# Lithium Iron Phosphate (LiFePO4) Battery
# CYG-B48V-100A

## User Manual

Version 1.0

July 2024

# Contents

# Chapter 1: Safety Precautions

## 1.1 Operational Safety

a. Follow all instructions and warnings and use the product as instructed.
b. Ensure you have read and completely understand instructions prior to installing or servicing this device (battery module).
c. When working on the battery module be sure to wear protective eyeglasses, clothing, rubber shoes, and gloves.
d. If any leaked battery material comes in contact with your eyes or skin, immediately flush them with clean water, and seek medical attention.
e. In case of fire use type D foam or CO2 fire extinguisher.
f. Clean the battery only with a dry, clean cloth.
g. If the battery comes into contact with a liquid, discontinue use and contact Cyclone.
h. Please refer to section 6 for contact information, and section 7 for warranty specifications.

## 1.2 Electrical Safety

a. When moving the battery module ensure it is powered off.
b. The length of the output cable should not exceed 33 feet (10 Meters).
c. Ensure the device is powered off before connecting wires.
d. Only use appropriate voltage when recharging to avoid damaging the battery.

## 1.3 Battery Safety

a. Extreme temperatures shorten battery life. See section 2.2 specifications for temperature ranges.
b. Overcharging or discharging the battery above or below recommended parameters will damage the battery and may render the battery unsafe for use. Use of an external safety relay is advised.
c. Regular battery maintenance can extend the life of the battery.
d. Batteries pose risks of electrical shock and short circuits. Avoid placing metal objects on the battery. Remove jewelry, rings, and other items before working on the battery module.
e. Spent batteries should not be thrown away with other waste. If the battery can be recycled, take it to a recognized recycling plant.

# Chapter 2：Product Description

## 2.1 Product Overview

The Cyclone lithium battery module provides an emergency backup to network and other electrical equipment affected by a power outage. When the electrical grid goes down the battery will supply power to the connected equipment to ensure operations can continue.

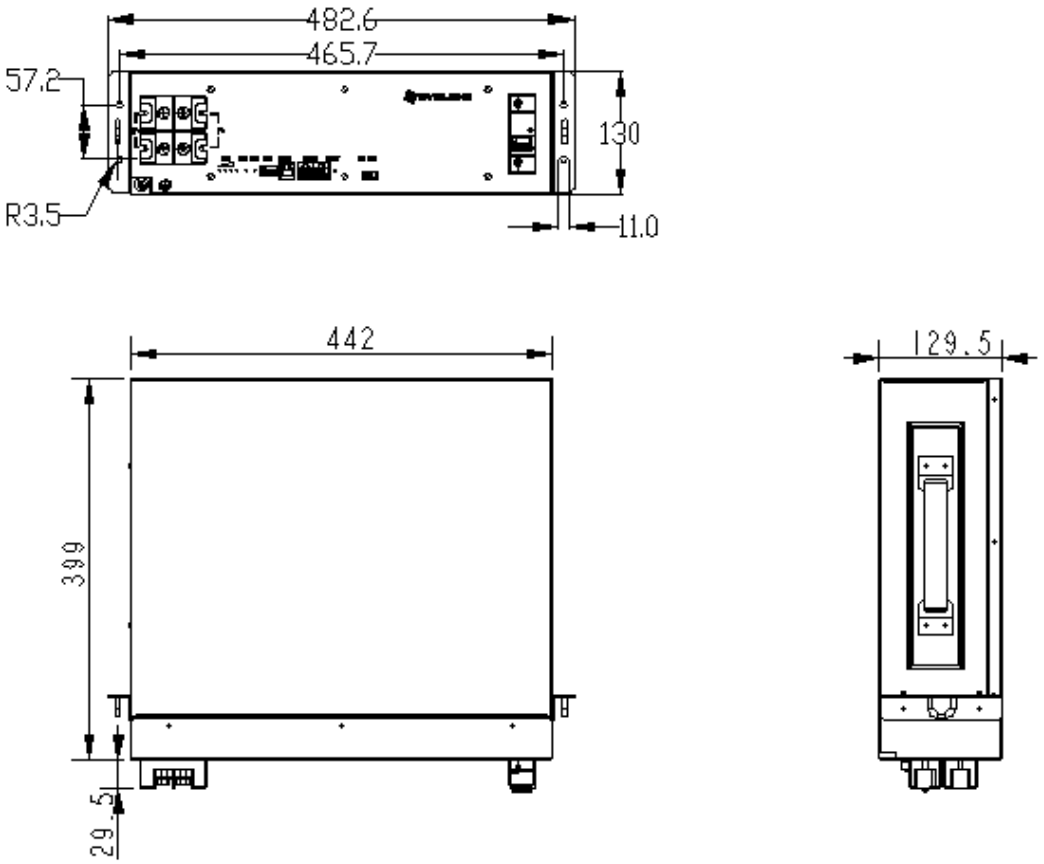
Cyclone uses a LiFePO4 battery which is long lasting as compared to the standard lead battery and it is safer to use. The system has a nominal capacity of 100Ah and a nominal output of 51.2V DC (100Ah / 51.2V DC). It includes a Battery Management System (BMS), which provides management of charge and discharge parameters, State of Charge (SOC) estimation and calibration, battery balance management, on-site alarm indications, and reporting functions. You can also manage the system with a console cable through the RS485 or RS232 interface.

## 2.2 Specifications

| No. | Item | Parameter | Remark |
|---|---|---|---|
| 1 | Nominal Voltage | 51.2V | |
| 2 | Nominal Capacity | 100Ah | 77°F (25°C) / 0.2C Charge / 0.5C Discharge |
| 3 | Combination Method | 1P16S | |
| 4 | Max Continuous Charge Current | 100A (1C) | |
| 5 | Overcharge Protection Voltage | 58.4V | Battery module: 58.4V, Cell: 3.7V. Whichever comes first |
| 6 | Max Continuous Discharge Current | 100A (1C) | |
| 7 | Over-discharge Protection Voltage | 43.2V | Battery module: 43.2V, Cell: 2.5V. Whichever comes first |
| 8 | Battery Dimensions | 17.4in x 15.7in x 5.1in (442mm x 399mm x 130mm) | WxDxH (Without handle and rack mount brackets) |
| 9 | Working Temperature (Charge) | 32°F to 131°F (0°C to 55°C | |
| 10 | Working Temperature (Discharge) | -4°F to 140°F (-20°C to 60°C) | |
| 11 | Storage Temperature | -4°F to 113°F (-20°C to 45°C) | Short time (within 1 month) |
| | | 59°F to 95°F (15°C to 35°C) | Long time (within 6 months) |
| 12 | Operating Relative Humidity | 10% to 90% RH | No condensation |
| 13 | Storage Relative Humidity | 5% to 95% RH | No condensation |
| 14 | Weight | About 90.4lbs (41kg) | |
| 15 | Design Life | 10 years | |
| 16 | IP Code | IP20 | |

| | | | | |
|---|---|---|---|---|
| 17 | Cooling | | Natural cooling | |
| 18 | External Ports | Power | M6 | |
| | | Communication | 2x RS485 + 1x RS232 | |
| 19 | Dry-contact | | DO1, DO2 | DO1: Normally open, closes when the protection action is triggered; DO2: Normally open, closes when the protection action or alarm is triggered |
| 20 | Panel Color | | RAL9005 Black | |

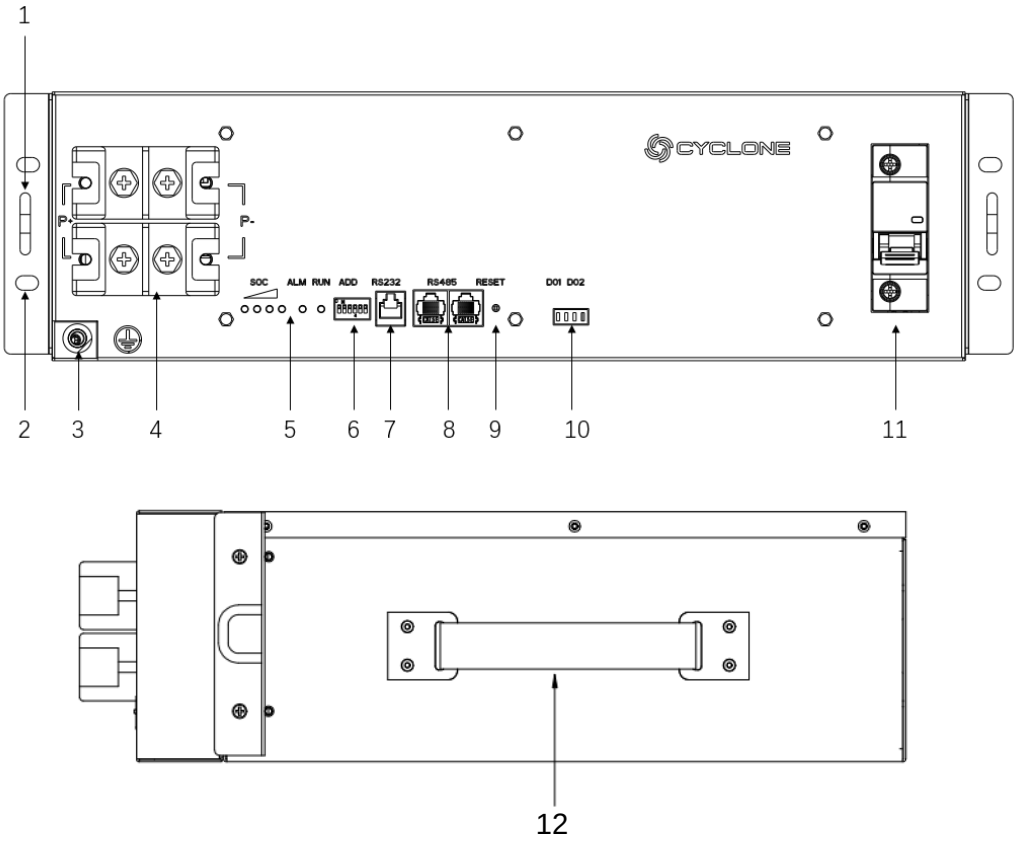
## 2.3 Dimensions (mm)




Overall dimensions of battery box: 17.4in x 15.7in x 5.1in (442mm x 399mm x 130mm) WxDxH, without handle and Rack Mount Brackets.

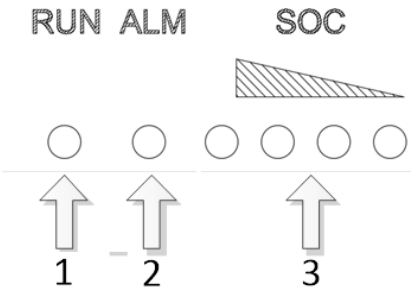
## 2.4 Product Manual

### 2.4.1 Operation Panel Description




| No. | Item | Function | Remark |
|---|---|---|---|
| 1 | Side Loops | Used to pull or push the unit into the cabinet or rack. | |
| 2 | Mounting Hole | Mounting hole when placing the battery module into the rack | M6 |
| 3 | Ground Hole | Ground hole | M6 |
| 4 | Power Connector | Power input and output | |
| 5 | Status Indicator | Displays battery module capacity and faults | |
| 6 | ADDR | Battery module address setting switch | |
| 7 | RS232 | RS232 communication port | RJ11 |
| 8 | RS485 | RS485 communication port for parallel connection | RJ45 |
| 9 | RESET | Start and shut down BMS | |
| 10 | DO1/DO2 | Dry contact | |
| 11 | Switch | Circuit breaker | 125A |
| 12 | Handle | Handle of battery module | |

### 2.4.2 Status Display Introduction




| NO | Item | Function |
|---|---|---|
| 1 | RUN | Operation indicator |
| 2 | ALM | Faulty indicator |
| 3 | SOC | Capacity indicator |

- **Capacity indicator**

| **Status** | | **Charge** | | | | **Discharge** | | | |
|---|---|---|---|---|---|---|---|---|---|
| Capacity indicator | | L4● | L3● | L2● | L1● | L4● | L3 | L2● | L1● |
| Capacity（%） | 0～25% | off | off | off | flash2 | off | off | off | on |
| | 25～50% | off | off | flash2 | on | off | off | on | on |
| | 50～75% | off | flash2 | on | on | off | on | on | on |
| | 75～100% | flash2 | on | on | on | on | on | on | on |
| Operated indicator● | | on | | | | Flash（flash 3） | | | |

- **Status indicator**

| **Status** | **Normal/Alarm/Protection** | **RUN** | **ALM** | **Capacity LED** | | | | **Remark** |
|---|---|---|---|---|---|---|---|---|
| | | ● | ● | ● | ● | ● | ● | |
| Power off | Sleep | off | off | off | off | off | off | All off |
| Standby | Normal | flash1 | off | Indicate according to capacity | | | | Standby status |
| | Alarm | flash1 | flash3 | | | | | Module low voltage |
| Charge | Normal | on | off | Indicate according to electricity (The maximum capacity indicator LED flashes 2) | | | | The maximum capacity indicator LED flash (flash2) , Overcharge alarm, ALM LED do not flash |
| | Alarm | on | flash3 | | | | | |
| | Overcharge protection | on | off | on | on | on | on | The battery module will stop charging and operate in standby mode |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Temperature, overcurrent and failure protection | off | on | off | off | off | off | The battery module will stop charging and shutdown |
| Discharge | Normal | flash3 | off | Indicate according to capacity | | | | |
| | Alarm | flash3 | flash3 | | | | | |
| | Under voltage protection | off | off | off | off | off | off | Stop discharge |
| | Temperature, overcurrent short circuit, reverse connection and failure protection | off | on | off | off | off | off | Stop discharge |
| Failure | | off | on | off | off | off | off | Stop charge, discharge |

- **LED flashing instruction**
-

| Flash way | on | off |
|---|---|---|
| Flash1 | 0.25s | 3.75s |
| Flash2 | 0.5s | 0.5s |
| Flash3 | 0.5s | 1.5s |

## 2.5 Operation mode

### 2.5.1 Power ON/OFF

**Activating the Battery from Sleep (Shutdown) State:**

- When the battery module is in the sleep (shutdown) state, press and hold the reset button (Section 2.4.1 #9) for 3 seconds, then release it. The battery will be activated, and the LED indicators will light up successively from "RUN" for 1/2 second.

**Putting the Product into Dormant State from Startup:**

- When the battery module is in the startup state, press and hold the reset button for 3 seconds, then release it. The product will enter the dormant state, and the LED indicators will light up successively from the lowest light for 1/2 second.

**Resetting the Battery Management System (BMS):**

- When the BMS is in the active state, press and hold the reset button for 3 seconds, then release it. The protection board will be reset, and all LED lights will light up simultaneously for 1/2 second.

### 2.5.2 Charging Mode

**Entering Charging Mode:**

When the battery module detects that the external charging voltage is ≥ 48V and the cell voltage and

temperature are within the rechargeable range, the BMS will begin the charging process. When the charging current reaches the effective charging current, the product will enter charging mode. In this mode, both the charging and discharging functions are enabled.

**Current Limiting Protection:**

- If the charging current exceeds the set overcurrent protection trigger value, the charging current limiting protection will be activated, restricting the charging current to 10A.

### 2.5.3 Discharge Mode

**Entering Discharge Mode:**

- The product will enter discharge mode under the following conditions:
  - An electrical load is being drawn.
  - The cell voltage and temperature are within the dischargeable range.
  - The discharge current reaches the effective discharge current.

### 2.5.4 Standby Mode

**Entering Standby Mode:**

- The battery module will enter standby mode when neither the conditions for charging nor discharging are met.

### 2.5.5 Sleep Mode

The system enters sleep mode (low power consumption mode) when any of the following conditions are met:

- The individual or overall over-discharge protection has not been released within 30 seconds (this value is adjustable).
- The RESET button is pressed and held for 3 seconds, then released.
- The minimum cell voltage is lower than the sleep voltage (refer to the specification, adjustable), and the duration reaches the sleep delay time (refer to the specification, adjustable). Additionally, there must be no communication and no charging or discharging current.
- Forced shutdown by upper computer software.

**Note:** Before entering sleep mode, ensure that the input terminal is not connected to a charger; otherwise, the system will not enter sleep mode.

### 2.5.6 Power on wake-up operation

When the system is in a low power consumption mode (sleep mode) and any of the following conditions are met, the system will exit sleep mode and begin normal operation mode:

- A charger with output voltage greater than 48V is connected to the unit.
- When the reset button is pushed for 3 seconds and released.
- A RS232/RS485 console cable is connected to the unit and logged into. (Note: If the unit is in sleep-mode due to being below the discharge level, it will remain in sleep-mode.).

## 2.6 Storage

| **Item** | | **Requirement** |
|---|---|---|
| Storage Temperature | -20~45℃ | Less than 1 month |
| | 15~35℃ | Less than 6 months |
| Humidity | | 5%-95%RH. No condensation |
| Storage SOC | | 40~60%SOC, Recharge the Power supply at least once every 6 months |
| Other Requirement | Store the unit out of direct sunlight and no less than 6 feet (2 meters) away from heat source. Do not store the unit upside down to avoid mechanical issues.<br>Do Not directly touch the power terminals.<br>Do not connect the positive and negative terminals. | |

# Chapter 3: Product Installation Instructions

## 3.1 Pre-Installation Instructions

Before starting the installation, please follow the instructions below:

1) **Temperature Check:**
   Ensure the installation environment temperature is within the specified range:
   - Charging: 32°F to 131°F (0°C to 55°C)
   - Discharging: -4°F to 140°F (-20°C to 60°C)
   - Avoid operating the battery module in environments below 32°F (0°C) and above 104°F (40°C) for extended periods to prevent reducing the battery lifespan.

2) **Ventilation and Safety:**
   Place the battery module in a well-ventilated area away from water, flammable gases, and corrosive materials.

3) **Environment Restrictions:**
   Do not install the battery module in areas where salt fog tests are conducted.

4) **Sunlight Exposure:**
   Avoid exposing the product to direct sunlight.

5) **Condensation Precaution:**
   If the product is disassembled and used in low temperatures, water condensation may damage the unit. Ensure the battery module is completely dry inside before installation to avoid the risk of electric shock.

6) **Emergency Protocol:**
   In any emergency, immediately stop charging or discharging the battery pack and power off the unit.

7) **Grounding:**
   Connect all power sockets to a protective ground wire.

## 3.2 Installation Requirements

### Requirements for Installation Personnel

Installation personnel must possess basic safety and electrical operation knowledge.

| | |
|---|---|
|  | **Cyclone assumes no responsibility for any damage to individuals or equipment caused by installation personnel failing to operate in accordance with the requirements of this article.** |

### 3.2.1 Installation Tool

Installation tool: Phillips screwdriver/Slotted screwdriver 

| | |
|---|---|
| ⚠ | **Installation personnel must use tools with insulated handles to prevent electric shock.** |

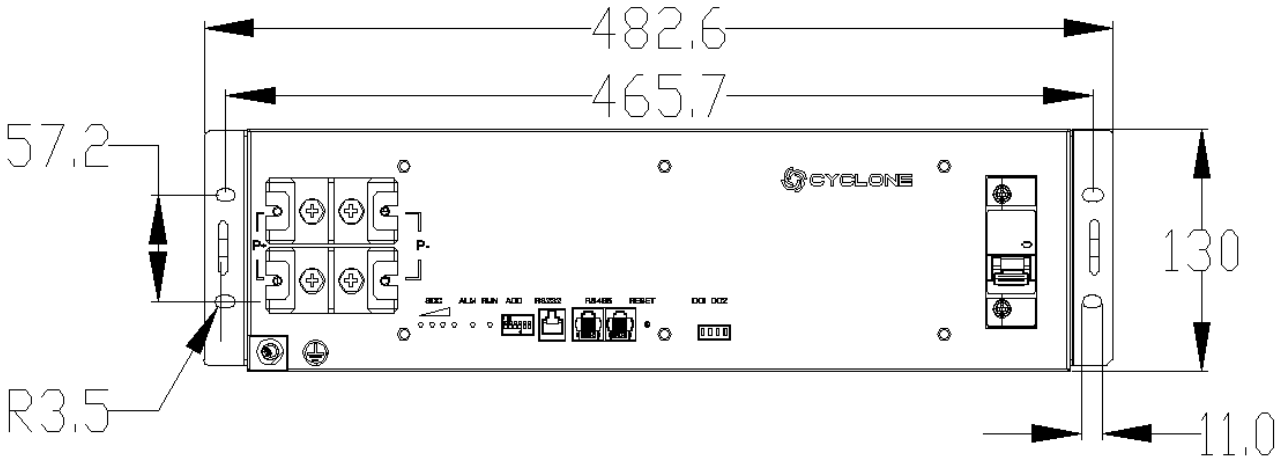
## 3.3 Battery Box Installation

### 3.3.1 Unpacking Acceptance

Step 1: Inspect the outer box packaging for signs of damage. If the packaging is significantly damaged or wet, ascertain the cause and report it to us immediately.

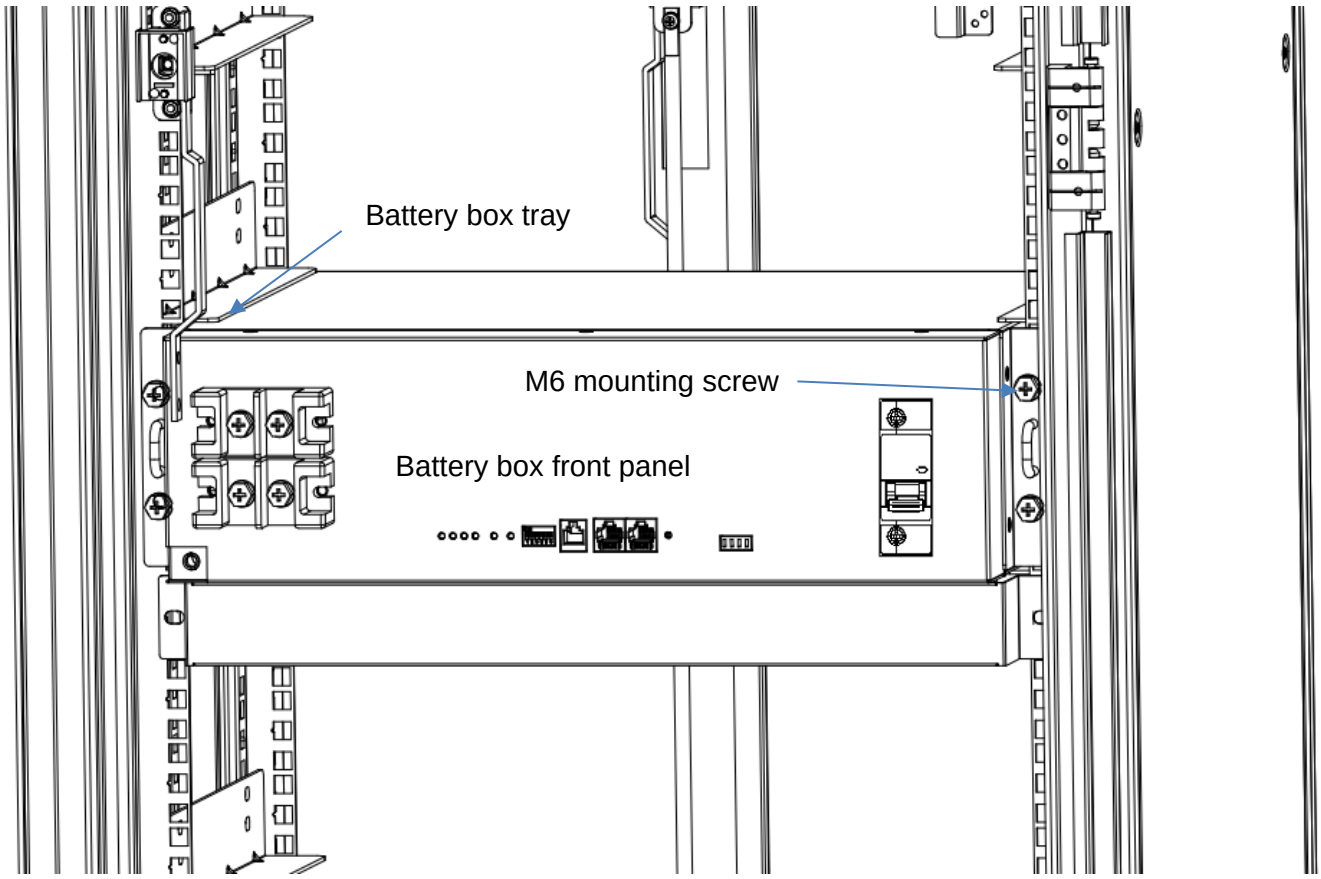
Step 2: Carefully unpack the outer box and conduct a visual inspection of the product for any signs of damage, scratches, or deformation. If any defects are found, promptly report them to Cyclone.

### 3.3.2 Battery Box Installation




Unit：mm

The battery box has plug holes on both sides for M6 waist holes. Use the appropriate screws to securely attach the battery pack to the rack. The bottom of the battery pack requires a tray to support the weight, to avoid the device from bending due to prolonged stress.

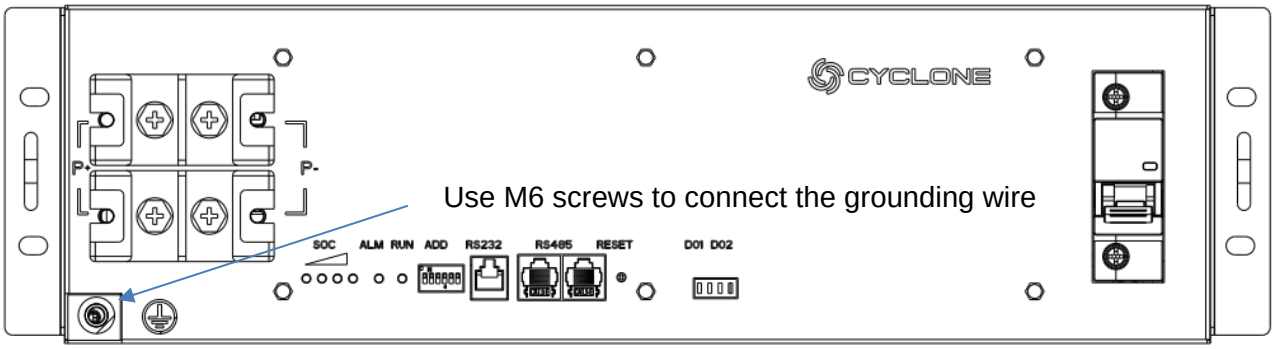



## 3.4 Cable Installation

### 3.4.1 Power And Grounding Cable Installation

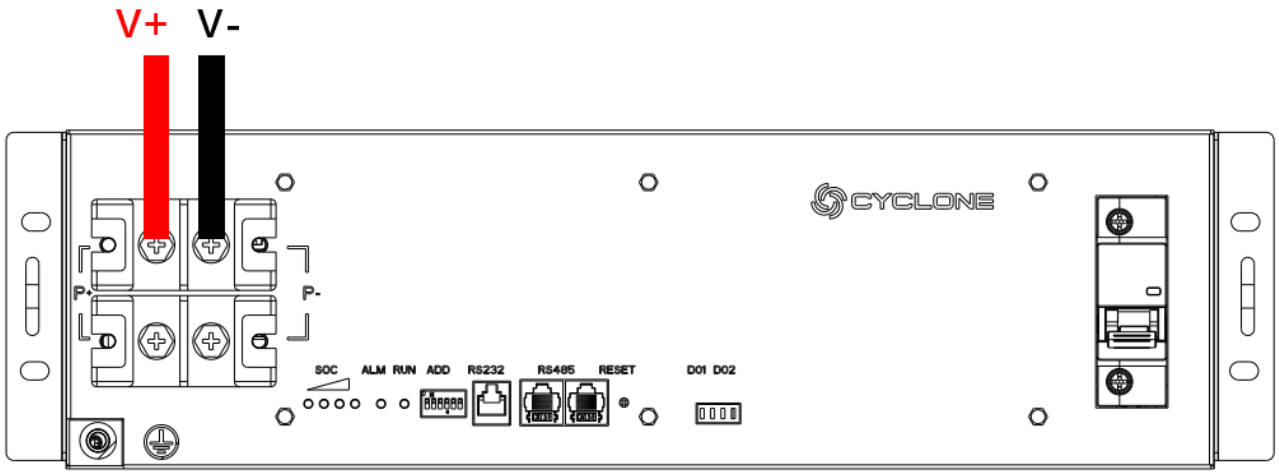
➢ Installation of grounding wire.

Before using, first connect the battery pack to the M6 terminals for grounding, as shown in the figure below:




➢ Single Use of Battery Pack

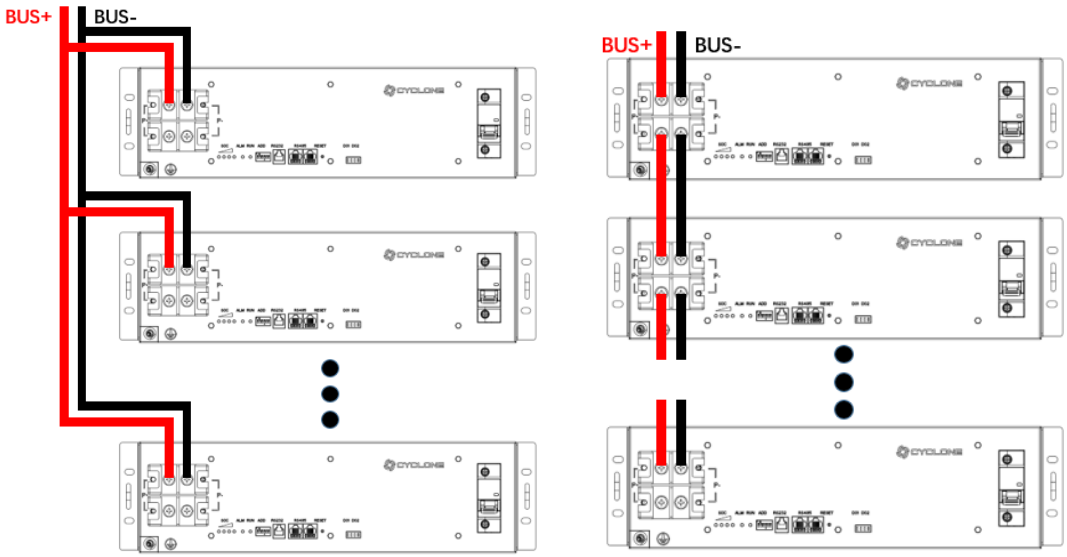
- When the battery box is used alone, connect the P+ and P- terminals of the battery box to the positive and negative terminals of the corresponding equipment.
- The wiring terminal screw is M6, and the installation torque is 4.8±0.5 N•m (42.5±4.4 lb•in).
- Ensure the battery output is off before installing the cable. Refer to the following figure for installation:




➢ Parallel Use of the Battery Pack

- The P+ and P- terminals of the battery box are connected to the positive and negative bus bars respectively through the external bus outside the battery box.
- The standby power of a single product is ≤ 4.8kW.
- A maximum of 16 battery sets can be used in parallel.
- The maximum supported parallel power is according to the standards in the table below.
- Ensure the battery is in sleep mode before wiring.

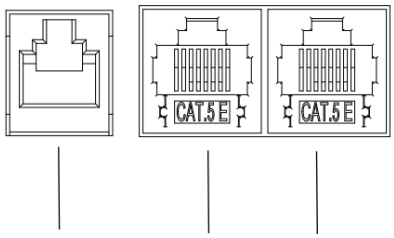
| Number of parallels | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|
| Maximum power | 6.7 | 8.6 | 11.5 | 13.2 | 15.8 | 16.8 | 19.2 | 19.6 |
| Number of parallels | 10 | 11 | 12 | 13 | 14 | 15 | 16 | |
| Maximum power | 20.8 | 22 | 23 | 24.9 | 26.8 | 27.8 | 30.7 | |

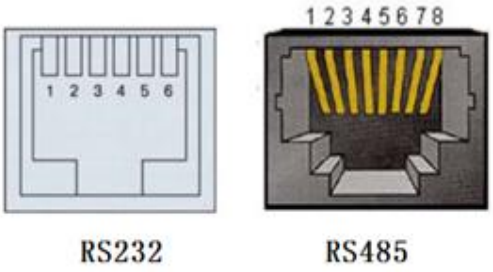



| | |
|---|---|
| ⚠ | **When connecting battery terminals in parallel, the total current must not exceed 100A** |

### 3.4.2 Communication Cable Installation

The battery pack panel has various communication ports: the RS232 or RS485 interface is used for communication with the upper computer, and the RS485 port is used for multi-machine parallel communication.

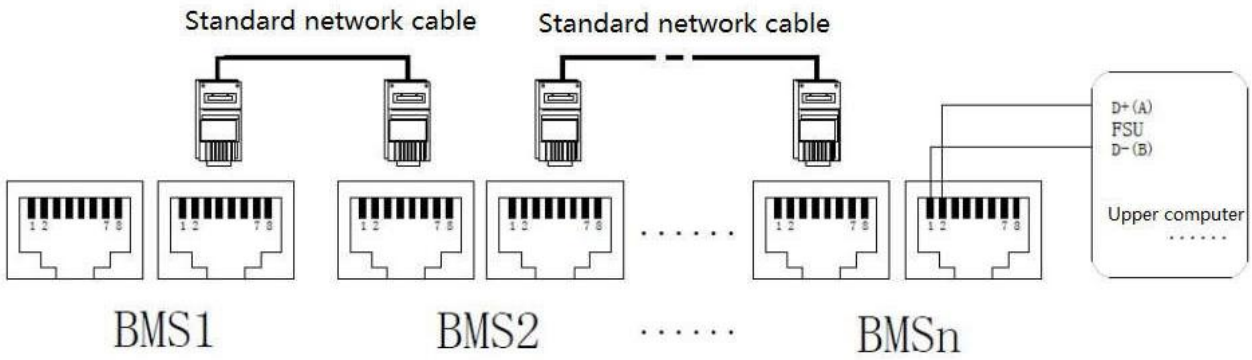



➢ Communication interface and pin definition：

| RS232—6Pin | | RS485—8Pin | |
|---|---|---|---|
| RJ11 | Definition description | RJ45 | Definition description |
| 1、2、6 | NC | 1、8 | RS485-B |
| 3 | TX | 2、7 | RS485-A |
| 4 | RX | 3、6 | NC |
| 5 | GND | 4、5 | NC |

When the battery module is used alone, both the RS232 and RS485 ports can be used to connect to the unit for debugging. When multiple battery boxes are used in parallel, only the RS485 port can be used for parallel connection between battery boxes or with other devices. You can view the information of any battery box connected in parallel via the RS485 bus through the RS232 or RS485 interface. The multi-machine parallel bus interface is shown in the figure below.




## 3.5 Installation Inspection

1) **Check Mounting Screws and Cable Fasteners:**
   - Ensure all screws are tightened and secure, especially those with electrical connections.
   - Verify that flat washers and spring washers are installed correctly.
2) **Verify Power Cable Installation:**
   - Confirm that the power cable of the battery box is installed correctly. If cables are reversed this can lead to the battery being damaged.
   - Ensure the power cable is not twisted or bent.
3) **Inspect Communication Cable Connections:**
   - Ensure the RS232/RS485 console cable plug-ins are securely installed and properly aligned.
   - Confirm that the console cable is neatly arranged with no twists or bends.

# Chapter 4: System Test

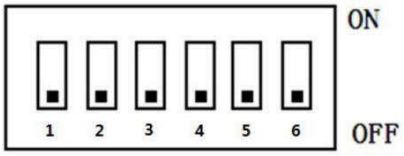
| | |
|---|---|
| Attention | **Testing personnel must possess basic safety and electrical operation knowledge, and read and understand the instructions in this manual before testing or servicing the bettery module.**<br>**The testing process involves live operations. Stand on dry insulation during operation and avoid wearing metal objects such as watches and necklaces.**<br>**Use insulated tools.**<br>**If any abnormal indications are observed during testing, immediately shut down the power. Resume testing only after identifying and resolving the issue.** |

## 4.1 Restart

Connect the power cable and RS232 orRS485 console cable to the battery module. After verifying the connections, activate the battery module. Measure the voltage between the power terminals P+ and P- of the battery module, which should be between 43.2V and 54V. The indicator lights on the panel of the battery module should follow the normal definitions outlined in the "Status Display Introduction."

## 4.2 Communication Address Settings

Set the communication address of the battery module panel. The default is all switches are OFF (default 0).



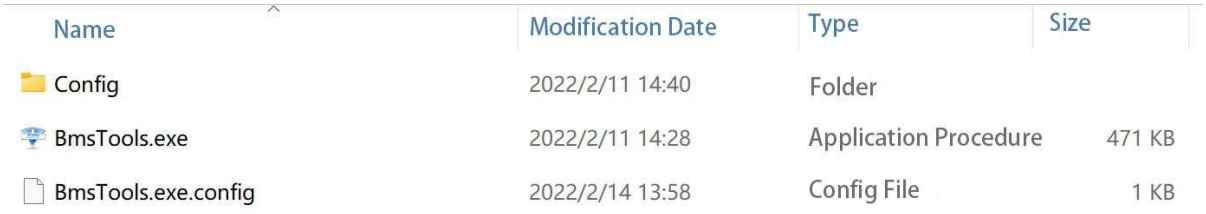

Refer to the table below for dial settings:

| ADD | Dial switch position | | | | | |
|---|---|---|---|---|---|---|
| | 1# | 2# | 3# | 4# | 5# | 6# |
| 0 | OFF | OFF | OFF | OFF | OFF | OFF |
| 1 | ON | OFF | OFF | OFF | OFF | OFF |
| 2 | OFF | ON | OFF | OFF | OFF | OFF |
| 3 | ON | ON | OFF | OFF | OFF | OFF |
| 4 | OFF | OFF | ON | OFF | OFF | OFF |
| 5 | ON | OFF | ON | OFF | OFF | OFF |
| 6 | OFF | ON | ON | OFF | OFF | OFF |
| 7 | ON | ON | ON | OFF | OFF | OFF |
| 8 | OFF | OFF | OFF | ON | OFF | OFF |
| 9 | ON | OFF | OFF | ON | OFF | OFF |
| 10 | OFF | ON | OFF | ON | OFF | OFF |
| 11 | ON | ON | OFF | ON | OFF | OFF |
| 12 | OFF | OFF | ON | ON | OFF | OFF |
| 13 | ON | OFF | ON | ON | OFF | OFF |
| 14 | OFF | ON | ON | ON | OFF | OFF |
| 15 | ON | ON | ON | ON | OFF | OFF |

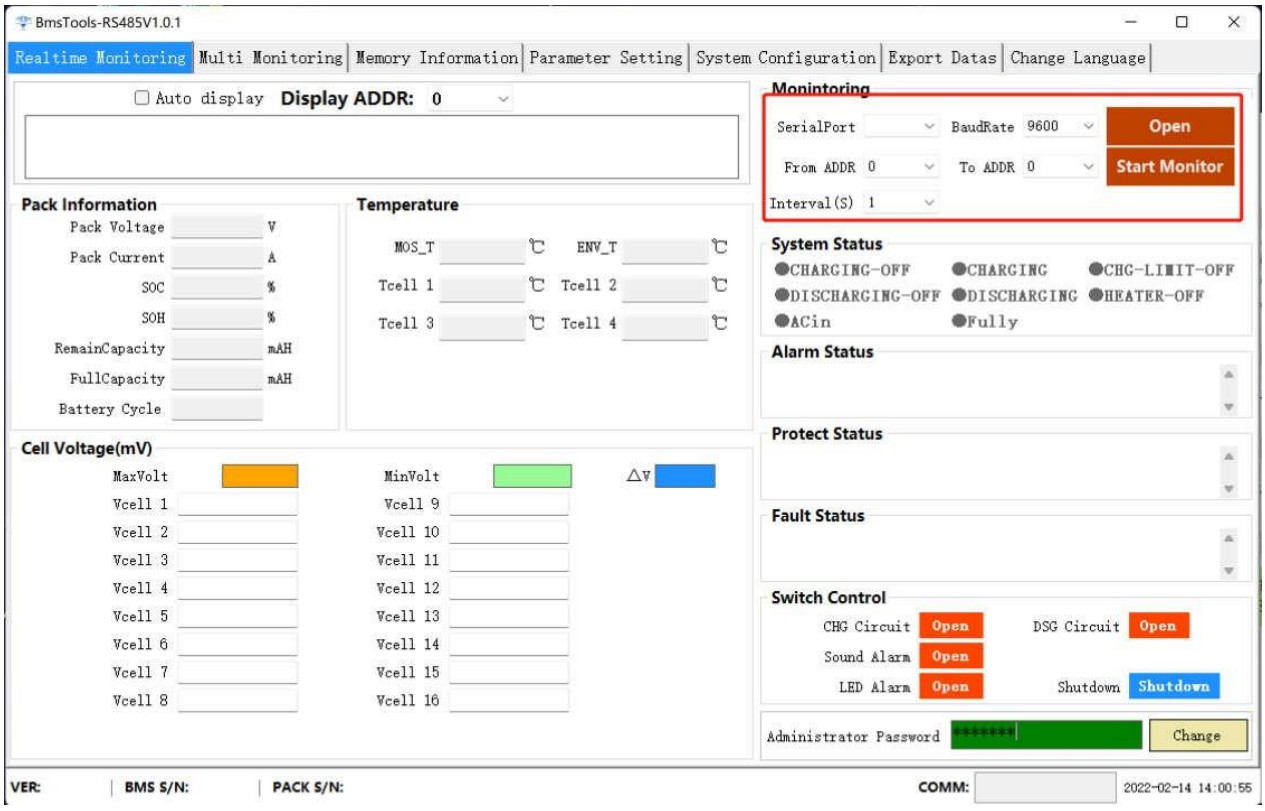
## 4.3 Communication Settings

**It is highly recommended that the default settings are not changed. Doing so can cause damage to the battery module and void the warranty.**

➢ Open the "BmsTools.exe" software program. The BMS application can be found at support.cyclonegear.com.




➢ Select the corresponding serial port in the upper right corner, set the baud rate to 9600, and ensure the starting address matches the dial address of the battery pack, which is set to 0 by default. Then click "open" to open the serial port and click "start monitor".




## 4.4 Power System Parameter Settings (Recommended Values)

| NO | Item | Recommended Value |
|---|---|---|
| 1 | Equalizing voltage | 56V |
| 2 | Float Voltage | 53.5V |
| 3 | Power off the Secondary Load | 48V |
| 4 | Power off | 43.2V |

## 4.5 Power-On Debugging

Once a connection is established and parameter settings are completed, the product can be debugged and put into operation.

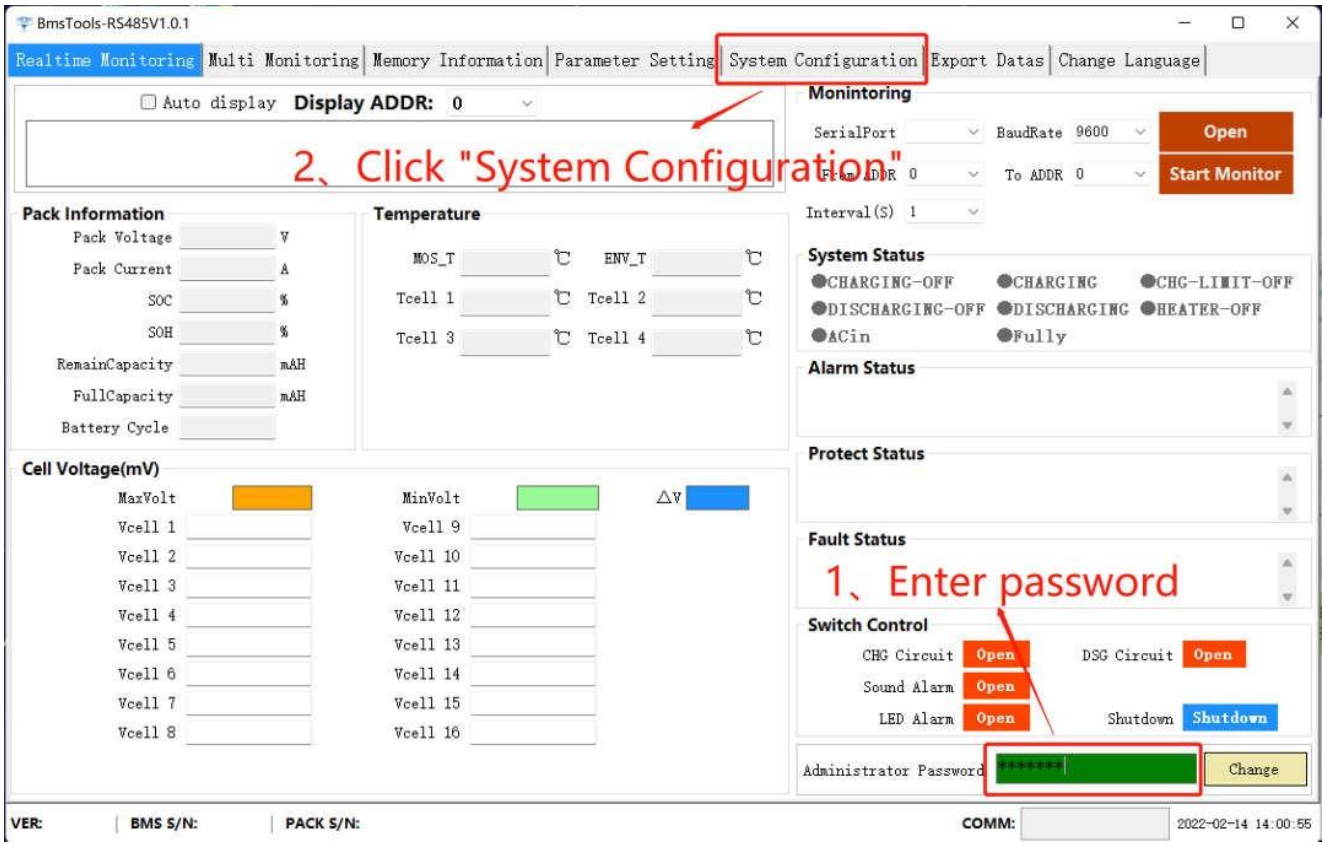
## 4.6 Anti-Theft

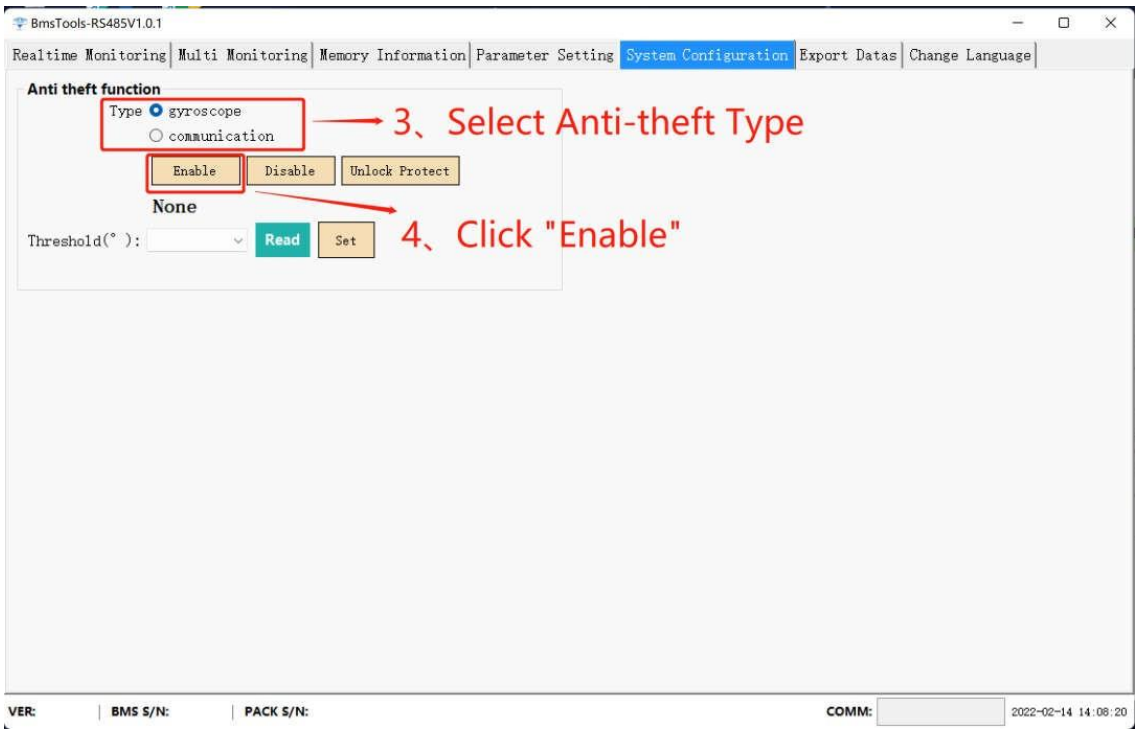
### 4.6.1 Description of Anti-Theft Function Mode

- **Gyroscope Anti-Theft Function:** After the battery anti-theft function is activated, if the battery tilt angle exceeds 60° (default value, adjustable), the anti-theft mechanism will engage. The charging and discharging MOS of the battery BMS will be locked and will remain in the closed state. The battery will no longer be able to charge or discharge, and the buzzer will continuously sound until the protection is released.

- **Anti-Theft Function Activation Instructions**

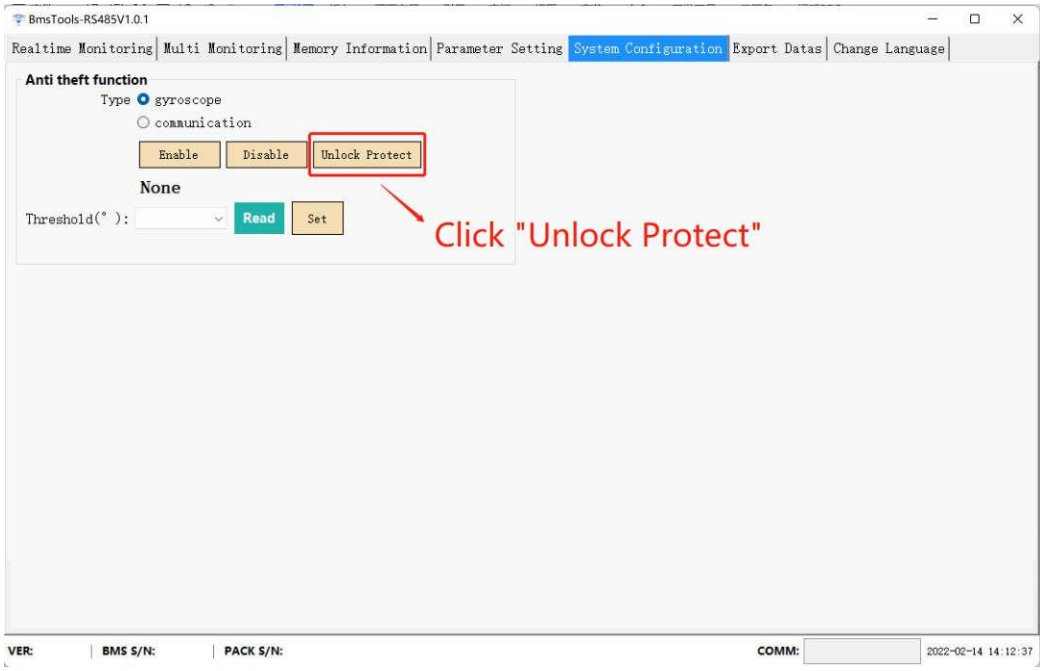
First, enter the administrator password in the lower right corner of the home page on the upper computer. Then, click "System Configuration" to enter the system settings interface. Select the anti-theft type in the anti-theft interface and click "Enable."





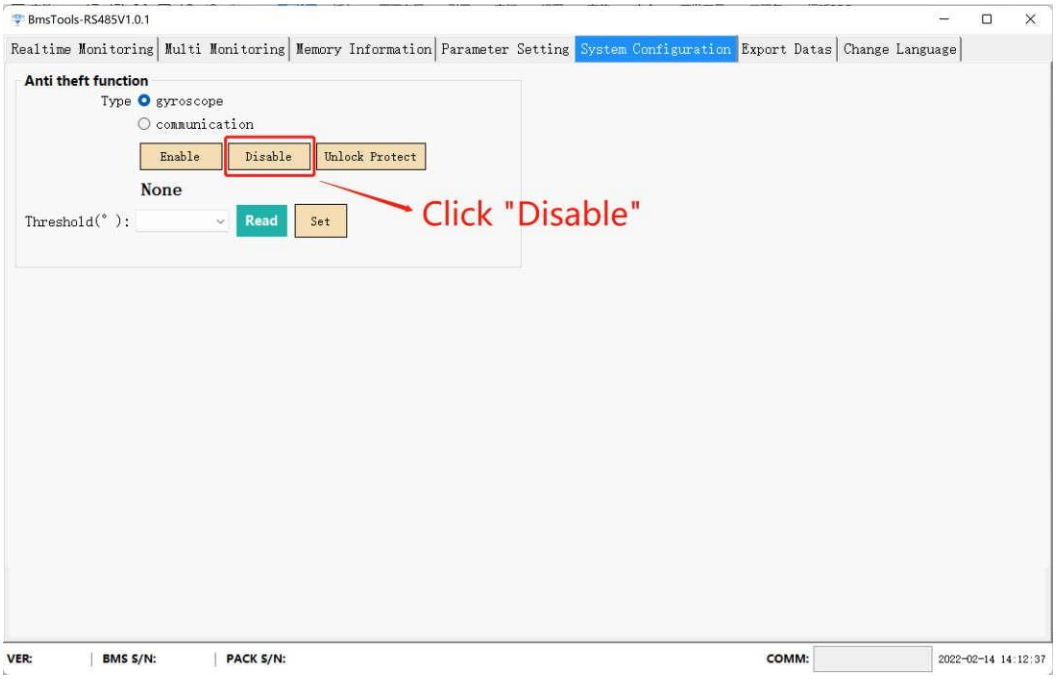

- **Instructions for Releasing the Anti-Theft Protection States**

After the battery triggers the anti-theft function, the charging and discharging MOS on the main page will be in the off state. To release the anti-theft protection, click "System Configuration" and then click "Unlock Protect" in the anti-theft interface. This action will only release the current protection state; if the anti-theft function is reset it will resume operating.



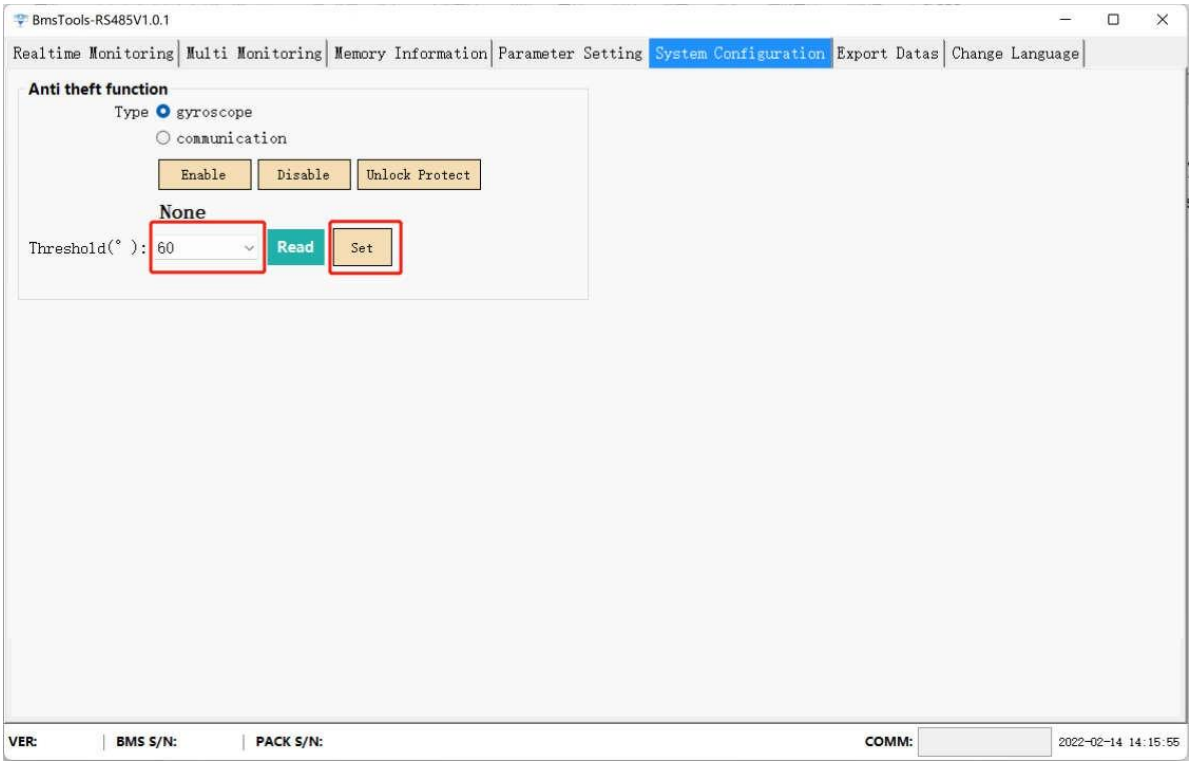

- **Instructions for Turning Off the Anti-Theft Function**

When the anti-theft function is activated, and it is decided that it is not needed you can disable this feature. On the System Configuration tab on the BMS, the Anti-Theft function, click the “r "Disable" button. Anti-theft protection is now disabled.




- **Gyroscope Anti-Theft Angle Settings**

Select the desired angle in the threshold value (°) (the angle between the bottom of the battery and the horizontal plane) and click "Set." After setting, click "Read" to verify if the setting was successful. The default is zero. Setting this feature will disable the unit if the unit varies from the default setting. This protects if the unit is removed, or if the shelf becomes loose and the unit could slip out.



## 4.7 Equipment Removal

If the product requires maintenance, first cut off the power or load. Press the RESET button on the battery box panel for 3 seconds and then release it. The battery box will shut down before you remove any device or cable. Working on the battery when it is in operation, turned on, **is strictly prohibited to prevent electric shock or short circuits.**

# Chapter 5：System Maintenance

## 5.1 Routine Maintenance

<table>
<tr><td colspan="3">⚠ Attention：<ul><li>Before inspection and maintenance, ensure the power supply or load is powered off and the battery pack is turned off.</li><li>Avoid leaving metal or other objects in the product case to prevent short circuits and potential system damage.</li></ul></td></tr>
<tr><td rowspan="3">Daily Maintenance</td><td>Environment</td><td>To prolong the service life of the battery box, maintain a suitable installation environment: Avoid direct sunlight or prolonged exposure to other radiation sources. Prevent the entry of water, other liquids, dust, or mud.<br>Exposure to sunlight is strictly prohibited. Excessive temperatures will negatively impact the service life of the lithium battery.</td></tr>
<tr><td>Alarm</td><td>If a fault alarm occurs, promptly refer to the fault indications in Section 5.2 and the corresponding solutions to avoid damage to the battery box.</td></tr>
<tr><td>Charge/Discharge</td><td>Avoid large current discharges.<br>When the power is too low, charge the device promptly to prevent long-term low-capacity storage of the battery pack.</td></tr>
<tr><td>Regular Maintenance</td><td colspan="2">Ensure the battery box does not lose power when not in use and charge it within 7 days after discharge.<br>If the backup time significantly shortens quickly while in use, the cell voltages may be unbalanced. Contact Cyclone for technical support and further guidance.<br>Regularly check all connectors to ensure they are tight. If any are loose, retighten them promptly.<br>Inspect all external output cables for wear. If they are worn, replace them promptly to prevent short circuits in the battery output cables.</td></tr>
</table>

## 5.2 Alarm

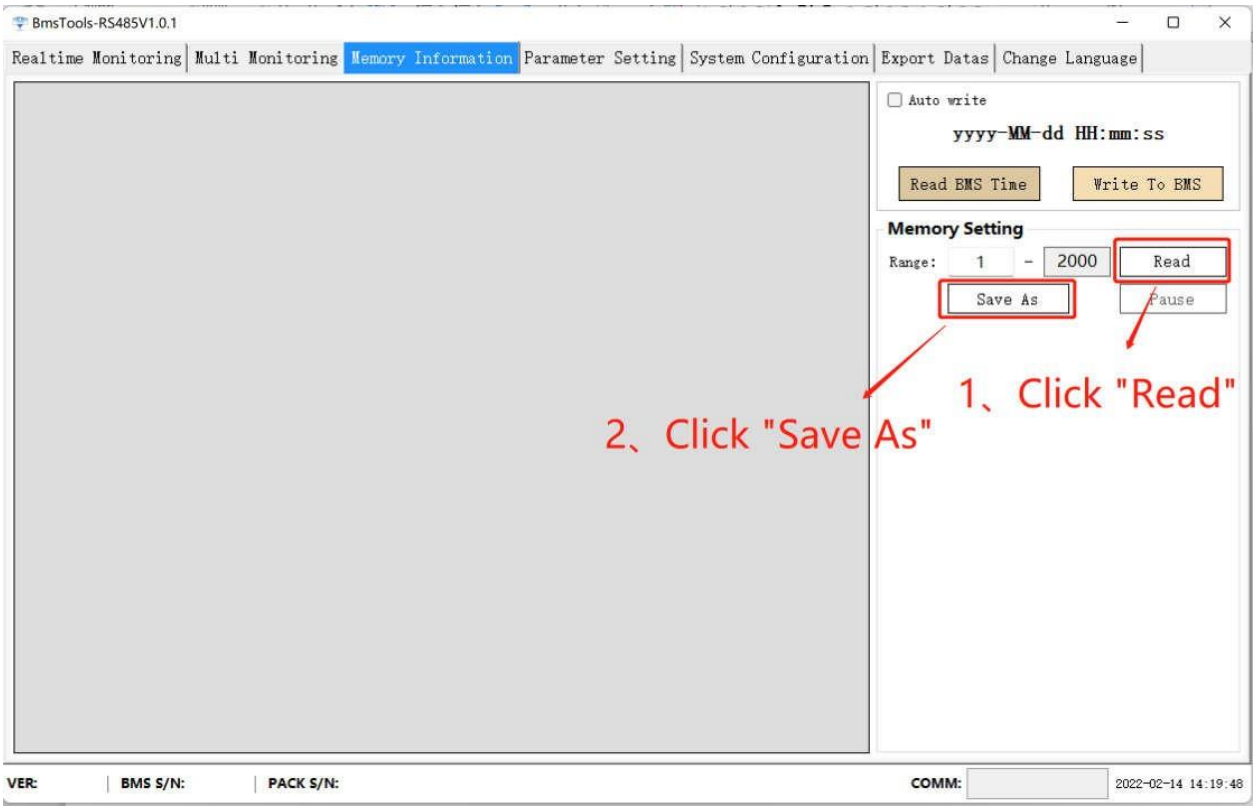
| Malfunction | Possible Reason | Solution |
|---|---|---|
| No response from pressing the Reset | Internal failure | Contact Support |
| Shorten discharge time | Low battery | Keep the 15A current of battery pack charged continuously for more than 6 hours to fully charge the battery |
| | Overload, short circuit | Remove the load. Confirm whether the load exceeds the rated current of 100A or if there is a short circuit. If the fault is resolved, perform small current charging to continue operation |

| | | |
|---|---|---|
| | Battery capacity drops | The standby time of the battery system is below 80% for an extended period. Please contact Cyclone support for troubleshooting and |
| | Internal failure | Contact Support |
| The system cannot be charged or discharged | High temperature | Let the system stand for more than 3 hours at room temperature |

When reporting fault information to Cyclone, please provide the following details:

- product model
- machine batch number
- fault occurrence date
- Complete Problem Description:
  - Panel Indicator Display
  - Buzzer Ringing
  - Load Capacity
  - Upper Computer Fault Record

Export the fault record from the upper computer following the instructions below:



## Chapter 6：Contact Information

Web:
cyclonegear.com

E-mail:
support@cyclonegear.com

Phone:
866.258.0258

# Chapter 7：Warranty Policy

**Applicable Product Types:**
Lithium Iron Phosphate (LiFePO4) Battery CYG-B48V-100A

This limited warranty letter (hereinafter "Warranty") as described below applies to the Lithium Battery Module ("Product") supplied by Cyclone (hereinafter "Cyclone") with the types referenced above via the way authorized by Cyclone. Cyclone warrants to the buyer as follows:

**1. Warranty Period**
Product Warranty:
The Product warranty period is 5 years from the date of delivery from Cyclone, according to the invoice date.

Capacity Performance Warranty:
Cyclone warrants that the Product retains 80% of Usable Energy for 5 years from the invoice date under the following conditions:

a) Operating ambient temperature: 50°F to 113°F (10°C to 45°C)

b) Charge and discharge current: ≤0.5C

c) Depth of Discharge: ≤80% DOD

d) Cycle requirement: <1 cycle/day

When any of the above conditions are not met but are in accordance with the user manual, Cyclone warrants that the Product retains 60% of Usable Energy for 5 years from the delivery date.

**2. Remaining Capacity Test Conditions**

a) Testing ambient temperature: 77°F ± 9°F (25°C ± 5°C)

b) Charge current: 0.2C

c) Discharge current: 0.5C

**3. Preconditions for Warranty**

a) Only for backup power in telecom base stations.

b) The battery must be grounded during installation.

**4. Replace or Repair**
If a problem arises during the warranty period, it must be confirmed and analyzed by engineers from both parties and cannot be determined unilaterally. Any repair or replacement of the BMS and Battery must be done with Cyclone's permission and guidance.

If any product within this warranty is confirmed by Cyclone to be defective or non-compliant, Cyclone will decide whether to replace or repair the defective or non-compliant product. Any repairs or replacements shall not be considered as an extension or recalculation of the warranty period.

Provided that Cyclone has discontinued the manufacture of the Product in question at the time the related warranty claim is confirmed by Cyclone, Cyclone shall, at its sole option, replace it with a different type of Product (of mutually agreed size, color, shape, and/or power) if technically feasible and reasonable.

Replacement of battery, components, or Products may not be brand new but with quality and specifications compliant with the Product specifications.

**5. Warranty Exceptions**

a) The warranty period specified above has already expired.

b) Product damage and defects caused by the End User's improper use, misuse, abuse, which do not conform to the User Manual.

c) Damage caused during transport, incorrect product installation, removal exceeding the temperature range during use, and improper use.

d) Unauthorized wiring and use with faulty or incompatible devices.

e) Product arbitrarily modified or its function changed without permission by Cyclone.

f) Any changes to the installation not made in accordance with the Installation Guidance.

g) Product damage caused by maintenance and other services conducted by personnel unauthorized by Cyclone.

h) End User fails to provide the correct product serial number, or the product serial number is undecipherable or has been modified without permission by Cyclone.

i) External influences, including unusual physical or electrical stress (power failure surges, inrush current, lightning, flood, fire, accidental breakage, etc.)

j) Product damage caused by external force, force majeure (natural disasters, war, civil war, strike, riot, or other government interventions, terrorism, unavailability of suitable labor or materials, and other events beyond Cyclone's control), or other third-party actions.

k) Defects that cannot be overcome under technological conditions when the Product is sold to the End User. Defects arise due to changes in national or regional laws or regulations.

l) Product damage caused deliberately or by the willful act of the End User.

m) Product failure not reported to Cyclone and Cyclone Authorized Service Partner within 2 weeks of appearance.

**6. Non-Applicability of Warranty Claim**

In case a warranty claim is reported and found to be invalid, the costs incurred by Cyclone or Cyclone Authorized Service Partner due to this non-applicability of the warranty claim shall be covered by the End User.

**7. Warranty Restriction**

Unless otherwise specified herein, to the extent permitted by applicable law, this Warranty and the above remedies shall be exclusive and replace all other guarantees and remedies, oral or in writing, expressed or implied. To the extent permitted by applicable law, Cyclone expressly rejects any and all legal or implied warranties, including but not limited to warranties of merchantability, fitness for a particular purpose, and hidden or potential defects. If Cyclone cannot abandon implied warranties as prescribed by applicable

law, all such guarantees and warranties shall be limited to the implied warranty as prescribed by applicable law or the scope within applicable laws and shall be under mandatory application according to applicable law. No distributor, agent, or staff of Cyclone and/or Cyclone Authorized Service Partner is authorized to make any revision, extension, or addition to the quality warranty. The legality and enforceability of the remaining clauses herein shall not be affected or damaged if any of the clauses herein is adjudged to be illegal or unenforceable.
Unless otherwise specified herein, to the maximum extent permitted by applicable law, Cyclone will not be liable for any direct, indirect, special, incidental, or consequential losses caused by the purchase or use of Products and its system, including but not limited to the loss of use, loss of income, actual or expected loss of revenue (including contract revenue losses), loss of the use of money, loss of anticipated savings, loss of business, loss of opportunity, loss of goodwill, loss of reputation, personal injury or damage loss, or the indirect or consequential loss or damage (including any expense arising from the replacement of equipment and property, resumption of production, etc.) caused by any reasons.

Cyclone's liability from any cause whatsoever shall in no event exceed the amount of the purchase price paid by the End User to Cyclone for the Product giving rise to the liability.

**8. Out of Warranty**
As for the service for Products out of warranty, Cyclone agrees to provide certain after-sales services to the End User upon written request addressed to Cyclone Authorized Service Partner, and all costs and expenses, which include but are not limited to the materials, parts, or labor costs, shall be borne by the End User. If the End User provides written notice to request service out of warranty, the End User shall provide a detailed description of defects so that Cyclone Authorized Service Partner can determine whether such defects can be cured or not. For the avoidance of doubt, in no event will Cyclone be liable for service out of warranty, and this Clause 9 will not constitute a promise by Cyclone to provide such service out of warranty.

**9. Dispute Resolution**
In the event of any dispute regarding warranty claims, both parties shall mutually agree to engage an international testing institute, such as TÜV SÜD, SGS, or a similar entity, to provide third-party verification and commentary. All fees and expenses associated with such verification shall be borne by the party requesting the verification procedure, unless otherwise stipulated by mutual agreement.

**For questions or comments please contact Cyclone at support@cyclonegear.com.**