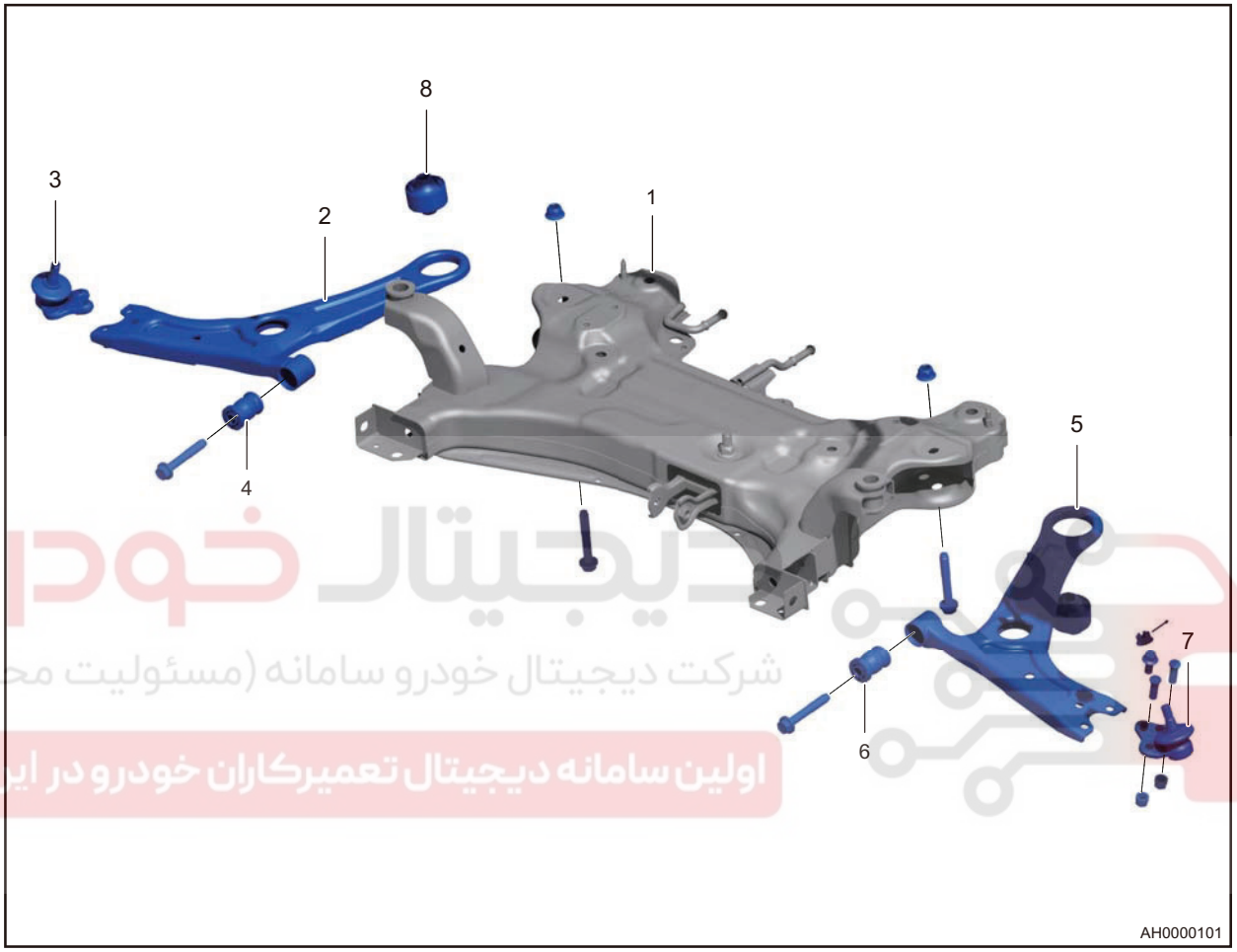
AXLE

GENERAL INFORMATION

Overview

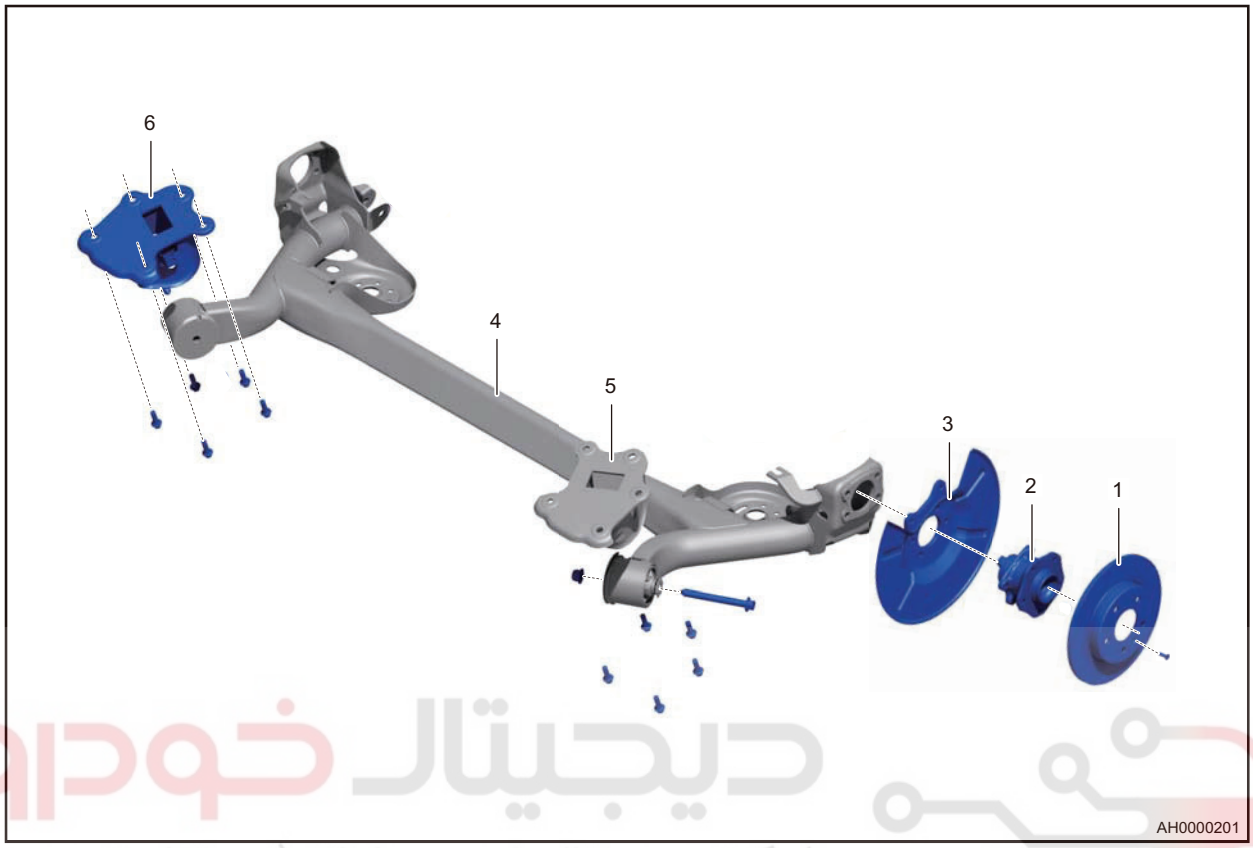
Description

Front Axle



1 - Front Sub Frame Assembly	2 - Front Right Control Arm Assembly
3 - Front Right Control Arm Ball Pin Assembly	4 - Rubber Bushing
5 - Front Left Control Arm Assembly	6 - Rubber Bushing
7 - Front Left Control Arm Ball Pin Assembly	8 - Rubber Bushing

Rear Axle



1 - Rear Left Brake Disc	2 - Rear Left Hub Bearing
3 - Rear Left Fender Apron Assembly	4 - Rear Shaft Assembly
5 - Rear Left Shaft Bracket Assembly	6 - Rear Right Shaft Bracket Assembly

Axles are connected to the integral body through suspensions, and wheels are installed at both ends. Its function is to transmit force in all directions between integral body and wheels.

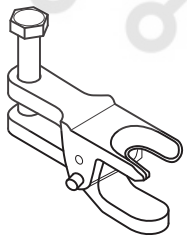
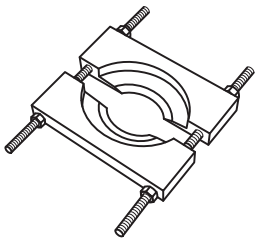
Specifications

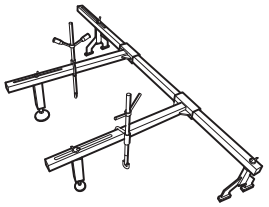
Torque Specifications

Description	Torque (N·m)
Front Drive Shaft Assembly Locking Nut	270 ± 20
Self-locking Nut Between Steering Tie Rod Assembly Ball Pin and Front Steering Knuckle Assembly	45 ± 5
Coupling Nut Between Front Control Arm Assembly Ball Pin and Front Steering Knuckle Assembly	95 ± 10
Coupling Bolt Between Front Shock Absorber Assembly and Front Steering Knuckle Assembly	240 ± 24
Locking Nut Between Front Shock Absorber Assembly and Front Steering Knuckle Assembly	240 ± 24
Coupling Bolt Between Front Stabilizer Bar Assembly and Front Sub Frame Welding Assembly	25 ± 3
Coupling Bolt Between Front Sub Frame Welding Assembly and Body	180 ± 18
Fixing Bolt Between Dust Guard and Front Left Steering Knuckle Assembly	10 ± 1
Fixing Bolt Between Front Wheel Speed Sensor and Front Left Steering Knuckle Assembly	10 ± 1
Fixing Bolt Between Front Sub Frame Welding Assembly and Steering Gear	110 N·m + 240° (Torque angle method)
Rear Shock Absorber Lower Connecting Pin Coupling Bolt	160 ± 16
Coupling Bolt Between Rear Shock Absorber and Body	60 ± 6
Mandrel Bolt Between Rear Shaft Bracket and Rear Shaft Assembly	180 ± 18
Coupling Bolt Between Rear Shaft Bracket and Body	60 ± 6

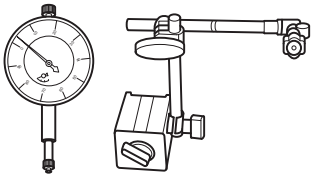
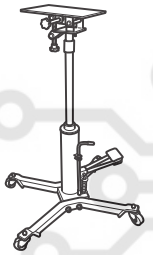
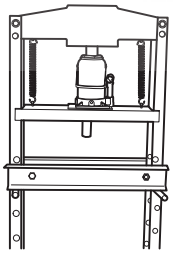
Tools

Special Tools

Tie Rod Ball Pin Remover	 024
Bearing Remover Special Tool	 011

Engine Equalizer	 026

General Tools

Dial Indicator and Magnetic Holder	 023
Transmission Carrier	 005
Hydraulic Press	 012

DIAGNOSIS & TESTING

Problem Symptoms Table

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

Symptom	Suspected Area
Running deviation	Tire (worn or improperly inflated)
	Front wheel alignment (incorrect)
	Rear wheel alignment (incorrect)
	Front hub bearing (loose or worn)
	Rear hub bearing (loose or worn)
	Steering gear (misaligned or damaged)
	Suspension component (worn)
Front wheel shimmy	Tire (worn or improperly inflated)
	Wheel (imbalanced)
	Front shock absorber assembly (stuck or damaged)
	Front wheel alignment (incorrect)
	Control arm ball pin assembly (stuck or damaged)
	Front hub bearing (loose or worn)
	Steering gear (misaligned or damaged)
Rear wheel shimmy	Tire (worn or improperly inflated)
	Wheel (imbalanced)
	Rear shock absorber assembly (stuck or damaged)
	Rear hub bearing (loose or worn)
	Rear wheel alignment (incorrect)

ON-VEHICLE SERVICE

Front Steering Knuckle

Removal

Warning/Caution/Hint

Hint:

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

Caution:

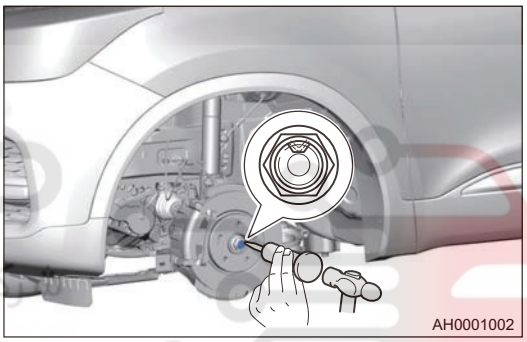
- Be sure to wear necessary safety equipment to prevent accidents.
- Check if safety lock of lift is locked when repairing chassis parts.
- It is not permitted to weld or modify bearing parts of wheel suspension and guide parts of wheel.
- When removing chassis parts, replace self-locking nuts and rusted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

1. Turn off all electrical equipment and the ignition switch.
2. Remove the front left wheel.
3. Remove the front drive shaft assembly locking nut.

(a) Using a nut punch and a hammer, loosen the staked part of nut.

Caution:

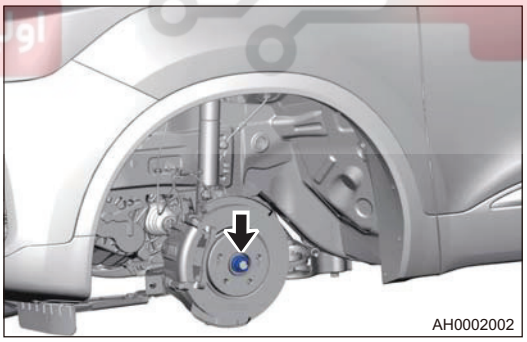
- Loosen staked part of nut completely, otherwise it will damage threads of drive shaft assembly.



(b) Remove the front drive shaft assembly locking nut and washer (arrow) while applying brake securely.

Tightening torque

270 ± 20 N·m

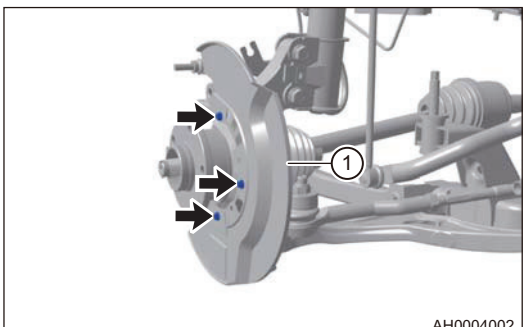


4. Remove the front left brake caliper assembly.
5. Remove the front left brake disc.
6. Remove the front left steering knuckle assembly.

(a) Remove 3 fixing bolts (arrow) between front left dust guard and front left steering knuckle assembly, and remove the front left dust guard (1).

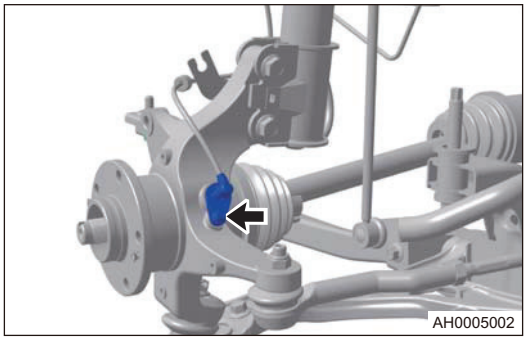
Tightening torque

10 ± 1.0 N·m



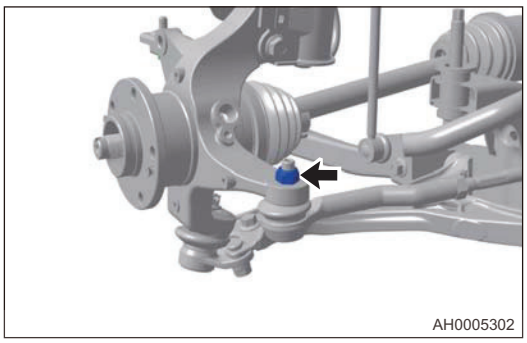
(b) Remove coupling bolt (arrow) between front left wheel speed sensor and front left steering knuckle assembly, and disengage front left wheel speed sensor carefully.

Tightening torque
10 ± 1.0 N·m

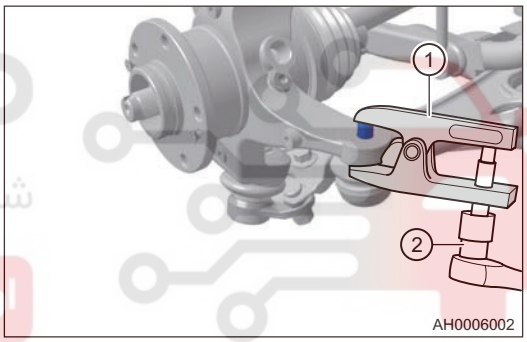


(c) Remove self-locking nut (arrow) between left steering tie rod assembly ball pin and front left steering knuckle assembly.

Tightening torque
45 ± 5 N·m

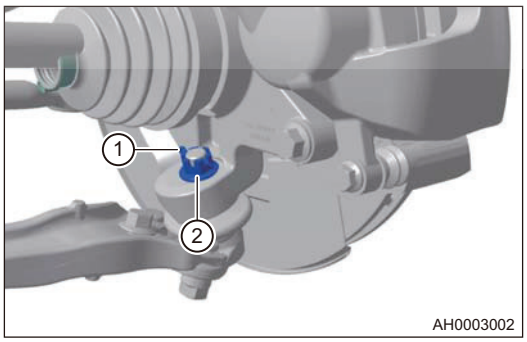


(d) Install ball pin separator (1), and tighten ball pin separator bolt with a wrench (2) to separate steering tie rod ball pin from steering knuckle assembly.

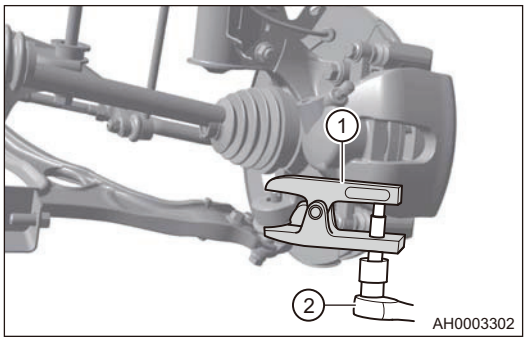


(e) Remove locking pin (1) and coupling nut (2) between front left control arm assembly ball pin and front left steering knuckle assembly.

Tightening torque
95 ± 10 N·m

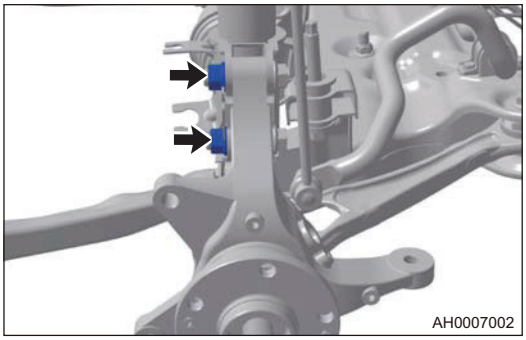


(f) Install ball pin separator (1), and tighten ball pin separator bolt with a wrench (2) to separate lower control arm ball pin from steering knuckle assembly.



(g) 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


AH0007002

(h) Disengage the left drive shaft and remove the front left steering knuckle assembly.

Disassembly

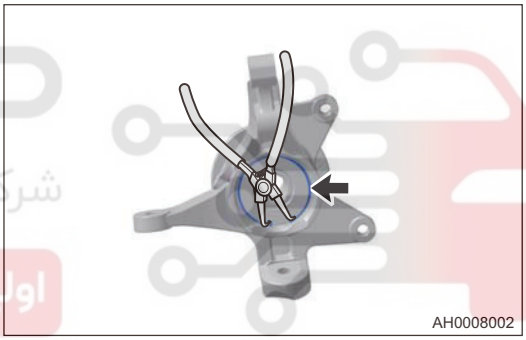
Warning/Caution/Hint

Caution:

- Be sure to wear necessary safety equipment to prevent accidents, when disassembling the front steering knuckle assembly, front hub, front hub bearing.
- Appropriate force should be applied, when disassembling the front steering knuckle assembly, front hub, front hub bearing. Be careful not to operate roughly.

1. Remove the front steering knuckle assembly, front hub and front hub bearing.

(a) Remove the front hub bearing retainer (arrow) with snap spring pliers.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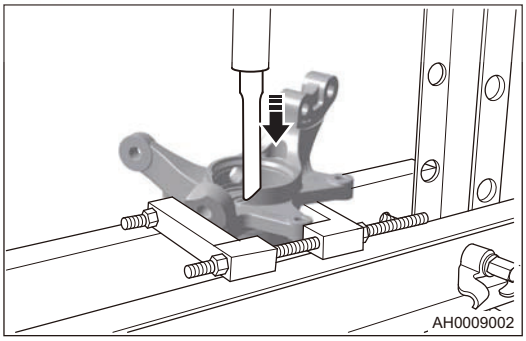
(b) Place the front steering knuckle assembly on a hydraulic press, install the bearing remover and adapter, and press out the front hub with hydraulic press.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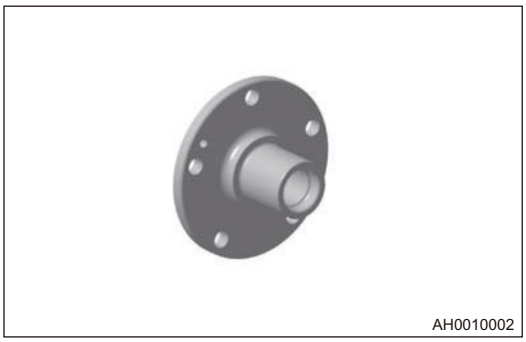
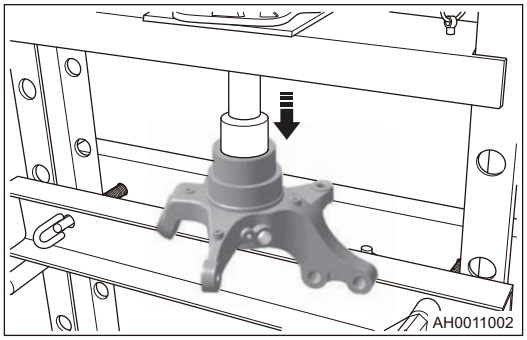
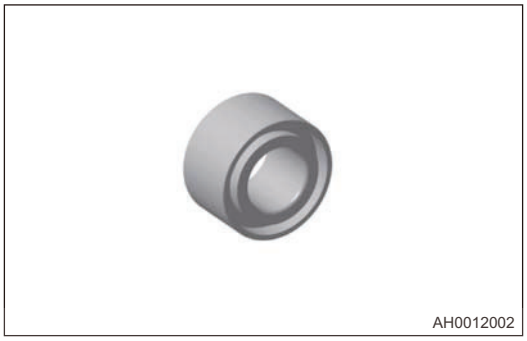
(c) Remove the front hub carefully.


AH0010002

(d) Place steering knuckle assembly on a hydraulic press, install bearing remover and adapter, and press out front hub bearing with hydraulic press.



(e) Remove the front hub bearing carefully.



Inspection

After installing front steering knuckle assembly, front hub and front hub bearing, check front steering knuckle and dust guard.

1. Check front steering knuckle for wear, cracks, deformation or damage. Replace as necessary.
2. Check dust guard for dirt, wear, cracks, deformation or damage. Replace 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 coupling bolts and nuts to specified torques.
   - Check wheel alignment after installation. Adjust wheel alignment to the standard range as necessary.

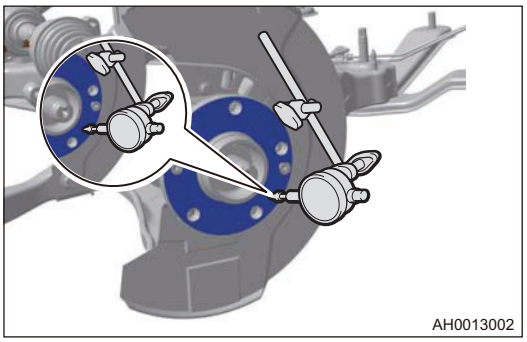
Front Hub Bearing

On-vehicle Inspection

1. Remove the front wheel.
2. Remove the front brake caliper assembly (See page 24-27).
3. Remove the front brake disc (See page 24-27).
4. Check the front hub bearing looseness.

   (a) Check looseness near center of the front hub assembly with a dial indicator.

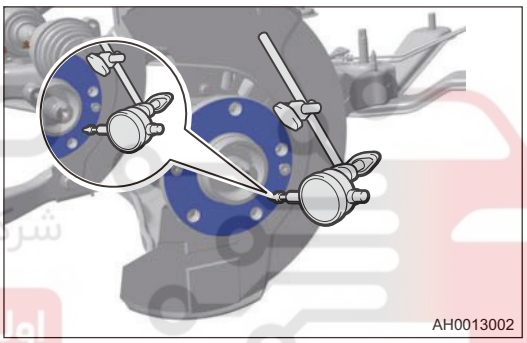
   Caution:
   - Ensure that dial indicator is perpendicular to measurement surface.
   - If looseness exceeds maximum value, replace the front hub bearing.



5. Check the front hub bearing runout.

   (a) Check runout of the front hub assembly bearing surface with a dial indicator.

   Caution:
   - Ensure that dial indicator is perpendicular to measurement surface.
   - If runout exceeds maximum value, replace front hub bearing.



Removal

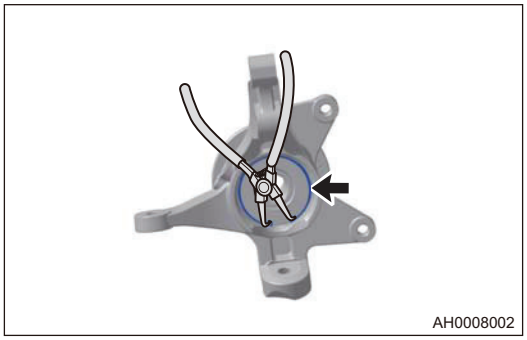
Warning/Caution/Hint

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 bearing parts of wheel suspension and guide parts of wheel.
- When removing chassis parts, replace self-locking nuts and rusted nuts for safety.

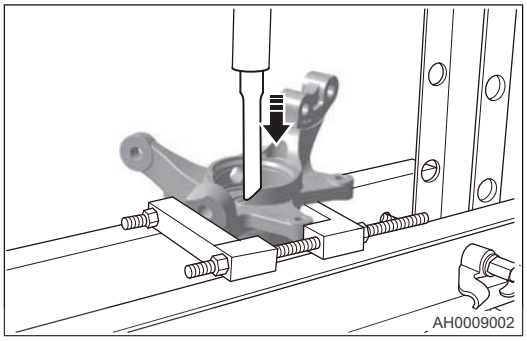
Hint:
- Use same procedures for right and left sides.
- Procedures listed below are for left side.

1. Remove the front left wheel.
2. Remove the front drive shaft assembly locking nut.
3. Remove the front left brake caliper assembly.
4. Remove the front left brake disc.
5. Remove the front left steering knuckle assembly.
6. Remove the front hub assembly.

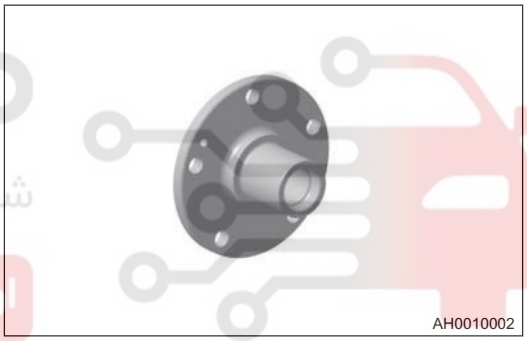
(a) Remove the front hub bearing retainer (arrow) with snap spring pliers.



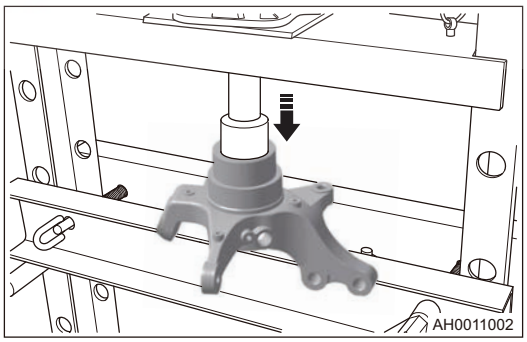
(b) Place the front steering knuckle assembly on a hydraulic press, install the bearing remover and adapter, and press out the front hub with hydraulic press.



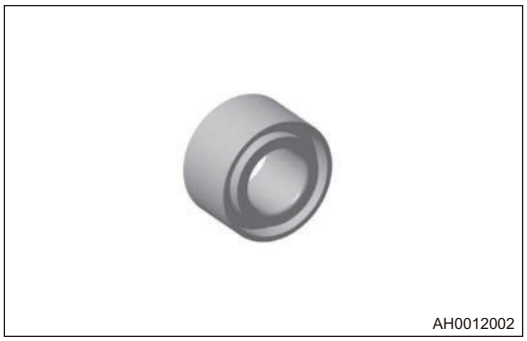
(c) Remove the front hub carefully.



(d) Place steering knuckle assembly on a hydraulic press, install bearing remover and adapter, and press out front hub bearing with hydraulic press.



(e) Remove the front hub bearing carefully.



Installation

1. Installation is in the reverse order of removal.

   Caution:
   - Please note that opening of retainer must face opening of front wheel speed sensor, when installing front hub bearing retainer.
   - Be sure to tighten coupling bolts and nuts to specified torques.
   - Check that hub assembly rotates smoothly and there is no seizuring after installation.
   - Check wheel alignment after installation. Adjust wheel alignment to the standard range as necessary.

Front Sub Frame Welding Assembly

Removal

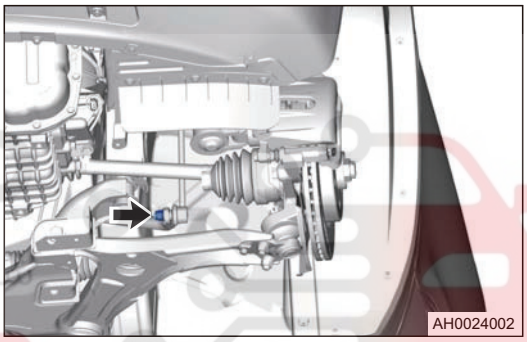
Warning/Caution/Hint

Caution:

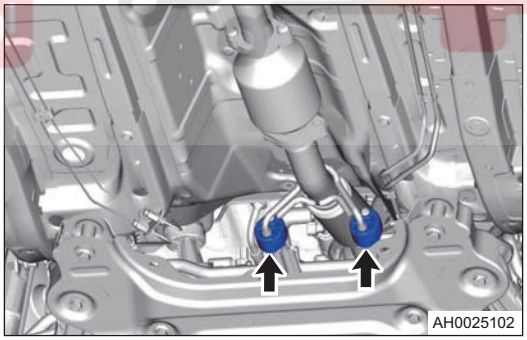
- Be sure to wear necessary safety equipment to prevent accidents.
- Check if safety lock of lift is locked when repairing chassis parts.
- It is not permitted to weld or modify bearing parts of wheel suspension and guide parts of wheel.
- When removing chassis parts, replace self-locking nuts and rusted nuts for safety.
- When removing front sub frame welding assembly, an engine equalizer needs to be used to support engine and transmission assembly securely to prevent them from being damaged.

1. Remove the front wheel.
2. Remove the engine lower protector assembly.
3. Remove the left/right side rail welding assembly.
4. Remove the front left/right control arm assembly.
5. Remove the front sub frame welding assembly.
   (a) Using an engine equalizer, support the engine and transmission assembly securely.
   (b) Remove the coupling nut (arrow) between front left stabilizer bar assembly and front left stabilizer link assembly. Use same removal procedure for right side.

   Tightening torque
   60 ± 6 N·m

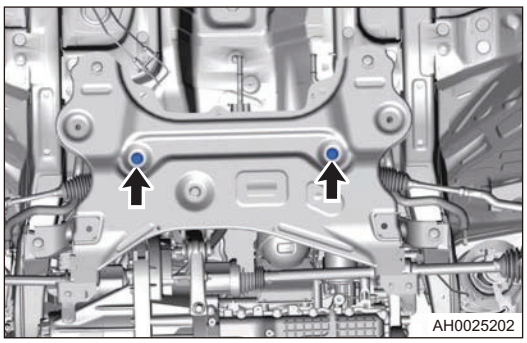


   (c) Detach exhaust pipe fixing rubber lugs (arrow) from front sub frame welding assembly.



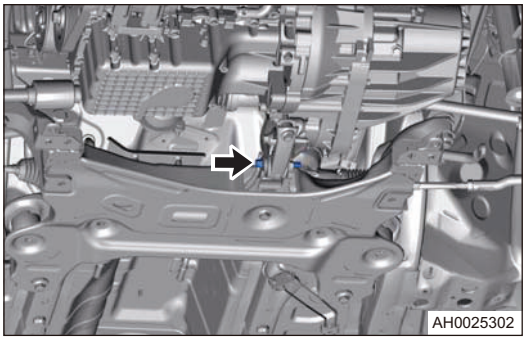
   (d) Remove 2 coupling bolts (arrow) between front sub frame welding assembly and steering gear assembly.

   Tightening torque (Torque angle method)
   110 N·m + 240°

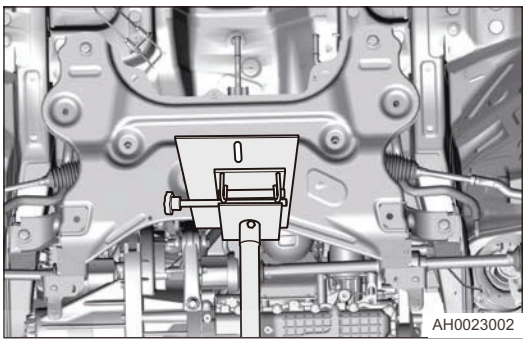


(e) Remove the coupling bolt and nut (arrow) between rear mounting cushion assembly upper body and rear mounting cushion assembly lower body.

Tightening torque
105 ± 10 N·m

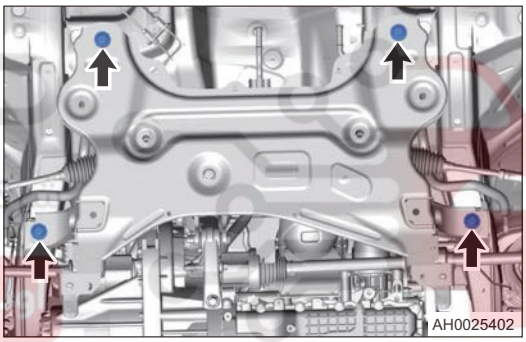


(f) Using a transmission carrier, support front sub frame welding assembly.



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

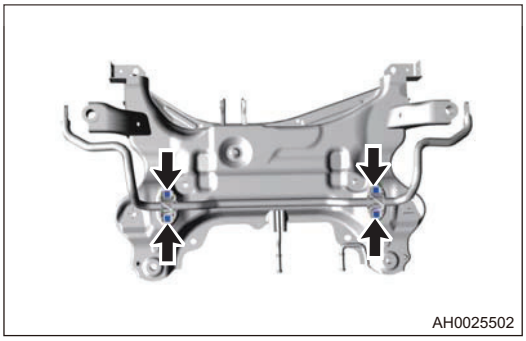
Tightening torque
180 ± 18 N·m



(h) Slowly lower the front sub frame welding assembly with stabilizer bar.

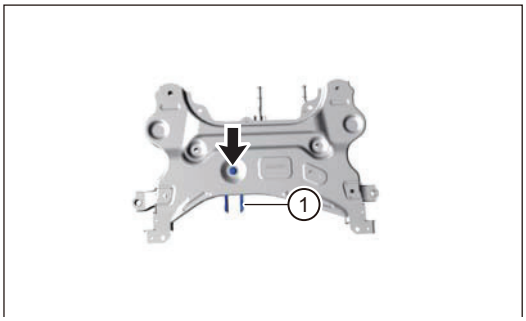
(i) Remove 4 fixing bolts (arrow) of stabilizer bar on sub frame, and remove front stabilizer bar assembly.

Tightening torque
25 ± 3 N·m



(j) Remove the coupling bolt and nut (arrow) of rear suspension lower body and rear suspension lower body (1).

Tightening torque
150 ± 10 N·m



(k) Remove the front sub frame welding 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 Bearing Assembly

Removal

Warning/Caution/Hint

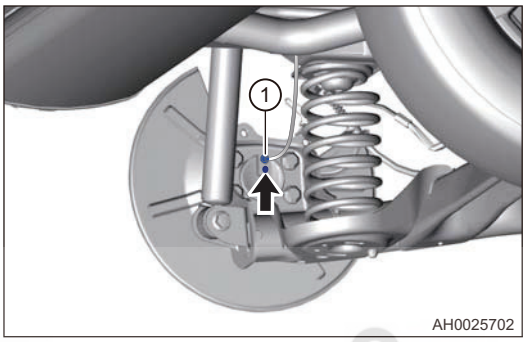
Hint:

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

1. Remove the rear left wheel.
2. Remove the rear left brake caliper assembly (See page 24-36).
3. Remove the rear left brake disc (See page 24-36).
4. Remove the rear left bearing assembly.

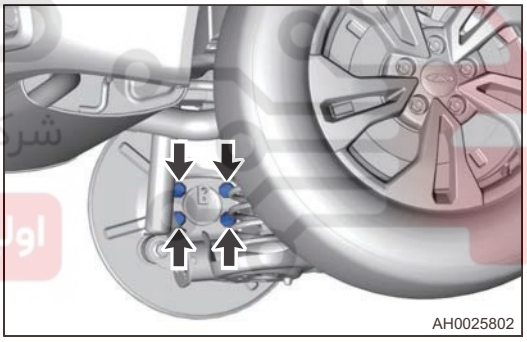
(a) Remove the coupling bolt (arrow) between rear wheel speed sensor and rear bearing assembly, and disengage the rear wheel speed sensor (1).

Tightening torque
10 ± 1.0 N·m

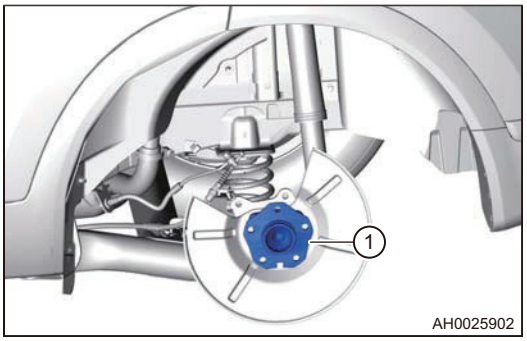


(b) Remove 4 fixing bolts (arrow) between rear bearing and fender apron assembly.

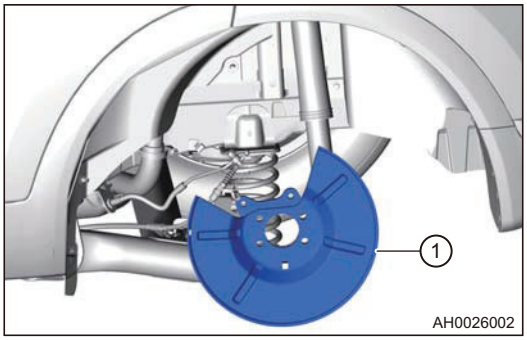
Tightening torque
100 ± 10 N·m



(c) Remove the rear bearing assembly (1).



(d) Remove the fender apron assembly (1).



Installation

1. Installation is in the reverse order of removal.
   Caution:
   - Be sure to tighten bolt to specified torque.

Rear Shaft Assembly

Removal

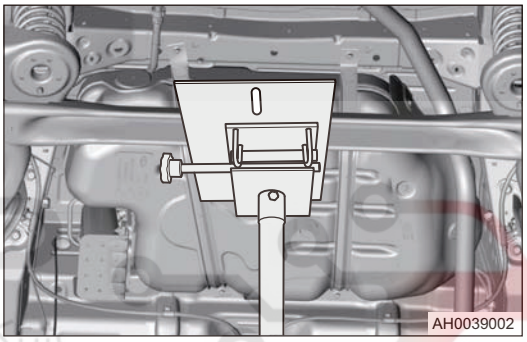
Warning/Caution/Hint

Caution:

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

1. Remove the rear wheel.
2. Remove the rear brake caliper assembly (See page 24-36).
3. Remove the brake disc assembly (See page 24-36).
4. Remove the wheel speed sensor.
5. Remove the rear bearing assembly.
6. Remove the rear shaft assembly.

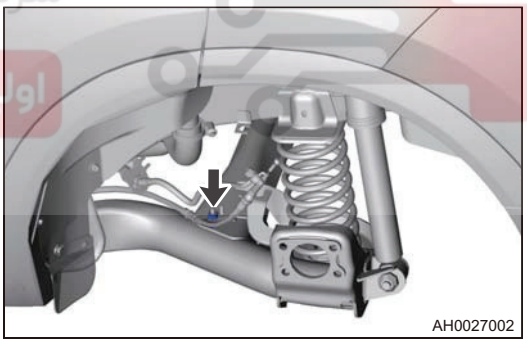
(a) Install transmission carrier and support rear shaft.



(b) Remove the fixing nut (arrow) between parking brake rear cable assembly fixing support and rear shaft assembly (manual parking) (use same removal procedure for right side).

Tightening torque

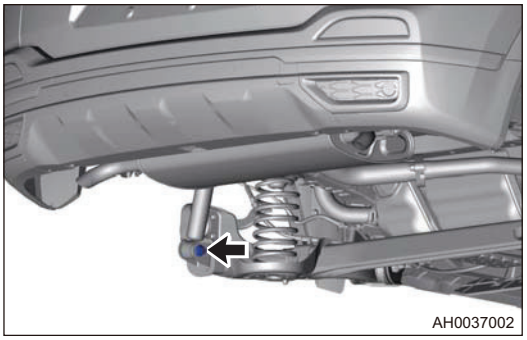
10 ± 1.5 N·m



(c) Remove the coupling bolt and nut (arrow) between rear left shock absorber assembly and rear shaft assembly. Use same removal procedure for right side.

Tightening torque

160 ± 16 N·m



(d) Remove the mandrel bolt (arrow) between left side of rear shaft assembly and rear shaft bracket. Use same removal procedure for right side.

Tightening torque
180 ± 18 N·m

(e) Slowly lower the transmission carrier, remove rear coil spring and rear coil spring soft pad.
(f) Remove the rear shaft assembly.

Installation

1. Installation is in the reverse order of removal.

Caution:
- Be sure to tighten bolt to specified torque.

- MEMO -