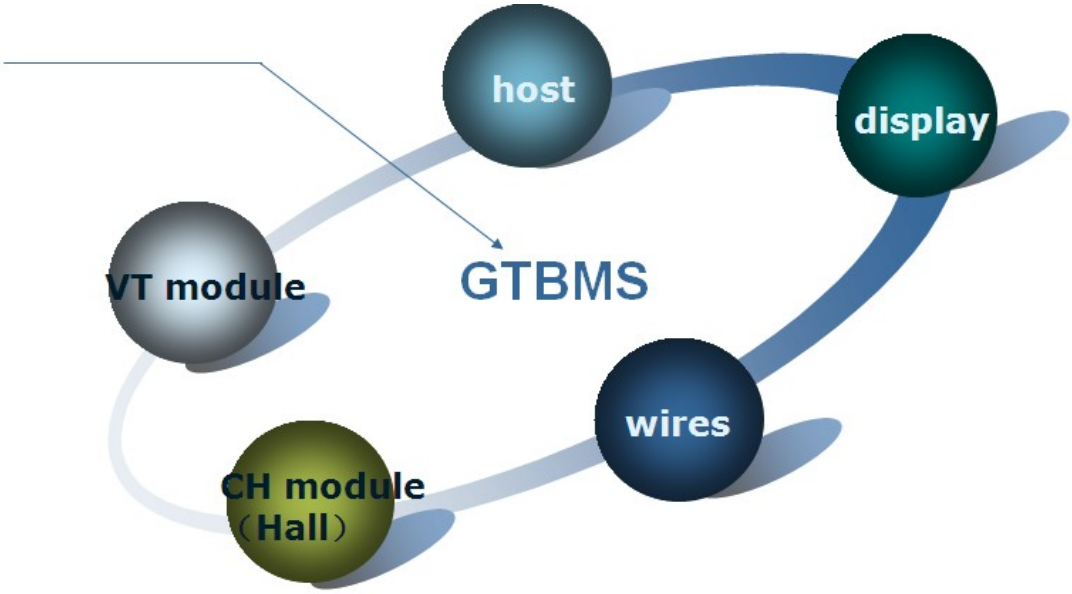
Lithium power battery management system

BMS005A specification

Content

1. Product structure

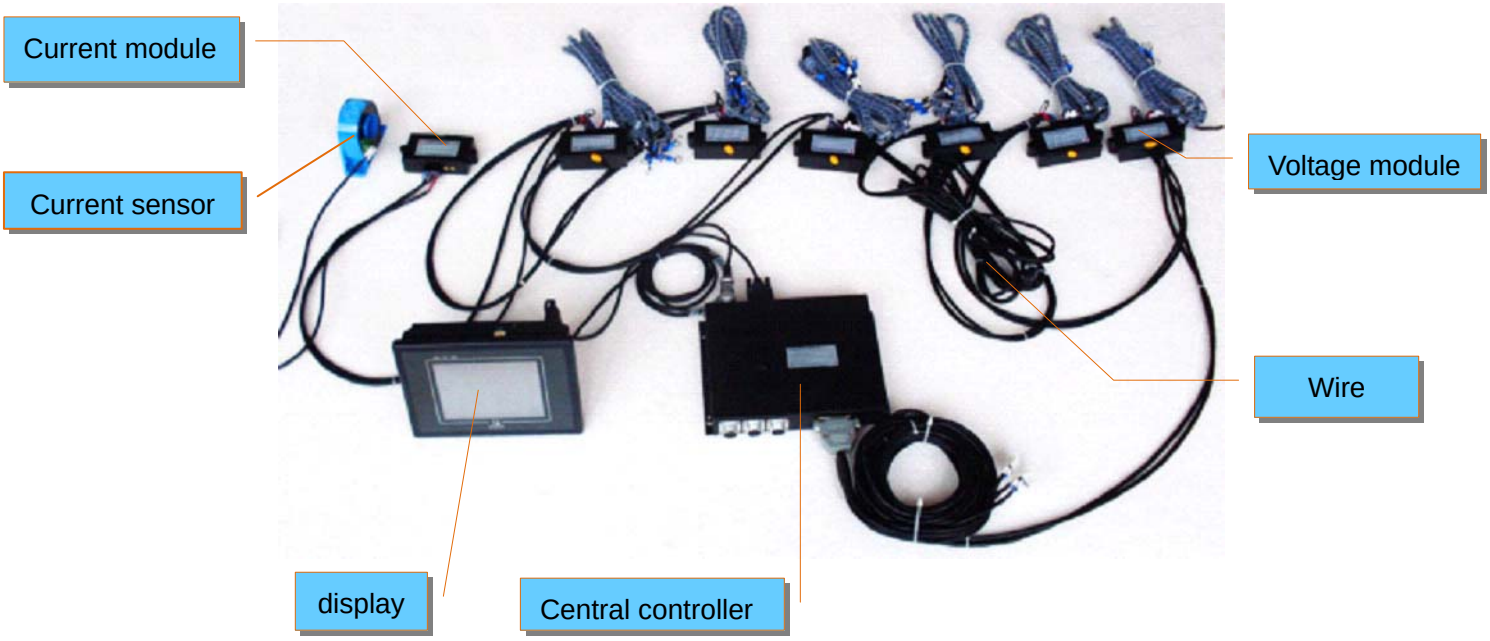
BMS005A-MC11 consists of central controller（BMS005A-MC11）、data collection modules(Volt/Tem module、current module、Insulation resistance module)、display、current sensor and wires.



pic 1 Product Structure

1.1 connection structure

- **Introduction**：Monitor total voltage、total current、remaining capacity (SOC)、highest temperature in a battery pack. It can display each cell voltage、a temperature collection point in a module. You can set up system working parameters. It contains that a module manages how many cells、battery upper limit and lower limit beep warn voltage、battery upper limit and lower limit cutting off voltage、temperature upper limit beep warns、biggest recharging current、current upper limit beep warns、 voltage difference beep warns ，recharging times，SOH，SOC initialize ，rated capacity，Reserve capacity correction factor，system clock and so on.



Pic 2 Overall Show

1.2 Central controller

Introduction：Provide total voltage、total current、module temperature、monomer voltage、SOC、SOH、cycle time and so on；Communicate with chargers and motor controllers with CAN BUS. Store all the data. It can be downloaded to the computer.

pic 3 Central controller (1)

pic 4 Central controller (2)

（1） DC +24V input。（2-pin，power supply input current, user provides）

（2） 7-pin **not used**

（3） CAN interface。（4-pin，charger and motor controller）

（4） Data collection modules communication interface and beep warns output

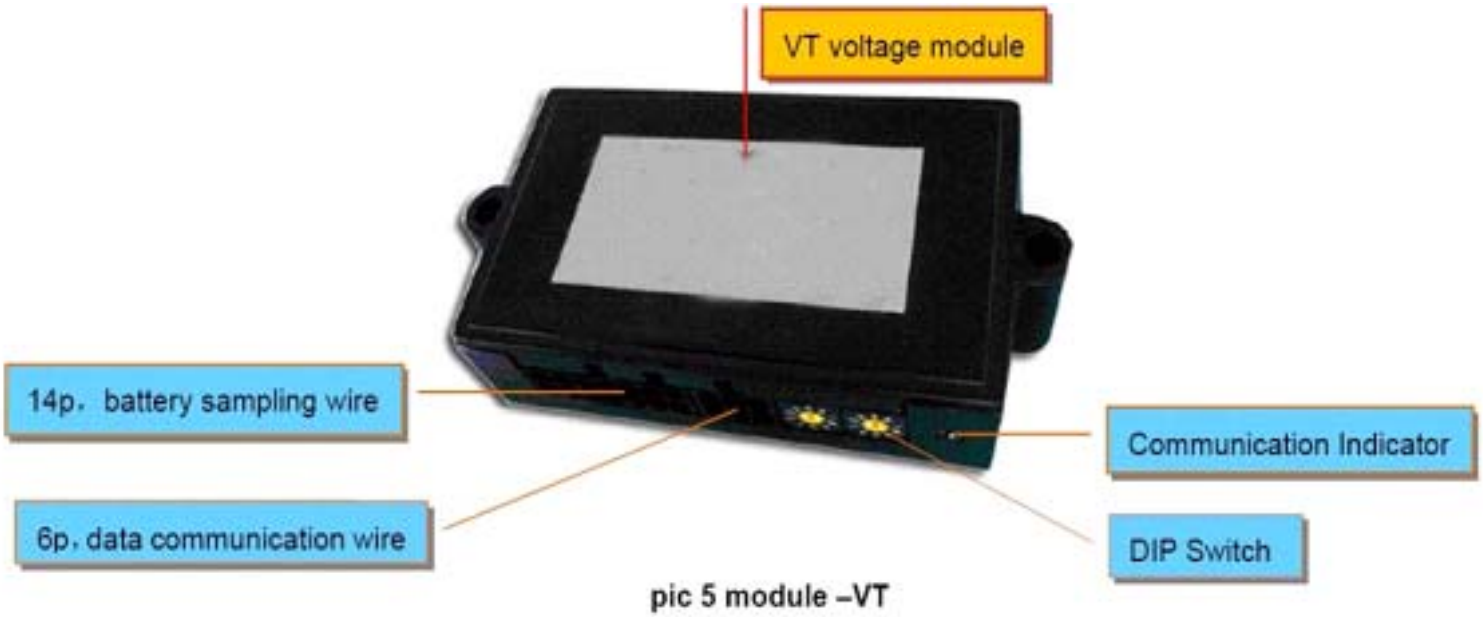
（5） DC+24V output — 3-pin，color touch display power interface。

（6） RS422 —color touch display communication interface。

（7） USB interface —Datas can be downloaded to the computer。

1.3 Voltage，Current，Insulation resistance sample module

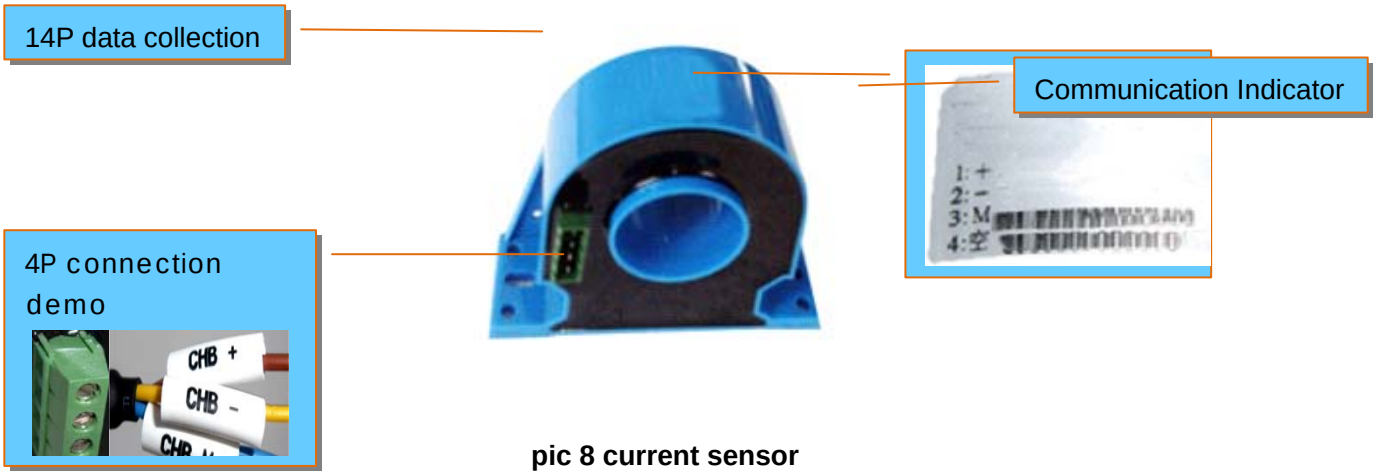
❑ **Introduction**：Voltage collection module is used for collecting voltage data. Each module can get 10 cells voltage and equips one temperature collection point. Data communicates with central controller through DB25 socket {**pic 3** (4)}.There is one current collection module in each BMS.It is often arranged after the volt- age module at last and collects current. Current sensor(hall) according to peak- discharge can be chosen(100A，200A，300A，500A，1000A).



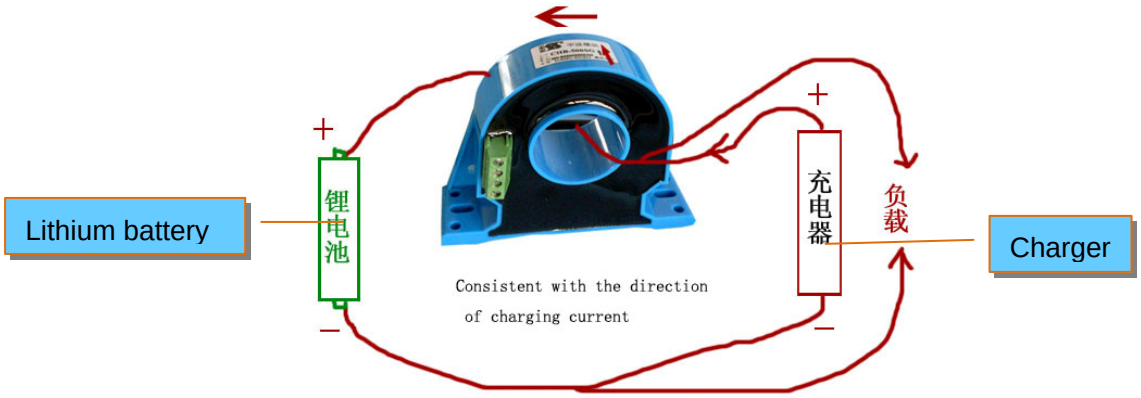
pic 5 module –VT

pic 6 module-CH

- **Connection**：＋，－， M the last pin isn't used， corresponding connection by marking, wrong connection easily leads to Hall corruption.）。
  When recharge, current direction accords to hall.

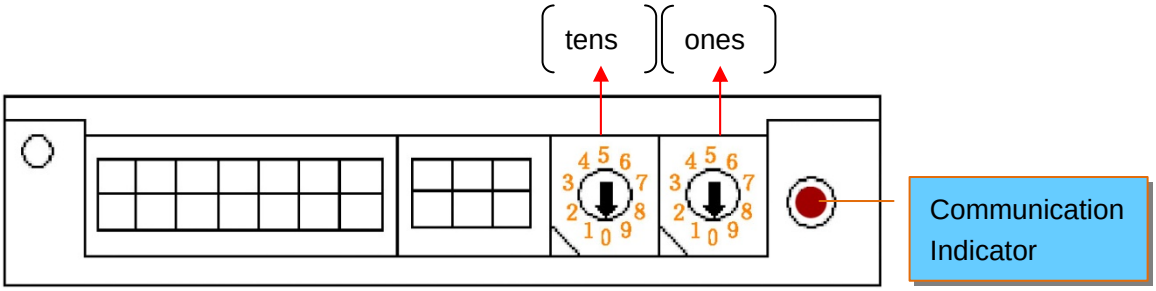


pic 8 current sensor



pic 9 current direction

- **DIP switch setting：**



pic 10 module port

Voltage module：For example, there are five voltage modules. According to the direction of the above fig9, from left to right(tens to ones) settings for each module :0 0，0 1，0 2，0 3，0 4，……； (Accord to modules connection sequence at DB25 communication wire).

If more than 10 modules, and address Carry, from left to right [tens to ones] followed by 1 1, 1 2, 13 ... ...)

Current modules: a voltage module address for the last voltage number +0 2, this case set up to 06 (from No. 04 the last voltage module is calculated +0 2)

Notice：As the method, set up any quantity modules.

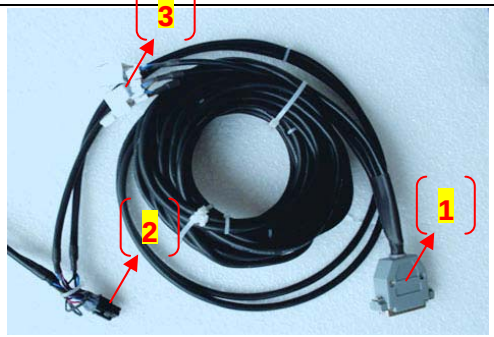
Arrows indicate the correct direction; Power supply connected, normal communications, light flash. Always bright but not flash, there is no normal communication. The light is dark, the power is not connected.

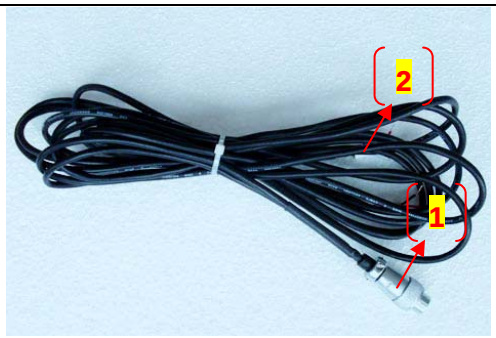
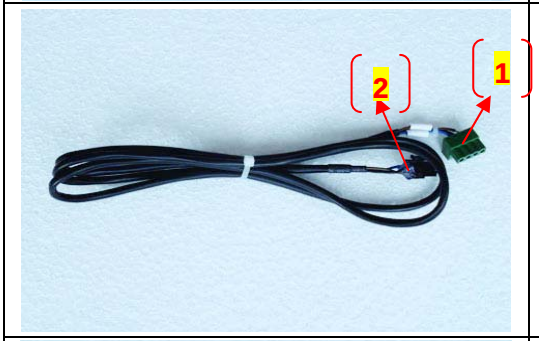
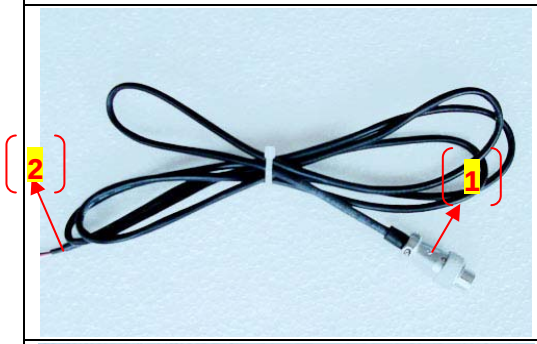
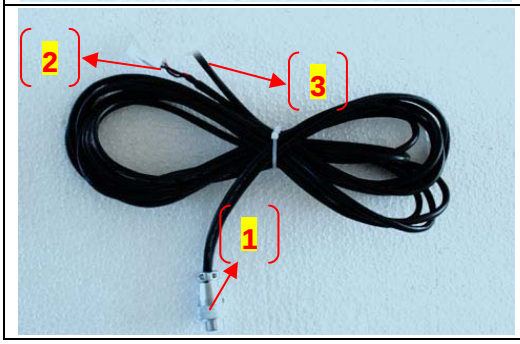
1.4 color touch display (5.6inch)

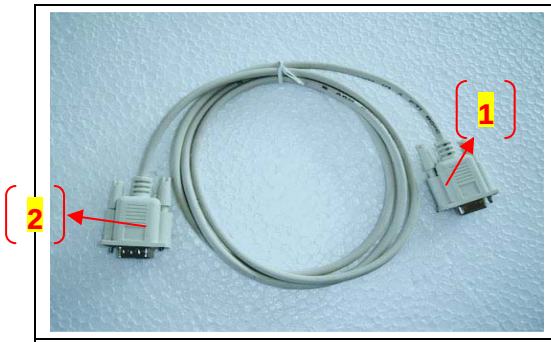
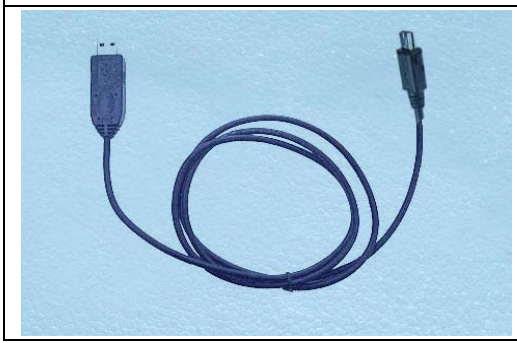
pic 11 dispaly back

pic 12 dispaly bottom

1.5 wires

Figure	name	remark
	DB25 Connection	Central controller and modules communication interface, beep warns output. 1. DB25 connect with central controller 2. 6P connect with modules 3. 3P warn output（switch）

	3-pin color display power supply wire	Used for powering for display 1. 3-pin,connect with central controller 2. Another side connect with (**pic11** display back) O type end.
	Battery sample wire	Used for collect data 1. 14P,connect with voltage, collect data. 2. OT soldering terminal，connect with battery end。
	Current collection wire	Used for collecting loop current 1. 4p,connect with hall sensor 2. 5557-4P,connect with current module 4p end.
	2-pin input power(Don't provide)	Used for supplying power to central controller. 1. 2-pin connect with central controller. 2. Connect with power supply
	4pin CAN communication wire	Communicate with charger and motor controller 1. 4pin,connect with central controller 2. **3.**connect CAN communication equipment（connector prepared by users）

	Color display data connection wire	Used for display and central controller communication 1. RS422 connect with central controller 2. DB9 connect with display
	USB data wire	Download from central controller

2 System setting and application

2.1 Technical Specifications

•Power supply.....user provides DC24V

•Range of voltage measuring.....DC0～+5V

•Voltage measuring accuracy .....±（0.3%RD+0.2%FS）

•Voltage display resolution.....1mV

•Hall sensor

Current measuring range.....0～500A（1000A）

Current measuring accuracy.....±0.5%

Current display resolution..... 0.1A

• Temperature measuring range.....10～85℃

•Temperature measuring accuracy.....±1℃

• Minimum sampling period (voltage).....0.5 s

• Minimum sampling period (current).....0.1 s

• Ah accumulative total minimum period.....0.1 s

• Ah display accuracy.....0.1Ah

• Ah measuring upper limit .....>1000Ah

• IR measuring range.....>2MΩ

• IR measuring accuracy.....±10%

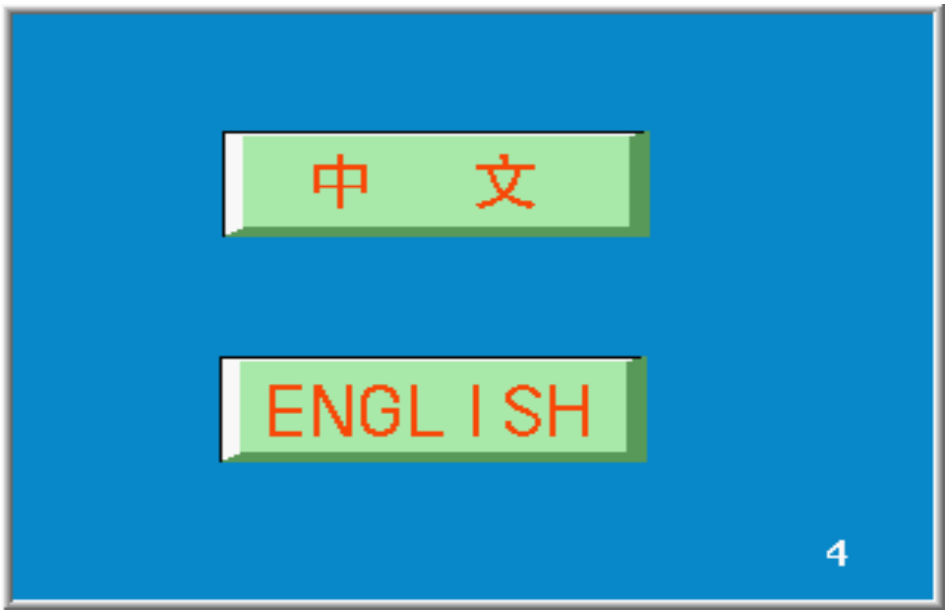
• warn index

The largest switch voltage 30Vdc

The largest switch current 1A

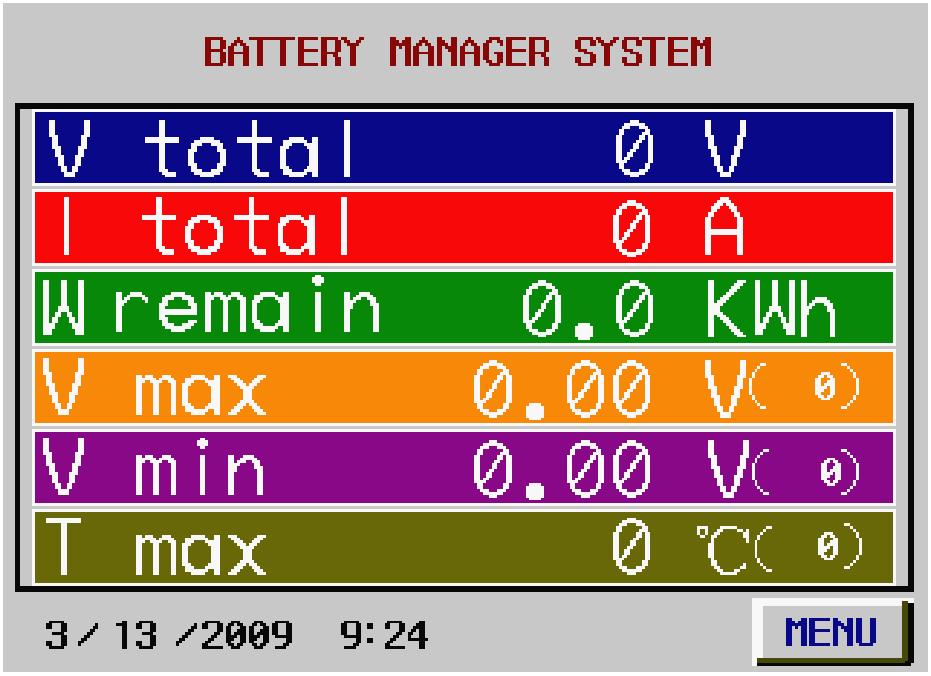
2.2 parameter setting

After starting the system into the home page。As below：



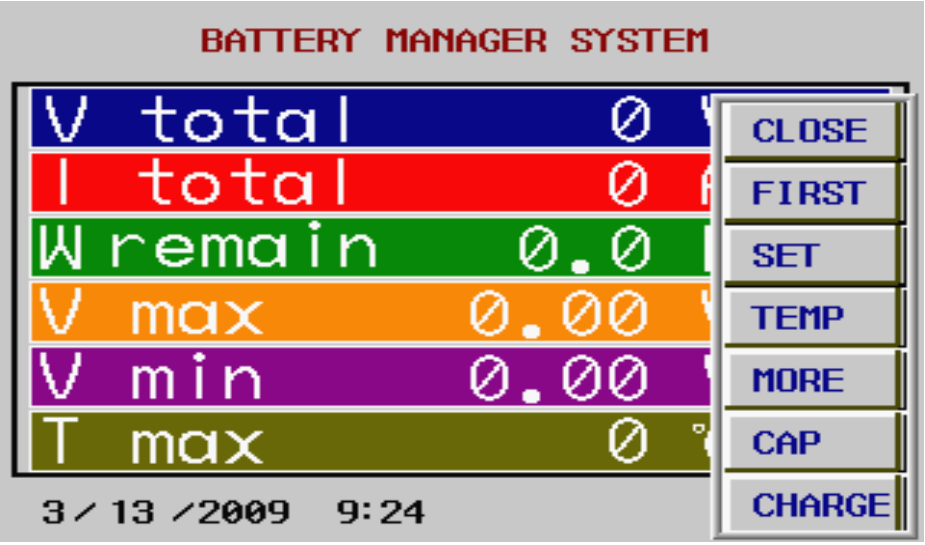
Pic 13 system interface (SOC/TEM)

- Choose “Chinese” or ”English” version



Pic 14 system interface

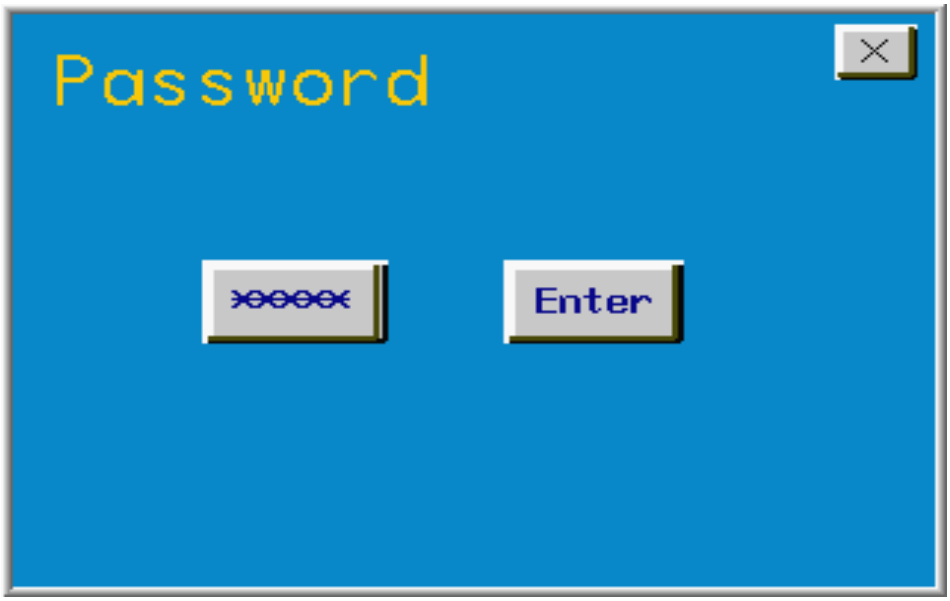
After choosing system menu as below：



Pic 15 system interface

The first time use the BMS, press “set” key, Initial Settings. The required password in the central controller's back. (Password: 31766);After setting up system parameter, it can memorize and save.

A. The next page as below:

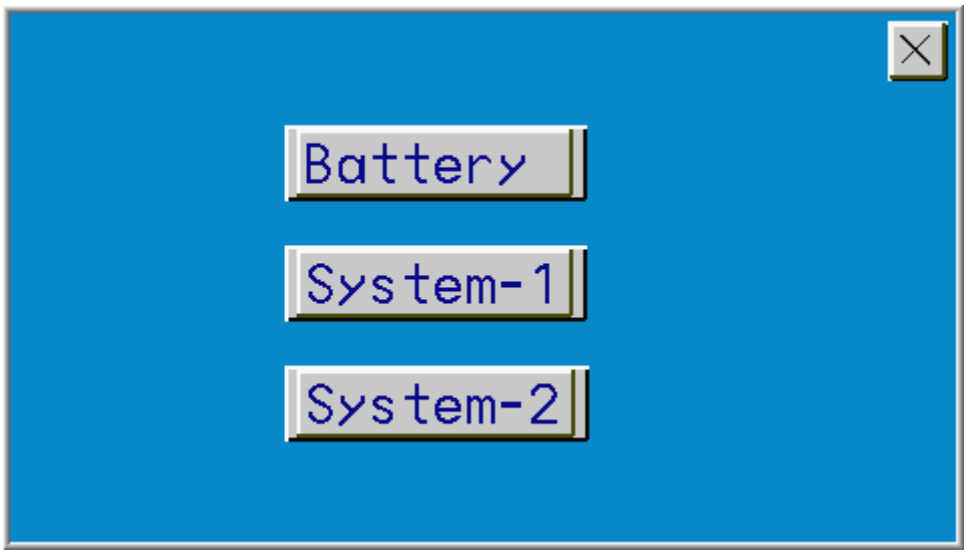


Pic 16 system interface (Password)

Choose“ **×××××**” key, input the password：

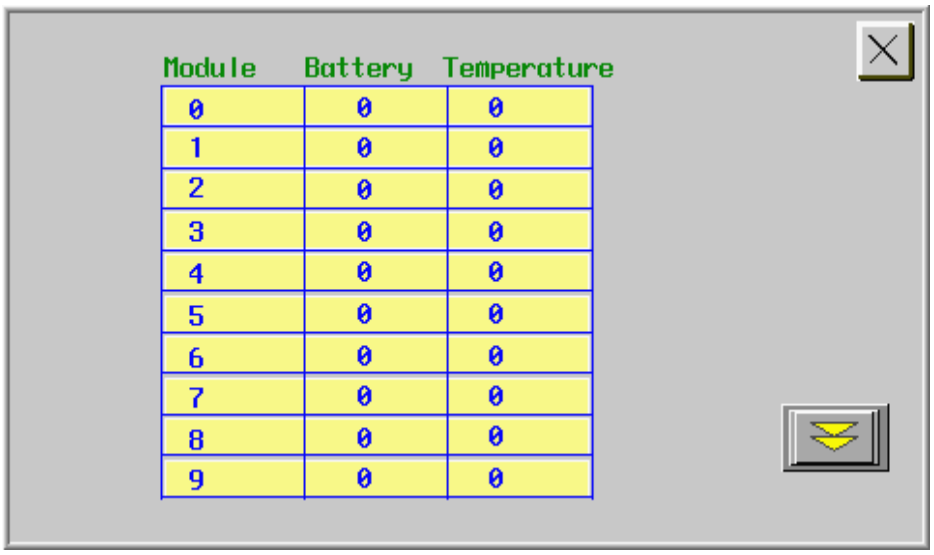
Pic 17 system interface (Password)

Input（Password: 31766）then go into the next page：



Pic18 system interface (operate choose)

- ❑ “Battery”option is used for setting up battery quantity and temperature.

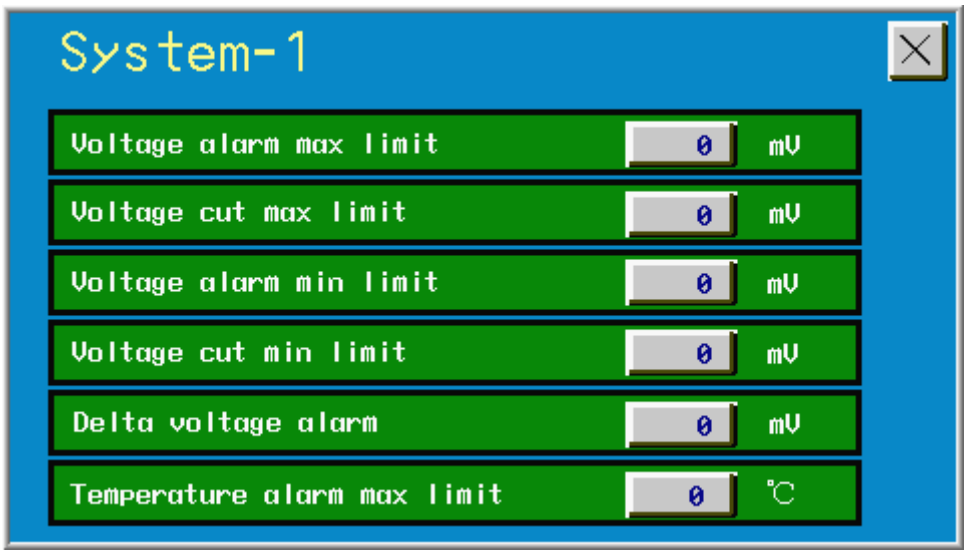


Pic19 system interface（address set）

- “Module” column is module address. It begins with 0. More than 10,turn to the next page.
- “Battery “column is battery quantity which one module manages(0－10 cells）.Input number to change.

  Notice: For example, there are five modules, you need set up 0~4 location.
- “Temperature”column is whether it need collect temperature.0 is no，1 is yes. Input number to change. Usually, we set up this as 1.

❑ Option“System-1” content：



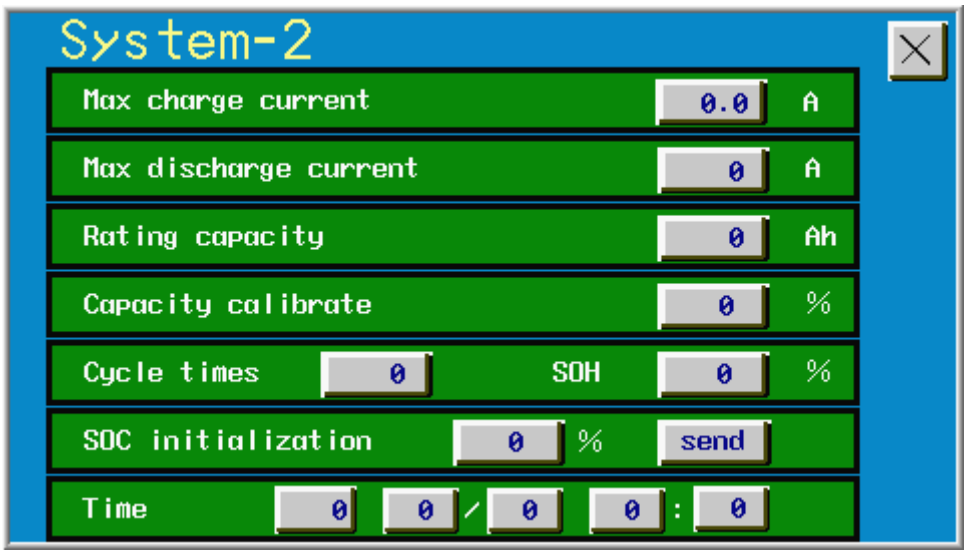
Pic 20 system interface（system-1）

The following parameters accords to battery situation, users set up these Initialization.

Table1: System_1 parameter

Voltage alarm max limit	When recharging, one of cells voltage reaches the value, BMS will warn and control charger to balance charging process.
Voltage cut max limit	One of cells voltage reaches the value, will warn and stop charging. Only shut off the power, warn can stop.。
Voltage alarm min limit	When discharging, one of cells voltage reaches the value, BMS will warn and controller motor controller to reduce out power. Avoid over-discharge. Voltage will be raised
Voltage cut min limit	One of cells voltage reaches the value,will warn and disconnect joint. Only shut off the power, warning can stop.We suggest that make the joint connect with motor controller.
Delta voltage alarm	The difference value between the highest voltage and the lowest voltage. It reaches the value, beep warns.
Temperature alarm max limit	When the temperature is higher than the value, beep warns. It shares the joint with voltage upper limit warning

❑ Option“System-2” content：



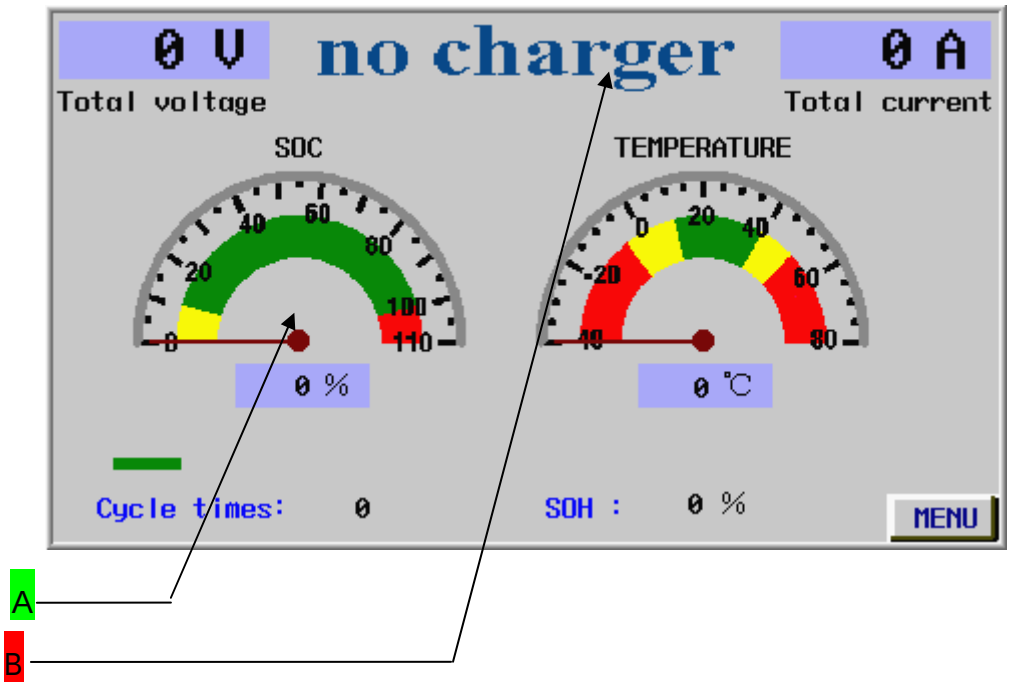
Pic21 system interface（system-2）

Table2: System_2 parameter

Max charge current	output maximum current. The function is effective for the chargers which can communicate with our BMS.
Max discharge current	BMS allows the maximum discharging current. If more , will warn .
Rating capacity	Rated capacity of single cell. Consistent with the SOC.100%
Capacity calibrate	Notice current sensor fix direction.Notice the direction of fixing hall。**Pic 8** 。Amend the capacity loss during charging and discharging/.
Cycle times	Times of Charge and discharge
SOH	Battery pack Health status , can set 0.
SOC initialization	Suggest that setting 100% after normal charging at the first time . choose “send”, can set successfully.

Time	System can save all data time.
NODE INVALID ALARMING	When the communication between central controller and collection module is valid, system warns. It shared a switch with Voltage cut min limit. this warn as a basis for motor controller to reduce power output.

B. Choose" CHARGE" button：



Pic 22 system interface（Charge state）

A：SOC status。When charging, this bar scrolls. Static value displays the SOC.

B：Charger Status Indicator。

Press "Menu", choose the next steps. Charge, stop or return：

Charging process is divided into three stages (chargers must communicate with the BMS)：

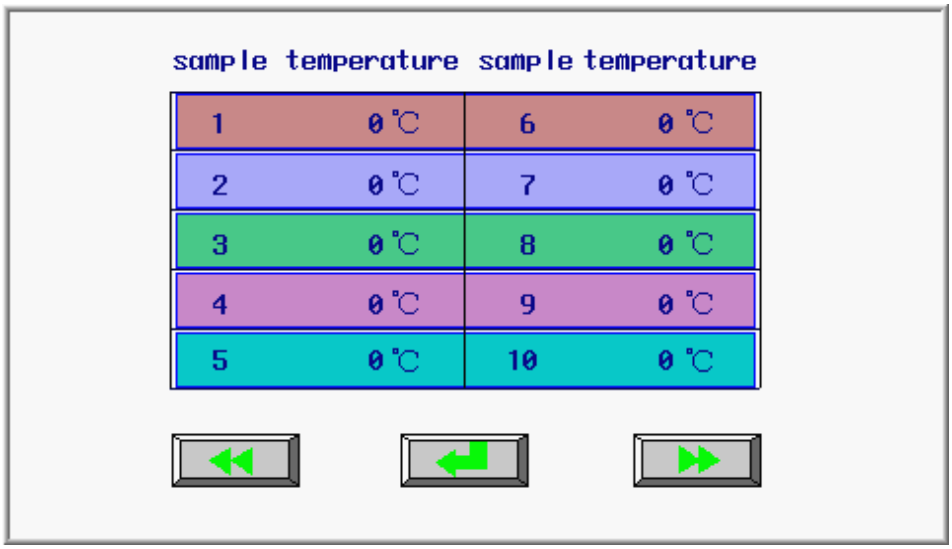
1. Pre-Charge 2. Constant current charging 3. trickle-charge

Table3: Charging state marking

No charger	Charger is not connected	Cycle times	Charge cycle times
Ready	Charger is ready, you can charge	SOH	Battery health index
Charging	Is charging	SOC	remaining capacity
Stop	Stop charging	Temperature	The maximum ambient temperature
Return	Back homepage		

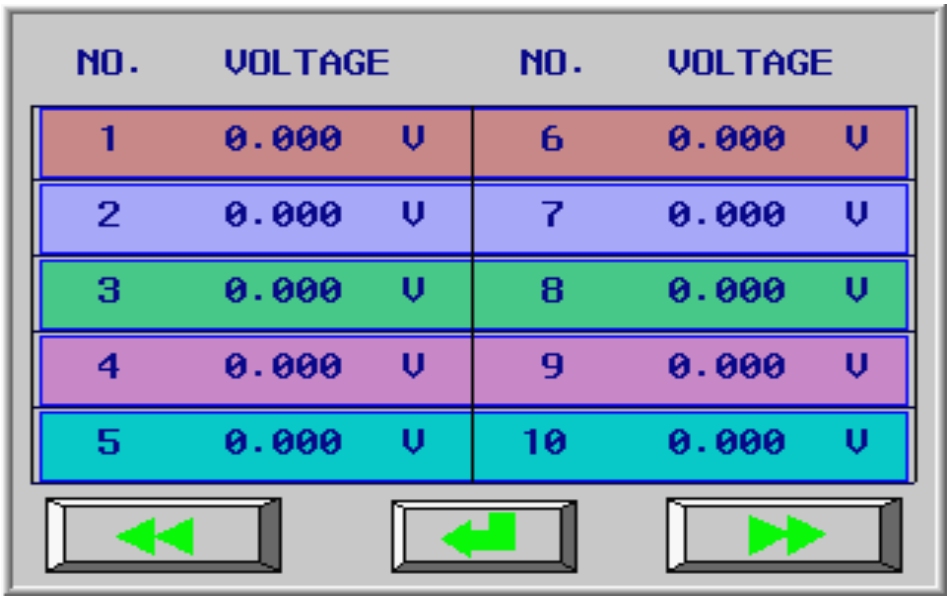
C. Choose “First” button, return homepage：

D. Press “TEMP” button, you can see the temperatures of each module managing.



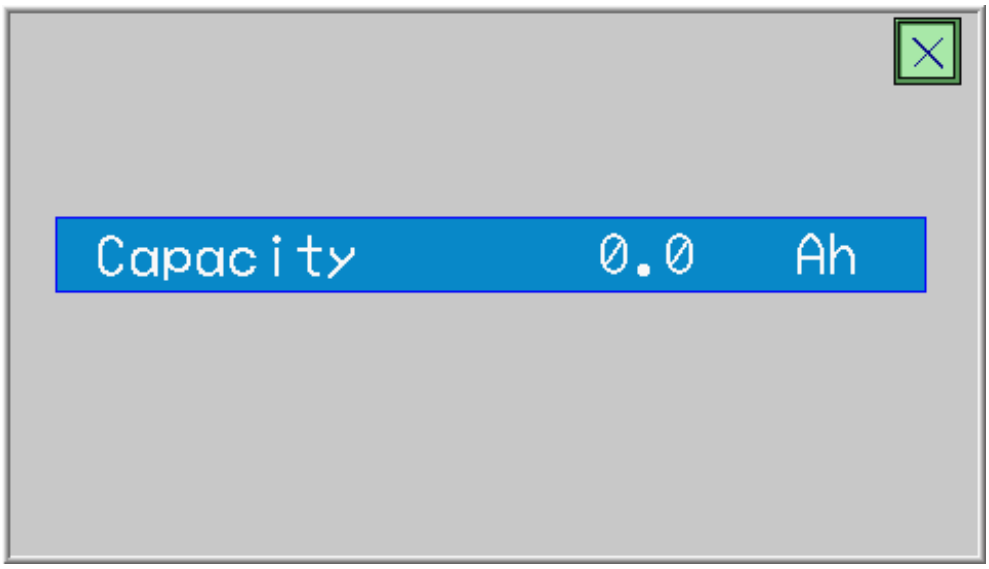
Pic 23 system interface（temperature）

E. Choose the “More “button, can check the each cell voltage. Default :0.000V：



Pic 24 system interface（monomer voltage）

F. Choose the “CAP”, check the remaining Capacity.



Pic 25 system interface（capacity）

2.3 Application areas

Electric buses, cars, three trucks, bicycles, yachts, golf cart, sightseeing car, clean cars, deep-sea exploration device auxiliary battery powered, underwater experimental devices, 3G communications base stations, electric power, wind power, sun Energy and other auxiliary power battery pack.

2.4 Accessories

- Disk (Wiring diagram, , Chinese and English specification, USB drive, upper computer software*(used for download data from system)*)
- specification
- Operation process

2.5 using method of disk

- If you want to install the data for testing, please connect with pc. At first, run the USB driver, after that, install the client-side software. Choose the corresponding USB COM port, download dates.
- BMS central controller can save seven days' data. Cycle and update the oldest data. When download the data , from the oldest to the newest about several hours. If connects with PC through USB all the time, can download persistently. It has a little time delay.

3. FAQ

3.1 Notice

1. The display should be placed in the shade to avoid in the sunlight, prevent display placed in the high-temperature environment, leading to damage.

2. Modules are coated with three anti-paint, waterproof, moisture-proof, still can not be directly immersed in water, so as to avoid corrosion of the module internal components moldy.

3. Supply power has a strict demand. At the beginning of design, should ensure that there will be no big power devices in the supply power branch, and avoid power supply appearing any voltage fluctuation.

4. BMS, wiring harness plugs should pay attention to press that buckle plug above at first, do not directly pull out, or will break.

Notice the top label of hall, ensure the right current direction to avoid break

the BMS.

5. Our BMS communicates with chargers and motor controller by CAN protocol. For an effective management of over-charging and over-discharging. Please ensure that.

3.2 Q&A

1. **Q**：When should the system parameter be set ?

   A： Products have an initial data; customers get the BMS and set it by the actual situation.

2. **Q**：Why does the battery quantity display wrongly ？

   A：Please check whether the communication wires, and module address, software setting are right.

3. **Q**：How long does the soc need to proofread？

   A：After using longer, accord to battery situation and circumstance proofreading again.

4. **Q**：There is a BMS, but still over- charge and discharge?

   A：Whether the charger and motor controller communicate with our BMS and the wire is good.

5. **Q**：Module indicator is always bright or not bright?

   A：Check the communication and supply power. Normal situation is flash.