

BMS 上位机说明书

SPECIFICATION

产品名称/Product name:	Hengchi BMS Intelligent Management Software
软件名称/Product model:	BMS Manager V2
版本/Version:	V2.0.0
客户名称/Customer name:	
客户签名盖章/Signatures:	

珠海市希望电子有限公司
Zhuhai Xiwang Electronic Co., Ltd.

修订履历表/Revision History

修订日期 Revision date	版本 Version number	修订内容描述 Revised content

目录/Catalog

1. 概述 (OVERVIEW)	4
2. 系统要求 (SYSTEM REQUIREMENT)	4
3. 安装步骤 (INSTALLATION STEPS)	4
4. 连接设备 (CONNECTING DEVICES)	10
4.1. CAN 总线连接设备 (CAN BUS CONNECTION)	10
4.2. RS-485 连接设备 (RS-485 CONNECTION)	13
5. 参数说明 (PARAMETER SPECIFICATIONS)	15
5.1. 游客模式/GUEST MODE	15
5.2. 一级授权/LEVEL 1 AUTHORIZATION:	21
5.3. 二级授权/LEVEL 2 AUTHORIZATION:	22
5.4. 三级授权/LEVEL 3 AUTHORIZATION:	24
6. 常见问题与故障处理 (COMMON ISSUES AND TROUBLESHOOTING)	24
7. 维护与升级 (MAINTENANCE AND UPGRADE)	25
7.1. 日常维护/DAILY MAINTENANCE	25
7.2. 在线升级/ONLINE UPGRADE	26
8. 技术支持与服务 (TECHNICAL SUPPORT AND SERVICES)	28
8.1. 联系方式/CONTACT INFORMATION	28
8.2. 服务说明/SERVICE DESCRIPTION	28
8.3. 安全声明/SAFETY STATEMENT	29

1. 概述（Overview）

本说明书适用于 BMS Manager V2，用于指导用户完成设备连接、参数配置、数据监控及系统维护等操作。软件可与 BCU 配套使用，实现电池管理系统（BMS）的数据采集、状态监控、远程控制及数据分析功能。

This manual applies to BMS Manager V2 and is intended to guide users through operations such as device connection, parameter configuration, data monitoring, and system maintenance. The software can be used in conjunction with the BCU to achieve the functions of the Battery Management System (BMS), including data collection, status monitoring, remote control, and data analysis.

2. 系统要求（System Requirement）

- 操作系统/Operating System: Windows 10/11
- 硬件配置/Hardware Configuration:
 - CPU: Intel Core i5 or higher
 - 内存/Memory: 8GB or higher
 - 存储/Storage: 100MB of available space
 - 显示器分辨率/Monitor Resolution: 1920*1080 or higher
- 通讯接口/Communication Interface: USB 2.0 or higher (for connecting CAN/RS-485 adapters)

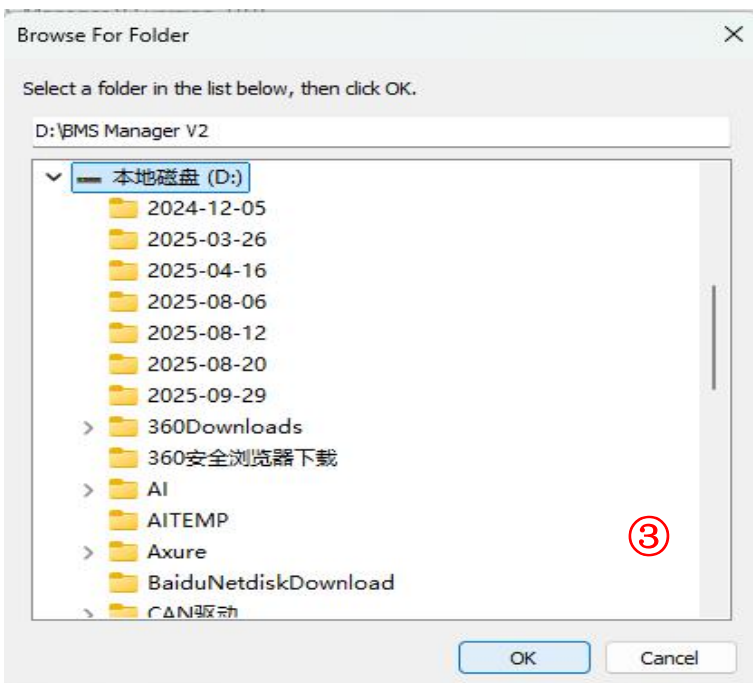
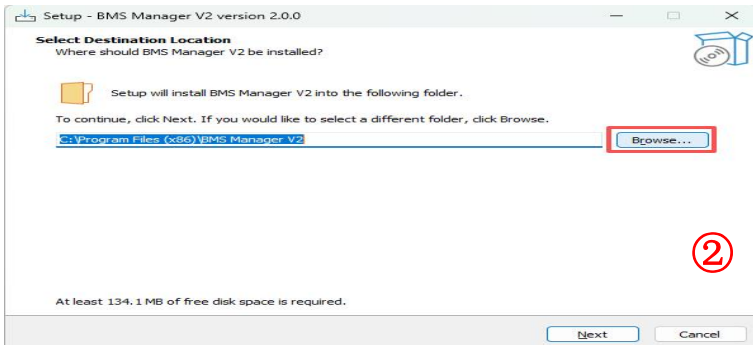
3. 安装步骤（Installation steps）

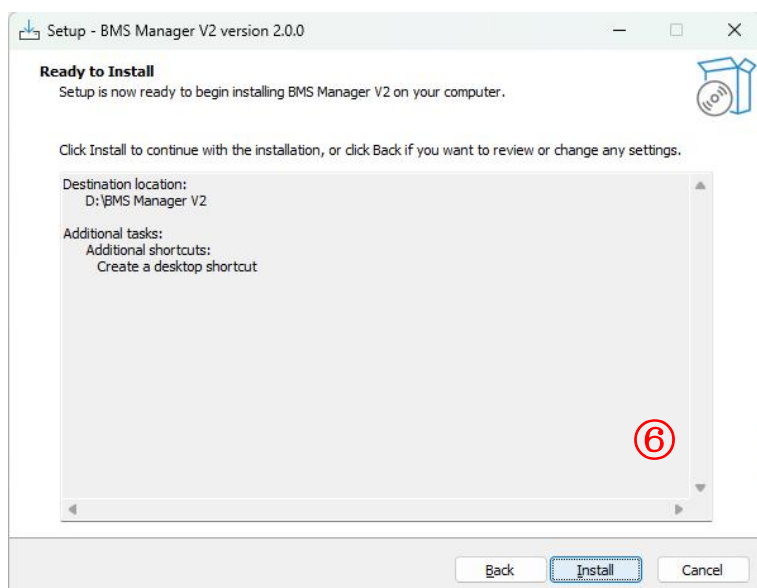
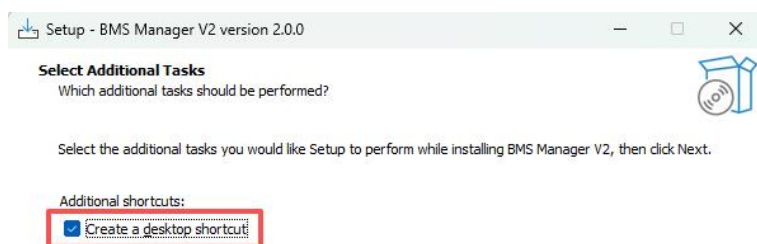
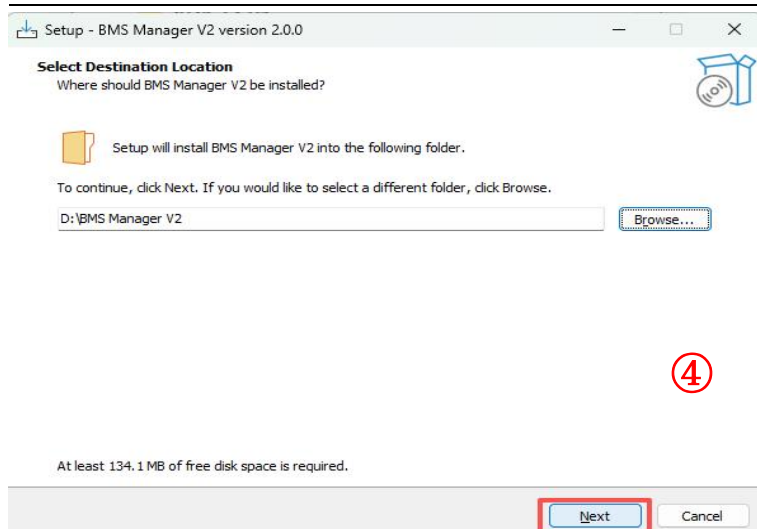
1. 安装运行/Install and run

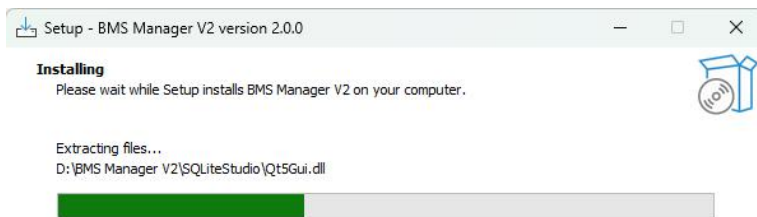
①找到下载的安装包（下载安装包时注意关闭杀毒软件，避免安装包找不到），双击打开→②③选择安装路径（不要包含中文）→④点击 Next→⑤可以勾选创建桌面快捷方式（方便使用）→⑤点击 Next→⑥⑦点击 Install→⑧首次安装需要勾选配置文件（Install Visual C++ Redist Library 2005/Install Visual C++ Redist Library 2008/Install USB CAN Driver/Install USB CAN 2E-U Driver/Launch BMS Manager V2）非首次安装可以不勾选安装配置文件，跳过以下步骤（⑨~⑮）→⑧点击 Finish→⑨点击 Next→⑩选择安装路径→⑩⑪点击 Install→⑫点击 Finish→⑬点击 Next→⑭选择安装路径→⑭点击 Install→⑮点击 Finish，完成安装。

① Locate the downloaded installation package (note to disable your antivirus software during the package download to prevent the package from being unlocatable), then double-click to open it → ②③ Select the installation path (do not include Chinese characters) → ④ Click Next → ⑤ You can check the box for "Create Desktop Shortcut" (for easy access) → ⑤ Click Next → ⑥⑦ Click Install → ⑧ For the first installation, you need to check the boxes for the configuration files (Install Visual C++ Redist Library 2005/Install Visual C++

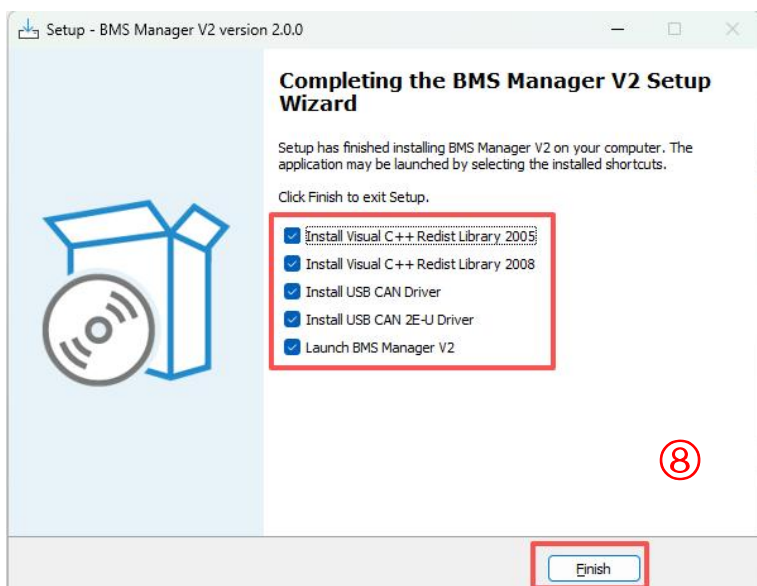
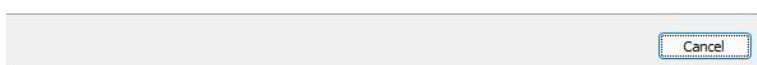
Redist Library 2008/Install USB CAN Driver/Install USB CAN 2E-U Driver/Launch BMS Manager V2). For non-first installations, you can skip checking the boxes for installation configuration files and bypass the following steps (Steps ⑨~⑮) → ⑧ Click Finish → ⑨ Click Next → ⑩ Select the installation path → ⑩⑪ Click Install → ⑫ Click Finish → ⑬ Click Next → ⑭ Select the installation path → ⑭ Click Install → ⑮ Click Finish to complete the installation.







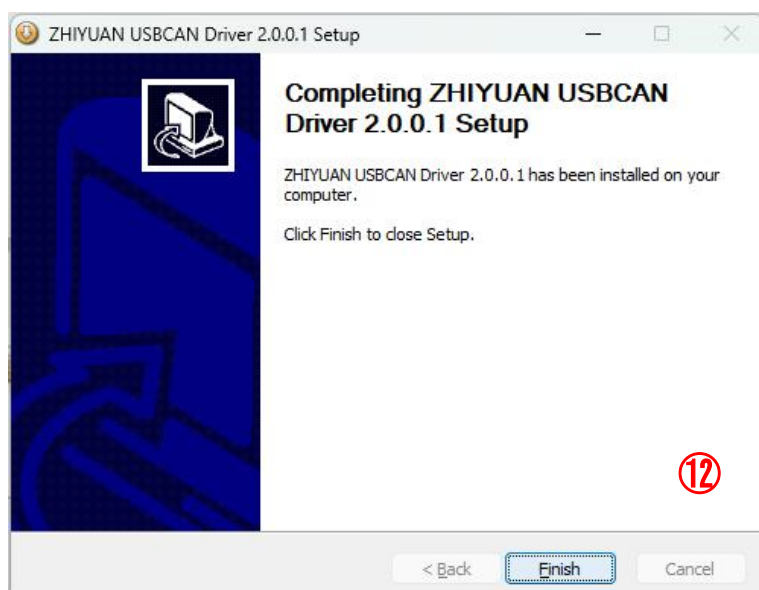
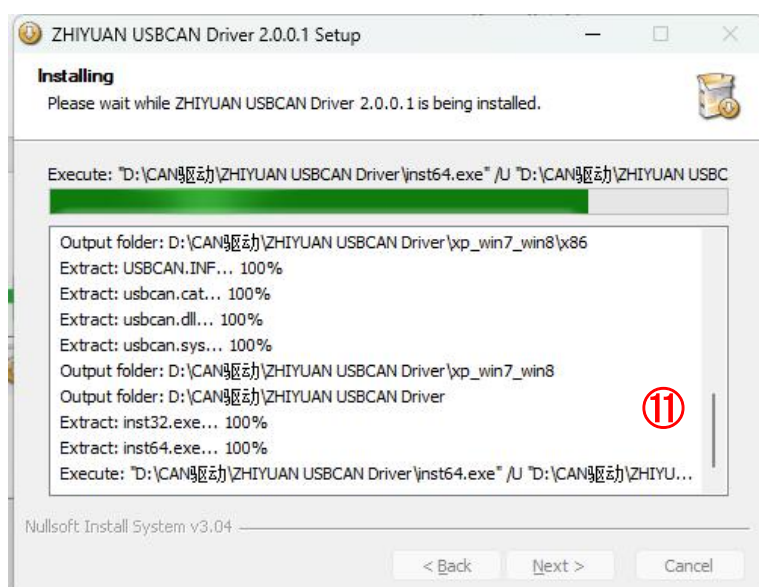
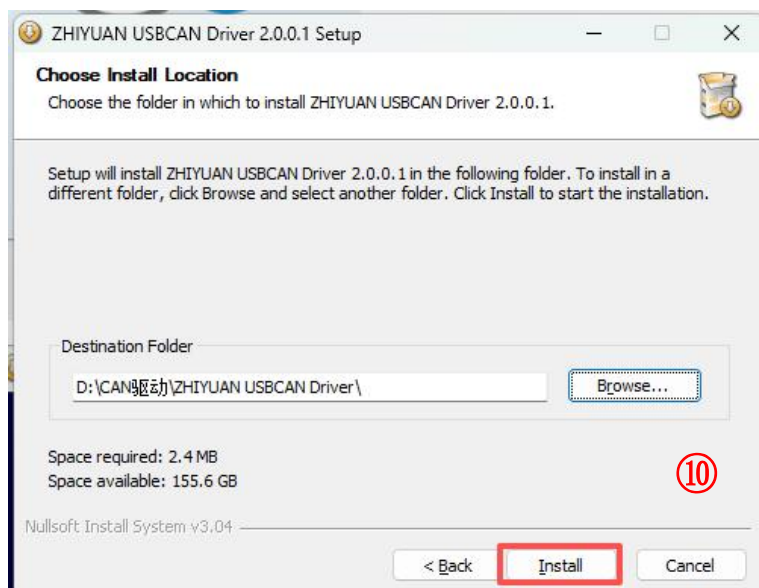
⑦

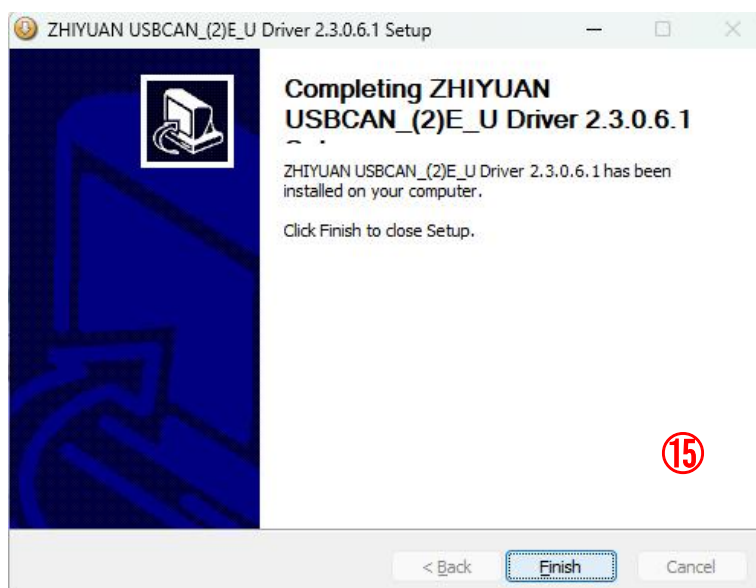
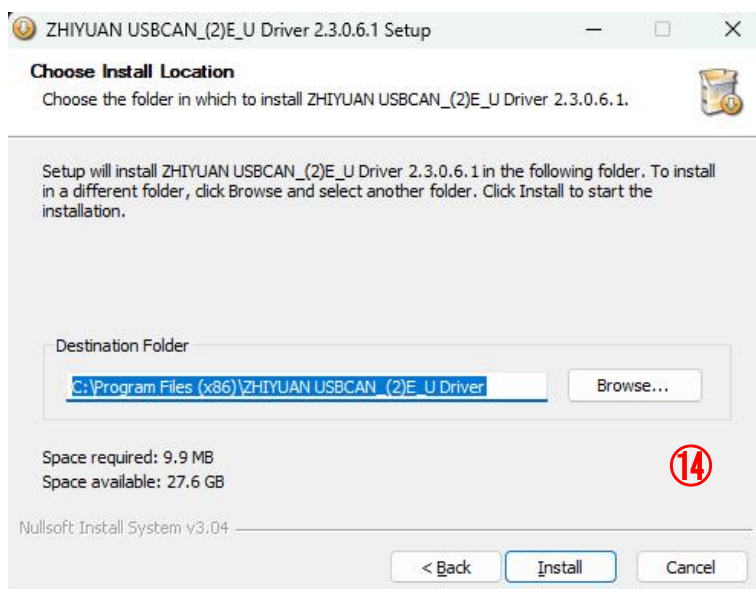


⑧

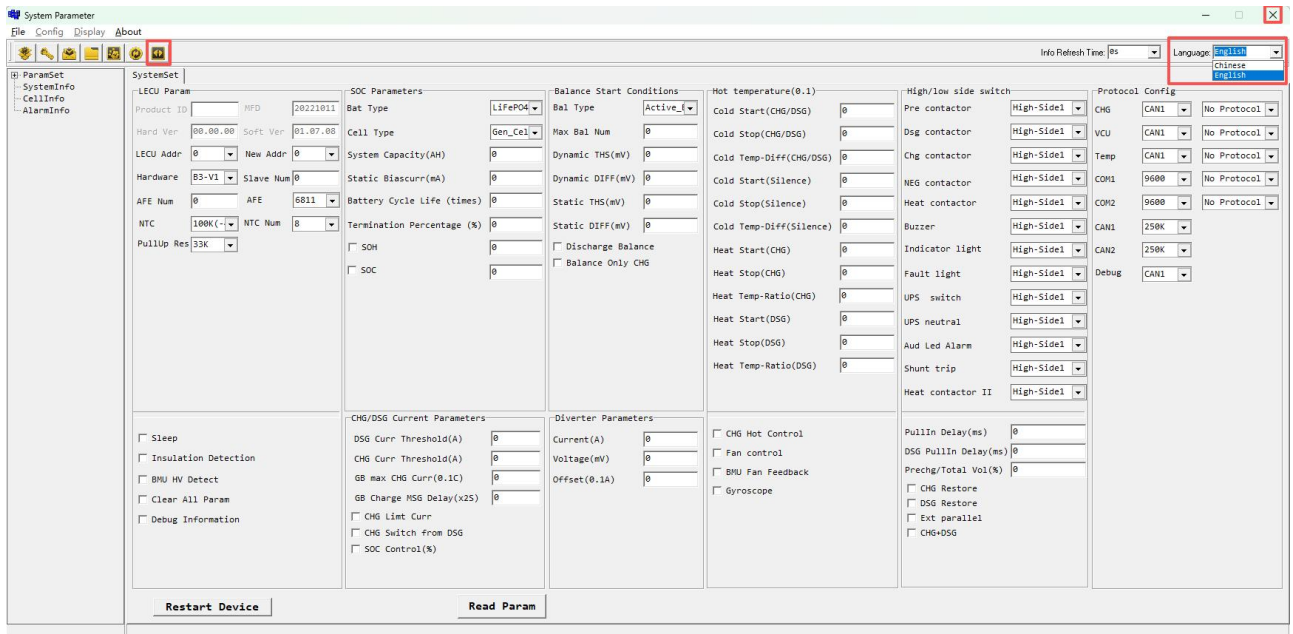


⑨





2. 语言切换/Language Switch



上位机软件安装成功后，打开软件是系统设置界面，在界面最上方右侧可以选择合适的语言（中文/英文），选好后会弹出语言设置成功的界面，点击“OK”。语言切换成功，需要点击右上角“X”或是左上角“Exit”按钮退出软件，重新进入页面，语言就切换成功了。

After the host computer software is installed successfully, you will enter the system settings interface upon opening the software. At the top-right corner of this interface, you can select the appropriate language (Chinese/English). Once selected, a prompt window titled "Language Settings Successful" will pop up; click "OK".

For the language switch to take effect, you need to exit the software by clicking either the "X" button in the top-right corner or the "Exit" button in the top-left corner. Relaunch the software, and the language switch will be fully applied.



4. 连接设备（Connecting devices）

4.1. CAN 总线连接设备（CAN Bus Connection）

- 1) 安全准备：断开所有设备电源，避免带电操作引发电气故障。
- 2) 线束识别：根据线束标签（如 CAN1_L、CAN1_H）对应连接 BCU 接口（见图 4-1）。
- 3) CAN 盒连接：将线束的 CAN1_L 和 CAN1_H 端口接入 CAN 盒对应接口（见图 4-3）。
- 4) 终端电阻检测：使用万用表在 CAN1_H 和 CAN1_L 之间测量电阻，标准值应为 60-120Ω（典型值 120Ω）。若阻值异常，检查终端电阻安装是否正确。

- 1) Safety Preparation: Disconnect the power supply of all devices to prevent electrical faults caused by live operation.
- 2) Harness Identification: According to the harness labels (e.g., CAN1_L, CAN1_H), connect them to the corresponding BCU interfaces (see Figure 4-1).
- 3) CAN Box Connection: Connect the CAN1_L and CAN1_H ports of the harness to the corresponding interfaces on the CAN box (see Figure 4-3).
- 4) Terminal Resistor Detection: Use a multimeter to measure the resistance between CAN1_H and CAN1_L. The standard value should be 60-120 Ω (typical value: 120 Ω). If the resistance value is abnormal, check whether the terminal resistor is installed correctly.

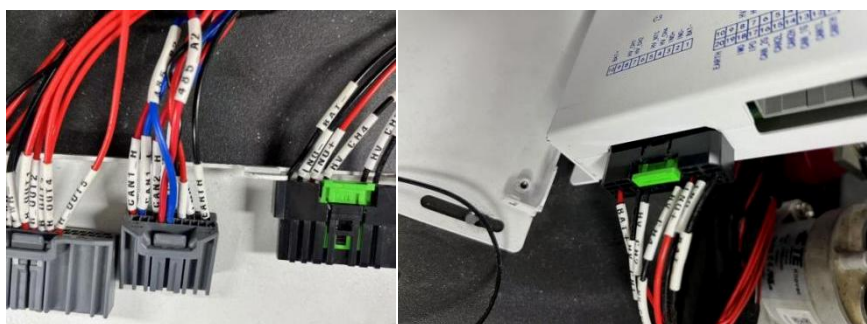


图 4-1 线束接口/Figure 4-1 Harness Interface

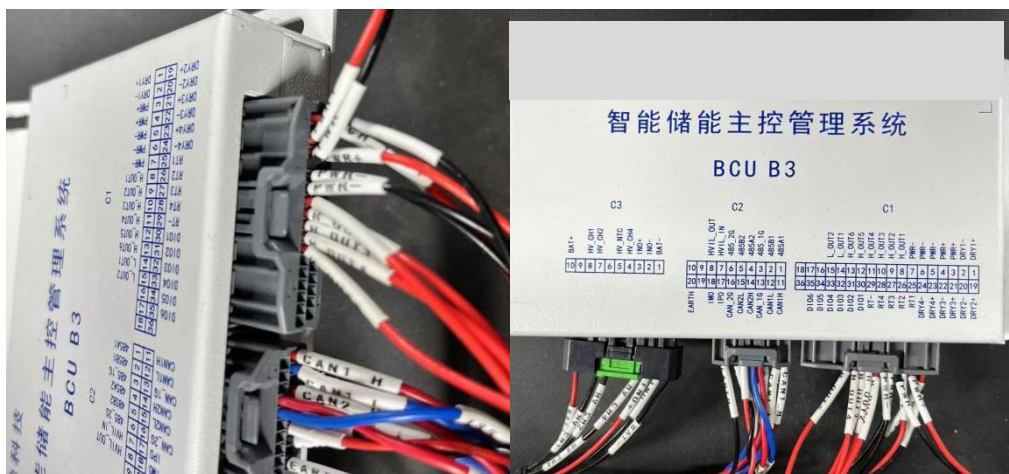
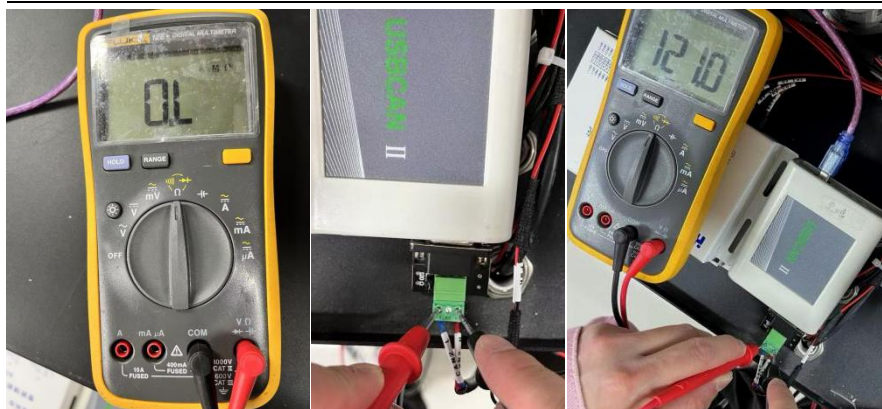


图 4-2 线束连接/Figure 4-2 Harness Connection



图 4-3 CAN 盒连接/Figure 4-3 CAN Box Connection



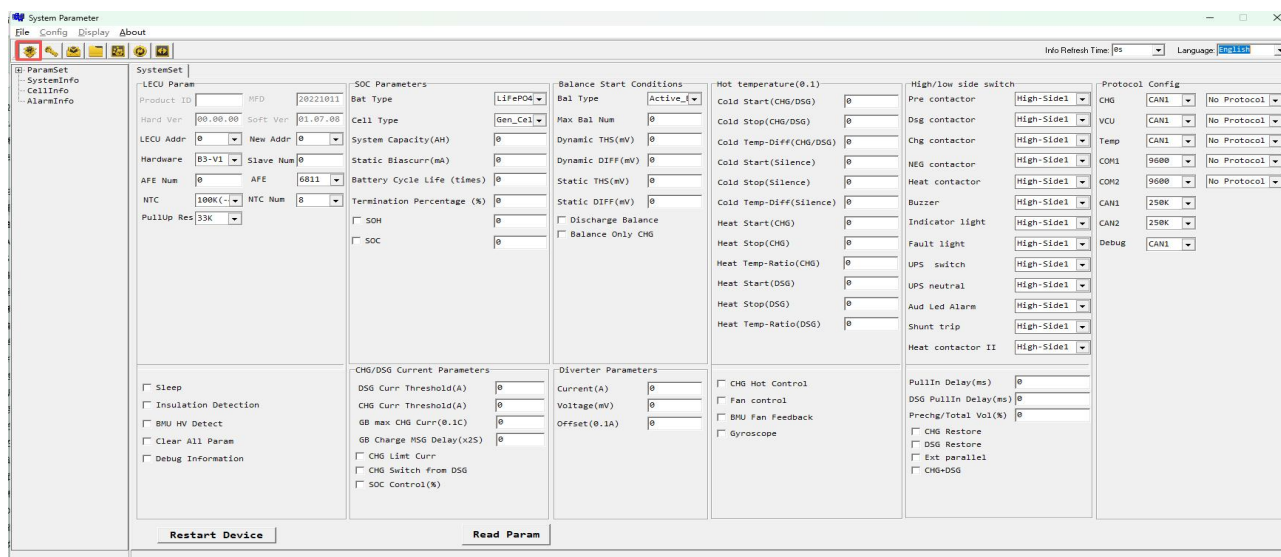
5) 参数配置

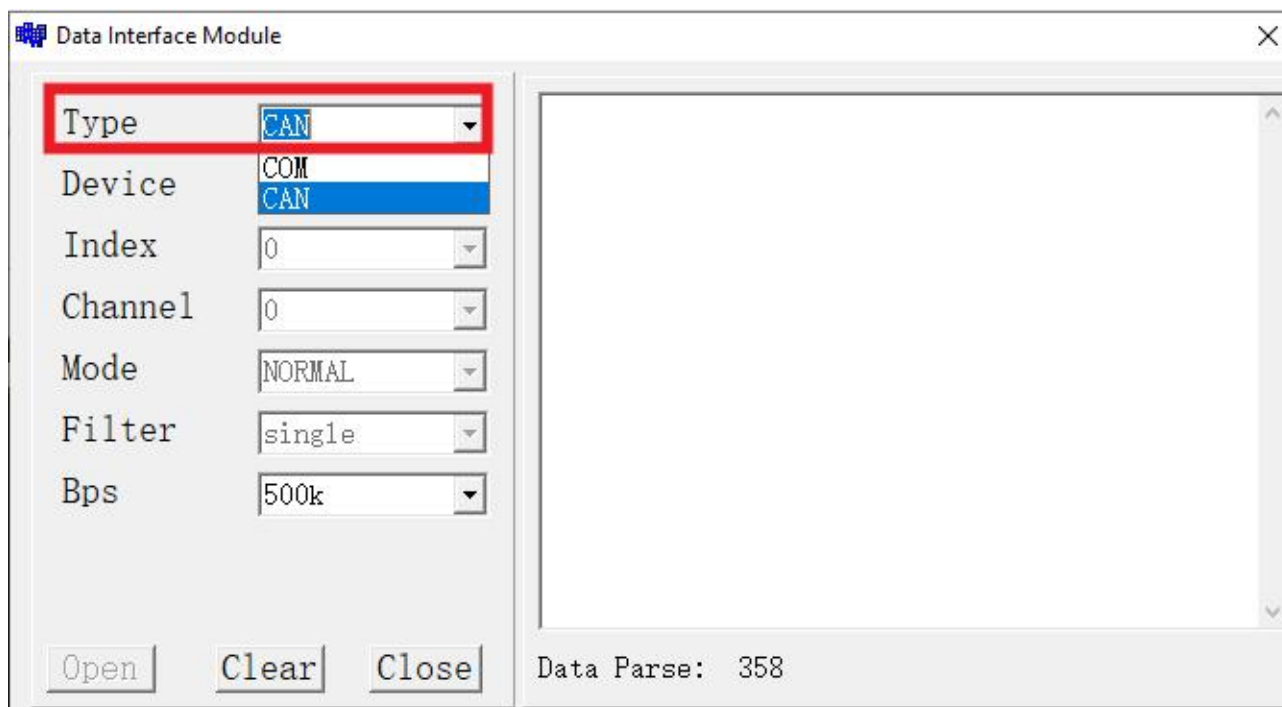
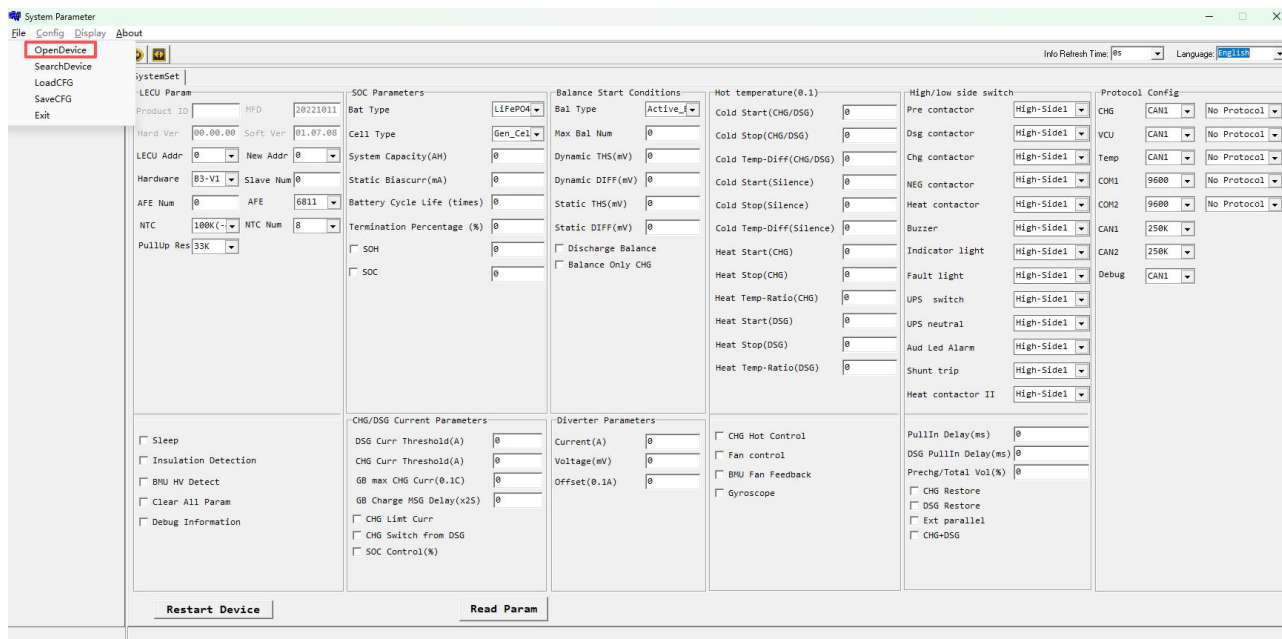
- ！注意：**打开此页面后等待设备连接，不能点击右上角的“×”，否则设备将无法连接！！！！

5) Parameter Configuration

1. Click the "Open Device" button in the top-left corner, or click File → Open Device; the CAN Communication Configuration interface will pop up.
2. Parameter configuration: Select "CAN" for "Type"; other parameters remain default and no modification is needed.
3. Click "Open" to establish the connection. Wait until the device status indicator stays on, which indicates a successful connection.

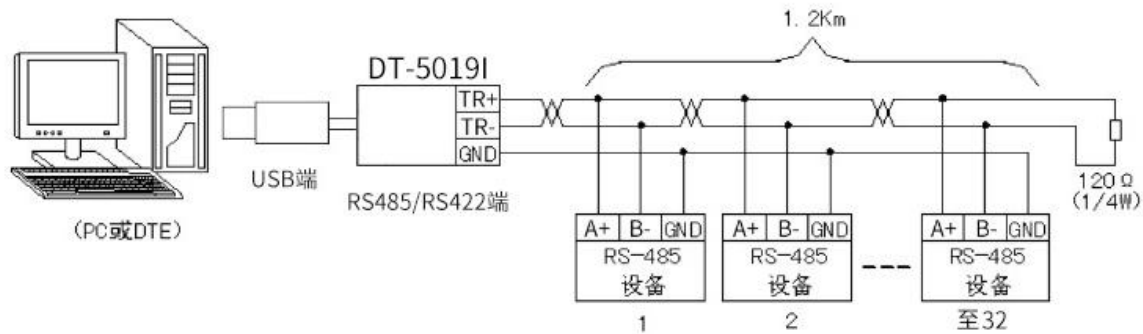
Note: After opening this page, wait for the device to connect. Do NOT click the "X" in the top-right corner, otherwise the device will fail to connect!!!





4.2. RS-485 连接设备（RS-485 Connection）

- 1) 将设备通讯线接入 RS-485 转 USB 适配器的 T/R+、T/R- 端口。
- 2) 将适配器 USB 端插入电脑，确保接口牢固。
- 1) Connect the device communication cable to the T/R+ and T/R- ports of the RS-485 to USB adapter.
- 2) Plug the USB end of the adapter into the computer and ensure a secure connection at the interface.



3) 参数配置

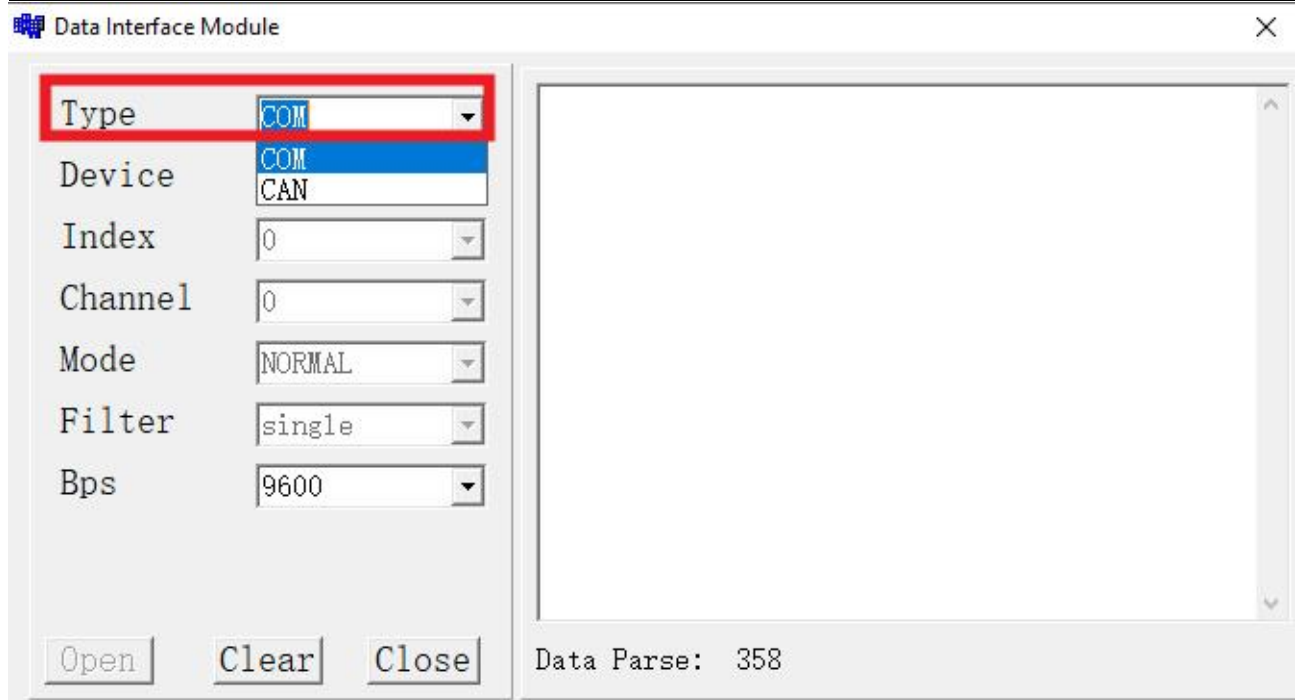
- 1、点击左上角“打开设备”按钮或是点击文件→打开设备，弹出 485 通讯配置界面；
- 2、参数配置：“Type”选择“COM”，其他参数默认无需修改。
- 3、点击“Open”建立连接，等待设备状态指示灯常亮表示连接成功。

！注意：打开此页面后等待设备连接，不能点击右上角的“×”，否则设备将无法连接！！

3) Parameter Configuration

1. Click the "Open Device" button in the top-left corner, or click File → Open Device; the 485 Communication Configuration interface will pop up.
2. Parameter configuration: Select "COM" for "Type"; other parameters remain default and no modification is needed.
3. Click "Open" to establish the connection. Wait until the device status indicator stays on, which indicates a successful connection.

Note: After opening this page, wait for the device to connect. Do NOT click the "X" in the top-right corner, otherwise the device will fail to connect!!!

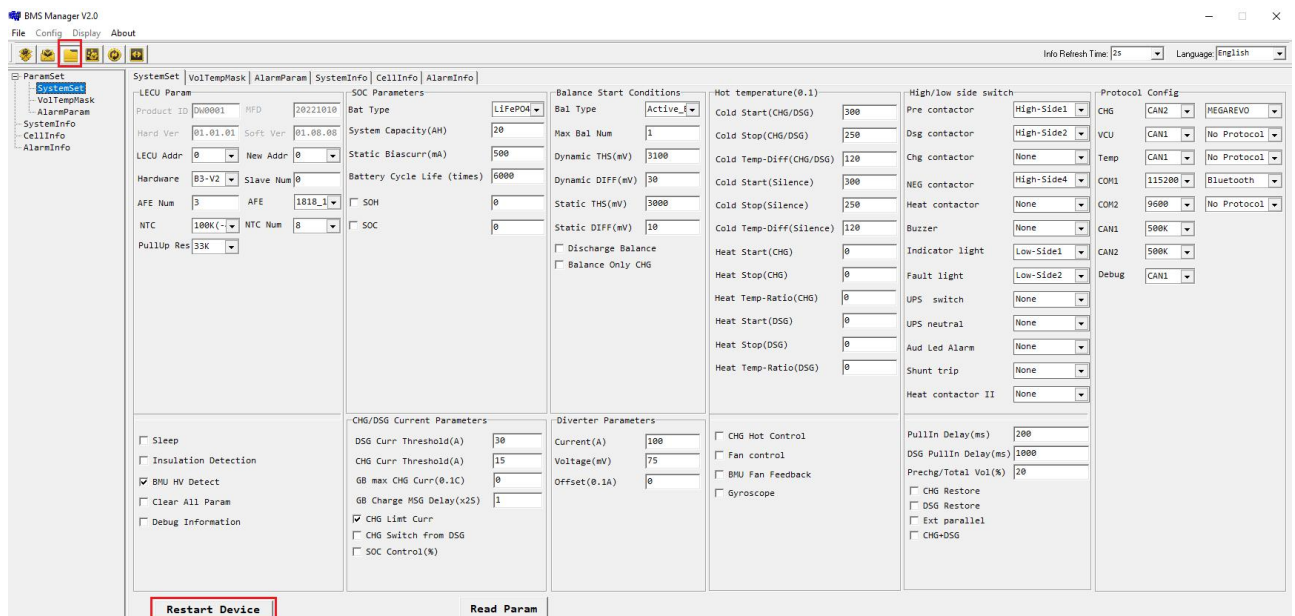


5. 参数说明（Parameter Specifications）

5.1. 游客模式/Guest Mode

游客模式的权限：1、保存配置文件；2、重启设备；3、读取参数

Guest Mode Permissions: 1.Save configuration files; 2.Restart devices; 3.Read parameters



BMS Manager V2.0

File Config Display About

Info Refresh Time: 0s Language: English

ParamSet

- SystemSet
- VolTempMask
- AlarmParam
- SystemInfo
- CellInfo
- AlarmInfo

SystemSet

LECU Param

Product ID: 0x0001 NFD 20221010

Hard Ver: 01.01.01 Soft Ver: 01.08.08

LECU Addr: 0 New Addr: 0

Hardware: B3-V2 Slave Num: 0

AFE Num: 3 AFE: 1818_0

NTC: 100K(-) NTC Num: 8

PullUp Res: 33K

SOC Parameters

Bat Type: LifePO4

System Capacity(AH): 20

Static Biascurr(mA): 500

Battery Cycle Life (times): 6000

SOH: 0

SOC: 0

Balance Start Conditions

Bal Type: Active_f

Max Bal Num: 1

Dynamic THS(mV): 3100

Dynamic DIFF(mV): 30

Static THS(mV): 3000

Static DIFF(mV): 10

Discharge Balance

Balance Only CHG

Hot temperature(0.1)

Cold Start(CHG/DSG): 300

Cold Stop(CHG/DSG): 250

Cold Temp-Diff(CHG/DSG): 120

Cold Start(Silence): 300

Cold Stop(Silence): 250

Cold Temp-Diff(Silence): 120

Heat Start(CHG): 0

Heat Stop(CHG): 0

Heat Temp-Ratio(CHG): 0

Heat Start(DSG): 0

Heat Stop(DSG): 0

Heat Temp-Ratio(DSG): 0

High/Low side switch

Pre contactor: High-Side1

Dsg contactor: High-Side2

Chg contactor: None

NEG contactor: High-Side4

Heat contactor: None

Buzzer: None

Indicator light: Low-Side1

Fault light: Low-Side2

UPS switch: None

UPS neutral: None

Aud Led Alarm: None

Shunt trip: None

Heat contactor II: None

Protocol Config

CHG: CAN2 MEGAREVO

VCU: CAN1 No Protocol

Temp: CAN1 No Protocol

COM1: 115200 Bluetooth

COM2: 9600 No Protocol

Debug: CAN1

CHG/DSG Current Parameters

DSG Curr Threshold(A): 30

CHG Curr Threshold(A): 15

GB max CHG Curr(0.1C): 0

GB Charge MSG Delay(x25): 1

CHG Limt Curr

CHG Switch from DSG

SOC Control(%)

Diverter Parameters

Current(A): 100

Voltage(mV): 75

Offset(0.1A): 0

CHG Hot Control

Fan control

BNU Fan Feedback

Gyroscope

PullIn Delay(ms): 200

DSG PullIn Delay(ms): 1000

Prechg/Total Vol(%): 20

CHG Restore

DSG Restore

Ext parallel

CHG+DSG

Restart Device

Read Param

hcbmspcsingle_3...

Param Read Success

OK

BMS Manager V2.0

File Config Display About

Info Refresh Time: 0s Language: English

ParamSet

- SystemSet
- VolTempMask
- AlarmParam
- SystemInfo
- CellInfo
- AlarmInfo

SystemSet

LECU Param

Product ID: 0x0001 NFD 20221010

Hard Ver: 01.01.01 Soft Ver: 01.08.08

LECU Addr: 0 New Addr: 0

Hardware: B3-V2 Slave Num: 0

AFE Num: 3 AFE: 1818_1

NTC: 100K(-) NTC Num: 8

PullUp Res: 33K

SOC Parameters

Bat Type: LifePO4

System Capacity(AH): 20

Static Biascurr(mA): 500

Battery Cycle Life (times): 6000

SOH: 0

SOC: 0

Balance Start Conditions

Bal Type: Active_f

Max Bal Num: 1

Dynamic THS(mV): 3100

Dynamic DIFF(mV): 30

Static THS(mV): 3000

Static DIFF(mV): 10

Discharge Balance

Balance Only CHG

Hot temperature(0.1)

Cold Start(CHG/DSG): 300

Cold Stop(CHG/DSG): 250

Cold Temp-Diff(CHG/DSG): 120

Cold Start(Silence): 300

Cold Stop(Silence): 250

Cold Temp-Diff(Silence): 120

Heat Start(CHG): 0

Heat Stop(CHG): 0

Heat Temp-Ratio(CHG): 0

Heat Start(DSG): 0

Heat Stop(DSG): 0

Heat Temp-Ratio(DSG): 0

High/Low side switch

Pre contactor: High-Side1

Dsg contactor: High-Side2

Chg contactor: None

NEG contactor: High-Side4

Heat contactor: None

Buzzer: None

Indicator light: Low-Side1

Fault light: Low-Side2

UPS switch: None

UPS neutral: None

Aud Led Alarm: None

Shunt trip: None

Heat contactor II: None

Protocol Config

CHG: CAN2 MEGAREVO

VCU: CAN1 No Protocol

Temp: CAN1 No Protocol

COM1: 115200 Bluetooth

COM2: 9600 No Protocol

Debug: CAN1

CHG/DSG Current Parameters

DSG Curr Threshold(A): 30

CHG Curr Threshold(A): 15

GB max CHG Curr(0.1C): 0

GB Charge MSG Delay(x25): 1

CHG Limt Curr

CHG Switch from DSG

SOC Control(%)

Diverter Parameters

Current(A): 100

Voltage(mV): 75

Offset(0.1A): 0

CHG Hot Control

Fan control

BNU Fan Feedback

Gyroscope

PullIn Delay(ms): 200

DSG PullIn Delay(ms): 1000

Prechg/Total Vol(%): 20

CHG Restore

DSG Restore

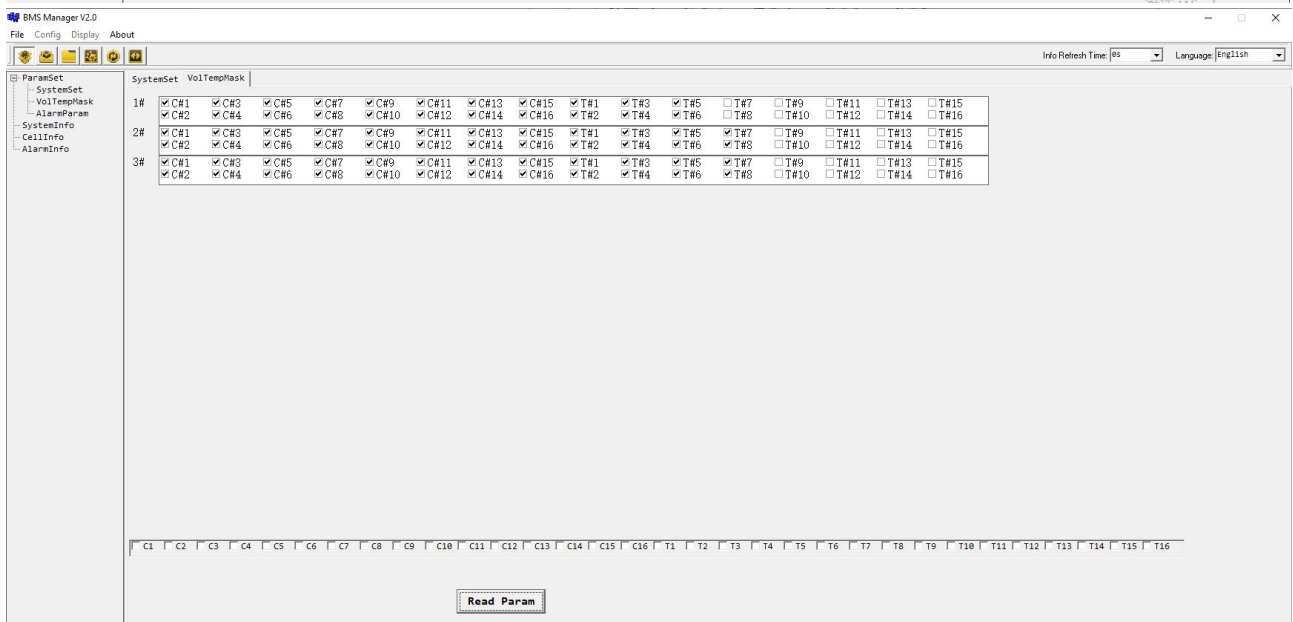
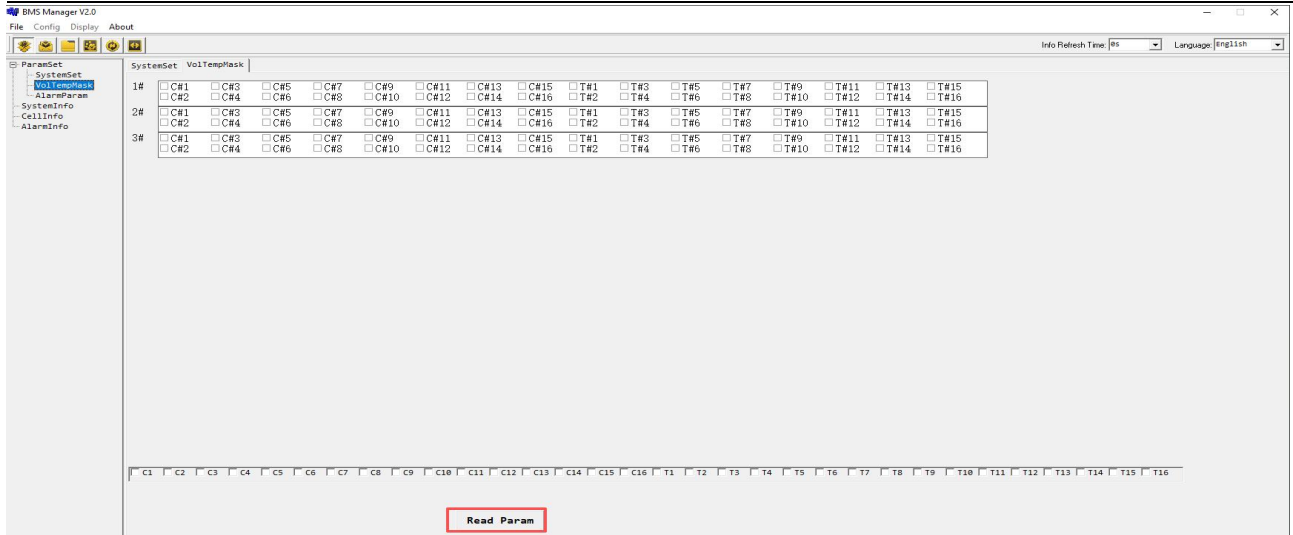
Ext parallel

CHG+DSG

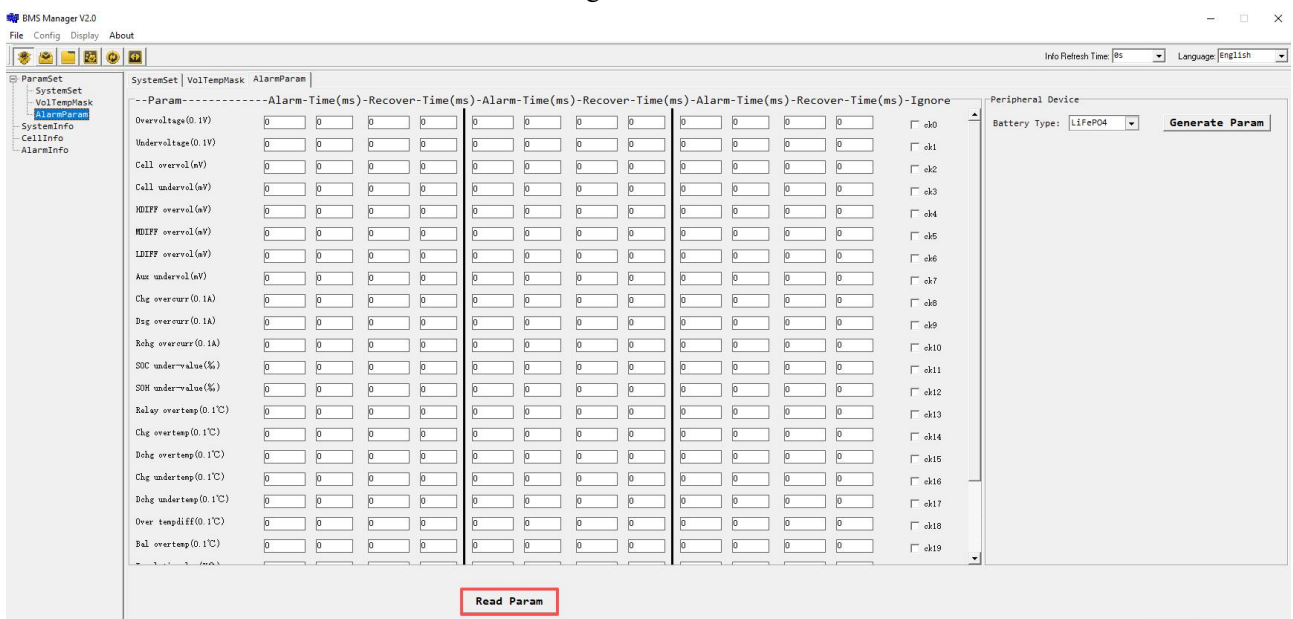
Restart Device

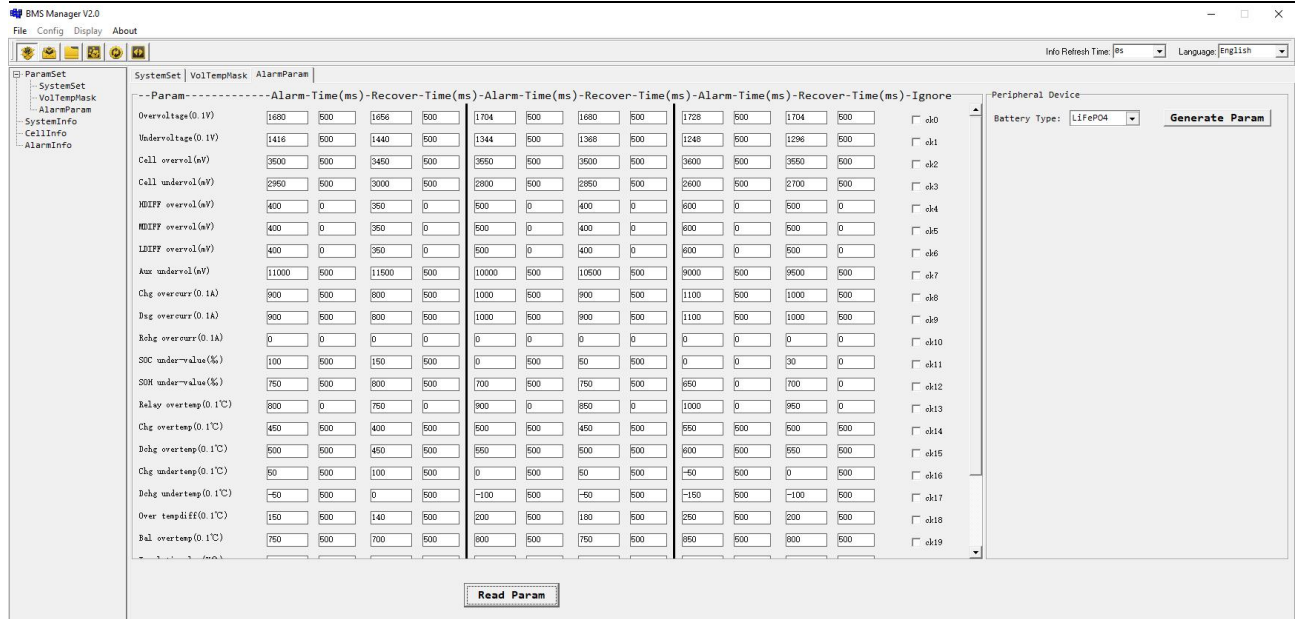
Read Param

1、读取系统参数/Read system parameters

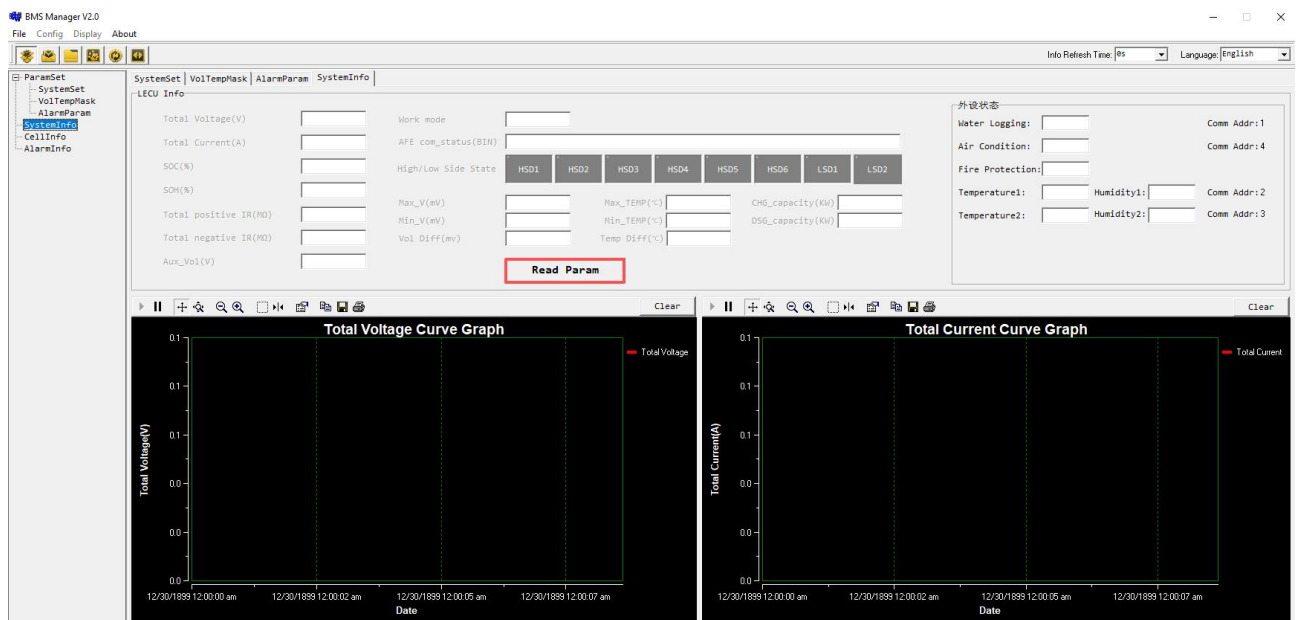


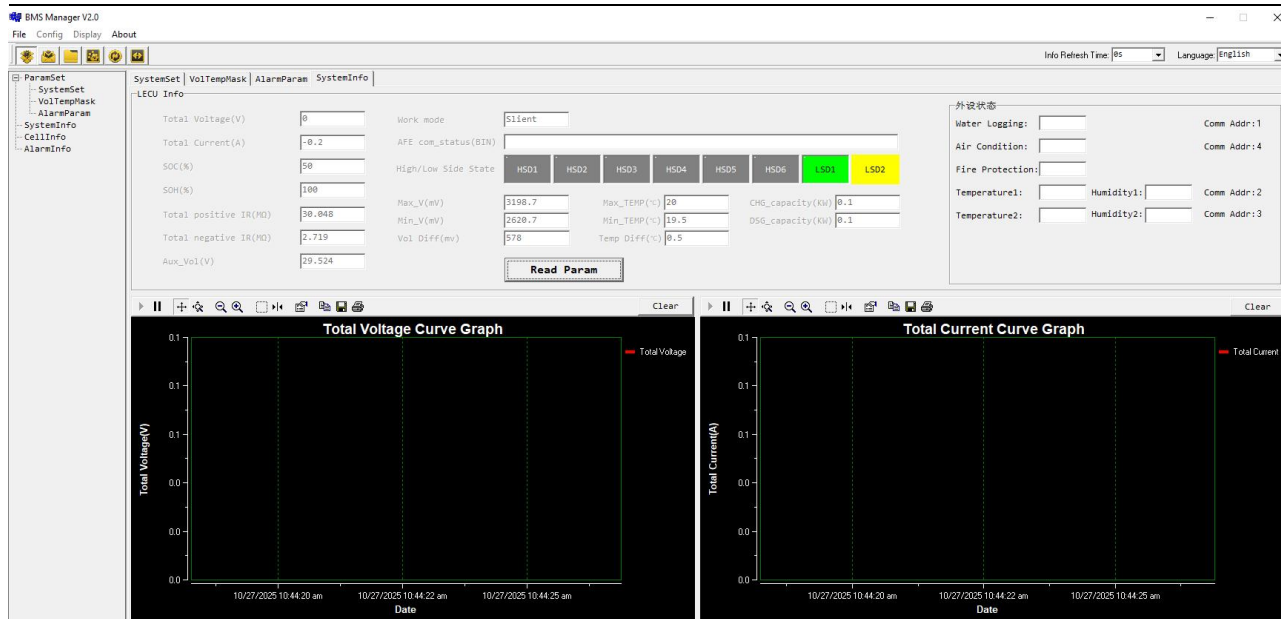
2、读取单体分布配置/Read cell distribution configuration



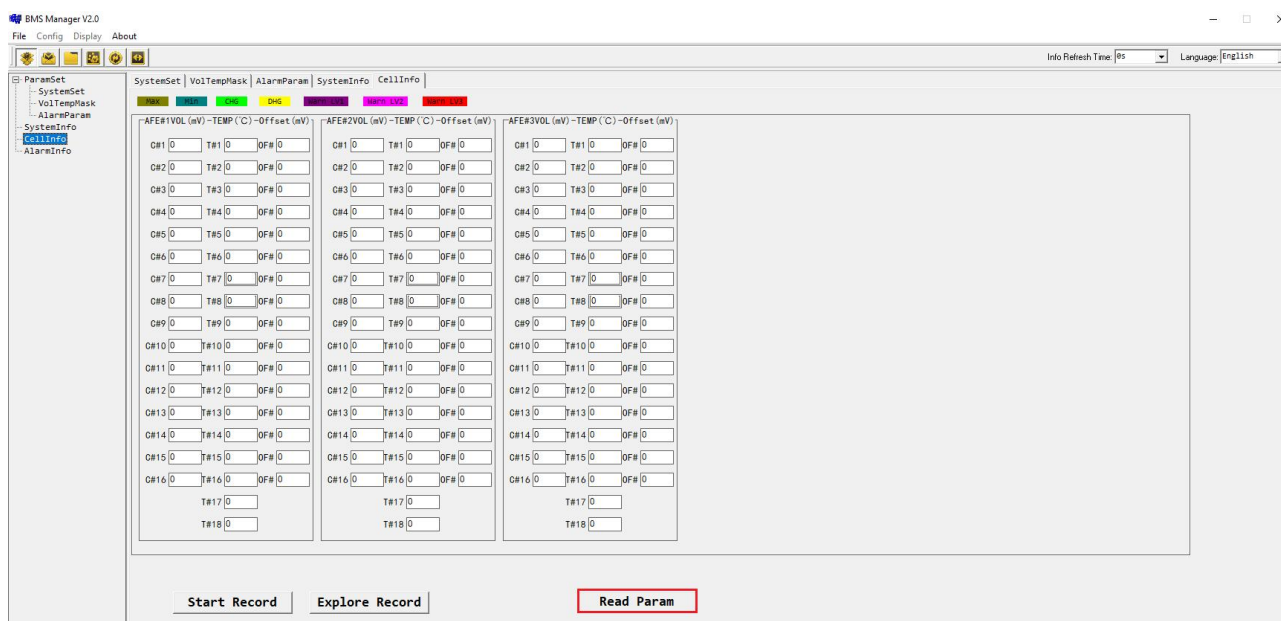


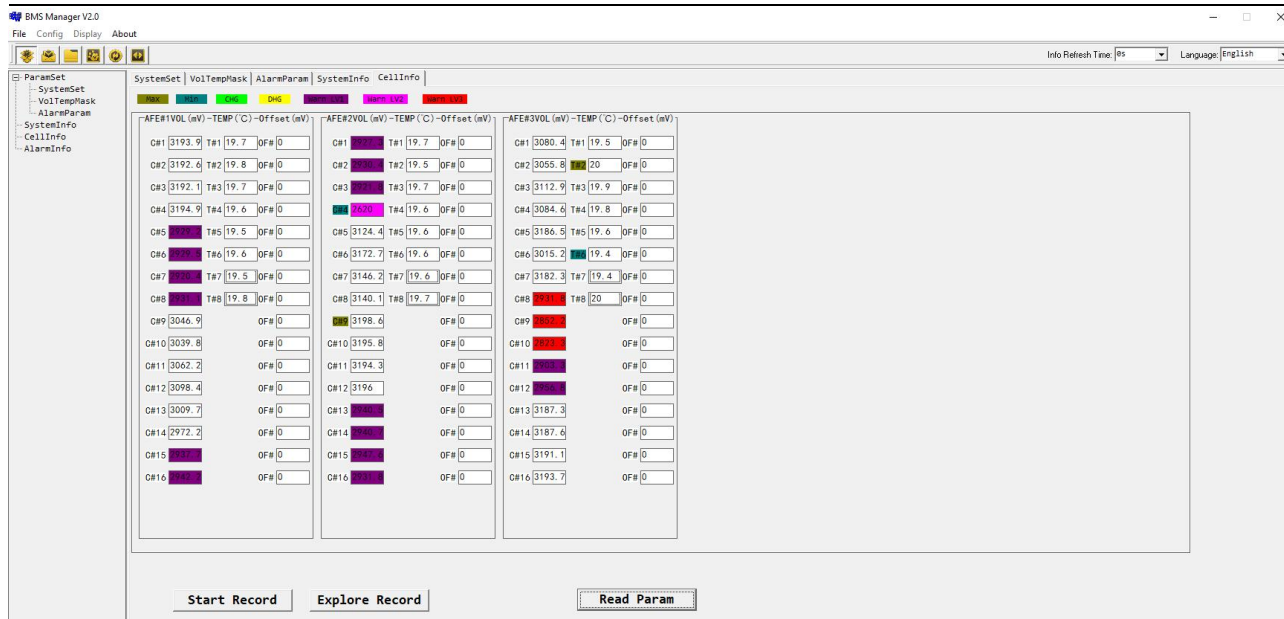
3、读取告警参数配置/Read alarm parameter configuration



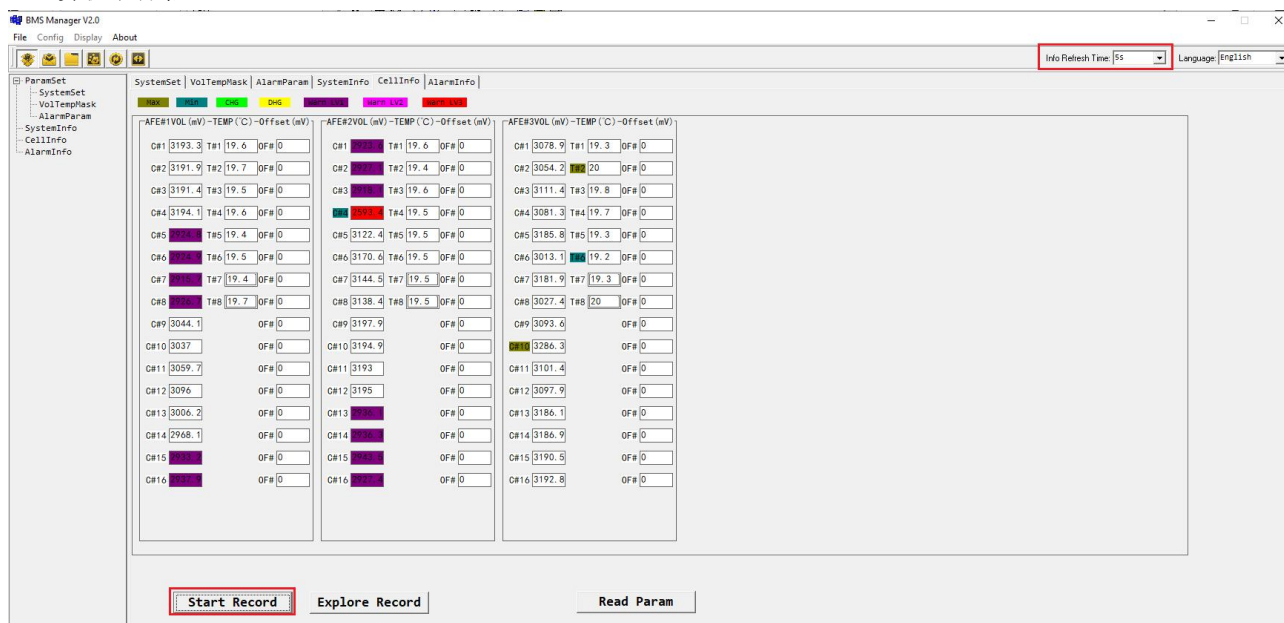


4、读取主机参数/Read host parameters



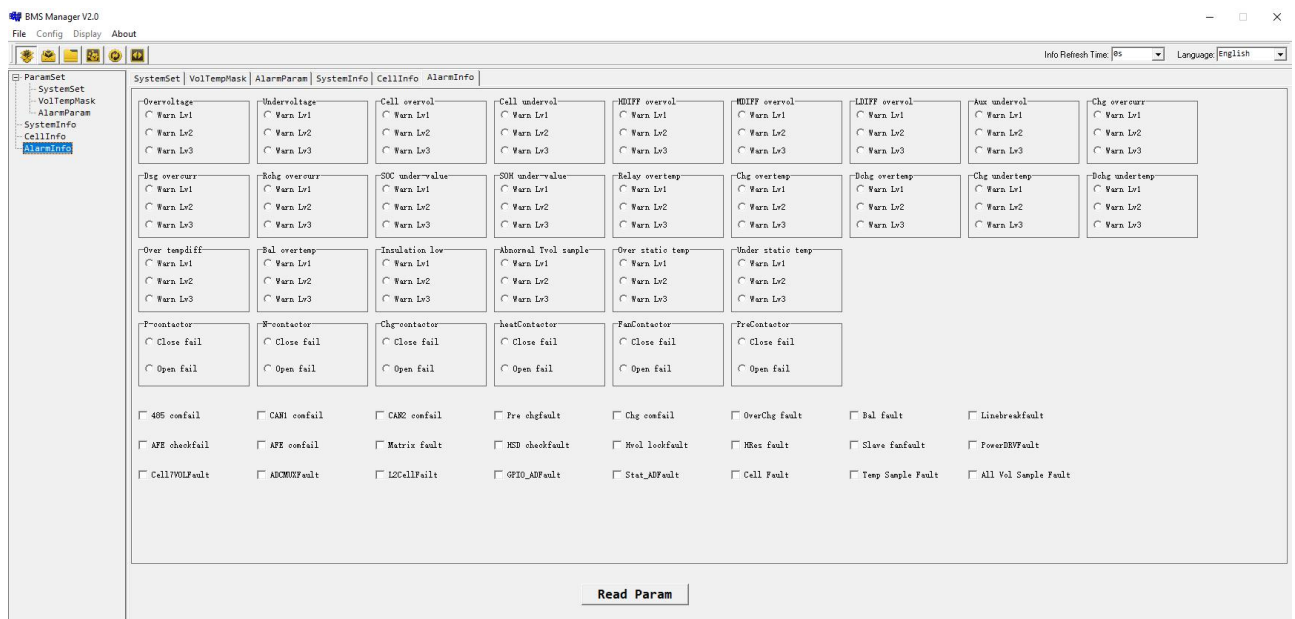


5、读取单体信息/Read cell information





6、记录单体电压和温度曲线/Record cell voltage and temperature curves

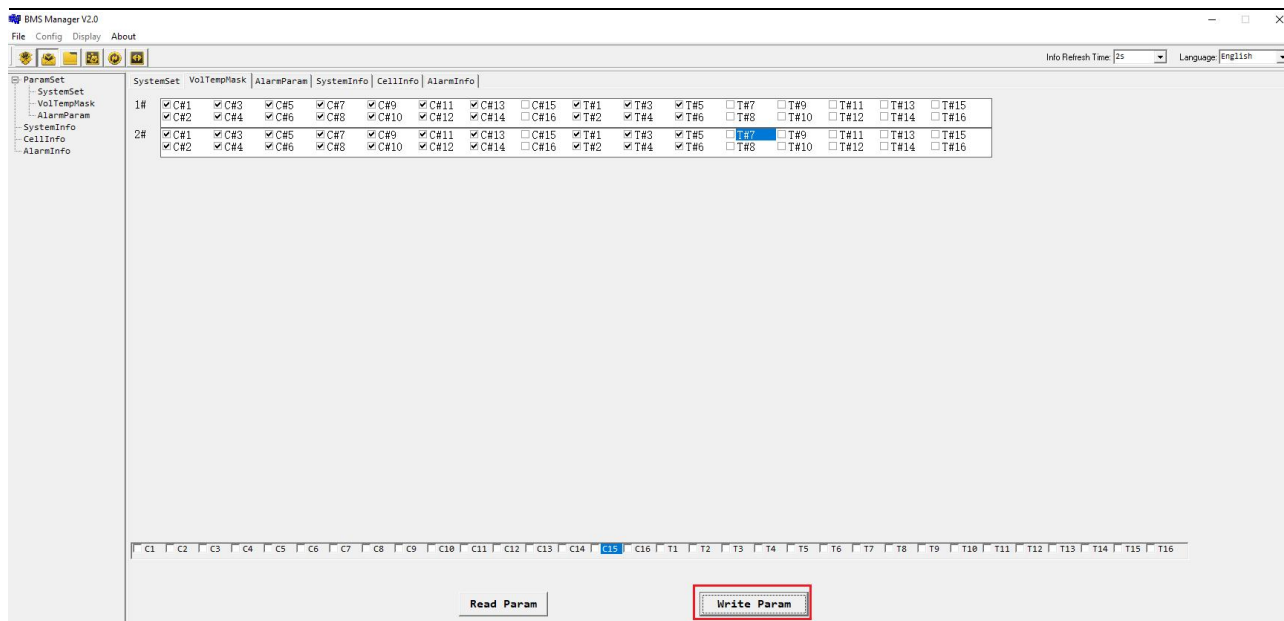


7、读取告警信息/Read alarm information

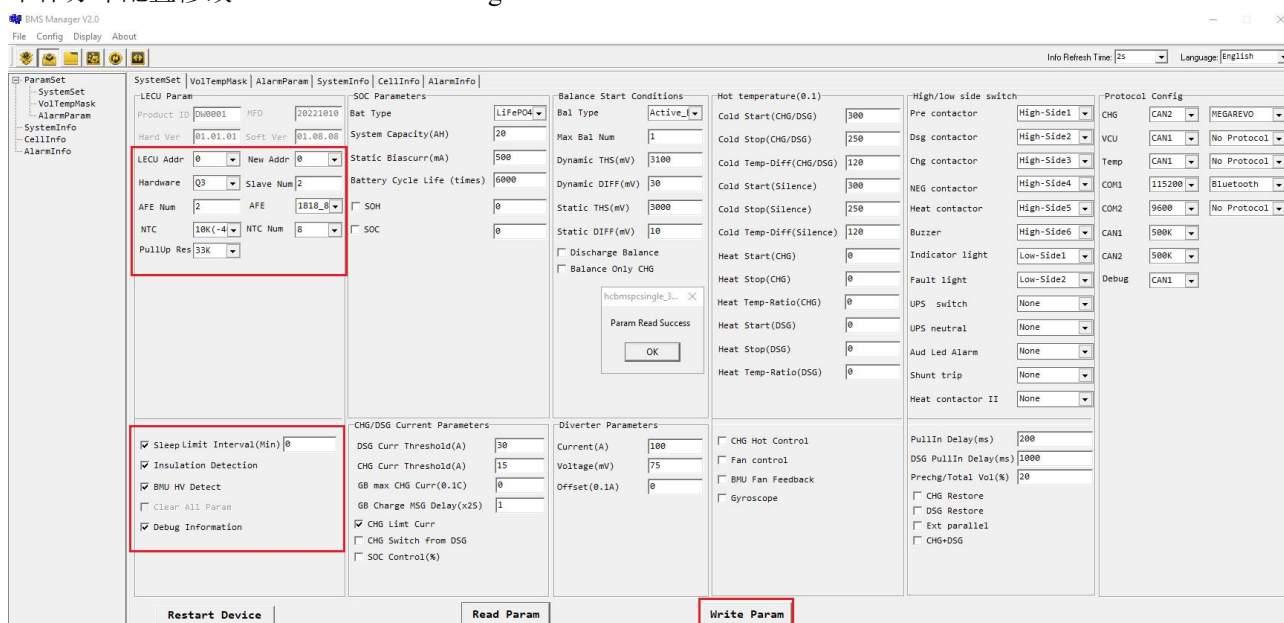
5.2. 一级授权/Level 1 Authorization:

一级授权的权限：1、保存配置文件；2、重启设备；3、读取参数；4、修改部分参数（①单体分布配置②部分系统参数见下图）

Level 1 Authorization Permissions: 1.Save configuration files; 2.Restart devices; 3.Read parameters; 4.Modify partial parameters (① Cell distribution configuration ② Partial system parameters, see the figure below)



单体分布配置修改/Cell distribution configuration modification



一级授权的权限可修改的系统参数/System parameters modifiable by Level 1 Authorization permissions

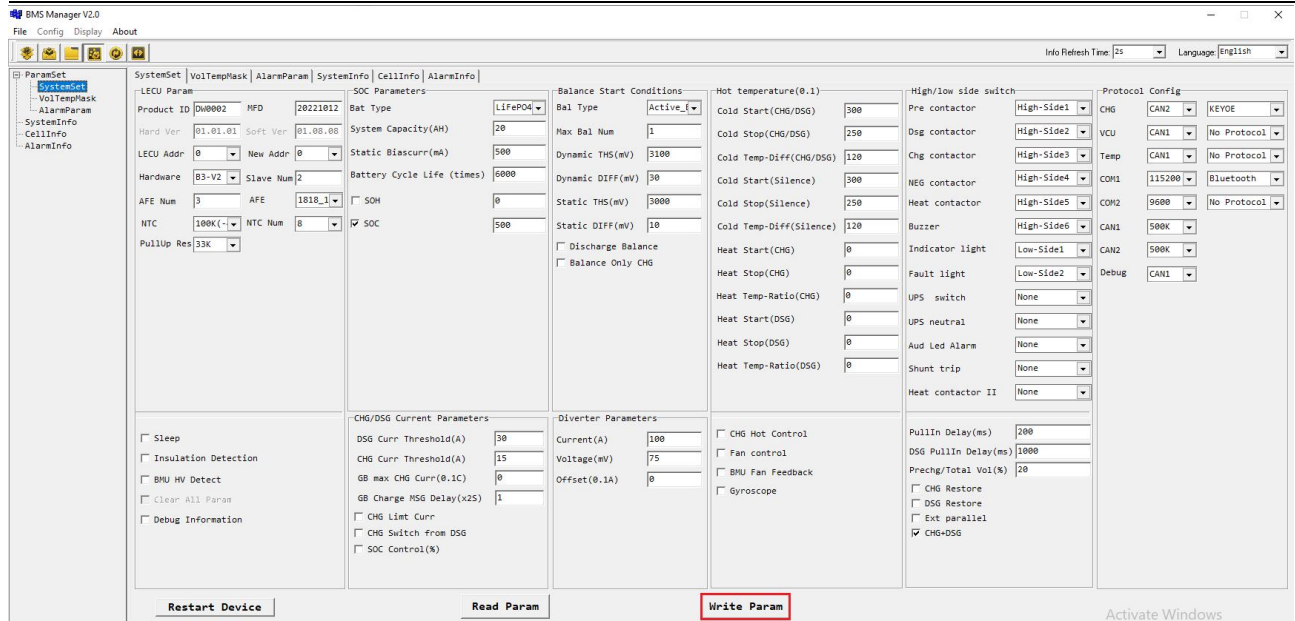
5.3. 二级授权/Level 2 Authorization:

二级授权的权限：1、保存配置文件；2、重启设备；3、读取参数；4、参数修改（全部）

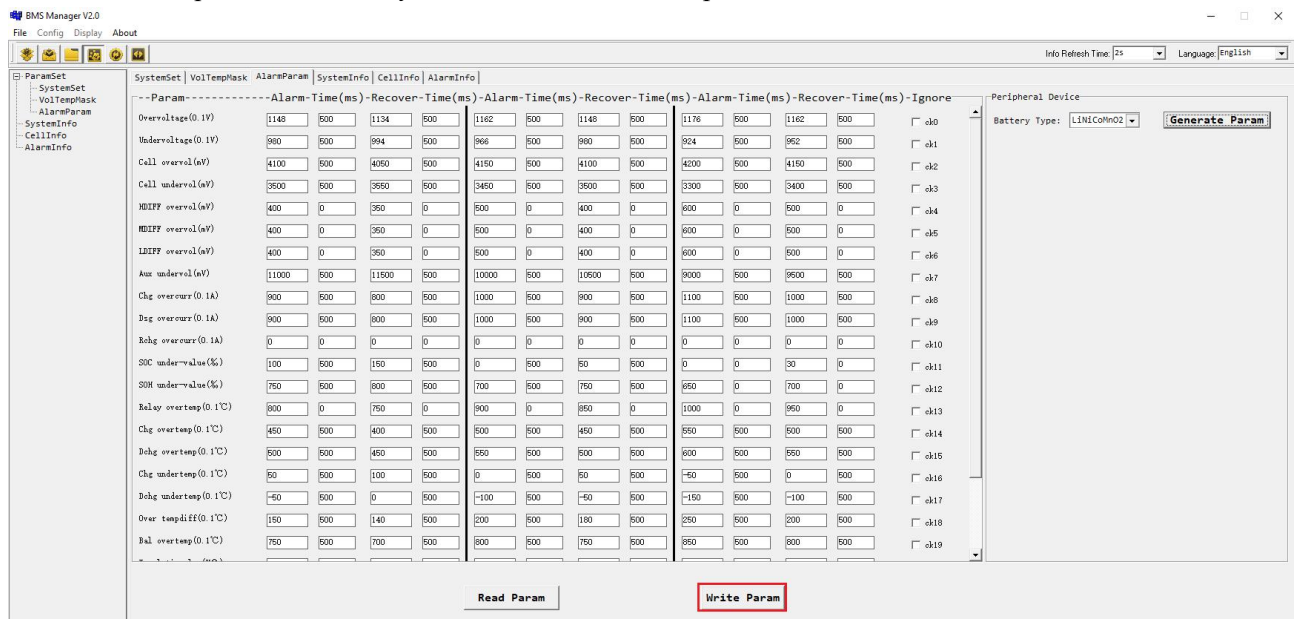
注意：系统参数配置界面先读取参数，然后 Product ID:需要输入 2 位字母+4 位数字（例如 DW1002），否则修改不了参数

Level 2 Authorization Permissions: 1.Save configuration files; 2.Restart devices; 3.Read parameters; 4.Modify parameters (all)

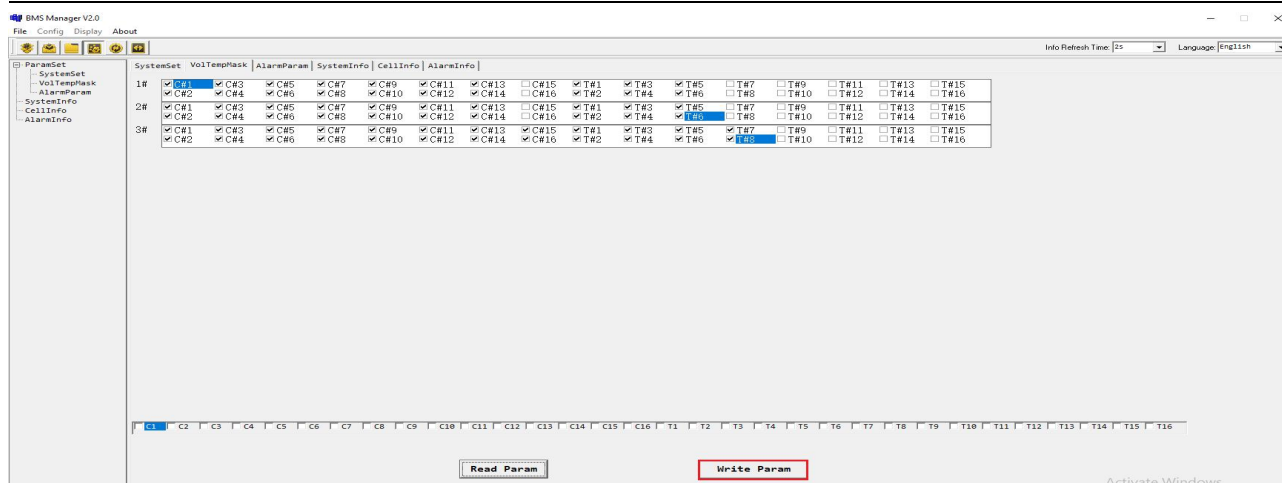
Note: On the system parameter configuration interface, first read the parameters. Then, for "Product ID": input of 2 letters + 4 digits is required (e.g., DW1002); otherwise, parameters cannot be modified.



系统参数修改界面：先读取下位机参数，修改好，下传参数/System Parameter Modification Interface:First read the slave device parameters, modify them, then download the parameters.



告警参数配置界面：点击右侧电池类型，下拉框中设有磷酸锂铁和三元锂电的默认参数，点击最右侧生成参数，方便修改告警参数阈值，然后下传参数，就设置成功了。/Alarm Parameter Configuration Interface Click the Battery Type on the right. The drop-down menu contains default parameters for two battery types: lithium iron phosphate (LFP) and lithium nickel cobalt manganese oxide (NCM). Click Generate Parameters on the far right to easily modify the alarm parameter thresholds. Then download the parameters, and the settings will take effect.



电池分布配置界面：配置电池时可以点击最下方批量配置，勾选电池编号及显示电池。/Battery Distribution Configuration Interface: When configuring batteries, click Batch Configuration at the bottom. Then check the battery numbers and enable battery display.

5.4. 三级授权/Level 3 Authorization:

三级授权的权限：1、保存配置文件；2、重启设备；3、读取参数；4、参数修改（全部）

注意：三级授权给设备升级时可以从高版本退到低版本，但注意软件的适配性。

Level 3 Authorization Permissions: 1.Save configuration files; 2.Restart devices; 3.Read parameters; 4.Modify parameters (all)

Note: When upgrading the device with Level 3 Authorization, you can downgrade from a higher version to a lower version, but please note the software compatibility.

6. 常见问题与故障处理（Common Issues and Troubleshooting）

问题现象 /Phenomenon	可能原因/Causes	解决措施/Solutions
设备连接无响应/No response from device connection	1. 通讯线缆接触不良 2. 端口配置错误 1. Poor contact of communication cable 2. Incorrect port configuration	1. 重新插拔线缆，检查接口 2. 在设备连接中确认 CAN/COM 口，修改软件端口设置 1. Replug the cable and check the interface 2. Confirm the CAN (Controller Area Network)/COM (Communication Port) in device connection, and modify the software port settings
数据显示异常 /Abnormal data	1. 传感器故障 2. 通讯干扰	1. 更换传感器，测试硬件电路 2. 更换屏蔽线缆，远离强电磁源

display	1. Sensor failure 2. Communication interference	1. Replace the sensor and test the hardware circuit 2. Replace with shielded cable and keep it away from strong electromagnetic sources
参数下传不成功/Failed parameter download	1. 用户权限不足 2. 密码输入错误 1. Insufficient user permissions 2. Wrong password input	1. 联系技术支持管理员，申请提升用户账号权限 2. 仔细核对密码，重新输入 1. Contact the technical support administrator to apply for enhanced user account permissions 2. Carefully verify the password and re-enter it
软件运行崩溃 /Software crash	1. 系统资源不足 2. 版本兼容性问题 1. Insufficient system resources 2. Version compatibility issue	1. 关闭后台程序，升级硬件配置 2. 下载最新版本软件（联系技术支持） 1. Close background programs and upgrade hardware configuration 2. Download the latest version of the software (contact technical support)
均衡功能不启动/Balancing function not activating	1. 阈值设置过高 2. 硬件故障 1. Excessively high threshold setting 2. Hardware failure	1. 降低 STHS 和 SDIFF 参数 2. 检查均衡电路连接线及芯片状态 1. Lower the STHS and SDIFF parameters 2. Check the connecting wires and chip status of the balancing circuit
三级告警未解除/Level 3 alarm not cleared	1. 硬件故障未排除 2. 未手动重启 1. Unresolved hardware failure 2. No manual restart performed	1. 排查接触器、绝缘检测模块等硬件 2. 断电 5 分钟后重新上电 1. Troubleshoot hardware such as contactors and insulation detection modules 2. Power off for 5 minutes, then power on again

7. 维护与升级（Maintenance and Upgrade）

7.1. 日常维护/Daily Maintenance

1. 通讯线缆接口是否松动/Check if the communication cable interface is loose;
2. 备份系统配置文件/Back up the system configuration files。

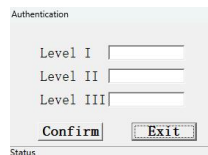
7.2. 在线升级/Online Upgrade

1. 准备工作/Preparation:

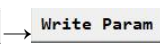
- 1) 下载最新固件（.bin 格式）到本地/Download the latest firmware (.bin format) to your local device;
- 2) 确保设备供电稳定，避免升级中断/Ensure stable power supply to the device to prevent upgrade interruptions。

2. 操作步骤/Procedure:

- 1) 点击“Upgrade”按钮或是点击“About”→“Upgrade”，会弹出 ，需要先获取二级或三级权限（联系TOPBMS 技术人员），点击“Authentication”按钮或是点击“About”→“Author”中



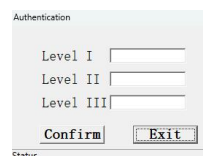
输入授权密码(从高版本退到低版本只有三级授权权限可以操作)，然后点击

 → ，打开在线升级界面；

- 2) 点击“Open File”会弹出选择固件文件，点击升级文件（.bin 格式）（联系厂家获取）；
- 3) Hardware 选择对应的硬件类型，Upgrade ID 选择对应设备 ID；
- 4) 点击 Start Upgrade，等待进度条完成（约 5 分钟）。

！ 注意：升级过程中严禁断电或关闭软件，否则可能导致设备损坏！

- 1) Click the "Upgrade" button, or click "About" → "Upgrade". A prompt will appear , requiring you to first obtain Level 2 or Level 3 permissions (contact technical personnel of Hengchi Technology). Click the



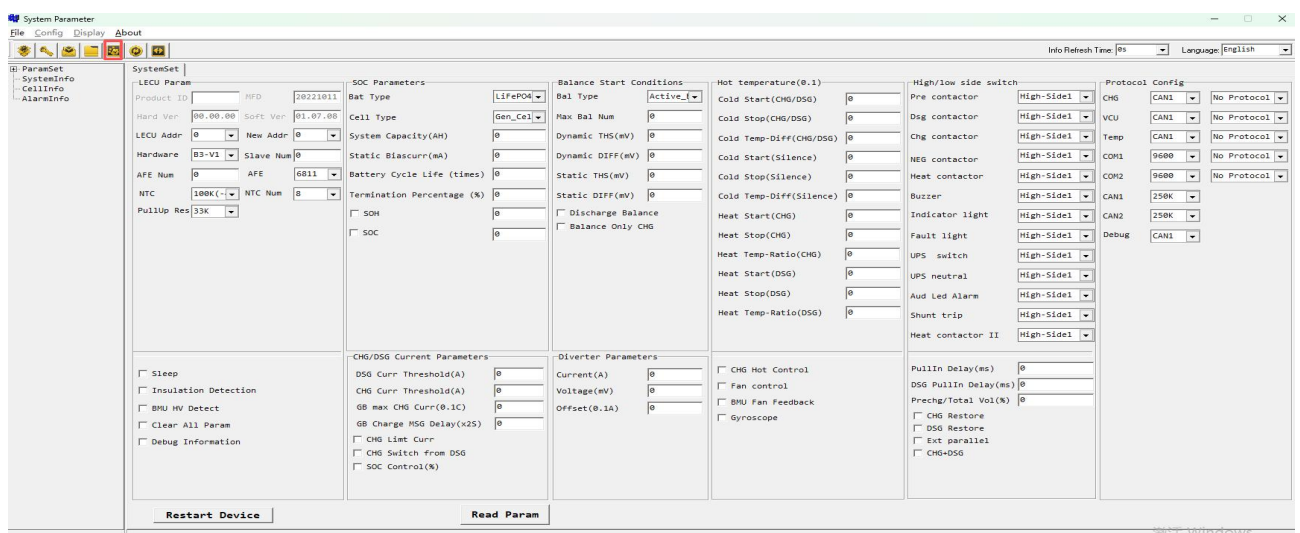
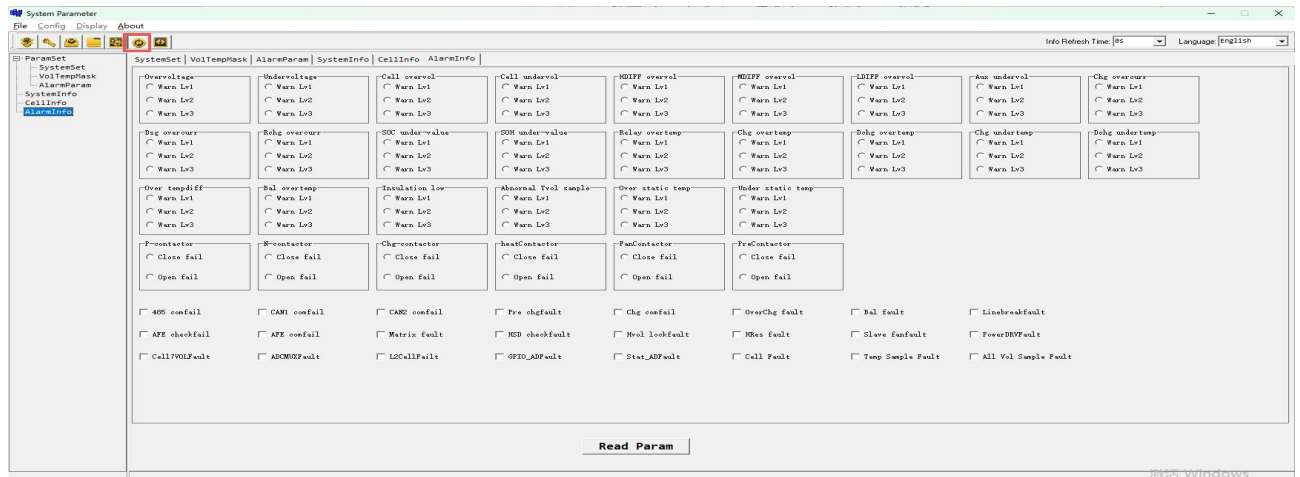
"Authentication" button, or click "About" → "Author" and enter the authorization password. Note that only Level 3 authorization permissions allow downgrading from a higher version to a lower one. Then click the  →  button to open the online upgrade interface.

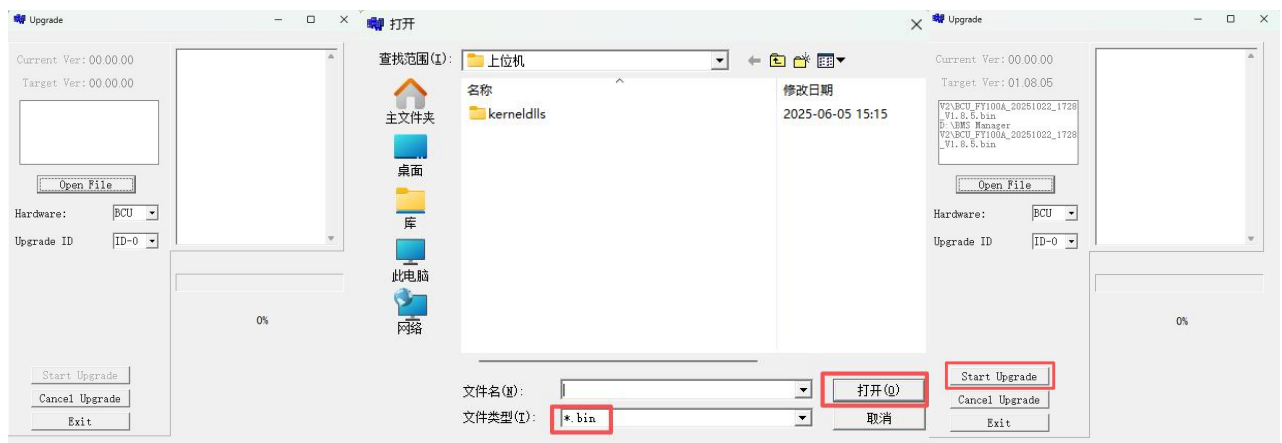
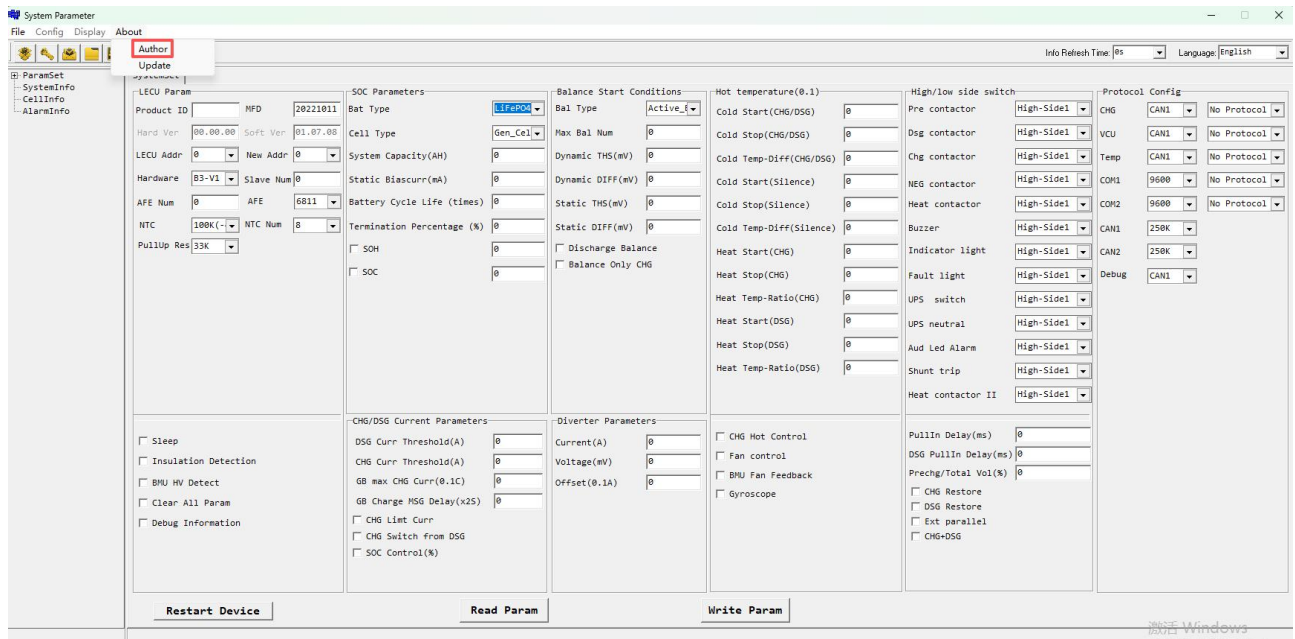
- 2) Click "Open File" and a prompt to select a firmware file will appear. Click the upgrade file (in .bin format, obtain from the manufacturer).
- 3) For "Hardware", select the corresponding hardware type; for "Upgrade ID", select the corresponding device

ID.

4) Click "Start Upgrade" and wait for the progress bar to complete (approximately 5 minutes).

! Note: Strictly prohibit powering off the device or closing the software during the upgrade process, otherwise it may cause device damage!





8. 技术支持与服务 (Technical Support and Services)

8.1. 联系方式/Contact Information

- 技术支持热线/Technical support hotline: +8617841591535
- 服务邮箱/Service email: andy@topbms.com
- 官方网站/Official website: www.topbms.com

8.2. 服务说明/Service Description

1. 保修期: 软件自发布之日起提供 1 年免费维护;
2. 付费服务: 超出保修期或人为故障, 需收取技术服务费;
3. 远程支持: 支持通过 TeamViewer 等工具远程协助调试。

1. Warranty period: 1-year free maintenance for software from the release date.

2. Paid services: Technical service fees apply for out-of-warranty or human-induced failures.
3. Remote support: Remote debugging via tools like TeamViewer is supported.

8.3. 安全声明/Safety Statement

1. 严禁擅自修改系统核心参数（如极限电压、电流阈值）；
2. 设备维修需由专业技术人员操作，避免触电或设备损坏；
3. 若发现冒烟、异响等异常情况，立即断开电源并联系厂家。

珠海市希望电子有限公司保留对本说明书的最终解释权，产品升级后文档将同步更新。

1. Strictly prohibited to modify system core parameters (e.g., limit voltage and current thresholds).
2. Device maintenance must be performed by professional technicians to avoid electric shock or equipment damage.
3. In case of abnormal conditions such as smoking or unusual noises, disconnect the power immediately and contact the manufacturer.

Hangzhou Hengchi Technology Co., Ltd. reserves the right to the final interpretation of this manual. The document will be updated simultaneously with product upgrades.