



## CHRYSLER CORP. (Cont.)

**NOTE** — See *Steering Columns* in this section for removal and installation procedures.

2) Remove steering column and disconnect power steering pressure and return hoses at centering valve on gear. Tie ends of hoses above pump level to avoid loss of fluid.

3) Mark pitman arm and steering gear shaft for reassembly reference. Remove pitman arm retaining nut and lock washer. Using a puller (C-4150), remove pitman arm. Remove steering gear mounting bolts and remove steering gear from vehicle.

**Installation** — Reverse removal procedures and note the following: Place steering wheel in straight ahead position. Rotate worm shaft by hand and center sector shaft to mid-point of its travel. Align master serration on sector shaft with splines on steering arm.

## OVERHAUL

### STEERING GEAR

**Disassembly** — 1) Clean exterior of gear housing and install it in a suitable holding fixture. Drain steering gear through pressure and return connections by turning steering worm shaft lock-to-lock several times. Remove valve body attaching screws, valve body and the three "O" rings. Remove pivot lever and spring.

**CAUTION** — Use care not to collapse slotted end of valve lever as this will destroy bearing tolerances of spherical head.

2) Loosen sector shaft adjusting screw lock nut and remove sector shaft cover spanner nut with a suitable tool (C-3988). Rotate worm shaft to position sector shaft sector teeth at center of piston travel. Loosen steering power train retaining nut with a suitable tool (C-3989).

3) Turn worm shaft to full left turn position to compress power train parts. Remove power train retaining nut and housing head tang washer. With power train firmly compressed, pry against piston teeth with a screwdriver using sector shaft gear teeth as a fulcrum, and remove complete power train.

**NOTE** — *Cylinder head, center race, spacer assembly and housing head must be maintained in close contact with each other.*

4) Place power train vertically in soft jawed vise. Remove housing head from worm shaft and "O" ring from groove in housing head. Remove reaction seal from groove in face of housing head with compressed air directed into ferrule chamber. Remove reaction spring, reaction ring, worm balancing ring and spacer.

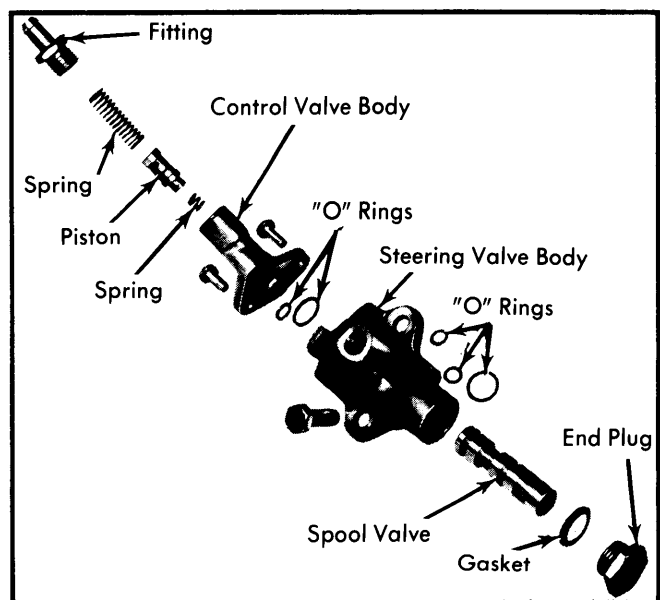
**NOTE** — *If worm shaft seal is to be replaced, replace seal with housing head disassembled in steering gear housing.*

5) Hold worm shaft from turning, then turn nut to release staked portions from knurled section and remove nut. Wire brush knurled sections to remove metal chips, then blow out nut and worm shaft to remove any metal particles. Remove upper thrust bearing race (thin) and upper thrust bearing. Remove center bearing race, then lower thrust bearing and bearing race (thick). Remove lower reaction ring and spring, then cylinder head assembly.

6) Remove "O" rings from outer grooves in cylinder head. Remove reaction "O" ring from groove in face of cylinder head by directing air pressure into oil hole between the two "O" ring grooves. Remove snap ring, sleeve and rectangular oil seal ring from cylinder head counterbore. Test operation of worm shaft. Torque required to rotate worm shaft throughout its travel in or out of piston should not exceed 1 1/2 INCH lbs.

**NOTE** — *Worm and piston are serviced as an assembly and should not be disassembled.*

7) Test for excessive side play with piston held in vise (rack teeth up) and worm in its approximate center of travel. Vertical side play measured at a point 2 5/16" from piston flange should not exceed .008" when end of worm is lifted with a force of one pound.



**Fig. 2 Valve Body**

**Inspection & Reassembly** — 1) Inspect condition of Teflon seal ring. If replacement is necessary, install a new rectangular seal, making sure that seal is not twisted. Stretch Teflon ring as little as possible and slide ring into piston groove. Re-size Teflon ring by using a piston ring compressor. Place piston assembly in vertical position (worm shaft up) in a soft jawed vise.

2) Inspect worm shaft Teflon seal for nicks and voids. To replace seal, cut with knife and remove. Replacement seal is split and should be installed using multi-purpose grease to hold seal centered on shaft. Make sure end gap is closed. Inspect cylinder head ferrule oil passages for obstructions and lands for burrs. Lubricate 2 large "O" rings and install in cylinder head grooves.

3) Install worm sleeve seal, sleeve and snap ring (if removed). Make sure snap ring is seated in groove. Install lower reaction seal ("O" ring) in cylinder head groove. Slide cylinder head assembly (ferrule up) onto worm shaft. Make sure gap on worm shaft seal ring is closed to avoid damaging ring as cylinder head moves against piston flange.

4) Lubricate all parts with power steering fluid and install in the following order: Lower bearing race (thick), lower thrust bearing, lower reaction spring (small hole over ferrule), lower reaction ring (flange up so ring protrudes through reaction

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spring and contacts reaction "O" ring in cylinder head), center bearing race, upper thrust bearing and upper thrust bearing race (thin).

5) Thread worm shaft thrust bearing adjusting nut onto shaft, but do not tighten. Turn worm shaft clockwise  $\frac{1}{2}$  turn. Hold worm shaft in this position with splined end, then tighten nut to 50 ft. lbs. (68 N·m) to pre-stretch threads. Loosen adjusting nut. Place several turns of cord around center bearing race. Make a loop in one end of cord, and attach a suitable spring scale to loop. Pulling cord will cause bearing race to rotate.

6) Retighten worm bearing adjusting nut while pulling on cord with scale. When adjusting nut is tightened properly, reading on scale should be 16-24 ozs. with race turning (20 ozs. preferred). Stake upper part of worm shaft adjusting nut into knurled area of shaft. Hold a  $\frac{1}{4}$ " punch on centerline of wormshaft end at a slight angle to nut flange and strike a sharp blow with hammer.

7) Check preload. If adjusting nut moved during staking operation, it can be corrected by striking the nut with the punch in the direction required to correct setting. After testing for proper preload, stake the nut in 3 more locations equally spaced around the upper part of nut. To test staking, apply 20 ft. lbs. (27 N·m) of torque in each direction. If nut does not move, staking operation is correctly completed.

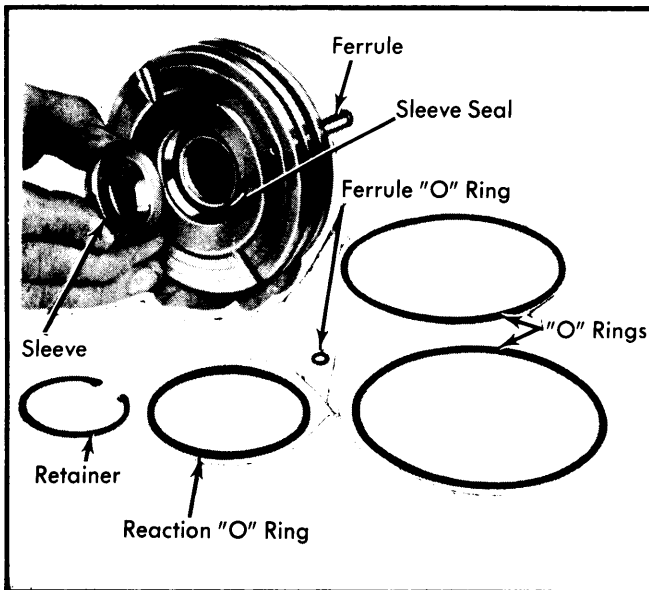


Fig. 3 Cylinder Head Oil Seals

8) Position spacer assembly over center race. Dowel pin should be engaged in slot in race and cylinder head ferrule should pass through slot in spacer. This aligns valve pivot lever hole in center bearing race with valve pivot lever hole in center bearing spacer assembly.

9) Install upper reaction ring on center race and spacer with flange against spacer. Install upper reaction spring over reaction ring with cylinder head ferrule passing through hole in reaction spring. Install worm balancing ring (without flange) inside upper reaction ring. Lubricate ferrule "O" ring with petroleum jelly and install in groove on cylinder head ferrule.

10) If oil seal was removed from housing head, install new seal with lip facing bearing. Drive seal into head until seal

driver (C-3650) bottoms on support. Lubricate and install reaction seal in groove in face of housing head with flat side of seal out. Install "O" ring in groove on housing head.

**NOTE** — The small "O" ring for the ferrule groove should not be installed until after the upper reaction spring and spacer have been installed.

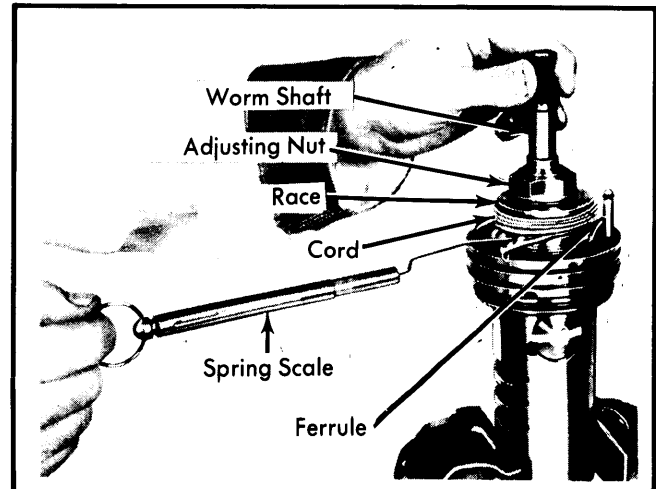


Fig. 4 Measuring Center Bearing Preload

11) Slide housing head over worm shaft, carefully engaging cylinder ferrule and "O" ring. Make sure reaction rings enter circular groove in housing head. Install power train in gear housing. If gear shaft needle bearings require replacement, turn adjusting screw clockwise until sector shaft becomes disengaged from cover. Slide adjusting screw out of "T" slot in end of shaft.

12) Do not remove sector shaft oil seal unless replacement is necessary. To remove seal, pry out grease retainer, remove oil seal snap ring and seal retainer, then pry out oil seal. Use care to avoid scratching seal bore. Lubricate new seal with power steering fluid and position seal with lip toward housing. Drive seal into housing. Install seal retainer and snap ring with snap ring mark facing outward.

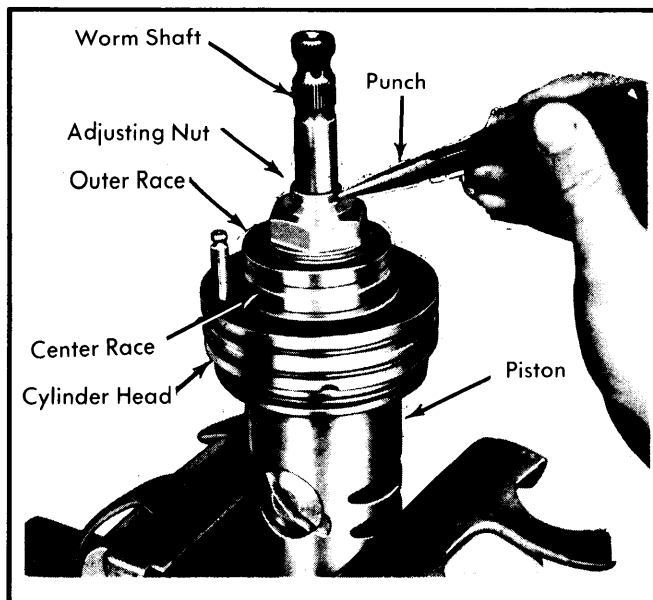
13) Fill housing cavity with multi-purpose grease. Position grease retainer on housing bore with metal side facing out. Drive retainer into housing until shoulder of driver tool (SP-5148) contacts gear housing.

14) Insert sector shaft and adjusting screw into cover. Using an Allen wrench, turn screw counterclockwise to pull shaft completely into cover. Install gasket, date tag and lock nut, but do not tighten. Install "O" ring in undercut shelf of cover.

15) Lubricate power train bore of housing and install power train. To keep reaction rings from coming out of their grooves, keep worm turned fully counterclockwise. Piston teeth must be facing to the right. Valve lever hole in center race and spacer must be in the "up" position. Ensure that cylinder head is bottomed on housing shoulder.

16) Align valve lever hole in center bearing race with valve lever hole in gear housing. Install valve lever (double bearing end first) into center race and spacer through hole in steering gear housing to engage center race and spacer. Slots in valve lever must be parallel to wormshaft.

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**Fig. 5 Staking Adjusting Nut Onto Worm Shaft**

**17)** Tap lightly on end of lever to seat lower pivot point in center race. Center lever in housing hole by turning housing head. Install housing head tans washer to index with groove in housing. Install spanner nut and tighten. Valve lever must remain centered in housing hole. Turn wormshaft until piston bottoms in both directions and note action of lever.

**18)** Valve lever must be in center of hole and snap back to its center position when wormshaft torque is relieved. Install valve lever spring (small end first). Set power piston at center of travel. Install gear shaft and cover assembly with sector teeth indexed to rack piston teeth. Make sure that cover "O" ring is installed correctly and tighten cover spanner nut.

**19)** Install valve body on housing making sure valve pivot lever enters hole in valve spool. Ensure "O" ring seals are in place. Tighten valve mounting screws. If new wormshaft and piston assembly have been installed, master serration on power steering gear worm shaft spline must be machined to properly center steering shaft coupling.

**20)** To remove master serration, steering gear must be assembled and wormshaft in the center of its travel. With steering gear in its normal upright position, use a file to remove 1 tooth of the spline at the 12 o'clock position.

### SECTOR SHAFT OIL SEAL

**1)** Sector shaft oil seal may be replaced without removing steering gear from vehicle. Remove steering arm nut. Disconnect steering gear arm from sector shaft with tool C-4150 or equivalent or damage to "T" slot ears on sector shaft

will result. Slide a threaded adapter (SP-3056 of tool C-3350) over end of sector shaft and threaded tool nut on sector shaft. Maintain pressure on threaded adapter with tool nut while screwing adapter far enough to engage metal portion of grease retainer. Place the two half rings (SP-1932), and tool retainer ring over both portions of the tool. Turn tool nut counterclockwise to remove retainer. Remove oil seal snap ring and seal back-up washer. Remove inner seal in same manner and using same tools as for grease retainer.

**2)** An acceptable alternate method of removing sector shaft oil seal, after disconnecting steering arm, is as follows: Carefully pry grease seal out of housing, then remove oil seal retaining snap ring and seal retainer. Place receptacle under gear and start engine. Turn steering wheel all the way to full left turn. Oil pressure will force seal out of housing.

**3)** Place new seal on flat surface (lip down), lubricate inner diameter with power steering fluid and insert seal protector sleeve (SP-1601). Position seal on sector shaft (seal lip in). Place tool adapter (SP-5148) with long step against new seal, slide it over shaft with seal lip toward housing. Install tool nut on sector shaft and tighten until shoulder of adapter contacts gear housing. Remove tool nut and adapter.

**4)** Install seal retainer and oil seal snap ring (identification stamp to outside). Fill housing cavity with multi-purpose grease and position grease retainer in housing bore. Place tool adapter (SP-5148) with short step of lip against retainer. Install tool nut on sector shaft and tighten tool nut until shoulder contacts gear housing. With steering gear and wheels in straight ahead position, install steering gear arm and nut.

### WORM SHAFT OIL SEAL

Worm shaft oil seal may be replaced without removing steering gear from vehicle. Remove steering column, then remove oil seal using suitable tool (C-3638). Drive new oil seal in place (lip of seal toward housing), install and align steering column.

### TIGHTENING SPECIFICATIONS

Application	Ft. Lbs. (N·m)
Steering Gear Mounting Bolts .....	100 (136)
Sector Shaft Adjusting Screw Lock Nut .....	28 (38)
Sector Shaft Cover Spanner Nut .....	150 (204)
Pitman Arm Nut .....	175 (238)
Housing Head Spanner Nut .....	200 (272)
Valve Body End Plug .....	50 (68)
Steering Wheel Nut .....	45 (61)
Valve Body Attaching Bolts .....	96 INCH Lbs. (11)