

Brake system

Parking brake

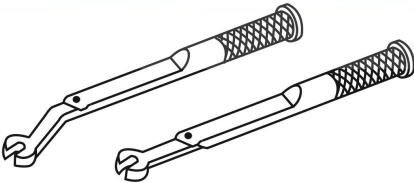
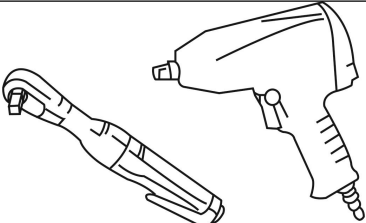
Cautions

- Recommended use of "DOT 4" brake fluid;
- Do not reuse the discharged brake fluid.
- Be careful not to splash the brake fluid onto the paint to avoid damage to the painted areas. If it splashes on the painted surface, please wash it off immediately with water.
- Clean all parts of the brake cylinder with a clean brake fluid.
- Do not use mineral oil such as gasoline or kerosene to avoid damaging the rubber parts in the hydraulic system.
- When removing and installing tubing, use a special tubing wrench.
- When installing the brake hose, be sure to check the tightening torque.
- When repairing or replacing the brake disc, brake shoe, or when the brake is soft when driving for a short distance, be sure to run the brake coupling surface.
- To confirm that there is no brake fluid on the brake disc, do not splash brake fluid onto the brake disc, otherwise brake failure will result.

Preparation Work

If necessary, use special maintenance tools to disassemble.

Maintenance tool list

No.	Tool	Outside View	Instructions
1	Tube wrench		Disassembly and Assembly of brake oil tube
2	Power Tool		Removal and Installation of Bolts and Nuts

Brake pedal

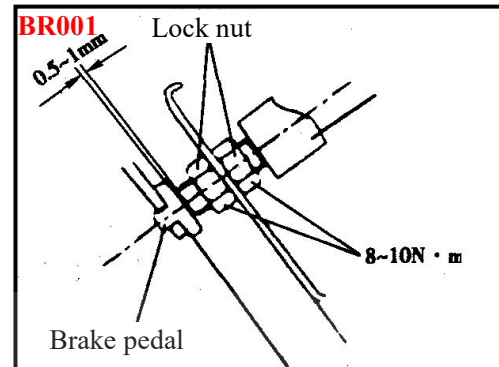
Inspection and Adjustment

Clearance between brake pedal and brake limit switch bolt adjustment

- 1) Disassemble the driver's side lower guard plate assembly
- 2) Disconnect the brake light switch connector.

Loosen the brake limit switch nut and loosen the brake pedal, rotary switch bolts, make the gap between switch bolt and brake pedal between 0.5mm and 1mm.

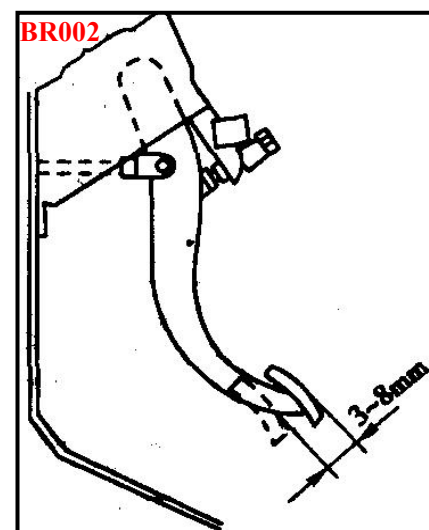
■ Tightening Torque: 8mm~10N·m



Brake pedal free travel

- 1) With the engine off, Press the brake pedal 2 ~ 3 times
- 2) Confirm the vacuum elimination of the brake vacuum booster, press the pedal with the hand.
- 3) Make sure that the free travel of the pedal is within the standard range before the resistance occurs.

■ Standard value: 3mm~8mm



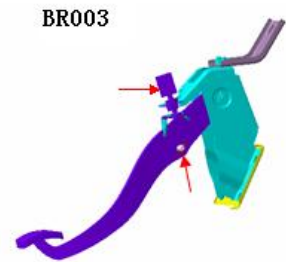
- 4) If free stroke exceeds standard range, please adjust.

Cautions:

■ If the free stroke can't be adjusted to standard range, please replace the damaged parts.

Removal and Installation:**1) Removal**

- ① Remove driver's side lower guard panel assembly.
- ② Disconnect the brake light switch connector.
- ③ Remove the locking pin from the brake vacuum booster and disconnect from the brake vacuum booster.

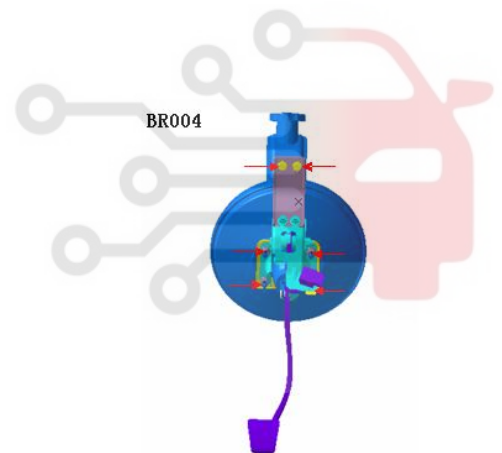


- ④ Remove brake pedal and body fixing bolt.

Remove the fixing nuts connecting brake pedal and brake vacuum booster.

■ Tightening Torque: $20 \sim 25 \text{ N} \cdot \text{m}$

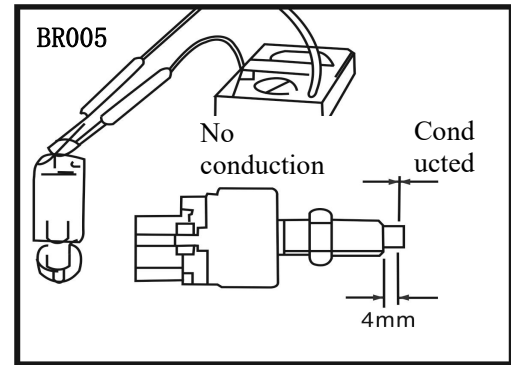
- ⑤ Remove the brake pedal.

**2) Inspection After Removal****Brake pedal**

- Check if brake pedal movable pin is worn or deformed.
 - Check brake pedal for cracks, twisting or other damage.
- ② Lock pin and bushing
- Check if the lock pin and bushing is damaged or deformed, if any, please replace.

③ Brake Lamp Switch

- a. Use a multimeter to detect the two terminals of the brake light switch, and check whether it is turned on when the brake light switch is pressed or released.

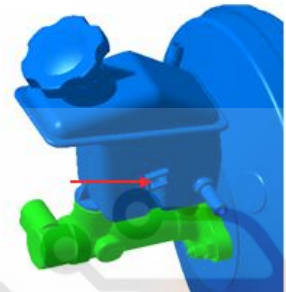


b. As shown in the figure, when the switch is pressed $>4\text{mm}$, the terminals are non-conductive, while the switch is released, the terminals are conductive, then the brake light switch is working normally.

3) Installation

Install in the reverse order of removal

BR006



Note:

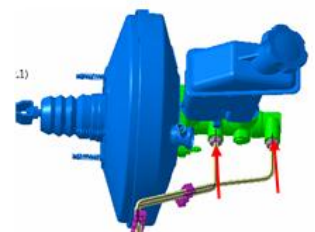
- Check if the brake pedal operation is smooth.
- Check free stroke of brake pedal.
- Check the clearance between the brake pedal and the brake lamp switch.

Brake master cylinder

Inspection on the vehicle:

Check if the master pump mounting surface, the fluid tank mounting surface and the brake tube connector have leakage.

BR007



Removal and Installation:

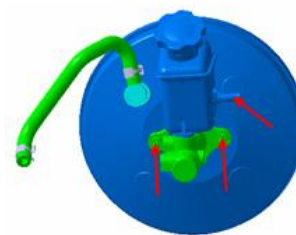
1) Removal

- ① Discharge the brake fluid.
- ② Remove brake fluid level switch plug

- ③ Use oil pipe wrench to disassemble the master cylinder hard tube.

■ Tightening torque 6~18N·m

BR008



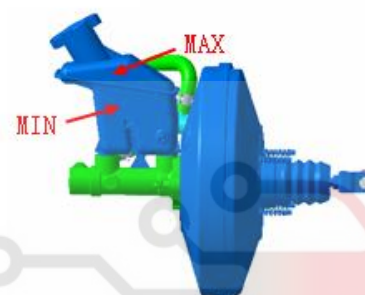
- ④ disassembly and disassembly brake main pump and clutch main pump

Connect pipe and master pump fixing nut, then remove the master cylinder assembly.

Attention:

■ Be careful not to bend or damage the brake pipe.

BR009



2) Installation

Attention:

■ Before installation Master cylinder pin should be coated with grease: SAE J310 J310;NLGI No2 or equivalent.

- ① Install the main pump assembly on the brake vacuum booster and tighten the nut.

Attention:

■ Do not damage the sliding surface of the piston push rod. Do not allow foreign bodies to fall on the surface.

- ② Install the brake hard tube to the main pump assembly and pre-tighten.
 ③ Use a tubing wrench or equivalent to tighten the brake tube tubing nut.
 ④ Install brake fluid level switch connector.
 ⑤ Add new brake fluid and expel air at the same time.

Brake fluid

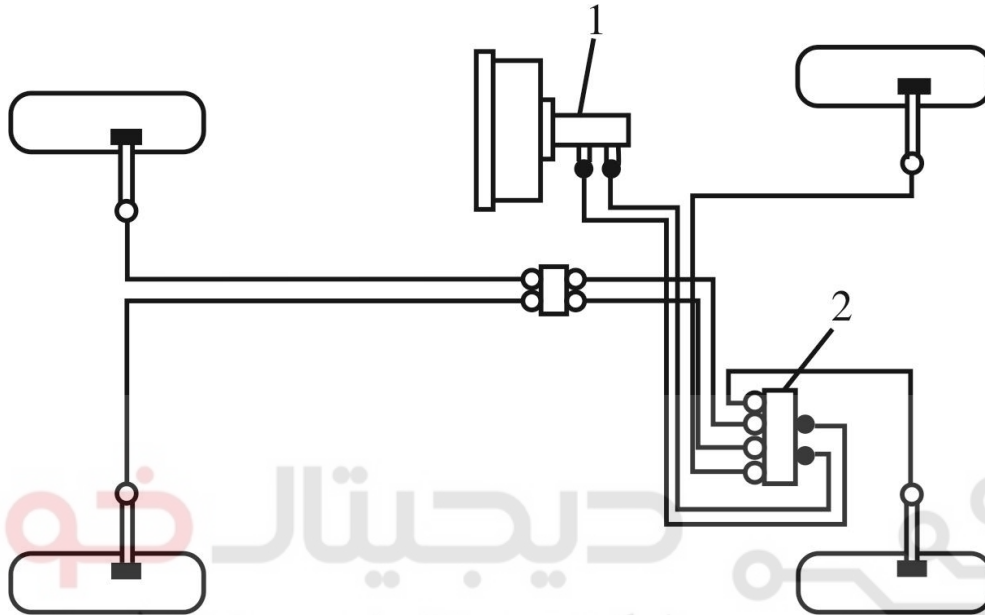
Check brake fluid level:

- 1) Verify brake fluid level in oil pot is it within the specified range (MAX and MIN), if the liquid level is too low, please check whether there is leakage around the oil pot and the brake system.

2) Start the vehicle, release the parking handle and observe if the brake warning light is off. If the light is not off, please check whether parking brake switch, brake fluid level the brake fluid level switch is faulty.

Brake pipeline

Hydraulic piping diagram:



Hydraulic piping diagram

1. Brake master cylinder 2. ESP module assembly

Attention:

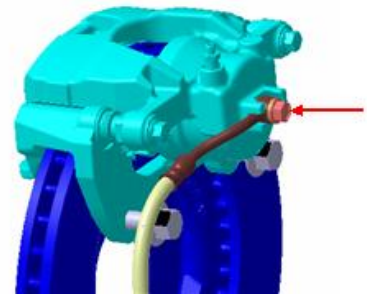
- All brake tubing should not be excessively bent, twisted or stretched.
- Verify that all brake tubing will not interfere with other parts when the vehicle is stationary or turning.
- Brake tubing is an important safety component, if brake liquid leaking, always tighten its fixing device. If you find damaged parts, please replace the new applicable parts.
- When disconnecting the brake pipe, seal the joint end to avoid entering the dust.

Front brake tube and hose:

1) Removal

- ① Remove the wheel tire.
- ② Remove the brake hose bolts.

BR010

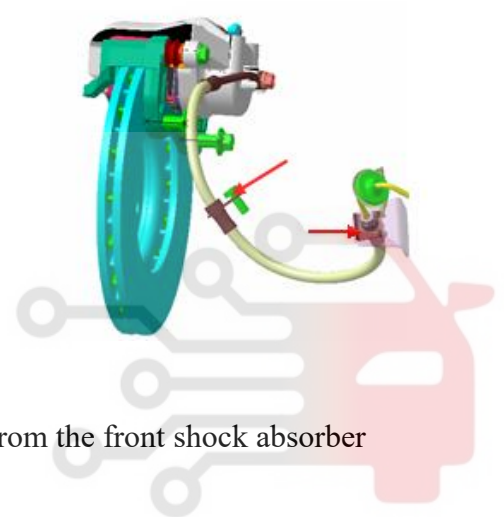
**Attention:**

■ Be careful of the drop of copper washers

Fastening torque: $25 \sim 30 \text{ N} \cdot \text{m}$

- ③ Remove brake hose and brake hard pipe joint with tubing wrench and remove card.

BR011



■ Tighten torque $16 \sim 18 \text{ N} \cdot \text{m}$

- ④ Remove the anchor bolts in the middle of the brake hose from the front shock absorber

- ⑤ Remove the brake hose and brake tube.

2) Installation

Follow the opposite sequence of the disassembly procedures.

Attention:

■ Do not reuse the gasket and oil tube card.

■ Note that brake hose connector installation direction.

■ Re-fill brake fluid and expel air at the same time.

2) Installation

Follow the opposite sequence of the disassembly procedures.

Rear brake tubing and brake hoses:

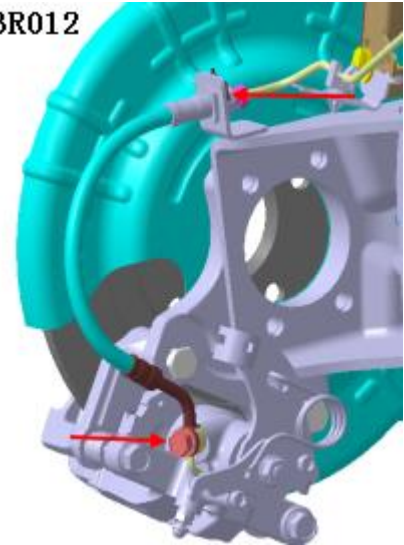
1) Removal

- ① Remove the wheel tire.
② Remove the brake hose bolts.

Attention:

- Be careful of the drop of copper washers
- Fastening torque: $25 \sim 30 \text{ N} \cdot \text{m}$
- ③ Remove brake hose and brake hard pipe joint with tubing wrench and remove card.

BR012



- Tighten torque $16 \sim 18 \text{ N} \cdot \text{m}$

- ④ Take off the brake hose.

2) Installation

Follow the opposite sequence of the disassembly procedures.

Attention:

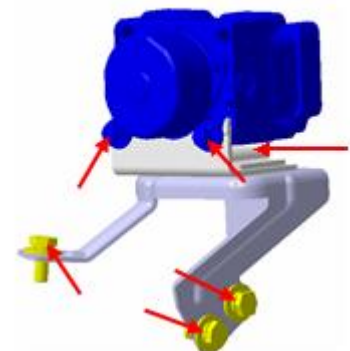
- Do not reuse the gasket and oil tube card.
- Note that brake hose connector installation direction.
- Re-fill brake fluid and expel air at the same time.

Brake hard tube for brake master pump and ESC module assembly:

1) Removal

- ① Remove the oil pipe joint at both ends of the brake master pump.
- ② Remove the ESC module assembly tubing connectors at both ends.
- ③ Remove the two fixed clips in the middle of the brake hard tube.

BR015



■ Tightening Torque: The tubing connector $16 \pm 18 \text{ N}\cdot\text{m}$

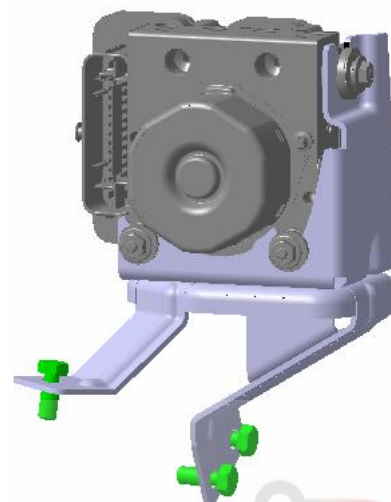
hold-down nut $10 \sim 15 \text{ N}\cdot\text{m}$

④ Then disconnect the tubing joint of the ESC module assembly in turn.

■ Tightening Torque: $16 \sim 18 \text{ N}\cdot\text{m}$

Attention:

■ Do not drain the brake fluid in the ESC module assembly or disassemble the ESC

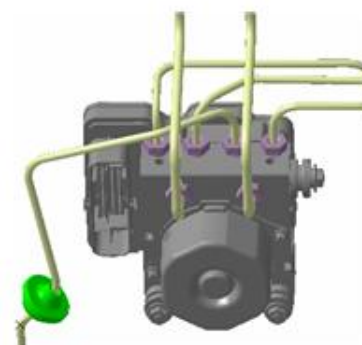


2) Installation

Follow the opposite sequence of the disassembly procedures.

Attention:

■ Install the ESC module assembly fixing bracket, tighten it with bolts, then attach the ESC module assembly to the ESC fixing bracket, tighten the fastening nut



Tightening torque: $6 \sim 10 \text{ N}\cdot\text{m}$.

■ Do not deform the brake line due to the difficulty of installation, and ensure that each fixed pipe clamp and sheath are installed in place when installing each pipeline assembly.

① Connect the left front brake hose assembly to the left front brake clamp, then allow the entire line to pass smoothly through the shock absorber bracket, then through the body bracket and install the left front brake hard tube, install the card, and finally bolt on the steering knuckle. The right side method is the same as the left one.

- ② Fix the rear brake line assembly under the body with bolts or nuts.
- ③ Re-fill brake fluid and expel air at the same time.

3) Inspection After Installation

Attention:

■ If there is leakage in brake pipe or brake hose, please re-tighten, or if there is component is damaged, please replace.

① Check brake hoses, brake pipes and joints for fluid leakage, damage, distortion, deformation, and other dry parts involved in loosening.

② During engine operation, apply a certain amount of braking force and continue for a few seconds, then check the parts for fluid leakage.

Brake vacuum booster assembly components:

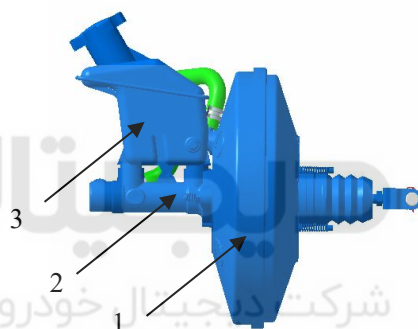


Diagram of brake vacuum booster assembly
1. Vacuum booster 2. Brake master cylinder 3. Brake oil pot

Inspection on the vehicle:

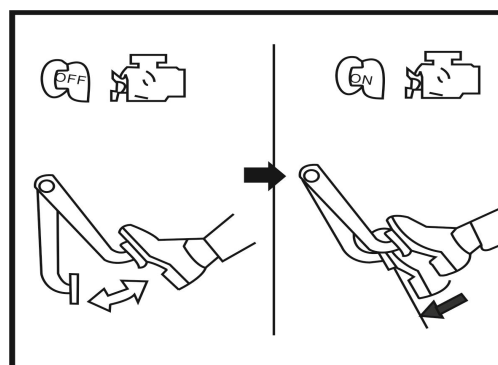
1. Operation Inspection

Turn off the engine, then depress the brake pedal several times to make the pressure in the brake vacuum booster equal to the atmosphere. Depress the brake pedal to the end, start the engine, when the vacuum reaches the standard, confirm whether the brake pedal and the floor gap is shortened.

Attention:

- The time interval between pressing the brake pedal is 5 seconds.

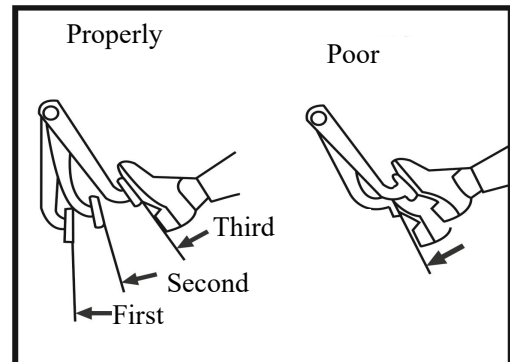
BR016



2) Tightness check

■ Start the engine, and keep the engine idle running for 1 minute, turn off the flame when the brake vacuum booster assumes a vacuum. Normally depress the brake pedal to remove the vacuum. Check if the gap between the brake pedal and the floor increases gradually.

BR017



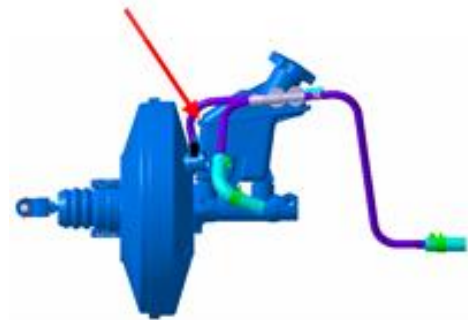
■ Depress the brake pedal while the engine is running, then press and hold the pedal to stop. After stepping 30 seconds, confirm that the pedal travel has not changed.

Removal and Installation:**Attention:**

- Do not bend the brake tube when removing the brake vacuum booster.
- Please replace the damaged lock pin.
- Do not damage the vacuum booster bolt thread.

1) Removal

① Remove the clamp of the vacuum hose and remove the vacuum hose from the brake vacuum booster.

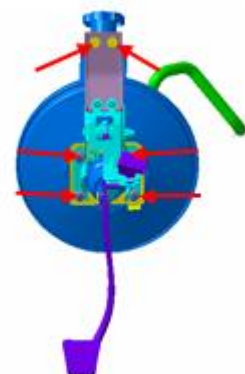


BR019

② Disassemble lock pin and washer from brake pedal.

③ Remove the fixing nuts connecting brake pedal

and brake vacuum booster.



④ Remove the connecting bolt of brake pedal and vehicle body.

■ Tightening Torque: $20 \sim 25 \text{ N} \cdot \text{m}$

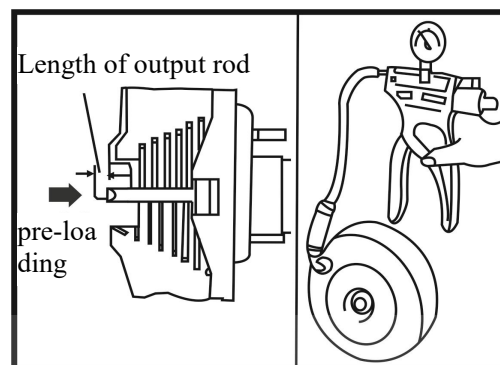
⑤ Remove the brake vacuum booster from the engine compartment.

2) Inspection After Removal

① Push rod length check

a. Use the manual vacuum pump to apply -66.7 kPa vacuum pressure to the brake vacuum booster.

BR020



b. Push rod length check

■ Push rod length: $116.7 \sim 117.3 \text{ mm}$

② Vacuum hose

Check for damage and cracking. If any, please replace it.

3) Installation

① Install brake master cylinder and vacuum booster assembly at corresponding place on vehicle body, then put brake pedal assembly through the center of vacuum booster push rod and install it on the vacuum booster bolts, tighten the 4 nuts .

Install brake pedal and vacuum booster push pin shaft, and apply SAE J31 0, NLGI No2 grease on the surface of the pin shaft. When the pin does not work properly, adjust the length of the pedal adjustment bolt to ensure that the pin can be installed in a natural state. However, the length of the vacuum booster rod must not be adjusted or the vacuum booster rod should be compressed.

③ Fix the bracket on the brake pedal with two angle combination bolts and tighten the fixing bolts.

■ Tightening torque: $20 \pm 25 \text{ N} \cdot \text{m}$;

④ Fix the vacuum hose assembly to the right position of the vacuum booster.

Attention:

■ Insert the vacuum hose into place during installation.

■ Do not apply grease during installing

- ⑤ Adjust brake pedal free travel.
- ⑥ Tighten the push rod lock nut according to the specified torque.
- ⑦ Install the air filter assembly.
- ⑧ Re-fill brake fluid and expel air at the same time.

Front disc brake caliper

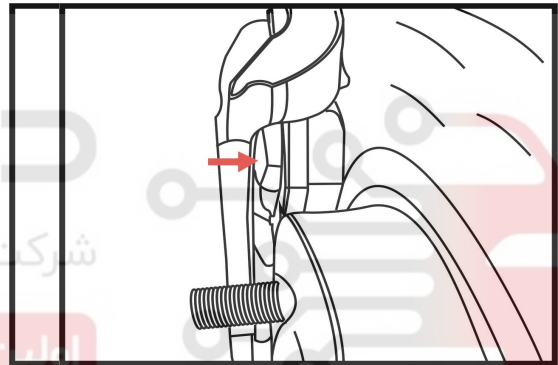
Inspection on the vehicle:

- 1) Check brake shoe for wear.

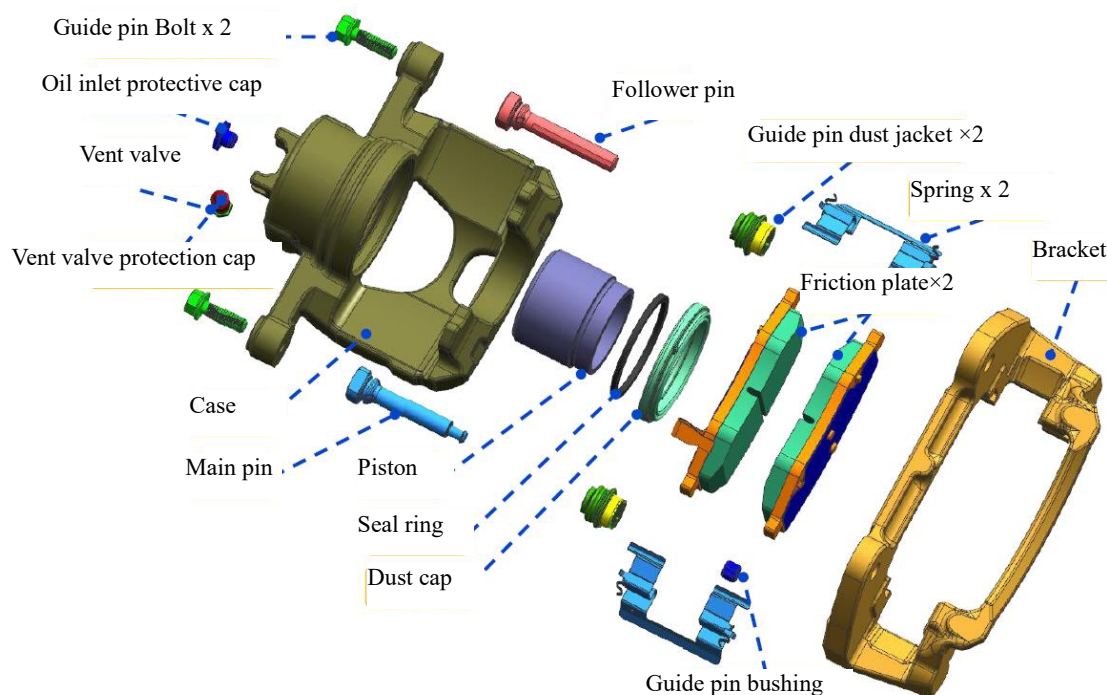
Attention:

- Standard thickness: 9.5mm
- Extreme abrasion limit thickness: 2mm

BR021



Component



Brake brake assembly breakdown diagram

Attention:

■clean the brake cylinder and brake shoe completely, minimize the damage caused by particles and other substances in the air.

■Do not step on brake pedal during cylinder disassembly, avoiding piston being ejected

■Do not damage the piston dust jacket.

■Do not disassemble the bolts of brake cylinder fixing bracket and brake hose unless disassemble or replace the cylinder. so, Lift the pump with a rope in case of brake hose pulling.

■If the brake shoe silencer is seriously corroded, please replace with a new silencer.

■Every time the brake shoe is replaced, the silencer is replaced

■Make sure there is no brake fluid on the brake disc.

Removal and Installation the brake shoe:

1)Removal

① Remove the wheel tire.

■Tightening torque: $90 \sim 110 \text{ N} \cdot \text{m}$;

② Disassemble the fixing bolt of brake caliper assembly

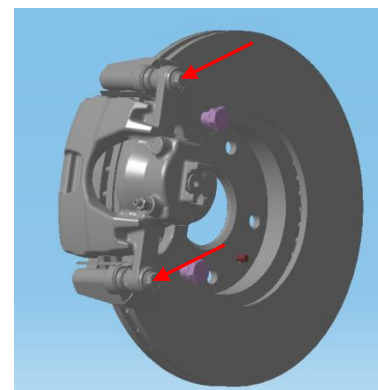
locating pin

■Tightening Torque: $35 \sim 25 \text{ N} \cdot \text{m}$

③ Using a rope to hoist the brake clamp,

then remove the inner and outer brake shoes, etc.

BR022



2) Installation

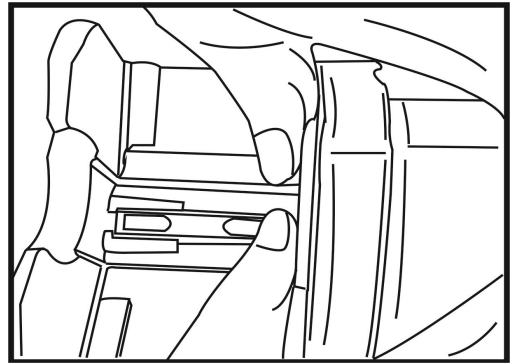
- ① Install the spring pieces of the shoes on the respective brake shoes.

Attention:

- install towards soundproofing fixing direction.

- ② To install the shoe, hold down the piston, and then install the sub-pump to the sub-pump fixing frame.

BR023



- ③ Install the brake shoes onto the brake sub-pump fixing frame.

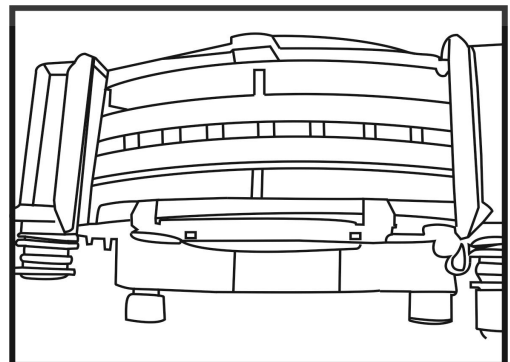
Attention:

- Pay attention to the liquid level of brake fluid in the brake oil pot.

- ④ Install the locating pin fixing bolt of the sub-pump and tighten it.

- ⑤ Hold the brake disc in place and press the brake pedal until the brake responds.

BR024



- ⑥ Check brake rotation friction

- ⑦ Install the wheel tires

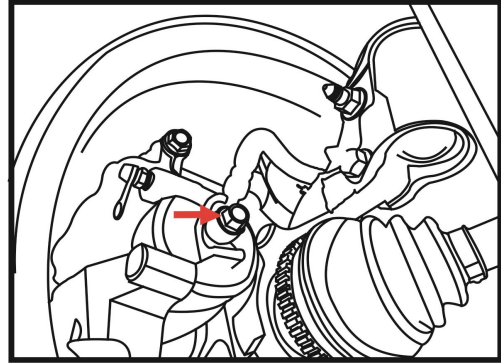
Remove and install brake clamp assembly:

1) Removal

- ① Remove the wheel tires.
- ② Remove the brake hose bolts, then disconnect the brake hose

■Fastening torque: 25~30 N·m

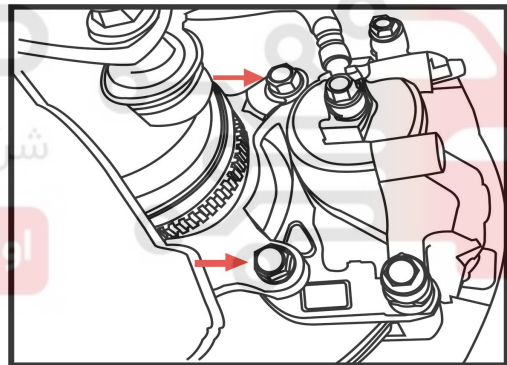
BR025

**Attention:**

■Be careful of the drop of copper washers on both ends of the bolt.

- ③ Remove the brake clamp assembly anchor bolt, then remove the brake clamp assembly.

BR026



■Tightening Torque: 75~85 N·m

2) Installation

Follow the opposite sequence of the disassembly procedures.

Disassembly and Assembly

1) Disassembly

- ① Remove the brake sub-pump locating pin fixing bolt and remove the brake sub-pump from the brake sub-pump fixing frame.

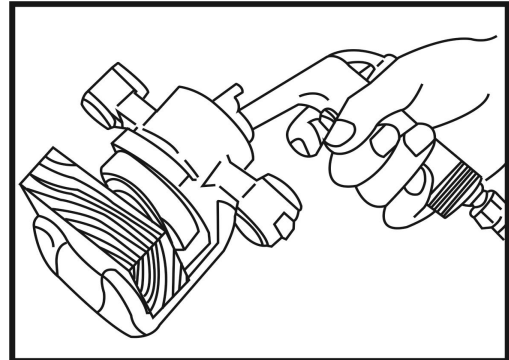
If necessary, remove the brake shoe and brake shoe silencer from the brake sub-pump fixing frame.

Attention:

- Do not drop brake shoes, brake shoes silencing film.

② Remove the locating pin and dust jacket of the locating pin of the sub-pump from the brake sub-pump fixing frame.

BR026



③ As shown in the picture. Place the appropriate block,

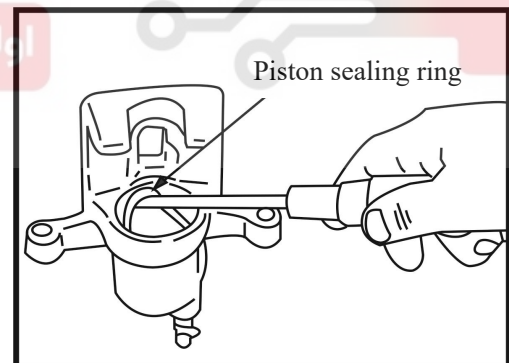
Then blow evenly into the brake hose retaining bolt hole and remove the piston and piston dust jacket.

Attention:

- Be careful not to get your fingers caught in the piston.

④ Remove the piston seal ring from the split pump using a flat screw driver.

BR027

**Attention:**

- Be careful not to damage the inner wall of the cylinder block.

2) Inspection After Disassembly

① Brake pump cylinder block

Attention:

- Use the new brake fluid to clean the cylinder body. Do not use gasoline or kerosene.

■ Check if the cylinder body internal wall has wear or damage. Please replace the brake cylinder if it has.

② Brake pump fixing frame

■ Check the fixture for wear, crack or damage. If any, please replace it.

③ Piston

■ Check if the piston surface has corrosion, wear or damage. If any, please replace it.

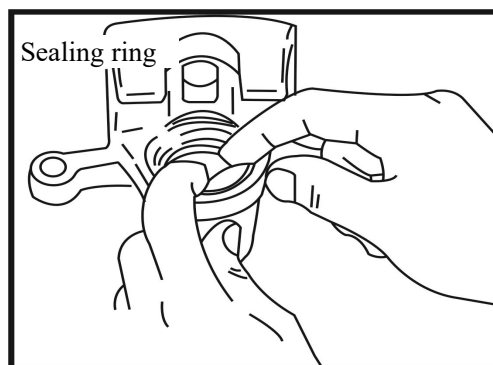
■ Do not sand the piston surface.

④ Sliding pins, pin bolts and pin dust jacket

■ Check sliding pins, pin bolts and pin dust jackets for wear and crack.

If any, please replace it.

BR028



3) Assembly

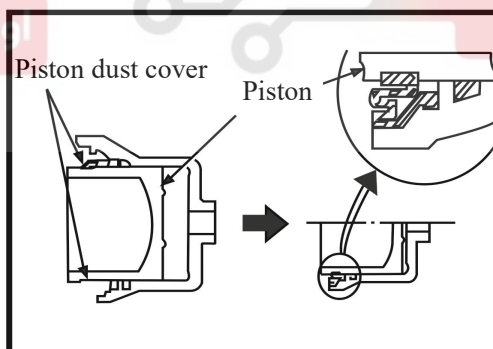
Attention:

■ The appointed rubber lubricating grease should be used when in assembly.

■ Do not reuse piston seals and Piston dust jacket.

① Grease the piston seal ring with rubber grease and install it into the cylinder block.

BR029



② Apply brake fluid to piston and rubber grease to piston dust jacket.

Cover the piston port with the piston dust jacket, and then slowly fix the side of the cylinder block on the piston dust jacket to the groove on the cylinder block.

③ insert the hand into the cylinder and insert the piston dust cover piston side edge into the piston groove.

Attention:

■ Press the piston evenly to avoid scratching the inner wall of the cylinder.

④ Install the sliding pin and the dust jacket of the sliding pin onto the brake sub-pump fixing frame.

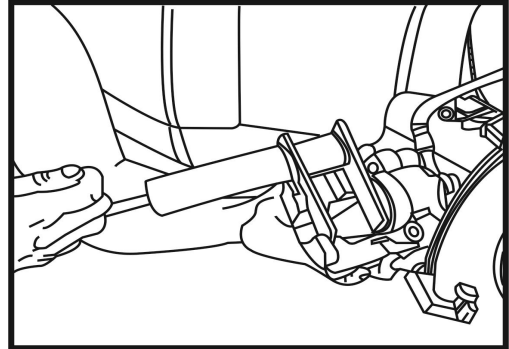
- ⑤ Install the shoe muffler on the brake shoe.

Attention:

- install towards soundproofing fixing direction.

- ⑥ Install the brake shoe assembly to the brake sub-pump fixing frame.

BR030



- ⑦ To install the shoe, hold down the piston, and then install the sub-pump to the sub-pump fixing frame.

- ⑧ Tighten the pin bolt.

Check brake disc

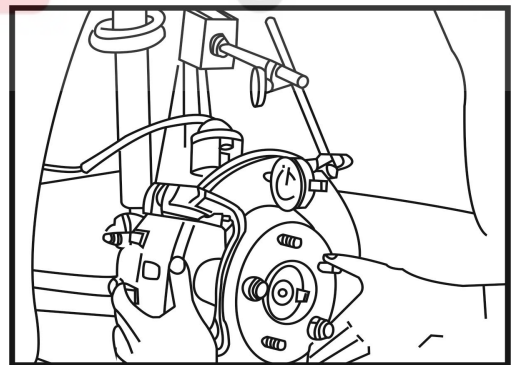
- 1) visual inspection

- Check brake disc surface for uneven wear, cracks and serious damage. If any, please replace it.

- 2) Bounce check

- ① Fix the brake disc to the hub.

BR031



Attention:

Before measuring, make sure that the axial clearance of the wheel bearings should not be too large.

- ② Use the micrometer to check the run out. (It can be measured at inside 10mm of the brake disc edge)

- Run out limit: 0.05mm

- ③ If the amount of run out exceeds the specified value, replace or perform the necessary

machining.

3)thickness check

■Use a micrometer to check the thickness of the brake disc.

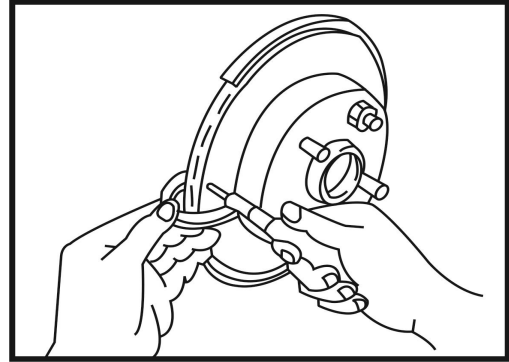
If the thickness is below the wear limit, replace the brake disc.

Front plate and rear plate models:

Standard value: 25mm

Abrasion limit: 23mm

BR032



Brake running-in procedure:

After repair or replacement of the brake disc, brake shoes after replacement or in a short distance braking phenomenon, please follow the following steps to close the brake disc and brake shoes joint surf

■Before running in, brake may be not well, please control vehicle speed.

■Carry out the following steps only in safety road and traffic condition, and pay attention to safety.

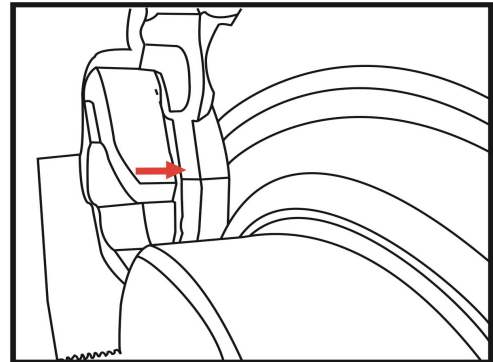
- 1) Drive vehicle in straight road;
- 2) Control the strength of pressing brake pedal, and brake vehicle in 3~5s.
- 3) Drive a car for a certain distance and stop for 3 minutes to cool the braking system.
- 4) Repeat step 1~3 until friction plate and brake disc is totally running in.

Rear DISC BRAKE CALIPER

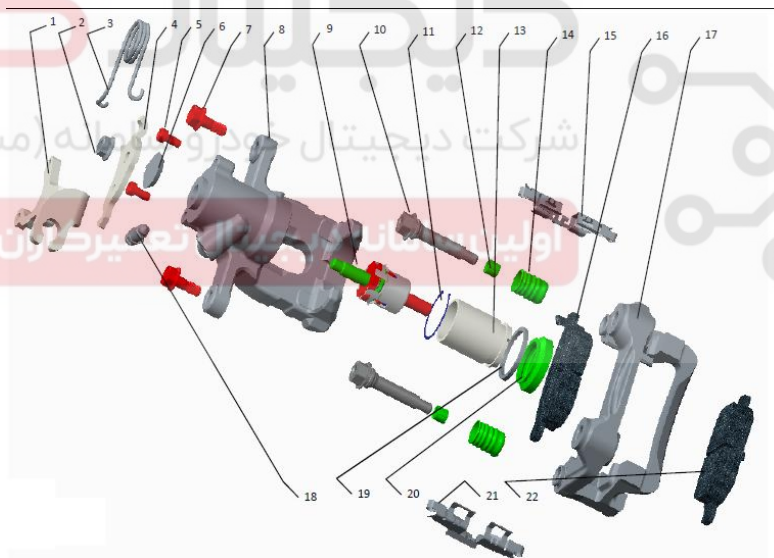
Brake shoe wear inspection:

Attention:

- Please use the scale to check.
- Standard thickness: 8mm
- Extreme abrasion limit thickness: 2mm



Component

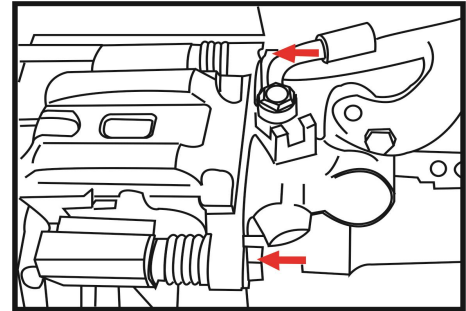


No.	1	2	3	4	5	6	7	8	9	10	11
Name	Guide seat	Support rod nuts	Torsional spring	Support rod	Guide bolt	Screw plug	Hexagon head bolt	Cylinder block	Drive shaft	Secondary pin	Clasp spring
No.	12	13	14	15	16	17	18	19	20	21	22
Name	Bushing	Piston	Dust jacket	Yoke spring B	Inner brake pad assembly	Fixed frame	Vent screw and vent cap	Oil seal ring	Dust ring	Yoke spring A	External brake pad assembly

Removal and Installation:

1) Removal

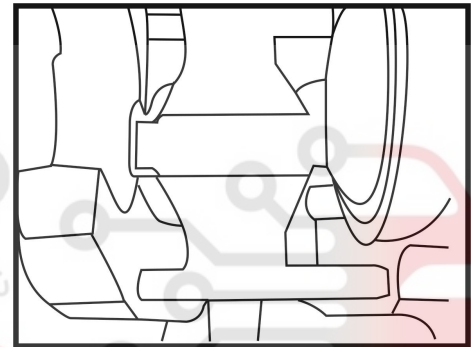
- ① Remove the wheel tires.
- ② Release parking brake, remove parking brake wire.



- ③ Remove brake split pump bolts.

■ Fastening torque: 22~32N·m

- ④ Lift the splitter pump with a rope, then remove the shoe, shoe gasket and shoe retaining ring.

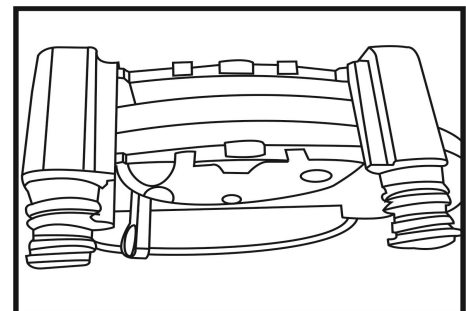


2) Installation

- ① Install shoe gasket and shoe retaining ring on each brake shoe.

Attention:

■ Install according to the fixed direction of shoe gasket and shoe retaining ring.



- ② To install the shoe, hold down the piston, and then install the sub-pump to the sub-pump fixing frame.

- ③ Install the brake shoes onto the brake sub-pump fixing frame.

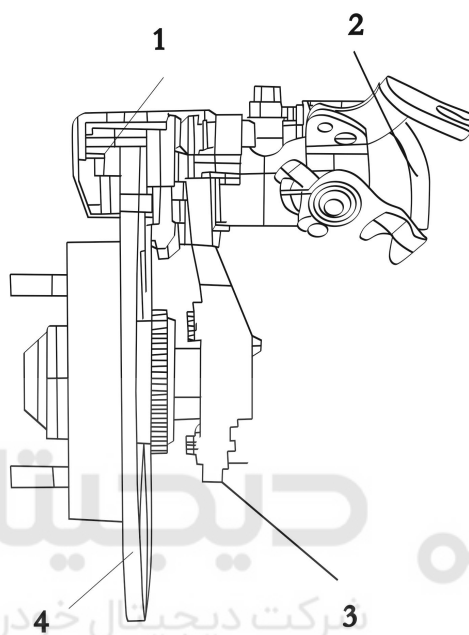
Attention:

■ Pay attention to the liquid level of brake fluid in the brake oil pot.

- ④ install the lower brake caliper sliding pin and tighten it.

- ⑤ fasten the brake disc with the tire nut and step on the brake pedal until the brake is restored.
- ⑥ Check brake rotation friction
- ⑦ Install the wheel tires

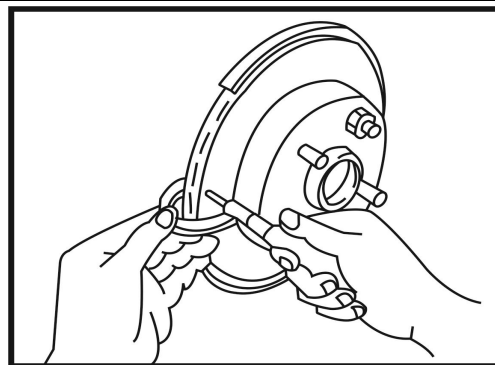
Rear brake installed



Schematic diagram of rear brake assembly

1- rear brake clamp assembly 2- rear brake hose assembly 3- rear hub assembly 4- rear brake disc

- ① First install the rear brake disc, respectively with a cross screw fixed.
- ② Install the rear brake clamp, and fix the brake clamp bracket to the corresponding hole in the rear steering knuckle with the bolt and bolt spring pad of the rear brake clamp.
 - Tightening torque: $65 \sim 75 \text{ N} \cdot \text{m}$
- ③ Finally install the rear brake hose assembly and brake tubing perforated bolts and gaskets.
 - In the installation process should pay attention to the same things as the front brake.
- ④ After installing the brake drum, please step on the brake pedal several times to make the brake shoe in place.
- ④ Check brake disc:
 - Please refer to the front disc brake forceps for details.



1)thickness check

■Use a micrometer to check the thickness of the brake disc.

If the thickness is below the wear limit, replace the brake disc.

Standard value: 9mm

Abrasion limit: 8mm

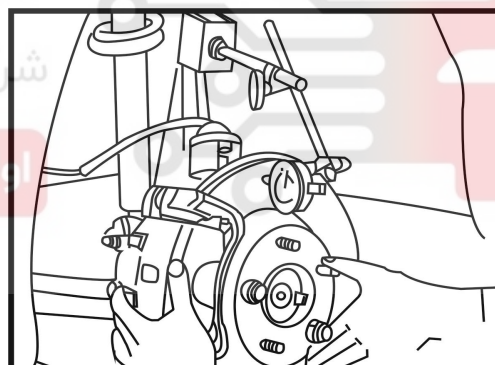
2) jerk value check

① Fix the brake disc to the hub.

②Use the micrometer to check the run out. /

(It can be measured at inside 10mm of the brake disc edge)

■Run out limit: 0.05mm



Malfunction Diagnosis

Troubleshooting Table of rear brake system

failure	possible causes	Handling
Insufficient brake force	1.Pipe connector or rear brake cylinder cover weeping 2.The residual air in the pipeline is not exhausted out cleanly 3.Shoe and drum clearance is too big 4.The shoe surface is greasy or hardened 5.Drum overheating,pipeline has a gas resistance	1.Wipe out and tighten or replace 2.Discharge air. 3.readjust 4.rub or replace 5.replace、cool、 exhaust
Release brake hard	1.The oil return hole of the rear brake pump is blocked or the leather bowl expands 2.Shoe and drum clearance is too small 3.The return spring has weakened or broken 4.The bottom plate is deformed and the return position is blocked	1.Repair or replace 2.readjust 3.Replace 4.Repair or replace.

Brake System

failure	possible causes	Handling
Noise	1.Rear brake shoe heavy wear 2.Brake drum out-of-round 3.When rear brake surface is too smooth , friction coefficient is little and brake pressure is high friction noise occurs during the smooth surface sliding, or the foreign matter squeezes the friction surface in the friction pair.	1.Replace 2.Boring and milling, and check balance performance 3.Clean the foreign matter, polish the rear brake shoe with raw emery paper.
Drum overheating caused by brake dragging	1.The brake clearance is too small, the pedal free travel too small,when release brake pedal,the brake force isn't completely relieved,that makes friction pair staying in frictional states in long time;then start is difficult , driving is short of power、 it feels hot on the surface of the drum with your hand touching 2.Brake handle is not completely released, the cause of improper adjustment or negligence in the operation, resulting in a long time friction pair in the state of friction and heat 3.The braking heat makes return spring distorted , elasticity declines or disappears , can not ensure rear brake shoe assembly return in time,so that it could not relieve the brake completely in time and lead drum overheating	1.Adjust the clearance according to the standard, facing these situations 2.Adjust according to specification when necessary 3.Service or replace the return spring to eliminate the malfunctions
parking brake failure	Common pull cable or sleeve corrosion,traction spring break, falling off or elastic disappearing, make the parking brake control pull cable or brake pull cable dumb in the sleeve , leading parking brake cannot release then works failure	It is necessary to check whether there is any damage on the surface of brake control pull cable and brake system parts. Whether the handle control action is flexible or not, no lag phenomenon;whether or not the connecting head and fixed parts are loose and damaged, repair or replace when it is necessary.

Troubleshooting Table of brake system

failure	possible causes	deal with
Vehicle off-track to one side in brake	Left right tire insufficient air pressure	Adjust
	The front wheel parameters are not adjusted correctly	Adjust
	Brake shoe poor contact	adjust
	Brake shoe surface with lubricant or oil	Replace
	brake drum eccentric or uneven	Replace
	Wrong installment of the brake cylinder	adjust
	self-adjusting mechanism malfunction	Adjust
Insufficient brake force	Brake liquid lack or polluted	add or replace
	Brake system with air	system air exhaust
	Brake booster failure	Adjustment
	Brake shoe poor contact	adjust
	Brake shoe surface with lubricant or oil	Replace
	self-adjusting mechanism malfunction	Adjust
	Brake shoe dragging lead to overheat of brake rotate parts	adjust
	Brake pipeline restrain	adjust
Pedal stroke increases(less	Brake system with air	system air exhaust
	Brake liquid leakage	adjust

Brake System

failure	possible causes	deal with
distance to floor)	self-adjusting mechanism malfunction	Adjust
	Too big gap between push rod and brake master cylinder	adjust
Brake lag	Parking brake incompletely release	Release
	Parking brake unsuitable adjustment	Adjust
	Brake pedal return spring wear	Replace
	Brake master cylinder oil return opening restrain	adjust
	Rear brake drum return spring damaged	Replace
	Slide parts insufficient lubrication	Lubrication
	Brake master cylinder single direction valve or return spring with faults	Replace
	Pusher and brake master cylinder clearance is too small	Adjust
Insufficient parking brake function	Rear brake shoe damage	Adjust
	Rear brake shoe surface with lubricant or oil	Replace
	parking brake pull cable stuck	adjust
	self-adjusting mechanism malfunction	Adjust
	The parking brake handle stroke is too long	Adjust

Repair Data and Specification

Technical Specification Table

Project	Specification
Brake master cylinder	Type series
	Bore diameter 22.22mm
Brake booster	Type vacuum
	Standard (sizes) 10 inch
	booster ratio 7.3:1
Front brake	Type floating clamp/ ventilated disc
	Brake disc diameter 294mm
	Brake disc thickness 25mm
	Friction block thickness 9.5mm
	Bore diameter 54mm
Rear brake	Type floating clamp/ ventilated disc
	Brake disc diameter 275mm
	Brake disc thickness 9mm
	Friction block thickness 8mm
	Bore diameter 34mm

Tightening Torque Table

Project	torque (N·m)
Front brake caliper and knuckle connecting bolts	75×85
Rear brake shoe and torsion beam connection bolts	65×75
Rear brake and rear hub connecting bolts	65×85
Front and rear caliper exhaust bolts	7×13
Brake pedal bracket support bolts	20×25
Brake pedal nuts	20×25
Brake hose and caliper connecting bolts	25×30
Brake pipe connector	16×18

Parking Brake control

Cautions

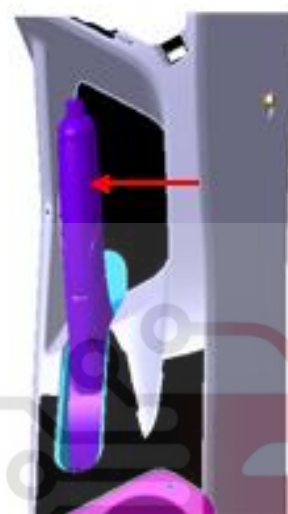
- Check and adjust parking brake only when brake is normal.
- When inspecting the parking brake system, the vehicle must be placed on the horizontal ground and the wheels are fixed with triangle wood.

Inspection on the vehicle:

1) Parking handle travel

- Pull the parking brake handle with a force of 200N to make sure the pawl is in the designated slot (there is a click for each tooth, listen and calculate the sound of the pawl to check).

PB001



- Standard value: 7~9 teeth

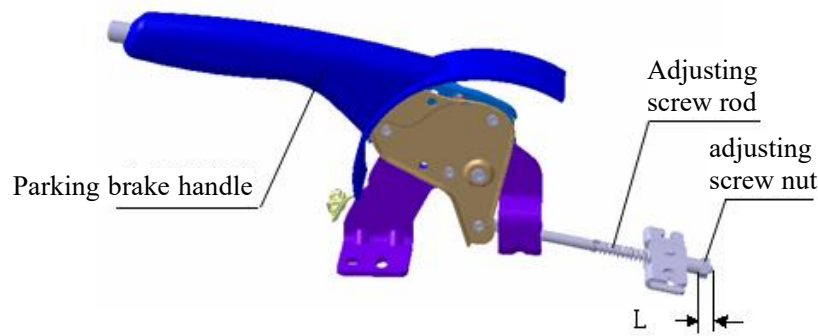
2) Component inspection

- ① Confirm that the fixed condition of each component is normal.
- ② Check whether parking brake handle assembly has bend, damage or crack or not. If there is situation above, please replace.
- ③ Whether parking brake pull cable has wear and damage or not. If any, please replace it.
- ④ Whether parking brake warning lamp switch works normally or not. If it does not work, please check or replace.
- ⑤ Disassemble parking brake switch connector, Check the conduction between the positive terminal and the car body.
 - When parking brake handle is up, it should be conductive.
 - Pulling the handle down, it shouldn't be conductive.

3) adjustment

- ① In the condition of parking brake handle is released, insert left and right parking brake pull cable connector into parking brake handle balance plate installation hole. As shown in the picture. After the pull cable is installed, tighten the adjusting nut to ensure that the distance between the

adjusting nut and the pull cable end is 20-25mm.

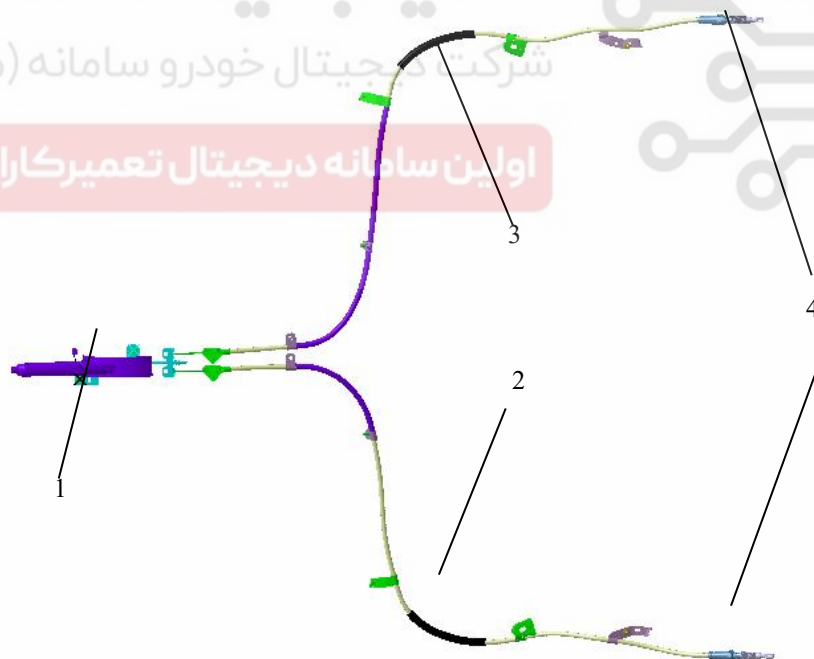


② After debugging is completed, pull the parking handle from the point 25mm from the end with 200N force perpendicular to the handle. Adjust the regulating nut, so that the handle can be locked in 7-9 tooth. Otherwise adjust the nut by adjusting the size of L. Adjusting method: If pulled gear number is less than 7, should reduce L; if pulled gear number is more than 9, should increase L.

Attention:

■ After the adjustment is completed, check whether the rear wheels are dragging when the parking brake handle is released.

Component:



Drawing diagram of braking system for front and rear disc parking

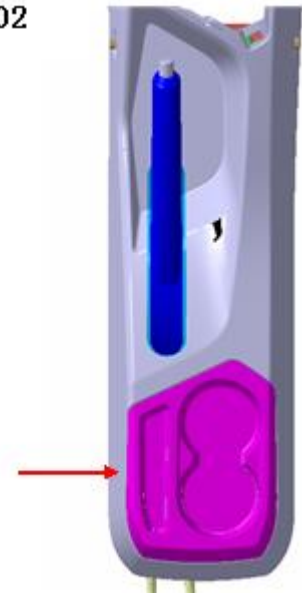
1- parking handle assembly 2- left parking brake drawing assembly 3- right parking brake drawing assembly 4- card

1) .Removal and Installation

① Removal

a.Remove the rear part assembly of sub-dashboard

PB002



b.Loosen adjusting nut,disassemble the head of left and right parking brake pull cable assembly from the cable interior.

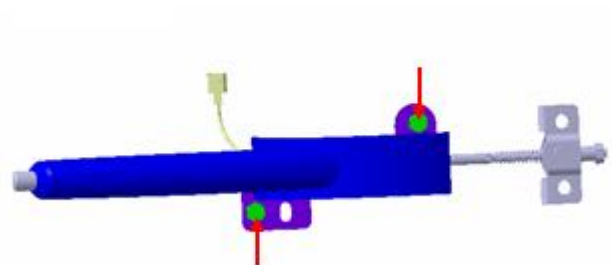
PB003



c.Disconnect the parking brake switch wiring harness, remove the four retaining bolts of the parking brake handle, and remove the parking brake handle assembly.

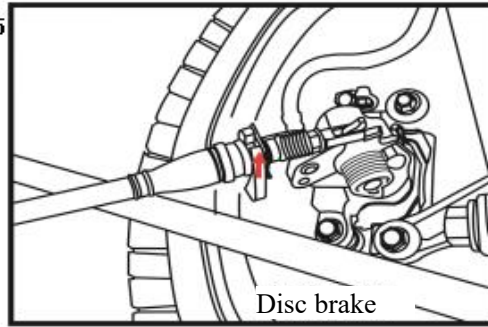
■Tightening Torque:20~25N·m

PB004



d.Unscrew the adjusting nut and remove the parking brake drawing-wire assembly from the brake clamp drawing-wire buckle.

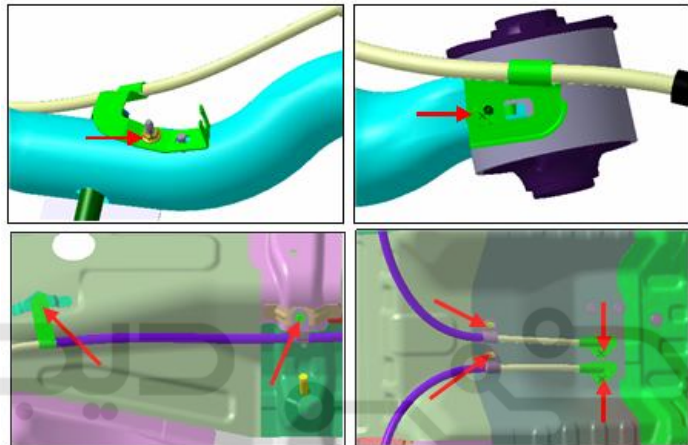
PB005



e. Remove 10 anchor bolts and 2 anchor nuts from standing wire

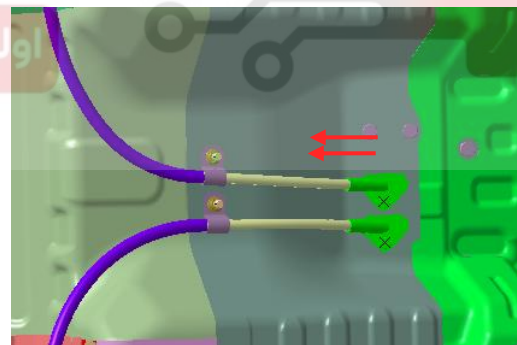
■ Tightening torque: $7 \sim 11 \text{ N} \cdot \text{m}$.

PB006



f. Take out parking brake pull cable assembly from the installation hole in the bottom of car body.

PB007



② Inspection after disassembly

■ Check if the button mechanism is flexible. If can't return normally, please replace.

■ Check if the parking handle pawl is abraded.

■ Check whether parking brake pull cable is deformed, abraded, bended or loosened. If any, please replace it.

③ Assembly

Follow the opposite sequence of the disassembly procedures.

Malfunction Diagnosis

The light is on or off:

① check if the indicator lamp has performance damage.

- ② check if the connecting screw between indicator lamp and teeth plate seat loosens.

Reparation:

Replace or re-install the indicator lamp if it has the above situation.

Insufficient or invalid brake force:

- ① check if the draw bench plate connects with the brake draw bench.
- ② check if the lock nut is slipped.
- ③ check if the current brake distance is same the required vehicle brake distance.

Check if the parking brake shoe is abraded

Reparation:

- ① Situation one:connect pull cable to the connecting board.
- ② Situation two:replace lock nut
- ③ Situation three:adjust lock nut
- ④ Situation four:adjust parking brake shoe clearance

ESC Electronic stability control system

Cautions

Observe the following general guidelines when repairing ESC, as it may damage ESC.

1、 Disconnect the connector from the ESC control module before performing the welding operation.

2. Electronic stability control system components are particularly sensitive to EMI (electromagnetic interference), should pay attention to all Electronic stability control system components of the alignment, location, installation and positioning, and wiring, connectors, clips and brackets Whether the occurrence of interference phenomenon.

3. Do not use a quick charger to start the engine or to charge the battery that is still connected, as this may cause damage to the battery or damage to the components of the Electronic stability control system.

4. Always turn off the ignition switch, then disconnect the negative battery, and then disconnect the ESC control module assembly connector.

5. Do not attempt to repair any anti-lock brake system parts; all ESC parts can only be replaced by replacement.

6.Do not hang parts of the suspension on the wheel speed sensor harness to prevent damage to the sensor harness.

7.The ESC control module shall not be placed in an environment with a temperature higher than 105°C.

8. The brake circuit shall not contain inorganic substances such as chlorine or sulfur, nor shall it contain mineral oil or ester-based plasticizer / softening agent (including parts that may dissolve such substances).

9. In the ESC operation, the brake pedal will vibrate slightly and may hear mechanical noise; this is normal.

After turning the ignition switch ON, the vehicle is started, the brake pedal may vibrate, or the motor operating noise from the ESC hydraulic assembly may be heard, which are the normal state of operation check.

11. When the vehicle is traveling on bumps, gravel or snow (deeper snow), the braking distance may be longer than the vehicle without ESC.

12. When the brake system failure, should first distinguish between the reasons for the ESC system or the general reasons for the braking system, such as vacuum booster, brake hydraulic system, brake and other components are faulty.

13. Brake distance or steering stability may be deteriorated if the tire size and type are not used in the correct combination, or if the brake shoe is not a genuine part of JAC.

Preparation Work

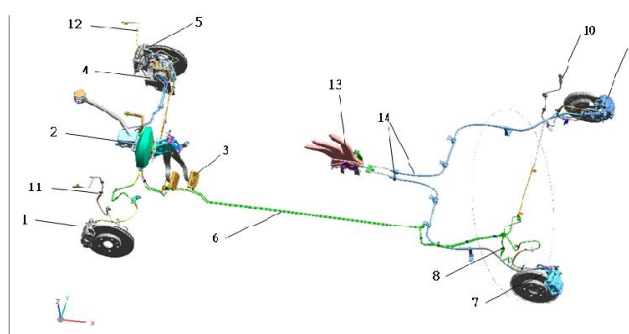
General maintenance tools and special tools will be used in the maintenance.

Special tools list

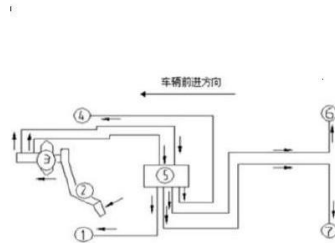
No.	Tool	Outside View	No.	Instructions
1	JDS			Malfunction Diagnosis of ABS System ESC system faults diagnosis

System instruction

1. Diagram of braking system



1.Left front brake assy 2.Vacuum booster with brake main pump assembly 3.Brake pedal assy 4.EPS module assembly 5.Left front brake assy 6.Brake line 7.Left rear brake assy 8.Left rear wheel speed sensor 9.Right rear brake assy 10.Right rear wheel speed sensor 11.Left front wheel speed sensor 12.Right front wheel speed sensor 13.Parking handle with bracket assembly 14.Left and right parking drawing assembly



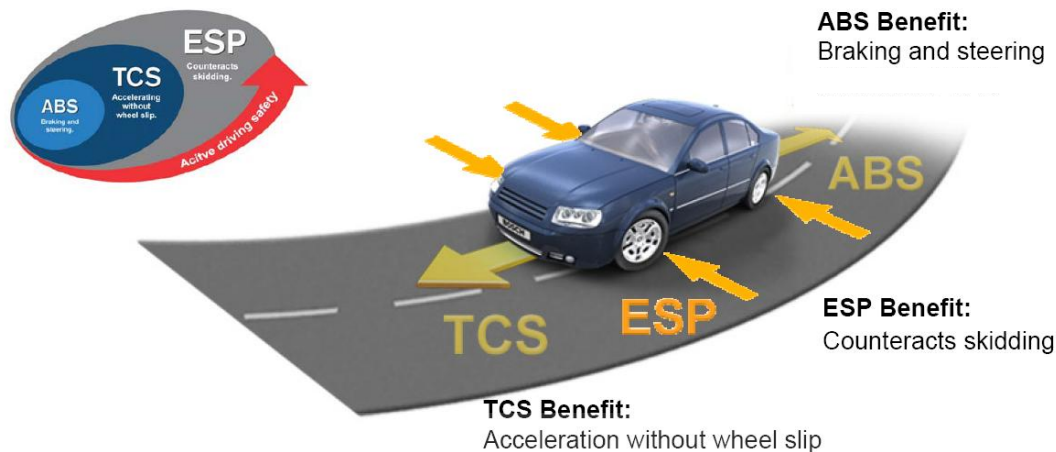
Notes: a.2 Arrow direction indicates the force direction of the brake pedal;3 Arrow direction Indicates the movement direction of the booster rod

b. 1.Left front wheel 2.Brake pedal 3.Vacuum booster with brake master pump assembly 4.Right front wheel 5.Hydraulic regulator assembly 6.Right rear wheel 7.Left rear wheel

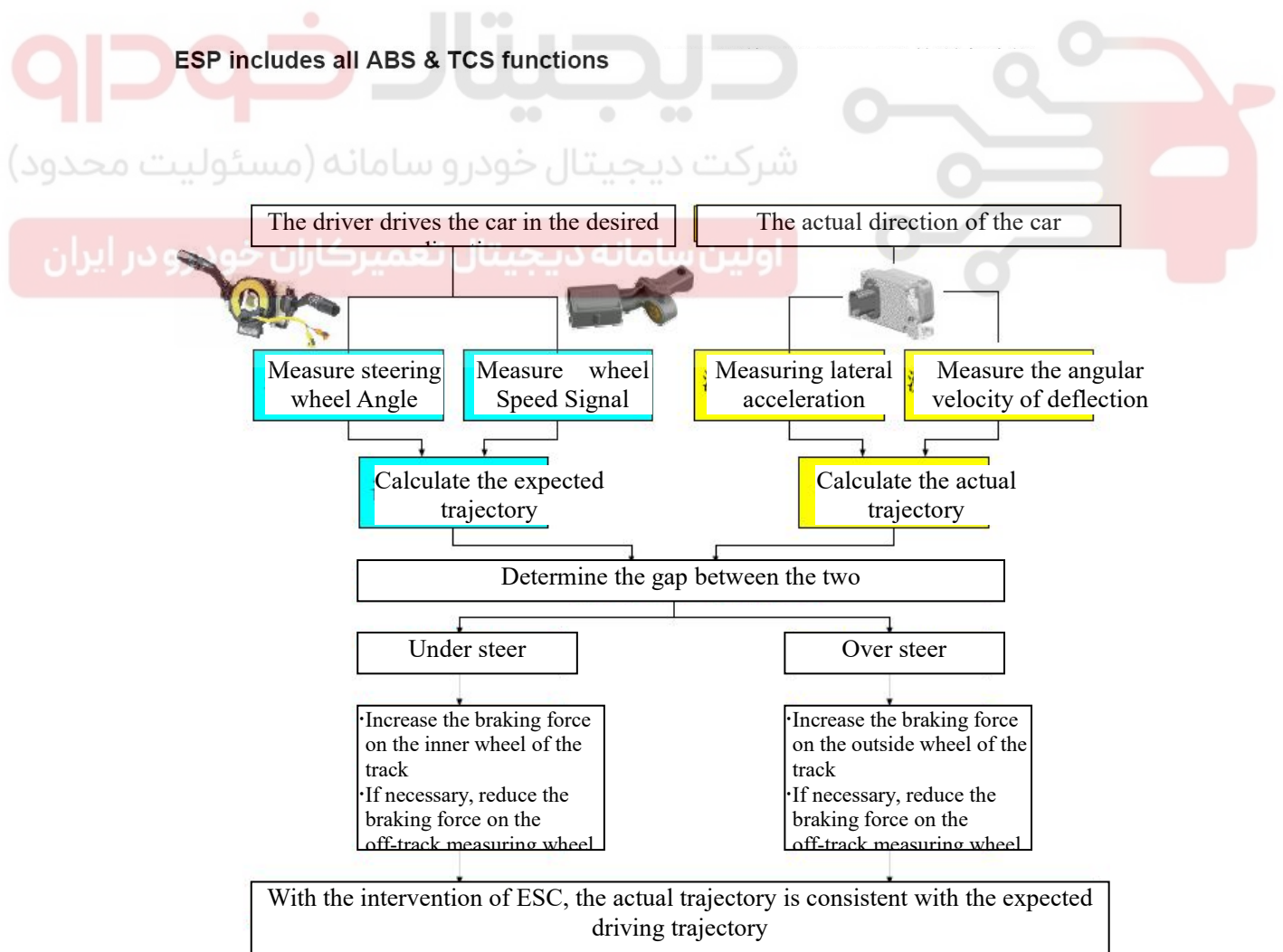
2. ESC (Electronic Stability Control System) function

ESC is an active safety system. It is a non-independent system built on other traction control systems. ESC contains all the features of ABS, adding TCS (traction control) and ESP (body stability control), and can add many optional functions by adding some of the sensors and signal input.

Functions of ESP



ESP includes all ABS & TCS functions



Basic Function: ABS-Anti-Lock Braking System

EBD-Electronic Brake Distribution

AYC-Active Yaw Angle Control

TCS-Traction Control System

Brake Assist Function:

HBA-Hydraulic Brake Assist

Static Control Function:

HHC-Hill Start Assist

ESC system control unit through the steering sensor, wheel sensor, side-slip sensor, lateral acceleration sensor and other signals to determine vehicle running status, and then issued a control command. It analyzes the information of vehicle driving status from each sensor and then sends error correction instruction to the ABS and ASR to help the vehicle maintain dynamic balance so that the vehicle maintains optimum stability under various conditions, the effect will be more obvious under the condition of over steer or under steer.

3.ABS Function

Anti-lock brake system is in the emergency braking and braking in the dangerous road braking four wheel hydraulic brake pressure to prevent the wheel lock. Using ABS has the following advantages:

(1)The vehicle can be reliably turned as encounters obstacles in the process of emergency braking.

(2)Under the condition of emergency braking on a curve, vehicle can maintain stable and steerable parking.

Attention:

■If the electrical system is interrupted, the fail-safe mode will be activated, the ABS enters into a non-operational state and the ABS warning lamp will be on.

■Special diagnostic instrument provided by JAC can be used for ABS electrical system diagnosis.

■In the process of braking, the brake pedal will vibrate slightly and some mechanical noise may be heard. This is a normal phenomenon of ABS work.

4.EBD Function

Electronic brake force distribution (EBD) can accurately control the braking force of each wheel to ensure vehicle stability during braking. Under normal braking conditions, effectively balance the same wheel speed required for braking The EBD uses the inlet and outlet valves in the ABS hydraulic regulating module to maintain the required brake pressure for each wheel to provide effective braking and stability.

5、TCS Function

The TCS function monitors the drive wheel slip rate, which, when the slip rate is too large, commands the engine to reduce the engine fuel injection or reduce the throttle opening, thereby reducing the torque output. So that the drive wheel slew rate to achieve the best, to ensure that the drive wheel to obtain greater adhesion. When the left and right driving wheels are on a road surface with a large difference in the adhesion coefficient(for example,one side is asphalt, one side is ice surface),a certain braking force is actively applied to the driving wheel on the low adhesion side to prevent the wheel from slipping, so that the driving wheel with high adhesion can get as much driving force as possible.

6.Malfunction Protection Function





ESC system electrical failure, ABS、ESC warning light will be lit. In the event of an EBD electrical failure the brake warning light and the ABS warning light light up at the same time.

At the same time, the ABS system becomes one of the following fail-safe functions:

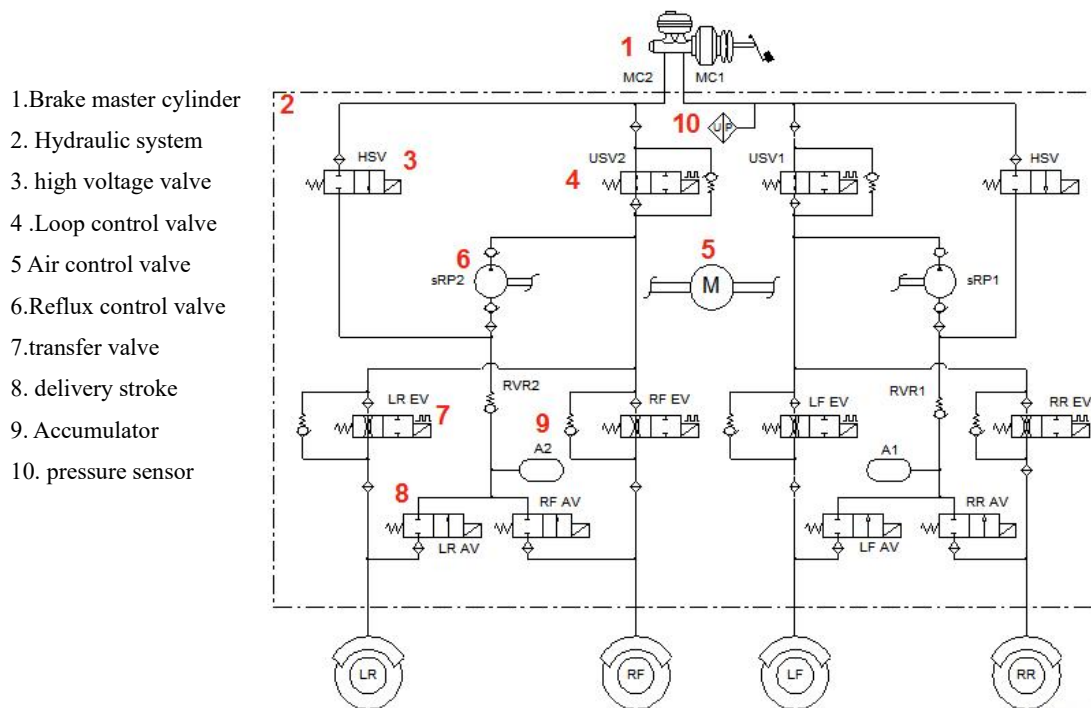
1)For ABS malfunction, only EBD is activated and the vehicle status is the same as for vehicles without ABS system.

2)For EBD malfunction, neither EBD nor ABS is available and the vehicle status is the same as for vehicles without ABS or EBD system.

ESC warning lamp strategy

GB4094			
Warning state	Shape		
ABS malfunction		Yellow	Always On
EBD malfunction -		Red	Always On
Warning state	FMVSS126		
	Shape	Color	Display mode
ESC system work	 Or ESC	Yellow	blink
ESC failure			Always On
ESC close (manual switch)	 Or ESC OFF	Yellow	Always On

5. Hydraulic schematic of the ABS、ESC system



ESC system hydraulic schematic diagram

Anti-lock braking mode

ABS will enter anti-lock brake mode when wheel slip is detected during braking. During anti-lock braking, the pressure in each wheel hydraulic circuit will be under control to prevent slippage of the wheels. Each wheel is equipped with separate hydraulic lines and valves. ABS can reduce, maintain or increase the hydraulic pressure of each wheel brake. However, ABS can not increase the hydraulic pressure beyond the pressure delivered by the master cylinder during braking. During anti-lock braking, the brake pedal senses a series of rapid shocks. Vibration occurs when each valve position changes rapidly with the required wheel speed. Pedal vibration occurs during anti-lock braking, and stops during normal braking or when the vehicle is fully stopped. Due to the rapid recycle of the solenoid valve, the noise of the operation can be heard. When anti-lock brakes are enabled on dry roads, the tires give intermittent, sharp sound as they approach slippage. These sounds and pedal vibrations are normal during anti-lock braking operations. The operation of the brake pedal should be the same as the ABS-free system during normal braking. Maintaining a balanced pedal force ensures the minimum vehicle stopping distance while maintaining vehicle stability.

1.Pressure to keep

When the ABS control module detects a wheel slip, it closes the inlet valve and closes the outlet valve in the hydraulic assembly to isolate the system. This will keep the pressure on the brake

steady so hydraulic pressure can not increase or decrease.

2. Pressure drops

If the ABS control module still detects a wheel slip in pressure-hold mode, it will reduce the pressure on the affected wheel. The inlet valve remains closed and the outlet valve opens. Excess liquid / pressure is temporarily stored in the accumulator in the hydraulic assembly until the pump motor can deliver brake fluid back to the master cylinder reservoir.

3. Increased pressure

If the ABS control module detects that the wheel slip has been reduced during pressure hold or pressure drop mode, the ABS control module will use the master cylinder pressure to increase the pressure on the affected wheel. The inlet valve opens and the outlet valve closes. Some or all of the pressure from the master cylinder will be added to the wheels.

4. ABS work process

Each vehicle speed sensor generates a voltage signal that is proportional to the speed of rotation of the wheel while the vehicle is in motion. The ABS controller receives the wheel speed data and determines whether one or more of the wheels decelerate too fast (as compared to the reference speed) as slip, and the ABS controller activates the module as needed, the brake pressure applied to each wheel by the module Take control so that it is optimized.

Wheel Speed Sensor

Made up of the sensor itself and the gear ring, each wheel has a set. This model adopts active wheel speed sensor, which requires additional power supply (12 V) to work. It provides a constant amplitude signal regardless of the speed.

1. Elements

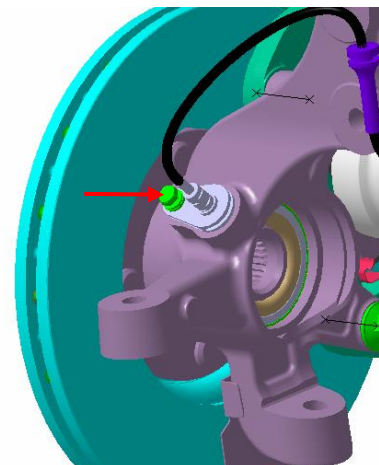
Made up of the sensor itself and the gear ring, each wheel has a set.

2. Disassembly

1) Front wheel

- ① Disconnect the power supply of the vehicle;
- ② Lift the vehicle.
- ③ Disconnect sensor connector.

ABS001



④ Unscrew the retaining bolt on the sensor head and slowly remove the sensor.

■Fastening torque: 8~10N·m;

Attention:

■ Please do not pull hard on the wire harness of the wheel speed sensor.

■pay attention to the installation of wheel speed sensor and signal ring gear gap.

Standard value:0.2~1.1mm.

2) Rear wheel

①Disconnect the power supply of the vehicle;

② Lift the vehicle and remove the rear tire.

Attention:

■ loosen the retaining nuts on the tires before lifting the car.

③Disconnect sensor connector.

④Unscrew the fixed bolt of the wheel speed sensor and slowly remove the wheel speed sensor.

ABS002



■Fastening torque: 8~10N·m;

Attention:

■ Please do not pull hard on the wire harness of the wheel speed sensor.

■pay attention to the installation of wheel speed sensor and signal ring gear gap.

Standard value:0.2~1.1mm.

3. Inspection after disassembly

1) Check that there is no foreign body in the sensor mounting hole, and there is no metal dust or other foreign body on the brake disc surface.

2) Check the number of wheel speed sensor gear ring and teeth, foreign bodies and rust

3) Clean the sensor installation hole and brake disc surface before installing

4. Installation

Install in the reverse order of removal and tighten up the bolt to standard torque.

Attention:

- Wiring harness shall not be distorted after installation.

ESC control module

1. Elements

This model adopts jingxi heavy industry DBC1200 electronic stability control system. ESC Control module and hydraulic assembly

2.ESC Control module pin description

ESC control module pin specification sheet

Pin No.	Instructions	Pin No.	Instructions
1	Motor Power Supply Terminal (Positive)	20	N.C.
2	wheel speed sensor output (front right wheel)	21	N.C.
3	N.C.	22	N.C.
4	Front right wheel speed sensor signal end	23	N.C.
5	N.C.	24	N.C.
6	N.C.	25	valve relay power end
7	N.C.	26	CAN high
8	Front left wheel speed sensor signal end	27	N.C.
9	N.C.	28	ECU power supply(ignition)
10	N.C.	29	Rear right wheel speed sensor signal end
11	N.C.	30	Brake light switch input
12	ESC switch	31	Rear left wheel speed sensor signal end
13	Motor grounding end	32	N.C.
14	CAN low	33	N.C.
15	N.C.	34	N.C.
16	wheel speed sensor power end(front right)	35	N.C.
17	wheel speed sensor power end(rear right)	36	N.C.
18	Rear left wheel speed sensor signal end	37	N.C.
19	wheel speed sensor power end(front left)	38	ECU grounding wire

ESC control module pin position diagram

3.ESC control module inspection

Attention:

- do braking system basic inspection first.

1) Basic inspection of the brake system

- ① Check brake fluid level. If the level is low, replenish the brake fluid.

② Check brake circuit and ESC hydraulic assembly near the area for leakage. If a leak is found, do the following:

a.If the ESC hydraulic assembly is loosened, tighten the tubing nut to the specified torque (16 to 18 N · m). Check the leak again to confirm there is no brake fluid leak.

b.If the threaded portion of the tubing nut and actuator at the connection is damaged, replace the damaged part. Check the leak again to confirm there is no brake fluid leak.

c.If leakage is found outside the actuator connection, wipe with a clean cloth and check again.

If there is still leakage, replace the damaged parts.

d.If leakage is found on the hydraulic assembly, wipe it with a clean cloth and check again. If there is still leakage, replace the hydraulic assembly.

Attention:

■ If there is no special requirement, do not disassemble the ABS hydraulic assembly (including the control module).

③ Check brake pad or shoe for wear.

④ Power circuit port loose and battery check.

■ Check the positive/negative extremes of the battery for looseness. Also confirm the battery voltage is normal.

2. ABS warning light and brake warning light check

① Make sure ABS warning light turn on for about 3 seconds when the ignition switch is turned "ON" and the brake warning light is on. If they are not bright, refer to "ABS Common Symptoms and Procedures"

② Check if ABS warning light are off after approx. 3 seconds after ignition switch is turned "ON", and Brake warning light goes off after engine start. If not extinguished, please refer to "ABS common symptoms and analysis procedures."

③ If the ABS warning light do not turn off after 10 seconds of engine start, refer to "ABS common symptoms and analysis procedures."

Attention:

■ The brake warning lamp lights when the parking brake is operating (when the switch is in the ON position) and when the brake fluid level sensor is operating (brake fluid is insufficient).

3) Use a diagnostic tool to check the ABS control module

Use the diagnostic tool to detect the control module control data and memory fault code, if any, according to the fault prompt repair. Please refer to troubleshooting.

4) ESC Fault code list

Malfunction Code	English description
C190004	ECU Voltage supply: High voltage
C190104	ECU Voltage supply: Low voltage
C100004	ECU error (hardware, Micro-controller error)
C101008	ECU error (general software problem)
C006B06	ABS/ESC implausible control (control time too long, etc.)
C003108	Wheel-speed sensor, front left: (signal failure) out of range, lost, noise, Intermittent
C003200	Wheel-speed sensor, front left: open
C00A000	Wheel-speed sensor, front left: short to GND
C00A100	Wheel-speed sensor, front left: short to UBATT
C00A900	Wheel-speed sensor, front left: general error
C003408	Wheel-speed sensor, front right: (signal failure) out of range, lost, noise, Intermittent
C003500	Wheel-speed sensor, front right: open
C00A200	Wheel-speed sensor, front right: short to GND
C00A300	Wheel-speed sensor, front right: short to UBATT
C00AA00	Wheel-speed sensor, front right: general error

Malfunction Code	English description
C003708	Wheel-speed sensor, front left: (signal failure) out of range, lost, noise, Intermittent
C003800	Wheel-speed sensor, rear left: open
C00A400	Wheel-speed sensor, rear left: short to GND
C00A500	Wheel-speed sensor, rear left: short to UBATT
C00AB00	Wheel-speed sensor, rear left: general error
C003A08	Wheel-speed sensor, rear left: (signal failure) out of range, lost, noise, Intermittent
C003B00	Wheel-speed sensor, rear right: open
C00A600	Wheel-speed sensor, rear right: short to GND
C00A700	Wheel-speed sensor, rear right: short to UBATT
C00AC00	Wheel-speed sensor, rear right: general error
C109904	Wheel-speed sensor generic error (sensor swap, multiple sensors error)
C001004	valve fault, inlet valve FL
C001104	valve fault, inlet valve FL
C001404	valve fault, inlet valve FR
C001504	valve fault, inlet valve FR
C001804	valve fault, inlet valve RL
C001904	valve fault, inlet valve RL
C001C04	valve fault, inlet valve RR
C001D04	valve fault, inlet valve RR
C109504	Valve relay error
C002004	Return pump fault
C007208	General Valve fault (overheat protection, signal invalid, hardware fault)

ESC system exhaust

1- ESC Exhaust conditions for system

Proceed ESC exhaust process after any of the following situations happen

- 1) The brake line can not achieve the required pedal height or feel according to the conventional exhaust method.
- 2) Replace the ESC hydraulic assembly.
- 3) Extreme liquid loss occurs.
- 4) Suspected of inhaling air.

This program uses the diagnostic scanner to drive the valve and run the pump motor and remove air from the secondary circuit. These secondary circuits are usually closed and only opened when the vehicle is started and the ESP is operating. Automatic venting opens these secondary circuits, allowing all air to flow out and collect into the hydraulic assembly where it can be purged from the system.

2- ESC Exhaust conditions for system

1) Required Item

- ① Diagnostic instrument with the correct software.
- ② Brake Fluid
- ③ Lifter.
- ④ Exhaust bottle equipped with pipe to recycle the brake fluid from the vehicle.
- ⑤ Appropriate safety equipment, including safety glasses.
- ⑥ Two maintenance personnel are required: one to step on the brake pedal and control the

diagnostic instrument while the other maintain the hydraulic fluid level in the main chamber of the master cylinder and switch the vent screw according to the procedure of the diagnostic instrument.

2) Preliminary test

① Check the state of charge of the battery, and repair the battery and charging system as needed.

② Connect the scanner and select the current and historical diagnostic trouble codes. Before performing the ESC exhaust procedure, clear all DTC. If you can not clear, please first troubleshoot.

③ Check appearance for damage and leaks. Repair as needed.

3) Exhaust before the action

① Start the engine

② Connect the diagnostic device and establish communication with the ESC control module.

③ Lift and properly support the vehicle.

4) Exhaust in the car

Attention:

Press the EXIT button on the scanner to terminate the auto exhaust procedure at any time.

① Select "Auto Exhaust Procedure" on the device and follow the instructions. (Please refer to the actual diagnostic procedures).

② During basic venting and auto-venting, apply brake pedal and maintain brake fluid level at master cylinder.

③ When venting a wheel, make sure that the hose is connected to the vent screw and emptied into the chamber with brake fluid. The cavity must be 30mm above the bolt with a hose filled with brake fluid. This is to prevent air from re-entering the brake line.

④ The first step is basic exhaust. This step must be done before auto exhaust, to get a good pedal height and pedal feel and guarantee the best performance of ESC

⑤ the first part of auto exhaust is rotate the pump and reducing valve for 30 seconds. It needn't to switch the exhaust bolt. During the entire process, the brake pedal must be pressurized and depressurized.

⑥ During the next step, the diagnostic device will ask the service technician to open one of the exhaust bolts. The diagnostic device will then cycle through the pressurization valve and pump motor for approximately 30 seconds. During the entire process, the brake pedal should keep pressurizing and depressurizing

⑦ For the remaining exhaust bolts, the diagnostic device will repeat step 6 for exhausting

⑧ When the auto exhaust procedure is completed, the device will display the corresponding message.

⑨ Depress brake pedal to measure pedal height and feel. Repeat steps 1 through 8 until the pedal is acceptable.

Attention:

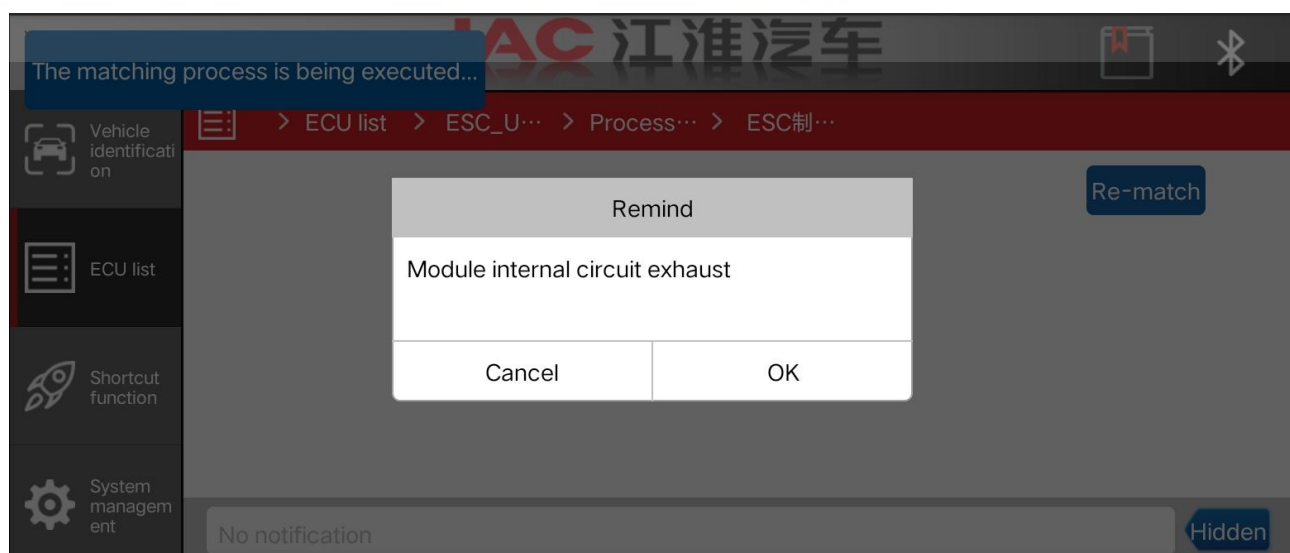
■ In the repetitive operation, the auto exhaust program may temporarily stop to enter the "cool down wait" mode.

5) automatic exhaust

it does not go on until the timer goes overtime, and it doesn't cross the process.

Car diagnostic steps:

Enter the JDS software, select the corresponding vehicle configuration, select ESC - Flow control - ESC brake loop exhaust, and operate according to the process prompts.



Malfunction Diagnosis

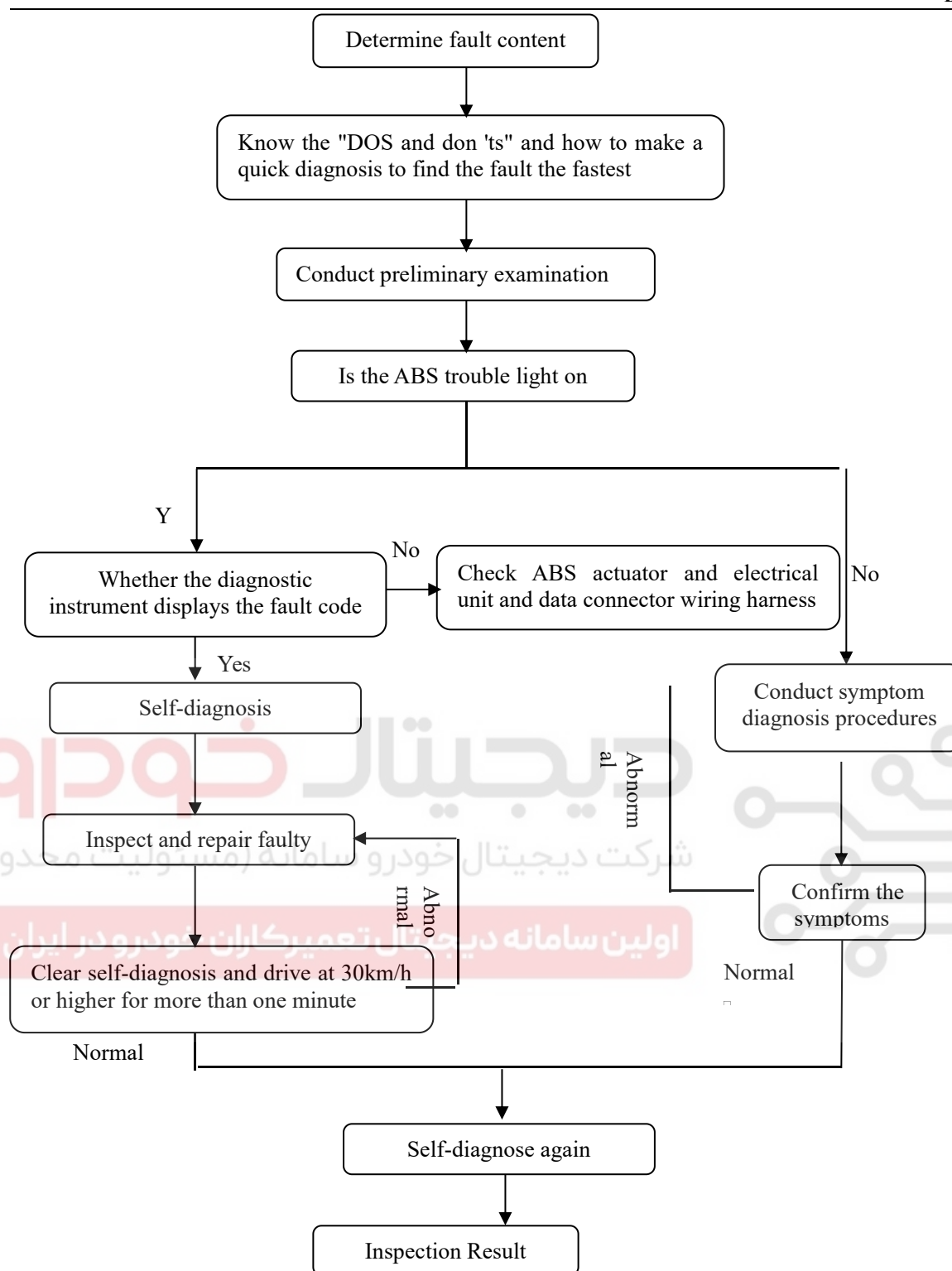
1.Introduction to fault diagnosis

- 1) Troubleshoot and thoroughly understand each system (control and organization) of the vehicle.
- 2) Check before the customer's complaint. After a thorough understanding of the symptoms, ask your customers for their dissatisfaction.
- 3) Symptoms must be checked from the beginning to completely repair the problem. For intermittent failures, it is important to reproduce the symptoms based on the conversations with clients and past cases. Do not check according to some special circumstances. Most intermittent failures are caused by poor contact. In this case, shaking the suspicious harness or connector by hand is an effective method.
- 4) After completing the diagnosis, be sure to execute "Clear Trouble Code".

2.Faults diagnosis flowchart

The diagnosis process is as follows:





3、Diagnostic information and process

1. Diagnosis

The ESC control module self-diagnoses the system to detect system faults. Once a fault is found, a diagnostic trouble code (DTC) is set, the ABS warning light is lit, and the ESC system is also turned off.

2) Display diagnostic trouble code

Diagnostic trouble codes can be displayed using a dedicated scanning tool (diagnostic tool).

3) Clear the diagnostic trouble code

Diagnostic trouble codes in the memory of the ESC control module can be cleared by the scanning tool (diagnostic instrument).

Attention:

- Verify that the system operation is normal after the cleaning step is completed and that the diagnostic trouble code is no longer present.

- Diagnostic trouble code can not be removed by disassembling ABS control module connector, disconnect the battery or flame out

4) Intermittent or poor contact Intermittent problems are mostly caused by the following conditions:

- ① Electrical wiring error.
- ② Electrical connection error.
- ③ Clamping stagnation of relay or solenoid valve.

5) Initialization sequence

ESC control module will do Initialization test at the beginning of each ignition cycle.

Initialization sequence is: solenoid valve and pump motor, check whether the parts' operation is correct or not. If the fault is detected, the ABS control module will set up the corresponding diagnostic fault code. Hearing and feeling some actions belongs to a part of normal system during the Initialization. If the ESC control module finds that the brake switch does not have a signal input (leaving the brake pedal), the initialization will proceed immediately. If the brake switch has the signal input (foot on the brake pedal), the initialization will not proceed until the brake switch does not have the signal input (leaving the brake pedal), or the vehicle speed reaches 25Km/h.

4、 Diagnostic circuit check

1) System description

The diagnostic circuit can detect problems caused by the ESC system failure. The diagnostic circuit check guides the service technician in the next step of diagnosing the problem.

2) Diagnosis Procedure

ESC maintenance steps are as follows:

① Check the vehicle for any mechanical problems related to the brake system

- Brake fluid tank level is correct.
- Check the master cylinder brake fluid pollution.
- Check brake master cylinder / ESP hydraulic assembly for leaks.
- Check all wheel brake components.
- Check for brake dragging.
- Verify that the brake is smooth (no pull or forward).
- Check brake lining for wear / damage.

- Check wheel bearings for damage.
- Check the wheel (speed) sensor and wiring harness.
- Check wheel speed sensor connector / ring gear for damage / check tire tread depth / degree of wear.
- Road test vehicle to verify the situation to be corrected.

② Diagnostic circuit checks must be performed according to the applicable diagnostic error procedure. The ESC fault code must be cleaned after all the system faults have been excluded.

Troubleshooting table

Steps	Diagnosis	Yes	No
1	1.If possible, connect or install all previously disconnected or removed parts. 2.Ignition switch is set to ON position, the engine flame out. 3.Install the appropriate diagnostic instrument into the DLC and communicate with the ESC control module.	Turn to step 2	Turn to step 4
2	Is there any fault code currently or in the past?	Turn To Step 3	Turn to step 7
3	1.Record the current fault code 2.Record past diagnostic trouble codes. 3.Record historical data such as the number of times each diagnostic trouble code is set; the number of times each diagnosis trouble code was first set; the number of times since each diagnosis trouble code was set; the speed at the time of diagnosis trouble code setting; data. 4.Do not clear the diagnostic trouble code before recording the information from the diagnostic equipment.		
4	Can the device communicate with other modules on the same data line?	Turn to step 5	Turn to step 6
5	To "No communication with ESC control module" in ESC control module error program.		
6	Data link connector unit to electrical end section.		
7	1.Turn off 2.Wait for 10s 3.starting the engine 4.Observe ESC warning light after starting.	Turn To Step 8	Turn to step 9
8	Are there any lights on?	Turn To Step 9	Turn to step 10
9	To the corresponding light "open" fault program.		
10	To the corresponding lamp "does not work" fault procedure.		

5、ESC Common symptoms and analysis procedures

1) There is no communication with the ESC control module

Typical reasons for not communicating with the ESC control module are:

- Diagnose poor port contact.
- The ESC control module is not grounded.
- The ESC control module has no voltage provided by the battery.
- The ESC control module does not have the voltage provided by the ignition switch.
- The data line is open or shorted.
- High data line resistance.

2) ABS Warning light not on/no diagnostic fault code

The typical reasons for the failure of the ABS warning light without the setting of the diagnostic fault code are as follow

- Warning of ABS Warning bulb failure/loose socket.
- The instrument panel fuse is disconnected.
- Instrument warning lamp driver module failure.
- ESC Control module failure.
- Circuit break or short circuit between ABS control module and instrument.

3) ABS Warning light on/no diagnostic fault code

Typical reasons for the ABS warning lamp to light up without the setting of diagnostic fault code are as follows:

- Open circuit between instrument and ABS control module.
- The ABS control module is ungrounded.
- Short circuit between instrument and ABS control module.
- Instrument warning lamp driver module failure.
- ABS Control module failure.

4) Brake warning light on

Typical reasons for the brake warning light to light up without the setting of the diagnostic fault code are as follows:

- Parking brake switch malfunction.
- Lower brake fluid level or brake fluid switch malfunction.
- In the ABS system, EBD will fail due to the following faults.
 - a.Two coaxial wheel speed sensors malfunction
 - b.Open or short circuit of battery.
 - c.Motor grounding or battery short circuit.
 - e.ABS control module Open or short circuit .
 - f.Ignition switch open or short circuit .
- Instrument and ABS control module open circuit.
- Warning lamp circuit failure.
- instrument display malfunction
- ABS Control module failure.

5) The brake warning light is not on/has no diagnostic fault code setting

Typical reasons why the brake warning light is not on and there is no setting of the diagnostic fault code are as follows:

- bulb failure/loose socket.
- The instrument panel fuse is disconnected.
- instrument malfunction
- ABS Control module failure.
- The circuit between the ABS control module and the instrument is grounded.

6、 ESC Module notes and preliminary inspection

ESC is a component that involves security. Therefore, in addition to the general safety and preventive measures, the following diagnostic considerations must be observed in its maintenance diagnosis.

1) The ESC system must be serviced by a trained technician with maintenance skills and only parts from the original plant are allowed to be replaced.

2) Before the diagnosis of the ESC system, if there is a fault in the foundation braking system, it must be eliminated first, such as:

- Braking system noise.
- The brake pedal is stiff.
- During conventional braking, the brake pedal or the vehicle vibrates.
- The vehicle braking is off-tracking.
- Parking brake system failure.

■ESC assembly (ESC electronic control unit and hydraulic regulator assembly, excluding brake piping, sensors and other ancillary devices) can only be replaced as a whole, not disassembled or partially replaced/interchanged.

4) The ESC system detects faults in the following two situations:

- Turn on the ignition switch, the system self-check is completed, and the warning light remains on.
- Keep the warning light on while driving.

At this time, the driver can make conventional braking, but the braking force should be minimized to prevent the wheels from locking. After the warning light is on, please drive carefully and go to the special service station for maintenance immediately to prevent more failures and thus lead to traffic accidents.

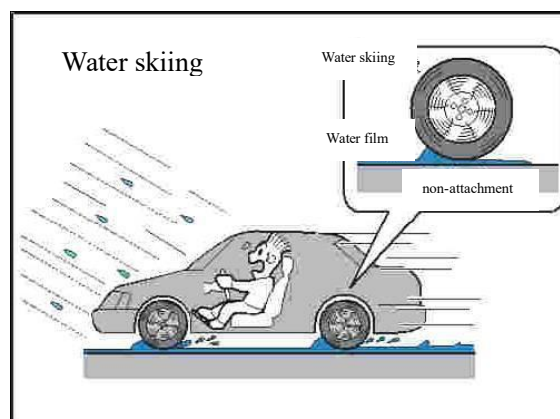


5) The following points should be noted when connecting and inserting ESC and sensor wiring harness:

■ Before unplugging the ESC harness and sensor harness, the ignition switch must be disconnected.

■ Make sure the connector is dry and clean to avoid any foreign matter entering.

■ The connectors for the ESC harness must be installed in place both horizontally and vertically to prevent damage to the connectors.



6) When connecting the ESC brake line, make sure the connection is correct. The ESC ECU cannot judge whether the brake pipe is connected correctly. A bad connection can lead to a serious accident. When connecting the brake line, follow the marking on the ESC assembly:

- MC1: brake line 1 connected to the brake main cylinder;
- MC2: brake line 2 connected to the brake main cylinder;
- FL: brake pipe connecting left front wheel brake cylinder;
- FR: brake line connecting the brake cylinder of the right front wheel;
- RL: brake pipe connecting left rear wheel brake wheel cylinder;
- RR: brake line connecting right rear wheel brake cylinder.

7) ESC makes noise when:

■ after starting the engine, when the vehicle travels to about 40km/h, there will be a short "hum" sound, which is the sound of self-test by ESC and is a normal phenomenon.

■ ESC has sound when working normally, mainly reflected in the following aspects:

- ① Motor, solenoid valve and back flow pump action sound in ESC hydraulic unit.
- ② The sound caused by a rebound of the brake pedal.
- ③ The crash of the suspension and the car body caused by emergency braking.

preliminary examination

Before making a diagnosis of the ESC system, the components that are likely to cause a failure of the ESC system and which are easy to contact should be examined first. Visual inspection and visual inspection procedures can quickly identify the fault without further diagnosis.

1) Make sure only the recommended size tires and wheels are installed on the vehicle. Coaxial tires must have the same pattern and depth. Please refer to the vehicle manual for the specific tire model.

2) Check ESC hydraulic regulator, brake line and connection for leaks.

3) Check the battery voltage and check whether the battery terminal is corroded or loose. The normal ESC operating voltage range is 9 V to 16 V

4) Are wiring harnesses and connectors for components of the ESC system correctly connected and clipped or cut?

5) ESC components are sensitive to electromagnetic interference (EMI). If intermittent faults are suspected, check that the added security devices, lights or mobile phones are not installed correctly.

6) ESC is an active safety system. Its main role is to maximize the use of ground adhesion, to maintain the vehicle's maneuverability and driving stability. However, ESC cannot completely prevent the car from

sliding when the physical limit is exceeded or driving at a high speed on a wet road surface.

7) If the ESC noise is too high, it may be caused by:

- The ESC assembly and support are loose in their fixed position.
- The fixing of ESC bracket and body is loose.
- Missing or damaged plastic gasket on ESC bracket.
- Brake pipe deformation, collision and interference.
- Brake pipe clamp is damaged.

7、Malfunction Diagnosis

7.1 diagnosing process

1	Deliver the vehicle to repair shop
2	Analysis on the customer problems
3	Read the malfunction code
	With DTC Go to step 7
	Without DTC Go to step 8
	With DTC Go to step 4
	Without DTC Go to step 6
6	Malfunction repair without DTC, then go to step 9
4	Record the malfunction code, then eliminate the malfunction memory
5	Confirm and reproduce the malfunction: re-ignite the vehicle and accelerate to 40km/h.
	Read the malfunction code
7	Troubleshoot the malfunction according to malfunction code table, then go to step 9
8	Occasional Malfunction Repair, Go to step 9
9	Confirm that malfunction has been troubleshoot
10	Prevent Malfunction From Happening Again
	End

7.2 Malfunction Repair without DTC

If the brake system is faulty, but the ESC does not store DTC, such a fault is called fault without DTC. Malfunction without DTC is usually caused by the fault of basic brake system. Such as:

■Brake fluid leakage (may cause the brake to be soft, the brake pedal stroke is too long, and serious brake failure may occur)

■Use inferior brake fluid (use of inferior brake fluid can corrode brake lines and internal components of the ESC hydraulic adjustment module, which can also cause brake failure)

■There is air in the brake line (may cause the brake to be soft or even the brake is invalid)

■Brake pipe blockage (may cause the brake to be hard or even the brake failure).

■Excessive wear of brake disc (may cause the brake to be soft, brake pedal stroke is too long).

■Booster failure (may cause the brake to be soft or hard, brake pedal stroke is too long or even the brake failure).

■Incorrect connection of brake pipeline (may cause ESC performance degradation, tail swing, long braking distance and other phenomena). For the correct installation method, please refer to the mark near the oil hole of ESC hydraulic adjustment module: MC1 represents the No.1 master cylinder tubing; MC2 stands for No.2 master cylinder tubing; FL for left front wheel cylinder tubing; FR stands for right front wheel cylinder tubing; RL stands for left rear wheel cylinder tubing; RR stands for right rear wheel cylinder tubing.

Note: No power supply or abnormal power supply interruption will cause ABS and ESC warning lamp is always on, but there is no malfunction code.

Troubleshooting suggestions: Check the corresponding parts for the symptoms and troubleshoot them

according to the vehicle service manual.

7.3 Occasional Malfunction Repair

In an electronic system, transient poor contact problem may occur in electrical circuits and the place where signals input and output, resulting in sporadic malfunctions. Sometimes the cause of the malfunction will disappear on its own, so it is not easy to find out the problem. When an accidental malfunction occurs, the malfunction can be simulated in the following way to check whether the malfunction is reproduced.

No.	faults possible reasons	Simulate failure	Remark
1	As vibration may be the main cause	<ul style="list-style-type: none"> ■ Shake the connector of ESC and ECU gently up and down, left and right. ■ Shake the ESC harness gently up and down, left and right ■ Shake the sensor gently up and down, left and right. ■ Shake the other moving parts (such as wheel bearing) gently. 	<p>If the harness is twisted or broken because it is stretched too tight, a new part must be replaced.</p> <p>The wheel speed sensor harness will form a short open/short-circuit as the suspension system moves up and down when the vehicle moves. Therefore, the actual vehicle running test must be carried out when inspecting the sensor wiring harness.</p>
2	As temperature is the main cause	<ul style="list-style-type: none"> ■ Use a blower to heat the parts that are considered to be malfunctioned. ■ Check the parts for cold welding with cold spray. 	
3	As excessive electrical load is the main cause	<ul style="list-style-type: none"> ■ Turn on all the electrical switches, including headlamp and wiper and make vehicle power supply work at high load. 	

If the malfunction does not reappear at this moment, malfunction can be diagnosed and repaired until it appears next time. In general, sporadic malfunction gradually evolves into reproducible malfunction that does not go away on their own.

7.4. Fault code analysis

7.4.1 table of fault codes

DTC	DTC(Hex)	DTC Description
C190004	0x590004	ECU high voltage
C190104	0x590104	ECU low voltage
C100004	0x500004	ECU Malfunction(hardware, controller malfunction)
C101008	0x501008	ECU Malfunction(software malfunction)
C006B06	0x406B06	ABS/ESC abnormal control(lasting time too long)
C003108	0x403108	Signal error of left front wheel speed sensor Signal out of range,loss,noise,interruption
C003200	0x403200	Open Circuit of Left Front Wheel Speed Sensor
C00A000	0x40A000	Left front wheel speed sensor is short-circuited to ground
C00A100	0x40A100	Left front wheel speed sensor is short-circuited to power supply
C00A900	0x40A900	Unknown malfunction on left front wheel speed sensor(Unable to define the exact cause of the malfunction)
C003408	0x403408	Signal error of right front wheel speed sensor Signal out of range,loss,noise,interruption
C003500	0x403500	Open Circuit of Right Front Wheel Speed Sensor
C00A200	0x40A200	Right front wheel speed sensor is short-circuited to ground
C00A300	0x40A300	Right front wheel speed sensor is short-circuited to power supply
C00AA00	0x40AA00	Unknown malfunction on right front wheel speed sensor(Unable to define the exact cause of the malfunction)
C003708	0x403708	Incorrect signal of left rear wheel speed sensor Signal out of range,loss,noise,interruption
C003800	0x403800	Open Circuit of Left Rear Wheel Speed Sensor
C00A400	0x40A400	Left rear wheel speed sensor is short-circuited to ground
C00A500	0x40A500	Left rear wheel speed sensor is short-circuited to power supply
C00AB00	0x40AB00	Unknown malfunction on left rear wheel speed sensor(Unable to define the exact cause of the malfunction)
C003A08	0x403A08	Incorrect signal of right rear wheel speed sensor. Signal out of range,loss,noise,interruption
C003B00	0x403B00	Open Circuit of Right Rear Wheel Speed Sensor
C00A600	0x40A600	Right rear wheel speed sensor is short-circuited to ground
C00A700	0x40A700	Right rear wheel speed sensor is short-circuited to power supply
C00AC00	0x40AC00	Unknown malfunction on right rear wheel speed sensor(Unable to define the exact cause of the malfunction)
C109904	0x509904	wheel speed sensor common malfunction(sensor interaction and multiple sensor malfunction,etc)
C004460	0x404460	Pressure sensor malfunction(signal)
C004510	0x404510	Pressure sensor malfunction(circuit)
C004008	0x404008	Brake lamp reliability malfunction
C006108	0x406108	Lateral acceleration sensor signal error
C006208	0x406208	Longitudinal acceleration sensor signal error
C006308	0x406308	Yaw angular sensor signal error
C019604	0x419604	Yaw angular sensor malfunction
C00A800	0x40A800	Yaw angular sensor is not calibrated or calibration failed
U000500	0xC00500	High voltage of CAN Bus
U000700	0xC00700	Low voltage of CAN Bus
C100104	0x500104	CAN bus hardware malfunction
U000104	0xC00104	Shutdown Malfunction of CAN Bus
U100104	0xD00104	External CAN Bus Error

Brake System

U010004	0xC10004	EMS CAN Timeout Packet
U010008	0xC10008	EMS Data interruption or signal invalid
C106600	0x506600	SAS Steering wheel angle sensor calibration error
C046008	0x446008	SAS Steering wheel angle sensor malfunction(signal)
U012604	0xC12604	CAN timeout packet of SAS Steering wheel angle sensor
U012608	0xC12608	SAS Steering wheel angle sensor data interruption or signal invalid
U010104	0xC10104	TCU CAN timeout packet
U010108	0xC10108	TCU data interruption or signal invalid
C001004	0x401004	Valve error: left front liquid inlet valve
C001104	0x401104	Valve error: left front liquid outlet valve
C001404	0x401404	Valve error: right front liquid inlet valve
C001504	0x401504	Valve error: right front liquid outlet valve
C001804	0x401804	Valve error: left rear liquid inlet valve
C001904	0x401904	Valve error: left rear liquid outlet valve
C001C04	0x401C04	Valve error: right rear liquid inlet valve
C001D04	0x401D04	Valve error: right rear liquid outlet valve
C000104	0x400104	Valve error: guide valve 1
C000204	0x400204	Valve error: guide valve 2
C000304	0x400304	Valve error: high pressure valve 1
C000404	0x400404	Valve error: high pressure valve 2
C109504	0x509504	Valve relay error
C002004	0x402004	Reflux pump error
C007208	0x407208	Regular valve error (valve overheating, signal invalid, hardware malfunction)
C104C04	0x504C04	ESC OFF switch malfunction
C121208	0x521208	Configuration code error
C108C08	0x508C08	Reverse switch signal level continues high/low
U015504	0xC15504	ICM CAN Communication Timeout
U042308	0Xc42308	ICM Data Interruption
C003129	0x403129	Front left wheel speed sensor direction error
C003429	0x403429	Front right wheel speed sensor direction error
C003729	0x403729	Rear left wheel speed sensor direction error
C003A29	0x403A29	Rear right wheel speed sensor direction error
C101038	0x501038	2 wheel speed sensors direction error

7.4.2 C190004, C190104 ECU power supply malfunction

Possible Cause of Malfunction

- (1) Battery power is too high or too low;
- (2) Poor body grounding.

Maintenance and Diagnosis Method

- (1) Measure the storage battery voltage and charge the storage battery if necessary (standard value of voltage 9.3V ~ 16.8V)
- (2) Check the two grounding points of ESC, including the grounding of the ESC electronic control unit and reflux pump motor;
- (3) Turn on all high-power appliances in the vehicle and measure the ESC power supply voltage. Under the condition of high-power load, there may be insufficient power supply.
- (4) Measure the generated voltage fluctuation as the vehicle is started and the high-power appliances are turned on and off. The potential appliances malfunction may cause large voltage fluctuation of the power supply circuit.

7.4.3 C100004, C101008 ECU malfunction

Possible Cause of Malfunction: ECU Damage

Repair and Diagnosis Method: Replace ESC assembly and exhaust braking line.

7.4.4 C006B06 Brake system is abnormal (ABS/ESC acting time is too long)

Possible Cause of Malfunction

- (1) Continuous fierce driving or applying the brake constantly for a long time;

- (2) Wheel speed sensor signal is not accurate;
- (3) Abnormal signal of Steering wheel angle sensor, yaw angular velocity sensor

Maintenance and Diagnosis Method

- (1) Utilize the diagnostic instrument to read the data flow of wheel speed sensor and observe whether some wheel speed is continuously high or low;
- (2) Drive the vehicle and perform 8-shaped test run, in the test, the steering wheel needs to hit the end as the vehicle is turning left or right, read the malfunction code again ;
- (3) If there is no relevant malfunction code of steering wheel angle sensor or yaw angular velocity sensor, it is necessary to check whether the installation position of ESC is horizontal and tight. The ESC bracket is not available to install other device.

7.4.5 C003200; C00A000; C00A100; C003500; C00A200; C00A300; C003800; C00A400; C00A500; C003B00; C00A600; C00A700 Wheel Speed Sensor Line Malfunction

Possible Cause of Malfunction

- (1) Wheel speed sensor line disconnection, connector looseness, breakage.
- (2) Wheel speed sensor signal line connects with power supply line reversely.
- (3) Signal line is short-circuited to ground.

Maintenance and Diagnosis Method

- (1) Check whether the wheel speed sensor harness is open or short-circuited or not;
- (2) Check all the connectors on the wheel speed sensor line for looseness, breakage;
- (3) Check whether power line of wheel speed sensor, signal line connects reversely or not;
- (4) Accelerate the vehicle to more than 40km/h and perform dynamic self-test of ESC system.
- (5) If the malfunction still cannot be eliminated after the dynamic self-test is completed, replace the wheel speed sensor.

7.4.6 C003108; C00A900; C003408; C00AA00; C003708; C00AB00; C003A08; C00AC00; C109904; C003B00; C00A600; C00A700 Wheel Speed Sensor Signal Malfunction

Possible Cause of Malfunction

- (1) The wheel speed sensor harness is bent, and the connector is loose and broken;
- (2) Wheel speed sensor signal line is short-circuited to power supply;
- (3) Power line of wheel speed sensor is short-circuited to ground;
- (4) Tooth ring is not installed, missing teeth, tooth ring is dirty with foreign matter, demagnetization, tooth ring eccentricity;
- (5) The air gap between the sensor and the tooth ring is too large;
- (6) The wheel speed sensor is disturbed by the external magnetic field; (the wheel or axle is not demagnetized)
- (7) Ontology malfunction of wheel speed sensor;
- (8) Tooth ring and tooth number error;
- (9) The tire size is out of specification.

Maintenance and Diagnosis Method

- (1) Check the wheel speed sensor harness for bending;
- (2) Check all the connectors on the wheel speed sensor line for looseness and breakage;
- (3) Check whether the wheel speed sensor harness is short-circuited to power supply or ground;
- (4) Check whether the wheel speed sensor is properly fixed.
- (5) Utilize the diagnostic instrument to read the data flow of wheel speed sensor, and whether the wheel speed and the acceleration display of each wheel are consistent during the vehicle is running, and whether the vehicle speed display is accurate;
- (6) If there is any inconsistency in the wheel speed display, check whether the tooth ring of corresponding wheel speed sensor signal has missing teeth, dirt, foreign matter, demagnetization and eccentricity.
- (7) After any maintenance on the wheel speed sensor, the vehicle needs to be accelerated to more than 40km/h and perform dynamic self-test of ESC system.
- (8) If the malfunction still cannot be eliminated after the dynamic self-test is completed, replace the wheel speed sensor.

7.4.7 C004460; C004510 Pressure Sensor Malfunction

Possible Cause of Malfunction

- (1) Brake lamp switch malfunction or line malfunction;
- (2) Pressure sensor malfunction.

Maintenance and Diagnosis Method

- (1) Check the brake lamp switch and its line for normal condition;
- (2) Confirm that ESC has been damaged and replace the ESC assembly after performing cross validation and exhaust the braking line.

7.4.8 C004008 Brake Lamp Switch (BLS) Malfunction

Possible Cause of Malfunction

- (1) Brake lamp switch line is open or short-circuited;
- (2) Incorrect installation of brake lamp switch;
- (3) Brake lamp switch damage.

Maintenance and Diagnosis Method

- (1) Check brake lamp switch and its harness;
- (2) Replace brake lamp switch.

7.4.9 C006108; C006208; C006308; C019604; C00A800 Yaw Rate Sensor Malfunction

The yaw rate sensor includes three signals: lateral acceleration, longitudinal acceleration, and yaw velocity. The controller of ESC9i integrates yaw rate sensor.

Possible Cause of Malfunction

- (1) Incorrect installation of ESC; (keep horizontal installation of ESC and no inclination in vertical direction)
- (2) Yaw rate sensor is not correctly calibrated;
- (3) Yaw rate sensor damage.

Maintenance and Diagnosis Method

- (1) Check ESC mounting bolt, bracket for looseness or deformation;
- (2) Recalibrate the yaw rate sensor;
- (3) Confirm that ESC has been damaged and replace the ESC assembly after performing cross validation and exhaust the braking line.

7.4.10 U000500; U000700; C100104; U000104; U100104 CAN Bus Malfunction

Possible Cause of Malfunction

- (1) Storage battery power supply is too high or too low (standard value of voltage 9.3V~16.8V) ;
- (2) CAN bus network has malfunction;
- (3) ECU damage.

Maintenance and Diagnosis Method

- (1) Measure the storage battery voltage, charge the storage battery if necessary;
- (2) Check CAN bus and each bus node;
- (3) Confirm that ESC has been damaged and replace the ESC assembly after performing cross validation and exhaust the braking line.

7.4.11 C106600; C046008; U012604 Steering Wheel Angle Sensor Malfunction

Possible Causes of Malfunction

- (1) Steering wheel angle is not correctly calibrated;
- (2) Steering wheel angle sensor line malfunction;
- (3) Plug looseness or damage of steering wheel angle sensor;
- (4) Steering wheel sensor damage.

Maintenance and Diagnosis Method

- (1) Cancel the calibration of the steering wheel angle sensor and recalibrate (the steering wheel must be in the middle position during calibration);
- (2) Check steering wheel angle sensor harness;
- (3) Check and plug in steering wheel angle sensor plug;
- (4) Confirm that steering wheel angle sensor is faulty after cross validation, replace the steering wheel angle sensor and calibrate the new steering wheel angle sensor. (the steering wheel must be in the middle position during calibration)

7.4.12. U010004; U010008; U010104; U010108; U015504; U042308 CAN Bus Node Malfunction

Possible Causes of Malfunction

- (1) CAN Bus Communication Interrupt;
- (2) Poor power supply of CAN Bus Node;
- (3) CAN Bus Node Malfunction (the node detaches from CAN bus or ECU malfunction).

Maintenance and Diagnosis Method

- (1) Check the CAN bus communication for normal operation;
- (2) Turn off the ignition switch and measure the resistance separately of CAN-H, CAN-L line from CAN bus node to ESC; (standard value: less than 5Ω)
- (3) Measure the resistance between CAN-H and CAN-L line from each node connector of the CAN bus (keep the plug in the plugged state); (standard value: 60Ω)
- (4) Check the power supply of each node of CAN bus;
- (5) Read the malfunction code of each node of CAN bus, perform relevant inspection according to the malfunction code.

7.4.13 **C001004; C001104; C001404; C001504; C001804; C001904; C001C04; C001D04; C000104; C000204; C000304; C000404; C007208** Solenoid Valve Malfunction

Possible Causes of Malfunction

- (1) System Overheating Protection;
- (2) ESC electronic control unit damage.

Maintenance and Diagnosis Method

- (1) Ensure that the vehicle has not been driven for at least 10 minutes before reading the malfunction code;
- (2) Confirm that ESC has been damaged and replace the ESC assembly after performing cross validation and exhaust the braking line.

7.4.14 **C109504** Solenoid Valve Relay Malfunction

Possible Causes of Malfunction

- (1) Poor power supply of solenoid valve (low voltage of power supply, fuse damage or poor contact) ;
- (2) Poor grounding of ESC electronic control unit;
- (3) ESC electronic control unit damage.

Maintenance and Diagnosis Method

- (1) Check the power supply line, fuse and power supply voltage of valve relay;
- (2) Use 21W test lamp to measure the voltage drop between the valve relay power supply pin of ESC connector and the storage battery positive pole; (standard value: less than 0.2V)
- (3) Use 21W test lamp to measure the voltage drop between the ESC ECU grounding pin of ESC connector and the body grounding point; (standard value: less than 0.2V)
- (4) Accelerate the vehicle to more than 40km/h and perform dynamic self-test of ESC system.
- (5) If the malfunction can not be eliminated after dynamic self-test is completed, perform cross validation to confirm that ESC has been damaged and replace the ESC assembly and exhaust the braking line.

7.4.15 **C002004** Reflux Pump Motor Malfunction

Possible Causes of Malfunction

- (1) System Overheating Protection;
- (2) Poor power supply of pump motor (Low power supply voltage, fuse damage or poor contact) ;
- (3) Poor grounding of pump motor;
- (4) Pump motor damage.

Maintenance and Diagnosis Method

- (1) Ensure that the vehicle has not been driven for at least 10 minutes before reading the malfunction code;
- (2) Check the power supply line, fuse and power supply voltage of pump motor;
- (3) Use 21W test lamp to measure the voltage drop between the pump motor power supply pin of ESC connector and the storage battery positive pole; (standard value: less than 0.2V)
- (4) Use 21W test lamp to measure the voltage drop between the pump motor grounding pin of ESC connector and the body grounding point; (standard value: less than 0.2V)
- (5) Accelerate the vehicle to more than 40km/h and perform dynamic self-test of ESC system.
- (6) If the malfunction can not be eliminated after dynamic self-test is completed, perform cross validation to confirm that ESC has been damaged and replace the ESC assembly and exhaust the braking line.

7.4.16 **C104C04** ESC Closed Switch Malfunction

Possible Causes of Malfunction

- (1)ESC closed switch is pressed by item.
- (2)ESC closed switch or its circuit damage.

Maintenance and Diagnosis Method

- (1)Manually close and reopen the ESC function through ESC closed switch;
- (2)Check ESC closed switch.

7.4.17 **C121208** ESC Configuration Error

Possible Causes of Malfunction

- (1)Configuration information is not input;
- (2)Mismatch of configuration information.

Maintenance and Diagnosis Method

Input the correct configuration information with the diagnostic instrument.

7.4.18 **C108C08** Brake Lamp Switch/Reverse Signal is Abnormal

Possible Causes of Malfunction

- (1)Brake lamp switch signal is abnormal;
- (2)Brake lamp switch harness is open or short-circuited;
- (3)Reverse signal is abnormal.

Maintenance and Diagnosis Method

- (1)Check brake lamp switch;
- (2)Check brake lamp switch harness;
- (3)Check reverse signal;
- (4)Check TCU, Perform diagnosis according to TCU malfunction code.

8、Exhaust instructions

The customer must exhaust after replacing the brake system components (such as brake fluid, brake pipe, hydraulic unit), or when the brake pedal is too soft.

The hydraulic unit to be replaced by the customer must be an oil filled ESC hydraulic regulator with ECU.

Exhaust must ensure that the brake system structure is complete, all the high pressure hydraulic units have been connected.

Pull up the parking brake before exhaust.

Brake fluid is corrosive and should be cleaned if it gets on the skin.

8.1 Exhaust by exhaust unit/filling unit (exhaust pressure 2 bar)

A	Connect the exhaust/filling unit to the reservoir, make sure the brake fluid is sufficient, turn on the switch, and set the pressure to 2bar ↓
B	Open the air screw at the wheel cylinder until the air bubbles empty order: left rear, left front, right front, right rear. ↓
C	Check pedal travel ↓
D	If not, repeat the exhaust on each wheel ↓
E	Check brake fluid level to ensure it is between maximum and minimum ↓

8.2 . Manual pedal exhaust

A	Fill up the reservoir (to the filter neck) ↓
B	Repeat the procedure below for each wheel cylinder order: left rear, left front, right front, right rear. ↓
C	Open exhaust screw ↓
D	Reciprocate on the brake pedal ↓
E	Closing exhaust screw ↓
F	Release the brake pedal ↓
G	Check pedal travel ↓
H	If not, repeat exhaust ↓
I	Check the brake fluid level to make sure it is between the maximum and minimum marks ↓

8.3 Manual pedal exhaust is combined with 2 bar exhaust

A	Connect the exhaust/filling unit to the reservoir, make sure the brake fluid is sufficient, turn on the switch, and set the pressure to 2bar ↓
B	Open the air screw at the wheel cylinder until the air bubbles empty order: left rear, left front, right front, right rear. ↓
B1	Perform reciprocating pedals ↓
C	Check pedal travel ↓
D	If not, repeat the exhaust on each wheel ↓
E	Check brake fluid level to ensure it is between maximum and minimum ↓

Remark:

During the whole exhaust process, the brake fluid in the accumulator shall not be lower than the minimum mark.

If one process or whole air bleeding process need to operate again, it needs at least 5min for the electronic valve to cool down, otherwise the electronic valve may be damaged because of overheating.