

1971-72 MAZDA

Mazda R-100 (1971)
 Mazda 616 (1971-72)
 Mazda 1200 (1971-72)
 Mazda RX-2 (1971-72)
 Mazda RX-3 (1972)
 Mazda 808 (1972)
 Mazda B-1600 Pickup (1972)

DESCRIPTION

Steering system consists of the steering gear, steering column, steering lock assembly (Models RX-3 and 808), steering wheel, and steering linkage. Steering gear is of a recirculating ball nut type and steering gear ratio varies according to the turning angle of the sector shaft. Steering linkage consists of the pitman arm, center link (pitman arm to idler arm), idler arm and bracket assembly, and tie rods.

ADJUSTMENT

STEERING SECTOR GEAR
& BALL NUT BACKLASH

1) If steering wheel play is excessive, check for loose steering linkage ball joints, loose steering gear or idler arm assembly attaching bolts, or loose wheel bearings. If inspection has found system to be satisfactory, adjust sector gear and ball nut backlash as follows:

2) Raise vehicle, turn steering wheel from one stop to the other, then turn wheel back exactly half-way to obtain center position. Loosen lock nut of adjusting screw (installed in side cover), then turn adjusting screw in or out until minimum backlash is obtained. Tighten adjusting screw lock nut. Rotate steering wheel and check to ensure that the sector shaft turns smoothly to the right and left without binding.

LUBRICATION

STEERING GEAR

Capacity — Approximately 0.5 pint (250 cc).

Fluid Type — S.A.E. EP 90 (All Seasons).

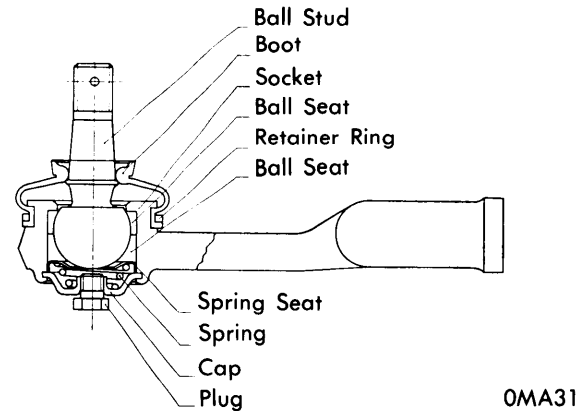
Service — Check fluid level every 12,000 miles (18,000 km) and add if necessary. Fluid should be level with top of filler hole. **NOTE** — After repair or overhaul, steering gear should not be refilled until after it has been installed in vehicle.

STEERING LINKAGE

Ball Joints — 1) All models except R-100 and 1200 have sealed ball joints which require no lubrication.

2) Models R-100 and 1200 ball joints are designed to be maintenance free for 30,000 miles (48,000 km). When lubrication of ball joints becomes necessary, proceed as follows:

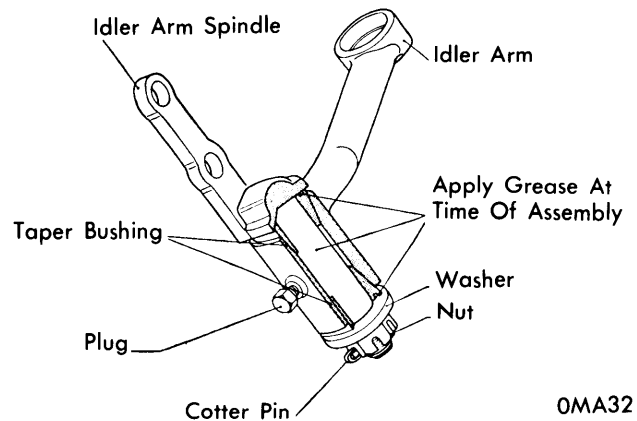
3) Check ball joint boot and retainer ring for damage and replace if necessary. Remove retainer ring from groove on boot and turn boot inside out. Remove plug and install lube fitting. Force new lithium grease into joint until old grease has been expelled, then reseal boot in groove on socket and install retainer ring. Add new grease until boot begins to balloon, then depress boot with fingers until about half the grease remains in boot. Wipe off excess grease, remove lube fitting and replace plug.



TIE ROD BALL JOINT

Idler Arm — 1) On Models RX-3 and 808, the idler arm is a sealed unit and requires no lubrication service.

2) On all other models, idler arm requires no lubrication for 30,000 miles (48,000 km). When lubrication of idler arm becomes necessary, proceed as follows: Remove plug and install lube fitting. Loosen nut retaining idler arm to bracket and force lithium grease into idler arm until grease appears. Remove lube fitting and replace plug. Tighten idler arm retaining nut to specification.



IDLER ARM (TYPICAL)

STEERING GEAR REMOVAL

Model R-100 — Loosen the worm shaft retaining bolt. Remove lighting and horn wire leads from coupler on instrument panel. Remove steering wheel and disconnect steering joint from wormshaft. Remove spring from steering joint. Raise vehicle and remove front wheel. Using a suitable ball joint puller, disconnect center link from pitman arm. Remove bolts and nuts retaining gear housing to frame and remove steering gear from vehicle. **CAUTION** — Note position of shim(s) for reference when readjusting the column shaft alignment.

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Model 616 (Separate Type Gear) — Loosen worm shaft retaining bolt. Raise vehicle and remove front wheel. Using a suitable puller, disconnect center link from pitman arm. Remove bolts and nuts retaining gear housing to frame and remove steering gear from vehicle. **CAUTION** — Note position of shim(s) for reference when readjusting the column shaft alignment.

Model 616 (Non-Separate Type Gear) — Remove horn cap attaching screws and remove horn cap. Mark steering wheel and column shaft for reassembly reference. Remove steering wheel nut, then remove steering wheel and horn lever assembly. Remove column lever, then remove combination switch assembly from column jacket. Remove steering column support bracket. Raise vehicle and remove front wheel. Using a suitable puller, disconnect center link from pitman arm. Remove bolts and nuts retaining gear housing to frame and remove steering gear from vehicle. **CAUTION** — Note position of shim(s) for reference when readjusting the column shaft alignment.

Model 1200 — Remove steering wheel and column cover. Remove dimmer switch assembly from column jacket. Raise vehicle and remove front wheel. Using a suitable puller, disconnect center link from pitman arm. Remove bolts and nuts retaining steering gear housing to frame. Apply soapsuds to column jacket, then remove steering gear housing from vehicle. **CAUTION** — Note position of shim(s) for reference when readjusting the column shaft alignment.

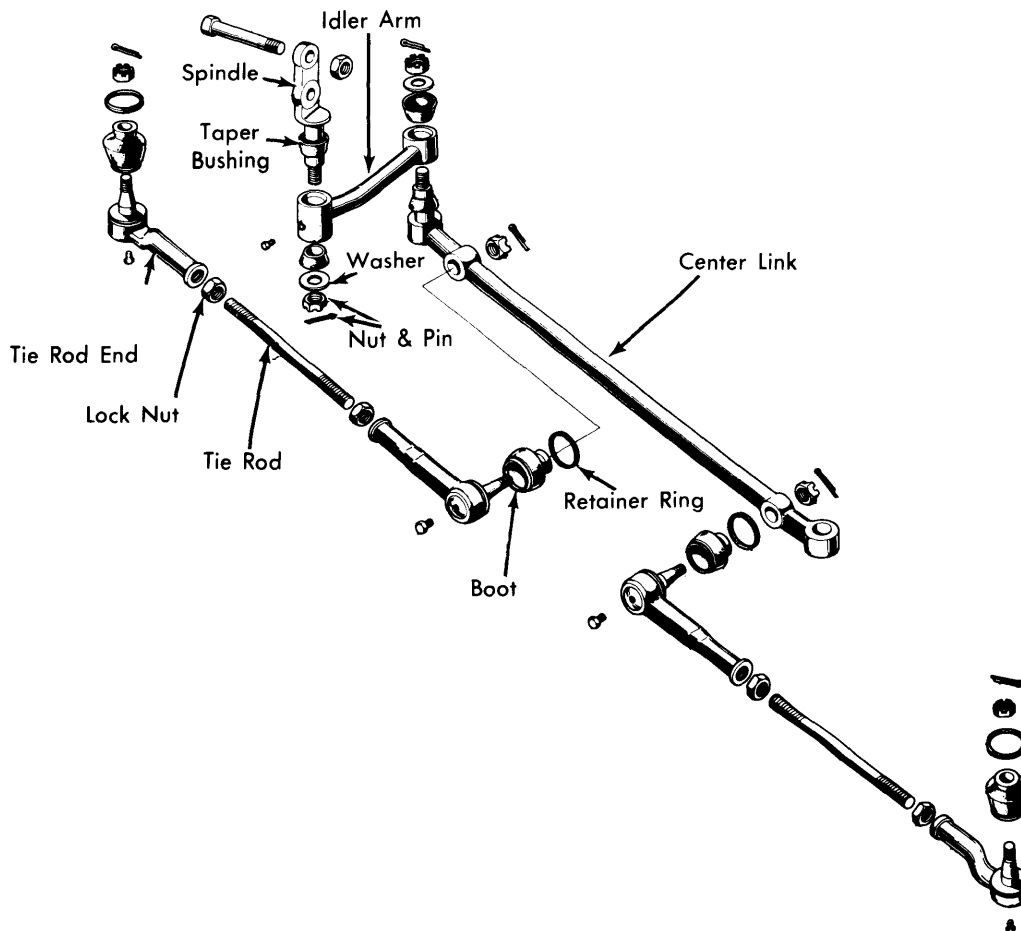
Model RX-2 — Loosen bolt retaining worm shaft to steering joint. Raise vehicle and remove front wheel. Using a suitable puller, disconnect center link from pitman arm. Remove bolts and nuts retaining steering gear housing to frame, then remove steering gear from vehicle. **CAUTION** — Note position of shim(s) for reference when readjusting the column shaft alignment.

Models RX-3 and 808 — 1) Remove horn cap attaching screws and remove horn ring. Mark steering wheel hub and worm shaft for reassembly reference. Remove steering wheel assembly. Pull out light switch knob, then remove column covers. Remove combination switch assembly retaining ring and lift switch assembly over worm shaft.

2) Disconnect wire connector from lock and switch assembly. Remove switch assembly attaching bolts with a screwdriver. **Note** — Cut slots in bolt heads to accommodate screwdriver blade. Remove lock and switch assembly.

3) Remove steering column support bracket. Open hood and remove steering column dust cover. Raise vehicle and remove front wheel. Using a suitable puller, disconnect center link from pitman arm. Remove bolts and nuts retaining steering gear housing to vehicle. **CAUTION** — Note position of shim(s) for reference when readjusting the column shaft alignment. Remove steering gear housing assembly from vehicle.

Model B-1600 Pickup — 1) Remove horn cap by turning cap retainer counterclockwise and remove horn contact cup and spring. Mark steering wheel hub and worm shaft for



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STEERING LINKAGE (TYPICAL)

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reassembly reference, then remove steering wheel. Remove light switch knob, then remove column cover. Remove stop ring, cancel cam and spring from end of column shaft. Disconnect wiring connections for combination switch assembly, remove switch attaching screws and remove switch assembly. Remove steering column support bracket. Loosen clamp at bottom of column jacket, then pull column jacket off shaft. Remove dust cover from dash panel.

2) Raise vehicle and remove front wheel. Remove nuts and bolts attaching upper arm shaft to support bracket. **CAUTION** — Note numbers and positions of the adjusting shims so that correct wheel alignment is obtained when reassembled. Remove left upper arm temporarily. Using a suitable puller, disconnect center link from pitman arm. Remove bolts and nuts retaining steering gear assembly to frame. **CAUTION** — Note position of shim(s) for reference when readjusting the column shaft alignment. Remove steering gear from vehicle.

STEERING GEAR INSTALLATION

NOTE — To install steering gear assembly, reverse removal procedure and note the following:

Model R-100 — To protect from rust, coat the steering joint spring with grease before installation.

Models RX-3 and 808 — Before installing gear housing to vehicle, install column jacket to instrument panel temporarily to obtain proper position of gear housing. Place shim in position to obtain correct shaft alignment. Use new bolts when installing steering lock and ignition switch assembly, then break head section of bolts after tightening to lock the steering lock assembly.

OVERHAUL

STEERING GEAR

NOTE — Overhaul procedures include both the separate type gear (without column jacket) and the non-separate type gear (with column jacket).

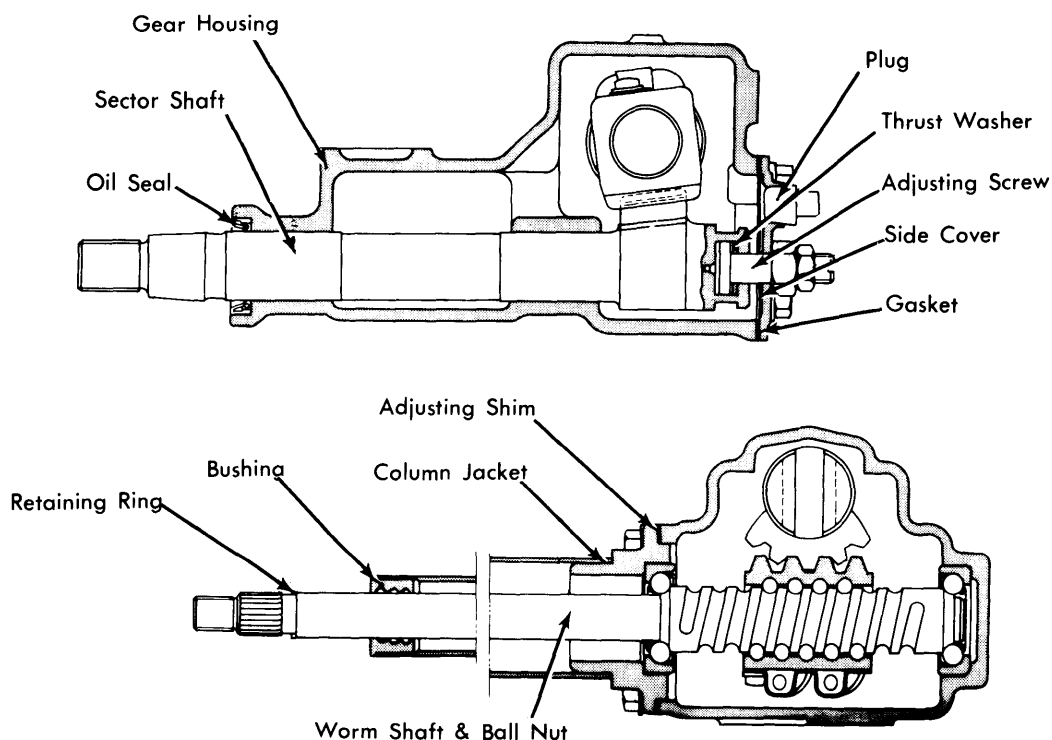
Disassembly — Remove filler plug and drain lubricant from gear housing. Remove pitman arm nut and remove arm with a suitable puller. Remove bolts attaching side cover to gear housing and loosen the sector shaft adjusting screw lock nut, then remove side cover and gasket by turning adjusting screw clockwise through cover. Remove sector shaft from gear housing. Remove column jacket (or end cover) bolts, then remove jacket (or cover) and shims from gear housing. Remove worm shaft and ball nut assembly from gear housing.

Inspection — 1) Check all parts for wear or damage. Check operation of ball nut assembly on worm shaft. If ball nut does not travel smoothly and freely on worm shaft, ball nut and worm shaft assembly should be replaced. **NOTE** - Worm shaft and ball nut are serviced as an assembly only.

2) On non-separate type gear, check the run-out of worm shaft with a dial indicator. Permissible run-out is under .006" (0.15 mm). If run-out is excessive, straighten in a press or replace.

3) Check oil seal(s) for wear or damage. If any possibility of oil leakage exists, replace seal(s).

4) Check clearance between sector shaft and bushings. Replace bushings if clearance exceeds .008" (0.20 mm). **NOTE** — Check oil grooves in bushings and replace with bushings of the same type.



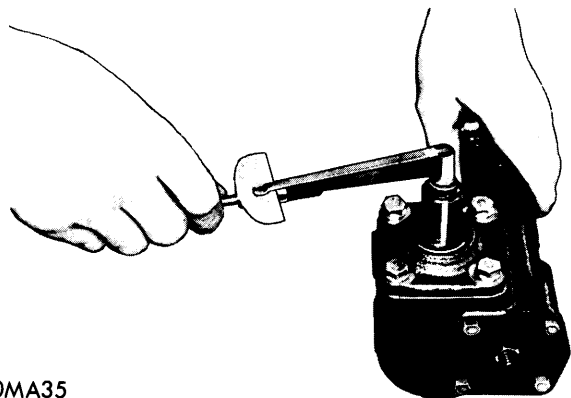
STEERING GEAR (TYPICAL) (NON-SEPARATE TYPE SHOWN)

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5) On non-separate type gear, check bushing in upper end of column jacket and replace bushing if damaged or worn.

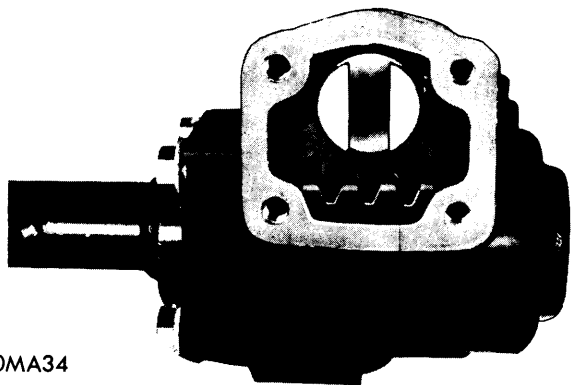
Reassembly & Adjustment - 1) Install worm shaft and ball nut assembly into gear housing. Install column jacket (or end cover) and bearing preload shims on gear housing and tighten attaching bolts.



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CHECKING PRELOAD

2) Adjust worm bearing preload as follows: With a torque wrench, rotate worm shaft and check the rotating torque. Rotating torque (preload) should be between 0.9 and 3.5 INCH lbs. (1.0 and 4.0 cmkg). If reading is not within these limits, add or delete shims as required. Selective shims are available in the following thicknesses: .002" (0.05 mm), .003" (0.075 mm), .004" (0.1 mm), and .008" (0.2 mm).



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SECTOR GEAR ALIGNED WITH RACK

3) Install sector shaft into gear housing, with the center of sector gear aligned with center of worm gear. Install sector shaft adjusting screw into slot at end of sector shaft. Check end clearance between sector shaft and adjusting screw with a feeler gauge and adjust this clearance to .001-.003" (.02-.08 mm) by inserting appropriate thrust washer. Thrust washers are available in the following thicknesses: .077" (1.95 mm), .079" (2.00 mm), .081" (2.05 mm), and .083" (2.10 mm).



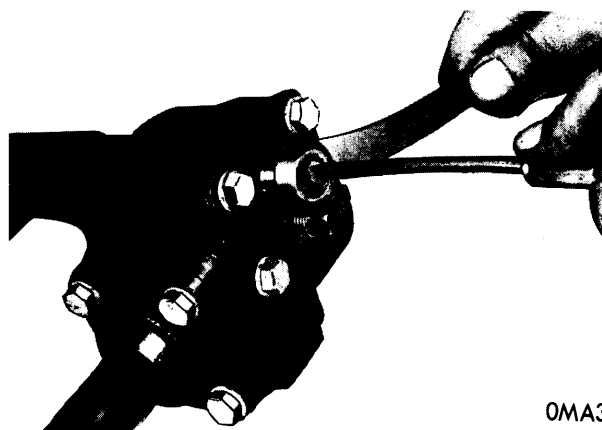
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CHECKING END CLEARANCE

4) Install side cover and gasket onto the sector shaft adjusting screw and turn adjusting screw until side cover is screwed into proper position. Install and tighten side cover bolts. Install pitman arm onto sector shaft, aligning identification marks of arm and sector shaft. Tighten pitman arm attaching nut to specification.

5) Adjust sector gear and ball nut backlash as follows: Turn worm shaft slowly and stop at the center position. Loosen adjusting screw lock nut and turn screw in or out until correct adjustment is obtained. Tighten adjusting screw lock nut. Rotate worm shaft and ensure that the sector shaft turns smoothly to the right and left.

Model	Backlash
R-100, 616, & 1200	Zero
RX-2 & RX-3	Zero to .004" (Zero to 0.10 mm)
808	Zero to .017" (Zero to 0.42 mm)
B-1600	Zero to .004" (Zero to 0.10 mm)



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ADJUSTING BACKLASH

Steering Gears & Linkage

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TIGHTENING SPECIFICATIONS

Model 616

Application	Ft. Lbs. (mkg)
Tie Rod Ball Joint	22 (3.0)
Tie Rod Lock Nut	54 (7.5)
Steering Gear Housing	36 (5.0)
Pitman Arm	108 (15.0)
Idler Arm	36 (5.0)
Steering Joint	11 (1.5)

Model 1200

Application	Ft. Lbs. (mkg)
Tie Rod Ball Joint	22 (3.0)
Steering Gear Housing	36 (5.0)
Pitman Arm	123 (17.0)
Idler Arm	36 (5.0)
Column Cover	25 (3.4)
Side Cover	17 (2.4)
Tie Rod Clamp Bolt	27 (3.8)
Center Link Ball Joint	22 (3.0)

Model RX-2

Application	Ft. Lbs. (mkg)
Tie Rod Ball Joint	18-25 (2.5-3.5)
Tie Rod Lock Nut	51-58 (7.0-8.0)
Steering Gear Housing	33-41 (4.5-5.7)
Pitman Arm	94-123 (13.0-17.0)
Center Link Ball Joint	18-25 (2.5-3.5)
Steering Wheel	22-29 (3.0-4.0)
Idler Arm Bracket	33-41 (4.5-5.7)
Idler Arm to Bracket & Center Link	36-58 (5.0-8.0)

Model RX-3

Application	Ft. Lbs. (mkg)
Steering Gear Housing	36 (5.0)
Steering Wheel	25 (3.5)
Pitman Arm	108 (15.0)
Idler Arm Spindle	47 (6.5)
Idler Arm Bracket	36 (5.0)
Tie Rod Ball Joint	22 (3.0)
Center Link Ball Joint	22 (3.0)
Tie Rod Lock Nut	54 (7.5)
Idler Arm to Center Link	22 (3.0)

Model 808

Application	Ft. Lbs. (mkg)
Steering Gear Housing	36 (5.0)
Steering Wheel	25 (3.5)
Pitman Arm	108 (15.0)
Idler Arm Bracket	36 (5.0)
Tie Rod Ball Joint	22 (3.0)
Center Link Ball Joint	22 (3.0)
Tie Rod Lock Nut	54 (7.5)
Idler Arm to Center Link	22 (3.0)

Model B-1600

Application	Ft. Lbs. (mkg)
Steering Gear Housing	33-41 (4.5-5.7)
Steering Wheel	22-29 (3.0-4.0)
Pitman Arm	108-130 (15.0-18.0)
Idler Arm Bracket	33-41 (4.5-5.7)
Center Link to Pitman Arm	22-29 (3.0-4.0)
Center Link to Idler	33-47 (4.5-6.5)
Tie Rod to Center Link	18-25 (2.5-3.5)
Tie Rod to Knuckle Arm	22-29 (3.0-4.0)
Tie Rod Clamp	13-18 (1.8-2.5)