USER MANUAL OF

PowerBase X1

J2-A03

OUR ENERGY WORKS FOR YOU

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

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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.

21000m²
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. 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.

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

1.1. General warnings

While working on the Li-ion Battery wear protective eyeglasses and clothing.

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 a li-ion battery is sensitive to mechanical shock.

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

Do not place at a child or pet touchable area.

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 components.


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.

1.2. Charge and discharge warnings


If the battery is stored for long time, it is required to charge them every six 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 an approved BMS.


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.


The temperature range over which the battery can be charged is 0°C to 55°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 55°C. Discharging the battery at temperatures outside this range may cause severe damage to the battery or reduce battery life expectancy.

1.3. Transportation warnings

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.

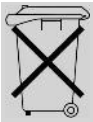
Never lift the battery at the terminals or the BMS communication cables, only lift the battery at the handles.

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 have to be transported according to this regulation. This means that for land and sea transport (ADR, RID & IMDG) they have to be packed according to packaging instruction P903 and for air transport (IATA) according to packaging instruction P965. The original packaging complies with these instructions.*

1.4. 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.

1.5. 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 1oumu.

◆ Make sure the grounding connection set correctly before operation.

◆ Please ensured the electrical parameters of battery system are compatible to related equipment.

◆ Keep the battery away from water and fire.

1.6. In Using

◆ If the battery system needs to be moved or repaired, the power must be cut off and the battery is completely shut down.

◆ 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).

◆ In case of fire, only dry powder fire extinguisher can be used, liquid fire extinguishers are prohibited.

◆ Please do not open, repair or disassemble the battery except staffs from or authorized by manufacturer. We do not undertake any consequences or related responsibility which because of violation of safety operation or violating of design, production, and equipment safety standards.

2. Introduction

Power Base X1 series lithium iron phosphate battery is a new energy storage product. Power Base X1 it can be used to support reliable power for various types of equipment and systems. Power Base X1 series is especially suitable for application scene of high power, limited installation space, and restricted load-bearing and long cycle life.

Power Base X1 series has built-in BMS (battery management system), which can manage and monitor cells information including voltage, current and temperature.

Multiple batteries 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.

2.1. Lithium iron phosphate battery

The lithium iron phosphate battery (LiFePO4 or LFP) is the safest of the mainstream lithium battery types. A single LFP cell has a nominal voltage of 3.2V. A 51.2V LFP battery consists of 16 cells connected in series.

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.

◆ 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 lithium iron phosphate battery is therefore the chemistry of choice for a range of very demanding applications.

2.2. Power Base X1 features

◆ The whole module is non-toxic, non-polluting and environmentally friendly.

◆ Cathode material is made from LiFePO4 with safety performance and long cycle life.

◆ 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 and balance current and voltage of each cell.

◆ Adopted self-cooling mode rapidly reduced system entire noise.

◆ The module has less self-discharge, up to 6 months without charging it on shelf, no memory effect, excellent performance of shallow charge and discharge.

◆ Working temperature range is from -20 to 50 ℃, (Charging 0~50 ℃, discharging -20~50℃) with excellent discharge performance and cycle life.

◆ A vertical energy storage system. It gets rid of the traditional cabinet or cross installation form. Beautiful design and convenient installation.

◆ Equipped with monitoring LED display, can provide basic data visualization, more convenient for users to observe the operation of the system.

2.3. Specifications

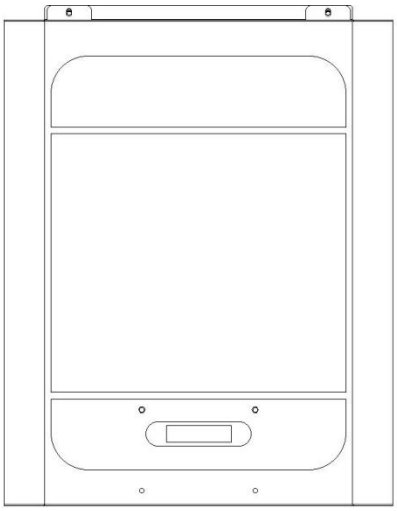
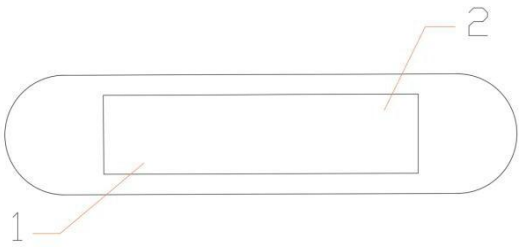


Figure 2.1. Outline dimensional drawing

No.	Items	Parameters
1	Cell model	100Ah/3.2V
2	Combination Mode	1P16S
3	Nominal Capacity (AH)	100
4	Rated energy (WH)	5120
5	Initial Internal Resistance (m r)	<50
6	Rated Voltage(V)	51.2
7	Charge Cut-off Voltage(V)	56.8
8	Discharge Cut-off Voltage(V)	46.8
9	Standard Charge Current(A)	20
10	Max. Charge Current(A)	95
11	Standard Discharge Current(A)	50
12	Max. Discharge Current(A)	95
13	Operating Temperature (℃)	-0~+50
		-20~ +50
14	Open Circuit Voltage(V)	47~56
15	Shell type	Painted metal
16	Weight (KG)	50±1
17	Dimension(mm)	600(L)*480(W)*135(H)

2.4. Equipment interface instruction



No.	Instructions	NO.	Instructions
1	Display screen	2	Status code

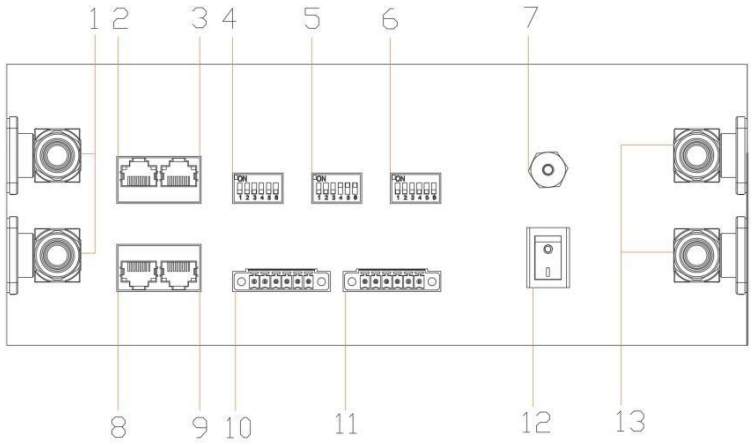


Figure 2.2. Interface definition

No.	Instructions	NO.	Instructions
1	Battery positive	8	Link-out Parallel Communication Port
2	Link-in Parallel Communication Port	9	Inverter Communication Port (RJ45)
3	Debug Port	10	Inverter Communication Port (connector)
4	Address Dial Switch	11	Dry contact
5	Inverter Dial Switch	12	ON/OFF
6	Function Dial Switch	13	Battery Negative
7	Grid port		

Power switch

Power switch: press it once to power on the battery and press it again to power off.

Display screen

Display screen: the interface can observe the operation status information SOC, SOH, charging and discharging power, alarm fault indication, charging and discharging status display and system status indication of the whole system.

Status code

Status code: When the system status code is displayed as protection information, only the value will be displayed. When the system status code is displayed as fault information, err and fault value will be displayed the definition of alarm is shown in the table below：

numerical value	Alarm indication	numerical value	Alarm indication
000	No breakdown	009	Low discharge temperature
001	Over voltage protection	011	High ambient temperature
002	Low voltage protection	012	Excessive differential pressure
003	Charging over current protection	013	Discharge circuit failure
004	Discharge over current protection	014	Charging circuit fault
005	Short circuit protection	015	Cell failure
006	Charging high temperature	016	NTC failure
007	High discharge temperature	017	Voltage acquisition fault
008	Low charging temperature	021	Parallel failed

NOTE:

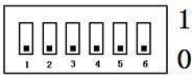
- When the system is charged, the display streamline gathers in the middle, and when it is discharged, the display streamline disperses to both sides.

Dry contact

Dry contact: provided 2 ways output dry contact signal.

Address dial switch

ADD Switch: 6 ADD switches, “0”and “1”, refer to picture right. The settings will be active only after restart the battery.



When the battery communicates with the inverter, the address of the battery pack must be set to 1, and the address of the parallel slave should be greater than 1.

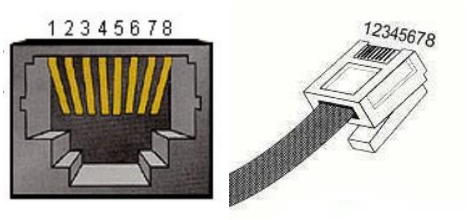
When the battery Pack is connected in parallel, cascading communication is required. Hardware address configuration is required for both the master PACK and the slave PACK, and the hardware address can be set by the dial switch on the board. The definition of the switch refers to the table below.

Address Coding	Dial Code Switch Position						Definition
	#1	#2	#3	#4	#5	#6	
1	ON	OFF	OFF	OFF	OFF	OFF	Set the master pack, and the inverter communicates with the battery at that address
2	OFF	ON	OFF	OFF	OFF	OFF	Set to the slave Pack1
3	ON	ON	OFF	OFF	OFF	OFF	Set to the slave Pack 2
4	OFF	OFF	ON	OFF	OFF	OFF	Set to the slave Pack 3
5	ON	OFF	ON	OFF	OFF	OFF	Set to the slave Pack 4
6	OFF	ON	ON	OFF	OFF	OFF	Set to the slave Pack 5
7	ON	ON	ON	OFF	OFF	OFF	Set to the slave Pack 6
8	OFF	OFF	OFF	ON	OFF	OFF	Set to the slave Pack 7
9	ON	OFF	OFF	ON	OFF	OFF	Set to the slave Pack 8
10	OFF	ON	OFF	ON	OFF	OFF	Set to the slave Pack 9
11	ON	ON	OFF	ON	OFF	OFF	Set to the slave Pack10
12	OFF	OFF	ON	ON	OFF	OFF	Set to the slave Pack 11
13	ON	OFF	ON	ON	OFF	OFF	Set to the slave Pack 12
14	OFF	ON	ON	ON	OFF	OFF	Set to the slave Pack13
15	ON	ON	ON	ON	OFF	OFF	Set to the slave Pack 14
16	OFF	OFF	OFF	OFF	ON	OFF	Set to the slave Pack 15
17	ON	OFF	OFF	OFF	ON	OFF	Set to the slave Pack 16
18	OFF	ON	OFF	OFF	ON	OFF	Set to the slave Pack 17
19	ON	ON	OFF	OFF	ON	OFF	Set to the slave Pack 18
20	OFF	OFF	ON	OFF	ON	OFF	Set to the slave Pack 19
21	ON	OFF	ON	OFF	ON	OFF	Set to the slave Pack 20
22	OFF	ON	ON	OFF	ON	OFF	Set to the slave Pack 21
23	ON	ON	ON	OFF	ON	OFF	Set to the slave Pack 22
24	OFF	OFF	OFF	ON	ON	OFF	Set to the slave Pack 23
25	ON	OFF	OFF	ON	ON	OFF	Set to the slave Pack 24
26	OFF	ON	OFF	ON	ON	OFF	Set to the slave Pack 25

27	ON	ON	OFF	ON	ON	OFF	Set to the slave Pack 26
28	OFF	OFF	ON	ON	ON	OFF	Set to the slave Pack 27
29	ON	OFF	ON	ON	ON	OFF	Set to the slave Pack28
30	OFF	ON	ON	ON	ON	OFF	Set to the slave Pack 29
31	ON	ON	ON	ON	ON	OFF	Set to the slave Pack 30

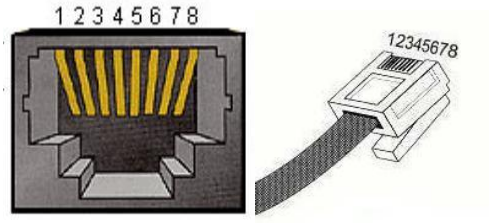
Debug port

The device supply CAN communication connection, for manufacturers or professional engineers debugging or service.

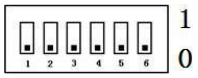
Port definitions	RJ45 Pin	Function
	1	Parallel.CANL
	2	Parallel.CANH
	3	Parallel.CANGND
	4	Switch control output -
	5	Switch control output +
	6	Parallel.CANGND
	7	Address configure output -
	8	Address configure output +

Link-out parallel connection port and Link-in parallel port

Multi-device parallel connection: The same RJ45 port, two RJ45 parallel. Comply with CAN protocol, used for parallel communication between batteries.

Port definitions	RJ45 Pin	Function
	1	Parallel.CANL
	2	Parallel.CANH
	3	Parallel.CANGND
	4	Switch control output -
	5	Switch control output +
	6	Parallel.CANGND
	7	Address configure output -
	8	Address configure output +

FUN.SET



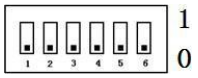
Function Switch: Six dial codes, “0”and “1”, refer to picture right.

① in the case of a single machine, all dip switches must be dialed 0.

② for parallel use, use dip switch to set the address: The first and last two need to be set as 000001, the middle battery is set as 0.

③ when EMSTOOLS is used to automatically set the address: the first dial 100001, the middle dial 000000, the last set of dial 010001. In this case the dip switch is invalid.

INV.SET



ADD Switch: Six dial codes, “0”and “1”, refer to picture right. When the host relates to the inverter, the host computer needs to communicate. Hardware address configuration is required on the host, and the hardware address can be set through the dial switch on the board.

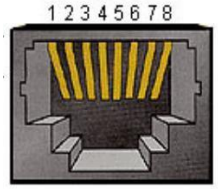
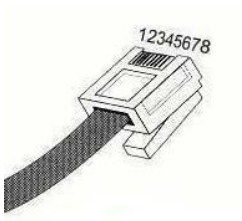
Inverter protocol setting function of dial switch 0 ~ 31: The inverter communication protocol can be changed directly by setting the dial switch, the definitions are shown in the following table.

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
5	ON	OFF	ON	OFF	OFF	OFF	Goodwe_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

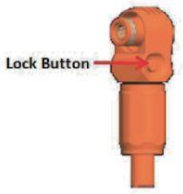
15	ON	ON	ON	ON	OFF	OFF	AFORE-LV
16	OFF	OFF	OFF	OFF	ON	OFF	Voltronic Power
17	ON	OFF	OFF	OFF	ON	OFF	DEYE
18	OFF	ON	OFF	OFF	ON	OFF	Growatt_SPH
19	ON	ON	OFF	OFF	ON	OFF	Reserved
20	OFF	OFF	ON	OFF	ON	OFF	Reserved
21	ON	OFF	ON	OFF	ON	OFF	SAJ-LV
22	OFF	ON	ON	OFF	ON	OFF	SMA-LV
23	ON	ON	ON	OFF	ON	OFF	Reserved
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

CAN/RS485 communication port

CAN/RS485 communication port: (RJ45 port) follow CAN protocol and RS485 protocol, for output battery information, the battery uses this interface to communicate with external inverters, PCS, and other devices.

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

Battery positive and Battery negative



Battery positive and Battery negative: there are two pairs of terminals with samefunction, one connects to equipment, the other one paralleling to other battery module for capacity expanding. For each single module, each terminal can achieve charging and discharging function. For power cables uses water-proofed connectors. It must keep pressing this Lock Button while pulling out the power plug.

2.5. Sleep and wake up

2.5.1 Sleep

Under voltage protection is not released within 30 seconds:

1) The lowest cell voltage is lower than the sleep voltage, and the duration reaches the sleep delay time (while meeting the requirements of no communication, no protection, no equilibrium, and no current).

2) Standby mode lasts for more than 24 hours (no communication, no charge, and discharge, nomains power, and the minimum cell is less than 3.2V).

3) Forced shutdown from the Ems Tools.

Before entering sleep, make sure no charger is connected, otherwise, it will not be able to enterlow-power mode.

2.5.2 Wake up

When the system is in the low-power mode and any of the following conditions is satisfied, the system will exit the low-power mode and enter the normal operation mode:

1) Connect the charger, and the output voltage of the charger must be greater than 48V.

2) Connect the communication line and open the Ems Tools (if enters sleep mode due to over-release protection, and this method cannot wake up the battery).

3) Use the power software switch.

NOTE:

- *After battery over-discharge protection, it enters the low-power mode, wakes up at a regular time every 4 hours, and starts open switch to charging or discharging. If it can be charged, it will exit the sleep mode and enter the normal charging state. If the auto wake up fails to charge for 10 consecutive times, it will no longer auto wake up. When the system is defined as the end of charging, and the recovery voltage is still not reached after 2 days /48h standby time (standby time set value), it is forced to resume charging until the end of recharging.*

2.6. Forced discharge mode

When the battery is in under voltage protection sleep mode and the minimum battery voltage is greater than 2.5V, turn on the power button, the display will light up and flash until the display stops flashing and releases the power button, and the battery will enter the forced discharge mode for 5 minutes. In the forced discharge mode, if the battery is charged, it will exitthe forced discharge mode and switch to the normal mode. If the discharge current exceeds 20Aor there is no charging current within 5 minutes, the battery will enter sleep mode again.

2.7. Automatic parallel

With automatic parallel function, when the slave battery (address > 1) is powered on, the charge and discharge switch is in a disconnected state. When the voltage difference between the slave battery and the master battery is less than the condition of "the minimum voltage difference between the slave and the master", the master sends the command to the slave. After the slave receives the command from the master, the charge and discharge switch will be connected, andthe slave is integrated into the master system to complete the parallel operation.

3. How to Use the ZRGP EmsTools

3.1. ZRGP EmsTools connection

(1) Connect the Debug com part of the battery to the computer using the CAN box communication line (this accessory is an optional accessory, needs to be purchased separately from the manufacturer).

(2) Unzip the package file of the Monitoring Software Ems Tools in the same file directory, pay attention to the directory do not store other files.

Figure 3.1. Unzip of Monitoring Software EmsTools

(1) This software is based on LabVIEW platform. Before opening EMS, you need to install a lab software, then open the Monitoring Software Ems tools icon, enter the Protocol selection interface.

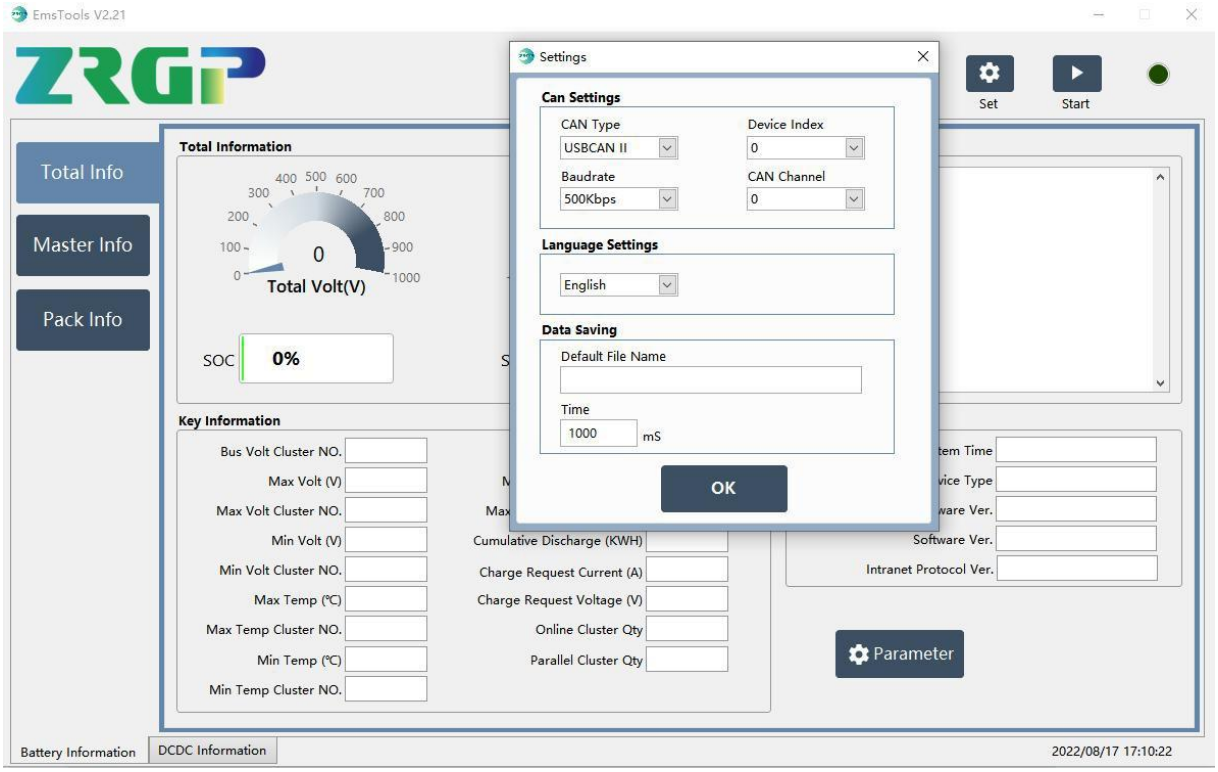


Figure 3.2. Protocol selection interface

(2) Users can set different languages according to their own needs. We support two languages, which are Simplified Chinese, English.

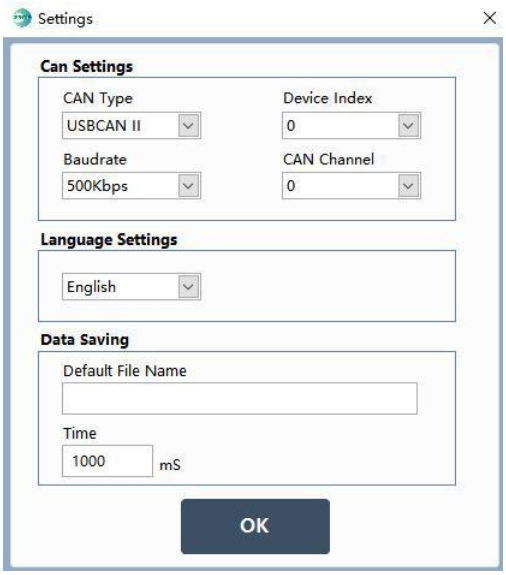


Figure 3.3. Monitoring software EMS language selection

(3) Select the serial port number in the EMS version of the Monitoring Software EMS tool, and the default baud rate is 500. Click the OK buttons.

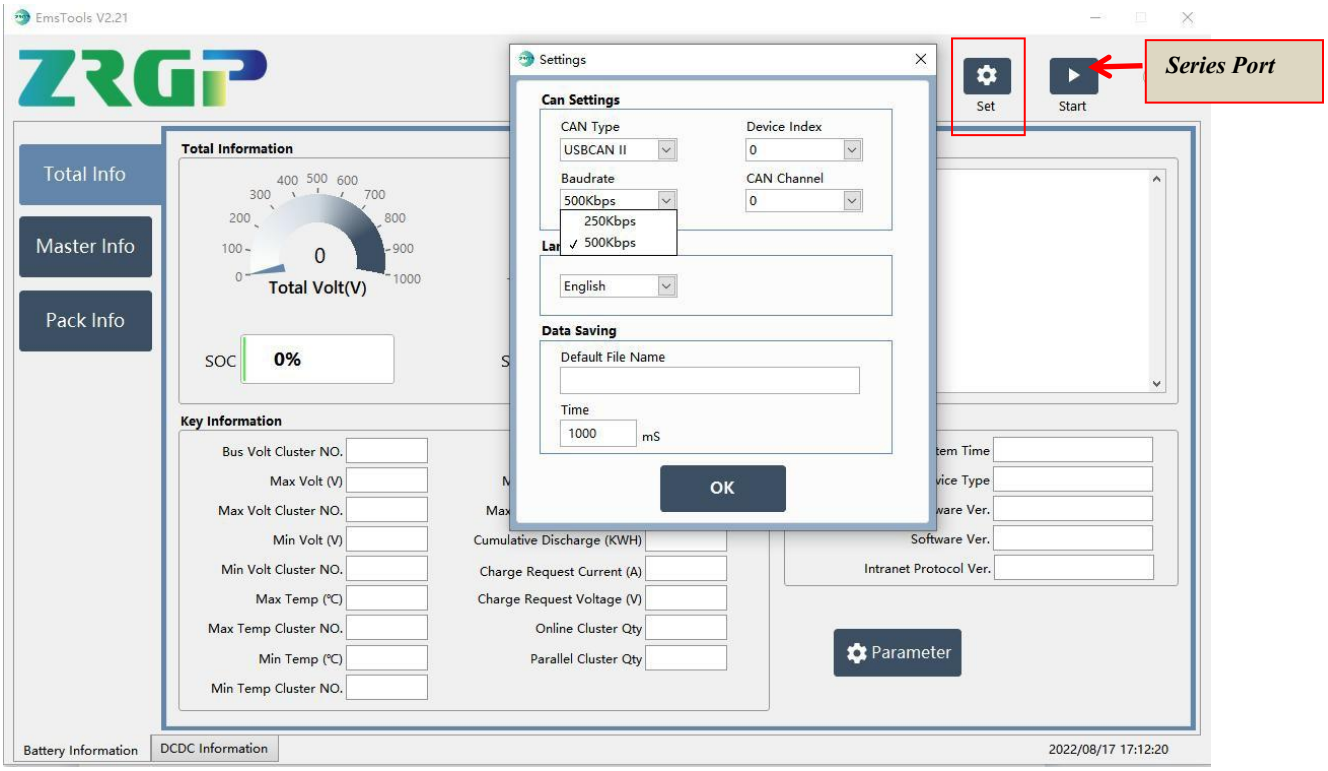


Figure 3.4. Monitoring software EMS serial port settings

(4) The corresponding functions can be selected through the navigation bar of the Monitoring Software EMS.

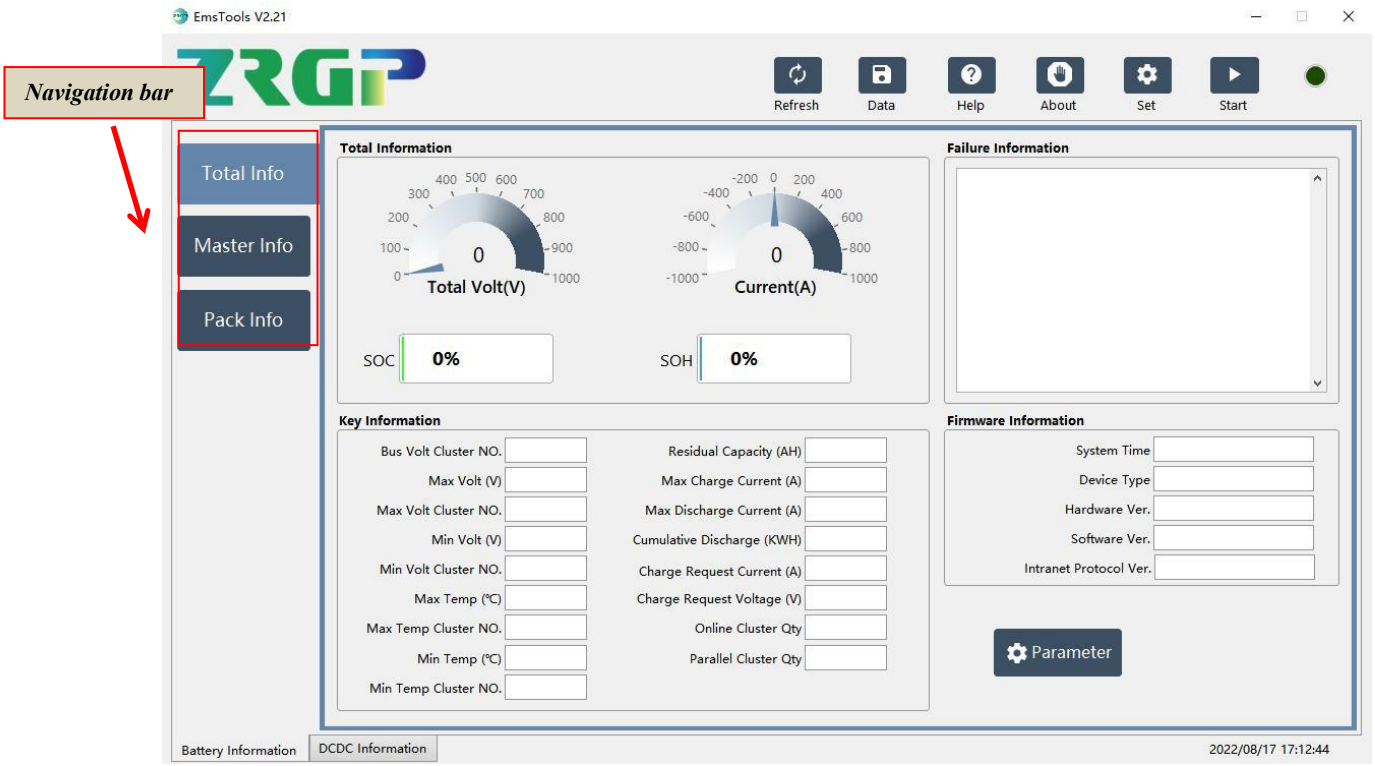


Figure 3.5. Monitoring software EMS data acquisition

(5) Cluster information operation information, you can select the corresponding operation information through the navigation bar. A total of 15 clusters can be monitored.

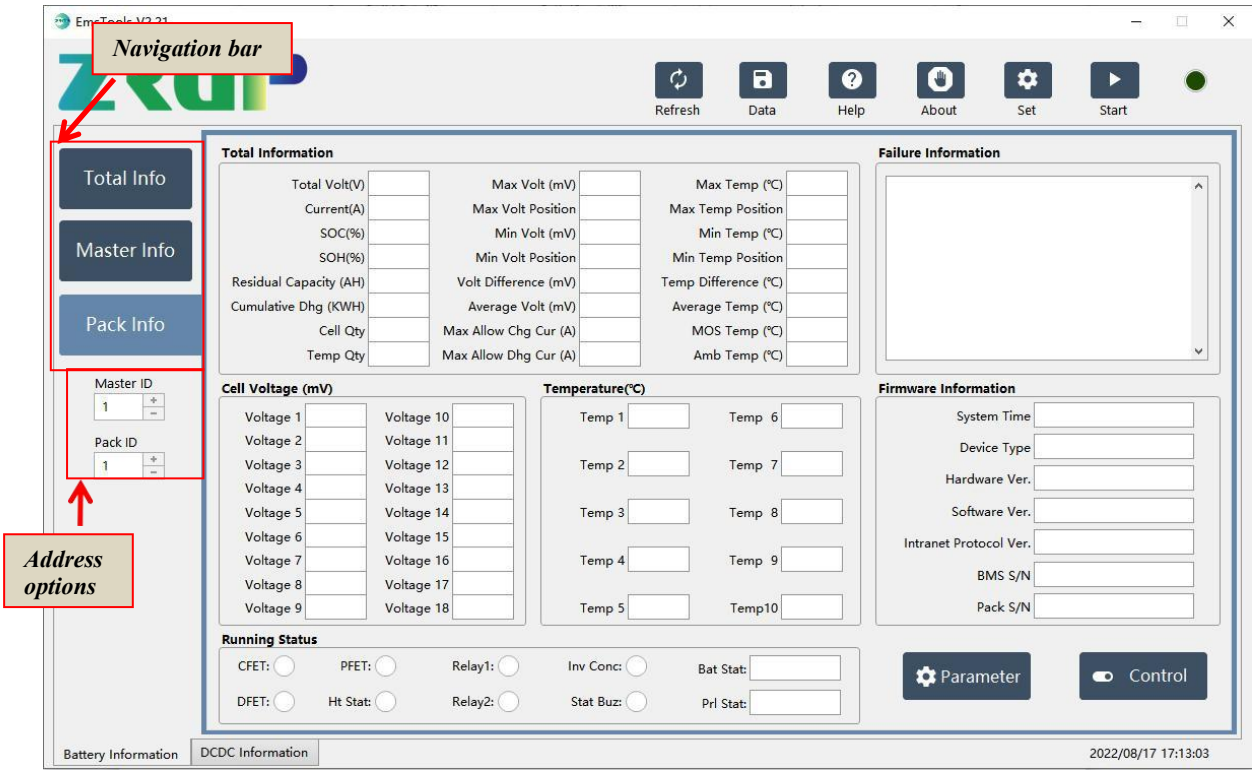


Figure 3.6. Monitoring software cluster data acquisition

(6) The configuration parameter interface displays software version, hardware version, temperature quantity and module battery quantity of a cluster in real time.

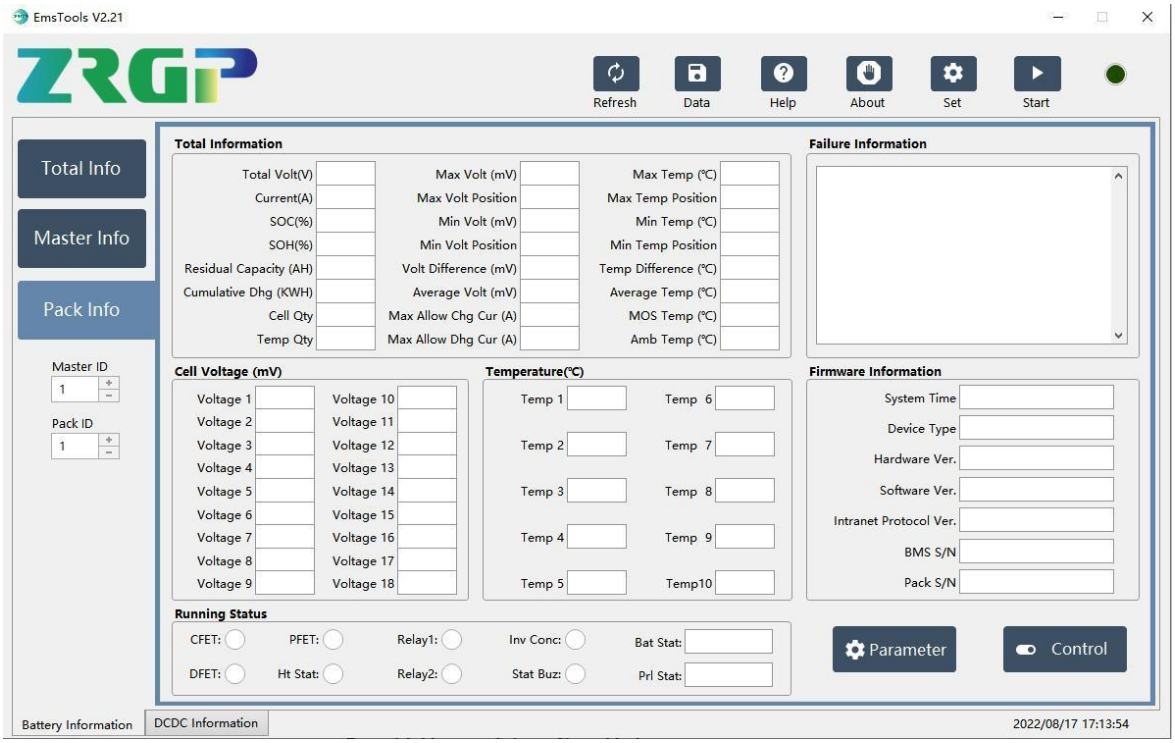


Figure 3.7. Monitoring software cluster matching parameters

NOTE:

- *The above contents only show the basic functions and operations of the monitoring software EMS tool. If you encounter any problems, please contact the supplier for solution.*

4. How to Match Communication with Inverter

4.1. Supported brands

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.

POWER BASE LV-MATE Compatible Inverter List

POWER BASE HV-MATE Compatible Inverter List

4.2. Inverter matching list

The list tab only lists the inverter manufacturers in 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.

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.

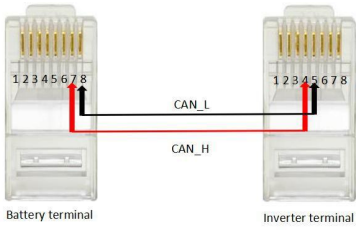
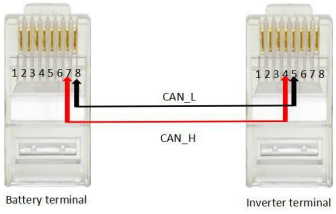
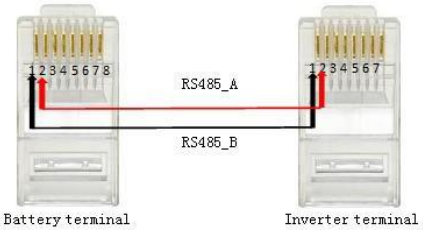
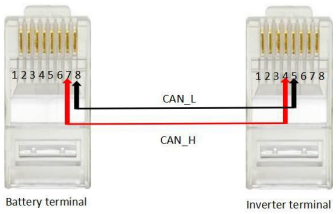
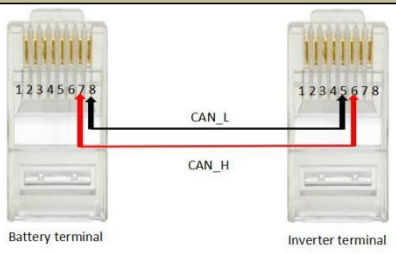
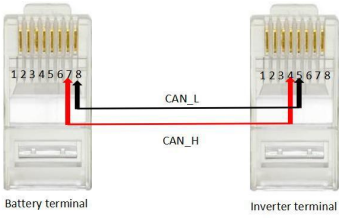
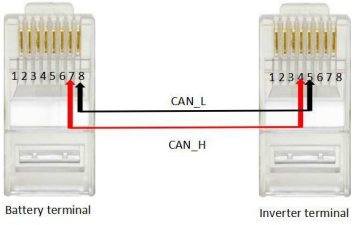
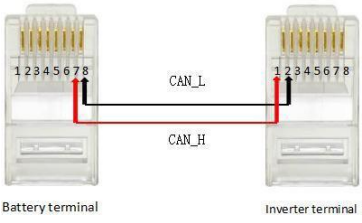
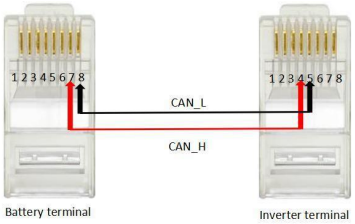
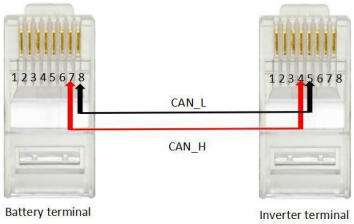
Inverter			Power Base Venus Firmware version	Communication mode
Brand	Type	Protocol Version		
Growatt	SPF 12KT HVM	V1.22	V23041	RS485
	SPH3000	V1.26		CAN
Studer	Xtender-XTH-8000-48	V1.0.3		Xcom-CAN
Sofar	HYD5000-ES	V6.0		CAN
Solis	RHI-5K-48ES	V1.2		CAN
Goodwe	GW5048-EM	V1.5		CAN
Victron	MultiPlus-II	V6.0		CAN
DEYE	SUNSYNK-5K-SG01LP1	V1.5		CAN
SMA	S16.0H-12	V2.0		CAN
Sermatec	SMT-5K-TL-UN	V1.2		CAN

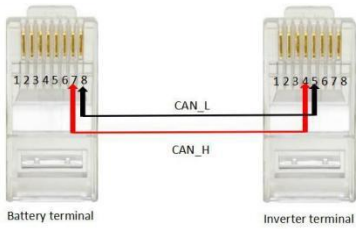
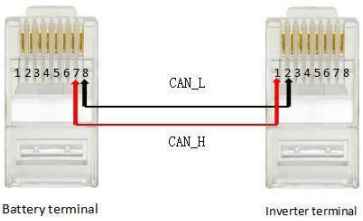
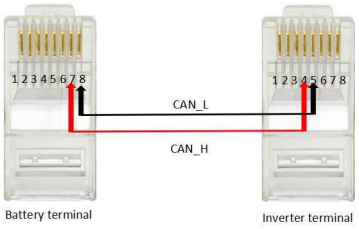
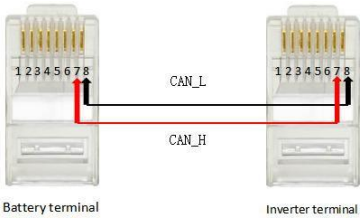
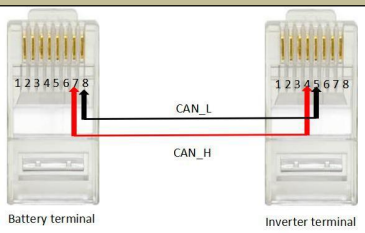
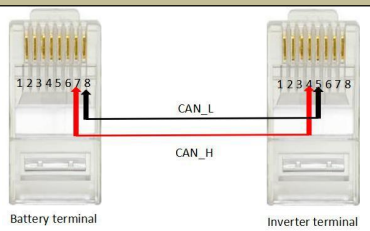
Schneider	Conext TM Gateway	V2.0		CAN
PYLON	SUNSYNK-5K-SG01LP1	V1.2		CAN
Li_PLUS	ZRStandard	V1.2		CAN
Sol-ark	Sol-ark-12k	V1.31		CAN

4.3. Connection with inverter

This section will introduce how to hardware connect Power BASE X1 series 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.

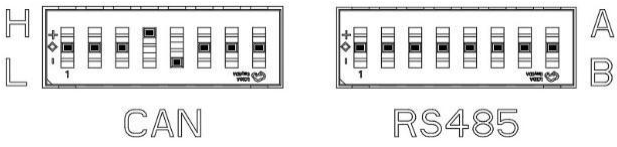
The CAN/RS485 communication port of Power BASE X1 is connected with the communication interface of inverter.

Connect to the DEYE inverter	Connect to the Goodwe inverter
	
Connect to the Growatt-SPF inverter	**Connect to the Growatt-SPH inverter**
	
Connect to the GreenCell inverter	**Connect to the Must inverter**
	
Connect to the Sol-ark-12k inverter	**Connect to the Sofar inverter**
	
Connect to the Solis inverter	**Connect to the SMA inverter**
	

Connect to the Sermatec inverter	Connect to the Studer inverter
	
Connect to the SAJ inverter	**Connect to the Victron inverter**
	
Connect to the Lux inverter	**Connect to the Afore 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.



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.*

5. Safe handling of lithium batteries guide

5.1. Schematic diagram of solution

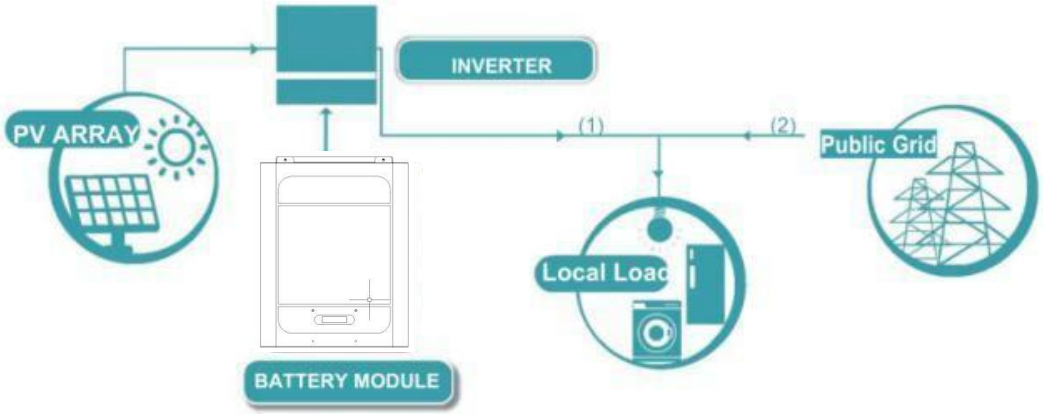


Figure 5.1. Schematic diagram of solution

5.2. Familiar with batteries

Be careful when opening the battery pack. The battery is heavy. Don't lift it with a pole. The weight of the battery can be found in the chapter "specifications".

Familiar with batteries. The battery poles are located on both sides directly behind the battery. The battery polarity is shown on both sides of the battery. The positive pole is represented by "+" and the negative pole by "-".

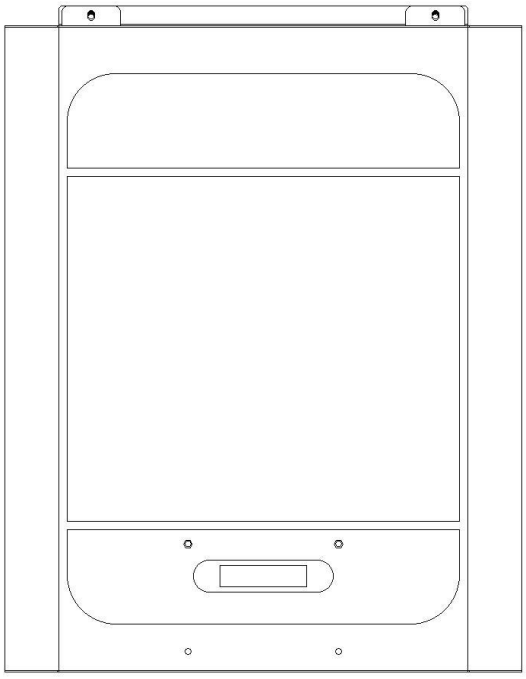


Figure 5.2. Side view of Power Base X1 Battery

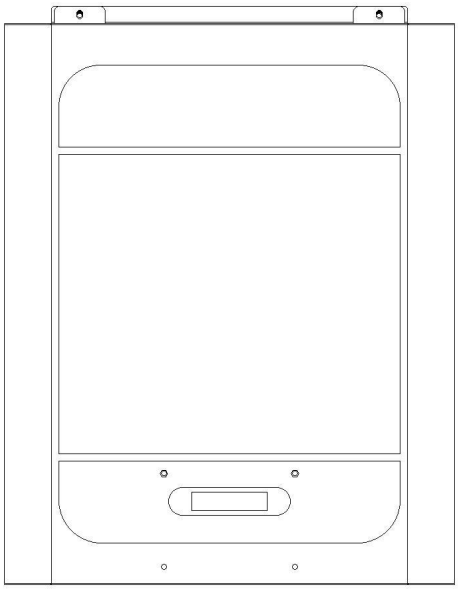


Figure 5.3. Front view of Power Base X1Battery

5.3. 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.

5.4. Tools

The following tools are required to install the battery pack:

Wire cutter

Cable clamp

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.*

5.5. Safety Gear

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

Insulated gloves

Safety goggles

Safety shoes

6. Installation

6.1. Package Items

Unpacking and check the Packing List:

(1) Packing list:

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

 Whole machine system×1	 Connector*2(orange and black)	 UL1015, 4AWG, red and black cable
 Dead plate	 M6*10*2	 expansion bolt
 Communication cable RJ45(2m)	 Pin order select box (optional)	 User's manual
 Communication cable RJ45(1m)		

(2) Connector

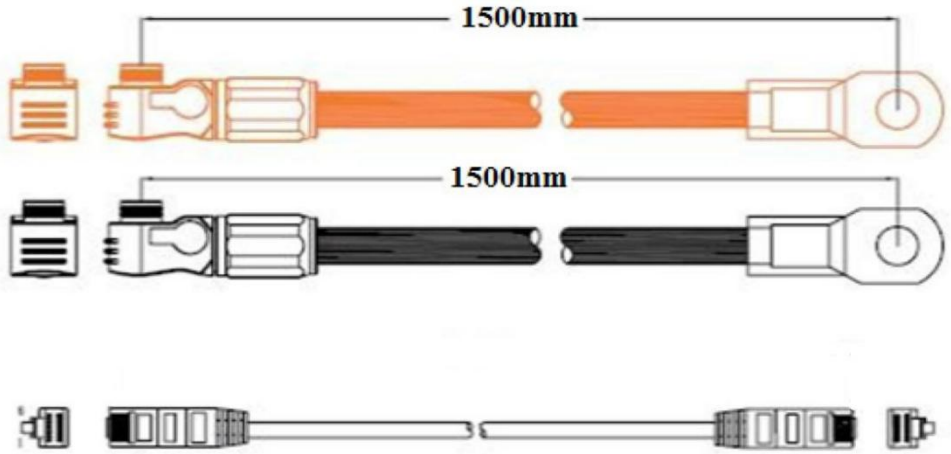
Each battery will be equipped with a positive connector and a negative connector, the two connectors are not connected to the cable, and the user can be wired according to the actual application needs.

Positive connector

Negative connector

(3) Connector For battery module package

Two long power cables and one communication cable for each battery package:



(4) Pin order select box (optional)

Set the pin order of the communication cable of battery and inverter, cooperate with 2 standard network cable.

6.2. Installation location

Make sure that the installation location meets the following conditions:

- ◆ The area is completely waterproof.
- ◆ 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.

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 50°C. Frequent exposure, to harsh temperatures may deteriorate the performance and life of the battery pack.

6.3. Wall mounting installation

Selection of installation position：

1. The Power Base X1 shall be mounted on a solid surface suitable for the size and weight of the inverter.

2. The Power Base X1 shall be installed vertically or on a slope with a maximum of 15 degrees。

3. The ambient temperature should be lower than 50 ℃

4. The installation of power base X1 should avoid direct sunlight, snow, rain, lightning and other bad weather (avoid outdoor installation).

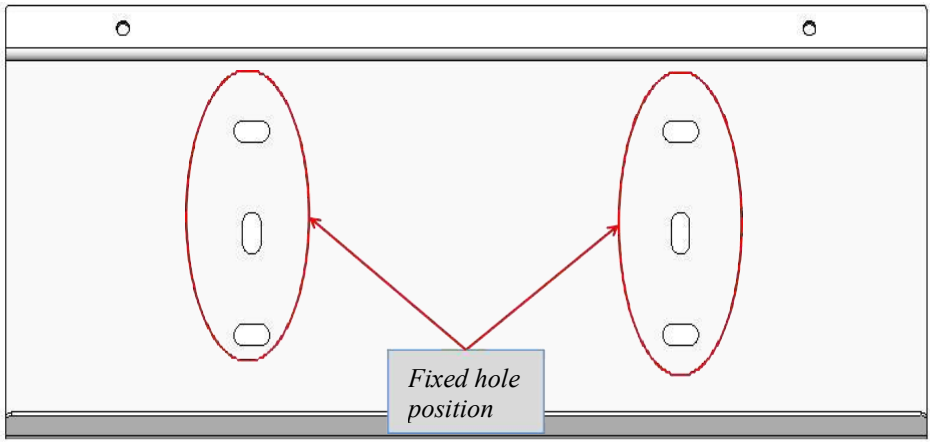
5. Power base X1 should be installed at eye level for easy maintenance.

6. The product label on the power base X1 should be clearly visible after installation.

7. Leave enough space around power base X1 as shown in Figure 3.

6.4. Install:

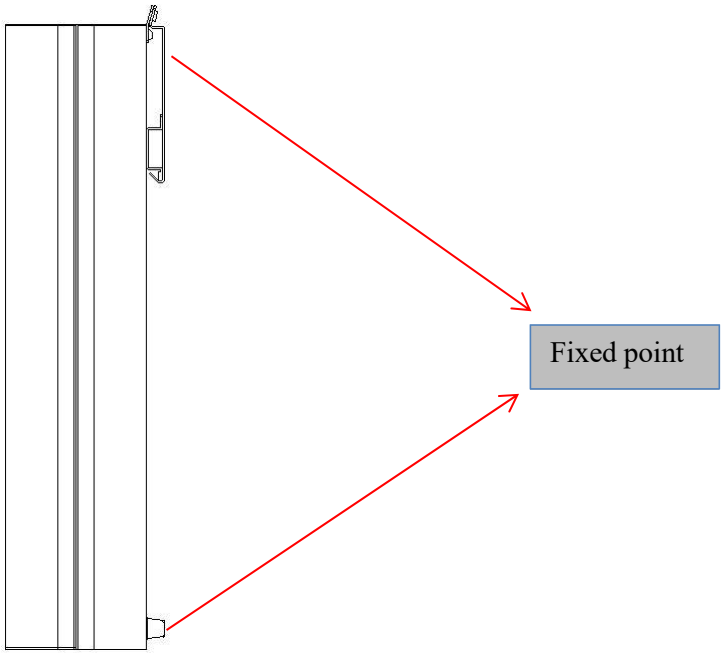
1.Please use the mounting bracket as a template, drill 6 holes (diameter 10 mm, depth 80 mm) in the correct position, and use the expansion bolts in the accessory box to firmly fix the mounting bracket on the wall.



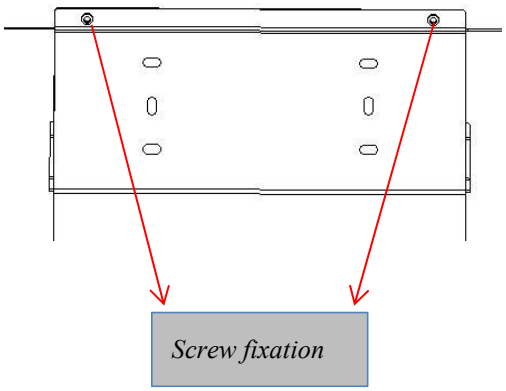
NOTE:

Bearing capacity of the wall must be higher than 17KG, otherwise may not be able to keep Power Base X1 from dropping.

2. During installation, the system hook shall be firmly attached to the bracket, and the holeposition shall correspond to the bracket fixing point.



3. Align the fixing point, install the fixing screw, and fix the screw firmly with the bracket.



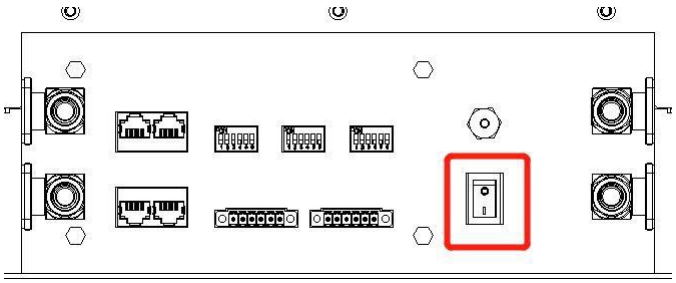
NOTE:

The system cannot be installed near flammable, explosive or strong electric magnetic field. Remember this system is heavy! Please be careful when removing from the package.

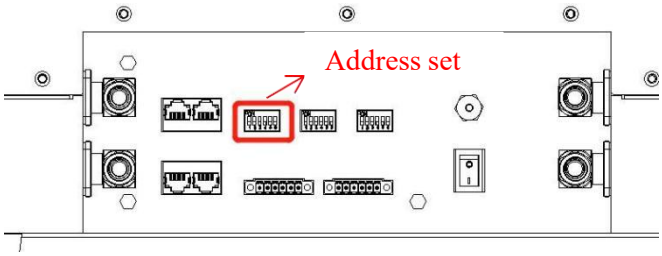
6.5. Parallel installation

A. Connect the whole system to the cable.

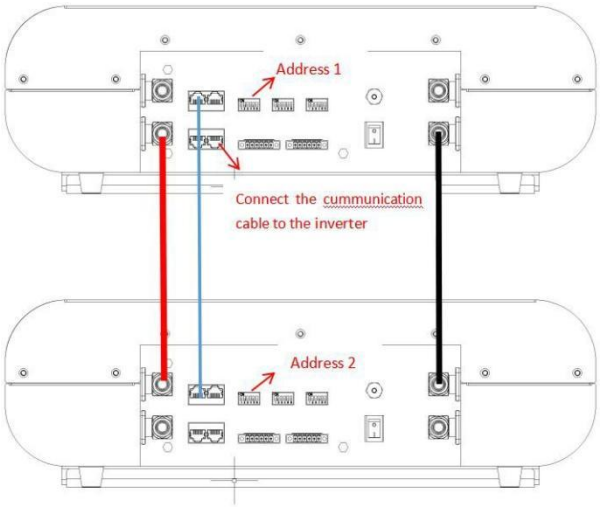
(1) When the system is connected, make sure that the system is shut down. If it is shut down, please turn on the battery.



(2) The module with the dialing switch of 1 is the master battery module, and the other modules are the slave battery module (one master battery module can be configured with up to 30 slave battery modules). The inverter must communicate with the battery module with the address of 1.



(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, and finally connect the communication cable of the host to the frequency converter.



B. Power On

Double-check all the power cable and communication cable.

(1) Turn on the battery and the display will light up and the system will start.

(2) Switch on all the battery systems.

(3)After powering on, the whole system will merge automatically. After merging, all systems will display normally. If the combination fails, the display will show the system disconnectionstatus code 21, which needs to be handled in time.

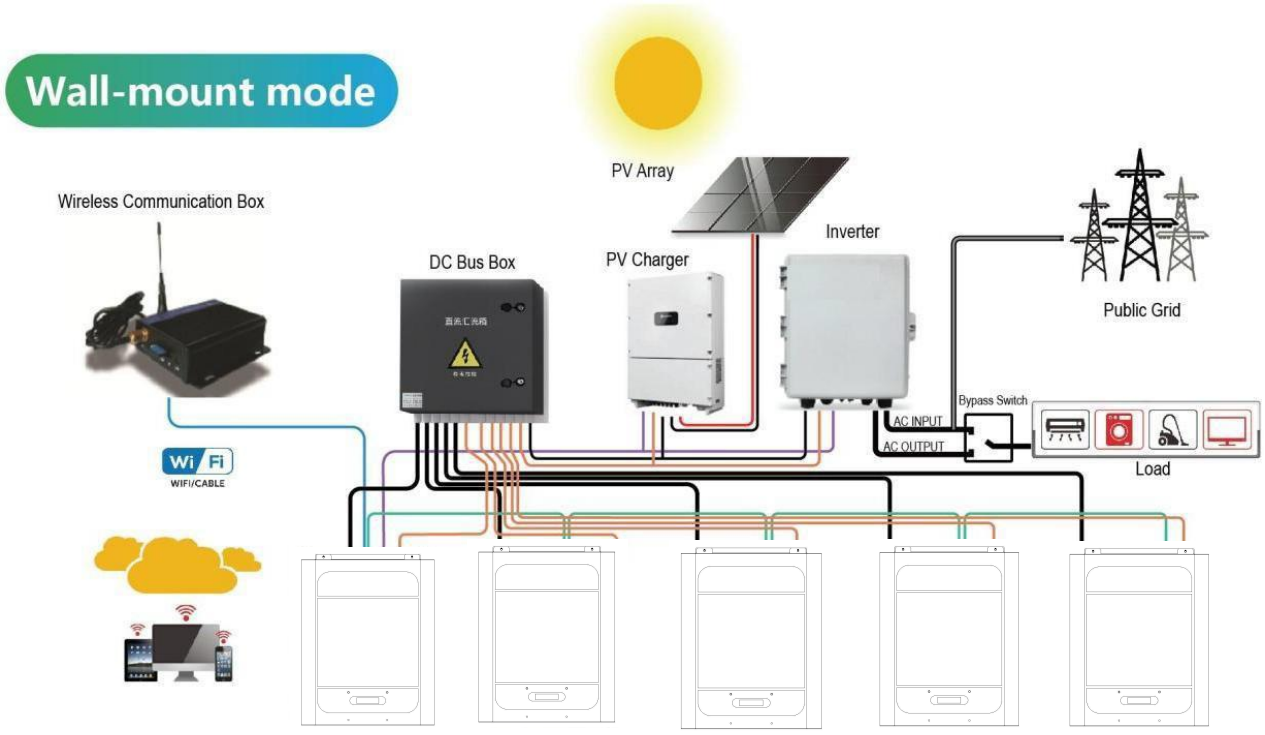


Figure 5.4. Schematic diagram of parallel solution

NOTE:

- To avoid current pulse of the inverter, add on the battery bank. Shall start inverter first or switch on breaker between battery and inverter after all connected batteries turned on.
- Between battery bank and inverter should install breaker to protect system safety.
- All the installation and operation must follow local electric standard.

7. Wi-Fi Configuration

1) Screw the antenna into the antenna connection port firmly before Wi-Fi configuration.

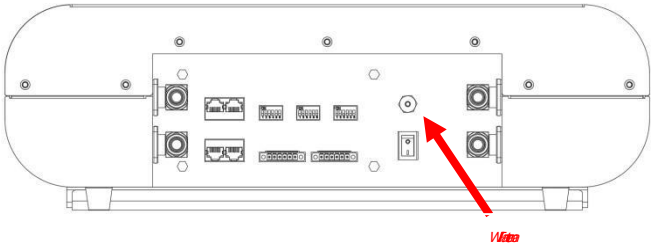
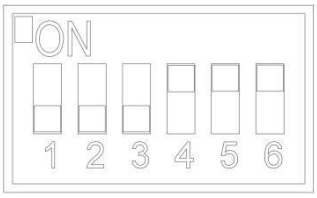


Figure 7.1. WIFI antenna position

2) Set the inverter dip switch of the battery to 56 to enable battery WI-FI.



3) Download and install ZRGP APP from Google or Apple Store by searching Z-Cloud.

Figure 7.2. Install the APP

4) You may acquire the Register Code from your installer for new account registration. If you already had an account, you may use it to log in the APP directly otherwise you need to create an account.

Figure 7.3. Start the APP & Create an account & Sign in

5) Turn to the page ‘Toolbox’ then click the Network, following by the instruction of network setting for WIFI configuration.

Figure 7.4. Network Setting

6) Connect your mobile phone to the WI-FI hotspot from the master controller whose SSID is the same as the controller's serial number (SN) and the password is 12345678.

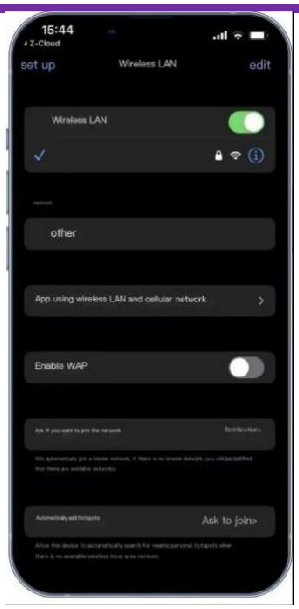


Figure 7.5. Network Setting

7) Enter the SSID and password of your private WI-FI for connecting master controller to your private WI-FI.

Figure 7.6. Connecting Private Wi-Fi

8) Set the inverter dip switch to matching inverter serial number. Please find the detailed comparison table on page 9

9) Ask your installer to assign all your products to your account.

10) Turn to the main page of the APP, create a plant, and set a recognizable name, your email and address for it.

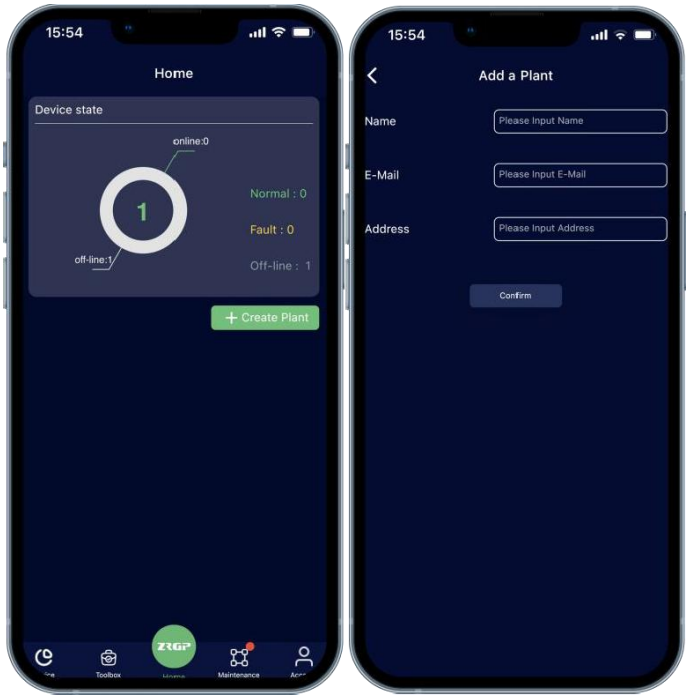


Figure 7.7. Create A New Plant

11) Click the confirm button to create your plant and all your products will show up as their SN, select the proper products and confirm.

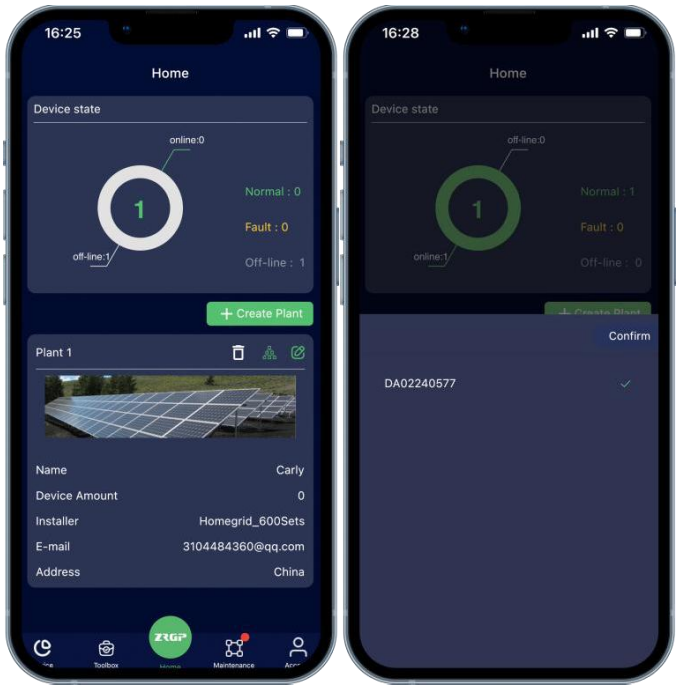


Figure 7.8. Manage Your Plant & Confirm Your Products

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

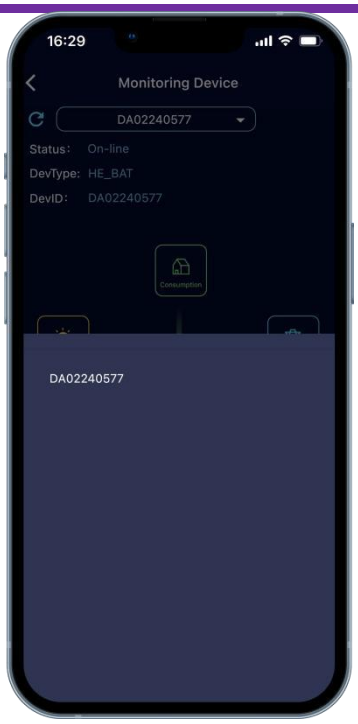


Figure 7.9. Manage Your Products

13) After the product is connected to Wi-Fi, 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.

Figure 7.10. Monitoring Device

8. Trouble Shooting Steps

8.1 Phenomenon and possible causes of failure

1) Unable to turn on the battery.

a.Try to charge the battery by the activation charging function of the inverter when power is on.

2) No output after power on

a. Make sure the address dial code setting is correct, refer to the chapter of address dial code.

b. Make sure SOC is not 0% otherwise charge battery please.

3) Unable to communicate with inverter

a.Make sure the connection of communication cable and power cable is correct, refer to the chapter of connection of cable and power.

b.Make sure the address dial code of the master controller connected to inverter is 1.

c.Make sure the inverter dial code of the master controller connected to inverter is correct, refer to the chapter of inverter dial code.

4) Unable to be charged by inverter:

a. Make sure power cable connection is correct.

b.Check whether inverter has faults.

c.Check whether grid or PV is available.

d.Make sure Time of Use of the inverter setting is correct.

c.Make sure charging voltage and charging current setting of the inverter match the parameters of the battery.

d.Check the battery low or high temperature protection alarm.

e.Check the over current protection alarm.

5) f.Make sure the SOC value is below 96% (default value)5)Unable to discharge while SOC is not zero.

a.Make sure the connection of cables is correct and circuit breaker is ON.

b.Check whether inverter has faults.

c.Make sure the inverter setting is not back up mode.

d.Check whether SOC is lower than the shutdown value of the inverter.

e.Check the battery low or high temperature protection alarm.

f.Check the over current protection alarm.

6) Error or Alarm shown on the screen

a.Check the battery refer to the definition of the error or warming codes. If cannot solve the problem, please contact the installer.

7) Unable to find the battery on the APP & the cloud

a.Make sure the antenna is screwed properly.

b.Make sure the WIFI configuration is correct.

c.Make sure the SSID & PASSWORD of your private WIFI is correct, please enter information case-sensitively without space.

d.Make sure the frequency of the WIFI connected to the product is not 5GHz (2.4GHz and 2.4GHz / 5GHz is acceptable).

e.Make sure the WIFI signal is strong enough.

f.Make sure WIFI is working.

g.Make sure installer is distributed your products on user's account.

h.Try to restart the WIFI router.

8.2 Fault and Troubleshooting

1) Cell voltage off-set protection

a.Restart the battery and see if the warning still remaining contact your distributor.

2) Low battery voltage Discharge protection

a.Need to be charged

3) Discharge circuit failure

a.Restart the battery and check whether the problem is solved.

4) Charge circuit failure

a.Restart the battery and check whether the problem is solved.

5) Cell failure

a. Restart the battery and check whether the problem is solved.

6) Temperature sensor malfunction

a. Restart the battery and check whether the problem is solved.

7) Current sensor malfunction

a. Restart the battery and check whether the problem is solved.

8) Short circuit detected

a. Make sure the external connection for both battery and inverters are proper.
b. Disconnect all external connections and restart the battery

9) Battery voltage sensor malfunction

a. Restart the battery and check whether the problem is solved.

10) Communication between controller and battery failure

a. Check whether the function dial switch is set according to the user manual.

b. Restart the battery.

9. Storage,Transportation and Emergency Situations

9.1 Storage

Recharge and maintain the battery pack regularly every three months to ensure the battery is in the best condition.

9.2 Transportation

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

9.3 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 let people access it, and then contact or an authorized dealer for technical support.

(4). Damaged batteries

Damaged batteries are dangerous and must be handled with the utmost care. They are not fit for use and may pose a danger to people or property. If the battery pack seems to be damaged, pack it in its original container, and then return it to an authorized dealer.

NOTE:

- Damaged batteries may leak electrolytes or produce flammable gas.
- In case a damaged battery needs recycling, it shall follow the local recycling regulation (ie. Regulation (EC) Nº 1013/2006 among European Union) to process and use the best available techniques to achieve a relevant recycling efficiency.

Our Energy Works For You

Website

Linkedin

www.zruipower.com support@zruipower.com +86(0755)2833 9703

ADD:Rm B0302, Building 1, Skyworth Maker World Science Park, No. 12, Gaoke Avenue, Baolong Street, Longgang District, Shenzhen