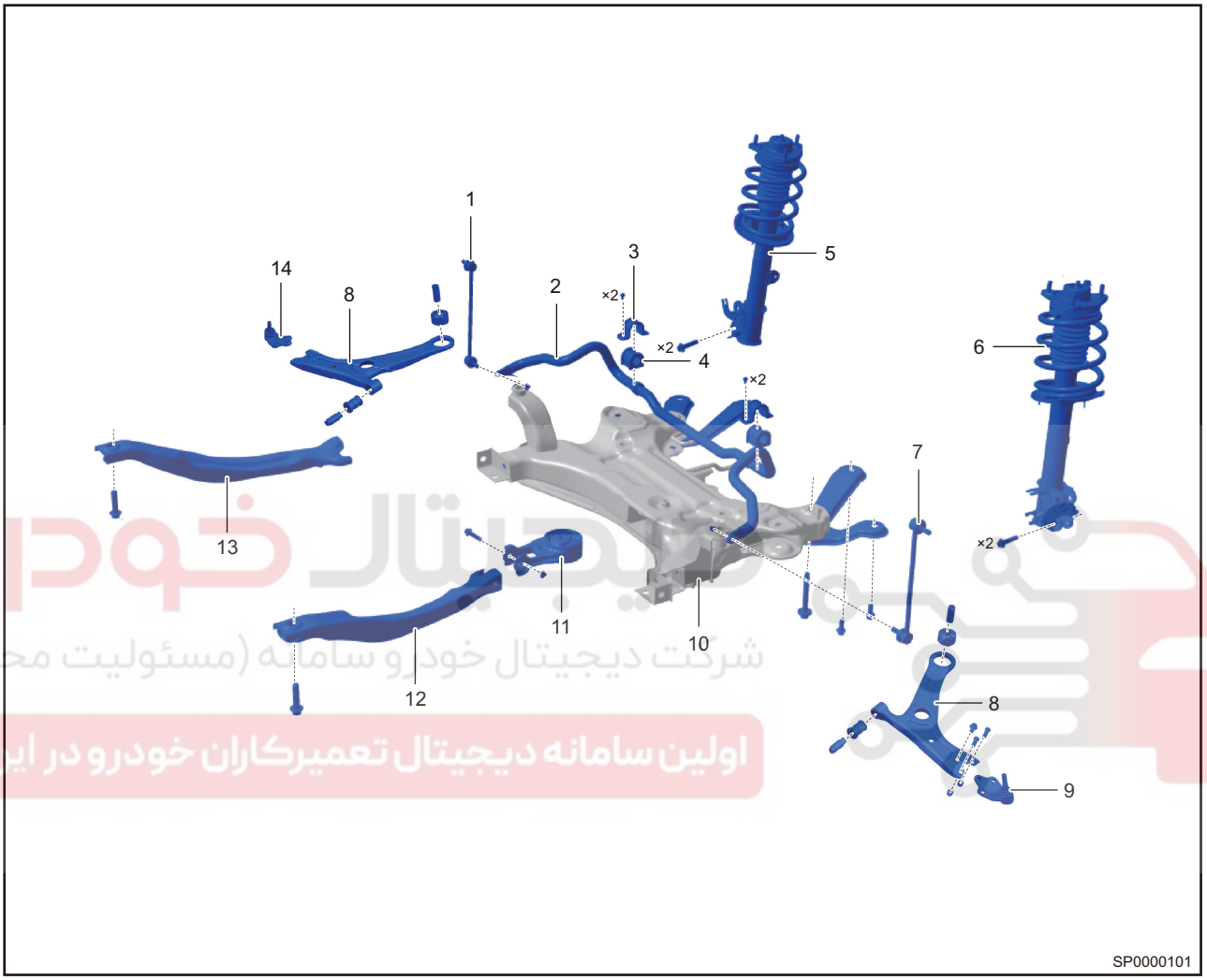
SUSPENSION

GENERAL INFORMATION

Overview

Description

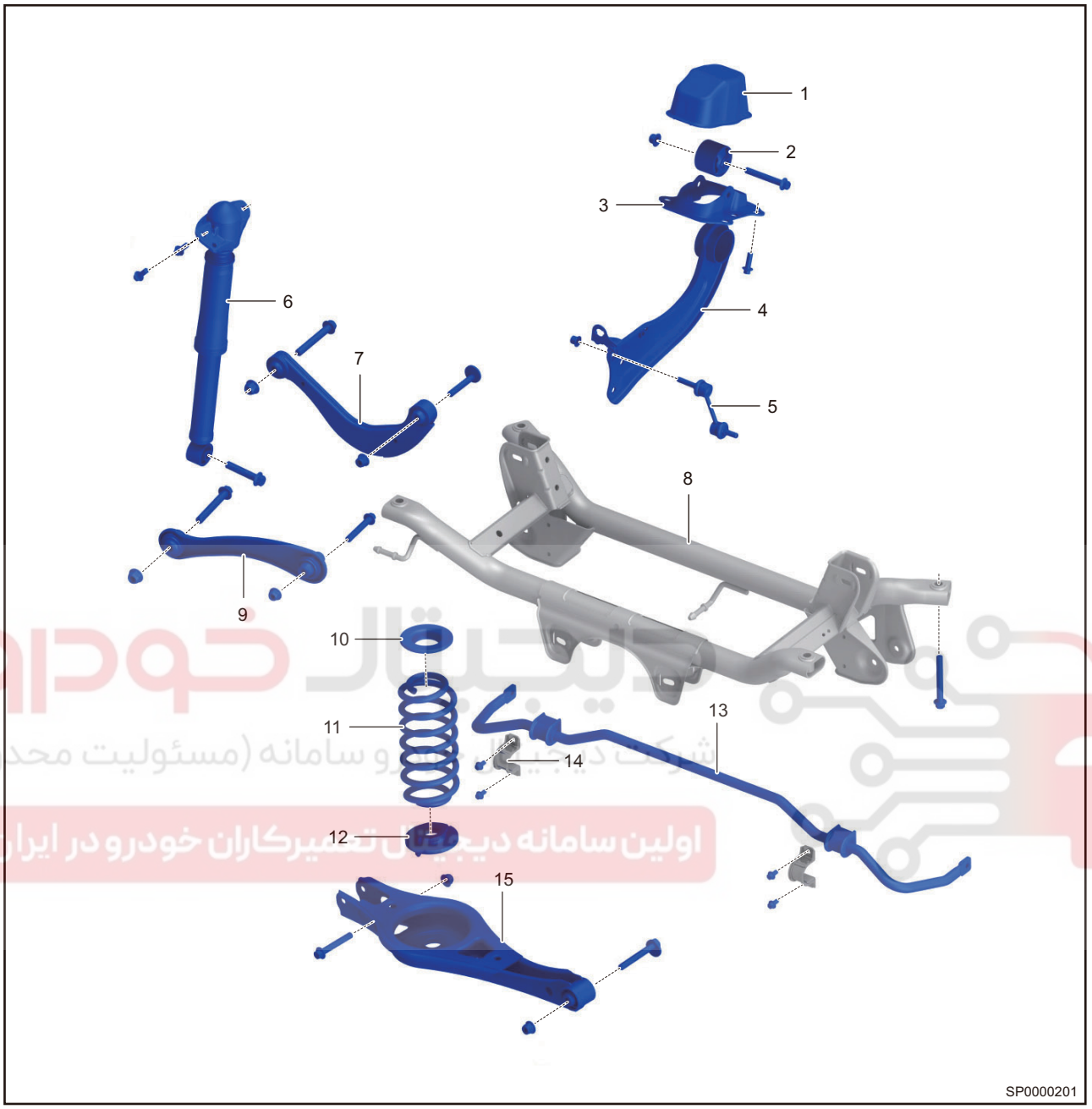
Front Suspension



1 - Front Right Stabilizer Bar Link	2 - Front Stabilizer Bar Assembly
3 - Front Stabilizer Bar Clamp	4 - Front Stabilizer Bar Rubber Boot
5 - Front Right Shock Absorber Assembly	6 - Front Left Shock Absorber Assembly
7 - Front Left Stabilizer Bar Link	8 - Front Left and Right Control Arm Assembly
9 - Front Left Control Arm Ball Pin Assembly	10 - Front Sub Frame Assembly
11 - Rear Mounting Lower Body	12 - Left Side Rail Welding Assembly
13 - Right Side Rail Welding 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 connects with front steering knuckle. Sub frame is connected with body by bolts, thus improving driving stability and safety.

Rear Suspension



1 - Dust Boot	2 - Rear Trailing Arm Bushing Assembly
3 - Rear Trailing Arm Bracket Assembly	4 - Rear Left / Right Trailing Arm Assembly
5 - Rear Stabilizer Link Assembly	6 - Rear Shock Absorber Assembly
7 -Rear Upper Control Arm Assembly	8 - Rear Sub Frame Welding Assembly
9 - Left Connecting Rod Assembly	10 - Rear Coil Spring Upper Cushion
11 - Rear Coil Spring	12 - Rear Coil Spring Lower Cushion
13 - Rear Stabilizer Bar Assembly	14 - Rear Stabilizer Bar Clamp
15 - Rear Lower Control Arm Assembly	

Rear suspension of this model uses multi-link independent suspension (height is non-adjustable), which is equipped with cylindrical coil spring, double action telescopic shock absorber and lateral stabilizer. This suspension features easy-removal and quick-installation, and driving stability and ride comfort have greatly improved.

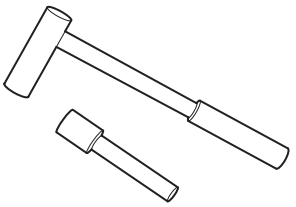
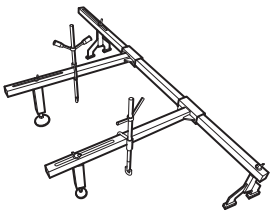
Specifications

Torque Specifications

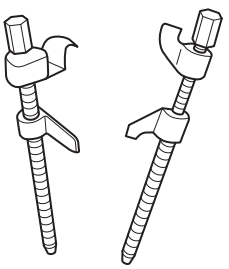
Description	Torque (N·m)
Coupling Nut Between Front Stabilizer Link Assembly and Front Shock Absorber Assembly	60 ± 5.0
Coupling Bolt Between Front Shock Absorber Assembly and Front Steering Knuckle Assembly	240 ± 24
Coupling Nut Between Front Shock Absorber Assembly and Front Steering Knuckle Assembly	240 ± 24
Coupling Nut Between Front Shock Absorber Assembly and Body	60 ± 6.0
Coupling Nut Between Front Control Arm Assembly Ball Pin and Front Steering Knuckle Assembly	95 ± 9
Coupling Nut Between Control Arm Front and Sub Frame	180 ± 18
Coupling Nut Between Front Part of Front Control Arm Assembly and Front Sub Frame Welding Assembly	180 ± 18
Coupling Bolt Between Rear Part of Front Control Arm Assembly and Front Sub Frame Welding Assembly	180 ± 18
Coupling Nut and Bolt Between Front Control Arm Ball Pin Assembly and Front Control Arm Assembly	150 ± 10
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	180 ± 18
Coupling Bolt Between Front Part of Front Sub Frame Welding Assembly and Body	180 ± 18
Coupling Bolt Between Front Sub Frame Welding Assembly and Body	180 ± 18
Coupling Bolt Between Rear Part of Front Sub Frame Bracket and Body	120 ± 12
Coupling Bolt Between Rear Shock Absorber Assembly and Body	60 ± 6.0
Coupling Bolt Between Rear Shock Absorber Assembly and Rear Steering Knuckle Assembly	160 ± 16
Coupling Nut Between Rear Stabilizer Bar and Rear Steering Knuckle	60 ± 6.0
Coupling Nut Between Rear Stabilizer Bar and Rear Sub Frame	25 ± 4.0
Coupling Bolt Between Rear Trailing Arm and Mounting Bracket	120 ± 12
Coupling Bolt Between Rear Trailing Arm and Steering Knuckle	110 ± 11
Coupling Nut Between Upper Control Arm and Rear Steering Knuckle	160 ± 16
Coupling Nut Between Upper Control Arm and Rear Sub Frame	110 ± 11
Coupling Nut Between Lower Control Arm and Rear Sub Frame	110 ± 11
Coupling Nut Between Connecting Rod Assembly and Rear Sub Frame Assembly	110 ± 11
Coupling Bolt Between Connecting Rod Assembly and Rear Steering Knuckle	160 ± 16
Coupling Bolt Between Rear Trailing Arm Bracket and Body Side Member	60 ± 6.0
Coupling Bolt Between Rear Sub Frame and Body	120 ± 12

Tools

Special Tools

Shock Absorber Nut Remover	 022
Engine Equalizer	 026

General Tools

Transmission Carrier	 005
Spring Compressor	 021

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
Vehicle pulls	Front tire (worn or improperly inflated)
	Front wheel alignment (incorrect)
	Control arm ball pin assembly (loose)
	Steering tie rod (loose or worn)
	Front hub bearing (excessively worn)
	Front suspension components (excessively worn or deformed)
Droop	Vehicle (overloaded)
	Front coil spring (too soft)
	Front shock absorber assembly (worn or damaged)
	Front suspension components (excessively worn or deformed)
	Front tire (improperly inflated)
	Front wheel alignment (incorrect)
Sways/pitches	Front tire (worn or improperly inflated)
	Front stabilizer bar assembly (bent or broken)
	Front shock absorber assembly (worn or damaged)
Wheel shimmy	Front tire (worn or improperly inflated)
	Front wheel (out of balance)
	Front shock absorber assembly (worn or damaged)
	Front wheel alignment (incorrect)
	Control arm ball pin assembly (loose)
	Front hub bearing (excessively worn)
	Steering gear (misaligned or damaged)

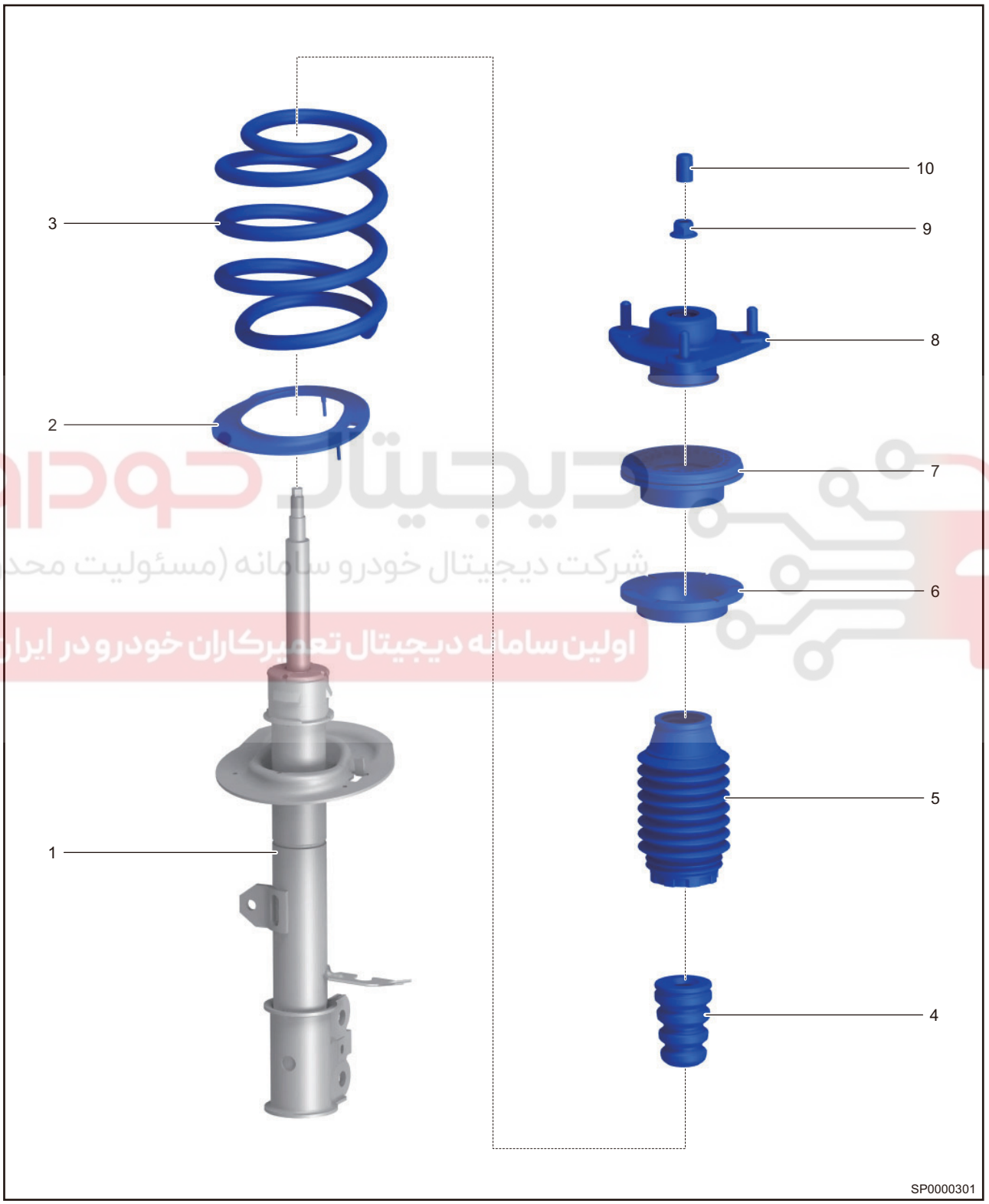
Rear Suspension

Symptom	Suspected Area
Vehicle pulls	Rear tire (worn or improperly inflated)
	Rear wheel alignment (incorrect)
	Rear hub bearing (excessively worn)
	Rear suspension components (worn or deformed)
Droop	Vehicle (overloaded)
	Rear coil spring (too soft)
	Rear shock absorber assembly (worn or damaged)
	Rear suspension components (excessively worn or deformed)
	Rear wheel alignment (incorrect)
	Rear tire (improperly inflated)
Sways/pitches	Rear tire (worn or improperly inflated)
	Rear stabilizer bar assembly (bent or broken)
	Rear shock absorber assembly (worn or deformed)
Wheel shimmy	Rear tire (worn or improperly inflated)
	Rear wheel (out of balance)
	Rear shock absorber assembly (worn or damaged)
	Rear wheel alignment (incorrect)
	Rear hub bearing (worn)

ON-VEHICLE SERVICE

Front Shock Absorber Assembly

Description



1 - Shock Absorber	2 - Front Spring Lower Cushion
3 - Spring	4 - Buffer Block

5 - Dust Boot	6 - Front Spring Upper Cushion
7 - Bearing Assembly	8 - Front Strut Upper Connecting Plate Assembly (w/ Insulator)
9 - Shock Absorber Lock Nut	10 - Front Shock Absorber Cover Cap

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 the shock absorber assembly.
   (b) Shock absorber is designed with a thin layer of oil film on the surface of piston rod. While the shock absorber is being compressed, the oil film will be scraped off by dust plate on shock absorber oil seal and a small amount of oil will deposit on the upper part of oil seal. Due to high oil permeability, the oil deposited on the 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 the following conditions occurs:
      (1) Oil film is between dust boot and spring seat.
      (2) 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 the shock absorber assembly.
   (c) When any of the following conditions occurs:
      (1) Oil traces in circumferential direction are uneven.
      (2) Oil traces reach lower connecting positions.
      Above conditions indicate that there may be leakage in shock absorber assembly, and it is necessary to replace the 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 the surface of malfunctioning shock absorber. Under normal road conditions, drive vehicle for 5 to 10 minutes and perform inspection. If there are oil traces at the shock absorber assembly surface, it indicates that oil leakage exists, and it is necessary to replace the shock absorber assembly.

Removal

Warning/Caution/Hint

- 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.

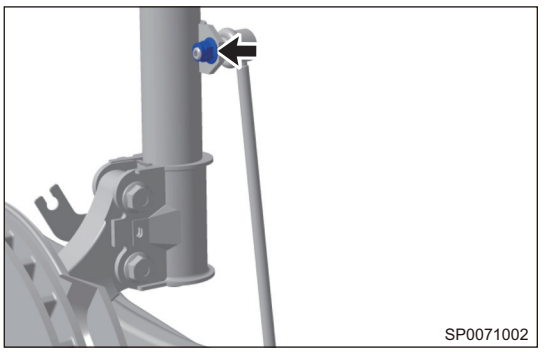
Hint:

- Use same procedures for right and left sides.
- Procedures listed below are for left side.

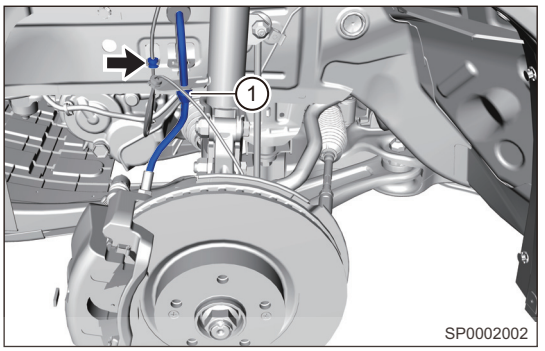
1. Remove the front left wheel (See page 20-8).
2. Remove the front left shock absorber assembly.

(a) Remove the coupling nut (arrow) between front left stabilizer link assembly and front left shock absorber assembly.

Tightening torque
60 ± 6.0 N·m

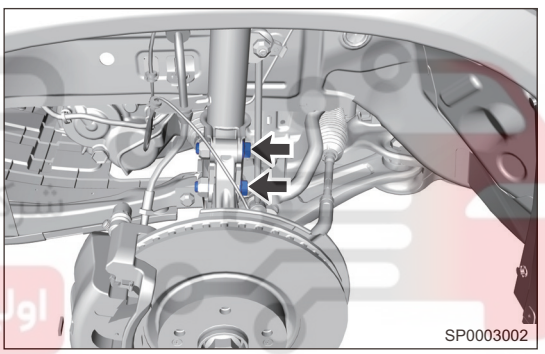


(b) Disengage the front left wheel speed sensor wire harness (arrow) and front left brake hose assembly (1) from front left shock absorber assembly.

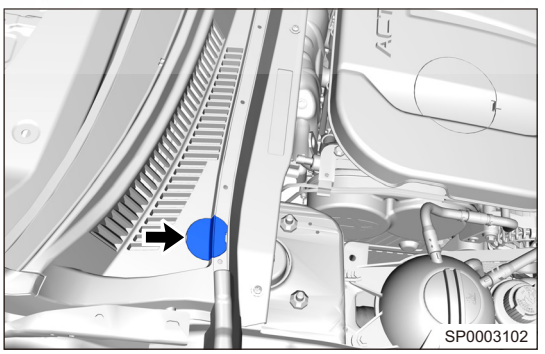


(c) Remove 2 coupling bolts and nuts (arrow) between front left shock absorber assembly and front left steering knuckle assembly.

Tightening torque
240 ± 24 N·m

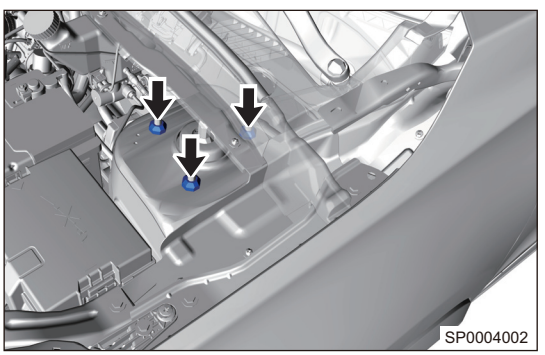


(d) Remove the shock absorber blockage cover (arrow) from front windshield trim cover plate.



(e) Remove 3 coupling nuts (arrow) between front left shock absorber assembly and body.

Tightening torque
60 ± 6 N·m



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

Disassembly

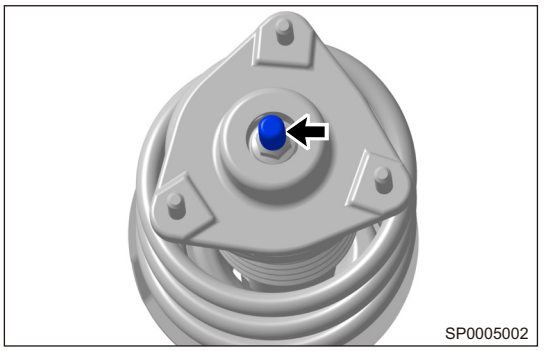
Warning/Caution/Hint

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 the front shock absorber cover cap (arrow) from front left shock absorber assembly.

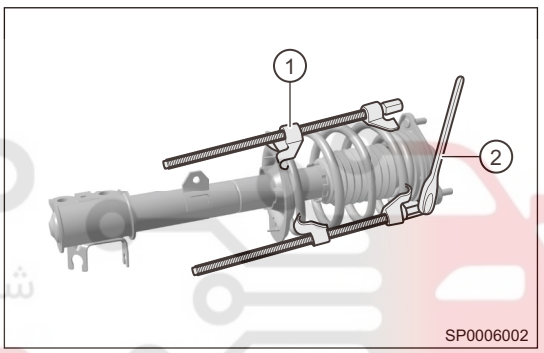


2. Remove the locking nut from front shock absorber assembly.

   (a) Using spring compressor (1) and wrench (2), tighten the end lever of spring compressor to compress the front coil spring.

   Warning:

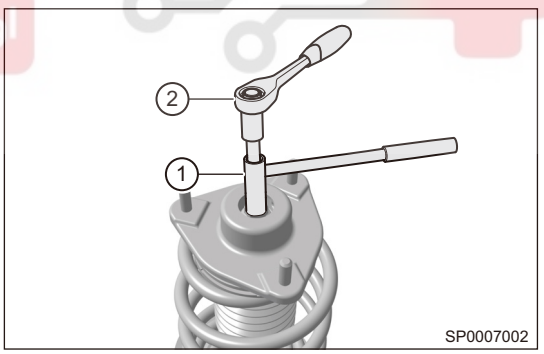
   - When removing front coil spring, compress spring until locking nut can be rotated. DO NOT compress spring more than necessary, avoid damaging spring and personal injury.



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

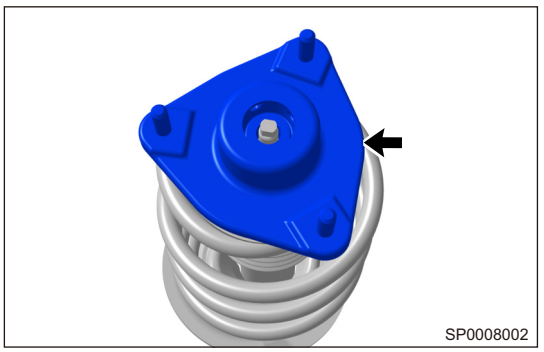
   Tightening torque

   70 ± 5 N·m



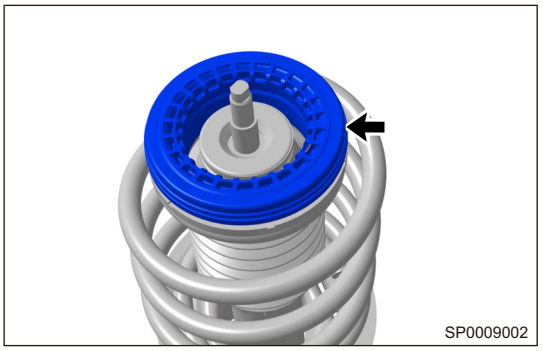
3. Remove the front strut upper connecting plate assembly (w/ insulator).

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



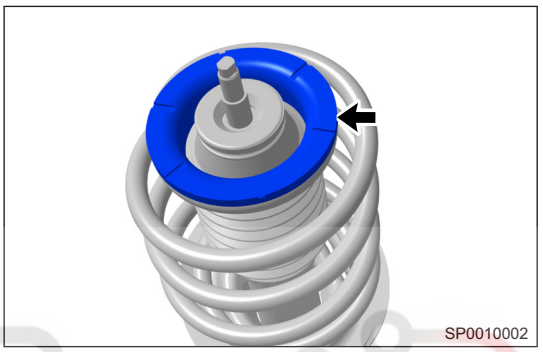
4. Remove the bearing assembly.

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



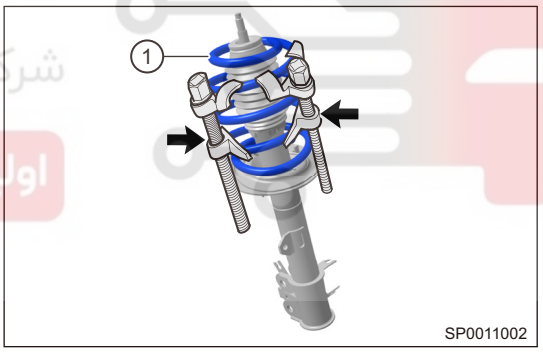
5. Remove the front spring upper tray.

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



6. Remove the front coil spring.

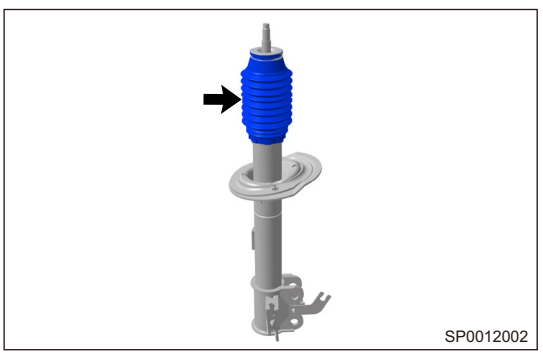
   (a) Remove the front coil spring (1) with spring compressor (arrow) from front left shock absorber assembly.



   (b) Slowly loosen the spring compressor, and carefully remove the front coil spring.

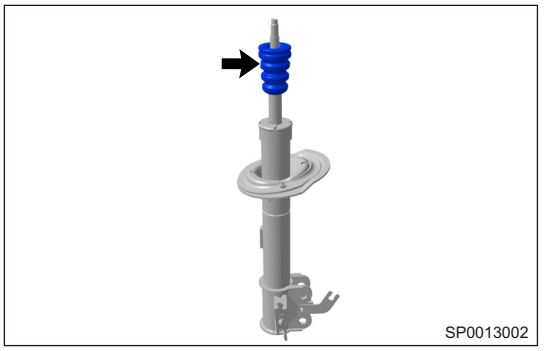
7. Remove the front dust boot.

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



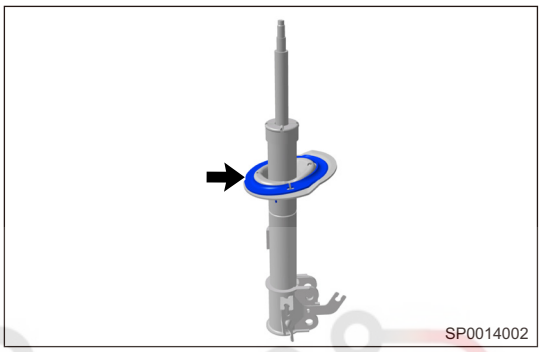
8. Remove the front buffer block.

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



9. Remove the front spring lower cushion.

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

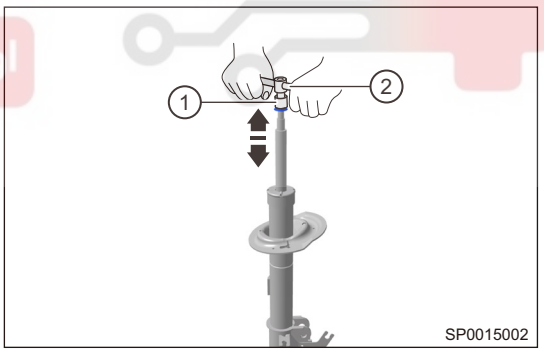


Inspection

1. Check the front shock absorber assembly.

   Manual check:

   (a) Install the locking nut (1) to the upper end of front shock absorber assembly strut, and then install the T-wrench (2) or equivalent.



   (b) Compress and extend the 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 the front shock absorber assembly with a new one.

2. Check the 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 it as necessary.

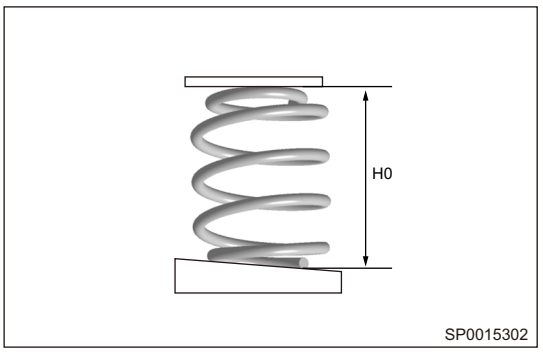
   (b) Check front strut upper connecting plate assembly (w/ insulator) and bearing assembly for damage. Replace it as necessary.

   (c) Check front coil spring for wear, cracks or deformation. Replace it as necessary.

3. Check the front shock absorber spring.

   (a) Check rear coil spring for wear, cracks or permanent deformation due to excessive use. Replace it as necessary.

(b) Check free height of front coil spring, free height of front coil spring H0 is 343.6 mm. Replace it as necessary.



Assembly

1. Assembly is in the reverse order of disassembly.
   Caution:
   - Please note that opening of retainer must face opening of front wheel speed sensor, when installing front hub bearing retainer.

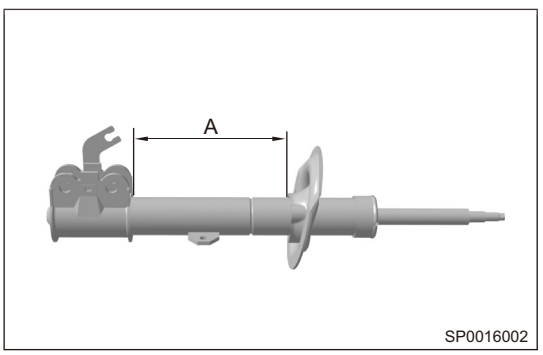
Installation

1. Installation is in the reverse order of removal.
   Caution:
   - Be sure to tighten bolt to specified torque.
   - Check wheel alignment after installation. Adjust wheel alignment to standard range as necessary.

Disposal

Warning/Caution/Hint
Warning:
- Shock absorber assembly contains nitrogen and oil, which are under high 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.
   (a) Extend the front shock absorber assembly strut fully, and clamp it in a vise at an angle.
   (b) Using a drill or equivalent, make a hole slowly at area A shown in the illustration, to discharge gas in the front shock absorber assembly.



   (c) Handle front shock absorber assembly properly after discharging gas.
   Hint:
   - Recycle disposed front shock absorber assembly according to local environmental regulations.

Front Control Arm Assembly

Removal

Warning/Caution/Hint

Warning:

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

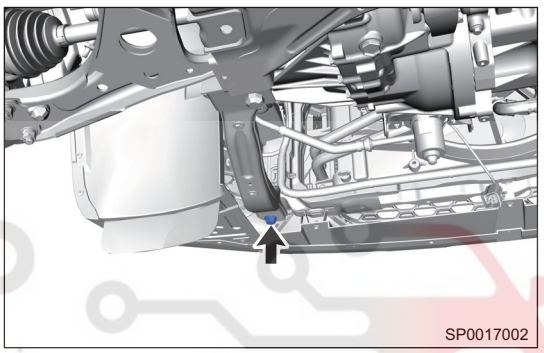
Hint:

- Use same procedures for right and left sides.
- Procedures listed below are for left side.

1. Remove the front left wheel (See page 20-8).
2. Remove the water tank lower protector assembly.
3. Remove the front left control arm assembly.

(a) Remove coupling bolt (arrow) between front left side rail and tank lower crossmember.

Tightening torque
180 ± 18 N·m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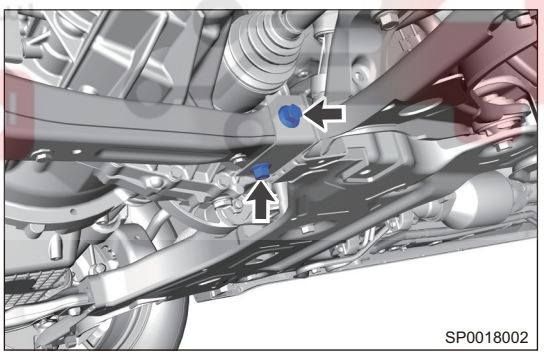
(b) Remove 2 coupling bolts (arrow) between front left side rail and front sub frame, and remove front left side rail.

Tightening torque
120 ± 12 N·m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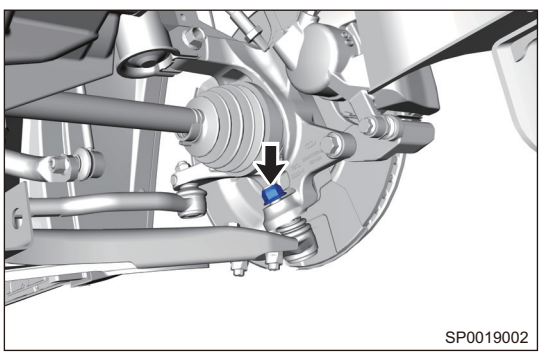
(c) Remove the coupling nut (arrow) between front left control arm ball pin assembly and front left steering knuckle assembly.

Tightening torque
95 ± 9 N·m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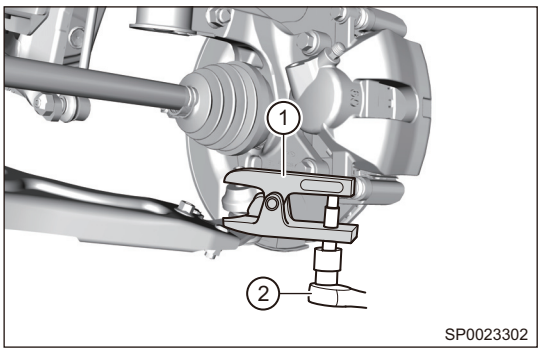
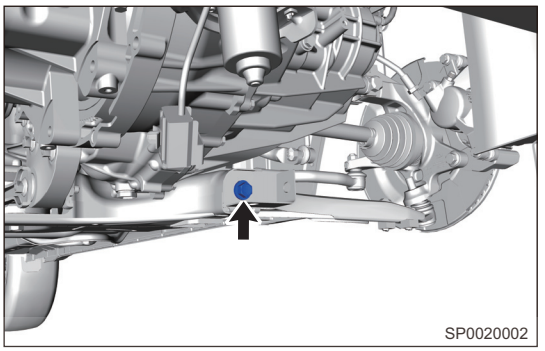
(d) Use the ball remover (1), turn the wrench (2) to detach the front control arm ball pin and steering knuckle.



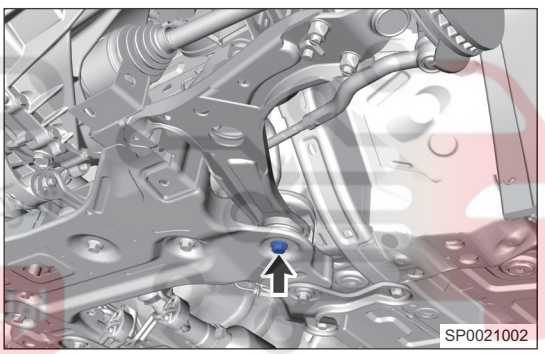
(e) Remove the coupling bolt (arrow) between front part of front left control arm assembly and front sub frame welding assembly.

Tightening torque
180 ± 18 N·m



(f) Remove the coupling bolt and nut (arrow) between rear part of front left control arm assembly and front sub frame welding assembly.

Tightening torque
180 ± 18 N·m



(g) Remove the front left control arm assembly with ball pin.

Installation

1. 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 sticking after installation.
- Check wheel alignment after installation. Adjust wheel alignment to standard range as necessary.

Front Control Arm Ball Pin Assembly

Removal

Warning/Caution/Hint

Warning:

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

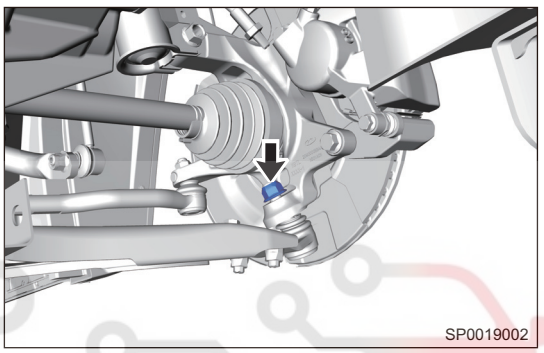
Hint:

- Use same procedures for right and left sides.
- Procedures listed below are for left side.

1. Remove the front wheel (See page 20-8).
2. Remove the front left control arm ball pin assembly.

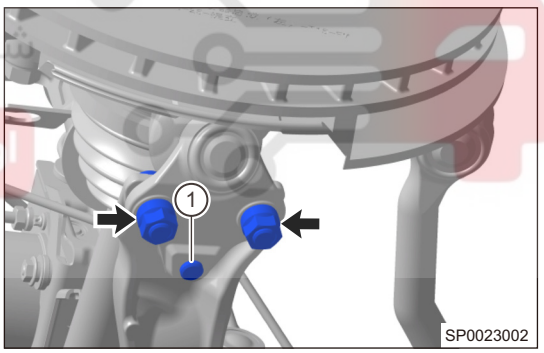
(a) Remove the coupling nut (arrow) between front left control arm ball pin assembly and front left steering knuckle assembly.

Tightening torque
95 ± 9 N·m

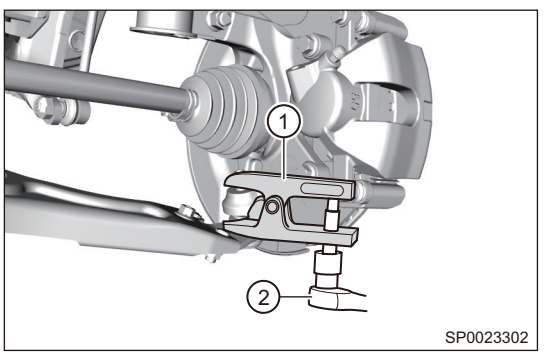


(b) Remove 2 fixing nuts (arrow) and bolt (1) between front left control arm and front left control arm ball pin.

Tightening torque
150 ± 10 N·m



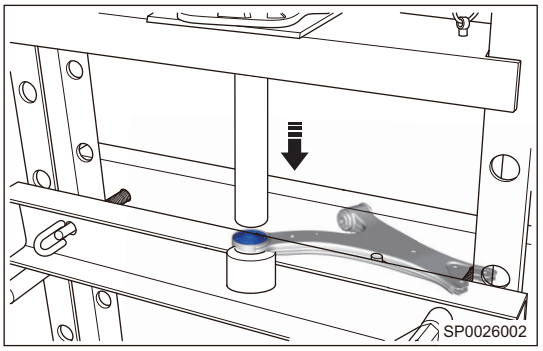
(c) Use the ball remover (1), turn the wrench (2) to detach the front control arm ball pin and steering knuckle.



(d) Remove the front left control arm ball pin assembly.

3. Remove front control arm front rubber bushing assembly.

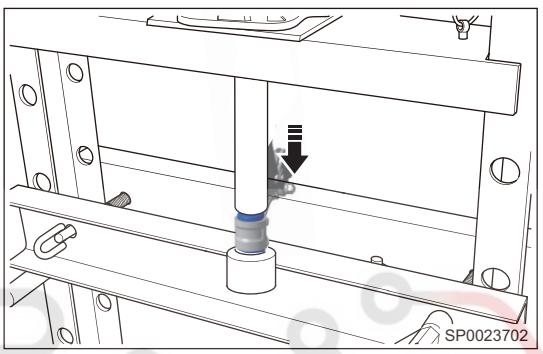
(a) Place the front control arm assembly on a hydraulic press, install front control arm remover and adapter, and press out front control arm front rubber bushing assembly.



(b) Remove the front control arm front rubber bushing assembly.

4. Remove the front control arm rear rubber bushing assembly.

(a) Place the front control arm assembly on a hydraulic press, install front control arm remover and adapter, and press out front control arm rear rubber bushing assembly.



(b) Remove the front control arm rear rubber bushing 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 it as necessary.
   (b) Check if control arm assembly ball pin rotates smoothly, replace it as necessary.

Installation

1. 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 sticking after installation.
- Check wheel alignment after installation. Adjust wheel alignment to standard range as necessary.

Front Stabilizer Bar Assembly

Removal

Warning/Caution/Hint

Caution:

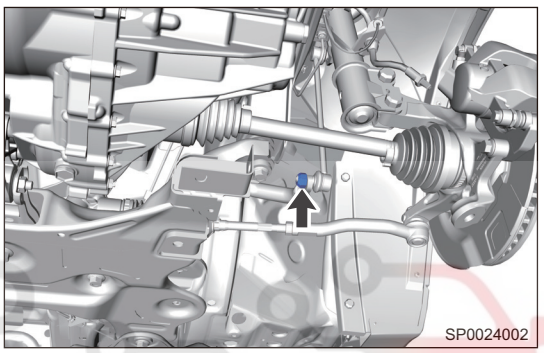
- Be sure to wear necessary safety equipment to prevent accidents.
- Check if safety lock of lift is locked when repairing chassis parts.
- It is not permitted to weld or modify suspension bearing parts and guide parts.
- When removing chassis parts, replace self-locking nuts and rusted nuts for safety.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

Warning:

1. Remove the front wheel (See page 20-8).
2. Remove the front stabilizer bar assembly.

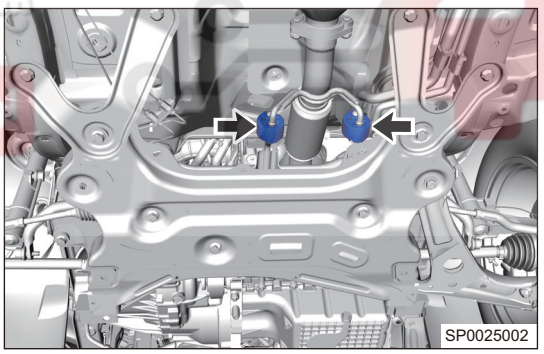
(a) Remove the fixing nut (arrow) between stabilizer bar and small end connecting rod.

Tightening torque
60 ± 6 N·m



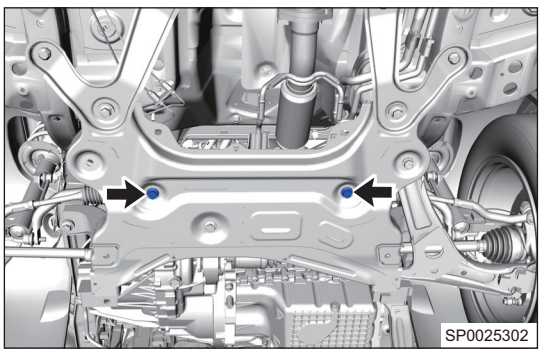
(b) Using an engine equalizer, support the engine and transmission assembly securely.

(c) Detach exhaust pipe fixing rubber lugs (arrow) from front sub frame welding assembly.



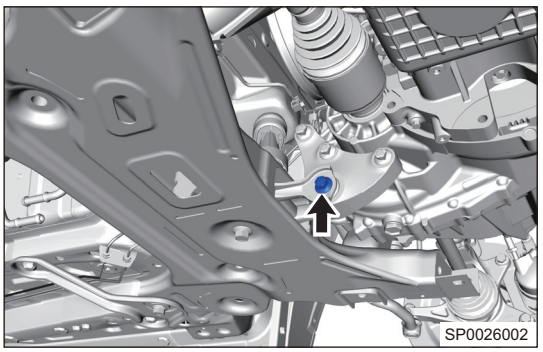
(d) Remove 2 through bolts (arrow) between steering gear with tie rod assembly and sub frame.

Tightening torque
180 ± 18 N·m



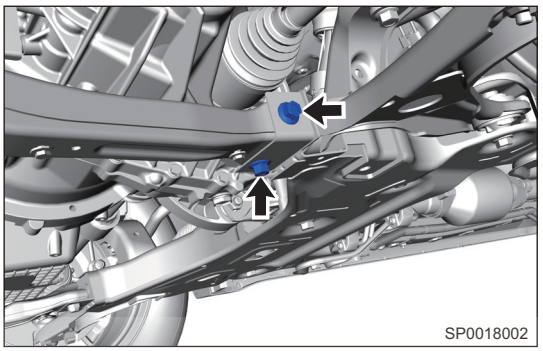
(e) Remove the transmission rear mounting fixing bolt (arrow).

Tightening torque
180 ± 18 N·m



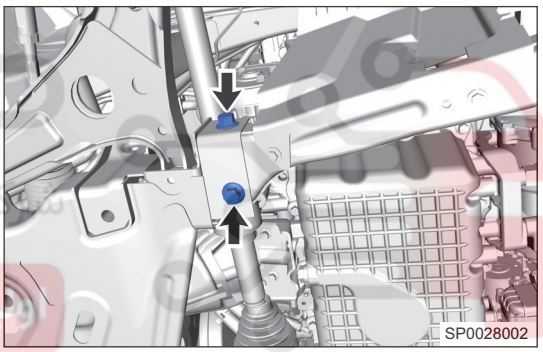
(f) Remove 2 fixing bolts (arrow) between front left side rail and sub frame.

Tightening torque
180 ± 12 N·m



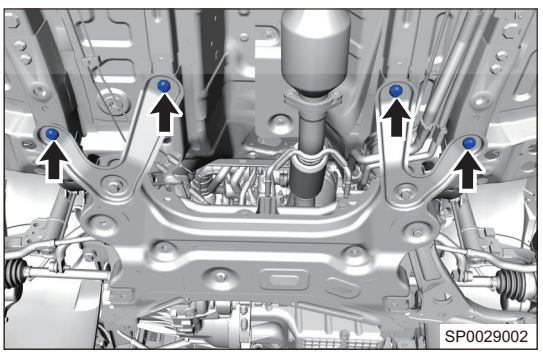
(g) Remove 2 fixing bolts (arrow) between front right side rail and sub frame.

Tightening torque
120 ± 12 N·m

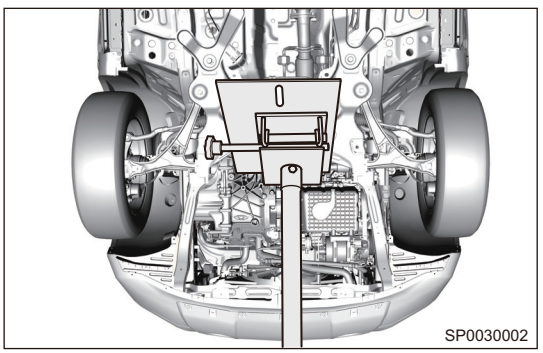


(h) Remove 4 fixing bolts (arrow) between rear end of sub frame bracket and body.

Tightening torque
120 ± 12 N·m



(i) Using a transmission carrier, support front sub frame welding assembly.



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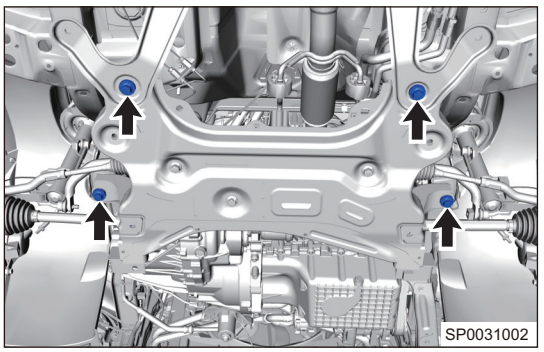
(j) Remove 4 fixing bolts (arrow) between sub frame and body.

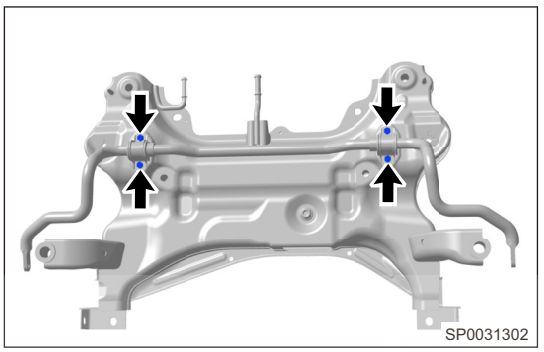
Tightening torque
180 ± 18 N·m


SP0031002

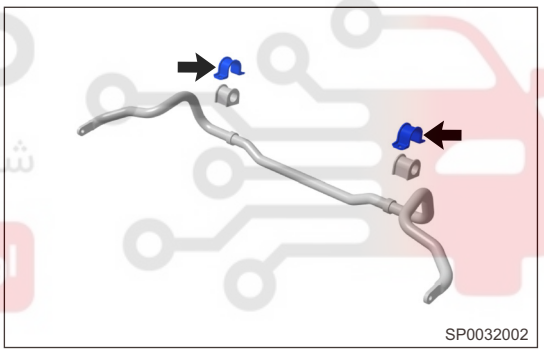
(k) Lower the front sub frame welding assembly.

(l) Remove 4 fixing bolts (arrow) of stabilizer bar on sub frame, and remove front stabilizer bar assembly.

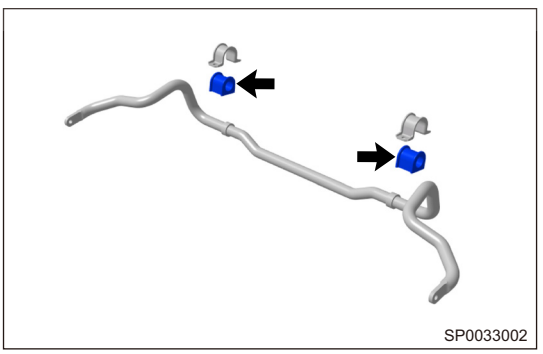
Tightening torque
25 ± 3 N·m


SP0031302

(m) Detach left and right fixing clamps (arrow) from front stabilizer bar assembly.


SP0032002

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


SP0033002

Inspection

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

Installation

1. 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. Adjust wheel alignment to standard range as necessary.

Front Stabilizer Link Assembly

Removal

Warning/Caution/Hint

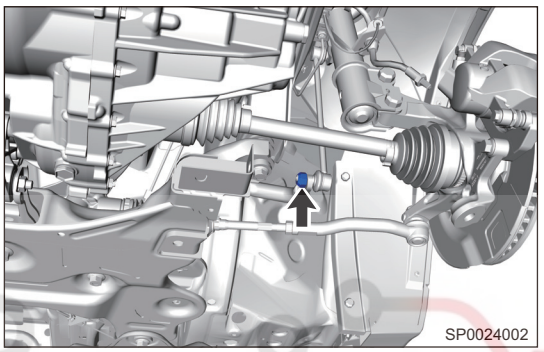
Caution:

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

1. Remove the front wheel (See page 20-8).
2. Remove the front left stabilizer link assembly.

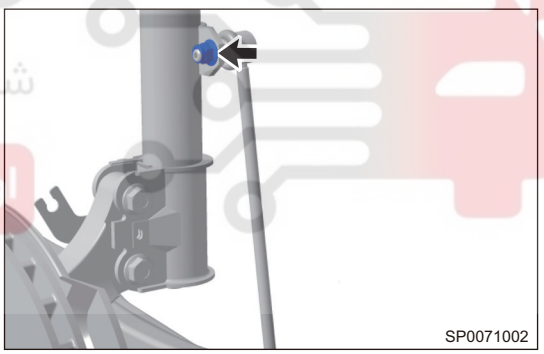
   (a) Hold the lower end of front left stabilizer link assembly with an inner hexagon wrench, and remove the coupling nut (arrow) between front left stabilizer bar assembly and front left stabilizer link assembly with a fixing wrench.

   Tightening torque
   60 ± 6.0 N·m


SP0024002

   (b) Hold the upper end of front left stabilizer link assembly with an inner hexagon wrench, and remove the coupling nut (arrow) between front left stabilizer bar assembly and front left shock absorber assembly with a fixing wrench.

   Tightening torque
   60 ± 6 N·m


SP0071002

   (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 it as necessary.
   (b) Check if end of front stabilizer link assembly rotates smoothly. Replace it as necessary.

Installation

1. Installation is in the reverse order of removal.

   Caution:

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

Rear Shock Absorber Assembly

Description

Description

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 - Shock Absorber Lock Nut	6 - Rear Shock Absorber Assembly

Removal

Warning/Caution/Hint

Caution:

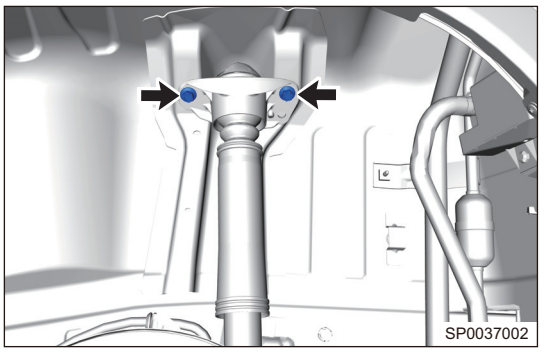
- Be sure to wear necessary safety equipment to prevent accidents.
- Check if safety lock of lift is locked when repairing chassis parts.

- It is not permitted to weld or modify suspension bearing parts and guide parts.
- When removing chassis parts, replace self-locking nuts and rusted nuts for safety.
- When lowering front sub frame welding assembly, you need to support engine and transmission assembly securely with engine equalizer to avoid damage.

1. Remove the rear left wheel (See page 20-8).
2. Remove the rear left wheel house protector (See page 45-32).
3. Remove the rear left shock absorber assembly.

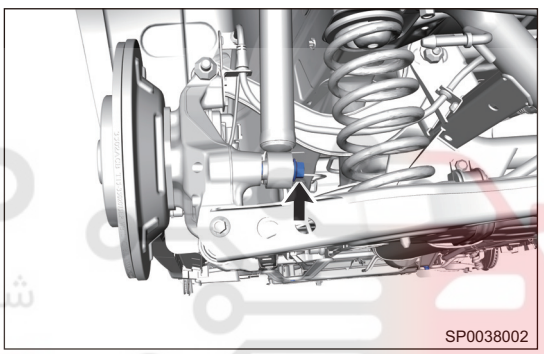
(a) Remove 2 coupling bolts (arrow) between upper part of rear left shock absorber assembly and body.

Tightening torque
60 ± 6 N·m



(b) Remove the coupling bolt (arrow) between lower part of rear left shock absorber assembly and rear left steering knuckle assembly.

Tightening torque
160 ± 16 N·m



(c) Remove the rear left shock absorber assembly.

Disassembly

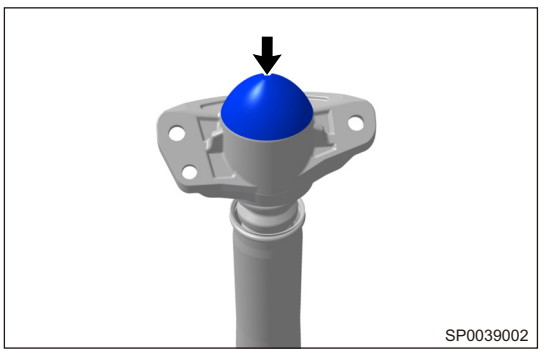
Warning/Caution/Hint

Hint:

- Use same procedures for right and left sides.
- Procedures listed below are for left side.

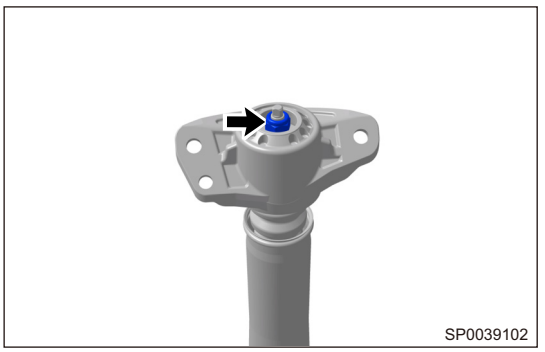
1. Disassemble the rear left shock absorber assembly.

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

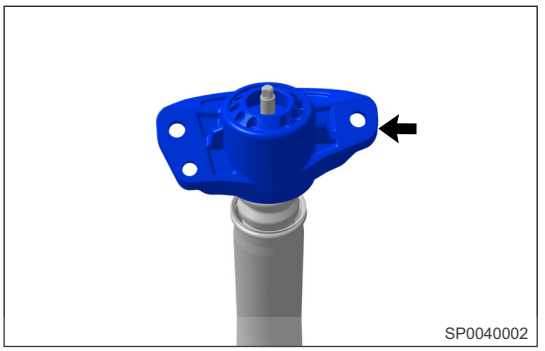


(b) Remove the fixing nut (arrow) from rear shock absorber assembly.

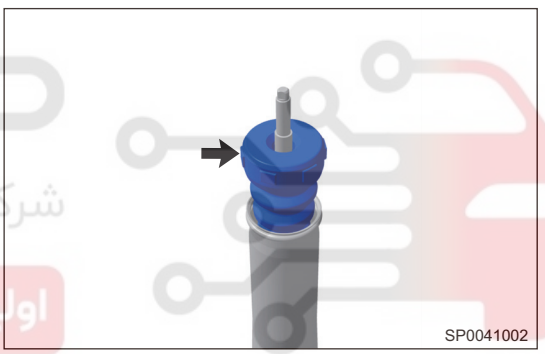
Tightening torque
33 ± 3 N·m


SP0039102

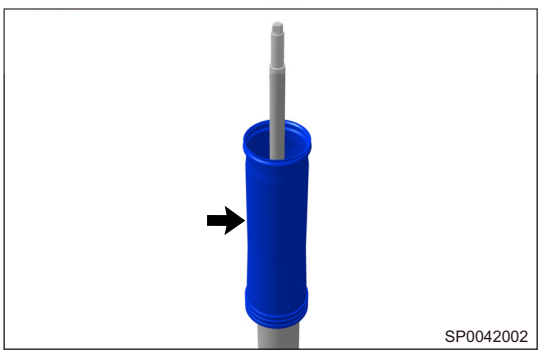
(c) Remove the rear shock absorber upper connecting plate assembly (w/ insulator) (arrow).


SP0040002

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


SP0041002

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

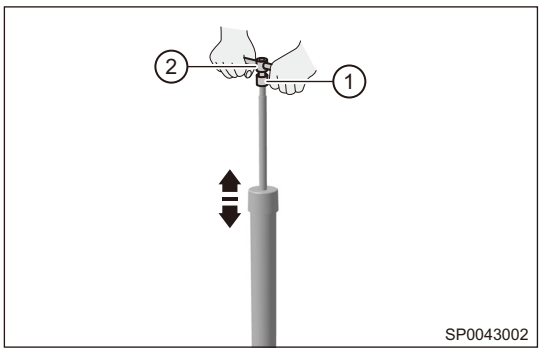

SP0042002

19

Inspection

1. Check the rear shock absorber assembly.
   Manual check:

(a) Install the nut (1) to the upper end of rear shock absorber assembly strut, and then install the T-wrench (2) or equivalent.



(b) Compress and extend the 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 the rear shock absorber assembly with a new one.

2. Check the other components of rear shock absorber assembly.
   (a) Check rear dust boot, rear buffer block and rear shock absorber cover cap for cracks, wear or deformation. Replace it as necessary.
   (b) Check front coil spring for wear, cracks or deformation. Replace it as necessary.

Assembly

1. Assembly is in the reverse order of disassembly.

Installation

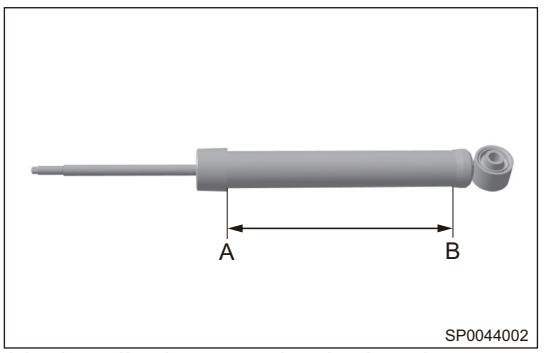
1. Installation is in the reverse order of removal.

Caution:

- Be sure to tighten coupling bolts and nuts to specified torques.
- Bounce vehicle up and down several times to stabilize rear suspension after installation.

Disposal

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



Caution:

- Be careful when drilling, because mental 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) After discharging gas from rear shock absorber assembly, handle the rear shock absorber assembly properly.

Hint:

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

Rear Coil Spring

Removal

Warning/Caution/Hint

Hint:

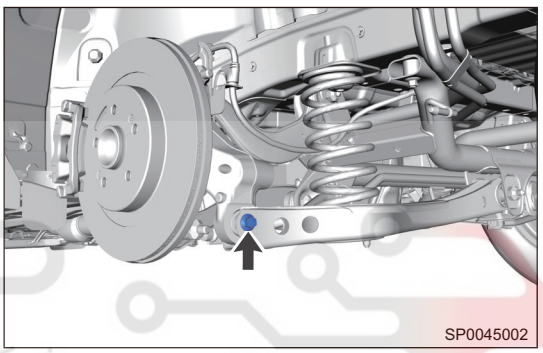
- Use same procedures for right and left sides.
- Procedures listed below are for left side.

Caution:

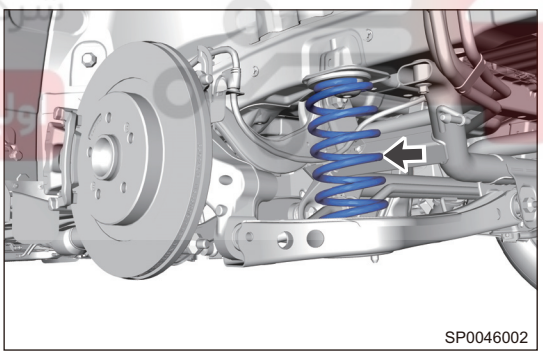
- Be sure to wear necessary safety equipment to prevent accidents.
- Check if safety lock of lift is locked when repairing chassis parts.
- It is not permitted to weld or modify suspension bearing parts and guide parts.
- When removing chassis parts, replace self-locking nuts and rusted nuts for safety.

1. Remove the rear wheel (See page 20-8).
2. Remove the rear coil spring.
   (a) Support the rear lower control arm assembly with a transmission carrier securely.
   (b) Remove the coupling bolt and nut (arrow) between rear lower control arm assembly and rear steering knuckle assembly.

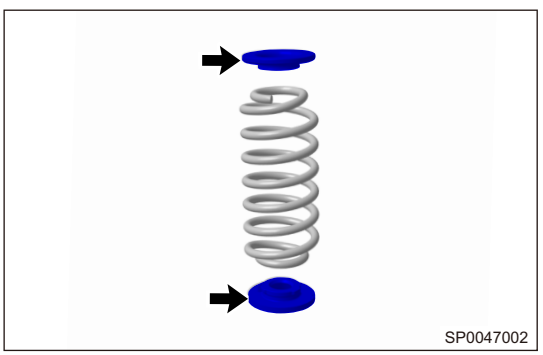
   Tightening torque
   110 ± 11 N·m


SP0045002

   (c) Lower the transmission carrier slowly to an appropriate height and remove the rear coil spring (arrow) carefully.

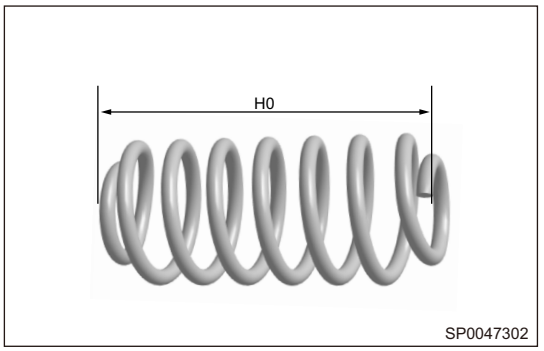

SP0046002

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


SP0047002

Inspection

1. Check the rear coil spring assembly.
   (a) Check rear coil spring for wear, cracks or permanent deformation due to excessive use. Replace it as necessary.
   (b) Check rear coil spring upper cushion and lower cushion for dirty, wear, cracks, deformation or damage. Replace it as necessary.
   (c) Check the free height of rear coil spring, free height of rear coil spring H0 is 380 mm (seven seats) and 368 mm (five seats). Replace it as necessary.



Installation

1. Installation is in the reverse order of removal.
   Caution:
   - Be sure to tighten coupling bolts and nuts to specified torques.
   - Align the protrusion of rear coil spring lower cushion with the positioning hole of rear lower control arm assembly during installation.
   - After installation, lower vehicle and bounce vehicle up and down several times to stabilize rear suspension.
   - Check wheel alignment after installation. Adjust wheel alignment to standard range as necessary.

Rear Upper Control Arm Assembly

Removal

Warning/Caution/Hint

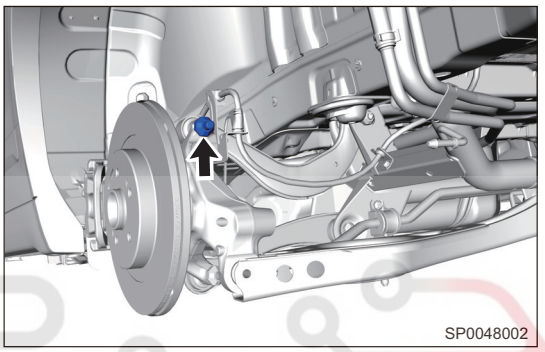
Hint:

- Use same procedures for right and left sides.
- Procedures listed below are for left side.

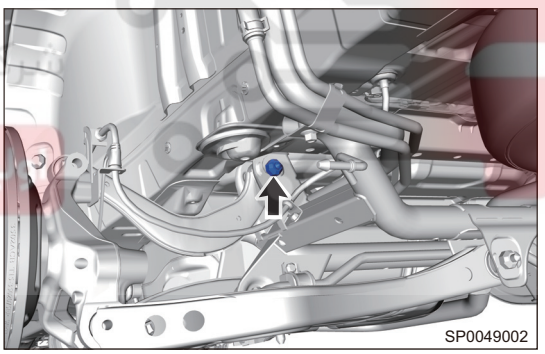
Caution:

- Be sure to wear necessary safety equipment to prevent accidents.
- Check if safety lock of lift is locked when repairing 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.

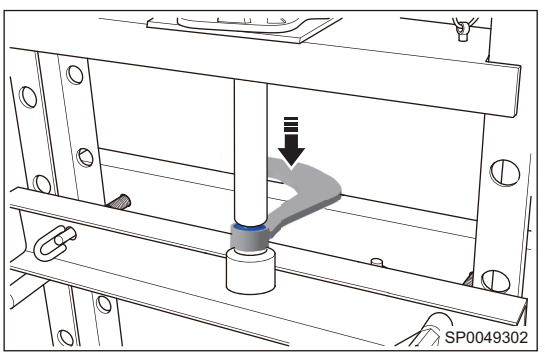
1. Remove the rear wheel (See page 20-8).
2. Remove the rear upper control arm assembly.
   (a) Remove the coupling bolt and nut (arrow) between rear upper control arm assembly and rear steering knuckle assembly.
   Tightening torque
   160 ± 16 N·m



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



   (c) Remove the rear upper control arm assembly.
3. Remove the rear upper control arm assembly rubber bushing.
   (a) Place the rear upper control arm assembly on a hydraulic press, match the adapter, and press out the rear upper control arm assembly rubber bushing.



Installation

1. 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. Adjust wheel alignment to standard range as necessary.

Rear Lower Control Arm Assembly

Removal

Warning/Caution/Hint

Hint:

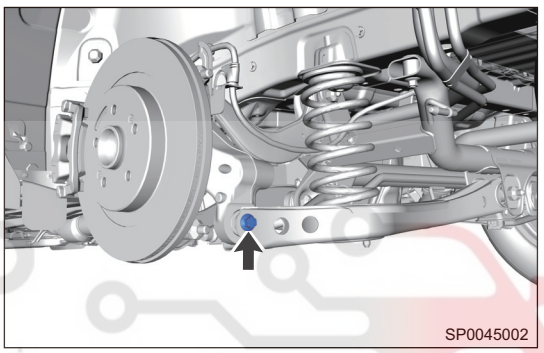
- Use same procedures for right and left sides.
- Procedures listed below are for left side.

Caution:

- Be sure to wear necessary safety equipment to prevent accidents.
- Check if safety lock of lift is locked when repairing 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.

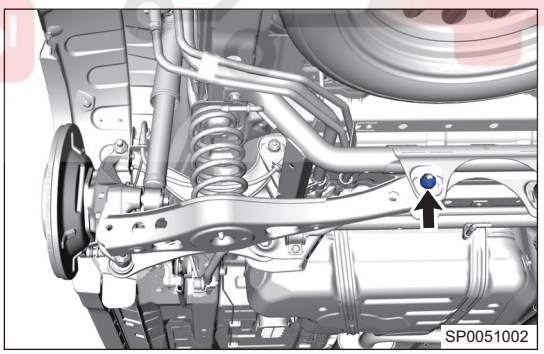
1. Remove the rear wheel (See page 20-8).
2. Remove the rear upper control arm assembly.
   (a) Support the rear lower control arm assembly with a transmission carrier securely.
   (b) Remove the coupling bolt and nut (arrow) between rear upper control arm assembly and rear steering knuckle assembly.

   Tightening torque
   110 ± 11 N·m



   (c) Lower the transmission carrier slowly to an appropriate height and remove the rear coil spring, rear coil spring upper cushion and rear coil spring lower cushion carefully.
   (d) Remove the coupling bolt, nut and adjusting washer (arrow) between rear lower control arm assembly and rear sub frame welding assembly.

   Tightening torque
   110 ± 11 N·m



   (e) Remove the rear lower control arm assembly.

Installation

1. 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. Adjust wheel alignment to standard range as necessary.

Rear Trailing Arm Assembly

Removal

Warning/Caution/Hint

Hint:

- Use same procedures for right and left sides.
- Procedures listed below are for left side.

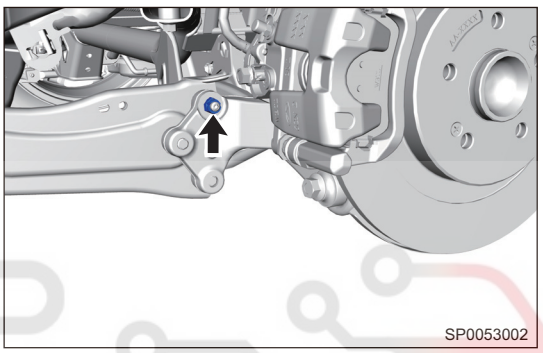
Caution:

- Be sure to wear necessary safety equipment to prevent accidents.
- Check if safety lock of lift is locked when repairing 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.

1. Remove the rear wheel (See page 20-8).
2. Remove the rear trailing arm assembly.

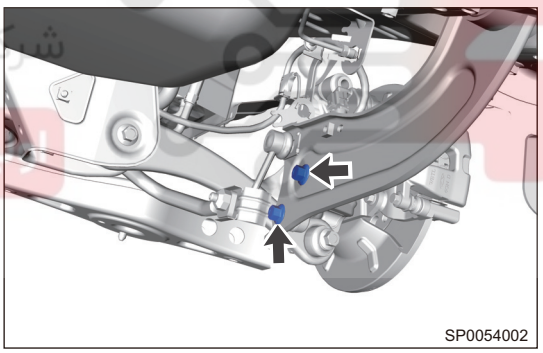
(a) Remove the coupling nut (arrow) between rear stabilizer link assembly and rear trailing arm assembly, and disengage the rear stabilizer link assembly.

Tightening torque
60 ± 6.0 N·m


SP0053002

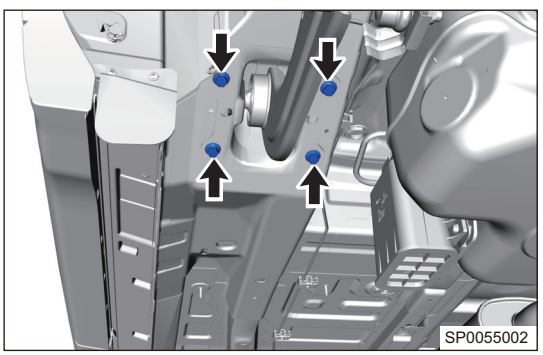
(b) Remove 2 coupling bolts (arrow) between rear steering knuckle assembly and rear trailing arm assembly.

Tightening torque
110 ± 11 N·m


SP0054002

(c) Remove 4 coupling bolts (arrow) between rear trailing arm assembly mounting bracket and body.

Tightening torque
60 ± 6.0 N·m


SP0055002

(d) Remove the rear trailing arm assembly (w/ mounting bracket).

Disassembly

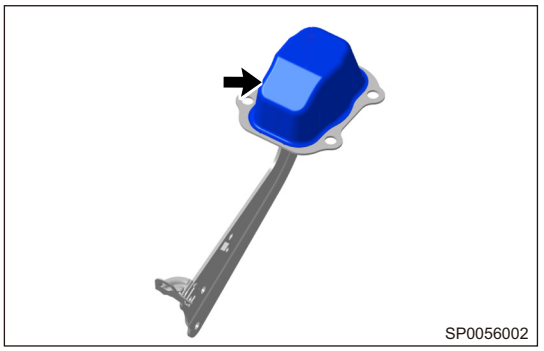
Warning/Caution/Hint

Hint:

- Use same procedures for right and left sides.
- Procedures listed below are for left side.

1. Remove the rear trailing arm assembly (w/ mounting bracket).

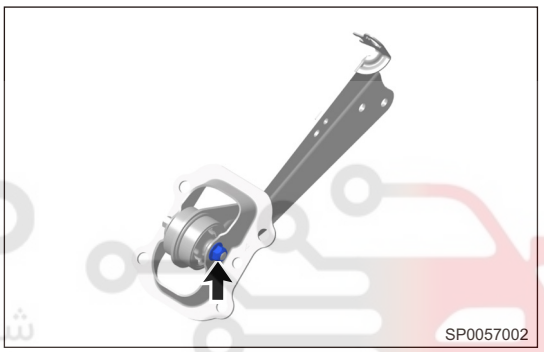
(a) Remove the rear trailing arm mounting bracket dust cover (arrow).



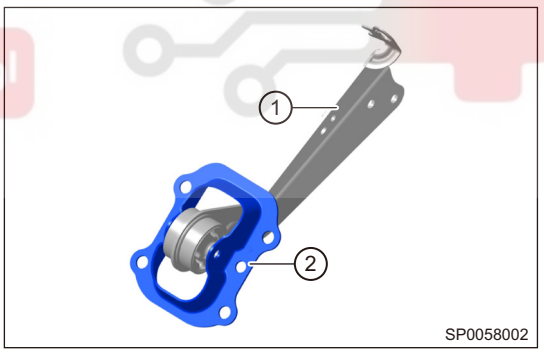
(b) Remove the coupling bolt and nut (arrow) between rear trailing arm assembly and mounting bracket.

Tightening torque

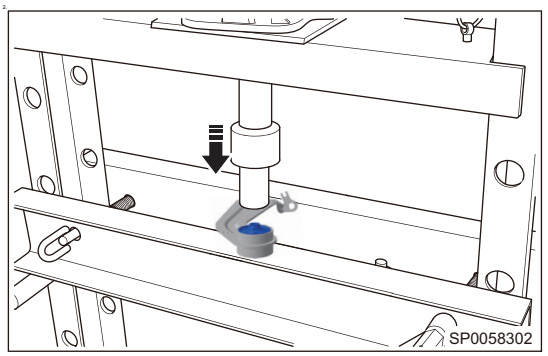
120 ± 12 N·m



(c) Separate the rear trailing arm assembly (1) and mounting bracket (2).



(a) Place the rear trailing arm assembly on a hydraulic press, match the adapter, and press out the rear trailing arm assembly rubber bushing.



Assembly

1. Assembly is in the reverse order of disassembly.

Installation

1. 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. Adjust wheel alignment to standard range as necessary.

Rear Connecting Rod Assembly

Removal

Warning/Caution/Hint

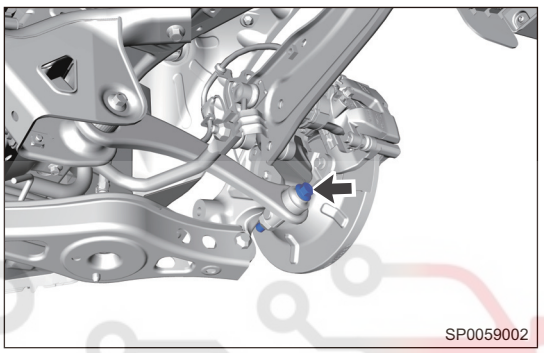
Hint:

- Use same procedures for right and left sides.
- Procedures listed below are for left side.

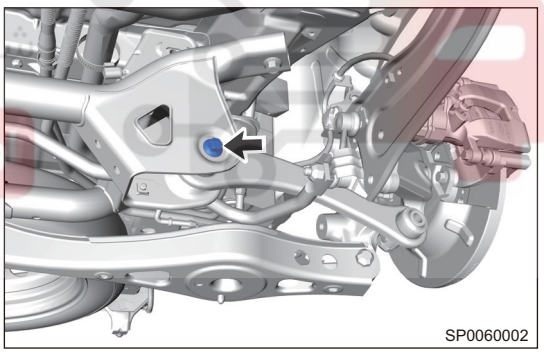
Caution:

- Be sure to wear necessary safety equipment to prevent accidents.
- Check if safety lock of lift is locked when repairing 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.

1. Remove the rear wheel (See page 20-8).
2. Remove the rear connecting rod assembly.
   (a) Remove the coupling bolt and nut (arrow) between rear connecting rod assembly and rear steering knuckle assembly.
   Tightening torque
   160 ± 16 N·m


SP0059002

   (b) Remove the coupling bolt and nut (arrow) between rear connecting rod assembly and rear sub frame welding assembly.
   Tightening torque
   110 ± 11 N·m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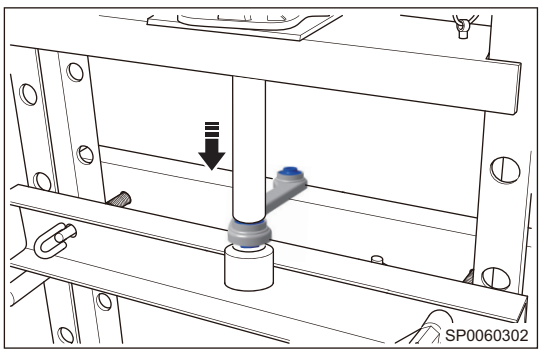
   (c) Remove the rear connecting rod assembly.
3. Remove the rear connecting rod assembly rubber bushing.
   (a) Place the rear connecting rod assembly on a hydraulic press, match the adapter, and press out the connecting rod assembly rubber bushing.


SP0060302

Installation

1. Installation is in the reverse order of removal.
   Caution:
   - Be sure to tighten coupling bolts and nuts to specified torques.

Rear Stabilizer Bar Assembly

Removal

Warning/Caution/Hint

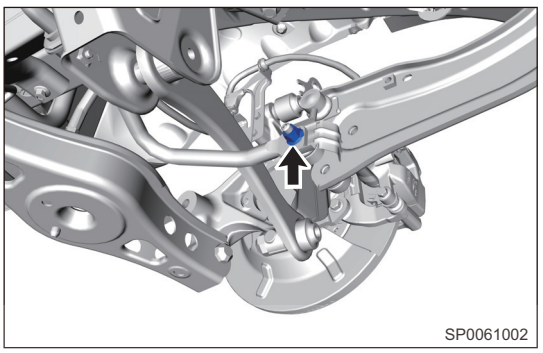
Caution:

- Be sure to wear necessary safety equipment to prevent accidents.
- Check if safety lock of lift is locked when repairing 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.

1. Remove the rear stabilizer bar assembly.

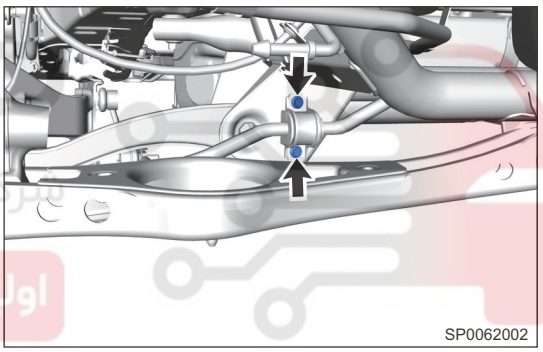
(a) Remove the coupling nut (arrow) between rear left stabilizer link assembly and rear stabilizer bar assembly. Use same removal procedure for right side.

Tightening torque
60 ± 6.0 N·m


SP0061002

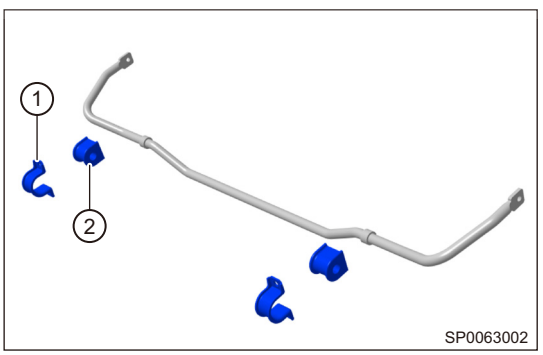
(b) Remove 2 coupling bolts (arrow) between rear stabilizer bar assembly and rear sub frame welding assembly (take left side as an example).

Tightening torque
25 ± 4.0 N·m


SP0062002

(c) Remove the rear stabilizer bar assembly.

(d) Remove the rear stabilizer bar fixing clamps (1) and rear stabilizer bar rubber supports (2) from rear stabilizer bar assembly.



SP0063002

Inspection

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

Installation

1. Installation is in the reverse order of removal.
   Caution:
   - Be sure to tighten coupling bolts and nuts to specified torques.

Rear Stabilizer Link Assembly

Removal

Warning/Caution/Hint

Hint:

- Use same procedures for right and left sides.
- Procedures listed below are for left side.

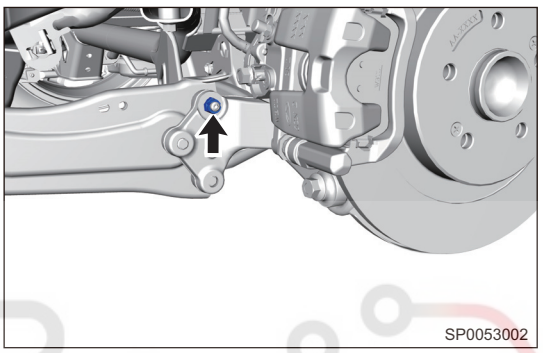
Caution:

- Be sure to wear necessary safety equipment to prevent accidents.
- Check if safety lock of lift is locked when repairing 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.

1. Remove the rear stabilizer link assembly.

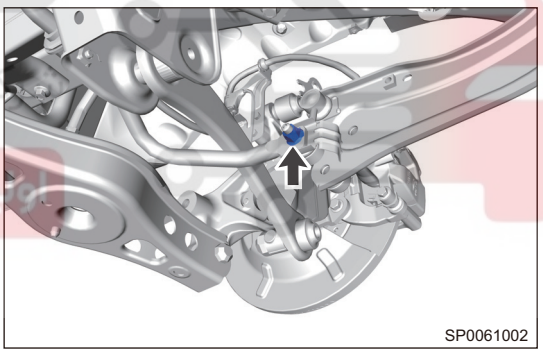
   (a) Remove the coupling nut (arrow) between rear stabilizer link assembly and rear trailing arm assembly, and disengage the rear stabilizer link assembly.

   Tightening torque
   60 ± 6.0 N·m


SP0053002

   (b) Remove the coupling nut (arrow) between rear stabilizer link assembly and rear stabilizer bar assembly.

   Tightening torque
   60 ± 6.0 N·m


SP0061002

   (c) Remove the rear stabilizer link assembly.

Inspection

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

Installation

1. Installation is in the reverse order of removal.

   Caution:

   - Be sure to tighten coupling bolts and nuts to specified torques.
   - Make sure that end of rear stabilizer link assembly rotates smoothly and there is no sticking after installation.

WHEEL ALIGNMENT

Description

Warning/Caution/Hint
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 the following 5 parameters:

2. Check front wheel camber.
3. Check kingpin caster.
4. Check kingpin inclination.
5. Check rear wheel camber.
6. Check the total toe of the four wheel alignment.

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 Lower Control Arm Assembly
- Rear Upper Control Arm Assembly
- Rear Steering Knuckle Assembly
- Rear Sub Frame Welding Assembly

Specifications (parameters standard for four-wheel alignment)

Item		Specified Value
Front Wheel	Front Wheel Camber	-25′ ± 45′
	Kingpin Caster	4°28′ ± 60'
	Kingpin Inclination	13°43′ ± 60′
Rear Wheel	Rear Wheel Camber	-42′ ± 30′
Total toe adjustment of four wheel alignment		One side: 5′ ± 5′

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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 it as necessary.

Symptom	Suspected Area
Vehicle pulls	Front wheel alignment (incorrect)
	Rear wheel alignment (incorrect)
Wheel shimmy	Front wheel alignment (incorrect)
	Rear wheel alignment (incorrect)
Abnormal tire wear	Tire (worn or improperly inflated)
	Front wheel alignment (incorrect)
	Rear wheel alignment (incorrect)

Inspection before Wheel Alignment

1. Vehicle is in unloaded state.
2. Use a lift to support and raise vehicle to a proper height.
3. Check hub bearing for excessive clearance, and replace the hub bearing as necessary.
4. Check suspension components, steering tie rod and ball pin for wear, deformation or damage. Replace malfunctioning parts as necessary.
5. Check shock absorber assembly for proper operation.
6. Check if tire pressure is within the specified range and adjust it to specified pressure as necessary.
   Check if tire pressure is within the specified range and adjust it to specified pressure as necessary.

Item	Front Wheel	Rear Wheel	Spare Tire
Cold tire pressure (kPa) (unloaded)	220	220	420

7. Check rim and tire.
   (a) Visually check rim and tire for scratches, wear or damage.
   (b) Perform wheel dynamic balance procedures.

Front Wheel Camber

1. Incorrect front wheel camber will cause abnormal tire wear. Check and adjust front wheel camber as necessary.
   Camber adjustment is not necessary after assembling independent suspension and wheel steering knuckle. If wheel camber is not within the tolerance due to other reasons, adjust through the coupling bolt between independent suspension and steering knuckle.
   Specified Value for Front Wheel Camber:

Item	Specified Value
Front Wheel Camber	-25′ ± 45′

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.

Front Wheel Toe-in

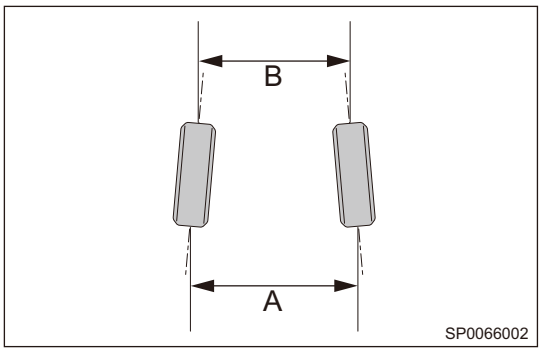
1. Incorrect front wheel toe-in will cause wheel pull and abnormal tire wear. Check and adjust front wheel toe-in as necessary.
   If front wheel toe-in is not within the tolerance due to other reasons, adjust the length of steering tie rod to return the toe-in to specified value.
   Specified Value for Front Wheel Toe-in:

Item	Specified Value
Total toe of four wheel alignment	One side: 5′ ± 5′

Inspection

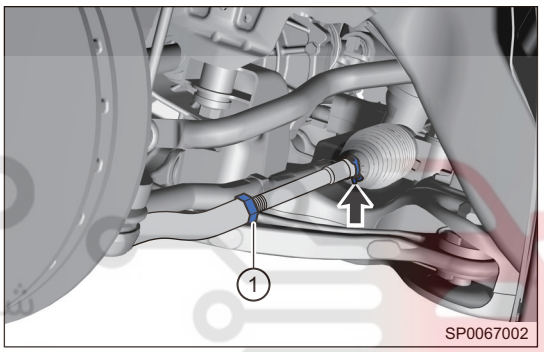
1. Perform inspection with four-wheel alignment device (perform inspection procedures referring to operating instructions for four-wheel alignment device).
2. Manual check:
   (a) Park vehicle on level ground, check if front tire pressure is within the specified range and adjust it to specified value as necessary.

(b) Place marks on the center position in front of front wheels, and measure the distance A between marks with a tape measure.
(c) Push vehicle to rotate wheels 180°, and measure the distance B between marks with a tape measure when marks are turned to the rear of wheels.
(d) Calculation method: front wheel toe-in = A - B ≦ 1 mm



Adjustment

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



3. Tighten the steering tie rod locking nut and reinstall the elastic jacket snap ring. Check if locking nut is tightened in place and if jacket position is correct.
   Tightening torque
   55 ± 5.0 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 the steering wheel locking nut and adjust the steering wheel to horizontal position, and then tighten the steering wheel locking nut to specified torque.
   Tightening torque
   30 ± 3.0 N·m

Kingpin Caster & Kingpin Inclination

1. Kingpin caster and kingpin inclination can only be checked by using four-wheel alignment device.
   Kingpin caster and kingpin inclination are assured by design structure and cannot be adjusted.
   If measured value is not within the specified range, check if other components that connect to steering knuckle are deformed or damaged, and check the connecting part of steering knuckle for deformed or damaged.
   If it is, replace corresponding components.
   Specified Value for Kingpin Caster & Kingpin Inclination:

Item	Specified Value
Kingpin Caster	4°28′ ± 60′
Kingpin Inclination	13°43′ ± 60′

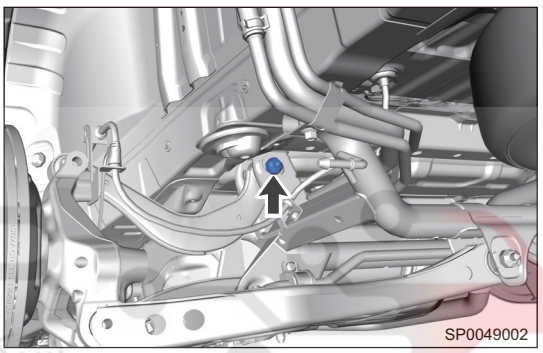
Rear Wheel Camber

1. Incorrect rear wheel camber will cause wheel pull and abnormal tire wear. Check and adjust rear wheel camber as necessary.
   If rear wheel camber is not within the tolerance due to other reasons, adjust eccentric adjusting bolt and eccentric adjusting sleeve between rear upper control arm assembly and rear sub frame welding assembly to return the camber to specified value.
   If rear wheel camber is not as specified, check rear suspension and wheels for damage or deformation. Replace damaged or deformed components as necessary.
   Specified Value for Rear Wheel Camber:

Item	Specified Value
Rear Wheel Camber	-42′ ± 30′

Adjustment

1. Make adjusting preparation for wheel alignment according to the requirement of tester.
2. Loosen the coupling bolt (arrow) between rear upper control arm assembly and rear sub frame assembly, be careful that eccentric adjusting sleeve does not detach from groove.



3. Rotate the eccentric adjusting sleeve and eccentric adjusting bolt to adjust rear wheel camber to specified value.
4. Tighten the coupling bolt between rear upper control arm assembly and rear sub frame welding assembly to specified torque after adjustment (adjusting method of left and right wheels is the same).
   Tightening torque
   110 ± 11 N·m

Rear Wheel Toe-in

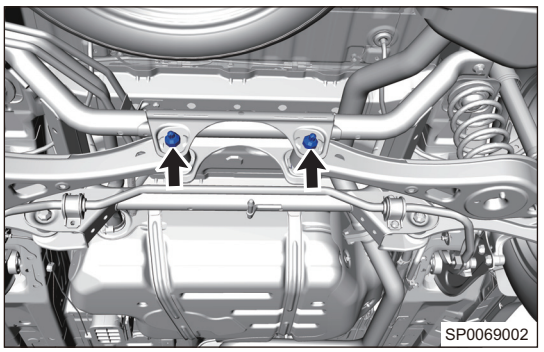
1. Incorrect rear wheel toe-in will cause wheel pull and abnormal tire wear. Check and adjust rear wheel toe-in as necessary.
   If rear wheel toe-in is not within the tolerance due to other reasons, adjust eccentric adjusting bolt and eccentric adjusting sleeve between rear lower control arm assembly and rear sub frame welding assembly to return the toe-in to specified value.
   If rear wheel toe-in is not as specified, check rear suspension and wheels for damage or deformation. Replace damaged or deformed components as necessary.
   Specified Value for Rear Wheel Toe-in:

Item	Specified Value
Total toe of four wheel alignment	5′ ± 10′ (one side) Dynamic total toe: 10′ ± 22′

Adjustment

1. Make adjusting preparation for wheel alignment according to the requirement of tester.

2. Loosen the coupling bolt (arrow) between rear lower control arm assembly and rear sub frame welding assembly, be careful that eccentric adjusting sleeve does not detach from groove.



3. Rotate the eccentric adjusting bolt and eccentric adjusting sleeve to adjust rear wheel toe-in to specified value.
4. Tighten the coupling bolt between rear lower control arm assembly and rear sub frame welding assembly to specified torque after adjustment (adjusting method of left and right wheels is the same).

Tightening torque

110 ± 11 N·m

- MEMO -