GROUP 33A

FRONT SUSPENSION

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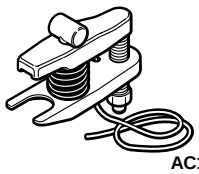
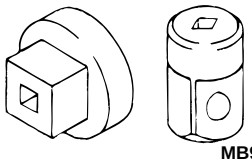
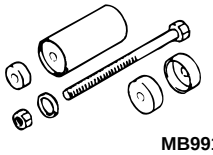
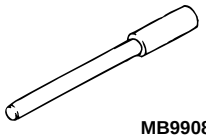
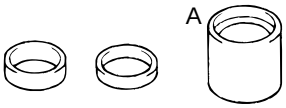
GENERAL DESCRIPTION

M1331000100073

Front suspension is an independent suspension having the double wishbone combined with the torsion bar spring.

SPECIAL TOOLS

M1331000600078

TOOL	TOOL NUMBER AND NAME	SUPERSESSION	APPLICATION
 AC106827	MB991897 Ball joint remover	MB991113-01, MB990635-01 or General service tool	Ball joint removal *NOTE: Steering linkage puller (MB990635 or MB991113) is also used to disconnect knuckle and tie rod end ball joint.*
 MB990326	MB990326 Preload socket	General service tool	Ball joint rotating torque check
 MB991522	MB991522 Torsion bar bushing remover and installer	–	Removal and press-fitting of bushing
 MB990883	MB990883 Arbor	MB990883-01	Removal and press-fitting of lower arm bushing
 MB990957	MB990957 Lower arm bushing remover and installer A: MB990971 Base	Tool not available	

ON-VEHICLE SERVICE

FRONT WHEEL ALIGNMENT CHECK AND ADJUSTMENT

M1331000900240

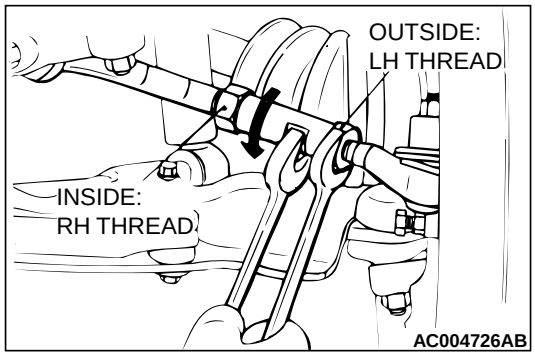
Measure wheel alignment with alignment equipment on a level surface. The front suspension, steering system, and wheels should be serviced to normal condition before measuring wheel alignment.

TOE-IN

Standard value: 3.5 ± 3.5 mm (0.14 ± 0.14 inch)

⚠ CAUTION

- **Take care when turning the tie rod end's outer side, as the threads are reversed.**
- **Make sure that the left/right difference of the tie rod does not exceed 5 mm (0.20 inch).**



1. If the toe-in is not within the standard value, adjust the toe-in by 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 P.37A-15.)

STEERING ANGLE

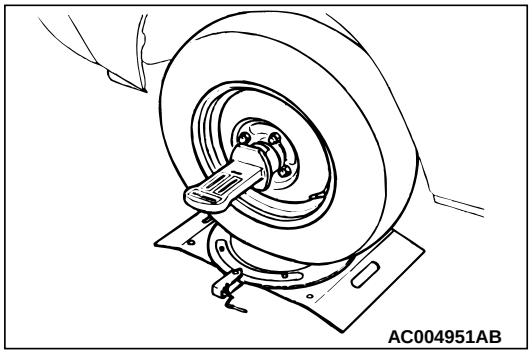
Standard value:

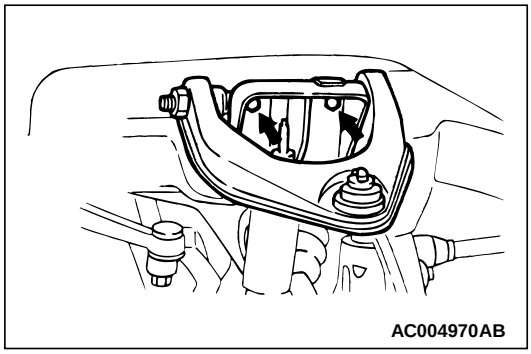
Inner wheel	30°90' ± 1°50'
Outer wheel (reference)	29°30'

CAMBER AND CASTER

Standard value:

- **Camber: <RH> 0°25'± 30'/<LH> 0°55'± 30'**
  (The difference between right and left wheels should be within 1°00', and the left side should be equal to or larger than the right side.)
- **Caster: 2°40' ± 1°**
  (The difference between right and left wheels should be within 30'.)

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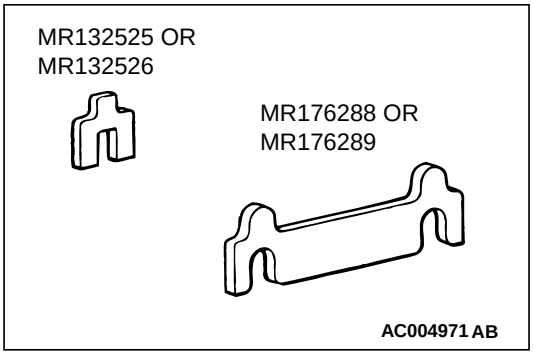


AC004971AB

If the standard value is not obtained, make adjustment by the following procedure.

1. Loosen the upper arm mounting bolts and nuts.

   NOTE: Remove the shock absorber mounting nut and jam nut, compress the shock absorber and loosen the upper arm mounting bolts and nuts.

⚠ CAUTION

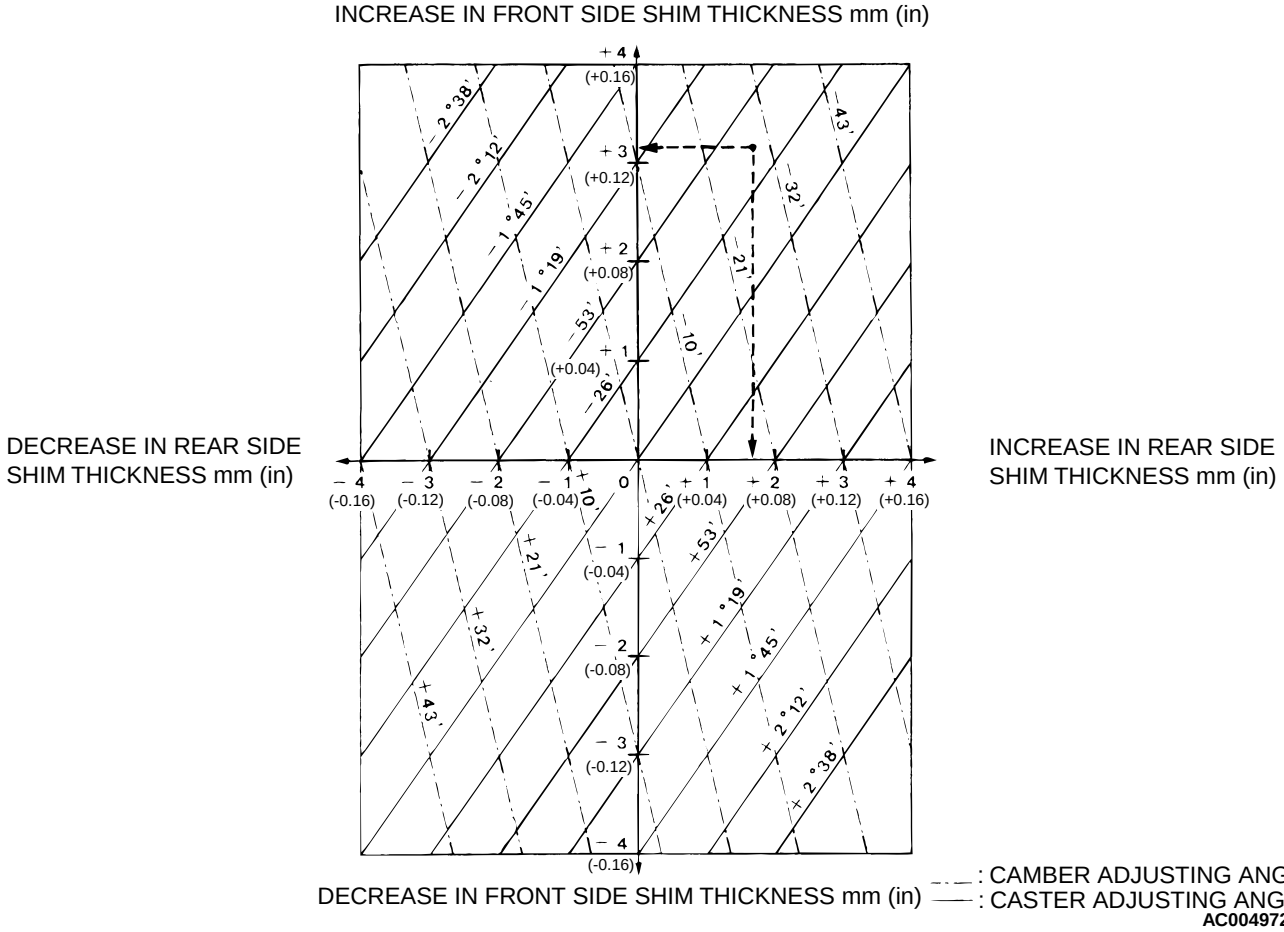
- **Difference in shim thickness between front and rear must be 4 mm (0.6 inch) or less.**
- **Do not use 4 or more shims at one location.**

2. Increase or decrease shims between the upper arm shaft and crossmember to adjust the camber and caster. (Refer to Charts for Shim Increase or Decrease .)

ADJUSTMENT OF SHIM	
Part number	Thickness mm (in)
MR132525	1 (0.04)
MR132526	2 (0.08)
MB176288 (Front shim integral with rear shim)	1 (0.04)
MB176289 (front shim integral with rear shim)	2 (0.08)

Charts for Shim Increase or Decrease

How to read this table (example)

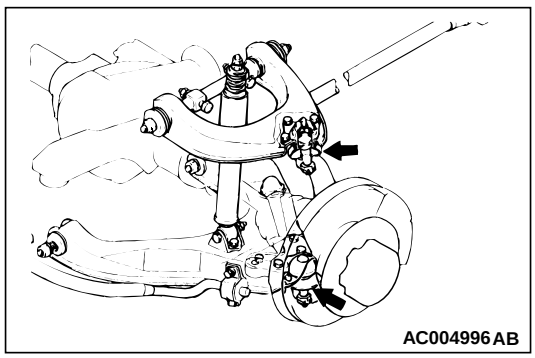


Calculate the difference of the measured value from the standard value of the camber and caster to decide how many adjusting shims to increase or decrease.

EXAMPLE To decrease camber by 30' and caster by 40', increase combined front side shim thickness by 3 mm (0.12 inch) and increase combined rear side shim thickness by 2 mm (0.08 inch).

BALL JOINT DUST COVER CHECK

M1332008600194



1. Press the dust cover with a finger to check whether the dust cover is cracked or damaged.
2. If the dust cover is cracked or damaged, replace the upper arm ball joint or lower arm ball joint.

   NOTE: If the dust cover is cracked or damaged, the ball joint could be damaged.

SHOCK ABSORBER ASSEMBLY AND UPPER ARM

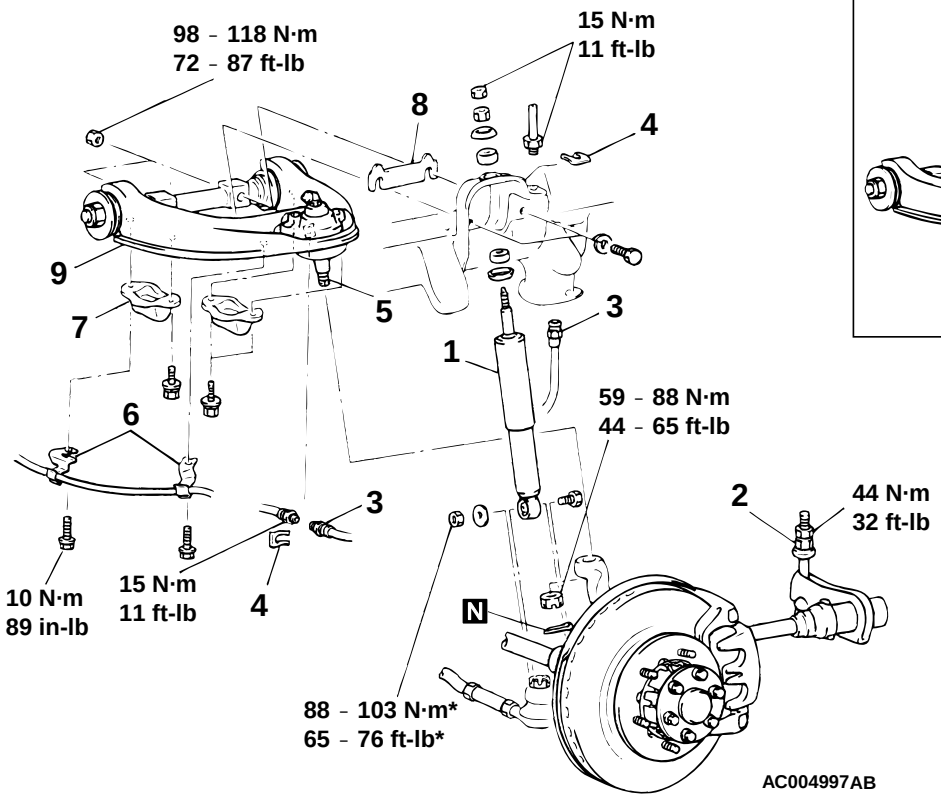
REMOVAL AND INSTALLATION

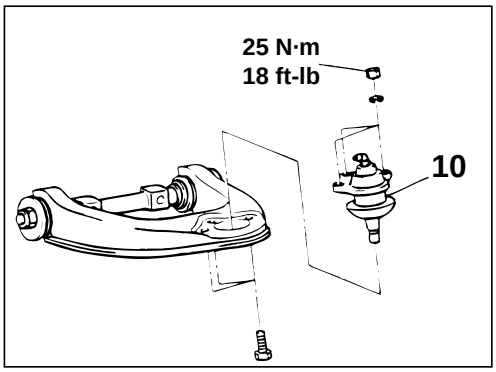
M1332002500069

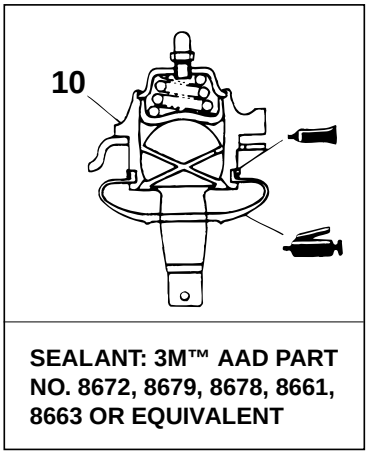
⚠ CAUTION

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

Pre-removal Operation	Post-installation Operation
• Brake Fluid Draining	• Press the dust cover with a finger to check whether the dust cover is cracked or damaged. • Brake Fluid Supplying • Brake Line Bleeding (Refer to GROUP 35A, On-vehicle Service P.35A-22.) • Front Wheel Alignment Check and Adjustment (Refer to P.33A-3.)







SEALANT: 3M™ AAD PART NO. 8672, 8679, 8678, 8661, 8663 OR EQUIVALENT

REMOVAL STEPS

- **>>D<<** 1. SHOCK ABSORBER
- **>>C<<** • BUMP STOPPER AND BUMP STOPPER BRACKET CLEARANCE ADJUSTMENT
- **<<A>>** 2. REAR ANCHOR ARM ADJUSTING NUT
- 3. BRAKE HOSE CONNECTION
- 4. HOSE CLIP
- **<<B>>** 5. UPPER ARM BALL JOINT CONNECTION

REMOVAL STEPS (Continued)

- 6. SPEED SENSOR BRACKET <VEHICLES WITH ABS>
- **>>B<<** 7. REBOUND STOPPER
- **<<C>>** 8. SHIMS
- **>>A<<** 9. UPPER ARM
- 10. UPPER ARM BALL JOINT ASSEMBLY

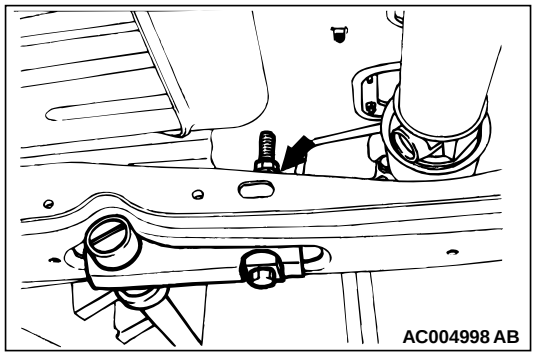
Required Special Tools:

- MB990326: Preload Socket
- MB991897: Ball Joint Remover

TSB Revision

REMOVAL SERVICE POINTS

<<A>> REAR ANCHOR ARM ADJUSTING NUT LOOSENING



⚠ CAUTION

When the rear anchor arm adjusting nut is loosened, use a jack to support the lower arm of the side to be loosened.

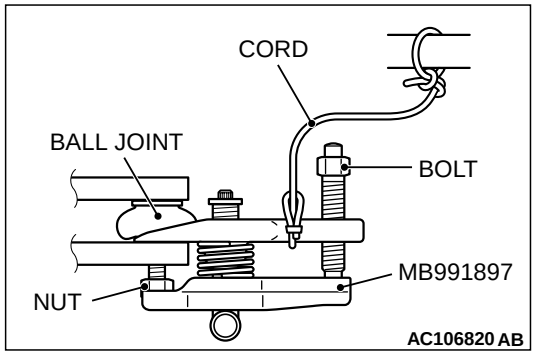
Loosen the anchor arm bolt of the torsion bar all the way.

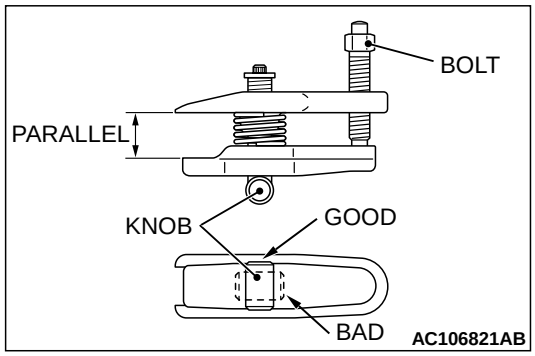
<<B>> UPPER ARM BALL JOINT DISCONNECTION

⚠ CAUTION

- **Do not remove the nut from ball joint. Loosen it and use special tool MB991897 to avoid possible damage to ball joint threads.**
- **Hang special tool MB991897 with cord to prevent it from falling.**

1. Install the special tool MB991897 as shown in the figure.





2. Turn the bolt and knob as necessary to make the jaws of special tool MB991897 parallel, tighten the bolt by hand and confirm that the jaws are still parallel.

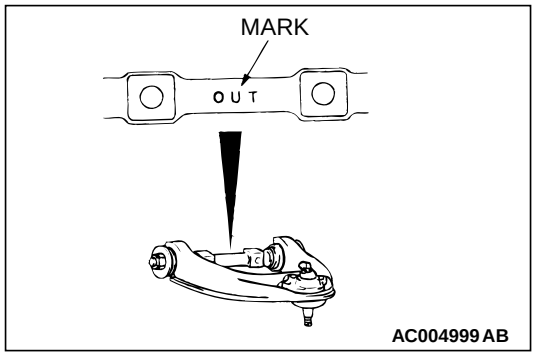
   NOTE: When adjusting the jaws in parallel, make sure the knob is in the position shown in the figure.

3. Tighten the bolt with a wrench to disconnect the tie upper arm ball joint.

<<C>> SHIMS REMOVAL

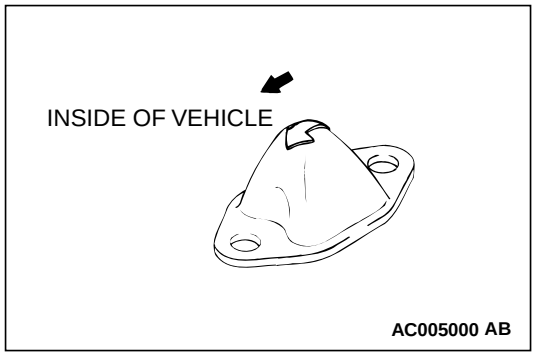
NOTE: The camber and caster adjustment shims should be kept for use during assembly.

INSTALLATION SERVICE POINTS



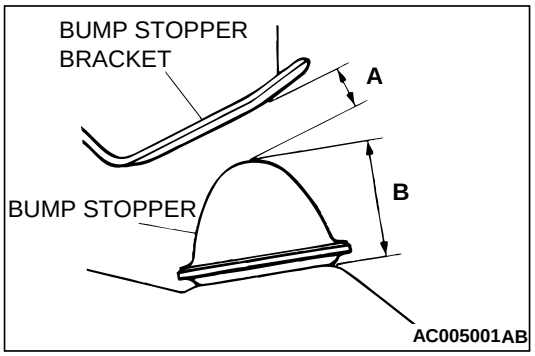
>>A<< UPPER ARM INSTALLATION

Install the upper arm so that the "OUT" mark on the upper arm shaft is facing toward the outside of the vehicle.



>>B<< REBOUND STOPPER INSTALLATION

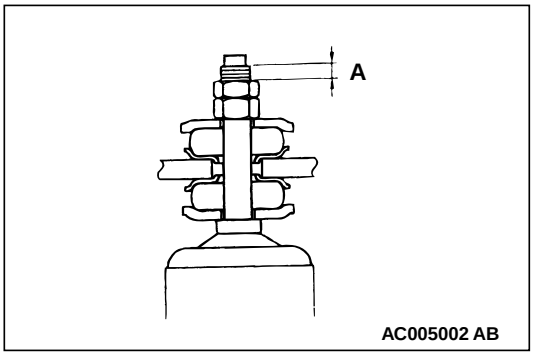
Install the rebound stopper so that its arrow faces inside of the vehicle.



>>C<< BUMP STOPPER AND BUMP STOPPER BRACKET CLEARANCE ADJUSTMENT

1. With the vehicle in an unladen condition, dimension A from the bump stopper to the bump stopper bracket should be 18 – 20 mm (0.71 – 0.79 inch).

   NOTE: Dimension A will be 18 mm (0.71 inch) (B = 50 mm [2.0 inches]) when the bump stopper is a new part. When the bump stopper is worn and becomes less than 50 mm (2.0 inches), dimension A will increase by the decreased amount.
2. If dimension A is not 18 – 20 mm (0.71 – 0.79 inch), adjust the rear anchor arm adjusting nut.



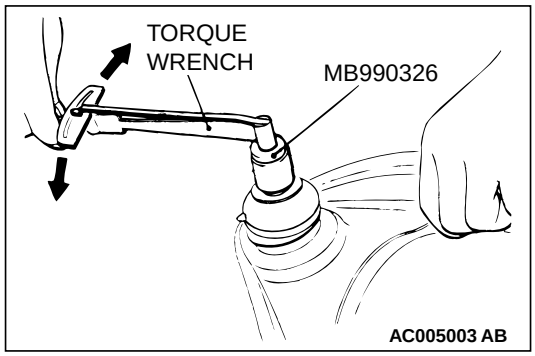
>>D<< SHOCK ABSORBER INSTALLATION

Install the shock absorber so that the distance (A) shown in the illustration is at the standard value.

Standard value (A): 1 – 2 mm (0.04 – 0.08 inch)

INSPECTION

M1332002600066



UPPER ARM BALL JOINT BREAKAWAY TORQUE CHECK

1. After shaking the upper arm ball joint assembly stud several times, install the nut to the stud and use the special tool MB990326 to measure the breakaway torque of the upper arm ball joint assembly.

   Standard value: 0.8 – 3.4 N·m (7.1 – 30.1 in-lb)

2. When the measured value exceeds the standard value, replace the upper arm ball joint.
3. When the measured value is lower than the standard value, check that the ball joint turns smoothly without excessive play. If not, it is possible to use that upper arm ball joint.

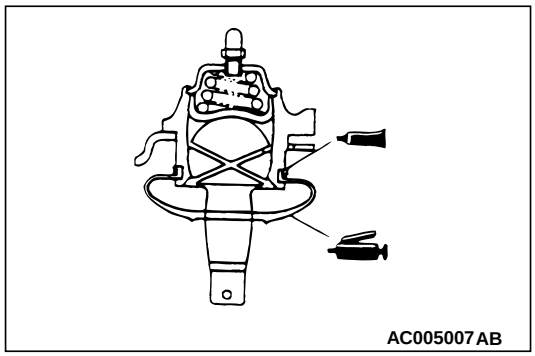
UPPER ARM BALL JOINT DUST COVER CHECK

1. Press the dust cover with a finger to check whether the dust cover is cracked or damaged.
2. If dust cover is cracked or damaged, replace the upper arm ball joint. Cracked or damaged dust cover may cause damage to the ball joint. In addition, if the dust cover is damaged during service work, replace the dust cover.

BALL JOINT DUST COVER REPLACEMENT

M1332008000114

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



1. Apply multipurpose grease to the interior of the dust cover and the upper arm ball joint.
2. Secure the dust cover to the upper arm ball joint with ring.
3. Press the dust cover with a finger to check whether the dust cover is cracked or damaged.

LOWER ARM AND TORSION BAR

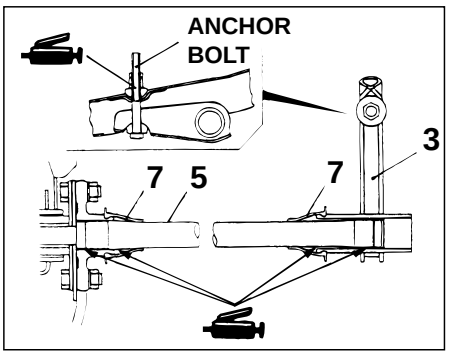
REMOVAL AND INSTALLATION

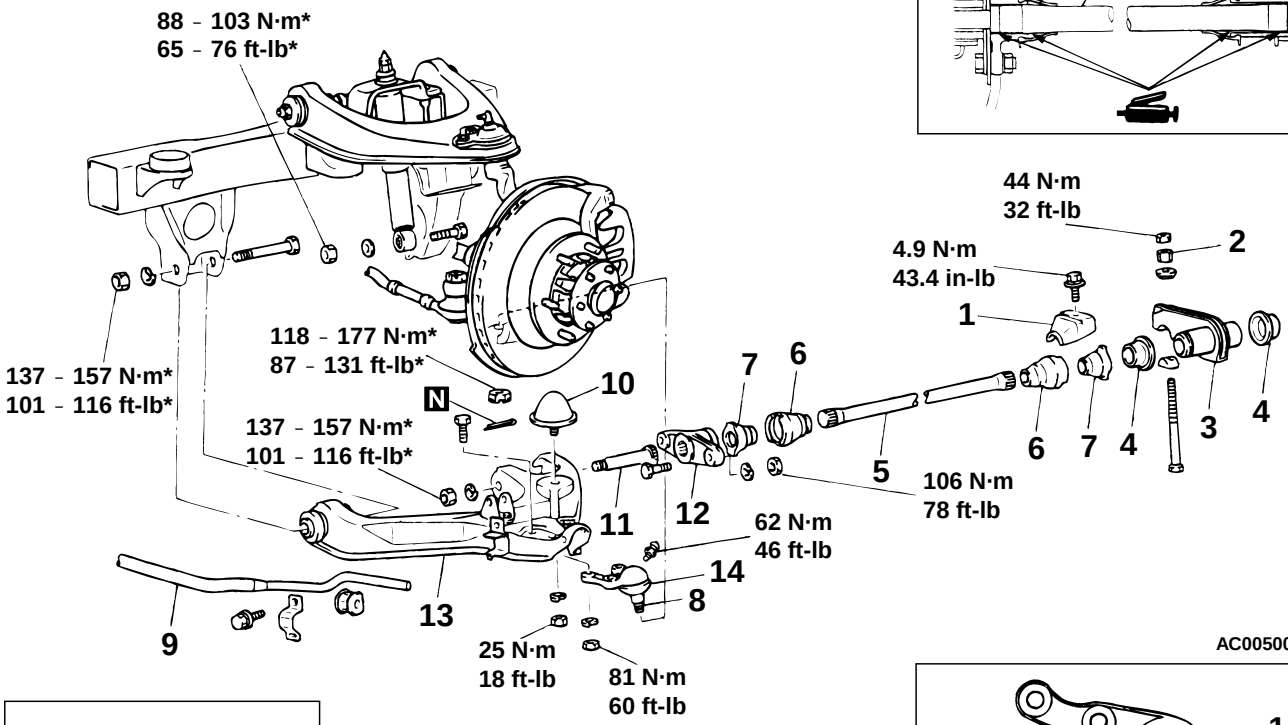
M1332010700046

⚠ CAUTION

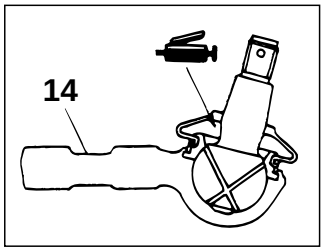
***: Indicates parts which should be temporarily tightened, and then fully tightened with the vehicle on the ground in an unladen condition.**

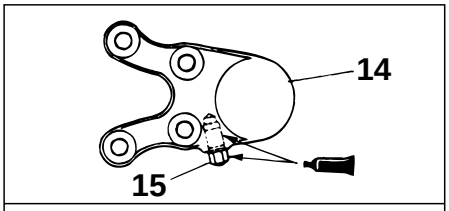
Pre-removal Operation	Post-installation Operation
• Under Cover and Skid Plate Removal (Refer to GROUP 42, Under Cover P.42-164.)	• Press the dust cover with a finger to check whether the dust cover is cracked or damaged. • Front Wheel Alignment Check and Adjustment (Refer to P.33A-3.) • Under Cover and Skid Plate Installation (Refer to GROUP 42, Under Cover P.42-164.)





AC005008 AD





ADHESIVES: 3M™ AAD PART NO. 8730 OR EQUIVALENT

REMOVAL STEPS

>>B<< • BUMP STOPPER AND BUMP STOPPER BRACKET CLEARANCE ADJUSTMENT

1. HEAT PROTECTOR (RIGHT SIDE ONLY)

REMOVAL STEPS (Continued)

2. ANCHOR ARM ASSEMBLY ADJUSTING NUT

>>A<< 3. REAR ANCHOR ARM ASSEMBLY

4. ANCHOR COLLAR

>>A<< 5. TORSION BAR

6. HEAT COVER (RIGHT SIDE ONLY)

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REMOVAL STEPS (Continued)

7. DUST COVERS
<<A>> 8. LOWER ARM BALL JOINT CONNECTION
9. STABILIZER BAR CONNECTION
10. BUMP STOPPER
11. LOWER ARM SHAFT
12. FRONT ANCHOR ARM
13. LOWER ARM
14. LOWER ARM BALL JOINT ASSEMBLY
15. STOPPER BOLT

Required Special Tools:

- MB990833: Arbor
- MB990971: Base
- MB991897: Ball Joint Remover Puller
- MB991522: Torsion Bar Bushing Remover and Installer

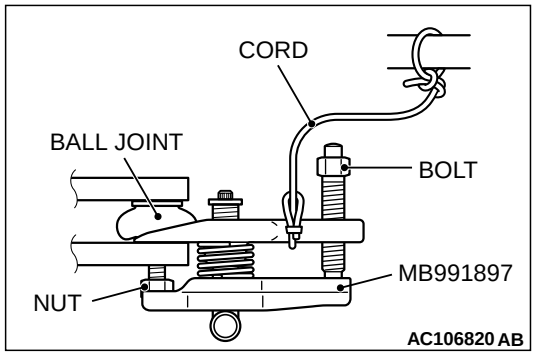
REMOVAL SERVICE POINT

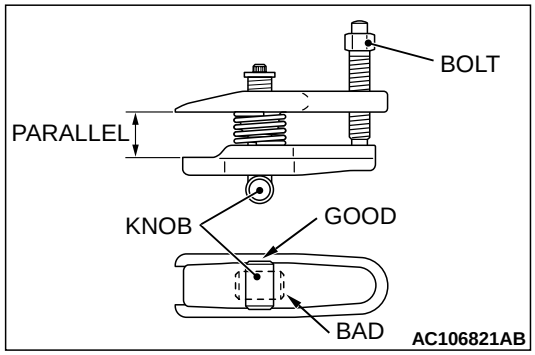
<<A>> LOWER ARM BALL JOINT DISCONNECTION

⚠ CAUTION

- **Do not remove the nut from ball joint. Loosen it and use special tool MB991897 to avoid possible damage to ball joint threads.**
- **Hang special tool MB991897 with cord to prevent it from falling.**

1. Install the special tool MB991897 as shown in the figure.



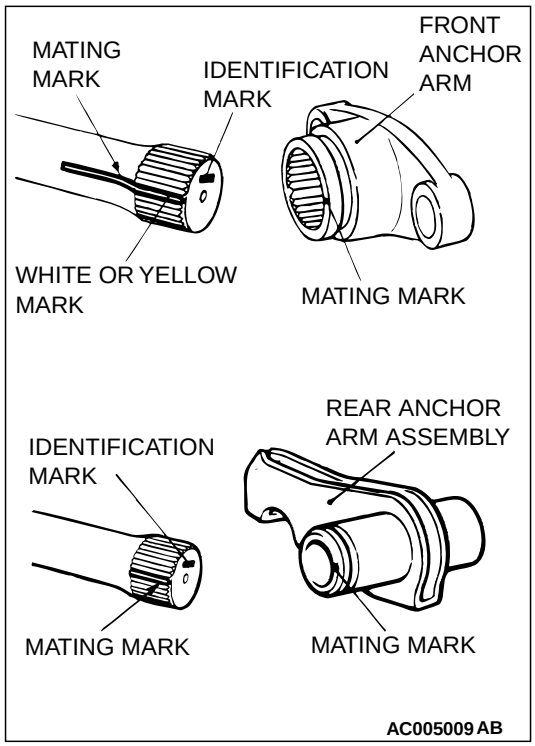


2. Turn the bolt and knob as necessary to make the jaws of special tool MB991897 parallel, tighten the bolt by hand and confirm that the jaws are still parallel.

   NOTE: When adjusting the jaws in parallel, make sure the knob is in the position shown in the figure.

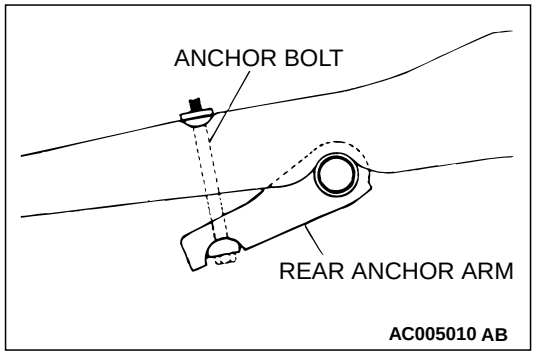
3. Tighten the bolt with a wrench to disconnect the tie lower arm ball joint.

INSTALLATION SERVICE POINTS

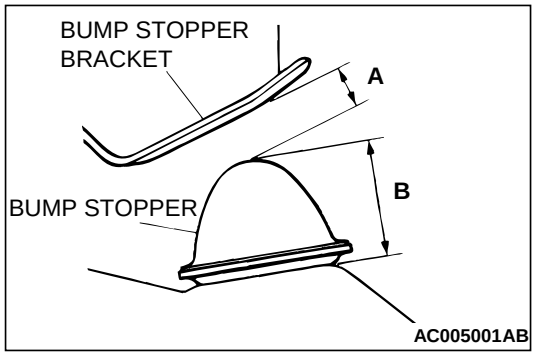


>>A<< TORSION BAR/REAR ANCHOR ARM INSTALLATION

1. Check the identification marks at the end of the left and right torsion bars.
   R → for right side
   L → for left side
2. When installing the torsion bar, align the white mark on the serrated section of the torsion bar with the mating mark on the anchor arm.



3. Mount the anchor bolt as shown in the illustration, and install the rear anchor arm adjusting nut.



>>B<< BUMP STOPPER AND BUMP STOPPER BRACKET CLEARANCE ADJUSTMENT

1. With the vehicle in an unladen condition, dimension A from the bump stopper to the bump stopper bracket should be 18 – 20 mm (0.71 – 0.79 inch).

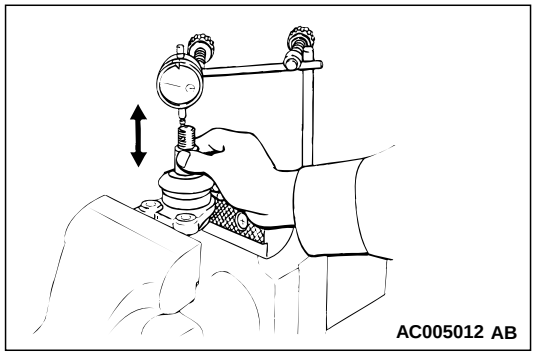
   NOTE: Dimension A will be 18 mm (0.71 inch) (B = 50 mm [2.0 inches]) when the bump stopper is a new part. When the bump stopper is worn and becomes less than 50 mm (2.0 inches), dimension A will increase by the decreased amount.
2. If dimension A is not 18 – 20 mm (0.71 – 0.79 inch), adjust the anchor arm assembly adjusting nut.

INSPECTION

M1332010800043

LOWER ARM BALL JOINT END PLAY

Check the lower arm ball joint assembly end play by following the steps below.



1. Measure the lower arm ball joint assembly end play with a dial indicator.

   Limit: 0.3 mm (0.01 inch)

2. If the lower arm ball joint assembly end play exceeds the limit, replace the lower arm ball joint assembly.

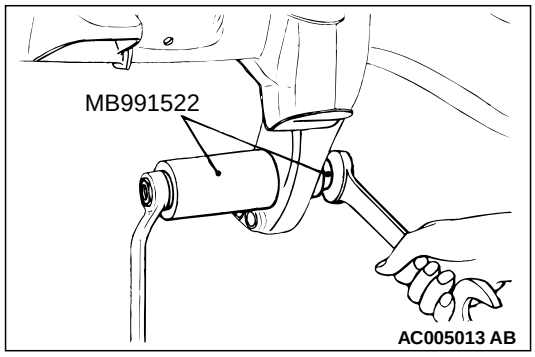
LOWER ARM BALL JOINT DUST COVER CHECK

1. Press the dust cover with a finger to check whether the dust cover is cracked or damaged.
2. When dust cover is cracked or damaged, replace the lower arm ball joint assembly.

   NOTE: If the dust cover is cracked, the ball joint could be damaged, so if the dust cover is damaged during maintenance work, replace it.

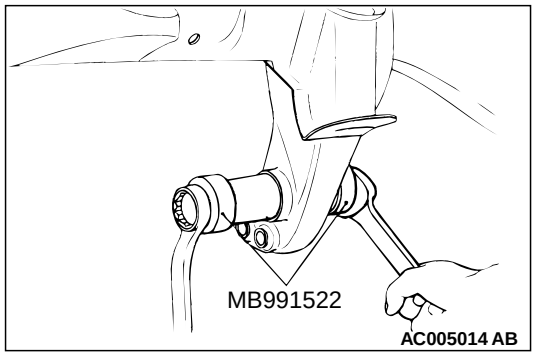
REAR LOWER ARM BUSHING REPLACEMENT

M1332008100230

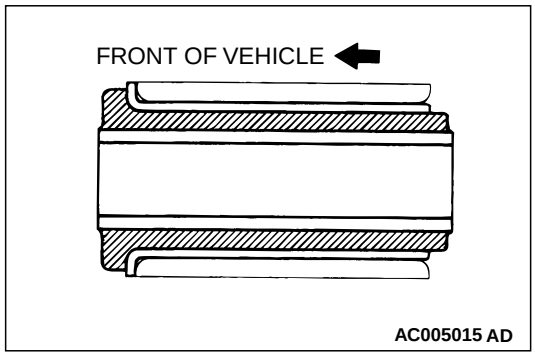


1. Using the special tool MB991522, remove the lower arm bushing (A) from the bracket.

   NOTE: When removing the left hand rear lower arm bushing, detach the differential carrier. (Refer to GROUP 26, Differential carrier P.26-36.)



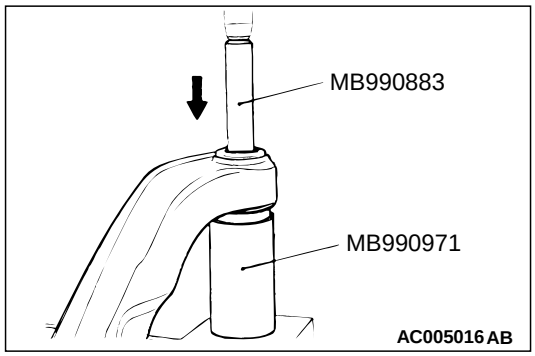
2. Using the special tool MB991522, press-fit the lower arm bushing (A) into the bracket.



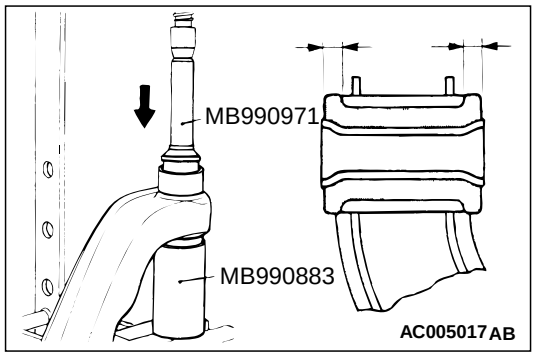
NOTE: Install the rear lower arm bushing in the direction shown in the illustration.

FRONT LOWER ARM BUSHING REPLACEMENT

M1332008100241



1. Remove the front lower arm bushing from the lower arm by using special tools MB990883, MB990971.

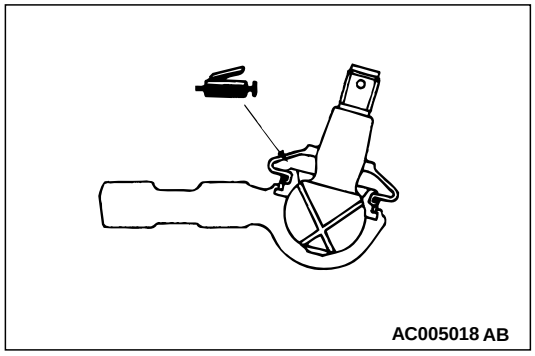


2. Coat the front lower arm bushing and the lower arm with soap solution and press-fit the front lower arm bushing into the lower arm by using special tools MB990883 and MB990971 and taking care not to twist or tilt the front lower arm bushing.

   NOTE: Press-fit the front lower arm bushing again from the opposite side to equalize bushing projections at both ends.

LOWER ARM BALL JOINT DUST COVER REPLACEMENT

M1332008200196



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

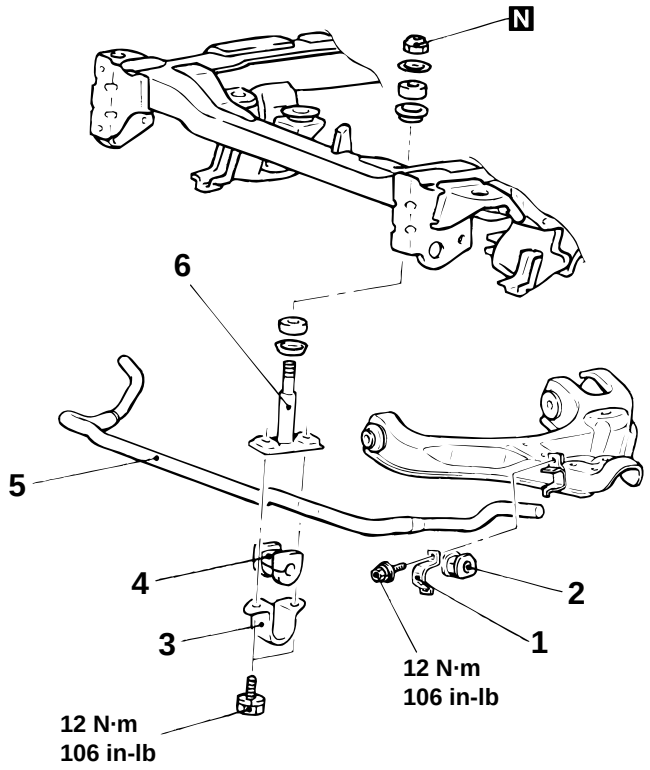
1. Apply multipurpose grease to the interior of the dust cover and the lower arm ball joint.
2. Secure the dust cover to the lower arm ball joint with ring.

STABILIZER BAR

REMOVAL AND INSTALLATION

M1332004000156

Pre-removal and Post-installation Operation
- Under Cover and Skid Plate Removal and Installation (Refer to GROUP 42, Under Cover P.42-164.)



AC005019 AB

REMOVAL STEPS
>>A<< • STABILIZER LINK ASSEMBLY MOUNTING NUT ADJUSTMENT
1. STABILIZER BRACKET (A)
2. BUSHING

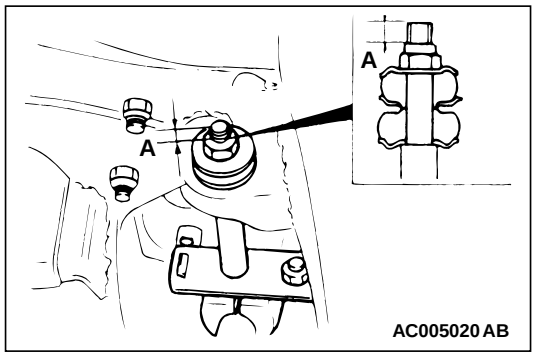
REMOVAL STEPS (Continued)
3. STABILIZER BRACKET
4. BUSHING
5. STABILIZER BAR
6. STABILIZER LINK ASSEMBLY

INSTALLATION SERVICE POINT

>>A<< STABILIZER LINK ASSEMBLY MOUNTING NUT ADJUSTMENT

Tighten the nut so that dimension A shown in the figure is at standard value.

Standard value (A): 6 – 8 mm (0.2 – 0.3 inch)



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TSB Revision

SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

M1331001200084

ITEM	SPECIFICATION
Anchor arm assembly adjusting nut	44 N·m (32 ft-lb)
Brake hose connection	15 N·m (11 ft-lb)
Bump stopper nut	25 N·m (18 ft-lb)
Fitting	62 N·m (46 ft-lb)
Front anchor arm nut	106 N·m (78 ft-lb)
Heat protector bolt	4.9 N·m (43.4 ft-lb)
Lower arm ball joint and knuckle connection nut	118 – 177 N·m (87 – 131 ft-lb)
Lower arm ball joint assembly nut	81 N·m (60 ft-lb)
Lower arm nut	137 – 157 N·m (101 – 116 ft-lb)
Lower arm shaft nut	137 – 157 N·m (101 – 116 ft-lb)
Shock absorber nut (Lower)	88 – 103 N·m (65 – 76 ft-lb)
Shock absorber nut (Upper)	15 N·m (11 ft-lb)
Speed sensor bracket bolt	10 N·m (89 in-lb)
Stabilizer bracket (A) bolt	12 N·m (106 in-lb)
Stabilizer bracket bolt	12 N·m (106 in-lb)
Upper arm ball joint and knuckle connection nut	59 – 88 N·m (44 – 65 ft-lb)
Upper arm ball joint assembly nut	25 N·m (18 ft-lb)
Upper arm nut	98 – 118 N·m (72 – 87 ft-lb)

GENERAL SPECIFICATIONS

M1331000200081

SUSPENSION TYPE

ITEM	SPECIFICATION
Suspension type	Double wishbone type independent suspension

TORSION BAR <RWD>

ITEM	SPECIFICATION
Length y OD mm (in)	1,307.5 × 25.6 (51.48 × 1.01)
Spring constant (wheel position) N/mm (lb/in)	22 (126)

TORSION BAR <4WD>

ITEM	SPECIFICATION
Length y OD mm (in)	1,307.5 × 26.4 (51.48 × 1.04)
Spring constant (wheel position) N/mm (lb/in)	25 (143)

SHOCK ABSORBER

ITEM			SPECIFICATION
Type			Hydraulic, cylindrical, double-acting type
Max length mm (in)			345 (13.6)
Min length mm (in)			230 (9.1)
Stroke mm (in)			115 (4.5)
Damping force [at 0.3 m/sec. (0.9 ft/sec.)] N (lb)	RWD	Expansion	2 040 (459)
		Contraction	981 (221)
	4WD	Expansion	2 254 (507)
		Contraction	882 (198)

SERVICE SPECIFICATIONS

M1331000300088

ITEM		STANDARD VALUE	LIMIT
Toe-in mm (in)		3.5 + 3.5 (0.14 + 0.14)	–
Camber		<RH> 0°25' ± 30' <LH> 0°55' ± 30'	–
Caster		2°40' ± 1°00'	–
Steering angle	Inner wheel	30°90' ± 1°50'	–
	Outer wheel (reference)	29°30'	–
Protruding length of shock absorber mounting bolt mm (in)		1–2	0.04–0.08
Upper arm ball joint breakaway torque N·m (in-lb)		0.8 – 3.4 (7.1 – 30.1)	–
Lower arm ball joint end play mm (in)		–	0.3 (0.01)
Stabilizer link assembly attaching dimension mm (in)		6 – 8 (0.2 – 0.3)	–

SEALANTS AND ADHESIVES

M1331000500059

ITEM	SPECIFIED SEALANT
Upper ball joint dust cover to upper ball joint groove	3M™ AAD Part No.8672, 8679, 8678, 8663, 8661 or equivalent
Stopper bolt	3M™ AAD Part No.8730 or equivalent

NOTES