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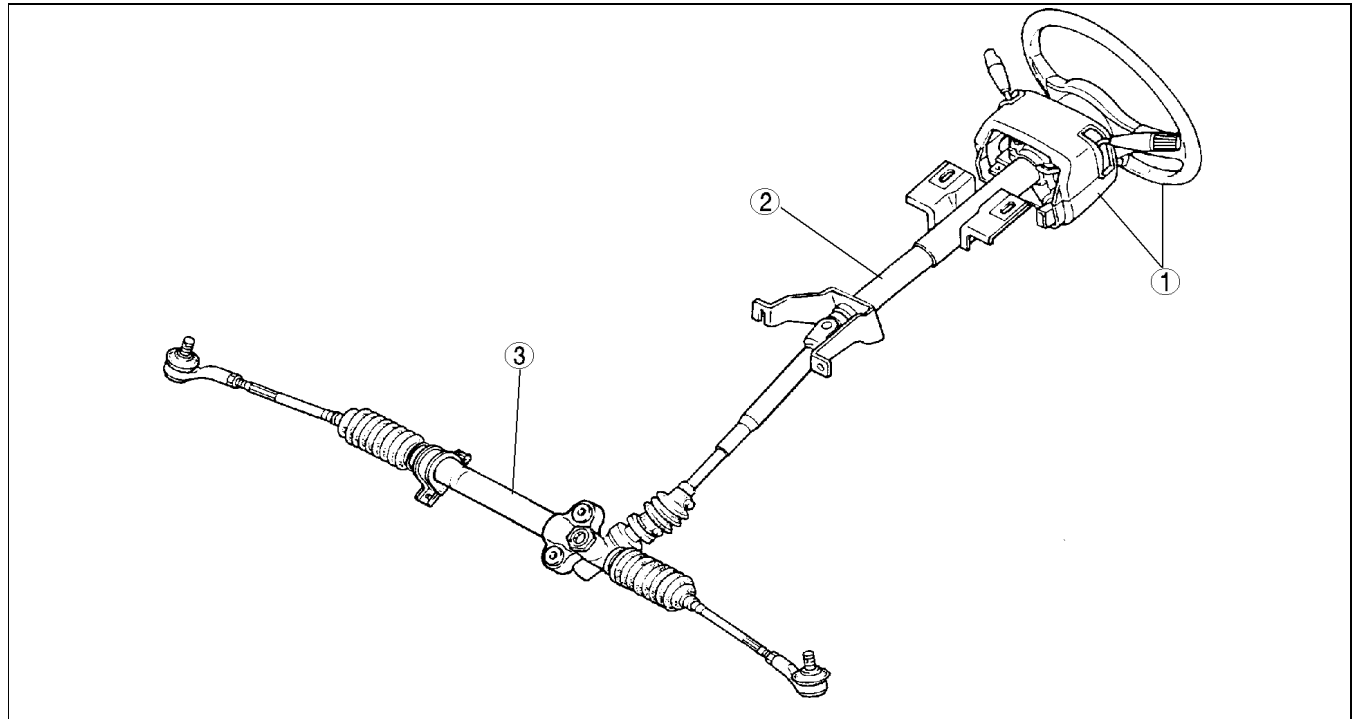
Tie Rod Inspection 06-11-14

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MANUAL STEERING COMPONENT LOCATION INDEX

A5U061101034W01



A5U0611W001

1	Steering wheel and column (See 06-11-2 STEERING WHEEL AND COLUMN INSPECTION) (See 06-11-3 STEERING WHEEL AND COLUMN REMOVAL/INSTALLATION)
2	Steering shaft (See 06-11-4 STEERING SHAFT DISASSEMBLY/ASSEMBLY) (See 06-11-5 STEERING SHAFT INSPECTION)

3	Steering gear and linkage (See 06-11-6 STEERING GEAR AND LINKAGE REMOVAL/INSTALLATION) (See 06-11-7 STEERING GEAR AND LINKAGE DISASSEMBLY/ASSEMBLY) (See 06-11-14 STEERING GEAR AND LINKAGE INSPECTION)
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MANUAL STEERING

STEERING WHEEL AND COLUMN INSPECTION

A5U061132010W01

Steering Wheel Play Inspection

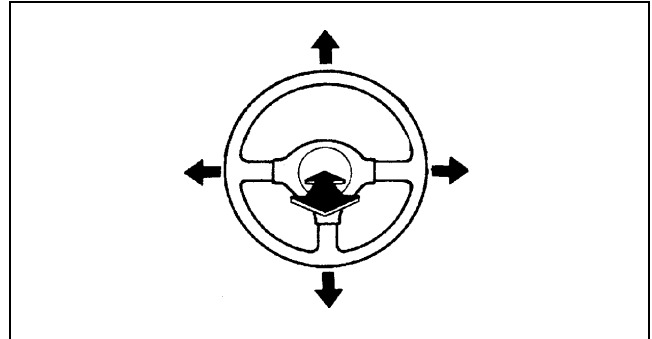
1. If the play exceeds specification, either the steering joints are worn or the backlash of the steering gear is excessive. With the wheels in the straight-ahead position, gently turn the steering wheel to the left and right and verify that the play is within specification.

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.



X5U611WA9

Steering Wheel Effort Inspection

1. On level ground, jack up the front of the vehicle and support it on safety stands.
2. Turn the steering wheel fully to the left and right at least 5 times.
3. Move the steering wheel to put the wheels in the straight ahead position.
4. Attach a pull scale to the outermost point of the steering wheel spoke. Then, starting with the wheels in the straight-ahead position, measure the effort required to turn the steering wheel to the left and to the right.
 - If not as specified, inspect the following: rotation starting torque of pinion, rotation torque of each ball joint, and steering joints.

Steering wheel effort

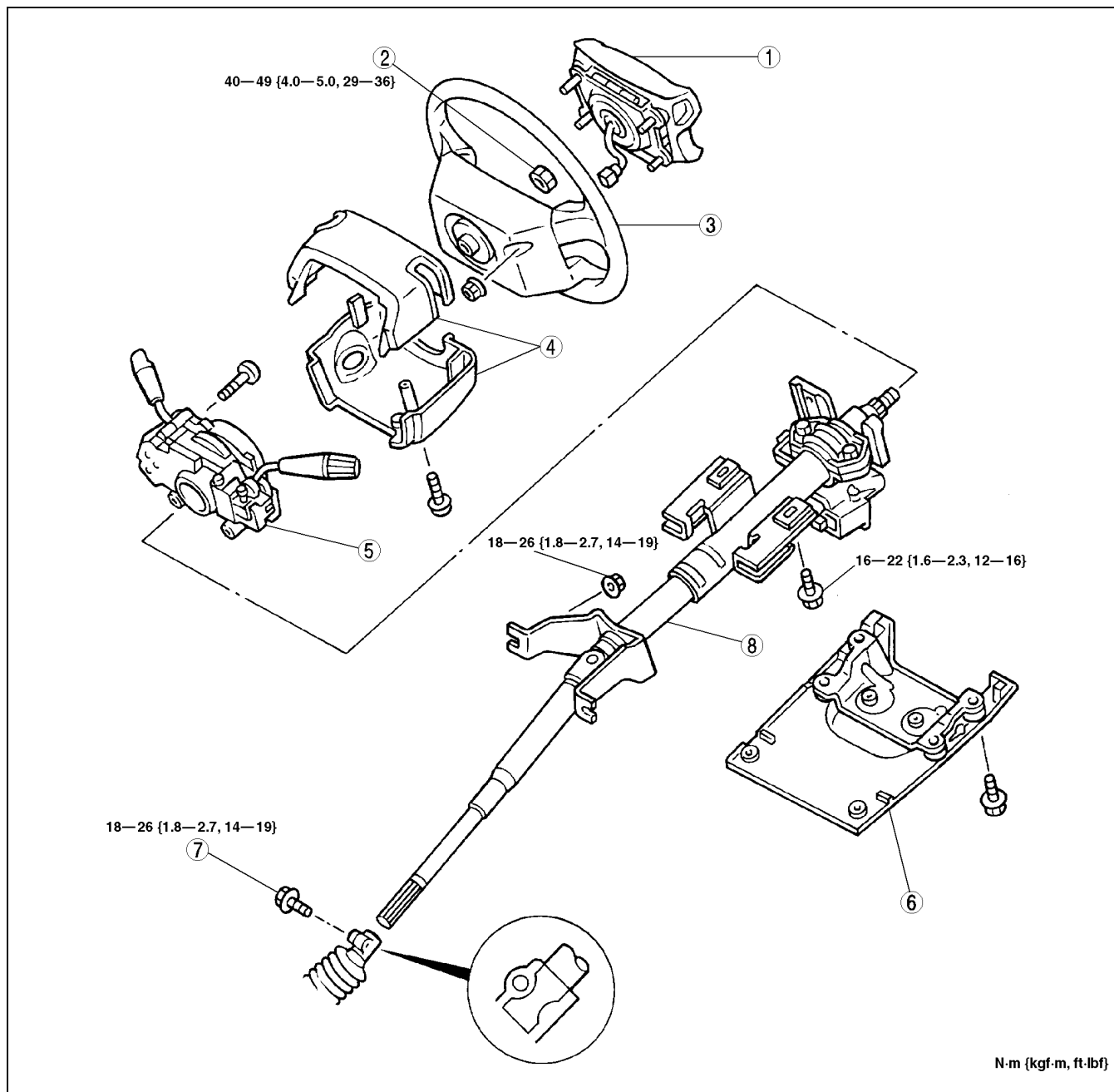
5—29 N {0.5—3.0 kgf, 1.2—6.6 lbf} (during one turn of steering wheel)

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STEERING WHEEL AND COLUMN REMOVAL/INSTALLATION

A5U061132010W02

1. Remove in the order indicated in the table.
2. Install in the reverse order of removal.
3. After installation, verify that the horn sounds.
 - If the horn does not sound, remove the air bag module and connect the module connectors.



06-11

N·m {kgf·m, ft·lbf}

Z5U0612W104

1	Air bag module (See 08-10-5 DRIVER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION)
2	Locknut
3	Steering wheel (See 06-11-4 Steering Wheel Removal Note)

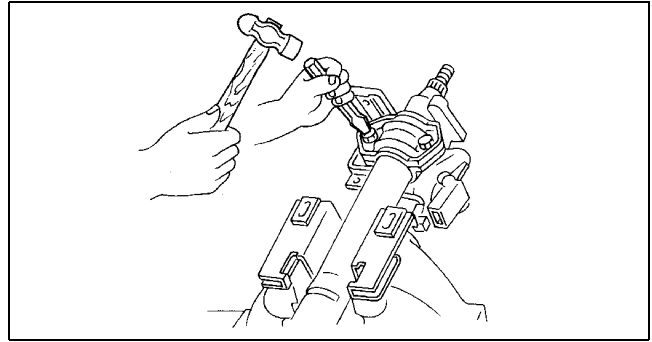
4	Column cover
5	Combination switch
6	Lower panel
7	Intermediate shaft bolt
8	Steering shaft

Steering Wheel Removal Note

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Steering Lock Mounting Bolts and Bracket Disassembly Note

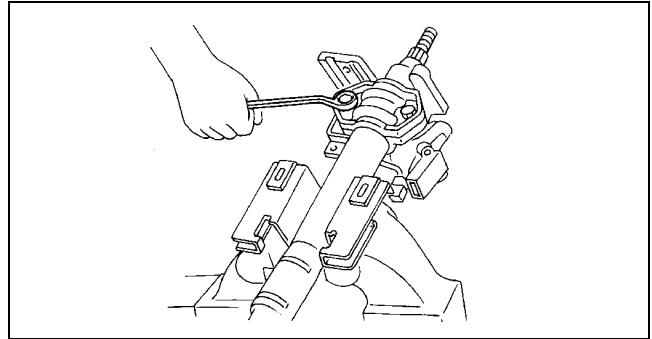
1. Use a chisel to make a groove in the heads of the steering lock mounting bolts. Remove the bolts with a screwdriver. Remove the steering lock component.



Z5U0611W201

Steering Lock Mounting Bolts and Bracket Assembly Note

1. Install the steering lock component. Install the new steering lock mounting bolts. Tighten the bolts until the heads break off.



Z5U0611W202

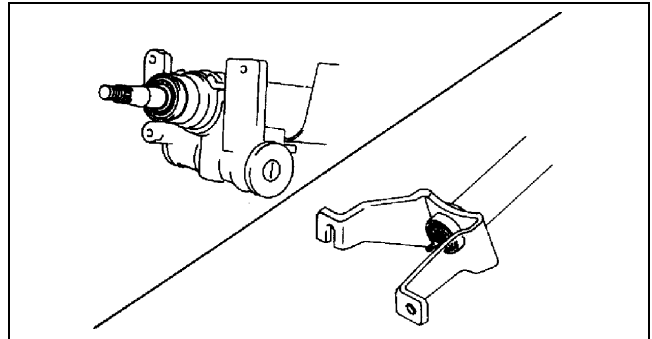
STEERING SHAFT INSPECTION

1. Inspect the following, and replace the column component as necessary.
 - (1) Column bearing damage.
 - (2) Steering shaft length.

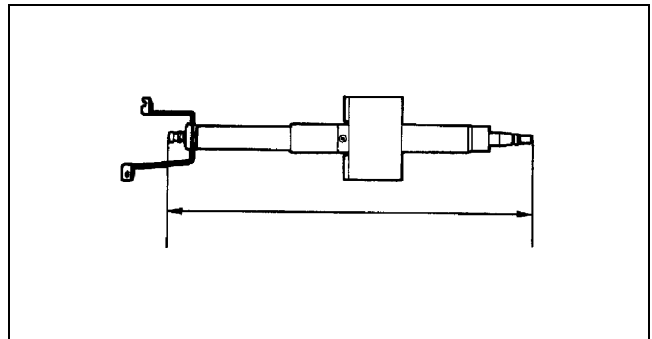
A5U061132100W02

Length

593.8—595.8 mm {23.38—23.45 in}



U5U61107



U5U61108

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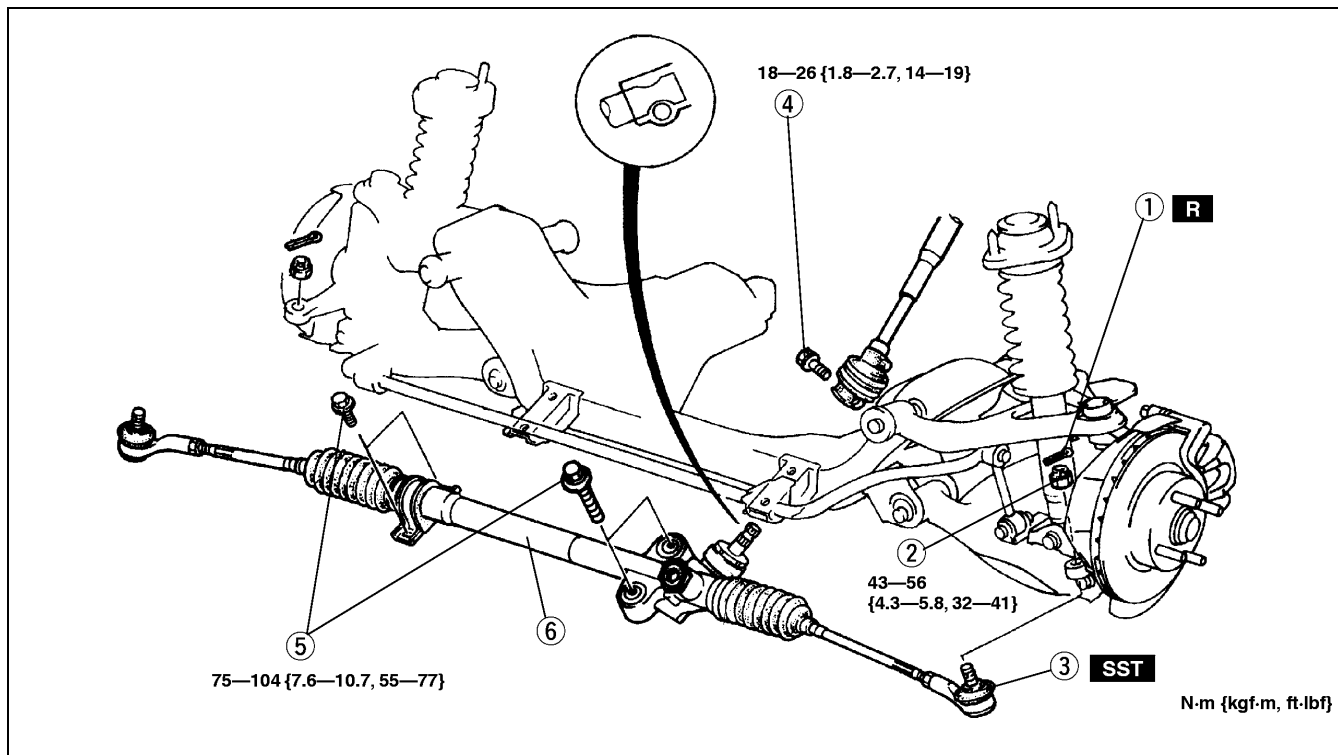
STEERING GEAR AND LINKAGE REMOVAL/INSTALLATION

A5U061132960W01

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.

- With the wheels in the straight-ahead position, remove in the order indicated in the table.
- Install in the reverse order of removal.
- Adjust the total toe-in.



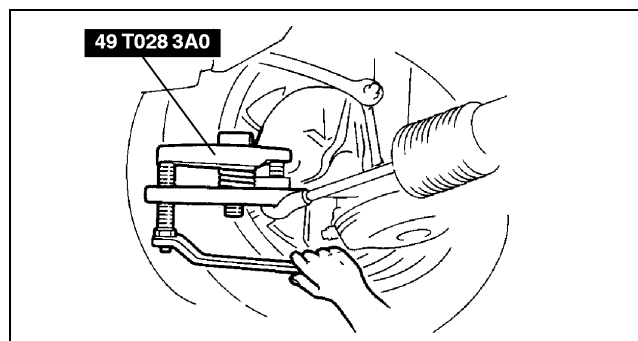
X5U611WA1

1	Cotter pin
2	Nut
3	Tie-rod end ball joint (See06-11-6 Tie-rod End Ball Joint Removal Note)

4	Intermediate shaft bolt
5	Mounting bracket bolt
6	Steering gear and linkage

Tie-rod End Ball Joint Removal Note

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



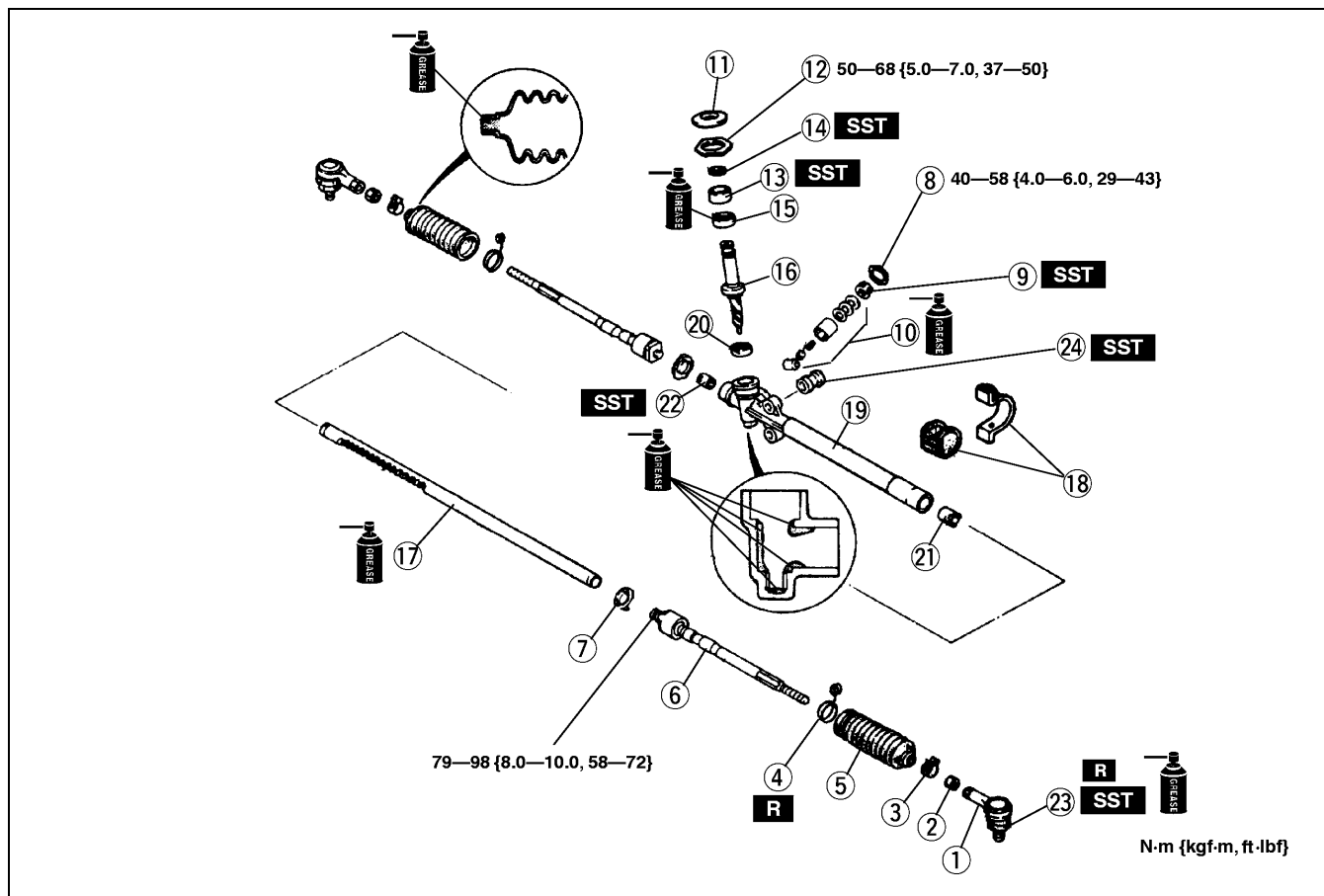
U5U61110

MANUAL STEERING

STEERING GEAR AND LINKAGE DISASSEMBLY/ASSEMBLY

A5U061132960W02

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



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Y5U611WA1

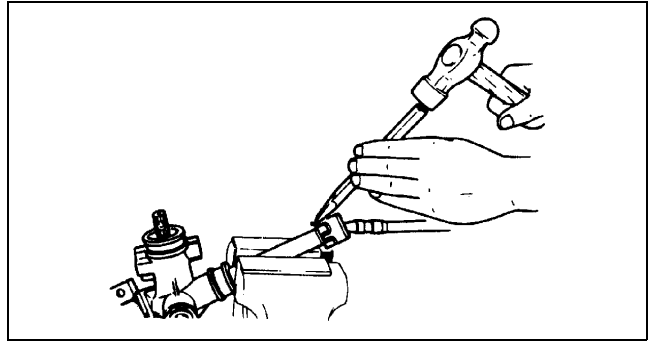
1	Tie-rod end
2	Locknut (Tie-rod end)
3	Boot band
4	Boot wire
5	Boot
6	Tie rod (See 06-11-8 Tie Rod Disassembly Note)
7	Washer
8	Locknut (Adjusting cover)
9	Adjusting cover (See 06-11-8 Adjusting Cover Disassembly Note) (See 06-11-13 Adjusting Cover Assembly Note)
10	Roller component
11	Dust cover
12	Locknut (Rear cover)
13	Rear cover (See 06-11-12 Rear Cover Assembly Note)
14	Oil seal (See 06-11-8 Oil Seal Disassembly Note)
15	Upper bearing

16	Pinion shaft (See 06-11-12 Pinion Shaft Assembly Note)
17	Steering rack (See 06-11-8 Steering Rack Disassembly Note) (See 06-11-12 Steering Rack Assembly Note)
18	Mounting bracket and mount
19	Gear housing
20	Lower bearing (See 06-11-9 Lower Bearing Disassembly Note) (See 06-11-11 Lower Bearing Assembly Note)
21	Rack bushing (See 06-11-9 Rack Bushing Disassembly Note) (See 06-11-11 Rack Bushing Assembly Note)
22	Bushing (See 06-11-9 Bushing Disassembly Note) (See 06-11-11 Bushing Assembly Note)
23	Tie-rod end boot (See 06-11-9 Tie-rod End Boot Disassembly Note) (See 06-11-11 Tie-rod End Boot Assembly Note)
24	Mounting rubber (See 06-11-10 Mounting Rubber Disassembly Note) (See 06-11-10 Mounting Rubber Assembly Note)

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Tie Rod Disassembly Note

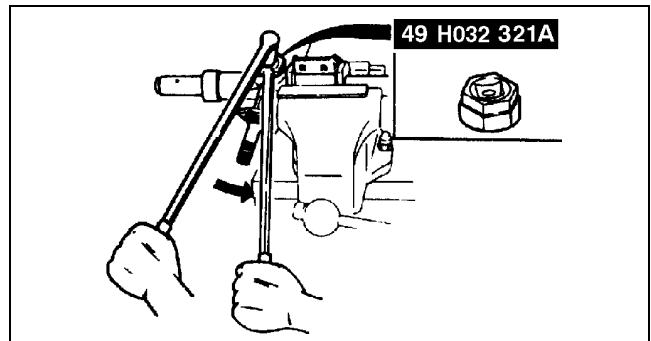
1. Unclamp the washer.
2. Remove the tie rod.



U5U61112

Adjusting Cover Disassembly Note

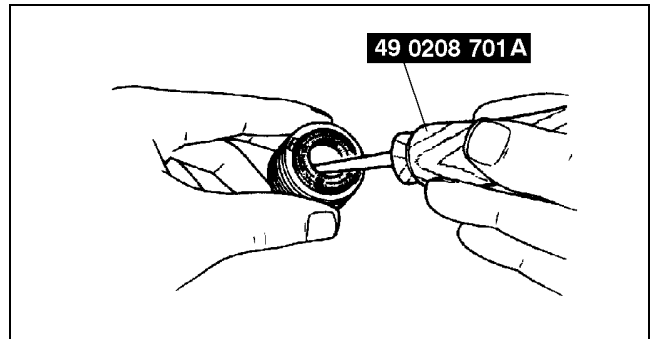
1. Remove the adjusting cover using the SST.



A5U0611W002

Oil Seal Disassembly Note

1. Remove the oil seal using the SST.



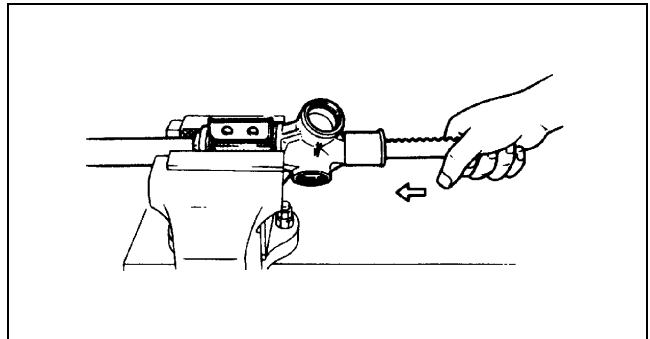
A5U0611W003

Steering Rack Disassembly Note

1. Remove the rack from the tube side.

Caution

- Removing the rack from the tube side can damage the rack bushing by dragging the rack teeth across it. When removing the rack, remove it slowly and carefully.



U5U61115

Lower Bearing Disassembly Note

Note

- The lower bearing does not need to be removed unless it is being replaced.

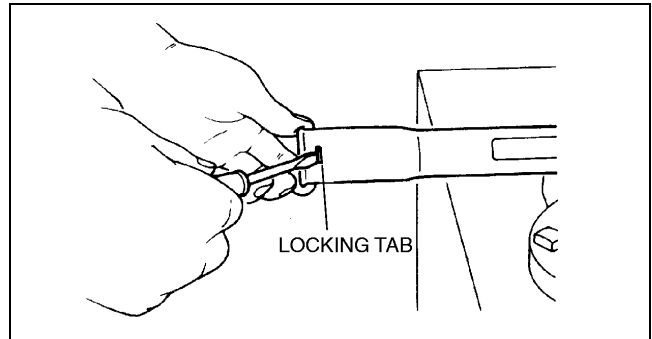
1. Heat the gear housing in water to about **80°C {176°F}**.
2. Tap the end of the housing with a plastic hammer to remove the lower bearing.

Rack Bushing Disassembly Note

Note

- The rack bushing does not need to be removed unless it is being replaced.

1. Depress the locking tab, and carefully remove the rack bushing.



U5U61116

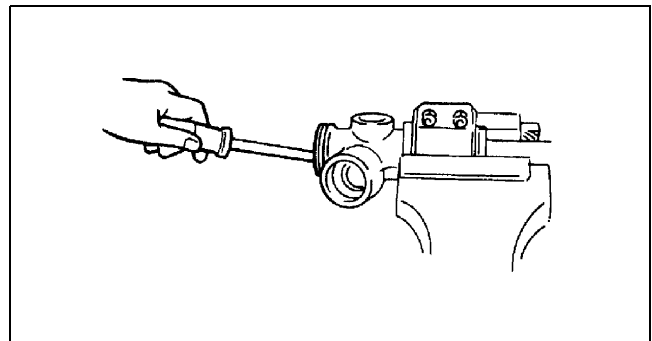
06-11

Bushing Disassembly Note

Note

- The bushing does not need to be removed unless it is being replaced.

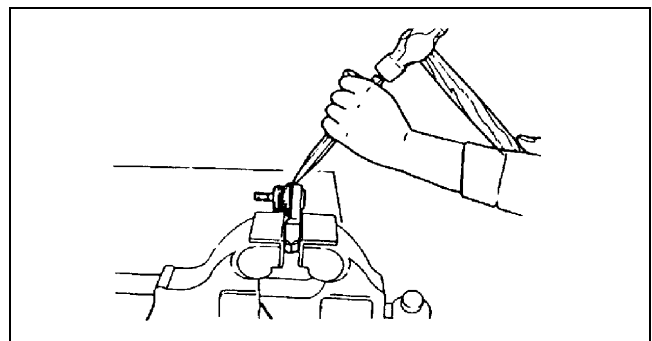
1. Carefully break the bushing to remove it.



U5U61117

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.

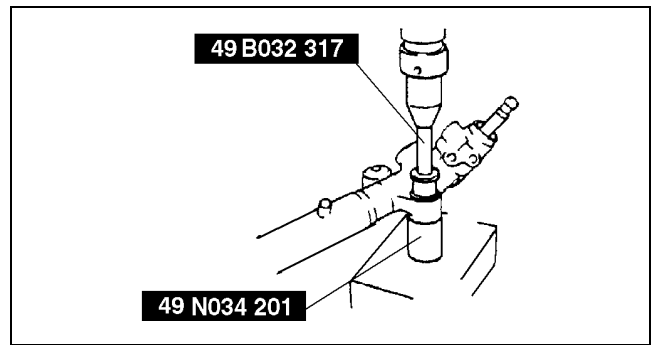


U5U61118

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Mounting Rubber Disassembly Note

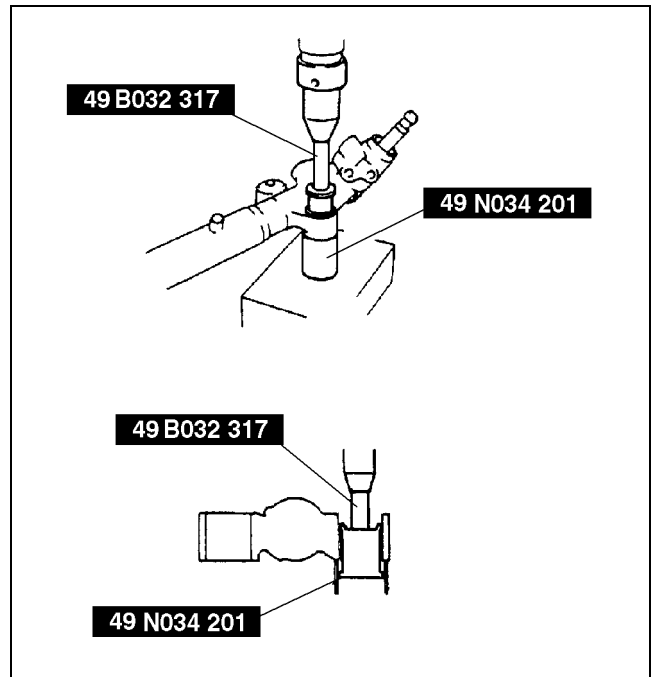
1. Press the mounting rubber out from the gear housing using the **SSTs** and a press.



A5U0611W004

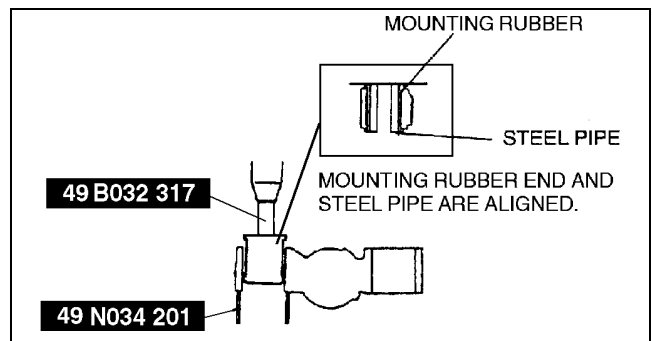
Mounting Rubber Assembly Note

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.



A5U0611W005

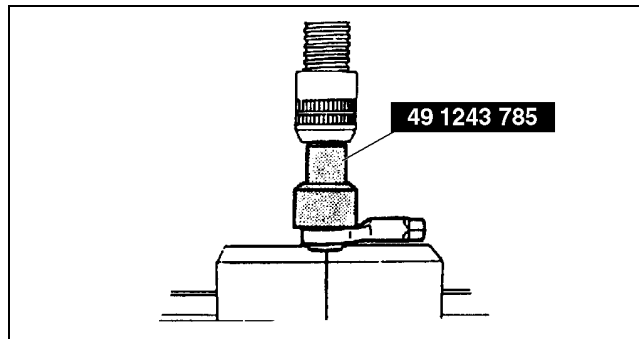
3. Reverse the gear housing, then press the mounting rubber until the mounting rubber end comes out completely from the other side. At this time, mounting rubber end and steel pipe are aligned.



A5U0611W006

Tie-rod End Boot Assembly Note

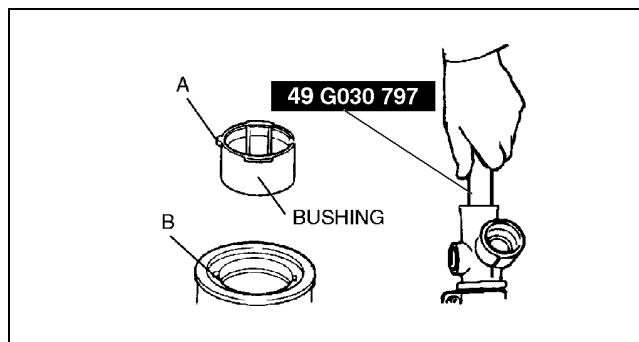
1. Wipe the grease off the ball joint.
2. Put a small amount of lithium-based grease into a new dust boot.
3. Install the dust boot onto the tie-rod end using the **SST** and a press.
4. Wipe away any excessive grease.



A5U0611W007

Bushing Assembly Note

1. Align A and B and press a new bushing into the gear housing using the **SST** until the bushing is fully seated.

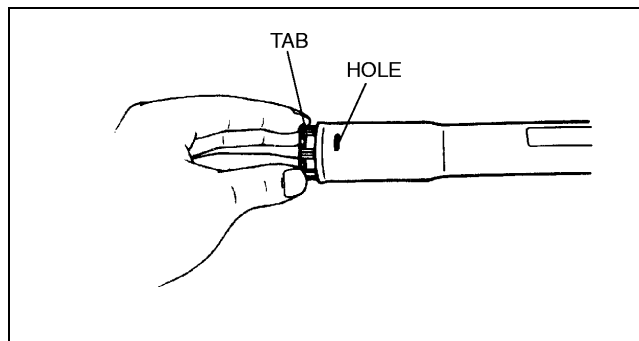


A5U0611W008

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Rack Bushing Assembly Note

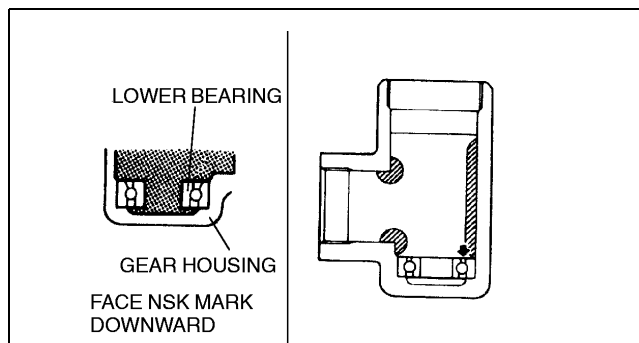
1. Align the tab of a new rack bushing with the hole in the column.
2. Push the rack bushing in until it is locked in place by the tab.



U5U61121

Lower Bearing Assembly Note

1. Apply grease to a new lower bearing.
2. Set the lower bearing onto the pinion shaft so that the NSK mark on the bearing faces downward.
3. Insert the pinion shaft together with the lower bearing.
4. Press the pinion shaft to seat the lower bearing.
5. Apply grease to the inside of the gear housing as shown.



U5U61122

MANUAL STEERING

Steering Rack Assembly Note

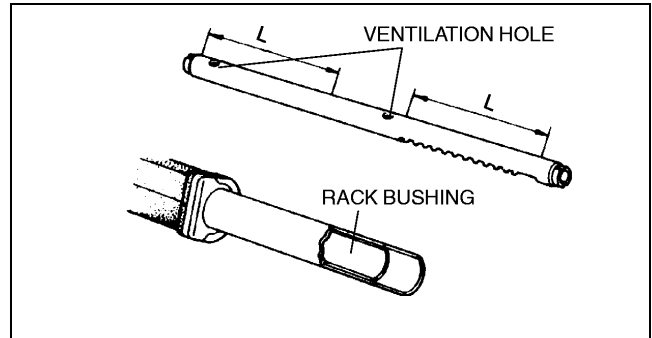
1. Secure the mounting bracket in a vise.
2. Apply grease to the rack bushing.
3. Apply grease to the rack teeth and the sliding surface.

Caution

- Do not plug the ventilation holes with the grease.

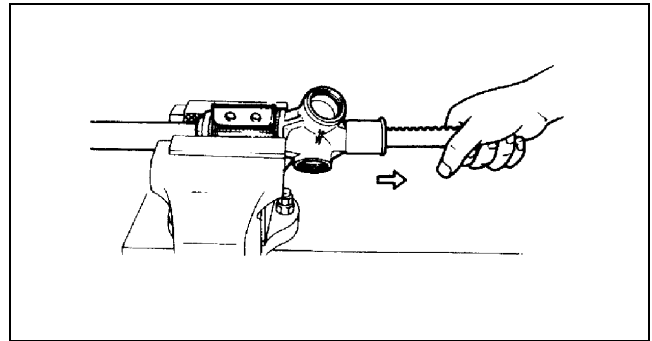
Caution

- Installing the rack from the tube side can damage the rack bushing by dragging the rack teeth across it. When installing the rack, install it slowly and carefully.



U5U61123

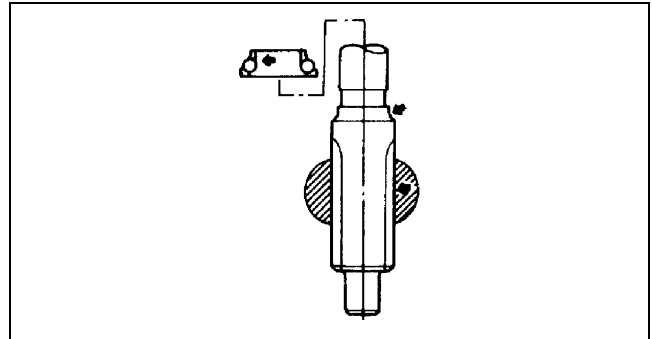
4. Slide the rack in from the tube side.



U5U61124

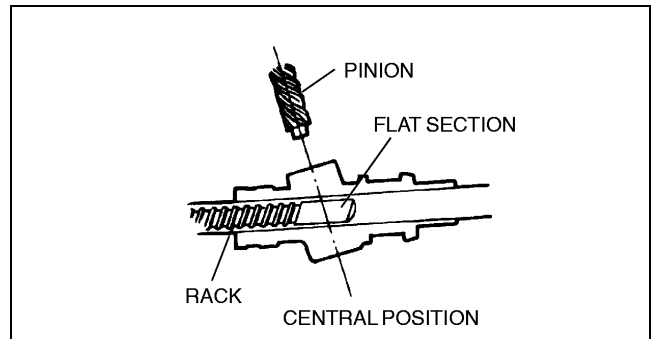
Pinion Shaft Assembly Note

1. Apply grease to the inner race of the upper bearing and install it to the pinion shaft.
2. Apply grease to the teeth of the pinion shaft.



U5U61125

3. Turn the flat section of the rack toward the pinion, and insert the pinion.



U5U61126

Rear Cover Assembly Note

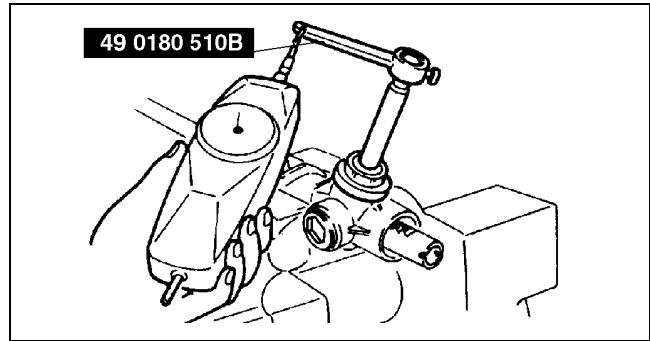
1. Apply grease to the outer race of the upper bearing and install it in the gear housing.

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2. Install a new oil seal to the rear cover.
3. Apply sealant to the threads of the rear cover and install it into the gear housing.
4. Rotate the pinion to the left and right a few times to seat the bearing.
5. Tighten the rear cover so that the starting torque of the pinion is **2.0—3.4 N·m {20—35 kgf·cm, 18—30 in·lbf}** (Pull scale reading: **20—34 N {2.0—3.5 kgf, 4.5—7.7 lbf}**) as inspected using the **SST** and a pull scale.
6. Tighten the locknut. Do not allow the rear cover to turn.

Tightening torque

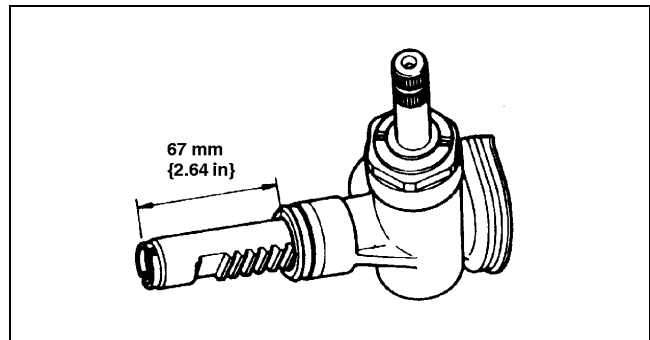
50—68 N·m {5.0—7.0 kgf·m, 37—50 ft·lbf}



A5U0611W009

Adjusting Cover Assembly Note

1. Carefully move the rack so that the pinion is set to the center (neutral position) of the rack gear as shown.



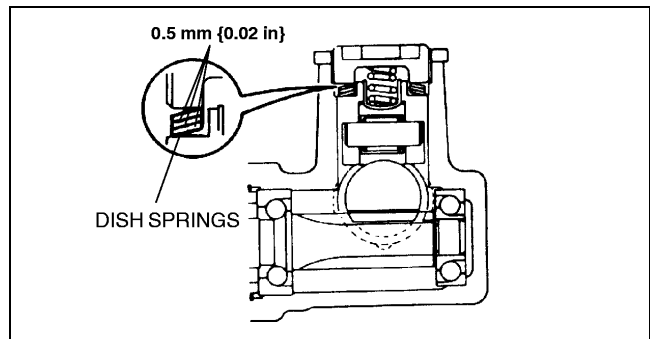
X5U611WA8

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2. Install the roller component, needle roller, holder, dish springs, friction block, and the spring as shown.
3. Tighten the adjusting cover to **9.8 N·m {100 kgf·cm, 87 in·lbf}**, then loosen it **25°—45°**. Use the **SSTs** to secure the adjusting cover and the locknut.

Tightening torque

40—58 N·m {4.0—6.0 kgf·m, 29—43 ft·lbf}



U5U61129

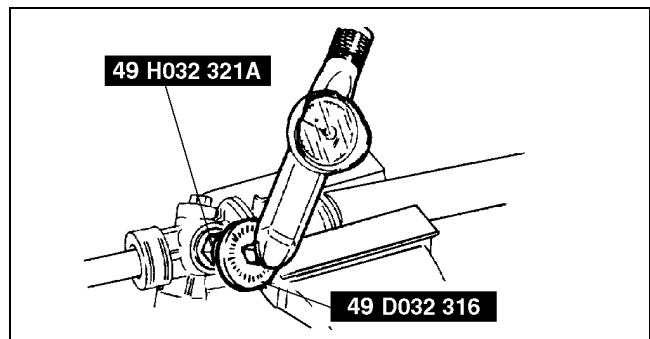
4. Measure the starting torque of the pinion using the **SST**.
 - If not as specified, repeat Steps 2 and 3.

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}



A5U0611W010

MANUAL STEERING

STEERING GEAR AND LINKAGE INSPECTION

A5U061132960W03

Tie-rod End Inspection

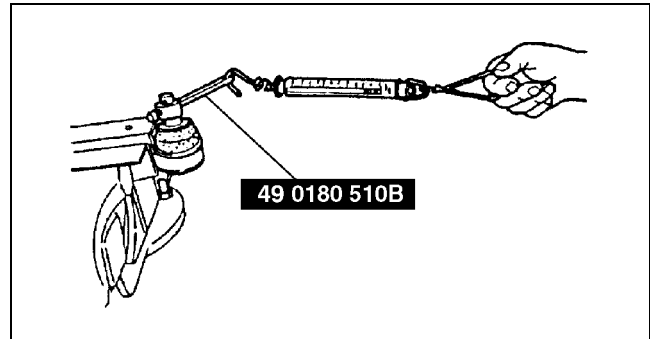
1. Inspect the tie-rod end for damage and boot cracks. Replace it as necessary.
2. Inspect the ball joint for looseness. Replace the tie-rod end as necessary.
3. Rotate the ball joint 5 times.
4. Measure the rotation torque of the ball joint using the SST and pull scale.
 - If not as specified, replace the tie-rod end.

Rotation torque

0.1—3.1 N·m {1—32 kgf·cm, 0.9—27.7 in·lbf}

Pull scale reading

0.5—15.4 N {0.05—1.58 kgf, 0.2—3.4 lbf}



A5U0611W011

Tie Rod Inspection

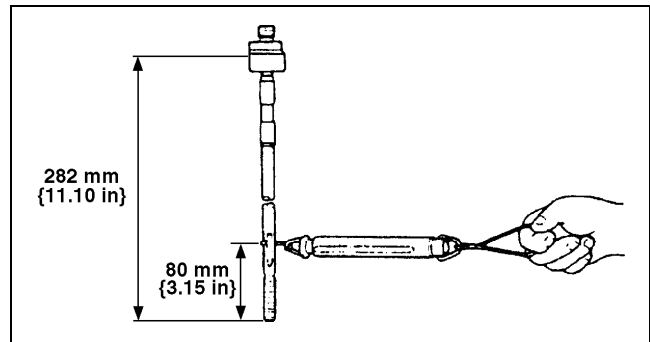
1. Inspect the tie rod for bending and damage. Replace it as necessary.
2. Inspect the ball joint for looseness. Replace the tie rod as necessary.
3. Swing the tie rod 5 times.
4. Measure the swing torque using a pull scale.
 - If not as specified, replace the tie rod.

Swinging torque

0.1—3.4 N·m {1—35 kgf·cm, 0.9—30.3 in·lbf}

Pull scale reading

0.7—21.5 N {0.07—2.20 kgf, 0.16—4.84 lbf}



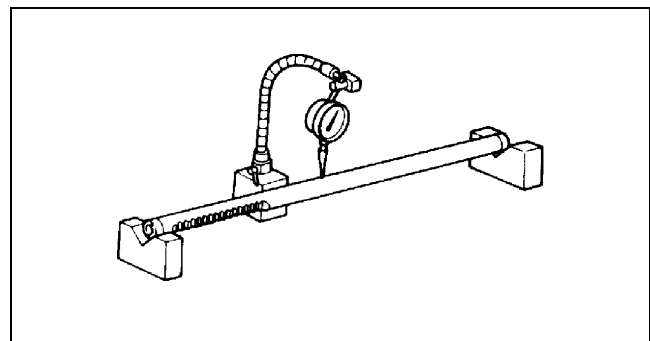
Y5U611WA0

Steering Rack Inspection

1. Inspect for cracks, damage, and tooth wear. Replace as necessary.
2. Measure runout of the rack.
 - If not as specified, replace the rack.

Runout

0.3 mm {0.012 in} max.



U5U61134