

JK48V100PRO Battery Pack

User Manual





Please comply with all warnings and operating instructions in this manual strictly. Save this manual properly and read carefully the following instructions before installing the unit. Do not operate this unit before reading through all safety information and operating instructions carefully.

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1.Safety Precaution

1.1 When Using Battery

Danger of High Voltage:

The high voltage power supply offer the equipment power, wet object contact high voltage power supply directly or indirectly , can cause fatal danger.

Using a special tool :

Working in high voltage and ac power, be sure to use a special tool instead of individual tools.

Static-free:

Static electricity would damage veneer on the electrostatic sensitive components, before touching the plug-in, circuit board or chips, be sure to use correct electrostatic prevention measures.

Disconnect the power supply in operation:

When operate the power supply, you must first cut off power supply, power operation is prohibited.

Dc short circuit dangerous:

Power system provides dc regulated power supply. Dc short circuit could cause fatal damage to the equipment.

1.2 While Charging

CAUTION

The temperature range over which the battery can be charged is 0°C to 45°C. Charging the battery at temperatures outside of this range may cause the battery to become hot or to break. Charging the battery outside of this temperature range may also harm the performance of the battery or reduce the battery's life expectancy.

1.3 When Discharging the Battery

DANGER

Do not discharge the battery using any device except for the specified device. When the battery is used in devices aside from the specified device it may damage the performance of the battery or reduce its life expectancy, and if the device causes an abnormal current to flow, it may cause the battery to become hot and cause serious injury.

CAUTION

The temperature range over which the battery can be discharged is -20°C to 60°C. Use of the battery outside of this temperature range may damage the performance of the battery or may reduce its life expectancy.

2.Parameters of Battery

2.1 Basic Block Diagram

- There are Battery cells and BMS board inside, before connecting the terminal, please read the diagram, and make sure the output is no short or other abnormal connection.

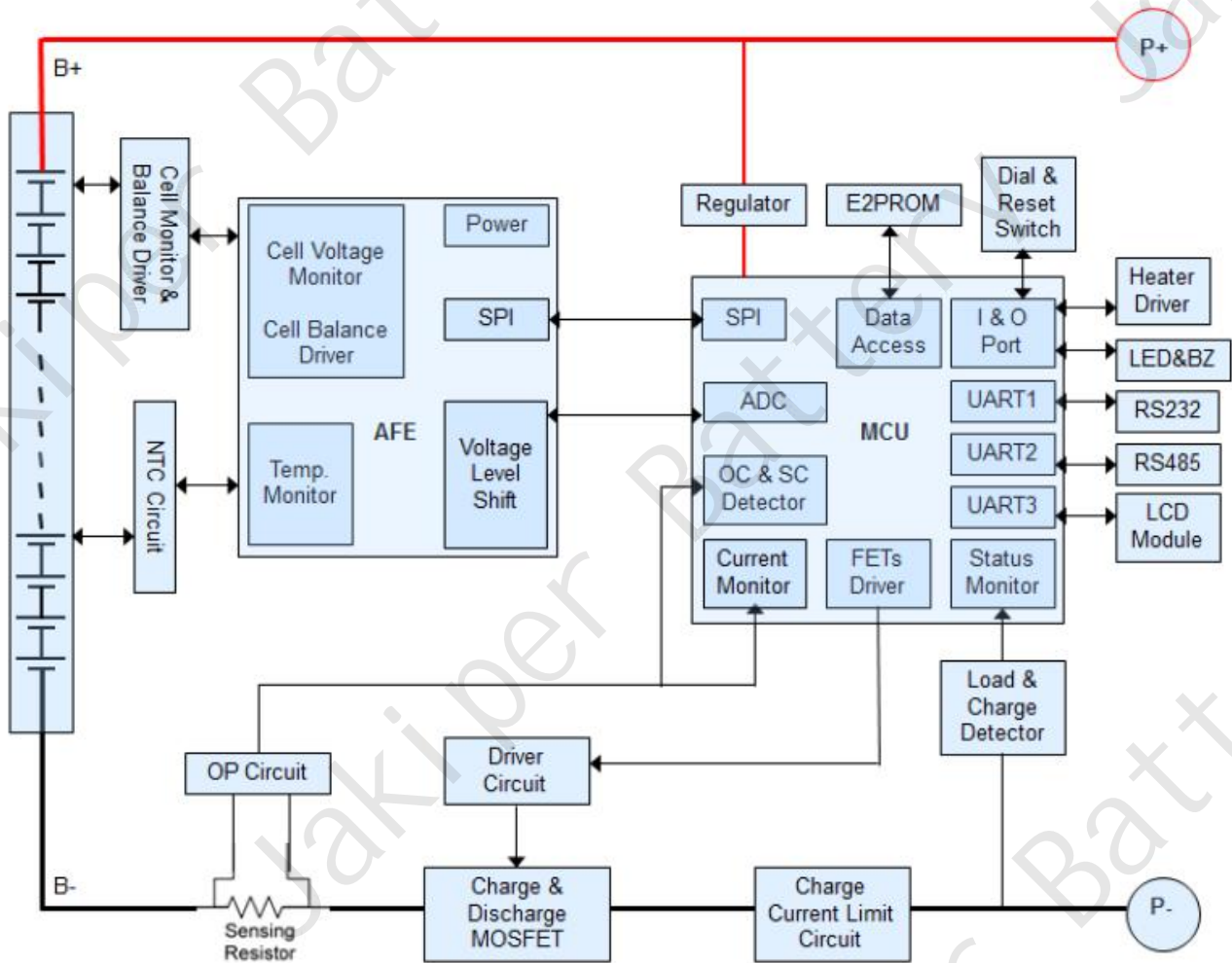


Fig1 Battery Block Diagram

2.2 Battery Specifications

| ELECTRICAL PERFORMANCE | |
|-------------------------------|-----------------------|
| Model | JK48V100PRO |
| Nominal Voltage | 51.2 V |
| Nominal Capacity | 100 Ah |
| Energy | 5120 Wh |
| Resistance | < 50mΩ |
| Self Discharge | < 3% |
| Cells | 16 x 3.2V 100Ah Cells |

| CHARGE PERFORMANCE | |
|----------------------------|-------------------------|
| Recommended Charge Current | 20 A |
| Maximum Charge Current | 100 A |
| Recommended Charge Voltage | 57.6 V (3.6 V/Cell) |
| BMS Charge Cut-Off Voltage | > 59.2 V (3.7 V/Cell) |
| Reconnect Voltage | < 54.08 V (3.38 V/Cell) |
| Balancing Voltage | > 54.4 V (3.4 V/Cell) |

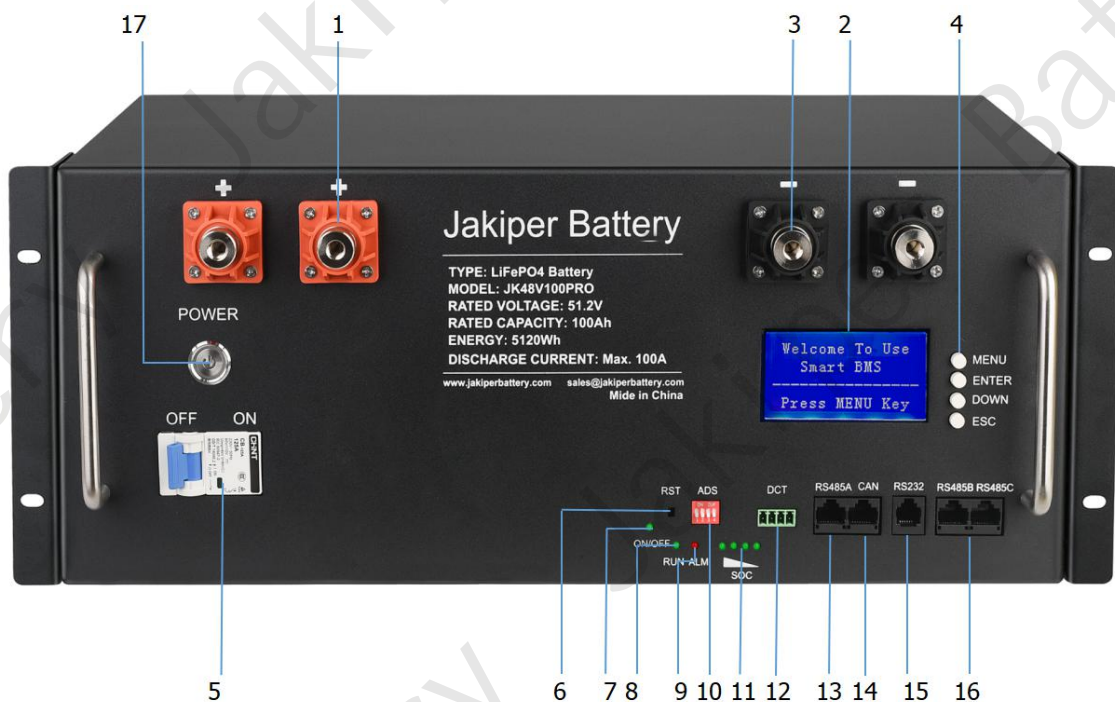
| DISCHARGE PERFORMANCE | |
|--------------------------------------|------------------------------|
| Maximum Continuous Discharge Current | 100 A |
| BMS Discharge Current High Warning | 125 A |
| BMS Discharge Cut-Off Current | 130 A (1000ms) |
| Low Voltage Warning | 44.8 V (2.8 V/Cell*16) |
| BMS Discharge Cut-Off Voltage | <40 V (1 s) (2.5 V/Cell*16) |
| Reconnect Voltage | >46.4 V (2.9 V/Cell) |
| Short Circuit Protection | 300 μs |

| MECHANICAL PERFORMANCE | |
|-------------------------------|--|
|-------------------------------|--|

| | |
|-----------------------------|------------------------------------|
| Dimension (LxWxH) | 17.4 x 15.7 x 8.7" (442x400x221mm) |
| Approx. Weight | 99 lbs (45 Kg) |
| Terminal Type | M8x4 |
| Terminal Torque | 106 ~ 132 in-lbs (12 ~ 15 N·m) |
| Case Material | Steel |
| Recommended Connection Wire | 6 AWG |

| TEMPERATURE PERFORMANCE | |
|--------------------------------|-------------------------------|
| Temperature Sensor Quantity | 6 pcs |
| Discharge Temperature | - 4 ~ 140 °F (- 20 ~ 60 °C) |
| Charge Temperature | 23 ~ 131 °F (- 5 ~ 55 °C) |
| Storage Temperature | 23 ~ 95 °F (- 5 ~ 35 °C) |
| BMS High Temperature Cut-Off | 149 °F (65 °C) |
| Reconnect Temperature | 140 °F (60 °C) |

2.3 Panel View



| No. | Description | Functional Description |
|-----|---------------------------------|-------------------------------------|
| 1 | Battery + | Positive Terminal |
| 2 | LCD | Display Screen |
| 3 | Battery - | Negative Terminal |
| 4 | LCD Key | LCD Operated Button |
| 5 | MCB | Output ON/OFF |
| 6 | Reset key | On/OFF Button |
| 7 | ON/OFF LED | Battery ON/OFF Indicator LED |
| 8 | RUN | Battery Running Signal |
| 9 | ALM LED | Alarm Indicator Light Blinking |
| 10 | ADS | Battery Address Dip Switch |
| 11 | SOC | Battery Remain Capacity Indication |
| 12 | DCT | 2 x Dry Contacts Output |
| 13 | RS485A connection port | RS485 Communication to Inverter |
| 14 | CAN connection port | CAN Communication to Inverter |
| 15 | RS232 connection port | RS232 Communication to PC |
| 16 | RS485B & RS485C connection port | Battery Internal Communication Port |
| 17 | Power Key | On/Off BMS |

2.4 General

2.4.1 Power & RST Key

| | |
|-----------|---|
| Power Key | On/Off BMS |
| RST Key | In the non-standby state of BMS, press the key for 10S, until all LED light up for reset. |

2.4.2 Breaker

Battery positive loop equipped with breaker, rated 125A, able to operate in DC system, designed for isolating positive while do wiring, also acting as secondary protection in addition to Smart BMS protection.

2.4.3 ADS (Address)

Dip switch settings for multiple batteries. While connecting to inverter the master battery address normally set as 1 (or ON OFF OFF OFF), and auxiliary packs set as per below table.

| Address | DIP switch position | | | | Note |
|---------|---------------------|-----|-----|-----|------------------|
| | #1 | #2 | #3 | #4 | |
| 0 | ON | OFF | OFF | OFF | stand-alone use |
| 1 | ON | OFF | OFF | OFF | master Pack |
| 2 | OFF | ON | OFF | OFF | Auxiliary Pack1 |
| 3 | ON | ON | OFF | OFF | Auxiliary Pack2 |
| 4 | OFF | OFF | ON | OFF | Auxiliary Pack3 |
| 5 | ON | OFF | ON | OFF | Auxiliary Pack4 |
| 6 | OFF | ON | ON | OFF | Auxiliary Pack5 |
| 7 | ON | ON | ON | OFF | Auxiliary Pack6 |
| 8 | OFF | OFF | OFF | ON | Auxiliary Pack7 |
| 9 | ON | OFF | OFF | ON | Auxiliary Pack8 |
| 10 | OFF | ON | OFF | ON | Auxiliary Pack9 |
| 11 | ON | ON | OFF | ON | Auxiliary Pack10 |
| 12 | OFF | OFF | ON | ON | Auxiliary Pack11 |
| 13 | ON | OFF | ON | ON | Auxiliary Pack12 |
| 14 | OFF | ON | ON | ON | Auxiliary Pack13 |
| 15 | ON | ON | ON | ON | Auxiliary Pack14 |

2.4.4 DCT(Dry Contacts)

Dry Contacts are mostly unused, but for communication with some non-smart systems please see the table below. Working current should be less than 2A, mainly to connect with an external indicator light or buzzer.


| | |
|--------------|---|
| PIN1 to PIN2 | Always open, will close with low battery signal |
| PIN3 to PIN4 | Always Open, will close with fault/protection signal. |



1 2 3 4

2.4.5 RS485A&CAN (RJ45 Connector)

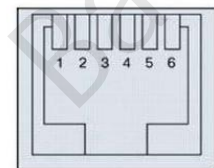
RS485A and CAN ports are configured to connect with inverter. Some inverter communicate through RS485, and some of the inverter designed to communicate through CAN.

|  | BMS RS485A Port RJ45 Connector | BMS CAN Port RJ45 Connector |
|---|--|---------------------------------------|
| Pin No. | Definition | Definition |
| 1 | B | -- |
| 2 | A | -- |
| 3 | GND | -- |
| 4 | -- | CANH |
| 5 | -- | CANL |
| 6 | -- | -- |
| 7 | -- | -- |
| 8 | -- | -- |

2.4.6 RS232 (RJ12 Connector)

RS232 (RJ12 Connector) Port are used for programming and retrieving information via PC only and must be left open. The port and standard USB-RS232-RJ12 definition as below table.

| Definition | RS232 Connector(9Pin) | RJ12 Port (6Pin) | Definition |
|-------------|-----------------------|------------------|--------------|
| PC Receive | Pin 2 | Pin3 | BMS Transmit |
| PC Transmit | Pin 3 | Pin4 | BMS Receive |
| GND | Pin 5 | Pin2,5 | GND |
| NC | | | NC |



2.4.7 RS485B&RS485C (RJ45 Connector)

When installing more than one battery in parallel, a standard RJ45 patch network cable will be required for internal-battery communication. These cables will need to be connected to port RS485B or RS485C between all the connected batteries. The ports are paralleled therefore any port can be used for in or out connection.

2.4.8 Positive & Negative Terminal

Battery has 2 positive terminals, internal connected together. 2 negative terminals, internal connected together.

2.5 Buzzer Operation (Optional)

| Model | Description and Status |
|------------|--|
| Fault | Buzzing 0.25S per 1Sec |
| Protection | Buzzing 0.25S per 2Sec (expect for over-charge protection) |
| Alarm | Buzzing 0.25S per 3Sec (expect for over-charge alarm) |

NOTE: Buzzer function can be set by monitor software, the default is off.

Note: Circuit breaker of battery circuit is set to OFF, connect it to switch power supply, and output voltage of switch power supply is set to (51.2V)56-58.4V, current set to 0.2C; after all settings done, switch the circuit breaker ON

2.6 LED Indicators

LED Indicators:

There are 6 LEDs on upper panel to show the battery working status:

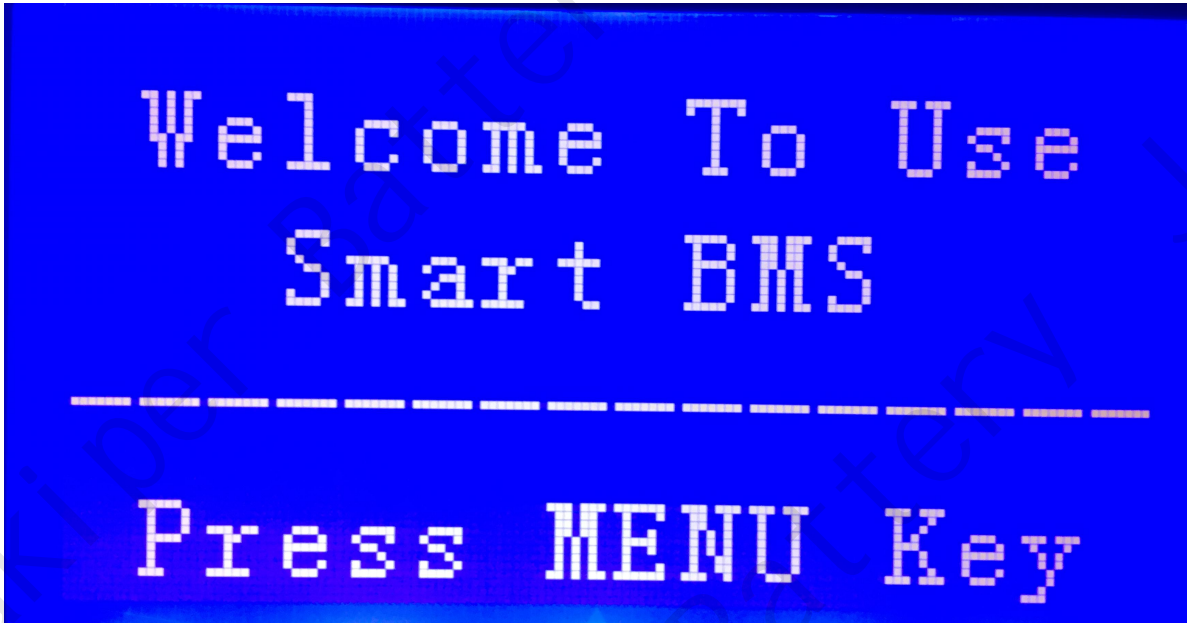
| Pack Status | Normal/Alarm/Protection | RUN | ALM | SOC Indication LED | | | | Remark |
|-------------|---|---------|---------|--------------------|-----|-----|-----|--|
| | | ● | ● | ● | ● | ● | ● | |
| Power Off | Sleep | OFF | OFF | OFF | OFF | OFF | OFF | All OFF |
| Standby | Normal | Flash 1 | OFF | Indication By SOC | | | | Standby |
| | Alarm | Flash 1 | Flash 3 | | | | | Battery Under Voltage |
| Charge | Normal | ON | OFF | Indication By SOC | | | | - |
| | Alarm | ON | Flash 3 | | | | | - |
| | Over Charge Protection | ON | OFF | | | | | -ALM LED is Off When Overcharge Protection |
| | Temperature/Over current protection | OFF | ON | | | | | Stop Charge |
| Discharge | Normal | Flash 3 | OFF | Indication by SOC | | | | - |
| | Alarm | Flash 3 | Flash 3 | | | | | - |
| | Over Discharge Protection | OFF | OFF | | | | | Stop Discharge |
| | Temperature/Over current/Short circuit protection | OFF | ON | | | | | Stop Discharge |
| Fault | | OFF | ON | OFF | OFF | OFF | OFF | Stop Charge & Discharge |

NOTE: LED function can be set by monitor software, the default is on.

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

2.7 Display Function Instruction

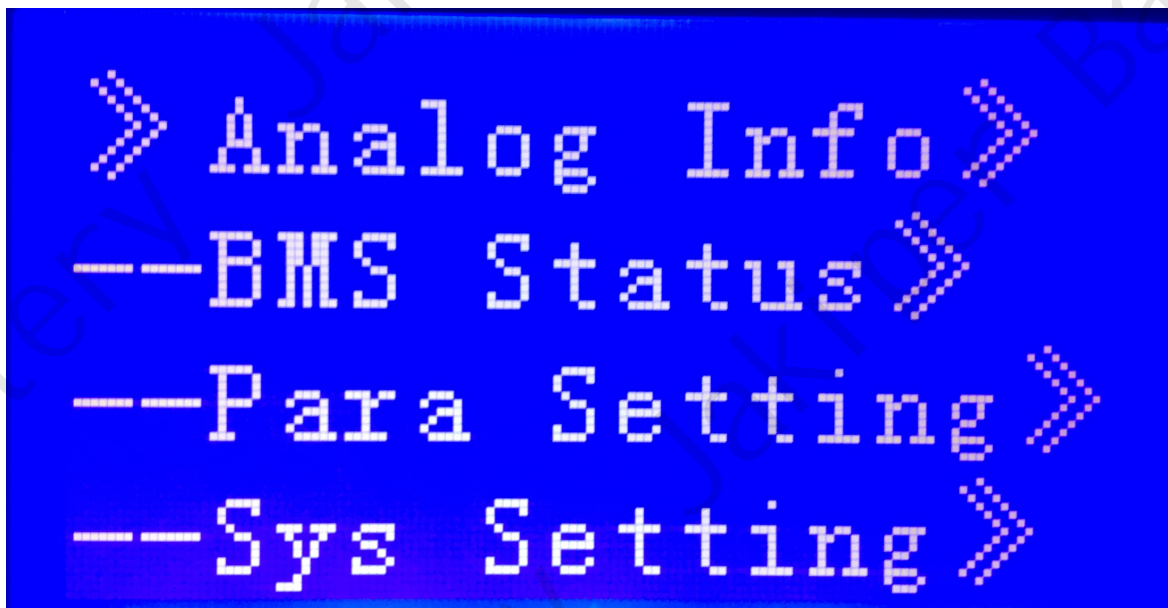
2.7.1 Display Rendering



2.7.2 Functional Specifications

2.7.2.1 Main Menu Page

Electricity / dormancy activated, will show the welcome screen, press the MENU button to enter the main menu page. As shown in the figure below:



2.7.2.2 Battery Parameters Collection Page

When the cursor “»” is point to “Analog Info”,press ENTER key will enter into the page of “Analog Info”,As shown in the figure below:

| | | |
|--|--|--|
| <pre> »PackV: 52.44 V --Im: 0.00 A --Temperature» --Cell Voltage» </pre> | <pre> --T1: 31.2°C --T2: 31.0°C --T3: 32.1°C --T4: 31.0°C </pre> | <pre> --Cell01: 3277 mV --Cell02: 3278 mV --Cell03: 3278 mV --Cell04: 3277 mV </pre> |
| <pre> »CellCapacity» </pre> | <pre> SOC: 20.96 % FCC: 100.0AH Rm : 20.9AH CC : 0 </pre> | |

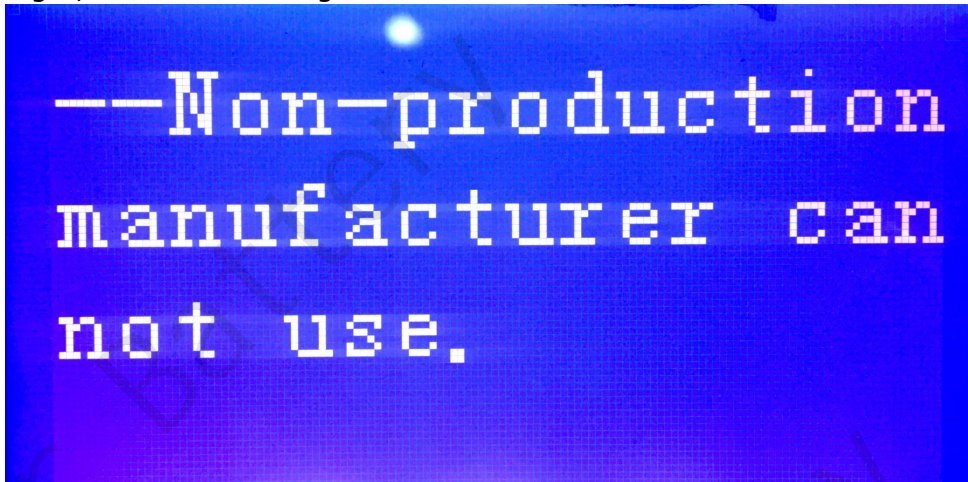
2.7.2.3 Battery Status Page

When the cursor “»” is point to “BMS Status”,press ENTER key will enter into the page of “BMS Status”,As shown in the figure below:

| | | |
|--|---|---|
| <pre> »Status: Idle --Record» --BMS Status» </pre> | <pre> »SCP: 5 --O/UTP: 0 --OCP: 0 --UVP: 4 </pre> | <pre> »OVP: 1 </pre> |
| <pre> »OT : N --OTP: N --OV: N --OVP: N </pre> | <pre> »UV : N --UVP: N --OC: N --OCP: N </pre> | <pre> »SCP: N --Failure: N </pre> |

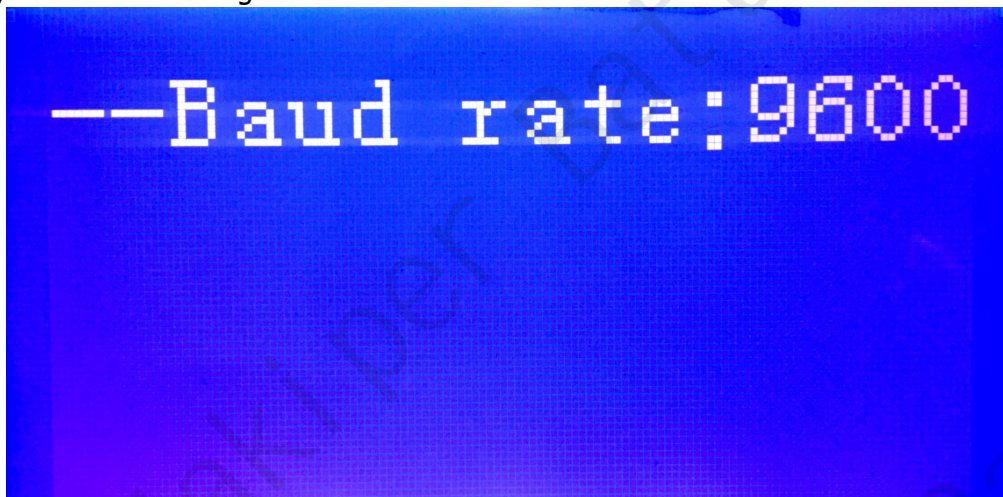
2.7.2.4 Battery Parameters Setting Page

When the cursor “»” is point to “Para Setting” ,press ENTER key will enter into the page of “Para Setting” ,As shown in the figure below:



2.7.2.5 Battery System Setting Page

When the cursor “»” is point to “Sys setting” ,press ENTER key will enter into the page of “Sys setting” ,As shown in the figure below:



2.7.2.6 Key Description

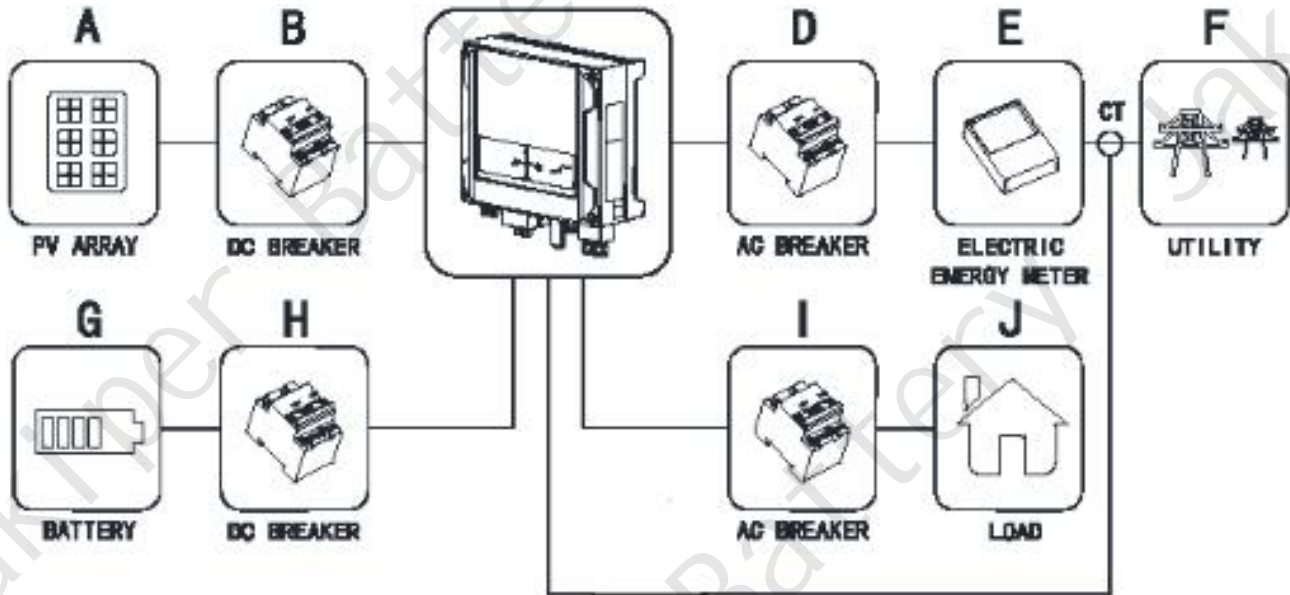
- 1) SW1----NEMU,SW2----ENTER,SW3----DOWN, SW4----ESC.
- 2) Each item is “»” or “--” as a beginning,among them “»” shows the current cursor position,press UP or DOWN key can move the cursor position; with “»” end of the project,the content of the said project has not shown, press ENTER key can enter the corresponding page.
- 3) Press ESC key can be returned at the next higher level directory; In any position, press NEMU key can return to the main menu page.
- 4) In a dormant state, press any key, can activate the screen.

2.7.2.7 Dormancy/Shutdown

Under normal operation condition, with no keystrokes 1 minutes later, system will enter a state of dormancy/shutdown. Shutdown/dormancy state, press any key, screen can be activated.

3. Safe handling Guide

3.1 System Diagram



3.2 Tools

The following tools are required to install the battery pack:

- Cable Lugs
- Cut Plier
- Crimping Modular Plier
- Screw Driver

NOTE: Use properly insulated tools to prevent accidental electric shock or short circuits. If insulated tools are not available, cover the entire exposed metal surfaces of the available tools, except their tips, with electrical tape.

3.3 Safety Gear

It is recommended to wear the following safety gear when dealing with the battery pack:

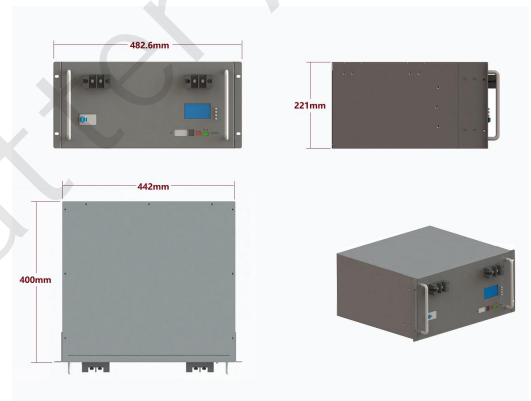
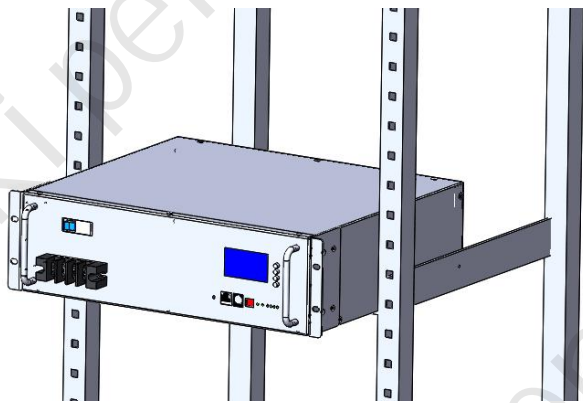
- Insulated gloves
- Safety goggles
- Safety shoes

3.4 Installation

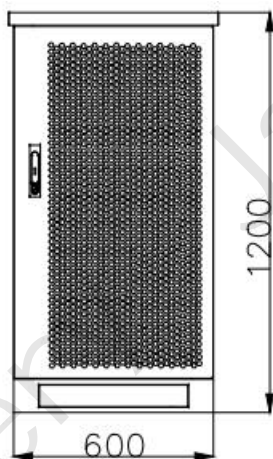
3.4.1 Standard Telecom Server Rack Cabinet Install

Thoroughly inspect the packaging upon receipt of goods. If there is any item that is missing or if there is any damage to the external packaging or to the unit itself upon unpacking, please contact the supplier immediately.

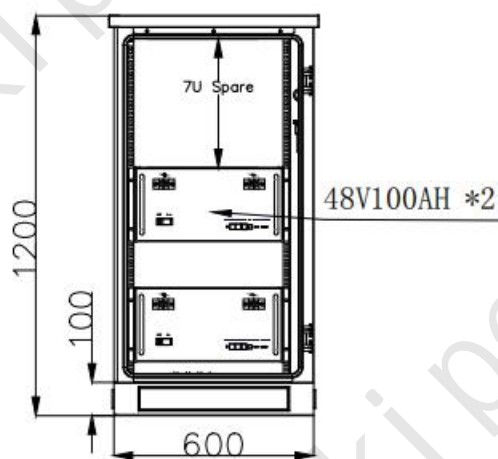
1. Choose suitable standard 19" telecom server rack cabinet.
2. Find side handler and screw in each battery package.
3. Fix side handler and screw on each battery pack.
4. Insert battery pack inside cabinet and complete the wiring.



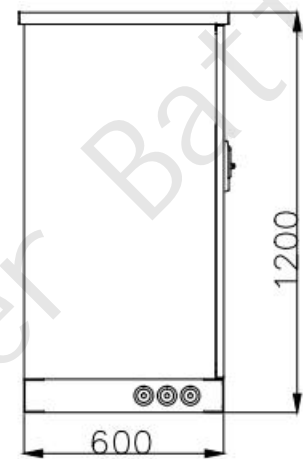
Standard 19"



Front view

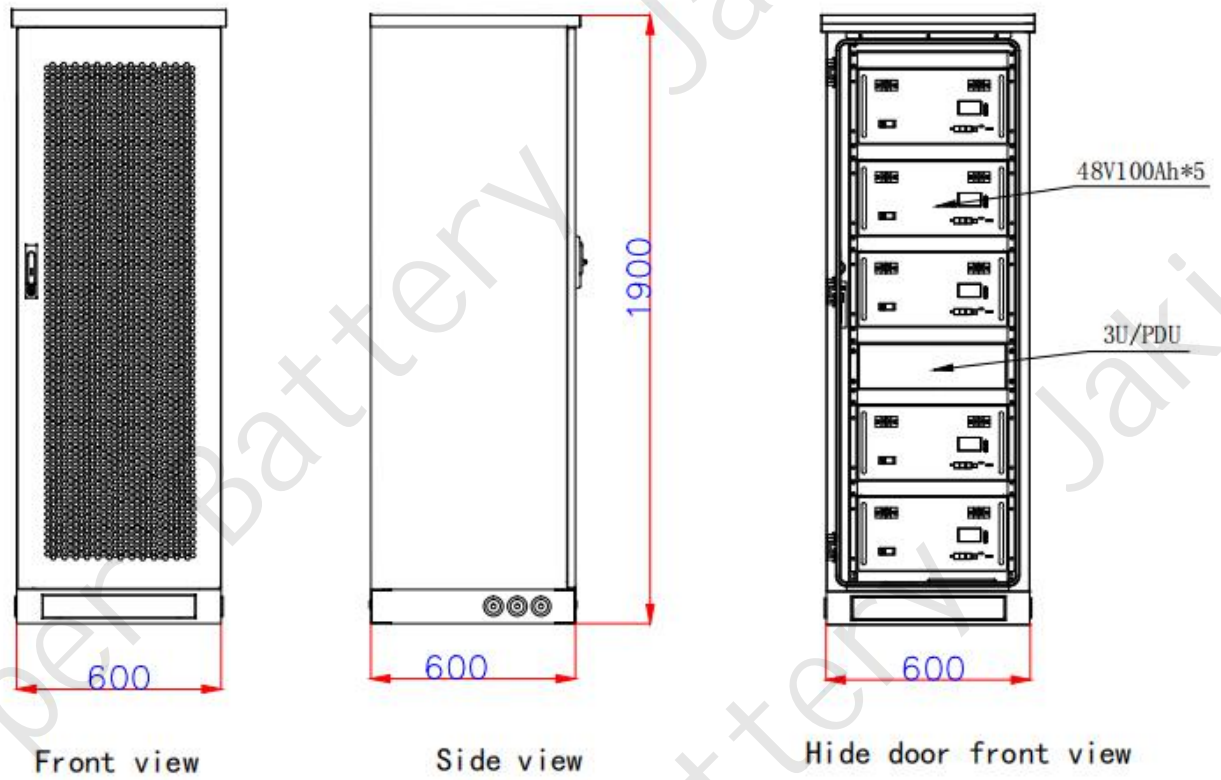


Hide door front view

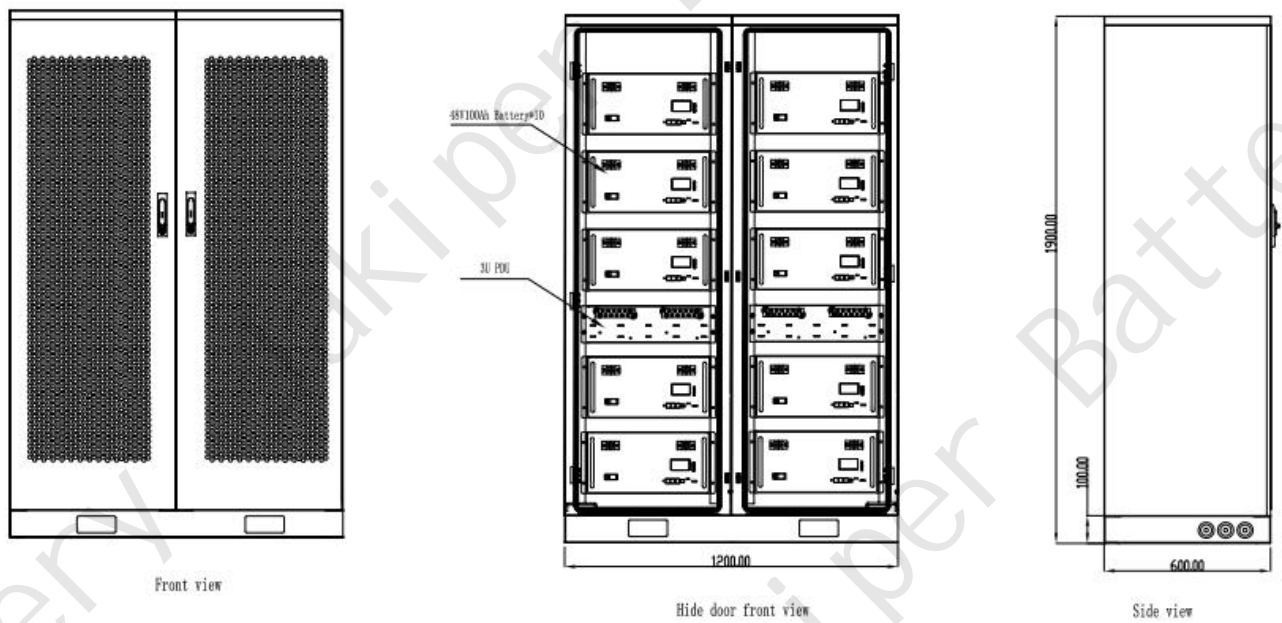


Side view

Example of 200Ah Cabinet Install



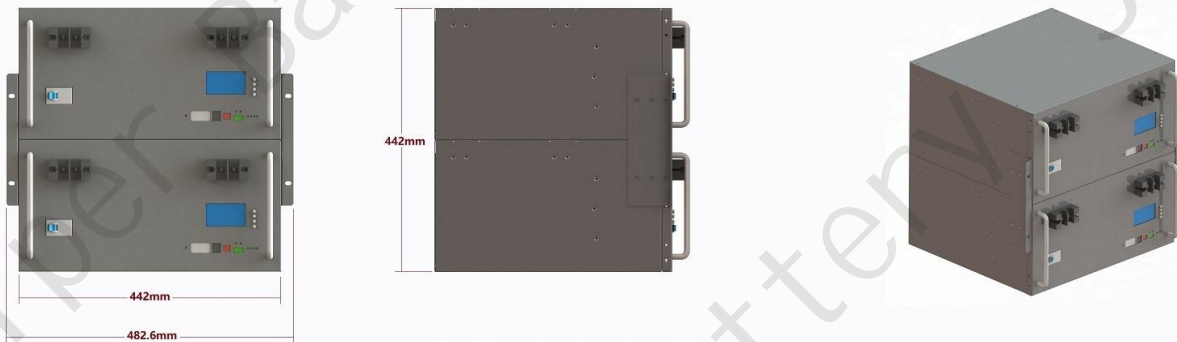
Example of 500Ah Cabinet Install



Example of 1000Ah Cabinet Install

3.4.2 Simple Self Rack Mounted

1. Choose suitable firm table or rack with height greater than 20mm (off the ground).
2. Place battery rack with LCD panel side face forward or upward.
3. Install side handler between each 2 packs with 6 screws each side.
4. Addition available fixture for fix backward of the pack is recommended.



Example of 200Ah Simple Install



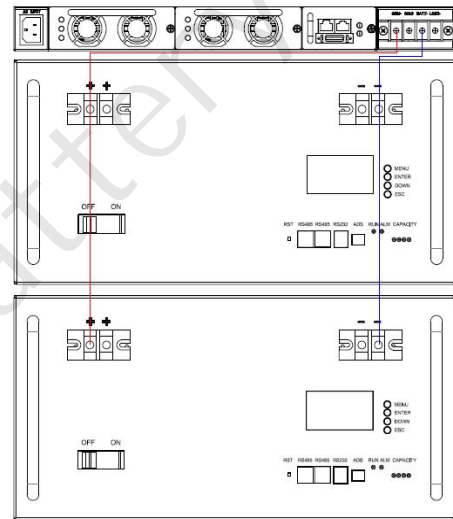
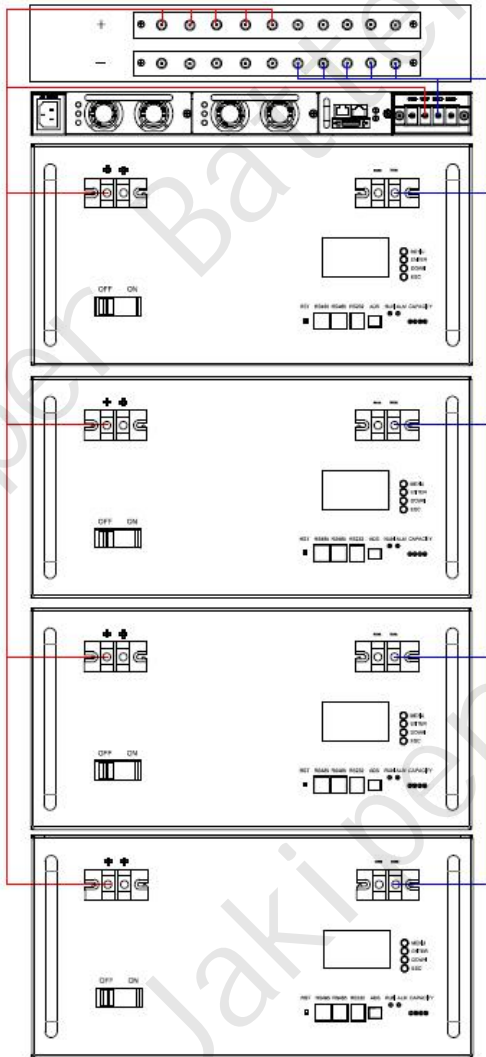
Example of 300Ah Simple Install

NOTE: For above simple installation, each stack no more than 3 packs, consider the weight of the battery.

3.4.3 Battery Parallel Connection

Make sure circuit breaker off before wiring:

- JK48V100 Battery designed for unlimited parallel.



Example of 500Ah and 200Ah Battery Parallel Connection

Note: Do not serial connect battery pack.

3.4.4 Other Wire Connection

Make sure that all the wires connected, then turn on circuit breaker:

- Connect to charger:

Circuit breaker of battery circuit is set to OFF, connect it to charging supply, and output voltage of charge power supply is set to 56-58.4V (16S LiFePO4 Battery Option).

- Connect to inverter:

Circuit breaker of battery circuit is set to OFF, connect it to inverter, and inverter input voltage is set to 44.8-58.4V (16S LiFePO4 Battery Option).

- After all settings done, switch the circuit breaker ON.

3.4.5 Installation Location

Make sure that the installation location meets the following conditions:

- The installation site must be suitable for the size and weight of the battery.
- Must be installed on a firm surface to sustain the weight of battery.
- The area is water proof.
- There are no flammable or explosive materials in proximity.
- The ambient temperature is within the range from 0°C to 45°C.
- The temperature and humidity is maintained at a constant level.
- There is minimal dust and dirt in the area.
- Installation must be vertical or tilted backwards by maximum 15° - avoid forward or sideways tilt.

4. Software & Communication

4.1 USB-RS232-RJ12 Driver Installation

To use USB-RS232-RJ12 connect PC and use PC software, a driver should be installed.

Follow steps as below(or check in Jakiper Website Blog):

- ❖ Download driver from product download tag.
- ❖ Un-Zip Files.
- ❖ Plug in USB-RS232-RJ12 to PC.
- ❖ PC>Device Manager>Find ? mark device>Right click>update driver>update driver from un-zipped files folder.
- ❖ Refresh PC>Device Manager to Verify

4.2 PC Software Installation

To use USB-RS232-RJ12 connect PC and use PC software, a BMS APP should be installed on PC.

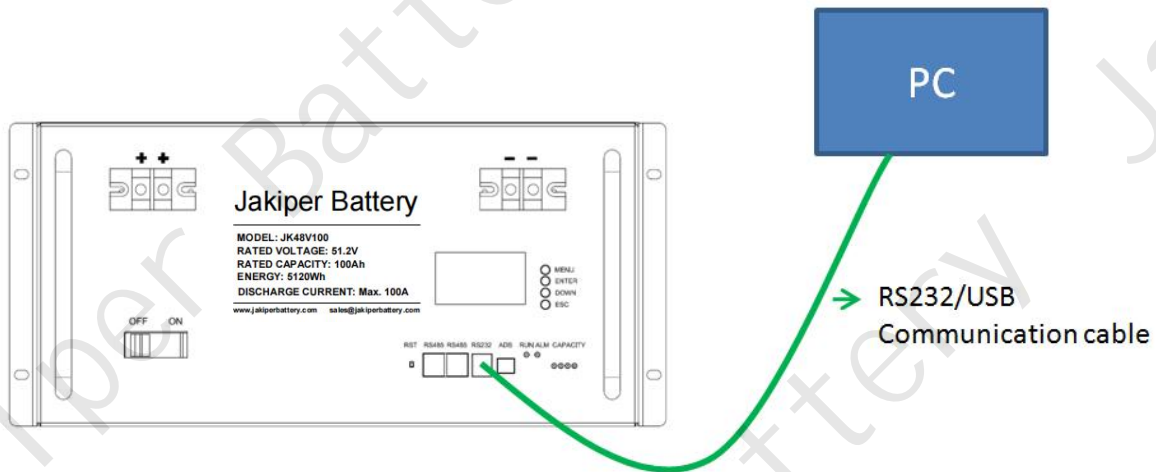
Follow steps as below(or check in Jakiper Website Blog):

- ❖ Download software V2.50 from product download tag.
- ❖ Un-Zip Files.
- ❖ Open software.
- ❖ Plug in RS232 wire.
- ❖ Open communication port.
- ❖ Start Monitoring.

4.3 BMS & Inverter Communication Setup

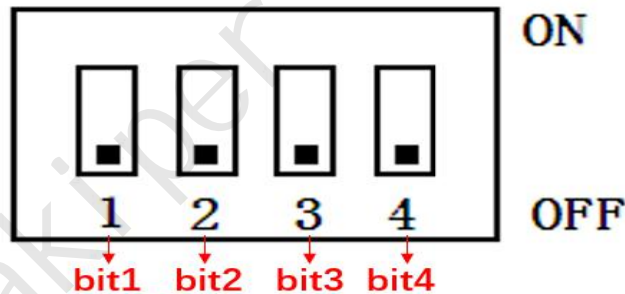
4.3.2 Communicate With PC/Software

4.3.2.1 Single Battery Communicate with PC/Software



4.3.2.2 Batteries Parallel Communicate with PC/Software

While battery in parallel communication, dial-up addresses of battery are different.

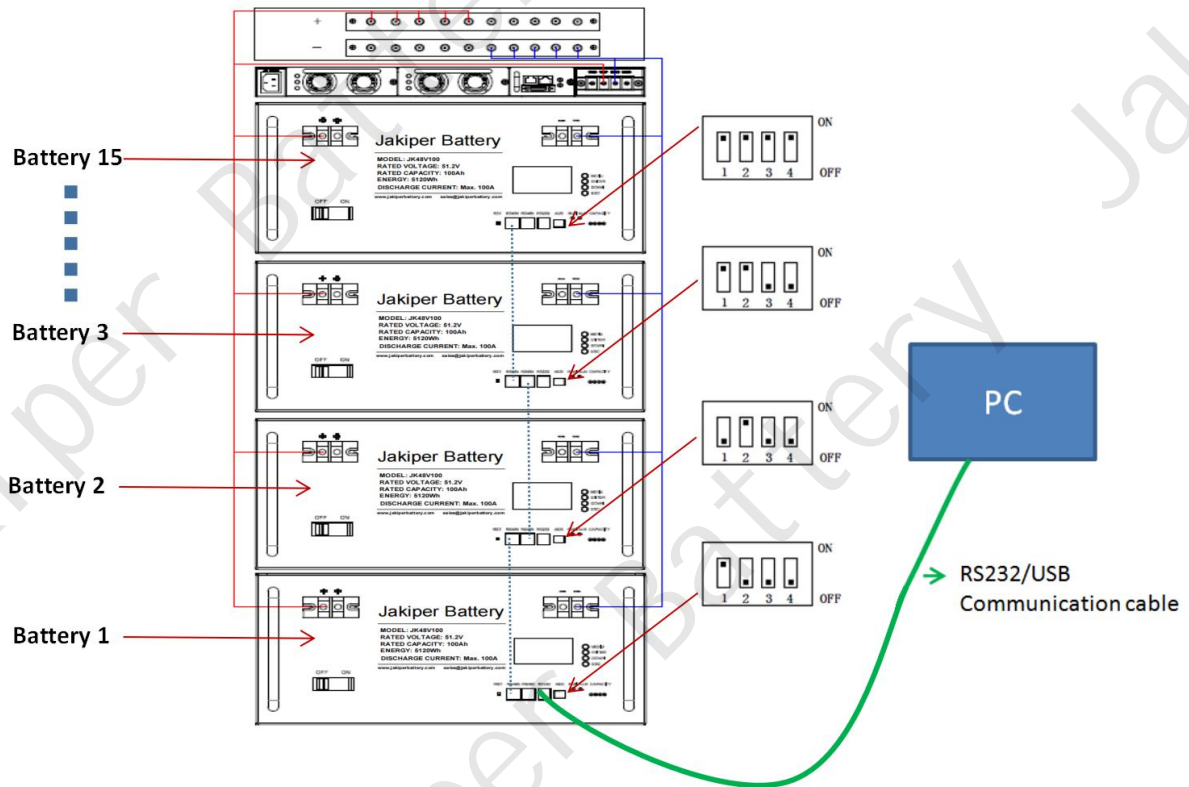


| Address | Dial Switch | | | | Remark |
|---------|-------------|-------|-------|-------|------------|
| | bit1 | bit2 | bit3 | bit4 | |
| 1 | ON | OFF | OFF | OFF | Battery 1 |
| 2 | OFF | ON | OFF | OFF | Battery 2 |
| 3 | ON | ON | OFF | OFF | Battery 3 |
| 4 | OFF | OFF | ON | OFF | Battery 4 |
| 5 | ON | OFF | ON | OFF | Battery 5 |
| | | | | | |
| 14 | OFF | ON | ON | ON | Battery 14 |
| 15 | ON | ON | ON | ON | Battery 15 |

Note: The range of batteries' address bit1-bit4 is 1-15.

Battery internal communication use standard internet cable connect though RS485B & RS485C ports.

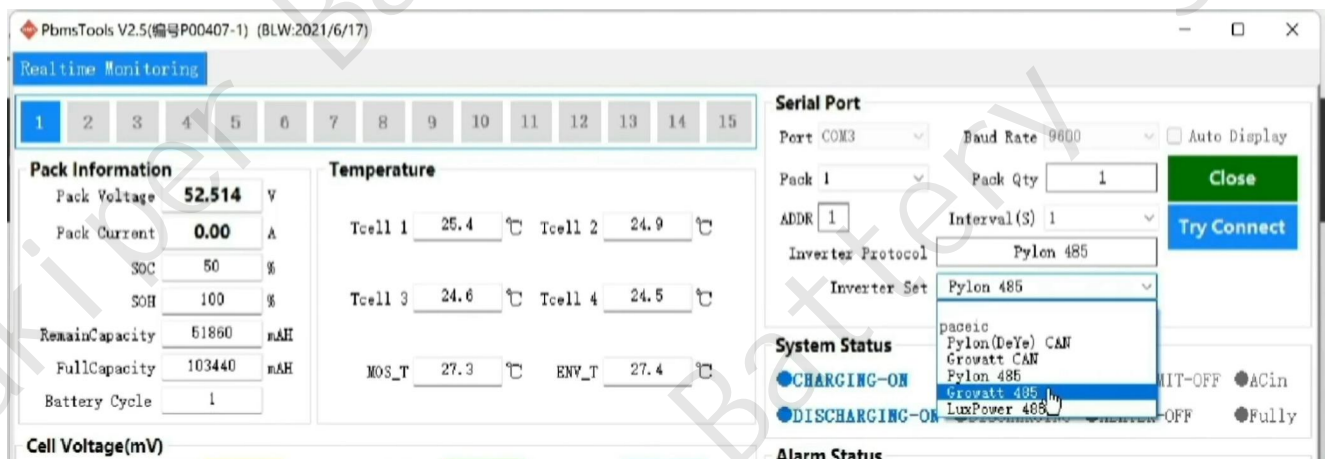
For example:15 sets batteries in parallel communicated with PC/software as below:



4.3.3 Communicate With Inverter (Optional)

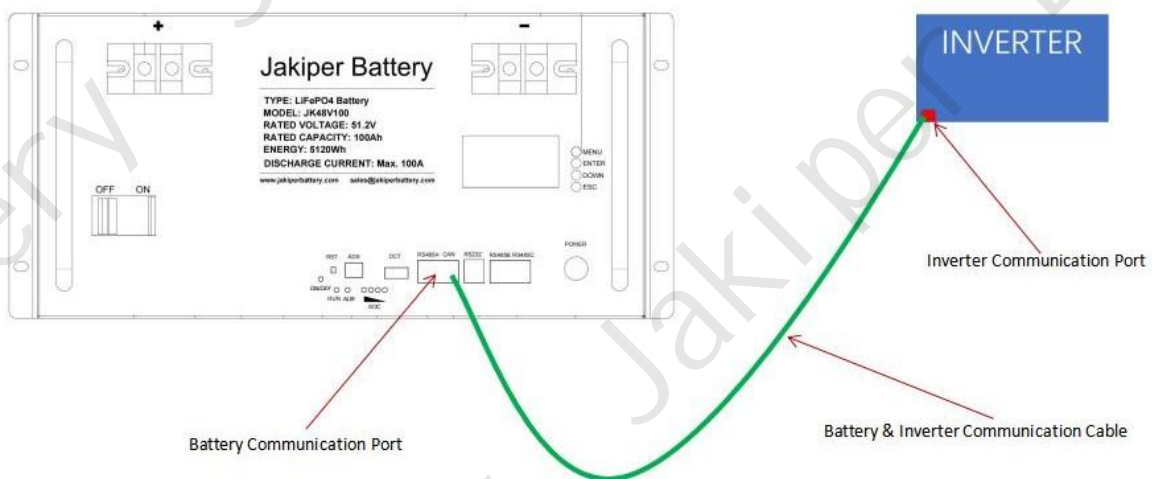
Step 1: Communication Protocol Select

- ❖ BMS pre-loaded with many brand inverter protocol, select the correct protocol as per brand & model of the inverter been used.
- ❖ Different model inverters from same brand/company may use different protocol, detailed setting please check Jakiper latest published videos.



Step 2: Connect BMS & Inverter Communication Cable

- ❖ If communicated with MPP/LUX inverter, please connected with RS485 port of battery.
- ❖ If communicated with GROWATT/DEYE/VICTRON inverter, please connected with CAN port of battery.



Step 3: ADS Setting

- ❖ The master battery ADS address set to 1 (or ON OFF OFF OFF), slave batteries set as per 4.3.2.2

Step 4: Inverter Setting

- ❖ Inverter battery type select as 'Li'
- ❖ Inverter battery communication protocol select as per inverter manual and refer to Jakiper latest published videos.

5. Troubleshooting

If the battery does not operate correctly, please solve the problem by using the table below.

| Symptom | Possible cause | Remedy |
|--|------------------------------------|--|
| All reading 0, and all temperature sensors -40 | Anti-Theft Protected | Contact Tech support |
| RST Key no response press 0-10s | RST Key Damage | Contact Tech support |
| No indication and alarm in the front display panel | Sleeping mode | Press Reset to normal mode |
| No indication and alarm in the front display panel even Reset still no | Battery voltage too low | Charge battery immediately |
| Red LED Flashing when Standby | Battery cell low voltage | Charge battery immediately |
| Red LED Flashing when charging | Alarm for protection when charging | BMS show alarm, protect and adjustment |
| Red LED Flashing when Discharging | Battery too low and will shutdown | Charge battery immediately |
| RED LED Lighting continuous | Battery wrong | Need to repair |

6. Storage and Maintenance

6.1. Storage

Before storing, charge the battery at least 7 hours. Store the Battery covered and upright in a cool, dry location. Recommend long-term storage temperature is 15°C -25°C . During storage, recharge the battery in accordance with the following table:

| Storage Temperature | Recharge Frequency | Charging Duration |
|---------------------|--------------------|-------------------|
| 0°C - 40°C | Every 3 months | 1-2 hours |

6.2. Maintenance



The battery system operates with hazardous voltages. Repairs may be carried out only by qualified maintenance personnel.



Even after the unit is disconnected from the mains, components inside are still connected to the battery cells which are potentially dangerous.



Before carrying out any kind of service and/or maintenance, disconnect the batteries and verify that no current is present and no hazardous voltage exists in the terminals.



Only persons are adequately familiar with batteries and with the required precautionary measures may replace batteries and supervise operations. Unauthorized persons must be kept well away from the batteries.



Verify that no voltage between the battery terminals and the ground is present before maintenance or repair. In this product, the battery circuit is not isolated from the input voltage. Hazardous voltages may occur between the battery terminals and the ground.



Batteries may cause electric shock and have a high short-circuit current. Please remove all wristwatches, rings and other metal personal objects before maintenance or repair, and only use tools with insulated grips and handles for maintaining or repairing.



When replace the batteries, install the same number and same type of batteries.



When replace the parallel batteries, make sure the new battery is full charged.



Do not open or destroy batteries. Escaping electrolyte can cause injury to the skin and eyes. It may be toxic.

7 Product Responsibilities and Consulting

- 1) We will not be liable for the accidents resulting from operation breaking this specification and user manual.
- 2) We will not send separate notice, provided that the contents of this specification are changed due to improvement of product quality or technological upgrading; provided that you want to understand the latest information of this product, please contact us.
- 3) The shelf life of this product is within 24 months after it is delivered; we will maintain the product, which is in the warranty period for free of charge, provided that it has any product quality problems within the specified operation range; we may replace the relevant parts, if we fail to maintain it, so as to achieve the purpose of sustainable use without performance reduction; our after-sales service personnel will propose the specific maintenance and troubleshooting methods.
- 4) In case of any questions, please contact us
 - For getting fast reply, you could join in our facebook group:
<https://www.facebook.com/groups/jakiperbattery>
Post your questions in this Facebook group.
 - Or if you don' t have a facebook account, please drop us an email to:
sales@jakiperbattery.com
If no reply in 24 hours, you could check the spam folder or send an reminder.

