FRONT SUSPENSION

CONTENTS

33209000158

GENERAL INFORMATION

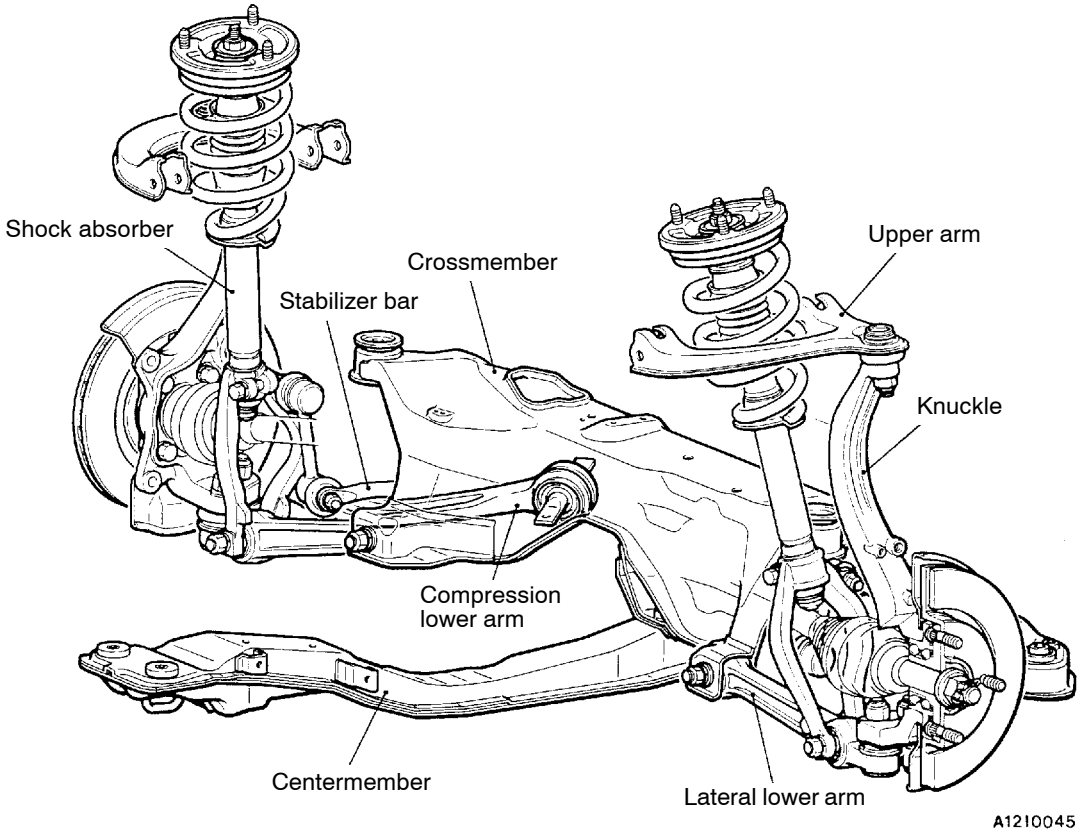
33200010181

The front suspension is of a multi-link construction with two lower arms which create the ideal virtual kingpin axis for the suspension system. In addition, by mounting the upper arm in a higher position than the tyres, excellent steering stability and ride comfort are obtained.

COIL SPRING

Items	Sedan (2000 - petrol-powered vehicles - M/T), Wagon (2000 - petrol-powered vehicles)	Sedan (except 2000 - petrol-powered vehicles - M/T), Wagon (except 2000 - petrol-powered vehicles)
Wire diameter × average diameter × free length mm	12 × 70 - 110 × 366	12 × 70 - 110 × 374

CONSTRUCTION DIAGRAM



SERVICE SPECIFICATIONS

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Items		Standard value
Toe-in	At the centre of tyre tread mm	0 ± 3
	Toe-angle (per wheel)	0°00' ± 09'
Toe-out angle on turns (inner wheel when outer wheel at 20°)		22°
Camber		0°00' ± 30' (difference between right and left wheel: less than 30')
Caster		4°20' ± 1°30' (difference between right and left wheel: less than 30')
Kingpin inclination		7°20' ± 1°30'
Upper arm ball joint rotation starting torque Nm		0.3 - 1.5
Compression lower arm ball joint rotation starting torque Nm		0.5 - 2.5
Lateral lower arm ball joint rotation starting torque Nm		1.5 or less
Stabilizer link ball joint turning torque Nm		0.5 - 1.5

SPECIAL TOOLS

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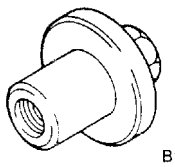
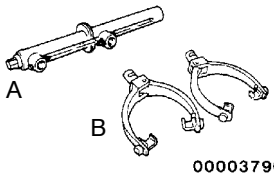
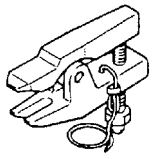
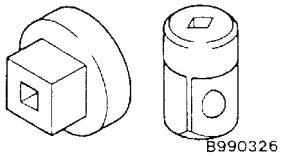
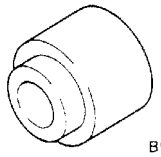
Tools	Number	Name	Use
 B991004	MB991004	Wheel alignment gauge attachment	Wheel alignment measurement <Vehicles with aluminium type wheels>
 A B 00003796	A: MB991237 B: MB991238	A: Spring compressor body B: Arm set	Coil spring compression
 B991113	MB991406, MB990635 or MB991113	Steering linkage puller	Ball joint disconnection
 B990326	MB990326	Preload socket	Ball joint rotation starting torque and turning torque measurement
 B990800	MB990800	Ball joint remover and installer	Ball joint dust cover installation

ON-VEHICLE SERVICE

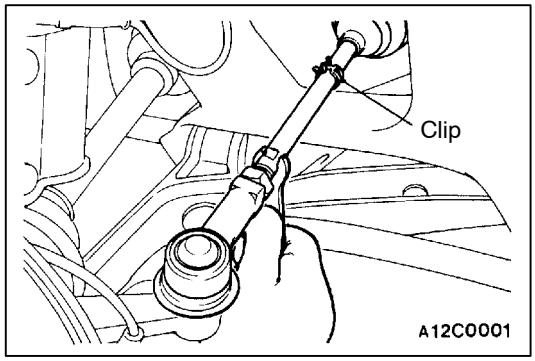
33100090175

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±3 mm
Toe angle (per wheel) 0°00'±09'



(1) If the toe-in is not within the standard value, adjust the toe-in by undoing the clips and turning the left and right tie rod turnbuckles by the same amount (in opposite directions).

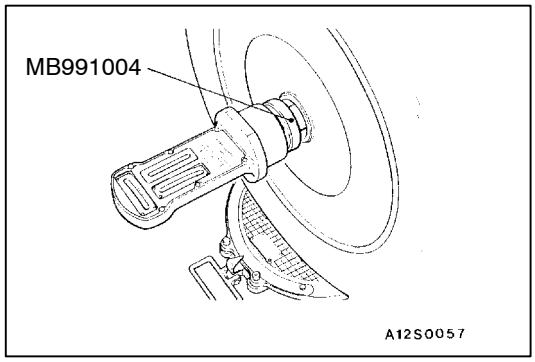
NOTE
The toe will move out as the left turnbuckle is turned toward the front of the vehicle and the right turnbuckle is turned toward the rear of the vehicle.

(2) Use a turning radius gauge to check that the steering angle is at the standard value. (Refer to GROUP 37A - On-vehicle Service.)

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:
22° (inner wheel when outer wheel at 20°)



CAMBER, CASTER AND KINGPIN INCLINATION

Standard value:

Camber

0°00' ± 30' (difference between right and left wheel: less than 30')

Caster

4°20' ± 1°30' (difference between right and left wheel: less than 30')

Kingpin inclination 7°20' ± 1°30'

NOTE

1. Camber and caster are preset at the factory and cannot be adjusted.
2. If camber is not within the standard value, check and replace bent or damaged parts.
3. For vehicles with aluminium type wheels, attach the camber/caster/kingpin gauge to the drive shaft by using the special tool. Tighten the special tool to the same torque 196 - 255 Nm as the drive shaft nut.

Caution

Never subject the wheel bearings to the vehicle load when the drive shaft nuts are loosened.

BALL JOINT DUST COVER CHECK 33200860021

(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 upper arm assembly, compression lower arm assembly, lateral lower arm assembly or stabilizer link.

NOTE

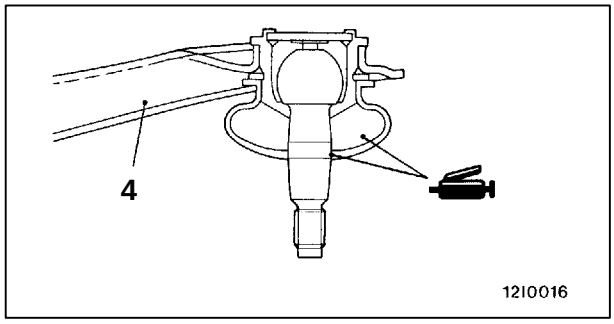
Cracks or damage of the dust cover may cause damage of the ball joint.

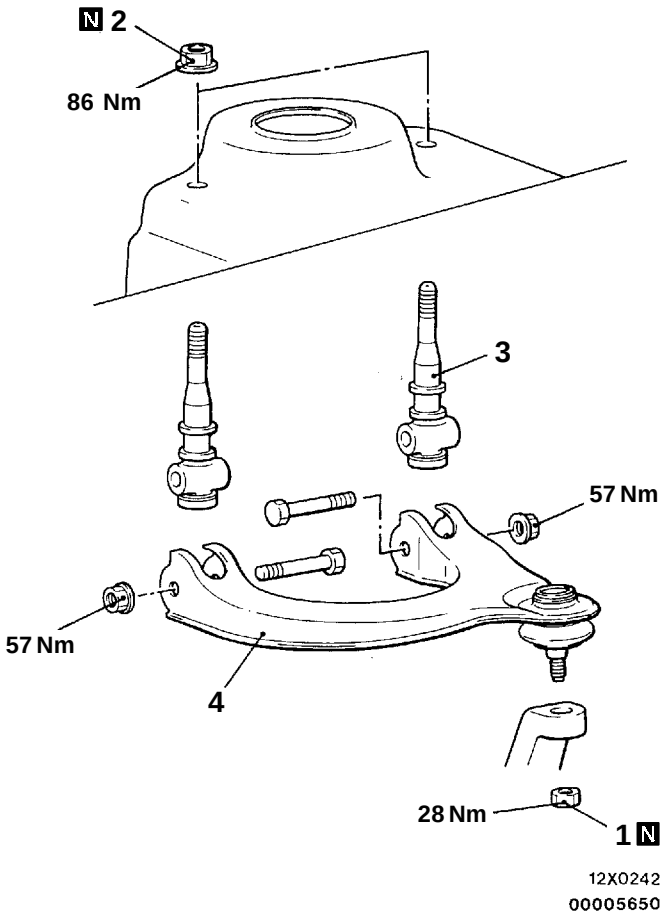
UPPER ARM ASSEMBLY

33200430079

REMOVAL AND INSTALLATION

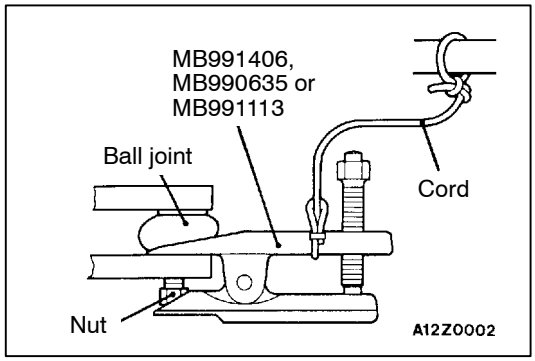
Post-installation Operation
- Check the Dust Cover for Cracks or Damage by Pushing it with Finger.
- Wheel Alignment Check and Adjustment (Refer to P.33A-4.)





Removal steps

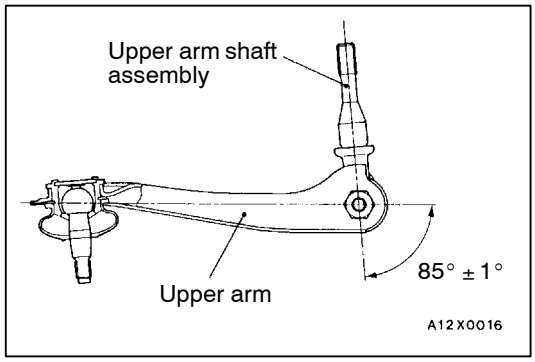
◀A▶ 1. Upper arm and knuckle connection
2. Upper arm mounting nut
▶A◀ 3. Upper arm shaft assembly
4. Upper arm assembly



REMOVAL SERVICE POINT

◀A▶ UPPER ARM AND KNUCKLE DISCONNECTION

Caution
1. **Use the special tool to loosen the nut only; do not remove it from the ball joint.**
2. **Tie the special tool with a cord not to let it fall off.**



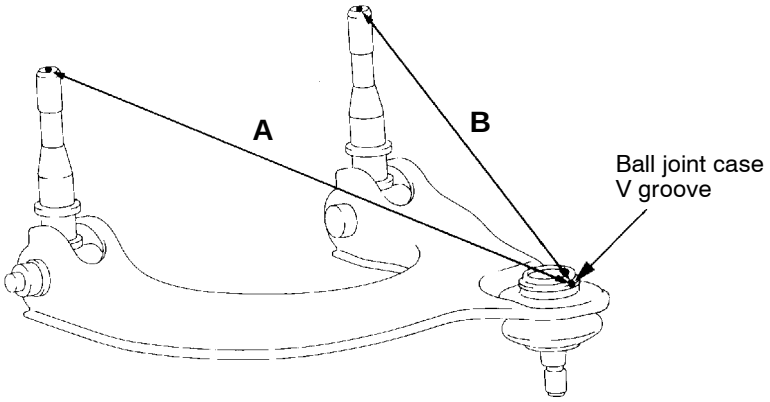
INSTALLATION SERVICE POINT

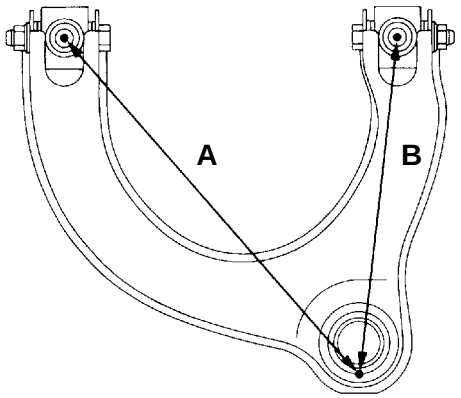
▶A◀ UPPER ARM SHAFT ASSEMBLY INSTALLATION

Install the upper arm shaft assembly at the angle shown in the illustration.

NOTE
If the upper arm shaft is installed at the above-mentioned angle, the reference dimension is determine as follows;

A: 300.1 mm
B: 234.3 mm





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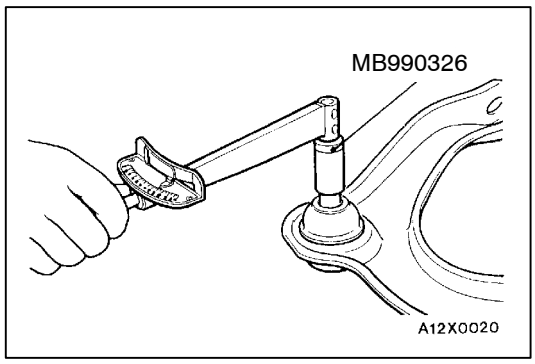

INSPECTION

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UPPER ARM BALL JOINT ROTATION STARTING TORQUE CHECK

(1) After shaking the ball joint stud several times, install the nut to the stud and use the special tool to measure the rotation starting torque of the ball joint.

Standard value: 0.3 - 1.5 Nm

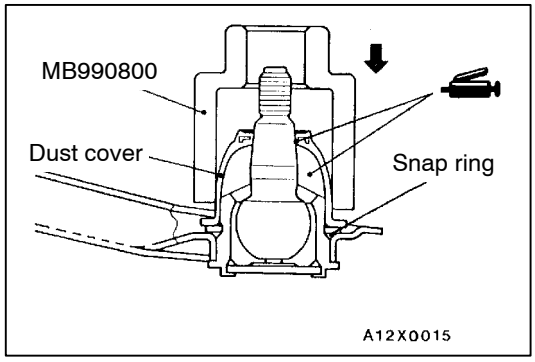
(2) When the measured value exceeds the standard value, replace the upper arm assembly.
(3) When the measured value is lower than the standard value, check that the ball joint turns smoothly without excessive play. If so, it is possible to use that ball joint.

UPPER ARM BALL JOINT DUST COVER CHECK

33200870017

(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 upper arm assembly.

NOTE
Cracks or damage of the dust cover may cause damage of the ball joint. When it is damaged during service work, replace the dust cover.



UPPER ARM BALL JOINT DUST COVER REPLACEMENT

33200770065

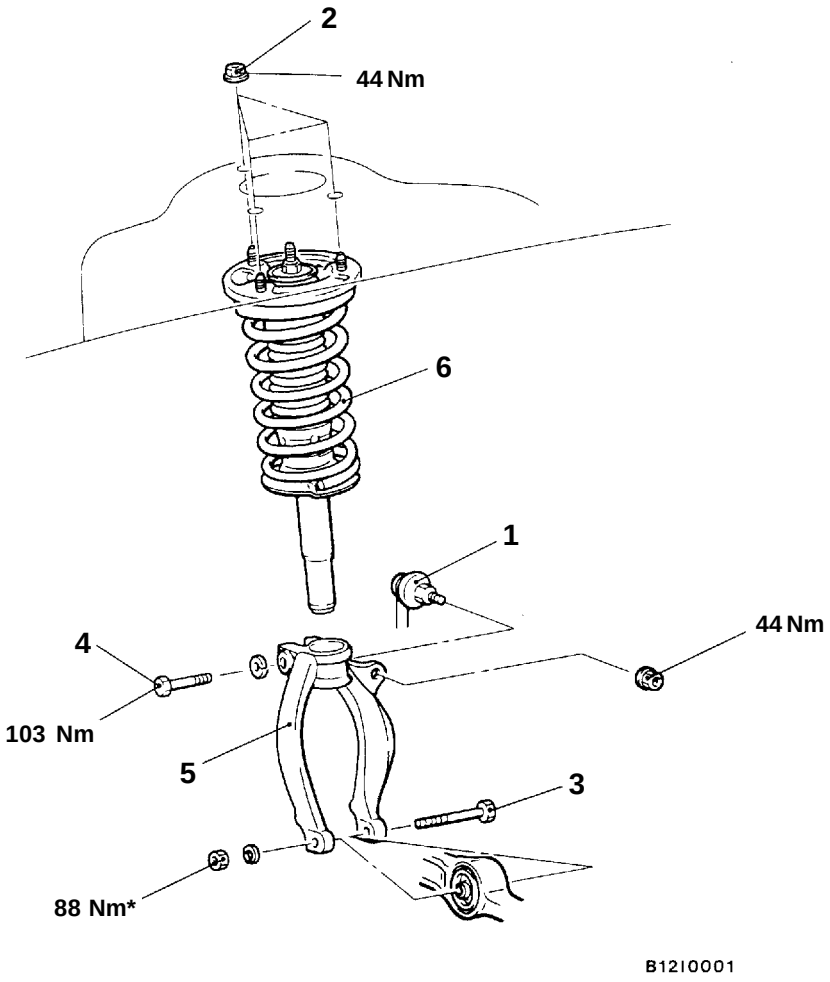
Only when the dust cover is damaged accidentally during service work, replace the dust cover as follows:
(1) Remove the dust cover.
(2) Apply multipurpose grease to the lip and inside of the dust cover.
(3) Drive in the dust cover with special tool until it is fully seated.
(4) Check the dust cover for cracks or damage by pushing it with finger.

SHOCK ABSORBER ASSEMBLY

33200460078

REMOVAL AND INSTALLATION

Post-installation Operation
- Wheel Alignment Check and Adjustment (Refer to P.33A-4.)



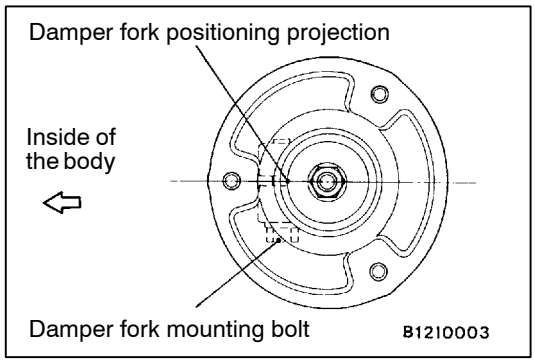
Removal steps

1. Stabilizer link
2. Shock absorber mounting nuts
3. Damper fork and lateral lower arm connection
4. Damper fork and shock absorber connection

▶A◀ 5. Damper fork
6. Shock absorber assembly

Caution

***: Indicates parts which should be temporarily tightened, and then fully tightened with the vehicle on the ground in the unladen condition.**



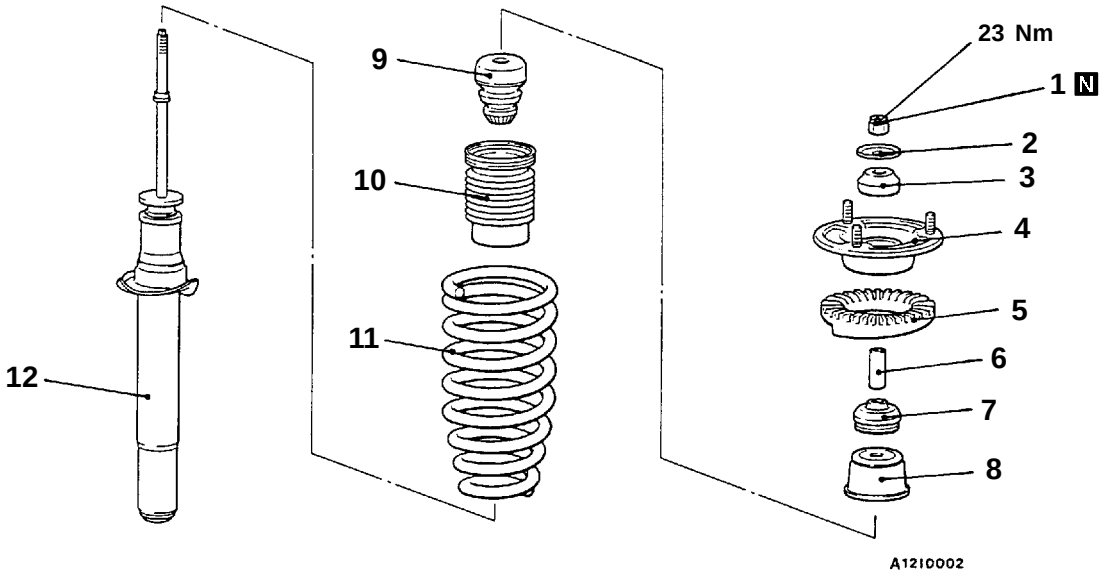
INSTALLATION SERVICE POINT

▶A◀ DAMPER FORK INSTALLATION

The damper fork must face against the damper fork positioning projection of the shock absorber assembly as shown in the figure.

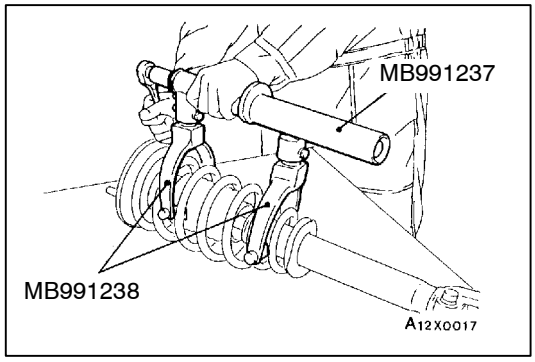
DISASSEMBLY AND REASSEMBLY

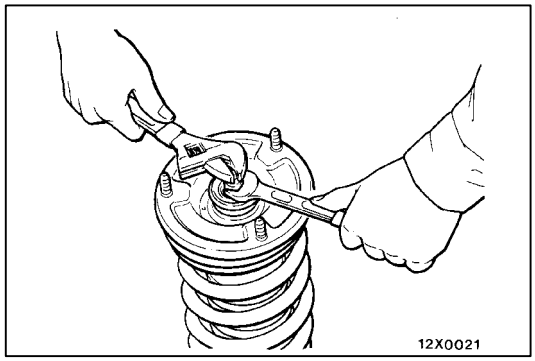
33200480050



Disassembly steps

◀A▶ ▶C◀ 1. Self-locking nut
2. Washer
3. Upper bushing A
▶B◀ 4. Upper bracket assembly
5. Upper spring pad
6. Collar
7. Upper bushing B
8. Cup assembly
9. Bump rubber
10. Dust cover
▶A◀ 11. Coil spring
12. Shock absorber assembly





DISASSEMBLY SERVICE POINT

◀A▶ SELF-LOCKING NUT REMOVAL

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

Caution
1. Install the special tools evenly, and so that the maximum length will be attained within the installation range.
2. Do not use an impact wrench to tighten the special tool bolt.

(2) While holding the piston rod, remove the self-locking nut.

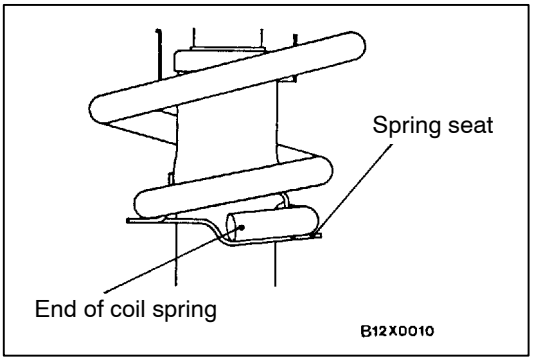
Caution
Do not use an impact wrench.

REASSEMBLY SERVICE POINTS

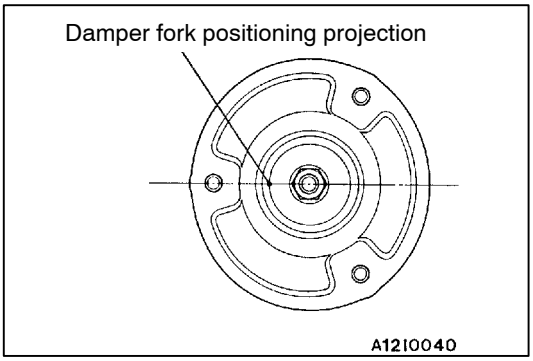
▶A◀ COIL SPRING INSTALLATION

(1) Install the special tool in the same manner as for removal, and compress the coil spring to install to the shock absorber.

Caution
Do not use an impact wrench to tighten the bolt of the special tool.



(2) Align the upper side of the coil spring with the upper spring pad stepped portion and the lower side with the spring seat stepped portion, respectively.



▶B◀ UPPER BRACKET ASSEMBLY INSTALLATION

The upper bracket assembly must face against the damper fork positioning projection of the shock absorber as shown in the figure.

▶C◀ SELF-LOCKING NUT INSTALLATION

(1) Temporarily tighten the self-locking nut.
(2) Remove the special tools (MB991237, MB991238), and tighten the self-locking nut to the specified torque.

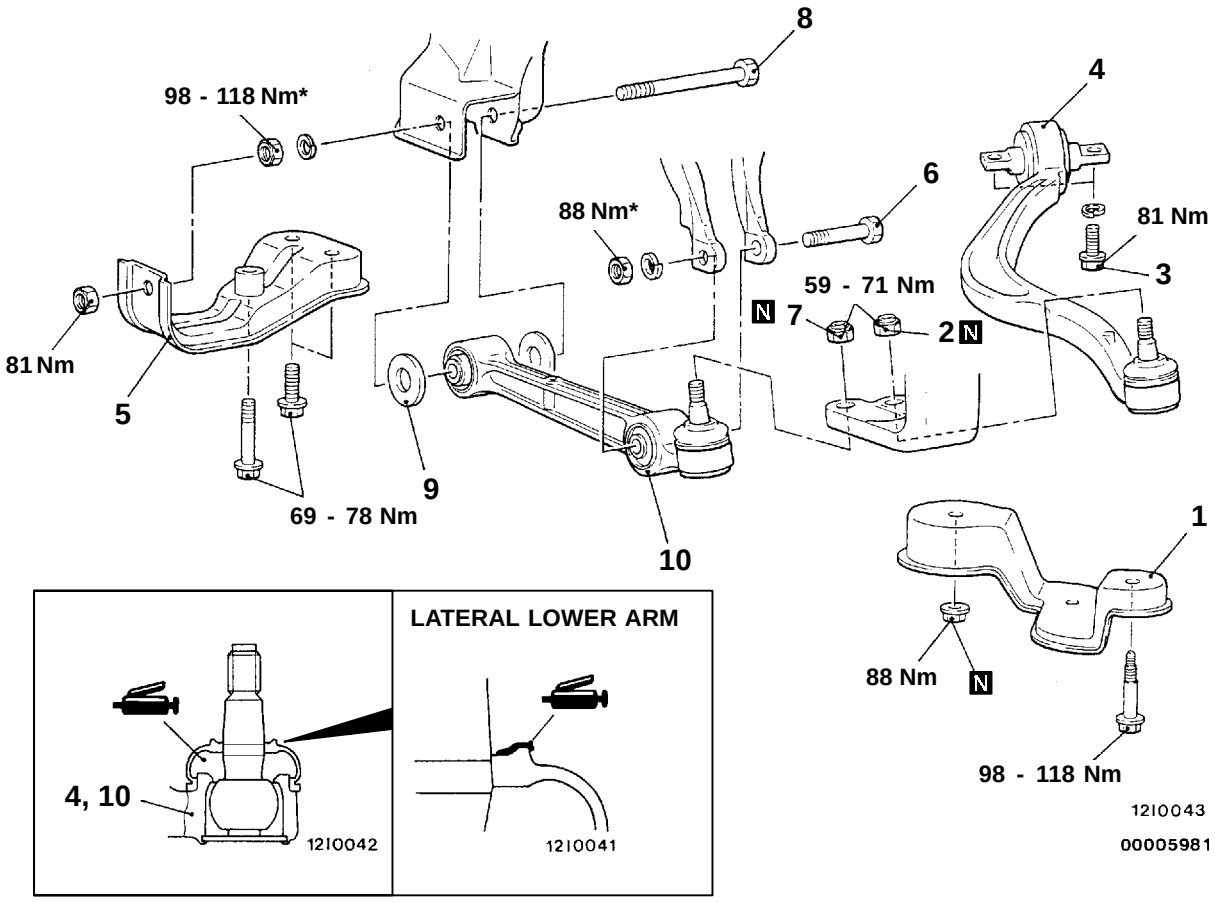
Caution
Do not use an impact wrench.

COMPRESSION LOWER ARM AND LATERAL LOWER ARM ASSEMBLIES

33200510100

REMOVAL AND INSTALLATION

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.)



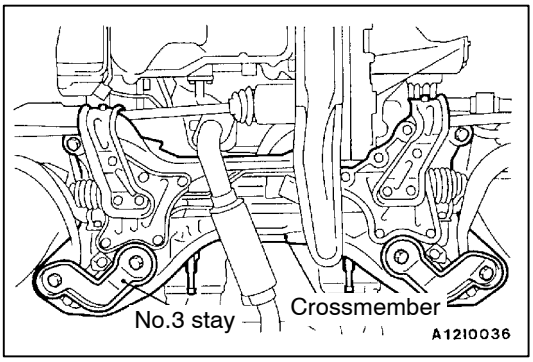
Compression lower arm assembly removal steps

◀A▶ 1. No.3 stay
◀B▶ 2. Compression lower arm and knuckle connection
3. Compression lower arm mounting bolts
4. Compression lower arm assembly

Lateral lower arm assembly removal steps

5. No.2 stay
6. Lateral lower arm and damper fork connection
◀B▶ 7. Lateral lower arm and knuckle connection
8. Lateral lower arm mounting bolt
9. Stopper
10. Lateral lower arm assembly

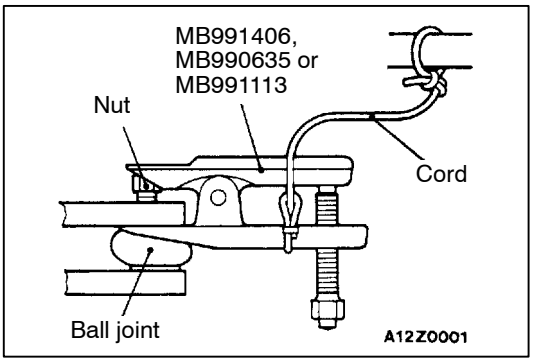
Caution
***: Indicates parts which should be temporarily tightened, and then fully tightened with the vehicle on the ground in the unladen condition.**



REMOVAL SERVICE POINTS

◀A▶ NO.3 STAY REMOVAL

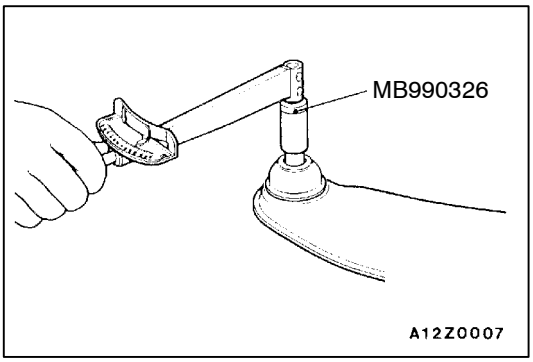
No.3 stay is tightened together with the crossmember. Therefore, after removing No.3 stay, install the nut and bolt to the crossmember provisionally.



◀B▶ COMPRESSION LOWER ARM AND KNUCKLE/LATERAL LOWER ARM AND KNUCKLE DISCONNECTION

Caution

1. **Use the special tool to loosen the nut only; do not remove it from the ball joint.**
2. **Tie the special tool with a cord not to let it fall off.**



INSPECTION

33200520066

LOWER ARM BALL JOINT ROTATION STARTING TORQUE CHECK

(1) After shaking the ball joint stud several times, install the nut to the stud and use the special tool to measure the rotation starting torque of the ball joint.

Compression lower arm ball joint
Standard value: 0.5 - 2.5 Nm

Lateral lower arm ball joint
Standard value: 1.5 Nm or less

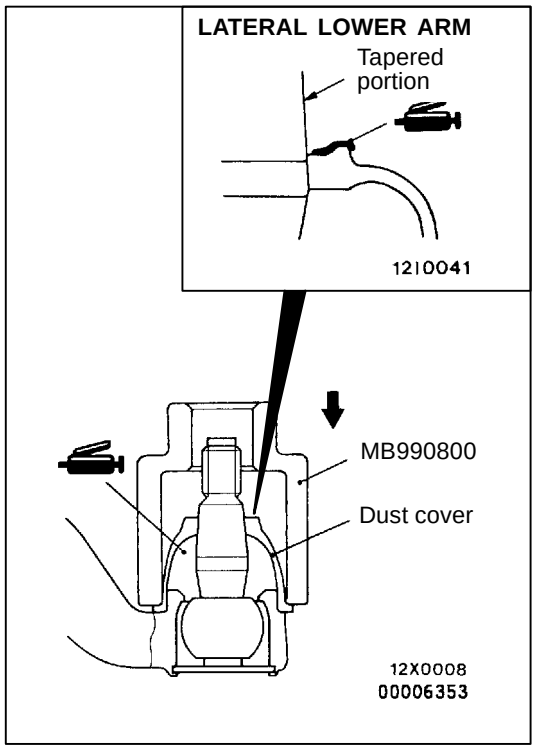
(2) When the measured value exceeds the standard value, replace the lower arm assembly.
(3) When the measured value is lower than the standard value, check that the ball joint turns smoothly without excessive play. If so, it is possible to use that ball joint.

LOWER ARM BALL JOINT DUST COVER CHECK

33200880010

(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. When it is damaged during service work, replace the dust cover.



LOWER ARM BALL JOINT DUST COVER REPLACEMENT

33200780051

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 inside of the dust cover.
(3) Apply multipurpose grease to the shown portion on the top of the lateral lower arm assembly dust cover.

Caution
Be careful not to let multipurpose grease touch the ball joint thread and the knuckle joint (tapered portion). If it touches, wipe away it.

(4) Drive in the dust cover with special tool until it is fully seated.
(5) Check the dust cover for cracks or damage by pushing it with finger.

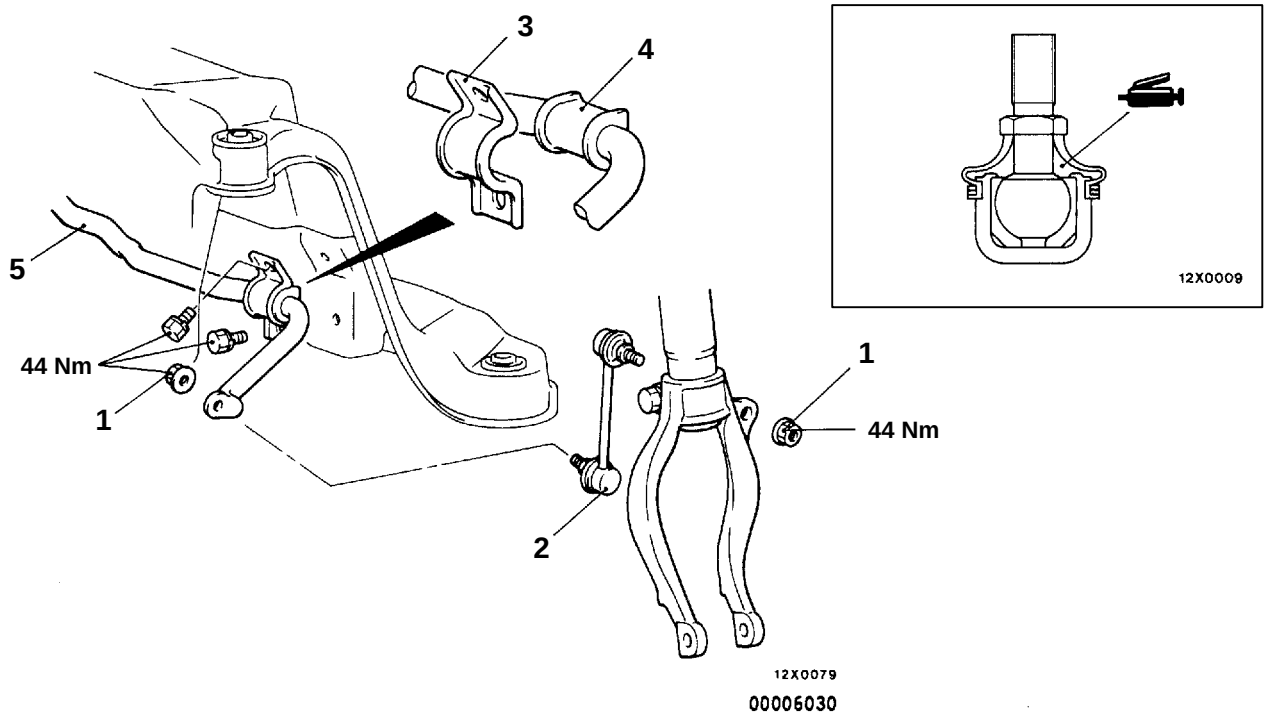
STABILIZER BAR

33200540079

REMOVAL AND INSTALLATION

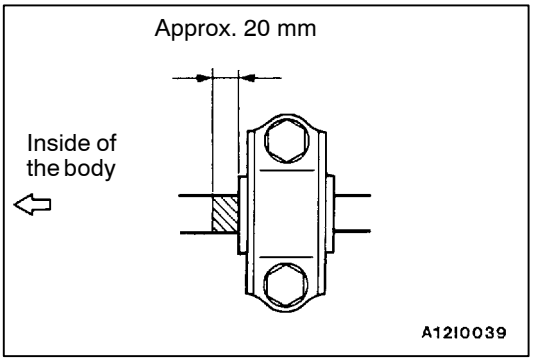
Pre-removal Operation
- Left Side of No.1 and No.2 Stays Disconnection <L.H. Drive Vehicles> (Refer to GROUP 32 - Crossmember.)
- Right Side of No.1 and No.2 Stays Disconnection <R.H. Drive Vehicles> (Refer to GROUP 32 - Crossmember.)

Post-installation Operation
- Check the Dust Cover for Cracks or Damage by Pushing it with Finger.
- Right Side of No.1 and No.2 Stays Connection <R.H. Drive Vehicles> (Refer to GROUP 32 - Crossmember.)
- Left Side of No.1 and No.2 Stays Connection <L.H. Drive Vehicles> (Refer to GROUP 32 - Crossmember.)



Removal steps

1. Stabilizer link mounting nut
2. Stabilizer link
▶A◀ 3. Stabilizer bar bracket
▶A◀ 4. Bushing
▶A◀ 5. Stabilizer bar



INSTALLATION SERVICE POINT

▶A◀ STABILIZER BAR/BUSHING/STABILIZER BAR BRACKET INSTALLATION

Position the stabilizer bar so that left side identification mark is at the shown position, and tighten the stabilizer bar bracket mounting bolt.

INSPECTION

33200550072

STABILIZER LINK BALL JOINT TURNING TORQUE CHECK

(1) After shaking the ball joint stud several times, install the nut to the stud and use the special tool to measure the turning torque of the ball joint.

Standard value: 0.5 - 1.5 Nm

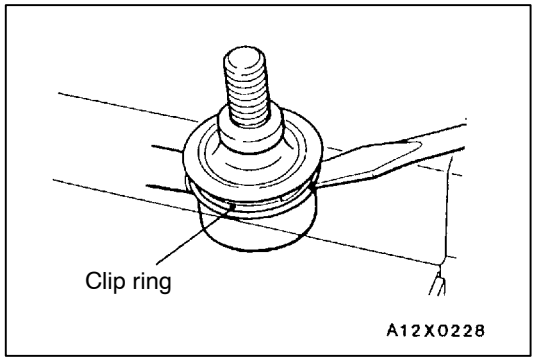
(2) When the measured value exceeds the standard value, replace the stabilizer link.
(3) When the measured value is lower than the standard value, check that the ball joint turns smoothly without excessive play. If so, it is possible to use that ball joint.

STABILIZER LINK BALL JOINT DUST COVER CHECK

33200890013

(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 stabilizer link.

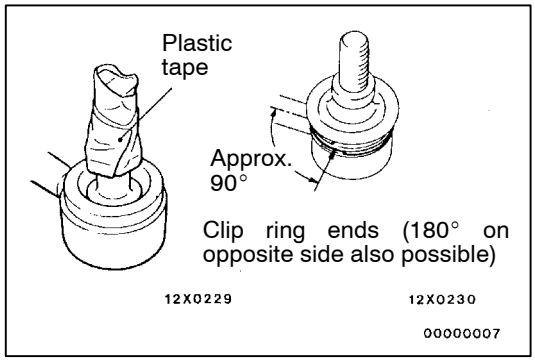
NOTE
Cracks or damage of the dust cover may cause damage of the ball joint. When it is damaged during service work, replace the dust cover.



STABILIZER LINK BALL JOINT DUST COVER REPLACEMENT

33200790078

Only when the dust cover is damaged accidentally during service work, replace the dust cover as follows:
(1) Remove the clip ring and the dust cover.
(2) Apply multipurpose grease to the inside of the dust cover.



(3) Use plastic tape on the stabilizer link threads as shown in the illustration, and then install the dust cover to the stabilizer link.
(4) Secure the dust cover by the clip ring. When installing the clip ring, align the ends at a 90° angle from the axis of the stabilizer link.
(5) Check the dust cover for cracks or damage by pushing it with finger.