

2002-04 REAR SUSPENSION

Rear - Miata

GENERAL PROCEDURES

SUSPENSION

Precaution (Suspension)

Wheels and Tires Removal/Installation

Tighten reinstalled wheels to 89-117 N.m {9.0-12.0 kgf.m, 66-86 ft. lbf}.

Suspension Links Removal/Installation

NOTE: Unloaded - Fuel tank is full. Engine coolant and engine oil are at specified levels. Spare tire, jack, and tools are in designated position.

Tighten any part of the suspension that uses rubber bushings only after the vehicle has been lowered and unloaded.

Brake Pipe Flare Nuts Tightening

Tighten the brake pipe flare nut using the SST (49 0259 770B). Be sure to modify the brake pipe flare nut tightening torque to allow for use of a torque wrench-SST combination.

Brake Lines Disconnection/Connection

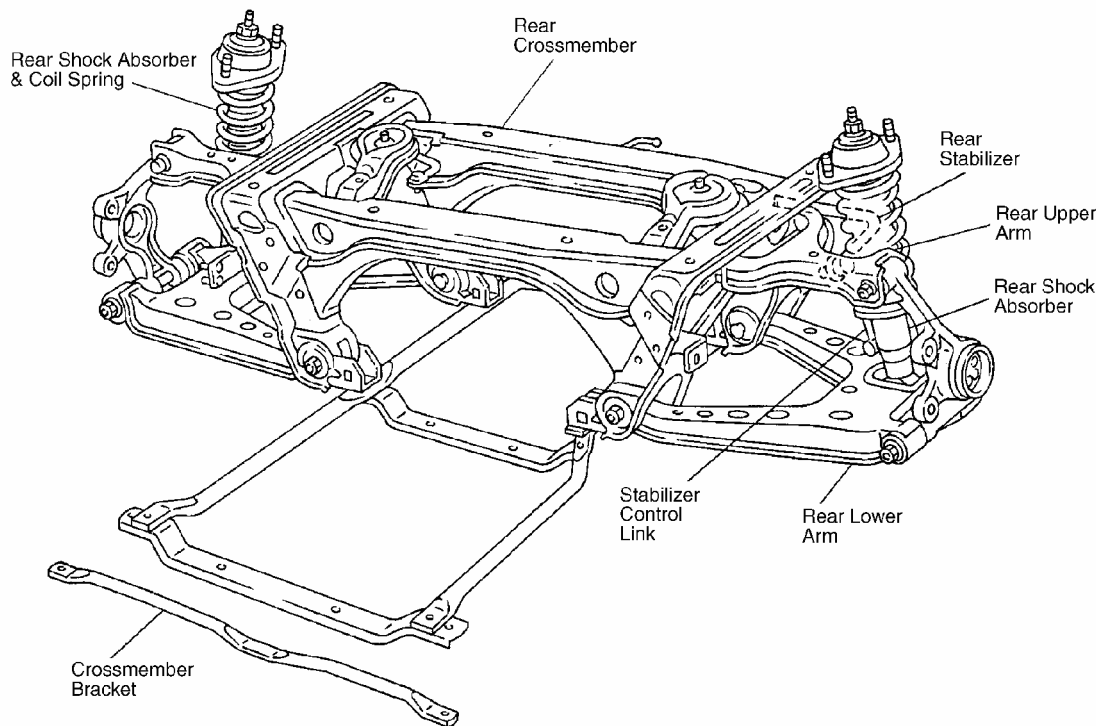
If any brake line has been disconnected anytime during the procedure, add brake fluid, bleed the brakes and inspect for leakage after the procedure has been completed. See **BLEEDING BRAKE SYSTEM.**

REAR SUSPENSION

REAR SUSPENSION LOCATION INDEX

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Fig. 1: Identifying Rear Suspension Components
Courtesy of MAZDA MOTORS CORP.

REAR SHOCK ABSORBER AND SPRING

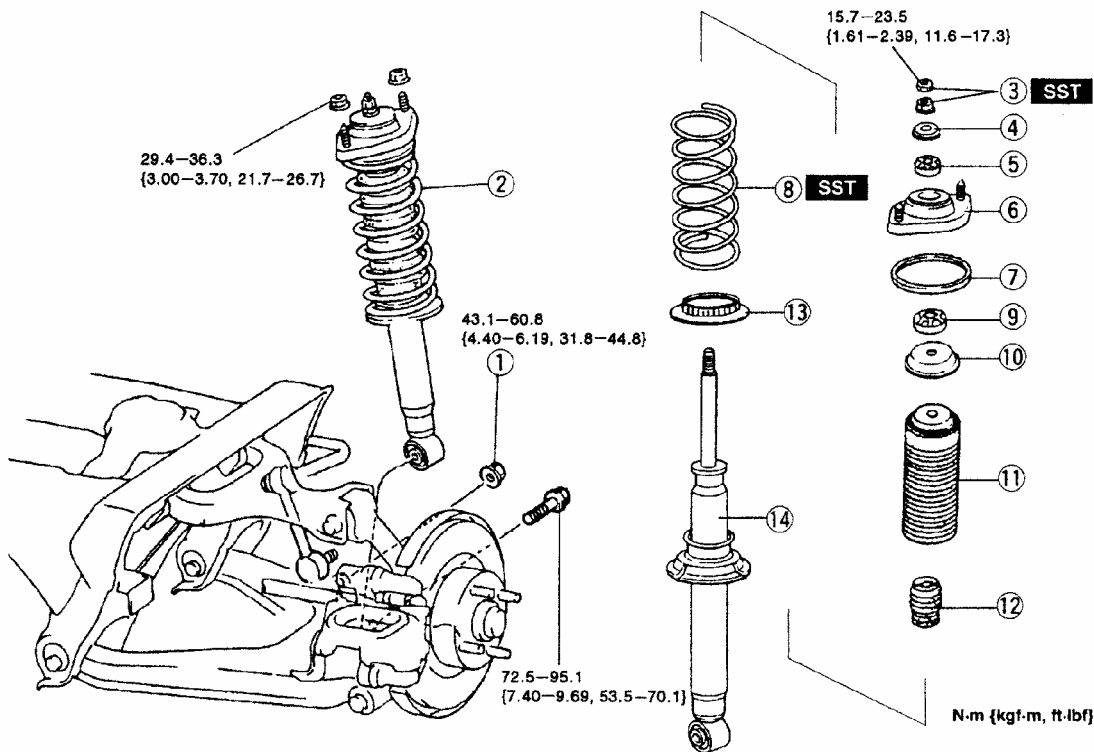
CAUTION: Performing the following procedures without first removing the ABS wheel-speed sensor may possibly cause an open circuit in the harness if it is pulled by mistake. Before performing the following procedures, remove the ABS wheel-speed sensor (axle side) and fix it to an appropriate place where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

Rear Shock Absorber And Coil Spring Removal/Installation

1. Remove in the order indicated. See **Fig. 2**.
2. Install in the reverse order of removal.
3. Inspect the rear wheel alignment. If not as specified, adjust the wheel alignment. See the following:
 - For 2002 and 2003 models, see **REAR WHEEL ALIGNMENT**.
 - For 2004 models, see **REAR WHEEL ALIGNMENT**.

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

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

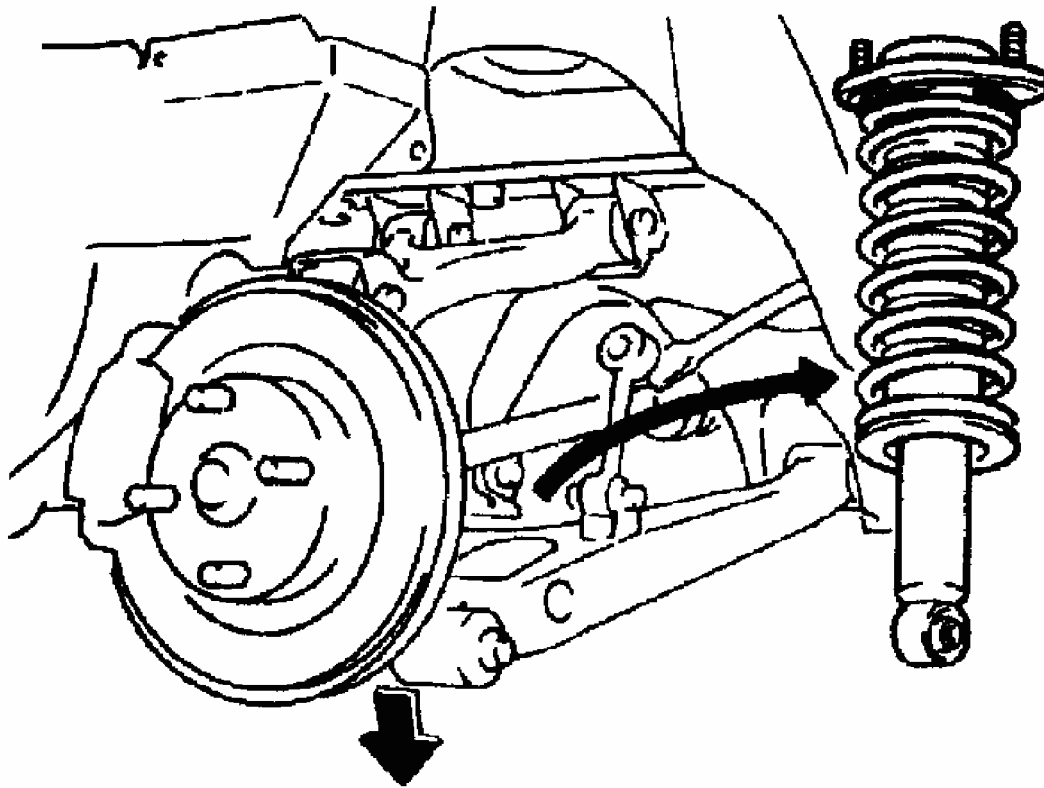
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Fig. 2: Removing/Installing Rear Shock Absorbers & Springs
 Courtesy of MAZDA MOTORS CORP.

Rear Shock Absorber and Coil Spring Removal Note

1. Loosen the upper arm and adjusting cam nuts.

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



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Fig. 3: Removing Rear Shock Absorber & Coil Spring
Courtesy of MAZDA MOTORS CORP.

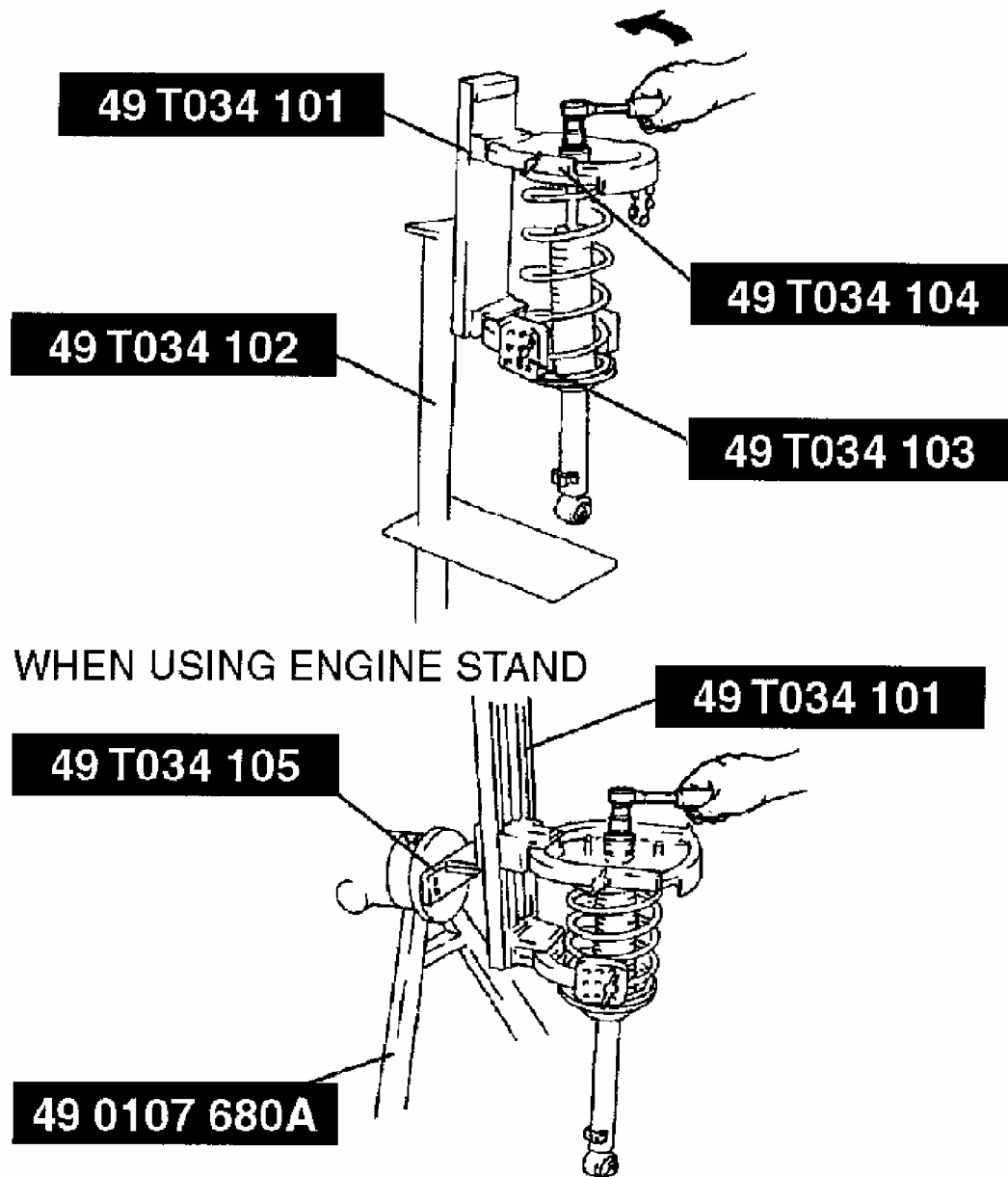
2. Lower the upper and lower arms to remove the shock absorber and spring.

Rear Shock Absorber and Coil Spring Installation Note

Install the rear shock absorber and coil spring so that the part number label (by Showa) or caution label (by Bilstein) on the shock absorber faces outside of the vehicle.

Piston Rod Nut Removal Note

1. Loosen the piston rod nut several turns, but do not remove the nut.
2. Assemble the SSTs.



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Fig. 4: Assembling Special Service Tools
 Courtesy of MAZDA MOTORS CORP.

- Secure the shock absorber in the SSTs.

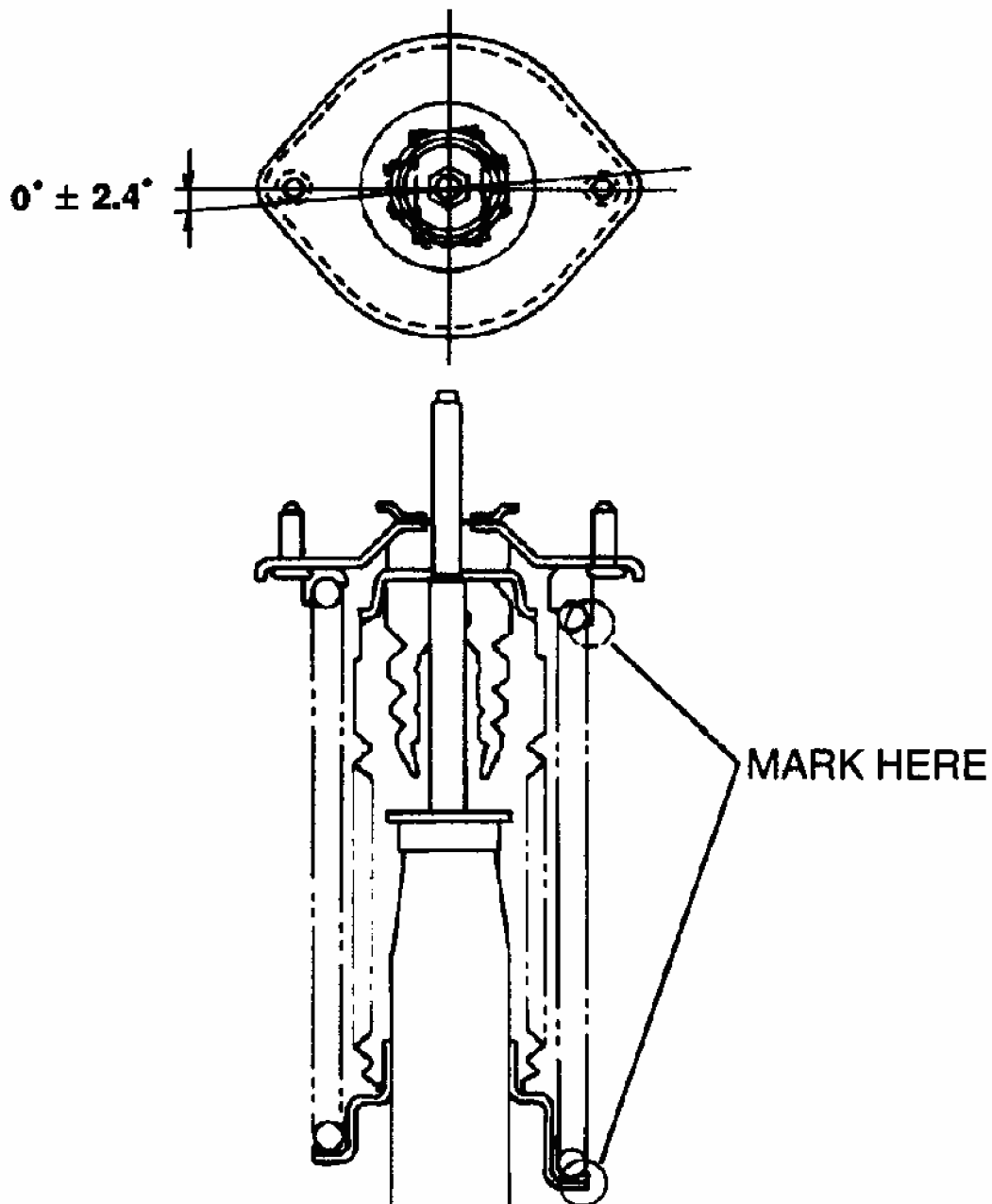
WARNING: Removing the piston rod nut is dangerous. The shock absorber and spring could fly off under tremendous pressure and cause serious injury or death. Secure the shock absorber in the SSTs before removing the coil

spring nut.

4. Compress the coil spring using the SSTs and remove the nut.

Coil Spring Installation Note

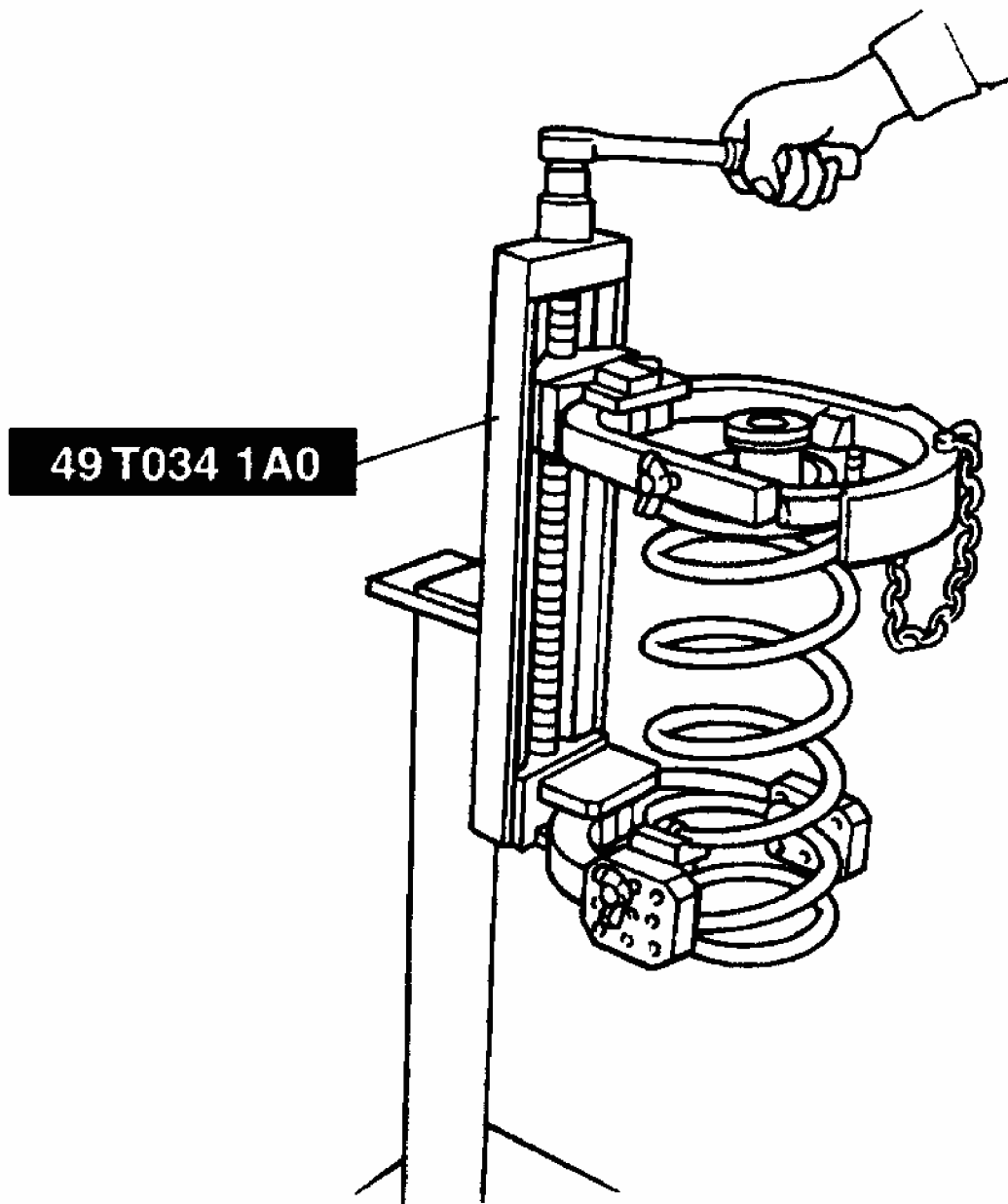
1. Temporarily install the upper spring seat, upper spring seat rubber and coil spring on the shock absorber as shown.



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Fig. 5: Installing Upper Spring Seat
Courtesy of MAZDA MOTORS CORP.

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.
4. Compress the spring using the SSTs.



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Fig. 6: Compressing Spring
Courtesy of MAZDA MOTORS CORP.

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.

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} (BP with TC) or 18.7-20.7 mm {0.74-0.81 in} (BP).

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

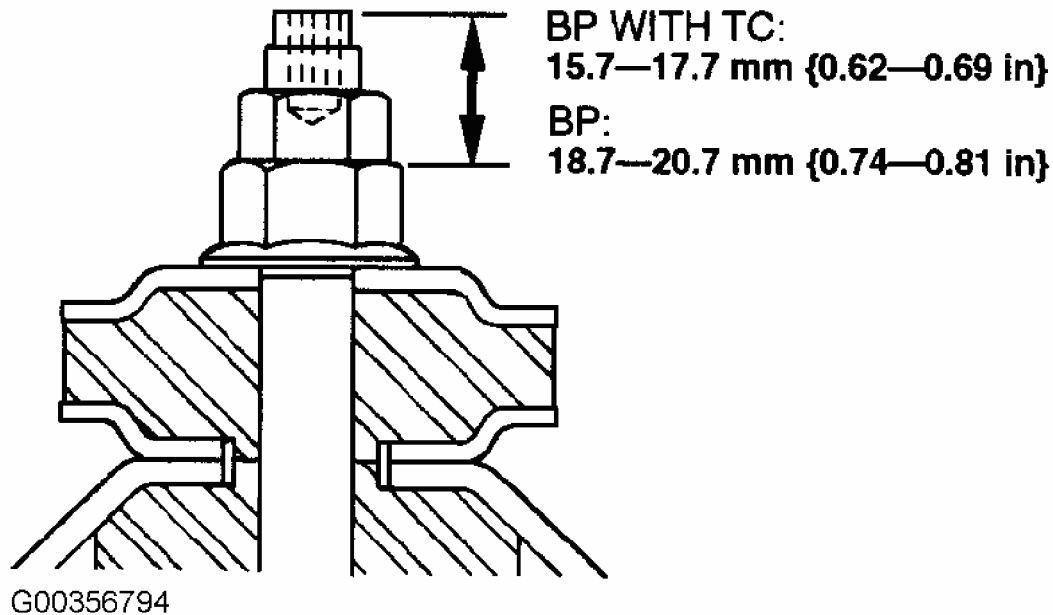
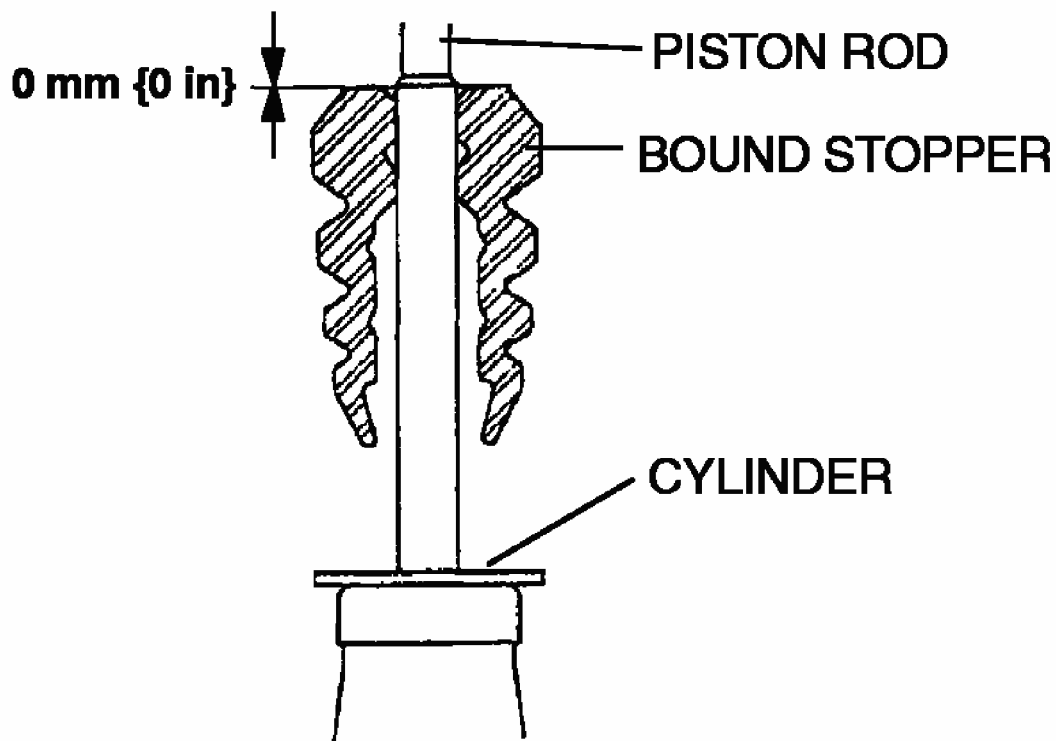


Fig. 7: Tightening Coil Spring Nut
Courtesy of MAZDA MOTORS CORP.

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}.

Bound Stopper Installation Note

1. Install the bound stopper to the piston rod as shown.



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Fig. 8: Installing Bound Stopper
 Courtesy of MAZDA MOTORS CORP.

2. Verify that the lower end of the bound stopper does not contact the cylinder.

REAR SHOCK ABSORBER

Inspection

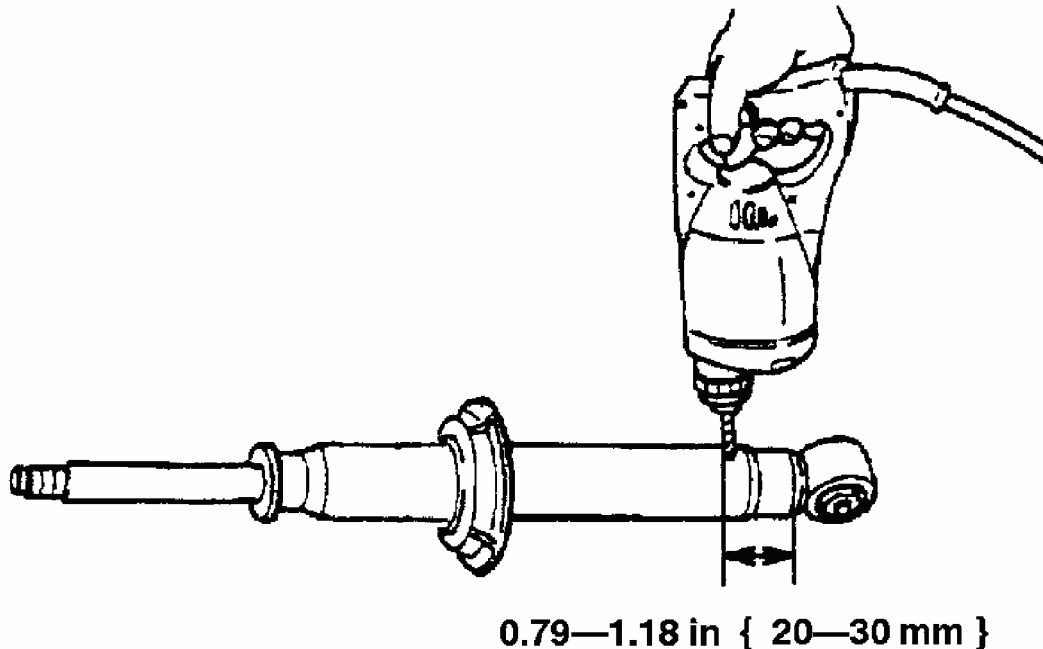
1. Inspect for damage and oil leakage.
2. Inspect the rubber bushing for deterioration and wear.
3. Compress and extend the shock piston at least 3 times. Verify that the operational force does not change and that there is no unusual noise.
 - Compress the shock absorber piston and release it.
 - Verify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

Rear Shock Absorber Disposal

Showa Shock Absorber

1. Clamp a shock absorber flat or with the piston downwards.

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.



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Fig. 9: Identifying Drill Hole Location (Showa)
Courtesy of MAZDA MOTORS CORP.

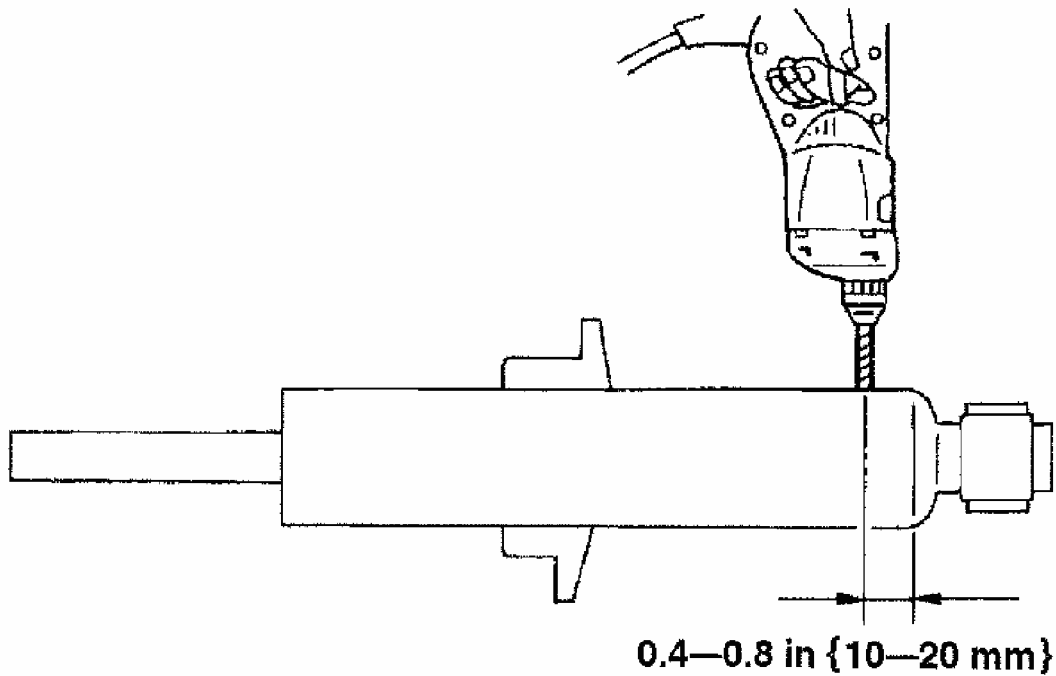
2. Drill a 2-3 mm {0.08-0.12 in} hole at a point 10-20 mm {0.4-0.8 in} shown in the figure, so that the gas can escape.
3. Turn the hole downwards.
4. The oil can be collected by moving the piston rod several times up and down and cutting the tube at the end.
5. Dispose of the waste oil according to local waste disposal laws.
 - Shock absorber gas is nitrogen gas.
 - Shock absorber oil is mineral oil.

Bilstein Shock Absorber

1. Clamp a shock absorber on a flat surface or with the piston pointing downwards.

WARNING: Whenever drilling into a shock absorber, wear

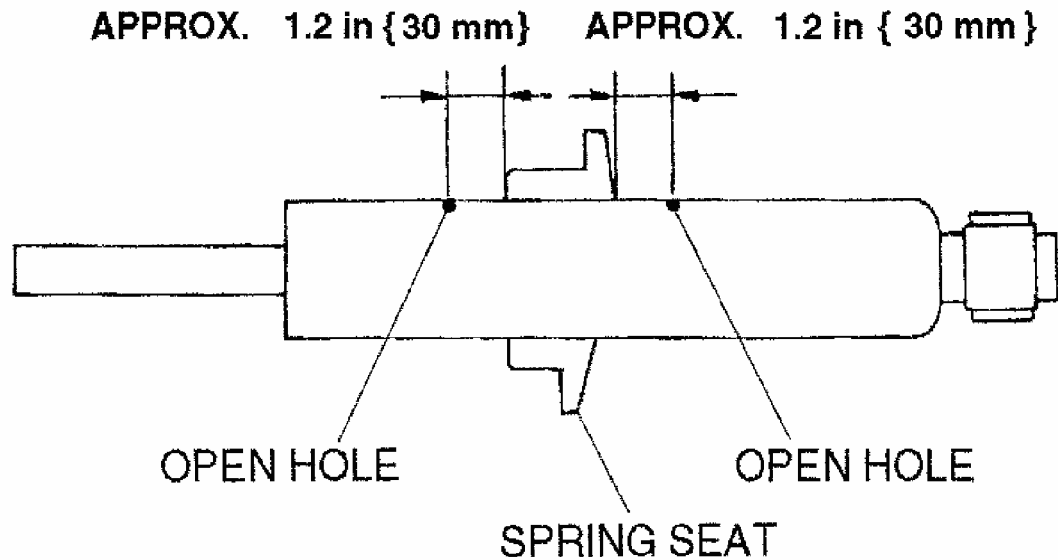
protective eye wear. The gas in the shock absorber is pressurized, and could spray metal chips into the eyes and face when drilling.



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Fig. 10: Identifying Drill Hole Location (Bilstein)
Courtesy of MAZDA MOTORS CORP.

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.
3. Drill two 2-3 mm {0.08-0.12 in} holes at points as shown in the figure, so that the oil can escape.



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Fig. 11: Locating Oil Drain Drill Hole Locations (Bilstein)
 Courtesy of MAZDA MOTORS CORP.

4. Turn the hole downwards.
5. The oil can be collected by moving the piston rod several times up and down and drain the oil through the hole.
6. Dispose of waste oil according to the waste disposal law.
 - Shock absorber gas is nitrogen gas.
 - Shock absorber oil is mineral oil.

REAR LOWER ARM

Rear Lower Arm 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.

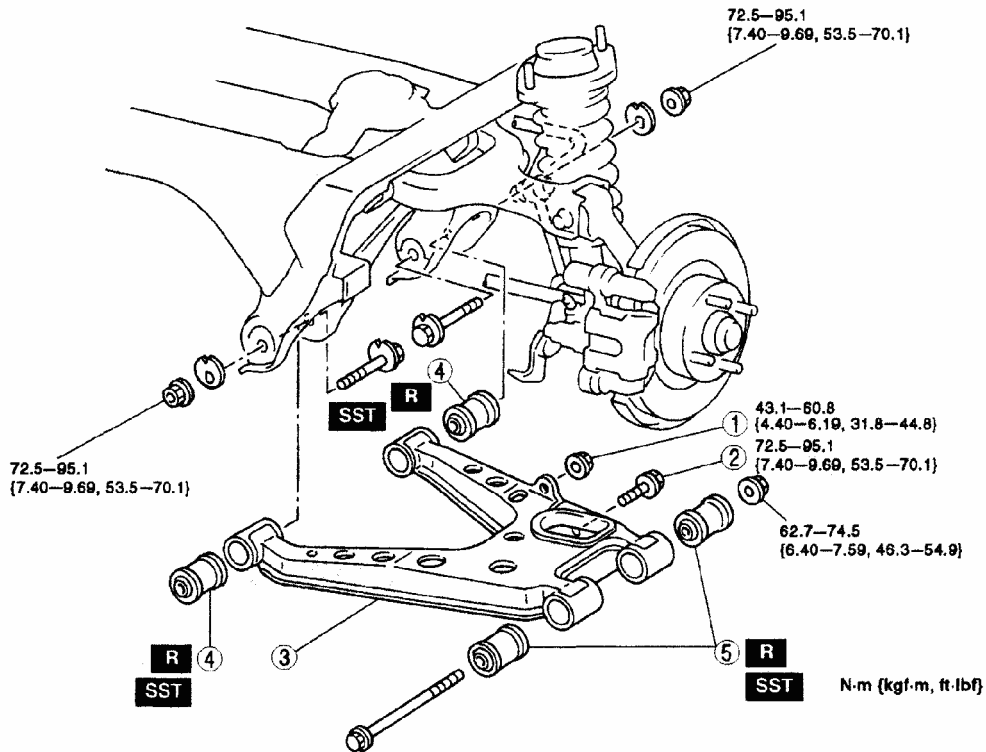
1. Remove in the order indicated. See **Fig. 12**.
2. Install in the reverse order of removal.
3. Inspect the rear wheel alignment. If not as specified, adjust as necessary. See the

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following:

- For 2002 and 2003 models, see **REAR WHEEL ALIGNMENT** .
- For 2004 models, see **REAR WHEEL ALIGNMENT** .



1	Stabilizer control link nut
2	Shock absorber bolt
3	Rear lower arm
4	Lower arm bushing (crossmember side) (See Lower Arm Bushing (Crossmember Side) Removal Note) (See Lower Arm Bushing (Crossmember Side) Installation Note)

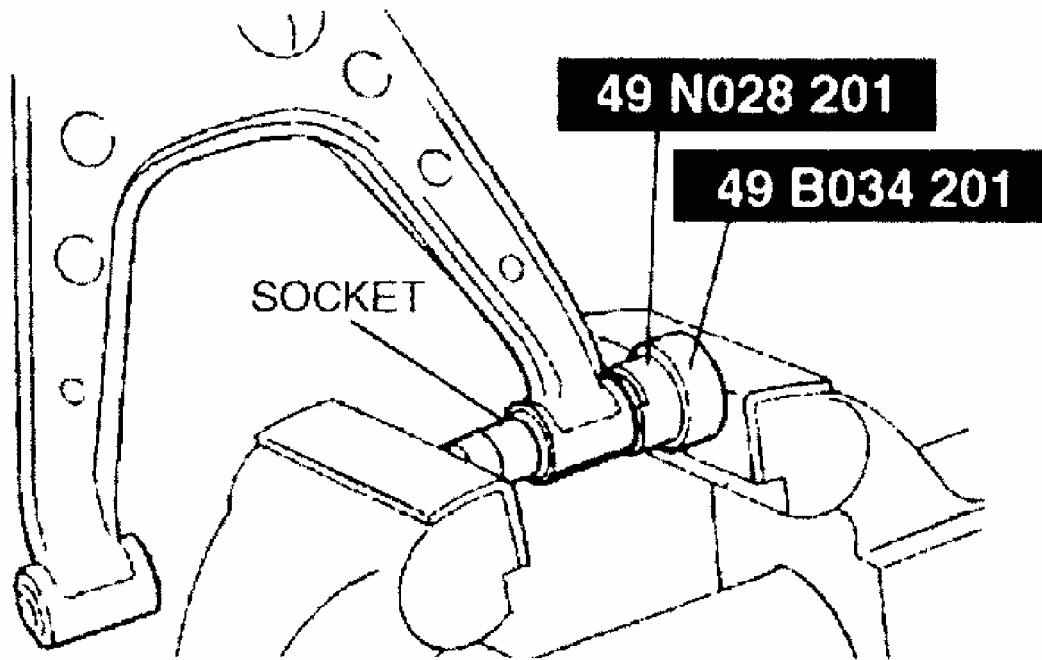
5	Lower arm bushing (knuckle side) (See Lower Arm Bushing (Knuckle Side) Removal Note) (See Lower Arm Bushing (Knuckle Side) Installation Note)
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Fig. 12: Removing/Installing Rear Lower Control Arm
 Courtesy of MAZDA MOTORS CORP.

Lower Arm Bushing (Crossmember Side) Removal Note

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



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Fig. 13: Pressing Out Lower Control Arm Bushing
Courtesy of MAZDA MOTORS CORP.

Lower Arm Bushing (Knuckle Side) Removal Note

Press the lower arm bushing out using the SST and a socket as shown.

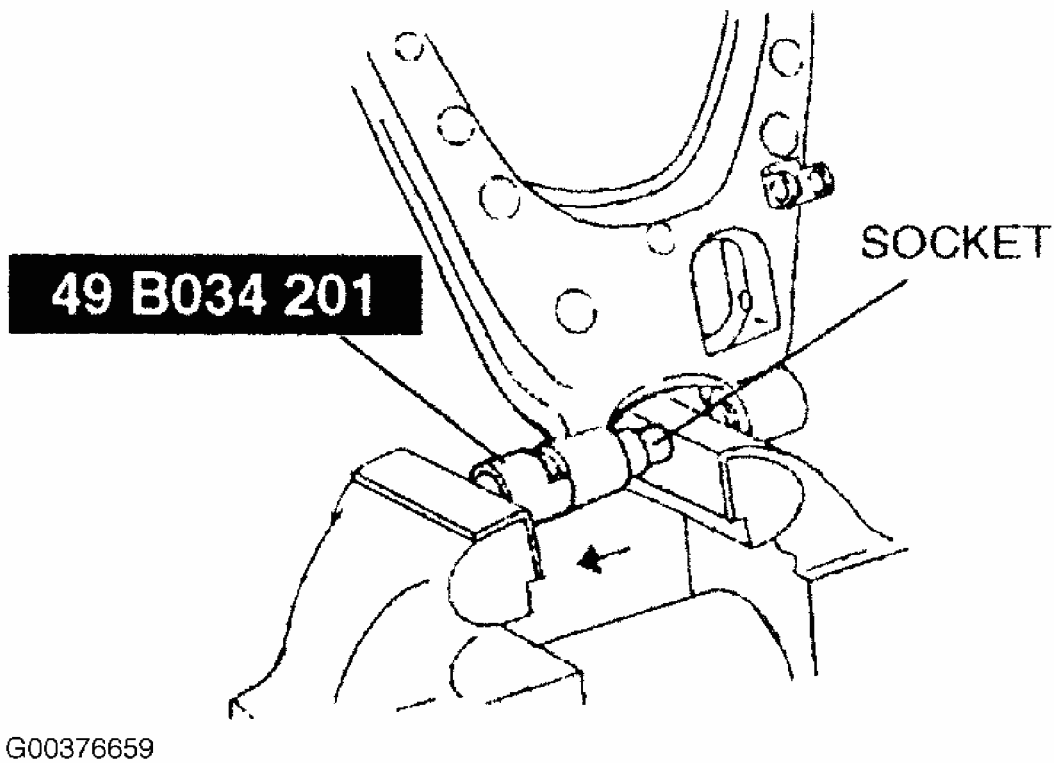


Fig. 14: Pressing Out Lower Arm Bushing (Knuckle Side)
Courtesy of MAZDA MOTORS CORP.

Lower Arm Bushing (Knuckle Side) Installation Note

1. Apply soapy water to the lower arm bushing.

CAUTION: Install the bushing with the mark to the front.

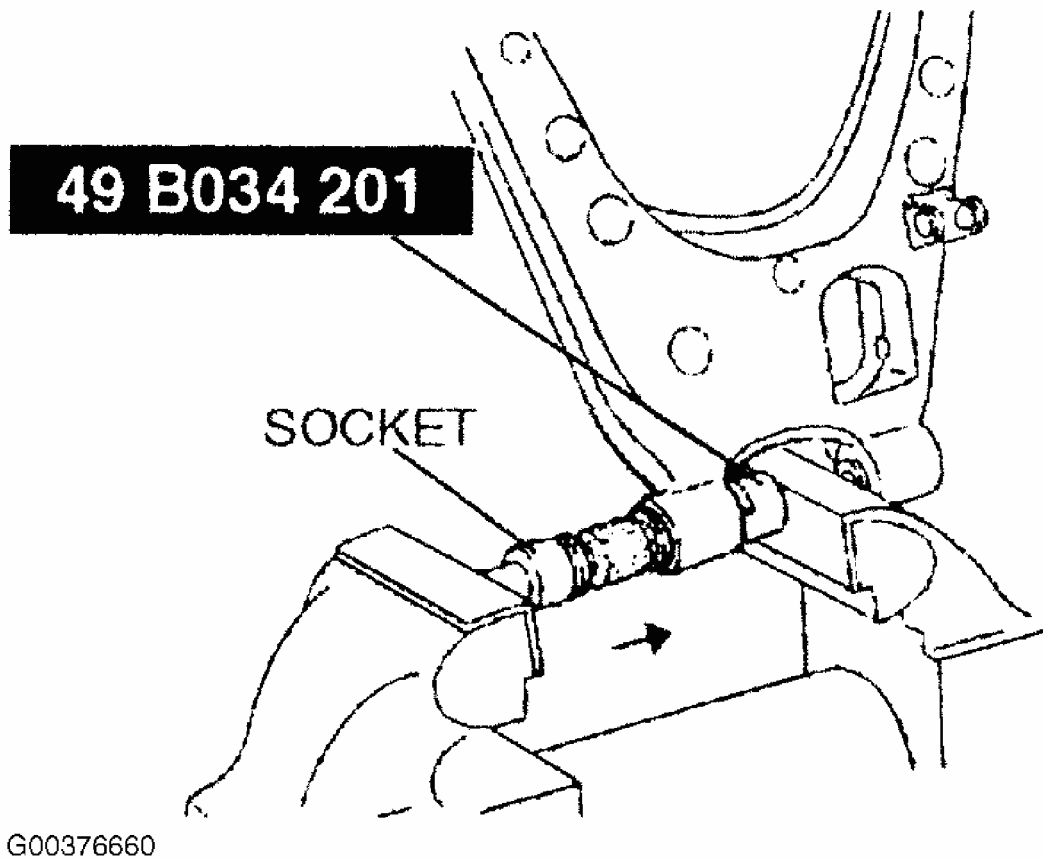


Fig. 15: Installing Lower Arm Bushing (Knuckle Side)
Courtesy of MAZDA MOTORS CORP.

2. Press the bushing in using the SST and a socket in the direction of the arrow.

Lower Arm Bushing (Crossmember Side) 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.

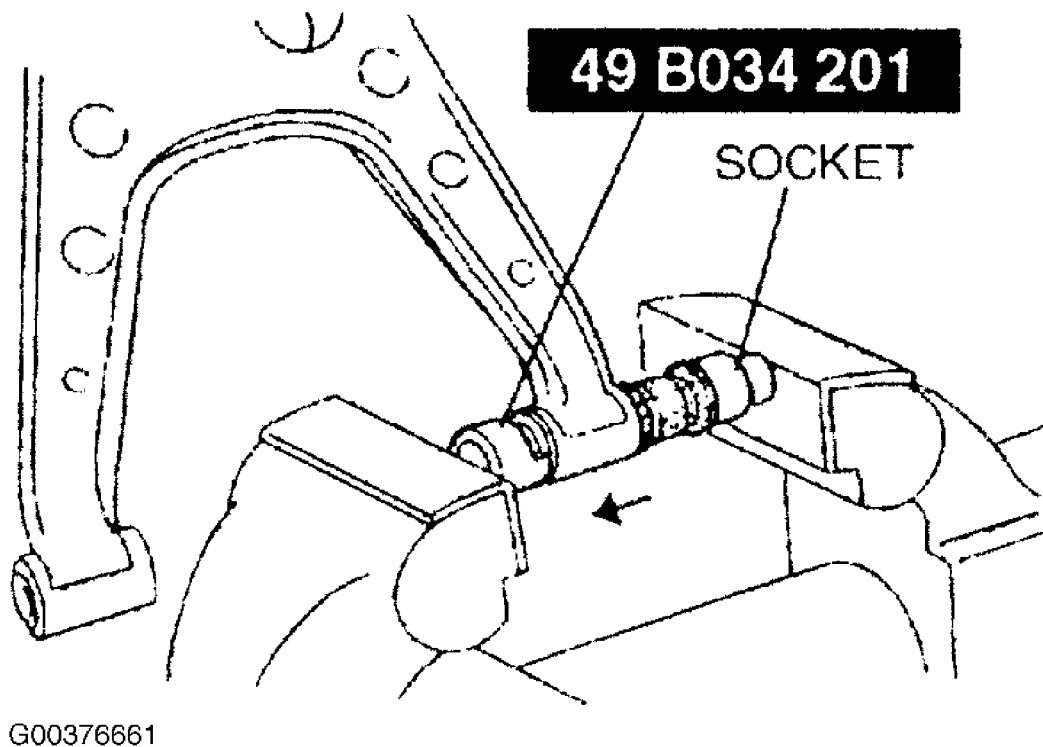


Fig. 16: Installing Lower Arm Bushing (Crossmember Side)
Courtesy of MAZDA MOTORS CORP.

REAR UPPER ARM

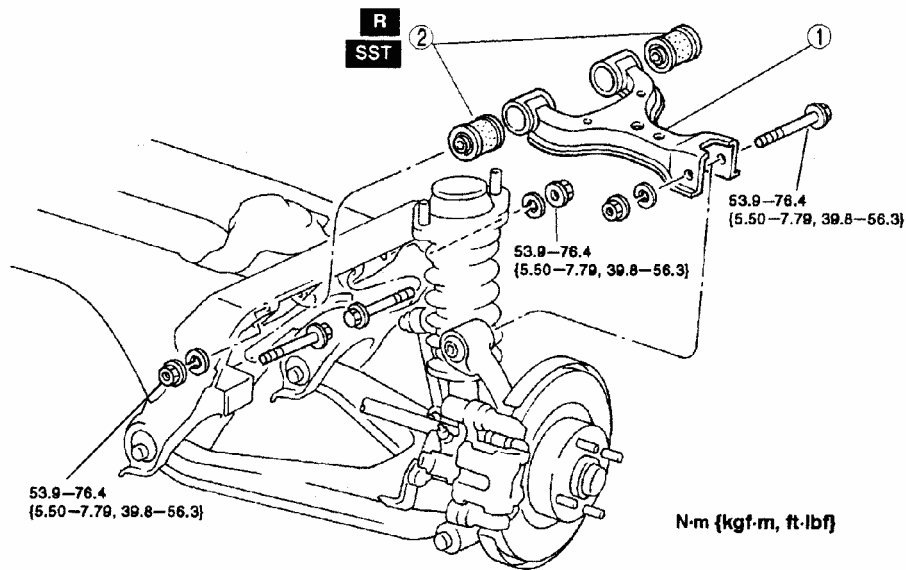
Rear Upper Arm Removal/Installation

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. Remove in the order indicated. See **Fig. 17**.
2. Install in the reverse order of removal. Inspect the rear wheel alignment. If not as specified, adjust the wheel alignment as necessary. See the following:
 - For 2002 and 2003 models, see **REAR WHEEL ALIGNMENT**.
 - For 2004 models, see **REAR WHEEL ALIGNMENT**.

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1 Rear upper arm

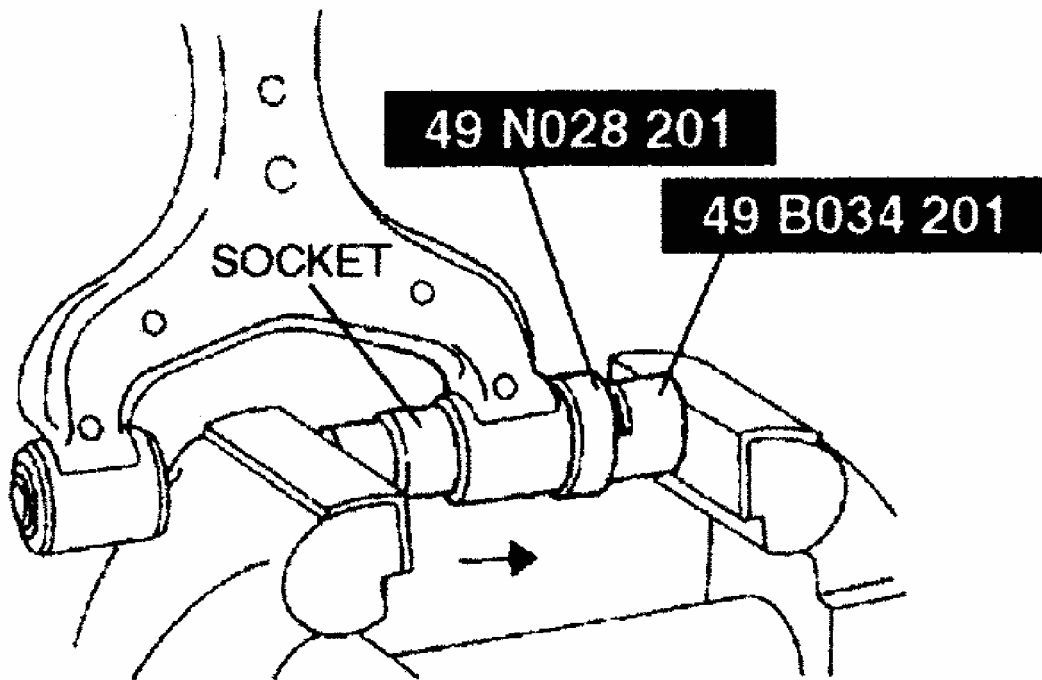
2 Upper arm bushing
(See Upper Arm Bushing Removal Note)
(See Upper Arm Bushing Installation Note)

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Fig. 17: Removing/Installing Rear Upper Arm
Courtesy of MAZDA MOTORS CORP.

Upper Arm Bushing Removal Note

Press the upper arm bushing out using the SSTs and a socket as shown.



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Fig. 18: Removing Rear Upper Arm Bushing
Courtesy of MAZDA MOTORS CORP.

Upper Arm Bushing 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.

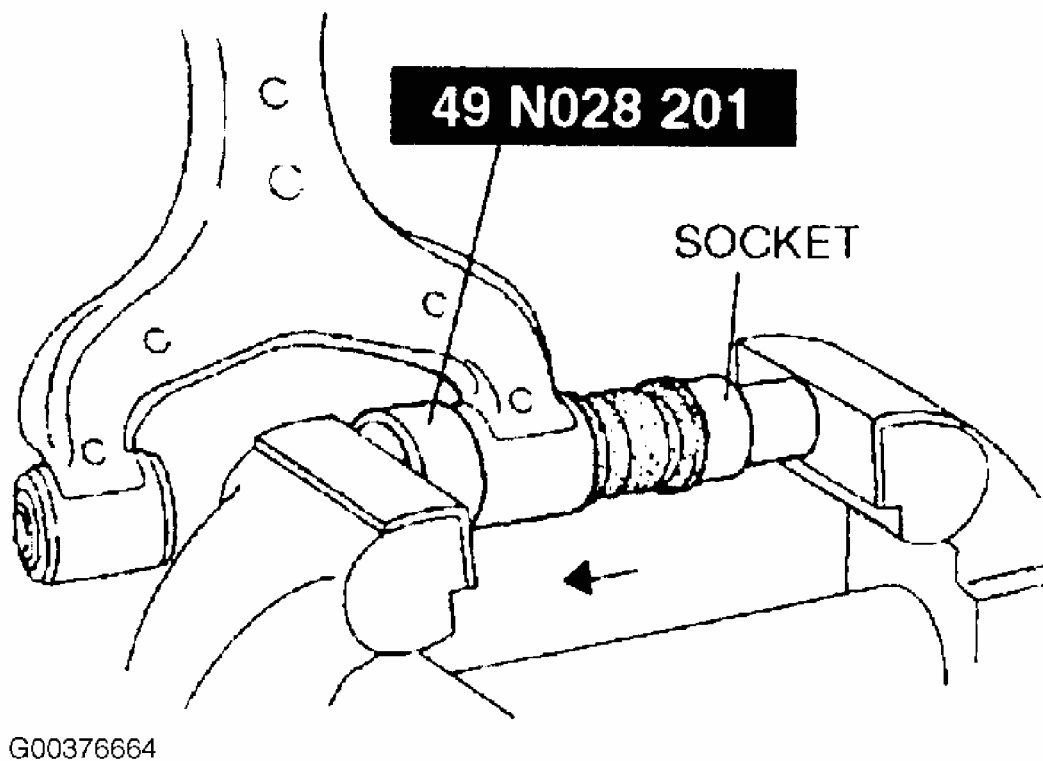


Fig. 19: Installing Rear Upper Arm Bushing
Courtesy of MAZDA MOTORS CORP.

REAR STABILIZER

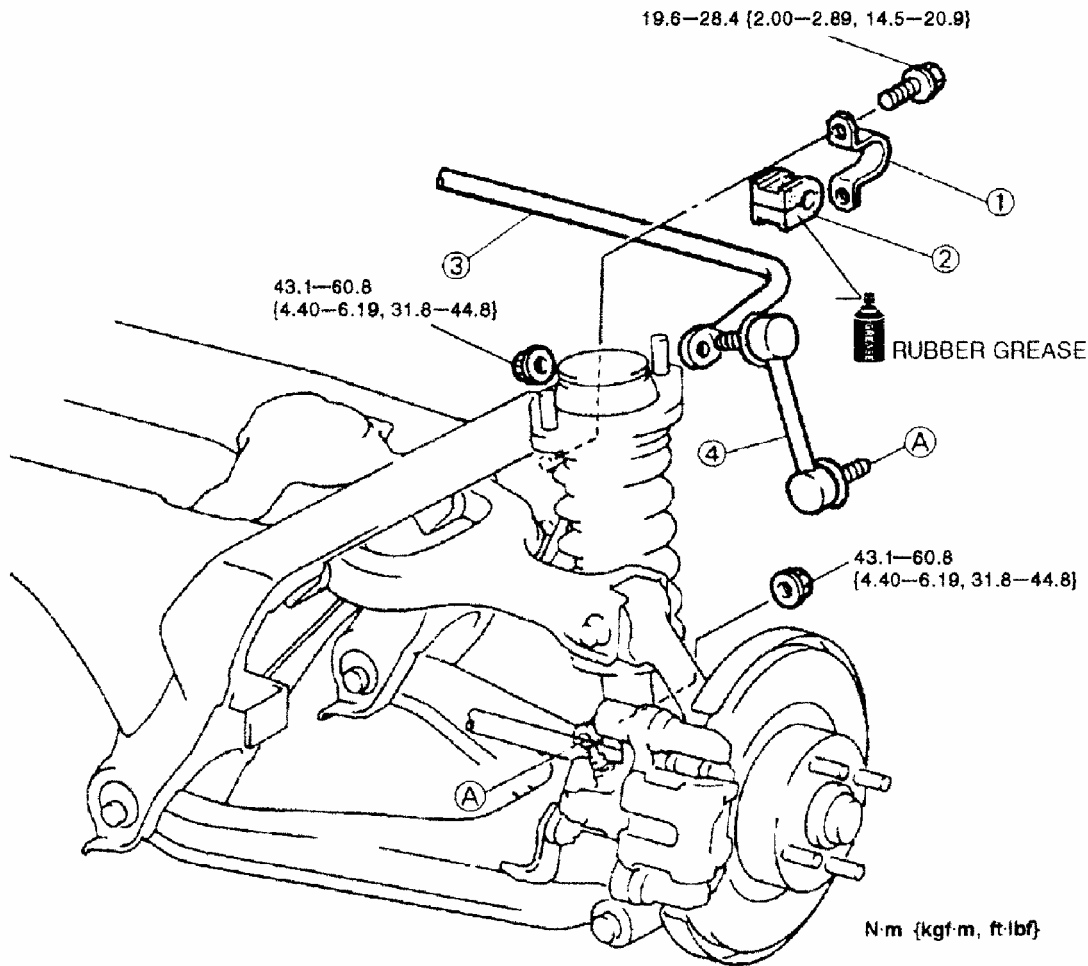
Rear Stabilizer Removal/Installation

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. Remove in the order indicated Install in the reverse order of removal. See **Fig. 20** .
2. Install in the reverse order of removal.

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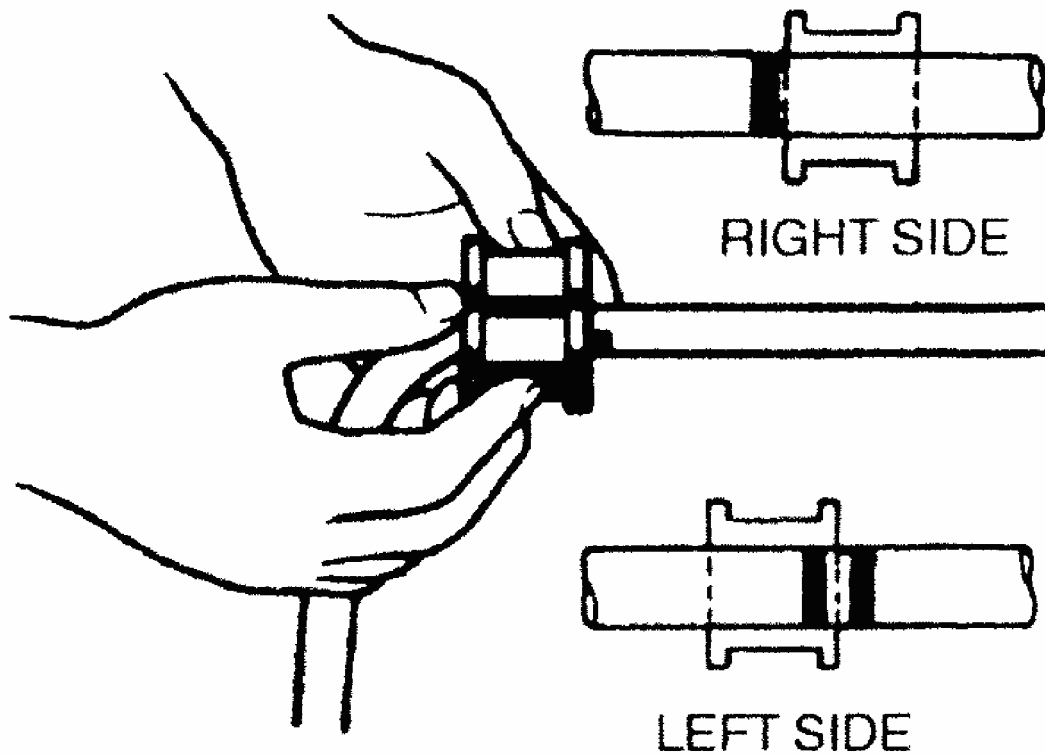
1	Stabilizer bracket
2	Stabilizer bushing (See Stabilizer Bushing Installation Note)
3	Stabilizer bar
4	Control link

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Fig. 20: Removing/Installing Rear Stabilizer Courtesy of FORD MOTOR CO.

Stabilizer Bushing Installation Note

Align the bushing with the installation mark on the stabilizer.



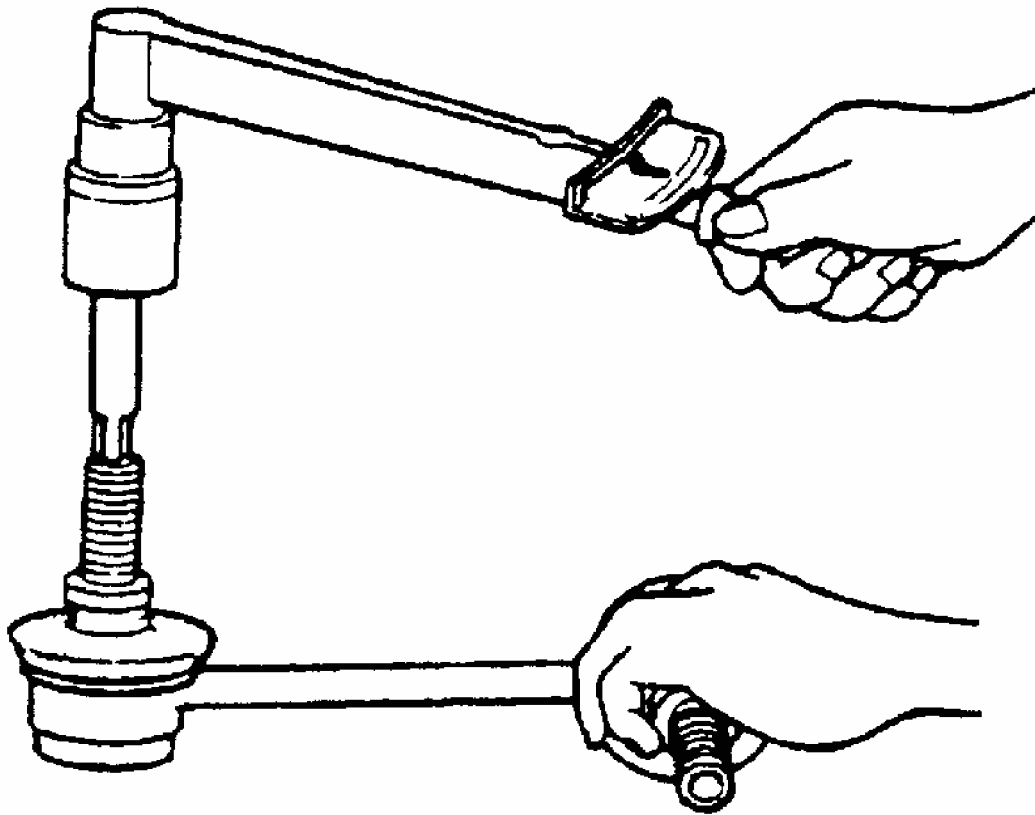
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Fig. 21: Installing Stabilizer Bushing
Courtesy of MAZDA MOTORS CORP.

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.
 - Rock the ball joint stud side to side 10 times.
 - Rotate the ball joint stud 10 times.
 - 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 inch lbf).



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Fig. 22: Inspecting Stabilizer Control Link
Courtesy of MAZDA MOTORS CORP.

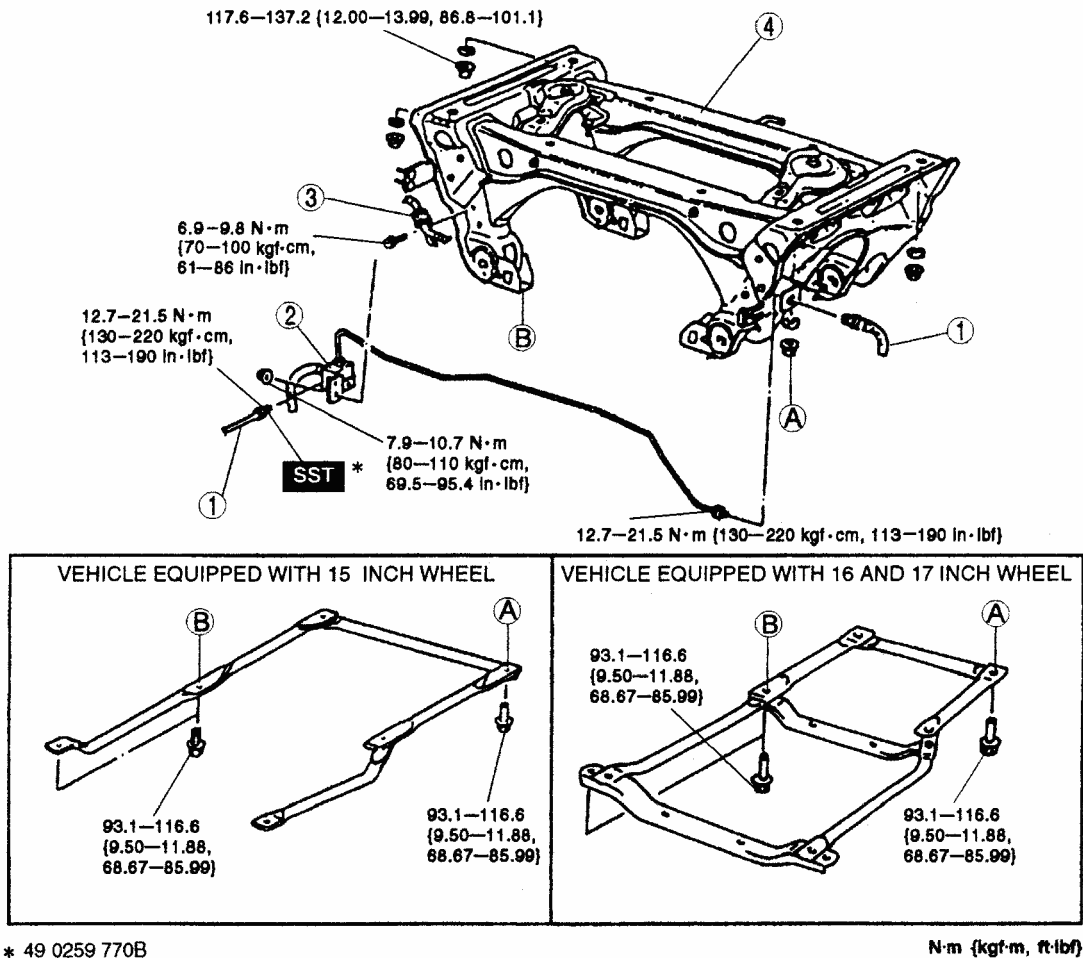
REAR CROSSMEMBER

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. Disconnect the parking brake cable.
2. Remove the rear crossbar.
3. Remove the differential and the power plant frame. See DIFFERENTIAL REMOVAL/INSTALLATION .

4. Remove the wheel hub and knuckle with the drive shaft. See **WHEEL HUB, STEERING KNUCKLE REMOVAL/INSTALLATION** .
5. Remove the rear lower arm. See **REAR LOWER ARM REMOVAL/INSTALLATION** .
6. Remove the rear upper arm. See **REAR UPPER ARM REMOVAL/INSTALLATION** .
7. Remove the rear stabilizer. See **REAR STABILIZER REMOVAL/INSTALLATION** .
8. Remove in the order indicated.



1	Brake pipe and flexible hose
2	Brake pipe and joint

3	Battery cable bracket
4	Rear crossmember

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Fig. 23: Removing/Installing Rear Crossmember
 Courtesy of MAZDA MOTORS CORP.

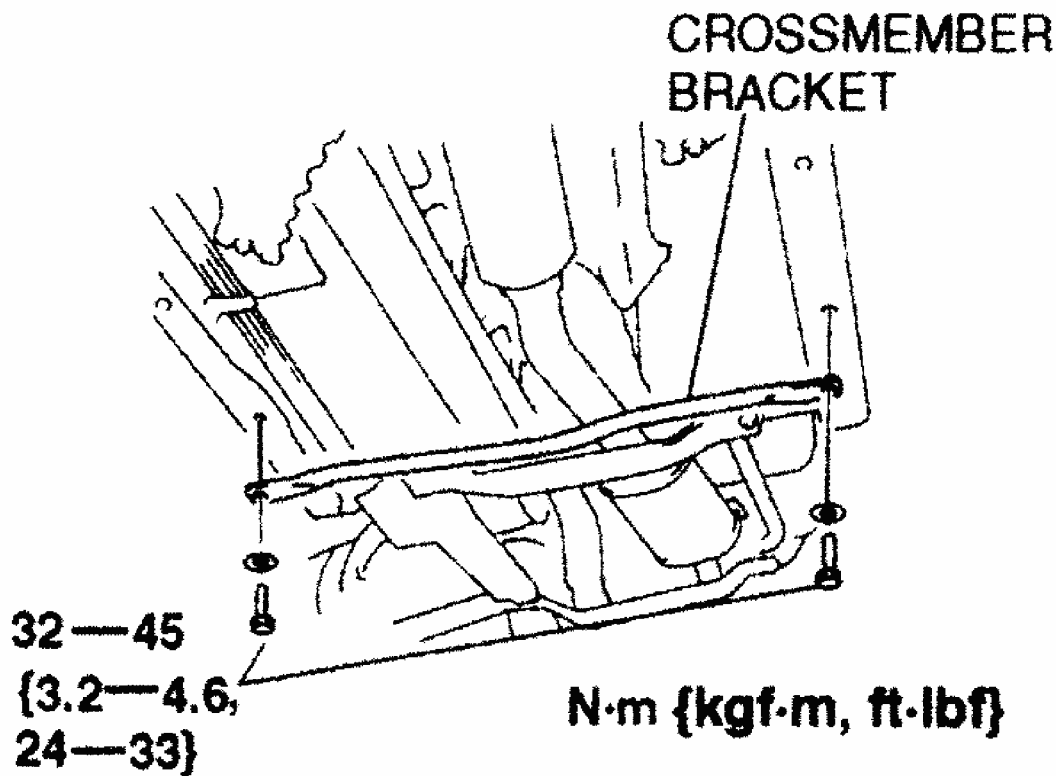
9. Install in the reverse order of removal.

10. After installation, do the following steps:

- Adjust the parking brake lever stroke. See **PARKING/EMERGENCY BRAKE**.
- Adjust the wheel alignment as necessary. See the following:
 - For 2002 and 2003 models, see **WHEEL ALIGNMENT**.
 - For 2004 models, see **REAR WHEEL ALIGNMENT**.

CROSSMEMBER BRACKET REMOVAL/INSTALLATION

1. Remove the crossmember bracket.



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Fig. 24: Removing/Installing Crossmember Bracket
 Courtesy of MAZDA MOTORS CORP.

2. Install the crossmember bracket.

TECHNICAL DATA

REAR SUSPENSION

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REAR SUSPENSION		
Item		Specification
Exposed thread of shock absorber piston rod	(mm {in})	15.7—17.7 {0.62—0.69}
Stabilizer control link starting torque	(N·m {kgf·cm, in·lbf})	0.2—2.7 {1.4—27, 1.3—23.4}

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Fig. 25: Rear Suspension Technical Data
 Courtesy of MAZDA MOTORS CORP.

TORQUE SPECIFICATIONS

TORQUE SPECIFICATIONS

Application	Ft. Lbs. (N.m)
Brake Caliper Bracket Bolt	35.4-50.6 (48-68.6)
Control Arm Cam Bolt Nut	53.8-70.1 (73-95)
Crossbar Bolt	68.7-86 (93.1-116.6)
Crossmember Bracket Bolt	23.6-33.2 (32-45)
Crossmember Nut	86.7-101.2 (117.6-137.2)
Lower Control Arm-To-Knuckle Bolt/Nut	46.2-55 (62.7-74.5)
Lower Control Arm Cambolt Nut	53.5-70.1 (72.5-95.1)
Shock Assembly-To-Lower Control Arm Bolt/Nut	53.5-70.1 (72.5-95.1)
Shock Absorber Upper Mount Nut	21.7-26.8 (29.4-36.3)
Stabilizer Bar Bracket-To-Frame Bolt	14.5-20.9 (19.6-28.4)
Stabilizer Link Nut	31.8-44.8 (43.1-60.8)
Upper Control Arm Pivot Bolt/Nut	39.8-56.4 (53.9-76.4)
Upper Control Arm-To-Knuckle Bolt/Nut	39.8-56.4 (53.9-76.4)
Wheel Lug Nut	65.6-86.3 (89-117)
Wheel Speed Sensor Bolt	14-17.7 (19-24)
	INCH Lbs. (N.m)
Battery Cable Bracket Bolt	61.1-86.7 (6.9-9.8)
Brake Pipe & Flexible Hose-To-Joint & Crossmember	112.4-190.3 (12.7-21.5)
Brake Pipe & Joint-To-Crossmember Nut	69.9-94.7 (7.9-10.7)