

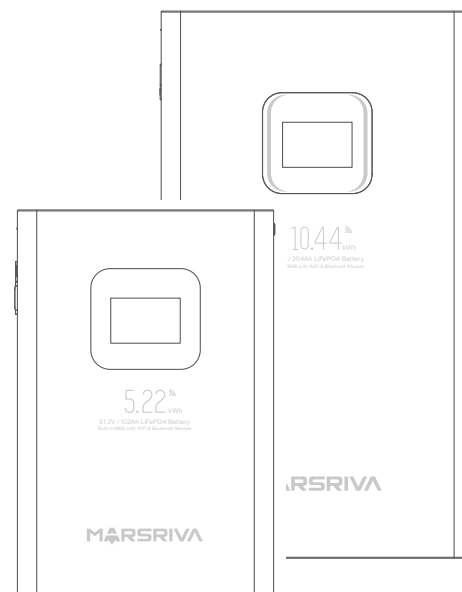


# USER MANUAL

## LiFePO4 Battery

MR-LFP48-100-WMD

MR-LFP48-200-WMD



[www.marsriva.com](http://www.marsriva.com)

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Made in China



Specifications are subject to change without notice, all product drawings are for reference only.

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## 1 OVERVIEW

### 1.1 About this manual

Appreciate for choosing household energy storage system developed and produced by MARSRIVA. We sincerely believe that our products can satisfy your requirements as well as looking forward to your feedback on the performance of the product during use, so that we can further improve the quality of the product.

- This User Manual is applicable to the installation and use of the product of low voltage series wall mounted type with communication.
- Please read and understand all the contents of this manual carefully before installation and operation of the product. Any loss caused by ignoring the contents of this Manual may void the warranty of the product.
- The drawings provided in this manual are for explanation of the relevant concepts of the product, including product information, installation guide, instructions for use, safety information, frequently asked questions and maintenance etc.
- This manual and other related documents are an integral part of the product and need to be properly kept for the on-site installation personnel and relevant technical personnel to look up further.
- The content of this Manual will be updated and amended continuously. Users will refer to the physical products purchased. For more information, please obtain the latest user manual through sales channels.
- This Manual contains the product information, installation guide, instructions for use, safety information, frequently asked questions and maintenance, etc. of the product.

### 1.2 Safety

#### • Safety Notice

The installation, operation and maintenance of the battery system must be carried out by trained and qualified professionals. Before installation and use, please read this product manual carefully, otherwise it may cause personal injury or product damage. The precautions mentioned in this manual belong to the precautions under normal circumstances. If you find that there is a special use environment or use condition, please contact the technical staff of MARSRIVA to solve it.

#### • Common symbols and descriptions

|                                                                                                            |                                                                                                      |                                                                                                                     |                                                                                                                |
|------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
|  <b>Safety Notice</b> |  <b>Recycle</b> |  <b>Do not throw into fire</b> |  <b>Do not throw away</b> |
|------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|

#### **Precautions**

1. Batteries are half charged before shipment. Don't use the battery if it's hot, bulgy, or smell abnormal and so on, and report to MARSRIVA immediately.
2. If you need to store the battery for a long time, please charge and discharge the battery every three months to ensure the best performance, and the best state of charge for storage is between 50%~60%.
3. Please use the battery in the temperature range which is defined in the manual.
4. The state of charge of batteries is 50% before shipment, please charge the battery before use or test.

## CAUTIONS: What Not To Do

Please read and comply with the following conditions of installation and use of the battery, as incorrect installation or use of the battery may cause personal injury or damage to the product.

1. **DO NOT** throw the battery into water. Store batteries in a cool and dry environment when not in use.
2. **DO NOT** put the battery into fire or heat the battery, so as to avoid explosion or other dangerous events.
3. When charging the battery, please choose specialized charging equipment, follow the correct procedures, and do not use unqualified chargers.
4. **DO NOT** reverse positive and negative terminals, do not connect the battery directly to AC power to avoid battery short circuit.
5. **DO NOT** use batteries from different manufacturers or different kinds, types together, and do not mix old batteries and new batteries.
6. **DO NOT** use the battery when it becomes hot, bulgy, deforms or leaks.
7. **DO NOT** puncture the battery by nail or other sharp objects; Do not throw, stamp on, impact or hit the battery.
8. **DO NOT** open or try to repair the battery when it is defective. Warranty is invalid if the battery is repaired or disassembled.

### 1.3 Product Features

1. Using the high-performance lithium iron phosphate (LiFePO<sub>4</sub>) as positive materials, the cycle life is more than 6000 times, floating life up to 10 years, prolongs the service life of backup power supply system.
2. Using the intelligent management system, it realizes the monitoring and control of battery system under charge, discharge, floating and standby, making sure the system is always in an ideal state of health.
3. Built with comprehensive monitoring system, the battery voltage, current, temperature, volume, state of health are monitored. It communicates with PC to realize the real-time monitoring and control through the core CPU.
4. The built-in intelligent balance module ensures the consistency of battery capacity and extends the service life.
5. It has an intelligent design, meeting the national standard requirements for remote measurement, remote communication, remote control and remote adjustment.
6. Working state and alarm display directly on control panel.
7. System with intelligent thermal management devices, ensures the system works in a wide range of temperature, -20°C ~ 55°C.
8. It has good electromagnetic compatibility and can be matched with common solar inverters.

## 2 SPECIFICATIONS

### 2.1 Product Specifications

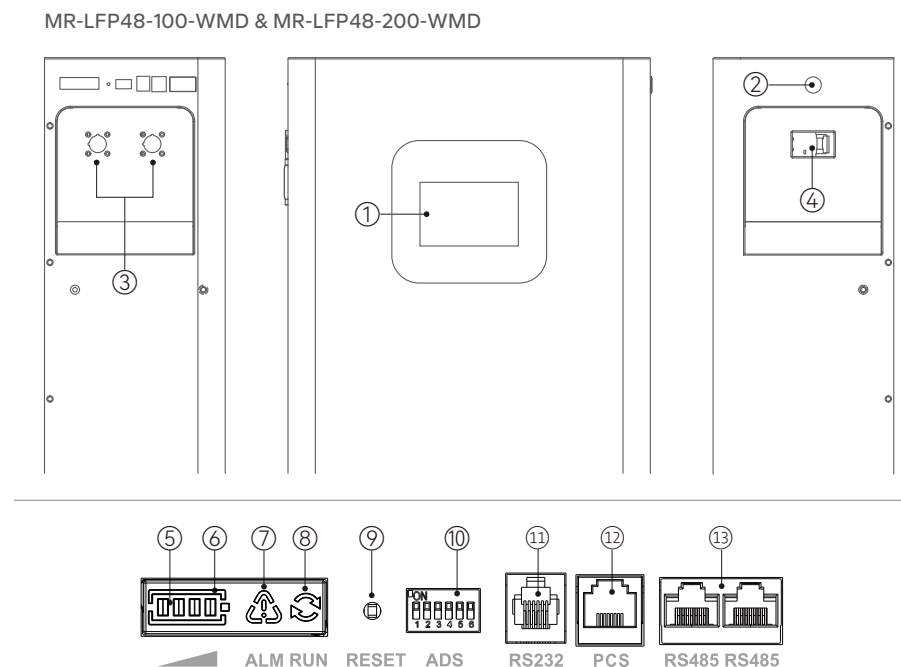
• Table 2.1 Basic Specifications

|                                   |                                |                    |
|-----------------------------------|--------------------------------|--------------------|
| Model                             | MR-LFP48-100-WMD               | MR-LFP48-200-WMD   |
| Battery Specification             |                                |                    |
| Battery Type                      | LiFePO4 Battery                |                    |
| Nominal Voltage                   | 51.2V                          | 51.2V              |
| Rated Capacity                    | 102Ah                          | 204Ah              |
| Rated Energy                      | 5.22kWh                        | 10.44kWh           |
| Battery Cycle Life                | ≥6000 cycles @25°C, to 70% EOL |                    |
| Charge & Discharge Parameter      |                                |                    |
| Nominal Charge Current            | 50A                            | 100A               |
| Charge Over-current Protection    | 110A                           | 215A               |
| Nominal Discharge Current         | 100A                           | 200A               |
| Discharge Over-current Protection | 125A                           | 215A               |
| Over-voltage Protection           | 58.4V                          | 58.4V              |
| Under-voltage Protection          | 43.2V                          | 43.2V              |
| Function & Communication          |                                |                    |
| Cell Balance Function             | Passive Balance                |                    |
| Power Off Self-Consumption        | ≤200uA                         |                    |
| Parallel Capacity                 | Up to 15 units                 |                    |
| Communication Interface           | BMS(485/CAN), RS232, Parallel  |                    |
| Monitoring                        | PC Software, Mobile APP        |                    |
| Environmental & Physical          |                                |                    |
| Charge Ambient Temperature        | 0°C to 55°C                    |                    |
| Discharge Ambient Temperature     | -20°C to 55°C                  |                    |
| Storage Temperature               | -0°C to 40°C                   |                    |
| Humidity                          | 5% – 95%                       |                    |
| Dimensions, W×D×H(TH)             | 360×150×400(437)mm             | 360×150×610(647)mm |
| Approximate Weight                | 26.5kg                         | 45kg               |

## 2.2 Operation Panel

The operation panel of this series storage battery is shown in Figure 2.2

• Figure 2.2 Panel of battery system



• Table 2.3 Descriptions of the panel interface

| NO. | Name          | Function                                                      |
|-----|---------------|---------------------------------------------------------------|
| ①   | Screen        | Touch display screen for viewing working data                 |
| ②   | Power Button  | Press this button to power on the battery BMS and screen      |
| ③   | Terminals     | Positive and negative terminals for connecting battery cables |
| ④   | Breaker       | Breaker for controlling battery input&output power            |
| ⑤   | SOC Indicator | LED indicator for battery SOC (Remain capacity)               |
| ⑥   | MOS Indicator | LED indicator for some protection events                      |
| ⑦   | ALM Indicator | LED indicator for alarm state                                 |
| ⑧   | RUN Indicator | LED indicator for working state                               |
| ⑨   | Reset Switch  | Reset the battery system when it is in idle state             |
| ⑩   | ADS Switch    | Allocate battery ID address for parallel system               |
| ⑪   | RS232         | 232 communication for PC monitoring                           |
| ⑫   | PCS           | BMS communication of RS485&CAN                                |
| ⑬   | RS485-2       | For battery parallel communication, and PC monitoring         |

## 2.3 Battery Management System (BMS)

### • Voltage Protection

#### ► Over-charge protection and recovery

During charging, if the voltage of any cell exceeds the setting for cell protection or total voltage of the system is greater than the setting for the system, the BMS stop charging. And when all voltage of each cell and total voltage of the battery drop to the recovering values, the protection removes automatically. The settings are shown as No. 1, 2 in table 2.4.

#### ► Over-discharge protection and recovery

During discharge, if the voltage of any one cell or total voltage of the battery is lower than the protection settings, the BMS stops discharge. And when all cell voltage and total voltage go up to recovering-setting, the protection remove automatically. The settings are shown as No. 3, 4 in table 2.4.

### • Current Protection

#### ► Charging over-current protection and recovery

When the charging current is bigger than the charging over-current protection current value and more than the delay time of charging over-current protection, the system would enter the mode of charging over-current protection and turn off the charging MOS. The settings are shown as No. 5, 6 in table 2.4.

#### ► Discharging over-current protection and recovery

When the discharging current beyond the discharging over-current protection current and more than the delay time of discharging over-current protection, the system would enter the mode of discharging over-current protection and turn off the discharging MOS.when move the load,then the battery will recover. The settings are shown as No. 7, 8 in table 2.4.

#### ► Short circuit protection and recovery

When the discharging current beyond the value of short circuit protection and reaches the delay time of the short circuit protection, the system would enter the mode of short circuit protection and turn off the discharge MOS. The settings are shown as No. 9 in table 2.4.

### • Temperature Protection

#### ► Cell Temperature Protection

There are several thermal sensors to monitor the cell temperature, if the temperature of any cell is higher than 60°C or lower than 0°C, the BMS will stop charging, this is charge temp protection; If the temperature of any cell is higher than 60°C or lower than -20°C, BMS will stop the discharge, this is the discharge temp protection. The settings are shown as No. 10-13 in table 2.4.

#### ► Environment Temperature Protection

There is a thermal sensor to monitor the environment temperature, if the environment temperature is higher than 75°C, BMS will trigger the temperature protection and stop working. The settings are shown as No. 14 in table 2.4.

#### ► PCB/MOS over-heat Protection

There is a thermal sensor to monitor the PCB/MOS temperature, if the PCB/MOS temperature is higher than 105°C, it will trigger the protection and stop charging or discharge until the temperature drop to normal range. The settings are shown as 15 in table 2.4.

### • Cell Balance

#### ► Smart Cell Balance

The BMS uses the resistance bypass method (Passive balance) to balance the cells. During charging, If all cell voltages are greater than 3.40V and the voltage difference is larger than 30mV, BMS will trigger the balancing process, the balance current is designed base on the capacity of battery pack.

Table 2.4 BMS Parameters (Default Values)

| NO. | Type    |             | Parameter                | Protection Value | Recover Value      |
|-----|---------|-------------|--------------------------|------------------|--------------------|
| 1   | Voltage | Charge      | Cell Voltage Protection  | 3.65V            | 3.38V              |
| 2   |         |             | Total Voltage Protection | 29.2V / 58.4V    | 27.0V / 54.0V      |
| 3   |         | Discharge   | Cell Voltage Protection  | 2.7V             | 2.9V               |
| 4   |         |             | Total Voltage Protection | 21.6V / 43.2V    | 23.2V / 46.4V      |
| 5   | Current | Charge      | Over Current Alarm       | 105A / 210A      | \                  |
| 6   |         |             | Over Current Protect     | 110A / 215A      | Delay 600s         |
| 7   |         | Discharge   | Over Current Alarm       | 120A / 210A      | \                  |
| 8   |         |             | Over Current Protect     | 125A / 215A      | Delay 60s          |
| 9   |         |             | Short Circuit            | 1200A            | Delay 60s / Charge |
| 10  | Temp    | Cell        | Charge Over Temp         | 60°C             | 55°C               |
| 11  |         |             | Charge Under Temp        | 0°C              | 5°C                |
| 12  |         |             | Discharge Over Temp      | 60°C             | 55°C               |
| 13  |         |             | Discharge Under Temp     | -20°C            | -15°C              |
| 14  |         | Environment | Environment Over Temp    | 75°C             | 65°C               |
| 15  |         | PCB/MOS     | MOS Over Temp            | 105°C            | 85°C               |

## 2.4 Recommended Charge Parameters

To ensure battery safety, when using this product with an inverter or charger, please set the charge parameters according to the following recommended values. The parameters are shown as table 2.5.

Table 2.5 Recommended Charge Parameters

| Parameter<br>Model | Recommended Charge Parameters |                      |                     |
|--------------------|-------------------------------|----------------------|---------------------|
|                    | Constant Charge Voltage       | Float Charge Voltage | Max. Charge Current |
| MR-LFP48-100-WMD   | 56.8V                         | 56.0V                | 100A                |
| MR-LFP48-200-WMD   | 56.8V                         | 56.0V                | 200A                |

## 2.5 Recommended Discharge Parameters

To ensure battery safety, when using this product with an inverter, please set the discharge parameters according to the following recommended values. The parameters are shown as table 2.6.

Table 2.6 Recommended Discharge Parameters

| Parameter<br>Model | Recommended Discharge Parameters |             |                        |
|--------------------|----------------------------------|-------------|------------------------|
|                    | Cut-off Voltage                  | Cut-off SOC | Max. Discharge Current |
| MR-LFP48-100-WMD   | 48.0V                            | 10%         | 100A                   |
| MR-LFP48-200-WMD   | 48.0V                            | 5%          | 200A                   |

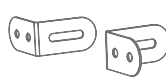
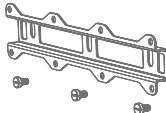


**NOTE:** The discharge power of battery will decreases as its voltage drops during discharging. Please note this and try to ensure the load power is less than the battery discharge power to avoid triggering overload.

# 3 INSTALLATION

## 3.1 Product Accessories

Figure 3.1 Accessories

| No. | Image                                                                                 | Accessory Items                                                                                                                 | Qty (pcs) |
|-----|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|-----------|
| 1   |    | <b>Positive Power Cable</b><br>(48-100: AWG3/25mm <sup>2</sup> , M8 Terminal)<br>(48-200: AWG0/50mm <sup>2</sup> , M8 Terminal) | 1         |
| 2   |    | <b>Negative Power Cable</b><br>(48-100: AWG3/25mm <sup>2</sup> , M8 Terminal)<br>(48-200: AWG0/50mm <sup>2</sup> , M8 Terminal) | 1         |
| 3   |    | <b>Communication Cable A</b><br>(Standard 8pin network RJ45 cable)                                                              | 1         |
| 4   |    | <b>Communication Cable B</b><br>(Special 1,2-3,5 pins RJ45 cable)                                                               | 1         |
| 5   |    | <b>Side Bracket Kits</b><br>(with screws)                                                                                       | 2         |
| 6   |  | <b>Wall-mount Bracket Kits</b><br>(with wall-mount and expansion screws)                                                        | 1         |
| 7   |  | <b>Bottom/Back Bracket Kits</b><br>(with screws)                                                                                | 2         |
| 8   |  | <b>User Manual</b>                                                                                                              | 1         |

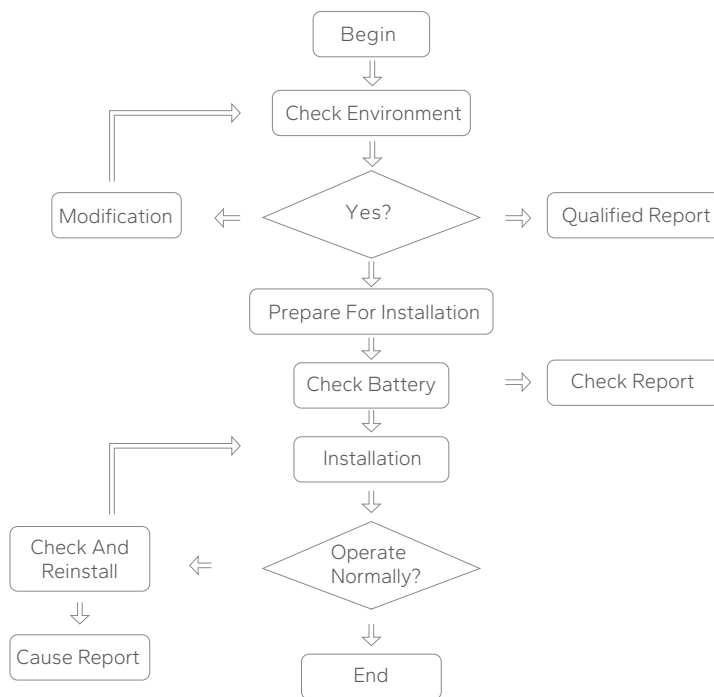
## 3.2 Preparation

### • Safety Rules

The installation, operation and maintenance of this series LiFePO4 battery system must be performed by trained and qualified professional personnel. Before installation and use, please carefully read the product safety precautions and related operating rules. Strictly abide by the following safety rules and local safety regulations, otherwise may cause personal injury or damage to the product.

- ▶ Make sure that the load equipment to be connected with the battery system is in good condition and free from defects;
- ▶ Before installation, make sure that the power supply system is under shut down state, while the battery system is also under shut down state;
- ▶ All the electricity cables must have corresponding grade of insulation, Please ensure that no exposed cables;
- ▶ Make sure that the battery and power system are reliably grounding.

Figure 3.2 Process of Installation



### • Requirement for Installation Environment

The requirement of installation environment is shown in Table 3.3

Table 3.3 Requirement of Environment

| Type                 | Requirement                                                                          |
|----------------------|--------------------------------------------------------------------------------------|
| Working Temperature  | Max. -20°C ~ 60°C, Recommend -15°C ~ 55°C                                            |
| Storage Temperature  | Max. -30°C ~ 55°C, Recommend 0°C~40°C                                                |
| Relative Humidity    | Max. 5% ~ 95%, Recommend 40%~70%                                                     |
| Atmospheric Pressure | 86kPa ~ 106kPa                                                                       |
| Site Requirements    | No conductive dust and corrosive gas, no vibration.<br>Keep away from heat and flame |

### • Tools and Materials

May use the tools and information are shown in Table 3.4

Table 3.4 Tools and Materials

| Category           | Description                                                                                                           |                                                                                                          |                                                                                                                |
|--------------------|-----------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| General Tools      | <br>Multimeter                     | <br>Protective gloves | <br>Insulated safety boots  |
|                    | <br>Protective clothing            | <br>Safety goggles    | <br>Anti-static wrist strap |
| Installation Tools | <br>Electric screwdriver          | <br>Socket wrench    | <br>Wire stripper          |
|                    | <br>Phillips screwdriver (M4/M6) | <br>Electric drill  | <br>Hammer                |

### • Battery Check

- ① On the installation site, check the battery product packaging to make sure it is intact;
- ② Check battery box according to the packing list, make sure all the material is complete, if any damaged, please fill in the receipt;
- ③ Please be careful while handling batteries, to avoid any damage.
- ④ Check and confirm the electrical grounding position of power system room.

### 3.3 Installation

When begin to install the battery system, you should pay attention to the following matters:

- ① Installation space and load bearing. Make sure that there are sufficient fixed components to install the battery system, and to ensure that the wall is strong and firm enough to bear the weight of battery.
- ② Cable specification. Ensure the cable specifications of battery cabel can meet the maximum current requirements of equipment operation.
- ③ Project layout. Ensure the whole construction process of power equipment, batteries and other reasonable layout.
- ④ Wiring layout. Ensure that the wiring is reasonable, orderly, and consider moisture-proof and corrosion prevention.
- ⑤ The whole installation process, operators should put on protective clothing and take precautions against electric shock. The installation site should be at least two or more people to operate.



#### CAUTIONS:

Please ensure the installation site is safe before installation.

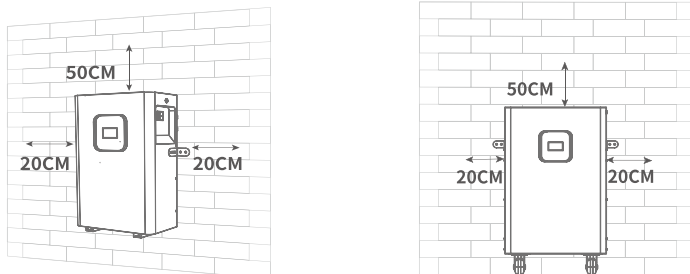
#### • Installation Step

Battery installation steps are shown in Table 3.5

**Table 3.5 The installation steps**

| Step NO. | Name                     | Description                                                                                      |
|----------|--------------------------|--------------------------------------------------------------------------------------------------|
| 1        | Turn off power supply    | The system should be powered off, to ensure that there is no electricity in installation process |
| 2        | Mechanical installation  | 1. Installation preparation<br>2. Fix on the wall                                                |
| 3        | Wiring installation      | 1. Battery cable connection<br>2. BMS cable connection                                           |
| 4        | Electrical commissioning | Power system commissioning                                                                       |

**Figure 3.6 Battery Installation Example**



#### ► Step 1. Turn off power supply

Before installation, please ensure the battery is powered off (power button and breaker). At the same time, shut down the equipment which needs to connect to the battery.

#### ► Step 2. Mechanical installation

- ① Installation preparation. Please first plan the position where the battery will be installed on the wall. Ensure that there is a space of at least 20cm between battery sides and other objects, and a space of at least 50cm above the battery. If you are installing a WMD/WMT battery hanging on the wall, please take the wall-mount bracket and expansion bolts out from the accessories, and select the appropriate position for installing the wall-mount bracket.
- ② Fix on the wall. Before fixing the battery on the wall, please first install the wheels of FSD battery (if the wheels are in accessories), or install the bottom bracket of WMD/WMT battery (if place on floor without hanging). For WMD/WMT batteries requiring hanging installation, attach the mounting screws to the battery back and hang the battery to the installed wall-mount bracket. Finally, install the side brackets in the accessories to further secure the battery to the wall.

#### ► Step 3. Wiring Installation

- ① Battery cable connection. Using the battery cables provided in the battery accessories, connect the battery input of the inverter/load device to the positive and negative terminals of the battery, when the battery and load device are turned off.
- ② BMS cable connection. Before connecting the BMS communication cable, please check the pin assignment of the battery BMS port (CAN/485) in 6.2 part "Communication ports", and confirm the pin assignment of the inverter BMS port. Then choose 8-pin standard RJ45 network cable or cable with special pins as the BMS communication cable.

#### ► Step 4. Electrical Commissioning

When these steps are completed, long press power button on the control panel to start the battery system one by one, then boot up the whole power system, complete the installation.



**CAUTIONS:** If you have any question about the installation, please stop and contact MARSRIVA technical support immediately. If the battery does not start or control panel ALM lights, please disconnect the power line for inspection and reinstall and start, if still can not solve please contact MARSRIVA, to avoid damage to equipment or cause accidents.

### 3.4 Parallel Installation

Parallel installation should first follow the basic battery installation steps in part 3.2 "Installation". Parallel installation steps are shown in Table 3.7

**Table 3.7 Parallel installation steps**

| Step NO. | Name                       | Description                                                                        |
|----------|----------------------------|------------------------------------------------------------------------------------|
| 1.       | Prepare and check          | Check voltage and SOC of each battery                                              |
| 2.       | Parallel electrical wiring | 1. Electrical wiring for parallel installation<br>2. Emergency braker installation |
| 3.       | Communicaiton wiring       | Connect parallel communication cables                                              |
| 4.       | Address switch setting     | Set DIP address switch for communication                                           |
| 5.       | System check               | Check whether the parallel system can work                                         |



**CAUTIONS:** Never connect this product batteries in series!

### ► Step 1. Prepare and check

Before connecting batteries in parallel, check the voltage and State of Charge (SOC) level of each unit. Ensure that the SOC difference is less than 2% and the voltage difference is less than 0.1V (preferably <0.05V). If the SOC or voltage difference is significant, please individually adjust each battery to the average SOC and voltage of the battery group, by using a charger or discharge load. Parallel connection is strictly prohibited when the voltage difference exceeds 0.1V.

### ► Step 2. Parallel electrical wiring

#### ① Parallel Electric Wiring:

When connecting batteries in parallel, it is recommended to use a star/radial connection topology. Do not use a daisy-chain connection topology. Additionally, do not stack multiple cable terminals on a single battery terminal hole. When using the star/radial connection topology, ensure that the cables from each battery to the positive and negative busbars have same length and specification. Then, connect the busbars to the load/inverter using cables of appropriate length and specification.

#### ② Emergency Disconnect:

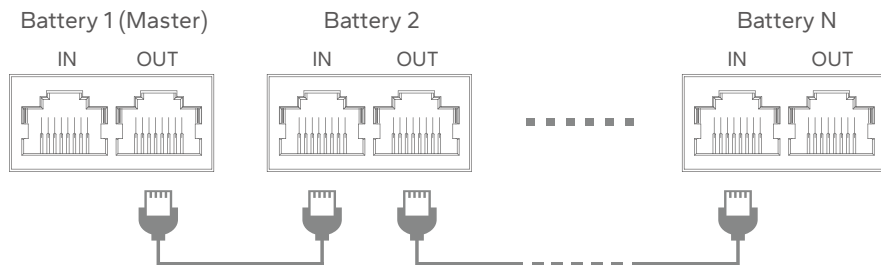
When using the star/radial connection topology, it is recommended to install a DC breaker on the cables between the busbars and the load/inverter. This can cut off power between the battery groups and the load/inverter in emergency situations.

For any special situation not covered above, please contact the MARSRIVA technical support team.

### ► Step 3. Communicaiton wiring

When connecting batteries parallel communication after electirc connection, please connect the parallel communication ports as shown in the diagram below. Please use standard 8-pin network cables for the parallel communication cables.

Figure 3.8 Parallel communication wiring



### ► Step 4. Address switch setting

This series battery product supports maximum of 15 units in parallel connection. After completing the parallel communication wiring, please set the DIP address switches for the master battery and each slave battery unit according to the following diagram.

If address switch has 6 dip switches, only left 4 switched can be set.

At the below diagram 3.9, "1" means trun on, "0" means turn off.

Figure 3.9 Parallel DIP Address Switch Settings

| Battery 1 (Master) | Battery 2  | Battery 3  | Battery 4  | Battery 5  | Battery 6  | Battery 7  | Battery 8 |
|--------------------|------------|------------|------------|------------|------------|------------|-----------|
|                    |            |            |            |            |            |            |           |
| 1000               | 0100       | 1100       | 0010       | 1010       | 0110       | 1110       | 0001      |
| Battery 9          | Battery 10 | Battery 11 | Battery 12 | Battery 13 | Battery 14 | Battery 15 |           |
|                    |            |            |            |            |            |            |           |
| 1001               | 0101       | 1101       | 0011       | 1011       | 0111       | 1111       |           |

### ► Step 5. System check

After the completion of the electricity and communication connections between the inverter and batteries, start each battery one by one.

First, use battery PC monitoring software, check whether master battery can read all slave batteries data. If it can, it indicates successful parallel communication between batteries.

Then turn on the master inverter, if you establish BMS communication between master inverter and master battery, check whether inverter has any display indicating successful BMS, and can read the correct battery data. (If the product has the function of BMS with inverter/PCS)

## 4. SHIPPING & STORAGE

### 4.1 Shipping & Storage

#### • Shipping

According to the provisions of the product can be used in general means of conveyance, but should avoid throwing, rain fall, strong radiation and corrosion erosion. during transportation, please prevent the collision and strong vibration.

#### • Storage

Store the device indoors, the ambient air temperature is 0°C to 45°C, the average monthly relative humidity is not more than 90%, the ambient air without corrosive and flammable and explosive gas; storage warehouse should be ventilated, free of alkaline, acidic substances and other corrosive gases, without a strong mechanical vibration, shock, a strong electromagnetic field or direct sunlight. Capacity was maintained at 50% to 60% stores, and charging the battery every 6 months.

Table 4.1 Requirement of Environment

| Type                 | Requirement                                                                       |
|----------------------|-----------------------------------------------------------------------------------|
| Working Temperature  | Max. -20°C ~ 60°C, Recommend -15°C ~ 55°C                                         |
| Storage Temperature  | Max. -30°C ~ 55°C, Recommend 0°C~40°C                                             |
| Relative Humidity    | Max. 5% ~ 95%, Recommend 40%~70%                                                  |
| Atmospheric Pressure | 86kPa ~ 106kPa                                                                    |
| Site Requirements    | No conductive dust and corrosive gas, no vibration. Keep away from heat and flame |



## 5. TROUBLE SHOOTING

### 5.1 LED Indicators

This series battery has four type of LED indicators: Frame, RUN, ALM, SOC. The working states of these indicators are as below.

Table 5.1 LED Display Description

|                | Indicators       | MOS<br>(Green light) | RUN<br>(Red light) | ALM<br>(Green light) | SOC<br>(LED1~4, Low-High) (Green light)                                                            |
|----------------|------------------|----------------------|--------------------|----------------------|----------------------------------------------------------------------------------------------------|
| Battery States | Event            | LED7                 | LED6               | LED5                 | LED1~4                                                                                             |
| OFF            | Sleep/OFF        | OFF                  | OFF                | OFF                  | OFF                                                                                                |
| Static/Standby | Normal           | OFF                  | Flash1             | OFF                  | Light up certain LED based on the remaining capacity.                                              |
|                | Alarm            | OFF                  | Flash1             | Flash3               |                                                                                                    |
| Charging       | Normal           | OFF                  | ON                 | OFF                  | Light up certain LED based on the remaining capacity. One SOC LED will flash to indicate charging. |
|                | Alarm            | OFF                  | ON                 | Flash3               |                                                                                                    |
|                | Over-voltage     | OFF                  | ON                 | OFF                  | ON                                                                                                 |
|                | Other Protection | OFF                  | OFF                | ON                   | OFF                                                                                                |
| Discharging    | Normal           | OFF                  | Flash3             | OFF                  | Light up certain LED based on the remaining capacity.                                              |
|                | Alarm            | OFF                  | Flash3             | Flash3               |                                                                                                    |
|                | Under-voltage    | OFF                  | Flash2             | OFF                  | OFF                                                                                                |
|                | Other Protection | OFF                  | OFF                | ON                   | OFF                                                                                                |
| Failure        | Failure States   | ON                   | OFF                | ON                   | OFF                                                                                                |

\*Other Protection: Over-current/overload, short-circuit, temperature.

\*Failure States: Cell collection fault, NTC fault, AFE fault, CHG/DSG MOS fault.

Table 5.2 SOC/Capacity Display

|        | Working State | Charging |        |        |        |        | Discharging |      |      |      |      |
|--------|---------------|----------|--------|--------|--------|--------|-------------|------|------|------|------|
|        | LED           | RUN      | LED1   | LED2   | LED3   | LED4   | RUN         | LED1 | LED2 | LED3 | LED4 |
| SOC(%) | 0~25%         | ON       | Flash2 | OFF    | OFF    | OFF    | Flash3      | ON   | OFF  | OFF  | OFF  |
|        | 25~50%        | ON       | ON     | Flash2 | OFF    | OFF    | Flash3      | ON   | ON   | OFF  | OFF  |
|        | 50~75%        | ON       | ON     | ON     | Flash2 | OFF    | Flash3      | ON   | ON   | ON   | OFF  |
|        | 75~100%       | ON       | ON     | ON     | ON     | Flash2 | Flash3      | ON   | ON   | ON   | ON   |

Table 5.3 LED Flash Mode

| Flash Mode | ON    | OFF   |
|------------|-------|-------|
| Flash1     | 0.25s | 3.75s |
| Flash2     | 0.5s  | 0.5s  |
| Flash3     | 0.5s  | 1.5s  |

**Note:** All LED lights are off when battery off, and RUN lights are long on in battery on. ALM light keeps on when the system is faulty. Battery capacity estimation has 4 green lights, each light represents 1/4 (25%) of the battery capacity. 4 lights are all on when battery has 100% capacity.

The Flash 1/2/3 Mode are shown as the 5.3 table.

### 5.2 Warning and Disposal

When the ALM indicator is on, battery has been alarmed or protected, please check fault reasons and take corresponding measures. Table 5.1 below is the main alarm condition.

Table 5.4 The main alarm and protection

| State       | Type                    | Indicator | Disposal                                 |
|-------------|-------------------------|-----------|------------------------------------------|
| Charging    | Over-voltage protection | ALM       | Stop charge, check the battery status    |
|             | Over-current protection | ALM       | Stop charge, check the battery status    |
|             | Temperature protection  | ALM       | Stop charge, check the battery status    |
| Discharging | Low-voltage protection  | ALM       | Stop discharge, check the battery status |
|             | Over-current protection | ALM       | Stop discharge, check the battery status |
|             | Temperature protection  | ALM       | Stop discharge, check the battery status |

### 5.3 Common Faults and Solutions

Common faults and solutions are shown in Table 5.2

Table 5.5 Common faults and solutions

| NO. | Fault phenomenon                       | Analysis                                                              | Solution                                                                          |
|-----|----------------------------------------|-----------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| 1   | LED "RUN" does not light after START   | Battery management system not activated                               | Press power button to restart. Or press the reset button to reset.                |
| 2   | No DC output                           | Discharge MOS off                                                     | Restart battery and try again                                                     |
| 3   | Power supply time is too short         | Battery capacity is insufficient or not full power                    | Maintenance or reduce load power.                                                 |
| 4   | Battery can not be charged to full     | Power system DC output voltage falls below the minimum charge voltage | Regulating DC output voltage of power supply to battery suitable charging voltage |
| 5   | ALM LED always lights                  | Power line connection short circuit                                   | Disconnect the power cable and check all cables                                   |
| 6   | The battery output voltage is unstable | Battery management system does not operate normally                   | Press the reset button to reset the system, then reboot the system                |
| 7   | Communication lost or data fault       | Communication settings fail                                           | Check the communication settings and correct it                                   |



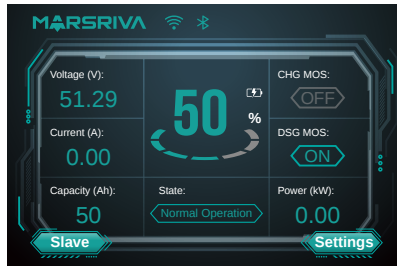
**Note:** If you have some special technical problems which not mentioned above, please contact MARSRIVA technical staff.

## 6. FUNCTION & COMMUNICATION

### 6.1 LCD Touched Screen

The LCD touched screen of this battery product enables simple viewing of BMS working data and status, also the setting of BMS protocols (485/CAN) and displaying 7 languages.

#### ► Main Page and Slave Page



#### Main Page:

The main page of the battery screen can display the working data of the battery system, and the connection status of WiFi/Bluetooth module, also enter the "Slave" and "Settings" pages. If the battery is used separately, the working data displayed on the main page and the slave page is the same. If multiple batteries are used in parallel, the main page will display the average Voltage and average SOC of the battery group, and the total Current, total Capacity, and total Power.



#### Slave Page:

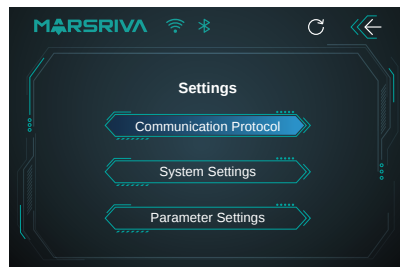
Based on the battery address assigned by the address switch, select the corresponding number to enter the battery slave details page. On the slave page, in addition to the basic working data of the battery, it will also show the temperature value of the internal sensors and the voltage of all cells.

#### ► Screen Settings

#### Settings Page:

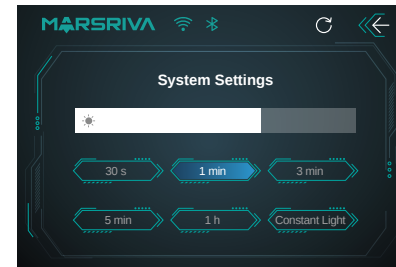
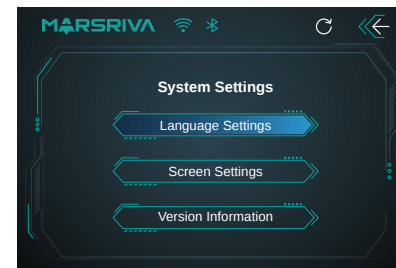
Enter the settings page, there are three subordinate setting page:

"Communication Protocol",  
"System Settings",  
"Parameter Settings".



#### Communication Protocol (BMS) :

This page is for selecting BMS communication protocol of CAN/RS485, it has below brand protocols:  
**RS485:** Marsriva, Pylon, Pace, Voltronic, Growatt, Deye, Luxpower, INVT, SRNE, EPEVER, SMK, Sako.  
**CAN:** Marsriva, Pylon, Voltronic, Growatt, Deye, Victron, Goodwe, SMA, Luxpower, Sofar, Solis, Aiswei, INVT, Must.



#### System Settings :

In Language Settings, there are 7 languages can be used and displayed: English, Arabic, Russian, Persian, Portuguese, Ukrainian.

In Screen Settings, you can change the screen brightness and the screen-off time.

In Version Information, you can check the version data of the battery.

#### Parameter Settings :

In these pages you can check some advanced BMS parameter. Such as SOH, Max. charging voltage or current, charge and discharge alarm current or protection current.



## 6.2 Communication Ports

This series product have different communication ports base on whether the product has SNMP function. The difference and pin assignment are as below.

Figure 6.2 Communication Port of Product

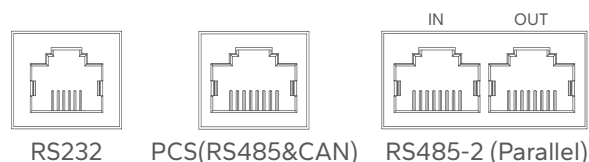


Figure 6.3 Pin Assignment of Communication Ports

| Interfaces     | RS232                       |             | PCS(RS485&CAN)    |             | RS485(Parallel)               |              |
|----------------|-----------------------------|-------------|-------------------|-------------|-------------------------------|--------------|
| Function       | PC Monitoring Communication |             | BMS Communication |             | Parallel and PC Communication |              |
| Pin Assignment | PIN                         | Description | PIN               | Description | PIN                           | Description  |
|                | 1                           | NC          | 1                 | RS485-B     | 1                             | RS485-B      |
|                | 2                           | NC          | 2                 | RS485-A     | 2                             | RS485-A      |
|                | 3                           | TX          | 3                 | VSS/GND     | 3                             | IN(L)/OUT(R) |
|                | 4                           | RX          | 4                 | CAN H       | 4                             | NC           |
|                | 5                           | VSS/GND     | 5                 | CAN L       | 5                             | NC           |
|                | 6                           | NC          | 6                 | VSS/GND     | 6                             | VSS/GND      |
|                |                             |             | 7                 | RS485-A     | 7                             | RS485-A      |
|                |                             |             | 8                 | RS485-B     | 8                             | RS485-B      |

## 6.3 Advanced Functions

### ► BMS Communication

This series battery can establish BMS communication with solar inverters. The useable BMS protocols and pin assignment of communication ports are introduced in previous contents. Please review the BMS communication contents in the user manual of you purchased inverter, and then establish BMS communication with the battery.

### ► PC Software Monitoring

The PC monitoring software can read more detailed battery real-time data, BMS parameter and history working data.

### ► WiFi&Bluetooth Module for Mobile APP

This battery product has WiFi&Bluetooth module for mobile APP. On the APP, first connect Bluetooth for close-range monitoring. After configure WiFi network, the APP can monitor battery working data remotely.



Please scan the QR code or contact MARSRIVA to get the files and guides of these function.

Thank you for purchasing MARSRIVA product

## PRODUCT WARRANTY CARD

Product :

Model :

Purchase Date (DD / MM / YY) :

Customer Name :

Telephone Number :

E-mail Address :

Dealer's Name and Address :

Serial Number\* :



This Warranty applies only if the Product was newly manufactured on the Date of Purchase and not sold as used, refurbished, or manufacturing seconds. Please keep the proof of purchase and this warranty card for future service requests.

### IMPORTANT!

Please store this card in a secured location for future reference. Marsriva reserves the right to request this card before accepting repair requests. This does not affect or limit your mandatory statutory rights.