

# 06-12 ENGINE SPEED SENSING POWER STEERING

## ENGINE SPEED SENSING POWER

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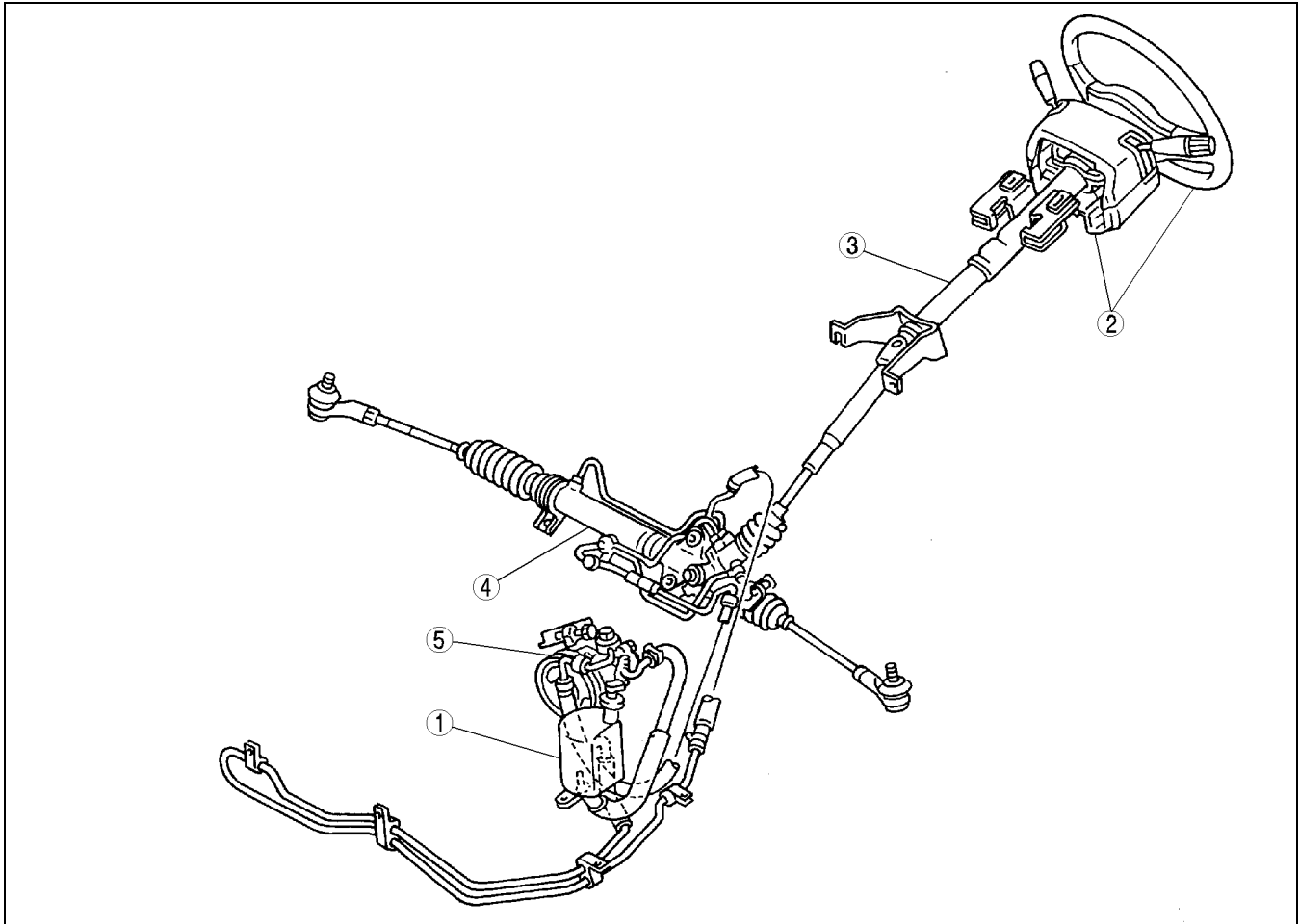
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# ENGINE SPEED SENSING POWER STEERING

## ENGINE SPEED SENSING POWER STEERING COMPONENT LOCATION INDEX

A5U061201034W01



Z5U0612W110

1	Power steering fluid (See 06-12-3 POWER STEERING FLUID INSPECTION)
2	Steering wheel and column (See 06-12-5 STEERING WHEEL AND COLUMN INSPECTION (ENGINE SPEED SENSING POWER STEERING)) (See 06-12-6 STEERING WHEEL AND COLUMN REMOVAL/INSTALLATION (ENGINE SPEED SENSING POWER STEERING))
3	Steering shaft (See 06-12-6 STEERING SHAFT DISASSEMBLY/ASSEMBLY (ENGINE SPEED SENSING POWER STEERING)) (See 06-12-6 STEERING SHAFT INSPECTION (ENGINE SPEED SENSING POWER STEERING))

4	Steering gear and linkage (See 06-12-7 STEERING GEAR AND LINKAGE REMOVAL/INSTALLATION (ENGINE SPEED SENSING POWER STEERING)) (See 06-12-8 STEERING GEAR AND LINKAGE DISASSEMBLY/ASSEMBLY (ENGINE SPEED SENSING POWER STEERING)) (See 06-12-16 STEERING GEAR AND LINKAGE INSPECTION (ENGINE SPEED SENSING POWER STEERING))
5	Power steering oil pump (See 06-12-16 POWER STEERING OIL PUMP REMOVAL/INSTALLATION) (See 06-12-17 POWER STEERING OIL PUMP DISASSEMBLY/ASSEMBLY)

## AIR BLEEDING

A5U061201034W02

1. Inspect the fluid level.
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.
  - Add fluid as necessary and repeat Steps 8 and 9.

## POWER STEERING FLUID INSPECTION

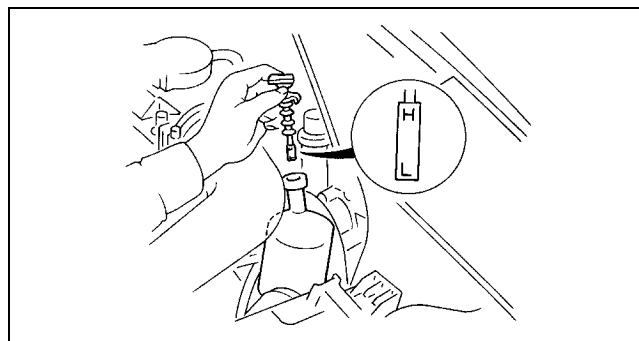
A5U061201034W03

### Fluid Level Inspection

1. Inspect the power steering fluid level.
  - Add the specified power steering fluid if it is below the L mark. Remove the fluid if it is above the H mark.

### Fluid specification

**ATF M-III or equivalent (e.g. Dexron® III)**



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### Fluid Leakage Inspection

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

#### Caution

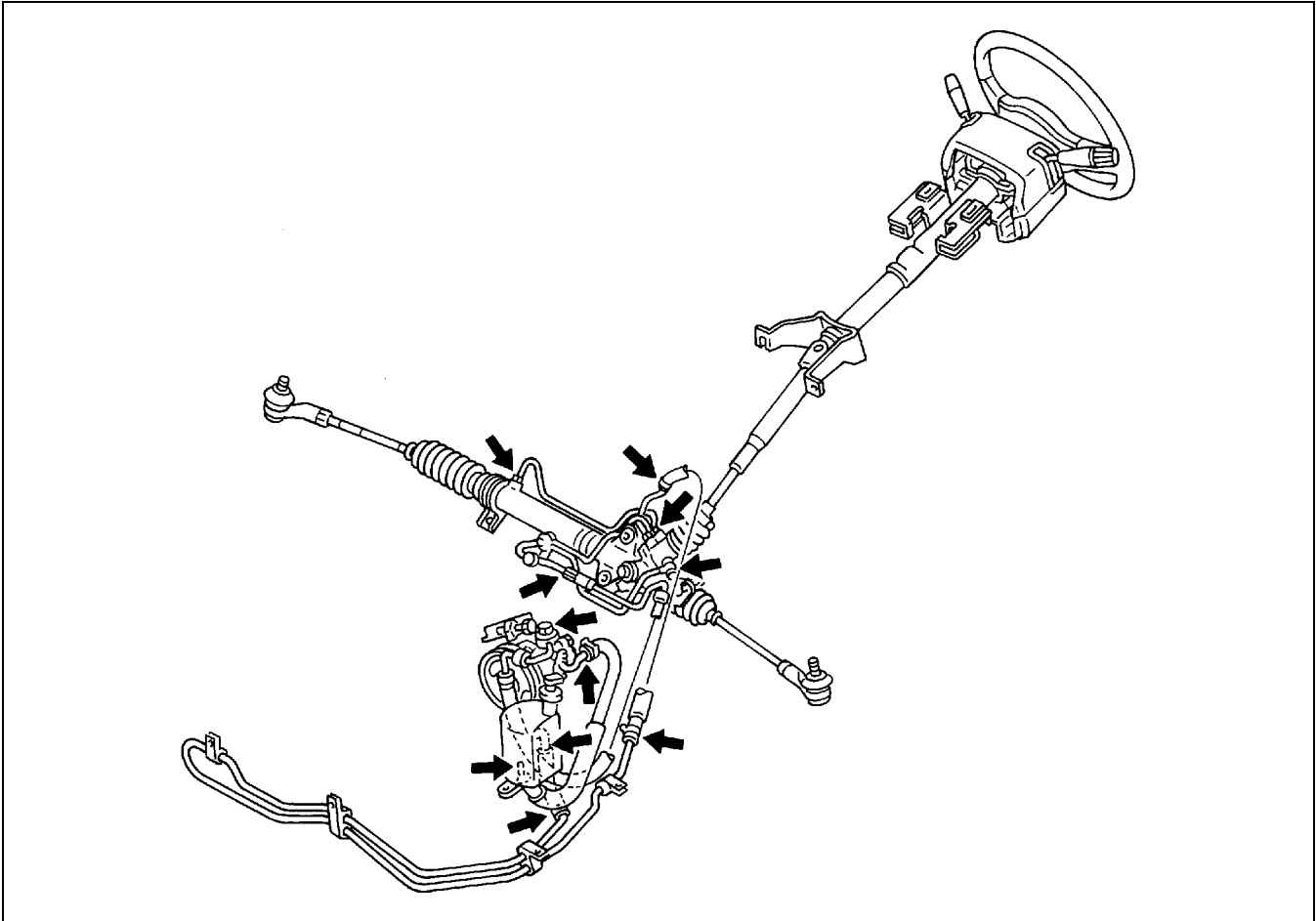
- **Never hold the steering wheel to the extreme left or right for more than 5 seconds with the engine running. This could damage the power steering pump.**

#### Note

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

## ENGINE SPEED SENSING POWER STEERING

2. Inspect for fluid leakage.



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- If fluid leakage is found replace related pipe or hose.

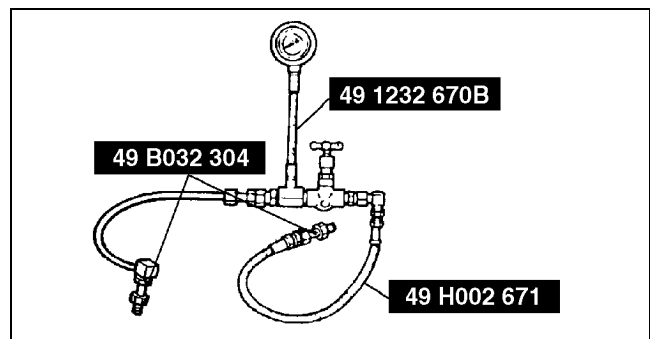
### Fluid Pressure Inspection

1. Assemble the **SSTs** as shown in the figure.

#### Tightening torque

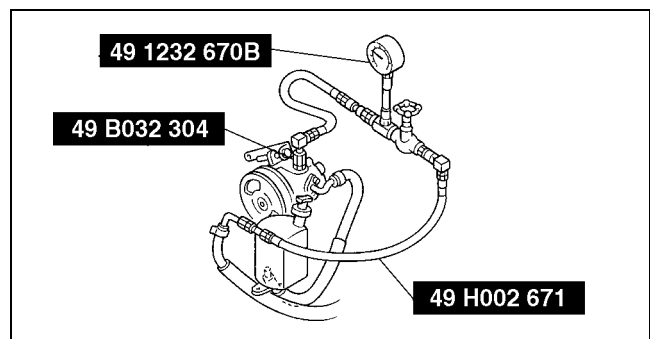
40—49 N·m {4.0—5.0 kgf·m, 29—36 ft·lbf}

2. Mark both hose connections to ensure that the hose is reinstalled in its original position.



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3. Disconnect the pressure pipe from the oil pump, and connect the **SSTs**.
4. Bleed the air from the system.



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## ENGINE SPEED SENSING POWER STEERING

- Open the gauge valve fully. Start the engine and turn the steering wheel fully left and right to raise the fluid temperature to **50—60°C {122—140°F}**.
- Close the gauge valve completely. 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 specification, 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.

### Oil pump fluid pressure

7,846—8,335 kPa {80—85 kgf/cm<sup>2</sup>, 1,138—1,208 psi}

- Open the gauge valve fully and increase the engine speed to **1,000—1,500 rpm**.
- 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 specification, repair or replace the gear housing component.

### 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

7,846—8,335 kPa {80—85 kgf/cm<sup>2</sup>, 1,138—1,208 psi}

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

### Tightening torque

32—47 N·m {3.2—4.8 kgf·m, 24—34 ft·lbf}

- Bleed the air from the system.

## STEERING WHEEL AND COLUMN INSPECTION (ENGINE SPEED SENSING POWER STEERING)

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### Steering Wheel Play Inspection

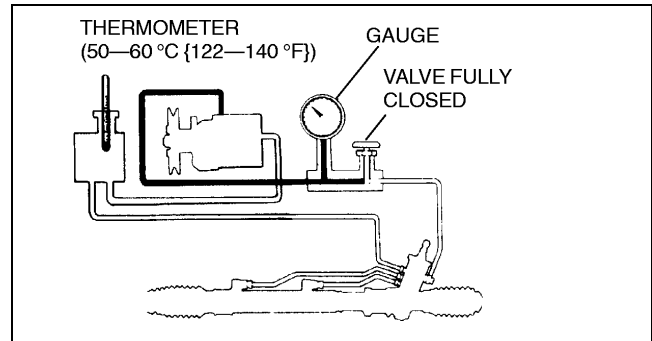
- (See 06-11-2 Steering Wheel Play Inspection.)

### Steering Wheel Looseness Inspection

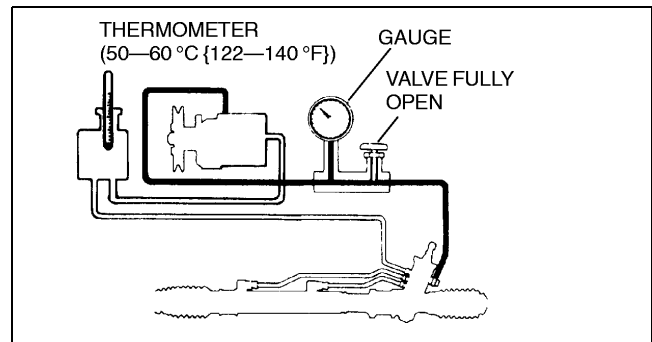
- (See 06-11-2 Steering Wheel Looseness Inspection.)

### Steering Wheel Effort Inspection

- Inspect the following points:
  - Tire size and tire pressure
  - Fluid level
  - Drive belt deflection
- With the vehicle on a hard, level surface, put the wheels in the straight-ahead position.
- Start the engine and warm the power steering fluid to **50—60°C {122—140°F}**.
- Remove the air bag module. (See 08-10-5 DRIVER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION.)



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## ENGINE SPEED SENSING POWER STEERING

5. Measure the steering wheel effort using a torque wrench.

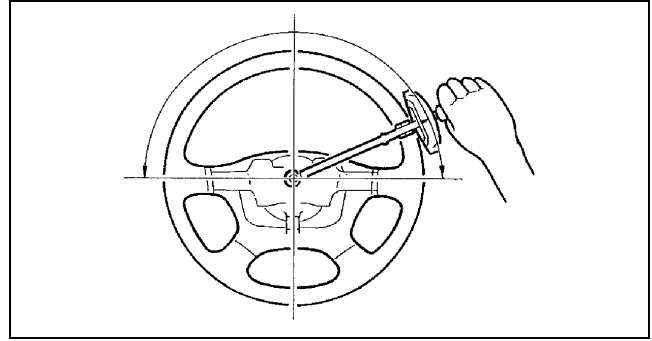
- If not within the specification, note the following:
  - Air in system
  - Function of oil pump and steering gear
  - Fluid leakage at hose or connectors

### Steering wheel effort

**7.8 N·m {80 kgf·cm, 69 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.



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### STEERING WHEEL AND COLUMN REMOVAL/INSTALLATION (ENGINE SPEED SENSING POWER STEERING)

A5U061232010W02

(See 06-11-3 STEERING WHEEL AND COLUMN REMOVAL/INSTALLATION.)

### STEERING SHAFT DISASSEMBLY/ASSEMBLY (ENGINE SPEED SENSING POWER STEERING)

A5U061232100W01

(See 06-11-4 STEERING SHAFT DISASSEMBLY/ASSEMBLY.)

### STEERING SHAFT INSPECTION (ENGINE SPEED SENSING POWER STEERING)

A5U061232100W02

(See 06-11-5 STEERING SHAFT INSPECTION.)

# ENGINE SPEED SENSING POWER STEERING

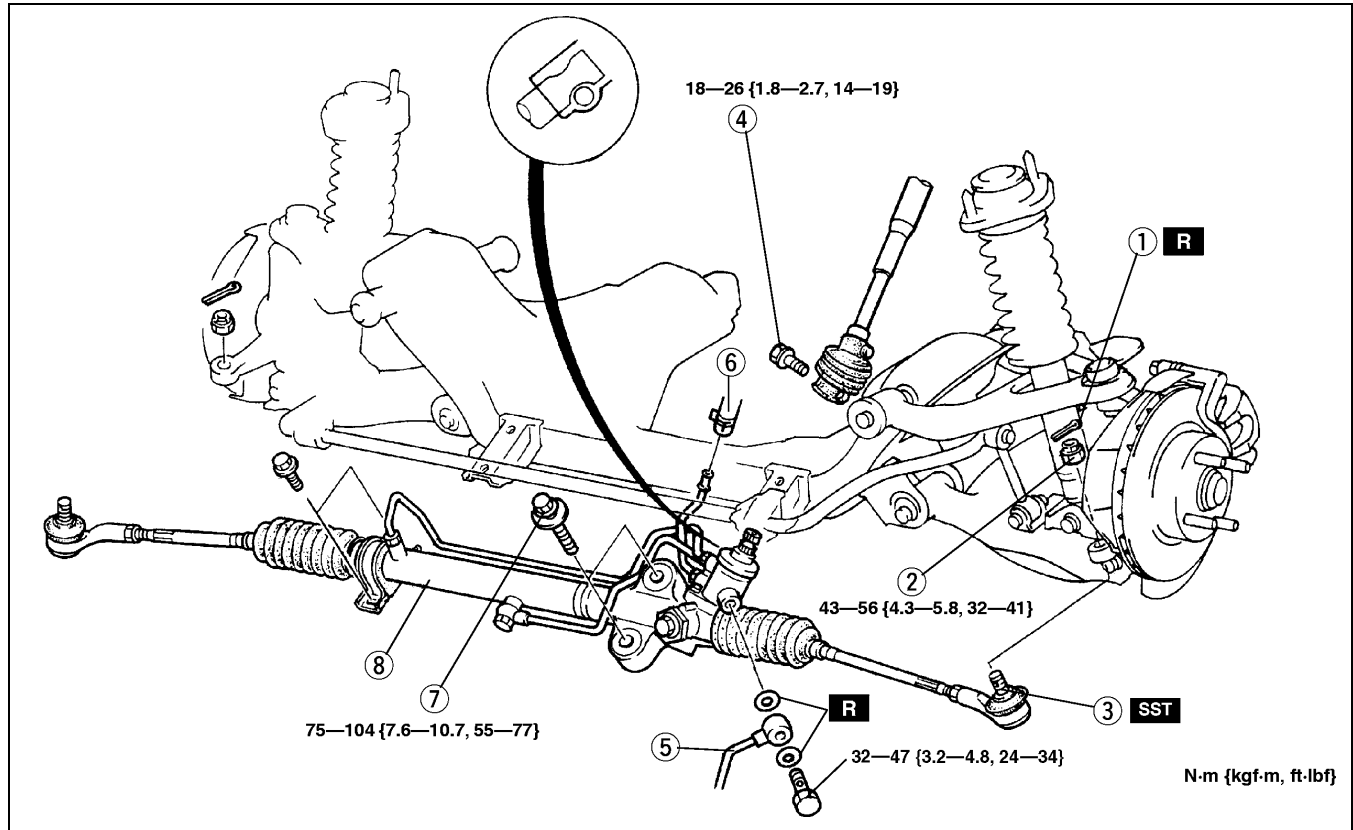
## STEERING GEAR AND LINKAGE REMOVAL/INSTALLATION (ENGINE SPEED SENSING POWER STEERING)

A5U061232960W01

### 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.

- Remove in the order indicated in the table.
- Install in the reverse order of removal.
- After installation, inspect the toe-in. (See 02-11-1 FRONT WHEEL ALIGNMENT.)



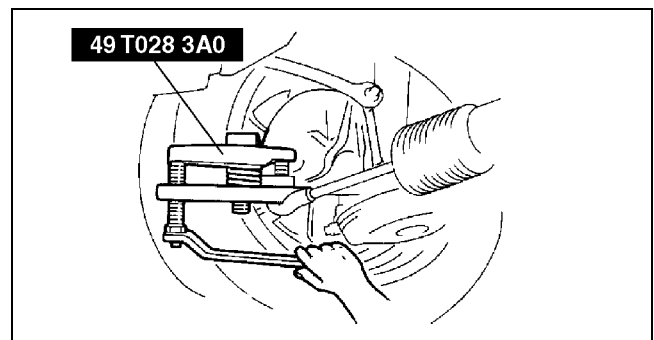
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1	Cotter pin
2	Nut
3	Tie-rod end ball joint (See 06-12-7 Tie-rod End Ball Joint Removal Note)
4	Bolt

5	Pressure pipe
6	Return hose
7	Mounting bracket bolt
8	Steering gear and linkage

### Tie-rod End Ball Joint Removal Note

- Separate the tie-rod end ball joint from the knuckle using the SST.



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## ENGINE SPEED SENSING POWER STEERING

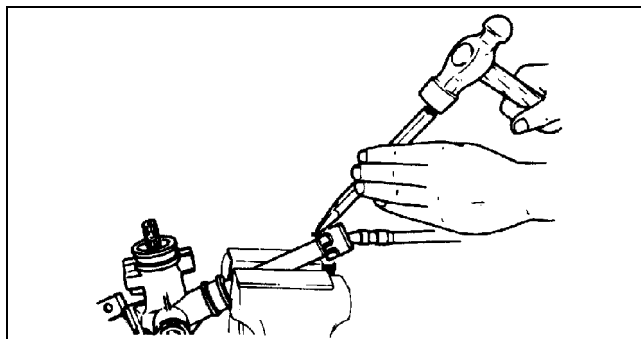
17	Pinion shaft component (See 06-12-10 Pinion Shaft Component Disassembly Note)
18	Snap ring (See 06-12-10 Snap Ring Disassembly Note)
19	Control valve component
20	Seal ring (See 06-12-15 Seal Ring Assembly Note)
21	Pinion shaft
22	Valve housing component
23	Upper bearing (See 06-12-11 Upper Bearing, Oil Seal Disassembly Note) (See 06-12-15 Upper Bearing Assembly Note)
24	Oil seal (See 06-12-11 Upper Bearing, Oil Seal Disassembly Note) (See 06-12-14 Oil Seal Assembly Note)
25	Valve housing
26	Holder (See 06-12-11 Holder Disassembly Note) (See 06-12-14 Holder Assembly Note)
27	U gasket

28	O-ring
29	Steering rack
30	Seal ring
31	O-ring
32	Oil seal (See 06-12-11 Oil Seal, Inner Guide Disassembly Note) (See 06-12-14 Oil Seal Assembly Note)
33	Inner guide (See 06-12-11 Oil Seal, Inner Guide Disassembly Note) (See 06-12-13 Oil Seal, Inner Guide Assembly Note)
34	Mounting bracket
35	Mount
36	Mounting rubber (See 06-11-10 Mounting Rubber Disassembly Note) (See 06-11-10 Mounting Rubber Assembly Note)
37	Gear housing
38	Tie-rod end boot (See 06-11-9 Tie-rod End Boot Disassembly Note) (See 06-11-11 Tie-rod End Boot Assembly Note)

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### Tie Rod Disassembly Note

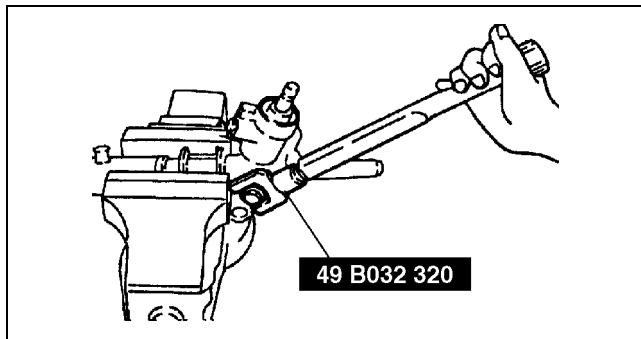
1. Unclamp the washer.
2. Remove the tie rod.



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### Locknut Disassembly Note

1. Remove the locknut using the SST.

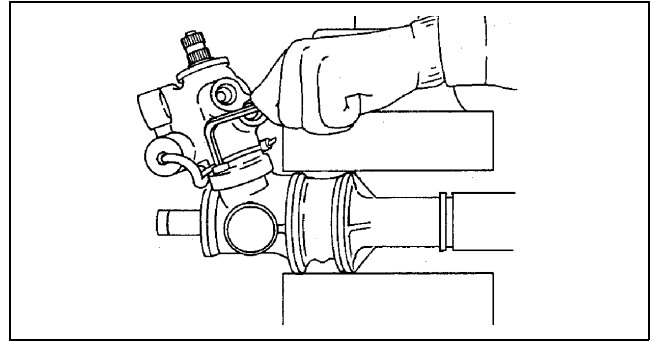


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## ENGINE SPEED SENSING POWER STEERING

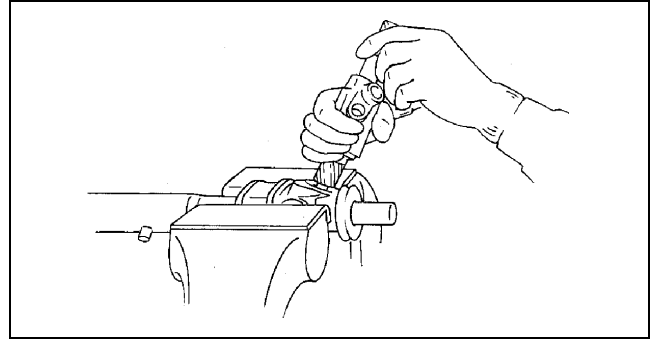
### Pinion Shaft and Housing Component Disassembly Note

1. Remove the socket bolts (2 points) fixing the pinion shaft and housing.



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2. Hold the pinion shaft as shown, and pull out the pinion shaft and housing component.



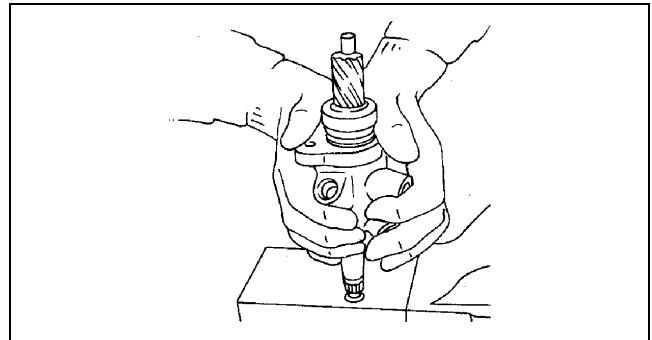
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### Pinion Shaft Component Disassembly Note

1. Push out the pinion shaft component from the valve housing as shown.

#### Note

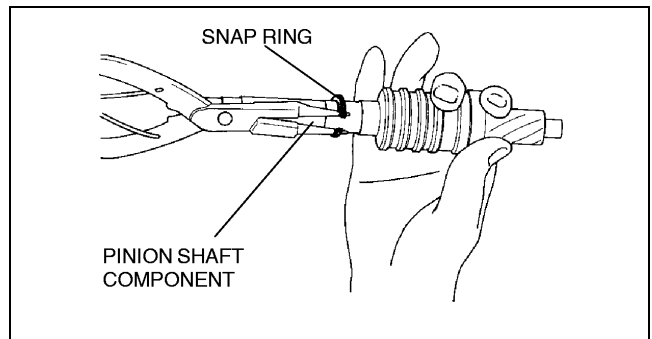
- If the pinion shaft does not come out easily, remove it using a press.



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### Snap Ring Disassembly Note

1. Carefully remove the snap ring without damaging the pinion shaft component.

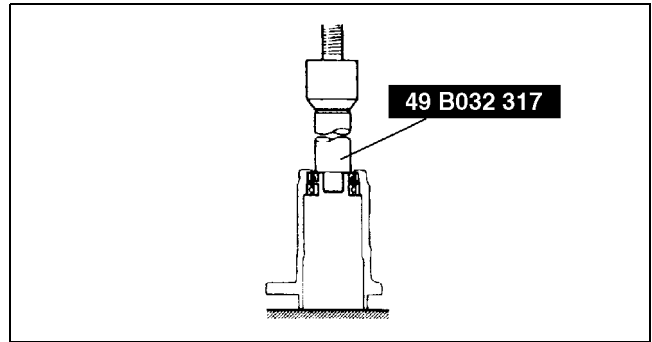


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## ENGINE SPEED SENSING POWER STEERING

### Upper Bearing, Oil Seal Disassembly Note

1. Press out the upper bearing and oil seal from the valve housing using the **SST**.



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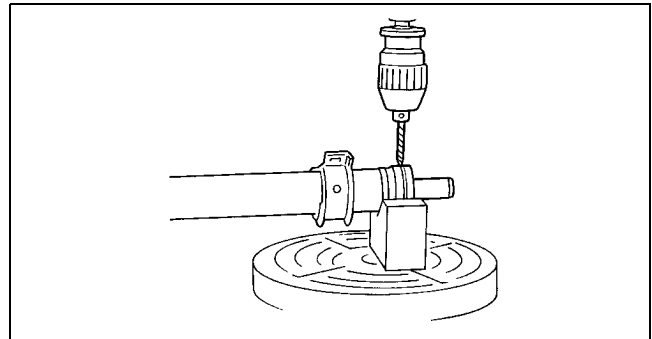
### Holder Disassembly Note

1. Cut away the staked area using a drill.

#### Caution

- Carefully pull out the holder without damaging the U gasket.

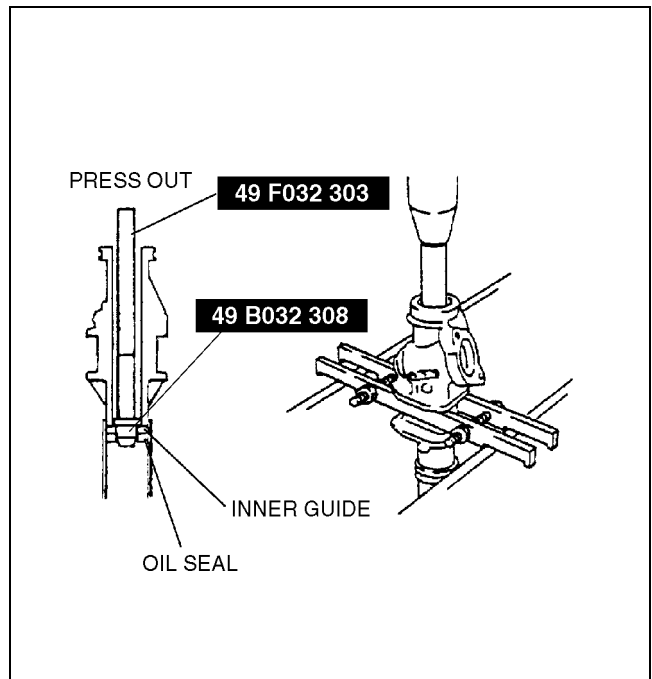
2. Remove the holder.



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### Oil Seal, Inner Guide Disassembly Note

1. Set the **SSTs** into the valve side.
2. Press out the oil seal and inner guide.



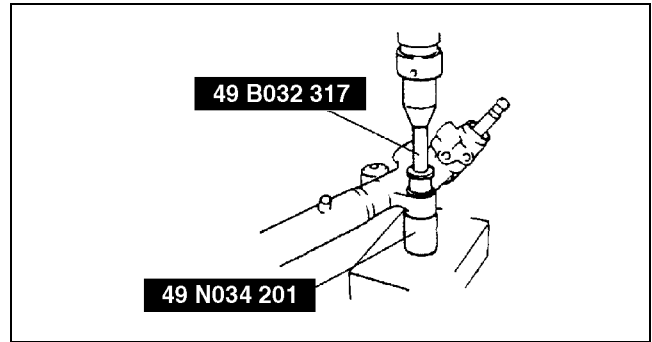
Z5U0612W133

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## ENGINE SPEED SENSING POWER STEERING

### Mounting Rubber Disassembly Note

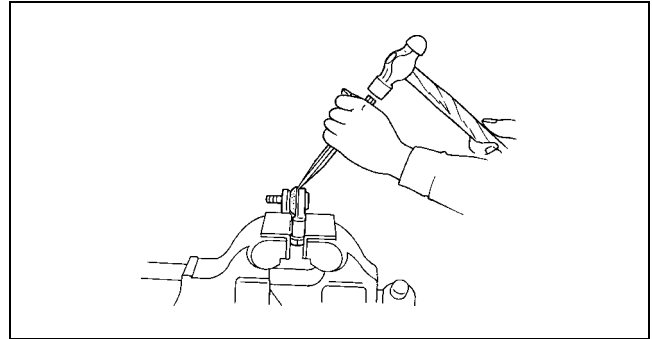
1. Press the mounting rubber out from the gear housing using the **SSTs** and a press.



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### Tie-rod End Boot Disassembly Note

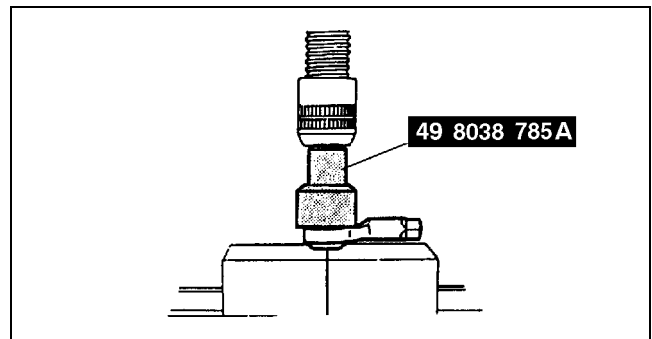
1. Secure the tie-rod end in a vise.
2. Place a chisel against the boot and hold it at the angle shown.
3. Remove the boot by tapping it with a hammer.



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### Tie-rod End Boot Assembly Note

1. Wipe the grease off the ball joint.
2. Put a small amount of lithium-based grease into a new dust boot.
3. Install the dust boot onto the tie-rod end using the **SST** and a press.
4. Wipe away any excessive grease.

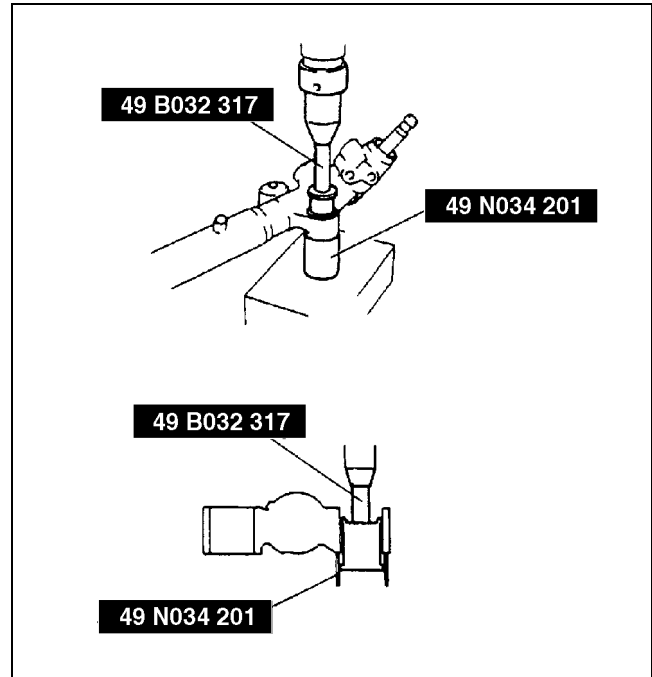


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## ENGINE SPEED SENSING POWER STEERING

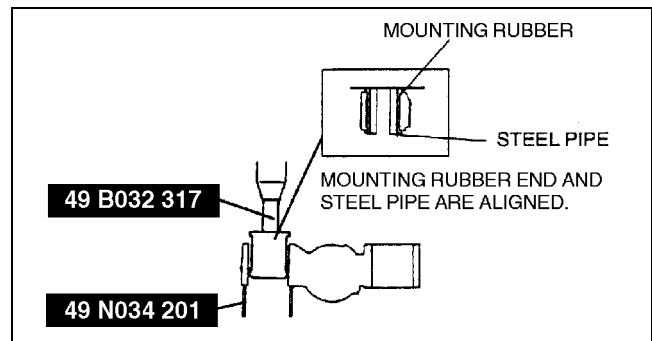
### Mounting Rubber Assembly Note

1. Apply soapy water to the rubber part of the mounting rubber.
2. Press the mounting rubber until the mounting rubber end comes out completely from the gear housing using the **SSTs** and a press.



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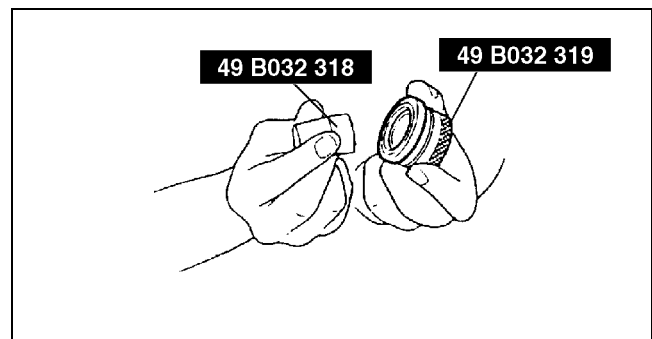
3. Reverse the gear housing, then press the mounting rubber until the mounting rubber end comes out completely from the other side. At this time, mounting rubber end and steel pipe are aligned.



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### Oil Seal, Inner Guide Assembly Note

1. Install a new O-ring and new seal ring to the rack's piston.
2. After installing the seal ring, seat it properly at the piston circumference.
3. Install a new oil seal and inner guide to the **SST**.



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## ENGINE SPEED SENSING POWER STEERING

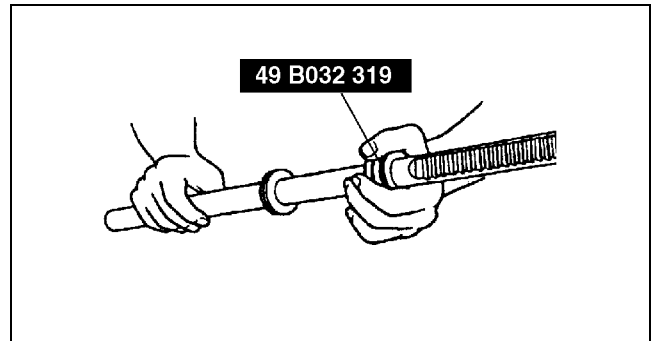
- Using the **SST**, place the oil seal and inner guide at the edge of the steering rack's pinion, and remove the **SST**.
- After mounting the steering rack to the gear housing, use a press to install the oil seal and inner guide to the correct position.

### Caution

- When pressing in, do not apply a load pressure of more than 39,227 kPa {400 kgf/cm<sup>2</sup>, 5,688 psi}.
- Doing so will damage the oil seal and inner guide.
- Apply grease to the seal ring, oil seal and inner guide.

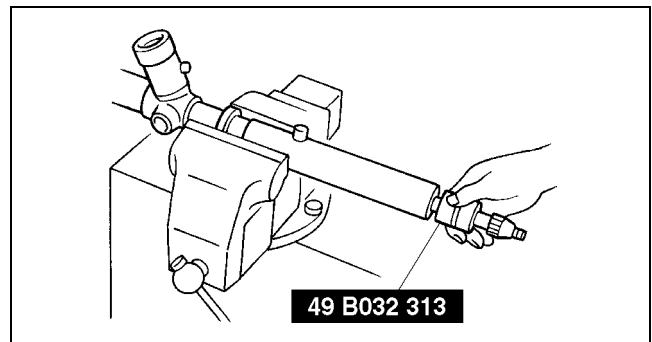
### Holder Assembly Note

- Apply grease to the U-gasket and O-ring.
- Assemble the U-gasket and O-ring into the holder.
- Assemble the holder using the **SST**.

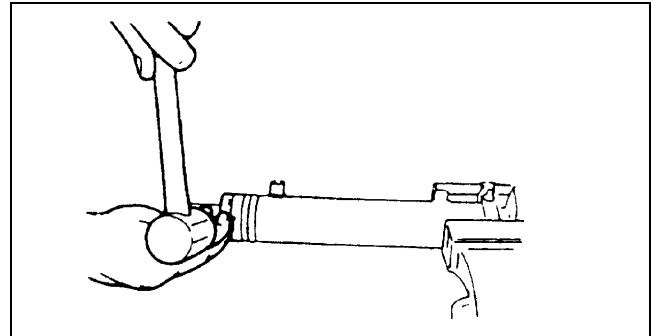


Z5U0612W139

- Stake the holder to the cylinder using a punch.



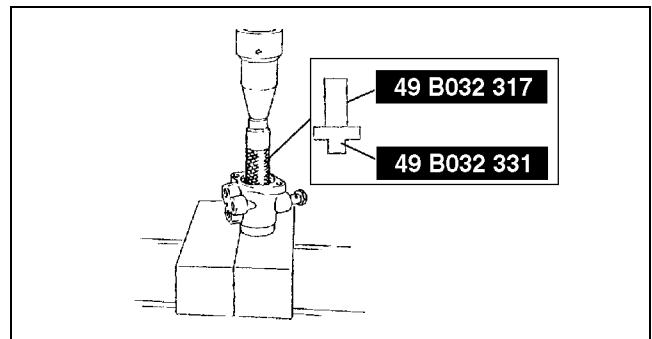
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### Oil Seal Assembly Note

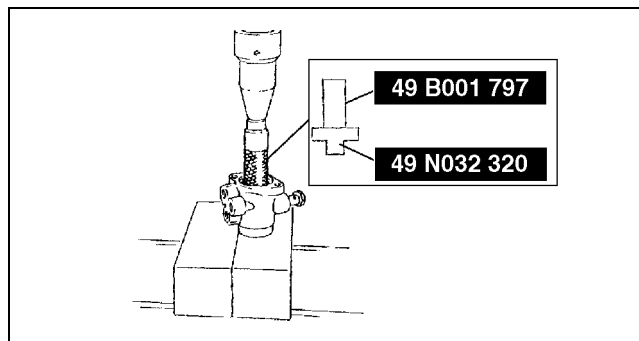
- Apply grease to a new oil seal.
- Press in the new oil seal using the **SSTs**.



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## Upper Bearing Assembly Note

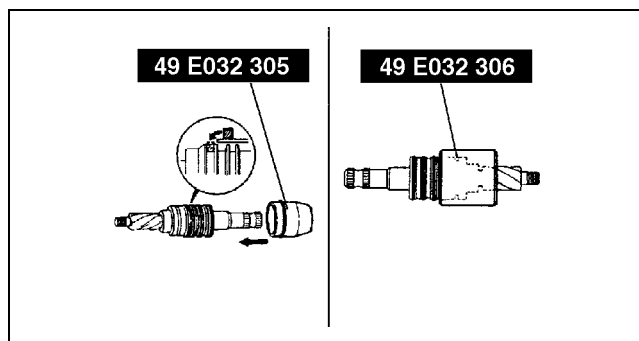
1. Apply grease to a new upper bearing.
2. Press in the upper bearing using the **SST**.



Z5U0612W140

## Seal Ring Assembly Note

1. Install a new seal ring to the valve part of the pinion shaft using the **SST**.
2. After installing it, seat it properly using the **SST**.
3. Install the snap ring.



Z5U0612W141

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## Adjusting Cover Assembly Note

1. Set the rack to the center position.
2. Tighten the adjusting cover to a torque of **4.9 N·m {50 kgf·cm, 43 in·lbf}** three times, then return it **25°** using the **SST**.
3. Apply sealant to the threads of the locknut.
4. Attach the locknut.
5. Measure the pinion torque using the **SST** and a pull scale.
  - If not as the specified, repeat steps 2 through 5.

### Standard

Center of rack  $\pm 90^\circ$  1.0—1.1 N·m  
{10—12 kgf·cm, 8.7—10.4 in·lbf}

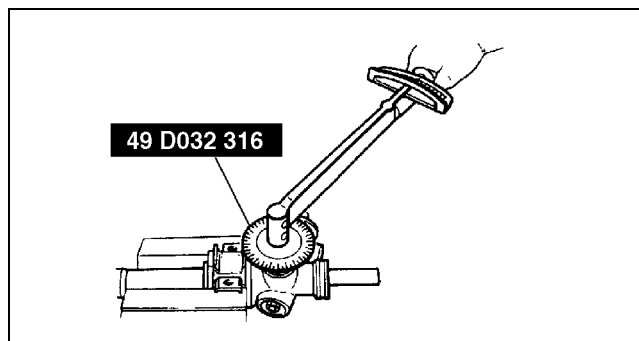
### Pull scale reading

10—11 N {1.0—1.2 kgf, 2.2—2.4 lbf}

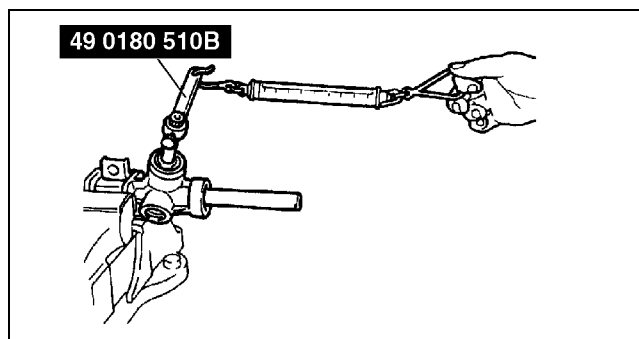
6. Install the locknut using the **SST** (49 B032 320).

### Tightening torque

40—49 N·m {4.0—5.0 kgf·m, 29—36 ft·lbf}



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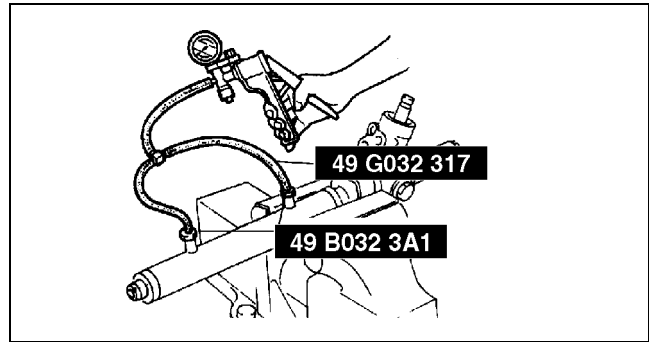


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## ENGINE SPEED SENSING POWER STEERING

### Hermetic sealing inspection

1. Connect the **SSTs** to the power cylinder section of the gear housing.
2. 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**.
  - If the vacuum is not held, replace the oil seal.



Z5U0612W144

### STEERING GEAR AND LINKAGE INSPECTION (ENGINE SPEED SENSING POWER STEERING)

A5U061232960W03

#### Tie-rod End Inspection

1. (See 06-11-14 Tie-rod End Inspection.)

#### Tie Rod Inspection

1. (See 06-11-14 Tie Rod Inspection.)

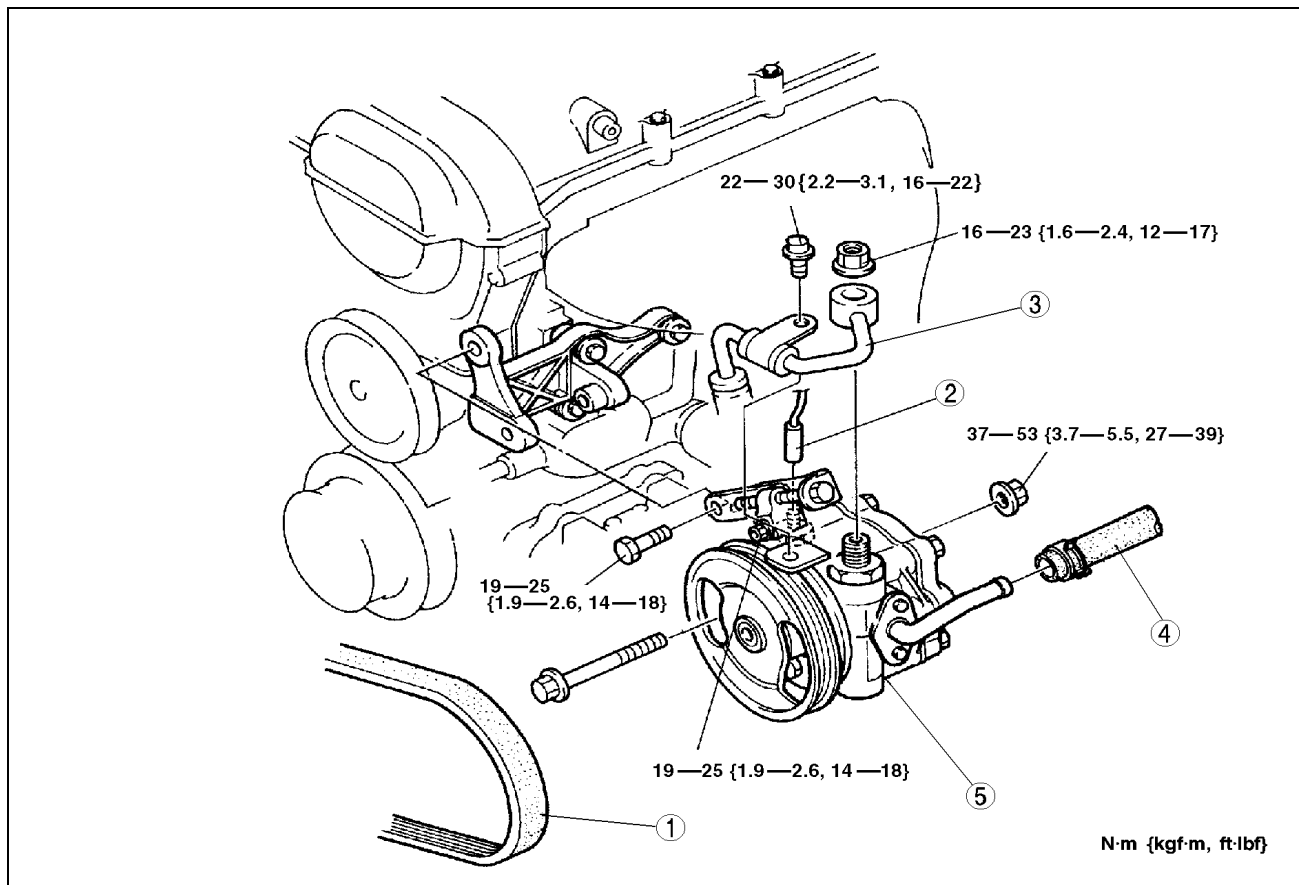
#### Steering Rack Inspection

1. (See 06-11-14 Steering Rack Inspection.)

### POWER STEERING OIL PUMP REMOVAL/INSTALLATION

A5U061232650W01

1. Remove the cooling fan. (See 01-12-4 RADIATOR REMOVAL/INSTALLATION.)
2. Remove in the order indicated in the table.
3. Install in the reverse order of removal.
4. Adjust the drive belt. (See 01-10-4 DRIVE BELT ADJUSTMENT.)



X5U0612WA6

1	Drive belt
2	Power steering pressure switch connector
3	Pressure pipe

4	Return hose
5	Power steering oil pump

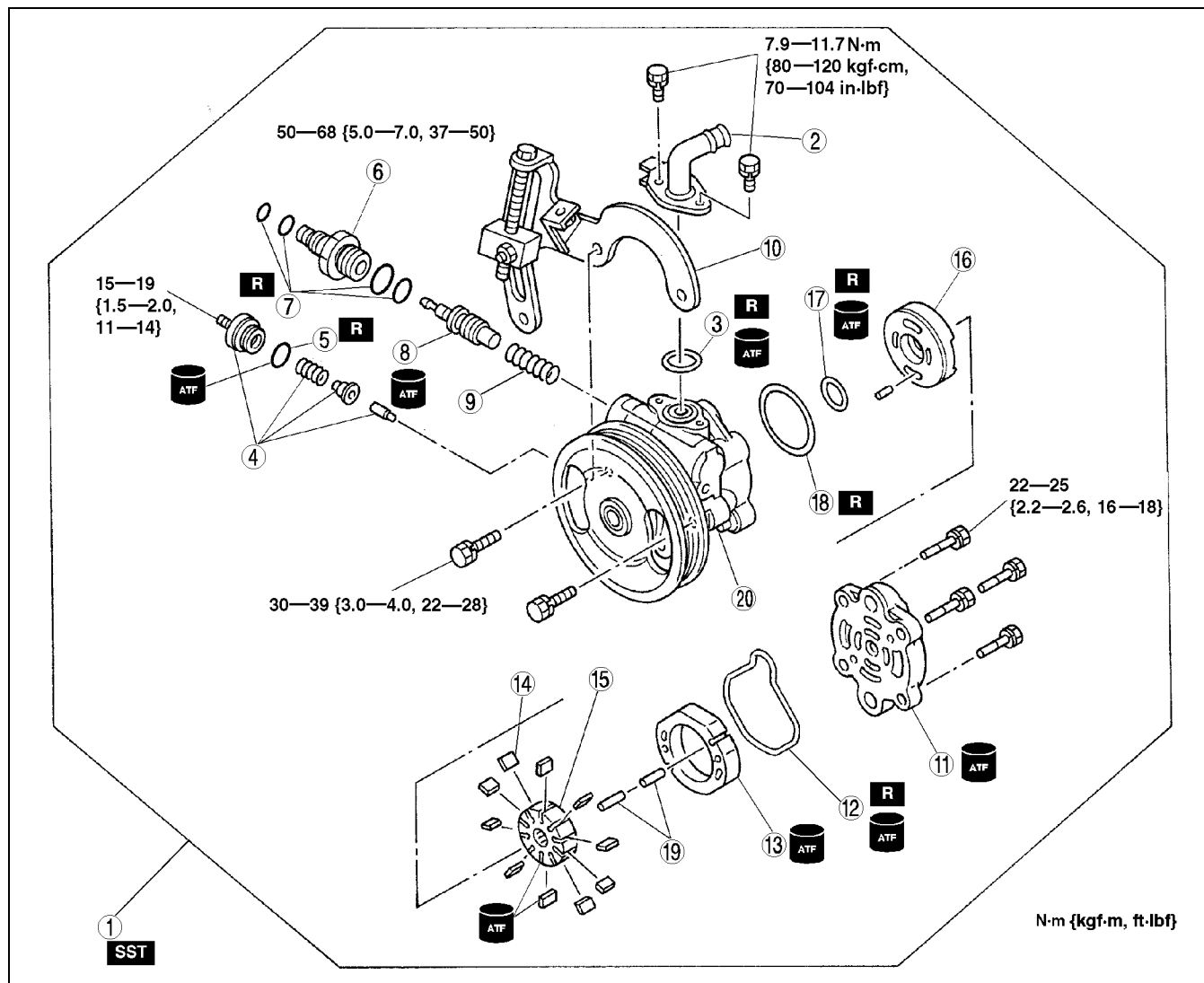


# ENGINE SPEED SENSING POWER STEERING

## POWER STEERING OIL PUMP DISASSEMBLY/ASSEMBLY

A5U061232650W02

1. The following procedure is for replacement of the O-rings only. Replace the pump component if other repairs are necessary.
2. Disassemble in the order indicated in the table.
3. Assemble in the reverse order of disassembly.



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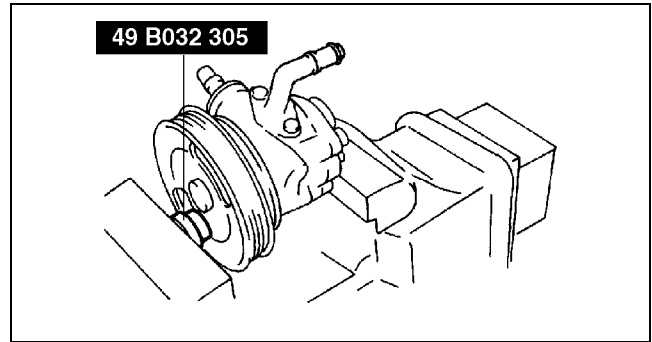
1	Power steering oil pump (See 06–12–18 Power Steering Oil Pump Disassembly Note)
2	Suction pipe
3	O-ring
4	Power steering pressure switch component
5	O-ring
6	Connector
7	O-ring
8	Control valve
9	Spring
10	Bracket

11	Rear pump body
12	O-ring
13	Cam ring (See 06–12–18 Cam Ring Assembly Note)
14	Vane (See 06–12–18 Vane Assembly Note)
15	Rotor (See 06–12–18 Rotor Assembly Note)
16	Side plate
17	O-ring
18	O-ring
19	Pin
20	Front pump body

## ENGINE SPEED SENSING POWER STEERING

### Power Steering Oil Pump Disassembly Note

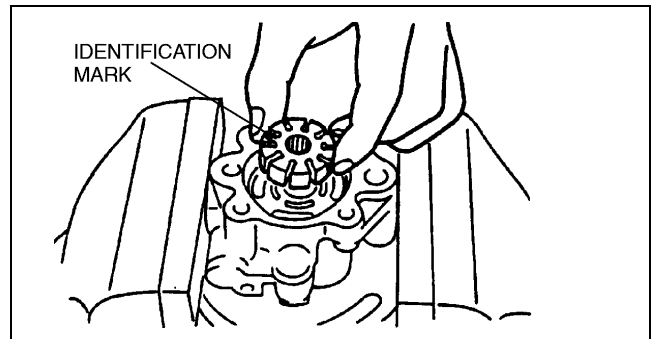
1. Use the **SST** when securing the oil pump in a vise, so that force is not applied to the pulley or shaft.



Z5U0612W145

### Rotor Assembly Note

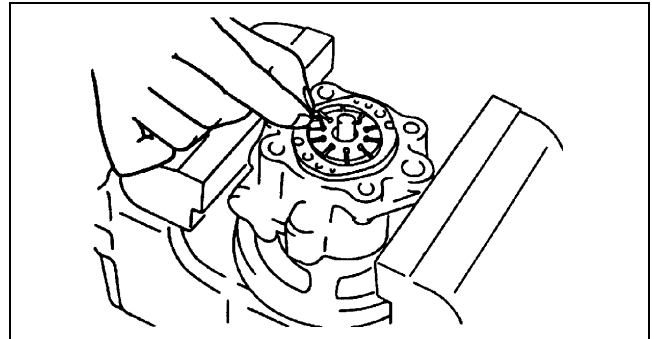
1. Install the rotor with the identification mark facing upward.



U5U61243

### Vane Assembly Note

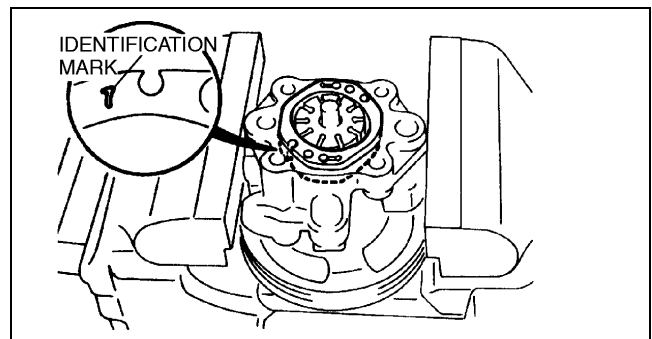
1. Place the vanes in the rotor with the rounded edges contacting the cam.



U5U61245

### Cam Ring Assembly Note

1. Install the cam ring with the identification mark facing downward.



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