

SECTION **FSU**  
FRONT SUSPENSION

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D

FSU

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# PRECAUTIONS

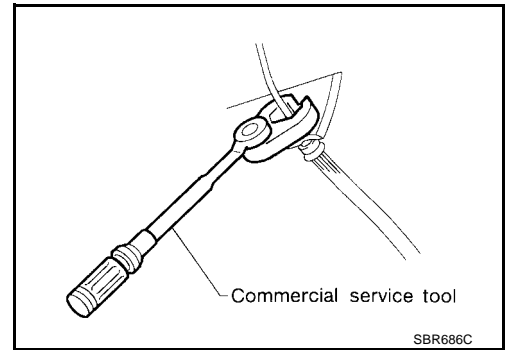
## PRECAUTIONS

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### Precautions

EES000E1

- 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.



# PREPARATION

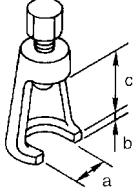
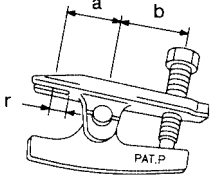
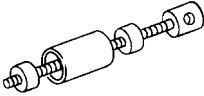
## PREPARATION

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### Special Service Tools

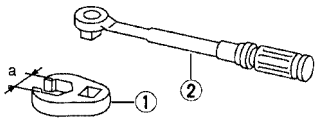
EES000E2

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
ST29020001 (J24319-01) Gear arm puller	 Removing ball joint for knuckle spindle <b>a: 34 mm (1.34 in)</b> <b>b: 6.5 mm (0.256 in)</b> <b>c: 61.5 mm (2.421 in)</b>
HT72520000 (J25730-B) Ball joint remover	 Removing tie-rod outer end <b>a: 33 mm (1.30 in)</b> <b>b: 50 mm (1.97 in)</b> <b>r: R11.5 mm (0.453 in)</b>
KV40106800 ( — ) Lower link bushing puller	 Removing and installing lower link bushing

## Commercial Service Tools

EES000E3

Tool name	Description
1 Flare nut crowfoot 2 Torque wrench	 Removing and installing each brake piping <b>a: 10 mm (0.39 in)</b>

# NOISE VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

## NOISE VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

PFP:54000

### NVH Troubleshooting Chart

EES000FD

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

Symptom		Possible Cause and SUSPECTED PARTS																	Reference page					
		Improper installation, looseness	Shock absorber deformation, damage or deflection	Parts interference	Suspension looseness	Incorrect wheel alignment	Stabilizer bar fatigue	Out-of-round	Imbalance	Incorrect air pressure	Uneven tire wear	Deformation or damage	Non-uniformity	Incorrect tire size	PROPELLER SHAFT	DIFFERENTIAL	DRIVE SHAFT	AXLE		SUSPENSION	TIRES	ROAD WHEEL	BRAKES	STEERING
SUSPENSION	Noise	x	x	x	x										x	x	x	x		x	x	x	x	
	Shake	x	x	x	x										x		x	x		x	x	x	x	
	Vibration	x	x	x											x		x	x		x				x
	Shimmy	x	x	x		x												x		x	x	x	x	x
	Judder	x	x															x		x	x	x	x	x
	Poor quality ride or handling	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	
	Shake	x						x	x	x	x	x		x	x		x	x	x		x	x	x	
	Vibration									x				x	x		x	x	x				x	
	Shimmy	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	
	Poor quality ride or handling	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	
	Shake	x						x	x					x		x	x	x	x		x	x	x	
	Shimmy, Judder	x						x	x								x	x	x		x		x	
	Poor quality ride or handling	x						x	x								x	x	x		x			

x: Applicable

# FRONT SUSPENSION ASSEMBLY

## FRONT SUSPENSION ASSEMBLY

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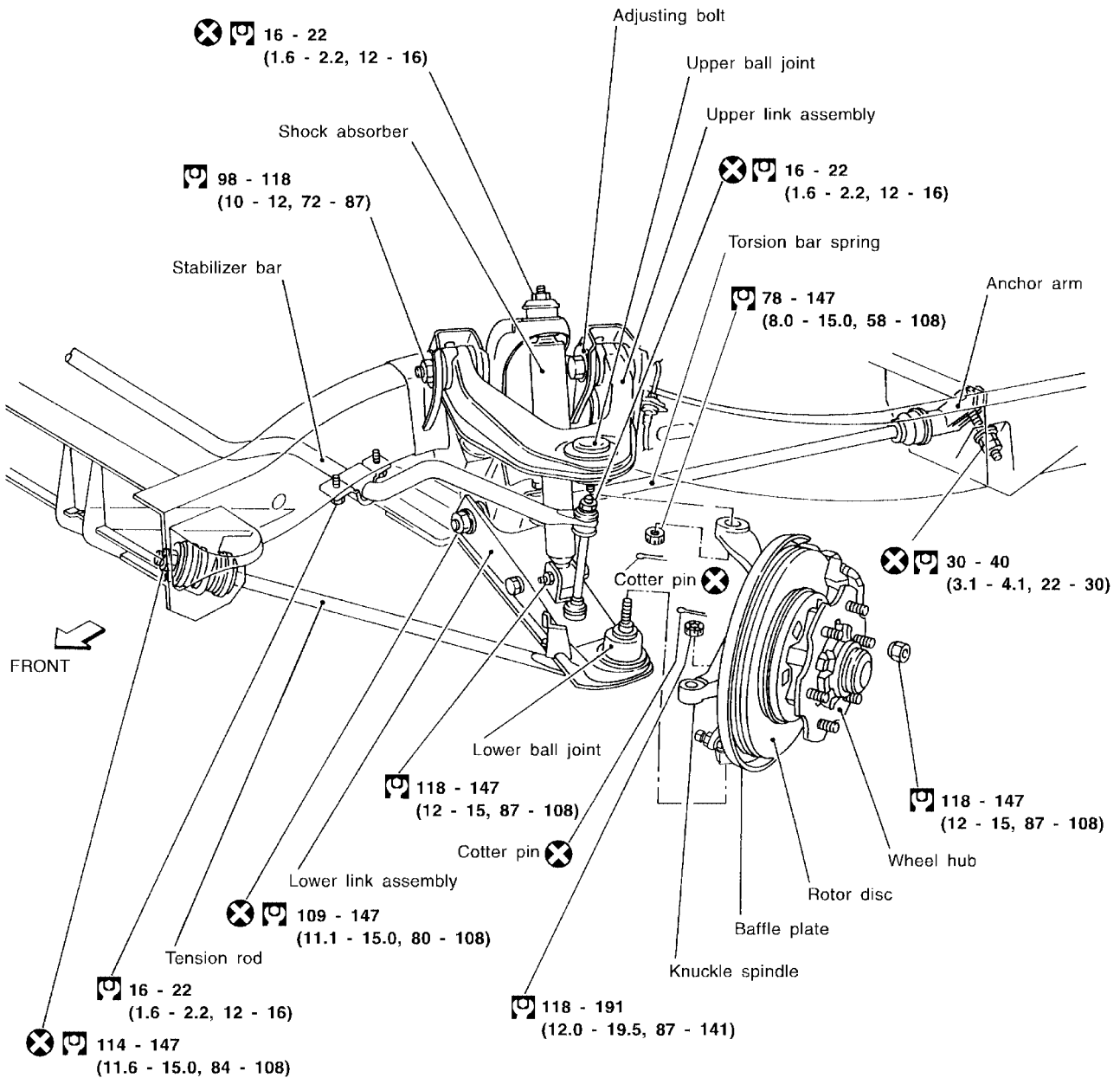
### Components 2WD KA24DE MODEL

EES000FC

#### 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)

: Always replace after every disassembly.

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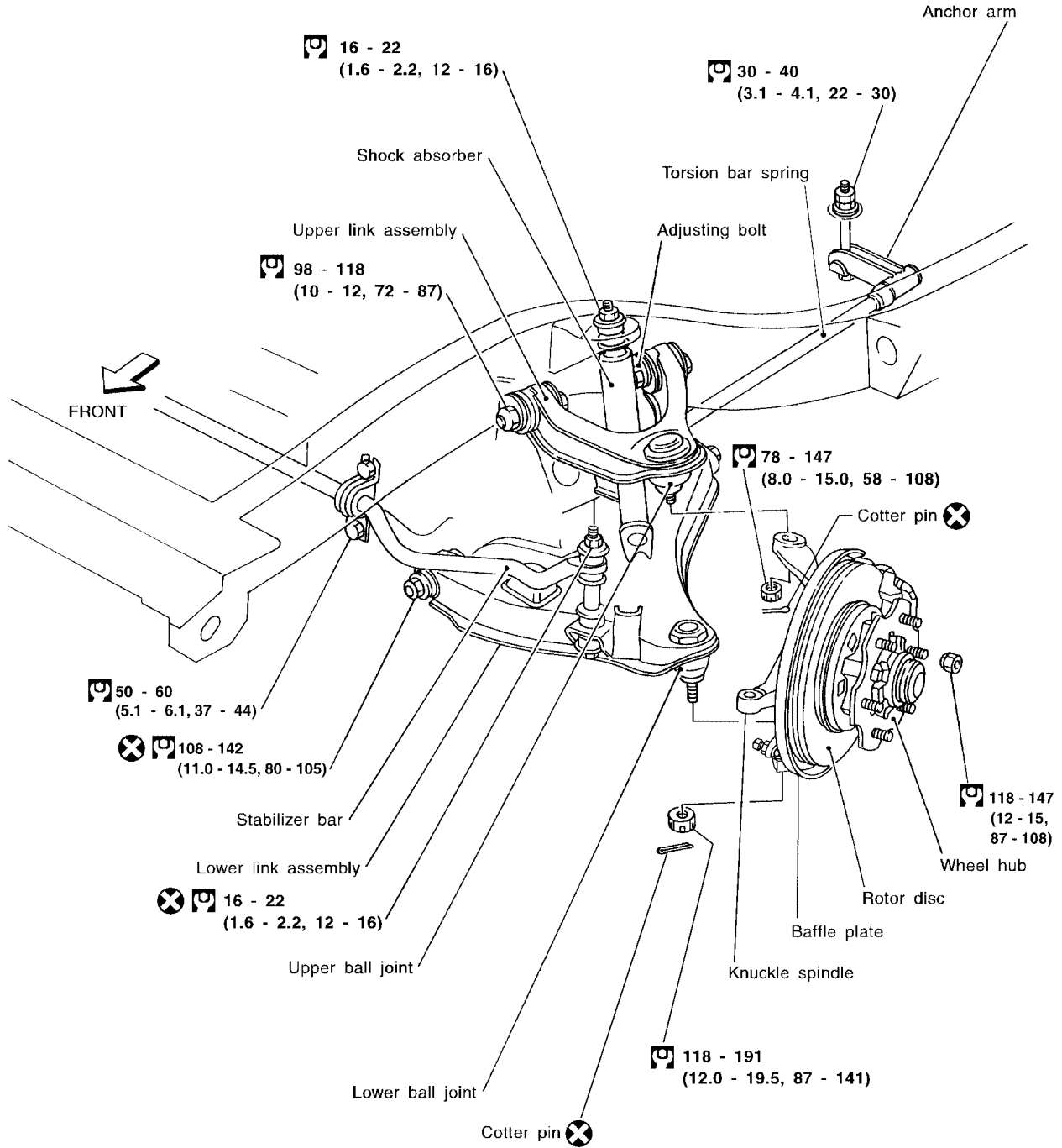
# FRONT SUSPENSION ASSEMBLY

## 2WD VG33E AND VG33ER MODELS

### 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)

WSU013

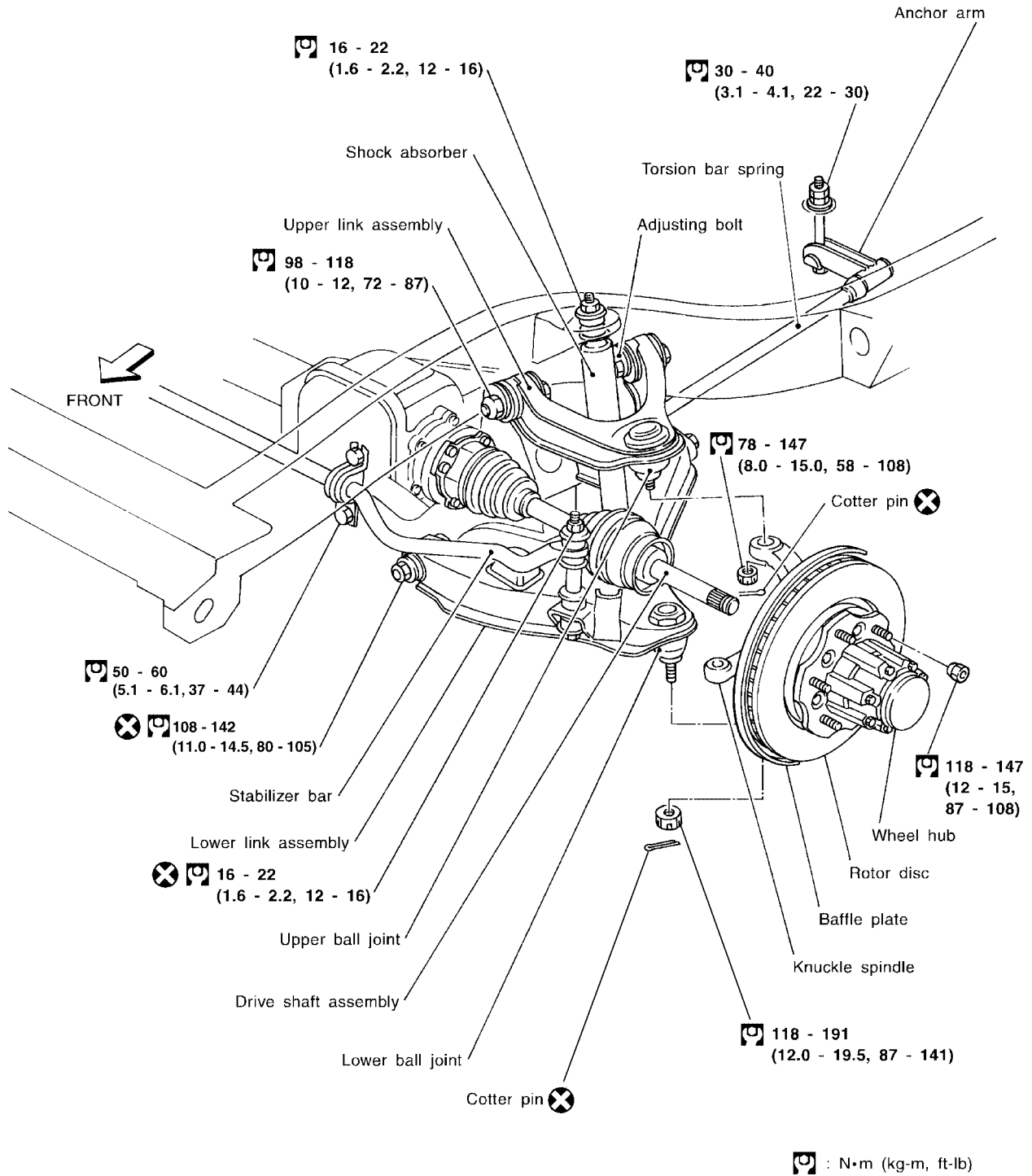
# FRONT SUSPENSION ASSEMBLY

## 4WD MODEL

### 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.

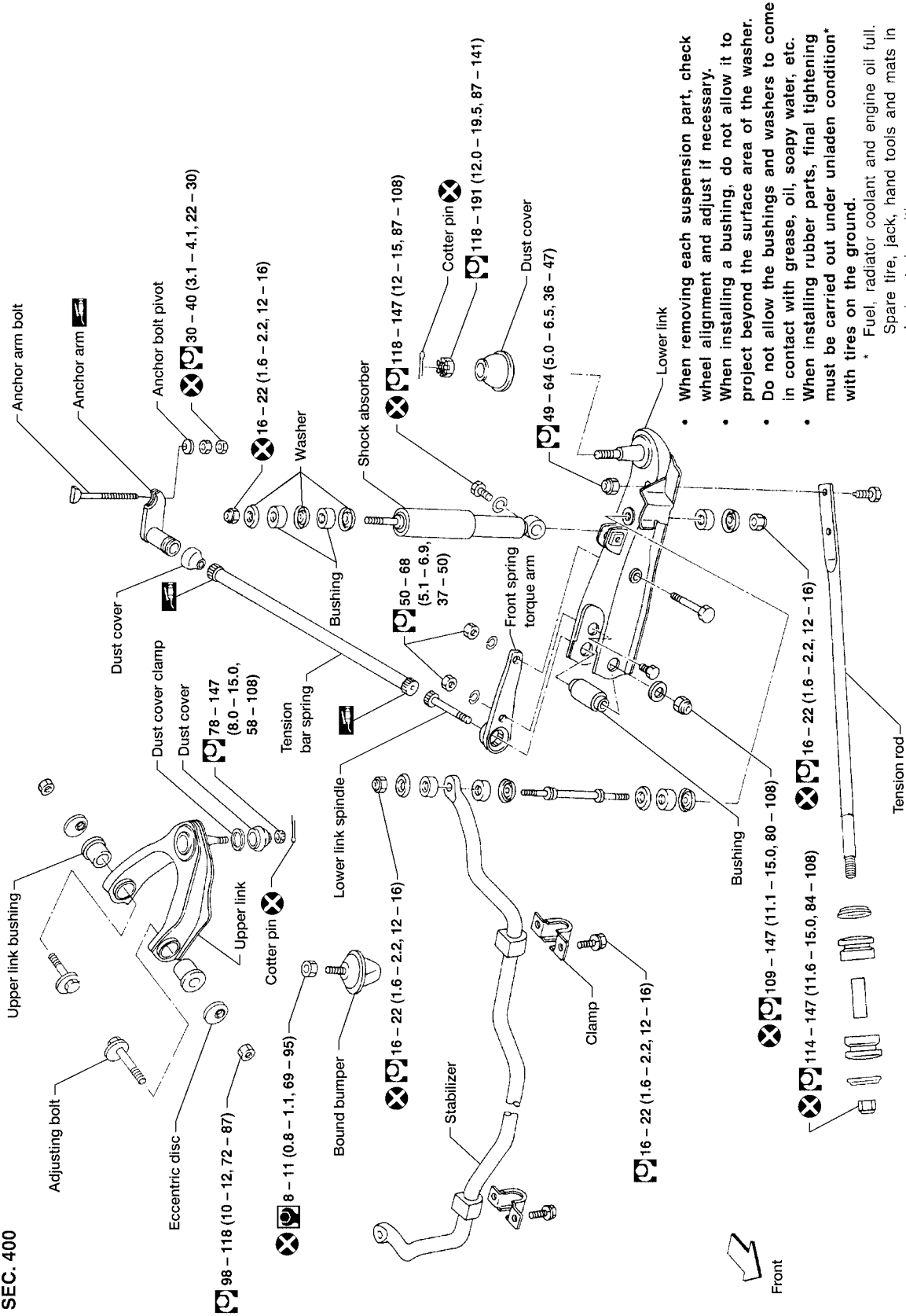


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## ON-VEHICLE SERVICE

### Component 2WD KA24DE MODEL

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.

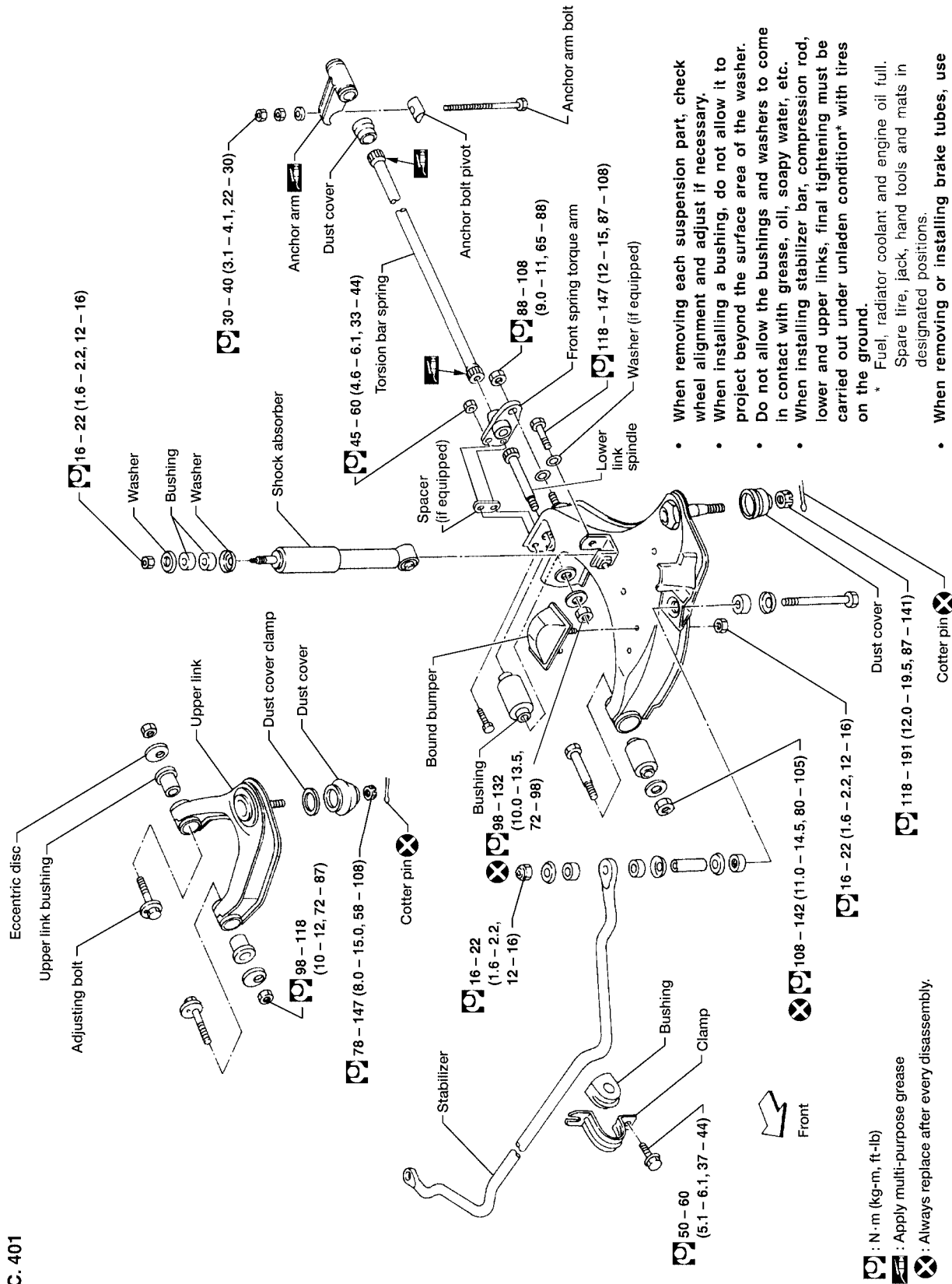
: N·m (kg-m, in-lb)  
 : N·m (kg-m, ft-lb)  
 : Always replace after every disassembly.



# ON-VEHICLE SERVICE

## 2WD AND 4WD VG33E AND VG33ER MODELS

SEC. 401



- 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 stabilizer bar, compression rod, lower and upper links, 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, ft-lb)  
 : Apply multi-purpose grease  
 : Always replace after every disassembly.

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# ON-VEHICLE SERVICE

## Front Suspension Parts

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

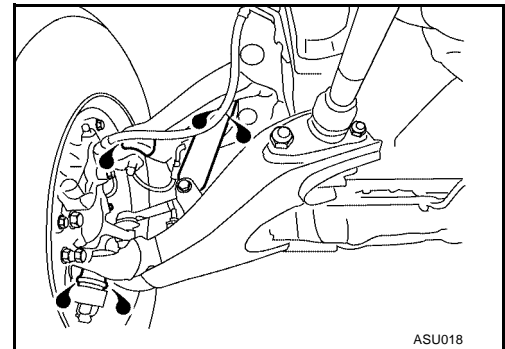
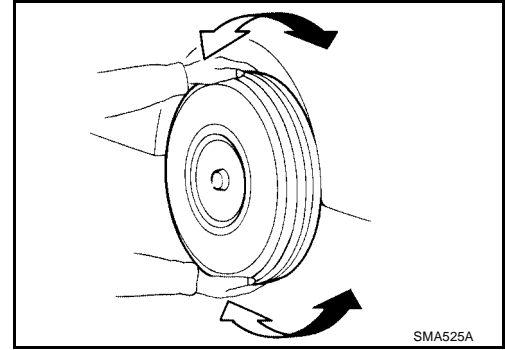
- Shake each front wheel to check for excessive play. If looseness is noted, adjust wheel bearing end play, then check ball joint end play.

Refer to [FSU-26, "Inspection"](#)

- Make sure that the cotter pin is inserted.
- Tighten all nuts and bolts to the specified torque.

Refer to [FSU-5, "2WD KA24DE MODEL"](#), [FSU-6, "2WD VG33E AND VG33ER MODELS"](#), or [FSU-7, "4WD MODEL"](#).

- 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 Alignment

EES000E7

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.

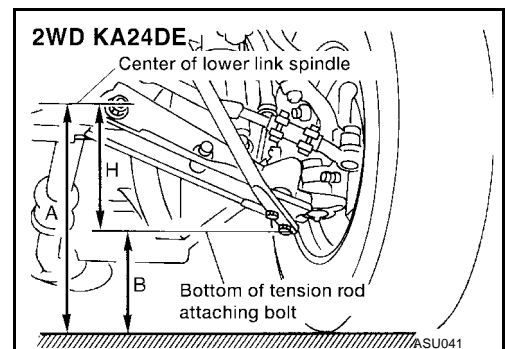
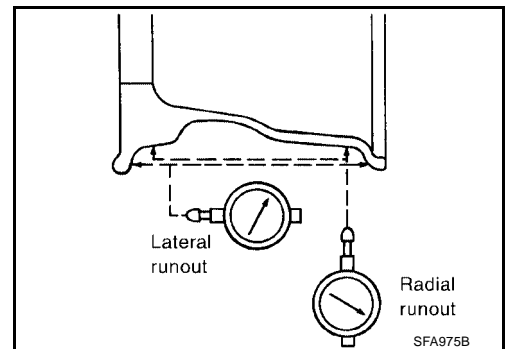
### PRELIMINARY INSPECTION

1. Check tires for wear and proper inflation.
2. Check wheels for deformation, cracks and other damage. If deformed, remove wheel and check wheel runout.
  - a. Remove tire from wheel and mount on a tire balance machine.
  - b. Set dial indicator as shown in the illustration.

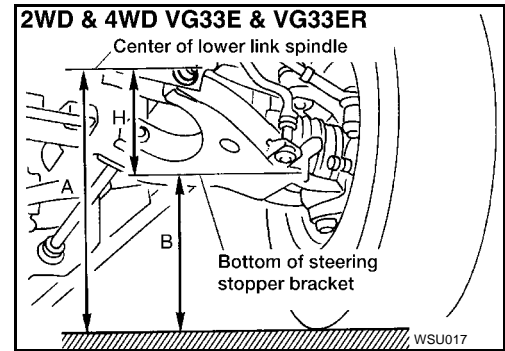
Wheel runout (Dial indicator value) : Refer to [FSU-27, "Wheel Runout Average\\*"](#).

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.
7. Check vehicle posture (Unladen):  $H = A - B$  mm (in).

Refer to [FSU-27, "2WD KA24DE MODEL"](#), [FSU-28, "2WD VG33E AND VG33ER MODELS"](#), or [FSU-29, "4WD MODEL"](#).



# ON-VEHICLE SERVICE



- 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.
- Measure wheel alignment.

Refer to [FSU-27, "2WD KA24DE MODEL"](#) , [FSU-28, "2WD VG33E AND VG33ER MODELS"](#) , or [FSU-29, "4WD MODEL"](#) .

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

Refer to [FSU-27, "2WD KA24DE MODEL"](#) , [FSU-28, "2WD VG33E AND VG33ER MODELS"](#) , or [FSU-29, "4WD MODEL"](#) .

- Adjust wheel alignment.

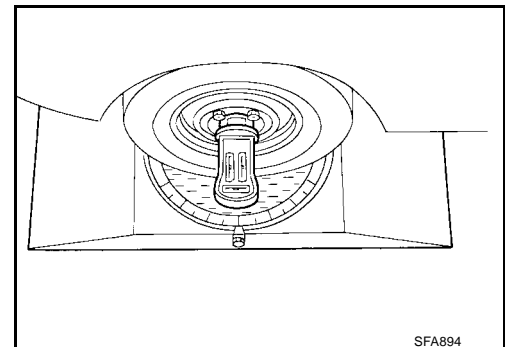
Refer to [FSU-27, "2WD KA24DE MODEL"](#) , [FSU-28, "2WD VG33E AND VG33ER MODELS"](#) , or [FSU-29, "4WD MODEL"](#) .

## 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.

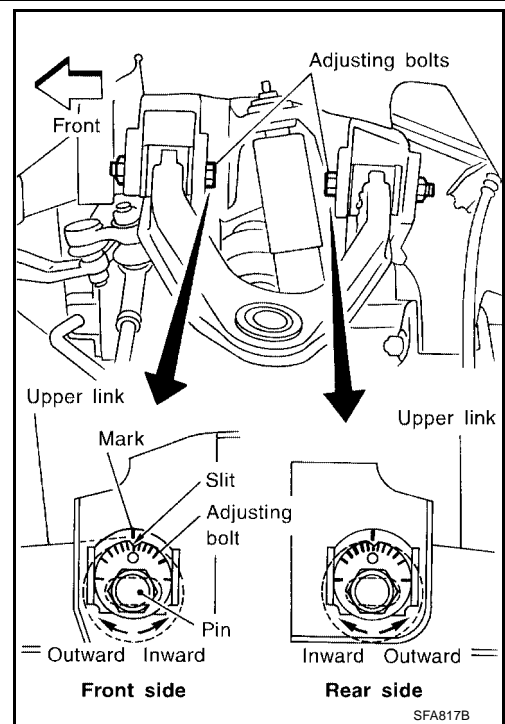
- Measure camber, caster and kingpin inclination of both right and left wheels with a suitable alignment gauge and adjust in accordance with the following procedures.

**Camber, Caster and Kingpin inclination** : Refer to [FSU-27, "2WD KA24DE MODEL"](#) , [FSU-28, "2WD VG33E AND VG33ER MODELS"](#) , or [FSU-29, "4WD MODEL"](#) .



## ON-VEHICLE SERVICE

- 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 right and measure the camber, caster and kingpin inclination:
  - When replacing the upper link or other suspension parts with new ones
  - 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.



### 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.

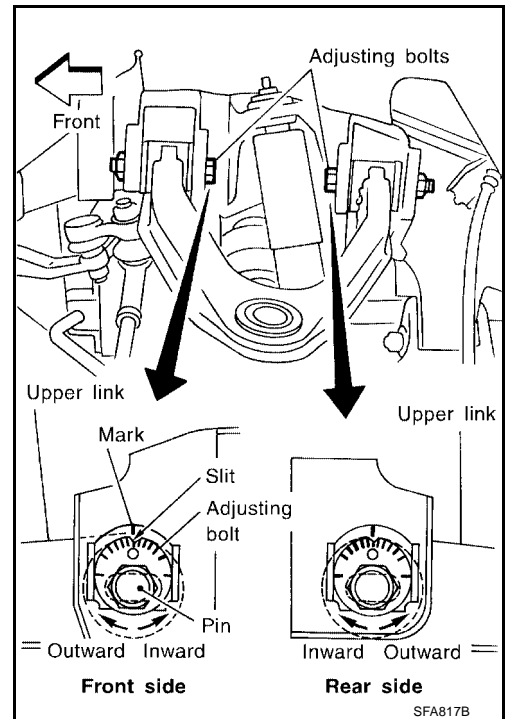
[Example]

- a. Measured values corresponding with the two values indicated below: (See chart for 4WD model.)

**Camber angle** :  $-0^{\circ}06'$  ( $-0.10^{\circ}$ )

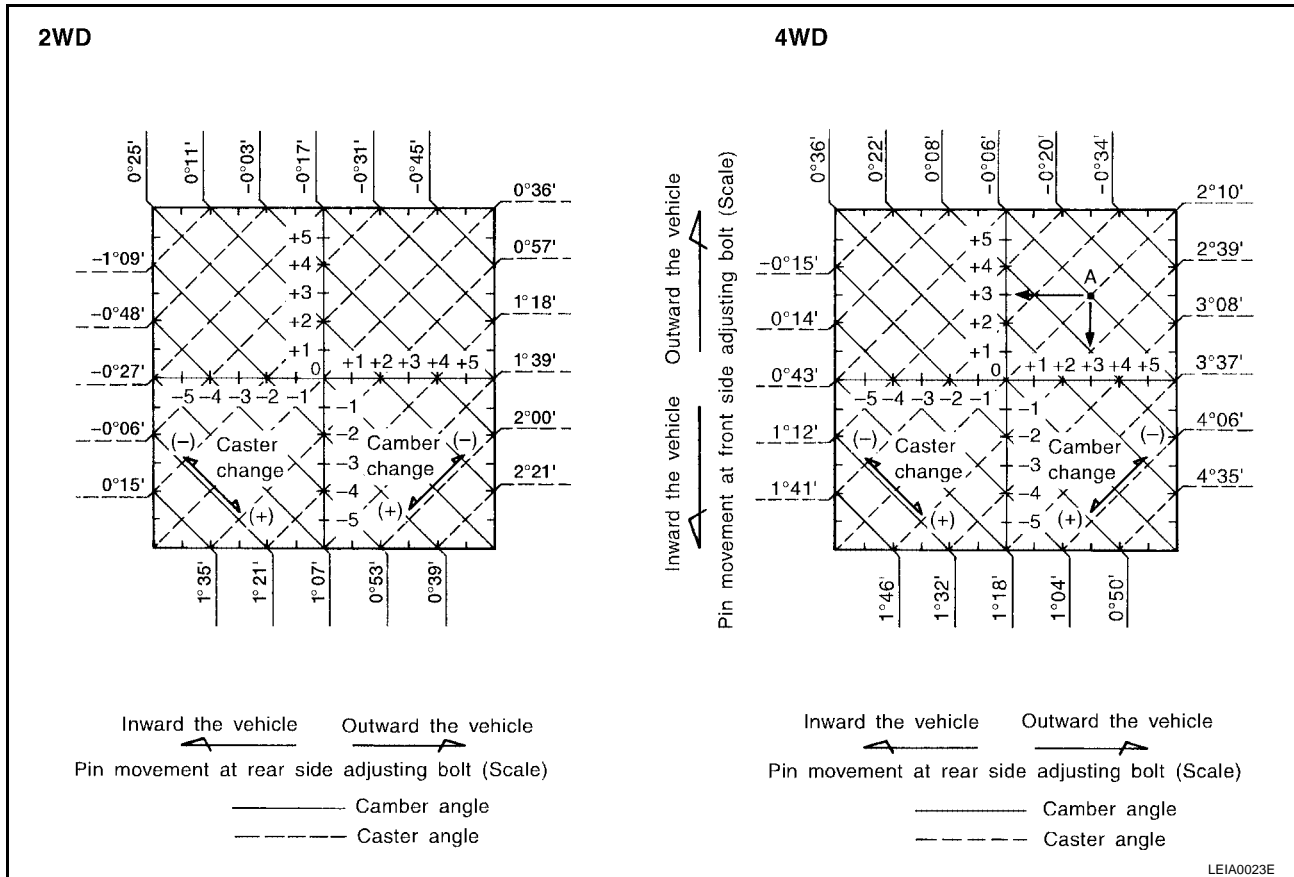
**Caster angle** :  $2^{\circ}10'$  ( $2.17^{\circ}$ )

- b. Apply the above two values to the graph and determine point "A".



# ON-VEHICLE SERVICE

- 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 three graduations.



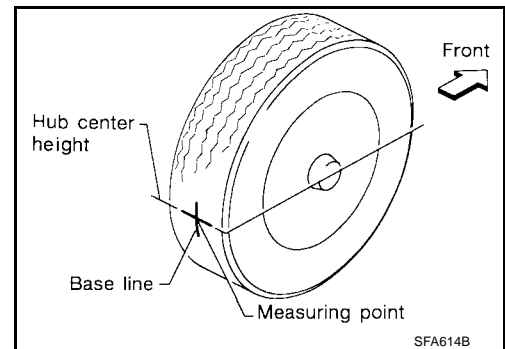
## TOE-IN

Measure toe-in using the following procedure.

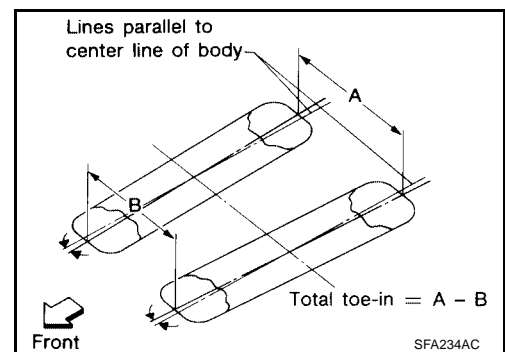
### WARNING:

- 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.



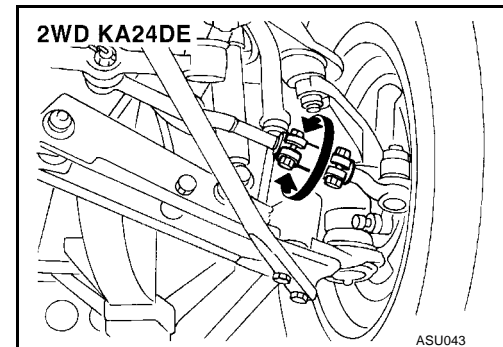
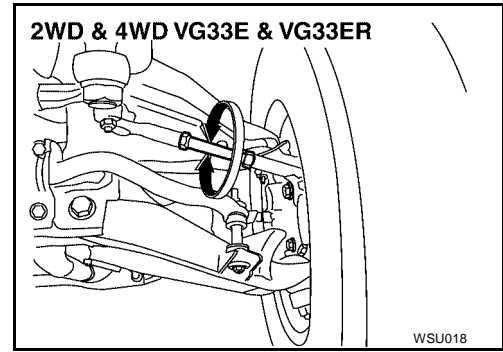
4. Measure distance "A" (rear side).
5. Push the vehicle slowly ahead to rotate the wheels 180 degrees (1/2 turn).
  - If the wheels have rotated more than 180 degrees (1/2 turn), try the above procedure again from the beginning. Never push vehicle backward.
6. Measure distance "B" (front side).



**Total toe-in** : Refer to [FSU-27, "2WD KA24DE MODEL"](#), [FSU-28, "2WD VG33E AND VG33ER MODELS"](#), or [FSU-29, "4WD MODEL"](#).

## ON-VEHICLE SERVICE

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.

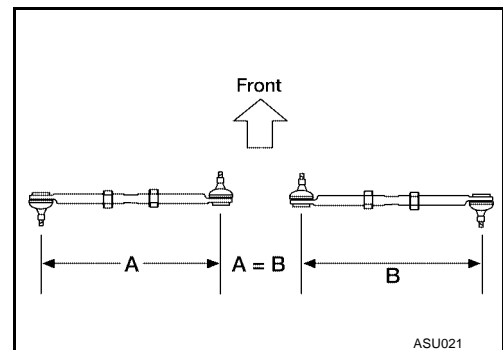
**Make sure that the tie-rod bars are screwed into the tie-rod tube more than 35 mm (1.38 in) KA24DE, 22 mm (0.87 in) 2WD and 4WD VG33E and VG33ER.**

**Make sure that the tie-rods are the same length before adjusting the alignment.**

**Standard length (A = B):**

**2WD KA24DE model : 343.9 mm (13.54 in)**

**2WD and 4WD VG33E and VG33ER models : 297.6 mm (11.72 in)**



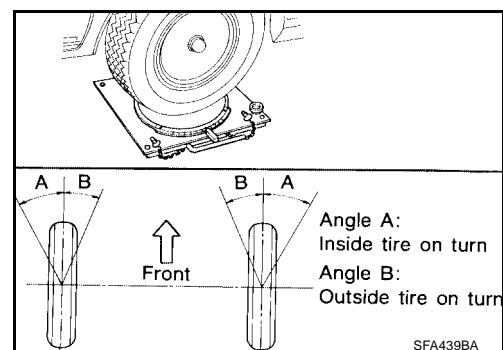
- c. Tighten clamp bolts or lock nuts.

**Refer to [PS-20, "Components"](#) .**

### 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.**

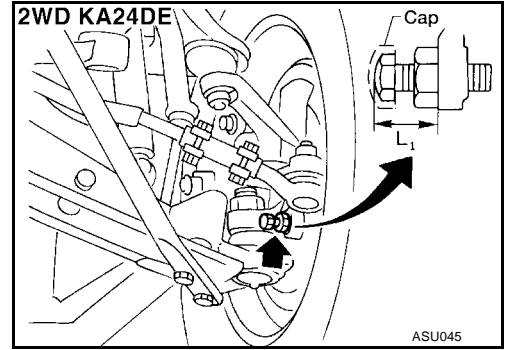
**Wheel turning angle (Full turn) : Refer to [FSU-27, "2WD KA24DE MODEL"](#) , [FSU-28, "2WD VG33E AND VG33ER MODELS"](#) , or [FSU-29, "4WD MODEL"](#) .**



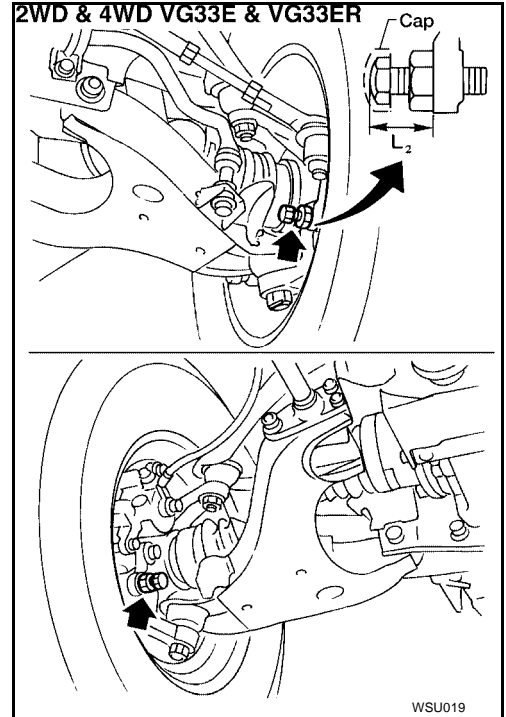
# ON-VEHICLE SERVICE

3. Adjust stopper bolt if necessary.

**Standard length "L1 "** : 26.5 mm (1.043 in)  
**(2WD KA24DE model)** (Length before cap is mounted)



**Standard length "L2 "** : Except P265/70R15 tire  
**(2WD and 4WD VG33E and VG33ER models)** 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)



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# SHOCK ABSORBER

## SHOCK ABSORBER

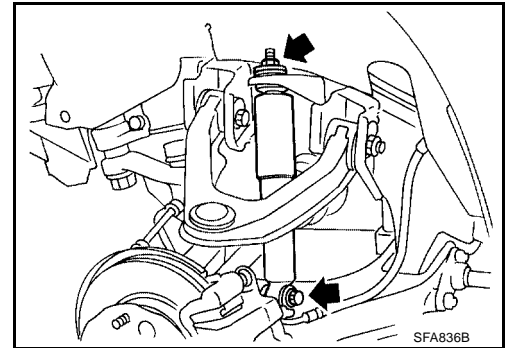
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### Removal and Installation

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1. Support lower link with jack.
2. Remove bolt and nut that hold shock absorber.
3. Tighten upper nut and lower bolt to specification.

Refer to [FSU-5, "2WD KA24DE MODEL"](#) , [FSU-6, "2WD VG33E AND VG33ER MODELS"](#) , or [FSU-7, "4WD MODEL"](#) .



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### Inspection

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Except for nonmetallic parts, clean all parts with suitable solvent and dry with compressed air. Use compressed air to blow dirt and dust off 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

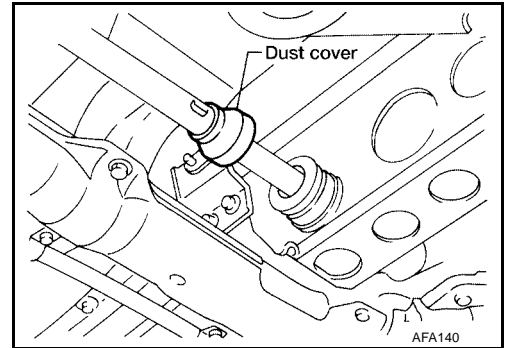
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EES000EB

## TORSION BAR SPRING

### Removal

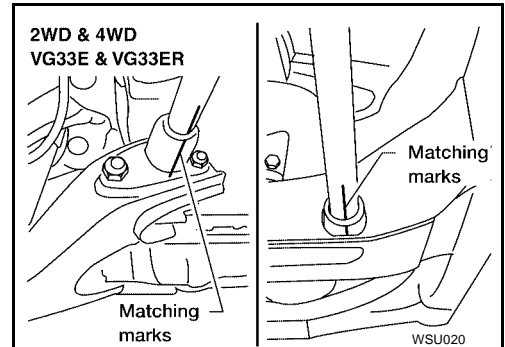
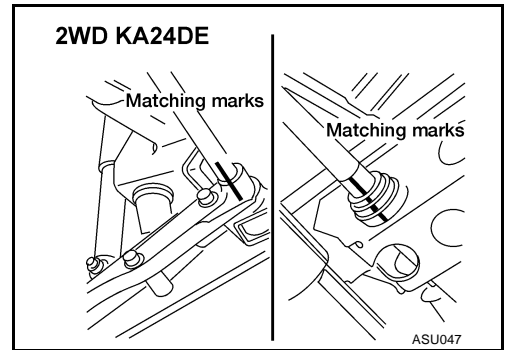
1. Move dust cover.



2. Paint matching marks on the torsion bar spring and the corresponding arm.

**NOTE:**

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

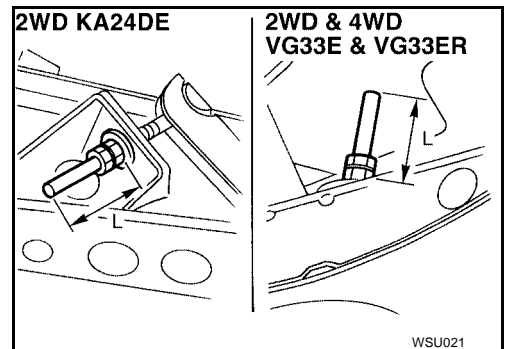


3. Measure anchor bolt protrusion "L" and remove the lock nut and adjusting nut.

**WARNING:**

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

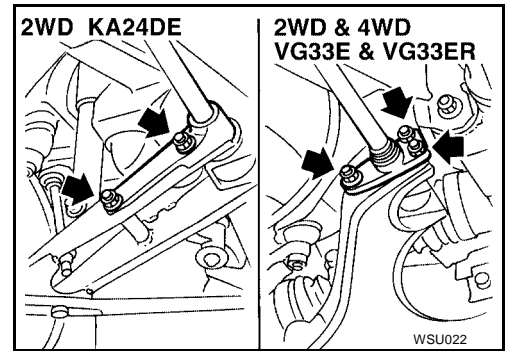
Standard length "L": 68 mm (2.68 in)



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# TORSION BAR SPRING

- Remove torsion bar spring.
  - Remove torque arm fixing nuts, then withdraw torsion bar spring forward with torque arm.



EES000EC

## 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

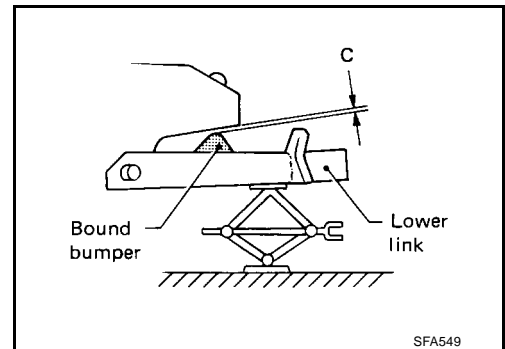
EES000ED

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

**Do not adjust by loosening anchor arm adjusting nut.**

- Coat multi-purpose grease on the serration of torsion bar spring.
- Place lower link in the position where bound bumper clearance "C" is 0.

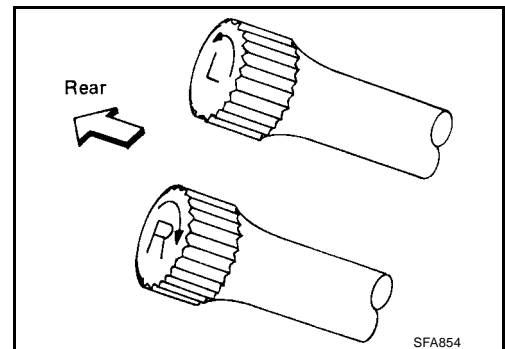
**Clearance "C": 0 mm (0 in)**



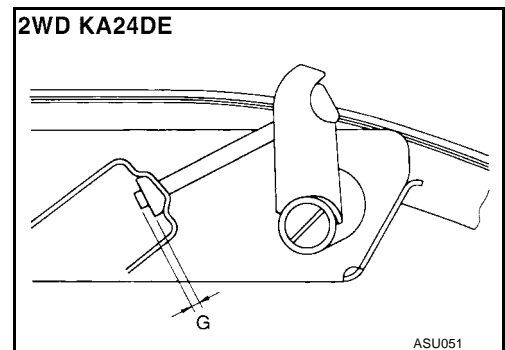
- Install torsion bar spring with torque arm.

### NOTE:

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



- While aligning the anchor arm with the matching mark, install the anchor arm to the torsion bar spring.



# TORSION BAR SPRING

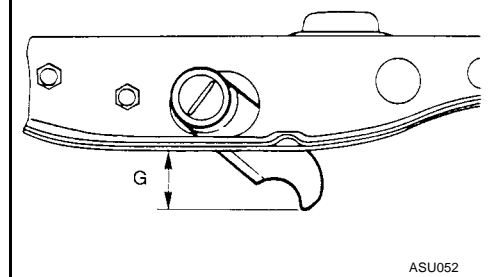
If a new torsion bar spring or anchor arm is installed, adjust anchor arm length to the dimension indicated in the figure at the right.

**Standard length "G":**

**2WD KA24DE model : 6 - 18 mm (0.24 - 0.71 in)**

**2WD and 4WD VG33E : 25 - 39 mm (0.98 - 1.54 in)**  
**and VG33ER models**

2WD VG33E & 4WD



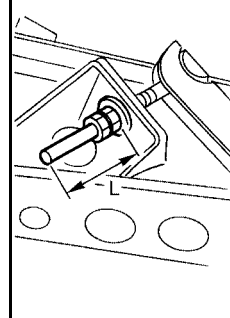
ASU052

- 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.

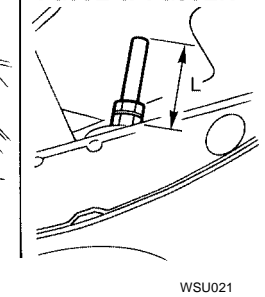
If a new torsion bar spring or anchor arm is installed, tighten the adjusting nut to the dimension indicated in the figure at the right, then tighten the lock nut to specifications.

**Standard length "L": 68 mm (2.68 in)**

2WD KA24DE

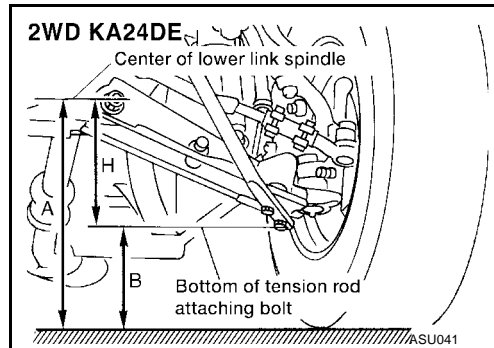


2WD & 4WD VG33E & VG33ER



WSU021

- Bounce vehicle with tires on ground (Unladen) to eliminate friction of suspension.
- Measure vehicle posture "H".
  - 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.
  - Measure vehicle posture, dimension "H".



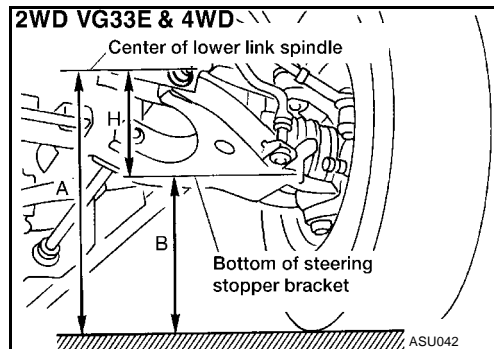
ASU041

**H = A - B mm (in)**  
**"Unladen"**

**: Refer to [FSU-27, "2WD KA24DE MODEL"](#), [FSU-28, "2WD VG33E AND VG33ER MODELS"](#), or [FSU-29, "4WD MODEL"](#).**

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

**Refer to [FSU-27, "2WD KA24DE MODEL"](#), [FSU-28, "2WD VG33E AND VG33ER MODELS"](#), or [FSU-29, "4WD MODEL"](#).**



ASU042

- Check wheel alignment if necessary.

**Refer to [FSU-27, "2WD KA24DE MODEL"](#), [FSU-28, "2WD VG33E AND VG33ER MODELS"](#), or [FSU-29, "4WD MODEL"](#).**

# STABILIZER BAR

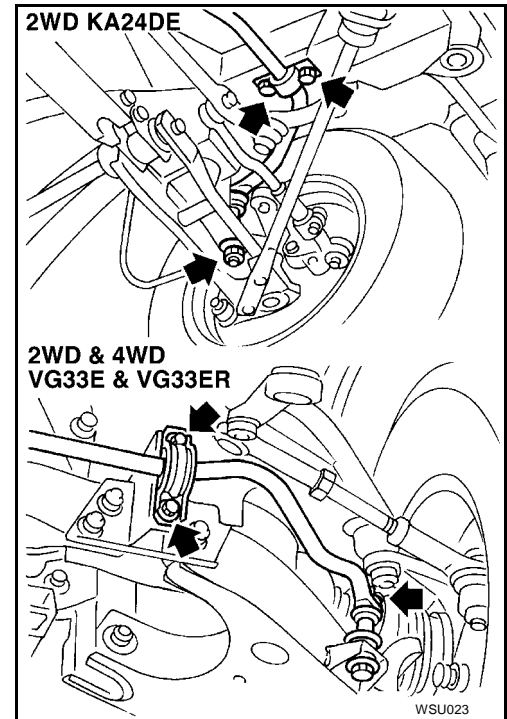
## STABILIZER BAR

PFP:54611

### Removal

EES000EE

Remove stabilizer bar connecting bolts and clamp bolts.



EES000EF

### Inspection

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

### Installation

EES000EG

Install in the reverse order of removal.

Refer to [FSU-5, "2WD KA24DE MODEL"](#) , [FSU-6, "2WD VG33E AND VG33ER MODELS"](#) ,  
or [FSU-7, "4WD MODEL"](#) .

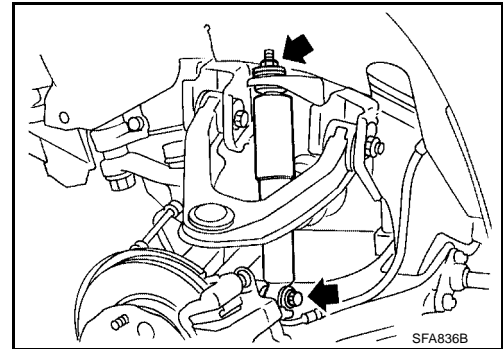
# UPPER LINK

PFP:54524

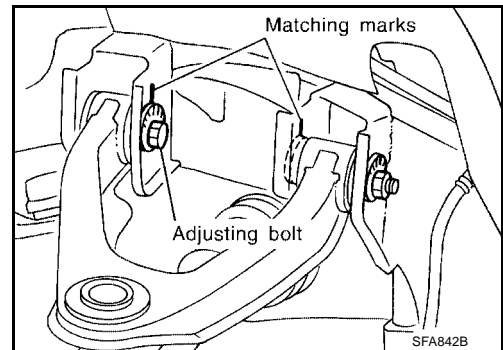
## UPPER LINK

### Removal

1. Remove shock absorber.  
[Refer to FSU-16, "Removal and Installation"](#).
2. Separate upper ball joint stud from knuckle spindle.  
**Support lower link with jack.**  
[Refer to FAX-17, "KNUCKLE SPINDLE"](#).



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 right, then install the upper link.

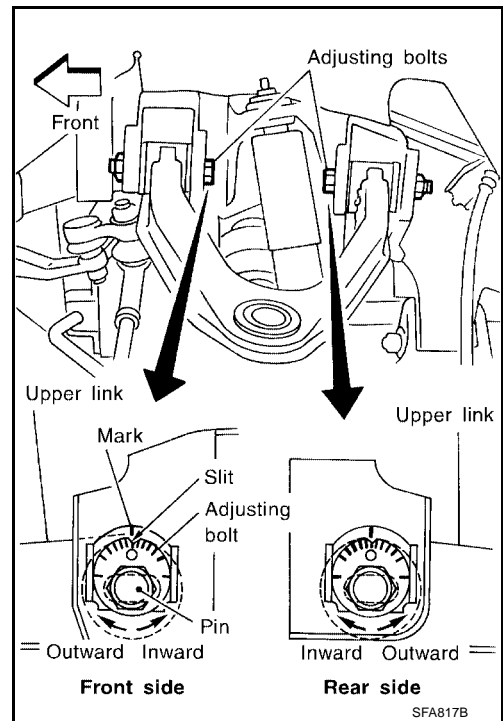
[Refer to FSU-27, "Wheel Alignment \(Unladen\\*1\)"](#).

2. Install shock absorber.
3. Tighten adjusting bolts under unladen condition (fuel, radiator coolant, and engine oil full; with spare tire, jack, hand tools, and mats in designated positions) with tires on ground.

[Refer to FSU-8, "2WD KA24DE MODEL" and FSU-9, "2WD AND 4WD VG33E AND VG33ER MODELS"](#).

4. After installing, check wheel alignment. Adjust if necessary.

[Refer to FSU-27, "Wheel Alignment \(Unladen\\*1\)"](#).

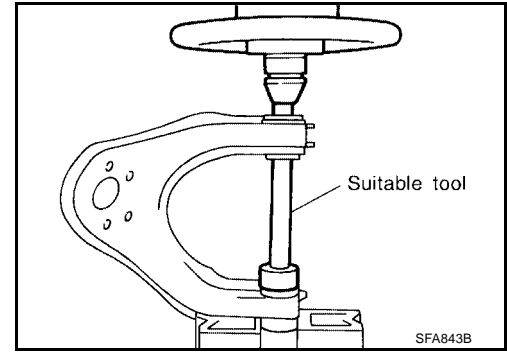


# UPPER LINK

## Disassembly

EES000EJ

Press out upper link bushings.



## Inspection

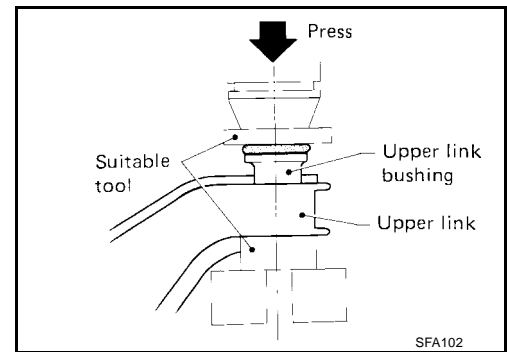
EES000EK

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

## Assembly

EES000EL

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

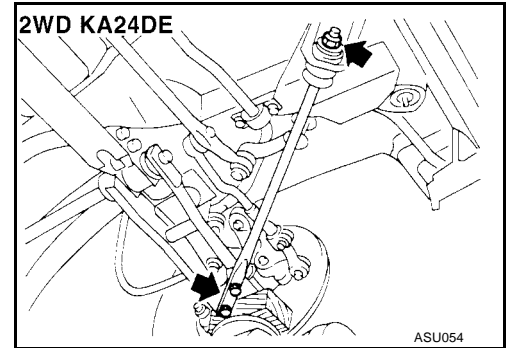
PFP:54010

## TENSION ROD

### Removal and Installation

EES000EM

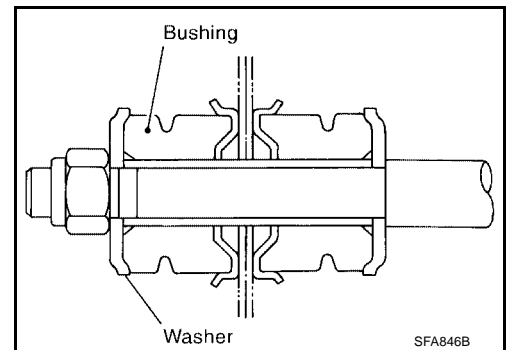
1. Remove fixing nuts on lower link and frame.  
**Support lower link with jack.**



2. Install tension rod.

Refer to [FSU-8, "2WD KA24DE MODEL"](#) .

**Make sure that the bushings and washers are installed properly.**



### Inspection

EES000EN

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

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# LOWER LINK

PFP:55020

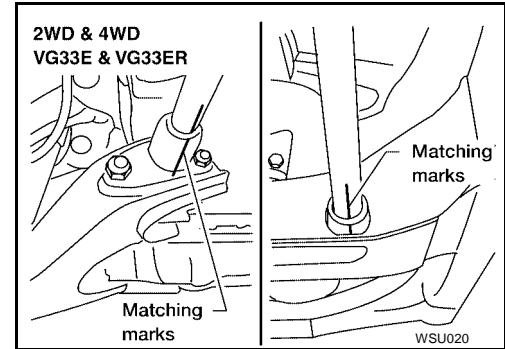
EES000EO

## LOWER LINK

### Removal and Installation

1. Remove torsion bar spring.

Refer to [FSU-17, "Removal"](#) .



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

Standard length "L" : 68 mm (2.68 in)

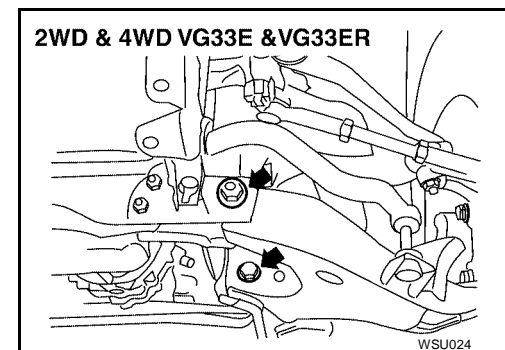
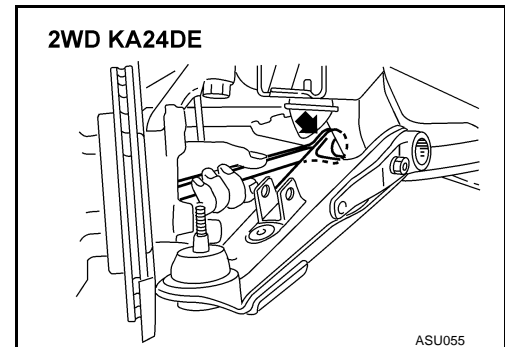
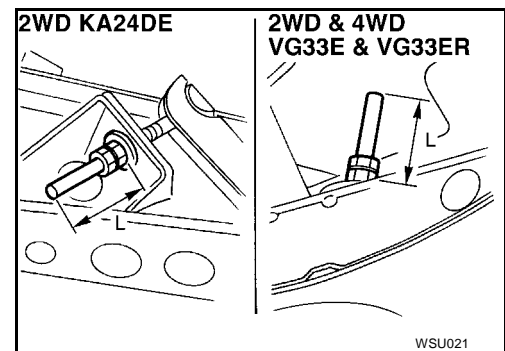
2. Remove shock absorber lower fixing bolt.
3. Remove stabilizer bar connecting bolt.
4. Separate drive shaft from front final drive (4WD models).

Refer to [FAX-20, "Removal"](#) .

5. Separate lower link ball joint from knuckle spindle.

Refer to [FAX-17, "Removal"](#) .

6. Remove front lower link fixing nut.



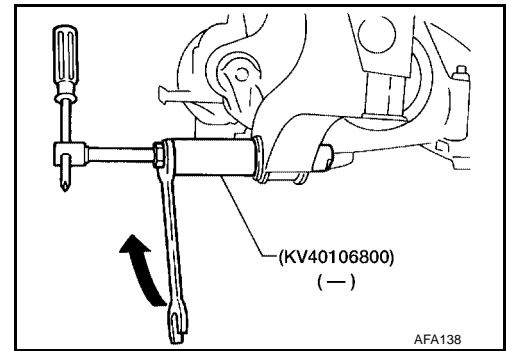


## LOWER LINK

7. Remove bushing of lower link spindle from frame with Tool.
8. After installing lower link, adjust wheel alignment and vehicle height.

Refer to [FSU-8, "2WD KA24DE MODEL"](#) and [FSU-9, "2WD AND 4WD VG33E AND VG33ER MODELS"](#) .

Refer to [FSU-10, "Front Wheel Alignment"](#) .



EES000EP

### 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.

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# UPPER BALL JOINT AND LOWER BALL JOINT

## UPPER BALL JOINT AND LOWER BALL JOINT

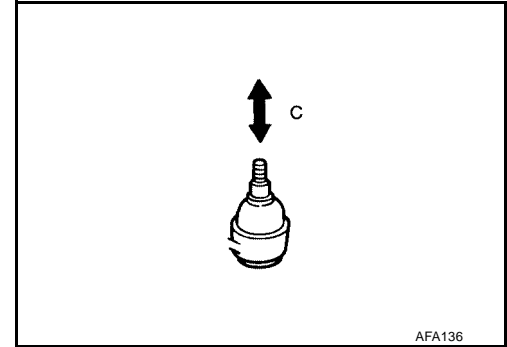
PF:40110

### Removal and Installation

EES000EQ

Separate knuckle spindle from upper and lower links.

Refer to [FAX-17, "Removal"](#) .



AFA136

### Inspection

EES000ER

- 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 KA24DE model 1.3 mm (0.051 in) or less
	: 2WD and 4WD VG33E and VG33ER models 0.2 mm (0.008 in) or less

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

# SERVICE DATA AND SPECIFICATIONS (SDS)

## SERVICE DATA AND SPECIFICATIONS (SDS)

PF:00030

### General Specifications (Front)

EES000ES

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

### Wheel Runout Average\*

EES000ET

Wheel type	Aluminum	Steel	
		Inside	Outside
Radial runout limit mm (in)	0.3 (0.012)	0.8 (0.031) or less	0.4 (0.016) or less
Lateral runout limit mm (in)	0.3 (0.012)	1.0 (0.039) or less	0.9 (0.035) or less

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

### Upper Ball Joint

EES000EU

Axial end play "C" mm (in)	0 (0)
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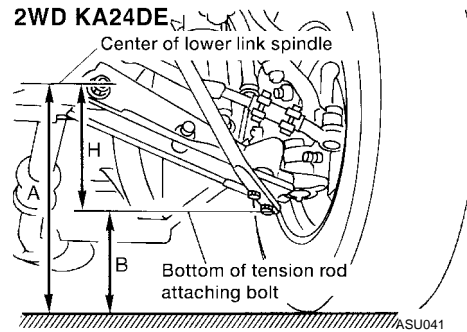
### Lower Ball Joint

EES000EV

Applied models	2WD, KA24DE	2WD and 4WD VG33E, VG33ER
Axial end play "C" mm (in)	1.3 (0.051) or less	0.2 (0.008) or less

### Wheel Alignment (Unladen\*1) 2WD KA24DE MODEL

EES000EW



Camber Degree minute (Decimal degree)	Minimum	-0°05' (-0.08°)
	Nominal	0°25' (0.42°)
	Maximum	0°55' (0.92°)
	Left and right difference	45' (0.75°) or less
Caster 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
Kingpin inclination Degree minute (Decimal degree)	Minimum	8°35' (8.58°)
	Nominal	9°05' (9.08°)
	Maximum	9°35' (9.58°)

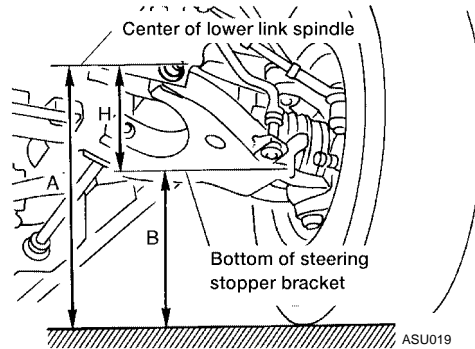
## SERVICE DATA AND SPECIFICATIONS (SDS)

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	11' (0.18°)
			Nominal	16' (0.27°)
			Maximum	20' (0.33°)
Wheel turning angle	Full turn*2	Inside Degree minute (Decimal degree)	Minimum	P225/70R15 31°48' (31.80°)
			Nominal	33°48' (33.80°)
			Maximum	33°48' (33.80°)
		Outside Degree minute (Decimal degree)	Minimum	28°36' (28.60°)
			Nominal	30°36' (30.60°)
			Maximum	30°36' (30.60°)
Vehicle posture	Lower arm pivot height (H) mm (in)		115 - 119 (4.53 - 4.69)	

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

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

### 2WD VG33E AND VG33ER MODELS



Camber Degree minute (Decimal degree)	Minimum	0°03' (0.05°)		
	Nominal	0°33' (0.55°)		
	Maximum	1°03' (1.05°)		
	Left and right difference	45' (0.75°) or less		
Caster Degree minute (Decimal degree)	Minimum	2°04' (2.07°)		
	Nominal	2°34' (2.57°)		
	Maximum	3°04' (3.07°)		
	Left and right difference	45' (0.75°) or less		
Kingpin inclination Degree minute (Decimal degree)	Minimum	10°23' (10.38°)		
	Nominal	10°53' (10.88°)		
	Maximum	11°23' (11.38°)		
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) Degree minute (Decimal degree)	Radial tire	Minimum	15' (0.25°)
			Nominal	20' (0.33°)
			Maximum	25' (0.42°)

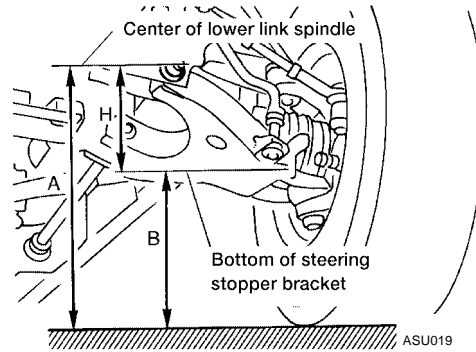
# SERVICE DATA AND SPECIFICATIONS (SDS)

Wheel turning angle	Full turn*2	Inside Degree minute (Decimal degree)		VG33E	VG33ER
			Minimum	31°00' (31.00°)	30°48' (30.80°)
			Nominal	33°00' (33.00°)	32°48' (32.80°)
		Maximum	33°00' (33.00°)	32°48' (32.80°)	
		Outside Degree minute (Decimal degree)	Minimum	29°00' (29.00°)	28°42' (28.70°)
			Nominal	31°00' (31.00°)	30°42' (30.70°)
Maximum	31°00' (31.00°)		30°42' (30.70°)		
Vehicle posture	Lower arm pivot height (H) mm (in)		37.7 - 41.7 (1.484 - 1.642)		

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

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

## 4WD MODEL



			VG33E	VG33ER
Camber Degree minute (Decimal degree)	Minimum		0°06' (0.10°)	0°03' (0.05°)
	Nominal		0°36' (0.60°)	0°33' (0.55°)
	Maximum		1°06' (1.10°)	1°03' (1.05°)
	Left and right difference		45' (0.75°) or less	
Caster Degree minute (Decimal degree)	Minimum		1°40' (1.67°)	2°04' (2.07°)
	Nominal		2°10' (2.17°)	2°34' (2.57°)
	Maximum		2°40' (2.67°)	3°04' (3.07°)
	Left and right difference		45' (0.75°) or less	
Kingpin inclination Degree minute (Decimal degree)	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) Degree minute (Decimal degree)	Radial tire	Minimum	15' (0.25°)
			Nominal	20' (0.33°)
			Maximum	25' (0.42°)

## SERVICE DATA AND SPECIFICATIONS (SDS)

Wheel turning angle	Full turn*2	Inside Degree minute (Decimal degree)	Minimum	31°00' (31.00°)	30°48' (30.80°)
			Nominal	33°00' (33.00°)	32°48' (32.80°)
			Maximum	33°00' (33.00°)	32°48' (32.80°)
		Outside Degree minute (Decimal degree)	Minimum	29°00' (29.00°)	28°42' (28.70°)
			Nominal	31°00' (31.00°)	30°42' (30.70°)
			Maximum	31°00' (31.00°)	30°42' (30.70°)
Vehicle posture	Lower arm pivot height (H) mm (in)		45.5 - 49.5 (1.791 - 1.949)	37.7 - 41.7 (1.484 - 1.642)	

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

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