

## STEERING SYSTEM - POWER RACK & PINION

### 1997 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 lines.

## TESTING

### HYDRAULIC SYSTEM PRESSURE TEST

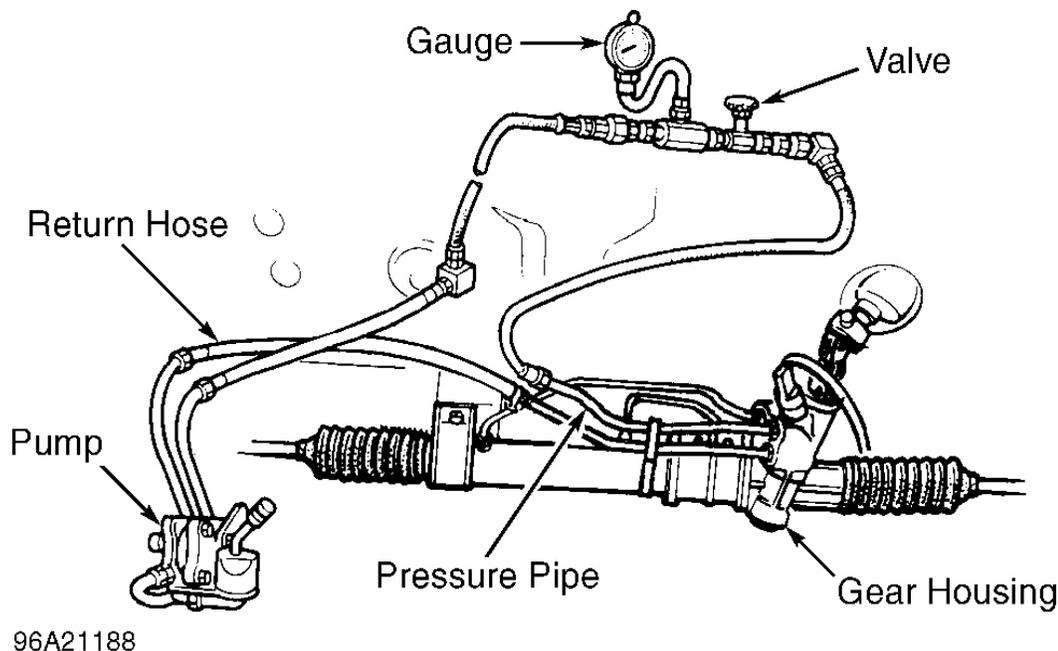
#### Pump Fluid Pressure Test

1. Disconnect pressure line from steering gear and steering pump. Connect pressure gauge/valve between steering pump and steering gear. See **Fig. 1** . Bleed air from system.
2. Completely open valve. Start engine and operate at idle. Turn steering wheel from 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. Measure oil pump fluid pressure. 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/Valve (Typical)**  
 Courtesy of MAZDA MOTORS CORP.

### Gear Fluid Pressure Test

1. Ensure steering pump pressure is within specification. See **PUMP FLUID PRESSURE TEST** . 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. Measure steering gear fluid pressure. Ensure gear pressure is within specification. See **HYDRAULIC SYSTEM FLUID PRESSURE SPECIFICATIONS** table. If pressure is not within specification, replace gear.

### HYDRAULIC SYSTEM FLUID PRESSURE SPECIFICATIONS <sup>(1)</sup>

Application	psi (kg/cm <sup>2</sup> )
Miata & MPV	1102-1209 (77-85)
MX-3	1138-1152 (80-81)
Millenia, MX-6 & 626	1209-1280 (85-90)
Protege	1244-1350 (87-95)
RX7	1110-1209 (78-85)
929	1066-1137 (75-80)

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

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### LUBRICATION

#### FLUID CAPACITY

##### POWER STEERING FLUID CAPACITY

Application	Qts. (L)
Miata & Protege	.85 (.80)
MPV	.95 (.90)
MX-3	
4-Cylinder	.85 (.80)
V6	1.27 (1.20)
Millenia, MX-6 & 626	1.32 (1.25)
RX7	1.01 (.96)
929	1.80 (1.70)

#### FLUID TYPE

Dexron-II or Mazda M-III fluid is recommended for all models.

#### FLUID LEVEL CHECK

Check fluid level on oil pump dipstick (if equipped) or reservoir. Fluid should be between marks on level gauge dipstick (if equipped) or reservoir. If fluid level is low, fill as necessary. Recheck fluid level. DO NOT overfill.

#### HYDRAULIC SYSTEM BLEEDING

1. Raise and support front of vehicle. With ignition off, turn steering wheel from lock to lock several times. Check fluid level. Add fluid as necessary. Repeat procedure until fluid level no longer decreases.
2. Start engine and operate at idle. Turn steering wheel from 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

#### PINION PRELOAD

**NOTE:** Pinion preload should be checked when steering gear assembly has been disassembled or overhauled. Check preload after steering gear assembly has been reassembled, but tie rods have not yet been installed.

#### Miata & Protege

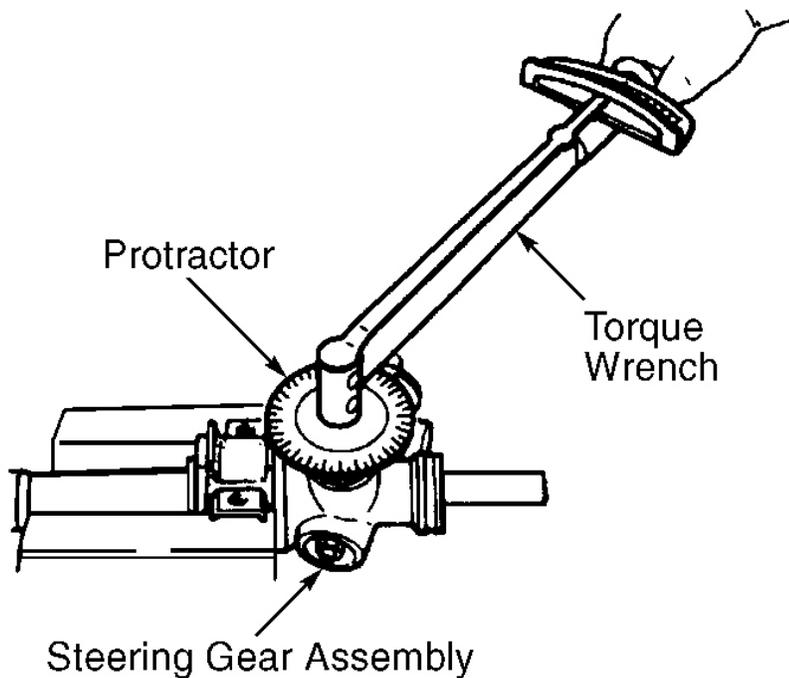
1. Ensure steering rack is in center position. Using Protractor (49-D032-316 ) and a torque wrench, tighten adjusting cover to 43 INCH lbs. (4.9 N.m), then loosen adjusting cover. See **Fig. 2** . Repeat loosening and tightening procedure 3 times. After tightening adjusting cover the third time, loosen adjusting cover 25

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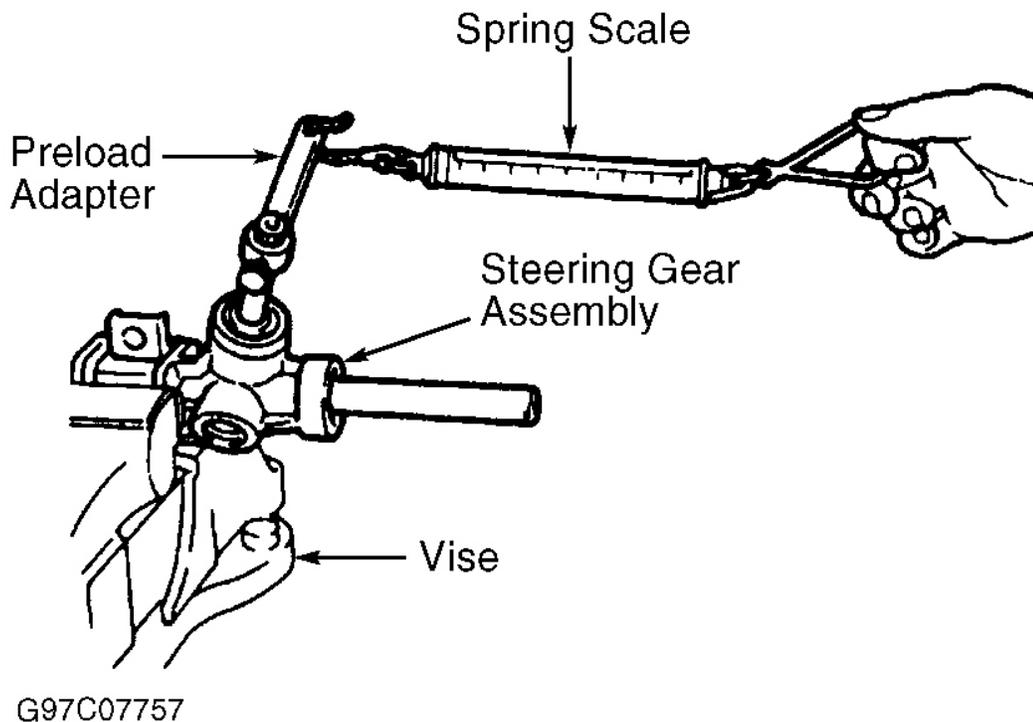
degrees.

2. Center steering rack. Install Preload Adapter (49-0180-510B ) on pinion shaft. See **Fig. 3** . Measure pinion preload using spring scale. Pinion preload should be 2.2-2.6 lbs. (1.0-1.2 kg).
3. If preload is not as specified, repeat steps 1) and 2). If preload is as specified, apply thread sealant to adjusting cover lock nut. Install lock nut. Holding adjusting cover in place, tighten lock nut 29-36 ft. lbs. (39-49 N.m) on Protege or 44-54 ft. lbs. (60-73 N.m) on Miata.



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**Fig. 2: Tightening Adjusting Cover (Miata Shown; Others Are Similar)**  
Courtesy of FORD MOTOR CO.



**Fig. 3: Checking Pinion Preload (Miata Shown; Others Are Similar)**  
 Courtesy of FORD MOTOR CO.

#### Millenia

1. Ensure steering rack is in center position. Using Protractor (49-D032-316 ) and a torque wrench, tighten adjusting cover 14-22 ft. lbs. (19-30 N.m), then loosen cover. Again, tighten adjusting cover to 15 ft. lbs. (20 N.m), then loosen adjusting cover 25-35 degrees.
2. Apply thread sealant to exposed adjusting cover threads. Install and tighten adjusting cover lock nut 37-50 ft. lbs. (50-68 N.m). Install Preload Adapter (49-0180-510B ) on pinion shaft. See **Fig. 3** . Measure pinion preload using spring scale. Pinion preload should be 1.8-3.3 lbs. (.8-1.5 kg). If preload is not as specified, repeat steps 1) and 2).

#### MPV

1. Ensure steering rack is in center position. Using Protractor (49-D032-316 ) and a torque wrench, tighten adjusting cover to 15 ft. lbs. (20 N.m), then loosen cover. Again, tighten adjusting cover to 15 ft. lbs. (20 N.m) then loosen cover.
2. Tighten adjusting cover 44-56 INCH lbs. (5.0-6.3 N.m), then loosen adjusting cover 35-45 degrees. Apply thread sealant to exposed adjusting cover threads. Install and tighten adjusting cover lock nut 37-43 ft. lbs. (50-58 N.m).

**MX-3 (4-Cylinder)**

1. Install and temporarily tighten adjusting cover to 95 INCH lbs. (10.7 N.m). Move steering rack back and forth about 3 times, then loosen adjusting cover. Tighten adjusting cover 40-47 INCH lbs (4.5-5.3 N.m) then loosen adjusting cover 0-40 degrees. Apply thread sealant to adjusting cover lock nut. Install lock nut. Holding adjusting cover in place, tighten lock nut 37-43 ft. lbs. (50-58 N.m).
2. Center steering rack. Install Preload Adapter (49-0180-510B ) on pinion shaft. See **Fig. 3** . Measure pinion preload using spring scale. With steering rack in center position, pinion preload should be 2.2-3.0 lbs. (1.0-1.4 kg). With steering rack in any other position, pinion preload should be a maximum of 3.7 lbs. (1.7 kg). If preload is not as specified, repeat steps 1) and 2).

**MX-3 (V6)**

1. Center steering rack. Install and temporarily tighten adjusting cover to 100 INCH lbs. (11.3 N.m), then loosen cover. Tighten adjusting cover 40-47 INCH lbs. (4.5-5.3 N.m), then loosen cover 45 degrees.
2. Install Preload Adapter (49-0180-510B ) on pinion shaft. See **Fig. 3** . Measure pinion preload using spring scale. With steering rack in center position (plus or minus 90 degrees), preload should be 2.2-2.6 lbs. (1.0-1.2 kg). With steering rack in any other position, preload should be a maximum of 3.7 lbs. (1.7 kg).
3. If preload is as specified, apply thread sealant to adjusting cover lock nut. Install lock nut. Holding adjusting cover in place, tighten lock nut 37-43 ft. lbs. (50-58 N.m). If preload is not as specified, repeat steps 1) and 2).

**MX-6 & 626**

1. Center steering rack. Install and temporarily tighten adjusting cover to 87 INCH lbs. (9.8 N.m), then loosen adjusting cover. Tighten adjusting cover 39-48 INCH lbs (4.4-5.4 N.m) then loosen adjusting cover 20 degrees. Apply thread sealant to adjusting cover lock nut. Install lock nut. Holding adjusting cover in place, tighten lock nut 37-43 ft. lbs. (50-58 N.m).
2. Install Preload Adapter (49-0180-510B ) on pinion shaft. See **Fig. 3** . Measure pinion preload using spring scale. With steering rack in center position (plus or minus 90 degrees), pinion preload should be 2.8-3.3 lbs. (1.3-1.5 kg). If preload is not as specified, repeat steps 1) and 2).

**RX7**

1. Ensure steering rack is in center position. Using Protractor (49-D032-316 ) and a torque wrench, tighten adjusting cover 87 INCH lbs. (9.8 N.m), then loosen adjusting cover 20-25 degrees. See **Fig. 2** .
2. Install Preload Adapter (49-0180-510B ) on pinion shaft. See **Fig. 3** . Measure pinion preload using spring scale. Pinion preload should be 3.3 lbs. (1.5 kg) maximum.
3. If preload is not as specified, repeat steps 1) and 2). If preload is as specified, apply thread sealant to adjusting cover lock nut. Install lock nut. Holding adjusting cover in place, tighten lock nut 37-50 ft. lbs. (50-68 N.m).

1. Ensure steering rack is in center position. Using Protractor (49-D032-316 ) and a torque wrench, tighten

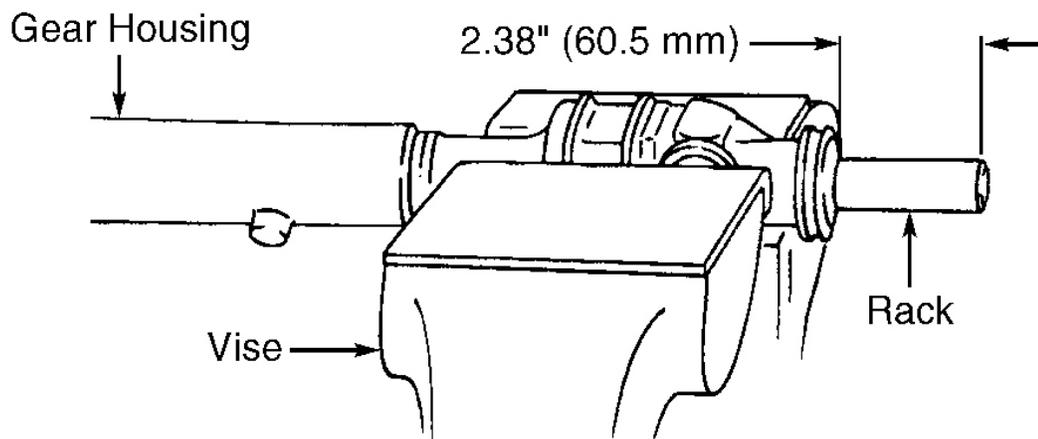
adjusting cover 15-21 ft. lbs. (20-28 N.m), then loosen adjusting cover 25 degrees. See **Fig. 2**.

2. Install Preload Adapter (49-0180-510B ) on pinion shaft. See **Fig. 3** . Measure pinion preload using spring scale. Pinion preload should be 3.3 lbs. (1.5 kg) maximum.
3. If preload is not as specified, repeat steps 1) and 2). If preload is as specified, apply thread sealant to adjusting cover lock nut. Install lock nut. Holding adjusting cover in place, tighten lock nut 37-50 ft. lbs. (50-68 N.m).

## PINION SHAFT & VALVE HOUSING ASSEMBLY

### Miata

1. With steering rack assembly secured in a vise, pull steering rack out until distance between end of rack and end of rack housing is 2.38" (60.5 mm). See **Fig. 4** .
2. If reusing original gear housing, pinion shaft and valve housing, install same number of shims that were removed during disassembly procedure. If installing a NEW gear housing, pinion shaft and/or valve housing, install same number of shims that were removed during disassembly procedure, and go to next step.
3. Install and tighten valve housing bolts 15-21 ft. lbs. (20-28 N.m). Using a feeler gauge, measure clearance between gear housing and valve housing. See **Fig. 5** . Add or remove necessary shims until clearance is zero.

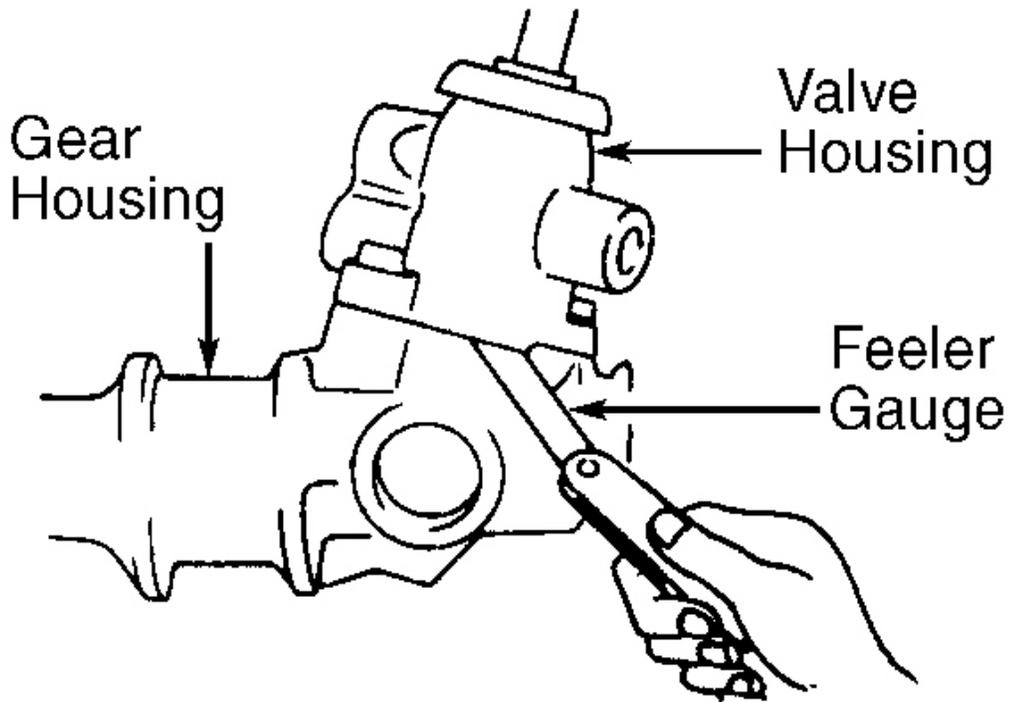


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**Fig. 4: Centering Steering Rack (Miata Shown; Others Are Similar)**  
 Courtesy of FORD MOTOR CO.

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**Fig. 5: Measuring Gear Housing To Valve Housing Clearance (1996-97 Miata)**  
 Courtesy of FORD MOTOR CO.

**POWER STEERING PUMP BELT**

**BELT ADJUSTMENT SPECIFICATIONS**

Application	<sup>(1)</sup> Deflection In. (mm)
Miata & Protege	
New Belt	.31-.35 (8.0-9.0)
Used Belt	.35-.39 (9.0-10.0)
Millenia	
2.3L	(2)
2.5L	
New Belt	.23-.27 (6.0-7.0)
Used Belt	.27-.31 (7.0-8.0)
MPV	
New Belt	.27-.35 (7.0-7.5)

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Used Belt	.35-.33 (7.5-8.2)
MX-3	
4-Cylinder	
New Belt	.31-.35 (8.0-9.0)
Used Belt	.35-.39 (9.0-10.0)
V6	
New Belt	.23-.27 (6.0-7.0)
Used Belt	.27-.31 (7.0-8.0)
MX-6 & 626	
4-Cylinder	
New Belt	.30-.35 (7.5-9.0)
Used Belt	.32-.37 (8.1-9.4)
V6	
New Belt	.24-.27 (6.0-7.0)
Used Belt	.27-.31 (7.0-8.0)
RX7	
New Belt	.14-.16 (3.5-4.0)
Used Belt	.18-.20 (4.5-5.0)
929	
New Belt	.23-.25 (5.8-6.3)
Used Belt	.27-.30 (6.9-7.7)
(1) Belt deflection is measured at midpoint between idler pulley and pump, with 22 lbs. (10 kg.) of pressure applied.	
(2) Serpentine belt with an automatic tensioner is used. No adjustment is necessary. If pointer on tensioner is not within wear gauge limit, replace belt.	

## REMOVAL & INSTALLATION

### STEERING GEAR

**NOTE:** Use a suitable container or rags to collect fluid when disconnecting pressure and return lines.

#### Removal & Installation (Miata & MPV)

1. Disconnect negative battery cable. Raise and support front of vehicle. Remove front wheel assemblies. Remove cotter pins and castle nuts from tie rod ends.
2. Using Puller Set (49-T028-3A0 ), separate tie rod ends from steering knuckles. Mark steering column intermediate shaft-to-steering column gear pinion for installation reference. Remove steering column intermediate shaft-to-steering gear pinion shaft bolt. Place reference marks on steering gear and pressure line fitting for reassembly.
3. Disconnect pressure and return line connections from steering gear. On Miata, remove steering gear-to-

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frame mounting bolts. Remove steering gear and linkage from vehicle. On MPV, remove steering gear bracket-to-frame mounting bolts. Remove steering gear and linkage with steering bracket from vehicle. Remove 4 steering gear-to-bracket bolts and separate gear from bracket.

4. On all models, to install, reverse removal procedure. Tighten bolts to specification. See **TORQUE SPECIFICATIONS** table. On MPV, tighten steering gear-to-bracket bolts in sequence: left front, right front, left rear, right rear. On all models, fill and bleed power steering system. Check and adjust front wheel alignment. See SPECIFICATIONS & PROCEDURES article in WHEEL ALIGNMENT.

#### Removal & Installation (Millenia)

1. Disconnect negative battery cable. Support engine using Engine Support (49-G017-5A0 ). Raise and support front of vehicle. Remove front wheel assemblies. Remove cotter pins and castle nuts from tie rod ends.
2. Using Puller Set (49-T028-3A0 ), separate tie rod ends from steering knuckles. Remove transverse member bolts and remove transverse member. See **Fig. 6** Disconnect pressure and return line connections from steering gear. Remove intermediate shaft pinch bolt.
3. Reference mark lower steering column-to-intermediate shaft. Remove engine mount member. Remove No. 1 engine mount bolts. Remove upper lateral link bolt and separate upper lateral link from crossmember. Remove lower control arm-to-crossmember mounting bolt and gusset. Separate lower control arm from crossmember.
4. Remove stabilizer link-to-lower control arm nut. Separate stabilizer link from lower control arm. Using a jack, support front suspension crossmember. Remove crossmember retaining nuts. Carefully lower crossmember. Disconnect stabilizer link from stabilizer bar. Remove stabilizer bar brackets, bushings and stabilizer bar. Remove steering gear mounting nuts. Remove steering gear assembly.
5. To install, reverse removal procedure. Tighten bolts to specification. See **TORQUE SPECIFICATIONS** table. Tighten steering gear mounting nuts in sequence: right front, left rear, right rear, left front. Fill and bleed power steering system. Check and adjust front wheel alignment. See SPECIFICATIONS & PROCEDURES article in WHEEL ALIGNMENT.



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vehicle through passenger side wheelwell.

5. To install, reverse removal procedure. Tighten bolts and nuts to specification. See **TORQUE SPECIFICATIONS** table. Tighten steering gear mounting nuts in sequence: left rear, right rear, left front, right front. Fill and bleed power steering system. Check and adjust front wheel alignment. See SPECIFICATIONS & PROCEDURES article in WHEEL ALIGNMENT.

#### Removal & Installation (MX-6 & 626)

1. Disconnect negative battery cable. Raise and support front of vehicle. Remove front wheel assemblies. Remove cotter pins and castle nuts from tie rod ends.
2. Using Puller Set (49-T028-3A0 ), separate tie rod ends from steering knuckles. On 2.5L engines, remove transverse member bolts and remove transverse crossmember. Remove front exhaust pipe and catalytic converter assembly nuts and remove assembly.
3. On all models, support engine using Engine Support (49-G017-5A0 ), and remove engine mount. Mark steering column intermediate shaft-to-steering column gear pinion for installation reference. Remove steering column intermediate shaft-to-steering gear pinion shaft bolt.
4. Disconnect pressure and return line connections from steering gear. Remove steering gear mounting nuts. Remove steering gear and linkage from vehicle through passenger's side wheelwell.
5. To install, reverse removal procedure. Tighten bolts to specification. See **TORQUE SPECIFICATIONS** table. Tighten steering gear mounting nuts in sequence: left front, right front, right rear, left rear. Fill and bleed power steering system. Check and adjust front wheel alignment. See SPECIFICATIONS & PROCEDURES article in WHEEL ALIGNMENT.

#### Removal & Installation (RX7)

1. Disconnect negative battery cable. Raise and support front of vehicle. Remove front wheel assemblies. Remove engine undercover. Remove cotter pins and castle nuts from tie rod ends. Using Puller Set (49-T028-3A0 ), separate tie rod ends from steering knuckles.
2. Remove stabilizer bar-to-frame bolts and brackets. Disconnect pressure and return line connections from steering gear. Mark steering column intermediate shaft-to-steering column gear pinion for installation reference.
3. Remove steering column intermediate shaft-to-steering gear pinion shaft bolt. Remove steering gear mounting bolts. Support crossmember with jack and remove crossmember nuts and bolts. Slowly lower jack and remove steering gear and linkage from vehicle.
4. To install, reverse removal procedure. Tighten bolts and nuts to specification. See **TORQUE SPECIFICATIONS** table. Tighten steering gear mounting bolts in sequence: left rear, right rear, left front, right front. Fill and bleed power steering system. Check and adjust front wheel alignment. See SPECIFICATIONS & PROCEDURES article in WHEEL ALIGNMENT.

#### Removal & Installation (929)

1. Disconnect negative battery cable. Raise and support front of vehicle. Remove front wheel assemblies. Remove engine undercover. Remove cotter pins and castle nuts from tie rod ends. Using Puller Set (49-T028-3A0 ), separate tie rod ends from steering knuckles.
2. Disconnect pressure and return line connections from steering gear. Mark steering column intermediate

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shaft-to-steering column gear pinion for installation reference. Remove steering column intermediate shaft-to-steering gear pinion shaft bolt. Remove steering gear mounting nuts. Remove steering gear and linkage from vehicle.

3. To install, reverse removal procedure. Tighten bolts and nuts to specification. See **TORQUE SPECIFICATIONS** table. Tighten steering gear mounting nuts in sequence: left rear, left front, right front, right rear. Fill and bleed power steering system. Check and adjust front wheel alignment. See **SPECIFICATIONS & PROCEDURES** article in **WHEEL ALIGNMENT**.

## POWER STEERING PUMP

**NOTE:** Use a suitable container or rags to collect fluid when disconnecting pressure and return lines.

### Removal & Installation

1. Remove drive belt. On Millenia, MPV, MX-6, RX7, 626 and 929, remove pulley lock nut and remove pulley from pump. On all models, disconnect power steering pressure switch electrical connector (if equipped).
2. Place reference marks on steering pump and pressure line fitting for reassembly. Disconnect pressure and return line connections from steering pump. Remove pump-to-bracket bolts and nuts. Remove pump from vehicle.
3. To install, reverse removal procedure. Tighten bolts and nuts to specification. See **TORQUE SPECIFICATIONS** table. Adjust belt tension. See **POWER STEERING PUMP BELT** under **ADJUSTMENTS**. Bleed air from system. Inspect system for leaks.

## OVERHAUL

### STEERING GEAR

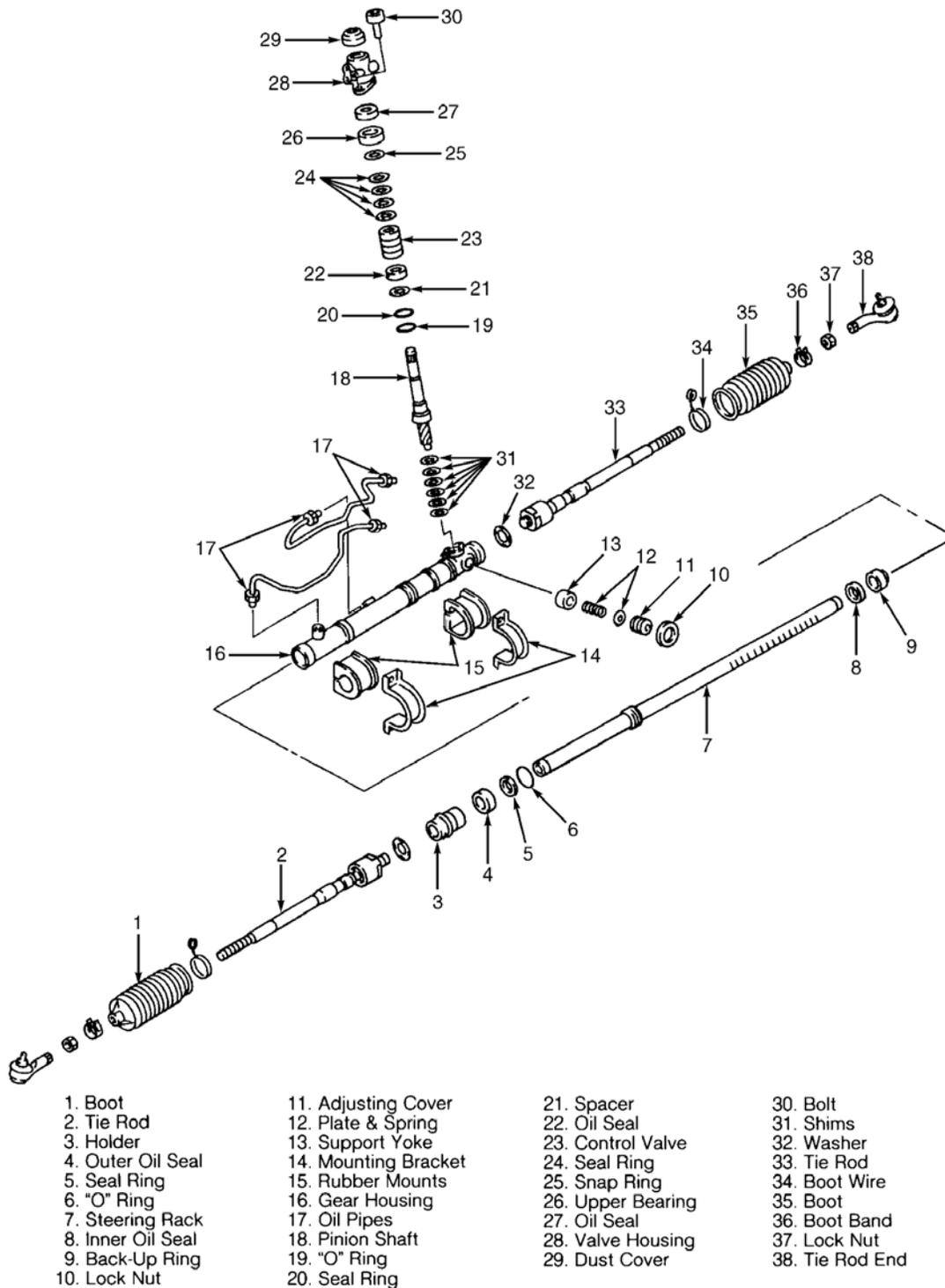
#### Disassembly & Reassembly

1. Remove steering gear assembly. See **STEERING GEAR** under **REMOVAL & INSTALLATION**. As an aid to disassembly and reassembly, use illustrations. See **Fig. 7 -16**. For reassembly reference, keep components in order of disassembly. Replace worn or damaged components as necessary.
2. On 1996-97 Miata, after installing valve housing, check clearance between gear housing and valve housing. See **PINION SHAFT & VALVE HOUSING ASSEMBLY** under **ADJUSTMENT**. Adjust clearance as necessary. On all models, after steering rack reassembly, but before installing tie rods, check pinion preload. See **PINION PRELOAD** under **ADJUSTMENTS**.



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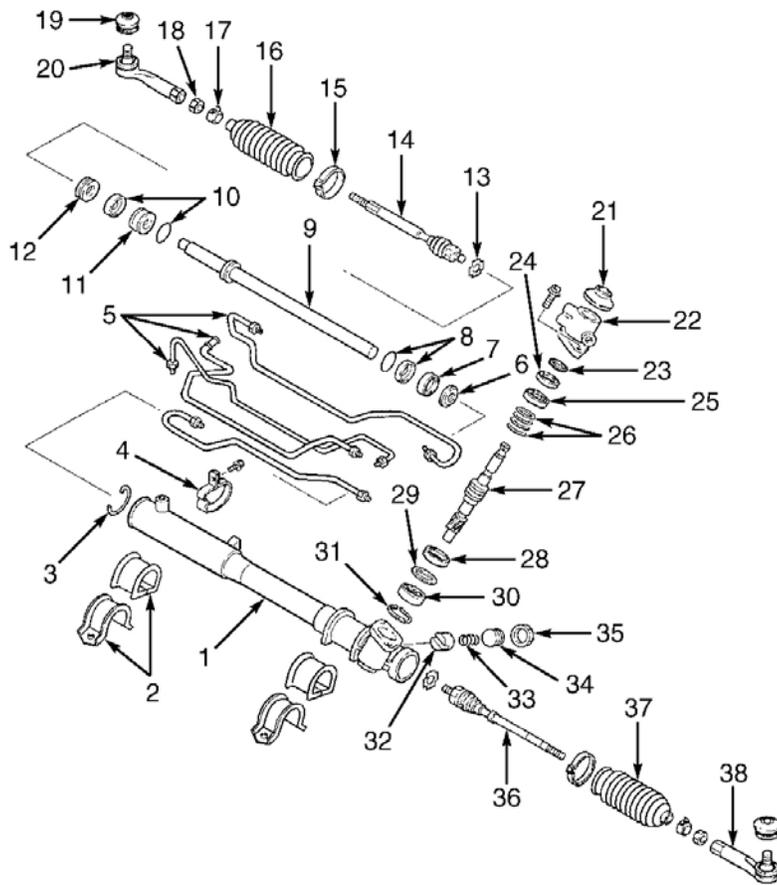


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**Fig. 8: Exploded View Of Rack & Pinion Steering Gear (1996-97 Miata)**  
 Courtesy of MAZDA MOTORS CORP.

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- |                             |                     |
|-----------------------------|---------------------|
| 1. Gear Housing             | 20. Tie Rod End     |
| 2. Mounting Bracket & Mount | 21. Dust Cover      |
| 3. Clip                     | 22. Valve Housing   |
| 4. Clamp                    | 23. "O" Ring        |
| 5. Oil Pipes                | 24. Oil Seal        |
| 6. Back-Up Washer           | 25. Upper Bearing   |
| 7. Oil Seal                 | 26. Seal Rings      |
| 8. "O" Ring & Seal Ring     | 27. Pinion Shaft    |
| 9. Steering Rack            | 28. Oil Seal        |
| 10. "O" Ring & Seal Ring    | 29. Back-Up Washer  |
| 11. Rack Bushing            | 30. Ball Bearing    |
| 12. Rack Stop               | 31. Snap Ring       |
| 13. Washer                  | 32. Support Yoke    |
| 14. Tie Rod                 | 33. Spring          |
| 15. Boot Clamp              | 34. Adjusting Cover |
| 16. Boot                    | 35. Lock Nut        |
| 17. Boot Clamp              | 36. Tie Rod         |
| 18. Lock Nut                | 37. Boot            |
| 19. Tie Rod End Boot        | 38. Tie Rod End     |

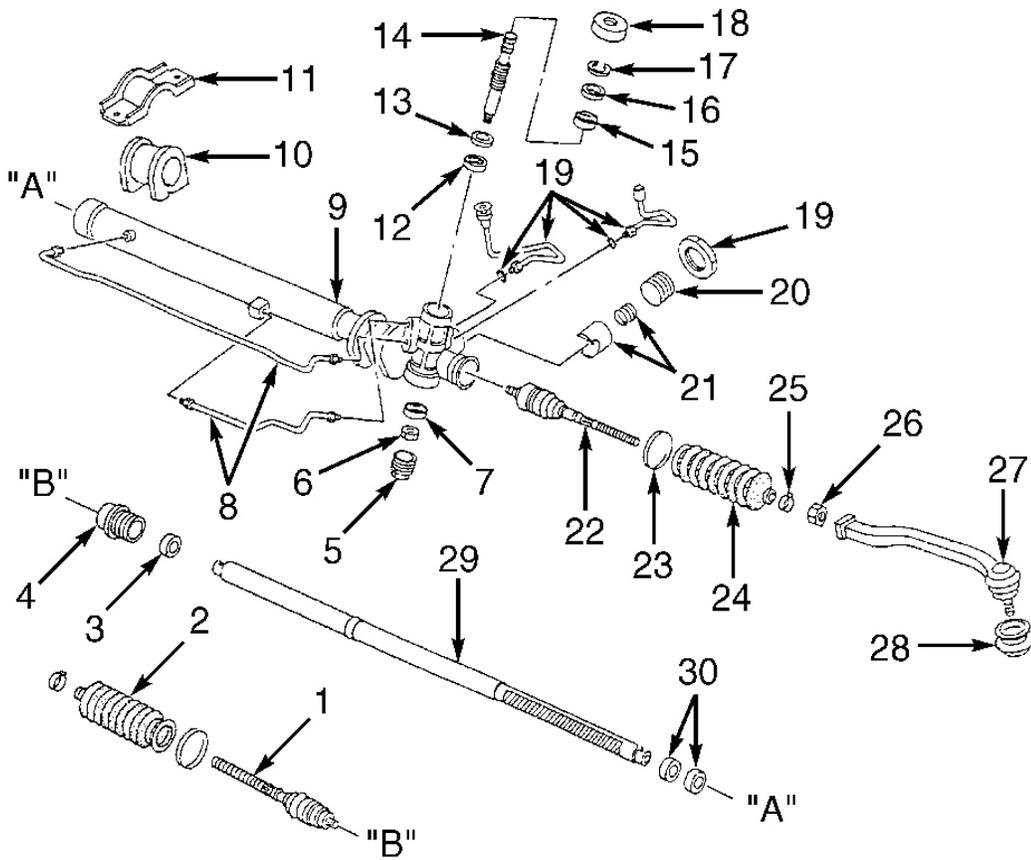
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**Fig. 9: Exploded View Of Rack & Pinion Steering Gear (Millenia)**  
 Courtesy of MAZDA MOTORS CORP.



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- |                                |                              |
|--------------------------------|------------------------------|
| 1. Tie Rod                     | 16. Oil Seal                 |
| 2. Boot                        | 17. Snap Ring                |
| 3. Oil Seal                    | 18. Dust Cover               |
| 4. Rack Bushing                | 19. Adjusting Cover Lock Nut |
| 5. Housing Cover               | 20. Adjusting Cover          |
| 6. Lower Pinion Shaft Lock Nut | 21. Spring & Pressure Pad    |
| 7. Lower Bearing               | 22. Tie Rod                  |
| 8. Oil Pipes                   | 23. Boot Wire                |
| 9. Gear Housing                | 24. Boot                     |
| 10. Rubber Mount               | 25. Boot Clamp               |
| 11. Mounting Bracket           | 26. Lock Nut                 |
| 12. Needle Bearing             | 27. Tie Rod End              |
| 13. Oil Seal                   | 28. Tie Rod End Boot         |
| 14. Pinion Gear Assembly       | 29. Rack                     |
| 15. Upper Bearing              | 30. Spacer & Oil Seal        |

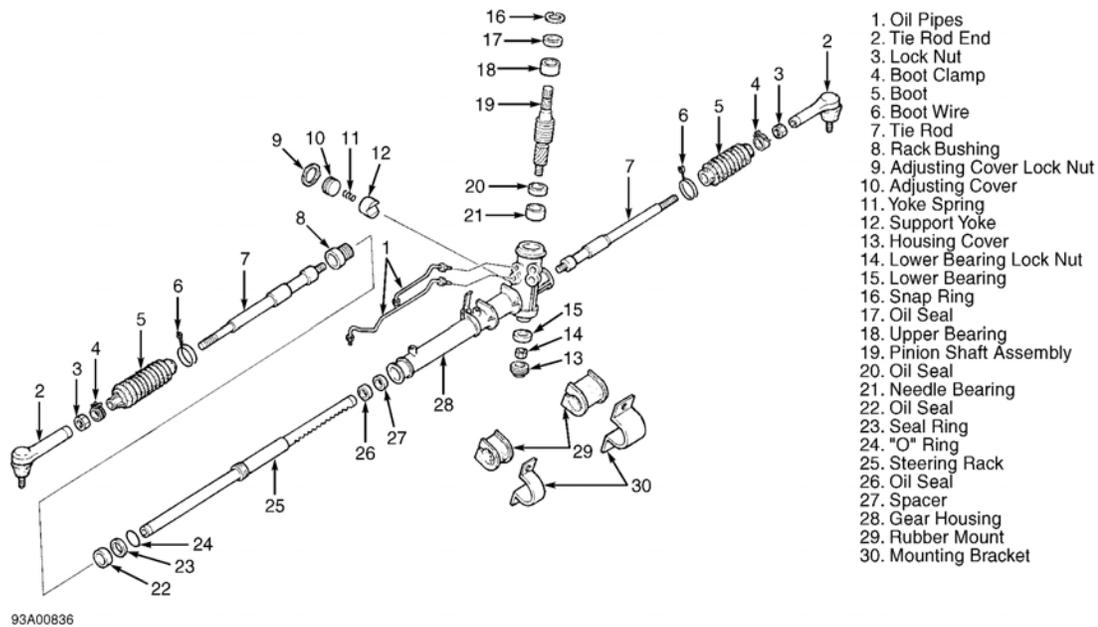
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**Fig. 11: Exploded View Of Rack & Pinion Steering Gear (1997 MPV)**

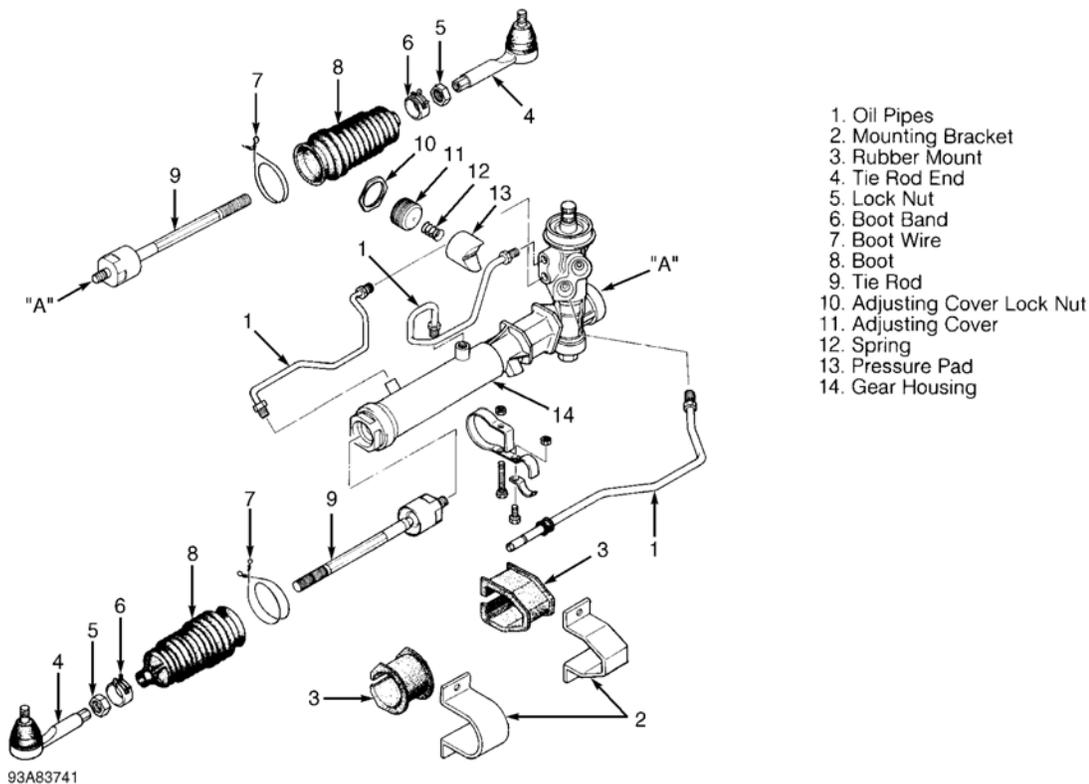


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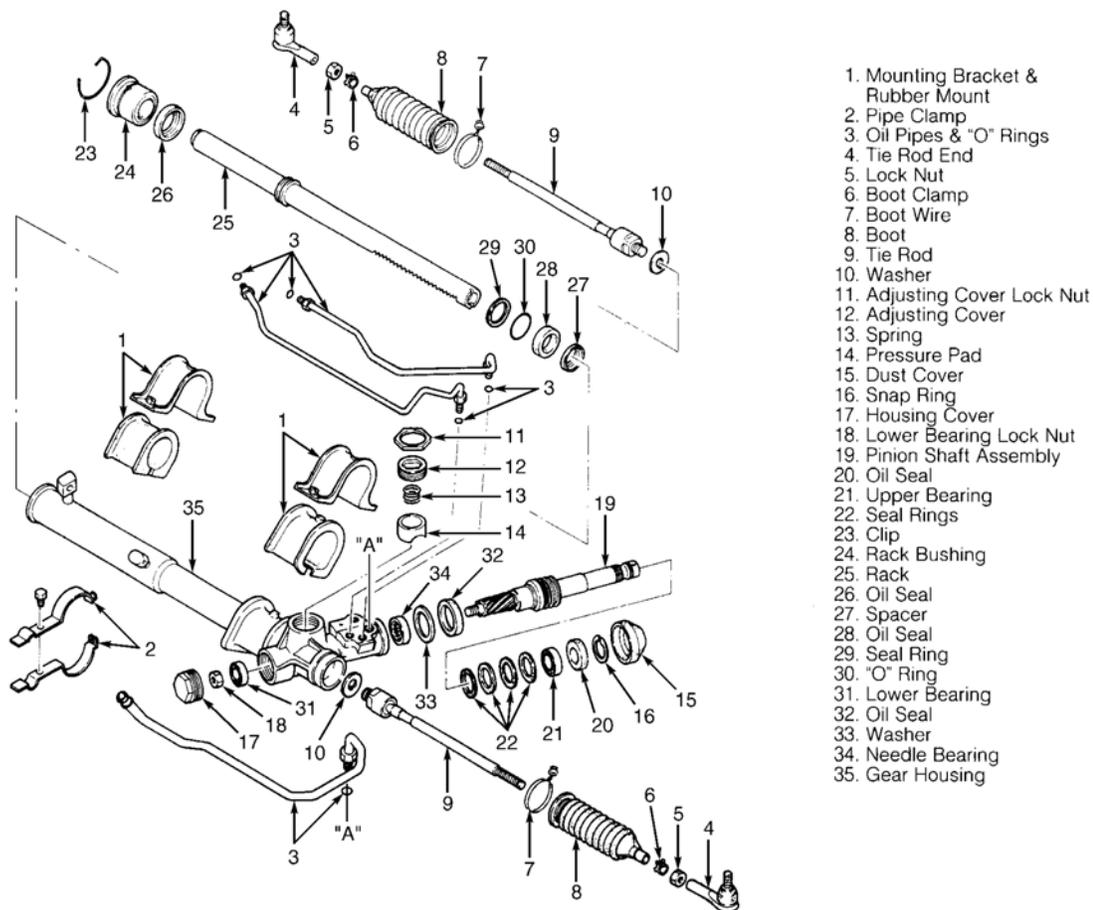
**Fig. 13: Exploded View Of Rack & Pinion Steering Gear (MX-3 1.8L)**  
 Courtesy of MAZDA MOTORS CORP.



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**Fig. 14: Exploded View Of Rack & Pinion Steering Gear (MX-6 & 626)**  
Courtesy of MAZDA MOTORS CORP.

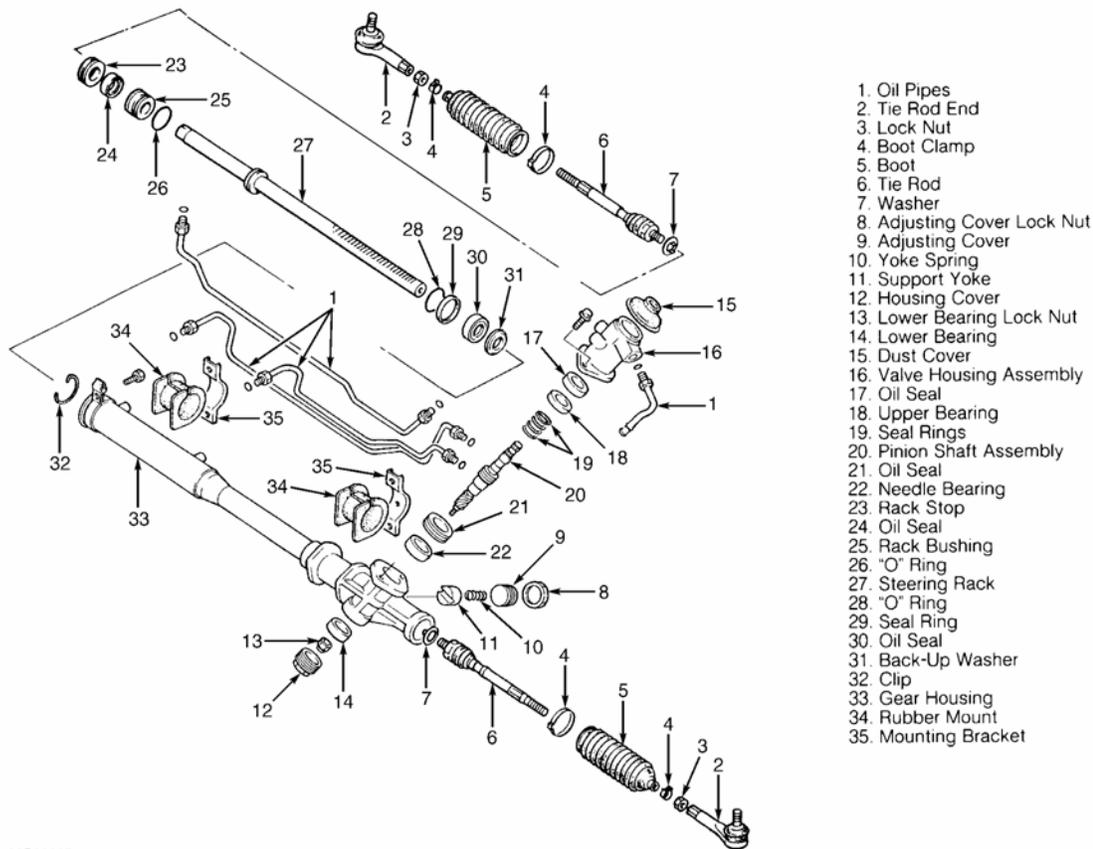


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**Fig. 15: Exploded View Of Rack & Pinion Steering Gear (RX7)**  
Courtesy of MAZDA MOTORS CORP.

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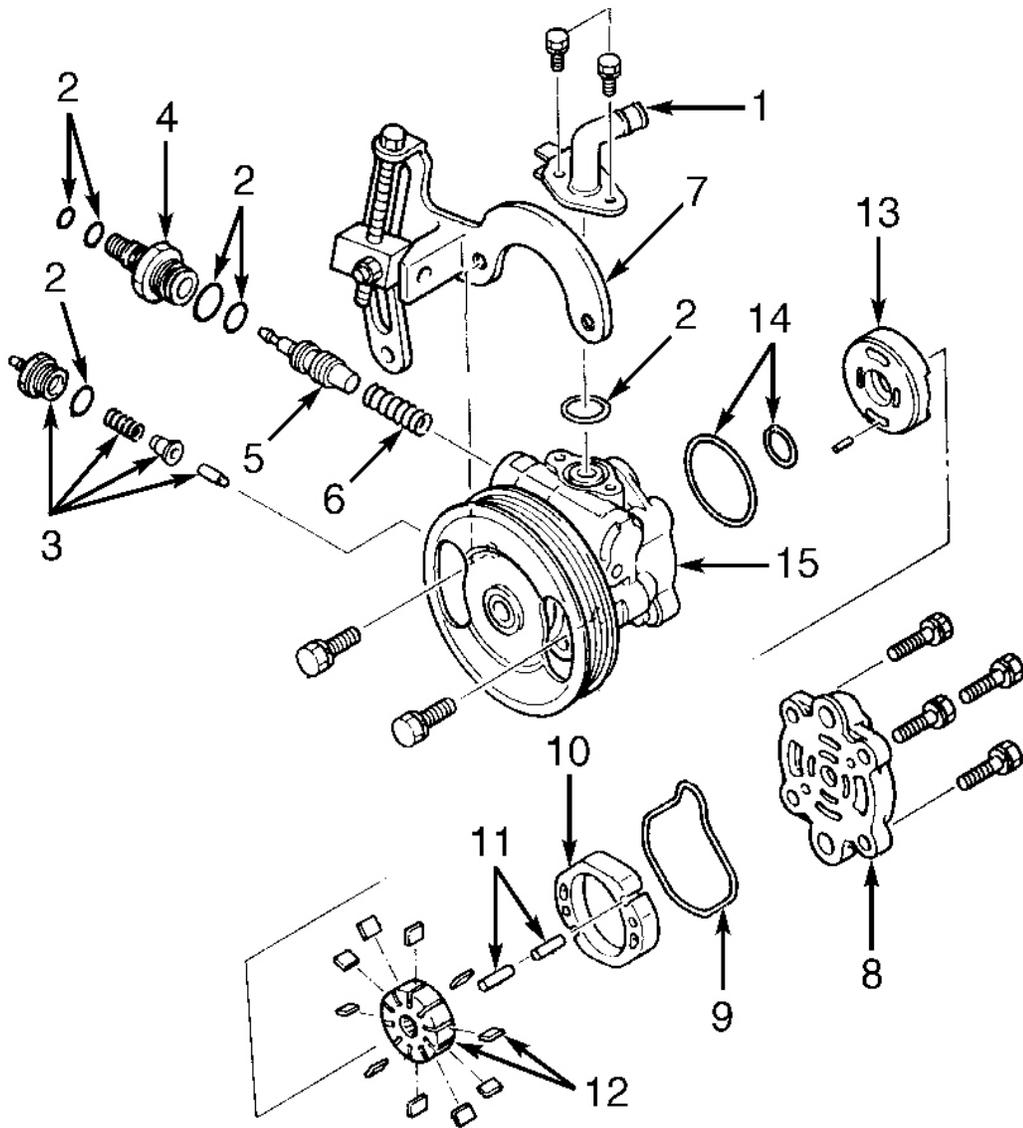
**Fig. 16: Exploded View Of Rack & Pinion Steering Gear (929)**  
Courtesy of MAZDA MOTORS CORP.

### POWER STEERING PUMP

**NOTE:** See Fig. 17 -22 for exploded views of power steering pumps.

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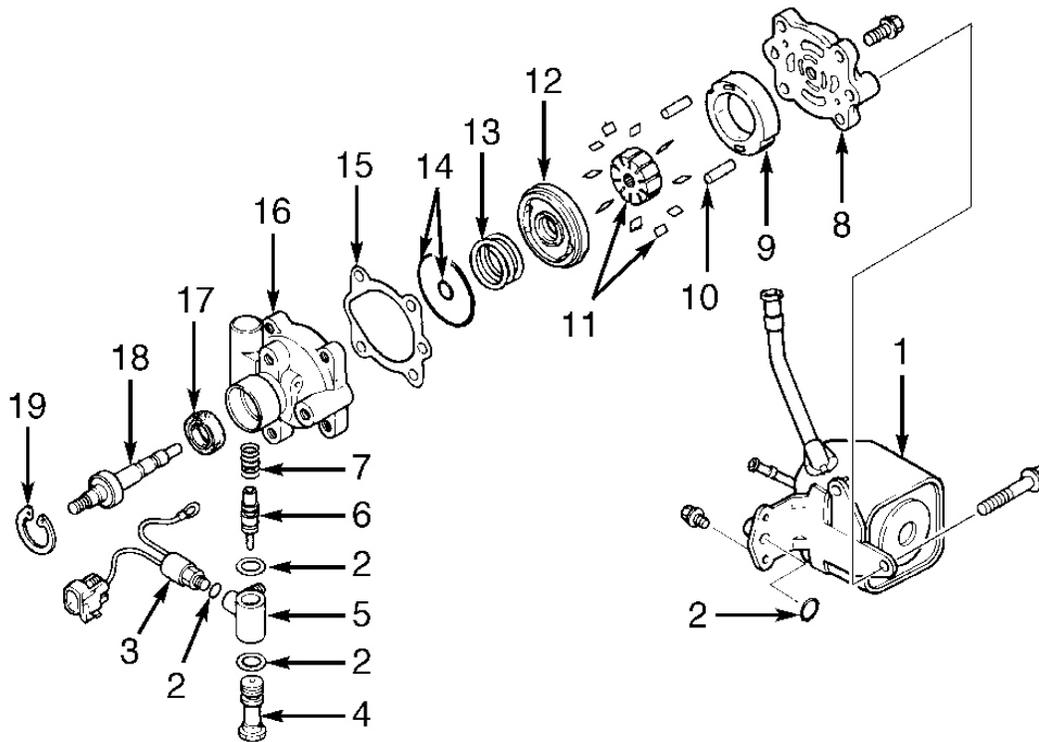


- |                             |                     |
|-----------------------------|---------------------|
| 1. Suction Pipe             | 9. "O" Ring         |
| 2. "O" Ring                 | 10. Cam Ring        |
| 3. Pressure Switch Assembly | 11. Pins            |
| 4. Connector                | 12. Rotor & Vanes   |
| 5. Control Valve            | 13. Side Plate      |
| 6. Spring                   | 14. "O" Ring        |
| 7. Bracket                  | 15. Front Pump Body |
| 8. Rear Pump Body           |                     |

## 1997 Mazda MX-5 Miata

STEERING SYSTEM - POWER RACK & PINION 1997 STEERING Mazda Power Rack & Pinion

**Fig. 17: Exploded View Of Power Steering Pump (Miata Shown; MX-3 1.6L & Protege Are Similar)**  
Courtesy of MAZDA MOTORS CORP.



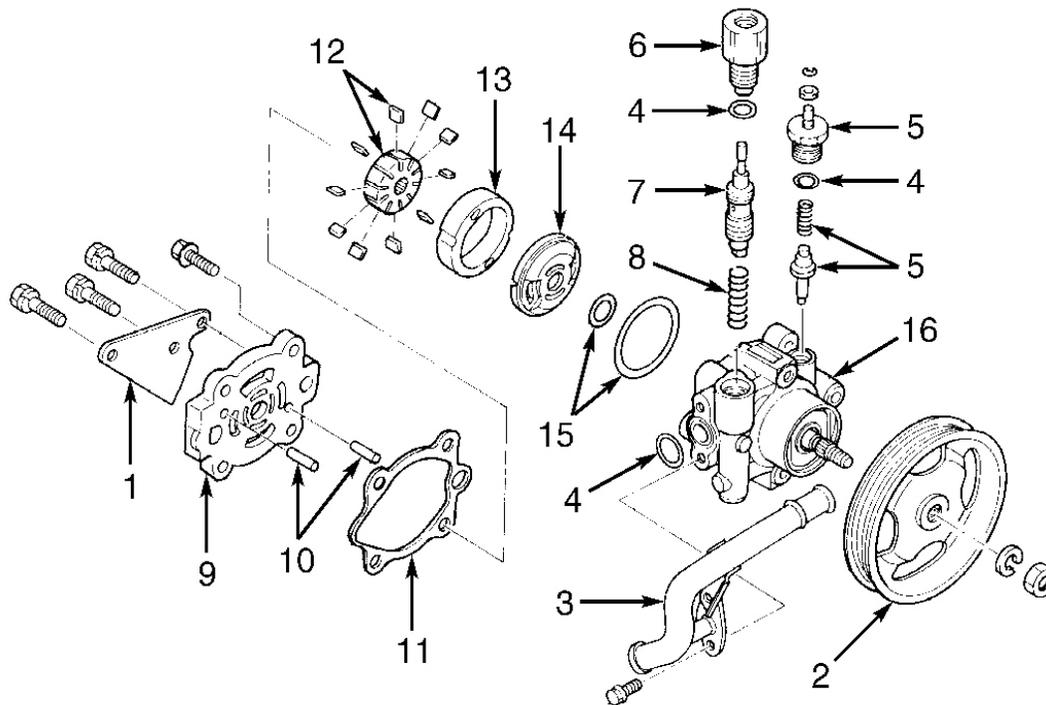
- |                             |                              |
|-----------------------------|------------------------------|
| 1. Reservoir                | 11. Rotor & Vanes            |
| 2. "O" Ring                 | 12. Side Plate               |
| 3. Pressure Switch Assembly | 13. Spring                   |
| 4. Connector                | 14. "O" Ring                 |
| 5. Joint                    | 15. Gasket                   |
| 6. Control Valve            | 16. Front Pump Body          |
| 7. Spring                   | 17. Oil Seal                 |
| 8. Rear Pump Body           | 18. Bearing & Shaft Assembly |
| 9. Cam Ring                 | 19. Snap Ring                |
| 10. Pins                    |                              |

93D00839

**Fig. 18: Exploded View Of Power Steering Pump (MPV)**  
Courtesy of MAZDA MOTORS CORP.

# 1997 Mazda MX-5 Miata

## STEERING SYSTEM - POWER RACK & PINION 1997 STEERING Mazda Power Rack & Pinion



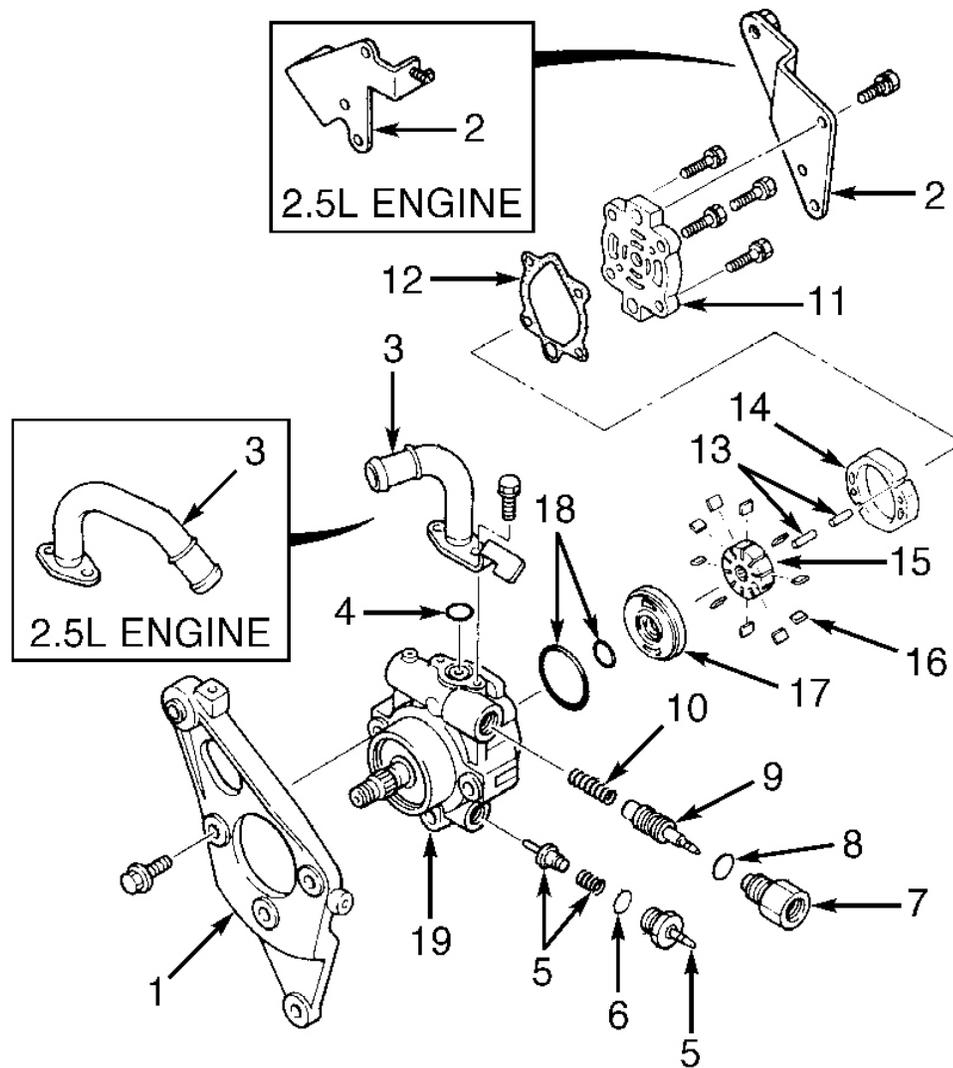
- |                             |                     |
|-----------------------------|---------------------|
| 1. Bracket                  | 9. Rear Pump Body   |
| 2. Pulley                   | 10. Pins            |
| 3. Suction Pipe             | 11. Gasket          |
| 4. "O" Ring                 | 12. Rotor & Vanes   |
| 5. Pressure Switch Assembly | 13. Cam Ring        |
| 6. Connector                | 14. Side Plate      |
| 7. Control Valve            | 15. "O" Ring        |
| 8. Spring                   | 16. Front Pump Body |

93G00840

**Fig. 19: Exploded View Of Power Steering Pump (MX-3 1.8L)**  
Courtesy of MAZDA MOTORS CORP.

# 1997 Mazda MX-5 Miata

## STEERING SYSTEM - POWER RACK & PINION 1997 STEERING Mazda Power Rack & Pinion

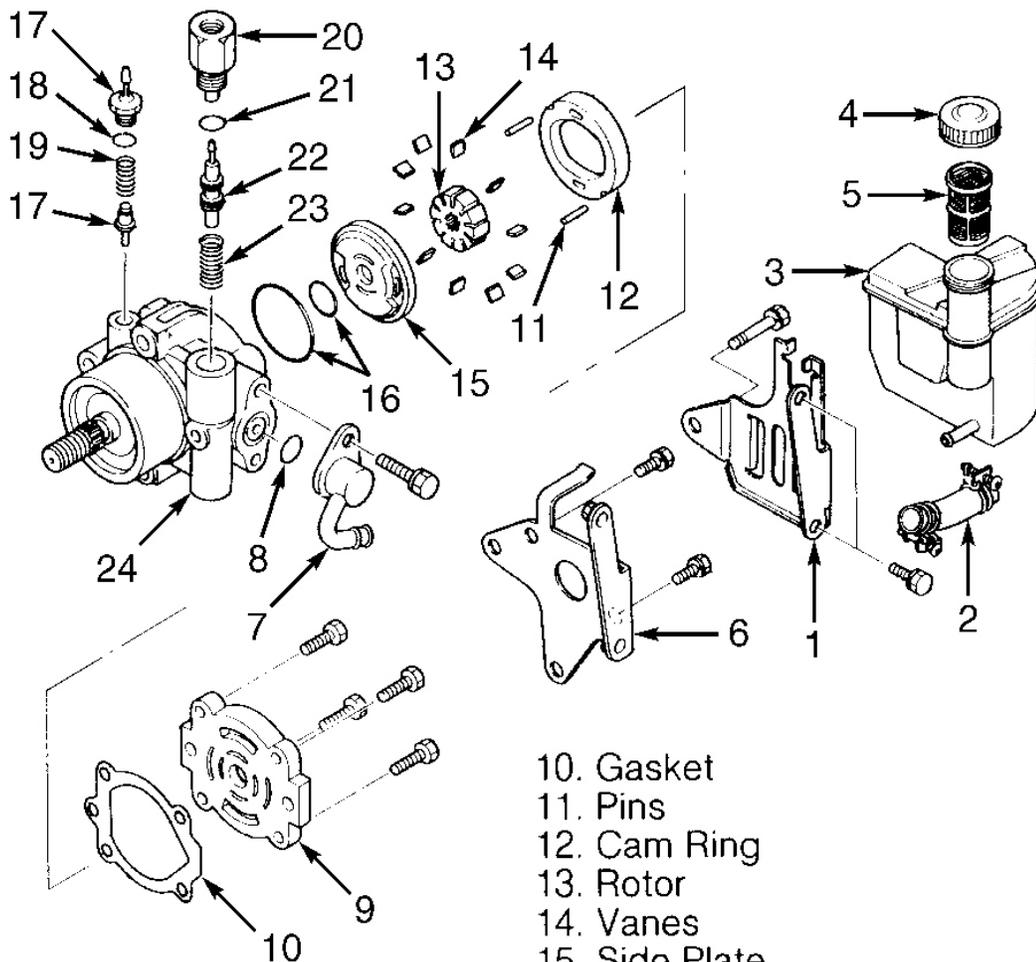


- |                             |                     |
|-----------------------------|---------------------|
| 1. Bracket (2.0L Engine)    | 11. Rear Pump Body  |
| 2. Bracket                  | 12. Gasket          |
| 3. Suction Pipe             | 13. Pins            |
| 4. "O" Ring                 | 14. Cam Ring        |
| 5. Pressure Switch Assembly | 15. Rotor           |
| 6. "O" Ring                 | 16. Vanes           |
| 7. Connector                | 17. Side Plate      |
| 8. "O" Ring                 | 18. "O" Ring        |
| 9. Control Valve            | 19. Front Pump Body |
| 10. Spring                  |                     |

1997 Mazda MX-5 Miata

STEERING SYSTEM - POWER RACK & PINION 1997 STEERING Mazda Power Rack & Pinion

**Fig. 20: Exploded View Of Power Steering Pump (MX-6 & 626 Shown; Millenia Is Similar)**  
 Courtesy of MAZDA MOTORS CORP.



- |                   |                              |
|-------------------|------------------------------|
| 1. Bracket        | 10. Gasket                   |
| 2. Suction Hose   | 11. Pins                     |
| 3. Reservoir      | 12. Cam Ring                 |
| 4. Cap            | 13. Rotor                    |
| 5. Filter         | 14. Vanes                    |
| 6. Bracket        | 15. Side Plate               |
| 7. Suction Pipe   | 16. "O" Ring                 |
| 8. "O" Ring       | 17. Pressure Switch Assembly |
| 9. Rear Pump Body | 18. "O" Ring                 |
|                   | 19. Spring                   |
|                   | 20. Connector                |
|                   | 21. "O" Ring                 |
|                   | 22. Control Valve            |
|                   | 23. Spring                   |
|                   | 24. Front Pump Body          |

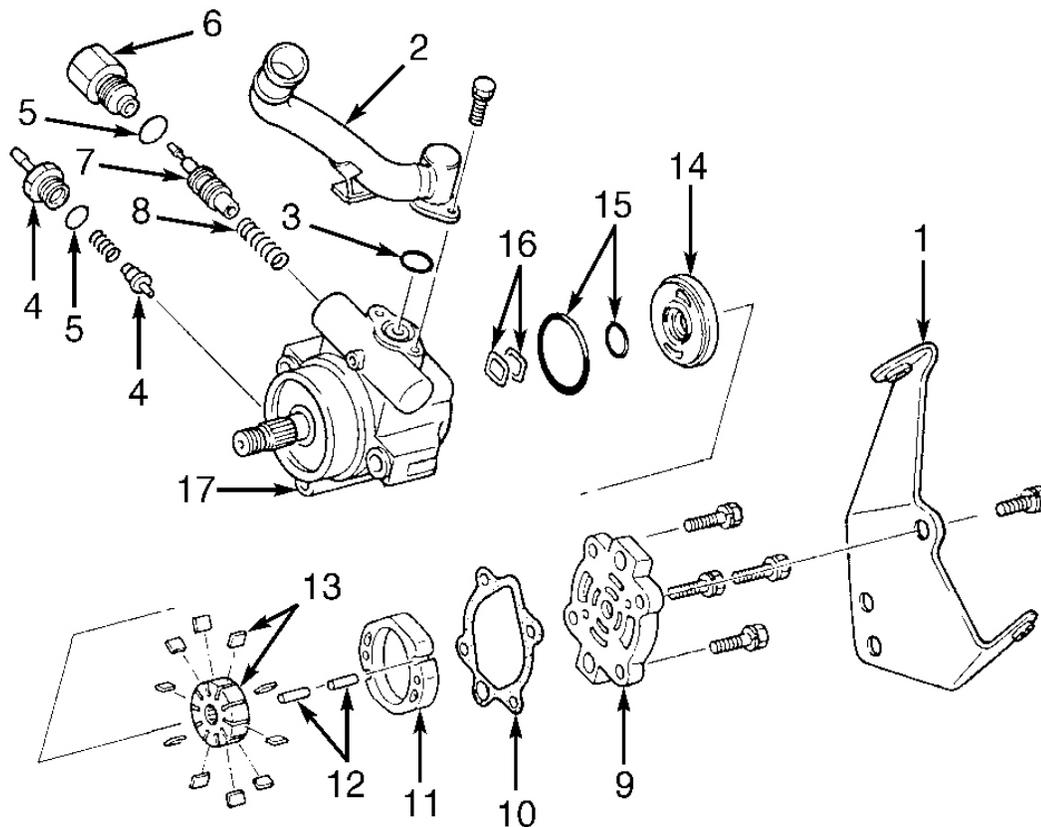
93F83746

**Fig. 21: Exploded View Of Power Steering Pump (RX7)**

## 1997 Mazda MX-5 Miata

STEERING SYSTEM - POWER RACK & PINION 1997 STEERING Mazda Power Rack & Pinion

Courtesy of MAZDA MOTORS CORP.



- |                             |                     |
|-----------------------------|---------------------|
| 1. Bracket                  | 10. Gasket          |
| 2. Suction Pipe             | 11. Cam Ring        |
| 3. "O" Ring                 | 12. Pins            |
| 4. Pressure Switch Assembly | 13. Rotor & Vanes   |
| 5. "O" Ring                 | 14. Side Plate      |
| 6. Connector                | 15. "O" Ring        |
| 7. Control Valve            | 16. Gasket          |
| 8. Spring                   | 17. Front Pump Body |
| 9. Rear Pump Body           |                     |

93100842

**Fig. 22: Exploded View Of Power Steering Pump (929)**  
Courtesy of MAZDA MOTORS CORP.

## TORQUE SPECIFICATIONS

### TORQUE SPECIFICATIONS

## 1997 Mazda MX-5 Miata

### STEERING SYSTEM - POWER RACK & PINION 1997 STEERING Mazda Power Rack & Pinion

Application	Ft. Lbs. (N.m)
<b>Miata</b>	
Adjusting Cover Lock Nut	(1)
Intermediate Shaft-To-Pinion Shaft Bolt	13-19 (18-26)
Pinion Shaft Lock Nut (1995)	22-29 (30-39)
Power Steering Pump Mounting Bolts/Nuts	27-40 (37-54)
Pressure Line Fitting-To-Power Steering Pump	23-35 (31-47)
Pressure Line Fitting-To-Steering Gear	23-35 (31-47)
Steering Gear Mounting Bolts/Nuts	34-43 (46-58)
Steering Rack-To-Tie Rod	58-72 (79-98)
Tie Rod Castle Nuts	22-32 (30-44)
Tie Rod End-To-Tie Rod Lock Nut	25-29 (34-39)
Valve Housing Bolts (1996-97)	15-21 (20-29)
Wheel Lug Nuts	66-86 (89-117)
<b>Millenia</b>	
Adjusting Cover Lock Nut	(1)
Intermediate Shaft-To-Pinion Shaft Bolt	13-19 (18-26)
Engine Mount Member	
Bolts	50-69 (67-93)
Nut	55-77 (75-104)
No. 1 Engine Mount Bolt	32-44 (44-60)
Power Steering Pump Mounting Bolts/Nuts	24-33 (33-45)
Power Steering Pump Pulley Lock Nut	36-43 (49-58)
Pressure Line Fitting-To-Power Steering Pump	23-35 (41-47)
Pressure Line Fitting-To-Steering Gear	(2)
Steering Gear Mounting Bolts/Nuts	32-44 (44-60)
Steering Rack-To-Tie Rod	58-72 (79-98)
Tie Rod Castle Nuts	41-59 (55-80)
Tie Rod End-To-Tie Rod Lock Nut	58-72 (79-98)
Transverse Member Nuts (Millenia)	40-56 (54-76)
Valve Housing Bolts	13-18 (17-25)
Wheel Lug Nuts	66-94 (89-127)
<b>MPV</b>	
Adjusting Cover Lock Nut	(1)
Intermediate Shaft-To-Pinion Shaft Bolt	13-19 (18-26)
Pinion Shaft Lock Nut	29-36 (39-49)
Power Steering Pump Mounting Bolts/Nuts	23-34 (31-46)
Power Steering Pump Pulley Lock Nut	29-43 (39-58)
Pressure Line Fitting-To-Power Steering Pump	23-35 (31-47)
Pressure Line Fitting-To-Steering Gear	23-35 (31-47)

## 1997 Mazda MX-5 Miata

### STEERING SYSTEM - POWER RACK & PINION 1997 STEERING Mazda Power Rack & Pinion

Steering Bracket-To-Frame Mounting Bolt	46-69 (62-94)
Steering Gear Mounting Bolts/Nuts	55-69 (75-94)
Steering Rack-To-Tie Rod	87-101 (118-137)
Tie Rod Castle Nuts	44-58 (60-79)
Tie Rod End-To-Tie Rod Lock Nut	51-58 (69-79)
Wheel Lug Nuts	65-87 (88-118)
<b>MX-3</b>	
Adjusting Cover Lock Nut	(1)
Intermediate Shaft-To-Pinion Shaft Bolt	13-19 (18-26)
Pinion Shaft Lock Nut	29-36 (39-49)
Power Steering Pump Mounting Bolts/Nuts	
Bolt	27-40 (37-54)
Nut	14-19 (19-26)
Pressure Line Fitting-To-Power Steering Pump	
4-Cylinder	12-17 (16-23)
V6	18-26 (24-35)
Pressure Line Fitting-To-Steering Gear	
4-Cylinder	21-25 (28-34)
V6	26-32 (35-44)
Steering Gear Mounting Bolts/Nuts	27-38 (37-52)
Steering Rack-To-Tie Rod	
4-Cylinder	43-58 (58-79)
V6	91-105 (123-142)
Tie Rod Castle Nuts	31-42 (42-57)
Tie Rod End-To-Tie Rod Lock Nut	25-37 (34-50)
Wheel Lug Nuts	65-87 (88-118)
<b>MX-6 &amp; 626</b>	
Adjusting Cover Lock Nut	(1)
Intermediate Shaft-To-Pinion Shaft Bolt	13-19 (18-26)
Power Steering Pump Mounting Bolts/Nuts	23-34 (31-46)
Power Steering Pump Pulley Lock Nut	36-43 (49-58)
Pressure Line Fitting-To-Power Steering Pump	22-32 (30-44)
Pressure Line Fitting-To-Steering Gear	25-33 (34-45)
Steering Gear Mounting Bolts/Nuts	28-38 (38-51)
Steering Rack-To-Tie Rod	91-105 (123-142)
Tie Rod Castle Nuts	23-33 (31-45)
Tie Rod End-To-Tie Rod Lock Nut	51-72 (69-98)
Wheel Lug Nuts	65-87 (88-118)
<b>Protege</b>	
Adjusting Cover Lock Nut	(1)

## 1997 Mazda MX-5 Miata

### STEERING SYSTEM - POWER RACK & PINION 1997 STEERING Mazda Power Rack & Pinion

Intermediate Shaft-To-Pinion Shaft Bolt	13-19 (18-26)
Pinion Shaft Lock Nut	29-36 (39-49)
Power Steering Pump Mounting Bolts/Nuts	
Bolt	33-44 (44-60)
Nut	28-37 (38-51)
Pressure Line Fitting-To-Power Steering Pump	18-26 (24-35)
Pressure Line Fitting-To-Steering Gear	22-32 (30-44)
Steering Gear Mounting Bolts/Nuts	27-38 (37-52)
Steering Rack-To-Tie Rod	44-58 (59-78)
Tie Rod Castle Nuts	31-42 (42-57)
Tie Rod End-To-Tie Rod Lock Nut	25-37 (34-50)
Wheel Lug Nuts	65-87 (88-118)
<b>RX7</b>	
Adjusting Cover Lock Nut	(1)
Intermediate Shaft-To-Pinion Shaft Bolt	13-19 (18-26)
Pinion Shaft Lock Nut	14-22 (19-30)
Power Steering Pump Mounting Bolts/Nuts	12-17 (16-23)
Power Steering Pump Pulley Lock Nut	29-43 (39-58)
Pressure Line Fitting-To-Power Steering Pump	17-26 (23-36)
Pressure Line Fitting-To-Steering Gear	12-17 (16-23)
Steering Gear Mounting Bolts/Nuts	27-38 (37-52)
Steering Rack-To-Tie Rod	58-72 (79-98)
Tie Rod Castle Nuts	22-32 (30-44)
Tie Rod End-To-Tie Rod Lock Nut	25-37 (34-50)
Wheel Lug Nuts	65-87 (88-118)
<b>929</b>	
Adjusting Cover Lock Nut	(1)
Intermediate Shaft-To-Pinion Shaft Bolt	13-19 (18-26)
Pinion Shaft Lock Nut	14-22 (19-30)
Power Steering Pump Mounting Bolts/Nuts	12-17 (16-23)
Power Steering Pump Pulley Lock Nut	29-43 (39-58)
Pressure Line Fitting-To-Power Steering Pump	33-40 (45-54)
Pressure Line Fitting-To-Steering Gear	29-43 (39-58)
Steering Gear Mounting Bolts/Nuts	27-38 (37-52)
Steering Rack-To-Tie Rod	58-72 (79-98)
Tie Rod Castle Nuts	37-47 (50-63)
Tie Rod End-To-Tie Rod Lock Nut	51-72 (69-98)
Valve Housing Bolts	13-18 (17-25)
Wheel Lug Nuts	65-87 (88-118)

(1) For adjusting cover lock nut tightening procedure, see **ADJUSTMENTS** .

## 1997 Mazda MX-5 Miata

STEERING SYSTEM - POWER RACK & PINION 1997 STEERING Mazda Power Rack & Pinion

(2) Tighten pressure line fitting-to-steering gear 76-115 INCH lbs. (8.6-13 N.m).