

SECTION **FSU**
FRONT SUSPENSION

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FSU

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PRECAUTIONS

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PRECAUTION

PRECAUTIONS

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

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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.

Precaution Necessary for Steering Wheel Rotation After Battery Disconnect

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NOTE:

- This Procedure is applied only to models with Intelligent Key system and NATS (NISSAN ANTI-THEFT SYSTEM).
- Remove and install all control units after disconnecting both battery cables with the ignition knob in the "LOCK" position.
- Always use CONSULT to perform self-diagnosis as a part of each function inspection after finishing work. If DTC is detected, perform trouble diagnosis according to self-diagnostic results.

For models equipped with the Intelligent Key system and NATS, an electrically controlled steering lock mechanism is adopted on the key cylinder.

For this reason, if the battery is disconnected or if the battery is discharged, the steering wheel will lock and steering wheel rotation will become impossible.

If steering wheel rotation is required when battery power is interrupted, 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. Use the Intelligent Key or mechanical key to turn the ignition switch to the "ACC" position. At this time, the steering lock will be released.
3. Disconnect both battery cables. The steering lock will remain released and the steering wheel can be rotated.
4. Perform the necessary repair operation.

PRECAUTIONS

< PRECAUTION >

5. When the repair work is completed, return the ignition switch to the "LOCK" position before connecting the battery cables. (At this time, the steering lock mechanism will engage.)
6. Perform a self-diagnosis check of all control units using CONSULT.

Precaution

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- When installing the rubber bushings, the final tightening must be done under unladen condition and with the tires on level ground. Oil will shorten the life of the rubber bushings, so wipe off any spilled oil immediately.
- Unladen condition means the fuel tank, engine coolant and lubricants are at the full specification. The spare tire, jack, hand tools, and mats are in their designated positions.
- After installing suspension components, check the wheel alignment.
- Lock nuts are not reusable. Always use new lock nuts for installation. New lock nuts are pre-oiled, do not apply any additional lubrication.

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PREPARATION

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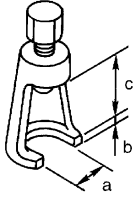
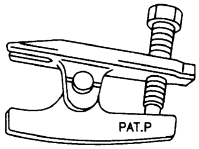
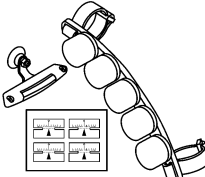
PREPARATION

PREPARATION

Special Service Tool

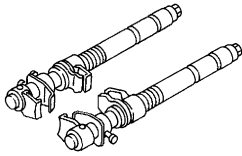

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The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

Tool number (Kent-Moore No.) Tool name	Description
ST29020001 (J-24319-01) Pitman arm puller <div style="text-align: center;">  <p>NT694</p> </div>	Separating upper link ball joint from steering knuckle a: 34 mm (1.34 in) b: 6.5 mm (0.256 in) c: 61.5 mm (2.421 in)
HT72520000 (J-25730-A) Ball joint remover <div style="text-align: center;">  <p>NT146</p> </div>	Removing tie-rod outer end
— (J-49286-1) Drift and pull gauge <div style="text-align: center;">  <p>AWEIA0156ZZ</p> </div>	Measuring drift and pull

Commercial Service Tool

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Tool name	Description
Spring compressor <div style="text-align: center;">  <p>NT717</p> </div>	Removing and installing coil spring
Power tool <div style="text-align: center;">  <p>PIIB1407E</p> </div>	Loosening nuts, screws and bolts

NOISE, VIBRATION, AND HARSHNESS (NVH) TROUBLESHOOTING

< SYMPTOM DIAGNOSIS >

SYMPTOM DIAGNOSIS

NOISE, VIBRATION, AND HARSHNESS (NVH) TROUBLESHOOTING

NVH Troubleshooting Chart

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Use the chart below to help you find the cause of the symptom. Repair or replace parts as necessary.

Symptom		Possible Cause and SUSPECTED PARTS													Reference page			
		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	PROPELLER SHAFT	FRONT FINAL DRIVE	WHEEL HUB	DRIVE SHAFT	TIRES		ROAD WHEEL	BRAKES	STEERING
Symptom	Noise	x	x	x	x	x	x			x	x	x	x	x	x	x	x	FSU-12
	Shake	x	x	x	x		x			x		x	x	x	x	x	x	FSU-12
	Vibration	x	x	x	x	x				x		x	x	x			x	FSU-11
	Shimmy	x	x	x	x			x				x		x	x	x	x	FSU-11
	Shudder	x	x	x								x		x	x	x	x	FSU-24
	Poor quality ride or handling	x	x	x	x	x		x	x			x		x	x			FSU-6 FSU-6 FSU-6
																		DLN-183. "NVH Troubleshooting Chart" DLN-207. "NVH Troubleshooting Chart" FAX-5. "NVH Troubleshooting Chart" FAX-5. "NVH Troubleshooting Chart" WT-45. "NVH Troubleshooting Chart" WT-45. "NVH Troubleshooting Chart" BR-6. "NVH Troubleshooting Chart" ST-9. "NVH Troubleshooting Chart"

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ON-VEHICLE SERVICE

< PERIODIC MAINTENANCE >

PERIODIC MAINTENANCE

ON-VEHICLE SERVICE

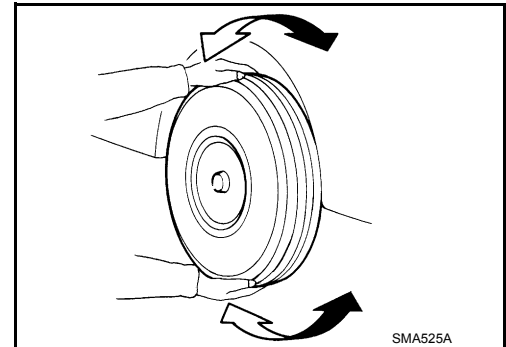
Front Suspension Parts

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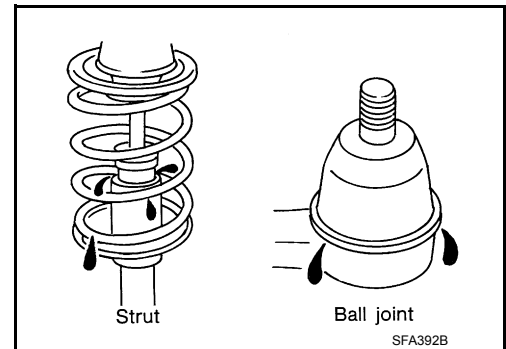
Check front suspension parts for excessive play, cracks, wear and other damage.

- Shake each front wheel to check for excessive play. If looseness is noted, inspect wheel bearing end play, then check ball joint end play. Refer to [FAX-6, "On-Vehicle Inspection and Service"](#) and [FSU-14, "Inspection"](#).
- Make sure that the cotter pin is inserted (4WD only).
- Retighten all nuts and bolts to the specified torque.

Suspension component torques : Refer to [FSU-11, "Exploded View"](#).



- Check shock absorber for oil leakage and other damage.
- Check suspension ball joint for grease leakage and ball joint dust cover for cracks and other damage.



Front Wheel Alignment

INFOID:000000009824270

PRELIMINARY INSPECTION

WARNING:

Always adjust the alignment with the vehicle on a flat surface.

NOTE:

If alignment is out of specification, inspect and replace any damaged or worn suspension parts before making any adjustments.

1. Check and adjust the wheel alignment with the vehicle under unladen conditions. "Unladen conditions" means that the fuel, coolant, and lubricant are full; and that the spare tire, jack, hand tools and mats are in their designated positions.
2. Check the tires for incorrect air pressure and excessive wear.
3. Check the wheels for run out and damage. Refer to [WT-49, "Inspection"](#).
4. Check the wheel bearing axial end play. Refer to [FAX-6, "On-Vehicle Inspection and Service"](#).
5. Check the shock absorbers for leaks or damage.
6. Check each mounting point of the suspension components for any excessive looseness or damage.
7. Check each link, arm, and the rear suspension member for any damage.
8. Check the vehicle height. Refer to [FSU-24, "Wheelarch Height \(Unladen*1\)"](#).

GENERAL INFORMATION AND RECOMMENDATIONS

1. 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 machine itself should be capable of accepting any NISSAN vehicle.
 - The alignment machine should be checked to ensure that it is level.
2. Make sure the alignment machine is properly calibrated.

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- Your alignment machine should be regularly calibrated in order to give correct information.
- Check with the manufacturer of your specific alignment machine for their recommended Service/Calibration Schedule.

THE ALIGNMENT PROCESS

IMPORTANT: Use only the alignment specifications listed in this Service Manual. Refer to [FSU-23, "Wheel Alignment \(Unladen*1\)"](#).

1. When displaying the alignment settings, many alignment machines use "indicators": (Green/red, plus or minus, Go/No Go). **Do NOT use these indicators.**
 - The alignment specifications programmed into your alignment machine that operate these indicators may not be correct.
 - This may result in an ERROR.
2. Most camera-type alignment machines are equipped with both "Rolling Compensation" method and optional "Jacking Compensation" method to "compensate" the alignment targets or head units. "Rolling Compensation" is the preferred method.
 - If using the "Rolling Compensation" method, after installing the alignment targets or head units, push or pull on the rear wheel to move the vehicle. Do not push or pull on the vehicle body.
 - If using 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 are using for more information.

NOTE:

- Do not use the "Rolling Compensation" method if you are using sensor-type alignment equipment.
- Follow all instructions for the alignment machine you're using for more information.

CAMBER AND CASTER

1. Measure camber and caster of both the right and left wheels and adjust as necessary to specification.

Camber and Caster : Refer to [FSU-23, "Wheel Alignment \(Unladen*1\)"](#).

NOTE:

Some vehicles may be equipped with straight (non-adjustable) lower link bolts and washers. In order to adjust camber and caster on these vehicles, replace the lower link bolts and washers with adjustable (cam) bolts and washers.

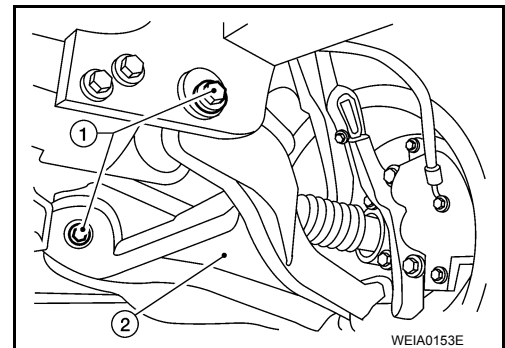
2. If outside of the specified value, adjust camber and caster using the cam bolts (1) in the front lower link (2).

CAUTION:

After adjusting the camber and caster, check the toe-in.

NOTE:

Camber changes about 3' (0.05°) minutes with each graduation of one cam bolt. Refer to table below for examples of lower link cam bolt effect on camber and caster.



Rear cam bolt	1 In	1 Out	1 In	1 Out	0	0	1 In	1 Out
Front cam bolt	1 Out	1 In	1 In	1 Out	1 In	1 Out	0	0
Camber Degree minute (Decimal degree)	0 (0)	0 (0)	7' (0.12°)	- 7' (-0.12°)	3' (0.05°)	- 3' (-0.05°)	3' (0.05°)	- 3' (-0.05°)
Caster Degree minute (Decimal degree)	- 14' (-0.23°)	14' (0.23°)	0 (0)	0 (0)	7' (0.12°)	- 7' (-0.12°)	- 7' (-0.12°)	7' (0.12°)

3. Tighten the adjusting cam bolt nuts to specification. Refer to [FSU-11, "Exploded View"](#).

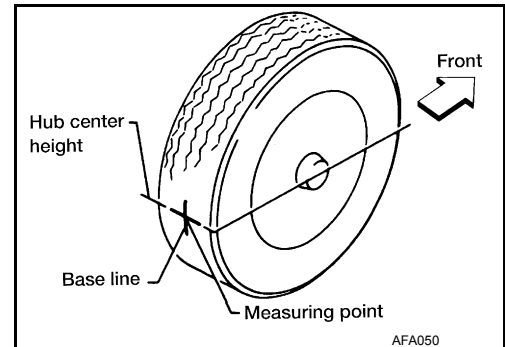
TOE-IN

ON-VEHICLE SERVICE

< PERIODIC MAINTENANCE >

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

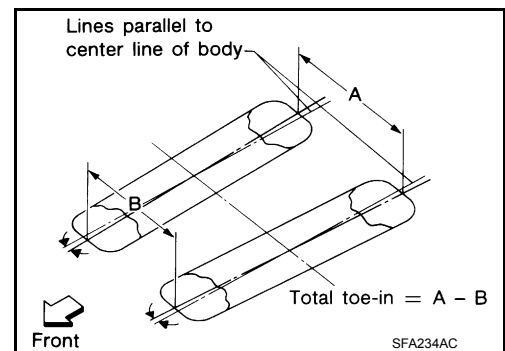


4. Measure the distance (A) on the rear side of the front tires as shown.
5. Push the vehicle slowly ahead to rotate the wheels 180° degrees (1/2 a turn).

CAUTION:

If the wheels have rotated more than 180° degrees (1/2 turn), start this procedure again from the beginning. Never push the vehicle backward.

6. Measure the distance (B) on the front side of the front tires at the same marks as shown. Total toe-in is calculated as $A - B$.

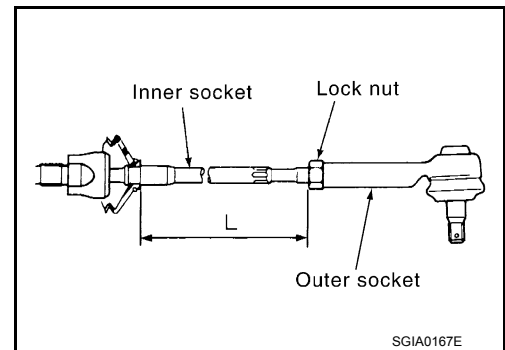


Total toe-in : Refer to [FSU-23, "Wheel Alignment \(Unladen*1\)"](#).

7. Adjust the toe-in by varying the length of the steering tie rod assembly.
 - a. Loosen the outer tie-rod lock nuts.
 - b. Adjust the toe-in by screwing the outer tie-rods in or out.

Standard length (L) : Refer to [ST-36, "Steering Outer Socket and Inner Socket"](#).

- c. Tighten the outer tie-rod lock nuts to specification.



Lock nut : Refer to [ST-22, "Removal and Installation"](#).

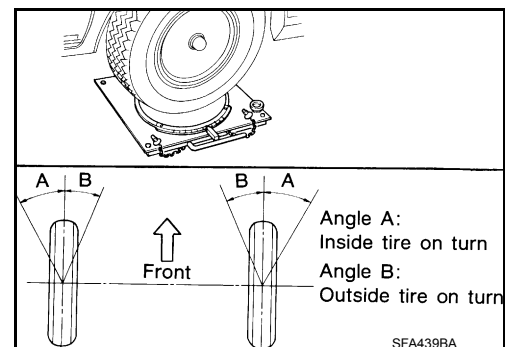
FRONT WHEEL TURNING ANGLE

NOTE:

Check front wheel turning angle after the toe-in inspection.

1. Place front wheels on turning radius gauges in straight ahead position and rear wheels on stands so that vehicle can be level. Check the maximum inner and outer wheel turning angles for LH and RH road wheels.
2. Start engine and run at idle, turn steering wheel all the way right and left, measure the turning angle.

Wheel turning angle (full turn) : Refer to [FSU-23, "Wheel Alignment \(Unladen*1\)"](#).



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< PERIODIC MAINTENANCE >

- Any turning angles are not adjustable. If any of steering angles are out of the specification, check if the following parts are worn or damaged:
 - Steering gear
 - Steering column
 - Front suspension components
- If found that they are worn or damaged, replace them with new ones.

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KNUCKLE

On-Vehicle Inspection and Service

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Make sure the mounting conditions (looseness, backlash) of each component and component status (wear, damage) are within specifications. Refer to [FSU-24, "Ball Joint"](#).

FRONT SUSPENSION ASSEMBLY

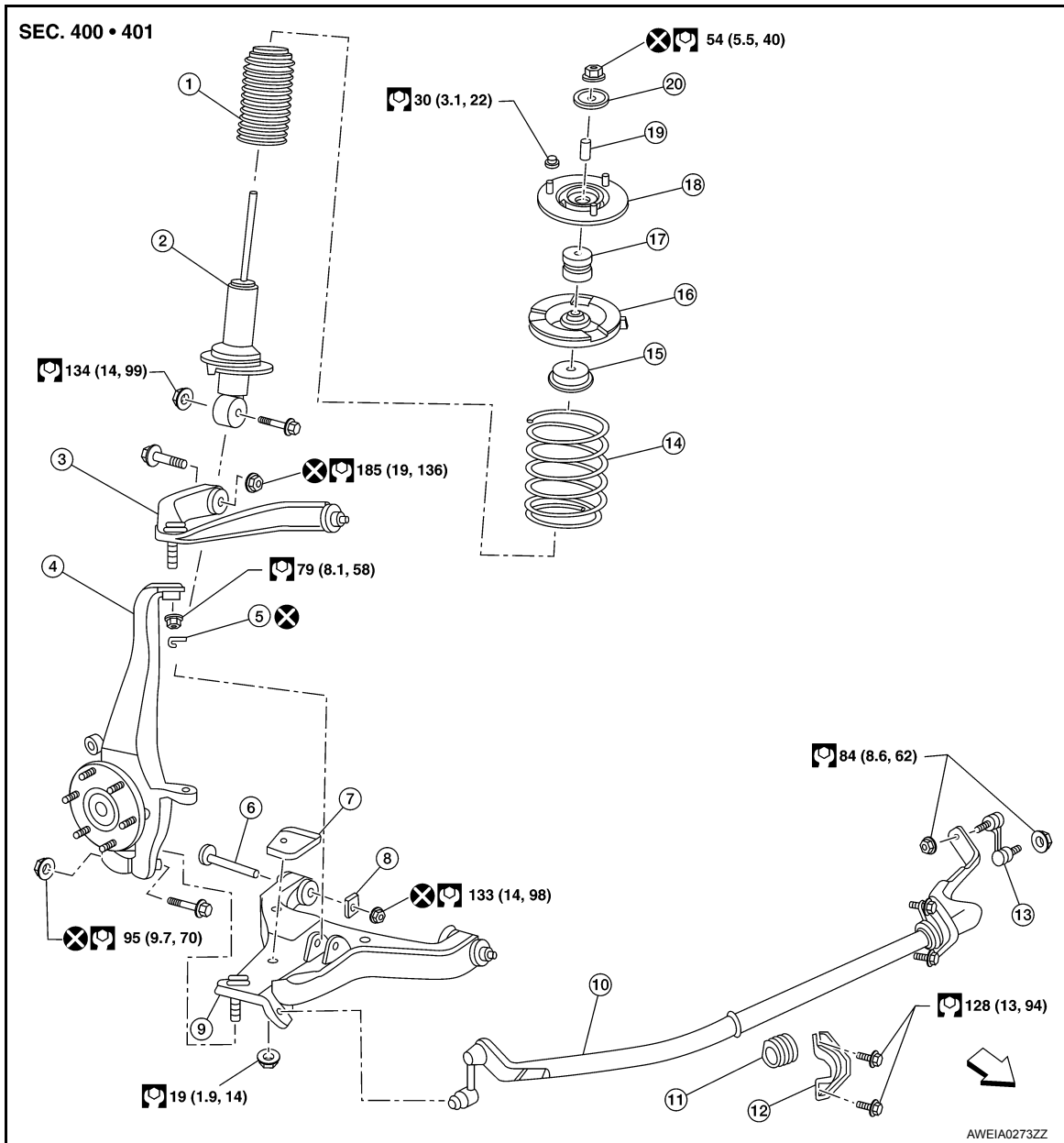
< REMOVAL AND INSTALLATION >

REMOVAL AND INSTALLATION

FRONT SUSPENSION ASSEMBLY

Exploded View

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- | | | |
|-----------------------|----------------------------|---|
| 1. Dust cover | 2. Shock absorber | 3. Upper link |
| 4. Steering knuckle | 5. Cotter pin | 6. Lower link bolt/cam bolt (if equipped) |
| 7. Jounce bumper | 8. Washer | 9. Lower link |
| 10. Stabilizer bar | 11. Stabilizer bar bushing | 12. Stabilizer bar mounting bracket |
| 13. Connecting rod | 14. Coil spring | 15. Upper seat |
| 16. Upper spring seat | 17. Shock absorber bushing | 18. Shock absorber mounting insulator |
| 19. Spacer | 20. Washer | ← Front |

COIL SPRING AND SHOCK ABSORBER

< REMOVAL AND INSTALLATION >

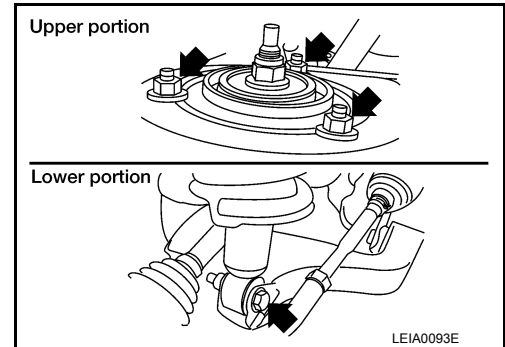
COIL SPRING AND SHOCK ABSORBER

Removal and Installation

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REMOVAL

1. Remove the wheel and tire using power tool. Refer to [WT-51. "Rotation"](#).
2. Turn steering knuckle out to gain enough clearance for removal.
3. Remove the shock absorber lower bolt using power tool.
4. Remove the three shock absorber upper nuts using power tool.
5. Remove the coil spring and shock absorber.

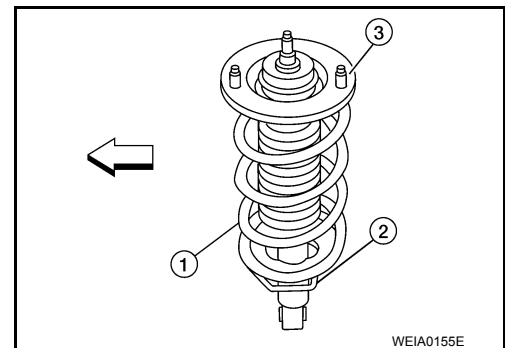


INSTALLATION

Installation is in the reverse order of removal.

- Position the coil spring and shock absorber (1) in the vehicle with the studs on the shock absorber mounting insulator (3) in line with the lower shock mount and the lower seat step (2). The lower seat step faces the outside of the vehicle.

⇐ : Front



- Tighten all nuts and bolts to specification. Refer to [FSU-11. "Exploded View"](#).

Disposal

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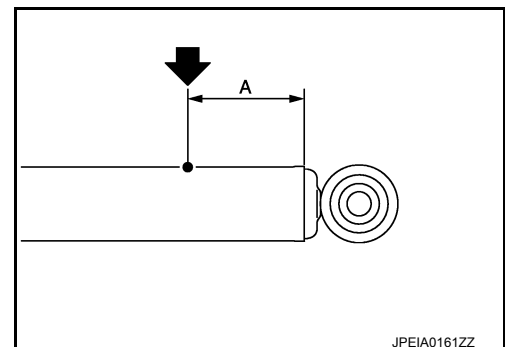
1. Set shock absorber horizontally with the piston rod fully extended.
2. Drill 2 – 3 mm (0.08 – 0.12 in) hole at the position (●) from top as shown to release gas gradually.

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 into 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.

STABILIZER BAR

< REMOVAL AND INSTALLATION >

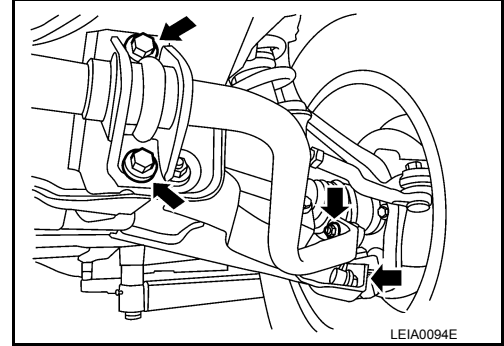
STABILIZER BAR

Removal and Installation

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REMOVAL

1. Remove the engine under cover using power tool. Refer to [EXT-15. "Removal and Installation"](#).
2. Remove stabilizer bar mounting bracket bolts and connecting rod nuts using power tool, as shown.
3. Remove bushings from stabilizer bar.



INSPECTION AFTER REMOVAL

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

INSTALLATION

Installation is in the reverse order of removal.

NOTE:

- Be sure the stabilizer bar mounting brackets are centered between the 2 stabilizer bar retention collars.
- Tighten all nuts and bolts to specification. Refer to [FSU-11. "Exploded View"](#).

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UPPER LINK

< REMOVAL AND INSTALLATION >

UPPER LINK

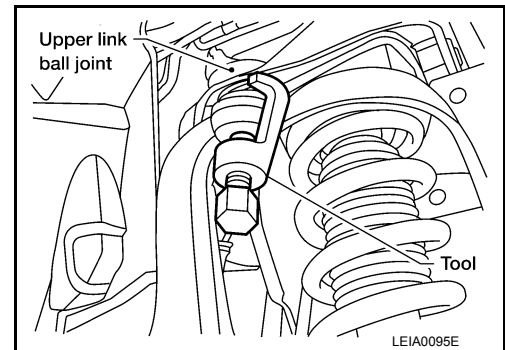
Removal and Installation

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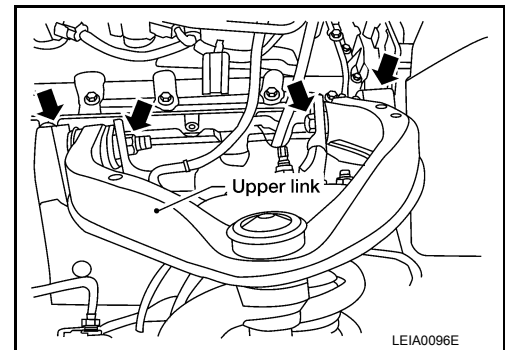
REMOVAL

1. Remove the wheel and tire using power tool. Refer to [WT-51. "Rotation"](#).
2. Support the lower link with a jack.
3. Remove the fender protector to access the upper link. Refer to [EXT-27. "Removal and Installation"](#).
4. Remove the cotter pin and the nut from the upper link ball joint. Discard the cotter pin.
5. Separate the upper link ball joint stud from the steering knuckle using Tool.

Tool number : ST29020001 (J-24319-01)



6. Remove the upper link bolts and nuts. Remove the upper link.



INSPECTION AFTER REMOVAL

Upper Link

Check for deformation and cracks. Replace if necessary.

Upper Link Ball Joint

Check for distortion and damage. Replace if necessary.

INSTALLATION

Installation is in the reverse order of removal.

CAUTION:

Do not reuse the upper link ball joint cotter pin.

Tighten all nuts and bolts to specification. Refer to [FSU-11. "Exploded View"](#).

Inspection

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- Check ball joint for grease leakage. Check dust cover for damage.
- Check the ball joint for excessive play. Replace the upper or lower link assembly if any of the following exists:
 - Ball joint stud is worn.
 - Ball joint is hard to swing.
 - Ball joint play in axial directions or end play is excessive.

NOTE:

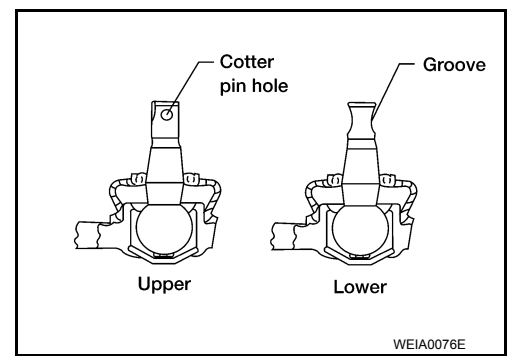
Before checking the axial forces and end play, turn the lower ball joint at least 10 revolutions so that the ball joint is properly broken in.

UPPER LINK

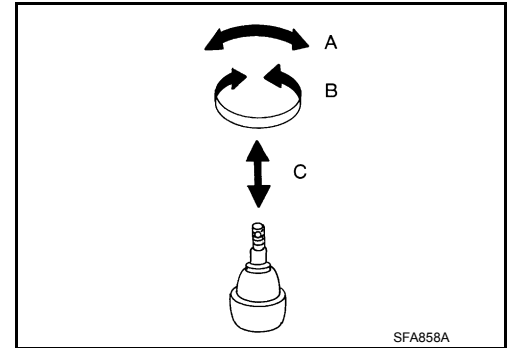
< REMOVAL AND INSTALLATION >

Measure the ball joint swinging force, turning force, and vertical end play using a suitable tool.

- Measure at the cotter pin hole for upper ball joint as shown.
- Measure at the groove for lower ball joint as shown.



- Swinging force (A)**
Upper ball joint : Refer to [FSU-24, "Ball Joint"](#).
- Lower ball joint : Refer to [FSU-24, "Ball Joint"](#).
- Turning torque (B)** : Refer to [FSU-24, "Ball Joint"](#).
- Vertical end play (C)** : Refer to [FSU-24, "Ball Joint"](#).



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LOWER LINK

< REMOVAL AND INSTALLATION >

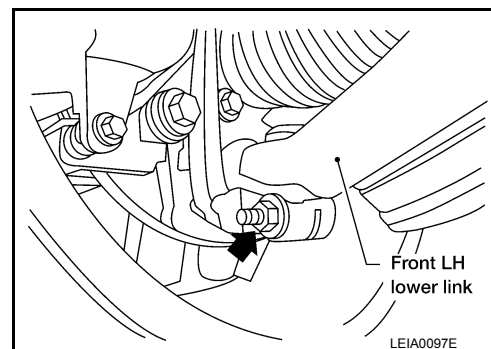
LOWER LINK

Removal and Installation

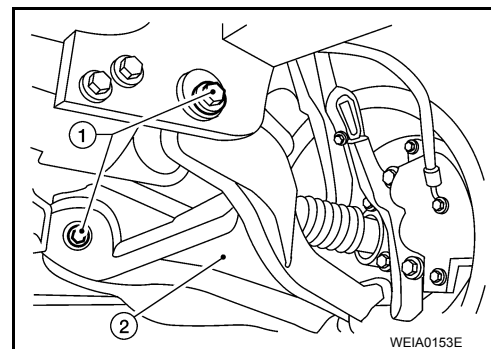
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REMOVAL

1. Remove the wheel and tire using power tool. Refer to [WT-51, "Rotation"](#).
2. Remove the lower shock absorber bolt.
3. Remove the stabilizer bar connecting rod lower nut using power tool. Separate the connecting rod from the lower link. Refer to [FSU-13, "Removal and Installation"](#).
4. Remove the drive shaft (if equipped). Refer to [FAX-9, "Removal and Installation"](#).
5. Remove the pinch bolt and nut from the steering knuckle using power tool. Separate the lower link ball joint from the steering knuckle.



6. Remove the lower link bolts/cam bolts (if equipped) (1) and nuts. Remove the lower link (2).



INSPECTION AFTER REMOVAL

Lower Link

Check for deformation and cracks. Replace if necessary.

Lower Link Bushing

Check for distortion and damage. Replace if necessary.

INSTALLATION

Installation is in the reverse order of removal.

CAUTION:

- Do not reuse the upper link ball joint cotter pin.
- Do not reuse the lower link ball joint nut.
- Do not reuse the lower link nuts.

NOTE:

Some vehicles may be equipped with straight (non-adjustable) lower link bolts and washers. In order to adjust camber and caster on these vehicles, replace the lower link bolts and washers with cam (adjustable) bolts and washers.

- Tighten all nuts and bolts to specification. Refer to [FSU-11, "Exploded View"](#).
- Check the wheel alignment. Refer to [FSU-6, "Front Wheel Alignment"](#).
- Adjust the neutral position of the steering angle sensor. Refer to [BRC-8, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement"](#).

Inspection

INFOID:000000009824279

- Check ball joint for grease leakage. Check dust cover for damage.

LOWER LINK

< REMOVAL AND INSTALLATION >

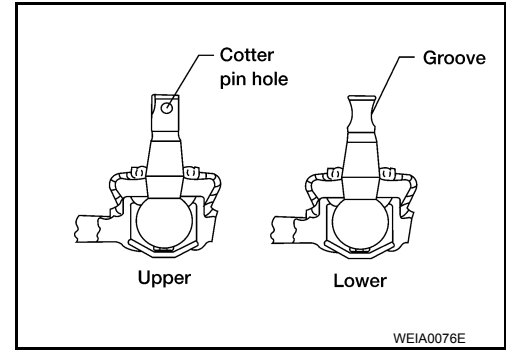
- Check the ball joint for excessive play. Replace the upper or lower link assembly if any of the following exists:
 - Ball joint stud is worn.
 - Ball joint is hard to swing.
 - Ball joint play in axial directions or end play is excessive.

NOTE:

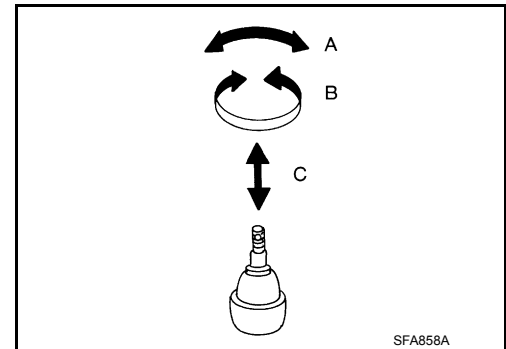
Before checking the axial forces and end play, turn the lower ball joint at least 10 revolutions so that the ball joint is properly broken in.

Measure the ball joint swinging force, turning force, and vertical end play using a suitable tool.

- Measure at the cotter pin hole for upper ball joint as shown.
- Measure at the groove for lower ball joint as shown.



- Swinging force (A)**
Upper ball joint : Refer to [FSU-24, "Ball Joint"](#).
- Lower ball joint : Refer to [FSU-24, "Ball Joint"](#).
- Turning torque (B)** : Refer to [FSU-24, "Ball Joint"](#).
- Vertical end play (C)** : Refer to [FSU-24, "Ball Joint"](#).



UPPER BALL JOINT AND LOWER BALL JOINT

< REMOVAL AND INSTALLATION >

UPPER BALL JOINT AND LOWER BALL JOINT

Removal and Installation

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The ball joints are part of the upper and lower links. Refer to [FSU-14. "Removal and Installation"](#) (upper link), [FSU-16. "Removal and Installation"](#) (lower link).

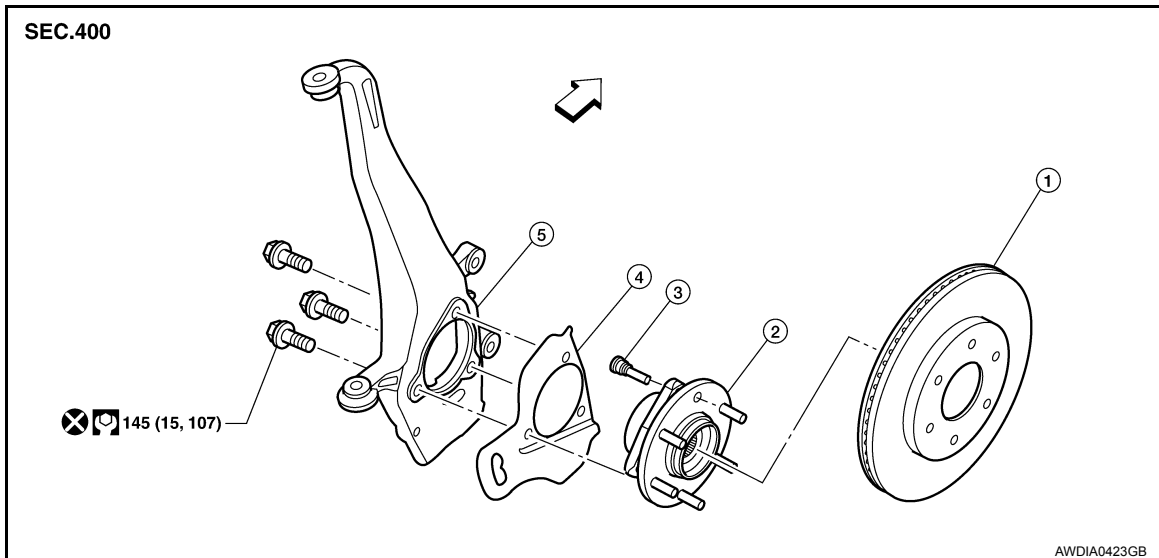
KNUCKLE

< REMOVAL AND INSTALLATION >

KNUCKLE

Removal and Installation

INFOID:000000009824281



1. Disc rotor
 2. Wheel hub and bearing assembly
 3. Wheel stud
 4. Splash guard
 5. Steering knuckle
- ⇐ Front

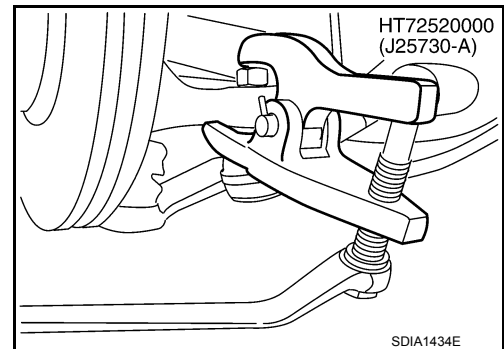
REMOVAL

1. Remove the wheel and tire using power tool. Refer to [WT-51, "Rotation"](#).
2. Disconnect wheel sensor harness connector. Do not remove the wheel sensor from the wheel hub and bearing assembly for this procedure.
3. Remove the wheel hub and bearing assembly. Refer to [FAX-7, "Removal and Installation"](#).
4. Remove the steering outer socket from the steering knuckle using Tool.

CAUTION:

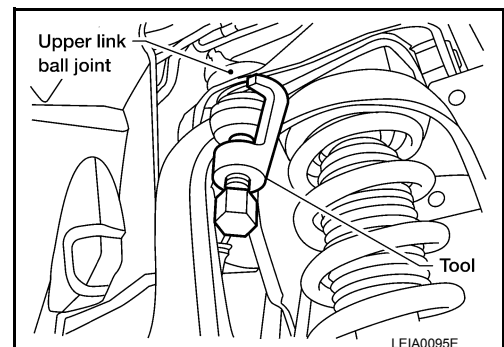
- Be careful to not damage the ball joint boot.
- Temporarily tighten the nut to prevent damage to the threads and to prevent Tool from coming off.

Tool number : HT72520000 (J-25730-A)



5. Remove the cotter pin and the nut from the upper link ball joint and discard the cotter pin.
6. Separate the upper link ball joint from steering knuckle using Tool.

Tool number : ST29020001 (J-24319-01)



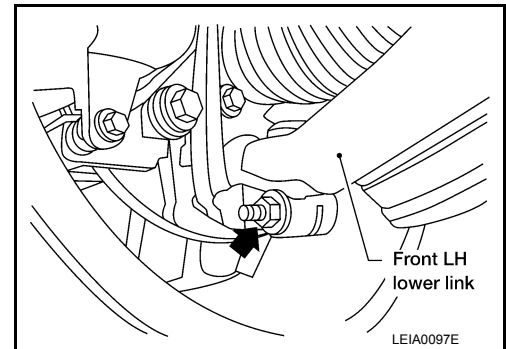
7. Remove the stabilizer bar connecting rod lower nut using power tool. Separate the connecting rod from the lower link. Refer to [FSU-13, "Removal and Installation"](#).

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< REMOVAL AND INSTALLATION >

8. Remove the pinch bolt and nut from the steering knuckle using power tool. Separate the lower link ball joint from the steering knuckle.



9. Remove the steering knuckle from the vehicle.

INSPECTION AFTER REMOVAL

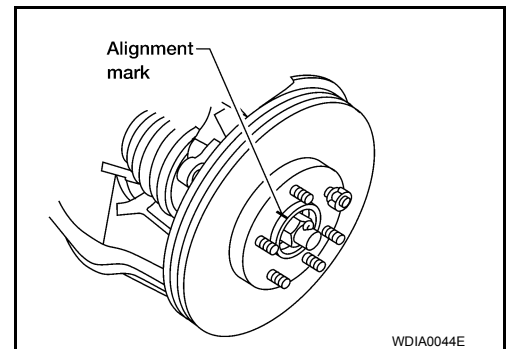
- Check for deformity, cracks and damage on each part, replace if necessary.
- Perform ball joint inspection. Refer to [FSU-14, "Inspection"](#).

INSTALLATION

Installation is in the reverse order of removal.

CAUTION:

- **Do not reuse the lower link ball joint nut.**
- **Do not reuse the upper link ball joint cotter pin.**
- Tighten all nuts and bolts to specification. Refer to [FSU-11, "Exploded View"](#).
- When installing disc rotor on wheel hub and bearing assembly, align the marks.
- Check the wheel alignment. Refer to [FSU-6, "Front Wheel Alignment"](#).
- Adjust the neutral position of the steering angle sensor. Refer to [BRC-8, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement"](#).



COIL SPRING AND SHOCK ABSORBER

< UNIT DISASSEMBLY AND ASSEMBLY >

UNIT DISASSEMBLY AND ASSEMBLY

COIL SPRING AND SHOCK ABSORBER

Disassembly and Assembly

INFOID:000000009824282

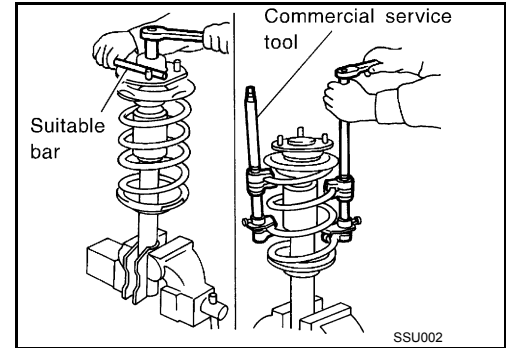
DISASSEMBLY

1. Set the coil spring and shock absorber in a vise.

CAUTION:

Do not remove the piston rod lock nut at this time.

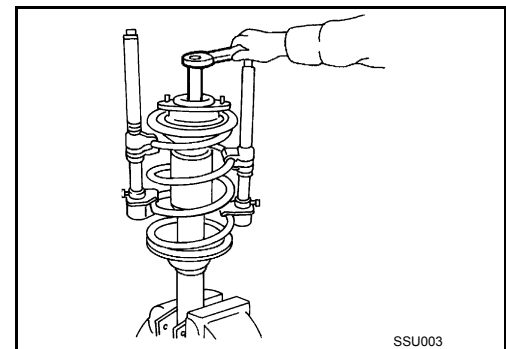
2. Use a suitable bar to prevent the shock absorber mounting insulator from turning.
3. Loosen (without removing) the piston rod lock nut as shown.
4. Compress the coil spring using spring compressors (commercial service tools) until the shock absorber mounting insulator can be turned by hand.



WARNING:

Make sure that the pawls of the spring compressors (commercial service tools) are firmly hooked on the coil spring. The spring compressors (commercial service tools) must be tightened alternately and evenly so as not to tilt the coil spring.

5. Remove the piston rod lock nut.
6. Remove the washer, the spacer, the shock absorber mounting insulator, the shock absorber bushing, and the upper spring seat.
7. Remove the dust cover and the upper seat.
8. Gradually release the spring compressors (commercial service tools) and remove the coil spring.



INSPECTION AFTER DISASSEMBLY

Shock Absorber

- Check the shock absorber for smooth operation through a full stroke, both compression and extension.
- Check the shock absorber for oil leakage on welded or gland packing portions.
- Check the piston rod for cracks, deformation or other damage and replace if necessary.

Mounting Insulator and Rubber Parts

Check the cemented rubber-to-metal portion for separation or cracks. Check rubber parts for deterioration and replace if necessary.

Coil Spring

- Check for cracks, deformation or other damage and replace if necessary.
- Check the free spring height.

Front spring free height

2WD : Refer to [FSU-23, "Spring Free Height"](#).

4WD : Refer to [FSU-23, "Spring Free Height"](#).

ASSEMBLY

1. Compress the coil spring using spring compressors (commercial service tools).

WARNING:

Make sure that the pawls of the spring compressors (commercial service tools) are firmly hooked on the coil spring. The spring compressors (commercial service tools) must be tightened alternately and evenly so as not to tilt the coil spring.

2. Install the coil spring to the shock absorber.

COIL SPRING AND SHOCK ABSORBER

< UNIT DISASSEMBLY AND ASSEMBLY >

3. Install the dust cover and the upper seat.
4. Install the upper spring seat, the shock absorber bushing, the shock absorber mounting insulator, the spacer, and the washer. Temporarily install, but do not tighten, the piston rod lock nut.

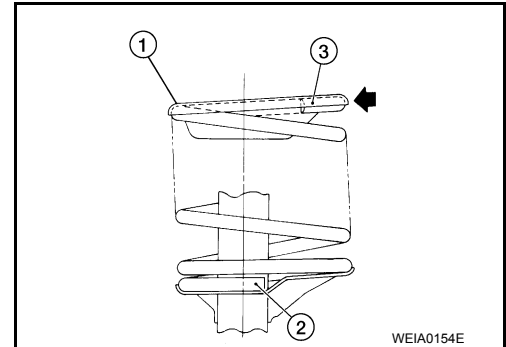
CAUTION:

Do not reuse the piston rod lock nut.

5. Position the coil spring lower end (2) and upper end (3) as shown.

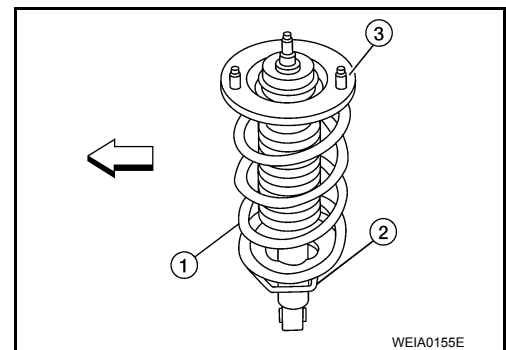
(1) : Shock absorber mounting insulator

← : Flat tail



6. Position the shock absorber mounting insulator (3) with the studs in line with the lower shock mount and the lower seat step (2). The lower seat step faces the outside of the vehicle.

⇐ : Front



7. Gradually release the spring compressors (commercial service tools).
8. Tighten the piston rod lock nut to specification. Refer to [FSU-11, "Exploded View"](#).
9. Remove the coil spring and shock absorber from the vise.

SERVICE DATA AND SPECIFICATIONS (SDS)

< SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

General Specification

INFOID:000000009824283

Suspension type	Independent double wishbone coil over shock
Shock absorber type	Double-acting hydraulic
Stabilizer	Standard equipment

Spring Free Height

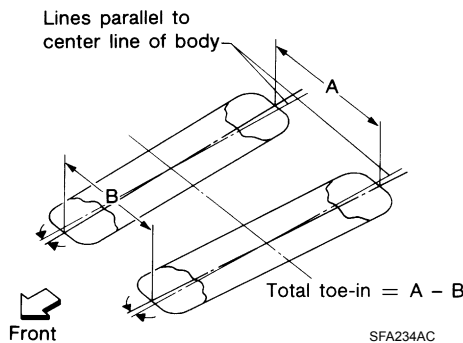
INFOID:000000009824284

2WD	325.5 ± 3 mm (12.8 ± 0.1 in)
4WD	335.0 ± 3 mm (13.2 ± 0.1 in)

Wheel Alignment (Unladen*1)

INFOID:000000009824285

Drive type	2WD		4WD		
	Standard	With air leveling	Standard	With air leveling	
Suspension					
Camber Degree minute (decimal degree)	Minimum	-0° 51' (-0.85°)	-0° 33' (-0.55°)		
	Nominal	-0° 6' (-0.10°)	0° 12' (0.20°)		
	Maximum	0° 39' (0.65°)	0° 57' (0.95°)		
	Cross camber	0° 45' (0.75°) or less	0° 45' (0.75°) or less		
Caster Degree minute (decimal degree)	Minimum	2° 39' (2.65°)	3° 15' (3.25°)	2° 15' (2.25°)	2° 45' (2.75°)
	Nominal	3° 24' (3.40°)	4° 0' (4.00°)	3° 0' (3.00°)	3° 30' (3.50°)
	Maximum	4° 09' (4.15°)	4° 45' (4.75°)	3° 45' (3.75°)	4° 15' (4.25°)
	Cross caster	0° 45' (0.75°) or less		0° 45' (0.75°) or less	
Kingpin inclination Degree minute (decimal degree)	13° 32' (13.53°)		13° 13' (13.22°)		



Toe-in	Total toe-in Distance (A - B)	Minimum	In 0.5 mm (In 0.02 in)
		Nominal	In 2.5 mm (In 0.10 in)
		Maximum	In 4.5 mm (In 0.17 in)
	Total toe-in Angle Degree minute (decimal degree)	Minimum	In 0° 0' 36" (In 0.01°)
		Nominal	In 0° 10' 12" (In 0.17°)
		Maximum	In 0° 19' 48" (In 0.33°)
Wheel turning angle (full turn)	Inside Degree minute (decimal degree)	34° 31' - 38° 31' *2 (34.52° - 38.52°)	34° 44' - 38° 44' *4 (34.73° - 38.73°)
	Outside Degree minute (decimal degree)	30° 59' - 34° 59' *3 (30.98° - 34.98°)	30° 29' - 34° 29' *5 (30.48° - 34.48°)

SERVICE DATA AND SPECIFICATIONS (SDS)

< SERVICE DATA AND SPECIFICATIONS (SDS)

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

*2: Target value 37° 31' (37.52°)

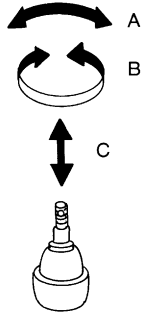
*3: Target value 33° 59' (33.98°)

*4: Target value 37° 44' (37.73°)

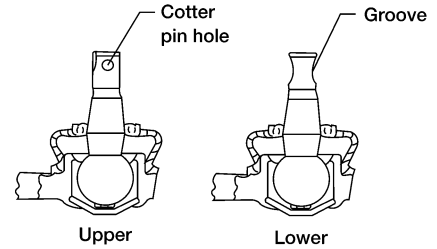
*5: Target value 33° 29' (33.48°)

Ball Joint

INFOID:000000009824286



SFA858A



WEIA0076E

Swinging force (A)	Upper ball joint	8.1 – 103.2 N (0.8 – 10.5 kg-f, 1.8 – 23.2 lb-f) *1
	Lower ball joint	11.4 – 145.5 N (1.1 – 14.8 kg-f, 2.5 – 32.7 lb-f) *2
Turning torque (B)		0.5 – 6.4 N·m (0.05 – 0.65 kg-m, 4 – 57 in-lb)
Vertical end play (C)		0 mm (0 in)

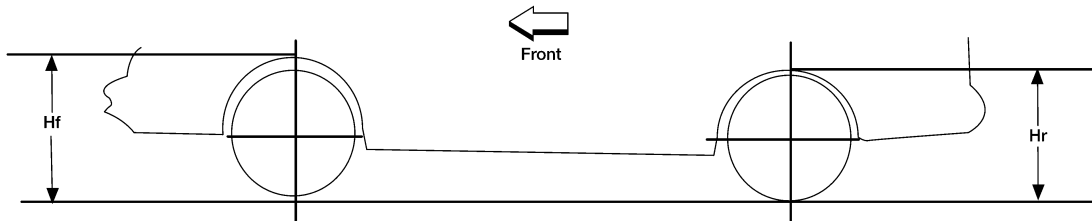
*1 Measure at cotter pin hole

*2 Measure at groove

Wheelarch Height (Unladen*¹)

INFOID:000000009824287

Unit: mm (in)



LEIA0085E

Suspension type	With air leveling* ²				Without air leveling			
	2WD		4WD		2WD		4WD	
Applied model	P265/70R18	P275/60R20	P265/70R18	P275/60R20	P265/70R18	P275/60R20	P265/70R18	P275/60R20
Tire size	P265/70R18	P275/60R20	P265/70R18	P275/60R20	P265/70R18	P275/60R20	P265/70R18	P275/60R20
Front wheelarch height (Hf)	914 (35.98)	920 (36.22)	931 (36.65)	937 (36.89)	914 (35.98)	920 (36.22)	931 (36.65)	937 (36.89)
Rear wheelarch height (Hr)	911 (35.87)	917 (36.10)	931 (36.65)	937 (36.89)	931 (36.65)	937 (36.89)	951 (37.44)	957 (37.68)

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

*2: Verify the vehicle height. If vehicle height is not within ± 10 mm (0.39 in) of the specification, perform the control unit initialization procedure. Refer to [SCS-8. "CONSULT Function"](#).