SECTION FSU
FRONT SUSPENSION

CONTENTS

SYMPTOM DIAGNOSIS

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

NVH Troubleshooting Chart

INFOID:0000000004212450

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

Reference page		FSU-13	FSU-9	–	–	–	FSU-13	FSU-6	FSU-6	WT-57, "NVH Troubleshooting Chart"	WT-57, "NVH Troubleshooting Chart"	FAX-2, "NVH Troubleshooting Chart"	BR-6, "NVH Troubleshooting Chart"	ST-2, "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:0000000004212451

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.**

Necessary for Steering Wheel Rotation After Battery Disconnect

INFOID:0000000004501288

NOTE:

- Before removing and installing any control units, first turn the push-button ignition switch to the LOCK position, then disconnect both 12-volt battery cables.
- After finishing work, confirm that all control unit connectors are connected properly, then re-connect both 12-volt 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 12-volt battery is disconnected or discharged, the steering wheel will lock and cannot be turned.
If turning the steering wheel is required with the 12-volt battery disconnected or discharged, follow the procedure below before starting the repair operation.

OPERATION PROCEDURE

1. Connect both 12-volt battery cables.
   NOTE:
   Supply power using jumper cables if 12-volt 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 12-volt battery cables. The steering lock will remain released with both 12-volt 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 12-volt 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:0000000004212452

- 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.

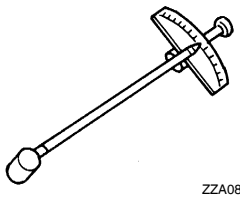
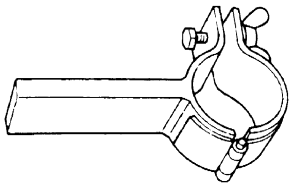
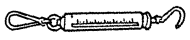
PREPARATION

PREPARATION

Special Service Tool

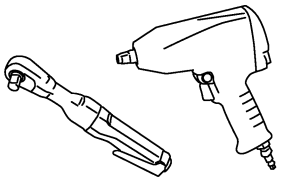
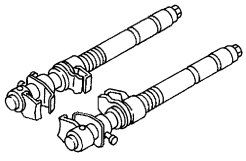
INFOID:0000000004523241

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
ST3127S000 (J-25765-A) Preload gauge  ZZA0806D	Measuring ball joint rotating torque
ST35652000 (—) Strut attachment  ZZA0807D	Disassembling and assembling strut
— (J-44372) Pull gauge  LST024	Measuring swing torque

Commercial Service Tool

INFOID:0000000004212454

Tool name	Description
Power tool  PBIC0190E	Loosening bolts and nuts
Spring compressor  NT717	Removing and installing coil spring

ON-VEHICLE MAINTENANCE

FRONT SUSPENSION ASSEMBLY

Inspection and Adjustment

INFOID:0000000004212455

INSPECTION

Make sure the mounting conditions (looseness, back lash) 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-15, "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-66, "Road Wheel".
3. Wheel bearing axial end play. Refer to FAX-6, "Inspection".
4. Transverse link ball joint axial end play. Refer to FSU-15, "Ball Joint".
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 on this.

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:0000000004523242

REMOVAL

1. Remove wheel and tire using power tool. Refer to WT-62, "Adjustment".
2. Remove brake caliper and reposition aside using wire. Refer to BR-30, "BRAKE CALIPER ASSEMBLY : Removal and Installation".
   CAUTION:
   Avoid depressing brake pedal with brake caliper removed.
3. Remove wheel sensor electical harness from strut.
4. Remove brake hose lock plate.
5. Remove mounting bolts and nuts securing steering knuckle to strut.
6. Remove mounting bolts on tower bar then remove strut from vehicle.

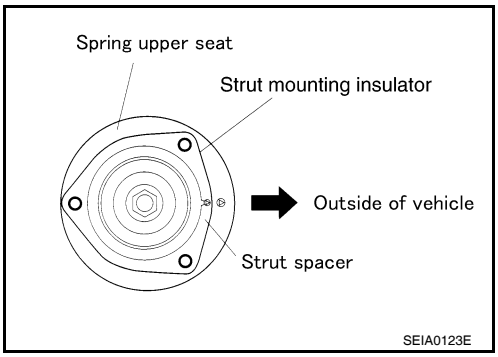
INSPECTION AFTER REMOVAL

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-13, "Exploded View" for tightening torque.
- Be sure arrows on strut mount insulator and spring upper seat are positioned as shown. Also be sure notch in strut spacer is positioned as shown. Then install strut.
- Assemble upper mounting plate with its notch facing toward the outside.



Disassembly and Assembly

INFOID:0000000004523243

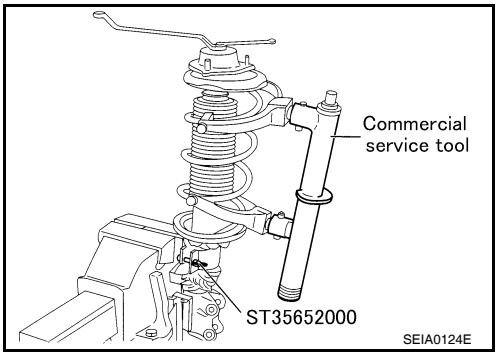
DISASSEMBLY

1. Install Tool to the strut and secure it in a vise as shown.

   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 spring compressor (commercial service tool).

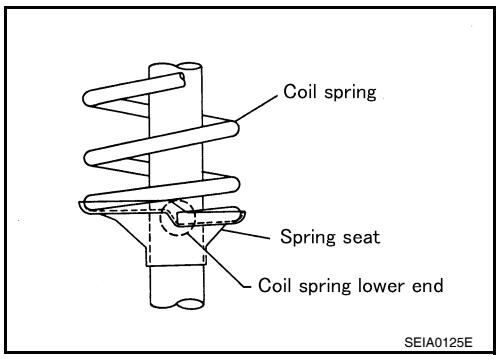
   WARNING:
   Make sure that the two pawls of the spring compressor are firmly hooked on the spring. The spring compressor must be tightened slowly so as not to tilt the spring.
4. Making sure coil spring is free between upper and lower seats, then remove piston rod lock nut.
5. Remove small parts on strut.
   - Remove strut spacer, strut mount insulator, strut mounting insulator bracket thrust bearing, spring upper seat, and upper rubber seat. Then remove coil spring.

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

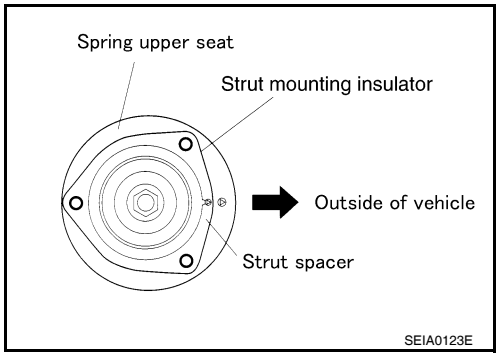
ASSEMBLY

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

   WARNING:
   Make sure that the two pawls of the spring compressor are firmly hooked on the spring. The spring compressor must be tightened slowly so as not to tilt the spring.
   CAUTION:
   Face tube side of coil spring downward. Align lower end to spring seat as shown.

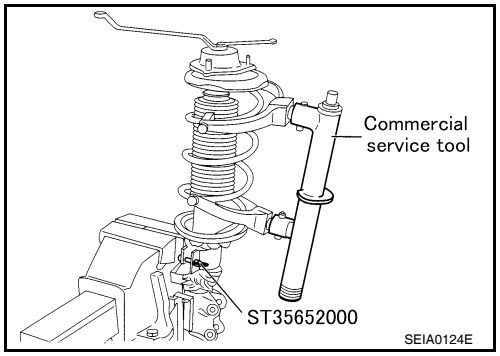


2. Connect bound bumper to spring upper seat.
   CAUTION:
   - **Be sure to install bound bumper to spring upper seat securely.**
   - **When installing bound bumper, use soapy water. Do not use machine oil or other lubricants.**
3. Install small parts to the strut.
   - Connect upper rubber seat, spring upper seats, thrust bearing, strut mount insulator, and strut spacer. Temporarily install piston rod lock nut.
     CAUTION:
     Do not reuse piston rod lock nut.
4. Be sure arrows on strut mount insulator and spring upper seat are positioned as shown. Also be sure notch in the strut spacer is positioned as shown.
5. Be sure coil spring is properly set in spring rubber seat. Gradually release the spring compressor (commercial service tool).
   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 from the strut.

Tool number : ST35652000 (—)



Inspection

INFOID:0000000004523244

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.

TRANSVERSE LINK

Removal and Installation

INFOID:0000000004523245

REMOVAL

1. Remove wheel and tire using power tool. Refer to WT-62, "Adjustment".
2. Remove steering knuckle from transverse link. Refer to FSU-13, "Exploded View".
3. Remove mounting nuts and washers on lower portion of stabilizer connecting rod.
4. Slightly loosen transverse link mounting bolts.
5. Remove transverse link mounting 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

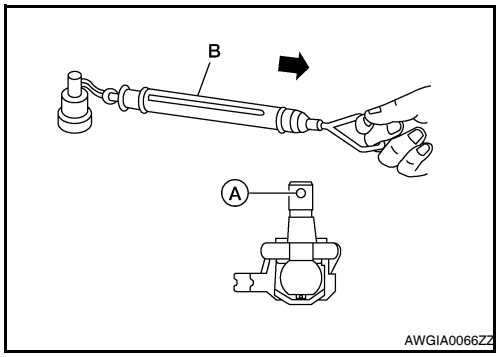
CAUTION:

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

Swing Torque Inspection

- Hook Tool (B) at cotter pin mounting hole (A). Confirm Tool (B) measurement value is within specifications when ball stud begins moving.

  ⇦: Front



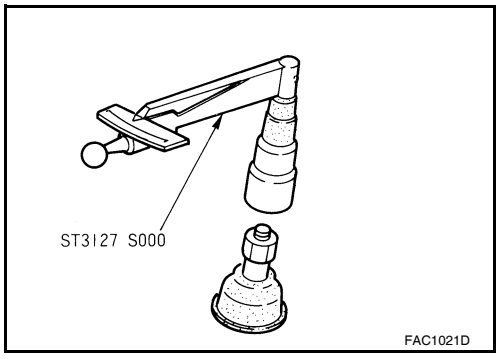
Tool number : — (J-44372)

Swing torque	**: 0.50 - 3.4 N·m (0.06 - 0.34 kg-m, 5 - 30 in-lb)**
Measurement on Tool	**: 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 mounting nut to ball stud. Check that rotating torque is within specifications using Tool.



Tool number : ST3127S000 (J-25765-A)

Rotating 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 End Play Inspection

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

Axial end play : 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-13, "Exploded View" for tightening torque specifications.
- Tighten transverse link mounting bolts with vehicle unladen and all four tire on flat, level ground.
- After installation, check the wheel alignment. Refer to FSU-6, "Inspection and Adjustment".

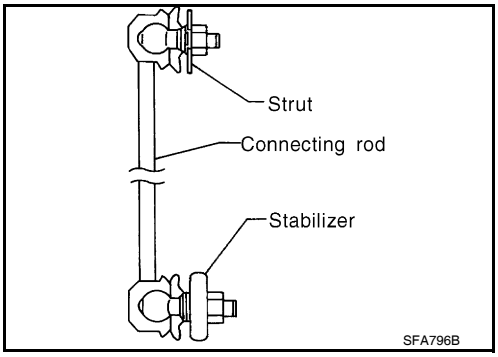
FRONT STABILIZER

Removal and Installation

INFOID:0000000004523246

REMOVAL

1. Remove the wheel and tire using power tool. Refer to WT-62, "Adjustment".
2. Remove the stabilizer connecting rod nuts from the strut.



3. Remove stabilizer clamp bolts.
4. Remove stabilizer bar.

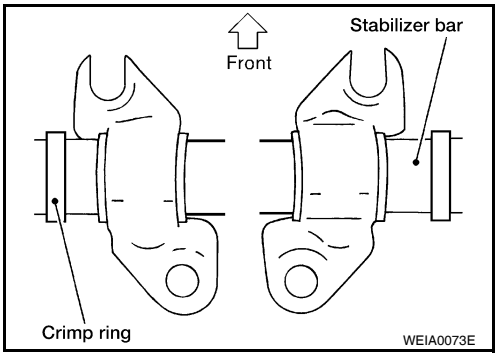
INSPECTION AFTER REMOVAL

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

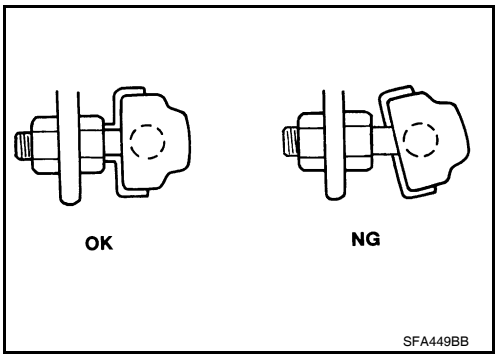
INSTALLATION

Installation is in the reverse order of removal. Refer to FSU-13, "Exploded View" for tightening torque specifications.

- When installing stabilizer bar, make sure that the clamps are facing in the direction as shown.
- Make sure the cut surface of the stabilizer bushing faces the rear of the vehicle.



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

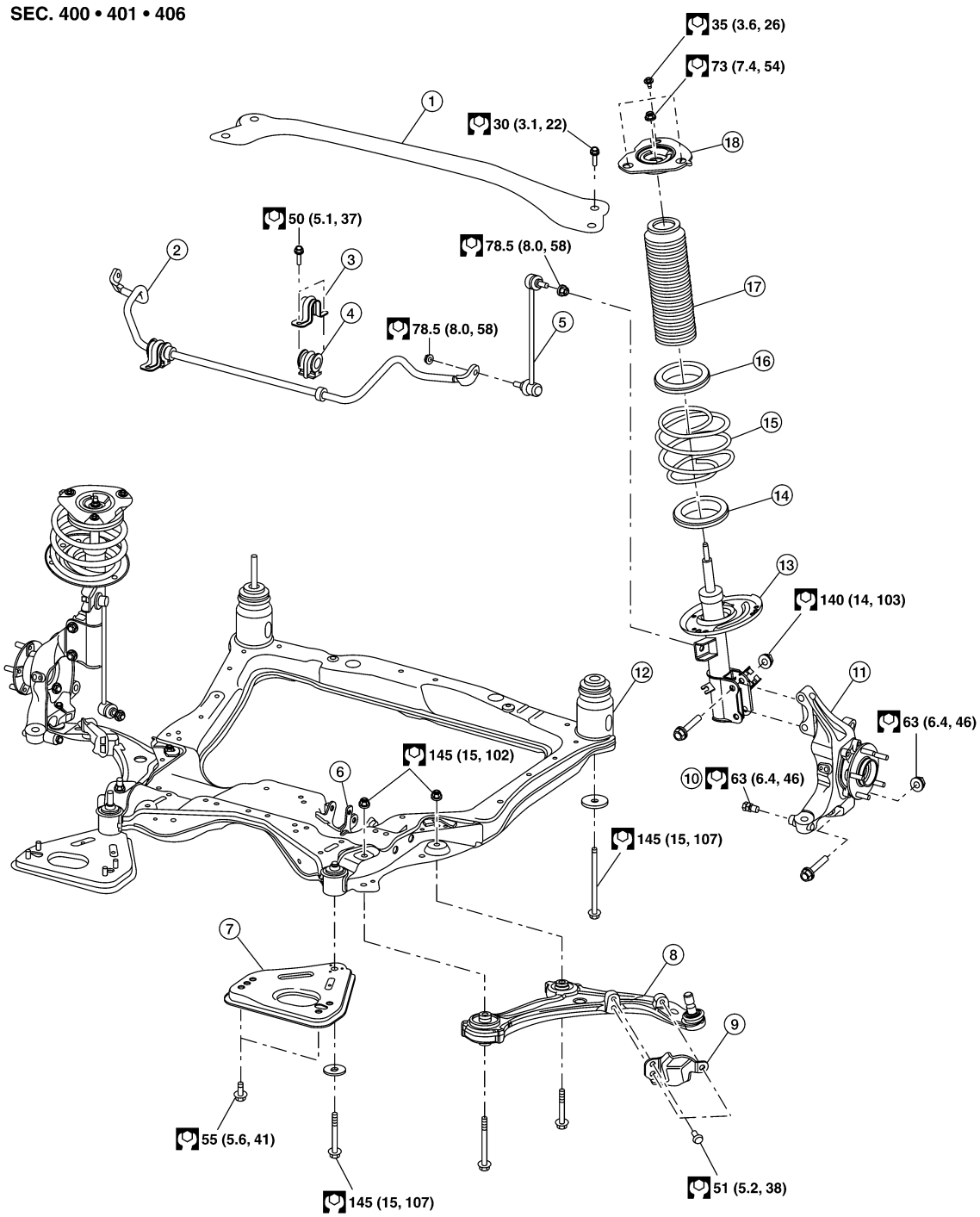


REMOVAL AND INSTALLATION

FRONT SUSPENSION ASSEMBLY

Exploded View

INFOID:0000000004523249



AWEIA0001GB

1. Strut tower bar
2. Stabilizer bar
3. Stabilizer clamp
4. Stabilizer bushing
5. Connecting rod
6. Engine mount bracket
7. Member pin stay
8. Transverse link
9. Steering stop plate
10. Steering stop
11. Steering knuckle
12. Front suspension member
13. Strut
14. Lower rubber seat
15. Coil spring
16. Upper rubber seat
17. Dust cover
18. Strut mount insulator

Removal and Installation

INFOID:0000000004523250

REMOVAL

The engine and transaxle are removed as an assembly mounted to the front suspension member. Refer to EM-71, "Removal and Installation". Once removed as an assembly, remove the front suspension member from the engine and transaxle assembly.

INSTALLATION

Installation is in the reverse order of removal.

- Refer to FSU-13, "Exploded View" for tightening torque specifications.
- After installation, perform final tightening of each part under unladen conditions with tires on ground.
- Check wheel alignment. Refer to FSU-6, "Inspection and Adjustment".

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

Front Wheel Alignment (Unladen*)

INFOID:0000000004523251

Camber* Degree minute (decimal degree)	LH	Minimum	1° 09' (-1.15°)
		Nominal	-0° 24' (-0.40°)
		Maximum	0° 21' (0.35°)
	RH	Minimum	-1° 24' (-1.40°)
		Nominal	-0° 39' (-0.65°)
		Maximum	0° 06' (0.10°)
	Right and left difference		-0° 15' ± 0° 33' (-0.25°± 0.55°)
Caster* Degree minute (decimal degree)		Nominal	5° 00' (5.00°)
		Right and left difference	0° 33' (0.55°)
Kingpin offset* Degree minute (decimal degree)		Minimum	11° 48' (11.80°)
		Nominal	12° 33' (12.55°)
		Maximum	13° 18' (13.30°)
Total toe-in* Degree minute (decimal degree)	Distance	Minimum	0 mm (0 in)
		Nominal	1 mm (0.04 in)
		Maximum	2 mm (0.08 in)
	Angle (right side or left side)	Minimum	0° 01' (0.017°)
		Nominal	0° 03' (0.050°)
		Maximum	0° 05' (0.083°)
Wheel turning angle*			Refer to ST-17, "Steering Angle".

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

Ball Joint

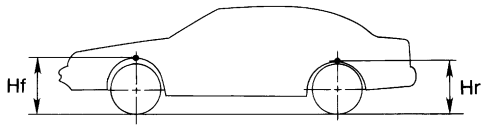
INFOID:0000000004523252

Swing torque	0.50 - 3.4 N·m (0.06 - 0.34 kg-m, 5 - 30 in-lb)
Measurement on tool	7.94 - 53.97 N (0.81 - 5.50 kg, 1.79 - 12.2 lb)
Rotating 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*)

INFOID:0000000004523253

Unit: mm (in)



SFA818A

Destination	USA	Canada
Tire size	215/60R16	215/60R16

Front (Hf)*	727 (28.62)	727 (28.62)
Rear (Hr)*	718 (28.27)	719 (28.31)

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