

II. Workshop Manual of Brake System

Parking brake

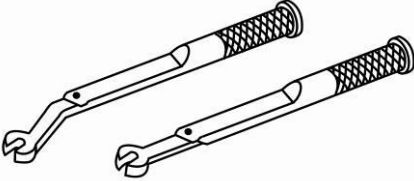
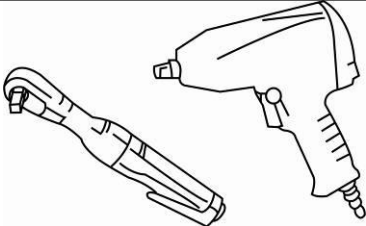
Cautions

- 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 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

If necessary, use special maintenance tools to disassemble.

Maintenance tool list

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

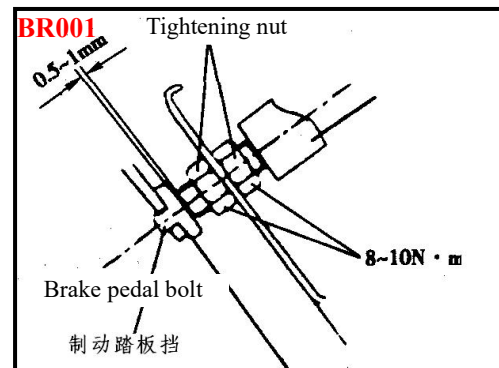
Brake Pedal

Inspection and Adjustment

Brake pedal and brake limit switch bolt

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 be 0.5mm~1mm.

■ Tightening Torque: 8mm~10N·m



Brake pedal free travel

1) With the engine off,

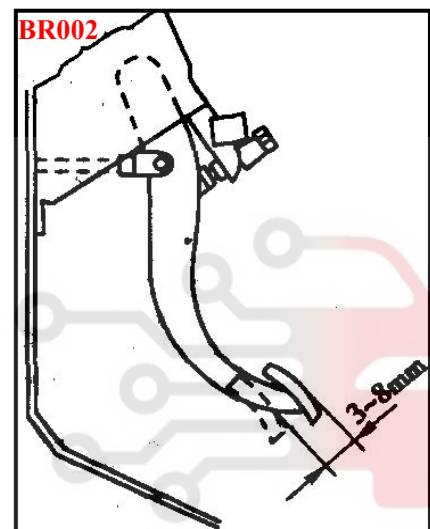
Press the brake pedal 2 ~ 3 times

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:

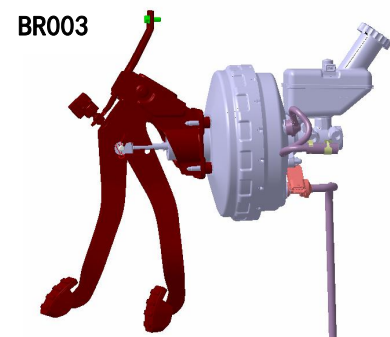
■ If the free stroke can't be adjusted to standard range, please replace damaged parts.

Removal and Installation:

1) Removal

① Disconnect the brake light switch connector.

② Remove the locking pin connecting the brake vacuum
booster



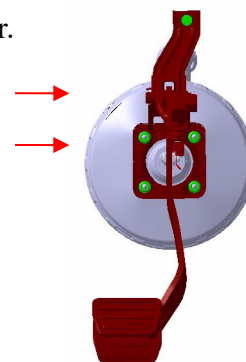
③ Remove the fixing bolts of the brake pedal and vehicle body, and

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

■Fastening torque: 25~30N·m

④ Take out the brake pedal.

BR004



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 Locking pin

■Check if the lock pin 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 >4mm, the terminals are non-conductive, while the switch is

released, the terminals are conductive,

then the brake light switch is working normally.

3) Installation

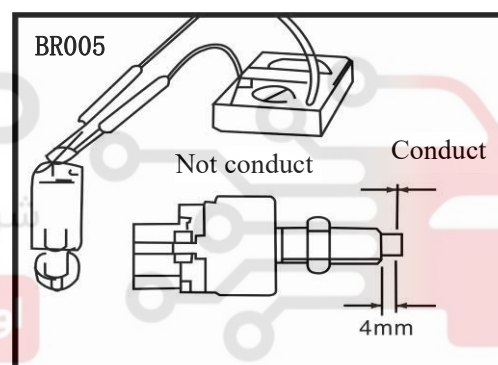
Install in the reverse order of removal

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.

Removal and Installation:

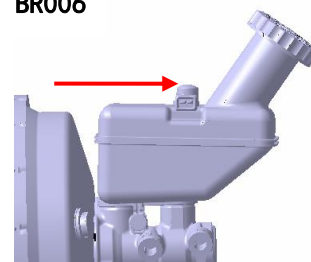
1) Removal

- ① Discharge the brake fluid.
- ② Remove brake fluid level switch plug
- ③ Use oil pipe wrench to disassemble the master cylinder

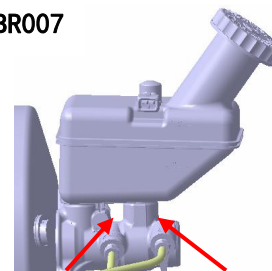
tube.

■ Tightening torque: 16~18N·m

BR006



BR007



- ④ Remove the fixing nuts of the brake cylinder and cylinder, and then remove the brake cylinder assembly.

Attention:

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

BR008



2) Installation

Attention:

■ Before installation Master cylinder pin should be coated with grease: SAE J310 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.

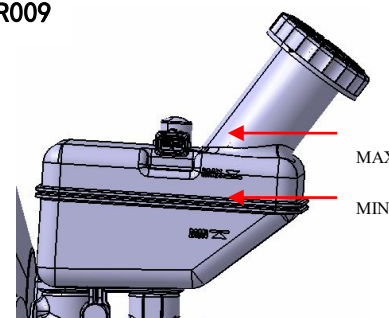
- ② Install the brake hard tube to the main pump assembly and pre-tighten.
- ③ Use a tubing wrench or equivalent to tighten the brake tube tubing nut.
- ④ Install brake fluid level switch connector.
- ⑤ Add new brake fluid and expel air at the same time.

Brake fluid

Check brake fluid level:

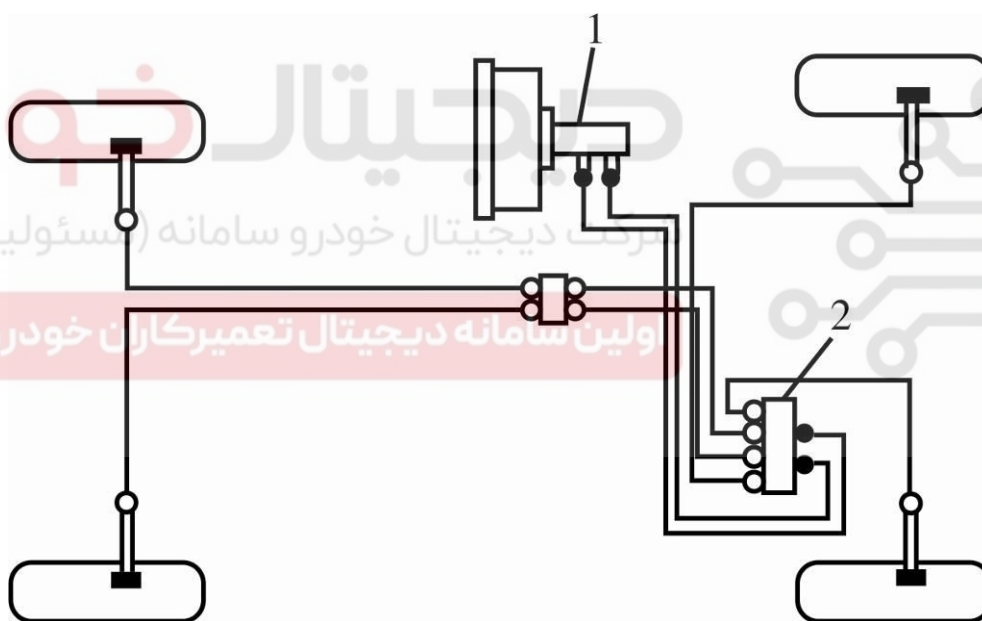
(3) Confirm if the brake fluid level in oil kettle is within the specified range (between MAX and MIN Mark), if the liquid level is too low, please check Whether there is leakage around the oil pot and the brake system.

BR009



2) Start the vehicle, press the EPB button, and observe if the brake warning

If the lamp is not off, please check if the brake liquid switch has failure.

Brake Tube line**Hydraulic piping diagram:**

Hydraulic piping diagram

1-Brake master cylinder 2-ESC 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.

Chassis System Maintenance Manual

Front brake tube and hose:

1) Removal

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

Note:

- 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.

brake tube connector with tubing wrench, and remove clamp plate.

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

- ④ Remove the fixing clamp plate in the middle of the brake hose from the front shock absorber.

- ⑤ Remove the brake hose and brake tube.

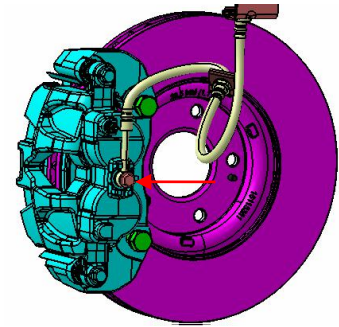
2) Installation

Follow the opposite sequence of the disassembly procedures.

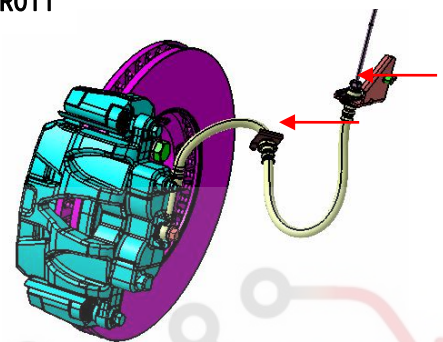
Attention:

- 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.

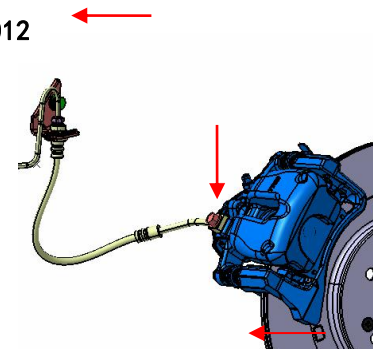
BR010



BR011



BR012



Rear brake tube and brake hose:

1) Removal

- ① Remove the fixing bolts of the rear brake hose and brake wheel cylinder.

- Tightening torque $25 \sim 30 \text{ N} \cdot \text{m}$

- ② Remove the brake hose and brake tube connector, remove the clamp plate.

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

- ③ Remove the brake hose and brake tube.

2) installation

During assembly, please follow the opposite sequence of the disassembly procedures.

Brake tube of brake master cylinder and ESC module assembly:

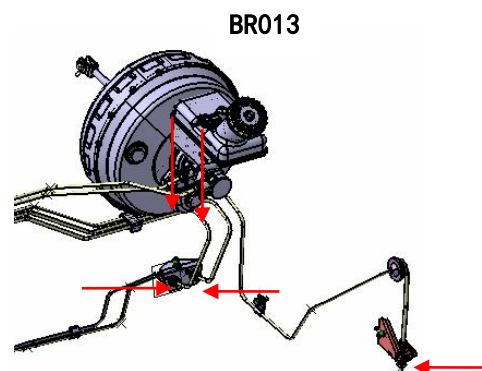
1) Removal

① Remove the oil pipe joint at both ends of the brake master pump.

② Remove the connector of front brake oil tube and rear brake oil tube.

③ Remove the connector of front brake oil tube and brake hose.

■ Tightening Torque: oil tube connector 16~18 N·m;



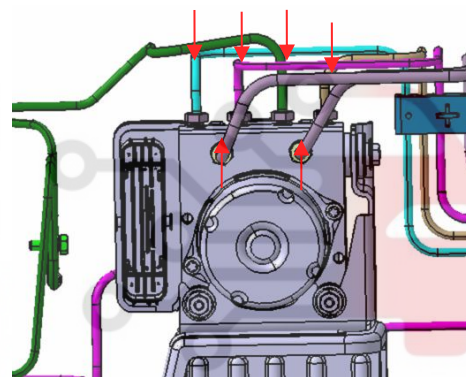
④ Then disconnect the oil tube connectors of the ESC module assembly in turn.

■ Tightening Torque: 16~18 N·m

Attention:

■ Do not drain the brake fluid in the ESC module assembly.

BR014



2) Installation

Follow the opposite sequence of the disassembly procedures.

Caution:

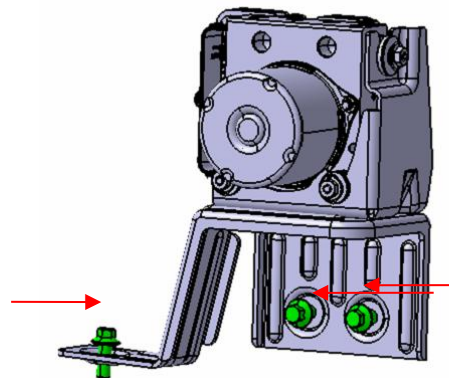
■ Install the ESC controller bracket, tighten with the bolts, then install the ESC controller to the ESC controller bracket, ESC controller assembly

installation

state is shown in the serial number of right figure:

■ Do not deform the brake line due to the difficulty of installation,

BR015



① Connect the left front brake hose assembly to the left front brake clamp, then pass smoothly through the vehicle body, and install to the left front brake tube, and install the clamp plate. The right side method is the same as the left one.

Chassis System Maintenance Manual

- 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.

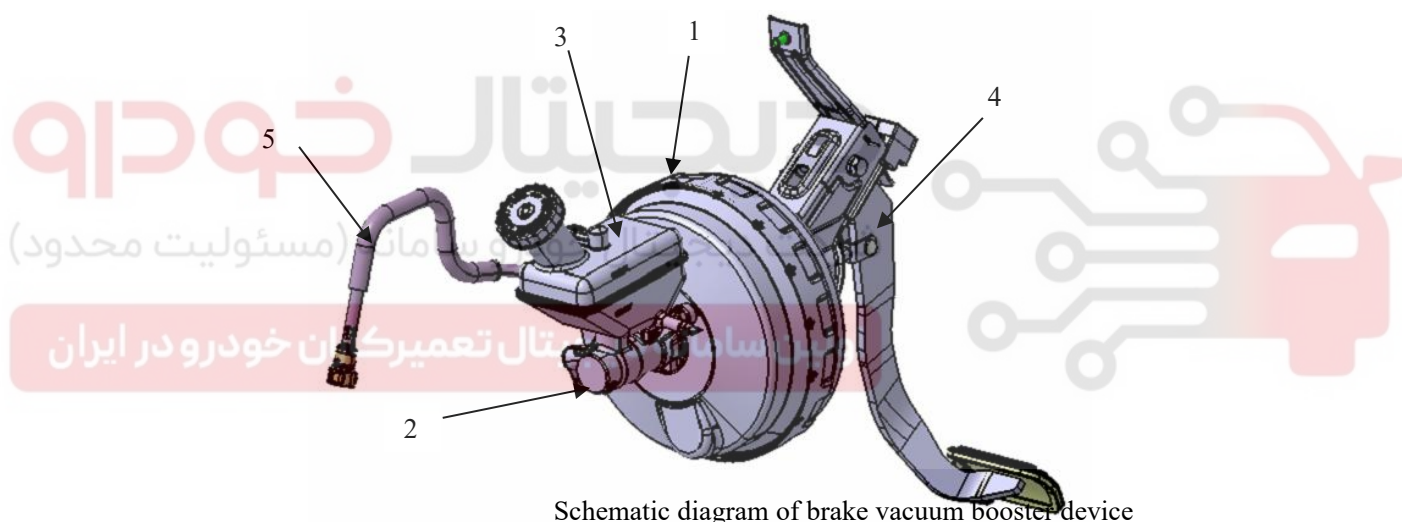
3) Inspection After Installation

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:

1-Vacuum booster assembly 2-Brake master cylinder 3-Brake oil kettle 4-Brake pedal 5-Brake hose

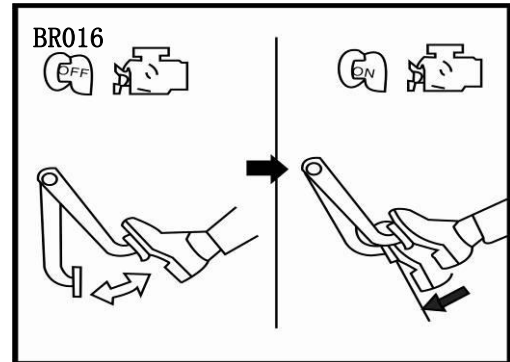
Inspection on the vehicle:

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:

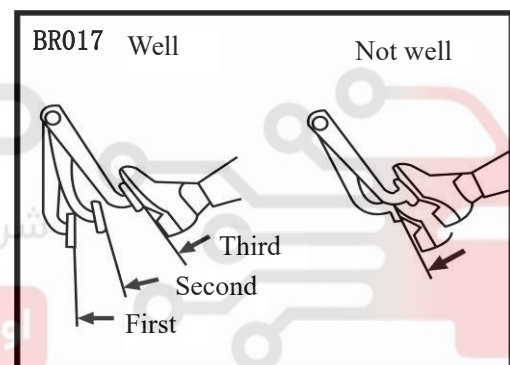
■ The time interval between pressing the brake pedal is 5 seconds.



2) Gas 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



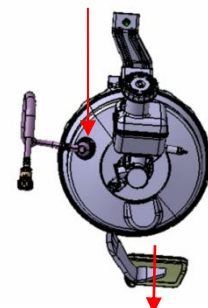
increases gradually.

increases gradually.

■ 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.

BR018



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 Pull out the vacuum hose assembly from the brake vacuum booster.

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.

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

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.

b. Push rod length check

■ Putter length: $140.2 \sim 141.8 \text{ mm}$

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 one bolt.

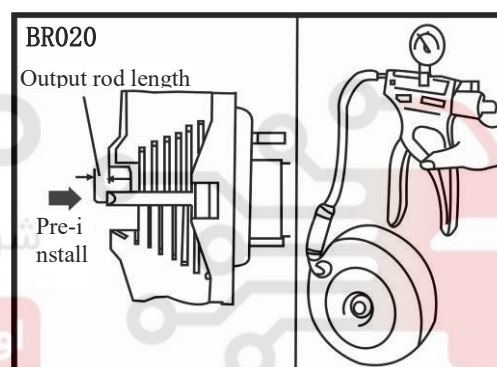
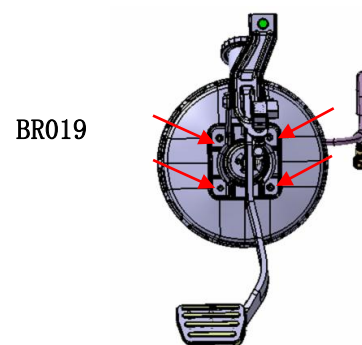
■ Tightening torque: $25 \pm 30 \text{ N} \cdot \text{m}$;

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



Chassis System Maintenance Manual

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

Front disc brake caliper

Inspection on the vehicle:

- 1) Check abrasion of brake friction plate

Attention:

- Standard thickness: 11mm
- Extreme abrasion limit thickness: 2mm

Removal and Installation of brake pad:

1) Removal

- ① Remove the wheel tires.

- Tightening torque: 100~120N·m

- ② Remove the fixing bolt of brake caliper assembly caliper bracket.

- Tighten torque: 160~190N·m

- ③ Use rope to hoist the brake caliper assembly, and remove the brake pad.

2) installation

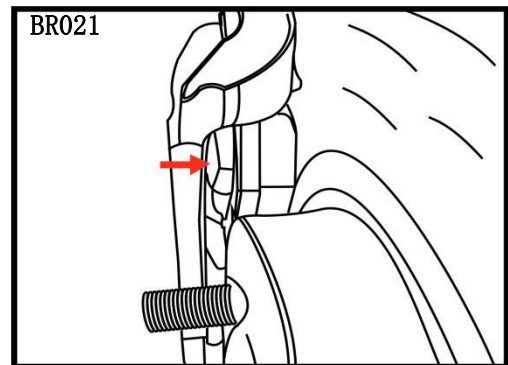
- ① Install the brake shoe spring clamps on the brake shoes respectively.

Attention:

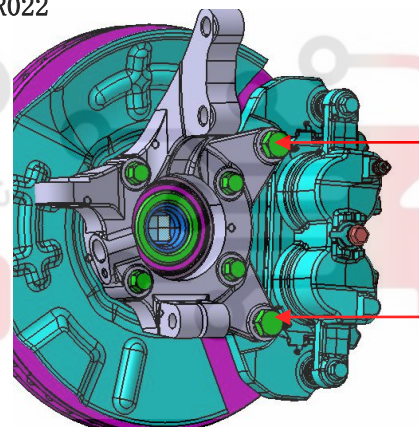
- install towards soundproofing fixing direction.

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

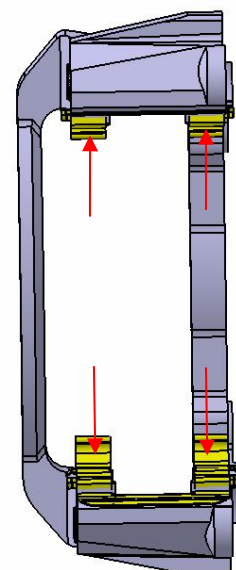
install the brake shoe to the caliper and the fixing bracket.



BR022



BR023



Attention:

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

③ Install the caliper bracket fixing bolt, and tighten it.

④ Check brake rotation friction

⑤ Install the wheels and tires.

Remove and install brake caliper assembly:

1) Removal

① Remove the wheel tire.

② Remove the brake hose bolts, then

disconnect the brake hose

■ Fastening torque: 25~30 N·m

Attention:

■ Be careful of bolt washer dropping.

③ Remove the fixing bolt of brake caliper assembly,

■ Tighten torque: 160~190 N·m

2) Installation

Follow the opposite sequence of the disassembly procedures.

Disassembly and Assembly

1) Disassembly

① Remove the brake wheel cylinder from the brake wheel cylinder fixing bracket. Remove the brake pad.

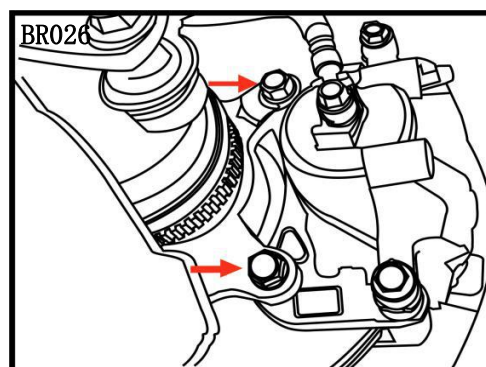
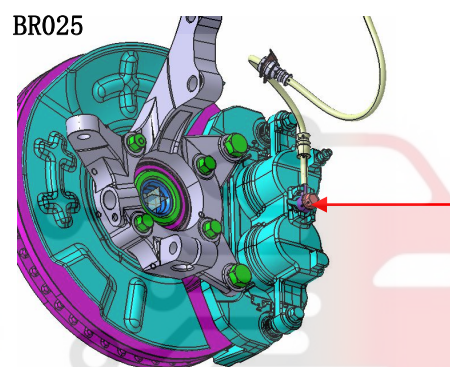
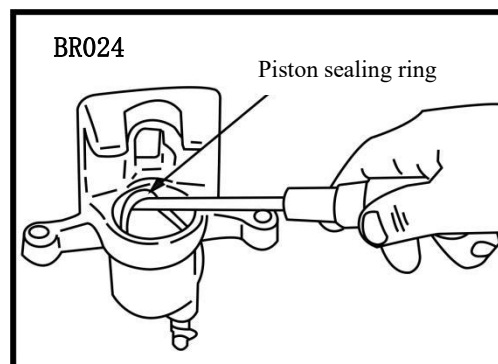
② Remove the locating pin and dust jacket of the locating pin of the brake wheel cylinder from the brake wheel cylinder fixing bracket.

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.

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 and pin dust jacket

■ Check sliding pins and pin dust jackets for wear and crack. If any, please replace it.

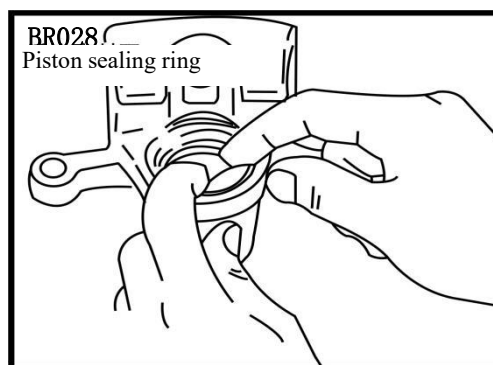
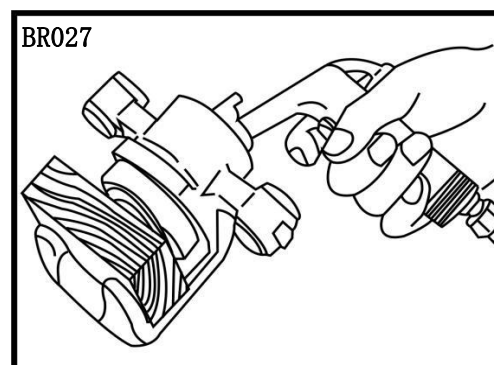
3) Assembly

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.



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

rubber lubricating grease to dust jacket.

- ③ Install the piston dust jacket and the piston.

Attention:

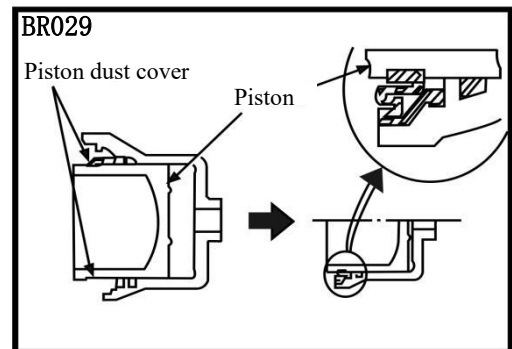
■Press the piston evenly to avoid scratching the inner wall of the cylinder.

- ④Install the sliding pin and the dust jacket of the sliding pin onto

the brake wheel cylinder fixing bracket.

- ③Install the brake pad assembly onto the brake wheel cylinder fixing bracket.

⑥ Press the piston when installing the brake pad, and then install the brake wheel cylinder on the fixing bracket.



Check brake disc

- 1) visual inspection

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

- 2) Jerk value check

- ① Fix the brake disc to the hub.

Attention:

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

- ②Use the micrometer to check the run out. /

Measure at inside 10mm of the brake disc edge)

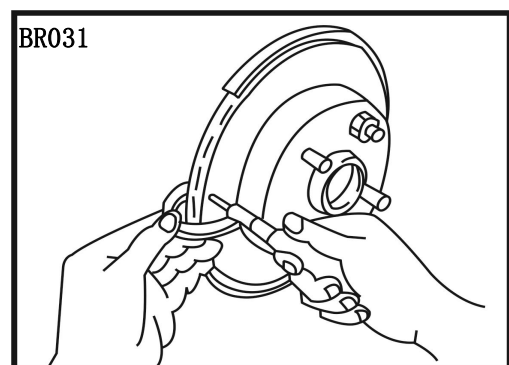
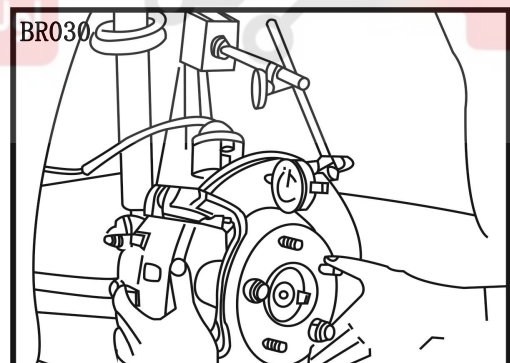
■Run out limit value: 0.025mm

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



Chassis System Maintenance Manual

brake disc.

Standard thickness: 30mm

Abrasion limit: 28mm

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.

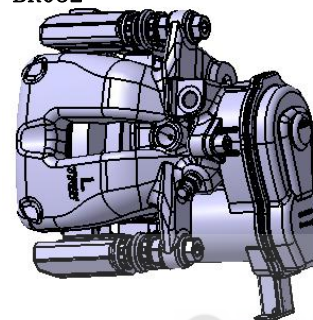
1) Drive vehicle in straight road;

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.

BR032



Rear disc brake caliper

Check abrasion of brake friction plate:**Attention:**

■ Please use the scale to check.

■ Standard thickness: 11mm

■ Extreme abrasion limit thickness: 2mm

Removal and Installation:

1) Removal

① Remove the wheel tires.

② Remove brake wheel cylinder bolts.

■ Tightening torque: 80~100N·m

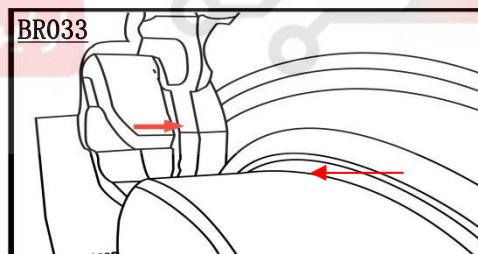
③ Lift the splitter pump with rope, then remove the brake pad and check ring.

2) Installation

① Install the brake pad onto the brake wheel cylinder

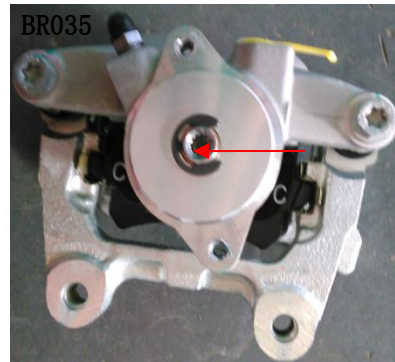
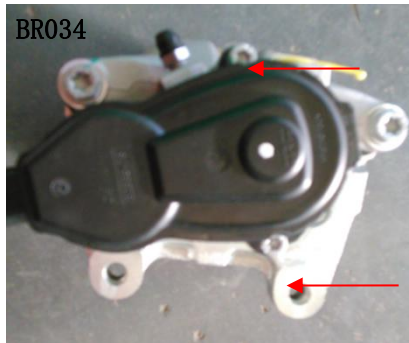
fixing brake, and press the piston when installing the brake pad

② And then install the brake wheel cylinder on the brake wheel cylinder fixing bracket.



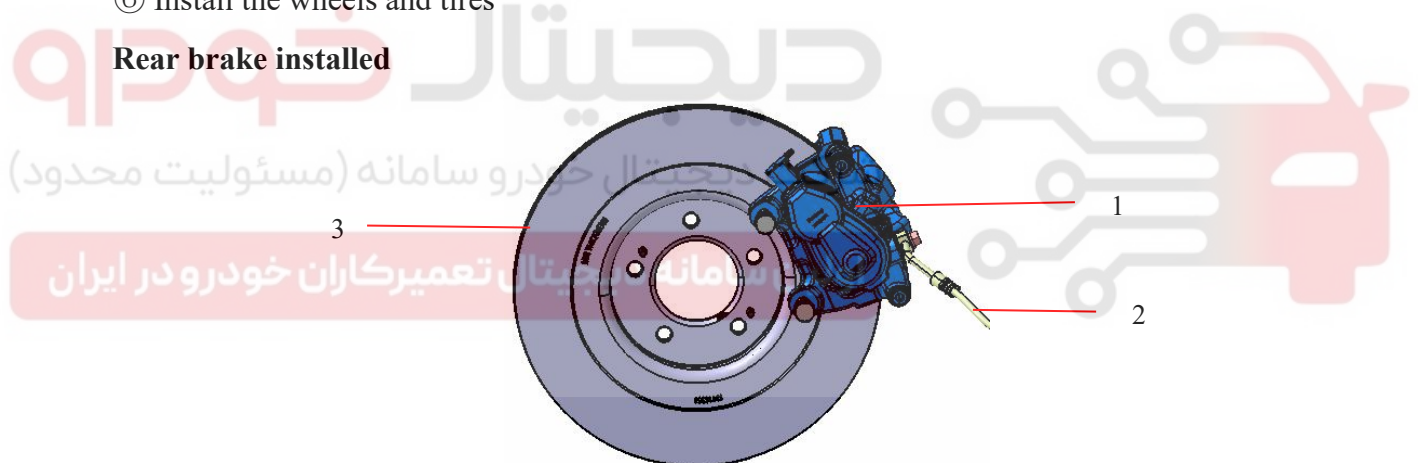
Attention:

■ If the piston can't be pressed, remove the EPB motor on the brake caliper, and loosen the tightening device behind the piston.



- ③ Install the lower brake wheel cylinder sliding pin and tighten it.
- ④ Fasten the brake disc with the tire nut and step on the brake pedal until the brake is working.
- ⑤ Check brake rotation friction
- ⑥ Install the wheels and tires

Rear brake installed



Schematic diagram of rear brake assembly

1- rear brake clamp assembly 2- rear brake hose assembly 3- 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.

■ Fastening torque: 80~100 N·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.

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 thickness: 11.9mm

Abrasion limit: 10mm

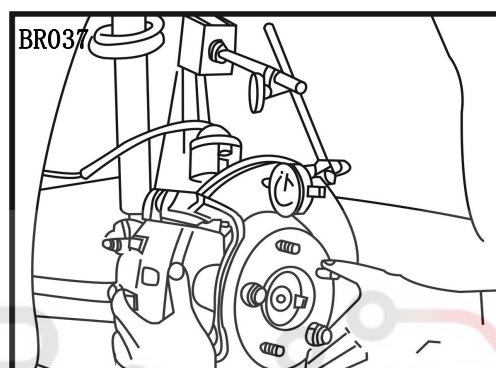
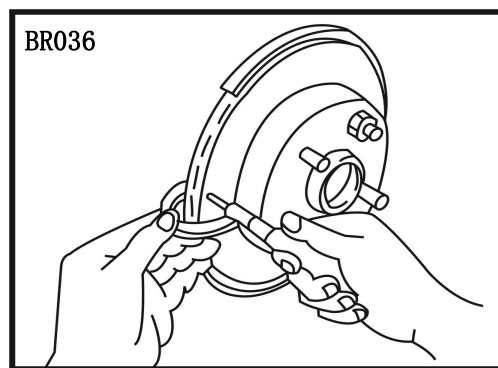
2) Bounce check

① Fix the brake disc to the hub.

② Use the micrometer to check the run out. /

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

■ Run out limit: 0.025mm

**Malfunction Diagnosis**

Common Malfunction Diagnosis List

Malfunction Symptom	Possible Causes of Malfunction	Solution
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 is installed incorrectly	Adjust
	self-adjusting mechanism malfunction	Adjust
Insufficient brake force	Brake liquid lack or polluted	Supply or replace
	Brake system with air	system air exhaust
	Brake vacuum booster with faults	Adjust
	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 distance to floor)	Brake system with air	system air exhaust
	Brake liquid leakage	adjust
	self-adjusting mechanism malfunction	Adjust

Chassis System Maintenance Manual

Malfunction Symptom	Possible Causes of Malfunction	Solution
	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
	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
	Electronic parking system failure	Adjust

Repair Data and Specification

Technical Specification Table

Project	Items	Specification
Brake master cylinder	Plunger	
	Bore diameter	Φ25.4mm
Brake booster	Items	vacuum
	Booster specification	8+9 inch
	booster ratio	6/10
Front brake	Items	floating clamp/ ventilated disc
	Brake disc diameter	320mm
	Brake disc thickness	30mm
	Friction block thickness	11mm
	Bore diameter	2×Φ45mm
Rear brake	Items	Floating caliper / solid disc
	Brake disc diameter	332.6mm
	Brake disc thickness	11.9mm
	Friction block thickness	11mm
	Bore diameter	Φ38mm

Tightening Torque Table

Project	torque (N·m)
Front brake caliper and knuckle connecting bolts	160×190
Rear brake caliper and steering knuckle connecting bolts	80×100
Front and rear caliper exhaust bolts	9×13
Brake pedal bracket support bolts	25×30
Brake pedal nuts	25×30
Brake hose and caliper connecting bolts	25×30
Brake pipe connector	16~18

Parking Brake

Cautions

■ Check and adjust parking brake only when normal brake is working normally.

■ When inspecting the parking brake system, the vehicle must be placed on the horizontal ground and the wheels are fixed.

Parking Brake control

Inspection on the vehicle:

1) EPB Features:

- ◆ Static parking and clamping;
- ◆ Hill-start assist control;
- ◆ Clamping function again;
- ◆ Emergency brake anti-lock brake function;
- ◆ Vehicle stop parking function;
- ◆ Post-operation priority function;

2) Parking brake button

- Pull the EPB button, the parking brake will be combined and the EPB switch indicator lamp  will be on. If the ignition switch is on at this time, the EPB indicator lamp  will be on.
- To release the parking brake, hold down the brake pedal and press the EPB button. At this time, the switch indicator and job indicator will go off, and the parking brake will be released.

3) Component inspection

- ① Confirm that the fixed condition of each component is normal.
- ② If the EPB working indicator lamp  is normal. If it can not be lit normally, check the parking system fault.
- ③ If the EPB switch indicator lamp  is working properly. If it does not work normally, please check or replace.
- ④ Open the parking brake switch connector, check if the connector is well.
 - The EPB button displays red lamp, it should be conducted.
 - The EPB button lamp goes out, it should not be conducted.

Malfunction Diagnosis

The light is on or off:

- ① check if the indicator lamp has performance damage.



② Check if the wiring harness connector is loosened.

③ Check if EPB parking system has failure.

ESC Electronic stability control system

Cautions

■ When the vehicle is traveling on bumps, gravel, or snow covered like wet surfaces, the braking distance may be longer than vehicles without ABS.

■ When the ESC, ESC-off, HDC, ABS, autohold or other warning lamp indicates failure occurs, before starting maintenance, gather all the necessary information from the customer (in which conditions which symptoms), find out the the simple reasons. In addition to electrical system inspection, check for vacuum booster operation, liquid level of brake fluid and leakage of liquid.

■ If the tire size and type are not used correctly, or the brake shoe is not a JAC original component, the braking distance or steering stability may deteriorate.

■ If install parts from the market (car stereo device, CD players, etc.), check the electrical wiring harness whether or not there is clamp、 open circuit、 short circuit or wiring not correct.

■ Disconnect the connector from the ESC control module before performing welding operations.

■ ESC components are particularly susceptible to EMC (electromagnetic interference) , so care should be taken to ensure that all anti-lock brake system components are routed, placed, installed and positioned, and wiring, connectors, clips, and brackets are present with no interference

■ Do not use quick chargers to start the engine or charge the still connected battery as this may cause battery failure or damage to parts of the anti-lock brake system.

■ Ignition switch must be turned off during the maintenance, then disconnect the negative battery and the ABS control module assembly connector, otherwise it will damage the control module.

■ Do not attempt to repair any anti-lock brake system components, all ABS components can only be repaired by replacement.

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

■ ESC control module shall not be placed in the temperature above 105°C environment.

■ Do no use fluid contains petroleum base in the brake master cylinder, petroleum will cause rubber component expansion and distortion

■ 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.

ABS function:

ABS function: In the process of emergency braking or in the dangerous road braking, control the hydraulic braking force of the four wheels to prevent the wheel lock. ABS advantages are as follows:

(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.

EBD function:

Electric brakeforce distribution (EBD) is a distribution system to keep vehicle stable in braking process Under normal braking conditions, effectively balance the same wheel speed required for braking Under the condition of brake difficulty, rear wheels need relative low brake force because the vehicle load is mainly on front wheels, EBD provide rear wheels with suitable brake force through ABS turbocharging and relief valve, ensure effective brake and keep vehicle stable.

HBA features:

Hydraulic Brake Assist (HBA) When driving in the event of emergency braking, the driver quickly enough to depress the brake pedal but did not provide sufficient braking force, take the initiative to build pressure, reduce Braking distance.

Attention:

■ During the HBA operation, the brake pedal will automatically sink.

■ When brake pedal sinking, you can not release the brake.

TCS function:

Electronic Traction Control (TCS) monitors the signals of each wheel and optimizes slippage of the drive wheels, stability and acceleration of the vehicle by controlling brake pressure and / or engine torque.

ESC function:

Electronic Stability Control (ESC) pulls the car back to its original driving trajectory as the vehicle transitions to a neutral position. When the car is under-steer, the car is pulled back to its original driving trajectory.

HSA function:

Chassis System Maintenance Manual

The Hill Start Assist System (HSA) prevents the vehicle from tumbling when the vehicle is stopped or parked on a slope with the brake pedal released and without a parking operation.

Attention:

- HSA works only in neutral, 1st gear and reverse gear.

HDC function:

The ramp descent control system (HDC) automatically controls the vehicle at a lower vehicle speed by the driver's choice when the vehicle is steep on a hill.

- When the HDC switch is pressed, if the HDC warning light is green to indicate workability (the warning light is red or not lit to indicate that it does not have the ability to work), the warning light flashes while the HDC is operating.

Autohold function:

AutoHold helps keep the vehicle stationary at any standstill. The driver does not have to step on the brake pedal in order to keep the vehicle stationary. Support driver's start request and linkage function with electronic parking system.

- When the Autohold switch is pressed, if the Autohold warning light is green to indicate workability (the warning light is red or not lit to indicate that it does not have the ability to work), the warning light flashes while the Autohold is operating.

Attention:

- The Autohold function only works when the engine is running, the driver is wearing a seat belt, and the driver's door is closed.

Fault protection function:

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

At the same time, the ABS system is transformed into 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 system electrical fault, ESC warning light will be lit. In the event of an EBD electrical fault, the brake warning light, the ABS warning light and the ESC warning light will both be on at the same time; the ABS warning light and the ESC warning light will both light up at the same time if an ABS electrical fault occurs

The HDC warning light will turn on (red) if there is an electrical failure in the HDC system.

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. 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

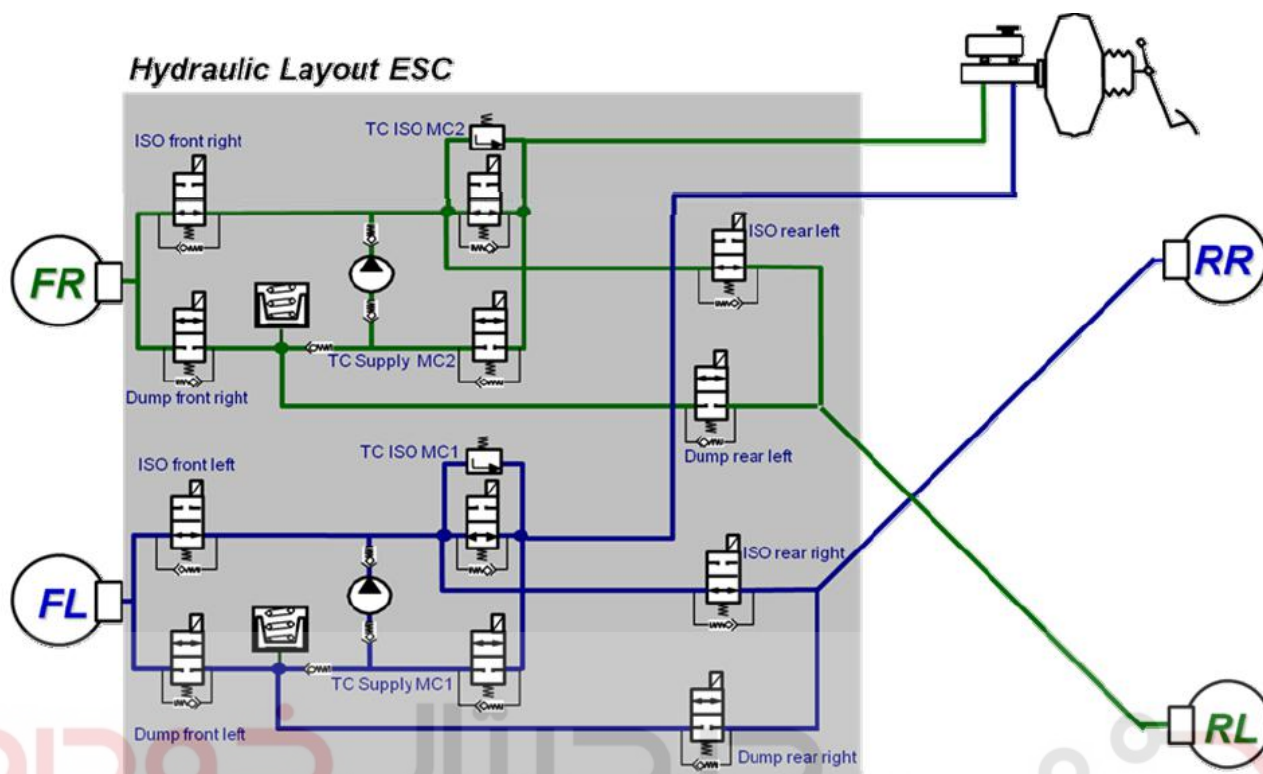
If the ABS control module still detects a wheel slip in pressure-hold mode, it will reduce the pressure on the affected wheel. The inlet valve remains closed and the outlet valve opens. Excess liquid / pressure is temporarily stored in the accumulator in the hydraulic assembly until the pump motor can 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) which are slipping, and the ABS controller activates the module if needed, the module control each wheel's brake force and optimizes them

ESC system hydraulic schematic diagram:**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.

Component:

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

Disassembly**1) Front wheel**

① Lift the vehicle.

② Open the bonnet and disconnect the sensor

connector.

③ Unscrew the retaining bolt on the sensor head and

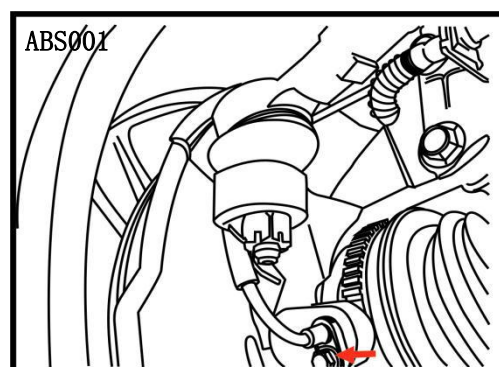
slowly remove the sensor.

■ Tightening torque: 8~12N·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.



Chassis System Maintenance Manual

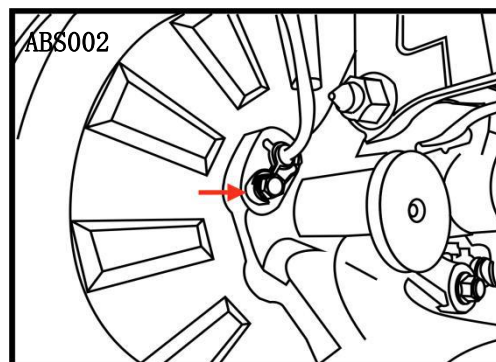
Standard Value: 0.3~1.2mm

2) Rear wheel

- ① Lift the vehicle and remove the rear tire.
- ② Remove the rear wheel cover.
- ③ Disconnect sensor connector.
- ④ Unscrew the fixed bolt of the wheel speed sensor, and slowly remove the wheel speed sensor.

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: 0.3~1.2mm

Check after disassembly:

- 1) Check if there is no foreign matter in the sensor mounting hole.
- 2) Clean the sensor installation hole before installing.

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 hydraulic assembly

Removal and Installation:

1) Disassemble

① Turn off the ignition switch, and disconnect the battery negative electrode.

② Remove the ESC control module connector.

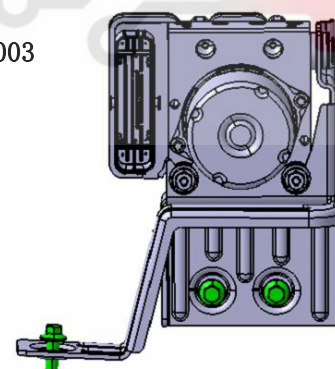
③ Press the pedal > 60mm and hold it with the pedal bracket.

■ Make the hydraulic assembly center valve closed, thus brake fluid flows out when the system starts braking.

④ First remove the brake tube connecting to the brake cylinder on the hydraulic assembly, and make marks, then immediately plug the outlet.

⑤ Remove the brake tube connecting each wheels

ABS003



Chassis System Maintenance Manual

and make marks, then plug the outlet immediately.

- ⑥ Remove the bolts on the ESC hydraulic assembly fixing bracket.

2) Installation

Attention:

■ Must tighten the brake pipeline connectors connecting to the ESC hydraulic assembly to the specified torque.

Tightening torque: 12~18N·m

■ The hydraulic opening plug on the ESC hydraulic assembly should only be removed when the brake tube is to be installed, to prevent foreign matter from entering into the brake system.

■ Replace the ESC hydraulic assembly if it has failure.

- ① Install the ESC hydraulic assembly on the bracket, and tighten to the specified torque.

② Remove the plug on the hydraulic opening, install the brake tube, and confirm the connection is correct.

- ③ Connect the brake tube from hydraulic assembly to the brake cylinder.

- ④ Install the brake tube, and tighten to the specified torque.

- ⑤ Fill new brake fluid into brake liquid kettle to MAX level, then exhaust the air as required.

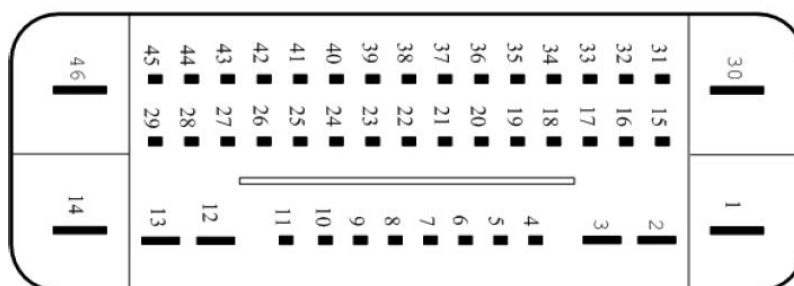
⑥ When turning the ignition switch to ON, the ABS, ESC, ESC off, brake, HDC warning lamp should be on and then off.

- ⑦ Clean error code in the memory, then read whether error code still exists

- ⑧ Drive the vehicle to check whether ESC functions normally.

ESC control module**Component:**

This model adopts BOSCH ESP9.3 electronic stability control system. ESC Control module and hydraulic assembly are integrated.



ESC control module pin position diagram

Chassis System Maintenance Manual

ESC control module pin specification: ESC control module pin specification

1	Right caliper motor positive	24	Wheel Speed Power Supply(Left Front)
2	Right caliper motor negative	25	
3		26	Wheel Speed Signal Line(Right Front)
4	CAN Communication(High)	27	
5		28	
6	Wheel Speed Signal Line(Left Front)	29	
7		30	Power Supply(Solenoid Valve)
8	Vehicle Speed Signal Output	31	APB switch S3
9	HID Switch Indicator Lamp	32	APB switch S1
10		33	
11	Left caliper motor negative	34	Wheel Speed Signal Output(Right Front)
12	Left caliper motor positive	35	
13	Grounding(Motor)	36	Wake-up Signal
14	APB switch S4	37	Wheel Speed Signal Line(Right Rear)
15	APB switch S2	38	Brake Lamp Switch Signal
16	Automatic parking switch	39	Wheel Speed Power Line(Left Rear)
17	ESP_OFF Switch Indicator Lamp	40	
18	CAN Communication(Low)	41	ESP.OFF Switch Signal Input
19		42	
20	Wheel Speed Power Supply(Right Front)	43	ESP.OFF Switch Signal Input
21	Wheel Speed Power Supply(Right Rear)	44	
22	Wheel Speed Signal Line(Left Rear)	45	
23	Right caliper motor positive	46	Grounding (Solenoid Valve)

ESC control module check:**Attention:**

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

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 (12~18N·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

Chassis System Maintenance Manual

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.

③ Check brake pad for wear.

④ If the power supply circuit port and battery positive and negative electrode is loosened, if the voltage is normal.

2) ESC, ESC OFF, HDC, ABS warning light and brake warning light check

① Make sure ESC, ESC OFF, HDC, ABS, Brake warning light turn on for about 1.8 seconds when the ignition switch is turned "ON". If they are not bright, please refer to "fault diagnosis".

③ Check if ESC, ESC OFF, HDC, ABS, Brake warning light are off after ignition switch is turned "ON" for about 2s. If not off, please refer to troubleshooting.

④ If the ESC, ESC OFF, HDC and ABS warning lights do not turn off after 10 seconds of engine start, refer to "Troubleshooting".

Attention:

■ The brake warning lamp is on when the parking brake system has failure and the brake fluid level sensor is working (brake fluid is insufficient).

ESC system exhaust**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.

Malfunction Diagnosis**Introduction to fault diagnosis:**

1) Troubleshoot and thoroughly understand each system 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".

دیجیتال خودرو

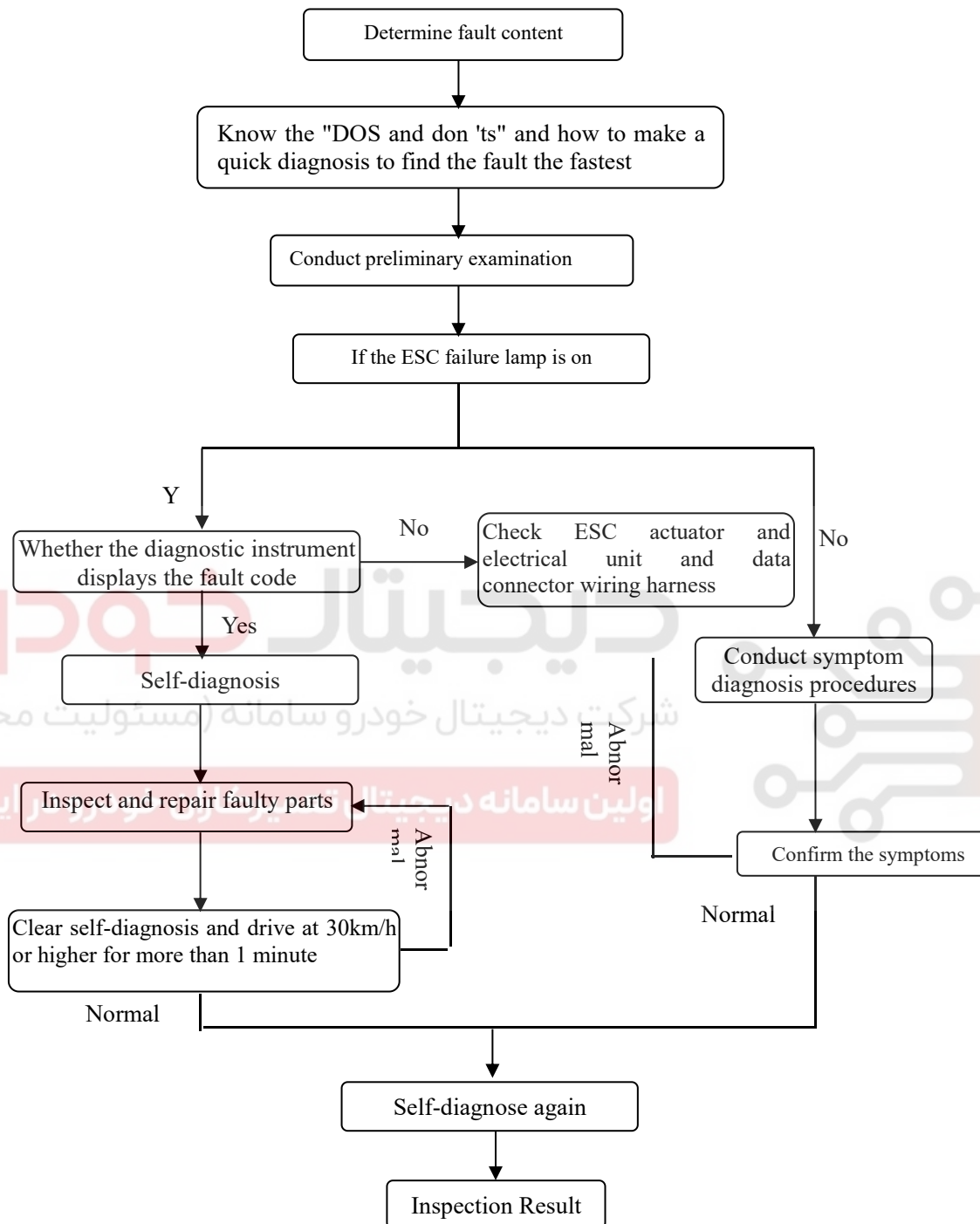
شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



Fault diagnosis flowchart:

The diagnosis process is as follows:

**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 ESC warning light is lit, and the ESC system is also turned

off.

2) Display diagnostic trouble code

Diagnostic trouble codes can be displayed using special diagnosis device (diagnostic tool).

3) Clear the diagnostic trouble code

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

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 are mostly caused by the following conditions:

① Electrical wiring error.

② Electrical connection error.

③ Clamping stagnation of relay or solenoid valve.

Diagnostic circuit check:

1) System description

The diagnostic circuit can detect problems caused by the ABS 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 kettle level is correct.

■ Check the master cylinder brake fluid pollution.

■ Check brake master cylinder / ESC 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.

Chassis System Maintenance Manual

■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

Step	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 ABS control module.	Turn to step 2	Turn to step 4
2	Is there any fault code currently or in the past?	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?	To Step 5	To Step 6
5	To "No communication with ABS control module" in ABS control module error program.		
6	To electrical other control module unit to diagnose.		
7	1.Turn off 2. Wait for 10 seconds. 3.starting the engine 4. Observe the ABS warning light after starting.	To Step 8	To Step 9
8	Are there any lights on?	To Step 9	To Step 10
9	To the corresponding light "open" fault program.		
10	To the corresponding lamp "does not work" fault procedure.		

ESC Common Symptoms and Analysis Procedure:

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 does not have the voltage provided by the battery or ignition switch.

■Data circuit is open circuit/short circuit/resistance too high.

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

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

Chassis System Maintenance Manual

- Warning of ESC Warning bulb failure/loose socket.
- The instrument panel fuse is disconnected.
- Instrument warning lamp driver module failure.
- ESC Control module failure.
- The instrument circuit is open or short circuit.

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.
- Brake fluid level too low or brake fluid switch malfunctions.
- Instrument and ABS control module open circuit.
- Warning lamp circuit failure.
- Instrument 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.