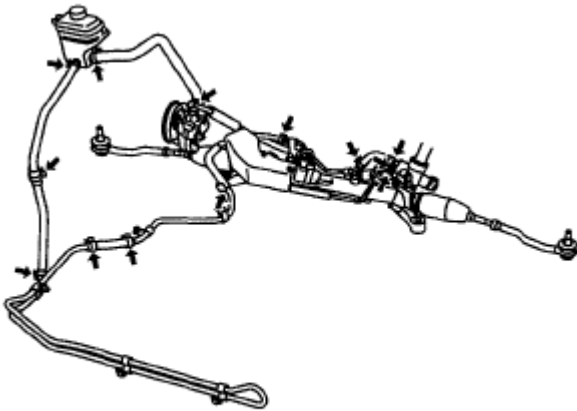


2008 STEERING

Power Steering - Mazda CX-9

STEERING LOCATION INDEX



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Fig. 1: Identifying Steering Location Index
Courtesy of MAZDA MOTORS CORP.

AIR BLEEDING

- CAUTION:**
- Do not turn the steering wheel during the fluid level inspection, otherwise the fluid level changes and cannot be inspected correctly.

1. Inspect the fluid level. (See POWER STEERING FLUID INSPECTION.)
2. Jack up the front of the vehicle and support it on safety stands.
3. Turn the steering wheel fully to the left and right several times with the engine not running.
4. Reinspect the fluid level.
 - If it has dropped, add fluid.
5. Repeat Steps 3 and 4 until the fluid level stabilizes.
6. Lower the vehicle.
7. Start the engine and let it idle.
8. Turn the steering wheel fully to the left and right several times.
9. Verify that the fluid is not foamy and that the fluid level has not dropped.
 - If the fluid level has dropped, add fluid as necessary and repeat Steps 8 and 9.

POWER STEERING FLUID INSPECTION

FLUID LEVEL INSPECTION

1. Inspect the power steering fluid level.
 - Add fluid to the specified level as necessary.

Power steering fluid type

ATF-MIII, M-V or Dexron®II

Power steering fluid capacity (approximate quantity) 1.27 L {1.34 US qt, 1.11 imp qt}

FLUID LEAKAGE INSPECTION

1. Start the engine and let it idle.
2. Turn the steering wheel fully to the left and right to apply fluid pressure.

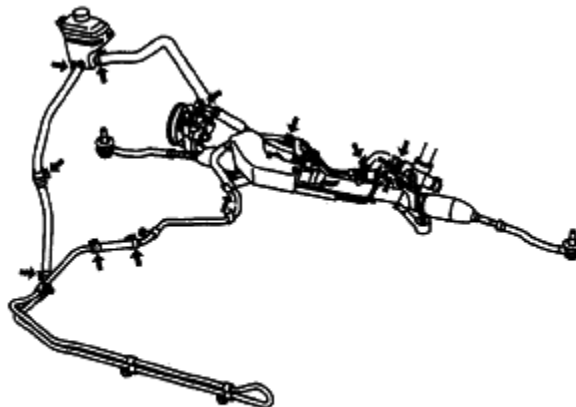
CAUTION:

- If the steering wheel is kept in the fully turned position for more than 5 seconds, the fluid temperature will rise excessively and adversely affect the oil pump.

3. Inspect for fluid leakage.
 - If fluid leakage is found, replace related pipe or hose.

NOTE:

- The points where fluid leakage may occur are indicated in the figure.



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Fig. 2: Inspecting For Fluid Leakage
Courtesy of MAZDA MOTORS CORP.

FLUID PRESSURE INSPECTION

1. Assemble the SSTs as shown in the figure.

2. Disconnect the pressure pipe from the steering gear and linkage, and connect the SSTs.

Tightening torque 29.4-44.1 N.m {3.00-4.49 kgf.m, 21.7-32.5 ft.lbf}

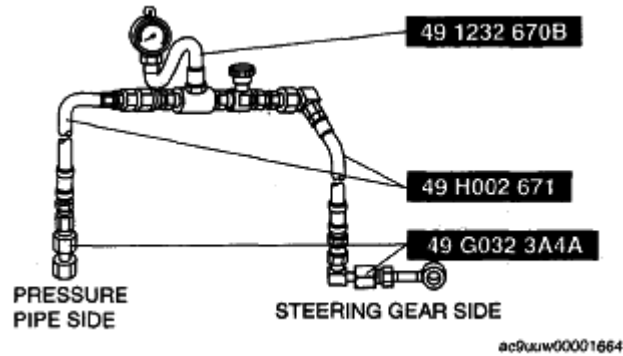


Fig. 3: Identifying SSTs
 Courtesy of MAZDA MOTORS CORP.

3. Bleed the air from the system. (See AIR BLEEDING.)
4. Open the gauge valve fully.
5. Start the engine and turn the steering wheel fully left and right to raise the fluid temperature to **50-60 °C {122-140 °F}**.
6. Close the gauge valve completely.
7. Increase the engine speed to **1,000-1,500 rpm** and measure the fluid pressure generated by the oil pump.
 - If the pressure is not within the specification, repair or replace the oil pump component.

CAUTION:

- If the valve is left closed for more than 5 seconds, the fluid temperature will rise excessively and adversely affect the oil pump.

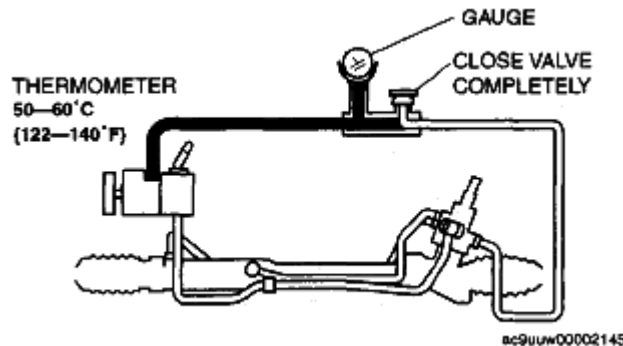


Fig. 4: Measuring Fluid Pressure Generated By Oil Pump
 Courtesy of MAZDA MOTORS CORP.

Oil pump fluid pressure 11.3-11.8 MPa {116-120 kgf/cm², 1639-1711 psi}

8. Open the gauge valve fully and increase the engine speed to **1,000-1,500 rpm**.
9. Turn the steering wheel fully to the left and right, then measure the fluid pressure generated at the gear housing.
 - If the pressure is not within the specification, repair or replace the steering gear component.

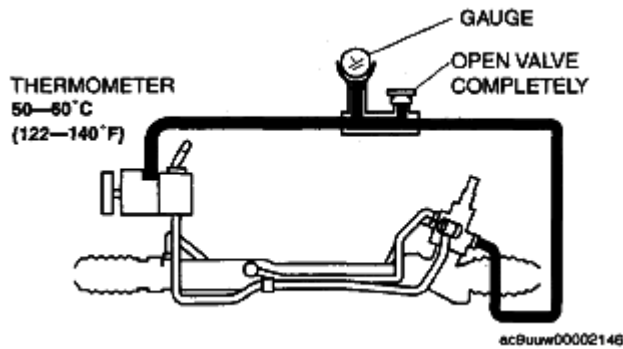


Fig. 5: Measuring Fluid Pressure Generated At Gear Housing
Courtesy of MAZDA MOTORS CORP.

- CAUTION:**
- If the steering wheel is kept in the fully turned position for more than 5 seconds, the fluid temperature will rise excessively and adversely affect the oil pump.

Gear housing fluid pressure 11.3-11.8 MPa {116-120 kgf/cm² , 1639-1711 psi}

10. Remove the SSTs. Install and tighten the pressure pipe to the specified torque.

Tightening torque 29.4-44.1 N.m {3.00-4.49 kgf.m, 21.7-32.5 ft.lbf}

11. Bleed the air from the system.

STEERING WHEEL AND COLUMN INSPECTION

STEERING WHEEL PLAY INSPECTION

1. With the wheels in the straight-ahead position, gently turn the steering wheel to the left and right and verify that the play is within the specification.
 - If the play exceeds the specification, either the steering joints are worn or the backlash of the steering gear is excessive. Correct as necessary.

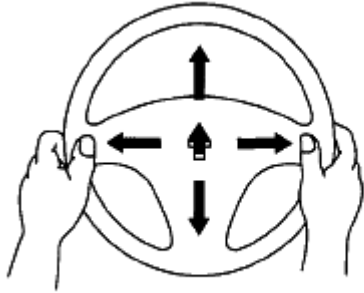
Steering wheel play 0-30 mm {0-1.18 in}

STEERING WHEEL LOOSENESS INSPECTION

1. Move the steering wheel as shown in the figure to inspect for column bearing wear, steering shaft joint

play, steering wheel looseness, and column looseness.

- Repair or replace as necessary.



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Fig. 6: Inspecting For Column Bearing Wear, Steering Shaft Joint Play, Steering Wheel Looseness, And Column Looseness
Courtesy of MAZDA MOTORS CORP.

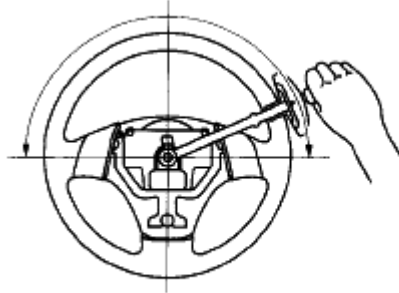
STEERING WHEEL EFFORT INSPECTION

1. Inspect the following points:
 - Tire size and tire pressure
 - Fluid level
 - Drive belt deflection
2. With the vehicle on a hard, level surface, put the wheels in the straight-ahead position.
3. Remove the air bag module.

WARNING:

- **Handling the air bag module improperly can accidentally deploy the air bag module, which may seriously injure you. Read AIR BAG SYSTEM WARNINGS before handling the air bag module. (See AIR BAG SYSTEM SERVICE WARNINGS .) (See AIR BAG SYSTEM SERVICE CAUTIONS .)**

4. Start the engine and warm the power steering fluid to **50-60 °C {122-140 °F}**.
5. Measure the steering wheel effort using a torque wrench.
 - If not within the specification, verify the following:
 - No air in steering system
 - No fluid leakage at hose or connectors
 - Function of oil pump and steering gear



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Fig. 7: Measuring Steering Wheel Effort Using Torque Wrench
Courtesy of MAZDA MOTORS CORP.

Steering wheel effort 7.8 N.m {80 kgf.cm, 58 in.lbf} max.

NOTE:

- To determine whether the steering effort is satisfactory or not, perform the inspection on another vehicle of the same model and under the same conditions, and compare the results.
- The steering wheel effort varies with conditions as shown below.
 - Road conditions, such as dry or wet, and asphalt or concrete.
 - Tire conditions, such as brand, wear, and tire pressure.

STEERING WHEEL AND COLUMN REMOVAL/INSTALLATION

WARNING:

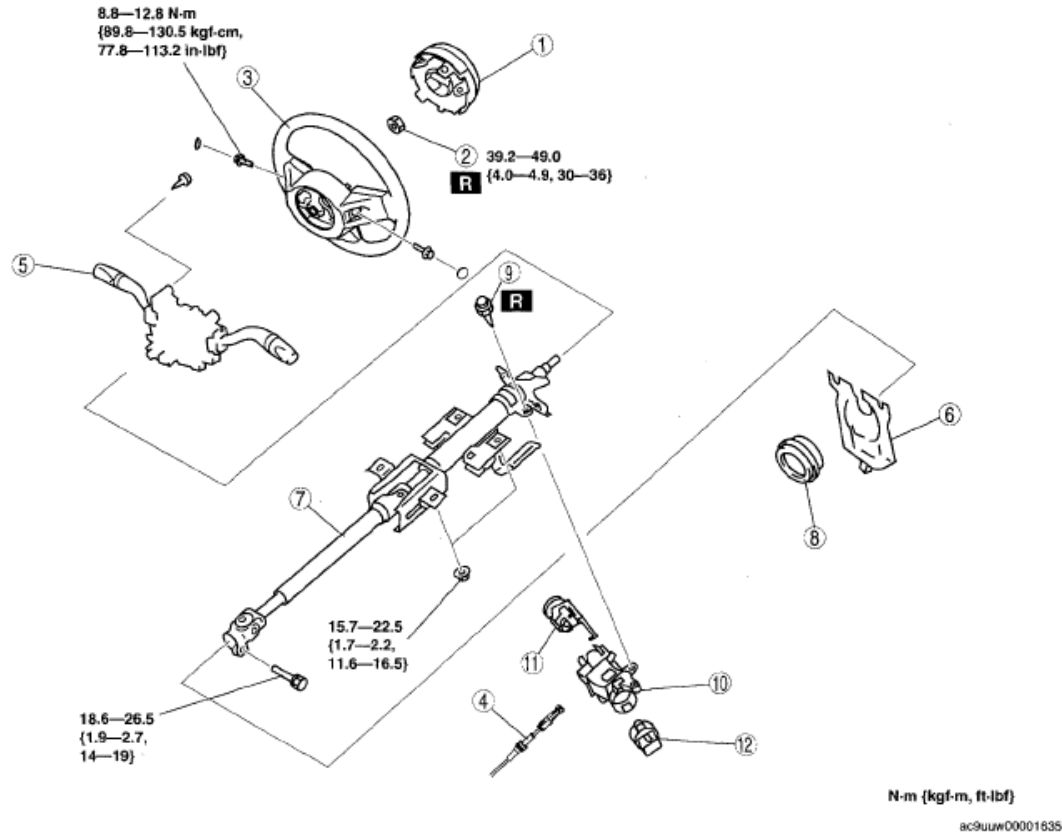
- Handling the air bag module improperly can accidentally deploy the air bag module, which may seriously injure you. Read **AIR BAG SYSTEM WARNINGS** before handling the air bag module. (See **AIR BAG SYSTEM SERVICE WARNINGS** .) (See **AIR BAG SYSTEM SERVICE CAUTIONS** .)

1. Remove the dashboard under cover (driver side). (See **DASHBOARD UNDER COVER REMOVAL/INSTALLATION** .)
2. Remove the column cover. (See **COLUMN COVER REMOVAL/INSTALLATION** .)
3. Remove the coil antenna (with advanced keyless system). (See **COIL ANTENNA REMOVAL/INSTALLATION [ADVANCED KEYLESS SYSTEM]** .)
4. Remove in the order indicated in the table.
5. Install in the reverse order of removal.
6. If the steering lock component of a vehicle equipped with the advanced keyless system is replaced, perform the following procedure after installation.
 - Without immobilizer system
 - Steering lock unit programming (See **STEERING LOCK UNIT ID CODE REGISTRATION [ADVANCED KEYLESS SYSTEM]** .)

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- With immobilizer system
 - Immobilizer system resetting (See **IMMOBILIZER SYSTEM COMPONENT REPLACEMENT/KEY ADDITION AND CLEARING [ADVANCED KEYLESS SYSTEM]** .) (See **IMMOBILIZER SYSTEM COMPONENT REPLACEMENT/KEY ADDITION AND CLEARING [KEYLESS ENTRY SYSTEM]** .)



1	Air bag module (See 08-10-6 DRIVER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION.)
2	Locknut
3	Steering wheel (See 06-14-7 Steering Wheel Removal Note.) (See 06-14-8 Steering Wheel Installation Note.)
4	Interlock cable (See 05-18-8 SELECTOR LEVER COMPONENT REMOVAL/INSTALLATION.)
5	Combination switch (See 09-18-15 COMBINATION SWITCH REMOVAL/INSTALLATION.)
6	Joint cover
7	Steering shaft (See 06-14-7 Steering Shaft Removal Note.) (See 06-14-8 Steering Shaft Installation Note.)

8	Dust cover
9	Steering lock mounting bolts (See 06-14-7 Steering Lock Mounting Bolts Removal Note.) (See 06-14-8 Steering Lock Mounting Bolts Installation Note.)
10	Steering lock component
11	Key cylinder (Without advanced keyless system) (See 06-14-7 Key Cylinder (Without Advanced Keyless System) Removal Note.)
12	Ignition switch (See 09-21-2 IGNITION SWITCH REMOVAL/INSTALLATION.)

Fig. 8: Identifying Steering Wheel, Column Components & Torque Specifications
Courtesy of MAZDA MOTORS CORP.

- CAUTION:**
- Do not try to remove the steering wheel by hitting the shaft with a hammer. The column will collapse.

1. Set the vehicle in the straight-ahead position.
2. Remove the steering wheel using a suitable puller.

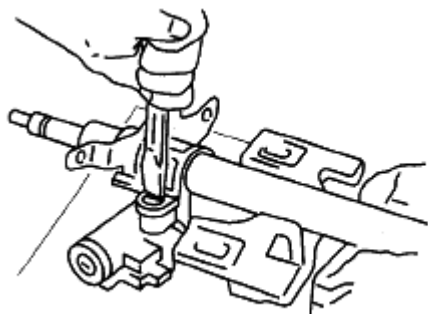
STEERING SHAFT REMOVAL NOTE

- CAUTION:**
- When removing/installing the steering shaft, protect the lower panel with a clean rag to prevent it from being scratched by interference.

1. Protect the lower panel with a clean rag.
2. Remove the steering wheel using any commercially available puller.

STEERING LOCK MOUNTING BOLTS REMOVAL NOTE

1. Make a groove in the heads of the steering lock mounting bolts using a chisel and a hammer.
2. Remove the bolts using a screwdriver.
3. Disassemble the steering lock component.

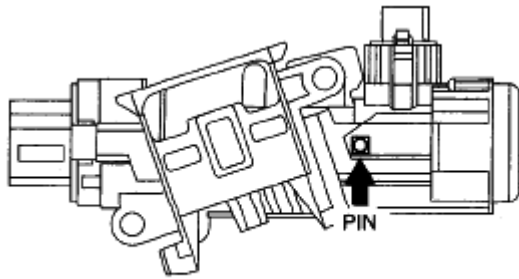


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Fig. 9: Making Groove In Heads Of Steering Lock Mounting Bolts Using Chisel And Hammer
Courtesy of MAZDA MOTORS CORP.

KEY CYLINDER (WITHOUT ADVANCED KEYLESS SYSTEM) REMOVAL NOTE

1. Turn the key to the ACC position.
2. Push the pin and remove the outer cylinder.

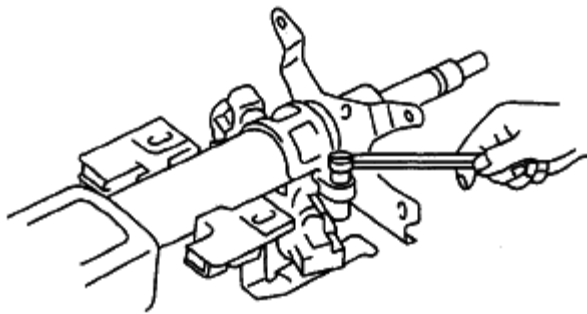


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Fig. 10: Locating Pin
Courtesy of MAZDA MOTORS CORP.

STEERING LOCK MOUNTING BOLTS INSTALLATION NOTE

1. Assemble the steering lock component to the steering shaft.
2. Verify that the lock operates correctly.
3. Install new steering lock mounting bolts.
4. Tighten the bolts until the heads break off.



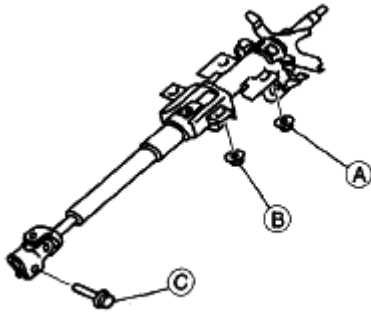
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Fig. 11: Installing Steering Lock Mounting Bolts
Courtesy of MAZDA MOTORS CORP.

STEERING SHAFT INSTALLATION NOTE

CAUTION: • Do not apply a shock in the axial direction of the shaft.

1. Lock the tilt lever.
2. Tighten nut A.
3. Tighten nut B.
4. Tighten bolt C.



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Fig. 12: Identifying Steering Shaft Nuts And Bolt
Courtesy of MAZDA MOTORS CORP.

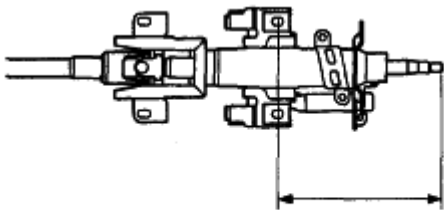
STEERING WHEEL INSTALLATION NOTE

1. Make sure the wheels in the straight-ahead position, and install the steering wheel.

STEERING SHAFT INSPECTION

1. Inspect the following.
 1. Column bearing for damage
 2. Steering shaft length
 - Replace the steering shaft component as necessary.

Steering shaft length 211.6 mm {8.331 in}



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Fig. 13: Identifying Steering Shaft Length
Courtesy of MAZDA MOTORS CORP.

2. Inspect the tilt operation.
 1. Verify that the adjusting lever moves smoothly from unlock position to lock position.
 2. Verify that the steering shaft is fixed firmly when the adjusting lever is locked.
 - Replace the steering shaft component as necessary.

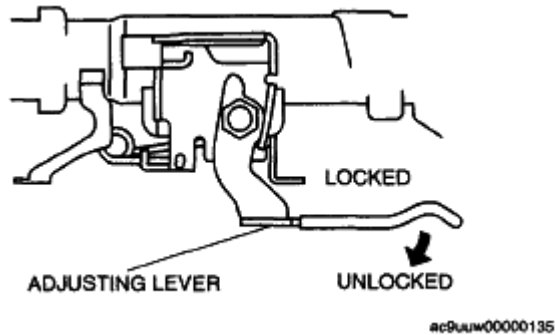


Fig. 14: Inspecting Tilt Operation
Courtesy of MAZDA MOTORS CORP.

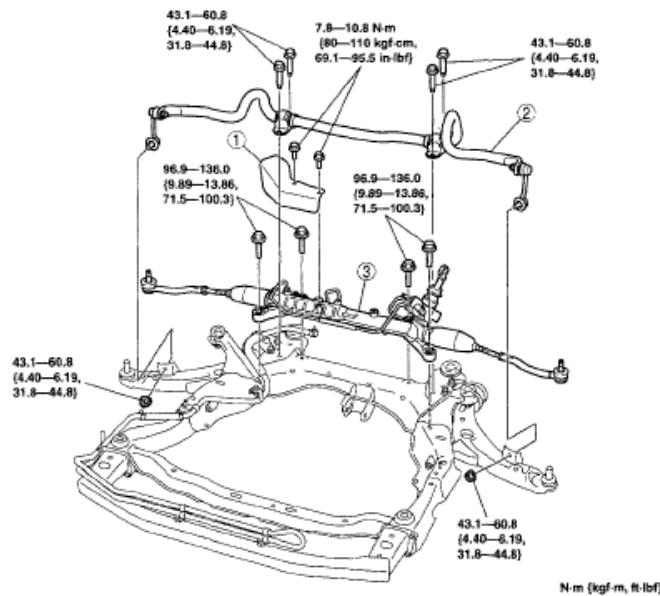
STEERING GEAR AND LINKAGE REMOVAL/INSTALLATION

- CAUTION:**
- Performing the following procedures without first removing the ABS wheel-speed sensor may possibly cause an open circuit in the harness if it is pulled by mistake. Before performing the following procedures, remove the ABS wheel-speed sensor (axle side) and fix it to an appropriate place where the sensor will not be pulled by mistake while servicing the vehicle.

1. Drain the power steering fluid. (See **POWER STEERING FLUID INSPECTION**.)
2. Remove the front under cover A and front under cover B. (See **FRONT UNDER COVER REMOVAL/INSTALLATION** .)
3. Remove the middle pipe. (See **EXHAUST SYSTEM REMOVAL/INSTALLATION [MZI-3.7]** .)
4. Remove the transverse member. (See **TRANSVERSE MEMBER REMOVAL/INSTALLATION** .)
5. Remove the front crossmember, steering gear and linkage component. (See **FRONT CROSSMEMBER REMOVAL/INSTALLATION** .)
6. Remove in the order indicated in the table.
7. Install in the reverse order of removal.
8. After installation, adjust the total toe-in. (See **FRONT WHEEL ALIGNMENT** .)

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1	Insulator
2	Front stabilizer

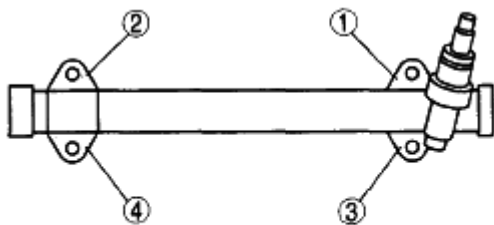
3	Steering gear and linkage (See 06-14-9 Steering Gear and Linkage Installation Note.)
---	---

Fig. 15: Identifying Steering Gear, Linkage Components & Torque Specifications
Courtesy of MAZDA MOTORS CORP.

STEERING GEAR AND LINKAGE INSTALLATION NOTE

1. Tighten the mounting bracket bolts to the specified torque in the order shown.

Tightening torque 96.9-136.0 N.m {9.89-13.86 kgf.m, 71.5-100.3 ft.lbf}



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Fig. 16: Identifying Mounting Bracket Bolts Tightening Order
Courtesy of MAZDA MOTORS CORP.

BOLT (INTERMEDIATE SHAFT) INSTALLATION NOTE

1. Align the marks and install the intermediate shaft and bolt.

STEERING GEAR AND LINKAGE DISASSEMBLY

2008 Mazda CX-9 Grand Touring

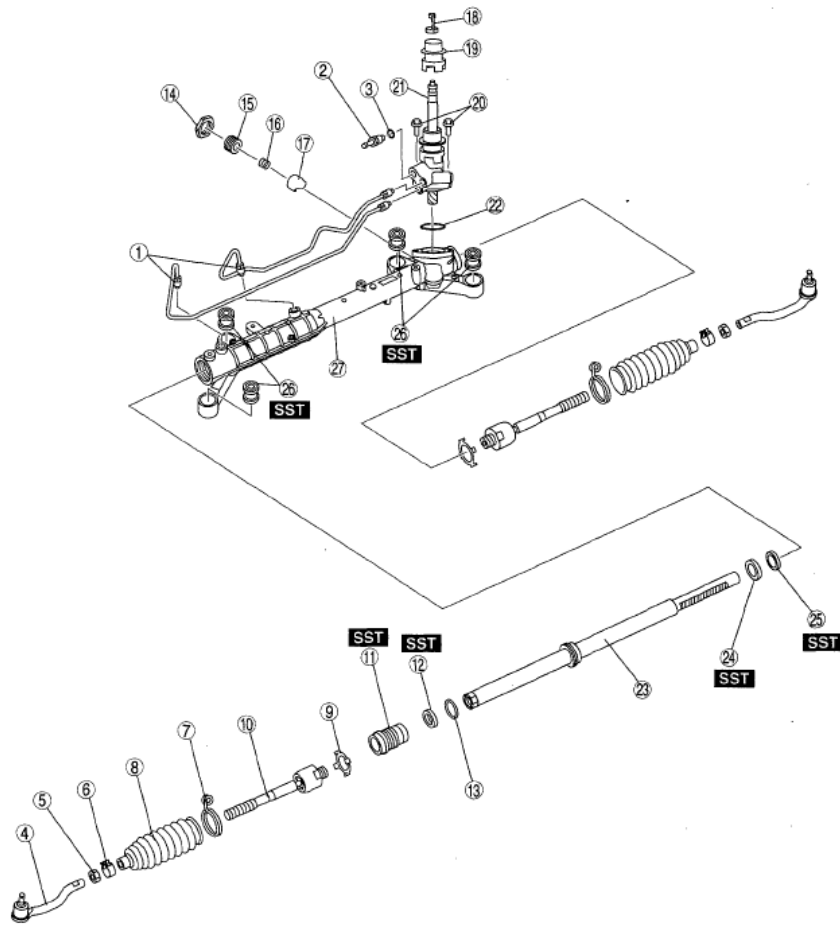
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- CAUTION:**
- Place copper plates, rag, or similar material in a vise, when securing the mounting bracket portion of the steering gear.

1. Disassemble in the order indicated in the table.

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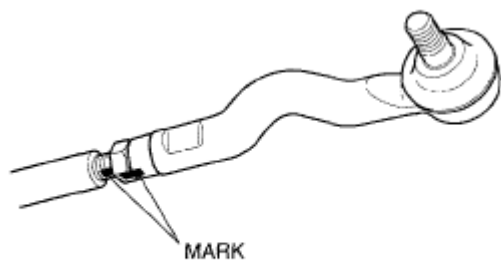
1	Oil pipe
2	Return pipe
3	O-ring
4	Tie-rod end (See 06-14-11 Tie-rod End Disassembly Note.)
5	Locknut
6	Boot clamp
7	Boot band
8	Boot
9	Lock washer (See 06-14-11 Lock Washer, Tie Rod Disassembly Note.)
10	Tie rod (See 06-14-11 Lock Washer, Tie Rod Disassembly Note.)
11	Holder (See 06-14-11 Holder, Oil Seal (Holder Side) Disassembly Note.)
12	Oil seal (holder side) (See 06-14-11 Holder, Oil Seal (Holder Side) Disassembly Note.)
13	O-ring
14	Locknut (adjusting cover)
15	Adjusting cover (See 06-14-12 Adjusting Cover Disassembly Note.)
16	Yoke spring

17	Support yoke
18	Clip
19	Pinion plug
20	Bolt
21	Pinion shaft component
22	O-ring
23	Steering rack
24	Oil seal (gear housing side) (See 06-14-12 Oil Seal (Gear Housing Side), Inner Guide Disassembly Note.)
25	Inner guide (See 06-14-12 Oil Seal (Gear Housing Side), Inner Guide Disassembly Note.)
26	Mounting rubber (See 06-14-12 Mounting Rubber Disassembly Note.)
27	Gear housing

Fig. 17: Identifying Steering Gear And Linkage Disassembly Order
 Courtesy of MAZDA MOTORS CORP.

TIE-ROD END DISASSEMBLY NOTE

1. Place alignment marks as shown in the figure for proper installation.

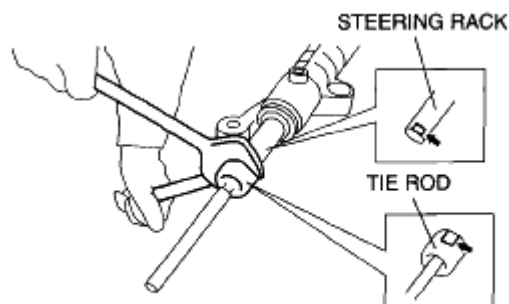


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Fig. 18: Identifying Tie-rod End Alignment Marks
Courtesy of MAZDA MOTORS CORP.

LOCK WASHER, TIE ROD DISASSEMBLY NOTE

1. Unclamp the washer.
2. Lock the steering rack end against rotation with a wrench and remove the tie rod.
3. Remove the lock washer.



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Fig. 19: Removing Tie Rod
Courtesy of MAZDA MOTORS CORP.

HOLDER, OIL SEAL (HOLDER SIDE) DISASSEMBLY NOTE

1. Remove the holder from the gear housing using the SST.

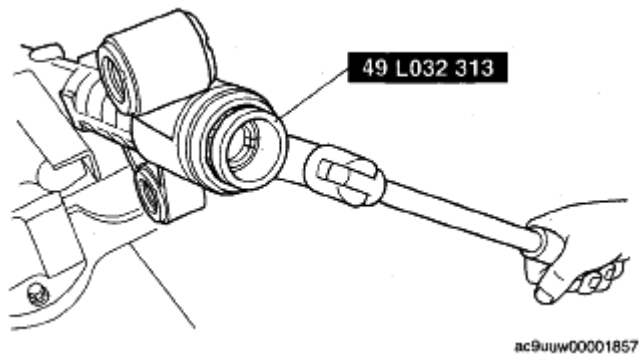


Fig. 20: Removing Holder From Gear Housing Using SST
Courtesy of MAZDA MOTORS CORP.

2. Remove the oil seal from the holder using the SST and a press.

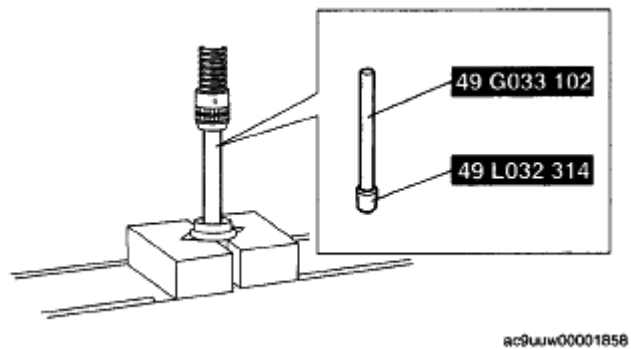


Fig. 21: Removing Oil Seal From Holder Using SST & Press
Courtesy of MAZDA MOTORS CORP.

ADJUSTING COVER DISASSEMBLY NOTE

1. Install two nuts to the bolt across a flat **24 mm {0.94 in}** and tighten them using a wrench.
2. Disassemble the adjusting cover with the bolt and nuts created in Step 1.

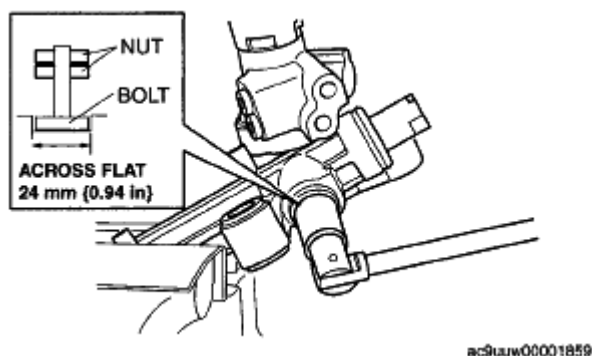


Fig. 22: Installing Nuts To Bolt Across Flat

Courtesy of MAZDA MOTORS CORP.

OIL SEAL (GEAR HOUSING SIDE), INNER GUIDE DISASSEMBLY NOTE

1. Set the SSTs as shown.
2. Insert the SSTs from the valve housing side.
3. Remove the oil seal (gear housing side) and inner guide using a press.

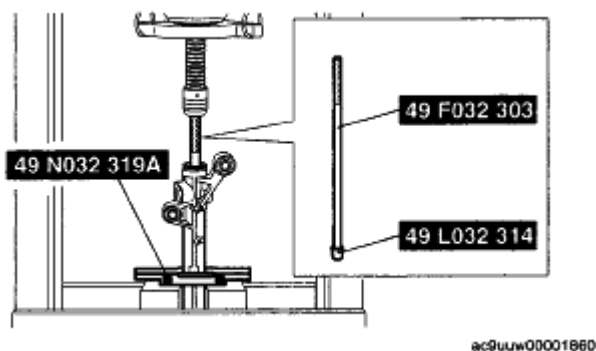


Fig. 23: Removing Oil Seal (Gear Housing Side) And Inner Guide Using Press
Courtesy of MAZDA MOTORS CORP.

MOUNTING RUBBER DISASSEMBLY NOTE

1. Press the mounting rubber out from the gear housing using the SSTs and a press.

Substitution SST

- **49B032 317**

Outer diameter: **17.5-23 mm {0.7-0.9 in}**

Length: **35 mm {1.4 in} or more**

- **49T028 301**

Outer diameter: **39-40 mm {1.54-1.57 in}**

Inner diameter: **36-38 mm {1.42-1.49 in}**

Length: **35 mm {1.4 in} or more**

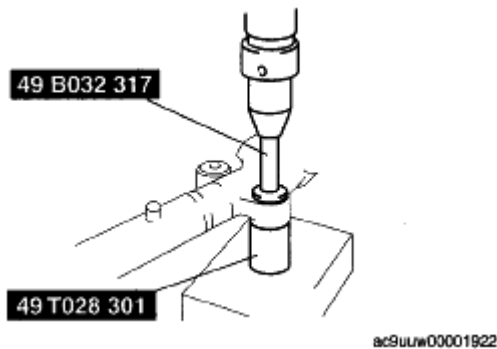


Fig. 24: Pressing Mounting Rubber Out From Gear Housing Using SSTs And Press
Courtesy of MAZDA MOTORS CORP.

STEERING GEAR AND LINKAGE INSPECTION

RACK INSPECTION

1. Inspect the rack for cracking, damage, and tooth wear. Replace it if necessary.
2. Measure the runout of the rack.

Steering rack runout

Near point A: 0.15 mm {0.006 in} max.

Near point B: 0.20 mm {0.008 in} max.

3. If not within the specification, replace the rack.

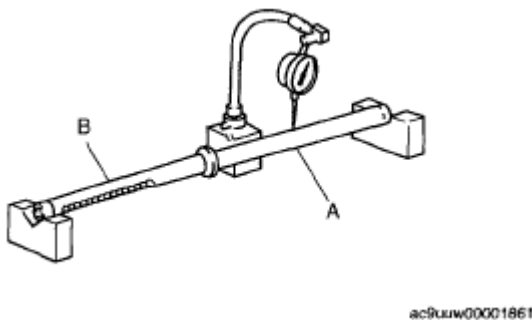


Fig. 25: Measuring Runout Of Rack
Courtesy of MAZDA MOTORS CORP.

TIE-ROD END INSPECTION

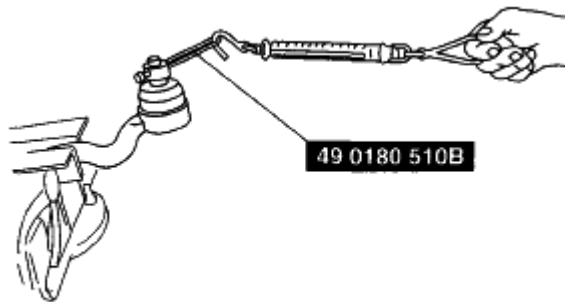
1. Inspect the tie-rod end for damage and boot cracks. Replace it if necessary.
2. Inspect the ball joint for looseness. Replace the tie-rod end if necessary.

3. Rotate the ball joint five times.
4. Measure the rotation torque of the ball joint using the SST and a pull scale.

Tie-rod end rotational torque 0.4-2.7 N.m {4.1-27.5 kgf.cm, 3.6-23.8 in.lbf}

[Pull scale reading: 3.4-25.5 N {0.35-2.60 kgf, 0.8-5.7 lbf}]

5. If not within the specification, replace the tie-rod end.



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Fig. 26: Measuring Rotation Torque Of Ball Joint Using And Pull Scale
Courtesy of MAZDA MOTORS CORP.

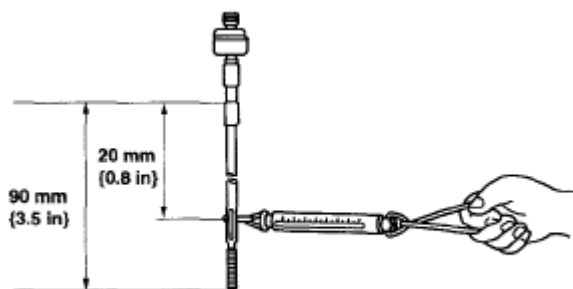
TIE ROD INSPECTION

1. Inspect the tie rod for bending and damage. Replace it if necessary.
2. Inspect the ball joint for looseness. Replace the tie rod if necessary.
3. Swing the tie rod five times.
4. Measure the swinging torque using a pull scale.

Tie-rod swing torque 0.1-4.0 N.m {1.1-40 kgf.cm, 0.89-35 in.lbf}

[Pull scale reading: 1.0-40.0 N {0.2-4.0 kgf, 0.23-8.99 lbf}]

5. If not within the specification, replace the tie rod.



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Fig. 27: Measuring Swinging Torque Using Pull Scale
Courtesy of MAZDA MOTORS CORP.

STEERING GEAR AND LINKAGE ASSEMBLY

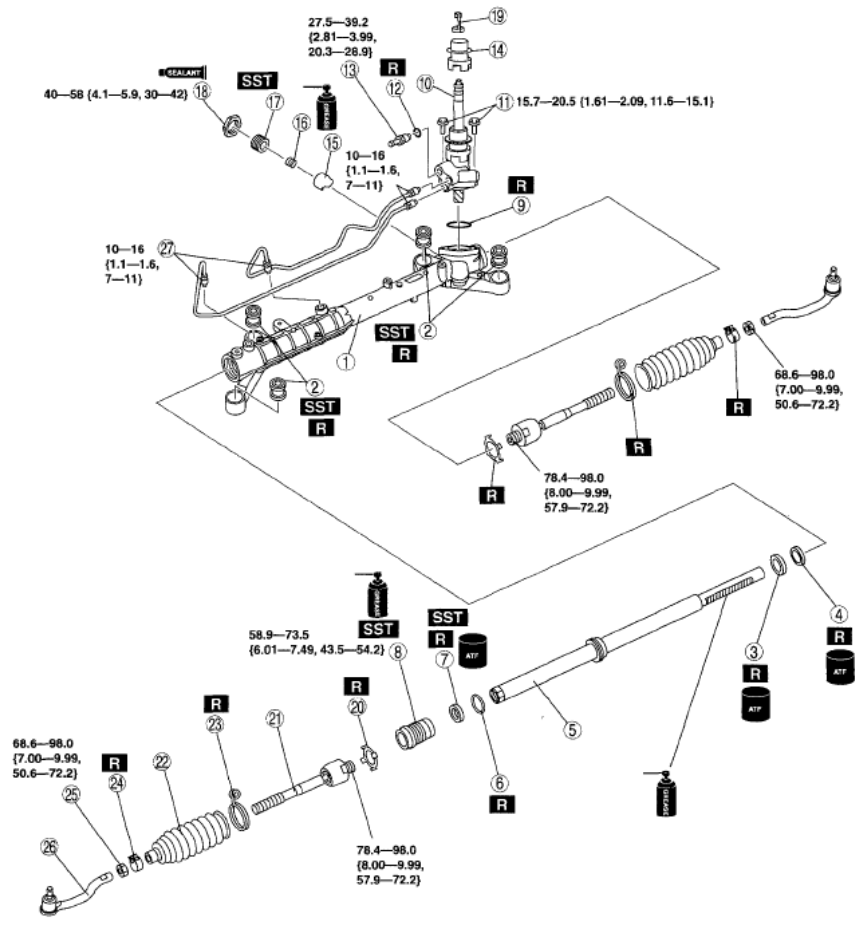
CAUTION:

- Place copper plates, rag, or similar material in a vise, when securing the mounting bracket portion of the steering gear.

1. Assemble in the order indicated in the table.

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N-m (kgf-m, ft-lbf)

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1	Gear housing
2	Mounting rubber (See 06-14-15 Mounting Rubber Assembly Note.)
3	Oil seal (gear housing side) (See 06-14-16 Steering Rack, Oil Seal (Gear Housing Side), Inner Guide Assembly Note.)
4	Inner guide (See 06-14-16 Steering Rack, Oil Seal (Gear Housing Side), Inner Guide Assembly Note.)
5	Steering rack (See 06-14-16 Steering Rack, Oil Seal (Gear Housing Side), Inner Guide Assembly Note.)
6	O-ring
7	Oil seal (holder side) (See 06-14-17 Oil Seal (Holder Side) Assembly Note.)
8	Holder (See 06-14-17 Holder Assembly Note.)
9	O-ring
10	Pinion shaft component
11	Bolt
12	O-ring
13	Return pipe
14	Pinion plug
15	Support yoke
16	Yoke spring

17	Adjusting cover (See 06-14-17 Adjusting Cover Assembly Note.)
18	Locknut (adjusting cover) (See 06-14-17 Adjusting Cover Assembly Note.)
19	Clip
20	Lock washer (See 06-14-18 Lock Washer, Tie Rod Assembly Note.)
21	Tie rod (See 06-14-18 Lock Washer, Tie Rod Assembly Note.)
22	Boot
23	Boot band
24	Boot clamp
25	Locknut
26	Tie-rod end
27	Oil pipe

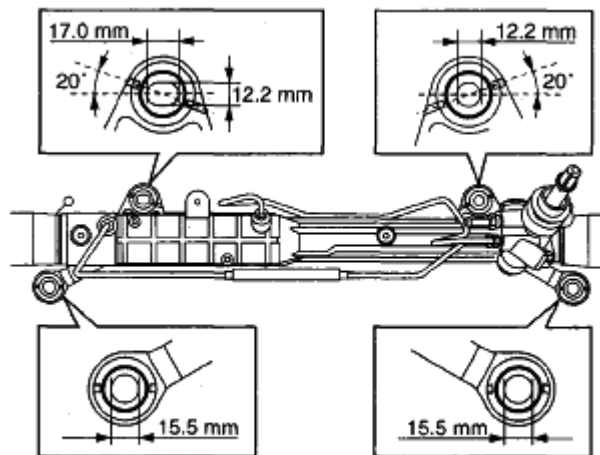
Fig. 28: Identifying Steering Gear, Linkage Assembly Order & Torque Specifications
 Courtesy of MAZDA MOTORS CORP.

MOUNTING RUBBER ASSEMBLY NOTE

1. Apply soapy water to the rubber part of the mounting rubber.
2. Temporarily install the mounting rubber to the steering gear so that the mounting rubber are in the positions shown in the figure.

CAUTION:

- If the mounting rubber is placed in the wrong position or assembled in the wrong direction, an installation malfunction will result when the vehicle is loaded. When assembling the mounting rubber, verify the position and directions.



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Fig. 29: Identifying Mounting Rubber Install Positions
Courtesy of MAZDA MOTORS CORP.

3. Press the mounting rubber until the mounting rubber end comes out completely from the gear housing using the SSTs and a press.

Substitution SST

- **49B032 317**

Outer diameter: **17.5-23 mm {0.7-0.9 in}**

Length: **35 mm {1.4 in} or more**

- **49T028 301**

Outer diameter: **39-40 mm {1.54-1.57 in}**

Inner diameter: **36-38 mm {1.42-1.49 in}**

Length: **35 mm {1.4 in} or more**

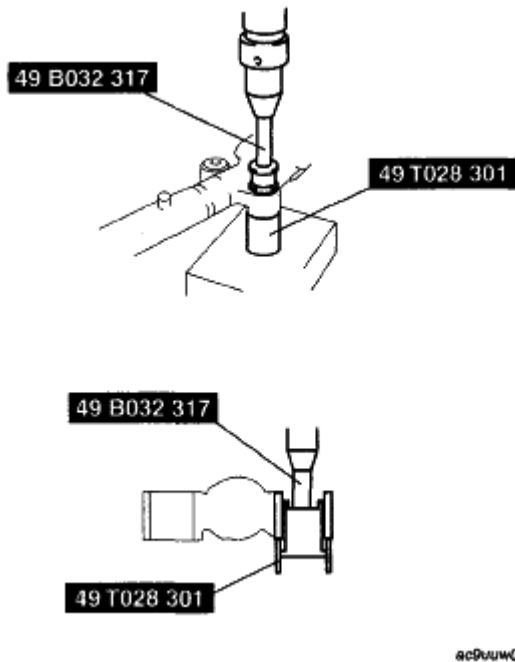


Fig. 30: Pressing Mounting Rubber Until Mounting Rubber End Comes Out Completely From Gear Housing
 Courtesy of MAZDA MOTORS CORP.

4. Reverse the gear housing, then press the mounting rubber until the mounting rubber end comes out completely from the other side. At this time, the mounting rubber end and steel pipe are aligned.

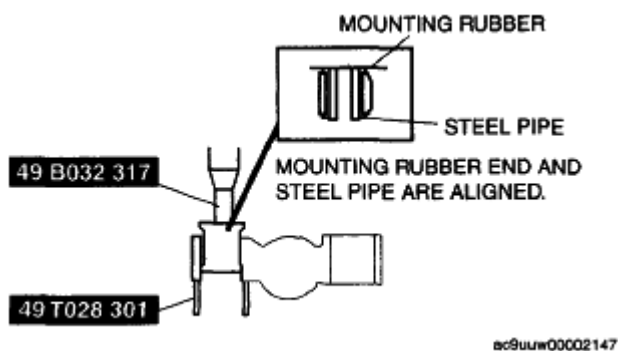
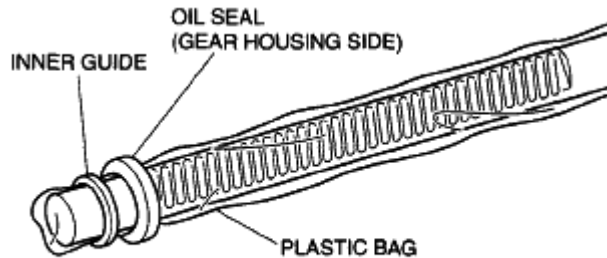


Fig. 31: Pressing Mounting Rubber Until Mounting Rubber End Comes Out Completely From Other Side
 Courtesy of MAZDA MOTORS CORP.

STEERING RACK, OIL SEAL (GEAR HOUSING SIDE), INNER GUIDE ASSEMBLY NOTE

1. Apply multi-purpose grease to the oil seal (gear housing side) and Inner guide.
2. Install the plastic bag to the steering rack teeth so as not to damage the oil seal (gear housing side) and the inner guide, and install the oil seal (gear housing side) and the inner guide to the seal. Move the oil seal (gear housing side) and the inner guide together with the plastic bag so that they pass the steering rack

- teeth, then remove the plastic bag.
- Put the steering rack into the gear housing.
 - Using a press, press-in the oil seal (gear housing side) and inner guide until the press-in force increases rapidly.

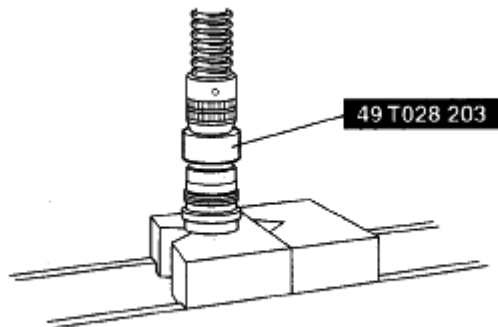


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Fig. 32: Installing Plastic Bag To Steering Rack Teeth
Courtesy of MAZDA MOTORS CORP.

OIL SEAL (HOLDER SIDE) ASSEMBLY NOTE

- Assemble the oil seal (holder side) to the holder using a press and the SST.



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Fig. 33: Assembling Oil Seal (Holder Side) To Holder Using Press And SST
Courtesy of MAZDA MOTORS CORP.

HOLDER ASSEMBLY NOTE

- Assemble the holder to the gear housing using the SST.
- Connect the SSTs to the power cylinder section of the gear housing.

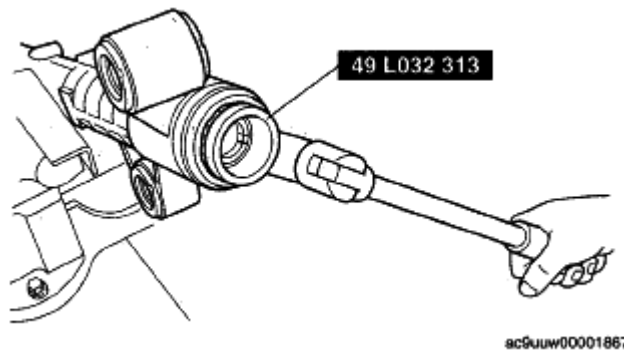


Fig. 34: Assembling Holder To Gear Housing Using SST
Courtesy of MAZDA MOTORS CORP.

3. Apply **53.3 kPa {400 mmHg, 15.7 inHg}** vacuum with a vacuum pump and verify that it is held for at least **30 seconds**.
4. If the vacuum is not held, replace the oil seal.

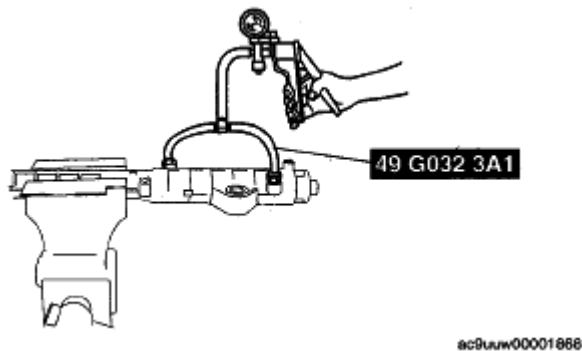
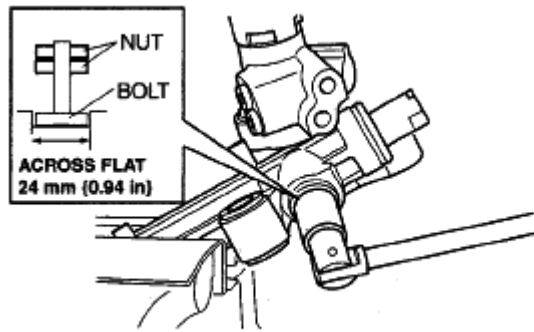


Fig. 35: Applying 53.3 kPa {400 mmHg, 15.7 inHg} Vacuum With Vacuum Pump
Courtesy of MAZDA MOTORS CORP.

ADJUSTING COVER ASSEMBLY NOTE

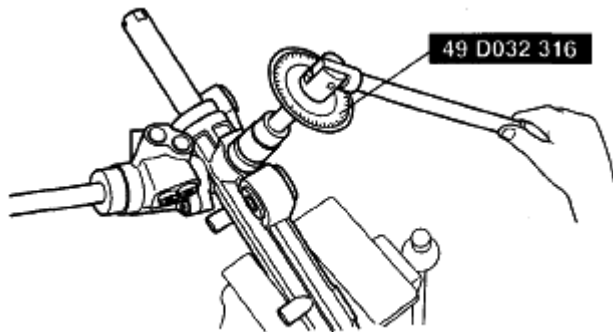
1. Set the rack to the center position.
2. Install two nuts to the bolt across a flat **24 mm {0.94 in}** and tighten them using a wrench.
3. Assemble the adjusting cover with the bolt and nuts created in Step 1.
4. Tighten the adjusting cover to **19.6 N.m {2.0 kgf.m, 15 ft.lbf}**.
5. Slide the rack back and forth **60 mm {2.4 in}** three times.
6. Retighten the adjusting cover to **19.6 N.m {2.0 kgf.m, 15 ft.lbf}**.



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Fig. 36: Installing Nuts To Bolt Across Flat
Courtesy of MAZDA MOTORS CORP.

7. Loosen the adjusting cover 63° using the SST.

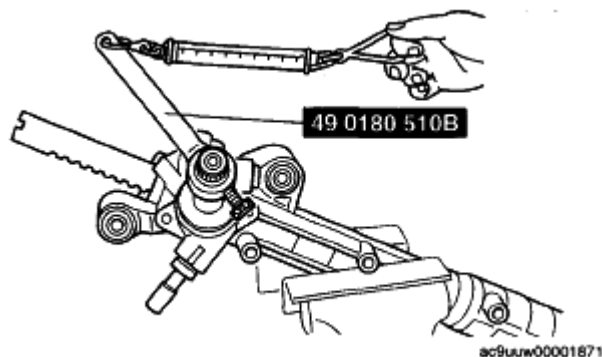


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Fig. 37: Loosening Adjusting Cover 63° Using SST
Courtesy of MAZDA MOTORS CORP.

8. Hold the adjusting cover so as not to rotate and tighten the locknut.

Tightening torque 40.0-58.0 N.m {4.08-5.91 kgf.m, 29.5-42.7 ft.lbf}



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Fig. 38: Measuring Pinion Torque Using SST And Pull Scale
Courtesy of MAZDA MOTORS CORP.

9. Measure the pinion torque using the SST and pull scale. (Measurement speed: **0.5-2.0 rpm**)

Pinion shaft rotation torque

Center of rack $\pm 90^\circ$: 1.0-1.6 N.m {1-16 kgf.cm, 8.9-14 in.lbf}

[Pull scale reading: 9-13 N {1.0-1.3 kgf, 2.1-2.9 lbf}]

Except center of rack $\pm 90^\circ$: Less than 1.68 N.m {17.1 kgf.cm, 14.8 in.lbf}

[Pull scale reading: Less than 13.8 N {1.4 kgf, 3.1 lbf}]

10. If not within the specification, repeat Step 4 to 9.

LOCK WASHER, TIE ROD ASSEMBLY NOTE

1. Temporary assemble the lock washer and the tie rod to the steering rack.
2. Lock the steering rack end against rotation with a wrench and assemble the tie rod.
3. Clamp the lock washer.

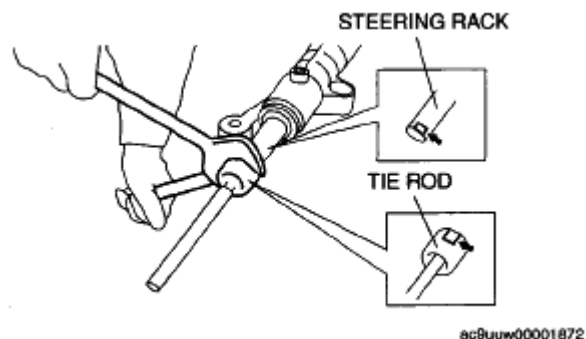
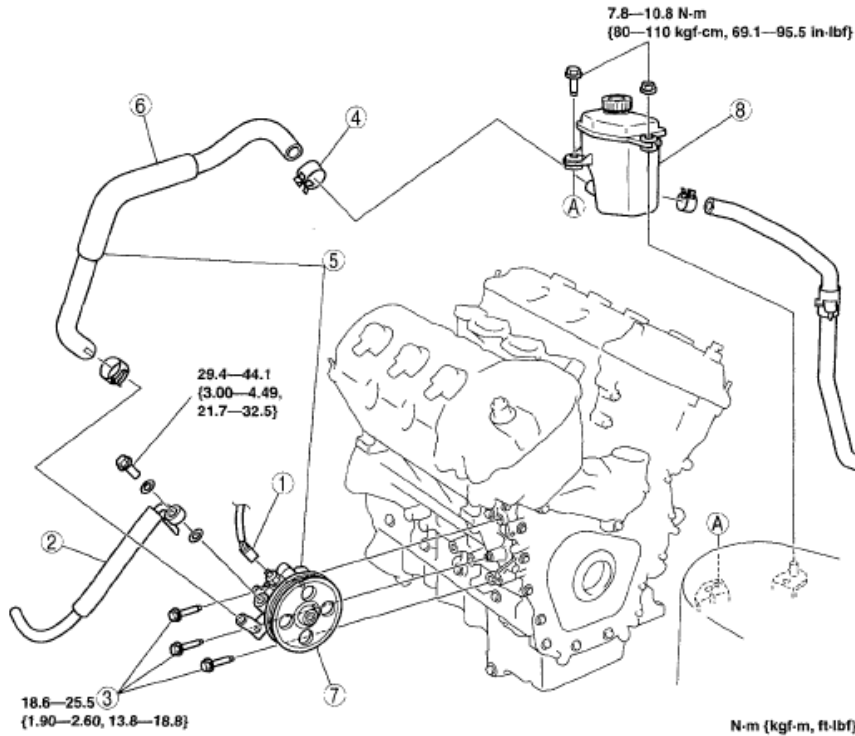


Fig. 39: Installing Tie Rod
Courtesy of MAZDA MOTORS CORP.

POWER STEERING OIL PUMP REMOVAL/INSTALLATION

1. Remove the windshield wiper arm and blade. (See WINDSHIELD WIPER ARM AND BLADE REMOVAL/INSTALLATION .)
2. Remove the cowl grill. (See COWL GRILLE REMOVAL/INSTALLATION .)
3. Remove the windshield wiper motor (See WINDSHIELD WIPER MOTOR REMOVAL/INSTALLATION .)
4. Remove the cowl panel. (See COWL PANEL REMOVAL/INSTALLATION .)
5. Remove the right side splashing shield.
6. Remove the drive belt. (See DRIVE BELT REMOVAL/INSTALLATION [MZI-3.7] .)
7. Remove in the order indicated in the table.

8. Install in the reserve order of removal.



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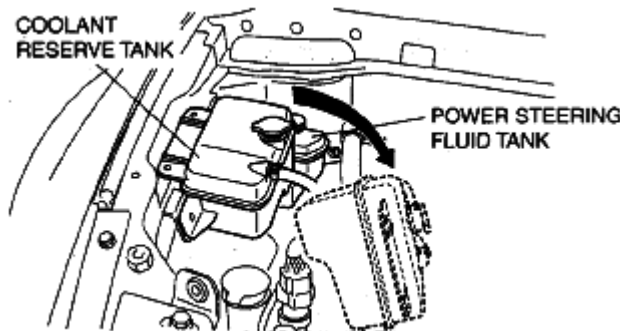
1	Pressure switch connector
2	Pressure pipe
3	Bolts
4	Suction hose clamp (Power steering fluid tank side)
5	Power steering pump and suction hose

6	Suction hose
7	Power steering pump
8	Power steering fluid tank (See 06-14-19 Power Steering Fluid Tank Removal Note.)

Fig. 40: Identifying Power Steering Oil Pump Components & Torque Specifications
 Courtesy of MAZDA MOTORS CORP.

POWER STEERING FLUID TANK REMOVAL NOTE

1. Remove the coolant reserve tank with the hose still connected, and position the coolant reserve tank out of the way.



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Fig. 41: Identifying Power Steering Fluid Tank
Courtesy of MAZDA MOTORS CORP.

POWER STEERING OIL PUMP DISASSEMBLY/ASSEMBLY

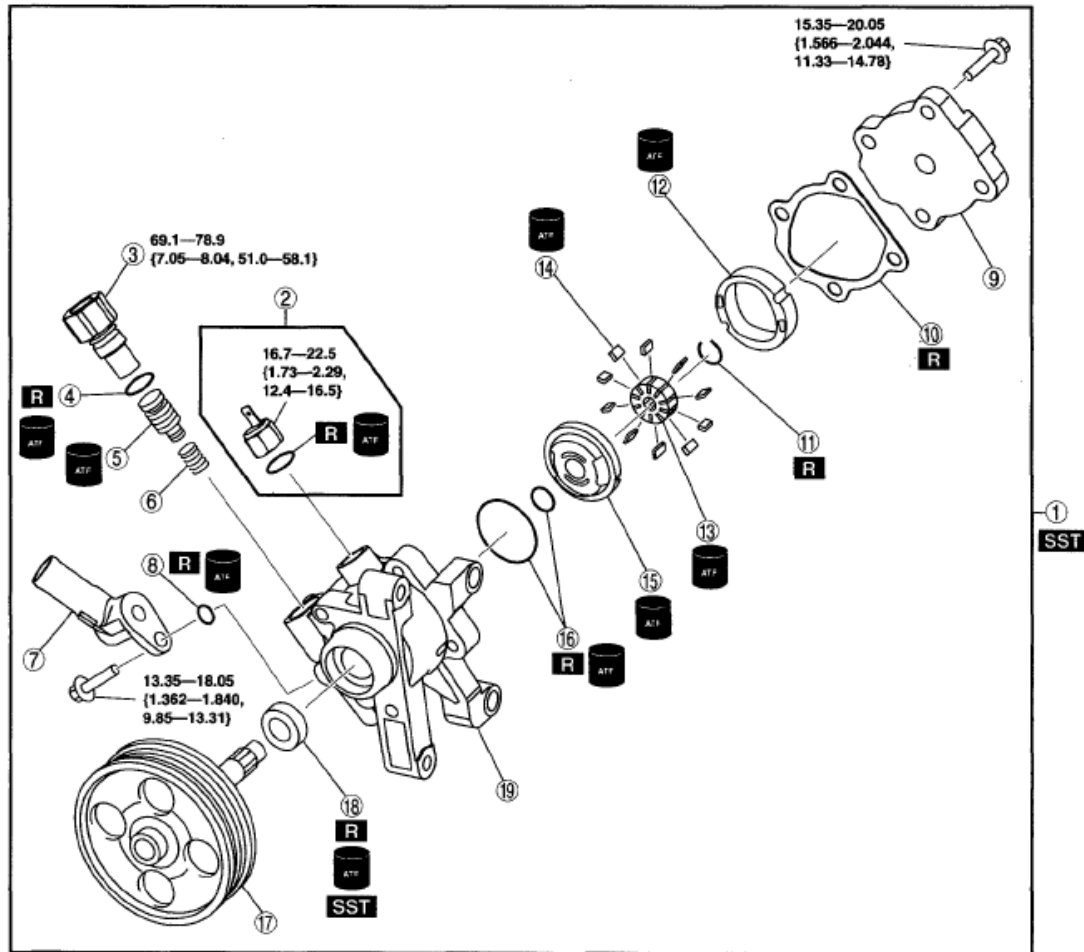
NOTE:

- The following procedure is for replacement of the O-ring and oil seal only.
Replace the pump component if other repairs are necessary.

1. Disassemble in the order indicated in the table.
2. Assemble in the reverse order of disassembly.

2008 Mazda CX-9 Grand Touring

2008 STEERING Power Steering - Mazda CX-9



N-m (kgf-m, ft-lbf)

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1	Power steering oil pump component (See 06-14-21 Power Steering Oil Pump Component Disassembly Note.)
2	Pressure switch component
3	Pressure pipe fitting
4	O-ring
5	Control valve
6	Spring
7	Suction pipe
8	O-ring

9	Rear pump body (See 06-14-22 Rear Pump Body Assembly Note.)
10	Gasket
11	Clip
12	Cam ring (See 06-14-22 Cam Ring Assembly Note.)
13	Rotor (See 06-14-22 Rotor Assembly Note.)
14	Vane
15	Side plate (See 06-14-22 Side Plate Assembly Note.)
16	O-rings
17	Shaft component (See 06-14-21 Shaft Component Disassembly Note.)
18	Oil seal (See 06-14-21 Oil Seal Assembly Note.)
19	Front pump body

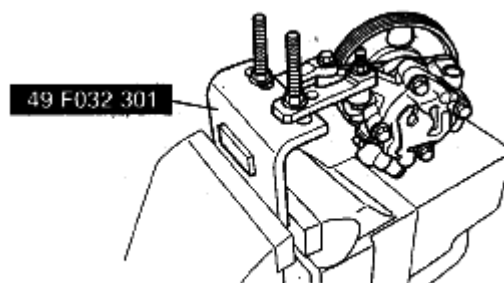
Fig. 42: Identifying Power Steering Oil Pump Disassembly/Assembly Order & Torque Specifications

Courtesy of MAZDA MOTORS CORP.

1. Secure the power steering oil pump using the SST.

CAUTION:

- Use the SST to prevent damage to the pump when securing it in a vise.

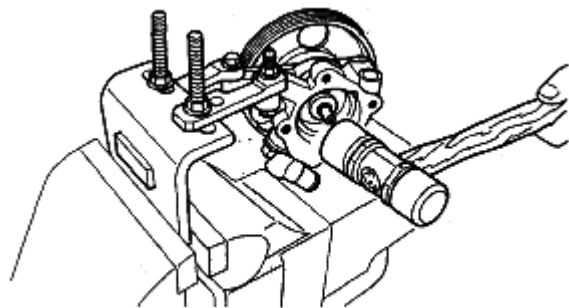


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Fig. 43: Securing Power Steering Oil Pump Using SST
Courtesy of MAZDA MOTORS CORP.

SHAFT COMPONENT DISASSEMBLY NOTE

1. Tap out the shaft component from the front pump body using a plastic hammer.

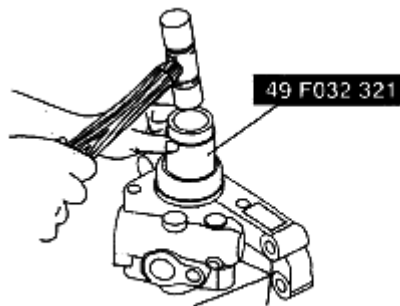


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Fig. 44: Tapping Out Shaft Component From Front Pump Body Using Plastic Hammer
Courtesy of MAZDA MOTORS CORP.

OIL SEAL ASSEMBLY NOTE

1. Install the oil seal in the front pump body using the SST and plastic hammer.

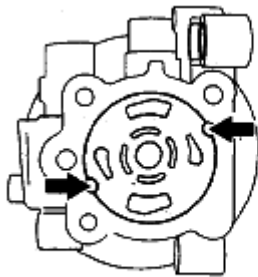


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Fig. 45: Installing Oil Seal In Front Pump Body Using And Plastic Hammer
Courtesy of MAZDA MOTORS CORP.

SIDE PLATE ASSEMBLY NOTE

1. Install the side plate in the position shown in the figure.

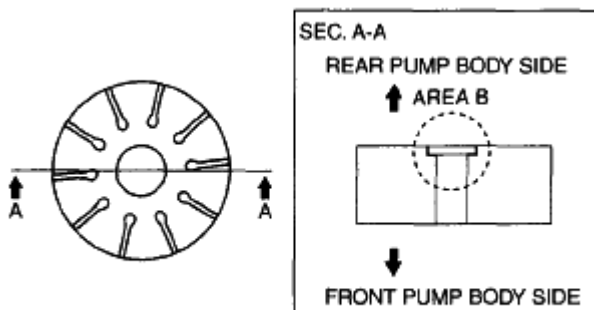


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Fig. 46: Locating Side Plate Install Position
Courtesy of MAZDA MOTORS CORP.

ROTOR ASSEMBLY NOTE

1. Install to the front pump body so that area B of the groove is on the rear pump body side as shown in the figure.



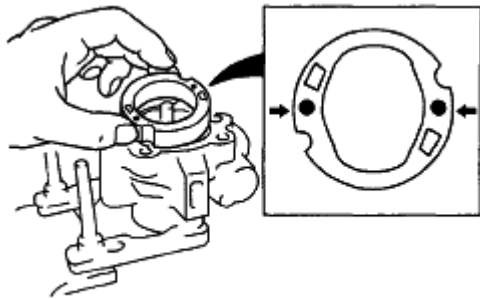
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Fig. 47: Identifying Rotor Assembly Note

Courtesy of MAZDA MOTORS CORP.

CAM RING ASSEMBLY NOTE

1. Install the cam ring in the front pump body with the mark facing upward.



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Fig. 48: Installing Cam Ring In Front Pump Body With Mark Facing Upward
Courtesy of MAZDA MOTORS CORP.

REAR PUMP BODY ASSEMBLY NOTE

1. After installing the rear body, manually turn the shaft to verify that it rotates smoothly.