

CHAPTER I BRAKE SYSTEM

SECTION I BRAKE SYSTEM PARAMETER

1) Check brake disc:

The friction surface of brake disc should be flat and has no apparent grooves; otherwise, brake disc should be replaced.

2) Check the thickness of brake disc:

Use caliber rule to check the thickness of brake disc.

The standard thickness of front disc (ventilation disc) is 22mm with its operating limit of 19mm; when exceeding the operating limit, the front disc should be replaced.

The standard thickness of the rear disc (solid disc) is 10mm with its operating limit of 7mm; when exceeding the operating limit, the rear disc should be replaced.

3) Check brake disc runout:

Use micrometer guage to check the runout degree of brake disc surface. The operating limits of front disc and rear disc are both 0.03mm respectively.

4) Check the thickness of brake lining:

The standard thickness of front brake lining is 19.3mm and the operating limit is 9mm. The residual thickness of brake pad thickness limit should be not less than 1mm (coated plate: 5mm, noise insulator: 0.6mm).

The standard thickness of rear-brake lining is 16mm with its operating limit of 8 mm. The residual thickness of brake pad thickness limit should be not less than 1mm (coated plate: 5.5mm, noise insulator: 0.3mm).

5) Remark:

Before dismounting the wheel, you should check the thickness of external brake lining through the aperture in the wheel spoke, or dismount the wheel to have a check.

Important Notice:

- ⑦ After replacing the friction lining or brake disc, you should step on the brake for several times in order to ensure a break-in between the brake lining and brake disc. Thus, the safety can be guaranteed.
- ⑦ After replacing the brake lining, you should check whether the brake fluid level is positioning between MIN and MAX.

SECTION II DISASSEMBLY AND ASSEMBLY OF REAR BRAKE

Needed tools: ratchet, ratchet rod, 8#, 13#, 15# and 20# sleeves, 13#, 14#, 17#, 30# box end wrenches, vice clamp, torque spanner and flat-tip screwdriver.

2.1 Disassembly sequence:

- 1) Screw off the tire clamp nut and dismount the tire.

Note: When dismounting the tire, you should firstly loosen the 4 clamp nuts for 1-2 folds, and then screw off the nuts. Do not scuff the bolt.

Torque: 110 ± 10 N.m

- 2) Use 13# box end wrench to screw off the nut connecting the brake oil pipe and the brake caliper, and discharge the brake fluid.

Note: Since the brake fluid is poisonous, you must keep your skin away from it.

Torque: 11-14 N.m

- 3) Use 13# box end wrench to loosen the bolts (2 pieces) connecting the brake caliper and brake backing plate. And then dismount the rear brake caliper assembly.

Torque: 63 ± 3 N.m



- 4) Use 30# box end wrench to screw off the clamp nut of the wheel hub bearing unit.

Torque: $78 \pm 5 \text{ N.m}$



- 5) Use 8# socket wrench to screw a M8 bolt into the bolthole illustrated in the figure, and pack out the brake disc.

Note: When replacing brake disc, please replace it in pair. No matter whatever happens, you are not allowed to use hammer or similar tools to hit the brake disc. If necessary, you can use rubber hammer to knock on the brake disc body.



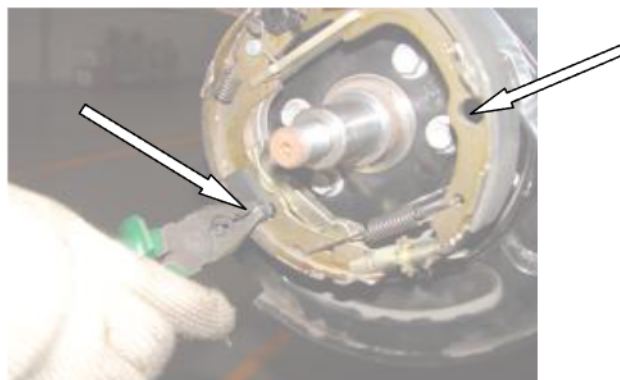
- 6) Take out the rear brake disc. Check the thickness of brake disc, and replace the brake disc when its thickness is less than the specified minimum thickness.



- 7) Use bearing puller to pull out the wheel hub bearing unit.



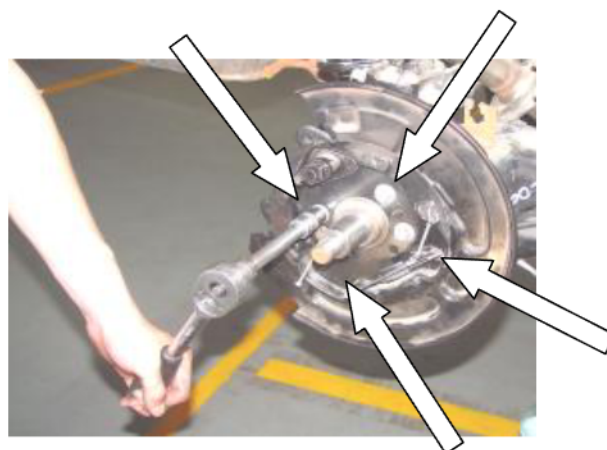
- 8) Use vice clamp to rotate the locating pin of handbrake shoe, and take out the hold-down spring seat (each for brake leading shoe and brake trailing shoe).



- 9) Dismount the return spring and handbrake control cable of handbrake shoe, and take down the handbrake shoe.

- 10) Use 15# socket wrench to loosen the fixed bolts (4 pieces) of brake backing plate, and dismount the brake backing plate.

Torque: 7-14N.m



2.2 Mounting of the rear brake assembly

Mount the rear brake assembly according to the reverse sequence of dismounting.

2.3 Disassembly of rear brake caliper

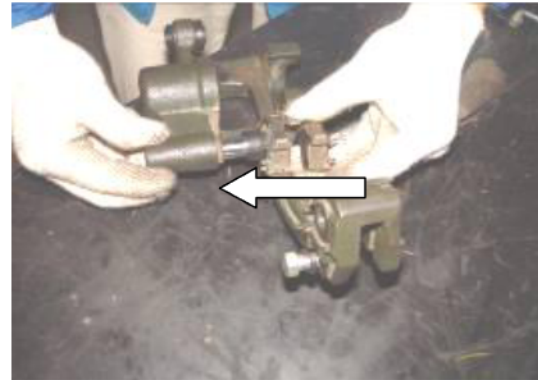
- 1) Use 17# box end wrench to dismount the connecting bolts of brake caliper.

Torque: 22—23N.m

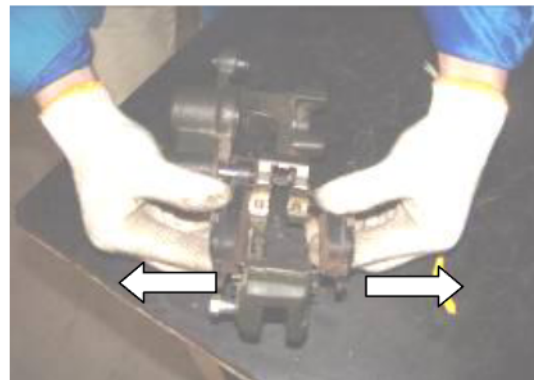


- 2) Take out the guide pin.

Note: When taking out the guide pin, you should avoid damaging the dust cover. If the dust cover is damaged, you should replace it immediately; otherwise, the piston alignment return shall not occur, leading to accidents. When mounting, you should equally paint **lubricant** onto the guide pin, but should not put the lubricant onto the brake lining. If lubricant grease splashes onto the brake lining, you should clean it and use sand paper to grind it slightly.

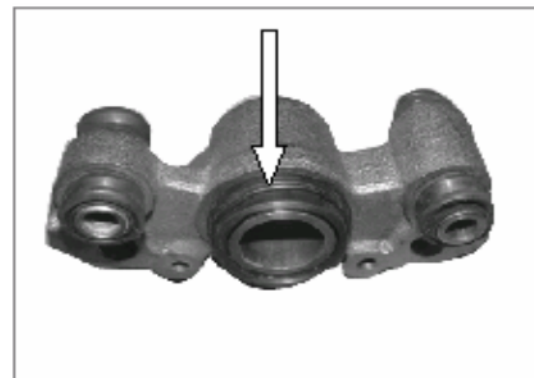


- 3) Dismount the brake lining to check its thickness. If one side of the brake lining is worn, you should not replace it. Only the thickness of brake disc is equal to or less than the specified minimum thickness, can you be allowed to replace it with new brake lining. Check the specified minimum thickness of brake lining, and clean it. Do not paint lubricant onto the backing plate of brake pad.



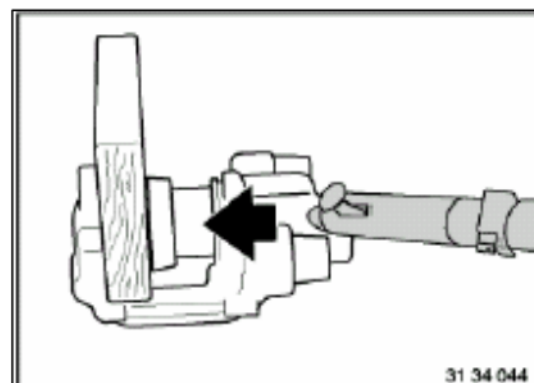
Note: When replacing brake lining, please replace it in pair.

- 4) Dismount the dust seal ring and check its damage. If necessary, you should replace it. Clean the contact surface of brake piston, and paint a thin layer of noise silencing paste onto it.
- 5) Dismount the piston. Use a board to shield off the piston, put the board between pistons and insert a pad at one end. Fill compressed air into the connecting hole to force off the piston. Put guard board (hard wood, etc) onto the notch of brake caliper in order to protect the piston.



Note: Do not use your finger to touch the piston in order to prevent your finger from being clamped.

The dismounting of brake caliper piston is strictly limited. Only professional personnel or



the one who is under the guidance of professional personnel can dismount brake caliper piston.

2.4 Assembly of rear brake caliper

Assemble the rear brake caliper according to the reverse sequence of disassembly.

SECTION III DISASSEMBLY AND ASSEMBLY OF FRONT WHEEL BRAKE

Needed tools: ratchet, ratchet rod, 8#, 13#, 15#, 20# sleeves, 13#, 14#, 17#, 30# box end wrenches, vice clamp and torque spanner.

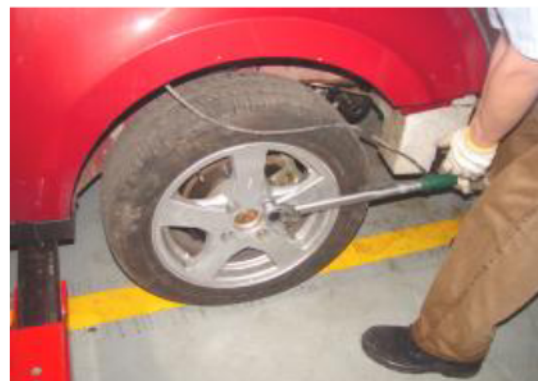
3.1 Assembly diagram of front wheel brake



3.2 Disassembly sequence of front wheel brake.

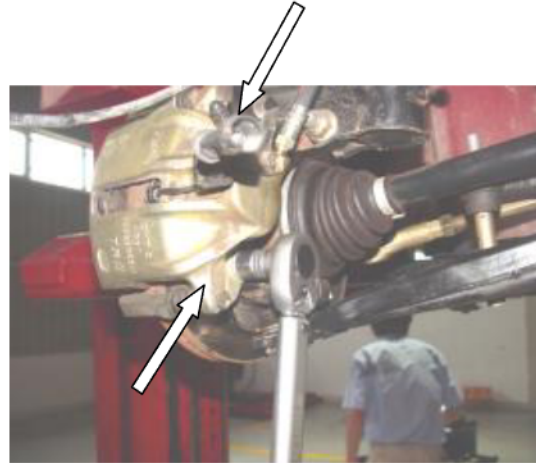
- 1) Use torque wrench or carry-on wrenches to unbolt the tire clamp nut and dismount the tire.

Torque: 110 ± 10 N.m



- 2) Use torque wrench and 17# sleeve to loosen the bolts connecting brake assembly and steering knuckle.

Torque: $85 \pm 5 \text{ N.m}$



- 3) Use box end wrench to loosen the bolts connecting the brake hose and brake caliper. (If only friction disc needs to be replaced during maintenance, there is no need to dismantle the brake pipeline).

Note: Since brake fluid is poisonous, you should prevent the brake fluid from splashing onto your clothes or skin when dismantling the brake hose.



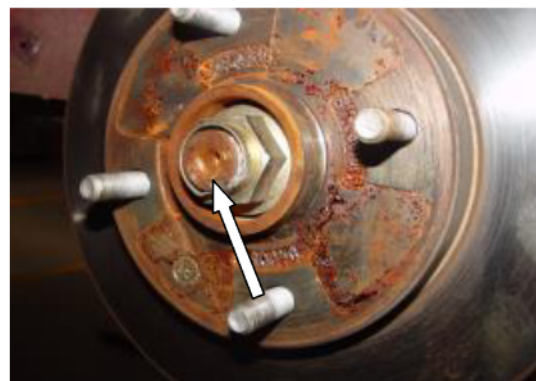
Torque:

- 4) Screw off the nuts and bolts mentioned in the 2nd and 3rd steps, remove the brake caliper from the steering knuckle, and isolate the brake caliper from the brake hose.

Note: Since brake fluid is poisonous, you should prevent the brake fluid from splashing onto your clothes or skin when dismantling the brake hose.

- 5) Use punch to rectify the notch as illustrated in the figure, and use 30# sleeve and torque wrench to dismount the clamp nut.

Torque: $78 \pm 5 \text{ N.m}$



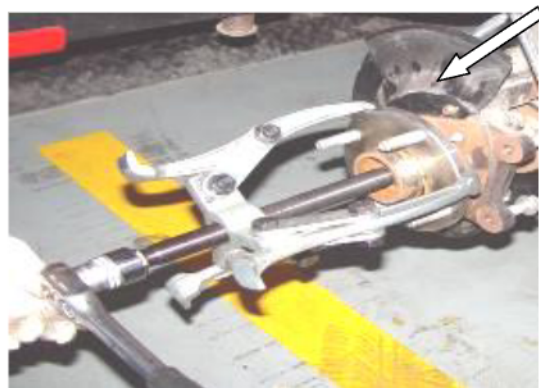
- 6) Use cross-head screwdriver to screw off the fastening screw of brake disc, and lift down the brake disc. Check the thickness of brake disc, and replace the brake disc if its thickness is less than the specified minimum thickness.

Note: When replacing the brake disc, please replace it in pair.

Torque: 7-9 N.m



- 7) Use 3-arm hub puller to pull out the wheel hub. Dismount the fastening bolt of splash shield, and remove the splash shield.



- 8) Use torque wrench and 18# sleeve to dismount the bolts connecting the steering knuckle and control arm.

Torque: 110 ± 5 N.m



- 9) Use torque wrench and 17# sleeve to dismount the bolts (3 pieces) that connect the ABS wheel-speed sensor unit and steering knuckle.

Torque:



- 10) Disassemble the connectors of the ABS wheel-speed sensor unit and wire harness, and take out the ABS wheel-speed sensor unit.



3.3 Assembly of front wheel brake

The assembly sequence is opposite to disassembly sequence.

3.4 disassembly of front-wheel brake caliper

- 1) Remove the thickness monitoring harness of friction wafer from the bracket.



- 2) Use a 13# and a 15# open end wrench to dismount the fastening bolt of brake caliper bracket.

Torque: 22-23N.m



- 3) Uplift the fixing bracket of brake caliper, and take out the brake lining.

Check the thickness of friction wafer, and replace it if it cannot meet the requirement.

Note: When replacing friction wafer, please replace it in pair.



- 4) Disassemble the brake cylinder. The disassembly sequence is as the same as that of the rear brake cylinder.

3.5 Assembly of brake caliper

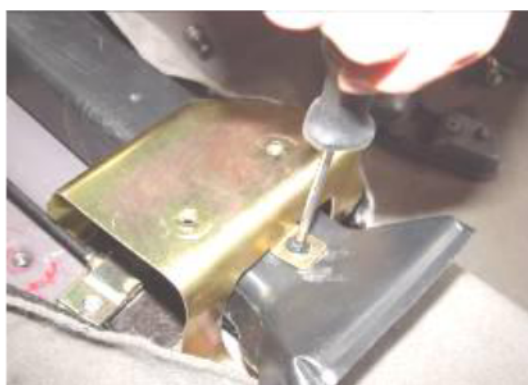
The assembly sequence is opposite to disassembly sequence.

SECTION IV REPLACEMENT OF HANDBRAKE CONTROL CABLE

Needed tools: flat-tip screwdriver, ratchet wrench, ratchet rod, 10#, 13# sleeves, carry-on wrenches, torque wrench and vice clamp.

4.1 Disassembly sequence:

- 1) Use screwdriver to pry out the edges of central armrest box, and dismount the central armrest box.
- 2) Use cross-head screwdriver to loosen the fixed screws connecting the rear air outlet and bracket.



- 3) Use ratchet wrench and 10#, 13# sleeves to loosen the fastening bolts connecting bracket and floor plate, and dismount the bracket.



- 4) Remove the brake cable from the cable connection.



- 5) Uplift the backseats and uncover the carpet.

Note: When uncovering the carpet, if the scuff plate stands in the way, you should dismantle the scuff plate firstly.



- 6) Unbolt the clamp nuts connecting the brake cable bracket and floor plate, and remove the brake cable from the bracket.



- 7) Dismount the rear tire, and dismantle the rear brake assembly as the figure illustrated (Disassembly sequence is detailed in the "Dismounting of rear wheel brake assembly". Use vice clamp to dismount the return spring under the drum brake, and remove the push rod as illustrated in the figure.



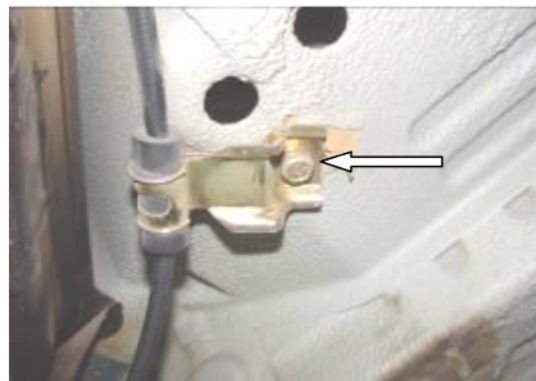
- 8) Take out the brake cable from brake arm.



- 9) Uplift the car, and use flat-tip screwdriver to pry out the brake cable from the brake backing plate.



- 10) Use ratchet wrench and 15# sleeve to dismount the bolts as shown in the following figure, and then pull out the brake cable.

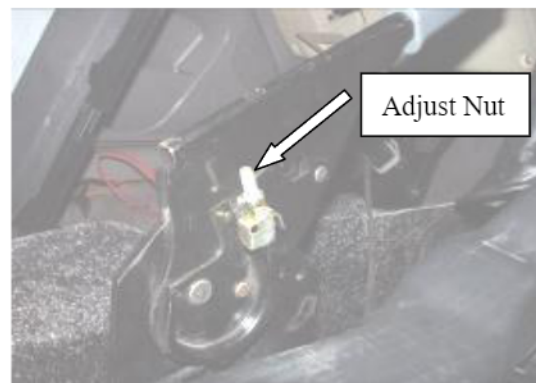


4.2 Assembly sequence:

Assemble the handbrake control cable according to the reverse sequence of disassembly.

Note: After replacing brake shoe or handbrake control cable, you need to regulate parking brake:

- ⑦ Loosen the parking brake handle.
- ⑦ Heavily step on the brake pedal once.
- ⑦ Pull up the parking brake handle for 4 gears.
- ⑦ Fasten the adjusting nut until the two wheels cannot be rotated by hand.
- ⑦ After finishing the above-mentioned sequences, you should loosen the parking brake and check whether the two rear wheels can rotate freely. Otherwise, repeat the above-mentioned steps.



SECTION V REPLACEMENT OF HANDBRAKE HANDLE

Needed tools: ratchet wrench, 10# sleeve, vice clamp, cross-head screwdriver, and slot-head screwdriver.

5.1 Disassembly sequence:

- 1) Use screwdriver to pry out the edges of central armrest box, and dismount the central armrest box.
- 2) Use ratchet wrench and 10# sleeve to dismount the handbrake fastening bolts (3 pieces).



- 3) Take out the brake cable from the cable connection.



- 4) Use cross-head screwdriver to dismount the earth screw of handbrake circuit, and then unbolt the handbrake.

5.2 Assembly sequence:

Assembly sequence is opposite to disassembly sequence.

SECTION VI REPLACEMENT OF BRAKE MASTER CYLINDER

Needed tools: clamp pliers, 10#, 12# open end wrenches, 13# sleeve and ratchet wrench.

6.1 Disassembly sequence:

- 1) Pull out the plug of oil level sensor.
- 2) Use sucker to pump out the brake oil.

Note: Since the brake oil has strong corrosiveness, you should prevent the brake oil from splashing on your skin and lacquer finish.

- 3) Use clamp pliers to dismount the fastening clamp at the oil inlet pipe of clutch cylinder, and remove the oil inlet pipe of clutch.



- 4) Use 10# and 13# open end wrench to loosen the brake pipeline of brake master cylinder.



5) Dismount fluid reservoir

Remark: Push the fluid reservoir upwards in order to remove it from the master cylinder and remove the O-shape seal ring from the groove of fluid reservoir. Check whether the fluid reservoir is cracked or deformed, and replace it if necessary. Use clean denatured alcohol to clean the fluid reservoir or use the compressed air containing no lubricant to clean the fluid reservoir.

- 6) Use 13# sleeve and ratchet wrench to dismount the fixing nut (each at both left and right side) of brake master cylinder, and take out the brake master cylinder.



6.2 Assembly sequence:

Assembly sequence is opposite to disassembly sequence.

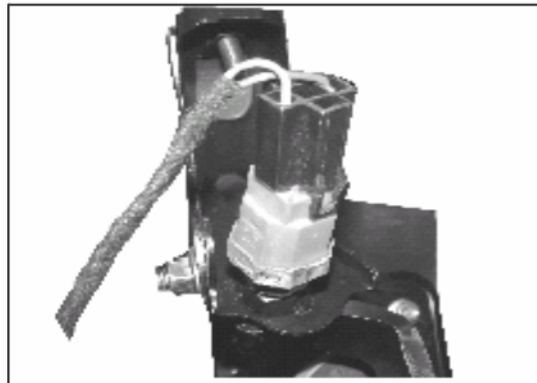
SECTION VII REPLACEMENT OF BRAKE PEDAL AND VACUUM BOOSTER

Needed tools: ratchet wrench, ratchet rod, 13# sleeve, vice clamp, 10#, 12# open end wrenches and clamp pliers.

7.1 Disassembly sequence:

- 1) Disassemble the brake master cylinder. (The disassembly sequence is detailed in the “disassembly of brake master cylinder”).
- 2) Use clamp pliers to dismount the clamp nearby the hose connecting vacuum booster and engine.

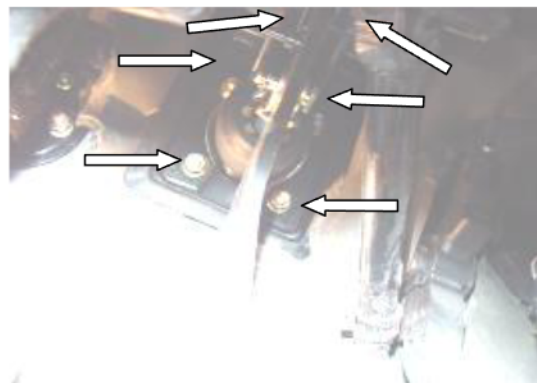
- 3) Dismount the brake light switch plug and remove the brake light switch.



- 4) Use vice clamp to dismount the pin connecting the vacuum booster pump to the brake pedal, and remove the connecting pin.



- 5) Dismount the four fixed bolts of the brake pedal bracket and the two bolts connecting the brake pedal and car body.

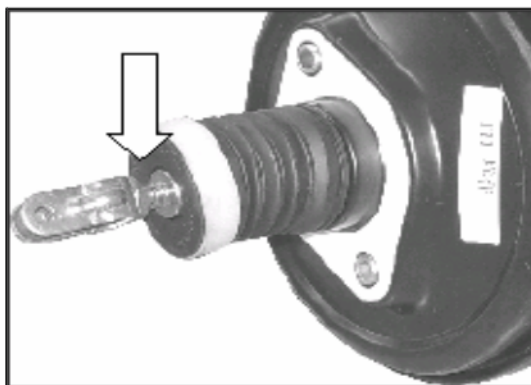


- 6) Take out the brake pedal and vacuum booster.

Note: The internal components of booster cannot be repaired and the booster case cannot be dismantled. The dismantling of booster case shall result in permanent deformation and improper capacity of thrust augmentation.



- 7) Loosen adjusting bolt to regulate the brake pedal to standard height.



7.2 Assembly sequence:

The assembly sequence is opposite to disassembly sequence.

SECTION VIII ABS SYSTEM MAINTENANCE

Needed tools: Chery-specific diagnostic tester, 10#, 13# open end wrenches, ratchet wrench and 10# sleeve

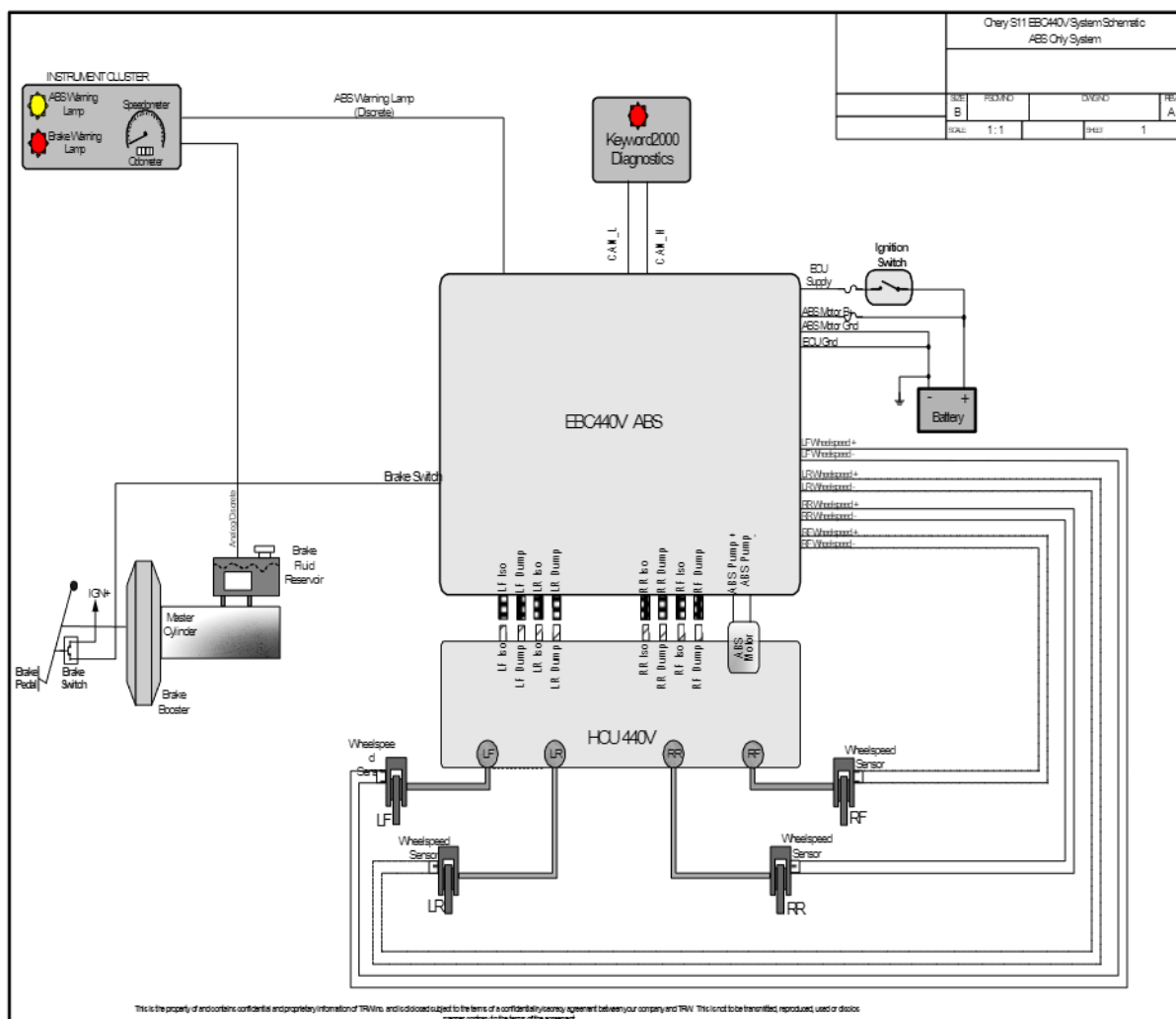
8.1 Precautions prior to maintenance

- 1) When the ignition switch is at the ignition position, you should not disassemble and assemble the electric components and harness connectors of the system in order to prevent the electronically controlled units (ECU) from being damaged. Before disassembling and assembling, you should turn off the ignition switch.
- 2) You are not allowed to supply extremely high voltage to ECUs, otherwise the ECUs shall be easily damaged.
- 3) Protect the ECUs from being impacted and knocked in order to avoid of damage.
- 4) High temperature environment is prone to damage ECUs; therefore, you should remove the ECUs from the car when baking paint for the car. In addition, when welding the system components or wire harness, you should also pull out the harness connectors from ECUs.
- 5) Prevent oil stain from splashing onto ECUs, especially the terminal. Otherwise, it shall lead to loose contact of terminal.
- 6) When the battery voltage is too low, the system cannot be operated. Therefore, you should check the battery voltage, especially at the circumstance that you launch the initial startup after stopping driving the car for a long time.
- 7) Prevent the wheel speed sensor and sensor gear ring from being polluted by oil stain or other dirties. Otherwise, the wheel speed sensor shall generate inaccurate wheel speed signal, which shall further impose influence on the accuracy of system control, and even lead to system failure. Furthermore, you are prohibited to knock the rotation speed sensor; otherwise, sensor-degaussing phenomenon may be prone to occur, which is unfavorable for the normal operation of system.
- 8) When repairing the hydraulic system, you should firstly discharge the high-pressure brake fluid of the energy accumulator completely in order to protect persons from being hurt by the splash of high-pressure brake fluid. In the case of discharging the high-pressure brake fluid of energy accumulator, you should firstly turn off the ignition switch, and repeatedly step on and loosen the brake pedal until it becomes very hard. Additionally, before the brake hydraulic system is well installed, you are not allowed to turn on the ignition switch with a bid to stop the electrically-driven pump from operating.
- 9) The brake system should use special pipeline, since brake system often has a very high pressure. If general pipeline is utilized, it shall be easily damaged.
- 10) Because the wheel speed sensor, ECUs and brake pressure adjusting devices of the antilock brake system (ABS) cannot be repaired, you should replace them completely if

they are damaged.

- 11) After repairing the brake hydraulic system or finding the brake pedal is becoming soft during operation, you should discharge the air from the brake system in accordance with required method and sequence.
- 12) You should try your best to select the tires recommended by the automobile manufacturers. If the using of tires in other types is necessary, you should select the tires with the outside diameter, traction performance and rotary inertia similar to the former ones, but should not select the tires with different specifications, which shall impose influence on the control effects of ABS.

8.2 Schematic diagram of abs control



8.3 Disassembly and assembly sequence

- 1) Dismount the ABS module plug.

Push the white clip shown in the figure towards the arrow direction, and the ABS module plug shall recede.



- 2) Use 10#, 12# open end wrenches to dismount the nuts connecting ABS assembly and pipelines.

Note: When dismounting the pipeline, you should prevent the extraneous substances from falling into the ABS assembly. You'd better use clean gauze to block up the oil inlet of ABS while dismounting the pipeline.



- 3) Use ratchet wrench and 10# sleeve to dismount the bolts connecting ABS assembly and bracket, and take out ABS assembly.



8.4 Assembly sequence:

The assembly sequence is opposite to the disassembly sequence.

Note: Turn on the power supply after completing installation, and connect diagnosis instruments to the system to access the failure code and then eliminate it. After these procedures are finished, the diagnostic tester shall carry out retest on the system.

Section IX Brake Fluid Filling and Air Discharge

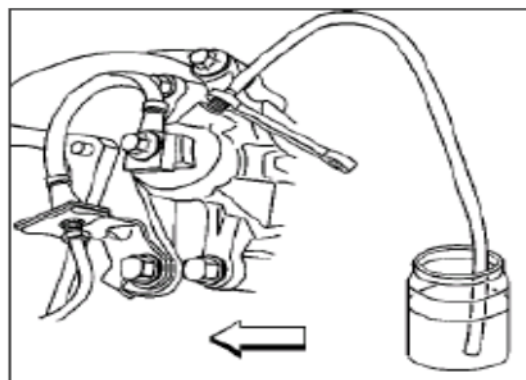
Needed tools: diagnosis instrument and 10# open end wrench

If air enters into the brake system in the case of brake component repairing or replacement, you should implement the complete air discharge process. Before the brake is air-discharged, the front and rear air-discharge cylinder piston must return to the highest position. The preferred method is to use failure diagnostic tester to make the cylinder piston return the highest position once again. If failure diagnostic tester cannot be used, you can adopt the second procedure, but you must carry out the operation in strictly accordance with the specified steps.

If air enters into the brake system due to too low liquid level or the cut-off of brake pipeline of the master cylinder, you must discharge the air from the four brake hydraulic systems. If the brake hose or brake is broken on certain wheel, you should only discharge the air from the wheel clamp. If brake pipe or hose is broken at any joint of mater cylinder and brake, you should only discharge the air from the brake systems related to the broken pipe or hose.

9.1 Air discharge of brake system

- 1) Uplift and support the car properly.
- 2) Install the transparent plastic exhaust hose onto brake caliper bleeder valve.
- 3) Put the other end of the transparent exhaust hose into the clean container containing some clean brakes.
- 4) Step on the brake pedal for 5-6 times, and open the exhaust valve to make the brake fluid flow.
- 5) Repeat above mentioned the fourth step until the there is no air bubble in the brake fluid, and close the exhaust valve when you feel more strength on step the brake pedal.
- 6) Dismount the transparent plastic exhaust hose from the exhaust valve.



Note: The above-mentioned steps are applicable for the air discharge of the brake pipeline of each brake.

9.2 Air discharge sequence of brake system is:

Left back → right front → right back → left front. If the ABS system connects with failure diagnosis instrument, you can access the fluid filling and air release program, and discharge the air from the ABS system according to the steps prompted by the system.

9.3 Air discharge of brake loop

Connect the exhaust hose of container to the fluid and air discharge valve of the left-back brake caliper. Open the fluid and air discharge valve, and step on the brake pedal to the earth for at least 5 times. The discharged brake fluid must be clean and have no air bubble. Keep stepping on the brake pedal to the largest extent, close the fluid and air discharge valve and then loosen brake pedal. Similar operations can be applicable for the brake systems of other wheels.

9.4 Brake fluid filling

In order to ensure the reliability of brake system, you should check the brake fluid level at intervals or after finishing the air discharge of the brake system. If brake fluid is deficient, you should fill it instantly.

Note:

- (1) Brake fluid should meet the standards stipulated by the Department of Transportation (DOT) (only DOT4 can be used), and should not be mixed with other types of brake fluid.
- (2) Brake fluid has relatively strong water absorptivity. It should be put into the original sealed container when being recycled.
- (3) Brake fluid has relatively strong corrosiveness. If it splashes onto your skin, you should instantly use wet cleaning cloth to wipe off the brake fluid, and then wash your skin by soapy water. Brake fluid is strongly corrosive to the car body paint; therefore, you should prevent the brake fluid from splashing onto the car body paint. If the brake fluid splashes onto the car body paint, you should wash it immediately.
- (4) During the process of air discharge, you should pay more attention to the brake fluid level of fluid reservoir. If the brake fluid level is very low, you should refill it in time.
- (5) Manual air discharge operation should be repeated for more times until the air in the brake system is completely discharged.
- (6) After finishing the fluid filling and air discharge operation, you should check whether there is leakage in the brake system. If leakage phenomenon exists, you should eliminate it timely in order to ensure the safety of car driving.