

FRONT AXLE & FRONT SUSPENSION

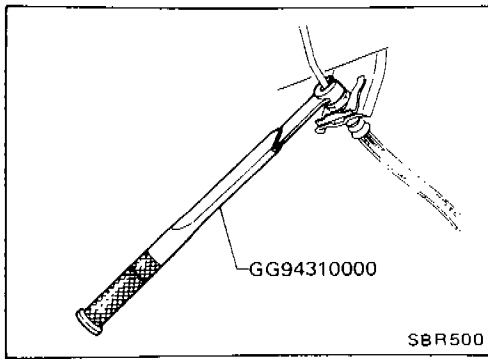
SECTION **FA**

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FA

PRECAUTIONS AND PREPARATION



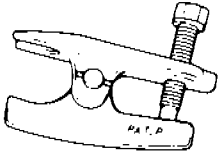
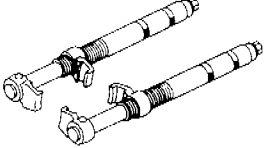
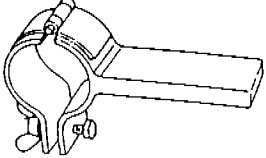
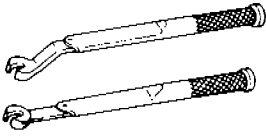
Precautions

- When installing each rubber part, final tightening must be carried out under unladen condition* with tires on ground.
- * Fuel, radiator coolant and engine oil full. Spare tire, jack, hand tools and mats in designated positions.
- When removing each suspension part, check wheel alignment and adjust if necessary.
- Use Tool when removing or installing brake tubes.

Preparation

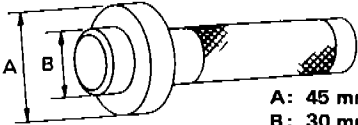
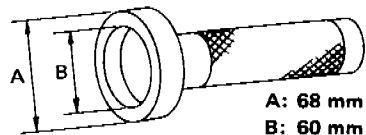
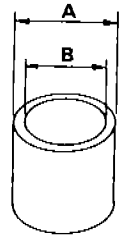
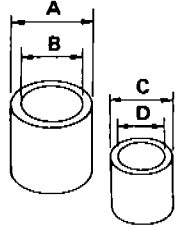
SPECIAL SERVICE TOOLS

*: Special tool or commercial equivalent

Tool number Tool name	Description
HT72520000* Ball joint remover	 Removing tie-rod outer end and lower ball joint
HT71780000* Spring compressor	 Removing and installing coil spring
ST35652000* Strut attachment	 Fixing strut assembly
GG94310000* Flare nut torque wrench	 Removing and installing brake piping

PRECAUTIONS AND PREPARATION

Preparation (Cont'd) COMMERCIAL SERVICE TOOLS

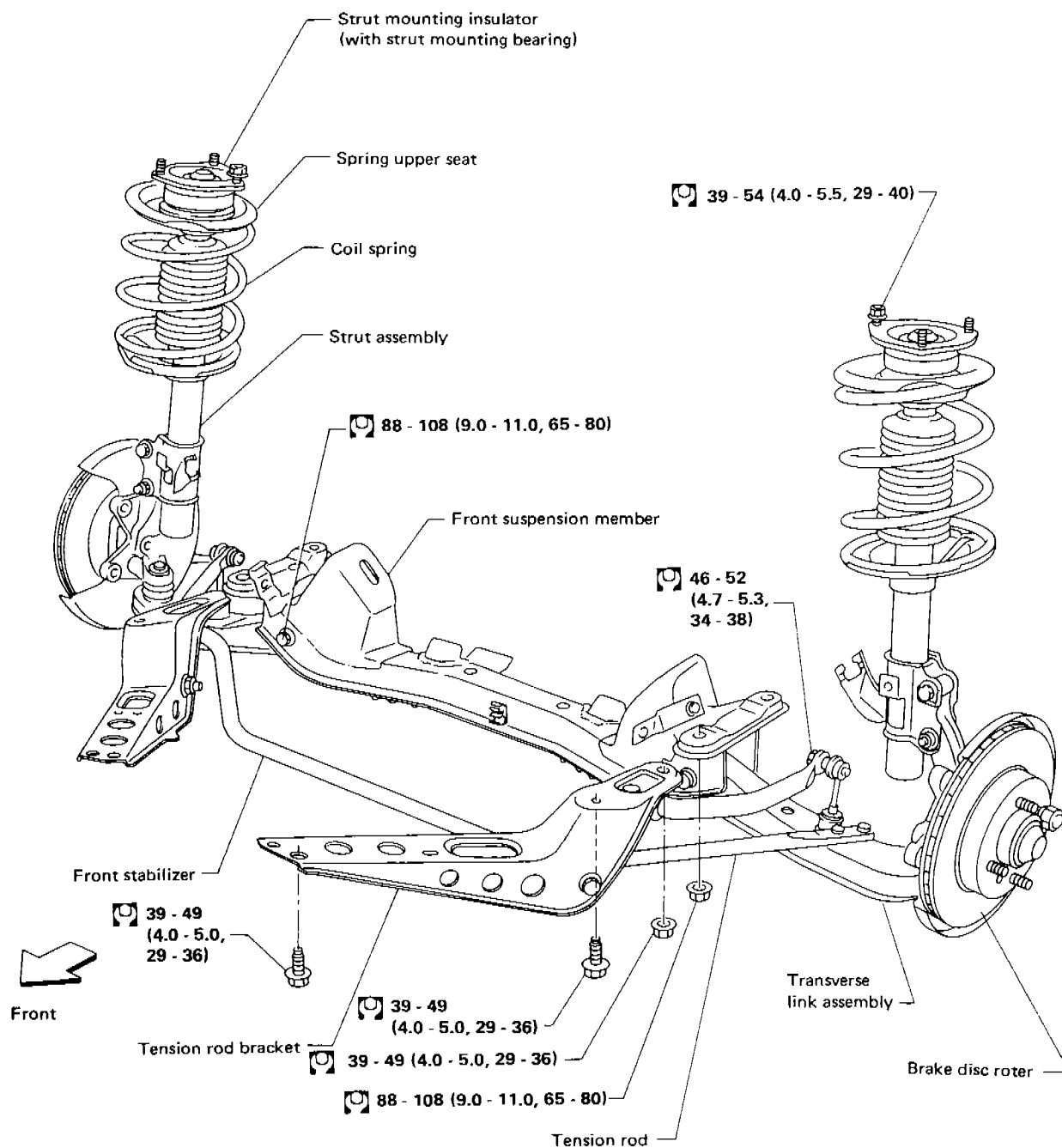
Tool name	Description
Wheel bearing drift	 A: 45 mm (1.77 in) dia. B: 30 mm (1.18 in) dia. Removing wheel bearing
Wheel bearing drift	 A: 68 mm (2.68 in) dia. B: 60 mm (2.36 in) dia. Installing wheel bearing
Baffle plate drift	 A: 88 mm (3.46 in) dia. B: 68 mm (2.68 in) dia. Installing baffle plate
Tension rod bushing drift	 A: 75 mm (2.95 in) dia. B: 66 mm (2.60 in) dia. C: 62 mm (2.44 in) dia. D: 25 - 55 mm (0.98 - 2.17 in) dia. Removing and installing tension rod bushing

FRONT AXLE AND FRONT SUSPENSION

Final tightening for rubber parts requires to be carried out under unladen condition* with tires on ground.

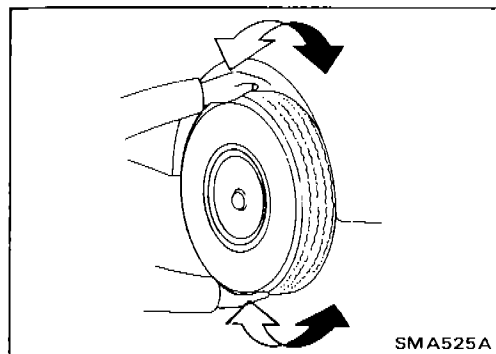
* Fuel, radiator coolant and engine oil full.

Spare tire, jack, hand tools and mats in designated positions.



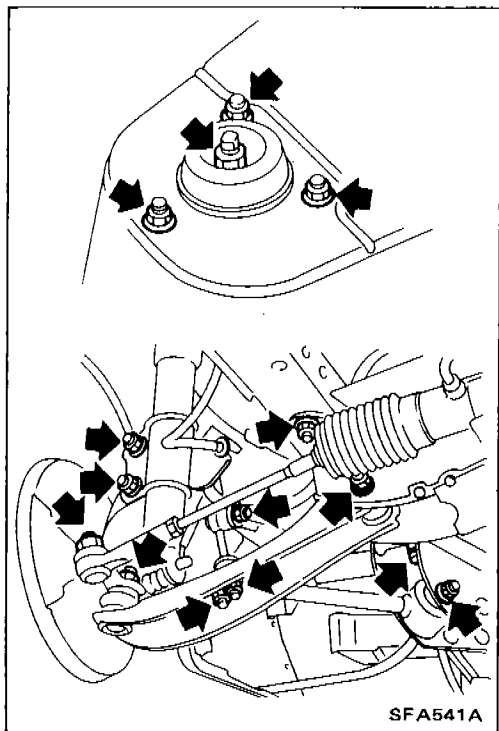
: N-m (kg-m, ft-lb)

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Front Axle and Front Suspension Parts

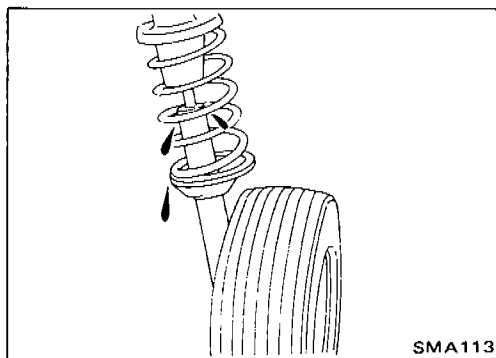
- Check front axle and front suspension parts for looseness, cracks, wear or other damage.
- (1) Shake each front wheel.



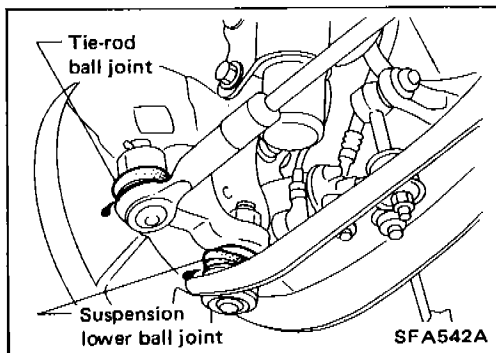
- (2) Retighten all nuts and bolts to the specified torque.

Tightening torque: Refer to pages FA-4, 14.

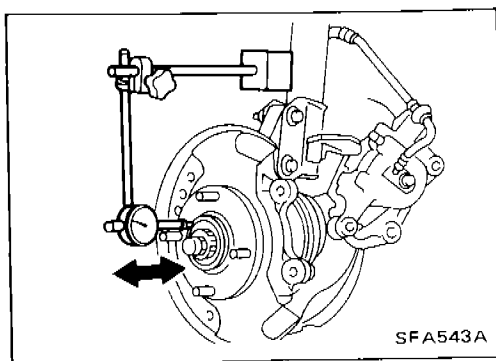
- (3) Make sure that cotter pin is inserted.
- (4) Check front axle and front suspension parts for wear, cracks or other damage.



- Check strut (shock absorber) for oil leakage or other damage.



- Check suspension ball joint for grease leakage and ball joint dust cover for cracks or other damage.



Front Wheel Bearing

- Check tightening torque of wheel bearing lock nut.
☞: 147 - 216 N·m
(15 - 22 kg-m, 108 - 159 ft-lb)
- Check that wheel bearings operate smoothly.
- Check axial end play.
Axial end play: 0.03 mm (0.0012 in) or less
- If axial end play is not within specification or wheel bearing does not turn smoothly, replace wheel bearing assembly.
Refer to FRONT AXLE — Wheel Hub and Knuckle.

Front Wheel Alignment

Before checking front wheel alignment, be sure to make a preliminary inspection.

PRELIMINARY INSPECTION

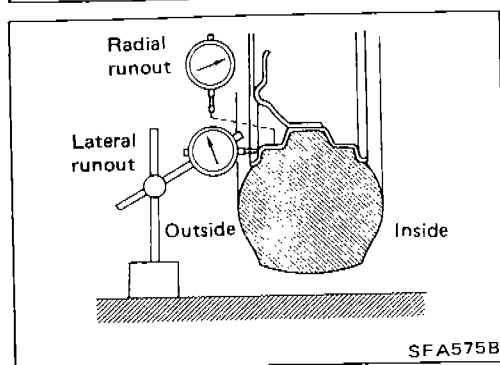
Make following checks. Adjust, repair or replace if necessary.

- Check tires for wear and improper inflation.
- Check front wheel bearings for looseness.
- Check wheel runout.

Refer to S.D.S.

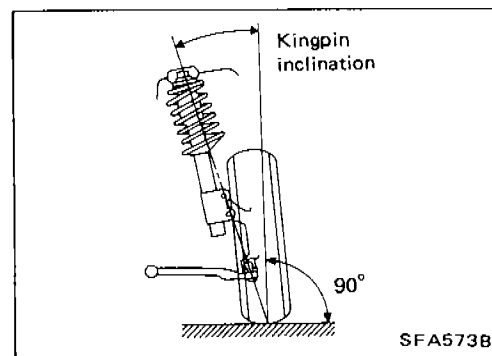
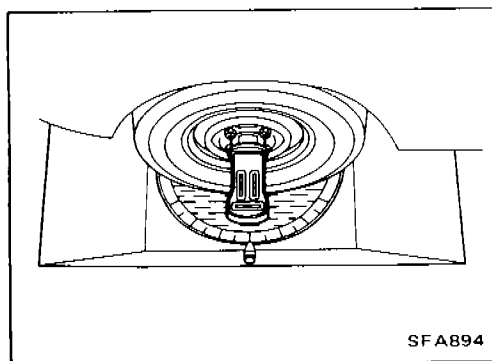
- Check front suspension for looseness.
- Check steering linkage for looseness.
- Check that front shock absorbers work properly.
- Check vehicle posture (Unladen):
"Unladen"

Fuel, radiator coolant and engine oil full. Spare tire, jack, hand tools and mats in designated positions.



CAMBER, CASTER AND KINGPIN INCLINATION

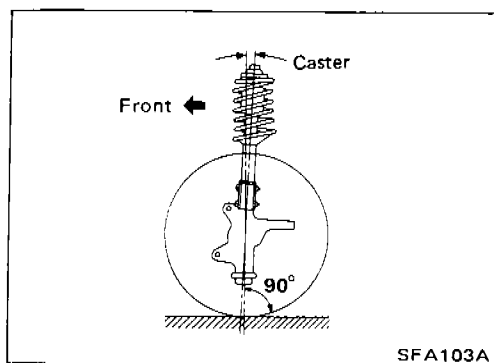
- Caster and kingpin inclination are preset at factory and cannot be adjusted.
- Measure camber, caster and kingpin inclination of both right and left wheels with a suitable alignment gauge, and adjust in accordance with the following procedures.



Kingpin inclination:
12°25' - 13°55'

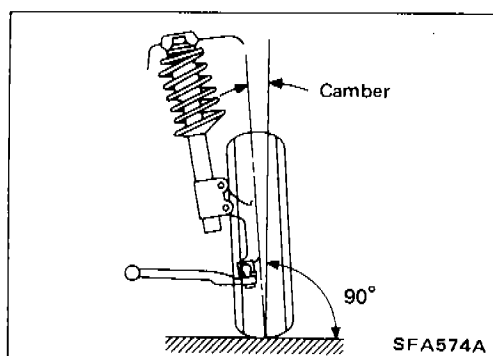
CHECK AND ADJUSTMENT — On-vehicle

Front Wheel Alignment (Cont'd)



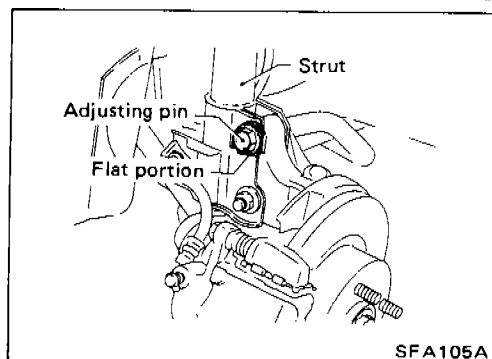
Caster:

$5^{\circ}55'$ - $7^{\circ}25'$



Camber:

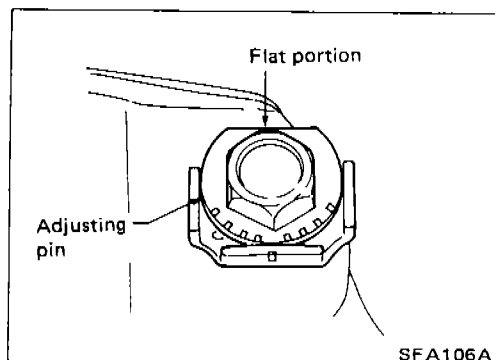
$-1^{\circ}25'$ to $5'$



If camber is not within specification, adjust by turning adjusting pin as follows:

- (1) Remove adjusting pin

Adjusting pin is installed with flat portion facing downward.



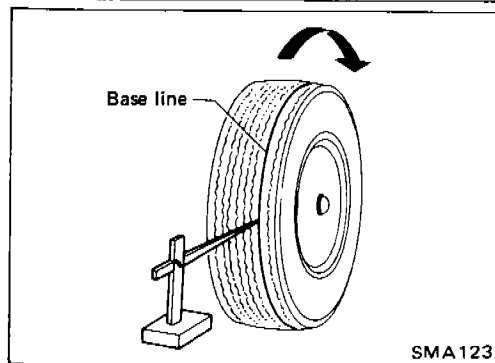
- (2) Next replace adjusting pin with flat portion facing upward.

- (3) Turn adjusting pin to adjust.

Camber changes about $5'$ with each graduation of adjusting pin.

- (4) Tighten adjusting pin to specified torque.

⌚: 124 - 143 N·m (12.6 - 14.6 kg-m, 91 - 106 ft-lb)

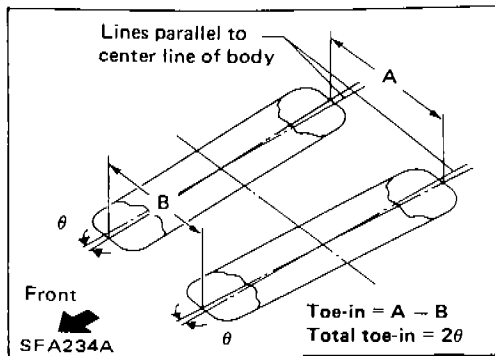


TOE-IN

1. Draw a base line on tread surface of tires.

After lowering front of vehicle, move it up and down to eliminate friction, and set steering wheel in straight-ahead position.

Front Wheel Alignment (Cont'd)



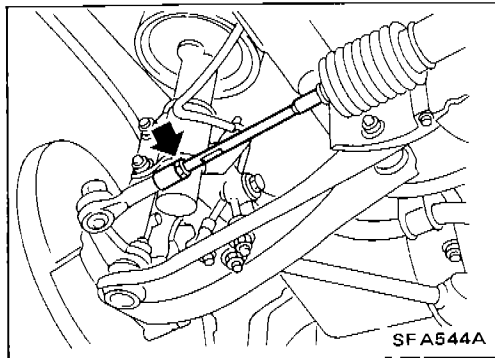
2. Measure toe-in.

Measure distance "A" and "B" at same height as hub center.

Toe-in:

$$A - B \quad 0 - 2 \text{ mm (0 - 0.08 in)}$$

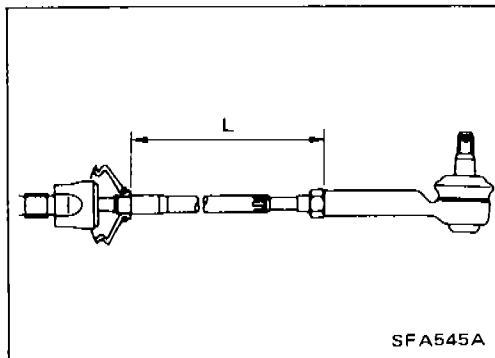
$$2\theta \text{ (Total toe-in) } 0' \text{ to } 12'$$



3. Adjust toe-in by varying length of steering tie-rods.

(1) Loosen lock nuts.

(2) Adjust toe-in by turning forward and reverse tie-rod.



Make sure both tie-rods are the same length.

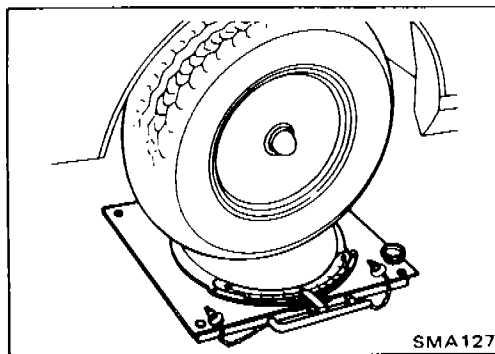
Standard length "L" — reference data:

$$174.8 \text{ mm (6.88 in)}$$

(3) Fix lock nuts, then tighten them designed torque.

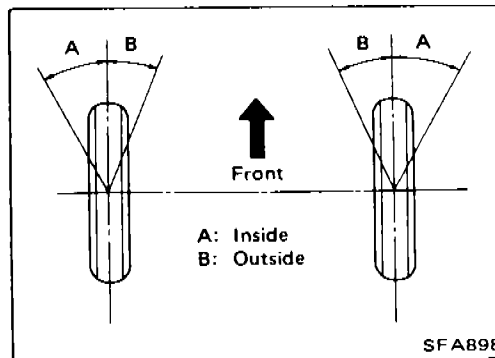
$$\square: 37 - 46 \text{ N}\cdot\text{m}$$

$$(3.8 - 4.7 \text{ kg}\cdot\text{m, } 27 - 34 \text{ ft}\cdot\text{lb})$$



FRONT WHEEL TURNING ANGLE

1. Set wheels in straight-ahead position and then move vehicle forward until front wheels rest on turning radius gauge properly.

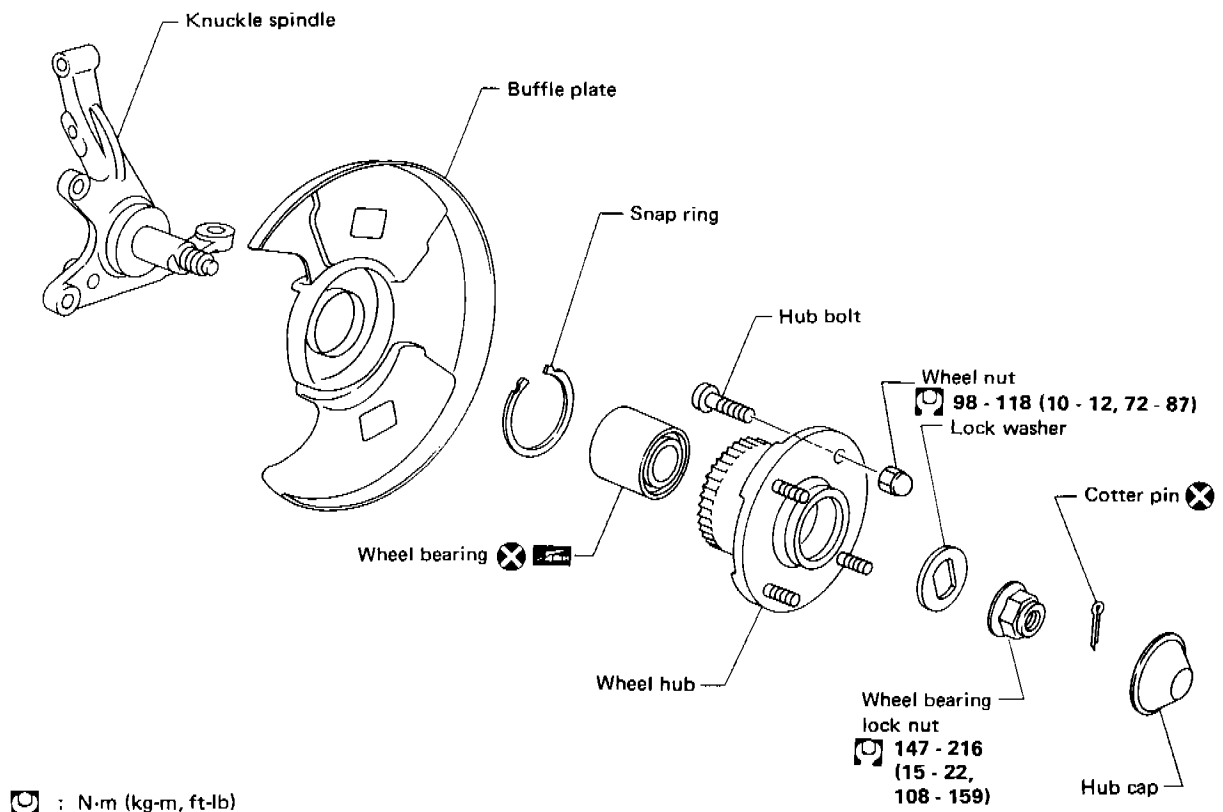


2. Rotate fully steering wheel to the right or left; measure turning angle.

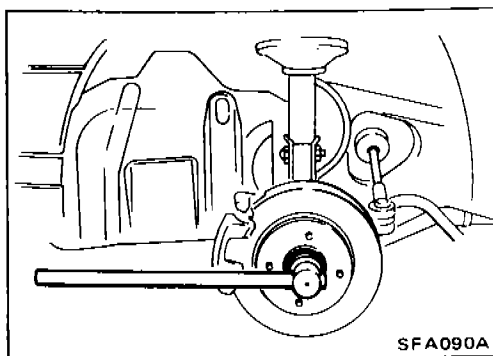
Wheel turning angle:

Full turns	Except Europe L.H.D. model	Inside wheel: A	39° - 43°
		Outside wheel: B	33°
	Europe L.H.D. model	Inside wheel: A	36° - 40°
		Outside wheel: B	32°

FRONT AXLE

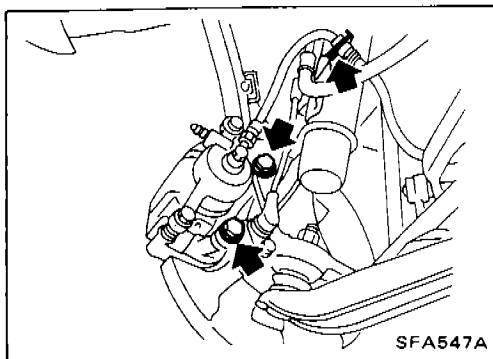


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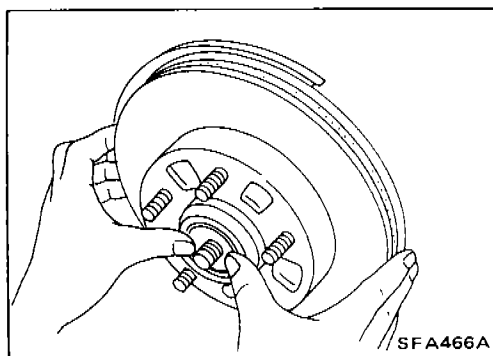


Removal

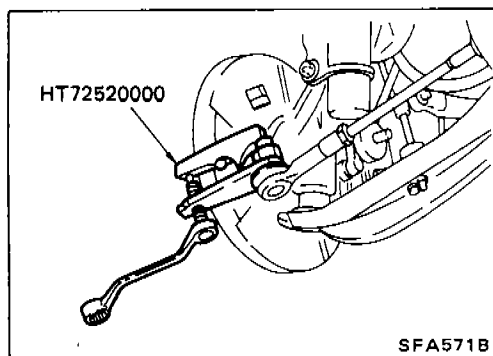
- Remove wheel bearing lock nut.



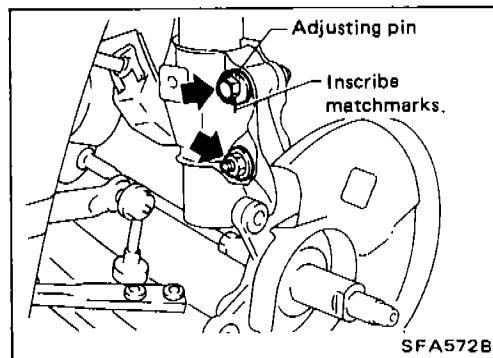
- Remove brake caliper assembly.
Brake hose need not be disconnected from brake caliper. Be careful not to depress brake pedal, or piston will pop out. Make sure brake hose is not twisted.



- Remove rotor and wheel hub from spindle.

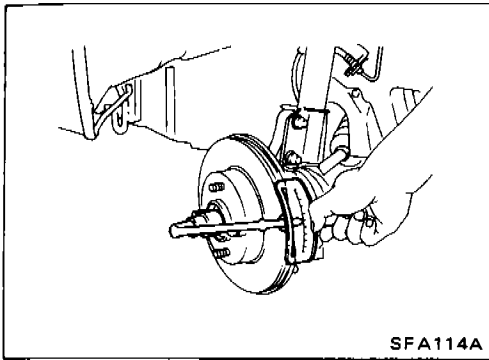


- Remove tie-rod ball joint and lower ball joint.



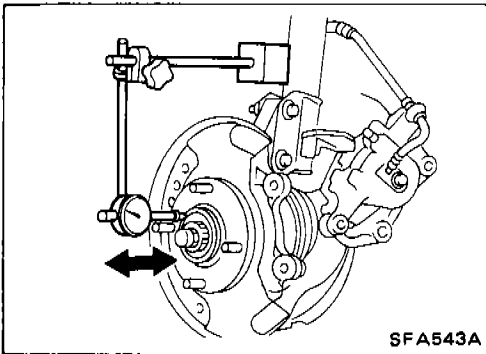
- Remove bolts and nuts as shown at left.
Make matchmarks before removing adjusting pin.

FRONT AXLE — Wheel Hub and Knuckle

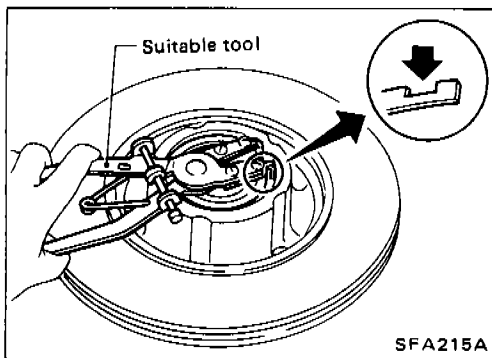


Installation

- Install wheel hub.
- Tighten wheel bearing lock nut.
⌚: 147 - 216 N·m
(15 - 22 kg-m, 108 - 159 ft-lb)



- Check wheel bearing axial end play.
Axial end play: 0.03 mm (0.0012 in) or less

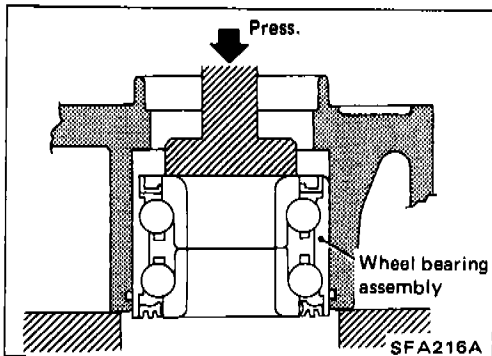


Disassembly

CAUTION:

When removing wheel bearing from wheel hub, replace wheel bearing assembly (outer race, inner races and grease seal) with a new one.

- Remove circular clip with suitable tool.



- Press out wheel bearing assembly from wheel hub.

Inspection

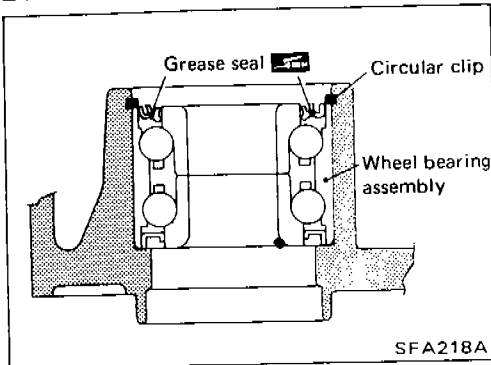
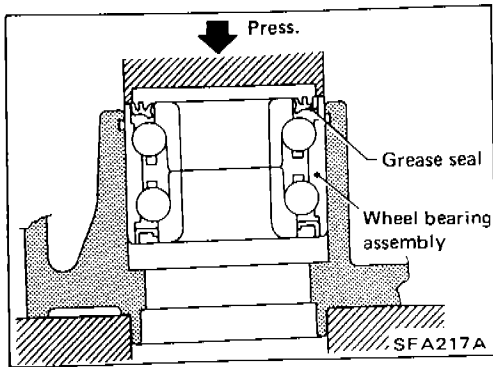
WHEEL HUB

- Check wheel hub for any cracks by using a magnetic exploration or dyeing test.

CIRCULAR CLIP

- Check circular clip for wear or cracks.
Replace if necessary.

FRONT AXLE — Wheel Hub and Knuckle



Assembly

1. Press new wheel bearing assembly into wheel hub from inside of rotor disc (with wheel hub).

Maximum load P:

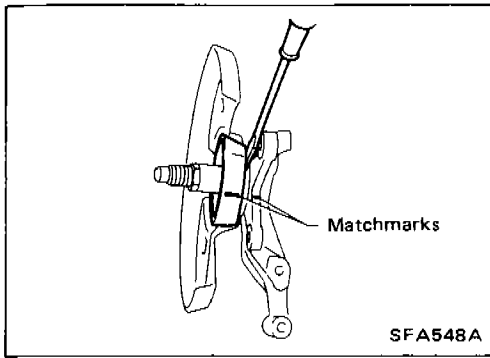
29 kN (3 t, 3.3 US ton, 3.0 Imp ton)

CAUTION:

- Do not press inner race of wheel bearing assembly.
 - Do not apply oil or grease to mating surfaces of wheel bearing outer race and wheel hub.
- Be careful not to damage grease seal.

2. Install circular clip into groove of wheel hub.
3. Apply multi-purpose grease to sealing lip.

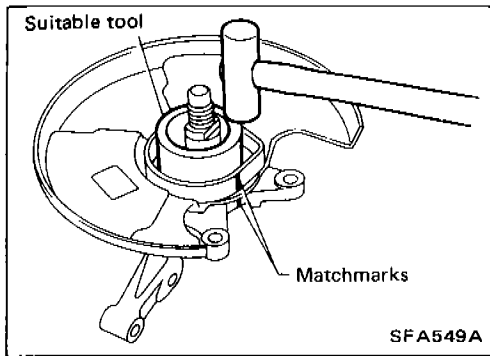
FRONT AXLE — Baffle Plate



Removal

- Mark matchmarks on baffle plate before removing.
- If baffle plate replacement requires removal of knuckle spindle, separate it equally using a screwdriver.

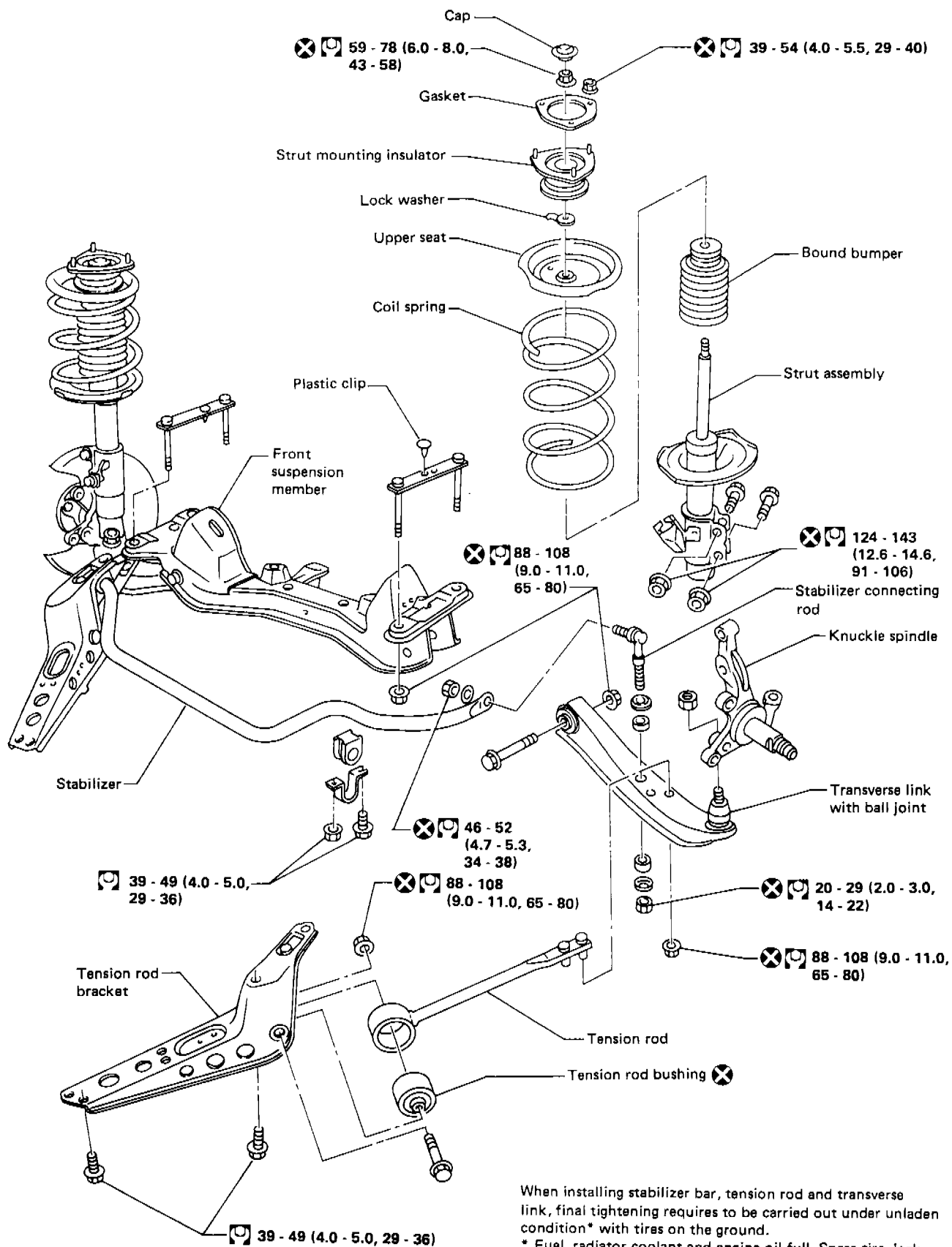
Be careful not to scratch knuckle spindle.



Installation

- Align matchmarks previously marked on baffle plate and install baffle plate by lightly tapping with a copper hammer and suitable tool.

FRONT SUSPENSION

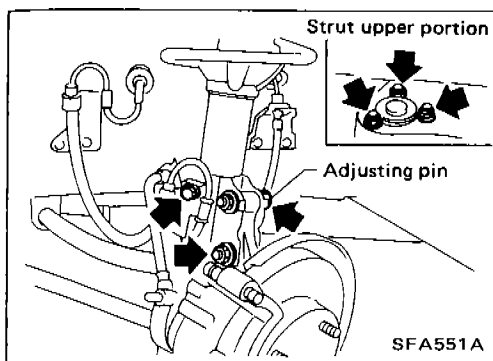


⊗ : N·m (kg-m, ft-lb)

When installing stabilizer bar, tension rod and transverse link, final tightening requires to be carried out under unladen condition* with tires on the ground.

* Fuel, radiator coolant and engine oil full. Spare tire, jack, hand tools and mats in designated position.

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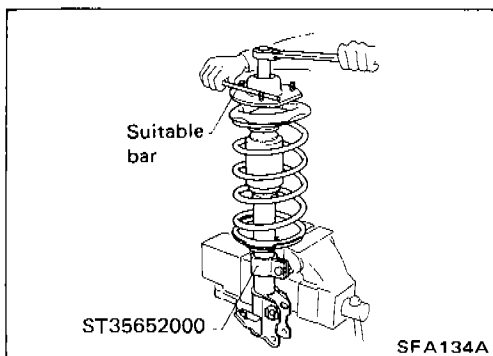
Removal

- Remove strut assembly fixing bolts and nuts (to hoodledge).
- Do not remove piston rod lock nut on vehicle.
- Put matchmarks on strut lower bracket and camber adjusting pin.

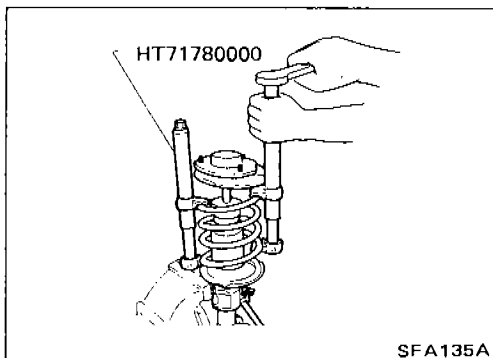
Disassembly

1. Set strut assembly on vise with Tool, then loosen piston rod lock nut.

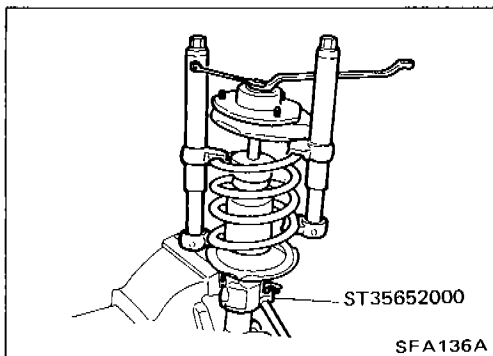
- Do not remove piston rod lock nut.



2. Compress spring with a Tool so that strut mounting insulator can be turned by hand.



3. Remove piston rod lock nut.



Inspection

STRUT ASSEMBLY

- Check for smooth operation through a full stroke, both compression and extension.
- Check for oil leakage occurring on welded or gland packing portion.
- Check piston rod for cracks, deformation or other damage. Replace if necessary.

FRONT SUSPENSION — Coil Spring and Strut Assembly

Inspection (Cont'd)

STRUT MOUNTING INSULATOR

- Check cemented rubber-to-metal portion for separation or cracks. Check rubber parts for deterioration.
- Check thrust bearing parts for abnormal noise or excessive rattle in axial direction.
Replace if necessary.

LOCK WASHER

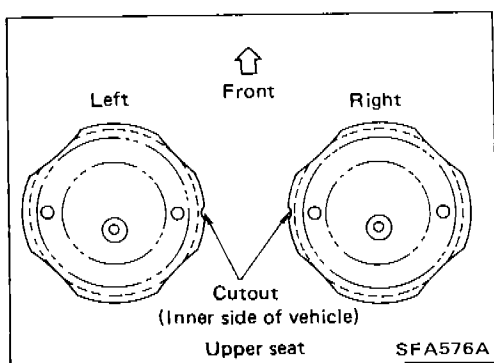
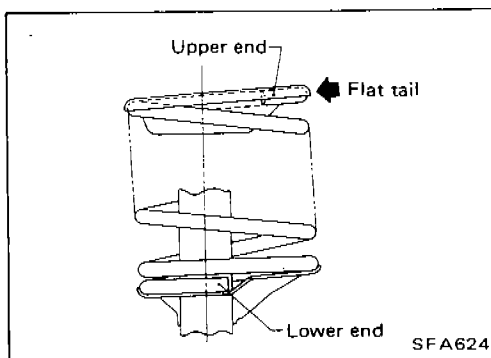
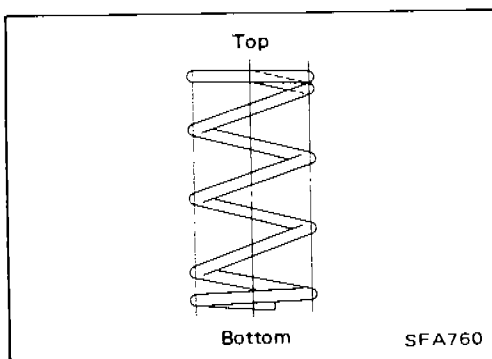
- Check for cracks, deformation or other damage. Replace if necessary.

COIL SPRING

- Check for cracks, deformation or other damage. Replace if necessary.

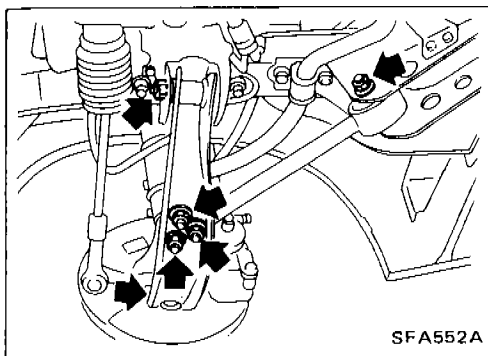
Assembly

- When installing coil spring, be careful not to reverse top and bottom direction. (Top end is flat.)



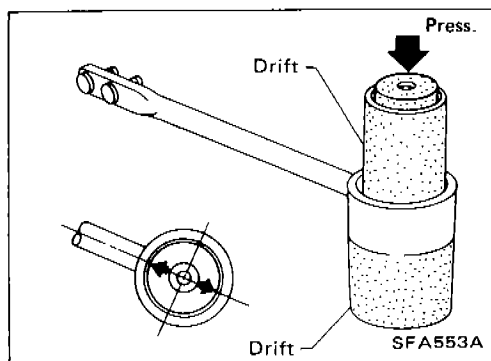
- When installing coil spring on strut, it must be positioned as shown in figure at left.
- Install upper spring seat with its cutout facing the inner side of vehicle.

FRONT SUSPENSION — Tension Rod and Stabilizer Bar

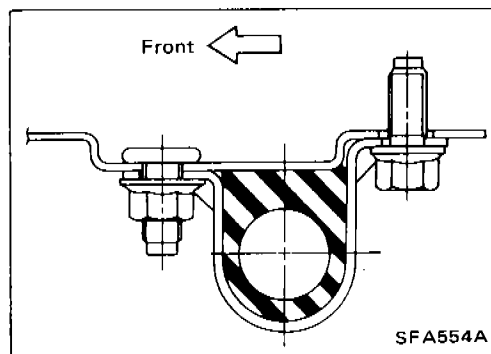


Removal and Installation

- Remove tension rod and stabilizer bar.

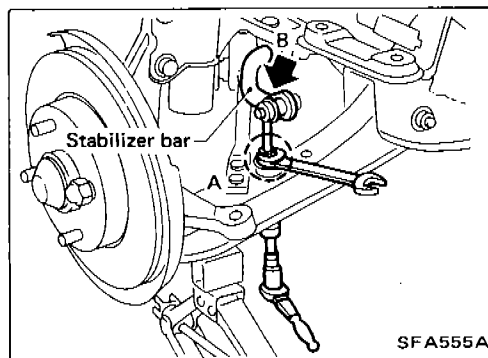


- When removing tension rod bushing, place one drift on lower side of bushing and the other on upper side, as shown at left, and press bushing out.
- Place arrow mark on bushing facing tension rod before installing bushing.

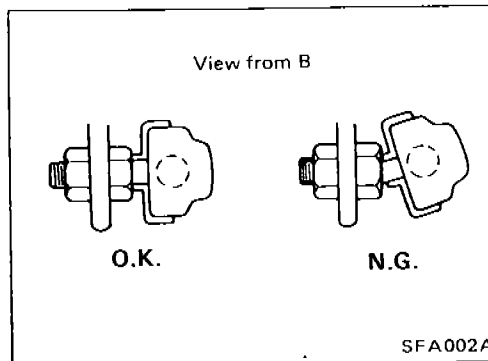


- Install stabilizer rear side bushings, then install front side bushings.

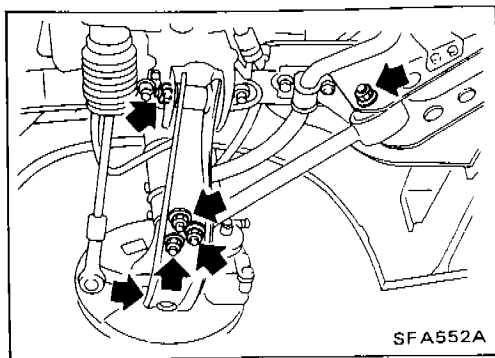
When installing stabilizer bar clamp, make sure direction is correct (as shown at left.)



- When removing and installing stabilizer bar, fix portion A.



- Install stabilizer bar with ball joint socket properly placed.



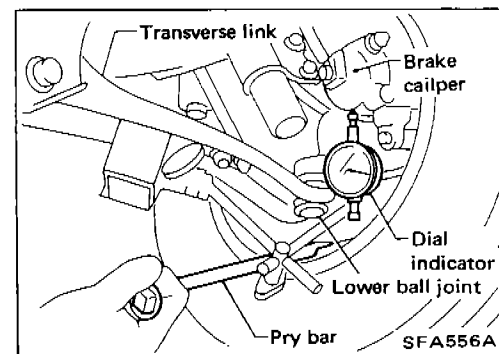
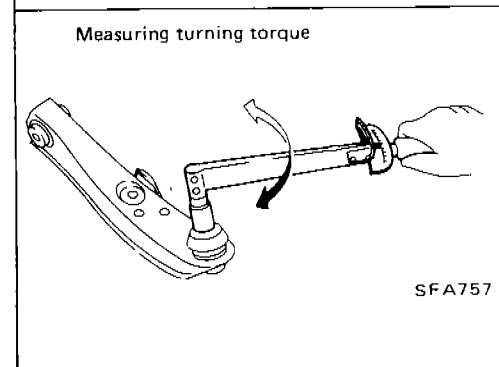
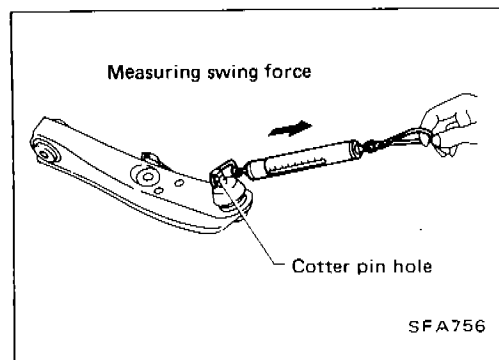
Removal and Installation

- Remove stabilizer, tension rod, ball joint and transverse link assembly.
- During installation, final tightening must be carried out at curb weight with tires on ground.
- After installation, check wheel alignment. Refer to "Front Wheel Alignment" of CHECK AND ADJUSTMENT — On-vehicle.

Inspection

TRANSVERSE LINK

- Check transverse link for damage, cracks or deformation. Replace it if necessary.
- Check rubber bushing for damage, cracks and deformation. Replace transverse link if necessary.



LOWER BALL JOINT

- Check ball joint for play. If ball stud is worn, play in axial direction is excessive or joint is hard to swing, replace transverse link assembly if necessary.

Swing force and turning torque

Before checking, turn ball joint at least 10 revolutions so that ball joint is properly broken in.

Swing force:

(measure point: cotter pin hole of ball stud)

7.8 - 55.9 N (0.8 - 5.7 kg, 1.8 - 12.6 lb)

Turning torque:

0.49 - 3.43 N·m (5.0 - 35 kg-cm, 4.3 - 30.4 in-lb)

Vertical end play (On-vehicle)

- (1) Jack up front of vehicle and set the stands.
- (2) Clamp dial indicator onto transverse link and place indicator tip on lower edge of brake caliper.
- (3) Make sure front wheels are straight and brake pedal is depressed.
- (4) Place a pry bar between transverse link and inner rim of road wheel.
- (5) While pushing and releasing pry bar, observe maximum dial indicator value.

Vertical end play: 0 mm (0 in)

- (6) If not within above specification, replace transverse link.

SERVICE DATA AND SPECIFICATIONS (S.D.S.)

General Specifications

COIL SPRING

Model Item		Europe		Except Europe	
Wire diameter	mm (in)	12.7 (0.500)			
Coil diameter	mm (in)	170 (6.69)			
Free length	mm (in)	360 (14.17)		350 (13.78)	
Spring constant N/mm (kg/mm, lb/in)		15.7 (1.6, 90)			
Identification color		Pink x 1		Yellow x 1	

FRONT STABILIZER BAR

Stabilizer diameter	mm (in)	25 (0.98)
Identification color		Orange

STRUT

Piston rod diameter	mm (in)	20.0 (0.787)
Stroke	mm (in)	160 (6.30)
Damping force [at 0.3 m (1.0 ft)/sec.]	N (kg, lb)	
Expansion		912 - 1,245 (93 - 127, 205 - 280)
Compression		392 - 588 (40 - 60, 88 - 132)

Inspection and Adjustment

WHEEL ALIGNMENT (Unladen*1)

Camber	degree	-1°25' to 5'
Caster	degree	5°55' - 7°25'
Toe-in (Total)	mm (in)	0 - 2 (0 - 0.08)
	degree	0' - 12'
Kingpin inclination	degree	12°25' - 13°55'
Front wheel turning angle		
Full turn*2 inside/outside	degree	36° - 40°/32°*3 39° - 43°/33°*4

*1: Tankful of fuel, radiator coolant and engine oil full. Spare tire, jack, hand tools, mats in designated position.

*2: On power steering models, wheel turning force (at circumference of steering wheel) of 98 to 147 N (10 to 15 kg, 22 to 33 lb) with engine idle.

*3: Europe L.H.D. model

*4: Except Europe L.H.D. model

WHEEL BEARING

Wheel bearing axial end play mm (in)	0.03 (0.0012) or less
Wheel bearing lock nut Tightening torque N-m (kg-m, ft-lb)	147 - 216 (15 - 22, 108 - 159)

LOWER BALL JOINT

Swing force (Measuring point: cotter pin hole of ball stud)	N (kg, lb)	7.8 - 55.9 (0.8 - 5.7, 1.8 - 12.6)
Turning torque	N-m (kg-cm, in-lb)	0.49 - 3.43 (5.0 - 35, 4.3 - 30.4)
Vertical end play	mm (in)	0 (0)

WHEEL RUNOUT (Radial and lateral)

Wheel type	Radial runout	Lateral runout
Aluminum wheel mm (in)	0.3 (0.012) or less	
Steel wheel mm (in)	0.5 (0.020) or less	0.8 (0.031) or less