



UNI-K

- **Brake system**

UNI-KRM2F/1/1

2.3 Brake system

Model :UNI-K

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2.3.1 Brake System - General

Specifications

Material specification

Project	Specifications
Brake fluid	HZY4/DOT4

General specifications

Front disc brake	Specifications(Mm)
Brake disc diameter	330.5
New brake disc normal thickness	28
Brake disc scrap thickness	26
New brake disc maximum runout	0.055
Caliper piston diameter	φ45x2
Minimum thickness of friction material of brake friction block	2

Rear disc brake(Electronic parking)	Specifications(Mm)
Brake disc diameter	310.5
New brake disc normal thickness	11
Brake disc scrap thickness	9
New brake disc maximum runout	0.055
Caliper piston diameter	φ41
Minimum thickness of friction material of brake friction block	2



Warning: When the brake disc reaches the scrap thickness, the brake disc must be replaced. Special care should be taken when polishing brake discs that do not reach the scrap thickness.

Description and operation

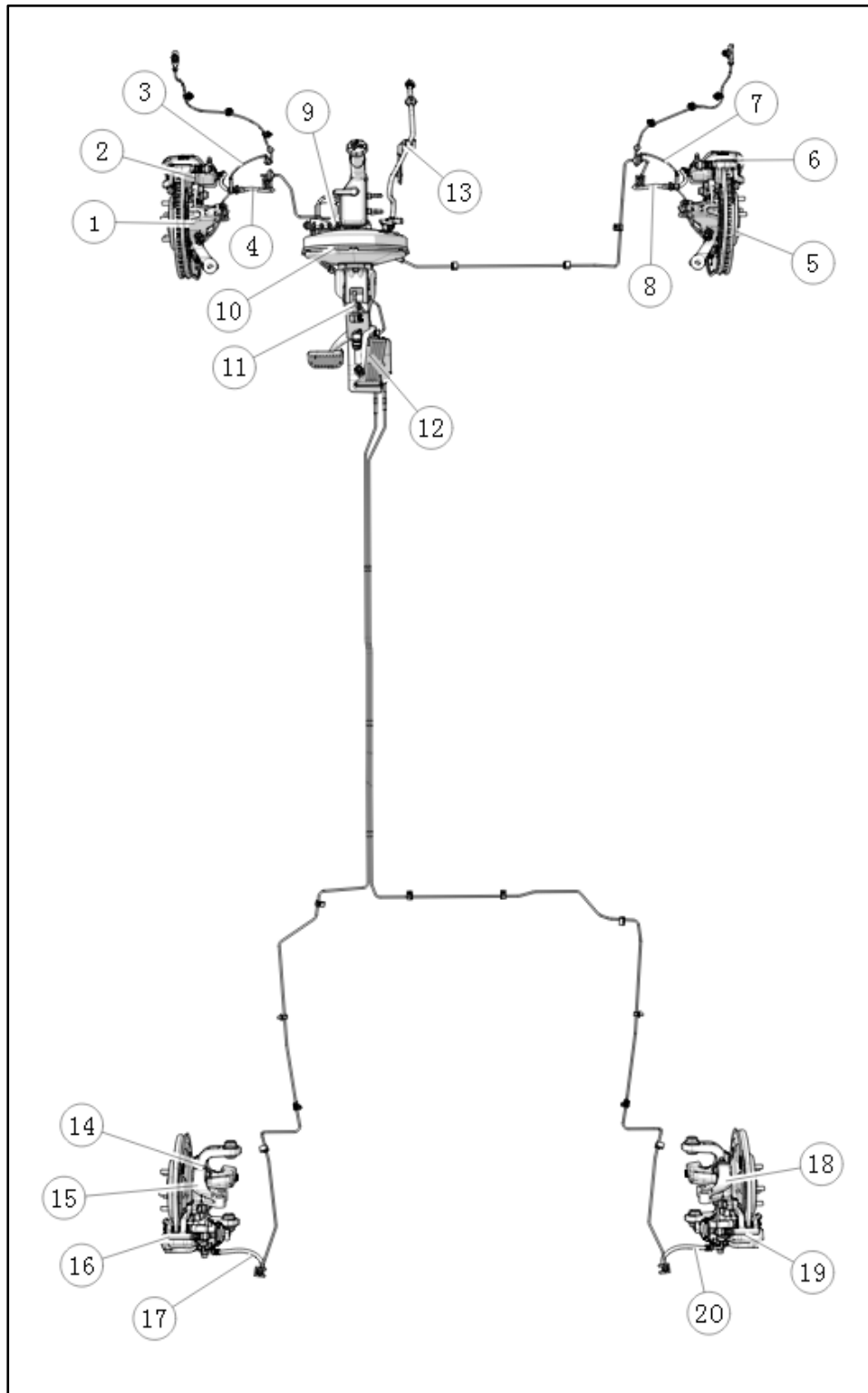
System overview

The foundation brake system adopts double circuit, diagonally arranged (front left and rear right; Front right, rear left), front and rear are disc hydraulic brakes. Front and rear disc brake calipers are installed on the steering knuckle and are floating calipers. The front and rear service brakes can automatically adjust the brake clearance, and the rear electronic parking brake system can adjust the clearance between brake disc and friction plate through the clearance self-adjustment function.

The brake master cylinder is designed in longitudinal series, directly connected to the booster, which can increase the braking force and reduce the force exerted by the driver on the brake pedal. Longitudinal series design can ensure that when one brake circuit fails, the other brake circuit remains in good working condition.

Anti-lock braking control system (including ESC) adds electronic hydraulic control unit and wheel speed sensor on the basis of basic braking, and each wheel is equipped with hydraulic system with independent circuit; The electronic control unit collects wheel speed signals of four wheels by wheel speed sensors mounted on the wheels, and adjusts the brake pressure during braking through the hydraulic control unit to achieve the purpose of preventing wheel lock-up and controlling body stability; When the ABS does not work, the electronic brake force distribution system can still adjust the rear wheel brake force to ensure that the rear wheel does not lock before the front wheel to ensure the safety of the vehicle.

The electronic parking brake system is a mechanical electronic system that operates the rear wheel disc electronic parking actuator through the electronic parking brake button. The parking brake button is located between two front seats, and the parking can be realized by pulling up the electronic parking brake button; Depress the brake pedal and press the electronic parking brake button at the same time to realize parking release.

Component position diagram

2.3.1 -4**Brake System****2.3.1-4**

Serial number	Component name	Quantity	Serial number	Component name	Quantity
1	Front steering knuckle assembly(Left)	1	11	Brake pedal assembly	1
2	Front brake caliper assembly(Left)	1	12	Accelerator pedal assembly	1
3	Front wheel sensor assembly(Left)	1	13	Brake vacuum pipe assy.	1
4	Front brake hose assembly(Left)	1	14	Rear wheel sensor assembly(Left)	2
5	Front steering knuckle assembly(Right)	1	15	Rear sheep angle assembly(Left)	1
6	Front brake caliper assembly(Right)	1	16	Electronic parking actuator assembly(Left)	1
7	Front wheel sensor assembly(Right)	1	17	Rear brake hose assembly(Left)	1
8	Front brake hose assembly(Right)	1	18	Rear sheep angle assembly(Right)	1
9	EPBi Actuator assembly	1	19	Electronic parking actuator assembly(Right)	1
10	Brake master cylinder with vacuum booster assembly	1	20	Rear brake hose assembly(Right)	1

General inspection

Road test



Warning: Road test technicians must be trained and have good driving skills.

The road test is performed to compare the actual braking performance of the vehicle with the standard braking performance expected by the driver. The technician's ability to correctly compare and determine braking performance depends on the technician's experience. The technician must have complete knowledge of the operating principles of the brake system and have received guidance from the system to correctly compare and detect problems.

Confirm the vehicle meets the following conditions before road test:

The tire is not excessively worn, and the tread patterns of the left and right tires are basically the same.

The tire pressure is within the specification range.

Wheel alignment is accurate.

Brake fluid level is normal.

Brake system working indicator lamp is normal without fault code.

Road tests must be carried out on dry, clean and relatively flat roads. An experienced technician will choose a route suitable for brake diagnostic circuit test. The road surface of this line shall be flat, not gravel or rugged. Mainly because of gravel and rough road surface, the adhesion between tire and road surface is different. Arched surfaces are also not suitable because most of the body weight is concentrated on the lower two wheels. Once the route has been determined and used, the road factors should not be considered.

Understand the customer's description of the fault before road test. According to the description, the technician can associate the possible causes with the symptoms. Some components will be considered suspicious and others will be rule out. More importantly, according to the customer's description, unsafe hazards can be checked or eliminated before road test. It is also possible to focus the problem on a specific component, speed or condition according to the customer's description, which helps determine the method of test drive.

The road test shall begin with a general brake performance check. Check the vehicle braking at different vehicle speeds with different pedal pressures according to the customer's description. When judging the problem of front or rear brake system, brake with pedal first and then brake with parking brake. If the symptoms (pull, vibration, rhythmic runout) occur only when the parking brake is used, the problem is in the parking brake system.

During road test, avoid brake lock. This does not mean that the brake is effective. Strong braking and keeping the wheels rotating can stop the vehicle in a shorter distance than braking and locking.

If the fault is obvious during the test, confirm that the fault conforms to the description. If the fault is not obvious, use the information obtained from the description to try to reproduce the fault.

If a fault exists, use the fault checklist to attribute the problem to the specific subsystem and the corresponding condition description. Using the described phenomenon, a list of possible causes can be used to further narrow the cause down to a particular part or condition.

Hydraulic leakage check



Note: Under normal conditions, brake fluid level will gradually decrease with brake friction block wear. Brake fluid level may be

too low if brake friction block wear exceeds specifications. If the brake friction block is worn within the specification and the brake fluid level is too low, the system leaks.



Note: If the vehicle is driven in rain or snow, the leaking traces may be washed out because the brake fluid is water soluble.

Please check as follows:

1. Confirm the brake fluid level is too low or drops too fast.
2. Visually inspect for signs of brake fluid leakage.



Note: As the brake caliper piston bellows is coated with grease during assembly, the grease may melt during use of the whole vehicle and flow out to soak the appearance of the caliper (there will be a circle of brake fluid contamination mark near the caliper cylinder hole), resulting in the false appearance of oil leakage of the caliper. Please wipe the traces clean first, then check whether there is oil leakage by pressing the brake pedal repeatedly.

3. Remove front wheels.

[Reference: 2.1.4 Wheels and tires.](#)

Inspect the front brake cylinder for leakage and brake block wear.

4. Remove rear wheels.

[Reference: 2.1.4 Wheels and tires.](#)

Check leakage of rear brake cylinder and wear of brake friction block.

5. Remove brake master cylinder.

[Reference: 2.3.7 Hydraulic brake control.](#)

Check the leakage of piston oil seal of brake master cylinder.

6. Repair the above possible fault points and exhaust the brake system.

[Reference: 2.3.1 Overview of brake system.](#)

Brake pedal travel allowance check

When the brake pedal stroke is felt to be too large or touches to the end, check the brake pedal stroke margin.

1. Put the transmission in neutral gear, pull up the EPB button, and run the engine at idle speed.
2. Gently depress the brake pedal 3 or 4 times.
3. Hold 15 s to make the booster replenish the vacuum.



Note: Resistance increase will have the feeling of stepping to the end.

4. Depress the brake pedal until the brake pedal stops moving downward or no resistance increases.
5. Depress the brake pedal and increase the engine speed to 2000 rpm.



Note: Increasing the vacuum of the booster will cause the brake pedal to continue to move down (additional movement).

6. Loosen the accelerator pedal and observe the brake pedal moves downward when the engine speed drops to idle speed.

Requirements: Additional stroke acting on the brake master cylinder shall not cause the brake pedal to touch the bottom, otherwise:

[Reference: 2.3.1 Overview of brake system.](#)

Vacuum booster check

1. Check brake fluid level between "MIN" line and "MAX" line.

2. Put the transmission in neutral, pull up the EPB button and run the engine (idle speed).
3. Shut down the engine, depress the release brake pedal to eliminate the vacuum in the system several times, then depress the brake pedal and keep it.
4. Start the engine. If the vacuum system works, the brake pedal will move downward. If the pedal cannot be felt to move down, the vacuum booster system will not work.
5. Remove brake vacuum pipe on one side of vacuum booster. When the engine is idling in neutral gear, vacuum acts on the vacuum booster end. Sense by hand or measure with a vacuum meter. If there is no vacuum or the vacuum is very small, check whether the brake vacuum pipe is blocked, sealed and leaking. Ensure that the vacuum pipe joint is intact and the vacuum pipe is normal, that is, the vacuum degree of brake vacuum pipe can play a role. Connect the brake vacuum pipe to the vacuum booster again, and repeat step 3. If the brake pedal cannot be felt to move downward, replace the vacuum booster.
6. Run the engine 10 s at 1000 rpm. After turning off the engine for 10 min, press the brake pedal with a force of approx. 889 N 20 lb. The brake pedal feeling should be the same as that when the engine is running (normal power).

If the brake pedal feels very hard, check and confirm whether the check valve of brake vacuum pipe is normal, re-test; if the fault still exists, replace the vacuum booster.

Brake master cylinder inspection



Note: Before diagnosis, ensure that the brake fluid level and warning indicator are

working normally, and the brake system has no DTC.

Normal condition

Normally, a change in brake pedal feel or travel indicates that there may be a problem in the brake system. However, the following conditions are normal, which does not mean that the brake master cylinder needs maintenance:

1. The new brake system design is different from the previous one, and the force required to depress the brake pedal is less.
2. When the brake works normally, the brake fluid level should drop and rise when released. The total amount of brake fluid remains unchanged.
3. Brake fluid level will decrease with brake shoe wear.

Abnormal condition

A change in brake pedal feel or travel indicates a possible problem in the brake system. The following conditions are not normal and indicate that the brake master cylinder may need to be repaired:

Symptoms	Brake master cylinder
Depress the brake pedal, and the brake pedal drops rapidly.	External leakage(Cracking, joint, seal failure)
Depress and hold the brake pedal, and the brake pedal drops slowly.	External leakage; Internal leakage(Master cylinder seal aging)
Depress the brake pedal, the brake pedal is too low or feels soft	Oil inlet hole or oil reservoir vent hole is blocked; Air in hydraulic system
Brake pedal returns too slowly	The compensation port is blocked; Master cylinder spring broken(Fatigue)
Slightly depress the	Proportional valve

brake pedal, and the rear brake is locked.	
Brake pedal travel is too large	Internal leakage

Bypass condition test


Observe the fluid level of the brake master cylinder reservoir. If the brake fluid level remains the same after several depressions of the brake pedal, measure the torque required for the wheel to rotate rearward when braking as follows.


1. Place the transmission in neutral and lift the vehicle.


Reference: 1.1.3 Lifting and towing.


1. Depress the brake pedal at 445 N and maintain approx. 15 s. Apply 10.1 N.m of torque to the wheel while the brake is still active. If any of the wheels rotates, replace the brake master cylinder.

Brake system exhaust


 **Warning:** Brake fluid contains polyethylene glycol ether and polyethylene glycol to avoid contact with eyes and skin.


 **Warning:** If the brake fluid touches the eye, rinse the eye with cold water of the faucet for 15 minutes. If you still feel pain, seek medical advice quickly.


 **Warning:** In case of contact with skin, clean thoroughly.


 **Warning:** If inadvertently swallowed, drink water and induce vomiting, and send to doctor immediately.


 **Warning:** Wear safety glasses.


 **Note:** If brake fluid splashes on the paint surface, immediately rinse with clean water.

 **Note:** Ensure the vehicle is parked on a horizontal road surface.

 **Note:** Exhaust in the following order: Rear right, front left, rear left and front right.

 **Note:** When the ignition switch is in "LOCK" position and the brake is in cold state, depress the brake for 3~5 times, or until the brake pedal force increases significantly to eliminate the residual vacuum of the vacuum booster.

 **Note:** During exhaust, the brake fluid reservoir must be filled with new and clean brake fluid to ensure that the brake fluid level is kept in the middle of the scale.

 **Note:** If there is known or suspected air in the cylinder bore of the master cylinder, the air in the master cylinder must be discharged first, and then the air in the brake cylinder must be discharged.

1. Place a rag under the master cylinder to prevent brake fluid from flowing to other components.
2. Ask the assistant to slowly depress the brake pedal to the bottom and depress it with steady force.
3. Release one main brake line from the master cylinder and bleed the air from the master cylinder.
4. Fasten the brake lines and ask the assistant to loosen the brake pedal slowly.
5. Repeat step 2~4 until all the air in one brake master cylinder is exhausted.
6. Drain all air from the other brake master

cylinder from the other master line connector in the same way.

7. Lift the vehicle.

Reference: 1.1.3 Lifting and towing.

8. Connect the open end of the transparent row trachea to the vent hole of the rear right slave cylinder.
9. Immerse the other end of row trachea into the brake fluid in the clear exhaust cylinder.
10. Place the bleeder cylinder at the bottom at least 300 mm above the bleeder hole to maintain hydraulic pressure and prevent air from entering the system through the threads of the bleeder hole.
11. Ask the assistant to slowly depress the brake pedal to the bottom and depress it with steady force.
12. Loosen the exhaust valve and bleed the wheel hydraulic oil line.
13. Tighten the exhaust valve and let the assistant release the brake pedal slowly.
14. Add brake fluid to the brake reservoir.
15. Continue depressing the brake pedal and repeat step 11~13 until the brake fluid without air flows into the exhaust cylinder.
16. After draining the brake lines, always install the vent cap. Otherwise, the exhaust hole may be blocked.
17. Repeat this procedure for other brake lines.

EPBi Hydraulic unit exhaust

Use the scan tool "Fill" operation to control the EPBi system pump valve to clear air from the auxiliary oil circuit. These lines are normally closed and only open during system initialization at vehicle start-up and during ESC operation. "Fill and vent" program opens these auxiliary oil lines to allow the

air trapped in these oil lines to flow to the brake cylinder.



Note: Before performing the "Filling and venting" procedure, perform venting on the conventional brake system first.

Reference: 2.3.1 Overview of brake system.



Note: In case of any of the following conditions, it is recommended to perform "filling and venting" procedure:

1. Routine brake system exhaust does not obtain correct pedal height or pedal feeling.
2. suspects that the auxiliary oil circuit of EPBi system has air resistance.



Note: Ensure the vehicle is parked on a flat road surface.



Note: When the ignition switch is in "LOCK" position and the brake is in cold state, depress the brake pedal 3~5 times, or until the brake pedal force increases significantly. The purpose of this operation is to eliminate residual vacuum of vacuum booster.



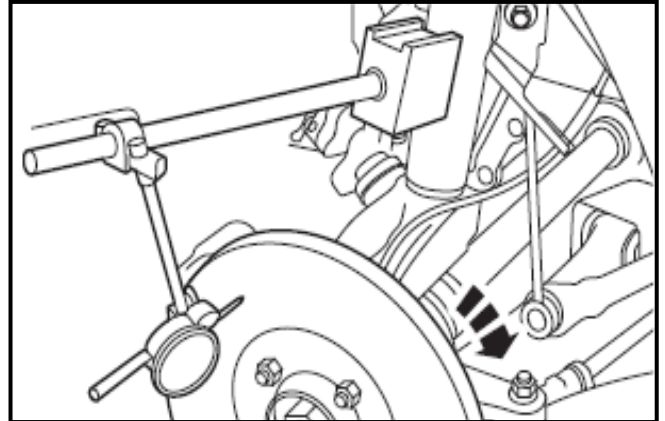
Note: During exhaust, the brake fluid reservoir must be filled with new and clean brake fluid to ensure that the brake fluid level is close to the MAX-ray position.

1. With the engine off, turn the ignition switch to the "ON" position.
2. Install the scan tool.
3. Establish communication with the EPBi system via the scan tool. Select the "Filling and venting" procedure.
4. Lift the vehicle.
Reference: 1.1.3 Lifting and towing.
5. Follow the scan tool instructions until the correct brake pedal height is reached.

6. If the exhaust procedure aborts abnormally, there is a fault. Read DTC and repair if there is DTC.

Reference: 2.3.8 Antilock/Electronic Stability Control.

7. If the brake pedal reaches the correct height, depress the pedal and feel the proper pedal force. If the brake pedal feels soft, repeat the exhaust procedure.
8. Lower the vehicle.
9. Remove the scan tool.
10. Road test vehicle. At the same time, check whether the pedal can maintain the correct height and proper pedal feeling.

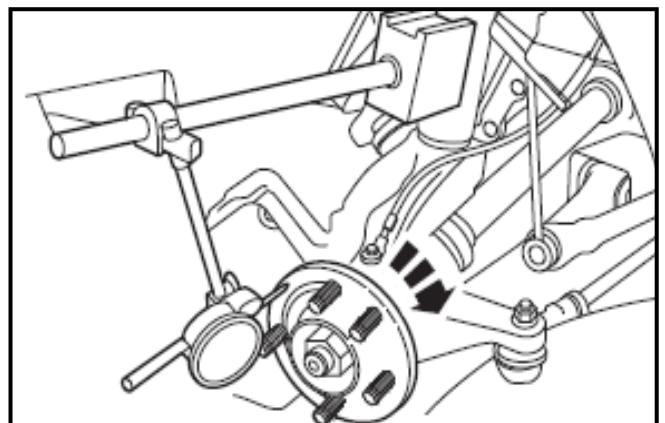


6. Install the dial indicator 10 mm from the brake outer edge so that it contacts the brake disc friction surface and is 90°.
7. Turn the brake disc until the dial indicator reading is minimum, then zero the dial indicator.
8. Slowly rotate the brake disc until the dial indicator reads maximum. Mark and record face runout.

New standard value: 0.055 mm (front brake assembly)/0.055 mm (rear brake assembly)

If the brake disc face runout exceeds the specified range, check the wheel hub runout according to the same method. If the axle hub runout is normal, replace the brake disc.

9. Slowly rotate the wheel hub to check the runout. If it exceeds the specified range: 0.025 mm, ensure that the bearing clearance is normal, and replace the wheel hub.



Brake disc runout and thickness check



Warning: Wear safety glasses to ensure safety.

General equipment

Dial indicator fixed support Dial indicator Micrometer
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1. Lift the vehicle.
Reference: 1.1.3 Lifting and towing.
2. Remove front wheel.
Reference: 2.1.4 Wheels and tires.
3. Remove brake pads.
Reference: 2.3.2 Front Disc Brake, 2.3.5 Disc Brake (Electronic Parking).
4. Fit the tyre nuts in the reverse order and fix the brake discs in place.
5. Fit dial indicator and retaining mount on suspension strut.

Fault symptom diagnosis and test

Inspection and confirmation



Note: Before diagnosis, confirm the brake system warning indicator is normal.

1. Verify the customer's problem.
2. Visually inspect obvious mechanical and hydraulic faults.

Visual Check List

Mechanical
Tire pressure
Wheels and tyres
Brake fluid level
Brake pipeline leakage

3. Resolve the discovered problem before proceeding to the next inspection.
4. If the apparent cause of the observed or raised problem has been found, the cause must be corrected before proceeding to the next step.
5. If the visual inspection is passed, confirm the fault and refer to the fault symptom table.

General equipment

Digital multimeter
Diagnostic scanner

Fault symptom table



Note:

1. Be careful when replacing each component because it may affect the performance of the brake system and cause driving hazards. Use standard components of Chang'an Motor Company.
2. When repairing the brake system, it is very important to keep the components and the site clean.
3. If brake fluid leakage is found, disassemble the components. If any abnormality is found, replace the components with new ones.
4. When removing the brake component, wrap the connecting part of the brake pipeline to prevent dust, dirt and other impurities from entering the pipeline.
5. When removing or installing the brake pipeline, do not damage or deform the brake pipeline.
6. When installing brake lines or brake hoses, make sure that they are not twisted or bent.
7. Brake hose must be away from shock absorber oil, grease, etc.
8. After installing brake pipe and brake hose, ensure that they do not interfere with other components.
9. Do not allow brake fluid to adhere to the painted surface such as the body. If brake fluid leaks to the painted surface, remove it immediately.

If the fault occurs, but the brake system working indicator lamp works normally, the control module does not store DTCs, and the cause of the fault cannot be confirmed in the basic inspection, the fault diagnosis and rule out shall be performed according to the sequence listed in the following table.

Symptoms	Possible causes	Measures
1. Shock when braking	A. Brake friction block is worn, damaged or oiled	Replace brake friction block Reference: 2.3.2 Front Disc Brake or 2.3.5 Rear Disc Brake (Electronic Parking).
	B. Abnormal wear and distortion of front brake disc	Replacing front brake disc Reference: 2.3.2 Front disc brake.
	C. Abnormal wear, out of circle and deformation of rear brake disc	Replacing rear brake disc Reference: 2.3.3 Rear disc brake electronic parking).
	D.. Brake caliper mounting bolt is loose.	Replace brake caliper mounting bolt
	E. The sliding resistance of caliper is	Replace caliper if necessary

	too large.	
	F. Loose or missing wheel mounting bolts	Tighten or replace wheel mounting bolts

2.3.1 -14**Brake System****2.3.1-14**

Symptoms	Possible causes	Measures
2. uneven braking/deviation	A. Inconsistency of tire tread and pressure	Replacing tyres and adjusting tyre pressure
	B. Brake hard pipe and hose(Distortion)	Replacing brake hard pipe and hose
	C. Brake friction block(Broken, twisted or greased) D. Lining damage	Clean or replace brake friction block Reference: 2.3.2 Front Disc Brake or 2.3.5 Rear Disc Brake (Electronic Parking).
	E. Abnormal wear and distortion of front brake disc	Replacing front brake disc Reference: 2.3.2 Front disc brake.
	F. Abnormal wear and deformation of rear brake disc	Replacing rear brake disc Reference: 2.3.5 Rear disc brake (electronic parking).
	G. Brake cylinder or caliper stagnation	Repair or replace brake cylinder or brake caliper Reference: 2.3.2 Front Disc Brake or 2.3.5 Rear Disc Brake (Electronic Parking).
	H. Incorrect wheel alignment	Wheel alignment
3. Brake pedal sinking quickly	A. Hydraulic system leakage	Repair leakage, fill brake fluid and exhaust Reference: 2.3.1 Overview of brake system.
	Air in B. system	Filling brake fluid and venting Reference: 2.3.1 Overview of brake system.
	C. Brake master cylinder piston sealing ring wear or cylinder block crack	Replace brake master cylinder Reference: 2.3.7 Hydraulic brake control.
	D. Excessive wear of brake friction block	Replace brake friction block 2.3.2 Front disc brake or 2.3.5 rear disc brake (electronic parking).

Symptoms	Possible causes	Measures
4. Brake pedal position is low or feels soft	A. The vent hole on the reservoir cap is blocked or dirty.	Clean vent
	Air in B. system	Filling brake fluid and venting Reference: 2.3.1 Overview of brake system.
5. When lightly stepping on the brake, brake lock occurs.	A. Incorrect tire pressure	Adjust tire pressure
	B. tire wear	Replacing tires
	C. Incorrect brake block installation	Reinstall brake friction block 2.3.2 Front disc brake or 2.3.5 rear disc brake (electronic parking).
6. Press and hold the pedal, and the pedal sinks slowly.	Leakage or air in A. system	Repair leakage, fill brake fluid and exhaust Reference: 2.3.1 Overview of brake system.
	B. Brake master cylinder fault	Check the brake master cylinder. If there is any fault, please replace the brake master cylinder. Reference: 2.3.9 Hydraulic brake control.
7. Brake pedal travel is too large	A. Excessive wear of brake friction block	Replace brake friction block 2.3.2 Front disc brake or 2.3.5 rear disc brake (electronic parking).

Symptoms	Possible causes	Measures
8. Brake drag	A. Electronic parking brake is not released	Release electronic parking brake
	B. Brake caliper or brake cylinder stuck	Repair or replace brake cylinder or brake caliper 2.3.2 Front disc brake or 2.3.5 rear disc brake (electronic parking).
	C. Brake friction block stuck	Repair or replace brake friction block 2.3.2 Front disc brake or 2.3.5 rear disc brake (electronic parking).
	D. Vacuum booster stuck	Repair or replace brake pedal or brake master cylinder with booster assembly Reference: 2.3.7 Hydraulic brake control.
	E. No free stroke of brake pedal	
9. Poor brake booster effect	A. Intake system leakage	Check vacuum of intake system and repair if necessary Reference: 3.1.7 intake system.
	B. Vacuum booster hose leakage	Reference: 2.3.1 Overview of brake system.
	C. Vacuum booster hose check valve fails	

Symptoms	Possible causes	Measures
10. brake system has abnormal sound	A. Brake friction block(Excessive wear, rupture, distortion, soiling, smoothness)	Replace brake friction block 2.3.2 Front disc brake or 2.3.5 rear disc brake (electronic parking).
	B. Spring leaf(Loose or abnormal deformation)	Replace spring plate
	C. Retaining bolt of brake caliper bracket(Loose)	Tighten or replace
	D. Brake caliper retaining bolt(Loose)	Replacement
	E. Brake caliper shaft pin(Severe wear)	Replacing caliper
	F. Abnormal wear, rupture and distortion of front brake disc	Replacing front brake disc Reference: 2.3.2 Front disc brake.
	G. Abnormal wear, out of circle, rupture and twist of rear brake disc	Replacing rear brake disc Reference: 2.3.2 Front disc brake.
	H. Brake pedal return spring fatigue	Replace return spring
	I. Bending and deformation of brake pedal push rod	Replacement
	J. Vacuum booster	Inspect the vacuum booster, and replace the brake master cylinder with vacuum booster assembly if necessary. Reference: 2.3.1 Overview of brake system.
	K. Brake master cylinder	Check brake master cylinder and replace brake master cylinder with vacuum booster assembly if necessary. Reference: 2.3.1 Overview of brake system.

2.3.2 Front disc brake

Specifications

Material specification

Project	Specifications
Brake fluid	HZY4/DOT4

General specifications

Front disc brake	Specifications(Mm)
Brake disc diameter	330.5
New brake disc normal thickness	28
Brake disc scrap thickness	26
Maximum runout of new brake	0.055
Caliper piston diameter	Φ45x2
Minimum thickness of brake pad friction material	2



Warning: When the brake disc reaches the scrap thickness, the brake disc must be replaced.
Special care should be taken when polishing brake discs that do not reach the scrap thickness.

Torque specification

Name	Nm	lb-ft	lb-in
Brake caliper guide pin fastening bolt	35±3	-	-
Brake caliper retaining bolt	180±10	-	-
Brake caliper brake hose joint bolt	30±2	-	-

Description and operation

System overview

The brake caliper for the front disc brake is dual piston type and is installed on the steering knuckle with two mounting bolts. When depressing the brake pedal, the brake caliper moves outward under the action of liquid pressure, the brake pressure forces the brake friction pad to stick on the brake disc, the generated friction force slows down the speed of the tire and wheel assembly, and brakes the vehicle. When the brake friction block is worn, the piston moves further to fill the gap. When the pressure on the brake pedal is removed and the hydraulic pressure on the piston is released, the piston rubber sealing ring restores its original shape, so that the clearance between the brake disc and the brake friction block remains at the original level.

Component description

Disc brake friction block

Apply the mechanical output force from the hydraulic brake caliper to the friction surface of the brake disc.

Disc brake friction block spring plate

It is located between disc brake block and brake block mounting bracket to keep brake block moving smoothly and eliminate noise.

Brake disc

Use the mechanical output force of disc brake friction pad acting on the brake disc friction surface to slow down the speed of tire and wheel assembly and brake the vehicle.

Brake caliper

Receive the fluid pressure from the brake master cylinder and convert the fluid pressure into a mechanical output force acting on the inner brake friction block; When the master cylinder returns, the brake caliper piston automatically returns.

Brake caliper bracket

It is used to fix disc brake friction block and brake caliper in place to maintain correct matching position with hydraulic brake caliper. When the mechanical output force acts on the brake friction block, make the brake friction block slide.

Disc brake caliper shaft pin

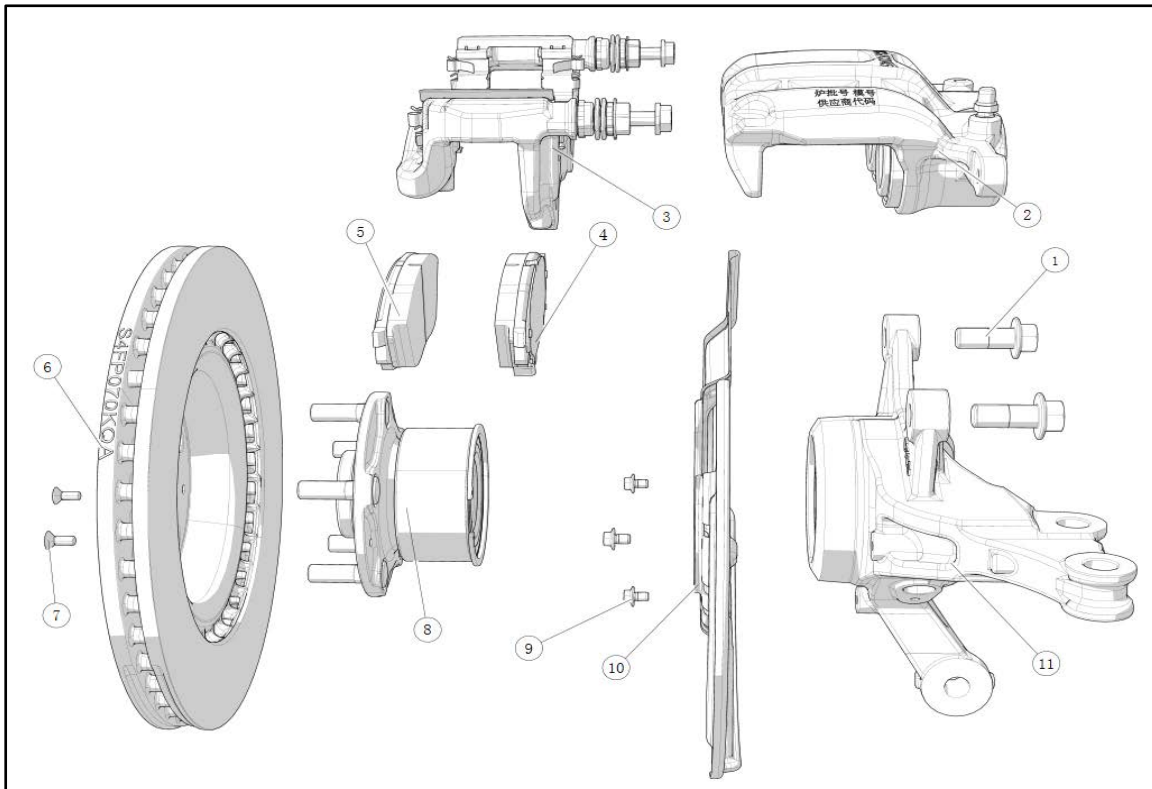
For installing the hydraulic brake caliper and holding it in place to maintain the correct fit position with the caliper bracket. When there is mechanical output force, make brake caliper slide relative to brake friction block.

Operation of front disc brake system

The mechanical output force from the hydraulic caliper piston acts on the inner brake friction block. When the piston pushes the inner brake friction block outward, the caliper housing pulls the outer brake friction block inward at the same time, so that the output force is evenly distributed. Brake friction pads apply output force to the friction surfaces on both sides of the brake disc, thereby slowing down the speed of the tire and wheel assembly. Whether the function of brake pad spring plate and brake caliper pin is normal is very important for evenly distributing brake force.

Exploded view

Front disc brake



Serial number	Component name	Quantity
1	Brake caliper mounting bolt	2
2	Front sub-cylinder assembly	1
3	Front brake caliper bracket	1
4	Front friction block component (Inner panel)	1
5	Front friction quick component (Outer plate)	1
6	Brake disc assembly	1
7	Brake disc retaining screw	2
8	Front hub bearing assembly	1
9	Front dust cover retaining screw	3
10	Front dust cover	1
11	Front steering joint	1

Removal and installation

Brake friction block

Removal

1. Remove tyre.

Reference: 2.1.4 Wheels and tires.

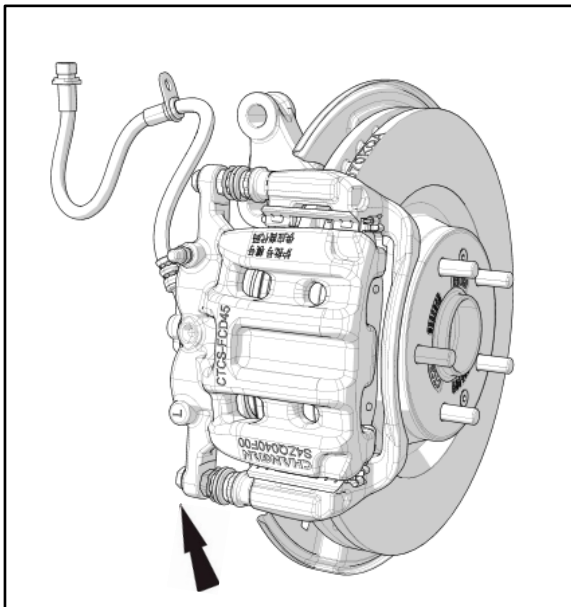
2. Remove brake caliper.

- 1). Remove the brake caliper lower shaft pin fastening bolt.

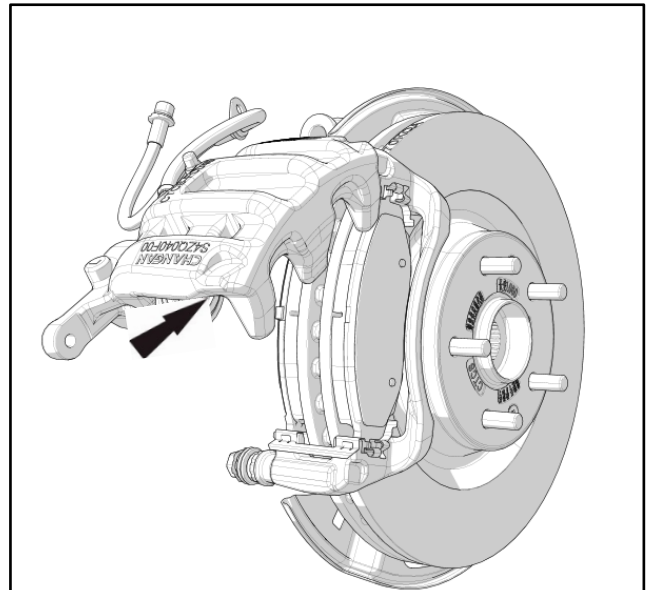


Note: This bolt is disposable parts and cannot be reused.

- 2). Turn brake caliper upwards.



3. Remove brake block.

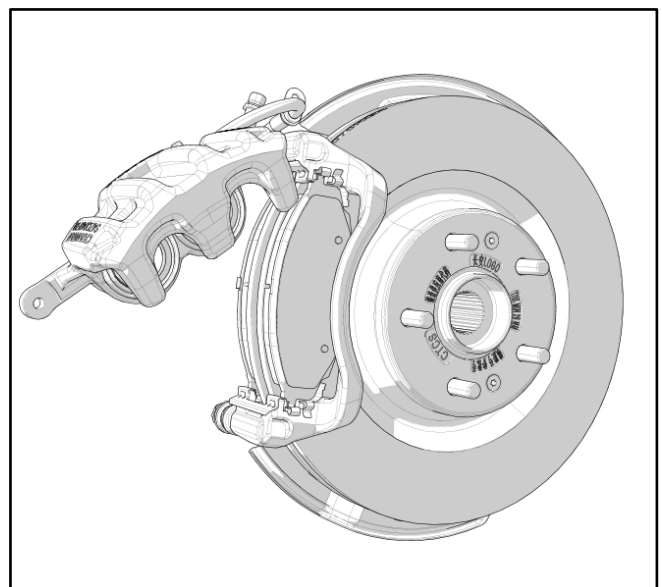


Installation

1. Using a suitable tool, compress the brake cylinder piston.



Note: When the brake cylinder piston is pressed into the piston cylinder block, the brake fluid will come out from the brake master cylinder.



2. Install brake friction block.



Note: The friction block must be replaced in

pairs (i.e. the inner friction block and the outer friction block are replaced at the same time).

3. Install new brake caliper pin retaining bolt, torque: $35 \pm 3 \text{ N.m}$



Note: This bolt is disposable parts and cannot be reused.

4. Press the brake pedal firmly more than twice.
5. Check brake fluid level and add if necessary.



Note: The following operations must be strictly performed when installing the friction block (the front and rear blocks are the same). Disc thickness to ensure that brake disc thickness is acceptable; Ensure that the spring plate has sufficient resilience, is free from plastic deformation, cracks or wear, and has removed all rust and dirt; If necessary, replace the spring plate.

Brake caliper

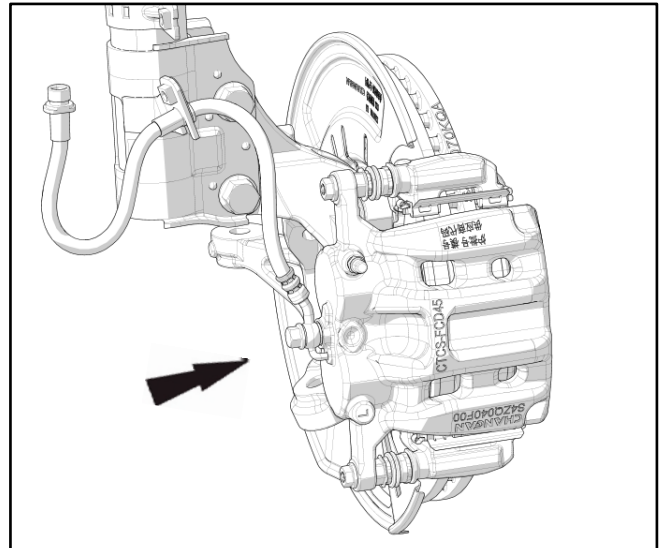
Removal

1. Remove the brake caliper mounting bolts.
[Reference: 2.3.2 Front disc brake.](#)
2. Remove the brake hose from the caliper.
 - 1) .Clamp the brake hose with a suitable brake hose clip.
 - 2). Remove brake hose.

Torque: $30 \pm 2 \text{ N.m}$

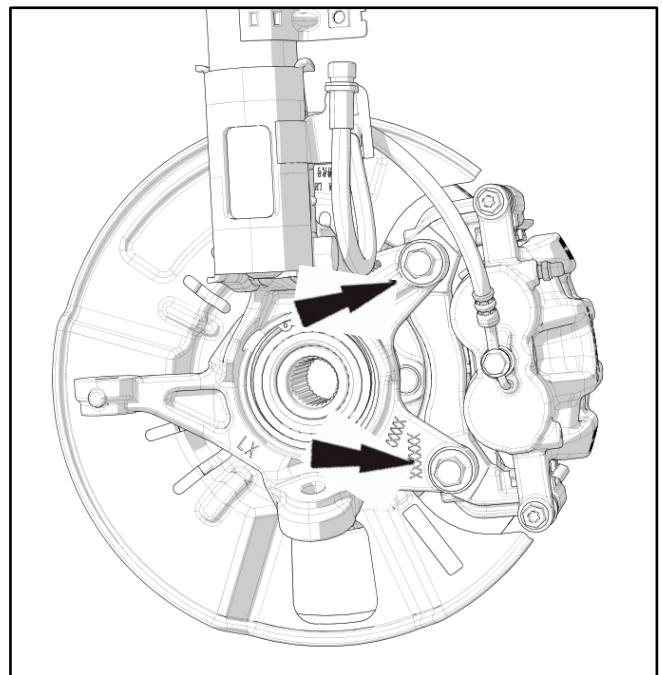


Note: Seal the brake hose to prevent fluid loss and dirt entering.



3. Remove brake caliper.

Torque: $180 \pm 10 \text{ N.m}$



Installation

1. The installation sequence is the reverse of the removal sequence.
2. Brake system exhaust.



Note: Brake caliper bracket bolts need to be replaced.

Reference: 2.3.1 Overview of brake system.

Brake disc

Removal

1. Remove brake caliper.

Reference: 2.3.2 Front disc brake.

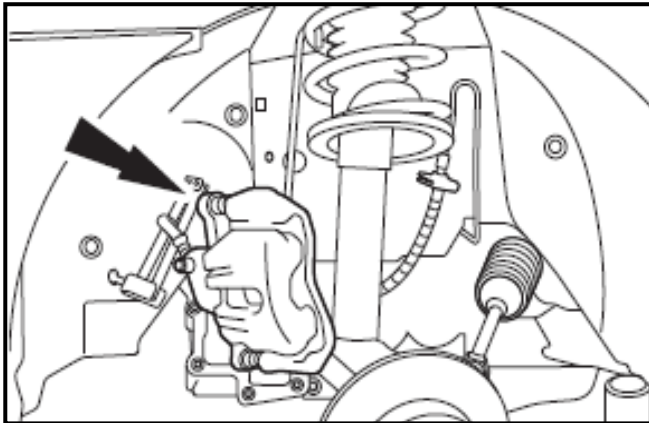


Note: The removal of brake pads and brake hoses can be ignored.

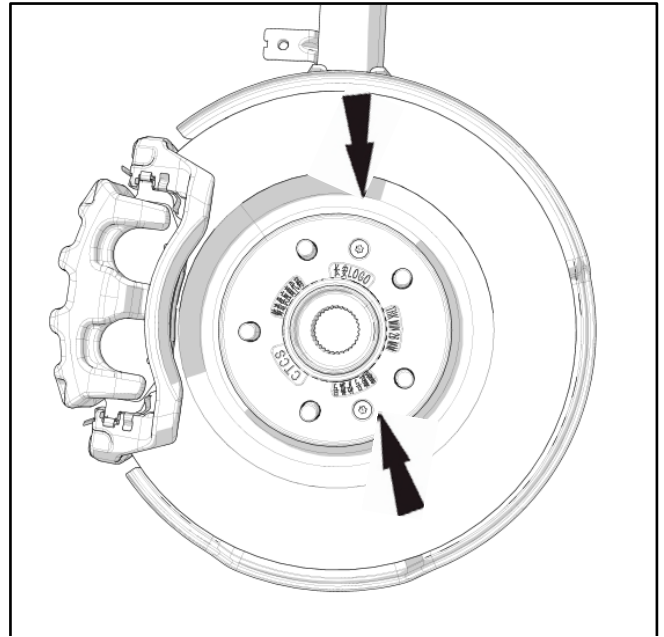
2. Suspension brake caliper.



Note: Hang the brake caliper to prevent stretching the brake hose.



3. Remove brake disc.



Installation

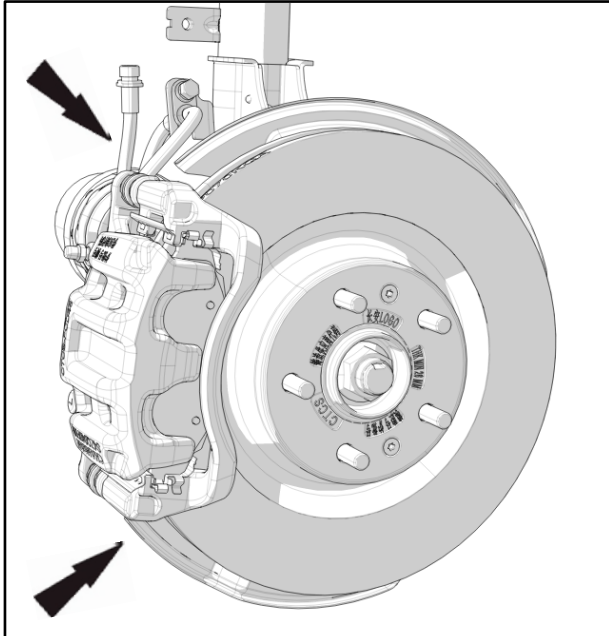
1. The installation sequence is the reverse of the removal sequence.

Screw torque: 5 - 8N.m

Lock nut torque: 294 ±10N.m

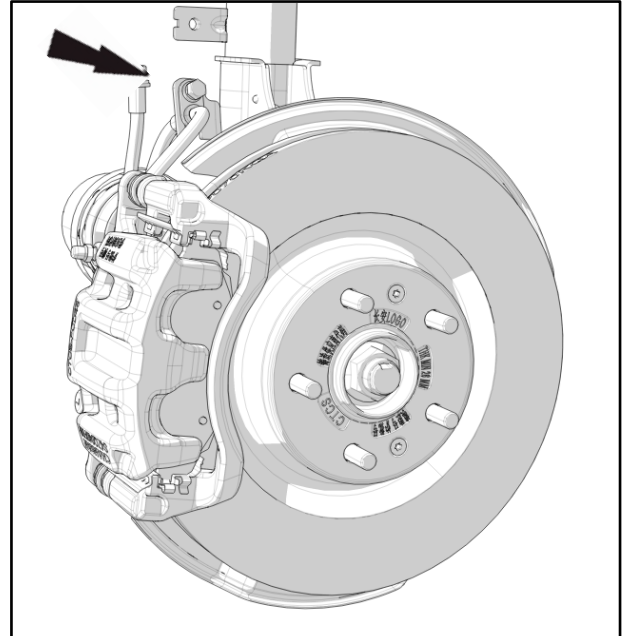


Note: When the lock nut is tightened, the brake disc anti-rotation pin is inserted on both sides of the caliper bracket (that is, the front right brake is inserted on the upper side of the caliper bracket and the front left brake is inserted on the lower side of the caliper bracket).



2. Brake system exhaust.

Reference: 2.3.1 Overview of brake system.



4. Remove brake caliper.



Note: Fix the brake caliper to one side to prevent pulling and damage the brake hose.

Front steering knuckle assembly

Torque: $180 \pm 10 \text{ N.m}$

Removal

1. Remove wheel.

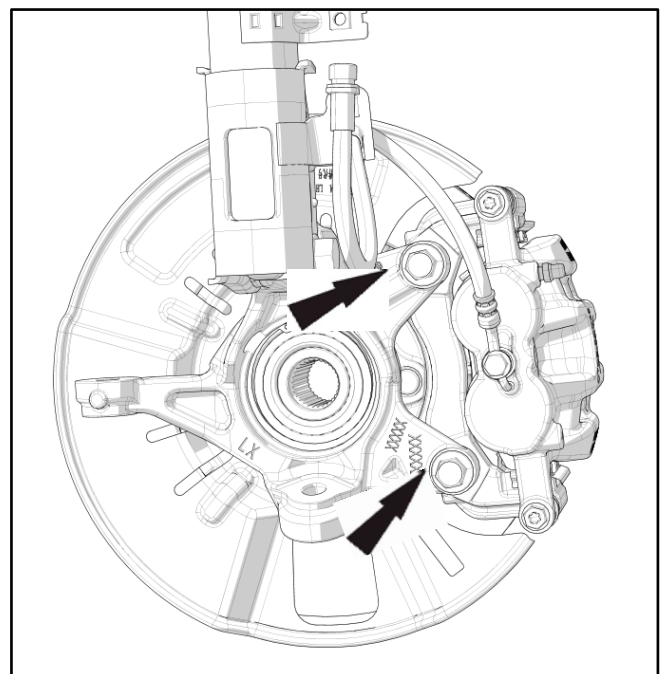
Reference: 2.1.4 Wheels and tires.

2. Lift the vehicle.

Reference: 1.1.3 Lifting and towing.

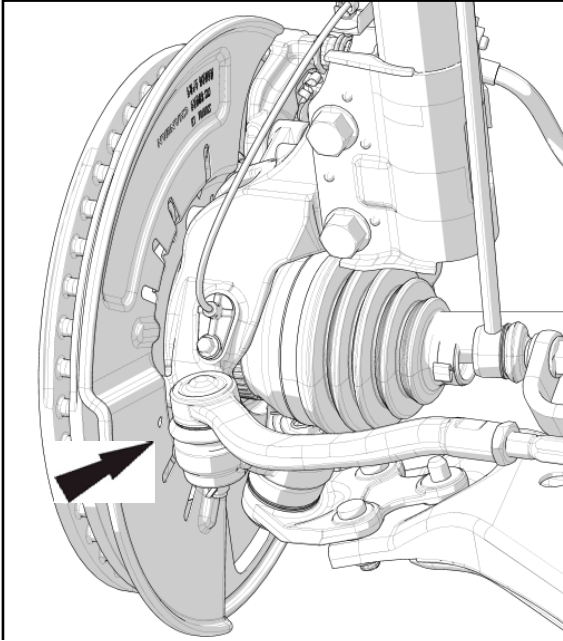
3. Remove the brake oil pipe from the front pillar assembly.

Torque: $22 \pm 2 \text{ N.m}$



5. Remove front wheel speed sensor.

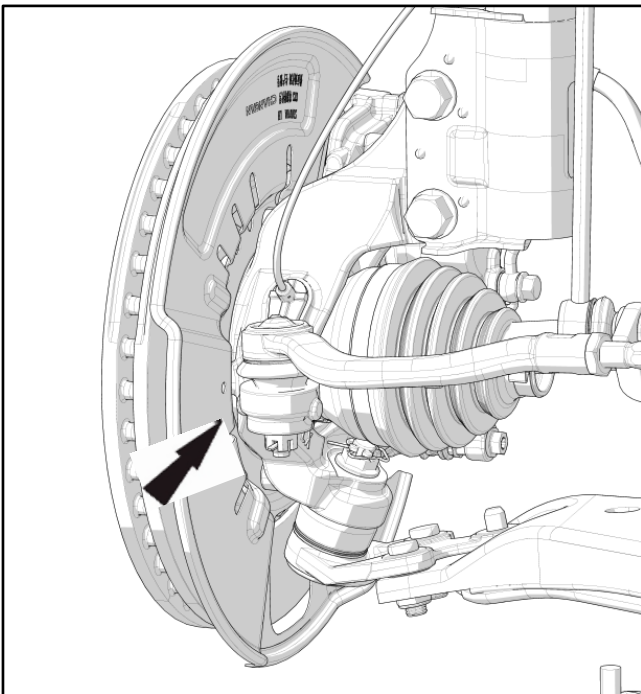
Torque: $9 \pm 2 \text{ N.m}$



6. Remove the tie rod lock nut.

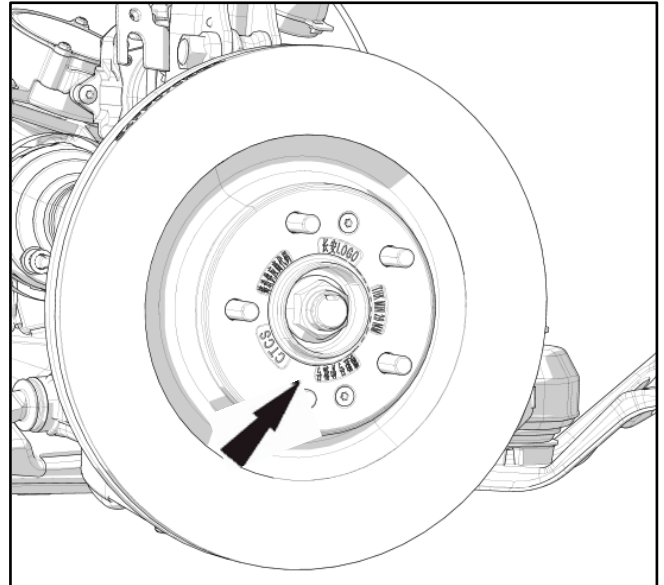
- Step 1: Straighten the locking pin.
- Step 2: Loosen the tie rod lock nut.

Torque: $45 \pm 5 \text{ N.m}$



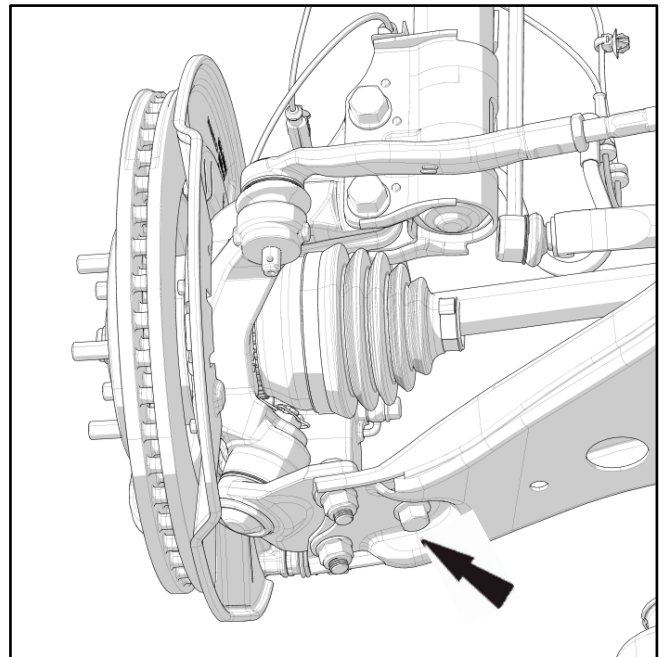
7. Remove the drive shaft lock nut.

Torque: $294 \pm 10 \text{ N.m}$



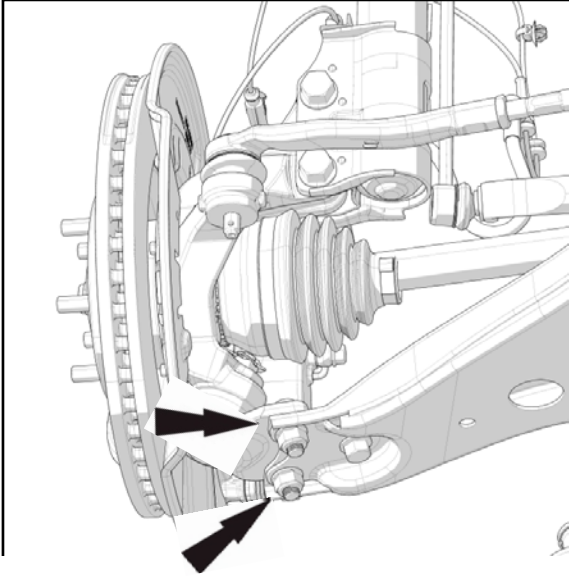
8. Remove retaining bolts of front swing arm.

Torque: $120 \pm 10 \text{ N.m}$



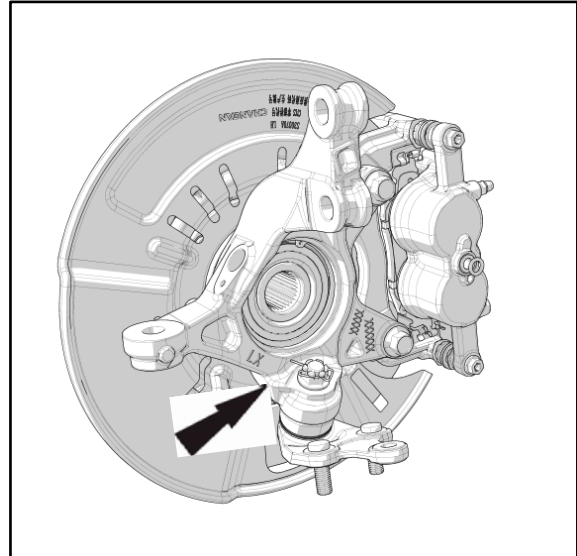
9. Remove the retaining nuts of the front swing arm.

Torque: $90 \pm 5 \text{ N.m}$



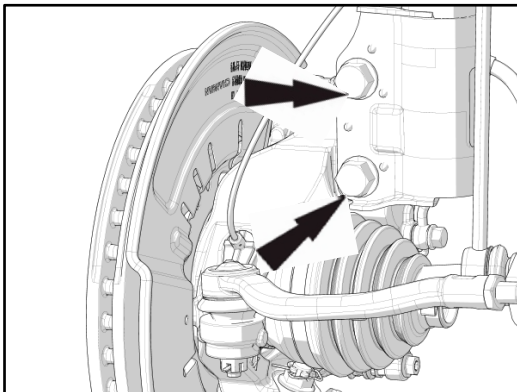
10. Remove connecting bolts between strut and steering knuckle.

Torque: $290 \pm 20 \text{ N.m}$



12. Dismantle brake disc

[Reference: 2.3.2 Front disc brake.](#)



11. Dismantle ball pin assembly of swing arm

[Reference: 2.1.2 Front suspension.](#)

Installation

1. The installation sequence is the reverse of the removal sequence.
2. Four-wheel alignment

[Reference: 2.1.1 Suspension System Overview.](#)

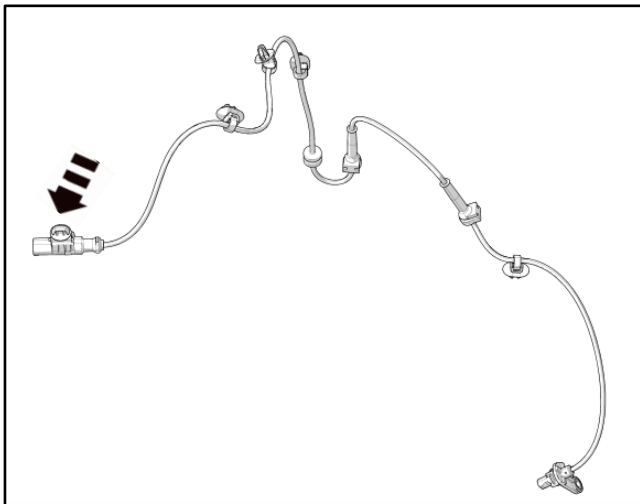
2.3.3 Front wheel speed sensor assembly

Removal

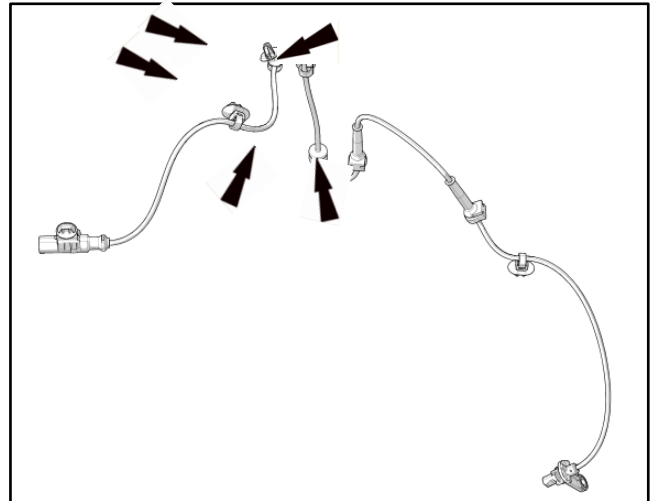
1. Disconnect the negative battery harness.

[Reference: 3.1.11 charging system.](#)

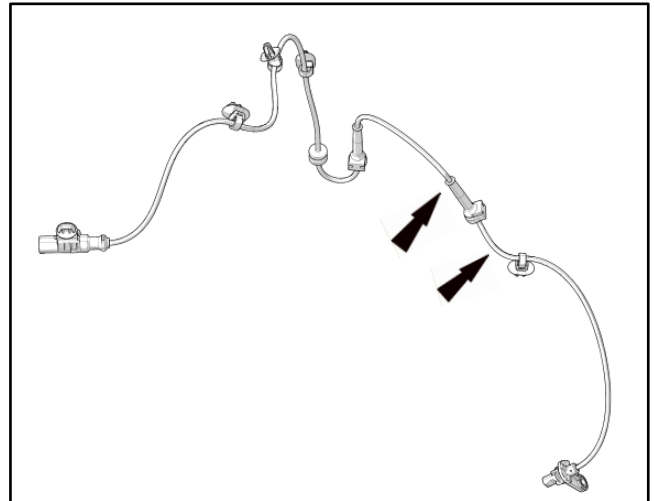
2. Disconnect the wheel speed sensor and harness connector.



3. Pull out the five pipe clips that the wheel speed sensor is clamped on the body bracket.

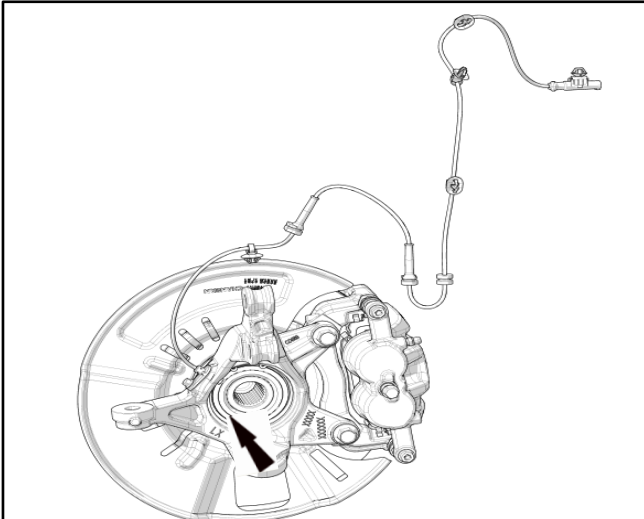


4. Remove the connecting pipe clip between wheel speed sensor and spring strut bracket.

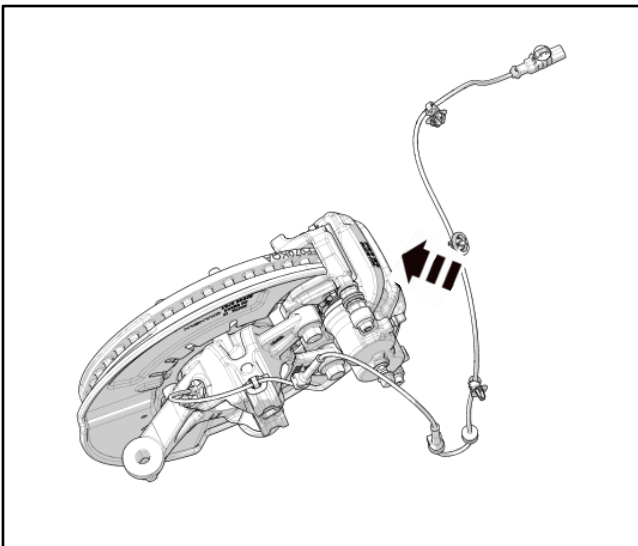


5. Remove the connecting bolts between wheel speed sensor head and steering knuckle.

Torque: $9 \pm 2 \text{ N.m}$



6. Remove front wheel speed sensor assembly.



Installation

The installation process is the reverse of the removal sequence

2.3.4 Rear wheel speed sensor assembly

Removal

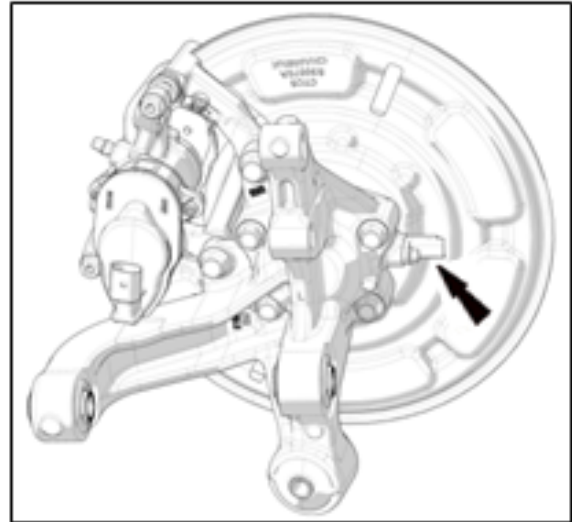
1. Disconnect the negative battery harness.

[Reference: 3.1.11 charging system.](#)

2. Disconnect the wheel speed sensor and harness connector.

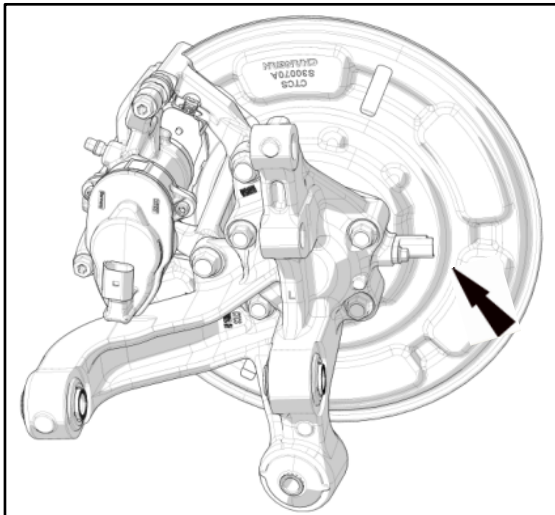


Note: If the hand operation space is insufficient, it is recommended to perform steps 3 and 4 before this operation.



3. Remove rear wheel speed sensor and rear angle connecting bolt torque: $9 \pm 2 \text{ N.m}$.

4. Remove rear wheel speed sensor assembly.



Installation

The installation process is the reverse of the removal sequence

2.3.5 Rear disc brake (electronic parking)

Specifications

Material specification

Project	Specifications
Brake fluid	HZY4/DOT4

General specifications

Rear disc brake(EPB Caliper)	Specifications(Mm)
Brake disc diameter	310.5
New brake disc normal thickness	11
Brake disc scrap thickness	9
New brake disc maximum runout(Relative brake disc mounting surface)	0.055
Caliper piston diameter	Φ41
Minimum thickness of brake pad friction material	2



Warning: When the brake disc reaches the scrap thickness, the brake disc must be replaced. Special care should be taken when polishing brake discs that do not reach the scrap thickness.

Torque specification

Name	Nm	lb-ft	lb-in
Brake caliper guide pin fastening bolt	35±3	-	-
Brake caliper retaining bolt	120±5	-	-
Brake caliper brake hose joint bolt	30±2	-	-

Description and operation

System overview

Rear disc type EPB brake assembly brake cylinder is of single cylinder structure. The service brake adopts disc structure, the parking brake adopts electronic parking brake system, the rear wheel disc electronic parking actuator is operated through the electronic parking brake button to realize parking brake, the parking brake button is located between two front seats, and the parking brake can be realized by pulling up the electronic parking brake button; Depress the brake pedal and press the electronic parking brake button at the same time to release the parking brake.

Component description

Brake friction block

Apply the mechanical output force from the hydraulic brake caliper to the friction surface of the brake disc. Disc brake caliper fixing spring is located between brake caliper and brake caliper bracket to fix brake caliper and eliminate wobble.

Brake disc

Use the mechanical output force of disc brake friction pad acting on the brake disc friction surface to slow down the speed of tire and wheel assembly and brake the vehicle.

Brake caliper

Receive the fluid pressure from the brake master cylinder and convert the fluid pressure into a mechanical output force acting on the inner brake friction block; When the master cylinder returns, the brake caliper piston automatically returns.

Brake caliper bracket

It is used to fix disc brake friction block and brake caliper in place to maintain correct matching position with hydraulic brake caliper. When the mechanical output force acts on the brake friction block, make the brake friction block slide.

Disc brake caliper shaft pin

For installing the hydraulic brake caliper and holding it in place to maintain the correct fit position with the caliper bracket. When there is mechanical output force, make brake caliper slide relative to brake friction

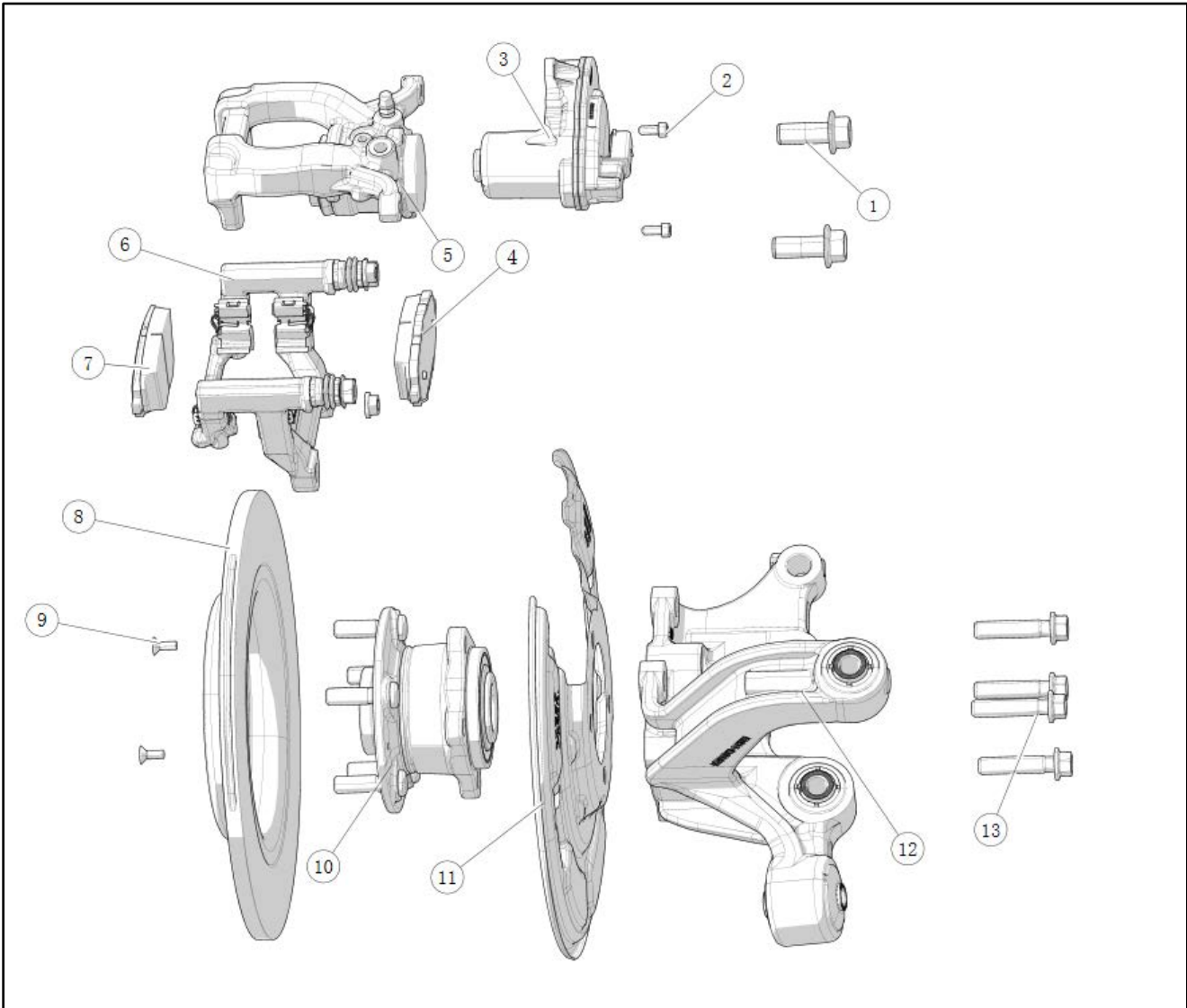
block.

Electronic parking system(EPB)

Implement the parking brake and release the parking brake according to the electrical signal from the electronic parking button.

Exploded view(NE15 model)

Rear disc brake(Electronic parking)



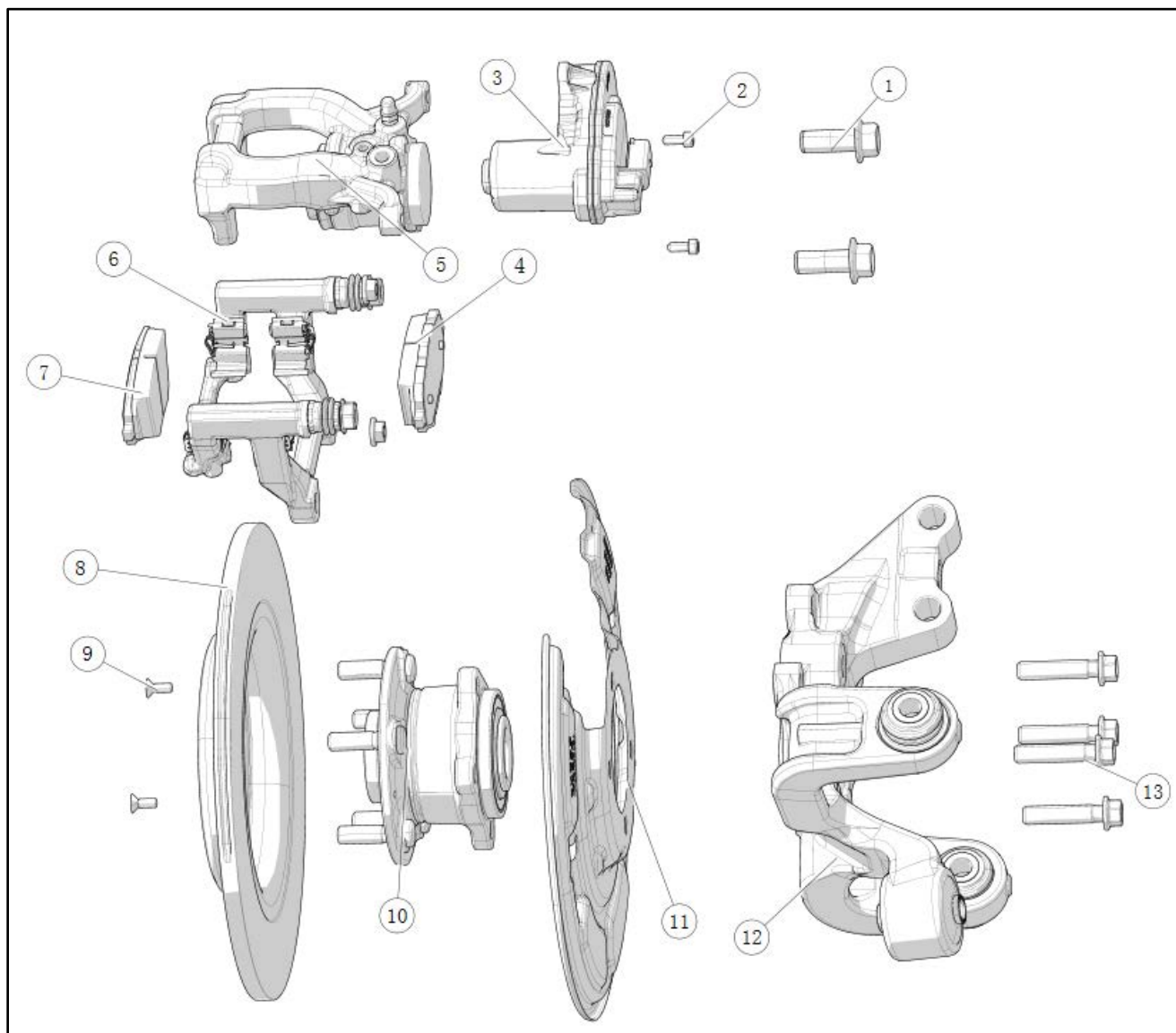
Serial number	Component name	Quantity
1	Caliper mounting bolt	2
2	EPB Motor mounting screws	2

2.3.5 -4**Rear disc brake (electronic parking)****2.3.5-4**

3	EPB Motor assembly	1
4	Inner friction block component	1
5	Rear cylinder sub-assembly	1
6	Caliper bracket with guide pin assembly	1
7	Outer friction block component	1
8	Brake disc	1
9	Brake disc mounting screws	2
10	Rear bearing(Two-drive)	1
11	Rear dust cover	1
12	Rear sheep angle component	1
13	Bearing retaining bolt	4

Exploded view(D20T 4x4)

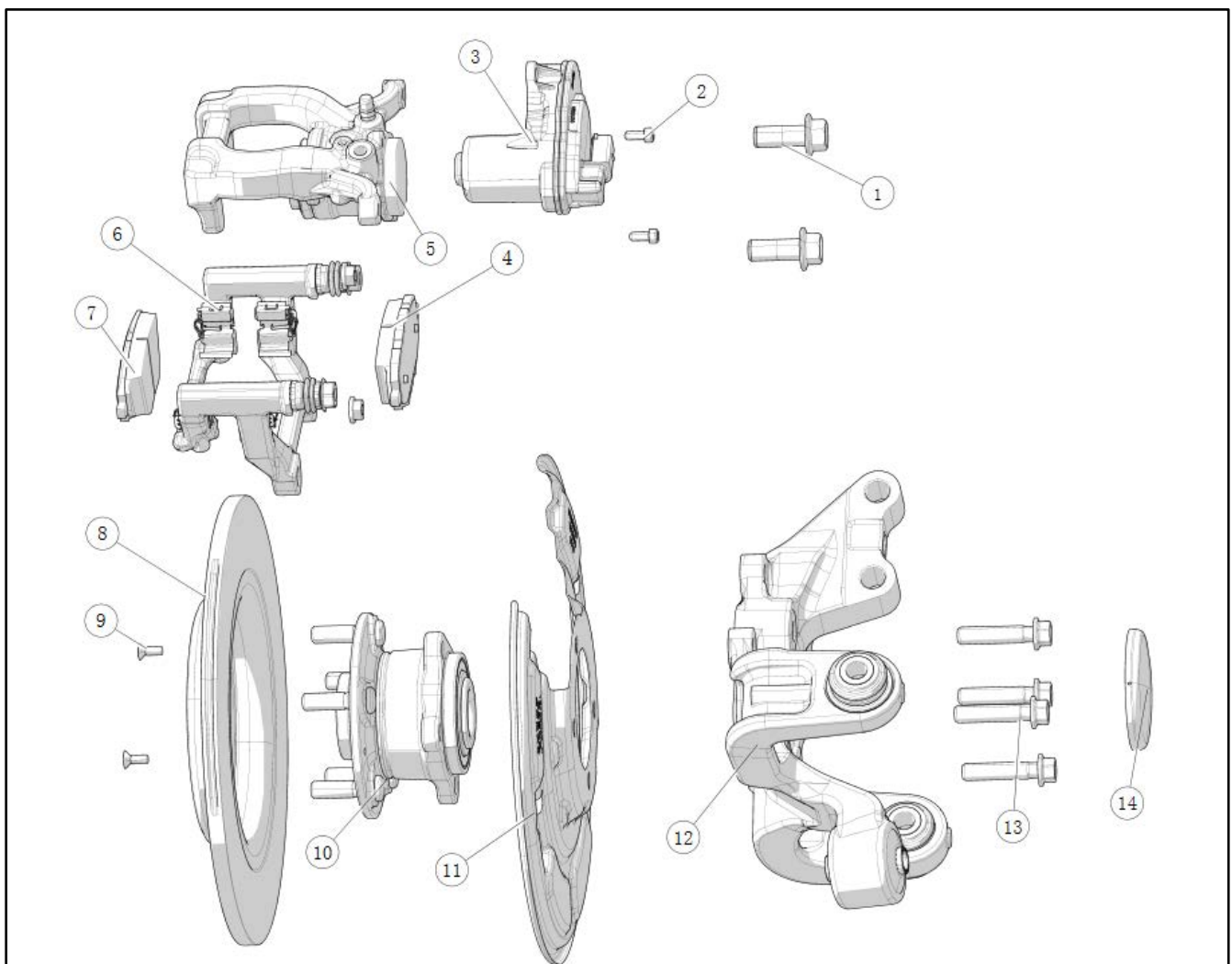
Rear disc brake(Electronic parking)



Serial number	Component name	Quantity
1	Caliper mounting bolt	2
2	EPB Motor mounting screws	2
3	EPB Motor assembly	1
4	Inner friction block component	1
5	Rear cylinder sub-assembly	1

2.3.5 -6**Rear disc brake (electronic parking)****2.3.5-6**

6	Caliper bracket with guide pin assembly	1
7	Outer friction block component	1
8	Brake disc	1
9	Brake disc mounting screws	2
10	Rear bearing(Four-wheel drive)	1
11	Rear dust cover	1
12	Rear sheep angle component	1
13	Bearing retaining bolt	4

Exploded view(D20T Two-drive models)**Rear disc brake(Electronic parking)**

2.3.5 -7**Rear disc brake (electronic parking)****2.3.5-7**

Serial number	Component name	Quantity
1	Caliper mounting bolt	2
2	EPB Motor mounting screws	2
3	EPB Motor assembly	1
4	Inner friction block component	1
5	Rear cylinder sub-assembly	1
6	Caliper bracket with guide pin assembly	1
7	Outer friction block component	1
8	Brake disc	1
9	Brake disc mounting screws	2
10	Rear bearing(Two-drive)	1
11	Rear dust cover	1
12	Rear sheep angle component	1
13	Bearing retaining bolt	4
14	Bowl-type race film	1

Removal and installation

Brake friction block

Removal

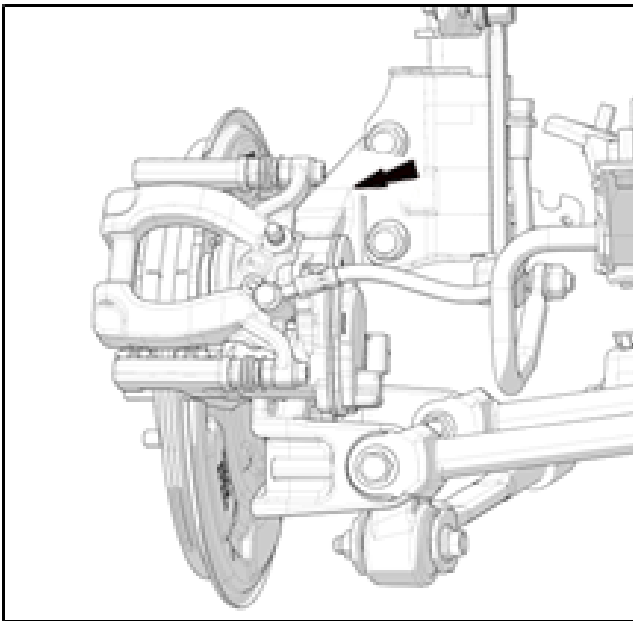
1. Use diagnostic scanner to execute "Maintenance On" action;
2. Remove wheel.

[Reference: 2.1.4 Wheels and tires.](#)
3. Remove the brake caliper body.
 - 1) Remove shaft pin bolt end cap
 - 2) Remove the retaining bolts of upper axle pin of brake caliper.

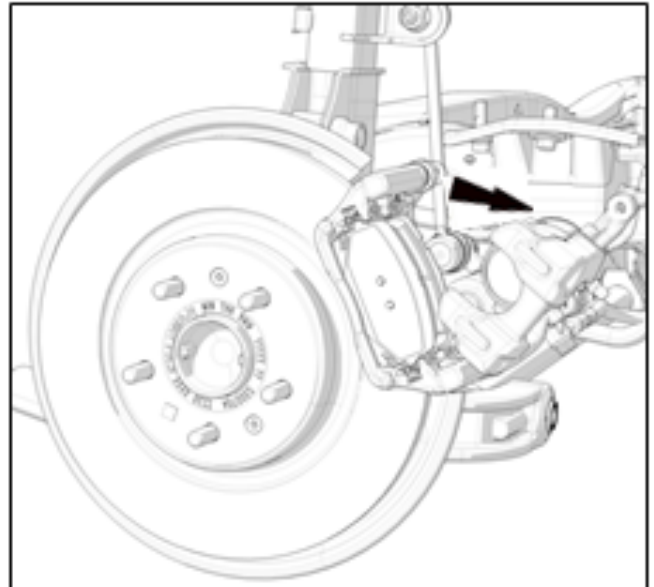
Torque: $35 \pm 3 \text{ N.m}$



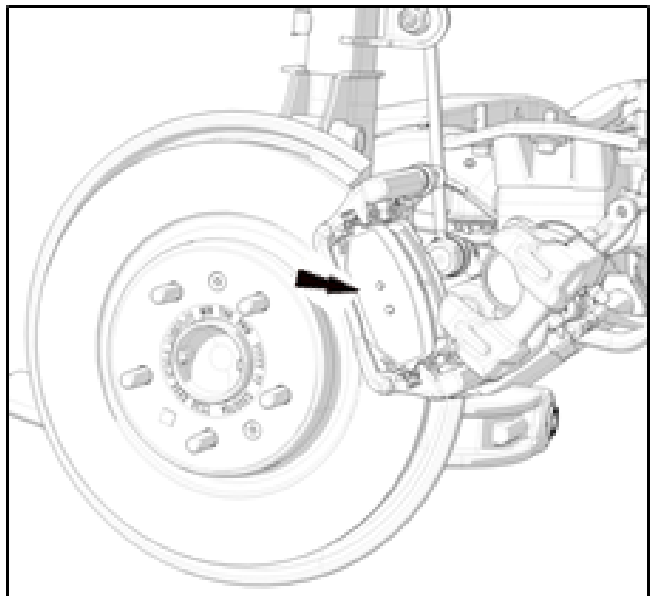
Note: This bolt is disposable parts and cannot be reused.



- 3) .Turn the brake caliper body around the first shaft.



5. Remove brake block.



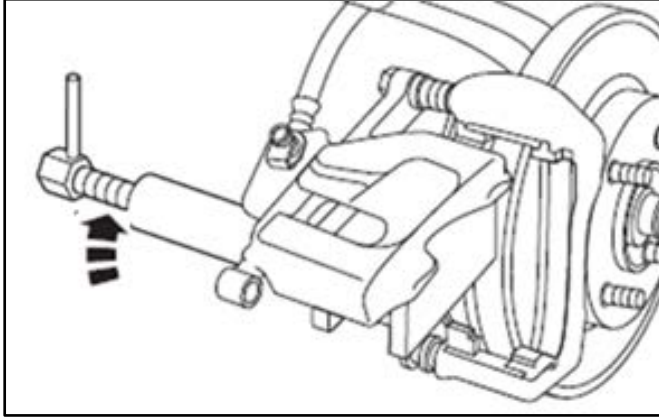
Note: When removing the brake block, it is forbidden to turn the brake caliper body forcefully to cause deformation of brake hose and pull the EPB harness. If necessary, unplug the EPB harness;

Installation

1. Using a suitable tool, compress the brake cylinder piston.



Note: When the brake cylinder piston is pressed into the piston cylinder block, the brake fluid will come out from the brake master cylinder.



1. Install brake friction block.



Note: The friction block must be replaced in pairs (i.e. the inner friction block and the outer friction block are replaced at the same time).

2. Install new brake caliper pin retaining bolt, torque: $35 \pm 3 \text{ N.m}$



Note: This bolt is disposable parts and cannot be reused.

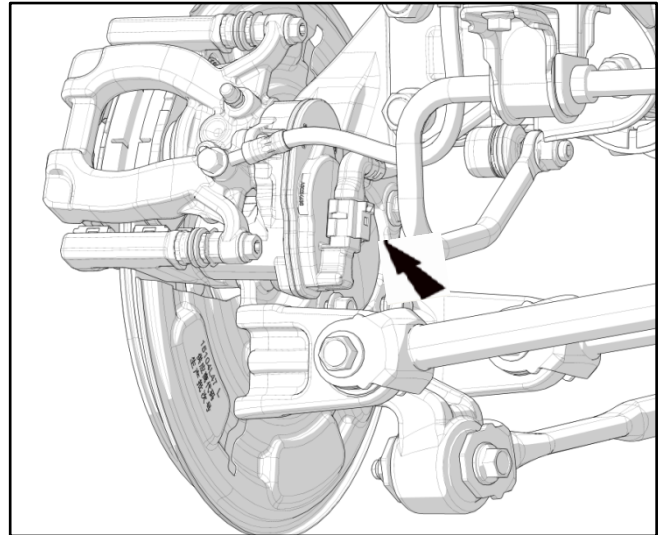
3. Use diagnostic scanner to execute "Maintenance Off" action;
4. Press the brake pedal firmly for more than two times;
5. Check brake fluid level and add if necessary.

Brake caliper

Removal

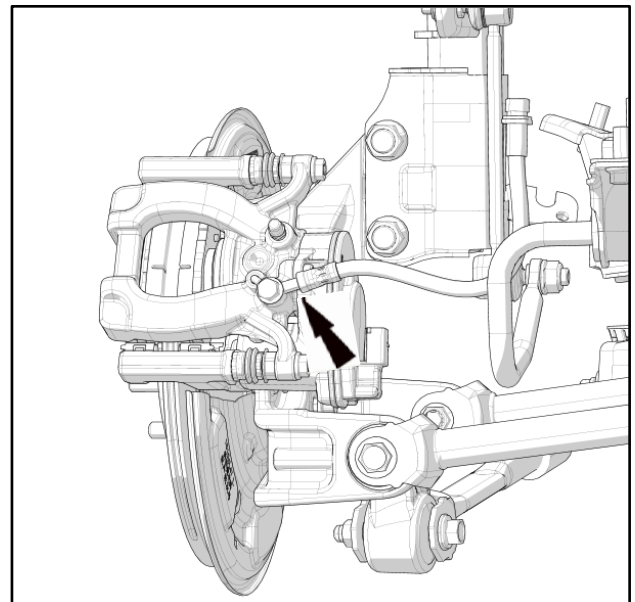
1. Remove EPB wire harness.

Press connector to pull out.



2. Remove the lower brake hose from the caliper.

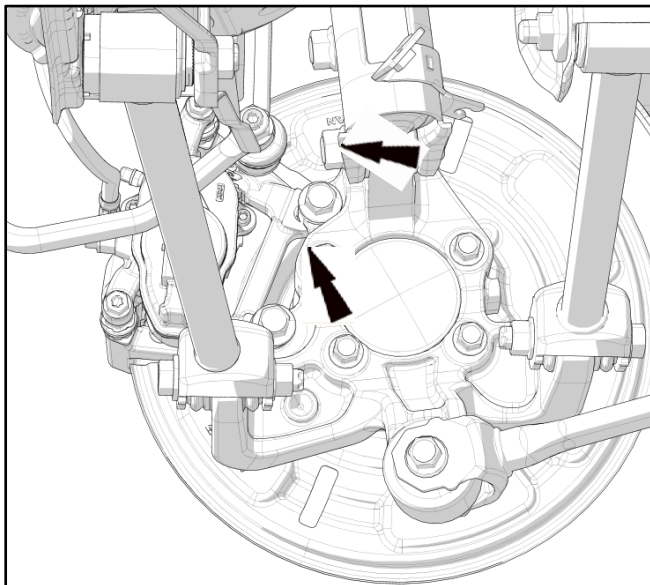
Torque: $30 \pm 2 \text{ N.m}$



Note: Seal the brake hose to prevent fluid loss and dirt entering.

3. Remove the connecting bolts of caliper bracket, and remove the brake caliper.

Torque: 120 \pm 5N.m



Installation

1. The installation sequence is the reverse of the removal sequence.
2. Brake system exhaust.

[Reference: 2.3.1 Overview of brake system.](#)

Brake disc

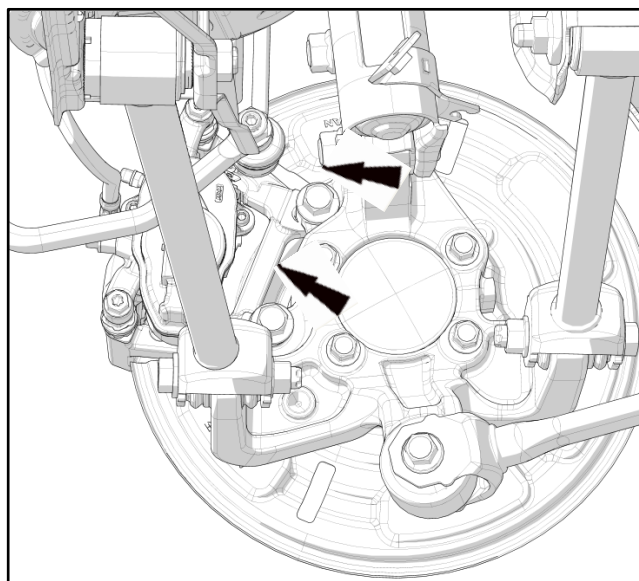
Removal

- 1 Remove the wheel.

[Reference: 2.1.4 Wheels and tires.](#)

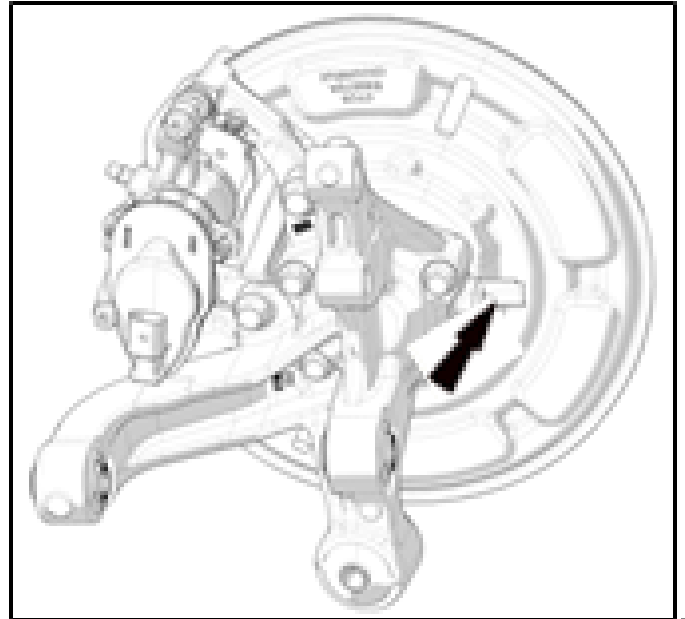
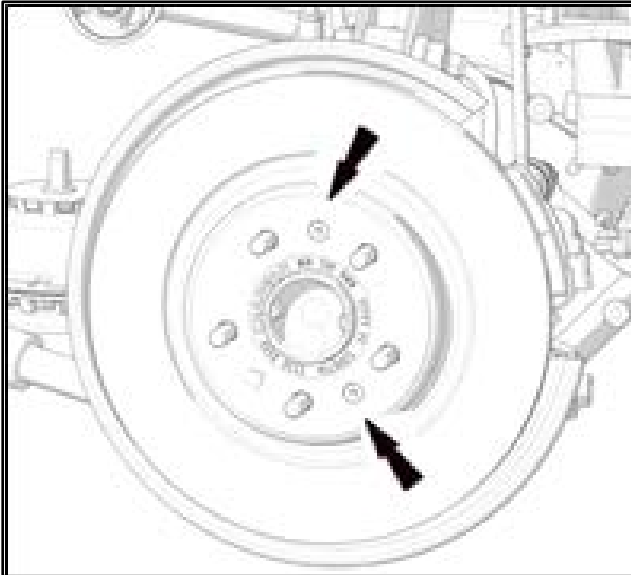
2. Remove the brake caliper bracket mounting bolts and remove the brake caliper.

Torque: 120 \pm 5N.m.



3. Remove the brake disc retaining screws and remove the brake disc.

Torque: 5 - 8N.m



Installation

1. The installation sequence is the reverse of the removal sequence.

3. Removing brake caliper

[Reference: 2.3.5 disc brake \(electronic parking\).](#)

Rear sheep angle assembly and rear hub bearing assembly

4. Remove the drive shaft lock nut. (4x4)

Torque: $294 \pm 10 \text{ N.m}$

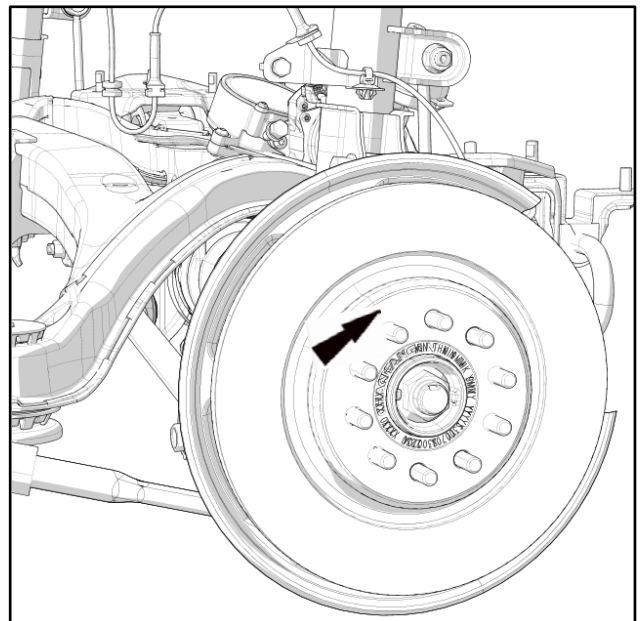
Removal

1. Remove wheel.

[Reference: 2.1.4 Wheels and tires.](#)

2. Removing wheel speed sensor

Torque: 9 N.m



5. Removing brake disc

[Reference: 2.3.5 Rear disc brake \(electronic parking\).](#)

6. Remove the connecting bolts of RR sheep angle assembly, RR trailing arm and RR suspension toe-in adjusting rod.

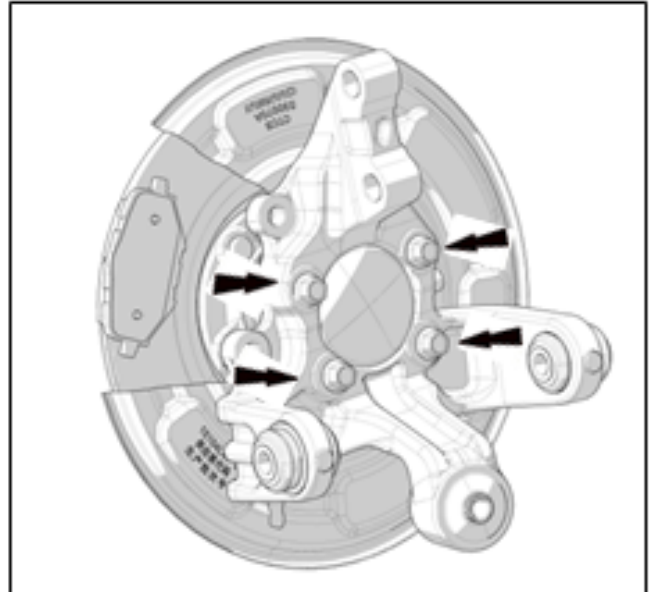
[Reference: 2.1.3 Rear suspension.](#)

7. Remove the connecting bolts of RR sheep angle assembly and RR pillar.

[Reference: 2.1.3 Rear suspension.](#)

8. Carefully remove the rear angle assembly and rear bearing assembly.

Rear hub bearing torque: $100 \pm 10 \text{N.m}$



Installation

The installation sequence is the reverse of the removal sequence.

2.3.6 Electronic parking brake system

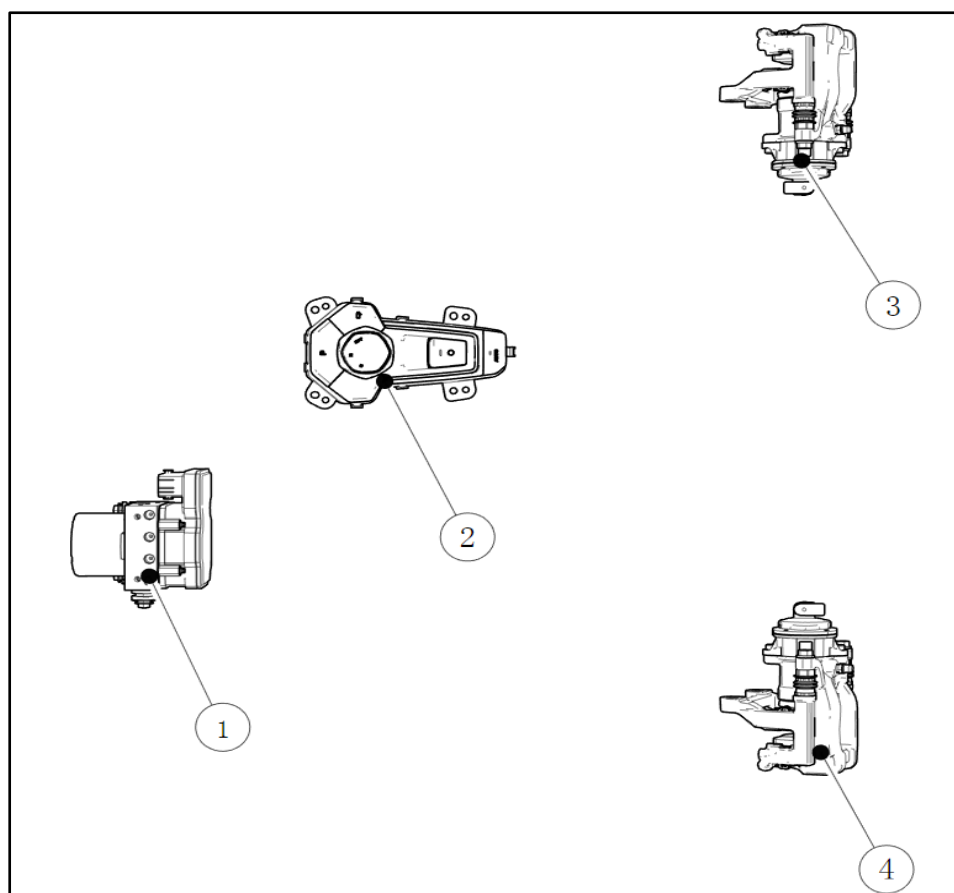
Description and operation

System overview

The electronic parking brake system is referred to as EPB system. The EPB system eliminates the traditional hand-pulled or foot-stepped parking control mechanism and uses an electronic control button to control the parking brake. Therefore, for the driver, the biggest advantage of this new parking brake system is convenient and comfortable operation.

From the control function point of view, the parking brake system can be jointly controlled with other control systems such as electronic stability control system (ESC) due to the overall electrification modification of the parking brake system. Therefore, the vehicle safety performance is greatly improved, and various control functions within the brake system are realized by electronic control. These advantages are beyond the comparison of traditional mechanical parking control system.

Component of EPB system



2.3.6 -2**Electronic parking brake system****2.3.6-2**

Serial number	Schematic description	Serial number	Schematic description
1	Control unit ECU	3	Right EPB caliper
2	EPB switch	4	Left EPB caliper

Basic control functions

Depending on the vehicle configuration and operating conditions, the EPB system can perform the following functions:

1. Static clamping and releasing function

When the vehicle is stationary, the traditional parking function can be realized by pulling up the EPB switch; When the vehicle is stationary, the parking brake release function can be realized by pressing the brake pedal and pressing the EPB switch. (If the brake pedal is not depressed, the instrument with text information display function will prompt to depress the brake pedal)

2. Auxiliary exit function(DAA)

This function releases the EPB parking brake when the EPB system detects that the driver wishes to drive away. However, when the vehicle is parked on a ramp, sufficient drive torque is required to function in order to prevent the vehicle from rolling.

The Auxiliary Drive-Out function can be used for ramp start and ordinary road start, especially for ramp start, so as to avoid the problem of vehicle slipping after parking ramp start. Hill start must meet several preconditions:

The driver fastens the seat belt, closes the driver door, the gear is in forward or reverse gear, depresses the accelerator, and the engine continuously outputs torque (in case of MT vehicle, it is necessary to release the clutch pedal and depress the accelerator pedal) EPB system will automatically release.

3. Dynamic deceleration function(ECD)

ECD function enables the driver to achieve dynamic deceleration in case of emergency. (For example, brake pedal and brake master cylinder fall off, vacuum booster leakage failure, etc.) When the driver pulls up the EPB switch for deceleration, the ECD function will send a deceleration request (deceleration 6m/s^2), which will require the ESC system to actively build up pressure and apply wheel braking force to decelerate the vehicle.

The ESC system sends a signal to confirm whether the ECD function can be responded to, and then confirm whether the EPB deceleration request is executed.

When the system detects that the deceleration makes the vehicle stationary, the deceleration request will immediately exit to ensure the vehicle deceleration comfort. When the driver performs dynamic deceleration through the EPB switch, this command is executed but there is a request that will interrupt the ECD function, that is, when the ECD function is activated and the accelerator pedal is depressed, the ECD function will be interrupted immediately.

4. Anti-lock brake function of rear wheel(RWU)



RWU function is to realize "electronic plus mechanical" dynamic deceleration function through EPB system. RWU The anti-lock braking of rear wheels can be carried out separately to realize vehicle stability of rear wheels. In case of service brake system failure, if the vehicle needs to decelerate and continuously pull the EPB switch, the RWU function will work.

5. Service function

When driving a certain mileage, it is necessary to replace the friction block of rear brake caliper, which shall be completed by the diagnostic scanner. First connect the diagnostic scanner through the OBD port, select the electronic handbrake system to enter the maintenance mode in special service, and operate according to the prompt of the diagnostic scanner. Then replace the friction plate according to the procedure for replacing the friction plate.

Safety strategy and fault type of EPB

Correspondence between instrument indicator lamp and function:

Indicator type	Display type	Indication content
Malfunction indicator lamp 	Flashing(Frequency 1HZ)	Vehicle is not offline
	On	EPB system fault
	On	EPB system fault under static conditions
	Off	System normal
Function indicator light 	Flashing(Frequency 1HZ)	EPB switch is invalid while parking operation
	On	Parking brake
	On	ECD function works
	On	RWU function works
	On	Rolling re-clamping function works
	Off	No parking brake or other conditions

EPB system fault type

1. Static parking fault

EPB. The ESC control system belongs to chassis brake control system. When the fault occurs, first distinguish which system caused the fault.

The failure of the wheel speed signal will cause the EPB switch to be pulled up in the stationary state, and the parking function will work. However, the parking will be released after releasing the EPB switch, and

the static parking will fail.

Please use diagnostic scanner to connect to ODB port, check current fault and historical fault code of EPB, confirm the faulty parts, check whether the associated parts harness connection is normal, and replace the harness if necessary.

2. Auxiliary departure function (DAA) fault

If the DAA function fails, the vehicle cannot drive off the normal slope. Please release the EPB parking brake according to the static release operation mode (press the brake pedal after the vehicle is powered on, and press the EPB switch to release the EPB parking brake).

Please use the diagnostic scanner to access the ODB port, check the current fault and history fault code of EPB system, and confirm whether the DAA function is invalid due to absence of airbag ECU signal, absence of main driver door signal, accelerator pedal signal output error, gear signal error, etc.

3. Dynamic deceleration (ECD) function fault

The fault problem related to the EPB control system affects the EPB hydraulic brake function (except the missing wheel speed sensor signal). If it does, it is mainly caused by the fault of the EPB function. Therefore, in this case, the dynamic braking function of EPB system will be in failure state.

Connect the diagnostic scanner to the ODB port, check the current fault and historical fault code of the ESC system, confirm the fault source, and refer to the maintenance content of the ESC system for troubleshooting.

4. Anti-lock brake function of rear wheel(RWU)

If the ECD function fails, the RWU function also fails to function, resulting in vehicle dynamic deceleration failure.

Please use diagnostic scanner to connect to ODB port, check current fault and history fault code of EPB system, and confirm whether the function fails due to missing wheel speed sensor signal and EPB switch fault.

5. Maintenance function

If the repair and maintenance function cannot be normally used during friction plate replacement, please check the current fault and historical fault code of EPB system (for details, refer to DTC code table of anti-lock brake/electronic stability control system), and confirm whether the function fails due to EPB switch fault, EPB caliper harness connection fault, low battery voltage and other factors.

2.3.7 Hydraulic brake control

Specifications

Material specification

Project	Specifications
Brake fluid	HZY4/DOT4(Or DOT4)

Torque specification

Name	Nm	lb-ft	lb-in
Brake master cylinder and oil pipe connecting lock bolt	18±2	-	-
Brake pedal retaining nut	22±2	-	-

Description and operation

System overview

The mechanical force from the brake pedal is transmitted to the vacuum booster by the swing arm of the pedal. It is transmitted to the master cylinder after being assisted by the booster. The master cylinder converts into oil pressure. After being adjusted by the hydraulic electronic control unit, it is transmitted to the brake cylinder through the brake hard pipe and hose. The brake cylinder converts the oil pressure into mechanical force, so that the brake pad presses the brake disc and brakes the vehicle.

Brake main pump, vacuum booster and fluid reservoir are assembly parts, collectively referred to as brake master cylinder with vacuum booster assembly, and disassembly and subassembly are not recommended.

Component description

Brake pedal

Receive, amplify and transmit brake system input force from the driver.

Brake pedal push rod

The amplified brake pedal input force is transmitted to the vacuum booster.

Brake master cylinder reservoir

Brake fluid for hydraulic brake system is installed inside.

Brake master cylinder

Convert mechanical input force to hydraulic output pressure. The output pressure is distributed from the master cylinder to both hydraulic lines to supply the diagonal wheel brake lines.

Brake pipe and brake hose

Transfer brake fluid through the hydraulic brake system components.

Brake cylinder

Convert hydraulic input pressure to mechanical output force.

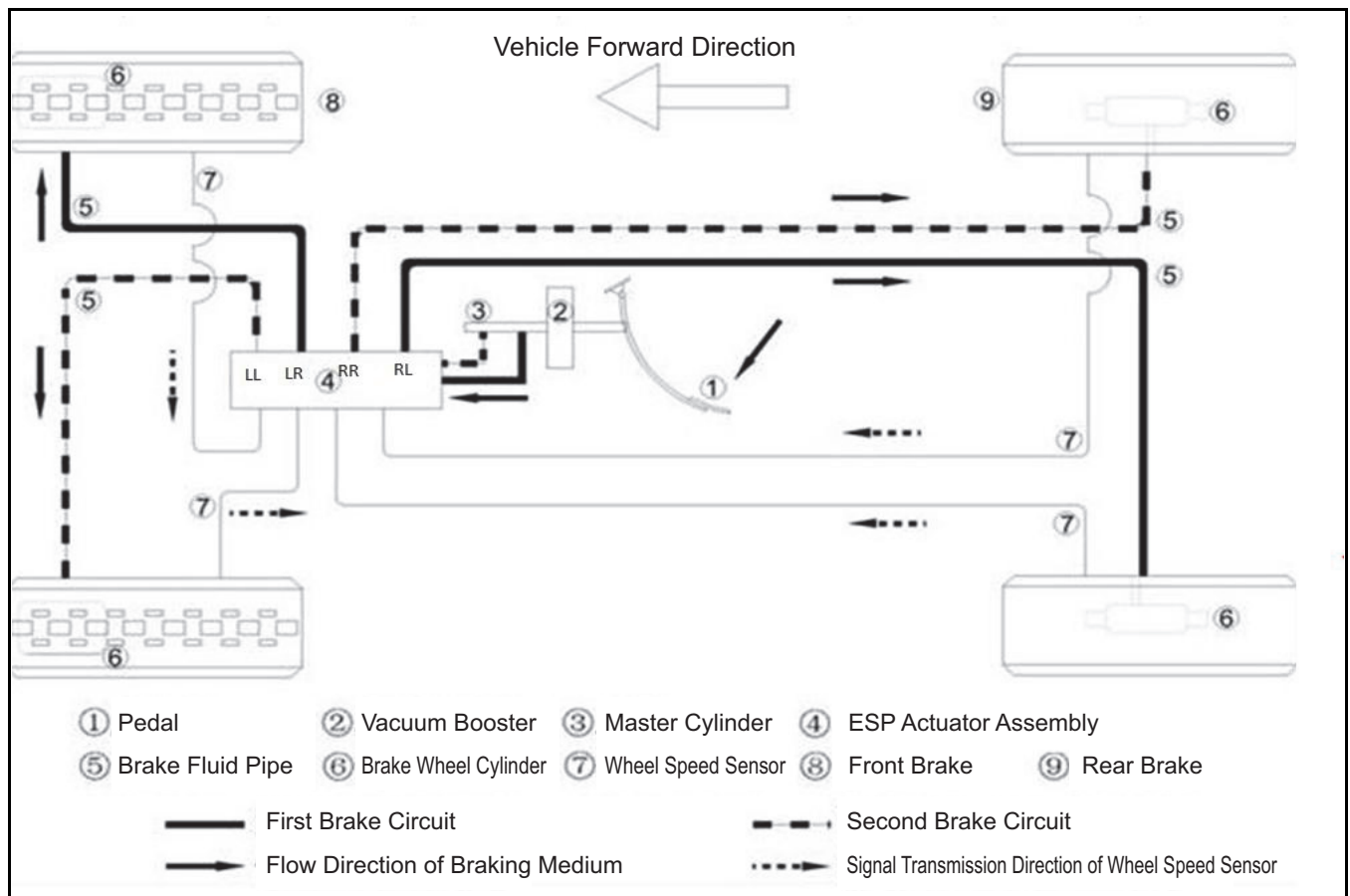
Low brake fluid level warning lamp

The combination instrument detects that the brake fluid level is too low (the signal circuit is low), and the combination instrument illuminates the low brake fluid level indicator.

Vacuum booster

The input force is amplified by the brake pedal, transmitted to the vacuum booster by the brake pedal push rod, and applied to the hydraulic brake master cylinder after boosted by the booster. The vacuum booster uses a vacuum source to assist, reducing the driver's operating force on the brake pedal when braking.

Working diagram




Removal and installation

Brake master cylinder and brake reservoir

Removal

Material

Name	Model
Brake fluid	HZY4/DOT4(Or DOT4)

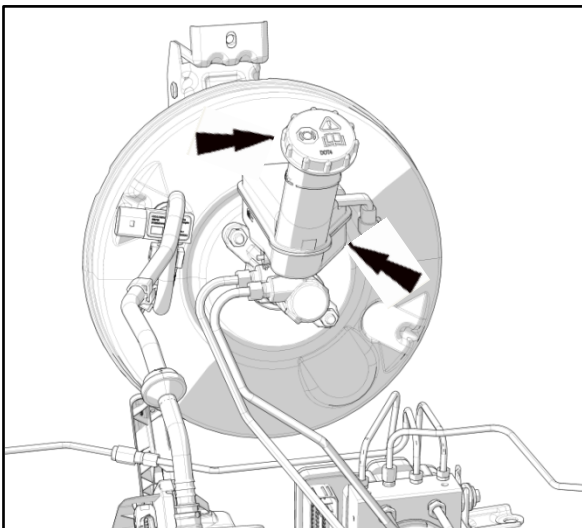
 **Note:** If brake fluid is accidentally splashed on the paint surface, flush it with clean water immediately.

 **Note:** The reservoir cover cannot be contaminated.

1. Remove reservoir cover.

- Remove the plug of brake oil level low indicator switch.

- Remove the reservoir cover.




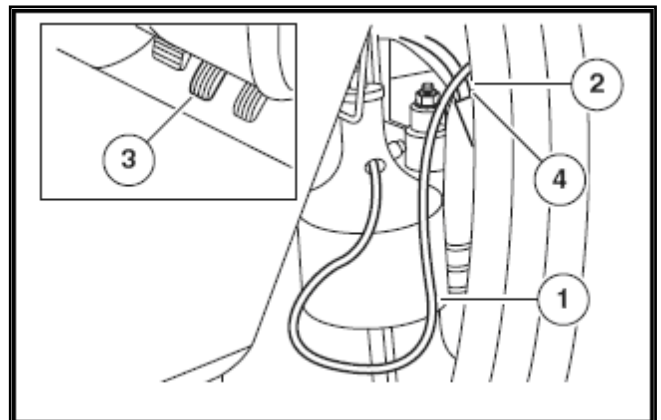
2. Drain brake fluid from the reservoir.

- Use a proper clean plastic pipe with one end connected to the system exhaust nozzle

and the other end connected to a proper container.

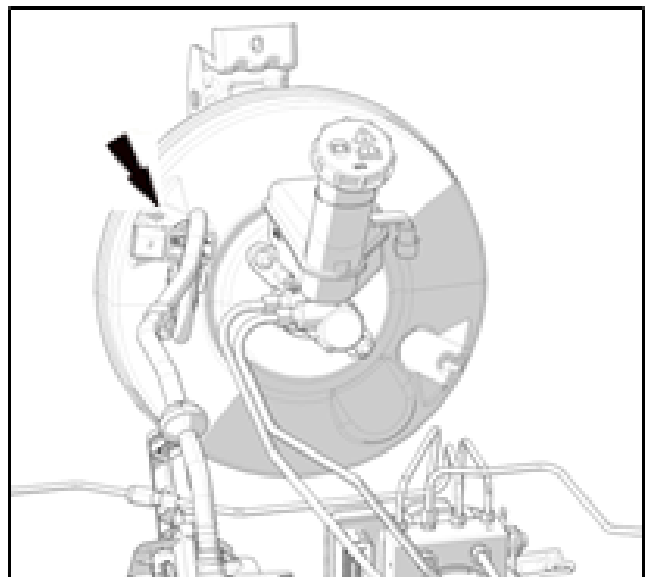
- Unscrew the exhaust nozzle.
- Depress the brake pedal repeatedly until all brake fluid in the reservoir is drained.
- Tighten the exhaust nozzle.

 **Note:** This step must be performed on both sides in order to completely drain all brake fluid from the reservoir.



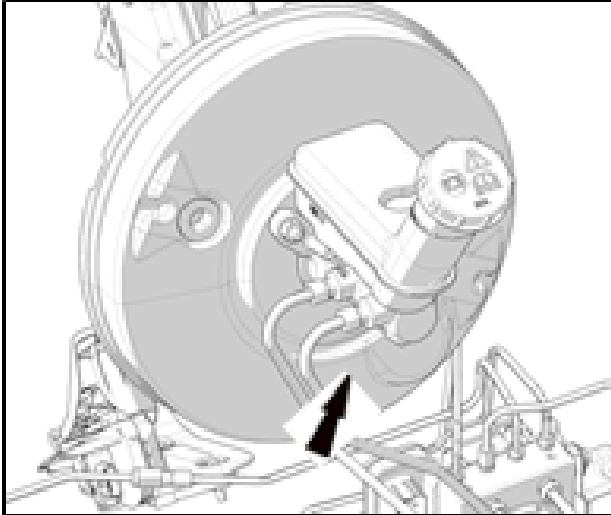
3. Remove vacuum pressure sensor assembly

- Remove the harness plug.
- Remove the vacuum pressure sensor assembly.



4. Remove the 2 brake oil pipes from the brake master cylinder.

Torque: $18 \pm 2 \text{ N.m}$

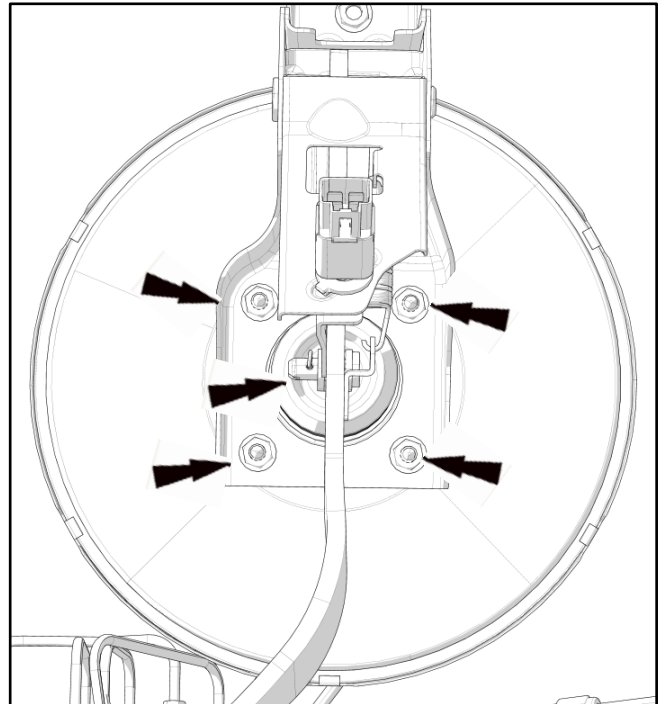


5. Remove the brake master cylinder and brake reservoir assembly.

- Remove lock pin and pin sub-assembly
- Remove four retaining nuts.

Torque: $22 \pm 2 \text{ N.m}$

- Take out the brake master cylinder outward (in the engine compartment, in the front direction).



Installation

1. The installation sequence is the reverse of the removal sequence.
2. Brake system exhaust.

Reference: [2.3.1 Overview of brake system.](#)



Note: Please confirm the brake booster push rod is in the correct position before installation.



Note: Please confirm the brake master cylinder vacuum seal is in the correct position before installation.

Hydraulic control mechanism assembly(HCU)

Removal


Material

2.3.7 -6

Hydraulic brake control

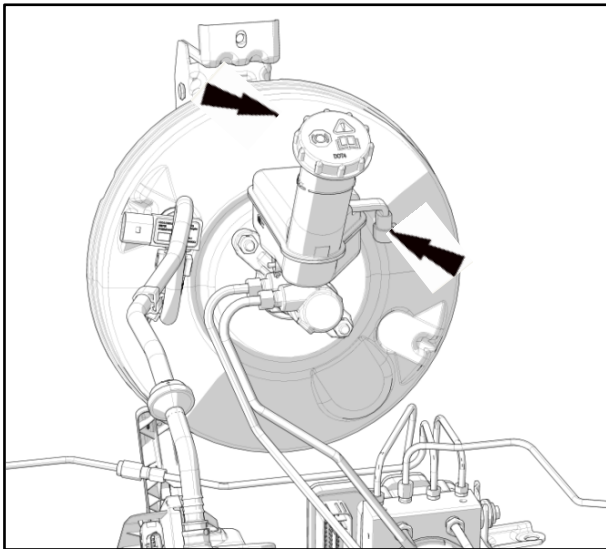
2.3.7-6

Name	Model
Brake fluid	HZY4/DOT4


 **Note:** If brake fluid is accidentally splashed on the paint surface, flush it with clean water immediately.

 **Note:** The reservoir cover cannot be contaminated.

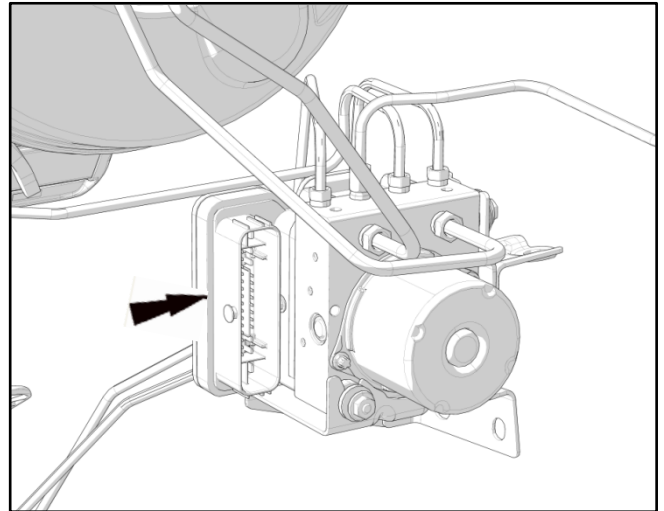
1. Disconnect the negative battery harness.
Reference: 3.1.11 charging system.
2. Remove reservoir cover.
 - 1). Remove plug connection for low brake oil level indicator switch.
 - 2). Remove reservoir cover.



3. Drain brake fluid from the reservoir.
 - 1). Use a suitable clean plastic pipe with one end connected to the system exhaust nozzle and the other end connected to a suitable container.
 - 2). Unscrew the exhaust nozzle.
 - 3). Press the brake pedal repeatedly until all brake fluid in the reservoir is drained.
 - 4). Tighten the exhaust nozzle.

 **Note:** This step must be performed on both sides in order to completely drain all brake fluid from the reservoir.


4. Disconnect the ABS/ESP control module harness connector.





5. Remove the 6 brake oil lines from the hydraulic control module:

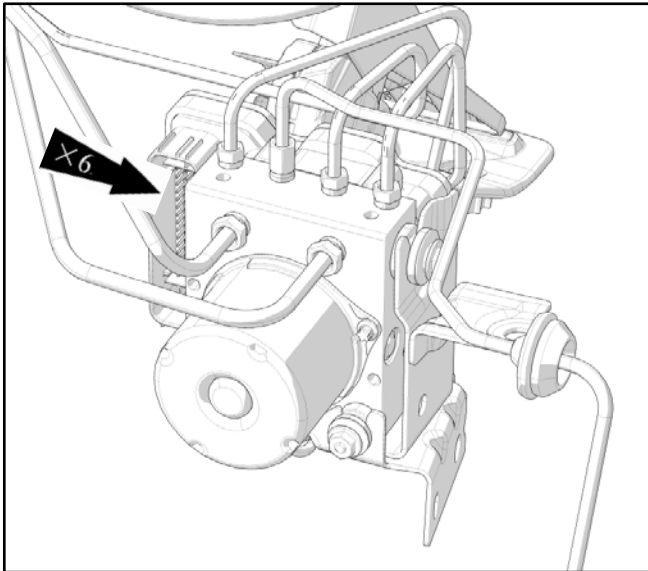
Two oil pipes connected to master cylinder, M12 torque: $18 \pm 2 \text{ N.m}$;

Other four oil pipes, M10 torque: $16 \pm 2 \text{ N.m}$.

 **Note:** Block the hydraulic control mechanism (HCU) to prevent the brake from coming out or entering the stolen goods.

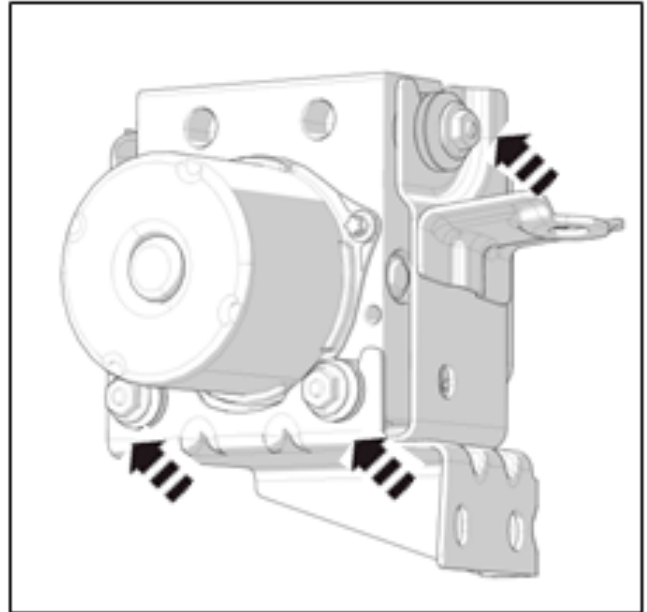
 **Note:** Cover the brake oil pipe to prevent the brake fluid from flowing out or entering the stolen goods.

 **Note:** Please note the position of each brake oil pipe for installation.



6. Remove 2 retaining nuts and 1 retaining bolts of hydraulic control module mounting bracket.

Torque: $22 \pm 2 \text{ N.m}$



Installation

1. The installation sequence is the reverse of the removal sequence.
2. Brake system exhaust.

Reference: 2.3.1 Overview of brake system.



Note: Please confirm the brake booster push rod is in the correct position before installation.



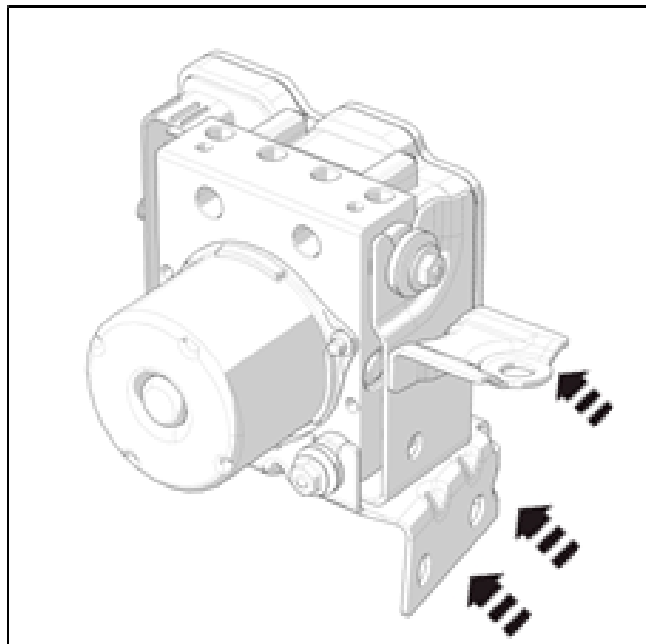
Note: Please confirm the brake master cylinder vacuum seal is in the correct position before installation.



Note: After installation, please confirm to use diagnostic scanner to write configuration information.



Note: The steering wheel steering angle sensor and yaw rate sensor (integrated sensor) must be calibrated after installation.



7. Remove 3 connecting bolts between hydraulic control module assembly and mounting bracket.

Torque: $8 \pm 2 \text{ N.m}$

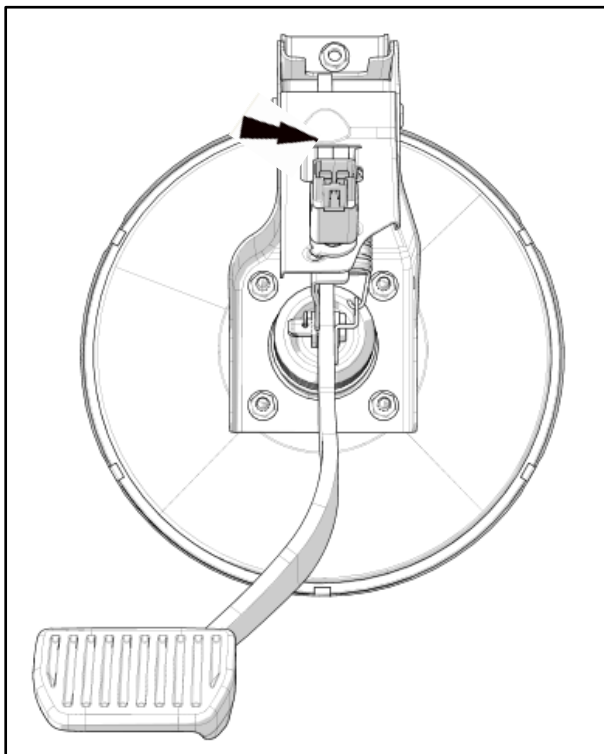
Pedal assembly

Removal

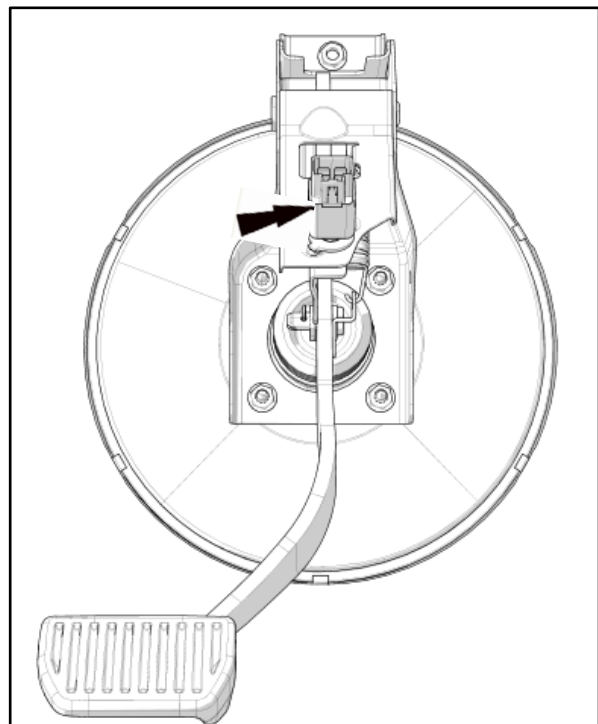
1. Disconnect the negative battery harness.

Reference: 3.1.11 charging system.

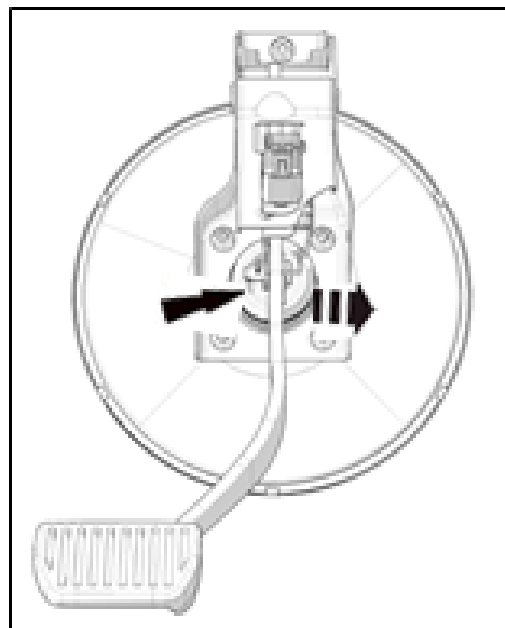
2. Pull out the brake pedal lamp switch harness connector.



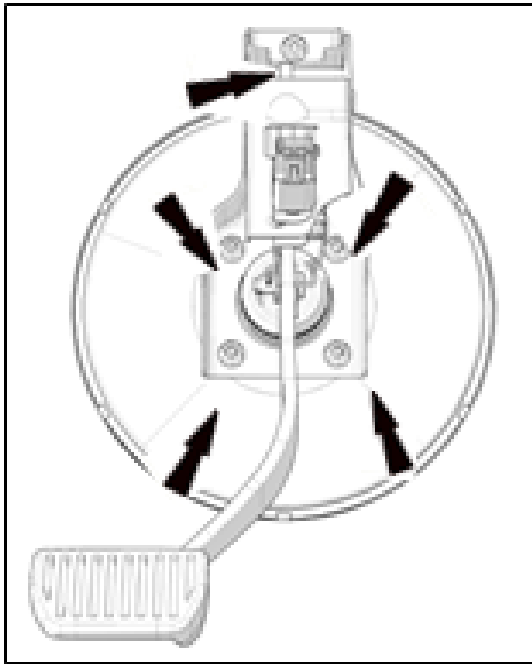
3. Remove brake lamp switch assembly
Rotate the brake lamp switch counterclockwise.



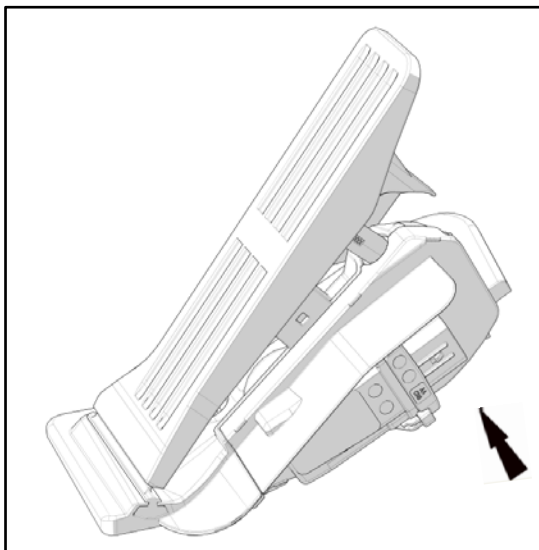
4. Remove the lock pin and pin assembly of brake pedal and vacuum booster.



5. Remove brake pedal nut (five places): 22 ± 2 N.m.

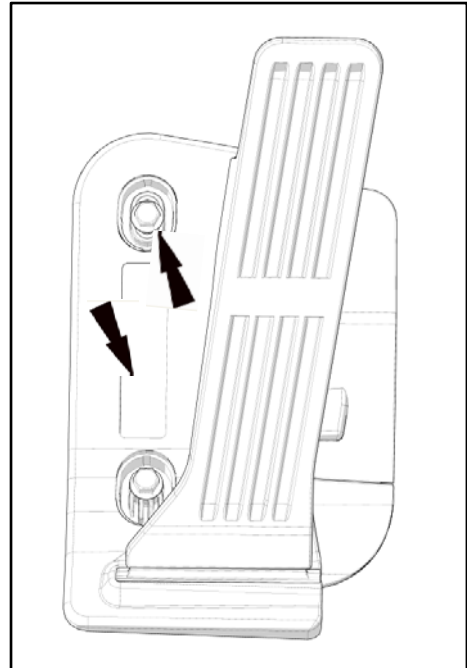


6. Remove the brake pedal assembly.
7. Press the end of the harness connector to unlock the clip and pull out the accelerator pedal harness end connector.



8. Remove the accelerator pedal.

Remove the accelerator pedal bolt (two places):
 $9 \pm 2 \text{ N.m}$;



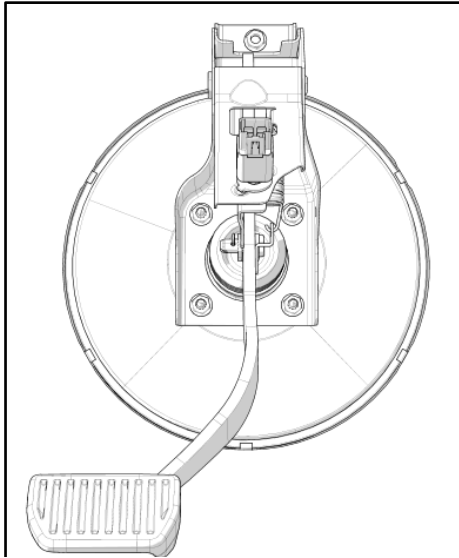
Installation

1. The installation sequence is the reverse of the removal sequence.

Installation of 2. brake lamp switch assembly:

Before assembling the switch, ensure that the brake pedal and brake master cylinder with vacuum booster assembly are installed on the body, and use the locking pin to complete the connection between the vacuum booster push rod fork and the brake pedal arm hole to ensure that the pedal surface is in the initial position.

Install the switch into the mounting hole. After the mounting surface of the switch and the surface of the pedal bracket are fitted, rotate the switch clockwise for 45° , and hear "click," that is, install in place.



2.3.8 Anti-lock/Electronic Stability Control

Specifications

Material specification


Project	Specifications
Brake fluid	HZY4(Or DOT4)

Torque specification

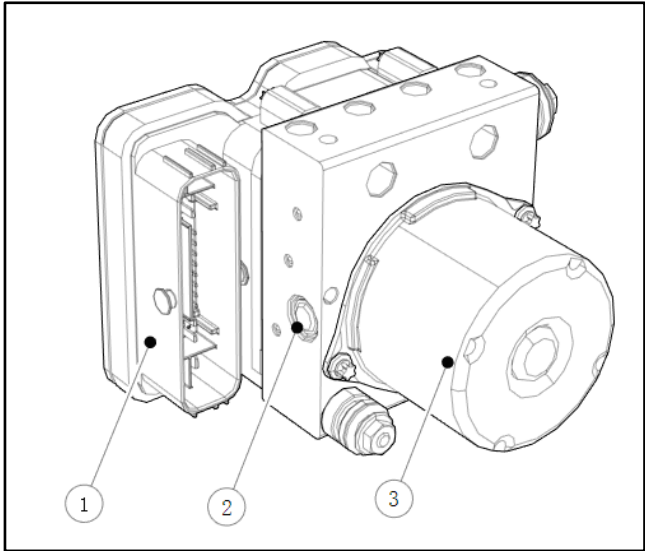
Name	Nm	lb-ft	lb-in
ESC system retaining bolt	8±2		
Connecting lock bolt between brake oil pipe and ESC system	M10: 16±2; M12: 18±2		
Wheel speed sensor retaining bolt	9±2		
ESC mounting bracket nut	M8: 22±2		

Component description

1. ESC system

 **Note:** There is rubber damping pad between mounting bolt and bracket of ESC system. Rubber damping pad is used to protect ESC system from vehicle vibration. The ESC system cannot be disassembled and replaced as an assembly.

Main components of ESC system include ESC control unit, hydraulic control module and motor.



Serial number	Component name	Quantity
1	ESC electronic control unit	1
2	ESC hydraulic control module	1
3	ESC motor	1

ESC electronic control unit

The electronic control unit constantly detects the state of the wheel through the wheel speed sensor, and controls the wheel slip rate within a certain range through the solenoid valve, thus

maintaining the stability of the vehicle. The ESC control module continuously compares its own stored slip limit value with the deceleration value detected by the wheel speed sensor, so that the locking tendency of each wheel can be detected. If it is detected that a wheel tends to lock, the ESC independently controls the four-wheel cylinder pressure by opening or closing the corresponding hydraulic valve in the control valve to avoid wheel lock. When the ABS function does not work, the EBD function can still adjust the rear wheel braking force to ensure that the rear wheel does not lock before the front wheel to ensure the safety of the vehicle.

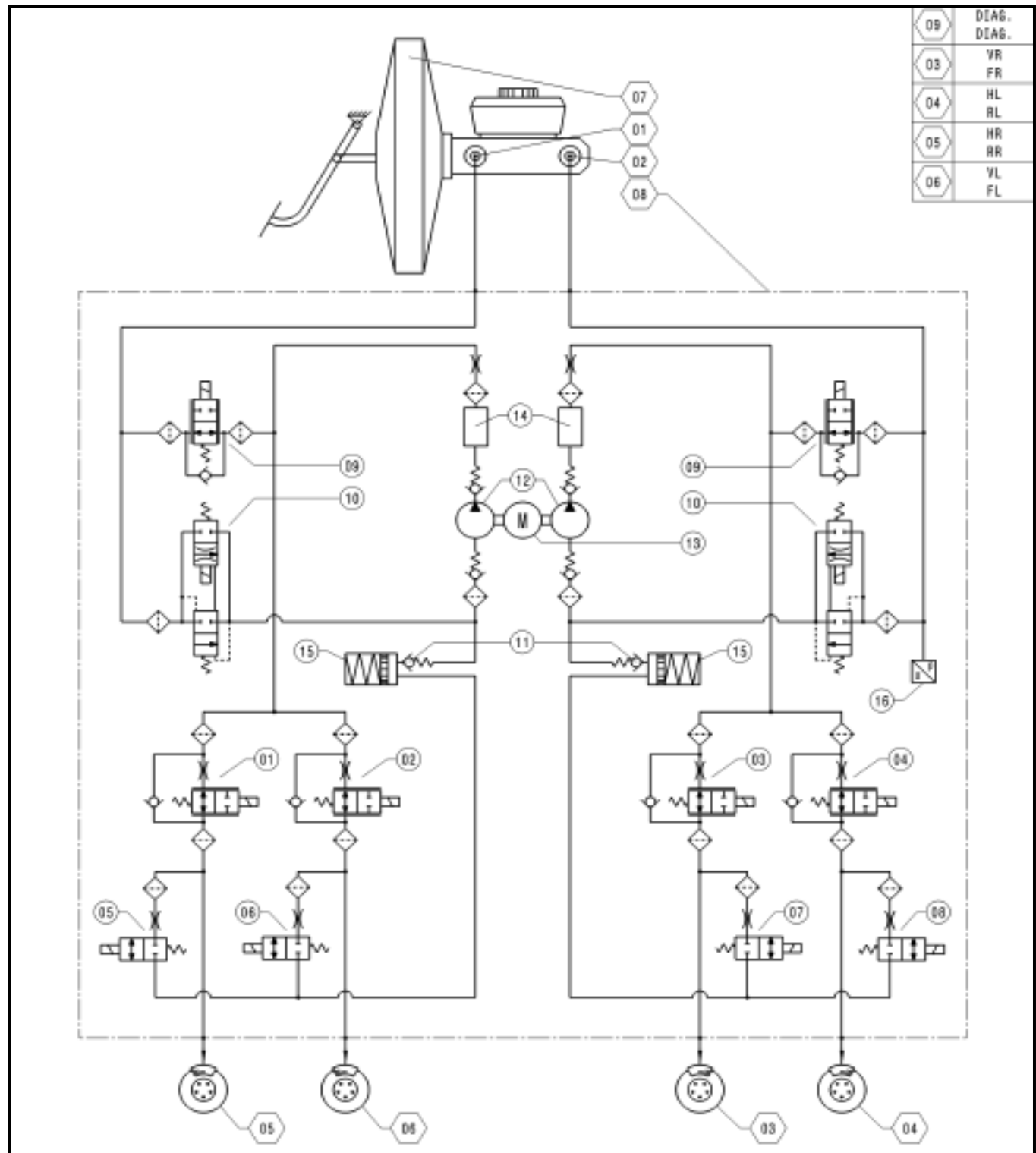
The ESC electronic control unit activates the ESC pump by controlling the ESC pump relay during system self-test and ABS functions.

When the ignition switch is turned on, the instrument control ABS/ESC warning lamp will light up after self-inspection. If the system is normal, it will go out after 3s. The module notifies the instrument to illuminate the indicator in case of a system fault to indicate a warning.

The ESC control module constantly monitors the system for any possible faults, which will be stored automatically once they occur. The diagnostic scanner can be used to access the OBD control module through the OBD interface.

4 oil inlet valves of ESC hydraulic control module, normally open solenoid valve, respectively control each wheel. 4 oil drain valves, normally closed solenoid valves, control one wheel respectively. Two low-pressure accumulators and hydraulic lines. ESC motor works during self-inspection and ESC operation, and can also be driven by diagnostic scanner.

Schematic diagram of electronic stability control system (ESC) hydraulic pipeline



An ABS/ESC hydraulic control adjustment cycle consists of three phases:

First stage - boost stage.

The oil inlet valve is open and the oil outlet valve is closed. When the driver applies braking force to the brake pedal, the system pressure gradually increases.

Stage 2 - Pressure maintenance stage.

Oil inlet valve is closed, and oil outlet valve is closed. The pressure on the wheel brake (slave cylinder or brake caliper) remains unchanged. The pressure of the slave cylinder or caliper will not change even if the brake pedal is pressed downward.

Stage 3 - Pressure Relief Stage.

The oil inlet valve closes and the oil outlet valve opens. The pressure on the wheel brake (slave cylinder or brake caliper) drops and the discharged brake fluid returns to the brake master cylinder under the action of the ABS/ESC pump.

ESC control module

The working mode of the ABS function in the ESC system is the same as that of the ABS function in the ABS system. However, ESC will also detect body attitude and angle through yaw rate, lateral acceleration sensor and angle sensor in ECU, and compare with various excitation conditions stored in control module. ESC function will be activated under appropriate working conditions.

When the ignition switch is turned on, the ESC control module notifies the instrument to turn on the ESC indicator lamp located in the instrument panel. The indicator lamp will not go out until the ESC completes the system self-check. In case of system fault, the module notifies the instrument to illuminate the corresponding indicator lamp to indicate warning.

The ESC control module constantly monitors the system for any possible faults, which will be stored automatically once they occur. The

diagnostic scanner can be used to access the OBD control module through the OBD interface.

2. Wheel speed sensor

The wheel speed sensor is a two-wire electromagnetic speed sensor. As the wheel rotates, the ABS control module uses the wheel speed signal to calculate the wheel speed and vehicle speed. The sensor obtains the pulse signal from the ring gear, and the signal is converted into digital signal through the integrated circuit in the sensor and then transmitted to the ABS control module. The front gear ring is fixed to and integral with the drive shaft. The rear wheel sensor is fixed to the rear wheel hub bearing.

3. brake lamp switch

When depressing the brake pedal, the brake lamp switch will work and the brake lamp will be lit. Meanwhile, the EFI control system will send the collected brake lamp switch status information to the vehicle CAN network for ABS/ESC to receive and process.

4. ABS indicator lamp

The ABS indicator is located on the combination instrument, and the driver is notified of ABS system fault by lighting. When ABSs work normally, the ignition switch is turned from "LOCK" to "ON," ABSs system self-check, indicator lamp lights up about 3 s, then goes out and stays out. The instrument cluster illuminates the ABS indicator when the following events occur:

The -ABS system detects that the ABS function is faulty.

-ABS Perform a self-test at the beginning of each ignition cycle. The indicator illuminates approx. 3 s.

· The combination instrument detects the loss of communication with the ABS system.

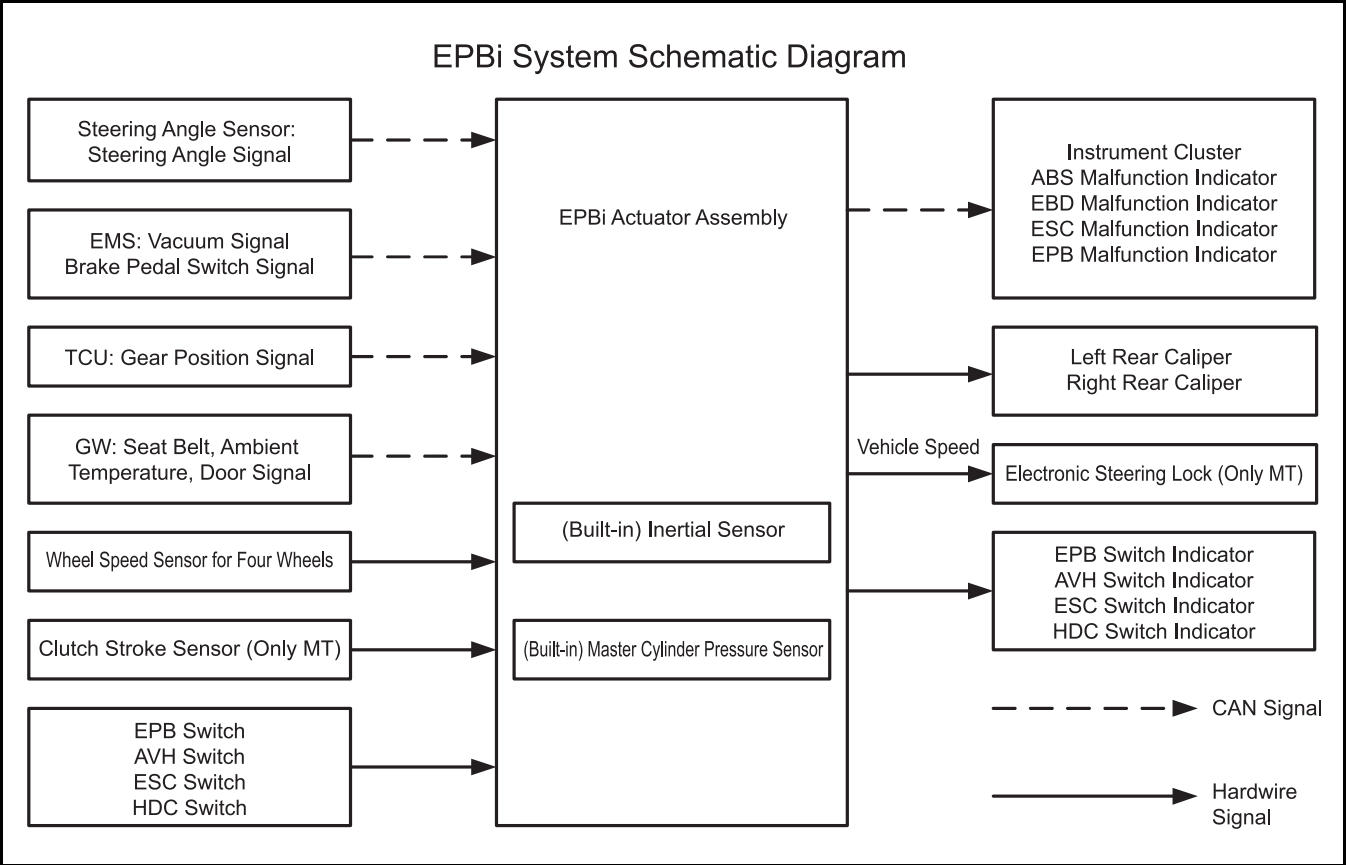
5. EBD indicator lamp

It is located on the instrument cluster and notifies the driver of EBD fault by lighting. When the EBD indicator is on but the EBD indicator is off, the system still has the EBD function. When both the EBD indicator lamp and the EBD indicator lamp are on, both the EBD and EBD functions are invalid.

6. ESC indicator lamp

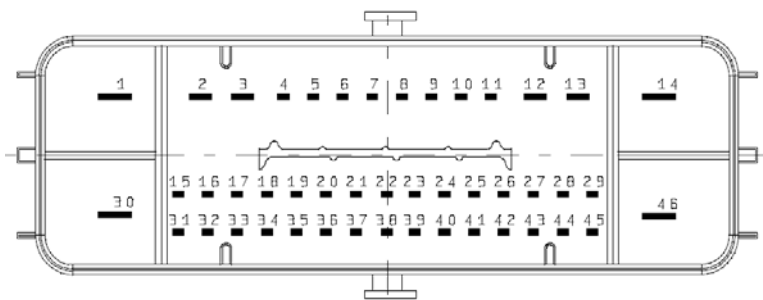
It is located on the combination instrument and notifies the driver of ESC fault by lighting. When the ESC indicator is on but the ABS and EBD indicators are off, only the ESC function is faulty. When the ESC indicator lamp strobes, it indicates that the ESC function is triggered.

System schematic



Connector section drawing and terminal definition

Connector section



Terminal definition

Pin	Function abbreviation	Function description	Rated current	I _{max} (A)	
1	UB_MR	Motor power supply	50	175	
2	MRP	Right caliper power supply			
3	MRM	Right caliper power supply			
5	CAN1P	Can high	0.03		

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7	WSS_FL	Wheel speed sensor signal	0.016	
8	AVH_LAMP	AVH switch indicator lamp	0.02	
9	VSO	Vehicle speed	0.02	
12	MLM	Left caliper power supply		
13	MLP	Left caliper power supply		
14	GND_MR	Motor ground	50	
15	SW3	EPB switch	0.05	
16	SW6	EPB switch	0.05	
18	APB_LAMP	APB switch indicator lamp	0.02	
19	CAN1M	Can low	0.03	
21	WSP_FR	Wheel speed sensor power supply	0.016	
22	WSP_RR	Wheel speed sensor power supply	0.016	
23	WSS_RL	Wheel speed sensor signal	0.016	
24	WSP_FL	Wheel speed sensor power supply	0.016	
26	WSS_FR	Wheel speed sensor signal	0.016	
30	UB_VR	Caliper and valve supply	38	116.5
31	SW1	EPB switch	0.05	
32	SW4	EPB switch	0.05	
34	WSO_FR	Right front wheel speed	0.02	
36	WAU_IN1	Ignition	0.2	
37	WSS_RR	Wheel speed sensor signal	0.016	
39	WSP_RL	Wheel speed sensor power supply	0.016	
41	AVH_SW	AVH switch	0.015	
46	GND_ECU	Caliper and valve ground	38	

List of main DTC codes

Serial number	DTC code	Fault type	Fault description	Possible fault causes	Maintenance advice
1	C1031	08	Front left wheel speed sensor signal fault, out of range, loss, interference or intermittent loss	1. The front left wheel is installed with wrong wheel speed sensor type 2.Front left wheel speed sensor is too loose 3.Tooth is worn or missing 4.Front left wheel speed sensor is not installed 5.Air clearance is too large 6.Tooth plate fouling	1Accelerate to 60 kph during a new ignition cycle and drive for one minute. 2. Replace the corresponding wheel speed sensor, stop ignition and wait for 30 s, repeat step 13, and check the ESP circuit.
2	C1032	00	Front left wheel speed sensor signal grounding/open circuit; Open circuit of	Front left wheel speed sensor short circuit to GND or open circuit(Signal line or power supply line)	1. Check whether the front left wheel speed sensor circuit is faulty. 2. Replace the front left wheel speed sensor. 3. Replace the ESP

2.3.8 -8**Antilock/Electronic Stability Control****2.3.8-8**

			power supply line		assembly. 4. Contact Chang'a for after-sales support.
3	C10A0	00	Front wheel speed sensor power supply grounding	Front left wheel speed sensor power supply wire short circuit to GND	1. Check whether the front left wheel speed sensor circuit is faulty. 2. Replace the front left wheel speed sensor. 3. Replace the ESP assembly. 4. Contact Chang'a for after-sales support.
4	C10A1	00	Front left wheel speed sensor signal wire short circuit to UBATT	Front left wheel speed sensor circuit fault(Fault cause not detected)	1. Check whether the front left wheel speed sensor circuit is faulty. 2. Replace the front left wheel speed sensor. 3. Replace the ESP assembly. 4. Contact Chang'a for after-sales support.
5	C10A9	00	Front left wheel speed sensor general fault	Front left wheel speed sensor circuit fault	1. Check whether the front left wheel speed sensor circuit is faulty. 2. Replace the front left wheel speed sensor. 3. Replace the ESP assembly. 4. Contact Chang'a for after-sales support.
6	C1034	08	Front right wheel speed sensor signal fault, out of range, loss, interference or intermittent loss	1. Wrong wheel speed sensor type is installed on front right wheel 2.Front right wheel speed sensor is too loose 3.Tooth is worn or missing 4.Front right wheel speed sensor is not installed 5.Air clearance is too large 6.Tooth plate fouling	1. Check whether the front right wheel sensor is correctly installed (wiring/type) 2. Replace the front left wheel speed sensor 3. Replace the ESP assembly 4. Contact Chang'a for after-sales support.
7	C1035	00	Front right wheel speed sensor signal grounding/open circuit; Open circuit of power supply line	Front right wheel speed sensor signal wire short circuit to GND or open circuit	1. Check whether the FRT RH wheel speed sensor signal wire or power supply wire is faulty. 2. Replace FRT RH wheel speed sensor. 3. Replace ESP assembly. 4. Contact Chang'a for after-sales support.
8	C10A2	00	Front right wheel speed sensor power supply grounding	Front right wheel speed sensor power supply wire short circuit to GND	1. Check whether the FRT RH wheel speed sensor signal wire or power supply wire is faulty. 2. Replace FRT RH wheel speed sensor. 3. Replace ESP assembly. 4. Contact Chang'a for after-sales support.
9	C10A3	00	Front right wheel speed sensor signal wire short circuit to UBATT	Front right wheel speed sensor signal wire short circuit to UBATT	1. Check whether the FRT RH wheel speed sensor signal wire or power supply wire is faulty. 2. Replace FRT RH wheel speed sensor. 3. Replace ESP assembly. 4. Contact Chang'a

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Antilock/Electronic Stability Control

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					for after-sales support.
10	C10AA	00	Front right wheel speed sensor general fault	Front right wheel speed sensor fault(Fault cause not detected)	1. Check whether the FRT RH wheel speed sensor signal wire or power supply wire is faulty. 2. Replace FRT RH wheel speed sensor. 3. Replace ESP assembly. 4. Contact Chang'a for after-sales support.
11	C1037	08	Rear left wheel speed sensor signal fault, out of range, lost, noise, intermittent	1. The wrong wheel speed sensor type is installed on the rear left wheel 2.Rear left wheel speed sensor is too loose 3.Tooth is worn or missing 4.Rear left wheel speed sensor is not installed 5.Air clearance is too large 6.Tooth plate fouling	1Accelerate to 60 kph during a new ignition cycle and drive for one minute. 2. Replace the corresponding wheel speed sensor, stop ignition and wait for 30 s, repeat step 13, and check the ESP circuit.
12	C1038	00	Rear left wheel speed sensor signal grounding/open circuit; Open circuit of power supply line	Rear left wheel speed sensor signal wire short circuit to GND or open circuit(Power supply line or signal line)	1. Check whether the rear left wheel speed sensor signal wire or power supply wire is faulty. 2. Replace the rear left wheel speed sensor. 3. Replace the ESP assembly. 4. Contact Chang'a for after-sales support.
13	C10A4	00	Rear left front wheel speed sensor power supply grounding	Rear left wheel speed sensor signal wire short circuit to GND or open circuit(Power supply line or signal line)	1. Check whether the rear left wheel speed sensor signal wire or power supply wire is faulty. 2. Replace the rear left wheel speed sensor. 3. Replace the ESP assembly. 4. Contact Chang'a for after-sales support.
14	C10A5	00	Rear left wheel speed sensor signal wire short circuit to UBATT	Rear left wheel speed sensor signal wire short circuit to UBATT	1. Check whether the rear left wheel speed sensor signal wire or power supply wire is faulty. 2. Replace the rear left wheel speed sensor. 3. Replace the ESP assembly. 4. Contact Chang'a for after-sales support.
15	C10AB	00	Rear left wheel speed sensor general fault	Rear left wheel speed sensor circuit fault	1. Check whether the rear left wheel speed sensor signal wire or power supply wire is faulty. 2. Replace the rear left wheel speed sensor. 3. Replace the ESP assembly. 4. Contact Chang'a for after-sales support.

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Antilock/Electronic Stability Control

2.3.8-10

16	C103A	08	Rear right wheel speed sensor signal fault, out of range, lost, noise, intermittent	1. The wrong wheel speed sensor type is installed on the right rear wheel 2.Rear right wheel speed sensor is too loose 3.Tooth is worn or missing 4.Rear right wheel speed sensor is not installed 5.Air clearance is too large 6.Tooth plate fouling	1Accelerate to 60 kph during a new ignition cycle and drive for one minute. 2. Replace the corresponding wheel speed sensor, stop ignition and wait for 30 s, repeat step 13, and check the ESP circuit.
17	C103B	00	Rear right wheel speed sensor signal grounding/open circuit; Open circuit of power supply line	Rear right wheel speed sensor signal wire short circuit to GND or open circuit(Power supply line or signal line)	1. Check whether the rear right wheel speed sensor signal wire or power supply wire is faulty. 2. Replace the rear right wheel speed sensor. 3. Replace the ESP assembly. 4. Contact Chang'a for after-sales support.
18	C10A6	00	Rear right wheel speed sensor power supply grounding	Rear right wheel speed sensor power supply wire short circuit to GND	1. Check whether the rear right wheel speed sensor signal wire or power supply wire is faulty. 2. Replace the rear right wheel speed sensor. 3. Replace the ESP assembly. 4. Contact Chang'a for after-sales support.
19	C10A7	00	Rear right wheel speed sensor signal wire short circuit to UBATT	Rear right wheel speed sensor power supply wire short circuit to UBATT	1. Check whether the rear right wheel speed sensor signal wire or power supply wire is faulty. 2. Replace the rear right wheel speed sensor. 3. Replace the ESP assembly. 4. Contact Chang'a for after-sales support.
20	C10AC	00	Rear right wheel speed sensor general fault	Rear right wheel speed sensor is generally faulty because rear right wheel speed sensor power supply wire or signal wire is shorted to GND or UBATT.	1. Check whether the rear right wheel speed sensor signal wire or power supply wire is faulty. 2. Replace the rear right wheel speed sensor. 3. Replace the ESP assembly. 4. Contact Chang'a for after-sales support.
21	C1199	04	Wheel speed sensor fault(Sensor interchange, multiple sensor faults)	1. Wheel speed sensor on front and rear axle interchange 2. At least one wheel speed sensor is installed in the wrong direction 3.Because the hardware fault does not work in the hardware wheel speed sensor test on the system IC.	1.The ignition switch is turned off and turned on, keep straight running above 25kph 40 s/obstacle driving and accelerating to 70kph2, replace the corresponding wheel speed sensor, stop ignition and wait for 30 s, repeat step 13.Inspect the ESP circuit.

2.3.8 -11

Antilock/Electronic Stability Control

2.3.8-11

22	C1040	08	Brake signal abnormal	Brake signal mechanical fault or adjustment error	1.Stop and ignite, drive the vehicle to brake and release the brake for 2-3 times, and replace the brake pedal switch.
23	C118C	08	Reverse gear signal abnormal	Reverse gear switch signal failure	The TCU sending the signal needs to be checked.
24	C1061	08	Lateral acceleration signal fault	1. Lateral acceleration sensor fault 2.Installation error 3.Hu Misalignment 4.Wrong sensor wiring or excessive internal offset	Stop ignition and wait for 30 s before driving in 10kph direction several times.
25	C1062	08	Longitudinal acceleration signal fault	1. Longitudinal acceleration sensor fault 2.Installation error 3.Hu Misalignment	Stop ignition and accelerate to 60kph and drive for 30 s
26	C1063	08	Yaw signal fault	1. Yaw rate sensor fault 2.Sensor circuit error or excessive internal offset 3.Sensor installation position error	Stop ignition and wait for 30 s. Turn left and right after accelerating to 70kph for a period of time.
27	C1096	04	Yaw angle sensor fault(Hardware fault, temperature, range, internal fault)	Sensor fault or no SPI connection	1.Check whether the yaw angle sensor is faulty: Hardware, type, installation position2, replace the yaw angle sensor3, replace the ESPassembly, and contact Chang'an after-sales support.
28	C10A8	00	Yaw angle sensor is not calibrated or calibration fails.	ECU installation error or EEPROM fault	1.Calibrate ESPs with diagnostic scanner YRS, check whether ECUs are installed incorrectly, replace ESPs assembly, and contact Chang'a for after-sales support.
29	C1166	00	Steering angle sensor not calibrated	Steering wheel angle sensor not calibrated	Steering wheel angle sensor calibration is successful
30	C1060	08	Steering angle sensor signal fault	1. Steering wheel angle sensor initialization fails 2.Steering wheel angle sensor fault 3.Installation error	Check sensor installation. Stop ignition and wait for 30 s. Accelerate to 70kph and turn around for a period of time.
31	U2126	04	SAS steering angle signal timeout	ESP does not receive relevant message	Check CAN network and send ECU
32	U2126	08	Steering angle signal damage	Data corruption or invalid signal value	Check SAS related transmission signal
33	C1212	08	Variable coding error	Model variable is incorrectly or not written	Rewrite vehicle variable information
34	C10B0	00	Wheel speed direction information error	At least one speed sensor is installed in the wrong direction.	First, it is necessary to check the installation of wheel speed sensor.
35	C10B1	00	Front left wheel air clearance is too large	Front left wheel speed sensor air gap error	First check the installation of WSS
36	C10B2	00	Front right wheel air clearance is too large	Front right wheel speed sensor air gap error	First check the installation of WSS

2.3.8 -12

Antilock/Electronic Stability Control

2.3.8-12

37	C10B3	00	Rear left wheel air clearance is too large	Rear right wheel speed sensor air gap error	First check the installation of WSS
38	C10B4	00	Rear right wheel air clearance is too large	Rear right wheel speed sensor air gap error	First check the installation of WSS
39	C10B5	00	Front left wheel pulse signal loss	Front left wheel speed sensor pulse signal loss	First, it is necessary to check the installation of wheel speed sensor.
40	C10B6	00	Front right wheel pulse signal loss	Front right wheel speed sensor pulse signal loss	First, it is necessary to check the installation of wheel speed sensor.
41	C10B7	00	Rear left wheel pulse signal loss	Rear left wheel speed sensor pulse signal loss	First, it is necessary to check the installation of wheel speed sensor.
42	C10B8	00	Rear right wheel pulse signal loss	RR RH wheel speed sensor pulse signal loss	First, it is necessary to check the installation of wheel speed sensor.
43	U2165	00	Vacuum sensor signal invalid	Vacuum sensor fault	Check vacuum sensor and CAN network transmission
44	C1165	00	Vacuum related failure	Insufficient vacuum booster	Check vacuum booster and associated hoses for leaks
45	U2162	08	Hand brake signal is invalid	Node sends error signal	Check BCM/Gateway/IP/SRS sending signal
46	U2164	08	Reverse gear signal is invalid	Node sends error signal	Check BCM/Gateway/IP/SRS sending signal
47	C104D	00	AVH button fault	AVH Switch long press 10 s	Check AVH switch
48	C1024	01	Electrical fault of EPB left actuator	Broken wire, line shorted to battery, or ground, or short circuit	<i>Check connection line/ESP/MGU</i>
49	C1021	00	EPB left actuator fault	Stop rotation during locking and when released	ESP/MGU Check connection circuit
50	C1022	00	EPB Right actuator fault	Stop rotation during locking, when releasing, etc.	Check connection line
51	C1025	1E	EPB Right control circuit abnormal or ECU fault	EPB Motor right H axle abnormal	Check connection line
52	C1025	01	EPB Right actuator electrical fault	Broken wire, short circuit to battery, short circuit to ground, short circuit, etc.	Check connection line
53	C1024	1E	EPB Left control circuit abnormal or ECU fault	Motor left H axle abnormal	Check connection line
54	C102B	62	EPB actuator works abnormally	Software running error	Check connection line
55	C1023	12	EPB switch circuit fault	EPB button shorted to ground or short circuit of power supply line	Check button and its connection line
56	C102C	71	EPB Switch stagnation	Mechanical fault	Check button and its connection line
57	C1041	00	EPB Left motor abnormal action	Software fault	Check connecting wire between caliper and ESP
58	C1042	00	EPB Right motor	Software fault	Check connecting wire between

		abnormal action		caliper and ESP
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DTC Diagnostic Process Index

Fault	Description	Fault cause	Diagnostic procedure
Electronic control unit	Module fault	Module damage	Reference: Electronic Control Unit Diagnostic Procedure
Power supply pin	Supply terminal KL30_V, P does not provide voltage or voltage is too high	ABS/ESC system fuse burns Battery voltage too low or too high ABS/ESC harness damage(Connector) ABS/ESC control module damaged	
ABS/ESC Hydraulic pump	When the vehicle speed exceeds 20 km/h, the ABS/ESC control module monitors that the pump motor cannot work normally.	Power supply or grounding Pump motor main relay Motor	
ABS/ESC Abnormal operation	When ABS/ESC is disturbed by high frequency electromagnetic wave	High frequency electromagnetic wave interference	rule out Electromagnetic interference
	The microprocessor considers the input speed signal unreliable	Sensor or harness damage ABS/ESC control module damaged	Reference: Wheel speed sensor diagnostic process
Front left wheel speed sensor	Accelerate the vehicle above 40 km/h and perform dynamic self-test of the ESP system, and then there is no vehicle speed output, sensor signal out of tolerance, open circuit, short circuit, etc.	Harness Sensor Ring gear The air gap is too large or too small. ABS/ESC control module fault	Reference: Wheel speed sensor diagnostic process
Front right wheel speed sensor			
Rear left wheel speed sensor			
Right rear wheel speed sensor			

General inspection

Inspection and confirmation

1. Verify the customer's problem.
2. Visually inspect for obvious mechanical or electrical faults.

Visual Check List

Mechanical	Electrical
Wheel speed sensor	Fuse
Wheel speed sensor ring	Connector
gear	Harness

3. Resolve the discovered problem before proceeding to the next inspection.
4. If the apparent cause of the observed or raised problem has been found, the cause must be corrected before proceeding to the next step.
5. If the visual inspection is passed, confirm the fault and refer to the fault symptom table.

General equipment

Digital multimeter
Diagnostic scanner




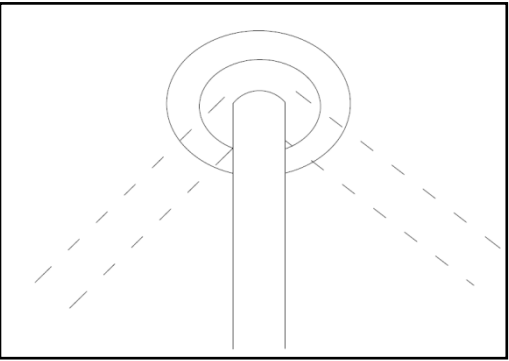


Note: 1. Clear DTC.

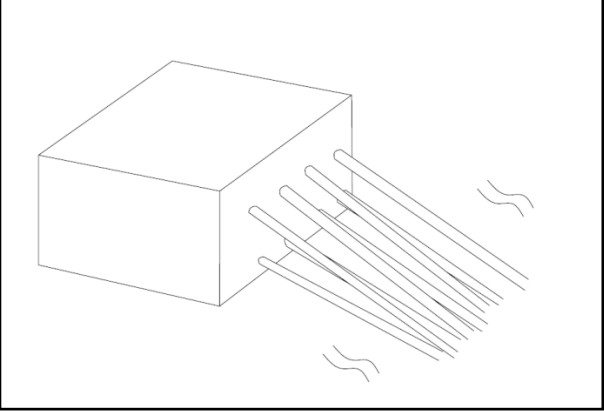
2. Perform simulation test.
3. Inspect and shake the harness, connectors and terminals.

When the fault cannot be confirmed through DTC inspection, the fault phenomenon only occurs occasionally in use. In this case, all circuits and components that may cause fault shall be confirmed. In many cases, the fault location can be found quickly and effectively by performing basic inspection as shown in the flow chart below, especially for poor contact of harness connector.

Fault definition: This fault does not occur at present, but history DTC record indicates that the fault has occurred. Or the customer has reported the fault, but because the fault is not related to the DTC, the fault symptom cannot be reproduced currently.

Test conditions	Details/Results/Measures
<p>1. Vibration method</p>	<p>If the fault occurs or the fault condition is more severe when driving on an uneven road, or the engine vibrates, go to step 2 or 3.</p> <p> Note: There are several reasons that may cause electrical fault due to vibration of vehicle or engine. Check the following:</p> <p>1. connector is not fully in place.</p> <p>The 2. harness does not have enough clearance.</p> <p>The 3. harness is routed across the bracket or moving parts.</p> <p>The 4. harness is arranged too close to the high temperature components.</p> <p> Note: Improper wiring, improper clamping or loose harness will cause wiring to be squeezed between parts.</p> <p> Note: The joint of connector, vibration position and the position through which the harness passes are all places to be inspected, for example, the harness passes through the firewall and body panel.</p>
<p>Inspection method of 2. switch connector or harness</p> 	<p>A Connect diagnostic scanner to diagnostic interface (OBD).</p> <p>B Turn the ignition switch to the "ON" position (engine not started).</p> <p>C Access the data flow of the switch you are checking.</p> <p>D Open the switch manually.</p> <p>E While monitoring the data flow, gently shake each connector or harness vertically and horizontally.</p> <p>If the data flow value is unstable, check for poor</p>

	connections.
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Inspection method of 3. sensor connector or harness	
	<p>A Connect diagnostic scanner to diagnostic interface (OBD).</p> <p>B Turn the ignition switch to the "ON" position (shut down the engine).</p> <p>C Access the data flow of the switch you are checking.</p> <p>D When monitoring the data flow, gently shake each connector or harness vertically and horizontally.</p> <p>If the data flow value is unstable, check for poor connections.</p>
Inspection method of 4. actuator or relay	
	<p>A Connect diagnostic scanner to diagnostic interface (OBD).</p> <p>B Ignition switch to "ON" position (engine off).</p> <p>C Conduct an active test on the actuator or relay you have inspected.</p> <p>Reference: Active Test List (2.3.7 Antilock Control System (ABS) and Electronic Stability Control (ESC), DTCs Diagnosis and Testing).</p>
5. Road test simulation fault, reading data stream	
	<p>A Connect the diagnostic scanner to the diagnostic interface (OBD).</p> <p>B Test drive, simulate the fault and read the data stream.</p> <p>Reference: List of data streams (2.3.7 Antilock Control and Electronic Stability Control, DTCs Diagnostics and Testing).</p> <p>If the data flow value is unstable or malfunctions, repair or replace the parts.</p>

ABS/ESC warning lamp does not illuminate diagnostic process

Refer to: Fault symptom table (4.2.1 Instrument, 2.3.7 fault symptom diagnosis and test).

Diagnosis process of ABS warning lamp always on

Test conditions	Details/Results/Measures
1. Use diagnostic scanner to access ESC control module	
	A. Check whether DTCs are output? ? Is serviced according to the output DTC. ? No to step 2.
2. Use diagnostic scanner to access gateway control module	
	A. Check whether DTCs are output? ? Is serviced according to the output DTC. ? No to step 3.
3. Access combination instrument control unit with diagnostic scanner	
	A. Check whether DTCs are output? ? Is serviced according to the output DTC. ? No to Step 4.
4. Replace combination instrument control unit	
	A. Turn the ignition switch to "LOCK" position and disconnect the battery negative harness. B. Replace combination instrument. Reference: Instrument (4.2.1 Instrument Assembly, Removal and Installation). Confirm the system is normal.

DTC diagnosis and test

Data stream list

Read out the "Data flow list," the working status of switches, sensors and actuators can be checked without removing any parts. Before fault diagnosis of engine electronic control system, observation and analysis of data is the first step of rule out fault, which can shorten the time of fault rule out.



Note: Data under normal conditions are listed in the following table for reference only. Do not judge whether a part is faulty based on these reference values. Normally, the normal working vehicle can be compared with the suspected faulty vehicle in the same state to determine whether the data of the diagnosed vehicle is normal in the current state.

1. Make the engine reach the normal working temperature.
2. Turn the ignition switch to "LOCK" position.
3. Connect the fault diagnostic scanner.
4. Turn the ignition switch to "ON" position.
5. Select Chang'an Automobile > Chang'an Passenger Car > Fuel Vehicle > CD 569/UNI-K > Bosch ESP9.3 > diagnostic data version.
6. Refer to the following table (there is an example list menu in the diagnostic scanner, here is an example) to check various data.

Diagnostic scanner display items	Component	Control range	Diagnosis description
Front left wheel speed	Signal from front left wheel speed sensor	Front left wheel speed changes with vehicle speed	Observe wheel speed change
Right front wheel speed	Signal from FRT RH wheel speed sensor	Right front wheel speed changes with vehicle speed	Observe wheel speed change
Rear left wheel speed	Signal from RR LH wheel speed sensor	RR LH wheel speed changes with vehicle speed	Observe wheel speed change
Right rear wheel speed	Signal from RR RH wheel speed sensor	Right rear wheel speed changes with vehicle speed	Observe wheel speed change
EBD Warning lamp status	Signal from ESC module	Controlled by ESC module	Use diagnostic scanner to control etc. on and off
ABS warning lamp status	Signal from ESC module	Controlled by ESC module	Use diagnostic scanner to control etc. on and off

ESC warning lamp status	Signal from ESC module	Controlled by ESC module	When the diagnostic scanner communicates with the ESC control module, the lamp illuminates.
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Action test

Use fault diagnostic scanner to conduct action test, and test the working status of ESC actuator without removing any parts. The action test is an effective means of rule out fault before the relevant fault diagnosis of the rule out control system, so that the time of fault rule out can be shortened.

1. Make the engine reach the normal working temperature.
2. Turn the ignition switch to "LOCK" position.
3. Connect the fault diagnostic scanner.
4. Turn the ignition switch to "ON" position.

5. Select Chang'an Automobile > Chang'an Passenger Car > Fuel Vehicle >CD 569/UNI-K> Bosch ESP9.3> diagnostic data version.

Test conditions:

1. Cannot be tested under voltage.
2. Vehicle speed cannot exceed 3 km/h.

Test procedure:

In Chang'an Automobile > Chang'an Passenger Car > Fuel Vehicle >CD 569/UNI-K> Bosch ESP9.3> diagnostic data version. Under the path, follow the entries on the diagnostic scanner screen to test one by one.

Special function

When the EPBi actuator assembly parts are replaced after sale, the EPBi actuator assembly must be calibrated with a scan tool for vehicle configuration and yaw rate sensor.

1. Make the engine reach the normal working temperature.
2. Ignition switch to "LOCK" position.
3. Connect the fault diagnostic scanner.
4. Ignition switch to "ON" position.

5. Select Chang'an Automobile > Chang'an Passenger Car > Fuel Vehicle >CD 569/UNI-K> Bosch ESP9.3> Diagnostic Data Version > Special Function Path, and park the vehicle correctly according to the type selection and prompts displayed on the diagnostic scanner screen. Perform "Vehicle Configuration" first, then "Yaw Rate Sensor Calibration." If the calibration is unsuccessful, repeat the above operation after the vehicle is powered on again. If it is not successful, use the diagnostic scanner to read the fault code to judge the fault or replace the parts.

Fault diagnostic scanner cannot communicate with vehicle for diagnostic process

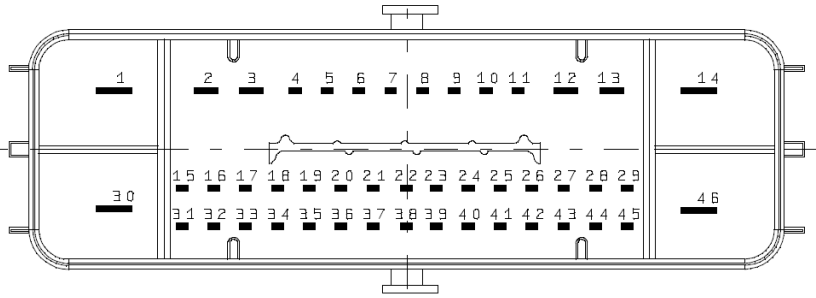
1. Make the engine reach the normal working temperature.
2. Ignition switch to "LOCK" position.
3. Connect the fault diagnostic scanner.
4. Troubleshoot circuit fault and control module fault according to fault diagnosis.



Note: Short circuit inside the module will also cause this fault.

Reference: Diagnostic scanner cannot communicate with ECM (M7) diagnostic process (4.2.14 onboard network, fault symptom

Electronic control unit diagnostic process

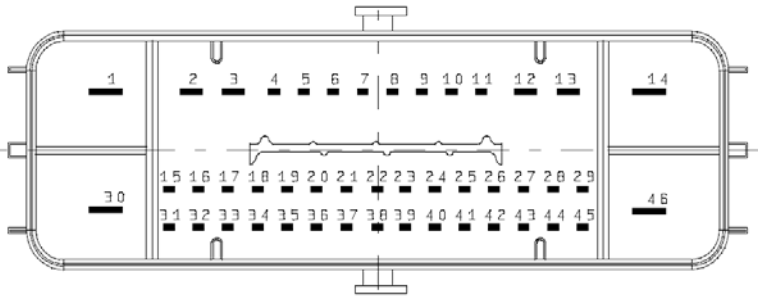
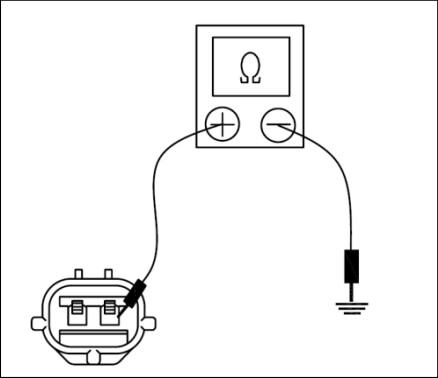
Test conditions	Details/Results/Measures
<p>1. Check battery voltage</p>	<p>A. Turn on the ignition switch and run the engine.</p> <p>B. Measure whether the battery voltage is normal with a multimeter.</p> <p>Standard value: 10 ~ 16 V</p> <p>Is the voltage normal?</p> <p>? Yes to step 2.</p> <p>? No</p> <p>Reference: Battery charging voltage is too low, and battery charging voltage is too high (4.2.15 charging system, fault symptom diagnosis and test).</p>
<p>Power supply and grounding wire of 2. control module</p> 	<p>A: Remove connector of control module;</p> <p>B: Find the corresponding connector harness of pins No.1, No.14 and No.30;</p> <p>C; Install the connector and check whether the voltage output of the harness is normal with a multimeter;</p> <p>Standard value: 10~18 V;</p> <p>? Power supply is normal.</p> <p>? No to step 3.</p>
<p>3. Access ESC control module with diagnostic scanner</p>	<p>A. Use diagnostic scanner to access the ESC control module and test the pump actively.</p> <p>Can I hear the sound of the pump working?</p> <p>? Yes System OK.</p> <p>? No Replace the ESC control module.</p>

	Reference: Hydraulic control mechanism assembly (HCU) (2.3.7 anti-lock brake control system, removal and installation).
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Wheel speed sensor diagnosis process

Test conditions	Details/Results/Measures
1. Check installation of wheel speed sensor	
	<p>A. Inspect the installation of front left wheel speed sensor.</p> <p>Loose?</p> <p>? Yes</p> <p>Go to step 2.</p> <p>? No</p> <p>Tighten.</p>
2. Measure resistance of wheel speed sensor	
	<p>A. Remove the wheel speed sensor harness and measure the resistance of the sensor.</p> <p>Standard value: 1.0 ~ 1.3 kΩ</p> <p>Is the resistance normal?</p> <p>? Yes</p> <p>Go to Step 3.</p> <p>? No</p> <p>Replace the front left speed sensor.</p>
3. Check wheel speed sensor	
	<p>A. Remove the wheel speed sensor.</p> <p>B. Inspect the sensor head and connector for scratches, foreign matter and dirt.</p> <p>C. Inspect whether the clearance of wheel speed sensor is normal.</p> <p>Standard value: 0.3 ~ 0.8 mm</p> <p>Check whether it is normal?</p> <p>? Yes</p> <p>Clean or replace the sensor.</p> <p>? No</p>

	Go to Step 4.
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Test conditions	Details/Results/Measures
4. Check wiring harness between wheel speed sensor and ESC control module	
<p>ESC control module connector</p> 	<p>A: Dismantle ESC connector;</p> <p>B: Check whether the power supply of the ESC system to the wheel speed sensor is normal;</p> <p>ESC system check pins 21, 22, 24 and 39;</p> <p>? Yes to step 5.</p> <p>? No to step 8.</p>
5. Check wheel speed sensor harness	
	<p>A: Inspect whether the wheel speed sensor circuit is normal.</p> <p>? Yes to step 6.</p> <p>? No Replace wheel speed sensor.</p>
6. Inspect front wheel speed sensor ring gear	
	<p>A. Inspect whether the front wheel speed sensor ring gear is deformed or missing teeth.</p> <p>? Yes Replace front wheel speed sensor ring gear.</p> <p>? No to step 7.</p>
7. Check rear wheel bearing clearance	
	<p>A. Inspect whether the wheel bearing clearance is normal.</p> <p>? Yes to step 8.</p> <p>? No Repair or replace wheel bearings.</p>
8. Replace ABS/ESC control module	
	<p>A. Replace ABS/ESC control module.</p>


Removal and installation


Hydraulic control mechanism assembly(HCU)

Removal

Material


Name	Model
Brake fluid	HZY4(Or DOT4)

 Note: If brake fluid is accidentally splashed on the paint surface, flush it with clean water immediately.

 Note: The reservoir cover cannot be contaminated.

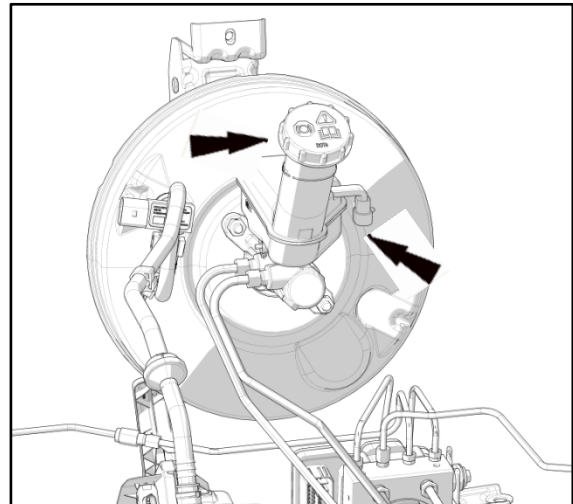
1. Press and hold the EPB switch while the vehicle is powered off, confirm that the rear EPB caliper is released and the transmission is in P position, and then disconnect the battery negative harness.

Reference: Battery inspection (general inspection).

 Note: During removal and installation, the complete vehicle shall be parked horizontally or on the lift.


2. Remove reservoir cover.

Turn the reservoir cap counterclockwise to remove it.

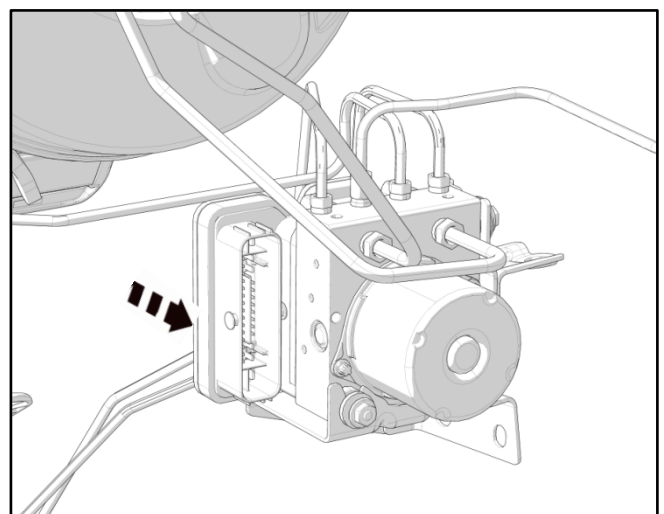


3. Drain brake fluid from the reservoir.

- 1). Use a suitable clean plastic pipe with one end connected to the system exhaust nozzle and the other end connected to a suitable container.
- 2). Unscrew the exhaust nozzle.
- 3). Press the brake pedal repeatedly until all brake fluid in the reservoir is drained.
- 4). Tighten the exhaust nozzle.


 Note: This step must be performed on both sides in order to completely drain all brake fluid from the reservoir.


4. Disconnect the ESC control module harness connector.




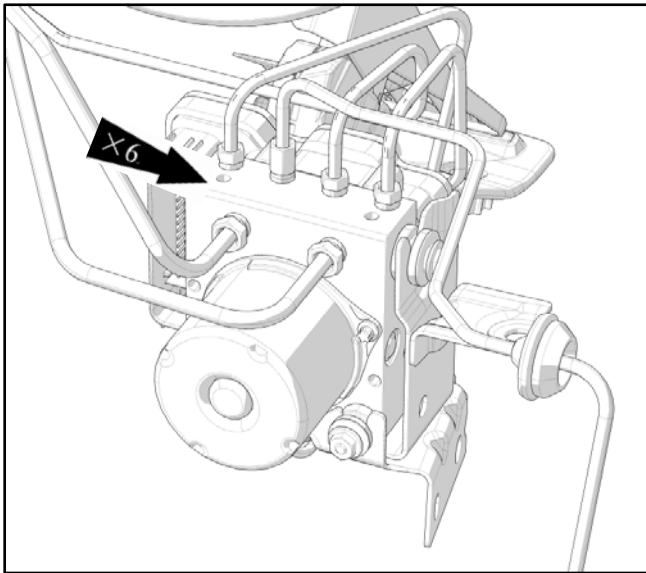
5. Remove the 6 brake lines from the hydraulic control module.

Torque: M10: $16 \pm 2 \text{ N.m}$; M12: $18 \pm 2 \text{ N.m}$

 Note: Block the hydraulic control mechanism (HCU) to prevent the brake from coming out or entering the stolen goods.

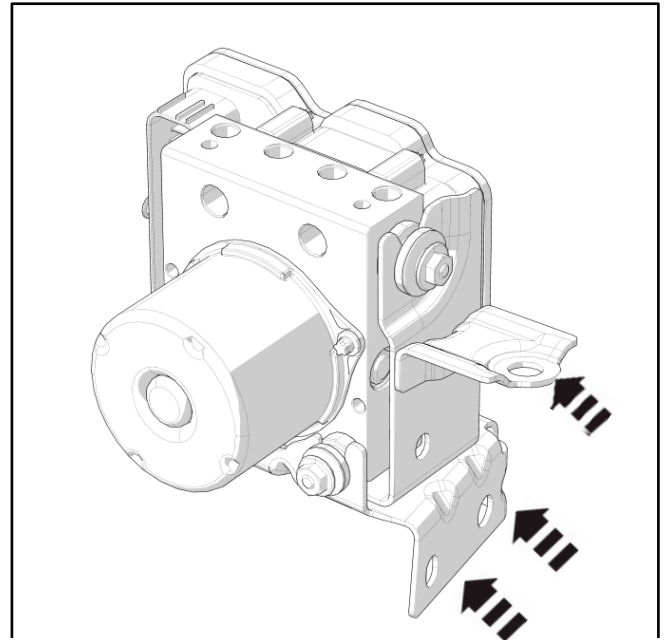
 Note: Cover the brake oil pipe to prevent the brake fluid from flowing out or entering the stolen goods.

 Note: Please note the position of each brake oil pipe for installation.



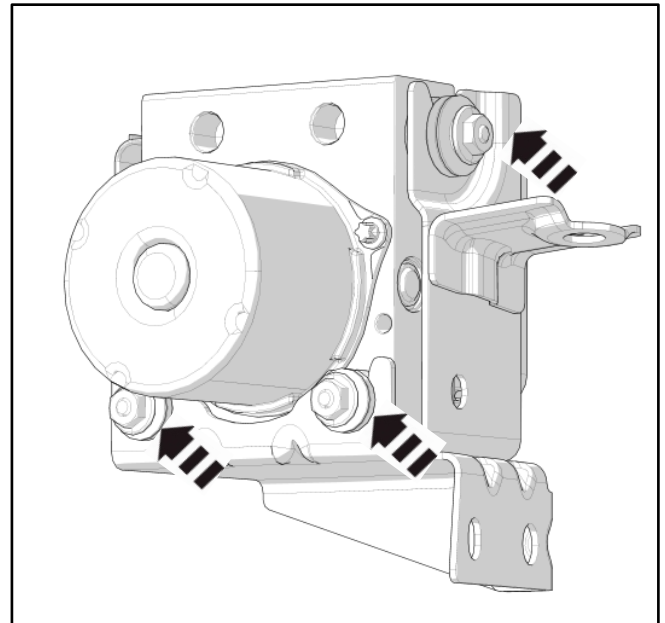
6. Remove 2 retaining nuts and 1 retaining bolts of control module mounting bracket.

Torque: M8: $22 \pm 2 \text{ N.m}$



7. Remove 3 connecting bolts between hydraulic control module assembly and mounting bracket.

Torque: $8 \pm 2 \text{ N.m}$



Installation

1. The installation sequence is the reverse of the removal sequence.
2. Brake system exhaust.

Reference: Exhaust of brake system (2.3.1)
Overview of brake system, general

inspection).



Note: Please confirm the brake booster push rod is in the correct position before installation.



Note: Please confirm the vacuum seal of brake master cylinder is in place before installation.



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