FRONT & REAR SUSPENSION

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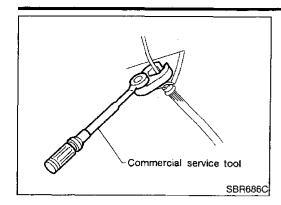








FRONT SUSPENSION



Precautions PRECAUTIONS

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- When installing rubber parts, final tightening must be carried out under unladen condition* with tires on ground.
 *Fuel, radiator coolant and engine oil full. Spare tire, jack, hand tools and mats in designated positions.
- 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**

SPECIAL SERVICE TOOLS

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

NB\$U0002

Tool number (Kent-Moore No.) Tool name	Description	
ST29020001 (J24319-01) Ball joint remover	NT694	Removing tie-rod outer end and lower ball joint a: 34 mm (1.34 in) b: 6.5 mm (0.256 in) c: 61.5 mm (2.421 in)

COMMERCIAL SERVICE TOOLS

NBSU0003

Tool name	Description	
1 Flare nut crowfoot 2 Torque wrench		Removing and installing each brake piping a: 10 mm (0.39 in)
Spring compressor	NT360	Removing and installing coil spring
	NT717	

FRONT SUSPENSION

Noise, Vibration and Harshness (NVH) Troubleshooting

Noise, Vibration and Harshness (NVH) Troubleshooting

NVH TROUBLESHOOTING CHART

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Us	e th	e chart below	/ to	help :	you	fin	d th	ie c	aus	se c	of th	ne s	sym	pto	m.	lf n	ece	SS	ary,	rep	air	or rep	olace	these	pã	nts.	- Mia
Re	efer∈	ence page	SU-4, 14	SU-8, 17				SU-8, 17	SU-6	SU-10, 19	9-NS		 - - -				1	NVH in PD section	NVH in PD section	NVH in AX section	NVH in AX section	Refer to SUSPENSION in this chart.	Refer to TIRES in this chart.	Refer to ROAD WHEEL in this chart.	NVH in BR section	NVH in ST section	EM LC
			looseness	mation,	Bushing or mounting deterioration			s	nent						ge												· EC
		le cause and ECTED PARTS	ation,	defor ection	Inting	9		seues	alignr	tigue			ssare	75	dama		e e	HAFT					Ì				AT
	.01	LOTEDTANTO	Improper installation, looseness	Shock absorber deformation, damage or deflection	ing or mou	Parts interference	Spring fatigue	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	'E SHAFT	tri	SUSPENSION	တ္သ	ROAD WHEEL	KES	STEERING	TF
		·	Impr	Shoc	Bush	Parts	Sprin	Susp	Incor	Stabi	Out-	Imba	Incor	Unev	Defo	Non-	Incor	PRO	DIFF	DRIVE	AXLE	SUS	TIRES	ROA	BRAKES	STEI	PD
		Noise	×	×	×	×	×	×										×	×	×	×		×	×	×	×	
,		Shake	×	×	×	×		×										×		×	×		×	×	×	×	$\mathbb{A}\mathbb{X}$
	SUSPENSION	Vibration	×	×	×	×	×											×		×	×		×			×	
	ENS	Shimmy	×	×	×	×			×												×		×	×	×	×	SU
	SUS	Judder	×	×	×																×		×	×	×	×	
		Poor quality ride or han- dling	×	×	×	×	×		×	×			į								×		×	×			BR
		Noise	×						-	-	×	×	×	×	×	×		×	×	×	×	×		×	×	×	ST
_		Shake	×								×	×	×	×	×		×	×		×	×	×		×	×	× .	തര
Symptom		Vibration											×				×	×		×	×	×				×	RS
Sym	TIRES	Shimmy	×								×	×	×	×	×	×	×				×	×		×	×	×	BT
	L	Judder	×								×	×	×	×	×		×				×	×		×	×	×	
		Poor quality ride or han- dling	×								×	×	×	×	×		×		j		×	×		×			AH
		Noise	×								×	×			×		T	×	×	×	×	×	×		×	×	SC
		Shake	×								×	×			×			×		×	×	×	×		×	×	
	ROAD WHEEL	Shimmy, Jud- der	×								×	×			×						×	×	×		×	×	EL
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^{×:} Applicable

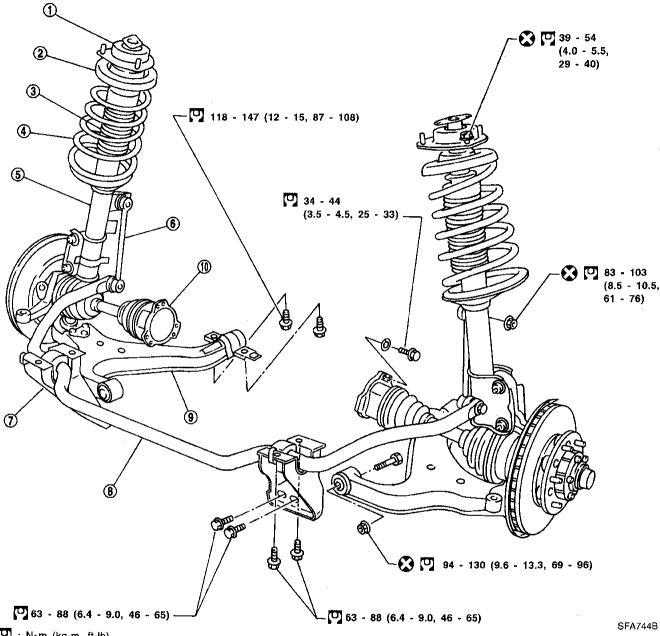
Components

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When installing rubber parts, final tightening must be carried out under unladen condition* with tires on ground. Fuel, radiator coolant and engine oil full.

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

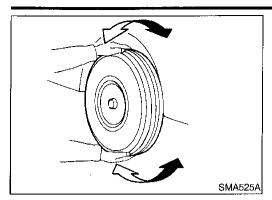


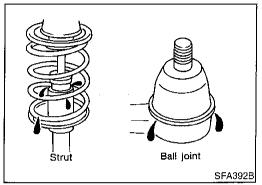
: N·m (kg-m, ft-lb)

- 1. Strut mounting insulator
- Spring upper seat
- 3. Bound bumper
- Coil spring

- Strut assembly
- 6. Stabilizer connecting rod
- 7. **B**racket

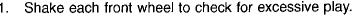
- Stabilizer bar
- 9. Transverse link
- 10. Drive shaft





On-vehicle Service FRONT SUSPENSION PARTS

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



Retighten all axle and suspensions nuts and bolts to the specified torque.

Tightening torque:

Refer to "Components", SU-8.

Check strut (shock absorber) for oil leakage and other dam-

Check suspension ball joint for grease leakage and ball joint dust cover for cracks and other damage. If ball joint dust cover is cracked or damaged, replace ball joint assembly.

Check suspension ball joint end play.

Jack up front of vehicle and set the stands.

Clamp dial indicator onto transverse link and place indicator tip b. on lower edge of brake caliper.

Make sure front wheels are straight and brake pedal is C. depressed.



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Place a pry bar between transverse link and knuckle.

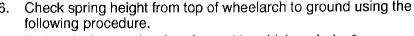
While raising and releasing pry bar, observe maximum dial indicator value.

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Vertical end play: 0 mm (0 in)

If ball joint vertical end play exists, remove lower ball joint assembly and recheck the ball joint. Refer to "Tranverse Link and Lower Ball Joint", SU-11.

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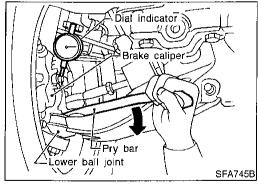


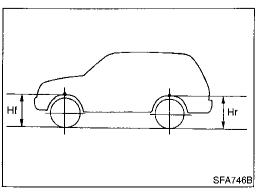
Park vehicle on a level surface with vehicle unladen*.

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

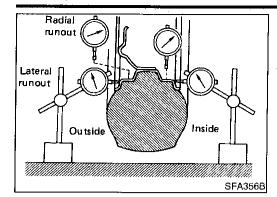
Check tires for proper inflation and wear (tread wear indicator must not be showing).

Bounce vehicle up and down several times and measure dimensions Hf and Hr. Refer to SDS, SU-21. Spring height is not adjustable. If out of specification, check for worn springs and suspension parts.





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FRONT WHEEL ALIGNMENT

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

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

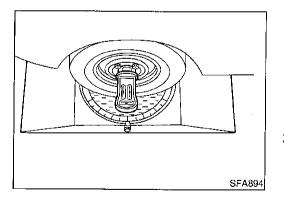
Preliminary Inspection

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- 1. Check tires for wear and improper inflation.
- Check wheel runout on outside and inside.

Wheel runout average [(Outside runout value + Inside runout value) x 0.5]: Refer to SDS, SU-21.

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



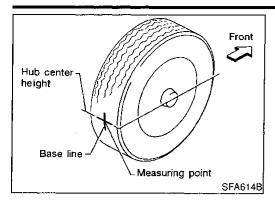
Camber, Caster and Kingpin Inclination

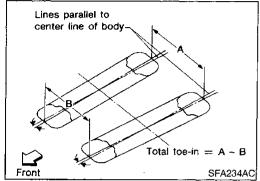
Camber, caster and kingpin inclination are preset at factory and cannot be adjusted.

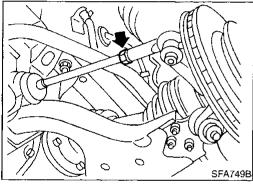
Measure camber, caster and kingpin inclination of both right and left wheels with a suitable alignment gauge.

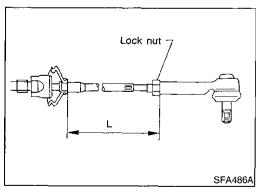
Camber, Caster and Kingpin inclination: Refer to SDS, SU-20.

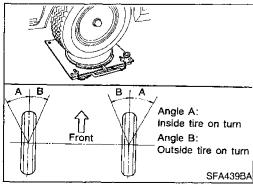
If camber, caster or kingpin inclination is not within specification, inspect front suspension parts. Replace damaged or worn out parts.











Toe-in

Measure toe-in using the following procedure. WARNING:



- Make sure that no person is in front of the vehicle before pushing it.
- 1. Bounce front of vehicle up and down to stabilize the posture.
- 2. Push the vehicle straight ahead about 5 m (16 ft).
- 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.
- Measure distance "A" (rear side).
- 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.

Measure distance "B" (front side).

Total toe-in:

Refer to SDS, SU-20.

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

Loosen lock nuts.

Adjust toe-in by screwing tie-rods in and out.

Make sure both tie-rods are the same length.

Standard length "L":

Refer to ST section ("Steering Gear and Linkage", "SDS").

Tighten lock nuts to specified torque.

Lock nut tightening torque:

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

Front Wheel Turning Angle

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

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

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

> Wheel turning angle (Full turn): Refer to SDS, SU-20.

SU-7

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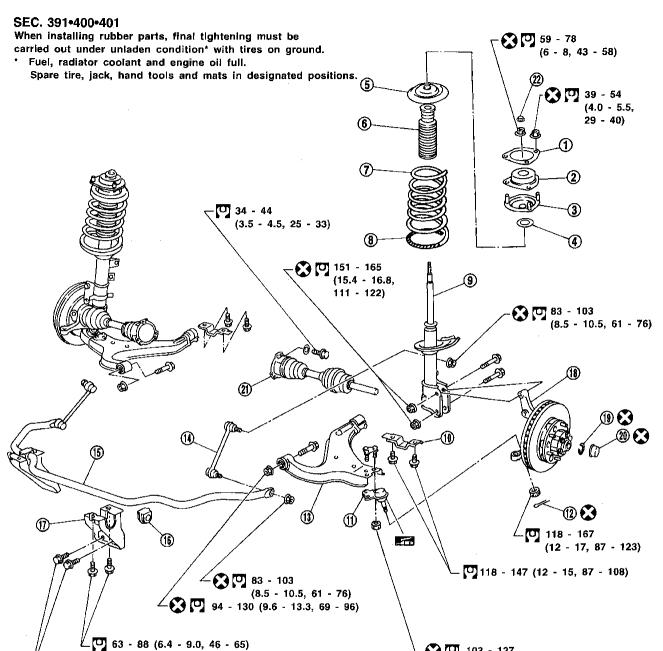
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Coil Spring and Strut Assembly

COMPONENTS

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- 1. Spacer
- 2. Strut mounting insulator

- 3. Bracket
- 4. Strut mounting bearing
- 5. Spring upper seat
- 6. Bound bumper
- 7. Coil spring
- 8. (Polyurethane tube)

- 9. Strut assembly
- 10. Bracket
- 11. Lower ball joint assembly
- 12. Cotter pin
- 13. Transverse link
- 14. Stabilizer connecting rod
- 15. Stabilizer bar

- : N·m (kg-m, ft-lb)
- SFA764BA
- 16. Bushing

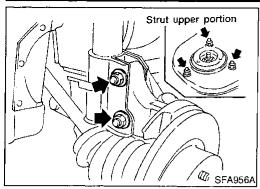
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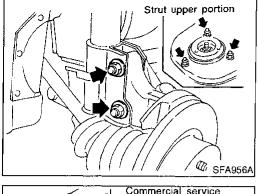
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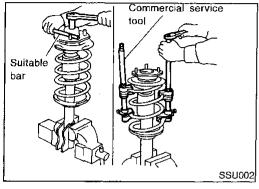
- 17. Bracket
- 18. Knuckle spindle
- 19. Snap ring
- 20. Hub cap
- 21. Drive shaft
- 22. Cap

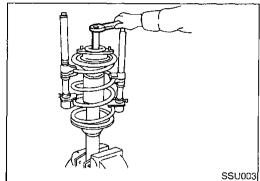
FRONT SUSPENSION

Coil Spring and Strut Assembly (Cont'd)









REMOVAL

Remove stabilizer connecting rod.

NBSU0008

Remove strut assembly fixing bolts and nuts (to hood-ledge).

Do not remove piston rod lock nut on vehicle.

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DISASSEMBLY

 Set strut assembly on vise, then loosen piston rod lock nut. WARNING:

EC

Do not remove piston rod lock nut at this time.

Compress spring with tool so that the strut mounting insulator can be turned by hand.

WARNING:

Make sure that the pawls of the two spring compressors are firmly hooked on the spring. The spring compressors must be tightened alternately so as not to tilt the spring.

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Remove piston rod lock nut.

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INSPECTION Strut Assembly

NBSU0010

Check for smooth operation through a full stroke, both compression and extension.

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- Check for oil leakage on welded and gland packing portion.
- Check piston rod for cracks, deformation and other damage.
- Replace if necessary.

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Strut Mounting Insulator And Rubber Parts

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

Replace if necessary.

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Strut Mounting Bearing

Check thrust bearing parts for abnormal noise and excessive rattle in axial direction.

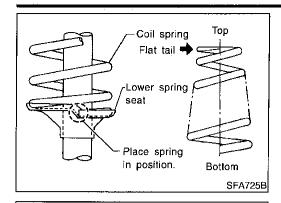
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Replace if necessary.

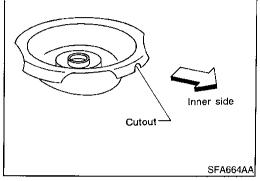
Coil Spring

Check for cracks, deformation and other damage. Replace if necessary.

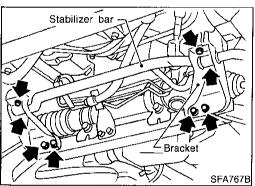


ASSEMBLY

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



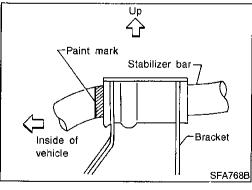
 Install upper spring seat with its cutout facing the inner side of vehicle.



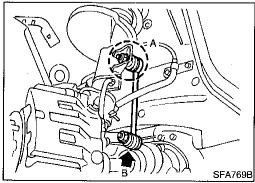
Stabilizer Bar REMOVAL AND INSTALLATION

NBSU0012

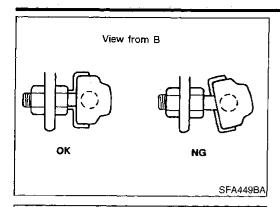
• Remove stabilizer bar and connecting rod.



 When installing stabilizer, make sure that paint mark and bracket face in their correct directions.



When removing and installing stabilizer bar fix portion A.



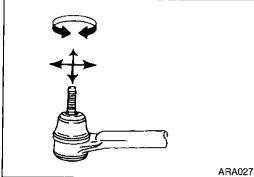
Install stabilizer bar with ball joint socket properly placed.



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INSPECTION

Check stabilizer for deformation and cracks. Replace if neces-

EC

 Check rubber bushings for deterioration and cracks. Replace if necessary.

FE

 Check ball joint can rotate in all directions. If movement is not smooth and free, replace stabilizer bar connecting rod.

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Transverse Link and Lower Ball Joint REMOVAL AND INSTALLATION

NBSU0014

Separate drive shaft from knuckle.
 Refer to AX section ("Drive Shaft", "FRONT AXLE").

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2. Separate lower ball joint stud from knuckle.

B. Remove lower ball joint assembly from transverse link.

4. Remove transverse link.

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5. During installation, final tightening must be carried out at curb weight with tires on ground.

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 After installation, check wheel alignment. Refer to "FRONT WHEEL ALIGNMENT", "On-vehicle Service", SU-6.

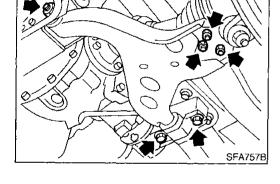
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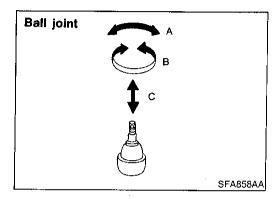


INSPECTION

Transverse Link

■NBSU0015

- NBSU0015S01 Check transverse link for damage, cracks and deformation. Replace it if necessary.
- Check rubber bushing for damage, cracks and deformation. Replace transverse link if necessary.



Lower Ball Joint

- Check ball joint for excessive play. Replace lower ball joint assembly if any of the following exists:
- Ball stud is worn.
- Joint is hard to swing.
- Play in axial direction is excessive.

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

Swinging force "A":

(measuring point: cotter pin hole of ball stud)

Refer to SDS, SU-20.

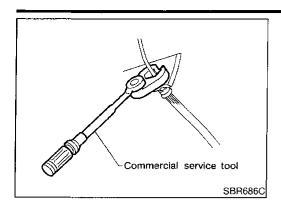
Turning torque "B":

Refer to SDS, SU-20.

Vertical end play "C":

Refer to SDS, SU-20.

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



Precautions 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.

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 Use flare nut wrench when removing and installing brake tubes.

 After installing removed suspension parts, check wheel alignment and adjust if necessary.

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Always torque brake lines when installing.

Preparation

COMMERCIAL SERVICE TOOLS

COMMENCIAL SE	NESU0023									
Tool name	Description									
1 Flare nut crowfoot 2 Torque wrench	9	Removing and installing each brake piping a: 10 mm (0.39 in)	FE							
			ΑT							
	NT360		ŢF							

Noise, Vibration and Harshness (NVH) Troubleshooting

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Refer to "Noise, Vibration and Harshness (NVH) Troubleshooting", "FRONT SUSPENSION", SU-3.

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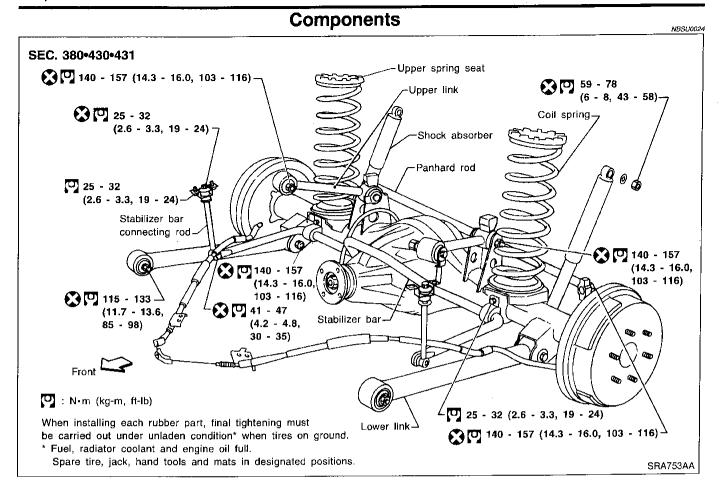
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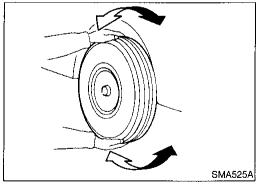
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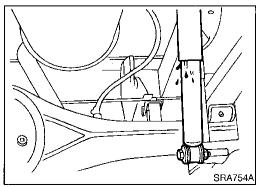
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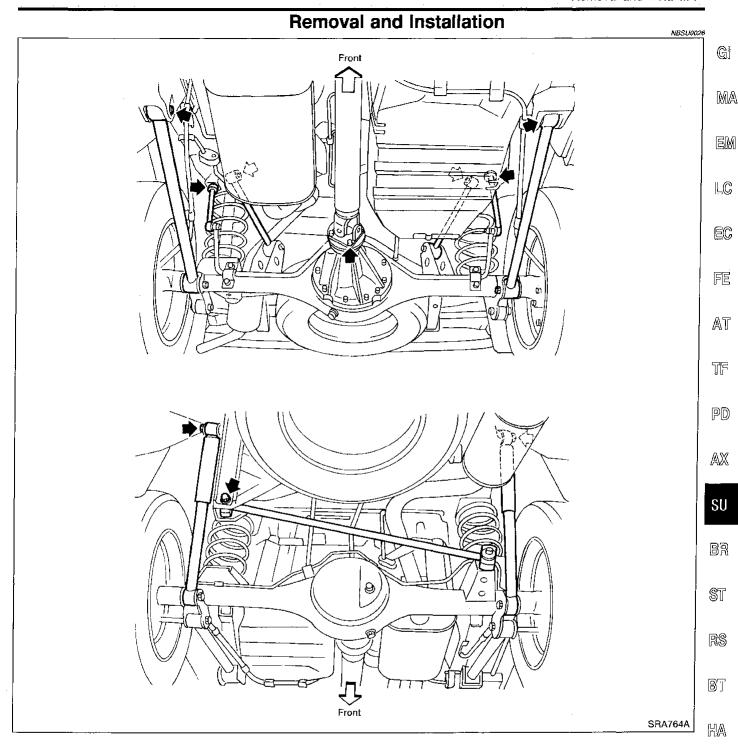
On-vehicle Service REAR SUSPENSION PARTS

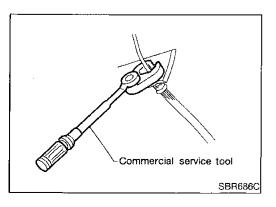
Check rear axle and rear suspension parts for excessive play, wear and damage.

- 1. Shake each rear wheel to check for excessive play.
- 2. Retighten all nuts and bolts to the specified torque.

Tightening torque: Refer to "Coil Spring and Shock Absorber", SU-17.

- 3. Check shock absorber for oil leakage and other damage.
- Check shock absorber bushing for excessive wear and other damage.
- Check wheelarch height. Refer to "On-vehicle Service", "FRONT SUSPENSION", SU-5.





- Support axle and suspension components with a suitable jack and block.
- Disconnect brake hydraulic line and parking brake cables at back plates.

CAUTION:

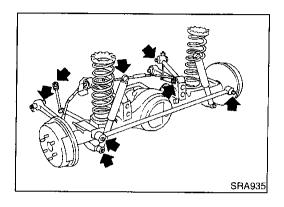
- Use flare nut wrench when removing and installing brake tubes.
 - Before removing the rear suspension assembly, disconnect the ABS wheel sensor from the assembly. Then move it away from the rear suspension assembly. Failure to do

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REAR SUSPENSION

- so may result in damage to the sensor wires and the sensor becoming inoperative.
- 3. Remove stabilizer bar from body.
- 4. Remove upper links and lower links from body.
- 5. Remove panhard rod from body.
- 6. Disconnect rear end of propeller shaft. Refer to PD section ("Removal and Installation", "PROPELLER SHAFT").
- 7. Remove upper end nuts of shock absorber.



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

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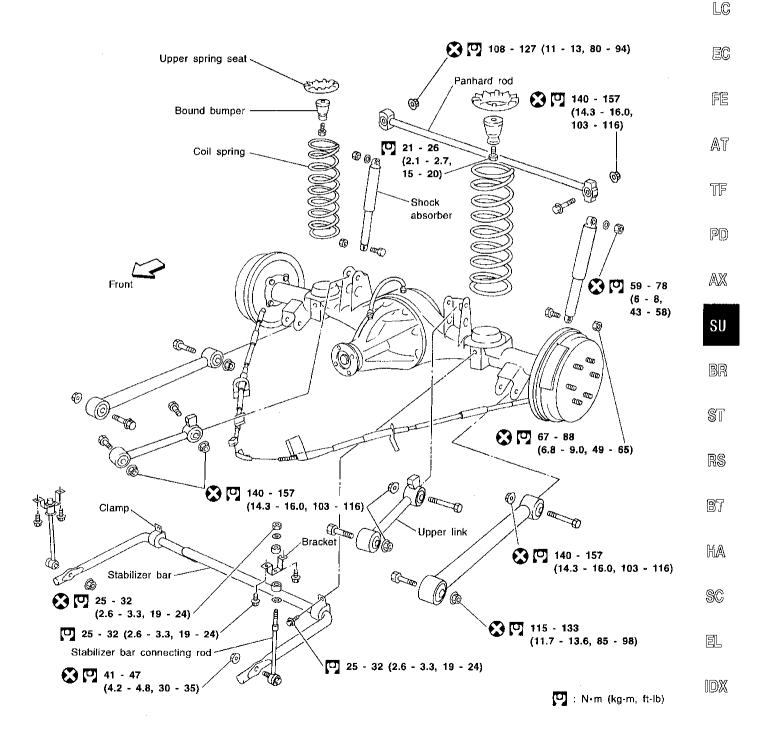
Coil Spring and Shock Absorber

COMPONENTS

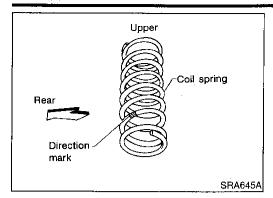
SEC. 380-430-431

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.



SSU001



REMOVAL AND INSTALLATION

Refer to "Removal and Installation", "REAR SUSPENSION", SU-15.

When installing coil spring, pay attention to its direction. Be sure spring rubber seat is not twisted and has not slipped off when installing coil spring.

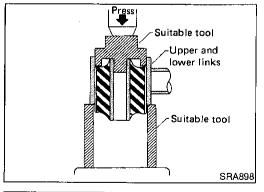
INSPECTION

NBSU0029

- Check coil spring for yield, deformation and cracks.
- Check shock absorber for oil leakage, cracks and deformation.
- Check all rubber parts for wear, cracks and deformation. Replace if necessary.

Upper Link, Lower Link and Panhard Rod **INSPECTION**

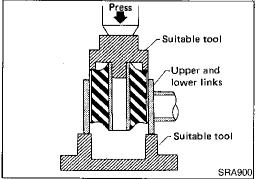
Check for cracks, distortion and other damage. Replace if necessary.



BUSHING REPLACEMENT

Check for cracks and other damage. Replace with suitable tool if necessary.

Remove bushing with suitable tool.



When installing bushing, apply a coat of 1% soapy water to outer wall of bushing.

Always install new bushing.

Do not tap end face of bushing directly with a hammer.

REAR SUSPENSION

Upper Link, Lower Link and Panhard Rod (Cont'd)

INSTALLATION

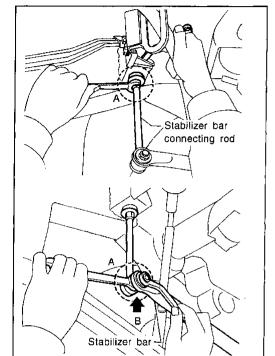
When installing each link, pay attention to direction of nuts

When installing each rubber part, final tightening must be carried out under unladen condition with tires on ground.



MA

LC



Stabilizer Bar **REMOVAL AND INSTALLATION**

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

FE

AT

TF

PD

 $\mathbb{A}\mathbb{X}$

SU

BR

Install stabilizer bar with ball joint socket properly placed.

ST RS

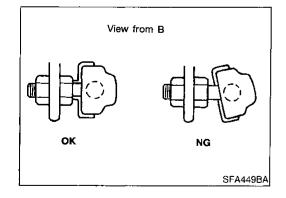
BT

HA

SC

FIL

IDX



SRA766A

	General Specifications (Front)						
Suspension type	Independent macpherson strut with coil spring						
Strut type	Double-acting hydraulic						
Stabilizer bar	Standard equipment						

Wheel Alignment (Unladen*1)

NBSU001

				Unit: Degree minute (Decimal degree)			
Applied model			245/70 R16 tire				
			Minimum	-0°35′ (-0.58°)			
			Nominal	0°10′ (0.17°)			
Camber			Maximum	0°55′ (0.92°)			
			Left and right differ- ence	45' (0.75°) or less			
***			Minimum	2°15′ (2.25°)			
			Nominal	3°00′ (3.00°)			
Caster			Maximum	3°45′ (3.75°)			
			Left and right difference	45' (0.75°) or less			
			Minimum	13°35′ (13.58°)			
Kingpin inclination			Nominal	14°20′ (14.33°)			
			Maximum	15°05′ (15.08°)			
			Minimum	1 mm (0.04 in)			
	Distance (A - B)		Nominal	2 mm (0.08 in)			
Total tao in			Maximum	3 mm (0.12 in)			
Total toe-in			Minimum	5′ (0.08°)			
	Angle (left plus right)	•	Nominal	10′ (0.17°)			
			Maximum	15′ (0.25°)			
			Minimum	30°00′ (30.00°)			
Wheel turning angle		Inside	Nominal	33°00′ (33.00°)			
	F. 11 4 10		Maximum	34°00′ (34.00°)			
	Full turn*2		Minimum	28°00′ (28.00°)			
		Outside	Nominal	31°00′ (31.00°)			
			Maximum	32°00′ (32.00°)			

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

Lower Ball Joint

NBSU001

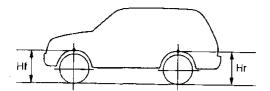
<u> </u>	Nessoora
Swinging force "A" (Measuring point: cotter pin hole of ball stud)	7.8 - 76.5 N (0.8 - 7.8 kg, 1.8 - 17.2 lb)
Turning torque "B"	0.5 - 4.9 N·m (5 - 50 kg-cm, 4.3 - 43.4 in-lb)
Vertical end play "C"	0 mm (0 in)

^{*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.

Wheelarch Height (Unladen*)

Unit: mm (in)







LC

SFA746B

EC

Applied model	245/70 R16 tire (With over fender)	
Front (Hf)	815 (32.09)	
Rear (Hr)	846 (33.31)	AT

TA

Wheel Runout Average*

TF

Unit: mm (in)

PD	
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NBSU0034

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

Radial runout limit

Lateral runout limit



General Specifications (Rear)

0.3 (0.012)

0.3 (0.012)

SU

Suspension type	5-link type rigid with coil spring		
Shock absorber type	Double-acting hydraulic		
Stabilizer	Standard equipment		



ST





MA

BT

SC

EL

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