
SECTION 2C

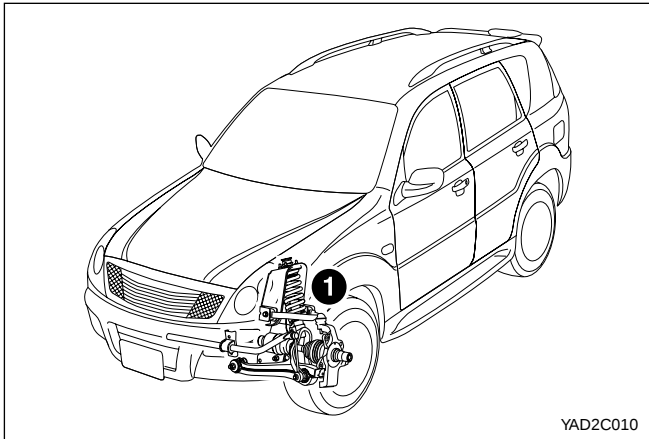
FRONT SUSPENSION

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DESCRIPTION AND OPERATION

FRONT SUSPENSION



YAD2C010

1. Front suspension type : Double Wishbone
2. Component
 - Knuckle, upper arm assembly, lower arm assembly, coil spring, shock absorber assembly, stabilizer.

The front suspension is a combination strut and spring design, with the control arms that pivot from the engine frame. The frame has isolation mounts on the body and a conventional rubber bushing is used on the lower control arm pivot. The front lower control arm bushing is mounted horizontally. The upper end of the strut is isolated by a rubber mount which contains a bearing to allow for wheel turning. The lower end of the steering knuckle pivots on a ball joint riveted to the control arm. The ball joint is fastened to the steering knuckle with a castellated nut and cotter pin.

Stabilizer

If the spring with lower spring constant is applied on the vehicle in order to increase the 'ride comfort', the vehicle's slope increases on turning due to the centrifugal force. Because its trend increases for the independent suspension system, the stabilizer bar should be applied to the system in order to make a balance the vehicle.

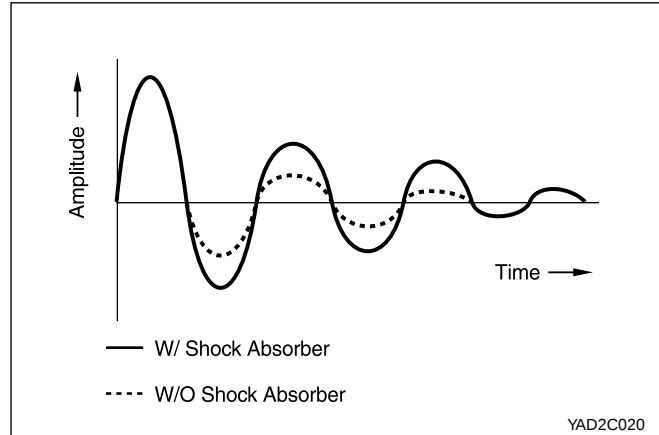
The stabilizer bar is the type of the torsion bar and the both end of the stabilizer bar are connected to the control bar, the center of the stabilizer bar is mounted to the body frame.

Coil Spring

The coil spring is made by winding solid steel rod to form the coil shape. Its energy absorption rate per weight is higher than that of the leaf spring and it allows to absorb little vibration properly resulted in keeping the ride comfort. Therefore, it's difficult to make a effect on vibration damping because there is not any friction between coils.

Shock Absorber

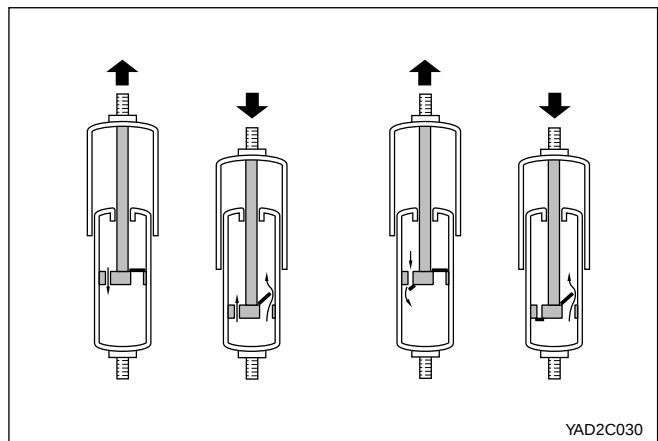
This vehicle is applied to the strut type and the telescopic double tube type. The shock absorber is connected to the piston rod in the strut. Positioned between the car body and the tire, acts with coil springs to insure a smooth ride ; dampens vibrations and improves driving stability and controllability by pressing the tires against the road surface.



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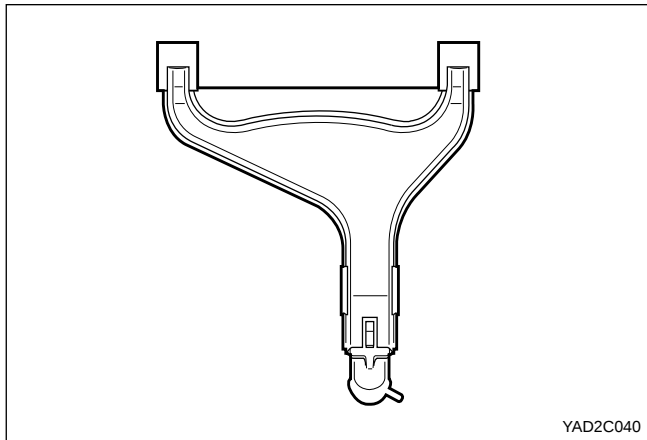
The telescopic shock absorber is consist of the tube with the piston and the rod, and the other cylinder tube. The piston section has the orifice and valve and the cylinder is filled fully with oil.

This double tube type enables to control the vibration properly because oil resistance forces are generated on compression and expansion of shock absorber. Thus, this double type is better than the mono tube type regarding the driving safety.



YAD2C030

Upper/Lower Arm Assembly



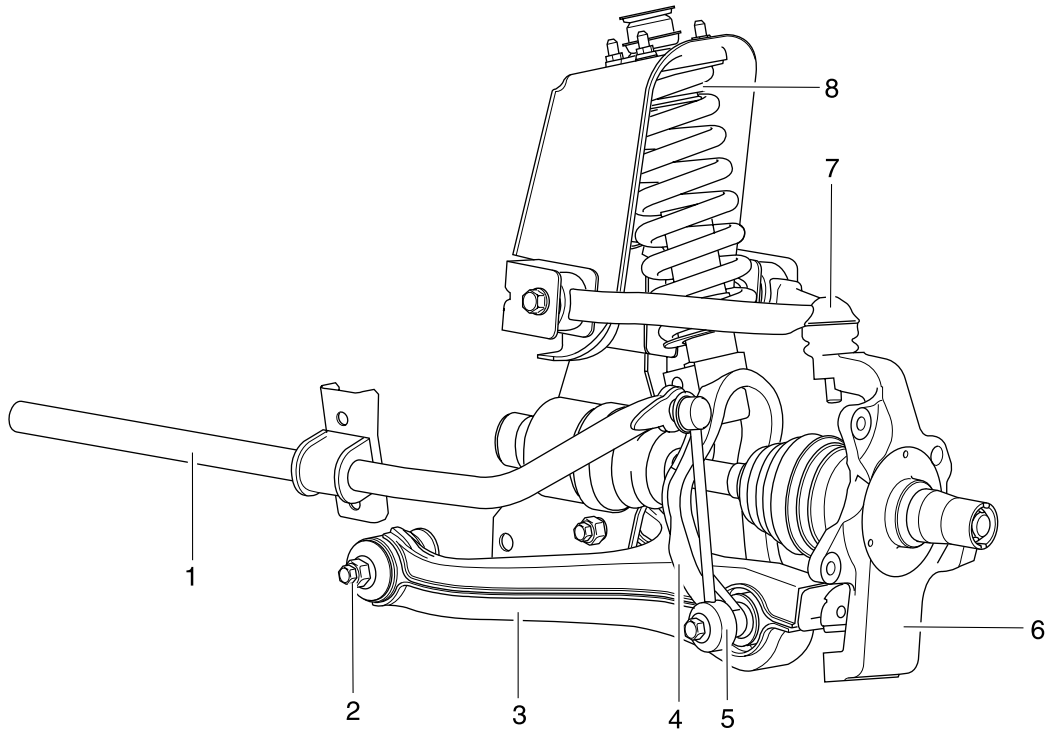
The lower arm assembly mounts the shock absorber with bushings in order to support the load delivered from the spring , the shock absorber and the bumper. The upper arm also supports the load delivering to the knuckle. This assembly enables to absorb the various shock and to ensure the driving safety.

SPECIFICATIONS

Application		Specification
Suspension System		Double Wishbone
Spring Type		Coil spring
Shock Absorber		Telescopic Double Tube Type(GAS)
Stabilizer		Torsion Bar Type
Wheel Alignment	Toe-In	2 ± 2 mm
	Camber	$0^{\circ} \pm 30'$ (Both side difference must be below $30'$)
	Caster	$2^{\circ} 45 \pm 30'$ (Both side difference must be below $30'$)

COMPONENT LOCATOR

FRONT SUSPENSION ASSEMBLY

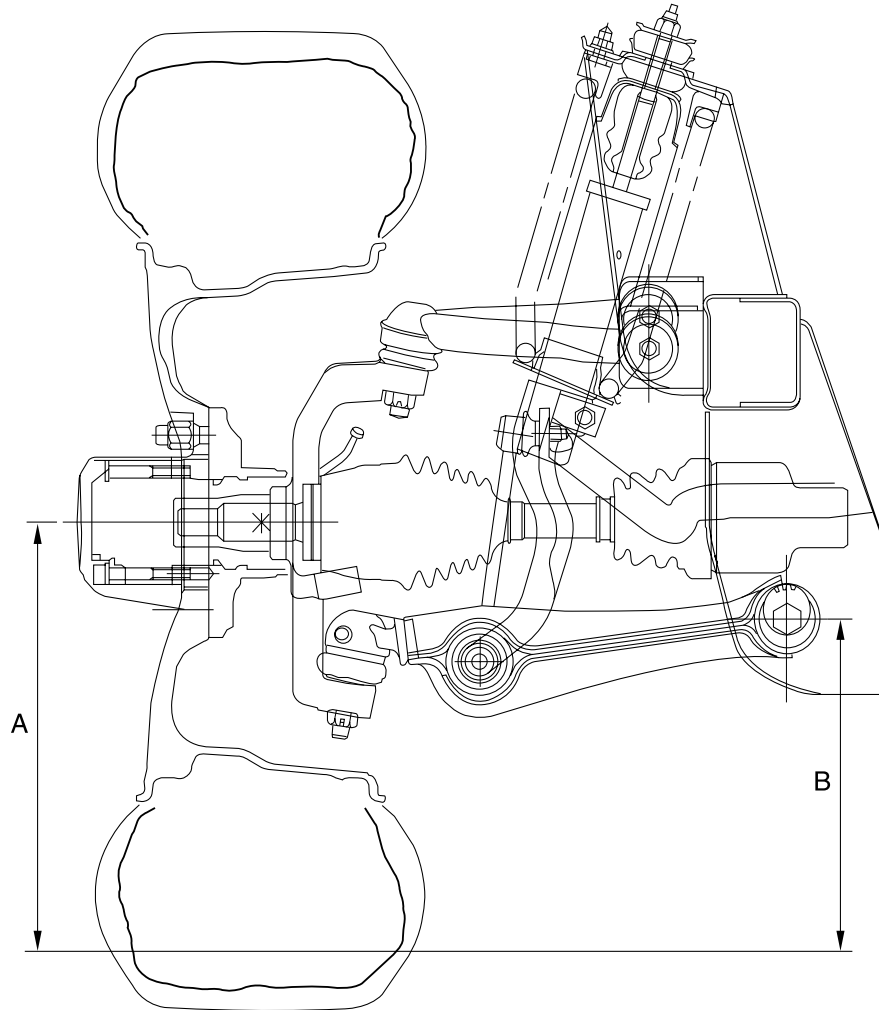


YAD2E050

- | | |
|------------------|--|
| 1 Stabilizer Bar | 5 Stabilizer Bar Link |
| 2 Cam bolt | 6 Knuckle |
| 3 Lower arm | 7 Upper arm |
| 4 Yoke | 8 Shock Absorber Assembly
(Including coil spring) |

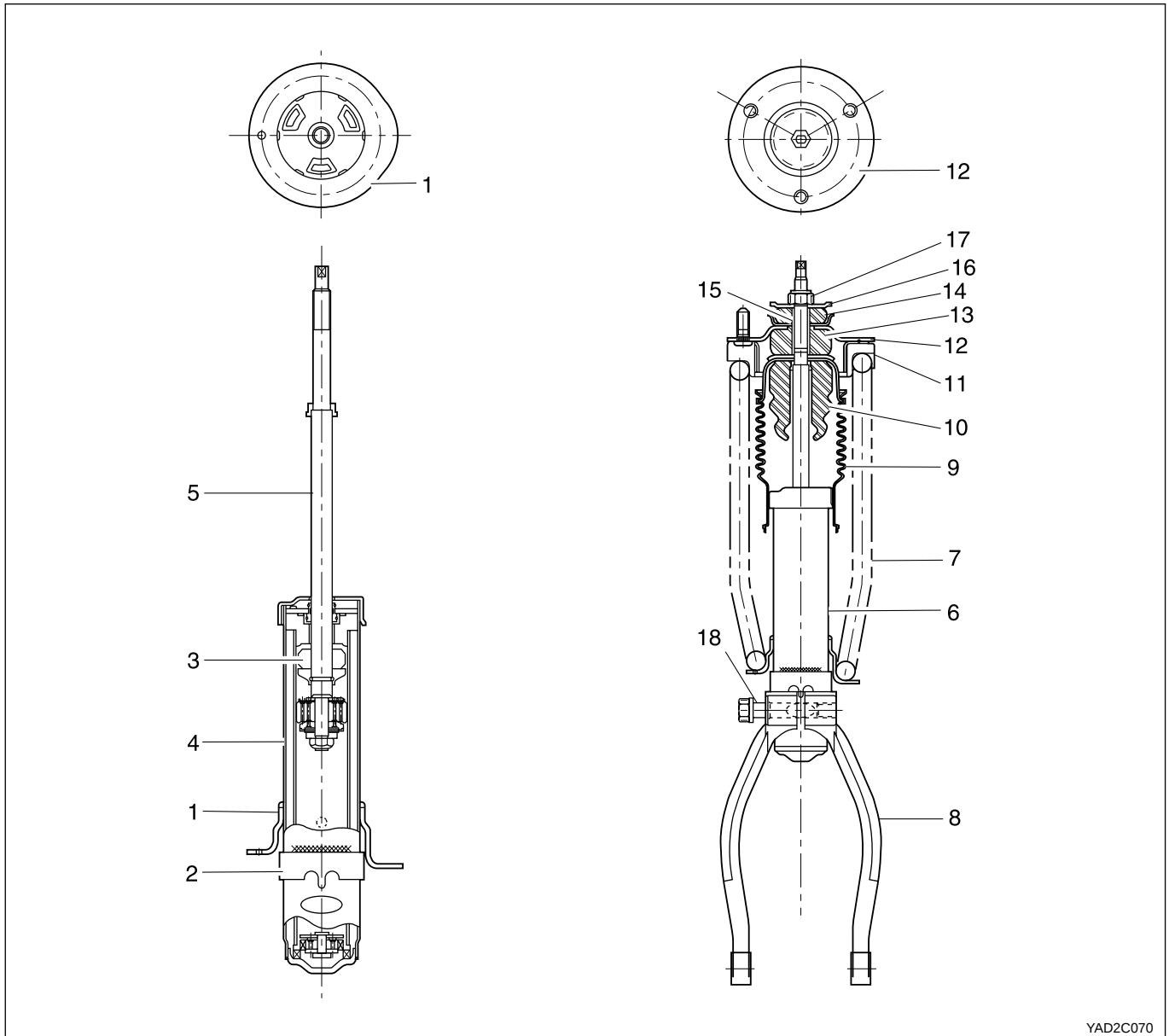
CROSS-SECTIONAL VIEW

SUSPENSION ASSEMBLY



YAD2C060

SHOCK ABSORBER



YAD2C070

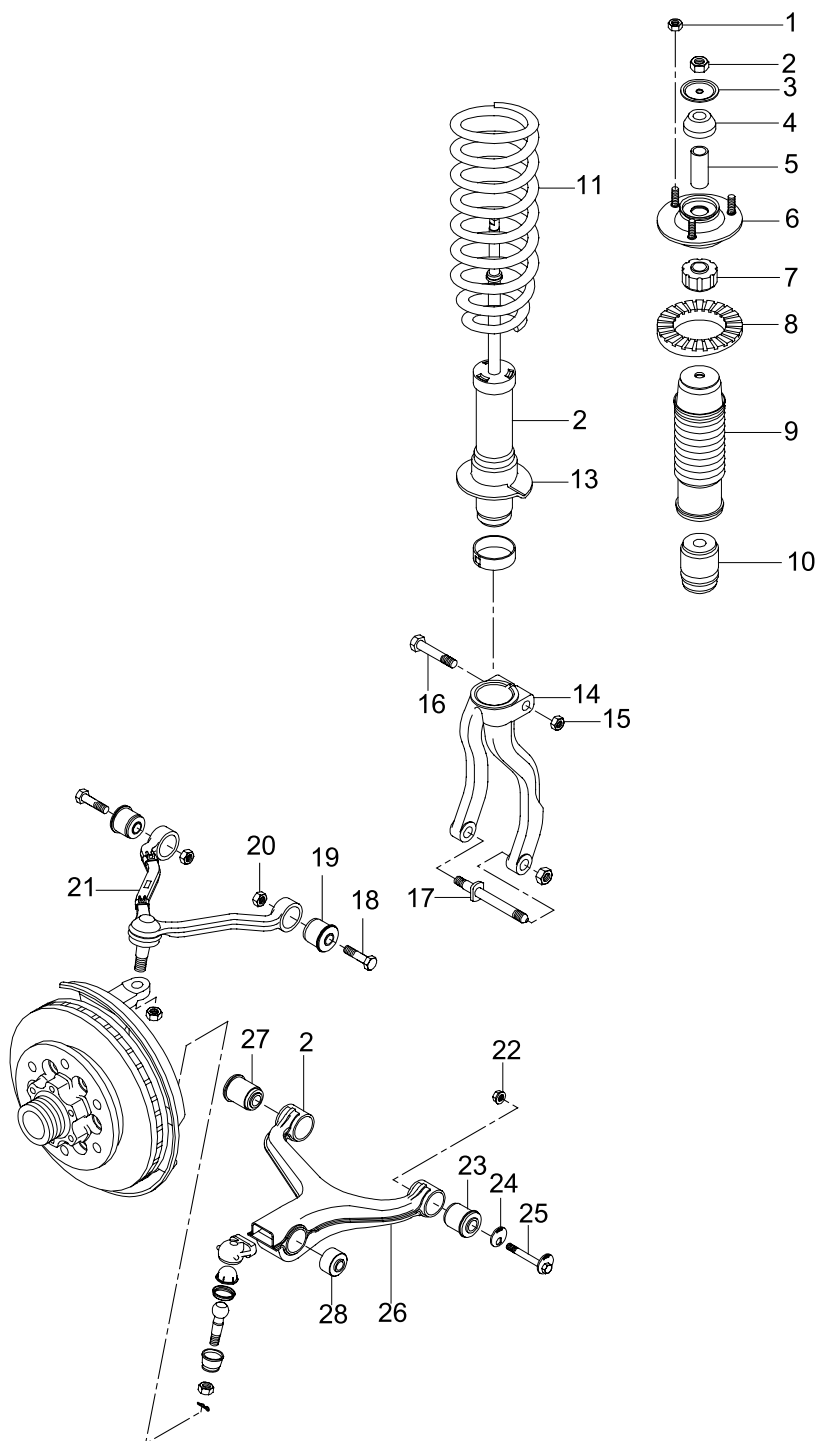
- | | |
|---------------------------|------------------------|
| 1 Lower Spring Sheet | 10 Bump Stopper |
| 2 Yoke Bracket | 11 Spring Sheet Rubber |
| 3 Rebound Stopper | 12 Upper Spring Sheet |
| 4 Cylinder | 13 Rubber |
| 5 Piston | 14 Rubber |
| 6 Shock-Absorber assembly | 15 Spacer |
| 7 Spring | 16 Washer |
| 8 Yoke | 17 Nut |
| 9 Boot | 18 Bolt |

DIAGNOSTIC INFORMATION AND PROCEDURES

Symptom	Possible Cause	Action
Vehicle Rolling	Broken Stabilizer Bar	Replace
	Faulty Shock Absorber	Replace
Abnormal Noises	Loosening Mountings	Re-Tighten
	Damaged or Worn Wheel Bearing	Replace
	Damaged Shock Absorber	Replace
	Damaged Tire	Replace
Poor Riding	Over Inflated Tire	Pressure Adjust
	Faulty Shock Absorber	Replace
	Loosened Wheel Nut	Tighten as specified torque
	Bent or Broken Coil Spring	Replace
	Damaged Tire	Replace
	Worn Bushing	Replace
Vehicle Pulls to Right or Left	Deformed Arm Assembly	Replace
	Worn Bushing	Replace
	Bent or Broken Coil Spring	Replace
Hard Steering	Incorrect Front Wheel Alignment	Repair
	Excessive Resistance of Lower Arm Ball Joint	Replace
	Insufficient Tire Pressure	Adjust
	Faulty Power Steering	Repair or Replace
Steering Instability	Incorrect Front Wheel Alignment	Repair
	Worn or Loosened Lower Arm Bushing	Re-Tighten or Replace
Vehicle Bottoming	Worn or Broken Coil Spring	Replace

REPAIR INSTRUCTIONS

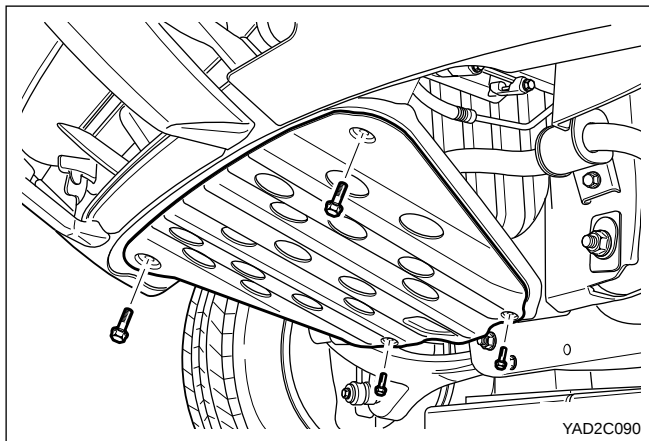
ON-VEHICLE SERVICE



YAD2C080

2C-10 FRONT SUSPENSION

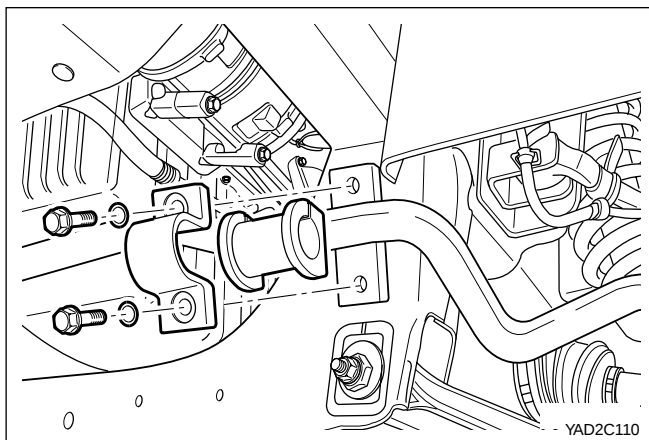
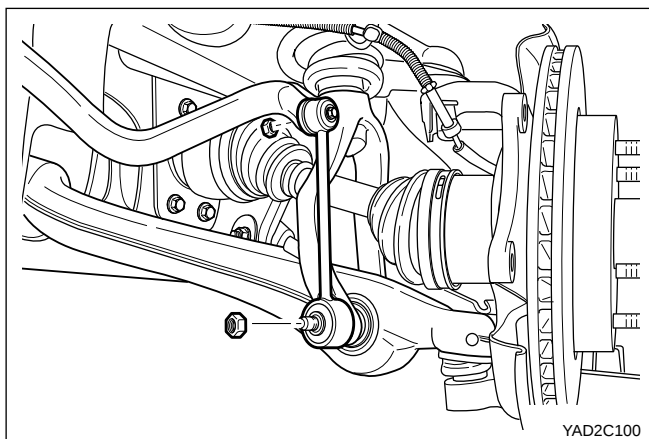
1 Nut	15 Nut
2 Nut	16 Bolt
3 Washer	17 Bolt
4 Rubber	18 Bolt
5 Bushing	19 Bushing
6 Upper Spring Sheet	20 Nut
7 Rubber	21 Upper Arm
8 Spring Sheet Rubber	22 Nut
9 Boot	23 Bushing
10 Boot	24 Washer
11 Spring	25 Bolt
12 Shock Absorber	26 Lower Arm
13 Lower Spring Sheet	27 Bushing
14 Yoke	28 Bushing



STABILIZER

Removal Procedure

1. Remove the skid plate at front bottom side.
2. Remove the upper mounting nut and the lower mounting nut from the front stabilizer bar link. Remove the front stabilizer bar link.
3. Remove the mounting cap bolt from the front stabilizer bar and remove the front stabilizer bar.

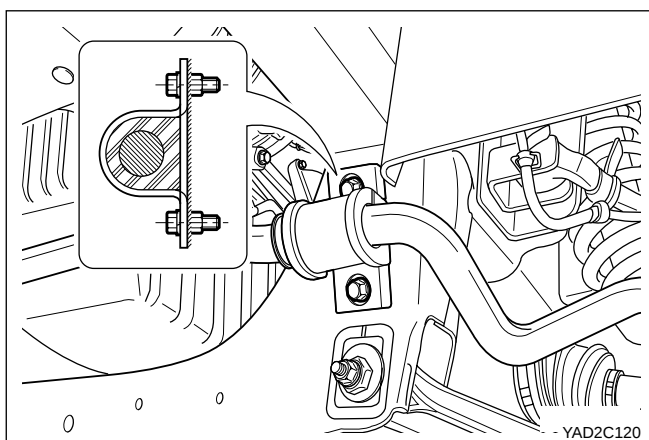


Installation Procedure

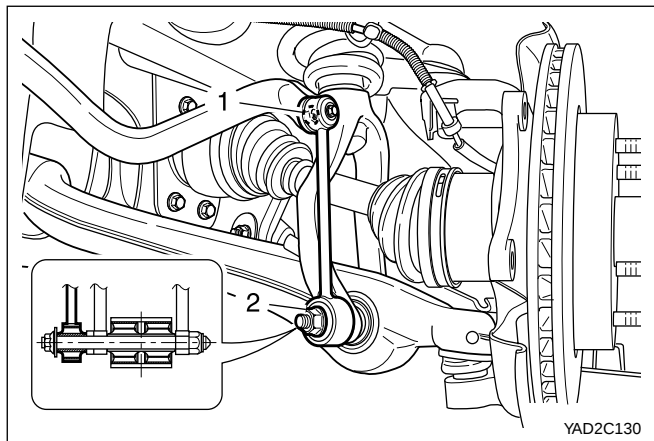
1. Install the front stabilizer bar to the frame and tighten manually the stabilizer bar mounting cap bolt. It allows the bar link to install to its original position.

Installation Notice

Tightening Torque	60 - 80 N•m (44 - 59 lb-ft)
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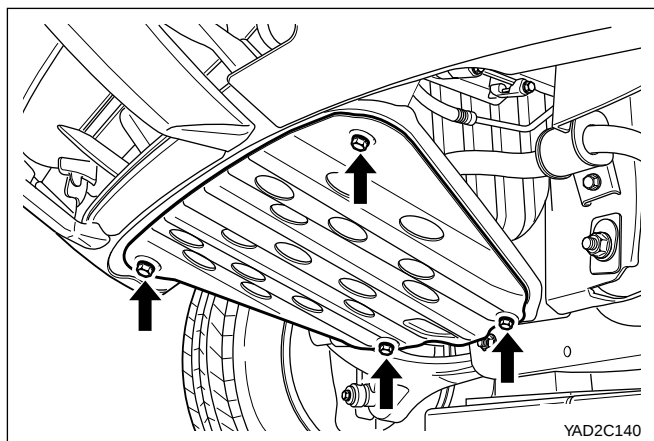
2C-12 FRONT SUSPENSION



2. Install the bra link between the stabilizer bar and the lower arm and tighten the mounting nut as the specified torque.

Installation Notice

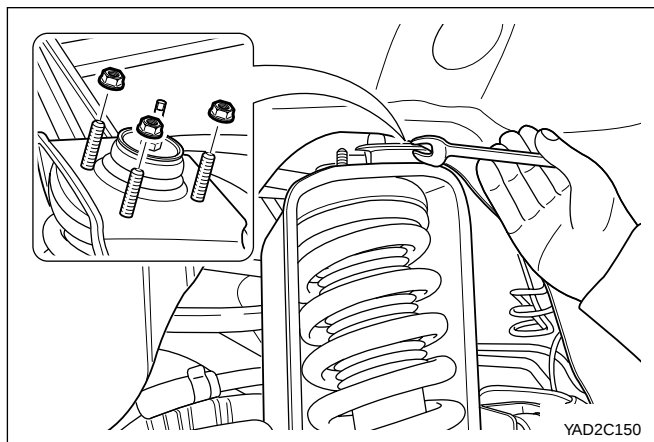
Tightening Torque	(1) 110 - 120 N•m
	(2) 110 - 130 N•m



3. Install the front stabilizer bar and the skid plate.

Installation Notice

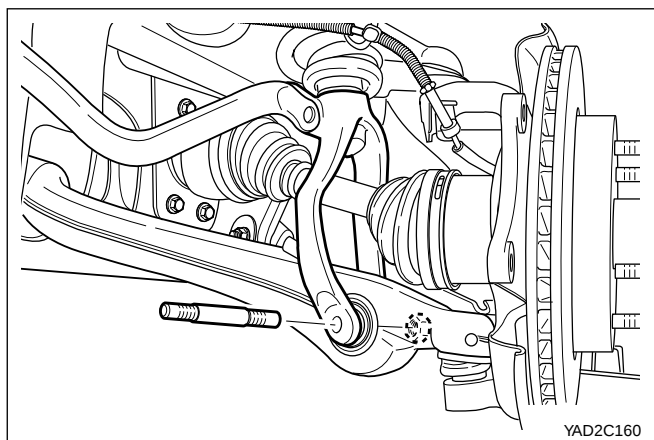
Tightening Torque	35 N•m (26 lb-ft)
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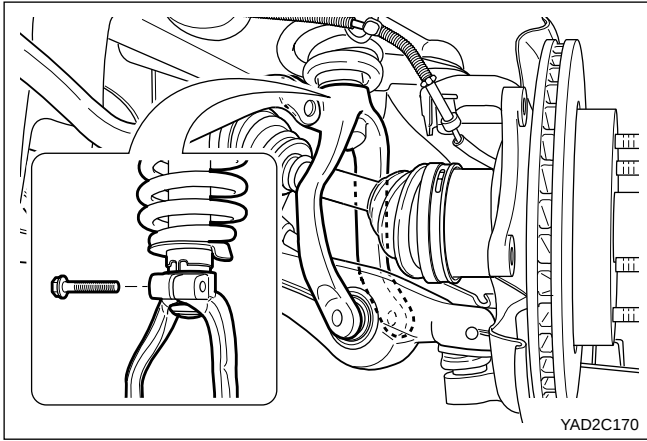


SHOCK ABSORBER ASSEMBLY

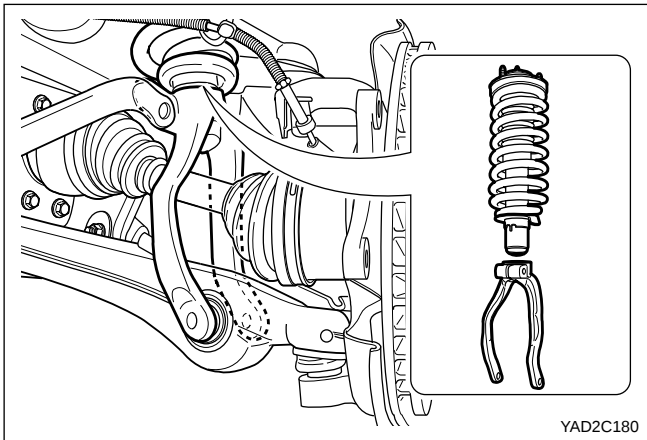
Removal Procedure

1. Remove three upper nuts from the shock absorber assembly.
2. Remove the yoke mounting pin nut at the lower arm and the yoke mounting pin.

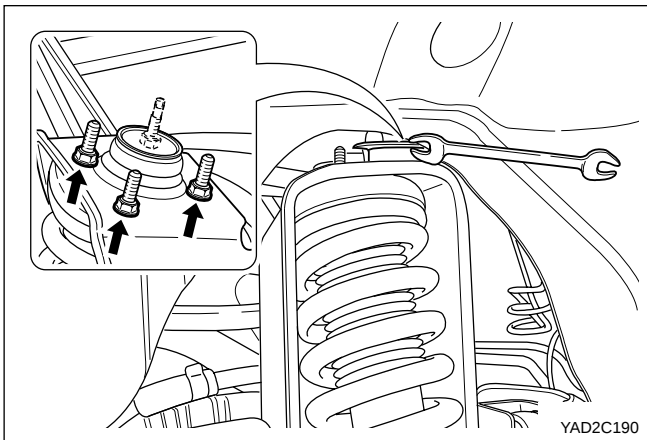




3. Remove the shock absorber and coil spring assembly. Separate the lower yoke mounting bolt and the yoke.
4. Remove the shock absorber yoke.



5. Separate the shock absorber assembly with pushing down the lower arm.

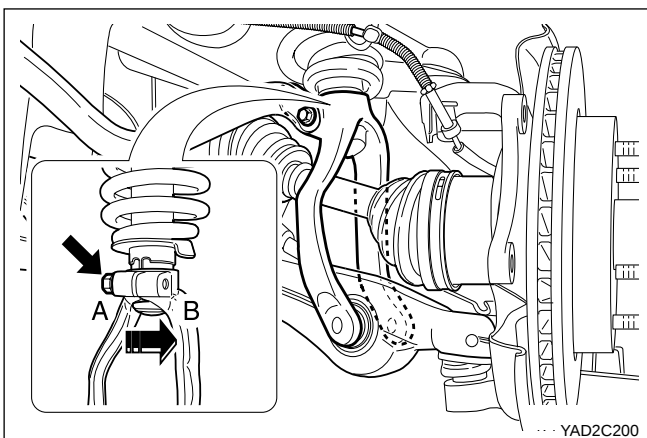


Installation Procedure

1. Install the coil spring(shock absorber) assembly and the yoke to the body. And then install the lower shock absorber into the yoke hole and insert the upper shock absorber to bolt hole by tightening the nut manually.

Installation Notice

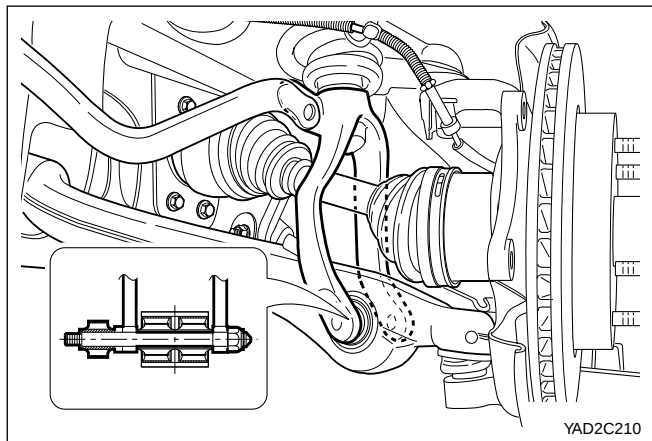
Tightening Torque	40 - 60 N•m (30 - 44 lb-ft)
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2. Tighten bolts of the shock absorber assembly and yoke. Be careful to tightening direction of the bolt as shown.(See the arrow).

Installation Notice

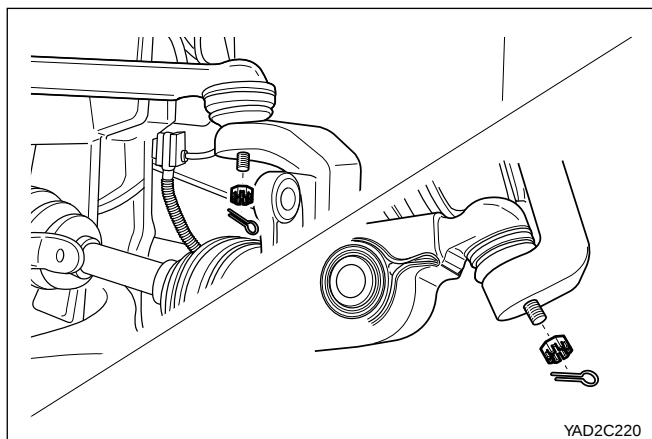
Tightening Torque	60 - 70 N•m (44 - 52 lb-ft)
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3. Fix the shock absorber yoke at the lower arm bolt hole and insert to tighten the yoke mounting pin to the hole.

Installation Notice

Tightening Torque	150 - 180 N•m
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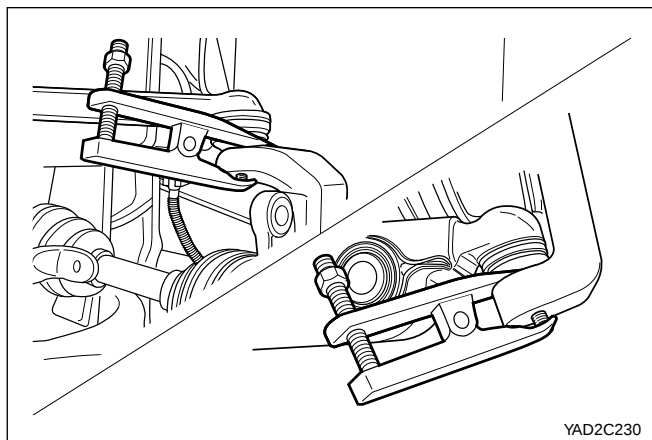


UPPER/LOWER ARM ASSEMBLY

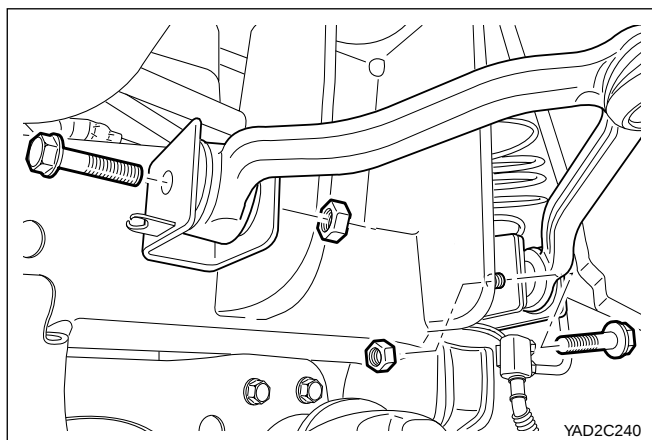
Removal Procedure

Notice: Perform the pre-work before the removal procedure.

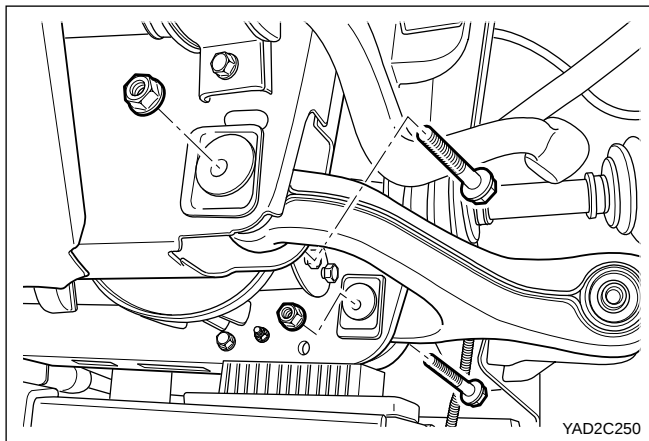
- Remove the shock absorber.
 - Remove the steering knuckle by referring the steering section.
1. Remove the mounting nut (slotted nut) and the split pin (cotter pin) from the upper/lower arm ball joint.



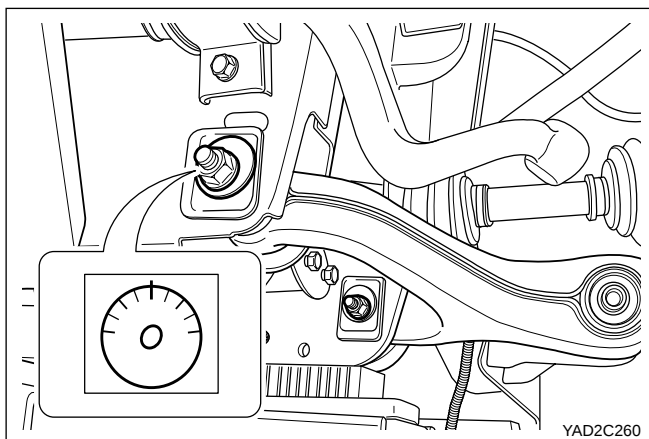
Notice: Separate the ball joint from the steering knuckle using the special tool as shown.



2. Remove mounting bolts and nuts of the upper arm/frame bracket (both front and rear) and separate the upper arm.



3. Remove mounting bolts and nuts of the lower arm (both front and rear) and separate the lower arm.



Installation Procedure

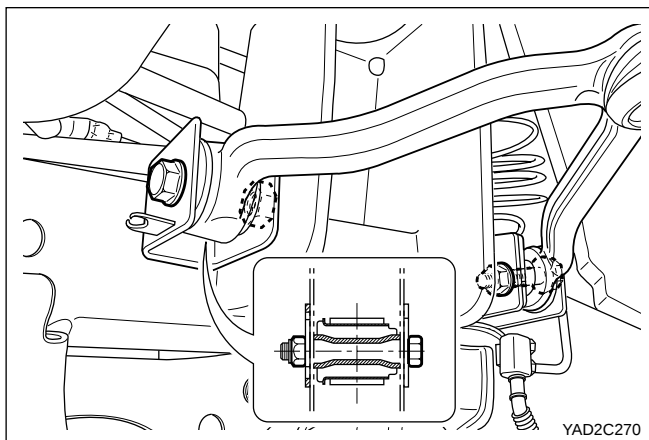
1. Install the lower arm to the frame bracket and tighten the mounting bolt and nut as the specified torque.

Notice :

- Tighten the bolt on the direction from rear side to front side of the vehicle.
- Fix the bolt center with the bracket indication.

Installation Notice

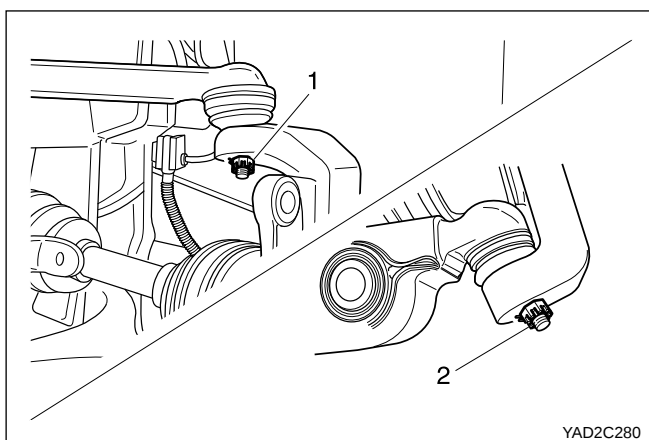
Tightening Torque	160 - 170 N•m
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2. Install the upper arm to the frame bracket.

Installation Notice

Tightening Torque	110 - 130 N•m
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3. Install the knuckle assembly to the shaft and insert the ball joint of the upper/lower arm. And then tighten the slotted nut and split pin.

Installation Notice

Slotted nut Tightening Torque	Upper side (1)	110 - 120 N•m
	Lower side (2)	110 - 130 N•m

UNIT REPAIR

FRONT COIL SPRING

Removal Procedure

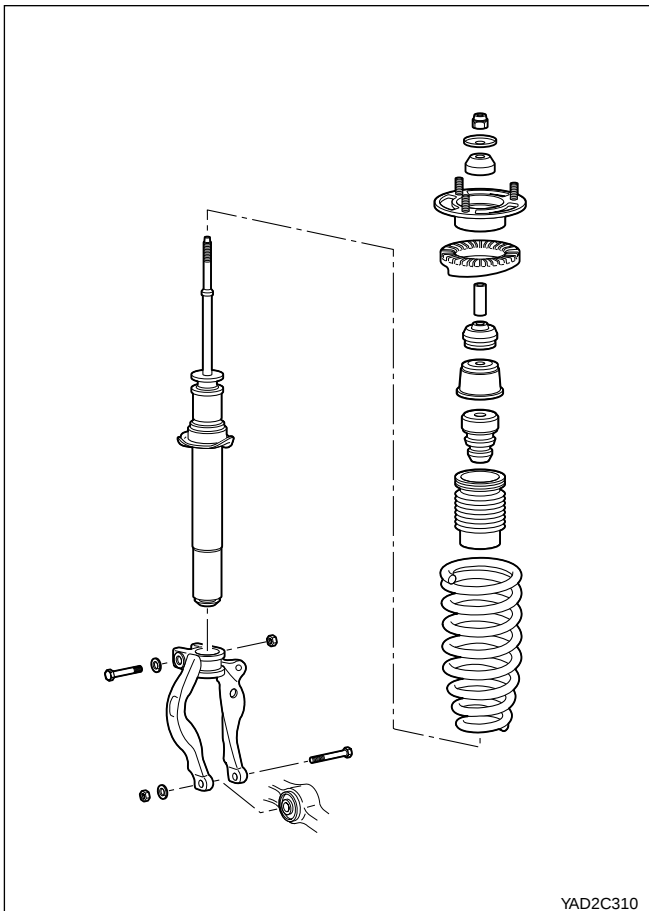
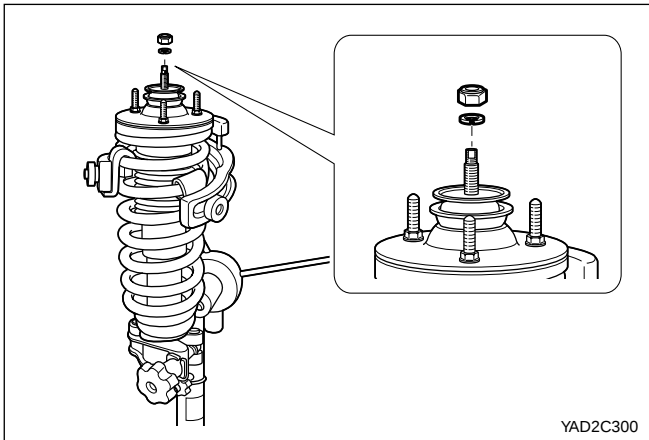
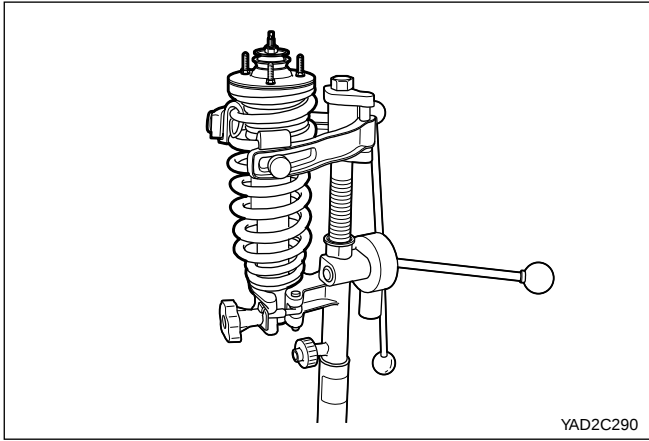
1. Remove the front coil spring assembly.
2. Fix the special tool to the coil spring assembly as shown and compress the coil spring.

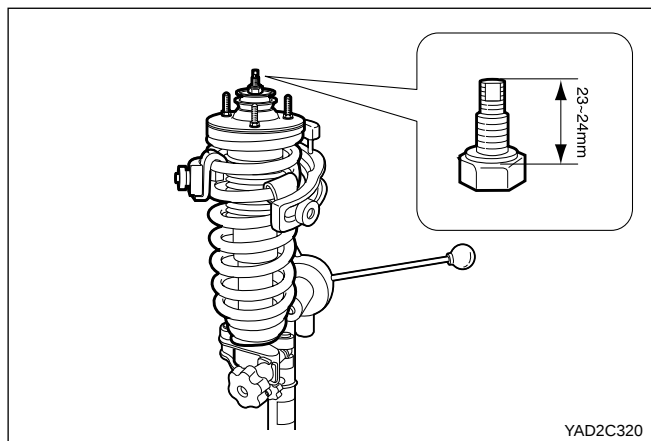
Notice: Install the special tool to the coil spring tightly not to separate it during work and be careful to spring end portion should look forward to the person during compressing the coil spring.

3. Remove the shock absorber mounting nut and remove the lock nut of the special tool in order to separate the shock absorber.

4. Remove the coil spring components in specified disassemble order.

Notice: Be careful to cause the spring elasticity to any personal injury when it is separated the special tool from the coil spring.





Installation Procedure

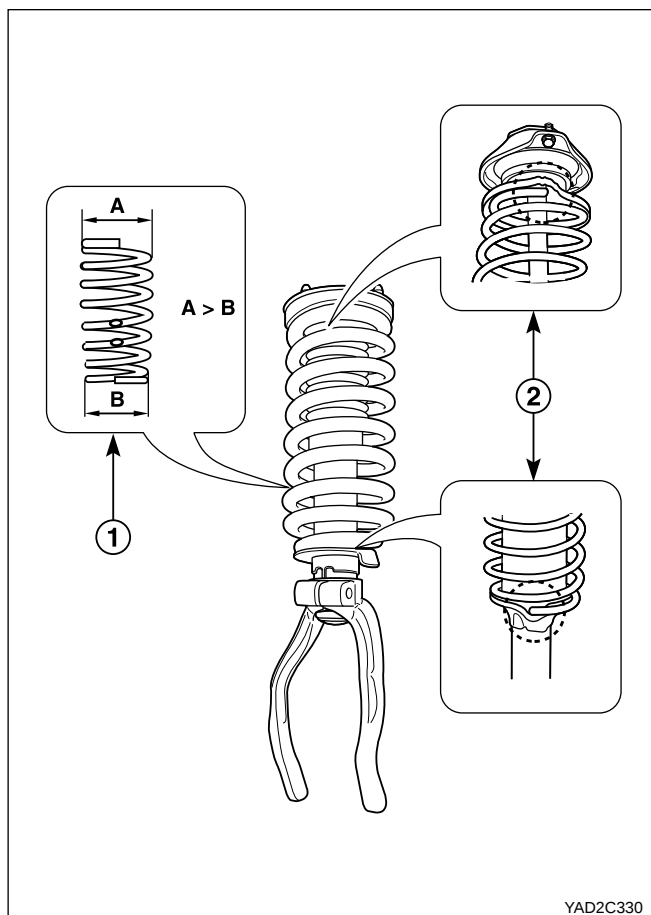
1. Compress the coil spring as the specified torque and install the related components. And then tighten the lock nut.

Installation Notice

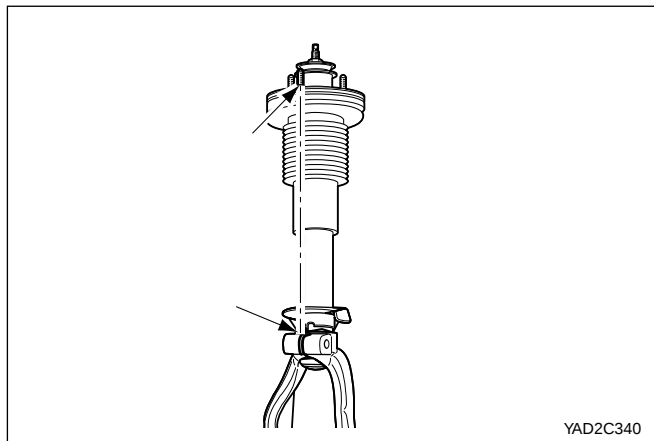
Length at compression	334 N•m
Tightening torque of lock nut	25 - 40 N•m (18 - 30 lb-ft)

Notice: Be careful to the installation direction for installing the coil spring.

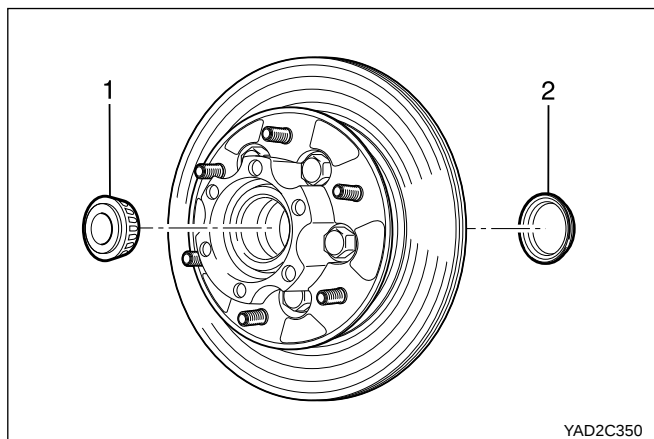
Note: When it's difficult to tighten the nut as specified torque, fix the length from upper lock nut to bolt end to 23 ~ 24 mm.



2. Check the coil spring installation.
 - Check the installation direction of the coil spring.
 - Verify that the coil spring is installed onto the spring sheet correctly.



Notice: One of the upper bracket bolts should coincide with the lower yoke insert projection as shown.



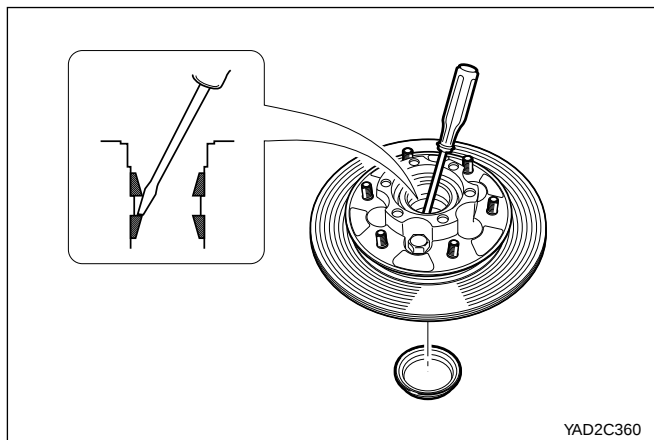
HUB AND BEARING

Disassembly/Assembly (Part time)

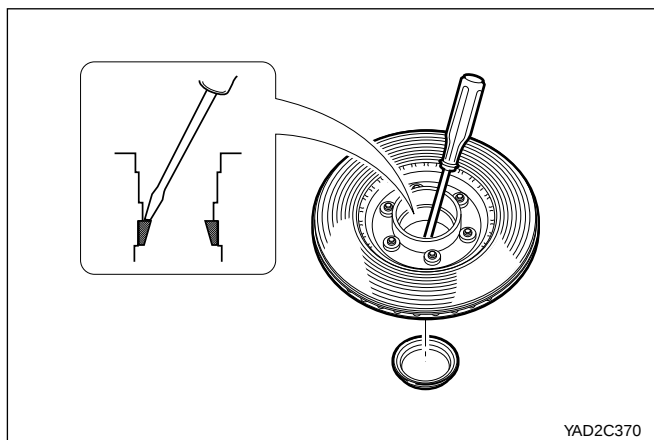
1. Remove the front hub and bearing assembly.
2. Remove the outer bearing (1) and inner seal.

Notice: Always use a new part as replacing inner seal.

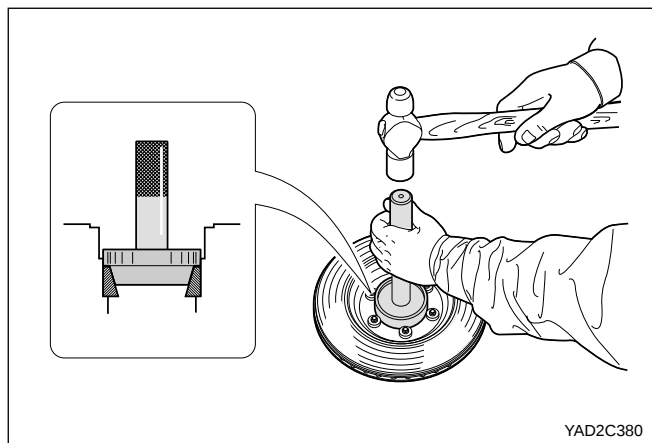
3. Remove the inner bearing (2).



4. Remove the inner bearing race.

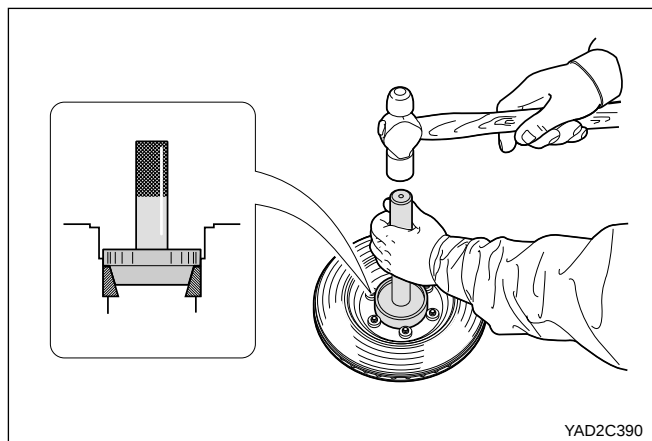


5. Remove the outer bearing race.



Notice:

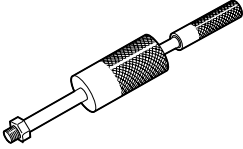
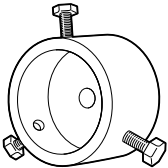
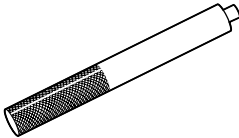
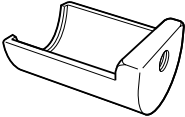
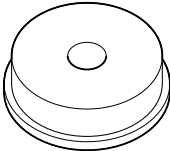
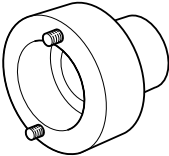
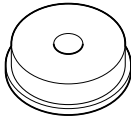
- Install the outer bearing race using the front outer bearing race installer and handle.



- Install the inner bearing race using the front inner bearing race installer and handle
6. Installation should follow the removal procedure in the reverse order

SPECIAL TOOLS AND EQUIPMENT

SPECIAL TOOLS TABLE

 YAD2C400	DW340 - 050 Sliding Hammer	 YAD2C440	661 589 13 33 00 Ball joint remover
 YAD2C410	DW 340 - 060 Front hub cap remover/ installer	 YAD2C450	DW 340 - 021 - 01 Handle
 YAD2C420	DW340 - 070 Front hub flange remover	 YAD2C460	DW 340 - 021 - 02 Front inner bearing race installer
 YAD2C430	661 589 01 07 00 Front hub adjust nut remover/installer	 YAD2C470	DW 340 - 021 - 03 Front outer bearing race installer