Preparation before BMS configuration , and points for attention

1、建议使用电脑端软件进行 BMS 的参数标定，

1. It is recommended to use computer software for parameter settings of BMS

2、BMS 与电脑的连接方式，推荐使用 USB 连接、或者 WIFI 的现场直连模式。请参考对应的说明文档，建立 BMS 与电脑的连接。

2, The connection of BMS and PC computer :it is recommended to use USB connection, or WIFI on-site direct connection mode. Please refer to the corresponding documentation to establish the connection between the BMS and the computer.

3、参数标定期间，确保电池组不会被意外充电、放电。最好能够断开直流回路。

3. During parameter settings, please ensure that the battery pack will not be accidentally charged or discharged. It is best to let discharging and charging disconnected

4、请使用开机信号 C6 唤醒 BMS 启动运行，不要用放电唤醒信号启动 BMS。

4, please use the BMS power-on signal C6 to wake up BMS to start and run, do not use the discharge wake up signal to start BMS.

5、请多次读取参数进行核对、仔细检查参数设置的是否正确。

参数标定完成后：After parameter settings on the PC software:

- 移除充电装置、放电装置，确保电池不会被意外的充放电，然后启动 BMS 开机。读取 BMC 主机、各个 BIC 采集器的电压温度数据，确认数据正常。最后，关闭 BMS、接通高压直流回路，准备正式充放电测试。

Remove the charging device and discharge device to ensure that the battery will not be accidentally charged and discharged, and then start the BMS. Read the voltage and temperature from the master BMS and each slave bms and verify that the data is on . Finally, the BMS is turned off , the HVDC circuit is switched on, and prepare the formal charge and discharge test

- 第一次正式充放电测试，电池组、人员、设备做好安全防护，充、放电期间，人员全程监控，确保 BMS 系统各个关键节点保护功能正常。

For the first formal charge and discharge test,of entire battery pack , the battery pack, personnel and equipment should be protected. During the charge and discharge , personnel should monitor the whole process to ensure the normal protection works well of each key points of the BMS system.

参数保护功能 Parameter protection function

BMS 运行中，关键的参数一旦被改变，将非常危险。为了防止参数被意外改变，BMC、BIC 等各个模块，设置有参数保护功能。当改变这些模块的参数时，必须同时解除它们的参数保护。

During BMS operation, once the key parameters are changed, it will be very dangerous. To prevent unexpected parameter changes, the master bms and slave bmss are configured with parameter protection functions. When you change the parameters of these modules, you must also remove their parameter protection.

参数错误停止运行功能 Parameter error and BMS Stops

BMS 系统中的很多参数项是相互依赖、相互控制、相互关联的。如果某个参数设置的不合理，可能导致其他的参数被迫出错；如果单独看某个参数处于合理区间，但不符合与其他参数的相容性要求，则也会导致系统出错。

Many parameters in the BMS system are interdependent, mutually controlled and interrelated. If a parameter is set improperly, other parameters may be forced to be errors. If a parameter is in a reasonable range, but does not meet the compatibility requirements with other parameters, it will also lead to system errors.

尽管我们的 BMS 系统已经做了一部分参数相互限制的判断，一旦出现关联性出错 BMS 将停止运行。但众多参数难以考虑全面，实际操作中请多加检查和验证。

Although our BMS system has made some judgments that the parameters are mutually limited, the BMS will stop running if there is a correlation error. However, many parameters are difficult to consider comprehensively, so please check and verify more in actual operation.

修改 BMC 模块的参数 Modify Master BMS settings

BMC 模块的设置参数在任何时候都可以读取，而修改保存参数，需要解除参数保护。

The Settings of the master bms can be read at any time. If you modify the parameters, you need to disable the parameter protection.

方式 1：BMS 开机唤醒后的 10 秒内，点击发送进入设定模式的指令。软件提示成功进入设定模式后，参数保护功能解除，将持续允许改动 BMC 的参数，直至下一次重新唤醒启动后，恢复参数保护。

Method 1: Within 10 seconds after the BMS starts up, click the button "Send to enter the setting mode". After the PC software shows you enter the setting mode successfully, the parameter protection function is disabled, and you can continue to change master bms parameters until the next restart, and the parameter protection is restored.

如果使用 WIFI 与电脑建立连接、进入设定模式时，由于 BMS 唤醒开机后，BMC 只允许唤醒后的 10 秒内，接收进入设定模式的指令，而在此期间，WIFI 模块不一定有足够时间与电脑软件建立连接，无法完成设定模式指令的接收，导致无法进入设定模式。可选择 USB 连接方式。

If you use WIFI to establish a connection with the computer and enter the setting mode, the master bms only allows the command to enter the setting mode within 10 seconds after the BMS wakes up and starts up, and during this period, the WIFI module may not have enough time to establish a connection with the computer software, and the receiving of the setting mode command cannot be completed, resulting in the failure to enter the setting mode. USB connection is available.

方式 2：不必进入设定模式，先在软件中填写好参数，然后按下设置按钮不要松开，此时参数保护被解除，最后点击保存，软件提示 Done 则说明参数保存成功。调整完成后松开按钮，恢复参数保护功能。

Method 2: Do not enter the setting mode, first of all . fill in the parameters in the PC software, and then press the setting button of master bms (see following picture) and do not release, at this moment the parameter protection is disabled , and finally click the button "Save", the PC software shows " Done", indicating that the parameters are saved successfully. Release the button after adjustment to restore the parameter protection function.

BMC 模块相关参数说明(单体电压部分) Master BMS data sheet (cell voltage)		
Name	Features	Setting Range
最高极限电压 Maximum voltage	一旦充电机未能按照 BMS 报告的状态终止充电，导致任意一节单体电压超过了“充电终止电压”，且继续上升超过此值后，BMS 断开分压继电器，并进行故障锁定。 Once the charger fails to stop charging according to the status reported by the BMS, resulting in the voltage of any cell exceeding the "charge cut-off voltage" and the voltage keeps rise , the BMS disconnects the voltage divider relay and performs fault locking.	大于充电终止电压一定的值，且单体不会过压损坏为好 Greater than a certain value of the charging cut-off , and the cell will not be damaged by overvoltage
最低极限电压 Minimum voltage	一旦放电的装置未能按照 BMS 报告的状态终止放电，导致任意一节单体电压低于“放电终止电压”，且继续下降低于此值后，BMS 断开分压继电器，并进行故障锁定。 If the discharging device fails to stop the discharge according to the status reported by the BMS, resulting in the voltage of any cell to be lower than the "discharge cut-off voltage" and it keeps dropping and goes below the cut-off voltage , the BMS disconnects the voltage divider relay and performs fault locking.	低于放电终止电压一定的值，且单体不至于欠压损坏为好 Lower than a certain value of discharge cut-off voltage , and the cell will not be damaged due to under voltage

充电终止电压 Charging cut-off voltage	当任意单体电压超过此值时，BMS 将通过 CAN 总线、输出信号，报告电池组状态为“不能充电”。充电机需要及时响应。 When any cell voltage exceeds this value, the BMS will report the status of the battery pack as "no charge" through the CAN bus and output signals. The charger needs to respond in time.	按照电芯厂家的要求设定。 Set according to the requirements of the battery manufacturer.
恢复充电电压 Recovery charge voltage	当最高的单体电压低于此值时，BMS 将报告电池组的状态为“允许充电”。 When the highest cell voltage falls below this value, the BMS will report the status of the battery pack as "Charge allowed".	低于“充电终止电压”一定的值， a certain value Lower than a certain value of "charge cut-off voltage",
降电流充电电压 current drop charging voltage	当任意单体电压超过此值时，BMS 报告电池组最大充电接受能力开始线性降低，如果充电机支持功率调节，应当降低充电电流。 When any cell voltage exceeds this value, the BMS reports that the maximum charge acceptance capacity of the battery pack begins to linearly decrease, and the charge current should be reduced if the charger supports power regulation.	根据电芯厂家提供的电池充电的接受性能，低于“充电终止电压”一定的值。 According to the battery charging acceptance performance provided by the battery cell manufacturer, it is a certain value lower than the "charging cut -off voltage".
降电流放电电压 current drop discharge voltage	当任意单体电压低于此值时，BMS 报告的电池组最大放电输出能力开始线性降低，如果放电装置支持功率限制，应当降低放电电流。 When any cell voltage is lower than this value, the maximum discharge output capacity of the battery pack reported by the BMS begins to decrease linearly, and the discharge current should be reduced if the discharge device supports power limits.	根据电芯厂家提供的电池放电输出性能，高于“放电终止电压”一定的值。 According to the battery discharge output performance provided by the battery cell manufacturer, it is higher than a certain value of "discharge cut-off voltage".
恢复放电电压 Discharge Recovery Voltage	当最高单体电压高于此值时，BMS 开始报告电池组的状态为“允许放电”。 When the maximum cell voltage is higher than this value, the BMS begins to report the status of the battery pack as "Discharge allowed".	高于“放电终止电压”一定的值。 A certain value Higher than Discharge Cut-off Voltage.
放电终止电压 Discharging cut-off voltage	当任意单体电压低于此值时，BMS 报告电池组的状态为“禁止放电”。 When any cell voltage is lower than this value, the BMS reports the status of the battery pack as "No discharge".	按照电芯厂家的要求设定。 Set according to the requirements of the cell manufacturer.
均衡开启压差 Balancing Voltage Difference	当各个单体电压的电压差值超过此值时，BMS 控制差异大的电芯进行能量均衡转移，最终目标是各个单体电压差值小于此值。 When the voltage difference of each cell voltage exceeds this value, BMS controls the balance transfer of cells with large differences, and the purpose is that the voltage difference of each cell is less than this value.	建议设置在 5mV - 50mV 区间。电芯体质先天较好、电池组运行环境干扰较小时，可以设置为较小值。 You are allowed to set the value in the range of 5mV-50mV. The battery nature is inherently good, the battery pack operating environment interference is small, you can set to a smaller value.

开始均衡电压 Balancing start Voltage	当各个单体电压大于此值时，BMS 开始检测各个单体电压之间的差值、并控制各个单体的电压均衡。 When the voltage of each cell is greater than this value, the BMS begins to detect the difference between the voltages of each cell and control the voltage balance of each cell.	小于“充电终止电压”，大于“放电终止电压”。电芯一致性非常好的电池组应当尽可能的低，这样可充分利用 BMS 开机时间进行均衡。反之应当提高。 Less than Charge cut-off voltage, greater than discharge cut-off voltage. The battery pack with very good cell consistency should be as low as possible, so as to make full use of the BMS startup time for balance. Instead, it should be raised.

某型号 LFP 磷酸铁锂设置电压参数举例：最高极限电压 3700mV；最低极限电压 2500mV；充电终止电压 3550mV；恢复充电电压 3500mV；降电流充电电压 3450mV；降电流放电电压 3050mV；恢复放电电压 3000mV；放电终止电压 2700mV；均衡开启压差 5mV；开始均衡电压 3250mV；

LFP Battery set voltage parameters Example: maximum limit voltage 3700mV; Minimum limit voltage 2500mV; Charging cut-off voltage 3550mV; Recovery charging voltage 3500mV; Downcurrent charging voltage 3450mV; Drop current discharge voltage 3050mV; Recovery discharge voltage 3000mV; Discharge cut-off voltage 2700mV; Balanced start voltage difference 5mV; Start balancing voltage 3250mV;

某型号 NCM 三元锂设置电压参数举例：最高极限电压 4150mV；最低极限电压 2900mV；充电终止电压 4050mV；恢复充电电压 4000mV；降电流充电电压 3950mV；降电流放电电压 3350mV；恢复放电电压 3200mV；放电终止电压 3000mV；均衡开启压差 5mV；开始均衡电压 3500mV；

Example of setting voltage parameters for a certain type of NCM ternary lithium: maximum limit voltage 4150mV; Minimum limit voltage 2900mV; Charging cut-off voltage 4050mV; Restore charging voltage 4000mV; Down current charging voltage 3950mV; Drop current discharge voltage 3350mV; Recovery discharge voltage 3200mV; Discharge cut-off voltage 3000mV; Balanced open pressure difference 5mV; Start balancing voltage 3500mV;

BMC 模块相关参数说明（温度部分）Master BMS Features Description (Temperature part)		
Name	功能 Features	设置范围 Setting Range
极限高温保护 Limit of high temperature protection	当温度高于“充电高温保护”、“放电高温保护”后，BMS 会报告状态禁止充电、放电；但如果温度继续上升，到达此值，BMS 断开分压继电器，并进行故障锁定。 When the actual temperature is higher than "charging high temperature protection" and "discharge high temperature protection", the BMS will report the status of no charging or discharging; But if the temperature continues to rise and this value is reached, the BMS disconnects the divider relay and performs a fault lock.	必须同时高于“充电高温保护”和“放电高温保护”一些，且电池不会高温损坏为好。 It must be higher than the "charging high temperature protection" and "discharge high temperature protection" at the same time, and the battery will not be damaged by high temperature.
极限低温保护 Limit of low temperature protection	当温度低于“充电低温保护”、“放电低温保护”后，BMS 会报告状态禁止充电、放电；但如果温度继续下降，到达此值，BMS 断开分压继电器，并进行故障锁定。 When the actual temperature is lower than "Charge low temperature protection" and "Discharge low temperature protection", the BMS will report the status to prohibit charging and discharging. But if the temperature continues to drop and this value is reached, the BMS disconnects the divider relay and performs a fault lock.	必须同时低于“充电低温保护”和“放电低温保护”一些，且电池不会低温损坏为好。 It must be lower than the "charge low temperature protection" and "discharge low temperature protection" at the same time, and the battery will not be damaged at low temperature.

充电高温保护 Charging high temperature protection	当温度高于此值，BMS 将报告电池组状态为“不能充电” When the temperature is higher than this value, the BMS will report the battery pack status as "no charge".	按照电芯厂家的要求设定 Set according to the requirements of the cell manufacturer
降电流充电高温值 Low current charging high temperature limit	当温度超过此值时，BMS 报告电池组最大充电接受能力开始线性降低，如果充电机支持功率调节，应当降低充电电流。 When the temperature exceeds this value, the BMS reports that the maximum charge acceptance capacity of the battery pack begins to linearly decrease, and the charge current should be reduced if the charger supports power regulation.	根据电芯厂家提供的温度对充电性能的影响而定，低于“充电高温保护”一些。 According to the influence of the temperature provided by the battery cell manufacturer on the charging performance, it is lower than the "charging high temperature protection".
降电流充电低温值 Lower current charge low temperature limit	当温度低于此值时，BMS 报告电池组最大充电接受能力开始线性降低，如果充电机支持功率调节，应当降低充电电流。 When the temperature is lower than this value, the BMS reports that the maximum charge acceptance capacity of the battery pack begins to linearly decrease, and the charge current should be reduced if the charger supports power regulation.	根据电芯厂家提供的温度对充电性能的影响而定，高于“充电低温保护”一些。 According to the impact of the temperature provided by the battery cell manufacturer on the charging performance, it is higher than the "charging low temperature protection".
充电低温保护 Charge low temperature protection limit	当温度低于此值时，BMS 报告电池组状态为“不能充电” When the temperature is below this value, the BMS reports the battery pack status as "no charge".	按照电芯厂家的要求设定 Set according to the requirements of the cell manufacturer
放电高温保护 Discharge high temperature protection limit	当温度高于此值时，BMS 报告电池组状态为“不能放电” When the temperature is higher than this value, the BMS reports the battery pack status as "cannot discharge".	根据电芯厂家的要求而定 According to the requirements of the battery manufacturer
降电流放电高温值 Low current discharge high temperature limit	当温度高于此值时，BMS 报告电池组最大放电输出能力开始线性降低。如果放电装置支持功率调节，应当限制放电电流。 When the temperature is higher than this value, the BMS reports that the maximum discharge output capacity of the battery pack begins to linearly decrease. If the discharge device supports power regulation, the discharge current should be limited.	根据电芯厂家提供的温度对放电性能的影响而定。低于“放电高温保护”一些 According to the impact of temperature on discharge performance provided by the battery cell manufacturer. Lower than "discharge high temperature protection"
降电流放电低温值 Low current discharge low temperature limit	当温度低于此值时，BMS 报告电池组最大放电输出能力开始线性降低。如果放电装置支持功率调节，应当限制放电电流。 When the temperature is lower than this value, the BMS reports that the maximum discharge output capacity of the battery pack begins to linearly decrease. If the discharge device supports power regulation, the discharge current should be limited.	根据电芯厂家提供的温度对放电性能的影响而定。高于“放电低温保护”一些 According to the influence of temperature on discharge performance provided by the battery cell manufacturer. Higher than "discharge low temperature protection"
放电低温保护	当温度低于此值时，BMS 报告电池组状态为“不能放电”	按照电芯厂家的要求设定

温度恢复回差 Temperature recovery return difference	发生温度保护后，需要向正常温度的范围内，返回一定的温度值，才允许解除温度保护。 After the temperature protection occurs, you need to return a certain temperature value to the normal temperature range to disable the temperature protection.	建议 1 至 5℃ 1 to 5 ° C is recommended
允许均衡温差 Allowable balancing temperature difference	各个温度检测点的最大最小差值必须小于此值时，BMS 将允许单体电压均衡电路工作 When the maximum and minimum difference of each temperature detection point must be less than this value, the BMS will allow the single voltage equalization circuit to work	建议 5 至 15℃ 5 to 15 ° C is recommended

某型号电池设置温度参数举例：极限高温保护 55℃；极限低温保护 -15℃；充电高温保护 45℃；降电流充电高温值 35℃；降电流充电低温值 15℃；充电低温保护 0℃；放电高温保护 50℃；降电流放电高温值 35℃；降电流放电低温值 15℃；放电低温保护 -10℃；温度恢复回差 1℃；允许均衡温差 10℃；

Example of setting temperature parameters for a battery model: Maximum high temperature protection 55 ° C; Limit of low temperature protection -15℃; Charging high temperature protection 45℃; Low current charging high temperature value 35℃; Lower current charging low temperature value 15℃; Charging low temperature protection 0℃; Discharge high temperature protection 50℃; Low current discharge high temperature value 35℃; Lower current discharge low temperature value 15℃; Low temperature discharge protection -10℃; The temperature recovery return difference is 1℃; Allow the balancing temperature difference of 10℃;

BIC 连接设定及热敏电阻 Slave bms connection setting and thermistor		
名称 Name	功能 Features	设置范围 Setting
安装 BIC 的数量 Number of Slave bms installed	设置整个 BMS 系统，有多少个 BIC 级联而成，也就是 BMC 需要读取多少个 BIC 数据 Set the number of slave bms in the entire BMS system ,the Master bms needs to read data via these slave bms	按照实际 BIC 的数量准确设定，常规供货版本 < 100 个 Set according to the actual number of slave bms , Standard version : SLAVE BMS <100 pcs
热敏电阻类型 Type of Thermistor	BIC 连接的温度传感器类型，如果不是定制产品，默认型号为“MF52-10K-3435”。 The type of temperature sensor connected to slave bms , if not a customized product, the default model is "MF52-10K-3435".	目前请设置为 1，客户有特殊定制的需要与我们确认。 At present, please set it to 1, the customer has special customization needs ;please ask us.
这里并不是属于 BIC 模块的参数，而是属于 BMC 的参数。“每个 BIC 的设定”才是属于 BIC 模块的参数 These are not parameters for the slave bms but for master bms . The "setting of each slave bms " is the parameter that belongs to the slave bms		

功率表 Power data sheet		
电流检测标定 Current Measurement and calibration	功能 Features	操作方法 Instructions
方式 1：标定传感器 Method 1: Calibrate the sensor	直接输入分流器的参数，实现电流值的正确显示 Directly enter the parameters of the shunt in the software to realize the correct value showed	选择 BMC 型号；计算出分流器的 A/mV 值，并输入软件的“传感器输出值”中，然后点击标定，软件将提示“Done”。最后读取电流量程核对是否正确。 Select master bms ; Calculate the value A/mV of the shunt, and input it into the "Sensor Output value" of the software, and then click calibration, the software will prompt "Done". Finally read the max current to check whether it is correct.
方式 2：步进微调 Method 2: fine-tuning	对 BMC 电流检测进行显示误差的修正 The error of master bms current measurement was corrected	选择修正的百分比，点击加大、减小进行显示误差微调 Select the percentage of correction and click Increase or decrease to fine-tune the display error
电流传感器零位 The current sensor ：zero	解决实际并没有任何电流，但显示电流不为 0 的问题。即传感器漂移问题。 Solves the problem that there is no actual current, but the displayed current is not zero . That is the sensor drift problem we called .	确保没有任何电流经过分流器，并等待 2 秒以上；然后点击自动；观察显示电流变为 0，说明归零成功。 Make sure that no current is going through the shunt and wait for more than 2 seconds; Then click the button "Automatic"; If the displayed current changes to Zero , the system successfully returns to zero.
	电流检测标定实例：采购的 BMC 是 40mV 的版本，BMC 型号选择“BMC-M0811-40mV”；市场上购买标准 100A/75mV 分流器，计算传感器输出值:100/75=1.33333A/mV，将此值输入软件中；然后点击标定，软件提示“Done”。读取电流量程核对，软件显示 53.333A。核算一下，这个分流器是 100A75mV，主机是 40mV 信号范围，40/75*100=53.333A，符合理论计算，说明标定是正确的。由此可见，40mV 的 BMC 主机，如果搭配市场上常见的 75mV 规格的分流器，可以测量的最大电流，是这个分流器额定的 53%左右。恰好分流器也可以实现电流降额，避免高温。 Example of current detection and calibration: The purchased Master BMS is 40mV version, and the BMC model is BMC-M0811-40MV. Buy the standard 100A/75mV shunt from the market, calculate the shunt current :100/75=1.3333A /mV, Enter this value into the software; Then click " Calibration" and the software shows "Done". Check the current range , the software shows 53.333A. Work it out, the shunt is 100A75mV, the master bms is 40mV signal , 40/75*100=53.333A, in line with the theoretical calculation, indicating that the calibration is correct. It can be seen that a 40mV master bms; if with a 75mV shunt common on the market,it can measure the maximum current, which is about 53% of the rated shunt. The shunt can also achieve current derating to avoid high temperatures.	
总电压检测标定 Total voltage measurement and calibration	功能 Features	操作方法 How to Operation

方式 1：设置分压电阻比例 Method 1: Set the voltage devider resistance ratio	直接标定总电压检测信号部分的电阻值，实现总电压值的正确显示 The resistance value of the total voltage detection signal is directly calibrated to realize the correct display of the total voltage value	默认情况下 Ra、Rb 无需修改。如果 BMC 原来的总电压检测量程不够，则输入实际安装的扩展量程电阻阻值，然后点击标定。最后读取总电压量程进行核对。 By default, Ra and Rb do not need to be modified. If the master bms' original total voltage measurement range is not enough, enter the actual resistance of installed extended range resistor and click Calibrate. Finally, the total voltage range is read for verification.
方式 2：步进微调 Method 2: fine-tuning	对总电压检测，进行显示误差的修正 The display error is corrected for the total voltage measurement	选择修正的百分比，点击加大、减小进行显示误差微调 Select the percentage of correction and click the button " Increase "or" decrease" to fine-tune the display error
	总电压检测标定实例：电池组 3.2V*192 串，最高总电压 3.6*192=691.2V，超过了 BMC 默认的约 400V 量程，需要扩展总电压量程。每扩展 100V 大约需要串联 200K 的电阻。选择 820K/1W 电阻串联到总电压检测的信号线中。软件中扩展电阻输入 820，Ra、Rb 不改动。点击标定，软件提示“Done”。读取总电压量程，显示 815V，满足最高电压值的测量。 Take example of Total voltage measurement and calibration : Battery pack 3.2V*192 in series, the maximum total voltage 3.6*192=691.2V, exceeds the measurement range of about 400V of the master bms , It need to expand the total voltage range. Approximately 200K resistance in series is required for every 100V extension. Select 820K/1W resistors connected in series to the signal wire for total voltage measurement. For the expanded resistance ,enter 820 in the PC software, Ra, Rb remain unchanged. Click " Calibration", and the software shows "Done". Read the total voltage range, showing 815V, to be in line with the highest voltage	

整组设置 Battery Pack Setting		
容量 Capacity	功能 Features	操作方法 How to Operate
额定 Ah 容量 Rated Capacity 额定总电压 Rated total voltage	BMS 根据 Ah 容量和额定总电压得到电池组的额定容量（kWh）。用于估算电池状态等。 The BMS obtains the rated capacity (kWh) of the battery pack from the rated capacity and the rated total voltage. It is used to estimate battery status.	按照电芯厂家参数、或实际测试结果输入。如果每一节单体是由多个小单体并联而来，应当输入这些小单体容量之和。 Enter data in the PC software according to cell manufacturer's parameters or actual test results. If each segment is composed of multiple small cells in parallel, the sum of the capacities of these small cells should be entered.
充电接受能力 Charge acceptance	功能 Features	操作方法 How to Operate

最高充电总电压 Maximum total charging voltage	BMS 根据此参数报告电池组的最高充电电压 BMS reports the maximum charge voltage of the battery pack based on this parameter,	标定为：单体充电终止电压 * 总单体串数 It is calibrated as: cell charge cut-off Voltage * total number of cell strings
最大充电电流 Maximum charging current	BMS 报告电池组的最大充电电流接受能力，将不超过此值。 The BMS reports the maximum charge current acceptance capacity of the battery pack, which will not exceed this value.	按照电芯厂家参数输入 Enter the date according to battery manufacturer's parameters
最小充电电流 Minimum charging current	当由于单体电压、温度等因素，导致 BMS 报告充电接受能力的电流降低时，降低到此值后，不在继续降低。 When the current reported by the BMS is reduced due to factors such as cell voltage and cell temperature, it will not continue to decrease after it is reduced to this value.	按照充电结束期要求的电流值输入 Enter the current value required for the end of charge period
放电输出能力 Discharge output	功能 Features	操作方法 How to Operate
最低放电总电压 Minimum total discharge voltage	BMS 根据此参数报告电池组的最低放电总电压 According to this parameter, BMS reports the minimum total discharge voltage of the battery pack.	标定为：单体放电终止电压 * 总单体串数 It is calibrated as: discharge cut-off voltage * total number of cell strings
最大放电电流 Maximum discharge current	BMS 报告电池组的最大放电电流输出能力，将不超过此值。 The BMS reports the maximum discharge current output capacity of the battery pack, which will not exceed this value.	按照电芯厂家参数输入 Enter data according to battery manufacturer's parameters
最小放电电流 Minimum discharge current	当由于单体电压、温度等因素，导致 BMS 报告放电输出能力电流降低时，降低到此值后，不在继续降低。 When the current of the discharge output capacity reported by the BMS is reduced due to factors such as the voltage and temperature of the monomer, it will not continue to decrease after it is reduced to this value.	按照放电结束期要求的电流值输入 Enter the data of current required for the discharge end period

	充电接受能力、放电输出能力这两个参数，关键是在于，充放电装置能够响应 BMS 的报告数据实施动态调节，而并不是 BMS 可以按照这些参数，实现主动的电流电压调节、以及保护。如果充放电装置无此功能，或选择不用此功能，则充放电无动态调节的效果。 The key to the two parameters of charge acceptance capacity and discharge output capacity is that the charge and discharge device can dynamically adjust in response to the reported data of the BMS, but the BMS can realize active current and voltage adjustment and protection according to these parameters. If the charge and discharge device does not have this function, or select not to use this function, the charge and discharge have no dynamic adjustment effect.
	设置实例：电池组 3.2V*192 串，额定总电压标定为 614.4V；额定 Ah 容量标定为 280Ah；最高充电总电压 3.55*192=681.6V；最大充电电流 140A；最小充电电流 14A；最低放电总电压 2.7V*192 串=518.4V；最大放电电流 280A；最小放电电流 28A； The example of BMS Setting : battery pack 3.2V*192 series, rated total voltage is 614.4V; The rated Ah capacity is calibrated to 280Ah; Maximum total charging voltage 3.55*192=681.6V; Maximum charging current 140A; Minimum charging current 14A; Minimum total discharge voltage 2.7V*192 series =518.4V; Maximum discharge current 280A; Minimum discharge current 28A;

信号 Signal		
充放电唤醒设置 Charge and discharge wake-up Settings	设置 BMS 系统唤醒、充电程序、放电程序的启动停止、休眠等控制逻辑。 Set the control logic regarding BMS system wake up, charging program, discharge program start stop, sleep and so on	操作方法、详细解释，见资料包中“BMS 唤醒启动设置以及工作策略”文档 For details, see the "BMS Wake Up Startup Settings and Working Roadmap" document in the documentation package
蜂鸣器和选装模块 Buzzer and optional module	功能 Features	操作方法 How to Operate
是否打开蜂鸣器 Whether or not turn on the buzzer	设置 BMC 内置蜂鸣器是否发出声音 Set in the PC software to let built-in buzzer work or not	按实际需求 According to actual demand
是否安装预充电控制模块 Whether or not install a precharge control module		
是否安装漏电检测模块 Whether or not install a leakage detection module		
是否安装接触器烧结检测模块 Whether or not to install the contactor sintering detection module		

电池类型代码 Battery type code	主要用于电池特性曲线分析、GB/T 标准充电时报告的电池类型。 It is mainly used for battery characteristic curve analysis and battery type reported when GB/T standard charging.
按此代码表设置。	01H:铅酸电池;02H:镍氢电池;03H:磷酸铁锂电池;04H:锰酸锂电池;05H:钴酸锂电池;06H:三元材料电池;07H:聚合物锂离子电池;08H:钛酸锂电池;FFH:其他电池

Set according to this code table	01H: lead-acid battery; 02H: nickel metal hydride battery; 03H: lithium iron phosphate battery; 04H: lithium manganate battery; 05H: lithium cobalt acid battery; 06H: ternary material battery; 07H: Polymer lithium-ion battery; 08H: lithium titanate battery; FFH: Other batteries

修改 BIC 模块的参数 Modify the parameters of the slave bms

无论系统 BIC 的数量是多少，每个 BIC 都要设置下列 3 项参数，BMS 才能正常运行。

Regardless of the number of slave bms in the system, the following three parameters must be set for each slave bms in order for the BMS to work properly.

*** 操作方法 1 ***(Setting Method-1)

1) 断开所有 BIC 的 4 芯线缆（通信供电端口），使所有的 BIC，断开与 BMC 的连接。是否连接了电压采样线、温度采样线，对设置无影响。

1) Disconnect the 4-core cables (communication power supply ports) of all Bics to disconnect all slave bms from master bms . Whether the voltage and temperature sampling lines are connected or not ,it has no impact on the setting.

2) 软件中填写好 BIC 地址、安装的单体数量、安装的温度传感器数量等这些参数。

2) Fill in the slave bms address, the number of installed cells, the number of installed temperature sensors and other parameters in the PC software.

3) 其它不需要设置的 BIC 的 4 芯线不要连接，仅需要设置的那个 BIC，与 BMC 单独进行连接。连接后的 10 秒内，点击保存，软件提示“Done”即保存成功。然后读取核对。

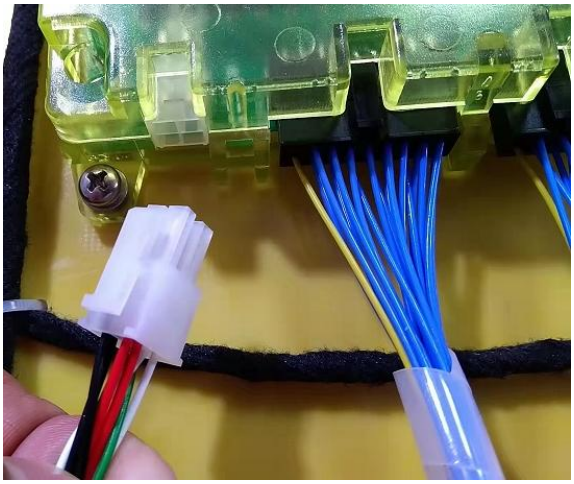
3) Do not connect the 4 cores of slave bms that do not need to be set. Connect only the master bms that needs to be set to the masterbms separately. Click "Save" within 10 seconds after the connection, and the software prompts "Done" to save successfully. Then read "check".

4) 重复以上步骤，完成所有 BIC 的设置。

4)Repeat the above steps to complete all master bms settings.

5) 此方法关键在于，BIC 通电后 10 秒内，参数保护解除，可以读取、保存参数；超过 10 秒，参数保护恢复，无法读取和保存参数。这也是没有设置按钮的 BIC 的唯一设置方法。

5) The key of this method is that the parameter protection is removed within 10 seconds after master bms is powered on, and the parameters can be read and saved. After 10 seconds, parameter protection is restored, and parameters cannot be read and saved. This is also the only way to set a master without a set button.



*** 操作方法 2 ***(Setting Method-2)

1) 全部 BIC 的 4 芯线（通信供电端口）与 BMC 保持正常连接。是否连接了电压采样线、温度采样线，对设置无影响。

1) The four core cables (communication power supply ports) of all slave bms are properly connected to the master bms. regardless the voltage and temperature balancing wires are connected ,it has no impact on the setting.

2) 软件中填写好 BIC 地址、安装的单体数量、安装的温度传感器数量等这些参数。

2) Fill in the slave bms address, the number of installed cells, the number of installed temperature sensors and other parameters in the PC software.

3) 按下需要设置的那个 BIC 的设置按钮，不要松开。其它不需要设置的 BIC 按钮不要按下。点击保存，软件提示“Done”即保存成功。然后读取核对，最后松开按钮。

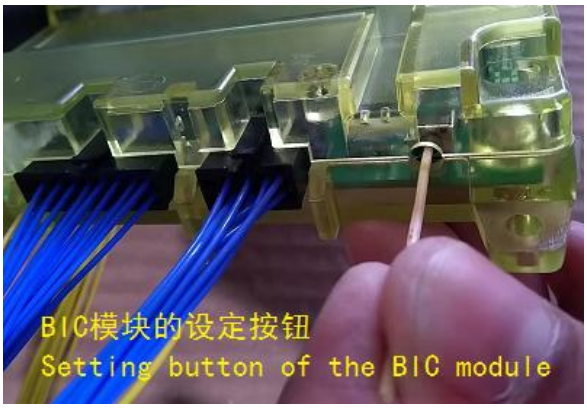
3) Press the set button for the slave bms you want to set without letting it go. Do not press other slave bms buttons that do not need to be set. Click" Save". The software displays "Done" indicating that the file is saved successfully. Then read the" check "and finally release the button.

4) 重复以上步骤，完成所有 BIC 的设置。

4) Repeat the above steps to complete all slave bms Settings.

5) 此方法使用设置按钮来解除 BIC 的参数保护。按钮与高压电池组不绝缘，为了防止触电，必须使用绝缘的材料去按压按钮；不能同时按下多个 BIC 的按钮进行设置操作；在 BMC 进入设定模式、且所有 BIC 与 BMC 保持连接超过 10 秒钟以后，才能进行按钮操作。

5) This method is that the set button to remove the parameter protection of the slave bms. The button is not insulated from the high-voltage battery pack. In order to prevent electric shock, an insulating material must be used to press the button. Do not press the button of multiple Bics at the same time to set the operation; The button can be pressed only after the master bms enters setting mode and all slave bms remain connected to the master bms for more than 10 seconds.



*** 操作方法 3 ***(Setting Method-3)

当各个电池模组已经装配完成，发现某个 BIC 参数设置有误，不便于拆开重新设置的情况下，可使用此方法改正部分参数。此方法不能读取和保存 BIC 的地址参数。在 BIC 地址已经设置完成且没有错误前提下，可以修改电芯数量和温度传感器数量。

When each battery module has been assembled, it is found that one slave bms parameter is wrong, and it is difficult to disassemble and reset, you can use this method to correct some parameters. with this method you cannot read and save the address parameters of the slave bms. The number of cells and temperature sensors can be modified only when the slave bms address has been set correctly

此方法操作时，人员容易搞混淆，非必要不推荐使用。

This method is easy to meke people confused when operating, and it is not recommended if it is not necessary.

操作过程：Operation Process

1) 在软件中，“指定 BIC 地址”选项打钩，输入要修改参数的那个 BIC 的地址编号；

1) In the software, check the "Specific slave bms address" option and enter the address number of the slave bms to modify the parameter;

2) 将这个 BIC 要修改的单体数量、温度传感器数量填写好；

2) Fill in the number of cells and temperature sensors to be modified by this slave bms;

3) 从 BMC 的端口位置，断开整个 BIC 的通信总线，然后重新接通（全体 BIC 重新上电）。在 10 秒内，点击保存，软件提示“Done”即保存成功。

3) From the master bms port , disconnect the communication bus for the entire slave bms , and then reconnect (power on all slave bms again). Click" Save" within 10 seconds, and the software shows "Done" to save successfully.

注意事项 Points For Attention

- 软件中，只有“每个 BIC 的设定”才是属于 BIC 模块的参数。“BIC 连接设定”、“热敏电阻类型设定”是属于 BMC 模块的参数，请按照修改 BMC 模块参数的方法进行；

  In the PC software, only the "setting of each slave bms " is a parameter that belongs to the slave bms module. Note Set slave bms connection Settings and thermistor type Settings for the master bms . For details, see Modifying master bms parameters.

- 当设置 BIC 时，BMC 也要处于解除参数保护的状态，建议控制 BMC 进入设定模式。

  When setting the master bms, disable parameter protection for the master bms . You are advised to set the master bms to setting mode.

- 每个 BIC 地址设置必须从 1 开始顺序排列，不能有重复和漏缺的地址。

Each slave bms address setting must be ordered from 1, with no duplicate or missing addresses.

The number of cells per slave bms and the number of temperature sensors allow different values to be set. The number of one of the slave bms temperature sensors can be set to 0, but one of all the slave bms in the system must have at least one temperature sensor installed.

- 每个 BIC 的单体数量、温度传感器数量允许设置不同的值。其中某个 BIC 温度传感器数量允许设置为 0，但系统所有的 BIC 中，必须有 1 个 BIC 安装至少 1 个温度传感器。

The number of cells per slave bms and the number of temperature sensors allow different values to be set. The number of one of the BIC temperature sensors can be set to 0, but one of all the slave bms in the system must have at least one temperature sensor installed.

修改 CCM 模块的参数

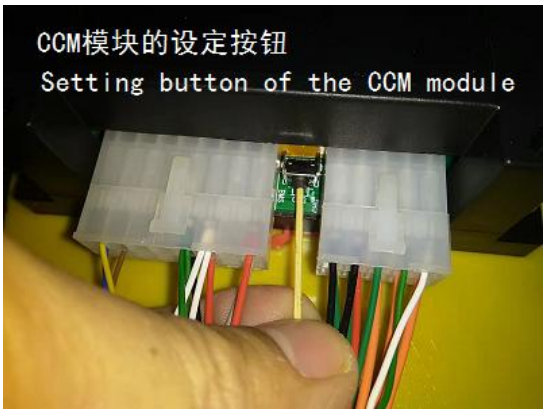
Modify the parameters of CCM (Charging Control Module)

CCM 模块只用设置按钮来解除参数保护功能。其它模块的设定模式、以及上电 10 秒的限制与 CCM 模块无关。
如果您的 BMS 未安装 CCM 模块，则无需进行相关设置。
软件中只有“GB/T 直流充电”页面的参数与 CCM 有关。

The CCM module has the set button which is used to disable the parameter protection f. The setting mode of the other modules and the 10-second power-on limit are independent of the CCM module.
If your BMS does not have the CCM module installed, there is no need to set it up.
In the software, only the parameters of the "GB/T DC charging" page are related to CCM.

先在软件中填写好参数，然后按下设置按钮不要松开，此时参数保护被解除，最后点击保存，软件提示 Done 则说明参数保存成功。调整完成后松开按钮，恢复参数保护功能。

First of all , fill the parameters in the software, and then press the "Set" button do not release, at this moment the parameter protection is released , and finally click "Save", the software shows "Done" indicating that the parameters are saved successfully. Release the button after adjustment to restore the parameter protection function.



GB/T 直流充电 GB/T DC charging		
名称 Name	功能 Features	操作 How to Operate
测量电流值来源 Source of measured current	选择“独立的电流检测”，可适应较严格参数检查的充电桩；选择“BMC 测量值”或者是“充电桩测量值”，则无需安装独立的直流充电口电流检测电路，可降低成本。 Select "Independent current measurement", which can adapt to the charging pile with stricter parameter ; If BMC Measurement Value or Charging pile Measurement value is selected, there is no need to install an independent DC charging port current detection circuit, which can reduce costs.	根据充电桩要求、项目成本控制决定。如果充电同时还可能会有较大电流的负载，BMS 测量的电流值则会与实际的充电机电流值产生很大偏差。建议安装独立的直流充电口电流检测电路，并设置为“独立的电流检测” Based on charging pile requirements, project cost control ,if there may be a large current load at the same time of charging, the current value measured by the BMS will deviate greatly from the actual charger current value. It is recommended to install an independent DC charging port current measurement circuit and set it to "Independent current measurement".
报告给充电机最高的 SOC Report the highest SOC to the charger	某些商业充电桩为了提高盈利水平，接近充满电的电池会强制停止充电，CCM 模块将报告给充电机最大不超过此值的 SOC，实现尽量充满电。 In order to improve the profitability of some commercial charging piles, the battery that is close to full charge will be forced to stop charging, and the CCM module will report the maximum SOC of the charger not exceeding this value to achieve full charge as far as possible.	必须确保符合各种法律规定、政府指令、确保安全的前提下，可以设置为低于 100%的值；否则，必须设置为 100% 100% Ensure compliance with various legal provisions, government directives, to ensure the premise of safety, can be set to less than 100% of the value; Otherwise, it must be set to 100%
充电插座温度保护值 The Value of Temperature protection of charging socket	当充电插座的温度超过此值时，将控制充电桩停止充电。 When the temperature of the charging socket exceeds this value, the charging pile will be controlled to stop charging.	设置的值要确保充电插座能够承受此温度不会烧坏。 Set the value to ensure that the charging socket can withstand this temperature and will not burn out.

充电插座温度预警值 The value of Charging socket temperature warning	当充电插座的温度超过此值时，CCM 要求充电桩降低输出电流。 When the temperature of the charging socket exceeds this value, CCM requires the charging pile to reduce the output current.	必须低于“充电插座温度保护值”，建议低 5℃ – 10℃。 The value must be lower than the Temperature Protection value of the charging socket. The recommended value is 5 ° C to 10 ° C.
充电插座温度传感器数量 Number of charging socket temperature sensors	设置的数量要与实际接线的温感数量对应。如果为 0 个，则充电插座温度保护功能关闭 The set quantity should correspond to the actual temperature sensing quantity of the cable. If the number is 0, the charging socket temperature protection function is turned off	根据实际接线，设置为 0 个，1 个，2 个。 Set this parameter to 0, 1, or 2 based on the actual connection.
	充电插座温度，到达充电插座温度预警值、CCM 开始要求充电桩降低电流时：如果 BMS 报告充电电流能力大于 5A,则 CCM 要求充电桩降低充电电流的最小电流等于 5A;否则 CCM 要求充电桩降低充电电流的最小值以 BMS 报告为准。 When the temperature of the charging socket reaches the warning value of the temperature of the charging socket and CCM starts to require the charging pile to reduce the current: If BMS reports that the charging current capacity is greater than 5A, CCM requires the minimum current of the charging pile to reduce the charging current to be equal to 5A; Otherwise, CCM requires the minimum value of the charging pile to reduce the charging current to be subject to the BMS report.	
独立的直流充电口电流检测标定 Independent DC charging port current measurement and calibration	功能 Features	操作 How To Operate
方式 1：标定传感器 Method 1: Calibrate the sensor	直接输入分流器的参数，实现电流值的正确显示 Directly enter the parameters of the shunt to realize the correct current value which is displayed	选择型号；计算出分流器的 A/mV 值，并输入软件的“传感器输出值”中，然后点击标定，软件将提示“Done”。最后读取电流量程核对是否正确。 Select the model; Calculate the A/mV value of the shunt, and enter it into the "Sensor Output value" of the software, and then click "calibration", the software will show "Done". Finally read the current range to check whether it is correct.
方式 2：步进微调 Method 2: fine-tuning	对充电口电流检测显示误差的修正。 Correction of current measurement error of charging port.	选择修正的百分比，点击加大、减小进行显示误差微调 Select the percentage of correction and click Increase or decrease to fine-tune the display error

电流传感器零位 The current sensor is zero	解决实际并没有任何电流，但显示电流不为 0 的问题。即传感器漂移问题。 Solve the problem that there is no actual current, but the displayed current is not 0. That is sensor drift problem.	确保没有任何电流经过分流器，并等待 2 秒以上；然后点击自动；观察显示电流变为 0，说明归零成功。 Ensure that no current is going through the shunt and wait for more than 2 seconds; Then click "Automatic"; If the current changes to 0, the system successfully returns to zero.
	充电口独立电流检测标定实例：采购的 CCM 模块是 40mV 的版本，选择型号“40mV”；市场上购买标准 100A/75mV 分流器，计算传感器输出值:100/75=1.33333A/mV，将此值输入软件中；然后点击标定，软件提示“Done”。读取电流量程核对，软件显示 53.333A。核算一下，这个分流器是 100A75mV，CCM 模块是 40mV 信号范围，40/75*100=53.333A，符合理论计算，说明标定是正确的。由此可见，40mV 的 CCM 模块，如果搭配市场上常见的 75mV 规格的分流器，可以测量的最大电流，是这个分流器额定的 53%左右。恰好分流器也可以实现电流降额，避免高温。 Charging port independent current detection and calibration example: The purchased CCM module is 40mV version, select the model "40mV"; Buy the standard 100A/75mV shunt on the market, calculate the sensor output value :100/75= 1.3333A /mV, input this value into the software; Then click Calibration and the software prompts "Done". Read the current range check, the software shows 53.333A. After calculation, the shunt is 100A75mV, and the CCM module is 40mV signal range, 40/75*100=53.333A, which conforms to the theoretical calculation, indicating that the calibration is correct. It can be seen that the 40mV CCM module, if paired with the 75mV shunts commonly available on the market, can measure the maximum current, which is about 53% of the rated current of this shunter. The exact shunt can also achieve current derating to avoid high temperatures.	