

FRONT AXLE & FRONT SUSPENSION

SECTION **FA**

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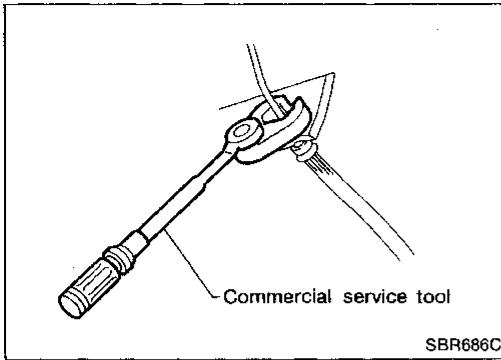
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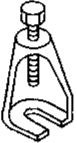
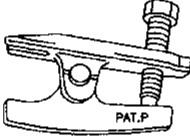
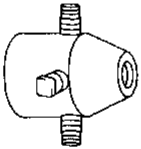
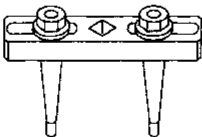
PRECAUTIONS AND PREPARATION



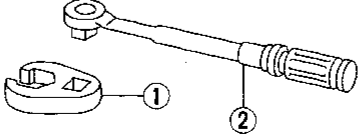
Precautions

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

Special Service Tools

Tool number (Kent-Moore No.) Tool name	Description	Unit application	
		2WD	4WD
ST29020001 (J24319-01) Gear arm puller	 NT143 Removing ball joint for knuckle spindle	X	X
HT72520000 (J25730-A) Ball joint remover	 NT146 Removing tie-rod outer end	X	X
KV401021S0 (—) Bearing race drift	 NT153 Installing wheel bearing outer race	X	X
KV40105400 (J36001) Wheel bearing lock nut wrench	 NT154 Removing or installing wheel bearing lock nut	—	X

Commercial Service Tools

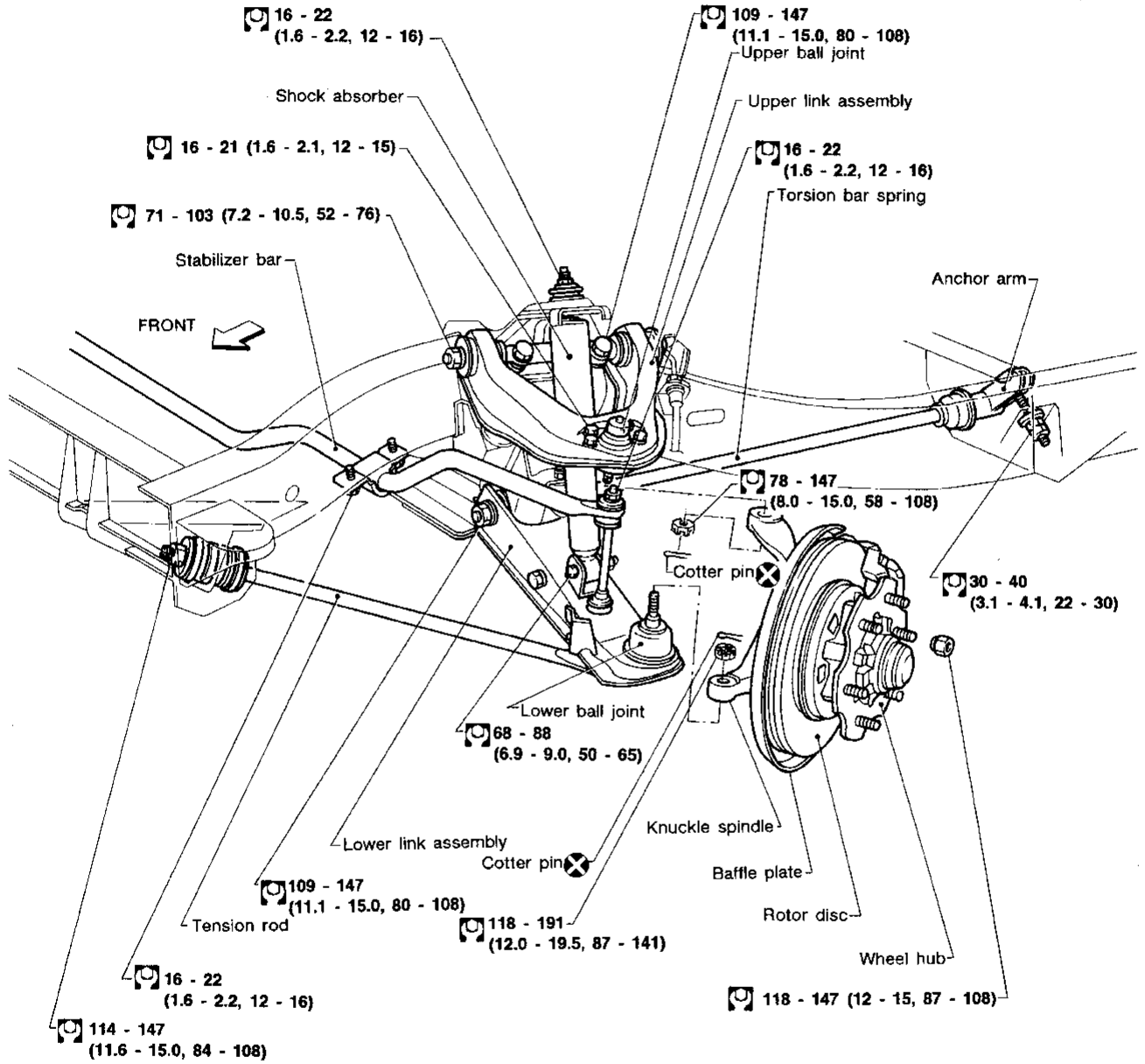
Tool name	Description
① Flare nut crows foot ② Torque wrench	 NT223 Removing and installing each brake piping

FRONT AXLE AND FRONT SUSPENSION

2WD TRUCKS

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)

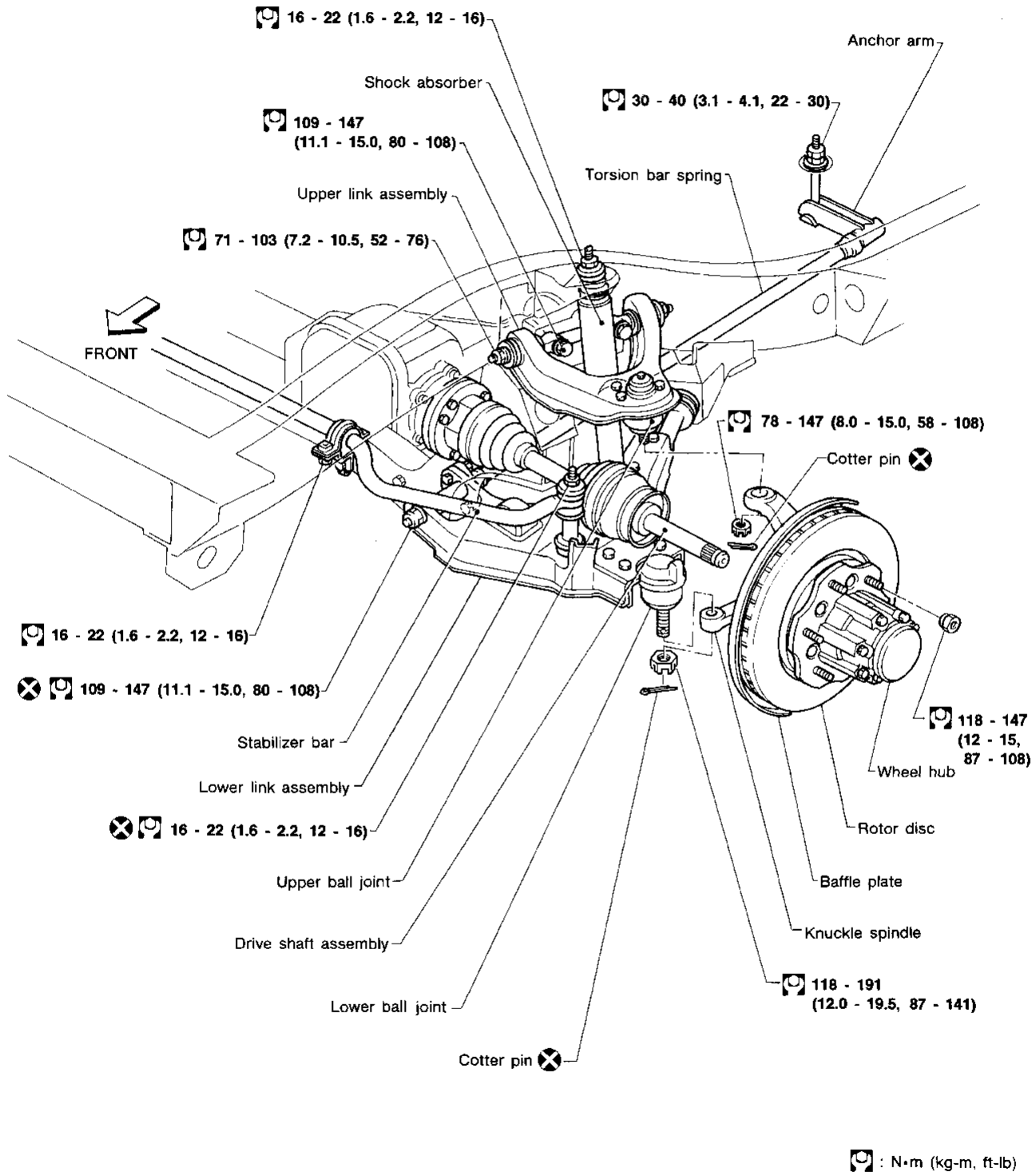
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FRONT AXLE AND FRONT SUSPENSION

4WD MODELS

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.

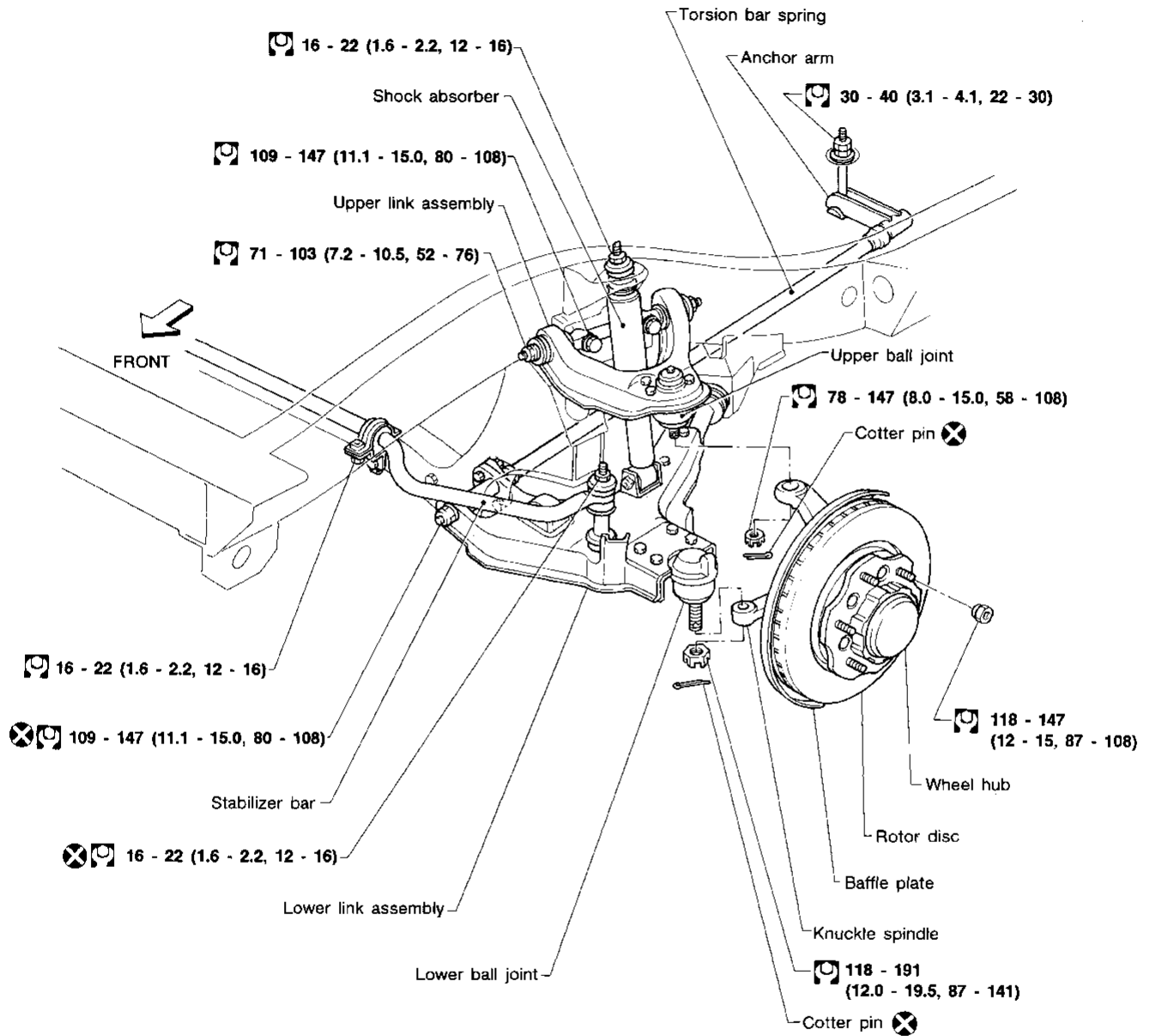


FRONT AXLE AND FRONT SUSPENSION

2WD PATHFINDER

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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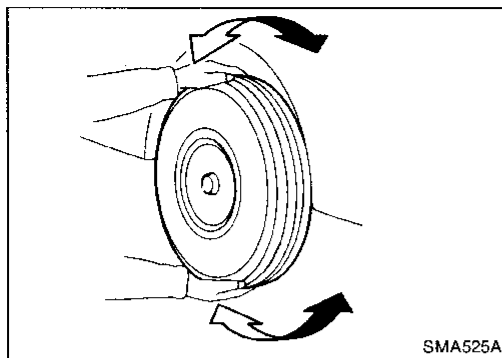
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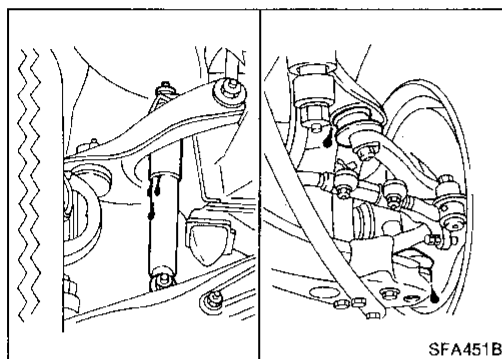
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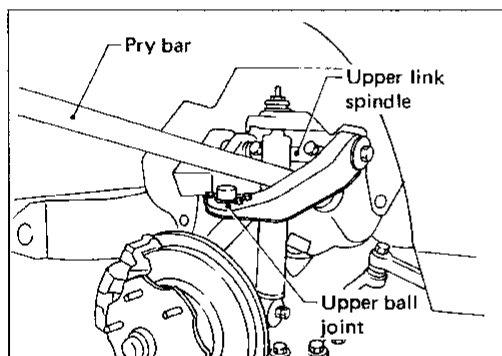


Front Axle and Front Suspension Parts

- Check front axle and front suspension parts for looseness, cracks, wear or other damage.
 - (1) Shake each front wheel.
 - (2) Make sure that cotter pin is inserted.
 - (3) Retighten all nuts and bolts to the specified torque.
 - Refer to **FRONT SUSPENSION (FA-36)**.
 - (4) Check front axle and front suspension parts for wear, cracks or other damage.



- Check 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.

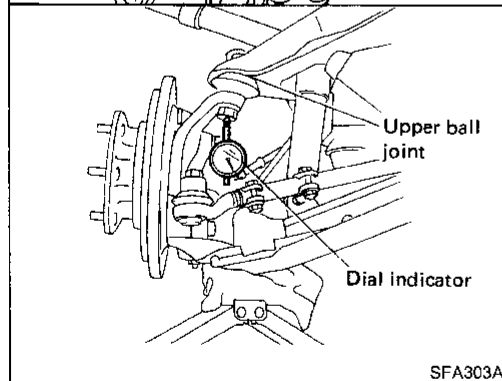


- Check ball joint for vertical end play.

Upper ball joint:

1.6 mm (0.063 in) or less

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



Lower ball joint:

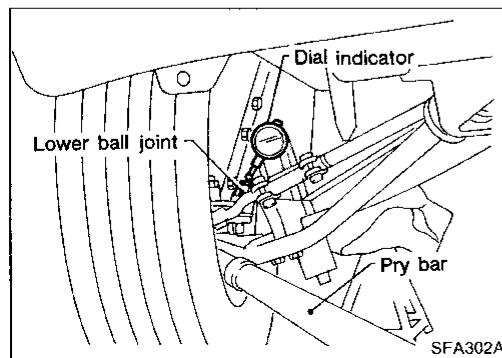
[2WD Trucks]

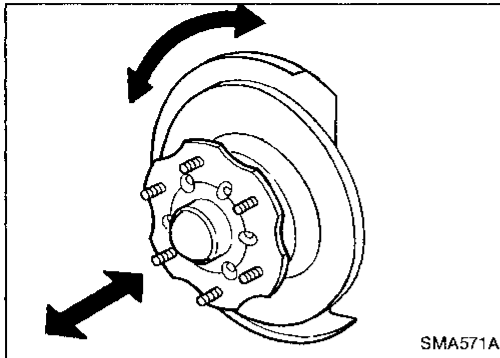
1.6 mm (0.063 in) or less

[Except 2WD Trucks]

0.5 mm (0.020 in) or less

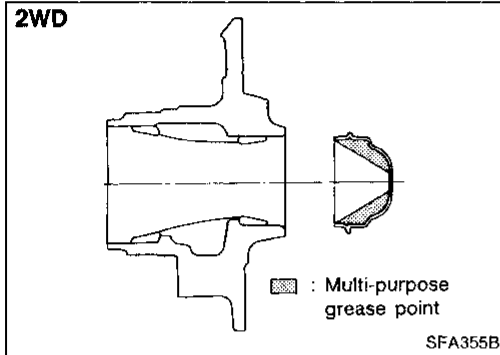
- (1) Jack up front of vehicle and set the stands.
- (2) Remove road wheel.
- (3) Clamp dial indicator onto upper link and place indicator tip on knuckle near ball joint.
- (4) Jack up lower link [Approx. 20 mm (0.79 in).]
- (5) Place a pry bar between upper link and upper link spindle.
- (6) While pushing and releasing pry bar, observe maximum dial indicator value.
- (7) If ball joint movement is beyond specifications, remove and recheck it.





Front Wheel Bearing

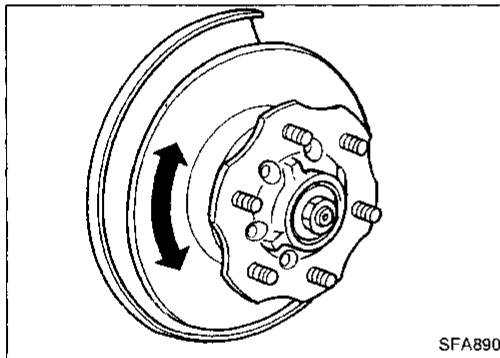
- Check that wheel bearings operate smoothly.
- Check axial end play.
 - Axial end play: 0 mm (0 in)**
- Adjust wheel bearing preload if there is any axial end play or wheel bearing does not turn smoothly.



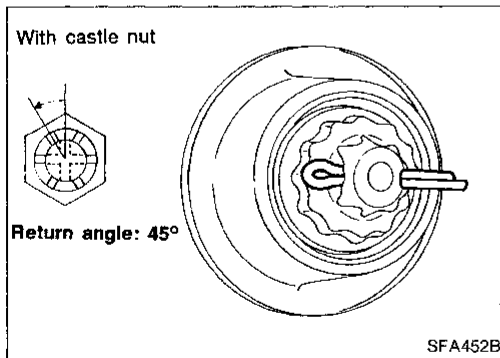
PRELOAD ADJUSTMENT (2WD Trucks)

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

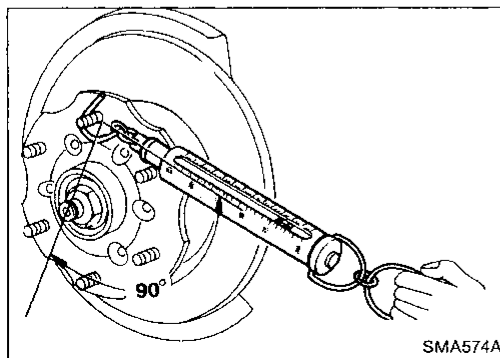
1. Before adjustment, thoroughly clean all parts to prevent dirt entry.
2. Apply multi-purpose grease sparingly to the following parts:
 - Rubbing surface of spindle
 - Contact surface between lock washer and outer wheel bearing
 - Hub cap (as shown at left)
 - Grease seal lip



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)



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

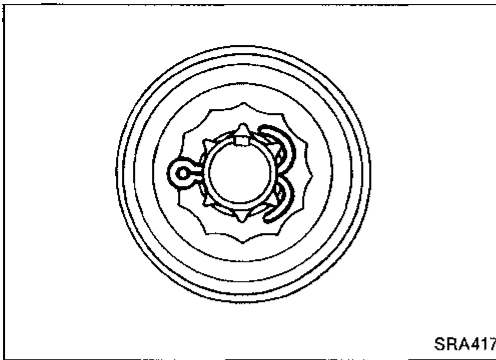


8. Measure wheel bearing preload and axial end play.
 - Axial end play: 0 mm (0 in)**
 - Wheel bearing preload**
 - (As measured at wheel hub bolt):**
 - [New grease seal]
 - 9.8 - 28.4 N (1.0 - 2.9 kg, 2.2 - 6.4 lb)
 - [Used grease seal]
 - 9.8 - 23.5 N (1.0 - 2.4 kg, 2.2 - 5.3 lb)
- Repeat above procedures until correct bearing preload is obtained.

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ON-VEHICLE SERVICE

Front Wheel Bearing (Cont'd)



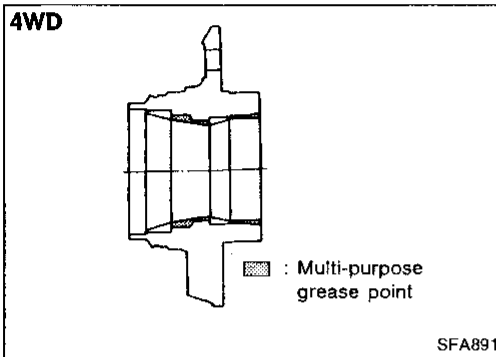
9. Spread cotter pin.
10. Install hub cap.

PRELOAD ADJUSTMENT (Except 2WD Trucks)

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

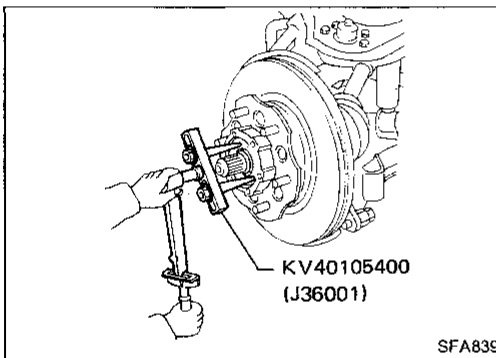
Adjust wheel bearing preload as follows:

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)



3. Tighten wheel bearing lock nut with Tool.

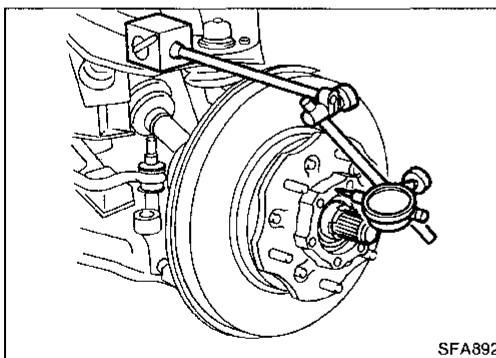
\square : 78 - 98 N·m (8 - 10 kg-m, 58 - 72 ft-lb)

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.

\square : 0.5 - 1.5 N·m (0.05 - 0.15 kg-m, 0.4 - 1.1 ft-lb)



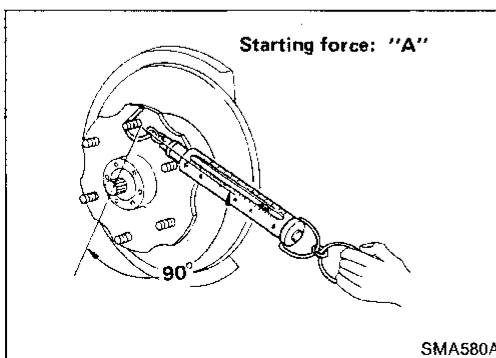
7. Turn wheel hub several times in both directions.

8. Retighten wheel bearing lock nut with Tool.

\square : 0.5 - 1.5 N·m (0.05 - 0.15 kg-m, 0.4 - 1.1 ft-lb)

9. Measure wheel bearing axial end play.

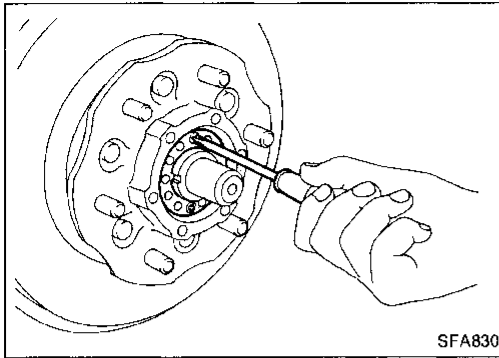
Axial end play: 0 mm (0 in)



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

ON-VEHICLE SERVICE

Front Wheel Bearing (Cont'd)



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 procedure 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 above procedures until correct axial end play and wheel bearing preload are obtained.
16. Install free-running hub and brake pads.

Front Wheel Alignment

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

PRELIMINARY INSPECTION

1. Check the tires for wear and proper inflation.

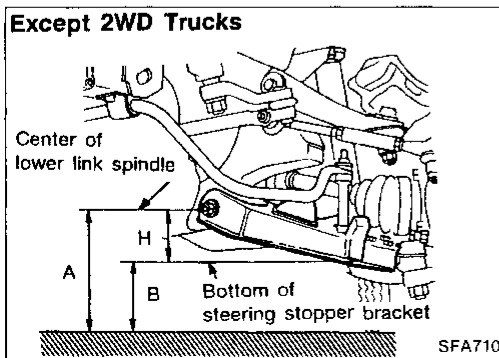
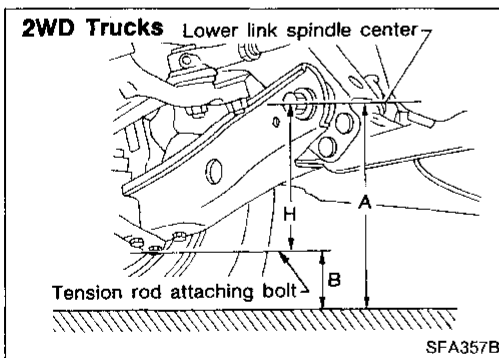
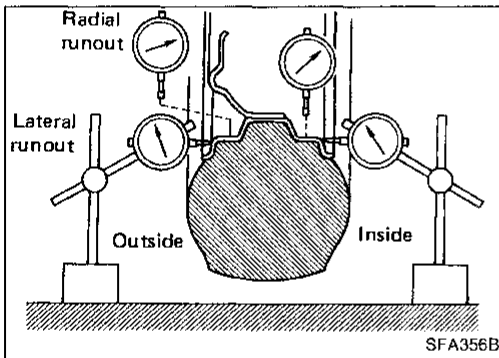
2. Check the wheel runout for outside and inside.

Wheel runout average

[(Outside runout value + Inside runout value) x 0.5]:

Refer to SDS (FA-53).

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



7. Measure vehicle height (Unladen): $H = A - B$ mm (in)

Refer to SDS (FA-52).

- (1) 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.

- (2) Measure wheel alignment.

Refer to ALLOWABLE LIMIT on SDS (FA-52).

- (3) If wheel alignment is not as specified, adjust vehicle posture.

Refer to ADJUSTING RANGE on SDS (FA-52).

- (4) Adjust wheel alignment.

Refer to ADJUSTING RANGE on SDS (FA-52).

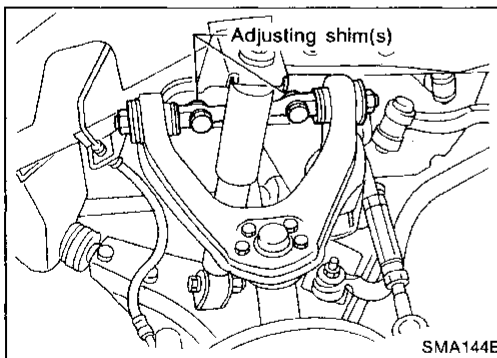
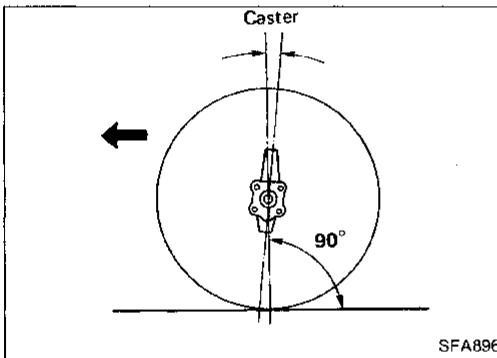
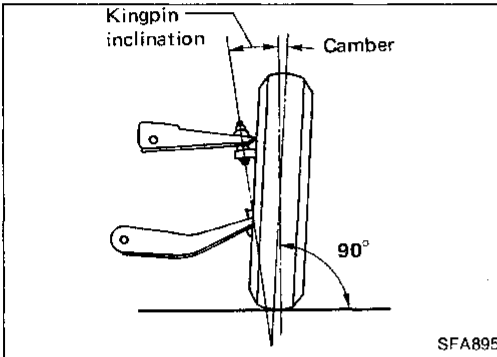
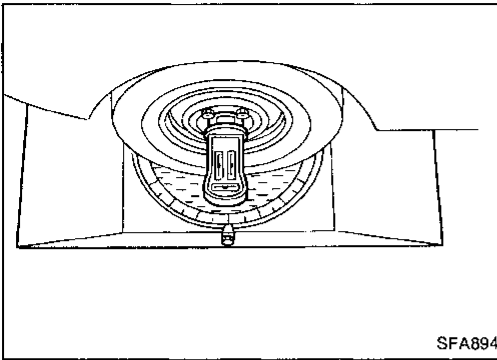
ON-VEHICLE SERVICE

Front Wheel Alignment (Cont'd)

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 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 (Unladen):

Refer to SDS (FA-52).

Kingpin inclination (Unladen):

Refer to SDS (FA-52).

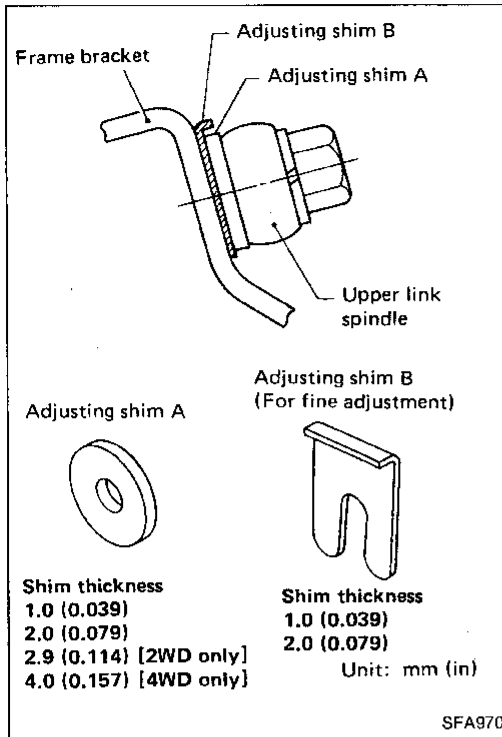
Caster (Unladen):

Refer to SDS (FA-52).

ADJUSTMENT

Both camber and caster angles are adjusted by increasing or decreasing the number of adjusting shims inserted between upper link spindle and frame.

Front Wheel Alignment (Cont'd)



Before removing or installing adjusting shim(s), be sure to place a jack under lower link.

Adjusting shim standard thickness:

2WD Trucks

2.9 mm (0.114 in)

Except 2WD Trucks

4.0 mm (0.157 in)

- Do not use three or more shims at one place.
- When installing shim B, always face the pawl towards spindle and insert them from bracket side. Use only one shim in a place.
- Total thickness of shims must be within 8.0 mm (0.315 in).
- Difference of total thickness of the front and rear must be within 2.0 mm (0.079 in).
- Determine thickness and number of shims necessary for adjusting camber and caster, in accordance with the following graph.

[Example]

- (1) When service data value minus measured value is equal to:

Caster angle: - 30'

Camber angle: + 30'

- (2) Obtain the intersecting point of lines in accordance with the graph.

- (3) Choose shims which are nearest to the intersecting point.

- (4) For the above example:

2WD Trucks:

Add 2.0 mm (0.079 in) shim on front side.

Add 3.0 mm (0.118 in) shim on rear side.

Except 2WD Trucks:

Add 1.0 mm (0.039 in) shim on front side.

Add 3.0 mm (0.118 in) shim on rear side.

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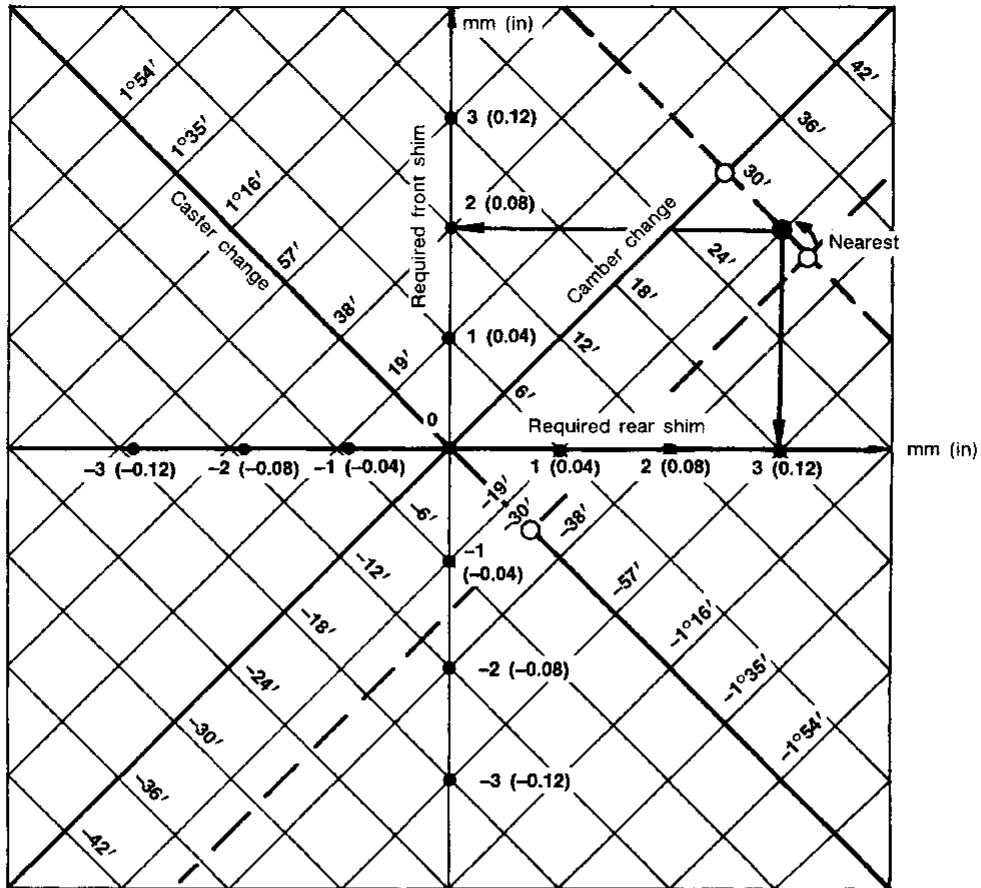
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ON-VEHICLE SERVICE

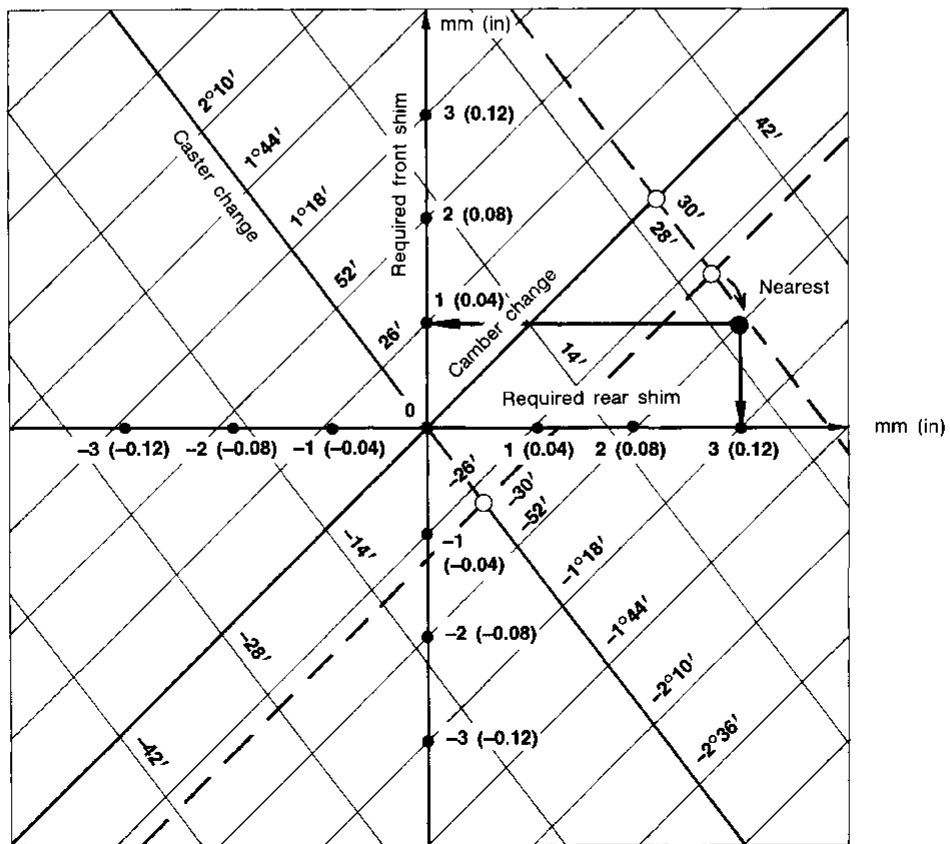
Front Wheel Alignment (Cont'd)

2WD Trucks



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Except 2WD Trucks

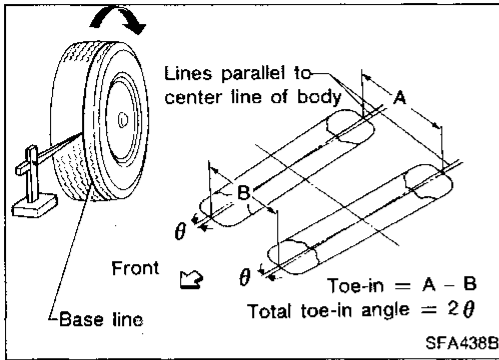


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ON-VEHICLE SERVICE

Front Wheel Alignment (Cont'd)

TOE-IN



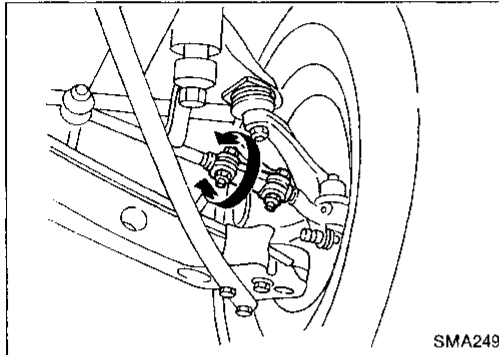
1. Mark a base line across the tread.

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

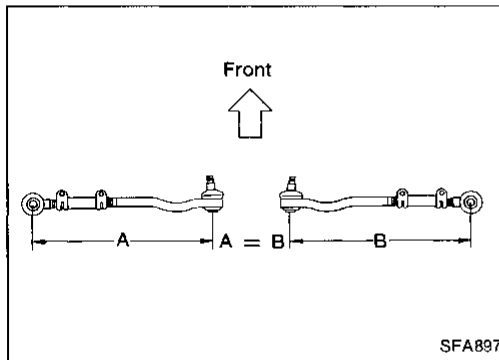
2. Measure toe-in.

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

**Toe-in (Unladen):
Refer to SDS (FA-52).**



3. Adjust toe-in by varying the length of steering tie-rods.
 - (1) Loosen clamp bolts or lock nuts.
 - (2) Adjust toe-in by turning the left and right tie-rod tubes an equal amount.



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):

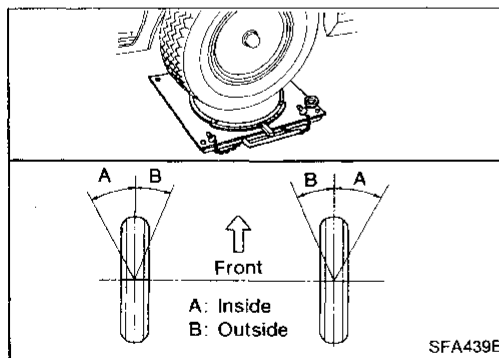
2WD Trucks

344 mm (13.54 in)

Except 2WD Trucks

281 mm (11.06 in)

- (3) Tighten clamp bolts or lock nuts, then torque them.

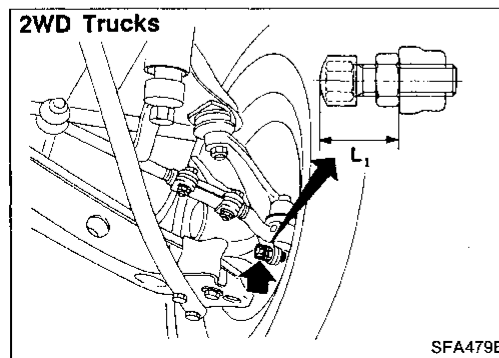


FRONT WHEEL TURNING ANGLE

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

2. Rotate steering wheel all the way right and left; measure turning angle.

Wheel turning angle: Refer to SDS (FA-52).



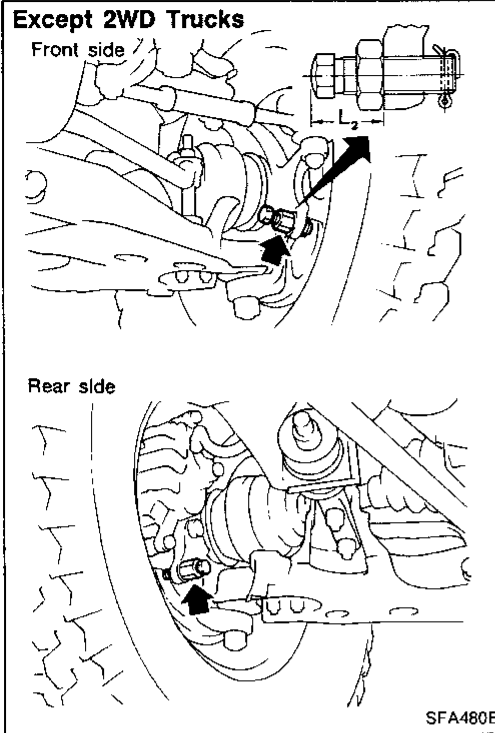
3. Adjust by stopper bolt if necessary.

[2WD Trucks]

Standard length "L₁": 20 mm (0.79 in)

ON-VEHICLE SERVICE

Front Wheel Alignment (Cont'd)



[Except 2WD Trucks]

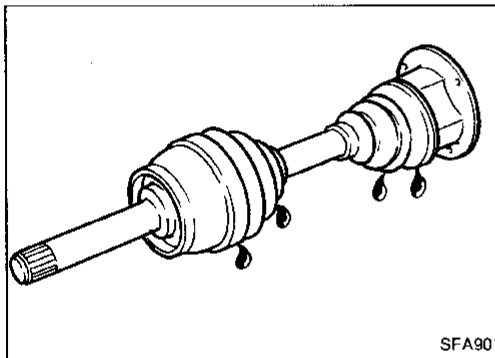
Standard length "L₂":

26.5 mm (1.043 in)

[Except tire size: 31x10.5R15]

37.5 mm (1.476 in)

[Tire size: 31x10.5R15]

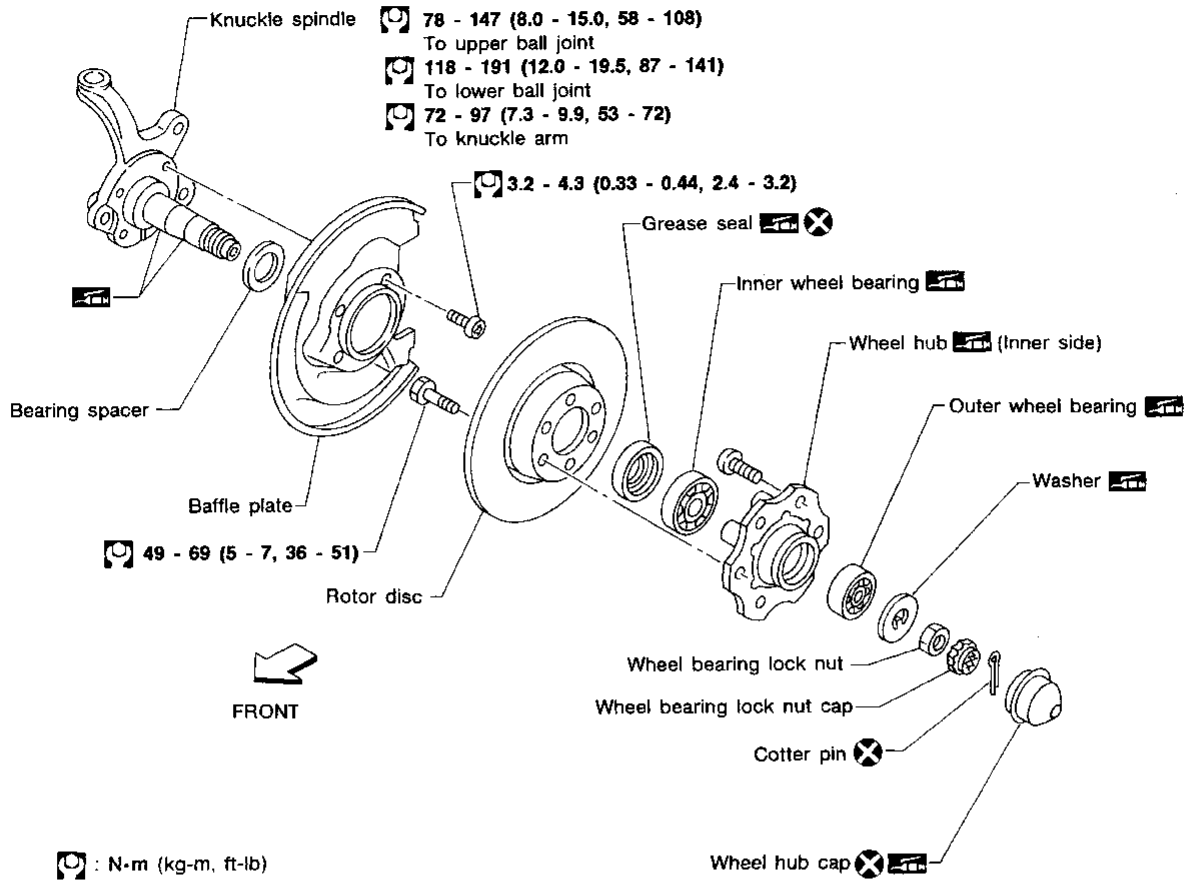


Drive Shaft

- Check for grease leakage or other damage.

FRONT AXLE

2WD TRUCKS



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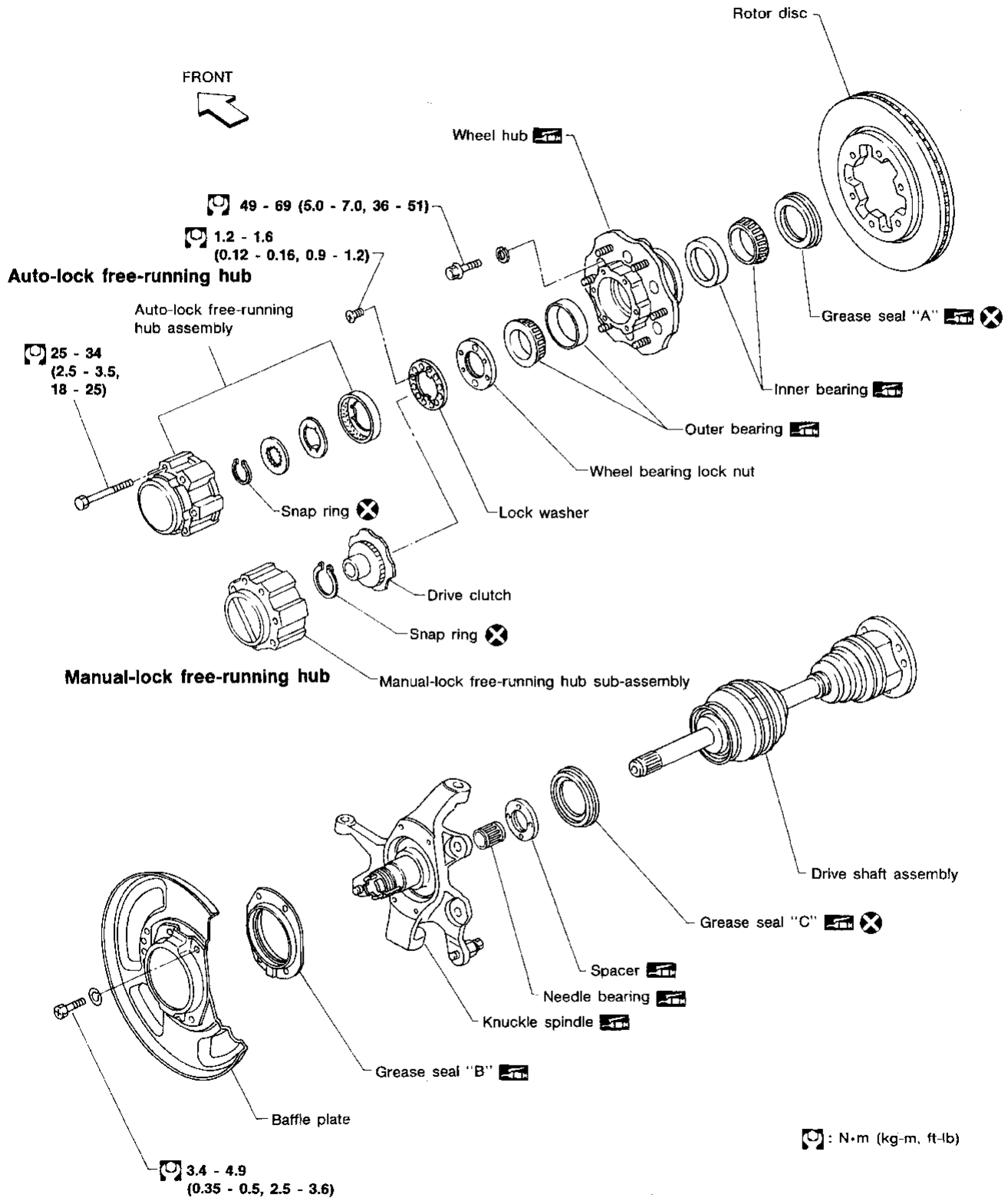
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FRONT AXLE

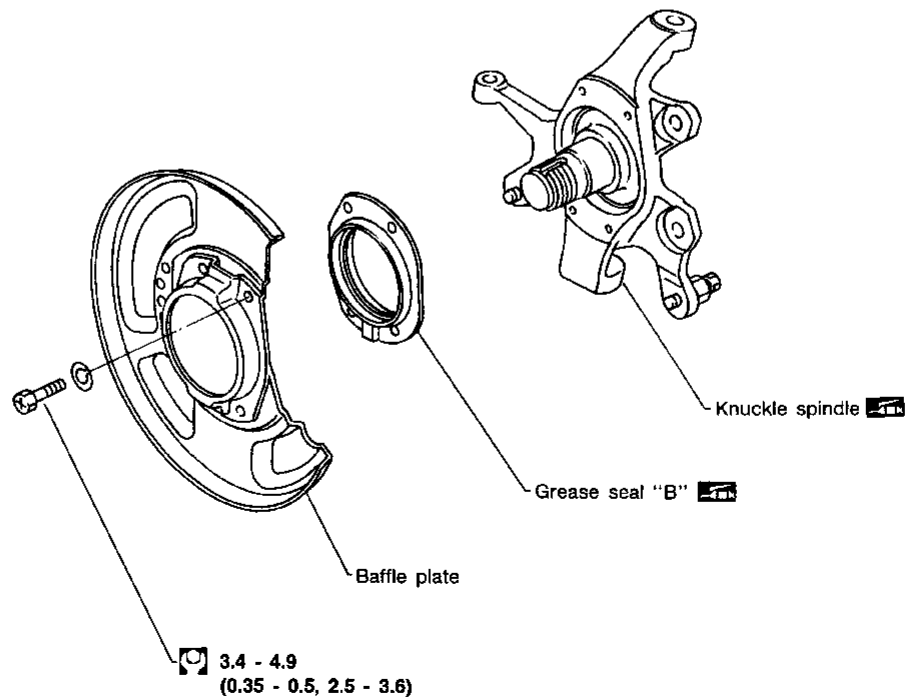
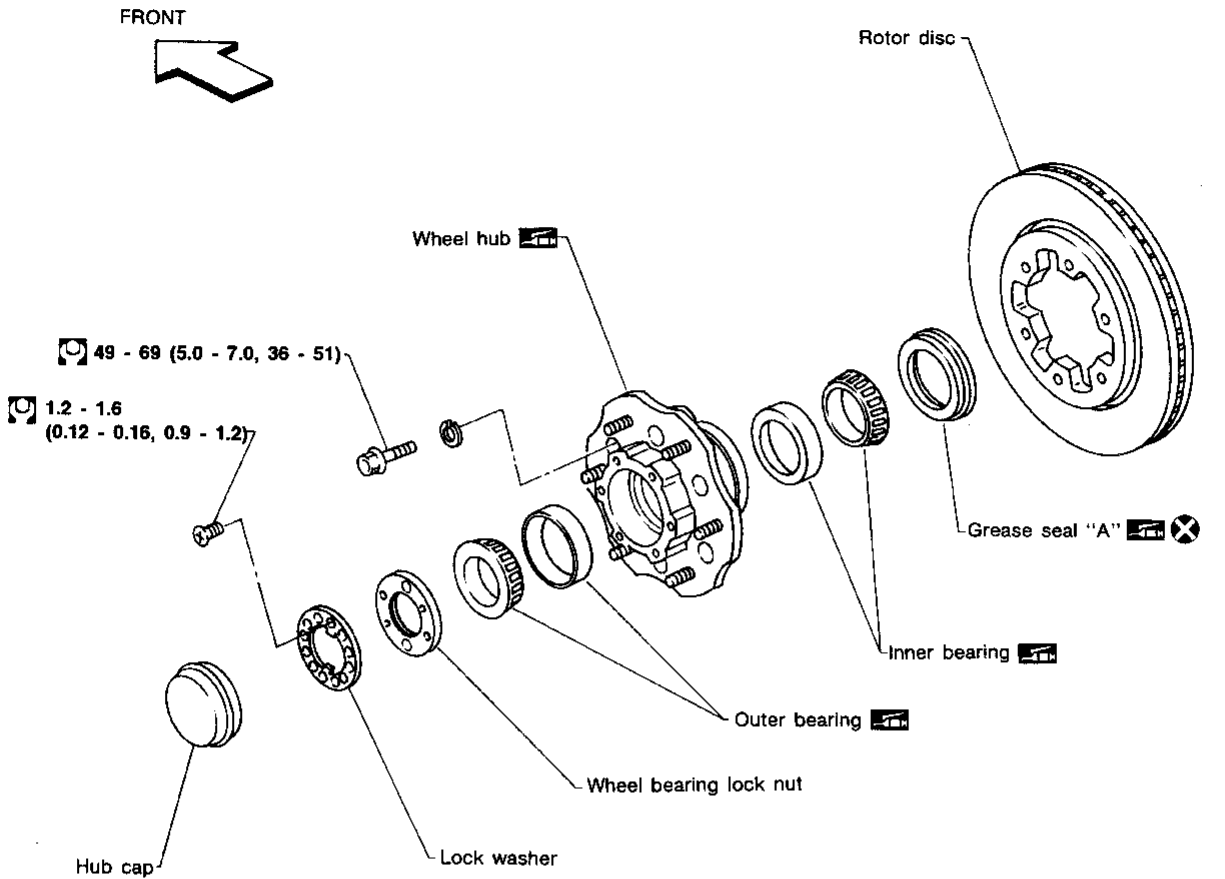
4WD



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FRONT AXLE

2WD PATHFINDER



: N·m (kg-m, ft-lb)

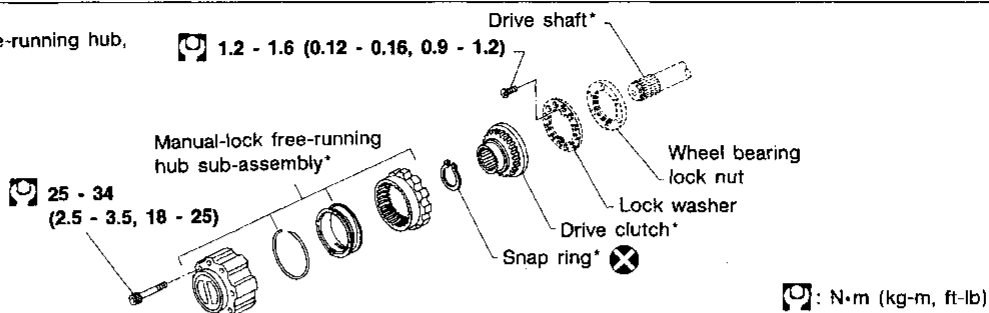
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FRONT AXLE (4WD)

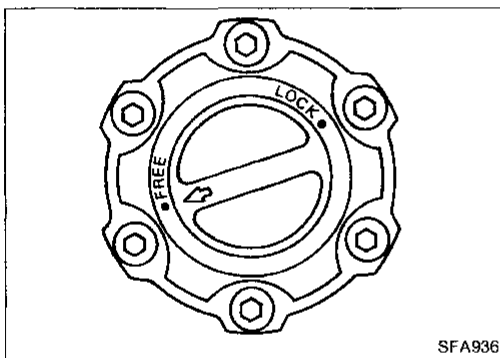
Manual-lock Free-running Hub

*: Lubricating parts

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

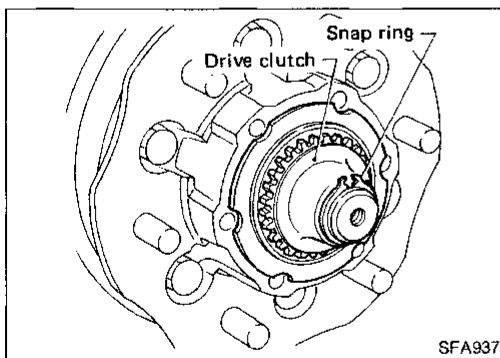


SFA972



REMOVAL AND INSTALLATION

- Set knob of manual-lock free-running hub in position "Free".
- Remove manual-lock free-running hub with brake pedal depressed.



- Remove snap ring and then draw out drive clutch.

- When installing manual-lock free-running hub, make sure the position is in "Free".

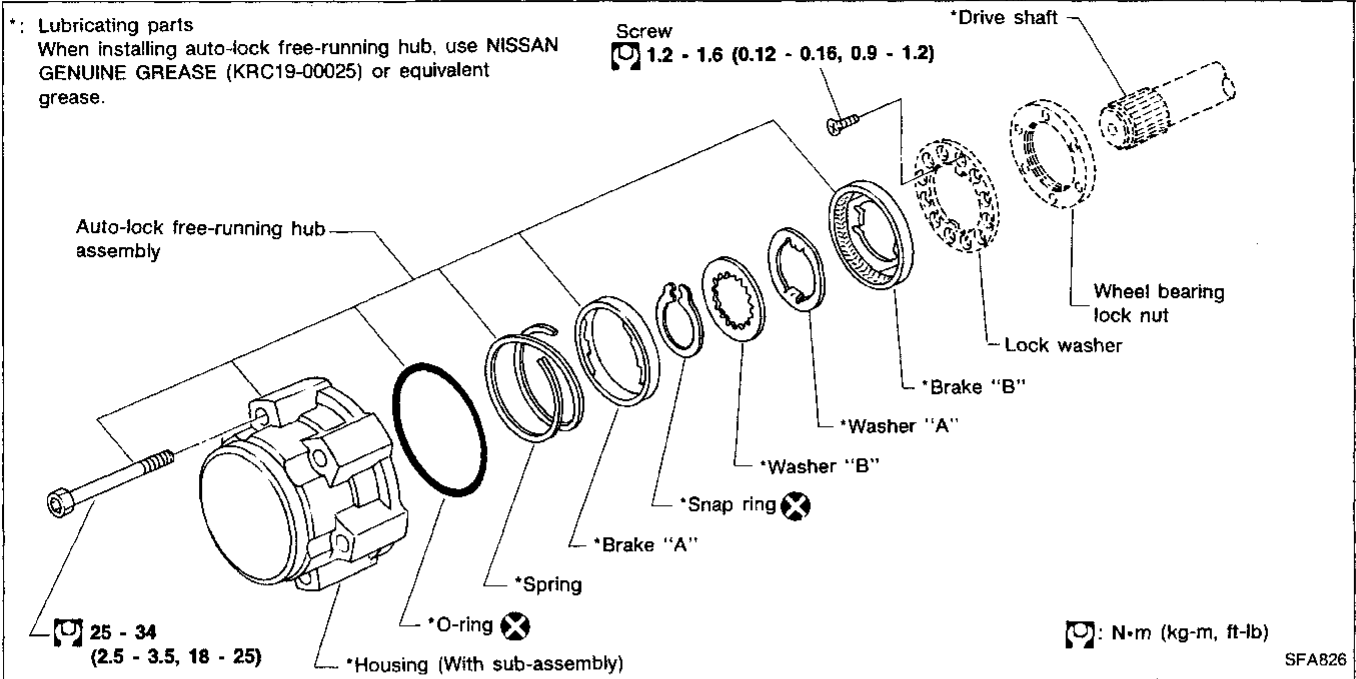
Apply multi-purpose grease to the parts shown in the above illustration.

- Check operation of manual-lock free-running hub after installing it.

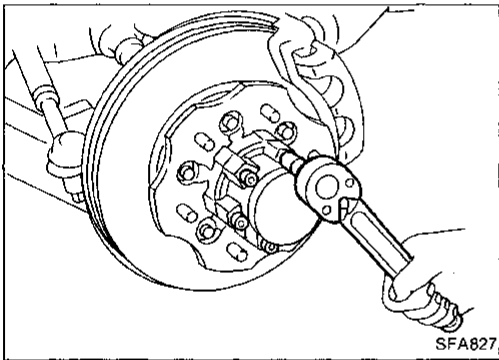
INSPECTION

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

Auto-lock Free-running Hub



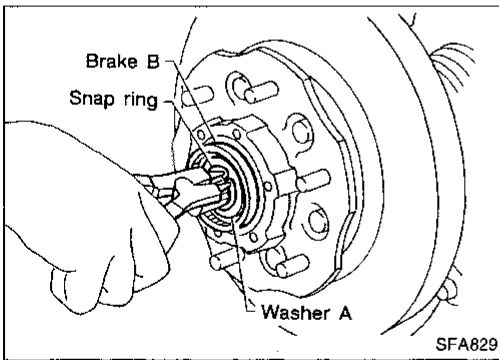
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REMOVAL AND INSTALLATION

- Set auto-lock free-running hub in position "Free".
- Remove auto-lock free-running hub with brake pedal depressed.

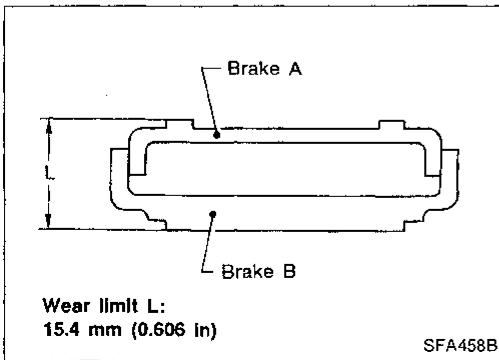
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- Remove snap ring.
- Remove washer B, washer A and brake B.
- After installing auto-lock free-running hub, check operation.

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

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INSPECTION

Thoroughly clean parts with cleaning solvent and dry with compressed air.

Brake "A" and "B"

Measure the thickness "L" of brake "A" and "B". If thickness is less than the specified limit, replace brake "A" and "B" as a set.

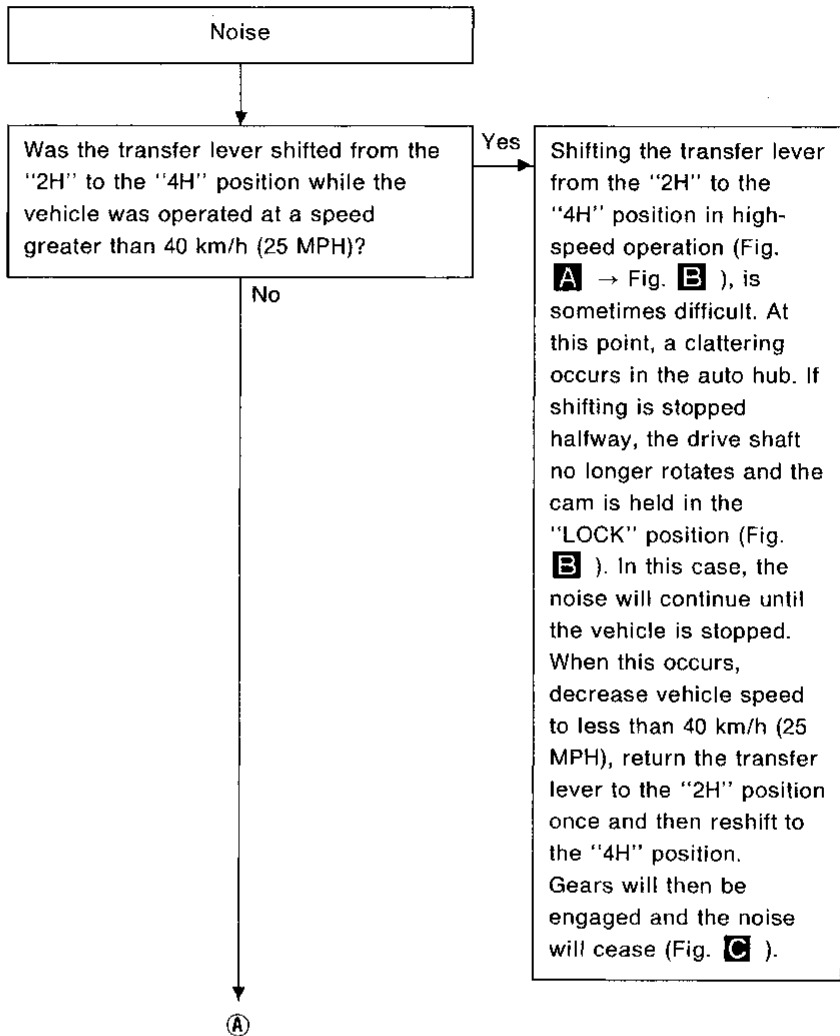
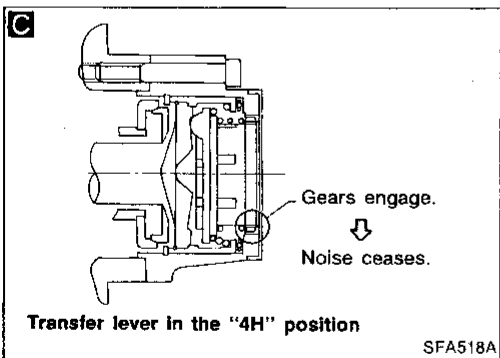
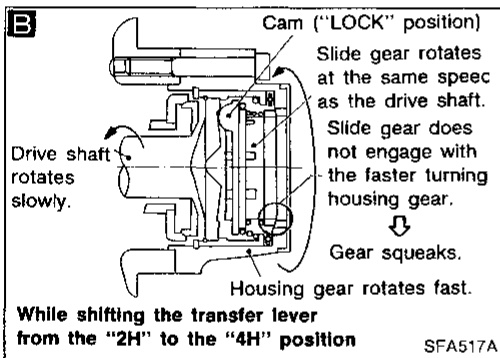
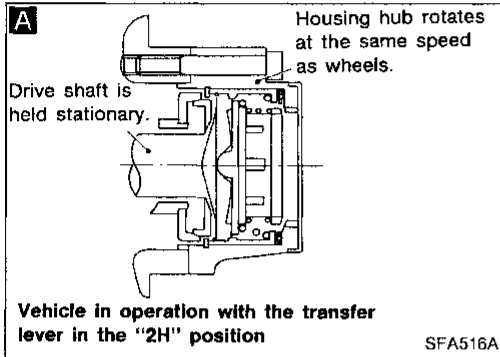
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FRONT AXLE (4WD)

Auto-lock Free-running Hub (Cont'd)

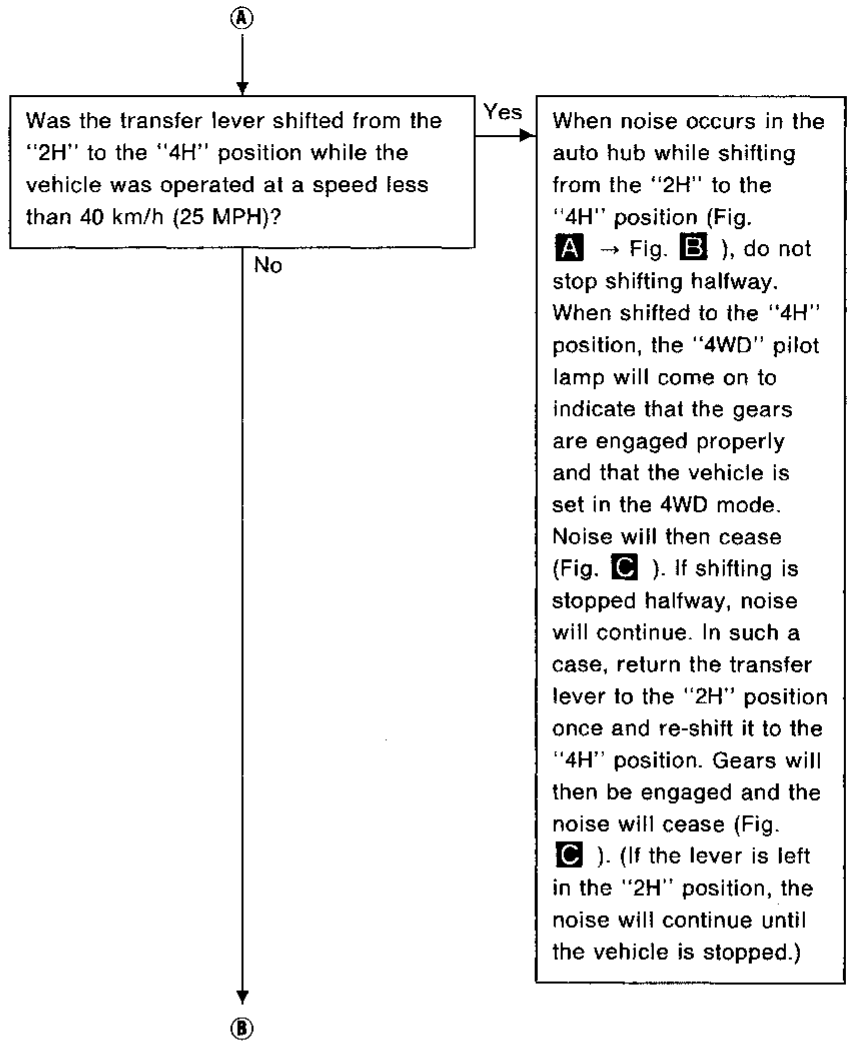
TROUBLE-SHOOTING

Noise occurring in the auto hub under any of the conditions described below is not indicative of a problem. Noise can be eliminated by properly operating the transfer lever or the vehicle.



FRONT AXLE (4WD)

Auto-lock Free-running Hub (Cont'd)



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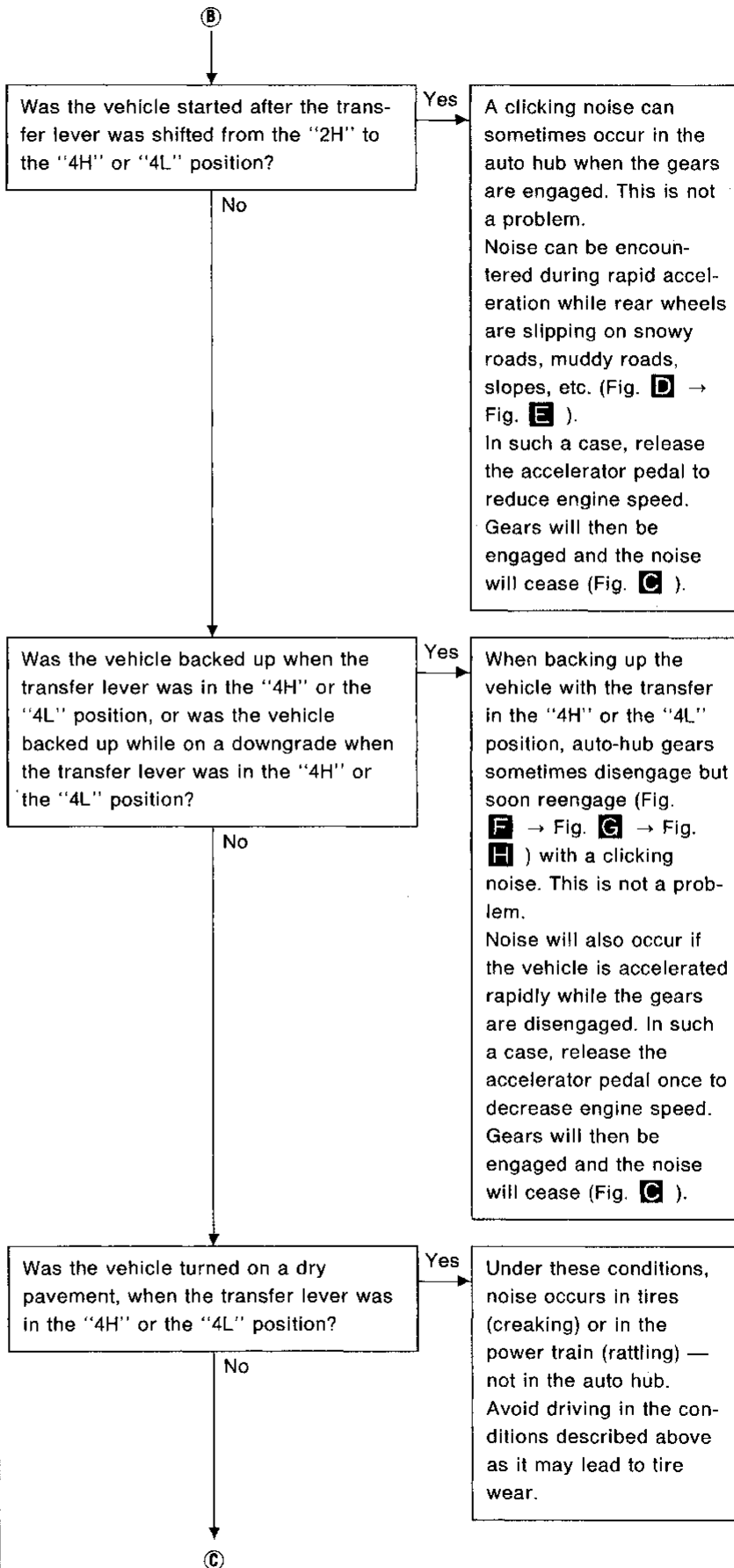
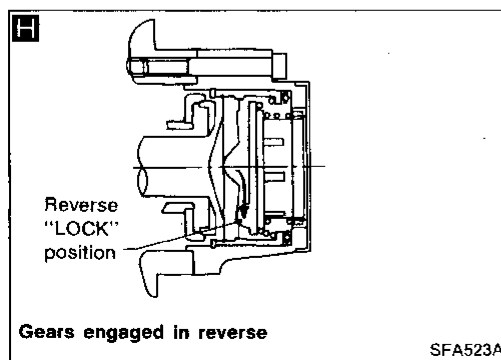
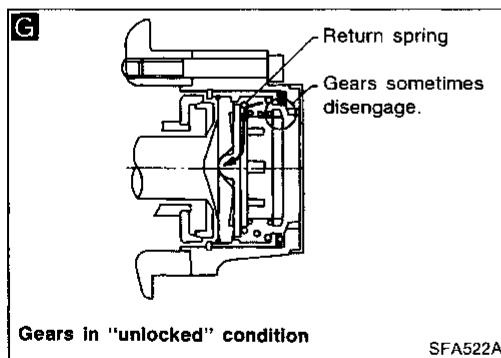
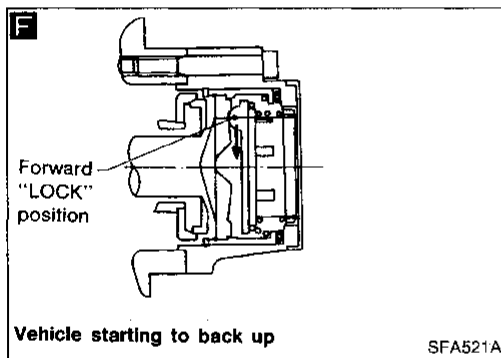
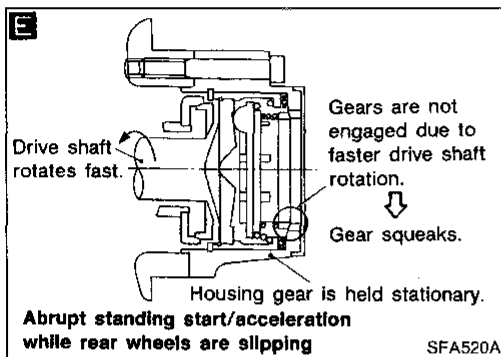
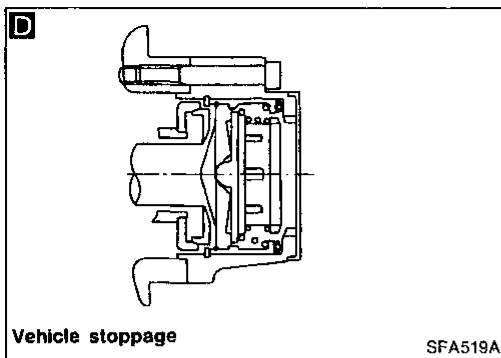
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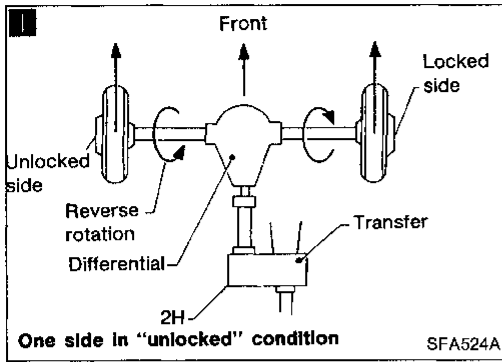
FRONT AXLE (4WD)

Auto-lock Free-running Hub (Cont'd)



FRONT AXLE (4WD)

Auto-lock Free-running Hub (Cont'd)



Was the vehicle moved in one direction after the vehicle was driven in another direction when the transfer lever was in the "4H" or the "4L" position and then returned to the "2H" position?

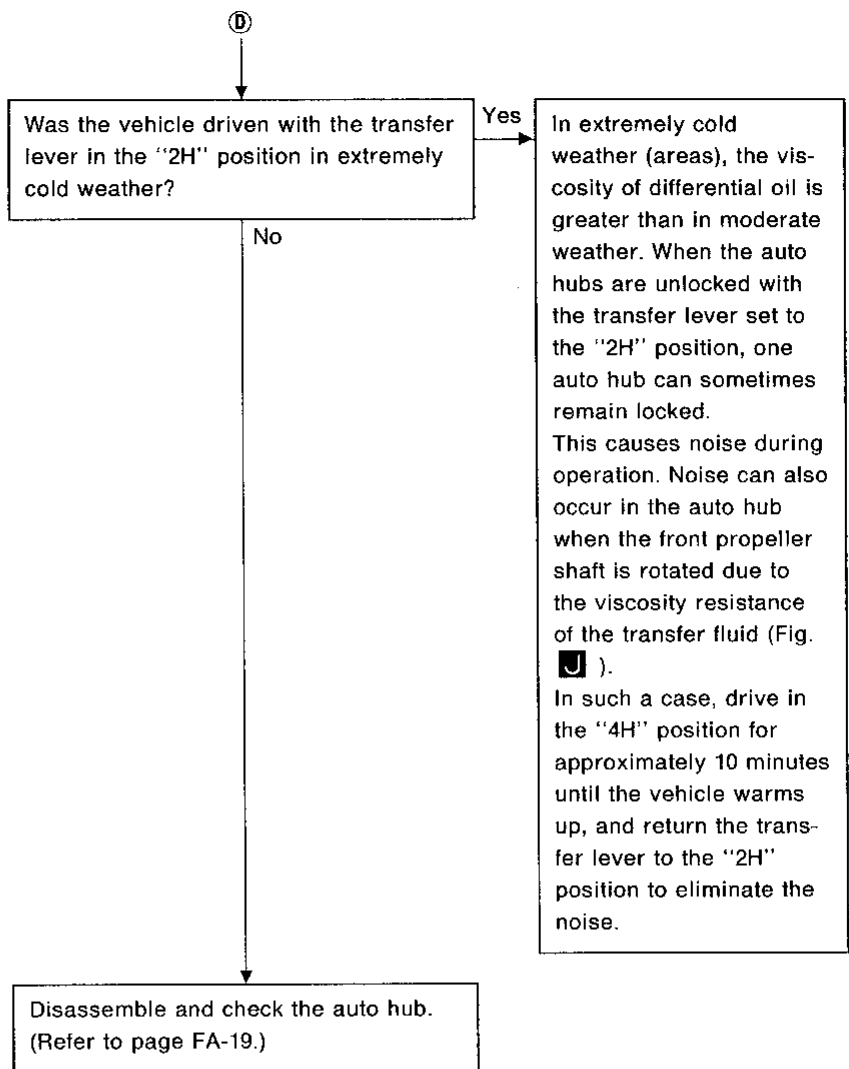
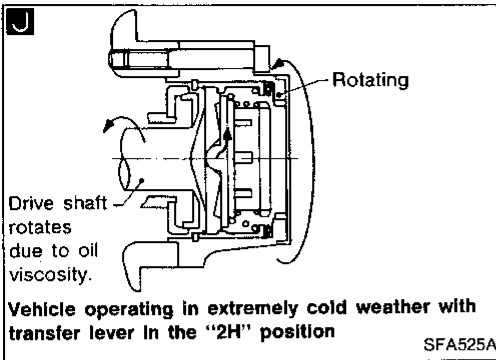
Yes → Auto-hub gears will disengage with a resultant noise (clicking). If the distance the vehicle is moved in the opposite direction is short [less than 1 m (3 ft)] or if the rotation angle of the left and right wheels is not the same (as in rounding a corner), gears on one side will disengage (Fig. **I**). Under this condition, a noise (crushing, etc.) might occur while driving in the "2H" position. If only gears on one side are unlocked, the locked drive shaft rotates at the same speed as wheels; however, the unlocked drive shaft is made to rotate in the reverse direction by the differential. This forces the auto hub's slide gear to lock in the reverse direction. As a result, noise occurs. If this happens, slowly move the vehicle straight back approximately 2 to 3 m (7 to 10 ft) with the transfer lever in the "2H" position to disengage the gears on the other side.

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FRONT AXLE (4WD)

Auto-lock Free-running Hub (Cont'd)



FRONT AXLE

Wheel Hub and Rotor Disc

REMOVAL AND INSTALLATION

- Remove free-running hub assembly.
Refer to FRONT AXLE (4WD) — Auto-lock Free-running Hub or Manual-lock Free-running Hub.

- Remove brake caliper assembly.

Brake hose does not need to be disconnected from brake caliper. Be careful not to depress brake pedal, or piston will pop out.

Make sure brake hose is not twisted.

- Remove lock washer. — 4WD and 2WD PATHFINDER —

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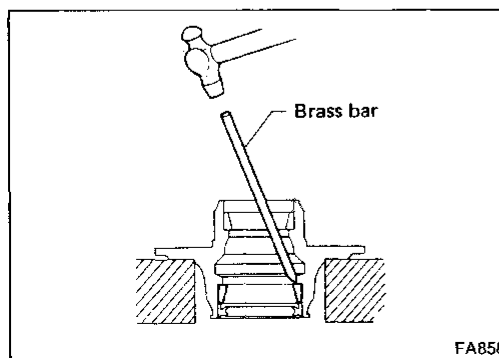
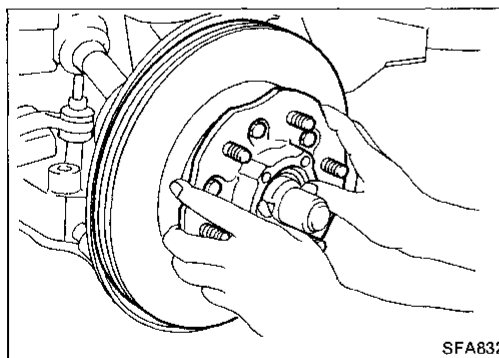
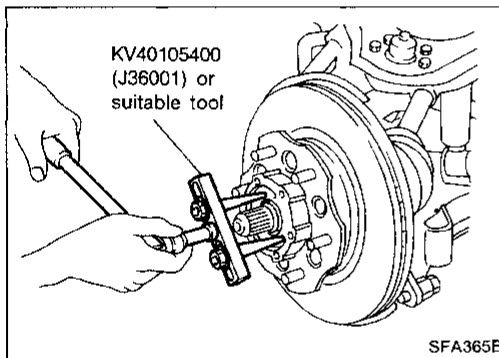
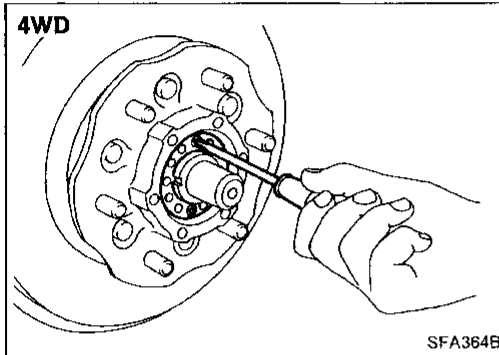
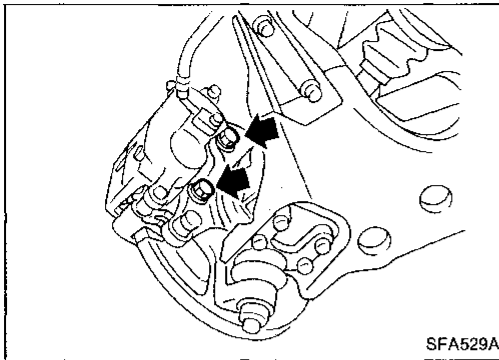
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- Remove wheel bearing lock nut.
2WD Trucks: With suitable tool
Except 2WD Trucks: With Tool

- Remove wheel hub and wheel bearing.

Be careful not to drop outer bearing.

- After installing wheel hub and wheel bearing, adjust wheel bearing preload.

Refer to PRELOAD ADJUSTMENT of Front Wheel Bearing in ON-VEHICLE SERVICE (FA-7).

DISASSEMBLY

- Remove bearing outer races with suitable brass bar.

FRONT AXLE

Wheel Hub and Rotor Disc (Cont'd)

INSPECTION

Thoroughly clean wheel bearings and wheel hub.

Wheel bearing

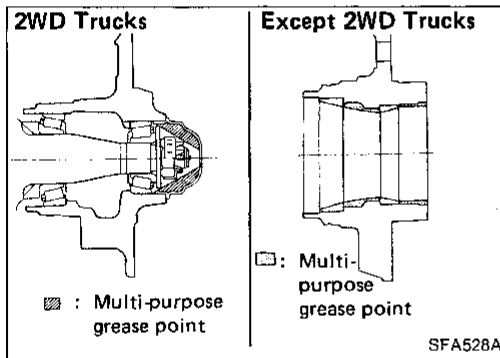
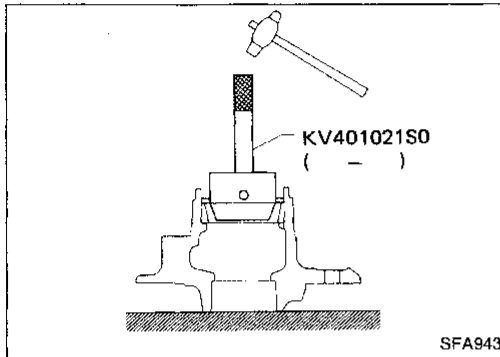
- Make sure wheel bearing rolls freely and is free from noise, crack, pitting or wear.

Wheel hub

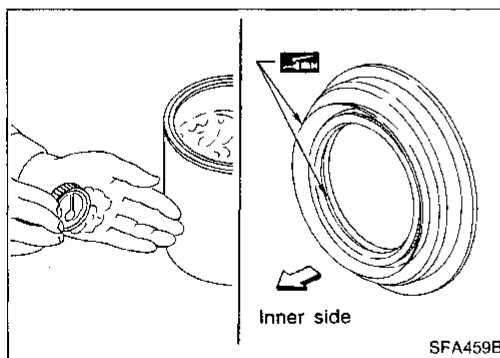
- Check wheel hub for crack by using a magnetic exploration or dyeing test.

ASSEMBLY

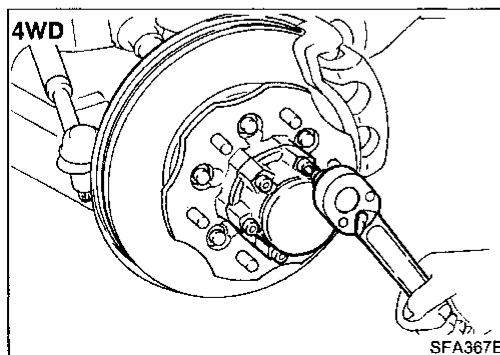
- Install bearing outer race with Tool until it seats in hub.



- Pack multi-purpose grease to hub and hub cap.



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



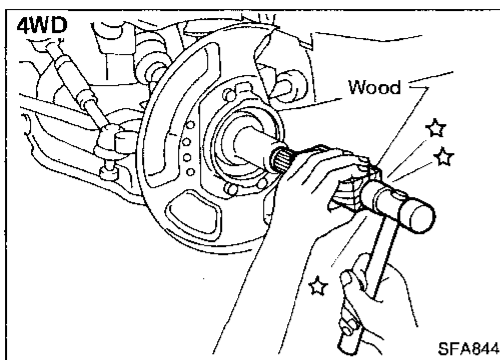
Knuckle Spindle

REMOVAL

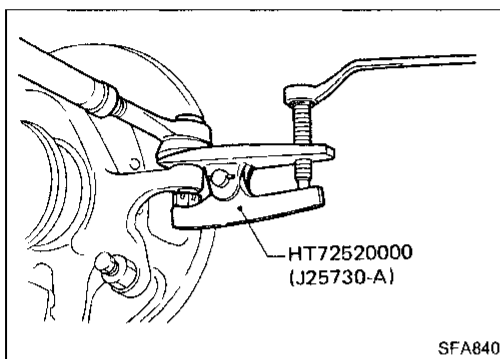
- Remove free-running hub assembly. — 4WD —
Refer to FRONT AXLE (4WD) — Auto-lock Free-running Hub or Manual-lock Free-running Hub (FA-18).

FRONT AXLE

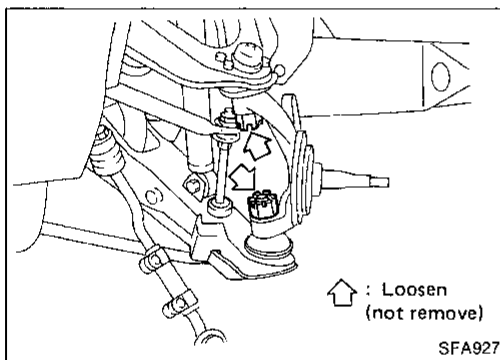
Knuckle Spindle (Cont'd)



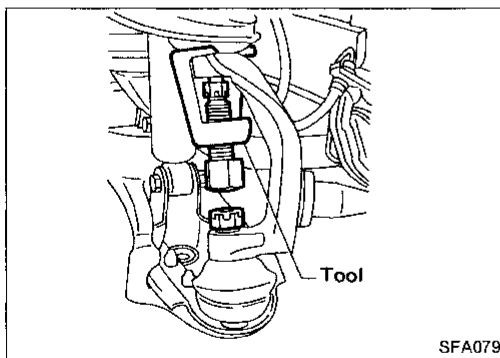
- Separate drive shaft from knuckle spindle by slightly tapping drive shaft end. — 4WD —



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



- Separate knuckle spindle from ball joints.
(1) Loosen (not remove) upper and lower ball joint tightening nuts.



- (2) 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 (1) above.

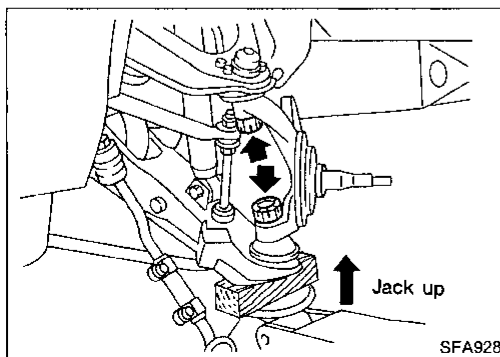
Tool:

2WD Trucks

ST29020001 (J24319-01)

Except 2WD Trucks

HT72520000 (J25730-A)



- (3) Remove ball joint tightening nuts.

Support lower link with jack.

- (4) Remove knuckle spindle from upper and lower links.

INSPECTION

Knuckle spindle

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

FRONT AXLE

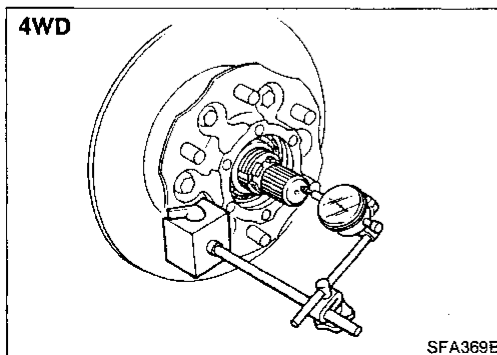
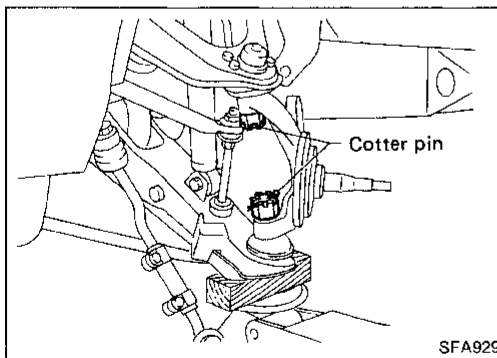
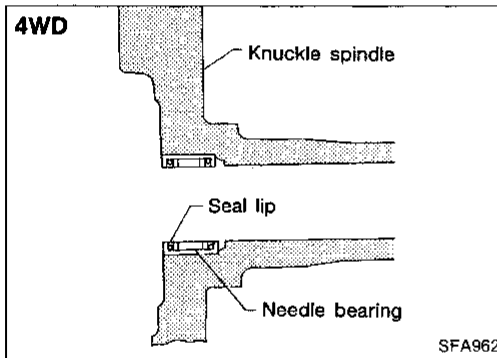
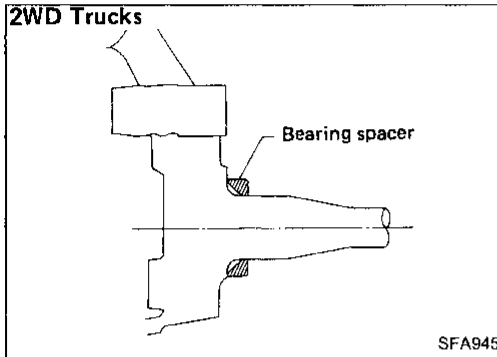
Knuckle Spindle (Cont'd)

Bearing spacer — 2WD Trucks —

- Check bearing spacer for damage.

Needle bearing — 4WD —

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



INSTALLATION

- Install bearing spacer onto knuckle spindle. — 2WD Trucks —

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

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

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

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

CAUTION:

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

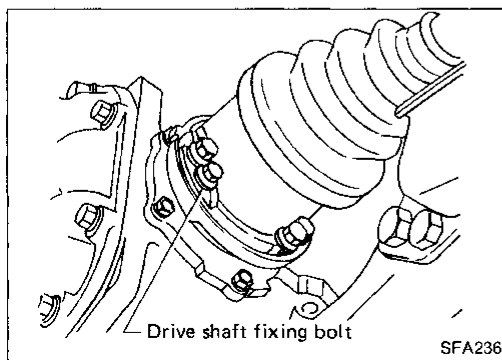
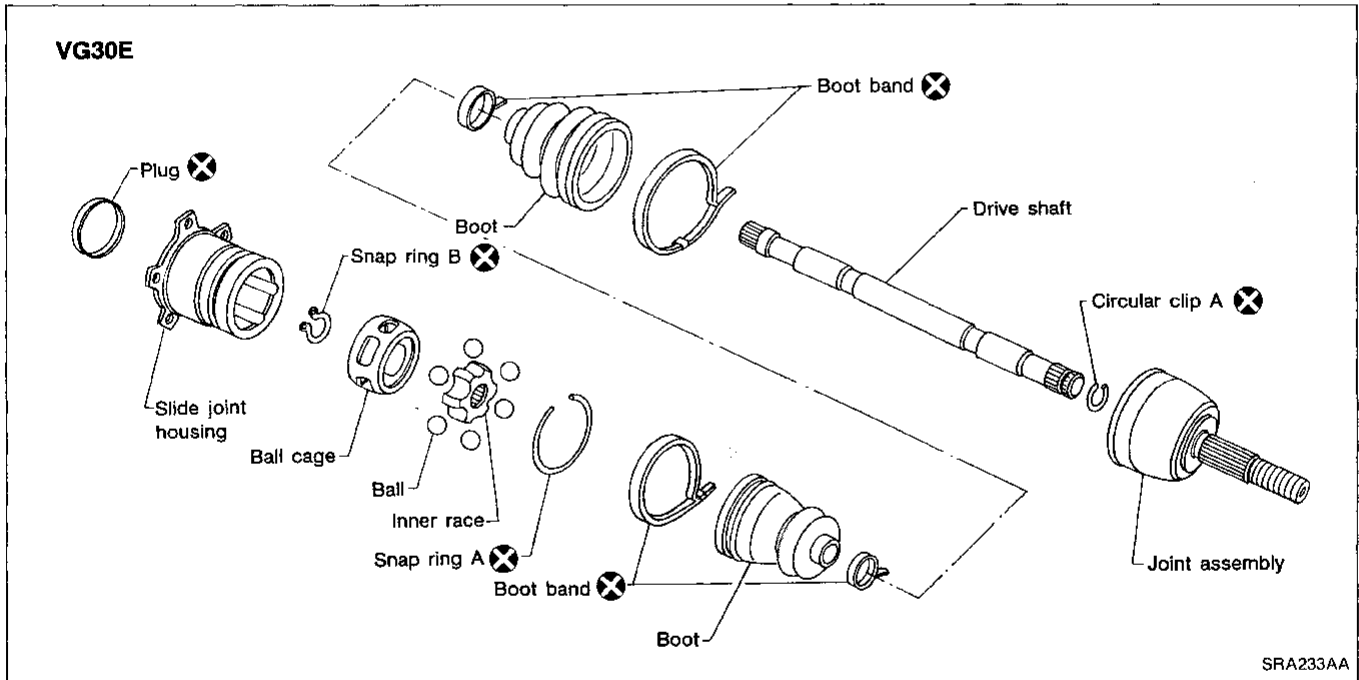
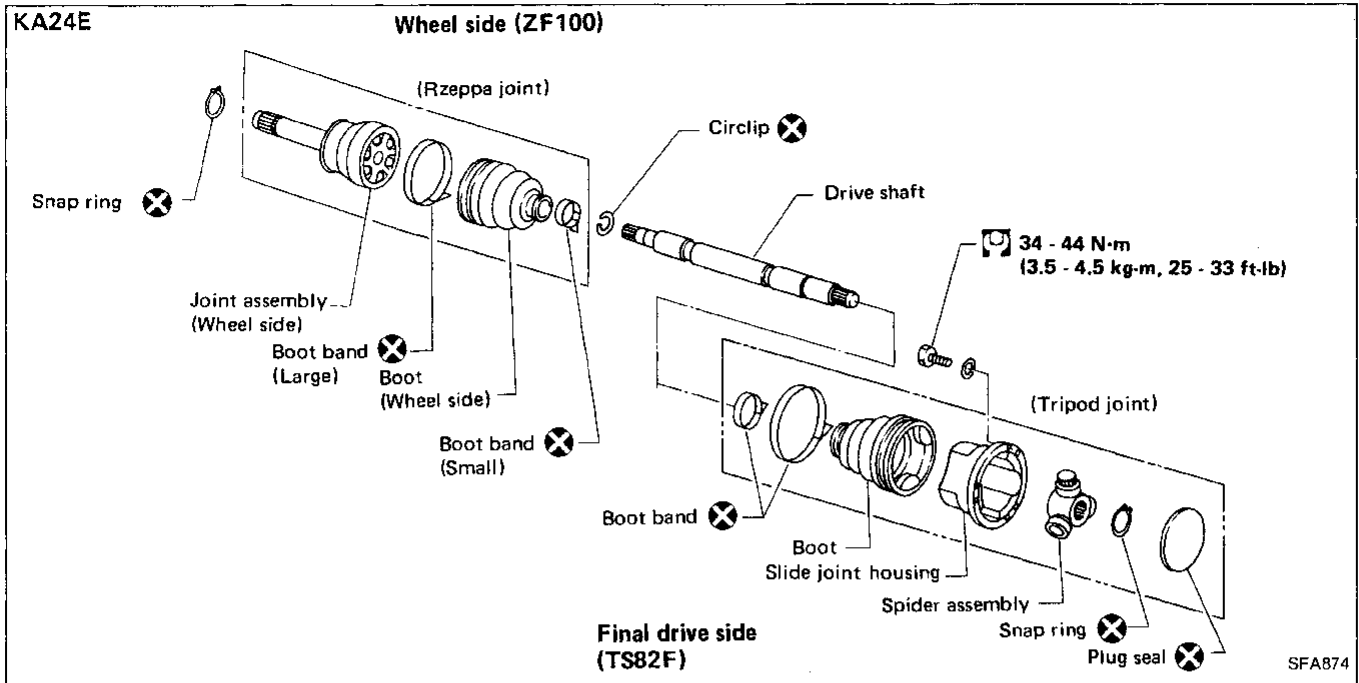
- After installing knuckle spindle, adjust wheel bearing preload. Refer to PRELOAD ADJUSTMENT of Front Wheel Bearing in ON-VEHICLE SERVICE (FA-7).
- After installing drive shaft, check drive shaft axial end play.

Do not reuse snap ring once it has been removed.

Refer to FRONT AXLE (4WD) — Drive shaft (FA-29).

FRONT AXLE (4WD)

Drive Shaft



REMOVAL

1. Remove bolts fixing drive shaft to final drive.
2. Remove free-running hub assembly with brake pedal depressed. Refer to FRONT AXLE (4WD) — Auto-lock Free-running Hub or Manual-lock Free-running Hub (FA-18).
 - Remove brake caliper assembly without disconnecting brake hydraulic line.

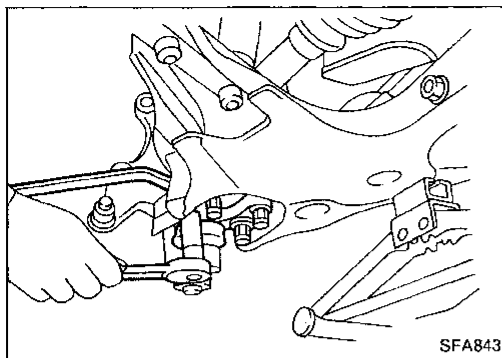
Make sure that brake hose is not twisted.

- Remove tie-rod ball joint. Refer to FRONT AXLE (4WD) — Knuckle Spindle (FA-26).

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FRONT AXLE (4WD)

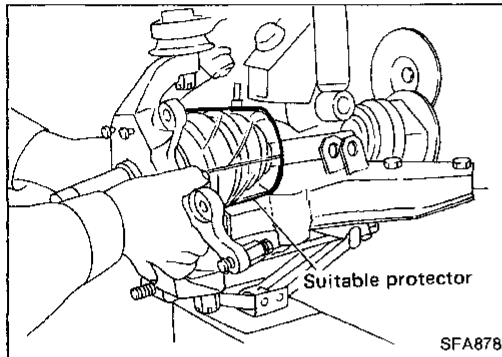
Drive Shaft (Cont'd)



3. Remove nuts fixing lower ball joint on lower link.

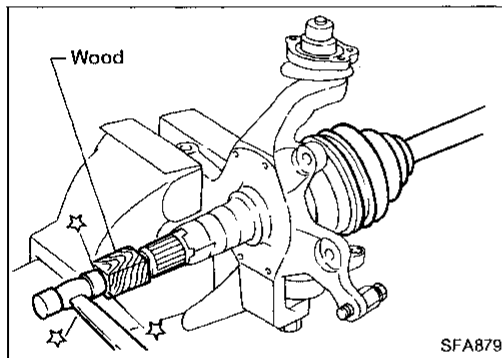
Support lower link with jack.

4. Remove upper ball joint fixing bolt.
5. Remove shock absorber lower bolt.

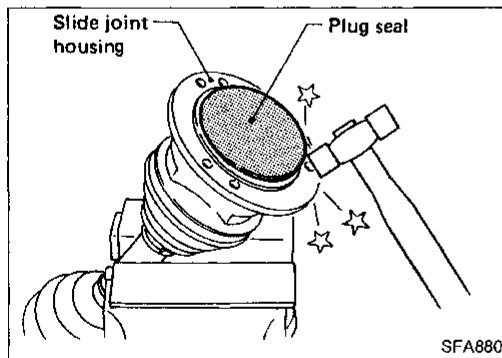


6. Remove drive shaft with knuckle.

Cover drive shaft boot with a suitable protector.



7. Separate drive shaft from knuckle by slightly tapping it.

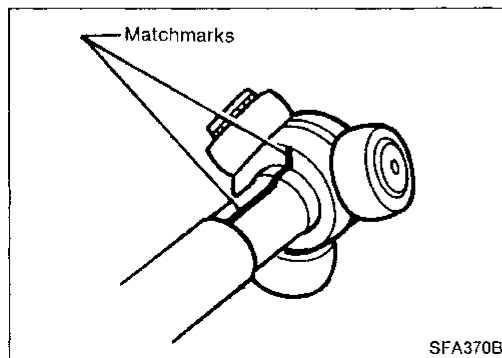


DISASSEMBLY

Final drive side

— TS82F type —

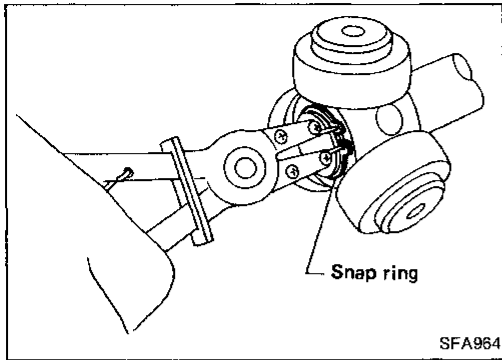
1. Remove plug seal from slide joint housing by lightly tapping around slide joint housing.
2. Remove boot bands.



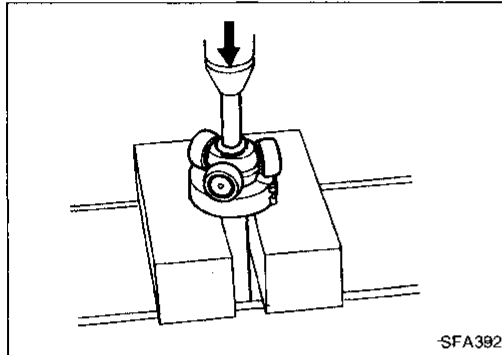
3. Move boot and slide joint housing toward wheel side, and put matchmarks.

FRONT AXLE (4WD)

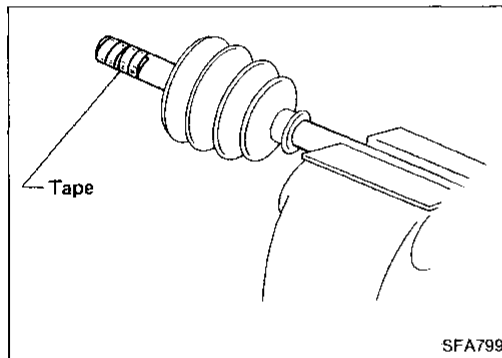
Drive Shaft (Cont'd)



4. Pry off snap ring.

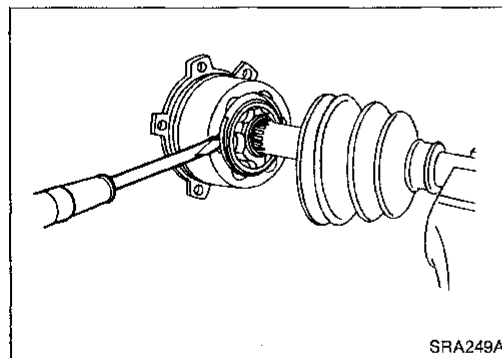


5. Detach spider assembly with press.



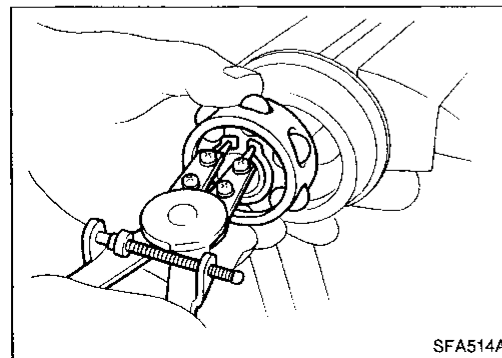
6. Draw out boot.

Cover drive shaft serration with tape so as not to damage the boot.



— DS90 type —

1. Remove boot bands.
2. Put matching marks on slide joint housing and inner race, before separating joint assembly.
3. Pry off snap ring "A" with a screwdriver, and pull out slide joint housing.



4. Put matching marks on inner race and drive shaft.
5. Pry off snap ring "B", then remove ball cage, inner race and balls as a unit.
6. Draw out boot.

Cover drive shaft serration with tape so as not to damage the boot.

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FRONT AXLE (4WD)

Drive Shaft (Cont'd)

Wheel side (ZF100)

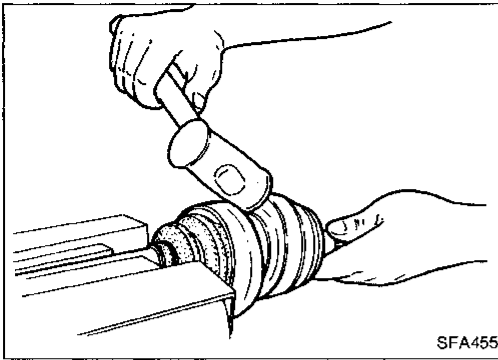
CAUTION:

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 or other damage.

Drive shaft

Replace drive shaft if it is twisted or cracked.

Boot

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

Joint assembly (Final drive side)

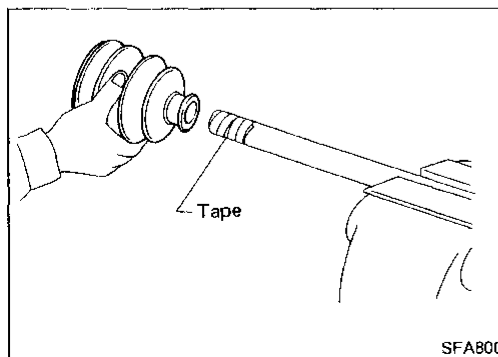
- Replace any parts of double offset joint which show signs of scorching, rust, wear or excessive play.
- Check serration for deformation. Replace if necessary.
- Check slide joint housing for any damage. Replace if necessary.

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

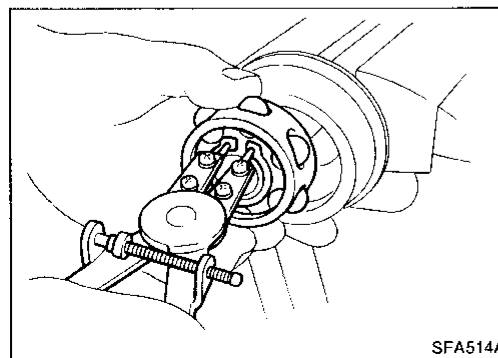
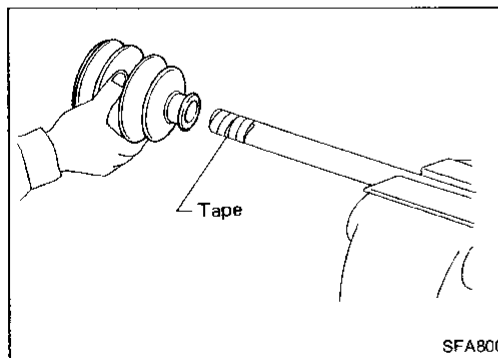
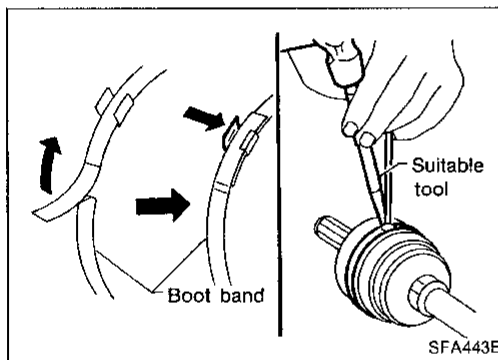
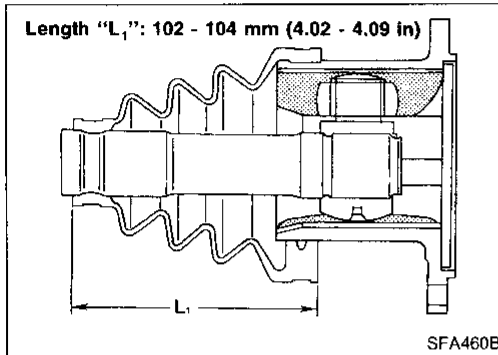
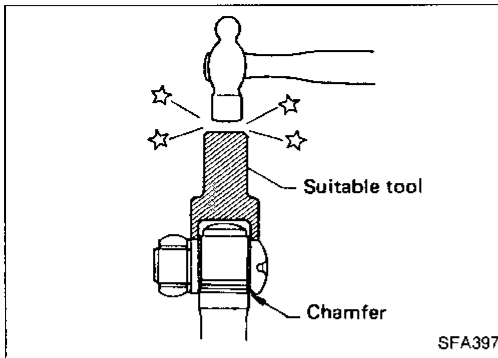
— TS82F type —

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

Cover drive shaft serration with tape so as not to damage boot during installation.

FRONT AXLE (4WD)

Drive Shaft (Cont'd)



2. Install spider assembly securely, ensuring 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:

150 - 160 g (5.29 - 5.64 oz)

5. Set boot so that it does not swell and deform when its length is "L₁".

Make sure that boot is properly installed on the drive shaft groove.

6. Lock new larger boot band securely with a suitable tool, then lock new smaller boot band.

7. Install new plug seal to slide joint housing by lightly tapping it.

Apply sealant to mating surface of plug seal.

— DS90 type —

1. Install boot and new small boot band on drive shaft.

Cover drive shaft serration with tape so as not to damage boot during installation.

2. Securely install ball cage, inner race and balls as a unit, making sure the marks which were made during disassembly are properly aligned.

3. Install new snap ring "B".

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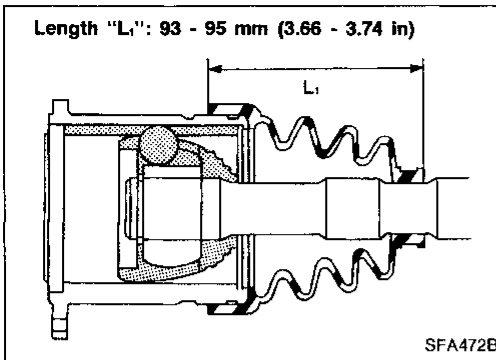
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FRONT AXLE (4WD)

Drive Shaft (Cont'd)



4. Pack drive shaft with specified amount of grease.

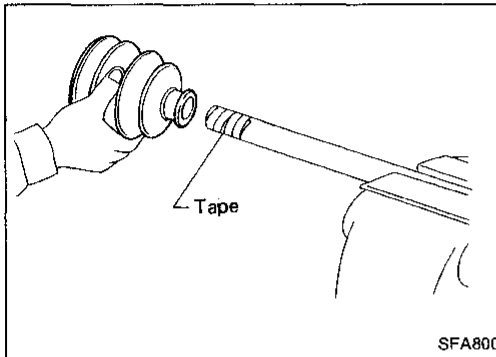
Specified amount of grease:

165 - 175 g (5.82 - 6.17 oz)

5. Install slide joint housing, then install new snap ring "A".
6. Set boot so that it does not swell and deform when its length is "L₁".

Make sure that boot is properly installed on the drive shaft groove.

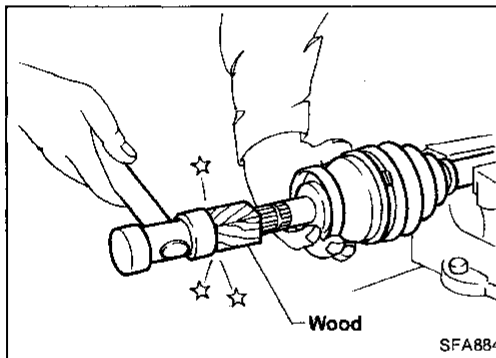
7. Lock new larger and smaller boot bands securely with a suitable tool.



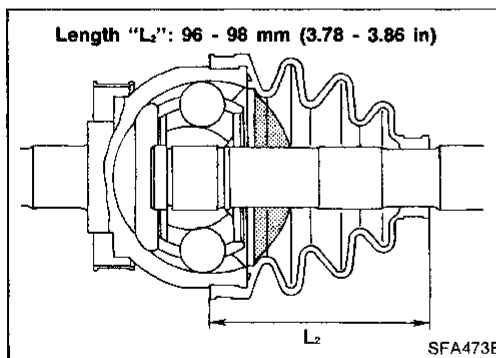
Wheel side (ZF100)

1. Install new small boot band and boot on drive shaft.

Cover drive shaft serration with tape so as not to damage boot during installation.



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



3. Pack drive shaft with specified amount of grease.

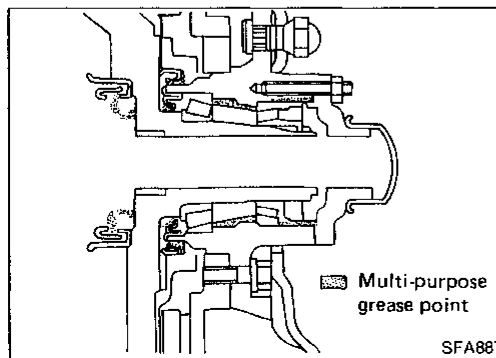
Specified amount of grease:

210 - 220 g (7.41 - 7.76 oz)

4. Set boot so that it does not swell and deform when its length is "L₂".

Make sure that boot is properly installed on the drive shaft groove.

5. Lock new larger boot band securely with a suitable tool.
6. Lock new smaller boot band.

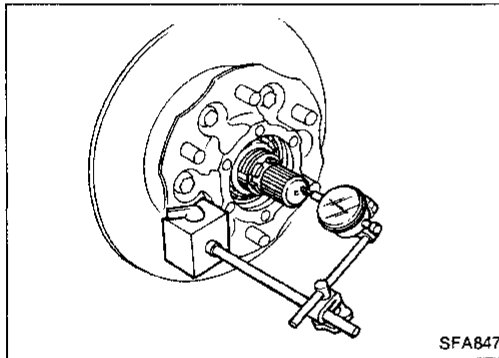
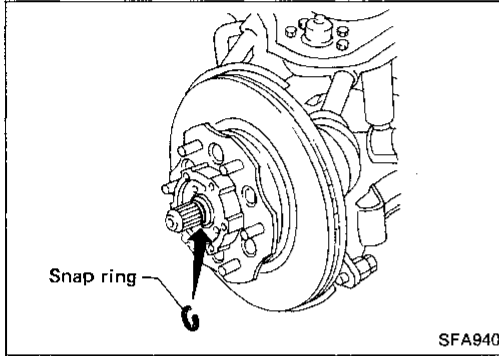
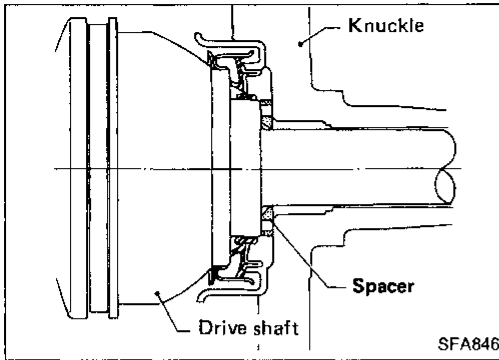


INSTALLATION

- Apply multi-purpose grease.

FRONT AXLE (4WD)

Drive Shaft (Cont'd)



- Install bearing spacer onto drive shaft.
Make sure that bearing spacer is facing in proper direction.

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

- (2) Set dial gauge on drive shaft end.
- (3) Measure axial end play of drive shaft.
Axial end play: 0.1 - 0.3 mm (0.004 - 0.012 in)
- (4) 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)	

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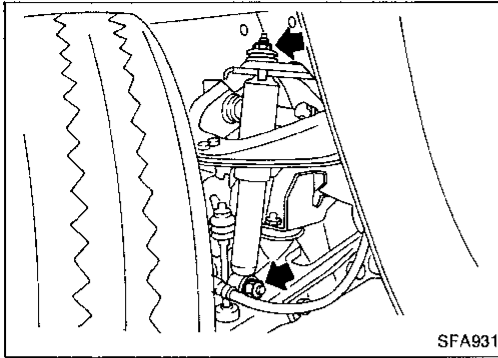
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FRONT SUSPENSION



Shock Absorber

REMOVAL AND INSTALLATION

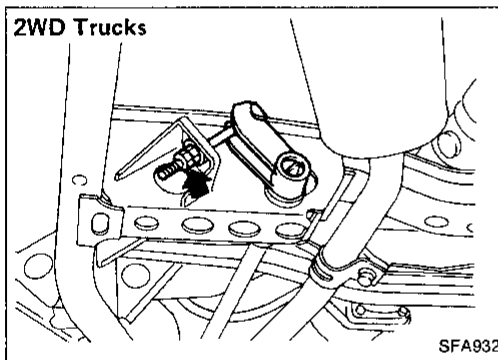
When removing and installing shock absorber, do not allow oil or grease to come into contact with rubber parts.

INSPECTION

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

Blow dirt and dust off of nonmetallic parts with compressed air.

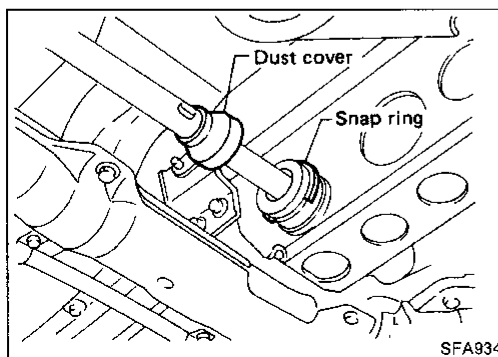
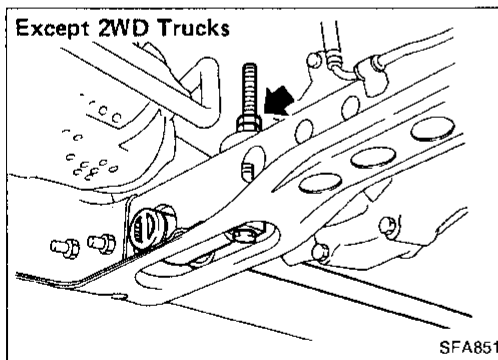
- Check for oil leakage and cracks. Replace if necessary.
- Check piston rod for cracks, deformation or other damage. Replace if necessary.
- Check rubber parts for wear, cracks, damage or deformation. Replace if necessary.



Torsion Bar Spring

REMOVAL

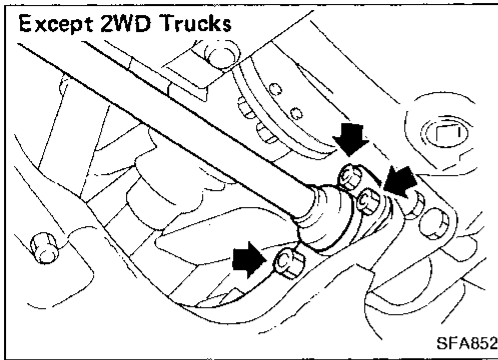
- Remove adjusting nut.



- Move dust cover, then detach snap ring from anchor arm.
- Pull out anchor arm rearward, then withdraw torsion bar spring rearward. — 2WD Trucks —
- Remove torque arm. — 2WD Trucks —

FRONT SUSPENSION

Torsion Bar Spring (Cont'd)



- Remove torque arm fixing nuts, then withdraw torsion bar spring forward with torque arm. — Except 2WD Trucks —

INSPECTION

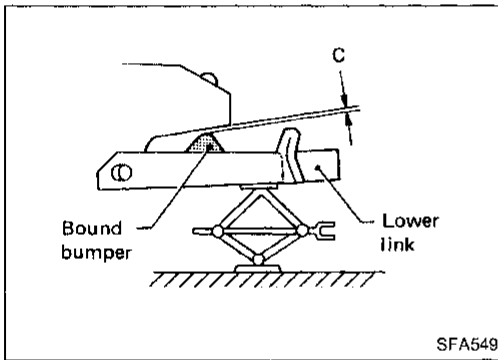
- Check torsion bar spring for wear, twist, bend and other damage.
- Check serrations of each part for cracks, wear, twist and other damage.
- Check dust cover for cracks.

INSTALLATION AND ADJUSTMENT

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

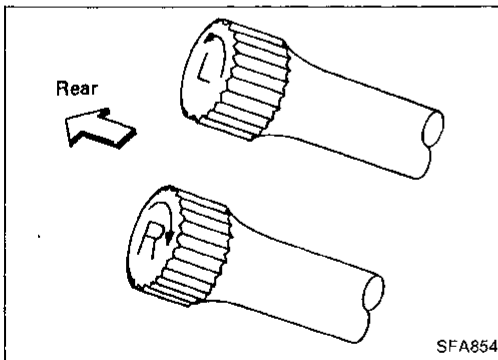
Do not adjust by loosening anchor arm adjusting nut.

1. Install torque arm to lower link. — 2WD Trucks —
2. Coat multi-purpose grease on the serration of torsion bar spring.



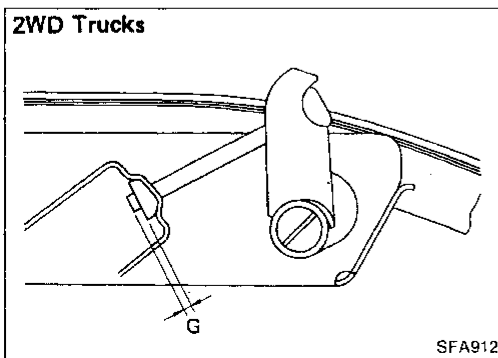
3. Place lower link in the position where bound buffer clearance "C" is 0.

Clearance "C": 0 mm (0 in)



4. Install torsion bar spring. — 2WD Trucks —
- Install torsion bar spring with torque arm. — Except 2WD Trucks —

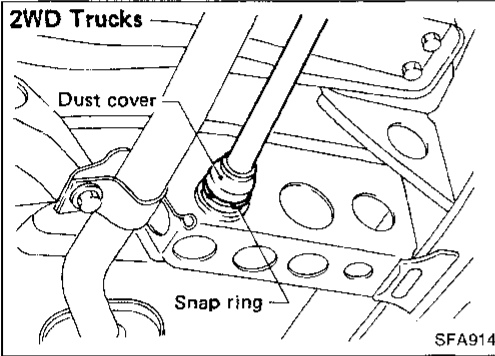
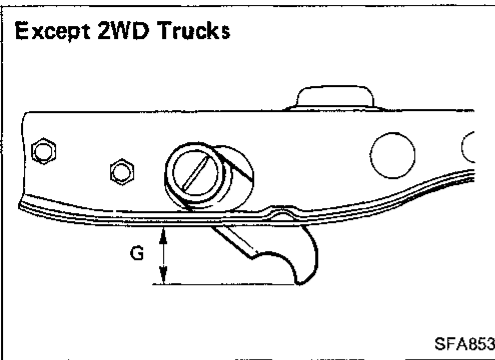
Be sure to install right and left torsion bar springs correctly.



5. Set anchor arm.
 - Standard length "G":
 - 2WD Trucks
6 - 18 mm (0.24 - 0.71 in)
 - Except 2WD Trucks
50 - 60 mm (1.97 - 2.36 in)

FRONT SUSPENSION

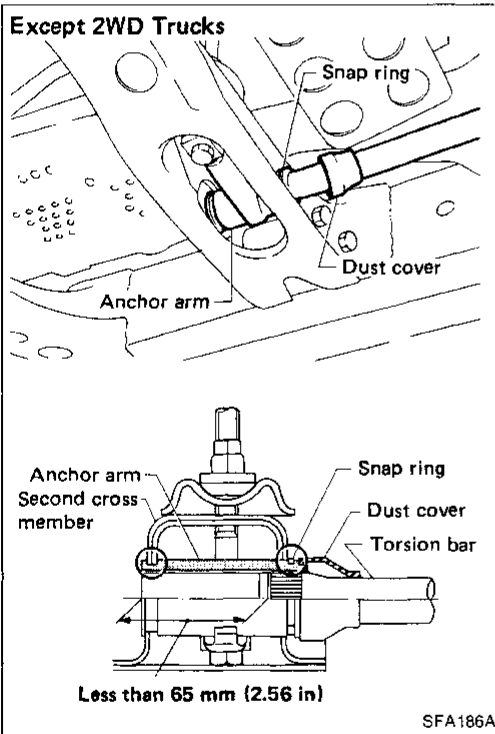
Torsion Bar Spring (Cont'd)



6. Install snap ring to anchor arm and dust cover.

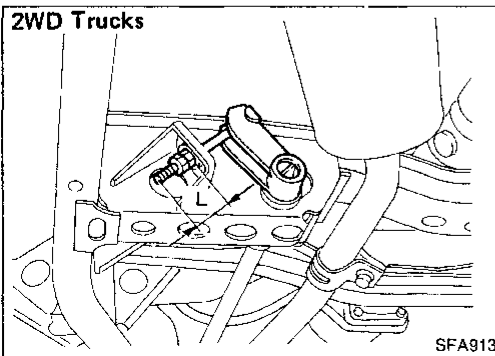
— 2WD Trucks —

Make sure that snap ring is properly installed on the anchor arm groove.



— Except 2WD Trucks —

Make sure that snap ring and anchor arm are properly installed.



7. Tighten anchor arm adjusting nut to get L dimension.

Standard length "L":

2WD Trucks

**For Heavy Duty, Cab & Chassis and
STD models**

35 mm (1.38 in)

Except above models

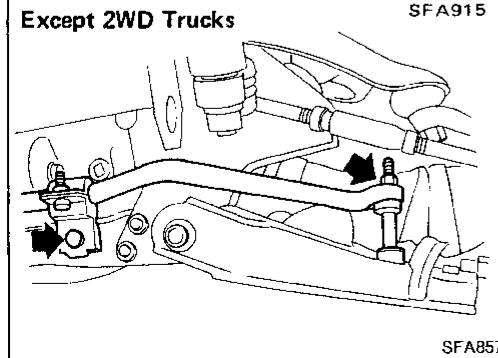
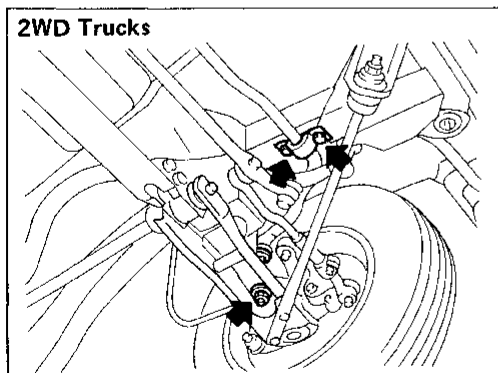
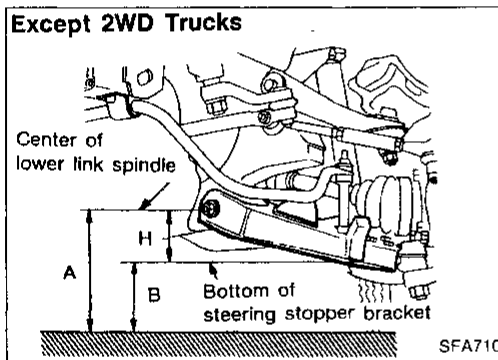
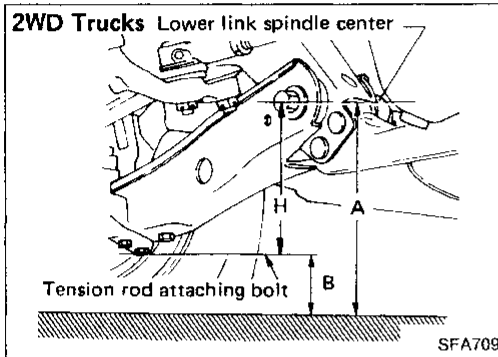
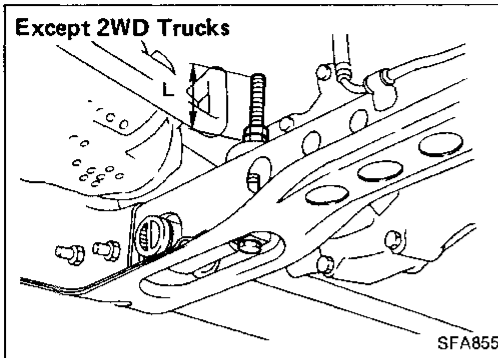
49 mm (1.93 in)

Except 2WD Trucks

77 mm (3.03 in)

FRONT SUSPENSION

Torsion Bar Spring (Cont'd)



8. Bounce vehicle with tires on ground (Unladen) to eliminate friction of suspension.

9. Measure vehicle posture "H".

(1) 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.

(2) Measure vehicle posture ... Dimension "H".

$$H = A - B \text{ mm (in) "Unladen"}$$

Refer to **WHEEL ALIGNMENT (Unladen)** on SDS (FA-52).

10. If height of the vehicle is not within allowable limit, adjust vehicle posture.

Refer to **WHEEL ALIGNMENT (Unladen)** on SDS (FA-52).

11. Check wheel alignment if necessary.

Refer to **WHEEL ALIGNMENT (Unladen)** on SDS (FA-52).

Stabilizer Bar

REMOVAL

- Remove stabilizer bar connecting bolt and a clamp bolt.

INSPECTION

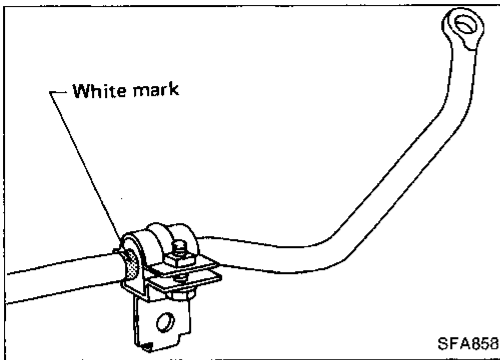
- Check stabilizer bar for twist and deformation. Replace if necessary.
- Check rubber bushing for cracks, wear or deterioration. Replace if necessary.

FRONT SUSPENSION

Stabilizer Bar (Cont'd)

INSTALLATION

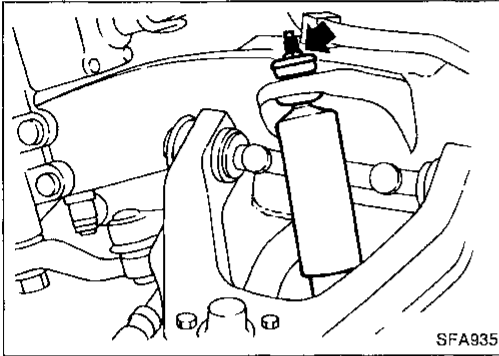
- Install bushing outside white mark painted on stabilizer.



Upper Link

REMOVAL

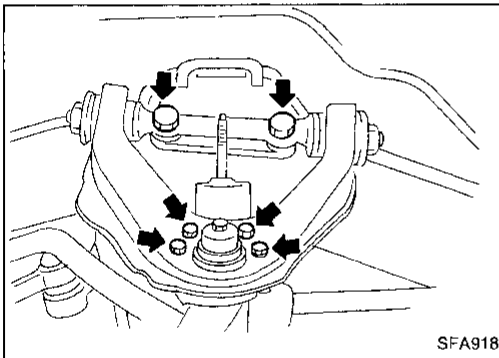
- Remove shock absorber upper fixing nut.



- Remove bolts fixing upper ball joint on upper link.

Support lower link with jack.

- Remove upper link spindle fixing bolts.

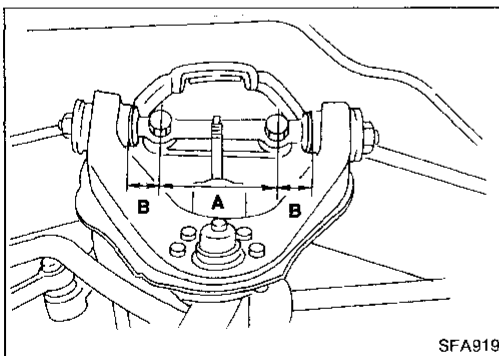


INSTALLATION

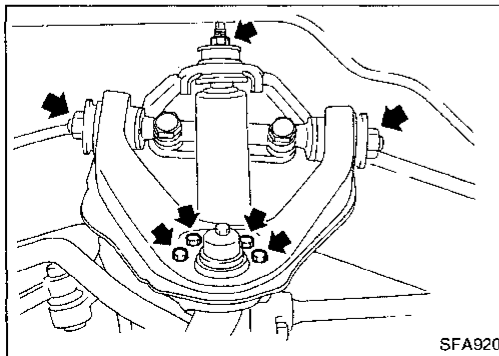
- Tighten upper link spindle with camber adjusting shims.
- After fitting, check dimensions "A" and "B".

A: 110 mm (4.33 in)

B: 32 mm (1.26 in)



- Install upper ball joint on upper link.
- Install shock absorber upper fixing nut.
- Tighten upper link spindle lock nuts under unladen condition with tires on ground.
- After installing, check wheel alignment. Adjust if necessary. Refer to Front Wheel Alignment of ON-VEHICLE SERVICE (FA-9).



FRONT SUSPENSION

Upper Link (Cont'd)

DISASSEMBLY

- Press out upper link spindle with bushings.

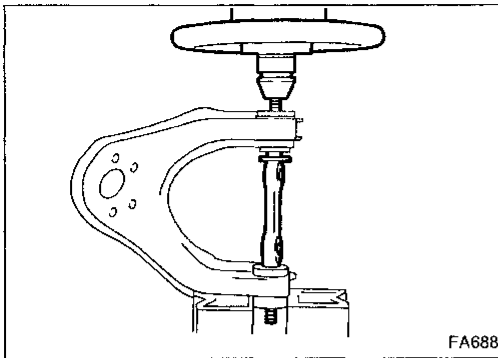
INSPECTION

- Check upper link spindle and rubber bushings for damage. Replace if necessary.
- Check upper link for deformation or cracks. Replace if necessary.

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ASSEMBLY

- Apply soapsuds to rubber bushing.
- Press upper link bushing.

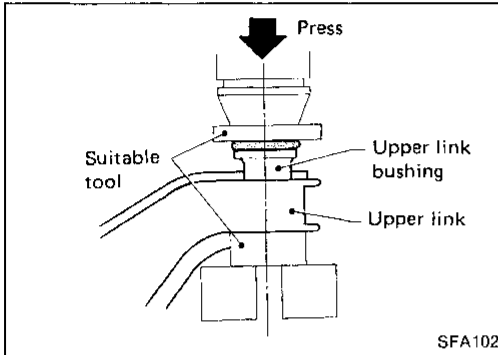
Press bushing so that flange of bushing securely contacts end surface of upper link collar.

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- Insert upper link spindle and inner washers. **Install inner washers with rounded edges facing inward.**
- Press another bushing.

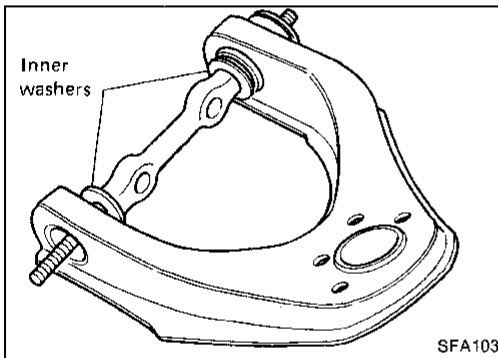
Press bushing so that flange of bushing securely contacts end surface of upper link collar.

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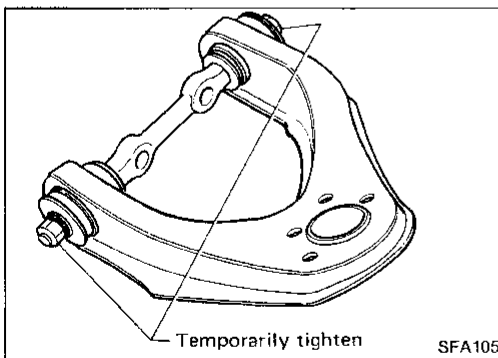
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- Temporarily tighten nuts.

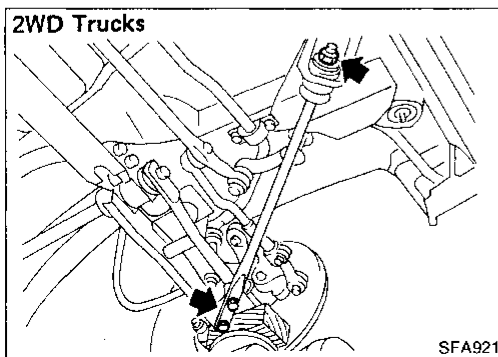


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Tension Rod or Compression Rod

REMOVAL AND INSTALLATION

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

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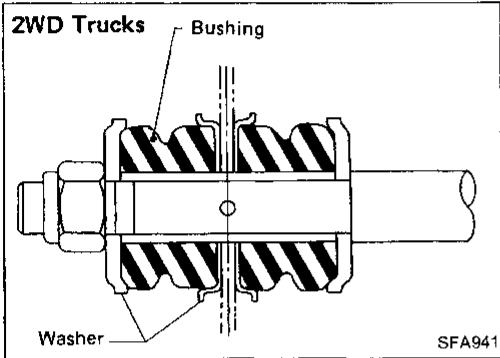
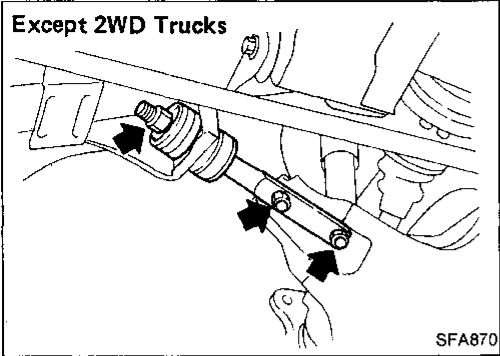
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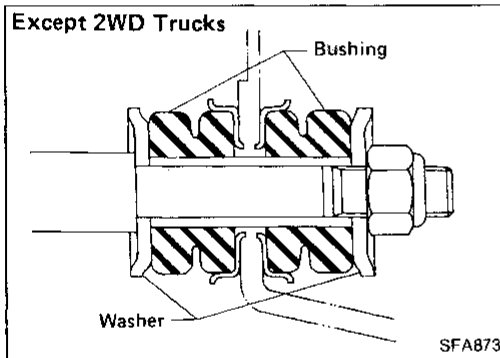
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FRONT SUSPENSION

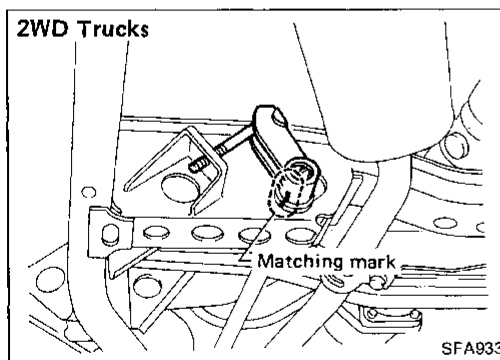
Tension Rod or Compression Rod (Cont'd)



- Install tension rod. — 2WD Trucks —
Make sure that bushings and washers are installed properly.



- Install compression rod. — Except 2WD Trucks —
Make sure that bushings and washers are installed properly.

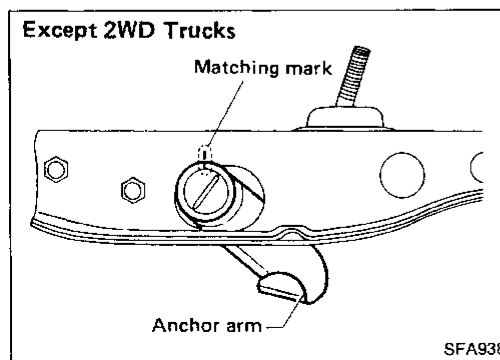


Lower Link

REMOVAL AND INSTALLATION

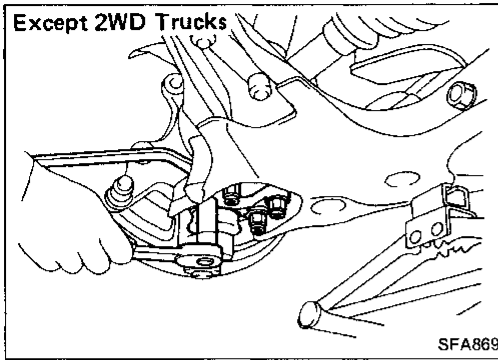
- Remove torsion bar spring. Refer to REMOVAL of Torsion Bar Spring (FA-38).

Make matching mark on anchor arm and crossmember when loosening adjusting nut until there is no tension on torsion bar spring.

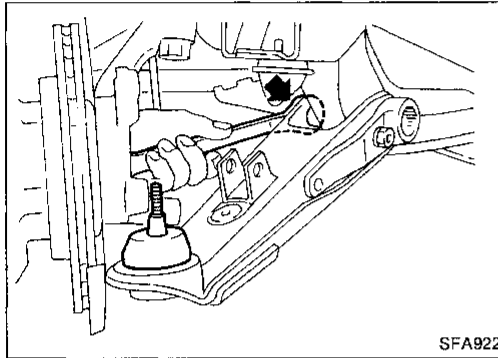


FRONT SUSPENSION

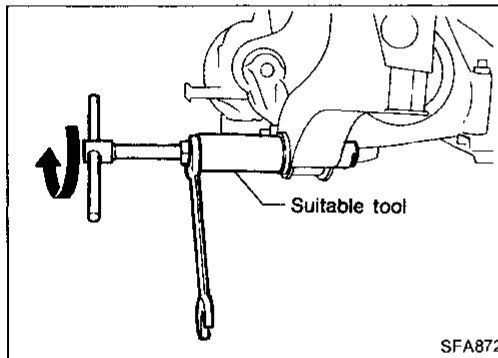
Lower Link (Cont'd)



- Separate lower link ball joint from knuckle spindle (FA-26).
— 2WD Trucks —
Refer to FRONT AXLE — Knuckle Spindle (FA-26).
- Separate lower ball joint from lower link. — Except 2WD Trucks —



- Remove front lower link fixing nut.



- Remove bushing of lower link spindle from frame with suitable tool.
- When installing bushing, apply soapy water on bushing.
- After installing lower link, adjust wheel alignment and vehicle height. Refer to Front Wheel Alignment of ON-VEHICLE SERVICE (FA-9).

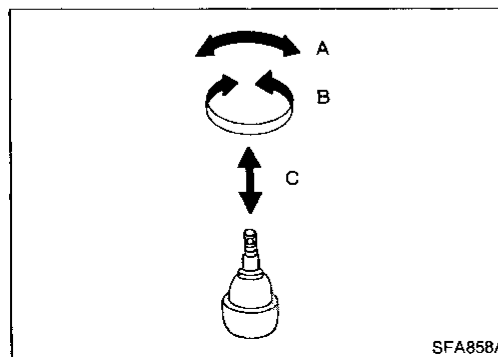
INSPECTION

Lower link and lower link spindle

- Check lower link and lower link spindle for deformation or cracks. Replace if necessary.

Lower link bushing

- Check bushing for distortion or other damage. Replace if necessary.



Upper Ball Joint and Lower Ball Joint

REMOVAL AND INSTALLATION

- Separate knuckle spindle from upper and lower links. Refer to FRONT AXLE — Knuckle Spindle (FA-26).

INSPECTION

- Check ball joint for turning torque "A".

Upper ball joint:

31.87 - 199.38 N

(3.25 - 20.33 kg, 7.17 - 44.83 lb)

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FRONT SUSPENSION

Upper Ball Joint and Lower Ball Joint (Cont'd)

Lower ball joint:

[2WD Trucks]

13.63 - 54.43 N

(1.39 - 5.55 kg, 3.06 - 12.24 lb)

[Except 2WD Trucks]

0 - 67.7 N

(0 - 6.9 kg, 0 - 15.2 lb)

If turning torque A is not within above specifications, replace ball joint assembly.

- Check ball joint for turning torque "B".

Upper ball joint:

1.0 - 4.9 N·m

(10 - 50 kg-cm, 8.7 - 43.4 in-lb)

Lower ball joint:

[2WD Trucks]

1.0 - 3.9 N·m

(10 - 40 kg-cm, 8.7 - 34.7 in-lb)

[Except 2WD Trucks]

0 - 4.9 N·m

(0 - 50 kg-cm, 0 - 43 in-lb)

If turning torque B is not within above specifications, replace ball joint assembly.

- Check ball joint for vertical end play "C".

Upper ball joint:

1.6 mm (0.063 in) or less

Lower ball joint:

[2WD Trucks]

1.6 mm (0.063 in) or less

[Except 2WD Trucks]

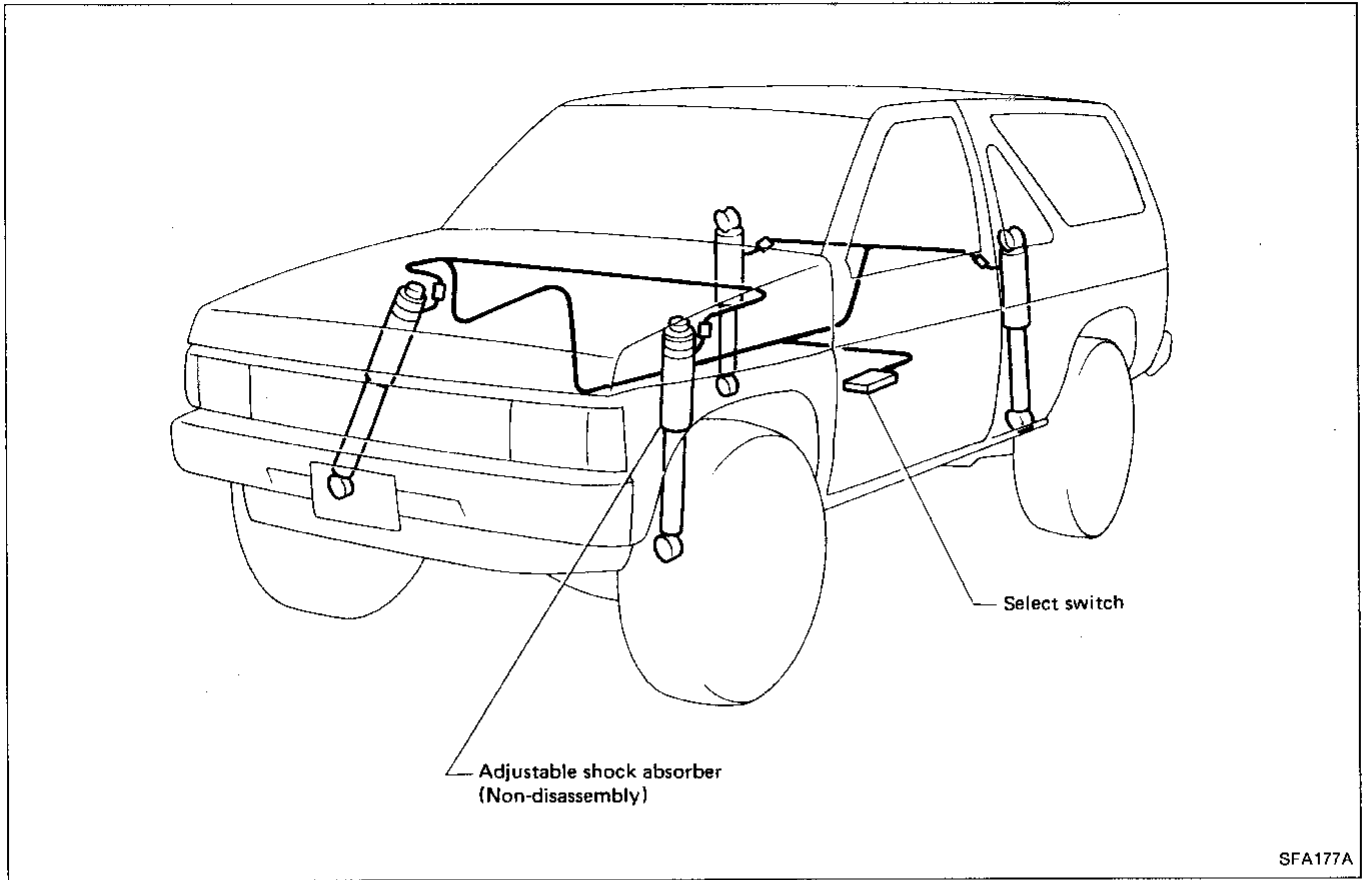
0.5 mm (0.020 in) or less

Replace ball joint if movement is beyond specifications.

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

ADJUSTABLE SHOCK ABSORBER

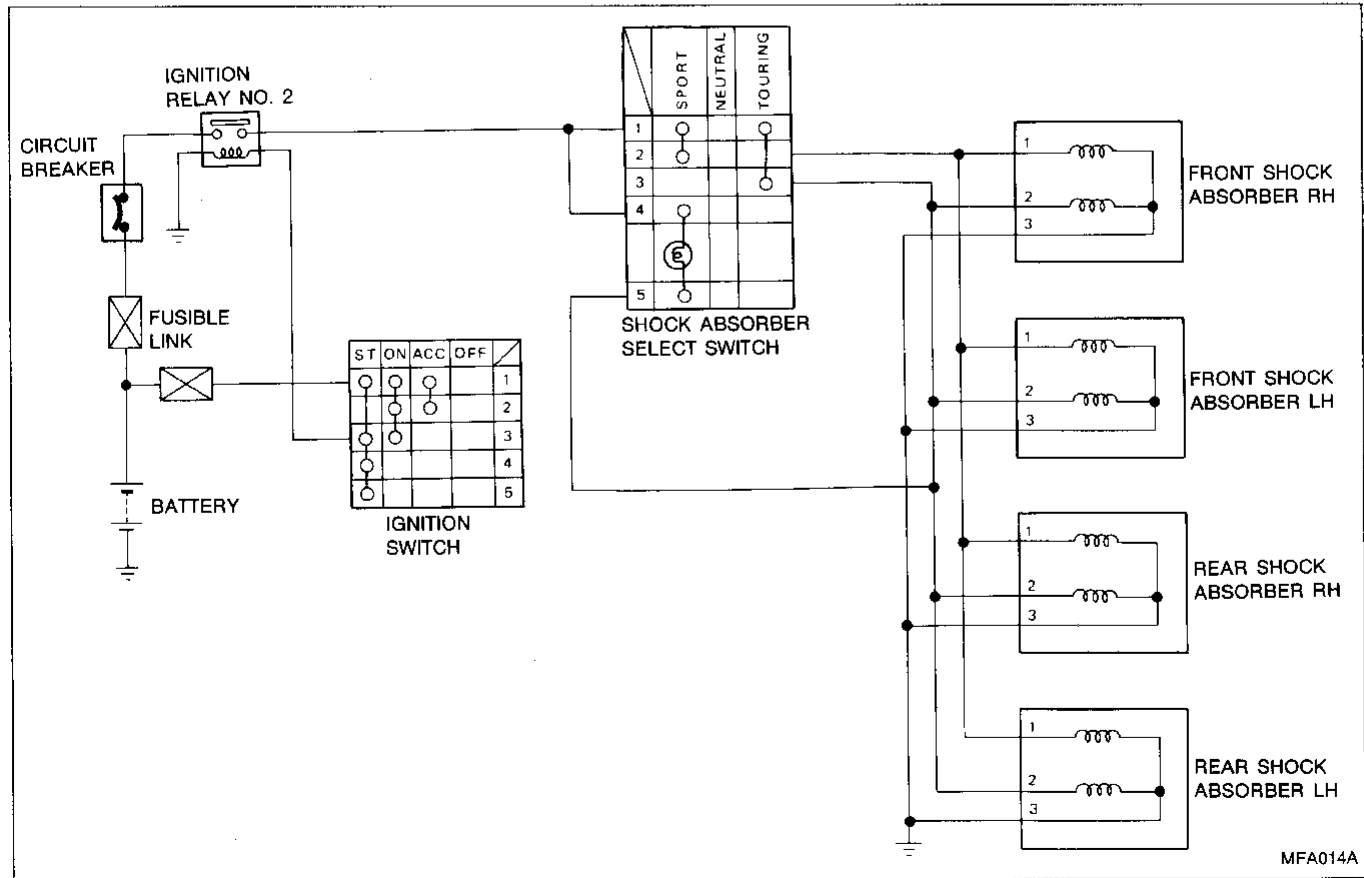
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Schematic

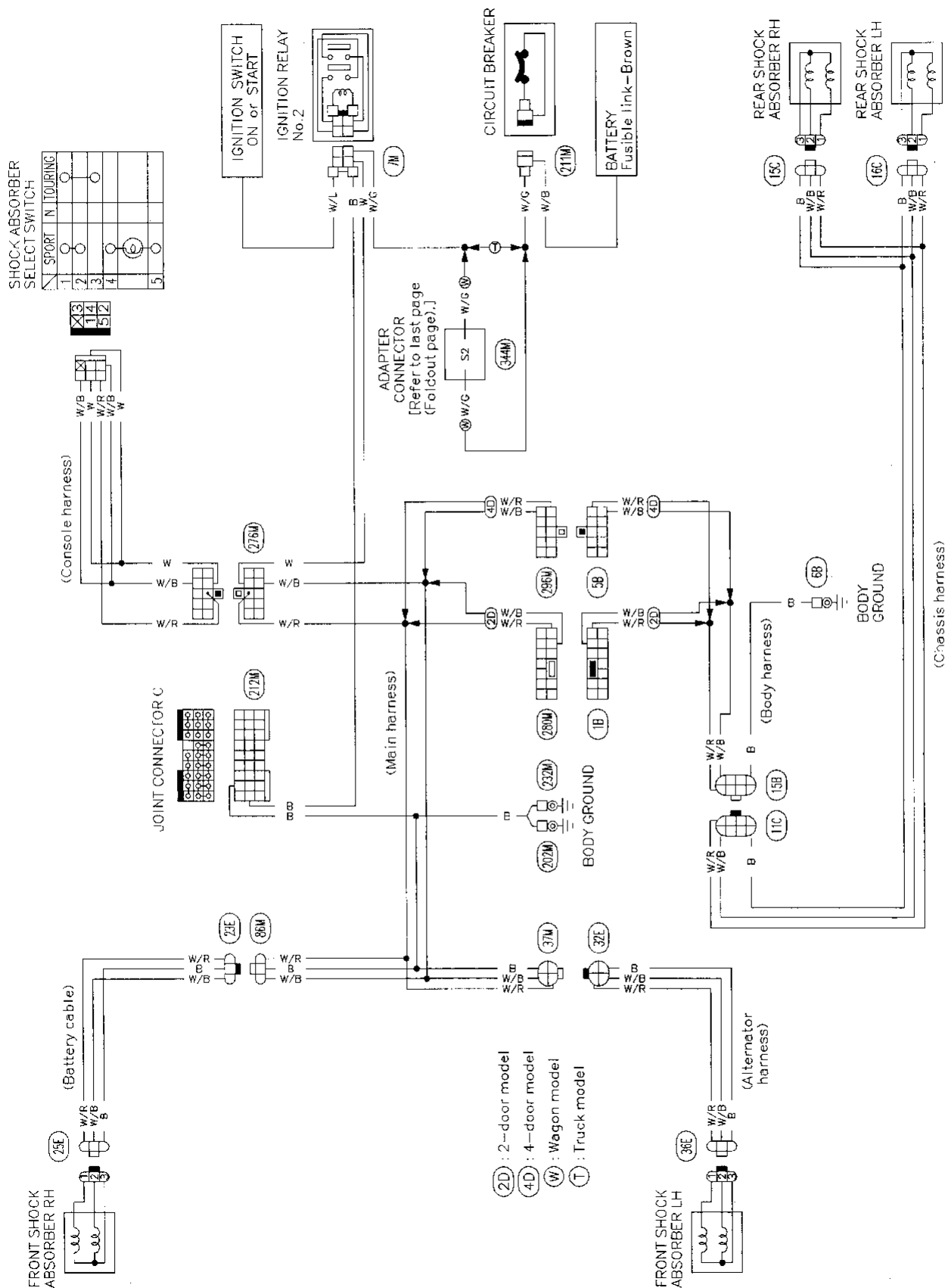


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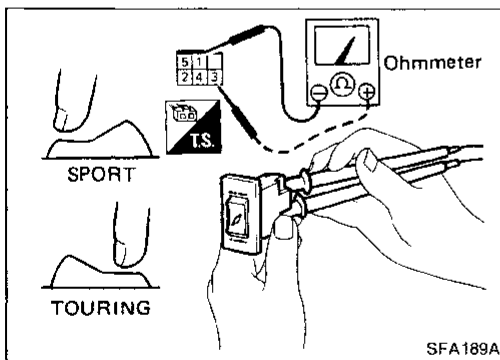
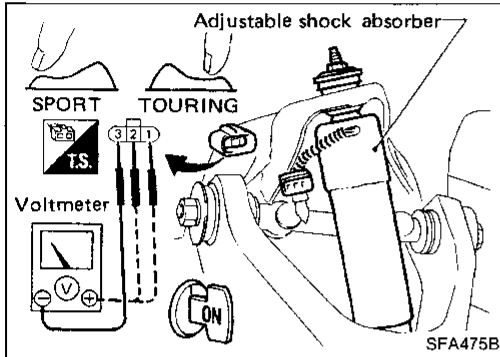
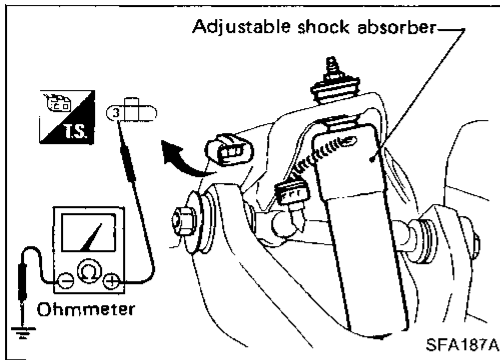
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ADJUSTABLE SHOCK ABSORBER

Wiring Diagram



ADJUSTABLE SHOCK ABSORBER



Terminal Check

POWER SUPPLY CIRCUIT CHECK

1. Disconnect adjustable shock absorber connector.
2. Check for continuity between terminal ③ and body ground.

Ohmmeter terminal		Continuity
(+)	(-)	
③	Body ground	Yes

3. Connect a voltmeter from terminal side.
4. Measure voltage across terminal ③ and terminals ② & ①.

Voltmeter		Voltage	Select switch position
(+)	(-)		
①	③	Approx. 12V	Push the SPORT end of the switch continuously.
		0	Release the switch.
②	③	Approx. 12V	Push the TOURING end of the switch continuously.
		0	Release the switch.

SELECT SWITCH CHECK

1. Disconnect select switch connector, then connect an ohmmeter to switch.
2. Check for continuity between terminals at each switch position.

Switch position	Terminal				
	①	②	③	④	⑤
NEUTRAL				 Approx. 20Ω	
SPORT	○	○			
TOURING	○		○		

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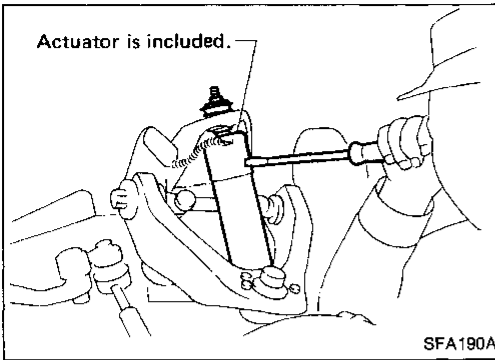
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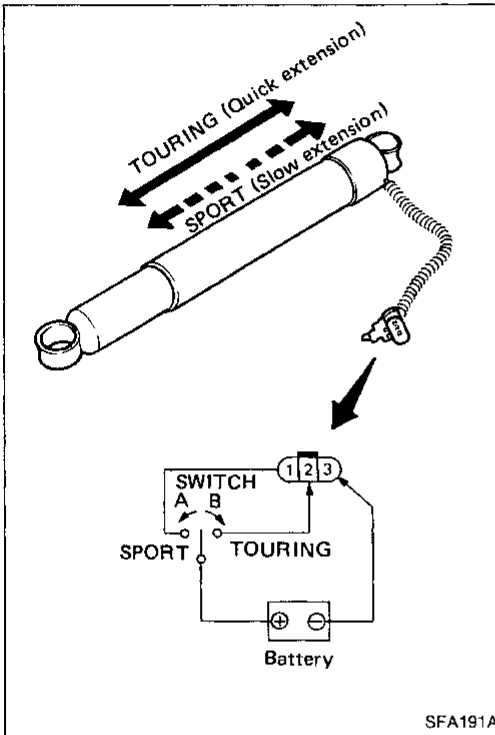
ADJUSTABLE SHOCK ABSORBER



Shock Absorber Check

[Method A]

Attach a suitable tool to the shock absorber. Check operating sound of the actuator when the select switch is moved from one position (SPORT) to the other (TOURING) and vice versa.



[Method B]

1. Compress the shock absorber as much as possible.
2. Apply battery voltage across terminals (③ and ①, ③ and ②) of the shock absorber.
3. Check if speed varies with expansion of the shock absorber when switching to A side and B side.
If speed changes, the actuator is functioning properly. (In other words, oil passages in the shock absorber are properly switched by the actuator.)

SERVICE DATA AND SPECIFICATIONS (SDS)

General Specifications

TORSION BAR SPRING

Applied model	Truck			Pathfinder
	2WD		4WD	
	Except Heavy duty	Heavy duty		
Spring diameter x length mm (in)	22.6 x 885 (0.890 x 34.84)	24.4 x 885 (0.961 x 34.84)	26.0 x 1,205 (1.024 x 47.44)	26.0 x 1,230 (1.024 x 48.43)
Spring constant N/mm (kg/mm, lb/in)	16.5 (1.68, 94.1)	22.8 (2.32, 129.9)	25.7 (2.62, 146.7)	25.3 (2.58, 144.5)

SHOCK ABSORBER

Applied model	Truck				Pathfinder		
	2WD		4WD				
	Except Heavy duty	Heavy duty	Except Canada	Canada			
Shock absorber type	Non-adjustable					Adjustable	
						Touring	Sport
Damping force [at 0.3 m (1.0 ft)/sec.] N (kg, lb)							
Expansion	579 - 794 (59 - 81, 130 - 179)	1,089 - 1,461 (111 - 149, 245 - 329)	1,599 - 2,128 (163 - 217, 359 - 478)	1,687 - 2,236 (172 - 228, 379 - 503)	2,501 - 3,285 (255 - 335, 562 - 739)	2,491 - 3,295 (254 - 336, 560 - 741)	2,972 - 3,933 (303 - 401, 668 - 884)
Compression	216 - 333 (22 - 34, 49 - 75)	314 - 471 (32 - 48, 71 - 106)	559 - 814 (57 - 83, 126 - 183)	432 - 647 (44 - 66, 97 - 146)	883 - 1,275 (90 - 130, 198 - 287)	716 - 1,069 (73 - 109, 161 - 240)	1,334 - 1,903 (136 - 194, 300 - 428)

STABILIZER BAR

Applied model	2WD Truck	Except 2WD Truck
Stabilizer bar diameter mm (in)	23.0 (0.906)	24.0 (0.945)

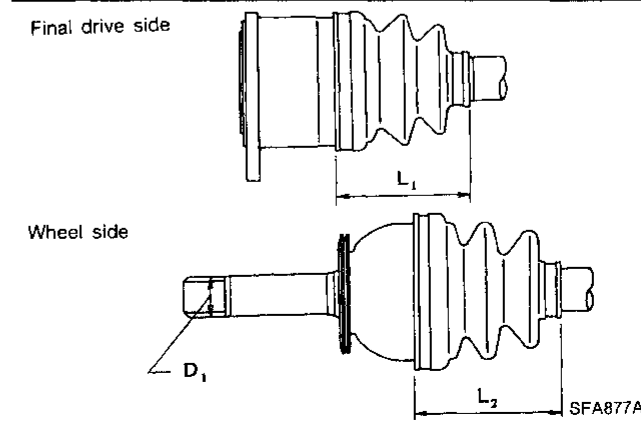
TENSION ROD OR COMPRESSION ROD

Applied model	2WD Truck	Except 2WD Truck
Rod diameter mm (in)	22.0 (0.866)	23.5 (0.925)

DRIVE SHAFT (4WD models)

Applied model	KA24E	VG30E
Drive shaft joint type		
Final drive side	TS82F	DS90
Wheel side	ZF100	ZF100
Fixed joint axial end play limit mm (in)	0.1 (0.004)	
Diameter mm (in)		
Wheel side (D ₁)	29.0 (1.142)	
Grease		
Quality	Nissan genuine grease or equivalent	
Capacity g (oz)		
Final drive side	150 - 160 (5.29 - 5.64)	165 - 175 (5.82 - 6.17)
Wheel side	210 - 220 (7.41 - 7.76)	

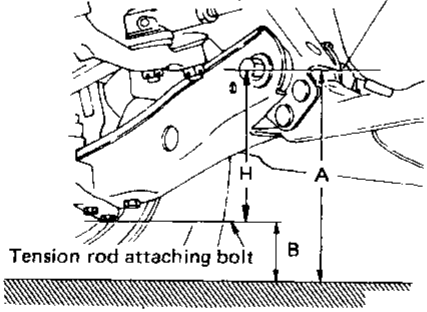
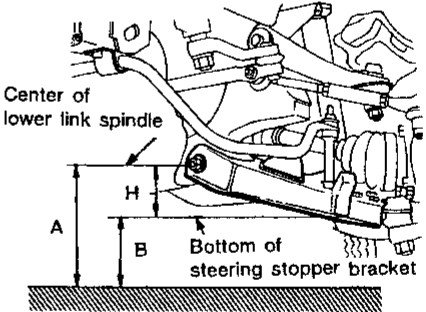
Applied model	KA24E	VG30E
Boot length mm (in)		
Final drive side (L ₁)	102 - 104 (4.02 - 4.09)	93 - 95 (3.66 - 3.74)
Wheel side (L ₂)	96 - 98 (3.78 - 3.86)	



SERVICE DATA AND SPECIFICATIONS (SDS)

Inspection and Adjustment

WHEEL ALIGNMENT (Unladen*1)

Applied model	ALLOWABLE LIMIT		ADJUSTING RANGE	
	2WD Truck	Except 2WD Truck	2WD Truck	Except 2WD Truck
Camber degree	-0°20' to 1°10'	-0°05' to 1°25'	-0°05' to 0°55'	0°10' - 1°10'
Caster degree	-0°23' to 1°07'	0°33' - 2°03'	-0°08' to 0°52'	0°48' - 1°48'
Kingpin inclination degree	8°20' - 9°50'	7°21' - 8°51'	8°35' - 9°35'	7°36' - 8°36'
Camber, caster, and kingpin inclination difference between both sides degree	45'			
Toe-in				
Radial tire				
A - B mm (in)	1 - 5 (0.04 - 0.20)	2 - 6 (0.08 - 0.24)	2 - 4 (0.08 - 0.16)	3 - 5 (0.12 - 0.20)
Total angle 2θ degree	5' - 25'	9' - 29'	10' - 20'	14' - 24'
Front wheel turning angle				
Full turn*2 degree				
Except 31 x 10.5R15 tire				
Inside	34° - 38°	31° - 35°	36° - 38°	33° - 35°
Outside	31° - 35°	29° - 33°	33° - 35°	31° - 33°
31 x 10.5R15 tire				
Inside	—	25° - 29°	—	27° - 29°
Outside	—	23° - 27°	—	25° - 27°
Vehicle posture				
Lower arm pivot height (H) mm (in)	108 - 118 (4.25 - 4.65)	41 - 51 (1.61 - 2.01)	111 - 115 (4.37 - 4.53)	44 - 48 (1.73 - 1.89)
		2WD Trucks  <small>SFA709</small>	Except 2WD Trucks  <small>SFA710</small>	

*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)

WHEEL BEARING

2WD Trucks

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)

Except 2WD Trucks

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)

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

DRIVE SHAFT

Drive shaft axial end play mm (in)	0.1 - 0.3 (0.004 - 0.012)
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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

UPPER BALL JOINT

Applied model	2WD Trucks	Except 2WD Trucks
Turning torque "A" (Measuring point: cotter pin hole of ball stud) N (kg, lb)	31.87 - 199.38 (3.25 - 20.33, 7.17 - 44.83)	
Turning torque "B" N·m (kg-cm, in-lb)	1.0 - 4.9 (10 - 50, 8.7 - 43.4)	
Vertical end play limit "C" mm (in)	1.6 (0.063)	

LOWER BALL JOINT

Applied model	2WD Trucks	Except 2WD Trucks
Turning torque "A" (Measuring point: cotter pin hole of ball stud) N (kg, lb)	13.63 - 54.43 (1.39 - 5.55, 3.06 - 12.24)	0 - 67.7 (0 - 6.9, 0 - 15.2)
Turning torque "B" N·m (kg-cm, in-lb)	1.0 - 3.9 (10 - 40, 8.7 - 34.7)	0 - 4.9 (0 - 50, 0 - 43)
Vertical end play limit "C" mm (in)	1.6 (0.063)	0.5 (0.020)