

SECTION

FSU

FRONT SUSPENSION

A

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C

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# PRECAUTIONS

## PRECAUTIONS

PFP:00001

### Cautions

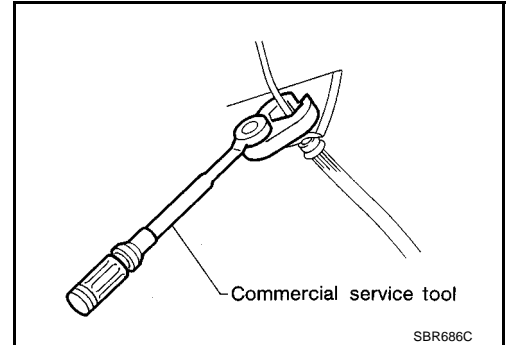
EES000ZW

- When installing rubber bushings, final tightening must be carried out under unladen conditions with tires on flat, level ground. Oil will shorten the life of rubber bushings. Be sure to wipe off any spilled oil.
- "Unladen condition" means that fuel, coolant and lubricant are full and ready for drive. However, spare tire, jack, and hand tools should be unloaded.
- After installing the removed suspension parts, always check wheel alignment and adjust if necessary.
- Replace the caulking nut with a new one. Install a new nut without wiping the oil off before tightening.

### Precautions for Brake System

EES000ZX

- 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.



SBR686C

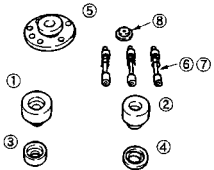
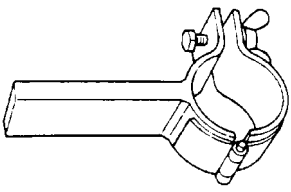
# PREPARATION

## PREPARATION

PFP:00002

## Special Service Tools

EES0002Y

Description		Application
CCK gauge attachment KV991040S1 1 KV99104020 Adapter A 2 KV99104030 Adapter B 3 KV99104040 Adapter C 4 KV99104050 Adapter D 5 KV99104060 Plate 6 KV99104070 Guide bolt 7 KV99104080 Spring 8 KV99104090 Center plate	 <p>ZZA1167D</p>	Measuring wheel alignment
Strut attachment ST35652000	 <p>ZZA0807D</p>	Disassembling and assembling strut

A

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FSU

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# NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

## NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

PFP:00003

### NVH Troubleshooting Chart

EES000ZZ

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

Reference page			Refer to <a href="#">FSU-5, "FRONT SUSPENSION ASSEMBLY"</a>	Refer to <a href="#">FSU-8, "COIL SPRING AND SHOCK ABSORBER"</a>	—	—	—	Refer to <a href="#">FSU-5, "FRONT SUSPENSION ASSEMBLY"</a>	Refer to <a href="#">FSU-6, "Wheel Alignment"</a>	Refer to <a href="#">FSU-11, "STABILIZER BAR"</a>	NVH in RAX and RSU section.	NVH in WT section.	NVH in WT section.	NVH in FAX section.	NVH in BR section.	NVH in PS section.
Possible cause and SUSPECTED PARTS			Improper installation, looseness	Shock absorber deformation, damage or deflection	Bushing or mounting deterioration	Parts interference	Spring fatigue	Suspension looseness	Incorrect wheel alignment	Stabilizer bar fatigue	REAR AXLE AND REAR SUSPENSION	TIRES	ROAD WHEEL	DRIVE SHAFT	BRAKES	STEERING
Symptom	FRONT 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		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	x	x			

x: Applicable

## FSU-5

# FRONT SUSPENSION ASSEMBLY

- |                             |                           |                                  |
|-----------------------------|---------------------------|----------------------------------|
| 1. Strut mounting insulator | 2. Strut mounting bearing | 3. Coil spring                   |
| 4. Bound bumper             | 5. Strut                  | 6. Knuckle                       |
| 7. Clamp                    | 8. Bushing                | 9. Connecting rod                |
| 10. Transverse link         | 11. Stabilizer            | 12. Upper link (A/T models only) |
| 13. Upper link              | 14. Suspension member     | 15. Suspension member stay       |

## On-Vehicle Inspection and Service

### LOOSENESS, BACKLASH, AND DAMAGE OF MOUNTING PARTS AND CONNECTIONS

EES00101

Lift the vehicle, and inspect as follows:

- Check mounting point of each component for looseness, backlash, and damage.
  - Check end play of the lower ball joint.
1. Attach a dial gauge so that the contact rests on the brake caliper.
  2. Set front wheels in a straight-ahead position. Do not depress brake pedal.
  3. Measure axial end play by placing an iron pry bar or something similar between transverse link and steering knuckle.

#### Standard

**Axial end play : 0 mm (0 in)**

#### CAUTION:

**Be careful not to damage ball joint boot.**

4. If axial end play is outside the standard, remove transverse link and check lower ball joint.

## Wheel Alignment

### DESCRIPTION

EES00102

- Measure wheel alignment under unladen conditions. "Unladen conditions" means that fuel, coolant, and lubricant are full. However, spare tire, jack, and hand tools should be unloaded.

### PRELIMINARY INSPECTION

1. Check the tires for improper air pressure and wear.
2. Check road wheels for runout.
3. Check wheel bearing axial end play.
4. Check lower ball joint axial end play.
5. Check strut operation.
6. Check each mounting point of axle and suspension for looseness and deformation.
7. Check each link and arm for cracks, deformation, and other damage.
8. Check the vehicle posture.

### INSPECTION OF CAMBER, CASTER, AND KINGPIN INCLINATION ANGLES

- Camber, caster, and kingpin inclination angles cannot be adjusted.
  - Before inspection, mount front wheels onto turning radius gauge. Mount rear wheels onto a stand that has same height so the vehicle will remain horizontal.
1. Measure camber, caster and kingpin inclination of both right and left wheels with a suitable alignment gauge.

#### Camber, caster and kingpin inclination:

##### For CR engines:

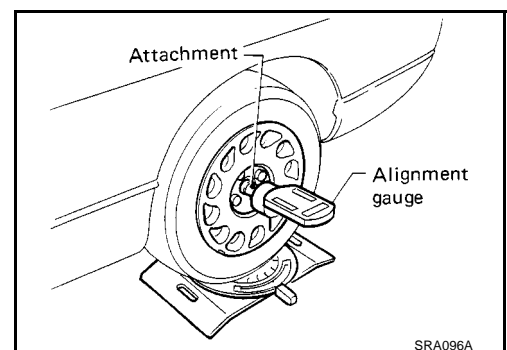
**Camber : -0°51' - 0°39' (-0.85° - 0.65°)**

**Caster : 3°42' - 5°12' (3.70° - 5.20°)**

##### For K9K engines:

**Camber : -0°51' - 0°39' (-0.85° - 0.65°)**

**Caster : 3°36' - 5°06' (3.60° - 5.10°)**



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

# FRONT SUSPENSION ASSEMBLY

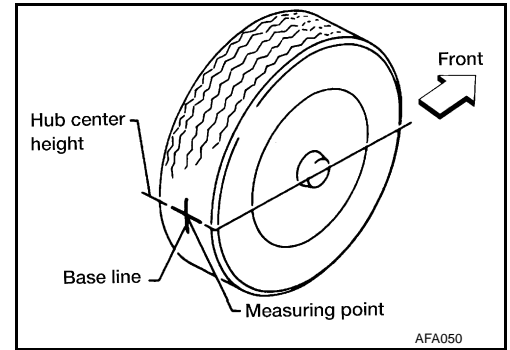
## Toe-in

Measure toe-in using the following procedure.

### **WARNING:**

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

1. Bounce front of vehicle up and down to stabilize the posture.
2. Push the vehicle straight ahead about 5 m (16 ft).
3. Put a mark on base line of tread (rear side) of both tires at the same height as hub center. These are measuring points.

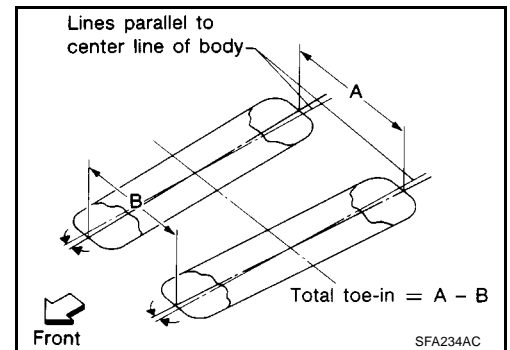


4. Measure distance "A" (rear side).
5. Push the vehicle slowly ahead to rotate the wheels 180degrees (1/2 turn).

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: In 2 - 0 mm (0.08 - 0 in)**



## STEERING ANGLE INSPECTION

1. Set wheels in straight-ahead position. Move vehicle to set front wheels on turning radius gauge.
2. Turn steering wheel fully to right and left, and measure steering angle. Refer to [PS-13, "SERVICE DATA AND SPECIFICATIONS \(SDS\)"](#).

# COIL SPRING AND SHOCK ABSORBER

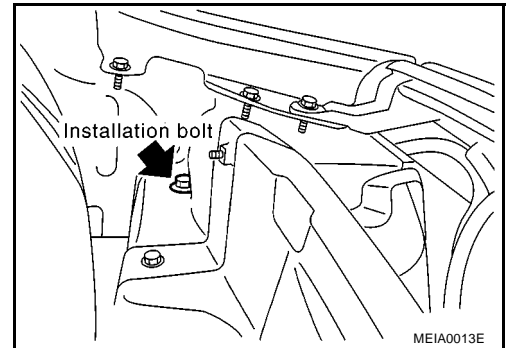
## COIL SPRING AND SHOCK ABSORBER

PFP:54302

### Removal and Installation REMOVAL

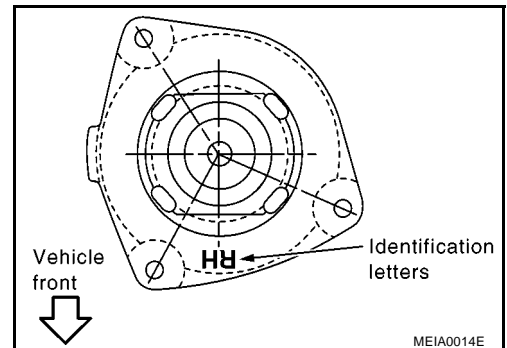
EES00103

1. Raise vehicle and remove tire.
2. Remove cowl top cover. Refer to [EI-10, "COWL TOP"](#).
3. Remove electrical wires of ABS wheel sensor from strut. Refer to [BRC-44, "WHEEL SENSORS"](#).
4. Remove brake hose lock plate. Refer to [BR-11, "BRAKE PIPING AND HOSE"](#).
5. Remove stabilizer connecting rod.
6. Remove nuts and bolts securing steering knuckle to strut.
7. Remove upper bolts of the strut and remove strut from the vehicle.



### INSTALLATION

- Refer to [FSU-5, "FRONT SUSPENSION ASSEMBLY"](#) for tightening torque. Tighten in the reverse order of removal.
- Make sure the identification letters on strut mounting insulator face toward vehicle front. Then install strut.



### Disassembly and Assembly DISASSEMBLY

EES00104

1. Install strut attachment (SST) to strut and fix it in a vise.

#### **CAUTION:**

**When installing strut attachment (SST), wrap a shop cloth around strut to protect it from damage.**

2. Slightly loosen piston rod lock nut.

#### **CAUTION:**

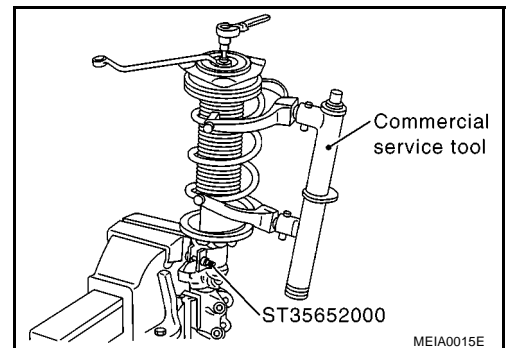
**Do not remove piston rod lock nut completely. If it is removed completely, coil spring jumps out and may cause serious damage or injury.**

3. Compress coil spring using a spring compressor (commercial service tool).

#### **CAUTION:**

**Start compressing the coil spring after making sure that the spring compressor is completely attached to the coil spring.**

4. After making sure coil spring is free between strut mounting bearing and lower seats at the end of Step 3, remove piston rod lock nut.
5. Remove small parts on strut.
  - Remove strut mounting insulator and strut mounting bearing. Remove coil spring from strut.





# COIL SPRING AND SHOCK ABSORBER

6. Remove bound bumper.
7. Gradually release spring compressor (commercial service tool), and remove coil spring.

## INSPECTION AFTER DISASSEMBLY

### Strut Inspection

- Check the strut for deformation, cracks, and damage, and replace if necessary.
- Check piston rod for damage, uneven wear, and distortion, and replace if necessary.
- Check connections and packing for oil leakage, and replace if necessary.

### Insulator and Rubber Parts Inspection

Check strut mounting insulator for cracks and rubber parts for wear. Replace them if necessary.

### Coil Spring Inspection

Check coil spring for cracks, wear, and damage. Replace if necessary.

## ASSEMBLY

1. Compress coil spring using a spring compressor (commercial service tool), and install it onto the strut.

### CAUTION:

- Face the small diameter side (there is identification mark in 1.25 rotations) of coil spring downward. Align lower end to spring seat as shown in the figure.
- Start compressing the coil spring after making sure that the spring compressor is completely attached to the coil spring.

2. Connect bound bumper to strut piston rod.

3. Install small parts to the strut.

- Attach strut mounting insulator, strut mounting bearing. Position piston rod lock nut.

### CAUTION:

**Do not reuse piston rod lock nut.**

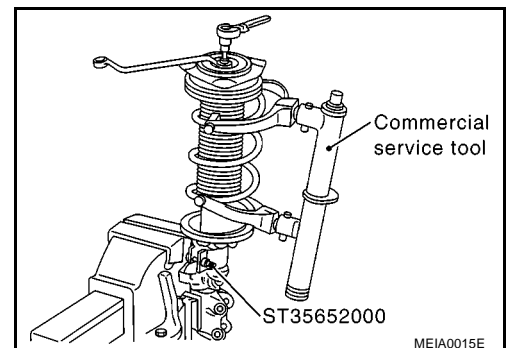
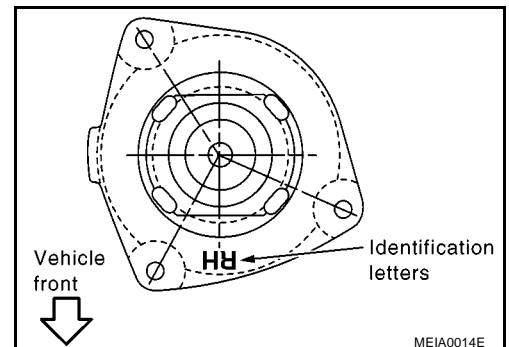
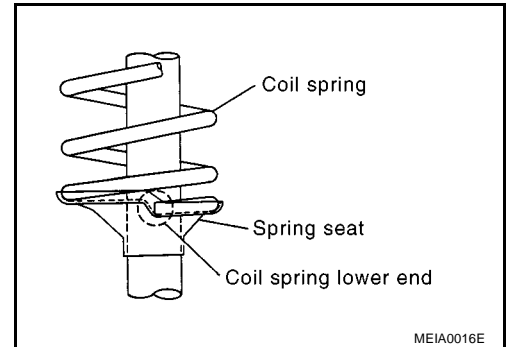
4. Be sure the identification letters on strut mounting insulator are positioned as shown.

5. Be sure coil spring is properly set in strut mounting bearing. Gradually release spring compressor (commercial service tool).

6. Tighten piston rod lock nut to the specified torque.

**Tightening torque : 60 - 75 N·m (6.2 - 7.6 kg·m, 45 - 55 ft·lb)**

7. Remove strut attachment (SST).



## TRANSVERSE LINK

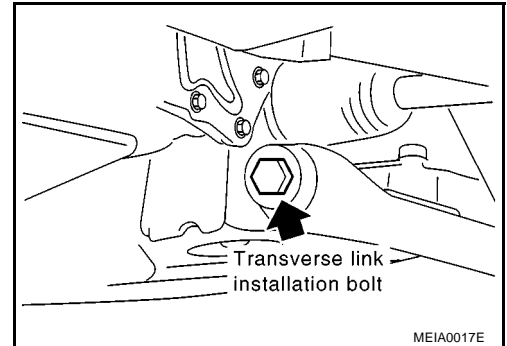
### Removal and Installation REMOVAL

1. Raise vehicle and remove tire.
2. Remove nuts and bolts of transverse link ball joint, and remove transverse link from steering knuckle.
3. Remove transverse link nuts and bolts, and remove transverse link from suspension member.

#### NOTE:

When removing LH transverse link (A/T models), lower the suspension member in order to remove bolts to avoid contacting and releasing the mounting bolts on vehicle front. Remove suspension member.

- a. Set jack under suspension member.
- b. Loosen RH upper link mounting bolt, LH upper link mounting bolt (suspension member side), suspension member mounting bolts (left/right). Lower the suspension member in order to remove transverse link mounting bolts.



### INSPECTION AFTER REMOVAL

#### Visual Inspection

Check transverse link and bushing for deformation, cracks, and other damage, and replace entire transverse link assembly if necessary.

#### Ball Joint Inspection

- Manually move ball stud to confirm it moves smoothly with no binding.

#### Oscillating Torque Inspection

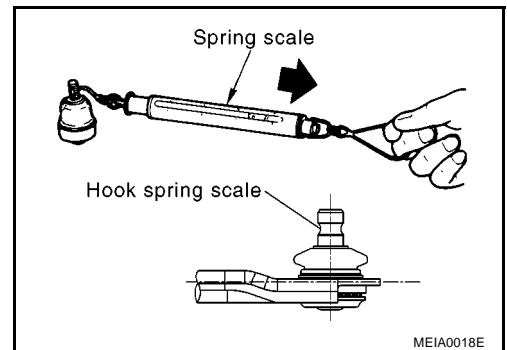
#### CAUTION:

Before measuring, move the ball joint at least ten times by hand to check for smooth movement.

- Hook the spring scale at the cutout on ball stud, and make sure the spring scale measurement value is within the standard when ball stud begins moving.

<b>Tensile force</b>	<b>: 0.5 - 4.9 N·m (0.05 - 0.5 kg·m, 5 - 43 in-lb)</b>
<b>Spring balance measurement</b>	<b>: 15.4 - 150.8 N (1.6 - 15.4 kg, 3.5 - 33.9 lb)</b>

- If value is outside the standard, replace transverse link.



#### Axial End Play Inspection

- Move the tip of the ball joint in the axial direction to check for looseness.

**Axial end play : 0 mm (0 in)**

- If any looseness is noted, replace transverse link assembly as a single unit.

### INSTALLATION

- Refer to [FSU-5, "Components"](#) for tightening torque. Tighten in the reverse order of removal.
- Fully tighten transverse link mounting nuts and bolts under unladen condition with tires on level ground.
- After installation, check wheel alignment. Refer to [FSU-6, "Wheel Alignment"](#).

# STABILIZER BAR

## STABILIZER BAR

PFP:54611

### Removal and Installation

EES00106

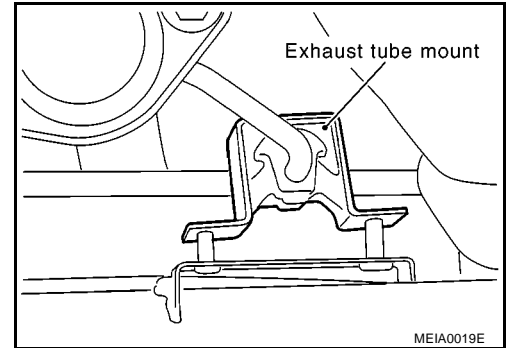
#### REMOVAL

1. Raise vehicle and remove tire.
2. Remove the attachment nut on the stabilizer connecting rod and remove the stabilizer connecting rod.
3. Remove tie-rod from steering knuckle. If it is difficult to remove tie-rod, remove it with a ball joint remover (commercial service tool).

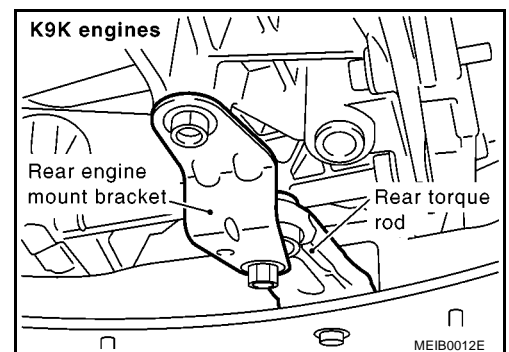
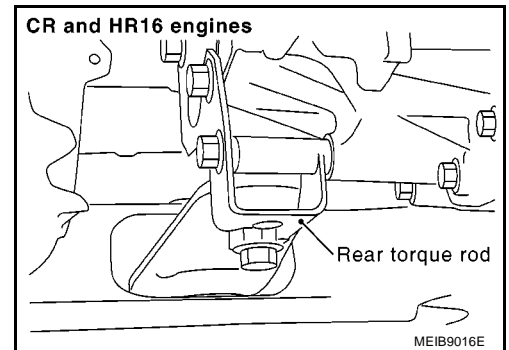
#### CAUTION:

To prevent damage to threads and to prevent ball joint remover (commercial service tool) from coming off, temporarily tighten lock nuts.

4. Remove exhaust tube mount (A/T models). Refer to [AT-430, "Removal and Installation"](#)



5. Remove transaxle rear torque rod. Refer to [MT-7, "REMOVAL AND INSTALLATION"](#) (with JH3 transaxle) or [MT-37, "REMOVAL AND INSTALLATION"](#) (with JR5 transaxle) for M/T models, [AT-430, "Removal and Installation"](#) for A/T models.



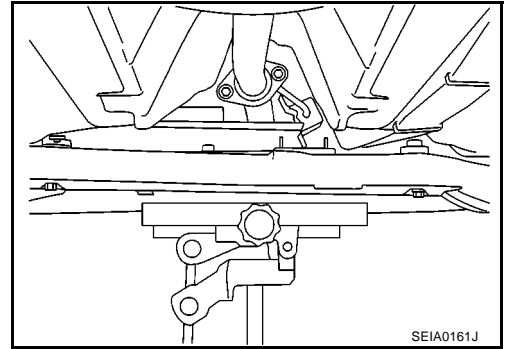
6. Remove rear side bolt of suspension member stay.
7. Set jack under suspension member.
8. Remove bolts of suspension member and suspension member stay.

## STABILIZER BAR

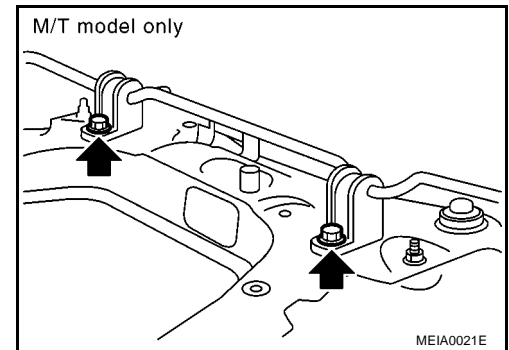
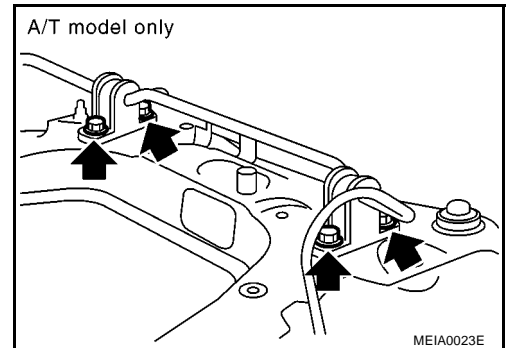
9. Lower suspension member in order to remove stabilizer mounting bolts.

**CAUTION:**

Be careful not to lower it too far. (Do not overload the links.)



10. Remove stabilizer bolt and remove clamp and bushing.
11. Remove stabilizer from the vehicle.

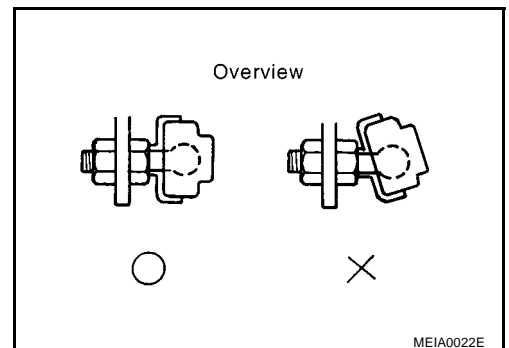


### INSPECTION AFTER REMOVAL

Check stabilizer, connecting rod, bushing and clamp for deformation, cracks and damage. Replace if necessary.

### INSTALLATION

- Refer to [FSU-5, "FRONT SUSPENSION ASSEMBLY"](#) for tightening torque. Tighten in the reverse order of removal.
- Because the stabilizer uses the pillow ball type connecting rod, position the ball joint with the case on the pillow ball head parallel to the stabilizer.



# FRONT SUSPENSION MEMBER

## FRONT SUSPENSION MEMBER

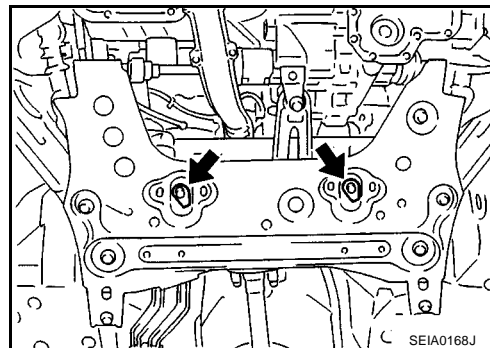
PFP:54401

### Removal and Installation

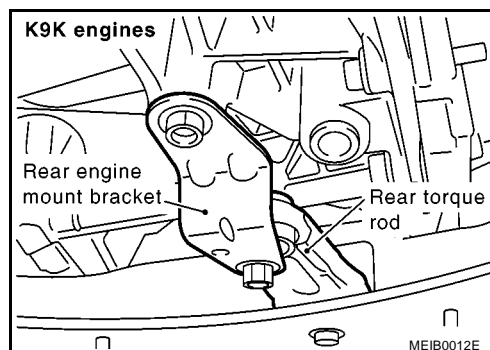
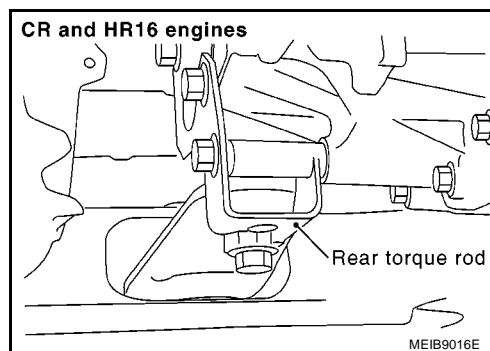
EES00107

#### REMOVAL

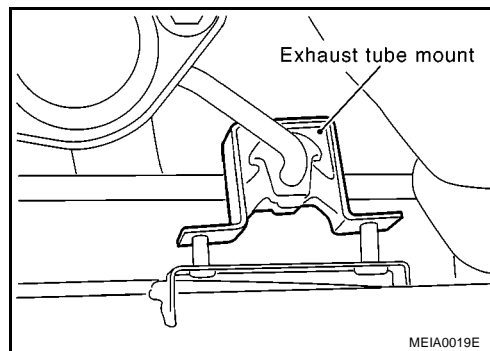
1. Raise vehicle and remove tire.
2. Remove stabilizer connecting rod.
3. Remove nuts and bolts of transverse link ball joint, and remove transverse link from steering knuckle.
4. Remove steering gear mounting nuts and bolts. Separate steering gear from suspension member.



5. Remove transaxle rear torque rod. Refer to [MT-7, "REMOVAL AND INSTALLATION"](#) (with JH3 transaxle) or [MT-37, "REMOVAL AND INSTALLATION"](#) (with JR5 transaxle) for M/T models, [AT-430, "Removal and Installation"](#) for A/T models.



6. Remove exhaust tube mount (A/T models). Refer to [EX-4, "REMOVAL"](#).
7. Remove body side bolt of upper link.
8. Set a jack under suspension member, and remove suspension member mounting bolts. Remove upper link, transverse link and stabilizer as a set.
9. Remove upper link, transverse link and stabilizer from the suspension member.



#### INSPECTION AFTER REMOVAL

Check suspension member for deformed parts, cracks, or any other damage. Replace if necessary.

## FRONT SUSPENSION MEMBER

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### INSTALLATION

- Refer to [FSU-5, "FRONT SUSPENSION ASSEMBLY"](#) for tightening torque. Tighten in the reverse order of removal.
- After finishing work, perform final tightening of each part under unladen condition with tires on level ground. Check wheel alignment. Refer to [FSU-6, "Wheel Alignment"](#) .

# SERVICE DATA AND SPECIFICATIONS (SDS)

## SERVICE DATA AND SPECIFICATIONS (SDS)

PFP:00030

### Wheel Alignment FOR CR ENGINES:

EES00108

Drive type	2WD
Camber	-0°51' - 0°39' (-0.85° - 0.65°)
Caster	3°42' - 5°12' (3.70° - 5.20°)
Kingpin offset	9°03' - 10°33' (9.05° - 10.55°)
Toe-in	In 2 - 0 mm (0.08 - 0 in)

### FOR K9K ENGINES:

Drive type	2WD
Camber	-0°51' - 0°39' (-0.85° - 0.65°)
Caster	3°36' - 5°06' (3.60° - 5.10°)
Kingpin offset	9°03' - 10°33' (9.05° - 10.55°)
Toe-in	In 2 - 0 mm (0.08 - 0 in)

### Ball Joint FOR CR ENGINES:

EES00109

Axial end play	0mm (0 in)
Sliding torque	0.5 - 4.9 N·m (0.05 - 0.5 kg-m, 5 - 43 in-lb)
Spring scale measurement (ball stud cutout)	15.4 - 150.8 N (1.6 - 15.4 kg, 3.5 - 33.9 lb)

### FOR K9K ENGINES:

Axial end play	0mm (0 in)
Sliding torque	0.5 - 4.9 N·m (0.05 - 0.50 kg-m, 5 - 43 in-lb)
Spring scale measurement (ball stud cutout)	15.4 - 150.8 N (1.6 - 15.4 kg, 3.5 - 33.9 lb)

## Tightening Torque

EES0010A

Unit: N·m (kg-m, ft-lb)

	Front		Rear
	M/T	A/T	
	90 - 107 (9.2 - 10.9, 67 - 78)	Right: 140 - 160 (15 - 16, 104 - 118) Left: 90 - 107 (9.2 - 10.9, 67 - 78)	Rear: 90 - 107 (9.2 - 10.9, 67 - 78)
Transverse link to suspension member			
Steering knuckle to Transverse link	54 - 66 (5.5 - 6.7, 40 - 48)		
Stabilizer connecting rod to Strut	38 - 50 (3.9 - 5.0, 28 - 36)		
Strut mounting insulator to Body	15 - 19.5 (1.6 - 1.9, 11 - 14)		
Strut piston rod lock nut	60 - 75 (6.2 - 7.6, 45 - 55)		
Strut to Steering knuckle	100 - 117 (11 - 12, 74 - 86)		
Upper link to Body	68 - 83 (7.0 - 8.4, 51 - 61)		
	Right		Left
	M/T	A/T	
	90 - 107 (9.2 - 10.9, 67 - 78)	140 - 160 (15 - 16, 104 - 118)	90 - 107 (9.2 - 10.9, 67 - 78)
Upper link to Suspension member			
Suspension member to Body	100 - 115 (11 - 12, 74 - 84)		
Suspension member stay to Body (rear)	40 - 50 (4.1 - 5.0, 30 - 36)		
Suspension member to Stabilizer clamp	28 - 35 (2.9 - 3.5, 21 - 25)		

## SERVICE DATA AND SPECIFICATIONS (SDS)

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