

User Manual For 100kW-215kWh Outdoor Cabinet ESS

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1 About this manual

1.1 Preface

Dear customer, thank you very much for using our company's developed and manufactured container energy storage system. We sincerely hope that this product meets your needs and we also hope that you can provide more valuable feedback on the performance and functionality of the product so that we can continue to improve.

1.2 Applicable products

➤ This manual is applicable to the following models of outdoor cabinet energy storage system.

Table 1

Model	Power rating	System-rated battery capacity	Cabinet body
100-215kWh	100kW	215kWh	Outdoor cabinet

1.3 Manual instructions

➤ This manual is applicable to engineers and technicians who transport, install and operate energy storage products.

➤ Should have a certain electronic, electrical wiring and mechanical professional knowledge, familiar with electrical and mechanical schematic diagram.

➤ Professional training related to installation and commissioning of electrical equipment.

➤ Please read this manual carefully before shipping, installing, and operating the product.

➤ Be familiar with the relevant standards and specifications of the project location country / region.


➤ Please combine this manual with other parts and product manuals.


➤ The Company reserves all rights, including the pictures, marks and symbols used in the manual.


➤ The contents of this manual will be regularly updated or revised due to product development without notice.


1.4 Sign the instructions


In order to ensure the safety and better use of the product, the manual provides relevant information and highlights it using appropriate symbols. The following lists the symbols that may be used in this manual, please read them carefully.

 Danger	Indicates a high potential danger and failure to avoid situations that would result in death or serious injury.
--	---

 Warning	Indicates a moderate potential danger and failure to avoid conditions that could lead to death or serious injury.
---	---




 Be careful	Indicates low potential hazards that may cause moderate or mild injury to personnel.
--	--

 Notice	There is a potential risk of failure to avoid possible equipment failure or reported failure.
--	---

	"Explanation" is an emphasis on and supplement to the content and may also provide techniques to optimize the use of the product.
---	---

Please always pay attention to the hazard warning signs on the product, including:

Table 2

ID	Marking instruction
	This identification indicates that the product contains high pressure inside and touch may cause electric shock hazard.
	This symbol indicates that the temperature is above the acceptable range. do not contact to avoid human injury.
	This symbol indicates that the protective ground (PE) end needs to be firmly grounded to ensure the safety of the operator.

1.5 Term

If not specified below, terms are used in place of product names:

Table 3

Number	Term	Full name
1	ESS	Energy storage system
2	BSS	Energy storage battery system
3	MPS	Hybrid inverter
4	Battery Cluster	Battery cluster
5	HVAC	Air-conditioning
6	FSS	Fire extinguishing system
7	BMS	Battery management system
8	EMS	Energy management system
9	UPS	Uninterrupted Power Supply

2 Safety instruction

2.1 Personnel requirements

- ◆ Only professional electricians or professional qualified personnel can carry out the Operation of the product.
- ◆ The operator should be fully familiar with the structure and working principle of the entire energy storage system.
- ◆ The operator shall be fully familiar with the product manual of the electrical internal equipment.
- ◆ The operator shall be fully familiar with the relevant standards of the project country / region.



Warning

- Do not perform maintenance or repair when the equipment is live!
- **At least two personnel** must be ensured on the site when maintaining or repairing the equipment. The equipment has been safely disconnected and waits for 15 minutes for the converter to be discharged before performing maintenance or overhaul operation.

2.2 Operation warning

In the operation of installation, daily maintenance and overhaul of the container energy storage system, in order to prevent the misoperation or accident of irrelevant personnel. Please follow the following items:

- ◆ Set a visible sign at the switch in the container to prevent misswitch.
- ◆ Set up warning signs or safety warning belts near the operating area.
- ◆ After maintenance or maintenance, pull out the door key and keep it properly.

2.3 Container logo

- ◆ The warning mark in the container contains important information for the safe operation of the energy storage hybrid inverter. It is strictly prohibited to tear it up or damage it artificially!
- ◆ The front door is installed on the inside of the container certificate, and the nameplate contains important parameter information related to the product. It is strictly prohibited to tear it up or damage it artificially!
- ◆ If the box identification is damaged or blurred, please contact us.



Notice

- Please sure the container identification is clear and readable.
- Once the container mark is damaged or blurred, it must be replaced immediately.

2.4 Security matters

2.4.1 Electrical safety



Danger

Deadatal high voltage inside the product!

- Do not touch the terminals or conductors connected to the grid circuit.
- Note all instructions or safety instructions on connection to the grid and observe the warning signs on the product.
- Observe the safety precautions listed in this manual and other relevant documents of the equipment.



Danger

Damaged equipment or system failure may cause an electric shock or a fire!

- Initially visually inspect the equipment for damage or other hazards before operation.
- Check that other external equipment or circuit connections are safe.
- Make ify that the device is in a safe state.

2.4.2 Electrostatic protection



Notice

Statically sensitive elements on the circuit board or elsewhere can be damaged by improper operation or contact by operators.

- Please the operator avoid unnecessary circuit board contact.
- Please follow the static electricity protection specifications, such as wearing an anti-static bracelet, etc.

2.4.3 Notes for energy storage battery pack



Danger

- There is a fatal high voltage between the positive and negative electrodes of the energy storage battery pack connected to the energy storage converter!
- When maintaining the equipment, ensure that the connection between the energy storage converter and the energy storage battery pack is completely disconnected.

2.5 Environmental space


2.5.1 escape passage requirements

To ensure that staff can evacuate the site quickly in case of an accident, please follow the following:

- ◆ Do not place combustible and explosive items around the container energy storage system.
- ◆ It is strictly prohibited to pile up debris in the escape passage, or to occupy the escape passage in any form.


2.5.2 Moisture protection

Do not use the container energy storage system beyond the specified wet conditions!

 <p>Notice</p>	<p>In order to guarantee the normal use of all functions of the outdoor cabinet, please observe the following items:</p> <ul style="list-style-type: none">● Do not open the cabinet door when the air humidity is > 95% or condensation.● Avoid opening the cabinet door for the maintenance or repairing of the container energy storage system in rainy or wet weather conditions.
---	---

2.6 Test specification

2.6.1 live line measurement

 <p>Danger</p>	<ul style="list-style-type: none">● There is high voltage in the equipment, accidental touch may cause fatal shock hazard, so during live measurement shall:● Do a good job of protection (such as wearing insulating gloves, wearing insulated shoes, etc.).● At least two personnel must be kept on the site to ensure personal safety.
--	--

2.6.2 Measurement equipment use

In order to connect and test the container energy storage system, relevant electrical measuring equipment is required to ensure that the electrical parameters meet the requirements



Warning

- Select high quality measuring equipment whose range and usable conditions meet the requirements of the site.
- Ensure the correct connection and use of measuring equipment, to avoid arc and other dangers.

2.7 Set requirements

The parameters in the equipment are closely related to the operation of the container energy storage system. Only after the operating status of the system and energy storage equipment must be reliably analyzed and evaluated.



Warning

- Improper parameter setting may affect the normal function realization of the container energy storage system!
- Only an authorized professional personnel can set the parameters of the container energy storage system.

2.8 Maintenance or maintenance

The following points should be noted during the maintenance or overhaul operation of the equipment:

- ◆ Set up the maintenance sign, and ensure that the container energy storage system will not be accidentally re-powered on.
- ◆ Use the multimeter measurement to ensure that the live equipment inside the container energy storage system has been disconnected.
- ◆ Ensure that the equipment is well grounded.
- ◆ Live parts must be insulated with insulating materials.
- ◆ After the container energy storage system is shut down and the AC / DC power supply is disconnected, it takes at least 15 minutes to conduct maintenance or overhaul of the container energy storage system.
- ◆ In the whole process of maintenance and overhaul, we need to ensure that the escape passage is completely unblocked.

2.9 Product scrap

- ◆ When the container energy storage system needs to be scrapped, it cannot be treated as conventional waste products.
- ◆ Please contact our local authorized professional recycling agency.

2.10 Matters need attention

The actual operation summary shall take the following protective or emergency measures according to the site requirements:

- ◆ During the maintenance, overhaul and other operations of the equipment, the relevant personnel should take appropriate protective measures according to the needs, such as wearing noise-proof earplugs, insulation shoes, burn-proof gloves, etc.
- ◆ The container energy storage system is usually located far away from the city, and the appropriate emergency rescue facilities should be prepared for implementation when needed.
- ◆ Use all necessary auxiliary measures to ensure the safety of personnel and equipment.



Notice

All operations of the container energy storage system shall comply with the relevant standards of the local country / region.

All descriptions in this manual are for standard configured container energy storage systems.

If you have special needs, please work from us at the time of order Personnel instructions.



For details, please refer to the actual products you have received. This manual does not cover all possible situations during operation, maintenance, overhaul, etc. If you encounter something not explained in the manual, please contact our company in time.

3 System introduction

3.1 System survey

- ◆ Container energy storage system includes battery cluster, converter, EMS, BMS and other units.
- ◆ The converter provides AC power to the load via the isolation transformer. STS (static bypass switch), which can achieve both parallel and off-grid switching.
- ◆ The system can work in different modes according to the actual project requirements and operation strategy.
- ◆ The MPPT PV controller charges the battery directly from the PV power supply and provides greater flexibility in the PV capacity.
- ◆ The container energy storage system is IP54, which can be installed outdoors.

System application:

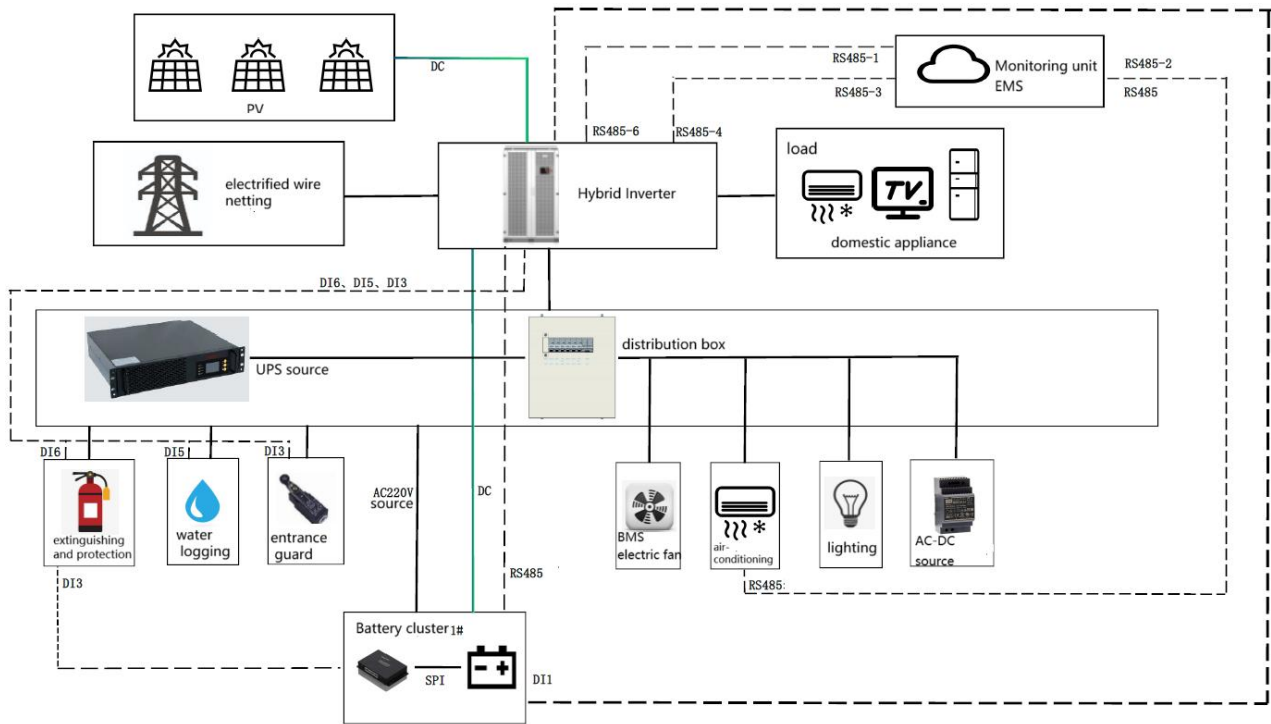


Figure 1_ System diagram

3.2 Work environment

- Operating temperature: 0~45°C;
- Storage temperature: -20~55°C;
- Relative humidity: 95%;
- It is forbidden to use it in places of fire or explosion;
- The height of the foundation should be higher than the height of the local flood, the foundation of steel concrete structure, buried steel plate is easy for container installation;

3.3 System characteristics

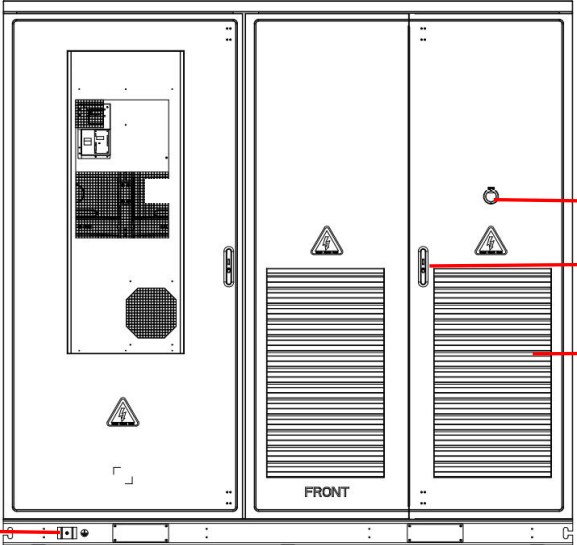
- Container energy storage system is a micro-grid product designed by the company, which is integrated in the 7.5-foot standard container, safe and reliable;
- Built-in EMS function to improve energy efficiency management; new IGBT module, efficient conversion;
- The battery capacity can be flexibly configured according to different customer needs;
- Standardized products provide support for rapid installation and deployment;
- Support photovoltaic, power grid, diesel generator and load access;

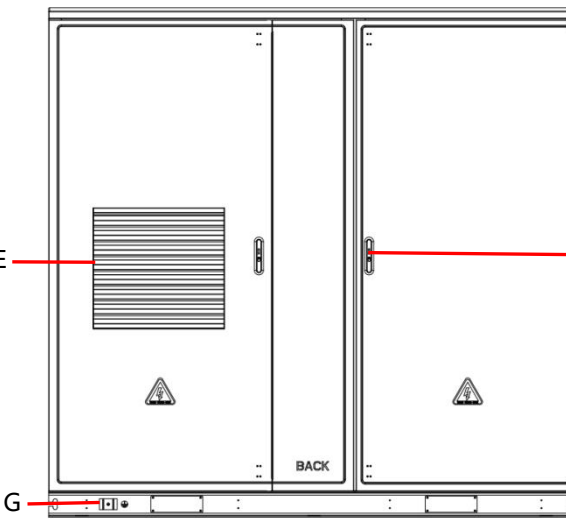
> Can realize the power supply automatic Internet access, and off the grid automatic switch;

> Suitable for energy storage system, distributed energy storage power station, industrial and commercial energy storage power station and other fields in industrial parks;

3.4 Appearance size

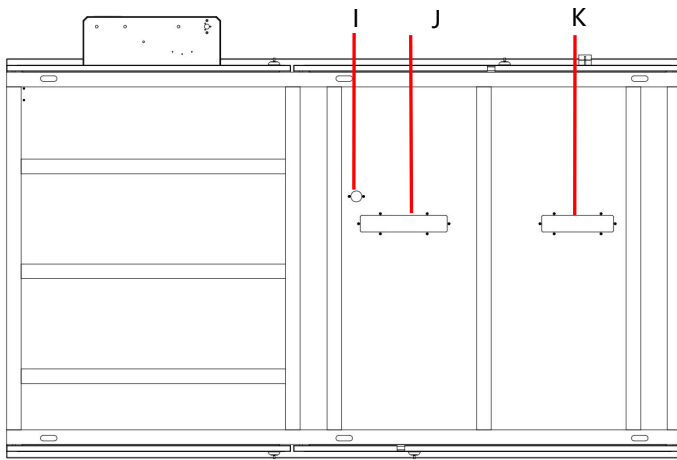
3.4.1 Appearance introduction

View	Explain
 <p>The diagram shows the front view of a three-door cabinet. The left door is open, revealing internal components. The middle and right doors are closed. Labels A, B, C, and D point to specific features: A is a stop switch on the right door, B is a door lock on the right door, C is an air inlet with a shutter and filter on the right door, and D is a grounding terminal at the bottom left.</p>	<p>Front view</p> <p>A: Stop switch. B: Door locks. C: Air inlet + (shutter, incl. filter). D: Grounding.</p>

View	Explain
 <p>The diagram shows the back view of the three-door cabinet. Labels E, F, G, and H point to features: E is an equipment outlet on the left door, F is a rear door lock on the right door, G is a grounding terminal at the bottom left, and H is a bottom lifting hole on the right door.</p>	<p>Back view</p> <p>E: After the equipment outlet. F: The rear door lock. G: Grounding. H: Bottom lifting hole.</p>

View

Explain



Bottom view

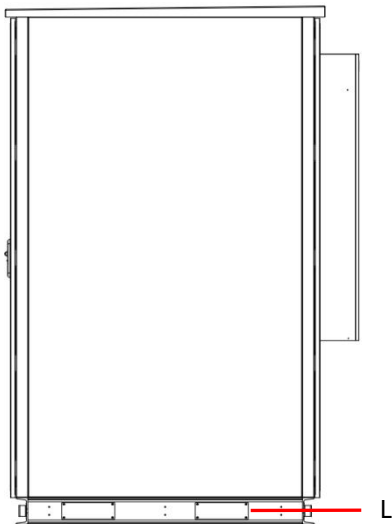
I: Photovoltaic input line inlet hole.

J: Inlet line hole of the external communication line.

K: Power grid or firewood hair, load into the line hole.

View

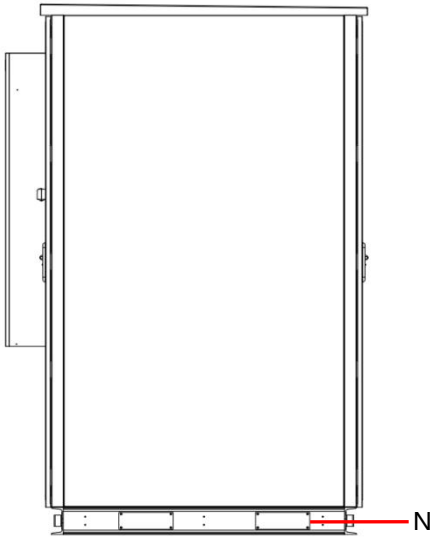
Explain



Right view

L: Forklift import and export

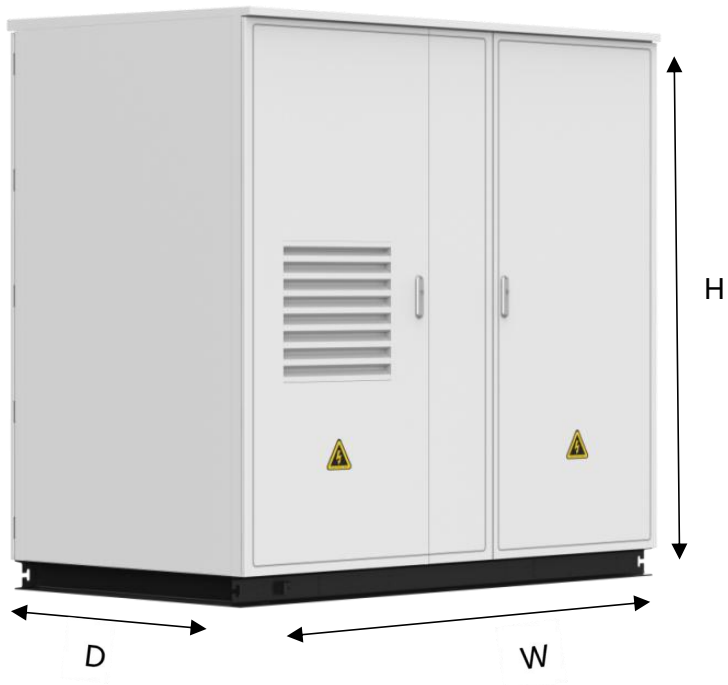
View	Explain
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Left view
N: Forklift import and export

The above pictures are for reference only, please refer to the physical objects received!

3.4.2 Outdoor cabinet size:



2450*1550*2400 (W*D*H: mm)

Figure 2_ dimensions of the cabinet

3.5 Electrical principle

3.5.1 The following figure is the primary circuit diagram of the energy storage outdoor cabinet system. See the interpretation method of the symbols in Table 4

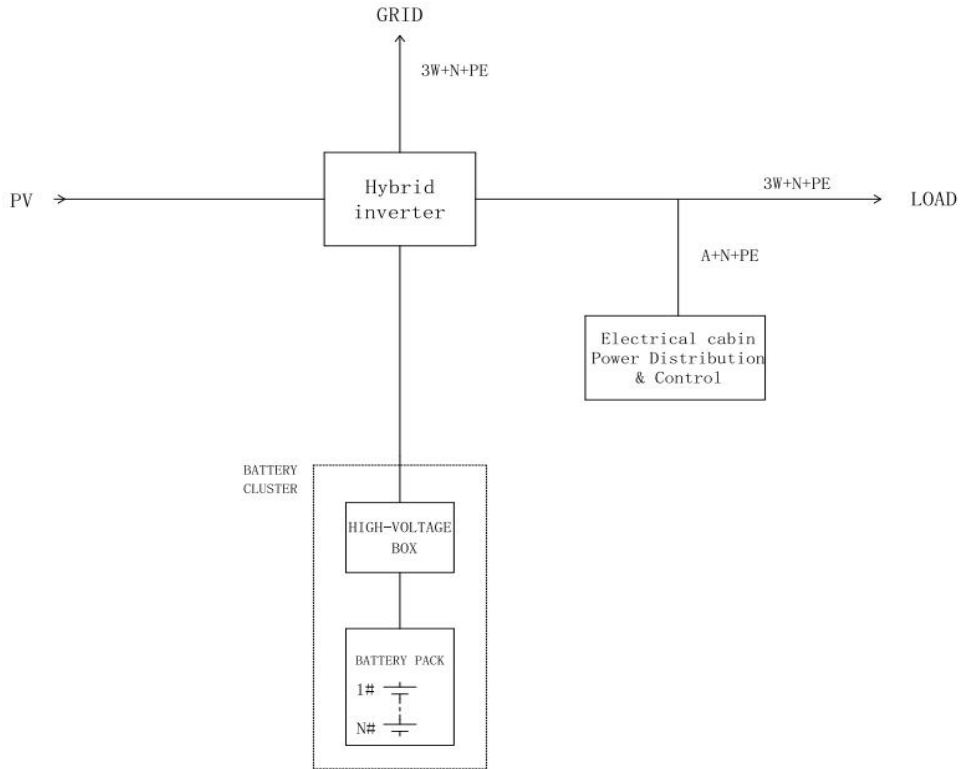


Figure 3_ Primary circuit diagram of the system

Table 4

Number	Symbol	Meaning
1	GRID	GRID
2	3W+N+PE	Three-phase, four-wire + ground wire
3	PV	Photovoltaic
4	LOAD	LOAD
5	Electrical cabin Power Distribution & Control	Distribution control
6	A+N+PE	Single phase line + ground line
7	HIGH-VOLTAGE BOX	High-voltage compartment
8	BATTERY PACK	Battery module

Note: PV is only available for hybrid inverter models

3.5.2 The secondary circuit diagram of the following below, and the explanation method of the symbols in the figure

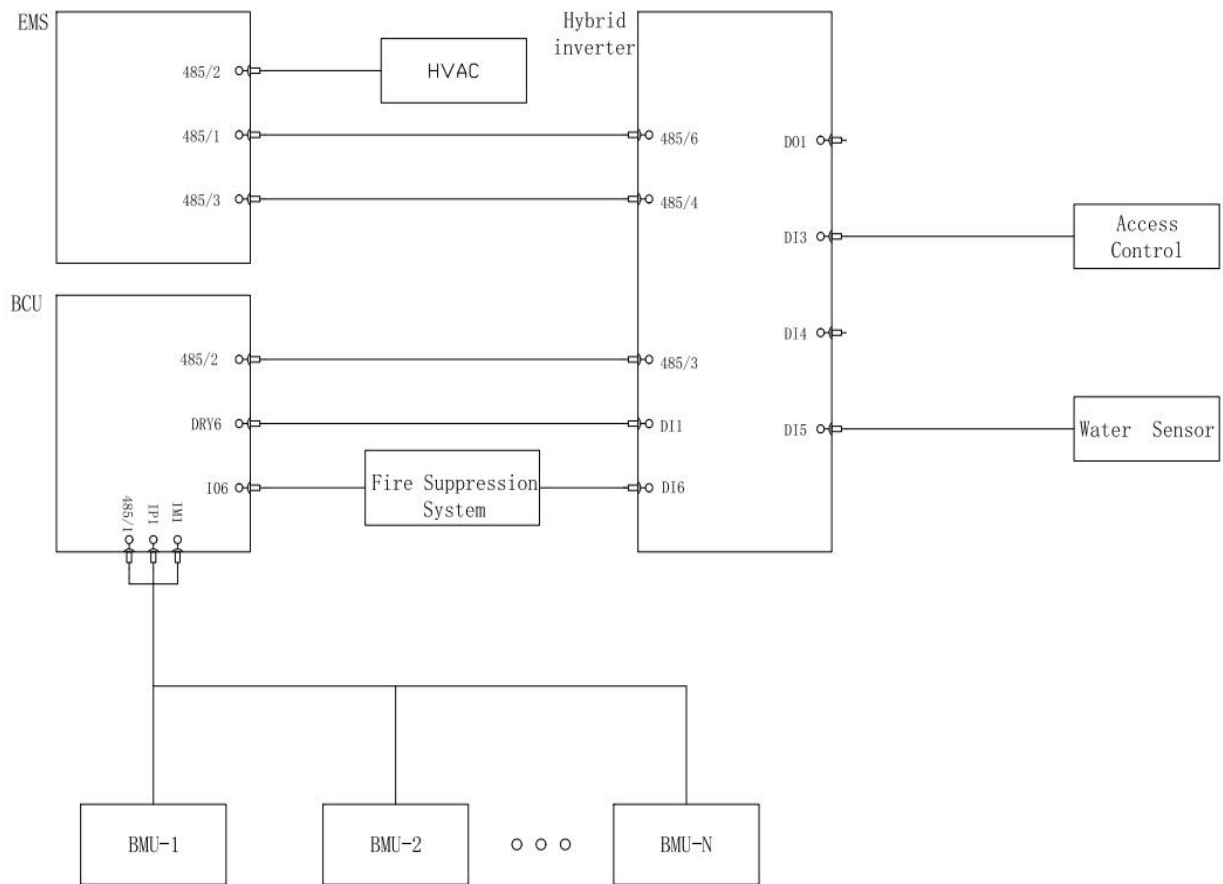


Figure 4_ Secondary circuit diagram of the system

Table 5

Number	Symbol	Meaning
1	BCU	Battery cluster management unit
2	EMS	Energy management system
3	FSS	Fire extinguishing system
4	HVAC	Air-conditioning
5	Access control	Entrance guard
6	Water sensor	Water logging

3.5.3 The communication topology of the symbols in the figure is shown in Table 6

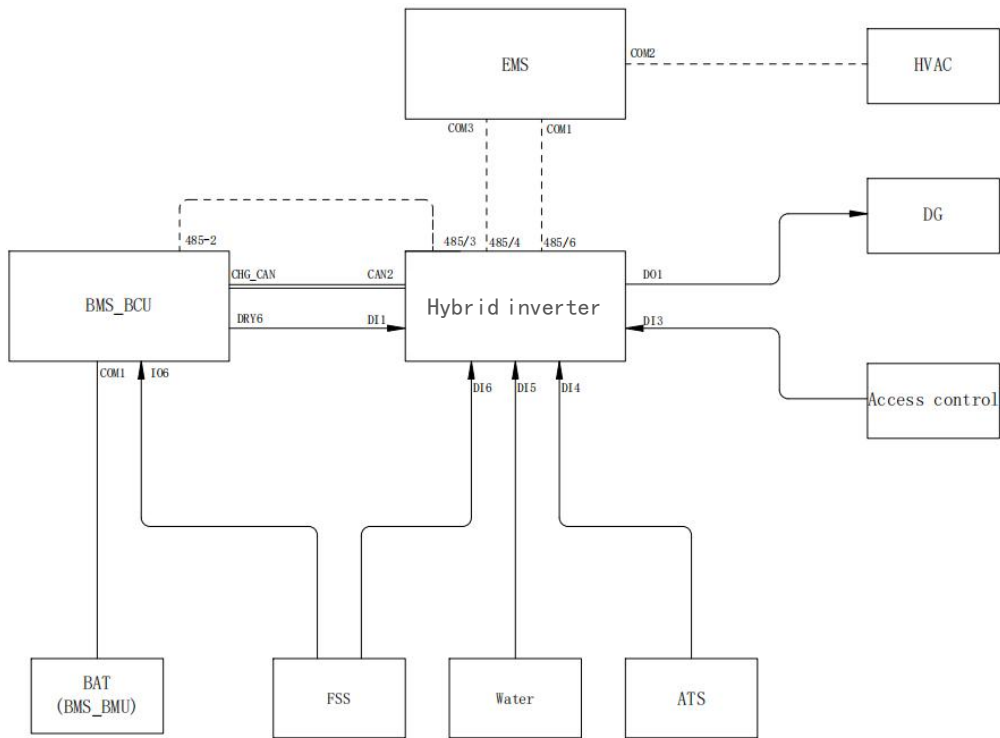
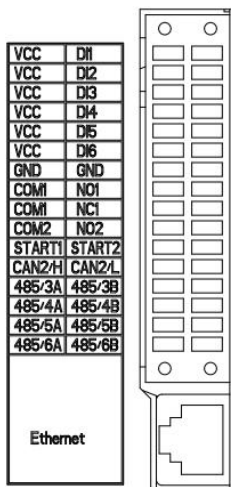


Figure 5 _ Communication topology diagram of the microgrid system

Table 6



Interface Comparison Table				
BMS	EMS	HMI	TF6	Device
-	COM1	485/6A;485/6B	-	-
-	COM2	-	485/4A;485/4B	HVAC
-	COM3	485/4A;485/4B	-	-
485A2;485B2	-	485/3A;485/3B	485/3A;485/3B	-
CHG.CANH;CHG.CANL	-	CAN2/H;CAN2/L;GND/2	CAN2/H;CAN2/L;GND	-
-	-	NC1;COM1;NO1	NC1;COM1	DG (Choose 1 of the 2)
-	-	NC1;COM1;NO1	NO1;COM1	
DRY6+;DRY6-	-	DI1;VCC	DI1;VCC	-
-	-	DI2;VCC	DI2;VCC	EPD
-	-	DI3;VCC	DI3;VCC	Access control
-	-	DI4;VCC	DI4;VCC	ATS
-	-	DI5;VCC	DI5;VCC	Water immersion sensor
-	-	DI6;VCC	DI6;VCC	FSS
IO6+;PWR-	-	-	-	

4 Functional unit

4.1 System layout

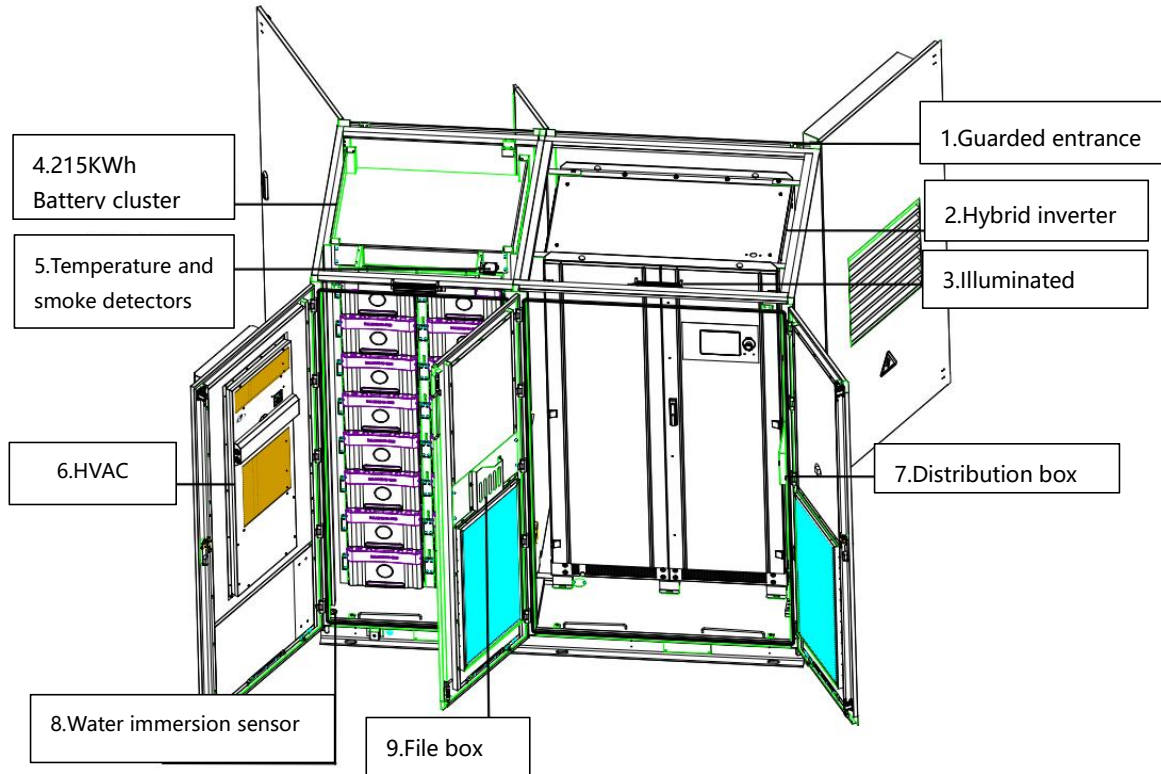


Figure 6_ System layout diagram

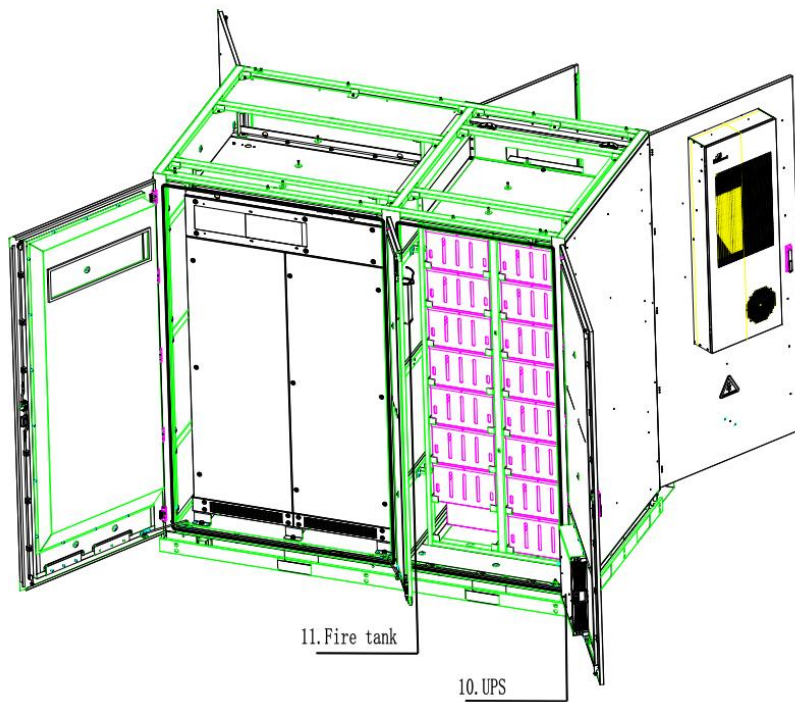


Figure7_ System layout diagram2

As shown in the figure above, for the basic construction and composition of the system

Table 7

Number	Name
1	Guarded entrance
2	Hybrid inverter
3	Illuminated
4	215KWh Battery cluster
5	Temperature and smoke detectors
6	HVAC
7	Distribution box
8	Water immersion sensor
9	File box
10	UPS
11	Fire tank

4.2 Current transformer

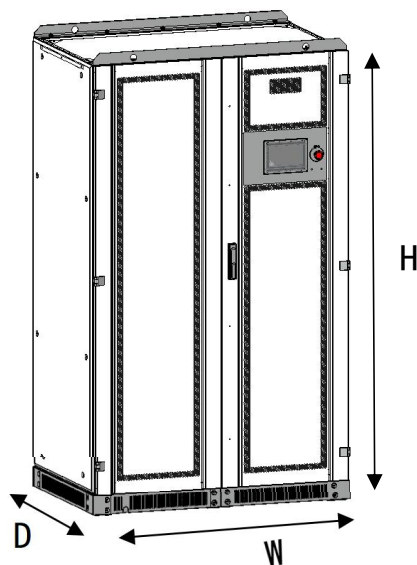


Figure 8 _ MPS100kW hybrid inverter

(1200X800X2050(W*D*H mm))

4.2.1 Converter features

- The converter can realize the bidirectional energy conversion between the battery and the AC power supply;
- The converter adopts the advanced digital control technology, optimizes the control performance and improves the reliability of the system, which is suitable for different battery charging and discharging needs;
- Built-in primary BMS system, support for multiple types of batteries;
- Can accept the power grid dispatching, the communication mode is RS485, CAN, Ethernet, etc.;
- Grid-connected mode, off-grid mode, automatic mode and other working modes;
- With low voltage traversal, reactive power compensation work, SVG function;
- With autonomous frequency modulation voltage modulation and controlled frequency modulation voltage modulation function;
- Off-grid independent inverter function, by the converter to establish the micro-grid system, to ensure the important load power supply;
- Strong off-grid belt three-phase unbalanced load capacity;
- Power frequency design scheme, strong impact resistance; double auxiliary power supply mode, redundant design to improve reliability; independent air duct design, excellent heat dissipation design.

Technical parameter:

Table 8

Model	100kW
Communication (grid connected)	
Maximum power (kVA)	110kVA
Active power (kW)	100kW
Rated voltage (V)	400V
Rated current(A)	144A
Voltage range	320V-460V
Rated frequency	50/60Hz
Frequency range	45-55/55-65Hz
THDI	<3%
Power factor	1.0 (0.8 Advance ~0.8 lag can be set)
Communication system	Three-phase, four-wire + ground wire (3W+N+PE)

Isolation transformer	270/400
Communication (off-grid)	
Maximum power	110kVA
Active power	100kW
Rated voltage	400V
Rated current	144A
THDU	< 2% linear
Rated frequency	50/60Hz
Overload capacity	110%over a long period of time
Photovoltaic input	
Maximum PV input voltage	1000V
Maximum photovoltaic power	120/180/240kW
MPPT voltage range	250VDC-850VDC
Cell	
Battery voltage range	420V-850V
Maximum charging power	120/180/240kW
Routine data	
Dimensions (W / depth / height)	1200×800×2050mm
Weight	936kg
Operating ambient temperature	- 20°C ~ +55°C
Humidity	And 0 ~95% without condensation
Levels of protection	IP20
Noise	<70dB
Height	5000m(Drop the amount over 3000m)
Standby power consumption	<30W
Cooling-down method	Forced air cooling
Show	Touch the LCD display screen
BMS communications	RS485/CAN
Local communications	RS485, TCP/IP

➤ PV parameters are only suitable for hybrid inverter models.

➤ The converter only introduces some of the information. For more information, please refer to the converter manual.

4.3 Battery system

4.3.1 Composition of the battery energy storage system

The product is applied to the power storage system, the battery type is lithium iron phosphate; battery pack modular design, easy to carry, installation and maintenance.

Each module consists of 16 pieces of 280Ah battery cells, with are integrated BMS and

thermal management design to realize safety protection and intelligent management application of energy storage battery system. It can combine different energy storage applications such as new energy generation side, power grid side and user side, power grid side and user side.

4.3.2 Battery cluster

0.5C Battery cluster

The battery cluster consists of 15 battery modules (15 1P16S modules) in series into 1 cluster, and the power quantity is 215.04kWh.

Table 9

List of equipment for clusters		
Number	Equipment	Remarks
1	Battery module	1P16S*15
2	High-voltage compartment	Standard high pressure box
3	BMS	Secondary architecture
4	Connect copper row	Series copper row in the battery cluster
5	The BMS communication acquisition wiring harness	

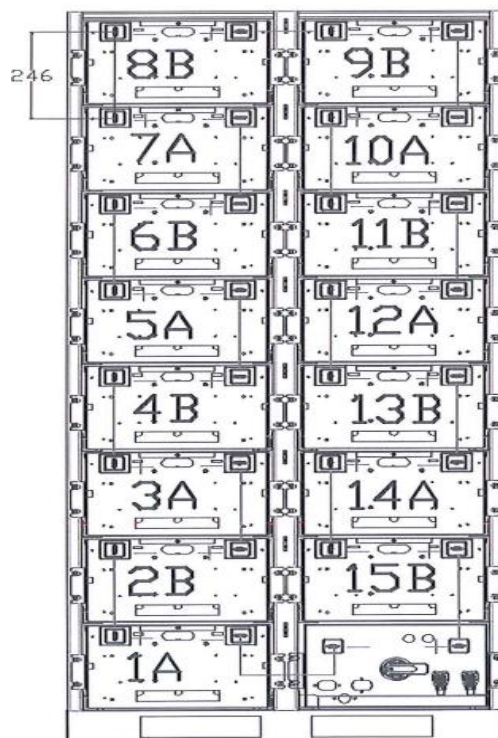


Figure 9_215kWh battery cluster

Table 10

Number	Name	Specifications	Remarks
1	Battery holder size	894mm*860mm*2088mm	±3mm
2	Nominal capacity	280Ah@0.5C,25°C	Test capacity is 98%, qualified
3	Nominal voltage	768V (240cells)	Shipment capacity of 40% SOC
4	Operating voltage range	672V~852V	Out of range use for the battery has Damage, and also safety risks
5	Maximum continuous charge rate	0.5C@25°C	160A
6	Maximum continuous discharge rate	0.5C@25°C	160A
7	Nominal weight	About 1,900 kg	
8	Nominal energy	215.04kWh	25°C@0.5C specified
9	*Insulation standard	Battery case insulation resistance > 1GΩ (1000VDC)	Consult GB36276-2018
10	*Pressure resistance standard	3110VDC, No breakdown or flashover phenomenon occurs	Consult GB36276-2018
11	Maximum single-unit charging voltage	3.65V	Any one cell, beyond the range of make There is damage to the battery and risks
12	Single-unit minimum discharge voltage	2.5V	Any one cell, beyond the range of make There is damage to the battery and risks
13	Instant maximum discharge current	180A@5S	Interval> 10min, prohibit beyond the use, out of range use has damage to the battery, and there are safety risks
14	Instant maximum charging current	180A@5S	Interval> 10min, prohibit beyond the use, out of range use has damage to the battery, and there are safety risks
15	Charging high temperature protection	≥45°C	Battery module battery temperature
16	Discharge high temperature protection	≥50°C	Battery module battery temperature
17	Charging low temperature protection	≤0°C	Battery module battery temperature
18	Discharge low temperature protection	≤-20°C	Battery module battery temperature
19	Working environment temperature range (°C)	charge 0°C~45°C discharge-20°C ~ 50°C	It is prohibited to use beyond the scope for damage to the battery, and there are safety risks



Pay attention to

- Note: The precharging pressure difference of multiple clusters is 20V
- Note: Multiple battery modules + 1 high-voltage box can be integrated into one battery system. The default maximum number of modules is 15 strings. If the number exceeds 15 strings, the technical specifications must be determined with the company. If not determined with the company, the company will not assume any responsibility!
- Note: High salt spray (above C4), high temperature (ambient temperature > 35°C), high humidity (humidity 95% or condensation), high ultraviolet light (UV index 10) and special environment areas must be highlighted by the customer. If not stated, the default to the conventional products supply, and the company will not assume any responsibility for the loss caused by the above environment!
- Note: Maximum operating temperature range: charge 0°C ~45°C, discharge -20°C ~50°C. If operated after long-term storage at low temperature, the internal temperature of the cell must be $T > 0^{\circ}\text{C}$ when charging, and keep fully heated to the optimal cycle temperature of $25 \pm 5^{\circ}\text{C}$.
- Note: In any case, the operating current of the battery module shall not be greater than 180A, the use beyond the range may cause irreversible damage to the battery and safety risks, any loss caused by this situation is not in the warranty scope.
- When the number of battery clusters is 2, the installation is fixed after 5mm interval.

4.3.3 Battery module introduction

The following figure shows the structure introduction of the battery module panel:

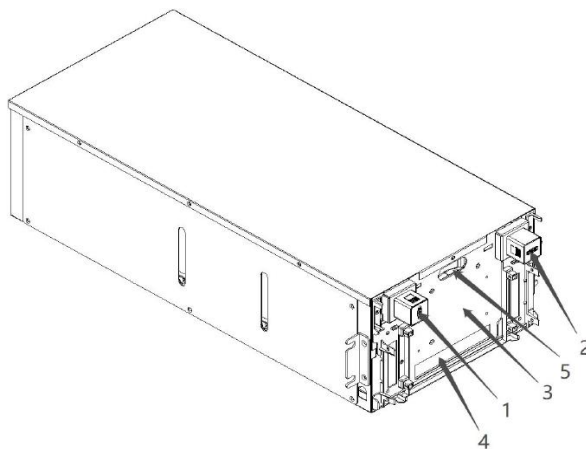


Figure 10_ Battery diagram illustration

Table 11

Number	Name	Model (Battery box end)	Remarks
1	High-voltage positive terminal hub	300A	Red
2	High-voltage negative-electrode wiring hub	300A	Black
3	BMU Installation area		Order number 2.3.5.3
4	Air outlet		
5	Collection line outlet		Assorting

Box diagram of battery panel A / B:

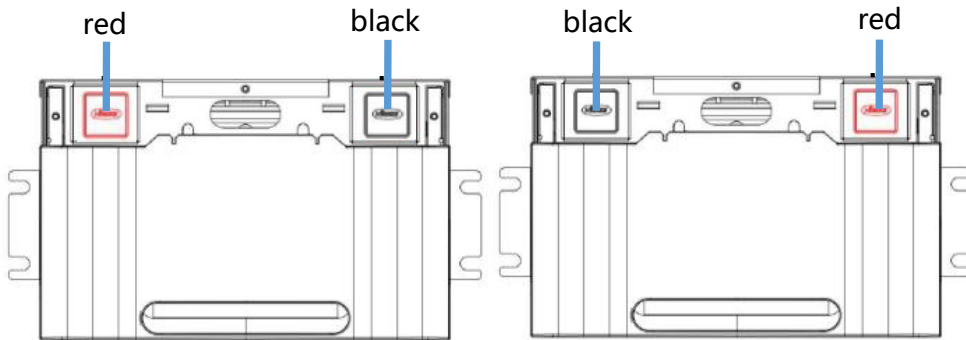


Figure11_A Box

Figure12_B Box

Box A: left are positive and right are negative, battery module connector red is positive, black is negative.

Box B: left and right, battery module connector red is positive, black is negative.

Battery nameplate:

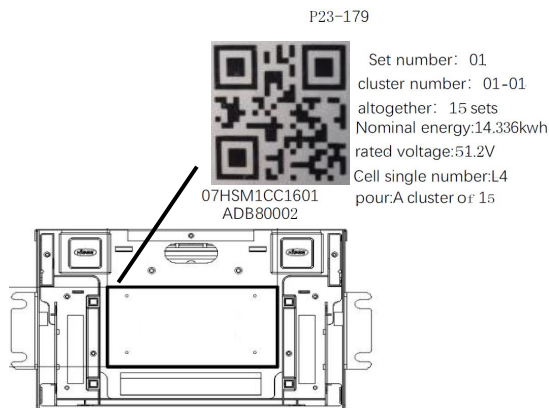


Figure13

Table 12

Model	LFP-51280
Cell configuration	280Ah,1P16S
Nominal capacity	280Ah@0.5C,25°C
Nominal voltage	51.2V
Nominal electricity	14.336kWh
Maximum charge / discharge rate	0.5C
Operating voltage range	44.8~56.8V
BMS type	PACK level, BMU
Size(W*D*H)	885*376*238 mm
Weight	~108kg

4.3.4 The BMS-BMU for the battery system

Level 1 BMS -- BMU is located in the battery module and monitors the battery information inside the battery box, such as the voltage, temperature, and total voltage of a single module. Each BMU collects data about one battery module. The BMU transmits the data to the BCMU through the CAN BUS (or Daisy chain communication), and balances batteries in the battery module according to the commands issued by the BCMU.

4.3.5 The BMS-BMU for the battery system

Secondary BMS -- BCU is located in the high voltage box and is responsible for battery cluster management. It receives detailed data uploaded by the BMU in the battery rack, samples the total voltage and current of the battery cluster, calculates SOC and SOH, and corrects the SOC and SOH. It manages battery pack precharge and charge and discharge by controlling the relay switch, and balances the voltage among battery clusters. The data is then uploaded to the BSU via the CAN BUS. One BCU manages one battery cluster.

4.3.6 The BMS-BMU for the battery system

The three-stage BMS -- BSU is installed in the control cabinet. The BSU is responsible for the operation and management of the entire battery pack unit, receives the data uploaded by the BCMU for analysis and processing, and can calculate the SOC and SOH of the battery pack unit and predict the power of the battery pack unit. The BSU can communicate with external devices through dry contacts. The BSU can communicate with external systems through Ethernet or RS485.

4.3.7 BMS Function introduction

1. Battery analog high-precision monitoring and reporting function;It includes battery cluster real-time voltage detection, battery cluster charging and discharging current detection, single battery terminal voltage detection, battery multipoint temperature

detection, and battery cluster insulation monitoring.

2. Battery system operation alarm, alarm local display and report function;

The alarm includes battery system overvoltage alarm, battery system undervoltage alarm, battery system overcurrent alarm, battery system high temperature alarm, battery system low temperature alarm, battery system leakage alarm, battery management system communication exception alarm, and battery management system internal exception alarm.

3. Battery system protection function;

When the battery management system detects that the analog voltage, current, and temperature of the battery system exceeds the safety threshold, the system isolates the fault, removes the faulty battery cluster from operation, reports the protection information, and displays the protection information locally.

4.4 Air conditioning system

4.4.1 Air-conditioning appearance and parameters



Figure 14_ Appearance diagram of the air conditioner

➤ Figure 14 is an intelligent temperature control system, which adopts an integrated wall-mounted series of air conditioners to ensure a suitable temperature environment at a high battery discharge rate. The selected air conditioning model is suitable for the occasions where the equipment in the cabinet produces a large amount of heat, the internal equipment is sensitive to the environmental temperature, and the internal and external equipment needs to be completely isolated. This product has complete functions, integrated external fan control and external air conditioning interlocking function, high reliability, convenient installation, can work after boot, debugging is not complicated.

➤ The internal circulating air path absorbs hot air from the lower part of the air conditioner and emits cold air from the upper part of the air conditioner. The external circulating air path absorbs the external cold air from the lower part and discharges the hot air from the upper part after heat exchange.

➤ The temperature control system and air conditioning operation are completely automatically controlled according to the temperature in the cabinet. The controller detects the return air temperature of the cabinet through the internal circulation temperature sensor, judges the set value to control the work of the compressor or fan, and also accepts EMS remote control.

Warning

- Do not set the air conditioning operation parameters at will, and the setting operation must be carried out by professional engineering and technical personnel!
- If you need to set the air conditioning operating parameters, please read the air conditioning user manual carefully, and then understand clearlySet to change the air-conditioning operating parameters!

Air conditioning parameters:

Table 13

Model	3000W
Overall dimensions (high x width x deep)	1300×500×250mm
Overall dimensions (height x width x deep) containing flange	1350×550×250mm
Net weight	62kg
Way to install	Door outfit
Application environment	outdoors
Scope of working environment	-40 to +55°C
Noise grade	65dB(A)
IP levels of protection	IP55
Cryogen	R134a
RoHS attestation	Yes
Refrigeration capacity @L35 / L35	3000W
Calorization	2500W
Interiorinput power@L35/L35	1100W
Input currenton@L35/L35	5.20A
Blowing rate	700m3/h
Power supply range	220±15%,50/60Hz
Rated operating voltage- -the controller	220V, 50/60 Hz

Rated operating voltage-Refrigeration / heating system	220V, 50/60Hz
Maximum current	9.5A

For reference only, subject to the physical object

Introduction of the air-conditioning function:

➤ The operation of the air conditioner is automatically controlled according to the temperature inside the cabinet, and the controller is detected by the internal circulation temperature sensor. Compare the return air temperature of the cabinet with the set point to determine and control the operation of the compressor or fan.

➤Cooling start point = cooling start point + return difference. When the temperature inside the cabinet exceeds the cooling start point, the cooling starts. When the temperature inside the cabinet is lower than the cooling point, the cooling stops.

Table 14

Parameter	Default value	Set the range	Unit	Set point description
Refrigeration point	28	[15 ~ 50]	°C	Temperature point where the refrigeration operation stops
Return difference	5	[1 ~ 10]	°C	The sensitivity of the temperature control

Note:The actual parameters have been set in the factory according to customer requirements.

➤ Heating start point = hot spot - return difference. When the temperature inside the cabinet is lower than the heating start point, heating starts. When the temperature inside the cabinet is higher than the heating point, stop heating.

Table 15

Parameter	Default value	Set the range	Unit	Set point description
Hot spot	15	[-15 ~ 25]	°C	Temperature point where the heating stops
Return difference	10	[1 ~ 10]	°C	The sensitivity of the temperature control

➤Dehumidification start point = dehumidification start point + return difference. When the humidity inside the cabinet is higher than the dehumidification start point, dehumidification starts. When the humidity inside the cabinet is lower than the dehumidification point, stop dehumidification.

Table 16

Parameter	Default value	Set the range	Unit	Set point description
Dehumidifying point	60	[40 ~ 90]	%	The humidity point where the dehumidification operation stops
Return difference	10	[1 ~ 30]	%	Sensitivity of the humidity control

Installation of air-conditioning drainage pipe:

1.Prepare air conditioning drainage pipe and accessories, prepare cross screwdriver tool, cross round head screw.



Figure 15_ Air-conditioning drain pipe

2.Remove the air conditioning drain pipe, find the air conditioning outlet, first slide on the clamp, then connect the drain to the outlet, once connected, tighten the clamp and adjust the drain to the appropriate position.

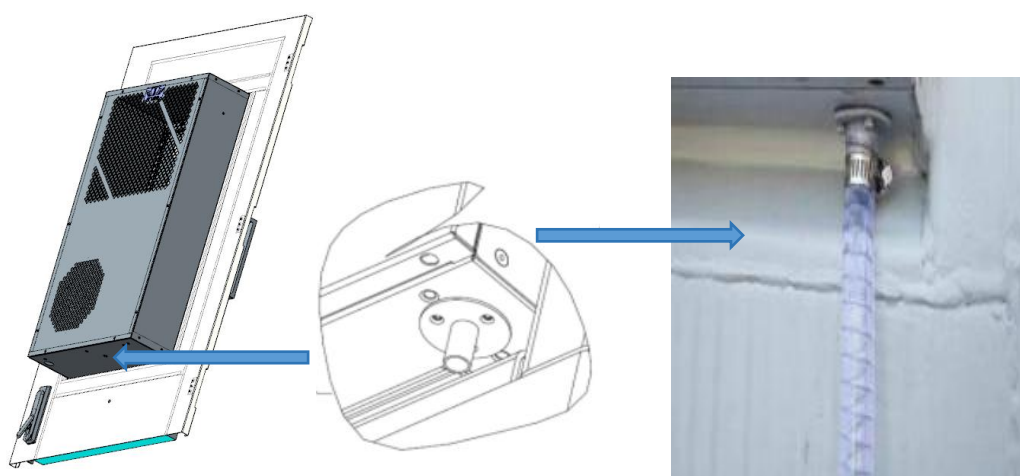


Figure 16_ Installation position diagram of air conditioning drainage pipe

3. After the installation is complete, check that the air conditioner drainpipes are properly installed and secured.

4.5 Fire extinguishing system

4.5.1 Fire control system layout diagram

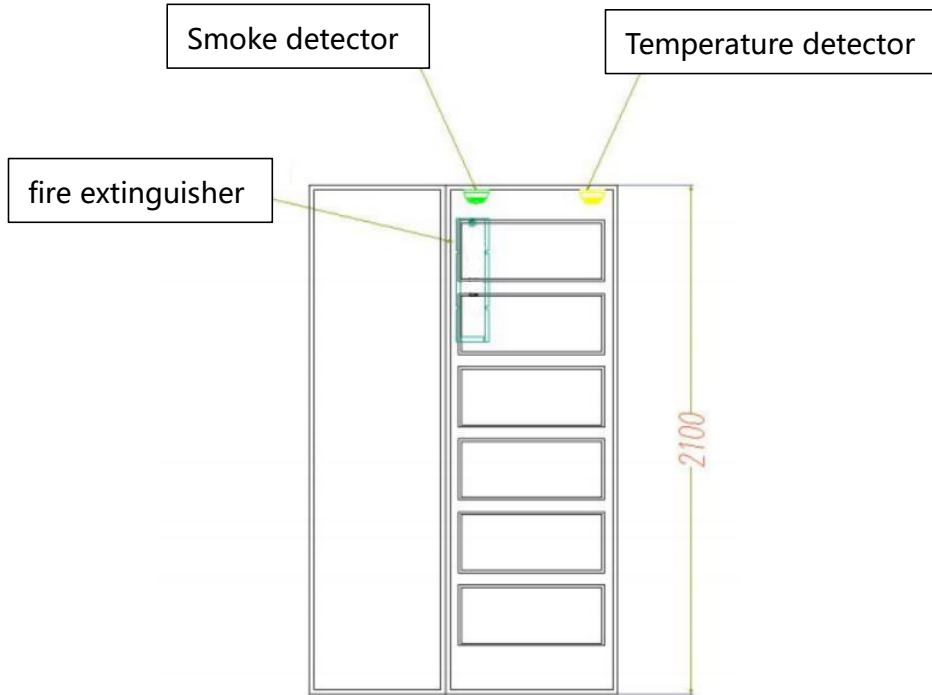


Figure 17

4.5.2 Control logic diagram

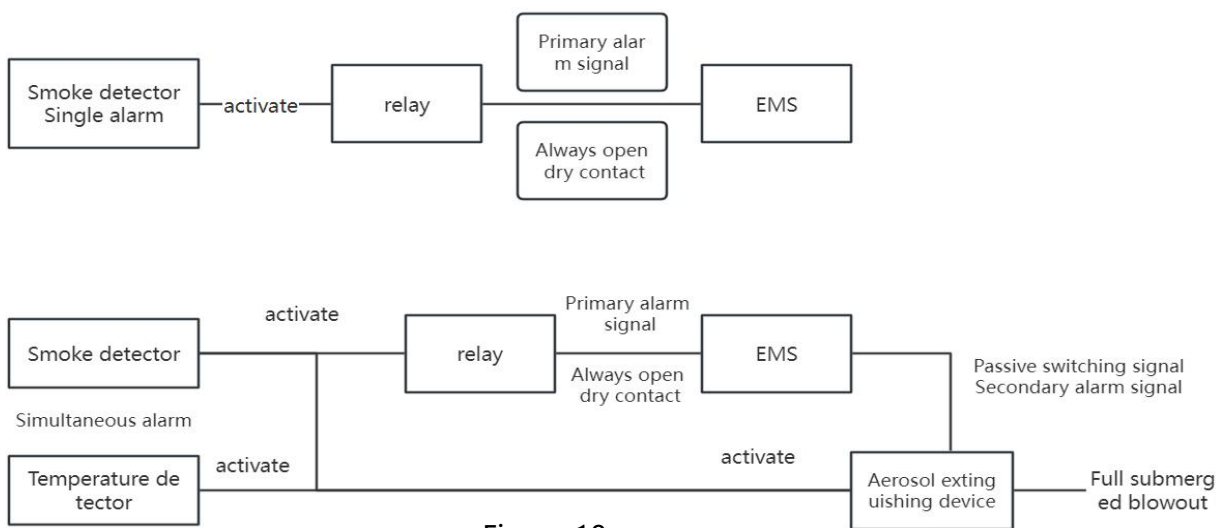
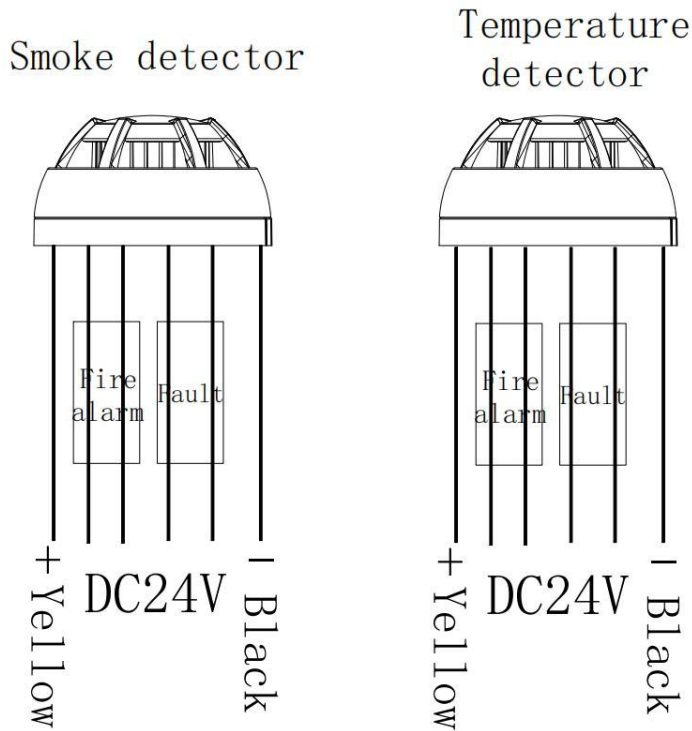


Figure 18

4.5.4 Smoke/temperature sensor harness Description:



4.5.5 Fire wiring diagram

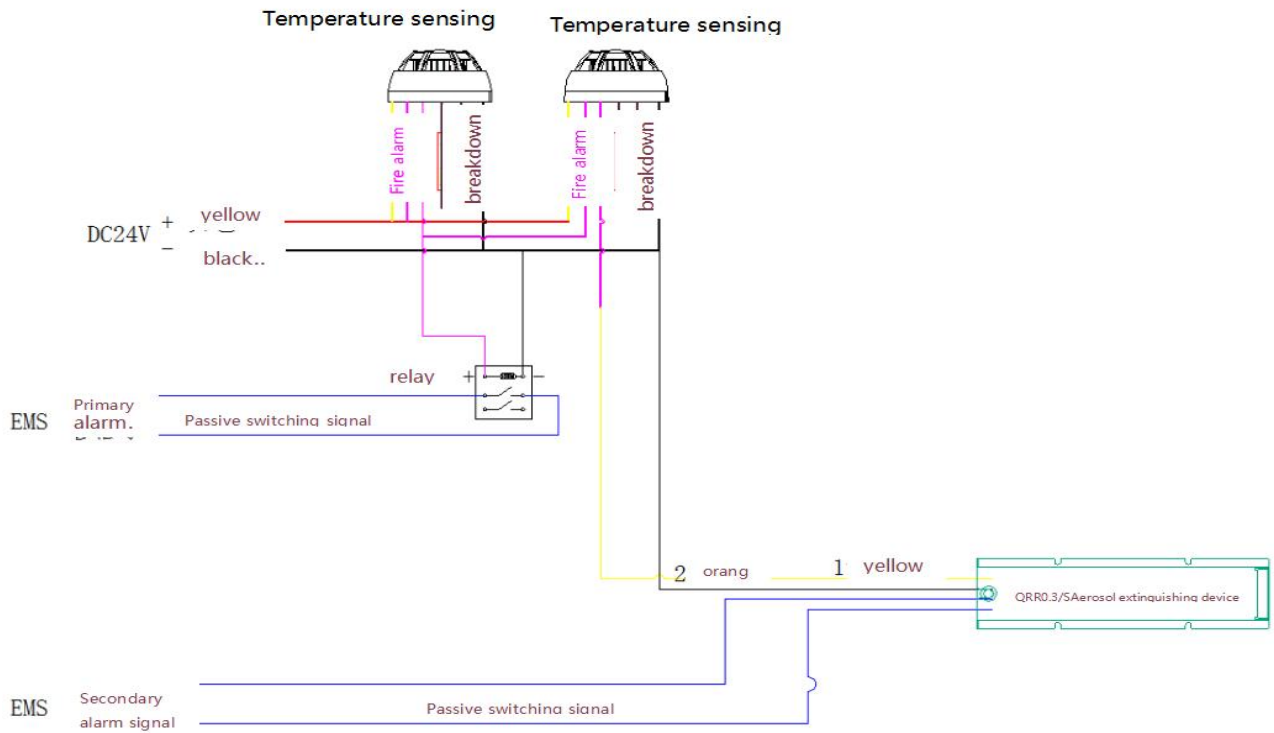


Figure21

4.5.3 Fire hot aerosol extinguishing device

The outdoor cabinet energy storage system uses a new type of hot gas sol fire extinguishing device, which is a breakthrough product in the field of fire fighting with ultra-high fire extinguishing efficiency and reliability. The product has the characteristics of small size, non-pressure storage, no need to lay pipe network and maintenance, fire extinguishing efficiency, rapid, non-toxic and harmless, safe and reliable, green and environmental protection. Especially suitable for communication room, battery compartment, engine compartment, battery box and other relatively closed places.

Main technical parameters:

- S-type hot air sol production implementation standard XF499.1 "Aerosol fire extinguishing system Part 1: Hot air sol fire extinguishing device".
- Service life: 10 years.
- Starting mode: electric starting/hot starting.
- Ambient temperature: $-50^{\circ}\text{C} \rightarrow +90^{\circ}\text{C}$.
- Protected space: $\leq 3\text{m}^3$.
- Hot gas aerosol dose: $300\text{g} \pm 2\%$.
- Blowdown lag time: $\leq 5\text{s}$.
- Nozzle temperature: 5mm away from the nozzle $\leq 200^{\circ}\text{C}$.
- Passive switching quantity feedback signal: passive switching quantity signal (standby, normally closed after starting. (start after more than 80°C)

Structure size and installation requirements:

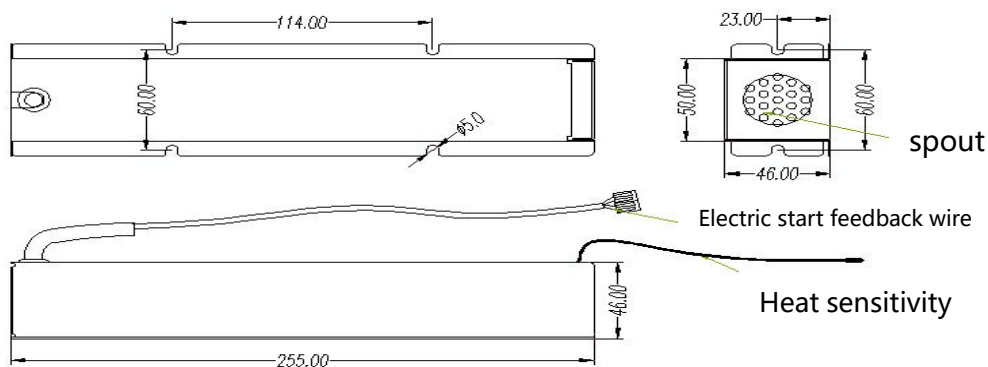


Figure 19

Instructions:

1. Unit: mm.
2. Hot start: heat sensitive wire exposed 500mm.
3. Feedback signal: wire length 500mm without terminals Wiring method: black wire for switch feedback signal wiring.

4. Electric start: the line length is 500, the yellow and orange lines are electric start wiring, and can be connected to DC1.5-24V power supply starting device, without positive and negative distinction; No terminal.

5. The fixing screw.

Working principle:

1, when the smoke detector is a single alarm, start the corresponding relay, the relay output switch signal. (first level fire alarm signal)

2, when the sense of warmth and smoke alarm at the same time, the temperature detector and smoke detector output electrical signals to start the fire extinguishing device, and the fire extinguishing device starts at the same time output a secondary alarm signal. (usually activated and closed passive switching signal)

4.5.6 Perfluorohexanone inhibition device

The suppression device uses a new solid gas agent as a pressure generating device, and the fire inhibitor uses a liquid, cooling environmental protection agent (perfluorohexanone) at normal temperature. This device is a new type of small fire extinguishing system. Daily storage at normal atmospheric pressure, immediately start after receiving the fire detector ignition signal, quickly establish the pressure, within 10S will be filled with fire extinguishing agent atomization release, gas state fire extinguishing agent accumulation in a closed space quickly form a high-concentration gaseous fire extinguishing environment, to achieve fire control.



Figure 22

The main technical parameters of the energy storage suppression box are as follows:

Table 17

Number	Parameter name	Unit	Numerical value
1	Amount of extinguishing agent to be filled	Kg	3.2
2	Injection rate	%	≥95
3	Injection frequency	time	1
4	Amount of extinguishing agent to be filled	Kg	≤3.2
5	Operational reliability	%	≥99

6	Safety current	Direct current mA	≤150
7	Starting current	Direct current mA	≥500
8	Injection time	S	≤10S
9	Start-up response time	S	≤3S
10	Gas generator resistance	Ω	1 ~ 2.5
11	Operating temperature	°C	-40 ~ 65
12	Working humidity	RH	0 ~ 95%
13	Trigger mode	/	Electric starting
14	Feedback signal	/	Dry contact

4.6 Distribution system

The distribution box integrates relay, terminal block, AC/DC power supply, DC power switch, AC power switch, etc. The appearance of the power distribution box is shown as follows: (See Section 8.1 for details about the wiring and description of the power distribution box)

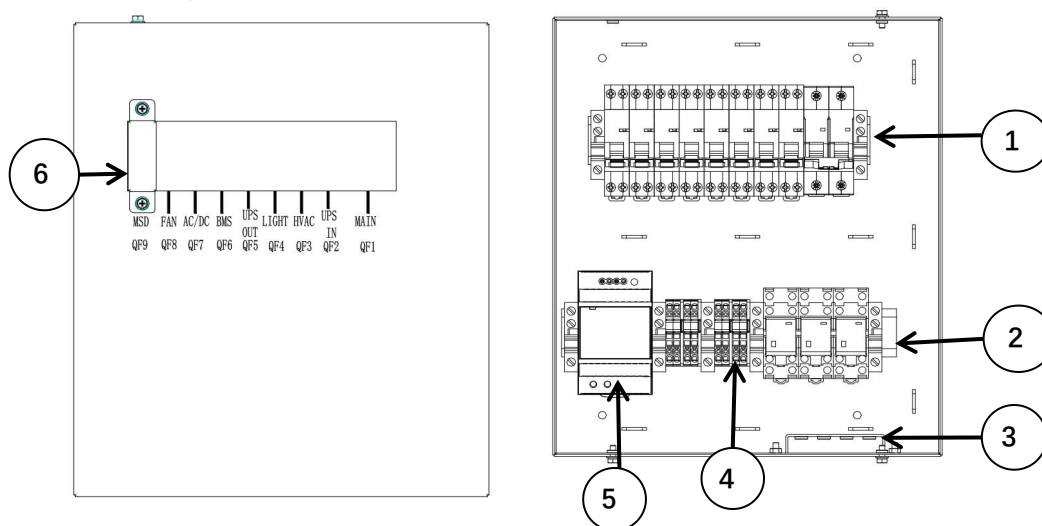


Figure23_Distribution box

Table 18

Serial Number	Name
1	Circuit breaker
2	Relay
3	Ground row
4	Terminal board
5	The 24V switch power supply
6	Service the switch fixtures

Note: The function of this equipment belongs to the power distribution control equipment system, please have relevant professional personnel operation.

4.6.1 miniature circuit breaker

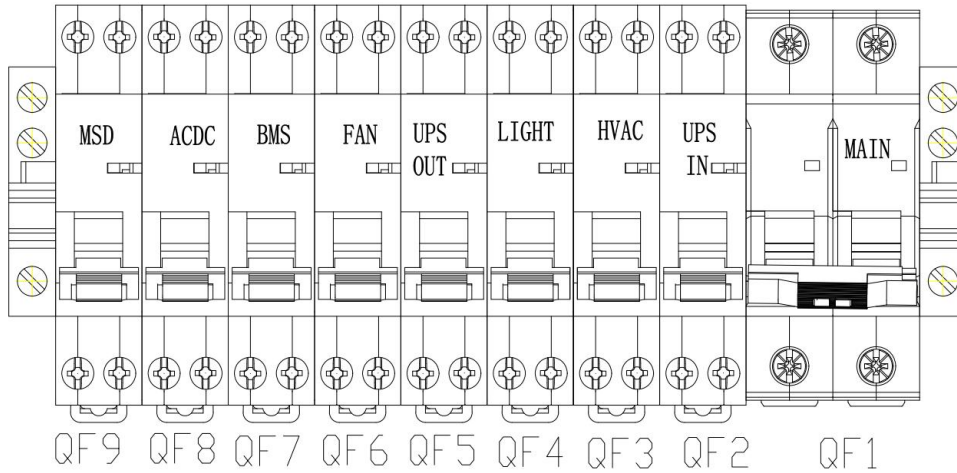


Figure24_Switch panel diagram

Table19

Number	Name	Circuit breaker identification	Circuit breaker description
1	QF1	MAIN	MAIN switch (total on)
2	QF2	UPS IN	UPS entry switch
3	QF3	HVAC	Air conditioning switch
4	QF4	LIGHT	Lighting switch
5	QF5	UPS OUT	UPS Out switch
6	QF6	BMS	BMS switch
7	QF7	AC/DC	The 24V power supply switch
8	QF8	MSD	Maintenance switch

4.6.3 UPS electrical supply equipment:

UPS adopts double transform online design, output pure sine wave, provide ideal and uninterrupted quality power supply for computer equipment, communication system and even industrial automation system; standard LCD LCD display, provides comprehensive information display for customer use, and also provides a variety of functional interfaces for customer operation, as shown in the figure below:

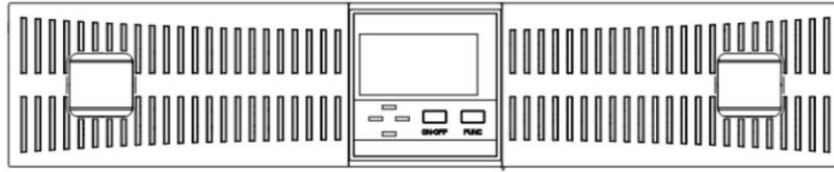


Figure 25 _ UPS front view

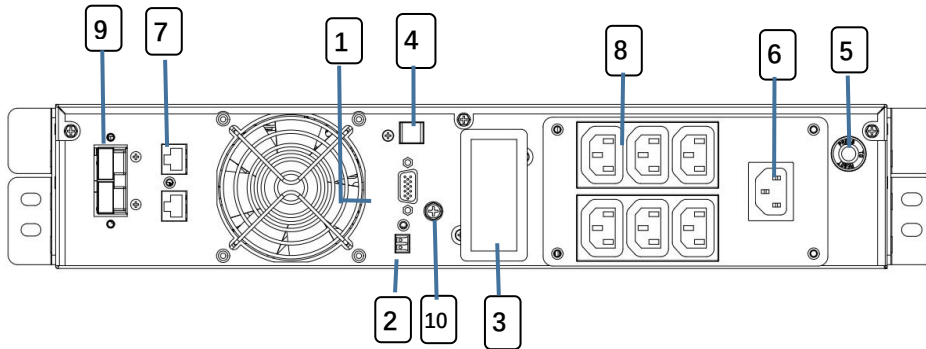


Figure 26 _ UPS Post-View

Table 20

Number	Interface definition
1	RS-232joggle, DB9
2	EPO joggle
3	Intelligent slot, used for network monitoring, intelligent expansion card or plug and plug dry contact card expansion use
4	UPS joggle
5	Enter the overflow protector
6	Enter the plug (1K: IEC C14, 2K/3K: IEC C20)
7	External battery interface network surge protection, used only for network connections
8	Output socket
9	External battery interface
10	landing

➤ The USP wiring is detailed in Section 7.3

4.7 EMS controller

EMS controller integrates data collection of all local devices, efficient remote service management and local control strategy. It is the core of the microgrid system and can realize unified management of the microgrid system, such as centralized monitoring of operation parameters, alarm and historical data storage. Combine with the big data cloud platform to realize intelligent operation and maintenance, big data analysis and processing, trend prediction, fault prediction, operation strategy optimization and other functions.



Figure 27_EMS Controller screen 1(selectable)



Figure 28_EMS controller 2

Data acquisition:

- Collect and display the relevant parameters of the converter equipment, including: voltage, current, DC side parameters, three-phase active power, reactive power, frequency, working status, alarm and fault information, as well as other common information of the converter.
- Collect and display relevant parameters of battery, including total voltage, total current, maximum / minimum temperature, maximum / minimum voltage, SOC, SOH, fault and alarm information, etc.
- Collect and display the temperature, humidity, and other environmental data for the container.
- Display the alarm information of the auxiliary equipment in the container, such as air conditioning, access control, water immersion sensor and other security equipment.

Database management:

- Supports real-time data view, historical data view, historical event view and data report printing, event and log management. You can check the operation situation of the equipment, the modification record of some important parameters, and the fault, alarm and other event information at any time.

User rights management:

- The default user has only permissions to view the system data. All operations to change the operation mode and operation parameters require permission confirmation.

energy management:

➤ According to the project requirements, the converter is equipped with standard operation strategies such as self-use, peak shifting and valley filling, and battery priority.

Cloud monitoring:

➤ The EMS controller is equipped with a 4G communication interface to send data to the local EMS backend and to the existing EMS cloud platforms. The user can check the running status of the system through the WEB or the small program.

HMI :

Local or remote HMI can be provided, including but not limited to real-time data monitoring, historical data query, alarm and fault information query, equipment control, parameter and value setting interface.

5 Mechanical installation

5.1 Space requirement

When installing products, appropriate and adequate distances must be reserved from walls and other equipment to meet the requirements for maintenance access, escape routes and ventilation.

Figure 29 describes the space requirements for the container storage system; if field conditions permit, greater spacing is recommended to ensure reliable and efficient operation of the product.

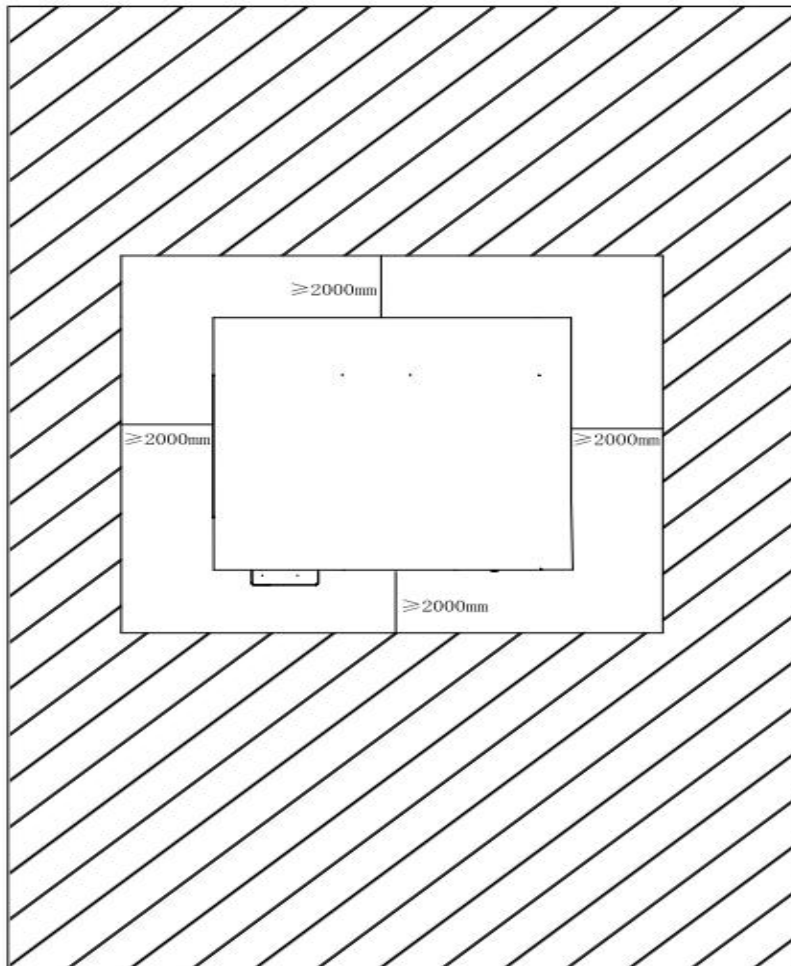


Figure 29_ Installation space dimensions

5.2 Build the base

5.2.1 Installation location selection

When selecting the installation site, follow at least the following principles:

- ◆ The climatic environment and geological conditions (such as stress wave emission, groundwater conditions of the installation site of the energy storage integrated system should be fully considered Position) and other characteristics.
- ◆ The surrounding environment is dry and well ventilated, far away from flammable and explosive areas.
- ◆ The soil at the installation site needs to have some compaction. The relative compactness of the soil is 98%. if the soil.
- ◆ Loose, please must take measures to ensure that the foundation is stable.
- ◆ The height of the foundation should be higher than the height of the local flood, the foundation adopts reinforced concrete structure, embedded steel plate is convenient for container installation.
- ◆ On the basis, the steel plate should be embedded in the standard position of the drawing, and the container can be connected with the steel plate. (welding or connection by twisted lock)
- ◆ All plane tolerances are $\pm 5\text{mm}$.

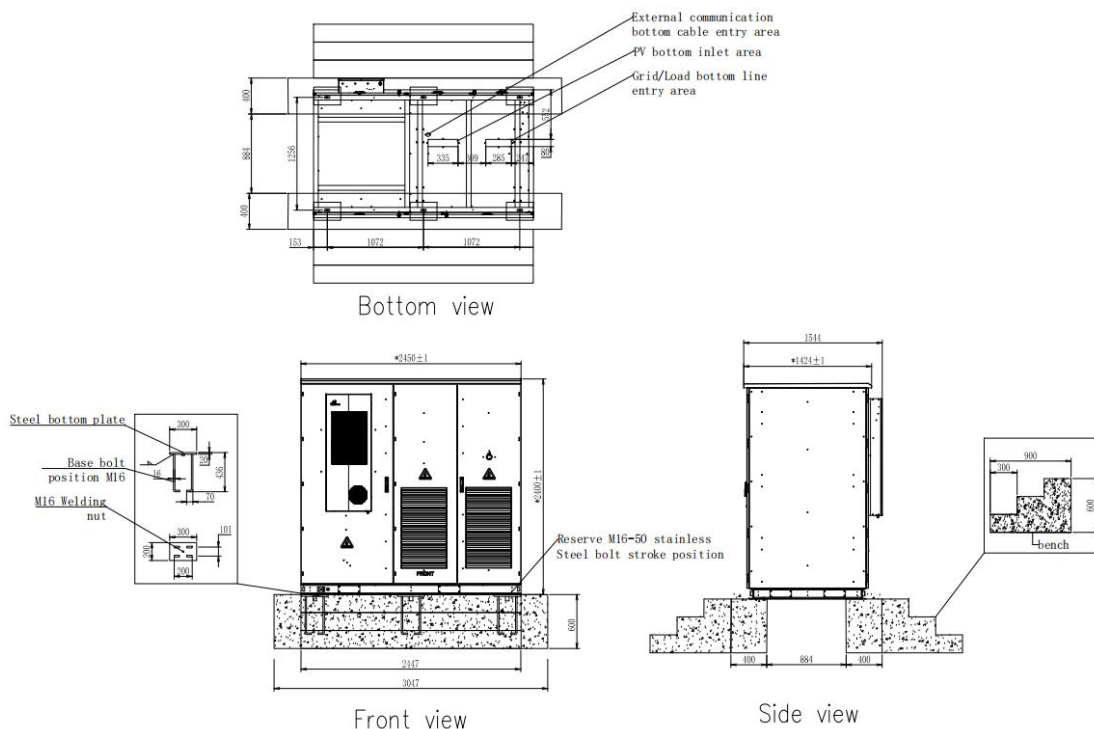


Figure 30_ Infrastructure Reference Drawing

5.3 Traffic condition

➤ All kinds of equipment in the container energy storage system have been installed and fixed in the box before leaving the factory, for overall lifting and transportation.



Warning

During the whole process of loading and unloading and transportation, the operation safety regulations of outdoor cabinet energy storage system in the project country / region must be observed!

- The outdoor cabinet energy storage system and any machines and tools used in the operation shall be maintained.
- All personnel engaged in loading and unloading and bolt-fixing should receive corresponding training, especially on safety aspects.

The transport container energy storage system requires the following conditions:

- The container doors are locked.
- Select the appropriate crane or lifting tool according to the site conditions; The selected tool must have sufficient load bearing capacity, arm length and rotation radius..
- If movement is required, etc., additional traction devices may be required.
- Remove all obstacles that exist or may exist during the movement, such as trees, cables, etc.
- The container should be transported and moved under better weather conditions whenever possible.
- Be sure to set up warning signs or warning belt to avoid non-staff entering the lifting transportation area to avoid accidents.

5.4 Forklift transport

If the installation site is flat, a forklift can be used to move the outdoor cabinet; the bottom of the outdoor cabinet has a fork hole for forklift transportation; move the outdoor cabinet through the forklift hole.

If the forklift transport method is used, the following requirements shall be met:

- 1.The forklift shall be equipped with sufficient carrying capacity (at least 5 tons).
- 2.The length of the pin shall be greater than 1600mm.

3.The pin should be inserted into the fork jack at the bottom of the workstation (see the figure below for the location of the fork jack). The pin depth of the pile insertion shall be the depth of the pile number, namely 1600mm.

4.Transportation, movement and lowering of outdoor cabinets should be slow and stable.

5.Place the outdoor cabinet in a smooth place; the place should be well drained without obstacles or bulging. The outdoor cabinet shall be fixed with 6 bottom corners.

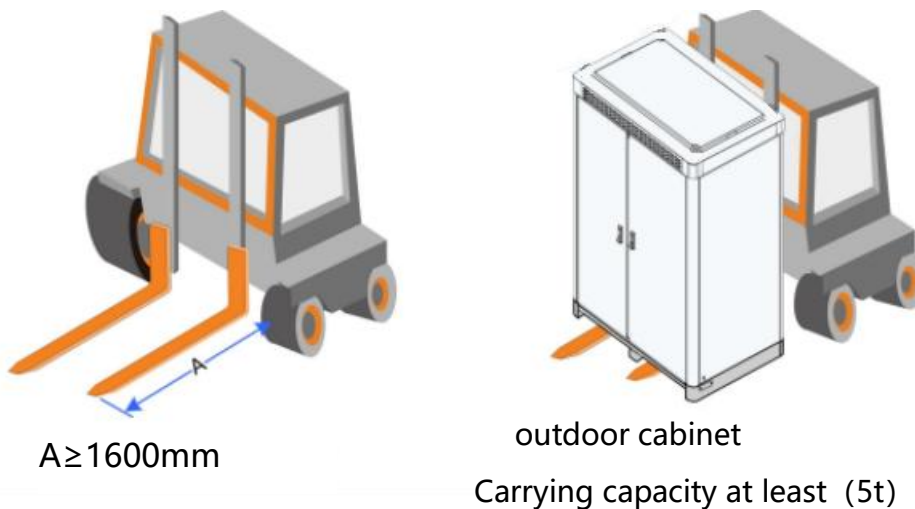


Figure 31_ Forklift transportation



Warning

- In the whole process of the transportation of the outdoor cabinet, the safety operation rules of the forklift truck and the crane shall be strictly followed
- Program operation
- Do not stand within 5m~10m in the operation area. Especially under the lifting arm and under the lifting or moving machine is strictly prohibited
- Stand for people to avoid casualties.
- In case of bad weather conditions, such as heavy rain, heavy fog, strong wind, the work should be stopped.

6 System assemble

6.1 Matters need attention

- Product installation must be trained by professional staff qualified before the post operation;






- Please read this manual carefully before installation and use. If the equipment is not installed and used in accordance with the manual, the company has the right not to conduct quality assurance;
- Abide by the product safety specifications, and ensure the non-live installation;
- There is high pressure in the product, non-professional personnel and unauthorized personnel are strictly prohibited to approach, operate and touch, to avoid the danger of high pressure electric shock.


6.2 Tool preparation

6.2.1 replacement tool

At least the following tools and parts shall be prepared before wiring:

Table 21

Number	Tool name	Use	Specifications
1	Electric screwdriver	Fix screw	
2	Torque limiter	Use it along with a torque wrench	
3	Hexagon head	Fixed tray for	
4	Knife	Unpack	
5	Forklift	Transport cabinet	

	<p>Use appropriate insulation tools to prevent accidental electric shock or short circuit. If the insulation tool is not available, Please wrap the metal surface of the tool to be used with insulation belt before use.</p>
<p>Notice</p>	

6.3 Environmental requirements

- 1.The installation position shall be kept clean and tidy;
- 2.The product must be installed in place with its weight and size;

3. Must be installed on the solid plane, prohibit skew, shaking;

4. The installation position should not be too wet, so as to ensure the optimal operating environment;

5. Do not install products near flammable and explosive materials.

6.4 Cabinet ground

6.4.1 Ground method:

➤ Lightning protection and grounding of outdoor cabinet is an important measure to ensure the safe use of outdoor cabinet in lightning weather. Through reasonable installation of grounding device, grounding treatment of the outer wall of outdoor cabinet, reasonable layout of grounding system and regular inspection and maintenance, the risk of outdoor cabinet can be effectively reduced and the safety of personnel and articles. Therefore, in the use of outdoor cabinets, it will be necessary to pay attention to the outdoor cabinet; the practice of lightning protection grounding can be in the building above the top of the outdoor cabinet, and then only keep the top can be exposed, the extended grounding part of the insulation pipe, do not contact with the cabinet, do not directly install lightning rod in the contact surface of the top of the outdoor cabinet.

➤ After the outdoor cabinet is placed and fixed according to the infrastructure requirements, find the outdoor cabinet and conduct the grounding test with the multimeter buzzblock. After the connection, connect the ground line to the outdoor cabinet location, and connect the other end to the external location.

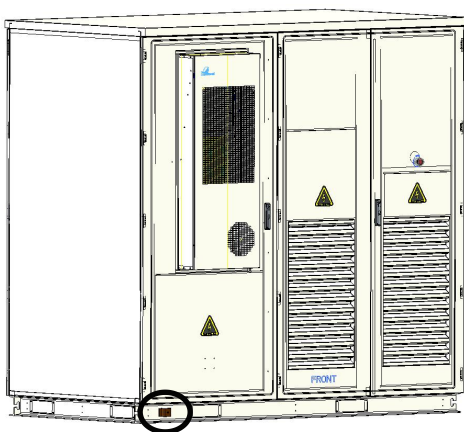


Figure 32_ Ground icon of the outdoor cabinet

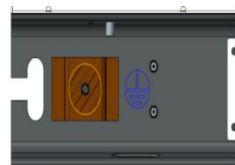


Figure 33_ outdoor cabinet after grounding

6.5 Internal unit

6.5.1 Battery installation

➤ According to the safety transportation requirements, the battery pack and the PMD0050 (DC / DC) module have been removed and packed separately before the shipment of the outdoor cabinet. (if the battery pack is not removed, the following battery pack installation steps are not required).

1. Check the outer box of the battery

According to the battery delivery list, check and confirm that the battery model and quantity are correct, whether the battery wooden box surface has obvious damage; the corresponding label is as follows (the battery quantity is slightly different according to different items):



Figure 34 battery outer box label



Li-ion Battery Module
HJESLFP-51280
UN 3480
LITHIUM ION BATTERIES
Nominal Energy: 14336 Wh
QTY: 3 PCS
N. W. : 336 KGS
G. W: 386 KGS
MADE IN CHINA

Figure 35_ Outer box label content

2. Product base accessories are shown in the figure below:

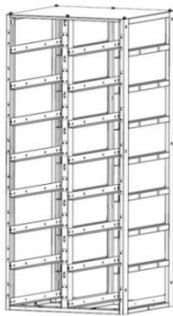


Figure 36_ Rack

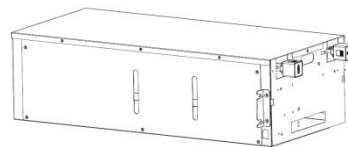


Figure 37_ Battery module

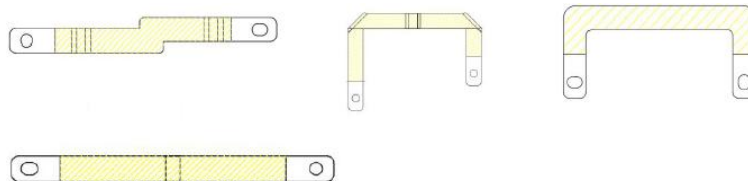


Figure 38_ Series copper row

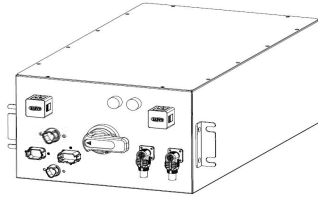


Figure 39_ High-pressure box

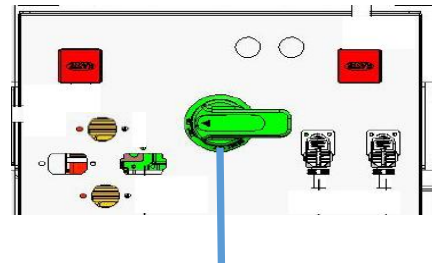


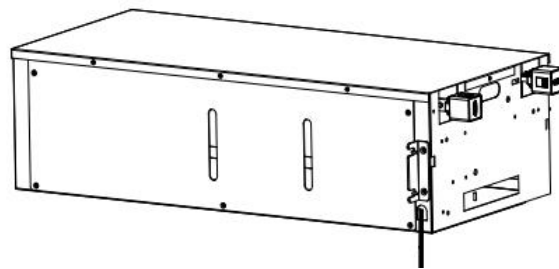
Figure 40_ Battery cluster DC circuit breaker

3. Battery cluster installation steps

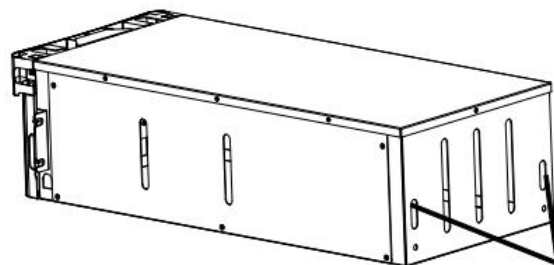
1. Check that the battery is consistent with the delivery list and looks intact.
2. Check the battery hook hook and prepare protective tool gloves and insulated shoes.
3. The hook hanging points are shown below:



Figure _41 hook



Hook-battery front hook hanging point



Hook-battery

Figure 42

4. Clarify that the battery pack box number corresponds to the rack installation position.

5. According to the plug box code of the battery pack, install the battery pack in the corresponding position on the battery rack (the installation position diagram of 15 batteries below) Box A: left and right, battery module connector orange is positive, black is negative; B box: left is negative and right, battery module connector orange is positive, black is negative.

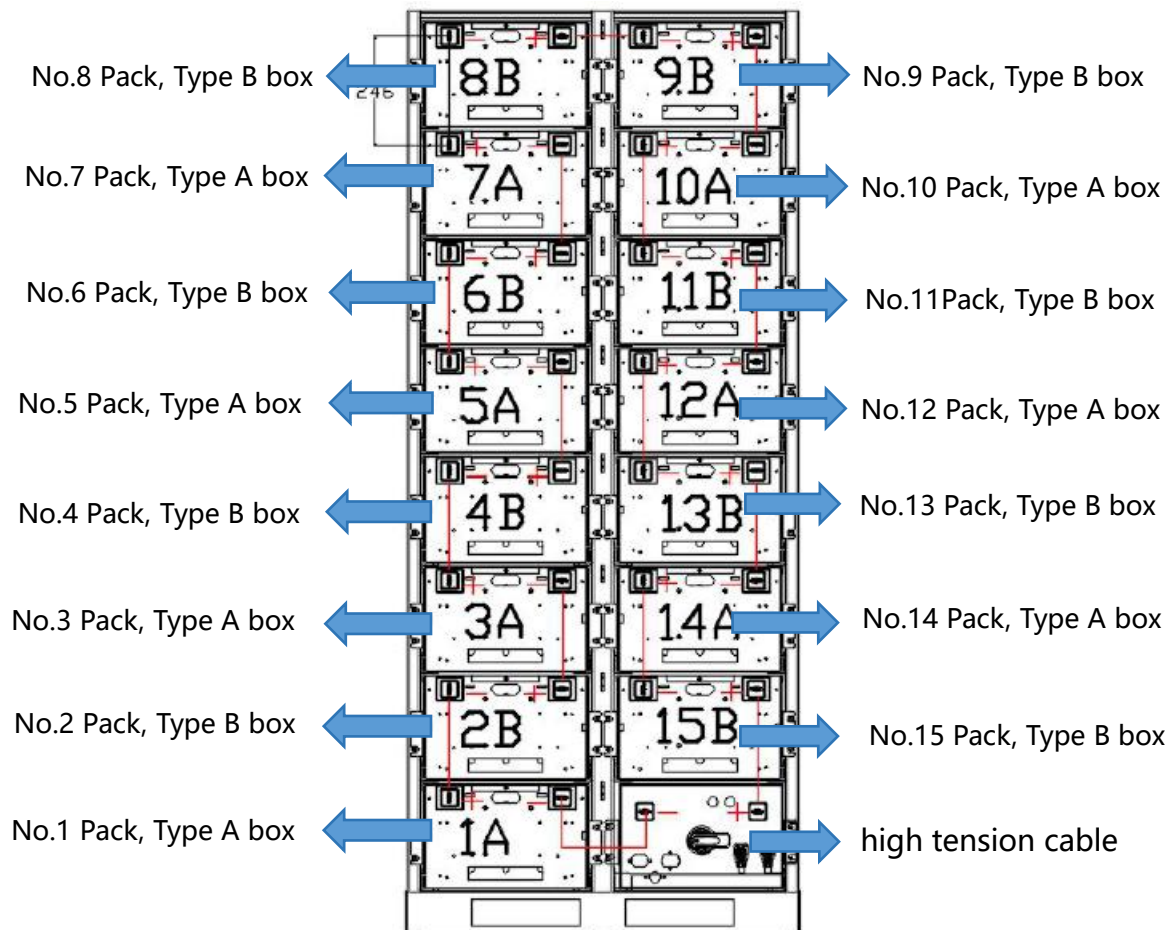


Figure 43_ Installation schematic diagram

6. Open the wooden box packaging, check the goods, and check whether the transport of the goods is damaged

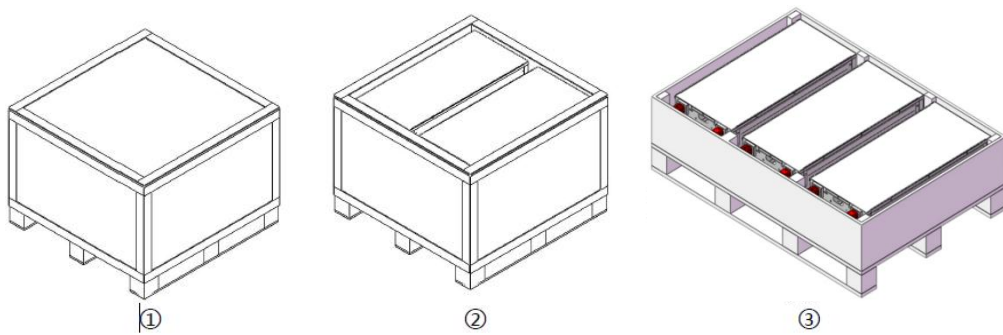


Figure 44

7. According to the battery cluster drawing arrangement, find the corresponding module number, and remove the module to be installed from the wooden box. (See the layout drawing for details)

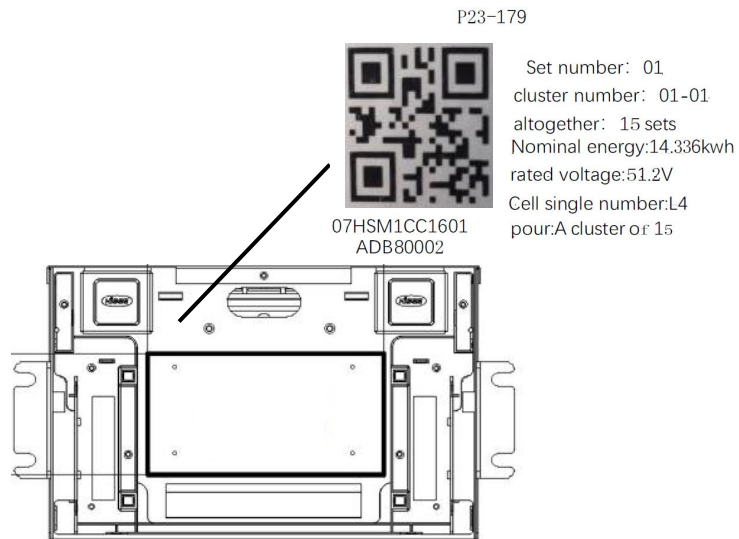


Figure 45

8. Take out the module: use the four hooks provided in the accessories, lift the hook holes on both sides of the module and the two hook holes on the back.

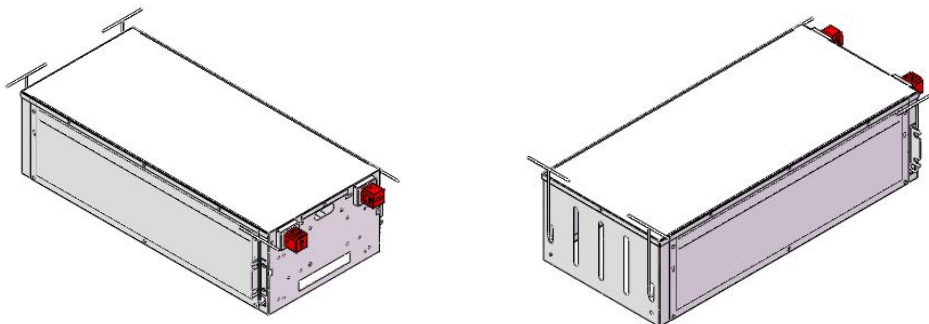


Figure 46

9.Lift the battery pack to hold the rack mounting position horizontally and hold the bottom of the battery pack horizontal to the upper surface of the rack guide rail.

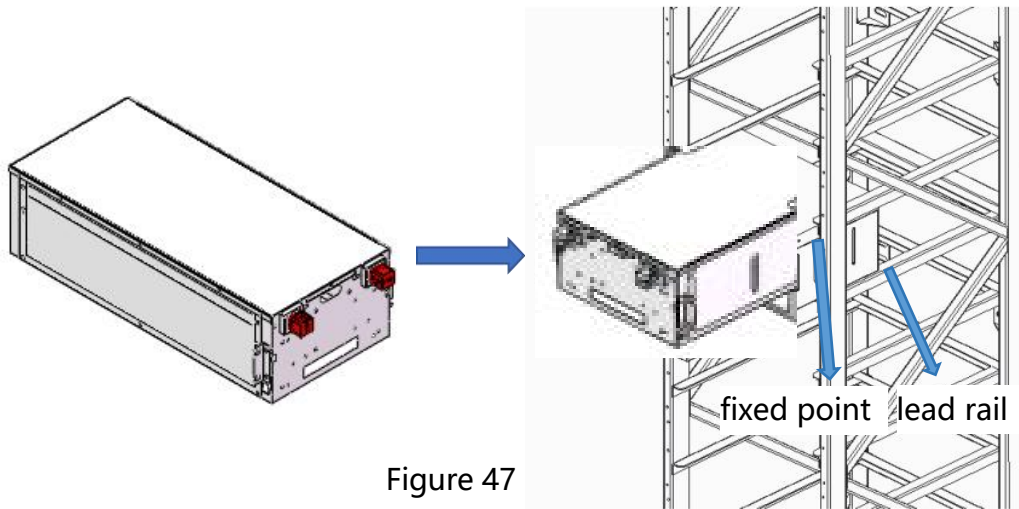


Figure 47

10.The battery slowly pushes the rack along the rack installation rail in the direction of the arrow until the battery installation ear fits the fixed position of the frame, fine tune the battery module, until the battery fixed point of the ear and the fixed point of the rack can successfully lock the bolt, as shown in the figure below.

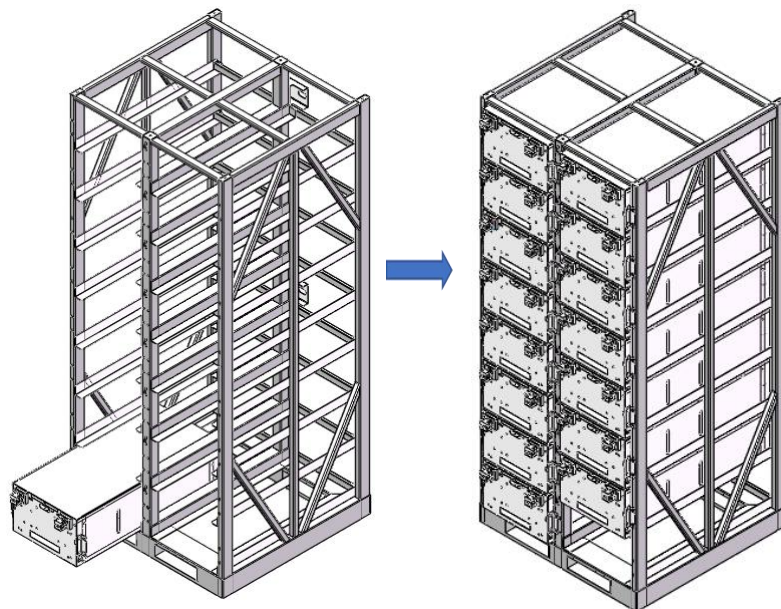
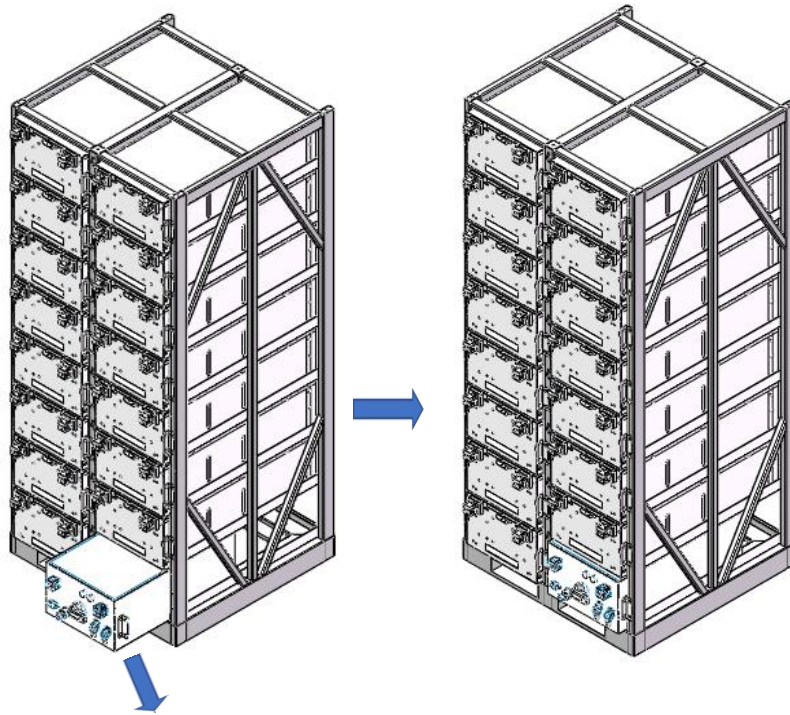


Figure 48

11.According to the drawing arrangement, insert the high pressure box into the corresponding frame slot, and check the order and position of the module number. Push the high voltage box horizontally along the frame installation rail in the direction of the arrow until the hanging ear of the battery module fits with the fixed position of the

frame. Tighten the fixed position with the M6 * 16 combination bolt, and the torque value is 13 N/m, as shown in Figure 51 below



Install the high pressure box

Figure 49

12. Use the sheet metal fixings of the battery and the M6 * 16 combination bolt, and the torque value is 13 N/m, as shown in Figure 52 below

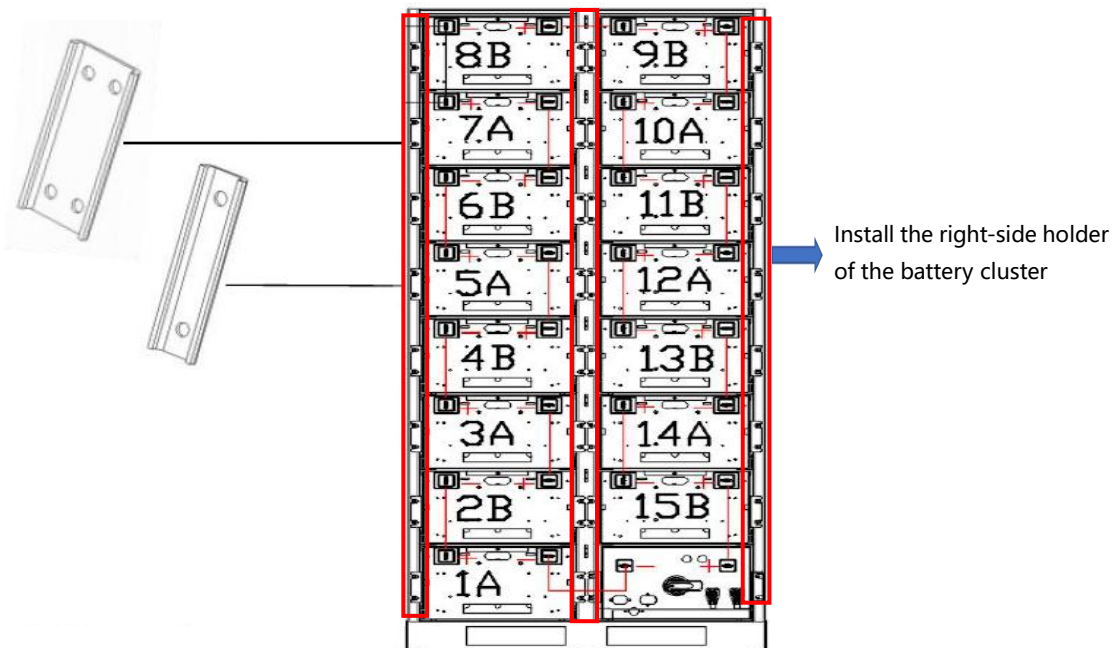


Figure 50

Note: Follow the steps 1-12

6.5.2 MPPT controller installation

Due to the turbulence of the product transportation road, in order to make the product reach the use place safely and smoothly, the DC / DC module in the hybrid inverter is disassembled and packed inside the outdoor cabinet, and the number of modules is counted according to the shipment list.

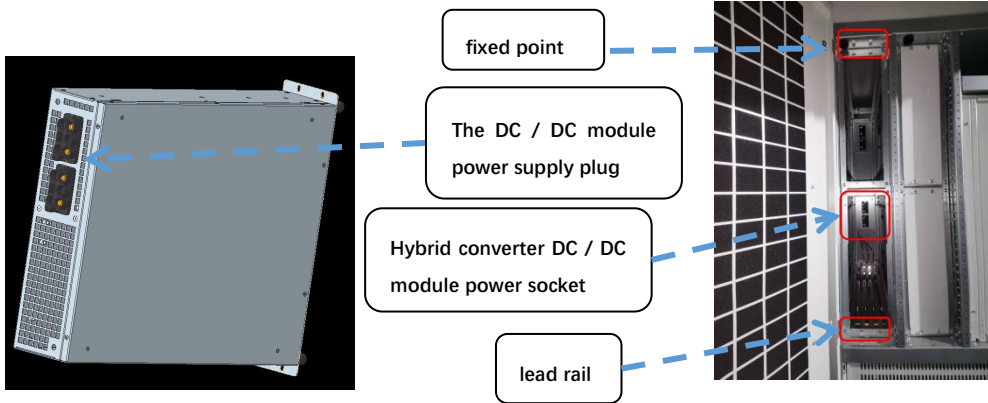


Figure 51_DC / DC module

Figure 52_ Drawing of chassis fixed point

Operating steps:

1. Remove the screws of the DC / DC module in the hybrid inverter using a torque wrench.
2. Disassemble the DC / DC module packed in the box, and lift the module to the corresponding height of the hybrid inverter.
3. The bottom of the DC / DC module remains at the same level as the upper surface of the hybrid inverter guide rail.
4. Put the DC / DC module power plug at the hybrid inverter DC / DC module power socket horizontally, push the plug to the inverter fixed point, and fine-tune the module, until the module installation hole and the fixed point thread hole of the inverter can lock the bolt smoothly.
5. Use the assembly bolt attached with the inverter, as shown in Figure 53.
6. Repeat the above steps to install the next module.



Figure 53_ Schematic diagram of installing the complete module



Warning

- 1.The DC / DC module should not be placed on the ground at will. Pay attention to the power plug position of the DC / DC module when installing.
- 2.The PCS inverter is installed without a DC / DC module.
- 3.The DC / DC module must be transported and assembled by two people. Do not install it violently during installation.

7 Electrical connection

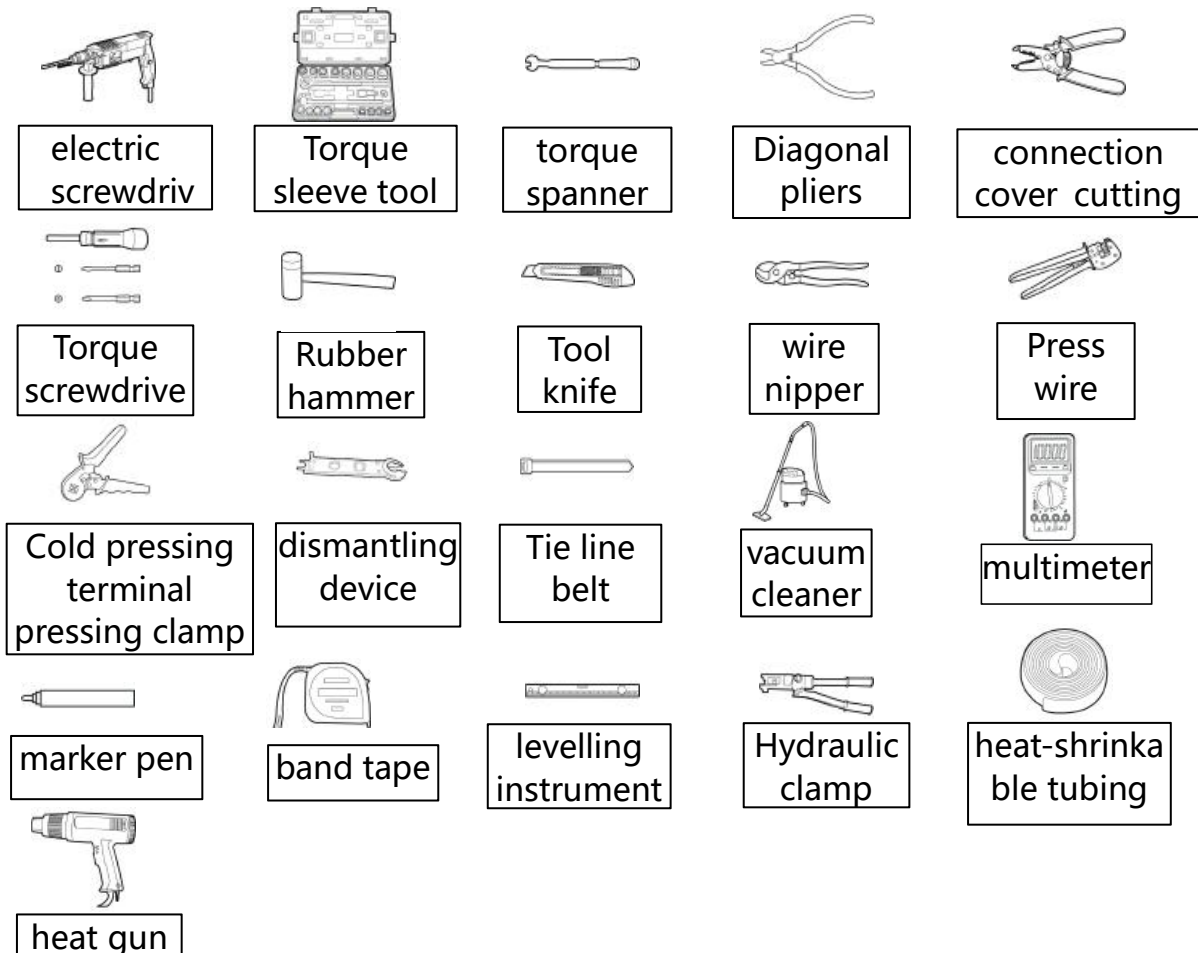
7.1 Safety precautions

During the whole process of electrical connection and all other operations of the outdoor cabinet energy storage system equipment The following rules:

- Disconnect all external connections to the outdoor cabinet energy storage system and to the internal power supply of the equipment.
- Ensure that the breaks are not accidentally re-powered on.
- Use the multimeter to ensure that the equipment is completely dead, and measure the high voltage box is not conductive.
- Ground the outdoor cabinet energy storage system.
- Insulate potentially live parts using insulating materials.

7.2 Wiring preparation

7.2.1 Prepare the tools before the wiring



7.2.2 Protective tools

The following protective tools are recommended for wiring



Insulating gloves



Safety shoes

Figure 54_ Figure of protective tool

7.2.3 Check the cable

➤ Check to ensure integrity and insulation before electrical cables. If there are damaged cables, please be timely and more exchange. Poor insulation or damaged cables may cause a hazard.

➤ The wiring work between the internal equipment of the energy storage integrated system has been completed before leaving the factory.

➤ User needs: check the connection cable for damage, if found, please replace the same specification model cable immediately.

➤ Check whether cable connections are securely secured. Ensure that all terminals are secured.



Caution

➤ Use proper insulation tools to prevent accidental electric shock or short circuit. If insulation tools are not available, Wrap the metal surface of the tool with insulation tape before use.

7.3 Battery system wiring

7.3.1 Product attachment introduction

The following figure is the product attachment:



Figure 55_ Communication wiring harness of the battery pack



Figure 56_ Battery positive and negative series copper row



Figure 57_ Battery total negative series copper row



Figure 58_ Battery total positive series copper row

BMU panel diagram:

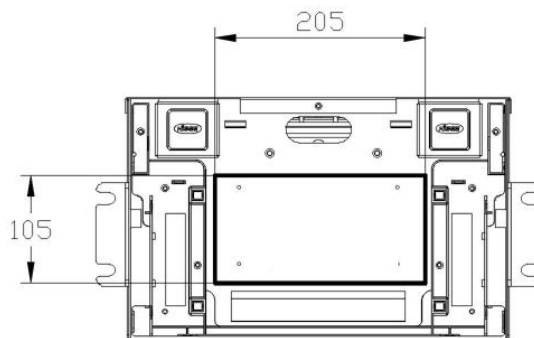


Figure 59

7.3.2 Battery cluster communication wiring harness connection

7.3.2.1 High-voltage box communication power supply wiring harness connection:

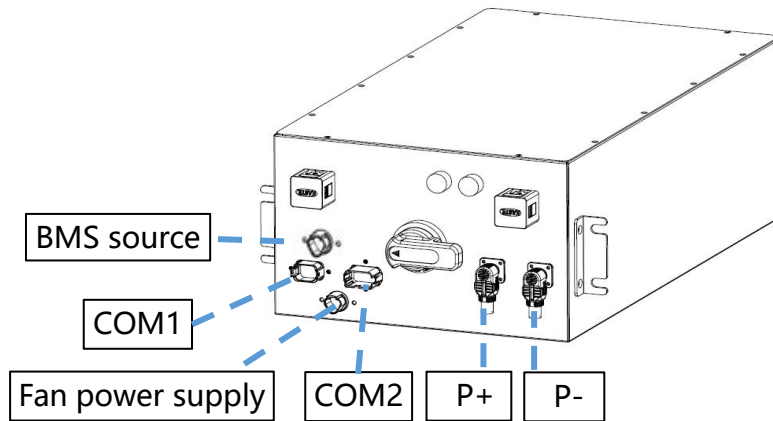


Figure 60_ Interface of high V box panel

- The communication harness power plug COM1 is connected to the high voltage box COM1.
- The communication harness power plug COM2 is connected to the high voltage box COM2.
- BMS POWER The communication harness power plug is connected to the high voltage box corresponding to each BMS power interface.
- FAN POWER The communication harness power plug is connected to the high voltage box corresponding to each FAN fan power interface.

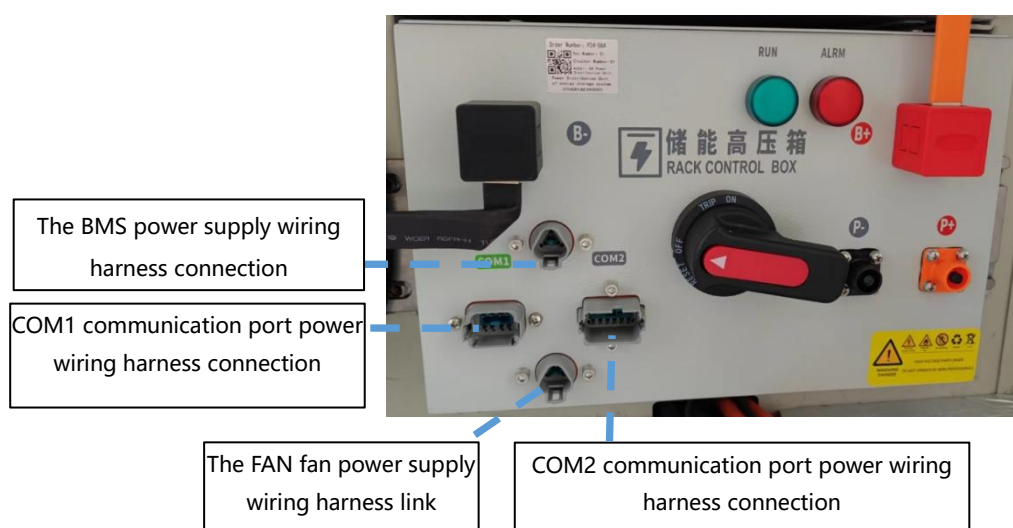
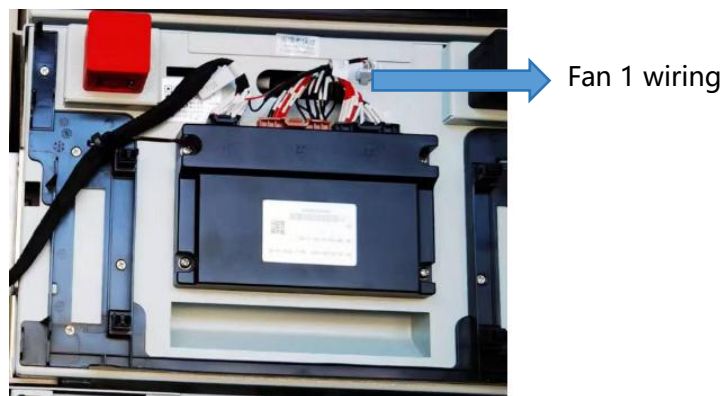
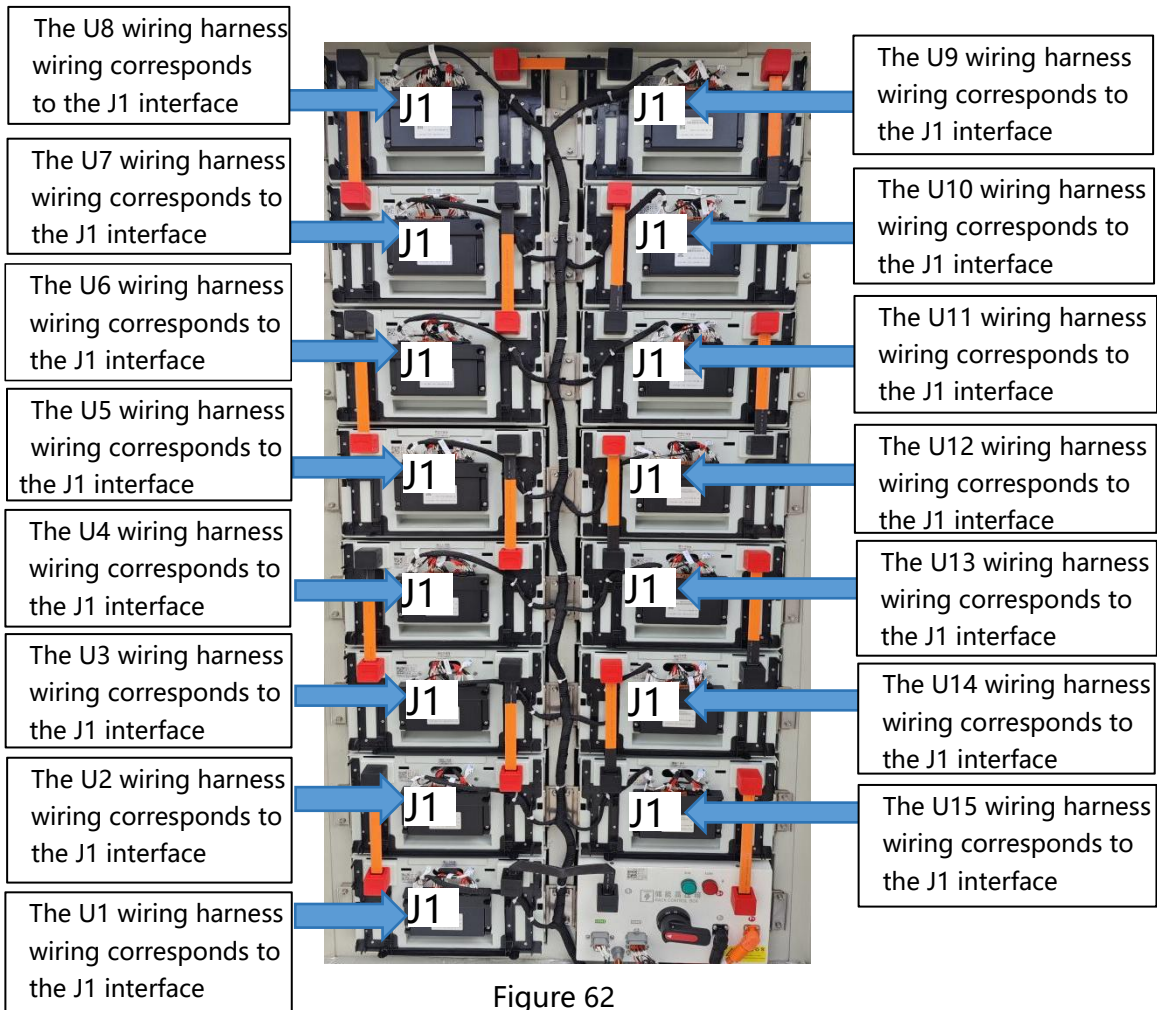


Figure 61

- Pass the communication harness through the middle cylinder hole of the battery frame and temporarily fix it in the middle cylinder slot.
- When installing, attention should be paid to the alignment of the communication terminal and the card slot to prevent the pin from bending.
- Connect the communication harness U1-U15 to the J1 interface on the battery panel, and fan 1-2 to the 01-01-01-15 code on the battery, and connect in numerical sequence;



As shown in the chrysanthemum chain walking diagram (refer to the battery specification)

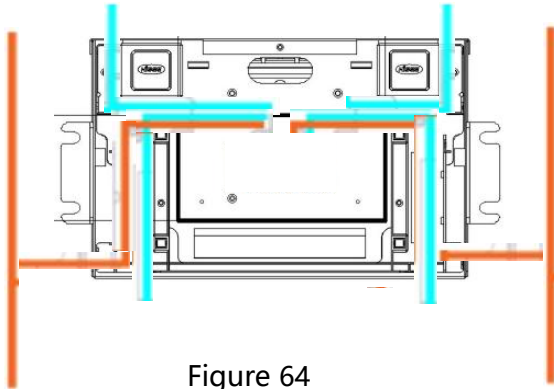
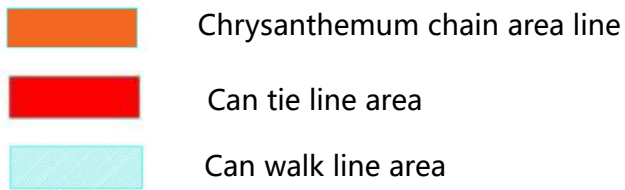


Figure 64

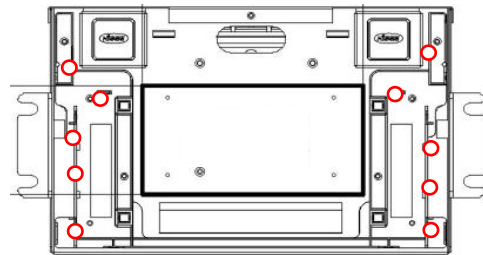


Figure 65

- After the connection is completed, use the tie belt to fix it along the card slot;
- Communication wiring is completed;

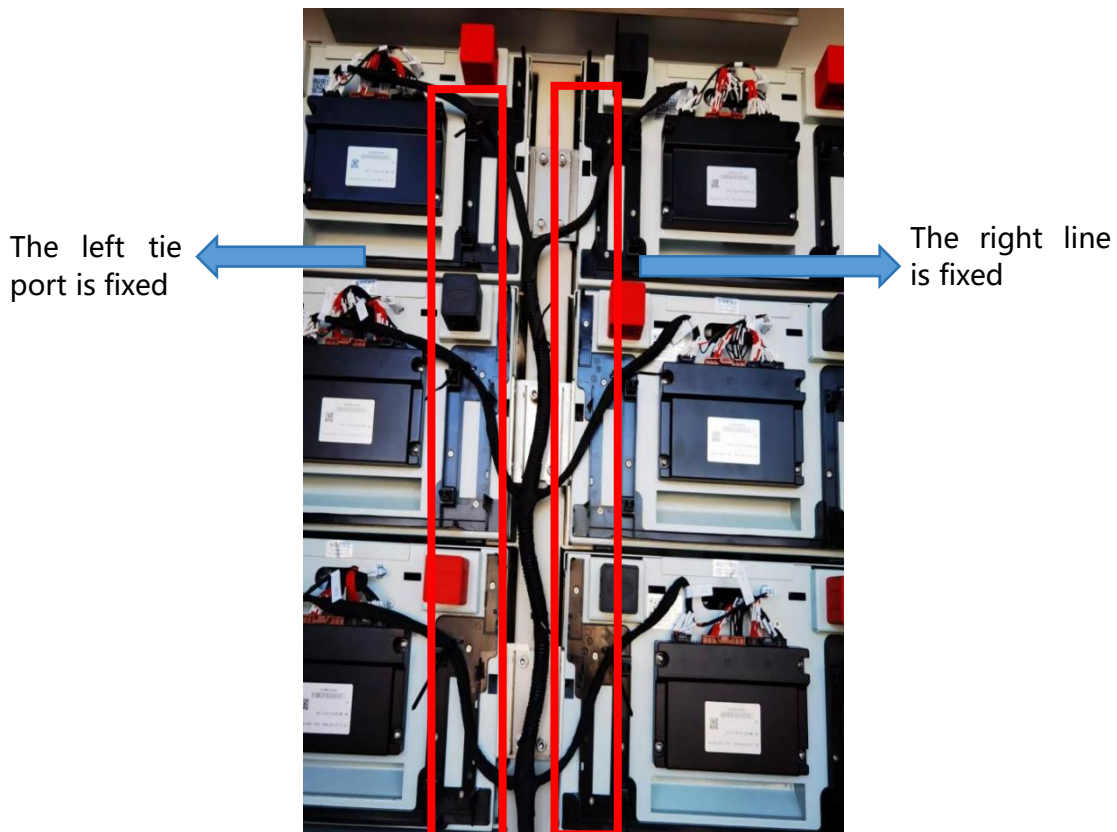


Figure 66

- Install the BMU cover plate, locate the cover card to secure the battery baffle, and check that it is properly installed.

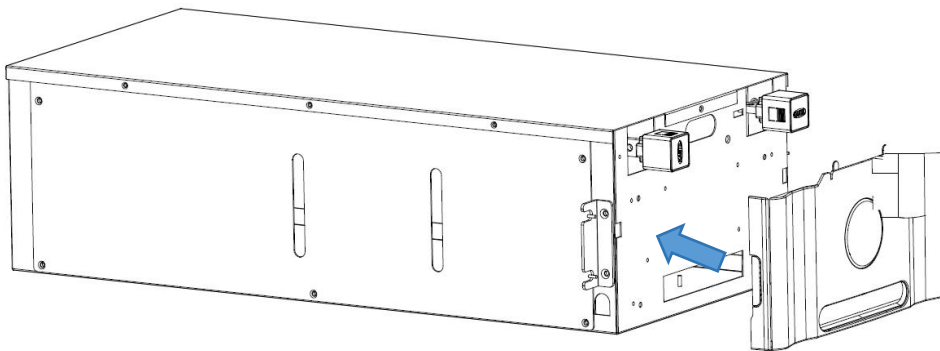


Figure 67_ Installing the battery cover fastener

The installation is complete as shown in the following figure



Figure 68

Battery power copper bar connection:

- 1.The battery cluster consists of 15 batteries connected in series, 16 batteries connected in series copper bars, 1 negative harness and 1 positive harness, as shown in Figure 58/59
- 2.Check that the high-voltage box switch is off, and then use a multimeter to measure that the battery input terminal on the high-voltage box is not in the on-state. The corresponding relationship between the positive and negative electrodes of the battery is correctly in line with the wiring standard;
- 3.Before installation, ensure that the sequence and layout of AB boxes are correct, and install the copper bars strictly according to the battery cluster layout diagram. Otherwise, there is a risk of short circuit.
- 4.Check polarity by color: the copper bar in series distinguishes the black end and the orange end, the orange end corresponds to the orange connector, and the black end corresponds to the black connector.

5. In the case of safety, use the screws (M6*12) provided with the accessories to connect the battery copper bar; Remove the battery terminal plastic shell and connect the copper bar in series. Lock the screws before installing the battery terminal plastic shell (Note: Install the battery terminal plastic shell after connecting one copper bar before connecting the next copper bar). The connection sequence is 1 to 15.

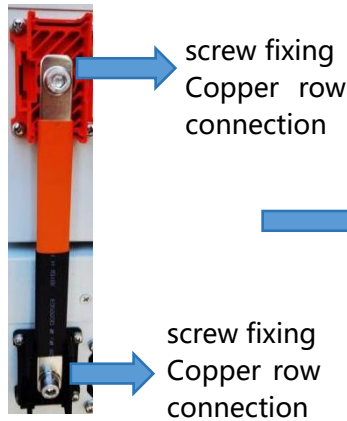


Figure 69

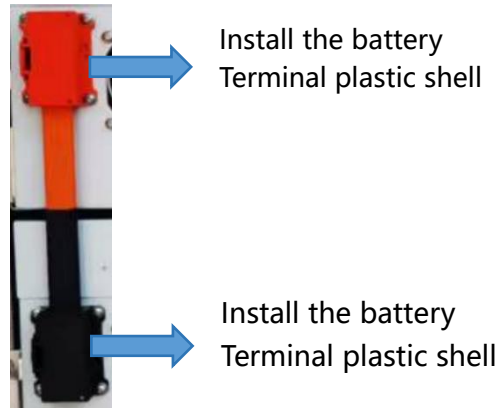


Figure 70

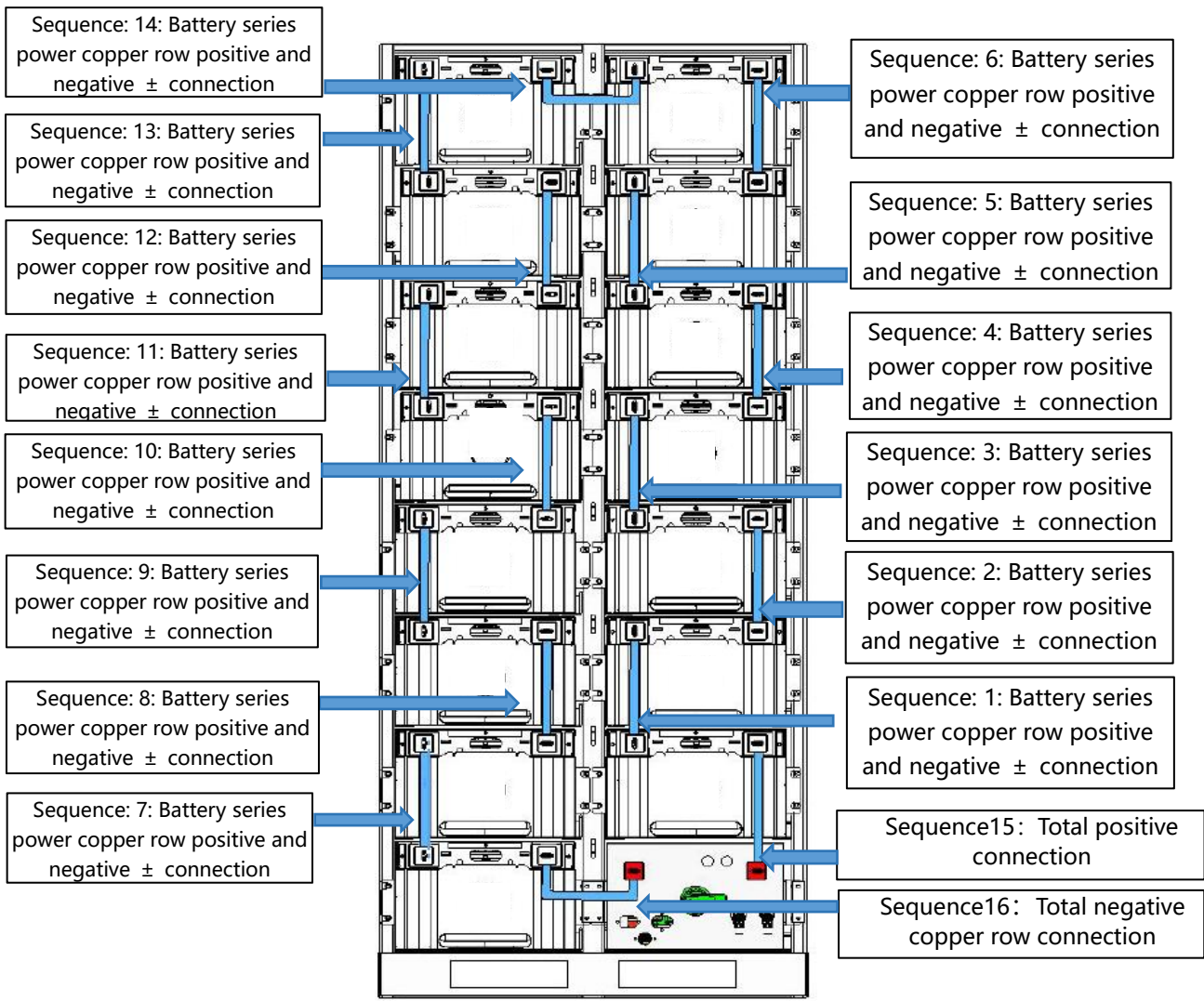


Figure 71



Warning

To avoid personal and equipment injuries, power copper protection (such as wearing insulating gloves, Wear insulated shoes, etc.).

6. After the installation, type the multimeter to the V DC gear, connect the negative electrode to the left connector of the high voltage box, and the positive pole to the right connector of the high voltage box, and check whether the total pressure is correct;

7. Install the battery connector cover plate, as shown in the figure below;

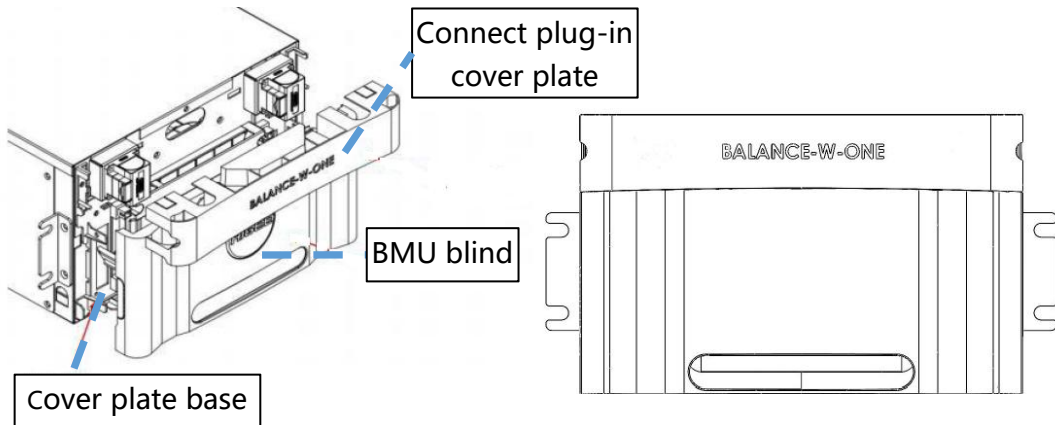


Figure 72

8. Diagram after installation:

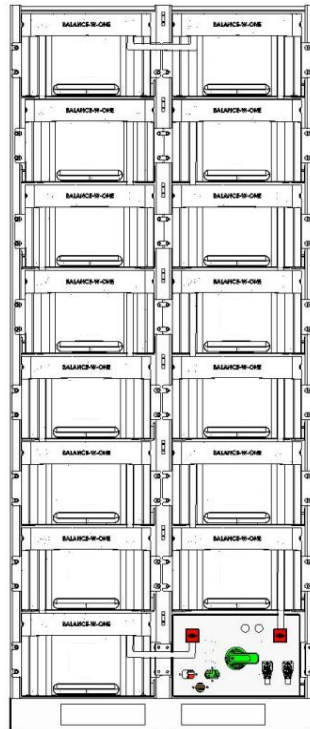


Figure 73 _ 215 kWh battery cluster

7.4 Electrical installation guidance

Users need to make external connections according to the relevant local electrical connection standards, and external cables shall be designed in accordance with local regulations and with consideration for environmental conditions.

Before wiring operation, confirm that both grid input and PV input switch are disconnected and put a warning identify to prevent others from operating the switch.

Power cable needs to go trench or metal wire trough to avoid mechanical damage of the cable;Or cause RF interference to the peripheral equipment.

7.4.1 Internal wiring terminal

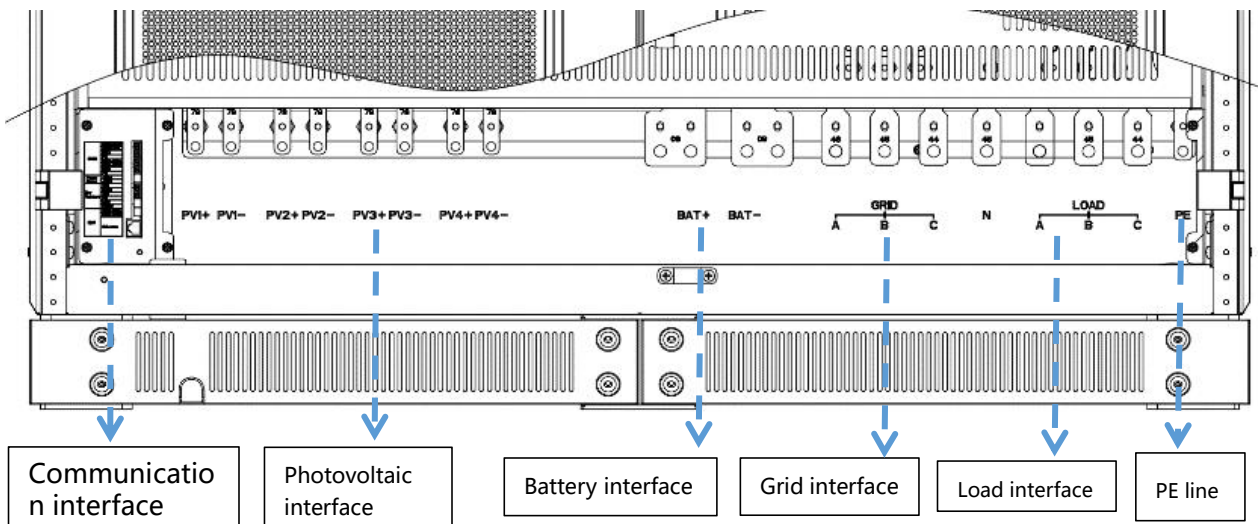


Figure 74

7.4.2 Converter DC side connection

Table 22 shows the DC connection relationship between the high pressure box and the converter.

Table 22

Converter "BAT+" positive electrode	High pressure box "P+" positive terminal
Converter "BAT-" negative electrode	High pressure box "P-" negative terminal

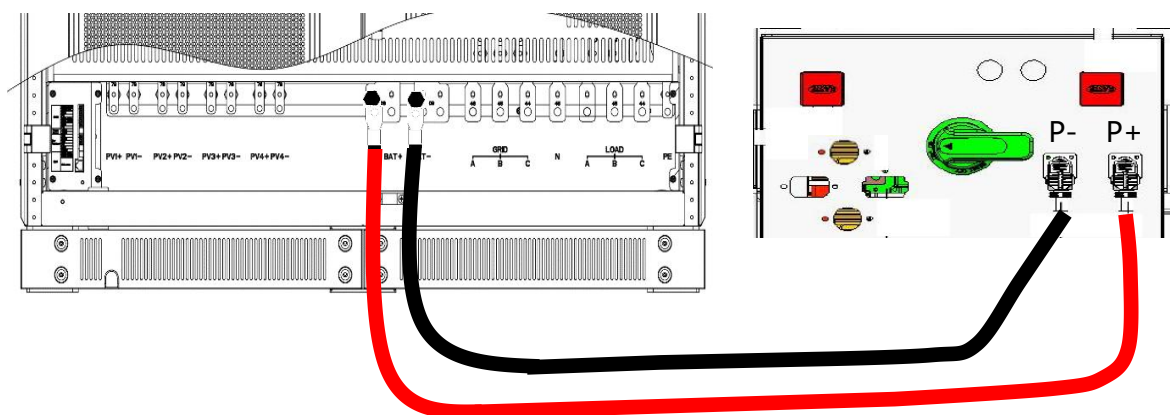


Figure 75_ Schematic diagram of converter and battery high voltage box wiring

The wiring steps are as follows:

- Check and verify that the HP box switch is in an off state.
- Pull off the battery power lines on the "P-" and "P +" on the high voltage box.
- Ensure that each circuit breaker switch of the converter and the external power grid power supply input switch are disconnected, which is in the "OFF" position.
- Use a multimeter to measure all terminals on the converter copper row.
- Connect the battery power lines on the "P-" and "P +" of the high voltage box to the "BAT-" and "BAT +" copper row terminals of the converter, respectively, and lock the screws on the terminals using the sleeve tool.
- Push the battery power line plug on P-and P + mark horizontally into the groove of the high voltage box input terminal.
- Ensure that the plug on the high pressure box is inserted properly.

➤ The PV DC cable is connected

Before connecting external cables to the hybrid inverter, remove the baffle plate of the cable inlet hole of the container to facilitate the cable access to the container. Perform the following steps to connect the cables.

1. Remove the baffle plate from the container cable inlet hole, as shown in the following figure

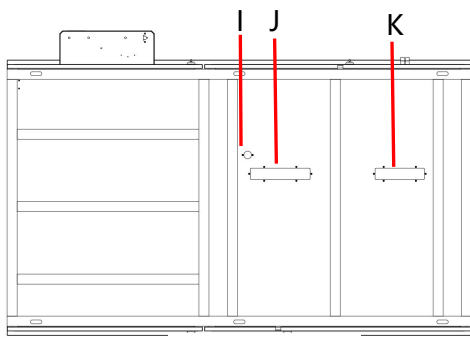


Figure 76

Bottom view:

I: Photovoltaic input line inlet hole.

J: Inlet line hole of the external communication line.

K: Power grid or firewood hair, load into the line hole.


2. Check that the PV circuit breaker is disconnected, that is, in the OFF position.

3. Ensure that the photovoltaic external cable input switch is off

4. Identify the positive and negative terminals of external cables and label them.

5. Connect the photovoltaic external cable to the copper bar PV+ and PV- of the hybrid inverter through the inlet hole.

6. The external cables are connected to the copper bar of the hybrid inverter. After the phase sequence is correct, seal the cable inlet to prevent damage to the device from the external environment.



To avoid personal and device injury, connect cables without power

- The DC switch is off.
- Use a multimeter to measure whether the DC cable bar is powered on.

7.4.3 The AC side of the converter is connected

All converters are connected to the power grid, and the corresponding relationships are shown in the following table. For details about the connection position of the copper bar, see section 7.4.1.

Table 23

GRID A	Grid phase Aoru
GRID B	Phase Bor phase V of the grid
GRID C	Phase Cor phase W of the grid
N	Neutral point
PE	Protective ground wire

Table 24

LOAD A	Load phase Aoru
LOAD B	Load phase Borv
LOAD C	Load phase cor phase W

Ac side wiring steps:

- Ensure that the circuit breaker switches of the converter and the power input switches of the external power grid are OFF, that is, in the "OFF" position
- Use a multimeter to measure that all terminals are powered off.
- The external power grid and load cables must be routed through the container inlet port.
- Determine the phase sequence of external cables and label them. Add yellow, green, red, blue, and yellow-green insulation tubes for AC three-phase cables A, B, C, N, and PE respectively to distinguish the phase sequence.
- Connect the ABC N of the power grid to the inverter according to Table 19-Table 20, and connect the ground cable of the external cable to the copper bar terminals of the inverter PE.
- The external cable is connected to the copper bar of the inverter. After checking the phase sequence of the power-on, seal the cable inlet to prevent external damage to the device.

7.4.4 UPS wiring

1. The UPS power output plug is plugged into the power output outlet corresponding to the UPS rear panel.
2. Power input plug into the corresponding U power input socket.

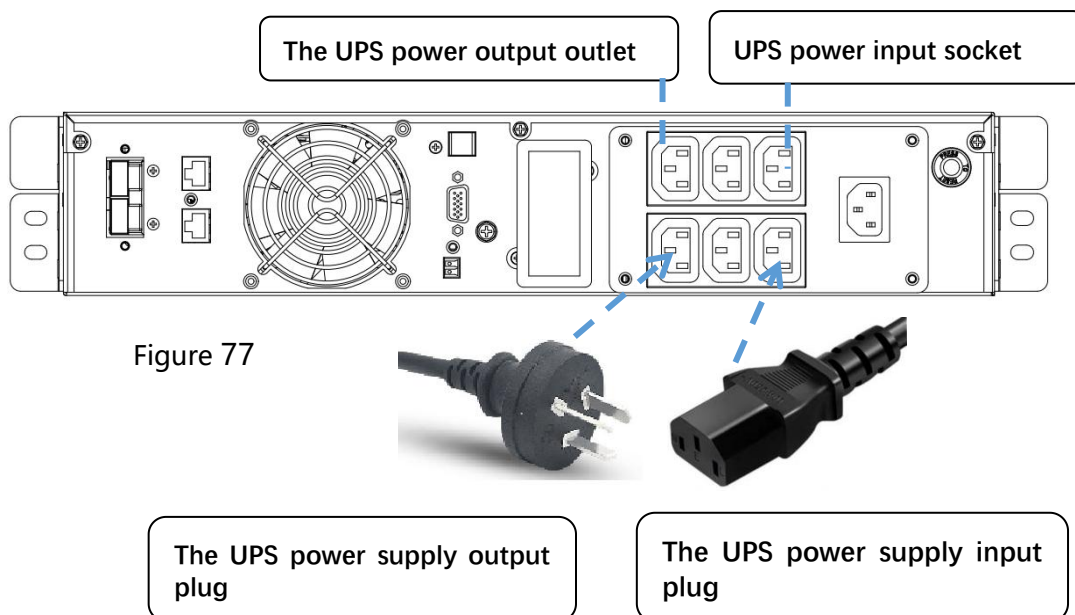



Figure 77

 <p>Warning</p>	<p>Wiring personnel should have a certain professional knowledge of electronics, electrical wiring and machinery, familiar with electrical, Mechanical schematic diagram.</p>
---	---

System earth:

The ground copper row in the inverter shall be reliably connected to the power grid or outside using the ground cable.



- 1.The parts such as fixed screws used in the wiring have been installed at the corresponding wiring terminals at the time of delivery.
- 2.The screws for the external input wire harness meet the hole position size of the device.
- 3.. It is necessary to check the material of the external terminal connection point. If copper and aluminum are connected to each other, special copper and aluminum are required Connector head, do not connect directly!

8 Trial operation of the energy storage system

8.1 Check before the system is enabled

Before the trial run, thoroughly check the installation of each equipment, and especially check whether the voltage at the DC and AC terminals meets the requirements of the converter, as well as whether the polarity and phase sequence are correct.

Check that all connections have met the relevant standard specifications. And whether the system is well grounded. The grounding resistance is of great significance to the safety of the whole system, and it must be determined to meet the requirements before the first test run.

Step1:External ground inspection of the outdoor cabinet

Refer to 6.4 grounding section of cabinet to confirm that the external grounding wire of outdoor cabinet is connected; and the connection is firm.

Step2:The Hybrid inverter wiring inspection

Confirm the wiring at the bottom of MPS, whether all AC / DC circuit breakers are disconnected, which is in the "OFF" position; and the switch of the external input power is also disconnected.

Confirm that the wire wiring for PV +, PV -, BAT +, BAT-, GRID, LOAD and PE are firm and correct;

Check whether the wiring of the communication board is loose and detached.
 Hybrid inverter The bottom wiring diagram is shown in Figure 78 below.

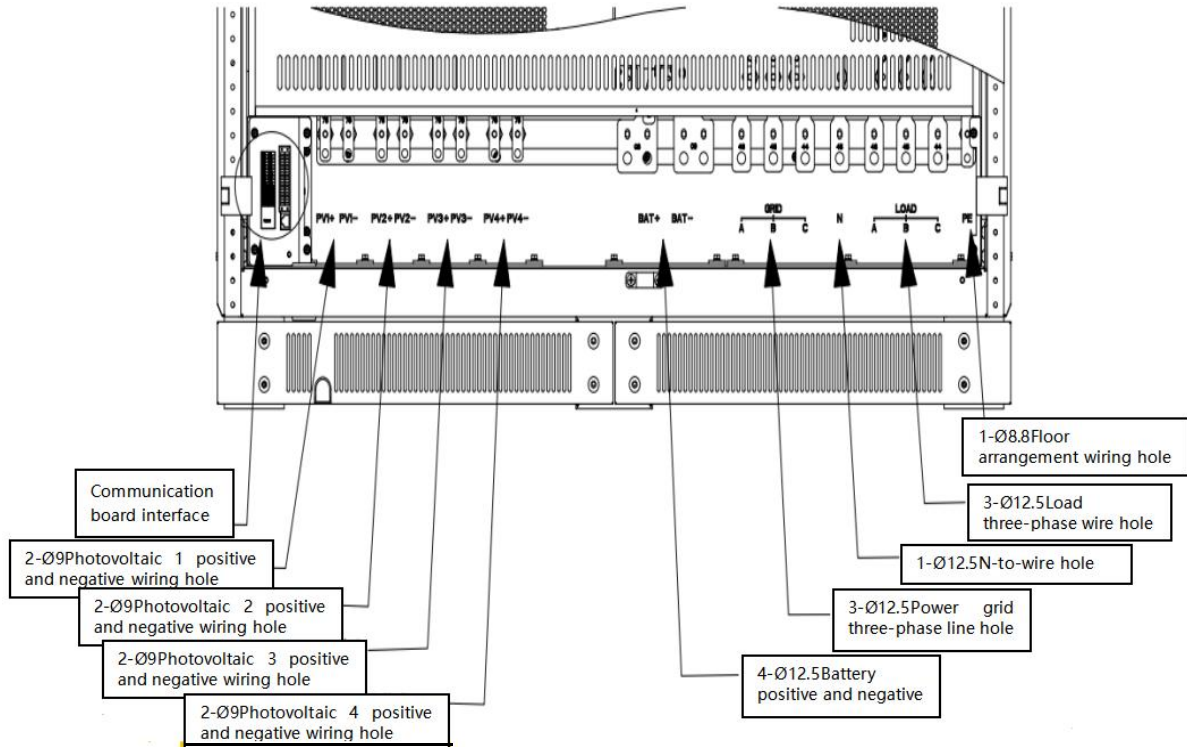


Figure 78 100kW bottom wiring diagram

Step3: Check the wiring of power distribution box and emergency stop button

Without starting any equipment, open the distribution box panel to confirm that the internal wiring of the distribution box is not loose or loose; the EPO switch on the front door of the outdoor cabinet is closed; all small circuit breakers are disconnected; the distribution box is shown in Figure 79 below.

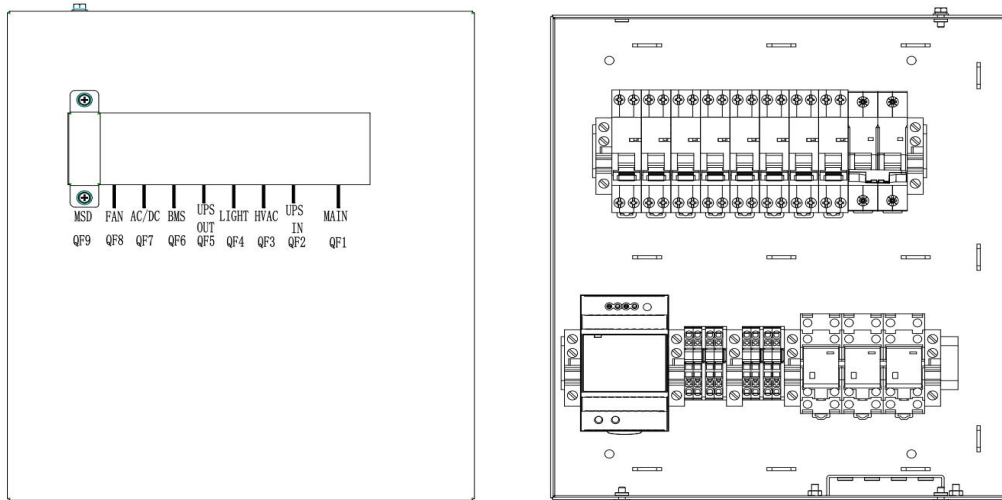


Figure 79 Power Distribution box

Note: For details about the power distribution box, see 4.6 Power Distribution System.

Step 4: Check cables to the UPS

For details, see 7.3 UPS Cable Connection. The power distribution box is located behind the Hybrid Inverter/PCS to check whether the UPS output/input power cable and battery cable are connected reliably and correctly.


Step 5: Check battery cluster connections


By referring to 7.5 Connecting Cables to the Battery System, check whether the B+ connector on the battery pack corresponds to the orange plug of the power cable and the B- connector corresponds to the black plug of the power cable. Pull out the plug and check whether it falls off.

Check that the communication cables between battery packs and fan cables are properly and securely connected.

Check whether the wiring on the high pressure box is loose and falls off; Whether the DC switch and mini circuit breaker are in the OFF state (i.e. in the "off" position).

8.2 System startup procedure

 Caution	In case of a dangerous situation, press the STOP button on the distribution box and the EPO button on the energy storage converter!
--	---

 Caution	Before power-on, ensure that all switches on the DC and AC sides of the energy storage converter are off.
--	---

Step 1: The UPS starts

Find the STOP switch on the right front door, rotate and open the STOP switch; press the ON / OFF button after confirm the wiring is correct; wait 3 seconds, hold the ON / OFF button again for 2 seconds until the INV icon remains on; UPS operation panel diagram as shown in Figure 80 below.

Note: Please refer to the UPS User Manual for the detailed operation



Figure _80 UPS operation panel

Step 2: If the UPS has been started, operate in turn:

1. Close QF5 UPS OUT for safety confirmation;
2. Closed for QF7 BMS;
3. Close the DC switch on the high voltage box (in the "TRIP ON" position), the indicator light will flash green, the high voltage box contactor will close after 25-30s, and the green light will always turn on;
4. Measure the voltage of BAT \pm of MPS, then if the DC side voltage is below 850V and the polarity is correct;
5. Close MPS auxiliary power switch KB 1, contactor power switch KB 2, (KB 3 needs to close); close QDC switch and wait for MPS screen to start;
6. After the MPS screen is started, there will be an alarm after 5 minutes. Click the alarm icon in the upper right corner of the screen to view the alarm information on the screen, there is access control alarm is normal, other alarms need to investigate the reason and then do the power operation;
7. Click Menu on the screen, click Switch, then click DCAC converter ON, then click OK on the pop-up, wait for MPS to start; (MPS will start normally);
8. After the MPS is started, close the LOAD switch on the load side; measure the voltage of A \ B \ C of the LOAD; proceed to the next step;

9. Close QF1 MAIN on the distribution box, QF2 UPS IN, wait for a while, the UPS will turn to the mains power inverter state, and charge the UPS battery pack;
10. Close QF3 HVAC, QF4 Light, QF8 AC / DC, then on the system.

Step 3:

Open the DC / DC module, measure the voltage of the connected PV positive and negative electrode with the multimeter, close the switch button on the module to the position of "ON", then close the "QDC" switch; view the data on the PV page to confirm normal, then open the DC / DC operation: click the "menu" on the screen, then click "switch", "then click" DCDC converter open ", then click" OK " on the window and wait for the DCDC to start.

Step4:

When required to be used on the grid side, measure whether the voltage of the A \ B \ C phase and the N pole is within the normal range; check the "menu" on the screen, then click "system", then click the parameters on the right of "Constant Power (AC)", change the existing parameters to "-5", the battery will be charged with 5KW power, and the specific parameters will be modified according to the actual requirements.

8.3 Electric step under the system

Step 1: The MPS shut-off operation

1. When running at high power, gradually reduce the grid or load power, and then reduce the MPS power:
 - When the MPS is in the state of charging the battery, click the "menu" on the screen, then click "system", then click the "constant power (AC)" right parameter, gradually reduce the existing parameters, such as the current parameter is "-100", changed to "-80", wait for 5 seconds, then change to "-60", wait for 5 seconds, and so on until changed to "0";
 - When the PCS is in the battery discharge state, if the parameter on the right side of "constant power (AC)" is "100", it will be changed to "80", wait for 5 seconds, then change to "60", wait for 5 seconds, and so on until it is changed to "0";
2. If you are using DCDC module, you need to click the "menu" on the screen, then click "switch", then "DCDC converter" off ", then click" OK " on the popup; disconnect the switch button on the module and hit it to the OFF position,
3. Click "menu" on the screen, then click "switch", then click "ACDC converter off", then click "OK" on the popup; wait for MPS shutdown;
4. MPS in shutdown state, disconnect DC side QDC switch, load side LOAD switch, grid side GRID switch and PV side QPV switch and all other switches;

Step 2: High-pressure box closing operation

Disconnect the DC switch of the high voltage box (i. e. in the "TRIP OFF" position);

Step 3: Power-down operation of the power distribution box

1. breakQF2 UPS_IN;
2. Disconnect QF5 UPS _ OUT, the power supply of UPS output will be cut off;
3. Then disconnect the QF 1 _ MAIN to QF 8 _ AC / DC;


Step 4: UPS shutdown operation

Long press the "ON / OFF" button on the UPS panel for 2 seconds, the UPS will turn off the inverter, and after a few seconds, the machine will fully power down;

Note: Please refer to the UPS User manual for detailed operation;

8.4 Maintenance switch

The service switch of the UPS can only be closed when the UPS fails and needs maintenance; the service switch is shown in Figure 81 below.

 Caution	This operation shall be carried out by our postsales personnel or our authorized professional personnel.
--	--

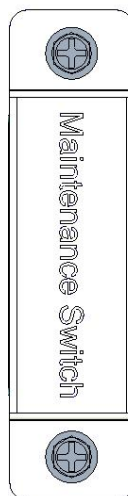


Figure 81_ Schematic diagram of the repair switch

9 Delivery and storage

9.1 The nameplate logo

Users can identify the equipment through the nameplate, which includes the equipment model, serial number, main technical parameters and origin.



Warning

The nameplate contains important parameter information related to the equipment, all in the transportation, installation, maintenance, overhaul, etc. Attention should be paid to protection. Do not destroy or dismantle it!

9.2 Product examination

The outdoor cabinet energy storage system has been carefully checked by the staff of the company and firmly packed before delivery. Nevertheless, it is possible that equipment can collide or even damage during transportation.

After receiving the equipment, the integrity and integrity of the transportation should be checked first. At least, the following items should be carefully checked:

- Check whether all the shipping components are complete against the "Scope of supply".
- Confirm that the received outdoor cabinet energy storage system and internal equipment model are consistent with your previous order model.
- Carefully check the outdoor cabinet energy storage system and each internal equipment to see if there is any damage during transportation.
- During the inspection, find problems or questions, please contact the carrier or our company.



Warning

Only a complete and no damage of the outdoor cabinet energy storage system, can be installed and trial run! Make sure that before the installation starts:

- The outdoor cabinet energy storage system itself is intact and without any damage.
- All the equipment in the outdoor cabinet energy storage system is in good condition and without any damage.

9.3 Memory

If not installed immediately after delivery, please store the outdoor cabinet energy storage system as described in this section

- In order to prevent condensation from the internal equipment of the outdoor cabinet energy storage system, or rain immersion at the bottom of the room during the rainy season, The outdoor cabinet energy storage system should be stored in an indoor environment, such as a large warehouse or workshop building.
- If the storage must be stored outdoors due to the limitation of site conditions, the base of the outdoor cabinet energy storage system must be raised. The specific elevation height should be reasonably determined according to the site geology and meteorological conditions. At the same time, heating should also be provided for the internal equipment of the outdoor cabinet energy storage system when the ambient temperature is too low.
- Storage environment temperature: $-30^{\circ}\text{C} \sim +50^{\circ}\text{C}$; relative humidity of storage environment: 0~95%, no condensation; store outdoor storage cabinet system in dry, smooth, solid, sufficient bearing capacity without any vegetation cover; storage ground shall be flat, no water, no bump or fluctuation.
- When storing, the door of the outdoor cabinet should be locked.

10 Maintenance and failure

10.1 matters need attention

Due to the influence of ambient temperature, humidity, dust and vibration, the internal equipment of the outdoor cabinet energy storage system will age, which will affect the performance of the equipment and may even lead to failure. Therefore, it is necessary to conduct regular and regular maintenance of the outdoor cabinet energy storage system to ensure its normal operation and service life. All measures and methods to help the equipment in good working condition are within the scope of maintenance work. If there is a fault, you are still unable to resolve this problem with the help of this manual. Pls Get in Touch with Us. At the same time, provide some information to provide you with a better service:

- 1.Photo of the fault scene;
- 2.Product model number and serial number;
- 3.Photovoltaic modules, power grid, firewood hair, load parameters and other information connected to the outdoor cabinet energy storage system.
- 4.Communication and connection scheme;
- 5.Fault information and simple description;

10.1.1 General safety provisions

To ensure the safety of operators, the outdoor cabinet energy storage system must observe the following safety rules during maintenance or overhaul:

Disconnect all external charged connections;

Check the power supply condition of the equipment.

Ensure that the outdoor cabinet energy storage system is not accidentally powered on.

Use the multimeter measurement to ensure that the interior of the outdoor cabinet energy storage system is not fully charged;

Ensure that the outdoor cabinet energy storage system is well grounded;

If the operation part is close to the parts that may be charged, it shall be insulated with insulation materials;



警告

Only qualified and authorized personnel can maintain the outdoor cabinet energy storage system.
During the maintenance work, do not leave the screws, washers and other metal parts in the outdoor cabinet energy storage system to avoid damage!

10.2 Maintenance work and cycle

Table 25_Maintenance work item list

functional unit	Maintenance project	Maintain the content	Recommended cycle
Converter	keeping records	<ul style="list-style-type: none"> ◆ Export the data using the standard communication cable and save the backup. 	One month
	Converter inspection	<ul style="list-style-type: none"> ◆ Observe the appearance of the energy storage converter and whether the cabinet door panel are damaged, deformed or rusted. ◆ Listen to the energy storage converter running for any abnormal sound. ◆ Runtime parameters are observed by the LCD. ◆ Use a thermal imager to detect fever. ◆ Check whether the ventilation, ambient temperature, humidity, dust and other environments around the converter meet the requirements. 	Half a year
	Air duct cleaning	<ul style="list-style-type: none"> ◆ Check the air duct for dust. ◆ Listen to any abnormal vibration when the fan is running. ◆ Use the compressed air and turn on the 	Half a year

		<p>fan for cleaning.</p> <ul style="list-style-type: none"> ◆ Clean or replace the air filter screen. 	
	safety function	<ul style="list-style-type: none"> ◆ Check that the EPO button fails. ◆ Check the LCD touch function for failure. 	Half a year
	Circuit connection	<ul style="list-style-type: none"> ◆ Check all electrical connections for loosening or poor contact. ◆ Check all cables and metal surfaces for breakage or scratches. ◆ Check the insulation strip of all terminals. ◆ Check the screw position for signs of overheating. ◆ Check the wiring copper bar and screws for color change. 	In 1 year
	Circuit breaker maintenance	<ul style="list-style-type: none"> ◆ Check all circuit breakers for failure. ◆ Check for any damaged circuit breaker or load switch. 	In 1 year
	Identification inspection	<ul style="list-style-type: none"> ◆ Check the body warning signs and other equipment signs, ◆ If it is fuzzy or damaged, please replace it in time. 	In 1 year
Outdoor cabinet	Appearance and paint inspection of the outdoor cabinet	<ul style="list-style-type: none"> ◆ Check the appearance of the cabinet, if there is any paint drop or damage, please use RAL7035 to paint treatment in time; 	Trimester
	System status and cleaning	<p>Check the following items, if not met, please correct immediately:</p> <ul style="list-style-type: none"> ◆ Check whether the internal equipment of the outdoor cabinet is damaged or deformed. ◆ Check whether there is any abnormal noise during the operation of the internal equipment; Check whether the temperature in the outdoor cabinet is too high. ◆ Check whether the humidity and gray scale inside the outdoor cabinet are within the normal range. ◆ If necessary, clean; check whether the air inlet and outlet of the outdoor 	Trimester

Outdoor cabinet		cabinet are blocked.	
	Cable shielding layer is grounded	◆ Check whether the cable shielding layer is in good contact with the insulation casing;	Half a year
	Lightning protection equipment and fuse	◆ Check whether the lightning protection equipment and fuse are well fastened.	Half a year
	Corrode circumstances	◆ Check whether there is oxidation or corrosion inside the battery bin equipment bin.	Half a year
	Outside the cabinet	<p>Check the following items, if not met, please correct immediately:</p> <ul style="list-style-type: none"> ◆ Check for flammable objects on the top of the outdoor cabinet. ◆ Check whether the welding point of the outdoor cabinet and the foundation steel plate is firm and whether there is corrosion. ◆ Check whether the outdoor cabinet shell is damaged, paint drop, oxidation, etc. ◆ Check whether the cabinet door lock can be opened flexibly. ◆ Check whether the seal strips are well fixed. 	Trimester
	Inside the cabinet	◆ Check for foreign matter, dust, dirt and condensate inside the outdoor cabinet.	Trimester
	Into, outlet	◆ Check the radiator temperature and the dust. If necessary, a vacuum cleaner can be used to clean the cooling module.	Half a year
	Wiring and cable arrangement	<ul style="list-style-type: none"> ◆ After the internal equipment of the outdoor cabinet is completely power off, then start the inspection work! During the inspection, once the non-conformance is found, please correct it immediately. ◆ Check whether the cable arrangement is standard, whether there is a short circuit and other conditions. If there is abnormal, it should be corrected immediately. 	Half a year

Outdoor cabinet	Wiring and cable arrangement	<ul style="list-style-type: none"> ◆ Check whether all the inlet and outlet line holes of the outdoor cabinet are well sealed. ◆ Check for water seepage inside the outdoor cabinet, ◆ Check whether the power cable connection is loose, and tighten it again according to the previously specified torque. ◆ Check the power cables and control cables without damage, especially for cuts on the skin in contact with the metal surface. ◆ Check whether the insulation strap of the power cable wiring terminals is falling off. 	Half a year
	nut bolt	<ul style="list-style-type: none"> ◆ Check whether there is a screw drop inside the outdoor cabinet. 	Half a year
	safety function	<ul style="list-style-type: none"> ◆ Check the stop function of emergency stop button; simulate shutdown. ◆ Check the body warning mark and other equipment identification, if blurred or damaged, please replace in time. 	Trimester
	Device maintenance	<ul style="list-style-type: none"> ◆ Routine inspection of all metal elements (three months). ◆ Annual inspection of the contactor (auxiliary switch and micro-switch) to ensure that its machinery runs well. ◆ Check the operating parameters (especially the voltage and insulation, etc.). 	Trimester
Fire Suppression System	Fire Suppression System check up	<ul style="list-style-type: none"> ◆ Check whether all the electrical connections of smoke detector, temperature detector, fire gas tank and thermal aerosol fire extinguishing device are loose or have poor contact; ◆ Check the appearance of all fire-fighting devices for damage phenomenon; ◆ It is strictly prohibited to remove the system parts by yourself to avoid 	Half a year

		touching the equipment and misspraying;	
Battery system	Battery system check up	<ul style="list-style-type: none"> ◆ Check that the DC circuit breaker of the high voltage box is disconnected; ◆ Check the appearance of the battery / battery pack without rupture, scratches, deformation, rust, stains, electrolyte leakage and other adverse phenomena; ◆ Check whether all communication connections, connecting cables and confluence copper bars are damaged to ensure that the insulation layer is intact; ◆ Check whether the open-circuit voltage of each cluster meets the requirements; ◆ Anti loosening inspection: Ensure that all high-voltage electrical connections have been tightened in place as required, and there are no loose conditions; ◆ When the battery cluster is not used for a long time, be sure to fill it full once every three months or so; ◆ During maintenance, do not unload or dissect the battery pack; ◆ In accordance with the requirements of the outer packaging identification, no rain, sun exposure, turnover, etc.; 	Trimester
Air conditioning system	Internal component inspection	<ul style="list-style-type: none"> ◆ Check the cleaning of the circuit board and the components. ◆ Check the air conditioning temperature and dust. If necessary, clean the air conditioner; if necessary, replace the air filter. ◆ pay attention to! The ventilation of the air intake port must be checked. Otherwise, if the air conditioner cannot be effectively cooled, it will fail due to overheating. 	Trimester



The recommended routine maintenance periods are listed in the table. The actual maintenance period should be determined based on the specific installation environment.

Power station scale, location, site environment and other factors will affect the product maintenance cycle. If the operating environment is large or dusty, it is necessary to shorten the maintenance period and increase the frequency of maintenance.

10.3 fault treatment

10.3.1 troubleshooting

When the energy storage system cannot output or charge and discharge abnormally, check the following:

Open circuit voltage of energy storage battery; whether the machine is in fault state, whether the grid is properly connected and energized; check normal communication of the metering equipment;

10.3.2 Non-alarm failure

Machine working noise is large:

➤ Check whether the power is within the normal range; measure whether the grid-connected current and voltage waveform are normal; check and replace the cooling fan.

Network communication mode:

- Please check whether the IP address, subnet mask, and gateway are set correctly.
- Check whether the communication line is a direct line and is well connected.
- If the above checks are normal, try to replace the LCD monitoring board.

Serial port communication mode:

- Check the line, check whether all wiring is good, A / B for reverse.
- If the communication adapter does not match, replace the communication adapter and try again.
- Check whether the local address and port rate are consistent with the upper computer, and check the communication connection between the LCD screen and the DSP board.

10.3.3 List of alarm failures

LCD can display alarm items with corresponding solutions shown in Table 26 below:

Table 26_Alarm troubleshooting method

Functional unit	Failure phenomenon or the code	Processing method
Converter	The battery voltage is low	Disconnect the DC load switch and check the DC side voltage and energy storage battery configuration.
	Power grid overpressure	Shut down, check and check the connection point voltage.
	Power grid voltage reverse order	Disconnect the power transmission switch and turn off to check the three-phase line.
	The frequency of the grid is abnormal	Shutdown to check the power grid voltage.
	Converter over current	Shutoff, check converter input / output for short circuit or converter overload.
	Converter fault	Shut down, and check the operation before startup.
	BMS communication failure	Shut down and check whether the communication cable between the converter and the battery system is loose.
	Battery voltage acquisition is abnormal	<ol style="list-style-type: none"> 1. Check whether the collection line is correctly connected and correct it. 2. Check the wiring harness plug and correct it. 3. Check the configuration and fix it. 4. Replace the module and return to the module for repair. 5. Check that the collection line is interrupted and corrected.
	Abnormal temperature acquisition	<ol style="list-style-type: none"> 1. Check the temperature collection cable and correct it. 2. Check the configuration and correct it. 3. Replace the temperature probe
Abnormal communication	<ol style="list-style-type: none"> 1. Check the communication lines and repair them. 	

		<p>2. Check that the terminal resistance is above normal.</p> <p>3. Replace the equipment.</p>
	The SOC were quite different	<p>1. The BMS performs the SOC self-correction.</p> <p>2. Replace the battery.</p>
Air conditioning system	The fan has no dust and no foreign body blockage at the tuyere	Visual inspection: use a brush to clean the fan for 10 minutes. Clean up the foreign body at the tuyere.
	The condenser has no backtransmission and foreign body blockage	Visual inspection: Clean the condenser with compressed air or a vacuum cleaner with brush head. If the fins are damaged or inverted during cleaning, it can be simply repaired with forceps. If it snows in winter, the snow around the heat exchanger should be cleaned up in time.
	Refrigeration system: no abnormal alarm	Visual inspection: a certain amount of refrigerant has been filled before leaving the factory, and the relevant parameters of the refrigeration system and the sealing ability of the system have been verified. The refrigeration circulation system is a fully enclosed system, so the user does not need to maintain the refrigeration circulation system. When the refrigeration system fails, there is a relevant detection device inside the system, and make an alarm prompt, and judge it according to the alarm prompt.
	The drainage pipe has no debris and dirty blockage	Visual inspection: Clean up the debris inside the drainage pipe and pay attention to the problem of ice blocking of the drainage pipe in winter. If ice blocking occurs, it should be dealt with in time to avoid the condensed water that cannot be discharged normally.
	The filter is free of dust and foreign objects	Visual inspection: When cleaning the filter screen, use warm water below 40 degrees, and do not rub it when cleaning. When it is dirty, you can use neutral detergent for decontamination. If it is not very dirty, you can directly use water spray for cleaning. After the filter screen is cleaned, the water on it is fully dried, and then it is loaded into the equipment and installed in strict accordance with the correct installation steps.

UPS system	7 Alarm: the battery has no or weak battery	Connect the battery or replace the battery.
	30 Alarm: switch number to (within one hour)	Check the output for overload, or some load short circuits. Remove the faulty load and restart the UPS, or wait for the UPS to automatically return to the inverter power supply.
	32 Alarm: output short circuit	Turn off UPS, remove all load, confirm that the load is not faulty or internal short circuit, and restart. If it fails, please contact your supplier.
	51 Warning: too warm	UPS Working environment temperature is 0~40°C, ensure UPS, inlet and outlet air There is no foreign body barrier in the mouth.
	55 Alarm: the inverter is overloaded	Please reduce the load to below the rated capacity.
	57 Alarm: Inverter overload timeout	Reduce the load to less than 95% of the load rate, and the UPS will automatically cut back to the inverter to work.
	65 Alarm: Battery is at low voltage	Restore the mains input or maintain your data before the battery is turned down.
Fire Suppression System	When the temperature or smoke sensation is a single alarm	Start the corresponding relay, which outputs the switch signal (level 1 fire alarm);
	When the mild smoke alarm at the same time	At the same time, start the relay, the relay output the switch signal and start the fire extinguishing device, the fire extinguishing device injection, output switch signal secondary alarm signal (often open or often open);
	When fire signals are detected	The detector changes its own supply current to transmit the signal to the control panel or the interface module. The detector illuminates the fire and remote indicators to display the alarm and will keep them reset;
	After the detector detects a fire signal	It can change its own current to transmit the fire signal to the control panel or the interface module. The detector continuously illuminated the fire LED indicating the fire status until reset. The detector uses the NTC thermistor as the sensing element;
	Thermal aerosol fire-extinguishing unit	Thermal aerosol occurrence dose: 300g±2%;
	Passive switch quantity feedback signal	Passive switch quantity signal (standby often on, often closed after start (more than 80°C after start);

Battery system	Start timeout alarm	Restart and observe whether to alarm again;
	SOC high alarm	Check the system battery SOC value;
	SOC low alarm	Check the system battery SOC value;
	Voltage anomaly	Check the tightening state of the voltage acquisition wiring harness;
	Temperature failure	Check the temperature acquisition wiring harness;
	The minimum working current of the battery shall be $\geq 14A$	The SOC estimation of the BMS will produce a large bias. If there is a small current operation for a long time or a long standing during the operation, the battery should be filled every 15 days to calibrate the SOC;
	Battery is in the 10% SOC state	The storage shall not exceed one month;
	Battery is in the 20% SOC state	The storage shall not exceed two months;
	Battery is in the 40% SOC state	The storage shall not exceed six months;
	Total pressure is high	Level 1: alarm, power reduction of 50% operation; Level 2: request PCS standby, no charging, allow discharge; Level 3: request PCS to stop and dry contact output, delay 3S to cut off all contactors, restart and recovery;
	The total discharge pressure is too low	Level 1: alarm, power reduction of 50% operation; Level 2: request PCS standby, no charging, allow discharge; Level 3: request PCS to stop and dry contact output, delay 3S to cut off all contactors, restart and recovery;
	Single high	Level 1:50% power reduction; Level 2: request PCS standby, no charging, allow discharge; Level 3: request PCS to stop and dry contact output, delay 3S to cut off all contactors, restart and recovery;
	Single bottom	Level 1:50% power reduction; Level 2: request PCS standby, prohibit charging, allow charging; Level 3: request PCS to stop and dry contact output, delay 3S to cut off all contactors, restart and recovery;

Battery system	Single pressure difference	Level 1: alarm, power reduction of 50% operation; Level 2: Request PCS standby, prohibit charge and discharge; Level 3: request PCS to stop and dry contact output, delay 3S to cut off all contactors, restart and recovery;
	Charge and discharge high temperature	Level 1: alarm, power reduction of 50% operation; Level 2: Request PCS standby, prohibit charge and discharge; Level 3: request PCS to stop and dry contact output, delay 3S to cut off all contactors, restart and recovery;
	Charge and discharge low temperature	Level 1: alarm, power reduction of 50% operation; Level 2: Request PCS standby, prohibit charge and discharge; Level 3: request PCS to stop and dry contact output, delay 3S to cut off all contactors, restart and recovery;
	difference in temperature	Level 1: alarm, power reduction of 50% operation; Level 2: Request PCS standby, prohibit charge and discharge; Level 3: request PCS to stop and dry contact output, delay 3S to cut off all contactors, restart and recovery;
	Charging over the flow	Level 1: alarm, power reduction of 50% operation;

Appendix I

System parameter

Model number	100kW-215kWh
AC data	
Product model	hybrid inverter 100kW
Rated power	100kVA
Active power	100kW
Rated voltage	400V
Rated current	144A
Voltage range	320V-460V
Rated frequency	50/60Hz
Frequency range	45-55/55-65Hz
THDi(on-grid)	<3%
THDu(Off-grid)	≤1% linear; ≤5% non linearity
Power factor	1.0(0.8 lead ~0.8 lag can be set)
Overload capacity	110% long-term
AC Output	3W+N+PE
Isolation transformer	270/400
On-grid off-grid switching	support
PV data	
Max PV input voltage(V)	1000VDC
Max PV power(KW)	120/180/240kW
MPPT voltage range	250VDC-850VDC
MPPT voltage range@full load	450VDC-850VDC
Buck-boost mode	support
Battery data	
Cell type	3.2V/280Ah/1C,LFP
Module configuration	51.2V/280Ah/0.5C,1P16S ,14.336KWh
Nominal voltage	768V,1P240S
Nominal energy	215.04KWh
Working voltage range	672~850V
Max charge and discharge rate	0.5C@25°C
Cycle number	≥5000 times
System data	
Structure type	Outdoor container
Cabinet size (W/ D/ H)	2450*1550*2400mm
Package size (W/ D/ H)	2540*1590*2445mm
Net weight	3900kg including battery
Rough weight	4000kg including battery

Operating temperature	0 ~ +45°C
Relative humidity	0 ~95% non-condensing
Levels of protection	IP54
Noise emission	<75dB
Operating altitude	3000m
Cooling	intelligent air cooling
Air conditioning refrigeration volume	3KW
Fire extinguishing system	FM200/NOVEC1230
Display	Touch LCD display cloud platform
EMS communication	RS485, TCP/IP

Appendix II

Quality assurance

- ◆ Products that fail during the warranty period.
- ◆ The company will repair or replace the new product free of charge.

proof

During the warranty period, the customer to present the invoice and date of the purchase, Provide product nameplates and SN barcodes, At the same time, the trademark on the product should be clearly visible, otherwise there is a right not to provide quality assurance.

Conditions

- ◆ The defective products after replacement shall be handled by the company.
- ◆ The customer shall allow reasonable time for the Company to repair the faulty equipment.

Liability exemption

Under the following circumstances, the Company has the right not to provide quality assurance:

- ◆ The whole machine and components have exceeded the free warranty period.
- ◆ Transport damage.
- ◆ Improper installation, modification or use.
- ◆ Operate in very harsh environments beyond those described in this manual.
- ◆ Machine failure or damage caused by installation, repair, alteration or disassembly by non-service personnel of the company.
- ◆ Any installation and use beyond the scope specified in the relevant international standards.
- ◆ Machine failure or damage caused by the use of non-standard or unincorporated components or software.
- ◆ Damage caused by abnormal natural environment caused by the above situation product failure, the customer requires maintenance services. After the judgment of the company's service agency, it can provide paid maintenance services.



In order to continuously improve customer satisfaction, the company's products and product manuals are under continuous improvement and upgrading. If your hands are hands There is a difference between the brochure and the product, which may be caused by the version. Please refer to the specific product. If you still have questions, please contact us