



LB51100

Installation and User Manual

Version: V1.0

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Statement:

This product is low voltage (48V) residential rack battery from Shenzhen Olipower Energy & Automation Technology., Ltd

Due to product upgrades or other reasons, this document will make appropriate adjustments. Unless otherwise agreed, this document is intended to be used only as a guide, and all statements, information and advice in the documentation shall not constitute any express or implied.

For more information, please contact us.

1 Preface

Thank you for choosing our low voltage (48V) residential rack battery . We will provide you good quality as well as reliable after service.

To protect using staffs and product, please kindly read this manual carefully which provide detailed information for products' features, structures, operate standard, maintenance and troubleshooting.

Special announcement:

This manual can't be taken as basis of requirement for Olipower.

Olipower hold the final explanation right of this manual.

2 Information in this Manual

2.1 About this Manual

This is the Manual for the low voltage (48V) residential rack battery products. User of this device or installer must refer to the installation guidance to installation and using correctly.

2.2 Use Range

This installation guidance applies only to our low voltage (48V) residential rack battery products.

2.3 Additional Information

Specification of the product can be changed without any notice to customers for the system improvement.

2.4 Symbol Used

Symbols meanings:



CAUTION:

CAUTION represents hazardous situations that can cause minor damage to the equipment or personal injury if not avoided.



NOTICE:

NOTICE represents the situations, which can cause damage the performance of the product if not avoided.



INFORMATION:

INFORMATION provides tips that are valuable for optimum installation and operation of the product.

3 Safety

3.1 Warnings and Notification

Installation environment requirements: low voltage (48V) residential rack battery are designed for household use. For installation, it must be installed in a location complying with IP20. If the Installation location does not comply with IP20 may cause failure and the product will not be guaranteed for any related accident or damage.

3.2 Safety Guidelines



CAUTION:

Install and use to avoid short-circuit between the anode terminal and a cathode terminal, all electrical connections on the low voltage (48V) residential rack battery work must be operated by qualified professional personnel, when operated in accordance with the expected design low voltage (48V) residential rack battery will be used as a safe and reliable power supply. In the absence of proper operating conditions, damage, misuse and / or abuse case, battery box there may be security risks such as overheating or electrolyte smoke potential, users are described in this section must comply with the safety precautions and warnings. If any of the following precautions is not fully understood or has any problems, please contact the customer service officer for assistance. The safety part may not include all the regulations in your area. The use of low voltage (48V) residential rack battery must review applicable local laws and regulations and the industry standards of the product.

Installation personnel shall not wear watches and other metal items to install operations, in order to avoid short circuits and personal injuries.



CAUTION:

Due to high weight of battery pack, please use original package and do safety protection when second transport. Please ensure that the battery box in the process of transportation safety, to avoid damage to the product and personnel injury.

4 Product Overviews

4.1 Produce Introduction

low voltage (48V) residential rack battery products as the energy storage parts can be used in off-grid & on-grid energy storage system. It is recommended not to use this device for other than the purpose described in this guidance. The substitute use of this product, random change, and use of components other than sold or recommended by Olipower will nullify the product guarantee.

4.2 Identifying The Product

| Battery model | Specification parameter | Matched inverter |
|---------------|-------------------------|------------------|
| LB51100 | 51.2V/5.12KWh | 3.2kW |

Detailed data are shown in appendix 1

4.3 Maintenance and Replacement



DANGER

High voltage may cause an electric shock, which results in serious injury, death, or serious property damage from the LB51100 in operation. Prior to maintenance, power off the LB51100 and strictly comply with the safety precautions in this document and associated documents to operate the LB51100.

- Maintain the LB51100 with sufficient knowledge of this document, proper tools, and testing equipment.
- Before performing maintenance tasks, power off the LB51100 and wait at least 5 minutes.
- Temporary warning signs or fences must be placed to prevent unauthorized people from entering the site.
- If the LB51100 is faulty, contact your supplier.
- The LB51100 can be powered on only after all faults are rectified. Failing to do so may escalate faults or damage the device.
- Observe ESD precautions and wear ESD gloves during maintenance.

Regular Maintenance

| Items | Time |
|--|---------------|
| Cleaning case using soft cloth | Once 6 months |
| Cleaning ventilation hole using soft brush | Once a year |
| Discharge to SOH 50% when not to use in 3month | On demand |
| Fully charge discharge to SOH 25% | Once a year |

Disposal

- The battery energy storage system must not be disposed of with domestic waste to fulfill the regulations and legal enquiry. The user has the responsibility and obligation to send it to the designated organization for recycling and disposal.

5 System Installation

5.1 Installation notice

- a) Before installation, check the battery open circuit voltage.
- b) Battery installation location should be away from heat and avoid produce spark. The safety distance should be above than 0.5m.
- c) Battery installing connecting cables should be as short as possible, to prevent excessive line pressure drop.
- d) Batteries with different capacity, different P/N or different manufactures are not allowed for connection.
- e) Before conducting the battery, the battery positive and negative poles need to be carefully checked as well to ensure correct installation.
- f) The mounting floor should be horizontal.
- g) The battery IP Rating is IP20 and is for indoor installations only.
- h) For Australian market, the battery energy storage system can only be mounted into battery cabinet or rack using screw firmed tightly and racks can be stand together without space. And distance between batteries is 5mm as least. Battery cabinets/racks are not provided with battery and are outside the scope of product certification.
- i) Distances of any standoff from a wall, floor, ceiling/roof is 0.5m at least; Distance from any heat source (e.g. hot water systems, gas heaters or the like) is 0.5m at least; Distance/clearances from any equipment/wall/structure to the sides, bottom,

top is 0.5m at least; Clearance distances from any vents to any wall, other equipment, structure is 0.5m at least.

5.2 Package information and system configuration list

The battery box is packed in cartons, and the components assort with the battery case. When you confirm the goods, please read the configuration list carefully to make sure that the battery box and kit are intact.

5.2.1 Parts list

| No. | Name | Quantity | Description |
|-----|----------------------------|----------|----------------------|
| 1 | Battery box | 1 | |
| 2 | Fixed screw | 4 | |
| 3 | CAN cable | 1 | |
| 4 | LINK cable | 1 | |
| 5 | RS232 cable | 1 | |
| 6 | Power cable | 1set | 1positive&1 negative |
| 7 | Grounding cable | 1 | |
| 8 | Outgoing Inspection Report | 1 | |

5.2.2 Installation

Table 3 Installation tools list

| | | |
|--|--|--|
|  Cross screwdriver M3-M10 |  Flat tip screwdriver M3-M6 |  Sockets spanner |
|  Diagonal cutters |  Adjustable wrench |  Knife |

Tool

5.2.3 Personal protective equipment

| | |
|---|---|
|  Insulating shoes |  Insulating gloves |
|---|---|

5.3 Installation

5.3.1 Product dimensions

See Appendix 2.

5.3.2 Installation method

5.3.2.1 Cabinet Installation



The positions of bolts are shown in the picture, which are anchored into ground.

5.3.2.2 Rack mounting Installation.

After the Cabinets installed firmly and reliably, the battery box is pushed from side to side along the wall until the mounting card on the battery box is placed in the proper position of the rack mounting position.

! Information:

Rack -mounted installation is suggested that the external connection line of the battery box should be connected first and then installed.

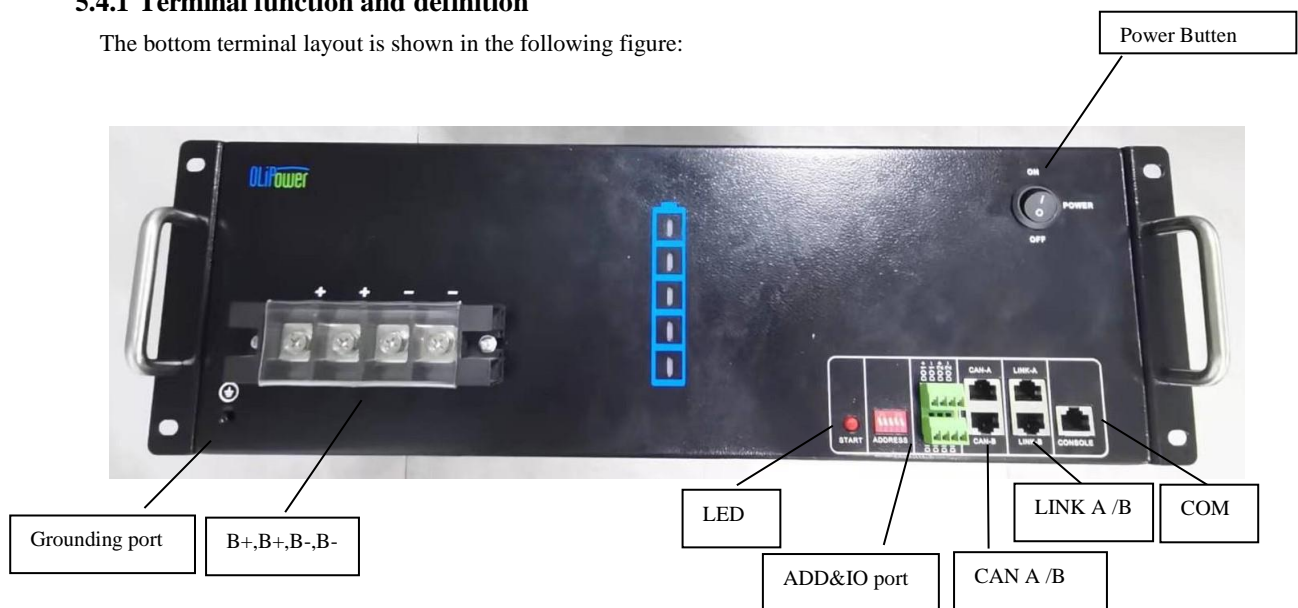
! Information:

When installing the battery box, please work together to avoid product damage or personal injury.

5.4 Wiring definition

5.4.1 Terminal function and definition

The bottom terminal layout is shown in the following figure:

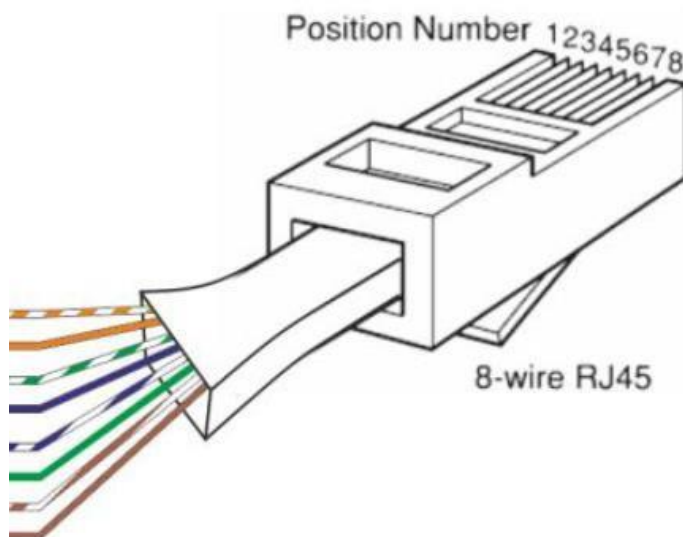


| Interface | Function |
|-----------|---|
| DIN1-P | IO port, interacts with a diesel engine, a photovoltaic device, or other external device. |
| DIN1-N | |
| DIN2-P | |
| DIN2-N | |
| DO1-P | |
| DO1-N | |
| SDO1-P | |
| SDO1-N | |
| CAN-A/B | |
| ADD | DIP switch, set the LINK address and terminal resistance. |
| B+ | Battery positive (The two positives are the same, one of which can be used as a parallel battery) |
| B+ | |
| B- | Battery negative (The two negative are the same, one of which can be used as a parallel battery) |
| B- | |

Attention: B interface RJ45 port corresponding to the CAN bus pin definition

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|------------|---|---|---|---|---|-----|-------|-------|
| 8 | • | • | • | • | 1 | Pin | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |
| | | | | | | Definition | | | | | | GND | CAN_L | CAN_H |

RJ45 pin number reference schematic:



5.4.2 A single battery box is connected to the inverter

5.4.2.1 The steps of a single battery box connected with the inverter

Step 1: Check the battery box enclosure is not damage.

Step 2: When the battery is not connected to the inverter, start the battery box, then confirm that the battery box running indicator light is bright, the battery box fault indicator light is not bright, and the battery box voltage

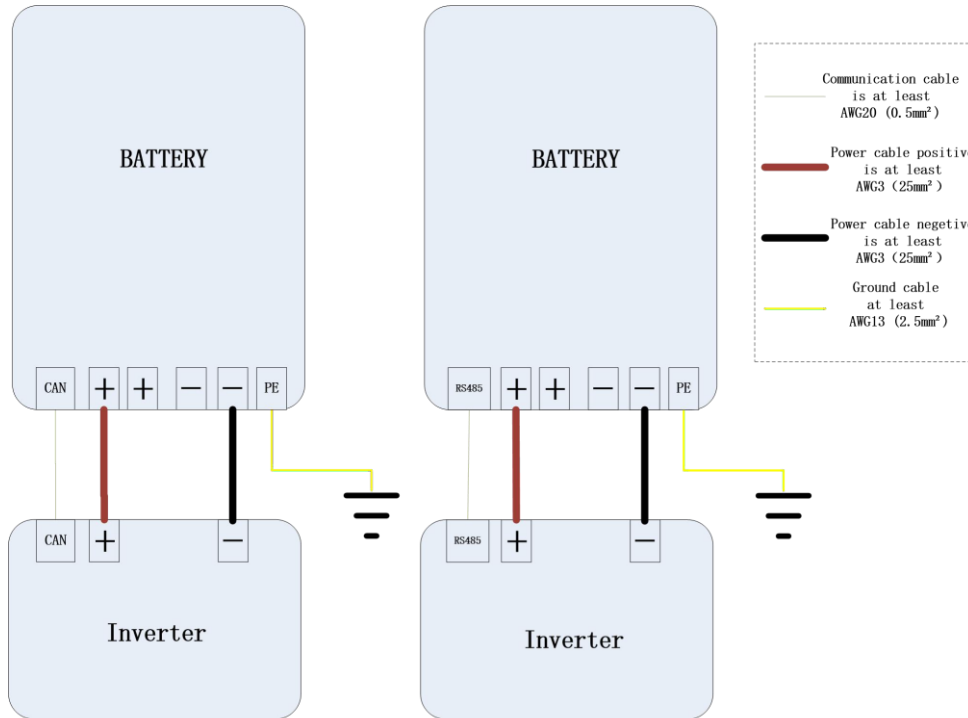
output is normal. Do the next operation if there is no problem.

Step 3: Turn off the battery, then connect the communication line and power cable (connect the way to refer to the 5.4.2.2 schematic diagram), set the DIP switch correctly, confirm the connection is correct, then turn on the battery.

5.4.2.2 Schematic diagram of single battery box and inverter connection

Attention: The drawing is for reference only, please take the material as the standard.

It is an Australia installation standard requirement AS/NZS 5139 that an overcurrent protection and isolation device that operates both positive and negative conductors is required between battery and inverter and also between parallel batteries.



The battery communicates with the inverter via CAN signal

The battery communicates with the inverter via 485 signal


Step 1 Connect the grounding cable to the grounding port.

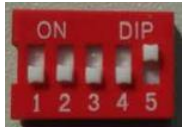
Step 2 Connect the power cables to the B+ and B- tightly using screwdriver.

Step 3 Plug the CAN cable into the CAN A or CAN B port, and then connect to Inverter. Shown as following:




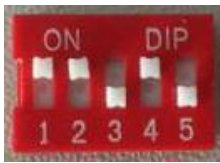
A single battery box through the CAN communication connection inverter when the DIP switch is defined as follows:

 **CAUTION:** Set the DIP switch after the need to restart the battery box, restart the settings will take effect.



Single battery box through the LINK communication connection to the inverter when the address DIP switch defined as follows:

 **CAUTION:** Set the DIP switch after the need to restart the battery box, restart the settings will take effect.



5.4.3 Multiple parallel battery boxes connected with inverter

5.4.3.1 The steps of parallel connection of multiple battery boxes

Step 1: Every single battery is started and the total voltage of the battery is measured with a multimeter. It is confirmed that the difference between the total voltage of each battery is not more than 2V, and then the following work is carried out.

Step 2: Connect the battery box communication line, set the DIP switch (the connection of the communication line and the setting of the dial code switch reference 5.4.3.3 description). Start Master battery box, then slave battery box 1, and the slave battery box 2,3,... observe the state of the alarm light from the battery box. If the fault light is on, please check whether the connection is tight enough and the switch setting is right. If the fault lights are not bright, follow up.

Step 3: First turn off all the battery boxes, then connect the battery box power cables (the connection of power cable to 5.4.3.4 description). After the connection is completed, start the master battery box, slave battery box 1 and slave battery box 2 (if have slave battery box 2).

Step 4: After the battery is completed in parallel, it is suggested that you wait a few minutes to connect the inverter later.

5.4.3.2 The connection between the parallel battery box and the inverter

Step 1: After the battery box is properly parallel, turn off all the battery boxes.

Step 2: Connect the CAN communication line between the battery box main station and the inverter (the connection of the communication line is described by 5.4.3.3), then connect the power cable between the parallel battery boxes and the inverter (the connection of the power cable is described by 5.4.3.4).

Step 3: Start the main station, the slave station 1, and the slave station 2 (if have slave station 2).

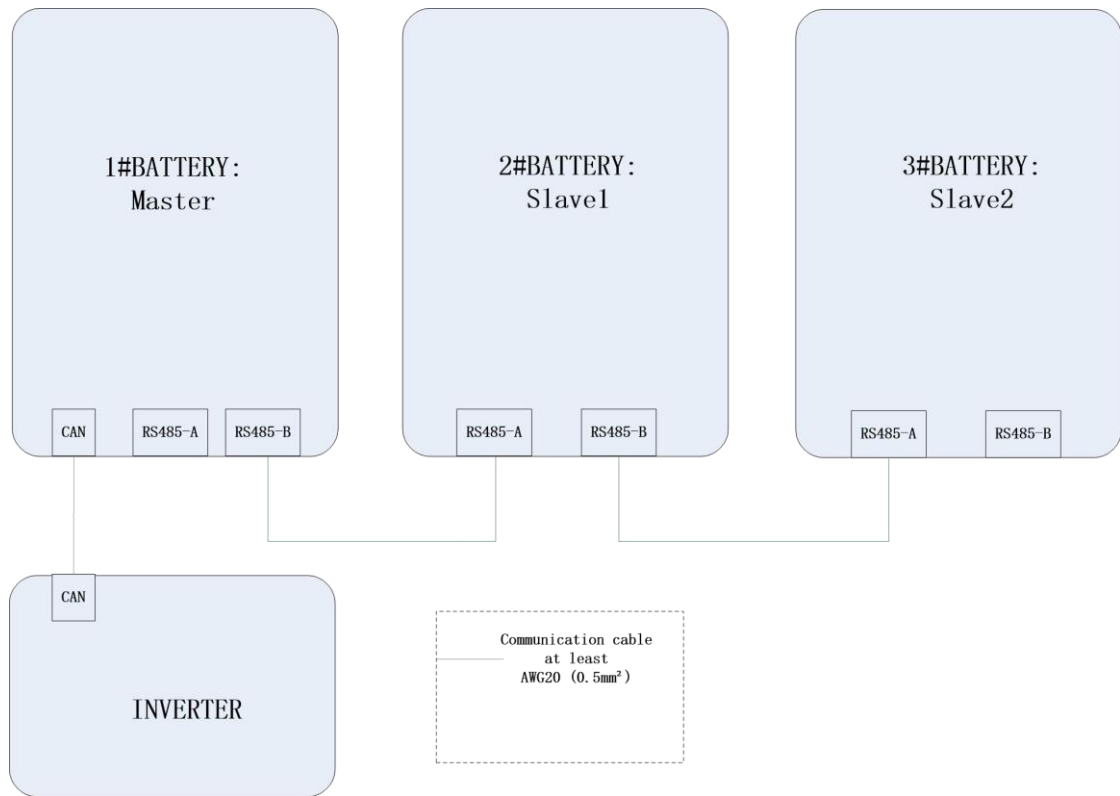
5.4.3.3 System communication line connection



Information: When multiple battery boxes are used in parallel, the parallel battery box and inverter can only communicate through CAN interface, and the communication between the battery box through LINK.

Attention: The following figure is only the communication line connection diagram. Specific interfaces must be compared to physical objects.

It is an Australia installation standard requirement AS/NZS 5139 that an overcurrent protection and isolation device that operates both positive and negative conductors is required between battery and inverter and also between parallel batteries.



Two battery boxes in parallel when the DIP switch is defined as follows:



CAUTION: Set the DIP switch after the need to restart the battery box, restart the settings will take effect.

Master:



Slave1:



Three battery boxes in parallel when the DIP switch is defined as follows:



CAUTION: Set the DIP switch after the need to restart the battery box, restart the settings will take effect.

Master:



Slave1:

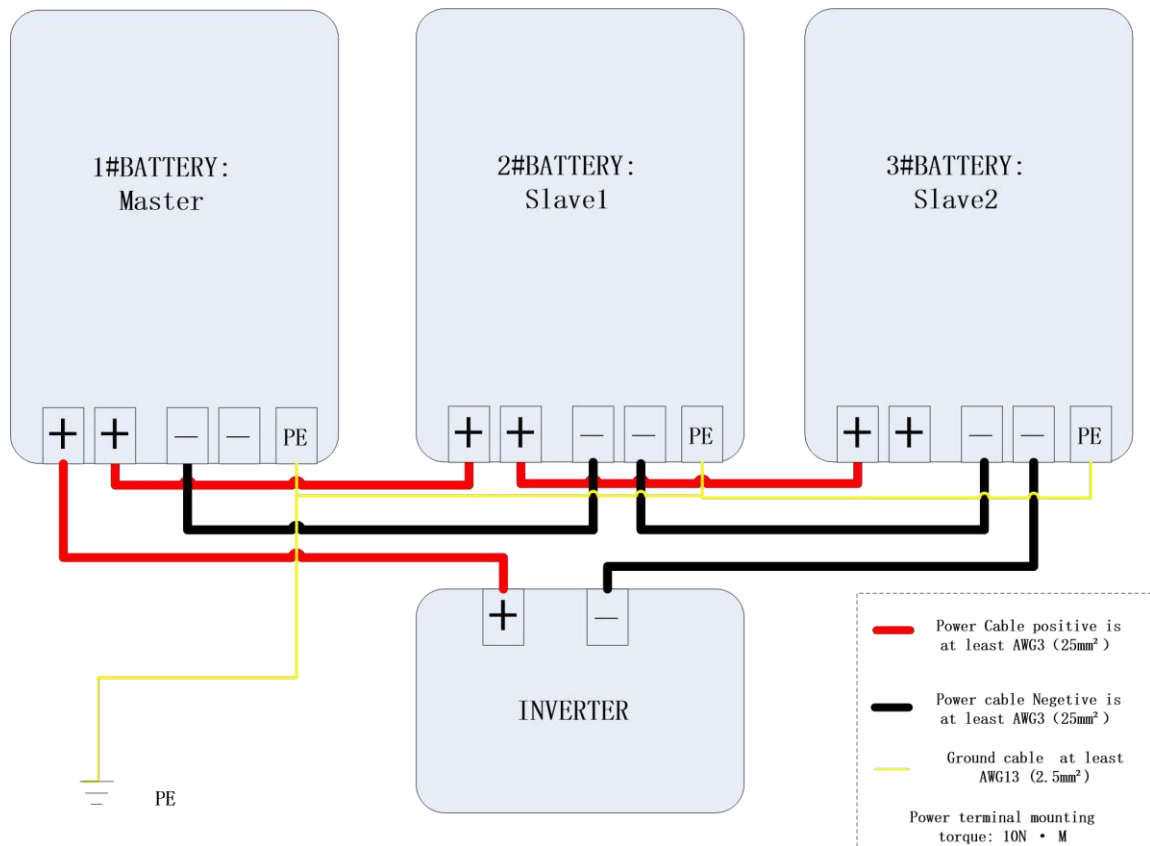


Slave2:



5.4.4.4 Power cable connection

Attention: The following figure is only the power cable connection diagram, the specific connection. Please refer to the object for specific connection.



6 Battery box activate and shutdown

6.1 Panel buttons and LEDs meaning

Attention: the drawing is for reference only, please take the material as the standard.

| Name | Meaning | Function or indication status |
|---------|---------------------------------|--|
| ON/OFF | Turn on or off button | Control battery box on or off |
| RUN | Running indicator light (green) | When the battery box is running normally, it always bright |
| LOW BAT | Low battery indicator (yellow) | When the battery is low(SOC<5%), it is always bright. |
| FAULT | Fault indicator light (red) | Flashing alarm when the battery box is faulty |

6.2 The operation steps of the battery box works alone

6.2.1 Start battery box

Short press the power button (1S), RUN light on, switch on the isolator between the battery and inverter., battery box is activated normally.

6.2.2 Shut down battery box

Long press the power button (5S), RUN light off, switch on the isolator between the battery and inverter, battery box is shut

down normally.

6.2.3 Low battery forced charge function

Prerequisite: When the battery voltage is too low, it will go into the shutdown state automatically. Meanwhile, the voltage between the battery box B + and B- is zero and the panel lights are off. when push the power button, the battery run(green) LED is on ,low battery(yellow) LED is on, fault(red) LED is flashing, if the fault(red) LED still flashing after 3 minutes, means the battery into ultra-low battery, in ultra-low power to recharge battery can only use forced charge function.

Preparation condition before forced charging: Connect the charger or the inverter with charging capability to the B+ and B- of the battery box to ensure charging capacity.

Forced charging step:

Step 1: Make sure the battery is in ultra-low power, please refer to "Prerequisites".

Step 2: If the battery is off, please turn on the battery and observe whether the status of the battery indicator is run(green) LED is on, the low power(yellow) LED is on, the fault(red) LED is flashing. if it is ,do next step operating. (If no operation is performed for five minutes from the moment you push the power button, the battery will turn off again.)

Step 3: Push the power button (1-2S) again, if the run(green) LED is flashing, the low power(yellow) LED is on, the fault(red) LED is on, means the battery into forces charge state.

Step 4: After entering the forced charge state, you have 90S of time to prepare for charging. battery is detected charging during this 90S, the fault (red) is off, run LED no longer flashing (just on) after 90S, means the battery into the normal charging mode. the battery is not detected charging after 90S,the fault(red) LED will flashing, the battery cannot be recharged in this time, you can only start the forced charging operation from the beginning (if no operation within 5 minutes, the battery will enter the shutdown state).

6.3 The steps of the battery boxes work in parallel

6.3.1 Cautions before Parallel:

(1) The battery boxes voltage difference must not be greater than 2V. Otherwise, the battery boxes are not allowed for parallel connection.

(2) The connection between the battery boxes and the parallel box is ready.

(3) Before activity the system, operator should check the cable connection strictly till make sure of the LINK cable connection is hard, and check the batteries DIP switch had been setup correctly.

6.3.2 Activate the parallel batteries system

Step 1, short press the master battery box power button(1S), the master battery box RUN light on, the master battery box is activated.

Step 2, short press the slave battery box 1 power button (1S), the slave battery box 1 RUN light on, the slave battery box 1 is activated.

Step 3, If parallel with three battery boxes, please short press slave battery box 2 power button(1S), the slave battery box 2 RUN light on, the slave battery box 2 is activated. Switch on dc isolators between battery and inverter, and between batteries.

Finally, all battery boxes are activated, and the parallel batteries system is properly powered on.

6.3.3 The parallel Batteries system shutdown

Switch off dc isolators between battery and inverter, and between batteries. Long press the master battery box power button (5s), the master battery box RUN light immediately extinguished, slave battery boxes RUN lights

will not be extinguished immediately. Slave battery boxes fault lights

flashing after 10s, slave battery boxes RUN lights and fault lights extinguished after 1min, the parallel Batteries system shut down in normal.



NOTICE:

When the battery box is in parallel, press the power button of the battery box will shut down the battery box. In normal use, we strongly recommend that you do not only turn off a battery box as a slave machine. The remote monitoring of battery is available via inverter monitoring solution.

7 Battery box abnormal and solution

| Abnormal description | Abnormal interpretation | Phenomenon | Cause | solution | |
|--|-------------------------------------|--|---|---|--|
| Run indicator light, Fault indicator light, battery no voltage output | Function of battery self-protection | The low battery indicator is light, and the fault indicator is light. The battery box has no output. | The battery is too low | The battery must be charged at once, and the specific operation will refer to the low power charge function. Check the communication between the battery box and the inverter is normal. | |
| | | When the battery box is running, fault indicator lights up. | The battery is too high | The battery must be stopped charging immediately. Check the communication between the battery box and the inverter is normal. | |
| | | | The current is too large | Please refer to the parameters of the battery charging current and discharge current of the corresponding model, and compare the technical parameters of the inverter. | |
| | | | The temperature is too high | Please install the battery in a ventilated place, which is beneficial to the heat dissipation of the battery. | |
| | Incorrect use of battery | After starting, the fault indicator is light. | Incorrect setting of DIP switch | Check whether the battery box DIP switch is set correctly. If it is not correct, please refer to the use manual to set the DIP switch. | |
| | | | When the battery is used in parallel, the fault indicator of the slave station battery box is light, and there is no fault when the battery | Incorrect setting of DIP switch | Check whether the communication connection between the main and slave stations of the battery box is firmly connected. Check whether the DIP switch of the battery main station and the slave station is set |
| | | | | | |
| | | | | | |

| | | | | |
|---|-----------------------|--|--|--|
| | | box is used alone. | | correctly. If incorrect, please refer to the manual to set up the DIP switch. |
| | | When the battery box is in parallel for the first time, start the parallel system. The fault indicator of the slave station battery box is light, and the slave station has no voltage output. | Protection measures to prevent battery damage when the battery is in parallel. | Take the positive and negative voltage of each battery box. If the voltage difference between the battery boxes is more than 2V, please keep the pressure difference under 2V and try the parallel connection. |
| Run indicator light, Fault indicator not light, battery no voltage output | Battery device damage | The battery has no fault alarm, but there is no voltage output | Short circuit cause damage of battery box fuse | Check whether the connection is correct and whether there is a short circuit. If there is a short circuit, please check the cause as soon as possible and solve the short circuit problem, and then change the fuse with the after sale or professional. |
| | | | Battery internal device damage | Please contact the after-sale service |
| Press the battery button, all the battery indicators are not light | | The battery indicator is not light and the battery has voltage output | The battery indicator is damaged, the line is loose, or aging. | Please contact the after-sale service |
| | | The battery indicator is not light and the battery has no voltage output | Circuit board fault, circuit board wiring looseness or aging. | Please contact the after-sale service |
| Other anomalies | | | | Please contact the after-sale service |

8 Battery box compatible with the inverter

| Serial number | Inverter brand | Inverter model | | |
|---------------|----------------|----------------|--|--|
| 1 | SMA | Sunny Island | | |
| 2 | SolaX | X-Hybrid | | |
| 3 | Goodwe | ES-series | | |
| 4 | SofarSolar | ME 3000SP | | |
| 5 | MUST | PH&PV series | | |
| | | | | |

Appendix 1- Product data sheet

| | |
|---|--|
| Product model | LB51100 |
| ated voltage | 51.2V |
| working voltage | 44.8-58.4V |
| Rated capacity | 100Ah |
| Battery energy | 5.12kWh |
| Rated output power | 3.2kW |
| Peak output power | 5kW |
| Maximum continuous charging current | 100A |
| Maximum continuous discharge current | 100A |
| Size(W*H*D) | 440*135*620mm |
| weight | 46.2kg |
| Installation method | Rack mounting |
| Cycle times (80% DOD,25°C) | 4000 |
| Charge temperature range | 0-55°C |
| Discharge temperature range | -20-55°C |
| communication interface | CAN2.0/LINK Modbus/RS485 |
| Battery protection | Over charge / over discharge / over temperature / over current / short circuit |
| Precharge control | optional |
| Life time | 10 years |
| Storage time (-20°C~35°C) | 3 months |
| Operating environment temperature range | 0-45°C |
| Storage temperature range | -10-40°C |
| EMC standard | IEC 61000 |
| Warranty period | 5 years,4000cycles |
| Protection grade | IP20 |
| Support inverter interaction protocol | SMA/Solax/GoodWe/SofarSolar/Studer/MUST |

Appendix 2- Product size table

| Product model | Outline dimension |
|---------------|-------------------|
| LB51100 | |