

FRONT SUSPENSION

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E33AA--

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GENERAL INFORMATION

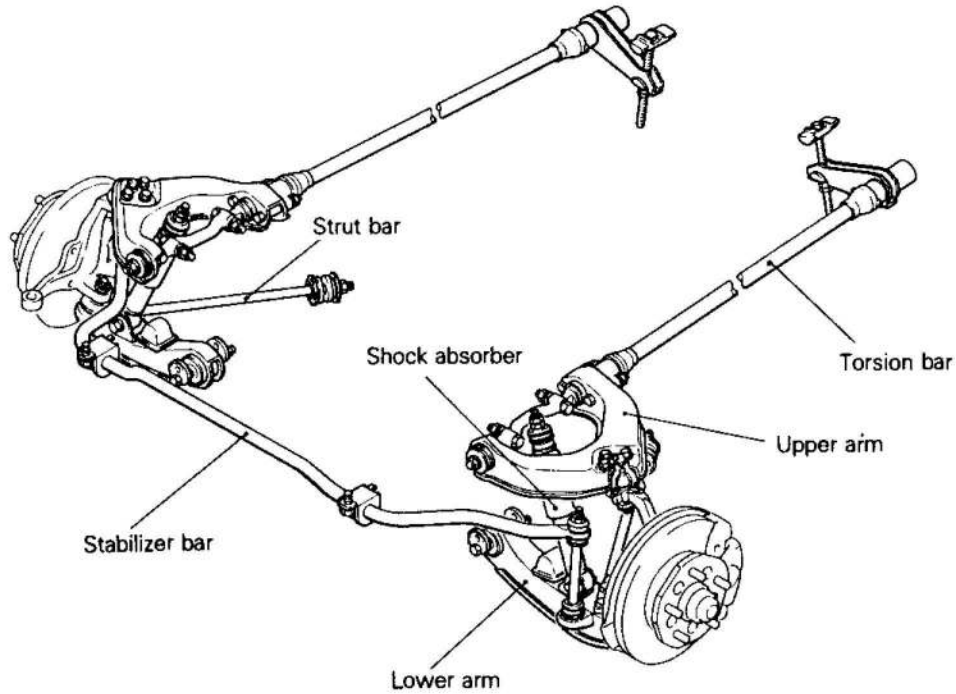
The front suspension is an independent suspension which is a combination of the double-wishbone and torsion bar spring.

One end of the torsion bar spring is installed to the upper arm, and the other end of each is installed to the crossmember of body.

2WD vehicles are equipped with I-beam lower arms provided with shock absorber, stabilizer bar and strut bar.

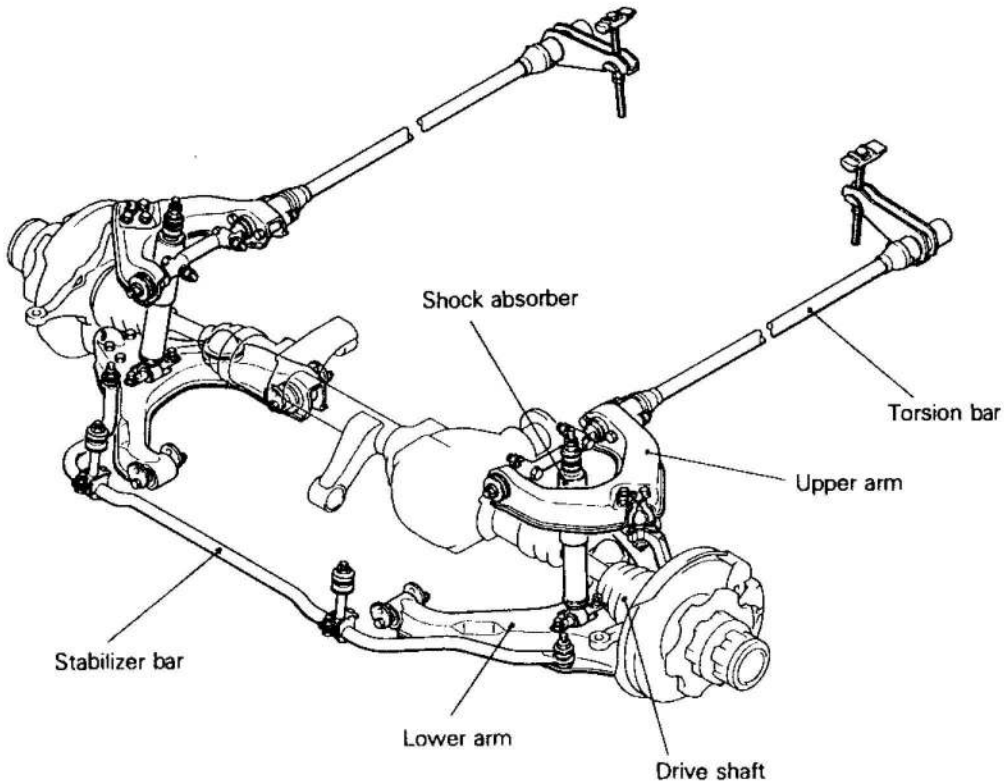
4WD vehicles are equipped with A-frame lower arms provided with shock absorber and stabilizer bar.

2WD



12G0028

4WD



12G0025

SPECIFICATIONS

GENERAL SPECIFICATIONS

E33CA-

VEHICLES FOR EUROPE AND AUSTRALIA

Items	2WD	4WD
Suspension system	Independent, double wishbone with torsion bar and telescopic shock absorber	Independent, double wishbone with torsion bar and telescopic shock absorber
Torsion bar (standard) Length×O.D. mm (in.)	970×20.5 (38.19×0.81)	970×20.5 (38.19×0.81) * ⁴ 970×19.5 (38.19×0.77)
Spring constant (Wheel position) N/mm (kg/mm, lbs./in.)	35 (3.5, 196)	35 (3.5, 196) * ⁴ 29 (2.9, 162)
Torsion bar (Heavy duty suspension) Length×O.D. mm (in.)	—	* ¹ 970×22.0 (38.19×0.87)
Spring constant (Wheel position) N/mm (kg/mm, lbs./in.)	—	45 (4.5, 252)
Shock absorber Type	Hydraulic, cylindrical, double acting type	Hydraulic, cylindrical, double acting type
Maximum length mm (in.)	355 (13.98)	329 (12.95) * ⁴ 331 (13.03)
Compression length mm (in.)	225 (8.86)	214 (8.43) * ⁴ 216 (8.50)
Stroke mm (in.)	130 (5.12)	115(4.53)
Damping force [at 0.3m (0.984 ft.)/sec.] Expansion N(kg, lbs.)	1,980–2,620 (198–262, 437–578)	* ² Van: 3,460–4,540 (346–454, 763–1,001) * ³ Van, Mini-bus: 3,020–3,980 (302–398, 666–877) * ⁴ 2,590–3,410 (259–341, 571–752)
Compression N (kg, lbs.)	900–1,300 (90–130, 198–287)	* ² Van: 1,830–2,570 (183–257, 403–567) * ³ Van, Mini-bus: 1,240–1,760 (124–176, 273–388) * ⁴ 960–1,440 (96–144, 212–317)
Stabilizer Outside diameter mm (in.)	27 (1.06)	25 (0.98)

NOTE

- *¹: indicates options excluding vans for European market.
- *²: indicates vehicles for Australian market
- *³: indicates vehicles for European market
- *⁴: indicates vehicles mini-bus models after December production, 1987 for the European market.

VEHICLES FOR GENERAL EXPORT

Items	2WD	4WD
Suspension system	Independent, double wishbone with torsion bar and telescopic shock absorber	Independent, double wishbone with torsion bar and telescopic shock absorber
Torsion bar (standard) Length×O.D. mm (in.) Spring constant (Wheel position) N/mm (kg/mm, lbs./in.)	970×20.5 (38.19×0.81) 35 (3.5, 196)	— —
Torsion bar (Heavy duty suspension) Length×O.D. mm (in.) Spring constant (Wheel position) N/mm (kg/mm, lbs./in.)	*970×22.0 (38.19×0.87) 45 (4.5, 252)	970×22.0 (38.19×0.87) 45 (4.5, 252)
Shock absorber Type Maximum length mm (in.) Compression length mm (in.) Stroke mm (in.) Damping force [at 0.3m (0.984 ft.)/sec.] Expansion N(kg.lbs.) Compression N (kg.lbs.)	Hydraulic, cylindrical, double acting type 355 (13.98) 225 (8.86) 130 (5.12) 1,980-2,620 (198-262, 437-578) 900-1,300 (90-130, 198-287)	Hydraulic, cylindrical, double acting type 329 (12.95) 214 (8.43) 115(4.53) 3,020-3,980 (302-398, 666-877) 1,240-1,760 (124-176, 273-388)
Stabilizer Outside diameter mm (in.)	Van (P12V, P15V): 24 (0.94) Mini-bus: 25 (0.98)	25 (0.98)

NOTE

*: indicates options excluding long body vehicles.

SERVICE SPECIFICATIONS

E33CB--

Items	2WD	4WD
Standard Value		
Toe-in		
At the center of tire tread mm (in.)	1±3 (0.04±0.12)	1±3 (0.04±0.12)
At the rim of disc wheel mm (in.)	0–3 (0–0.12)	0–3 (0–0.12)
Toe-in angle (per wheel)	±8'	±7'
Toe-out angle on turn (inner wheel when outer wheel is at 20°)	21°10'	20°10'
Camber	0°30'±45'	0°30'±45'
Caster	3°±1°	3°±1°
Kingpin inclination	10°30'	8°23'
Side slip mm (in.)	0±3 (0±0.12)	0±3 (0±0.12)
Vehicle height		
(Clearance between rebound stopper and upper arm) mm (in.)	51 (2.01)	45 (1.77)
Lower ball joint starting torque		
Nm (kg/cm, in.lbs.)	1–4 (10–40, 9–35)	–
Upper ball joint starting torque		
Nm (kg/cm, in.lbs.)	0.8–3.5 (8–35, 7–30)	0.8–3.5 (8–35, 7–30)
Shock absorber attaching dimension		
mm (in.)	–	7–8 (0.28–0.31)
Length of the anchor bolt section protruding from rear anchor arm (when torsion bar is replaced.)		
mm (in.)	–	–
Van		
Mini-bus	36 (1.42)	40 (1.57)
Vehicles for Genral Export and Australia		
Vehicles for Europe	30 (1.18)	40 (1.57)
Produced through November, 1987		
Produced from December, 1987	30 (1.18)	40 (1.57)
Produced from December, 1987	23 (0.91)	28 (1.10)
Strut bar installation dimension mm (in.)	110 (4.33)	–
Stabilizer attaching bolt end attaching dimension (lower arm side) mm(in.)	10–12 (0.39–0.47)	8–10 (0.31–0.39)
Hanger bolt end attaching dimension (Suspension crossmember side) mm (in.)	–	4.5–6.5 (0.18–0.26)
Limit		
Lower ball joint axial play mm (in.)	–	0.5 (0.02)

TORQUE SPECIFICATIONS

E33CC--

2WD

Items	Nm	kgm	ft.lbs.
Shock absorber to frame	12-18	1.2-1.8	9-13
Shock absorber to lower arm	70-95	7.0-9.5	51-69
Lower arm to suspension crossmember	110-130	11-13	80-94
Lower ball joint to knuckle arm	120-180	12-18	87-130
Bump stopper to lower arm	20-30	2.0-3.0	14-22
Upper arm to frame	120-160	12-16	87-116
Upper ball joint to knuckle arm	120-180	12-18	87-130
Upper ball joint to upper arm	35-55	3.5-5.5	25-40
Rebound stopper to rebound stopper bracket	20-30	2.0-3.0	14-22
Front anchor arm to upper arm	70-95	7.0-9.5	51-69
Torsion bar adjusting nut to torsion bar lock nut	40-50	4.0-5.0	29-36
Strut bar to lower arm	85-110	8.5-11	61-80
Strut bar to engine mounting crossmember			
Vehicles built up to May 1994	90-125	9.0-12.5	65-90
Vehicles built from June 1994	140-190	14-19	101-137
Stabilizer bar to frame	9-14	0.9-1.4	7-10

4WD

Items	Nm	kgm	ft.lbs.
Shock absorber mounting nut to locking nut	12-18	1.2-1.8	9-13
Shock absorber to lower arm	28-35	2.8-3.5	20-25
Lower arm to gear mounting crossmember	90-120	9.0-12	65-87
Lower arm to suspension crossmember	90-110	9.0-11	65-80
Lower ball joint to knuckle arm	120-180	12-18	87-130
Lower ball joint to lower arm	70-95	7.0-9.5	51-69
Bump stopper to lower arm	20-30	2.0-3.0	14-22
Tie rod assembly to knuckle arm	35-45	3.5-4.5	25-33
Freewheeling hub cover mounting bolt (Vehicles for manual free wheeling hub)	10-14	1.0-1.4	7-10
Cover (Vehicles for automatic free wheeling hub)	18-35	1.8-3.5	13-25
Front dumper bracket to frame	60-70	6.0-7.0	43-51
Upper arm to frame	120-160	12-16	87-116
Upper ball joint to knuckle arm	120-180	12-18	87-130
Upper ball joint to upper arm	35-55	3.5-5.5	25-40
Rebound stopper to rebound stopper bracket	20-30	2.0-3.0	14-22
Front anchor arm to upper arm	70-95	7.0-9.5	51-69
Torsion bar adjusting nut to torsion bar locking nut	40-50	4.0-5.0	29-36
Stabilizer attaching bolt to hanger	9-14	0.9-1.4	7-10

LUBRICANTS

E33CD--

Items	Specified lubricants	Quantity
Lower ball joint Upper ball joint Torsion bar serrations Torsion bar dust covers Torsion bar anchor bolt	Multipurpose grease SAE J310, NLGI No. 2	As required

SEALANTS AND ADHESIVES

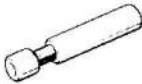
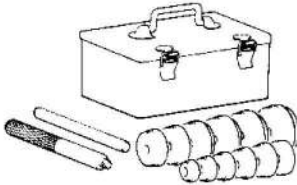



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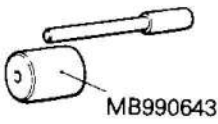
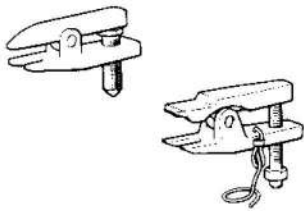
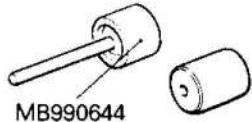
Items	Specified sealant	Remarks
Slot of upper ball joint	3M ATD Part No. 8663, 8661 or equivalent	Semi-drying sealant

SPECIAL TOOLS

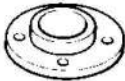
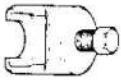


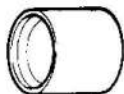
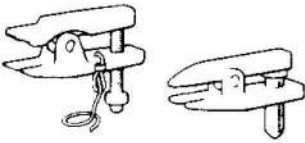
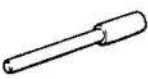
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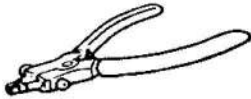


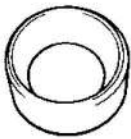

2WD

Tool (Number and name)	Use	Tool (Number and name)	Use
MB990804 Knuckle arm puller 	Removal of upper ball joint and lower ball joint to knuckle	MB990925 Bearing and oil seal installer set 	Removal of lower arm bushing MB990926
MB990326 Preload socket  MB990685 or MB990968 Torque wrench 	Measurement of the upper and lower ball joint starting torque	MB991179 Bushing remover and installer support 	Removal and installation of the lower arm bushing

Tool (Number and name)	Use	Tool (Number and name)	Use
MB990649 Lower arm bushing remover and installer  MB990643	Removal and installation of the lower arm bushing	MB990635 or MB991113 Steering linkage puller 	Removal of the tie rod ball joint to knuckle
MB990641 Lower arm bushing remover and installer  MB990644	Installation of the lower arm bushing		

4WD

Tool (Number and name)	Use	Tool (Number and name)	Use
MB991034 Gauge attachment 	Measurement of the wheel alignment	MB990809 Pitman arm puller 	Removal of upper and lower arm ball joints and knuckle
MB990326 Preload socket  MB990685 or MB990968 Torque wrench 	Measurement of the upper ball joint starting torque	MB991180 Bushing remover and installer base 	Removal and installation of the lower arm bushing
MB990635 or MB991113 Steering linkage puller 	Removal of tie rod ball joint and knuckle	MB990883 Rear suspension bushing arbor 	Removal and installation of the lower arm bushing

Tool (Number and name)	Use	Tool (Number and name)	Use
MB991181 Bushing installer guide 	Installation of the rear lower arm bushing	MB991183 Bushing remover and installer arbor 	Removal and installation of the front lower arm bushing
MB991182 Bushing remover and installer ring 	Removal and installation of the front lower arm bushing	MB990628 Snap ring pliers 	Removal and installation of the snap ring
MB991152 Dust cover installer 	Installation of the front lower arm bushing	MB991318 Lower arm bushing arbor 	Removal and installation of the front lower arm bushing
MB991319 Lower arm bushing guide 	Installation of the front lower arm bushing	MB991320 Lower arm bushing ring 	Removal and installation of the front lower arm bushing

TROUBLESHOOTING

Symptom	Probable cause	Remedy	Reference page	
			2WD	4WD
Steering wheel is heavy, vibrates or pulls to one side	Suspension malfunctioning Ball joint Torsion bar Wheel alignment	Inspect, adjust or replace the part	33-10, 11, 18	33-10, 11, 31
Excessive vehicle rolling	Broken or deteriorated stabilizer Shock absorber malfunctioning	Replace	33-14, 21	33-25, 34
Poor riding	Excessive tire inflation pressure	Adjust the tire inflation pressure	GROUP 31	
	Shock absorber malfunctioning	Replace	33-14	33-25
	Deformed torsion bar	Replace	33-18	33-31
	Broken or deteriorated torsion bar	Replace	33-18	33-31
Noise	Loose or deformed anchor bolt	Retighten or replace	33-18	33-31
	Worn torsion bar serration	Replace	33-18	33-31
	Oil leaks from shock absorber		33-14	33-25
	Inadequate lubrication of various sections	Lubricate	–	–
	Worn or deformed bushing	Replace	–	–
	Shock absorber malfunctioning		33-14	33-25
Inclination of vehicle	Anchor arm assembly not installed in correct position	Retighten or replace	33-18	33-31
	Inadequately tightened anchor bolt		33-18	33-31
	Deformed crossmember	Replace	GROUP 32	
	Broken or deteriorated torsion bar	Replace	33-18	33-31

NOTES

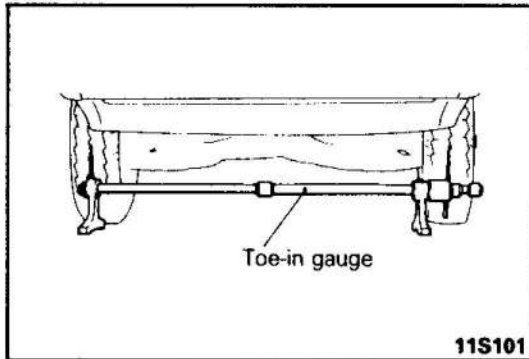
SERVICE ADJUSTMENT PROCEDURES

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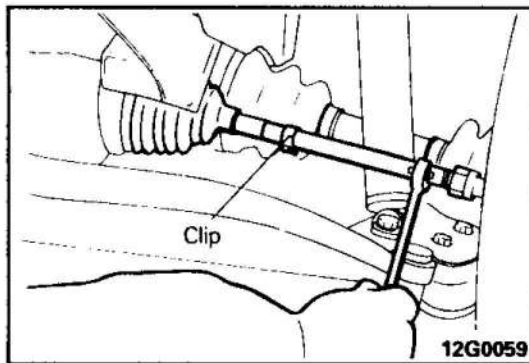
INSPECTION AND ADJUSTMENT OF THE WHEEL ALIGNMENT

Measure the wheel alignment with the vehicle parked on a level surface and with the front wheels placed in the straight ahead position.

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



11S101



12G0059

TOE-IN

1. Measure the toe-in.

Standard value:

At the centre of tyre tread

1 ± 3 mm (0.04 ± 0.12 in.)

At the rim of disc wheel

0–3 mm (0–0.012 in.)

Toe-in angle (per wheel)

2WD $\pm 8'$

4WD $\pm 7'$

2. 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). 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 half turn of the left and right tie rods, the toe-in will be adjusted by approx. 3 mm (0.12 in.).

Caution

The difference between the left and right tie rods shall not exceed 5 mm (0.21 in.).

3. After making the adjustments, use a turning radius gauge to confirm that the steering wheel turning angle is within the standard value range. (Refer to GROUP 37).

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.

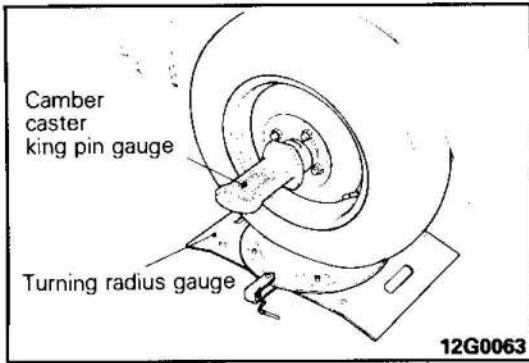
Conduct this test on the left turn as well as on the right turn.

Standard value:

(inner wheel when outer wheel at 20°)

2WD $21^\circ 10'$

4WD $20^\circ 10'$



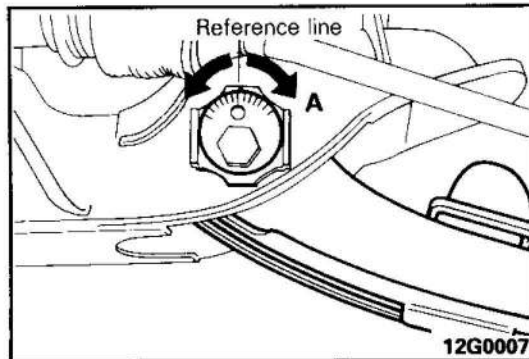
CAMBER AND CASTER (2WD)

1. Place front wheels on turning radius gauge.
2. Remove hub cap and split pin.
3. Attach camber/caster/king pin gauge and measure camber and caster.

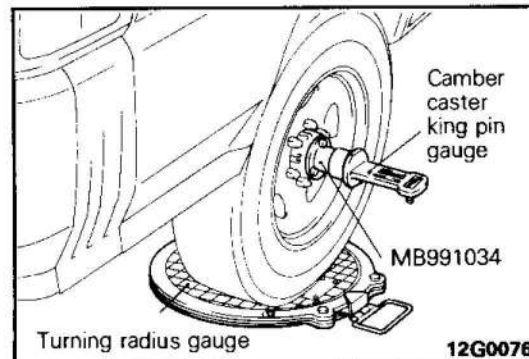
**Standard values: Camber; $0^{\circ}30' \pm 45'$
Caster; $3^{\circ} \pm 1^{\circ}$**

NOTE

Caster is non-adjustable



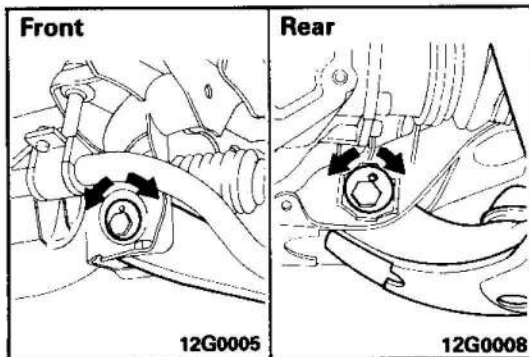
4. If the camber is not the standard value, adjust by rotating the lower arm's shaft assembly. One marking is a change of $18'$ of the camber; it is increased by turning in the A direction.



CAMBER AND CASTER (4WD)

1. Place front wheels on turning rading gauge.
2. Remove free-wheel hub.
3. Attach special tool and then camber/caster/king pin gauge. Measure camber and caster.

**Standard values: Camber; $0^{\circ}30' \pm 45'$
Caster; $3^{\circ} \pm 1^{\circ}$**



4. When the camber or caster value is outside standard value, loosen the lower arm shaft assembly (front side) and the bolt assembly (rear side), and adjust by rotating the adjusting cam. (Refer to camber/caster adjustment table.)

Reading the Table:

Calculate the difference between the measured values and the standard camber and caster values. Note the proper displacement of the adjusting cam in the table.

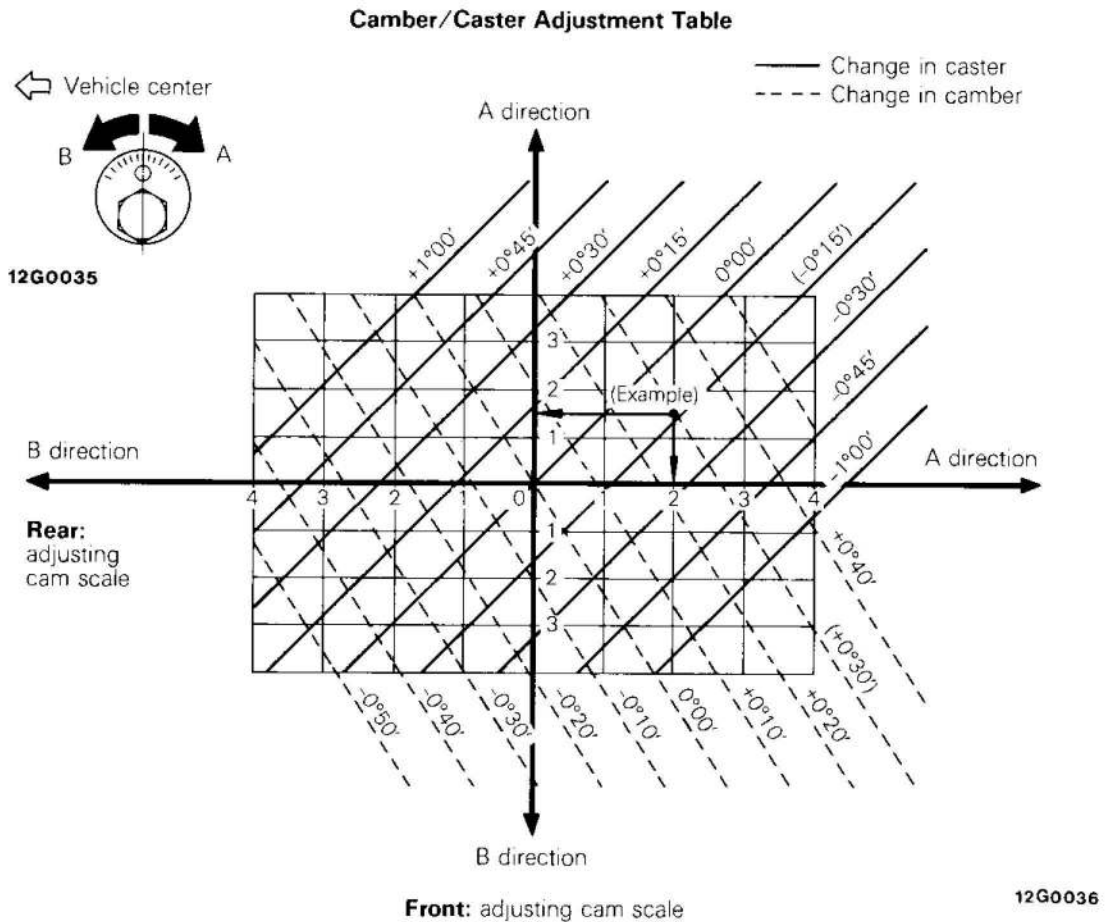
Example:

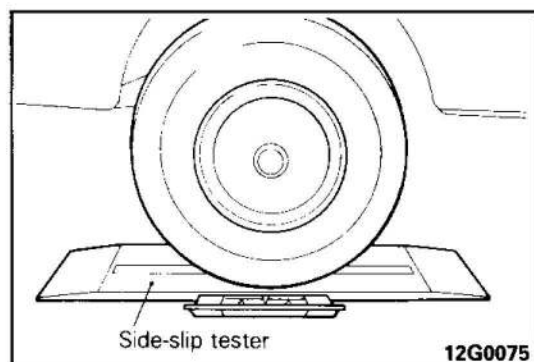
	Measured value	Standard value	(Difference)
Camber	0°	0°30'	30'
Caster	3°15'	3°	15'

To increase the camber by 30' and reduce the caster by 15' in order to bring them to the standard values, if the point where the adjustment angle lines cross in the Camber/Caster Adjustment Table is found, then it can be seen that the front adjusting cam must be turned 1.5 steps in A direction, and the rear adjusting cam must be moved 2 steps in the A direction.

NOTE

The values on the horizontal and vertical axes indicate a single step on the adjusting cam scales.

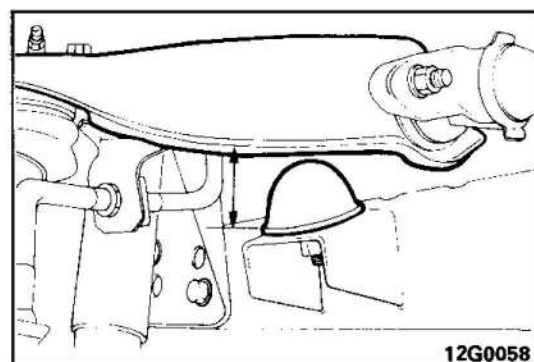


KINGPIN INCLINATION**Standard value:****2WD 10°30'****4WD 8°23'****SIDE SLIP**

1. Measure the side slip with a side slip tester.

Standard value: 0±3 mm (0±0.12 in.)

2. Adjust the wheel alignment when the amount of side slip is outside the standard value.

**CHECKING OF THE VEHICLE HEIGHT**

E33FCAA

1. With the vehicle in the unladen condition, measure to determine whether the distance from the upper arm rebound stopper to the upper arm is the standard value.

Standard value:**2WD 51 mm (2.01 in.)****4WD 45 mm (1.77 in.)**

2. If it is not the standard value, adjust by using the anchor bolt's adjustment nut.

33-12-2

NOTES

SHOCK ABSORBER AND LOWER ARM

E335A--1

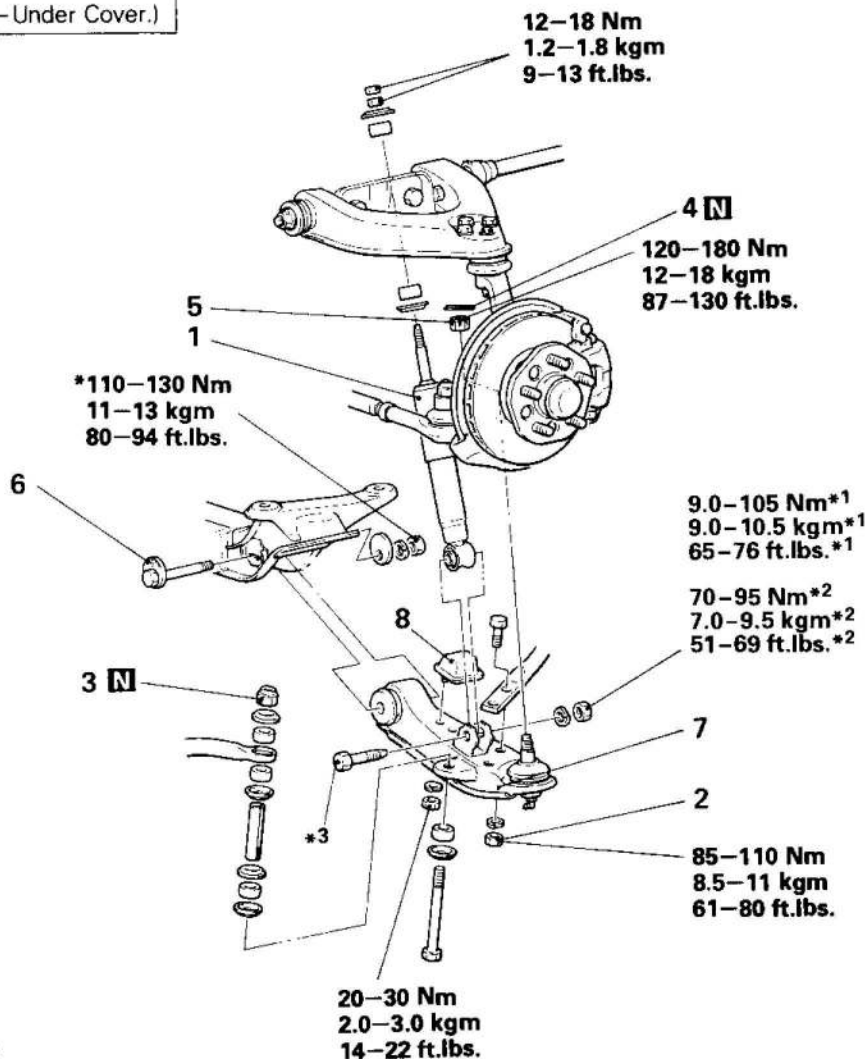
REMOVAL AND INSTALLATION

Pre-removal Operation

- Removal of under cover
(Refer to GROUP 42 Body–Under Cover.)

Post-installation Operation

- Inspection of wheel alignment
(Refer to P.33–10)
- Installation of under cover.
(Refer to GROUP 42 Body–Under Cover.)



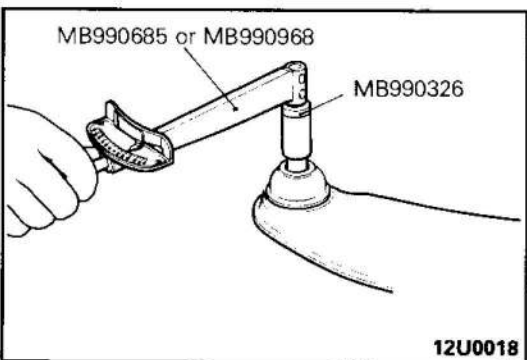
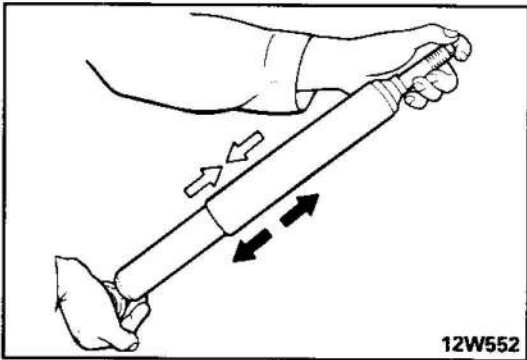
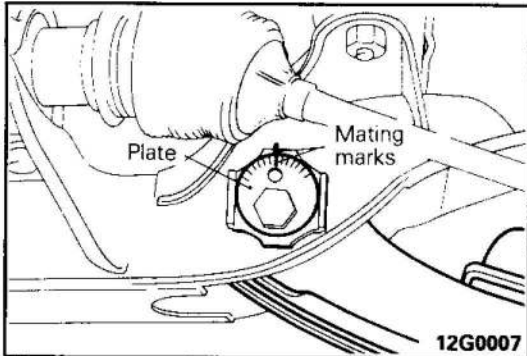
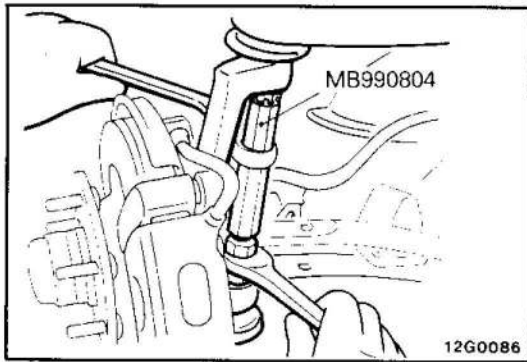
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Removal steps

1. Shock absorber
2. Nut
- ◆◆ 3. Self locking nut
4. Split pin
- ◆◆ 5. Connection of lower ball joint and knuckle
- ◆◆ ◆◆ 6. Shaft assembly
7. Lower arm
8. Bump stopper

NOTE

- (1) Reverse the removal procedures to reinstall.
- (2) ◆◆ : Refer to "Service Points of Removal".
- (3) ◆◆ : Refer to "Service Points of Installation".
- (4) N : Non-reusable parts
- (5) * : Must be tightened while vehicle is unladen.
- (6) *1 : In case *3 bolt has the head mark of 10.
- (7) *2 : In case *3 bolt has the head mark of 7.



SERVICE POINTS OF REMOVAL

E33SBAA

5. DISCONNECTION OF LOWER BALL JOINT AND KNUCKLE

- (1) Loosen the slotted nut tightening the lower ball joint to the knuckle.

Caution

The nut should be partially loosened and should not be removed.

- (2) Using a special tool, disconnect the lower ball joint from the knuckle.

6. REMOVAL OF SHAFT ASSEMBLY

Make mating marks on the shaft assembly's plate and the crossmember.

INSPECTION

E33SCAA

- Check the lower arm for damage or deformation.
- Check the rubber parts for cracks or deterioration.

ACTION OF THE SHOCK ABSORBERS

Expand and compress the shock absorbers; check whether they operate smoothly and with the same resistance. Also check for oil leakage and abnormal noise.

LOWER BALL JOINT STARTING TORQUE

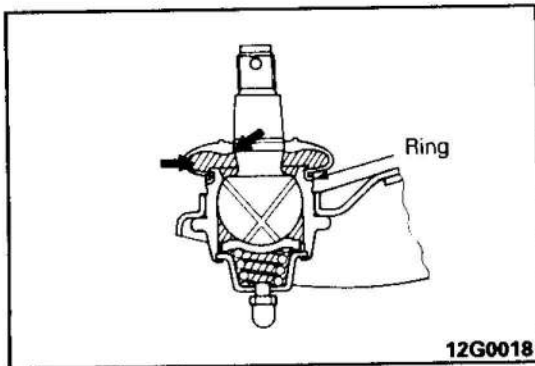
Check the lower ball joint starting torque by following the steps below.

- (1) After installing the nut to the ball joint, shake the ball joint's stud 4 or 5 times.
- (2) Measure the lower ball joint starting torque.

Standard value: 1–4 Nm (10–40 kgcm, 9–35 in.lbs.)

- (3) If the lower ball joint starting torque is out of specification, replace the lower arm assembly.

If the lower ball joint starting torque is less than the standard value, use is still possible unless there is play or a feeling of roughness.



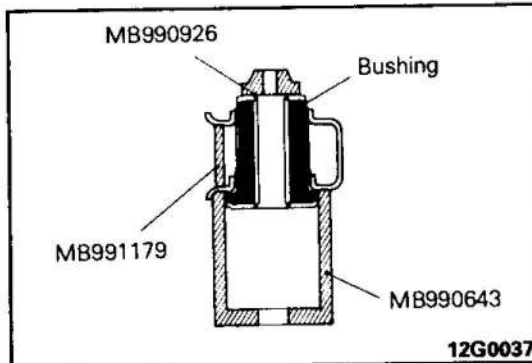
REPLACEMENT OF LOWER BALL JOINT DUST COVER

E33HEAC

1. Apply the specified grease to the interior of the dust cover and the lower ball joint. Also apply a coating of the specified grease to the lip part of the dust cover.

**Specified grease: Multipurpose grease
SAE J310, NLGI No.2**

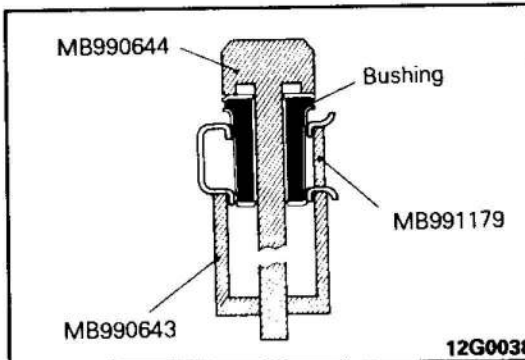
2. Secure the dust cover to the lower ball joint with a ring.



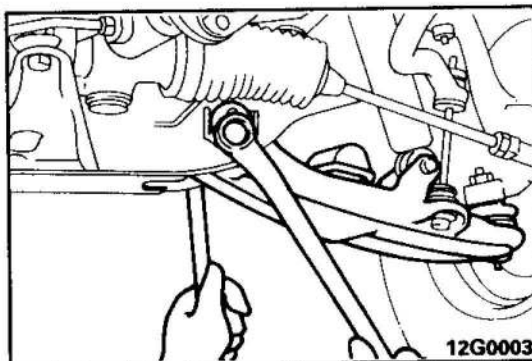
REPLACEMENT OF LOWER ARM BUSHING

E33HDAB

1. Remove the lower arm bushing from the lower arm by using special tools.



2. Use the special tool to press in the lower arm bushing until the flange part of the lower arm bushing contacts the lower arm.



SERVICE POINTS OF INSTALLATION

E33SDAA

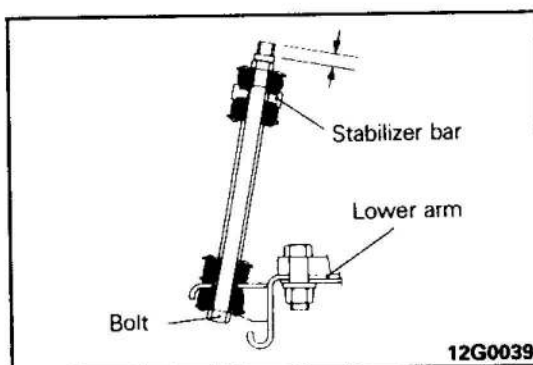
6. INSTALLATION OF SHAFT ASSEMBLY

Align the mating marks of the shaft assembly and of the crossmember, and then slightly tighten the lower arm installation nut.

3. INSTALLATION OF SELF-LOCKING NUT

As shown in the figure, install the cup and bushings, and then tighten the self-locking nut so that the amount of projection of the bolt is the standard value.

Standard value: 10–12 mm (0.39–0.47 in.)

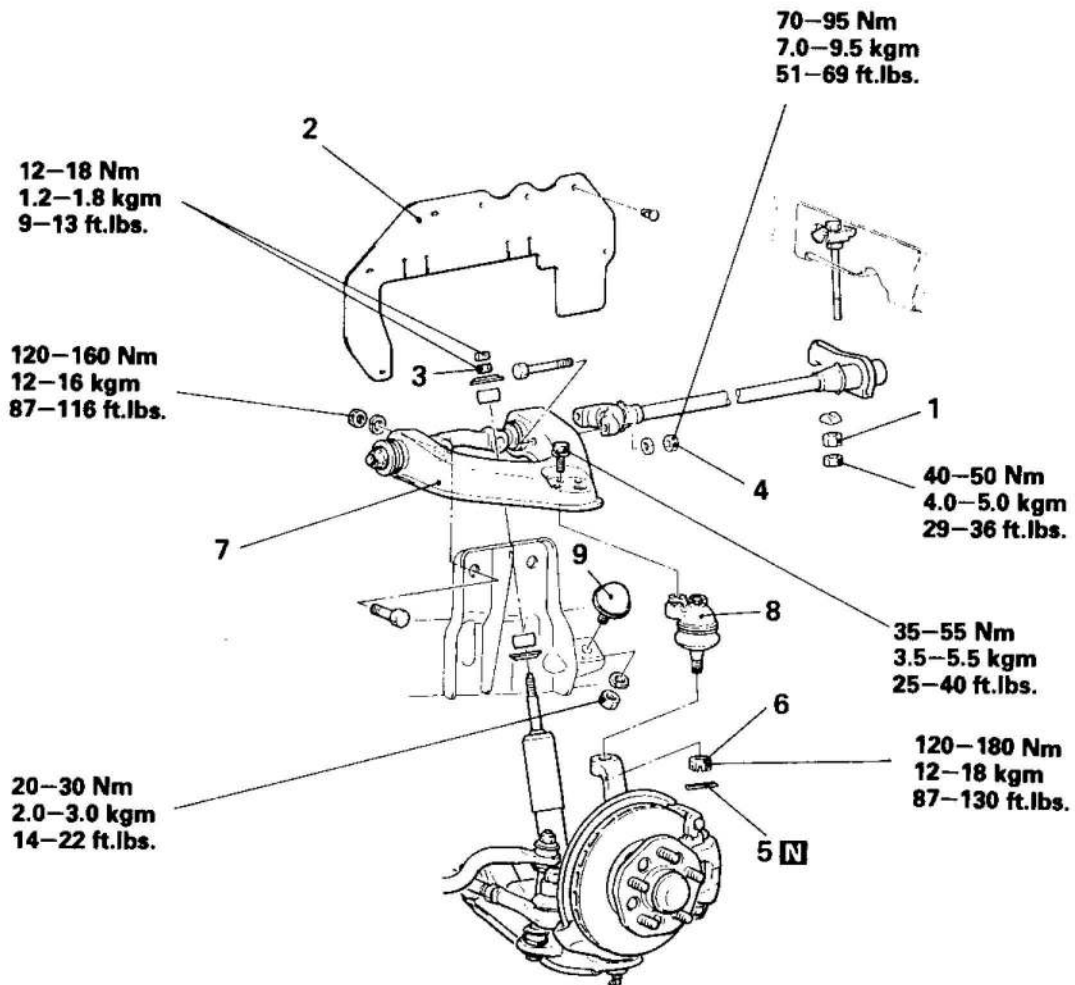


UPPER ARM

REMOVAL AND INSTALLATION

Post-installation Operation

- Checking of the vehicle height
(Refer to P.33-12)



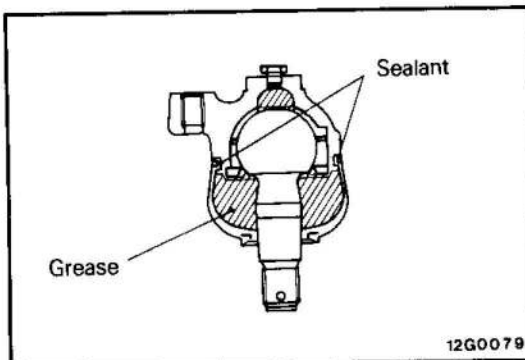
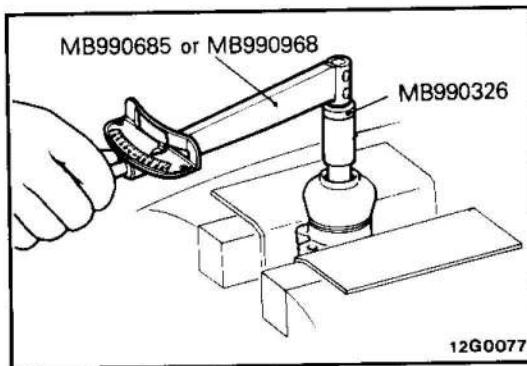
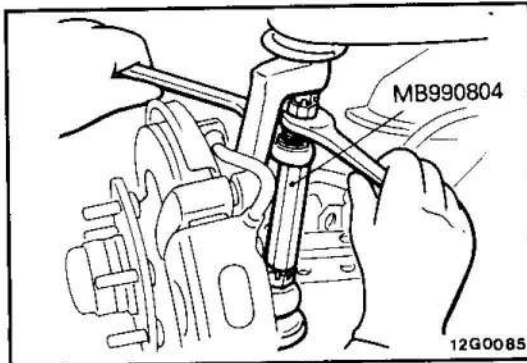
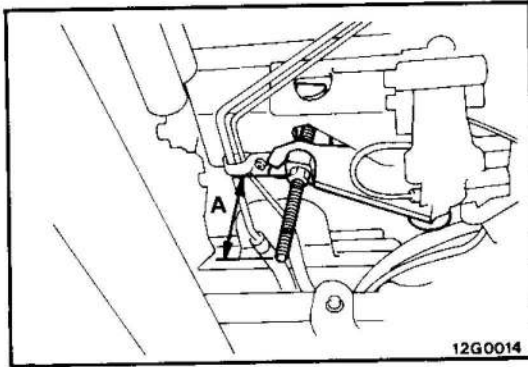
12G0065

Removal steps

- ◆◆ 1. Torsion bar adjusting nut
- 2. Shield rubber
- 3. Nut
- 4. Nut
- 5. Split pin
- ◆◆ 6. Connection of upper ball joint and knuckle
- 7. Upper arm
- 8. Upper ball joint
- 9. Rebound stopper

NOTE

- (1) Reverse the removal procedures to reinstall.
- (2) ◆◆ : Refer to "Service Points of Removal".
- (3) **N** : Non-reusable parts



SERVICE POINTS OF REMOVAL

ES3TBAA

1. REMOVAL OF TORSION BAR ADJUSTING NUT

Measure dimension "A" of the anchor bolt and use this measurement as a reference when installing.

6. DISCONNECTION OF UPPER BALL JOINT AND KNUCKLE

- (1) Loosen the slotted nut tightening the upper ball joint to the knuckle.

Caution

The nut should be partially loosened and should not be removed.

- (2) Using a special tool, disconnect the upper ball joint from the knuckle.

INSPECTION

E33TCAA

- Check the upper arm for cracks or deformation.
- Check the rubber parts for cracks or deterioration.

UPPER BALL JOINT STARTING TORQUE

1. After installing the nut to the ball joint, shake the ball joint's stud 4 or 5 times.
2. Measure the upper ball joint starting torque.

Standard value: 0.8–3.5 Nm (8–35 kgcm, 7–30 in.lbs.)

3. If the upper ball joint starting torque is out of specification, replace the upper ball joint.

If the rotation starting torque is less than the standard value, use is still possible unless there is play or a feeling of roughness.

REPLACEMENT OF UPPER BALL JOINT DUST COVER

E33GFAB

1. Apply the multipurpose grease to the interior of the cover and the upper ball joint.
2. Apply the specified sealant to the grooves in the upper ball joint.

Specified sealant: 3M ATD Part No. 8663, 8661 or equivalent

3. Secure the dust cover to the upper ball joint with a ring.

TORSION BAR

E331A--1

REMOVAL AND INSTALLATION

Post-installation Operation

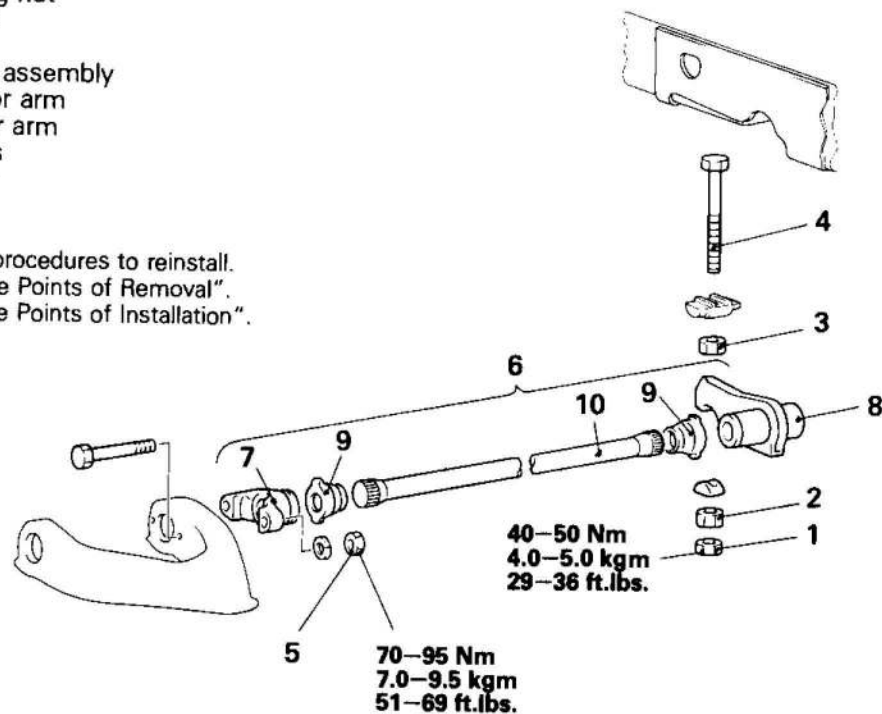
- Checking of the vehicle height
(Refer to P.33-12)

Removal steps

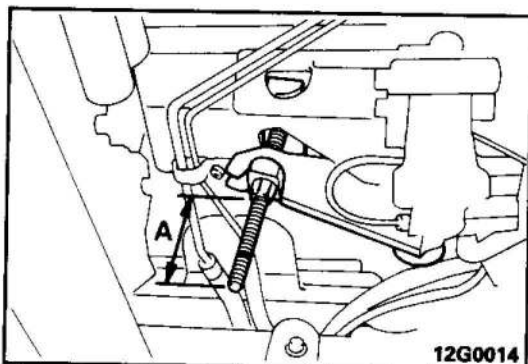
1. Torsion bar locking nut
- ◆◆◆◆ 2. Torsion bar adjusting nut
3. Seat-holding nut
- ◆◆ 4. Anchor bolt
5. Nuts
6. Torsion bar assembly
- ◆◆◆◆ 7. Front anchor arm
- ◆◆◆◆ 8. Rear anchor arm
- ◆◆ 9. Dust covers
- ◆◆◆◆ 10. Torsion bar

NOTE

- (1) Reverse the removal procedures to reinstall.
- (2) ◆◆◆◆ : Refer to "Service Points of Removal".
- (3) ◆◆◆◆ : Refer to "Service Points of Installation".



12G0066



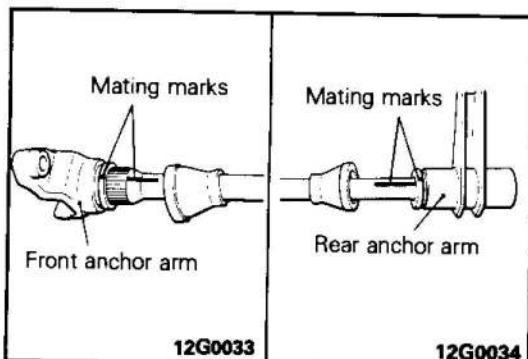
12G0014

SERVICE POINTS OF REMOVAL

E331BAB

2. REMOVAL OF TORSION BAR ADJUSTING NUT

Measure dimension (A) of the anchor bolt and use this measurement as a reference when installing.



12G0033

12G0034

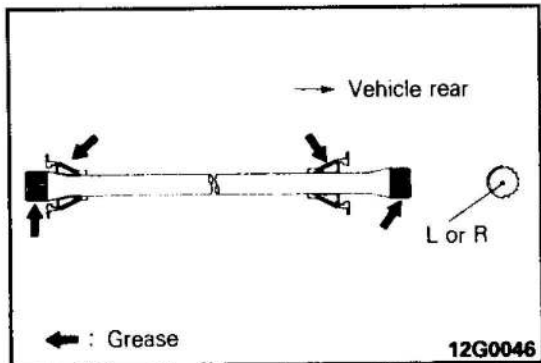
7. REMOVAL OF FRONT ANCHOR ARM/8. REAR ANCHOR ARM

Move the dust cover, and make mating marks on the front anchor arm and rear anchor arm and the torsion bar.

INSPECTION

E33CAB

- Check the anchor bolt for bends or damage.
- Check the dust cover for cracks or damage.
- Check the torsion bar for dents or other damage.
- Check the serrated part for damage.



SERVICE POINTS OF INSTALLATION

E33DAD

10. TORSION BAR IDENTIFICATION AND GREASE APPLICATION

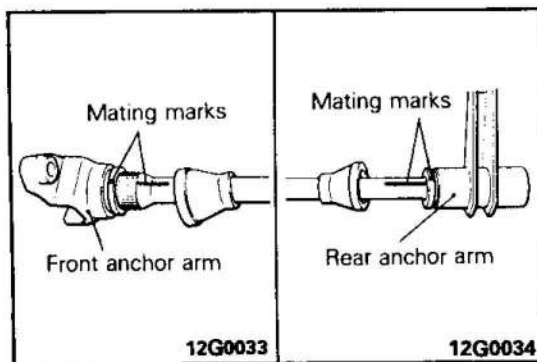
- (1) The left and right are identified by the identification mark at the rear end of the torsion bar. The marked one is to be at the vehicle rear.
- (2) Apply the specified grease to the torsion bar serrations.

**Specified grease: Multipurpose grease
SAE J310, NLGI No.2**

9. APPLICATION OF GREASE TO THE DUST COVER

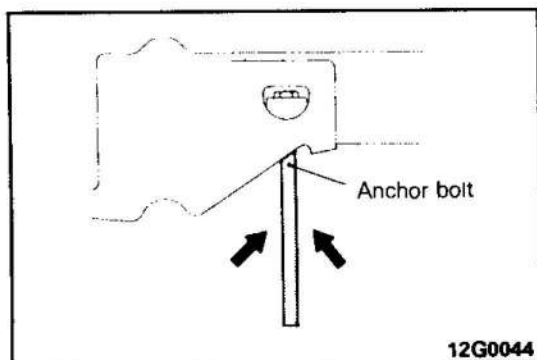
Apply the specified grease inside the dust cover.

**Specified grease: Multipurpose grease
SAE J310, NLGI No.2**



8. INSTALLATION OF REAR ANCHOR ARM / 7. FRONT ANCHOR ARM

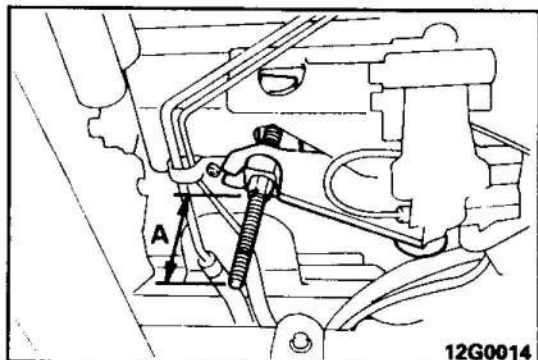
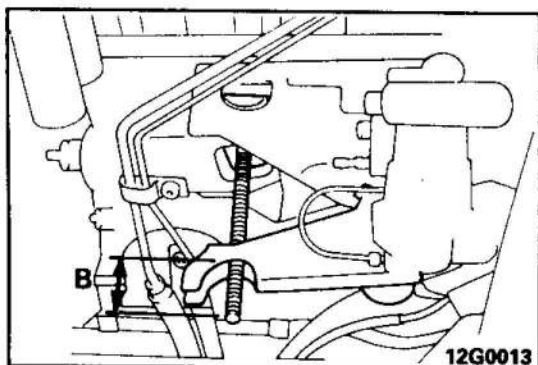
If the torsion bar is reused, align the mating marks on the rear anchor arm and front anchor arm and the torsion bar.



4. APPLICATION OF GREASE TO ANCHOR BOLT

Apply the specified grease to the threaded part of the anchor bolt.

**Specified grease: Multipurpose grease
SAE J310, NLGI No.2**



2. TIGHTENING OF THE TORSION BAR ADJUSTMENT NUT

If the torsion bar is replaced...

- (1) Before installing the torsion bar adjustment nut, offset the phase of the torsion bar and rear anchor arm so that the amount of projection (B) of the anchor bolt (from the rear anchor arm) is the standard value.

Standard value

Van: 36 mm (1.42 in.)

Mini-bus:

Vehicles for General Export and Australia

30 mm (1.18 in.)

Vehicles for Europe produced through

November, 1987

30 mm (1.18 in.)

Vehicles for Europe produced from

December, 1987

23 mm (0.91 in.)

- (2) As a temporary adjustment of the vehicle height, tighten the torsion bar adjustment nut until the amount of projection (A) of the anchor bolt becomes the following value.

Projection (A) of anchor bolt: 63 mm (2.48 in.)

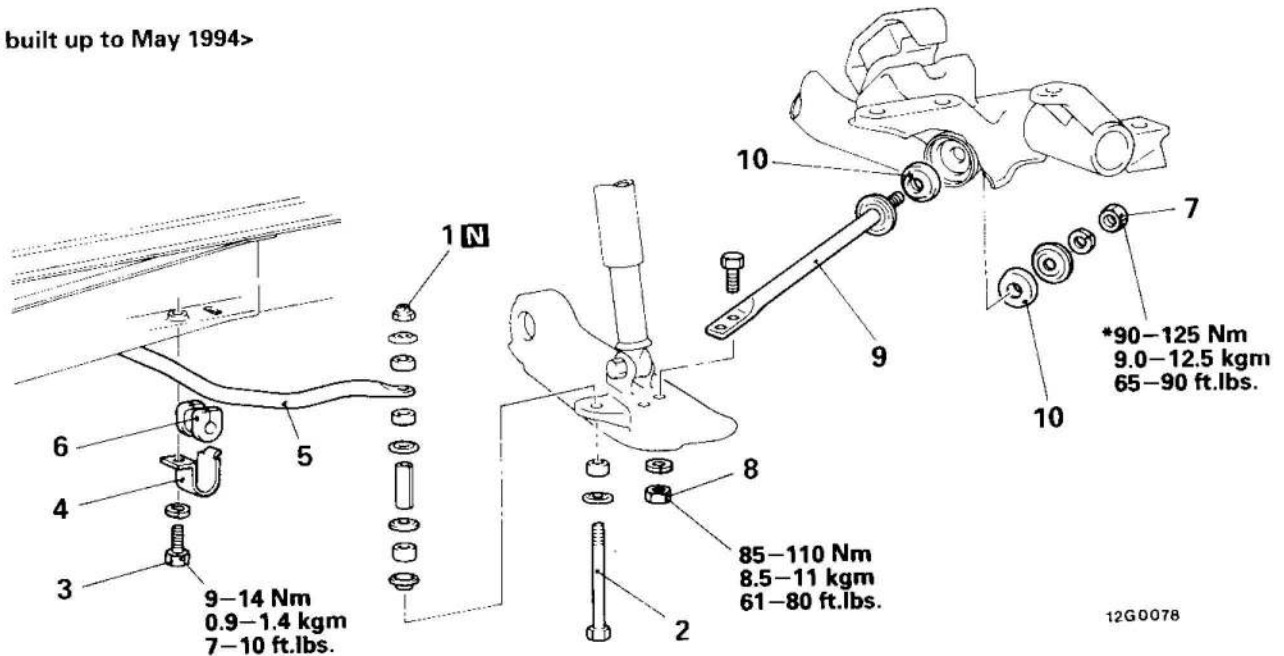
If the torsion bar is reused...

As a temporary adjustment of the vehicle height, tighten the torsion bar adjustment nut until dimension "A" of the anchor bolt becomes the measurement made before removal.

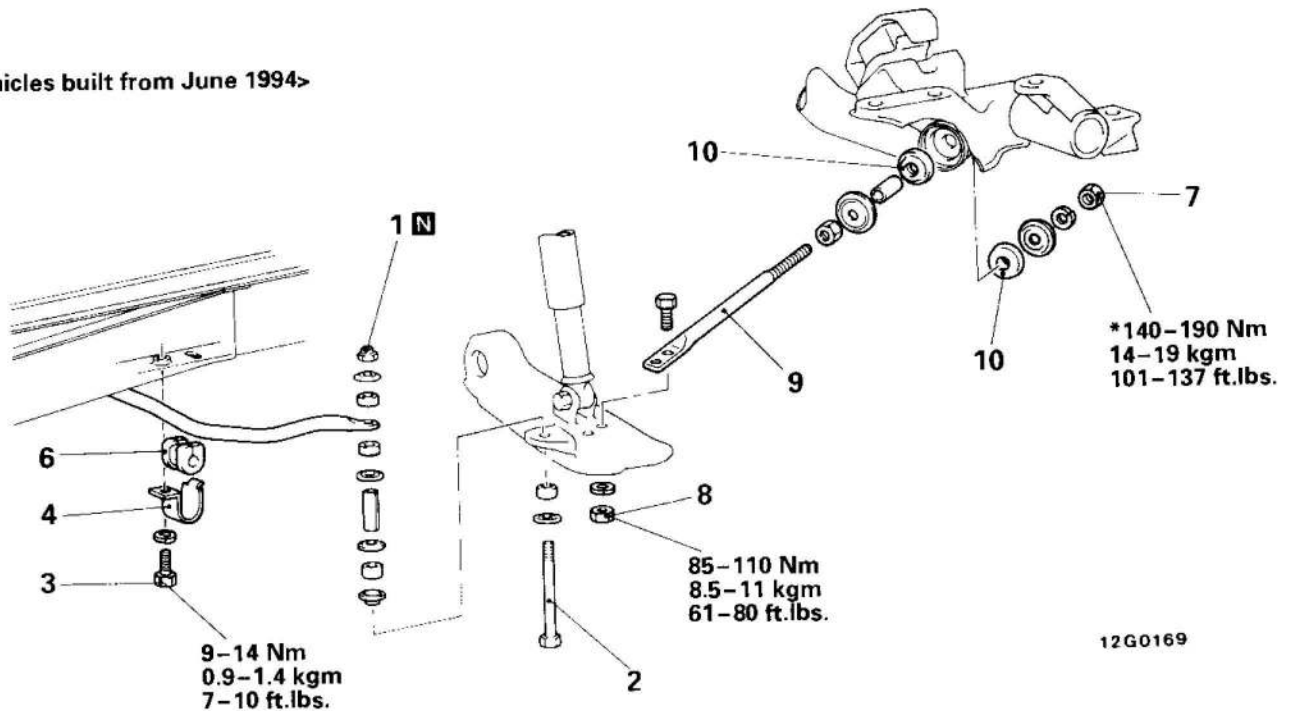
E33NA--

STRUT BAR AND STABILIZER BAR REMOVAL AND INSTALLATION

<Vehicles built up to May 1994>



<Vehicles built from June 1994>



Stabilizer bar removal steps

- ◆◆ 1. Self locking nut
- 2. Bolt
- 3. Bolt
- 4. Clamp
- 5. Stabilizer bar
- 6. Bushing

Strut bar removal steps

- 7. Nut (rear)
- 8. Nut (front)
- ◆◆ 9. Strut bar
- ◆◆ 10. Strut bar bushings

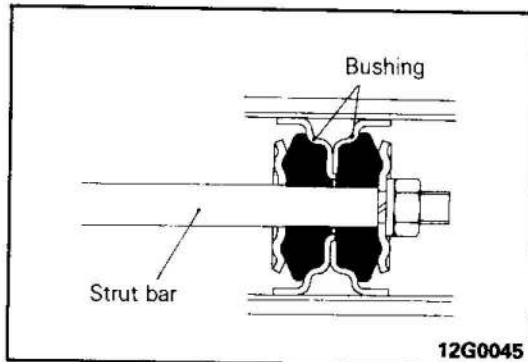
NOTE

- (1) Reverse the removal procedures to reinstall.
- (2) ◆◆ : Refer to "Service Points of Removal".
- (3) N : Non-reusable parts
- (4) * : Must be tightened while vehicle is unladen.

INSPECTION

E33NCBB

- Check the stabilizer bar for dents or damage.
- Check the bolt for bends or damage.
- Check the rubber parts for cracks, deterioration or wear.
- Check the strut bar for damage or bend.
- Check the strut bar bushing for cracks or damage.



12G0045

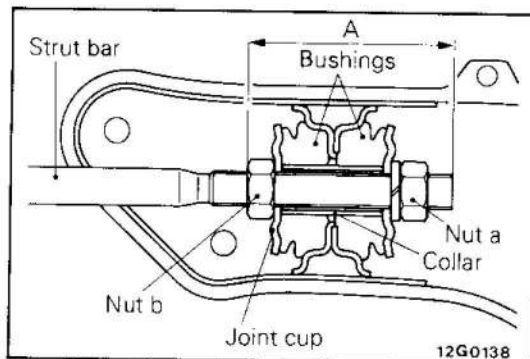
SERVICE POINTS OF INSTALLATION

E33NEBB

10. INSTALLATION OF STRUT BAR BUSHING

<Vehicles built up to May 1994>

Install the strut bar bushing as shown in the figure.



12G0138

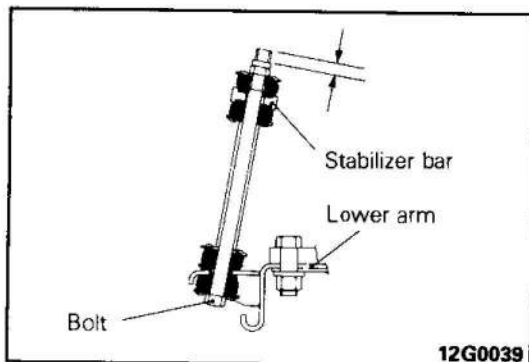
10. INSTALLATION OF STRUT BAR BUSHING

<Vehicles built from June 1994>

- (1) Adjust the position of nut b to the standard value.

Standard value (A): 110 mm

- (2) Install the joint cup and strut bar bushings as shown in the illustration, and then tighten the nut a to the specified torque.



12G0039

1. INSTALLATION OF SELF-LOCKING NUT

Install the cup and bushings as shown in the figure, and then tighten the self-locking nut so that the amount of bolt projection is the standard value.

Standard value: 10–12 mm (0.39–0.47 in.)

SHOCK ABSORBER AND LOWER ARM

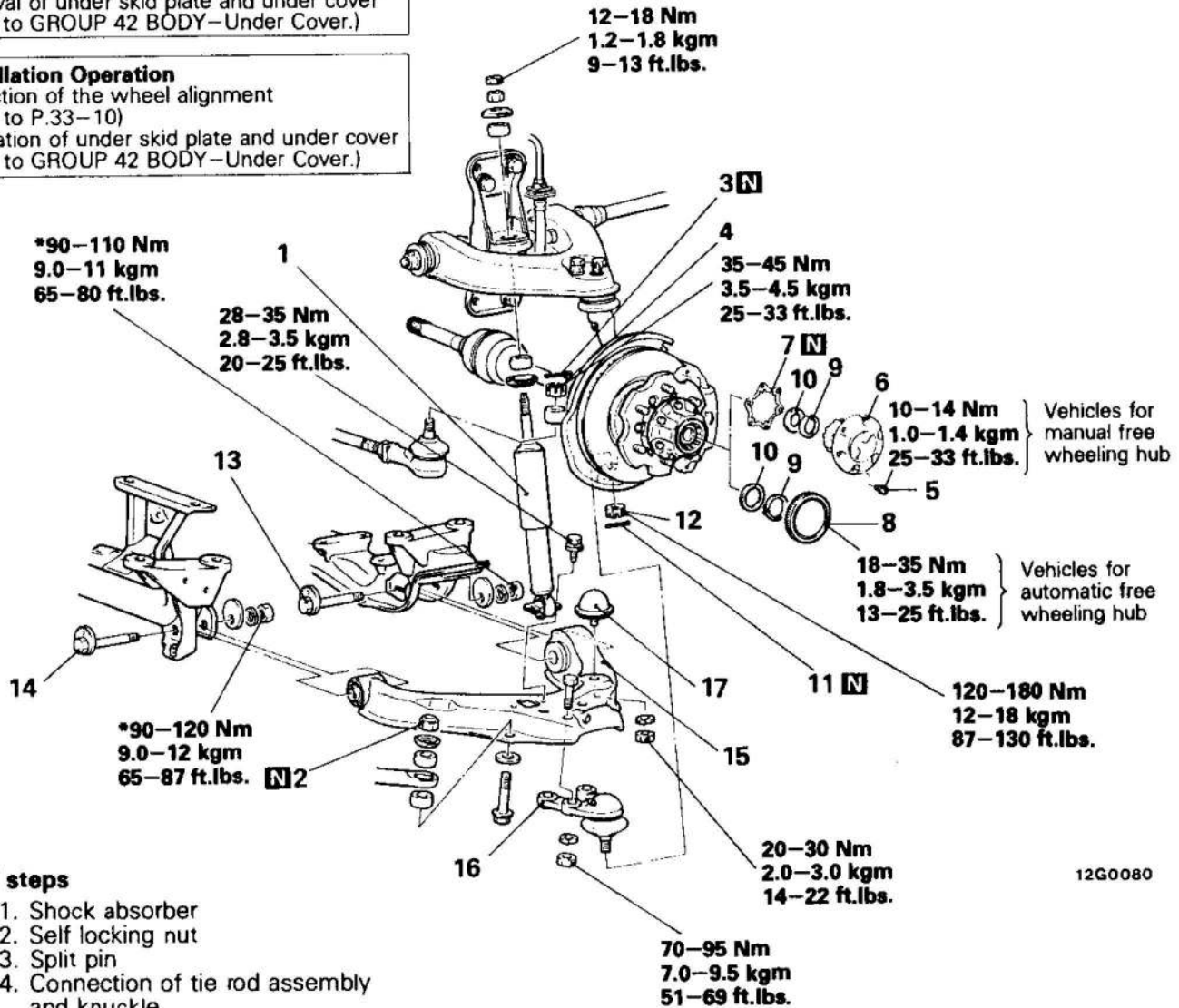
REMOVAL AND INSTALLATION

Pre-removal Operation

- Removal of under skid plate and under cover (Refer to GROUP 42 BODY-Under Cover.)

Post-installation Operation

- Inspection of the wheel alignment (Refer to P.33-10)
- Installation of under skid plate and under cover (Refer to GROUP 42 BODY-Under Cover.)



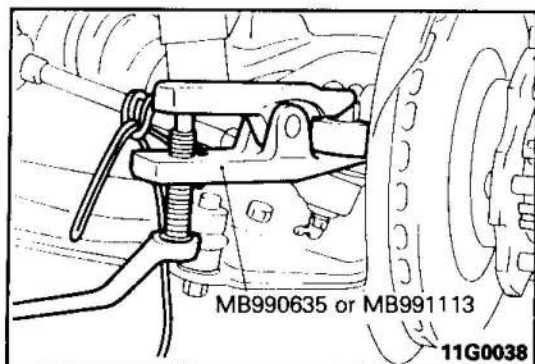
12G0080

Removal steps

- ◆◆ 1. Shock absorber
- ◆◆ 2. Self locking nut
- ◆◆ 3. Split pin
- ◆◆ 4. Connection of tie rod assembly and knuckle
- ◆◆ 5. Bolt
- ◆◆ 6. Free wheeling hub cover
- ◆◆ 7. Gasket
- ◆◆ 8. Cover
- ◆◆ 9. Snap ring
- ◆◆ 10. Shim
- ◆◆ 11. Split pin
- ◆◆ 12. Connection of lower ball joint and knuckle
- ◆◆◆◆ 13. Shaft assembly
- ◆◆◆◆ 14. Bolt assembly
- ◆◆ 15. Lower arm
- ◆◆ 16. Lower ball joint
- ◆◆ 17. Bump stopper

NOTE

- (1) Reverse the removal procedures to reinstall.
- (2) ◆◆ : Refer to "Service Points of Removal".
- (3) ◆◆ : Refer to "Service Points of Installation".
- (4) N : Non-reusable parts
- (5) * : Must be tightened while vehicle is unladen.

**SERVICE POINTS OF REMOVAL****4. DISCONNECTION OF TIE ROD ASSEMBLY AND KNUCKLE**

- (1) Loosen the slotted nut by 2 to 3 rotations.

Caution

The nut should be partially loosened and should not be removed

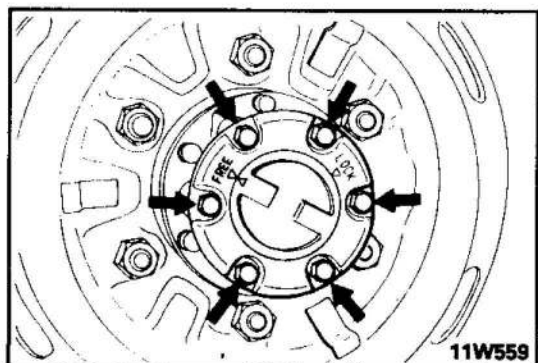
- (2) Use special tool to disconnect tie rod ball joint from knuckle.

Caution

Tie the rope of the special tool to the lower arm to prevent the tool from slipping off.

6. REMOVAL OF FREE WHEELING HUB COVER (Manual free wheeling hub)

- (1) Set the control handle to the FREE position.
- (2) Remove the free wheeling hub cover.

**8. REMOVAL OF COVER (Automatic free wheeling hub)**

- (1) Place the free-wheeling hub in the free condition.

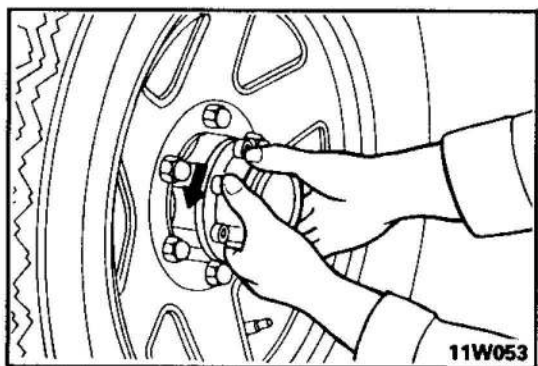
NOTE

The free condition can be obtained by shifting the transfer shif lever to the 2H position and then moving in reverse for 1 to 2 meters. (3.3 to 6.5 ft.)

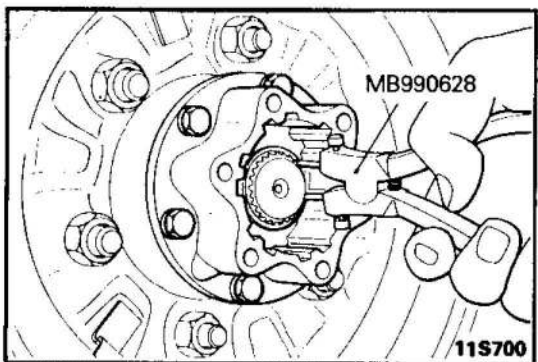
- (2) Remove the automatic free wheeling hub cover.

NOTE

When the cover cannot be loosened by hand, use an oil filter wrench with a protective cloth in between not to damage the cover.

**9. REMOVAL OF SNAP RING**

Using the special tool, remove the snap ring from the drive shaft.

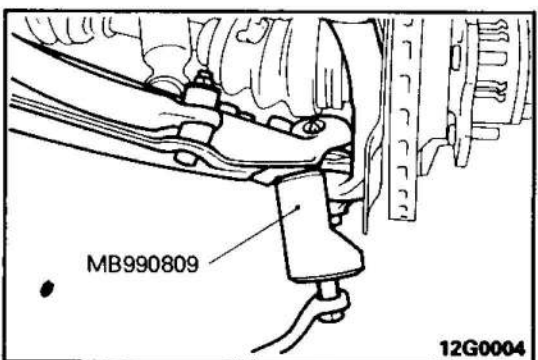
**12. DISCONNECTION OF LOWER BALL JOINT AND KNUCKLE**

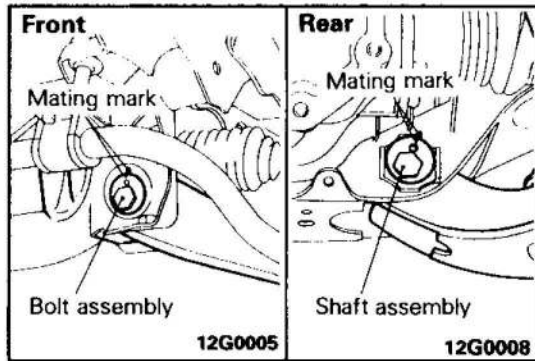
- (1) Loosen the slotted nut by 2 to 3 rotations.

Caution

The nut should be partially loosened and should not be removed.

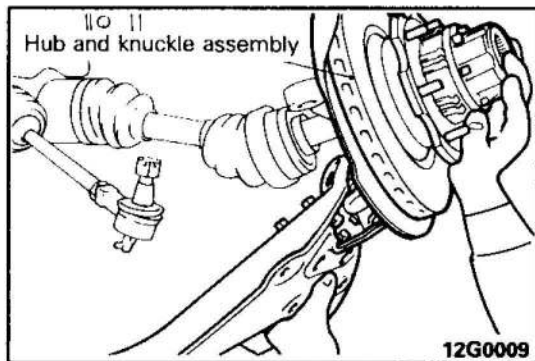
- (2) Use special tool to disconnect lower ball joint from knuckle.





13. REMOVAL OF SHAFT ASSEMBLY/14. BOLT ASSEMBLY

Provide match marks on the shaft assembly, bolt assembly and cross member.

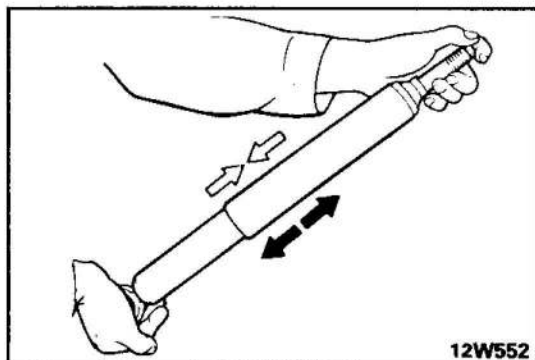


15. REMOVAL OF LOWER ARM

Raise the hub and knuckle assembly to remove the lower arm assembly from the knuckle.

Caution

Do not damage drive shaft dust cover, lower arm ball joint or ball joint dust cover.



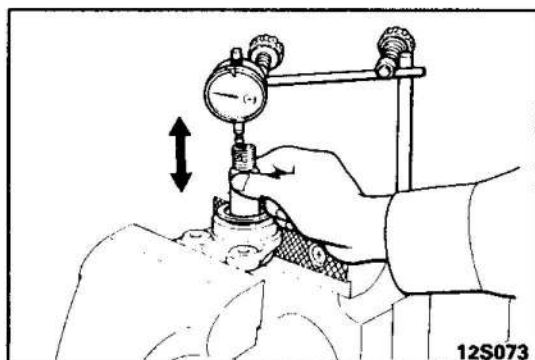
INSPECTION

E33SCAB

- Check the lower arm for damage or deformation.
- Check the rubber parts for cracks or deterioration.

ACTION OF THE SHOCK ABSORBERS

Expand and compress the shock absorbers; check whether they operate smoothly and with the same resistance. Also check for oil leakage and abnormal noise.



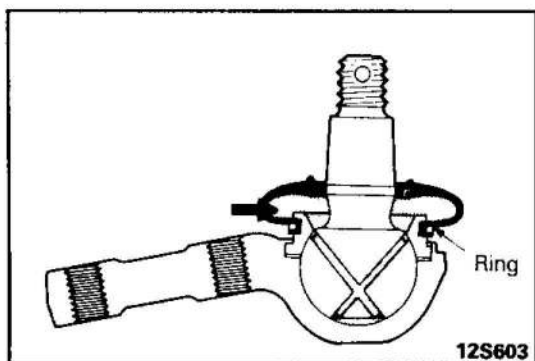
LOWER BALL JOINT AXIAL DIRECTION BACKLASH CHECK

Check lower ball joint axial direction backlash as follows:

1. Fit the dial gauge as illustrated in the figure and measure axial backlash.

Limit: 0.5 mm (0.012 in.).

2. Replace the ball joint if backlash exceeds the limit, or if the ball joint does not move by a light pressure from a finger even if the backlash is within the limit.



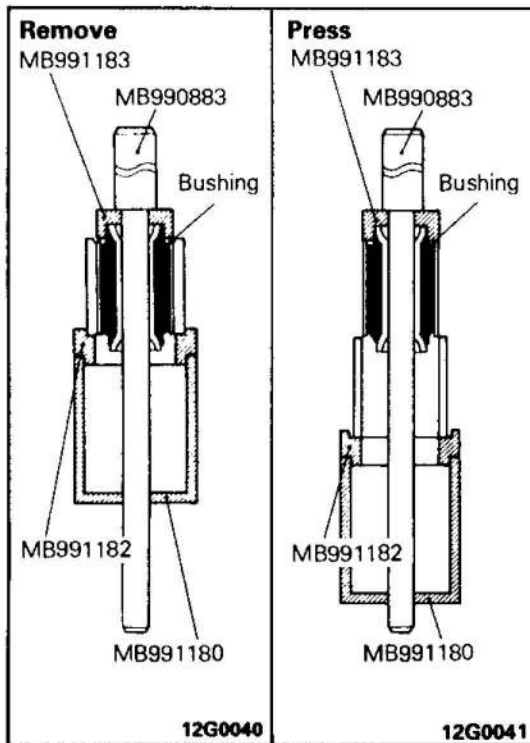
REPLACEMENT OF LOWER BALL JOINT DUST COVER

E33HEAD

1. Apply the specified grease to the interior of the dust cover and the lower ball joint

**Specified grease: Multipurpose grease
SAE J310, NLGI No.2**

2. Secure the dust cover to the lower ball joint with a ring.

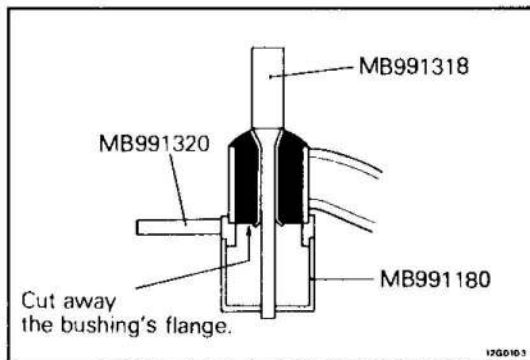


REPLACEMENT OF LOWER ARM BUSHING

E33HDAC

[Vehicles built up to September 1988]

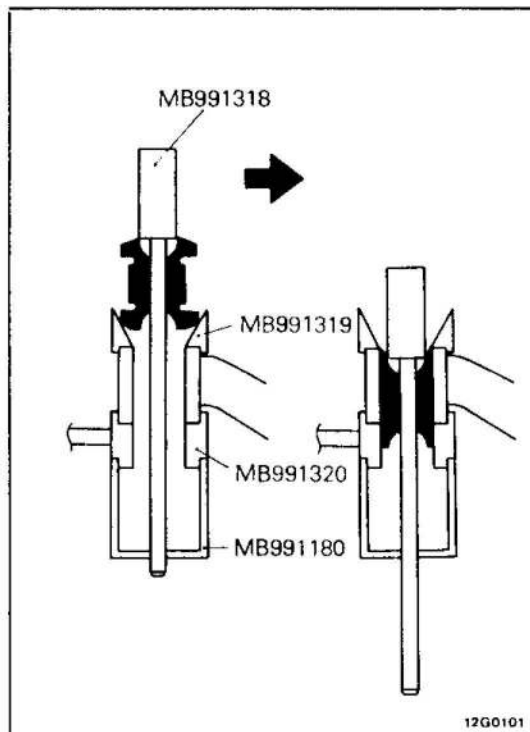
- (1) Use special tool to remove front bushing.
- (2) Press the front bushing in with the special tool until the front bushing outer cylinder face is level with the lower arm pipe.



[Vehicles built from October 1988]

Pull-out

- (1) Using a knife, cut away the flange of the bushing.
- (2) Then use the special tools to pull out the bushing.



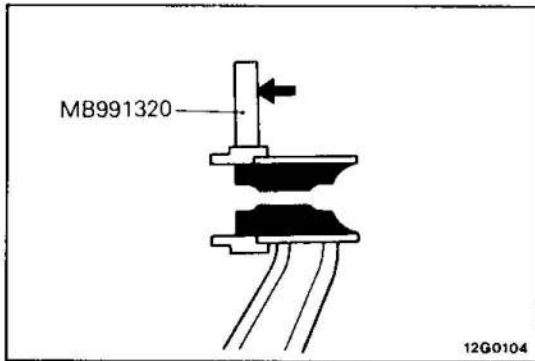
Press-in

- (1) Apply a soap-and-water solution around the circumference of the bushing.
- (2) Then place the special tools as shown in the figure and press in the bushing until the upper flange of the bushing passes special tool MB991319 (lower arm bushing guide).

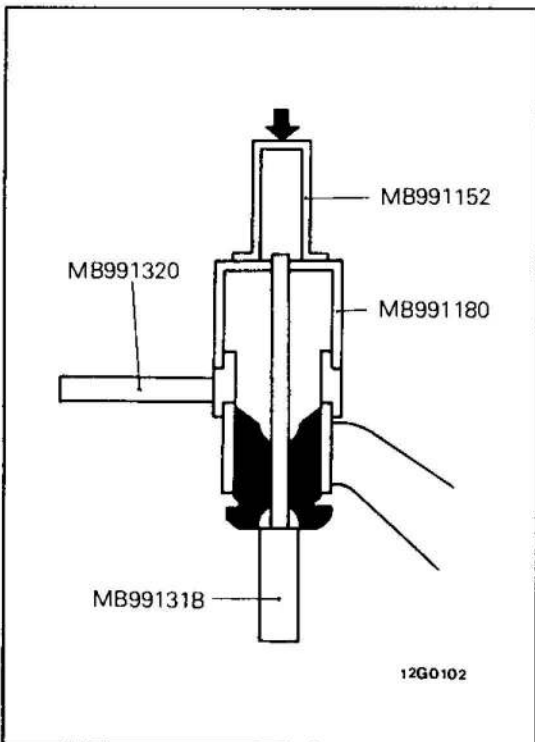
NOTE

The bushing must be inserted so that its thicker part faces downward.

(The thicker part of the bushing should face toward the rear of the vehicle when the lower arm is installed to the vehicle.)



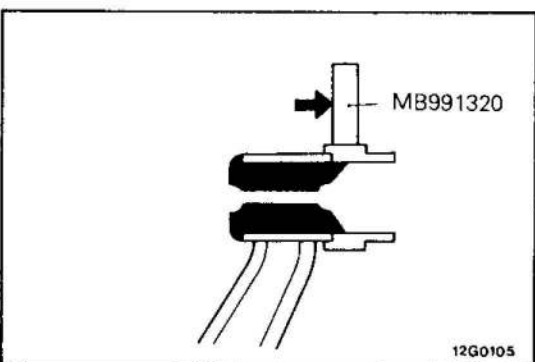
- (3) Remove the lower arm bushing ring by tapping the handle part of the special tool with a plastic hammer.



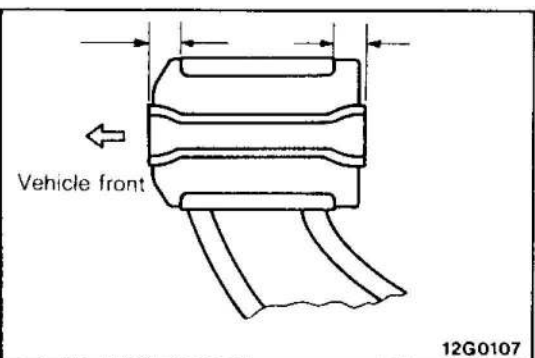
- (4) Place the special tools as shown in the figure and press the bushing so as to return it to the usual position.

NOTE

This should be done slowly and carefully, because the stability is poor.



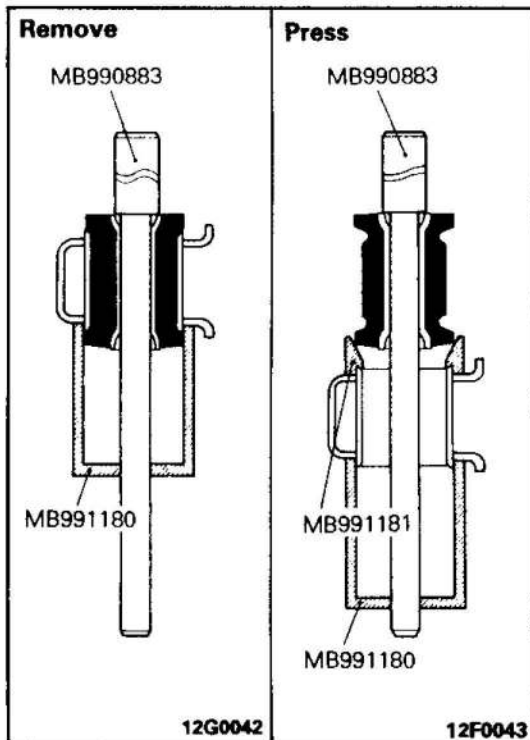
- (5) Remove the lower arm bushing ring by tapping the handle part of the special tool with a plastic hammer.



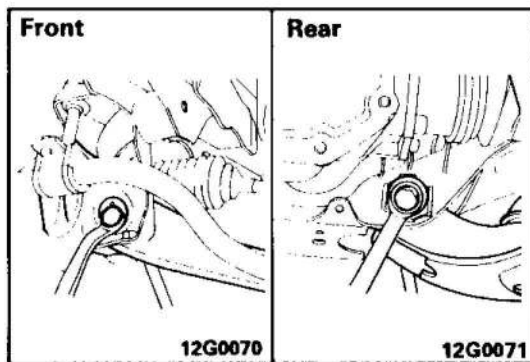
- (6) Check to be sure that the amount of front and rear projection of the bushing inner cylinder is uniform, and that the bushing is installed in the correct direction.

NOTE

The difference in the amount of front and rear projection of the bushing's projection should be within 1 mm (0.04 in.).

**REAR BUSHING**

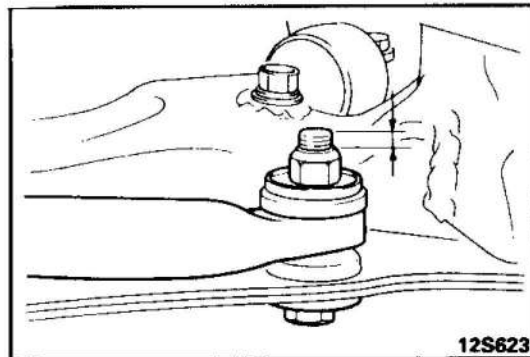
- (1) Use special tool to remove rear bushing.
- (2) Apply soapy water to the peripheral surface of the rear bushing.
- (3) Press the rear bushing in with the special tool.
- (4) After pressing the rear bushing in, confirm that the section of rear bush protruding from the pipe is uniform.

**SERVICE POINTS OF INSTALLATION**

E33SDAB

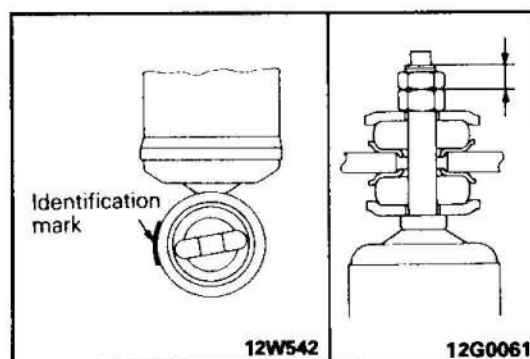
14. INSTALLATION OF BOLT ASSEMBLY/13.SHAFT ASSEMBLY

Align the match marks on bolt assembly and shaft assembly to those on the cross member, and temporarily fasten arm mounting nuts.

**2. TIGHTENING OF SELF-LOCKING NUT**

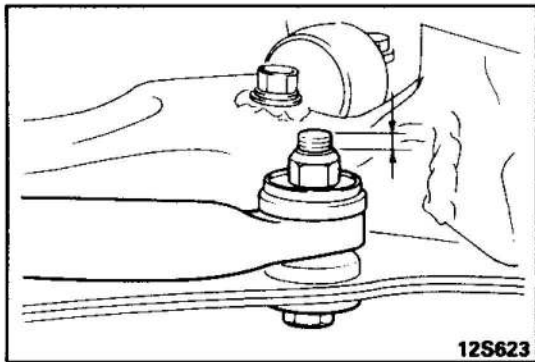
Tighten self-locking nut until the size described in the figure reaches the standard value.

Standard value: 8–10 mm (0.31–0.39 in.)

**1. INSTALLATION OF SHOCK ABSORBER**

- (1) Attach the shock absorber with its identification mark at the bottom pointing outwards of the vehicle.
- (2) Tighten shock absorber attaching nut until the size described in the figure reaches the standard value.

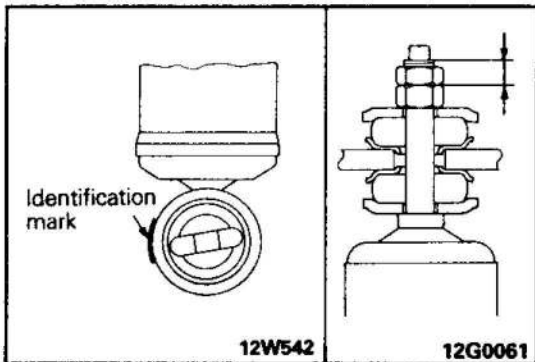
Standard value: 7–8 mm (0.28–0.31 in.)



2. TIGHTENING OF SELF-LOCKING NUT

Tighten self-locking nut until the size described in the figure reaches the standard value.

Standard value: 8–10 mm (0.31–0.39 in.)



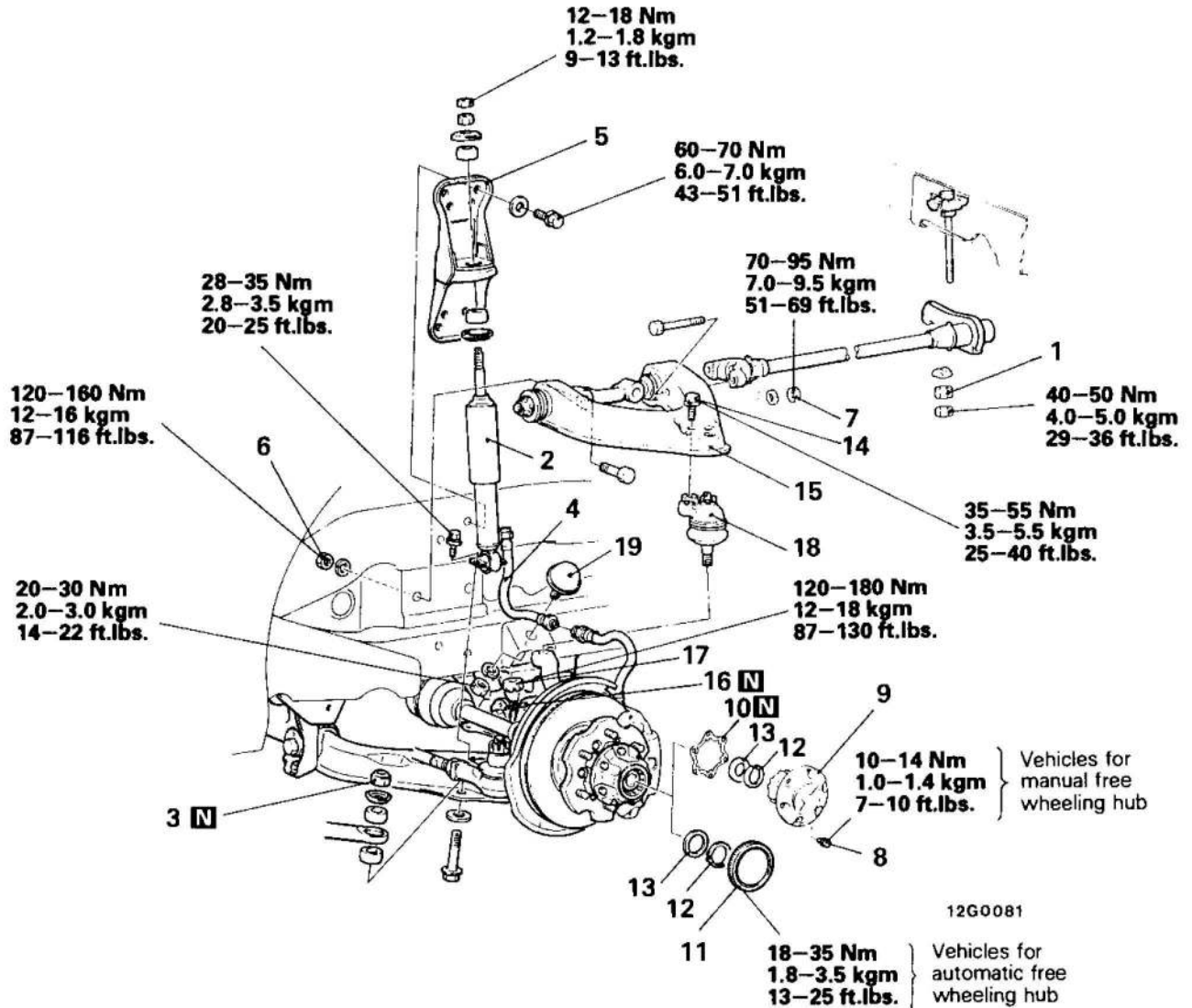
1. INSTALLATION OF SHOCK ABSORBER

- (1) Attach the shock absorber with its identification mark at the bottom pointing outwards of the vehicle.
- (2) Tighten shock absorber attaching nut until the size described in the figure reaches the standard value.

Standard value: 7–8 mm (0.28–0.31 in.)

UPPER ARM

REMOVAL AND INSTALLATION



Removal steps

- ◆◆ 1. Torsion bar adjusting nut
- ◆◆ 2. Shock absorber
- ◆◆ 3. Self locking nut
- 4. Brake hose
- 5. Front dumper bracket
- 6. Nut
- 7. Nut
- 8. Bolt
- ◆◆ 9. Free wheeling hub cover
- ◆◆ 10. Gasket
- ◆◆ 11. Cover
- ◆◆ 12. Snap ring
- 13. Shim
- 14. Bolt
- 15. Upper arm
- 16. Sprit pin
- ◆◆ 17. Connection of upper ball joint and knuckle
- 18. Upper ball joint
- 19. Rebound stopper

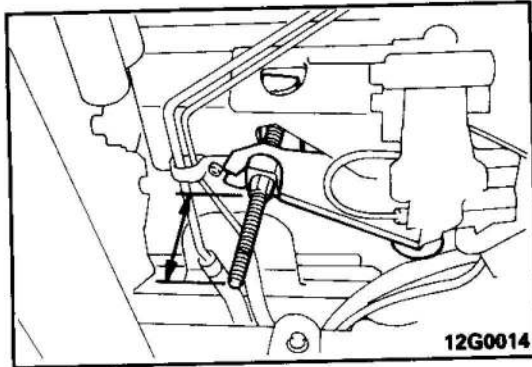
Post-installation Operation

- Checking of the vehicle height (Refer to P.33-12.)
- Bleeding of the brake line (Refer to GROUP 35 SERVICE BRAKES—Service Adjustment Procedures.)

NOTE

- (1) Reverse the removal procedures to reinstall.
- (2) ◆◆ : Refer to "Service Points of Removal".
- (3) ◆◆ : Refer to "Service Points of Installation".
- (4) [N] : Non-reusable parts

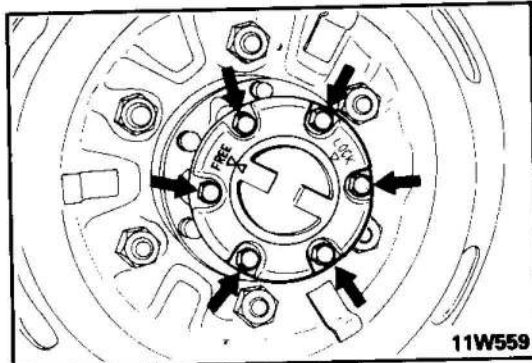
E23TBAB



SERVICE POINTS OF REMOVAL

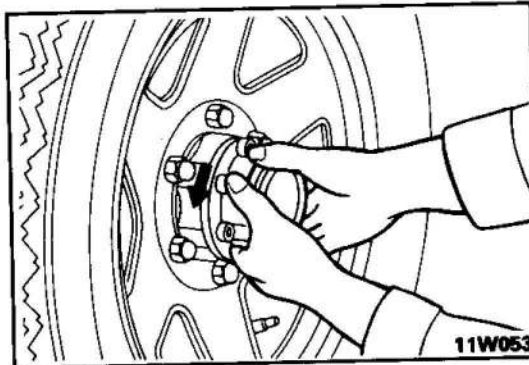
1. REMOVAL OF TORSION BAR ADJUSTING NUT

- (1) Measure dimension of the anchor bolt and use this measurement as a reference when installing.
- (2) Remove the adjusting nut.



9. REMOVAL OF FREE WHEELING HUB COVER (Manual free wheeling hub)

- (1) Set the control handle to the FREE position.
- (2) Remove the free wheeling hub cover.



11. REMOVAL OF COVER (Automatic free wheeling hub)

- (1) Place the free-wheeling hub in the free condition.

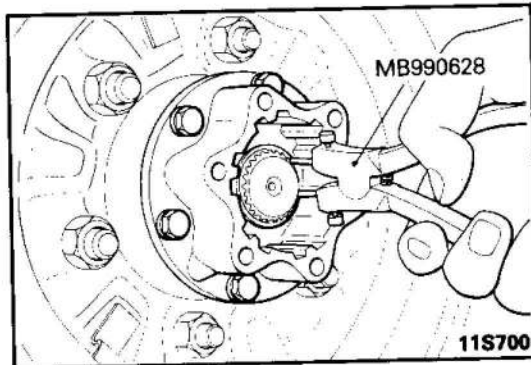
NOTE

The free condition can be obtained by shifting the transfer shift lever to the 2H position and then moving in reverse for 1 to 2 meters. (3.3 to 6.5 ft.)

- (2) Remove the automatic free wheeling hub cover.

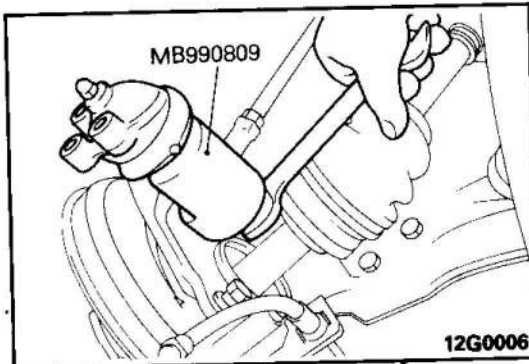
NOTE

When the cover cannot be loosened by hand, use an oil filter wrench with a protective cloth in between not to damage the cover



12. REMOVAL OF SNAP RING

Using the special tool, remove the snap ring from the drive shaft.



17. DISCONNECTION OF UPPER BALL JOINT AND KNUCKLE

- (1) Loosen the slotted nut by 2 to 3 rotations.

Caution

The nut should be partially loosened and should not be removed.

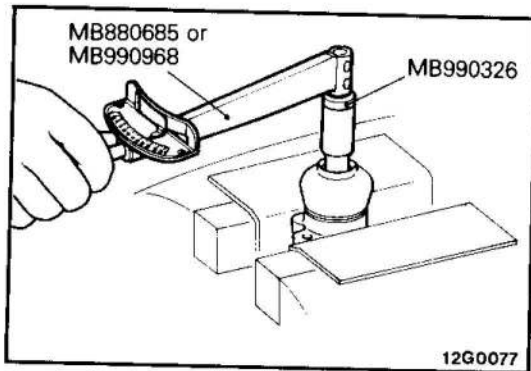
- (2) Pull the lower arm down slightly and set the special tool as shown in the figure.

Caution

Do not pull the lower arm down more than necessary.

- (3) Use the special tool to disconnect the upper ball joint from the knuckle.

PWWE8608

**INSPECTION**

E33TCAA

- Check the upper arm for cracks or deformation.
- Check the rubber parts for cracks or deterioration.

UPPER BALL JOINT STARTING TORQUE

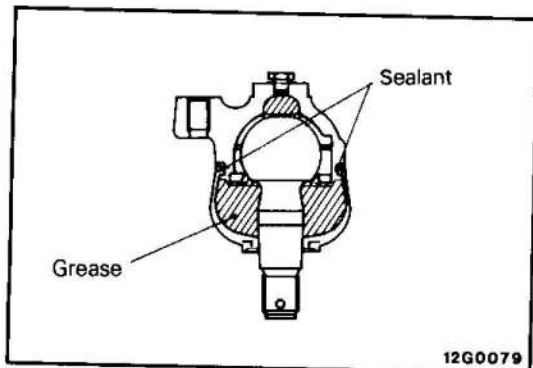
Check the upper ball joint starting torque by following the steps below.

- (1) After installing the nut to the ball joint, shake the ball joint's stud 4 or 5 times.
- (2) Measure the upper ball joint starting torque.

Standard value: 0.8–3.5 Nm (8–35 kgcm, 7–30 in.lbs.)

- (3) If the upper ball joint starting torque is out of specification, replace the upper ball joint.

If the lower ball joint starting torque is less than the standard value, use is still possible unless there is play or a feeling roughness,

**REPLACEMENT OF UPPER BALL JOINT DUST COVER**

E33GFAB

1. Apply the multipurpose grease to the interior of the dust cover and the upper ball joint.
2. Apply the specified sealant to the grooves in the upper ball joint.

Specified sealant: 3M ATD Part No. 8663, 8661 or equivalent

3. Secure the dust cover to the upper ball joint with a ring.

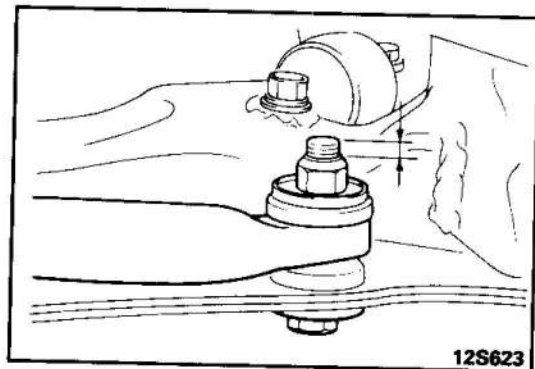
SERVICE POINTS OF INSTALLATION

E33TDAA

3. TIGHTENING OF SELF-LOCKING NUT

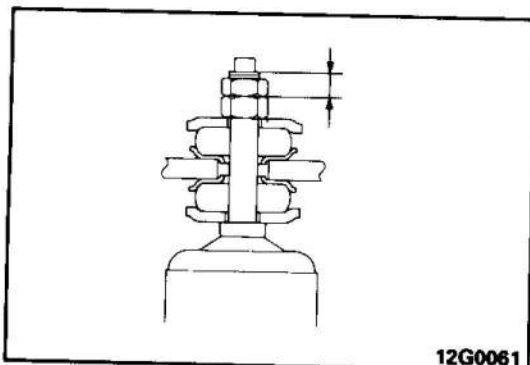
Tighten the self-locking nut until the size described in the figure reaches the standard value.

Standard value: 8–10 mm (0.31–0.39 in.)

**2. INSTALLATION OF SHOCK ABSORBER**

Tighten the shock absorber attaching nut until the size described in the figure reaches the standard value.

Standard value: 7–8 mm (0.28–0.31 in.)

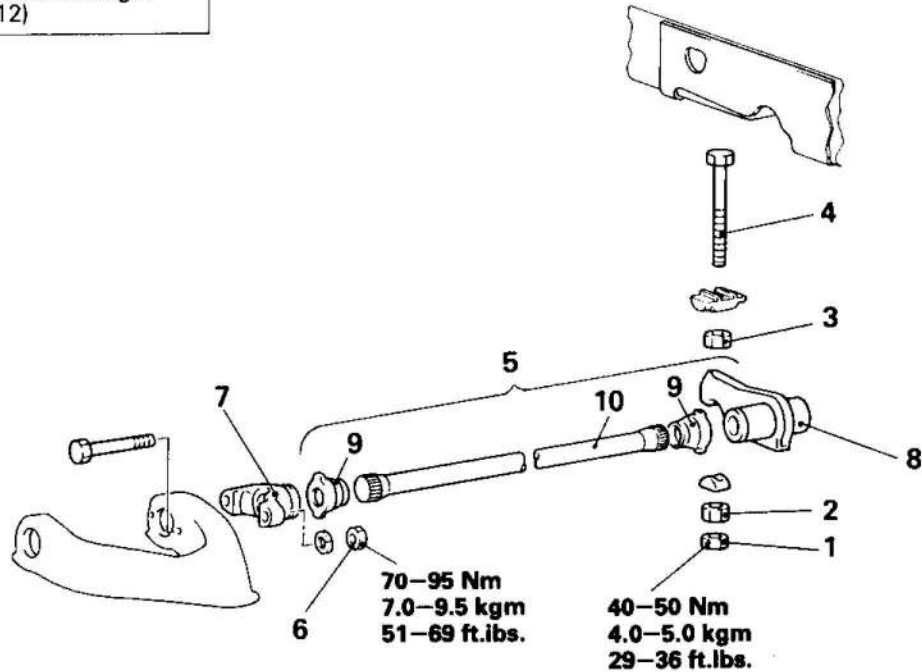


TORSION BAR

REMOVAL AND INSTALLATION

Post-installation Operation

- Checking of the vehicle height (Refer to P.33-12)



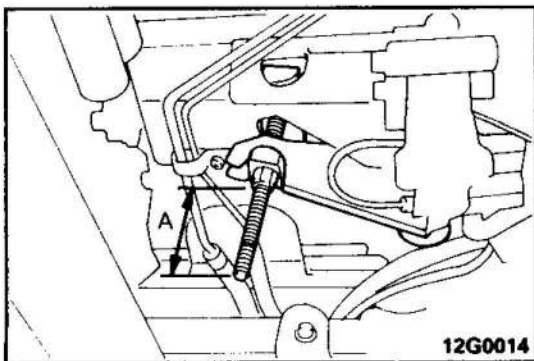
12G0066

Removal steps

- | | | | |
|------|------------------------------|----|-----------------|
| ◆◆◆◆ | 1. Torsion bar locking nut | ◆◆ | 9. Dust covers |
| ◆◆◆◆ | 2. Torsion bar adjusting nut | ◆◆ | 10. Torsion bar |
| ◆◆◆◆ | 3. Seat-holding nut | | |
| ◆◆◆◆ | 4. Anchor bolt | | |
| ◆◆◆◆ | 5. Torsion bar assembly | | |
| ◆◆◆◆ | 6. Nuts | | |
| ◆◆◆◆ | 7. Front anchor arm | | |
| ◆◆◆◆ | 8. Rear anchor arm | | |

NOTE

- (1) Reverse the removal procedures to reinstall.
- (2) ◆◆ : Refer to "Service Points of Removal".
- (3) ◆◆◆ : Refer to "Service Points of Installation".

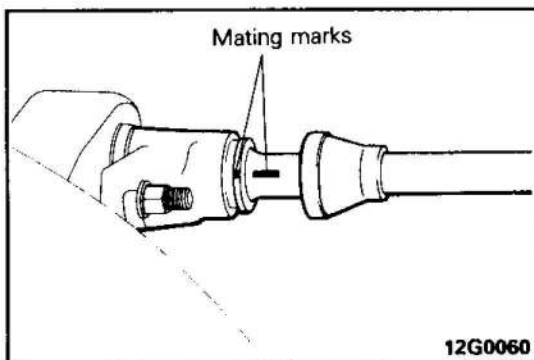


SERVICE POINTS OF REMOVAL

E331BAC

2. REMOVAL OF TORSION BAR ADJUSTING NUT

Measure dimension (A) of the anchor bolt and use this measurement as a reference when installing.

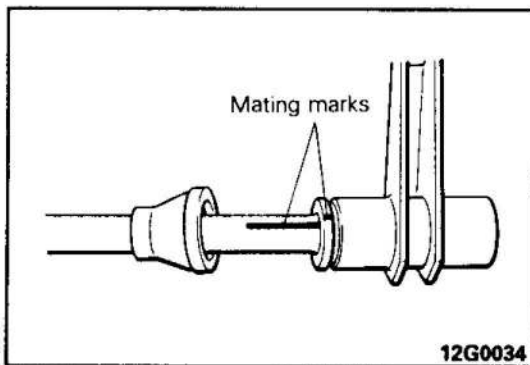


5. REMOVAL OF TORSION BAR ASSEMBLY

Move the dust cover at front side, and make mating marks on the front anchor arm and the torsion bar.

NOTE

Remove all grease from the torsion bar before withdrawing it from the vehicle to prevent smearing grease on other parts.

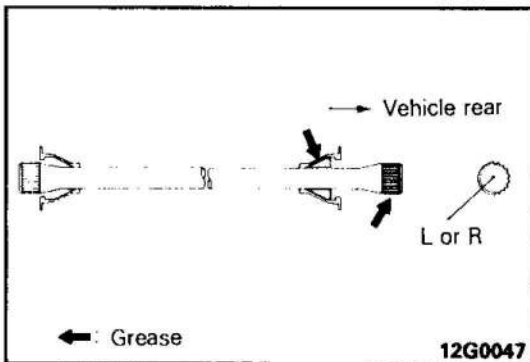
**8. REMOVAL OF REAR ANCHOR ARM**

Move the dust cover, and make mating marks on the rear anchor arm and the torsion bar.

INSPECTION

- Check the anchor bolt for bends or damage.
- Check the dust cover for cracks or damage.
- Check the torsion bar for dents or other damage.
- Check the serrated part for damage.

E33ICAB

**SERVICE POINTS OF INSTALLATION**

E33IDAE

10. TORSION BAR IDENTIFICATION AND GREASE APPLICATION

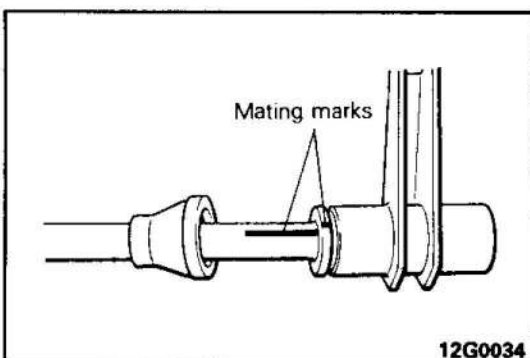
- (1) The left and right are identified by the identification mark at the rear end of the torsion bar. The marked one is to be at the vehicle rear.
- (2) Apply specified grease on the serrations at the rear of the torsion bar.

**Specified grease: Multipurpose grease
SAE J310, NLGI No. 2**

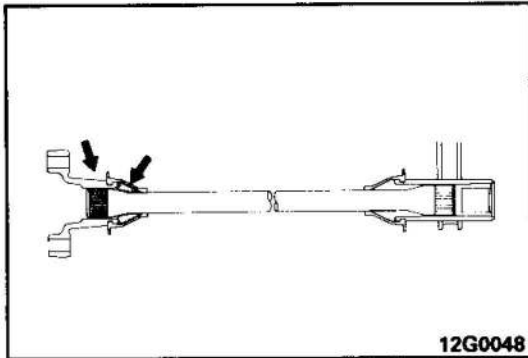
9. APPLICATION OF GREASE TO THE DUST COVER

Fill the rear dust cover with specified grease.

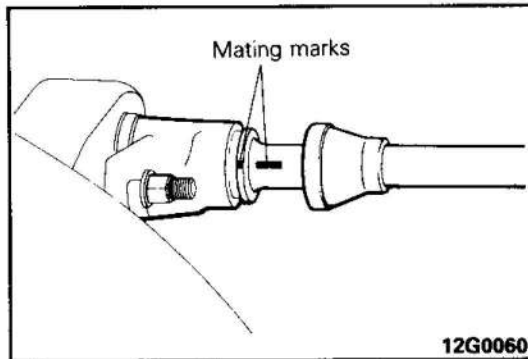
**Specified grease: Multipurpose grease
SAE J310, NLGI No.2**

**8. INSTALLATION OF REAR ANCHOR ARM**

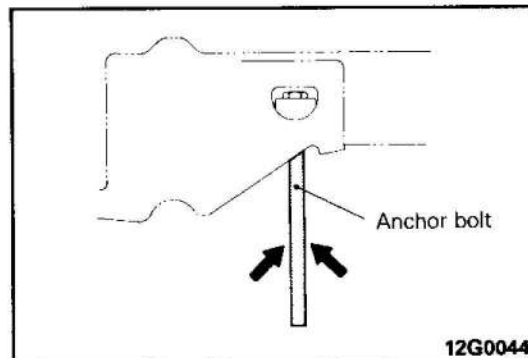
If the torsion bar is reused, align the mating marks on the rear anchor arm and the torsion bar.



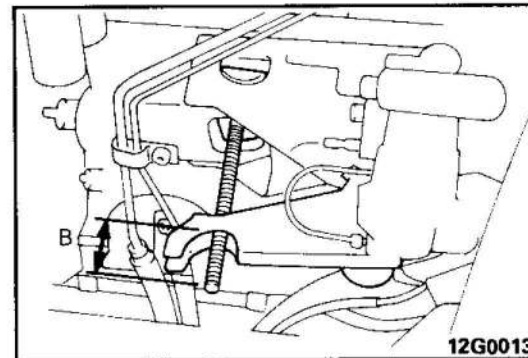
12G0048



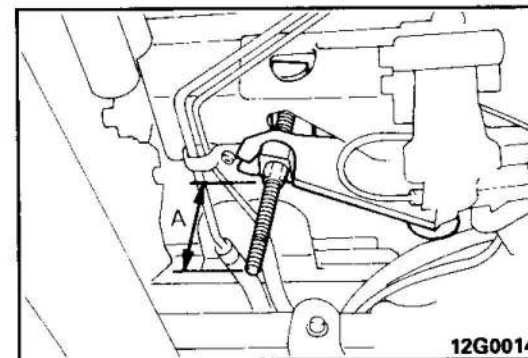
12G0060



12G0044



12G0013



12G0014

5. INSTALLATION OF TORSION BAR ASSEMBLY

- (1) Apply multipurpose grease on the serrations at the front of the torsion bar.
- (2) Fill the front dust cover with multipurpose grease.

- (3) If the torsion bar is reused, align the mating marks on the front anchor arm and the torsion bar.

4. APPLICATION OF GREASE TO ANCHOR BOLT

Apply the multipurpose grease to the threaded part of the anchor bolt.

2. TIGHTENING OF THE TORSION BAR ADJUSTING NUT

If the torsion bar is replaced...

- (1) Before installing the torsion bar adjustment nut, offset the phase of the torsion bar and rear anchor arm so that the amount of projection (B) of the anchor bolt (from the rear anchor arm) is the standard value.

Standard value:

Vehicles for General Export and Australia

40 mm (1.57 in.)

Van for Europe

40 mm (1.57 in.)

Mini-bus for Europe produced through

November, 1987

40 mm (1.57 in.)

Mini-bus for Europe produced from

December, 1987

28 mm (1.10 in.)

- (2) As a temporary adjustment of the vehicle height, tighten the torsion bar adjustment nut until the amount of projection (A) of the anchor bolt becomes the following value.

Projection (A) of anchor bolt:

Vehicles with heavy duty suspension for General

Export, Europe and Australia

75 mm (2.95 in.)

Vehicles for Europe and Australia (Except heavy duty suspension)

91 mm (3.58 in.)

If the torsion bar is reused...

As a temporary adjustment of the vehicle height, tighten the torsion bar adjustment nut until dimension "A" of the anchor bolt becomes the measurement made before removal.

STABILIZER BAR

REMOVAL AND INSTALLATION

Pre-removal Operation

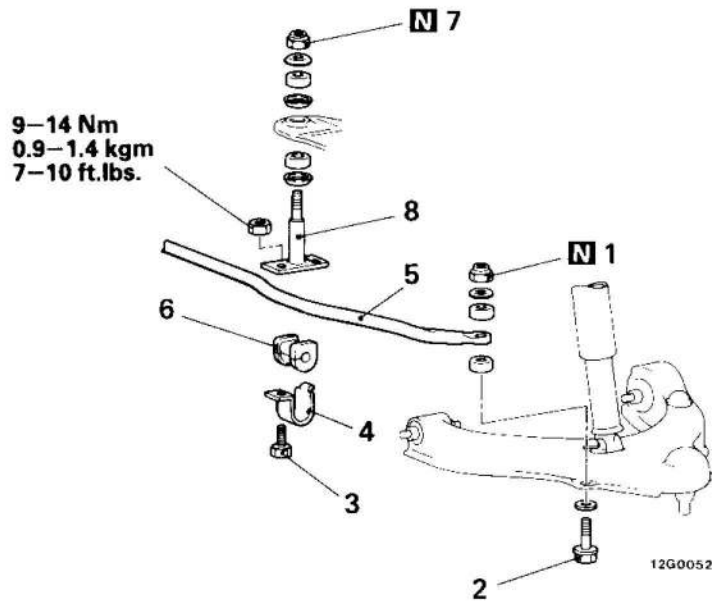
- Removal of under skid plate and under cover
(Refer to GROUP 42 BODY–Under Cover Protector.)

Post-installation Operation

- Installation of under skid plate and under cover
(Refer to GROUP 42 BODY–Under Cover Protector)

Removal steps

- ◆◆ 1. Self-locking nut
2. Bolt
3. Bolt
4. Clamp
5. Stabilizer bar
6. Bushing
- ◆◆ 7. Self-locking nut
8. Hanger



NOTE

- (1) Reverse the removal procedures to reinstall.
- (2) ◆◆ : Refer to "Service Points of Installation".
- (3) **N** : Non-reusable parts

INSPECTION

E33RCBA

- Check the stabilizer bar for dents or damage.
- Check the rubber parts for cracks, deterioration or wear.
- Check the hanger for bends or damage.

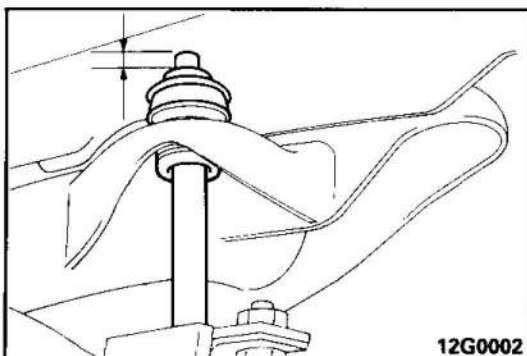
SERVICE POINTS OF INSTALLATION

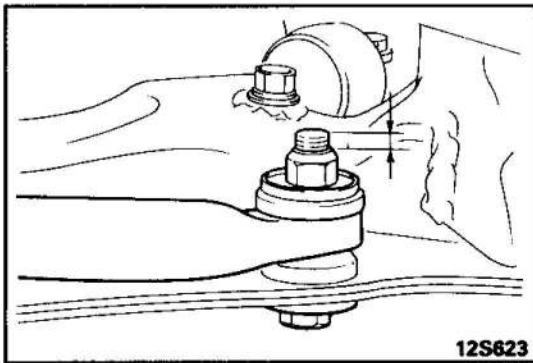
E33RDBA

7. TIGHTENING OF SELF-LOCKING NUT

Tighten self-locking nut until the size described in the figure reaches the standard value.

Standard value: 4.5–6.5 mm (0.18–0.26 in.)





1. TIGHTNING OF SELF-LOCKING NUT

Tighten self-locking nut until the size described in the figure reaches the standard value.

Standard value: 8–10 mm (0.31–0.39 in.)

