. After any steering linkage replacement, the toe-in should be checked.

### OVERHAUL

#### STEERING GEAR

**Disassembly** — 1) Thoroughly clean outside of gear housing and place in padded vise. Remove lower portion of flange from worm shaft. Set gear to center position and unbolt top

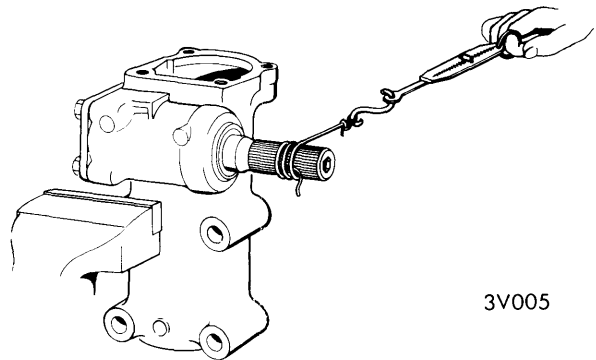
cover. Pull up on cover slightly, tip unit, and drain oil. Pull out cover and roller shaft.

2) Unbolt and remove lower cover, noting number of spacers. Carefully tap worm shaft until lower bearing outer races come loose from housing. Remove worm shaft with bearings.

3) Unscrew lock nut and back adjusting screw out of cover. **NOTE** — Remove circlip from top of roller shaft to free adjusting screw. Remove both oil seals from housing.

**Assembly** — 1) If bushings are replaced for roller shaft, carefully press in new bushings and ream to proper size. Clean housing of all metal particles. If replacing upper bearing race, press in new race until it seats against housing shoulder. Install new oil seals.

2) Carefully install worm shaft with bearings. Place gear housing in vise so that worm shaft is horizontal. Attach lower cover with original shims, coating cover bolts with sealing compound. Attach pull-scale to worm shaft splines (see illustration) and check for proper turning torque of 6-14 INCH lbs. (6.92-16.14 cmkg). It may be necessary to change shims to gain proper torque.



#### CHECKING WORM TURNING TORQUE

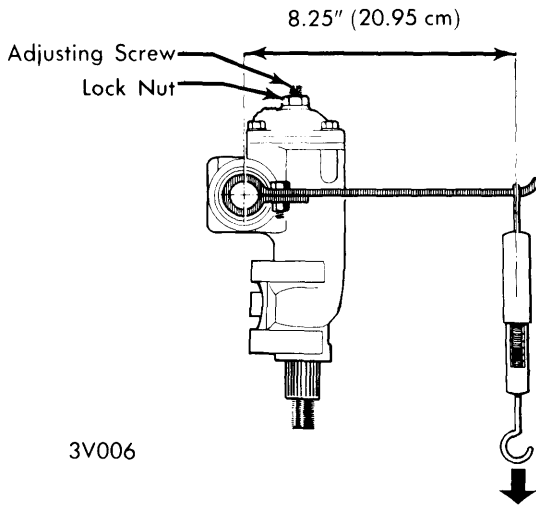
3) Fit adjusting screw, washer, and circlip on roller shaft. Axial play for adjusting screw should not exceed .002" (.05 mm). Play may be reduced by installing a thicker washer.

4) Install protective sleeve over pitman shaft splines and install shaft in housing. Apply a few drops of oil to adjusting screw. Install top cover and tighten adjusting screw such that roller shaft will not be jammed when cover bolts are tightened. Lock bolts with sealing compound.

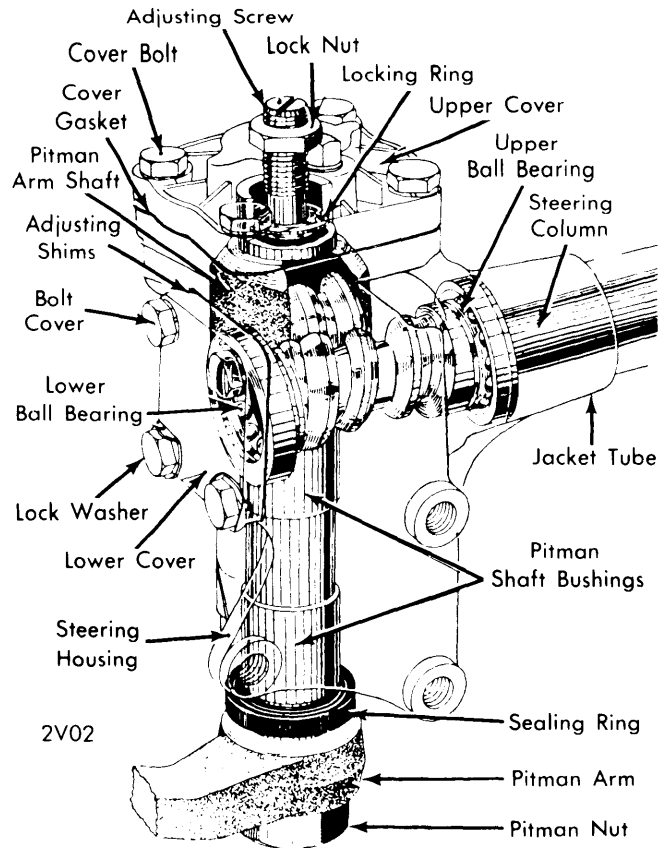
## VOLVO 140 WORM & ROLLER (Cont.)

5) Place gear housing in vise with worm shaft vertical. Turn worm shaft to center position. Turn in adjusting screw further until resistance is noticed when rotating worm shaft through center position. Place bar on worm shaft splines and attach

pull-scale such that it is 8 1/4" (210 mm) from center of worm shaft (see illustration). Turn out adjusting screw such that pull-scale reads 1-1.5 lbs. (.45-.68 kg) when bar is pulled through gear center position. Tighten lock nut and recheck.



CHECKING CENTERPOINT TORQUE LOAD



WORM & ROLLER STEERING GEAR