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User Manual

KON-TEC E-MATE 61-A OUTDOOR

KON-TEC E-MATE 50-61-A OUTDOOR

Energy storage $LiFePO_4$

HV energy storage

61,44 kWh

Catalogue

Preface

Main Contents

This manual describes the KT-LFPHV5.12-12 introduction, transport, installation, operation, maintenance and troubleshooting. Before using this product, be sure to read the manual carefully and operate the energy storage system according to the methods described in this manual, or equipment or personal injury may result.

Target Reader

This document is primarily intended for users:

1 . Technical support engineers: responsible for providing professional technical support and consulting to solve technical problems.

2 . System Installation Engineer: responsible for on-site installation, wiring and hardware configuration of the energy storage system.

3 . Testing engineers: responsible for system debugging and testing to ensure that the system operates normally in accordance with the design requirements.

4 . Maintenance engineers: responsible for daily system maintenance and troubleshooting, to maintain long-term stable operation of the system.

5 . Product end-users: end-users who utilize energy storage systems and need to understand basic operation and maintenance.

Manual Warning Sign Definition

To help users identify potential safety risks and take appropriate precautions to ensure safety when using the energy storage system. Users should read the manual carefully before using the energy storage system and strictly observe all safety warnings and operating instructions in the manual.

Notation	Descriptions
	Used to warn of an imminently hazardous situation which, if not avoided, will result in death or serious bodily injury.
	Used an equipment environmental warning indicating a hazard with a medium level of risk that may result in death or typhoid if not avoided.
	Hazards with a low level of risk of causing minor or moderate harm if not avoided.

1 Safety Precautions

1.1 Safety Instructions

Please strictly observe the terms of the safety regulations in this product manual. In order to avoid possible injury or death and property damage during the use of this product, as well as to improve the service life and use efficiency of this product, please be sure to read the safety regulations carefully.

1 . Do not immerse the battery in water;

2 . Improper use and storage of the battery poses a risk of fire, explosion, and burns; do not disassemble, crush, incinerate, heat, or throw batteries into fire;

3 . Do not expose the battery to fire or prolonged exposure to temperatures exceeding the temperature conditions specified in this manual, as this may result in fire;

4 . When batteries reach the end of their useful life, used batteries should be disposed of in a timely manner in accordance with local recycling or waste regulations;

5 . Do not disassemble, dismantle or recondition the battery in any way without authorization;

6 . Do not mix different sizes and brands of lithium-ion batteries;

7 . Do not use the battery if it emits a strange odor, heat, deformation, discoloration or any other abnormal phenomenon;

8 . Do not short-circuit the positive and negative terminals of the battery, otherwise strong current and high temperature may cause personal injury or fire;

9 . Connect the positive and negative terminals of the battery in strict accordance with the labeling and instructions, and prohibit reverse or series wire charging;

10 . Prohibit over charging/over discharging of the battery, otherwise it may cause overheating and fire accidents;

11 . Avoid skin and eye contact with the electrolyte when it is leaking. In case of contact, wash the contact area immediately with plenty of water and seek medical help;

12 . It is prohibited for any person or animal to ingest any part of the battery or any substance contained in the battery;

13 . Batteries are potentially hazardous and must be operated and maintained with appropriate protective measures. Failure to do so may result in serious personal injury and property damage;

14 . Prohibit any behavior that may cause deformation of the battery, such as needling, hammering, etc., which may cause a short circuit or fire in the battery.

1.2 Personnel Requirements

1 . When operating or maintaining the energy storage cabinet, it's necessary to wear a helmet, insulated gloves, insulated shoes, goggles, it is strictly prohibited to wear watches and other metal jewelry;

2 . Only qualified electricians and trained personnel can operate and maintain this product, and complete professional electrical equipment is required;

3 . Personnel responsible for the installation and maintenance of the equipment must be strictly trained in the correct operation methods, and be aware of the various safety precautions and the relevant standards of the country/region where they work;

4 . Replacement of equipment or parts (including software) must be done by authorized professionals;

5 . Keep persons other than those operating the equipment away from the equipment.

1.3 Electrostatic Protection ⚠

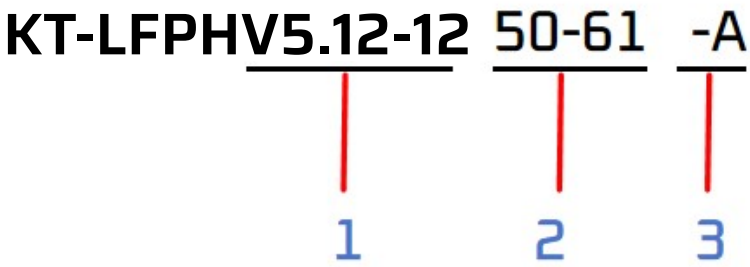
Accumulation of static electricity may cause electric shocks,fires, explosions, failure and damage of electronic devices, etc. There are circuit boards or other static-sensitive components in the energy storage cabinet. Board or other static-sensitive components, in order to prevent or reduce the harm of static electricity, it is necessaryto do a good job of static protection, and thus inhibit the generation of static electricity, accelerate the leakage of static electricity, static electricity neutralization. The prevention methods include but are not limited to:

1 . During the component replacement process,keep all the components that have not been installed in the ESDshielding bag, and the temporarily removed device is placed on a foam mat with anti-static function;

2 . Do not touch solder joints, pins or exposedcircuitry.

2 Product Introduction

2.1 Naming Rule



NO.	Meaning	Explanation of Parameter Values
1		KT-LFPHV5.12-12
2	Energy Level	50-61 : Rated 50 Rated 61kWh
3	Cooling Method	A: Cooling

2.2 Energy Storage Systems Overview

2.2.1 Systems Overview

This energy storage system adopts the form of one-piece outdoor cabinet, which integrates battery Pack, High Voltage (HV) control box, Hybrid inverter, Battery Management System (BMS), Energy Management System(EMS),Air Conditioning (AC), Power Distribution Unit, etc..

2.2.2 Working Principle

The system consists of 1 Pcs50kW Hybrid inverter, 12 Pcsbattery Pack in series and 1 PcsHVbox. The

main circuit of the HV box is mainly composed of circuit breaker, fuse, total positive contactor, total negative contactor, pre-charged contactor, pre-charged resistor, shunt, etc..

2.3 Energy Storage Cabinet Exterior View

Fig. 2-1 KT-LFPHV5.12-12 -cooled Energy Storage Cabinet Exterior View

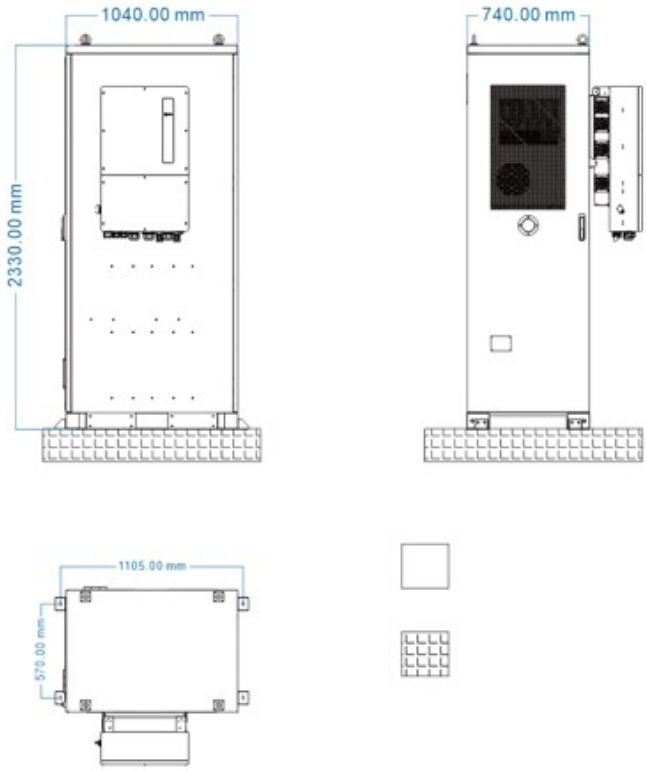


Fig. 2-2 KT-LFPHV5.12-12 Air-cooled Energy Storage Cabinet Exterior View Dimension

2.4 Technical Parameters

No.	Items	Spec.	Remarks
		System Parameters	
1	Rated	50	
2	Rated	61.44 kWh	
3	Rated	614.4	
4	System	~	
5	Operating Temperature Range	-30℃ ~+55℃	Derating below-15 ℃ or above 45 ℃
6	Level	IP55	
7	Corrosion	C4	
8	Dimension	740*1040*2330mm	
9	Weight	1200 kg	
		Pack Parameters	
10	Configuration	1P16S	
11	Rated Capacity	100 Ah	
12	Rated Voltage	51.2V	
13	Voltage Range	40V-58.4V	cell ~
14	Rated Energy	5.12 kWh	
15	Charge /Discharge Current	≤1 P	
16	Altitude	3000 m	>2000m Derating
17	IP Level	IP20	
18	Dimension	590* 440*137mm	W*D*H
19	Weight	44±2 kg	
		PV Parameters (PV DC side)	
20	Recommended	100 kW	/
21	Max. usable PV input power	96 kW	/
22	Max. input voltage	1000 V	/
23	Rated voltage	600 V	/

24	Start-up voltage	180 V	/
25	MPPTvoltage range	150 - 850 V	/
26	/ Max. input	4 / 8	/
	AC Parameters		
27	Rated Output Power	50 kW	
28	Rated Grid Voltage	380V±15%	
29	Rated Current	76 A	
30	Rated Frequency	50 Hz/60 Hz±2.5 Hz	
31	Output THDI	<3%	
32	Power Factor	-1~1	
33	AC Output Type	3W+N+PE	
34	Charge/D onversion	<100 ms	
35	Maximum Efficiency	97.8%	
	HV Box Parameters		
36	Rated Voltage	1000 V	
37	Rated Current	100 A	
38	IP Level	IP20	
39	Dimension	440*590*147mm	W*D*H
40	Weight	22 kg	
	Other Parameters		
41	Fire Fighting System	Aerosol	
42	Altitude	3000 m	>2000m Derating
43	Noise	<75dB	
44	Environment Humidity	0~95℃ ,non-condensing	
45	Cooling Method	Air Cooling	

46	Environmental Requirement	ROHS
47	Communication Protocol	CAN/RS485
48	Design Service Life	6000 (25 ± 2 ℃, 0.5P/0.5P,70% EOL,90%DOD /10 years, whichever comes first)
49	Compliance	UN38.3、UN3480、EN 62477-1、EN IEC61000-6-2、EN 61000-6-4

2.5 Main Components

2.5.1 ESSCabinet

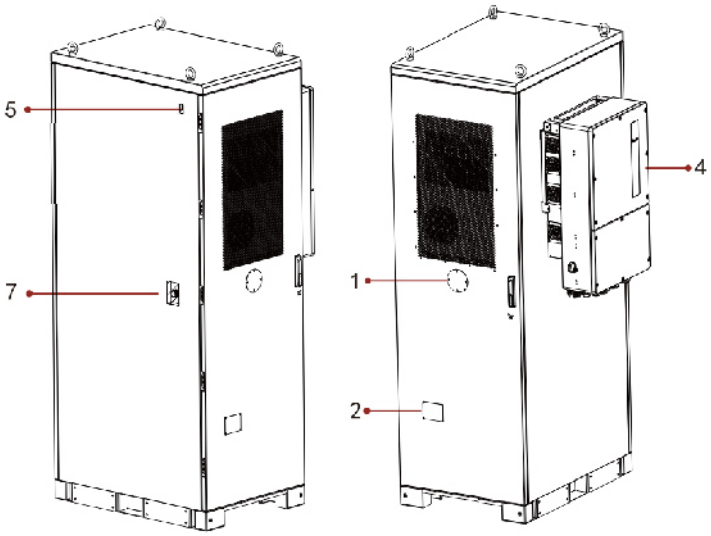


Fig.2-3 Description of Cabinet Components (Closed State)

Table 2-1 Cabinet Front Door Components

No.	Components	Amounts	Remark
1	Emergency stop button	1	Pressthis button when the device is in emergency
2	Nameplate	1	Productinformation
3	Reserved	/	/
4	Hybrid	1	
5	antenna outlet port	1	Using report internal temperature and
6	Reserved	/	/
7	connection	1	out, cooling

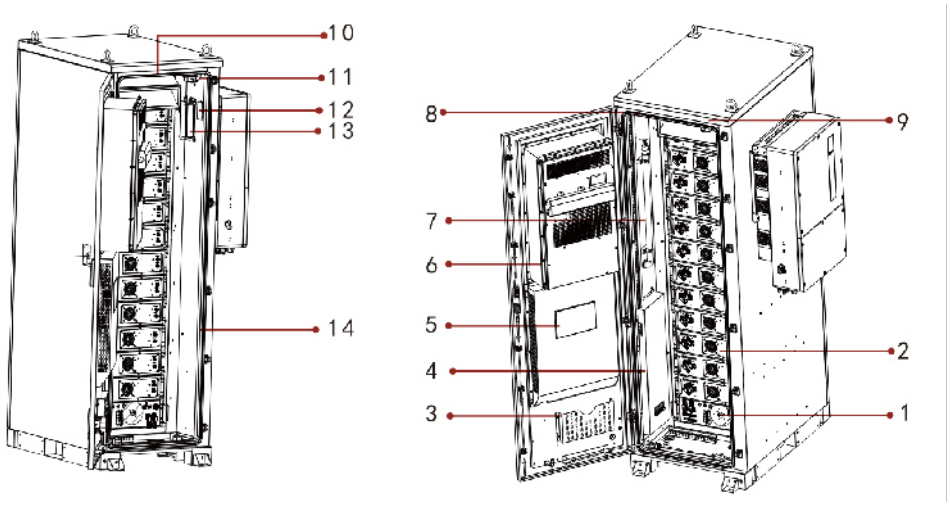


Fig.2-4 Introduction to Cabinet Components (Open Door State)

Table 2-2 Cabinet Component Configuration

No.	Components	Amounts	Remark
1	HV Box	1	/
2	Battery pack	1	composed of 16 in
3	File box	1	Deposit file
4	distribution unit	11	/
5	EMS display	1	/
6	Air conditioner	1	2 W/ system cabinet conditioning
7	Water pipe	1	/
8		1	For temperature detection
9	Entrance guard	1	Monitor the status of the door
10	LED tube	1	For cabinet lighting
11	Smoke detector	1	For smoke detection
12	Aerosol extinguishing	1	1.69 M3
13	Cabinet	1	/

2.5.2 Battery Pack

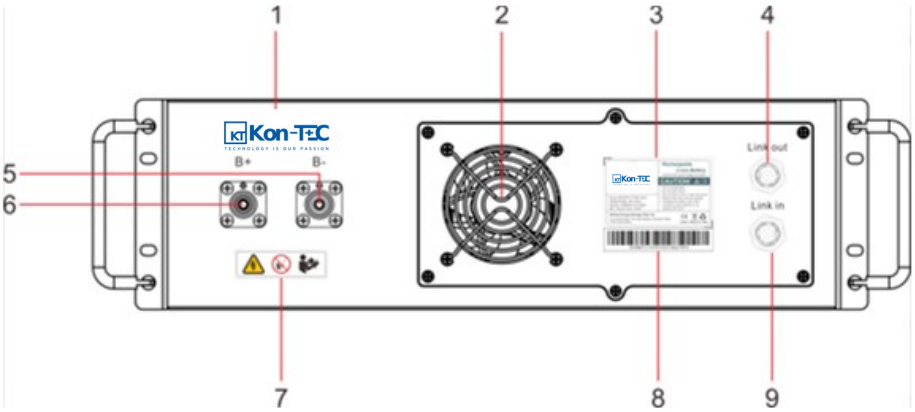


Fig. 2-5 Pack Panel Schematic diagram

Table 2-2 Device Description

No.	Description	Remark
1	LOGO	/
2	Fan	fan
3	Nameplate sticker	/
4	Communication output port	/
5	Negative terminal	/
6	Positive terminal	/
7	Warning label	/
8	Serial number tag	/
9	Communication input port	/

2.5.3 High-Voltage Box

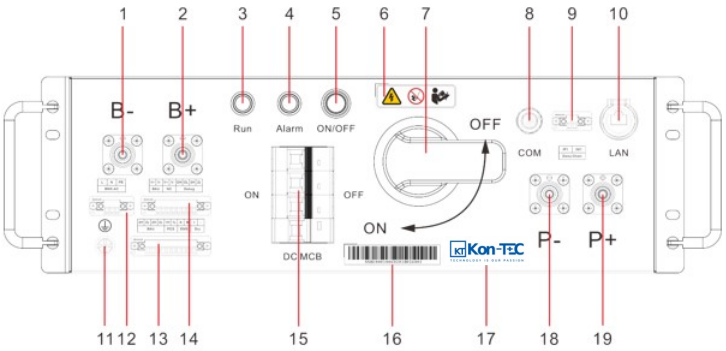


Fig. 2-6 HVBox Panel Schematic Diagram

Table 2-2 Device Description

NO.	Description	
1	B-	Battery cluster -

2	B+	Battery cluster +
3	Run	Running light
4	Alarm	Warning light
5	ON/OFF	HVbox power-on/off switch
6	Warning Label	/
7	Handle	HVbox high voltage power switch
8	COM2	Communication interface with battery clusters
9	COM3	Communication interface with battery clusters
10	LAN	External network communication port
11	GND	/
12	COM1	AC power external port
13	COM5	External communications interface
14	COM4	Power output & debug port
15	DC MCB	DCDC power switch
16	Barcode	/
17	Logo	Supplier name
18	P-	PCS -
19	P+	PCS +

2.5.4 Air Conditioner

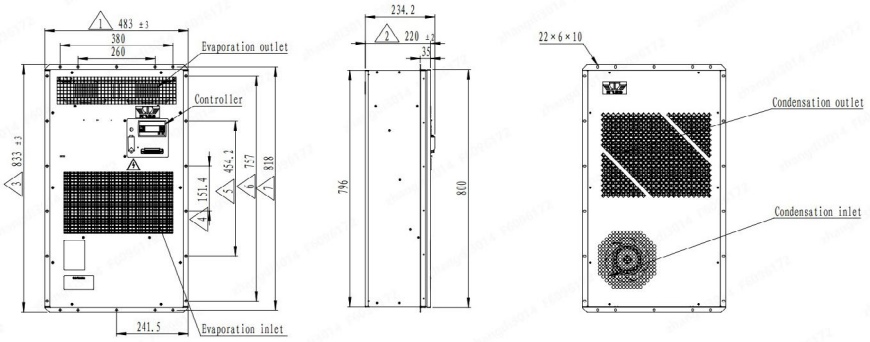


Fig.2-7 Air Conditioner Diagrammatic Sketch

Table 2-3 Air Conditioning Technical Parameters

No.	Item	Spec.
1	Operation Temperature	-45~50 ℃
2	Rated input	
3	Rated Cooling	2000
4	Rated (Cooling/Heating)	1000/1200
5	Rated Current (Cooling/Heating)	
6	Heating	1000
7		900m^3/h
8	Weight	38 kg

9	Level	IP55
10	Refrigerating Fluid	R134a

2.5.4.1 Introduction of Air-conditioning Panel and Key Functions

The air conditioner enters standby loading after powering up, if there is no EMS communication strong control mode when set the parameters of the air conditioner through the panel.

Fig. 2-8 Display and Setting Board

Buttons	Function Descriptions
▲	To modify temperature parameter in setting mode.
▼	To check cabinet-in temperature, cabinet-in humidity, condensing temperature, defrosting temperature and setting temperature in working mode.
▲ ▼	Press and hold 3 sec. at the same time to enter the setting state, the digital tube blinks, 5 sec no operation automatically exit.
⚙	Long key press ⚙ for 3 sec can enter the parameter setting interface. setup mode is used to switch the parameter setting items.
⏻	Press ⏻ to turn on the power in standby mode, press ⏻ to turn off the power in power-on mode, and long press ⏻ for 3 sec to reset in faulty mode.

2.5.4.2 Display Instructions

The control board has three LED indicators for current chiller status and a four-digit, seven-segment LED digital tube display:

Name	Function Descriptions
Operation Light	Blinking: running
Cooling Indicator	Refrigeration compressor operating instructions
Alarm Indicator	Marking equipment is faulty and needs to be serviced
Display Window	Current ambient, defrosting and preset displayed, which can switched by pressing "▲" or "▼".

As shown in the following Fig., after switching on the cooling unit, the software version is displayed for 2 sec., (i.e., "r1. 0" means software version is 1.0), followed by the setting state.

The controller has a 7-segment LED display, which can normally display the current ambient temperature after switching on the power supply, as shown below:

At this time, press the "▼" key, in the frost melting temperature and cabinet humidity, condensing temperature and preset temperature directly switch. The defrost temperature is shown below:

2.5.4.3 Modification Via Panel Parameters

After switching on the power supply, press "UP" and "DOWN" buttons simultaneously for 2 sec. to enter the password input interface, 【pd00】 is displayed. Then press the "DOWN" to modify the value of the password to 1, press the "UP" to enter factory parameter setting state, password error will automatically exit (Password:1). The setting state automatically exits without operations for 5 sec., and ambient temperature is displayed. automatically, and display the temperature inside the cabinet.

2.5.6 Hybrid Inverter

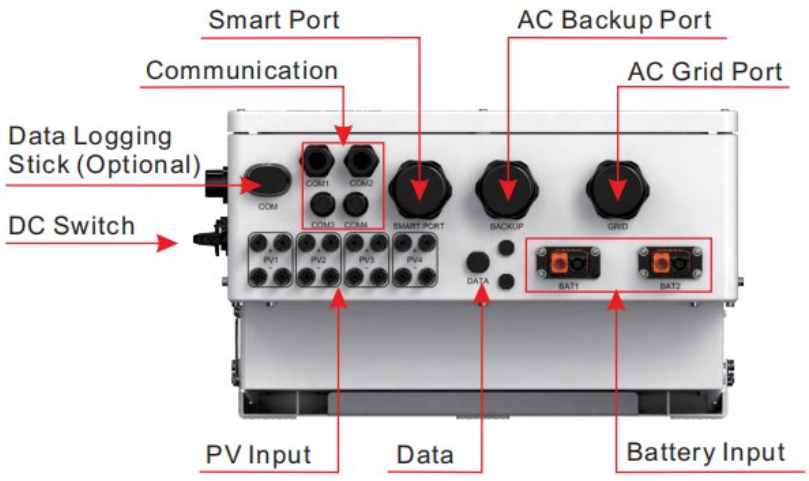


Fig. 2-9 PCS Panel Diagrammatic Sketch

Table 2-4 PCS Technical Parameters

No.	Symbol/Name	Function Description
1	Switch	disconnect switch
2	COM	data connected version of will
3	COM1	RS485 and CAN communication and parallel should through
4	COM2	RS485 and CAN communication and

		parallel should through
5	COM3	Communication 14PIN terminal should through
6	COM4	Communication 14PIN terminal should through
7	Smart Port	Conduit should connected
8	Backup	Conduit backup panel should connected
9	Grid	Conduit main panel should connected
10	PVModule Input	Conduit should connected
11	Battery Connection	Conduit should connected
12		of signal

2.5.8 Local EMS/HMI

2.5.8.1 EMSOverview

EMS is responsible for monitoring and energy optimization scheduling of battery system BMS, converter system PCS,power distribution system,power l

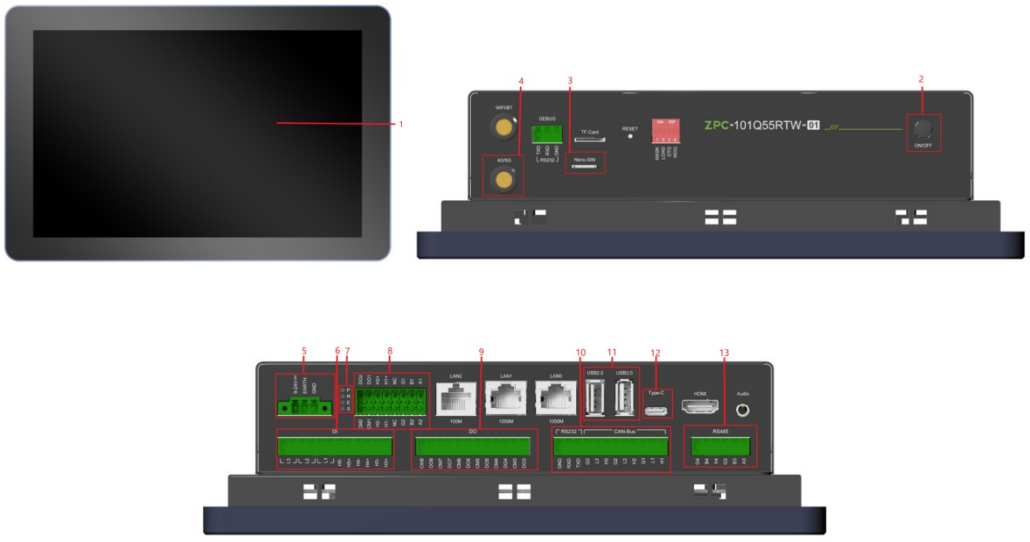


Fig. 2-10 EMS/HMISchematic Diagram

2.5.9 Fire Suppression System

The energy storage cabinet fire protection system includes pack-level and cluster-level fire protection. Pack-level fire protection can provide early detection of fire sources at the root of the pack and rapid-fire extinguishing, while cluster-level fire protection can focus on the external fire sourcesof the system,preventing their spread and inhibiting their growth.

2.5.9.1 Cluster-level Fire Protection

Cluster-level fire protection systemis fire extinguishing system.

2.5.9.2 Fire Safety System Components

Table 2-5 Fire Safety System Components

1		1
2		1
3	firefighting system	1
4	erosol	1

2.5.9.3 Fire hose systems

NOTICE

- Notice!:The internal temperature of the energy storage system reaches 68℃ , the red thermal glass bulb on the fire extinguishing hose explodes, and water is sprayed to extinguish the fire and cool the energy storage system.
- It is recommended to install water pipes with an external diameter of DN 25.

Single Cabinet Installation:When installing a single cabinet, it is recommended to install an extension. First remove the plug above the cabinet, then connect the pagoda connector to the interface of the cabinet and connect it to the water source to complete the installation of the water pipe (the direction of installation is according to the customer's requirements).

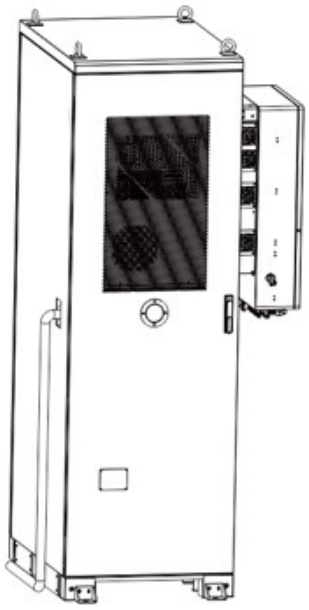


Fig.2-11 Single Cabinet Plumbing Installation

Multi-cabinet installation: When installing multiple cabinets, it is recommended that extension tubes be installed. Then install the tee connector to connect to the neighboring cabinets. Finally connect the water pipe (water source direction according to customer's requirement).

3 Product Lifting, Transport, Storage

- Prohibition of rough loading and unloading, as this may result in short-circuiting, damage, fire or explosion of the battery.

3.1 Hoisting Operation

3.1.1 Safety Precautions for Hoisting Operations

- Throughout the entire hoisting process, it is essential to strictly follow the safety operating procedures of the crane.
- Within a 10-meter radius of the operating area, no one is allowed to stand, especially under the crane arm and directly below any lifted or moving machinery, to prevent accidents and casualties.
- In case of adverse weather conditions, such as heavy rain, fog, or strong winds, hoisting operations should be halted.

3.1.2 Preparations Before Hoisting

- Crane Preparation : The total weight of the equipment (including packaging) is about 1.2 tons, please select the crane lifting tonnage according to the total weight of the equipment and the site conditions, recommended tonnage: 5 to 8 tons.
- Tool Preparation : Wire rope, buckles, brace, etc..

3.1.3 Hoisting Process

- The hoisting process must be carried out strictly in accordance with the hoisting diagram. For specific details, please refer to the attached Fig.3-1 below.
- Lifting should be done vertically, and it is prohibited to drag on the ground or to push and drag across any surface.
- After the cabinet is lifted 300mm off the ground, the movement should be paused to inspect the connection of the lifting gear. Only after confirming that the connection is secure, then continue with the lifting process.
- Throughout the entire hoisting process, it should be carried out slowly, with careful observation of the box's balance. The movement must not be too fast.

Fig.3-1 Lifting Schematic

3.2 Forklift Operation

When conducting forklift operations with a forklift, the following conditions must be met:

1. The forklift used should have adequate load capacity (it is recommended to have at least 5 tons).
2. When using a forklift for lifting operations, the fork should be fully inserted into the entire depth of the energy storage cabinet, with the fork length being no less than 1500mm. As shown in Fig. 3-2 below:

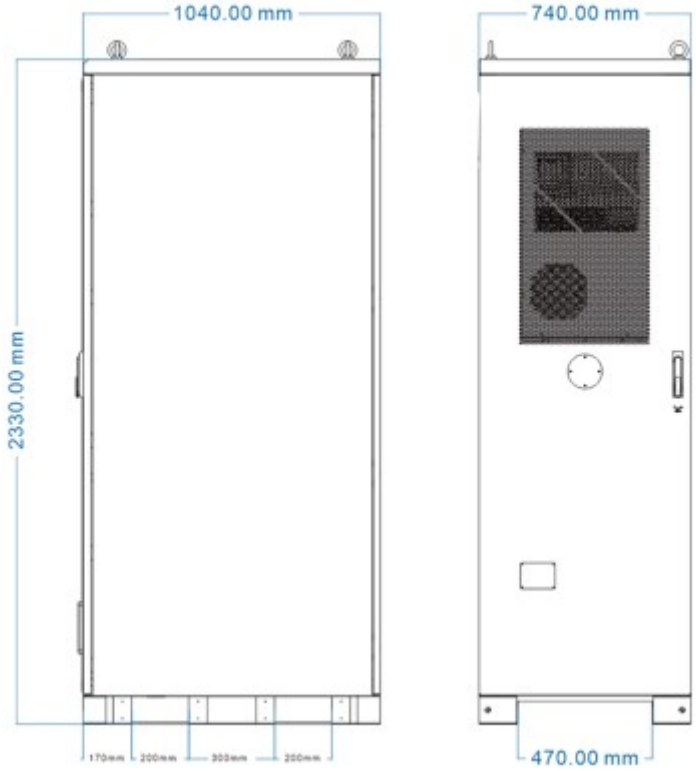


Fig.3-2 Forklift Hole Diagram

3. During the movement, make sure that it is slow and smooth, and a test fork must be performed.
4. For safety considerations during forklift loading, it is recommended that a safety belt be tied around the energy storage cabinet and attached to the forklift crossbar. For specific forklift operations, refer to Fig.3-3 below.

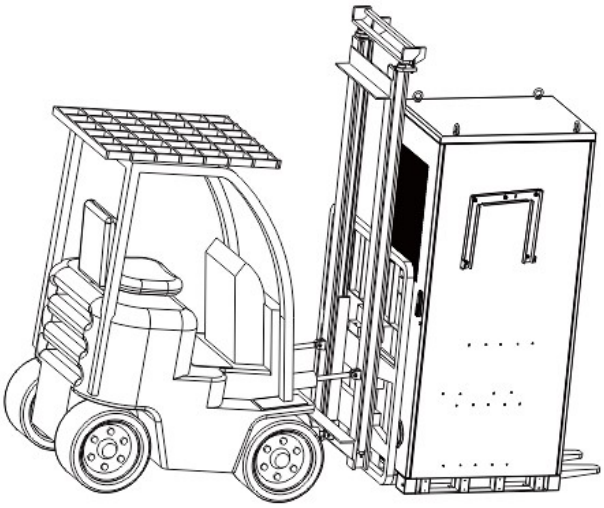


Fig. 3-3 Fork Diagram

- Always keep in mind the mechanical parameters of the energy storage systemduring transportation and handling
- Dimension(W*D*H):740*1040*2230mm
- Weight: about 1200kg

4 Equipment Installation

4.1 Installation Precautions

4.1.1 Installation Requirements

- Becareful not to touch the staff when the cabinet is lifted to the ground.
- Specializedinstallation isolation areas are required to perform installation operations.
- During the lifting process, pay more attention to the energy storage cabinets to be held lightly.
- Installation should only be carried out by installers trained in high voltage electrical handling.
- Do not install the energy storage cabinet if it is defective, cracked or damaged.
- Do not attempt to open, disassemble or modify the energy storage cabinet during installation.
- Do not install in inclement weather such as rain, sand, etc..
- To protect the Energy Storage Cabinet and its components from damage during transportation, do not hit, drag or step on the EnergyStorage Cabinet, and do not subject the Energy Storage Cabinet to any strong external force.
- Do not insert foreign objects into any part of the energy storage cabinet.
- Do not exposethe energy storage cabinet or its components directly to flames.
- Do not install energy storage cabinets near heating equipment.
- Do not immersethe EnergyStorage Cabinet or its components in water or other liquids.
- Please place the energy storage cabinet on a level floor and make sure that it is placed smoothlywithout wobbling or tilting.
- The installation of energy storage cabinets should take into account the bearing and loading capacity of the ground on which they are installed.

4.2 Pre-installation

4.2.1 Installation Environmental Requirements

Considering the space requirements of the energy storage battery storage cabinet, the specific installation distance is based on the requirements of local design and installation specifications.

> ⚠ NOTICE
>
> - The maintenance space of the front door of the cabinet is required to be not less than 1.5m (if a forklift is needed to replace the pack, it is recommended to reserve 2.5m.
> - The maintenance space on the left and right sides is required to be not less than 0.2m.
> - The maintenance space of the back door of the cabinet is required to be not less than 0.2m.
> - Environment Humidity: 0~95 ℃. non-condensing.
> - Altitude: 3000m (>2000m derating).

4.2.1.1 Installation Project Site Requirements

Refer to Fig. 4-1 below for a diagram of the minimum dimensions for the installation and operation and maintenance of energy storage cabinets:

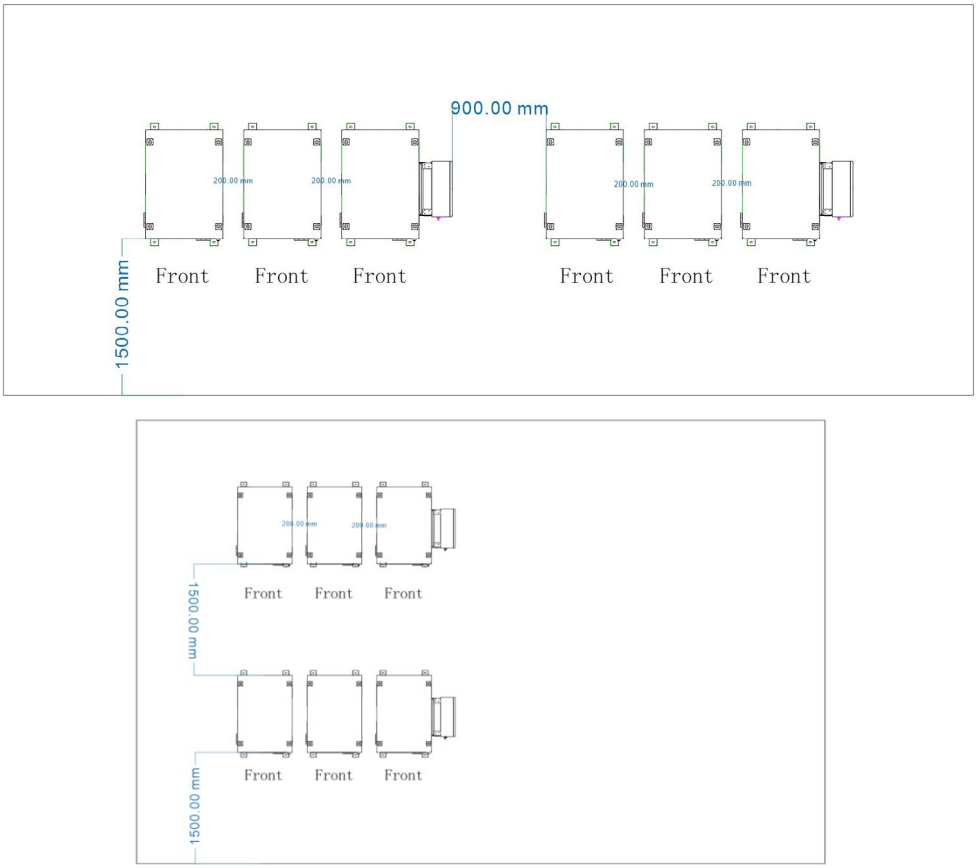


Fig. 4-1 Installation Site Requirements

4.2.1.2 Foundation requirements

1. The installation level should be higher than the highest water level in the history of the area and at least 200mm higher than the horizontal ground, and the installation position should not be in low-lying areas. The installation site should have a dry climate, good ventilation, and be located away

from areas prone to fire or explosion hazards.

2. The energy storage cabinet must be mounted on concrete or other non-combustible surfaces, and the mounting plane must be level, firm, and flat, with sufficient bearing capacity to prohibit depressionsor tilting.

3. The foundation soil needs to have a certain degree of compactness,and it is recommended that the relative density of the soil at the installation site is not less than 98%. If the soil is loose, corresponding measures must be taken to ensure the stability of the foundation. The equipment foundation is configured according to the total weight of the equipment,if the foundation capacity is not satisfied, it needsto be reviewed.

4. Equipment foundation excavation is strictly prohibited after soaking water disturbance, if soaking water disturbance should continue to excavate and replace the fill.

5. Equipment foundation and cabinet contact surface level error less3m.

6. Construction of drainage facilities in conjunction with local geology and municipal supporting drainage requirementsto ensurethat water does not accumulate at the foundation of the equipment. foundation construction should meet the local historical maximum rainfall drainage requirements,and the discharged water needsto be treated in accordance with local laws and regulations.

7. When constructing the equipment foundation, it's important to consider the energy storage cabinet cable outlet and reserve a trench or inlet hole. The trench must incorporate necessary waterproof and moisture-proof designsto prevent cable aging and short circuits, which could affect the normal operation of the energy storage equipment. Due to the high power of the equipment and the correspondingly thick cables required, the design of the trench must take into account the cross-sectionalarea of the cables adequately.

8. The holes reservedfor the foundation of the equipment and the holesfor the inlet lines at the bottom of the equipment shall be blocked.

9. Customers can determine the number of cables supports based on their needs,and the cable supports must fully consider the weight and size of the equipment. When laying cables, communication lines,power lines,and power cables need to be laid separately. Direct current circuits and alternating current circuits should be laid separately, and the distance between different cables should be greater than 300mm.

10. Site Location Requirements. The area where the equipment is placed should be firm, level, well drained, and free of obstructions or protrusions.

4.2.2 Equipment Ventilation Requirements

The operation of energy storage equipment generates a large amount of heat, and high equipment temperatures can cause deterioration of the electrical parameters of the energy storage equipment and may cause damage to the energy storage equipment. To ensure the heat dissipation of the energy storage device,the installation environment must meet the following requirements:

1 . The equipment shouldbe installed in a well-ventilated environment.

2 . The air inlet must ensurethat enough fresh air enters into enters.

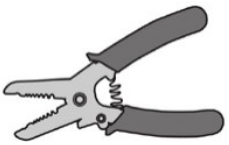
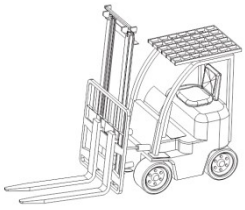
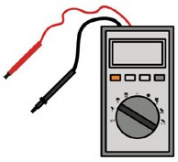
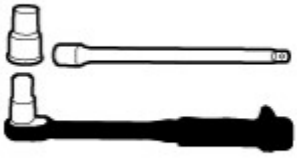
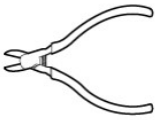
3 . The ventilation systemfor the equipment is recommendedto be separate from the rest of the ventilation systemin the control room.

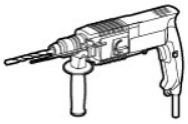
4 . If the equipment overheats,checkwhether the air ventsare properly ventilated.

4.2.3 Installation Tool Preparation

Table 4-1 Tool Preparation

Tool	Q

Wire Stripper	1	
Electric Forklift Truck	1	
Multimeter	1	
Torque Wrench	1	
Insulated Socket Wrench	1	
Tweezers	1	
Heat Gun	1	
Hand Forklift	1	

Pneumatic Drill	1	
Art Knife	1	
Safety Gloves	1	
Protective Glasses	1	
Insulating Shoes	1	
Safety Helmet	1	

4.2.4 Pre-installation Inspection

Table 4-2 Inspection Items

.	
1	that packing not missing,damaged, damp
2	unpacking, shell of each without deformation, paint loss, rupture and other abnormalities, and no water damage and other abnormalities in the shell.
3	of and count according list that (optional).

4.3 Energy Storage System Structure Installation

4.3.1 Cabinet Package Removing & Installation

Step 1: Removethe outer box packaging

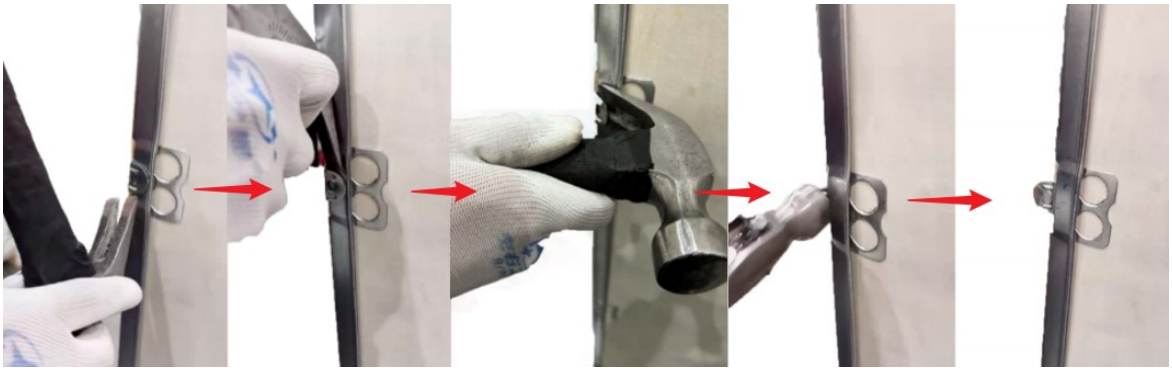


Fig.4-2 Schematic Diagram of the Removal of the Wooden Box

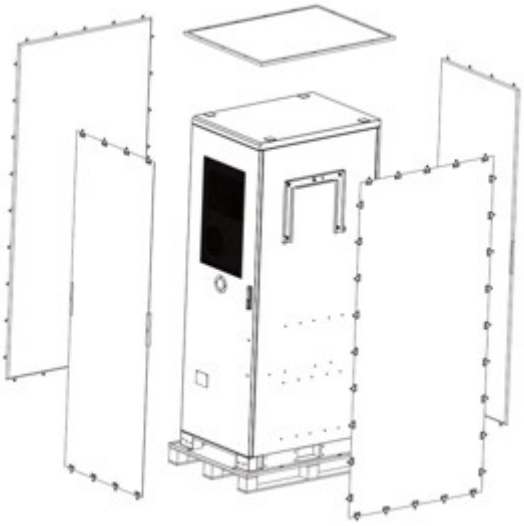


Fig.4-3 Removing around Box Graph

Step 2: Removethe pallet by removing the bolts connecting the energy storage system to the pallet with an adjustable wrench or socket wrench

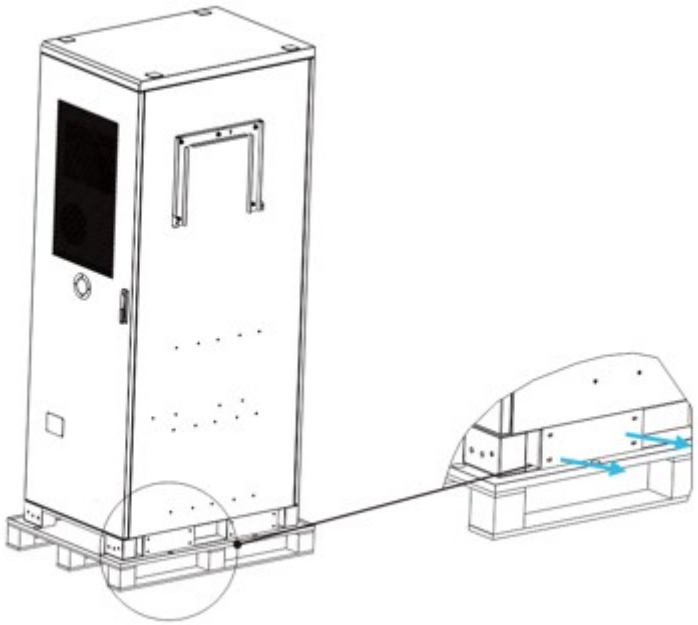


Fig.4-4 Partial Screw Removal Diagram

Step 3: Remove the sealing plate of the cabinet base, use a Phillips screwdriver to remove the sealing plate of the base

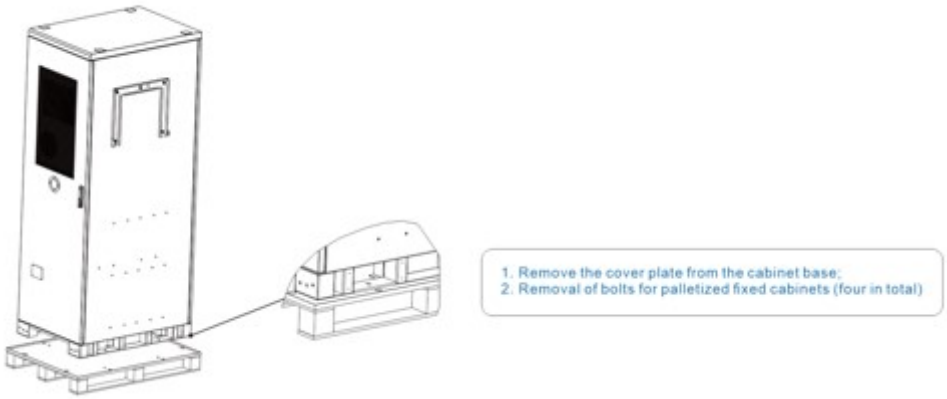


Fig.4-5 Removing the Sealing Plate Schematic

Step 4: Open the cabinet door

Step 5: Pick up the information for the file box, such as packing list, etc..

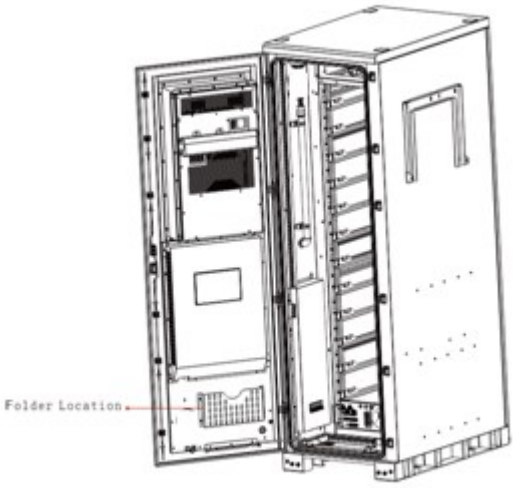


Fig.4-6 Opening door Schematic

Step 6: Take out the installation parts supplied with the box, after opening the door, please check the delivery parts and quantity supplied with the box according to the “packing list”. As following table:

Table 4-3 Inspection items

	Description		Diagram
Power line 1	Power C1	1	
Power line 2	Power C3	11	
Power Line 2	Power C2	1	
Communication line1	COM1	1	
Communication line2	COM2	11	
Communication line3	COM3	1	
Chassis Mount	/	4	

Windscreen	/	1	
Expansion Bolt	M12*120	4	
Eyebolt	M16	4	
Assembling Bolt	M6*16	48	
Assembling Bolt	M4*12	15	
Assembling Bolt	M10*20	8	
Pagoda Fitting	DN25	1	
Throat hoop	DN25	1	
an head screw	M6*12	18	
Bellows fixings	AD18.5	18	
Cable Tie	3*150mm	100	/

Step 7: After closing the cabinet door, move the energy storage cabinet to the designated installation location. When using a forklift to move the equipment, please tie down and fix it according to the actual situation to ensure that there is no risk of tipping over. When using a hoist to move the equipment, usea nylon sling (strap) or wire rope

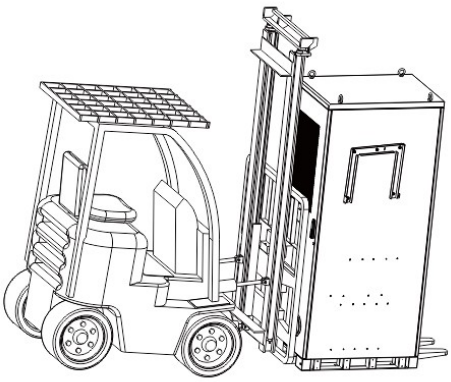


Fig.4-7 Transportation Schematic

Step 8: Fixing the energy storage system

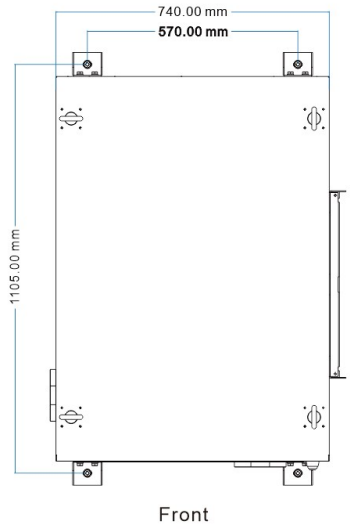


Fig.4-8 Fixing Schematic

Step 9: Fixed energy storage systems : First of all, take 4PCSChassisMount and install it to the front and rear of the cabinet's base, and lock it with 2PCSM10*20 respectively, using a torque of not less than 30N.m. and then use expansion bolts M12*120 to fix the cabinet on the ground as a whole.

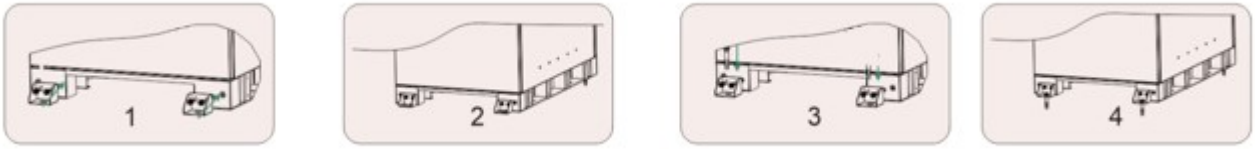


Fig.4-9 Support Installation

Step 10:Take out four base fixing seats and secure them to the cabinet base using eight M10 bolt assemblies.

Step 11:Take out four M12 expansion bolts to secure the cabinet to the foundation.

4.3.2 Pack Installation in Cabinet

1. Pre-installation Inspection

> ⚠ NOTICE
>
> • Please make sure that the installed battery Pack is intact.
> • Before installation, please consult the information on installing the battery Pack, and familiarize with and comply with its installation requirements and precautions.

2.Procedure

Step 1: Open the battery pack wooden box

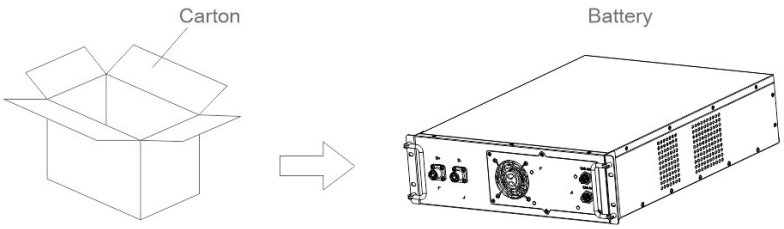


Fig.4-10 Open Carton Structure Schematic

Battery packs are installed into the ESS,install the battery packs according to the following sequencing table, use M6*16 combination screws and socket wrenches to fasten them, the installation torque is 5N.m.

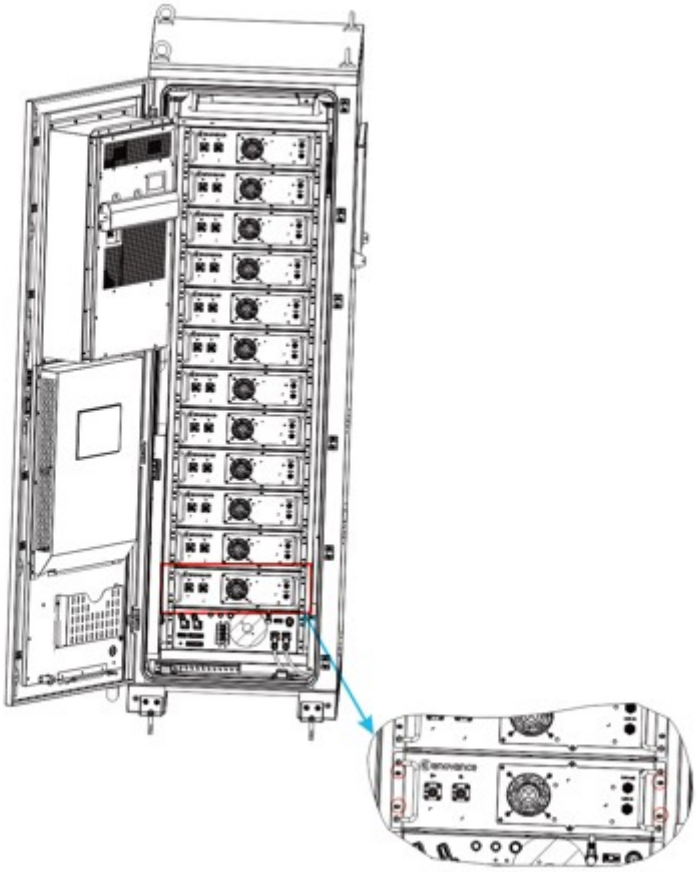


Fig.4-11 Battery Packs Mounted to ESS

Step 2:Installation of the battery pack to the ESS:Install the battery pack to the position as shown above, take the M6 screws and use a socket wrench to lock them, the installation torque is 5N.m.

Step 3:Mount the air guide to the cabinet and fix it with 7PCSM4*12 combination screws.

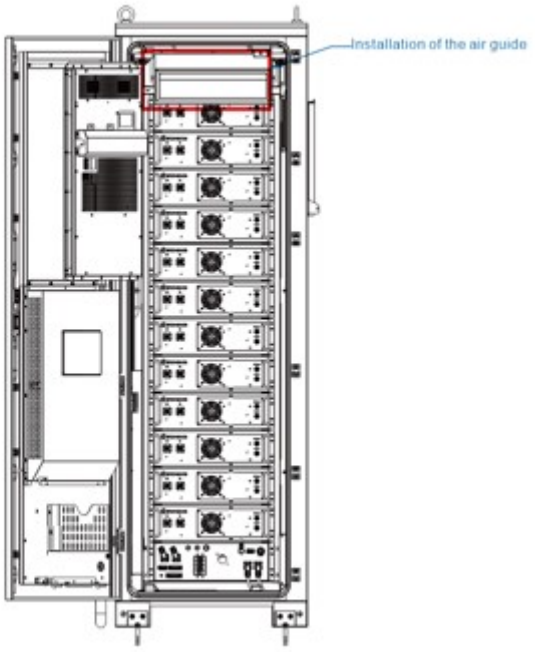


Fig. 4-12 Reinstall The Removed Air Hood Schematic

4.3.3 Inverter Installation

4.3.3.1 Inspection of packaging materials

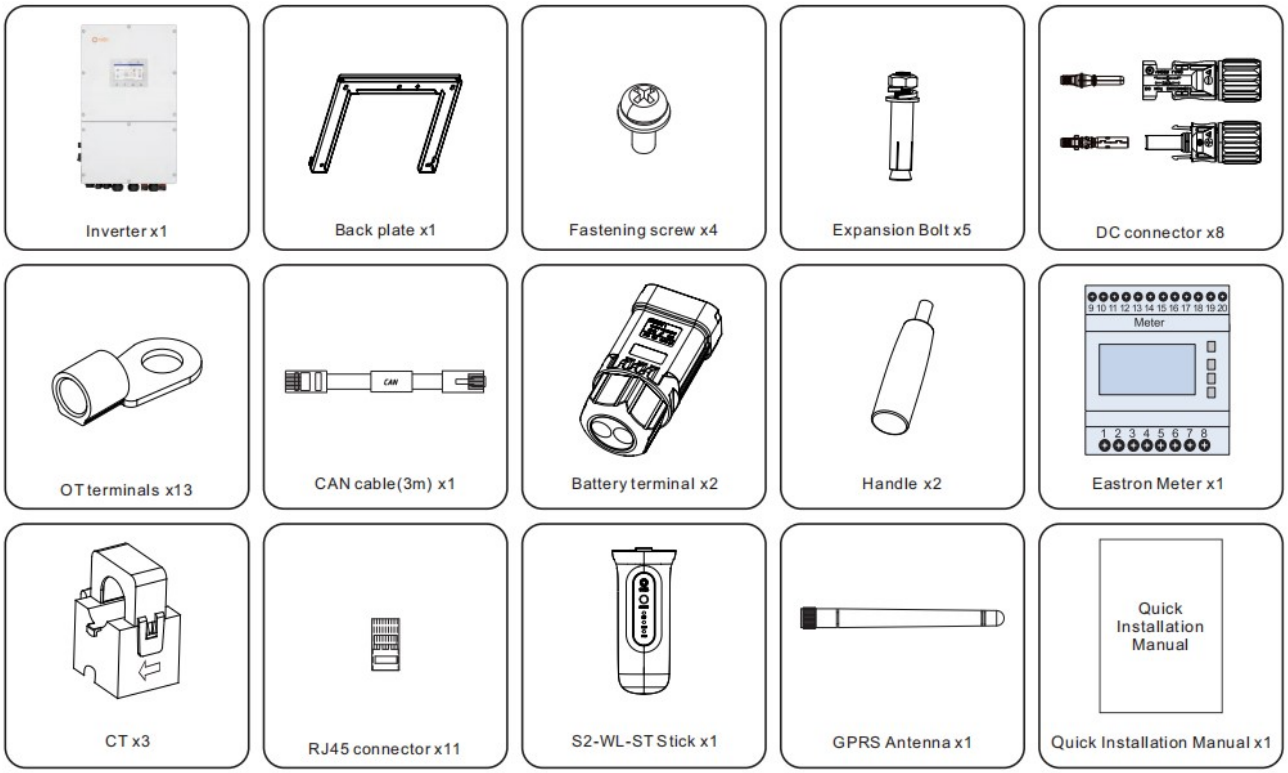


Fig. 4-13 Unpacking the Inverter

4.3.3.2 Tools Required for Installation

Fig.4-14 Installation Tools

4.3.3.3 Installation Instructions

When choosing the location for an inverter, the following criteria should be considered:

1 . Exposure to direct sunlight may cause output power derating due to overheating;

2 . It is recommended to avoid installing the inverter in direct sunlight. The ideal location is one where the ambient temperature does not exceed 40°C;

3 . It is also recommended to install the inverter somewhere the rain and snow will not land directly on it. The ideal installation location is on a north-facing wall under an eave.

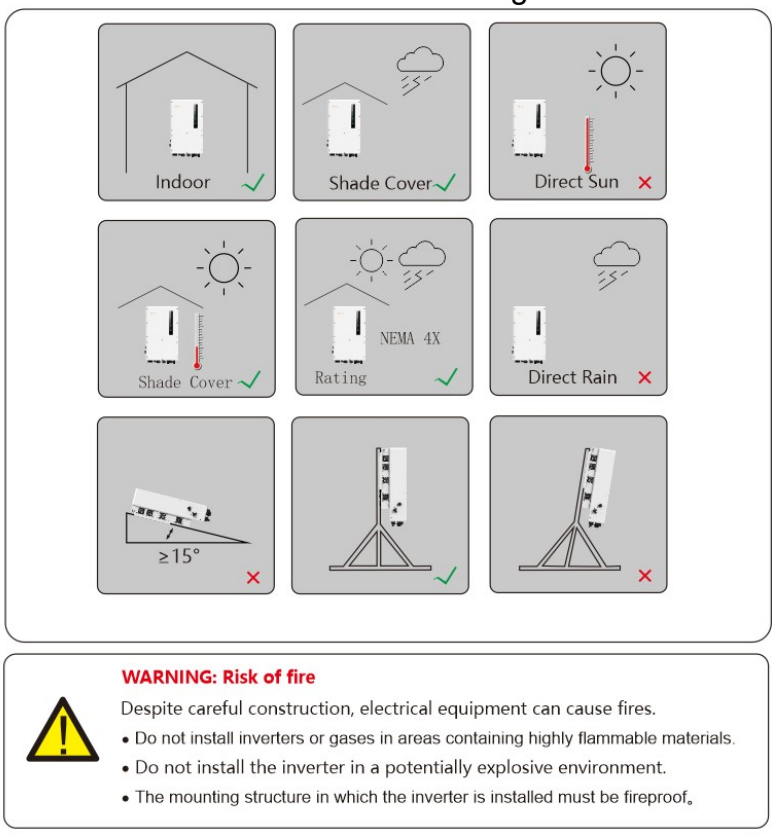


Fig.4-15 Installation Environment

When selecting the location for the inverter, please consider the following factors:

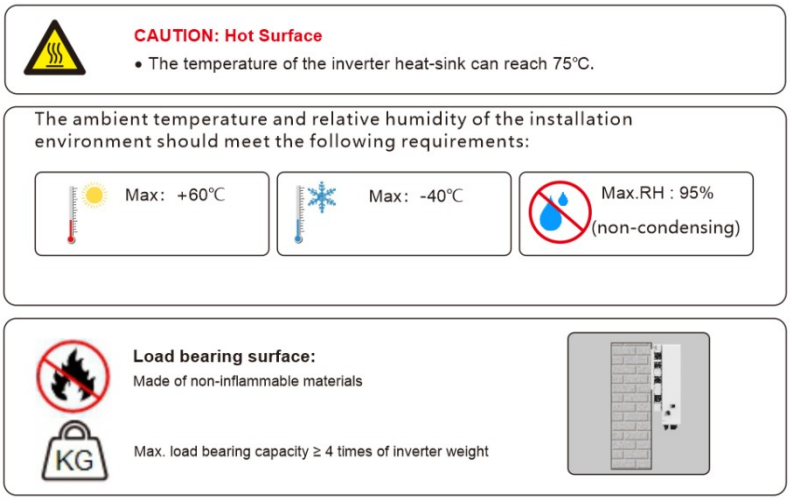


Fig.4-16 Installation Requirements

1 . If multiple inverters are installed on site, a minimum clearance of 500mm should be kept between each inverter and all other mounted equipment. The bottom of the inverter should be at least 1000mm above of the ground or floor.

2 . The LEDstatusindicator lights located on the inverter's front panel should not be blocked.

3 . Adequate ventilation must be present if the inverter is to be installed in a confined space.

4.3.3.4 Mounting the Inverter

Mount the inverter on a wall or structure capable of bearing the weight of the machine.Theinverter must be mounted vertically with a maximum incline of +/- 5 degree. Exceeding this may cause the output power to derate.

To avoid overheating, always make sure the flow of air around the inverter is not blocked. A minimum clearance of 500mm should be kept between inverters or objects and 1000mm clearance between the bottom of the machine and the ground.

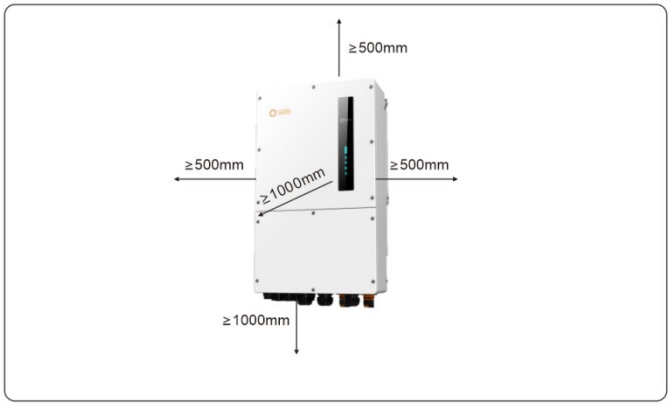


Fig.4-17 Inverter Mounting Clearance

Visibility of the LEDindicator lights should be considered.

Adequate ventilation around the inverter must be provided.

NOTE

Nothing should be stored on the top of or placed against the inverter.

Lift the inverter (taking care to avoid body stress)and align the rear bracket of the inverter with the

convexpart of the mounting bracket. Hangthe inverter on the mounting bracket, making surethat the inverter isstable（see Fig.4-18）.

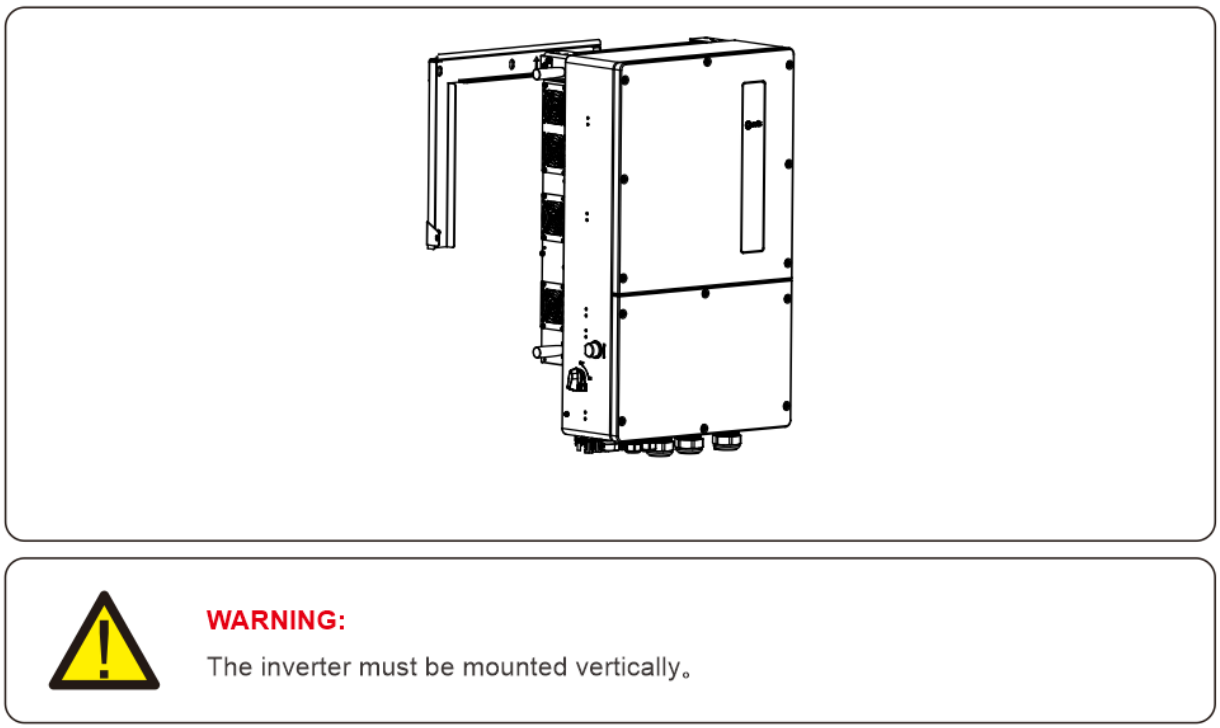


Fig.4-18 Lift the Inverter

Lockboth endsof the inverter with M5*12 combination screwsto securethe inverter（ seeFig.4-19）.

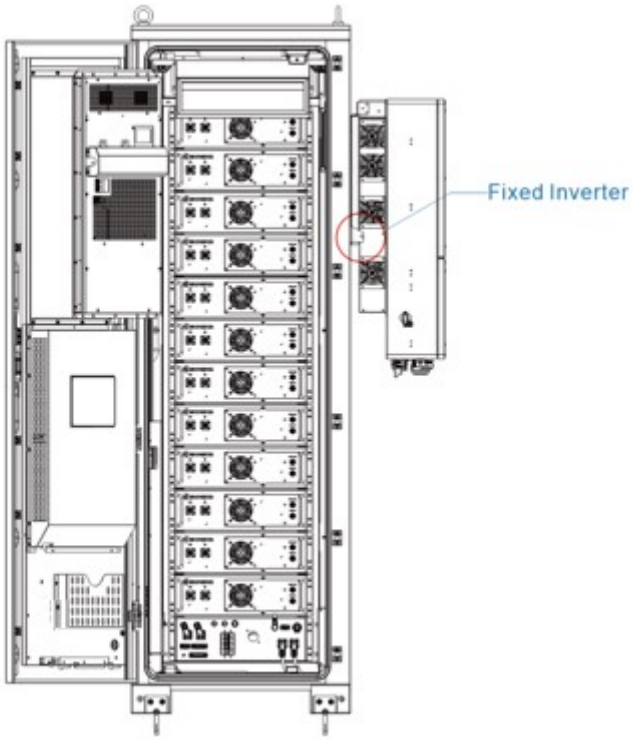


Fig.4-19 Fixed Inverter

4.3.4 Structure Safety Check

Table 4-4 Safety Check

No.	Inspection I	Treatment
1	tightened not	If loose,tighten again
2	environment installation	If insufficient, it recommended redesign and reinstall
3	Are the air ducts clear and free of foreign objects	If a foreign body, deal with it, if it doesnot flow smoothly to rule out the

4.4 Energy Storage System Electrical Connection

4.4.1 Overview of Electrical Connections

1 . All electrical connectionsmustbe made in strict accordancewith the wiring diagrams.
2 . All electrical connectionsmustbe made with the equipment completely de-energized.

4.4.1.1 Preparation before connection

The internal work of the energy storage cabinet has been completed before delivery except for the wiring between battery packs, the user only needs to connect the inter-cabinet cable and external wiring can be, the AC terminal is mainly located in the lower right side of the energy storage cabinet, the ground terminal is located in the bottom of the energy storage cabinet.

4.4.2 Energy Storage System Interface Description

Table 4-5 Wiring HarnessList

		Diagram
Power Harness 1	11	
Power Harness 2	1	
Communication Harness1	1	
Communication Harness2	11	

Step1: Take 11 PCSPowerHarness1 and plug it into the battery pack's 2 ends, as shown in Figure 4-21, the cables should be installed in place, and a “click” will be heard that the installation is in place.

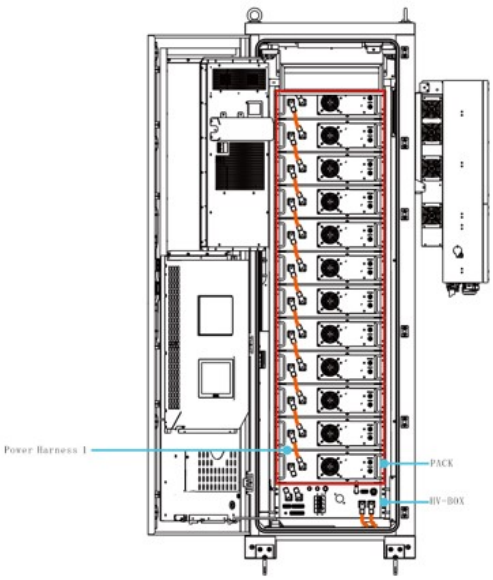


Fig.4-20 Installation of Power Harness1

Step2:Take 1PCSof Power Harness2 and connect it to the battery pack and HVbox as shown in Figure 4-22, the cables need to be installed in place, when you hear a "click" , it will be installed in place.

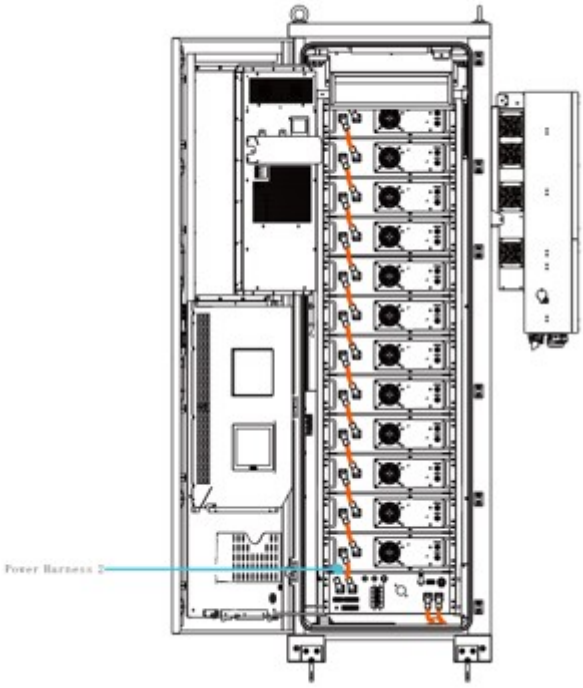


Fig.4- 21 Installation of Power Harness2

Step3：Connect the cables tied inside the cabinet to the battery pack as shown in Fig.4-23.The cables need to be installed in place, and a "click" is heard when they are in place.

Step4: Installing the communication harness: you will install the communication harness 1, communication harness2 respectively to the position in Figure 4-24, and at the same time, cut the ties of the communication harness on the left side of the cabinet and connect the harness to the battery

pack.

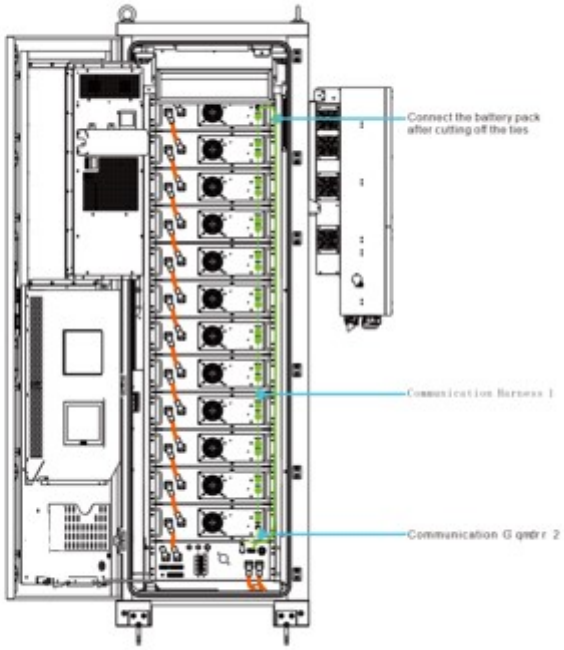


Fig. 4-22 Connection Harnesses

4.4.3 Cable Connection of the Inverter to the ESS

To connect the 2-way battery harness from the energy storage system to the inverter, please open the cabinet door and connect according to the following figure
BAT-Copper row connecting inverter BAT1-and BAT2-, BAT+Copper row connecting inverters BAT1+ and BAT2+.
Step 1: Remove the wire end battery terminals from the attachment package, insert the positive and negative battery cables from the rear end of the battery terminal and pass them through the nut and the waterproof ring. According to polarity, insert the positive and negative cables separately into the wiring holes of the board-side battery terminal. Observe the transparent hole, the cable is in place, use a screwdriver to tighten the screw. The torque is 1.2±0.1N.M.
Step 2: Insert the wire end terminal onto the board end terminal until you hear a "click", ensuring the terminal lock is securely in place.

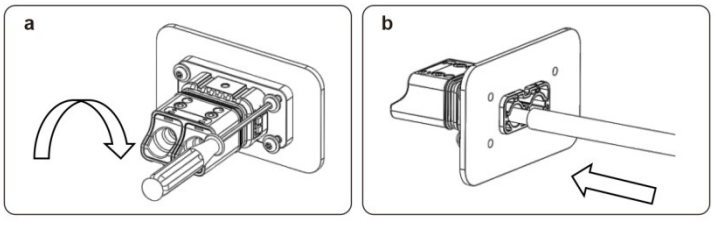


Fig. 4-23 Locking Power Terminal

Step 3: Press the wiring with T8 Torx screwdriver with torque of 1.2±0.1N.M.
Step 4: Thread the stripped wire into the lock nut and the main body in turn (the flexible wire needs to be riveted to the insulated terminal).
Step 5: Installation completed.

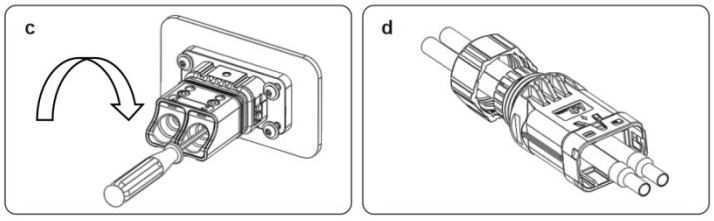


Fig.4-24 Tighten connectors

Step 6: Insert the cable into the rubber core according to the line sequence,observe the perspective hole, the cable is in place, and the torque of the crimping screwdriver is 4 ± 0.1N. M.
Step 7: Insert the main body into the rubber core and hear the "click" sound.

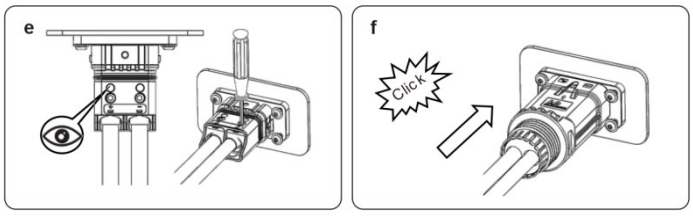


Fig.4-25 Tighten the Harness

Step 8: Tighten the nut with an open-ended wrench(torque 10.0±0.1N·m).
Step 9: Complete the installation.

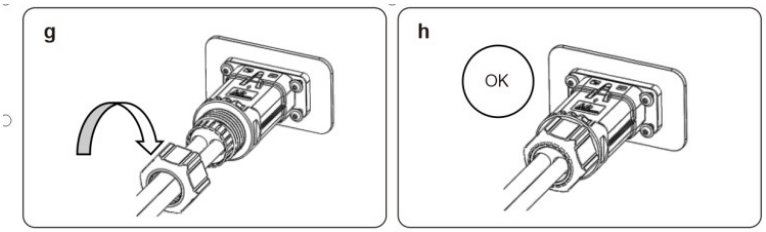


Fig.4-26 Tighten the Nut

A. Hold the body with one hand and turn the nut in the opposite direction with the other.
B. Use a screwdriver to align the unlocking position, press and hold the main body and pull back to complete the removal.

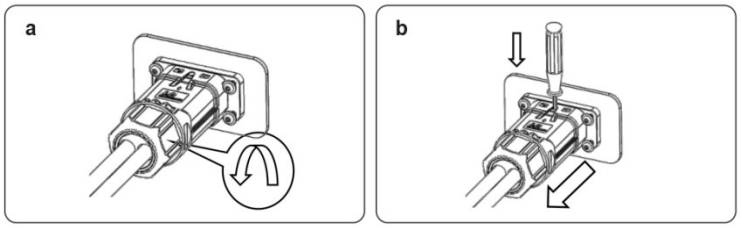


Fig.4-27 Loosen the Nut

4.4.4 Wiring Description Sheet

Connect cables requirements between battery packs in the energy storage cabinet, as shown in the following Table 4-6

Table 4-6 Wiring Description Sheet

No	Name	Cable Specifications	Terminal	Clarification

1	A Phase	50 mm^2(1/0 AWG)	M10(OT terminal)	Connecting cables between the system and the external power grid(28.2 N.m)
2	B Phase	50 mm^2(1/0 AWG)	M10(OT terminal)	Connecting between system and the external power grid(28.2 N.m)
3	C Phase	50 mm^2(1/0 AWG)	M10(OT terminal)	Connecting between system and the external power grid(28.2 N.m)
4	N Phase	25 mm^2(4 AWG)	M6(OT terminal)	Ground to the closest neutral bar(20.3 N.m)
5	PE	25 mm^2(4 AWG)	M6(OT terminal)	Connect nearest ground (20.3 N.m)

4.5 AC Wiring

4.5.1 AC Wiring Connection and Procedure

1 . Before installing the AC cables, be sure thatthe OCPDs(breakers) are turned off. Use a multimeter to verify that the AC voltages are 0Vac before proceeding.

2 . Use a wire stripper to strip the corresponding specification ground wire to expose a bare copper core, and the length of the bare copper core should be 3mm longer than the OT terminal connection end.

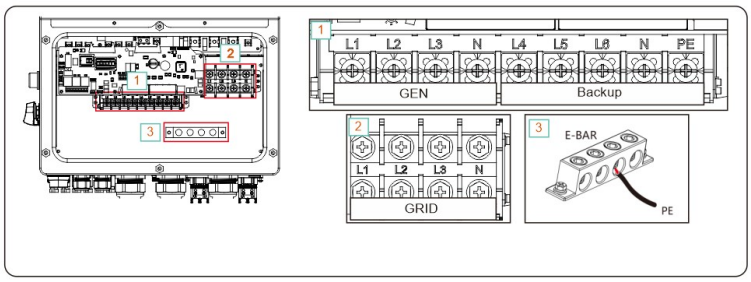
3 . Use a crimping tool to crimp the OT terminal onto the bare copper core.

4 . Slide a heat-shrink tube of the appropriate size onto the wiring end of the OT terminal, and the length of the heat-shrink tube (with a voltage rating of at least 1000V) should be 1.5 to 2 times the length of the wiring end.

5 . Use a heat gun to shrink the heat-shrink tube tightly, ensuring it grips the terminal and the cable securely, thus completing the cable assembly.

6 . Secure the prepared cable at its interface with the corresponding screws(use M10 screws for phases A, B, and C, and M6 screws for phase N and PE).

7 . Wiring complete: There are three sets of AC output terminals and the ins both are the same.



Model	AC Gen/AC Backup/AC Grid
Wire Size	4/0 AWG
Torque	28.2N.m
Cable	35 mm2

Fig.4-28 AC Output Terminals

8．Bring the AC cables for the backup loads panel (backup) and the main service panel (grid) into the inverter wire box. The backup loads panel should not be electrically connected to the main service panel.

9．Strip 13mm from the ends of each cable. Crimp the R-type connectors onto the ends.

10．Remove the terminal bolts, insert them into the connectors, then use a torque wrench o tighten the bolts down.

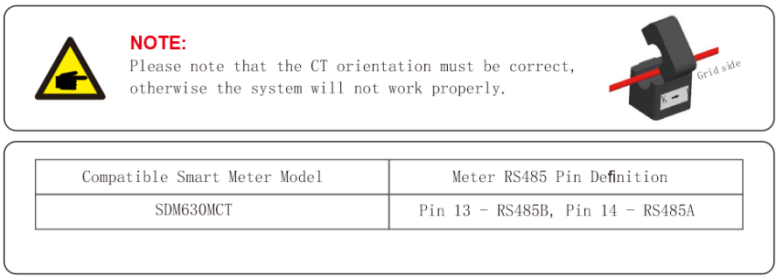
11．Please refer to the terminal labels to connect the AC wires to the correct terminals.

4.5.2 Meter/CT Connection

4.5.2.1 Meter Installation

The Solis S6-EH3P(29.9-50)K-H Series inverters are able to connected standard Eastron meters to fulfill the control logic of the self-consumption mode, export power control, monitoring, etc.

Eastron 3ph meter (With CT): SDM630MCTV2(Provided by default).



Compatible Smart Meter Model	Meter RS485 Pin Definition
SDM630MCT	Pin 13 - RS485B, Pin 14 - RS485A

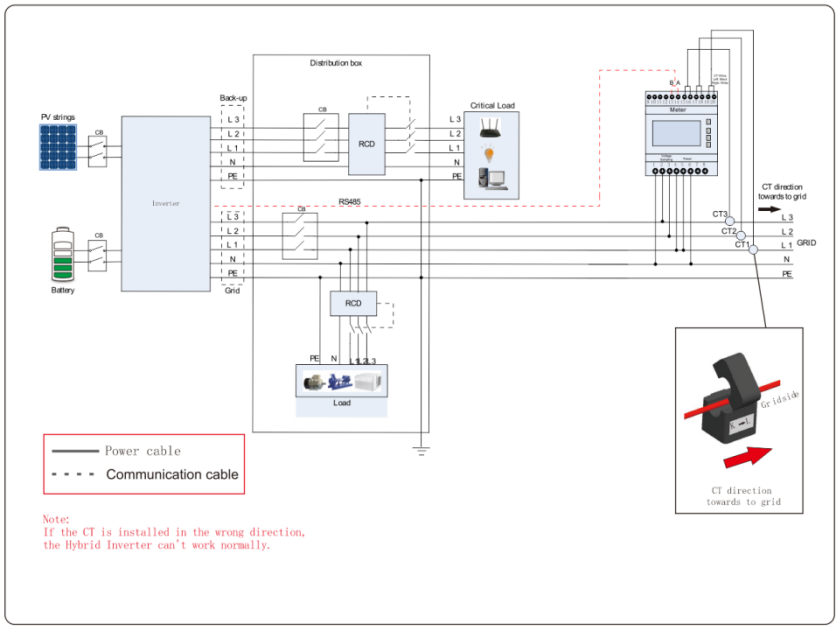


Fig. 4-29 Eastron SDM630M CT

4.5.2.2 CT Installation

The CT provided in the product box is compulsory for hybrid system installation. It can be used to detect the grid current direction and provide the system operating condition to hybrid inverter.

CT Model: ESCT-T50-300A/5A

CT Cable: Size– 2.3mm2, Length - 3m

Please install the CT on the hot line at the system grid connection point and the arrow on the CT needs to point to the grid direction.

Lead the CT wires through the COM3 port at the bottom of the inverter and connect the CT wires to the 14pin communication terminal block.

Pin 1 (From Left	Right)
Pin 2 (From Left	Right)
Pin 3 (From Left	Right)
Pin 4 (From Left	Right)
Pin 5 (From Left	Right)
Pin 6 (From Left	Right)
Pin 1 (From Left	Right)
Pin 2 (From Left	Right)

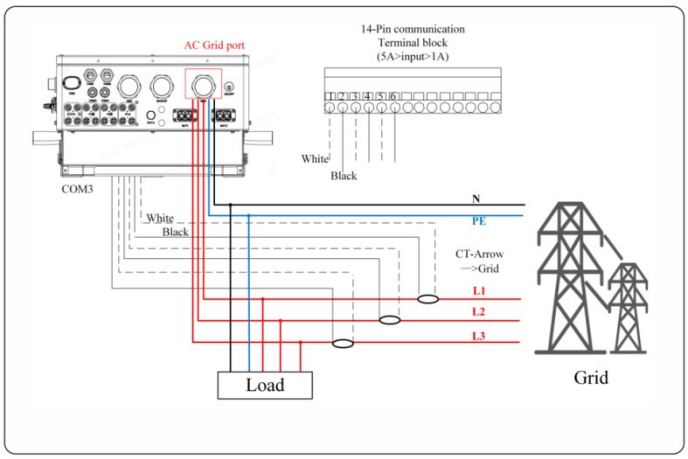
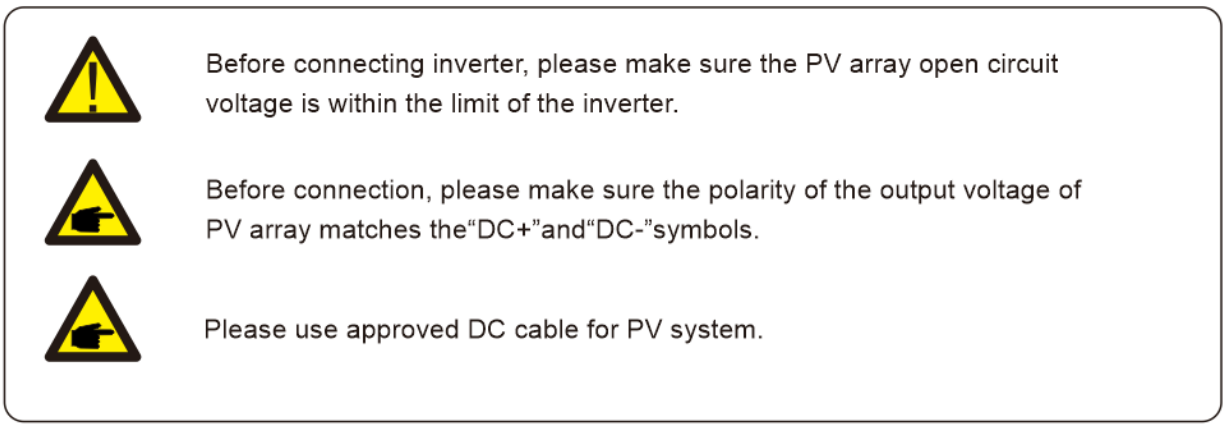


Fig.4-30 Installation Position

4.5.2.3 Checking the Equipment After Wiring

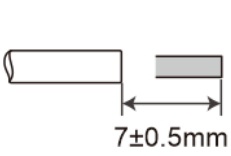
After completing the wiring, it's necessarily to carefully check whether the phase sequence and the silkscreen correspond to each other, and whether the wiring of the zero row and the ground row is correct.

The connection diagram is as follows:



4.5.2.4 PV Cable Installation

Step 1: Select a suitable DC cable and strip the wires out by 7±0.5mm. Please refer to the table below for specific specifications.



Cable type	Cross section（mm²）	
	Range	Recommended value
Industry generic PV cable	4.0~6.0 (12~10AWG)	4.0（12AWG）

Fig.4-31 Wire Stripping Requirements

Step 2: Take the DC terminal out of the accessorybag, turn the screw cap to disassembleit, and take out the waterproof rubber ring.

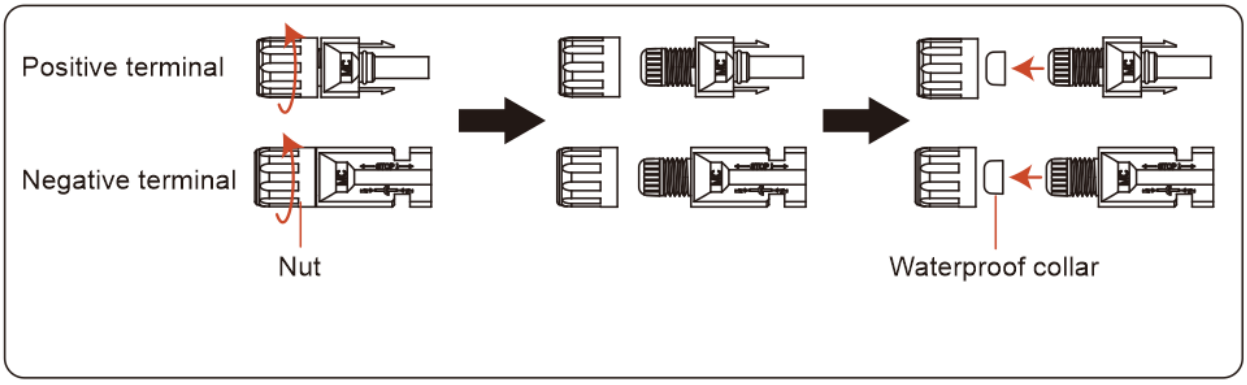


Fig.4-32 PVConnector Installation

Step3: Passthestripped DC cable through the nut and waterproof rubber ring.

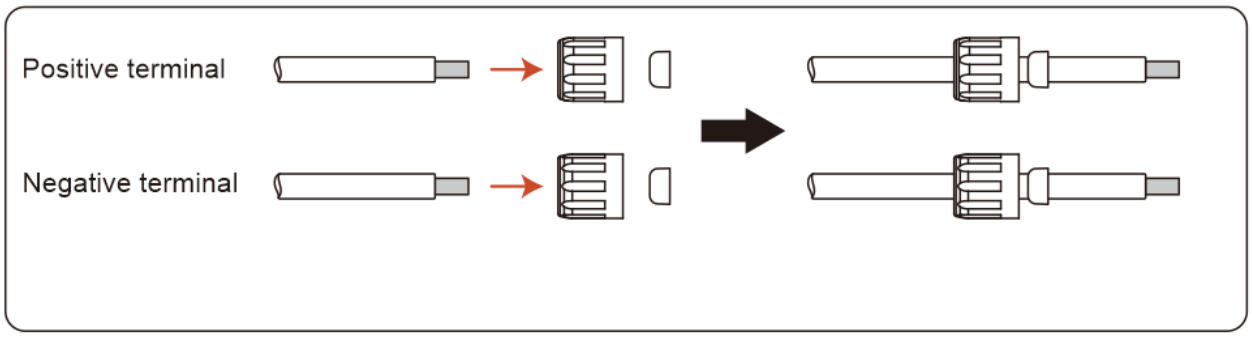


Fig.4-33 DC Cable Installation

Step4: Connectthe wire part of the DC cable to the metal DC terminal and crimp it with a special DC terminal crimping tool.

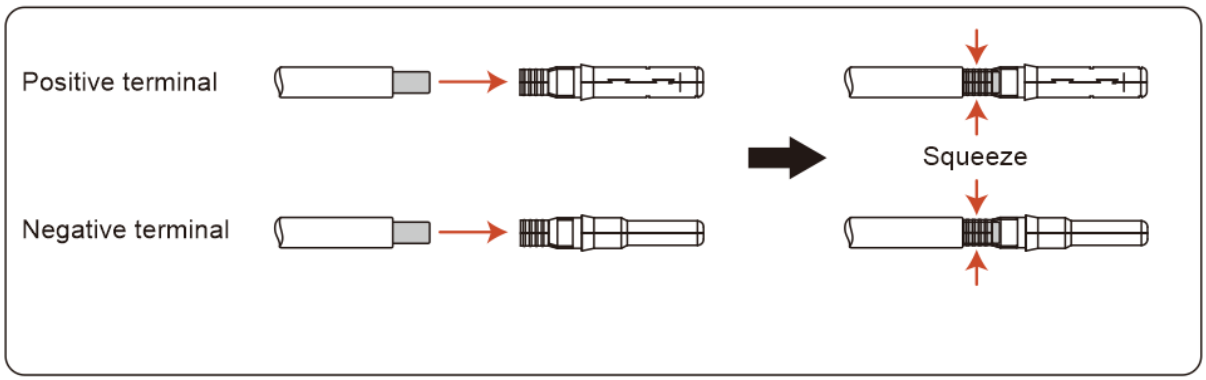


Fig.4-34 DC Terminal Crimp

Step5: Insert the crimped DC cable into the DC terminal firmly, then insert the waterproof rubber ring into the DC terminal and tighten the nut.

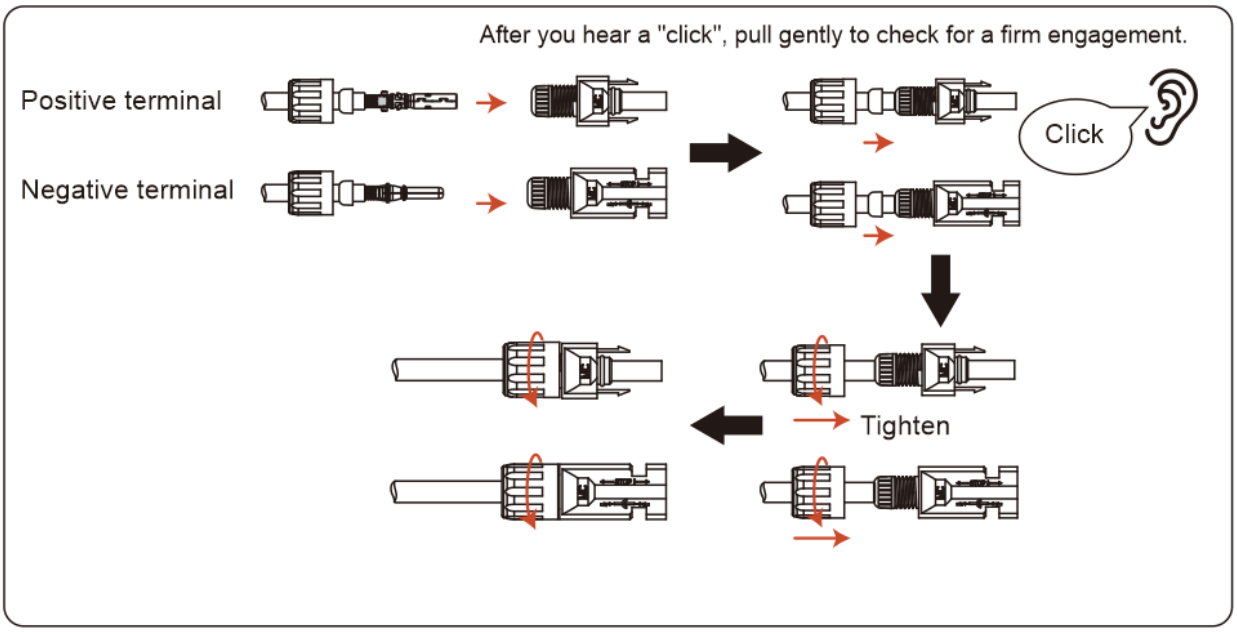


Fig.4-35 DC Cable Installation

Step6: Measure PV voltage of DC input with multimeter, verify DC input cable polarity.

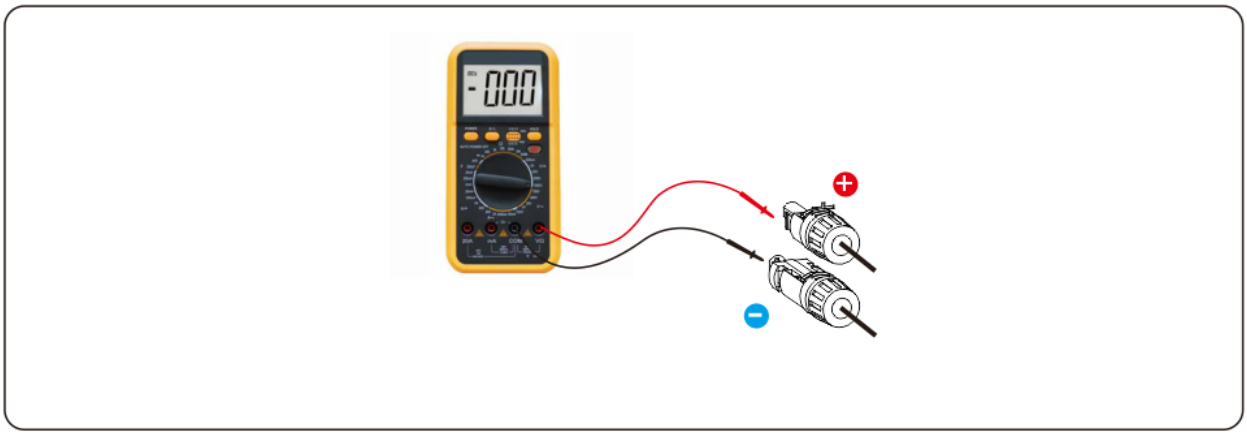


Fig.4-36 Multimeter Check DC Input

Step 7: Connect the wired DC terminal to the inverter as shown in the figure, and a slight "click" is

heard to prove the connection is correct.

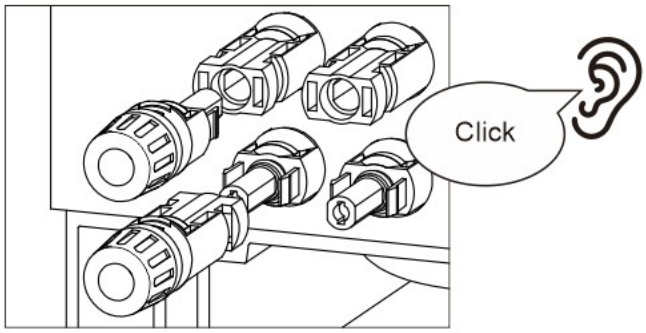


Fig.4-37 DC Terminal to The Inverter Connection Check

CAUTION:
If DC inputs are accidentally reversely connected or inverter is faulty or not working properly, it is NOT allowed to turn off the DC switch. Otherwise it working properly, it is NOT allowed to turn off the DC switch. Otherwise it may cause DC arc and damage the inverter or even lead to a fire disaster.
The correct actions are:
Use a clip-on ammeter to measure the DC string current.
If it is above 0.5A, please wait for the solar irradiance reduces until the current decreases to below 0.5A.
Only after the current is below 0.5A, you are allowed to turn off the DC switches and disconnect the PV strings.
In order to completely eliminate the possibility of failure, please disconnect the PV strings after turning off the DC switch to avoid secondary failures due to continuous PV energy on the next day. Please note that any damages due to wrong operations are not covered in the device warranty.

4.5.3 Parallel wiring

4.5.3.1 DC Side Parallel

1-10 ESS Can be Connected: It is recommended that each battery clusters are connected to the power distribution separately.
If the cabinet is connected to an external inverter, we recommend that the external connection is sleeved or fitted with a protective case to avoid interference that may be caused by the exposure of the connecting wires.
ESS Connected to an Inverter: If the cabinet is connected to an external inverter, we recommend that the external connection is sleeved or fitted with a protective case to avoid interference that may be caused by the exposure of the connecting wires.

4.5.3.2 AC Side Parallel

1-6 ESS can be connected. It is recommended that each energy storage system is connected to the

power distribution separately, if the power distribution is not connected separately, please follow the recommended way of connection.
If the cabinet is connected to an external inverter, we recommend that the external connection is sleeved or fitted with a protective case to avoid interference that may be caused by the exposure of the connecting wires
2 Pcs ESSConnected to an Inverter: If the cabinet is connected to an external inverter, we recommend that the external connection is sleeved or fitted with a protective case to avoid interference that may be causedby the exposure of the connecting wires.
6 Pcs ESS Connected to Inverters:If the cabinet is connected to an external inverter, we recommend that the external connection is sleeved or fitted with a protective case to avoid interference that may be causedby the exposure of the connecting wires.

5 Product Operation

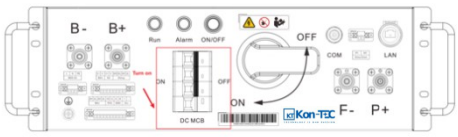
5.1 Energy Storage System Power-up Process

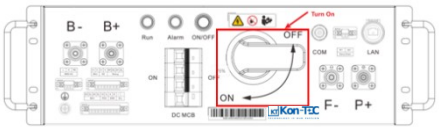
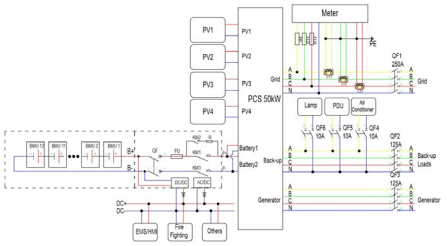
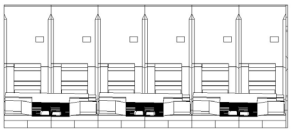
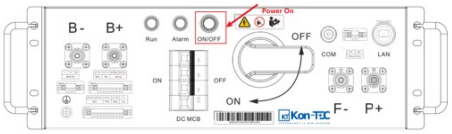
5.1.1 Pre-power-up Check

1 . Check that the circuit breaker in the electrical compartment inside the storage cabinet is in the disconnected position.
2 . Check whether the serial power cables between the battery packs and between the battery packsand the high voltage box are connected reliably.
3 . Check that all communication and power supply cable connection terminals are connected reliably and that the grounding cable is reliable.
4 . Check that the communication and power harnessesaswell as the power cables are properly connected on the high voltage box panel.
5 . Check that the emergencystop button is released.
6 . Use a multimeter to check that the DC and AC voltages meet the startup conditions and ensurethat there is no overvoltage.
7 . Check and make surethat there are no unnecessarytools and devicesinside the equipment.
8 . Check all air inlets and outlets for blockages.

5.1.2 Power-up Procedure

Table 5-1 Power-up Procedure Steps

s	ist	
Step 1	Confirm that the normal load, backup load, generator, air conditioner, PDU, lamp, and switches are in the off (disconnected) state. Verify whether there is any photovoltaic connection external system.	/
Step 2	circuit breaker, close the DC MCB switch, and close the AC supply switch of the high-voltage box. The EMS and fire protection system will	

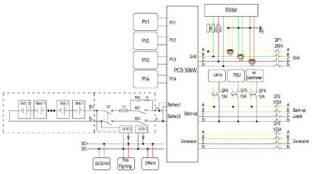
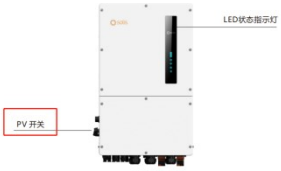
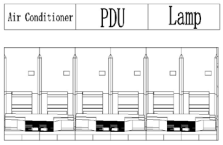
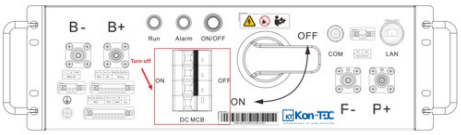
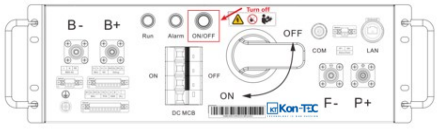
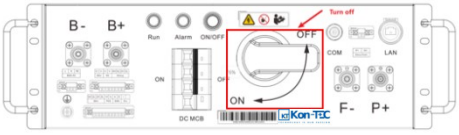
	power-up process.	
Step 3	protection and status on the EMS screen. In the absence of any alarms or faults, control the closing of the high-voltage box contactor through the EMS. At this point, the battery will be energized with high voltage, and the inverter will powered up through side.	For details, refer to the EMS section part 5.3.
Step 4	grid circuit (customer-supplied) turn on, the AC side of the inverter will complete the power supply. Check the inverter's current status . The APP(Local EMS or Inverter HMI) to control the inverter startup. Turn on the inverter photovoltaic (PV) switch, allowing PV power input, the will then start and operate.	Check local EMS screen or inverter APP or HMI to make sure configuration is correct and error events , refer to the local EMS section part 5.3, Inverter APP* HMI part 5.2.
Step 5	Turn on the inverter backup load switch, and generator load switch (customer-supplied). Sequentially close the air conditioning, PDU, and lamp switches. Press the AC supply switch of the HV box. At this point, the air conditioner will power on, the cabinet lighting will illuminate, and the system power-up process will be complete.	   

WARNING

- Please follow the steps strictly to power up
- If there is any abnormality, power down and check carefully step by step

5.1.3 Normal Shutdown Procedure

Table 5-2 Normal shutdown steps

s	ist	
Step1	The local EMS controls the inverter shutdown or control Inverter APP &HMI finish shutdown process.	Make sure software shutdown is a priority
Step 2	1 . Disconnect conditioning unit, PDU, and lighting switches. Power off the air conditioning system and extinguish the lights. 2 . Disconnect the AC supply switch of the high-voltage distribution box. Isolate the inverter backup load switch, normal load switch, and generator load switch (customer-installed). 3 . The inverter will cease power output. Disconnect the photovoltaic switch, effectively stopping the inverter from receiving PV power input.	  
Step 3	Disconnect the DC MCB switch, the AC supply switch of the HV box, and the fire protection system power. Also, disconnect the high-voltage box circuit breaker, completing the system shutdown procedure.	  

5.1.4 Emergency Shutdown Procedure

DANGER

- In case of emergency, tap the emergency stop button on the cabinet door and the system will stop running.
- Fire Incident: Contact local professional firefighters.
- System Failure: Contact local aftermarket operator.

5.2 Hybrid Inverter APP & HMI Setting

- The basic parameter settings have been debugged before shipment, and the user does not need to make any additional adjustments.
- If any parameter adjustments are required, please contact technical support.

5.2.1 Hybrid Inverter APP Setting

The hybrid inverter app download method :

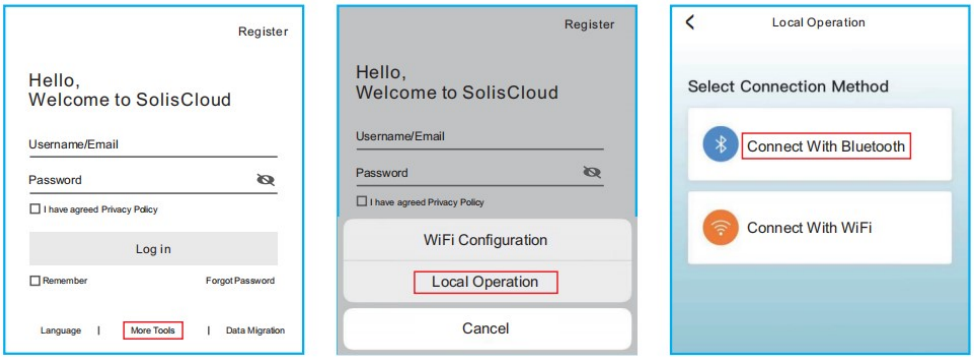
1. Scan this QR code to download Soliscloud. 2. Visit www.soliscloud.com. 3. Search "Soliscloud" in Google Play or APP Store.	

5.2.1.1 Log in the APP via Bluetooth

Step 1: Connect with Bluetooth

Turn on Bluetooth switch on your mobile phone and then open the Soliscloud APP.

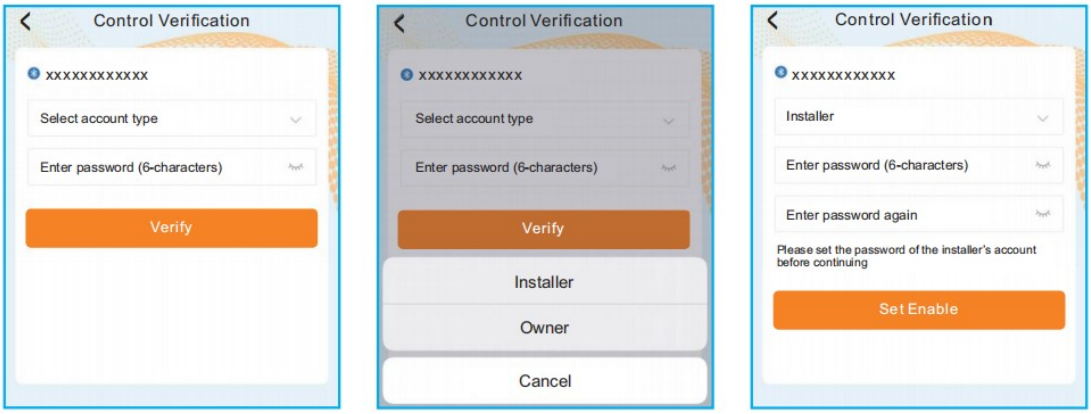
Click "More Tools"->"Local Operation"->"Connect with Bluetooth"



Step 2: Select the Bluetooth signal from the inverter. (Bluetooth Name: Inverter SN)

Step 3: Login account.

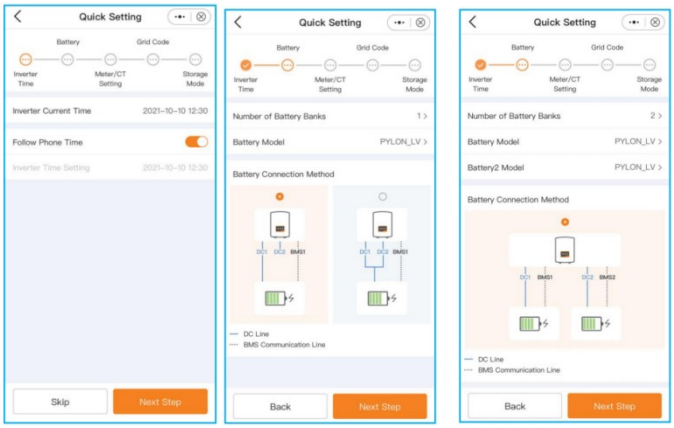
If you are the installer, please select the account type as Installer. If you are the plant owner, please select the account type as owner. Then set your own initial password for control verification. (The first log-in must be finished by installer in order to do the initial set up)



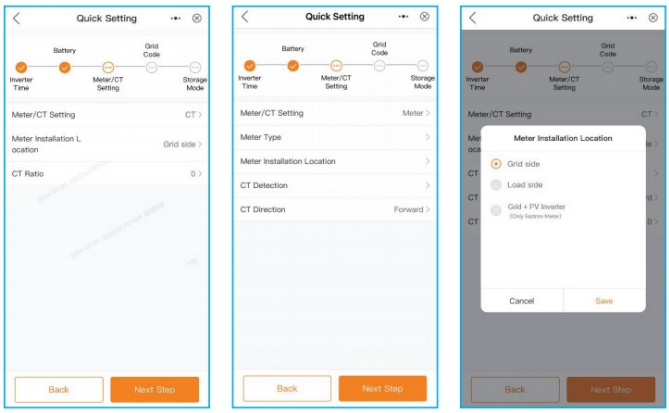
5.2.1.2 APPQuick Setting

If this is the first time the inverter has been commissioned,you will need to first go through the Quick Settings. Once this has been done, these settings can be changed later.
Inverter Time -> Meter Setting -> Grid Code -> Storage mode -> Battery Model

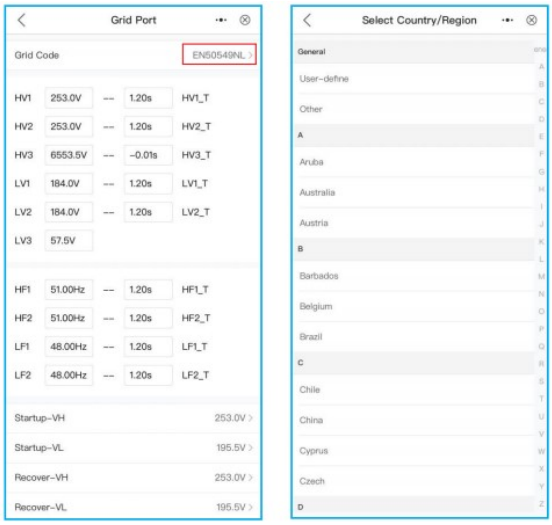
1. Inverter time: Set inverter time and date, tap the slider next to "Follow Phone Time", then tap "Next step"at the bottom right corner.



2. Battery:
   - Select number of battery banks : 1-2 ;
   - Select battery model: if the connected battery brand is not on the list, please select "General_LiBat_HV
   - Select battery connection method.
3. CT/Meter Setting:
   - Select CT or Meter.
   - Set Meter type (Solis provide Eastron 3 phase meter, it is self-identifiable).
   - Set Meter installation location: Grid side / Load side / Grid+PV inverter.
   - Set CT ratio: default 60 (Solis provide ESCT-T50-300A/5ACT),if the user install their own CT, then need to set the CT ratio manually. If the system connected to Meter, then CT ratio need to be set on Meter.
   - CT direction: When CT installed correctly, select " Forward" . when CT installed direction wrong, the sampling current of CT will be reversed when calculating the power, select "Reversal" to correct it.

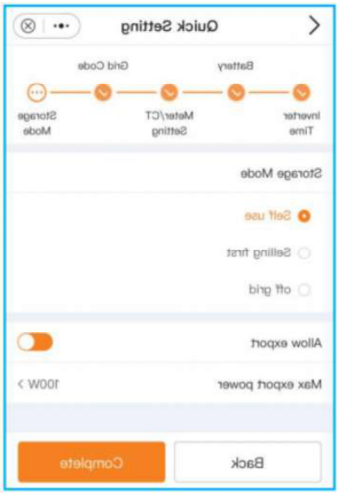


4. Grid Code:
   - Select grid code that meet the local regulations.
   - Three level of Over-voltage / under-voltage / Over-frequency / under-frequency are default based on grid code, there is no need to set the parameters in manual.



5. Storage Mode:

All modes first priority is to use the available PV power to support loads. The different modes determine what the second priority, or use of the excess PV power, will be. Self-use / Selling first / Off-grid are exclusive , the user could select only one mode.



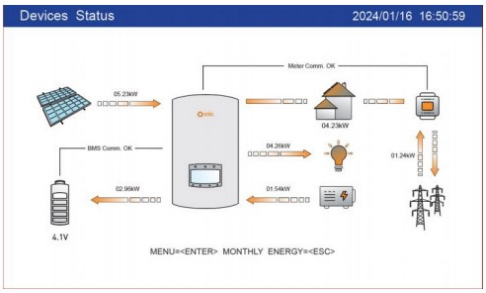
⚠ NOTICE

Any more function detail about storage mode usage, please refer to 5.3.2 part

5.2.2 PCS HMI Setting

5.2.2.1 Detailed HMI Setting

Step 1: Enter Home page After quick setting, press "ENTER", the screen displays the home page.



The screen will be automatically turn off after being idle for a few minutes to save power, click any operation button ("ESC"/"UP"/"DOWN"/ "ENTER") to restart the screen, then into the main operation interface.

Step 2: Enter "SYSTEM SETTING" interface

Press "Down" button, then press "ENTER" into the "SYSTEM SETTING" interface.

Step 3: Set "Storage Mode"

Use "UP" or "DOWN" key to select the desired mode, then press "ENTER".

The Mode description please refer to 5.4.1.

NOTICE

Any more function detail about storage mode usage, please refer to 5.3.2 part

5.3 Local EMS Interface Operation

> **NOTICE**
>
> - The local EMS is mainly responsible for performing checks and confirmations on the user side before the first startup, especially for the battery-side circuit breaker function.
> - During subsequent operations and maintenance, the local EMS is used to monitor battery information and other auxiliary system data.
> - Under normal circumstances, the user does not need to make any additional settings.

5.3.1 EMS Interface Introduction

5.3.1.1 Overview

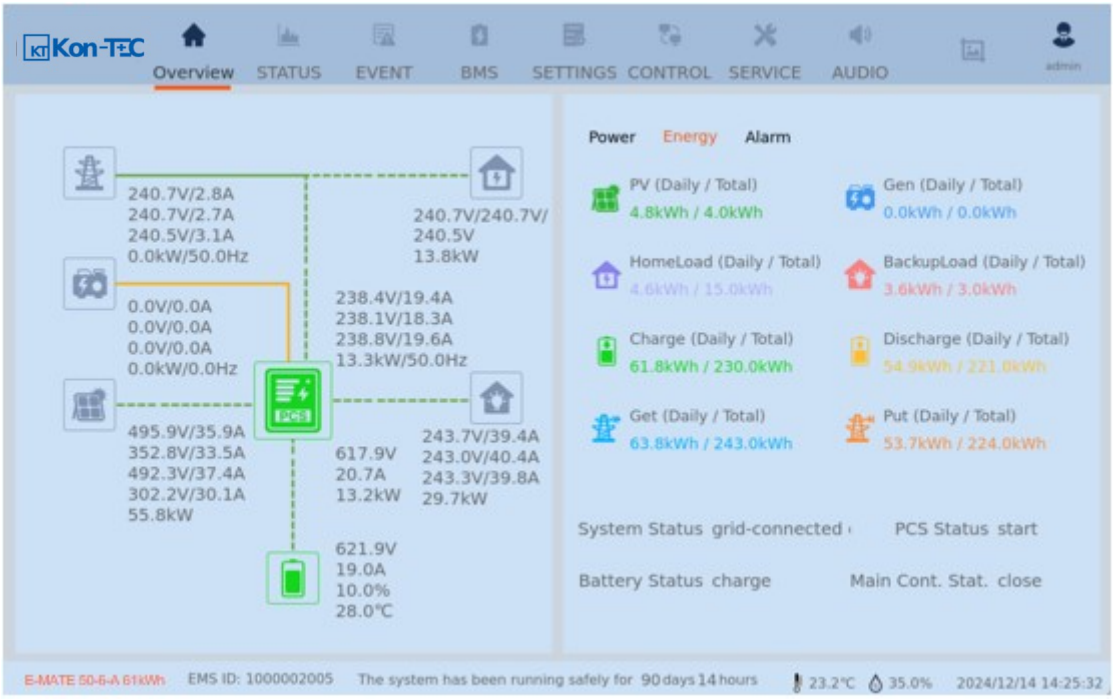


Fig. 5-1 EMS System Overview Screen

The system overview part shows the system energy flow diagram, power curve, power statistics, alarm fault statistics, etc..

5.3.1.2 Event

The event recording section records the alarm fault information of the equipment and system, and displays the current events, historical events, etc. As shown in Fig. 5-2.

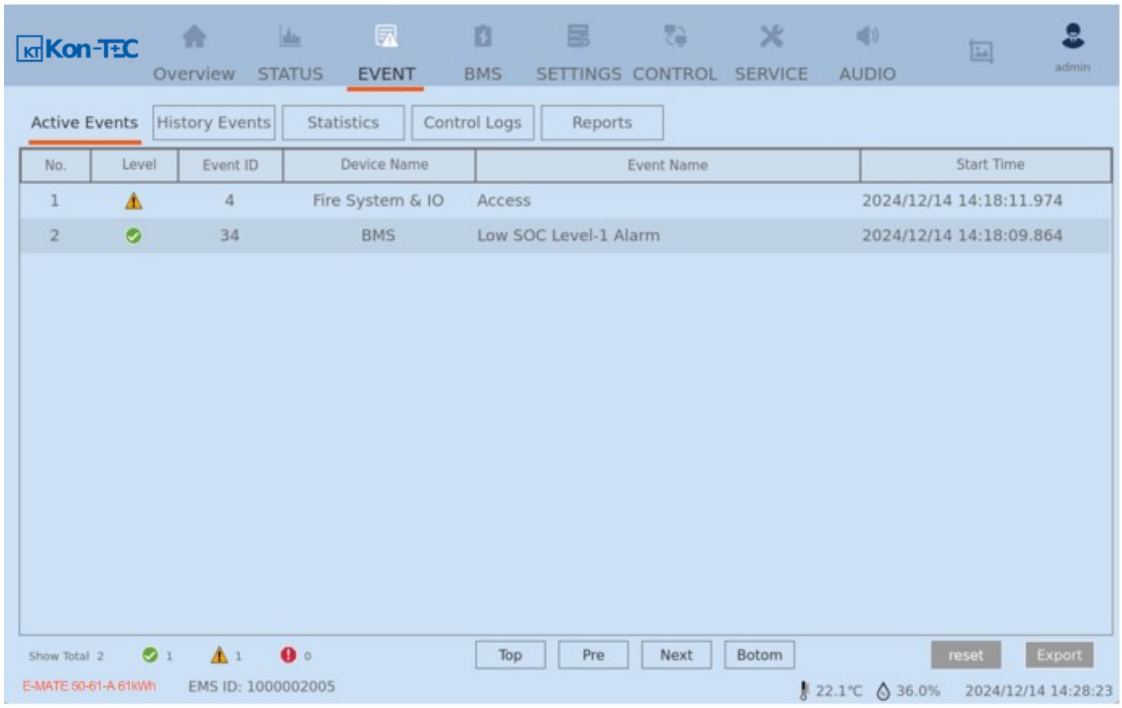


Fig. 5-2 EMSEvent Logging Screen

5.3.1.3 EMS

The Battery Information section monitors the operating status of the batteries in real time. As shown in Fig. 5-3:

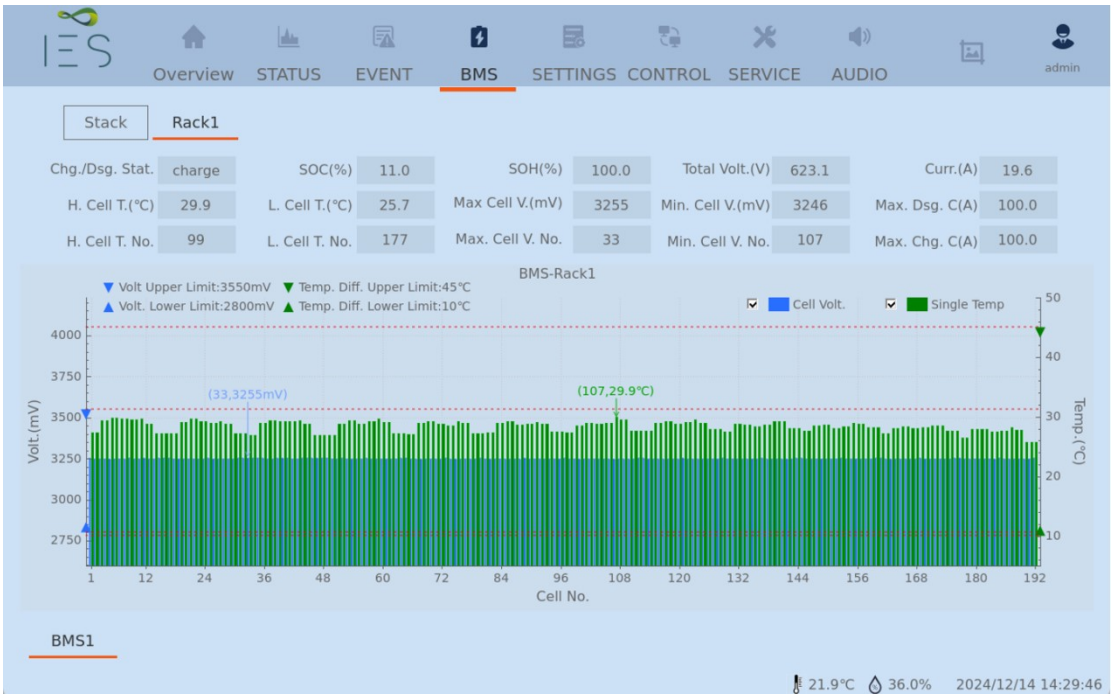


Fig. 5-3 EMSBattery Management Interface

5.3.1.4 Basic Setting

The parameter setting page provides the installation configuration and the operation configuration of the equipment parameters. As shown in Fig. 5-4:

Fig. 5-4 EMSParameter Setting Interface

5.3.1.5 Control

The Control page provides settings for PCSturn on/turn off, close/open battery contactors, clearing faults, and selecting time period control modes, as well as configuration of 48 fixed time periods and 12 custom time periods.

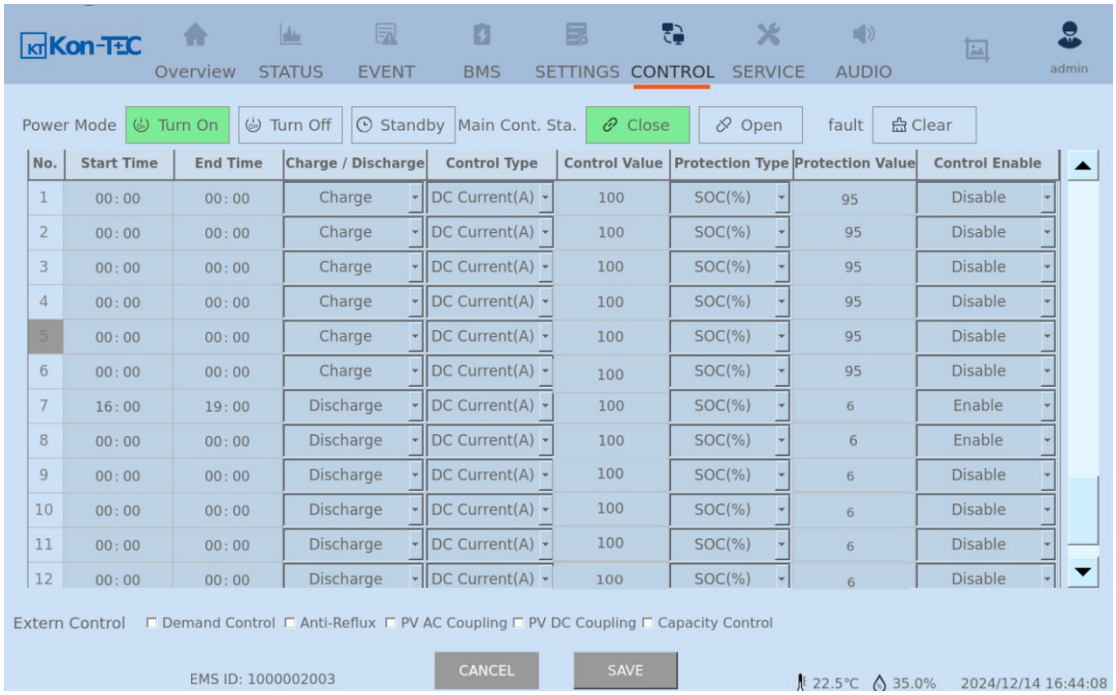


Fig. 5-5 EMSControl

Instruction
50-61 support 12 custom period controls. set period does not conflict with the existing time period, and the end time is greater than start time. first 6 last 6

control	current, and	protection	SOC.

5.3.2 Introduction of Hybrid Inverter Energy Storage Mode

There are three kinds of energy storage modes, which are Self-use, Selling first and Off grid mode. Self-use/ Selling first / Off-grid are exclusive ,the user could select only one mode. All modes first priority is to use the available PV power to support loads. The different modes determine what the second priority, or use of the excess PV power, will be.

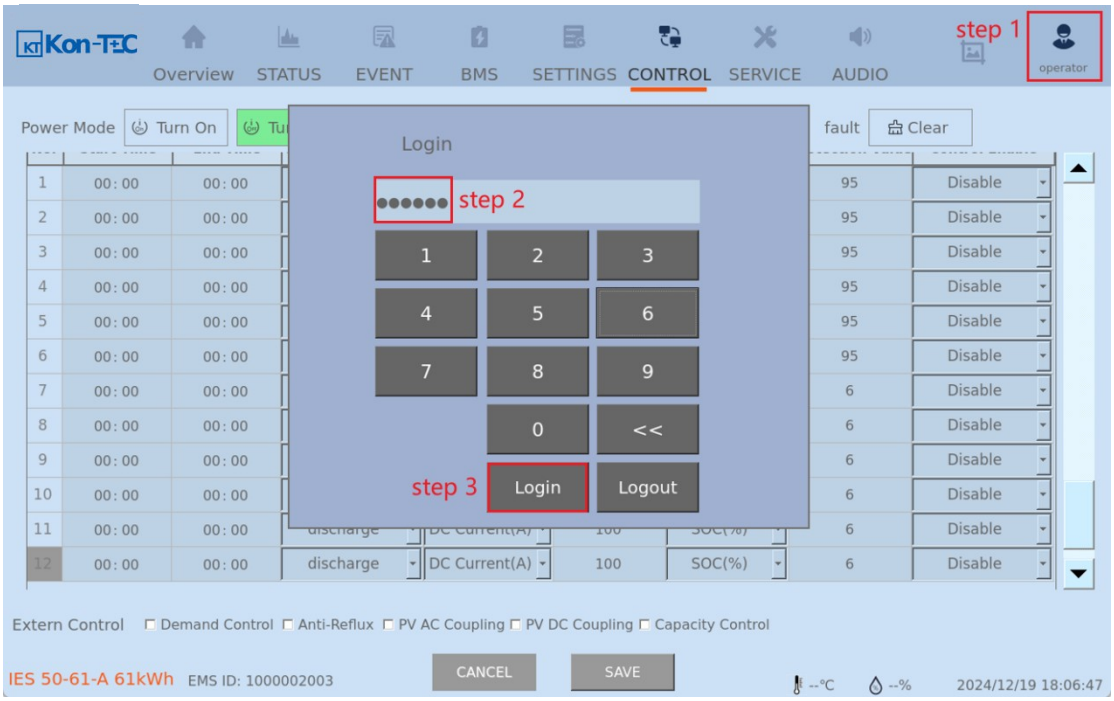
Table 5-3 Energy Storage Mode Description

Settings	Description
Self-use	: > > grid. In mode, system stores excess PV power into the battery after the loads are supplied. If the battery is charged full, or there is no battery, the excess PV power will be exported(sold)back to the grid. If the system is set to not export any power, then the inverter will curtail the PV power (derate the inverter output power).
Selling first	: > grid > .In mode, system exports any excess PV power after the loads are supplied. If the export power quota has been met, then the remaining PV power will be stored in the battery. Notice: This mode should not used if export set zero.
Off grid	: > battery. used when system are not electrically connected to the grid at all.

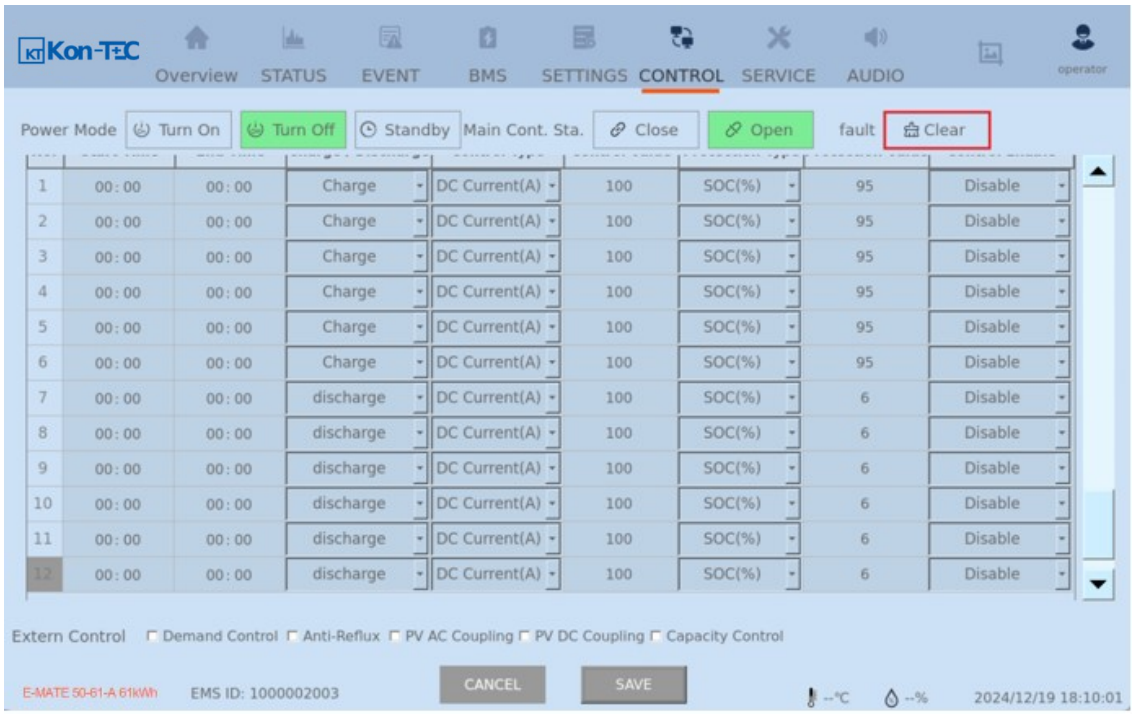
If "Allow Grid Feed-In" is enabled, the system can sell electricity to the power grid. If "Allow Grid Charging of Battery" is enabled, it is necessary to set up 12 charge-discharge time periods, which are used to charge the battery with grid power in only two scenarios: when the battery is depleted to the strong charge SOC, and when the photovoltaic power generation output during charging cannot meet the set current value. "Add Time Period" can only be set in the grid-connected state (in self-consumption and grid priority mode). If “Allow export” is enabled, the system can sell power to the grid.

5.3.3 EMS Controlled Charge/Discharge Steps

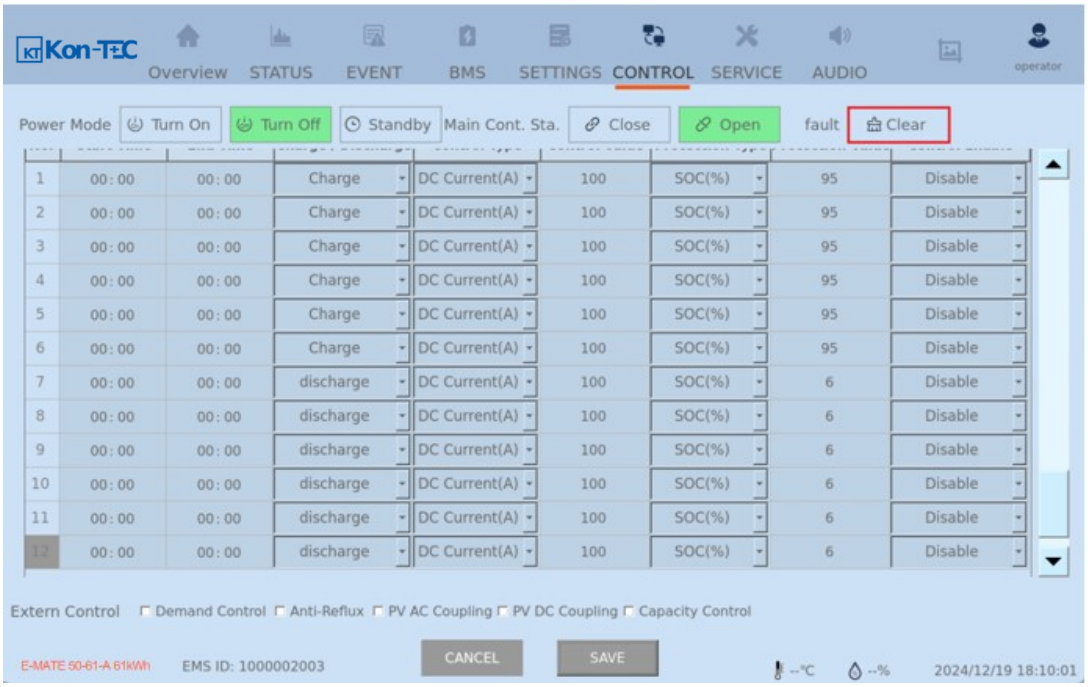
Step 1: Log in to the EMS using the “Operator” account and password 123456.



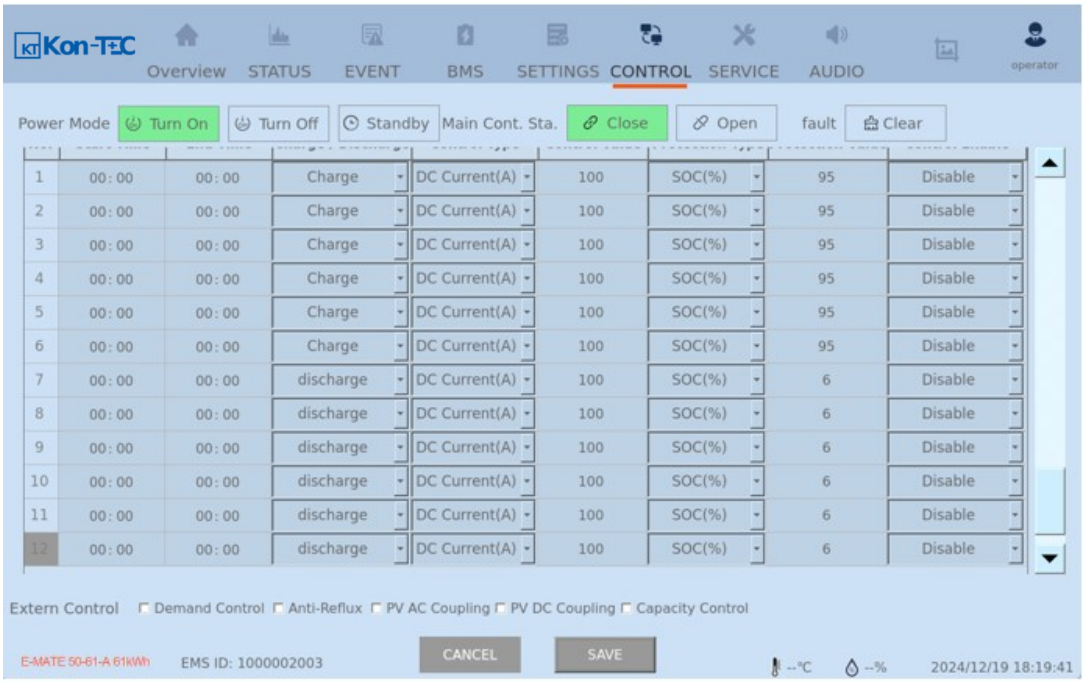
Step2: Ensurethe systemoperates normally, no alarm fault. If there are faults on the Eventpage, first investigate the causeof the fault. If the systemEPOfault, first reset the EPObutton, click the "Clear" button twice on the "Control Strategy" page to reset the system.



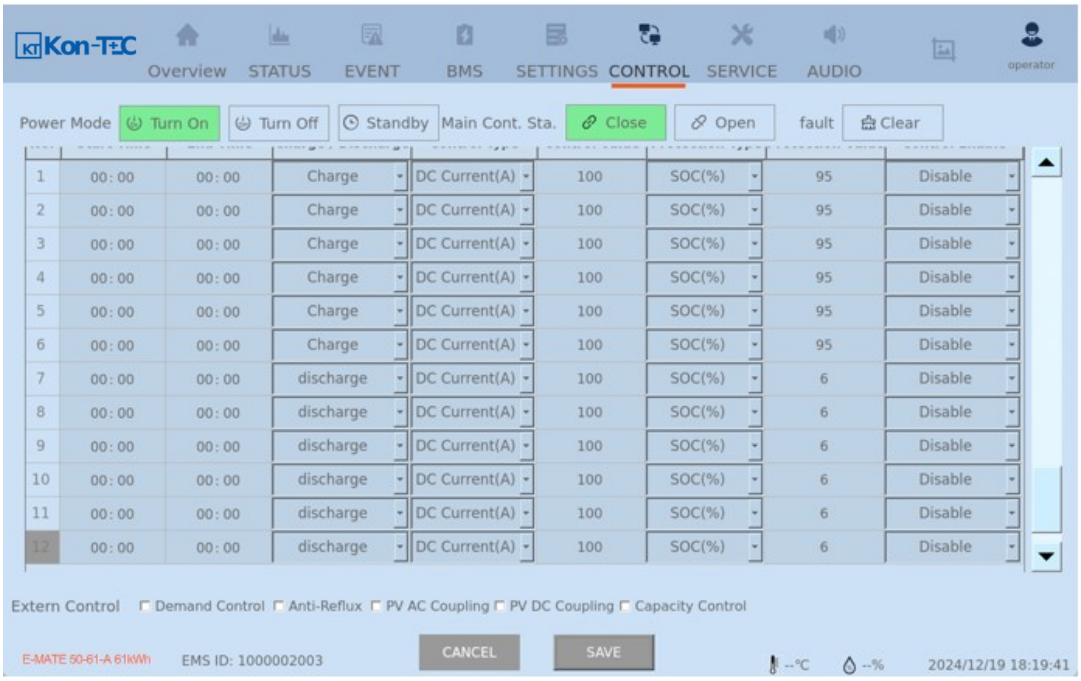
Step 3: On the 'Settings-PCS'page, the energy storage mode is set to Self-use,enabling 'Time Slot configure', enabling 'Allow Export' asshown.
Step4: In the “Control Strategy” page, click the “Close” button to closethe main contactor.
Notice:When the BMS is in the power-on self-test state, it is necessaryto wait for the self-test to be completed, click the ' close ' button again, and the BMS enters the high-voltage power-on state.



Step5: On the "Control Policy" page, click the "Turn On" button to power on PCS.

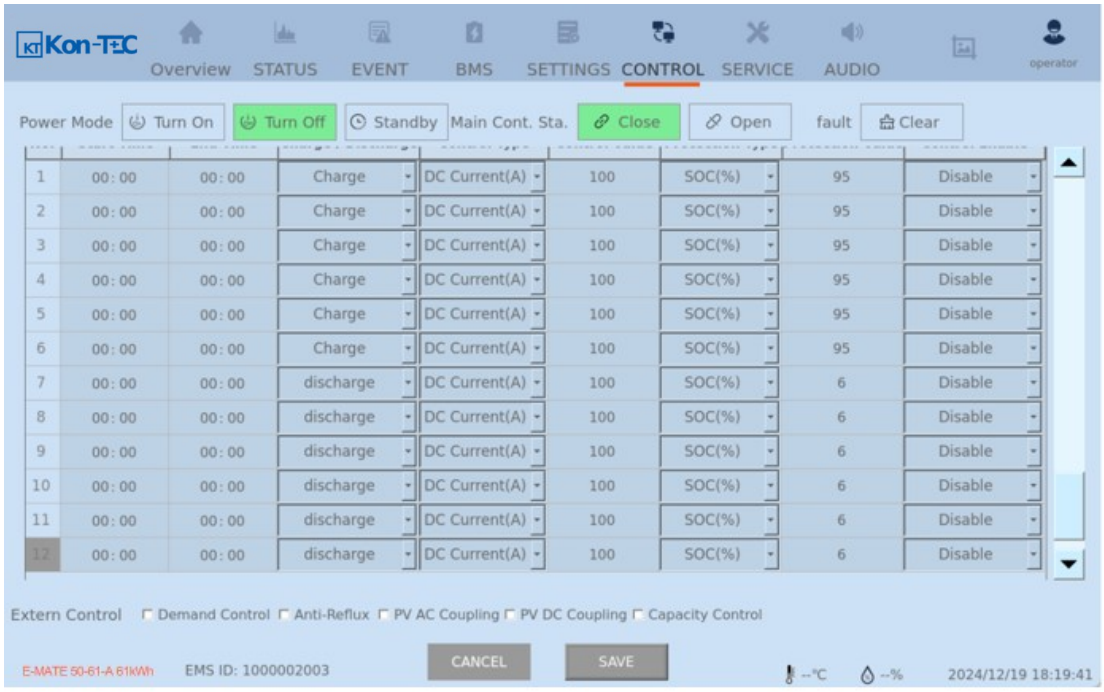


Step 6: Set a reasonable charge and discharge time period. Note : Ensurethat the set time period cannot conflict with the existing time period, and the end time is greater than the start time.Set a reasonable charge and discharge current. Set a reasonable charge and discharge cut-off SOC.

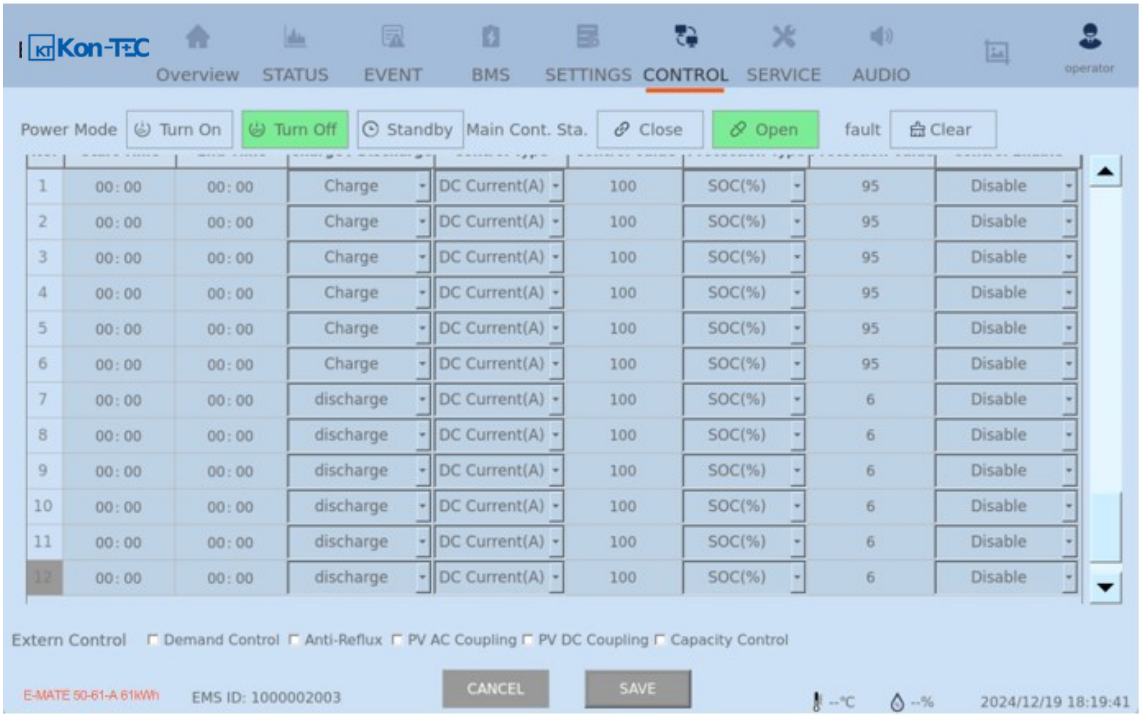


5.3.4 EMS Controlled Power off Steps

Step 1: On the "Control Strategy" page, click the "Turn off" button to shut down the PCS.



Step 2: If you need to power off completely, on the "Control Strategy" page, click the "Open" button to disconnectthe battery contactor.



5.3.5 Diesel Generator Setting

When the diesel generator needs to be connect for use, please follow the steps below for setup.

- Enable in off-grid mode.
- Set the Smart port to Genset input mode, configure auto-start, set the diesel generator's start SOC range (adjustable), and set the generator charging power (adjustable).
- When the battery SOC is below 25%, the inverter outputs a dry contact signal to the generator.
- The generator is enabled, providing 3kW charging power to charge the battery. Once the battery SOC exceeds 80%, the dry contact signal is stopped, and the generator shuts down.

6 Maintenance & Disassembly

6.1 System Usage Requirements

6.1.1 Precautions Before Maintenance

⚠ WARNING

- To avoid electric shock, do not perform any other maintenance operations beyond this manual..
- If necessary, contact customer service for maintenance.

- Maintenance requires licensed professional maintenance personnel, non-professionalmaintenance personnelare prohibited to operate.
- If necessary, maintenance intervals can be shortened depending on site conditions.

6.1.2 Maintenance (Everytwo years)

Item	method
System status and cleanliness	Check equipment inside the outdoor cabinet for any damage or deformation. Checkfor any abnormal noisesduring the operation of the internal equipment. Checkwhether the temperatures inside the outdoor cabinet and on its exterior are excessivelyhigh. Checkwhether the humidity inside the outdoor cabinet is within the normal range. of oxidation rust cabinet.

6.1.3 Maintenance (Once a year)

Item	method
Systemstatus and cleanliness	Checkthe interior of the outdoor cabinet for foreign objects, dust and grime. Removeinterior dust if necessary. Checkthe air inlet and outlet of the outdoor cabinet for blockages. Checkfor any screwdetachment inside the outdoor cabinet. within cabinet.
Appearance	of cabinet damage, paint loss, oxidation, etc. Checkthe cabinet door locks,etc. for smooth operation. If necessary,apply appropriate lubricants to door locks,hinges,etc. Checkwhether sealing strips,etc. are securely attached. Properly maintained sealing strips are essential for preventing water ingressinto the product. Inspect them carefully, and replace immediately if any sealing strips are found damaged. Checkmachine warning signsand other device signs.if any blurred damaged, them promptly.
Cable connections	all incoming and outgoing of outdoor cabinet are well sealed. Check cable connections for looseness.Retighten any loose cables according to the specified torque. Check cables for any damage, particularly for cuts on the surface in contact with metal. Check the insulating cable ties of cable connection terminals for detachment.
Grounding and equipotential	grounding correct. grounding should not than4Ω.

	equipotential storage system are correct. Check whether the cable shielding layers are in good contact with insulation sleeves, and whether the grounding copper bars are secured.
Fire protection system	container. Check the external condition of the equipment for any damages or compressions from nearby equipment. Check whether the equipment status indicator lights are normal. Visually inspect the input/output modules. Check the external condition of the equipment for any damages or compressions from nearby equipment. Check whether the equipment status normal.

6.1.4 Long Without System Usage Requirements

1 . Check the remaining charge and health of the battery.

2 . Ensure that the battery is stored under suitable temperature and humidity conditions to prevent degradation or damage to the battery.

3 . Check whether the battery management system (BMS) is working properly and ensure that the safety protection functions of the battery system are effective, including overcharging, over-discharging, short-circuit and thermal runaway protection.

4 . Before being put back into service, the energy storage system should be subjected to a comprehensive system test, including battery performance, electrical connections and protective features.

5 . Perform cleaning and maintenance of the system, e.g., cleaning battery contacts, checking the cooling system, etc..

6.2 Battery Maintenance

6.2.1 Maintenance Overview

⚠ WARNING

Do not leave the product in a low voltage or low SOC condition for a long period of time. Loss of capacity due to the following conditions is not covered by the warranty.

- Battery discharge cell voltage is below 2.7V for 120 consecutive hours.
- Any cell cluster SOC is 0% for 80 consecutive hours.
- Single battery discharge cell voltage ≤2.2V.

- Read the user manual or instruction manual before maintenance.
- Ensure that the battery system is shut down during maintenance.
- Please check and confirm the positive (+) and negative (-) poles before assembly.
- Check insulation before assembly to prevent short circuits.
- It must be stored according to the battery storage environment requirements.
- Maintain the removed batteries and prohibit sunlight and rain.
- Charging and discharging should be carried out in strict accordance with the requirements of

this manual.

- When the battery reaches the specified end-of-life conditions, it should be discontinued in time.

6.2.2 Battery Storage

> **NOTICE**
>
> - If the system is stored for a long period of time (six months or more) without operation, the system needs to do at least 1 full charge in order to activate the battery before the system is used for the first time.
> - Battery storage requires proper storage at the appropriate temperature and humidity, otherwise it will reduce the battery's service life.
> - It is recommended to adjust the power of product storage to 30%~50%.

Product storage must be kept away from fire and heat sources. When continuous static storage is required for more than 2 months, maintenance should be performed every two months.

7 Alarm Reference & Troubleshooting

7.1 EMS Trouble Shooting

	Fault	Troubleshooting
-1000	Fault set	need deal with it.
-1001	fault	Troubleshooting PCS.
-1002	communication fault	communication between and abnormal
-1003	fault	Troubleshooting BMS.
-1004	communication fault	communication between and abnormal.
-1005	fault	Troubleshoot fire-related faults.
-1006	communication fault	communication between and abnormal.
-1007	EPO	Confirm that EPO been reset and Fault
-1008		need deal with it.
-2000	Alarm set	need deal with it.
-2001	alarm	Troubleshooting PCS.
-2002	communication failed	communication between and abnormal
-2003	alarm	Troubleshooting BMS.
-2004	communication failed	communication between and abnormal.
-2005	alarm	Troubleshoot fire-related alarm.
-2006	conditioning communication failed	turned on and confirm

		communication between and abnormal.
-2008		need deal with it.
-2009	communication failed	card and suction cup antenna are properly plugged in. Then restart the system.

7.2 PCSTrouble Shooting

	Fault	Troubleshooting
1	grid	• Confirm the fault condition on-site and close the high-voltage box circuit breaker again. • Clear the fault and power up the systemagain. • If the issueis not resolved, please contact the supplier for further assistance.
2	Grid	
3	Grid	
4	Grid overfreq	
5	Grid underfreq	
6	Unbalanced grid	
7	Gird fluctuation	
8	Grid current	
9	Grid current tracking	
10	METERCOM Fail	communication between and abnormal
12	Select Fail	factory-provided
17	Backup fault	1. backup port wiring normal 2.Restart the system, confirm that the fault continues.
18	Backupoverload fault	Backup load too large, load startup power is too large, need to remove some backup load, or remove the inductive load on backup.
21	Battery not connected	within standards. 2.Measurebattery voltage at plug
22	Battery overvoltage Check	Verify battery voltage is within standards. Measure battery voltage at inverter connection point. Contact your battery manufacturer for further service.
23	Battery undervoltage Check	Restart system and if fault persists.If it is still not eliminated, please contact the manufacturer's customer service.
24	Alarm	need deal with it.
25	Inconsistent selection	Confirm model selection consistentwith actual one.

28		if abnormal. 2.Restartthe system,confirm that the fault
29		Restart system,confirm that fault continues.
30	unbalanced	
31		
32	unbalanced 2	
33	overcurrent on circuit	Restart system,confirm that fault continues.
34	overcurrent on circuit	
35	input	if connected without loose connection.
36	Grid overcurrent	1. Confirm that grid abnormal. 2. Confirm that the AC cable connection is not abnormal. 3. Restart the system, confirm that the fault continues.
37	overcurrent	Restart system, confirm that fault continues.
38	Grid 02	1. Confirm grid distorted. 2. Check whether the AC cable is connected reliably.
39	AFCI	Restart system, confirm that fault continues.
40	Arc fault	tight within system. Arc fault settings can be changed in advanced if adjustment
42		Restart system, confirm that fault continues.
44	Grid	Restart system, confirm that fault continues.
45	Over dc components	1. Confirm that grid abnormal. 2. Confirm that the AC cable connection is not abnormal. 3. Restart the system, confirm that the fault
46	Over temperature protection	1. surrounding environment of the inverter has poor heat dissipation. 2. Confirm whether the product installation meets
47	fault	Restart system, confirm that fault continues.
48	Undertemperature protection	1. working environment temperature of the inverter. 2. Restart the system to confirm if the fault continues.

49	PVinsulation fault	1. insulation problems. 2. damaged.
50	tection	1. current ground. grounding. Verify all wires are in good condition and not leaking current to ground.
51	current tection	
52	current self tection	
53	initial tection	Restart system, confirm that fault continues.
54	fault	Restart system, confirm that fault continues.
55	fault	1. if circuit tripping. 2. if damaged
56	overcurrent	1. backup load overloaded. 2. Restart the system, confirm that the fault
78	3 overcurrent	Restart system, confirm that fault continues.
79	4 overcurrent	Restart system, confirm that fault continues.
101	Grid Surge(Warn)	Grid fault, restart device. If it still not eliminated, please contact the manufacturer's .
102	Fanfault(Warn)	if internal fan working jammed.
1000001	Equipment comm. status	communication between EMSand PCSis abnormal.

7.3 BMS Trouble Shooting

EVENTID	Fault Message	Troubleshooting
1	terminal Level-1 Alarm	need deal with it.
2	terminal Level-2 Alarm	need deal with it.
3	terminal Level-3 Alarm	Confirm fault condition and close the high-voltage box circuit breaker again. • Clear the fault and power up the system again. • If the issueis not resolved, please contact assistance.

4	terminal Level-1 Alarm	need deal with it.
5	terminal Level-2 Alarm	need deal with it.
6	terminal Level-3 Alarm	Confirm fault condition and close the high-voltage box circuit breaker again. • Clear the fault and power up the system again. • If the issueis not resolved, please contact assistance.
7	terminal over-current Level-1 Alarm	need deal with it.
8	terminal over-current Level-2 Alarm	need deal with it.
9	terminal over-current Level-3 Alarm	Confirm fault condition and close the high-voltage box circuit breaker again. • Clear the fault and power up the system again. • If the issueis not resolved, please contact assistance.
10	terminal over-current Level-1 Alarm	need deal with it.
11	terminal over-current Level-2 Alarm	No need to deal with it.
12	terminal over-current Level-3 Alarm	Confirm fault condition and close the high-voltage box circuit breaker again. • Clear the fault and power up the system again. • If the issueis not resolved, please contact assistance.
13	terminal isolation Level-1 Alarm	No need to deal with it.
14	terminal isolation Level-2 Alarm	No need to deal with it.
15	terminal isolation Level-3 Alarm	Confirm fault condition and close the high-voltage box circuit breaker again. • Clear the fault and power up the system again. • If the issueis not resolved, please contact assistance.
16	Cell over-temperatureLevel-1 Alarm	need deal with it.

17	Cell over-temperatureLevel-2 Alarm	need deal with it.
18	Cell over-temperatureLevel-3 Alarm	Confirm fault condition and close the high-voltage box circuit breaker again. • Clear the fault and power up the system again. • If the issueis not resolved, please contact assistance.
19	Cell charge under-temperatureLevel-1 Alarm	No need to deal with it.
20	Cell under-temperatureLevel-2Alarm	No need to deal with it.
21	Cell under-temperatureLevel-3 Alarm	Confirm fault condition and close the high-voltage box circuit breaker again. • Clear the fault and power up the system again. • If the issueis not resolved, please contact assistance.
22	Cell Level-1 Alarm	No need to deal with it.
23	Cell Level-2 Alarm	No need to deal with it.
24	Cell Level-3 Alarm	Confirm fault condition and close the high-voltage box circuit breaker again. • Clear the fault and power up the system again. • If the issueis not resolved, please contact assistance.
25	Cell Level-1 Alarm	need deal with it.
26	Cell Level-2 Alarm	need deal with it.
27	Cell Level-3 Alarm	Confirm fault condition and close the high-voltage box circuit breaker again. • Clear the fault and power up the system again. • If the issueis not resolved, please contact assistance.
28	Cell high Level-1 Alarm	No need to deal with it.

29	Cell high Level-2 Alarm	No need to deal with it.
30	Cell high Level-3 Alarm	Confirm fault condition and close the high-voltage box circuit breaker again. • Clear the fault and power up the system again. • If the issue is not resolved, please contact assistance.
31	Cell high Level-1 Alarm	No need to deal with it.
32	Cell high Level-2 Alarm	No need to deal with it.
33	Cell high Level-3 Alarm	Confirm fault condition and close the high-voltage box circuit breaker again. • Clear the fault and power up the system again. • If the issue is not resolved, please contact assistance.
34	Level-1 Alarm	need deal with it.
35	Level-2 Alarm	need deal with it.
36	Level-3 Alarm	need deal with it.
54	Internal CAN communication disconnect	Confirm fault condition and close the high-voltage box circuit breaker again. • Clear the fault and power up the system again. • If the issue is not resolved, please contact assistance.
55	Cell abnormal	Confirm fault condition and close the high-voltage box circuit breaker again. • Clear the fault and power up the system again. • If the issue is not resolved, please contact assistance.
56	Cell temperature abnormal	Confirm fault condition and close the high-voltage box circuit breaker again. • Clear the fault and power up the system again. • If the issue is not resolved, please contact assistance.

64	CAN Hall fault	Confirm fault condition and close the high-voltage box circuit breaker again. • Clear the fault and power up the system again. • If the issueis not resolved, please contact assistance.
65	CAN Hall communication fault	Confirm fault condition and close the high-voltage box circuit breaker again. • Clear the fault and power up the system again. • If the issueis not resolved, please contact assistance.
71	Cell Leve-l Alarm	need deal with it.
72	Cell Leve-2 Alarm	No need to deal with it.
73	Cell Leve-3 Alarm	· Confirm fault condition and close the high-voltage box circuit breaker again. · Clear the fault and power up the system again. · If the issue is not resolved, please contact assistance.
74	Cell under-temperature Leve-1 Alarm	need deal with it.
75	Cell 2 Alarm	need deal with it.
76	Cell under-temperature Leve-3 Alarm	· Confirm fault condition and close the high-voltage box circuit breaker again. · Clear the fault and power up the system again. · If the issue is not resolved, please contact assistance.
77	High Level-1 Alarm	need deal with it.
78	High 2 Alarm	need deal with it.
79	High 3 Alarm	need deal with it.

7.4 Air Conditioner Trouble Shooting

EVENTID	Fault Message	Troubleshooting

1	Cabinet temperature high alarm	electrical cabinet heat load, the electricity Whether the gas tank temperature and humidity regulator works Normal, check the probe and line. Only alarm does not stop.
2	Cabinet alarm	need deal with it.
3	Humidity high alarm	need deal with it.
4	alarm	need deal with it.
5	Coil freeze protection alarm	not open compressor, reset.
6	Defrost probe malfunction	and . alarm not stop.
7	Condensation temperature probe malfunction	and reset alarm.
8	Cabinet temperature probe fault	and .Do not open compressor,do not open the heating, automatic reset.
10	The outlet temperature probe fault	and .
11	Humidity probe malfunction	and . alarm not stop.Automatic reset.
12	Internal fan failure	fan. Stop machine, manually reset or power off to restart the power-on reset.
13		compressor. not open compressor, manual reset.
14	High-voltage alarm	ambient high . dust fouling too much . air inlet blockage . fan failure . pressureswitch failure. Not open the compressor, automatic after 2H Reset or power-down reset reset.
15	Low-voltage alarm	ambient of refrigerant, do not open the compressor, manual reset or power down to restart reset.
16		sequence. not stop, manual reset down reset.
17	Equipment comm. status	turned on and confirm whether the communication line between the EMS and the air conditioner is abnormal.

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