CESS-125K261LL
User Manual

All-in-one Liquid-cooled ESS Cabinet

Jiangsu Hanchu Energy Technology Co., Ltd

The release date identified in the change history for this Manual is correct. Hanchu reserves the right of modification at any time.

The images provided in this Manual are for demonstration purposes only. Details vary slightly based on product version and market region. Hanchu has the final right of interpretation for all designs of products.

The information and advice are given in good faith and are believed to be accurate as of the date of editing. Hanchu does not express or imply any warranty regarding the information.

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First release

Contents

1 Preface

1.1. Overview

This document primarily outlines the procedures for installing, establishing electrical connections, commissioning, and resolving issues with the CESS-125K261LL energy storage system. It is imperative to study this manual attentively prior to the installation and utilization of the energy storage system to comprehend the safety guidelines and to become acquainted with its functionalities and features.

1.2. About this Manual

Prior to the installation, operation, or maintenance of this equipment, it is essential to thoroughly read this manual and gain a comprehensive understanding of the equipment.

The manual's content is subject to ongoing updates and revisions, there may be minor inconsistencies or errors when compared to the actual product. Users are advised to consult the physical product they have purchased and to obtain the most current version of the manual through the company's official website or through authorized sales channels.

1.3. Symbol Usage

To safeguard the personal and property safety of users while utilizing the product, pertinent information has been provided. Emphasis is placed on this information through the use of specific symbols.

Only properly trained and qualified personnel are allowed to perform the installation procedures identified in this Manual.

Below is a list of symbols that you may encounter in this manual. Please read and understand them to ensure proper use of the manual.

	**DANGER:** This signifies an imminently hazardous situation. Failure to avoid it will likely result in death or severe injury. The DANGER designation is reserved for the most extreme circumstances and is not applied to property damage hazards unless there is also a significant risk of personal injury at these levels.

	**WARNING:** This indicates a hazardous situation. If not avoided, it has the potential to result in death or serious injury. The WARNING label is not used for property damage hazards unless there is an associated risk of personal injury that is proportional to the severity of the property damage.
	**CAUTION:** This denotes a hazardous situation. If not avoided, it may lead to minor or moderate injury. The CAUTION indicator can also serve as a warning for unsafe operations that could potentially cause property damage.
	**ATTENTION**: This indicates a potential risk, which, if not avoided, may lead to equipment malfunction or property damage.

2 Safety Precautions

2.1. Personnel Requirements

The lifting, transportation, installation, wiring, operation, and maintenance of the Energy Storage System (ESS) must be conducted by professional electrical technicians who adhere to local regulations. Operators are required to meet the following criteria:

- Possess a solid understanding of electronics, electrical wiring, and mechanics, and be well-versed in electrical and mechanical schematics.
- Be thoroughly familiar with the composition and operational principles of the ESS, as well as its associated front-end and back-end equipment.
- Have completed professional training specifically related to the installation and commissioning of electrical systems.
- Demonstrate the capability to manage emergencies and handle unexpected situations that may occur during the installation or commissioning process.
- Be knowledgeable about the relevant standards and regulations applicable to the country or region where the project is situated.

2.2. Electrical Safety

	• There is a risk of electric shock when touching points or terminals connected to the power grid or internal equipment! • Both the battery and grid sides may generate voltage. Always use a standard voltmeter to verify that there is no voltage present before making contact. • Lethal high voltage exists in the cabinet. Pay attention to and follow the warning labels on the product! • Damaged internal component may cause electric shock or fire! • Comply with the safety precautions detailed in this manual and any other relevant documentation for the equipment. • Abide by the protective requirements and precautions specific to the battery. • Allow a 10-minute waiting period to ensure the equipment is fully energized before beginning any operations.
	• All activities, including lifting, transportation, installation, wiring, operation, and maintenance, must adhere to the relevant regulations and ordinances applicable in the project area. • It is crucial to use the ESS as instructed by this manual to prevent equipment damage. • Upon disconnecting the power supply of the ESS, the battery will not power off immediately.
	To prevent unauthorized individuals from approaching the energy storage container, which could lead to accidents or mishandling, please follow these precautions: • Install prominent warning signs around the ESS to avoid accidental closures that may result in accidents. • Position warning signs or establish safety tapes in the vicinity of the equipment.

2.3. Battery Safety

Battery Protection Signs

	This sign indicates a high voltage hazard which may cause electrical hazards if touched.
	This sign indicates that the temperature here is higher than the acceptable range for human body. Do not touch it arbitrarily to avoid personal injury.
	This sign indicates that this is the protective earthing (PE) terminal, which needs to be firmly grounded to ensure the safety of personnel.

To ensure the secure operation of the product, it is imperative for technical staff to adhere to the safety protocols outlined below. The company disclaims liability for product malfunctions, component failures, personal injuries, or property damages resulting from the following circumstances:

- Any depletion or permanent impairment of battery capacity due to the customer's delay in charging.
- Any harm or leakage of the battery resulting from incorrect usage or neglect of proper operational procedures.
- Damage to the battery from delayed recharging by the customer, leading to excessive battery discharge.
- Damage caused by the use of inappropriate charging and discharging equipment by the customer.
- Repeated deep discharges of the battery due to inadequate maintenance, on-site capacity increases, or extended periods of incomplete charging.
- Damage resulting from incorrect configuration of the battery's operational parameters by the customer.
- Direct harm to the battery from operating conditions that do not conform to the necessary standards for its function.

- Alterations to the battery's usage made by the customer, such as self-installed additional loads.
- Inadequate upkeep of the battery as per the guidelines in the system manual provided with the equipment.
- Damage to the product due to the customer's continued use of batteries after the expiration of the warranty period.
- Damage resulting from the use of batteries that are faulty or physically distorted.
- Combining batteries supplied by the company with those from other sources, such as batteries from different brands or with varying capacity ratings.
- Damage to the product or loss of other property due to the improper storage or installation of batteries in proximity to flammable or explosive materials.
- Accidents involving personal safety and property loss caused by not wearing the appropriate protective gear during battery operations, which should be handled by trained professionals.
- Damage to the battery from activities such as eating, drinking, or smoking in close proximit to it.

2.4. Operation and Maintenance Safety

	• It is mandatory to equip oneself with personal protective gear when carrying out maintenance, inspections, or any other tasks associated with the energy storage system. • Technicians engaged in maintenance are required to equip safety goggles, helmets, insulated footwear, gloves, and other protective apparel. • The battery unit does not contain any parts that can be serviced by the user. • Self-maintenance of the battery is prohibited. Only personnel appointed by Hanchu are authorized to perform tasks such as removal, replacement, or handling of the battery. • To mitigate the risk of electric shock, refrain from conducting any maintenance procedures not outlined in this manual. • For repair assistance, reach out to after-sales service team of Hanchu. • To maintain fire safety, the replacement of internal components should be executed solely by skilled professionals.
	• Taking apart or burning the battery poses a significant fire hazard!
	• Avoid applying any substances to the components, whether inside or outside the equipment. • I Do not clean the equipment with cleaning agents or subject it to harsh chemicals.

2.5. Storage

In case installation is not to be conducted soon after delivery acceptance, the ESS shall be stored according to the requirements in this section. The ESS with outer packaging shall be stored in a ventilated, dry, and clean indoor environment. Meanwhile, the following instructions shall be complied with:

- The ESS Cabinet shall be kept with transportation packaging, and the desiccant inside the packaging shall be retained rather than discarded.

- Keep ESS Cabinet SOC in 30%~50% during storage; Avoid long-term storage when SOC is lower than 15%. In case ESS Cabinet is to lay idle for a long time, turn off the power-consuming equipment in a timely manner.
- The warehouse ground shall be flat and strong enough to bear the weight of the ESS. The warehouse environment must be free from noxious gases, combustible and explosive materials, as well as corrosive substances.
- During storage, the equipment shall be ventilated and protected against moisture, and the warehouse must be free from water accumulation.
- Temperature of storage environment: -20°C to 55°C; relative humidity of storage environment: 0-95%, without condensation. The ESS should be positioned at least 2 meters away from any heat sources. The packaging box should be elevated a minimum of 20 centimeters from the floor and maintained at a distance of no less than 50 centimeters from walls, windows, or air intake vents.
- Regular inspection shall be conducted, generally no less than once a week. The packaging shall be checked for potential damage of rodent bites. If there is damage to the outer packaging, it shall be remedied or replaced immediately.

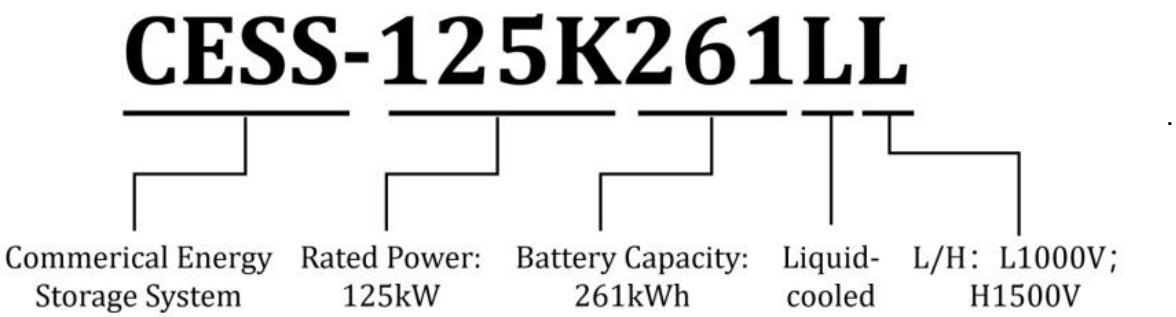
2.6. Product Disposal

When the battery system reaches end-of-life, it shall not be disposed of as regular waste.

Contact the relevant authorized recycling agency for proper disposal.

3 Product Introduction

3.1. Naming Rule



3.2. Product Overview

CESS-125K261LL is a C&I ESS Cabinet product that is exclusively developed and manufactured by Hanchu. It features an integrated All-In-One design, incorporating LFP (Lithium Iron Phosphate) batteries, High Voltage Box (HVB), Power Conversion System (PCS), Fire Suppression System (FSS), liquid-cooling unit, and additional components all within one ESS Cabinet.

This cabinet is designed with attributes such as energy efficiency, compact dimensions, high energy density, adaptability to various environments, the ability to be quickly installed on-site, compatibility with the electrical grid, and the ease of expanding its capacity.

CESS-125K261LL Cabinet appearance is shown below as Figure 3-1 and Figure 3-2.

Figure 3-1

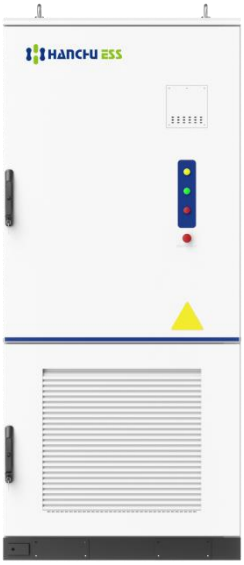


Figure 3-2

3.2.1. Specification

DC Side	
Cell Type	LFP / 314 Ah
Pack Configuration	52.2 kWh / 1P52S
System Configuration	261 kWh / 1P260S
Rated DC Voltage	832 V
DC Voltage Range	728 ~ 936 V
Max. Charge/Discharge Rate	0.5 P
Max. Depth of Discharge	100% (25 ± 2 ℃)
AC Side	
Rated Output Power	125 kW

Max. Output Power	138 kW
Rated AC Voltage	230 / 400 V
AC Voltage Range	±15%
Grid Type	3W+PE / 3W+N+PE
Rated Frequency	50 Hz / 60 Hz
Power Factor	0.99/ -1 ~ +1
THDi	≤3%
DC Ratio	<0.5% Ipn
General	
Round Trip Efficiency	≥ 89%
Cycle Life	≥ 8,000 cycles
Communication	Modbus TCP/IP, RS485
Fire Suppression System	Aerosol
Ingress Rating	IP55
Cooling	Active liquid cooling
Operating Temperature	-25℃~55℃ (Derating above 45℃)
Anticorrosion Rating	C4 (C5 optional)
Humidity	5~95% RH (Non-condensing)
Noise	≤ 75 dB
Altitude	4,000m (Derating above 2000m)
Dimensions (W*D*H)	1,050*1,350*2,400 mm
Weight	2,600 kg

3.2.2. Electrical Diagram

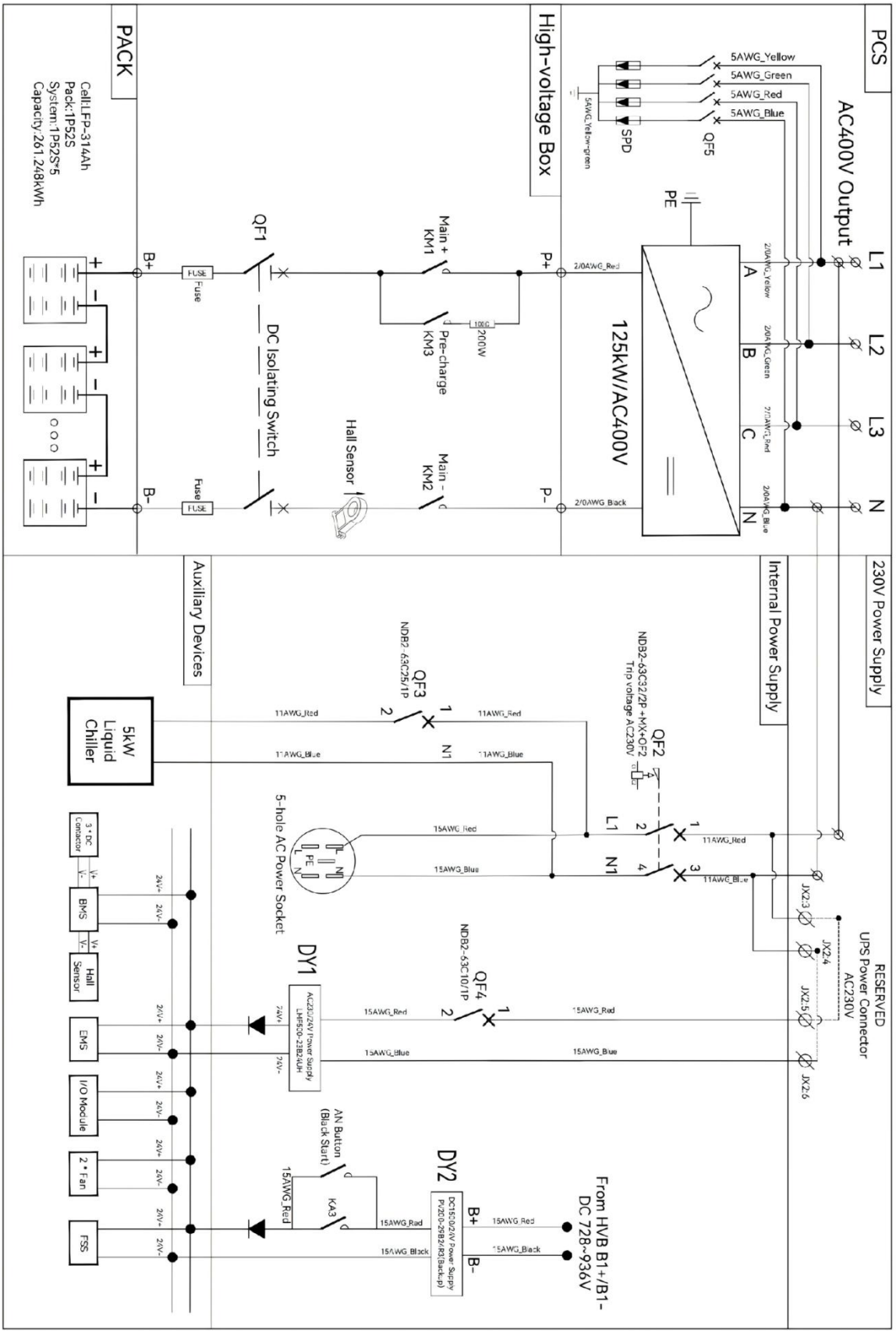


Figure 3-3 Electrical Diagram

3.2.3. System Communication

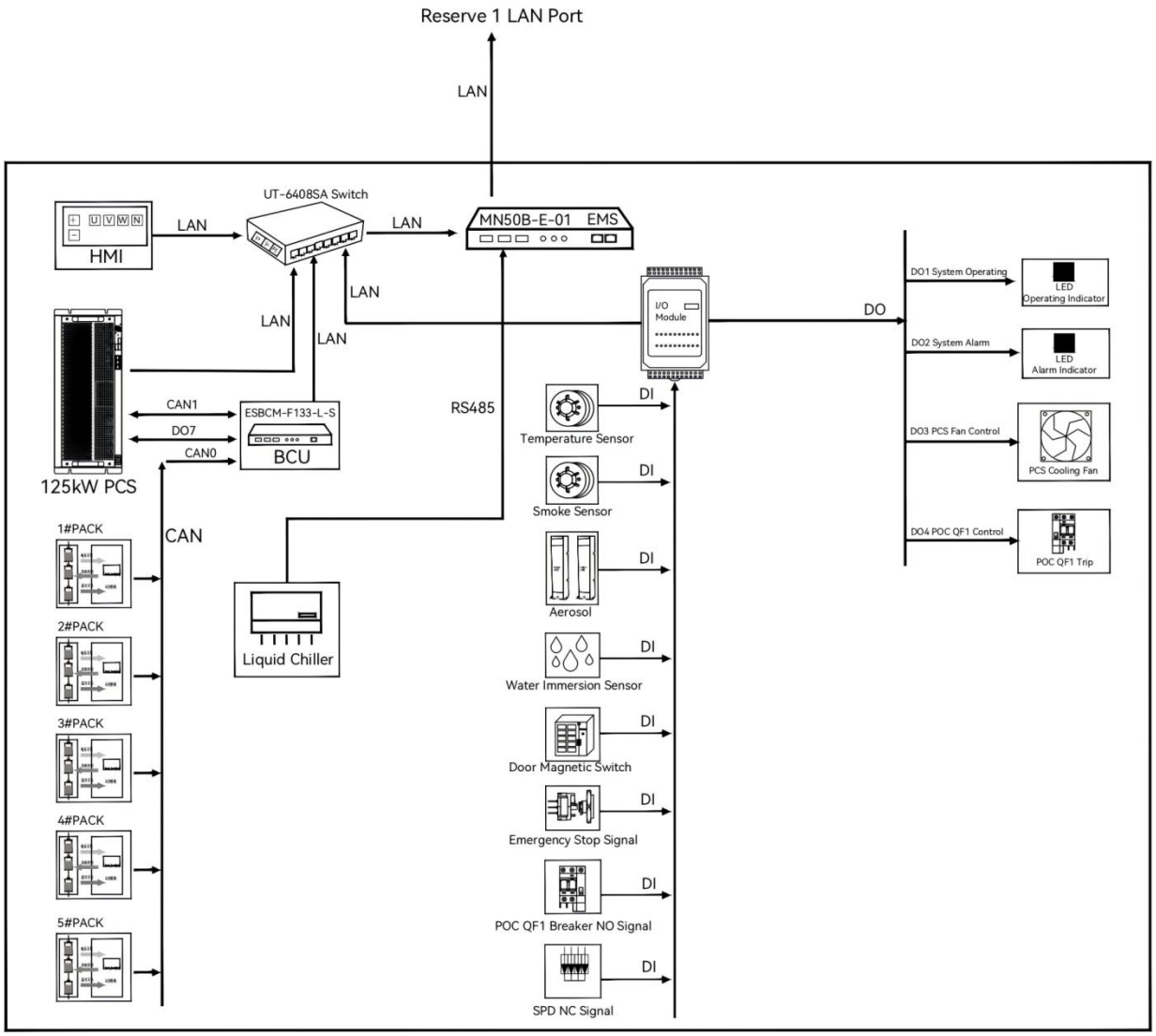


Figure 3-4 System Communication Diagram

CESS-125K261LL adopts a three-level communication system.

- Level-Ⅰ is the BMU sub-control device of the BMS, which is responsible for acquisition of PACK voltage, temperature and other signals as well as the battery equalization management.
- Level-Ⅱ is the BCU, main control device of the BMS, responsible for the summary and processing of the signals acquired by BMU, the realization of charging/discharging control, threshold protection, and the formulation and execution of thermal management strategies.
- Level-Ⅲ is the BCQ, Local EMS Controller, the brain of ESS, Level-III realizes the info-acquisition, monitoring, processing and control of the BMS, PCS, HVB, FSS status and other signals of the ESS Cabinet through I/O Module.

3.3. Product Appearance

3.3.1. Cabinet Appearance & Structure

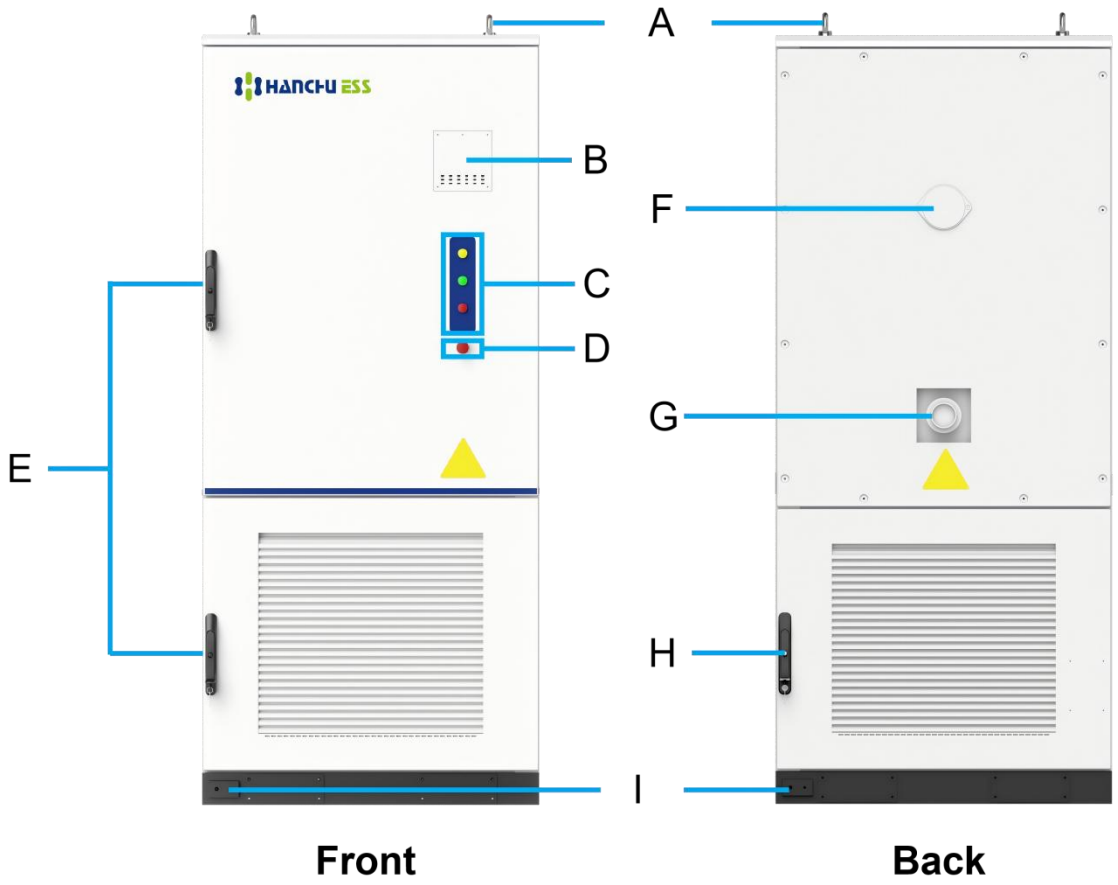


Figure 3-5 Cabinet Appearance

*The figures are for reference, please refer to actual product.

No.	Item	Qty	Note
A	Hanging Ring	4	For lifting the cabinet (place inside the cabinet for transportation)
B	Audible&visual Alarm	1	For potential fire alarms
C	Indicator Lights	1	White light for power-on indication Green light for running indication Red light for fault indication
D	Emergency Stop Button	1	Press to emergency shutdown
E	Front Door Lock	2	Upper section for battery compartment Lower section contains electrical components
F	Explosion-proof Valve	1	To prevent over-pressure or pressure loss inside the cabinet.
G	Fire Hose Adapter	1	To connect water hydrant
H	Back Door Lock	1	For maintenance of electrical components
I	Grounding Copperplate	1	For cabinet grounding connection

3.3.2. Indicator&Button

Indicator	Name	Status	Description
Audible & Visual Alarm	/	ON	At least one of the smoke sensor or temperature sensor has be triggered.
		OFF	Neither the smoke sensor nor the temperature sensor has been triggered.
White	POWER ON	ON	Both QF2 and QF4 are switched on.
		OFF	Either QF2 or QF4 is switched off, or neither of them are switched off.
Green	RUN	ON	1. ESS Cabinet in charging status, charging power ≥5kW. 2. ESS Cabinet in discharging status, discharging power ≥3kW.
		OFF	The ESS Cabinet in standby mode, neither charging nor discharging.
Red	FAULT	ON	Fault occurs.
		OFF	No-fault status.

Button	Status	Description
Emergency Stop	Press Down	Immediately cutoff the EMS, BMS and DC power
	Turn off	Normally working (If the button is pressed and then released, the ESS needs to be restarted to return to normal operation.)

3.3.3. Dimension

Cabinet Dimension(W*D*H): 1050*1350*2400 mm; Weight: 2600kg

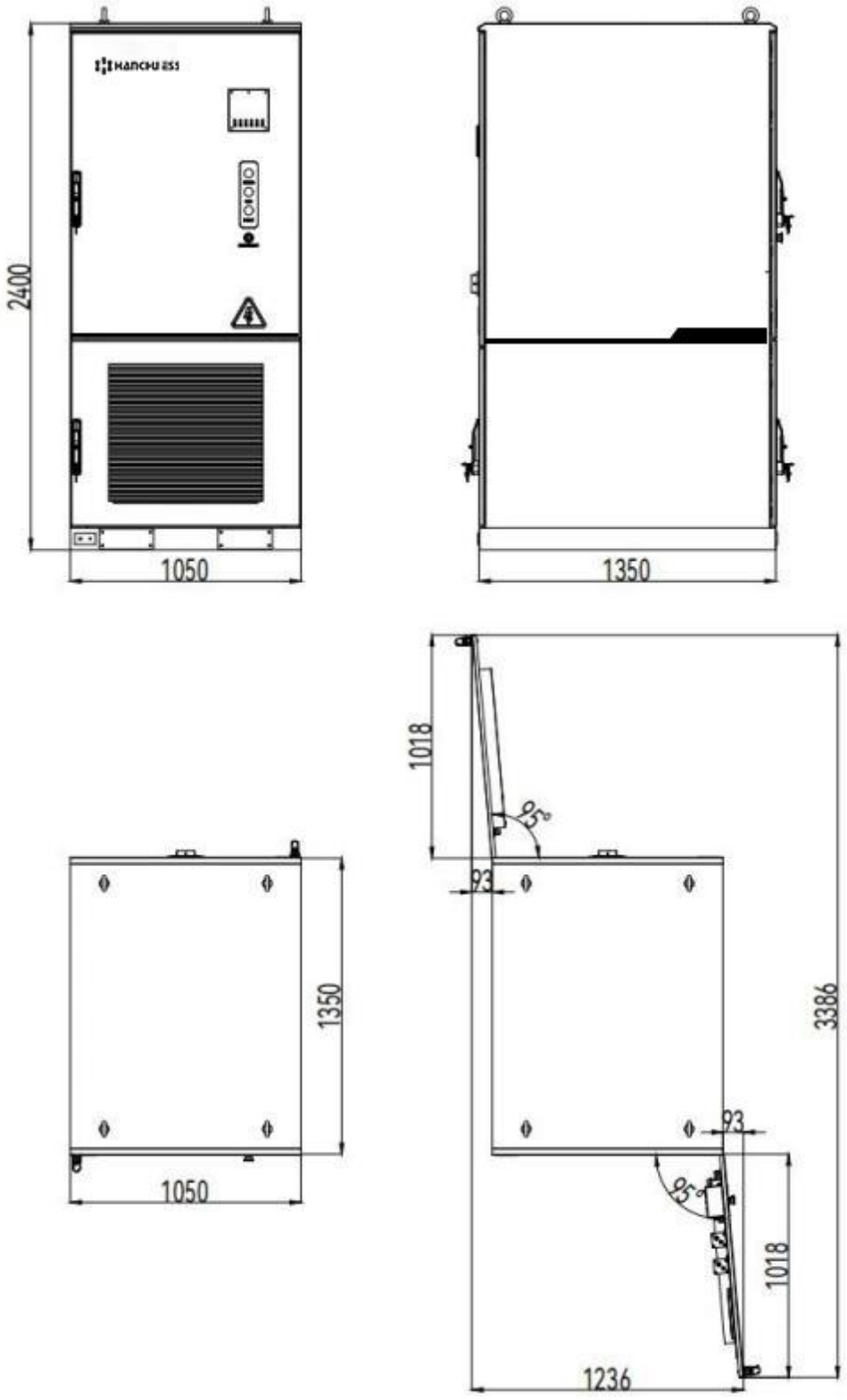


Figure 3-6 Cabinet Dimension

3.3.4. Explosion-proof Valve

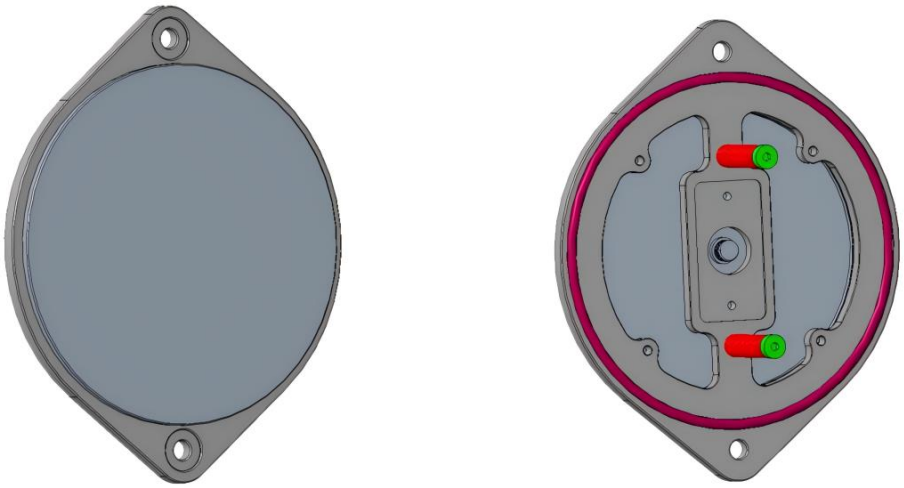


Figure 3-7 Explosion-proof Valve

The explosion-proof valve is mainly applicable to fields such as energy storage containers, battery boxes, and cabinets.

After this product is installed, when the internal pressure of the box rises and reaches the product's opening pressure, the pressure relief port will open to release the internal pressure to the surrounding area.

As the internal pressure of the box increases, the opening area of the pressure relief port will also increase synchronously under the action of the pressure, ensuring that the internal pressure of the box always remains at a safe level.

Dimension:

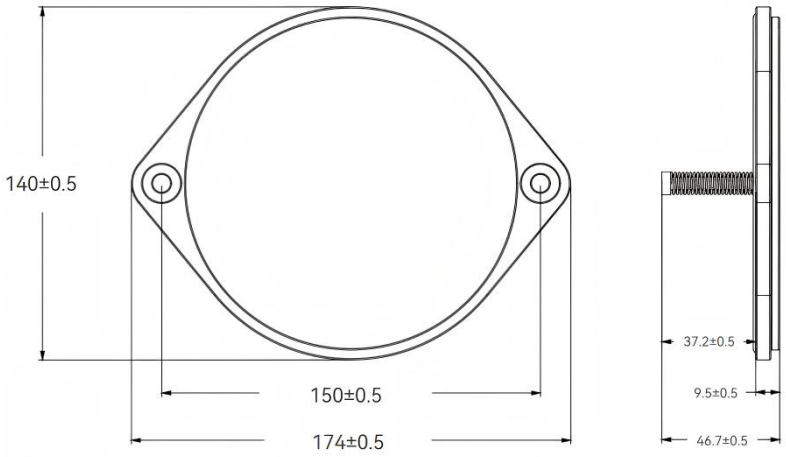


Figure 3-8 Dimension

Specification:

Item	Parameter
IP degree	IP66
Maximum relief area	>5836 mm²
Working temperature	-20~80℃
Material	Galvanized sheet/Aluminum alloy/Foamed silicone/304 Stainless steel
Environmental standard	ROHS 2.0
Activation pressure	5-10kPa

3.3.5. Fire Hose Adapter

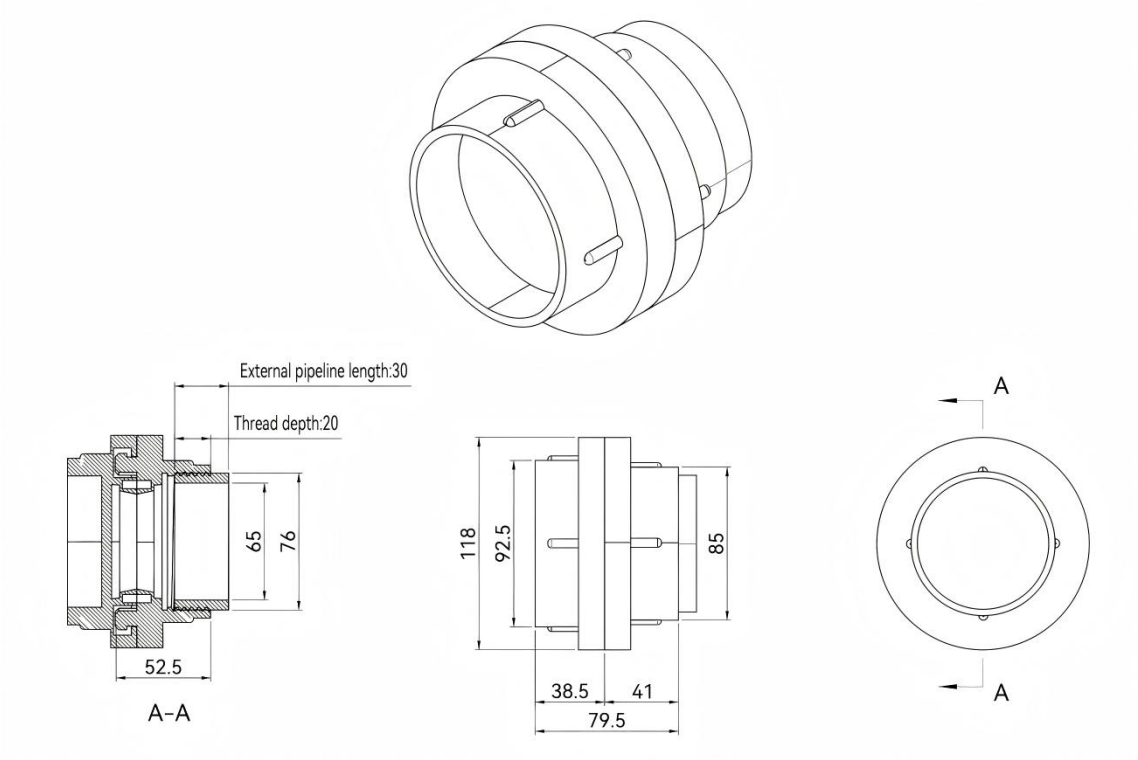


Figure 3-9 Fire hose adapter

The fire hose adapter is equipped with a standard DN65 coupling. This type of coupling is forged from aluminum-magnesium alloy, with a surface that has undergone anodizing treatment. It is equipped with an oil-resistant rubber seal, capable of withstanding a working pressure of up to 2.5MPa, and features an internal snap mechanical binding connection structure.

3.3.6. Cable Inlet/Outlet

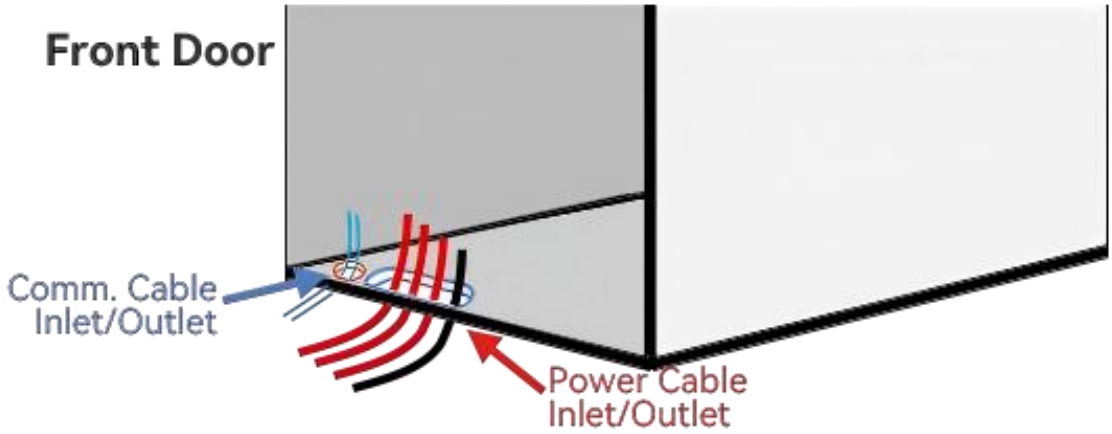
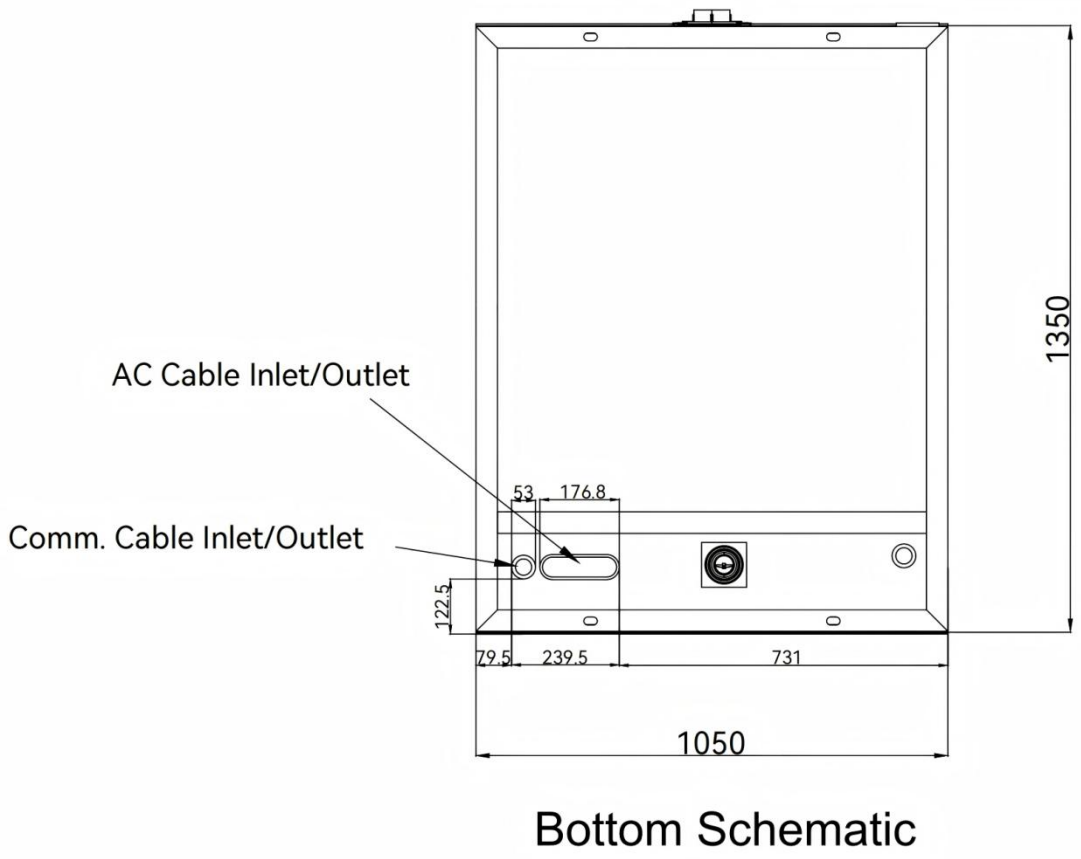


Figure 3-10 Cable Inlet/Outlet Hole

The product in standard configuration has all connecting cables coming in and out from the bottom of the cabinet, near by the front door.

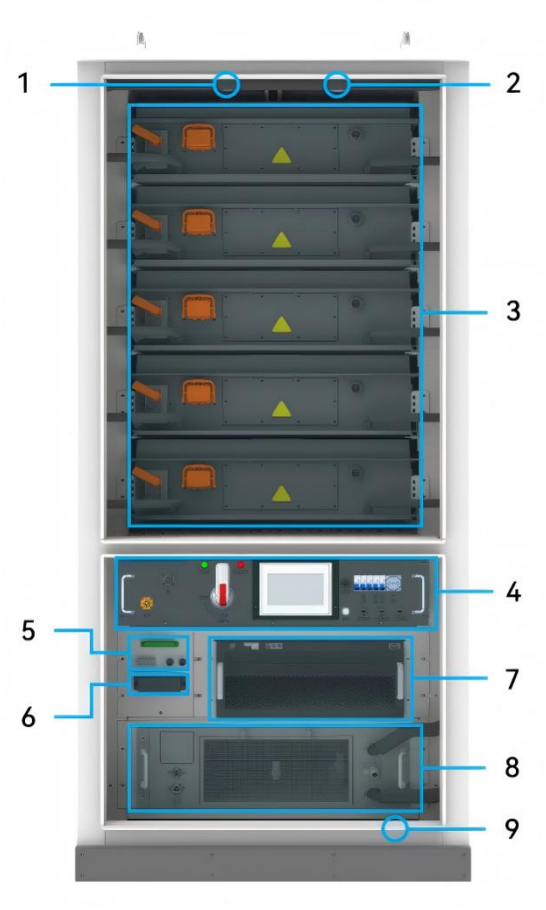
The circle hole under the cabinet is for communication cables, and the rectangle one is for AC power cables.



Bottom Schematic

3.4. Internal Components

3.4.1. Internal Equipment Layout



No.	Item
1	Smoke Sensor
2	Temperature Sensor
3	Battery Packs
4	High Voltage Box
5	External Terminals
6	AC Power Port
7	Power Conversion System(PCS)
8	Liquid-cooling Chiller Unit
9	Immersion Sensor

Figure 3-11 Internal Layout of Cabinet

3.4.2. Power Conversion System(PCS)

3.4.2.1. Introduction

Figure 3-12 125kW PCS

PCS is a device that realizes bidirectional conversion of electrical energy. It converts DC into AC feeding to power grid or directly to AC loads; it also rectifies the AC into DC to charge the batteries. CESS-125K261LL employs a rear-maintained 125kW PCS with built-in over-voltage and overload protection strategies, enabling safe and highly efficient energy conversion.

3.4.2.2. Circuit Diagram

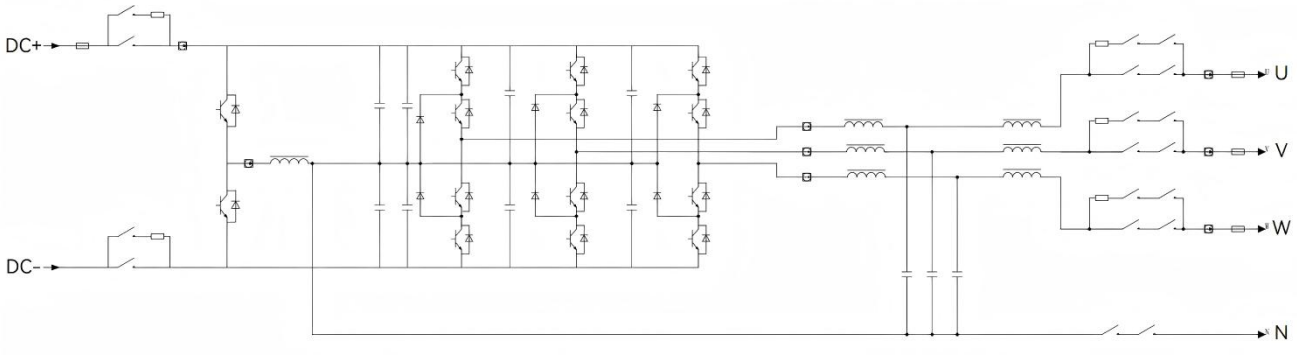


Figure 3-13 PCS Circuit Diagram

3.4.2.3. Dimension & Ports

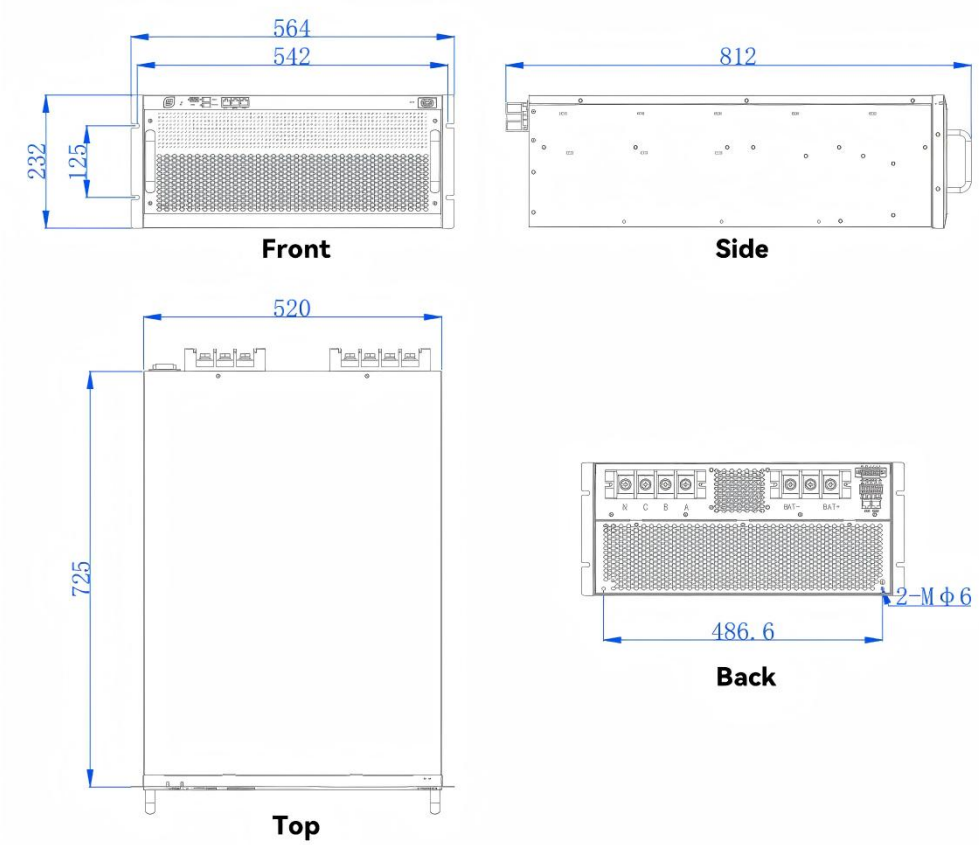


Figure 3-14 PCS Dimension

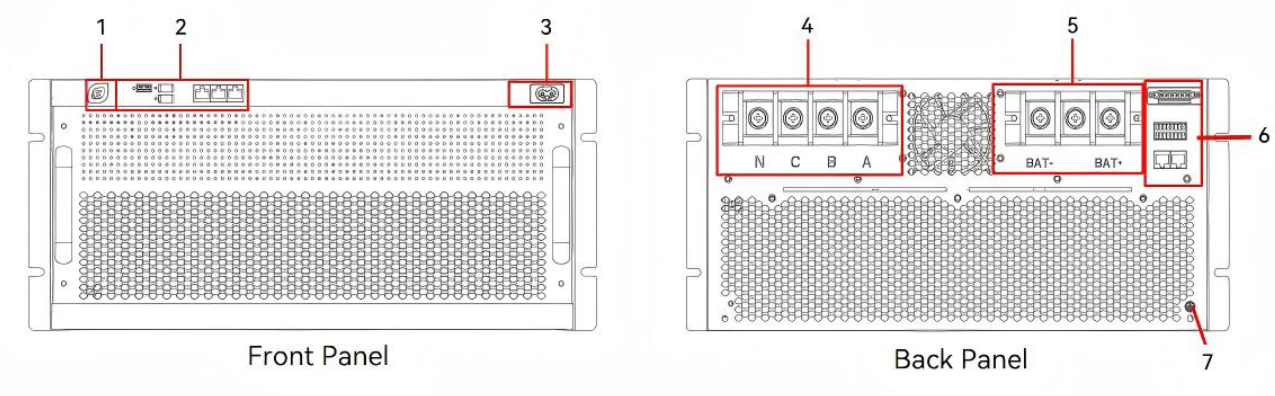


Figure 3-15 Ports of PCS

No.	Name	Description
1	Indicator light	Steady-on in green when power is on; Fast flash in green at 0.5s intervals when standby; Slow flash at 1s intervals when power is off with no fault. Continuous in red when a fault occurs.
2	Communication terminals area (Front)	
3	230V power input terminal	230Vac input (internal use only)
4	AC interface	For AC cable connection
5	DC interface	For DC cable connection
6	Communication terminals area (Back)	
7	PE	For grounding connection

3.4.2.4. Technical Parameter

DC-side Parameters	
Number of routes	1
Maximum input current (A)	203
Voltage range (V)	615~950（3W+PE）/650~950（3W+N+PE）
AC-side Parameters	
Rated output power (kW)	125
Rated output current (A)	138
Overload capacity	110% Long term @ambient temp ≤35℃ 120% 60s
AC wiring	3L+N+PE/3L+PE
Isolation	Non-Transformer
Power factor	0.99, -1 to+1
Rated voltage (Vac)	AC400V/230V
Voltage range (Vac)	400V(-15%to+15%)
Rated grid frequency(Hz)	50/60

Protection Functions	
Short circuit protection	Support
AC phase sequence protection	Support
Comm fault protection	Support
Anti-is landing protection	Support
DC over-voltage protection	Support
AC over-voltage protection	Support
Reverse Polarity protection	Support
Overheating protection	Support
LVRT	Fault-ride-through
General Parameters	
Dimensions(mm)	W520*D785*H232
Max. Efficiency	98.5%
Weight (kg)	69
Cooling method	Air cooling
Ingress Protection	IP20
Communication protocol	RS485 & Modbus-RTU for EMS; CAN for BMS
Operation environment temperature	-25℃ to 55℃ (>45℃ derating)
Relative humidity	0-95% RH (No condensing)
Attitude	4000m (Derating above 2000m)

3.4.3. High Voltage Box (HVB)

3.4.3.1. Introduction

The High Voltage Box of CESS-125K261LL is essential for managing energy usage and high-voltage circuits. It is integrated BCQ and high-voltage protection components like breakers and fuses, ensuring the system's control, protection, and communication, supporting various communication modes and power sources. It's designed for reliability and safety, making it a vital part of ESS operations.

3.4.3.2. Dimension&Ports

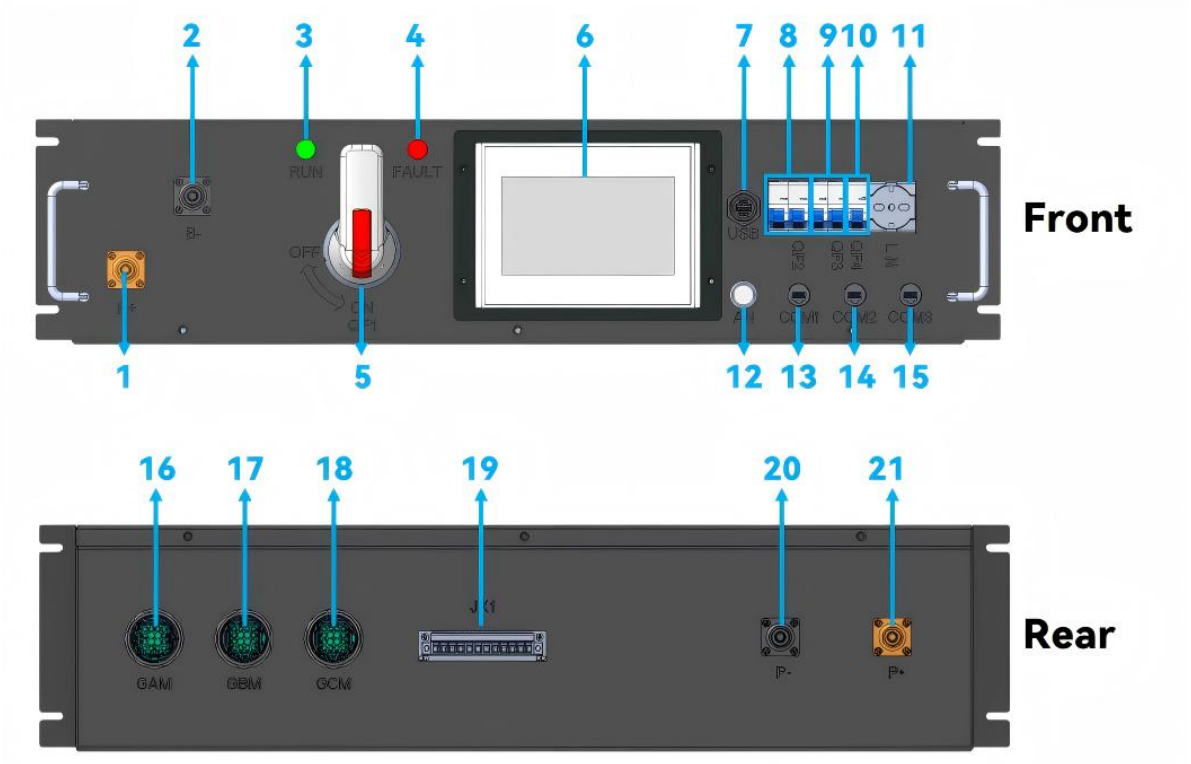


Figure 3-16 Dimension & Ports of HVB

No.	Symbol	Name	Description
1	B+	Battery positive connector	Positive pole connection between PACK and HVB
2	B-	Battery negative connector	Negative pole connection between PACK and HVB
3	RUN	Operation indicator light	Indicate the normal operating status of the high-voltage box
4	FAULT	Fault indicator light	Indicate the shutdown status of the high-voltage box due to malfunction
5	QF1	HVB Main Switch	Main switch of HVB
6	HMI	HMI Screen	Screen to show the real-time data and status
7	USB	USB Terminal	For HMI maintenance
8	QF2	Auxiliary power main circuit breaker	Auxiliary power control inside the cabinet
9	QF3	Chiller unit power circuit breaker	Power supply control of chiller unit
10	QF4	Auxiliary devices circuit breaker	Power supply for BMS, EMS, fans, sensor and other devices
11	LN	230V AC output socket	230V AC output socket for installation or maintenance use
12	AN	Black Start Button	Press down to black start the cabinet
13	COM1	EMS debug port	For EMS debugging or testing
14	COM2	External communication port	For connecting gateway or third-party EMS

15	COM3	Internal PCS communication port	For communicate with PCS through Modbus
16	GAM	BMS & PCS communication port	For BMS and PCS communication
17	GBM	I/O signal communication port	For HVB internal I/O module signal communication
18	GCM	Internal device communication port	For the communication between HVB and other internal devices
19	JX1	HVB power supply port	For HVB power supply
20	P+	PCS positive connector	Positive pole connection between PCS and HVB
21	P-	PCS negative connector	Negative pole connection between PCS and HVB

Switches Description

Switch	Description
QF1	Close to connect the main positive/negative contactors of battery packs.
QF2	Close to activate the 230V auxiliary power system.
QF3	Close to power the chiller unit, which then enters its self-check and start state.
QF4	Close to power the 230/24V transformer, and the power BMS, EMS, fans, sensors and other auxiliary devices.

3.4.3.3. Specification

Items	Parameter
Dimension(W*D*H)	800*843*201 mm
Weight	60 kg
Power Supply	AC 230V
Output Power Voltage	LV : DC 24V
	HV : DC 832V
Operating Temperature	-20~55℃
Ingress Rating	IP20
Current Accuracy	±1%FSR
Voltage Accuracy	±1%FSR

3.4.4. Battery Pack

3.4.4.1. Introduction

The CESS-125K261LL cabinet utilizes the Module-1P52S-ECO liquid-cooled battery pack, which is equipped with 314Ah cells. It features a 1P52S configuration and employs liquid cooling to maintain a temperature difference among the cells within 3 ℃, thereby enhancing operational efficiency and extending the service life of the battery.

3.4.4.2. Dimension & Ports

Figure 3-19 Module-1P52S-ECO Battery Pack

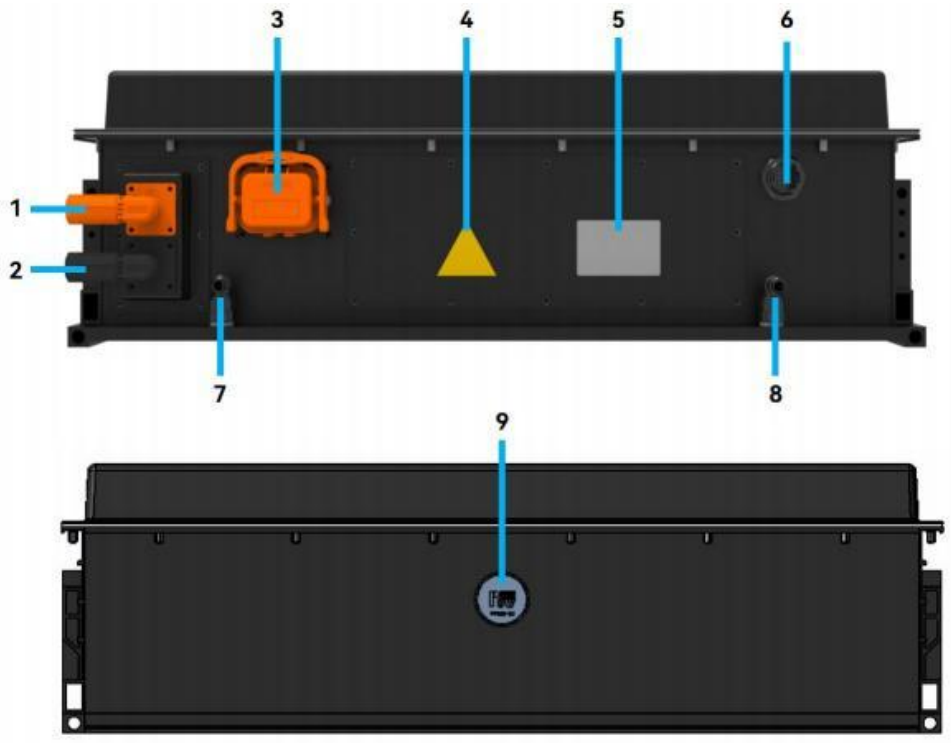


Figure 3-20 Ports of Battery pack

No.	Item	No.	Item
1	Power-in connector	6	BMS Communication port
2	Power-out connector	7	Liquid cooling inlet
3	MSD	8	Liquid cooling outlet
4	Warning signs	9	Pressure relief valve
5	Pack nameplate		

3.4.4.3. Technical Parameters

ECO-P1P52LP	
Cell Type	LFP
Rated Capacity	314Ah
Grouping	1P52S
Rated Energy	52.249kWh (rated condition)
Rated Voltage	166.4Vdc
Recommended Operating Voltage	145.6-187.2Vdc
Rated Charge/Discharge Rate	0.5P
Cycle Life	≥8000 times@75%
Operating Temperature	-20~50℃ (Discharging)/0~55℃ (Charging)
Ingress Rating	IP65
Dimensions(W*D*H)	812*1132*238 mm
Weight	350 kg

3.4.5. Liquid-cooling Chiller Unit

3.4.5.1. Introduction

CESS-125K261LL adopts a drawer type chiller product with a 5kW AC power supply standard. The chiller adopts an integrated structure, and all components are enclosed in one chassis, with a compact external structure, making it easy to install and maintain. The chiller unit supports multiple functions such as CAN communication, power-off memory, self starting, intelligent cooling and heating. The liquid cooling unit is equipped with a variable frequency compressor and a variable frequency water pump to achieve dual variable frequency regulation of the refrigeration system and the coolant circulation system, achieving high efficiency and energy saving during operation.

The liquid cooling method realizes a small temperature difference and fast cooling, which can effectively extend the battery life and delay decay.

3.4.5.2. Dimension & Ports

Figure 3-22 Chiller Unit

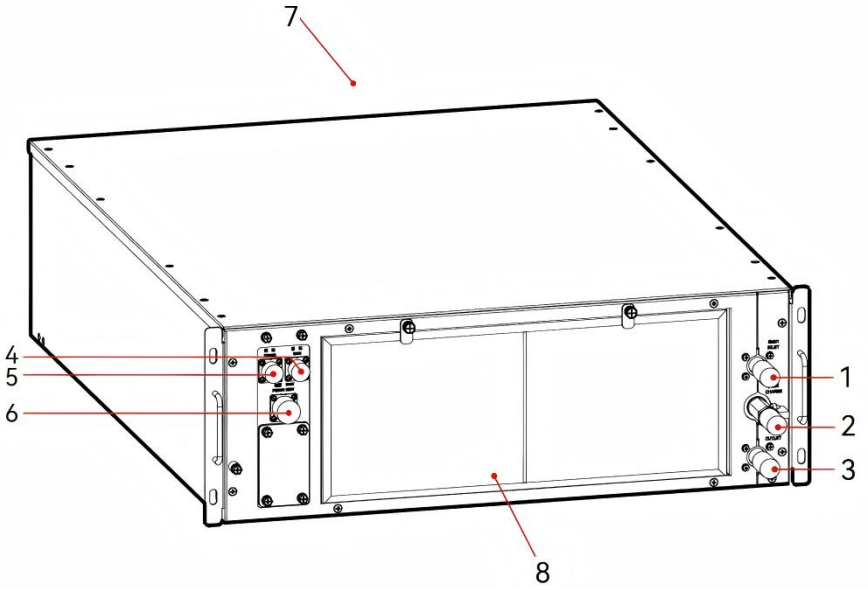


Figure 3-23 Ports of Chiller Unit

No.	Item	No.	Item
1	Coolant Inlet	5	Debug Interface
2	Coolant filling&drain Port	6	Power Interface
3	Coolant Output	7	Air Output
4	COM Interface	8	Air Input

3.4.5.3. System Principle

The liquid-cooling chiller is composed of a refrigeration cycle system and a coolant cycle system, and the system principle is shown below.

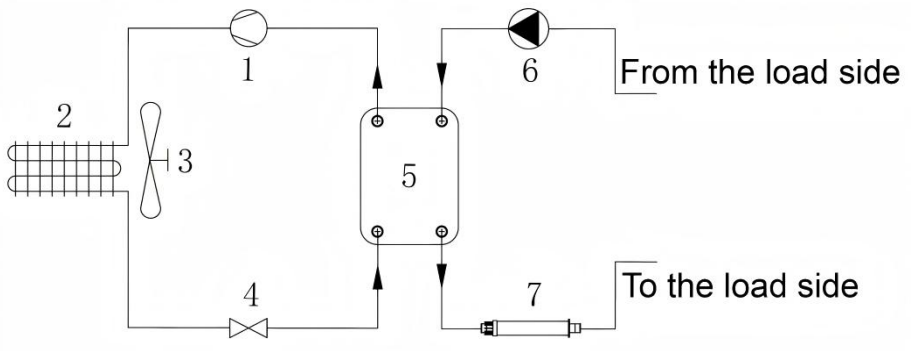


Figure 3-24 System principle diagram

No.	Item	No.	Item
1	Compressor	5	Plate Heat Exchanger
2	Condenser	6	Circulation Water Pump
3	External Circulation Fan	7	Electric Heater
4	Throttling Element		

3.4.5.4. Technical Parameters

Liquid-cooled Chiller Unit	
Operating voltage range	230V±15%, 50/60Hz±3Hz
Operating environment temperature range	-30°C-+55°C
Operating relative humidity range	5%-95%
Storage environment temperature range	-40°C-+70°C
Storage environment relative humidity range	5%-95%
Working altitude	≤4000m The refrigerating capacity is derated when the altitude is above 1000m, and the refrigerating capacity will be derated by 5% for every 1000m increase. The highest application altitude is ≤4000m
Unit size(W×D×H)	700mm×900mm×245mm(with out flange)
Max. flow	50L/min
IP level	IP55
Inlet coolant temperature range	-30°C-55°C
Outlet coolant temperature range	5°C-40°C

3.4.6. External Terminals

3.4.6.1. COM4 Communication Terminal

COM4 communication terminal is designed for the access of on-site meter connection, the connection with POC(Point of Connection) cabinet and on-site debugging.

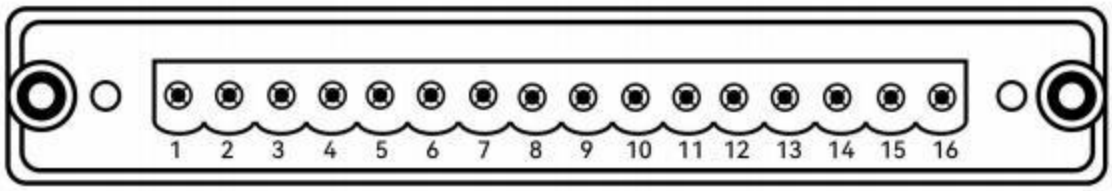


Figure 3-25 COM4 Communication Terminal

Pin Definition:

Pin No.	Definition	Pin No.	Definition
1	Breaker status DI signal	9	BMS debugging CANL
2	Breaker status COM signal	10	PCS debugging RS485A1
3	Breaker trip DO+ control	11	PCS debugging RS485B1
4	Breaker trip DO- control	12	RS485A2(Reserved)
5	/	13	RS485B2(Reserved)
6	On-site Meter Comm. RS485A	14	/
7	On-site Meter Comm. RS485B	15	/
8	BMS debugging CANH	16	/

3.4.6.2. Parallel Connection Terminal

The parallel connection terminal employs two RJ45 ports for communication when multiple ESS cabinets need operate in off-grid parallel application.

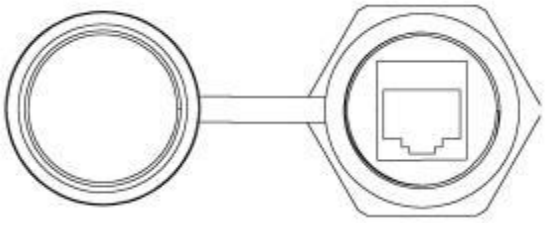


Figure 3-26 Parallel Connection RJ45 Port

Pin	Pin Definition	Description
1	CAN1_L	CAN communication parallel signal
2	CAN1_H	
3	INV_SYNC	Internal AC frequency synchronization signal

4	GND	Common signal terminal
5	CARRIER_SYNC	Internal carrier synchronization signal
6	GND	Common signal terminal
7	/	Reserved
8	/	Reserved

3.4.6.3. UPS Power Supply Terminal (XT1 Terminal)

UPS Power Supply Terminal is a reserved interface. When an external UPS power supply needs to be connected, it can be connected to the system through this terminal.

At the time before factory delivery, Pin 3 will be short-circuited with Pin 5, and Pin 4 will be short-circuited with Pin 6 in advance. When an external UPS needs to be connected, simply remove the connection between Pin 3 and Pin 4, and connect them to the L and N terminals of the UPS, respectively.

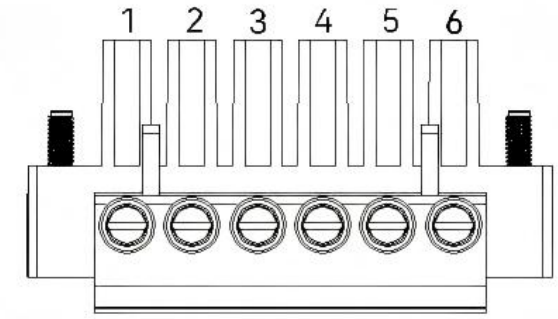


Figure 3-27 UPS Power Supply Terminal

Pin	Pin Definition	Description
1	/	/
2	/	/
3	PCS Power: L	PCS L phase output
4	PCS Power: N	PCS N phase output
5	UPS Power: L	Connect to external UPS L
6	UPS Power: N	Connect to external UPS N

3.5. Safety Protection

CESS-125K261LL cabinet is furnished with an array of detectors designed to identify smoke, temperature fluctuations and water immersion, among other hazards. Additionally, it is equipped with pack-level aerosol and 2 cabinet-level aerosols. It can detect potential safety hazards in the cabinet in real-time and prevent fire accidents such as accidental battery fire and other fire safety accidents.

3.5.1. Fire Suppression System(FSS)

Work Principle

Hanchu CESS-125K261LL equipped FSS consists of pack-level FSS and cluster-level FSS:

- Pack-level applies early detection and fast fire extinguishing for internal combustion sources. Each pack is assembled with internal module-level FSS device, which detects fire and automatically extinguish fire without power supply. Once fire or heat reaching 185℃ is detected, FSS immediately start fire extinguishing.

- Cabinet-level applies key control, expansion prevention and growth suppression for the external combustion sources. Cabinet-level FSS is an aerosol-based fire protection system. When both smoke sensor and temperature sensor are triggered, it starts fire extinguishing device. At the same time, the explosion-proof valve located on the back of the cabinet will release pressure to ensure that the cabinet does not experience over-pressure due to gas expansion. The FSS Synchronously sends the fire message to all related agents and personnel.

FSS components

- Aerosol FSS devices

Figure 3-28 Aerosol

Work Principle:

When both smoke sensor and temperature sensor are triggered, the fire EMS activates the aerosol generator inside upon receiving an electrical start signal or when an open flame ignites the heat-sensitive wire. The aerosol generator, activated by the electrical initiator or the burning heat-sensitive wire, releases heat through a redox reaction, causing the chemical coolant to decompose, thus achieving a combined effect of the aerosol generator and the coolant in extinguishing the fire.

Specification:

Item	Parameter
Net Weight per Unit	1145g ± 30g
Operating Temperature Range	-30 °C - +70℃
Dimensions	247mm × 67mm × 66mm
Operating Humidity	≤95% RH
Activation Method	Electrical/Thermal
Discharge Time	≤15s
Electrical Activation Current	≥700mA
Protection Volume	3m³
Nozzle Heat Distance	Temperature ≤200℃ at 400mm from nozzle
Surface Temperature of Shell	≤200℃
Oxidizer Name and Content	Strontium nitrate, potassium nitrate 50% ~ 58%

- Temperature Sensor

Figure 3-29 Temperature Sensor

Work Principle:

The temperature sensor can monitor the temperature data inside the cabinet in real-time, enabling early detection and warning of potential fires. It can also be integrated with other fire protection equipment to provide enhanced safety protection.

Specification:

Item	Parameter
Alarm indicator	Red light emitting diode
Design alarm load	420 Ω in series with a 2 V drop
Dimensions	100mm diameter x 42 mm height
Operating temperature	-20℃ to +65℃
Trip alarm temperature	>65℃
Humidity	0% to 95% RH, no condensation
Effect of atmospheric pressure	None
IP degree	IP54
Standards and approvals	CPR, LPCB, VdS, VNIIPO, SBSC, FG, BOMBA
Weight	80g
Materials	Housing: White flame retardant polycarbonate Terminals: Nickel plated stainless steel

- Smoke Sensor

Figure 3-30 Smoke Sensor

Work Principle:

The smoke sensor can detect smoke through light-scattering principles and can monitor the concentration in real-time, enabling the detection and early warning of fires.

Specification:

Item	Parameter
Detection principle	Photo-electric detection of light scattered in a forward direction by smoke particles
Sensor	Silicon PIN photo-diode
Emitter	GaAs infra-red light emitting diode
Sampling frequency	Once every three seconds
Alarm indicator	Clear light emitting diode (LED) emitting red light
Sensitivity	Nominal alarm threshold of 0.15 dB/m obscuration
Operating temperature	-20°C to + 60°C
Humidity	0% to 95% RH (no condensation or icing)
Alarm trigger concentration	0.15dB/m
Standards & approvals	EN 54-7, LPCB, VdS, DIBt, BOSEC, FG, CPR and SBSC
Dimension	100 mm diameter x 42 mm height (50 mm high with mounting base)
Weight	99g, 150g with base
Materials	Housing: White polycarbonate UL94-V0 Terminals: Nickel plated stainless steel

3.5.2. Water Immersion Detect

Work Principle

Figure 3-31 Water Immersion Sensor

The water sensor provides a single point detection of water via a solid state liquid level sensor. A LED and a photo-transistor are housed within a plastic dome at the head of the device. When no water is present, light from the LED is internally reflected from the dome to the photo-transistor.

When water covers the dome, the effective refractive index at the dome-liquid boundary changes, allowing some light from the LED to escape. Thus the amount of light received by the photo-transistor is reduced and the output switches, indicating the presence of water.

Technical Parameter

Item	Parameter
Supply Voltage	24V DC (±5%)
Supply Current (Normal)	30mA(MAX)
Supply Current (Alarming)	40mA(MAX)
Relay Ability	1A 30VDC / 0.3A 110VDC / 0.5A 125VAC
Water Sensing Level	3±1 mm
Output	Relay Closed for Alarm
Operating Temperature	-10 to 60℃

4 Transportation

4.1. Precaution

	• The ESS Cabinet must not be disassembled during transportation or installation. • Malfunctions caused by unauthorized modifications are not covered by the warranty. • Transport the ESS cabinet in strict accordance with the description in this chapter! • Always pay attention to the gravity center marking on the package of the cabinet! • Due to the fact that the gravity center is not the mechanical center, always pay attention to the gravity center marking during transportation. • With or without external package, it is strictly prohibited to tilt the ESS Cabinet with an angle exceeding 5° during transportation. If the tilt angle is too large, the cabinet may overturn. Due to its large volume and weight, personal injury/death and equipment damage may occur when tilted. • During transportation, avoid mechanical impact on the cabinet, such as violent shaking or sudden lowering or lifting. • Avoid transporting the ESS cabinet in rain. If unavoidable, please take necessary rain-proofing measures. • Only personnel with license and approved by the authority are allowed to handle the ESS cabinet.

	• To ensure safe and intact transportation of the product to destination/site, please also take any other necessary auxiliary measures.

4.2. Transportation with Outer Package

To ensure that the ESS Cabinet is properly protected during transportation, please transport it with package as much as possible in accordance with the signs on the package. The package signs are illustrated as follows:

Sign	Meaning
	Right side up. It is prohibited to handle the cabinet lying down, tilted or up side down.
	Handle with care. Avoid damage to the ESS Cabinet caused by excessive collision and friction.
	Moisture prevention. Protect the ESS Cabinet from and against rain or moisture.
	No Rolling
	Recyclable
	Hazardous goods, category-9.
	No Stacking
	Center of Gravity

The unpackaged ESS Cabinet may be moved with forklift, pallet truck or crane. When moving the ESS Cabinet, pay attention to its weight as well as the gravity center marking and lifting marking

on the package box. Ensure that the transportation equipment has sufficient load-bearing capacity and arrange support or lifting points reasonably.

4.2.1. Transportation with Forklift

Transporting the ESS Cabinet with a forklift is a standard transportation method. During transportation, the center of gravity of the box shall be placed between the two forks of t he forklift. A trial forking shall be conducted before normal handling. The length of fork s hall not be less than 1.6m.

When using a forklift to lift, lower, and move the ESS Cabinet, please ensure that the operation is slow and smooth. In addition, only place the ESS Cabinet on a hard and leveled ground.

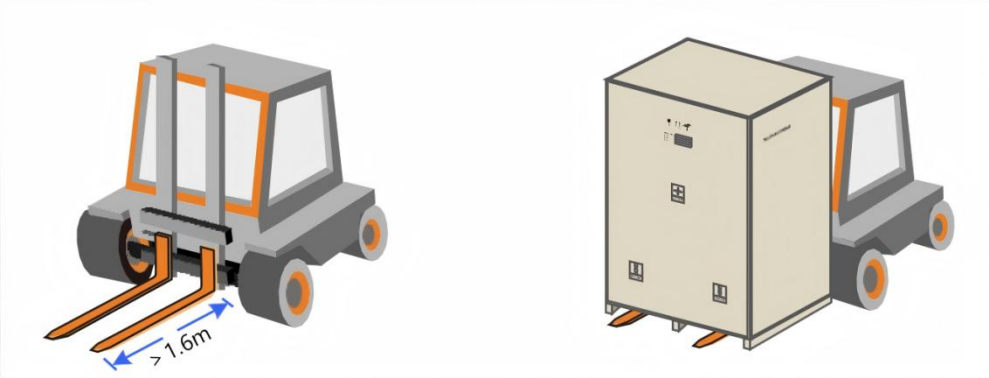


Figure 4-1 Schematic Diagram of Transportation with Forklift

During the transportation with forklift, please strictly follow the safety operating procedures for forklift. The packaging of the ESS cabinet may block the driver's sight, so auxiliary personnel shall be arranged to provide assistance.

4.2.2. Transportation with Crane

A crane may be used to lift and transport the ESS Cabinet. For the purpose of lifting, tie two flexible lifting straps to the outer packaging box through lifting signs. The equipment shall be lifted with the hook being perpendicular to ESS gravity center. Tilting transportation is strictly prohibited!

When using a crane to lift, lower, and move the ESS cabinet, please ensure that the operation is slow and smooth. In addition, only place the ESS cabinet on a hard and leveled ground. In lifting

operations, please ensure that the angle between the rope and the equipment is greater than 60° to maintain good force conditions.

During the process of transportation with crane, please strictly follow the safety operating procedures for crane. In case of adverse weather conditions such as heavy rain, heavy fog or strong winds, the lifting operation s hall be stopped.

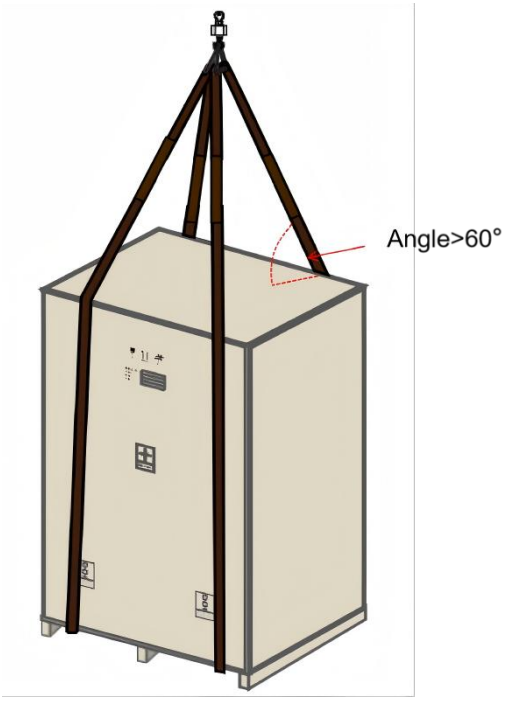


Figure 4-2 Lifting Operation

	If the crane is used to transport the cabinet without unpacking, it will inevitably damage the outer package, making it unusable for a second time.

4.3. Transportation without Outer Package

The transportation of ESS Cabinet without outer packaging is usually carried out near the final installation location. The unpackaged ESS Cabinet may be transported by using forklift, crane or other means.

	Before moving the ESS Cabinet to the predetermined position, it is recommended to conduct cable laying first. Considering the thickness of cables, once the ESS cabinet is seated, cable routing operations becomes difficult and cables may be easily damaged.

4.3.1. Transportation with Forklift

During the process of transportation with forklift, please strictly follow the safety operating procedures for forklift.

When using a forklift to lift, lower, and move the ESS cabinet, please ensure that the operation is slow and smooth. In addition, only place the ESS cabinet on a hard and leveled ground.

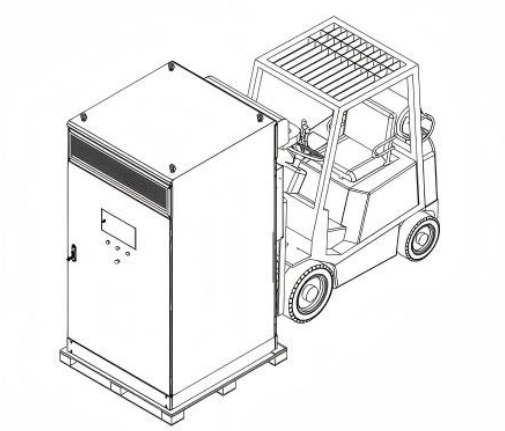


Figure 4-3 Transportation with Forklift (with Bottom Wooden Pallet)

If the unpacking location is closer to the installation location, a forklift may be used to transport the ESS Cabinet with a bottom wooden pallet. Please ensure that the gravity center of the ESS Cabinet is placed between the two forks of t he forklift.

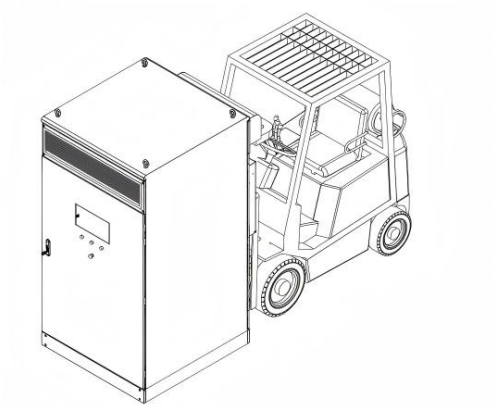


Figure 4-4 Transportation with Forklift (without Bottom Wooden Pallet)

If the wooden pallet at the bottom of the ESS cabinet has been removed, it may be transported directly by a forklift, and the forks may be placed directly in the base fork grooves.

For the purpose of facilitating the on-site transportation, the fork grooves have been designed in advance, and the base baffle must be removed before transportation.

4.3.2. Transportation with Crane

	The lifting rings are dismantled before shipping. It is required to be installed before lifting. Even without using the lifting ring, please install it after securing the base.

For the purpose of facilitating the transportation with crane, the lifting rings are designed on the top of the ESS cabinet. Users may directly lift and transport the ESS cabinet through lifting rings.

Figure 4-5 Transportation with Crane (no package, no pallet)

During lifting operation, the center of the hook s hall be perpendicular to the center of the ESS cabinet, and a trial lifting shall be conducted. Tilted lifting is strictly prohibited. Meanwhile, during the lifting of the ESS cabinet, please strictly follow the safety operating procedures for crane.

When using a crane to lift, lower, and move the ESS cabinet, please ensure that the operation is slow and smooth, and ensure that the angle between the rope and the equipment is greater than 60° to maintain good force conditions. In addition, only place the ESS cabinet on a hard and leveled ground.

5 Installation

5.1. Installation Preparation

5.1.1. Basic Installation Requirements

	• For the mechanical setup phase, it is crucial to follow all applicable standards and requirements of the installation site. • Utilize only the equipment that has been specifically designated by Hanchu. Deviating from this and using non-designated equipment could lead to a reduction in the system's protective capabilities, potentially resulting in personal injury.

With IP55, CESS-125K261LL cabinet is designed for installation in industrial environments. For safe and efficient operation, please make sure that the installation environment complies with the following instructions:

- Make sure that the installation ground is always dry, flat and free from water accumulation;
- Ensure that the ground is leveled without shaking and the ground is strong enough to bear the weight of the ESS Cabinet.
- The ambient temperature range at the installation site is -20℃ to 55℃; the relative humidity range s hall be 0-95% (without condensation).
- Reserve sufficient space in front of and behind the cabinet for convenience of ventilation, heat dissipation, installation maintenance and safe escape.
- The ESS Cabinet grounding resistance shall be less than 4Ω .
- Ensure that the location is convenient for operations of LED indicators and LCD screen.
- There shall be no flammable gases or combustible materials nearby or in the installation area.
- The installation environment shall be clean.

5.1.2. Installation Requirements

The ground, space, cable ducts, air ducts, ventilation equipment, and protective measures in the control room of the ESS Cabinet shall be properly designed to meet at least the following requirements.

5.1.2.1. Environment requirement

In addition to the above basic requirements, please choose the installation location according to the following requirements to ensure that the equipment installation meets various requirements such as safety, fire protection, and regulations.

I. General Requirements

- **Regulatory compliance:**

The installation site must fully comply with local laws, regulations, and relevant industry standards.

- **Permitted installation locations:**
  - Outdoor
  - Inside an independent energy storage building
  - Interior of buildings (equipped with fire prevention and ventilation measures)
- **Prohibited installation locations:**

It is generally not allowed to install in residential units, elevator shafts, stairwells, refuge floors, and other critical passages and evacuation paths.

- **Accessibility:**

The site should be easily accessible for transportation, installation, and maintenance.

- **Future Expansion:**

Reserve adequate space for potential capacity expansion or parallel connections during future system upgrades.

II. Fire Safety

- **Environmental requirements:**

Ensure that no plants have been grown within 3 meters of the site and its surroundings, to avoid wildfires due to the high temperature in the summer which results in equipment on fire.

- **Fire Protection:**

Fire extinguishers must be installed according to local fire codes, and a connection port for water-based fire suppression systems should be reserved.

- **Safety Spacing:**

The distance between the device and residential areas, populated centers, or production buildings must meet local fire safety standards.

If the required safety distance cannot be met, a fire-rated firewall must be constructed in accordance with local regulations.

Sufficient space must be reserved for transportation, installation, and maintenance activities.

- **Safe distance:**

The safe distance between the equipment and buildings shall meet the local fire safety codes, standards and following requirements:

Building Classification	Minimum Safe Distance
Residential housing	≥ 12 m
Schools, hospitals, or other population centers	≥ 30.5 m
Class A industrial buildings	≥ 12 m
Class B industrial buildings	≥ 10 m

Class C & D industrial buildings (meeting Class I and II fire resistance rating)	≥ 10 m
Industrial buildings (meeting Class III fire resistance rating)	≥ 12 m
Adjacent buildings with external fire-resistant walls, no windows/doors/eaves	As per calculation: (3 – 25% × 3) meters

III. Flood and Water Protection

- **Elevation Requirements:**

Avoid low-lying and flood-prone areas.

The installation site must be at least 300 mm higher than the historical maximum water level.

For locations near rivers, lakes, or seas, the foundation must be at least 0.6 m above the historical maximum wave height.

- **Drainage Facilities:**

If large volumes of water may pass through the site, appropriate drainage systems must be installed.

In areas prone to water accumulation, waterproofing measures such as water barriers, drainage systems, or raised foundations must be implemented to prevent equipment damage.

- **Liquid Intrusion Prevention:**

The site must be located away from areas where liquids may be generated or leaked to prevent device failure.

IV. Geological and Surrounding Environment Requirements

- **Soil Conditions:**

Avoid installing on soils that are prone to deformation or settlement.

- **Pollution and Corrosion Prevention:**

The installation site must be kept away from salt-laden or polluted areas that may corrode the device. The minimum distances are listed below:

Environmental Source	Minimum Safety Distance
Coastal areas	> 2000 m
Heavy pollution sources (e.g., smelters, coal mines, thermal power plants)	> 1500 m
Moderate pollution sources (e.g., chemical plants, rubber plants, electroplating facilities)	> 1000 m
Light pollution sources (e.g., food processing, leather plants, slaughterhouses, landfills, sewage plants)	> 500 m

V. Security Measures

- **Physical Security:**

The installation area must be enclosed with locking fences or walls, and access should be restricted to authorized personnel only.

5.1.2.2. Foundation Preparation

	• The concrete foundation or channel steel must be able to withstand at least 3 tons of weight without deformation. • Please ensure to comply with local safety regulations during the project implementation.

The ESS shall be installed on a concrete foundation or channel steel structure that is flame-retardant. It is necessary to ensure that the foundation is flat, solid, safe and reliable with sufficient load capacity.

There shall be neither depression nor inclination on the surface of the foundation.

For the foundation construction, the cable trenches shall be pre-constructed according to the design of the ESS of which the cable entry and exit are bottom-in and bottom-out.

Holes shall be pre-drilled on the foundation. The size and position of such holes shall be consistent with the cable holes at bottom of the cabinet, so that the cabinet can be properly seated on the foundation.

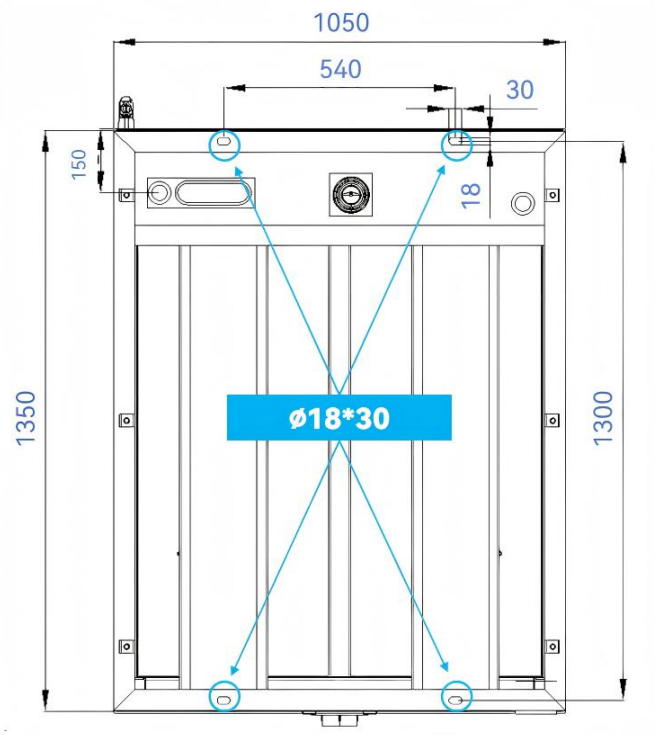


Figure 5-1 The position of pre-drilled holes

The base of the cabinet is equipped with 4 positioning ⌀ 18*30 holes, as shown in Figure 5-1 (unit: mm).

5.1.2.3. Space Requirements

For proper installation, it is necessary to maintain an appropriate and sufficient distance to adjacent building or equipment, so as to meet the requirements of maintenance corridor, escape ways and ventilation.

1) Single cabinet installation

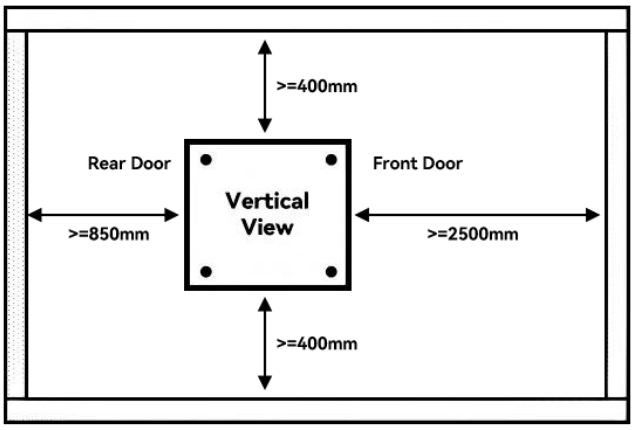


Figure 5-2 Minimum Front&Rear space requirement

The minimum space requirements of the front and rear of the ESS cabinet are shown in the Figure 5-2. There must be at least 2500mm of space in front of the cabinet and at least 850mm of space behind it. Please note that a space of 1050mm is required to fully open the rear door, 850mm is the minimum distance available for maintenance purposes.

If possible, it is recommended to choose spacious location, so as to ensure reliable and efficient operation.

2) Multiple cabinets installation

	The distances mentioned in this section are only recommendations; actual installation should be carried out according to the on-site conditions and local relevant regulations. Please reserve a passage for pedestrian traffic according to the actual needs.

Hanchu provides matching standard POC cabinet that support up to 6 ESS units in parallel. The diagram below shows the actual space requirements for 6 ESS units plus 1 POC cabinet.

The standard width of t he Hanchu POC cabinet is 800mm. If you use POC cabinets from other brands or Hanchu non-standard customized POC cabinets, the dimensions will vary. Please design according to the actual situation.

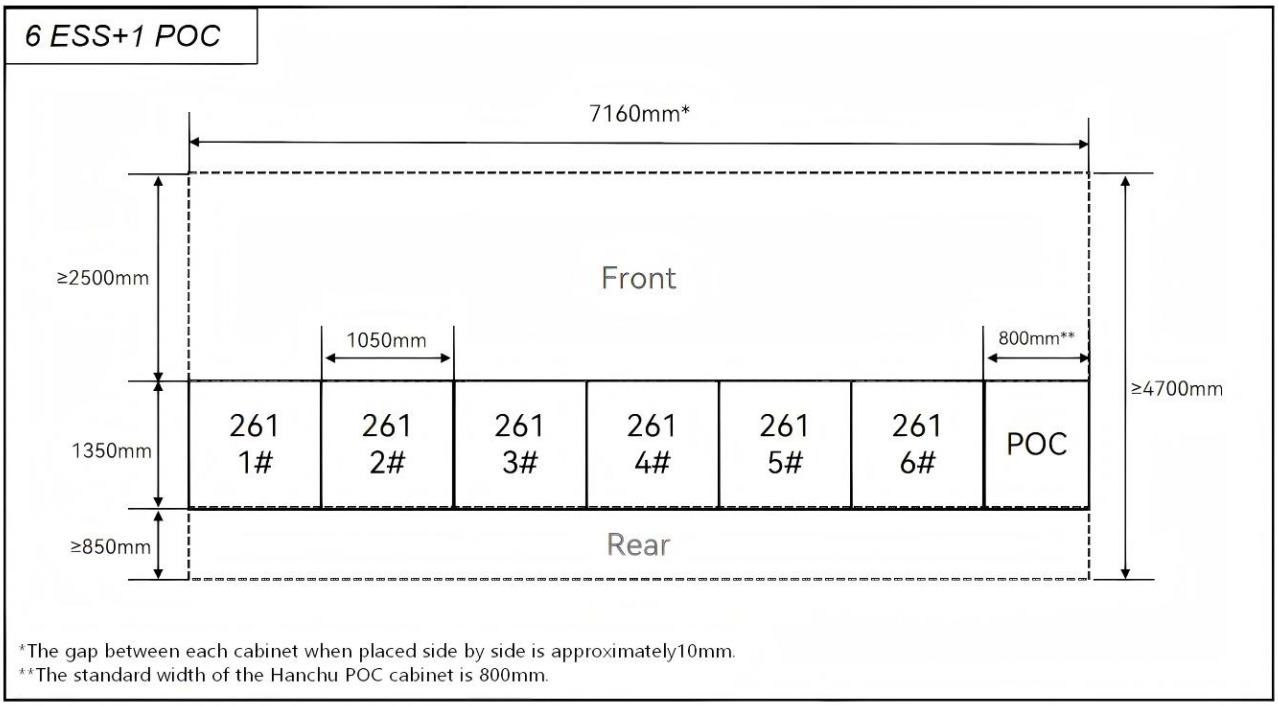


Figure 5-3 The space requirement of 6 ESS cabinet

When the number of required ESS units exceeds 6, it is recommended to divide them into multiple systems and match them with the corresponding number of POC cabinets.

Below is an example of the installation space requirements for 12 ESS cabinets.

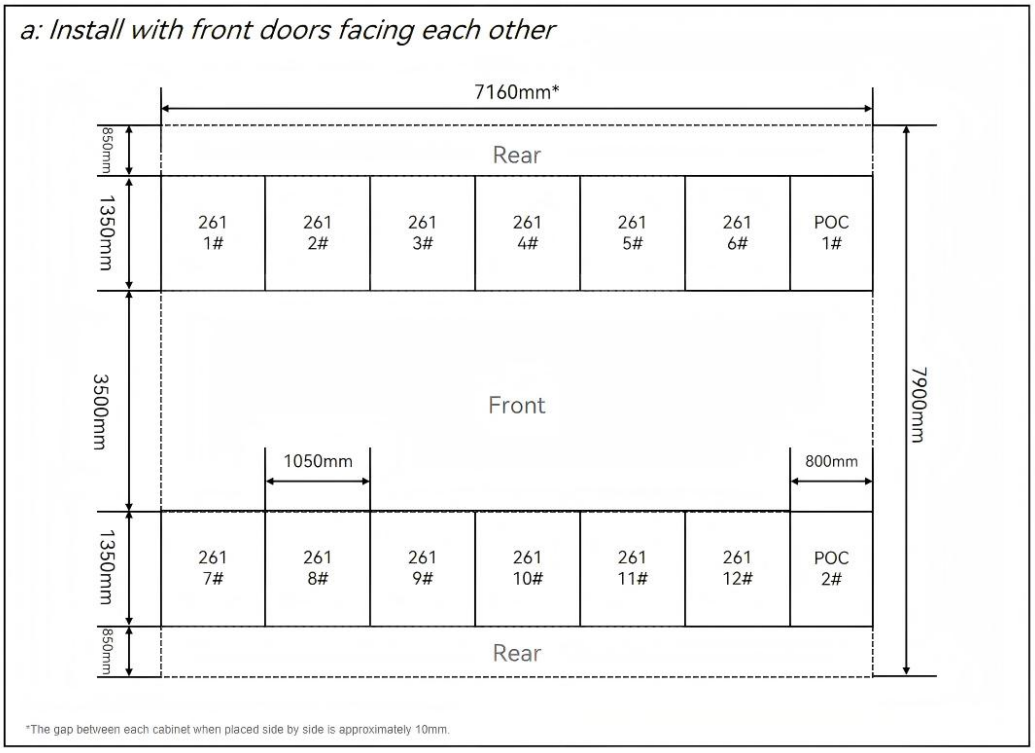


Figure 5-4 Install with front doors facing each other

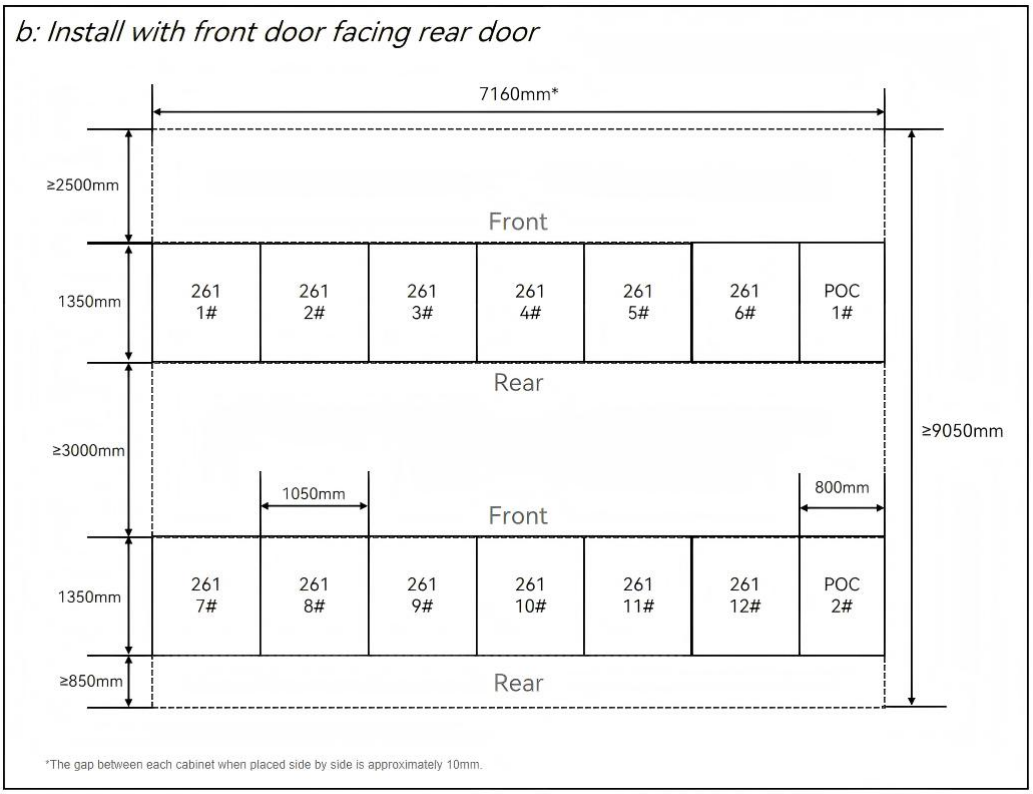


Figure 5-5 Install with front door facing rear door

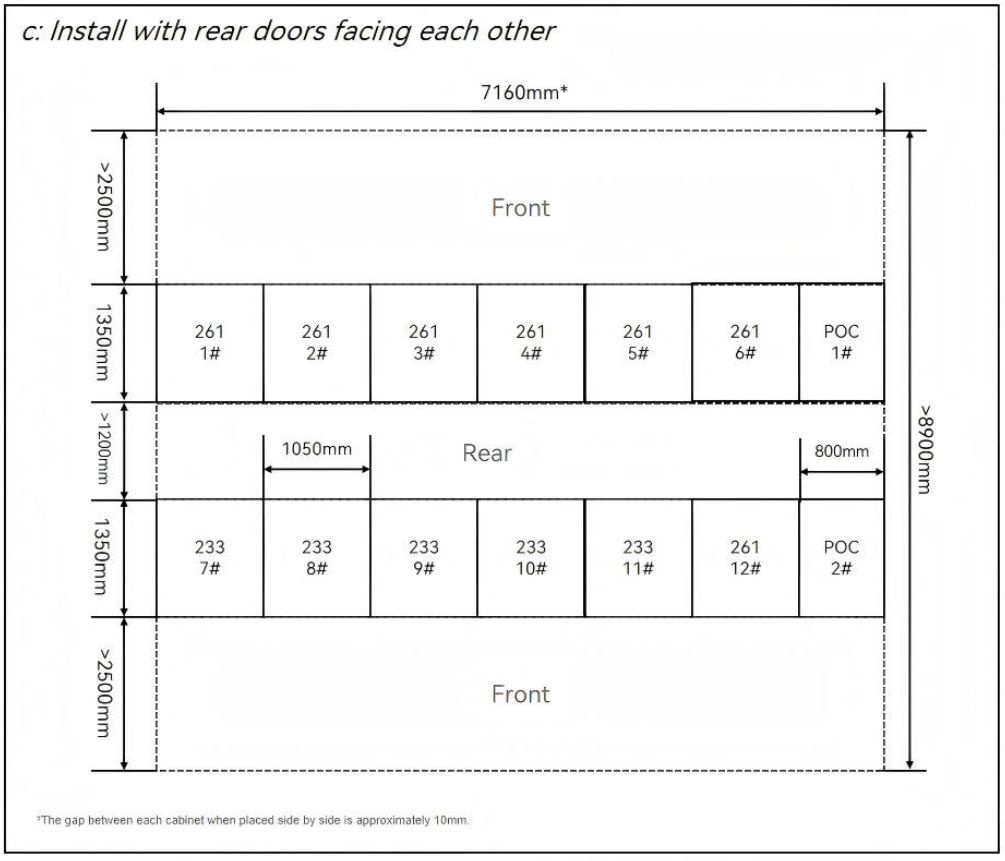


Figure 5-6 Install with rear doors facing each other

5.1.3. Cable Preparation

5.1.3.1. Cable and Connector Selection

The cable diameter shall be selected according to the maximum current of the AC or DC sides with margin. Please select cables of same specifications and same type on the same side.

The recommended specifications for connecting cables are detailed in the table below.

Symbol	Function Description	Bolt Spec.	Max. Voltage and Current	Cable Recommendation	Cable Terminal
A	A-phase input terminal	M8*20	Voltage≤460V Current≤199A	Flexible cooper cable 70-95mm²	DT70/95-8
B	B-phase input terminal	M8*20	Voltage≤460V Current≤199A	Flexible cooper cable 70-95mm²	DT70/95-8
C	C-phase input terminal	M8*20	Voltage≤460V Current≤199A	Flexible cooper cable70-95mm²	DT70/95-8
N	Neutral input terminal	M8*20	Voltage≤460V Current≤199A	Flexible cooper cable 70-95mm²	DT70/95-8
PE*	Grounding interface	M8	/	Flexible cooper cable 35mm²	DT35-8
Para	Parallel connection	/	/	Category 6A Ethernet cable	/

*Adjust according to the usage environment.

The control and communication line connections are connected using connectors, and the connector plug and connectors configuration information is:

Connector plug model: LC2AM-5.08-16P-1Y-00A

Recommendation wire diameter: Flexible cooper cable 0.5 - 1mm2 , STP Cable

	• Overloading of cables is strictly prohibited!
	The cable diameters given in the table are for copper cores. In case that aluminum cables are selected, determine the cable size reasonably based on site conditions. The recommended cable parameters are for the BESS with standard configuration. If your order is with different requirement, cable parameters may vary.

5.1.3.2. Cable Placement

The cables used in the system is generally classified into power cables and communication cables. When laying communication cables, please keep them away from power cables and maintain right angles at intersections. The communication cables shall be as close to the ground surface as possible or be supported by supporting beams, channel steel, or metal rail.

The power cables and communication cables shall be placed in different cable trenches, so as to avoid the long-distance parallel routing to reduce the electromagnetic interference to communication line caused by power line voltage transients.

When the wires are cross distributed, the crossing angle s hall be set to 90 degrees, and the distance may be appropriately.

If it is unavoidable that power lines and communication lines must run parallel over a long distance, please determine the appropriate distance between the two according to the following table, the minimum distance s hall be greater than 200mm.

Parallel Line Length (m)	Minimum Distance (m)
200	0.3
300	0.5
500	1.2

5.1.3.3. Cable Torque Requirement

Loose contact of cables to copper noses may lead to over-heating or even fire, please follow the torque requirements when tightening the screws/bolts of copper noses:

Bolt Size	M3	M4	M5	M6	M8	M10	M12	M16
Torque(N ·m)	0.7-1	1.8-2.4	4-4.8	7-8	17-20	34-40	60-70	119-140

5.1.3.4. Cable Protection

The protection of cables encompasses both communication and power cables. The measures to protect them are detailed below:

- **Communication Cable Protection**

Given their small size, communication cables are susceptible to damage or detachment from wiring terminals. It is advisable to install power cables before laying the communication cables. Utilize cable trays extensively and secure communication cables with zip ties where trays cannot be used. Additionally, communication cables should be kept at a distance from heating elements and power cables.

- **Power Cable Protection**

Power cables carry dangerous levels of voltage and current, so it is necessary to use appropriate cable trays. During installation, it is crucial to safeguard the insulation layer from scratches or damage to prevent short circuits. Power cables should also be adequately secured in areas where cable trays are not in use.

5.2. On-site Installation

	It is prohibited to perform any un-related mechanical operation either inside or on the top of the ESS Cabinet. During installation, please ensure the ESS Cabinet is clean (both inside and surrounding place)

5.2.1. Removal of Packaging

	The packaging plates of the ESS cabinet are heavy. To remove the outer packaging, please ensure that at least two workers are performing this operation simultaneously.

Please remove the transportation package of the cabinet with the following steps.

Step 1: Remove the top plate of the package box.

Step 2: Remove the wooden sides of the package box.

Step 3: Remove the shielding material from the package box.

Step 4: Remove the anchoring components that secure the cabinet to the transportation board. At this point, the ESS Cabinet can be detached from the wooden transportation pallet.

	After the ESS cabinet is detached from the wooden pallet, it is strictly prohibited to transport the ESS cabinet through the wooden pallet again. In addition, since now the ESS cabinet is at risk of tipping over, please handle with special care

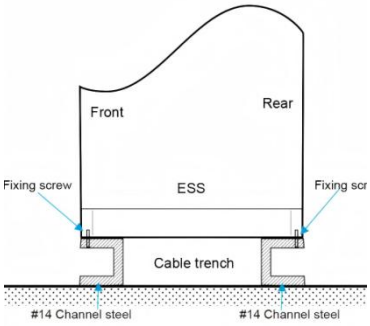
	The ESS cabinet may be repacked in accordance with the reversed steps for storage. Please keep the shielding materials and desiccants inside the box during repacking, and store the ESS cabinet in strict accordance with the description in this manual.

5.2.2. Cabinet Foundation

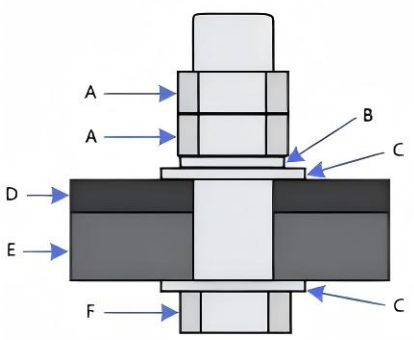
	The following methods and standards for base construction are recommended only. Actual installation should be professionally designed based on local requirements and site conditions.

5.2.2.1. Single Cabinet

Method 1: Channel steel



Method of Channel

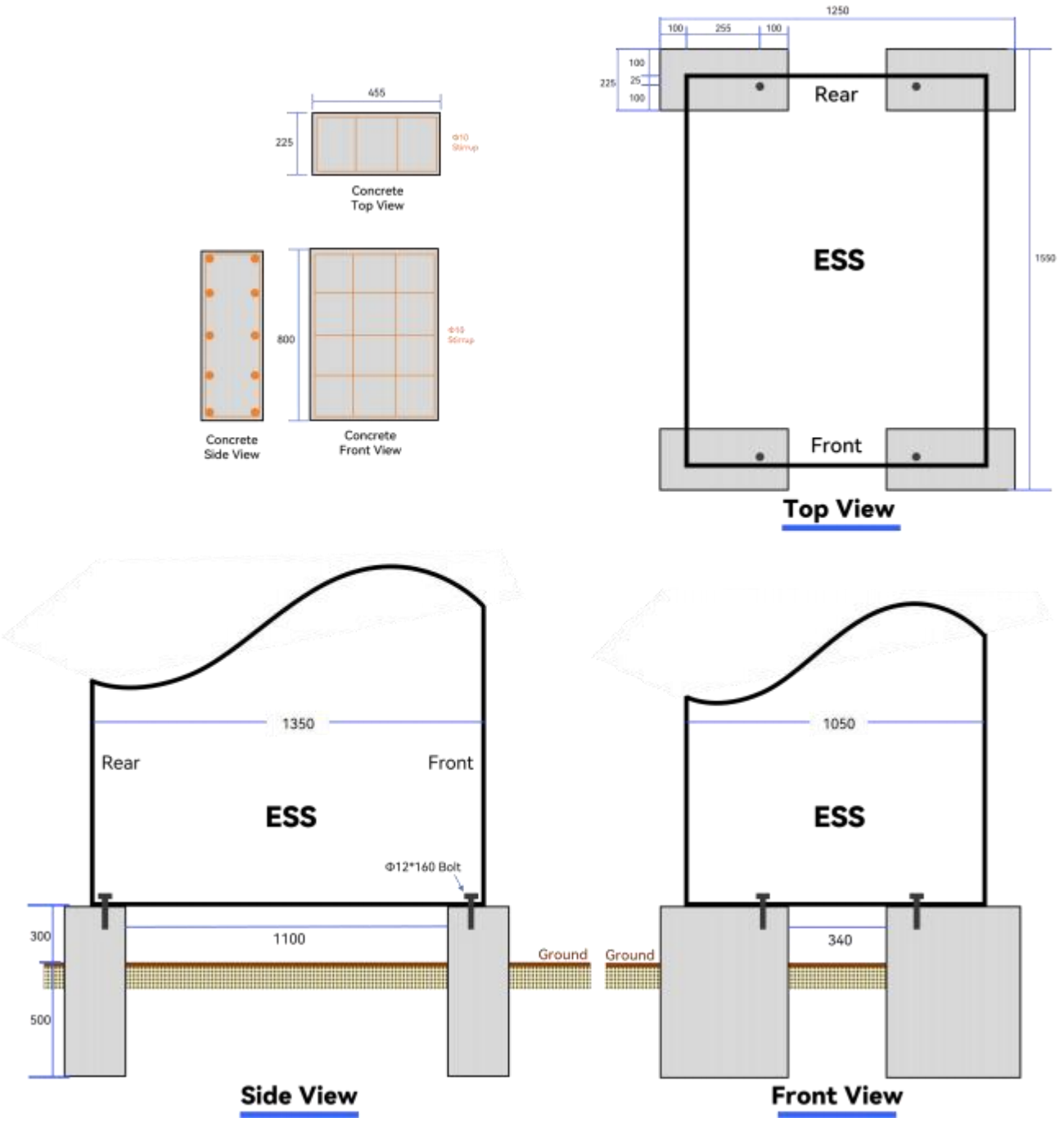


Screw Fixing Method

No.	Item
A	Nut
B	Spring washer
C	Flat washer
D	Base of cabinet
E	Channel steel
F	Bolt

Fix the cabinet to the #14 channel steel with M16 bolts through the pre-drilled slots on the base of cabinet.

Method 2: Concrete Base

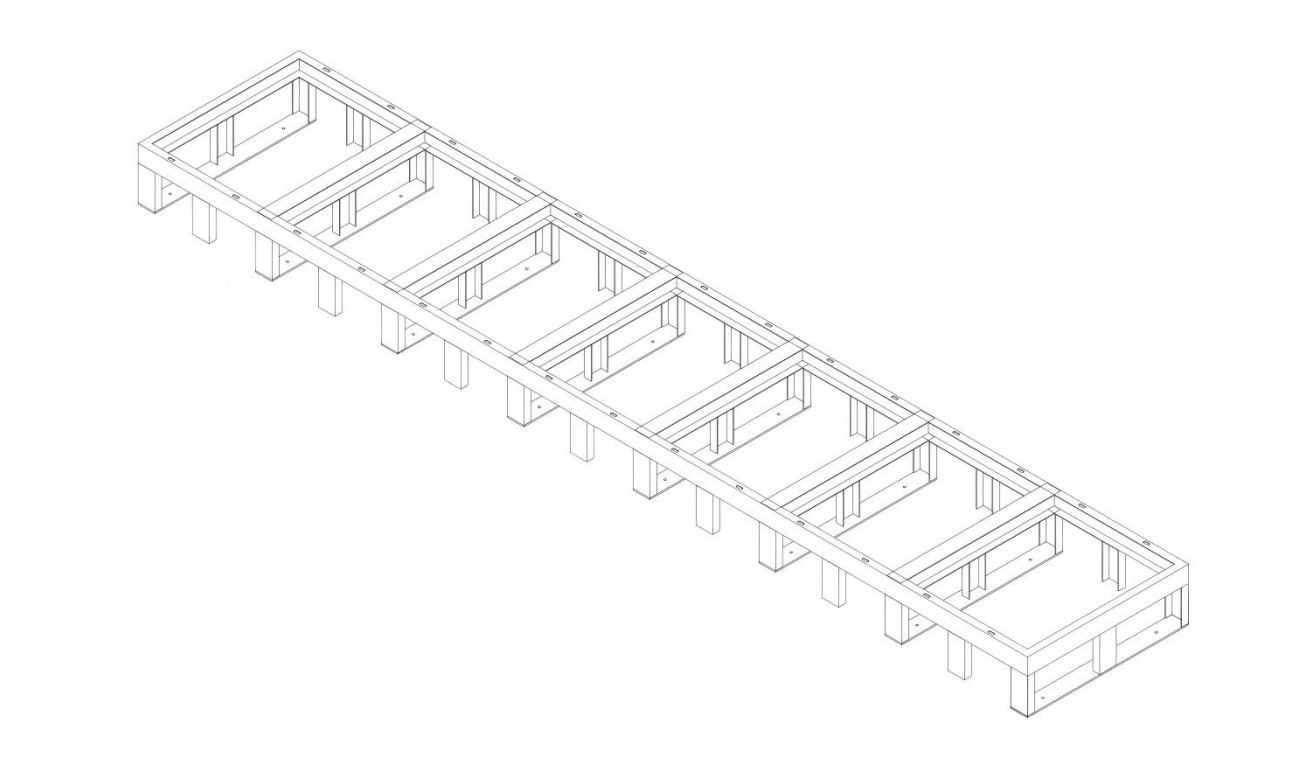


Note:

1) The foundation concrete grade is C30.
2) The reserved bolt position is determined according to the actual situation.
3) The characteristic value of the foundation bearing capacity is required to be above 150 kPa. After the foundation is excavated to the designed bearing layer, the backfill soil must be compacted before use. Gravel soil or silty clay should be compacted in layers, and the compaction coefficient should be at least 0.94.

5.2.2.2. Multiple Cabinets

Method 1: Channel steel



Technical Requirements:

1. The material s hall be channel steel of grade 14# and steel plate of 10mm thickness, made of Q235 steel, with a smooth surface capable of evenly supporting the weight of the cabinet, with a single cabinet weighing approximately 2.7T;

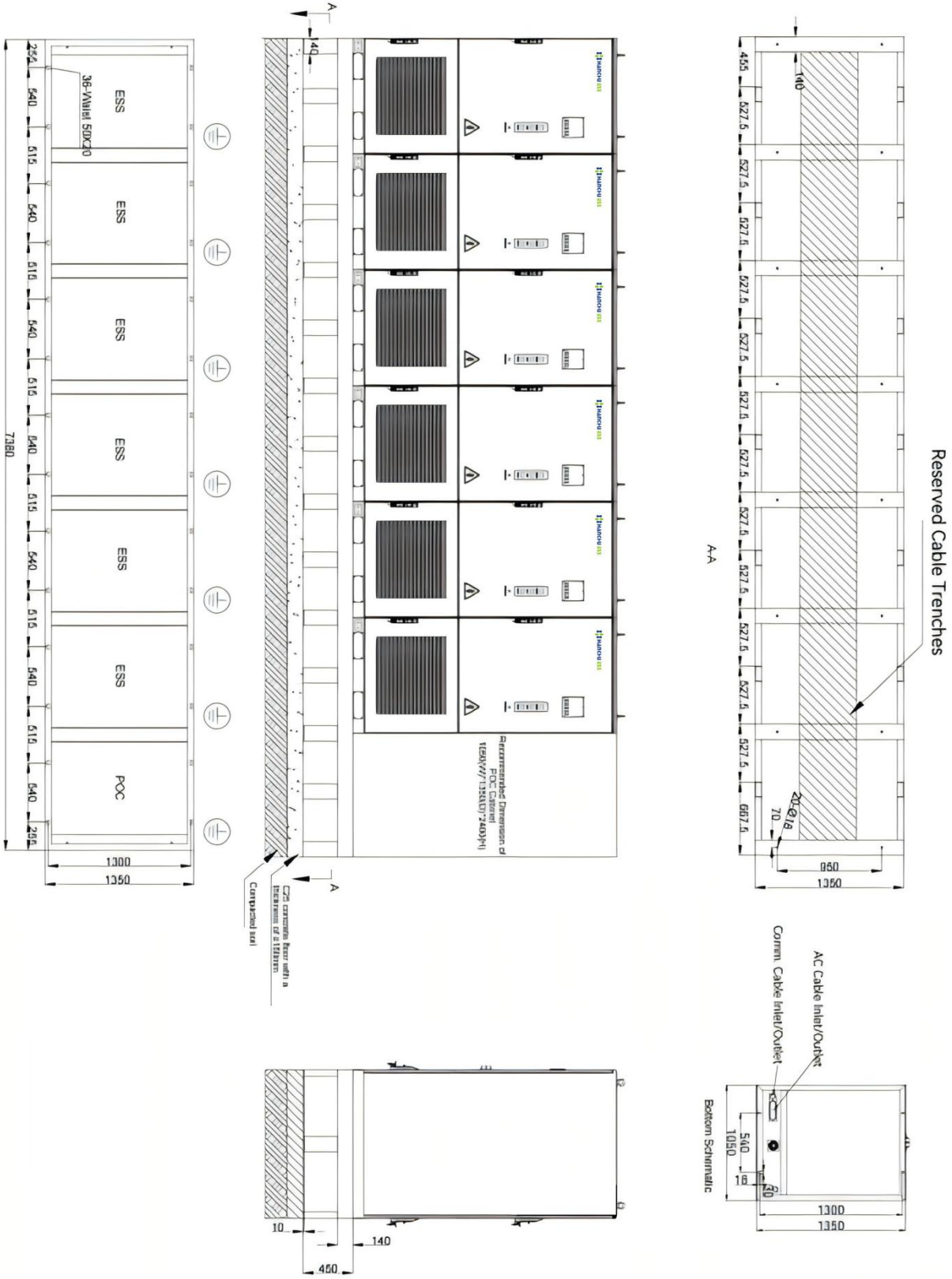
2. After the base is installed, secure it to the concrete floor using M16*100 expansion bolts, or weld it to the pre-embedded parts to form a structure;

3. The channel steel base must be treated for corrosion resistance;

4. During the base construction, the surface of the base must be relatively flat (with an error not exceeding 3mm);

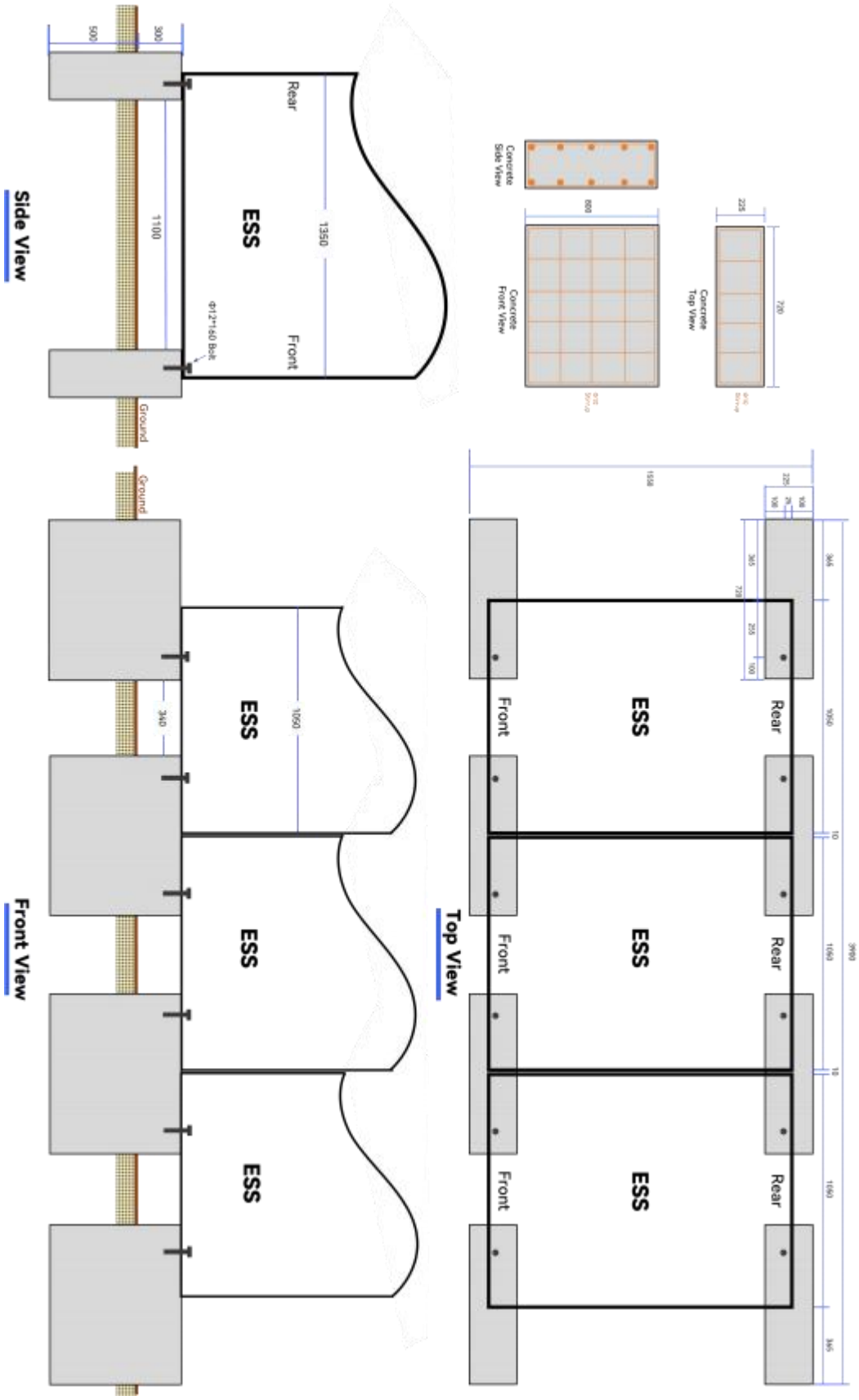
5. User cables should be routed below the base, with the middle part of the base being hollow.

Installation Guide:



Note: The actual dimensions of the POC Cabinet shall be based on the actual project design; the dimensions provided here are for reference only.

Method 2: Concrete Base



Concrete Base Diagram

Note:

1) The foundation concrete grade is C30.
2) The reserved bolt position is determined according to the actual situation.
3) The characteristic value of the foundation bearing capacity is required to be above 150 kPa. After the foundation is excavated to the designed bearing layer, the backfill soil must be compacted before use. Gravel soil or silty clay should be compacted in layers, and the compaction coefficient should be at least 0.94.

5.2.3. Accessories&Cable Connection

	• Please ensure that both the AC and DC sides are not live before installation. • Be sure not to touch any live part!

	• All electrical connections shall comply with the electrical connection standards of the country/region where the project is located. • Only professional electricians or qualified personnel are allowed to conduct electrical connection for the product. • Check all cables before connection to make sure that insulation is perfect; Replace all cables of any insulation defect to avoid risk of safety problem.

5.2.3.1. Safety Requirement

In order to ensure the safety of personnel and equipment during electrical installation, follow all safety instructions in this manual (especially those in this chapter), complying also with local safety regulations (of destination region/country).

During the electrical connections of the ESS Cabinet, as well as all other operations carried out to the ESS Cabinet, always follow the Five Safety Rules below:

1) Disconnect all external connections of the ESS and the connections to the internal power supply.

2) Make sure that the ESS will not be re-powered on by all means

3) Use a multi-meter to make sure that the inside of the ESS is completely powered-off.

4) Conduct necessary earthing connection and short-circuit connection.

5) Use insulating coverings to cover the potentially-live parts near the operation section.

5.2.3.2. Tool Preparation

					
Striping Plier	Torque Wrench	Wire Crimper	Hydraulic Plier	Multi-meter	Electric Screwdriver
					
Heat Gun	Insulating Gloves	Anti-arc Flash Suit	Safety Shoes	Ear Protector	Safety Goggles

5.2.3.3. Overview of Wiring Area

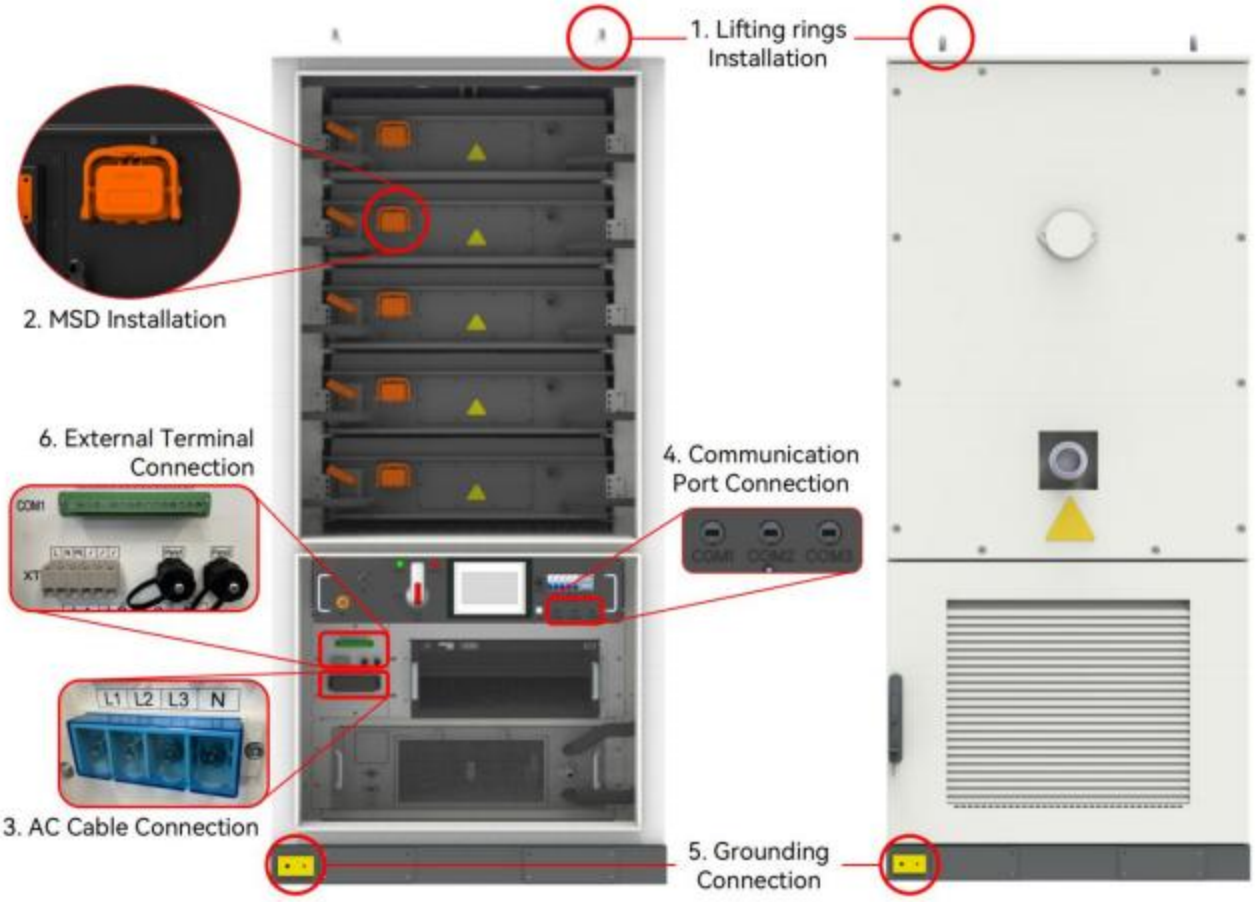


Figure 5-7 Wiring Area

The CESS-125K261LL cabinet completes most of the internal wiring before leaving the factory, so during on-site installation, only the wiring in the three areas shown in the Figure 5-4 needs to be connected:

- Lifting rings installation
- MSD installation
- AC cable connection
- Communication cable connection
- External terminals connection
- Grounding connection

5.2.3.4. Lifting Rings Installation

Even if there is no need for lifting, please install the lifting rings to prevent the protection rating from being compromised.

The lifting rings are placed inside the cabinet and will be shipped together. Please manually install them at the four corners of t he top of the cabinet.

5.2.3.5. MSD Installation

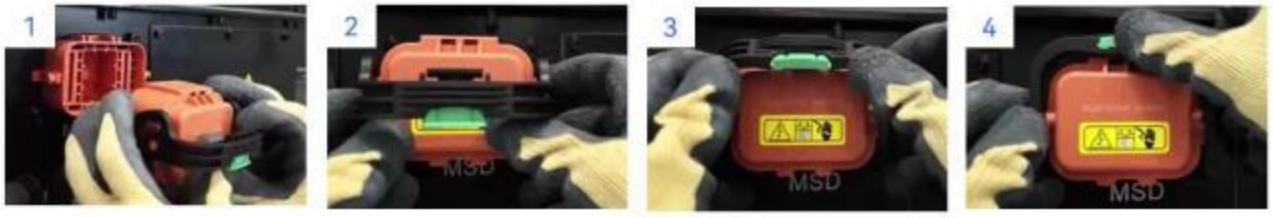


Figure 5-8 MSD Installation

1) Open the handle, make sure at a 90° angle to the connection surface.

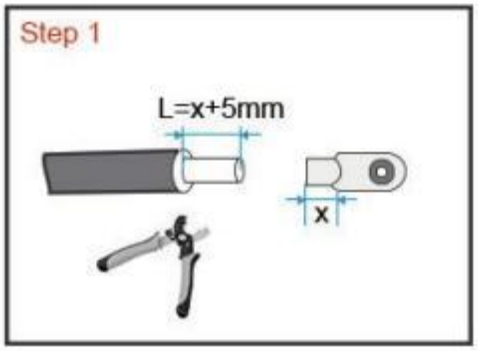
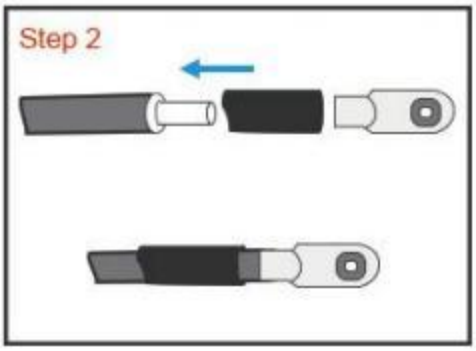
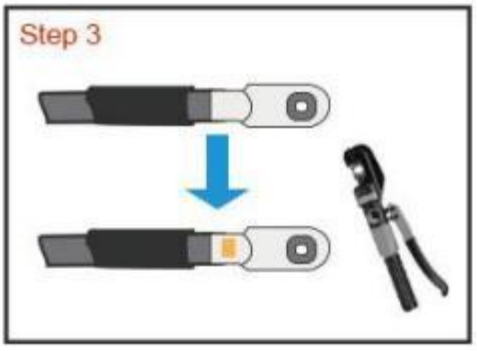
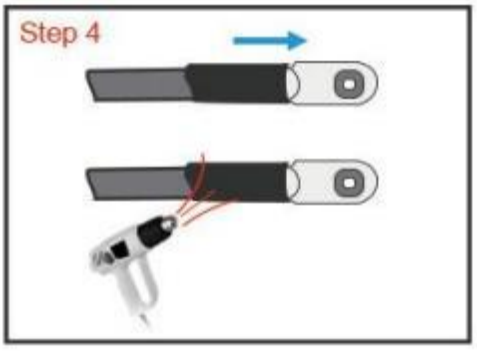
2) Insert the MSD horizontally.

3) After inserting, flip the handle upwards while continuing to push it further in.

4) After pushing the handle all the way in, press the central protruding part until you hear a click.

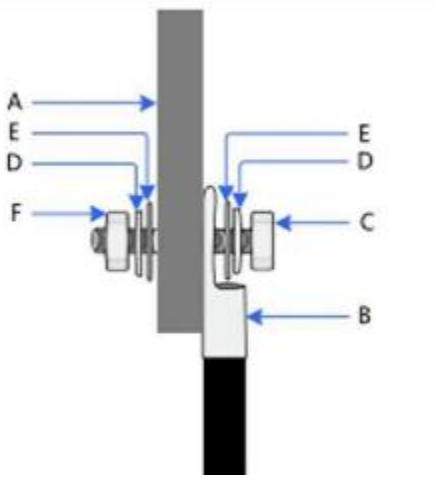
5.2.3.6. AC Cable Connection

	Make sure that the battery unit of the ESS Cabinet is disconnected before connection.

	Step 1: Strip the cable with Stripping Piler, to expose copper core for a length of the-copper-nose-conduit-depth(x in figure) +5mm. Based on the cable specifications, it is recommended to use DT XX-8 copper nose terminal for wiring, where XX is the wire diameter of cable.
	Step 2: Select a heat shrink tubing that matches the cable size. The length of the tubing shall exceed the copper nose conduit by 20mm. Slide the heat shrink tubing and DT terminal sequentially onto the cable.
	Step 3: Crimp copper nose terminal. Put the exposed copper core into the copper nose conduit. Use a wire crimper to compress the copper nose terminal. Compress it at least twice.
	Step 4: Wrap the heat shrink tubing over the copper nose till the copper nose conduit is fully covered. Use a heat gun to tighten the heat shrink tubing.

Step 5: Connect the power cables.

- Select bolts that match copper nose terminals.
- Fix the nose onto the wiring bar, minding the phase order of A-B-C-N.
- Tighten the screws with screwdriver and/or wrench. The tightening torque of copper cables is 20N.m.



No.	Item
A	Cooper Bar
B	Cooper Nose Terminal
C	Screw
D	Spring Washer
E	Flat Washer
F	Nut

Step 7: Check and make sure that the wiring is securely fixed.

5.2.3.7. Communication Connection

Figure 5-9 Communication Terminals on HVB

To establish the network connection for the ESS, it is necessary to first configure the ESS to be on the same subnet as the router or gateway before proceeding with the wiring.

The detailed configuration steps are as follows:

Step 1: Connect the HVB's COM2 port and computer through RJ45, or connect them both to the same gateway.

Step 2: The default IP address of the cabinet is 172.23.1.201, please manually set your computer's IPv4 address to 172.23.1.x(x can be set from 0 to 255 but not 201), set subnet mask to 255.255.255.0 and save.

Step 3: Then log in the local web by Link: 172.23.1.201:38080

1) Account: Config

2) Password: sfereems

*Please ensure the PCS is halted before operation.

Step 4: Select the "setting page" and change the cabinet's

1) IP address: fit your router or gateway's IP segment.

2) Subbet Mask: 255.255.255.0

3) Default Gateway: your gateway's IP address

4) Preferred DNS Server: 8.8.8.8

5) Click the "Edit" button

Step 5: Restart the Cabinet. Off the cabinet by the sequence: QF4 →QF3 →QF2 →QF1. Then wait 10 seconds, start the cabinet by: QF1 →QF2→QF3 →QF4.

Step 6: Don't forget connect the COM2 port to the gateway.

* The EMS IP address has already been changed to the one you configured. If you want access Local Web to so some settings, please use the new link: IP address:38080. The account and password are fixed.

5.2.3.8. External Terminals Connection

User can connect external communications based on their own requirements.

1) COM4 Communication Terminal

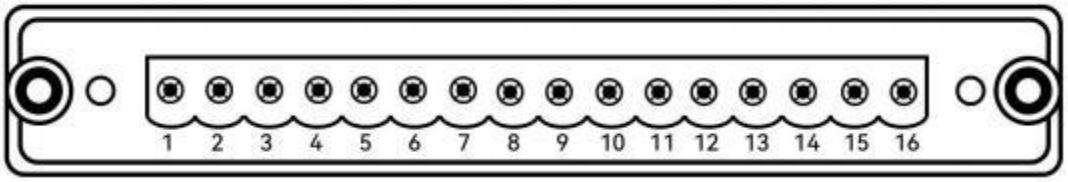


Figure 5-10 COM4 terminal

Pin No.	Definition	Pin No.	Definition
1	Breaker status DI signal	9	BMS debugging CANL
2	Breaker status COM signal	10	PCS debugging RS485A1
3	Breaker trip DO+ control	11	PCS debugging RS485B1
4	Breaker trip DO- control	12	RS485A2(Reserved)
5	/	13	RS485B2(Reserved)
6	On-site Meter Comm. RS485A	14	/
7	On-site Meter Comm. RS485B	15	/
8	BMS debugging CANH	16	/

When the ESS is used in conjunction with the Hanchu POC cabinet, it is necessary to use COM4 terminal to communicate with the devices inside the POC cabinet. Pin1 and Pin2 is used to detect and collect the status of the breaker, Pin3 and Pin4 is DO contact to control the breaker to trip. Pin 6 and Pin7 is RS485 to communicate with meter inside the POC cabinet.

	The above applies only to the Hanchu POC cabinet. If you wish to use these functions on a POC cabinet of other brands, please contact Hanchu technical personnel in advance.

2) Parallel Connection Terminal

When using multiple ESS units and nee to operate in off-grid application, please connect the STS with master unit's Para1 and connect the Para2 of master unit to slave unit's Para1, and then connect Para2 to next Para1 in sequence as follows:

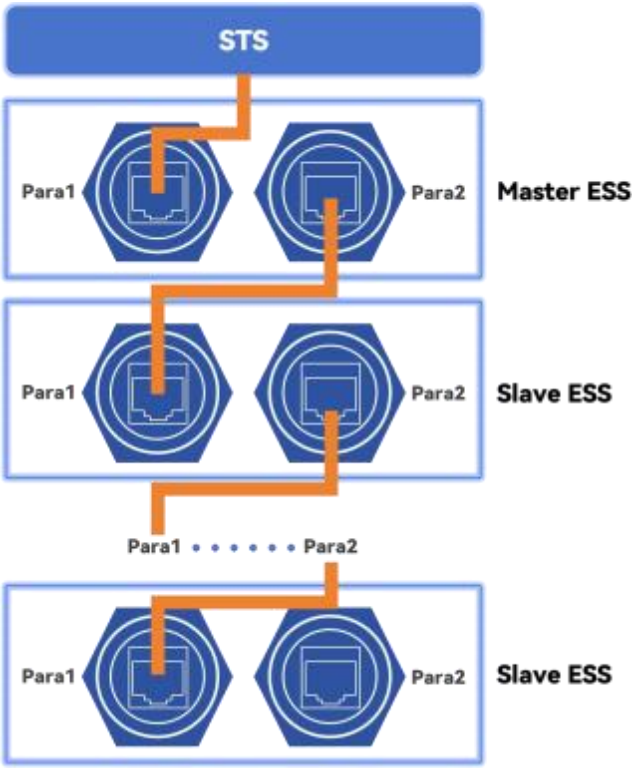


Figure 5-11 Parallel Connection Method

3) UPS Power Supply Terminal

When an external UPS power supply needs to be connected, it can be connected to the system through this terminal. At the time before factory delivery, Pin 3 will be short-circuited with Pin 5, and Pin 4 will be short-circuited with Pin 6 in advance. When an external UPS needs to be connected, simply remove the connection between Pin 3 and Pin 4, and connect them to the L and N terminals of t he UPS, respectively.

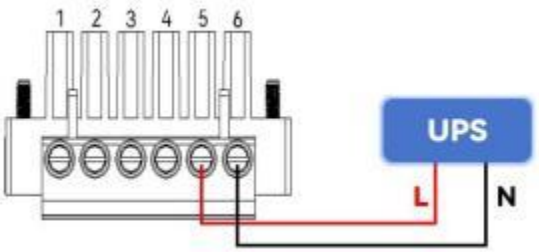


Figure 5-12 UPS Connection Method

5.2.3.9. Grounding Connection

The cabinet is equipped with two grounding copper bars at the front and back. The front copper bar is used for electrical grounding, while the rear copper bar is used for cabinet grounding.

The grounding panel on the cabinet is equipped with both M12 and M8 screws; choose one of them. Select flexible copper cable of 35mm² and DT 35-8 terminal.

Front Grounding Bar

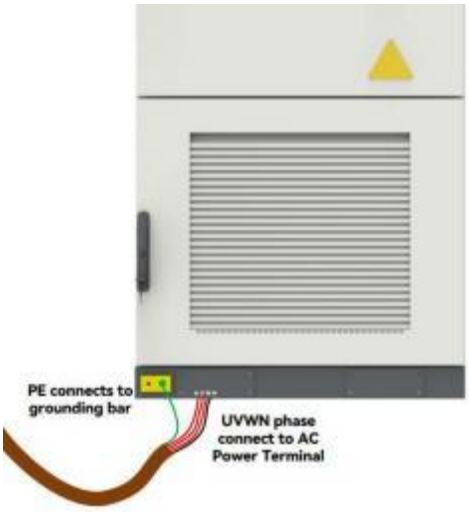


Figure 5-13 Front grounding bar connection

Rear Grounding Bar

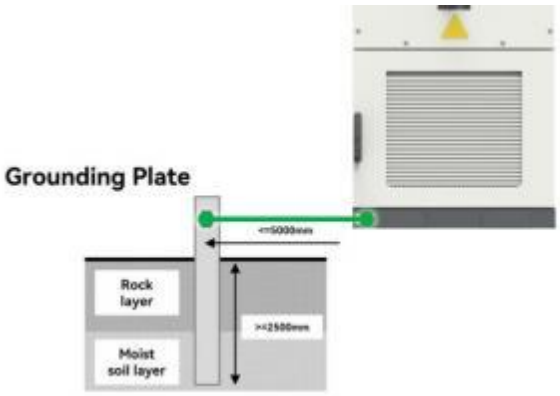


Figure 5-14 Grounding Plate Connection

Grounding connection shall comply with the following instructions:

- The grounding connection shall comply with the grounding standards and codes of the country/region where the project is located.
- The connection between the equipment and the grounding electrode shall be tightened and reliable.
- Upon completion of grounding, the grounding resistance shall be measured and not exceeding 4Ω.

	The grounding cables shall be well grounded! Otherwise: ● In case of malfunction, it may pose a fatal electric shock hazard to operators! ● Lightning strikes may cause equipment damage! ● The equipment may malfunction! ● The wiring shall be conducted in strict accordance with the wiring markings inside the equipment.

5.2.4. Sealing of Inlet Holes

Check carefully all the electric connections upon completion of works. When all connections are verified, seal the gaps with fireproof mud. The fireproof mud is provided by Hanchu and will be shipped together with the cabinet.

Don’t remove the protective sponge which prevents the cables from being scratched.

	● If the sealing is not done properly, there's a risk of moisture infiltrating the equipment. ● An inadequate seal might permit the intrusion of rodents or similar creatures.

5.2.5. On-grid Parallel Application

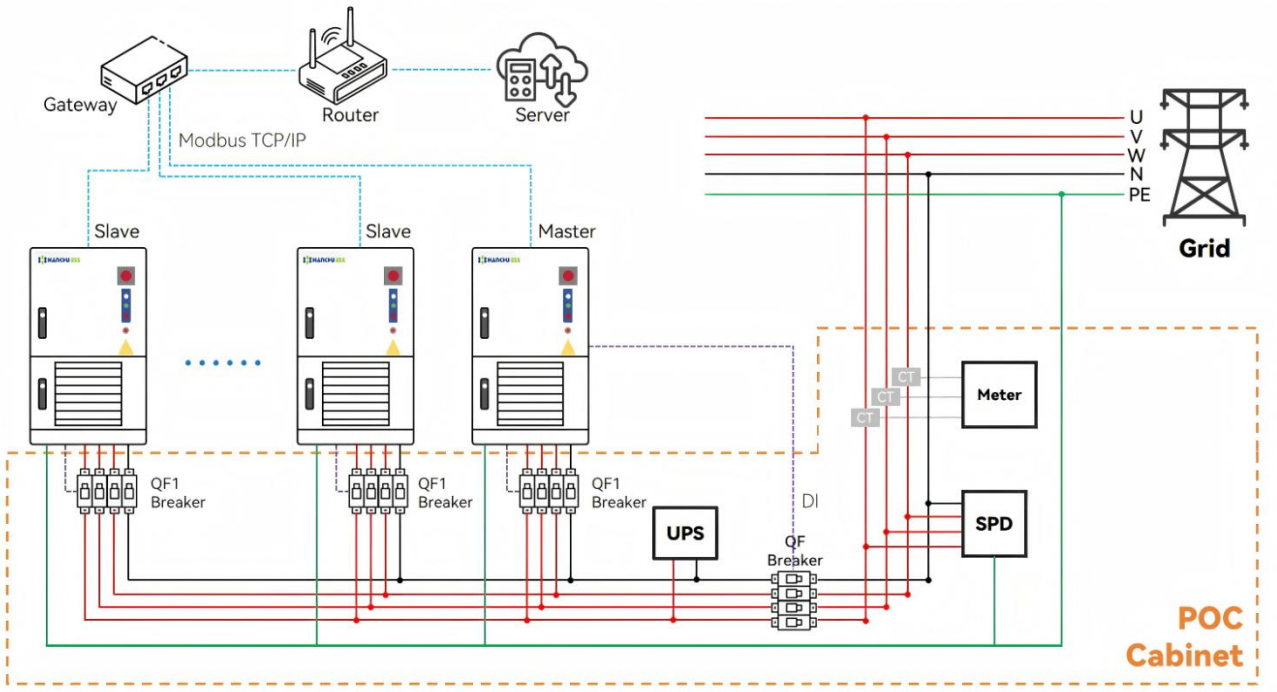


Figure 5-15 On-grid Parallel Connection Diagram

In the case of on-grid parallel connection, each cabinet need go through a circuit breaker (QF1 breaker) before junction, and then pass through the main circuit breaker (QF breaker) to export to the grid. Each cabinet collects the breaker contact and tripping signal of its own QF1 breaker through DO, and the master device additionally collects the tripping signal of the QF circuit breaker and control the open or close the breaker through DI. Additionally, the UPS, SPD and meter will also be integrated inside the POC cabinet.

The COM2 port of the high-voltage box need be connected to the higher-level EMS or gateway, and then the data can be uploaded to the server through the router.

5.2.6. Off-grid Application

Hanchu provides flexible off-grid operation modes and switching solutions, supporting both single-unit and multi-unit ESS configurations. Depending on the application scenario, the ESS can operate in pure off-grid mode or achieve on/off-grid switchover through dedicated cabinets. For any on/off-grid switching applications, it is mandatory to use Hanchu 's POC cabinet or STS cabinet.

Pure Off-grid Operation

- **Single Unit:** The ESS cabinet operates independently, directly supplying power to the load without grid connection.
- **Multiple Units**: Up to 6 ESS cabinets can be connected in parallel for off-grid operation, coordinated by one master unit.

On/Off-grid Switching via UPS (Integrated in Hanchu POC Cabinet)

- **Single Unit**: The UPS performs the transfer between grid and ESS. Typical switchover time: 1 –2 minutes.
- **Multiple Units**: Up to 6 ESS cabinets can be paralleled. The UPS in the POC cabinet manages the transfer between grid and ESS, with typical switchover time of 1–2 minutes.

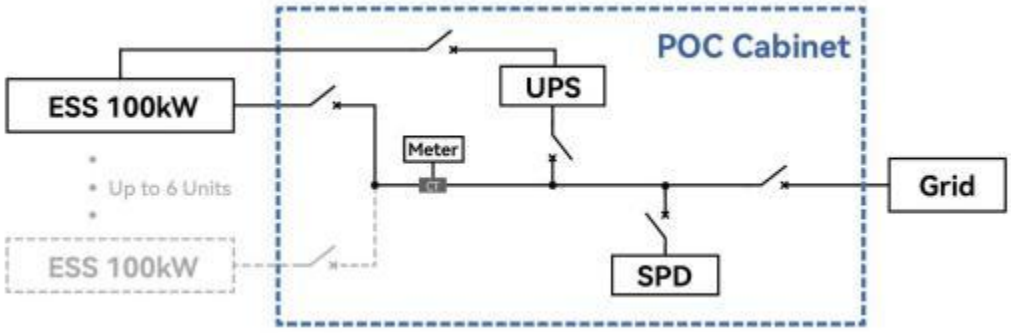


Figure 5-16 System diagram of ESS & grid connection via POC cabinet

On/Off-grid Switching via Hanchu STS Cabinet

- **Single Unit**: The ESS connects to the STS cabinet, where UPS is embedded. The STS achieves seamless source transfer between grid and ESS with switchover time within 20 ms.

- **Multiple Units**: Up to 3 ESS cabinets can be paralleled with 1 STS cabinet. For larger systems, two STS cabinets can be deployed in parallel, allowing up to 5 ESS cabinets in total. The STS ensures fast and reliable switchover between grid and ESS, with transfer time within 20 ms.

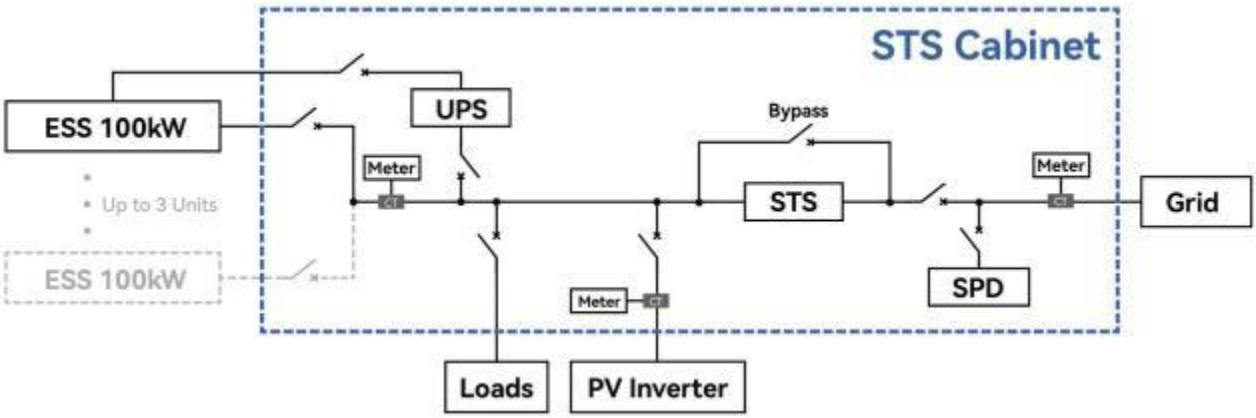


Figure 5-17 System diagram of ESS on/off-grid switching via STS cabinet

	The detailed installation methods of POC cabinet and STS cabinet please refer to the installation manual separately.

5.2.7. Installation Check-list

Upon completion of installation, to ensure the normal operation, conduct the following inspections:

Mechanical Installation Inspection
☐ The ESS Cabinet is not deformed or damaged
☐ There is sufficient maintenance space around the Cabinet
☐ Temperature,humidity,and ventilation conditions of the environment (where the ESS is seated) meet the requirements
☐ Clear warning signs have been put up in and out of the ESS Cabinet
☐ There is no flammable,explosive or hazardous materials near the ESS Cabinet
Electrical installation inspection
☐ The ESS Cabinet grounding cables:complete and secured
☐ The ESS Cabinet power cables connection:correct and secured
☐ The ESS Cabinet communication cable connection,correct and kept at a proper distance from power cables
☐ The cables SN number:correctly and clearly identified
☐ The insulated protective cover:complete and secured and the warning signs are clear and secured
Other Inspections
☐ Inside the cabinet: no foreign objects, like tools, parts, waste or conductive dust
☐ The ESS Cabinet and cables: neat and secured

6 Warranty Statement

6.1. Power-on Operation

	Before the power-on operation, please check the “Emergency Button” has not been pressed.

Power-on steps:

Close QF1 →QF2 →QF3 →QF4 in sequence

Once the high-voltage box is active, the BMS enters a self-check state. If no issues are detected, the high voltage box operation indicator light will illuminate, and the system will automatically close the high voltage contactor within the high voltage box. This action generates DC high voltage at both the positive and negative terminals of t he battery. Subsequently, the BCQ begins to check the PCS. If no faults are found, the BCQ will instruct the PCS to connect its main contactors. If the BCQ does not issue any command, the PCS will remain in standby mode. If the BCQ issues a power-on command, the PCS will initiate a self-check for grid connection.

	During the commissioning or maintenance phase, if the PCS is not in standby mode, it is strictly forbidden to perform a power-on operation using the BMS.

6.2. Charging and Discharging

After ESS Cabinet is powered on, EMS starts its programmed operation and issues charging/discharging commands to the charger. BMS detects the charging/discharging current. Built-in charger starts charging/discharging operations. During charge/discharge period, both green indicator and white indicator light up.

6.3. Power-off Operation

Power-off Step:

QF1 →QF4 →QF3 →QF2

The white LED indicator on the cabinet front panel goes out: it indicates that CESS-125K261LL is successfully powered off.

DANGER	Before powering off CESS-125K261LL, please ensure that it has exited from the charge/discharge mode. Never cut off the power supply when the ESS cabinet is in charge/discharge mode!

6.4. Black Start

Step 1:

- Disconnect the Grid and Loads

WARNING	Switch off the grid breaker to isolate the ESS from the grid.

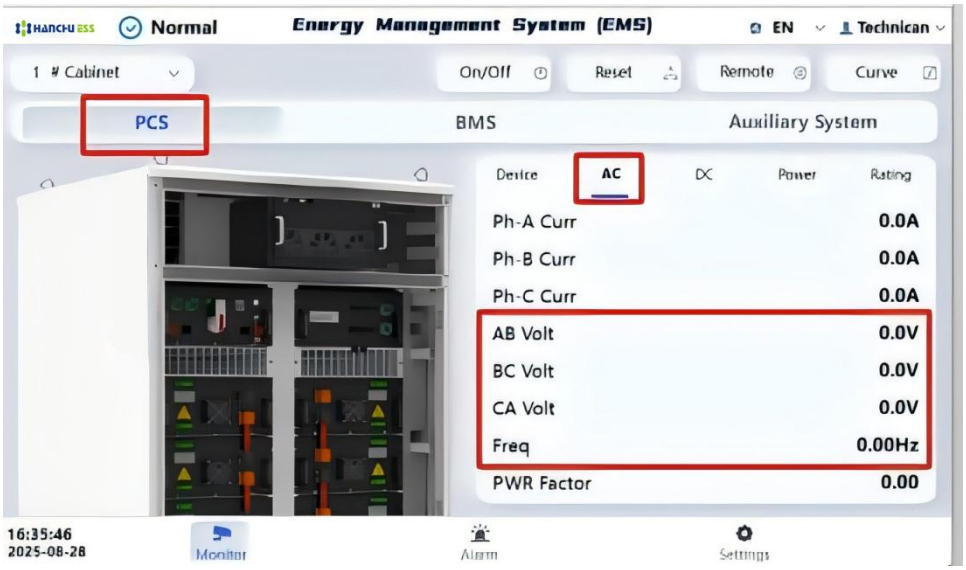
Step 2:

- Switch on QF1.

Press and hold the “AN” button until the green “RUN” light turns on.

Figure 6-1 Black Start Button

- Keep all other QF breakers switched off.
- Verify that the ESS has stopped operating, or confirm on the ESS HMI that the AC voltage has dropped to 0V and frequency has dropped to 0Hz as well.



Step 3:

- Connect to LocalWeb
- Navigate to “Monitor → PCS → Remote Adjustment”.
- Change the following values:

  No.3: “GridConnectSet” from 0 → 1

  No.5: “OnOff” from 0 → 1

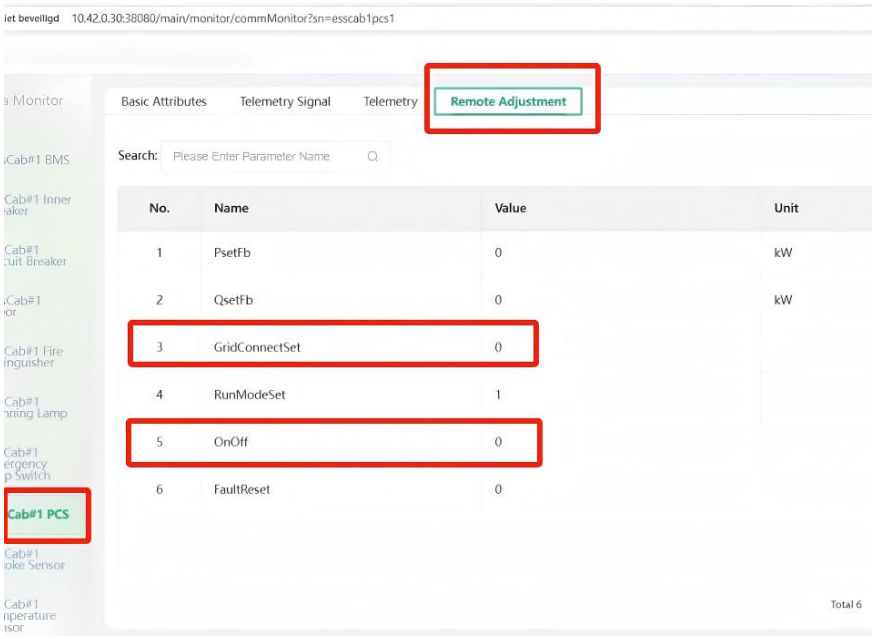


Figure 6-2 Local Web Setting Steps

	Local web login Steps: 1) Connect your computer to the “BCQ” port with an Ethernet cable 2) Configure the laptop network to be on the same subnet as the ESS cabinet. 3) Open a browser and enter [Cabinet IP address:38080]. 4) Username: config 5) Password: sfereems

Step 4:

- Observe the HMI status. Once the HMI shows approximately 400V AC voltage and 50Hz frequency, the ESS is successfully running in off-grid mode.

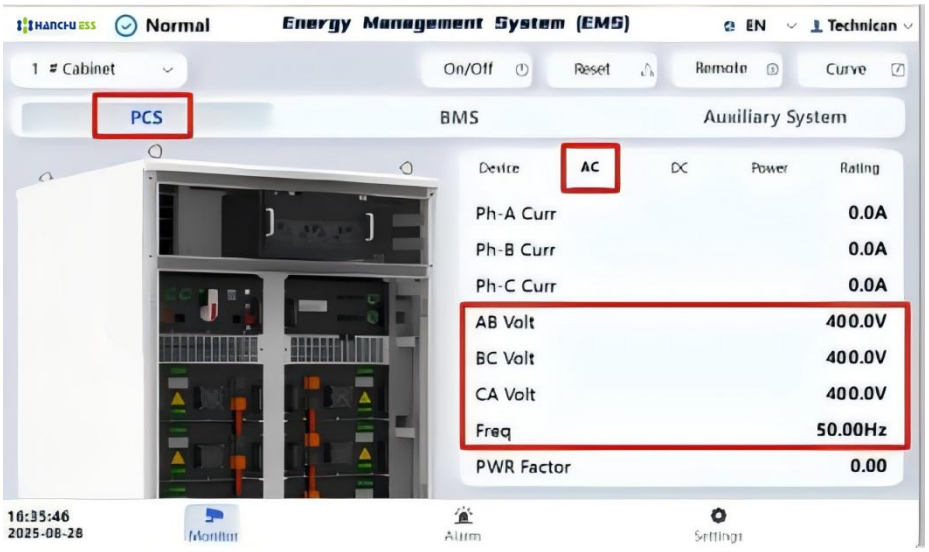


Figure 6-3 HMI

Step 5:

- Switch on the QF2 → QF3 → QF4.

	• Never reconnect the ESS to the grid while in off-grid mode. • Doing so will damage the PCS, and Hanchu will not be responsible for misuse. • When switching on the switches, please strictly follow the specified sequence. • When switching on multiple switches, allow an interval of 1–2 seconds between each operation. Do not switch on them all at the same time.

7 HMI

7.1. Operation Instruction

7.1.1. Function Introduction

The energy storage system supports the on-site viewing of its operating status and monitoring data, the on-site configuration of strategy parameters, and the on-site viewing of alarm records through t he HMI configuration screen.

7.1.2. Account Login

Choose Account : Technician

Password: 1

Log-in t he HMI system.

Figure 7-1 Log-in page

Click the account name in the upper right corner, and then a "log out" button will pop up. Click it to log out of the account. (Figure 7-2)

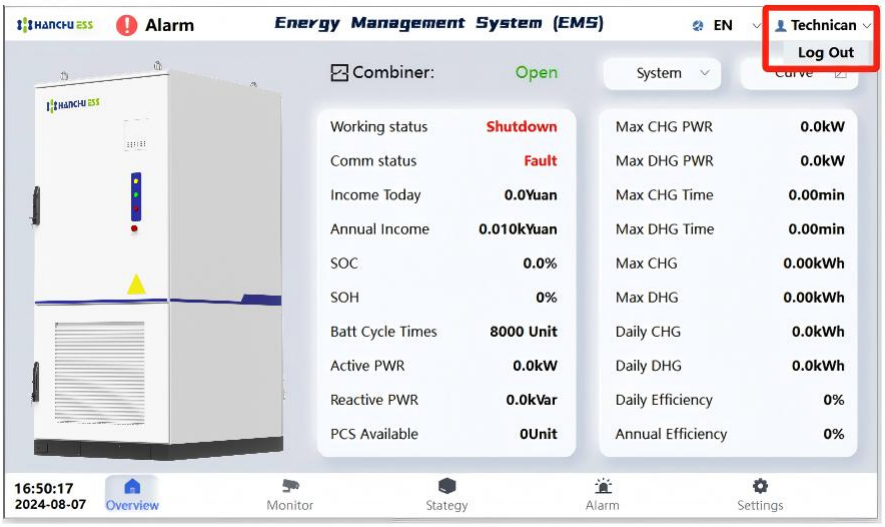


Figure 7-2 Log out button

7.1.3. Overview

The overall operation data of the BCQ system and grid-tied bus-bars are displayed, the switching of the system as a whole and each grid-tied bus-bar is supported, and the viewing of parameter operation curve chart is supported. (Figure 7-3)

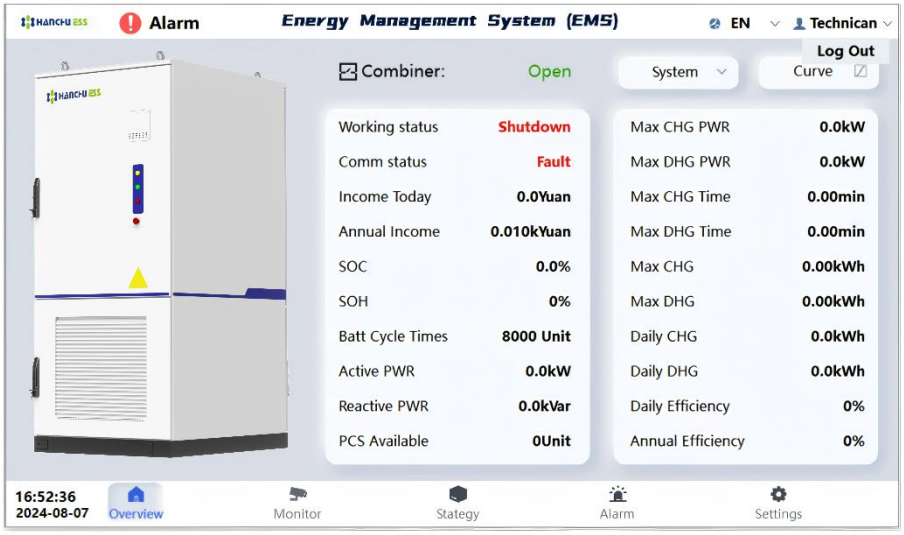


Figure 7-3 Overview page

Operation Curve Chart:

This is the operation curve chart that supports the viewing of power parameters, charging/discharging level, energy storage benefits, and battery SOC of the BCQ system. (Figure 7-4)

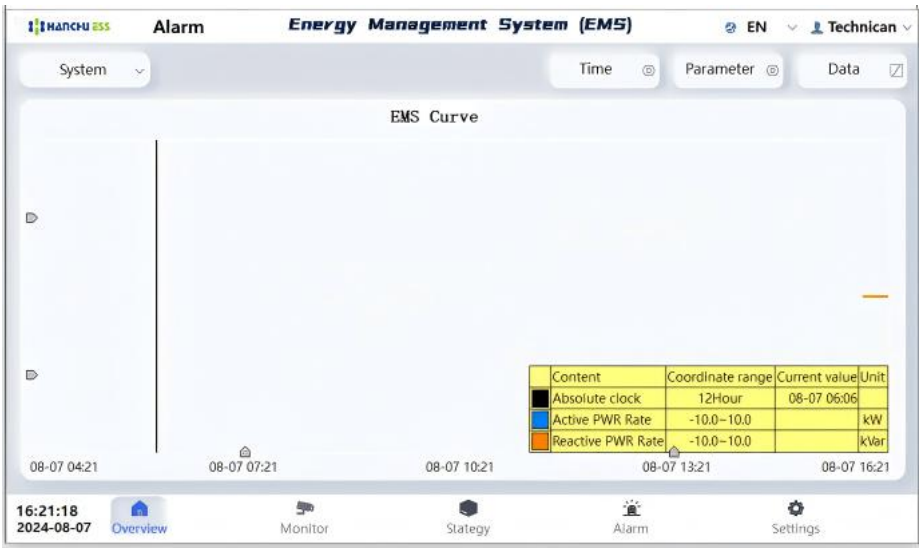


Figure 7-4 EMS operation curve chart

When viewing the operation curve, you can set the query time: (Figure 7-5)

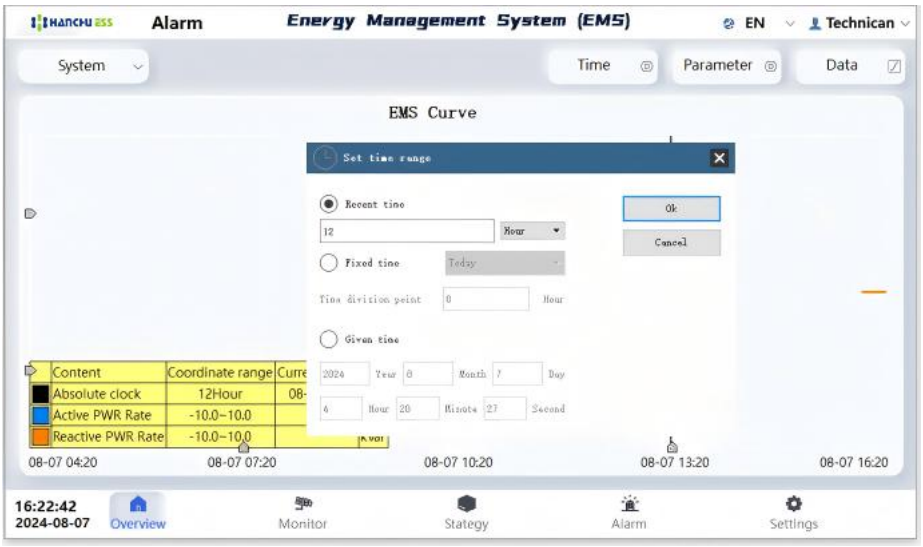


Figure 7-5 Query time setting

7.1.4. Monitoring

The operation data of BCQ system, PCS, BMS equipment, and auxiliary systems are displayed, and the viewing of parameter operation curve chart is supported. The remote control of equipment is supported. (Figure 7-6)

You can switch to different energy storage cabinets in the upper left corner of the interface.

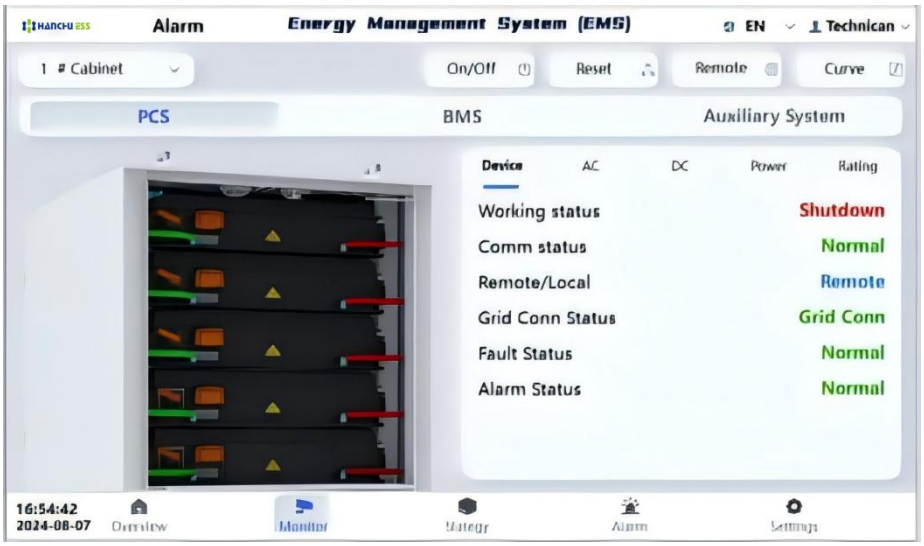


Figure 7-6 Detail information of PCS

Operation Curve Chart:

The viewing of operation curve of equipment parameters is supported. The switching of parameters and the setting of query time are supported. (Figure 7-7)

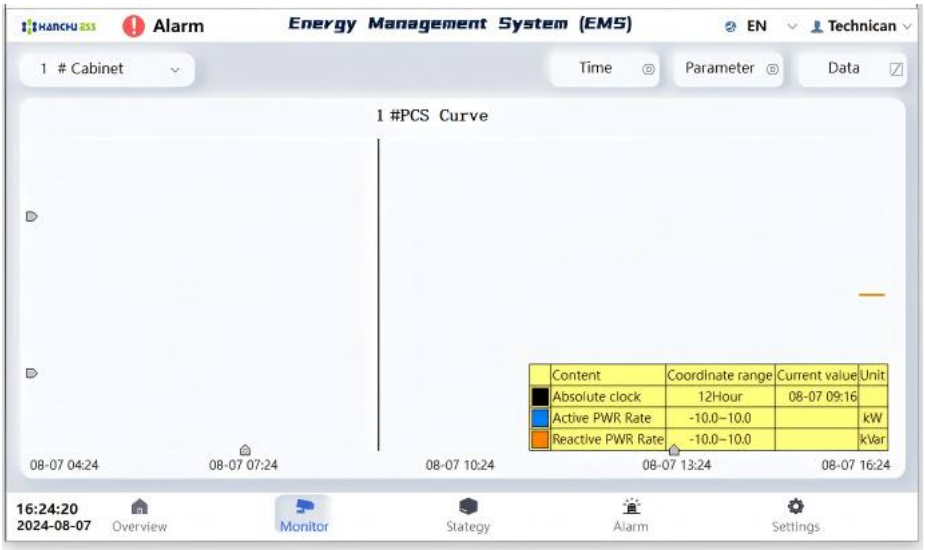


Figure 7-7 PCS operation curve chart

Remote Control:

Click the control button and select the operation content and password in the pop-up window, so as to complete the control operation. (Figure 7-8)

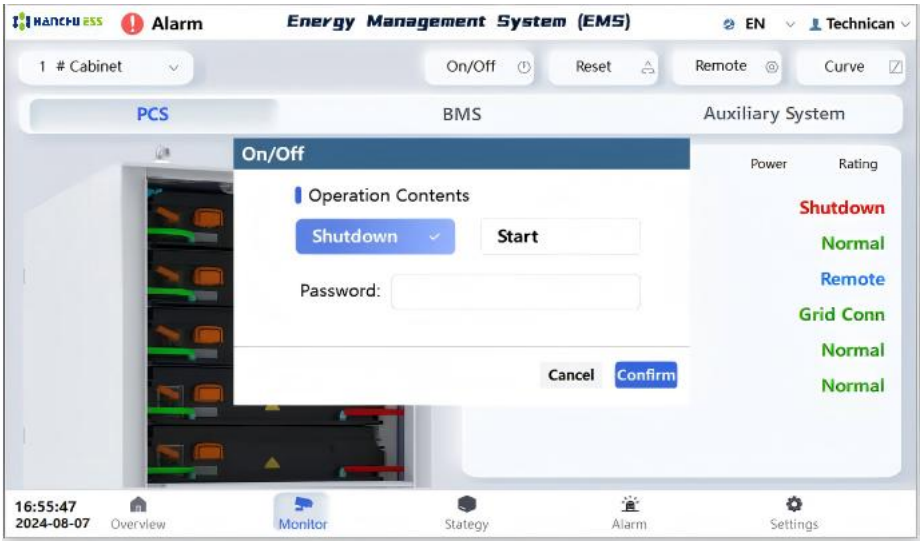


Figure 7-8 PCS remote control page

Battery Cell:

Click "Battery Details" on the BMS equipment monitoring page, so as to view the detailed data of battery cells. (Figure 7-9)

Figure 7-9 Detail information of battery cell

In "Details of Battery Cell" in Figure 7-10, the voltage and temperature data of all battery cells can be viewed, and the quick queries by entering the battery section number and temperature measurement point is supported.

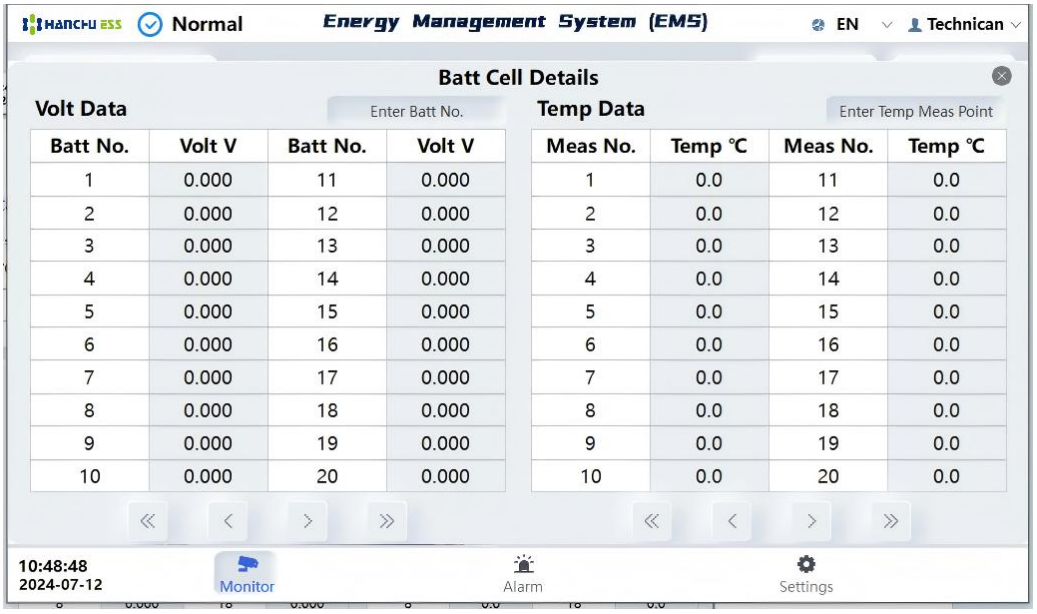


Figure 7-10 Battery cell details page

7.1.5. Alarm

Various alarm information during the operation of energy storage system is displayed, including real-time alarms and historical alarm records. (Figure 7-11)

If there is an alarm during the operation of the energy storage system when any other interface is displayed on the screen, the alarm icon in the upper left corner will flash continuously.

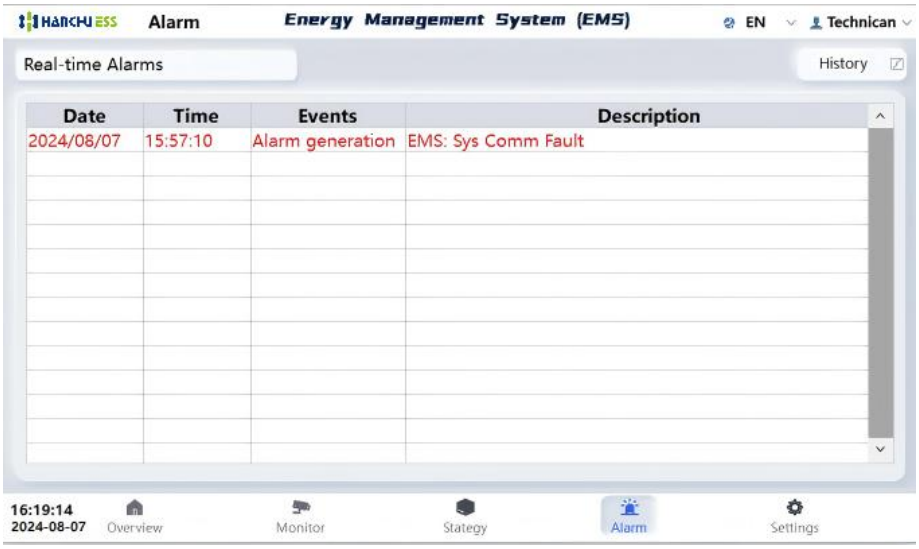


Figure 7-11 Alarm page

Click on "Historical Alarm" to display the historical alarm records of the energy storage system (Figure 7-12):

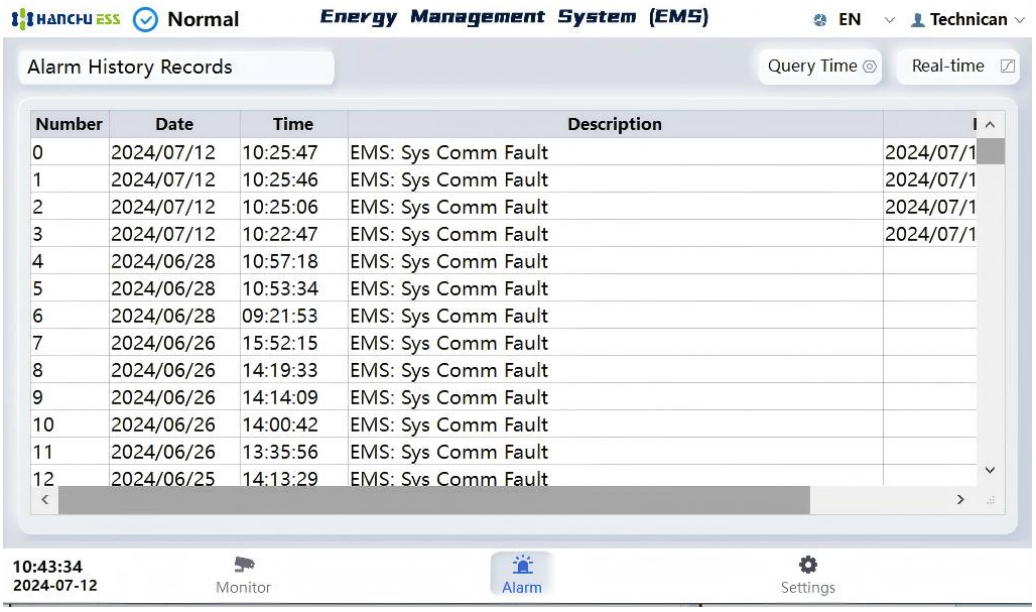


Figure 7-12 Alarm history record page

7.1.6. Setting

This interface is for password change, basic setting, buzzer & screen saver, restart operation, and equipment information. (Figure 7-13)

To enter the "Settings" interface, you need to log in to your account.

Figure 7-13 Setting page

Password Change: Enter the original and new account passwords. The new password will become valid only after the original password is verified as correct.

Buzzer & Screen Saver: Set the alarm duration of the buzzer when an alarm occurs; when there is no operation on t he HMI screen within the set time, the system will log out of the account automatically and enter the screen saver interface.

Restart: Click on "Restart Equipment" to automatically restart the HMI screen.

Basic Setting: Set the number of energy storage cabinets and the number of grid-tied points.

Equipment Information: Display the manufacturer information, equipment model, and software version of the energy storage system.

8 Maintenance

8.1. Emergency Faults and Handling Methods

8.1.1. Fire

Step 1: Evacuate on-site personnel to a safe place, delineate an isolation zone, and pass the warning message to relevant personnel to report.

Step 2: To the extent that safety is ensured, follow steps below:

1) In case wiring harness is in fire, fight fire with a carbon dioxide or dry powder fire extinguisher.

2) In case ESS Cabinet catches fire, fight fire with a high-pressure water gun at distance.

3) In case site smoke inhaled, evacuate and seek medical methods at nearest hospital as soon as possible.

	If a fire is caused by abnormal charging or discharging, cut off the power supply immediately. Then extinguish the fire!

8.1.2. Water Flooding

Step 1: Regardless of whether the system is powered on or not, evacuate personnel from site to a safe place and delineate a safe isolation zone.

Step 2: Notify ESS Cabinet supplier for maintenance after the water recedes.

Step 3: Do not start the ESS Cabinet until original supplier/manufacturer examines and determines so.

8.2. System Maintenance

8.2.1. Maintenance Methods

To ensure safety and reliability, read and comply with the following instructions:

Option 1:

This option is recommended for ESS Cabinet with SOC at low level.

1) Discharge the battery to the cut-off condition (average cell voltage < 3.1V or min voltage < 2.8V), then keep still for 1 hour;

2) Charge the battery to SOC 100% (max cell voltage > 3.65V), then keep still for 1 hour;

3) Discharge the battery to SOC 40%.

Option 2:

This option is recommended for ESS Cabinet with SOC at high level.

1) Charge the battery to SOC 100% (max cell voltage > 3.65V) then keep still for 1 hour;

2) Discharge the battery to cut-off condition (average cell voltage < 3.1V or min voltage < 2.8V), then keep still for 1 hour;

3) Recharge the battery to SOC 40%.

8.2.2. Maintenance Interval

8.2.2.1. Interpretation of Terms

Normal Operation: ESS Cabinet operates every day;

Intermittent Operation: ESS Cabinet operation frequency is not fixed during a month. ESS Cabinet does not run on daily basis;

Long-term Idle: ESS Cabinet is shut down for more than 3 consecutive months. (the battery system s hall be charged to minimum SOC 40% before it is laid idle)

8.2.2.2. Maintenance under Normal Operation

- Perform the battery system maintenance once every 12 months to prevent battery damage.
- Inspect the system once every 12 months and keep the inspection records properly.

8.2.2.3. Maintenance under Intermittent Operation

Same as those for Normal Operation system.

8.2.2.4. Maintenance under Long-term Idle

- Keep ESS Cabinet SOC i n 30%~50% during storage; Avoid long-term storage when SOC is lower than 15%. In case ESS Cabinet is to lay idle for a long time, turn off the power-consuming equipment in a timely manner.
- Check ESS Cabinet every 3 months. Make and keep the inspection records properly.
- ESS Cabinet maintenance shall be done every 3 months to prevent battery damage.
- Before using ESS Cabinet under Long-term Idle, fully charge the ESS Cabinet at least once to restore its performance to the optimal state.

8.3. Components Maintenance

- Please strictly follow local regulations for safety precautions during maintenance operations.
- The maintenance period is a recommended value and can be adjusted according to actual planning.

8.3.1. PCS Dust-proof Filter Maintenance

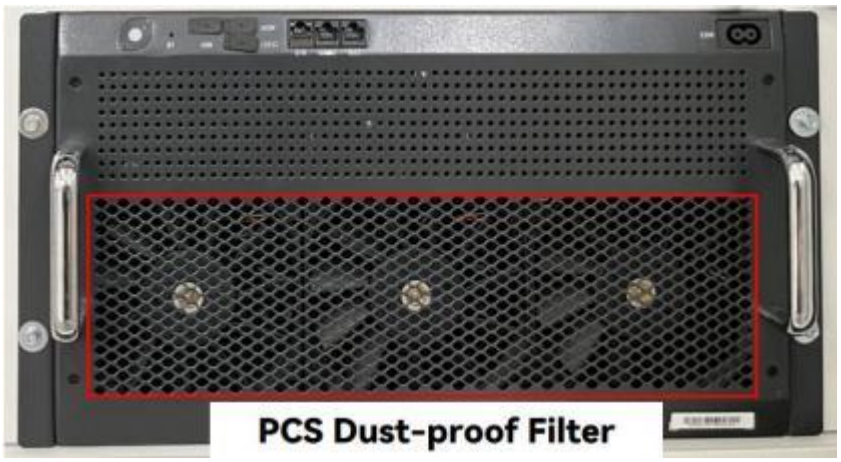


Figure 8-1 PCS Dust-proof Filter

The dust filter is a consumable part, and its cleaning or replacement cycle is directly related to the on-site conditions of the liquid-cooled energy storage system during routine maintenance.

Item	Standard	Period	Inspection Method	Handling
PCS Dust-proof Filter	The dust-proof device is free from dust accumulation, foreign object blockage, and damage.	6 months	Visual inspection	After a power outage of at least 1 minute, use a brush to clean dust and other blockages, or replace the filter and dust filter net.

8.3.2. Fire Protection System Maintenance

Regularly inspect the appearance of point-type photoelectric smoke detectors, point-type temperature sensors, sound and light alarms, aerosol fire extinguishing devices, and other components to maintain their cleanliness.

Item	Standard	Period	Inspection Method	Abnormal Handling
Point-type smoke detector	Visual inspection, keep all components clean	1 months	Visual inspection	Contact after-sales service if abnormal.
Point-type heat detector				
Audible and visual alarm				
Aerosol fire extinguishing device				

8.3.3. Liquid-cooled Chiller Maintenance

1) Routine maintenance

Item	Maintenance Standard	Inspection Method	Abnormal Handling
Operating Data	The current, voltage, and inlet/outlet liquid temperature/pressure during unit operation should be within the following ranges: Current: Less than the maximum operating current indicated on the nameplate Voltage: 230V ± 15% Cooling liquid operating temperature range: -30°C to 55°C	Visual Inspection	Contact after-sales service if data is abnormal
Operating Sound	No abnormal vibration or noise during unit operation, mainly observe the operation of the following components: Compressor, Fan, Circulating water pump	Visual + Auditory Inspection	Contact after-sales service if operation is abnormal
Pipeline Reliability	No refrigerant leakage in the refrigeration system.	Visual Inspection	Please contact after-sales service for maintenance.

Pipeline Reliability	No leakage in the cooling liquid circulation system.	Visual Inspection	Please contact after-sales service for maintenance.
Unit Appearance	The unit surface is clean, free of dust and dirt.	Visual Inspection	Power off for at least 1 minute, then use a brush or cloth to clean the unit's surface.

2) Chiller Unit Filter&Cabinet Filter maintenance

Figure 8-2 Cabinet Filter

Figure 8-2 Cabinet Filter

Item	Standard	Period	Inspection Method	Handling
Filter Cleaning	The filter is free from dust accumulation, foreign object blockage, and damage	1 month	Visual Inspection	Power off for at least 1 minute, then use a brush to clean dust and other blockages, or rinse with clean water and dry in a shaded area.

3) Cooling Fan Maintenance

Figure 8-4 Cooling Fan

Item	Standard	Period	Inspection Method	Abnormal Handling
Fan Reliability	The fan is free from dust, and there are no foreign objects blocking the air outlet	6 months	Visual Inspection	Power off for at least 1 minute, then use a brush to clean the dust from the fan thoroughly. Remove any foreign objects from the air outlet.
	The fan blades are free from damage, and the fan operates smoothly without any noise	6 months	Visual Inspection	Power off for at least 1 minute, then tighten the fan and check for any internal cables or other obstructions that may interfere with the fan's rotation. If the fan malfunctions or operates abnormally, please contact after-sales service.

4) Cable&Terminal Maintenance

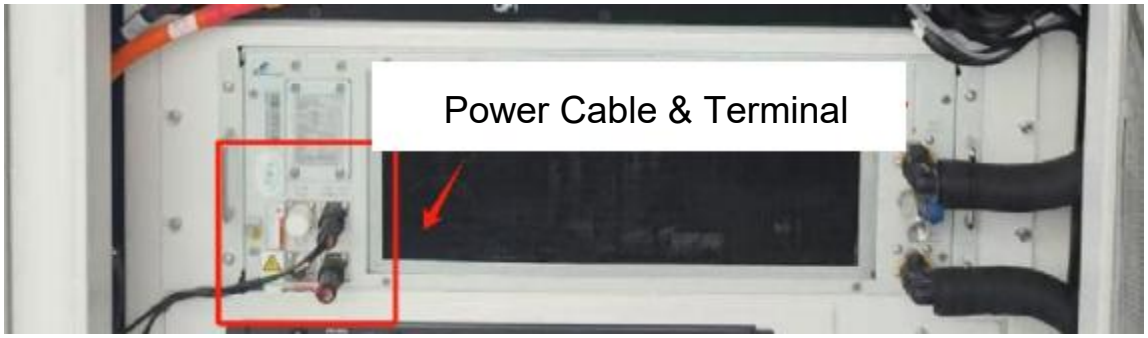


Figure 8-5 Power cable and terminal

Item	Standard	Period	Method	Abnormal Handling
Reliability of Wiring Cables and Terminals	No looseness in power plug electrical cables and terminal connections	6 months	Visual inspection	Power off for at least 1 minute, then reconnect any loose power plugs; use a screwdriver to tighten any loose cables.
	No aging, damage, abnormal heating, or other abnormalities in electrical cables	6 months	Visual inspection	Power off for at least 1 minute, then replace the power cables.
	No dust at the wiring panel	6 months	Visual inspection	Power off for at least 1 minute, then clean the dust with a brush.

5) Coolant Maintenance

Item	Standard	Period	Inspection Method	Abnormal Handling
Coolant	Concentration meets the required range	6 months	Visual inspection	Contact after-sales service in case of abnormality
	Regularly replace the coolant	5 years	/	Use a professional filling machine to replace the coolant.

- **Coolant selection precautions:**

It is **not recommended** to mix different brands of coolants.

If it is necessary to use your own coolant for replenishing or replacing, please choose:

Type: Glycol-based coolant

Freezing temperature: -35°C

Concentration: Glycol concentration of 45-55%

- **Filling machine selection precautions:**

Hanchu can provide the filling machine specifically utilized for CESS-125K261LL cabinet, for more details, you can consult with the sales staff.

If you wish to use your own filling machine for replenishing or replacing the coolant, please send the brand, model, and technical specifications of t he filling machine to Hanchu in advance.

- **The basic process of using filling machine for coolant replacement:**

Step 1:

Gas tightness test. Insert the air hose of the filling machine into the exhaust port of the pipeline below the cabinet, tighten it, and then turn on the "gas test" function of the filling machine. After the pressure rises to 0.2 mega-pascals, turn off the "gas test" function and observe whether the pressure drops. No change indicates good gas tightness.

Step 2:

Pipeline connection. Place the supply hose into the coolant, insert the delivery hose into the filling port of the liquid chiller unit. And then Insert the air hose into the exhaust port on the top of the cabinet pipeline (ensure the exhaust pipe at the bottom is sealed properly), and the other end is placed into the coolant, as the return tube.

Step 3:

Filling. Turn on the filling switch and ensure that there is an adequate supply of coolant before proceeding with the filling. The entire process takes approximately 1 hour.

Step4:

Filling completion and pressure holding. When the return tube is filled with coolant and free of air bubbles, it indicates that the filling is essentially complete. Two people are required to collaborate on the pressure holding operation: one person holds the return tube and observes the pressure rising to 2.1 mega-pascals, at which point the filling machine is shut off. The other person then closes t he filling valve of the liquid chiller and removes the air hose from the top pipeline of the cabinet, sealing it tightly. The filling is completed.

6) Cooling Pipe&Valve Maintenance

Figure 8-6 Cooling Pipe&Valve Position

Item	Standard	Period	Inspection Method	Abnormal Handling
Pipeline Appearance	No damage, deformation, or corrosion	Every 6 months	Visual inspection	Contact after-sales service in case of abnormality
Pipeline Reliability	No damage, deformation, or corrosion	Every 6 months	Visual inspection	Contact after-sales service in case of abnormality
Valve Reliability	No failure or damage	Every 6 months	Visual inspection	Contact after-sales service in case of abnormality.

9 Warranty Statement

9.1 Warranty Period

The warranty period shall be in accordance with the commercial contract, provided the product is used correctly.

9.2 Warranty Scope

Within the warranty period, for faults caused by the product's own quality issues, the company will repair or replace the product for the customer free of charge. Customers should allow reasonable response time for the company to make repairs, and the replaced products will be handled by the company. Customers must present related proof of purchase and ensure the product brand is clearly visible, otherwise, the company reserves the right to refuse warranty service.

9.3 Disclaimer

The company reserves the right not to provide a quality guarantee, but may still offer paid repair services under the following conditions.

(1) The warranty period has expired；

(2) Unable to provide related proof of product purchase；

(3) Damage caused during transportation or loading and unloading；

(4) Damage caused by incorrect installation, modification, or repairs by unauthorized personnel；

(5) Damage caused by operating under abnormal conditions or environments；

(6) Machine failure or damage caused by using non-Hanchu parts or software；

(7) Faults caused by force majeure factors such as fire, earthquake, flood, etc.

10 After-sales Service

For any question about this product, please contact us with info below:

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Android APP

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