AXLE

AXLE

Warnings and Precautions

Warnings

1. Be sure to wear necessary safety equipment to prevent accidents.
2. Make sure that safety lock of lifter has been locked, when removing and installing chassis parts.
3. It is not allowed to weld or modify frame loading parts and guide parts.

Precautions

1. When removing and installing chassis parts, replace self-locking nuts and rusted nuts for safety.

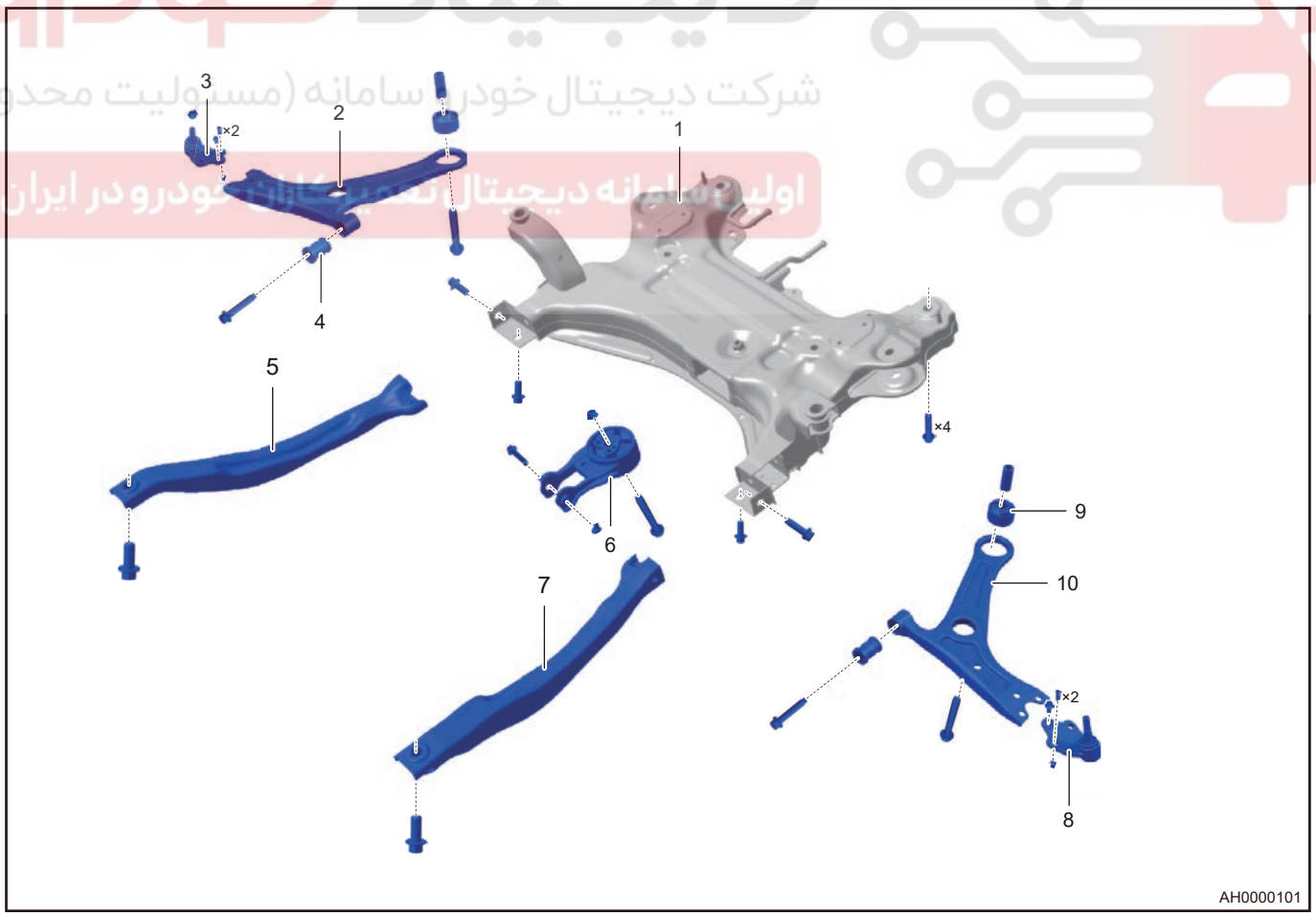
System Overview

System Description

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.

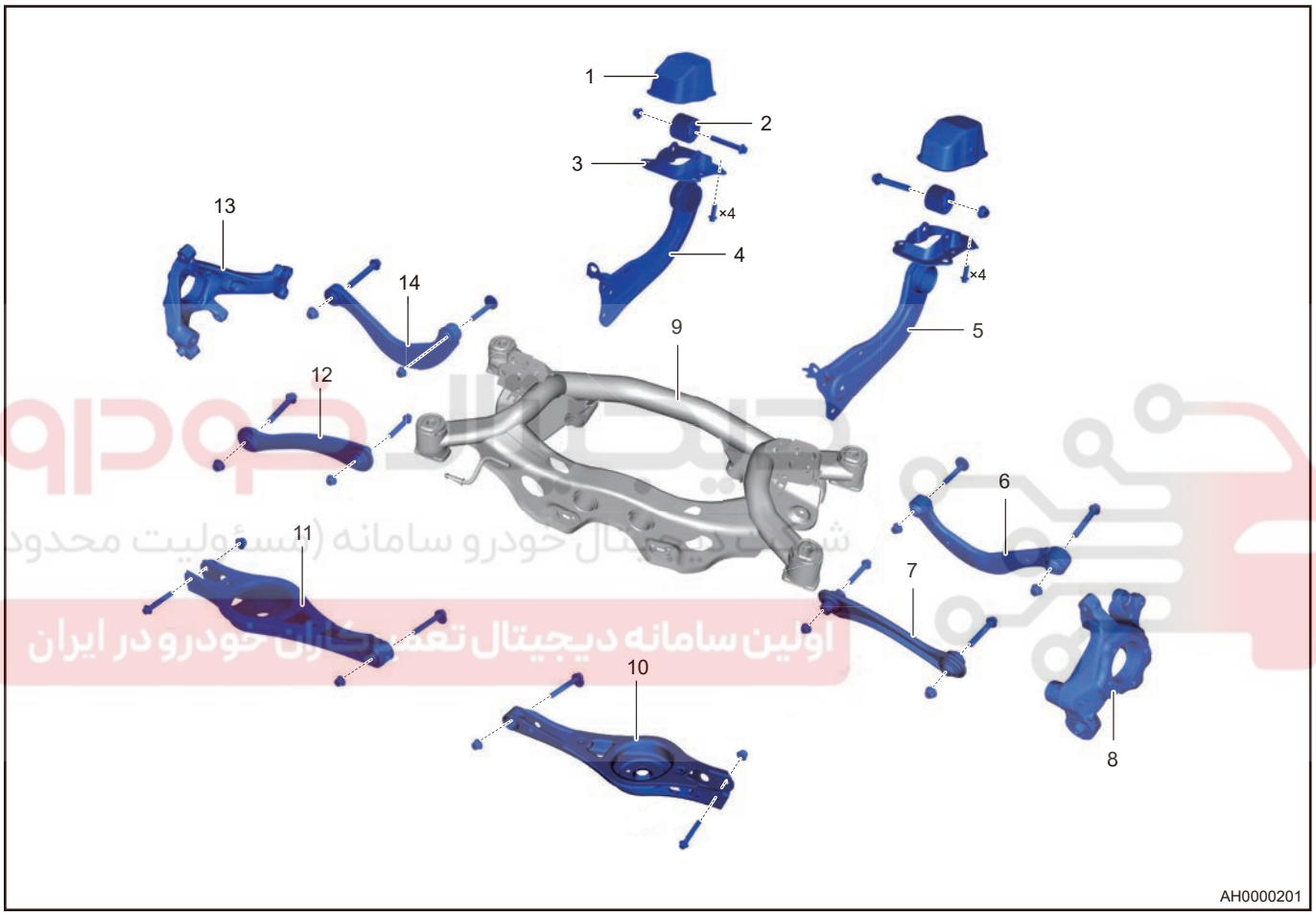
System Components Diagram

Front Axle



1	Front Sub Frame Assembly	6	Rear Mounting Lower Body
2	Front Right Control Arm Assembly	7	Left Side Rail Welding Assembly
3	Front Right Control Arm Ball Pin Assembly	8	Front Left Control Arm Ball Pin Assembly
4	Rubber Bushing	9	Rubber Bushing
5	Right Side Rail Welding Assembly	10	Front Left Control Arm Assembly

Rear Axle



1	Left Trailing Arm Mounting Bracket Dust Boot	8	Rear Right Steering Knuckle
2	Trailing Arm Bushing Assembly	9	Rear Sub Frame Welding Assembly
3	Trailing Arm Bracket Assembly	10	Right Rear Lower Control Arm Welding Assembly
4	Rear Left Trailing Arm Welding Assembly	11	Left Rear Lower Control Arm Welding Assembly
5	Rear Right Trailing Arm Welding Assembly	12	Left Pull Rod Body

6	Rear Upper Control Arm Welding Assembly	13	Rear Left Steering Knuckle
7	Right Pull Rod Body	14	Rear Upper Control Arm Welding Assembly

Specifications

Torque Specifications

Description	Torque (N·m)
Front Drive Shaft Assembly Locking Nut	270 ± 20
Front Control Arm Assembly Ball Pin Coupling Nut	95 ± 9
Front Dust Guard Fixing Bolt	10 ± 1.0
Front Wheel Speed Sensor Coupling Bolt	10 ± 1.0
Steering Tie Rod Assembly Ball Fixing Nut	45 ± 5.0
Fixing Bolt and Nut Between Front Shock Absorber Assembly and Steering Knuckle Assembly	240 ± 24
Coupling Nut Between Front Connecting Rod Assembly and Front Stabilizer Bar Assembly	60 ± 6
Through Bolt and Nut Between Power Steering Gear and Sub Frame	110 N•m + 240°
Coupling Bolt Between Rear Sub Frame Bracket and Body	120 ± 12
Coupling Bolt Between Rear Mounting Upper Body and Transmission Lower Body	105 ± 10
Coupling Bolt Between Front Sub Frame and Body	220 ± 22
Stabilizer Bar Fixing Bolt	25 ± 3
Rear Mounting Lower Body Coupling Bolt and Nut	150 ± 10
Rear Wheel Speed Sensor Fixing Bolt	10 ± 1.0
Rear Hub Bearing Fixing Bolt	120 ± 12
Coupling Bolt Between Rear Shock Absorber Assembly and Rear Steering Knuckle Assembly	160 ± 16
Coupling Bolt and Nut Between Rear Lower Control Arm Assembly and Rear Steering Knuckle Assembly	110 ± 11
Coupling Bolt and Nut Between Rear Upper Control Arm Assembly and Rear Steering Knuckle Assembly	160 ± 16
Coupling Bolt and Nut Between Pull Rod Assembly and Rear Steering Knuckle Assembly	160 ± 16

Description	Torque (N·m)
Fixing Nut Between Connecting Rod Small End and Rear Steering Knuckle Assembly	60 ± 6.0
Coupling Bolt Between Rear Sub Frame Assembly and Body	120 ± 12

Diagnosis & Testing

Problem Symptoms Table

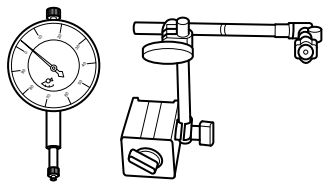
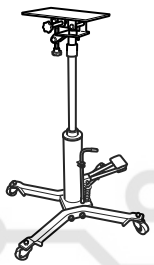
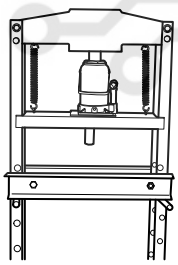
Hint:
Use symptoms table below to help determine cause of problem. Check each suspected area in sequence. Repair, replace or adjust faulty components as necessary.

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 assembly ball pin (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)

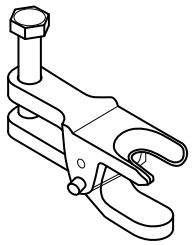
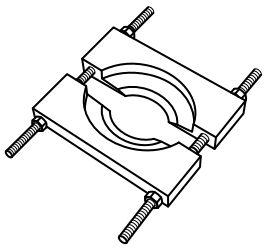
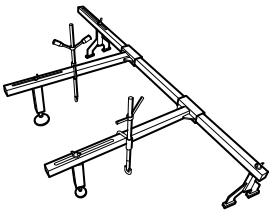
On-Vehicle Service

Tools

General Tools

Tool Name	Tool Drawing
Dial Indicator and Magnetic Holder	 RCH0023006
Transmission Carrier	 RCH0005006
Hydraulic Press	 RCH0012006

Special Tools

Tool Name	Part No.	Tool Drawing
Tie Rod Ball Remover	CH-10002-A	 RCH0024006
Bearing Remover Special Tool	CH-30057	 RCH0011006
Engine Equalizer	CH-20056	 RCH0026006

Front Steering Knuckle

Removal

Hint:

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

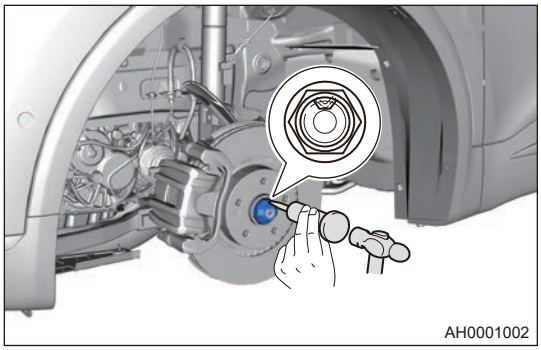
Caution
• Be sure to wear necessary safety equipment to prevent accidents. • Check if safety lock of lifter is locked when repairing chassis parts. • It is not allowed to weld or modify bearing parts of wheel suspension and guide parts of wheel. • When removing chassis parts, be sure to replace self-locking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

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the front left wheel.
4. Remove the front drive shaft assembly locking nut.

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

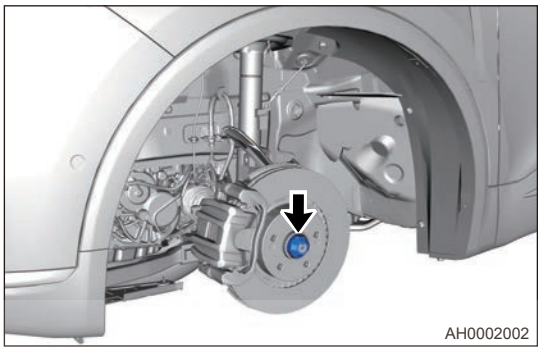
Hint:

- 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.

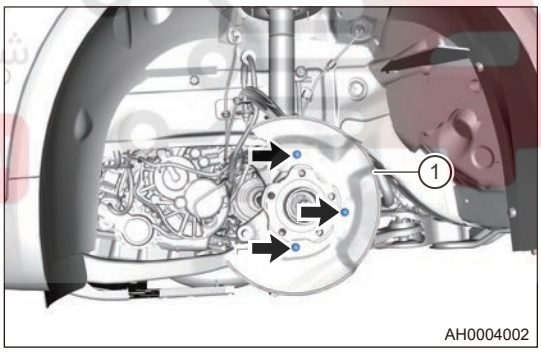
Tightening torque: 270 ± 20 N m



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

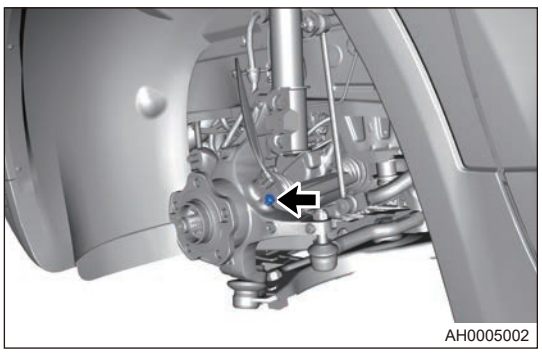
a. Remove 3 fixing bolts (arrow) between front left dust guard and front left steering knuckle assembly, and remove the front left dust guard (1).

Tightening torque: 10 ± 1.0 N m



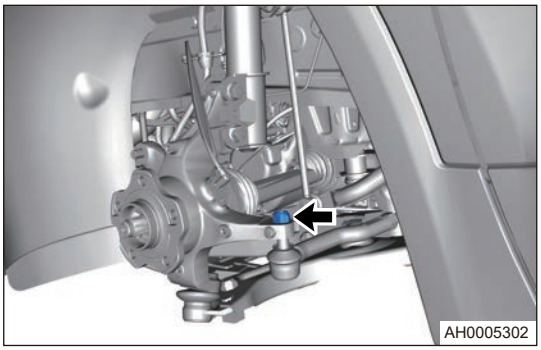
b. Remove coupling bolt (arrow) between front left wheel speed sensor and front left steering knuckle assembly, and disengage front left wheel speed sensor carefully.

Tightening torque: 10 ± 1.0 N m

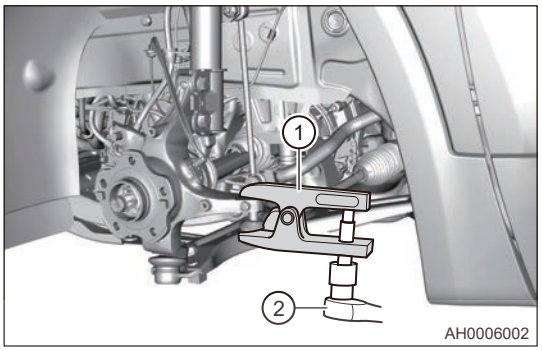


c. Remove self-locking nut (arrow) between left steering tie rod assembly ball pin and front left steering knuckle assembly.

Tightening torque: 45 ± 5 N m

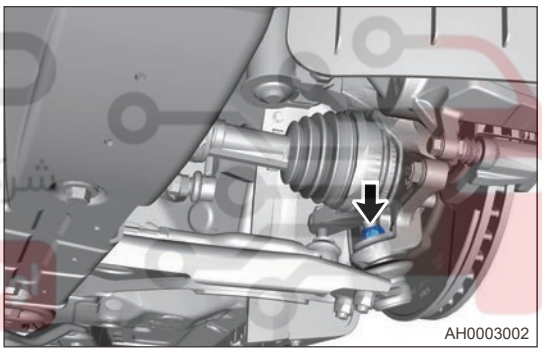


d. Install ball pin separator (1), and tighten ball pin separator bolt with a wrench (2) to separate steering tie rod ball pin from steering knuckle assembly.

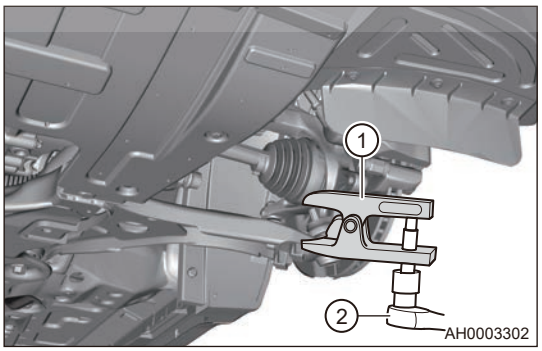


e. Remove coupling nut (arrow) between front left control arm assembly ball pin and front left steering knuckle assembly.

Tightening torque: 95 ± 9 N m

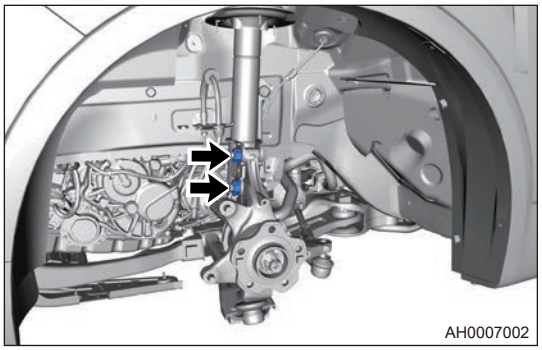


f. Install ball pin separator (1), and tighten ball pin separator bolt with a wrench (2) to separate lower control arm ball pin from steering knuckle assembly.



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



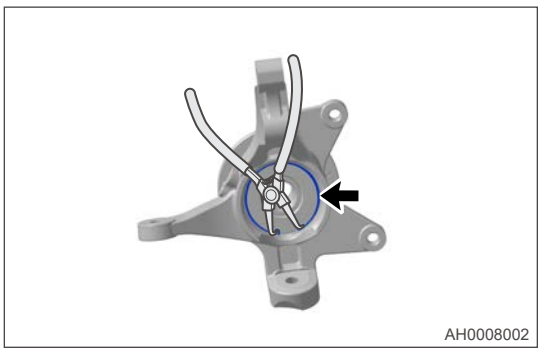
h. Disengage the left drive shaft and remove the front left steering knuckle assembly.

Disassembly

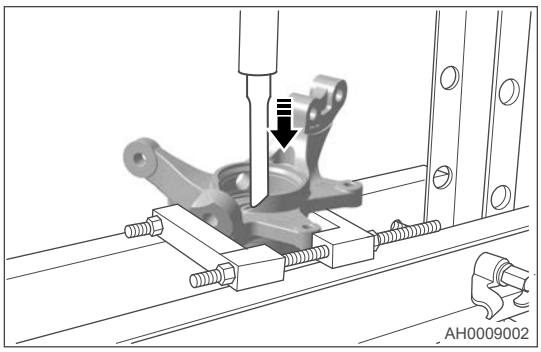
Caution
• Be sure to wear necessary safety equipment to prevent accidents, when disassembling the front steering knuckle assembly, front hub, front hub bearing. • Appropriate force should be applied, when disassembling front steering knuckle assembly, front hub, front hub bearing. Be careful not to operate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

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

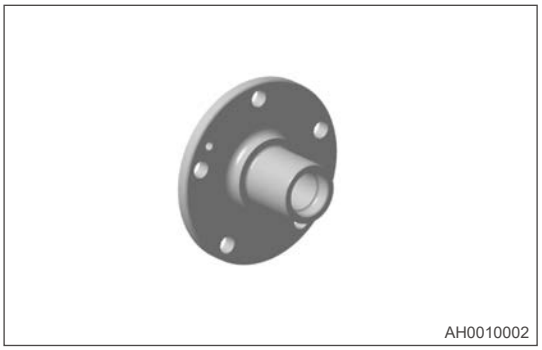
a. Remove the front hub bearing retainer (arrow) with snap spring pliers.



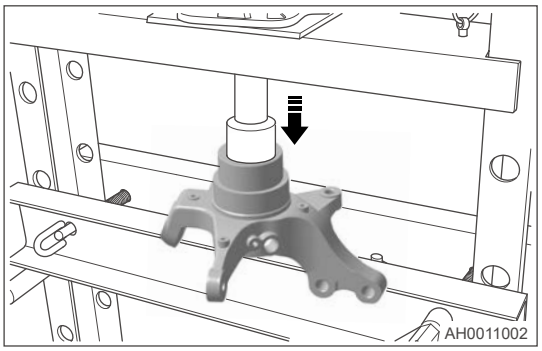
b. Place front steering knuckle assembly on a hydraulic press, install bearing remover and adapter, and press out front hub with hydraulic press.



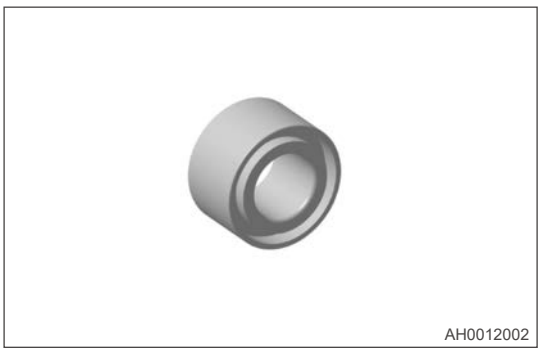
c. Remove the front hub.



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.



Inspection

Check the front steering knuckle and dust guard after installing the front steering knuckle assembly, front hub and front hub bearing

1. Check front steering knuckle for wear, cracks, deformation or damage. Replace it as necessary.
2. Check dust guard for dirt, wear, cracks, deformation or damage. 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.

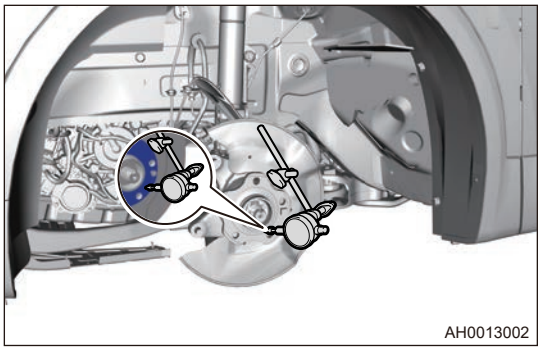
Caution
• Be sure to tighten coupling bolts and nuts to specified torques. • Check wheel alignment after installation. Adjust wheel alignment to the standard range as necessary.

Front Hub Bearing

On-vehicle Inspection

1. Remove the front wheel.
2. Remove the front brake caliper assembly.
3. Remove the front brake disc.
4. Check the front hub bearing looseness.
   a. Check looseness near center of the front hub assembly with a dial indicator.

      Hint:
      - Ensure that dial indicator is perpendicular to measurement surface.
      - If looseness exceeds maximum value, replace the front hub bearing.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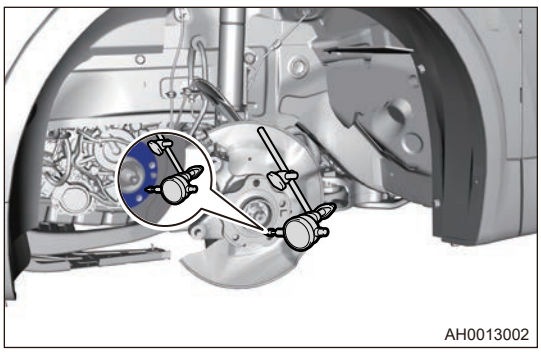
5. Check the front hub bearing runout.
   a. Check runout of the front hub assembly bearing surface with a dial indicator.

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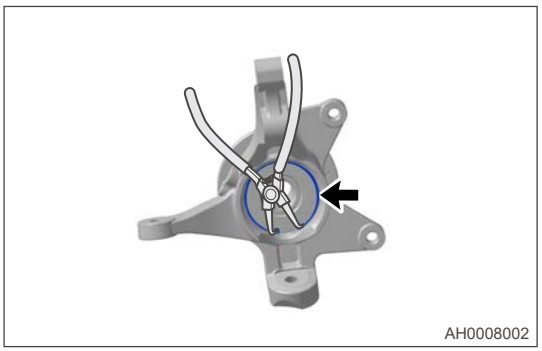
Removal

Hint:

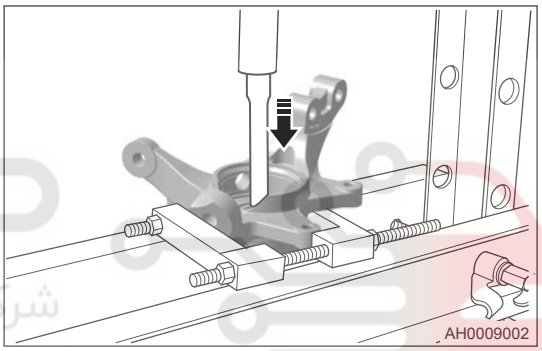
- Use same procedures for right and left sides.
- Procedures listed below are for left side.

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

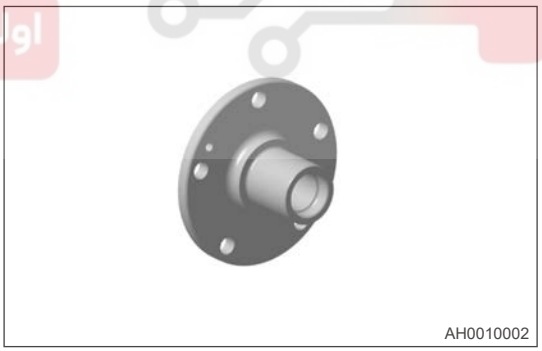
1. Remove the front left wheel.
2. Remove the front drive shaft assembly locking nut.
3. Remove the front left brake caliper assembly.
4. Remove the front left brake disc.
5. Remove the front left steering knuckle assembly.
6. Remove the front hub assembly.
   a. Remove the front hub bearing retainer (arrow) with snap spring pliers.



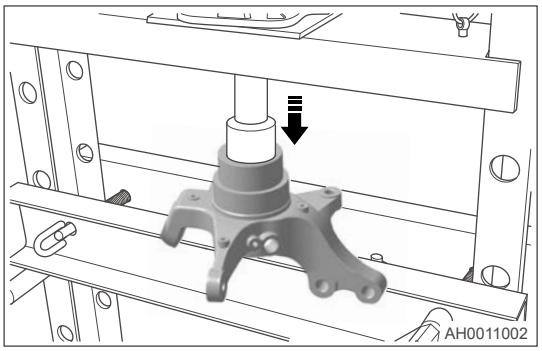
   b. Place front steering knuckle assembly on a hydraulic press, install bearing remover and adapter, and press out front hub with hydraulic press.



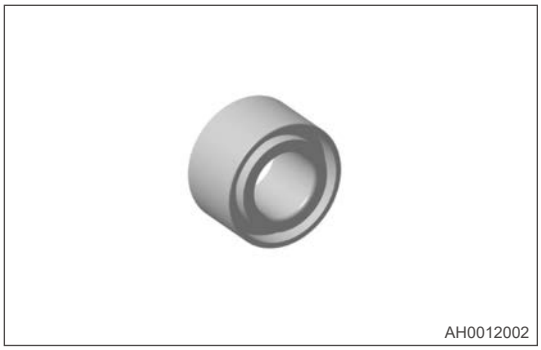
   c. Remove the front hub carefully.



   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 without any sticking after installation. • Check wheel alignment after installation. Adjust wheel alignment to the standard range as necessary.

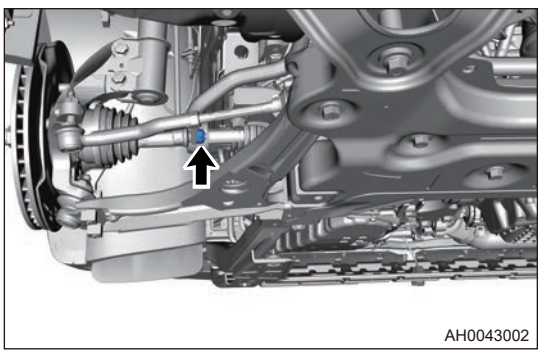
Front Sub Frame Assembly

Removal

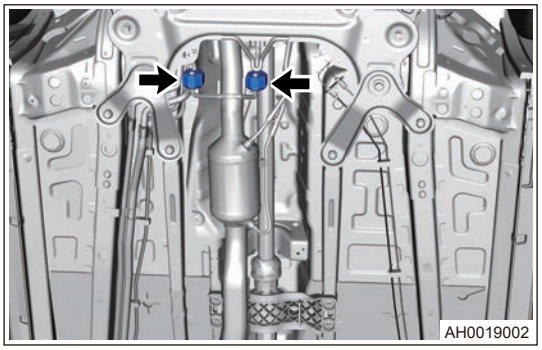
Caution
• Be sure to wear necessary safety equipment to prevent accidents. • Check if safety lock of lifter is locked when repairing chassis parts. • It is not allowed to weld or modify bearing parts of wheel suspension and guide parts of wheel. • When removing chassis parts, be sure to replace self-locking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

1. Remove the front wheel.
2. Remove the front left/right control arm assembly.
3. Remove the front sub frame assembly.
   a. Using an engine equalizer, support 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

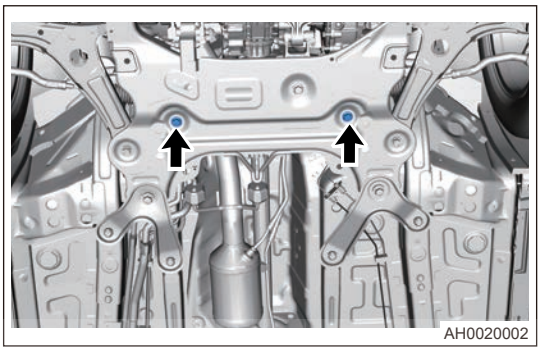


c. Detach exhaust pipe fixing rubber lugs (arrow) from front sub frame welding assembly.



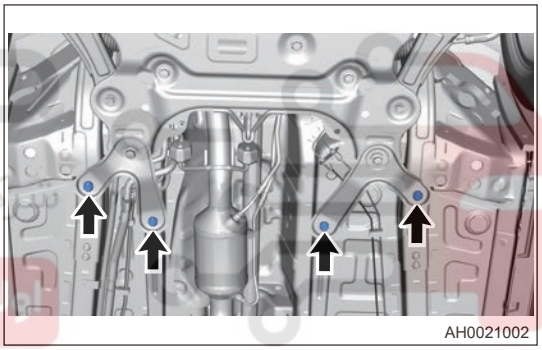
d. Remove 2 through bolts (arrow) between power steering gear with tie rod assembly and sub frame.

Tightening torque: 110 N•m + 240°



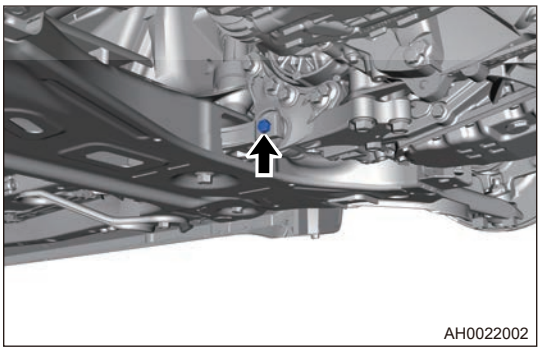
e. Remove 4 fixing bolts (arrow) between rear sub frame bracket and body.

Tightening torque: 120 ± 12 N·m

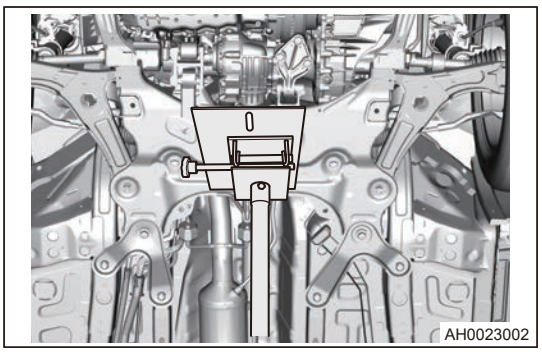


f. Remove 1 coupling bolt (arrow) between rear mounting upper body and transmission lower body.

Tightening torque: 105 ± 10 N·m

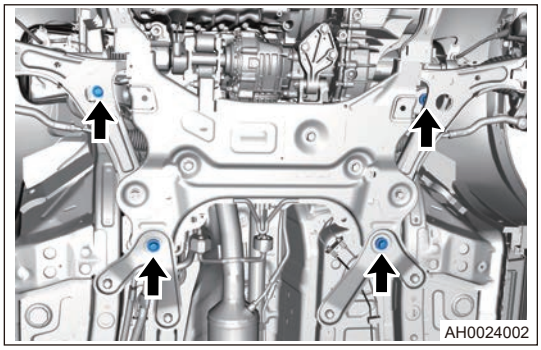


g. Using a transmission carrier, support the sub frame welding assembly.



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

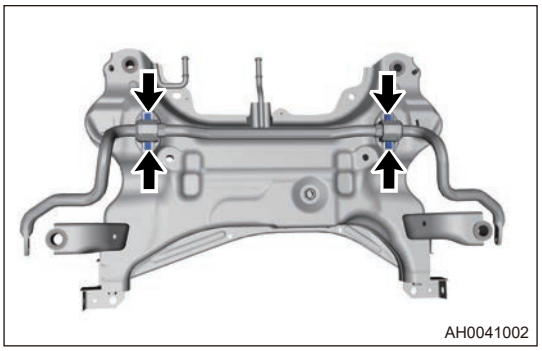
Tightening torque: 220 ± 22 N·m



i. Slowly lower the front sub frame welding assembly with stabilizer bar.

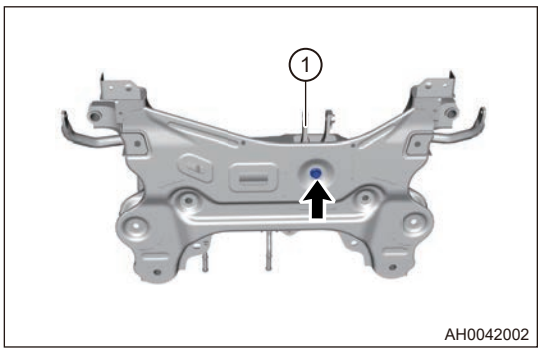
j. Remove 4 fixing bolts (arrow) of stabilizer bar on sub frame, and remove front stabilizer bar assembly.

Tightening torque: 25 ± 3 N m



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

Tightening torque: 150 ± 10 N m



l. 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 is completed. Adjust wheel alignment to standard range as necessary.

Rear Hub Shaft Assembly

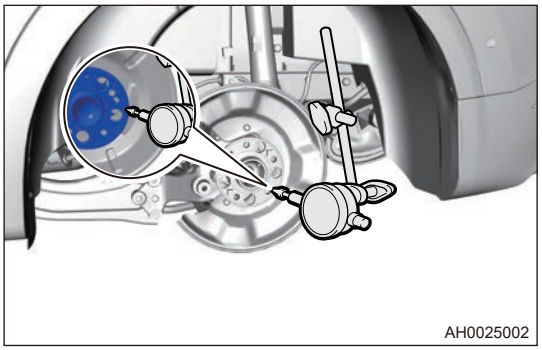
On-vehicle Inspection

1. Remove the rear wheel.
2. Remove the rear brake caliper assembly.
3. Remove the rear brake disc.
4. Check the rear hub bearing looseness.

a. Check looseness near center of the rear hub assembly with a dial indicator.

Hint:

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

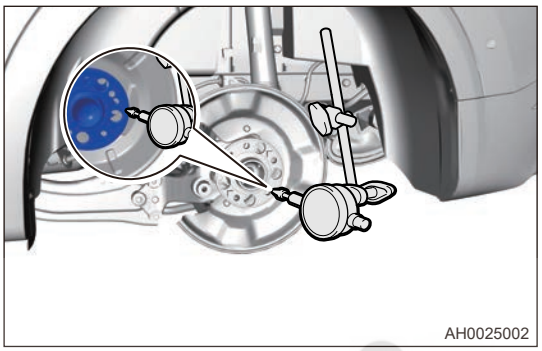


5. Check the rear hub bearing runout.

a. Check runout of the rear hub assembly bearing surface with a dial indicator.

Hint:

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



Removal

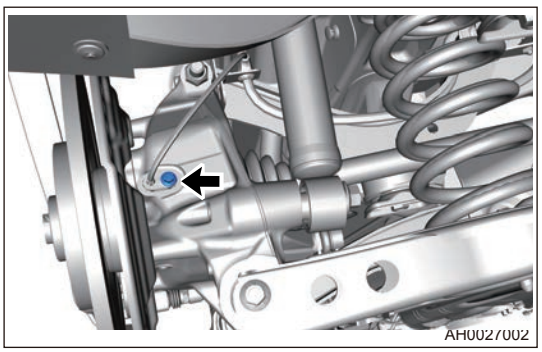
Hint:

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

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the rear left wheel.
4. Remove the rear left brake caliper assembly.
5. Remove the rear left hub shaft assembly.

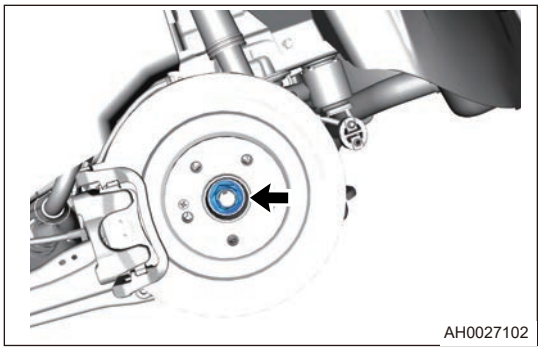
a. Remove 1 fixing bolt (arrow) from rear left wheel speed sensor, and remove wheel speed sensor.

Tightening torque: 10 ± 1.0 N m



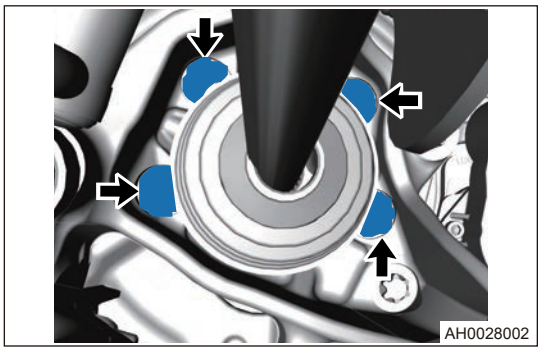
b. Removal the rear left wheel drive shaft self-locking nut and gasket (arrow).

Tightening torque: 270 ± 20 N m



c. Remove 4 fixing bolts (arrow) from rear left hub bearing.

Tightening torque: 120 ± 12 N·m



d. Replace the rear left hub shaft assembly.

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 the standard range as necessary.

Rear Steering Knuckle Assembly

Removal

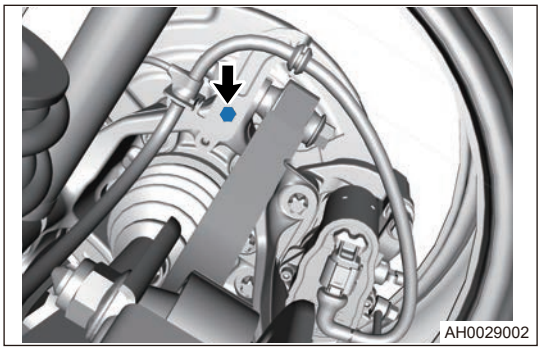
Hint:
Use same procedures for right and left sides, procedures listed below are for left side.

Caution
• Be sure to wear necessary safety equipment to prevent accidents. • Check if safety lock of lift is locked when repairing chassis. • It is not allowed 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 ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the rear wheel.
4. Remove the rear brake caliper assembly.
5. Remove the rear brake disc assembly.
6. Remove the rear steering knuckle assembly.

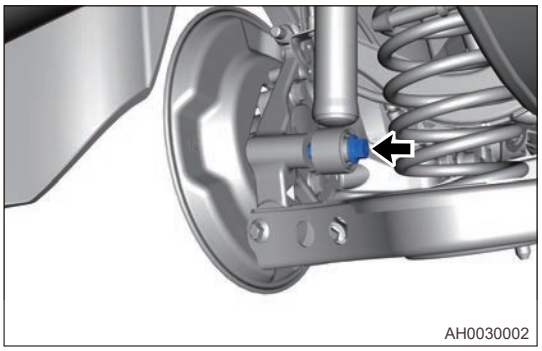
a. Remove 1 coupling bolt (arrow) between EPB wire harness fixing bracket and rear steering knuckle assembly.

Tightening torque: 15 ± 5 N m



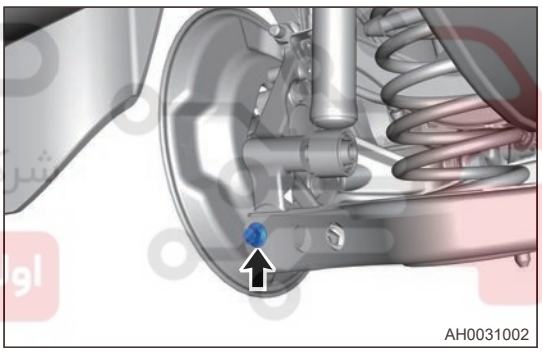
b. Remove coupling bolt (arrow) between rear shock absorber assembly and rear steering knuckle assembly.

Tightening torque: 160 ± 16 N·m



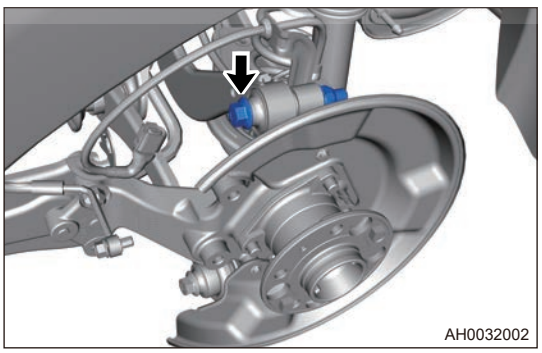
c. Remove the coupling bolt and nut (arrow) between rear lower control arm assembly and rear steering knuckle assembly.

Tightening torque: 110 ± 11 N·m



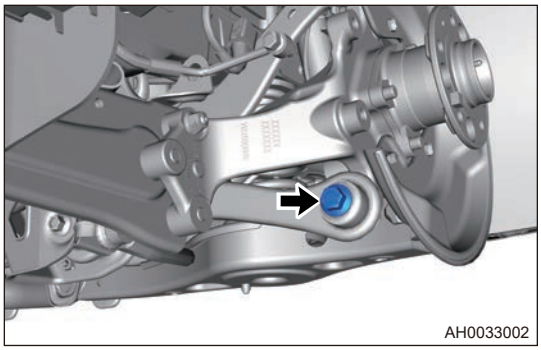
d. Remove the coupling bolt and nut (arrow) between rear upper control arm assembly and rear steering knuckle assembly.

Tightening torque: 160 ± 16 N·m



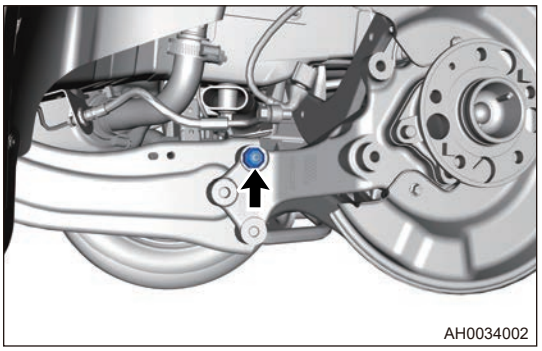
e. Remove the coupling bolt and nut (arrow) between pull rod assembly and rear steering knuckle assembly.

Tightening torque: 160 ± 16 N·m



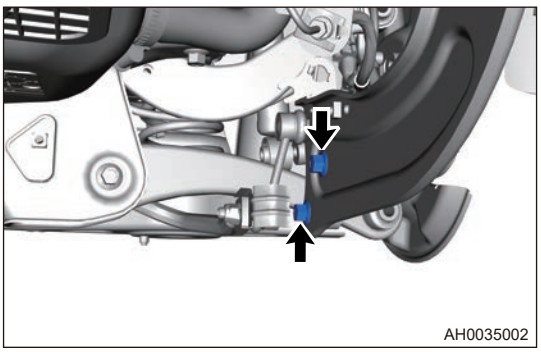
f. Remove the fixing nut (arrow) between rear connecting rod small end and rear steering knuckle assembly.

Tightening torque: 60 ± 6.0 N·m



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

Tightening torque: 110 ± 11 N·m



h. Remove the rear left steering knuckle assembly.

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 the standard range as necessary.

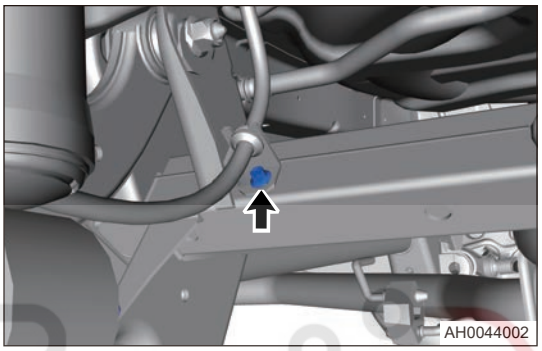
Rear Sub Frame Assembly

Removal

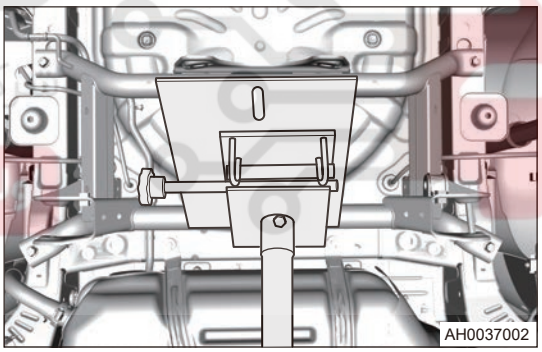
Caution
• Be sure to wear necessary safety equipment to prevent accidents. • Check if safety lock of lift is locked when repairing chassis. • It is not allowed to weld or modify bearing parts of wheel suspension and guide parts of wheel. • When removing chassis parts, replace self-locking nuts and rusted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

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the rear wheel.
4. Remove the rear brake caliper assembly.
5. Remove the rear brake disc assembly.
6. Remove the rear hub shaft assembly.
7. Remove the rear steering knuckle.
8. Remove the rear lower control arm assembly.
9. Remove the pull rod assembly.
10. Remove the rear stabilizer bar assembly.
11. Remove the muffler assembly.
12. Remove the rear sub frame assembly.
    a. Remove 1 coupling bolt (arrow) between EPB wire harness fixing bracket and rear sub frame assembly. Use same removal procedure for right side.

       Tightening torque: 15 ± 5 N·m

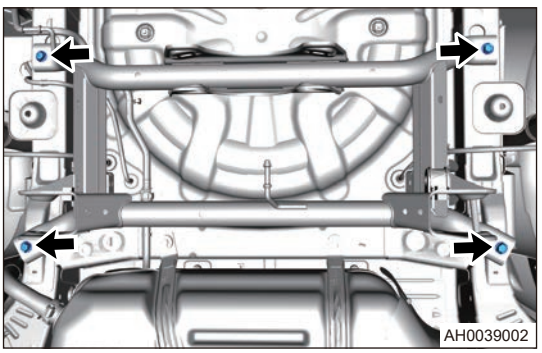


    b. Install transmission carrier to support rear sub frame assembly.



    c. Remove 4 coupling bolts (arrow) between rear sub frame assembly and body.

       Tightening torque: 120 ± 12 N·m



    d. Slowly lower the transmission carrier, and remove the rear sub frame assembly.

Installation

1. Installation is in the reverse order of removal.

Caution
• Be sure to tighten bolt to specified torque. • Bounce vehicle up and down several times to stabilize rear suspension after installation. • Check wheel alignment after installation. Adjust wheel alignment to the standard range as necessary.