



# USER MANUAL OF

PowerBase X16

ZR-PBX16

OUR ENERGY WORKS FOR YOU



Zhongrui Green Energy Technology (Shenzhen) Co., Ltd.

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# Zhongrui Green Energy Technology (Shenzhen) Co., Ltd.

ZRGP is a national high-tech enterprise with a global vision. With independent research and development capabilities and focus on ESS solutions, ZRGP is becoming a world leading supplier of BMS, ESS, modules and monitoring systems. Our business scope integrates R&D, design, production and sales.

Headquartered in China, with multiple sales offices, product centers, factories, and wholly-owned subsidiaries around the world, ZRGP is committed to providing you with safe, lightweight and long-life green energy products.



ZRGP's industrial park boasts comprehensive facilities, including automated intelligent production lines, testing and aging sections, warehouse areas, office spaces, employee dormitories, cafeteria etc. A majority of the production and testing equipment possessed by the company is imported from Germany, whose advanced level and automation level are on the cutting edge of the industry.

**21000m<sup>2</sup>**

Factory Area

**3GWh**

Per Year

**90+**

Countries We Export To

## Company Advantages

- Years of research and development experience
- Sales and after-sales outlets all over the world
- Highly information-based automated factory
- Scientific production process control ability



To produce world-class energy storage products  
To serve the consumers in the global market

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# 1.Introduction

The purpose of this reference manual is to describe the Power Base X16 components, its functions, and the environment in which it can be operated properly. So that the user can understand the use scope and provide the necessary information for maintenance of the Power Base X16 when they need to.

## 1.1. Lithium iron phosphate Battery

The lithium iron phosphate battery is an energy storage product. It can be used to support reliable power for various types of equipment and systems. The product especially suitable for applications of high power, limited installation space, and restricted load-bearing and long cycle life. The lithium iron phosphate battery (LiFePO<sub>4</sub> or LFP) is the safest of the mainstream lithium battery types.

LFP is the chemistry of choice for very demanding applications. Some of its features are:

- ◆ Rugged - It can operate in deficit mode during long periods of time.
- ◆ For use in residential dwelling units and commercial buildings, indoor and outdoor.
- ◆ High round trip efficiency.
- ◆ High energy density - More capacity with less weight and volume.
- ◆ High charge and discharge currents - Fast charge and discharges are possible.
- ◆ Flexible charge voltages.
- ◆ The whole module is non-toxic, pollution-free, and environment-friendly.
- ◆ Cathode material is made from LiFePO<sub>4</sub> with safety performance and long cycle life.

## 1.2. Power Base X16

Multiple battery stacks are allowed to be connected in parallel to expand capacity and power to meet the requirements of longer power supporting duration and higher power consumption. A single LFP cell has a nominal voltage of 51.2V.

Power Base X16 has a built-in BMS battery management system, which can manage and monitor cell's information including voltage, current and temperature.

- ◆ Battery management system (BMS) has protection functions including over-discharge, over-charge, and over-current and high/low temperature.
- ◆ The system can automatically manage charge and discharge state.
- ◆ Flexible configuration, multiple battery modules can be internal for expanding voltage and Capacity.
- ◆ Adopted self-cooling mode rapidly reduced system entire noise.
- ◆ The module has less self-discharge, up to 3 months without charging it on shelf, no memory effect, excellent performance of shallow charge and discharge.
- ◆ Working temperature range is from -20°C to 55°C, (Charging 0°C~55°C, discharging -20°C~55°C) with excellent discharge performance and cycle life.
- ◆ Small volume, light weight, plug-in embedded design module, easy to install and maintain

## 2. Safety Precautions

It is very important and necessary to read the user manual carefully (in the accessories) before installing or using battery. Failure to do so or to follow any of the instructions or warnings in this document can result in electrical shock, serious injury, or death, or can damage battery, potentially rendering it inoperable.



Observe these instructions and keep them located near the Li-ion Battery for future reference.



For more information about this product, please contact the



Work on a Li-ion Battery should be carried out by qualified personnel only.

### 2.1. General warnings



While working on the Li-ion Battery wear protective eyeglasses



Any uncovered battery material such as electrolyte or powder on the skin or in the eyes must be flushed with plenty of clean water immediately. Then seek medical assistance. Spillages on clothing should be rinsed out with water.



Explosion and fire hazard. Terminals of the Li-ion Battery are always alive; therefore, do not place items or tools on the Li-ion Battery. Avoid short circuits, too deep discharges, and too high charge currents. Use insulated tools. Do not wear any metallic items such as watches, bracelets, etc. In case of fire, you must use a type D, foam, or CO2 fire extinguisher.



Do not open or dismantle the battery. Electrolyte is very corrosive. In normal working conditions contact with the electrolyte is impossible. If the battery casing is damaged do not touch the exposed electrolyte or powder because it is corrosive.



Li-ion batteries are heavy. If involved in an accident, they can become a projectile! Ensure adequate and secure mounting and always use suitable handling equipment for transportation.



Handle with care because an ion battery is sensitive to mechanical shock.



Do not expose cable outside, all the battery terminals must be disconnected.



Please use caution when it's placed around children or pets.



Do not use cleaning solvents to clean battery.



Do not expose battery to flammable or harsh chemicals or vapors.





Do not paint any part of battery; include any internal or external.



Do not drop, deform, impact, cut or spearing with a sharp object.



Do not wet the battery and avoid of direct sunlight.



Do not use a damaged battery.



Please contact the supplier within 24 hours if there is something abnormal.



Any foreign object is prohibited to insert into any part of battery.



The warranty claims are excluded for direct or indirect damage due to items above.



Recharge and maintain the battery pack regularly every three months to ensure the battery is in the best condition.  
Don't store the battery at 0% SOC for over one month, this may result in permanent damage to the battery and violet the warranty.



It is prohibited to connect the battery with different type of battery.



It is prohibited to put the batteries working with faulty or incompatible inverter.



It is prohibited to disassemble the battery (QC tab removed or damaged).



Please do not open, repair, or disassemble the battery except trained technicians. We do not undertake any consequences or related responsibility which, because of violation of safety operation, or violation of design, production, and equipment safety standards.

## 2.2. Charge and discharge warnings



If the battery is stored for a long time, it is required to charge them every three months, and the SOC should be no less than 90%.



Battery needs to be recharged within 12 hours, after fully discharged.



Do not connect battery with PV solar wiring directly.



Use only with BMS approved by the supplier.



If charged after the Lithium Battery was discharged below the “Discharge cut-off voltage”, or when the Lithium Battery is damaged or overcharged, the Lithium Battery can release a harmful mixture of gasses such as phosphate.



If the battery system needs to be moved or repaired, the power must be cut off and the battery is completely shut down; The battery must be transported in its original or equivalent package and in an upright position. If the battery is in its package, use soft slings to avoid damage.



Do not stand below a battery when it is hoisted.



Never lift the battery at the terminals or the BMS communication cables, only lift the battery at the handles.

## 2.3. Transportation warnings



The temperature range over which the battery can be charged is 0°C to 50°C. Charging the battery at temperatures outside this range may cause severe damage to the battery or reduce battery life expectancy.



The temperature range over which the battery can be discharged is -20°C to 50°C. Discharging the battery at temperatures outside this range may cause severe damage to the battery or reduce battery life expectancy.



Battery packs need to be packed before they can be shipped, during transportation, severe impact, extrusion, direct sunlight and rain should be avoided.

### **NOTE:**

•Batteries are tested according to *UN Handbook of Tests and Criteria, part III, sub section 38.3 (ST/SG/AC.10/11/Rev.5)*.

•For transport the batteries belong to the category *UN3480, Class 9, Packaging Group II* and must be transported according to this regulation. This means that for land and sea transport (*ADR, RID & IMDG*) they must be packed according to packaging instruction *P903* and for air transport (*IATA*) according to packaging instruction *P965*. The original packaging complies with these instructions.

## 2.4. Disposal of lithium batteries



Batteries marked with the recycling symbol must be processed via a recognized recycling agency. By agreement, they may be returned to the manufacturer.



Batteries must not be mixed with domestic or industrial waste.



Do not throw a battery into fire.

## 2.5. Emergency Situations

### (1).Leaking Batteries

If the battery pack leaks electrolyte, avoid contact with the leaking liquid or gas. If one is exposed to the leaked substance, immediately perform the actions described below. Inhalation:

Evacuate the contaminated area and seek medical attention.

Contact with eyes: Rinse eyes with flowing water for 15 minutes and seek medical attention.

Contact with skin: Wash the affected area thoroughly with soap and water and seek medical attention.

Ingestion: Induce vomiting and seek medical attention.

#### (2).Fire

NO WATER! Only dry powder fire extinguisher can be used; if possible, move the battery pack to a safe area before it catches fire.

#### (3).Wet Batteries

If the battery pack is wet or submerged in water, do not allow any person access, and then contact an authorized dealer for technical support.

#### (4).Damaged Batteries

Damaged batteries are dangerous and must be handled with extreme care. They are not suitable for use and may cause danger to persons or property. If the battery pack appears to be damaged, place it in the original container and return it to an authorized dealer.

#### **NOTE:**

- Damaged batteries may leak electrolyte or produce flammable gas.
- In case a damaged battery needs recycling, it shall follow the local recycling regulation to process, and using the best available techniques to achieve a relevant recycling efficiency.

## **2.6. Before Connecting**

- ◆ After unpacking, please check product and packing list first, if product is damaged or lack of parts, please contact with the local retailer.
- ◆ Before installation, be sure to cut off the grid power and make sure the battery is in the turned-off mode.
- ◆ Wiring must be correct, do not mistake the positive and negative cables, and ensure no short circuit with the external device.
- ◆ It is prohibited to connect the battery and AC power directly.
- ◆ The embedded BMS in the battery is designed for 48V DC, please DO NOT connect battery in series.
- ◆ Battery system must be well grounded, and the resistance must be less than 100mΩ.
- ◆ Make sure the grounding connection set correctly before operation.
- ◆ Please ensure the electrical parameters of battery system are compatible to related equipment.
- ◆ Keep the battery away from water and fire.



## 3.Component's introduction and Daily usage

### 3.1. Whole Cluster

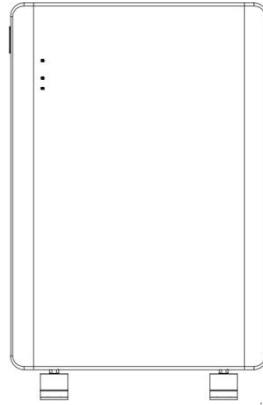
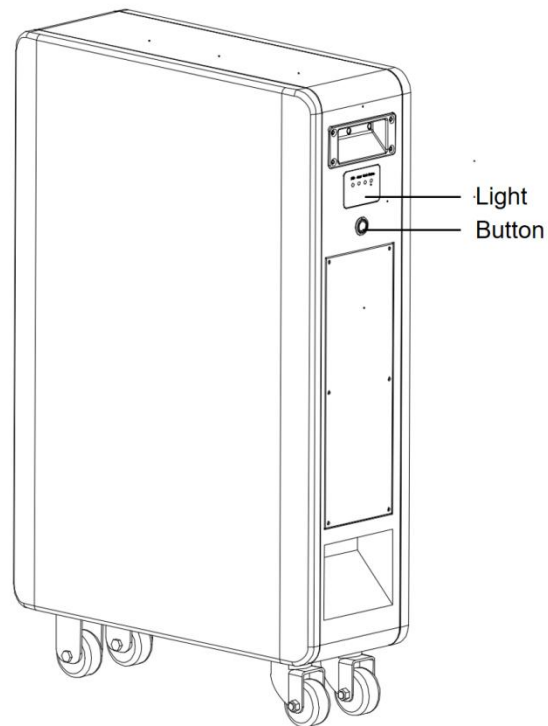


Figure 3.1. Overall system diagram of battery modules

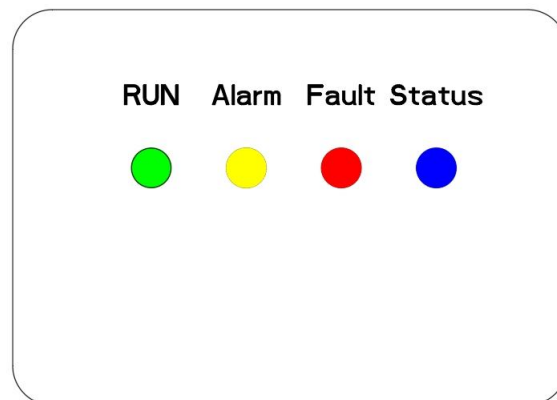
The form below is for Power Base X16.

No.	Items	Parameters	
1	Model	ZR-Power Base X16	
2	Battery Module Chemistry	LiFePO4	
3	Nominal Capacity (Ah)	314	
4	Nominal Energy(kWh)	16	
5	Voltage	Nominal(V)	51.2
		Recommend Charging(V)	56.8
		Max. Charging(V)	58.4
		Discharge Cut-off(V)	43.2
6	Current	Max. Charging(A)	190
		Max. Discharging(A)	190
7	Weight (Approx.)	278lbs	
8	Dimensions(L*H*W)	200*800 *560mm@24.0 kwh (Each module has a height of 163.5mm)	
9	Communication	RS485, CAN, RS232	
10	Cycle Life	8000@25% °C	
11	Designed Calendar Life	≥10 years	
12	Safety Function	Over-charge, Over-discharge, Over-current, Low/High-temperature, Low-voltage, Short-circuit Protections	
13	Parallel Capability	Maximum 15 Cluster (Recommended 8 Cluster)	

## 3.2. Light and Button



### 3.2.1. Light

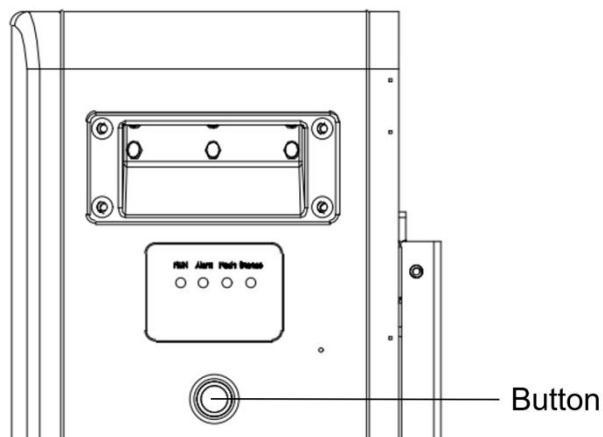


The specific lights and their functions are shown as below.

No.	Item	Colour	Condition
1	RUN	Green	Device shut down:Power off
			Device disconnect router:Always on
			Device has connected router:0.5s on,0.5s off
			Device has connected Cloud Platform:0.5s on,1.5s off
2	Alarm	Yellow	No alarm or shut down:Power off
			Alarm:Always on

3	Fault	Red	No protection or fault:Power off
			Protective firing:0.5s on,0.5s off
			Fault triggering:Always on
4	Status	Blue	Standing:Always on
			Charge: 0.5s on,0.5s off
			Discharge:0.5s on,1.5s off
			Shut down:Power off

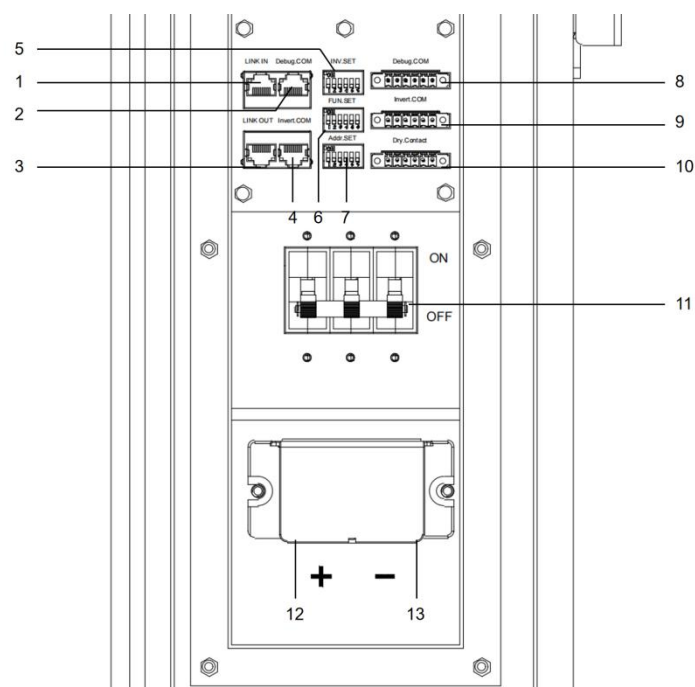
### 3.2.2. Button



(1)The switch button location is shown in the picture.

(2)Tap the switch to activate the battery.

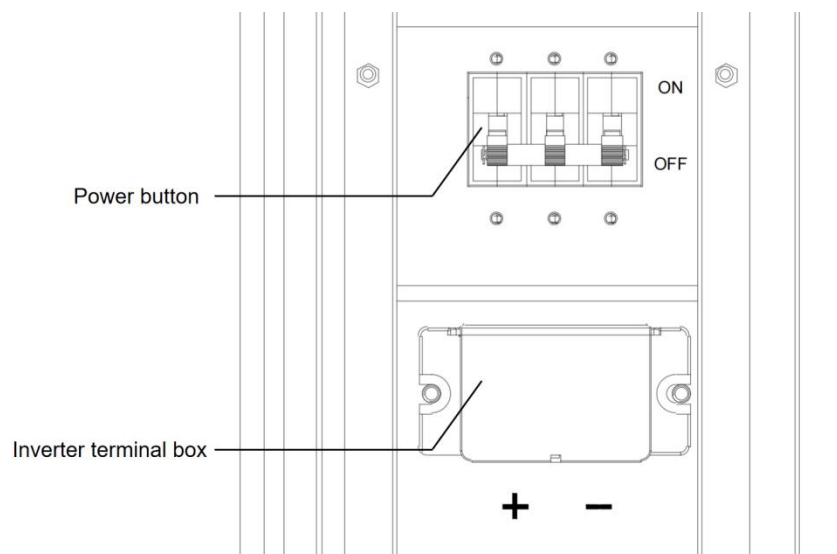
### 3.3. Interface description



The interface port are shown above,details are shown in the following reference table.

No.	Item	Condition
1	Link-in	Parallel Communication Port
2	Debug.COM	Debug Port(RJ45)
3	Link-out	Parallel Communication Port
4	Invert.COM	Inverter Communication Port(RJ45)
5	INV.SET	Inverter Dial Switch
6	FUN.SET	Function Dial Switch
7	Addr.SET	Address Dial Switch
8	Debug.COM	Debug Port(connector)
9	Invert.COM	Inverter Communication Port(connector)
10	Dry.Contact	Dry Contact & GPIO Port
11	On/Off	Switch
12	+	Power Positive
13	-	Power Negative

### 3.4. Power cable connection

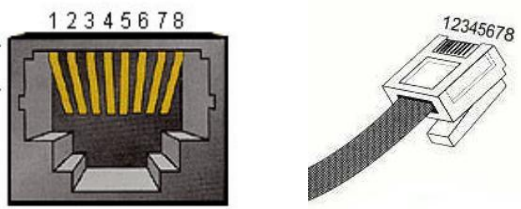


Power switch: turn on/off the input and output of the whole system.

### 3.5. Main Controller


#### 3.5.1. Link-in communication port

Link-in communication port:(RJ45 port) the definition of link A and B are same.

Port definitions	RJ45 Pin	Function
	1	BMS_CAN1L
	2	BMS_CAN1H
	3	BMS_CC_GND
	4	BMS_CC_GND
	5	BMS_PW_IN1
	6	BMS_CC_GND
	7	BMS_XUNZIN-
	8	BMS_XUNZIN+

#### 3.5.2. Debug.COM port

Debug port:RJ45

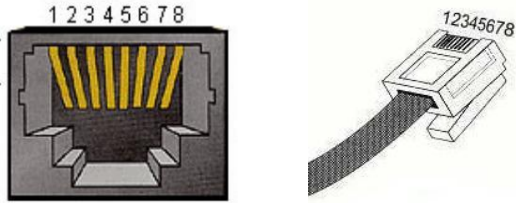
Port definitions	RJ45 Pin	Function
	1	BMS_CAN1L
	2	BMS_CAN1H
	3	BMS_RS232_RX
	4	BMS_CC_GND
	5	BMS_CC_GND
	6	BMS_RS232_TX
	7	IN_CANL
	8	IN_CANH

#### 3.5.3. Link-out communication port

Link-out communication port:(RJ45 port) the definition of link A and B are same.

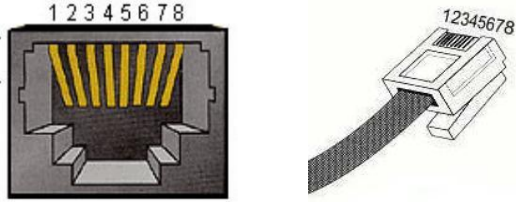
Port definitions	RJ45 Pin	Function
	1	BMS_CAN1L
	2	BMS_CAN1H



	3	BMS_CC_GND
	4	BMS_PW_OUT2
	5	BMS_PW_OUT1
	6	BMS_CC_GND
	7	BMS_XUNZOUT-
	8	BMS_XUNZOUT+

### 3.5.4. Invert.COM port

Inverter port:RJ45

Port definitions	RJ45 Pin	Function
	1	Inverter.RS485-B
	2	Inverter.RS485-A
	3	Inverter.RS485-GND
	4	WAKEUP +
	5	WAKEUP -
	6	Inverter.RS485-GND
	7	Inverter.CANH
	8	Inverter.CANL

### 3.5.5. INV.SET code

At present, the energy storage products of our company have completed matching tests with some series inverters of the following brands, and we will continue matching tests with inverters of other companies. Please check our official website for the latest list of supporting brands.

The list tab only lists the inverter manufacturers one of the same series products, general inverter manufacturers in the same series of other products, the communication protocol are the same, so our battery can be communicated with the other products of same series inverter, if encounter a series of products can't communication, please contact us.

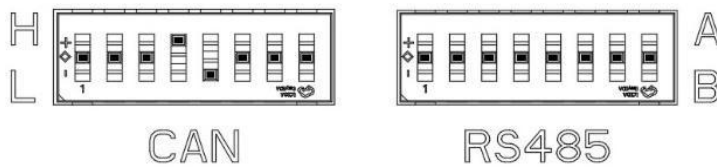
The following inverter matching list may not be up to date. The list may change according to the software version upgrade, and the reference manual may does not change immediately according to the software version upgrade. Therefore, if the user wants to get the latest inverter matching support, please browse our official website to check the relevant documents.

The inverter manufacturer may upgrade its software version, which may cause problems in the communication between our battery and the inverter. Therefore, before communicating with the inverter, please confirm whether the software version of the inverter is consistent with the list. If not, please contact us.

This section will introduce how to connect the different brands inverter with our products. Inverters manufacturers may upgrade their products, resulting in hardware communication interface changes. If communication is not possible in the application according to the following wiring method, please contact with us.

The CAN/RS485 communication port of ZRGP relates to the communication interface of inverter.

- a. If you are using the pin order select box, please refer to the table above to set the dial switch, according to the inverter brand.
- b. For example, if you want to match a Deye inverter, you should dial 4 high and 5 low on the CAN side as shown in the following figure.



- c. If the inverter brand is not shown in the table, please refer to the inverter manual or consult ZRGP's engineer.

**NOTE:**

• The above CAN and RS485 communication connections are not connected the ground wire, in the application of relatively large interference, it is recommended to connect the ground wire, the ground wire connection method is a single-ended shielding line.

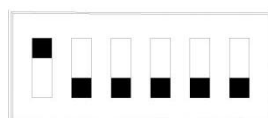
• If you want to view inverter matching and dip details, please visit our website <https://zruipower.com/wp-content/uploads/2023/09/Inverter-Matching-Guide-ZRGP-battery1.pdf>.

Address Coding	Dial Code Switch Position						Definition
	#1	#2	#3	#4	#5	#6	
0	OFF	OFF	OFF	OFF	OFF	OFF	Monitoring Software setting mode
1	ON	OFF	OFF	OFF	OFF	OFF	ZRGP
2	OFF	ON	OFF	OFF	OFF	OFF	Studer_Xtender
3	ON	ON	OFF	OFF	OFF	OFF	Sofar_LV
4	OFF	OFF	ON	OFF	OFF	OFF	Solis_LV
6	OFF	ON	ON	OFF	OFF	OFF	Victron_color control
7	ON	ON	ON	OFF	OFF	OFF	SMA_LV
8	OFF	OFF	OFF	ON	OFF	OFF	Sermatec_LV

9	ON	OFF	OFF	ON	OFF	OFF	Reserved
10	OFF	ON	OFF	ON	OFF	OFF	Growatt_SPF
11	ON	ON	OFF	ON	OFF	OFF	Li_PLUS
12	OFF	OFF	ON	ON	OFF	OFF	Schneider_Gateway
13	ON	OFF	ON	ON	OFF	OFF	SOL-ARK_LV
14	OFF	ON	ON	ON	OFF	OFF	Phocos-AnyGrid
15	ON	ON	ON	ON	OFF	OFF	AFORE-LV
16	OFF	OFF	OFF	OFF	ON	OFF	Voltronic Power
17	ON	OFF	OFF	OFF	ON	OFF	DEYE
18	OFF	ON	OFF	OFF	ON	OFF	Growatt_SPH
19	ON	ON	OFF	OFF	ON	OFF	Reserved
20	OFF	OFF	ON	OFF	ON	OFF	Reserved
21	ON	OFF	ON	OFF	ON	OFF	SAJ-LV
22	OFF	ON	ON	OFF	ON	OFF	SMA-LV
23	ON	ON	ON	OFF	ON	OFF	Reserved
24	OFF	OFF	OFF	ON	ON	OFF	Fronius
25	ON	OFF	OFF	ON	ON	OFF	Lux
26	OFF	ON	OFF	ON	ON	OFF	Reserved
27	ON	ON	OFF	ON	ON	OFF	GreenCell
28	OFF	OFF	ON	ON	ON	OFF	Reserved
29	ON	OFF	ON	ON	ON	OFF	Must
30	OFF	ON	ON	ON	ON	OFF	MEGAREVO-LV
31	ON	ON	ON	ON	ON	OFF	Aiswei-LV

### 3.5.6. FUN.SET code

The dial switch settings for a single are as below:

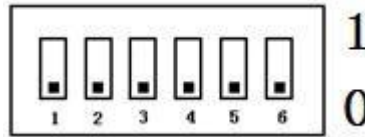


Single device	#1	#2	#3	#4	#5	#6
Device FUN.SET dial code	1	0	0	0	0	0

### 3.5.7. Addr.SET code

Address dial switch

Dial switch: 6-digit dial switch, address "0" and "1", as shown in the figure. After setting, you need to restart the system and activate it.



Automatic addressing: The dial codes of all Addr.SET are set for 0.

Manual addressing:

When the system groups are in parallel, the communication between two levels is needed. Both master and slave packets need hardware address configuration, and the hardware address can be set through the dial switch on the board. The definition of switch is shown in the table below.

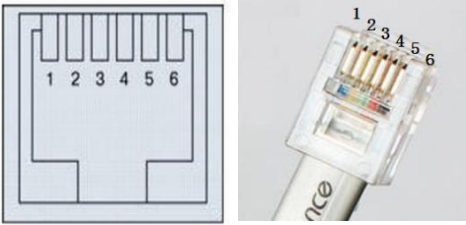
Addresses are increasingly added.

Address Coding	Dial Code Switch Position						Definition
	#1	#2	#3	#4	#5	#6	
1	ON	OFF	OFF	OFF	OFF	OFF	The host computer can monitor the operation of other systems by setting the main package
2	OFF	ON	OFF	OFF	OFF	OFF	Set to the slave Cluster 2
3	ON	ON	OFF	OFF	OFF	OFF	Set to the slave Cluster 3
4	OFF	OFF	ON	OFF	OFF	OFF	Set to the slave Cluster 4
5	ON	OFF	ON	OFF	OFF	OFF	Set to the slave Cluster 5
6	OFF	ON	ON	OFF	OFF	OFF	Set to the slave Cluster 6
7	ON	ON	ON	OFF	OFF	OFF	Set to the slave Cluster 7
8	OFF	OFF	OFF	ON	OFF	OFF	Set to the slave Cluster 8
9	ON	OFF	OFF	ON	OFF	OFF	Set to the slave Cluster 9
10	OFF	ON	OFF	ON	OFF	OFF	Set to the slave Cluster 10
11	ON	ON	OFF	ON	OFF	OFF	Set to the slave Cluster 11
12	OFF	OFF	ON	ON	OFF	OFF	Set to the slave Cluster 12
13	ON	OFF	ON	ON	OFF	OFF	Set to the slave Cluster 13

14	OFF	ON	ON	ON	OFF	OFF	Set to the slave Cluster 14
15	ON	ON	ON	ON	OFF	OFF	Set to the slave Cluster 15

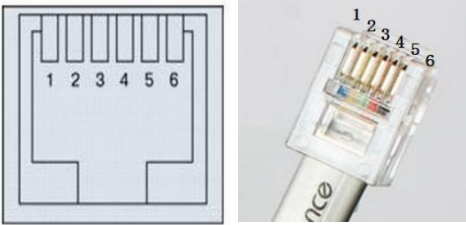
### 3.5.8. Debug.COM port

Debug port: (RJ45 port) comply with CAN protocol , for manufacturers or professional engineers debugging or service.

Port definitions	6Pin	Function
	1	BMS_CAN1H
	2	BMS_CAN1L
	3	IN_CANH
	4	IN_CANL
	5	GND
	6	BMS_POWER

### 3.5.9. Invert.COM communication port

Inverter CAN/RS485 communication port: Follows can protocol and RS485 protocol. For the output system information, the system master uses this interface to communicate with External inverter and other equipment.

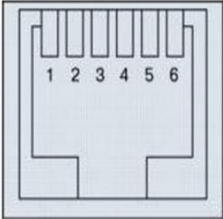
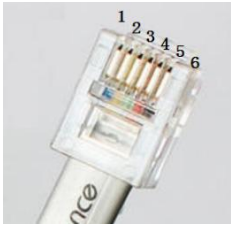
Port definitions	6Pin	Function
	1	RS485_2B
	2	RS485_2A
	3	COM_SGND
	4	CAN2L
	5	CAN2H
	6	COM_SGND

### 3.5.10. Dry contact&GPIO port

Dry contact port: Reserved for future communication and used for an uncommitted digital signal pin.

Port definitions	6Pin	Function
	1	BMS_NO1
	2	BMS_COM1
	3	BMS_NO2



		4	BMS_COM2
		5	WAKEUP +
		6	WAKEUP -

### 3.5.11. Power on/Power off

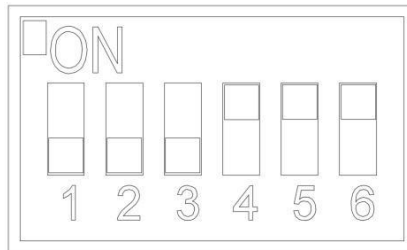
Wire: 70 mm<sup>2</sup> power cable

When user need to toggle switch of the battery module and press on power button of the main controller.

To power off the cluster, user need to press on the power button again. Make sure the light extinguished after pressed the button.

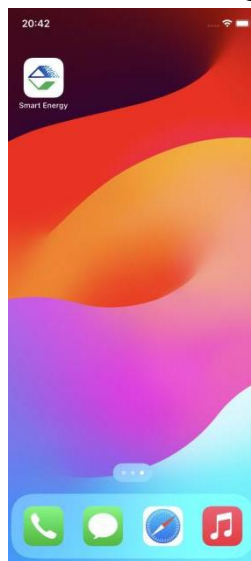
### 3.6. WiFi configuration and adding device

1. Screw the antenna into the antenna connection port firmly before WiFi configuration.
2. Set the inverter dip switch of the battery to 56 to enable battery WiFi.



- 1) Download the Smart Energy APP on phone

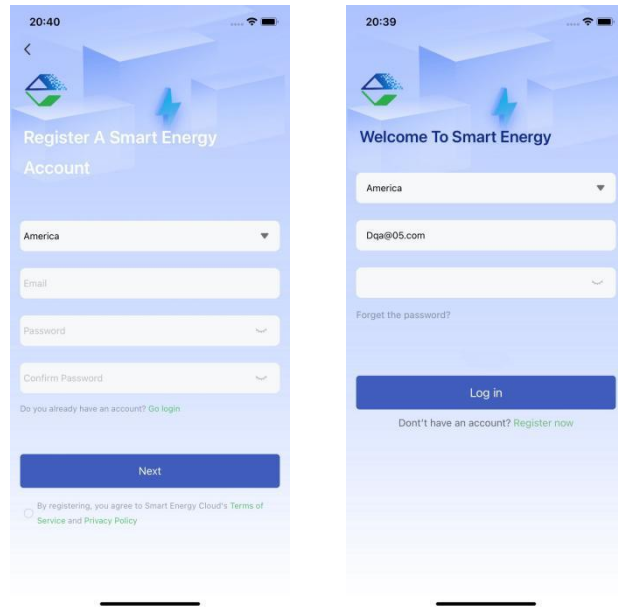
Search the keyword “Smart Energy” from AppStore on iphone or Google play on Android phone, download APP and finish installation. If users fail to upgrade the latest APP version or to install the APP on phone, please contact Smart Energy technical support for advice.



- 2) Create APP user account

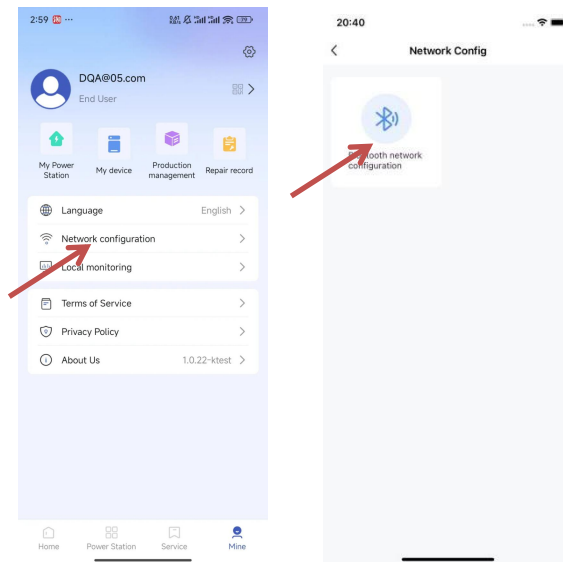
Select the area where you live. Click Register button and type in account and password. If you

already had an account, you may use it to log in the APP directly otherwise you need to create an account.



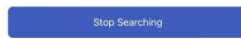
### 3) Create AP for APP parameter settings

Turn to the page Mine, click the Network configuration, then click Bluetooth Model, and following by the instruction of network setting for WIFI configuration.



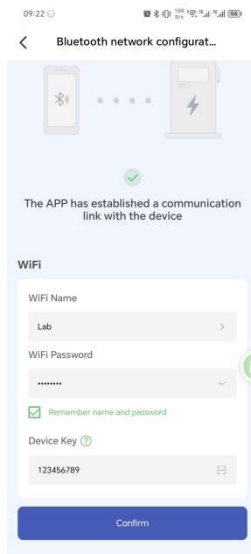
### 4) Bluetooth setting

Connect your mobile phone to the Bluetooth from the master controller which SSID is same as controller's serial number (SN).



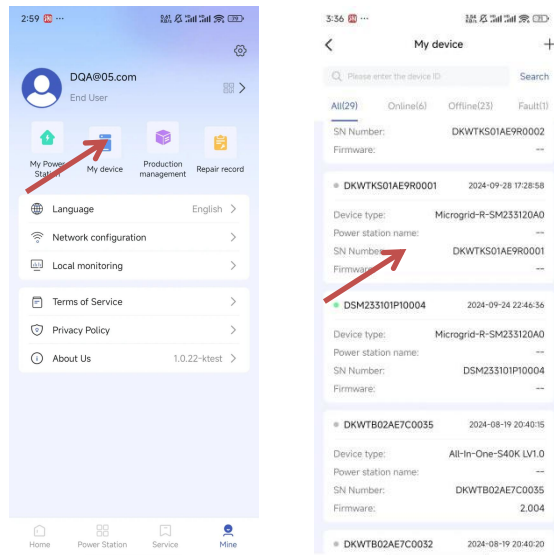
### 5) Pairs WIFI SSID & Password from battery product

Find the battery SSID that includes the battery SN code shows on the product information label. Normally, the default password is 123456789. If users have trouble to connect the product WIFI, please contact Smart Energy FAE for further help.



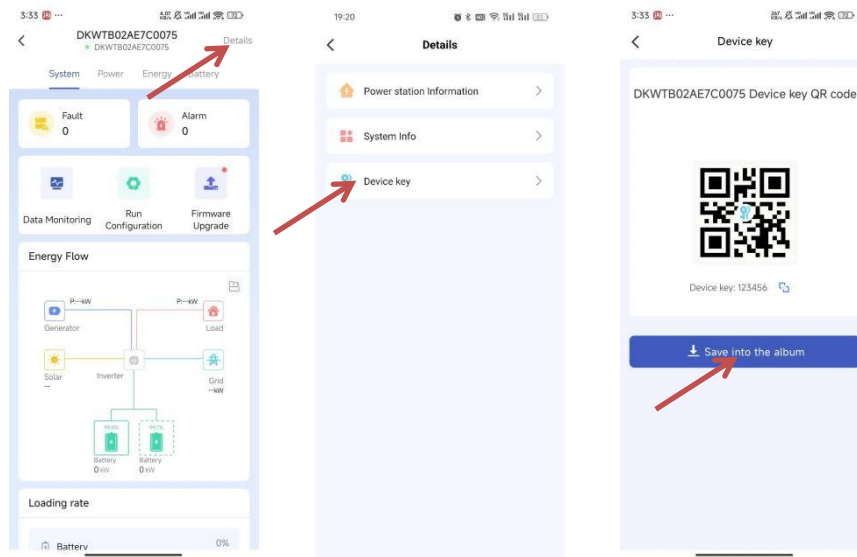
### 6) Find the device verification code on APP

Click my device at page Mine and make sure your SN number.



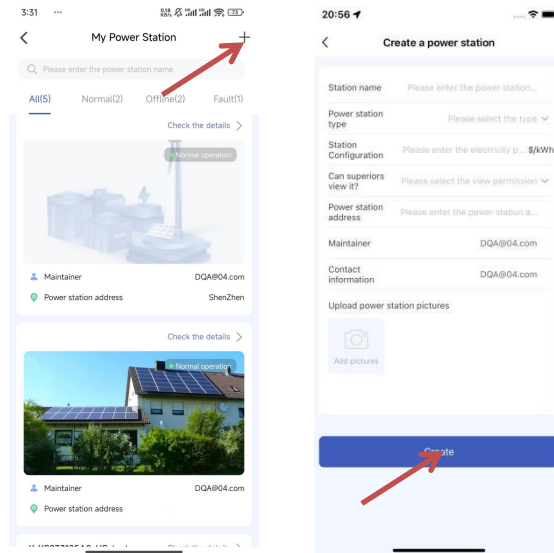
7) Enter my device and find the device key

Click the device and click the “details” in the upper right corner of the interface, and then click “Device key”. It will show the verification code .For example, “123456” shown in the picture.



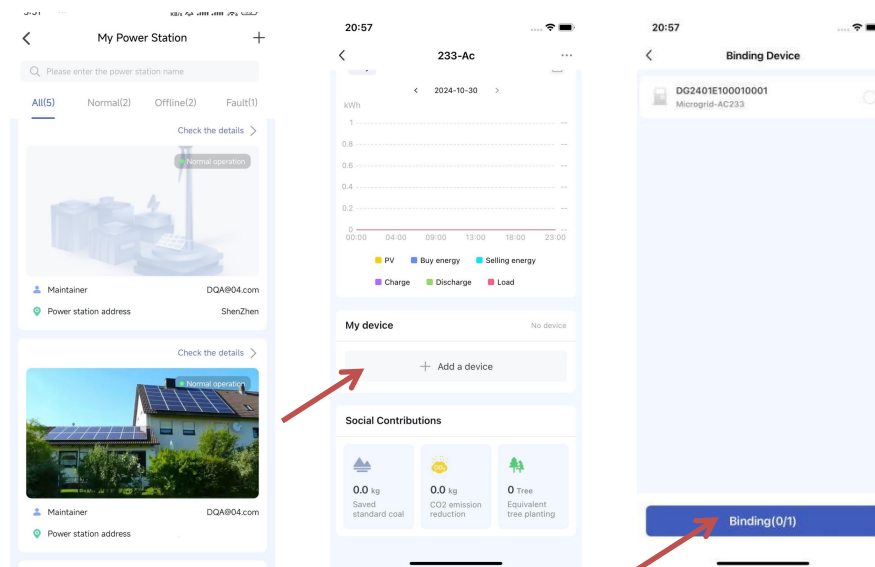
8) Create a new power station

Turn to main page of the APP, create a plant, and set a power station name, power station type, grid price configuration,superiors view and power station address for it.



### 9) Binding the device

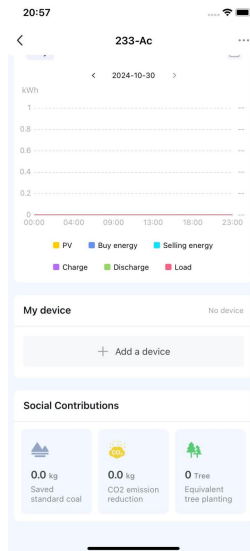
Click the device and enter the page to add a device to your plant and all your products will show up as their SN, select proper products and confirm.



### 10) Manage your product

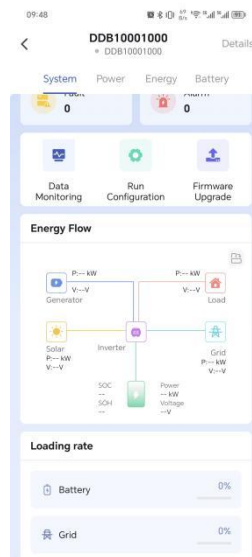
Now you can manage your products in the APP, and you can also manage them in Website, ask your installer for the site URL.





### 11) Monitor all real-time data

After the product is connected to WiFi, the running status, real-time power, daily power consumption and cumulative power of the product can be monitored in real time on the network platform or mobile APP. It can also be used to configure parameters.



## 4.Safe handing of lithium batteries Guide

### 4.1.Precautions before installation

Before installation, be sure to read the contents in Chapter 1 Safety Precautions, which is related to the operation Safety of installation personnel, please pay attention to.

### 4.2.Safety Gear

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



Insulated gloves



Safety goggles



Safety shoes

### 4.3.Tools

The following tools are required to install the battery pack:



Wire cutter



Cable clamp



Screwdriver

#### **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.

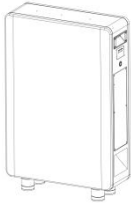
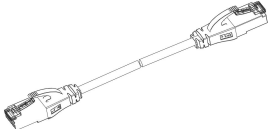
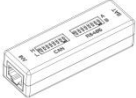
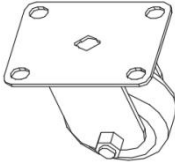






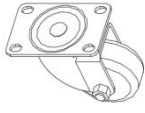
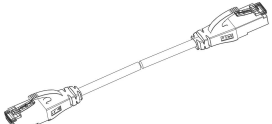

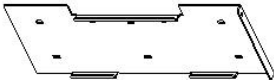
# 5.Installation

## 5.1.Package Items

Unpacking and check the Packing List:

After receiving the complete system, please check to ensure that all the following components are not lost or damaged Broken.

The required form of components for master and base installation is given below.

 <p>Battery Module×1</p>	 <p>Communication Cable×2</p>	 <p>Communication switch box×1</p>
 <p>Directional Wheel×2</p>	 <p>Embedded Screw*M8×6</p>	 <p>Embedded Screw*M5×1</p>
 <p>Embedded Screw*M6×16</p>	 <p>Footed Glass×4</p>	 <p>User's manual×1</p>
 <p>Power Cable(+)*×1</p>	 <p>Universal Wheel×2</p>	 <p>UTP Cable×1</p>
 <p>Power Cable(-)*×1</p>	 <p>Footed Glass×1</p>	

## 5.2.Installation Location

Make sure that the installation location meets the following conditions:

- ◆ The area should be avoided with touching water.
- ◆ The floor is flat and level.

- ◆ There are no flammable or explosive materials.
- ◆ The ambient temperature is within the range from 0°C to 50°C.
- ◆ The temperature and humidity are maintained at a constant level.
- ◆ There is minimal dust and dirt in the area.
- ◆ The distance from heat source is more than 2 meters.
- ◆ The distance from air outlet of inverter is more than 0.5 meters.
- ◆ Do not install outside directly.
- ◆ Do not cover or wrap the battery case or cabinet.
- ◆ Do not place at a child or pet touchable area.
- ◆ The installation area shall avoid of direct sunlight.
- ◆ There are no mandatory ventilation requirements for battery module, but please avoid of installation in confined area. The aeration shall avoid of high salinity, humidity, or temperature.
- ◆ For household installation, only single row unit installation is allowed, and the installation capacity is limited to 40KWH.
- ◆ Non-household application scenarios can be installed in multiple rows units, with each row installed at a spacing of 1.5 meters and above.



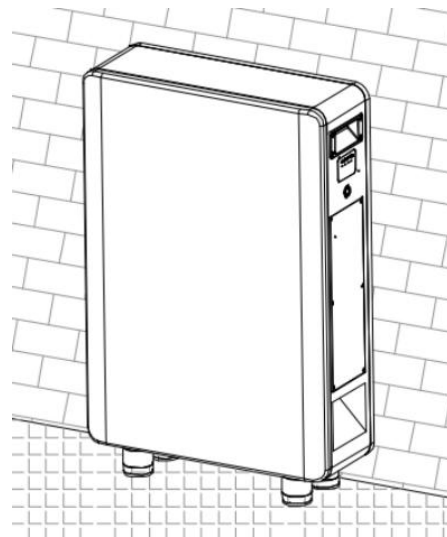
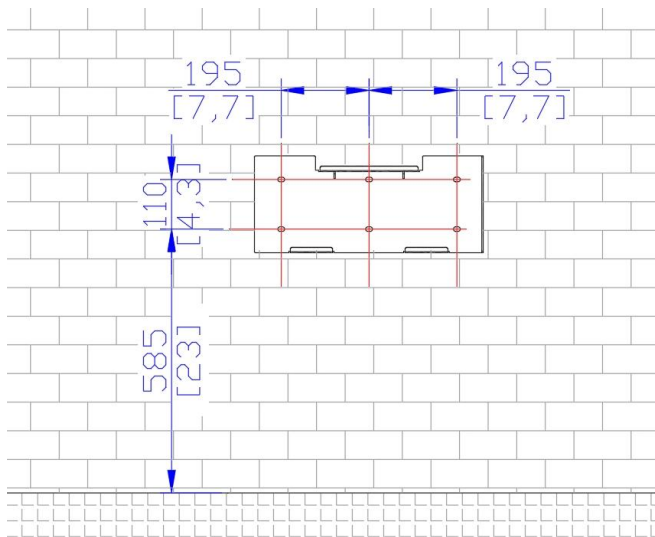
## CAUTION

If the ambient temperature is outside the operating range, the battery pack stops operating to protect itself. The optimal temperature range for the battery pack to operate is 0°C to 55°C. Frequent exposure, to harsh temperatures may deteriorate the performance and life of the battery pack.

### 5.3.Installation

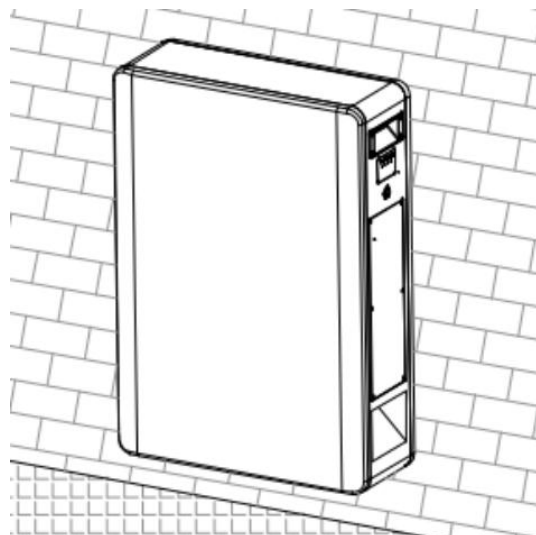
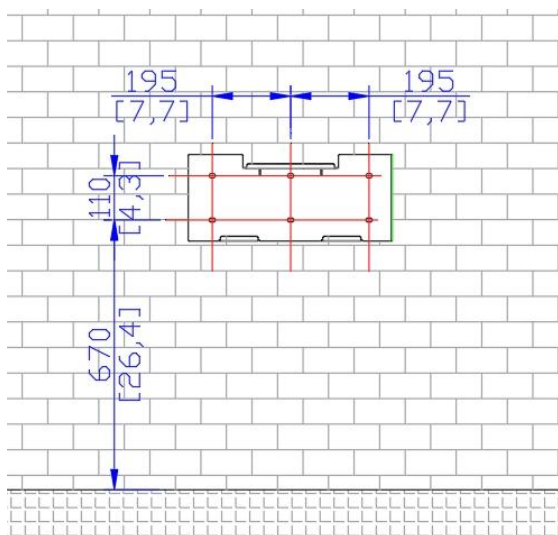
#### A. On the wall

- (1) Make sure whether the wall can support the weight of the device.
- (2) Find a appropriate installation position as the diagram below,drill the mounting screws,and install the bracket on the wall.
- (3) Fix the product on the bracket to ensure that the wall hanging is stable and perpendicular to the wall.
- (4) Secure the screw to grounding cable hole and grounding,using M5 screws to secure the device and bracket.
- (5) Please plug the protective ring of the outlet line with fireproof mud after installing.



### B. On the ground

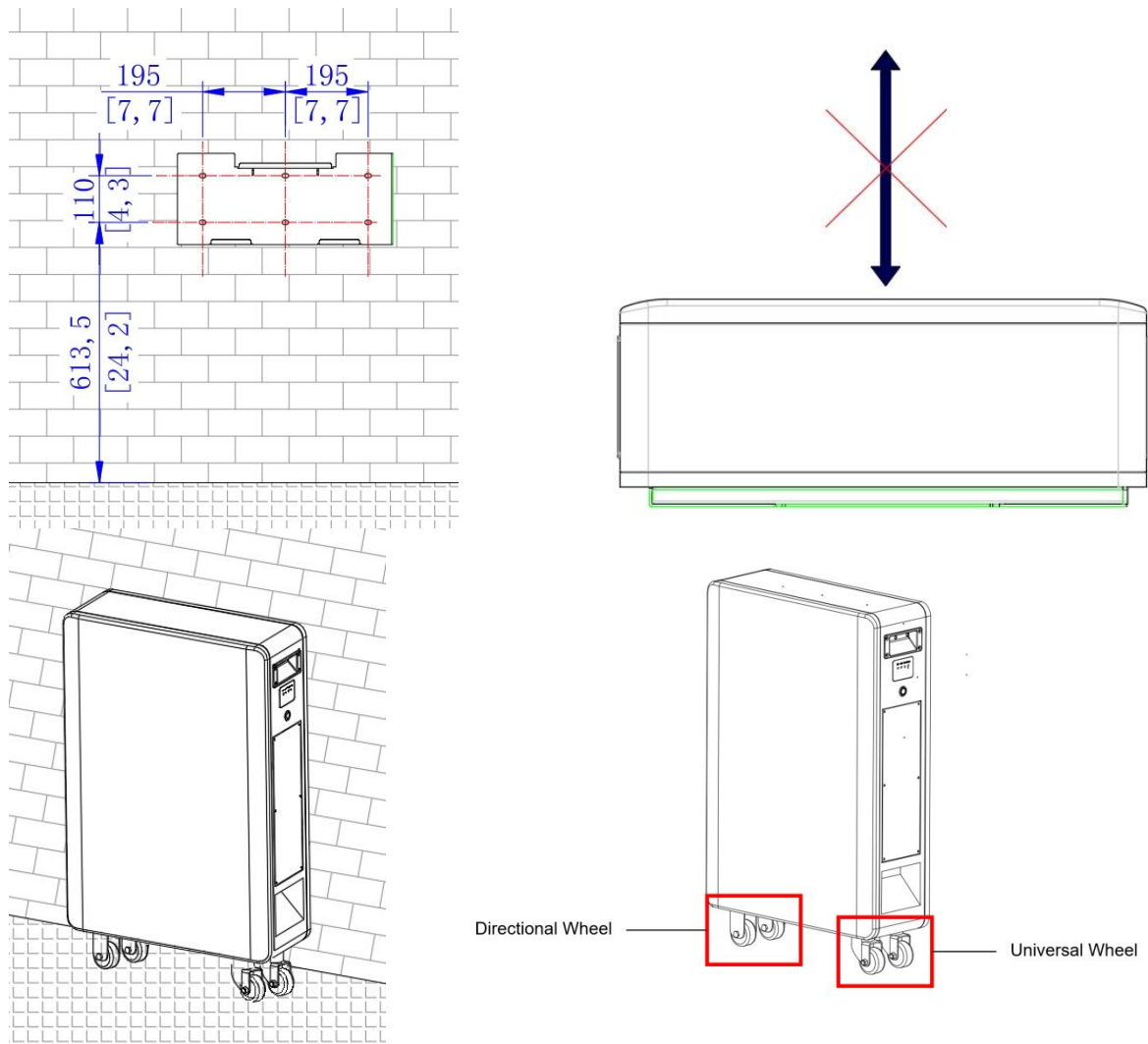
- (1) Make sure whether the wall can support the weight of the device.
- (2) Find a appropriate installation position as the picture below,drill the mounting screws,and install the bracket on the wall.
- (3) Fix the product on the bracket to ensure that the wall hanging is stable and perpendicular to the wall.
- (4) Secure the screw to grounding cable hole and grounding,using M5 screws to secure the device and bracket.
- (5) Rotate the footed glass to the right and mount it to the bottom plate.
- (6) Adjust the appropriate position as the following diagram.
- (7) Please plug the protective ring of the outlet line with fireproof mud after installing.



### C. Removable

- (1) Make sure whether the wall can support the weight of the device.
- (2) Find a appropriate installation position as the diagram below,drill the mounting screws,and install the bracket on the wall.

- (3) Move the device in an appropriate position. Do not back and forth when you move the device to prevent device dumping.
- (4) Fix the product on the bracket to ensure that the wall hanging is stable and perpendicular to the wall.
- (5) Secure the screw to the grounding cable hole and ground, using M5 screws to secure the device and bracket.
- (6) What you need to pay attention is that the left is the directional wheel and the right is the universal wheel.
- (7) Please plug the protective ring of the outlet line with fireproof mud after installing.



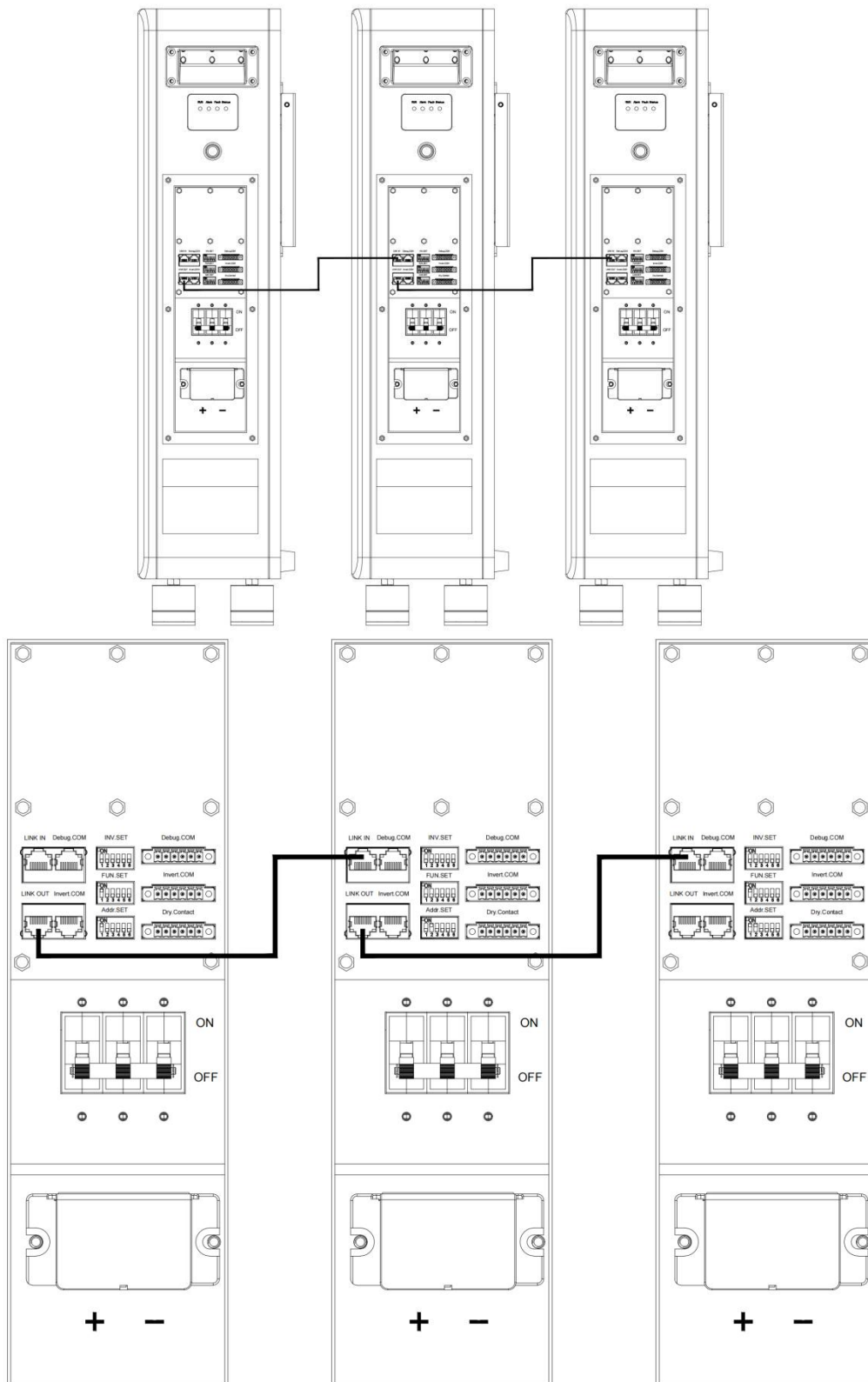
#### 5.4. Parallel connection (Optional)

- (1) Check all connection terminals and communication lines carefully.
- (2) The master control address shall be set to "1" for communication between the master control and the inverter (a host system can be configured with up to 15 slave systems). Turn off the Controller switch before connecting the inverter.
- (3) Connect the parallel port of the slave to the communication cable of the host, connect the positive pole of the slave to the positive pole of the host, connect the negative pole of the

slave to the negative pole of the host, connect the parallel cable of the slave to the host, and finally connect the communication cable of the host to the frequency converter.

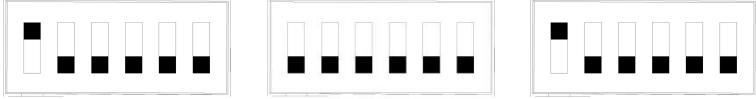
(4) When connecting communication cable in parallel, connect from the Link-out of the first battery to the Link-in of the second battery, and then connect from the Link-out of the second battery to the Link-in of the third battery, and so on. It should be noted that the Link-in of first battery and Link-out of last battery should not be connected.

(The top is the parallel communication wiring diagram, and the bottom shows the details of the wiring diagram)




(5) Limit the distance between the two units to be no less than 300mm, and the recommended distance is 500mm.

(6) Set the Function dial code (FUN.SET) of the minimum and maximum address as code 1 when parallel.



When 3 devices in parallel	#1	#2	#3	#4	#5	#6
The first device	1	0	0	0	0	0
The second device	0	0	0	0	0	0
The third device	1	0	0	0	0	0

 *Note: after installation, please do not forget to contact the supplier to register online for full warranty*

- NOTE:**
- *In order to avoid current pulse during start-up, the predischarge function should be added to high voltage system. All connected batteries should be turned on first, and then the circuit breaker between high voltage system and inverter should be turned on.*
  - *Circuit breaker shall be installed between high voltage system and inverter to protect system safety. All installation and operation must comply with local electrical standards.*



## 6. Trouble Shooting Steps

### 6.1. Problem determination based on

- 1) Whether the system can be opened.
- 2) If the system is turned on, check whether the display is on.
- 3) If the display goes off, check whether the system can be charged/discharged.

### 6.2. Warning codes

Code	Warning type	Investigation
W1	Battery cell overvoltage alarm	1.High voltage level and needs to be discharged.
W2	Battery cell undervoltage alarm	1.Low voltage level and needs to be charged.
W3	Charge overcurrent alarm	1.Restore to factory setting. 2.Make sure the inverter's setting of max current do not exceed the max charge current of the battery.
W4	Discharge overcurrent 1 alarm	1.Make sure the power of load do not exceed the power of battery.
W6	High charge temp alarm	1.Make sure the battery's temperature shown on the inverter or the APP is below 50°C, otherwise turn off the battery till the temperature is below 50°C and then try to charge battery.
W7	High discharge temp alarm	1.Make sure the battery's temperature shown on the inverter or the APP is below 50°C, otherwise turn off the battery till the temperature is below 50°C and then try to discharge battery.
W8	Low charge temp alarm	1.Make sure the battery's temperature shown on the inverter or the APP is above 0°C, otherwise turn off the battery till the temperature is above 0°C and then try to charge battery.
W9	Low discharge temp alarm	1.Make sure the battery's temperature shown on the inverter or the APP is above -20°C, otherwise turn off the battery till the temperature is above -20°C and then try to charge battery.
W11	High ambient temp alarm	1.Make sure the ambient temperature of the battery is below 50°C.
W13	Low SOC alarm	1.Low SOC and needs to be charged.
W51	High total voltage alarm	1.High voltage level and needs to be discharged.
W52	Low total voltage alarm	1.Low voltage level and needs to be charged.
W53	Low ambient temp alarm	1.Make sure the ambient temperature of the battery is above -25°C.
W54	High MOS temp alarm	1.Reduce the ambient temperature and restart the battery.

### 6.3. Protection codes

Code	Warning type	Investigation
P1	Battery cell overvoltage protection	1. High voltage level and needs to be discharged.
P2	Battery cell undervoltage protection	1. Low voltage level and needs to be charged.
P3	Overcurrent charge protection	1. Restore to factory setting. 2. Make sure the inverter's setting of max current do not exceed the max charge current of the battery.
P4	Overcurrent discharge protection	1. Make sure the power of load do not exceed the power of battery.
P6	High charge temp protection	1. Make sure the battery's temperature shown on the inverter or the APP is below 52°C, otherwise turn off the battery till the temperature is below 52°C and then try to charge battery.
P7	High discharge temp protection	1. Make sure the battery's temperature shown on the inverter or the APP is below 52°C, otherwise turn off the battery till the temperature is below 52°C and then try to discharge battery.
P8	Low charge temp protection	1. Make sure the battery's temperature shown on the inverter or the APP is above 0°C, otherwise turn off the battery till the temperature is above 0°C and then try to charge battery.
P9	Low discharge temp protection	1. Make sure the battery's temperature shown on the inverter or the APP is above -20°C, otherwise turn off the battery till the temperature is above -20°C and then try to charge battery.
P11	High ambient temp protection	1. Make sure the ambient temperature of the battery is below 52°C.
P51	High total voltage protection	1. High voltage level and needs to be discharged.
P52	Low total voltage protection	1. Low voltage level and needs to be charged.
P53	Low ambient temp protection	1. Make sure the ambient temperature of the battery is above -25°C.
P54	High MOS temp protection	1. Reduce the ambient temperature and restart the battery.

## 6.4. Protection codes

Code	Warning type	Investigation
F5	Short circuit fault	1. Make sure the external connection for both battery and inverters are proper. 2. Disconnect all external connections and restart the battery, and if the error code F5 still remaining or reappear, contact your installer.
F13	The main control discharge relay is faulty	1. Restart the battery, and if the error code F13 still remaining or reappear, contact your installer.
F14	The main control charge relay is faulty	1. Restart the battery, and if the error code F14 still remaining or reappear, contact your installer.
F15	Battery cell failure	1. Restart the battery, and if the error code F15 still remaining

		or reappear, contact your installer.
F16	NTC fault	1. Restart the battery, and if the error code F16 still remaining or reappear, contact your installer.
F18	Current sensor fault	1. Restart the battery, and if the error code F18 still remaining or reappear, contact your installer.
F56	Pack disconnect fault	1. Restart the battery, and if the error code F56 still remaining or reappear, contact your installer.
F57	EMS SN is empty	1. Restart the battery, and if the error code F57 still remaining or reappear, contact your installer.
F60	Master SN is empty	1. Restart the battery, and if the error code F60 still remaining or reappear, contact your installer.

# Our Energy Works For You




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