

# FRONT AXLE & FRONT SUSPENSION

## SECTION **FA**

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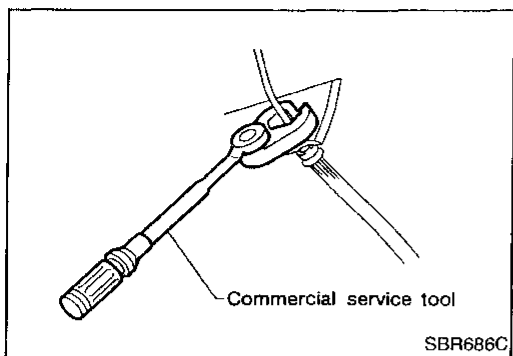
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## PRECAUTIONS AND PREPARATION

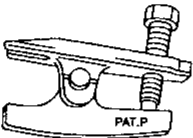
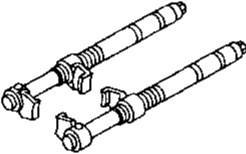
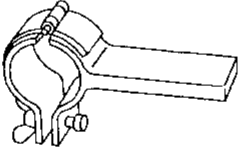


### Precautions

- When installing rubber parts, 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.
- After installing removed suspension parts, check wheel alignment and adjust if necessary.
- Use flare nut wrench when removing or installing brake tubes.
- Always torque brake lines when installing.

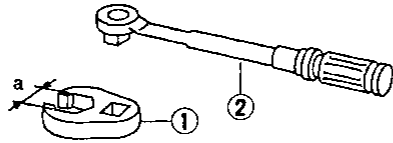
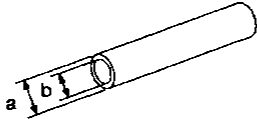
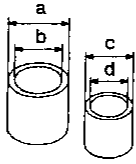
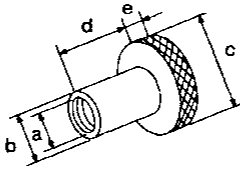
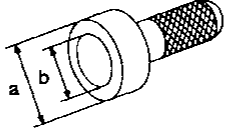
### Special Service Tools

The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

Tool number (Kent-Moore No.) Tool name	Description
HT72520000 (J25730-B) Ball joint remover	
HT71780000 ( — ) Spring compressor	
ST35652000 ( — ) Strut attachment	

# PRECAUTIONS AND PREPARATION

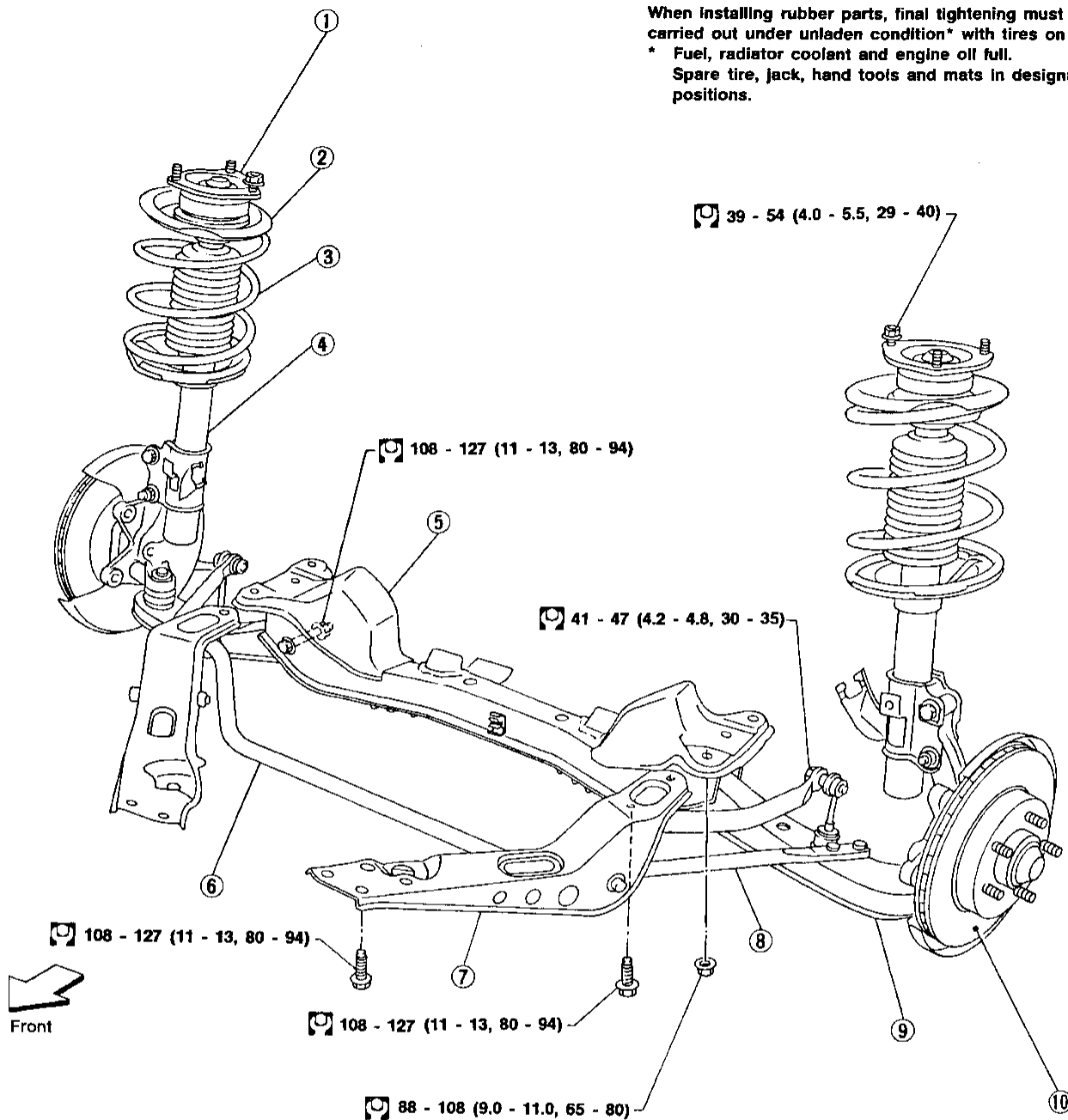
## Commercial Service Tools

Tool name	Description	
① Flare nut crowfoot ② Torque wrench	 <p>NT360</p>	Removing and installing each brake piping GI MA a: 10 mm (0.39 in)
Baffle plate drift	 <p>NT065</p>	Installing baffle plate EM LC a: 88 mm (3.46 in) dia. b: 68 mm (2.68 in) dia.
Tension rod bushing drift	 <p>NT155</p>	Removing and installing tension rod bushing EC FE CL 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.
Attachment Wheel alignment	 <p>NT148</p>	Measure wheel alignment MT AT PD a: Screw M22 x 1.5 pitch b: 35 mm (1.38 in) dia. c: 65 mm (2.56 in) dia. d: 56 mm (2.20 in) e: 12 mm (0.47 in)
Cap drift	 <p>NT115</p>	Installing hub cap FA RA BR ST RS BT HA EL IDX a: 70 mm (2.76 in) dia. b: 59 mm (2.32 in) dia.

# FRONT SUSPENSION SYSTEM

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When installing rubber parts, 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.



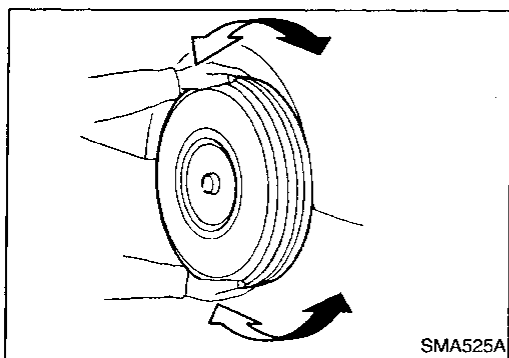
: N·m (kg-m, ft-lb)

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- ① Strut mounting insulator
- ② Spring upper seat
- ③ Coil spring
- ④ Strut assembly

- ⑤ Front suspension member
- ⑥ Front stabilizer bar
- ⑦ Tension rod bracket

- ⑧ Tension rod
- ⑨ Transverse link assembly
- ⑩ Brake rotor



## Front Axle and Front Suspension Parts

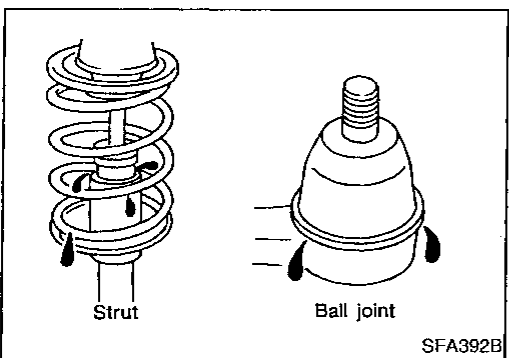
Check front axle and front suspension parts for excessive play, cracks, wear or other damage.

- Shake each front wheel to check for excessive play.
- Retighten all axle and suspensions nuts and bolts to the specified torque.

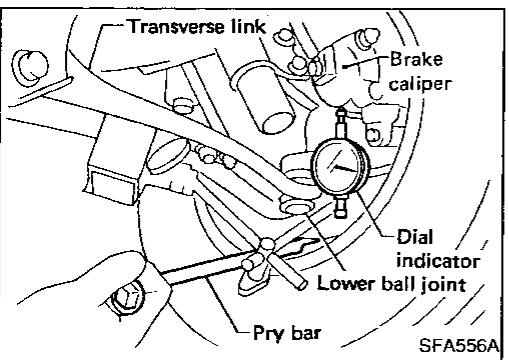
**Tightening torque:**

**Refer to FRONT SUSPENSION (FA-12).**

- Make sure that cotter pins are inserted.



- 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. If ball joint dust cover is cracked or damaged, replace transverse link.

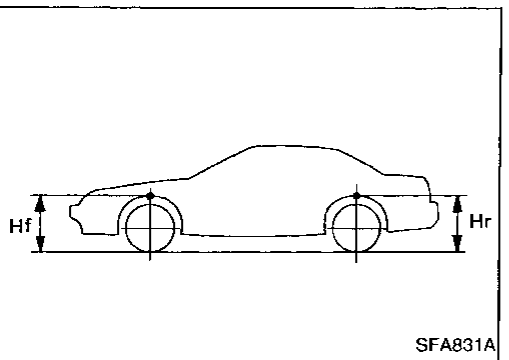


- Check suspension ball joint end play.
  - (1) Jack up front of vehicle and set the stands.
  - (2) Clamp dial indicator onto transverse link and place indicator tip on lower edge of brake caliper.
  - (3) Make sure front wheels are straight and brake pedal is depressed.
  - (4) Place a pry bar between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

**Vertical end play:**

**0 mm (0 in)**

If ball joint vertical end play exists, remove transverse link and recheck the ball joint. Refer to FA-15.



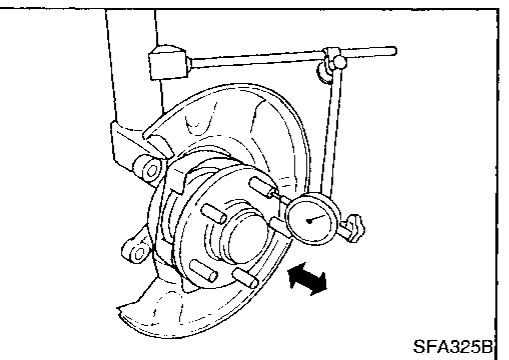
- Check spring height from top of wheelarch to ground using the following procedure.

- (1) Park vehicle on a level surface with vehicle unladen\* .

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

- (2) Check tires for proper inflation and wear (tread wear indicator must not be showing).
- (3) Bounce vehicle up and down several times and measure dimensions Hf and Hr. Refer to SDS (FA-16).

Spring height is not adjustable. If out of specification, check for worn springs or suspension parts.



## Front Wheel Bearing

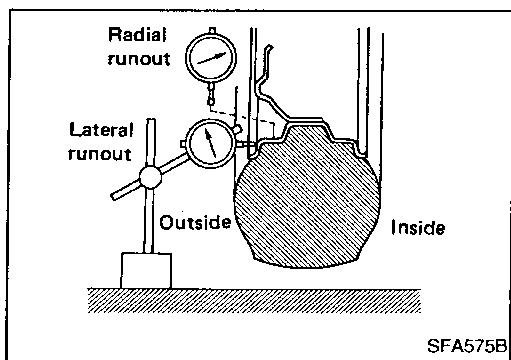
- Check that wheel bearings operate smoothly.
- Check axial end play.

**Axial end play:**

**0.05 mm (0.0020 in) or less**

- If out of specification or wheel bearing does not turn smoothly, replace wheel bearing assembly.

Refer to FRONT AXLE — Wheel Hub and Knuckle (FA-8).



## Front Wheel Alignment

Before checking front wheel alignment, be sure to make a preliminary inspection (Unladen\*).

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

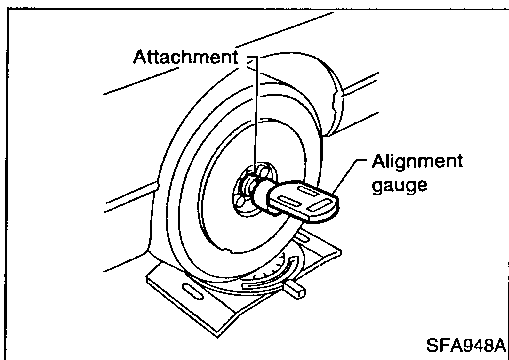
### PRELIMINARY INSPECTION

1. Check tires for wear and improper inflation.
2. Check wheel runout.

#### Wheel runout:

Refer to SDS (FA-17).

3. Check front wheel bearings for looseness.
4. Check front suspension for looseness.
5. Check steering linkage for looseness.
6. Check that struts work properly.
7. Check vehicle posture (Unladen).



### CAMBER, CASTER AND KINGPIN INCLINATION

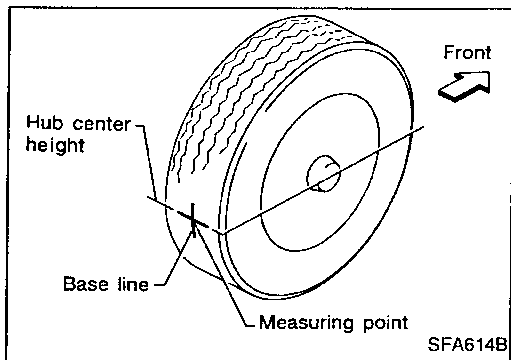
Camber, caster and kingpin inclination are preset at factory and cannot be adjusted.

1. Measure camber, caster and kingpin inclination of both right and left wheels with a suitable alignment gauge.

#### Camber, Caster and Kingpin inclination:

Refer to SDS (FA-17).

2. If camber, caster or kingpin inclination is not within specification, inspect front suspension parts. Replace damaged or worn out parts.



### TOE-IN

Measure toe-in using the following procedure.

#### WARNING:

- Always perform the following procedure on a flat surface.
- Make sure that no person is in front of the vehicle before pushing it.

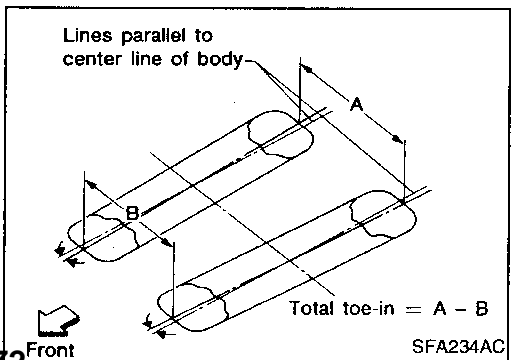
1. Bounce front of vehicle up and down to stabilize the posture.
2. Push the vehicle straight ahead about 5 m (16 ft).
3. Put a mark on base line of the tread (rear side) of both tires at the same height of hub center. This mark is a measuring point.
4. Measure distance "A" (rear side).
5. Push the vehicle slowly ahead to rotate the wheels 180 degrees (1/2 turn).

If the wheels have rotated more than 180 degrees (1/2 turn), try the above procedure again from the beginning. Never push vehicle backward.

6. Measure distance "B" (front side).

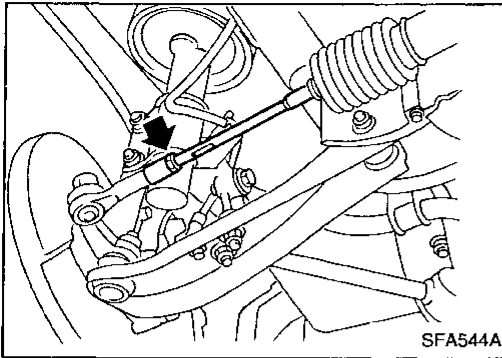
#### Total toe-in

Refer to SDS (FA-17).

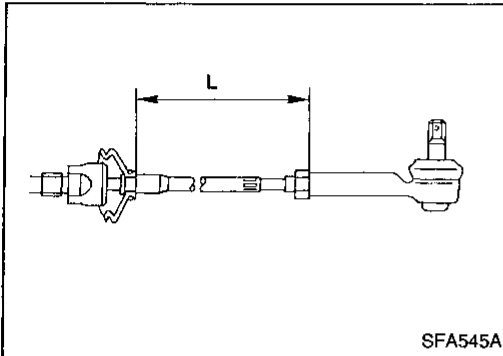


# ON-VEHICLE SERVICE

## Front Wheel Alignment (Cont'd)



7. Adjust toe-in by varying the length of steering tie-rods.
  - (1) Loosen lock nuts.
  - (2) Adjust toe-in by screwing tie-rods in and out.



Make sure both tie-rods are the same length.

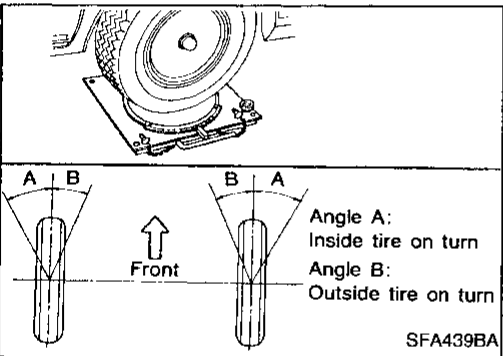
**Standard length "L":**

**Refer to ST section ("Inspection and Adjustment", "SDS").**

- (3) Tighten lock nuts to specified torque.

**Lock nut tightening torque:**

**Refer to ST section ("POWER STEERING GEAR AND LINKAGE").**



## FRONT WHEEL TURNING ANGLE

**Turning angle is set by stroke length of steering gear rack and cannot be adjusted.**

1. Set wheels in straight-ahead position. Then move vehicle forward until front wheels rest on turning radius gauge properly.
2. Rotate steering wheel all the way right and left; measure turning angle.

**Do not hold the steering wheel on full lock for more than 15 seconds.**

**Wheel turning angle (Full turn):**

**Refer to SDS (FA-17).**

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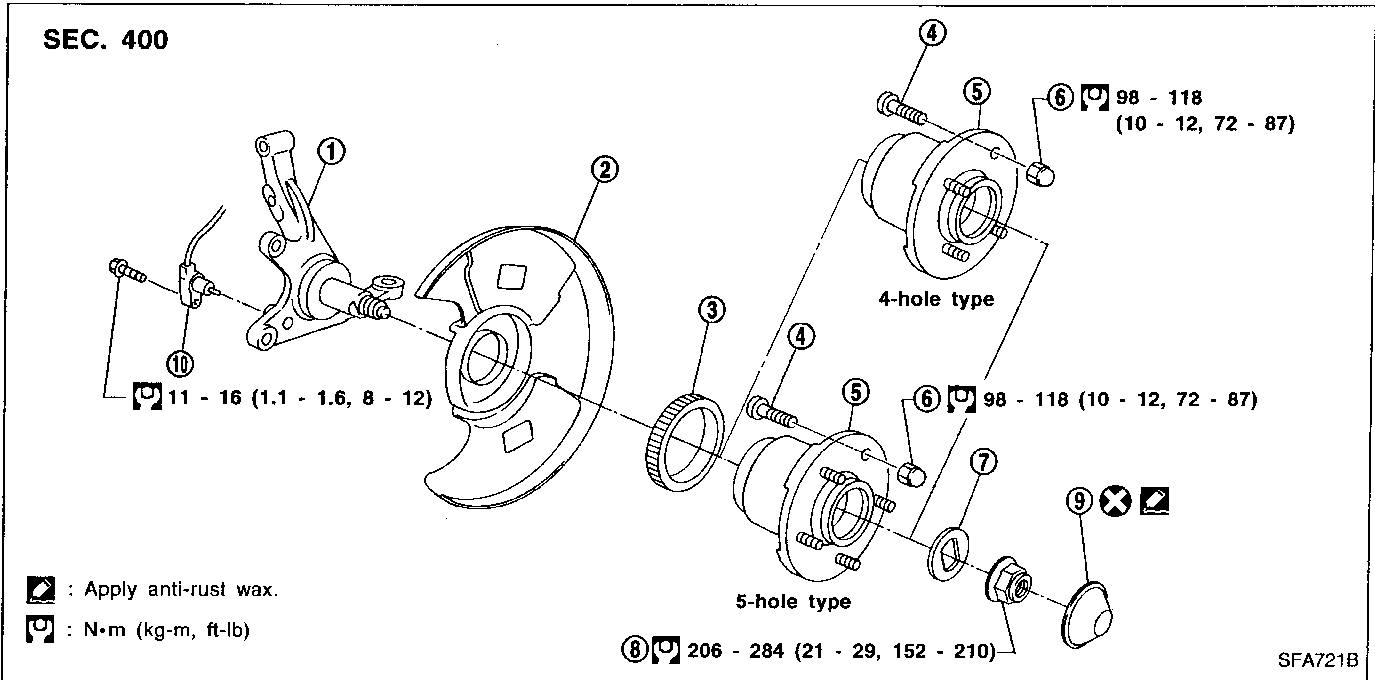
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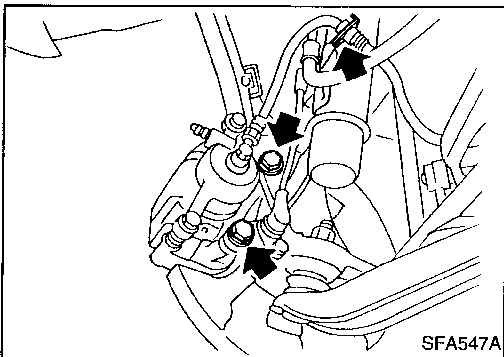
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# FRONT AXLE

## Wheel Hub and Knuckle



- |                   |                     |                          |
|-------------------|---------------------|--------------------------|
| ① Knuckle spindle | ⑤ Wheel hub bearing | ⑧ Wheel bearing lock nut |
| ② Baffle plate    | ⑥ Wheel nut         | ⑨ Hub cap                |
| ③ ABS ring        | ⑦ Lock washer       | ⑩ ABS sensor             |
| ④ Hub bolt        |                     |                          |



### REMOVAL

#### CAUTION:

- Before removing the front axle assembly, disconnect the ABS wheel sensor from the assembly. Then move it away from the front axle assembly area. Failure to do so may result in damage to the sensor wires and the sensor becoming inoperative.
  - Wheel hub bearing does not require maintenance. If any of the following symptoms are noted, replace wheel hub bearing assembly.
    - Growling noise is emitted from wheel hub bearing during operation.
    - Wheel hub bearing drags or turns roughly. This occurs when turning hub by hand after bearing lock nut is tightened to specified torque.
  - If the wheel hub bearing assembly is removed, it must be renewed. The old assembly must not be re-used.
1. Remove brake caliper assembly and rotor.

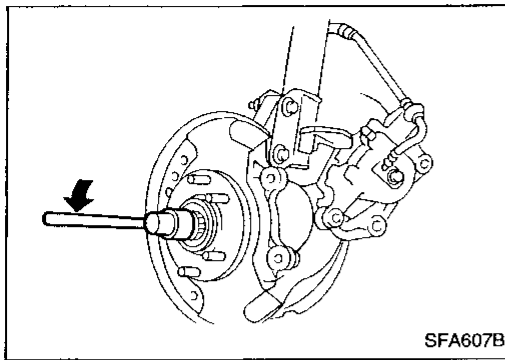
**Brake hose need not be disconnected from brake caliper. In this case, suspend caliper assembly with wire so as not to stretch brake hose. Be careful not to depress brake pedal, or caliper piston will pop out.**

**Make sure brake hose is not twisted.**

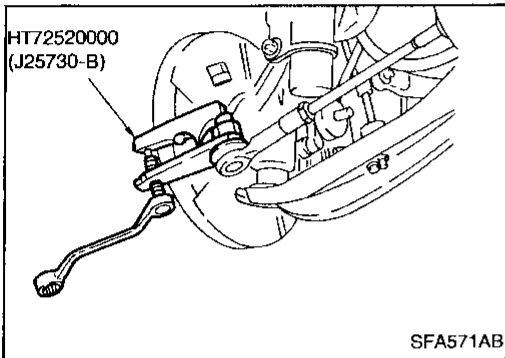


# FRONT AXLE

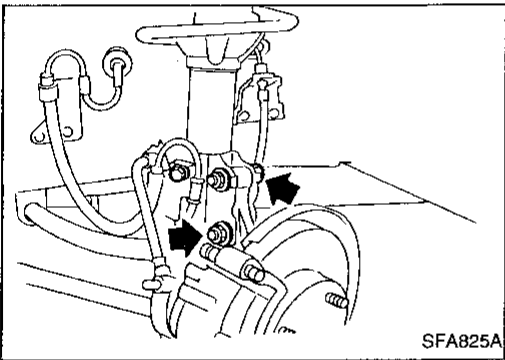
## Wheel Hub and Knuckle (Cont'd)



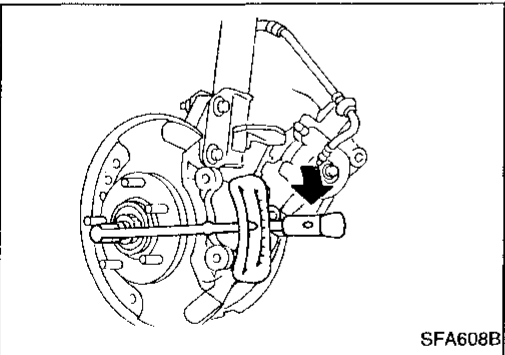
2. Remove wheel bearing lock nut. Remove wheel hub from spindle.



3. Remove tie-rod ball joint and lower ball joint with Tool.

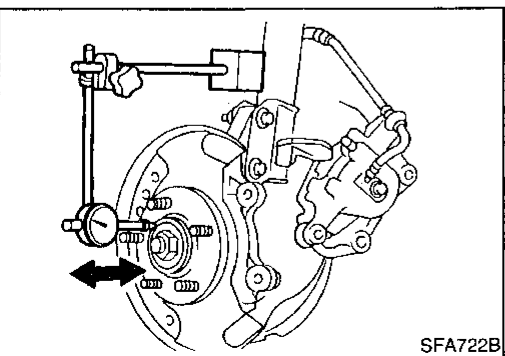


4. Disconnect knuckle from strut.



### INSTALLATION

1. Install knuckle with wheel hub.
  - Replace strut lower mounting nuts.
2. Tighten wheel bearing lock nut.  
⚙️: 206 - 284 N·m  
(21 - 29 kg·m, 152 - 210 ft·lb)



3. Check wheel bearing axial end play.  
Axial end play:  
0.05 mm (0.0020 in) or less

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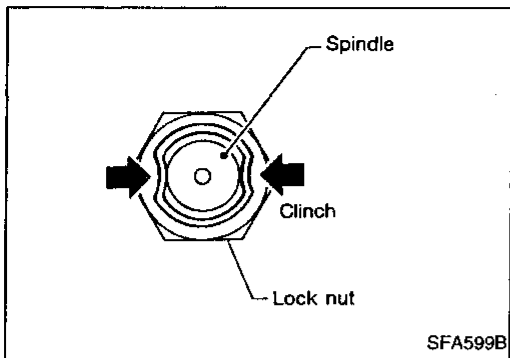
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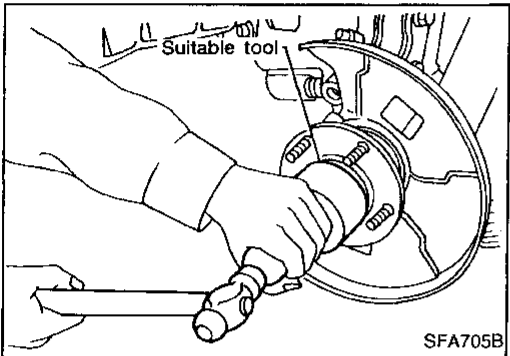
## FRONT AXLE

### Wheel Hub and Knuckle (Cont'd)

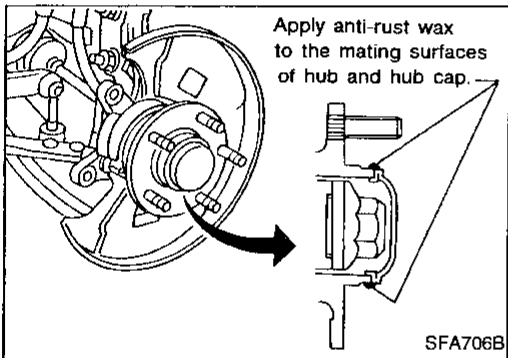
4. Clinch two places of lock nut.



5. Install hub cap using a suitable tool.  
**Do not reuse hub cap. When installing, replace it with a new one.**



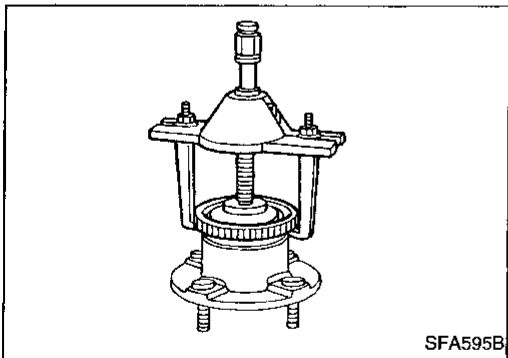
6. Apply anti-rust wax to the mating surfaces of hub and hub cap.



### ABS Sensor Rotor

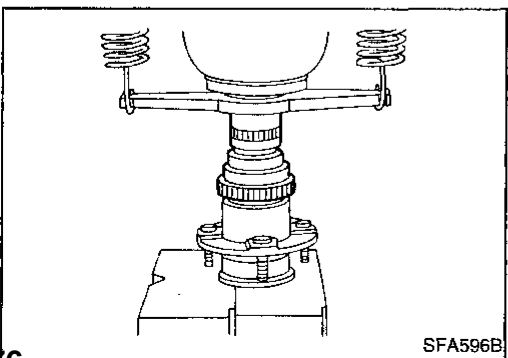
#### REMOVAL

Remove ABS sensor rotor (models equipped with ABS) or labyrinth plate (models without ABS) with suitable tool.

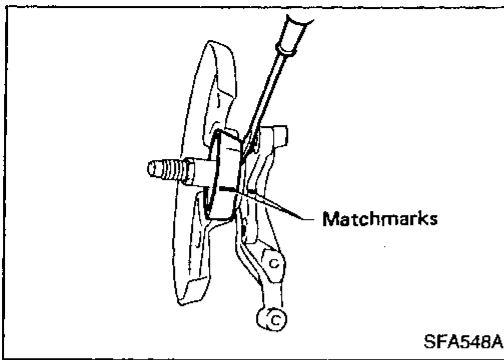


#### INSTALLATION

Press-fit ABS sensor rotor or labyrinth plate.



# FRONT AXLE

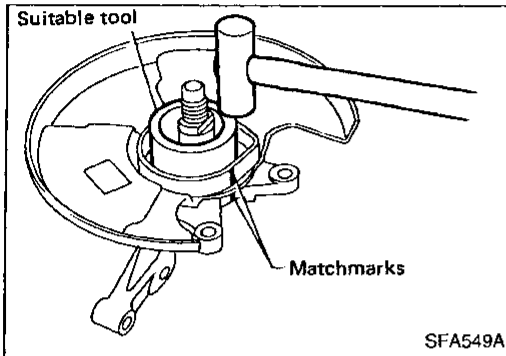


## Baffle Plate

### 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

With matchmarks aligned, install baffle plate by tapping it with a copper hammer and a suitable tool.

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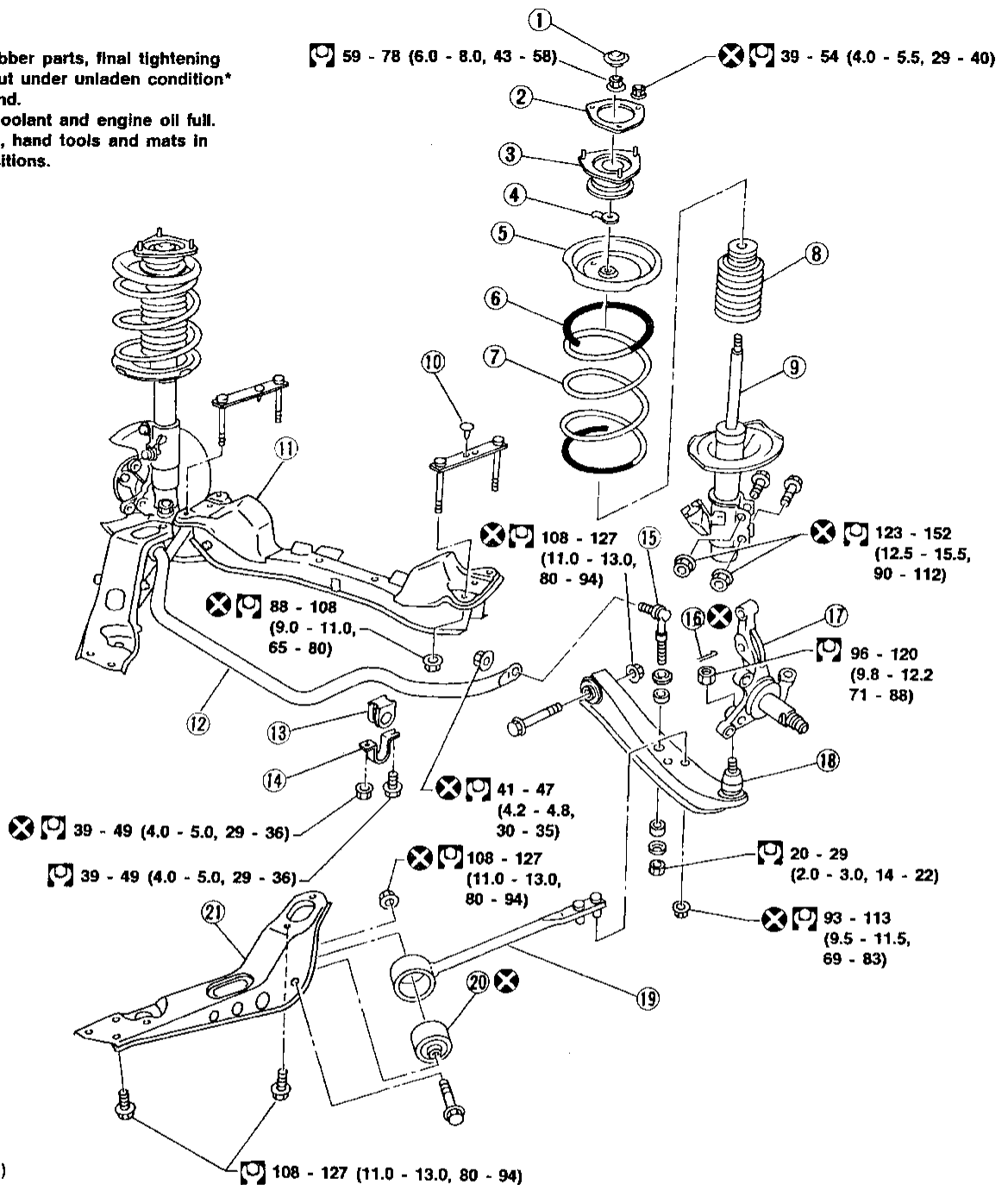
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# FRONT SUSPENSION

## SEC. 400-401

When installing rubber parts, 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.



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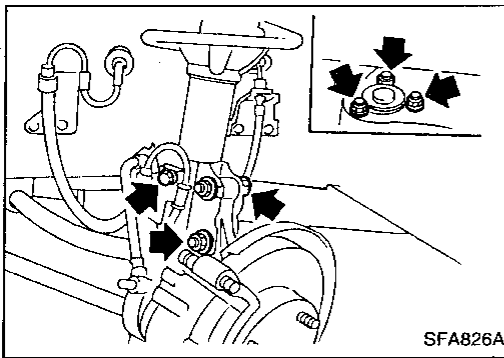
- |                            |                           |                                   |
|----------------------------|---------------------------|-----------------------------------|
| ① Cap                      | ⑧ Bound bumper            | ⑮ Stabilizer connecting rod       |
| ② Gasket                   | ⑨ Strut assembly          | ⑯ Cotter pin                      |
| ③ Strut mounting insulator | ⑩ Plastic clip            | ⑰ Knuckle spindle                 |
| ④ Lock washer              | ⑪ Front suspension member | ⑱ Transverse link with ball joint |
| ⑤ Upper seat               | ⑫ Stabilizer bar          | ⑲ Tension rod                     |
| ⑥ (Polyurethane tube)      | ⑬ Bushing                 | ⑳ Tension rod bushing             |
| ⑦ Coil spring              | ⑭ Clamp                   | ㉑ Tension rod bracket             |

# FRONT SUSPENSION

## Coil Spring and Strut Assembly

### REMOVAL

Remove strut assembly fixing bolts and nuts (to hoodledge).  
**Do not remove piston rod lock nut on vehicle.**



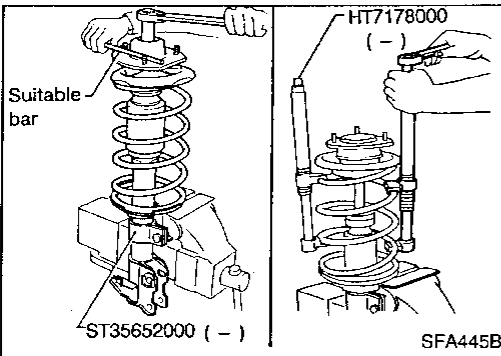
### DISASSEMBLY

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

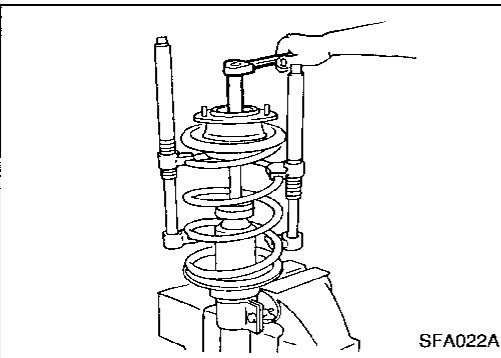
#### WARNING:

**Do not remove piston rod lock nut at this time.**

2. Compress spring with 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 on welded or gland packing portion.
- Check piston rod for cracks, deformation or other damage. Replace if necessary.

#### Strut mounting insulator

Check cemented rubber-to-metal portion for separation or cracks. Check rubber parts for deterioration. 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.

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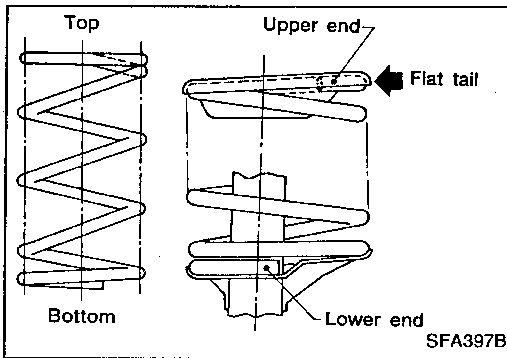
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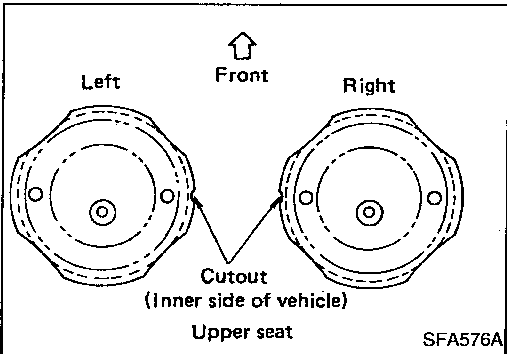
## FRONT SUSPENSION

### Coil Spring and Strut Assembly (Cont'd)

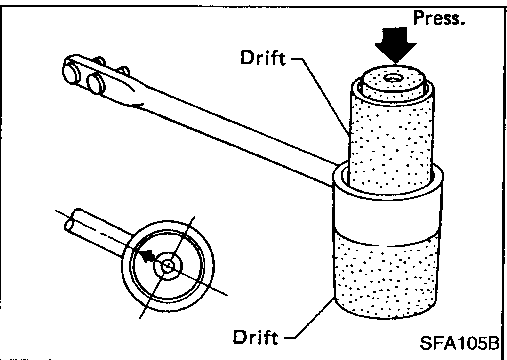
#### ASSEMBLY



- When installing coil spring on strut, it must be positioned as shown in figure at left.



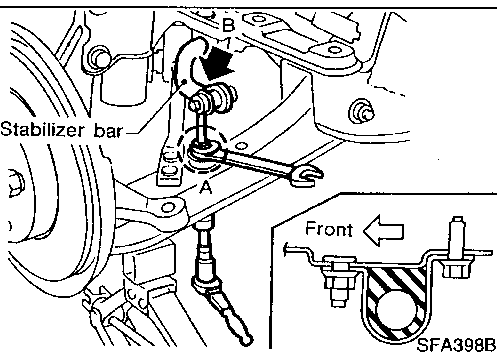
- Install upper spring seat with its cutout facing the inner side of vehicle.



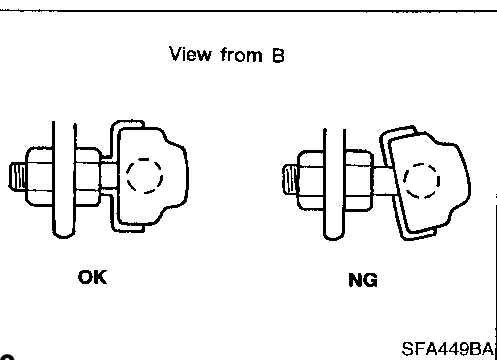
### Tension Rod and Stabilizer Bar

#### REMOVAL AND INSTALLATION

- Remove tension rod and stabilizer bar.
- Place one drift on lower side of tension rod bushing and another on upper side, as shown. Remove tension rod bushing by pressing it out.
- Place arrow mark on bushing facing tension rod before installing bushing.

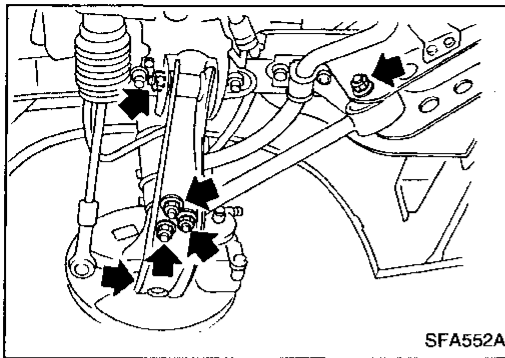


- Install stabilizer rear side bushings, then install front side bushings. When installing stabilizer bar clamp, make sure direction is correct (as shown at left).
- When removing and installing stabilizer bar, fix portion A.



- Install stabilizer bar with ball joint socket properly placed.

# FRONT SUSPENSION



## Transverse Link and Lower Ball Joint

### 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 ON-VEHICLE SERVICE (FA-6).

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### INSPECTION

#### Transverse link

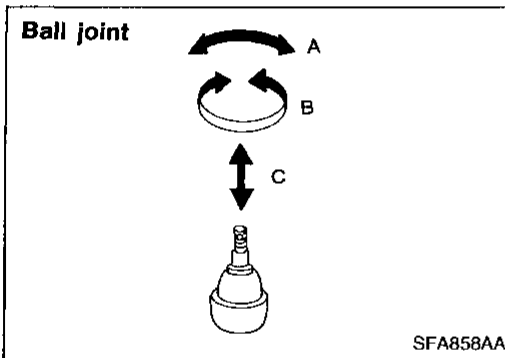
- Check transverse link for damage, cracks or deformation. Replace it if necessary.
- Check rubber bushing for damage, cracks and deformation. Replace transverse link if necessary.

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#### Lower ball joint

- Check ball joint for excessive play. Replace transverse link assembly if any of the following exists:
  - Ball stud is worn.
  - Joint is hard to swing.
  - Play in axial direction is excessive.Before checking, turn ball joint at least 10 revolutions so that ball joint is properly broken in.

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#### Swinging force "A":

(measuring point: cotter pin hole of ball stud)

Refer to SDS (FA-17).

#### Turning torque "B":

Refer to SDS (FA-17).

#### Vertical end play "C":

Refer to SDS (FA-17).

- Check dust cover for damage. Replace it and cover clamp if necessary.

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# SERVICE DATA AND SPECIFICATIONS (SDS)

## General Specifications

### COIL SPRING

Unit: mm (in)

Applied model	M/T	A/T
Wire diameter	13.1 (0.516)	13.2 (0.520)
Coil outer diameter	183.2 (7.21)	183.4 (7.22)
Free length	310 (12.20)	320 (12.60)
Identification color	White x 1, White x 2	White x 1, Purple x 2

### STRUT

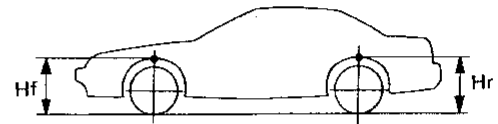
Applied model	195/60 R15 tire	205/55 R16 tire
Piston rod diameter mm (in)	20 (0.79)	22 (0.87)

### FRONT STABILIZER BAR

Unit: mm (in)

Applied model	All
Stabilizer diameter	27.2 (1.071)
Identification color	Light green

### WHEELARCH HEIGHT (Unladen\*)



SFA831A

Unit: mm (in)

Applied model	195/60R15 tire	205/55R16 tire
Front (Hf)	687 (27.05)	694 (27.32)
Rear (Hr)	663 (26.10)	670 (26.38)

\*: Fuel, radiator coolant and engine oil full.

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



# SERVICE DATA AND SPECIFICATIONS (SDS)

## Inspection and Adjustment

### WHEEL ALIGNMENT (Unladen\*1)

Camber	Degree minute (Decimal degree)	Minimum	-1°30' (-1.50°)	GI	
		Nominal	-0°45' (-0.75°)		
		Maximum	0°00' (0.00°)		
		Left and right difference	45' (0.75°) or less		MA
Caster	Degree minute (Decimal degree)	Minimum	6°00' (6.00°)	EM	
		Nominal	6°45' (6.75°)		
		Maximum	7°30' (7.50°)		
		Left and right difference	45' (0.75°) or less		
Kingpin inclination	Degree minute (Decimal degree)	Minimum	12°55' (12.92°)	LC	
		Nominal	13°40' (13.67°)		
		Maximum	14°25' (14.42°)		
Total toe-in	Distance (A - B)  mm (in)	Minimum	1.5 (0.059)	EC	
		Nominal	2.5 (0.098)		
		Maximum	3.5 (0.138)		
	Angle (left plus right)	Degree minute (Decimal degree)	Minimum	8' (0.13°)	FE
			Nominal	14' (0.23°)	
			Maximum	20' (0.33°)	
Wheel turning angle	Degree minute (Decimal degree)	Minimum	39°00' (39.00°)	CL	
		Nominal	42°00' (42.00°)		
		Maximum	43°00' (43.00°)		
		Full turn*2			
Outside	Degree minute (Decimal degree)	Nominal	33°10' (33.17°)	AT	

\*1: Fuel, radiator coolant and engine oil full. Spare tire, jack, hand tools and mats in designated positions.

\*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.

### WHEEL BEARING

Wheel bearing axial end play mm (in)	0.05 (0.0020) or less
Wheel bearing lock nut  Tightening torque N·m (kg·m, ft·lb)	206 - 284 (21 - 29, 152 - 210)

### 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	

### LOWER BALL JOINT

Swinging force "A" (Measuring point: cotter pin hole of ball stud)  N (kg, lb)	7.8 - 54.9 (0.8 - 5.6, 1.8 - 12.3)
Turning torque "B" N·m (kg·cm, in·lb)	0.49 - 3.43 (5.0 - 35.0, 4.3 - 30.4)
Vertical end play "C" mm (in)	0 (0)

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