SECTION FSU
FRONT SUSPENSION

CONTENTS

SYMPTOM DIAGNOSIS

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

NVH Troubleshooting Chart

INFOID:0000000005462938

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

		Reference page	FSU-15	FSU-18	—	—	—	FSU-15	FSU-7	FSU-7	WT-57, "NVH Troubleshooting Chart"	WT-57, "NVH Troubleshooting Chart"	FAX-2, "NVH Troubleshooting Chart"	BR-6, "NVH Troubleshooting Chart"	ST-8, "NVH Troubleshooting Chart"
		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	TIRES	ROAD WHEEL	DRIVE SHAFT AND WHEEL HUB	BRAKES	STEERING
Symptom	Noise		×	×	×	×	×	×			×	×	×	×	×
	Shake		×	×	×	×		×			×	×	×	×	×
	Vibration		×	×	×	×	×				×		×		×
	Shimmy		×	×	×	×			×		×	×		×	×
	Shudder		×	×	×						×	×		×	×
	Poor quality ride or handling		×	×	×	×	×		×	×	×	×			

×: Applicable

PRECAUTION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000005462939

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted. Information necessary to service the system safely is included in the SR and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SR section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

PRECAUTIONS WHEN USING POWER TOOLS (AIR OR ELECTRIC) AND HAMMERS

WARNING:

- **When working near the Airbag Diagnosis Sensor Unit or other Airbag System sensors with the Ignition ON or engine running, DO NOT use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.**
- **When using air or electric power tools or hammers, always switch the Ignition OFF, disconnect the battery, and wait at least 3 minutes before performing any service.**

Precautions Necessary for Steering Wheel Rotation after Battery Disconnect (Early Production, With Electronic Steering Column Lock)

INFOID:0000000005885846

NOTE:

- Before removing and installing any control units, first turn the push-button ignition switch to the LOCK position, then disconnect both battery cables.
- After finishing work, confirm that all control unit connectors are connected properly, then re-connect both battery cables.
- Always use CONSULT-III to perform self-diagnosis as a part of each function inspection after finishing work. If a DTC is detected, perform trouble diagnosis according to self-diagnosis results.

This vehicle is equipped with a push-button ignition switch and a steering lock unit.
If the battery is disconnected or discharged, the steering wheel will lock and cannot be turned.
If turning the steering wheel is required with the battery disconnected or discharged, follow the procedure below before starting the repair operation.

OPERATION PROCEDURE

1. Connect both battery cables.
   NOTE:
   Supply power using jumper cables if battery is discharged.
2. Carry the Intelligent Key or insert it to the key slot and turn the push-button ignition switch to ACC position. (At this time, the steering lock will be released.)
3. Disconnect both battery cables. The steering lock will remain released with both battery cables disconnected and the steering wheel can be turned.
4. Perform the necessary repair operation.

5. When the repair work is completed, re-connect both battery cables. With the brake pedal released, turn the push-button ignition switch from ACC position to ON position, then to LOCK position. (The steering wheel will lock when the push-button ignition switch is turned to LOCK position.)
6. Perform self-diagnosis check of all control units using CONSULT-III.

Service Notice or Precautions

INFOID:0000000005462941

- When installing rubber bushings, the final tightening must be carried out under unladen conditions with tires on ground. Oil might shorten the life of rubber bushings. Be sure to wipe off any spilled oil.
- Unladen conditions mean that fuel, engine coolant and lubricant are full. Spare tire, jack, hand tools and mats are in designated positions.
- After servicing suspension parts, be sure to check wheel alignment.
- Self-lock nuts are not reusable. Always use new ones when installing. Since new self-lock nuts are pre-oiled, tighten as they are.

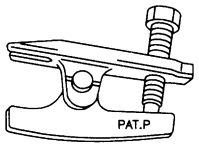
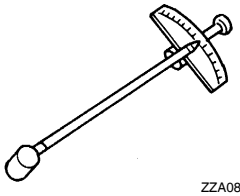
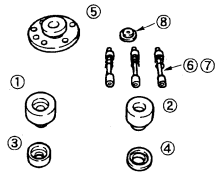
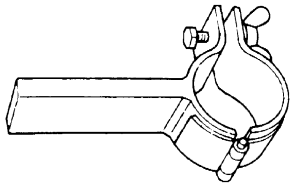
PREPARATION

PREPARATION

Special Service Tool

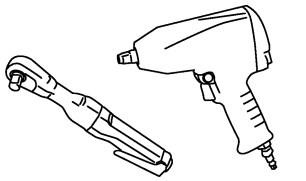
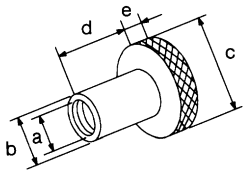
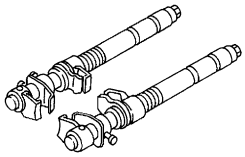
INFOID:0000000005462942

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

Tool number (Kent-Moore No.) Tool name		Description
HT7252000 (J-25730-B) Ball joint remover	 S-NT146	Removing tie-rod outer and lower ball joint
ST3127S000 (J-25765-A) Preload gauge	 ZZA0806D	Measuring ball joint sliding torque
KV991040S1 (—) CCK gauge attachment 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	 ZZA1167D	Measuring wheel alignment
ST35652000 (—) Strut attachment	 ZZA0807D	Disassembling and assembling strut

Commercial Service Tool

INFOID:0000000005462943

Tool name	Description
Power tool  PBIC0190E	Loosening bolts and nuts
Attachment wheel alignment a: screw M24 x 1.5 pitch b: 35 mm (1.38 in) dia. c: 65 mm (2.56 in) dia. d: 56 mm (2.20 in) dia. e: 12 mm (0.47 in) dia.  NT148	Measuring wheel alignment
Spring compressor  NT717	Removing and installing coil spring
Engine slinger  LEIA0062E	Removing and installing suspension member with VQ35DE and CVT

ON-VEHICLE MAINTENANCE

FRONT SUSPENSION ASSEMBLY

Inspection and Adjustment

INFOID:0000000005462944

INSPECTION

Make sure the mounting conditions (looseness, backlash) of each component and component conditions (wear, damage) are normal.

LOWER BALL JOINT END PLAY

1. Set front wheels in a straight-ahead position. Do not depress brake pedal.
2. Place an iron bar or similar tool between upper link and steering knuckle.
3. Measure axial end play by prying it up and down. Refer to FSU-19, "Ball Joint".
   CAUTION:
   Be careful not to damage ball joint boot. Do not damage the installation position by applying excessive force.

SHOCK ABSORBER

Check for oil leakage, damage and replace if malfunction is detected.

WHEEL ALIGNMENT

Description

Measure wheel alignment under unladen conditions.

NOTE:

"Unladen conditions" means that fuel, engine coolant, and lubricant are full. Spare tire, jack, hand tools and mats are in designated positions.

General Information and Recommendations

- A four-wheel thrust alignment should be performed.
- This type of alignment is recommended for any NISSAN vehicle.
- The four-wheel "thrust" process helps ensure that the vehicle is properly aligned and the steering wheel is centered.
- The alignment rack itself should be capable of accepting any NISSAN vehicle.
- The rack should be checked to ensure that it is level.
- Make sure the machine is properly calibrated.
- Your alignment equipment should be regularly calibrated in order to give correct information.
- Check with the manufacturer of your specific equipment for their recommended Service/Calibration Schedule.

Preliminary Check

Check the following:

1. Tires for improper air pressure and wear.
2. Road wheels for runout. Refer to WT-67, "Road Wheel".
3. Wheel bearing axial end play. Refer to FAX-27, "Wheel Bearing".
4. Transverse link ball joint axial end play. Refer to FSU-11, "Removal and Installation".
5. Shock absorber operation.
6. Each mounting part of axle and suspension for looseness and deformation.
7. Each of suspension member, shock absorber, upper link and transverse link for cracks, deformation and other damage.
8. Vehicle height (posture).

Alignment Process

IMPORTANT:

Use only the alignment specifications listed in this Service Manual.

- When displaying the alignment settings, many alignment machines use "indicators" **Do not use these indicators.**: (Green/red, plus or minus, Go/No Go).
- The alignment specifications programmed into your machine that operate these indicators may not be correct.

- This may result in an ERROR.
• Some newer alignment machines are equipped with an optional "Rolling Compensation" method to "compensate" the sensors (alignment targets or head units). Do not use this "Rolling Compensation" method.
- Use the "Jacking Compensation Method". After installing the alignment targets or head units, raise the vehicle and rotate the wheels 1/2 turn both ways.
- See Instructions in the alignment machine you're using for more information.

ADJUSTMENT

Camber, Caster and Kingpin Inclination Angles

CAUTION:

Camber, caster, kingpin inclination angles cannot be adjusted.

ON-VEHICLE REPAIR

FRONT COIL SPRING AND STRUT

Removal and Installation

INFOID:0000000005462945

REMOVAL

1. Remove tire using power tool.
2. Remove brake caliper and reposition aside using wire. Refer to BR-32, "Removal and Installation of Brake Caliper and Rotor".
   CAUTION:
   Avoid depressing brake pedal with brake caliper removed.
3. Remove wheel sensor electrical harness from strut. Refer to BRC-101, "Removal and Installation".
4. Remove brake hose lock plate.
5. Remove steering knuckle to strut bolts and nuts. Refer to FSU-15, "Exploded View".
6. Remove bolt on strut tower bar, then bolts on strut tower and remove strut from vehicle.

INSPECTION AFTER REMOVAL

Check the strut for any oil leakage or other damage and replace as necessary.

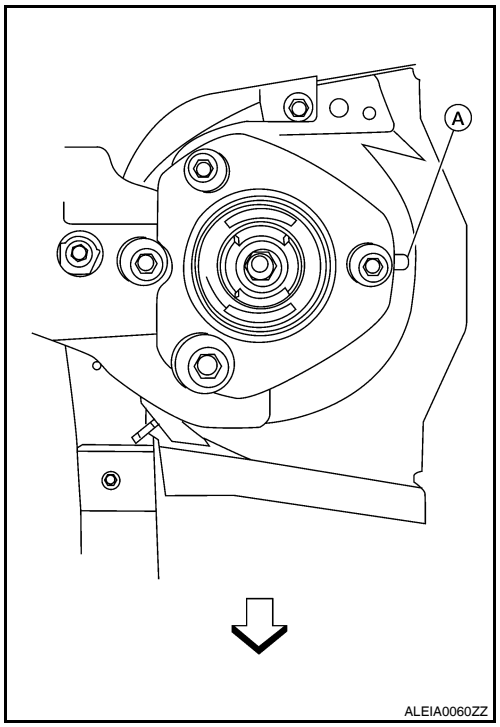
INSTALLATION

Installation is in the reverse order of removal.

- Refer to FSU-15, "Exploded View" for tightening torque.
- Be sure tab (A) on strut mount insulator is positioned as shown.

A : tab

⇦ : Vehicle front



Disposal

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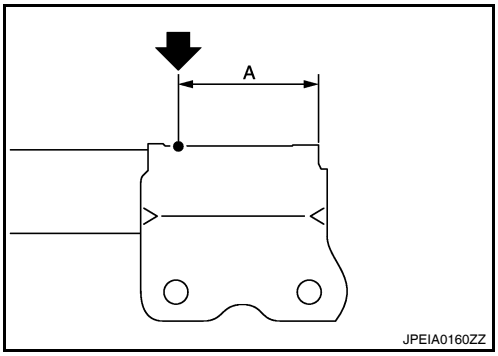
1. Set strut assembly horizontally with the piston rod fully extended.

2. Drill 2 – 3 mm (0.08 – 0.12 in) hole at the position (●) from top as shown in the figure to release gas gradually.
CAUTION:
- **Wear eye protection (safety glasses).**
- **Wear gloves.**
- **Be careful with metal chips or oil blown out by the compressed gas.**

NOTE:
- Drill vertically in this direction (⬅).
- Directly to the outer tube avoiding brackets.
- The gas is clear, colorless, odorless, and harmless.



A : 20 – 30 mm (0.79 – 1.18 in)

3. Position the drilled hole downward and drain oil by moving the piston rod several times.
CAUTION:
Dispose of drained oil according to the law and local regulations.

TRANSVERSE LINK

Removal and Installation

INFOID:0000000005462947

REMOVAL

1. Remove tire using power tool.
2. Remove steering knuckle from transverse link using Tool. Refer to FSU-15, "Exploded View".

Tool number : HT7252000 (J-25730-B)

3. Remove mounting nuts and washers on lower portion of stabilizer connecting rod.
4. Slightly loosen transverse link mounting bolts.
5. Remove transverse link bolts and nuts, and remove transverse link from suspension member.

INSPECTION AFTER REMOVAL

Visual Inspection

Check transverse link and bushing for deformation, cracks, and other damage. Replace the entire transverse link assembly if cracks, deformation or any other damage is found.

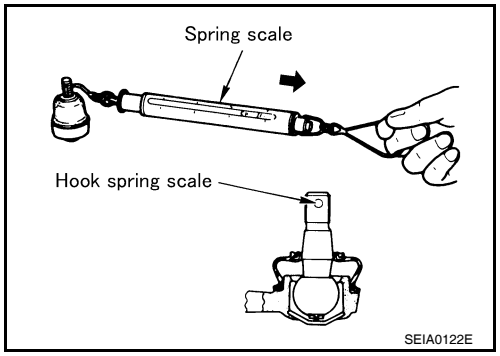
Ball Joint Inspection

CAUTION:

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

Swing Torque Inspection

- Hook spring scale at cotter pin mounting hole. Confirm spring scale measurement value is within specifications when ball stud begins moving.



Swing torque:

0.50 - 3.4 N·m (0.06 - 0.34 kg-m, 5 - 30 in-lb)

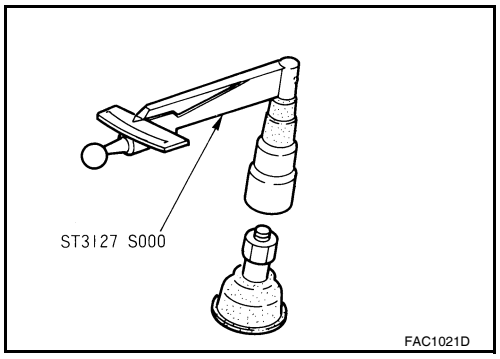
Measurement on spring balance:

7.94 - 53.97 N (0.81 - 5.50 kg, 1.79 - 12.2 lb)

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

Rotating Torque Inspection

- Attach nut to ball stud. Check that rotating torque is within specifications using Tool.



Tool number : ST3127S000 (J-25765-A)

Turning torque:

0.50 - 3.4 N·m (0.06 - 0.34 kg-m, 5 - 30 in-lb)

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

Axial Endplay Inspection

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

Axial endplay : 0.1 mm (0.004 in) or less

- If any looseness is noted, replace transverse link.

INSTALLATION

Installation is in the reverse order of removal.

- Refer to FSU-15, "Exploded View" for tightening torque.
- Tighten transverse link bolts with vehicle unladen and all four tires on flat, level ground.

- After installation, check wheel alignment. Refer to FSU-7, "Inspection and Adjustment".

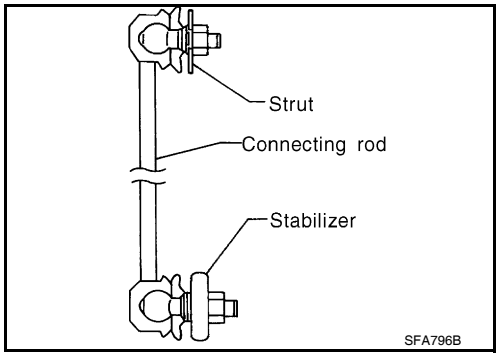
FRONT STABILIZER

Removal and Installation

INFOID:0000000005462948

REMOVAL

1. Remove steering gear and linkage. Refer to ST-27, "Removal and Installation".
2. Remove nuts on upper portion of stabilizer connecting rod.



3. Remove stabilizer clamp bolts.
4. Remove stabilizer from the vehicle.

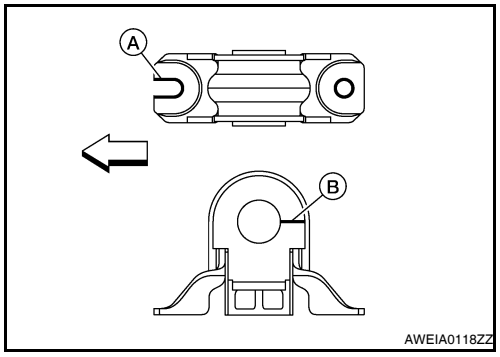
INSPECTION AFTER REMOVAL

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

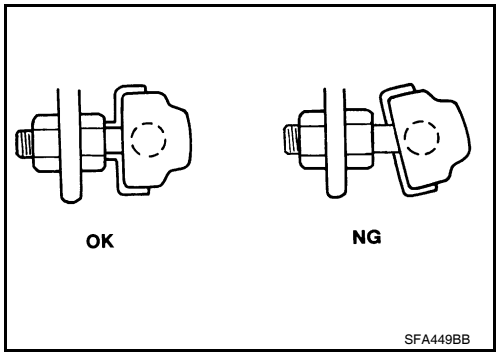
INSTALLATION

Installation is in the reverse order of removal. Refer to FSU-15, "Exploded View".

- When installing stabilizer, make sure that notch (A) in stabilizer clips face front.
- Make sure the slit (B) in surface of stabilizer bushings face rear.
- ⇦: Front.



- Stabilizer uses pillow ball type connecting rod. Position ball joint with case on pillow ball head parallel to stabilizer.



STEERING KNUCKLE

Removal and Installation

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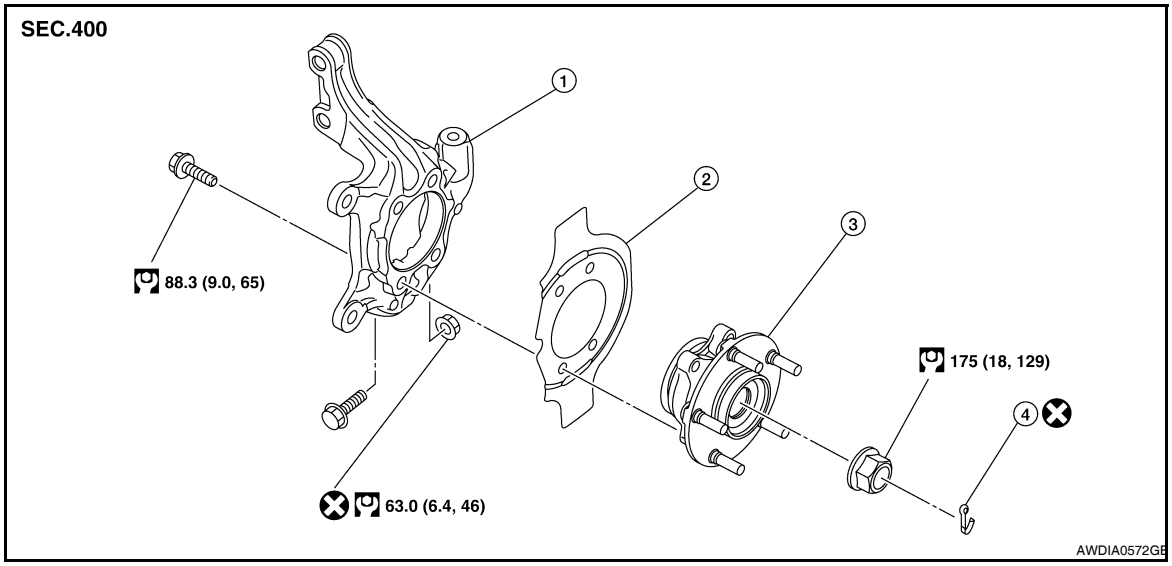


1. Steering knuckle
2. Splash guard
3. Wheel hub and bearing assembly
4. Cotter pin

REMOVAL

1. Remove front wheel hub and bearing assembly. Refer to FAX-8, "Removal and Installation".
2. Remove steering linkage from steering knuckle. Refer to ST-27, "Removal and Installation".
3. Remove steering knuckle lower pinch bolt.
4. Remove steering knuckle to strut bolts, then remove steering knucle. Refer to FSU-15, "Exploded View".

INSPECTION AFTER REMOVAL

Check for deformity, cracks and damage on each part, replace if necessary.

INSTALLATION

Installation is in the reverse order of removal.

CAUTION:

Do not reuse non-reusable parts.

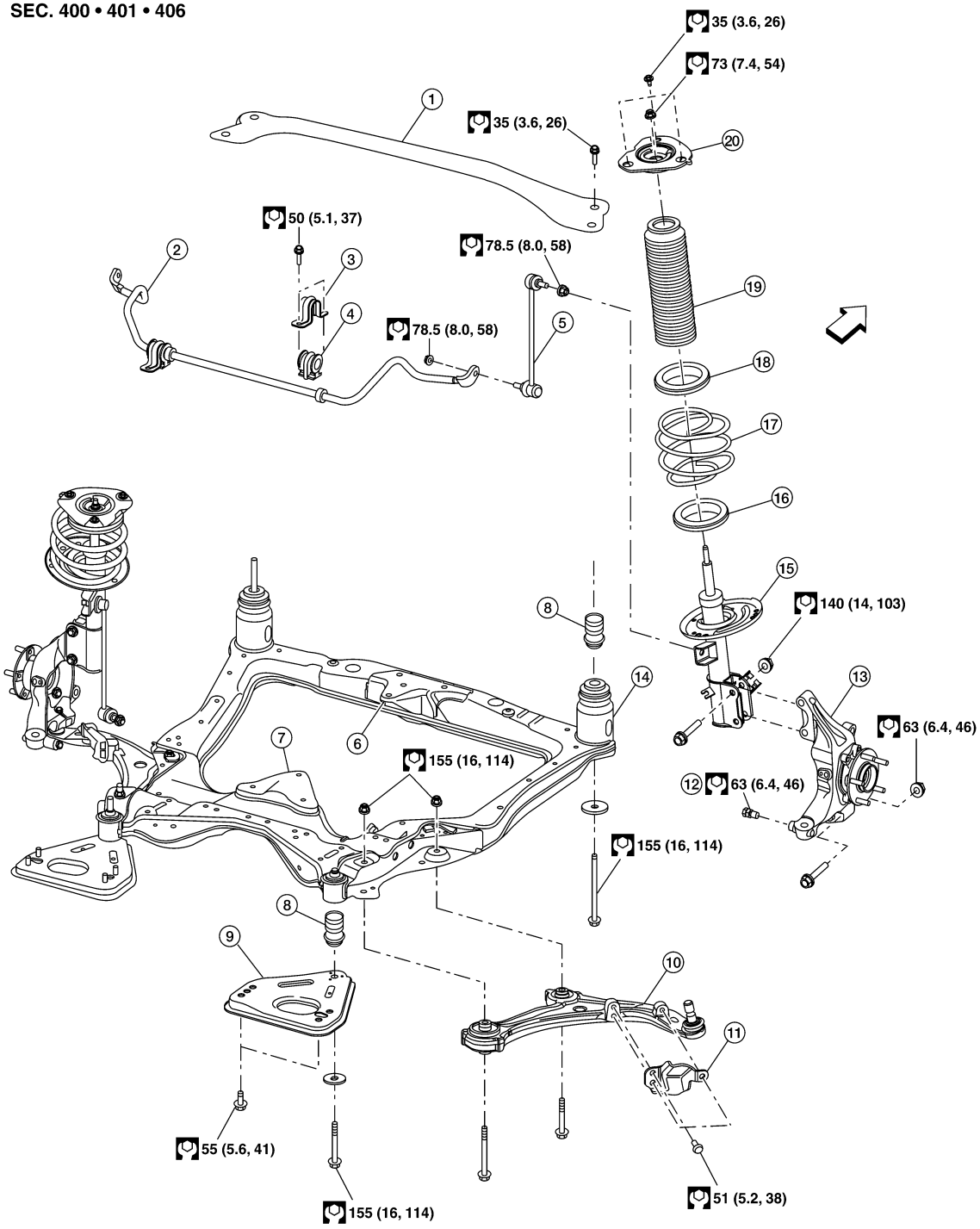
REMOVAL AND INSTALLATION

FRONT SUSPENSION ASSEMBLY

Exploded View

INFOID:0000000005462950

SEC. 400 • 401 • 406



AWEIA0117GB

1. Strut tower bar
2. Stabilizer bar
3. Stabilizer clamp
4. Stabilizer bushing
5. Connecting rod
6. Front mount bracket
7. Rear mount bracket
8. Suspension member insulator
9. Member pin stay
10. Transverse link
11. Steering stop plate
12. Steering stop
13. Steering knuckle
14. Front suspension member
15. Strut
16. Lower rubber seat
17. Coil spring
18. Spring upper seat / strut bearing
19. Dust cover/jounce bumper
20. Strut mount insulator
⇦ Front

Removal and Installation

INFOID:0000000005462951

REMOVAL

- Engine, transmission and suspension member must be removed as an assembly. Refer to EM-95, "Removal and Installation".
- Once removed as an assembly, lift engine and transmission off suspension member using suitable tool.

INSTALLATION

Installation is in the reverse order of removal.

- Refer to FSU-15, "Exploded View" for tightening torque.
- After installation, perform final tightening of each part under unladen conditions with tires on ground. Check wheel alignment. Refer to FSU-7, "Inspection and Adjustment".

DISASSEMBLY AND ASSEMBLY

FRONT COIL SPRING AND STRUT

Disassembly and Assembly

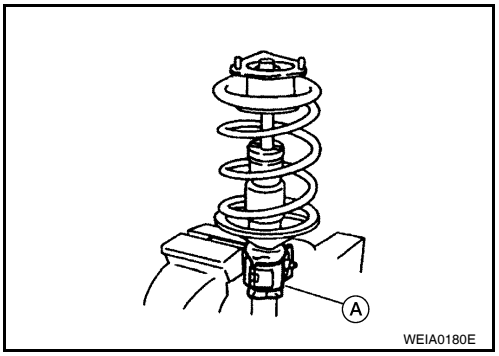
INFOID:0000000005462952

DISASSEMBLY

1. Install Tool (A) to strut and secure it in a vise.

Tool number : ST35652000 (—)

CAUTION:
When installing Tool, wrap a shop cloth around strut to protect it from damage.

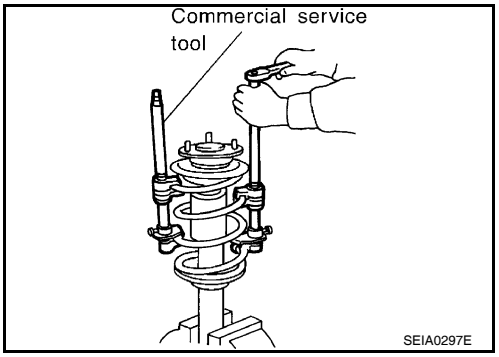


2. Slightly loosen piston rod lock nut.

WARNING:
Do not remove piston rod lock nut completely. If it is removed completely, the coil spring can jump out and may cause serious damage or injury.

3. Compress coil spring using a commercially available spring compressor.

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.



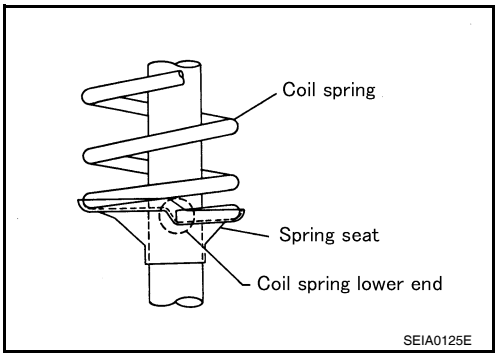
4. Making sure coil spring is free between upper and lower seats, then remove piston rod lock nut.
5. Remove small parts on strut.
   - Strut mount insulator, spring upper seat/strut bearing. Then remove coil spring.
6. Remove dust cover/jounce bumper from strut mount insulator.
7. Gradually release spring compressor (commercial service tool), and remove coil spring.

ASSEMBLY

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

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.

CAUTION:
Face tube side of coil spring downward. Align lower end to spring seat as shown.

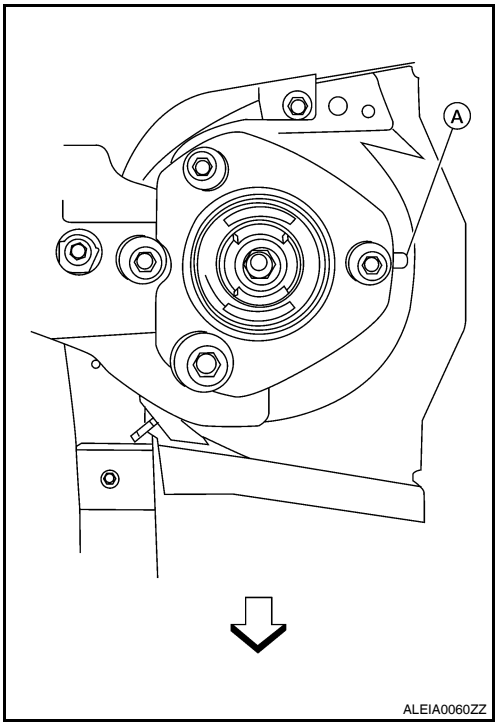


2. Install dust cover/jounce bumper to strut mount insulator.

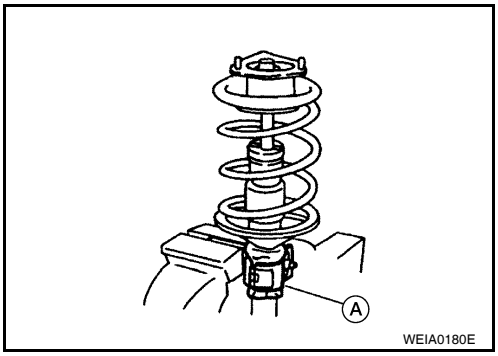
CAUTION:
- **Be sure to install dust cover/jounce bumper to strut mount insulator securely.**
- **When installing dust cover/jounce bumper, use soapy water. Do not use machine oil or other lubricants.**

3. Install small parts to the strut.
   - Spring upper seat/strut bearing and strut mount insulator. Temporarily install piston rod lock nut.
   CAUTION:
   Do not reuse piston rod lock nut.
4. Be sure tab (A) on strut mount insulator is positioned as shown.

A : Tab
⇦ : Vehicle front



5. Be sure coil spring is properly set in spring rubber seat. Gradually release spring compressor.
   CAUTION:
   Be sure upper rubber seat is properly aligned to spring upper seat and coil spring.
6. Tighten piston rod lock nut to the specified torque.
7. Remove Tool (A) from strut.



Inspection

INFOID:0000000005462953

INSPECTION AFTER DISASSEMBLY

Strut
- Check strut for deformation, cracks, and damage, and replace if necessary.
- Check piston rod for damage, uneven wear, and distortion, and replace if necessary.
- Check welded and sealed areas for oil leakage, and replace if necessary.

Insulator and Rubber Parts
Check strut mount insulator for cracks and rubber parts for wear. Replace them if necessary.

Coil Spring
Check for cracks, wear, and damage, and replace if necessary.

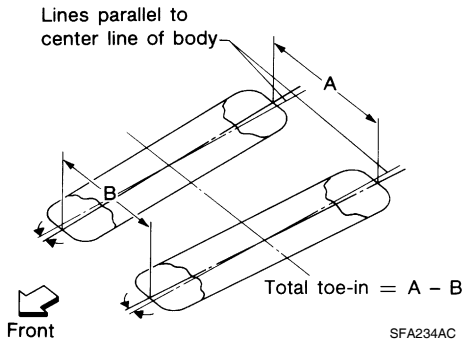
SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

Wheel Alignment (Unladen*)

INFOID:0000000005462954

Market			USA/Canada		Mexico	
Tire size			245/45R18	245/40R19	245/45R18	245/40R19
Camber Degree minute (Decimal degree)	LH	Minimum	-1°05’ (-1.10°)	-1°10’ (-1.15°)	-0°55’ (-0.95°)	
		Nominal	-0°20’ (-0.35°)	-0°25’ (-0.40°)	-0°10’ (-0.20°)	
		Maximum	0°25’ (0.40°)	0°20’ (0.35°)	0°35’ (0.55°)	
	RH	Minimum	-1°20’ (-1.35°)	-1°25’ (-1.40°)	-1°10’ (-1.20°)	
		Nominal	-0°35’ (-0.60°)	-0°40’ (-0.65°)	-0°25’ (-0.45°)	
		Maximum	0°10’ (0.15°)	0°05’ (0.10°)	0°20’ (0.30°)	
	RH with respect to LH		0°15’ ±° 0°33’ (0.25°± 0.55°)			
Caster Degree minute (Decimal degree) Against ground surface		Minimum	4°10’ (4.20°)	4°15’ (4.25°)	3°45’ (3.75°)	
		Nominal	4°55’ (4.95°)	5°00’ (5.00°)	4°30’ (4.50°)	
		Maximum	5°40’ (5.70°)	5°45’ (5.75°)	5°15’ (5.25°)	
		Maximum left and right difference	0°33’ (0.55°)			
Kingpin offset Degree minute (Decimal degree)		Minimum	—		—	
		Nominal	—		—	
		Maximum	—		—	



Total toe-in	Distance (A - B)	Minimum	0 mm
		Nominal	1 mm
		Maximum	2 mm
	Angle (left or right, each side) Degree minute (Degree)	Minimum	0°00′ (0.00°)
		Nominal	0°02′(0.03°)
		Maximum	0°04′ (0.07°)
Wheel turning angle			Refer to ST-38, "Steering Angle"

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

Ball Joint

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Swing torque	0.50 - 3.4 N·m (0.06 - 0.34 kg-m, 5 - 30 in-lb)
Measurement on spring balance (cotter pinhole position)	7.94 - 53.97 N (0.81 - 5.50 kg, 1.79 - 12.2 lb)

Swing torque	0.50 - 3.4 N·m (0.06 - 0.34 kg-m, 5 - 30 in-lb)
Turning torque	0.50 - 3.4 N·m (0.06 - 0.34 kg-m, 5 - 30 in-lb)
Axial endplay	0.1 mm (0.004 in) or less

Wheelarch Height (Unladen*1)

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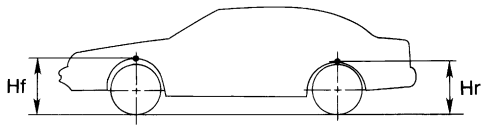
Unit: mm (in)



SFA818A

Market	USA/Canada			Canada			Mexico	
Tire size	P245/ 45R18*2	P245/ 45R18*3	P245/ 40R19*2	P245/ 45R18*2	P245/ 45R18*3	P245/ 40R19*2	P245/ 45R18*2	P245/ 40R19*2
Front (Hf)	719 (28.31)	719 (28.31)	723 (28.46)	720 (28.35)	719 (28.31)	723 (28.46)	729 (28.70)	732 (28.82)
Rear (Hr)	728 (28.66)	727 (28.62)	730 (28.74)	728 (28.66)	727 (28.62)	730 (28.74)	747 (29.41)	750 (29.53)

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

*2: Without top load sunroof

*3: With top load sunroof