

Steering Linkage

GENERAL MOTORS

STEERING SERVICE PRECAUTIONS

All steering component fasteners are made of special quality materials. Replacement fasteners must be of same part number or equivalent. Torque all fasteners to specification and install new cotter pins. When installing cotter pins, do not back off castellated nuts to align cotter pin hole, tighten nut to next slot that lines up with hole.

Do not hammer on ball studs or damage to threads may result. If threads are not clean and smooth, ball studs may turn in joint when nuts are tightened. Sleeve clamps must always be positioned as specified before tightening bolts.

SERVICE PROCEDURES

Tie Rod Replacement

1) Raise vehicle and remove tie rod fasteners. Use removal tool (J-6627), or remove outer ball stud by tapping on steering arm at tie rod end. Use a light hammer with a heavy hammer as backing. Remove inner ball stud from relay rod using same procedure.

2) To remove tie rod ends from tie rod, loosen clamp bolts and unscrew end assemblies. Tie rod adjuster clamp bolts often become rusted in service. If rusted, discard the nuts and bolts.

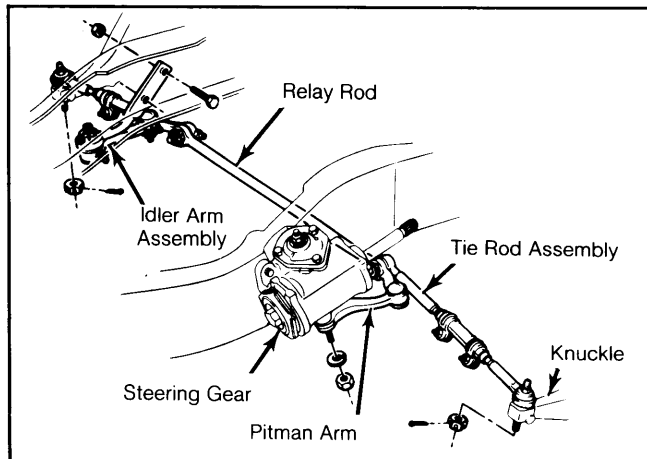
3) Apply penetrating oil between clamps and tube. Rotate clamps until they move freely. Use new fasteners of same part number during reassembly to assure proper clamping at specified torque.

4) Lubricate tie rod threads with EP chassis lube and install tie rod ends. Ensure both are threaded an equal distance from tie rod. Check that threads on ball studs and nuts are clean and smooth.

5) Check condition of ball stud seals and replace if necessary using suitable tool (J-24434). Install ball studs in steering arms and relay rod. Install ball stud nuts and new cotter pins. Adjust toe-in. See *Wheel Alignment Specifications & Procedures in WHEEL ALIGNMENT Section*.

6) Before tightening tie rod adjusting sleeve clamp bolt, note the following: Clamps must be between locating dimples at either end of sleeve. Adjuster sleeve slot must not be within open area of clamp jaw opening. See Figs. 6 and 7.

Fig. 1: "C" Model Steering Linkage



7) Rotate both inner and outer tie rod housing rearward to limit of ball joint travel before tightening clamps. After tightening clamps, return tie rod assembly to center of travel. Check each tie rod for a rotation of at least 35° using a bubble protractor and a pair of vise grips. Lubricate inner and outer tie rod ends.

Fig. 2: "G" Model Steering Linkage

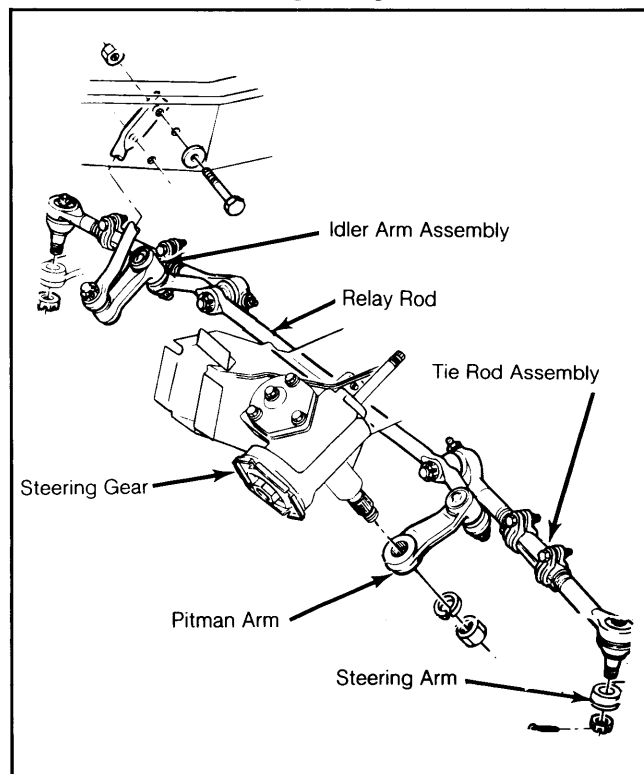
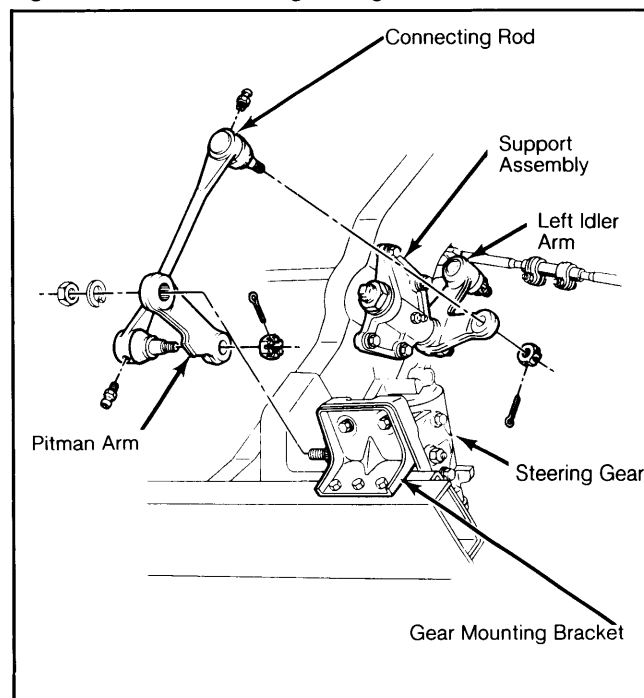


Fig. 3: "P" Model Steering Linkage



GENERAL MOTORS (Cont.)

Fig. 4: "K" Model Steering Linkage

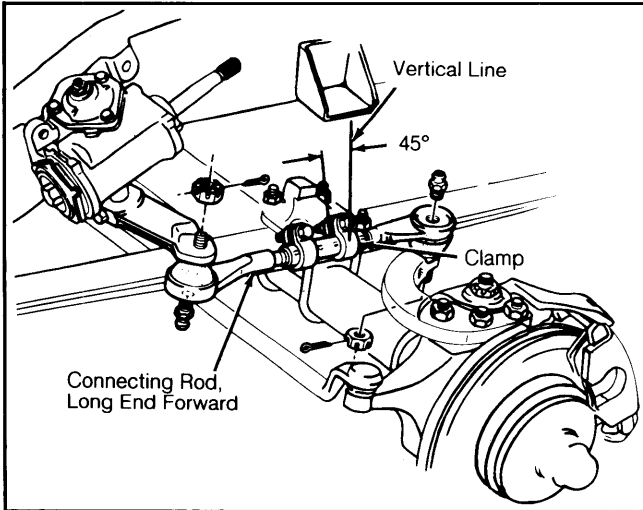
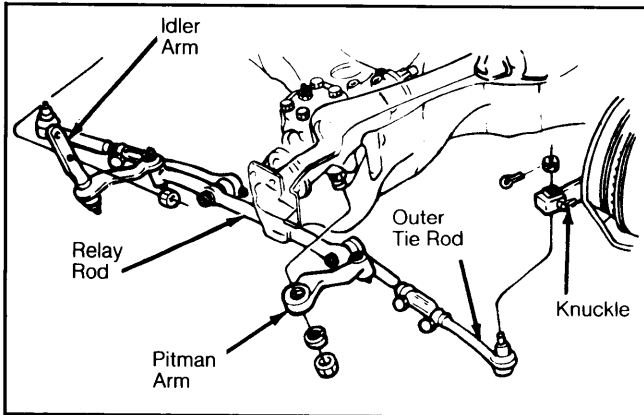


Fig. 5: "S" Model Steering Linkage

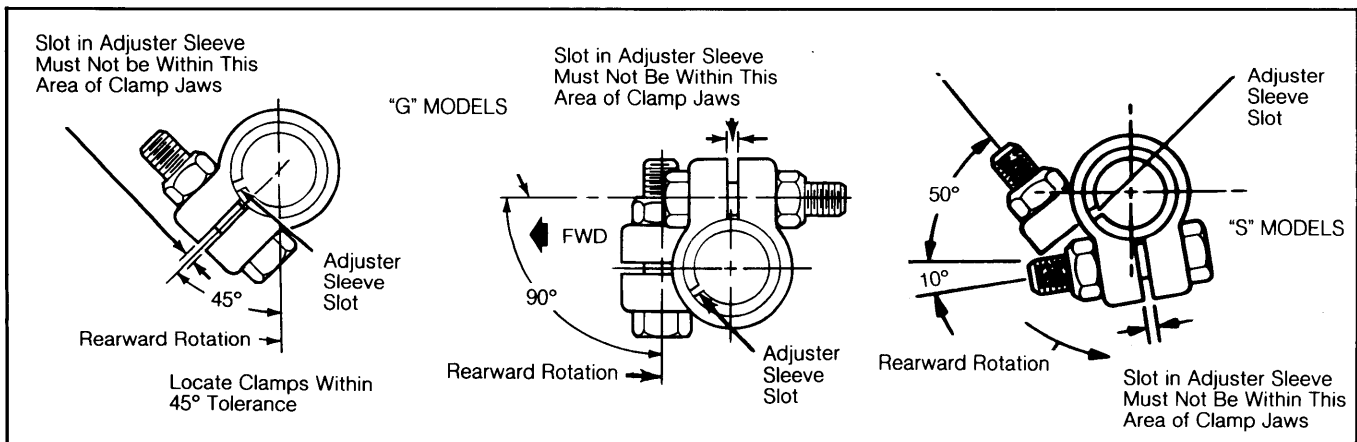


Relay Rod Replacement

1) Raise vehicle on hoist. Remove inner ends of tie rods from relay rod. Remove nuts from pitman arm and idler arm ball studs at relay rod. Remove relay rod from pitman and idler arms by tapping on relay rod ball stud bosses. Use a light hammer with heavy hammer as a backing. Remove relay rod.

2) To install, reverse removal procedure. Check ball studs and nuts for clean and smooth threads.

Fig. 6: Tie Rod Clamp Position



Check stud seals and replace if necessary. Torque nuts and install new cotter pins.

Idler Arm Replacement

1) Place vehicle on hoist. Remove fasteners from ball stud and relay rod. Remove ball stud from relay rod by tapping on relay rod boss with a light hammer, while using a heavy hammer as a backing. Remove idler arm-to-frame bolts and remove idler arm assembly.

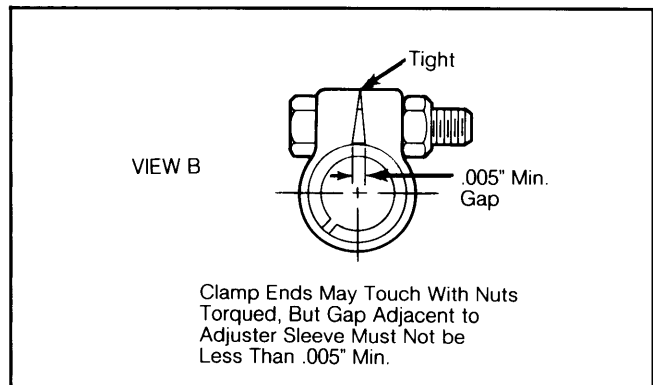
NOTE: Idler arm assembly should always be replaced if an up and down force of 25 lbs. (11 kg), applied at relay rod end of idler arm, produces a lash of more than 1/8" (3 mm) in straight ahead position.

2) To install, reverse removal procedure while noting the following: Ensure that threads on studs and nuts are clean and smooth. Check ball stud seals and replace if necessary. Install connecting rod while making sure long end of rod is toward pitman arm. See illustrations for proper alignment and orientation of connecting rod clamps.

Pitman Arm Replacement

1) Raise vehicle on hoist. Remove cotter pin from pitman arm ball stud and remove nut. Remove pitman arm or relay rod from ball stud by tapping on side of rod or arm (in which stud mounts) with a hammer while using heavier hammer as a backing. Remove pitman arm

Fig. 7: Tie Rod Clamp Tightness



Steering Linkage

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nut from shaft or clamp bolt from pitman arm, and mark arm-to-shaft position. Remove pitman arm from shaft using suitable puller.

2) To install, reverse removal procedure. If a clamp type pitman arm is used, spread pitman arm with a wedge just enough to slip arm onto shaft by hand pressure. Do not hammer on or damage to steering gear may result. Be sure to reinstall the hardened steel washer before installing nut.

Steering Connecting Rod Replacement (4-WD Models)

1) Remove cotter pins from ball studs and remove castellated nuts. Remove ball studs from steering arm and pitman arm boss by tapping with a light hammer while using a heavy hammer as a backing.

2) To install, reverse removal procedure. Ensure threads on studs and nuts are clean and smooth. Check ball stud seals and replace if necessary. Install connecting rod on steering components, tighten nuts and install new cotter pins. See illustration for proper alignment and orientation of connecting rod clamps.

TIGHTENING SPECIFICATIONS

Application	Ft. Lbs. (N.m)
Tie Rod Ball Stud Nuts	150 (68)
Tie Rod Clamps	
"S" Trucks	14 (19)
All Other Models	22 (30)
Idle Arm Mounting Bolt	30 (41)
Idle Arm-to-Relay Rod Nut	266 (90)
Pitman Arm-to-Relay Rod Nut	266 (90)
Steering Connecting Rod Nut	
P10/30 & Motor Home Chassis	370 (95)
K10/20	150 (68)
Steering Connecting Rod Clamps	40 (54)
Pitman Arm-to-Pitman Shaft Nut	
K10/20	90 (122)
Motor Home Chassis	125 (170)
All Other Models	180 (244)

- 1 — Plus torque required to align cotter pin.
- 2 — Seat the taper using a free-spinning nut, then install lock nut
- 3 — Plus torque required to align cotter pin. Maximum torque of 100 ft. lbs. (136 N.m).

JEEP

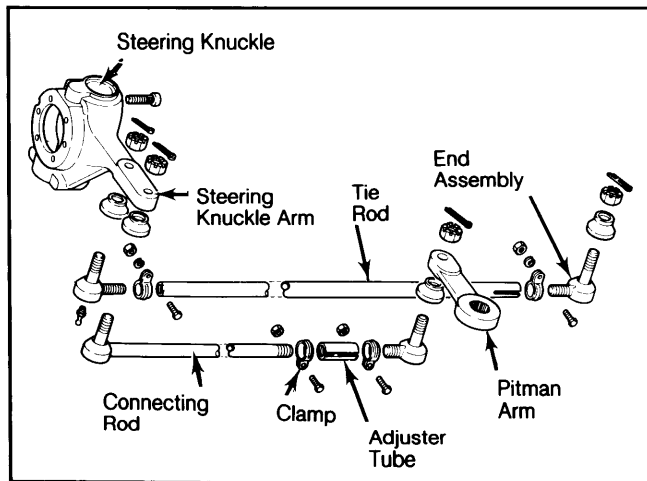
SERVICE PROCEDURES

Tie Rod Replacement

1) Remove cotter pins and retaining nuts at both ends of tie rod and from end of connecting rod where it attaches to tie rod. Disconnect steering damper push rod at tie rod bracket. Remove tie rod ends from steering arms and connecting rod using a puller or expansion fork.

2) To install, attach tie rod ends to steering arms. Tighten nuts and install new cotter pins. Attach connecting rod, tighten nuts, and install new cotter pin. Attach steering damper. Check and adjust toe-in as necessary.

Fig. 1: Disassembled View of Steering Linkage



"CJ" & Scrambler models shown.

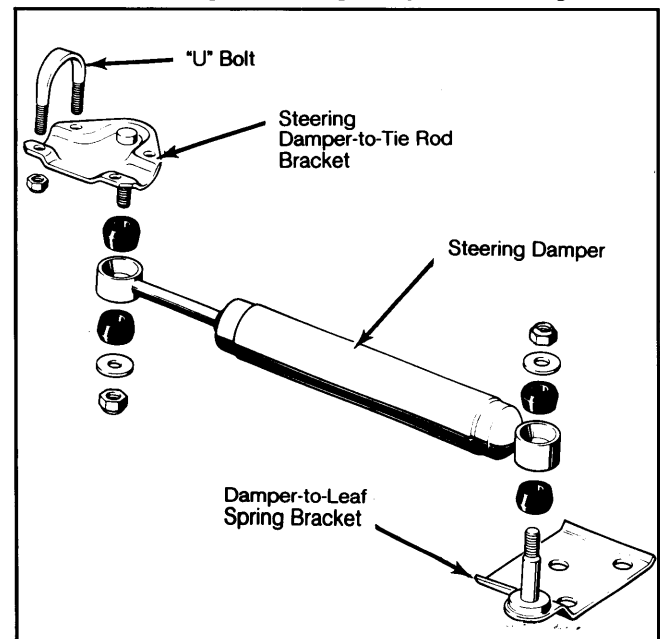
Steering Damper Replacement

1) With front wheels in straight-ahead position, remove lock nut securing damper to bracket on tie plate,

then lift damper off stud. Remove lock nut securing push rod end to tie rod bracket and remove damper assembly.

2) To install, install rubber bushings in damper eyelets, then secure eyelet at push rod end to stud on tie rod bracket with attaching hardware. Install rubber bushings in damper body eyelet. Extend push rod by pulling back on damper body until eyelet can be located on, and secured to, stud on damper bracket. Tighten all lock nuts.

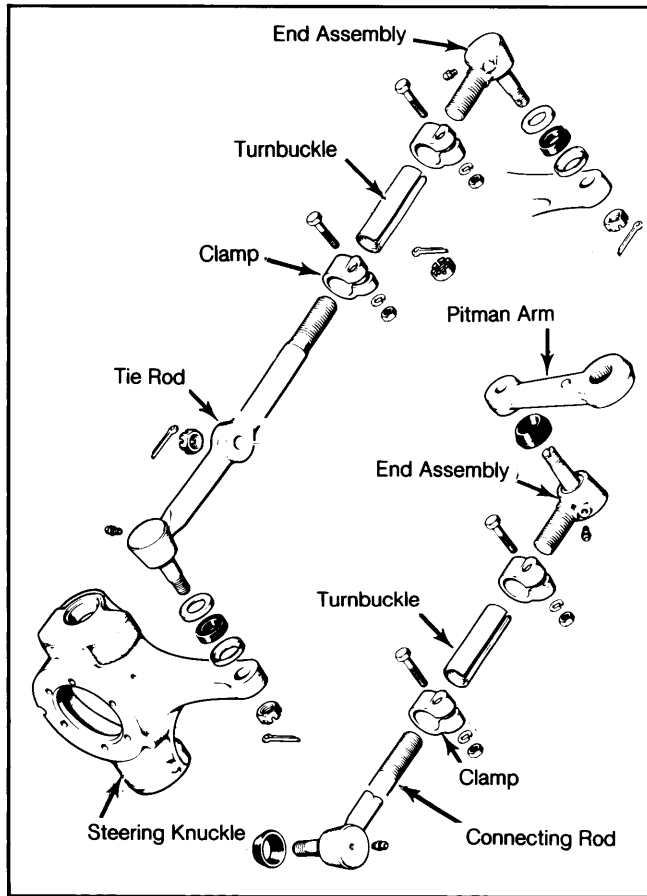
Fig. 2: Positioning of Steering Damper Bushings



All models except "CJ" & Scrambler.

JEEP (Cont.)

Fig. 3: Disassembled View of Steering Linkage

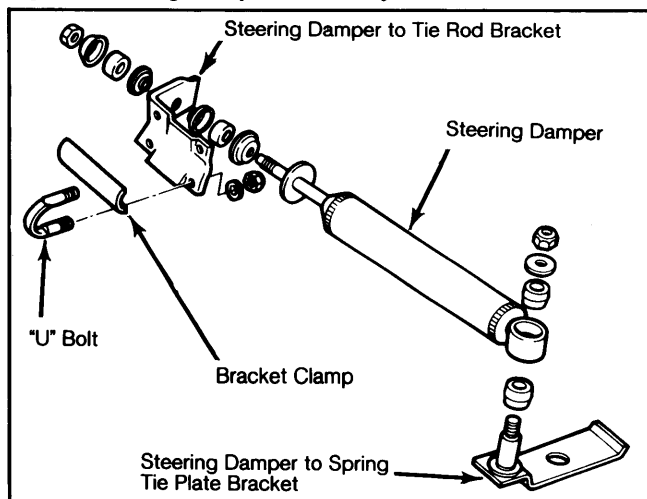


Cherokee, Wagoneer & Truck models shown.

Connecting Rod Replacement

Remove cotter pins and nuts from both ends of connecting rod, then remove rod. When installing, be sure wheels are in straight ahead position and steering arm is parallel to centerline of vehicle. Have steering gear steering arm properly indexed, with line marks on steering arm, and gear shaft in center of high point. With steering arm so positioned, install connecting rod.

Fig. 4: Steering Damper Assembly



"CJ" & Scrambler models shown.

TIGHTENING SPECIFICATIONS

Application	Ft. Lbs. (N.m)
Connecting Rod Clamp Bolt	
"CJ" & Scrambler Models	10-15 (14-20)
All Other Models	25-35 (34-48)
Connecting Rod $\frac{5}{8}$ " (To Castellated Nut Slot)	70 (95) Min.
Connecting Rod $\frac{9}{16}$ " (To Castellated Nut Slot)	60 (82) Min.
Pitman Arm-to-Shaft	160-210 (218-286)
Tie Rod Clamp Bolt	
CJ & Scrambler Models	10-15 (14-20)
All Other Models	25-35 (34-48)
Tie Rod Stud Nuts (To Castellated Nut Slot)	
CJ & Scrambler	40 (54) Min.
All Other Models	60 (82) Min.
Steering Damper Lock Nut	
CJ & Scrambler Models	16-28 (22-38)
All Other Models	24-36 (33-49)