

SUSPENSION

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دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

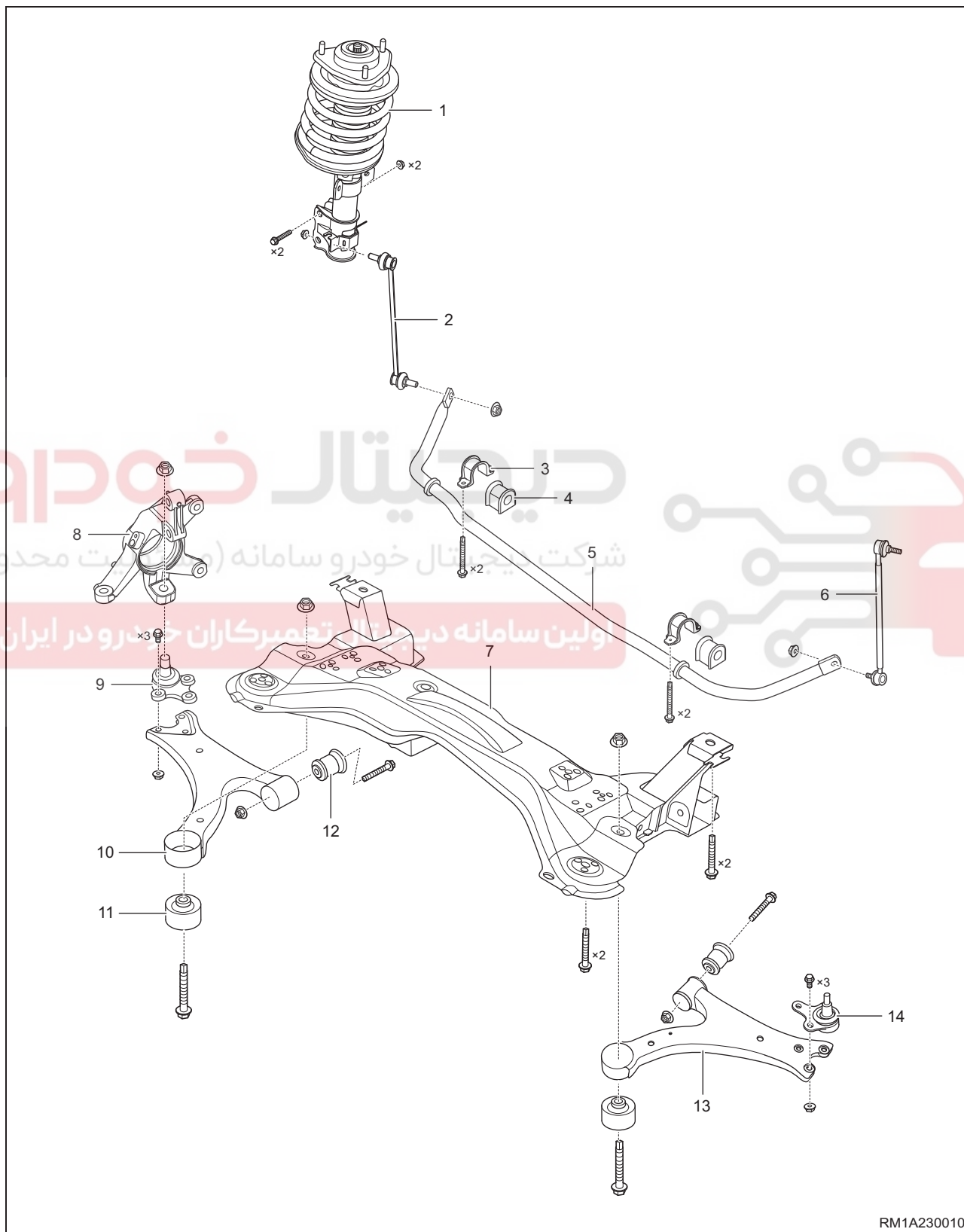
اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



GENERAL INFORMATION

Description

Front Suspension



RM1A230010

23 - SUSPENSION

1 - Front Shock Absorber Assembly	2 - Front Left Stabilizer Link Assembly
3 - Front Stabilizer Bar Clamp	4 - Front Stabilizer Bar Rubber Support
5 - Front Stabilizer Bar Assembly	6 - Front Right Stabilizer Link Assembly
7 - Front Sub Frame Welding Assembly	8 - Front Steering Knuckle
9 - Front Left Control Arm Ball Pin Assembly	10 - Front Left Control Arm Assembly
11 - Rubber Bushing	12 - Rubber Bushing
13 - Front Right Control Arm Assembly	14 - Front Right Control Arm Ball Pin Assembly

Front suspension of this model uses Macpherson independent suspension (height is non-adjustable), which is equipped with cylindrical coil spring, double action telescopic shock absorber and lateral stabilizer. Front suspension has driving and steering functions. Upper end of suspension connects with body, and lower end with front steering knuckle. Sub frame is fitted with body by bolts, thus improving driving stability and safety.

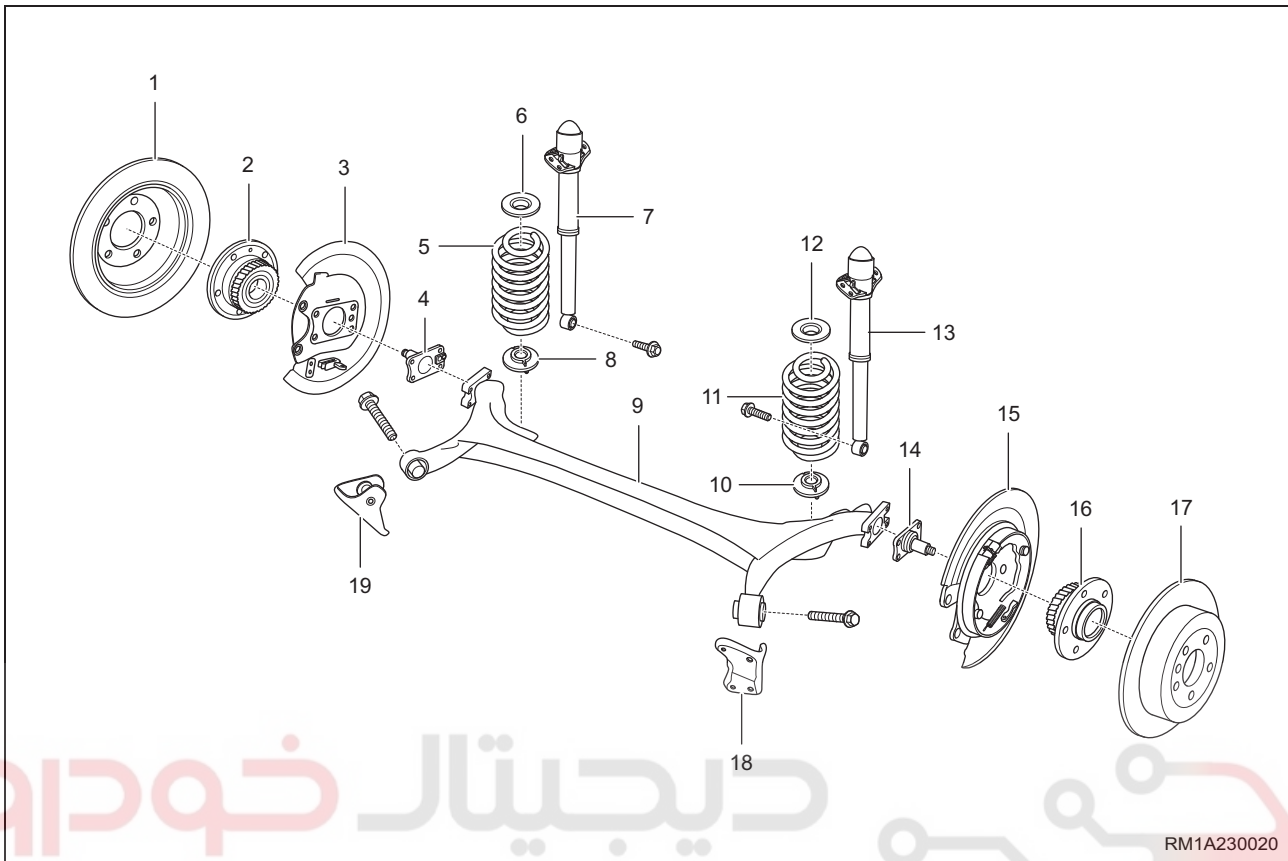
دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

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Rear Suspension



1 - Rear Right Brake Drum	2 - Rear Right Hub Assembly
3 - Rear Right Brake Assembly	4 - Rear Right Hub Shaft
5 - Rear Right Coil Spring	6 - Rear Right Coil Spring Upper Cushion
7 - Rear Right Shock Absorber Assembly	8 - Rear Right Coil Spring Lower Cushion
9 - Rear Shaft Assembly	10 - Rear Left Coil Spring Lower Cushion
11 - Rear Left Coil Spring	12 - Rear Left Coil Spring Upper Cushion
13 - Rear Left Shock Absorber Assembly	14 - Rear Left Hub Shaft
15 - Rear Left Brake Assembly	16 - Rear Left Hub Assembly
17 - Rear Left Brake Drum	18 - Rear Left Support Assembly
19 - Rear Right Support Assembly	

Rear suspension of this model uses torsion beam semi-independent suspension (height is non-adjustable), which is equipped with cylindrical coil spring and double action telescopic shock absorber, and lateral stabilizer is not included. Upper end of suspension connects with body, and lower end with rear shaft assembly, thus improving driving stability and safety.

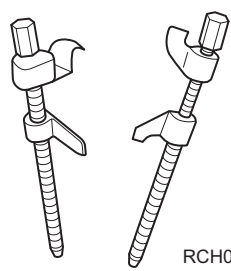
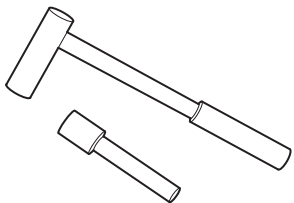
Specifications

Torque Specifications

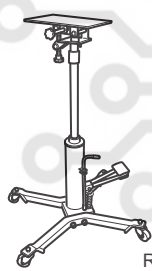
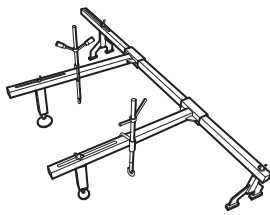
Description	Torque (N·m)
Coupling Nut Between Front Stabilizer Link Assembly and Front Shock Absorber Assembly	60 ± 6
Coupling Bolt Between Front Shock Absorber Assembly and Front Steering Knuckle Assembly	180 ± 18
Coupling Nut Between Front Shock Absorber Assembly and Front Steering Knuckle Assembly	180 ± 18
Coupling Nut Between Front Shock Absorber Assembly and Body	55 ± 5
Coupling Nut Between Front Control Arm Assembly Ball Pin and Front Steering Knuckle Assembly	100 ± 10
Coupling Bolt Between Front Part of Front Control Arm Assembly and Front Sub Frame Welding Assembly	110 ± 11
Coupling Nut Between Front Part of Front Control Arm Assembly and Front Sub Frame Welding Assembly	110 ± 11
Coupling Bolt Between Rear Part of Front Control Arm Assembly and Front Sub Frame Welding Assembly	110 ± 11
Coupling Nut Between Rear Part of Front Control Arm Assembly and Front Sub Frame Welding Assembly	110 ± 11
Coupling Nut Between Front Control Arm Ball Pin Assembly and Front Control Arm Assembly	70 ± 7
Coupling Bolt Between Front Control Arm Ball Pin Assembly and Front Control Arm Assembly	70 ± 7
Coupling Nut Between Front Stabilizer Bar Assembly and Front Stabilizer Link Assembly	60 ± 6
Coupling Bolt Between Front Sub Frame Welding Assembly and Steering Gear Assembly	120 ± 10
Coupling Bolt Between Upper Part of Front Sub Frame Welding Assembly and Body	180 ± 18
Coupling Bolt Between Rear Part of Front Sub Frame Welding Assembly and Body	180 ± 18
Coupling Bolt Between Rear Shock Absorber Assembly and Body	60 ± 6
Coupling Bolt Between Rear Shock Absorber Assembly and Rear Shaft Assembly	160 ± 16
Coupling Bolt Between Rear Shaft Assembly and Rear Support Assembly	135 ± 13
Steering Tie Rod Locking Nut	50 - 60
Steering Wheel Locking Nut	30 ± 3

Tools

Special Tools

Spring Compressor	 RCH0000021
Shock Absorber Nut Remover	 RCH0000022

General Tools

Transmission Carrier	 RCH0000005
Engine Equalizer	 RCH0000026

DIAGNOSIS & TESTING

Problem Symptoms Table

HINT:

Use symptoms table below to help determine cause of problem. Check each suspected area in sequence. Repair or adjust faulty components, or replace as necessary.

Front Suspension

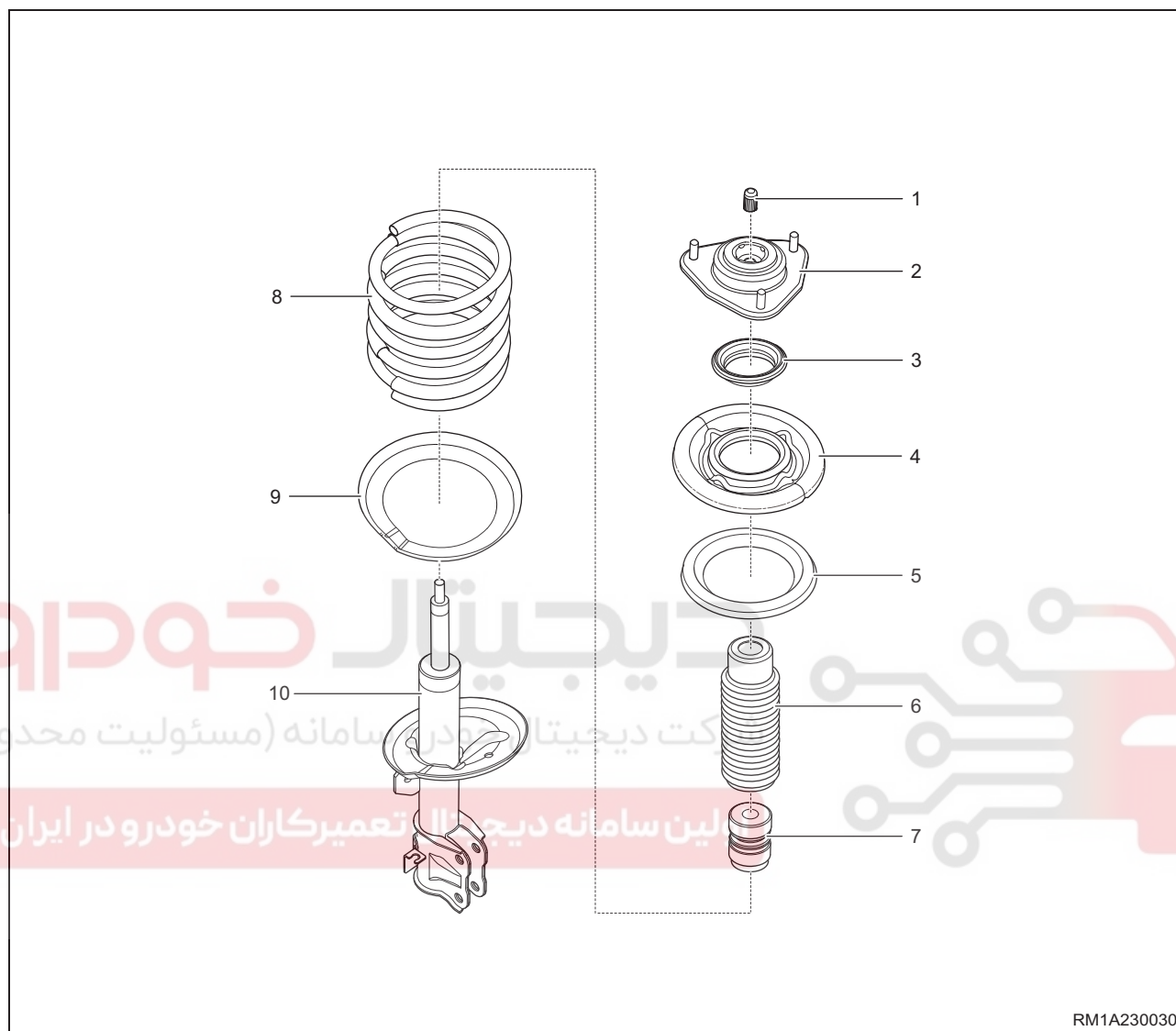
Symptom	Suspected Area	See page
Vehicle pulls	Front tire (worn or improperly inflated)	24-7
	Front wheel alignment (incorrect)	23-33
	Control arm ball pin assembly (loose)	23-20
	Steering tie rod (loose or worn)	29-19
	Front hub bearing (excessively worn)	22-14
	Front suspension components (excessively worn or deformed)	23-10
Droop	Vehicle (overloaded)	-
	Front coil spring (too soft)	23-13
	Front shock absorber assembly (worn or damaged)	23-10
	Front suspension components (excessively worn or deformed)	23-10
Sways/pitches	Front tire (worn or improperly inflated)	24-7
	Front stabilizer bar assembly (bent or broken)	23-22
	Front shock absorber assembly (worn or damaged)	23-10
Wheel shimmy	Front tire (worn or improperly inflated)	24-7
	Front wheel (out of balance)	24-10
	Front shock absorber assembly (worn or damaged)	23-10
	Front wheel alignment (incorrect)	23-33
	Control arm ball pin assembly (loose)	23-20
	Front hub bearing (excessively worn)	22-14
	Steering gear (misaligned or damaged)	29-21
Abnormal tire wear	Front tire (improperly inflated)	24-7
	Front wheel alignment (incorrect)	23-33
	Front shock absorber assembly (worn or deformed)	23-10
	Front suspension components (worn or deformed)	23-10

Rear Suspension

Symptom	Suspected Area	See page
Vehicle pulls	Rear tire (worn or improperly inflated)	24-7
	Rear wheel alignment (incorrect)	23-33
	Rear hub bearing (excessively worn)	22-20
	Rear suspension components (worn or deformed)	23-27
Droop	Vehicle (overloaded)	-
	Rear coil spring (too soft)	23-31
	Rear shock absorber assembly (worn or damaged)	23-27
	Rear suspension components (excessively worn or deformed)	23-27
Sways/pitches	Rear tire (worn or improperly inflated)	24-7
	Rear shock absorber assembly (worn or deformed)	23-27
Wheel shimmy	Rear tire (worn or improperly inflated)	24-7
	Rear wheel (out of balance)	24-10
	Rear shock absorber assembly (worn or damaged)	23-27
	Rear wheel alignment (incorrect)	23-33
	Rear hub bearing (worn)	22-20
Abnormal tire wear	Rear tire (improperly inflated)	24-7
	Rear wheel alignment (incorrect)	23-33
	Rear shock absorber assembly (worn or deformed)	23-27
	Rear suspension components (worn or deformed)	23-27

ON-VEHICLE SERVICE

Front Shock Absorber Assembly



RM1A230030

1 - Front Shock Absorber Cover Cap

2 - Front Strut Upper Connecting Plate Assembly
(w/ Insulator)

3 - Bearing Assembly

4 - Front Spring Upper Tray

5 - Front Spring Upper Cushion

6 - Front Dust Boot

7 - Front Buffer Block

8 - Front Coil Spring

9 - Front Spring Lower Cushion

10 - Front Strut Assembly

On-vehicle Inspection

1. Check the front shock absorber assembly.
 - a. Park vehicle on level ground, and bounce vehicle up and down, then check if vehicle shakes up and down when body bounds. If vehicle shakes up and down consecutively, shock absorber assembly may be damaged and should be replaced.
2. Check front shock absorber assembly for leakage.
 - a. As shock absorber assembly operates frequently while driving vehicle, shock absorber fluid temperature rises and oil gas is formed and adheres to dust boot. This is a normal phenomenon, and it is not necessary to replace shock absorber assembly.
 - b. Shock absorber is designed with a thin layer of oil film on surface of piston rod. While shock absorber is being compressed, oil film will be scraped off by dust plate on shock absorber oil seal and a small amount of oil will deposit on upper part of oil seal. Due to high oil permeability, oil deposited on upper part of oil seal spreads slowly from upper part of shock absorber to lower part of shock absorber, thus forming a thin coat of oil film.

When any of following conditions occur:

- Oil film is between dust boot and spring seat;
- Oil traces in circumferential direction are even.

For above conditions, oil traces are formed through volatilization, so we can judge it as minor leaks. This is a normal phenomenon, and it is not necessary to replace shock absorber assembly.

- c. If following conditions occur:
 - Oil traces in circumferential direction are uneven;
 - Oil traces reach lower connecting positions.

Above conditions indicate that there may be leakage in shock absorber assembly, and it is necessary to replace shock absorber assembly.

- d. If it is difficult to accurately judge shock absorber assembly for leakage from appearance, perform road test after wiping off oil on surface of malfunctioning shock absorber. Under normal road conditions, drive vehicle for 5 to 10 minutes and perform inspection. If there are oil traces on shock absorber assembly surface, it indicates that oil leakage exists, and it is necessary to replace shock absorber assembly.

Removal

⚠ WARNING

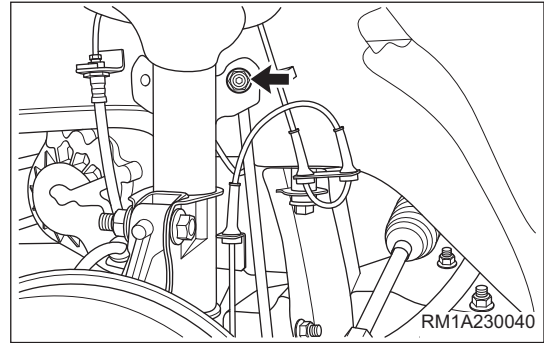
- Be sure to wear necessary safety equipment to prevent accidents.
- Make sure that safety lock of lift has been locked, when removing and installing chassis parts.
- It is not permitted to weld or modify suspension bearing parts and guide parts.
- When removing and installing chassis parts, replace self-locking nuts and rusted nuts for safety.
- Operate carefully when removing and installing coil spring, to prevent spring from jumping out and causing personal injury.

HINT:

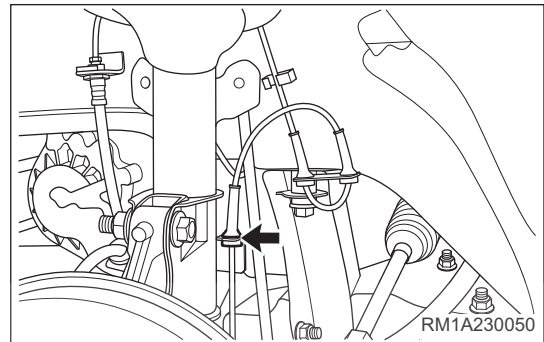
- Use same procedures for right and left sides.
 - Procedures listed below are for left side.
1. Remove the front left wheel ([See page 24-9](#)).

23 - SUSPENSION

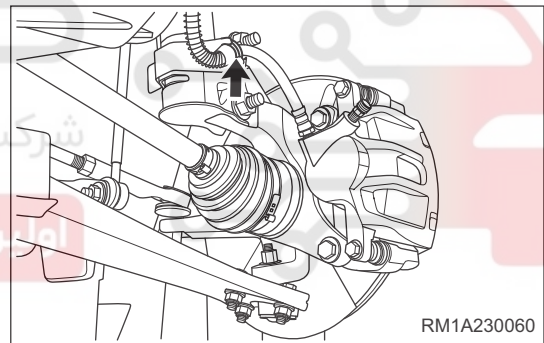
2. Remove the front left shock absorber assembly.
 - a. Remove coupling nut (arrow) between front left stabilizer link assembly and front left shock absorber assembly.
(Tightening torque: $60 \pm 6 \text{ N}\cdot\text{m}$)



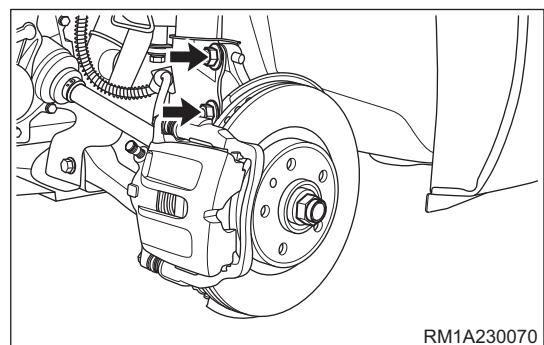
- b. Disengage front left wheel speed sensor wire harness (arrow) from front left shock absorber assembly.



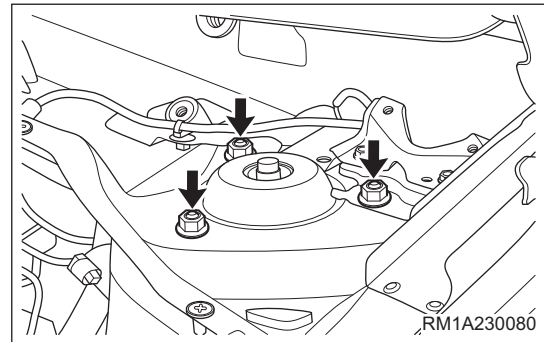
- c. Disengage front left brake hose assembly (arrow) from front left shock absorber assembly.



- d. Remove 2 coupling bolts and nuts (arrow) between front left shock absorber assembly and front left steering knuckle assembly.
(Tightening torque: $180 \pm 18 \text{ N}\cdot\text{m}$)



- e. Remove 3 coupling nuts (arrow) between front left shock absorber assembly and body.
(Tightening torque: 55 ± 5 N·m)

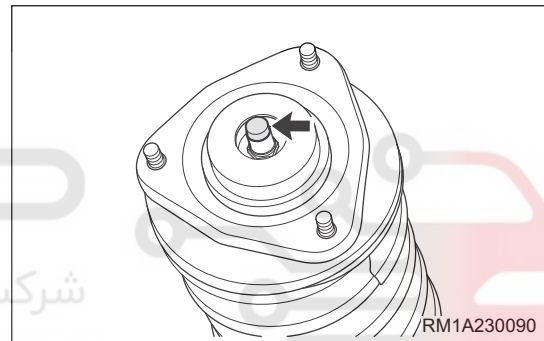


- f. Remove the front left shock absorber assembly with front coil spring.

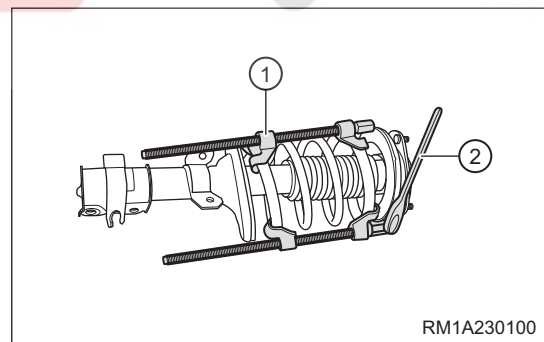
Disassembly

HINT:

- Use same procedures for right and left sides.
 - Procedures listed below are for left side.
1. Remove the front shock absorber cover cap.
 - a. Remove front shock absorber cover cap (arrow) from front left shock absorber assembly.



2. Remove the front shock absorber assembly locking nut.
 - a. Using spring compressor (1) and wrench (2), tighten spring compressor end lever to compress front coil spring.

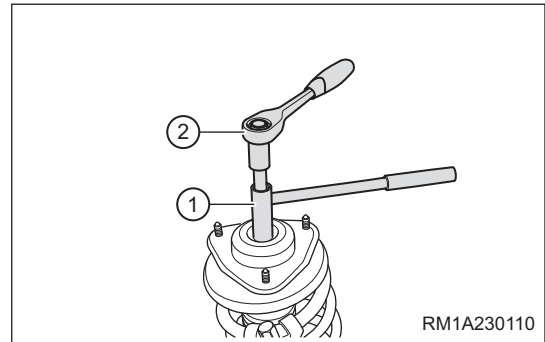


⚠ WARNING

- When removing front coil spring, compress spring until locking nut can be rotated. DO NOT compress spring more than necessary, avoid damaging spring and personal injury.

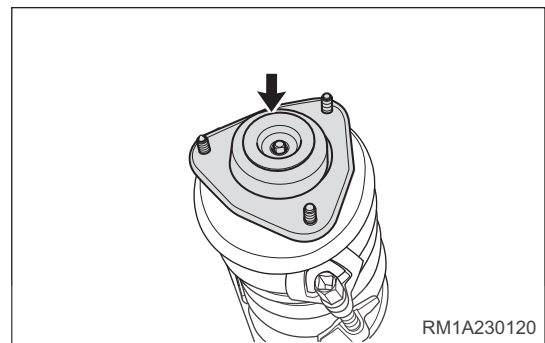
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- b. Hold end of front left shock absorber assembly lever with a shock absorber nut remover (1), and then remove front left shock absorber assembly locking nut with a wrench (2).



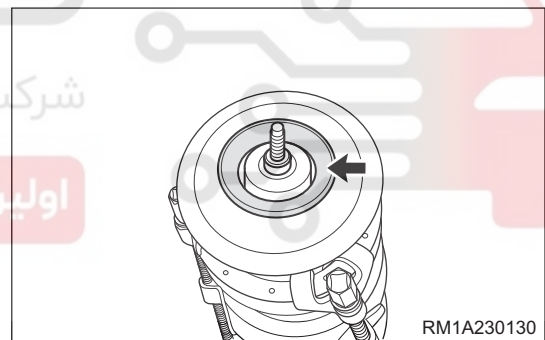
3. Remove the front strut upper connecting plate assembly (w/ insulator).

- a. Remove front strut upper connecting plate assembly (w/ insulator) (arrow) from upper part of front left shock absorber assembly.



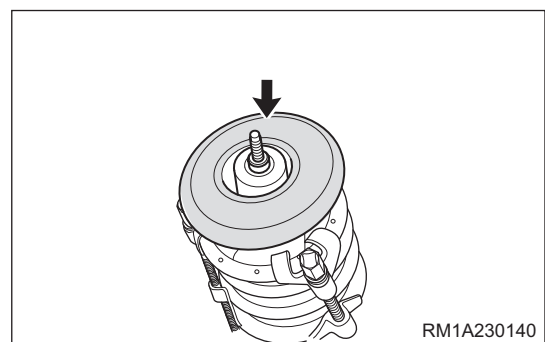
4. Remove the bearing assembly.

- a. Remove bearing assembly (arrow) from upper part of front left shock absorber assembly.



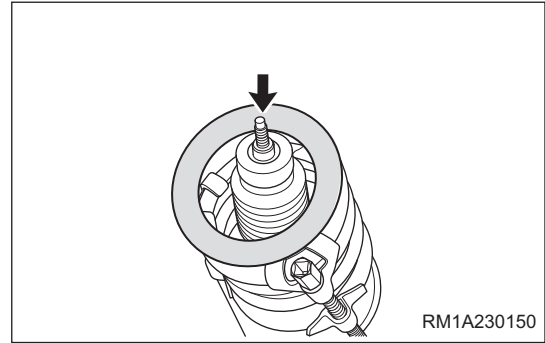
5. Remove the front spring upper tray.

- a. Remove front spring upper tray (arrow) from upper part of front left shock absorber assembly.



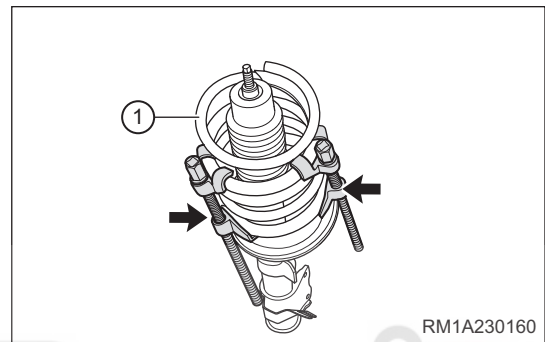
6. Remove the front spring upper cushion.

- a. Remove front spring upper cushion (arrow) from upper part of front left shock absorber assembly.



7. Remove the front coil spring.

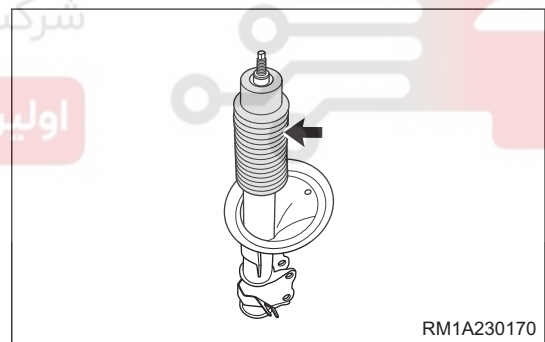
- a. Remove front coil spring (1) with spring compressor (arrow) from front left shock absorber assembly.



- b. Slowly loosen spring compressor, and carefully remove front coil spring.

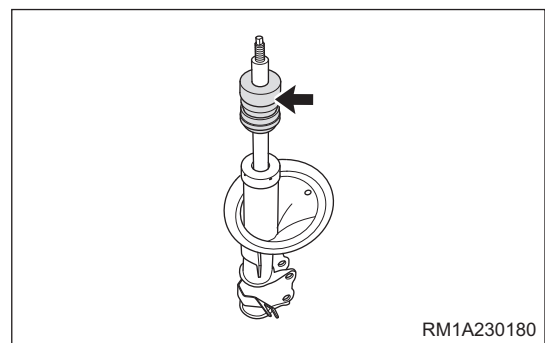
8. Remove the front dust boot.

- a. Remove front dust boot (arrow) from upper part of front left shock absorber assembly.



9. Remove the front buffer block.

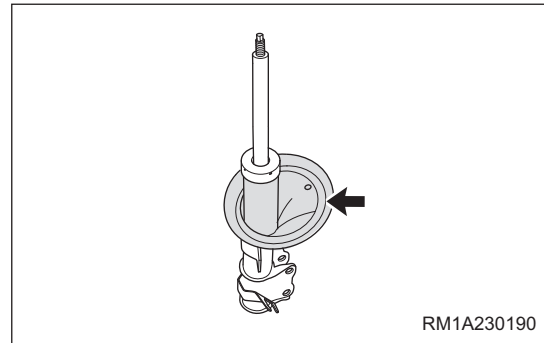
- a. Detach front buffer block (arrow) from front left shock absorber assembly, and remove it.



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10. Remove the front spring lower cushion.

- a. Remove front spring lower cushion (arrow) from lower end of front left shock absorber assembly strut.

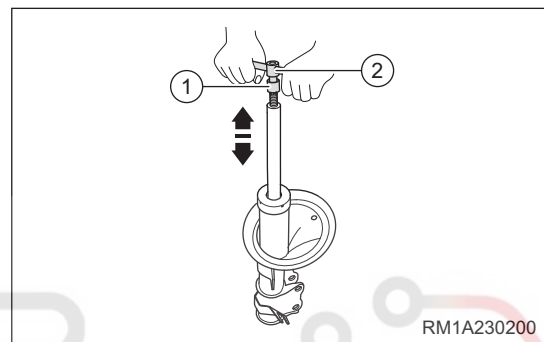


Inspection

1. Check the front shock absorber assembly.

Manual check:

- a. Install locking nut (1) to upper end of front shock absorber assembly strut, and then install T-wrench (2) or equivalent.
- b. Compress and extend front shock absorber assembly strut several times by hands in direction of arrow as shown in illustration. Check that there is no abnormal resistance or unusual sound during operation. If there is any abnormality, replace front shock absorber assembly with a new one.



2. Check other components of front shock absorber assembly.

- a. Check front shock absorber cover cap, front spring upper cushion, front dust boot, front buffer block and front spring lower cushion for cracks, wear or deformation. Replace as necessary.
- b. Check front strut upper connecting plate assembly (w/ insulator) and bearing assembly for damage. Replace as necessary.
- c. Check front coil spring for wear, cracks or deformation. Replace as necessary.

Assembly

Assembly is in the reverse order of disassembly.

Installation

Installation is in the reverse order of removal.

CAUTION

- Be sure to tighten coupling bolts and nuts to specified torques.
- Check wheel alignment after installation is completed. Adjust wheel alignment to standard range as necessary.

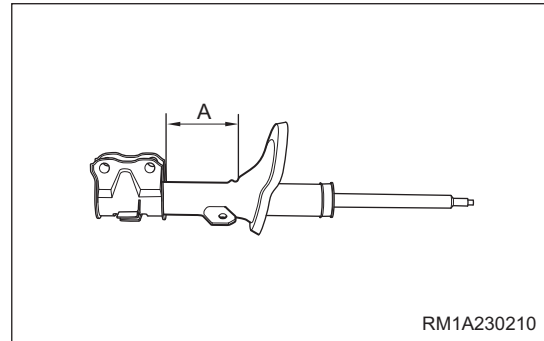
Disposal

WARNING

- Shock absorber assembly contains nitrogen and oil, which are under negative pressure. Before handling, be sure to wear goggles and release pressure inside shock absorber assembly to avoid personal injury.

1. Disposal of the front shock absorber assembly.

- Extend front shock absorber assembly strut fully, and clamp it in a vise at an angle.
- Using a drill or equivalent, make a hole slowly at area A shown in illustration, to discharge gas from front shock absorber assembly.



RM1A230210

CAUTION

- Gas discharged from shock absorber is colorless and harmless. Be careful when drilling, because iron chips may fly out.

- Handle front shock absorber assembly properly after discharging gas.

ENVIRONMENTAL PROTECTION

- Recycle disposed front shock absorber assembly according to local environmental regulations.

Front Control Arm Assembly

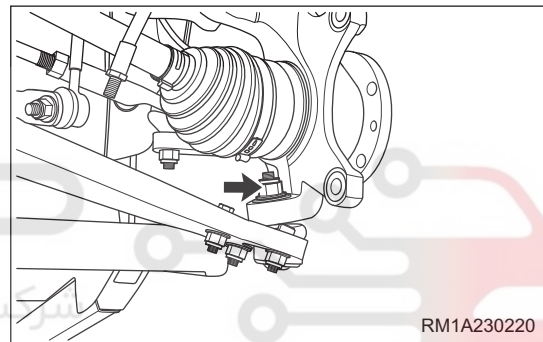
Removal

CAUTION

- Be sure to wear necessary safety equipment to prevent accidents.
- Make sure that safety lock of lift has been locked, when removing and installing chassis parts.
- It is not permitted to weld or modify suspension bearing parts and guide parts.
- When removing and installing chassis parts, replace self-locking nuts and rusted nuts for safety.

HINT:

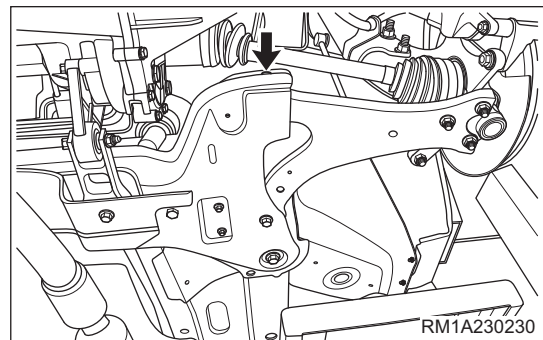
- Use same procedures for right and left sides.
 - Procedures listed below are for left side.
1. Remove the front left wheel (See page 24-9).
 2. Remove the front left control arm assembly.
 - a. Remove coupling nut (arrow) between front left control arm assembly ball pin and front left steering knuckle assembly.
(Tightening torque: $100 \pm 10 \text{ N}\cdot\text{m}$)



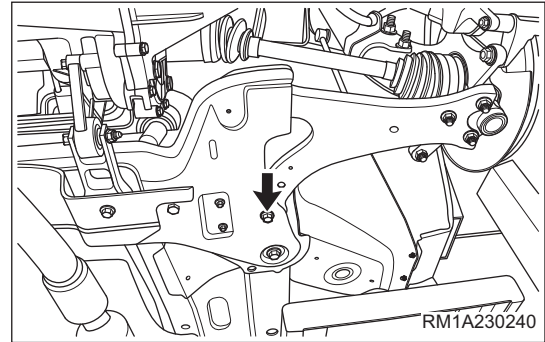
CAUTION

- If it is difficult to remove control arm ball pin end from steering knuckle, disengage ball pin by striking end of steering knuckle uniformly and slightly with a hammer or equivalent.

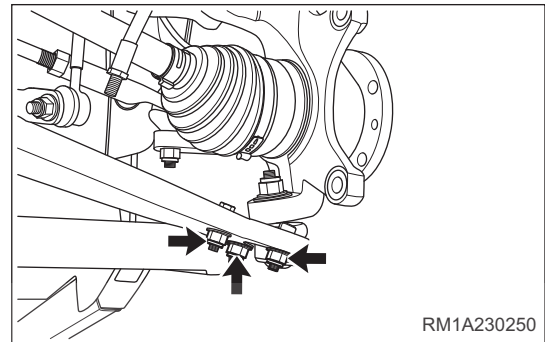
- b. Remove coupling bolt and nut (arrow) between front part of front left control arm assembly and front sub frame welding assembly.
(Tightening torque: $110 \pm 11 \text{ N}\cdot\text{m}$)



- c. Remove coupling bolt and nut (arrow) between rear part of front left control arm assembly and front sub frame welding assembly.
(Tightening torque: 110 ± 11 N·m)



- d. Remove the front left control arm assembly with ball pin.
e. Remove 3 coupling bolts and nuts (arrow) between front left control arm and front left control arm ball pin.
(Tightening torque: 70 ± 7 N·m)



- f. Separate front left control arm and front left control arm ball pin.

Installation

Installation is in the reverse order of removal.

CAUTION

- Be sure to tighten coupling bolts and nuts to specified torques.
- Make sure that ball pin assembly rotates smoothly and there is no seizing after installation.
- Check wheel alignment after installation. Adjust wheel alignment to standard range as necessary.

Front Control Arm Ball Pin Assembly

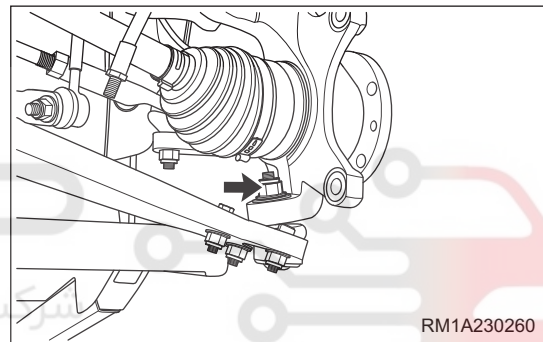
Removal

CAUTION

- Be sure to wear necessary safety equipment to prevent accidents.
- Make sure that safety lock of lift has been locked, when removing and installing chassis parts.
- It is not permitted to weld or modify suspension bearing parts and guide parts.
- When removing and installing chassis parts, replace self-locking nuts and rusted nuts for safety.

HINT:

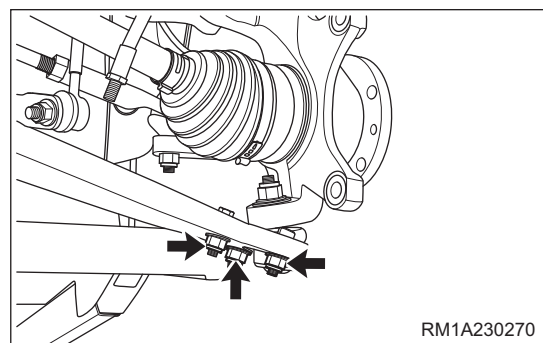
- Use same procedures for right and left sides.
 - Procedures listed below are for left side.
1. Remove the front left wheel (See page 24-9).
 2. Remove the front left control arm ball pin assembly.
 - a. Remove coupling nut (arrow) between front left control arm assembly ball pin and front left steering knuckle assembly.
(Tightening torque: $100 \pm 10 \text{ N}\cdot\text{m}$)



CAUTION

- If it is difficult to remove control arm ball pin end from steering knuckle, disengage ball pin by striking end of steering knuckle uniformly and slightly with a hammer or equivalent.

- b. Remove 3 coupling bolts and nuts (arrow) between front left control arm and front left control arm ball pin.
(Tightening torque: $70 \pm 7 \text{ N}\cdot\text{m}$)



- c. Remove the front left control arm ball pin assembly.

Inspection

1. Check the control arm ball pin assembly.
 - a. Check control arm assembly ball pin bushes for wear, cracks, deformation, damage or grease leakage. Replace as necessary.
 - b. Check if control arm assembly ball pin rotates smoothly. Replace as necessary.

Installation

Installation is in the reverse order of removal.

CAUTION

- Be sure to tighten coupling bolts and nuts to specified torques.
- Make sure that ball pin assembly rotates smoothly and there is no seizing after installation.
- Check wheel alignment after installation. Adjust wheel alignment to standard range as necessary.

دیجیتال خودرو
شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



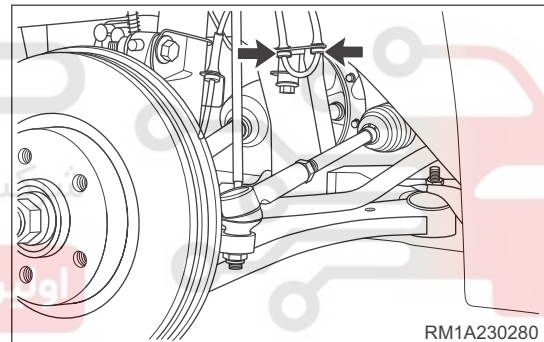
Front Stabilizer Bar Assembly

Removal

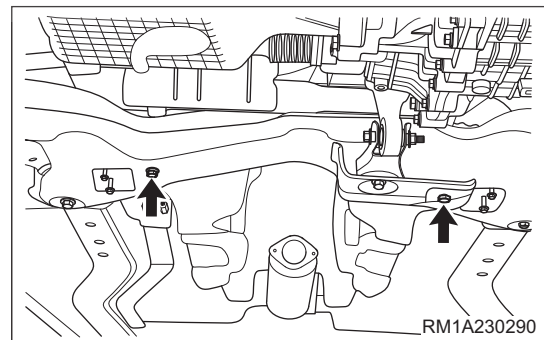
CAUTION

- Be sure to wear necessary safety equipment to prevent accidents.
- Make sure that safety lock of lift has been locked, when removing and installing chassis parts.
- It is not permitted to weld or modify suspension bearing parts.
- When removing and installing chassis parts, replace self-locking nuts and rusted nuts for safety.
- When lowering front sub frame welding assembly, it is necessary to support engine and transmission assembly securely with engine equalizer to avoid damage.

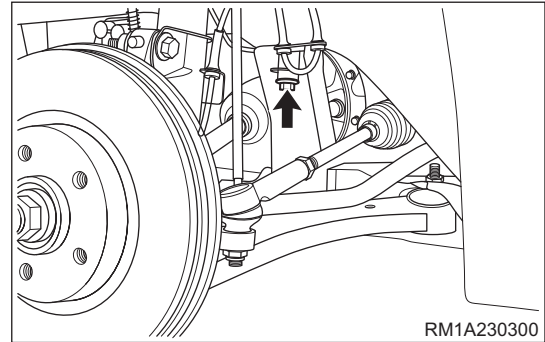
1. Remove the front wheel (See page 24-9).
2. Remove the front control arm assembly (See page 23-18).
3. Remove the front bumper lower protector assembly (See page 49-20).
4. Remove the main catalytic converter assembly (See page 11-12).
5. Remove the front stabilizer bar assembly.
 - a. Using an engine equalizer, support engine and transmission assembly securely.
 - b. Disengage front wheel speed sensor fixing parts (arrow) from front sub frame welding assembly.



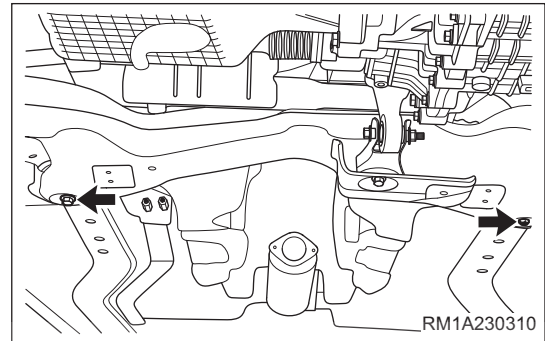
- c. Remove 2 coupling bolts (arrow) between front sub frame welding assembly and steering gear assembly. (Tightening torque: $120 \pm 10 \text{ N}\cdot\text{m}$)



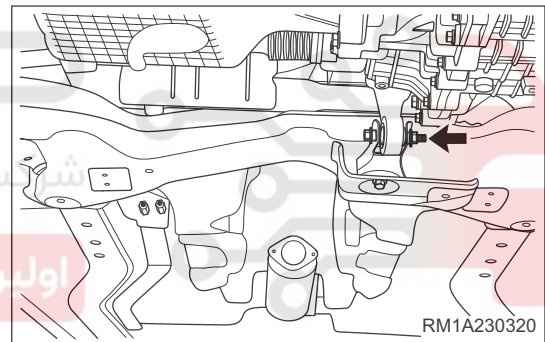
- d. Remove coupling bolt (arrow) between left upper part of front sub frame welding assembly and body. Use same removal procedure for right side.
(Tightening torque: 180 ± 18 N·m)



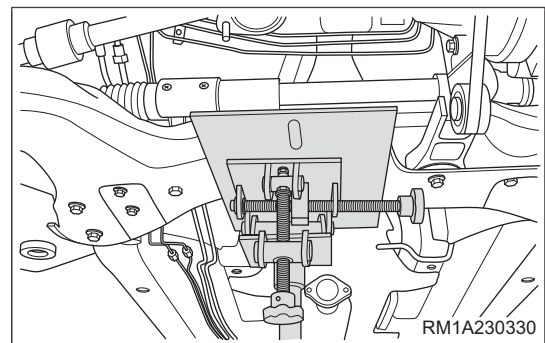
- e. Remove 2 coupling bolts (arrow) between rear part of front sub frame welding assembly and body.
(Tightening torque: 180 ± 18 N·m)



- f. Remove coupling bolt and nut (arrow) between rear mounting cushion assembly upper body and rear mounting cushion assembly lower body.
(Tightening torque: 80 ± 8 N·m)

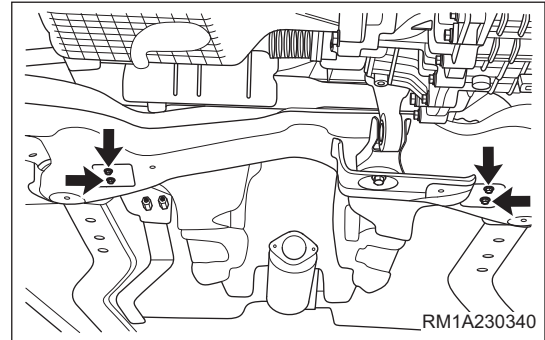


- g. Using a transmission carrier, support and lower front sub frame welding assembly carefully.

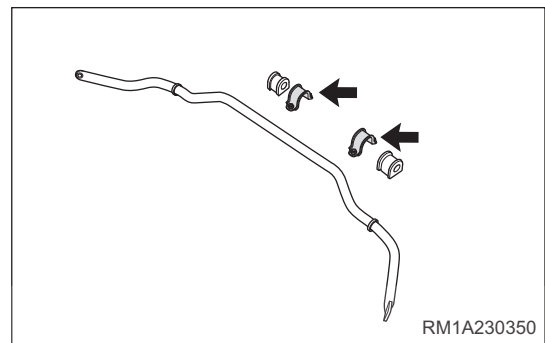


23 - SUSPENSION

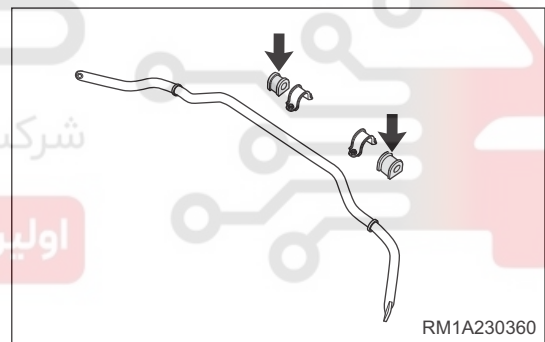
- h. Remove 4 coupling bolts (arrow) between front stabilizer bar assembly and front sub frame welding assembly.
(Tightening torque: 20 ± 3 N·m)



- i. Remove the front stabilizer bar assembly.
j. Detach left and right fixing clamps (arrow) from front stabilizer bar assembly.



- k. Detach left and right rubber supports (arrow) from front stabilizer bar assembly.



Inspection

1. Check the front stabilizer bar assembly.
 - a. Check front stabilizer bar assembly fixing clamps for wear, cracks, deformation or damage. Replace as necessary.
 - b. Check front stabilizer bar assembly rubber supports for dirt, wear, cracks, deformation or damage. Replace as necessary.

Installation

Installation is in the reverse order of removal.

23

CAUTION

- Be sure to tighten coupling bolts and nuts to specified torques.

Front Stabilizer Link Assembly

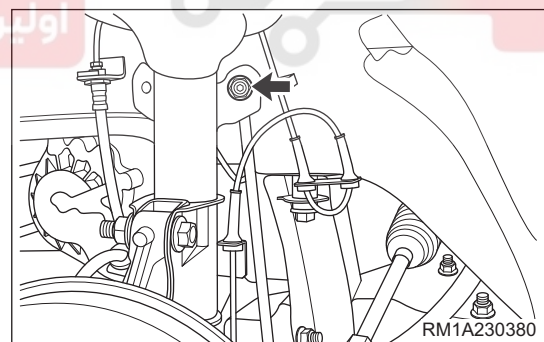
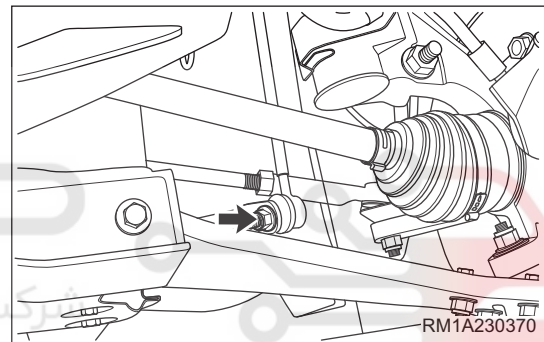
Removal

CAUTION

- Be sure to wear necessary safety equipment to prevent accidents.
- Make sure that safety lock of lift has been locked, when removing and installing chassis parts.
- It is not permitted to weld or modify suspension bearing parts.
- When removing and installing chassis parts, replace self-locking nuts and rusted nuts for safety.

HINT:

- Use same procedures for right and left sides.
 - Procedures listed below are for left side.
1. Remove the front left wheel (See page 24-9).
 2. Remove the front left stabilizer link assembly.
 - a. Hold lower end of front left stabilizer link assembly with an inner hexagon wrench, and remove coupling nut (arrow) between front left stabilizer bar assembly and front left stabilizer link assembly with a fixing wrench.
(Tightening torque: $60 \pm 6 \text{ N}\cdot\text{m}$)
 - b. Hold upper end of front left stabilizer link assembly with an inner hexagon wrench, and remove coupling nut (arrow) between front left stabilizer link assembly and front left shock absorber assembly with a fixing wrench.
(Tightening torque: $60 \pm 6 \text{ N}\cdot\text{m}$)



- c. Remove the front left stabilizer link assembly.

Inspection

1. Check the front stabilizer link assembly.
 - a. Check front stabilizer link assembly bush for wear, cracks, deformation, damage or grease leakage. Replace as necessary.
 - b. Check if end of front stabilizer link assembly rotates smoothly. Replace as necessary.

Installation

Installation is in the reverse order of removal.

CAUTION

- Be sure to tighten coupling nuts to specified torque.
- Make sure that end of front stabilizer link assembly rotates smoothly and there is no seizing after installation.

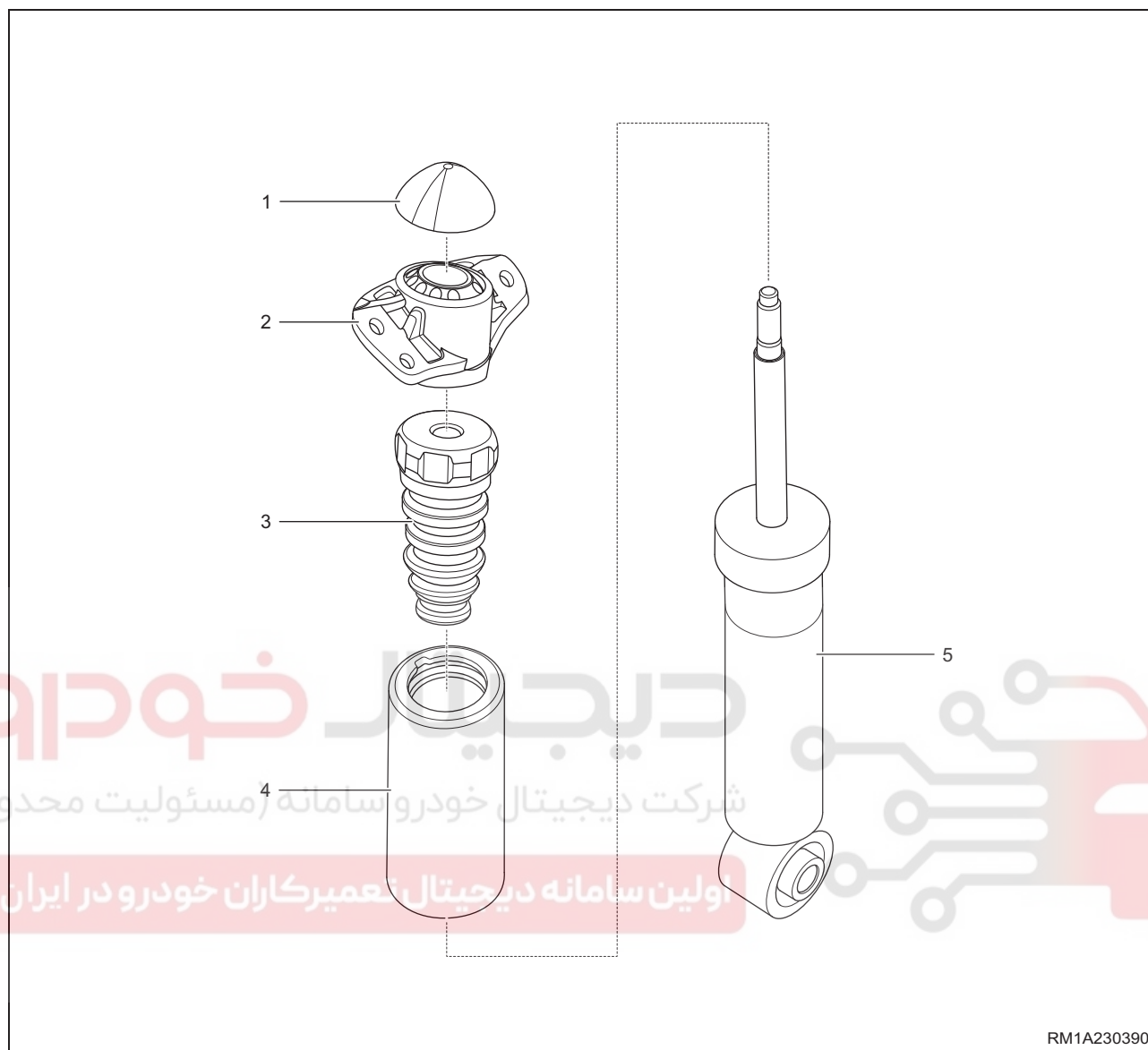
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Rear Shock Absorber Assembly



1 - Rear Shock Absorber Cover Cap	2 - Rear Shock Absorber Upper Connecting Plate Assembly (w/ Insulator)
3 - Rear Buffer Block	4 - Rear Dust Boot
5 - Rear Shock Absorber Assembly	

Removal

23

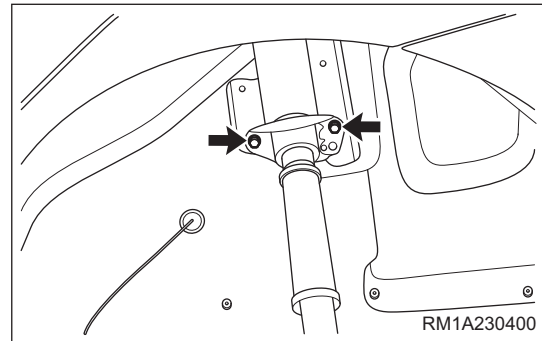
CAUTION

- Be sure to wear necessary safety equipment to prevent accidents.
- Make sure that safety lock of lift has been locked, when removing and installing chassis parts.
- It is not permitted to weld or modify suspension bearing parts.
- When removing and installing chassis parts, replace self-locking nuts and rusted nuts for safety.

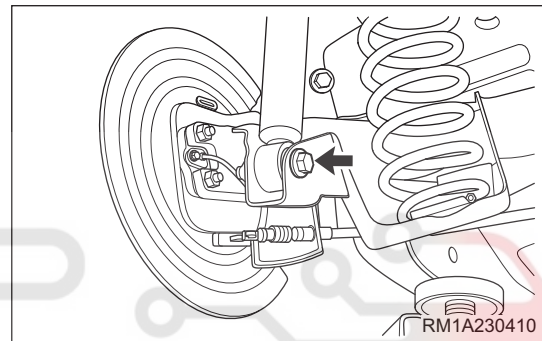
23 - SUSPENSION

HINT:

- Use same procedures for right and left sides.
 - Procedures listed below are for left side.
1. Remove the rear left shock absorber assembly.
 - a. Remove the fender apron.
 - b. Remove 2 coupling bolts (arrow) between upper part of rear left shock absorber assembly and body. (Tightening torque: $60 \pm 6 \text{ N}\cdot\text{m}$)



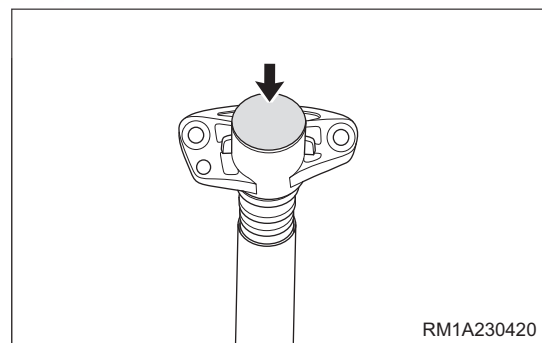
- c. Remove coupling bolt (arrow) between lower part of rear left shock absorber assembly and rear left shaft assembly. (Tightening torque: $160 \pm 16 \text{ N}\cdot\text{m}$)



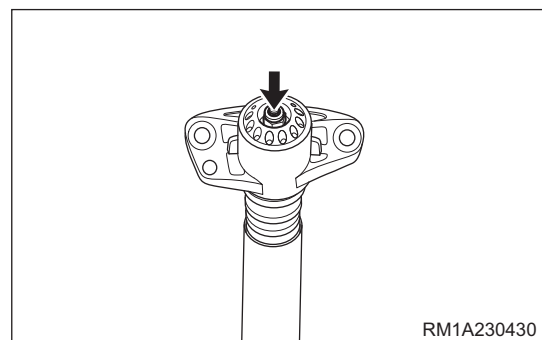
- d. Remove the rear left shock absorber assembly.

Disassembly

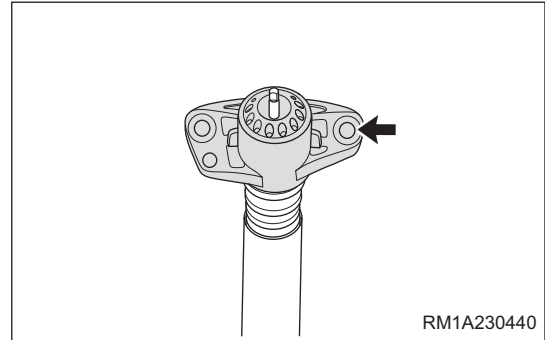
1. Remove the rear shock absorber assembly.
 - a. Remove the rear shock absorber cover cap (arrow).



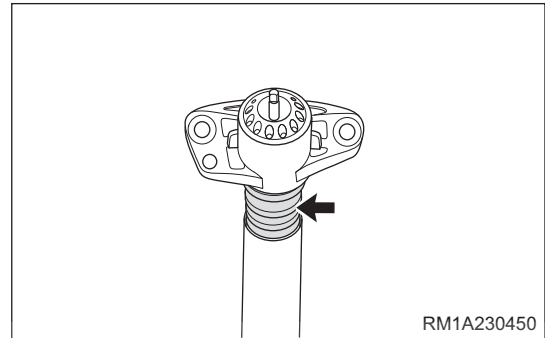
- b. Remove the rear shock absorber assembly fixing nut (arrow).



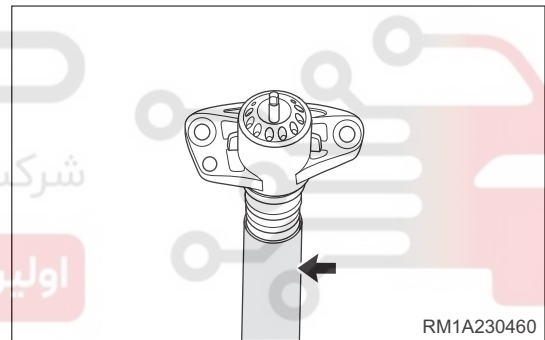
- c. Remove the rear shock absorber upper connecting plate assembly (w/ insulator) (arrow).



- d. Remove the rear buffer block (arrow).



- e. Remove the rear dust boot (arrow).

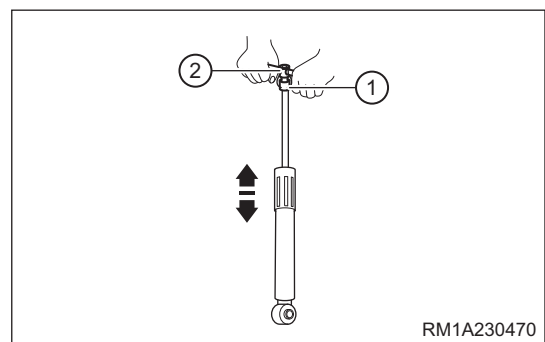


Inspection

1. Check the rear shock absorber assembly.

Manual check:

- Install nut (1) to upper end of rear shock absorber assembly strut, and then install T-wrench (2) or equivalent.
- Compress and extend rear shock absorber assembly strut several times by hands in direction of arrow as shown in illustration. Check that there is no abnormal resistance or unusual sound during operation. If there is any abnormality, replace rear shock absorber assembly with a new one.



2. Check other components of rear shock absorber assembly.

- Check rear dust boot, rear buffer block and rear shock absorber cover cap for cracks, wear or deformation. Replace as necessary.
- Check rear shock absorber upper connecting plate assembly (w/ insulator) for damage. Replace as necessary.

23 - SUSPENSION

Assembly

Assembly is in the reverse order of disassembly.

Installation

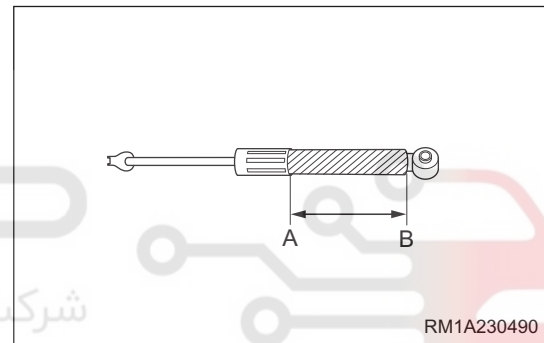
Installation is in the reverse order of removal.

CAUTION

- Be sure to tighten coupling bolts and nuts to specified torques.
- Make sure installation angle is 14.423° , when connecting rear shock absorber assembly and rear steering knuckle.
- Bounce vehicle up and down several times to stabilize rear suspension after installation.

Disposal

1. Disposal of the rear shock absorber assembly.
 - a. Extend rear shock absorber assembly strut fully.
 - b. Using a drill, make a hole between A and B on strut as shown in illustration, to discharge gas from rear shock absorber assembly.

**CAUTION**

- Be careful when drilling, because metal chips may fly about. Always perform operations with proper safety equipment to avoid personal injury.
- Gas discharged from shock absorber is colorless, odorless and nonpoisonous.

- c. Handle rear shock absorber assembly properly after discharging gas from rear shock absorber assembly.

ENVIRONMENTAL PROTECTION

- Recycle disposed rear shock absorber assembly according to local environmental regulations.

Rear Coil Spring

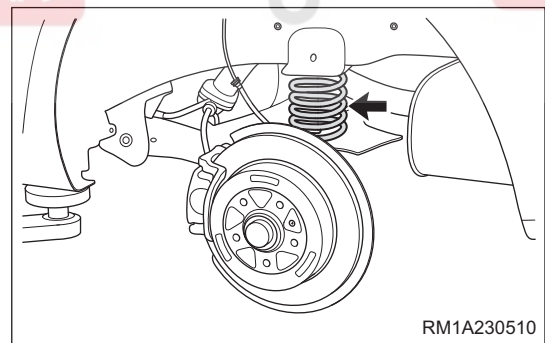
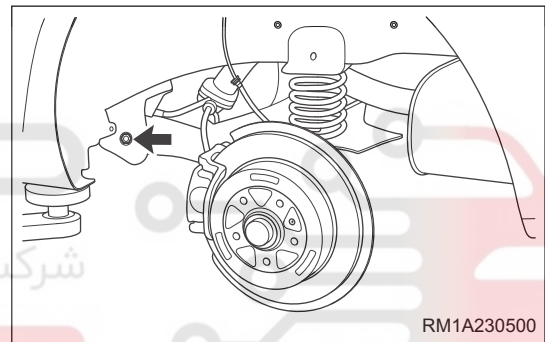
Removal

CAUTION

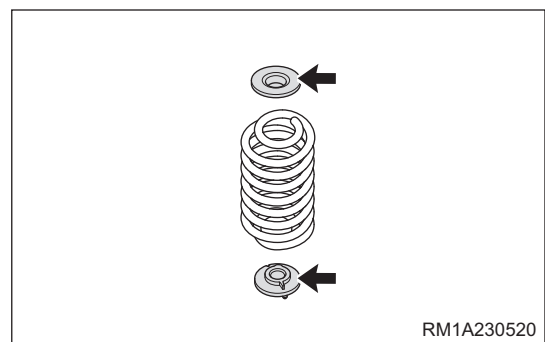
- Be sure to wear necessary safety equipment to prevent accidents.
- Make sure that safety lock of lift has been locked, when removing and installing chassis parts.
- It is not permitted to weld or modify suspension bearing parts.
- When removing and installing chassis parts, replace self-locking nuts and rusted nuts for safety.

HINT:

- Use same procedures for right and left sides.
 - Procedures listed below are for left side.
1. Remove the rear wheel (See page 24-9).
 2. Remove the rear coil spring.
 - a. Support rear lower control arm assembly securely with a transmission carrier.
 - b. Remove coupling bolt and nut (arrow) between rear left shaft assembly and rear support assembly.
(Tightening torque: $135 \pm 13 \text{ N}\cdot\text{m}$)
 - c. Lower transmission carrier slowly to a proper height and remove rear coil spring (arrow) carefully.



- d. Remove rear coil spring upper and lower cushions (arrow).



23 - SUSPENSION

Inspection

1. Check the rear coil spring assembly.
 - a. Check rear coil spring for wear, cracks or permanent deformation due to excessive use. Replace as necessary.
 - b. Check rear coil spring upper and lower cushions for dirty, wear, cracks, deformation or damage. Replace as necessary.

Installation

Installation is in the reverse order of removal.

CAUTION

- Be sure to tighten coupling bolts and nuts to specified torques.
- Align protrusion of rear coil spring lower cushion with positioning hole of rear lower control arm during installation.
- After installation, lower vehicle and bounce vehicle up and down several times to stabilize rear suspension.

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WHEEL ALIGNMENT

Description

CAUTION

- Be sure to perform wheel alignment procedures according to operating instructions of four-wheel alignment device.
- Periodic maintenance and service for four-wheel alignment device should be performed.

In general, wheel alignment has following 6 parameters:

1. Check front wheel camber
2. Check front wheel toe-in
3. Check kingpin caster
4. Check kingpin inclination
5. Check rear wheel camber
6. Check rear wheel toe-in

If following components have been removed, installed or replaced, check and perform wheel alignment procedures:

- Front control arm assembly
- Front control arm ball pin assembly
- Front steering knuckle
- Front shock absorber assembly
- Steering gear and steering tie rod
- Drive shaft
- Front sub frame welding assembly
- Rear torsion beam welding assembly

Specifications

Specifications (four-wheel alignment parameters standard)

Item		Specified Value
Front Wheel	Front wheel camber	$-0.4^{\circ} \pm 20'$
	Front wheel toe-in	$-0.05^{\circ} \pm 6'$
	Kingpin inclination	$12.56^{\circ} \pm 30'$
	Kingpin caster	$3.95^{\circ} \pm 30'$
Rear Wheel	Rear wheel camber	$-0.7^{\circ} \pm 20'$
	Rear wheel toe-in	$0.11^{\circ} \pm 10'$
Sideways Sliding		$\leq 3 \text{ m/km}$

Problem Symptoms Table

HINT:

Use symptoms table below to help determine cause of problem. Check each suspected area in sequence. Repair or adjust faulty components, or replace as necessary.

Symptom	Suspected Area	See page
Vehicle pulls	Front wheel alignment (incorrect)	23-33
	Rear wheel alignment (incorrect)	23-33
Wheel shimmy	Front wheel alignment (incorrect)	23-33
	Rear wheel alignment (incorrect)	23-33
Abnormal tire wear	Tire (worn or improperly inflated)	24-7
	Front wheel alignment (incorrect)	23-33
	Rear wheel alignment (incorrect)	23-33

Inspection Before Wheel Alignment

- Vehicle is in unloaded state.
- Use a lift to support and raise vehicle to a proper height.
- Check hub bearing for excessive clearance, and replace as necessary.
- Check suspension components, steering tie rod and ball pin for wear, deformation or damage. Replace malfunctioning parts as necessary.
- Check shock absorber assembly for proper operation.
- Check if tire pressure is within specified range and adjust it to specified pressure as necessary.
Standard Cold Tire Inflation Pressure (kPa)

Item	Front Wheel	Rear Wheel	Spare Tire
Tire (Unloaded)	220	220	420

- Check rim and tire.
 - Visually check rim and tire for scratches, wear or damage.
 - Perform wheel dynamic balance procedures ([See page 24-10](#)).

Front Wheel Camber

Incorrect front wheel camber will cause abnormal tire wear. Check and adjust front wheel camber as necessary.

In normal conditions, it is not necessary to adjust camber after assembling independent suspension and wheel steering knuckle. If wheel camber is not within tolerance due to other reasons, adjust with coupling bolt between independent suspension and steering knuckle.

Specified Value for Front Wheel Camber

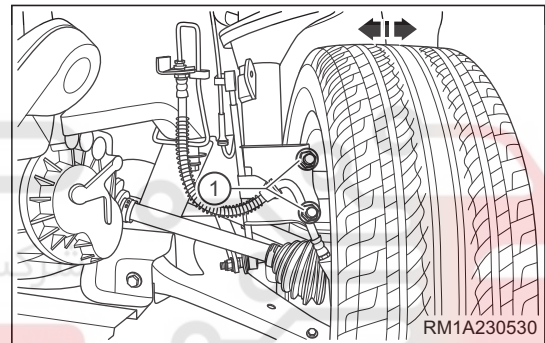
Item	Specified Value
Front Wheel Camber	$-0.4^{\circ} \pm 20'$

Inspection

1. Visually check driving system components for deformation and damage before adjustment. Replace deformed or damaged components as necessary.
2. Install wheel alignment device onto front wheel, and perform inspection procedures according to operating instructions for wheel alignment device.

Adjustment

1. If front wheel camber is not within tolerance of specified value, loosen coupling bolts (1) between front shock absorber assembly and front steering knuckle, and move wheel to adjust.



2. Tighten coupling bolts to specified torque after adjusting front wheel camber.
(Tightening torque: $180 \pm 18 \text{ N}\cdot\text{m}$)

23 - SUSPENSION

Front Wheel Toe-in

Incorrect front wheel toe-in will cause wheel pull and abnormal tire wear. Check and adjust front wheel toe-in as necessary.

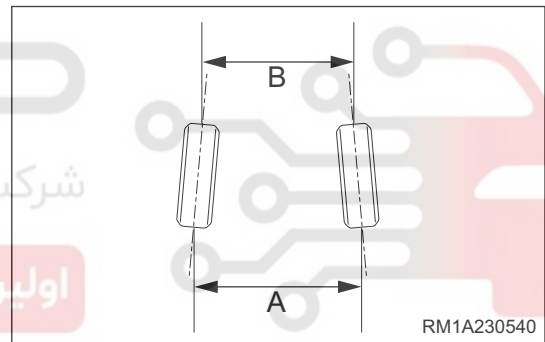
If front wheel toe-in is not within tolerance due to other reasons, adjust length of steering tie rod to return toe-in to specified value.

Specified Value for Front Wheel Toe-in

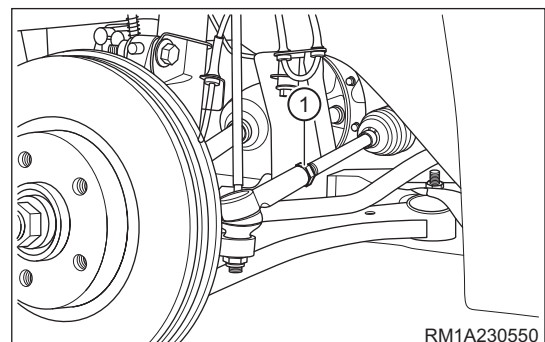
Item	Specified Value
Front Wheel Toe-in	$-0.05^{\circ} \pm 6'$

Inspection

1. Perform inspection with four-wheel alignment device (perform inspection procedures by referring to operating instructions for four-wheel alignment device).
2. Manual check:
 - a. Park vehicle on level ground, check if front tire pressure is within specified range and adjust it to specified value as necessary.
 - b. Place marks on center position in front of front wheels, and measure distance A between marks with a tape measure.
 - c. Push vehicle to rotate wheels 180° , and measure distance B between marks with a tape measure when marks are turned to rear of wheels.
 - d. Calculation method: front wheel toe-in = $A - B \leq 1 \text{ mm}$

**Adjustment**

1. Make adjusting preparation for wheel alignment according to requirement of tester.
2. Loosen steering tie rod locking nut (1), and turn tie rod to adjust length as required until front wheel toe-in reaches specified value.



3. Tighten steering tie rod locking nut and reinstall elastic jacket snap ring. Check if locking nut is tightened in place and if jacket position is correct.
(Tightening torque: 50 - 60 N·m)

CAUTION

- If elasticity of elastic jacket snap ring is not enough, replace it.

4. After adjusting front wheel toe-in, check steering wheel for eccentricity. If necessary, loosen steering wheel locking nut and adjust steering wheel to horizontal position, and then tighten steering wheel locking nut to specified torque.
(Tightening torque: 30 ± 3 N·m)

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Kingpin Caster & Kingpin Inclination

1. Kingpin caster and kingpin inclination can only be checked by using four-wheel alignment device.
2. Kingpin caster and kingpin inclination are assured by design structure and cannot be adjusted. If measured value is not within specified range, check if other components that connect to steering knuckle are deformed or damaged. Also, check if connected part of steering knuckle is deformed or damaged. If so, replace corresponding components.

Specified Value for Kingpin Caster & Kingpin Inclination

Item	Specified Value
Kingpin Caster	$3.95^{\circ} \pm 30'$
Kingpin Inclination	$12.56^{\circ} \pm 30'$

Rear Wheel Camber & Rear Wheel Toe-in

Rear wheel camber and rear wheel toe-in are assured by design structure and cannot be adjusted. If measured value is not within specified range, check if rear suspension components are deformed or damaged. Replace as necessary. If rear shaft assembly is deformed due to large shock, causing rear wheel alignment parameters change beyond specified range, replace rear shaft assembly.

Item		Specified Value
Rear Wheel	Rear wheel camber	$-1^{\circ}15' \pm 20'$
	Rear wheel toe-in	$7' \pm 20'$

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