FRONT SUSPENSION

CONTENTS

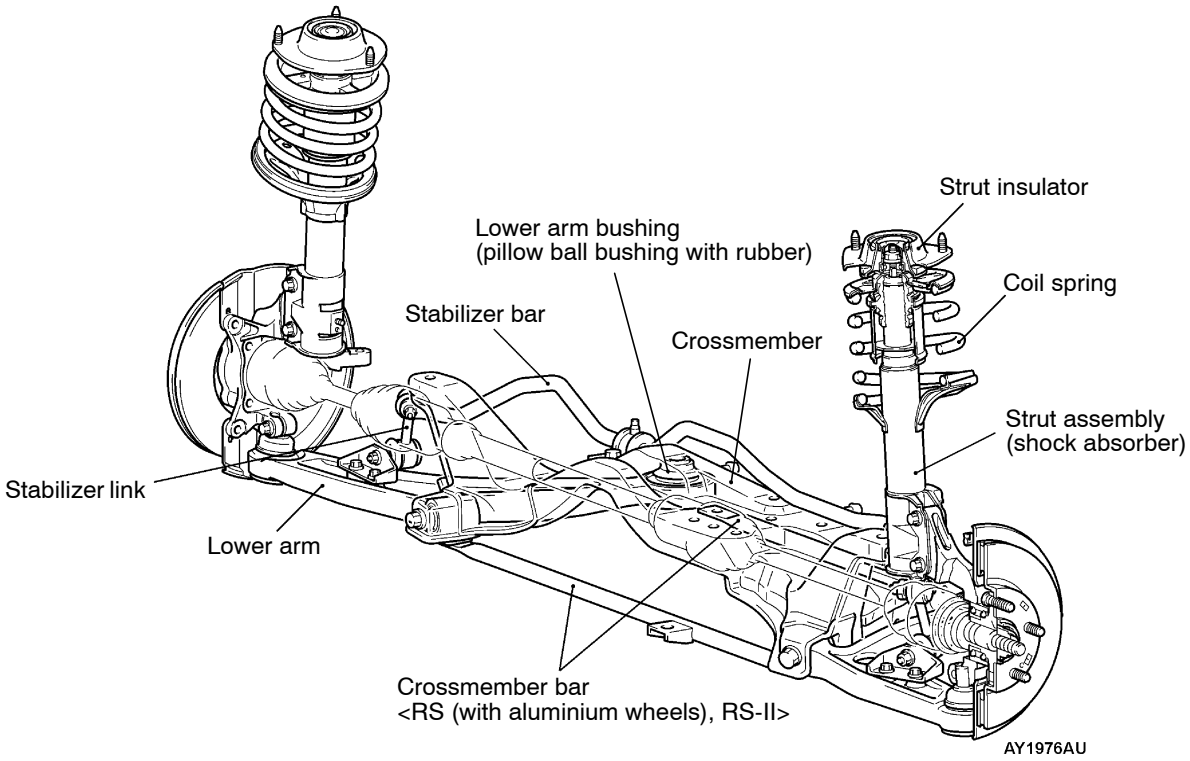
GENERAL INFORMATION

The front suspension is a McPherson strut with coil spring. The shock absorber is gas-filled hydraulic double-acting type.

COIL SPRING

Item	RS <Vehicles with steel wheels>, RS-II	RS <Vehicles with aluminium wheels>
Wire diameter × average diameter × free length mm	14 × 155 × 281	14 × 155 × 275

CONSTRUCTION DIAGRAM

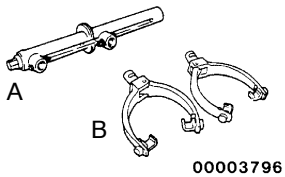
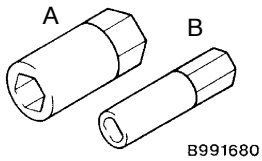
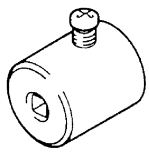
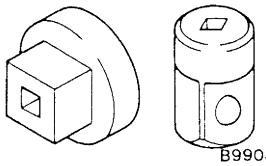


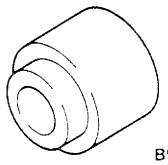
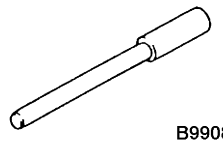
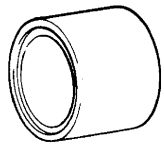
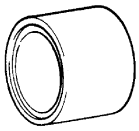
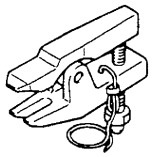
SERVICE SPECIFICATIONS

Items		Standard value
Toe-in	At the centre of tyre tread mm	0 ± 2
	Toe-angle (per wheel)	0°00' ± 05'
Toe-out angle on turns (inner wheel when outer wheel at 20°)		22°00' ± 1°30'
Steering angle	Inner wheel	31°45' ± 1°30'
	Outer wheel (for reference)	27°15'
Camber (Selectable from 2 options)		-1°00' ± 30'* or -2°00' ± 30'*
Caster		3°55' ± 30'*
Kingpin inclination		13°45' ± 1°30'
Lower arm ball joint rotation starting torque N·m		0.5 - 3.4
Lower arm pillow ball bushing rotation starting torque N·m		0.5 - 3.0

NOTE
*: difference between right and left wheels: less than 30'

SPECIAL TOOLS

Tools	Number	Name	Use
	A: MB991237 B: MB991238	A: Spring compressor body B: Arm set	Coil spring compression
	MB991680 A: MB991681 B: MB991682	Wrench set A: Wrench B: Socket	Strut assembly disassembly and reassembly
	MB991006	Preload socket	Lower arm ball joint rotation starting torque measurement
	MB990326	Preload socket	Lower arm pillow ball bushing rotation starting torque measurement

Tools	Number	Name	Use
 B990800	MB990800	Ball joint remover & installer	Lower arm ball joint dust cover press-in
 B990883	MB990651	Bar	Lower arm pillow ball bushing removal and press-fitting
	MB990816	Bushing remover & installer base	
	MB991576	Base	
 B991113	MB990635, MB991113 or MB991406	Steering linkage puller	Tie rod end and knuckle disconnection

ON-VEHICLE SERVICE

WHEEL ALIGNMENT CHECK AND ADJUSTMENT

Measure the wheel alignment with the vehicle parked on a level surface.

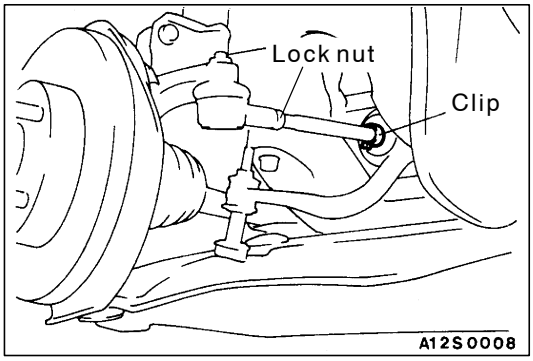
The front suspension, steering system, and wheels should be serviced to normal condition prior to measurement of wheel alignment.

TOE-IN

Standard value:

At the centre of tyre tread 0 ± 2 mm

Toe angle (per wheel) 0°00' ± 05'



1. Adjust the toe-in by undoing the clip and lock nut, and turning the left and right tie rod turnbuckles by the same amount (in opposite directions).

   NOTE

   The toe will move out as the left turnbuckle is turned toward the front of the vehicle and the right turnbuckle is turned toward the rear of the vehicle.
2. Install the clip and tighten the lock nut to the specified torque.

Tightening torque: 52 ± 2 N·m

3. Confirm that the toe-in is at the standard value.
4. Use a turning radius gauge to check that the steering angle is at the standard value.

Standard value:

Inner wheels	31°45' ± 1°30'
Outer wheels (for reference)	27°15'

TOE-OUT ANGLE ON TURNS

To check the steering linkage, especially after the vehicle has been involved in an accident or if an accident is presumed, it is advisable to check the toe-out angle on turns in addition to the wheel alignment.
Conduct this test on the left turn as well as on the right turn.

Standard value:

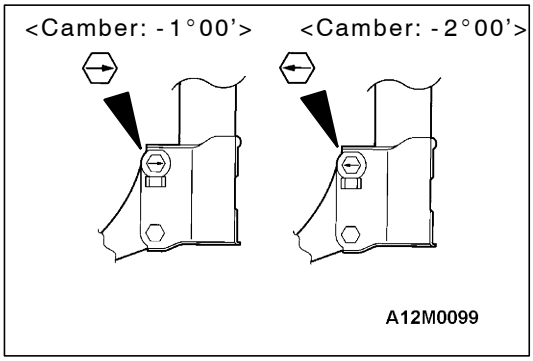
Items	Specifications
Toe-out angle on turns (inner wheel when outer wheel at 20°)	22°00' ± 1°30'

CAMBER, CASTER AND KINGPIN INCLINATION

Standard value:

Items	Specifications
Camber (Selectable from 2 options)	-1°00' ± 30'* or -2°00' ± 30'*
Caster	3°55' ± 30'*
Kingpin inclination	13°45' ± 1°30'

NOTE
1. *: difference between right and left wheels must be less than 30'
2. Caster and kingpin inclination are preset at the factory and cannot be adjusted.



SELECTION THE CAMBER

Select the camber by the installation direction of the allow of the connecting bolt of the strut assembly and the knuckle.
- -1°00' ± 30': Install the bolt turning the allow to the direction of vehicle inside.
- -2°00' ± 30': Install the bolt turning the allow to the direction of vehicle outside.

BALL JOINT DUST COVER CHECK

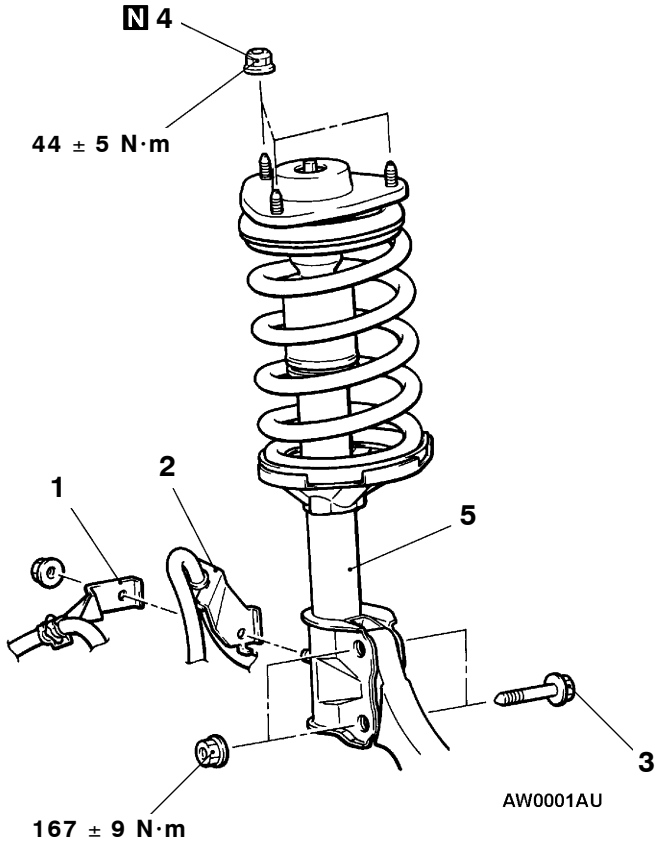
1. Check the dust cover for cracks or damage by pushing it with finger.
2. If the dust cover is cracked or damaged, replace the lower arm assembly.

   NOTE
   Cracks or damage of the dust cover may cause damage of the ball joint.

STRUT ASSEMBLY

REMOVAL AND INSTALLATION

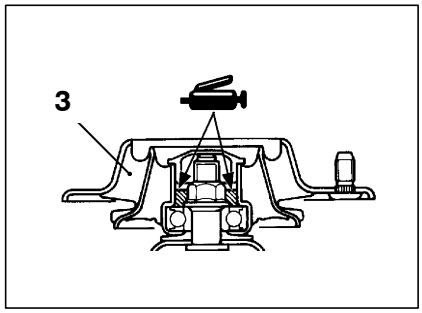
Post-installation Operation
Wheel alignment check and adjustment (Refer to P.33A-4.)

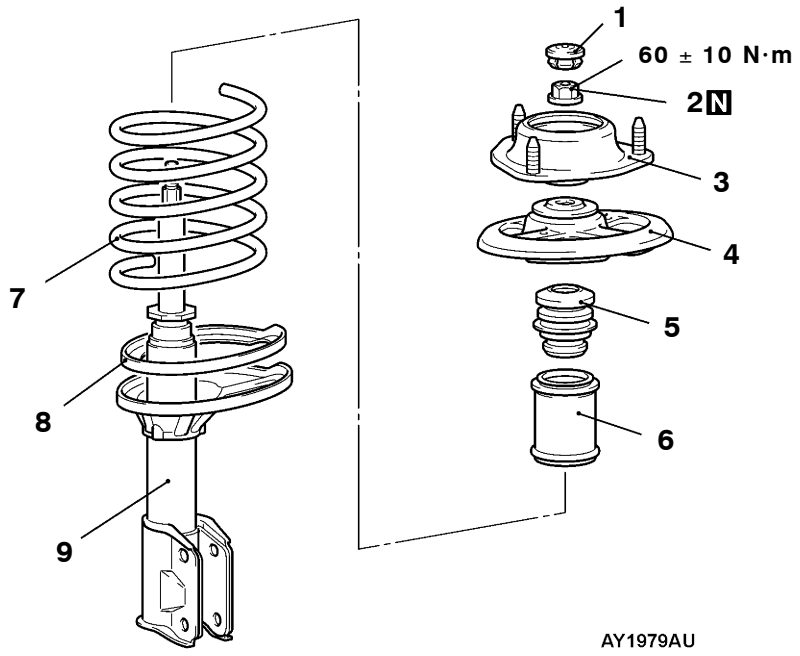


Removal steps

1. Front wheel speed sensor harness bracket <Vehicles with ABS or ACD>
2. Brake hose bracket
3. Knuckle connection
4. Strut mounting nut
5. Strut assembly

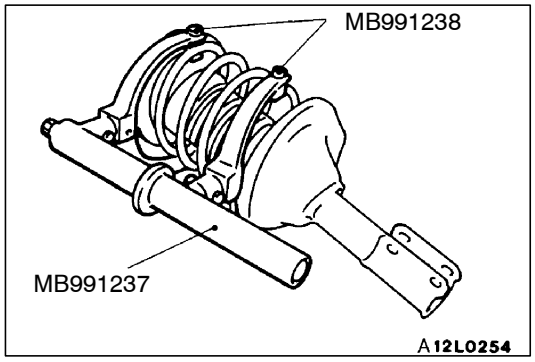
DISASSEMBLY AND REASSEMBLY

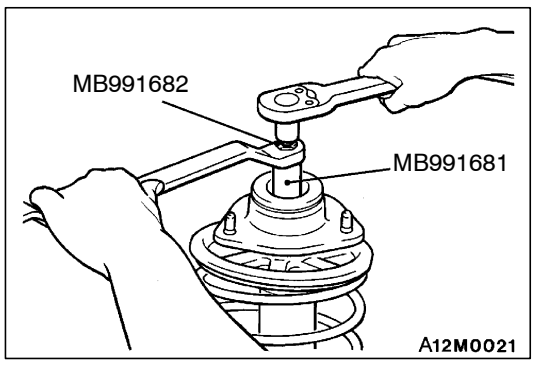




Disassembly steps

◀A▶ ▶A◀ 1. Dust cover
2. Self-locking nut
3. Strut insulator assembly
4. Upper spring seat assembly
5. Bump rubber
6. Dust cover
7. Coil spring
8. Lower spring pad
◀B▶ 9. Strut assembly





DISASSEMBLY SERVICE POINTS

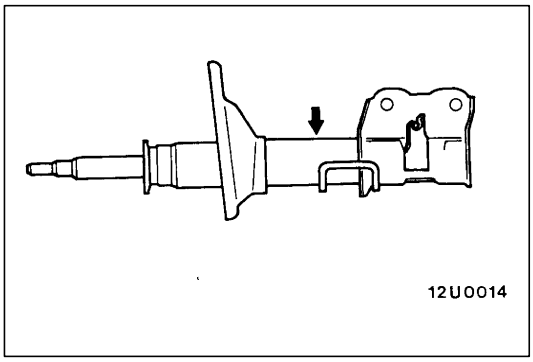
◀A▶ SELF-LOCKING NUT REMOVAL

1. Use the special tools to compress the coil spring.

Caution
(1) Do not tighten the special tool bolt too tight. The special tool will be broken if the allowable tightening torque of 74 N·m is exceed.
(2) Install the special tools evenly, and so that the maximum length will be attained within the installation range.
(3) Do not use an impact wrench as it will cause the bolt of the special tool to be seized.

2. Using the special tools, loosen the self-locking nut.

Caution
To prevent the piston rod lock nut inside the strut from loosening, do not use an impact wrench when the self-locking nut is loosened.



◀B▶ STRUT ASSEMBLY REMOVAL

To discard the strut assembly, place the assembly horizontally with its piston rod extended. Then drill a hole approx. 3 mm in diameter at the location shown in the illustration and discharge the gas.

Caution
The gas itself is harmless but it may issue out of the hole together with chips generated by the drill. Therefore, be sure to wear goggles.

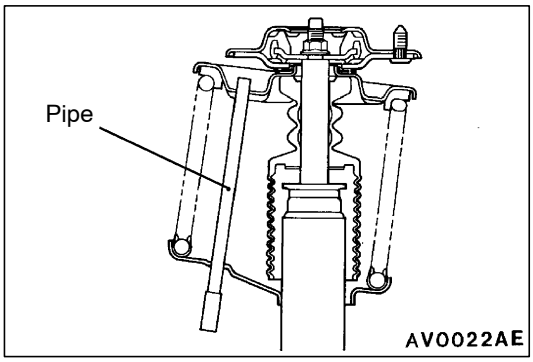
REASSEMBLY SERVICE POINT

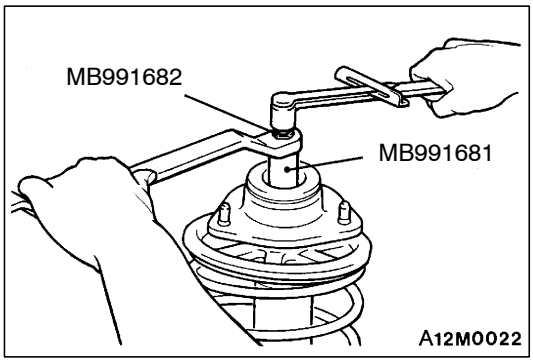
▶A◀ SELF-LOCKING NUT INSTALLATION

1. Ensure that the bearing is seated correctly.
2. Install the special tool to the strut assembly same as its removal.
3. While the coil spring is being compressed by the special tools, provisionally tighten the self-locking nut.

   Caution
   Do not use an impact wrench as it will cause the bolt of the special tool to be seized.
4. Align the hole in the strut assembly lower spring seat with the hole in the upper spring seat.

   NOTE
   Using a pipe as shown facilitates the alignment.
5. Correctly align both ends of the coil spring with the grooves in the spring seat, and then loosen the special tools.

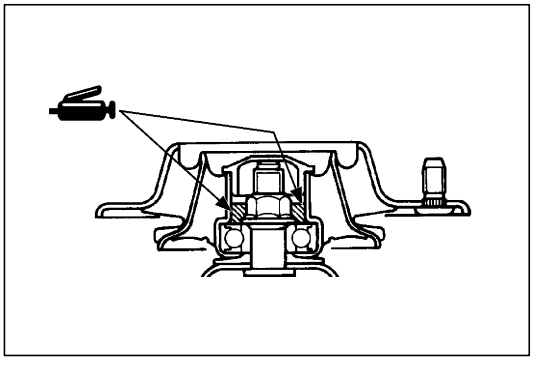




6. Using the special tools, tighten the self-locking nut to the specified torque.

   Specified torque: 60 ± 10 N·m

   Caution
   To prevent the piston rod lock nut inside the strut from loosening, do not use an impact wrench when the self-locking nut is tightened.



7. After tightening self-locking nut, fill the multi purpose greese to the bearing part of strut insulator.

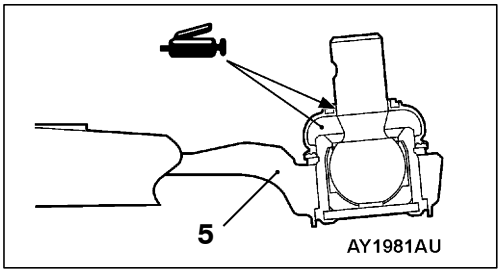
LOWER ARM ASSEMBLY

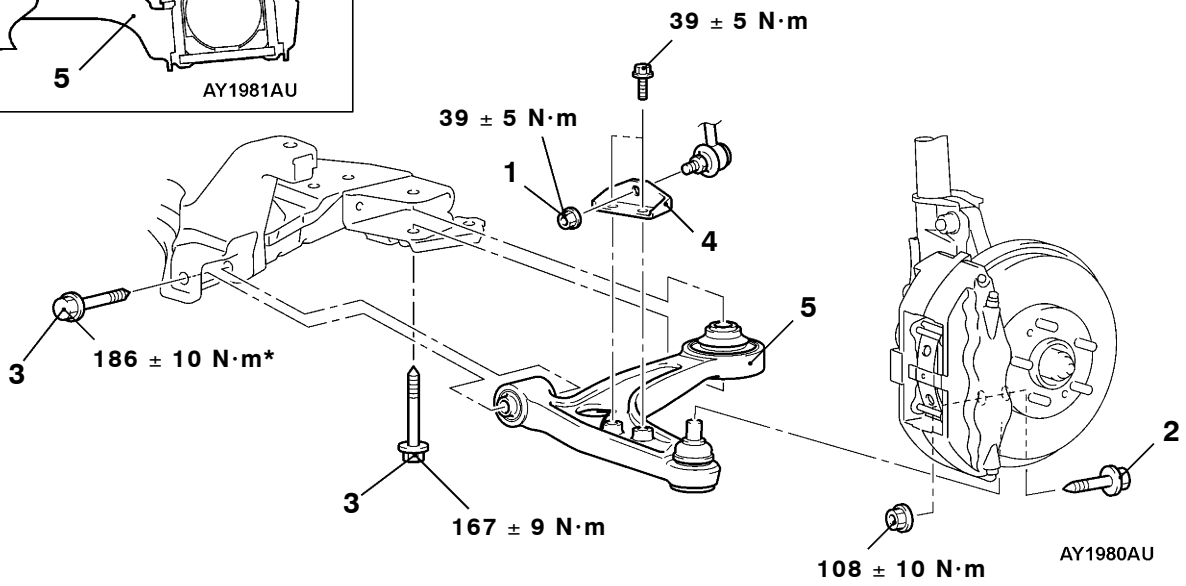
REMOVAL AND INSTALLATION

Caution

1. **If the vehicle is equipped with the Brembo disc brake, during maintenance, take care not to contact the parts or tools to the caliper because the paint of caliper will be scratched. And if there is brake fluid on the caliper, wipe out quickly.**
2. ***: To prevent bushings from breakage, the parts indicated by * should be temporarily tightened, and then fully tightened with the vehicle on the ground in the unladen condition.**

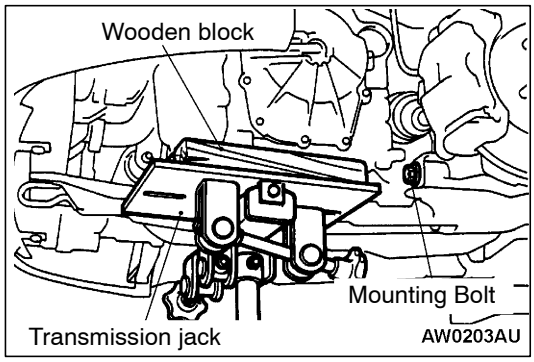
Post-installation Operation
- Check the dust cover for cracks or damage by pushing it with finger.
- Wheel alignment check and adjustment (Refer to P.33A-4.)





Removal steps

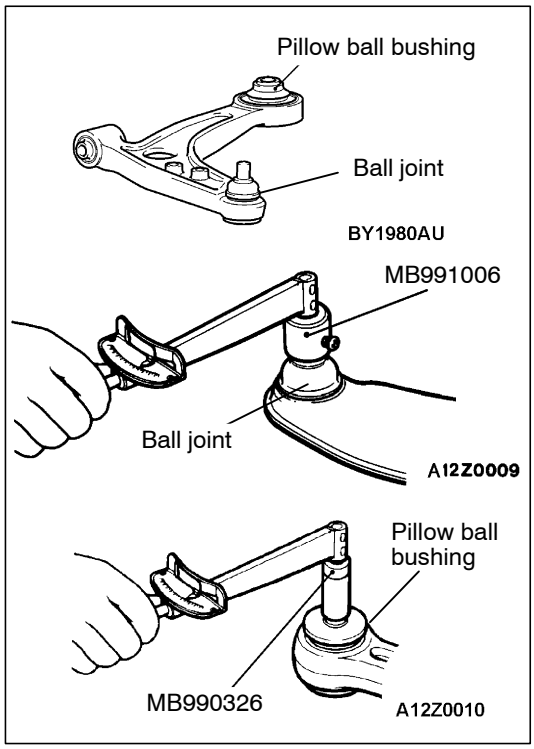
1. Stabilizer link nut
2. Lower arm and knuckle connection
◀A▶ 3. Lower arm and crossmember connection
4. Stabilizer bracket
5. Lower arm assembly



REMOVAL SERVICE POINT

◀A▶ LOWER ARM AND CROSSMEMBER DISCONNECTION

Lift the transmission with a transmission jack, and then withdraw the front mounting bolt on the left lower arm assembly.



INSPECTION

LOWER ARM BALL JOINT ROTATION STARTING TORQUE CHECK

1. After shaking the ball joint stud several times, use the special tool to measure the rotation starting torque of the lower arm ball joint.

   Standard value: 0.5 - 3.4 N·m

2. When the measured value exceeds the standard value, replace the lower arm assembly.
3. When the measured value is lower than the standard value, check that the lower arm ball joint turns smoothly without excessive play. If there is no excessive play, the ball joint can be reused.

PILLOW BALL BUSHING ROTATION STARTING TORQUE CHECK

1. Insert the bolt to the lower arm pillow ball bushing, in the opposite direction, insert the washer then install the nut. After rotating the inner sleeve (contained washer) several times, measure the rotation starting torque of the lower arm pillow ball bushing using special tool.

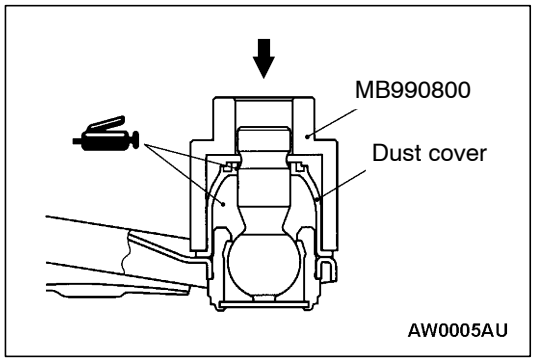
   Standard value: 0.5 - 3.0 N·m

2. When the measured value exceeds the standard value, replace the pillow ball bushing.
3. When the measured value is lower than the standard value, check that the lower arm pillow ball bushing turns smoothly without excessive play. If there is no excessive play, the pillow ball bushing can be reused.

LOWER ARM BALL JOINT DUST COVER CHECK

1. Check the dust cover for cracks or damage by pushing it with finger.
2. If the dust cover is cracked or damaged, replace the lower arm assembly.

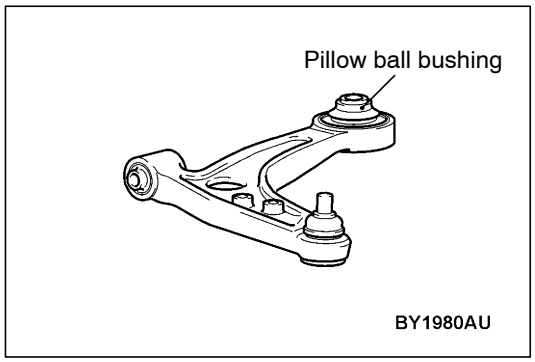
   NOTE
   If the dust cover is cracked or damaged, it is possible that there may also be damage to the ball joint.
   When it is damaged during service work, replace the dust cover.



LOWER ARM BALL JOINT DUST COVER REPLACEMENT

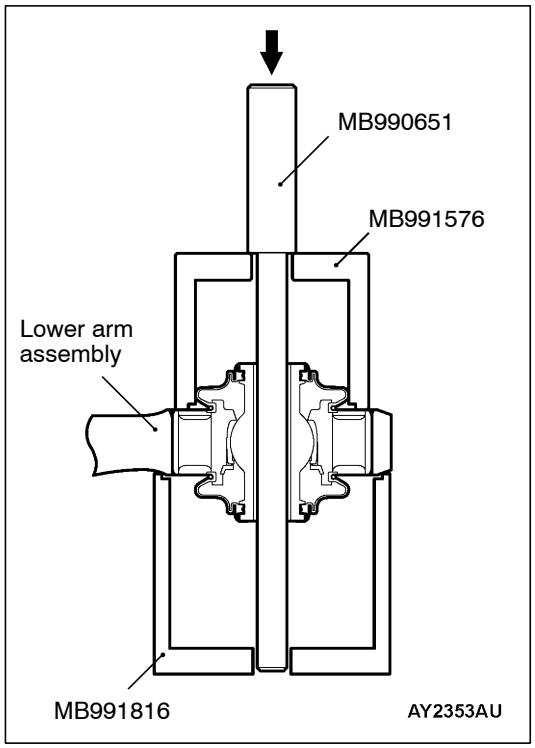
Only when the dust cover is damaged accidentally during service work, replace the dust cover as follows:

1. Remove the dust cover.
2. Apply multipurpose grease to the lip and inside of the dust cover.
3. Using the special tool, press the dust cover until it contacts the lower arm assembly.
4. Press the dust cover with your finger to check that there are no cracks or damage in the dust cover.

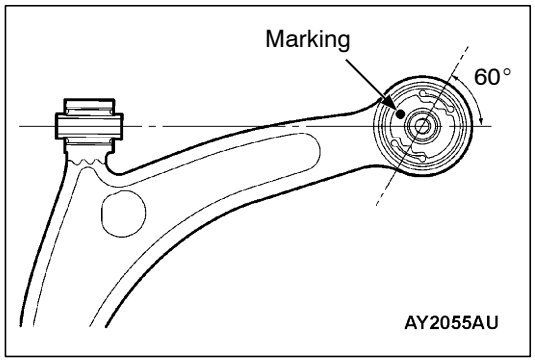


LOWER ARM PILLOW BALL BUSHING REPLACEMENT

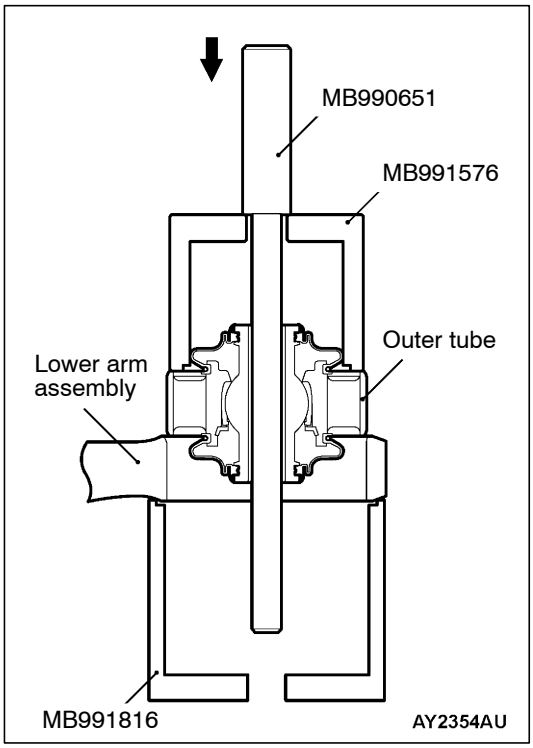
Replace the bushing as follows:



1. Use the special tools to drive out the bushing.



2. Set the bushing to the lower arm assembly in order to the direction of bushing marking is upper, and of the opening is the direction as shown in the illustration.



3. Use the special tools to press in the bushing until its outer tube is flush with the lower arm assembly surface.

STABILIZER BAR

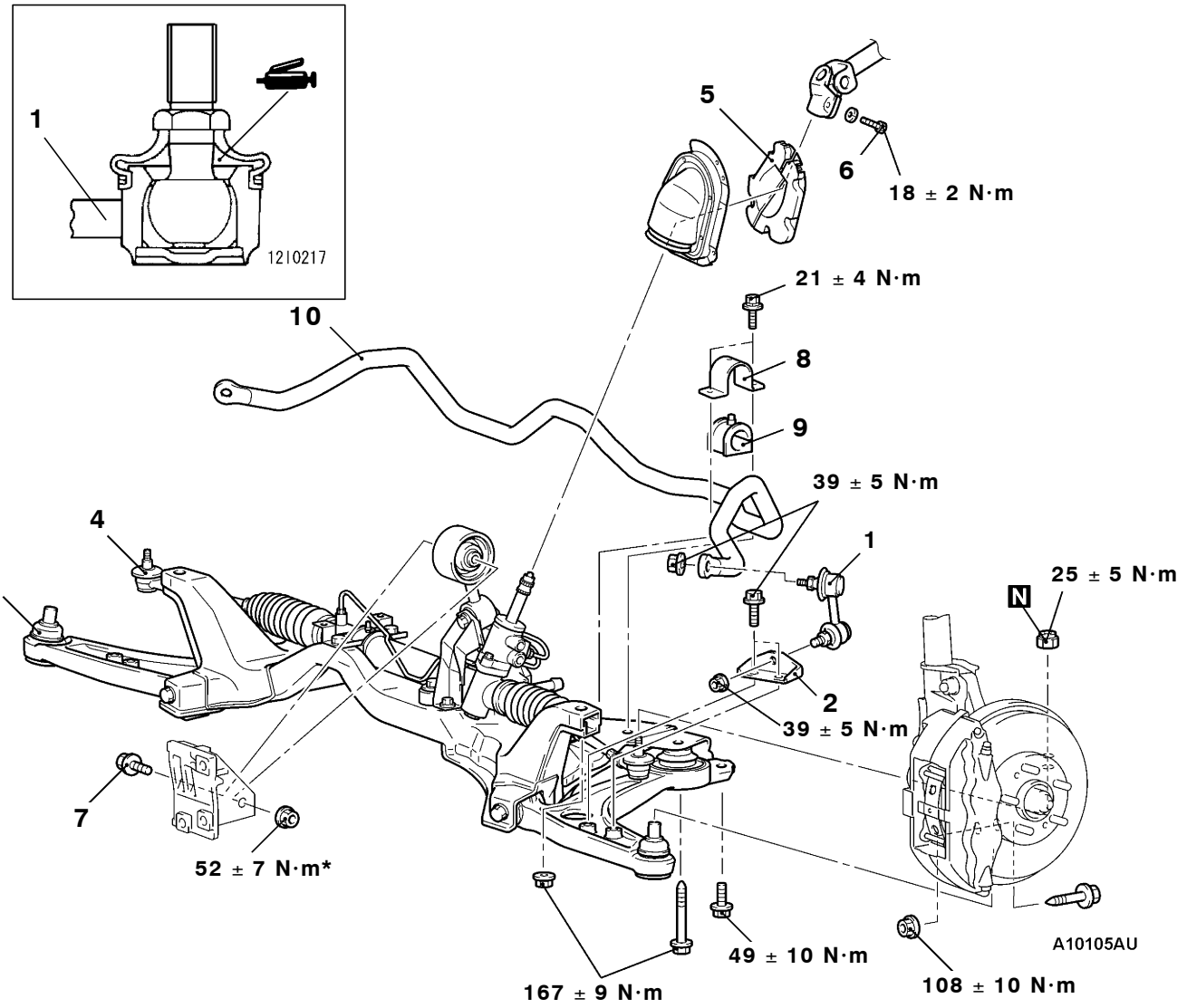
REMOVAL AND INSTALLATION

Caution

1. **Before removing the steering wheel and air bag module assembly, refer to GROUP 52B - Service Precautions and Air Bag Module and Clock Spring. Also, put the front wheels in straight-ahead position. Failure to do so may damage the SRS clock spring and render the SRS air bag inoperative, which results serious driver injury.**
2. **If the vehicle is equipped with the Brembo disc brake, during maintenance, take care not to contact the parts or tools to the caliper because the paint of caliper will be scratched. And if there is brake fluid on the caliper, wipe out quickly.**
3. **To prevent bushings from breakage, the parts indicated by * should be temporarily tightened, and then fully tightened with the vehicle on the ground in the unladen condition.**

Pre-removal Operation
- Steering Wheel and Air Bag Module Assembly Removal (Refer to GROUP 37A.)
- Clock Spring Removal (Refer to GROUP 52B.)
- Crossmember Bar Removal (Refer to P.33A-15.)
- Centermember Removal (Refer to GROUP 32.)
- Front Exhaust Pipe Removal (Refer to GROUP 15.)

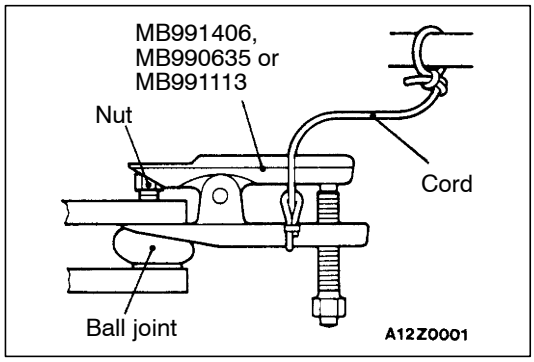
Post-installation Operation
- Front Exhaust Pipe Installation (Refer to GROUP 15.)
- Centermember Installation (Refer to GROUP 32.)
- Crossmember Bar Installation (Refer to P.33A-15.)
- Clock Spring Installation (Refer to GROUP 52B.)
- Steering Wheel and Air Bag Module Assembly Installation (Refer to GROUP 37A.)
- Check the Dust Cover for Cracks or Damage by Pushing it with Finger.
- Checking Steering Wheel Position with Wheels Straight Ahead
- Front Wheel Alignment Check and Adjustment (Refer to P.33A-4.)



Removal steps

1. Stabilizer link
2. Stabilizer bracket
3. Lower arm and knuckle connection
4. Tie rod end and knuckle connection
5. Steering shaft cover
6. Steering gear and joint connecting bolt
7. Rear roll stopper connecting bolt
8. Fixture
9. Bushing
10. Stabilizer bar

◀A▶ ◀B▶ ▶A◀

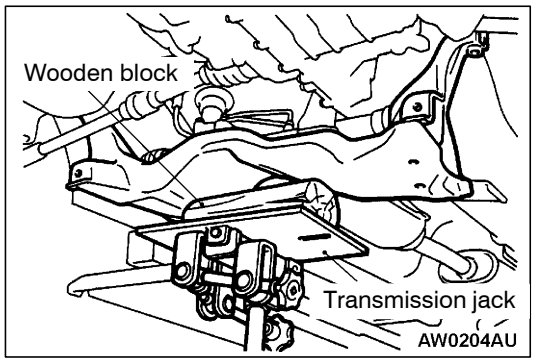


REMOVAL SERVICE POINTS

◀A▶ TIE ROD END AND KNUCKLE DISCONNECTION

Caution

1. **To prevent the ball joint thread from damage, the tie rod end mounting nut must be only loosened but not removed from the ball joint. Be sure to use the special tool.**
2. **Support the special tool with a cord to prevent it from coming off.**

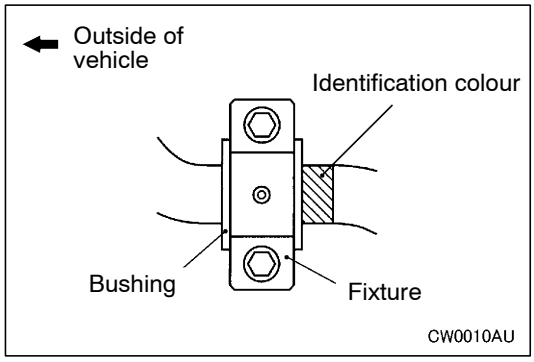


◀B▶ FIXTURE/BUSHING/STABILIZER BAR REMOVAL

Carry out the following operations to ensure working space in order to remove the fixture, the bushing and the stabilizer bar.

1. Use a transmission jack to hold the crossmember, and then remove the crossmember mounting nuts and bolts.
2. Lower the crossmember until the fixture, the bushing and the stabilizer bar can be removed.

Caution
Be careful not to lower the crossmember excessively, otherwise the power steering return hose bracket may deform.



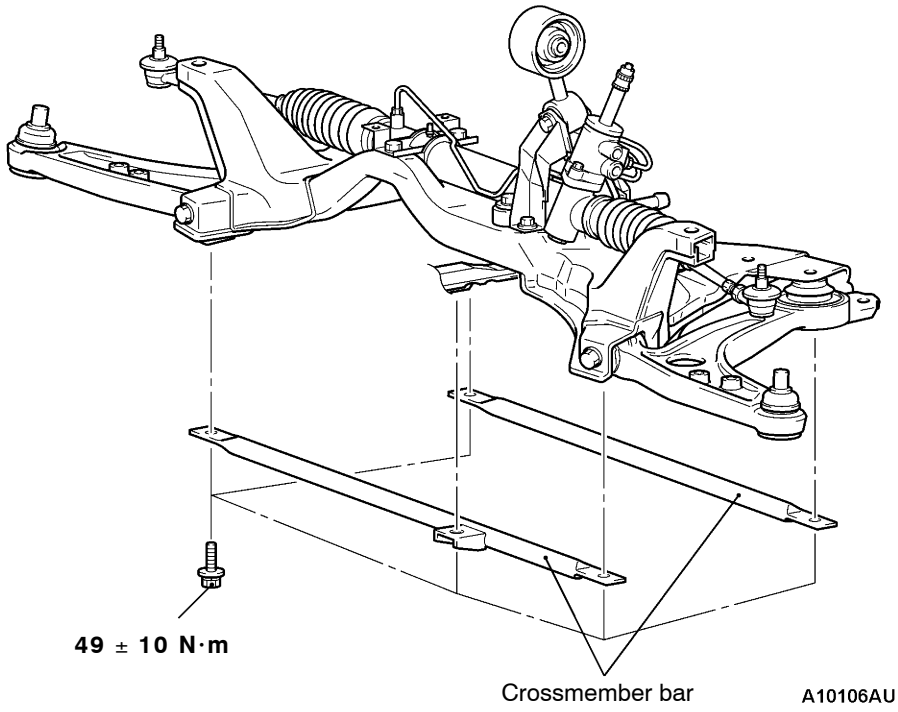
INSTALLATION SERVICE POINT

▶A◀ STABILIZER BAR/BUSHING/FIXTURE INSTALLATION

Align the stabilizer bar identification mark with the right end of the bushing.

CROSSMEMBER BAR
<RS (Vehicles with aluminium wheels), RS-II>

REMOVAL AND INSTALLATION



NOTES