SECTION FSU
FRONT SUSPENSION

CONTENTS

PRECAUTION

PRECAUTIONS

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

INFOID:0000000014417880

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. 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, it is recommended that all maintenance and repair be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper repair, 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

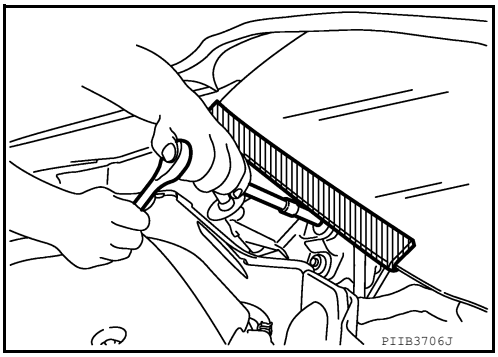
WARNING:

- **When working near the Air Bag Diagnosis Sensor Unit or other Air Bag 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 or batteries, and wait at least three minutes before performing any service.**

Precaution for Procedure without Cowl Top Cover

INFOID:0000000014417881

When performing the procedure after removing cowl top cover, cover the lower end of windshield with urethane, etc to prevent damage to windshield.



Precautions for Suspension

INFOID:0000000014417882

- When installing rubber bushings, the final tightening must be carried out under unladen conditions with tires on ground. Spilled oil might shorten the life of rubber bushings. Be sure to wipe off any spilled oil.
- Unladen conditions mean that fuel, engine coolant and lubricants 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.

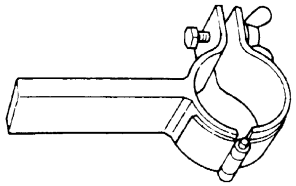
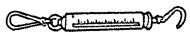
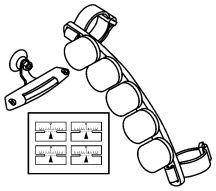
PREPARATION

PREPARATION

Special Service Tool

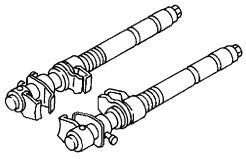
INFOID:0000000014417883

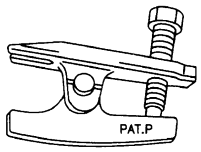
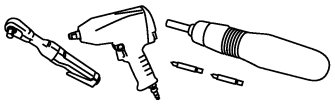
The actual shape of the tools may differ from those illustrated here.

Tool number (TechMate No.) Tool name	Description
ST35652000 (–) Shock absorber attachment  ZZA0807D	Securing shock absorber outer tube in a vise while disassembling and assembling front coil spring and shock absorber.
— (J-44372) Pull gauge  LST024	Measuring ball joint swinging force
— (J-49286-1) Drift and pull gauge  AWEIA0156ZZ	Measuring drift and pull

Commercial Service Tool

INFOID:0000000014417884

Tool name	Description
Spring compressor  NT717	Removing and installing coil spring

Tool name	Description
Ball joint remover  NT146	Removing tie-rod outer end
Power tool  PIIB1407E	Loosening nuts, screws and bolts

SYMPTOM DIAGNOSIS

NOISE, VIBRATION, AND HARSHNESS (NVH) TROUBLESHOOTING

NVH Troubleshooting Chart

INFOID:0000000014417885

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

Reference page		FSU-6	FSU-11	FSU-6	FSU-6	FSU-6	FSU-6	FSU-7	FSU-24	DLN-154 [2F (Double Cardan)], DLN-145 [2F (Single Cardan)]	DLN-181 (MA235), DLN-211 (MA210)	FAX-5	FAX-5	WT-64	WT-64	BR-7	ST-33
Possible Cause and SUSPECTED PARTS		Improper installation, looseness	Shock absorber deformation	Bushing or mounting deterioration	Parts interference	Spring fatigue	Suspension looseness	Incorrect wheel alignment	Stabilizer bar fatigue	FRONT PROPELLER SHAFT	FRONT FINAL DRIVE	DRIVESHAFT	WHEEL HUB	TIRES	WHEEL	BRAKES	STEERING
Symptom	Noise	×	×	×	×	×	×			×	×	×	×	×	×	×	×
	Shake	×	×	×	×		×			×		×	×	×	×	×	×
	Vibration	×	×	×	×	×				×		×	×	×			×
	Shimmy	×	×	×	×			×					×	×	×	×	×
	Shudder	×	×	×									×	×	×	×	×
	Poor-quality ride or handling	×	×	×	×	×		×	×				×	×	×		

x: Applicable

PERIODIC MAINTENANCE

FRONT SUSPENSION ASSEMBLY

Inspection

INFOID:0000000014417886

ON-VEHICLE SERVICE

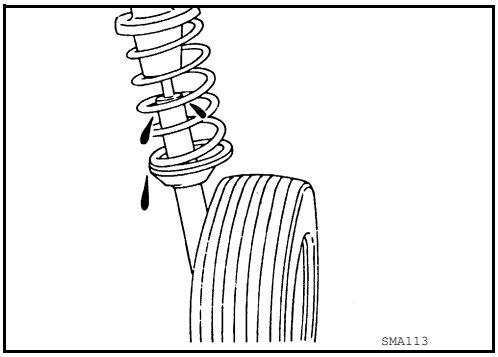
- Check the suspension parts for excessive play, cracks, wear or damage. Shake each front wheel to check for excessive play.
- Retighten all nuts and bolts to the specified torque.
- Make sure that each cotter pin is installed.
- Check the wheelarch height. Refer to FSU-37, "Wheelarch Height (Unladen*1)".

INSPECTION

Check the conditions (looseness, backlash) of each component. Verify that the component conditions (wear, damage) are normal.

FRONT COIL SPRING AND SHOCK ABSORBER

Check for oil leaks and damage. Replace parts if necessary.



LOWER AND UPPER LINK

- Check the lower and upper links for damage, cracks, or deformation and replace if necessary.
- Check the rubber bushings for damage, cracks and deformation. Replace the lower or upper link if necessary.
- Check the suspension ball joints for grease leaks and ball joint dust covers for cracks or other damage. Replace the applicable lower link or upper link if ball joint is worn or hard to swing.

FRONT STABILIZER

- Check the front stabilizer and clamps for any deformation, cracks or damage and replace if necessary.
- Check the rubber bushings for deterioration or cracks and replace if necessary.

STEERING KNUCKLE

Check the steering knuckle for any deformation, cracks, or other damage and replace if necessary.

WHEEL ALIGNMENT

Inspection

INFOID:0000000014417887

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.

- Check and adjust the wheel alignment with the vehicle under unladen conditions. “Unladen conditions” means that the fuel, engine coolant, and lubricants are full; and that the spare tire, jack, hand tools and mats are in their designated positions.
- Check the tires for incorrect air pressure and excessive wear. Refer to WT-76, "Tire".
- Check the wheels for deformation, cracks, and other damage. Remove the wheel and check wheel run out. Refer to WT-65, "Inspection".
- Check the wheel bearing axial end play. Refer to FAX-6, "On-vehicle Service".
- Check the shock absorbers for leaks or damage.
- Check each fastener for looseness or damage.
- Check each suspension component and the frame for damage.
- Check the wheelarch height in unladen conditions. Refer to FSU-37, "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.
   - 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-36, "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 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.
     NOTE:
     Do not use the "Rolling Compensation" method if you are using sensor-type alignment equipment.
   - Follow all instructions for the alignment machine you are using for more information.

CAMBER, CASTER, AND KINGPIN INCLINCATION ANGLE INSPECTION

1. Measure camber and caster of both the right and left wheels.

Camber and caster : Refer to FSU-36, "Wheel Alignment (Unladen*1)".

2. If outside the specified value, adjust camber and caster to specification. Refer to FSU-8, "Adjustment".

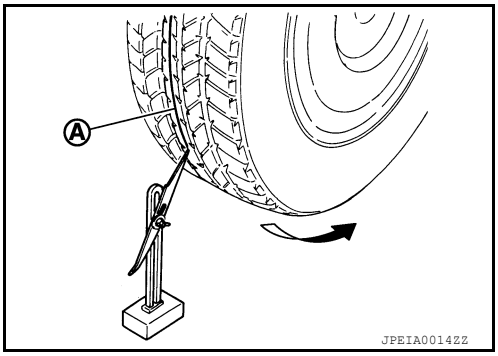
TOTAL TOE-IN INSPECTION

Measure the total toe-in using the following procedure:

WARNING:

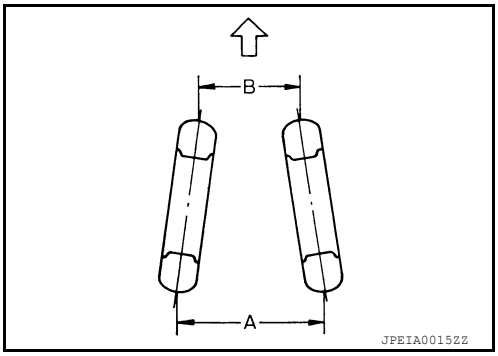
- **Always perform the following procedure on a flat surface.**
- **Make sure that no person is in front of vehicle before pushing it.**

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



4. Measure the distance (A) from the rear side.

⇦ : Front



5. Push on the rear wheel to move the vehicle slowly ahead and to rotate the wheels 180 degrees (1/2 turn).
   CAUTION:
   If the wheels have rotated more than 180 degrees (1/2 turn), try the above procedure again from the beginning. Do not push the vehicle backward.
6. Measure the distance (B) from the front side.
7. Use the formula below to calculate total toe-in.

Total toe-in formula : A - B

Total toe-in specification : Refer to FSU-36, "Wheel Alignment (Unladen*1)".

- If the total toe-in is outside the specification, adjust the total toe-in. Refer to FSU-8, "Adjustment".

Adjustment

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CAMBER AND CASTER ADJUSTMENT

1. Adjust the camber and caster using the cam bolts in the front lower link. Refer to FSU-15, "Exploded View".
   CAUTION:
   After adjusting the camber and caster, check the toe-in.
2. Tighten the cam bolt nuts to specification. Refer to FSU-15, "Exploded View".

TOE-IN ADJUSTMENT

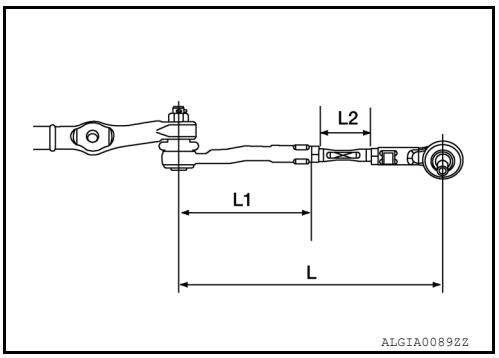
1. Adjust the toe-in by varying the length of the steering outer socket.

a. Loosen the inner socket tie-rod lock nuts.

b. Adjust the toe using the inner socket.
   CAUTION:
   Always evenly adjust toe using LH and RH inner sockets alternately and adjust the total toe-in to the standard.

- XD Models:

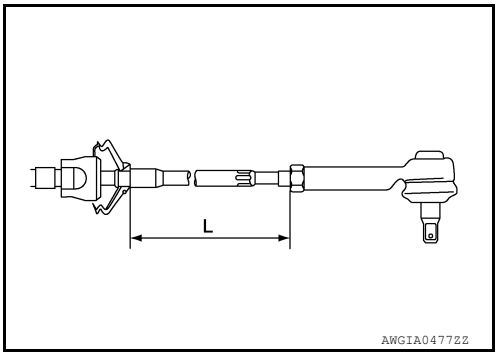
Standard length (L)	**: Refer to ST-87, "Steering Linkage - XD Models".**
Inner socket length (L1)	**: Refer to ST-87, "Steering Linkage - XD Models".**
Possible amount of adjustment (L2)	**: Refer to ST-87, "Steering Linkage - XD Models".**



- Non-XD Models:

Inner socket length (L)	**: Refer to ST-87, "Steering Linkage - XD Models".**

CAUTION:
To prevent damage, hold outer socket across flats using suitable tool while loosening inner socket luck nut.



c. Tighten the inner socket lock nuts to specification.
- XD Models refer to ST-56, "Exploded View".
- Non-XD Models refer to ST-62, "Exploded View".

CAUTION:
- **To prevent damage, hold outer socket across flats using suitable tool while tightening inner socket nut.**
- **Inspect to make sure no boot deformation during toe-in adjustment. Adjust boot as necessary.**

REMOVAL AND INSTALLATION

COIL SPRING AND SHOCK ABSORBER

Exploded View

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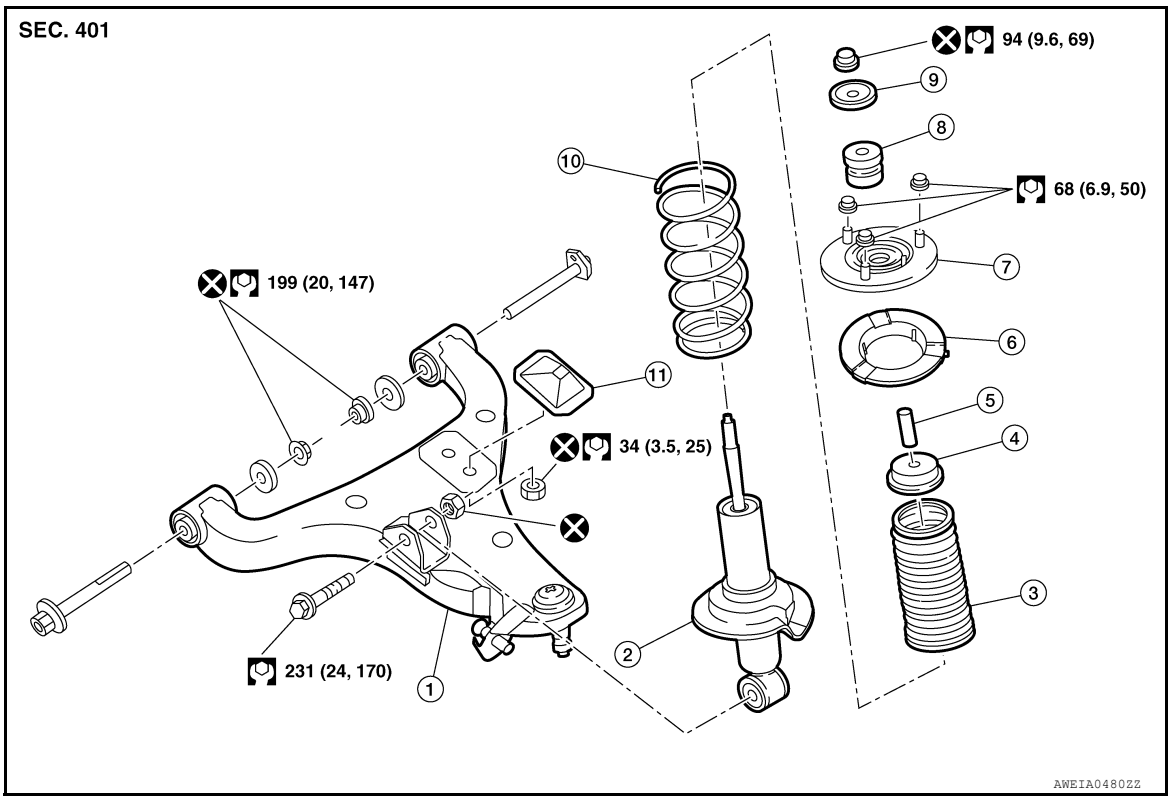
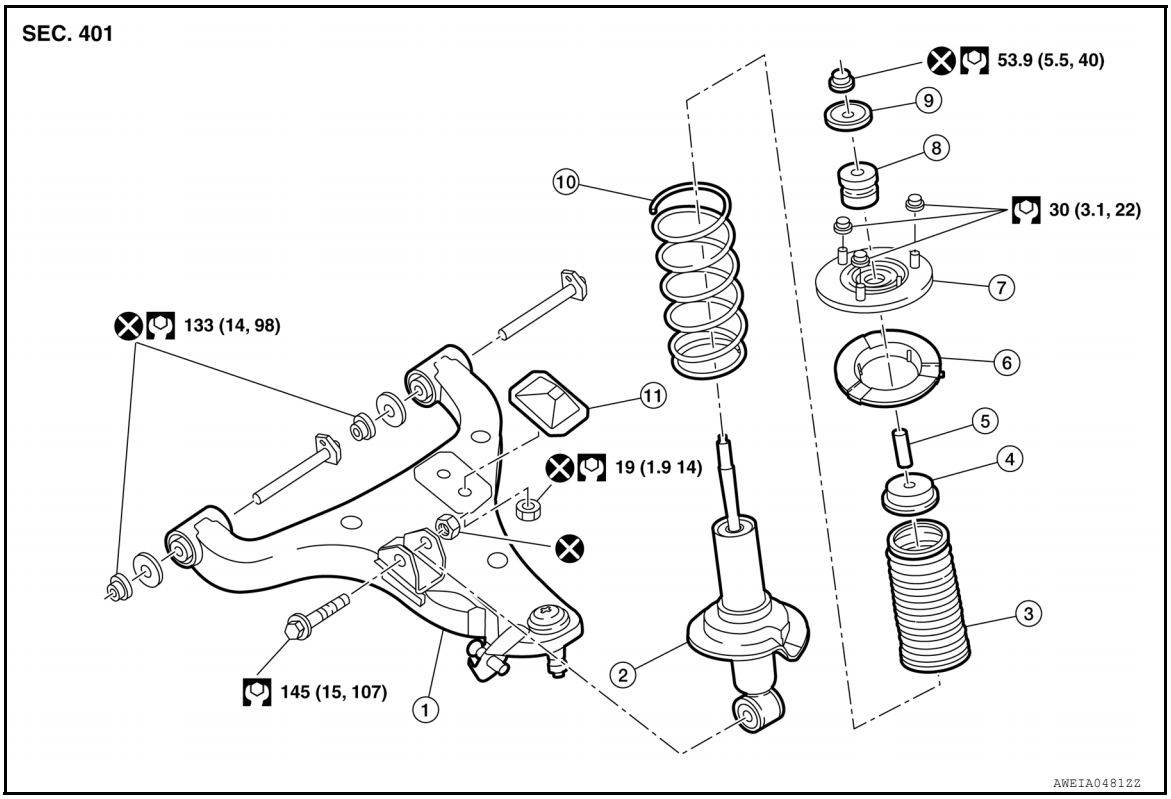
XD Models



1. Lower link
2. Shock absorber
3. Dust cover
4. Bound bumper
5. Distance tube
6. Rubber seat
7. Front shock absorber bracket
8. Rubber bushing
9. Washer
10. Front coil spring
11. Bumper

Non-XD Models



1. Lower link
2. Shock absorber
3. Dust cover
4. Bound bumper
5. Distance tube
6. Rubber seat
7. Front shock absorber bracket
8. Rubber bushing
9. Washer
10. Front coil spring
11. Bumper

Removal and Installation - 2WD

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REMOVAL

1. Remove the wheel and tire using power tool. Refer to WT-69, "Removal and Installation".
2. Support the lower link using a suitable jack.
   WARNING:
   Place a suitable jack under the lower link.
   CAUTION:
   Do not damage the lower link with the suitable jack.
3. Remove the front disc brake rotor. Refer to BR-43, "DISC BRAKE ROTOR : Removal and Installation".
4. Remove the front wheel sensor. Refer to BRC-160, "FRONT WHEEL SENSOR : Removal and Installation".
5. Remove the nut and remove the brake hose block from the steering knuckle. Refer to BR-23, "FRONT : Exploded View".
6. Remove the front coil spring and shock absorber lower bolt.
7. Remove the front coil spring and shock absorber upper nuts.
8. Remove the front coil spring and shock absorber.

INSPECTION AFTER REMOVAL

Shock Absorber

Check the following items, and replace the parts if necessary.

- Shock absorber for deformation, cracks or damage
- Piston rod for damage, uneven wear or distortion
- Oil leaks

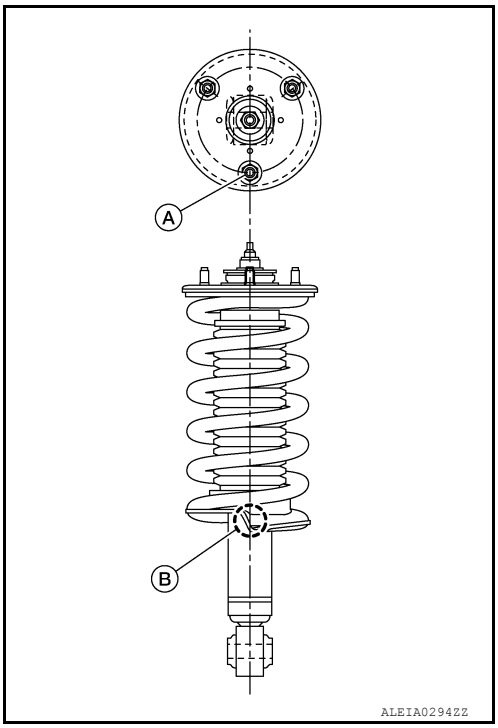
Front Coil Spring

Check the front coil spring for cracks, wear, or damage. Replace the front coil spring if necessary.

INSTALLATION

Installation is in the reverse order of removal.

- When installing the front coil spring and shock absorber, be sure that one nut (A) which is aligned with the lower end of the front coil spring (B) is installed facing the inboard direction of the vehicle.



- If replacing the shock absorber, follow the disposal procedure to discard old shock absorber. Refer to FSU-13, "Disposal".

Removal and Installation - 4WD

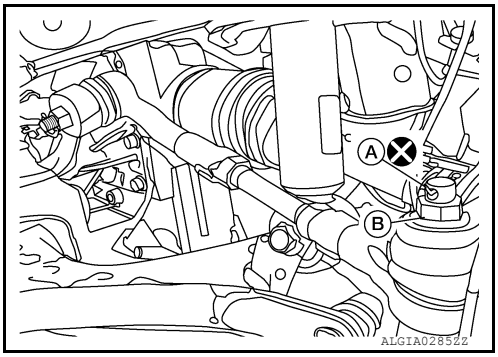
INFOID:0000000014724623

REMOVAL

1. Remove the wheel and tire using power tool. Refer to WT-69, "Removal and Installation".
2. Support the lower link using a suitable jack.

   WARNING:
   Place a suitable jack under the lower link.
   CAUTION:
   Do not damage the lower link with the suitable jack.
3. Separate the outer socket from the steering knuckle using the following steps:

a. Remove the cotter pin (A) and loosen the nut (B) from the outer socket.
   CAUTION:
   Do not reuse the cotter pin.
   NOTE:
   XD Models shown, Non-XD Models similar.



b. Separate the outer socket from the steering knuckle using suitable tool.
   CAUTION:
   Leave the outer socket nut half threaded on the outer socket to prevent damage to the threads and to prevent the suitable tool from coming off suddenly.

c. Remove the outer socket nut and separate the outer socket from the steering knuckle.

4. Remove the front coil spring and shock absorber lower bolt.
5. Remove the front coil spring and shock absorber upper nuts.
6. Remove the front coil spring and shock absorber.

INSPECTION AFTER REMOVAL

Shock Absorber

Check the following items, and replace the parts if necessary.

- Shock absorber for deformation, cracks or damage
- Piston rod for damage, uneven wear or distortion
- Oil leaks

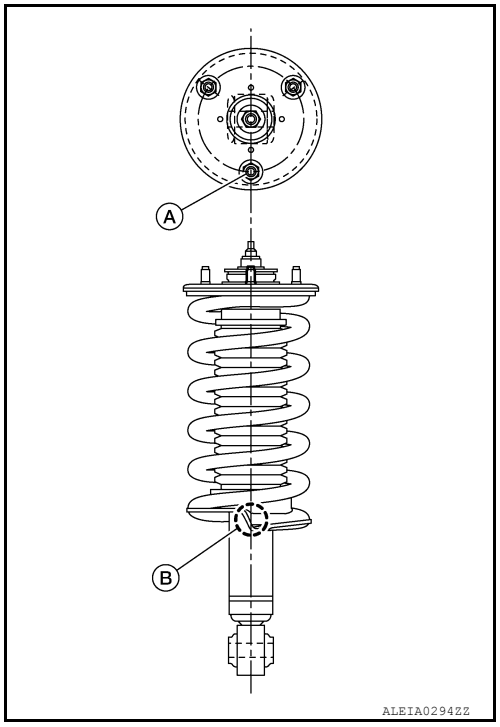
Front Coil Spring

Check the front coil spring for cracks, wear, or damage. Replace the front coil spring if necessary.

INSTALLATION

Installation is in the reverse order of removal.

- When installing the front coil spring and shock absorber, be sure that one nut (A) which is aligned with the lower end of the front coil spring (B) is installed facing the inboard direction of the vehicle.



- If replacing the shock absorber, follow the disposal procedure to discard old shock absorber. Refer to FSU-13, "Disposal".
- Check the wheel alignment. Refer to FSU-7, "Inspection".
- Adjust the neutral position of the steering angle sensor. Refer to BRC-70, "Description".

Disposal

INFOID:0000000014417891

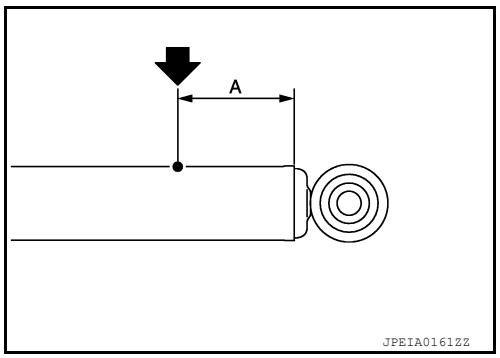
1. Set shock absorber horizontally with the piston rod fully extended.
2. Drill 2 – 3 mm (0.08 – 0.12 in) hole at the position (●) from top as shown to release gas gradually.

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 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.

LOWER LINK

Exploded View

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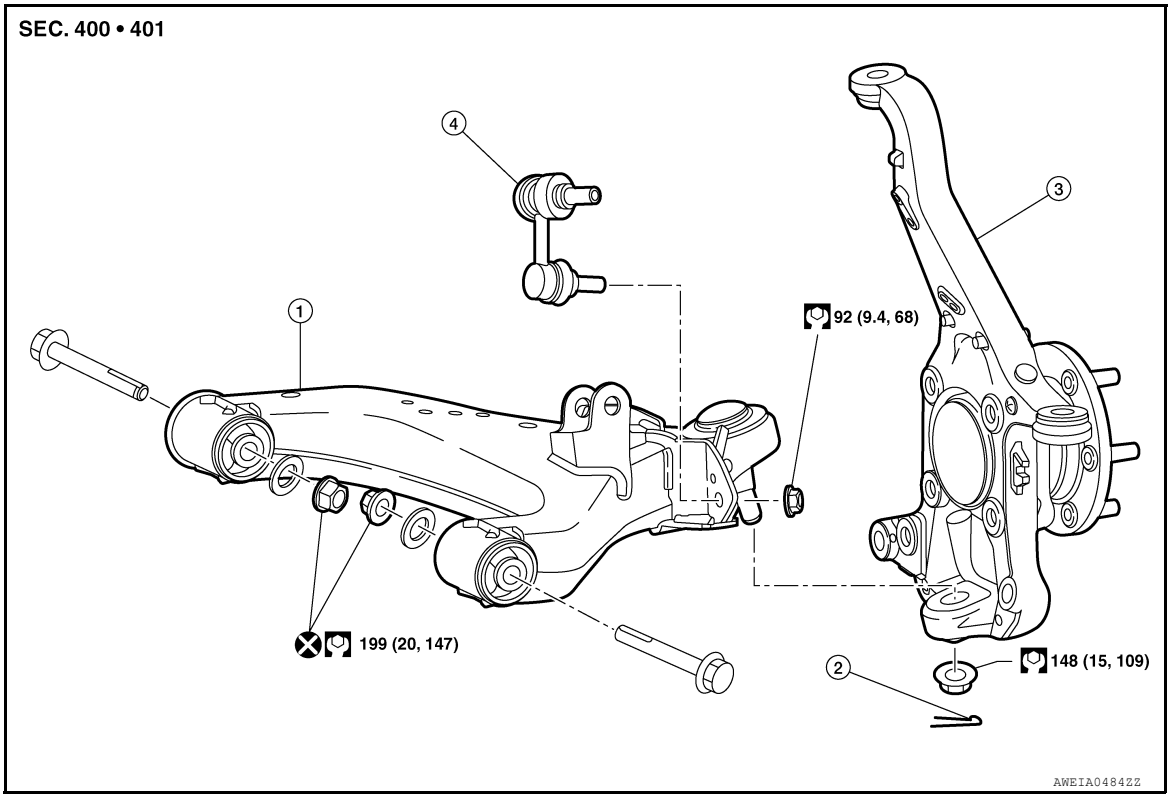
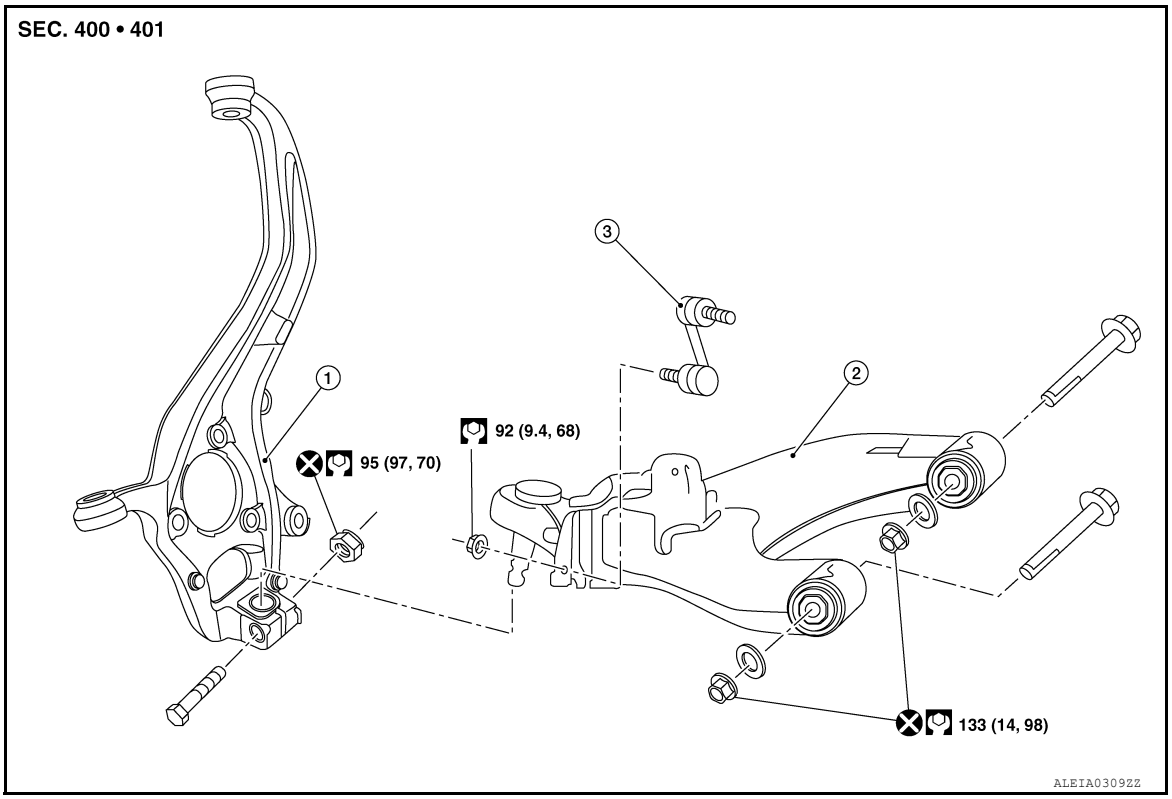
XD Models



1. Lower link
2. Cotter pin
3. Steering knuckle
4. Stabilizer connecting rod

Non-XD Models



1. Stabilizer connecting rod
2. Steering knuckle
3. Lower link

Removal and Installation - 2WD

INFOID:0000000014417893

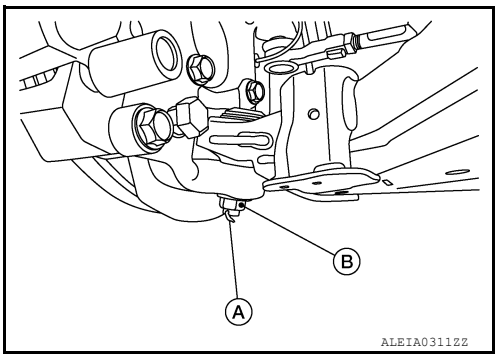
REMOVAL

1. Remove the wheel and tire using power tool. Refer to WT-69, "Removal and Installation".
2. Support the lower link using a suitable jack.

   WARNING:
   Place a suitable jack under the lower link.
   CAUTION:
   Do not damage the lower link with the suitable jack.
3. Remove the front disc brake rotor. Refer to BR-43, "DISC BRAKE ROTOR : Removal and Installation".
4. Remove the lower shock absorber bolt. Refer to FSU-10, "Exploded View".
5. Remove the stabilizer bar connecting rod lower nut.
6. Separate the stabilizer bar connecting rod from the lower link.
7. Separate the lower ball joint from the knuckle using the following steps:

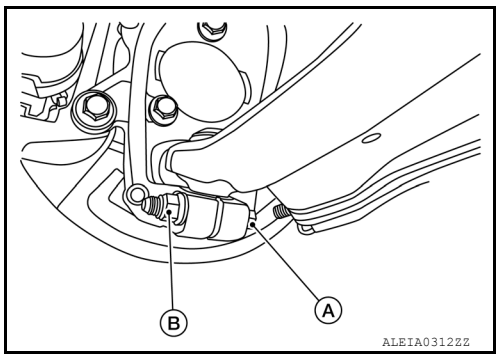
XD Models

1. Remove the cotter pin (A).
   CAUTION:
   Do not reuse the cotter pin.
2. Remove nut (B) from the lower link ball joint.
3. Separate the lower link ball joint from the steering knuckle using suitable tool.



Non-XD Models

1. Remove the steering knuckle lower pinch nut (B) and bolt (A).
CAUTION:
Do not reuse the lower pinch bolt nut.
2. Separate the lower link ball joint from the steering knuckle using suitable tool.



8. Remove the lower link nuts and bolts and remove the lower link.

INSPECTION AFTER REMOVAL

Check the following items, and replace the components as necessary.

Lower Link Inspection

Check the lower link for deformation, cracks, or damage.

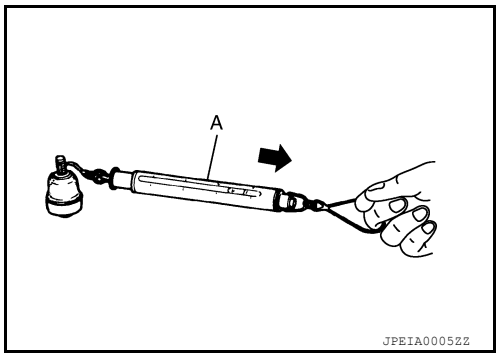
Ball Joint Inspection

- Manually move the ball joint to confirm that it moves smoothly with no binding.
- Check the ball joint boot for cracks, grease leaks, or other damage.

Swinging Torque Inspection

1. Move the ball joint at least ten times by hand to check for smooth movement.
2. Hook Tool (A) on the ball joint as shown. Confirm that the measurement value is within specifications when the ball joint begins moving.

Tool number : – (J-44372)
Swinging torque : Refer to FSU-37, "Ball Joint".



3. If the swinging torque exceeds the standard range, replace the lower link.

Rotating Torque Inspection

1. Move the ball joint at least ten times by hand to check for smooth movement.
2. Confirm that the measurement value is within specifications when the ball joint begins rotating.

Rotating torque : Refer to FSU-37, "Ball Joint".

- If the rotating torque exceeds the standard range, replace the lower link.

Axial End Play Inspection

1. Move the ball joint at least ten times by hand to check for smooth movement.
2. Move the tip of the ball joint in the axial direction to check for looseness.

Axial end play : Refer to FSU-37, "Ball Joint".

- If the axial end play exceeds the standard value, replace the lower link.

INSTALLATION

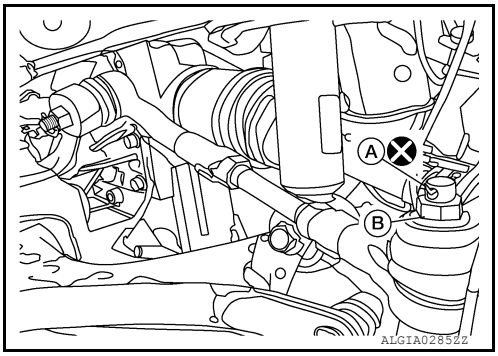
Installation is in the reverse order of removal.

- Perform the final tightening of the lower link nuts at the frame and shock absorber lower side (rubber bushing) under unladen conditions with the tires on level ground.
- Check the wheel alignment. Refer to FSU-7, "Inspection".
- Adjust the neutral position of the steering angle sensor. Refer to BRC-70, "Description".

Removal and Installation - 4WD

INFOID:0000000014417894

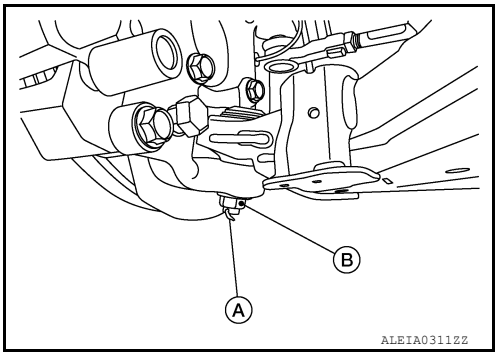
1. Remove the wheel hub and bearing. Refer to FAX-8, "Removal and Installation".
2. Remove the stabilizer connecting rod from the lower link.
3. Remove the nut and remove the brake hose block from the steering knuckle. Refer to BR-23, "FRONT : Exploded View".
4. Remove the cotter pin (A) and loosen the nut (B) from the outer socket.
   CAUTION:
   Do not reuse the cotter pin.
   NOTE:
   XD Models shown, NonXD Models similar.



5. Separate the outer socket from the steering knuckle using suitable tool.
   CAUTION:
   Leave the outer socket nut half threaded on the outer socket to prevent damage to the threads and to prevent the suitable tool from coming off suddenly.
6. Remove the outer socket nut and separate the outer socket from the steering knuckle.
7. Remove the cotter pin and the nut from the upper link ball joint.
   CAUTION:
   Do not reuse the cotter pin.
8. Separate the upper link ball joint from the steering knuckle using suitable tool.
9. Separate the lower ball joint from the knuckle using the following steps:

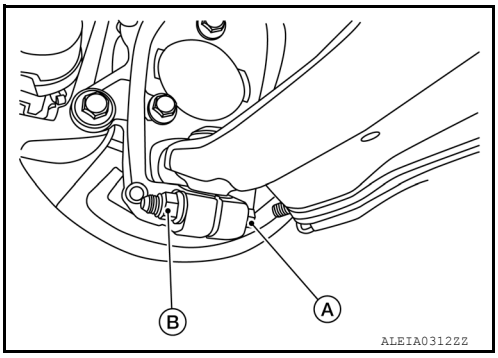
XD Models

1. Remove the cotter pin (A).
   CAUTION:
   Do not reuse the cotter pin.
2. Remove nut (B) from the lower link ball joint.
3. Separate the lower link ball joint from the steering knuckle using suitable tool.



Non-XD Models

1. Remove the steering knuckle lower pinch bolt nut (B) and bolt (A).
   CAUTION:
   Do not reuse the lower pinch bolt nut.
2. Separate the lower link ball joint from the steering knuckle using suitable tool.



10. Remove the steering knuckle.
11. Remove the lower link nuts and bolts and remove the lower link.

INSPECTION AFTER REMOVAL

Check the following items, and replace the components as necessary.

Lower Link Inspection

Check the lower link for deformation, cracks, or damage.

Ball Joint Inspection

- Manually move the ball joint to confirm that it moves smoothly with no binding.
- Check the ball joint boot for cracks, grease leaks, or other damage.

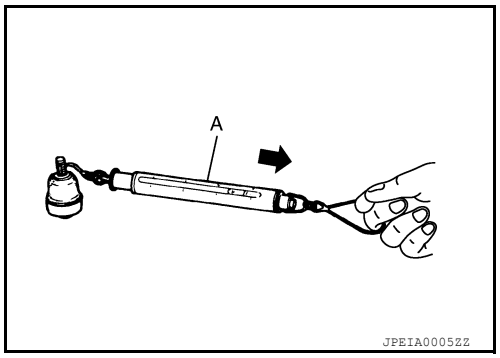
Swinging Torque Inspection

1. Move the ball joint at least ten times by hand to check for smooth movement.
2. Hook Tool (A) on the ball joint as shown. Confirm that the measurement value is within specifications when the ball joint begins moving.

Tool number : – (J-44372)

Swinging torque : Refer to FSU-37, "Ball Joint".

- If the swinging torque exceeds the standard range, replace the lower link.



Rotating Torque Inspection

1. Move the ball joint at least ten times by hand to check for smooth movement.
2. Confirm that the measurement value is within specifications when the ball joint begins rotating.

Rotating torque : Refer to FSU-37, "Ball Joint".

- If the rotating torque exceeds the standard range, replace the lower link.

Axial End Play Inspection

1. Move the ball joint at least ten times by hand to check for smooth movement.
2. Move the tip of the ball joint in the axial direction to check for looseness.

Axial end play : Refer to FSU-37, "Ball Joint".

- If the axial end play exceeds the standard value, replace the lower link.

INSTALLATION

Installation is in the reverse order of removal.

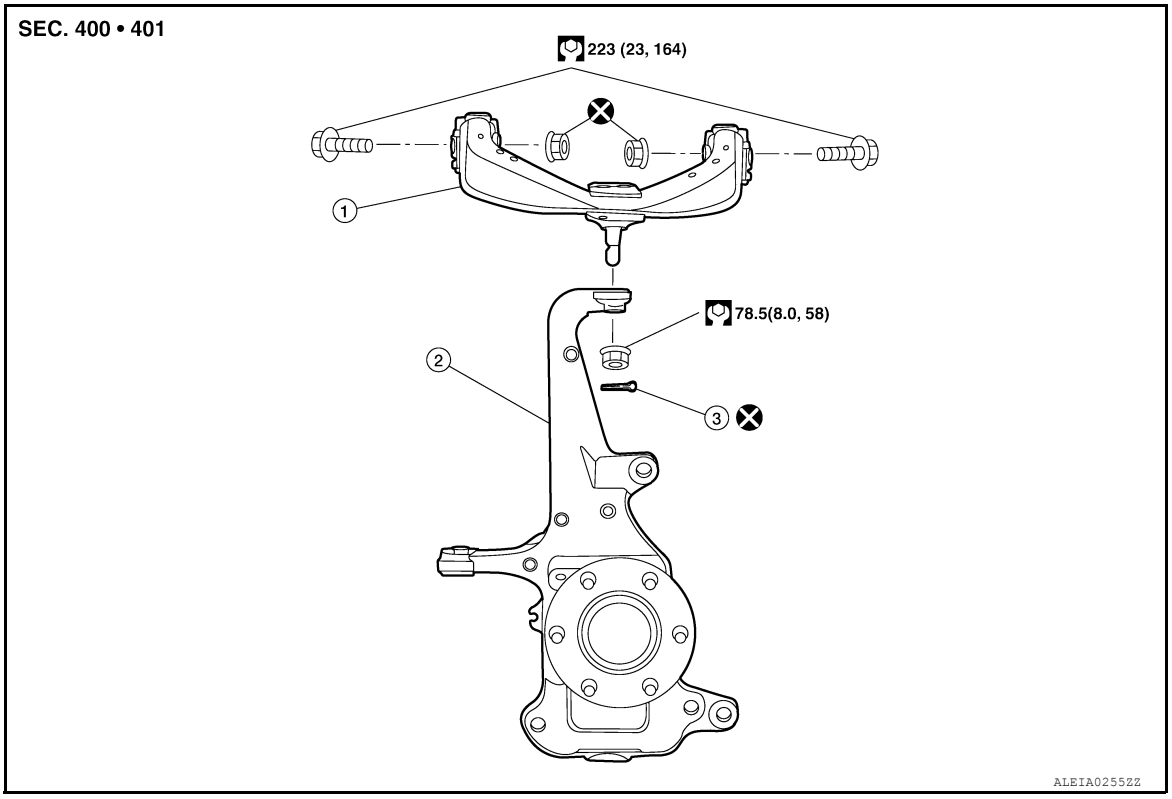
- Perform the final tightening of the lower link nuts at the frame and shock absorber lower side (rubber bushing) under unladen conditions with the tires on level ground.
- Check the wheel alignment. Refer to FSU-7, "Inspection".
- Adjust the neutral position of the steering angle sensor. Refer to BRC-70, "Description".

UPPER LINK

Exploded View

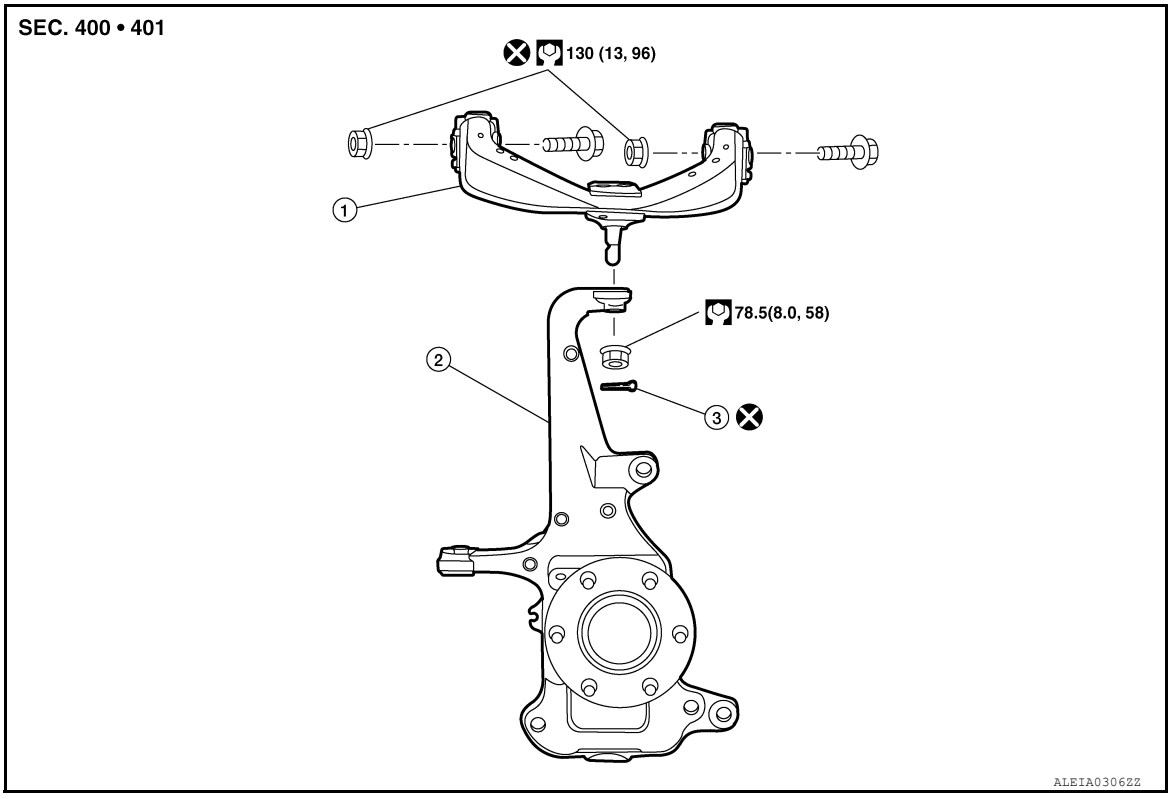
INFOID:0000000014417895

XD Models



1. Upper link
2. Steering knuckle
3. Cotter pin

Non-XD Models



1. Upper link
2. Steering knuckle
3. Cotter pin

Removal and Installation

INFOID:0000000014417896

REMOVAL

1. Remove the wheel and tire using power tool. Refer to WT-69, "Removal and Installation".
2. Support the lower link using a suitable jack.
   WARNING:
   Place a suitable jack under the lower link.
   CAUTION:
   Do not damage the lower link with the suitable jack.
3. Remove the nut and remove the brake hose block from the steering knuckle. Refer to BR-23, "FRONT : Exploded View".
4. Remove the cotter pin and the nut from the upper link ball joint.
   CAUTION:
   Do not reuse the cotter pin.
5. Separate the upper link ball joint stud from the steering knuckle using suitable tool.
6. Remove the upper link bolts and nuts. Remove the upper link.
   CAUTION:
   Do not reuse the upper link nuts.

INSPECTION AFTER REMOVAL

Check the following items, and replace the components as necessary.

Upper Link Inspection

Check the upper link for deformation, cracks, or damage.

Ball Joint Inspection

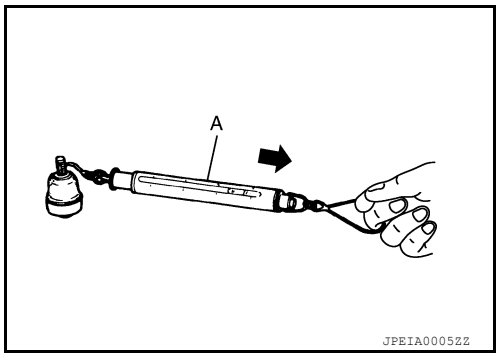
- Manually move the ball joint to confirm that it moves smoothly with no binding.
- Check the ball joint for cracks, grease leaks, or other damage.

Swinging Torque Inspection

1. Move the ball joint at least ten times by hand to check for smooth movement.
2. Hook Tool (A) on the ball joint as shown. Confirm that the measurement value is within specifications when the ball joint begins moving.

Tool number : – (J-44372)
Swinging torque : Refer to FSU-37, "Ball Joint".

- If the swinging torque exceeds the standard range, replace the upper link.



Rotating Torque Inspection

1. Move the ball joint at least ten times by hand to check for smooth movement.
2. Confirm that the measurement value is within specifications when the ball joint begins rotating.

Rotating torque : Refer to FSU-37, "Ball Joint".

- If the rotating torque exceeds the standard range, replace the upper link.

Axial End Play Inspection

1. Move the ball joint at least ten times by hand to check for smooth movement.
2. Move the tip of the ball joint in the axial direction to check for looseness.

Axial end play : Refer to FSU-37, "Ball Joint".

- If the axial end play exceeds the standard value, replace the upper link.

INSTALLATION

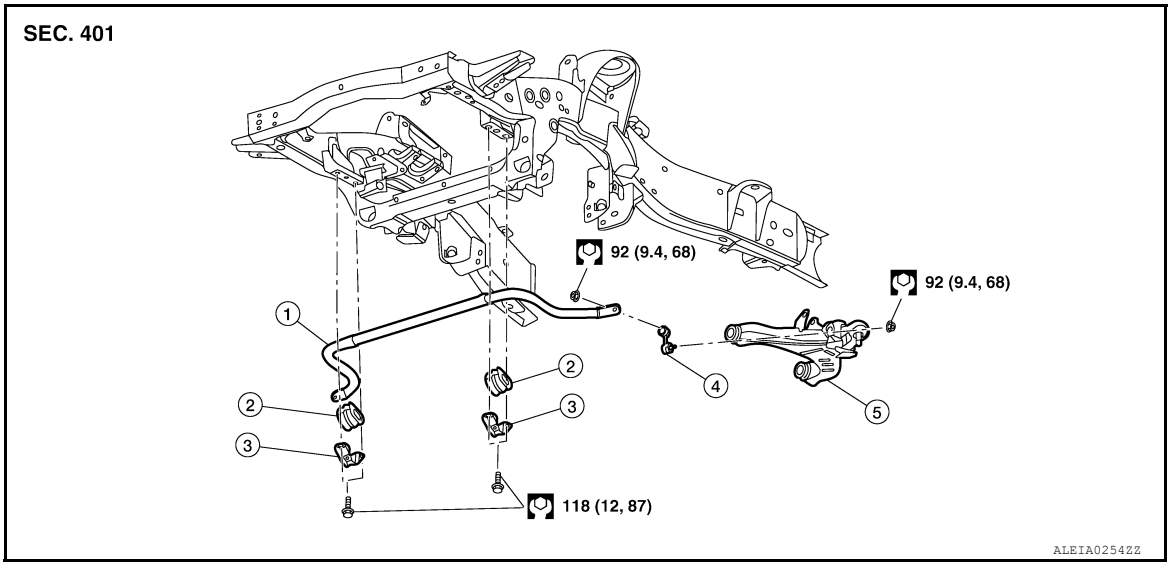
Installation is in the reverse order of removal.
Perform the final tightening of the upper link nuts at frame (rubber bushing) under unladen conditions with the tires on level ground.

STABILIZER BAR

Exploded View

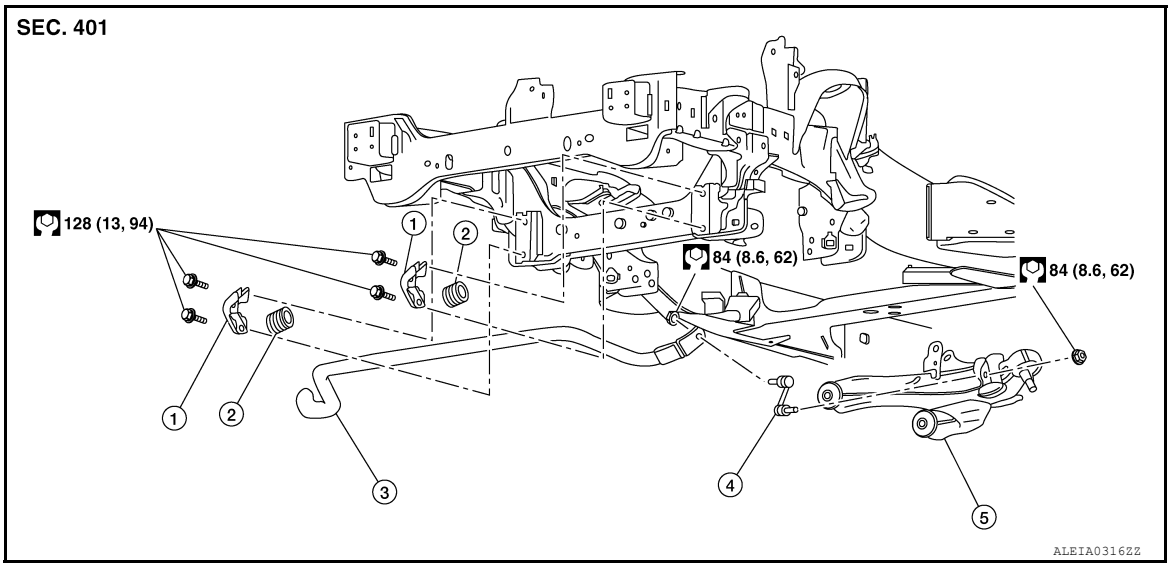
INFOID:0000000014417897

XD Models



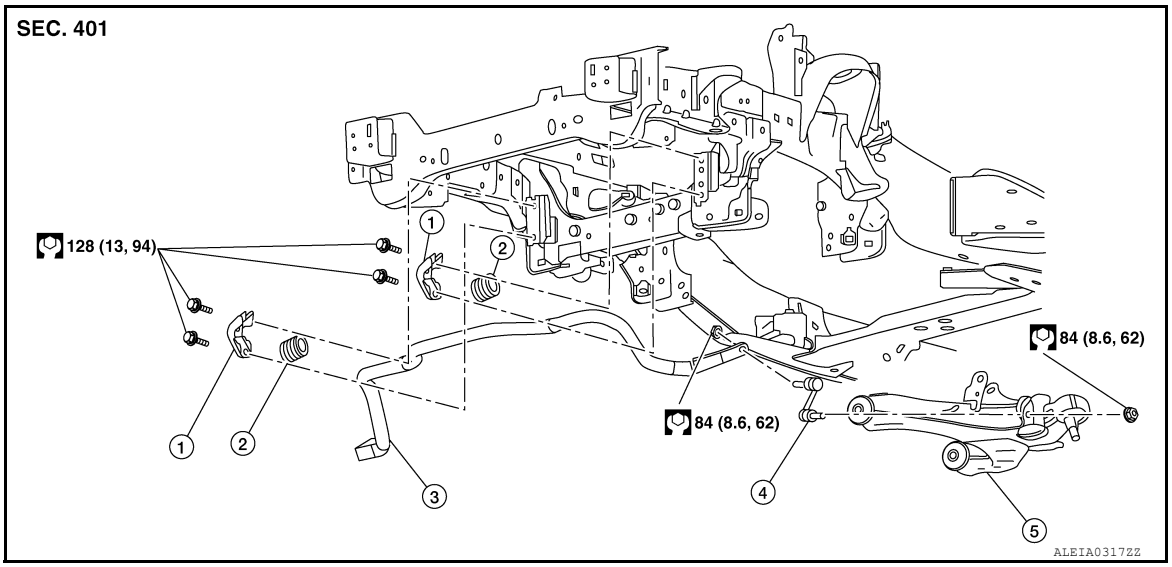
1. Stabilizer bar
2. Stabilizer bar bushing
3. Stabilizer bar clamp
4. Stabilizer bar connecting rod
5. Lower link

Non-XD Models 4WD



1. Stabilizer bar clamp
2. Stabilizer bar bushing
3. Stabilizer bar
4. Stabilizer bar connecting rod
5. Lower link

Non-XD Models 2WD



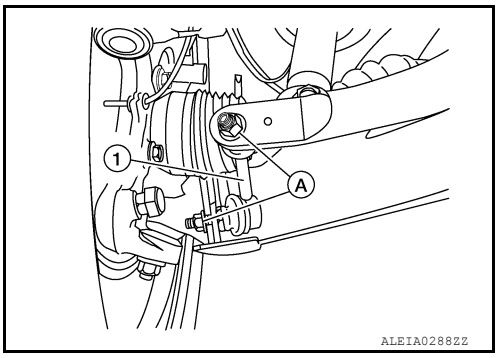
1. Stabilizer bar clamp
2. Stabilizer bar bushing
3. Stabilizer bar
4. Stabilizer bar connecting rod
5. Lower link

Removal and Installation - XD Models

INFOID:0000000014417898

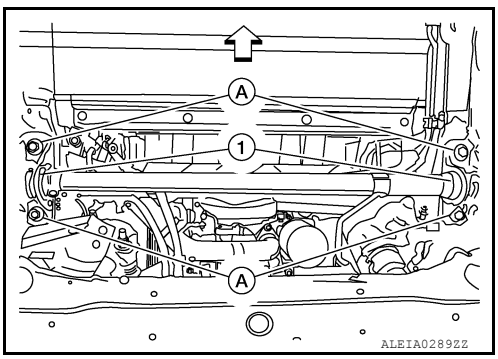
REMOVAL

1. Remove the front under cover. Refer to EXT-37, "FRONT UNDER COVER : Removal and Installation".
2. Remove the nuts (A) from the stabilizer bar connecting rod[1 (RH/LH)].



3. Remove the (RH/LH) stabilizer bar connecting rod.
4. Remove the bolts (A) from the stabilizer bar clamp (1).

⇦ : Front



5. Remove the (RH/LH) stabilizer bar clamp.
6. Remove the stabilizer bar.
7. Remove the stabilizer bar bushings from the stabilizer bar.

INSPECTION AFTER REMOVAL

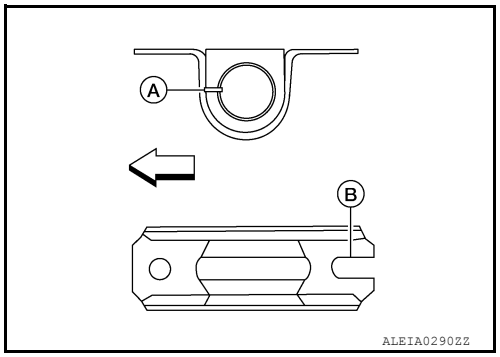
Check the stabilizer bar, stabilizer bar connecting rod, stabilizer bar bushing, and stabilizer bar clamps for deformation, cracks, or damage. Replace if necessary.

INSTALLATION

Installation is in the reverse order of removal.

- Install the stabilizer bushing with the slit (A) facing the front of the vehicle.
- Install the stabilizer clamp with the notch (B) facing the rear of the vehicle.

⇦ : Front

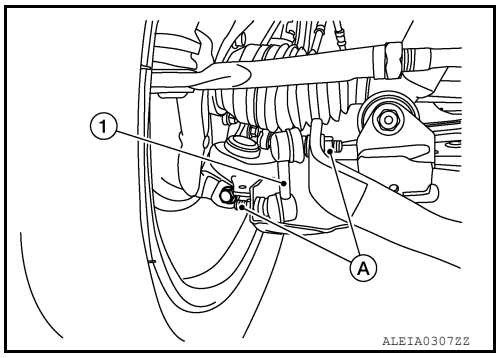


Removal and Installation - Non-XD Models

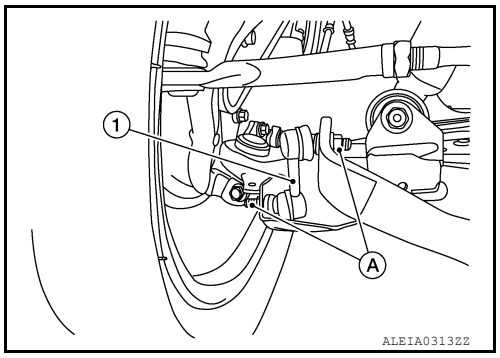
INFOID:0000000014704564

REMOVAL

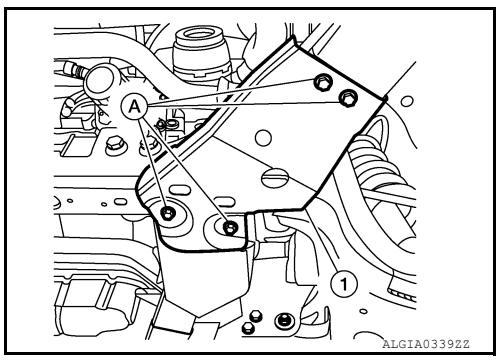
1. Remove the front under cover. Refer to EXT-37, "FRONT UNDER COVER : Removal and Installation".
2. Remove the nuts from the stabilizer bar connecting rod.
   - For 4WD remove the nuts (A) from the stabilizer bar connecting rod (1) (RH/LH).



   - For 2WD remove the nuts (A) from the stabilizer bar connecting rod (1) (RH/LH).



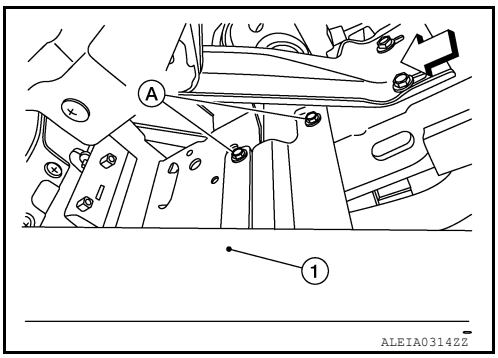
3. For 2WD remove bolts (A) and remove front suspension member reinforcement [LH (1)].



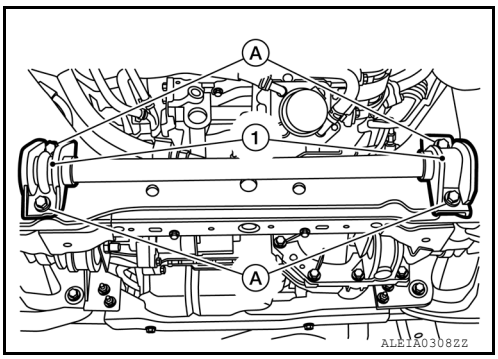
4. For 2WD remove bolts (A) and remove push arm [LH (1)].

Bolts A **: 35 Nm (3.6 kg-m, 26 ft.-lb)**

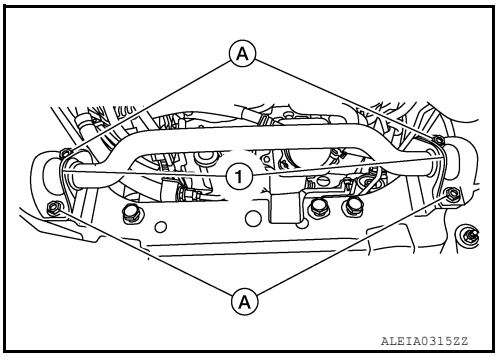
⇦ : Front



5. Remove the bolts from the stabilizer bar clamp.
   - For 4WD remove bolts (A) from the stabilizer bar clamp (1).



   - For 2WD remove bolts (A) from the stabilizer bar clamp (1).



6. Remove the stabilizer bar clamp (RH/LH).
7. Remove the stabilizer bar.
8. Remove the stabilizer bar bushings from the stabilizer bar.

INSPECTION AFTER REMOVAL

Check the stabilizer bar, stabilizer bar connecting rod, stabilizer bar bushing, and stabilizer bar clamps for deformation, cracks, or damage. Replace if necessary.

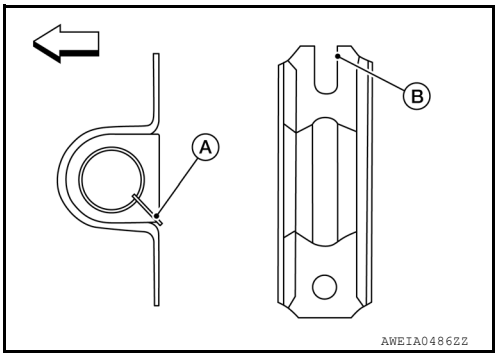
INSTALLATION

Installation is in the reverse order of removal.

- Install the stabilizer bushing with the slit (A) at a downward angle.

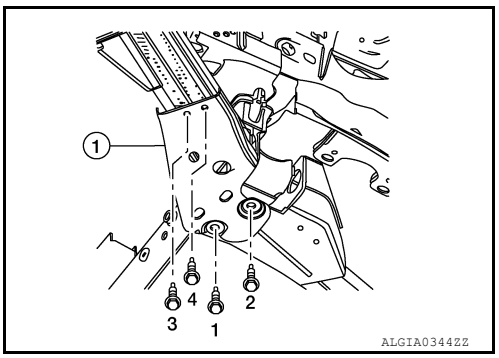
⇦ : Front

- Install the stabilizer clamp with the notch (B) facing up.



- For Non-XD Models 2WD Install front suspension member reinforcement (1) (LH) bolts finger tight, then tighten to specification in sequence as shown.

Bolts 1 - 4	**: 80.0 Nm (8.2 kg-m, 59 ft.-lb)**

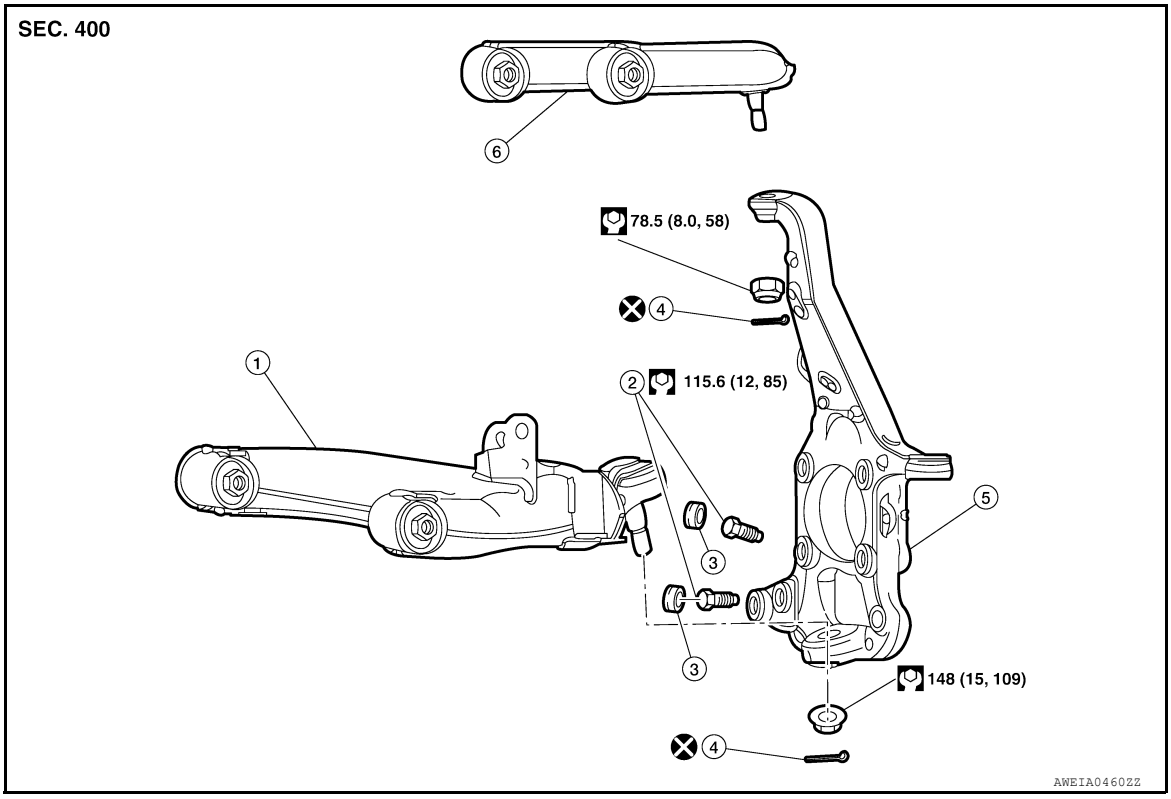


STEERING KNUCKLE

Exploded View

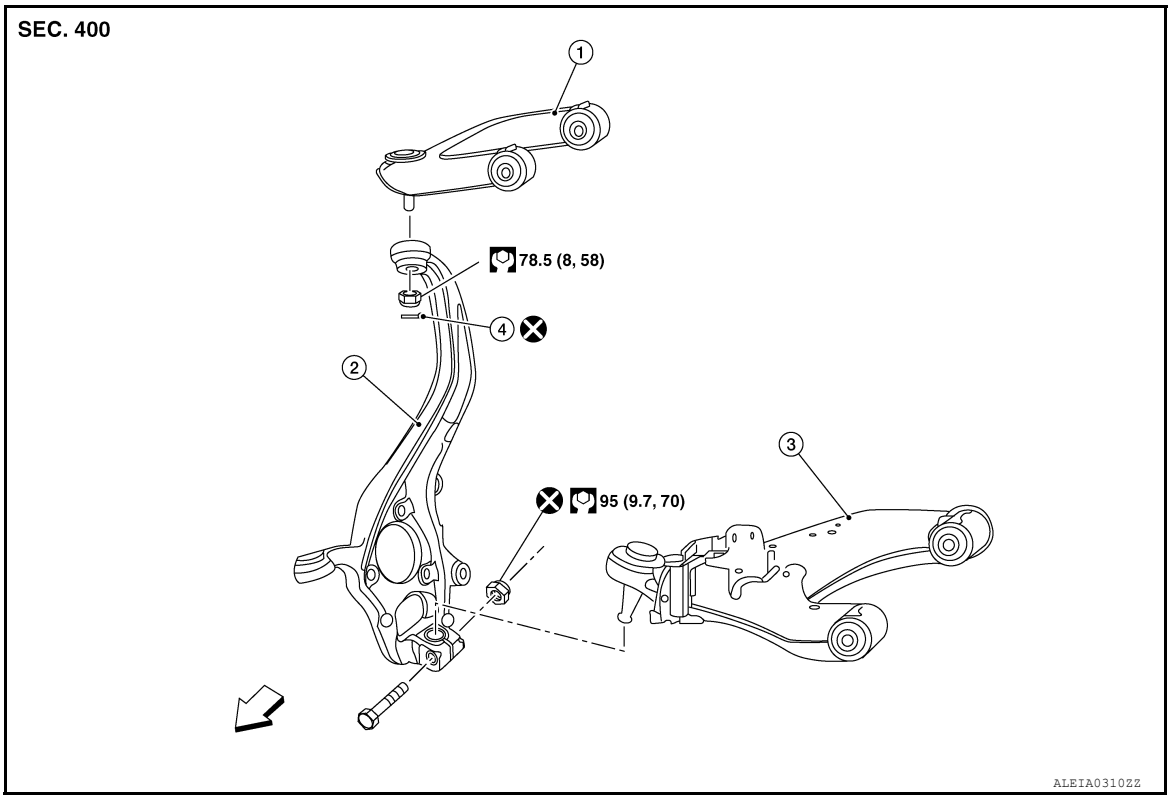
INFOID:0000000014417899

XD Models



1. Lower link
2. Stopper
3. Stopper cap
4. Cotter pin
5. Steering knuckle
6. Upper link

Non-XD Models



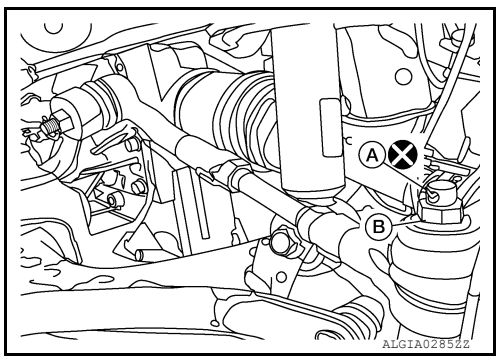
1. Upper link
2. Steering knuckle
3. Lower link
4. Cotter pin
⇦ Front

Removal and Installation

INFOID:0000000014417900

REMOVAL

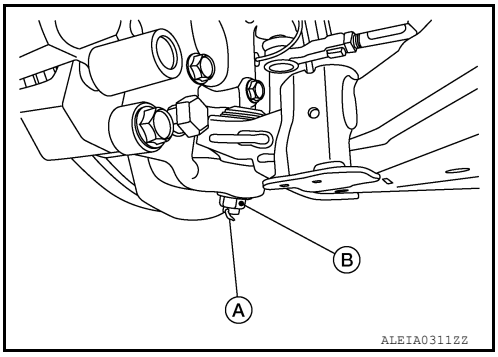
1. Remove the wheel hub and bearing. Refer to FAX-8, "Removal and Installation".
2. Remove the nut and remove the brake hose block from the steering knuckle. Refer to BR-23, "FRONT : Exploded View".
3. Remove the cotter pin (A) and loosen the nut (B) from the outer socket.
   CAUTION:
   Do not reuse the cotter pin.
   NOTE:
   XD Models shown, Non-XD Models similar.



4. Separate the outer socket from the steering knuckle using suitable tool.
   CAUTION:
   Leave the outer socket nut half threaded on the outer socket to prevent damage to the threads and to prevent the suitable tool from coming off suddenly.
5. Remove the outer socket nut and separate the outer socket from the steering knuckle.
6. Remove the cotter pin and the nut from the upper link ball joint.
   CAUTION:
   Do not reuse the cotter pin.
7. Separate the upper link ball joint from the steering knuckle using suitable tool.
8. Separate the lower ball joint from the knuckle using the following steps:

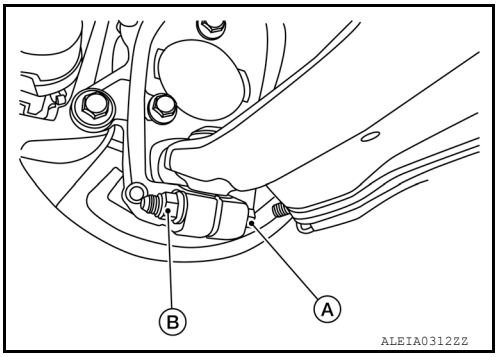
XD Models

1. Remove the cotter pin (A).
   CAUTION:
   Do not reuse the cotter pin.
2. Remove nut (B) from the lower link ball joint.
3. Separate the lower link ball joint from the steering knuckle using suitable tool.
   NOTE:
   2WD XD Models shown, 4WD XD Models similar.



Non-XD Models

1. Remove the steering knuckle lower pinch bolt nut (B) and bolt (A).
   CAUTION:
   Do not reuse the lower pinch bolt nut.
2. Separate the lower link ball joint from the steering knuckle using suitable tool.
   NOTE:
   4WD Non-XD Models shown, 2WD Non-XD Models similar.



9. Remove the steering knuckle.
10. Remove the front wheel sensor harness bracket from the steering knuckle (if necessary).
11. For XD Models, remove the stoppers from the steering knuckle (if necessary).

INSPECTION AFTER REMOVAL

- Check for deformity, cracks and damage on each part; replace if necessary.
- Perform the ball joint inspection. Refer to FSU-21, "Removal and Installation".

INSTALLATION

Installation is in the reverse order of removal.

- Check the wheel alignment. Refer to FSU-7, "Inspection".
- Adjust the neutral position of the steering angle sensor. Refer to BRC-70, "Description".

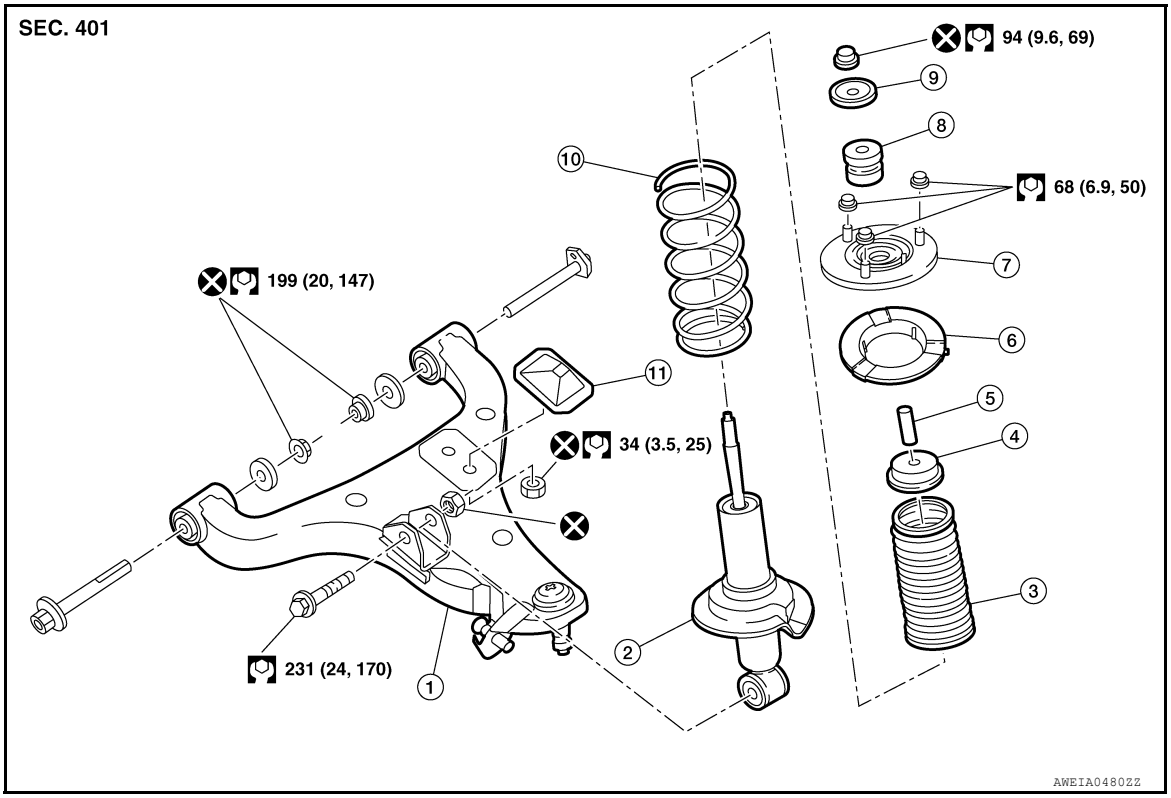
UNIT DISASSEMBLY AND ASSEMBLY

COIL SPRING AND SHOCK ABSORBER

Exploded View

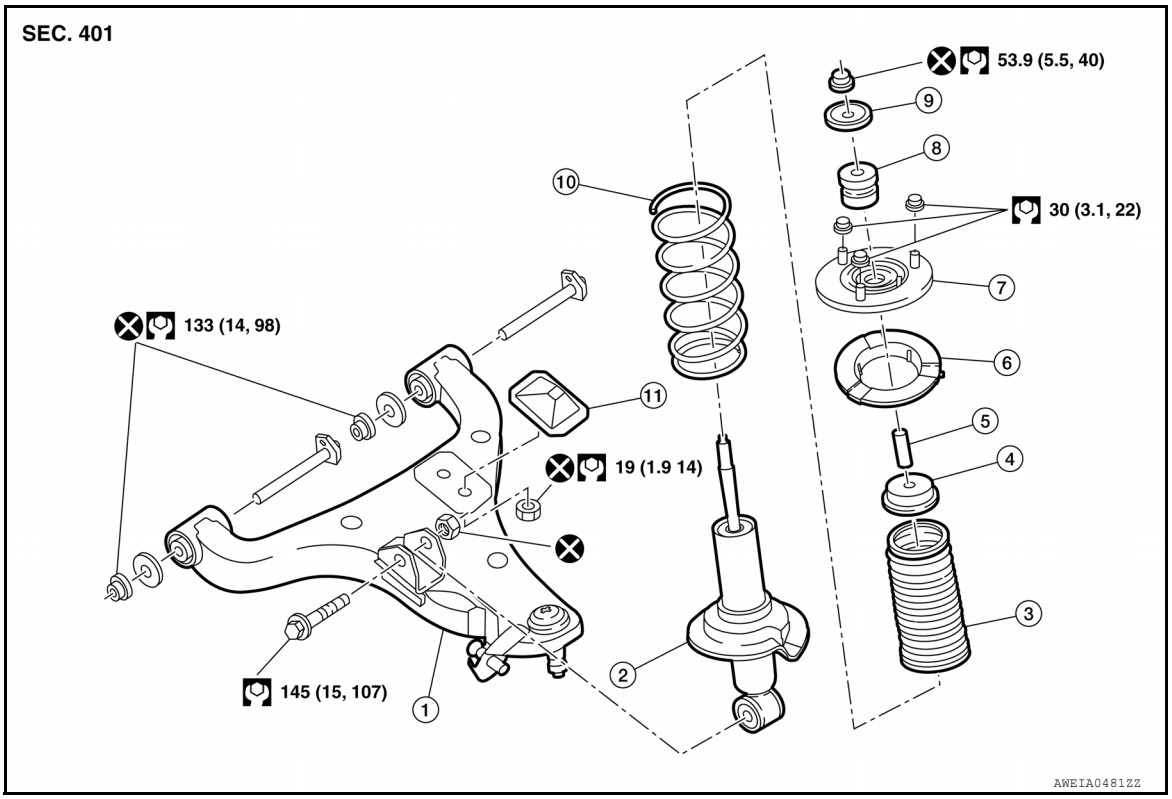
INFOID:0000000014417901

XD Models



1. Lower link
2. Shock absorber
3. Dust cover
4. Bound bumper
5. Distance tube
6. Rubber seat
7. Front shock absorber bracket
8. Rubber bushing
9. Washer
10. Front coil spring
11. Bumper

Non-XD Models



1. Lower link
2. Shock absorber
3. Dust cover
4. Bound bumper
5. Distance tube
6. Rubber seat
7. Front shock absorber bracket
8. Rubber bushing
9. Washer
10. Front coil spring
11. Bumper

Disassembly and Assembly

INFOID:0000000014417902

DISASSEMBLY

CAUTION:

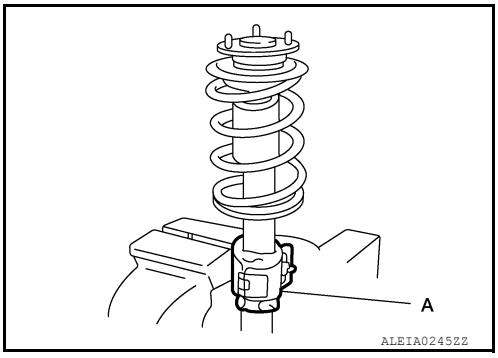
Do not damage the piston rod when removing components from the front coil spring and shock absorber.

1. Install Tool (A) to the front coil spring and shock absorber.

   CAUTION:

   When installing Tool (A), wrap a shop cloth around the front coil spring and shock absorber to protect the parts from damage.

   Tool number : ST35652000 (—)



2. Secure Tool (A) in a vise.

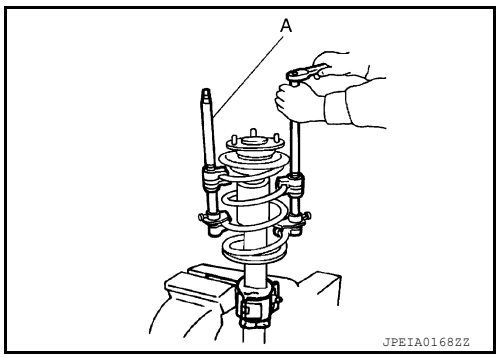
3. Slightly loosen the piston rod lock nut.

   WARNING:

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

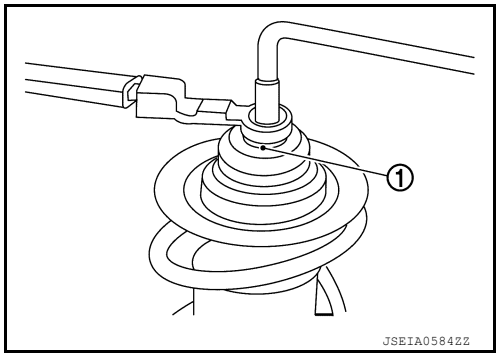
4. Compress the front coil spring using suitable tool (A).

WARNING:
Make sure that the pawls of the suitable tool are firmly hooked on the front coil spring. Suitable tool must be tightened alternately so as not to tilt the front coil spring.



5. Make sure the front coil spring is free between the shock absorber bracket and the spring lower seat.
6. Hold the piston rod and remove the piston rod lock nut (1).

CAUTION:
Do not reuse the piston rod lock nut.



7. Remove the washer, bushings, shock absorber bracket, tube, and rubber seat from the shock absorber. Refer to FSU-31, "Exploded View".
8. Gradually release the suitable tool and remove the front coil spring.

CAUTION:
Release the suitable tool while making sure the position of the suitable tool on the front coil spring does not move.

INSPECTION AFTER DISASSEMBLY

Shock Absorber Assembly

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

Bracket and Rubber Parts

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

Front Coil Spring

- Check for cracks, deformation or other damage and replace if necessary.

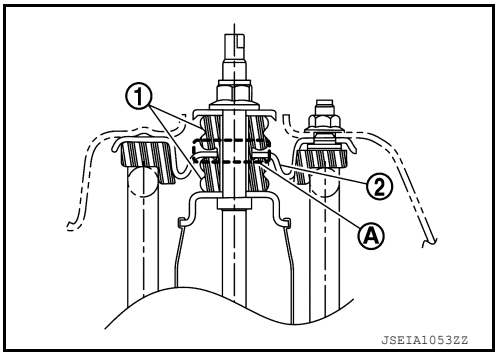
ASSEMBLY

1. Compress the front coil spring using the suitable tool.

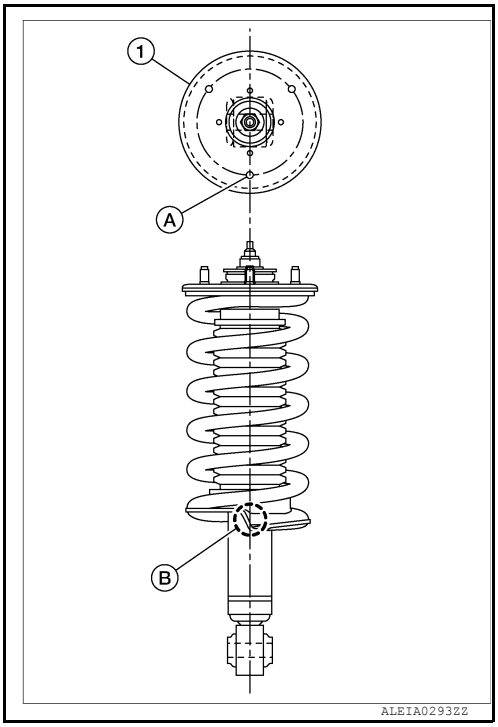
WARNING:
Make sure that the pawls of the suitable tool are firmly hooked on the front coil spring. Suitable tool must be tightened alternately so as not to tilt the front coil spring.

2. Install the rubber seat, bushings, tube, shock absorber bracket, and washer to the shock absorber.

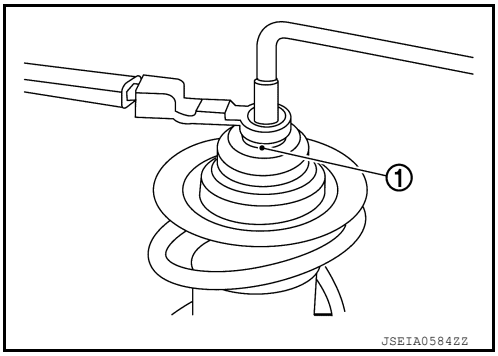
- To install the bushings (1), securely insert the lower bushing protrusion (A) to the center hole on the shock absorber bracket (2).



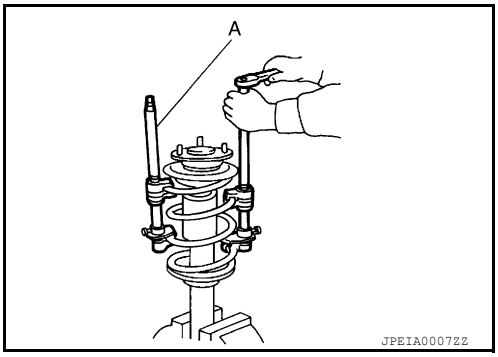
- Check that the lower end of the front coil spring (B) is positioned at the spring lower seat step of the shock absorber. The spring lower seat step is toward the outboard side of the vehicle.
- Install the shock absorber bracket (1) as shown so that one stud (A) is aligned with the lower end of the front coil spring (B) of the shock absorber.



3. Install the piston rod lock nut (1). Secure the piston rod tip so that the piston rod does not turn, then tighten the piston rod lock nut to the specified torque.
CAUTION:
Do not reuse the piston rod lock nut.

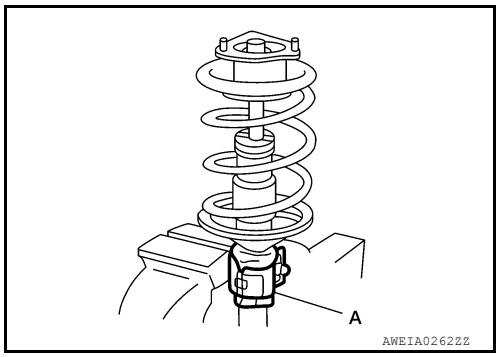


4. Gradually release the suitable tool (A) and remove the suitable tool from the front coil spring.
CAUTION:
Release the suitable tool while making sure the position of the suitable tool on the front coil spring does not move.



5. Remove Tool (A) from the vise.
6. Remove Tool (A) from the front coil spring and shock absorber.

Tool number : ST35652000 (–)



7. After replacing the shock absorber, always follow the disposal procedure to discard the old shock absorber. Refer to FSU-13, "Disposal".

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

General Specification

INFOID:0000000014417903

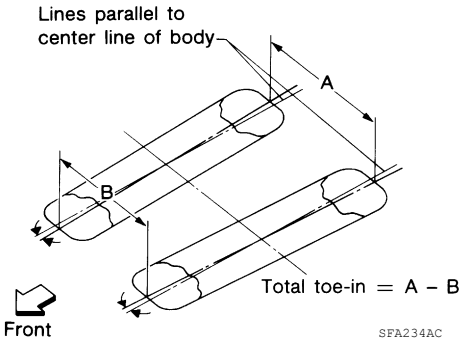
Suspension type	Independent double wishbone coil over shock
Shock absorber type	Double-acting hydraulic
Stabilizer	Standard equipment

Wheel Alignment (Unladen*1)

INFOID:0000000014417904

XD MODELS

Camber Degree minute (decimal degree)	Minimum	-0° 25′ (-0.42°)
	Nominal	0° 05′ (0.08°)
	Maximum	0° 35′ (0.58°)
	Cross camber	0° 45′ (0.75°) or less
Caster Degree minute (decimal degree)	Minimum	5° 25′ (5.42°)
	Nominal	5° 55′ (5.92°)
	Maximum	6° 25′ (6.42°)
	Cross caster	0° 45′ (0.75°) or less
Kingpin inclination (reference only) Degree minute (decimal degree)		9° 00′ (9.00°)



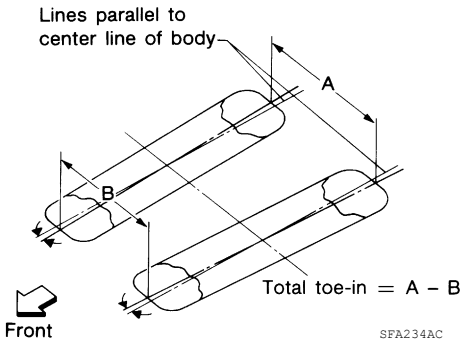
Total toe-in	Total toe-in Distance (A – B)	Minimum	In 5.0 mm (In 0.20 in)
		Nominal	In 7.5 mm (In 0.30 in)
		Maximum	In 10.0 mm (In 0.39 in)
	Total toe-in Angle Degree minute (decimal degree)	Minimum	In 0° 20′ 00″ (In 0.37°)
		Nominal	In 0° 30′ 00″ (In 0.50°)
		Maximum	In 0° 40′ 00″ (In 0.66°)

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

NON-XD MODELS

Drive Type		2WD	4WD	
Grade		ALL	S/SV	SL/PRO4X/Platinum
Camber Degree minute (decimal degree)	Minimum	-0° 55′ (-0.92°)	-0° 50′ (-0.83°)	-0° 27′ (-0.45°)
	Nominal	- 0° 10′ (-0.17°)	-0° 05′ (-0.08°)	0° 18′ (0.30°)
	Maximum	0° 35′ (0.58°)	0° 40′ (0.67°)	1° 03′ (1.05°)
	Cross camber	0° 45′ (0.75°) or less		

Drive Type		2WD	4WD	
Grade		ALL	S/SV	SL/PRO4X/Platinum
Caster Degree minute (decimal degree)	Minimum	2° 20′ (2.33°)	2° 05′ (2.08°)	1° 35′ (1.58°)
	Nominal	3° 05′ (3.08°)	2° 50′ (2.83°)	2° 20′ (2.33°)
	Maximum	3° 50′ (3.83°)	3° 35′ (3.58°)	3° 05′ (3.08°)
	Cross caster	0° 45′ (0.75°) or less		
Kingpin inclination (reference only) Degree minute (decimal degree)		13° 35′ (13.58°)	13° 20′ (13.33°)	13° 00′ (13.00°)



Total 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°)

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

Ball Joint

INFOID:0000000014417905

XD Models

Swinging torque	Upper ball joint	7.6 – 74.2 N (0.78 – 7.57 kg-f, 1.71 – 16.68 lb-f)
	Lower ball joint	6.2 – 80 N (0.63 – 8.2 kg-f, 1.39 – 18.0 lb-f)
Rotating torque	Upper ball joint	1.0 – 6.5 N·m (0.10 – 0.66 kg-m, 9 – 58 in-lb)
	Lower ball joint	1.8 – 12 N·m (0.18 – 1.2 kg-m, 16 – 106 in-lb)
Axial end play		0 mm (0 in)

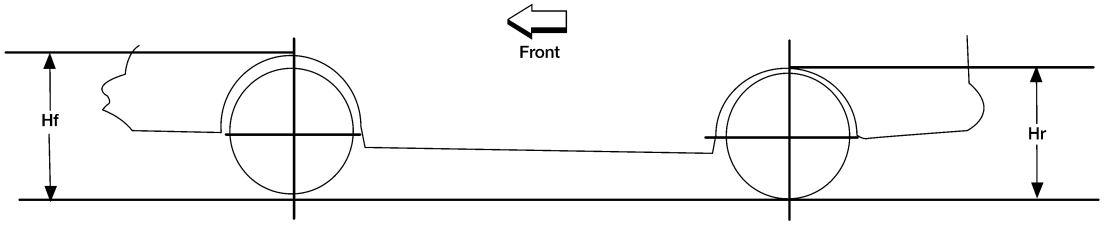
Non-XD Models

Swinging torque	Upper ball joint	8.1 – 103.2 N (0.8 – 10.5 kg-f, 1.8 – 23.2 lb-f)
	Lower ball joint	11.4 – 145.5 N (1.1 – 14.8 kg-f, 2.5 – 32.7 lb-f)
Rotating torque		0.5 – 6.4 N·m (0.05 – 0.65 kg-m, 4 – 57 in-lb)
Axial end play		0 mm (0 in)

Wheelarch Height (Unladen*1)

INFOID:0000000014417906

XD MODELS

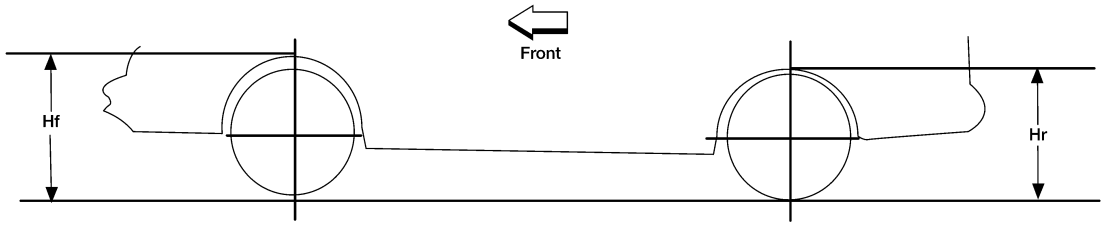


LEIA0085E

Drive type	2WD		4WD		
Tire size	245/75R17	265/60R20	245/75R17	275/65R18	265/60R20
Front wheel arch height (Hf)	988 mm (38.90 in)	1011 mm (39.80 in)	986 mm (38.82 in)	1000 mm (39.37 in)	1010 mm (39.76 in)
Rear wheel arch height (Hr)	1025 mm (40.35 in)	1045 mm (41.14 in)	1025 mm (40.35 in)	1034 mm (40.71 in)	1045 mm (41.14 in)

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

NON-XD 2WD MODELS

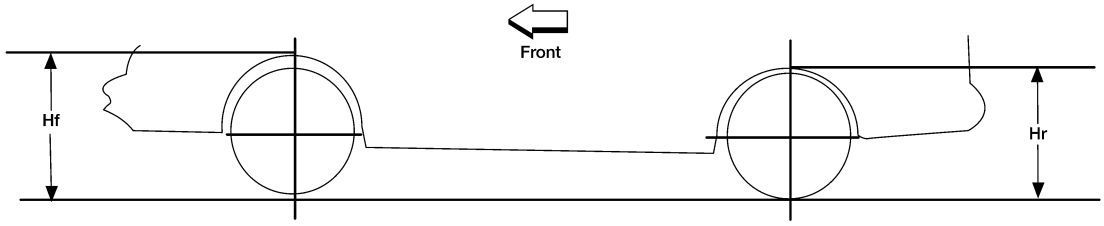


LEIA0085E

Drive type	2WD			
Grade	S BASE	SV BASE	SV COMF	SL BASE
Body	CREW CAB			
Tire size	265/70R18	265/70R18	265/70R18	275/60R20
Front wheel arch height (Hf)	920 mm (36.22 in)	921 mm (36.26 in)		927 mm (36.50 in)
Rear wheel arch height (Hr)	960 mm (37.80 in)	961 mm (37.83 in)		966 mm (38.03 in)

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

NON-XD 4WD MODELS



LEIA0085E

Drive type	4WD

Grade	S BASE	SV BASE	SV COMF	PRO-4X	SL BASE
Body	CREW CAB				
Tire size	265/70R18	265/70R18	265/70R18	275/70R18	275/60/R20
Front wheel arch height (Hf)	934 mm (36.77 in)	935 mm (36.81 in)		965 mm (37.99 in)	965 mm (37.99 in)
Rear wheel arch height (Hr)	976 mm (38.43 in)	976 mm (38.43 in)		1007 mm (39.65 in)	1006 mm (39.61 in)

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