

FRONT AXLE & FRONT SUSPENSION

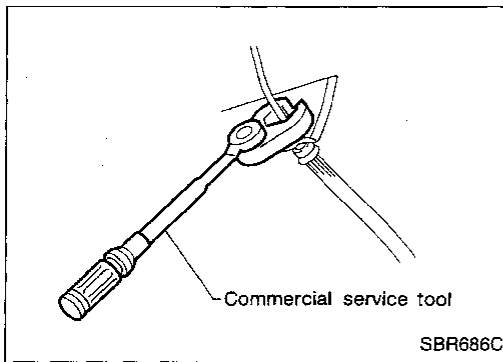
SECTION **FA**

CONTENTS

PRECAUTIONS AND PREPARATION2	Manual-lock Free-running Hub — 4WD —16
Precautions.....2	Auto-lock Free-running Hub — 4WD —17
Special Service Tools2	Wheel Hub and Rotor Disc.....17
Commercial Service Tools.....3	Knuckle Spindle.....19
NOISE, VIBRATION AND HARSHNESS (NVH)	Drive Shaft — 4WD —22
TROUBLESHOOTING4	FRONT SUSPENSION27
NVH Troubleshooting Chart.....4	Shock Absorber29
FRONT SUSPENSION SYSTEM5	Torsion Bar Spring.....29
2WD5	Stabilizer Bar31
4WD6	Upper Link32
ON-VEHICLE SERVICE7	Tension Rod.....33
Front Axle and Front Suspension Parts7	Lower Link34
Front Wheel Bearing.....7	Upper Ball Joint and Lower Ball Joint.....35
Front Wheel Alignment.....9	SERVICE DATA AND SPECIFICATIONS (SDS)36
Drive Shaft.....13	General Specifications.....36
FRONT AXLE14	Inspection and Adjustment36

GI
MA
EM
LC
EC
FE
CL
MT
AT
TF
PD
FA
RA
BR
ST
RS
BT
HA
EL
IDX

PRECAUTIONS AND PREPARATION

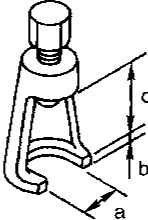
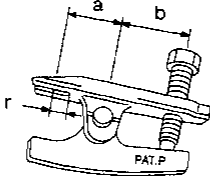
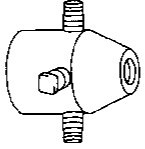
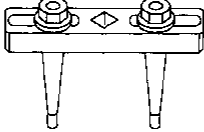
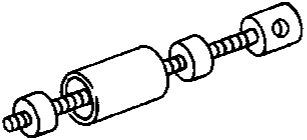


Precautions

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

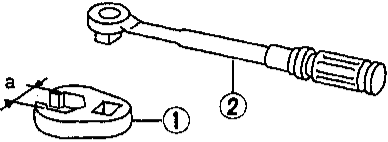
Special Service Tools

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	Unit application	
		2WD	4WD
ST29020001 (J24319-01) Gear arm puller	 NT694 a: 34 mm (1.34 in) b: 6.5 mm (0.256 in) c: 61.5 mm (2.421 in)	X	X
HT72520000 (J25730-B) Ball joint remover	 NT546 a: 33 mm (1.30 in) b: 50 mm (1.97 in) r: R11.5 mm (0.453 in)	X	X
KV401021S0 (—) Bearing race drift	 NT153	X	X
KV40105400 (J36001) Wheel bearing lock nut wrench	 NT154	—	X
KV40106800 (—) Lower link bushing puller	 NT685	X	X

PRECAUTIONS AND PREPARATION

Commercial Service Tools

Tool name	Description
<ul style="list-style-type: none"> ① Flare nut crowfoot ② Torque wrench 	<div style="display: flex; justify-content: space-between; align-items: center;"> <div style="text-align: center;">  </div> <div style="text-align: right;"> <p>Removing and installing each brake piping</p> </div> </div> <div style="display: flex; justify-content: space-between; margin-top: 10px;"> NT360 a: 10 mm (0.39 in) </div>

GI
 MA
 EM
 LC
 EC
 FE
 CL
 MT
 AT
 TF
 PD
FA
 RA
 BR
 ST
 RS
 BT
 HA
 EL
 IDX

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

NVH Troubleshooting Chart

Use the chart below to help you find the cause of the symptom. If necessary, repair or replace these parts.

Reference page																															
SUSPECTED PARTS (Possible cause)		Excessive joint angle	Joint sliding resistance	Imbalance	Improper installation, looseness	Shock absorber deflection or damage	Bushing or mounting deterioration	Parts interference	Spring fatigue	Suspension looseness	Incorrect wheel alignment	Stabilizer bar fatigue	Wheel bearing damage	Out-of-round	Incorrect air pressure	Uneven tire wear	Deformation or damage	Non-uniformity	Incorrect tire size	PROPELLER SHAFT	DIFFERENTIAL	DRIVE SHAFT	FRONT AXLE AND FRONT SUSPENSION	REAR AXLE AND REAR SUSPENSION	TIRES	ROAD WHEEL	BRAKES	STEERING			
Symptom	DRIVESHAFT	Noise, Vibration	X	X																X	X		X	X	X	X	X	X	X		
		Shake	X		X																X			X	X	X	X	X	X	X	
	FRONT AXLE AND FRONT SUSPENSION	Noise				X	X	X	X	X	X										X	X	X		X	X	X	X	X	X	X
		Shake				X	X	X	X		X										X	X		X	X	X	X	X	X	X	X
		Vibration				X	X	X	X	X											X	X		X	X					X	
		Shimmy				X	X	X	X			X													X	X	X	X	X	X	X
		Judder				X	X	X																	X	X	X	X	X	X	X
		Poor quality ride or handling				X	X	X	X	X		X	X	X											X	X	X				
	TIRES	Noise			X	X								X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X
		Shake			X	X								X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X
		Vibration													X					X	X			X	X					X	
		Shimmy			X	X								X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X
		Judder			X	X								X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X
		Poor quality ride or handling			X	X								X	X	X	X	X	X		X	X		X	X	X	X				
	ROAD WHEEL	Noise			X	X								X							X	X	X	X	X	X	X	X	X	X	X
		Shake			X	X								X							X	X		X	X	X	X	X	X	X	X
		Shimmy, Judder			X	X								X										X	X	X	X	X	X	X	X
		Poor quality ride or handling			X	X								X										X	X	X					

X: Applicable

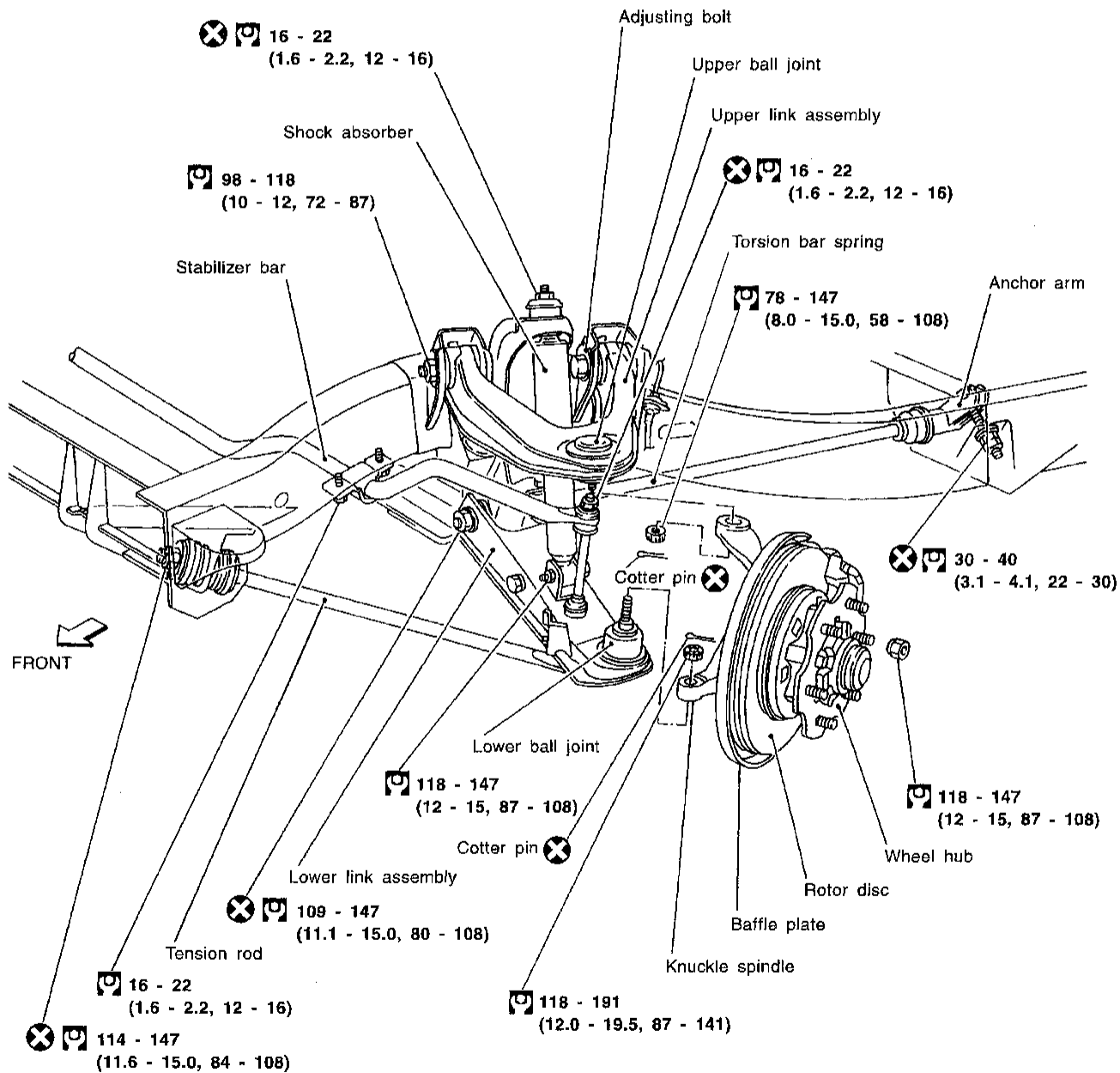
FRONT SUSPENSION SYSTEM

2WD

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.



: N·m (kg-m, ft-lb)

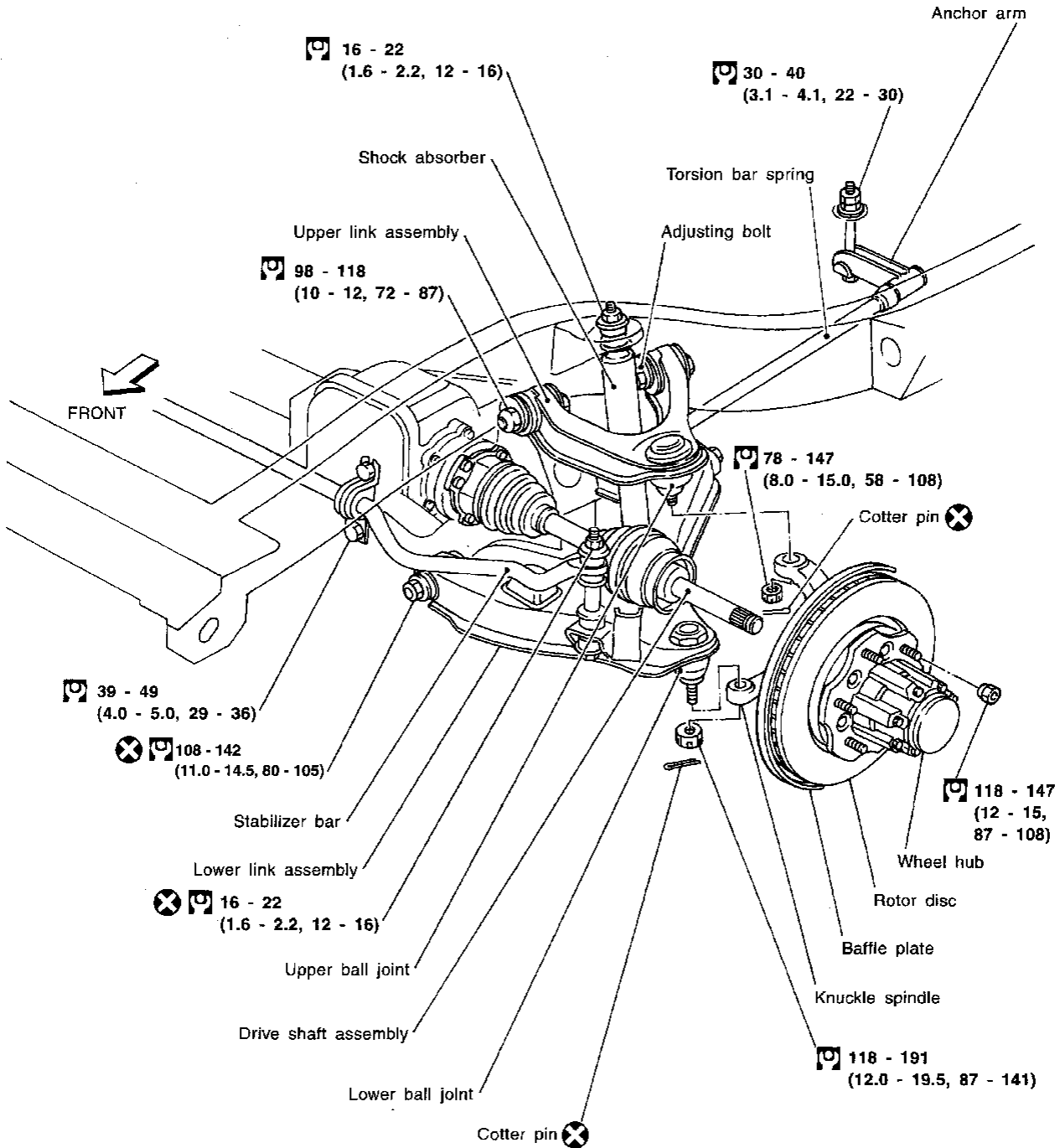
FRONT SUSPENSION SYSTEM

4WD

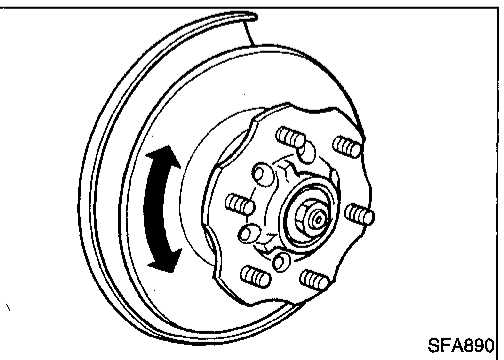
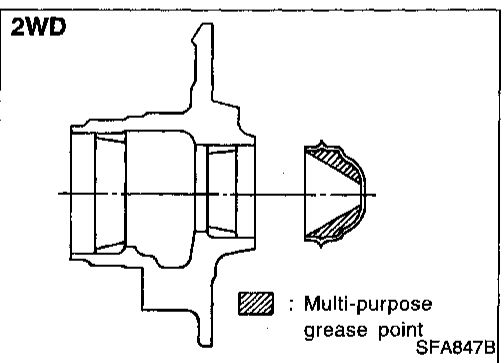
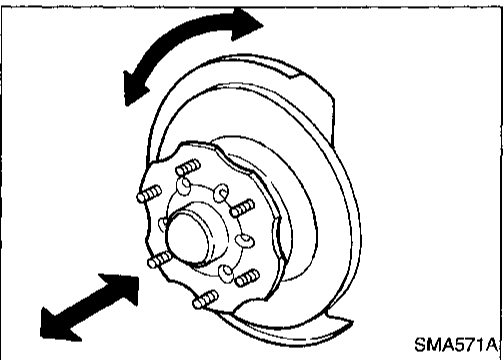
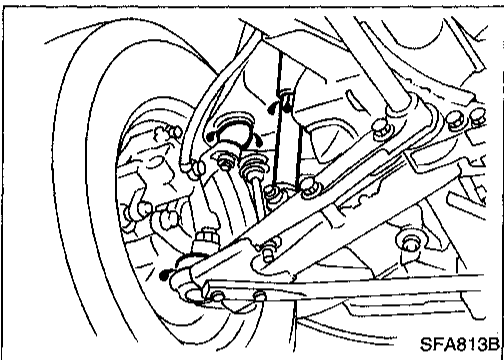
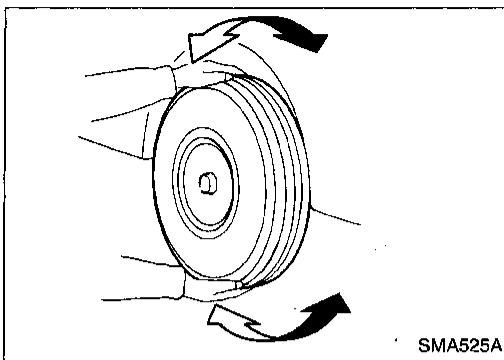
SEC. 391•400•401

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.



: N•m (kg-m, ft-lb)



Front Axle and Front Suspension Parts

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

- Shake each front wheel to check for excessive play. If looseness is noted, adjust wheel bearing end play, then check ball joint end play.
- Make sure that the cotter pin is inserted.
- Retighten all nuts and bolts to the specified torque.
 - Ⓜ: Refer to "FRONT SUSPENSION", FA-27.
- Check front axle and front suspension parts for wear, cracks and other damage.
- Check shock absorber for oil leakage and other damage.
- Check suspension ball joint for grease leakage and ball joint dust cover for cracks and other damage.

Front Wheel Bearing

- Check that wheel bearings operate smoothly.
- Check axial end play.
 - Axial end play: 0 mm (0 in)**
- Adjust wheel bearing preload if there is any axial end play or wheel bearing does not turn smoothly.

PRELOAD ADJUSTMENT (2WD)

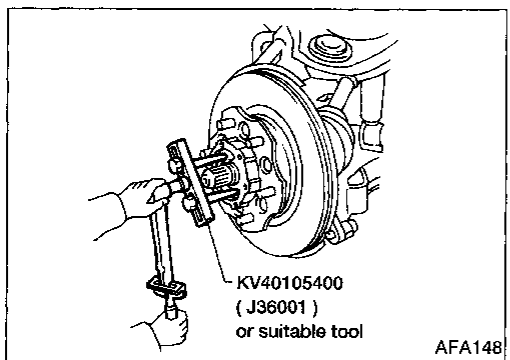
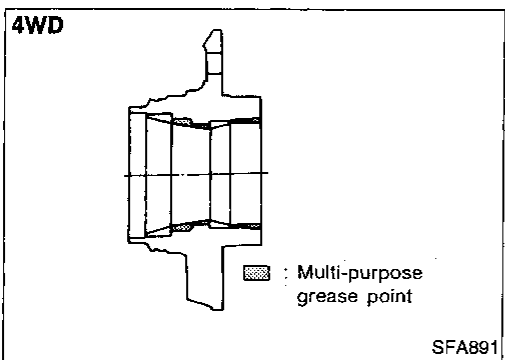
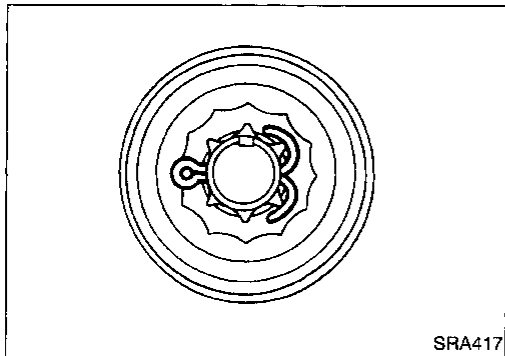
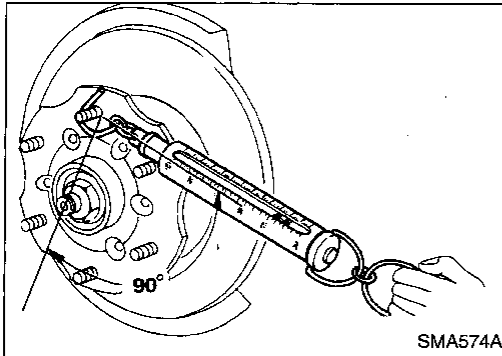
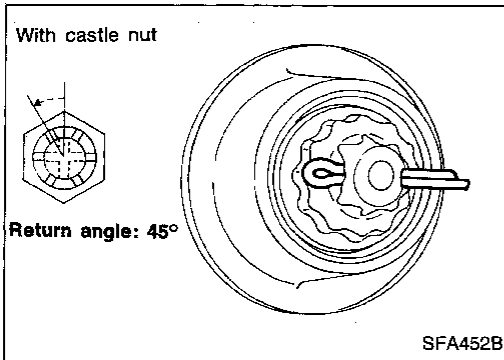
Adjust wheel bearing preload after wheel bearing has been replaced or front axle has been reassembled.

1. Before adjustment, thoroughly clean all parts to prevent dirt entry.
2. Apply multi-purpose grease sparingly to the following parts:
 - Threaded area of spindle
 - Contact surface between lock washer and outer wheel bearing
 - Hub cap (as shown at left) 18 - 22 g (0.63 - 0.78 oz)
 - Grease seal lip
3. Tighten wheel bearing lock nut to the specified torque.
 - Ⓜ: 34 - 39 N·m (3.5 - 4.0 kg-m, 25 - 29 ft-lb)
4. Turn wheel hub several times in both directions to seat wheel bearing correctly.
5. Again tighten wheel bearing lock nut to the specified torque.
 - Ⓜ: 34 - 39 N·m (3.5 - 4.0 kg-m, 25 - 29 ft-lb)

GI
MA
EM
LC
EC
FE
CL
MT
AT
TF
PD
FA
RA
BR
ST
RS
BT
HA
EL
IDX

ON-VEHICLE SERVICE

Front Wheel Bearing (Cont'd)



6. Turn wheel bearing lock nut back 45 degrees.
7. Fit adjusting cap and new cotter pin. Align cotter pin slot by loosening nut 15 degrees or less.

8. Measure wheel bearing preload and axial end play.

Axial end play: 0 mm (0 in)

Wheel bearing preload

(As measured at wheel hub bolt):

New grease seal

9.8 - 28.4 N (1.0 - 2.9 kg, 2.2 - 6.4 lb)

Used grease seal

9.8 - 23.5 N (1.0 - 2.4 kg, 2.2 - 5.3 lb)

Repeat above procedures until correct bearing preload is obtained.

9. Spread cotter pin.
10. Install hub cap.

PRELOAD ADJUSTMENT (4WD)

Adjust wheel bearing preload after wheel bearing has been replaced or front axle has been reassembled.

Adjust wheel bearing preload as follows:

1. Before adjustment, thoroughly clean all parts to prevent dirt entry.

2. Apply multi-purpose grease sparingly to the following parts:

- Threaded portion of spindle
- Contact surface between wheel bearing washer and outer wheel bearing
- Grease seal lip
- Wheel hub (as shown at left) **18 - 23 g (0.63 - 0.81 oz)**

3. Tighten wheel bearing lock nut with Tool.

☐: 78 - 98 N·m (8 - 10 kg-m, 58 - 72 ft-lb)

4. Turn wheel hub several times in both directions.

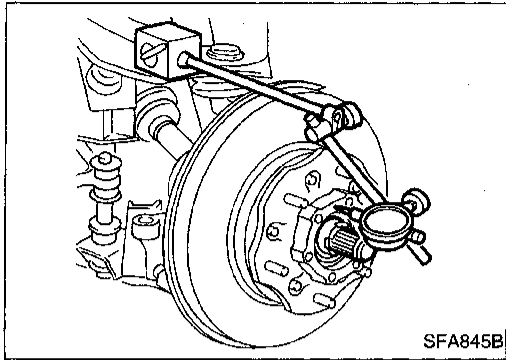
5. Loosen wheel bearing lock nut so that torque becomes 0 N·m (0 kg-m, 0 ft-lb).

6. Retighten wheel bearing lock nut with Tool.

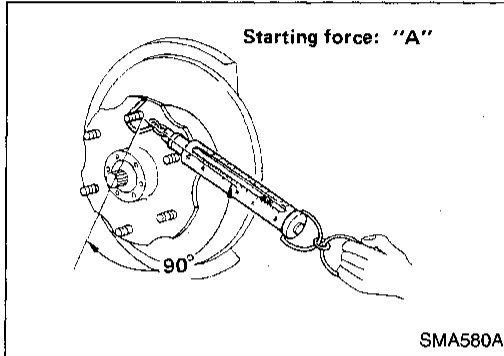
☑: 0.5 - 1.5 N·m (0.05 - 0.15 kg-m, 4.3 - 13.0 in-lb)

ON-VEHICLE SERVICE

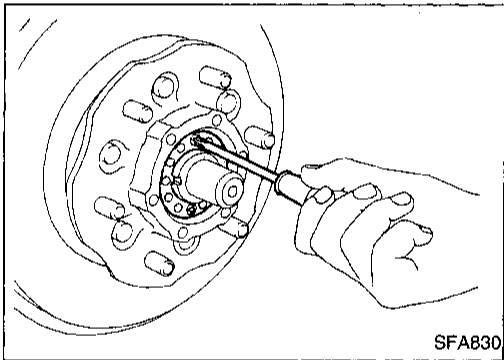
Front Wheel Bearing (Cont'd)



7. Turn wheel hub several times in both directions.
8. Retighten wheel bearing lock nut with Tool.
⚙️: 0.5 - 1.5 N·m (0.05 - 0.15 kg·m, 4.3 - 13.0 in·lb)
9. Measure wheel bearing axial end play.
Axial end play: 0 mm (0 in)



10. Measure starting force "A" at wheel hub bolt.



11. Install lock washer by tightening the lock nut within 15 to 30 degrees.
12. Turn wheel hub several times in both directions to seat wheel bearing correctly.
13. Measure starting force "B" at wheel hub bolt. Refer to step 10.
14. Wheel bearing preload "C" can be calculated as shown below.

$$C = B - A$$

Wheel bearing preload "C":

7.06 - 20.99 N (0.72 - 2.14 kg, 1.59 - 4.72 lb)

15. Repeat steps 3 through 14 until correct axial end play and wheel bearing preload are obtained.
16. Tighten screws.
⚙️: 1.2 - 1.8 N·m (0.12 - 0.18 kg·m, 10.4 - 15.6 in·lb)
17. Install free-running hub.

Front Wheel Alignment

Before checking front wheel alignment, make a preliminary inspection (Unladen*).

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

PRELIMINARY INSPECTION

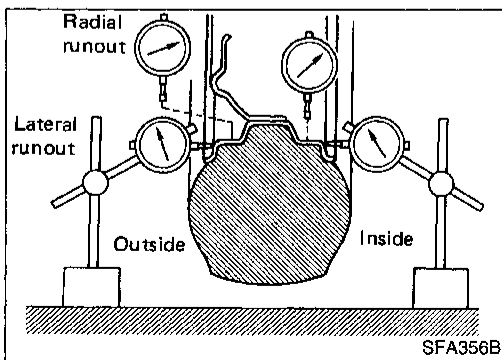
1. Check tires for wear and proper inflation.
2. Check outside and inside wheel runout.

Wheel runout average

$[(\text{Outside runout value} + \text{Inside runout value}) \times 0.5]$:

Refer to SDS, FA-36.

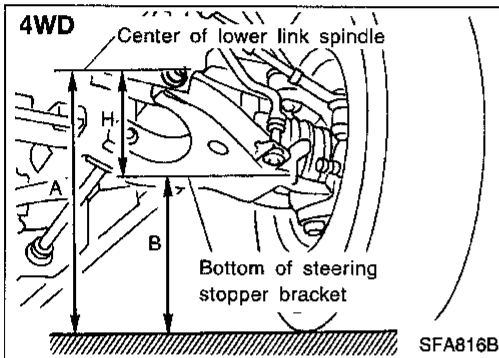
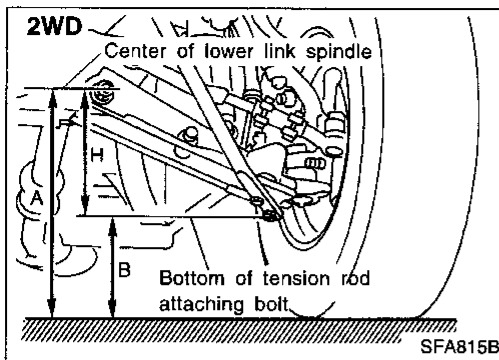
3. Check front wheel bearings for looseness.
4. Check front suspension for looseness.
5. Check steering linkage for looseness.
6. Check that front shock absorbers work properly by using the standard bounce test.



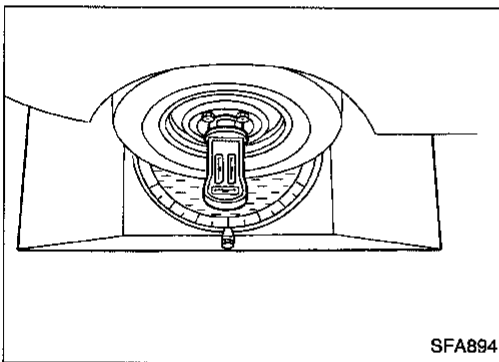
GI
MA
EM
LC
EC
FE
CL
MT
AT
TF
PD
FA
RA
BR
ST
RS
BT
HA
EL
IDX

ON-VEHICLE SERVICE

Front Wheel Alignment (Cont'd)



7. Measure vehicle height (Unladen): $H = A - B$ mm (in)
Refer to SDS, FA-37.
 - a. Exercise the front suspension by bouncing the front of the vehicle 4 or 5 times to ensure that the vehicle is in a neutral height attitude.
 - b. Measure wheel alignment.
Refer to SDS, FA-37.
 - c. If wheel alignment is not as specified, adjust vehicle posture.
Refer to SDS, FA-37.
 - d. Adjust wheel alignment.
Refer to SDS, FA-37.

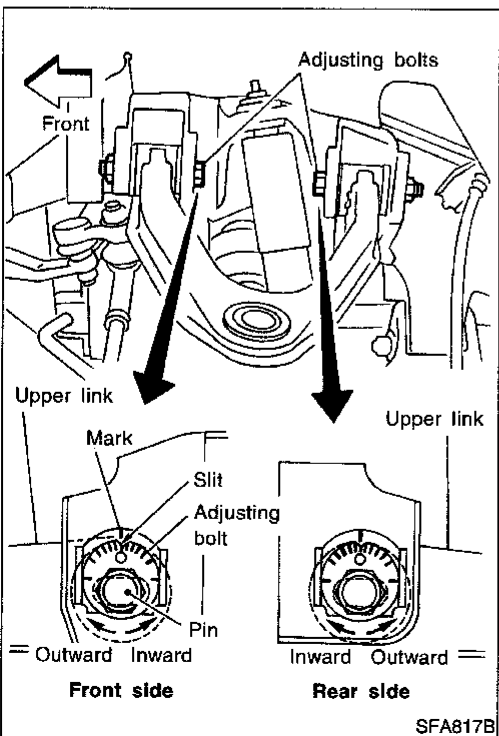


CAMBER, CASTER AND KINGPIN INCLINATION

Before checking camber, caster or kingpin inclination, move vehicle up and down on turning radius gauge to minimize friction. Ensure that the vehicle is in correct posture.

- 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.

Camber, Caster and Kingpin inclination:
Refer to SDS, FA-37.

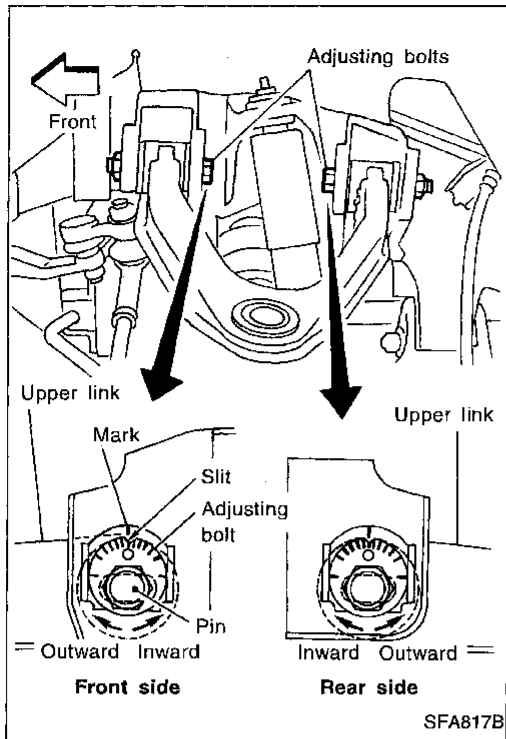


- In the following two cases, temporarily tighten the adjusting bolts while aligning the matching marks with the slits as shown in the figure at the left and measure the camber, caster and kingpin inclination:
 - (1) When replacing the upper link or other suspension parts with new ones
 - (2) When matching marks were not painted on adjusting bolts before suspension disassembly procedures
- If matching marks were already painted during suspension disassembly, align the matching marks with the slits, then temporarily tighten the adjusting bolts. Measure the camber, caster and kingpin inclination.

ON-VEHICLE SERVICE

Front Wheel Alignment (Cont'd)

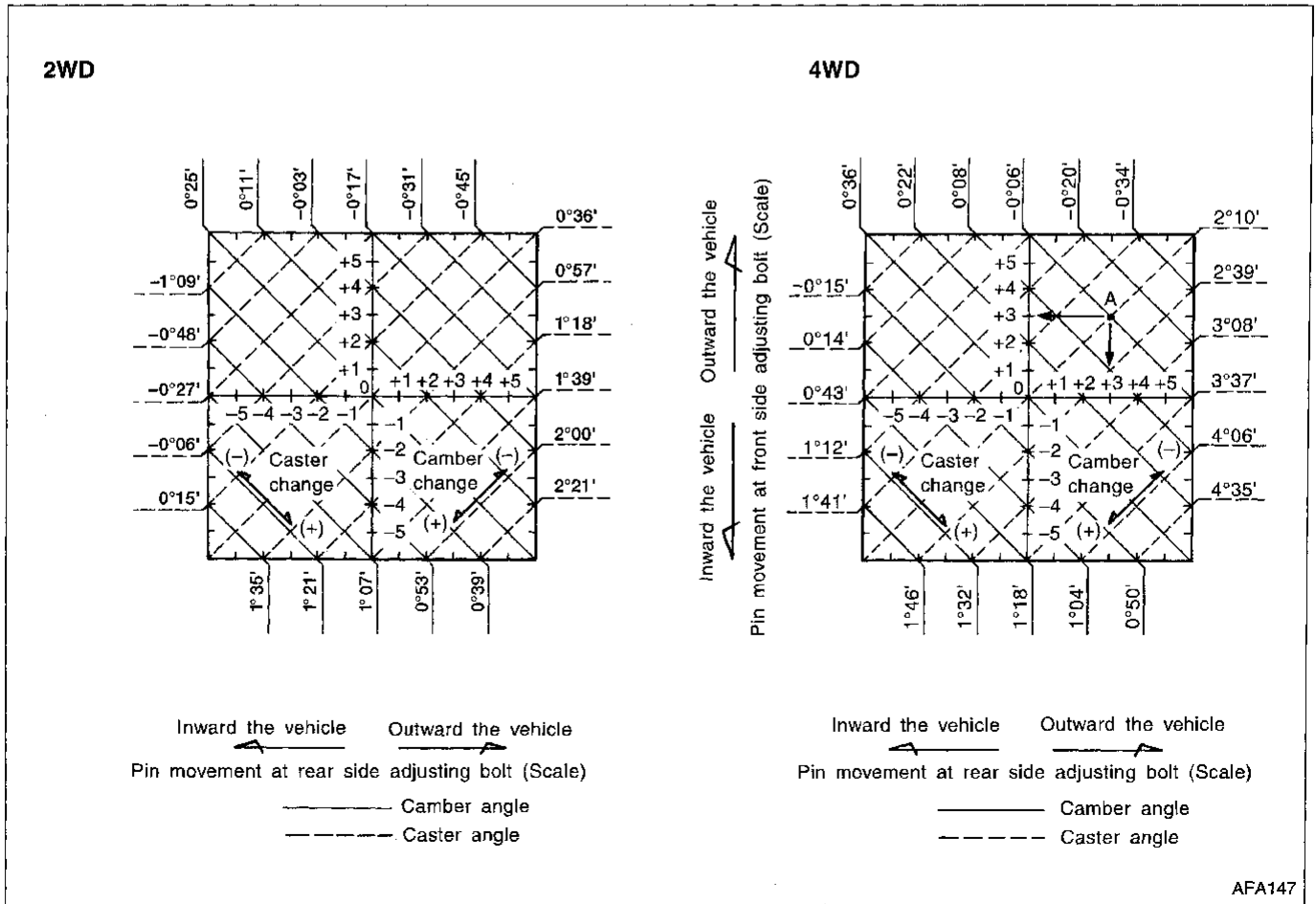
ADJUSTMENT



1. Both camber and caster angles are adjusted by adjusting bolts.
 - If the kingpin inclination is outside specifications, check the front suspension parts for wear or damage. Replace faulty parts with new ones.
2. From the measured value, read the coordinate (or: graduation) at the intersecting point in the graph.
 - a. If the coordinate (or: graduation) at the intersecting point is positive, move the pin outward by turning the corresponding adjusting bolt by the indicated graduation.
 - b. If the coordinate (or: graduation) at the intersecting point is negative, move the pin inward by turning the corresponding adjusting bolt by the indicated graduation.
 After properly moving the pin(s), tighten the front and rear adjusting bolts to specifications.
3. Re-measure to ensure that the camber and caster are within specified tolerances.

[Example]

- a. Measured values corresponding with the two values indicated below: (See chart for 4WD model.)
Camber angle: $-0^{\circ}06'$ (-0.10°)
Caster angle: $2^{\circ}10'$ (2.17°)
- b. Apply the above two values to the graph and determine point "A".
- c. The coordinate (or: graduation) indicates that both the front and rear adjusting bolts must be turned outward by 3 graduations.
 Turn the adjusting bolts by the amount corresponding with the 3 graduations.



ON-VEHICLE SERVICE

Front Wheel Alignment (Cont'd)

TOE-IN

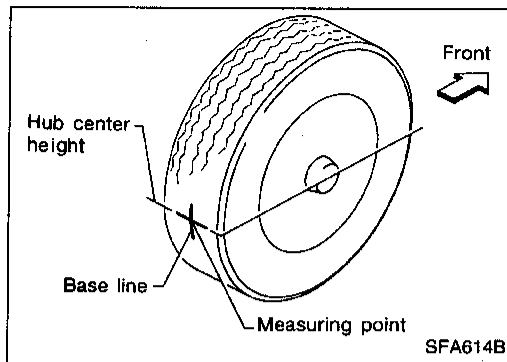
Measure toe-in using the following procedure.

WARNING:

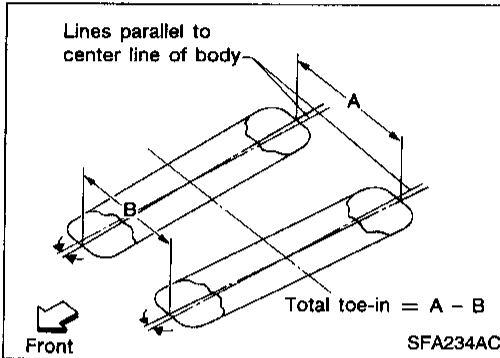
- Always perform the following procedure on a flat surface.
 - Make sure that no one is in front of the vehicle before pushing it.
1. Bounce front of vehicle up and down to stabilize the posture.
 2. Push the vehicle straight ahead about 5 m (16 ft).
 3. Put a mark on base line of the tread (rear side) 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:

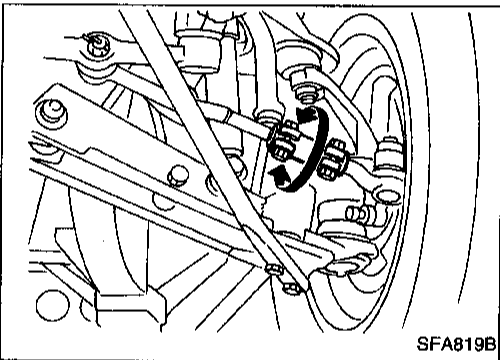
Refer to SDS, FA-37.



SFA614B



SFA234AC



SFA819B

7. Adjust toe-in by varying the length of both steering tie-rods.
 - a. Loosen clamp bolts or lock nuts.
 - b. Adjust toe-in by turning both the left and right tie-rod tubes equal amounts.

Make sure that the tie-rod bars are screwed into the tie-rod tube more than 35 mm (1.38 in).

Make sure that the tie-rods are the same length.

Standard length (A = B):

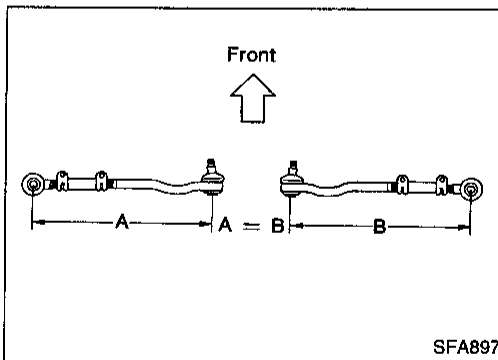
2WD

343.9 mm (13.54 in)

4WD

297.6 mm (11.72 in)

- c. Tighten clamp bolts or lock nuts, then torque them.

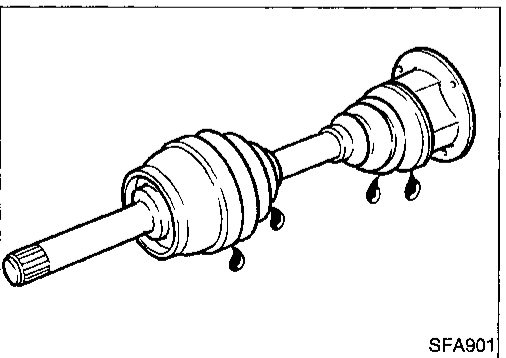
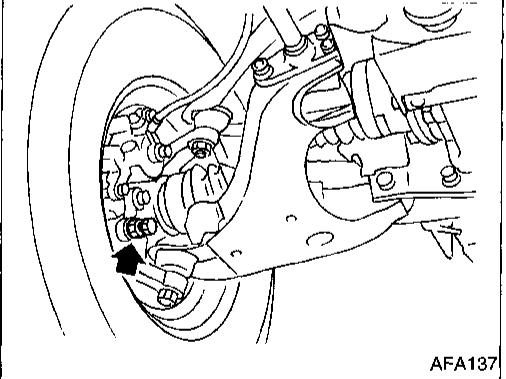
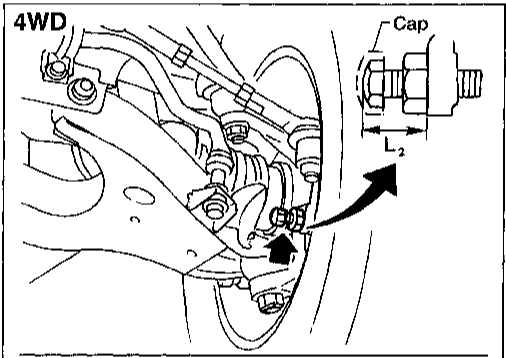
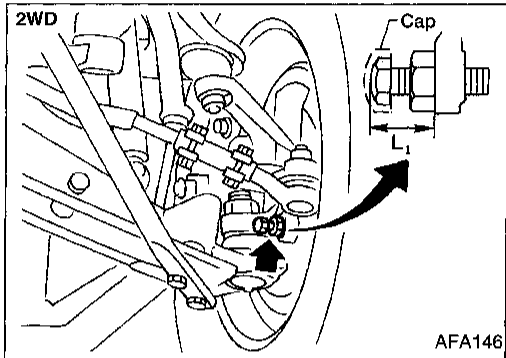
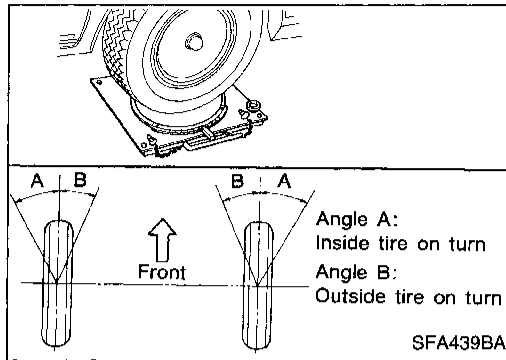


SFA897

ON-VEHICLE SERVICE

Front Wheel Alignment (Cont'd)

FRONT WHEEL TURNING ANGLE



1. Set wheels in straight-ahead position. Then move vehicle forward until front wheels rest properly on turning radius gauge.
 2. Rotate steering wheel all the way right and left; measure turning angle.
- On power steering models, turn steering wheel to full lock and apply force (at circumference of steering wheel) of 98 to 147 N (10 to 15 kg, 22 to 33 lb) with engine at idle.
 - **Do not hold the steering wheel at full lock for more than 15 seconds.**

Wheel turning angle (Full turn):

Refer to SDS, FA-37.

3. Adjust stopper bolt if necessary.

Standard length "L₁" (2WD):

20 mm (0.79 in)

(Length before cap is mounted)

Standard length "L₂" (4WD):

Except P265/70R15 tire:

26.5 mm (1.043 in)

(Length before cap is mounted)

P265/70R15 tire:

30.0 mm (1.2 in)

(Length before cap is mounted)

Drive Shaft

- Check for grease leakage and damage.

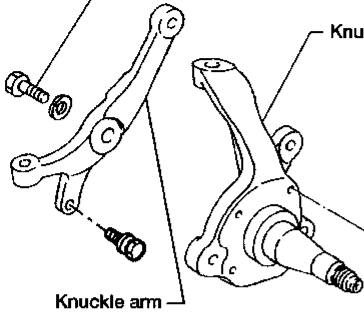
GI
MA
EM
LC
EC
FE
CL
MT
AT
TF
PD
FA
RA
BR
ST
RS
BT
HA
EL
IDX

FRONT AXLE

2WD

SEC. 400

72 - 97 (7.3 - 9.9, 53 - 72)



Knuckle spindle 78 - 147 (8.0 - 15.0, 58 - 108)
To upper ball joint

118 - 191 (12.0 - 19.5, 87 - 141)
To lower ball joint

72 - 97 (7.3 - 9.9, 53 - 72)
To knuckle arm

3.1 - 4.3 (0.32 - 0.44, 27.7 - 38.2)

Knuckle arm

Baffle plate

Rotor disc

Grease seal

ABS sensor rotor

Inner wheel bearing

Wheel hub

Outer wheel bearing

Washer

49 - 69 (5 - 7, 36 - 51)

Front

Wheel bearing lock nut

Wheel bearing lock nut cap

Cotter pin

Wheel hub cap

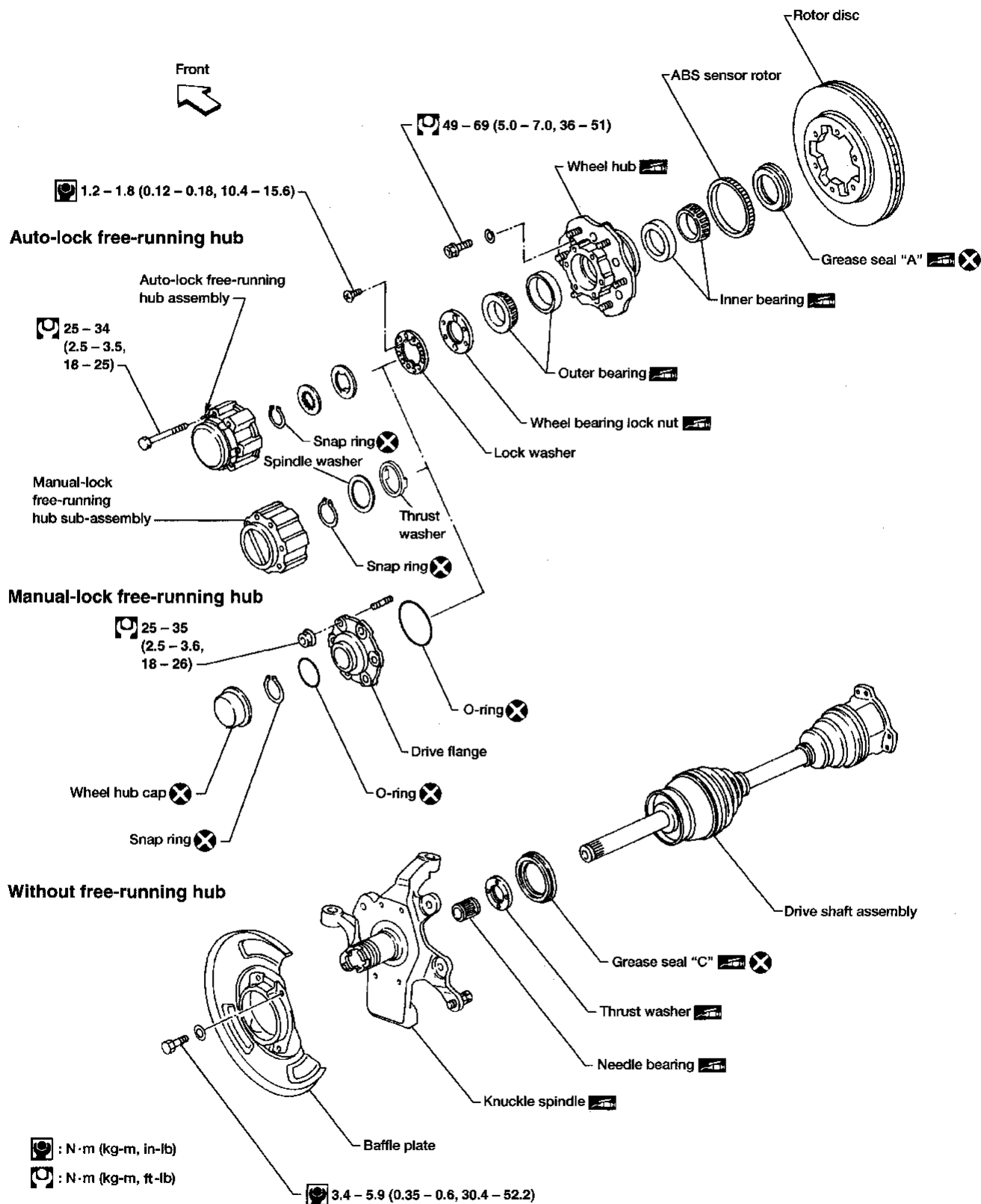
: N·m (kg-m, in-lb)

: N·m (kg-m, ft-lb)

AFA145

FRONT AXLE

4WD
SEC. 391 • 400



[Torque symbol] : N·m (kg-m, in-lb)

[Torque symbol] : N·m (kg-m, ft-lb)

GI
MA
EM
LC
EC
FE
CL
MT
AT
TF
PD
FA
RA
BR
ST
RS
BT
HA
EL
IDX

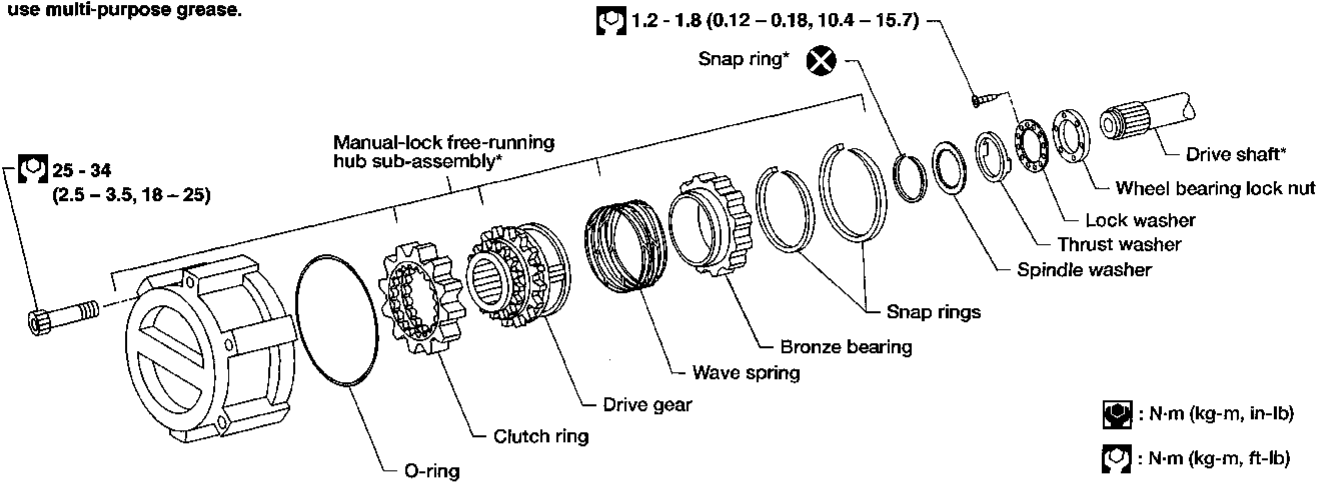
FRONT AXLE

Manual-lock Free-running Hub — 4WD —

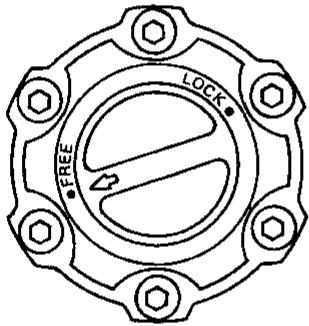
SEC. 400

*: Lubricating parts

When installing manual-lock free-running hub, use multi-purpose grease.



AFA154



REMOVAL AND INSTALLATION

1. Set knob of manual-lock free-running hub in the FREE position.
2. Remove manual-lock free-running hub.
3. When installing manual-lock free-running hub, make sure the hub is in the FREE position.

Apply multi-purpose grease to the parts shown in the above illustration.

4. Check operation of manual-lock free-running hub after installation.

INSPECTION

- Check that the knob moves smoothly and freely.
- Check that the clutch moves smoothly in the body.

FRONT AXLE

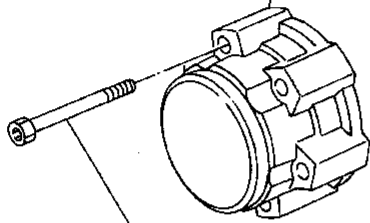
Auto-lock Free-running Hub — 4WD —

SEC. 400

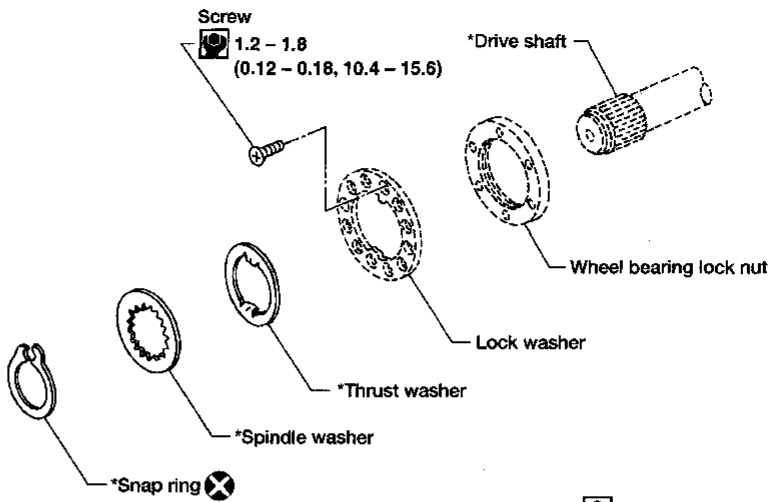
* : Lubricating parts

When installing auto-lock free-running hub, use NISSAN GENUINE GREASE (KRC 19-00025) or equivalent grease.

Auto-lock free-running hub assembly



25 - 34 (2.5 - 3.5, 18 - 25)



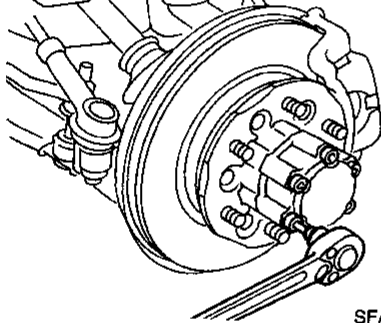
: N·m (kg-m, in-lb)

: N·m (kg-m, ft-lb)

AFA142

REMOVAL AND INSTALLATION

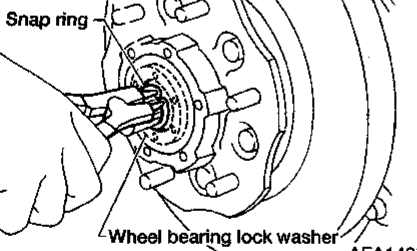
1. Set auto-lock free-running hub in the FREE position.
2. Remove auto-lock free-running hub.



SFA828B

3. Remove snap ring.
4. Remove spindle washer and thrust washer.
5. After installing auto-lock free-running hub, check operation.

When installing it, apply recommended grease to the parts shown in the above illustration.



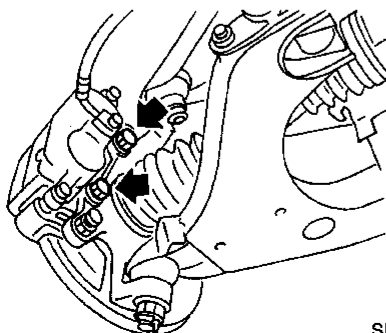
AFA143

Wheel Hub and Rotor Disc

REMOVAL AND INSTALLATION

1. Remove free-running hub assembly. — 4WD —
Refer to "Auto-lock Free-running Hub — 4WD —", FA-17, or "Manual-lock Free-running Hub — 4WD —", FA-16.
2. Remove brake caliper assembly without disconnecting hydraulic line.

Be careful not to depress brake pedal, or piston will pop out. Make sure brake hose is not twisted.



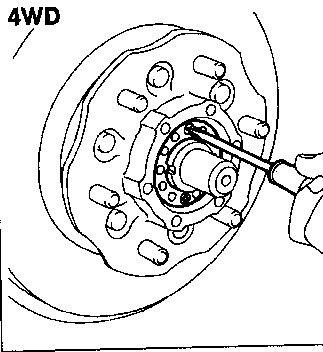
SFA825B

GI
MA
EM
LC
EC
FE
CL
MT
AT
TF
PD
FA
RA
BR
ST
RS
BT
HA
EL
IDX

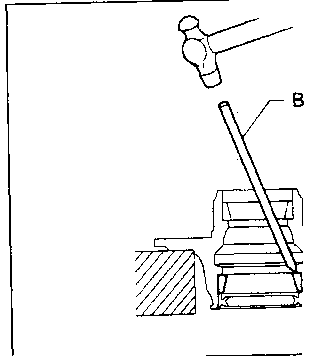
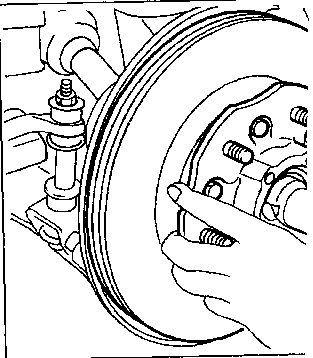
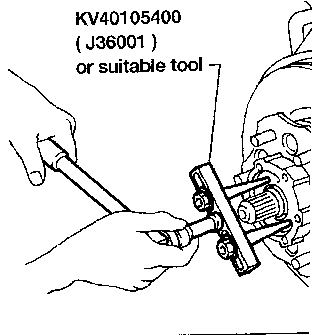
FRONT AXLE

Manual-lock Free-running Hub

4WD



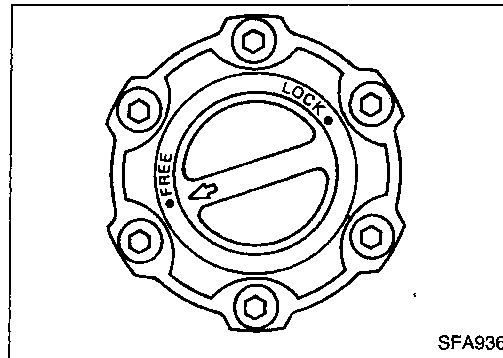
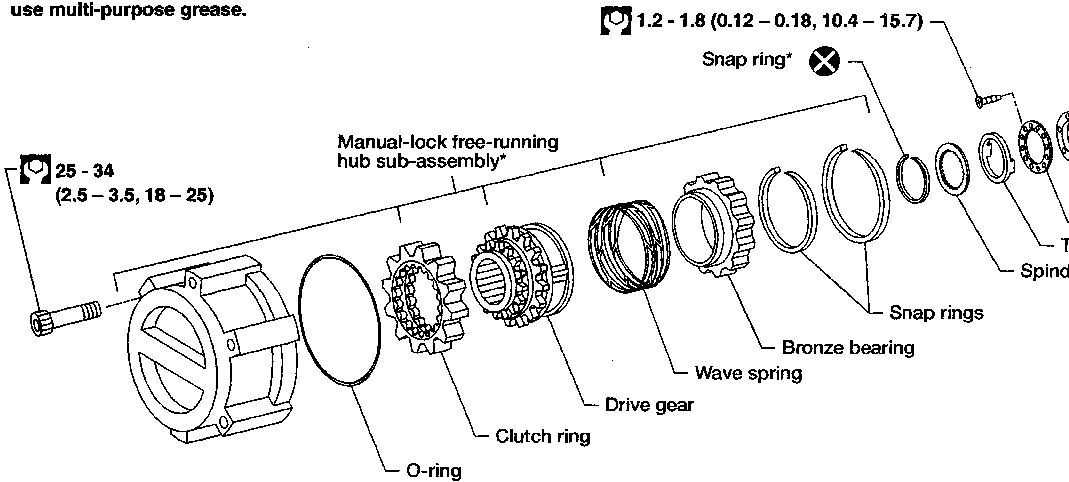
KV40105400
(J36001)
or suitable tool



SEC. 400

*: Lubricating parts

When installing manual-lock free-running hub,
use multi-purpose grease.



REMOVAL AND INSTALLATION

1. Set knob of manual-lock free-running hub to FREE position.
2. Remove manual-lock free-running hub.
3. When installing manual-lock free-running hub is in the FREE position.

Apply multi-purpose grease to the parts illustrated.

4. Check operation of manual-lock free-running hub after installation.

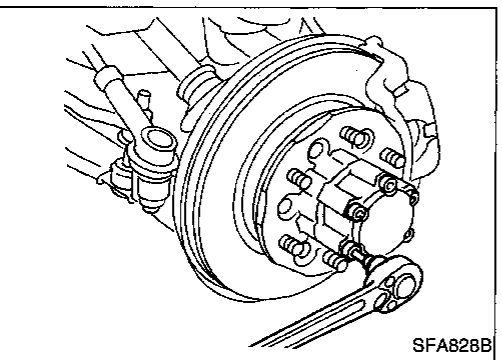
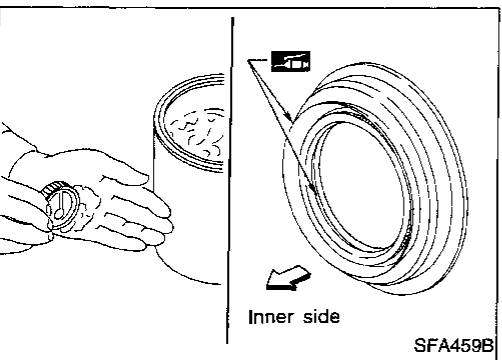
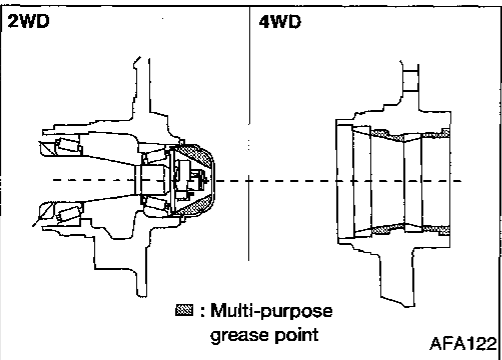
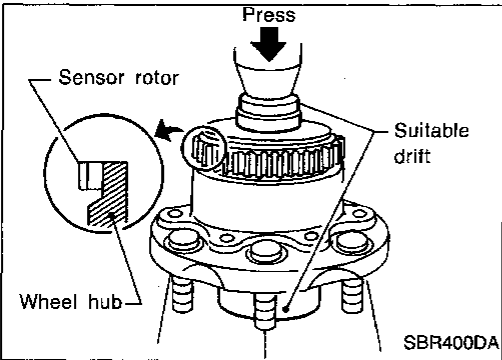
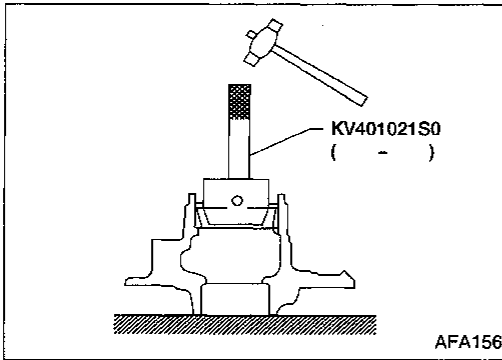
INSPECTION

- Check that the knob moves smoothly and returns to FREE position.
- Check that the clutch moves smoothly in both directions.

FRONT AXLE

Wheel Hub and Rotor Disc (Cont'd)

ASSEMBLY



1. Install bearing outer race with Tool until it seats in hub.

2. Install the sensor rotor using suitable drift and press. (Models with ABS)
Always replace sensor rotor with new one.
Pay attention to the direction of front sensor rotor as shown in figure.

3. Pack multi-purpose grease in wheel hub and hub cap.

4. Apply multi-purpose grease to each bearing cone.
5. Pack grease seal lip with multi-purpose grease, then install it into wheel hub with suitable drift.

Knuckle Spindle

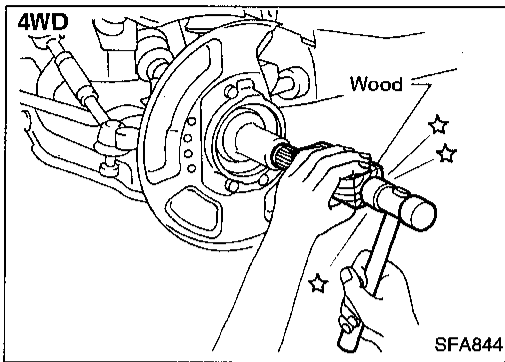
REMOVAL

1. Remove free-running hub assembly. — 4WD —
Refer to "Auto-lock Free-running Hub — 4WD —", FA-17, or "Manual-lock Free-running Hub — 4WD —", FA-16.
2. Remove wheel hub and rotor disc.
Refer to "Wheel Hub and Rotor Disc", FA-17.

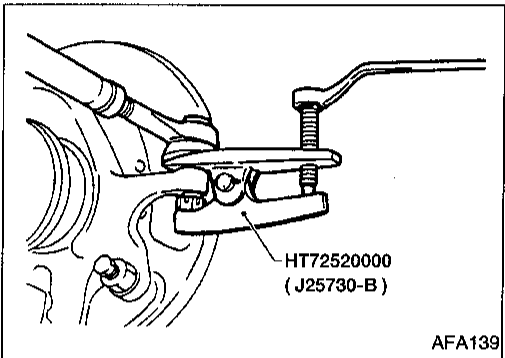
GI
MA
EM
LC
EC
FE
CL
MT
AT
TF
PD
FA
RA
BR
ST
RS
BT
HA
EL
IDX
903

FRONT AXLE

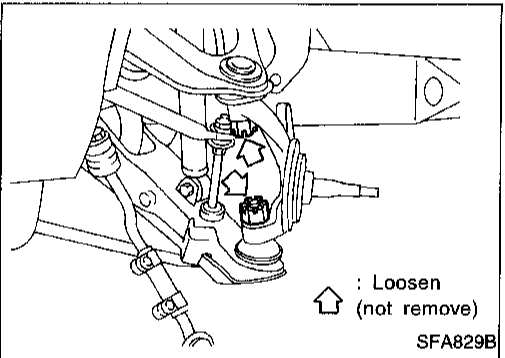
Knuckle Spindle (Cont'd)



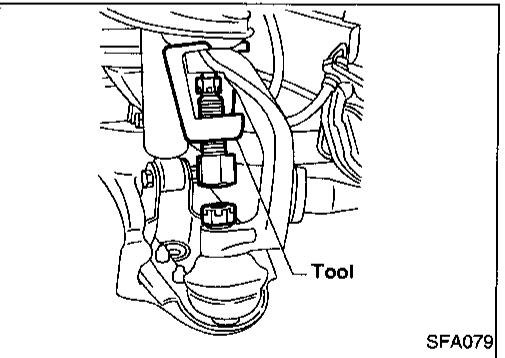
3. Separate drive shaft from knuckle spindle by slightly tapping drive shaft end. — 4WD —



4. Separate tie-rod from knuckle spindle with Tool.
Install stud nut conversely on stud bolt so as not to damage stud bolt.



5. Separate knuckle spindle from ball joints.
a. Loosen (do not remove) upper and lower ball joint tightening nuts.



- b. Separate knuckle spindle from upper and lower ball joint studs with Tool.

During above operation, never remove ball joint nuts which are loosened in step (a) above.

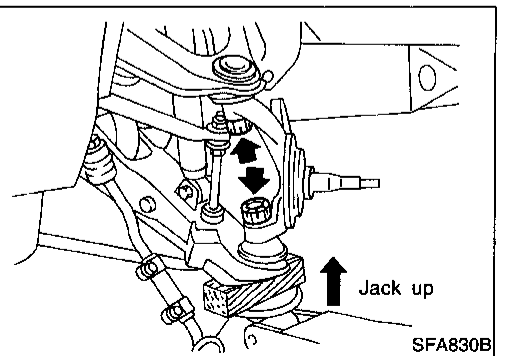
Tool:

2WD

ST29020001 (J24319-01)

4WD

HT72520000 (J25730-B)



- c. Remove ball joint tightening nuts.

Support lower link with jack.

- d. Remove knuckle spindle from upper and lower links.

INSPECTION

Knuckle spindle

- Check knuckle spindle for deformation, cracks and other damage by using a magnetic exploration or dyeing test.

FRONT AXLE

Knuckle Spindle (Cont'd)

Bearing spacer — 2WD —

- Check bearing spacer for damage.

Needle bearing — 4WD —

- Check needle bearing for wear, scratches, pitting, flaking and burn marks.

GI

MA

EM

LC

EC

FE

CL

MT

AT

TF

PD

FA

RA

BR

ST

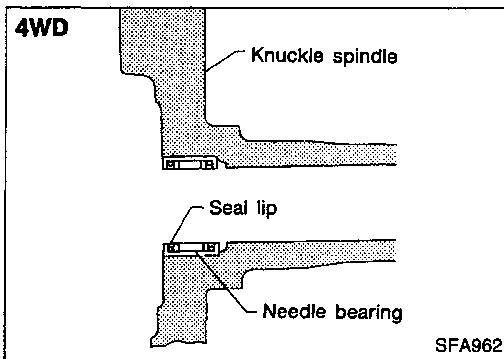
RS

BT

HA

EL

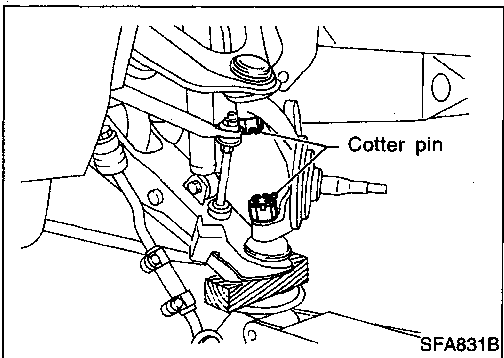
IDX



INSTALLATION

1. Install needle bearing into knuckle spindle. — 4WD —

Make sure that needle bearing is facing in the proper direction. Apply multi-purpose grease.

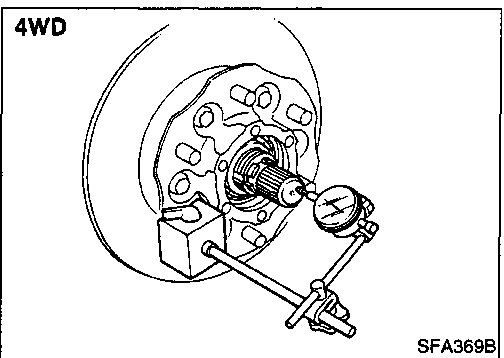


2. Install knuckle spindle to upper and lower ball joints with lower link jacked up.

CAUTION:

Make sure that oil and grease do not come into contact with tapered areas of ball joint, knuckle spindle and threads of ball joint.

3. Connect tie-rod to knuckle spindle.



4. After installing knuckle spindle, adjust wheel bearing preload. Refer to "PRELOAD ADJUSTMENT", "Front Wheel Bearing", "ON-VEHICLE SERVICE", FA-7.

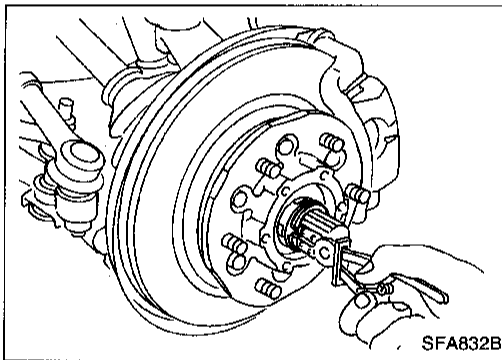
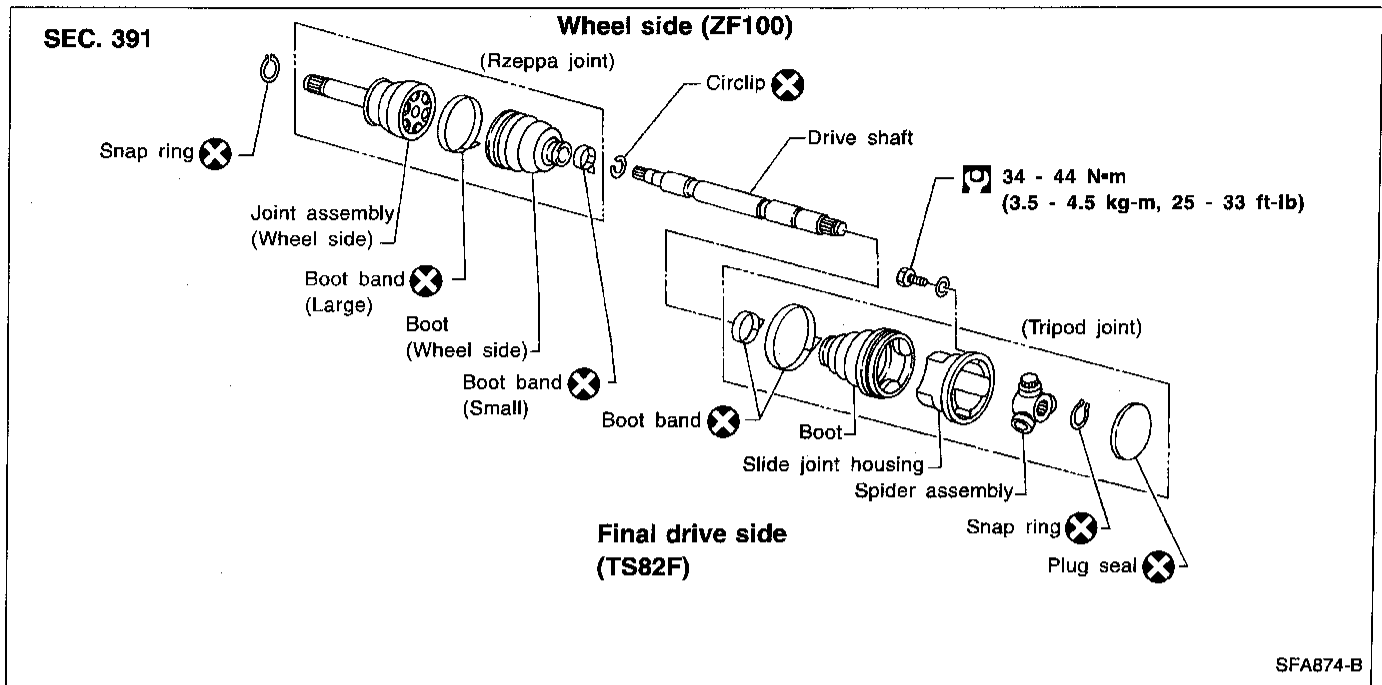
5. After installing drive shaft, check drive shaft axial end play.

Do not reuse snap ring once it has been removed.

Refer to "Drive Shaft — 4WD —", FA-22.

FRONT AXLE

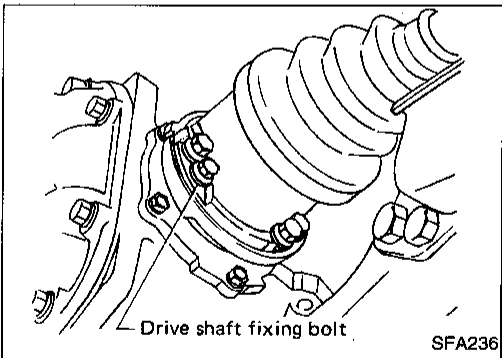
Drive Shaft — 4WD —



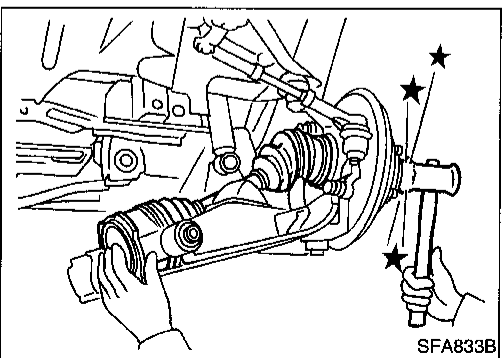
REMOVAL

1. Remove free-running hub or drive flange and snap ring. Refer to "Auto-lock Free-running Hub — 4WD —", FA-17, or "Manual-lock Free-running Hub — 4WD —", FA-16.
2. Remove torsion bar spring. Refer to "Torsion Bar Spring", "FRONT SUSPENSION", FA-29.
3. Remove shock absorber lower fixing bolt.
4. Remove lower link, fixing bolts.

Support lower link with jack.



5. Remove bolts fixing drive shaft to final drive.



6. Separate drive shaft from knuckle spindle by slightly tapping end of drive shaft.

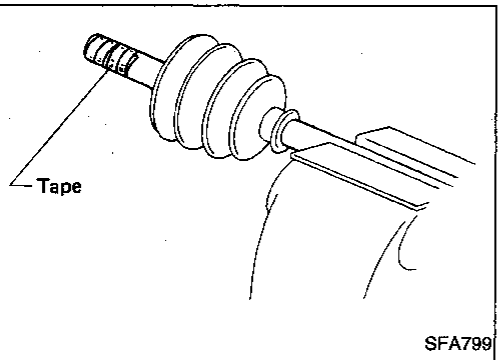
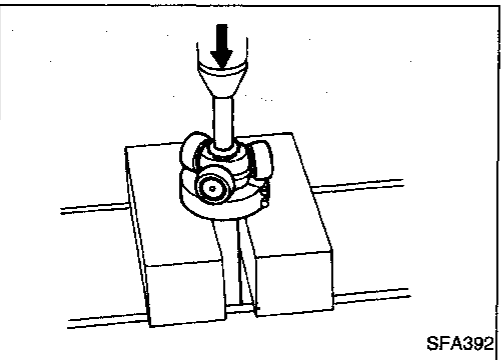
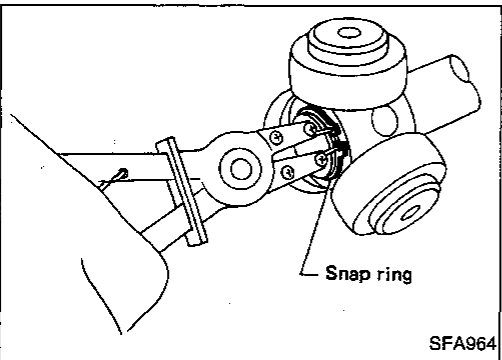
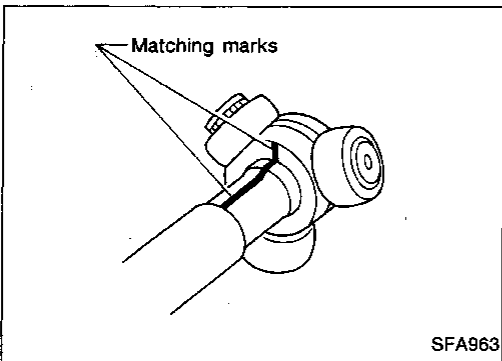
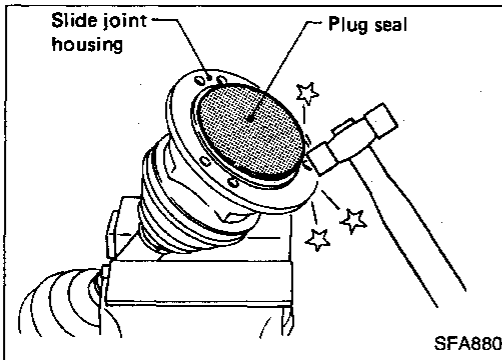
FRONT AXLE

Drive Shaft — 4WD — (Cont'd)

DISASSEMBLY

Final drive side (TS82F)

1. Remove plug seal from slide joint housing by lightly tapping around slide joint housing.
2. Remove boot bands.



3. Move boot and slide joint housing toward wheel side, and put matching marks.

4. Remove snap ring.

5. Detach spider assembly with press.

6. Draw out boot.
Cover drive shaft serration with tape to prevent damaging the boot.

GI

MA

EM

LC

EC

FE

CL

MT

AT

TF

PD

FA

RA

BR

ST

RS

BT

HA

EL

IDX

FRONT AXLE

Drive Shaft — 4WD — (Cont'd)

Wheel side (ZF100)

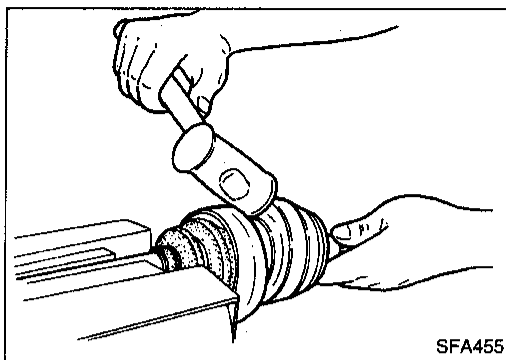
CAUTION:

The joint on the wheel side cannot be disassembled.

- Before separating joint assembly, put matching marks on drive shaft and joint assembly.
- Separate joint assembly with suitable tool.

Be careful not to damage threads on drive shaft.

- Remove boot bands.



INSPECTION

Thoroughly clean all parts in cleaning solvent, and dry with compressed air. Check parts for evidence of deformation and other damage.

Drive shaft

Replace drive shaft if it is twisted or cracked.

Boot

Check boot for fatigue, cracks and wear. Replace boot with new boot bands.

Joint assembly (Final drive side)

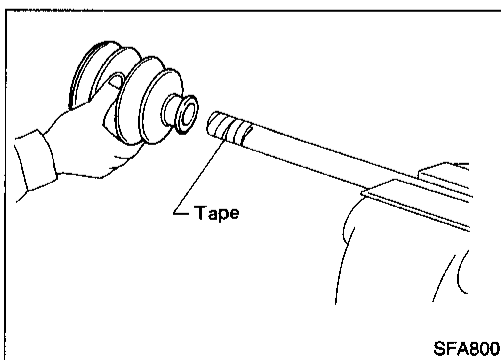
- Replace any parts of double offset joint which show signs of scorching, rust, wear or excessive play.
- Check serration for deformation. Replace if necessary.
- Check slide joint housing for any damage. Replace if necessary.

Joint assembly (Wheel side)

Replace joint assembly if it is deformed or damaged.

ASSEMBLY

- After drive shaft has been assembled, ensure that it moves smoothly over its entire range without binding.
- Use **NISSAN GENUINE GREASE** or equivalent after every overhaul.



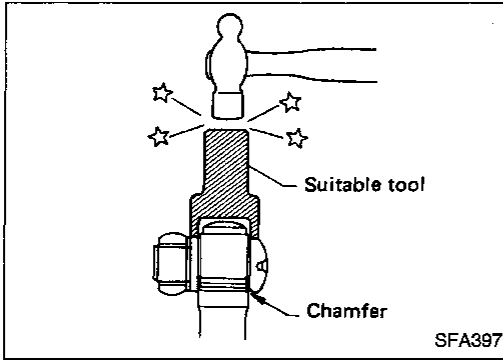
Final drive side (TS82F)

1. Install new small boot band, boot and side joint housing to drive shaft.

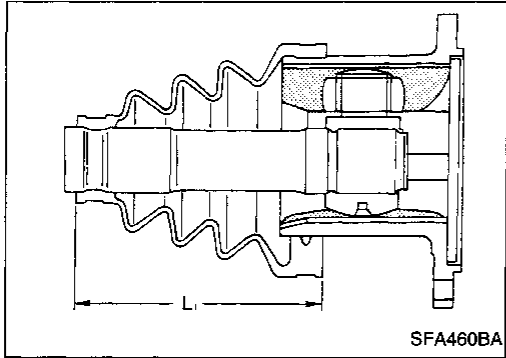
Cover drive shaft serration with tape to prevent damaging boot during installation.

FRONT AXLE

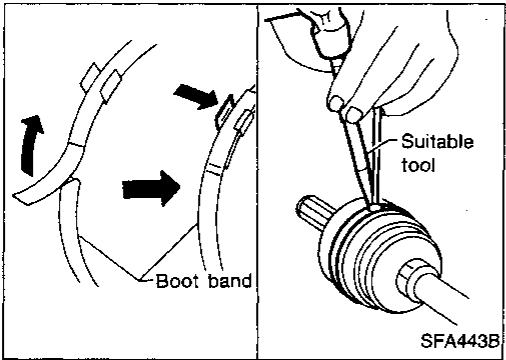
Drive Shaft — 4WD — (Cont'd)



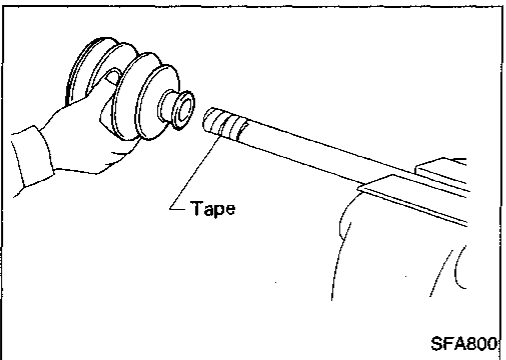
2. Install spider assembly securely, making sure marks are properly aligned.
- **Press-fit with spider assembly serration chamfer facing shaft.**
3. Install new snap ring.



4. Pack with grease.
Specified amount of grease:
95 - 105 g (3.35 - 3.70 oz)
5. Make sure that the boot is properly installed on the drive shaft groove. Set the boot so that it does not swell or deform when its length is "L₁".
Length "L₁": 95 - 97 mm (3.74 - 3.82 in)

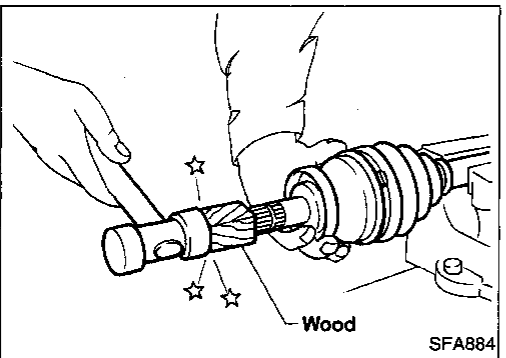


6. Lock new large boot band securely with a suitable tool, then lock new small boot band.
7. Install new plug seal to slide joint housing by lightly tapping it.
Apply sealant to mating surface of plug seal.



Wheel side (ZF100)

1. Install new small boot band and boot on drive shaft.
Cover drive shaft serration with tape to prevent damaging boot during installation.

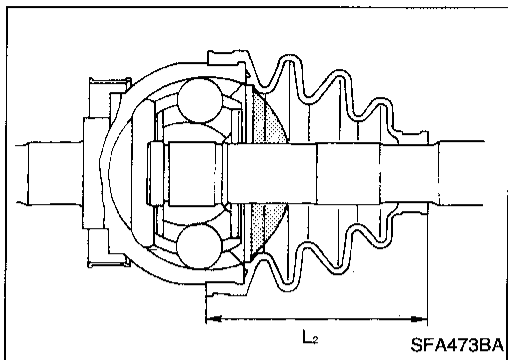


2. Set joint assembly onto drive shaft by lightly tapping it. Install joint assembly securely, ensuring that marks which were made during disassembly are properly aligned.

GI
MA
EM
LC
EC
FE
CL
MT
AT
TF
PD
FA
RA
BR
ST
RS
BT
HA
EL
IDX

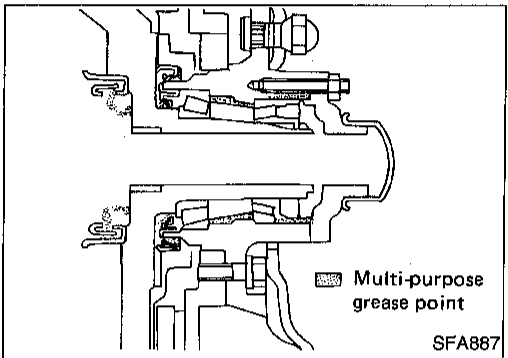
FRONT AXLE

Drive Shaft — 4WD — (Cont'd)

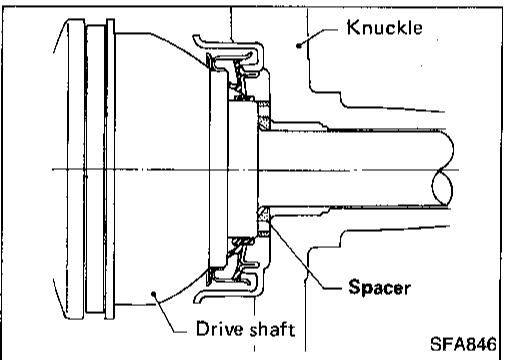


3. Pack drive shaft with specified amount of grease.
Specified amount of grease:
135 - 145 g (4.76 - 5.11 oz)
4. Make sure that the boot is properly installed on the drive shaft groove. Set the boot so that it does not swell or deform when its length is "L₂".
Length "L₂": 96 - 98 mm (3.78 - 3.86 in)
5. Lock new large boot band securely with a suitable tool.
6. Lock new small boot band.

INSTALLATION



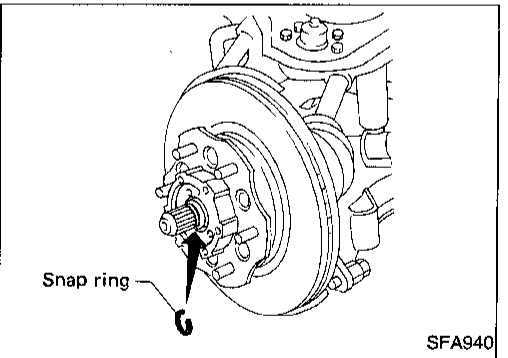
1. Apply multi-purpose grease.



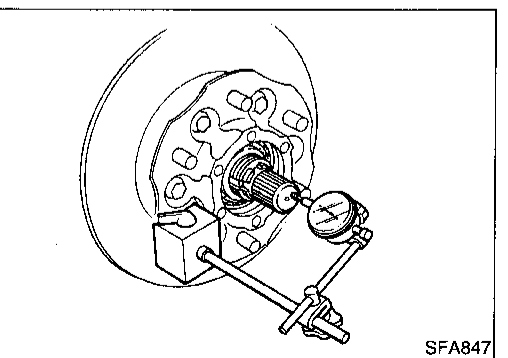
2. Install bearing spacer onto drive shaft.

Make sure that the bearing spacer is facing in the proper direction.

3. After installing wheel hub and wheel bearing, adjust wheel bearing preload. Refer to "PRELOAD ADJUSTMENT", "Front Wheel Bearing", "ON-VEHICLE SERVICE", FA-7.



4. When installing drive shaft, adjust drive shaft axial end play by selecting a suitable snap ring.
 - a. Temporarily install new snap ring on drive shaft in the same thickness as it was installed before removal.



- b. Set dial gauge on drive shaft end.
- c. Measure axial end play of drive shaft.
Axial end play:
0.45 mm (0.0177 in) or less
- d. If axial end play is not within the specified limit, select another snap ring.

1.1 mm (0.043 in)

1.3 mm (0.051 in)

1.5 mm (0.059 in)

1.7 mm (0.067 in)

1.9 mm (0.075 in)

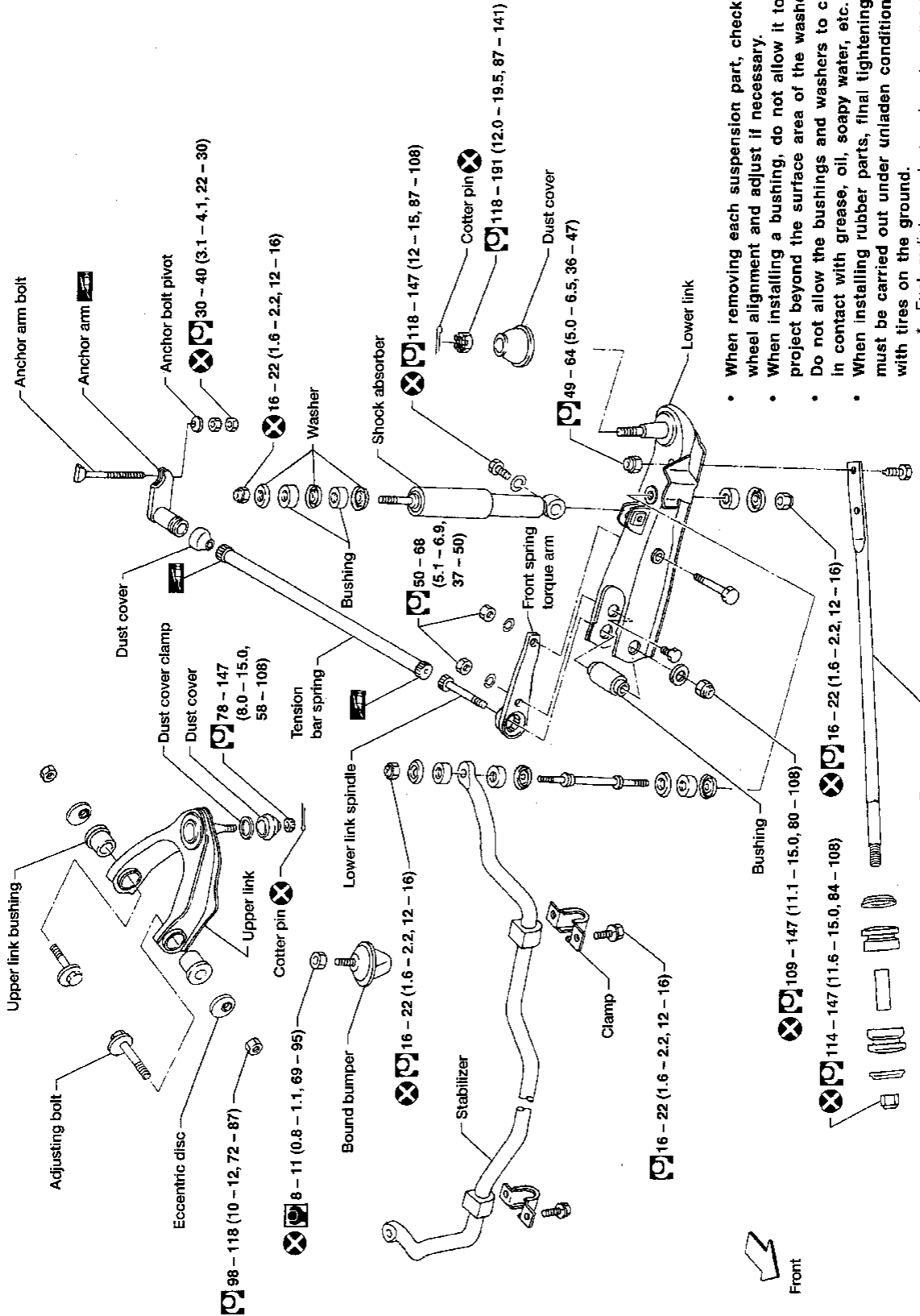
2.1 mm (0.083 in)

2.3 mm (0.091 in)

FRONT SUSPENSION

2WD

SEC. 400



- When removing each suspension part, check wheel alignment and adjust if necessary.
 - When installing a bushing, do not allow it to project beyond the surface area of the washer.
 - Do not allow the bushings and washers to come in contact with grease, oil, soapy water, etc.
 - When installing rubber parts, final tightening must 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 positions.
- When removing or installing brake tubes, use flare nut torque wrench.

: N·m (kg-m, in-lb)

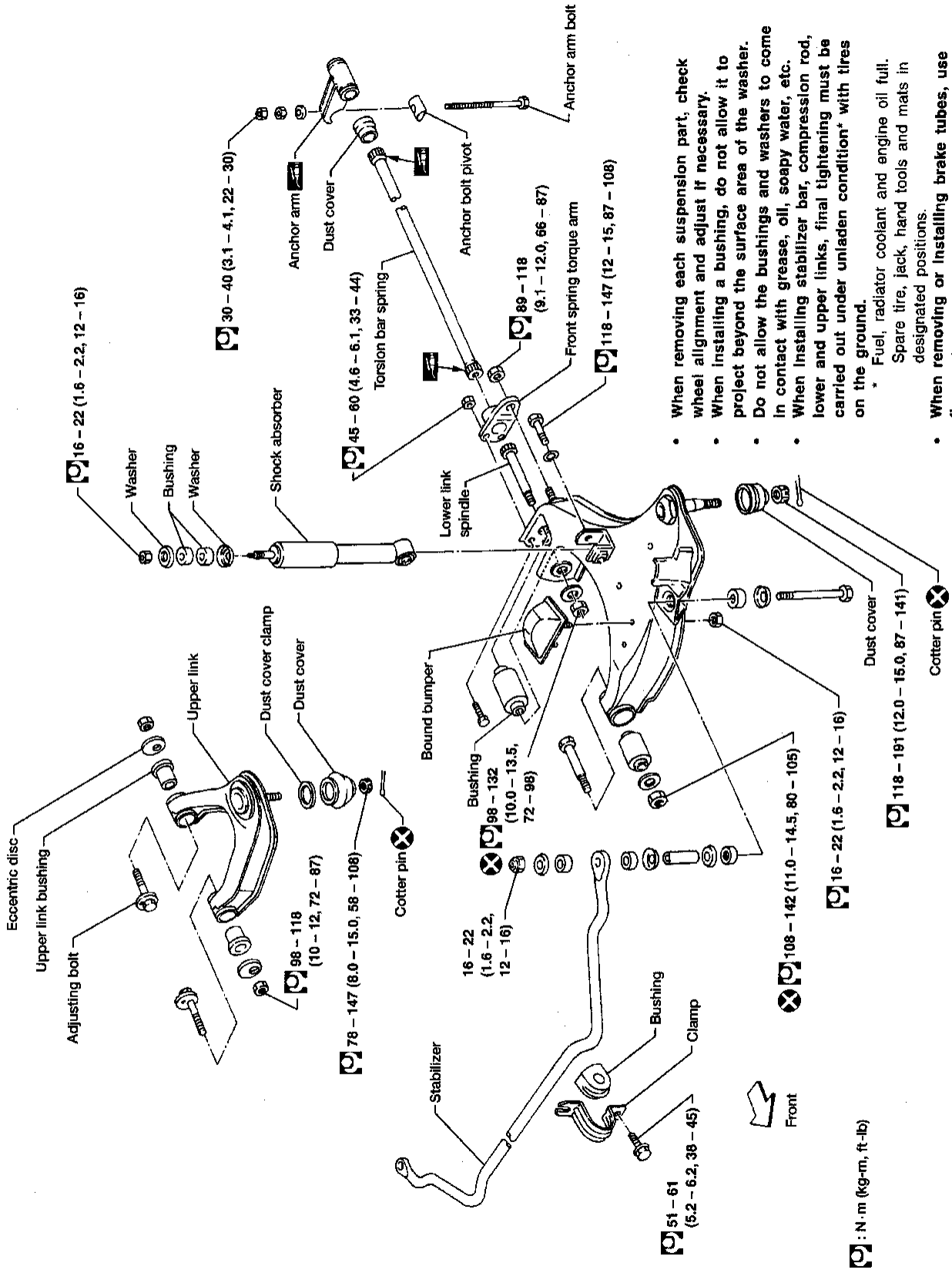
: N·m (kg-m, ft-lb)

GI
MA
EM
LC
EC
FE
CL
MT
AT
TF
PD
FA
RA
BR
ST
RS
BT
HA
EL
IDX

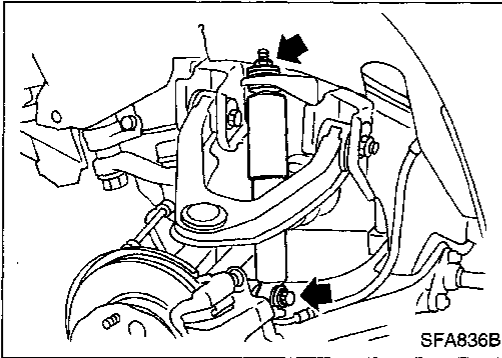
FRONT SUSPENSION

4WD

SEC. 401



FRONT SUSPENSION



Shock Absorber

REMOVAL AND INSTALLATION

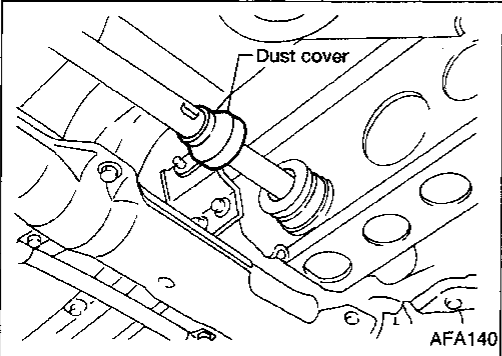
1. Support lower link with jack.
2. Remove bolt and nut that hold shock absorber.

INSPECTION

Except for nonmetallic parts, clean all parts with suitable solvent and dry with compressed air.

Use compressed air to blow dirt and dust off of nonmetallic parts.

- Check for oil leakage and cracks. Replace if necessary.
- Check piston rod for cracks, deformation and other damage. Replace if necessary.
- Check rubber parts for wear, cracks, damage and deformation. Replace if necessary.



Torsion Bar Spring

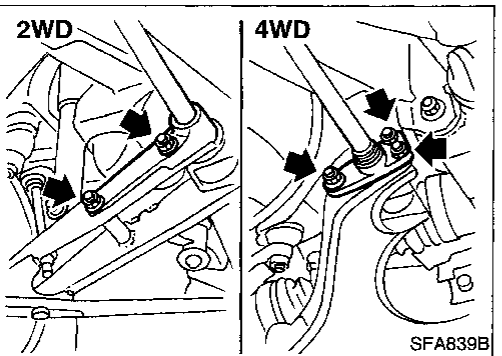
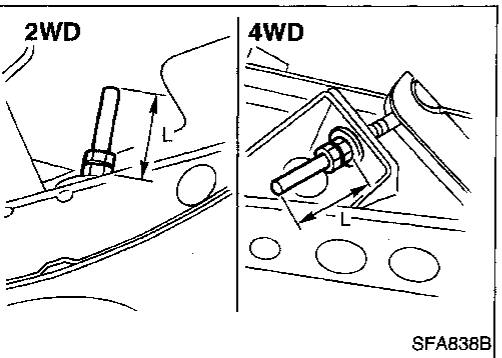
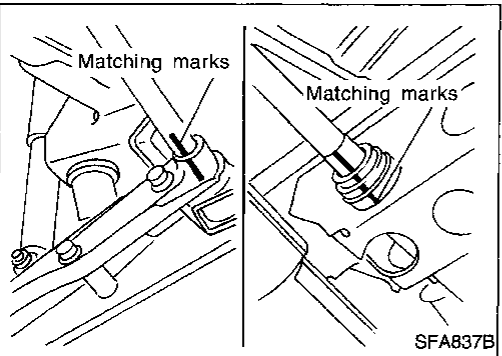
REMOVAL

1. Move dust cover.
2. Paint matching marks on the torsion bar spring and the corresponding arm.

Always use paint to place the matching mark; do not scribe the affected parts.

3. Measure anchor bolt protrusion "L" and remove the lock nut and adjusting nut.

Before removing the nuts, ensure that twisting force is eliminated from the torsion bar springs.



4. Remove torsion bar spring.
 - Pull out anchor arm rearward, then withdraw torsion bar spring rearward. — 2WD —
 - Remove torque arm. — 2WD —
 - Remove torque arm fixing nuts, then withdraw torsion bar spring forward with torque arm. — 4WD —

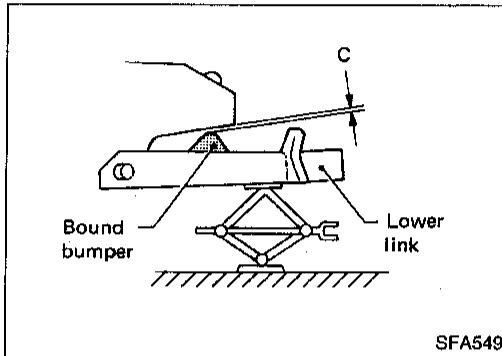
GI
MA
EM
LC
EC
FE
CL
MT
AT
TF
PD
FA
RA
BR
ST
RS
BT
HA
EL
IDX

FRONT SUSPENSION

Torsion Bar Spring (Cont'd)

INSPECTION

- Check torsion bar spring for wear, twist, bend and other damage.
- Check serrations of each part for cracks, wear, twist and other damage.
- Check dust cover for cracks.



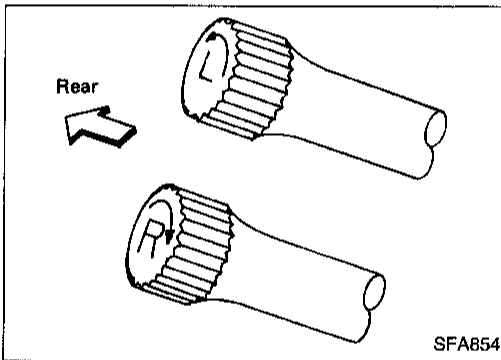
INSTALLATION AND ADJUSTMENT

Adjustment of anchor arm adjusting nut is in tightening direction only.

Do not adjust by loosening anchor arm adjusting nut.

1. Install torque arm to lower link. — 2WD —
2. Coat multi-purpose grease on the serration of torsion bar spring.
3. Place lower link in the position where bound bumper clearance "C" is 0.

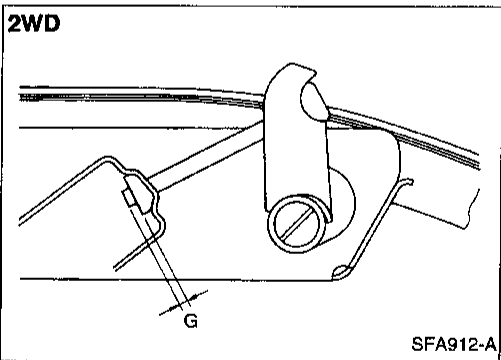
Clearance "C": 0 mm (0 in)



4. Install torsion bar spring. — 2WD —

Install torsion bar spring with torque arm. — 4WD —

Be sure to install right and left torsion bar springs correctly.



5. While aligning the anchor arm with the matching mark, install the anchor arm to the torsion bar spring.
If a new torsion bar spring or anchor arm is installed, adjust anchor arm length to the dimension indicated in the figure at the left.

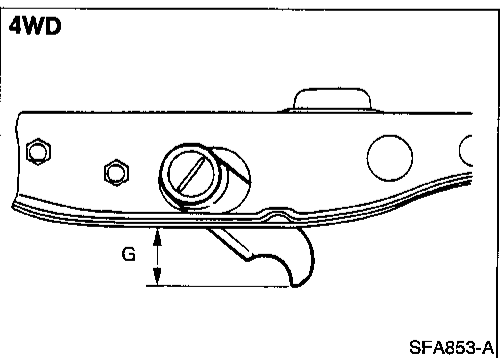
Standard length "G":

2WD

6 - 18 mm (0.24 - 0.71 in)

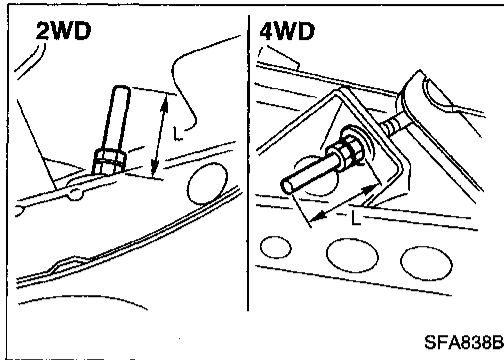
4WD

25 - 39 mm (0.98 - 1.54 in)



FRONT SUSPENSION

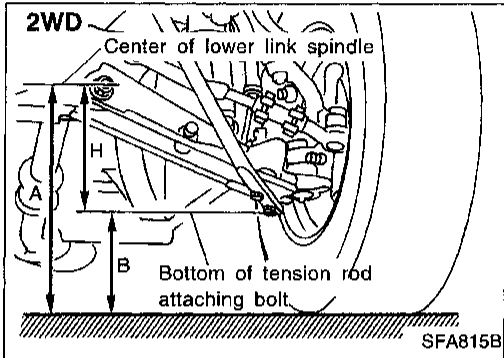
Torsion Bar Spring (Cont'd)



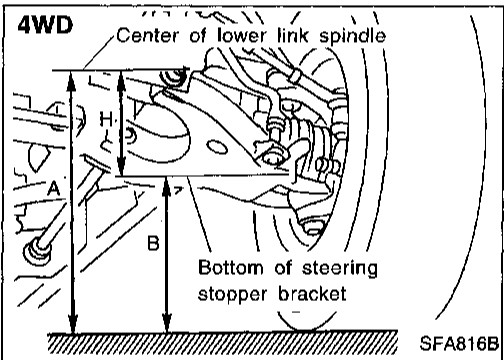
6. Tighten the adjusting nut so the torsion bar length corresponds with dimension "L" previously measured during torsion bar removal. Tighten the lock nut to specifications. If a new torsion bar spring or anchor arm is installed, tighten the adjusting nut to the dimension indicated in the figure at the left, then tighten the lock nut to specifications.

Standard length "L":

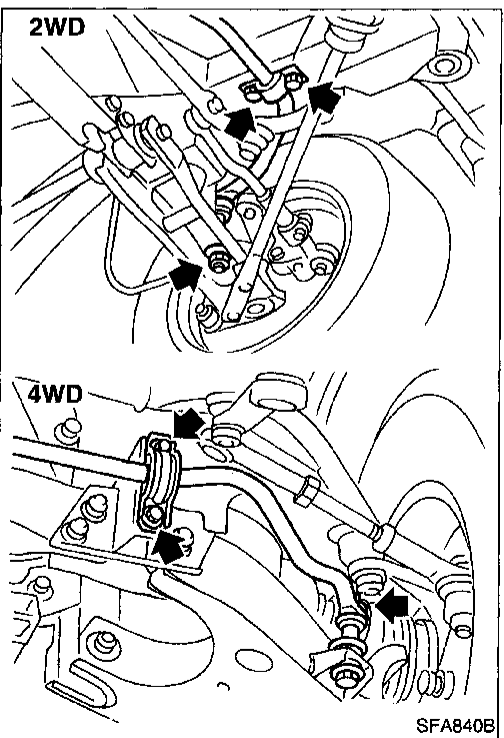
- 2WD**
54 mm (2.13 in)
- 4WD**
70 mm (2.76 in)



7. Bounce vehicle with tires on ground (Unladen) to eliminate friction of suspension.
8. Measure vehicle posture "H".
 - a. Exercise the front suspension by bouncing the front of the vehicle 4 or 5 times to ensure that the vehicle is in a neutral height attitude.
 - b. Measure vehicle posture ... Dimension "H".
 $H = A - B$ mm (in) "Unladen"
Refer to "WHEEL ALIGNMENT (Unladen)", "SDS", FA-37.



9. If height of the vehicle is not within allowable limit, adjust vehicle posture.
Refer to "WHEEL ALIGNMENT (Unladen)", "SDS", FA-37.
10. Check wheel alignment if necessary.
Refer to "WHEEL ALIGNMENT (Unladen)", "SDS", FA-37.



Stabilizer Bar

REMOVAL

- Remove stabilizer bar connecting bolts and clamp bolts.

INSPECTION

- Check stabilizer bar for twist and deformation. Replace if necessary.
- Check rubber bushing for cracks, wear and deterioration. Replace if necessary.

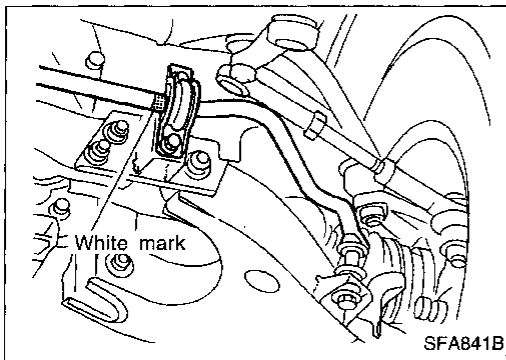
GI
MA
EM
LC
EC
FE
CL
MT
AT
TF
PD
FA
RA
BR
ST
RS
BT
HA
EL
IDX

FRONT SUSPENSION

Stabilizer Bar (Cont'd)

INSTALLATION

- Install bushing outside of white mark painted on stabilizer.



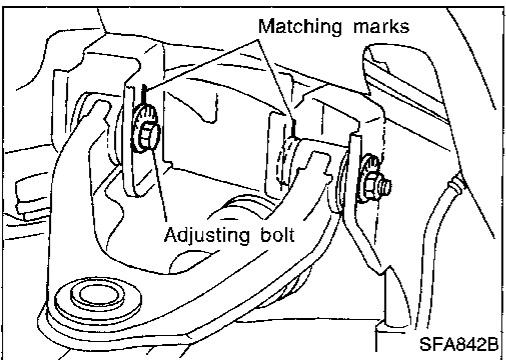
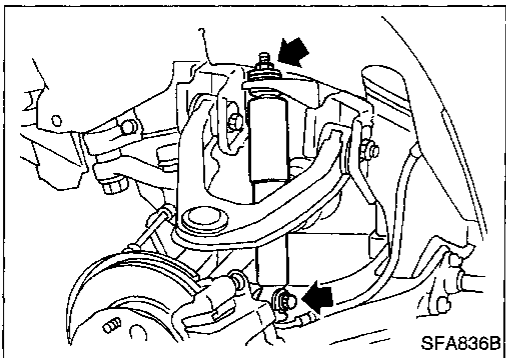
Upper Link

REMOVAL

1. Remove shock absorber. Refer to "Shock Absorber", FA-29.
2. Separate upper ball joint stud from knuckle spindle.

Support lower link with jack.

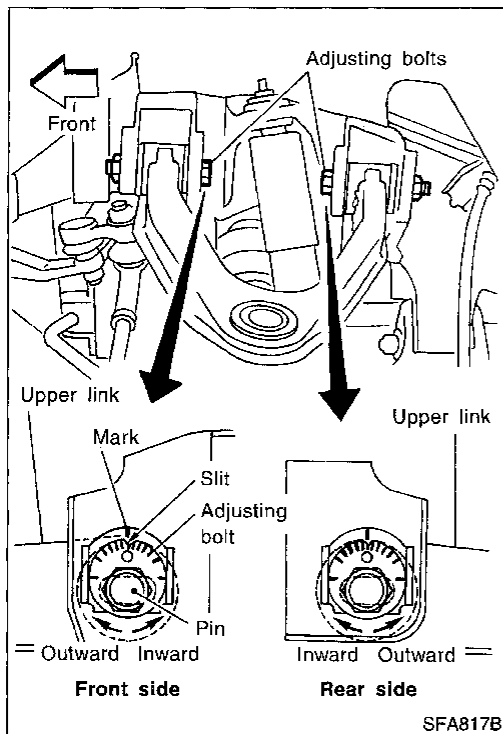
Refer to "Knuckle Spindle", "FRONT AXLE", FA-19.



3. Put matching marks on adjusting bolts and remove adjusting bolts.

INSTALLATION

1. While aligning the adjusting bolts with the matching marks, install the upper link.
If a new upper link or any other suspension part is installed, align the matching mark with the slit as indicated in the figure at the left, then install the upper link.
Refer to "Front Wheel Alignment", "ON-VEHICLE SERVICE", FA-9.
2. Install shock absorber.
3. Tighten adjusting bolts under unladen condition with tires on ground.
4. After installing, check wheel alignment. Adjust if necessary.
Refer to FA-9.



FRONT SUSPENSION

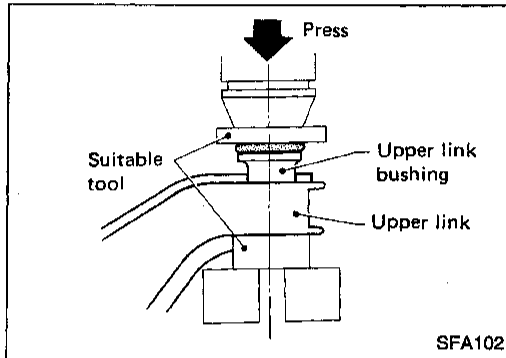
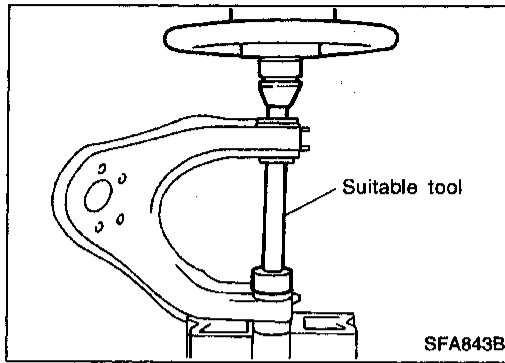
Upper Link (Cont'd)

DISASSEMBLY

- Press out upper link bushings.

INSPECTION

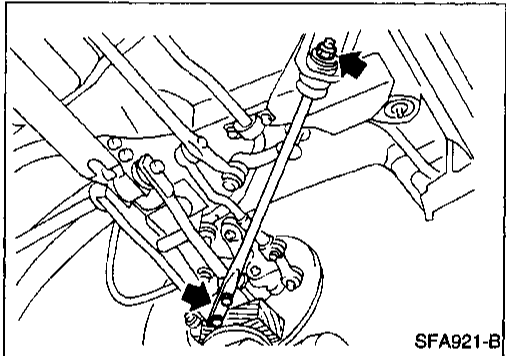
- Check adjusting bolts and rubber bushings for damage. Replace if necessary.
- Check upper link for deformation and cracks. Replace if necessary.



ASSEMBLY

1. Apply soapsuds to rubber bushing.
2. Press upper link bushing.

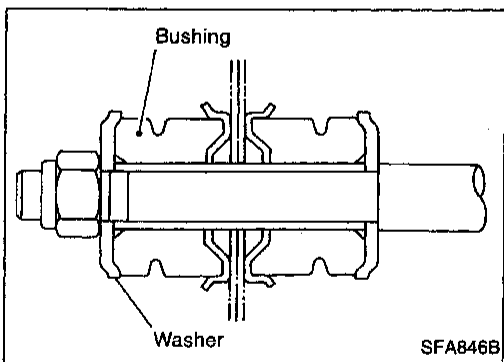
Press bushing so that the flange of bushing securely contacts the end surface of the upper link collar.



Tension Rod

REMOVAL AND INSTALLATION

1. Remove fixing nuts on lower link and frame.
Support lower link with jack.



2. Install tension rod.

Make sure that the bushings and washers are installed properly.

INSPECTION

- Check tension rod for deformation and cracks. Replace if necessary.
- Check rubber bushings for damage. Replace if necessary.

FRONT SUSPENSION

Tension Rod (Cont'd)

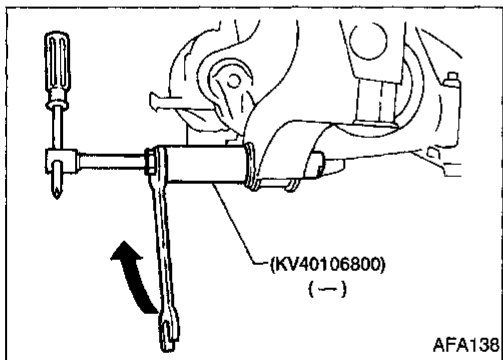
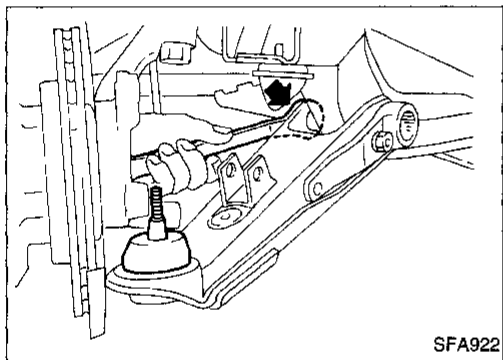
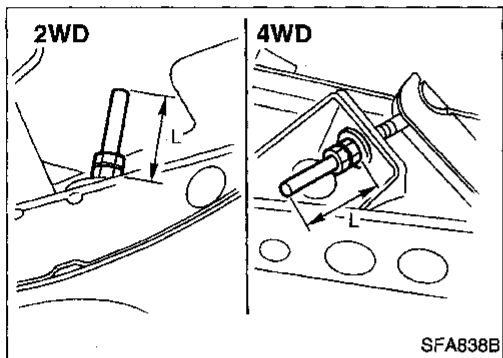
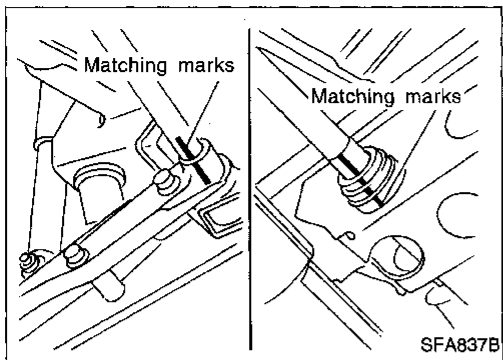
Lower Link

REMOVAL AND INSTALLATION

1. Remove torsion bar spring. Refer to "REMOVAL", "Torsion Bar Spring", FA-29.

Make matching marks and measure dimension "L" when loosening adjusting nut until there is no tension on torsion bar spring.

2. Remove shock absorber lower fixing bolt.
3. Remove stabilizer bar connecting bolt.
4. Separate drive shaft from front final drive. — 4WD —
Refer to "Drive Shaft —4WD —", "FRONT AXLE", FA-22.
5. Separate lower link ball joint from knuckle spindle.
Refer to "Knuckle Spindle", "FRONT AXLE", FA-19.



6. Remove front lower link fixing nut.

7. Remove bushing of lower link spindle from frame with Tool.
8. After installing lower link, adjust wheel alignment and vehicle height. Refer to "Front Wheel Alignment", "ON-VEHICLE SERVICE", FA-9.

INSPECTION

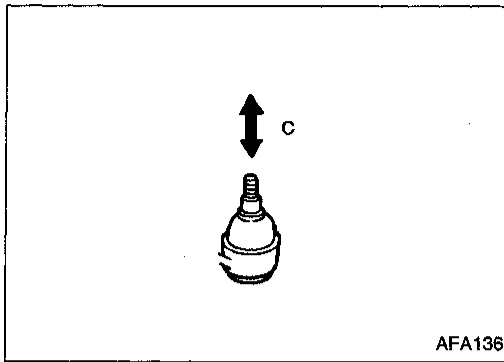
Lower link and lower link spindle

- Check for deformation and cracks. Replace if necessary.

Lower link bushing

- Check for distortion and damage. Replace if necessary.

FRONT SUSPENSION



Upper Ball Joint and Lower Ball Joint

REMOVAL AND INSTALLATION

- Separate knuckle spindle from upper and lower links. Refer to "Knuckle Spindle", "FRONT AXLE", FA-19.

INSPECTION

- Check joints for play. If ball is worn and play in axial direction is excessive or joint is hard to swing, replace as a upper link or lower link.

Axial end play "C":

Upper link

0 mm (0 in)

Lower link

2WD 1.3 mm (0.051 in) or less

4WD 0.2 mm (0.008 in) or less

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

GI

MA

EM

LC

EC

FE

CL

MT

AT

TF

PD

FA

RA

BR

ST

RS

BT

HA

EL

IDX

SERVICE DATA AND SPECIFICATIONS (SDS)

General Specifications

Suspension type	Independent double wishbone torsion bar spring
Shock absorber type	Double-acting hydraulic
Stabilizer	Standard equipment

Inspection and Adjustment

WHEEL BEARING

2WD

Wheel bearing axial end play mm (in)	0 (0)
Wheel bearing lock nut Tightening torque N-m (kg-m, ft-lb)	34 - 39 (3.5 - 4.0, 25 - 29)
Return angle degree	45° - 60°
Wheel bearing starting torque At wheel hub bolt With new grease seal N (kg, lb)	9.8 - 28.4 (1.0 - 2.9, 2.2 - 6.4)
With used grease seal N (kg, lb)	9.8 - 23.5 (1.0 - 2.4, 2.2 - 5.3)

4WD

Wheel bearing lock nut Tightening torque N-m (kg-m, ft-lb)	78 - 98 (8 - 10, 58 - 72)
Retightening torque after loosening wheel bearing lock nut N-m (kg-m, ft-lb)	0.5 - 1.5 (0.05 - 0.15, 0.4 - 1.1)
Axial end play mm (in)	0 (0)
Starting force at wheel hub bolt N (kg, lb)	A
Turning angle degree	15° - 30°
Starting force at wheel hub bolt N (kg, lb)	B
Wheel bearing preload at wheel hub bolt N (kg, lb) B - A	7.06 - 20.99 (0.72 - 2.14, 1.59 - 4.72)

UPPER BALL JOINT

Vertical end play "C" mm (in)	0 (0)
----------------------------------	-------

LOWER BALL JOINT

Applied model	2WD	4WD
Vertical end play "C" mm (in)	1.3 (0.051) or less	0.2 (0.008 in) or less

WHEEL RUNOUT AVERAGE*

Wheel type	Aluminum	Steel		
		15 inches	14 inches	
			Painted	Plated
Radial runout limit mm (in)	0.3 (0.012)	0.8 (0.031)	0.5 (0.020)	0.6 (0.024)
Lateral runout limit mm (in)	0.3 (0.012)	0.8 (0.031)	0.8 (0.031)	0.8 (0.031)

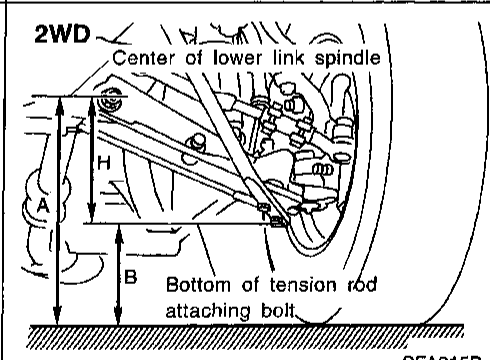
* Wheel runout average = (Outside runout value + Inside runout value) x 0.5

SERVICE DATA AND SPECIFICATIONS (SDS)

Inspection and Adjustment (Cont'd)

WHEEL ALIGNMENT (Unladen*1)

2WD

Camber		Minimum	-0°05' (-0.08°)			
		Nominal	0°25' (0.42°)			
		Maximum	0°55' (0.92°)			
		Left and right difference	45' (0.75°) or less			
	Degree minute (Decimal degree)	Minimum	0°06' (0.10°)			
		Nominal	0°36' (0.60°)			
		Maximum	1°06' (1.10°)			
		Left and right difference	45' (0.75°) or less			
Caster		Minimum	0°06' (0.10°)			
		Nominal	0°36' (0.60°)			
		Maximum	1°06' (1.10°)			
	Degree minute (Decimal degree)	Minimum	8°35' (8.58°)			
		Nominal	9°05' (9.08°)			
		Maximum	9°35' (9.58°)			
Kingpin inclination		Minimum	8°35' (8.58°)			
		Nominal	9°05' (9.08°)			
	Degree minute (Decimal degree)	Maximum	9°35' (9.58°)			
Total toe-in	Distance (A - B) mm (in)	Radial tire	Minimum	2 (0.08)		
			Nominal	3 (0.12)		
			Maximum	4 (0.16)		
	Angle (left plus right)	Degree minute (Decimal degree)	Radial tire	Minimum	10' (0.17°)	
				Nominal	15' (0.25°)	
				Maximum	20' (0.33°)	
Wheel turning angle	Inside	Degree minute (Decimal degree)		Minimum	Except P215/65R15 36°00' (36.00°)	P215/65R15 35°00' (35.00°)
				Nominal	38°00' (38.00°)	37°00' (37.00°)
			Full turn*2	Maximum	38°00' (38.00°)	37°00' (37.00°)
	Outside	Degree minute (Decimal degree)		Minimum	32°36' (32.60°)	31°36' (31.60°)
				Nominal	34°36' (34.60°)	33°36' (33.60°)
			Full turn*2	Maximum	34°36' (34.60°)	33°36' (33.60°)
Vehicle posture						
Lower arm pivot height (H)		mm (in)	111 - 115 (4.37 - 4.53)			
			 <p style="text-align: right;">SFA815B</p>			

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

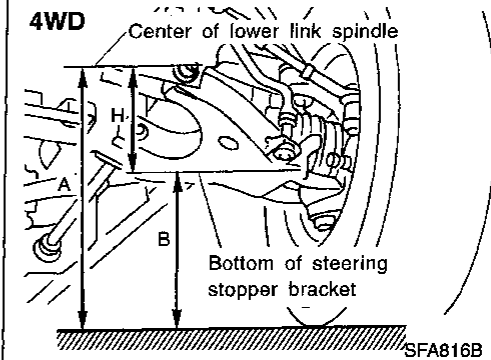
*2: On power steering models, wheel turning force (at circumference of steering wheel) of 98 to 147 N (10 to 15 kg, 22 to 33 lb) with engine idle.

SERVICE DATA AND SPECIFICATIONS (SDS)

Inspection and Adjustment (Cont'd)

4WD

Camber		Minimum	0°06' (0.10°)					
		Nominal	0°36' (0.60°)					
		Maximum	1°06' (1.10°)					
		Left and right difference	45' (0.75°) or less					
Caster		Minimum	1°40' (1.67°)					
		Nominal	2°10' (2.17°)					
		Maximum	2°40' (2.67°)					
		Left and right difference	45' (0.75°) or less					
Kingpin inclination		Minimum	10°18' (10.30°)					
		Nominal	10°48' (10.80°)					
		Maximum	11°18' (11.30°)					
Total toe-in	Distance (A - B)	mm (in)	Radial tire	Minimum	3 (0.12)			
				Nominal	4 (0.16)			
				Maximum	5 (0.20)			
	Angle (left plus right)			Radial tire	Minimum	15' (0.25°)		
					Nominal	20' (0.33°)		
					Maximum	25' (0.42°)		
Wheel turning angle	Full turn*2			Degree minute (Decimal degree)				
							Except P265/70R15	P265/70R15
					Inside	Minimum	33°06' (33.10°)	31°00' (31.00°)
						Nominal	35°06' (35.10°)	33°00' (33.00°)
						Maximum	35°06' (35.10°)	33°00' (33.00°)
					Outside	Minimum	31°12' (31.20°)	29°00' (29.00°)
	Nominal	33°12' (33.20°)	31°00' (31.00°)					
	Maximum	33°12' (33.20°)	31°00' (31.00°)					
	Vehicle posture							
Lower arm pivot height (H)		mm (in)	45.5 - 49.5 (1.791 - 1.949)					



*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.

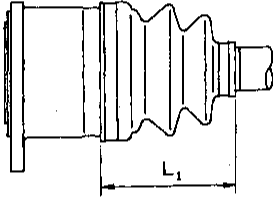
SERVICE DATA AND SPECIFICATIONS (SDS)

Inspection and Adjustment (Cont'd)

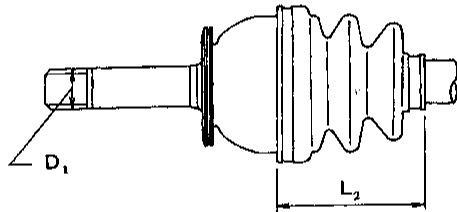
DRIVE SHAFT (4WD)

Drive shaft joint type		
Final drive side		TS82F
Wheel side		ZF100
Fixed joint axial end play limit	mm (in)	1 (0.04)
Diameter	mm (in)	
Wheel side (D ₁)		29.0 (1.142)
Grease		
Quality		Nissan genuine grease or equivalent
Capacity	g (oz)	
Final drive side		95 - 105 (3.35 - 3.70)
Wheel side		135 - 145 (4.76 - 5.11)
Boot length	mm (in)	
Final drive side (L ₁)		95 - 97 (3.74 - 3.82)
Wheel side (L ₂)		96 - 98 (3.78 - 3.86)

Final drive side



Wheel side



SFA877A

Drive shaft axial end play

Drive shaft axial end play	mm (in)	0.45 (0.0177) or less
----------------------------	---------	-----------------------

Drive shaft end snap ring

Thickness mm (in)	Part No.
1.1 (0.043)	39253-88G10
1.3 (0.051)	39253-88G11
1.5 (0.059)	39253-88G12
1.7 (0.067)	39253-88G13
1.9 (0.075)	39253-88G14
2.1 (0.083)	39253-88G15
2.3 (0.091)	39253-88G16

GI
MA
EM
LC
EC
FE
CL
MT
AT
TF
PD
FA
RA
BR
ST
RS
BT
HA
EL
IDX