

steering efforts, increased valve displacement will give the driver proportionately higher assisting pressure. The driver will have a smooth hydraulic assist at all times.

When the driver stops applying steering effort, the valve is forced back to a centered position by the torsion bar. When this occurs, pressure is equalized on both sides of the piston. The steering geometry will tend to return the front wheels to the straight-ahead position.

**NOTE: A hissing noise is a normal characteristic of rotary valve steering gear and in no way affects steering. Do not replace the shaft and control assembly unless the hissing noise is**

**extremely objectionable. A replacement valve will also exhibit slight noise, and is not always a cure for the complaint. Any metal-to-metal contacts at the flexible steering shaft coupling (due to column misalignment) will transmit valve hissing noise into the passenger compartment.**

The only service that can be performed on the control valve assembly is replacement of the four (4) teflon seals on the valve sleeve.

There is no provision for adjusting the steering or turning effort. Refer to Adjustments for instructions.

## ADJUSTMENTS

### MESH LOAD

During the vehicle breaking-in period, some factory adjustments may change. These changes will not necessarily affect operation of the steering gear assembly, and need not be adjusted unless there is excessive lash or other malfunctioning.

#### Adjustment in Vehicle

Adjust the total-over-center position load to eliminate excessive lash between the sector and rack teeth as follows:

1. Disconnect the Pitman arm from the sector shaft.
2. Disconnect the fluid return line at the reservoir and cap the reservoir return line pipe.
3. Place the end of the return line in a clean container and turn the steering wheel from left to right to discharge the fluid from the gear.
4. Turn the steering wheel to 45 degrees from the left stop.
5. Using an in-lb torque wrench on the steering wheel nut, determine the torque required to rotate the shaft slowly approximately 1/8 turn from the 45 degree position.
6. Turn the steering wheel back to center, and determine the torque required to rotate the shaft back and forth across the center position. Loosen the nut, and turn the adjuster screw (Fig. 2) until the reading is 14 to 18 in-lb greater than the torque measured at 45 degrees from the stop. Tighten the nut while holding the screw in place.
7. Recheck the readings and replace the Pitman arm and steering wheel hub cover.
8. Connect the fluid return line to the reservoir and fill the reservoir as specified in Part 13-01. **Do not pry against the reservoir to obtain proper belt load. Pressure may deform the reservoir causing it to leak.**
9. Recheck belt tension and adjust, if necessary. Torque the bolts and nut to 30 to 40 ft-lb.

### ROTARY VALVE CENTERING CHECK

1. Install a 0-2000 PSI pressure gauge (Tool T56L-33610-D) in the pressure line between the power steering pump outlet port and the integral steering gear inlet port. **Be sure that the valve on the gauge is fully open.**

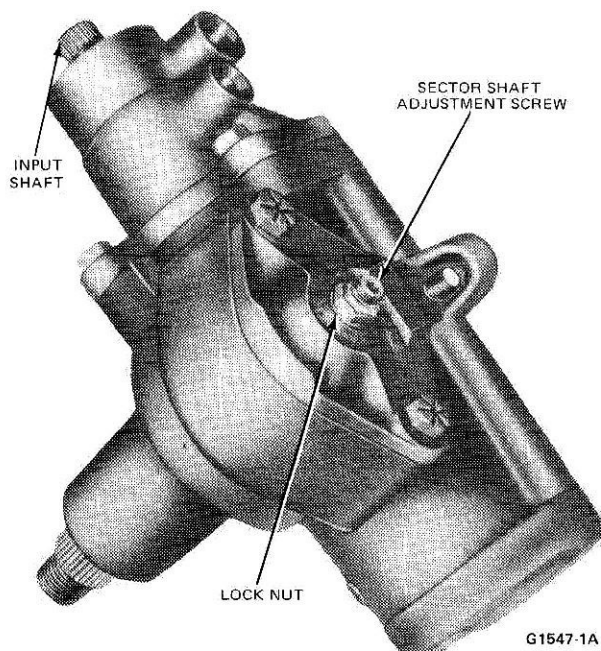


FIG. 2 Adjusting Mesh Load

2. Check the fluid level in the reservoir and add fluid if necessary.
3. Start the engine and turn the steering wheel from stop-to-stop to bring the steering lubricant to normal operating temperature. Turn off the engine and recheck the fluid level. Add fluid, if necessary.
4. With the engine running at approximately 1000 rpm and the steering wheel centered, attach an in-lb torque wrench to the steering wheel nut. Apply sufficient torque in each direction to get a gauge reading of 250 PSI.
5. The torque wrench readings should be the same in both directions at 250 PSI. If the difference between the readings exceeds 4 in-lbs, remove the steering gear and replace the shaft and control assembly.
6. When performing the valve spool centering check outside the vehicle, use the procedures described above, except take the torque and pressure readings at the right and left stops instead of either side of center.

## REMOVAL AND INSTALLATION

### STEERING GEAR

#### Removal

1. Tag the pressure and return lines for future identification.
2. Disconnect the pressure and return lines from the steering gear. Plug the lines and ports in the gear to prevent entry of dirt.
3. Remove the bolts that secure the flexible coupling to the steering gear and column.
4. Raise the vehicle and remove the sector shaft attaching nut.
5. Remove the Pitman arm from the sector shaft with Tool T64P-3590-F. Remove the tool from the Pitman arm. **Do not damage the seals.**
6. On vehicles with standard transmissions, remove the clutch release lever retracting spring to provide clearance for removing the steering gear.
7. Support the steering gear. Remove the steering gear attaching bolts.
8. Remove the clamp bolt that holds the flexible coupling to the steering gear. Work the gear free of the flex coupling and remove.
9. If the flex coupling did not come off with the gear, lift it off the shaft.

#### Installation

1. Slide the flex coupling into place on the steering shaft assembly. Turn the steering wheel so the spokes are in the normal position.
2. Center the steering gear input shaft.
3. Slide the steering gear input shaft into the flex coupling and into place on the frame side rail. Install the attaching bolts and torque to specification.
4. Be sure the wheels are in the straight ahead position. Then install the Pitman arm on the sector shaft. Install and tighten the sector shaft and attaching bolts. Torque the bolts to specification.
5. Move the flex coupling into place on the input and steering column shaft. Install the attaching bolts and torque to specification.
6. Connect the pressure and the return lines to the steering gear. Tighten the lines.
7. Fill the reservoir as described in Part 13-01. Turn the steering wheel from stop-to-stop to distribute the fluid.
8. Recheck the fluid level and add fluid, if necessary.
9. Start the engine and turn the steering wheel from left to right. Inspect for fluid leaks.

## DISASSEMBLY AND ASSEMBLY

Take the following precautions when servicing the steering gear:

1. Use a clean workbench and tools.
2. Thoroughly clean the exterior of the unit with solvent. Drain off excess hydraulic oil, if necessary.
3. **Handle all parts carefully to avoid nicks, burrs, scratches and dirt.**
4. **Do not use solvent on seals.**

### STEERING GEAR

#### Disassembly

1. Hold the steering gear upside down over a drain pan and turn the input shaft from left to right several times to drain the fluid from the gear.
2. Using mounting pads for support, secure the gear in a Bench Mounted Holding Fixture T57L-500-A.
3. Remove the lock nut from the adjusting screw.
4. Turn the input shaft to either stop, then back approximately one and three-quarter turns to center the gear.
5. Remove the sector shaft cover bolts, brake line bracket, and identification tag.
6. Tap the lower end of the sector shaft with a soft-hammer to loosen it, then lift the cover and shaft as an assembly from the housing. Discard the O-ring.
7. Turn the sector shaft cover counterclockwise to remove the cover from the adjuster screw.
8. Remove the valve housing attaching bolts. Hold the piston to keep it from spinning off the shaft and

separate the valve housing from the steering gear housing. Remove the valve housing and control valve seals. Discard the seals.

9. Stand the valve body and piston on end with the piston end down. Rotate the input shaft counterclockwise out of the piston allowing the ball bearings to drop into the piston.
10. Place cloth over the open end of the piston and turn it upside down to remove the balls.
11. Remove the screws that attach the ball guide clamp (Fig. 5) to the ball nut. Remove the clamp and the guides.
12. Install the valve body assembly in the bench mounted holding fixture Tool T57L-500-A, and loosen the Allen head face nut screw in the valve housing. Remove the worm bearing race nut (Fig. 3).
13. Carefully slide the input shaft, worm, and valve assembly out of the valve housing. Due to the close fit between the valve sleeve and housing, the slightest cocking of the spool may jam it in the housing and damage the sleeve and the rings on the sleeve.

#### Assembly

1. Mount the valve housing in the bench mounted holding fixture Tool T57L-500-A, with the flanged end up.
2. Apply a light coat of gear lubricant to the valve sleeve rings on the valve sleeve.
3. Carefully install the worm and valve in the housing.
4. Install the race nut in the housing and torque it to specification (Fig. 4). Refer to special torque procedure in Specifications Section.

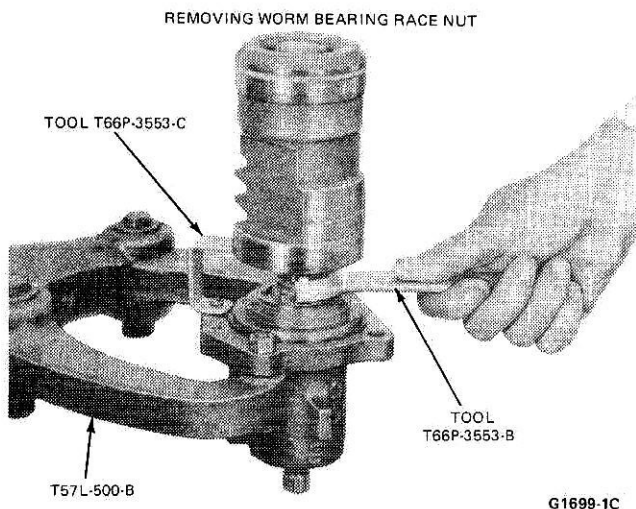


FIG. 3 Removing Worm Bearing Race Nut

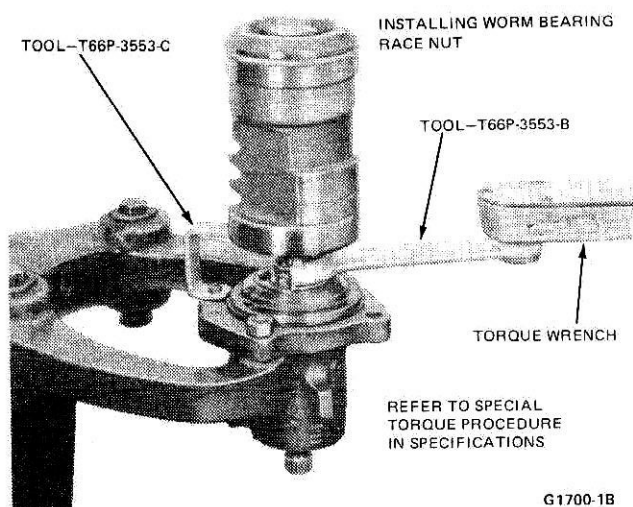


FIG. 4 Installing Worm Bearing Race Nut

5. Install the Allen head race nut set screw through the valve housing and torque to specification.
6. Place the piston on the bench with the ball guide holes up. Insert the worm shaft into the piston so the first groove is in line with the hole nearest the center of the piston (Fig. 6).

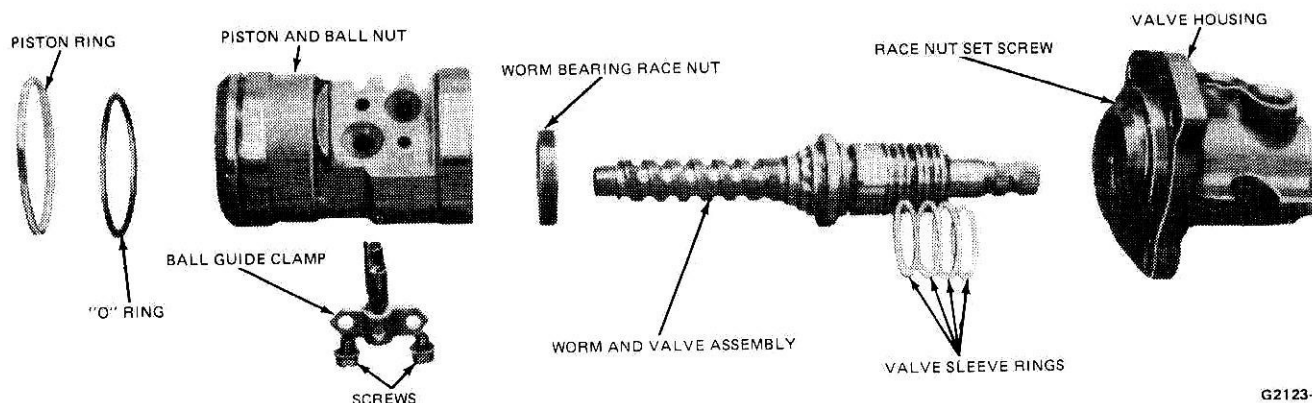


FIG. 5 Ball Nut and Housing Disassembled—Rotary Valve Type

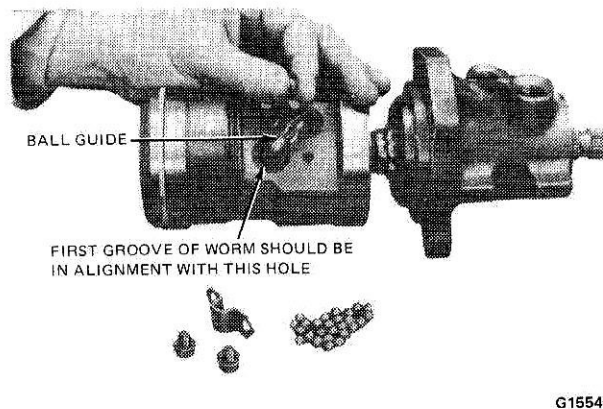


FIG. 6 Assembling Piston on Worm Shaft

7. Place the ball guide in the piston. Turning the worm clockwise, as viewed from the input end of the shaft, place 27 to 29 balls, depending on the piston design, in the ball guide (Fig. 6). If all the balls have not been inserted upon reaching the right stop, rotate the input shaft in one direction then the other while inserting the remaining balls. Once the balls are inserted, do not rotate the input shaft or piston more than three and one-half turns off the right stop, or the balls will fall out of the circuit.
8. Secure the guides in the ball nut with the clamp (Fig. 6).
9. Apply petroleum jelly to the seal on the piston.
10. Place new control valve seals on the valve housing.
11. Slide the piston and valve into the gear housing. **Do not damage the seal.**
12. Align the lube passage in the valve housing with the passage in the gear housing. Install **but do not tighten** the attaching bolts.
13. Rotate the ball nut so the teeth are in the same plane as the sector teeth. Torque the valve housing bolts to specification.
14. Install the sector shaft cover O-ring in the steering gear housing. Turn the input shaft to center the piston.
15. Apply petroleum jelly to the sector shaft journal. Position the sector shaft and cover assembly in the gear housing. Install the brake line bracket, steering