

STEERING GEAR - POWER RACK & PINION

1991 STEERING Mazda - Power Rack & Pinion

DESCRIPTION

Steering system is a power-assisted rack and pinion. The system consists of a rack and pinion steering gear and power-assist pump/reservoir. The steering gear and pump/reservoir are connected by flexible hoses.

TESTING

HYDRAULIC SYSTEM PRESSURE TEST

Pump Fluid Pressure Test

1. Disconnect pressure hose and connect pressure gauge/valve between steering pump and steering gear. See **Fig. 1** . Bleed air from system.
2. Open valve fully. Start engine and idle. Turn steering wheel lock-to-lock to increase fluid temperature to 122-140°F (50-60°C). To measure pump fluid pressure, close gauge valve completely.
3. Increase engine speed to 1000-1500 RPM. Ensure pump pressure is within specification. See **HYDRAULIC SYSTEM FLUID PRESSURE SPECIFICATIONS** table. If pressure is not within specification, replace pump.

CAUTION: DO NOT leave gauge valve closed for more than 15 seconds, or pump may be damaged.

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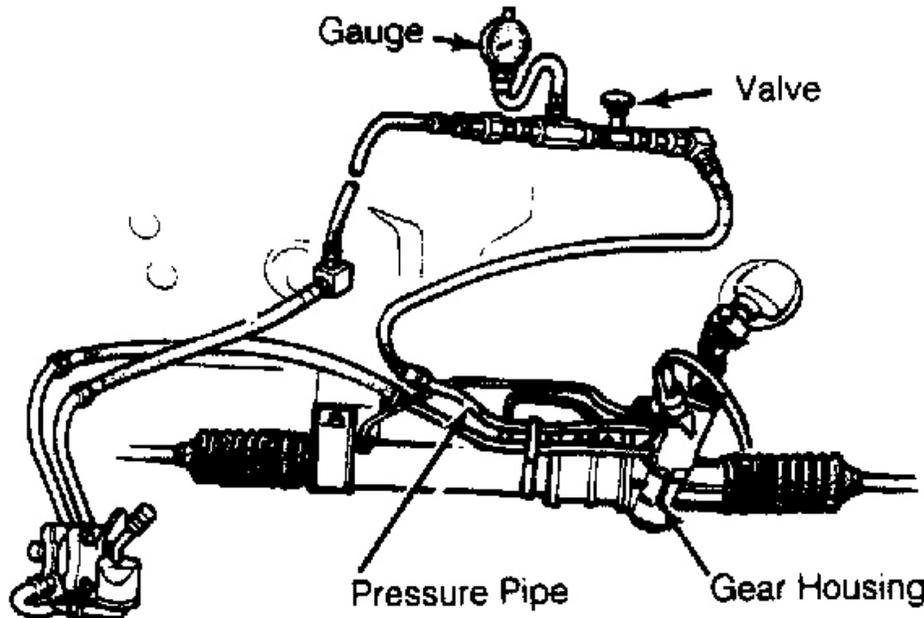


Fig. 1: Connecting Pressure Gauge (Except 4-Wheel Steering)
Courtesy of MAZDA MOTORS CORP.

Gear Fluid Pressure Test

1. Ensure pump pressure is within specification. To measure steering gear fluid pressure, open gauge/valve completely. Increase engine speed to 1000-1500 RPM.
2. Turn steering wheel from lock-to-lock. Gauge pressure must be within specification. See **HYDRAULIC SYSTEM FLUID PRESSURE SPECIFICATIONS** table. If pressure is less than specification, steering gear is defective.

HYDRAULIC SYSTEM FLUID PRESSURE SPECIFICATIONS ⁽¹⁾

| Application | psi (kg/cm ²) |
|----------------------|---------------------------|
| Miata | 1109-1209 (78-85) |
| MPV, MX-6, 626 & 929 | 1067-1138 (75-80) |
| Protege | |
| 2WD | 1067 (75) |
| 4WD | 1138 (80) |
| RX7 | 1138-1209 (80-85) |
| 323 | 1067 (75) |

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(1) Specifications are measured at 1000-1500 RPM, with fluid temperature at 122-140°F (50-60°C).

LUBRICATION

CAPACITY

POWER STEERING FLUID CAPACITY

| Application | Qts. (L) |
|--|------------|
| Miata, MPV & 929 | .95 (.90) |
| MX-6 & 626 | |
| Electronic Controlled Power Steering (ECPS) | 1.06 (1.0) |
| Engine Speed (Sensing) Power Steering (ESPS) | .95 (.90) |
| Protege & 323 | .63 (.60) |
| RX7 | .85 (.80) |

FLUID TYPE

Dexron-II or M-III are recommended for all vehicles.

FLUID LEVEL CHECK

Check fluid level with engine off. Remove fluid level gauge on oil pump or reservoir. Check fluid level. Fluid should be between "L" and "H" marks on level gauge dipstick. If fluid level is low, fill through gauge tube. Recheck fluid level. **DO NOT** overfill.

HYDRAULIC FLUID BLEEDING

1. Raise and support front of vehicle. With ignition off, turn steering wheel lock-to-lock several times. Add fluid as necessary. Repeat procedure until fluid level no longer decreases.
2. Start engine and let idle. Turn steering wheel lock-to-lock 5 times. Check fluid level. Add fluid as necessary. Continue procedure until fluid is clear of air bubbles and does not decrease in level.

ADJUSTMENTS

NOTE: On-vehicle adjustment procedures are not available from manufacturer.

POWER STEERING BELT ADJUSTMENT

POWER STEERING BELT DEFLECTION ⁽¹⁾

| Application | In. (mm) |
|----------------------|-------------------|
| Miata, Protege & 323 | |
| New Belt | .31-.35 (7.8-8.9) |
| | |

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| | |
|---|---------------------|
| Used Belt | .35-.39 (8.9-10.0) |
| MPV | |
| V6 | |
| New Belt | .28-.30 (7.1-7.6) |
| Used Belt | .30-.32 (7.6-8.1) |
| 4-Cylinder | |
| New Belt | .26-.28 (6.6-7.1) |
| Used Belt | .28-.31 (7.1-7.8) |
| MX-6 & 626 | |
| New Belt | .31-.36 (7.8-9.1) |
| Used Belt | .35-.43 (8.9-10.9) |
| RX7 | |
| New Belt | .43-.51 (10.9-12.9) |
| Used Belt | .55-.63 (14.0-16.0) |
| 929 | |
| New Belt | .28-.35 (7.1-8.9) |
| Used Belt | .35-.43 (8.9-10.9) |
| (1) Belt deflection is measured at midpoint between idler pulley and pump, with 22 lbs. (10 kg.) of pressure applied. | |

REMOVAL & INSTALLATION

STEERING GEAR

Removal & Installation (Miata & MPV)

1. Disconnect negative battery cable. Raise and support front of vehicle. Remove front wheels. Remove cotter pins and castle nuts from tie rod ends.
2. Using puller, remove tie rods from steering knuckles. Remove steering column intermediate shaft-to-steering gear pinion shaft bolt. Mark reference lines on pressure pipe fittings.
3. Remove pressure and return hose connections from steering gear. Remove 2 steering bracket-to-frame mounting through bolts. Remove steering gear and linkage with steering bracket attached from under the vehicle.
4. To install, reverse removal procedure. Fill and bleed system. Tighten bolts to specification. See **TORQUE SPECIFICATIONS** table. Tighten steering gear-to-mounting bracket bolts (4) in the following order: left front, right front, left rear, right rear.

Removal & Installation (MX-6 & 626)

1. Disconnect negative battery cable and power steering pressure switch connectors. Raise and support front of vehicle. Remove front wheels.
2. Remove cotter pins and castle nuts from tie rod ends. Using puller, remove tie rods from steering knuckles. Remove steering column intermediate shaft-to-steering gear pinion shaft bolt.

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3. Remove pressure and return hose connections from steering gear. Remove mud flap on driver's side. Remove steering gear mounting bolts. Remove steering gear through wheelwell on driver's side.
4. To install, reverse removal procedure. Fill and bleed system. Tighten bolts to specification. See **TORQUE SPECIFICATIONS** table.

Removal & Installation (Protege & 323)

1. Disconnect negative battery cable. Raise and support front of vehicle. Remove front wheels. Remove engine undercover. Remove cotter pins and castle nuts from tie rod ends.
2. Using puller, remove tie rods from steering knuckles. Remove steering column intermediate shaft-to-steering gear pinion shaft bolt. Remove pressure and return hose connections from steering gear box.
3. Remove all accessible steering gear mounting bracket upper nuts and lower bolts. On Protege, support drive train from above. Loosen stabilizer bar left mounting bracket and remove engine mount crossmember.
4. Remove transmission control cable clip. Remove transfer case mount nuts. Lower engine gradually until rear engine mount bolts can be removed. Remove lower left steering gear mounting bolt from between transaxle and transfer case.
5. On all models, remove steering gear. To install, reverse removal procedure. Fill and bleed system. Tighten bolts to specification. See **TORQUE SPECIFICATIONS** table.

Removal & Installation (RX7)

1. Remove battery. Drain cooling system. Remove fan shroud and radiator. Raise and support front of vehicle. Remove front wheels and engine undercover.
2. Remove control links and stabilizer bar. Remove cotter pins and castle nuts from tie rod ends. Remove tie rods from steering knuckles with puller.
3. Remove steering column intermediate shaft-to-steering gear pinion shaft bolt. Remove pressure and return hose connections from steering gear box.
4. Remove steering gear mounting bolts. Lower steering gear brackets, steering gear and linkage from vehicle as an assembly.
5. To install, reverse removal procedure. Fill and bleed system. Tighten bolts to specification. See **TORQUE SPECIFICATIONS** table.

Removal & Installation (929)

1. Disconnect negative battery cable. Raise and support front of vehicle. Remove front wheels. Remove engine undercover. Disconnect pressure and return hose connections in front of steering gear.
2. Drain fluid. Disconnect return hose fitting to control valve. Remove starter for access to control valve. Disconnect control valve and pressure switch connectors. Remove control valve. Remove cotter pins and castle nuts from tie rod ends.
3. Using puller, remove tie rods from steering knuckles. Remove steering column intermediate shaft-to-steering gear pinion shaft bolt. Remove steering gear mounting bolts. Remove steering gear from bottom of vehicle.
4. To install, reverse removal procedure. Tighten bolts to specification. See **TORQUE SPECIFICATIONS**

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table. Bleed air from system. Check fluid level. Check for leaks. Adjust alignment (if necessary).

POWER STEERING PUMP

Removal & Installation

1. Raise and support front of vehicle. On MX-6 and 626, remove right wheel and splash shield. On all models remove belt, alternator and hydraulic lines from pump.
2. On Protege and 323, disconnect air cleaner duct and pressure switch. On all models, cap lines to prevent contamination. Remove bracket-to-pump bolts.
3. To install, reverse removal procedure. Adjust belt tension. See **POWER STEERING BELT DEFLECTION TABLE** under ADJUSTMENTS. Bleed air from system. Check for leaks.

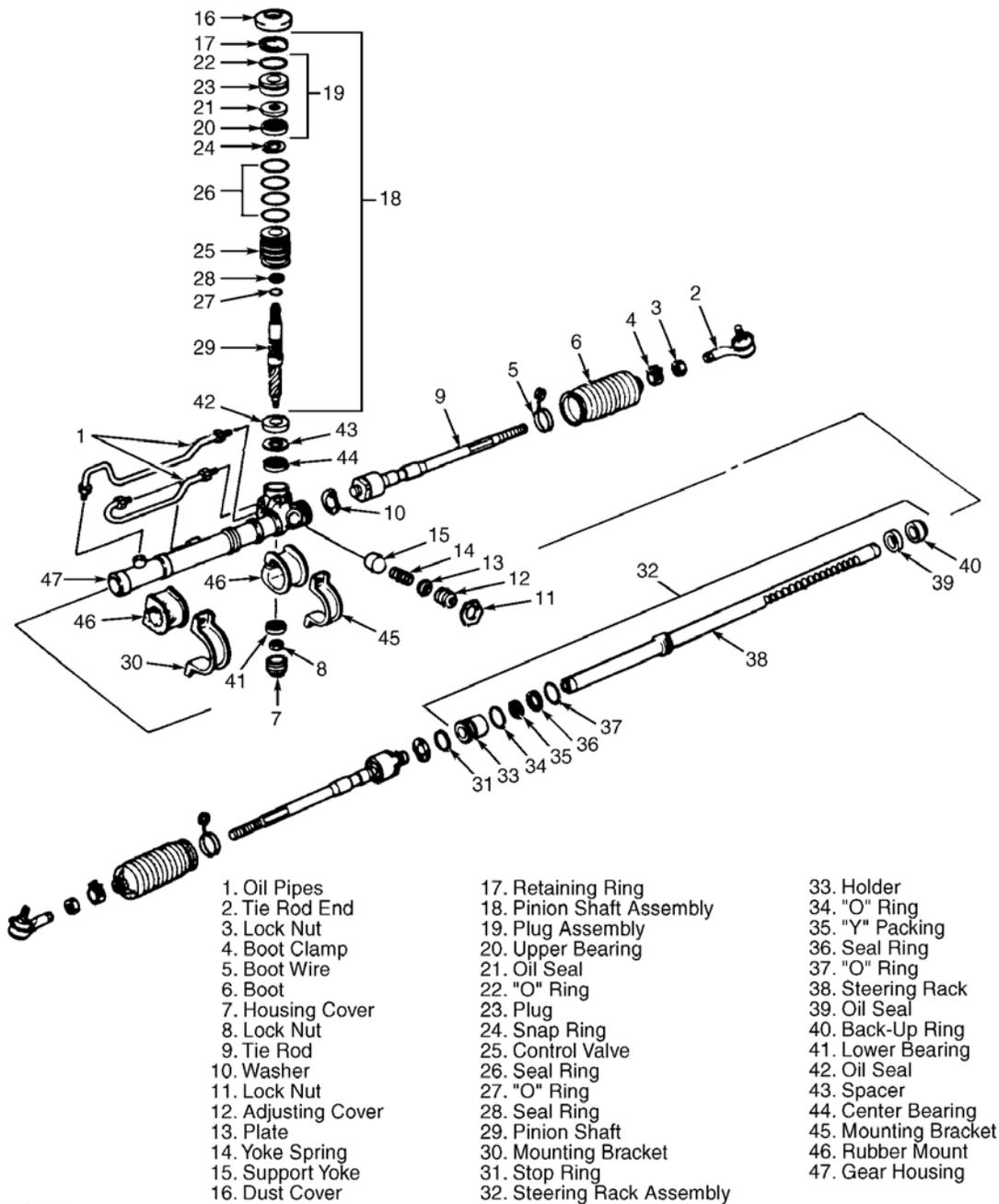
OVERHAUL

STEERING GEAR

NOTE: See **Fig. 2 -8** for exploded views of rack and pinion steering gears.

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Fig. 2: Rack & Pinion Steering Gear (Miata)
 Courtesy of MAZDA MOTORS CORP.

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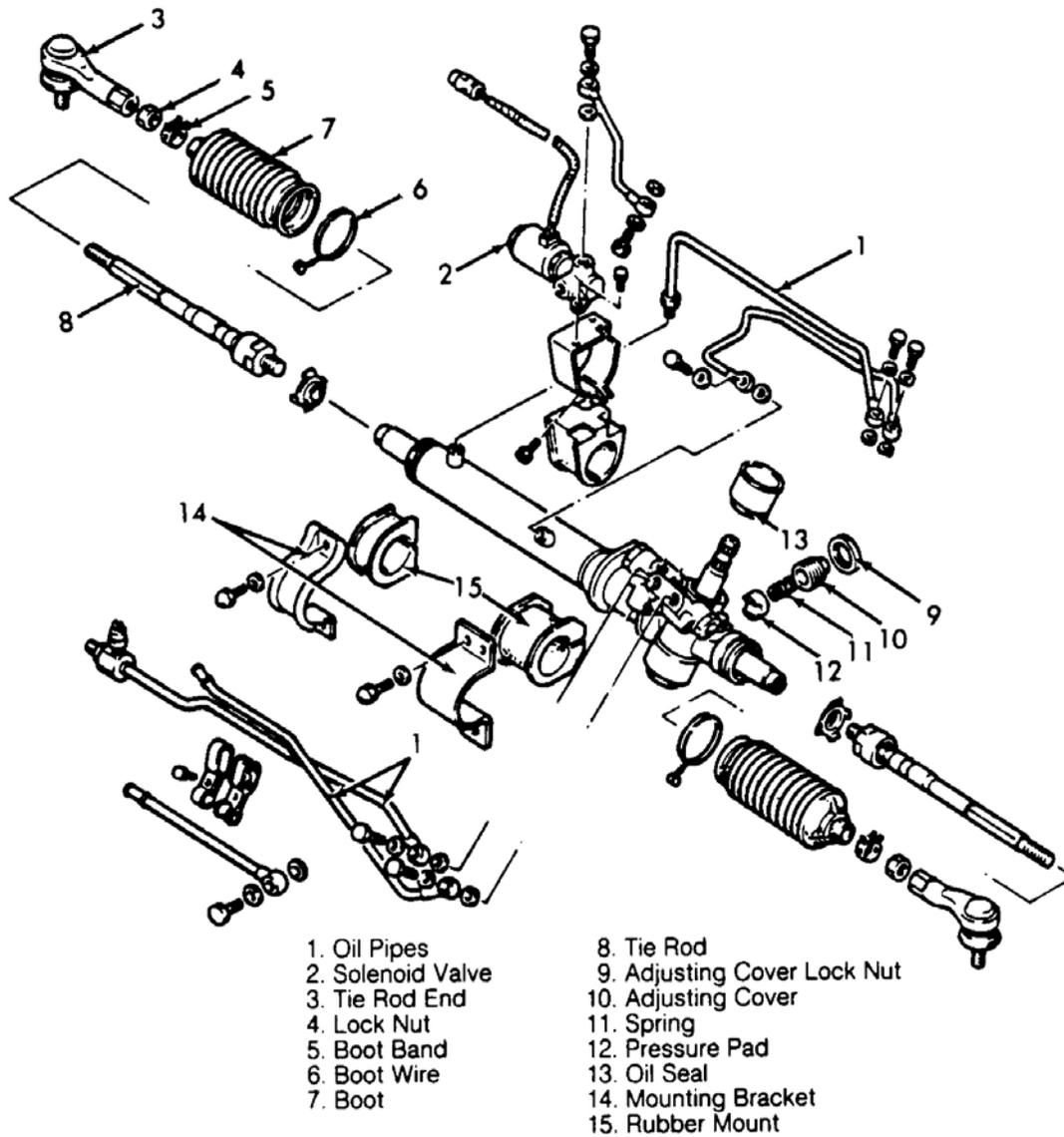


Fig. 4: Engine Speed Sensing Rack & Pinion Steering Gear (MX6 & 626)
Courtesy of MAZDA MOTORS CORP.

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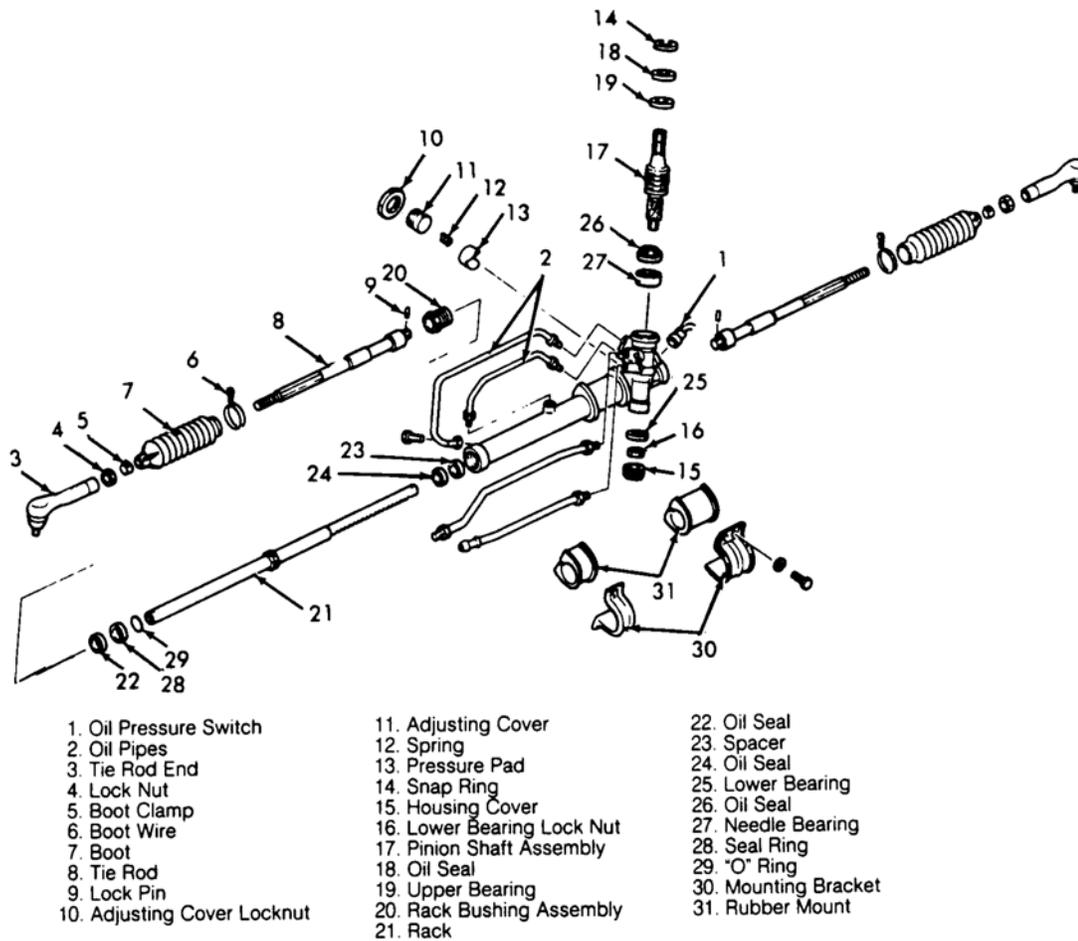


Fig. 5: Elect. Controlled Rack & Pinion Steering Gear (MX6 & 626)
Courtesy of MAZDA MOTORS CORP.

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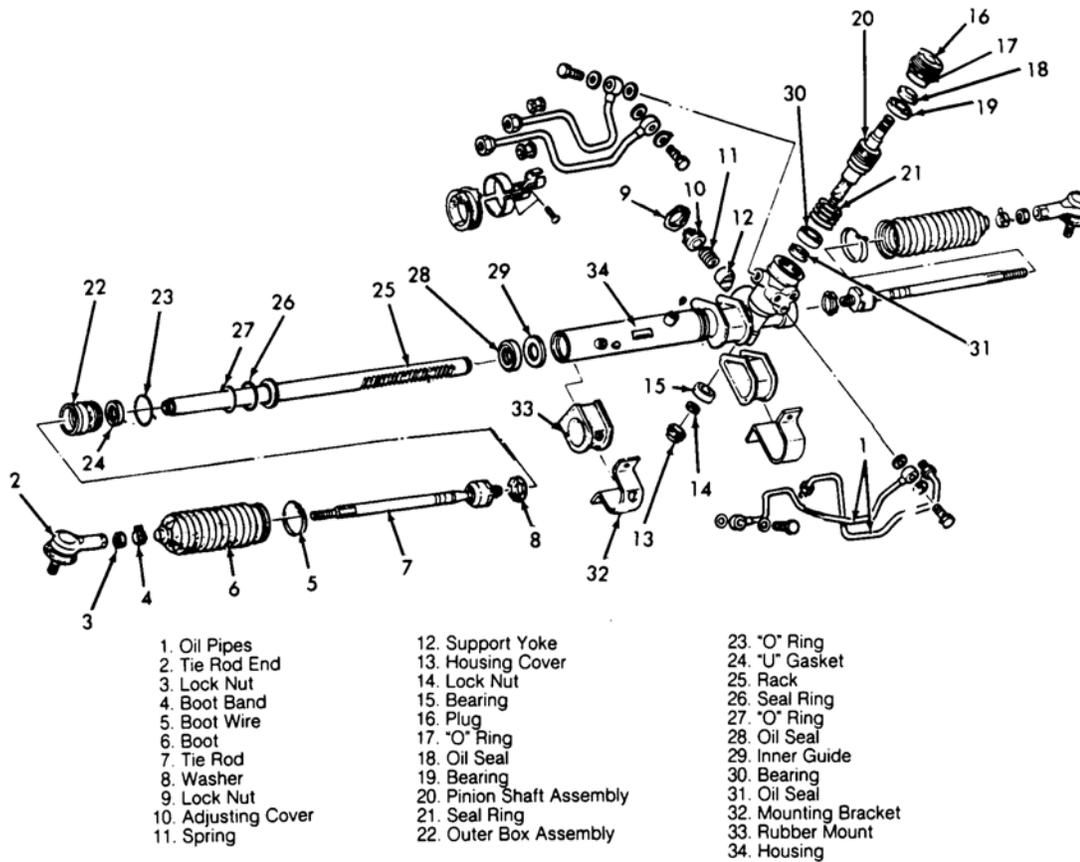


Fig. 6: Exploded View of Rack & Pinion Steering Gear (Protege & 323)
Courtesy of MAZDA MOTORS CORP.

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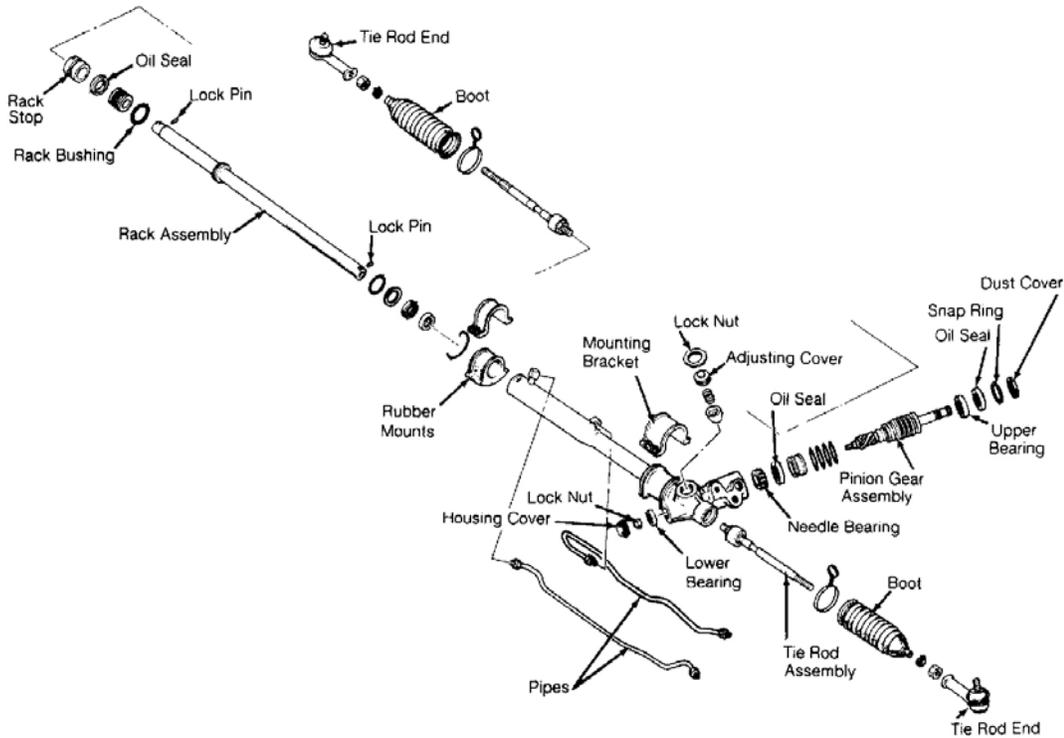


Fig. 7: Exploded View of Rack & Pinion Steering Gear (RX7)
Courtesy of MAZDA MOTORS CORP.

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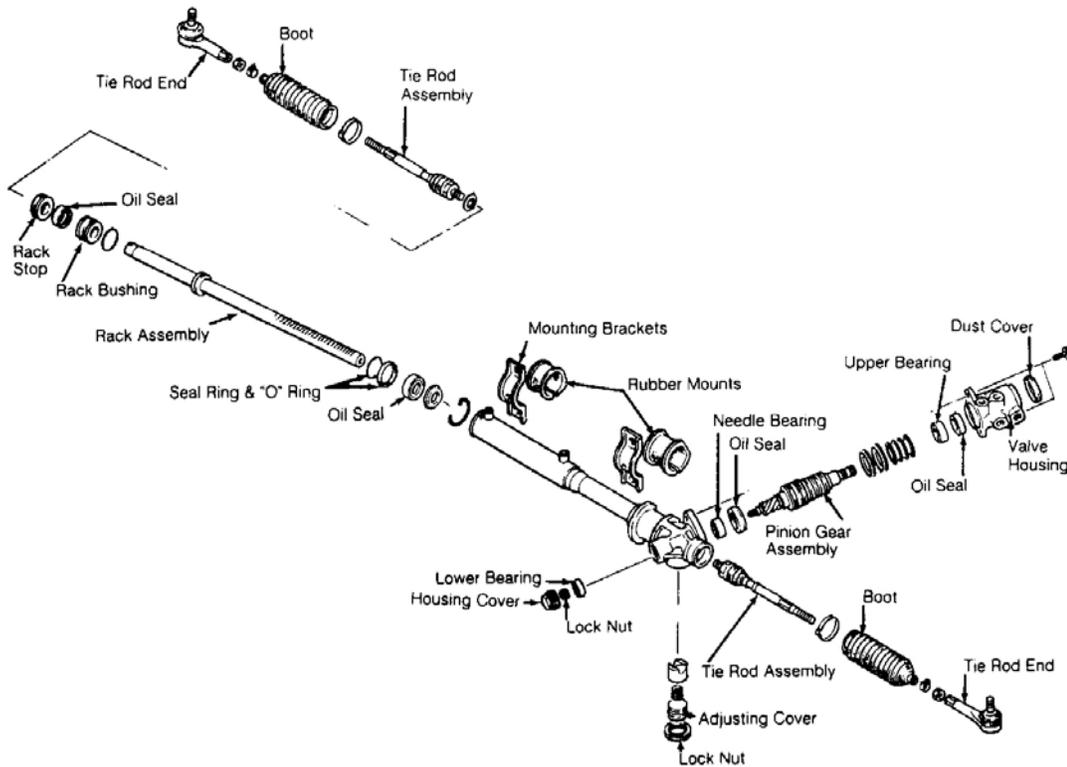


Fig. 8: Exploded View of Rack & Pinion Steering Gear (929)
 Courtesy of MAZDA MOTORS CORP.

TORQUE SPECIFICATIONS

TORQUE SPECIFICATIONS

| Application | Ft. Lbs. (N.m) |
|---|----------------|
| Intermediate Shaft-To-Pinion Shaft Bolt | |
| All Models Except RX7 | 13-19 (18-26) |
| RX7 | 12-18 (16-24) |
| Middle Crossmember | |
| Front Bolt | 29-40 (39-54) |
| Rear Bolt | 58-86 (78-117) |
| Pinion Bearing Lock Nut | 29-36 (39-50) |
| Pinion Housing Lock Nut | |
| Miata | 29-39 (39-53) |
| MPV, Protege & 323 | 29-36 (39-50) |
| MX-6 & 626 | 33-40 (44-54) |
| RX7 & 929 | 36-51 (49-69) |
| Stabilizer Bar-To-Control Link Nut | 27-40 (36-54) |

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| | |
|---|---------------|
| Stabilizer Link Bolt/Nut | 12-17 (16-23) |
| Steering Angle Transfer Shaft-To-Steering Gear Bolt | 13-19 (18-26) |
| Steering Bracket-To-Frame Mounting Bolt | 46-69 (63-93) |
| Steering Gear Mounting Bolt | |
| Miata | 34-43 (46-58) |
| MPV | 55-69 (74-93) |
| MX-6 & 626 | 27-40 (36-54) |
| Protege, RX7, 323 & 929 | 23-34 (31-46) |
| Steering Rack-To-Tie Rod | |
| Miata | 58-72 (78-98) |
| MPV, MX-6, RX7 & 626 | 87 (118) |
| Protege, 323 & 929 | 43-58 (60-78) |
| Tie Rod Castle Nuts | |
| All Models Except MPV | 21-32 (29-44) |
| MPV | 44-58 (59-78) |
| Valve Housing Bolt (929) | 14-22 (20-29) |