ZOE

Z BOX-C PLUS

User Manual



C&I All-in-one ESS

Z BOX-C PLUS 261-2H

125kW/261kWh| 0.5C

Product models:

C261L-A-EU

C261L-B-EU

Revision History

Version number	Manual Number	Version date	Editor	Instruction	Content
V1.0					

To ensure your personal safety, please read and follow the following safety requirements carefully:

This manual uses the following symbols to highlight important information:

⚠ Warning: Indicates a dangerous situation that may cause serious injury or death if not avoided

CAUTION Caution: Indicates a dangerous situation that may cause minor injury or equipment damage if not avoided.

Note: This indicates important steps or techniques that can lead to the best results, but are not related to safety or damage.

General information

Note: Maintenance personnel must hold a qualified electrician certificate issued by the Work Safety Administration Bureau or be authorized by ZOE to perform maintenance operations.

⚠ Warning: It is strictly prohibited to touch the high-voltage positive and negative terminals of the energy storage system with both hands at any time.

⚠ Warning: Ensure that the corresponding high voltage and low voltage switches are disconnected before performing maintenance operations on the energy storage system.

⚠ Warning: When operating or maintaining the energy storage system, wear a safety helmet, insulating gloves, insulating shoes, and goggles. It is strictly prohibited to wear metal accessories such as watches.

⚠ Warning: Do not use water to clean high and low voltage connectors when cleaning the energy storage system.

⚠ Warning: It is strictly prohibited to crush, puncture, burn or destroy the energy storage battery.

⚠ Warning: The working environment of the energy storage system should be free of corrosive, explosive and insulating gas or conductive dust, and far away from heat sources.

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⚠ Warning: Do not step on the cabinet top during use or maintenance.

⚠ Warning: If you have any questions, please contact the system supplier. Unauthorized operation is prohibited.

⚠ Warning: Do not use in series or parallel with other battery products.

Maintenance

Environmental requirements

The cabinet can charge and discharge within the specified operating temperature range. In extreme cases of this temperature range, the cabinet may limit the charging or discharging power to extend battery life.

Charging temperature	-30~55℃
Discharge temperature	-30~55℃

Maintenance and cleaning

If installed outdoors, keep the side of the electrical cabinet free of leaves and other debris to maintain optimal airflow.

CAUTION Caution: Do not lean anything on the top of the electrical cabinet or hang anything on the wires or conduits inside or outside the electrical cabinet.

CAUTION Caution: Clean electrical cabinets with a soft, lint-free cloth. If necessary, only use neutral soap water to moisten the cloth.

CAUTION Caution: Do not use cleaning solvents to clean electrical cabinets, or expose electrical cabinets to flammable or irritating chemicals or vapors.

Maintenance

Electrical cabinets and entry/exit points do not require scheduled preventive maintenance. The only maintenance required by the owner is to keep the electrical cabinet units clear of debris, especially around air intake and exhaust ports.

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1. Important information

1.1 Safety Tips

Symbol	Instruction
	Failure to follow safety instructions may result in life-threatening injuries, harm, or equipment damage. We disclaim any liability for claims arising from such actions. ● **Electrical hazard** Only qualified and authorized electrical professionals who have undergone relevant training are responsible for installation. During the initial commissioning and maintenance of the energy storage cabinet, the existing standards and installation regulations shall be followed when performing the aforementioned operations. For details, please refer to the "Installation Instructions" chapter. ● **Electrical hazard/ fire hazard** Do not use damaged, worn, or dirty cables. ● **Owners (end users) must ensure the energy storage system operates in perfect condition.** ➢ The cables of the energy storage system must be checked regularly for damage and the housing must be checked for damage (visual inspection). ➢ If the energy storage system is damaged, it must be shut down and replaced immediately. ➢ Maintenance operations on energy storage systems shall not be performed without authorization and shall be performed only by the manufacturer. ➢ Do not modify or modify the energy storage system without authorization. ➢ Do not remove safety symbols, warning signs, nameplates, signs, or pipeline markings.

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Caution

- Risk of damage.
- Do not use spray water (garden hose, high-pressure washer, etc.) to clean the energy storage system.

1.2 Intended Use

- The product is a system for managing electrical energy in outdoor areas (e.g., storing electrical energy, releasing electrical energy).
- When installing and connecting energy storage systems, national regulations should be followed.
- The specified use of the equipment includes the need to comply with the environmental conditions for the equipment under all circumstances.
- Equipment is developed, produced, inspected, and registered in accordance with relevant safety standards. Failure to comply with instructions and safety technical tips for specified purposes may cause property damage or endanger human health.
- The instructions in this manual must be strictly followed, otherwise there may be safety risks or cause the failure of safety devices. Although this manual explains the relevant safety tips, you should still pay attention to the safety regulations and accident prevention regulations corresponding to the application.

1.3 Instruction

- This manual applies to the All-in-One Energy Storage Outdoor Cabinet (C261L-A-EU).
- This manual is intended for the following groups:
  - ➢ End user (outdoor cabinet user)
  - ➢ Debugging and service technicians

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2. Product Overview

This product features a 125kW/261kWh liquid-cooled outdoor energy storage cabinet as its core component, integrated with energy dispatch monitoring software to manage user-side energy demands, enabling comprehensive control of energy storage facilities.

The energy storage system can receive energy dispatch system instructions and interact with energy network and user load to realize energy storage and release in time to meet customers' different energy needs.

2.1 Product Description

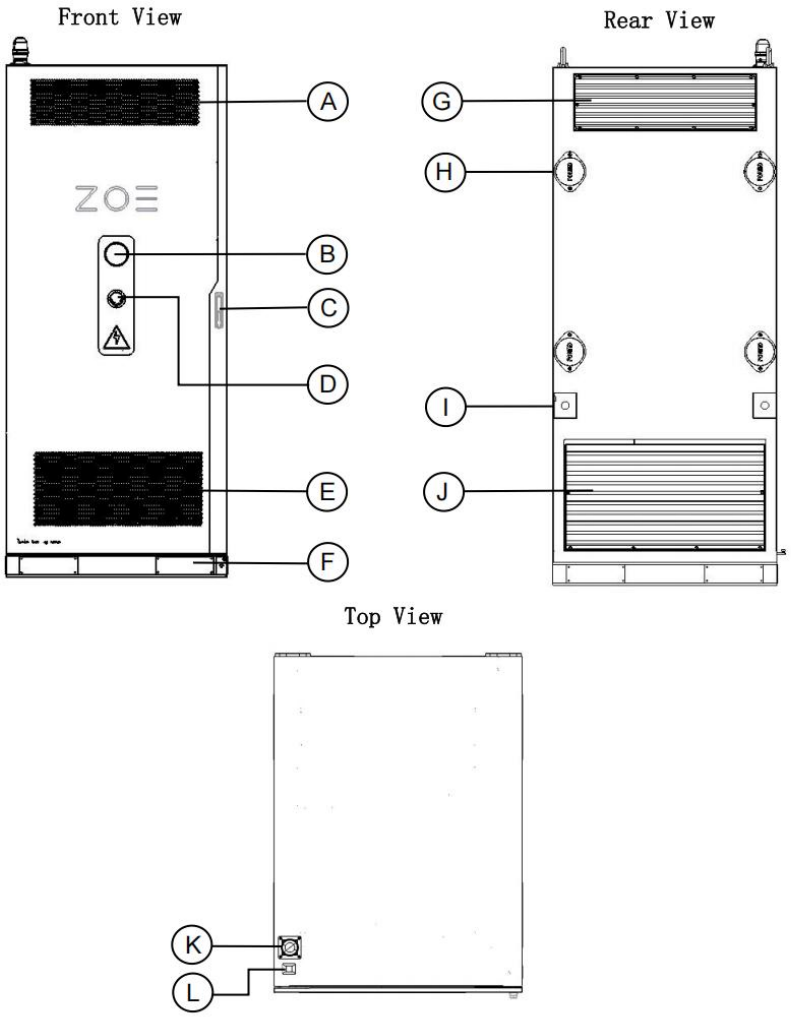


Figure 2.1 Product exterior schematic

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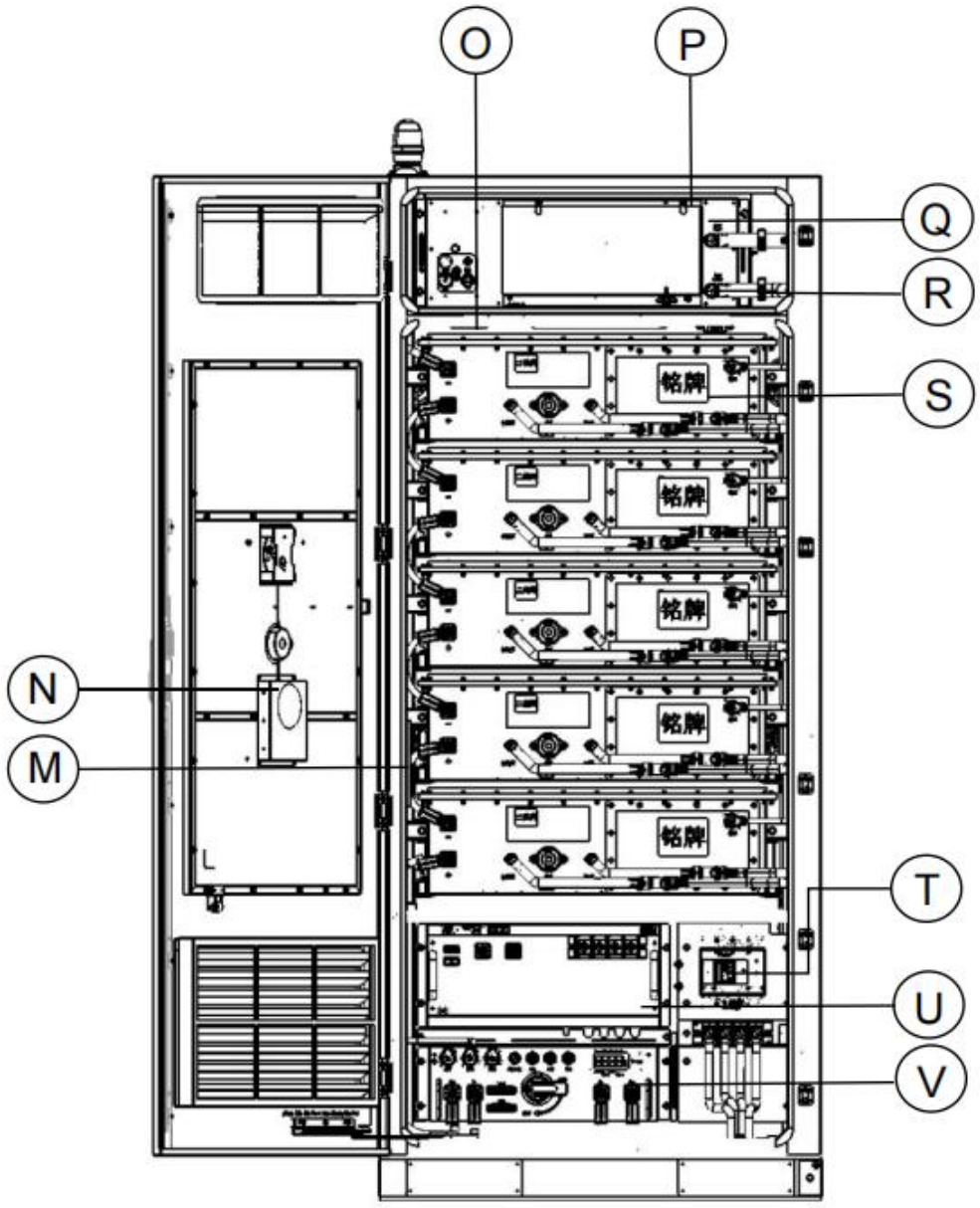


Figure 2.2 Internal product diagram

Table 2-1 Product Description

Number	Definition	Number	Definition
A	Chiller machine air inlet	L	4G Module(optional)
B	Indicator light	M	Dehumidifier
C	Lock-set	N	Hot aerosol fire extinguishing device
D	Emergency stop button	O	Fire Controller
E	PCS air intake	P	Limit switch

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F	Forklift hole	Q	Chiller machine
G	Chiller machine outlet	R	Liquid-cooled pipe
H	Pressure relief valve	S	PACK
I	Firefighting water connection	T	Circuit breaker
J	PCS air outlet	U	PCS
K	Audible and visual alarm	V	Main control box

2.2 Product Specifications

125kW/261kWh All-in-One Li-ion Battery Storage System	
Product Model	**C261L-A-EU**
Battery Data	
Cell type	LFP
Rated capacity	314Ah
Serial-parallel type	1P52S
Rated capacity per pack	52.2496kWh
Pack number	5
System rated energy capacity	261.248kWh
Rated DC voltage	832V
DC voltage range	728~936V
Rated DC current	157A
Max. DC current	180A
AC Data	
Rated AC power	125kW
Rated grid voltage	400Vac
Rated grid frequency	50/60Hz
Max. AC current	200A
AC wiring type	3W/N+PE
THDi	<3% (Rated AC power)
Power factor	-1~+1
General Data	
DOD	95% DOD
Degree of protection	IP55（Battery room）

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Cooling/Heating concept	Liquid cooling/liquid heating
Fire suppression system	Aerosol
Operating temperature range	-30~55℃
Relative humidity	0~95%RH
Max. working altitude	2000m
Display	Web/LED
COM interfaces	Modbus TCP
Dimensions(W*D*H)	990*1320*2300mm
Weight	2550±50kg

- PCS technical parameter



Specifications	125KW
DC side	
Operating voltage range (V)	615~950（3W+PE）/650~950（3W+N+PE）
Full load voltage range (V)	615~950（3W+PE）/680~950（3W+N+PE）
Input channels	1
Maximum current （A）	203
AC side (on-grid)	
Rated voltage （V）	230/400
Voltage deviation	-15%~+15%
AC output type	3W+PE 3W+N+PE
Rated output power (kW)	125
Maximum output power	138

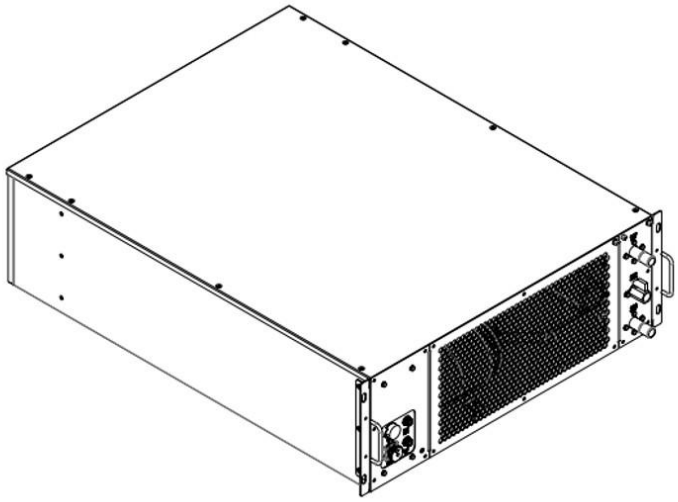
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(kW)	
Maximum current （A）	200
Rated grid frequency (Hz)	50/60
Power factor	0.99
Power factor range	1 (forward) to 1 (backward)
Current distortion rate	<2% (rated power)
Direct component	< 0.50%
Overload capacity	110% long term
Maximum discharge efficiency	98.50%
AC (off-grid)	
Rated output voltage	230/400
AC voltage harmonics	<3% (linear load)
Rated frequency （Hz）	50/60
Rated output power (kW)	125
Maximum apparent power (kVA)	138
Maximum output current (A)	200
Protection feature	
Features	AC overcurrent protection, AC overvoltage protection, AC short circuit protection, anti-islanding protection, DC reverse protection, etc.
System parameter	
Size (W×D×H, mm)	520×785×232
Weight （kg）	74.5
Altitude （m）	4000m (over 2000m rated for reduced capacity)
Working temperature	-30℃ ~ 55℃ (over 45℃, rated for use)
Storage temperature	-45℃ ~ 70℃
Humidity	0%RH to 95%RH, no condensation
Cooling-down method	Smart forced air cooling
Degree of protection	IP20
Communication interface	CAN/RS485/Ethernet

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Grid Support	L/HVRT, active/reactive power control

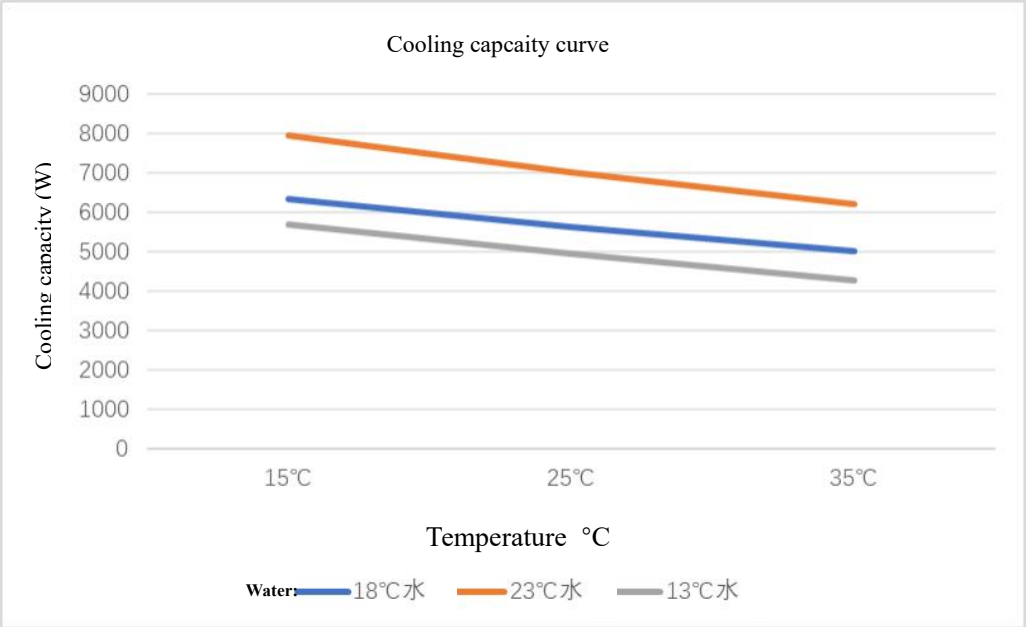
- Chiller machine technical parameters



Parameter		HMS005W
Rated cooling capacity	kW	5 (Ambit Temperature 45°C,LWT 18°C)
Rated heating capacity	kW	2
Supply voltage	V	220
Frequency	Hz	50/60
Rated cooling current	A	12
Maximum operating current	A	15
Rated heating current	A	10
Refrigerant	/	R134a
Refrigerant charge	Kg	0.64
Operating environment temperature	℃	-30~55
Flow rate(50% ethylene glycol solution)	L/min	40(@60kPa)
Altitude	m	0~4000

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IP rating	IP	IPX5(Unit)
Noise level	dB(A)	<75
Dimensions (W*D*H)	mm	900*700*245
Unit color	/	RAL9003 (customizable)
Weight (excluding coolant)	Kg	< 75
Water inlet/outlet configuration	/	Bottom inlet and outlet, chuck interface
Cooling capcaity curve		



- PACK technical parameter

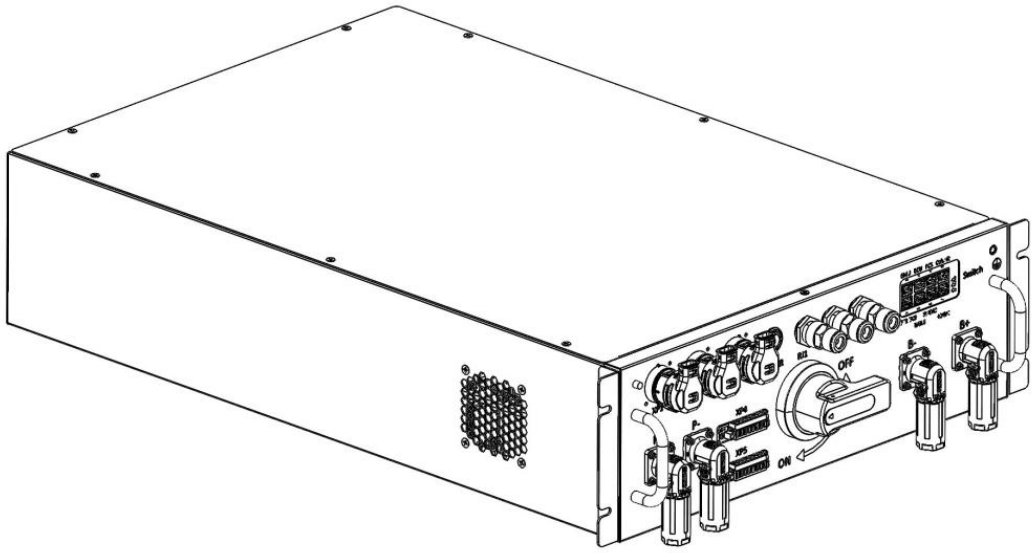
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1P52S Battery Module (LFP)	
Product Model	**P152314L-A**
Battery Data	
Cell type	LFP
Rated capacity	314Ah
Serial-parallel type	1P52S
Rated capacity per pack	52.25kWh
Rated DC voltage	166.4V
DC voltage range	145.6~187.2V
Rated DC current	157A
Max. DC current	180A
General Data	
DOD	95% DOD
Degree of protection	IP67
Cooling/Heating concept	liquid cooling/liquid heating
Operating temperature range	-20~55℃
Relative humidity	5~95%RH
Max. working altitude	2000m
Dimensions(W*D*H)	807*1157*240mm
Weight	350±10kg

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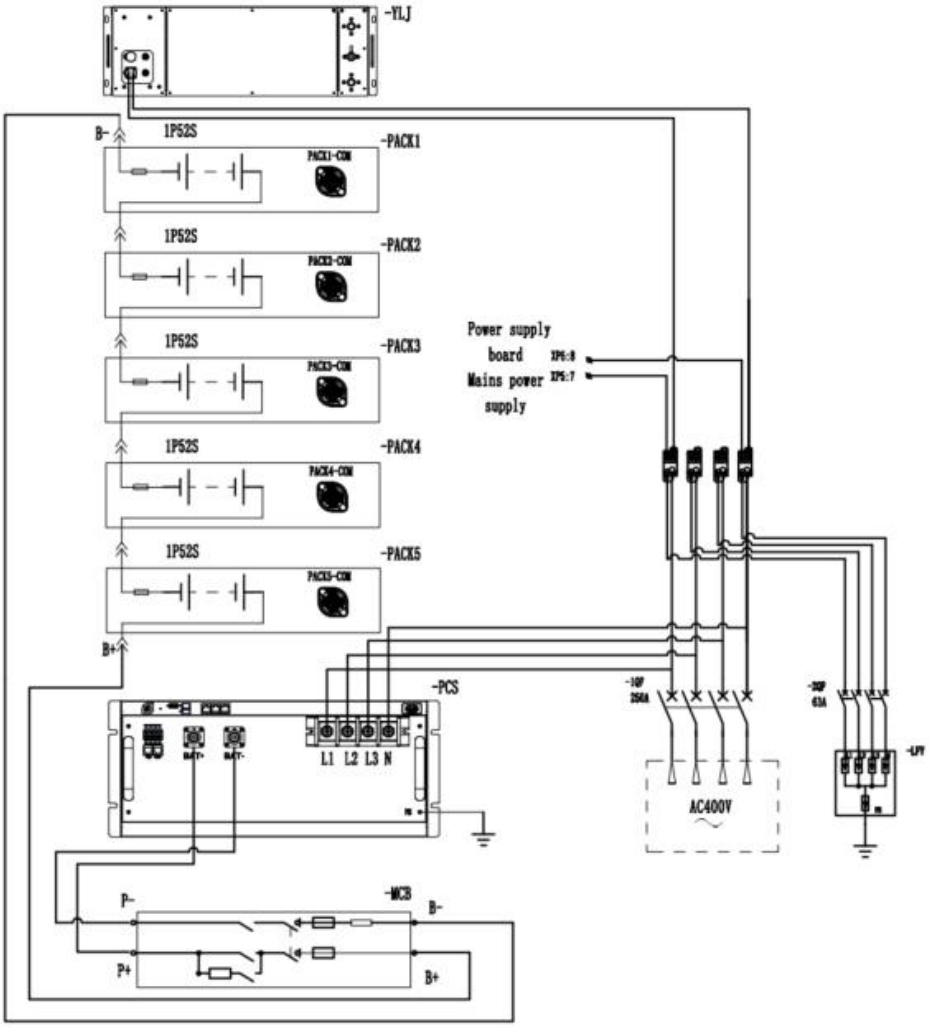
- Main control box technical parameter



Product Model	EX-OS-A
Rated DC voltage	1000V DC
Battery Input Rated current	157A DC
PCS Input Rated current	150A DC
Cooling Method	Forced-air cooling
Installation Method	Plug-in installation
Max. DC current	180A
Degree of protection	IP23
Operating temperature range	-20~55℃
Relative humidity	5~95%RH，no condensation
Max. working altitude	4000m,(>2000m derating)
Dimensions(W*D*H)	660*790*260mm
Weight	40kg
Communication Method	CAN/MODBUS TCP

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2.3 System Principle



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3. Transportation and storage

3.1 Transportation

Suitable for trucks and ships. During transportation, cover the cargo, protect from sun, and handle loading and unloading properly. During loading and unloading, handle the electric cabinet gently and avoid falling, rolling, or heavy pressure. During transportation, avoid direct rain, snow, and mechanical impact.

- **3.1.1 Cabinet transportation environment requirements**

According to the characteristics of the battery, the battery cabinet should meet the following requirements during storage and transportation to maximize the protection of the battery performance:

Average daily storage temperature: ≤20℃, permissible storage temperature: -20~55℃； The oblique angle is less than 15 degrees.

Humidity: below 95% RH, no condensation.

- **3.1.2 Requirements for electrical cabinet transportation**

(1) Pre-loading inspection of the cabinet

1) Check the external packaging, labels, and other information of the cargo before loading, and ensure that the packaging is intact.

(2) Cabinet loading

1) Use a forklift that meets the cabinet's weight requirements. The forklift must have passed annual inspection. During lifting operations, the forklift must not move;

2) Due to the heavy weight of a single cabinet, ensure proper use of filling materials and straps to secure the cabinet inside the vehicle;

3) After loading, perform a re-inspection to confirm that the straps and protective measures are properly secured.

(3) Cabinet transportation

1) The speed of the vehicle shall not exceed the speed stipulated by the traffic regulations, and the transportation shall be avoided as far as possible on the bumpy road;

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2) Sudden braking or sharp turns are prohibited during transportation.;

3) Keep the vehicle in good condition and regularly check the cargo. Report any issues immediately.

(4) Cabinet unloading

1) Prepare appropriate unloading tools according to the loading list before picking up goods.

3.2 Storage

Electrical cabinets should be stored in a dry warehouse, protected from direct sunlight and rain. The warehouse must be free of harmful gases, flammable or explosive materials, and corrosive chemicals. Avoid mechanical impacts, heavy pressure, and strong magnetic fields. Keep the cabinets at least 2 meters from heat sources and 50 centimeters away from walls, windows, or air vents.

Average daily storage temperature: ≤20℃, allowable storage temperature: -20~55℃;

Storage humidity: ≤95%RH, no condensation

Under the above conditions:

After the product leaves the factory, it should be powered on every three months. If the SOC is below 15%, it should be recharged to 30% before powering on.It should be recharged to 50%SOC at least once every 6 months, and a capacity verification test and reinspection should be conducted every 12 months.

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4. Installation Instructions

4.1 Installation Requirements

When selecting an outdoor cabinet installation site, the following environmental conditions should be considered. If dust or sand particles accumulate in the equipment, it may cause premature damage. In addition, according to the fire protection requirements of lithium batteries, the outdoor cabinet installation location should be far away from people.

Ambient condition	Suggested range
Ambient temperature	-30℃ ~ 55℃
Humidity	≤95%RH, no condensation
Dustiness	≤1mg/m^3
Corrosive substances	No pollutants, such as salt, acid, smoke, etc.
Vibration	≤1.5m/s^2
Insects, pests, and termites	None
Mould	None
Humidity	Rain-proof
Fire protection	No flammable materials on the top or bottom of the cabinet

4.2 Layout Requirements

- **Cabinet layout requirements**

No specific clearance is required on the left and right sides of a single cabinet. The front and rear clearances for a single cabinet shall follow Figure 4.1. For multiple cabinets, the front and rear clearances shall follow Figure 4.2.

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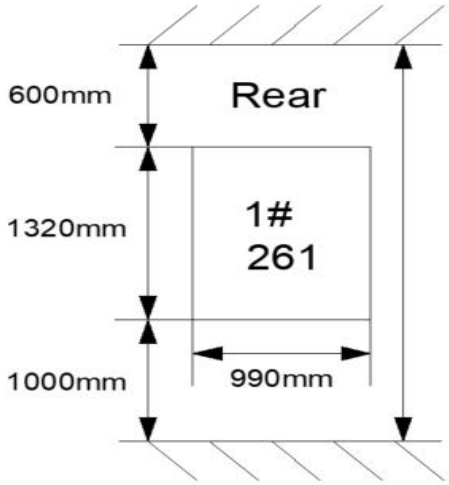


Figure 4.1 Recommended Front&Rear space requirement

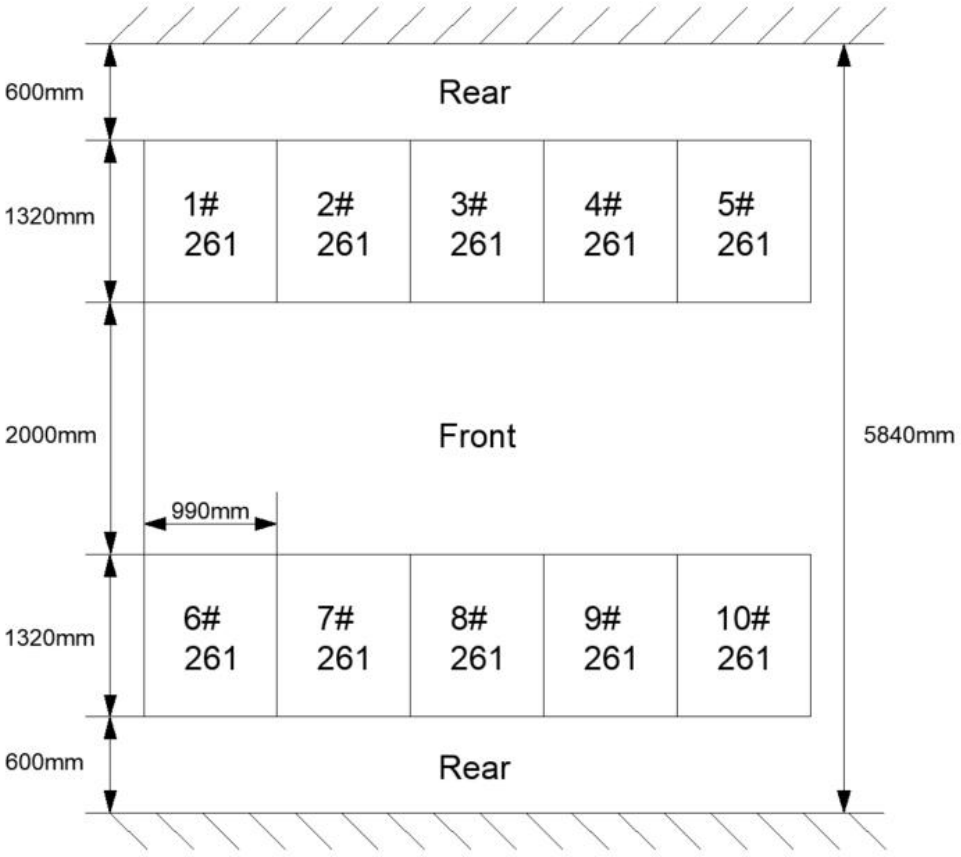


Figure 4.2 Install with front doors facing each other

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- **Cable laying requirements**

The system's AC power lines and communication cables are routed from the cabinet's base, with all cables installed through cable trenches.

- **Power supply requirements**

To ensure reliable power supply for components like the EMS and fire protection system in the energy storage cabinet, it is recommended to use an external UPS as a backup power source.

Copper-core cables are recommended for AC power lines, with cross-sectional areas matching load requirements. Outdoor installations should be buried directly or in conduits, and power lines should be routed separately from signal lines.

- **Cable requirements**

1）For outdoor AC220V UPS power supply, AWG #16 cable is recommended with a minimum power output of 100W.

2）The cable length for connecting outdoor cabinets to external distribution cabinets shall be determined based on project requirements and site conditions. AWG #1 power cables are recommended (AWG #1 AC400V cables for A/B/C circuits, and AWG #4 AC400V cables for N/PE circuits).

3）For outdoor cabinet communication cables, Category 6a network cables are recommended.

4）For the cabinet enclosure grounding wire, the AWG #4 AC400V cable is recommended.

- **Security requirements**

➢ Lightning and surge protection.

➢ Lightning protection and grounding system complies with the current national or ministry standards.

- **Grounding requirements**

The grounding wire (AWG #4) must ensure reliable grounding.

4.3 Outdoor Cabinet Installation

- **Lift Cabinet**

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- Check for any looseness in the rings. If found loose, tighten them using tool No.15 from the quick-installation manual.
- The suspension rope should pass through four rings and be raised 800mm, so that the angle of the suspension rope will be greater than 60°
- The lifting rope can bear a weight of ≥3T, with a slow lifting process and a smooth lowering process.

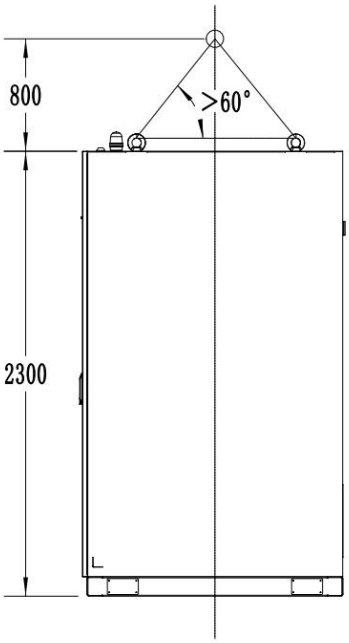


Figure 4.3 Lifting Cabinet

- **Moving requirements**

- For priority forklift handling, the fork extension length A must exceed 1.5 meters, as shown in the figure below.

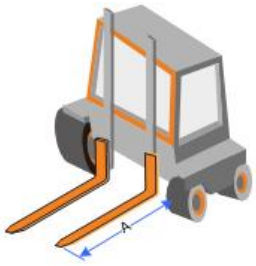


Figure 4.4 Forklift gear tooth A length exceeds 1.5 meters

- The forklift load should not be less than 3 tons, and the gear must completely penetrate the forklift hole and be exposed, as shown in the figure below:

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Figure 4.5 Forklift gear fully penetrates the forklift hole and protrudes

- The forklift is slowly raised and lowered during the handling process.

- **Cabinet dimensions**

The outdoor cabinet measures 990 mm wide, 1320mm deep, and 2300 mm high, with a weight of 2550±50 kg.

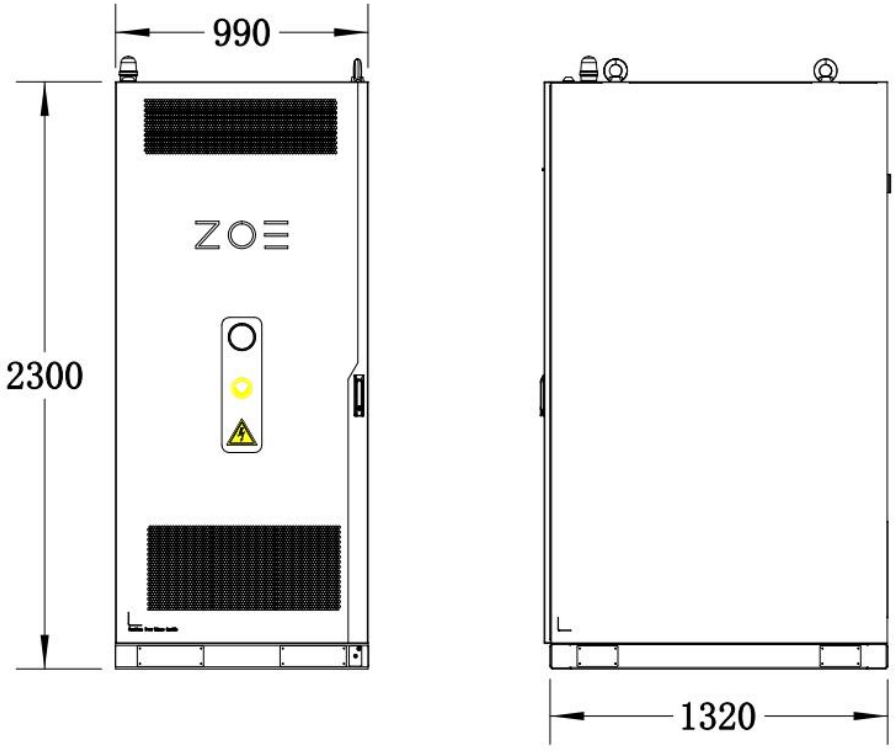


Figure 4.6 Outdoor cabinet dimensions

- **Foundation installation drawings**

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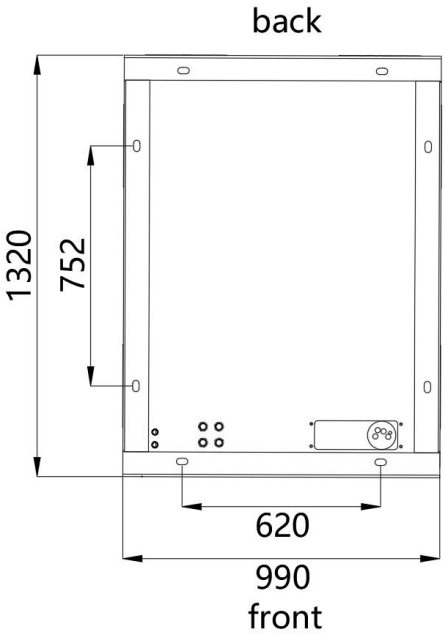


Figure 4.7 Base dimensions

- **Cement Foundation Requirements**

The installation must accommodate a 1320*990 flat surface with pre-installed M12 anchor bolts, positioned according to the dimension drawing.

4.4 Electrical Connection

- **4.4.1 Installation Requirements**

➢ The AC transfer line starts from he user's power distribution switch and connects to the PCS input terminal. The power distribution unit must be equipped with protective devices against overcurrent, short circuits, and lightning strikes.

➢ The colors yellow, green, red, and light blue on AC power lines correspond to phases A, B, C, and the neutral line, respectively. If a power line has only one color, a wire number label must be attached (or a marked sleeve must be used).

➢ The AC power line should be laid separately from the communication line.

➢ The laid cable shall not have broken ends, damage or scratches.

- **4.4.2 Cable Connection**

Installation of power cables

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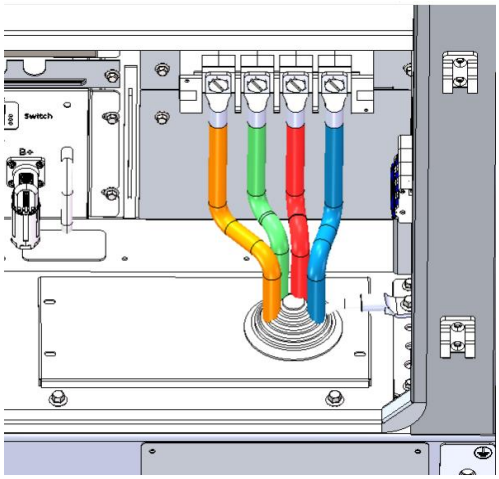


Figure 4.8 Power cable installation

- The cable is introduced from the bottom of the cabinet. Select the cable's outer diameter and determine whether to remove the gland and gland mounting plate. Refer to Table 4.8 for details.
- The crimping terminal width must be ≤22mm. The installation torque for the wiring screws is 18-22N.M.

Table 4.1 Recommended Cable Specifications

Symbol	Function Description	Bolt Spec.	Max.Voltage and Current	Cable Recommendation	Cable Terminal
A	A-phase input bar	M10*1.5P*16L	Voltage:400V Current≤181A	Copper cable 70-95mm² Aluminum cable 120mm²	Copper: DT-70/95 Aluminum: DL-120
B	B-phase input bar	M10*1.5P*16L		Copper cable 70-95mm² Aluminum cable 120mm²	Copper: DT-70/95 Aluminum: DL-120
C	C-phase input bar	M10*1.5P*16L		Copper cable 70-95mm² Aluminum cable 120mm²	Copper: DT-70/95 Aluminum: DL-120
N	Neutral input bar	M10*1.5P*16L		Copper cable 70-95mm² Aluminum cable 120mm²	Copper: DT-70/95 Aluminum: DL-120

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PE	Grounding interface	M12	/	Copper cable 70mm² Aluminum cable 95/120mm²	Copper: DT-70 Aluminum: DL-95/120
PE	Grounding bar	M8	/	Copper cable 35-50mm² Aluminum cable 70mm²	Copper: DT-35/50 Aluminum: DL-70
Para	Parallel connection	/	/	Category 6A Ethernet cable	/

- UPS power cable (2×16AWG), recommended for connection to L/N terminals. Torque requirement: 0.8-1.0N.M.

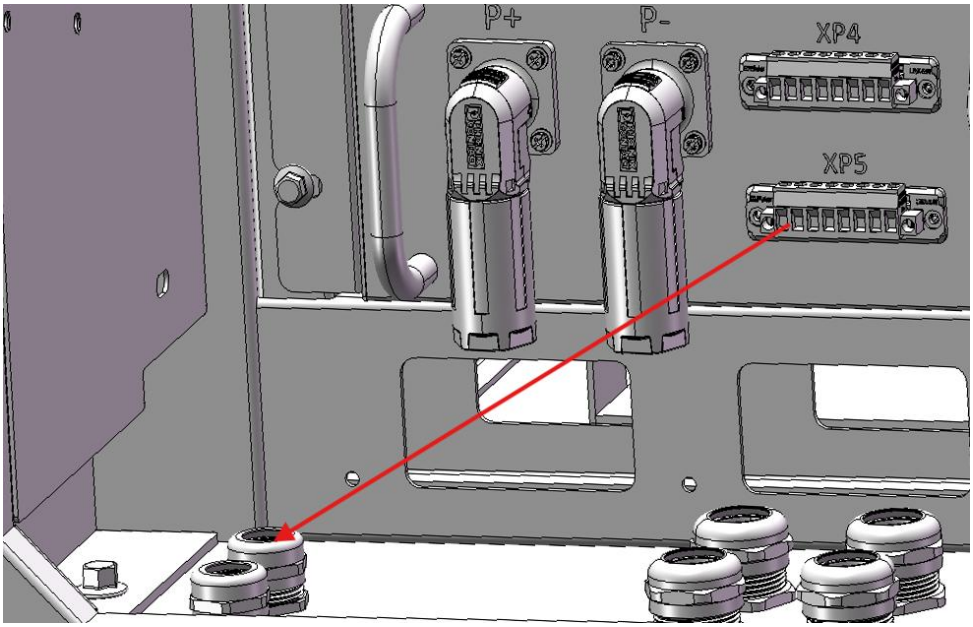


Figure 4.10 UPS wiring diagram

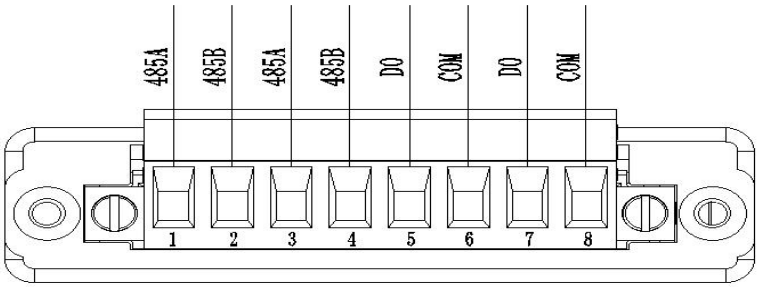


Figure 4.11 XP4 port definition diagram

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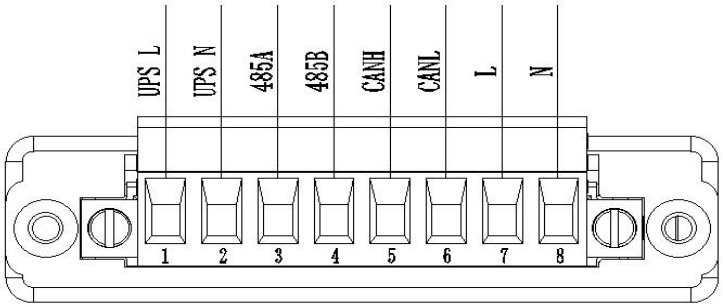


Figure 4.12 XP5 port definition diagram

4.4.3 Connection Notes

⚠ Check whether the protection level of the equipment meets the requirements, especially the cable entrance at the bottom of the equipment, and whether the cable holes inside the equipment are sealed

⚠ Prevent any form of short circuit during the connection process;

⚠ It is strictly prohibited for operators who have not been trained to operate;

⚠ Operators who do not wear protective equipment in accordance with relevant requirements are prohibited from operating;

⚠ All connections must be made under clear guidance, and any form of speculation and vague attempts are strictly prohibited;

⚠ The key points of connection are: ensure that the connection is correct and reliable (no loose), good contact, no short circuit;

⚠ After the connection is completed, measure and confirm point by point;

⚠ Warning: Before starting the wiring section of the installation, make sure the circuit breaker is off.

⚠ Other uncertain factors should be confirmed by professionals before implementation.

4.5 Communication Method

Installation requirements for communication network cables and UPS power cables

- For external communications of FFR/FCR, DEBUG, and SCADA, CAT 6e network cables

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are recommended in Table 4.8. Connect them from the cabinet base, with specific locations shown in Figure 4.12.Refer to Figure 4.14 for the external port interface definitions.

- Figure 4.14 illustrates the external communication ports, all of which are connected using CAT6 Ethernet cables.

➢ Port 1: Dedicated for FFR/FCR communication.

➢ Port 2: Used for connecting the customer's third-party EMS.

➢ Port 3: Used for connecting to the upper-level computer for system diagnostics and troubleshooting.

➢ Ports 4–8: Available for connecting additional customer devices.

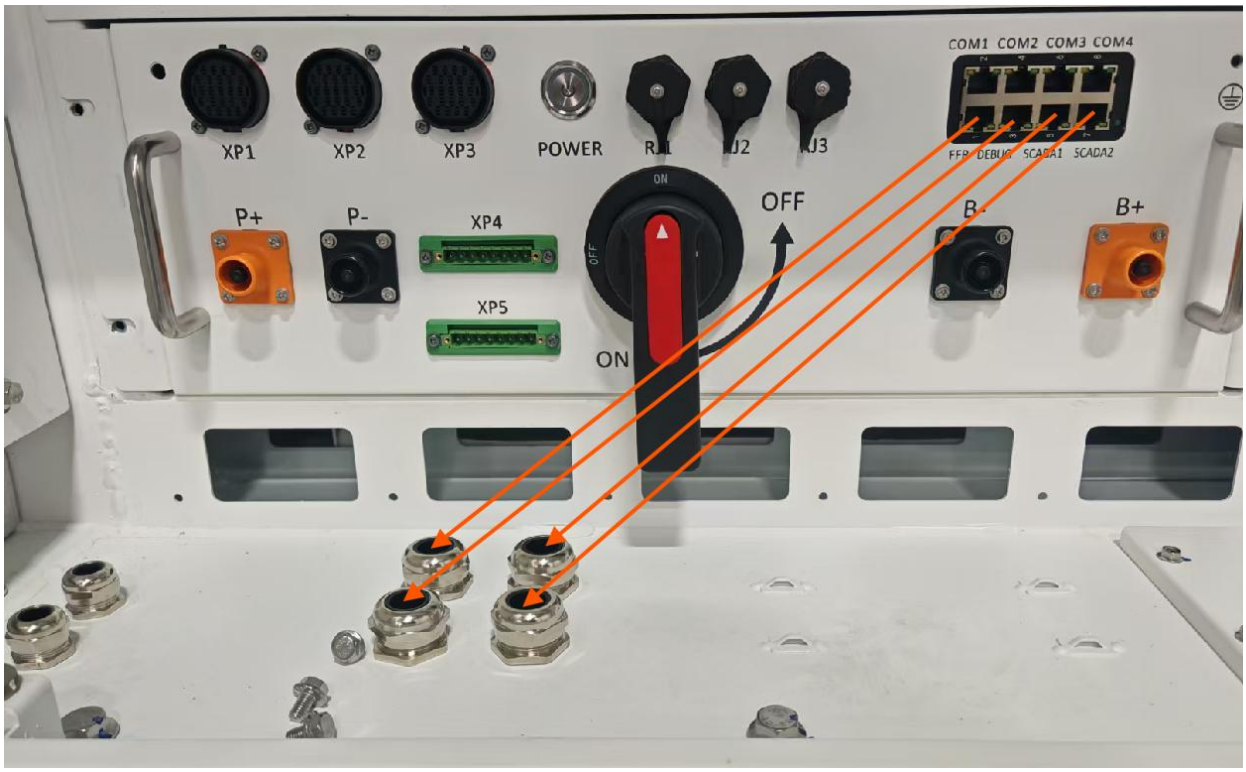


Figure 4.13 External network cable wiring diagram

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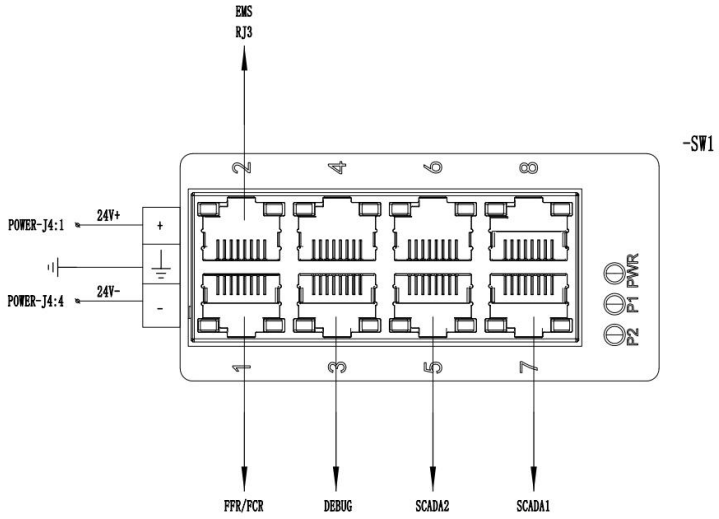


Figure 4.14 External port interface definition

5. Instructions

5.1 Cable Connection Confirmation

- Before the formal power supply, check the connection cable of the whole system to ensure that the cable connection is reliable, without aging, fracture and insulation damage;
- Check whether the input three-phase power cable of the battery cabinet is connected correctly, tightly and reliably;
- Check whether all communication cables and connection terminals are tightly and reliably connected;

5.2 Power-On and Power-Off Instructions for Equipment

Energy storage system operations consist of two phases: system power-on and system commissioning. Users must first power on the system before using the product. After power-on, factory-appointed professional commissioning personnel will assist in system debugging. Upon completion of debugging, the equipment will enter automatic operation mode, requiring no further user intervention.

- The power-on procedure is as follows:

Step 1: First, confirm the external AC400V power supply connection. After closing circuit

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breaker 1QF, the PCS power indicator light will illuminate.

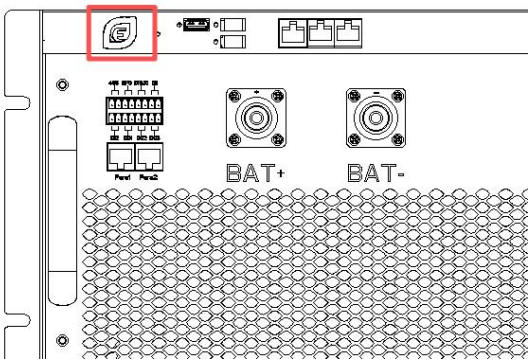


Figure 5.1 PCS Status Indicator Diagram

Step 2: Activate the high-voltage box isolator switch (SWITCH) with the handle in the ON position.

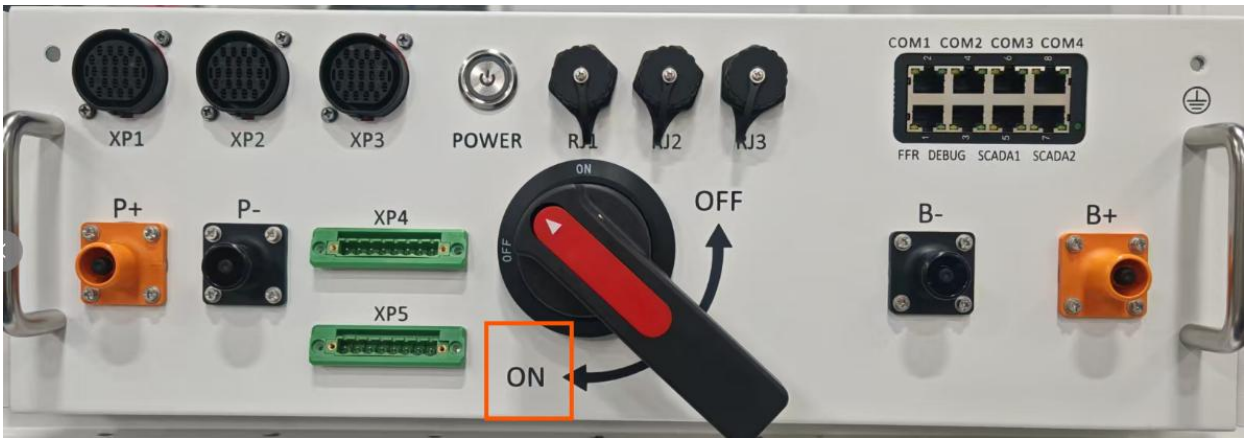


Figure 5.2 Isolation closed state

Step 3: Press the power button of the secondary circuit on the high-voltage box. The red light of the power button and the front door running status indicator light up. At this time, the system is powered on.

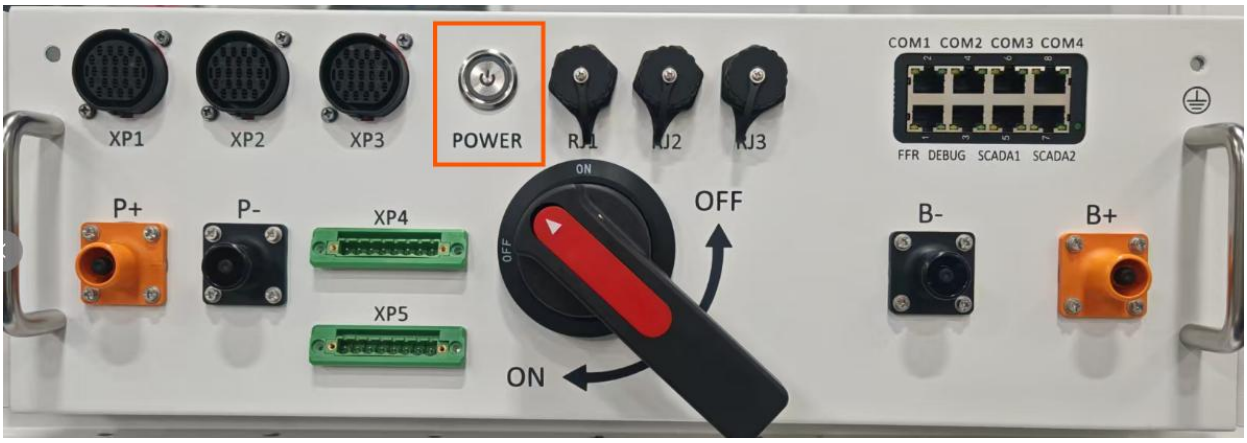


Figure 5.3 Secondary circuit power button

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The operation status indicator lights of the electrical cabinet are defined as shown in the following table.

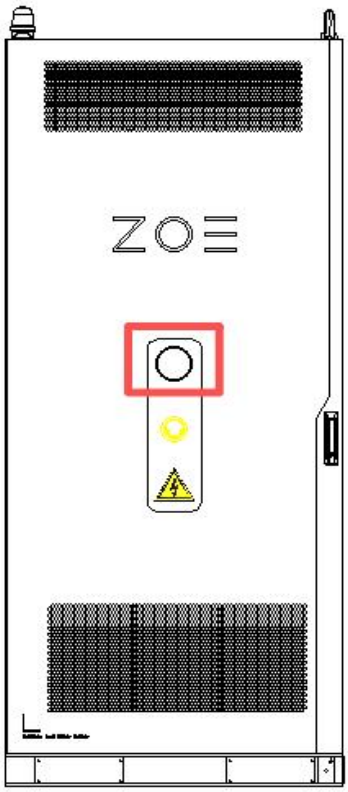


Figure 5.4 Operating status indicator

Color		State	Control logic	Description	Cycle
Not lit		Always off	The display board power supply is abnormal		
White		Always on	Display panel communication error		
Green		Always on	Await the opportune moment		
		Breathe	Charge		2s/time
Blue		Breathe	Discharge		2s/time
Red		Always on	Fault		

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Tips
When the cabinet status indicator is in Level 1 Alarm (L2), Level 2 Alarm (L2), or Level 3 Fault (L3), the system may be in water heater heating. The heating waiting time depends on the ambient temperature. The lower the ambient temperature, the longer the heating waiting time.

- **Power-Off procedure:**

  Step 1: Set the cabinet to standby mode and stop charging and discharging

  Step 2: Disconnect the external circuit breaker, including external auxiliary power supply or UPS

Step 3: Press the power button on the DC high-voltage box. The red indicator light for the secondary circuit will turn off. Then Switch the handle down from ON to OFF, and the system will be powered off.

- **Emergency stop procedure:**

Step 1: Confirm a fire alarm (Level 3 fault, L6).

Step 2: Press the E-stop button firmly by hand or break the E-stop button panel with a hard object.



Figure 5.5 Before the emergency stop button is pressed (Left)



Figure 5.6 After the emergency stop button is pressed (Right)

Step 3: Press the emergency stop button



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Figure 5.7 Press the emergency stop button

5.3 Troubleshooting

Classification	Trouble	Possible cause	Exclusion measures
Entire system	The power indicator light is off	No power supply	Check the line protection switch and turn on the device if necessary Damaged. Contact your service provider.
	Red status indicator	PCS fault	Contact your service partner
		Emergency stop fault	Check if the emergency stop button is pressed to trigger
		Fire alarm	Contact your service partner
		Liquid-cooled machine fault	Contact your service partner
		BMS fault	Contact your service partner
		Fire Alarm	Contact your service partner
Chiller machine	Fan fault	No power supply	Check the power supply voltage
		Control panel failure	Check whether the control board output voltage is normal and whether there are burn marks
	Compressor fault	No power source	Check the power supply voltage
		The compressor is noisy	Check the power supply voltage Check the suction pressure is normal
		The compressor is overheating	Check that the fan is working properly Check for condenser blockage
High-voltage box	High-voltage cabinet fault	QF circuit breaker fault	Check if the manual load switch is closed
		Invalid total pressure collection	Check for damage or open circuits in the B+ and B-power lines of the battery pack.

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		Communication fault	Check if the power supply is normal Power supply button triggered Check whether the communication line is short-circuited or short-circuited

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6. Product Maintenance

6.1 Definitions

- Normal operation: refers to the daily operation of the electrical cabinet.
- Intermittent operation: refers to the power cabinet whose operation frequency is not fixed every month and cannot guarantee daily work.
- Long-term inactivity: Electrical cabinets that have not been operated for more than 3 consecutive months (must be charged to 50%SOC before suspension)

6.2 Operating Requirements for Normal Electric Panels

- Perform battery maintenance on the electrical cabinet every 12 months to prevent battery damage. Refer to section 6.6 for specific maintenance procedures.
- Inspect the electrical cabinet every 12 months (see Appendix 2) and keep inspection records.

6.3 Operating requirements for intermittently operated cabinets

- The usage requirements are the same as those for a normal operating electrical cabinet.

6.4 Operating requirements for long-term idle cabinets

- The energy storage cabinet must maintain a SOC range of 30% to 50%. Long-term storage below 15% SOC is prohibited. Power consumption devices must be disconnected promptly when the cabinet remains unused for extended periods.
- Inspect the electrical cabinet every three months (see Appendix 2) and keep inspection records.
- Perform battery maintenance on the electrical cabinet every three months to prevent battery damage.
- Before the first use of the long discharge cabinet, the battery should be fully charged at least once to restore the battery performance to the best state.

Tips

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If the energy storage cabinet is left unused for a long time, it will cause irreversible damage to the battery. Please perform regular maintenance.

6.5 Function of Isolation Switch

Before performing maintenance on the system, the relevant personnel must first disconnect the isolator switch. After completing the maintenance, ensure the isolator switch remains ON

6.6 Maintenance of Liquid-cooled system

- If there is a liquid leak inside the electrical cabinet, stop the machine immediately and contact ZOE for maintenance.
- Check the coolant level in the chiller machine (first remove the front panel), then observe the coolant level (red indicates coolant). If no liquid is visible in the observation window, add coolant and contact the maintenance personnel for replenishment.

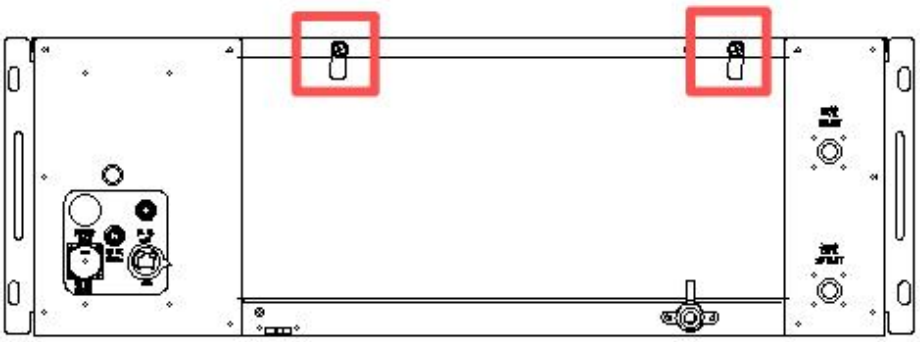


Figure 6.1 Front panel of chiller machine

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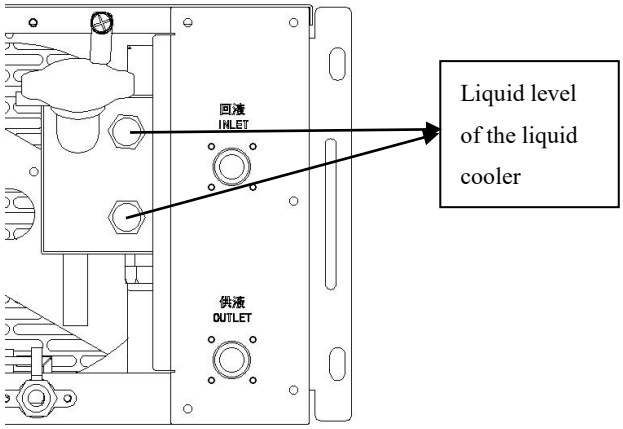


Figure 6.2 Liquid level status of chiller machine

6.7 Fire Protection System Maintenance

- The service life of the aerosol is 15 years. Maintenance and replacement are required every 15 years.
- Quarterly inspection of temperature and smoke sensors:
- Open the cabinet door. The low-voltage section of the cabinet is powered on. If the temperature and smoke indicator lights blink every few seconds, it indicates normal operation.

6.8 Check air inlet and outlet

- Check all air inlets and outlets quarterly for foreign matter blockage
- Clean the filter cotton in the PCS compartment and Chiller machine air inlet, as well as the filter mesh at the air outlet, every quarter.

6.9 Electrical grounding system inspection

- Quarterly inspections should check for rust or oxidation at the crimping points of the grounding system, which may cause poor contact and increased resistance. Verify that the grounding markings are complete and clearly visible, with no loss or damage.
- The grounding of electrical equipment should be checked every year to check whether the grounding wire and grounding terminal point are in good condition.

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6.10 Appearance inspection

- Quarterly routine inspection: Check for stains on the cabinet's exterior and perform a thorough cleaning. Inspect for deformation, rust, or paint damage on the cabinet's sheet metal, and apply timely repainting and rust-proofing treatments to enhance its appearance.

6.11 Maintenance cycle

Maintenance cycle table

Inspection item	Quarter	Semiannually	Annually	Operation
Cabinet appearance	√			Cleaning
Air outlet	√			Cleaning
Air intake	√			Cleaning
Cable		√		Test
Dust-proof cotton	√			Cleaning
Panel switches	√			Visual inspection
Ground system	√		√	Test
Liquid-cooled system	√			Visual inspection
Smoke sensor	√			Visual inspection
Temperature sensor	√			Visual inspection

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7. Software user manual

For detailed operating procedures for end users, please refer to the “Software User Manual”.

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