

STEERING GEAR - MANUAL RACK & PINION

1991 Mazda Miata

1991 STEERING
Mazda - Manual Rack & Pinion

Miata, Protege, 323

DESCRIPTION

Rack and pinion steering gear is mounted by rubber insulators to crossmember. Pinion shaft is coupled to steering shaft. Tie rods connect ends of rack to steering knuckles.

ADJUSTMENTS

Adjustments to steering gear assembly are made during overhaul procedure.

REMOVAL & INSTALLATION

STEERING GEAR

Removal

- 1) Disconnect negative battery cable. Raise and support vehicle. Remove front wheels. On Miata, remove undercover.
- 2) On all models, remove cotter pins and castle nuts from tie rod ends. Using tie rod puller, separate tie rod ends from steering knuckles. Remove band securing rubber boot to steering gear.
- 3) Pull boot upward. Remove bolt and washer securing steering shaft to pinion coupler. Remove steering gear bracket bolts. Remove steering gear through left tie rod hole.

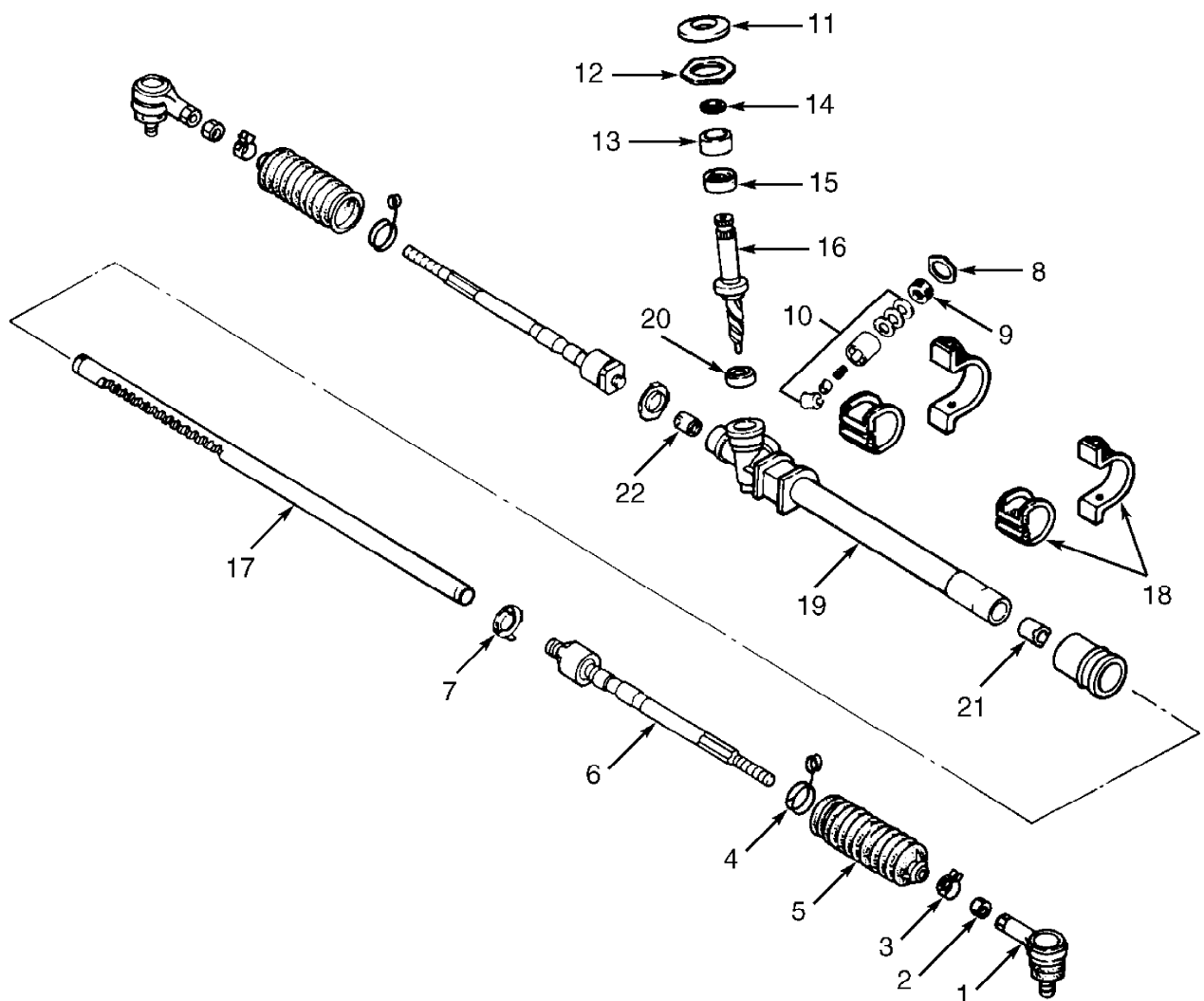
Installation

To install, reverse removal procedure. Tighten bolts and nuts to specification. See TORQUE SPECIFICATIONS TABLE at end of article. Check and adjust front toe-in. See WHEEL ALIGNMENT SPECIFICATIONS & PROCEDURES article.

OVERHAUL

Disassembly

- 1) Put steering gear assembly in soft-jawed vise. Reference mark tie rod ends for reassembly. Loosen lock nuts on tie rod ends and remove. Remove boot bands and boot wires. Slide boots off tie rods. Remove tie rods. See Fig. 1.



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|----------------|---------------------|-------------------|----------------------|
| 1. Tie Rod End | 7. Washer | 13. Rear Cover | 18. Mounting Bracket |
| 2. Lock Nut | 8. Lock Nut | 14. Oil Seal | 19. Gear Box |
| 3. Boot Band | 9. Adjusting Cover | 15. Upper Bearing | 20. Lower Bearing |
| 4. Boot Wire | 10. Roller Assembly | 16. Pinion Shaft | 21. Rack Bushing |
| 5. Boot | 11. Dust Cover | 17. Rack | 22. Bushing |
| 6. Tie Rod | 12. Lock Nut | | |

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Fig. 1: View of Manual Rack & Pinion Steering Gear Assembly (Typical)
Courtesy of Mazda Motors Corp.

2) Remove lock nut from adjusting cover. Remove adjusting cover. Carefully remove roller assembly. Lay components in order removed to ensure correct reassembly.

3) Remove dust cover, lock nut, rear cover, oil seal and upper bearing from pinion shaft. Remove pinion shaft. Taking care not to damage steering gear housing, remove rack.

4) To remove lower pinion bearing from steering gear housing, heat housing in water to about 176°F (80°C). Tap end of housing near bearing with plastic hammer to remove bearing.

NOTE: Remove lower bearing ONLY if excessively worn or damaged.
Replace with NEW bearing.

Inspection

1) Check tie rod ends for damage or excessive looseness. Check boots for cracks or damage. Ensure tie rods are not bent or scored. Replace components as necessary.

2) Inspect rack for excessive wear or tooth damage. Check pinion shaft and related parts for excessive wear or damage. Inspect roller assembly and rack support for excessive wear. Replace components as necessary.

3) Ensure steering gear housing is not damaged. Inspect housing bushings for wear or scoring. Replace if necessary.

Reassembly

1) Lubricate and press NEW lower bearing into steering gear housing. Lubricate rack and push into housing from tube side. Ensure housing bushings are not damaged during rack installation. Align flat side at end of rack with pinion shaft hole to allow pinion shaft installation without engaging teeth of either shaft.

2) Insert pinion shaft and seat firmly on lower bearing. Lubricate and install upper bearing on pinion shaft. Install NEW oil seal in rear cover. Put thread sealant on rear cover and install in housing.

NOTE: Rotate pinion shaft right and left several times to ensure seating of bearings.

3) Using pull gauge and Preload Lever (49 0180 510B), measure pinion starting torque. Tighten rear cover. Pinion shaft starting torque should be 7.1-13.8 ozs. (201-391 g). Ensure rear cover does not move. Tighten lock nut to specification. See TORQUE SPECIFICATIONS TABLE at end of article.

4) Position pinion shaft to center of rack. Ensure proper alignment of components and install roller assembly. Apply thread sealant to adjusting cover and install. Tighten adjusting cover to 7 ft. lbs. (9.5 N.m). Loosen cover 25-45°. Ensure cover does not move. Install and tighten lock nut to specification. See TORQUE SPECIFICATIONS TABLE at end of article.

5) Using pull gauge and Preload Lever (49 0180 510B), measure pinion shaft starting torque. At center, starting torque should be 35-50 ozs. (992-1417 g). At other positions, torque should be less than 60 ozs. (1701 g).

6) Install tie rods. Carefully slide boots on tie rods. Using NEW boot bands and boot wires, secure boots. For initial adjustment, install tie rod ends aligning reference marks.

TORQUE SPECIFICATIONS

TORQUE SPECIFICATIONS TABLE

Application	Ft. Lbs. (N.m)
Adjusting Cover Lock Nut	
Miata	29-43 (39-58)
Protege & 323	29-36 (39-49)
Rear Cover Lock Nut	36-51 (49-69)
Steering Gear Mounting Bolts	
Miata	34-43 (46-58)
Protege & 323	27-38 (37-52)
Steering Shaft-To-Pinion Coupler Bolt	13-20 (18-27)
Tie Rod End Castle Nut	
Miata	22-33 (30-45)
Protege & 323	31-42 (42-57)

Tie Rod End Lock Nut

Miata	22-33 (30-45)
Protege & 323	25-29 (34-39)
