

FRONT SUSPENSION

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GENERAL

**GENERAL
SPECIFICATIONS**

Suspension system	McPherson strut with coil spring and compression rod type		
	A	B	C
Coil spring			
Wire dia. x O.D. x free length mm (in.)	13.5x15.85x360 (0.53x6.24x14.17)	13.5x158.5x368.4 (0.53x6.24x14.5)	13.5x158.5x376.8 (0.53x6.24x14.83)
Coil spring identification color	Green x 1	Green x 2	Violet x 1
Shock absorber			
Type	Hydraulic, cylindrical double acting type		
Maximum length mm (in.)	507 (19.96)		
Compressed length mm (in.)	357 (14.06)		
Stroke mm (in.)	150 (5.91)		
Wheel			
Wheel type	Steel	Aluminum	
Wheel size	5J x 14	5.5JJx14, 6JJx15	
Tire size	P185/70 R14	P195/70R14, P205/60R15	
Tire inflation pressure kPa (psi)	207 (30)	207 (30)	
Temporary spare tire			
Wheel size	4Tx 15		
Tire size	T125/70 D 15		
Tire inflation pressure kPa (psi)	414 (60)		

NOTE

A	B	C
GL	GL + AC, GL + SR GL + PB, GL + AC + SR GL + AC + PB, GL + SR + PB GLS, GLS + SR, GLS + PB	GL + AC + SR + PB GLS + AC, GLS + SR + PB

GL, GLS : Trim level AC : With air conditioner SR : With sun roof
 PB : With passive seat belt

GENERAL

SERVICE STANDARD

Standard value			
Toe		± 3 mm	
Camber		30' ± 30'	
Caster		2° ± 30'	
King pin inclination angle		13°25'	
Wheel runout		Steel	Aluminum
Radial	mm (in.)	0.6 (0.024)	0.3 (0.012)
Axial	mm (in.)	1.0 (0.039)	0.3 (0.012)

TIGHTENING TORQUE

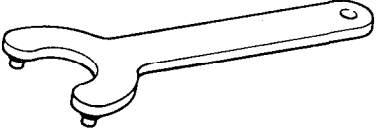
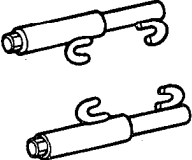
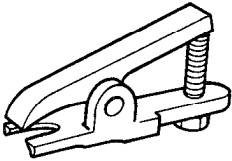

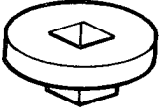
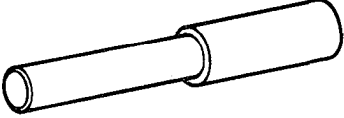
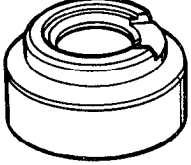
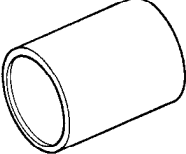
	Nm	Kg.cm	lb.ft
Strut assembly to stopper	49-59	500-600	36-43
Lower arm shaft to crossmember	93-118	950-1200	69-87
Stabilizer bar bracket to crossmember	29-41	300-420	22-30
Lower control arm clamp to crossmember (bolt)	78-98	800-1000	58-72
Lower control arm clamp to crossmember (nut)	34-46	350-470	25-34
Lower control arm clamp shaft to body	98-118	1000-1200	72-87
Stay to crossmember	69-78	700-800	51-58
Center member to body	78-98	800-1000	58-72
Center member to crossmember	78-98	800-1000	58-72

LUBRICANTS

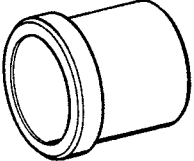
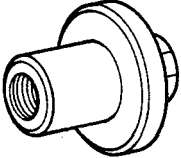
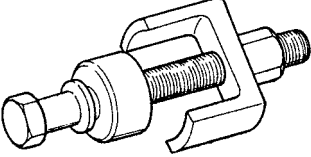
Inside surface and lip of ball joint dust cover	Multipurpose grease SAE J310a, NLGI grade #2	As required
In Insulator bearing of strut	Chassis grease SAE J310a, NLGI grade #0	As required

GENERAL

SPECIAL TOOLS

Tool (Number and Name)	Illustrations	Use
09546—33000 Special spanner		Removal and installation of the front coil spring.
09546—11000 Spring compressor		Compression of the front coil spring
09568—31000 Tie rod end puller		Separation of the tie rod end and the lower arm ball joint.
09545—11000 Ball joint remover and installer (A/B)		1) Removal and installation of the front lower arm ball joint. 2) Installation of the front lower arm ball joint dust cover.
09532—11600 Preload socket		Measurement of the front lower arm ball joint starting torque. (use with torque wrench)
09545—21400 Lower arm bushing arbor		Removal and installation of the clamp bushing (use with 09556—31000, 09216—21100)
09556—31000 Bushing remover and installer		Removal and installation of the clamp bushing. (use with 09545—21400, 09216—21100)
09216—21100 Mount bushing remover and installer base		Removal and installation of the clamp bushing. (use with 09545—21400, 09556—31000)

GENERAL

Tool (Number and Name)	Illustration	Use
09221-21000 Camshaft oil seal installer		Removal of the front lower arm ball joint (use with 09545-11000)
09529-21000 Wheel alignment gauge attachment		Measurement of the wheel alignment
09624-33000 Crossmember bushing remover and installer		Removal and installation of the cross- member bushing

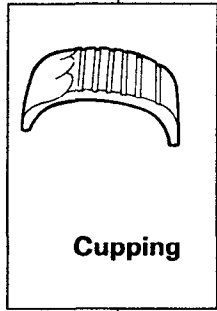
GENERAL

TROUBLESHOOTING

Symptom	Probable cause	Remedy
Hard steering	Improper front wheel alignment	Correct
	Excessive turning resistance of lower arm ball joint	Replace
	Flat tire	Adjust
	No power assist	Repair and replace
Poor return of steering wheel to center	Improper front wheel alignment	Correct
Poor riding	Improper front wheel alignment	Correct
	Malfunctioning shock absorber	Repair or replace
	Broken or worn stabilizer	Replace
	Broken or worn coil spring	Replace
	Worn lower arm bushing	Replace the lower arm assembly
Abnormal tire wear	Improper front wheel alignment	Correct
	Malfunctioning shock absorber	Replace
Wandering	Improper front wheel alignment	Correct
	Poor turning resistance of lower arm ball joint	Repair
	Loose or worn lower arm bushing	Retighten or replace
Vehicle pulls to one side	Improper front wheel alignment	Correct
	Excessive turning resistance of lower arm ball joint	Replace
	Broken or worn coil spring	Replace
	Deformed lower arm	Repair
Steering wheel shimmy	improper front wheel alignment	Correct
	Poor turning resistance of lower arm ball joint	Replace
	Broken or worn stabilizer	Replace
	Worn lower arm bushing	Replace
	Malfunctioning shock absorber	Replace
	Broken or worn coil spring	Replace
Bottoming	Broken or worn coil spring	Replace
	Malfunctioning shock absorber	Replace

WHEEL AND TIRE DIAGNOSIS

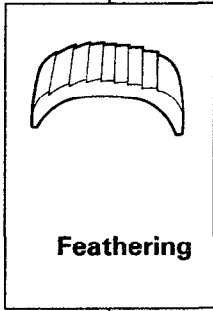
Unevenly worn tires



Unbalance of wheels

Loose wheel bearings

Faulty shock absorbers

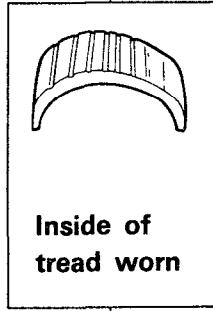


Excessive toe-in



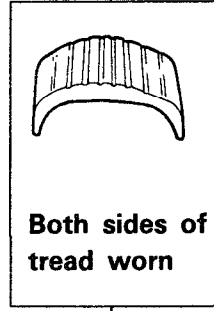
Excessive toe-in

Excessive camber

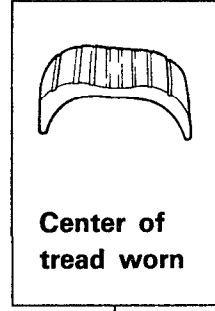


Insufficient toe-in

Insufficient camber



Under-inflation



Over-inflation

Road noise, body vibration

Under-inflation

Unbalance of wheels

Wheels and tire runout

Abnormally worn tire

Prematurely worn tire

Over-inflation

Fast driving with under-inflated tires

SERVICE ADJUSTMENT PROCEDURES

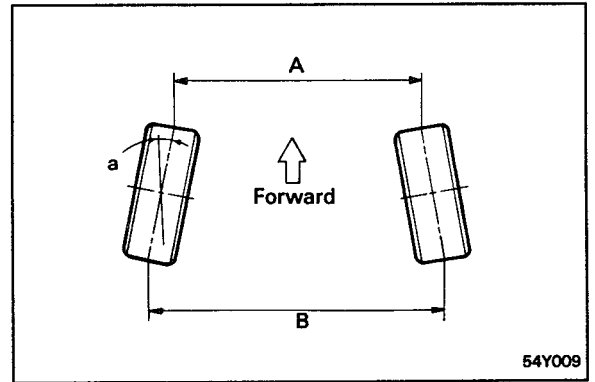
FRONT WHEEL ALIGNMENT

When using a wheel alignment tester to inspect front wheel alignment, always position the car on a level surface and the front wheels in the straight ahead position. Prior to inspection make sure that the front suspension and steering system are in normal operating condition and that wheels and tires are free of deflection and tires inflated to specification.

Toe-in

Toe-in (B-A or angle α) is adjusted by turning the tie rod turn-buckles. Toe-in on the left front wheel can be reduced by turning tie rod toward the rear of the car. Toe-in change achieved by turning the tie rods for the right and left wheels simultaneously the same amount is as follows:

Description		Changes toe mm (in.)
No of turns of tie rod (same amount for right and left)	1/2	Approx. 6 (0.24)
	1	Approx. 12 (0.47)

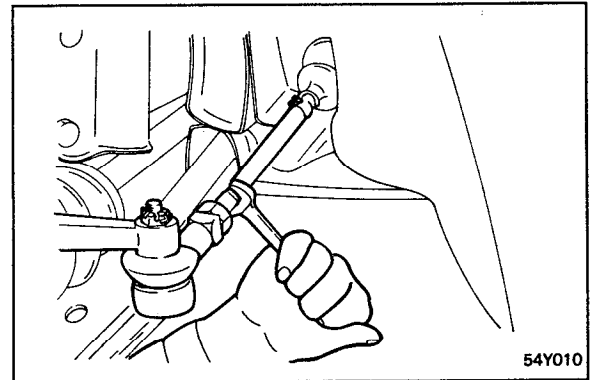


CAUTION

- 1) Toe-in adjustment should be made by turning the right and left tie rods the same amount.
- 2) When adjusting toe-in, remove the outer bellows clip to prevent twisting the bellows.
- 3) After the adjustment, firmly tighten the tie rod end lock nuts and reinstall the bellows clip.

Toe-in (B-A) 3 mm in-3 mm out
 [Standard value] (0.12 in. in-.12 in. out)

Tie rod end lock nuts tightening torque.....
 49-54 Nm (500-550 kg.cm, 36-40 lb.ft)



Camber

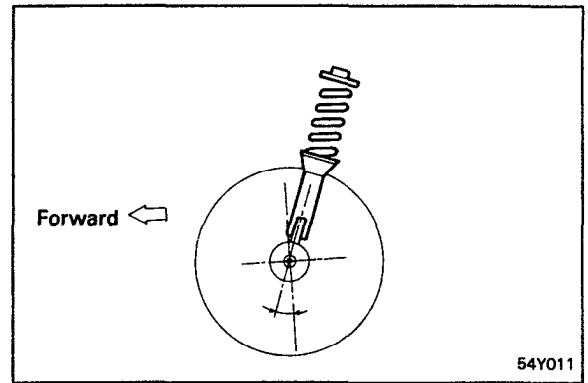
The steering knuckle which is integral with the strut assembly is pre-adjusted to the specified camber at the factory and requires no adjustment.

Camber [Standard value] 30' ± 30'

Caster

Caster, as a rule, requires no adjustment, although it is slightly adjustable by moving the strut bar nut as shown in illustration. If caster has been adjusted, it is necessary to confirm that the wheel bases, right and left, are within the specified limits.

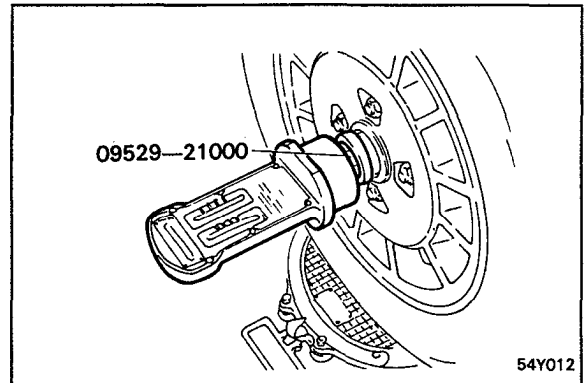
Caster [Standard value] $2^{\circ} \pm 30'$



54Y011

NOTE

1. The front suspension assembly must be free of worn, loose or damaged parts prior to measurement of front wheel alignments.
2. Measure wheel alignment by using the special tool.
3. Camber and caster are pre-set at the factory and cannot be adjusted.
4. If camber and caster are not within specifications, replace bent or damaged parts.

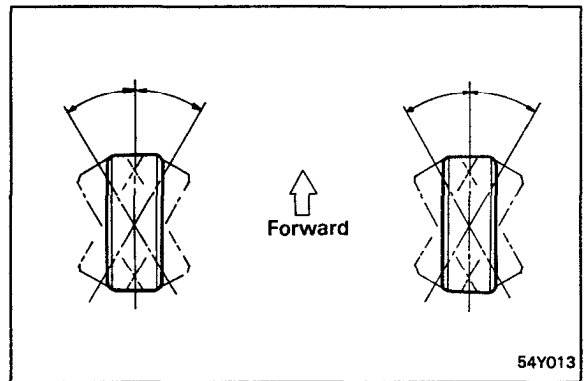


54Y012

Steering Angle

Steering angle, as a rule, requires no adjustment. However, if there is a difference in steering angle between the right and left wheels, change the length of right and left tie rods.

Steering angle [Standard value]
 Inner wheel θ_1 $37^{\circ}7' \pm 2'$
 Outer wheel θ_2 $30^{\circ}12'$



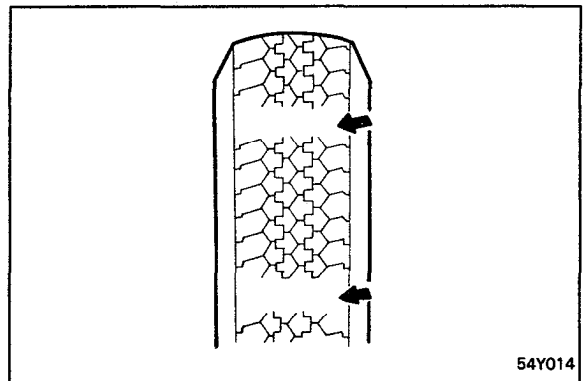
54Y013

TIRE WEAR

1. Measure the tread depth of tires.
 Tread depth of tire [Limit] 1.6 mm (0.06 in.)
2. If the remaining tread depth is less than the limit, replace the tire.

NOTE

When the tread depth of tires is reduced to 1.6 mm (0.06 in.) or less, the wear indicators will appear.



54Y014

GENERAL

WHEEL RUNOUT

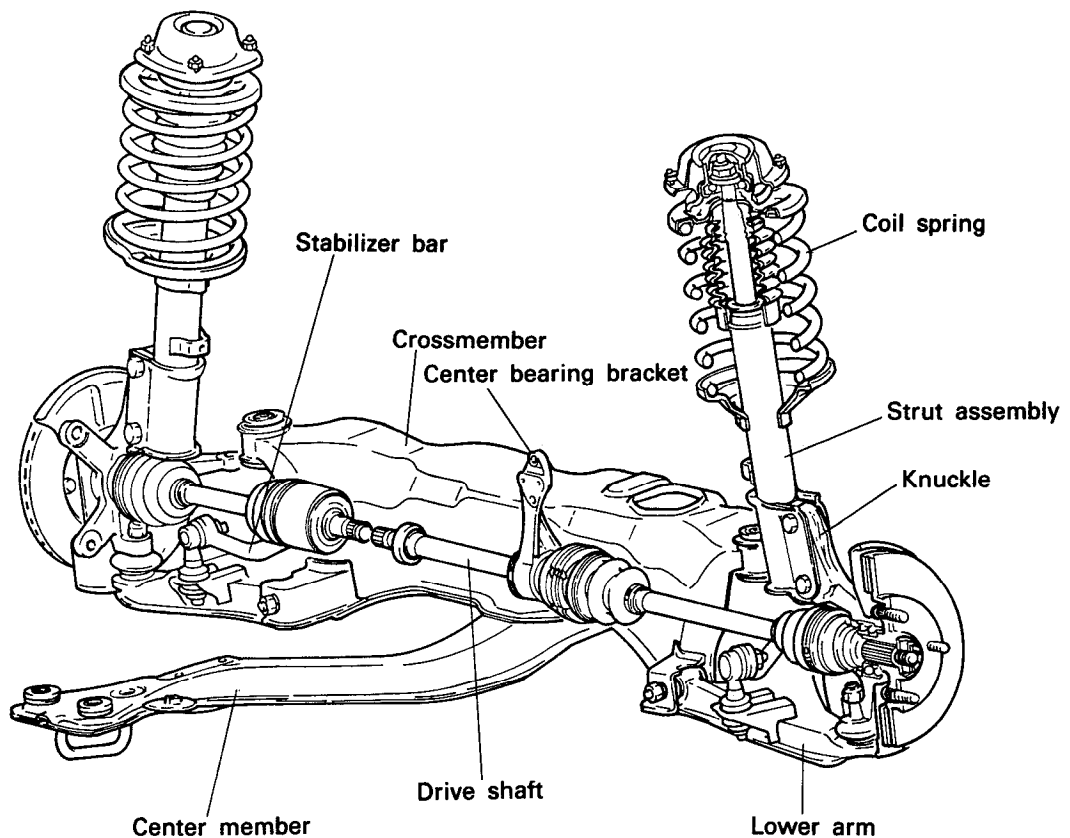
1. Jack up the vehicle and support it with floor stands.
2. Measure wheel runout with a dial indicator as illustrated.
3. Replace the wheel if wheel runout exceeds the limit.

Wheel runout [Limit]

Steel wheel	Radial 0.6 mm (0.024 in.) Axial 1.0 mm (0.039 in.)
Aluminum type wheel	Radial 0.3 mm (0.012 in.) Axial 0.3 mm (0.012 in.)

GENERAL VIEW

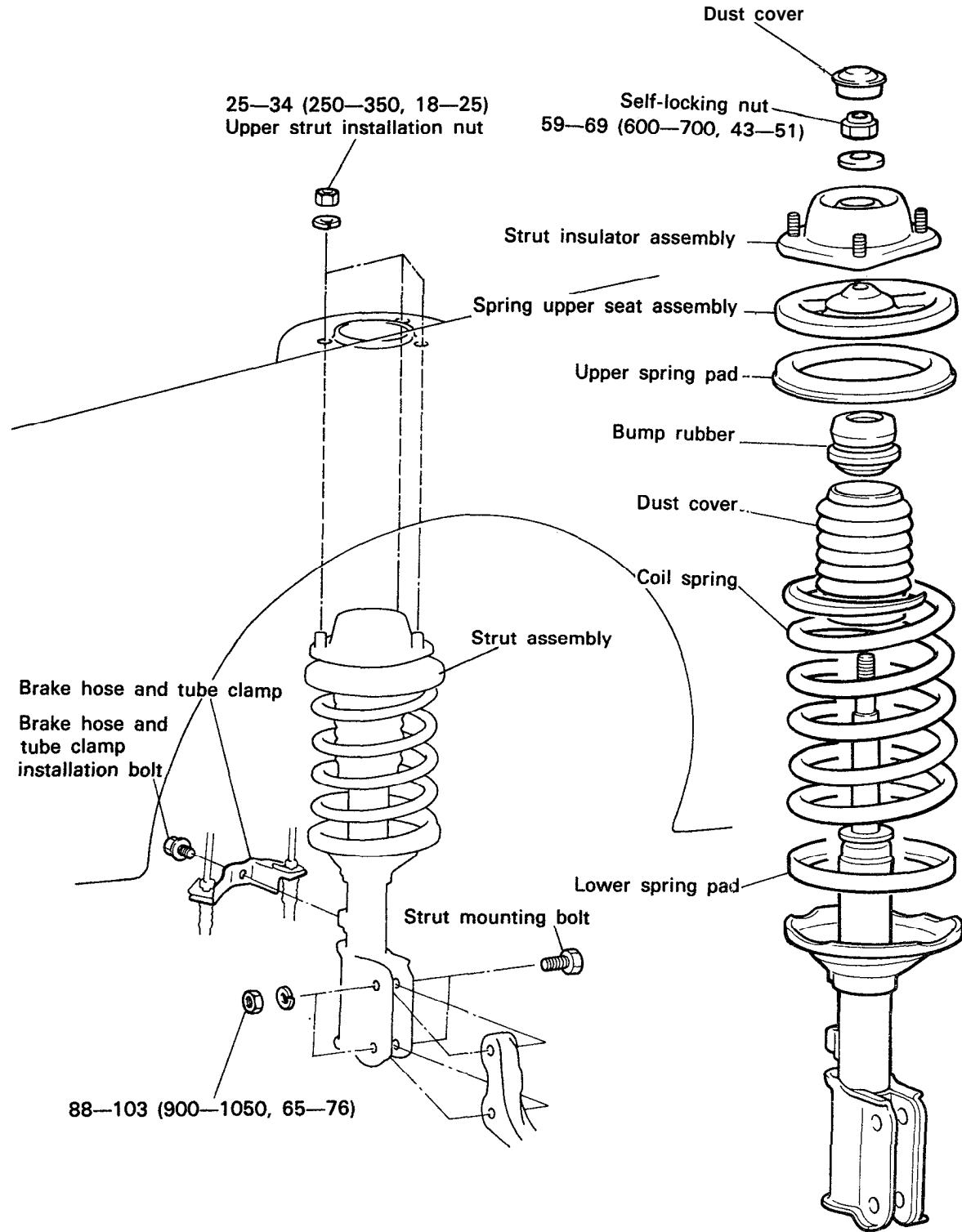
The front suspension is an McPherson strut type independent suspension. The upper end of the strut assembly is attached to the wheel housing through a rubber insulator, while the lower end is attached to the steering knuckle. The knuckle is attached to the lower arm through the ball joint.



STRUT ASSEMBLY

STRUT ASSEMBLY

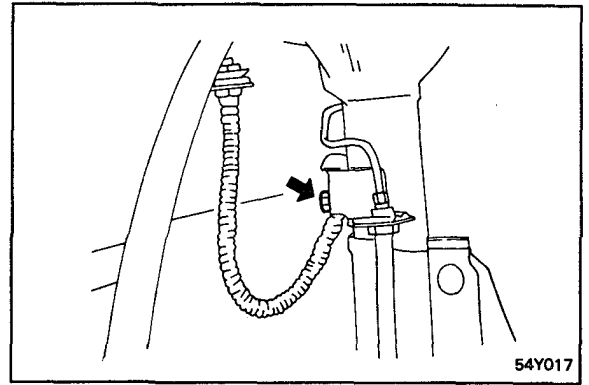
COMPONENTS



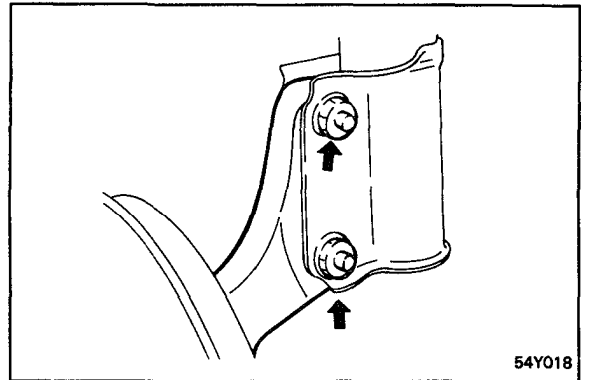
TORQUE : Nm (kg.cm, lb.fr)

REMOVAL

1. Remove the brake hose and line clamp.
Do not pry or force components.

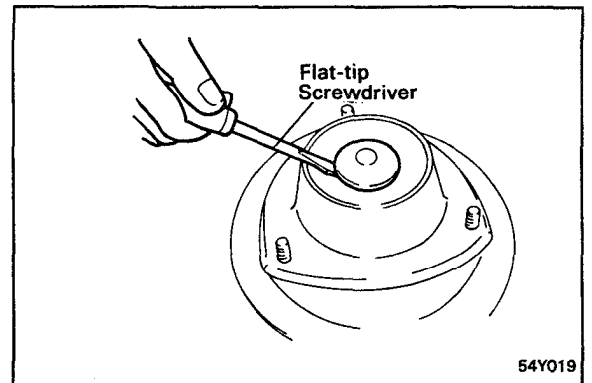


2. Having removed the union between the strut and the knuckle, jack up the lower arm, Attach the brake hose, brake line, front speed sensor wiring harness and drive shaft to the knuckle with wire to prevent them from being pulled out.



DISASSEMBLY

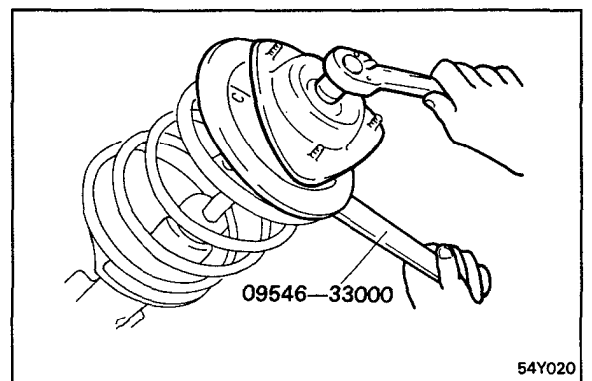
1. Remove the dust cover with a fiat-tip screwdriver.



2. While holding the spring upper seat with the special tool, loosen the self-locking nut.

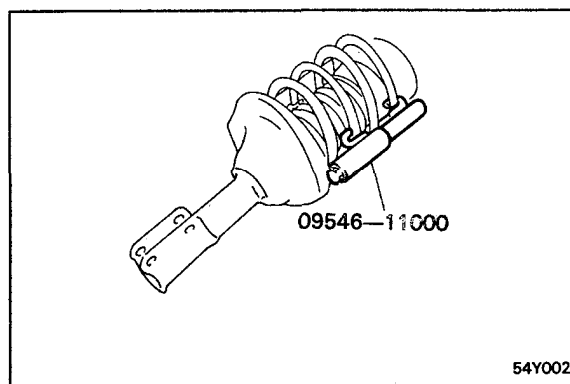
CAUTION

The self-locking nut should be loosened only, not removed.



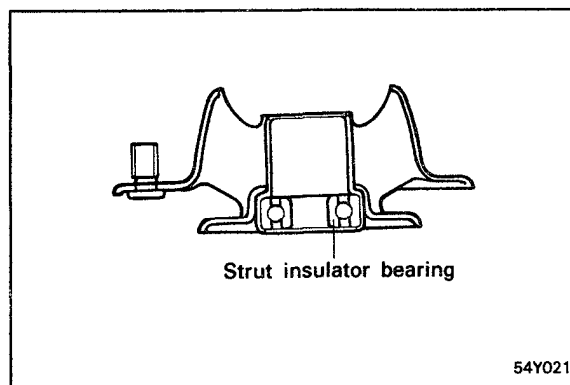
STRUT ASSEMBLY

3. Press the front coil spring with the special tool.
4. Remove the self-locking nut from the strut assembly.



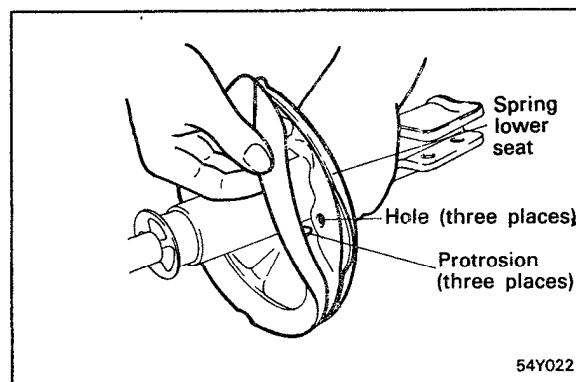
INSPECTION

1. Check the strut insulator bearing for wear or rust.
2. Check the rubber parts for damage or deterioration.
3. Check the spring for deformation, deterioration or damage.

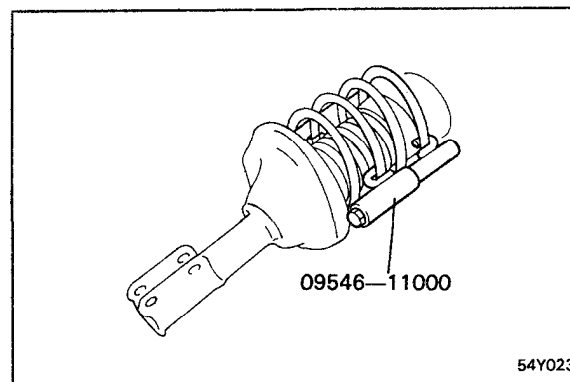


ASSEMBLY

1. Install the lower spring pad so that the protrusions fit to the holes in the spring lower seat.

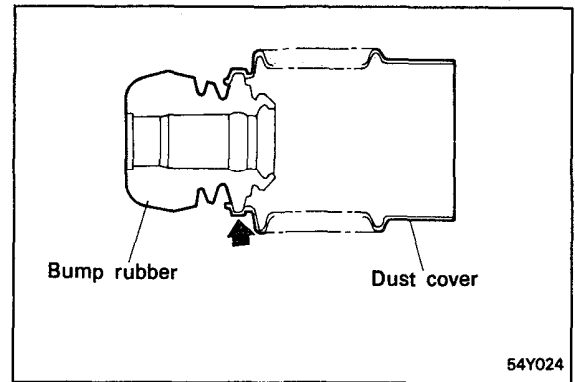


2. Attach the special tool to the front coil spring then press it on the strut.

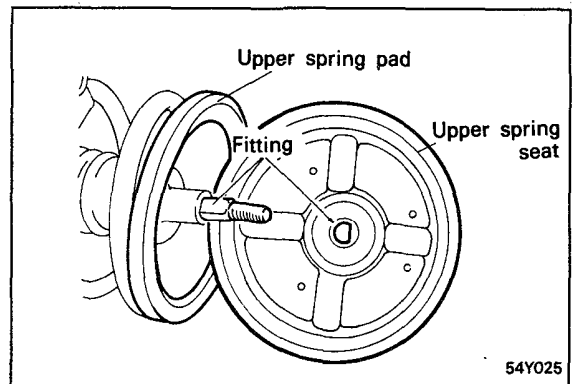


STRUT ASSEMBLY

3. Join the dust cover and bump rubber.



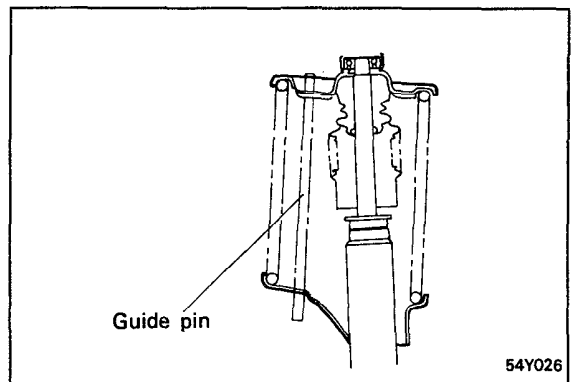
4. Assemble the spring upper seat to the piston rod, fitting the notch in the rod to the D shaped hole in spring seat.



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

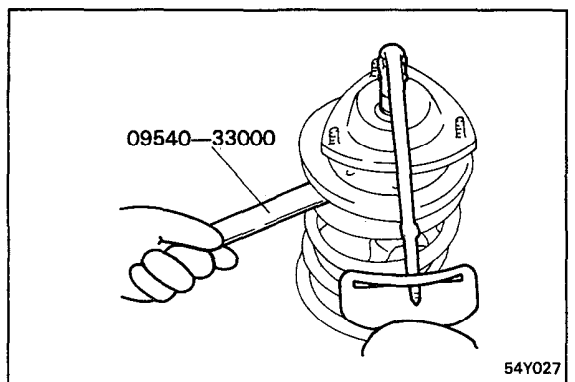
NOTE

The job is easily accomplished with a guide pin [$\varnothing 8$ mm x 227 mm ($\varnothing 0.32$ in. x 8.94 in.)].



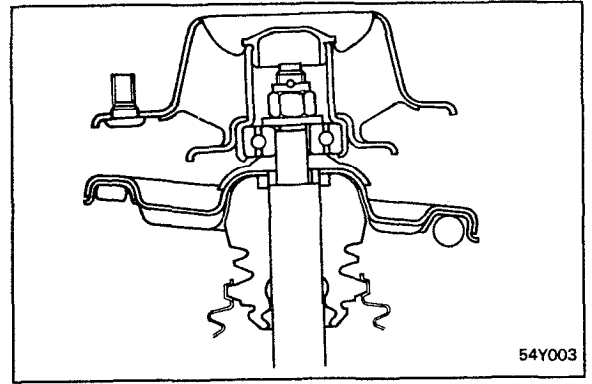
INSTALLATION

1. Thread the self-locking nut onto the strut assembly.
2. Align the two ends of the coil spring to the grooves on the spring seat.
3. Holding the spring upper seat with the special tool, tighten the self-locking nut to the specified torque.



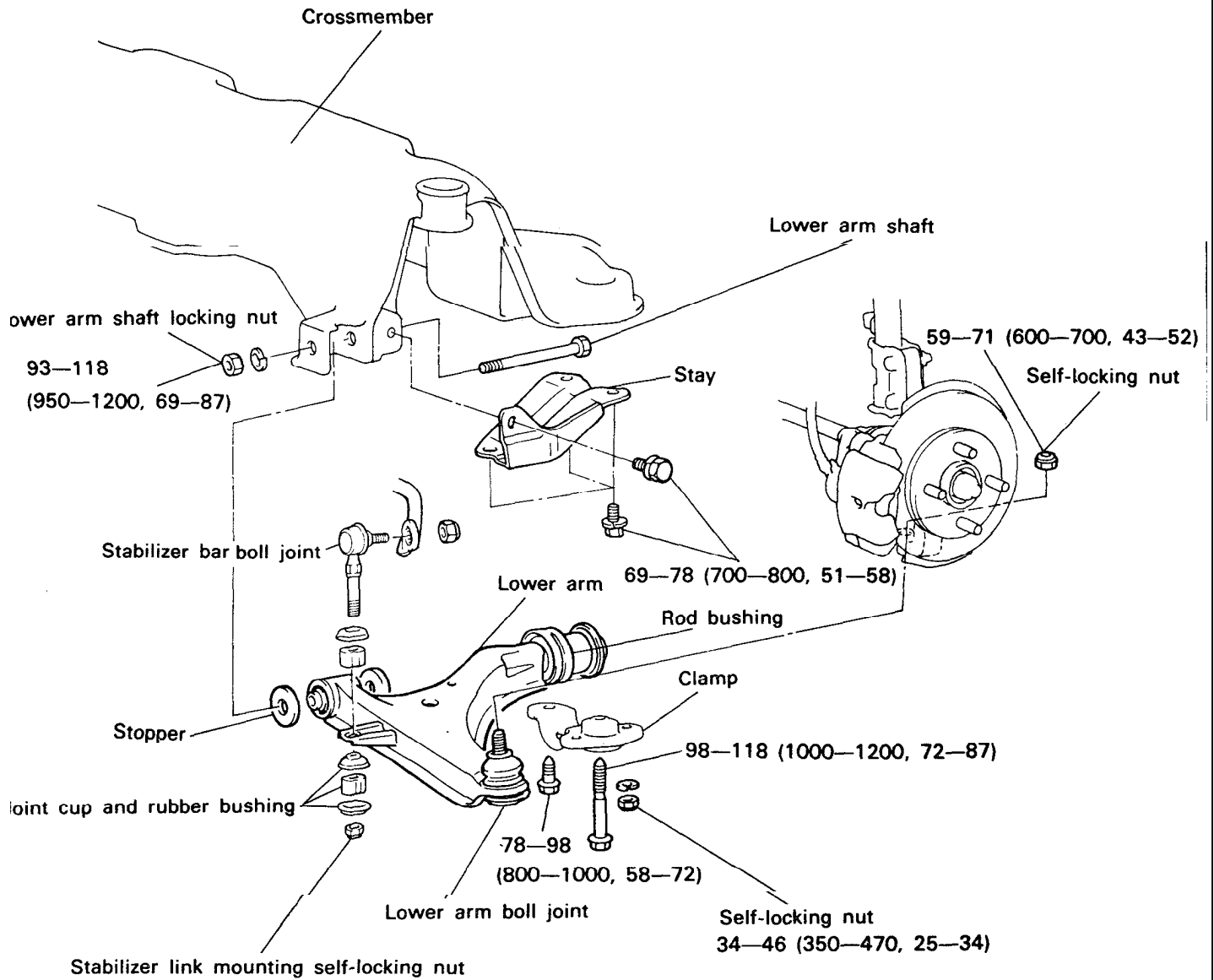
STRUT ASSEMBLY

4. Apply multipurpose grease to the strut insulator bearing and install the dust cover.



LOWER ARM

COMPONENTS



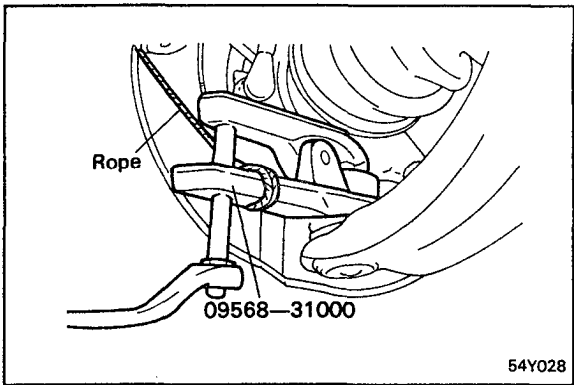
TORQUE ; Nm (kg.cm, lb.ft)

REMOVAL

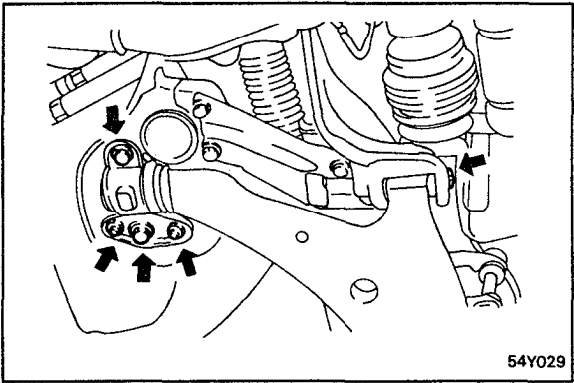
1. Using the special tool, disconnect the lower arm ball joint from the knuckle.

CAUTION

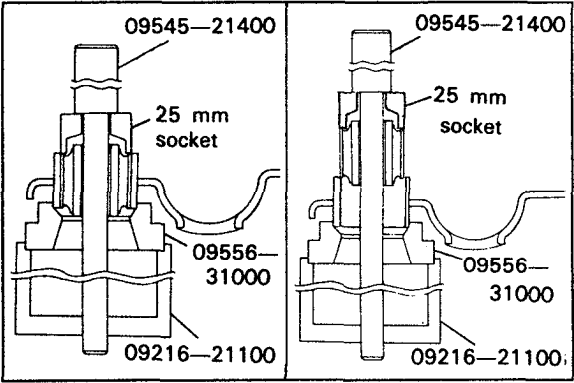
Loose the nut but do not remove it.
Be sure to tie the cord of the special to a nearby part.



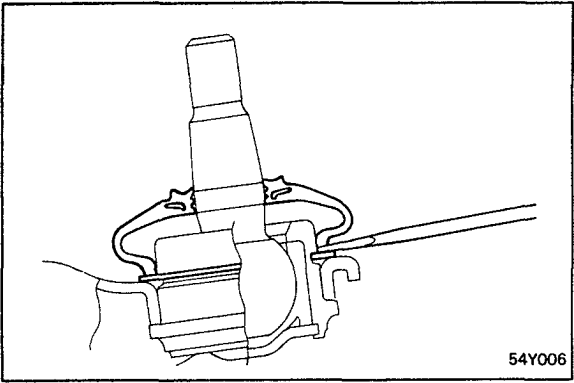
2. Remove the lower arm.



3. Using the special tool, disconnect the bushing from the clamp.

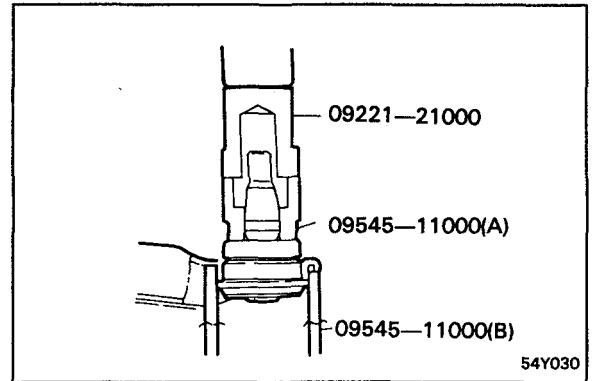


4. Using a screwdriver, remove the dust cover from the lower arm ball joint.
5. Remove the snap ring.



LOWER ARM

- Using the special tools, remove the ball joint from the lower arm assembly.

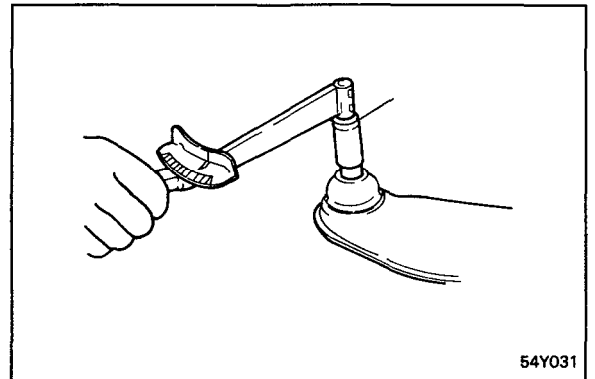


INSPECTION

- Check the bushing for wear and deterioration.
- Check the lower control arm for bending or breakage.
- Check the clamp for deterioration or damage.
- Check the ball joint dust cover for cracks.
- Check all bolts.
- Check the ball joint for starting torque.
 - If a crack is noted in the dust cover, replace it, adding grease.
 - Shake the ball joint stud several times.
 - Mount two nuts on the ball joint, and then measure the ball joint starting torque.

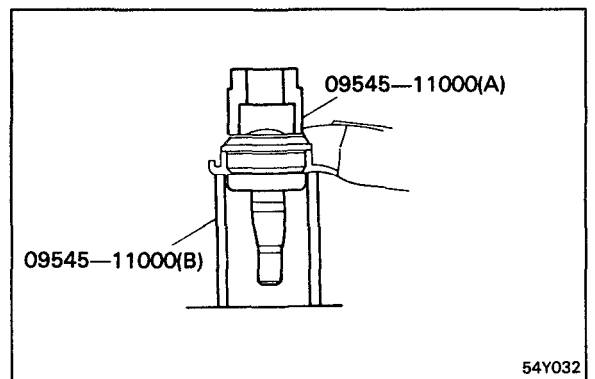
Standard value
2-10 Nm (20-100 Kg.cm, 26-87 lb.in.)

- If the starting torque exceeds the upper limit of standard value, replace the tie rod end.
- Even if the starting torque is below the lower limit of the standard value, the ball joint may be reused unless it has drag and excessive play.



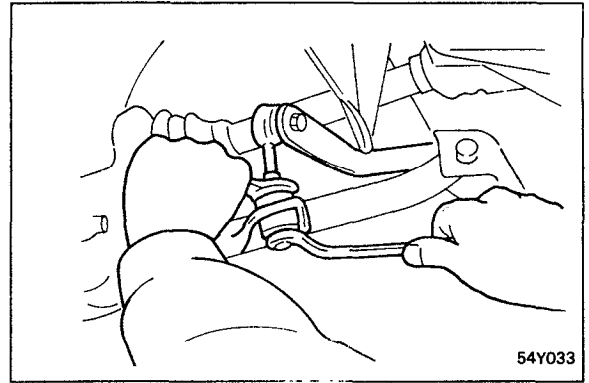
INSTALLATION

- Press fit the ball joint into the lower arm assembly.



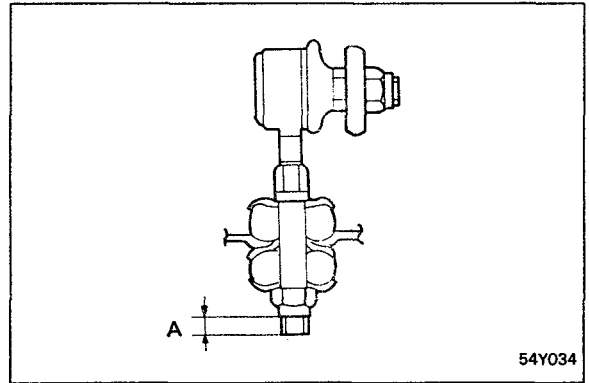
LOWER ARM

2. Tighten the stabilizer link with a spanner wrench (12.7 mm or 1/2 in.), then install the self locking nut.



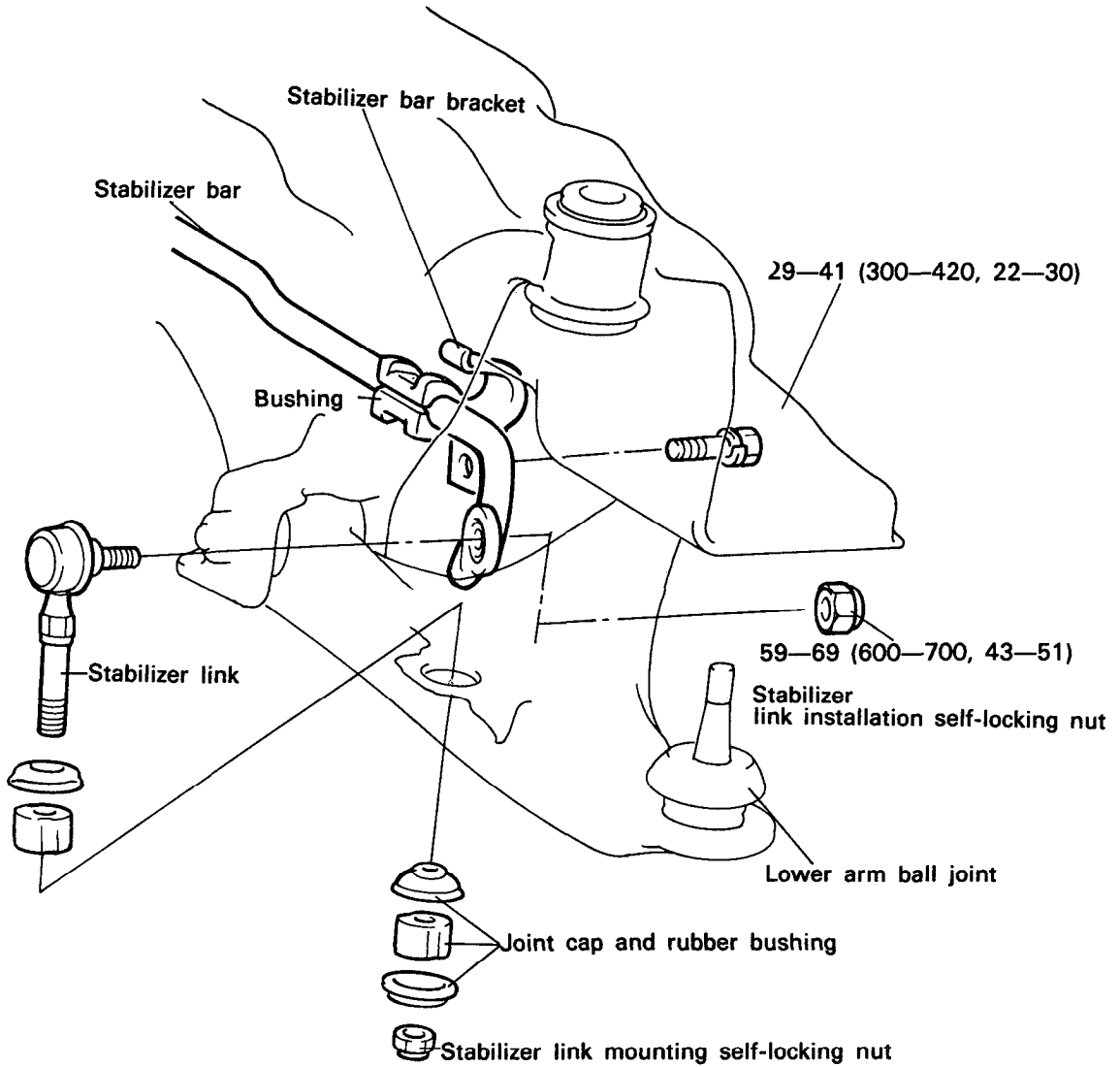
3. Tighten the self-locking nut on the stabilizer link to the specified distance.

Standard value.. 5-7 mm (0.2-0.3 in.)



STABILIZER BAR

COMPONENTS

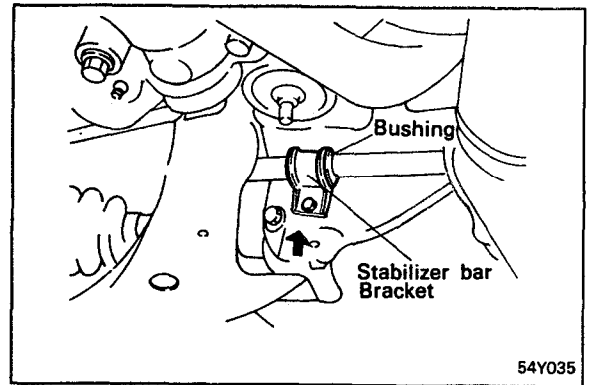


TORQUE ; Nm (Kg.cm. lb.ft)

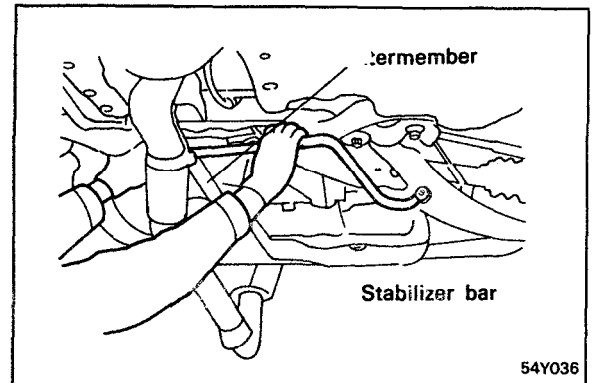
STABILIZER BAR

REMOVAL

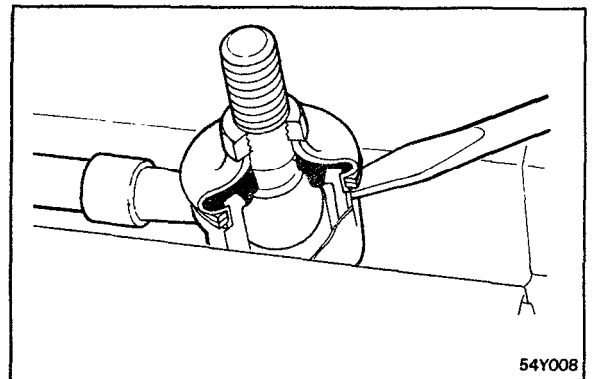
1. Remove the stabilizer bar bracket from the crossmember.



2. Lower the rear portion of center member and remove the stabilizer bar.



3. Remove the stabilizer link.
4. Remove the clip ring, then remove the dust cover.
Apply multipurpose grease to the ball joint.



INSPECTION

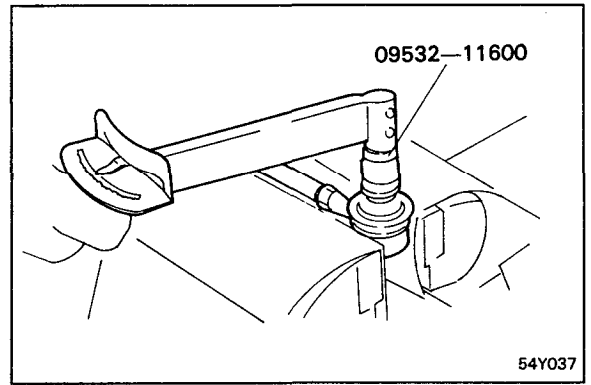
1. Check all parts for cracks, damage and wear.
2. Check the stabilizer link ball joint rotation starting torque.
 - 1) If there is a crack in the dust cover, replace it, adding grease.
 - 2) Shake the stabilizer link ball joint stud several times.

STABILIZER BAR

- 3) Mount the self-locking nut on the ball joint, and then measure the ball joint starting torque.

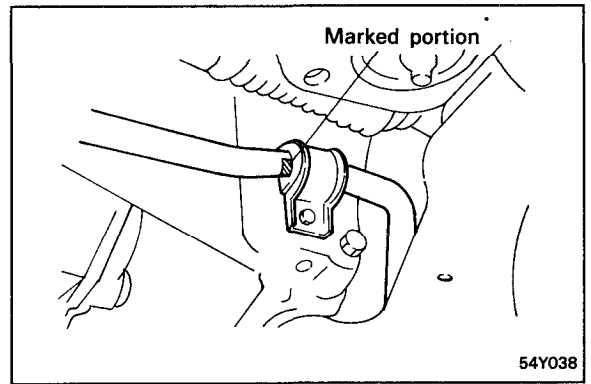
Standard value
1.7-3.1 Nm (17-32 kg.cm, 15-27 lb.in.)

- 4) If the starting torque exceeds the upper limit of standard value, replace the stabilizer link.
- 5) Even if the starting torque is below the lower limit of the standard value, the ball joint may be reused unless it has drag and excessive play.

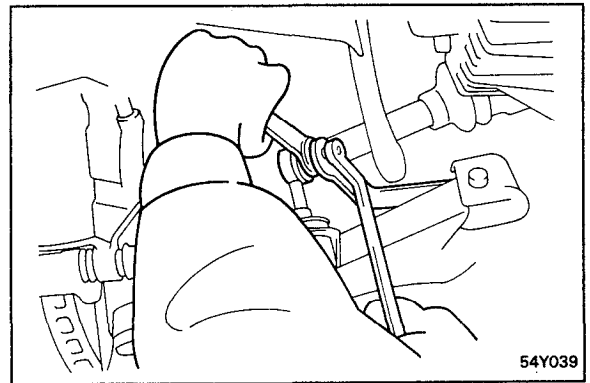


INSTALLATION

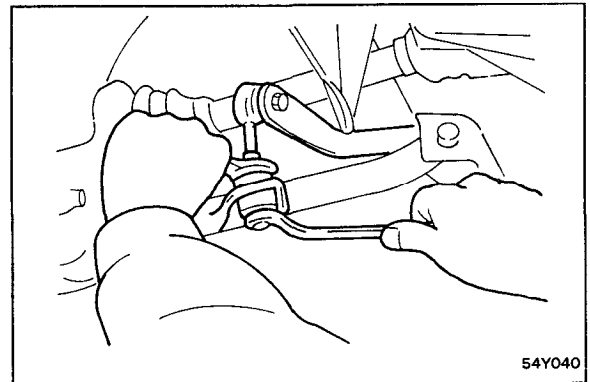
1. Lightly thread the stabilizer bar bracket bolt in, place the marked portion downward and align the edge of the marking with the edge of the bushing, then position the stabilizer, then tighten the bracket down fully.



2. Secure the stabilizer link ball stud with a spanner (15.8 mm, 5/8 in.), then install the self locking nut.



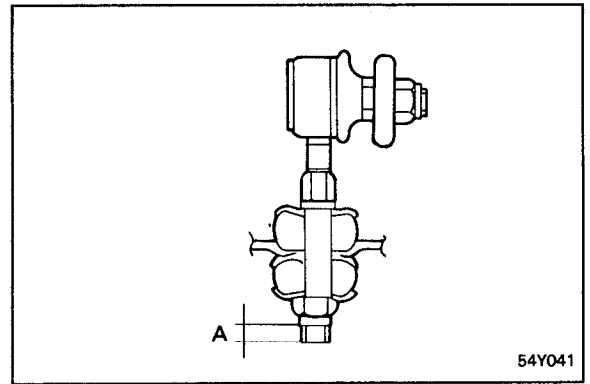
3. Secure the stabilizer link with a spanner wrench (12.7 mm, 1/2 in.), then install the self locking nut.



STABILIZER BAR

4. Tighten the self-locking nut on the stabilizer link to the specified distance.

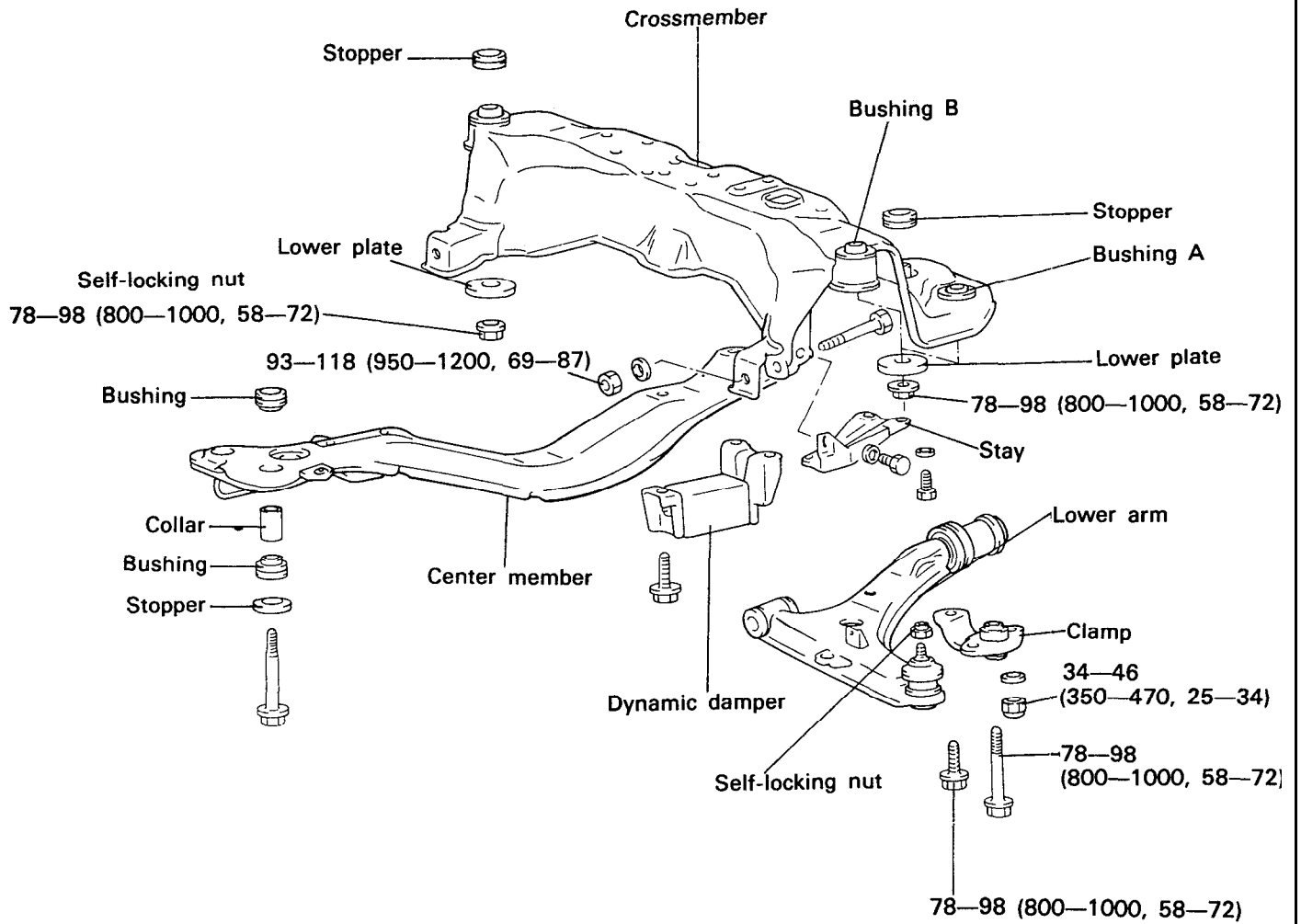
Standard value A 5-7 mm (0.2-0.3 in.)



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CROSSMEMBER

COMPONENTS



TORQUE : Nm (kg.cm, lb.ft)

REMOVAL

1. Jack up the vehicle and install jack stands.
2. Remove the centermember mounting bolts.
3. Remove the stabilizer bar and steering gear box assembly.

CAUTION

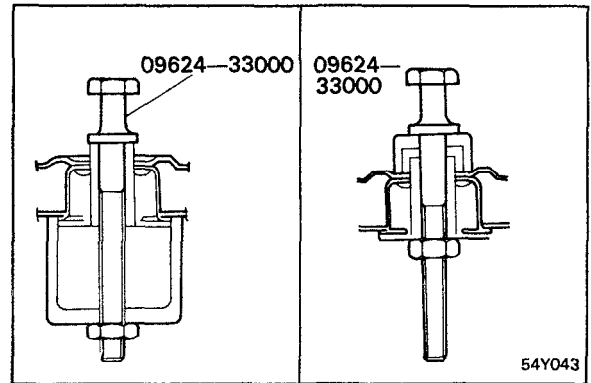
Do not drop or damage the dynamic damper, because it is fastened to the centermember.

INSPECTION

1. Check the crossmember for cracks or deformation.
2. Check the bushings for cracks or deterioration.
3. Check the centermember for cracks or deformation.

CROSSMEMBER BUSHING REPLACEMENT

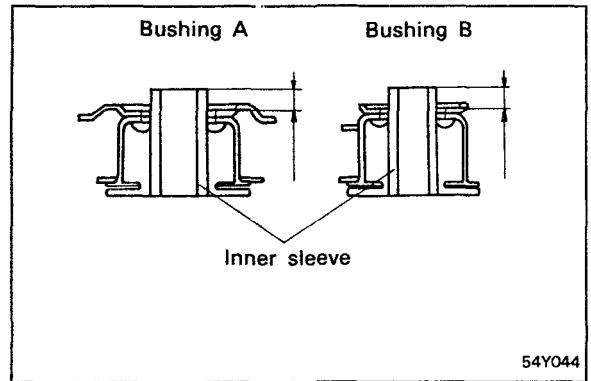
1. Use the special tool to remove and press in bushings A and B.



2. Press in bushings A and B so that the inner sleeve extends out by the standard value.

Standard value

Bushing A	9.2-10.2 mm (0.36-0.40 in.)
Bushing B	8.5-9.5 mm (0.334-0.35 in.)



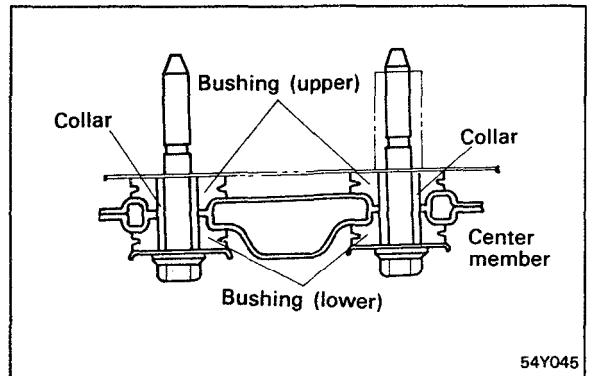
CAUTION

When pressing in, apply a solution of soap and water to the outside of the bushings, and then press them in one after the other.

If there is a pause during the pressing operation, frictional resistance will prevent installation.

INSTALLATION

1. Install the front end of the center member so that the bushings are in the positions shown in the illustration.



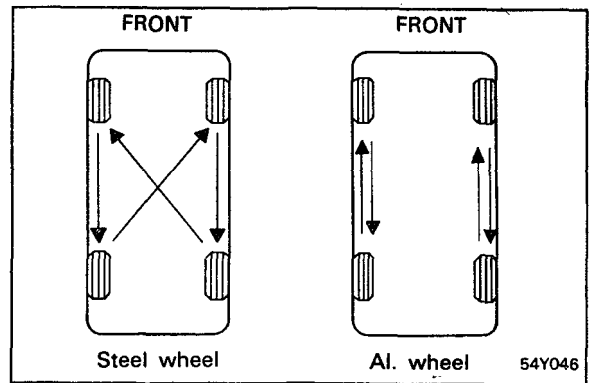
WHEEL AND TIRE

WHEEL ROTATION

Rotate the tires in the patterns illustrated.

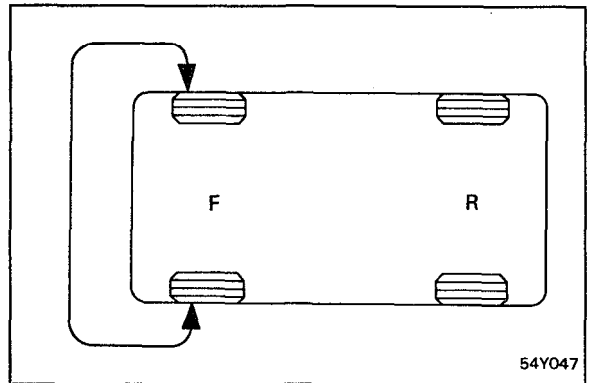
CAUTION

Temporary spare tire should not be used in the wheel rotation.

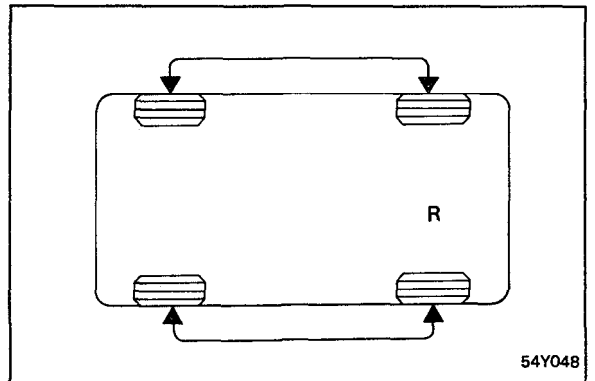


1. If the steering wheel pulls to one side, perform the tire rotation by following procedures.

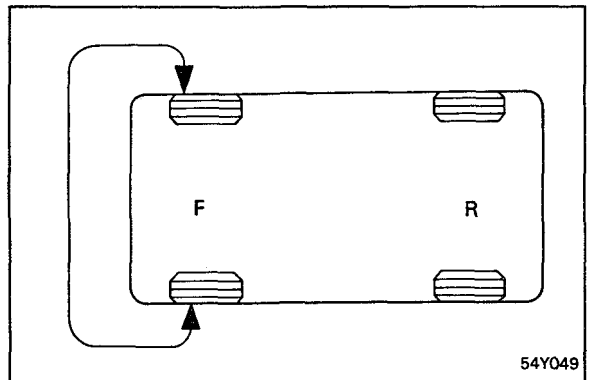
- 1) Interchange the front right and left tires, and perform the road test in order to confirm the vehicle stability.



- 2) If the steering wheel pulls to opposite side, interchange the front and rear tires, and perform the road test.

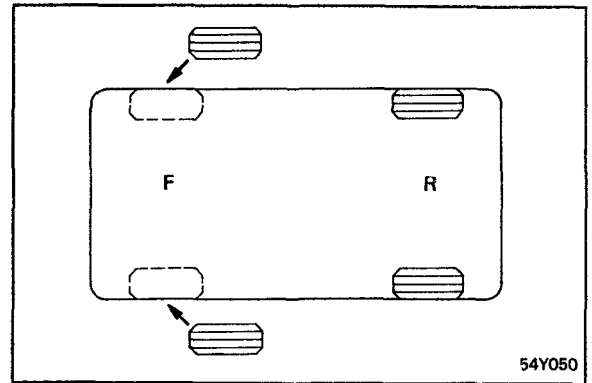


- 3) If the steering wheel still pulls to one side, interchange the front right and left tires again, and perform the road test.



WHEEL AND TIRE

- 4) If the steering wheel pulls to opposite side of step 3), replace the front wheels with new ones.



INSTRUCTIONS FOR ALUMINUM TYPE WHEELS

1. Aluminum wheels need special attention. If salt or chemicals have adhered to the wheels, they need to be rinsed off as soon as possible. After cleaning the wheels, a coating of wax should be applied to prevent corrosion.
2. When cleaning the vehicle with steam, do not direct steam onto the aluminum type wheels.
 - 1) Clean the hub surface of aluminum type wheels.
 - 2) After tightening wheel nut by finger, tighten them to specifications.
 - 3) Do not use an impact wrench or push the wrench by foot to tighten the wheel nuts.
 - 4) Do not apply oil to the threaded portions.

TIRE CHAINS AND SNOW TIRES

1. Use tire chains only on front wheels, not on rear wheels.
2. When using snow tires, use them on all four wheels for maneuverability and safety.

NOTE

It is recommended that tire chains should not be used on wheel size 6JJx15 and tire size P205/60R15.