

## 02-13 FRONT SUSPENSION

### FRONT SUSPENSION

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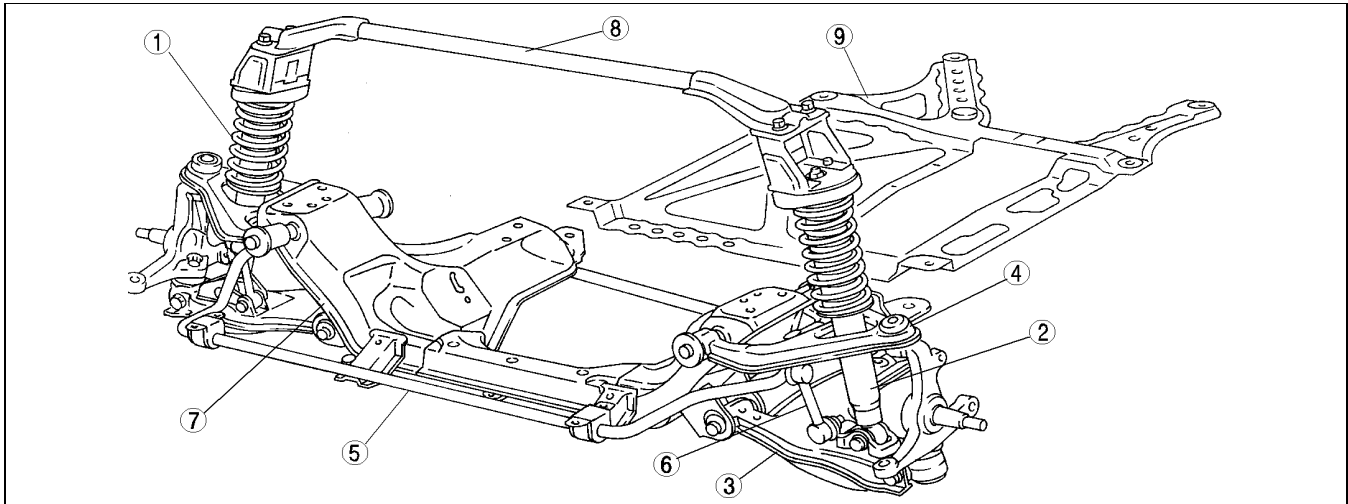
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02-13

# FRONT SUSPENSION

## FRONT SUSPENSION LOCATION INDEX

A5U021301015W01



Z5U0213W125

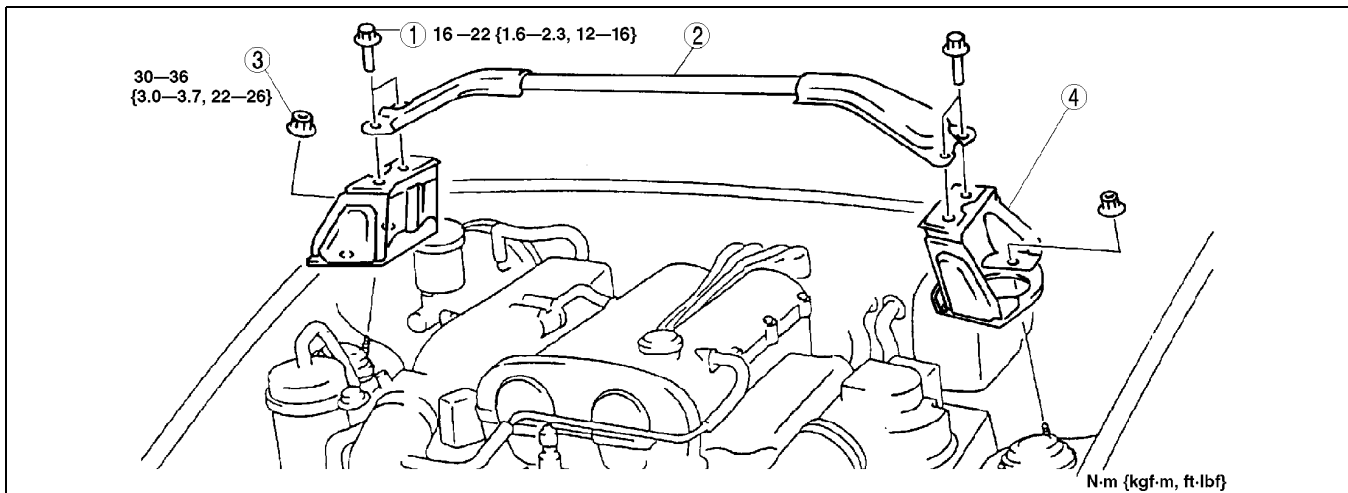
1	Front shock absorber and coil spring (See 02-13-3 FRONT SHOCK ABSORBER AND COIL SPRING REMOVAL/INSTALLATION)
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## FRONT STRUT BAR REMOVAL/INSTALLATION

A5U021301015W02

1. Remove in the order indicated in the table.
2. Install in the reverse order of removal.



Z5U0213W123

1	Bolt
2	Front strut bar

3	Nut
4	Strut bracket

# FRONT SUSPENSION

## FRONT SHOCK ABSORBER AND COIL SPRING REMOVAL/INSTALLATION

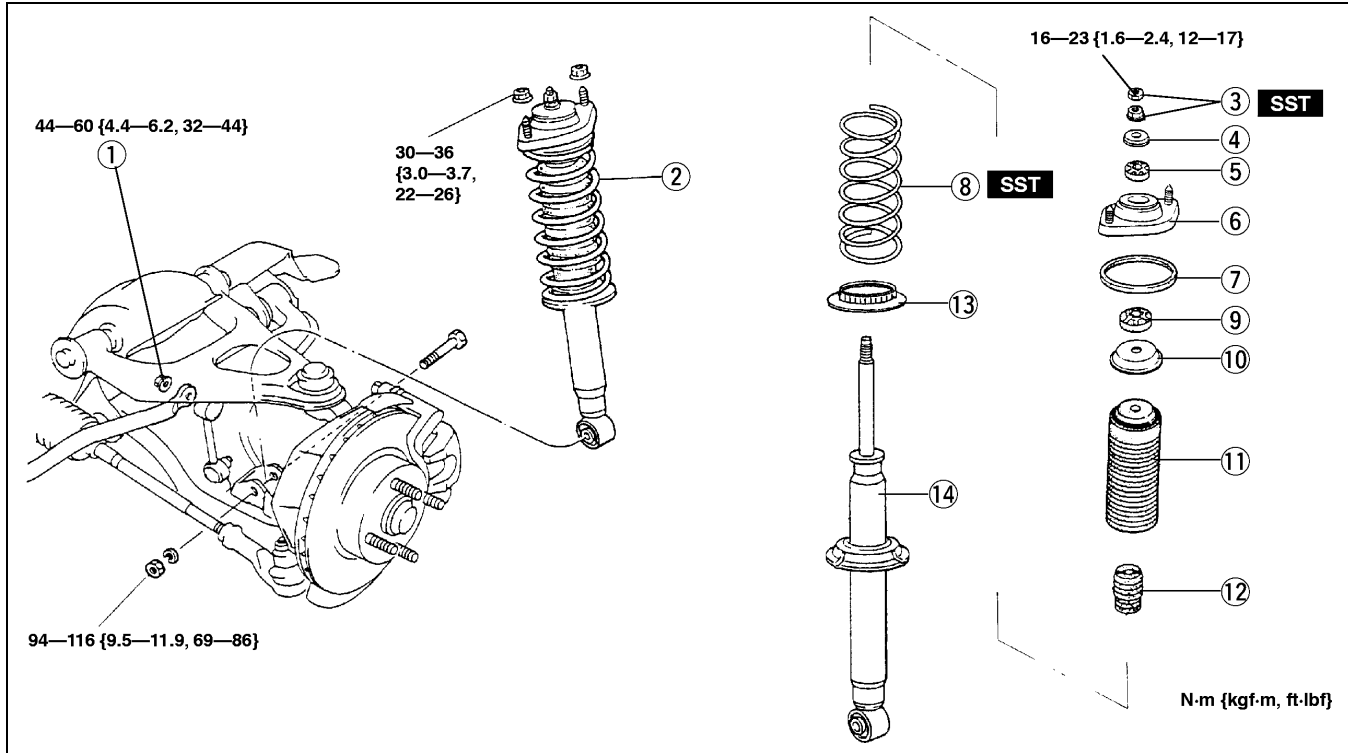
A5U021304910W01

### 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.
- Inspect the front wheel alignment.
  - If not as specified, adjust the front wheel alignment. (See 02-11-1 FRONT WHEEL ALIGNMENT.)

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X5U213WA0

1	Stabilizer control link nut
2	Front shock absorber and coil spring (See 02-13-4 Front Shock Absorber and Coil Spring Removal Note) (See 02-13-6 Front Shock Absorber and Coil Spring Installation Note)
3	Piston rod nut (See 02-13-4 Piston Rod Nut Removal Note)
4	Retainer
5	Rubber bushing
6	Upper spring seat

7	Upper spring seat rubber
8	Coil spring (See 02-13-5 Coil Spring Installation Note)
9	Rubber bushing
10	Stopper casing
11	Dust boot
12	Bound stopper (See 02-13-4 Bound Stopper Installation Note)
13	Lower spring seat rubber
14	Front shock absorber

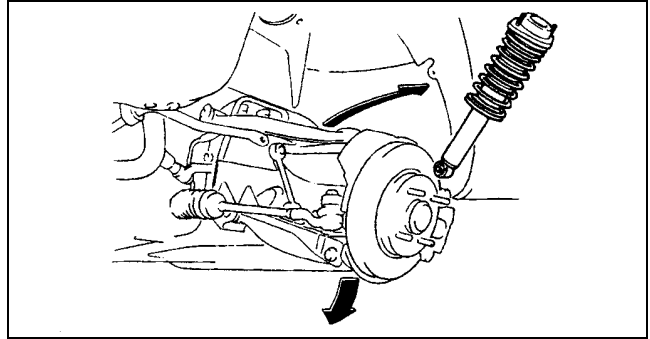
## FRONT SUSPENSION

### Front Shock Absorber and Coil Spring Removal Note

1. Disconnect the lower arm ball joint. (See 02-13-8 Lower Arm Ball Joint Removal Note.)
2. Loosen the lower arm bolts.
3. Lower the lower arm to remove the shock absorber.

#### Caution

- Do not lower the arms excessively, doing so may damage the brake hose.



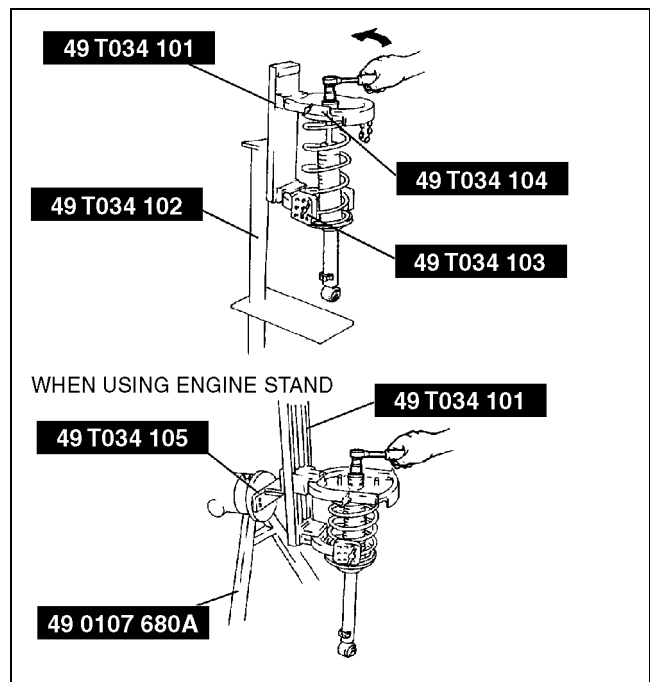
Y5U213WA2

### Piston Rod Nut Removal Note

1. Loosen the piston rod nut several turns, but do not remove the nut.
2. Assemble the **SSTs**.
3. Secure the shock absorber in the **SSTs**.
4. Compress the coil spring using the **SSTs** and remove the nut.

#### Warning

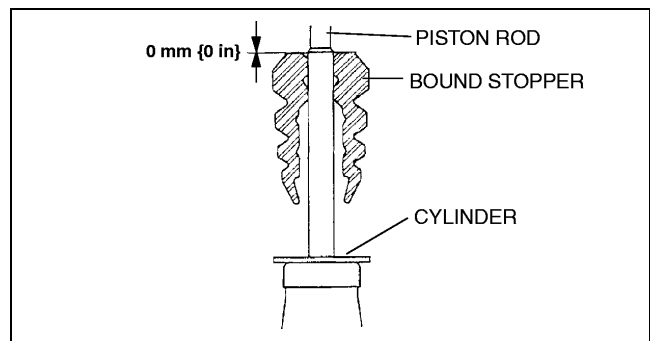
- Removing the piston rod nut is dangerous. The shock absorber and spring could fly off under tremendous pressure and cause serious injury or death. Secure the shock absorber in the **SSTs** before removing the coil spring nut.



Z5U0213W130

### Bound Stopper Installation Note

1. Install the bound stopper to the piston rod as shown.
2. Verify that the lower end of the bound stopper does not contact the cylinder.

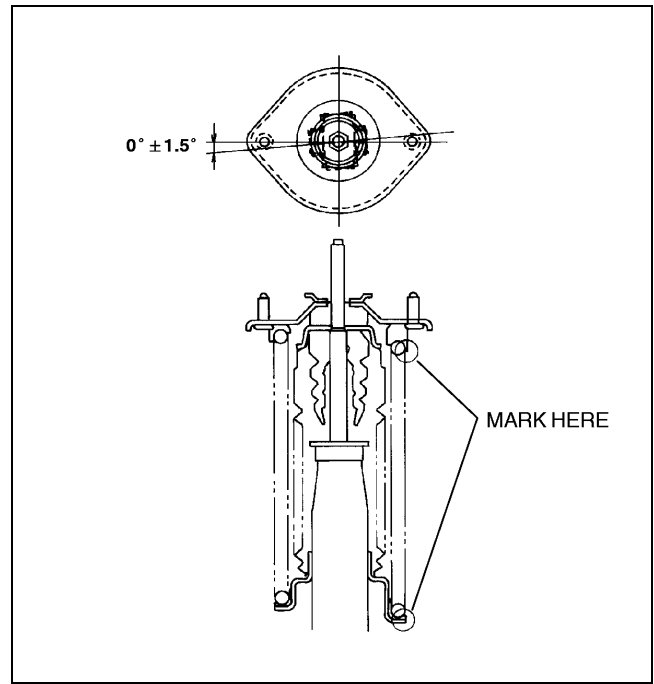


X5U213WA8

## FRONT SUSPENSION

### Coil Spring Installation Note

1. Temporarily install the upper spring seat, upper spring seat rubber and coil spring on the shock absorber as shown.
2. Mark the upper spring seat, shock absorber and coil spring for proper reassembly.
3. Align the marks of the upper spring seat and coil spring. Protect the upper spring seat and the coil spring with a piece of cloth, then assemble the **SSTs**.



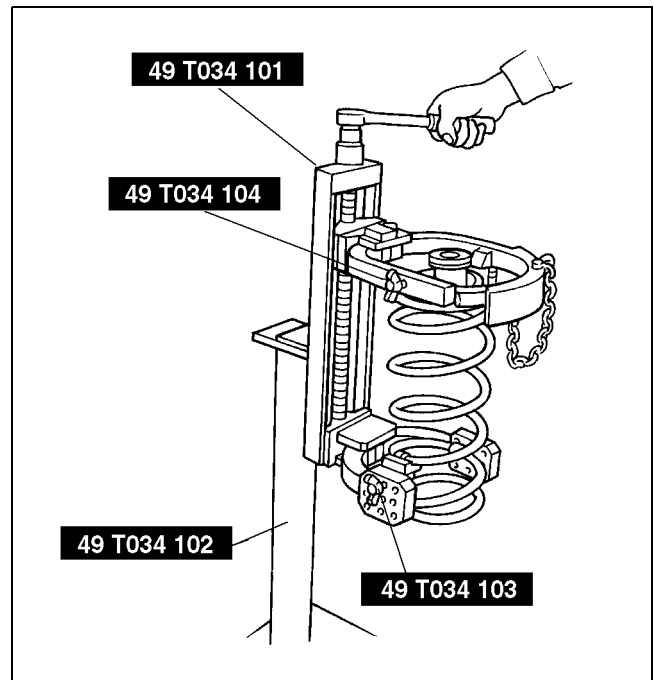
X5U213WA1

4. Compress the spring using the **SSTs**.
5. Install the shock absorber, making sure that the marks on the shock absorber and coil spring are aligned.
6. Tighten the nut several turns.
7. Remove the **SSTs**.
8. Secure the shock absorber in a vise.

### Caution

- Using an air tool will damage the piston rod thread. Do not use an air tool.

9. Apply an antirust penetrating oil lubricant to the piston rod thread and tighten the lower piston rod nut so that the exposed thread of the piston rod is 15.7—17.7 mm {0.62—0.69 in}.

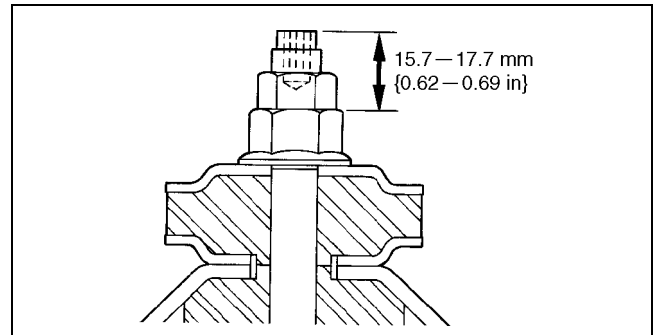


Z5U0213W101

10. Tighten the upper nut to the specified torque.

### Tightening torque

16—23 N·m {1.6—2.4 kgf·m, 12—17 ft·lbf}



Z5U0213W102

## FRONT SUSPENSION

### Front Shock Absorber and Coil Spring Installation Note

1. Install the front shock absorber and coil spring so that the ABS wheel-speed sensor bracket of the shock absorber faces the rear of the vehicle.

### FRONT SHOCK ABSORBER INSPECTION

A5U021334700W01

1. Inspect the following and replace as necessary.
  - Inspect for damage and oil leakage.
  - Inspect the rubber bushing for deterioration and wear.
  - Compress and extend the shock piston at least 3 times. Verify that the operational force does not change and that there is no unusual noise.
    - Compress the shock absorber piston and release it.
    - Verify that the piston extends fully at a normal speed.

### FRONT SHOCK ABSORBER DISPOSAL

A5U021334700W02

#### Showa Shock Absorber

1. Clamp a shock absorber flat or with the piston downwards.
2. Drill a **2—3 mm {0.08—0.11 in}** hole at a point **20—30 mm {0.79—1.18 in}** from the bottom of the tube, so that the gas can escape.

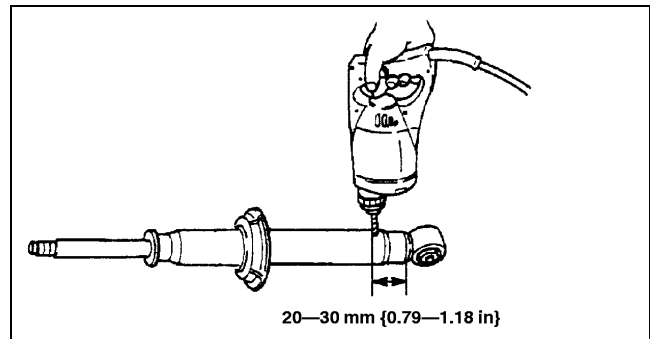
#### Warning

- **Whenever drilling into a shock absorber, wear protective eye wear. The gas in the shock absorber is pressurized, and could spray metal chips into the eyes and face when drilling.**

3. Turn the hole downwards.
4. The oil can be collected by moving the piston rod several times up and down and cutting the tube at the end.
5. Dispose of the waste oil according to local waste disposal laws.

#### Note

- Shock absorber gas is nitrogen gas.
- Shock absorber oil is mineral oil.



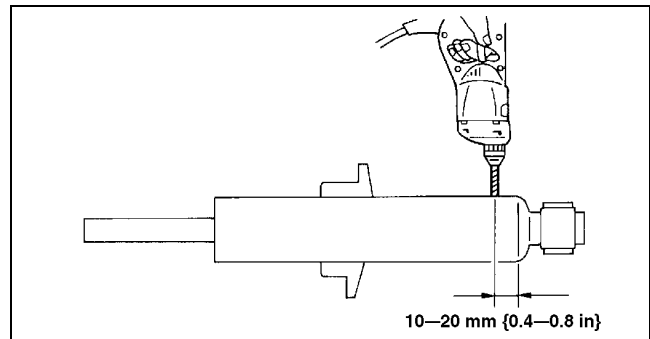
X5U213WC0

#### Bilstein Shock Absorber

#### Warning

- **Whenever drilling into a shock absorber, wear protective eye wear. The gas in the shock absorber is pressurized, and could spray metal chips into the eyes and face when drilling.**

1. Clamp a shock absorber on a flat surface or with the piston pointing downwards.
2. Drill a **2—3 mm {0.08—0.12 in}** hole at a point **10—20 mm {0.4—0.8 in}** shown in the figure, so that the gas can escape.



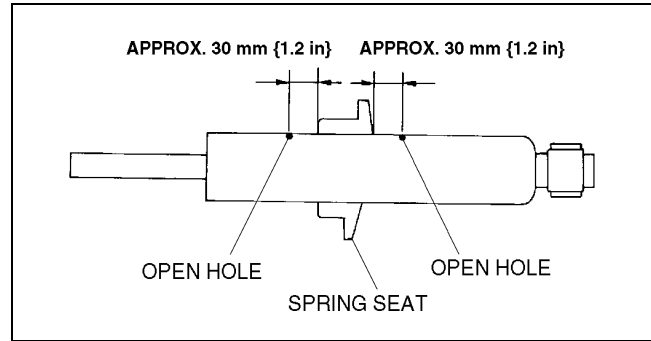
Z5U0213W139

## FRONT SUSPENSION

- Drill two **2—3 mm {0.08—0.12 in}** holes at points as shown in the figure, so that the oil can escape.
- Turn the hole downwards.
- The oil can be collected by moving the piston rod several times up and down and drain the oil through the hole.
- Dispose of waste oil according to the waste disposal law.

### Note

- Shock absorber gas is nitrogen gas.
- Shock absorber oil is mineral oil.



Z5U0213W140

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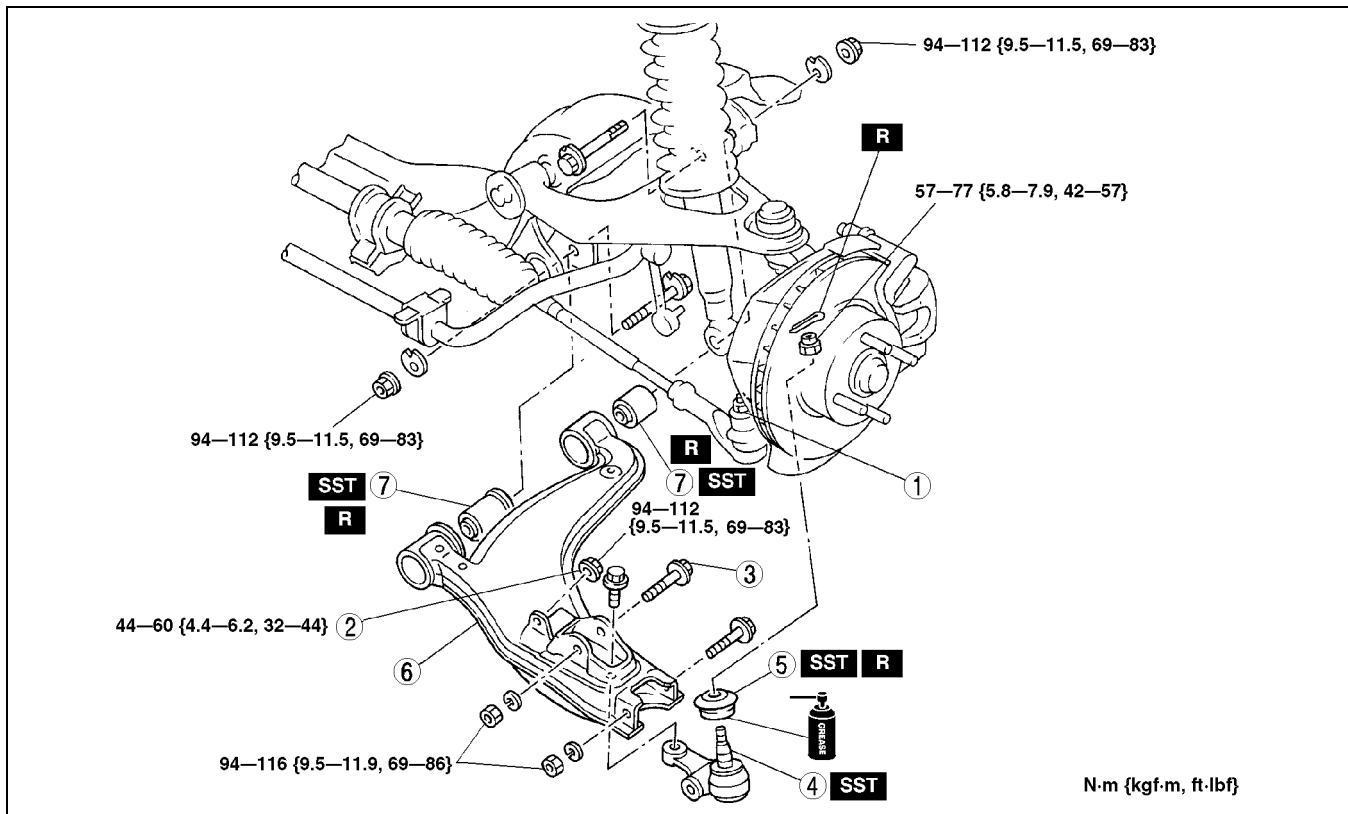
## FRONT LOWER ARM REMOVAL/INSTALLATION

A5U021334300W01

### 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.
- Inspect the front wheel alignment.
  - If not as specified, adjust the front wheel alignment. (See 02-11-1 FRONT WHEEL ALIGNMENT.)



Z5U0213W120

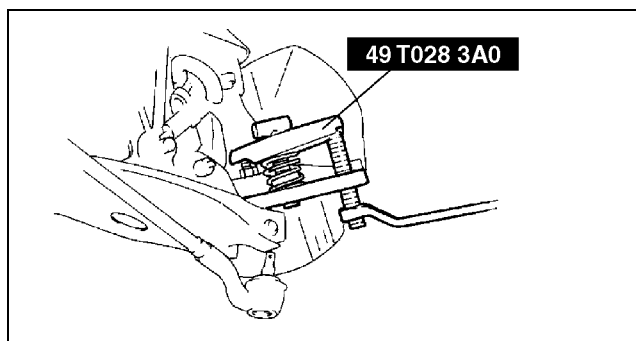
1	Tie-rod end ball joint (See 06-11-6 Tie-rod End Ball Joint Removal Note)
2	Stabilizer control link nut
3	Shock absorber bolt
4	Lower arm ball joint (See 02-13-8 Lower Arm Ball Joint Removal Note)

5	Dust boot (See 02-13-8 Dust Boot Removal Note) (See 02-13-9 Dust Boot Installation Note)
6	Lower arm
7	Lower arm bushing (front and rear) (See 02-13-8 Lower Arm Bushing (Front and Rear) Removal Note) (See 02-13-9 Lower Arm Bushing (Front and Rear) Installation Note)

## FRONT SUSPENSION

### Lower Arm Ball Joint Removal Note

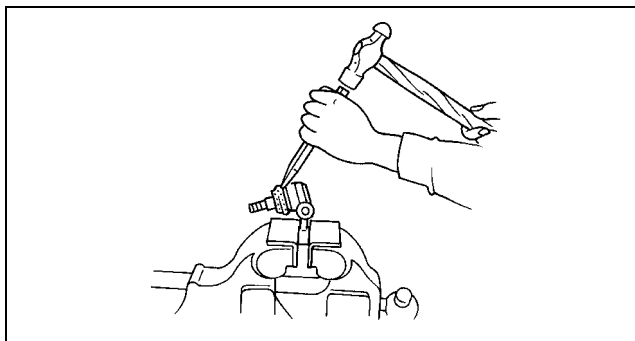
1. Separate the ball joint from the knuckle using the **SST**.



Z5U0213W131

### Dust Boot Removal Note

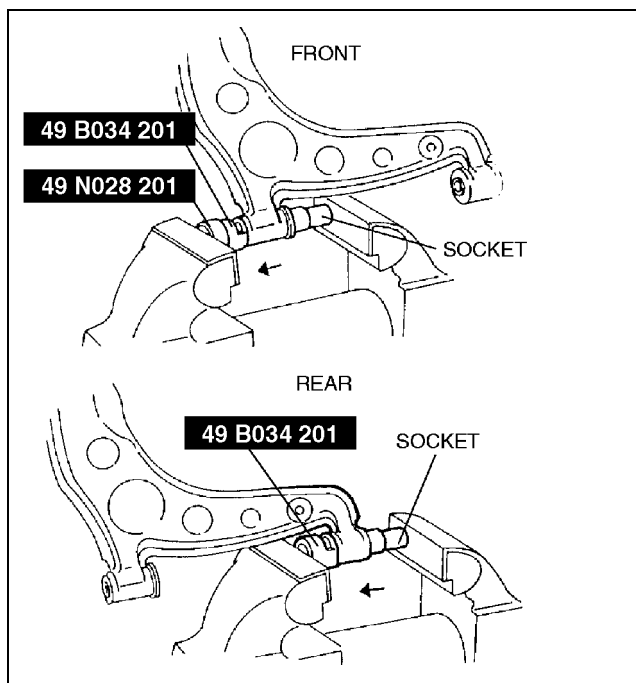
1. Remove the dust boot using a chisel, being careful not to damage the ball joint and the arm.



Z5U0213W103

### Lower Arm Bushing (Front and Rear) Removal Note

1. Press the lower arm bushing out using the **SSTs** and a socket as shown.



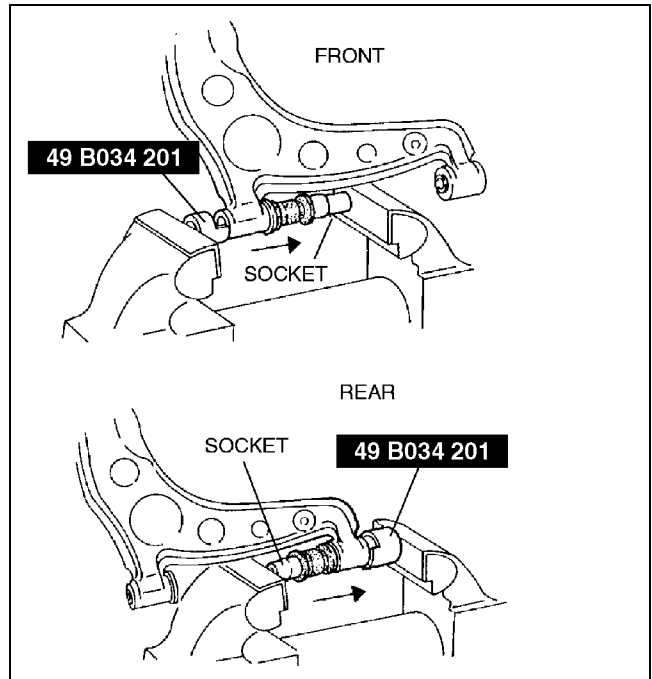
Z5U0213W132



## FRONT SUSPENSION

### Lower Arm Bushing (Front and Rear) Installation Note

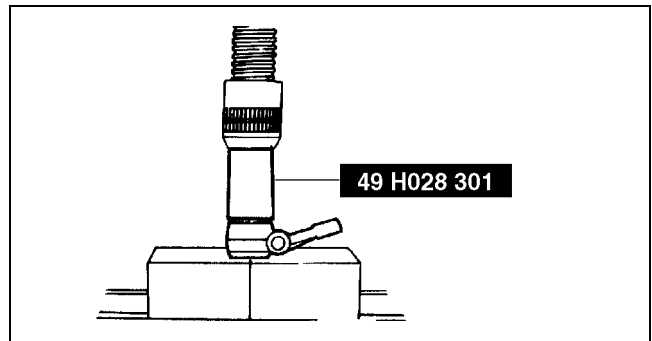
1. Apply soapy water to the lower arm bushing.
2. Press the bushing in using the **SST** and a socket in the direction of the arrow.



Z5U0213W133

### Dust Boot Installation Note

1. Wipe the grease off the ball joint.
2. Fill the inside of the new dust boot with grease.
3. Press the dust boot onto the ball joint using the **SST**.
4. Wipe away the excess grease.



Z5U0213W134

### FRONT LOWER ARM INSPECTION

1. Shake the ball joint stud 5 times.
2. Connect the SST to the ball stud, and measure the rotation torque using a pull scale.
  - Replace if it is not within the specification.

#### Rotation torque

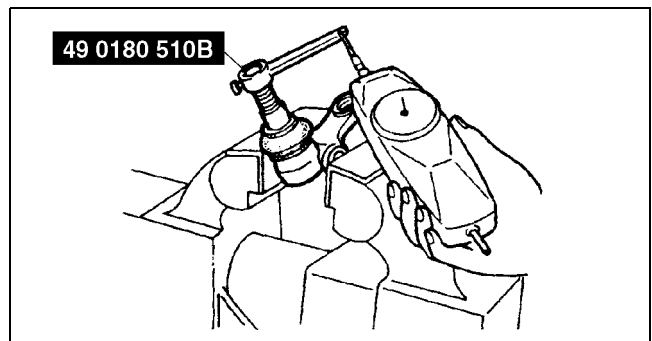
0.4—1.9 N·m

{3.5—19.5 kgf·cm, 3.1—16.9 in·lbf}

#### Pull scale reading

3.5—19.1 N

{0.35—1.95 kgf, 0.78—4.29 lbf}



Z5U0213W135

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## FRONT SUSPENSION

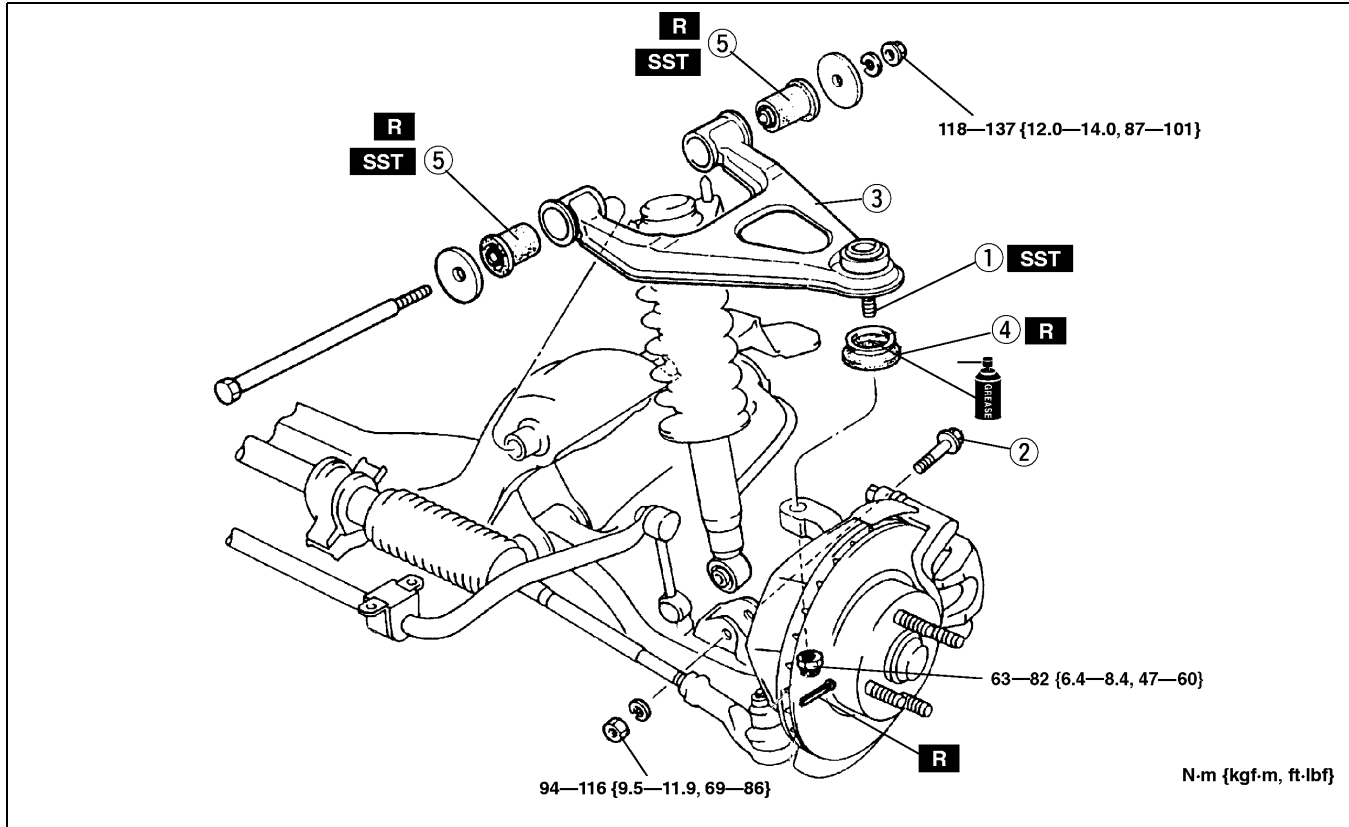
### FRONT UPPER ARM REMOVAL/INSTALLATION

A5U021334200W01

#### 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.
- inspect the front wheel alignment.
  - If not as specified, adjust the front wheel alignment. (See 02-11-1 FRONT WHEEL ALIGNMENT.)



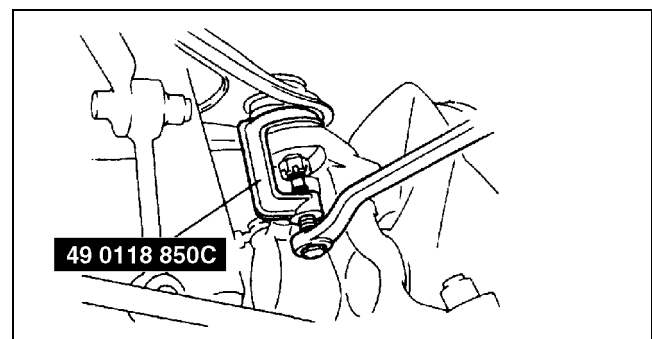
Z5U0213W121

1	Upper arm ball joint (See 02-13-10 Upper Arm Ball Joint Removal Note)
2	Shock absorber bolt
3	Upper arm

4	Dust boot (See 02-13-11 Dust Boot Removal Note) (See 02-13-11 Dust Boot Installation Note)
5	Upper arm bushing (front and rear) (See 02-13-11 Upper Arm Bushing (Front and Rear) Removal Note) (See 02-13-11 Upper Arm Bushing (Front and Rear) Installation Note)

#### Upper Arm Ball Joint Removal Note

- Separate the upper arm ball joint from the knuckle using the SST.

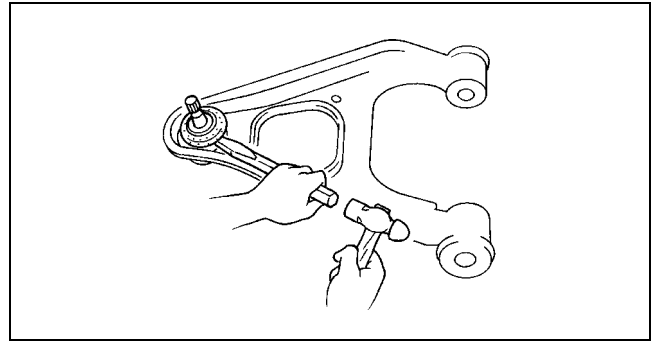


Z5U0213W136

## FRONT SUSPENSION

### Dust Boot Removal Note

1. Remove the dust boot using a chisel, being careful not to damage the ball joint and the arm.

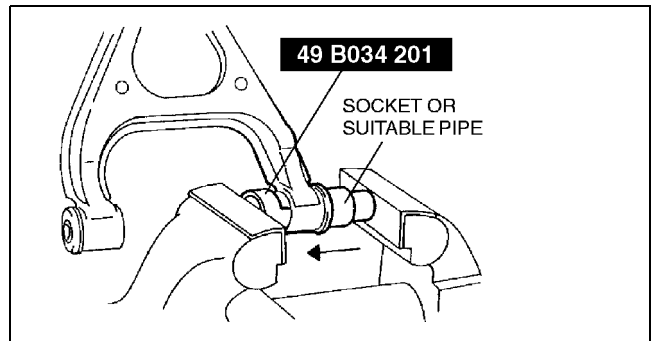


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02-13

### Upper Arm Bushing (Front and Rear) Removal Note

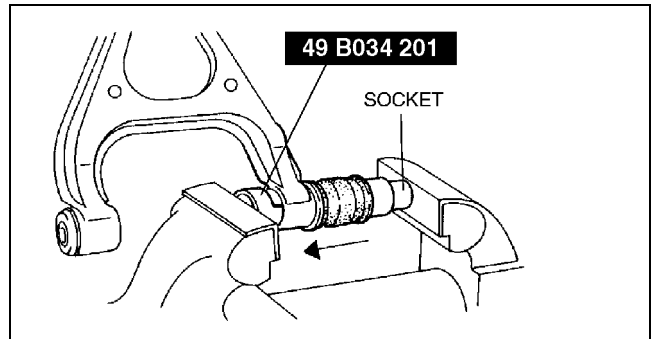
1. Press the upper arm bushing out using the **SST** and a socket as shown.



Z5U0213W137

### Upper Arm Bushing (Front and Rear) Installation Note

1. Apply soapy water to the upper arm bushing.
2. Press the bushing in using the **SST** and a socket in the direction of the arrow.



Z5U0213W138

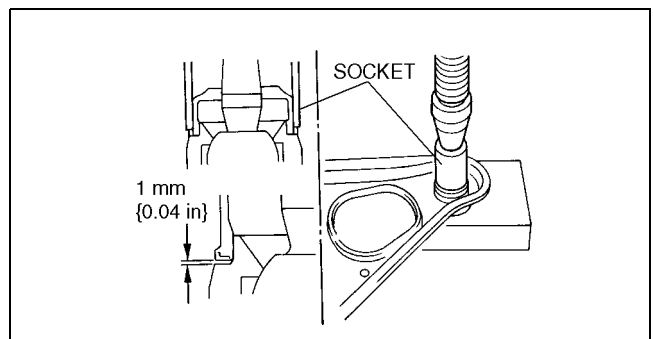
### Dust Boot Installation Note

1. Fill the inside of the new dust boot with grease.
2. Press the dust boot on using a **30 mm {1.18 in}** socket until the dust boot contacts the seat.

#### Caution

- Install the dust boot squarely and do not press excessively. The inner metal ring will be deformed if not done correctly.

3. Verify that the clearance between the boot and the seat is less than **1 mm {0.04 in}**.



Z5U0213W105

## FRONT SUSPENSION

### FRONT UPPER ARM INSPECTION

A5U021334200W02

1. Shake the ball joint stud 5 times.
2. Connect the **SST** to the ball stud, and measure the rotation torque using a pull scale.
  - Replace if it is not within the specification.

#### Rotation torque

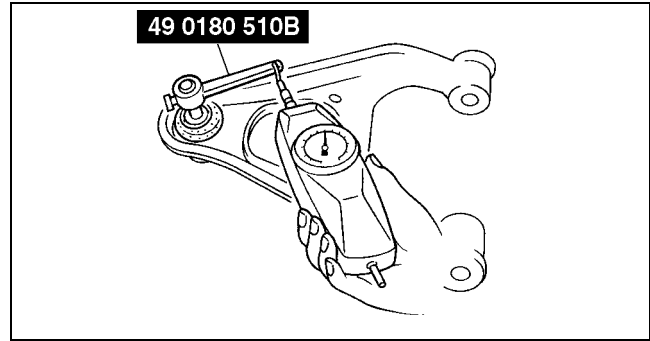
0.3—2.2 N·m

{2.8—23.4 kgf·cm, 2.5—20.3 in·lbf}

#### Pull scale reading

3.0—22.5 N

{0.3—2.3 kgf, 0.7—5.0 lbf}



Z5U0213W106

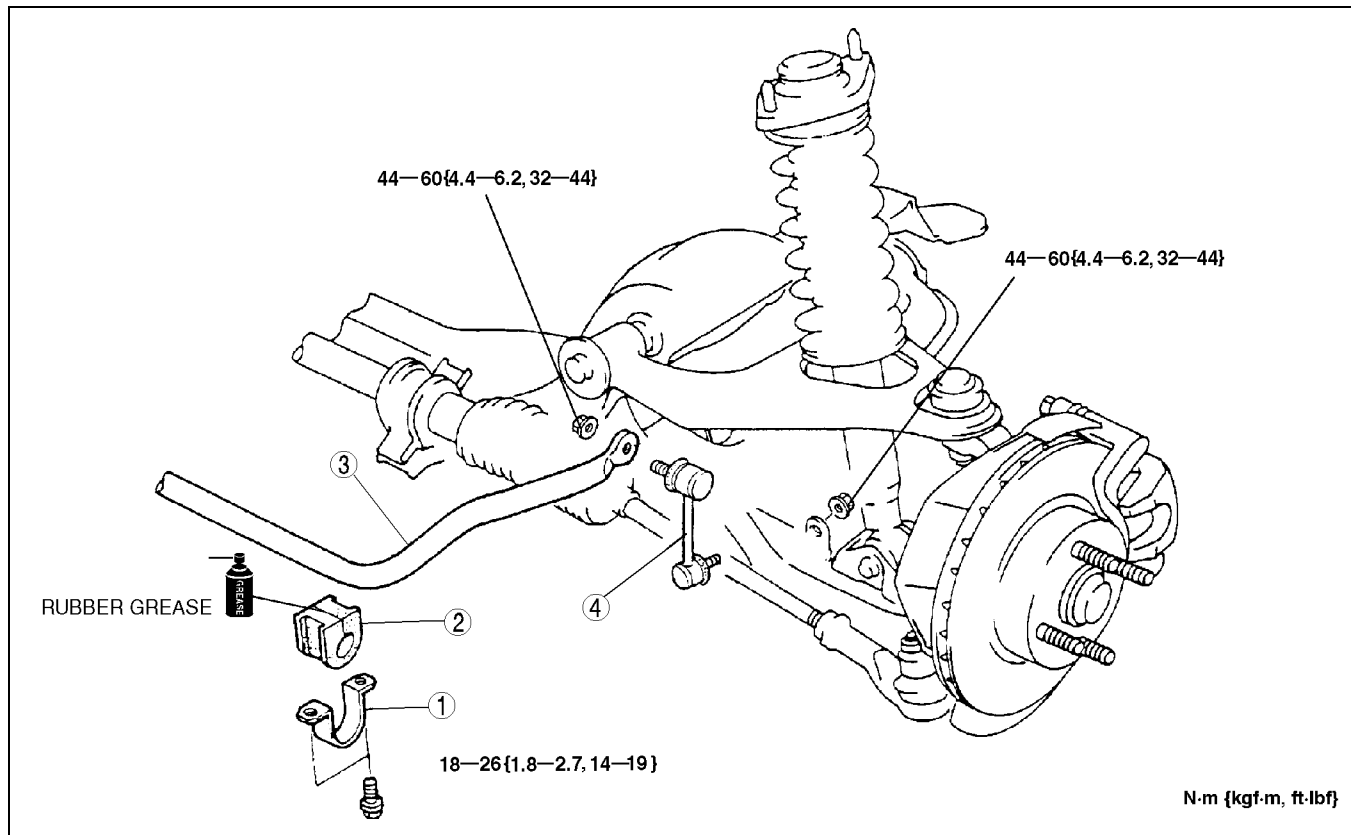
### FRONT STABILIZER REMOVAL/INSTALLATION

A5U021334100W01

#### 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. Remove in the order indicated in the table.
2. Install in the reverse order of removal.



N·m {kgf·m, ft·lbf}

A5U0213W001

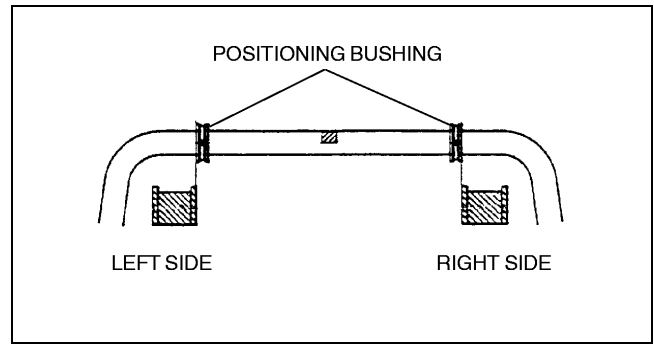
1	Stabilizer bracket
2	Stabilizer bushing (See 02-13-13 Stabilizer Bushing Installation Note)

3	Stabilizer bar
4	Stabilizer control link

## FRONT SUSPENSION

### Stabilizer Bushing Installation Note

1. Align the bushing with the positioning bushing on the stabilizer.



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A5U021334150W01

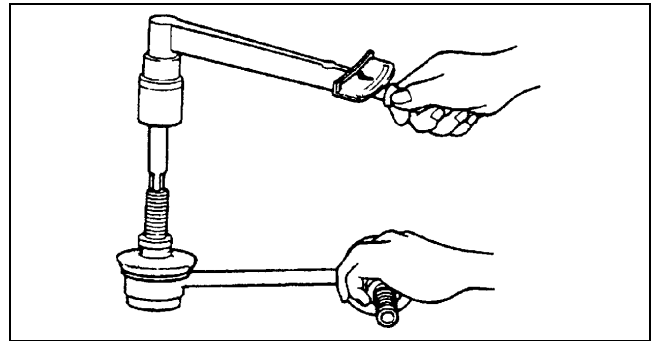
### STABILIZER CONTROL LINK INSPECTION

1. Remove the stabilizer control link from the vehicle.
2. Inspect for bending and damage.
3. Measure the ball joint starting torque.
  - (1) Rock the ball joint stud side to side 10 times.
  - (2) Rotate the ball joint stud 10 times.
  - (3) Measure the starting torque using a suitable Allen socket and a torque wrench.
    - Replace if it is not within the specification.

#### Starting torque

0.2—2.7 N·m

{1.4—27 kgf·cm, 1.3—23.4 in·lbf}



X5U213WB0

### FRONT CROSSMEMBER REMOVAL/INSTALLATION

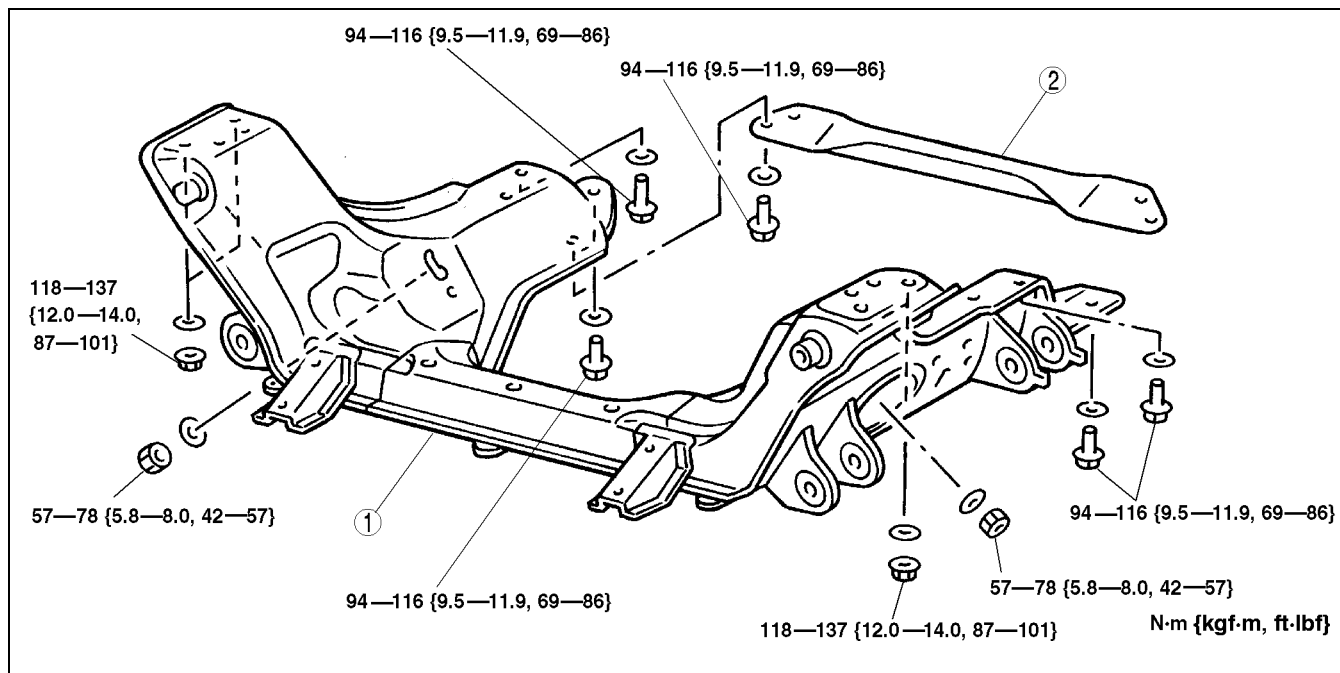
A5U021334800W01

#### 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. Support the engine with a hoist or baby crane.
2. Remove the steering gear and linkage. (See 06-11-6 STEERING GEAR AND LINKAGE REMOVAL/INSTALLATION.)
3. Remove the steering knuckles. (See 03-11-2 WHEEL HUB, STEERING KNUCKLE REMOVAL/INSTALLATION.)
4. Remove the front stabilizer. (See 02-13-12 FRONT STABILIZER REMOVAL/INSTALLATION.)
5. Remove the front lower arms. (See 02-13-7 FRONT LOWER ARM REMOVAL/INSTALLATION.)
6. Remove the front upper arms. (See 02-13-10 FRONT UPPER ARM REMOVAL/INSTALLATION.)
7. Remove in the order indicated in the table.
8. Install in the reverse order of removal.
9. Inspect the front wheel alignment.
  - If not as specified, adjust the front wheel alignment. (See 02-11-1 FRONT WHEEL ALIGNMENT.)

## FRONT SUSPENSION



Z5U0213W107

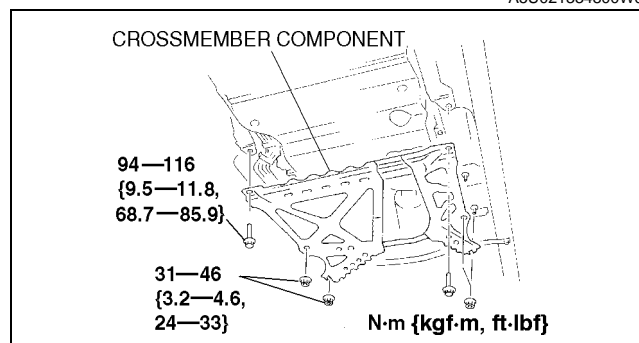
1	Front crossmember
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2	Front crossbar
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### CROSSMEMBER COMPONENT REMOVAL/INSTALLATION

A5U021334800W02

1. Remove the crossmember component.
2. Install in the reverse order of removal.



Z5U0213W124