FRONT SUSPENSION

Click on the applicable bookmark to selected the required model year

FRONT SUSPENSION

CONTENTS

33109000070

GENERAL INFORMATION

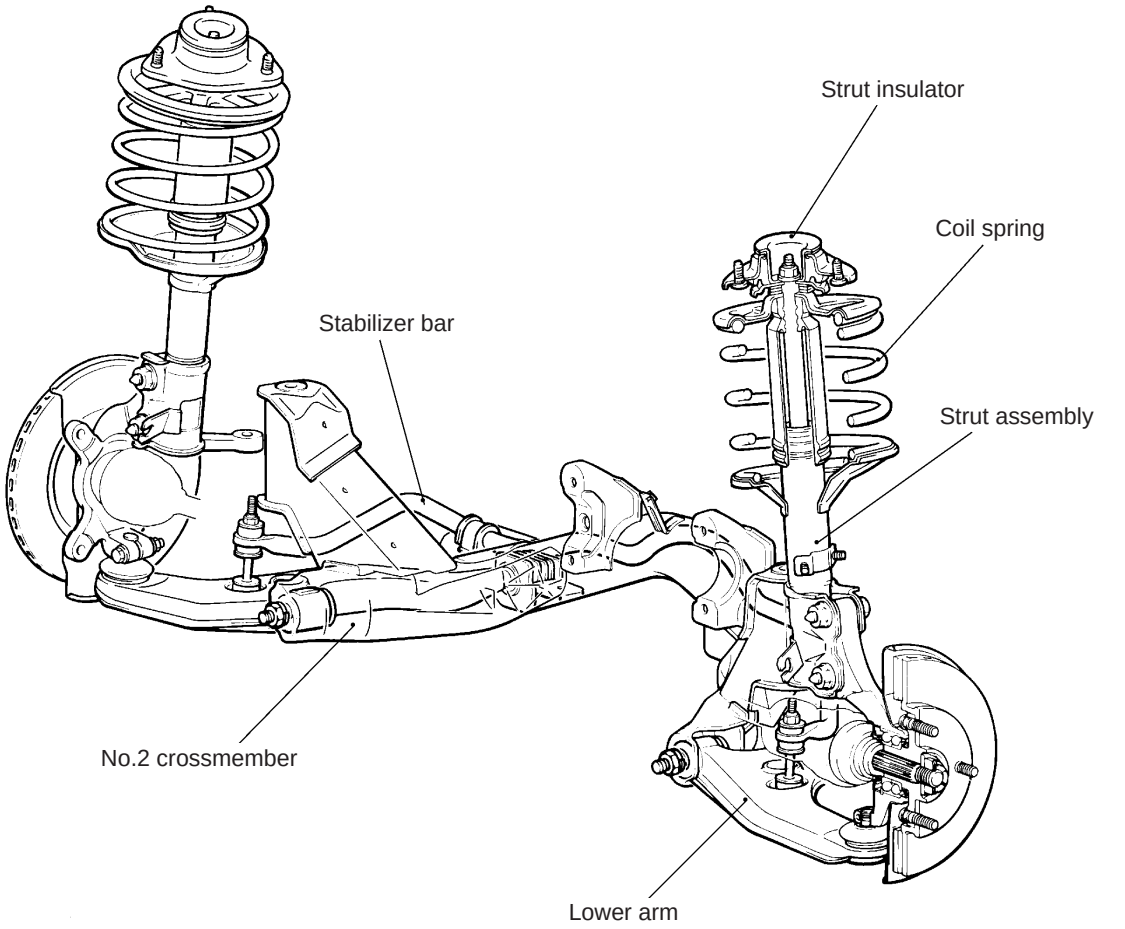
33100010072

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

COIL SPRING

Items	1300	1800
Wire dia. × O.D. × free length mm	12×138×354	13×160×383

CONSTRUCTION DIAGRAM



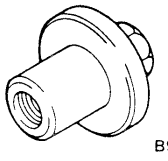
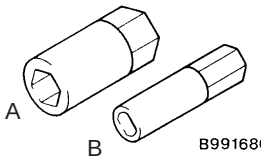
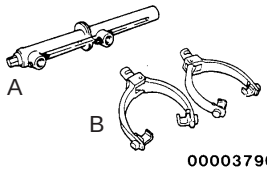
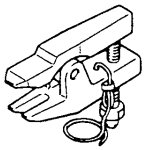
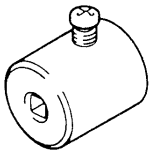
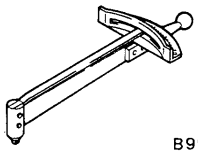
SERVICE SPECIFICATIONS

33100030078

Items		Standard value
Toe-in	At the centre of tyre tread mm	0 ± 2
	Toe-angle (per wheel)	0°00’ ± 06’
Toe-out angle on turns (inner wheel when outer wheel at 20°)		21°39’
Steering angle	Inner wheel	41°30’
	Outer wheel	34°00’
Camber		0°40’ ± 30’
Caster		2°54’
Kingpin inclination		13°36’
Lower arm ball joint starting torque Nm		1.0 – 6.4
Lower arm ball joint turning torque Nm		1.0 – 2.5
Protruding length of stabilizer bar mounting bolt mm		22

SPECIAL TOOLS

33100060060

Tools	Number	Name	Use
 B991004	MB991004	Wheel alignment gauge attachment	Measurement of the wheel alignment
 A B991680 B	MB991680 A: MB991681 B: MB991682	Wrench set A: Wrench B: Socket	Disassembly/assembly of the strut assembly
 A B 00003796	A: MB991237 B: MB991238	A: Spring compressor body B: Arm set	Compression of the front coil spring
 B991113	MB991113	Steering linkage puller	Removal of the ball joint
 B991006	MB991006	Preload socket	Measurement of the ball joint rotation starting torque and turning torque
 B990968	MB990968	Torque wrench	

ON-VEHICLE SERVICE

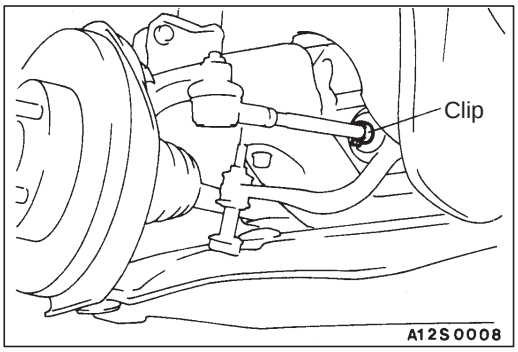
33100090212

FRONT 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' ± 06'



NOTE
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 turn buckles by the same amount (in opposite directions).
2. 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.
   For each one turn of the left and right tie rods, the toe-in will be adjusted by approx. 1°05' (per wheel).

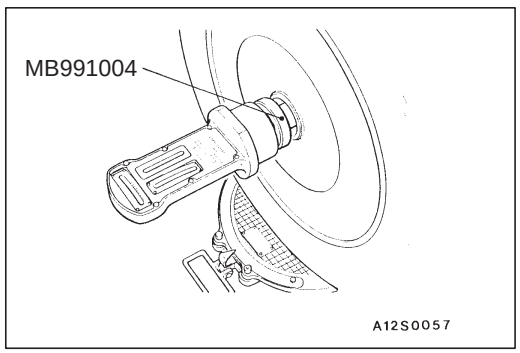
TOE-OUT ANGLE ON TURNS

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:
21°39' (inner wheel when outer wheel at 20°)

STEERING ANGLE

Standard value:
Inner wheel 41°30'
Outer wheel 34°00'



CAMBER, CASTER AND KINGPIN INCLINATION

Standard value:
Camber 0°40' ± 30'
Caster 2°54'
Kingpin inclination 13°36'

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 216–255 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 33200860076

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

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

STRUT ASSEMBLY

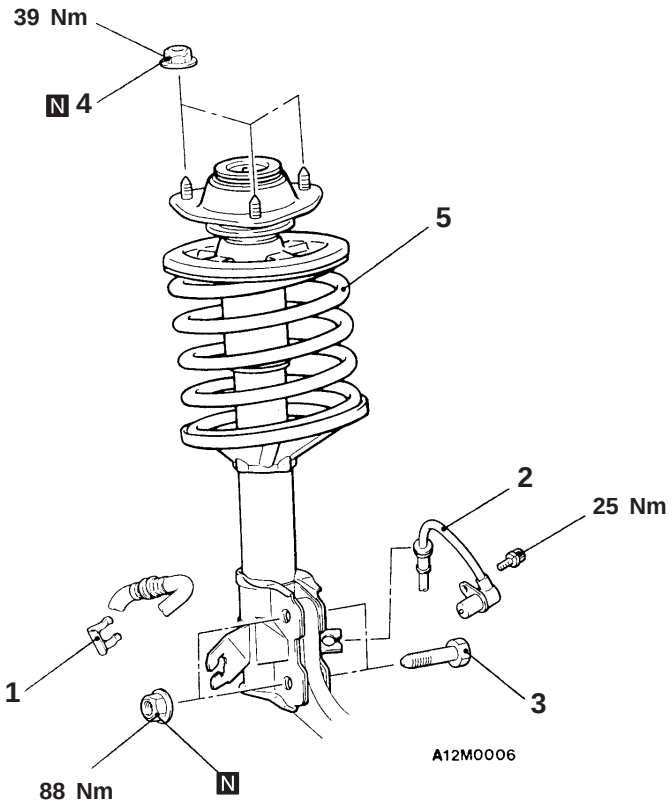
33200110096

REMOVAL AND INSTALLATION

Caution
Do not strike the speed sensor against other parts when removing or installing it. Otherwise the speed sensor will be damaged. <Vehicles with SRS>

Pre-removal Operation
- Relay Box Removal

Post-installation Operation
- Relay Box Installation
- Front Wheel Alignment Adjustment (Refer to P.33A-5.)



Removal steps
1. Brake hose clamp
2. Front speed sensor <Vehicles with ABS>

◀A▶
3. Bolts
4. Self-locking nut
5. Strut assembly

REMOVAL SERVICE POINT

◀A▶ BOLTS REMOVAL

1. Suspend the lower arm from the vehicle with wire.
2. Remove the strut and knuckle connection.

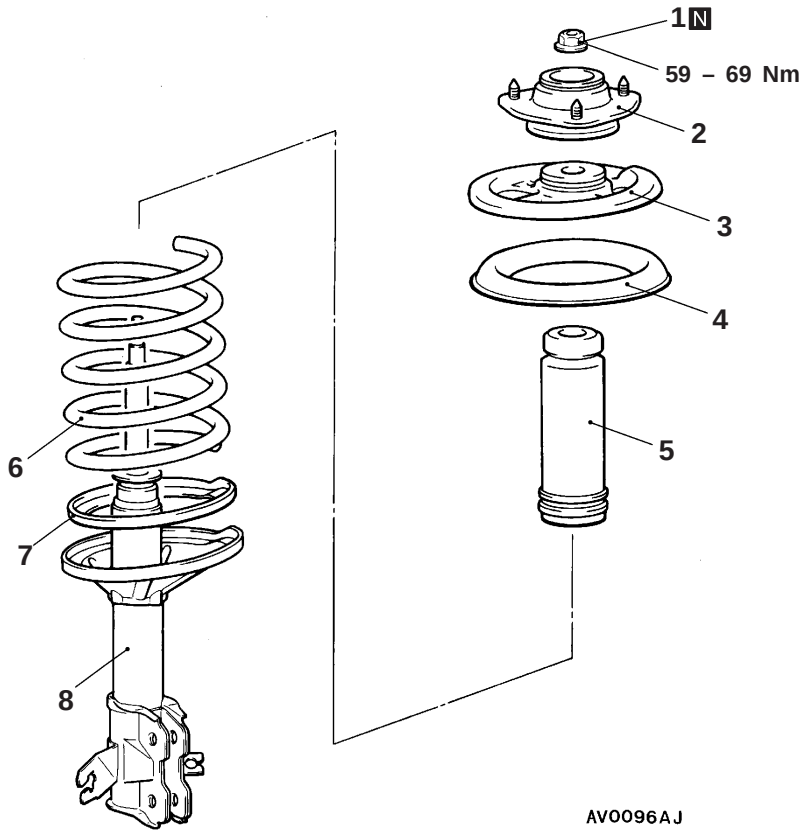
INSPECTION

33200120020

- Check for oil leaks from the strut assembly.
- Check the strut assembly for damage or deformation.

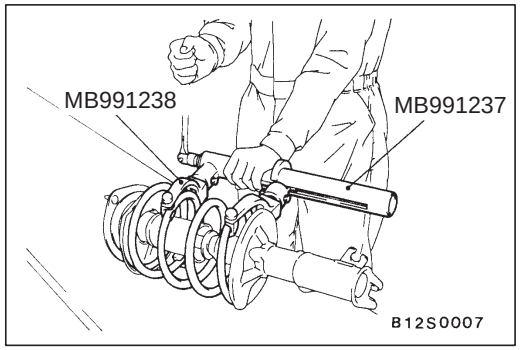
DISASSEMBLY AND REASSEMBLY

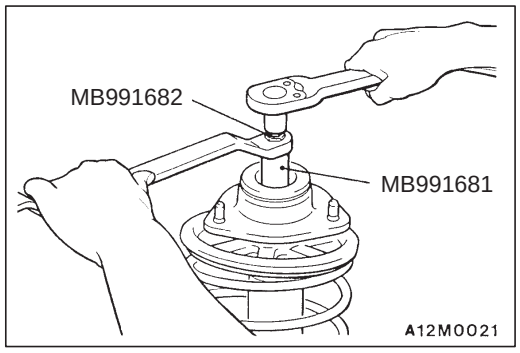
33200130115



Disassembly steps

◀A▶ ▶A◀ 1. Self-locking nut
2. Strut insulator
3. Spring seat, upper
4. Spring pad, upper
5. Bump rubber
6. Coil spring
7. Spring pad, lower
◀B▶ 8. Strut assembly





DISASSEMBLY SERVICE POINTS

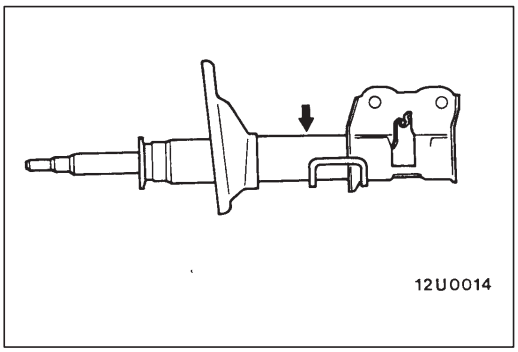
◀A▶ SELF-LOCKING NUT REMOVAL

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

Caution
(1) To compress the coil spring fully, install the special tools evenly, and so that the space between both arms of the special tool will be maximum within the installation range.
(2) Do not use an impact wrench to tighten the special tool bolt, otherwise the special tool will break.

2. Use the special tools to remove the self-locking nut.

Caution
Do not use an impact wrench, otherwise the strut assembly internal parts will loose.



▶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.

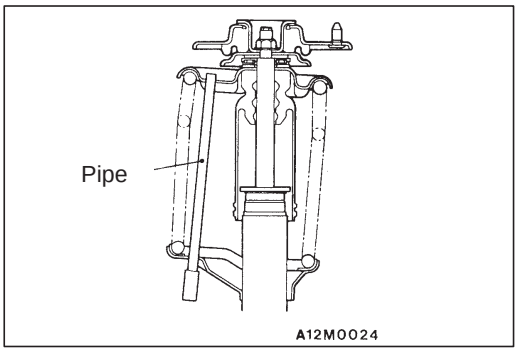
Caution
The gas itself is harmless but it may issue out of the hole together with chips generated by the drill. Therefore, be sure to wear goggles.

REASSEMBLY SERVICE POINT

▶A◀ SELF-LOCKING NUT INSTALLATION

1. With the coil spring held compressed by the special tools (MB991237 and MB991238), provisionally tighten the self-locking nut.

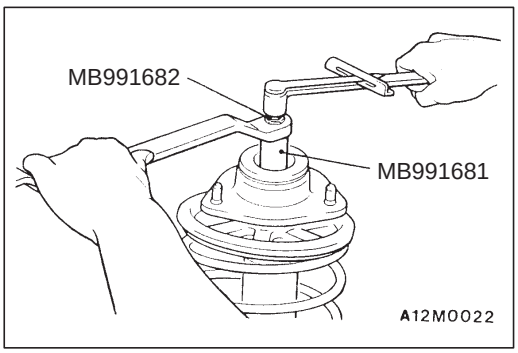
   Caution
   Do not use an impact wrench to tighten the special tool bolt, otherwise the special tool will break.



2. Line up the holes in the strut assembly spring lower seat with the hole in the spring upper seat.

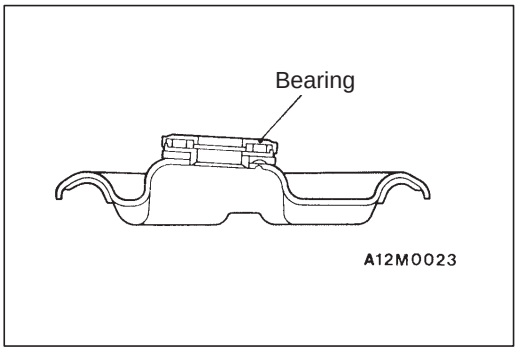
   NOTE
   The job is easily accomplished with a pipe.

3. Correctly align both ends of the coil spring with the grooves in the spring seat, and then loosen the special tools (MB991237 and MB991238).



4. Using the special tool, tighten the self-locking nut to the specified torque.

   Caution
   Do not use an impact wrench, otherwise the strut assembly internal parts will loose.



INSPECTION

33200140033

- Check the bearing for wear or rust.
- Check the rubber parts for damage or deterioration.
- Check the spring for deformation, deterioration or damage.
- Check the shock absorber for deformation.

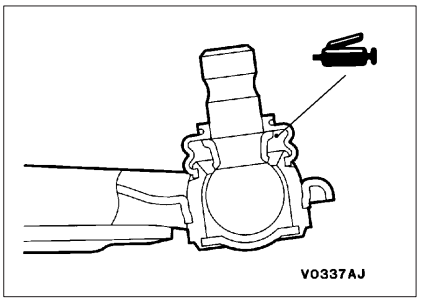
LOWER ARM

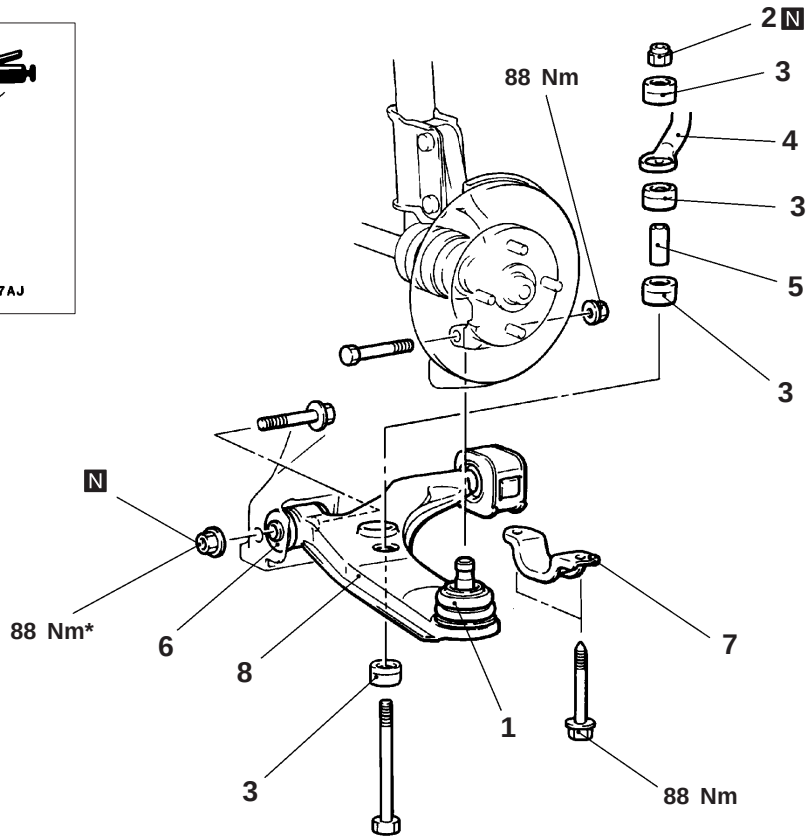
33200160091

REMOVAL AND INSTALLATION

Caution*:
indicates parts which should be temporarily tightened, and then fully tightened with the vehicle on the ground in an unladen condition. Otherwise the bush will be damaged.

Post-installation Operation
- Check the Dust Cover for Cracks or Damage by Pushing it with Finger.
- Front Wheel Alignment Adjustment (Refer to P.33A-5.)

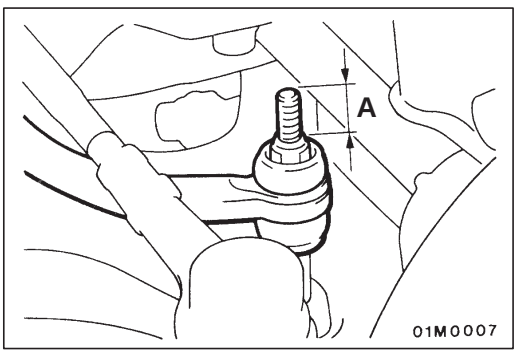




00008502

Removal steps

1. Lower arm ball joint connection
▶A◀ 2. Self-locking nut
3. Stabilizer rubber
4. Stabilizer bar
5. Collar
6. Lower arm front bushing connection
7. Support bracket
8. Lower arm assembly



INSTALLATION SERVICE POINT

▶A◀ SELF-LOCKING NUT INSTALLATION

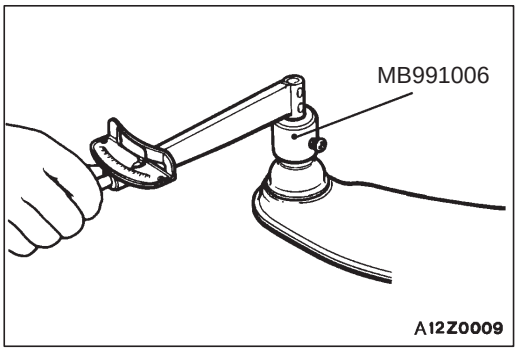
Tighten the self-locking nut so that the amount of protrusion of the end of the stabilizer bar mounting bolt is at the standard value.

Standard value (A): 22 mm

INSPECTION

33200170094

- Check the bushing for wear and deterioration.
- Check the lower arm for bend or breakage.
- Check the support bracket for deterioration or damage.
- Check all bolts for condition and straightness.



BALL JOINT STARTING TORQUE/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 starting/turning torque of the ball joint.

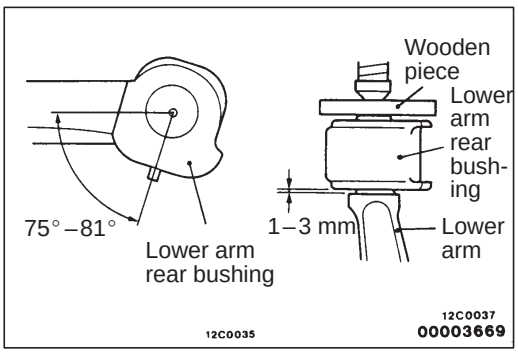
   Standard value:
   Starting torque 1.0 – 6.4 Nm
   Turning torque 1.0 – 2.5 Nm

2. If the measured values exceed the standard values, replace the ball joint.
3. If the measured values are lower than the standard values, check that the ball joint does not feel stiff. If it doesn't feel stiff, it is possible to use the ball joint.

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 cracks or damaged, replace the lower arm assembly.

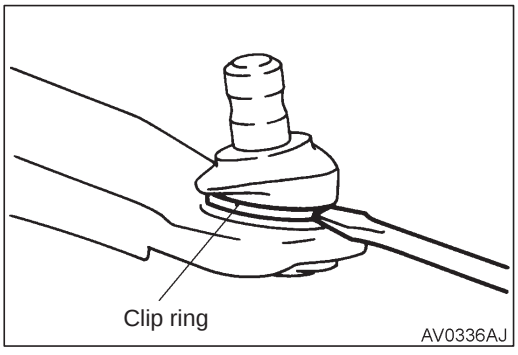
   NOTE
   Cracks or damage of the dust cover may cause damage of the ball joint.



LOWER ARM REAR BUSHING REPLACEMENT

33200810101

1. Apply soapy water between the shaft and old bushing, and pry up bushing using a screwdriver.
2. Apply soapy water to the shaft and new bushing and install new bushing into the shaft at the angle shown in the illustration.
3. Press in the bushing as illustrated.



LOWER ARM BALL JOINT DUST COVER REPLACEMENT

33200820081

When the dust cover is damaged or the grease gushes out 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. Install the dust cover to the ball joint.
4. Secure the dust cover by the clip ring.

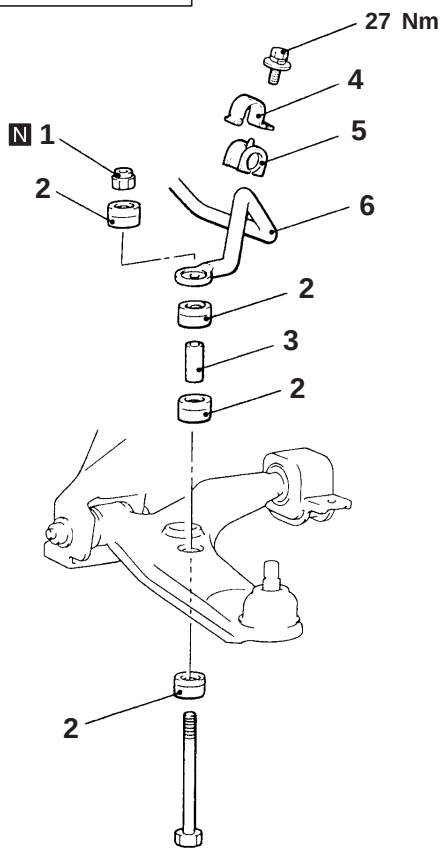
5. Check the dust cover for cracks or damage by pushing it with finger.

STABILIZER BAR

33200190106

REMOVAL AND INSTALLATION

Pre-removal and Post-installation Operation
- Crossmember Removal and Installation (Refer to GROUP 32 – Crossmember.)



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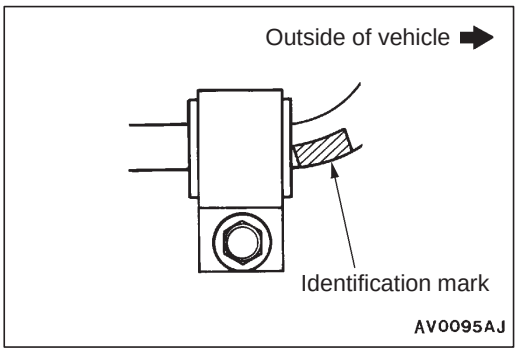
Removal steps

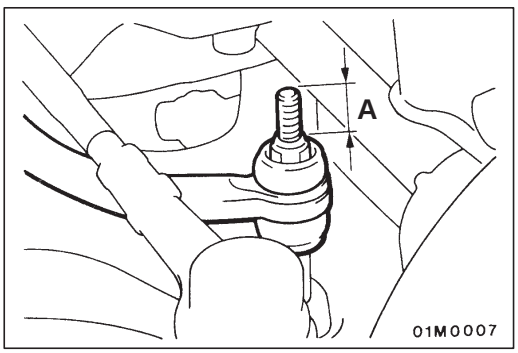
▶B◀ 1. Self-locking nut
2. Stabilizer rubber
3. Collar
▶A◀ 4. Fixture
▶A◀ 5. Bushing
6. Stabilizer bar



INSTALLATION SERVICE POINTS

▶A◀ BUSHING/FIXTURE INSTALLATION

Place the identification mark of the stabilizer bar to the right, and install the bushing so that the identification mark is at the shown position.



▶B◀ SELF-LOCKING NUT INSTALLATION

Tighten the self-locking nut so that the amount of protrusion of the end of the stabilizer bar mounting bolt is at the standard value.

Standard value (A): 22 mm

INSPECTION

33200200021

- Check the bushing for wear and deterioration.
- Check the stabilizer bar for deterioration or damage.

NOTES

GROUP 33A
FRONT SUSPENSION

GENERAL

OUTLINE OF CHANGE

The coil spring has been changed as follows <1800,1900>.

COIL SPRING

Items	1800-M/T	1800-A/T,1900
Wire dia. × O.D. × free length mm	13 × 160 × 374	13 × 160 × 384

NOTES

GROUP 33A
FRONT SUSPENSION

GENERAL

OUTLINE OF CHANGE

Due to the introduction of 1600 engine models, the front coil spring specification has been revised.

GENERAL INFORMATION

COIL SPRING

Items	1600-5M/T	1600-4A/T
Wire dia. × O.D. × free length mm	13×160×356 13×160×364*	13×160×374 13×160×373*

NOTE

*: Vehicles with High-ground clearance suspension.

NOTES

SERVICE BULLETIN

PUBLICATION GROUP, AFTER SALES SERVICE DEP.
MITSUBISHI MOTOR SALES EUROPE BV

SERVICE BULLETIN	**No.:** ESB-99E33-501	
	Date: 1999-11-15	**<Model>** (EC,EXP) CARISMA SPACE STAR **<M/Y>** 96-10
Subject: CORRECTION TO FRONT SUSPENSION CAMBER AND CASTER VALUES		
Group: FRONT SUSPENSION		
CORRECTION	O. Kai - E.V.P. & G.M. After Sales Service Dept.	

1. Description:

A descriptive omission found in the front suspension camber and caster values has been rectified.

2. Applicable Manuals:

Manual	Pub. No.	Language	Page(s)
'96 CARISMA Technical Information Manual	PYGE95E1	(English)	3-4
'96 CARISMA Workshop Manual chassis	PWDE9502	(English)	33A-3,6
	PWDS9503	(Spanish)	
	PWDF9504	(French)	
	PWDG9505	(German)	
	PWDD9506	(Dutch)	
	PWDW9507	(Swedish)	
	PWDI96E1	(Italian)	
'99 SPACE STAR Technical Information Manual	1MXE99E1	(English)	3-4
'99 SPACE STAR Workshop Manual chassis	CMXE99E1	(English)	33A-3,6
	CMXS99E1	(Spanish)	
	CMXF99E1	(French)	
	CMXG99E1	(German)	
	CMXD99E1	(Dutch)	
	CMXW99E1	(Swedish)	
	CMXI99E1	(Italian)	

3. Details

'96 CARISMA Technical Information Manual, page 2
'96 CARISMA Workshop Manual chassis, page 3, 4
'99 SPACE STAR Technical Information Manual, page 5
'99 SPACE STAR Workshop Manual chassis, page 6, 7

SPECIFICATIONS

SUSPENSION SYSTEM

Item	Specifiactions
Suspension method	McPherson strut with coil springs and compression rods

WHEEL ALIGNMENT

Item		Specifiactions
Camber		0° 0 0’ ± 3 0’* **<Added>**
Caster		2° 1 2’ ± 30’* **<Added>**
Kingpin inclination		1 2° 4 1’
Toe-In	At the centre of tyre tread mm	1 ± 2
	Toe-angle (per wheel)	0° 0 6’ ± 1 2’
Toe-out angle on turns (inner wheel when outer wheel at 20°)		2 1. 8°

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

<Added>

SERVICE SPECIFICATIONS

Items		Standard value
Toe-in	At the centre of tyre tread mm	1 ± 2
	Toe-angle (per wheel)	0° 03’ ± 06’
Toe-out angle on turns (inner wheel when outer wheel at 20°)		21.8°
Steering angle	Inner wheel	39°00’ ± 1°30’
	Outer wheel	32°00’
Camber		0° 00’ ± 30’ * **<Added>**
Caster		2° 12’ ± 30’* **<Added>**
Kingping inclination		12° 41’
Lower arm ball joint starting torque Nm		1.0 – 6.5
Lower arm ball joint turning torque Nm		1.0 – 3.9
Stabilizer link ball joint turning torque Nm		1.7 – 3.1

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

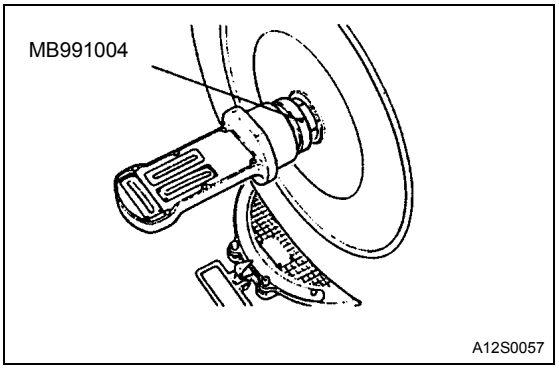
<Added>

STEERING ANGLE

Standard value:
Inner wheel 39°00' ± 1°30'
Outer wheel 32°00'

<Added>

(difference between right and left wheels: less than 30'.)



CAMBER, CASTER AND KINGPIN INCLINATION

Standard value:
Camber 0°00' ± 30'
Caster 2°12'
Kingpin inclination 12°41'

<Added>

± 30' (difference between right and left wheels: less than 30'.)

NOTE
1. Camber and caster are preset at the factory and cannot be adjusted.
2. If camber is not within the standar value, check and replace bent or damaged parts.
3. For vehicles with aluminium type wheels, attache the camber/caster/kingpin gauge to drive shaft by using the special tool. Tighten the special tool to the same torque 200-260 Nm as the drive shaft nut.

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

SPECIFICATIONS

SUSPENSION SYSTEM

Item	Specifiactions
Suspension method	McPherson strut with coil springs and compression rods

WHEEL ALIGNMENT

Item		Specifiactions
Camber		-0°40’ ± 30’* **<Added>**
Caster		2°54’ ± 30’* **<Added>**
Kingpin inclination		13°36’
Toe-In	At the centre of tyre tread mm	0 ± 2
	Toe-angle (per wheel)	0°00’ ± 06’
Toe-out angle on turns (inner wheel when outer wheel at 20°)		21°39’

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

<Added>

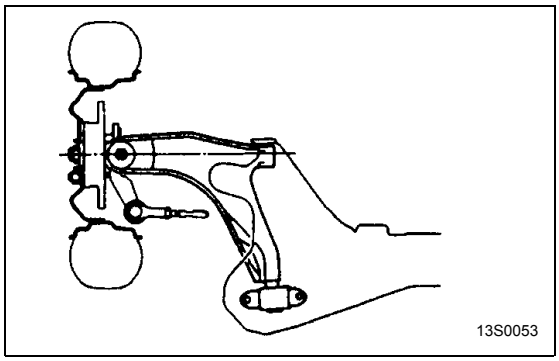
LOWER ARM

A compression type lower arm is fitted, giving the following advantages.

- Prevents fore/aft compliance steering by optimizing the lower arm pivot axis.
- Box-type cross-sectional construction for superior strength and light weight.
- Lower arm rear bushing with non-symmetrical spring characteristics in the vehicle lateral direction for steering stability and riding comfort.
- Front supporting point (lower arm front bushing section) positioned near the front wheel axis line to provide higher literal rigidity and reduce lateral force steering.
- Lower arm ball joint using polyacetal resin bearing which changes the rotating torque according to applied vibration frequency.

LOWER ARM FRONT BUSHING

Lower arm front bushing has “hard” characteristics in the vehicle left/right direction and “soft” characteristics in both fore/aft and twisting directions, which means that it functions to provide both steering stability and riding comfort.



Also the lower arm front bushing is installed at a point almost on the same line as the front wheel axis line to provide increased lateral rigidity and reduced lateral force steering.

SERVICE SPECIFICATIONS

Items		Standard value
Toe-in	At the centre of tyre tread mm	0 ± 2
	Toe-angle (per wheel)	0° 00’ ± 06’
Toe-out angle on turns (inner wheel when outer wheel at 20°)		21°39’
Steering angle	Inner wheel	41°30’
	Outer wheel	34°00’
Camber		0° 40’ ± 30’* **<Added>**
Caster		2° 54’ ± 30’* **<Added>**
Kingping inclination		13° 36’
Lower arm ball joint starting torque Nm		1.0 – 6.4
Lower arm ball joint turning torque Nm		1.0 – 2.5
Protruding lenght of stabilizer bar mounting bolt mm		22

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

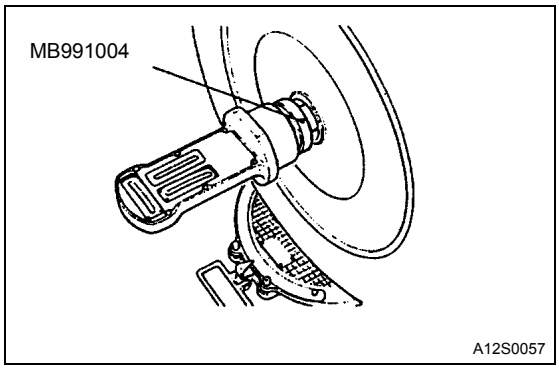
<Added>

STEERING ANGLE

Standard value:
Inner wheel 41°30'
Outer wheel 34°00'

<Added>

(difference between right and left wheels: less than 30'.)



CAMBER, CASTER AND KINGPIN INCLINATION

Standard value:
Camber 0°40' ± 30'
Caster 2°54'
Kingpin inclination 13°36'

<Added>

± 30' (difference between right and left wheels: less than 30'.)

NOTE
4. Camber and caster are preset at the factory and cannot be adjusted.
5. If camber is not within the standard value, check and replace bent or damaged parts.
6. For vehicles with aluminium type wheels, attach the camber/caster/kingpin gauge to drive shaft by using the special tool. Tighten the special tool to the same torque 216-255 Nm as the drive shaft nut.

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

BALL JOINT DUST COVER CHECK

33200660076

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

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

SERVICE BULLETIN

PUBLICATION GROUP, AFTER SALES SERVICE DEP.
MITSUBISHI MOTOR SALES EUROPE BV

SERVICE BULLETIN	No.: ESB-99E33-502	
	Date: 1999-12-31	<Model> (EC) SPACE STAR (DG1A, DG5A) <M/Y> 99-10
Subject: CORRECTION TO CAMBER VALUE FOR FRONT SUSPENSION		
Group: FRONT SUSPENSION		
CORRECTION	O. Kai - E.V.P. & G.M. After Sales Service Dept.	

1. Description:

This Service Bulletin informs you of correction to the camber value for the front suspension installed on Space Star.

2. Applicable Manuals:

Manual	Pub. No.	Language	Page(s)
'99 SPACE STAR Workshop Manual	CMXE99E1	(English)	33A-3, 6
	CMXS99E1	(Spanish)	
	CMXF99E1	(French)	
	CMXG99E1	(German)	
	CMXD99E1	(Dutch)	
	CMXW99E1	(Swedish)	
	CMXI99E1	(Italian)	

3. Details:

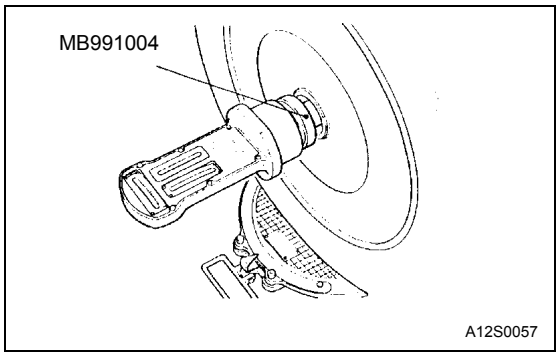
SERVICE SPECIFICATIONS

33100030078

Items		Standard value
Toe-in	At the centre of tyre tread mm	0 ± 2
	Toe-angle (per wheel)	0°00 ± 06’
Toe-out angle on turns (inner wheel when outer wheel at 20°C)		21°39’
Steering angle	Inner wheel	41°30’
	Outer wheel	34°00’
Camber		~~0°40’ ± 30’~~ <Incorrect> ◄ -0°40’ ± 30’ <Correct>
Caster		2°54’
Kingpin inclination		13°36’
Lower arm ball joint starting torque Nm		1.0 - 6.4
Lower arm ball joint turning torque Nm		1.0 - 2.5
Protruding length of stabilizer bar mounting bolt mm		22

STEERING ANGLE

Standard value:
Inner wheel 41°30'
Outer wheel 34°00'



CAMBER, CASTER AND KINGPIN INCLINATION

Standard value: **<Incorrect>**
Camber ~~0°40' ± 30'~~ ← **-0°40' ± 30'** **<Correct>**
Caster 2°54'
Kingpin inclination 13°36'

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 216-255 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

33200660076

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

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