

All in-one Air-cooled Hybrid Cabinet ECO-B100/120WP-2H User Manual



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1. Preface

1.1. Overview

This document primarily outlines the procedures for installing, establishing electrical connections, commissioning, and resolving issues with the ECO-B100/120WP-2H 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.

	<p>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.</p>
	<p>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.</p>
	<p>ATTENTION: This indicates a potential risk, which, if not avoided, may lead to equipment malfunction or property damage.</p>

2. Safety Precautions

2.1. Personnel Requirements

The lifting, transportation, installation, wiring, operation, and maintenance of the battery cabinet 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 hybrid cabinet as instructed by this manual to prevent equipment damage.
- Upon disconnecting the power supply of the cabinet, the battery will not power off immediately.

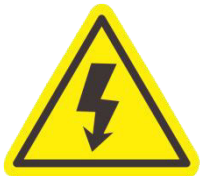


To prevent unauthorized individuals from approaching the energy storage container, which could lead to accidents or mishandling, please follow these precautions:

- Install prominent warning signs around the cabinet 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 proximity

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 Sunpal 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, please reach out to after-sales service team of Sunpal .
- 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.
- 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 battery cabinet

shall be stored according to the requirements in this section.

- The cabinet with outer packaging shall be stored in a ventilated, dry, and clean indoor environment.
- Keep battery SOC in 30%~50% during storage; Avoid long-term storage when SOC is lower than 15%. In case battery 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 cabinet. 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: -25°C to 55°C; relative humidity of storage environment: 0-95%, without condensation. The cabinet 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.



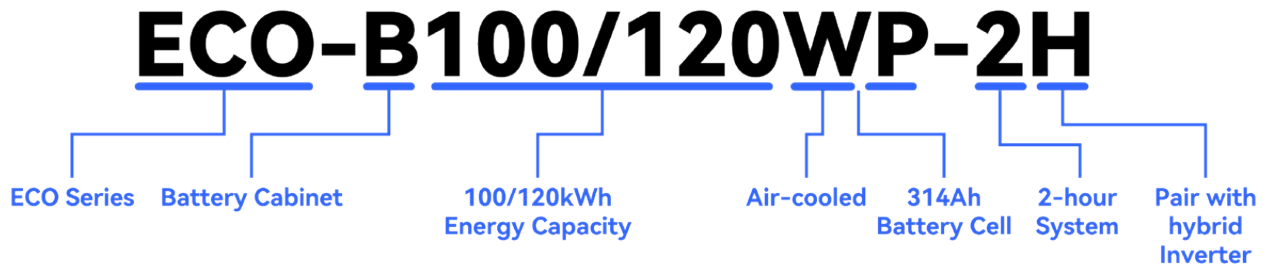
For the storage of hybrid inverter, please refer to the official user manual provided by the inverter manufacturer.

2.6. Product Disposal

When the battery system reaches end-of-life, it shall not be disposed of as regular waste. Please contact the relevant authorized recycling agency for proper disposal.

3. Product Introduction

3.1. Naming



3.2. Product Overview

ECO-B100/120WP-2H, a hybrid cabinet product, is composed of the 100/120kWh battery cabinet and external hybrid inverter. The hybrid inverter can be directly mounted on the exterior of the battery cabinet enclosure, with pre-drilled holes provided for convenient installation.

The battery cabinet features an integrated All-In-One design, incorporating LFP (Lithium Iron Phosphate) batteries, High Voltage Box (HVB), Fire Suppression System (FSS), air-cooling unit, and additional components all within one cabinet.

Hybrid inverters can be directly connected to PV panels. It's capable of directly charging battery with the DC power generated by the PV panels, and convert the DC power from either the PV panels or the battery into AC power. Conversely, it can also convert AC power into DC power to charge the battery.

ECO-B100/120WP-2H cabinet appearance is shown below as Figure 3-1 and Figure 3-2.

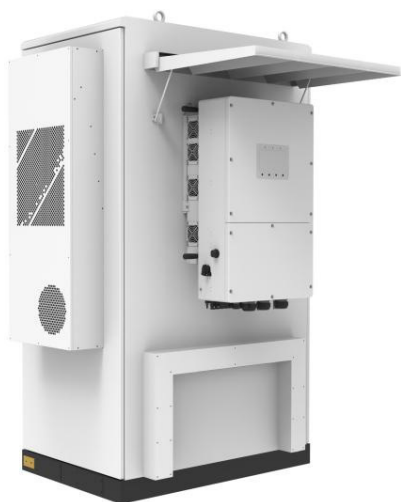


Figure 3-1

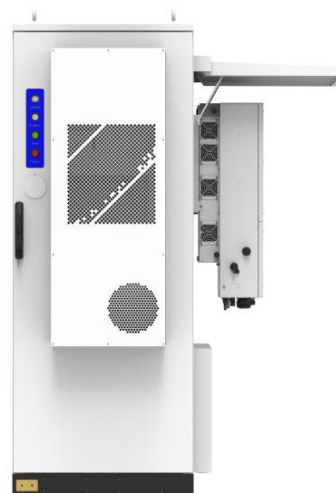


Figure 3-2

3.2.1. Specification

	ECO-E100WP-2H	ECO-E120WP-2H
DC Side		
Cell type	LFP 314Ah	
Pack Capacity	20.096kWh/1P20S	
System Capacity	100.48kWh/1P100S	120.576kWh/1P120S
Rated Voltage	320V	384V
Recommended voltage range	280-360Vdc	336-432Vdc
PV Input		
Recommended PV Input Power	30 - 120kW	
Recommended PV Voltage Range	150 - 850V	
AC Output		
Rated Power	29.9/30/40/49/50/60kW	
Nominal Voltage	400Vac/3P+N+PE	
THDi	<3%	
DC Ratio	<0.5% I _{pn}	
Power Factor	-0.8 lagging ~ 0.8 leading	
General		
System Efficiency	90%	
Charge/Discharge Rate	Max. 0.5P	
Depth of Discharge	100%DOD(25±2°C)	
Cycle Life	≥8000 times (25±2°C,0.5P,95%DOD)	
Ingress Protection	IP55	
Cooling Method	Force air cooling	
Operating Temperature	-25 to 55°C	
Relative Humidity	0-95%RH	
Working Altitude	3000m (Derating above 2,000m)	
Dimensions (W*D*H)	800*1200*2100mm (exclude hybrid inverter)	
Weight	1.2t (exclude hybrid inverter)	
Fire Suppression System	Aerosol	
Communication interface	Ethernet/RS485	

3.2.2. Electrical Diagram

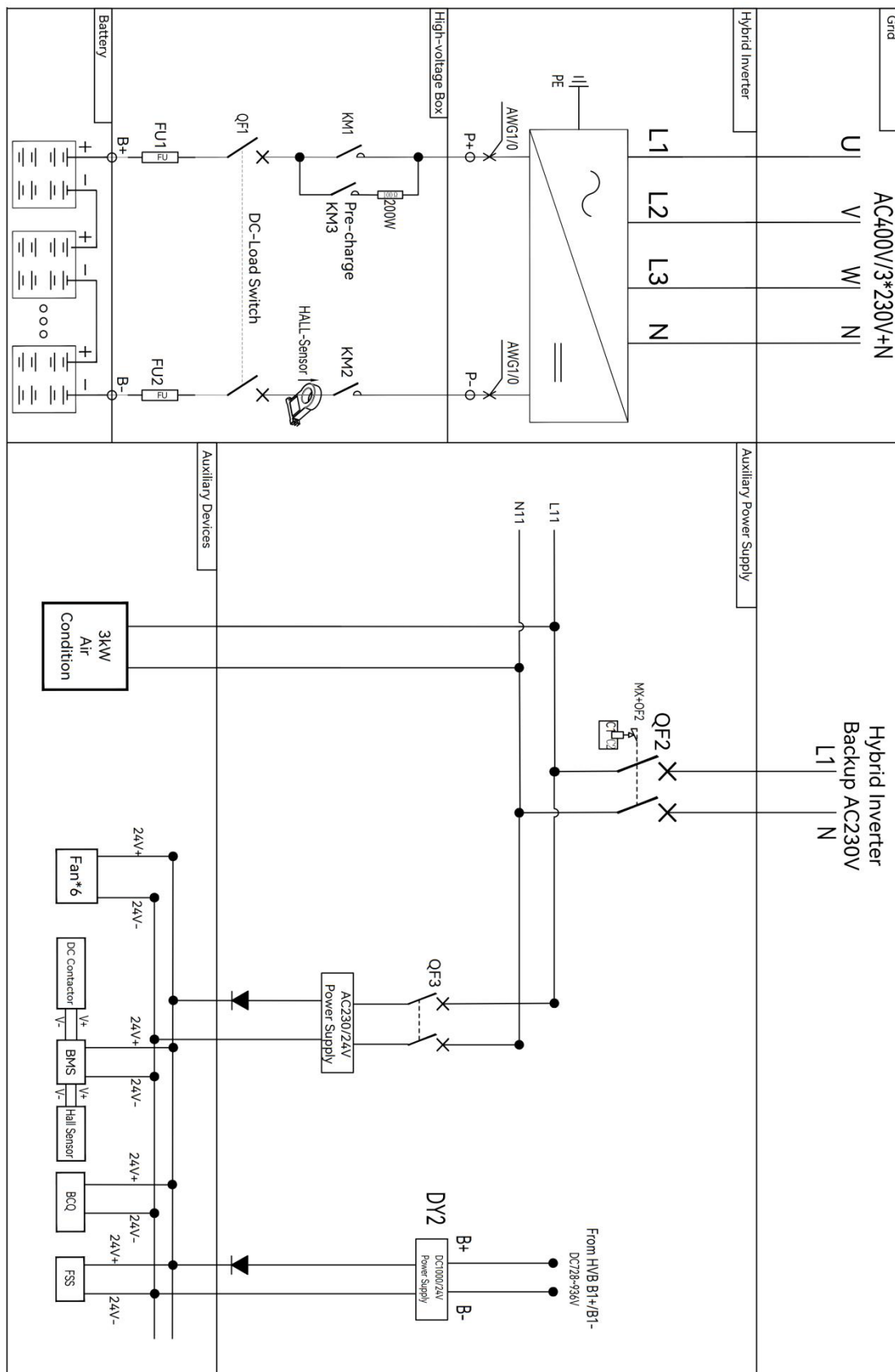


Figure 3-3 Electrical Diagram

3.2.3. System Communication

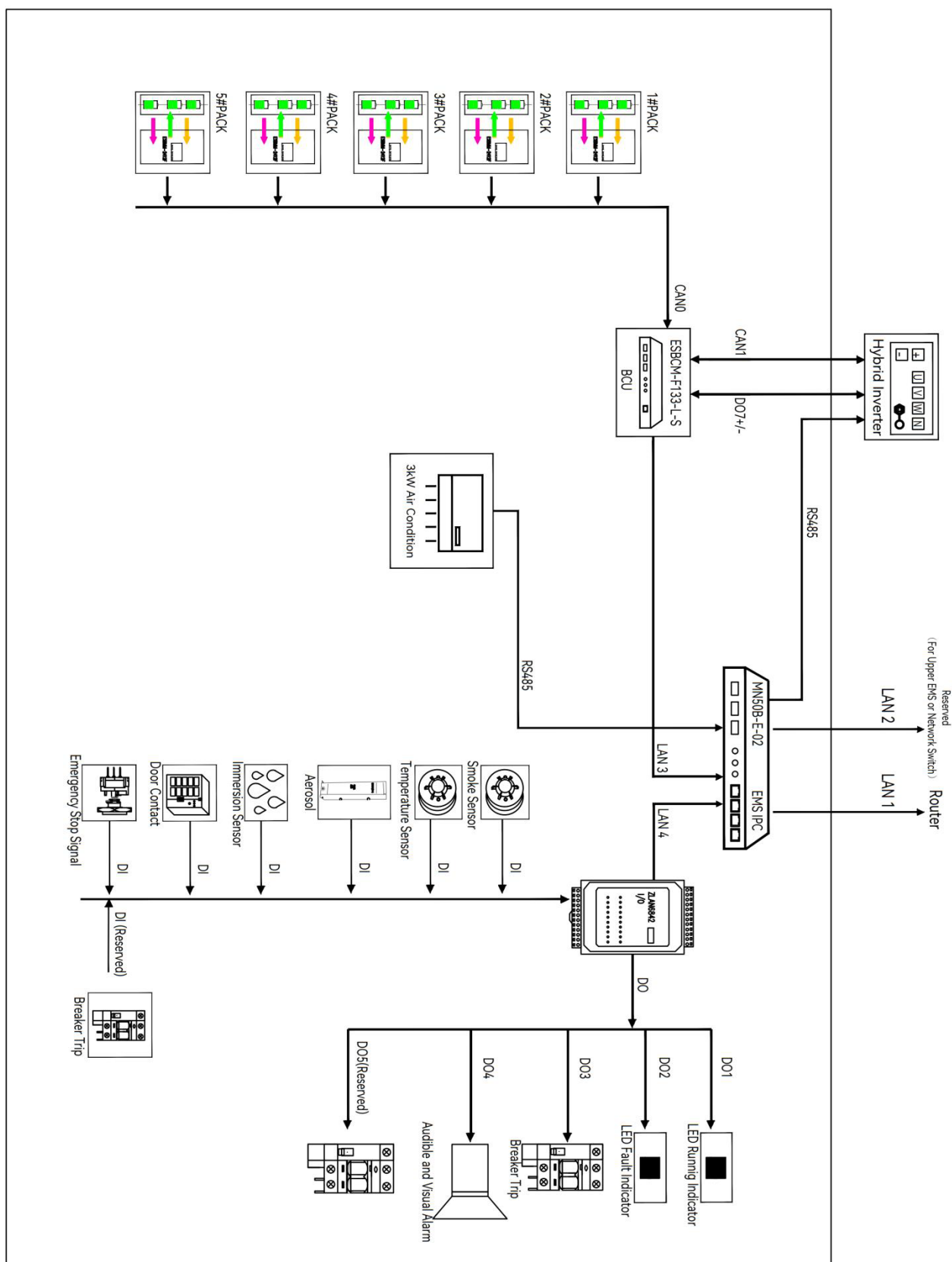


Figure 3-4 System Communication Diagram

3.3. Product Appearance

3.3.1. Cabinet Appearance & Structure

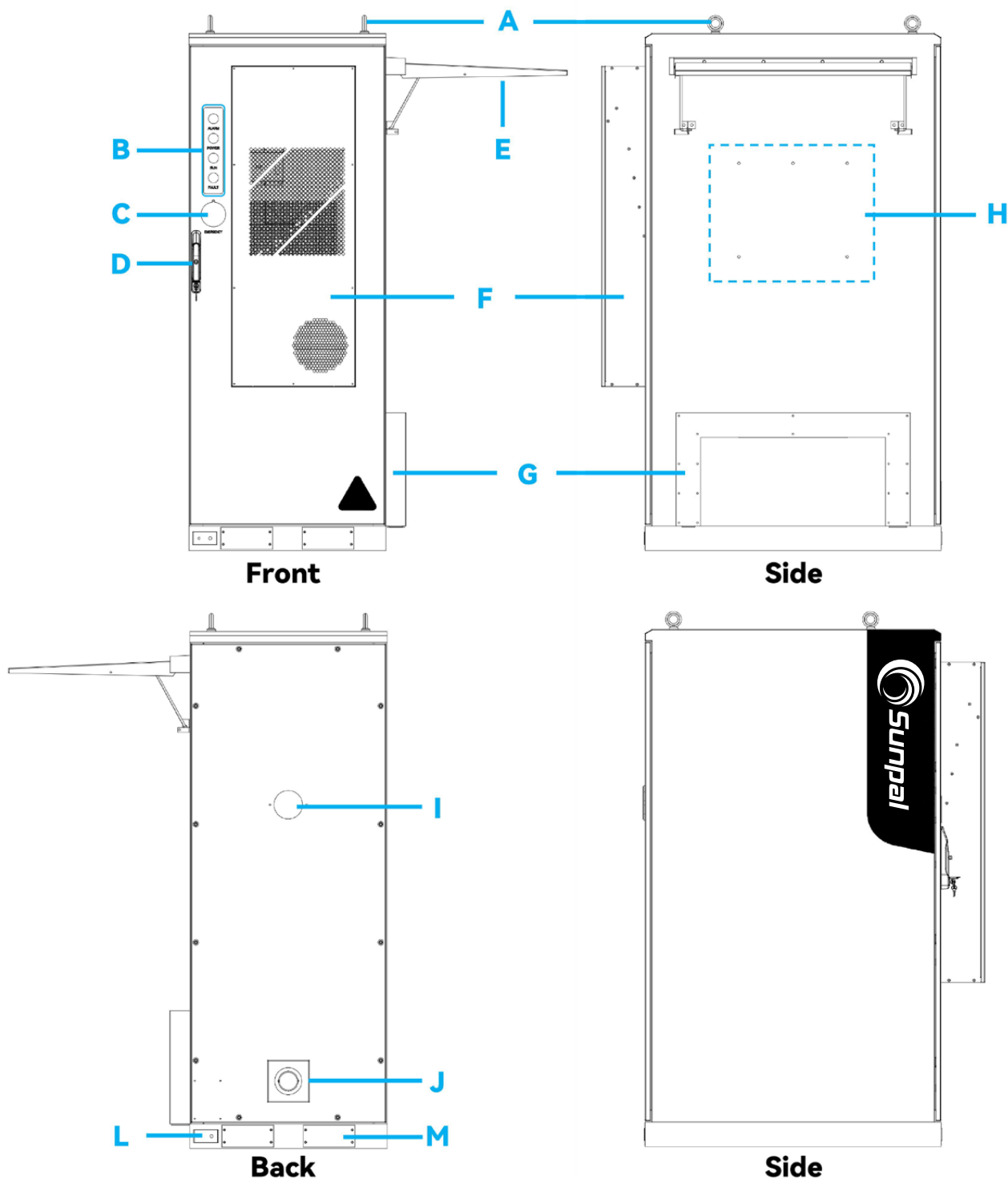


Figure 3-5 Cabinet Appearance

No.	Item	Quantity	Note
A	Hanging Ring	4	For lifting the cabinet (place inside the cabinet for transportation)
B	Indicators	1	From up to down: Alarm indicator Power indicator Running indicator Fault indicator
C	Emergency Button	1	
D	Door Lock	2	
E	Sunshade Awning	1	Awning for hybrid inverter
F	Air condition	1	3kW air condition
G	Cable Entry Plate	1	
H	Inverter Hanging Area	1	Design for inverter installation
I	Explosion-proof Valve	1	Releasing high-pressure gas can mitigate the hazards brought by thermal runaway
J	Fire Hose Connection	1	DN65
L	Grounding	1	For cabinet grounding connection
M	Forklift Pocket	4	

3.3.2. LED Indicator

Indicator	Name	Status	Description
Audible and visual alarm	ALARM	ON	FSS sensors are activated or Emergency button has been pressed
		OFF	Normally working
White	POWER	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 $\geq 5\text{kW}$. 2. ESS Cabinet in discharging status, discharging power $\geq 3\text{kW}$.
		OFF	The ESS Cabinet in standby mode, neither charging nor discharging.
Red	FAULT	ON	Fault occurs
		OFF	No-fault status

3.3.3. Dimension

Cabinet Dimension (Foundation) (W*D*H): 800*1200*2100 mm

Cabinet Dimension (Entire) (W*D*H): 1535.6*1377*2100 mm

Weight: 1400kg

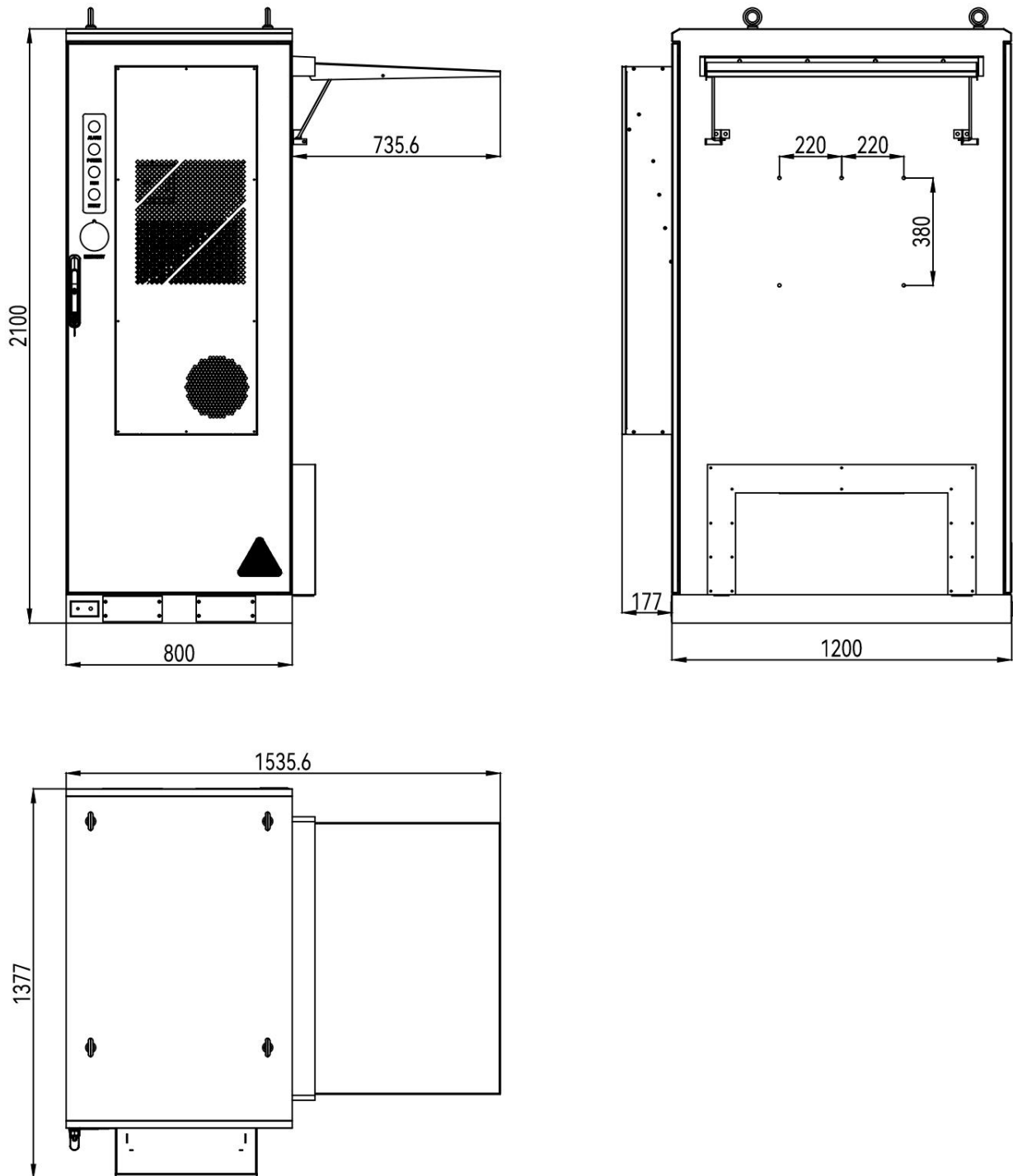


Figure 3-6 Cabinet Dimension

3.4. Components

3.4.1. Overview

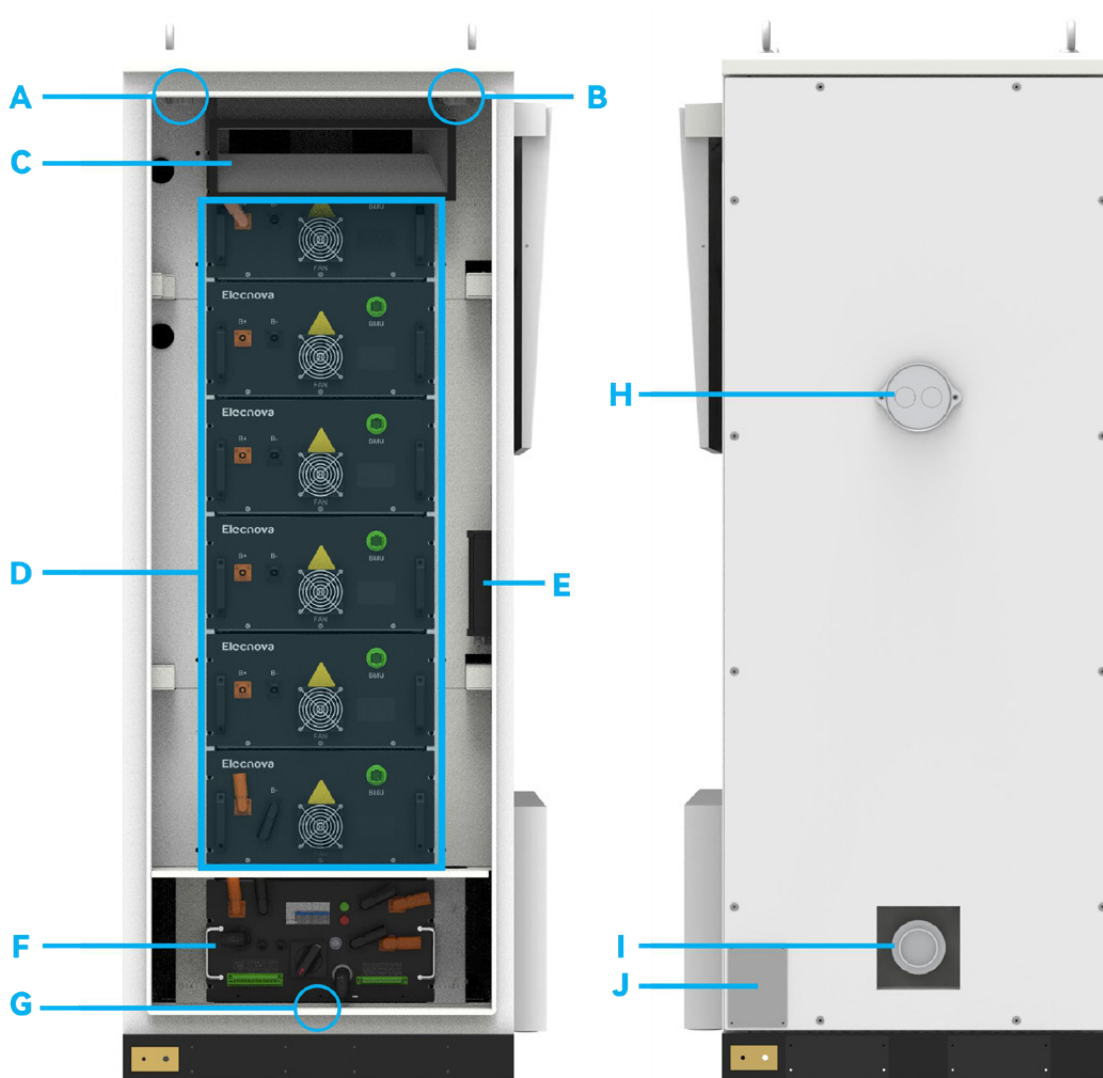


Figure 3-7 Equipment&Components of Cabinet

No.	Item	No.	Item
A	Smoke Sensor	F	High-voltage Box
B	Temperature Sensor	G	Immersion Sensor
C	Air Duct	H	Explosion-proof Valve
D	Battery Packs*	I	Fire Hose Connector
E	Aerosol	J	Name Plate

*ECO-B100WP-2H is equipped with 5 packs, ECO-B120WP-2H is equipped with 6 packs.

3.4.2. Battery Pack

3.4.2.1. Introduction

The ECO-B100/120WP-2H cabinet utilizes the ECO-P1P20WS air-cooled battery pack, which is equipped with 1P20S configuration of 314Ah cells. Each pack has a capacity of 20.096 kWh, with a compact size factor that facilitates flexible placement.

3.4.2.2. Dimension & Ports



Figure 3-8 ECO-P1P20WS Battery Pack

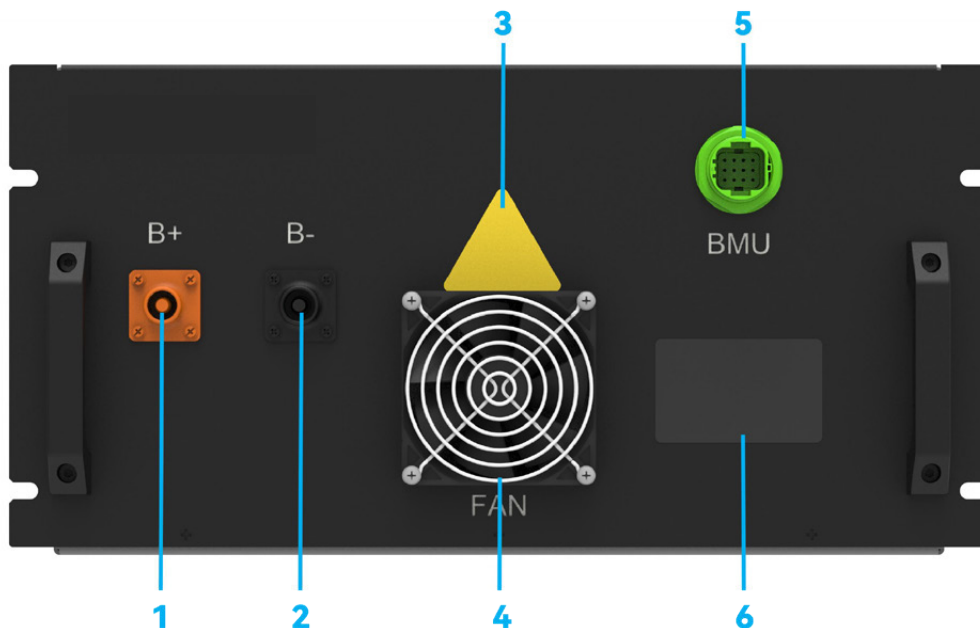


Figure 3-9 Ports of Battery pack

No.	Item	No.	Item
1	Battery positive connector	4	Fan
2	Battery negative connector	5	BMU port
3	Warning plate	6	Name plate

3.4.2.3. Technical Parameters

Item	Parameter	Note
PACK Model	ECO-P1P20WS	
Cel type&capacity	LFP 314Ah	
PACK grouping mode	1P20S	
PACK nominal voltage	DC 64V	
PACK nominal energy	20.096kWh	
PACK dimensions (W*D*H)	470*956*235mm	
PACK Weight	Approximately 147kg	Including connecting copper bars
Operating voltage range	2.8V-3.6V(cell)	T>0°C
Operating temperature range	Discharging: -20~55°C	Temperature of cell
	Charging: 0~55°C	
Storage conditions	-20~45°C,0~95%RH,no condensing	Short-term storage (1 month)
Communication method	CAN	
Ingress Protection level	IP20	
Cooling method	Air cooling	

3.4.3. High Voltage Box(HVB)

3.4.3.1. Introduction

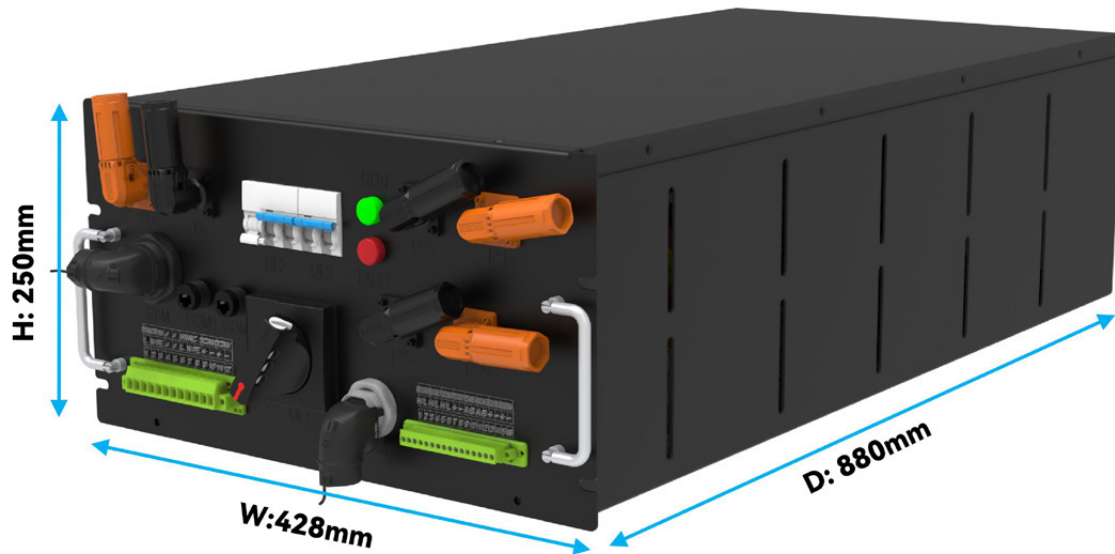


Figure 3-10 Appearance & Dimension of HVB

The High Voltage Box of ECO-B100/120WP-2H is essential for managing energy usage and high-voltage circuits. It is integrated EMS, BCU, 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 battery operations.

3.4.3.2. Ports

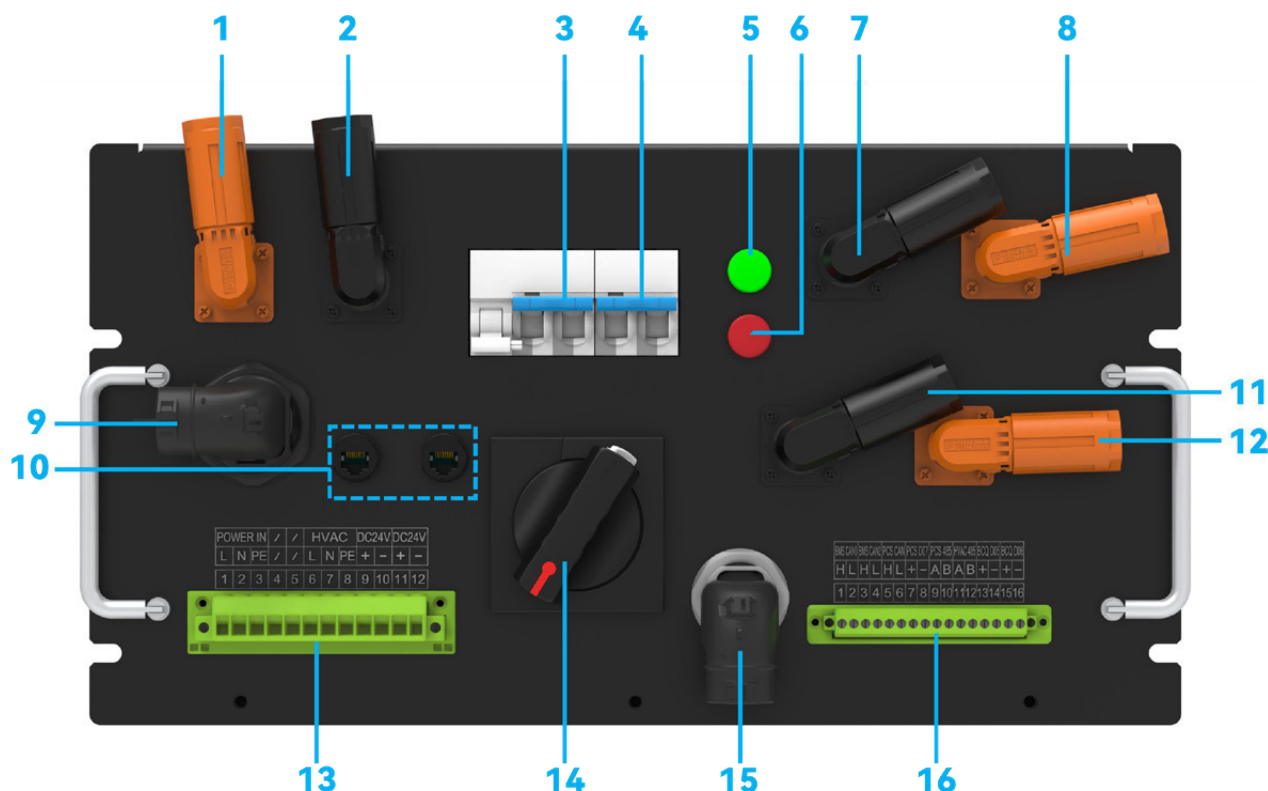


Figure 3-11 Ports of HVB

No.	Symbol	Name	Description
1	B+	Battery positive connector	Positive connection between PACK and high-voltage box
2	B-	Battery negative connector	Negative connection between PACK and high-voltage box
3	QF2	Auxiliary power supply breaker	Power supply control of auxiliary devices
4	QF3	230/24V power supply breaker	Power supply control of 230/24V power supply
5	RUN	Running indicator	Indicate the normal operating status of the high-voltage box
6	FAULT	Fault indicator	Indicate the shutdown status of the high-voltage box due to malfunction
7	P1-	PCS DC negative connector(Channel 1)	Negative pole connection between PCS and high-voltage box, channel 1
8	P1+	PCS DC positive connector(Channel 1)	Positive pole connection between PCS and high-voltage box, channel 1
9	GBM	Control feedback terminal	BMS communication
10	COM	ETH port	COM1 is DHCP port for Router COM2 is fixed IP address for upper EMS
11	P2+	PCS DC positive connector(Channel 2)	Positive pole connection between PCS and high-voltage

			box, channel 2
12	P2-	PCS DC negative connector(Channel 2)	Negative pole connection between PCS and high-voltage box, channel 2
13	POWER	Power terminal	
14	QF1	DC main circuit switch	The main control switch of battery cabinet
15	GAM	Communication terminal	BMS communication
16	COM Terminal	External COM terminal	Communication terminal with external device

Switches Description

Switch	Description
QF1	Close to connect the main positive/negative contactors of battery packs.
QF2	Power supply to air conditioner and 230/24V power supply.
QF3	The independent switch for 230/ 24V power supply

3.4.3.3. JX1 - Power Terminal

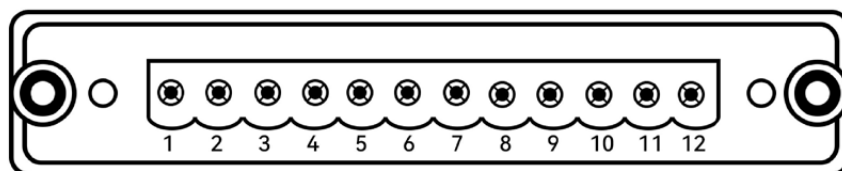


Figure 3-12 POWER terminal

Ports	Pin No	Pin	Port Definitions
POWER	1	AC-L	Auxiliary power supply
	2	AC-N	Auxiliary power supply
	3	AC-PE	Auxiliary power supply
	4	NA	/
	5	NA	/
	6	KT-L	Air-conditioning power supply
	7	KT-N	Air-conditioning power supply
	8	KT-PE	Air-conditioning power supply
	9	24V+	24V power supply for battery cabinet

	10	24V-	24V power supply for battery cabinet
	11	24V+	Reserved
	12	24V-	Reserved

3.4.3.4. JX2 - External Communication Terminal

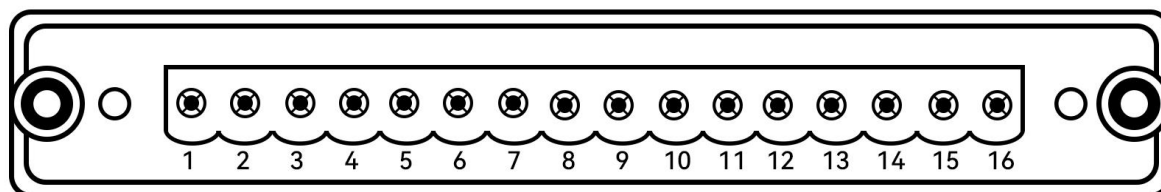


Figure 3-13 External COM Terminal

Ports	Pin No	Pin	Port Definitions
COM Terminal	1	CAN0H	BMS upper computer debugging
	2	CAN0L	BMS upper computer debugging
	3	CAN2H	BMS upper computer debugging
	4	CAN2L	BMS upper computer debugging
	5	CAN1H	BMS to Hybrid inverter
	6	CAN1L	BMS to Hybrid inverter
	7	DO7+	BMS to Hybrid inverter
	8	DO7-	BMS to Hybrid inverter
	9	RS485 1A	Battery EMS to Hybrid inverter
	10	RS485 1B	Battery EMS to Hybrid inverter
	11	RS485 2A	For air condition
	12	RS485 2B	For air condition
	13	DO5+	Reserved
	14	DO5-	Reserved
	15	DO6+	Fan control
	16	DO6-	Fan control

3.4.3.5. Technical Parameters

High-voltage Box	
Power input	AC 230V
Low-voltage output	DC 24V
Rated high-voltage output	DC 384V
Operating temperature	-25 to 55°C
Current accuracy	±1%FSR
Voltage accuracy	±1%FSR
Protection level	IP20
Dimension	428*880*250mm
Weight	40kg

3.4.4. Air Conditioner

3.4.4.1. Introduction

ECO-B100/120WP-2H adopts the air-cooled method with a 3kW air conditioner, which can provide a stable temperature and humidity for the battery cabinet. Main components of refrigeration system: evaporator, compressor, condenser and throttling and pressure reducing device.



Figure 3-14 Air conditioner

3.4.4.2. System Principle

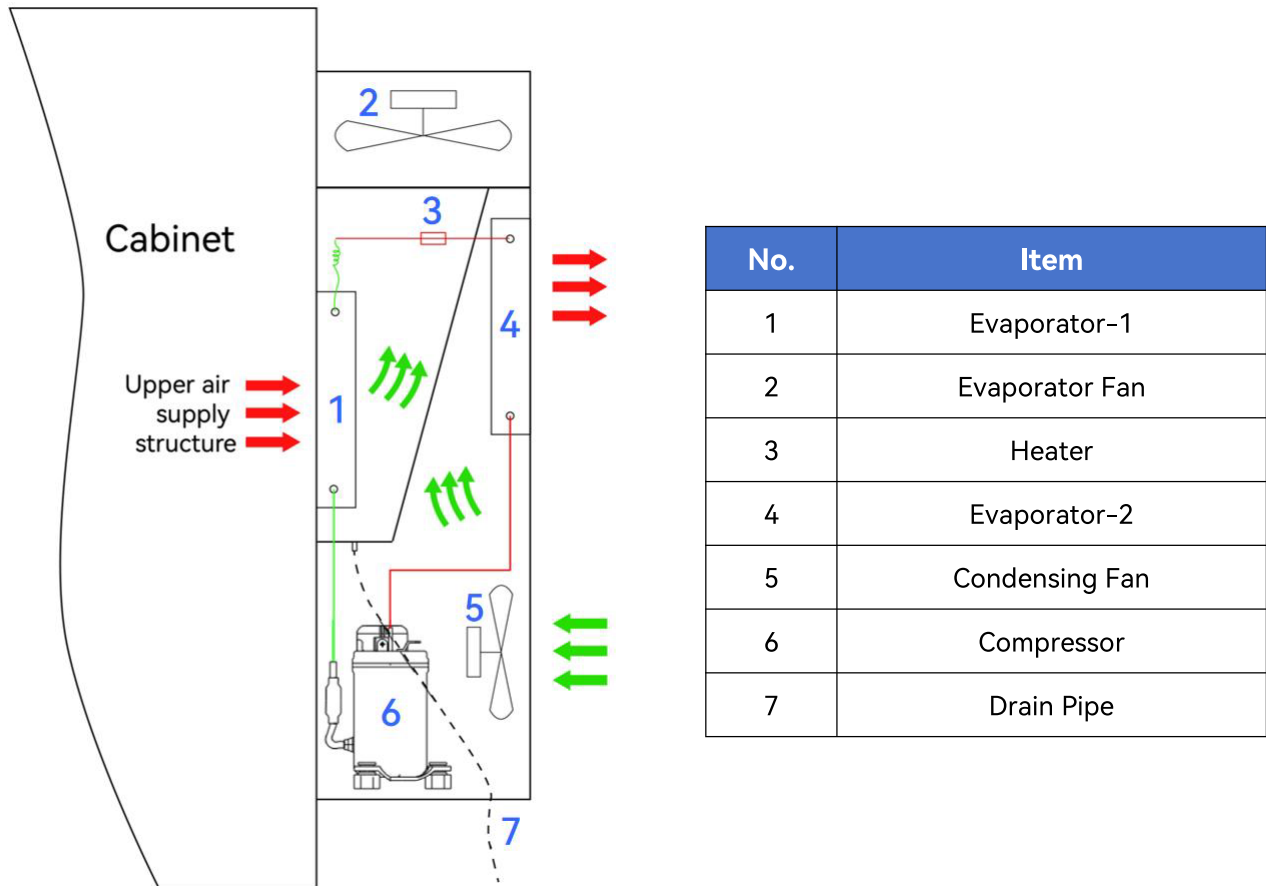


Figure 3-15 System principle diagram

The refrigerant flows through the cooling unit in the order of evaporator, compressor, condenser and throttling and pressure reducing device, evaporator in a closed system. It absorbs the heat of the enclosure (e.g. air) in the evaporator and is transferred to a gaseous state, so cold is generated at the same time. The compressor absorbs the gaseous refrigerant from the evaporator and compresses it. The compressed high-temperature and high-pressure refrigerant enters the condenser and is cooled by the cooling medium (such as air). The condenser condenses refrigerant and releases heat. The cooled refrigerant enters the throttling and pressure reducing device and the pressure decreases.

The cooling medium returns to the evaporator, and the gas/liquid mixture is converted into gas again to absorb heat and realize refrigeration. For example, the refrigerant system is also equipped with a liquid reservoir (for small refrigeration systems, there is usually no liquid reservoir) and a drying filter.

3.4.4.3. Technical Parameters

General parameters	
Temperature adjustment range	20~50°C
Environment temperature	-40~50°C
Control accuracy	±2°C
Dimensions(W*D*H)	550*276*1350 mm
Net weight	75Kg
IP degree	IP55
Noise level dB(A)	70dB(A)
Power supply	
Phases	1/PE
Operating voltage	AC230V
Frequency	230V 50Hz 230V 60Hz
Cooling/Heating capacity	
Operating performance	1.6kW(heating)/1.2 kW(cooling), 50Hz 1.7kW(heating)/1.3 kW(cooling), 60Hz
Operating current	7.1A(heating)/5.4A(cooling), 50Hz 7.4A(heating)/5.7A(cooling), 60Hz
Nominal cooling capacity	3.2kW
Nominal heating capacity	1kW
Internal airflow	1300 m ³ /h
External airflow	1300 m ³ /h
Refrigerant	
Refrigerant	400g R134a(CO2 equivalent:572kg)

3.4.5. Safety Devices

3.4.5.1. Fire Suppression System(FSS)

Work Principle

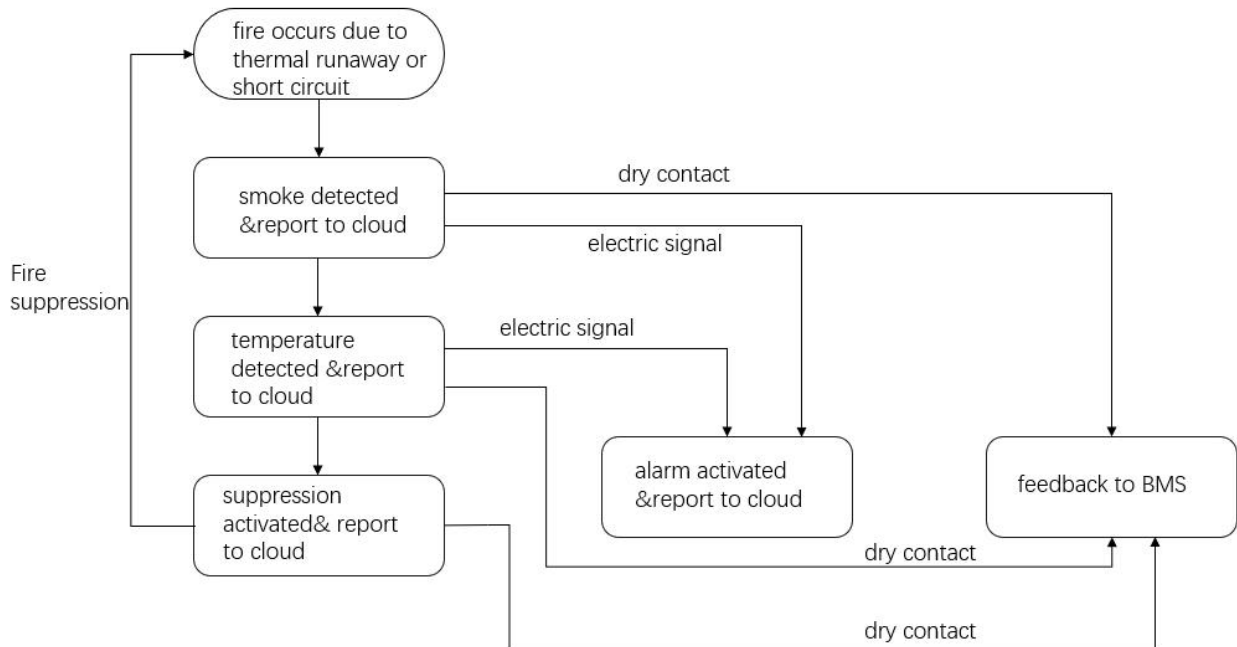


Figure 3-16 Work Principle

ECO-B100/120WP-2H equipped cluster-level FSS. Cluster-level FSS is an aerosol-based fire protection system. When smoke, or high temperature, or fire is detected, 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 through EMS to all related agents and personnel.

FSS components

- Aerosol



Figure 3-17 Aerosol

Work Principle:

When a fire occurs, the fire extinguishing device 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°C
Dimensions	247mm × 67mm × 66mm
Operating Humidity	≤95% RH
Activation Method	Electrical/Thermal
Discharge Time	≤15s
Electrical Activation Current	≥700mA
Thermal Activation Temperature	≥170°C
Protection Volume	3m ³
Nozzle Heat Distance	Temperature ≤200°C at 400mm from nozzle
Surface Temperature of Shell	≤200°C
Oxidizer Name and Content	Strontium nitrate, potassium nitrate 50% ~ 58%

- Temperature Detector



Figure 3-18 Temperature Detector

Work Principle:

The temperature detector 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°C to +65°C
Humidity	0% to 95% RH, no condensation
Effect of atmospheric pressure	None
IP degree	IP54
Standards and approvals	CPR, LPCB, VdS, VNIPO, SBSC, FG, BOMBA
Weight	80g
Materials	Housing: White flame retardant polycarbonate Terminals: Nickel plated stainless steel

- Smoke Detector



Figure 3-19 Smoke Detector

Work Principle:

The smoke detector 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)
IP Rating	IP23D
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

- Explosion-proof Valve

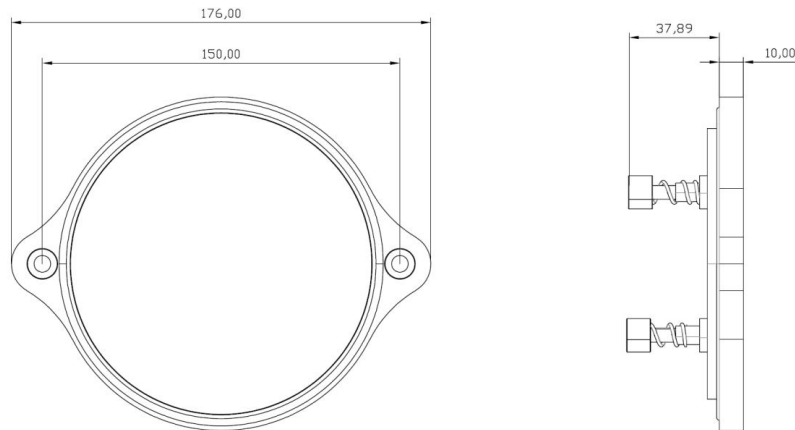


Figure 3-20 Explosion-proof Valve

Work Principle:

The primary function of the cabinet explosion-proof valve is to prevent explosions or fires in the equipment. Mounted on the cabinet or associated equipment, the explosion-proof valve will automatically open when the pressure of the internal medium inside the equipment exceeds the normal range. This allows excess medium to be discharged through the valve, thereby preventing excessive pressure buildup inside the equipment and protecting the safety of both the equipment and personnel.

Specification:

Item	Specification
Protection Level	IP66
Air Permeability	>3000mL/min@1.5KPa
Venting Area (Max Opening)	>2500mm ²
Opening Pressure	4.5±1 Kpa
Product Salt Spray Test	External Corrosion Resistance Grade (Neutral Salt Spray Test, 720h) Internal Corrosion Resistance Grade (Neutral Salt Spray Test, 48h)
Environmental Requirement	ROHS 2.0

- Fire Hose Connector

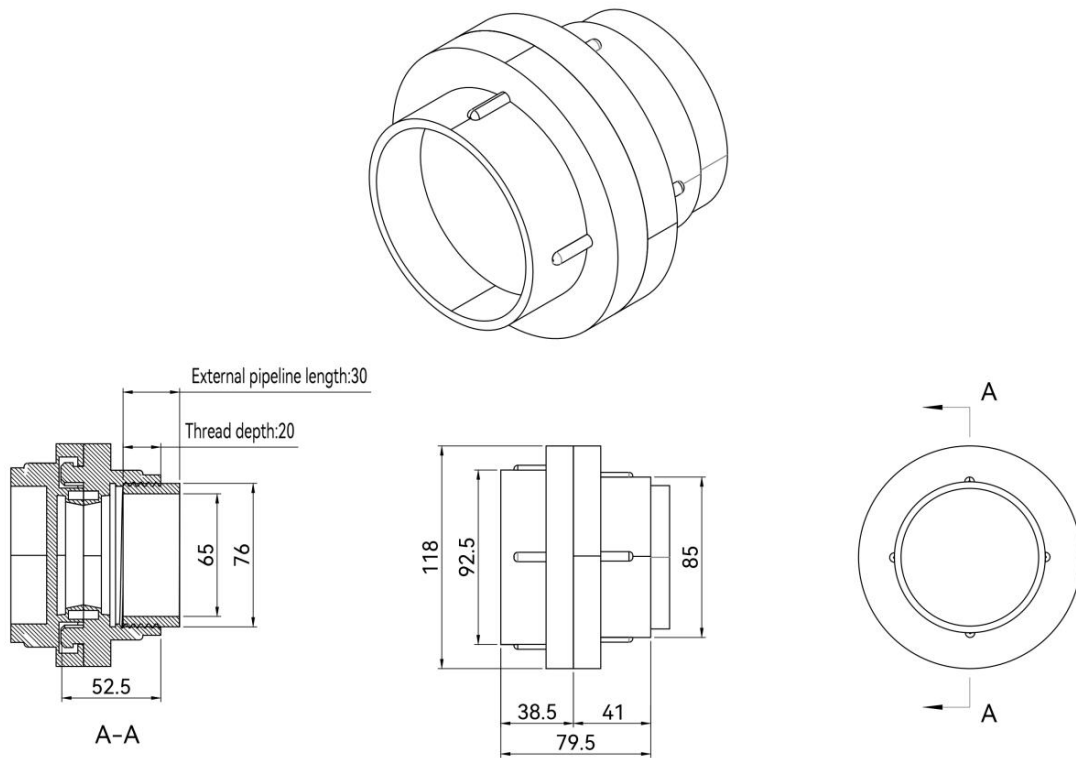


Figure 3-21 Fire hose connector

The fire hose connector 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.

3.4.5.2. Water Immersion Detect

Work Principle



Figure 3-22 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°C

4. Transportation

4.1. Precaution



- The cabinet must not be disassembled during transportation or installation.
- Malfunctions caused by unauthorized modifications are not covered by the warranty.
- Transport the 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 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 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 cabinet.

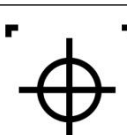


To ensure safe and intact transportation of the product to destination/site, please also take any other necessary auxiliary measures.

4.2. Transportation

To ensure that the 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 cabinet may be moved with forklift, pallet truck or crane. When moving the 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 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 the forklift. A trial forking shall be conducted before normal handling. The length of fork shall not be less than 1.5m.

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

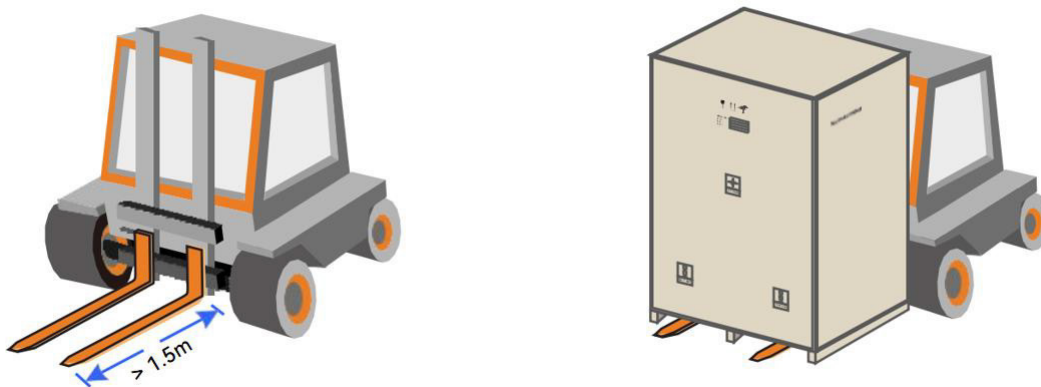


Figure 4-1 Schematic Diagram of Transportation with Forklift

During the transportation with forklift, please strictly follow the safety operating procedures for forklift. The packaging of the 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 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 gravity center. Tilting transportation is strictly prohibited!

When using a crane to lift, lower, and move the cabinet, please ensure that the operation is slow and smooth. In addition, only place the 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 shall be stopped.

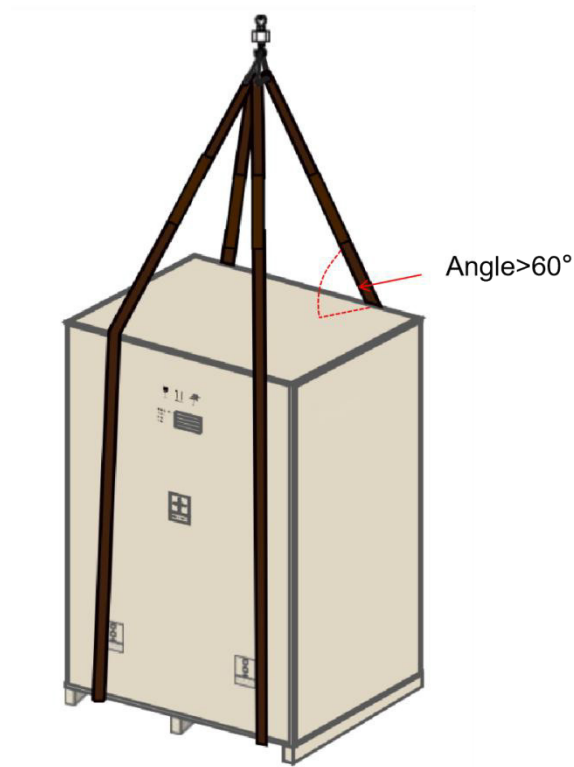


Figure 4-2 Lifting Operation



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.

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 Sunpal . 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, ECO-B100/120WP-2H cabinet is designed for installation in both indoor and outdoor 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 cabinet.
- The ambient temperature range at the installation site is -25°C to 55°C ; the relative humidity range shall 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 cabinet grounding resistance shall be less than 4Ω .
- Ensure that the location is convenient for observation of LED indicators.
- There shall be no flammable gases or combustible materials nearby or in the installation area.

5.1.2. Installation Environment Requirements

The ground, space, cable ducts, air duct, and protective measures in the control room of the cabinet shall be properly designed to meet at least the following 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 cabinet 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.

Holes shall be pre-drilled on the foundation. The size and position of such holes show as following Figure 5-1. The size of the hole is 30*16mm with 8mm fillet.

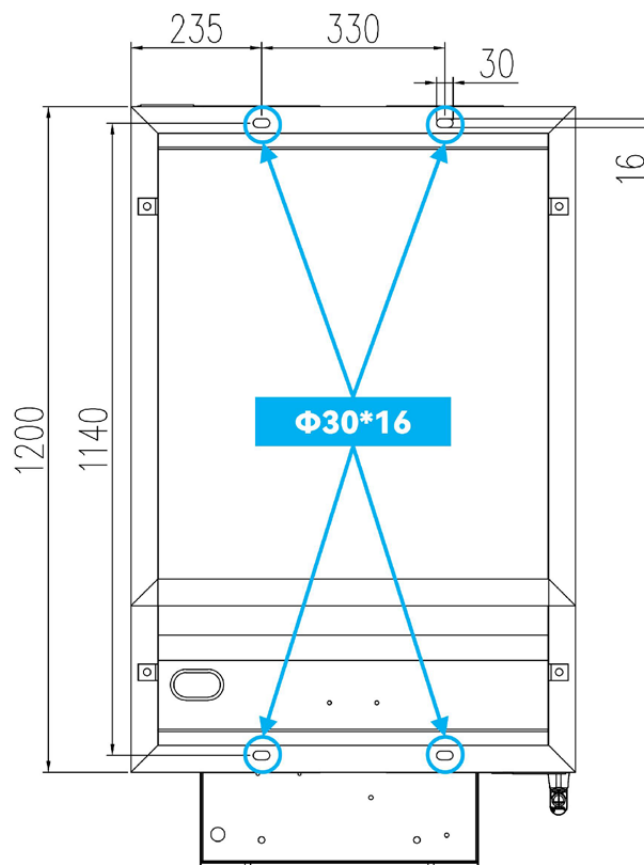


Figure 5-1 The position of pre-drilled holes

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.

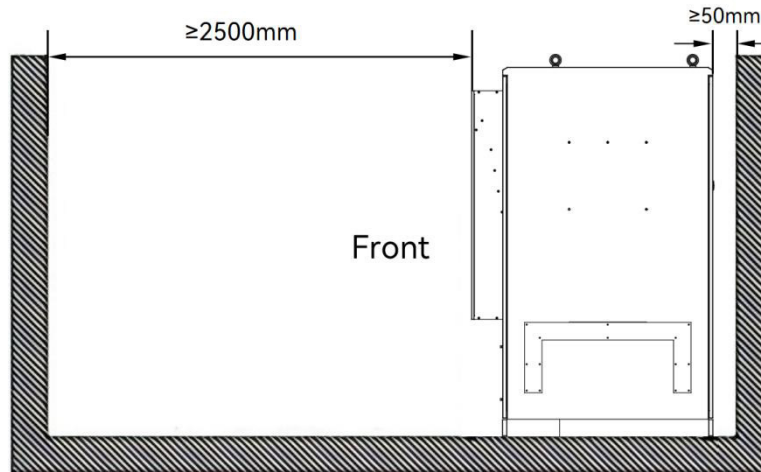


Figure 5-2 Minimum Front&Rear space requirement

The minimum space requirements of the front and rear of the cabinet are shown in the Figure 5-2. There must be at least 2500mm of space in front of the cabinet. And the behind only needs to have at least 50mm clearance for ventilation and pressure relief of the explosion-proof valve. If possible, it is recommended to choose spacious location, so as to ensure reliable and efficient operation.

On the side where the inverter is mounted, please leave a reasonable space according to the requirements of the inverter manufacturer.

5.1.3. Cable Preparation

The power cables and the communication cables between the high-voltage box and the hybrid inverter will be provided by Sunpal and shipped together with the packaging. The PE cable need to be prepared on site.



The prepared cable length is based on the scenario where the cable is mounted on the side of the battery cabinet. If you intend to mount it at other positions, please prepare the cable by yourself or submit a request to Sunpal prior to placing your order.

The specific parameters of the cables are as follows:

Terminal Symbol	Description	Max. Voltage	Cable Recommendation	Range of Temp.
P+	Positive connection cable	AC 1000V DC 1500V	Single-core cooper cable 25mm ²	-40~125°C
P-	Negative connection cable	AC 1000V DC 1500V	Single-core cooper cable 25mm ²	-40~125°C
PE	Grounding cable	/	Single-core cooper cable 25-50mm ²	/
/	Communication	Flexible STP cable 1mm ²		



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 and the requirements by inverter manufacturer.

5.2. On-site Installation



It is prohibited to perform any un-related mechanical operation either inside or on the top of the cabinet.

During installation, please ensure the cabinet is clean (both inside and surrounding place)

5.2.1. Removal of Packaging



The packaging plates of the 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 cabinet can be detached from the wooden transportation pallet.



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



The 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 cabinet in strict accordance with the description in this manual.

5.2.2. Cabinet Handling

Forklift handling

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



It is recommended that when the packaging is removed, the cabinet should be transported directly using a forklift, rather than together with the wooden pallet.

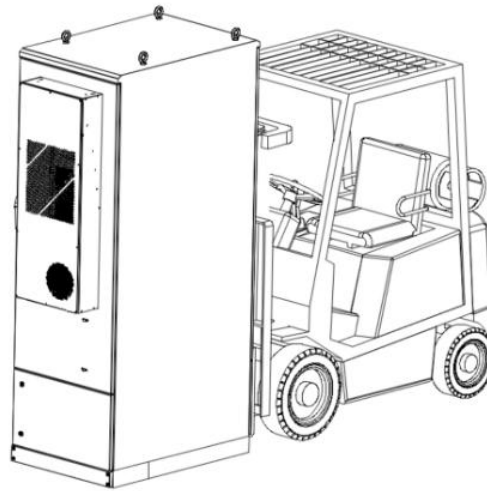


Figure 5-3 Transportation with Forklift

The cabinet can be transported directly front rear or front 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.

Lifting



The lifting rings are dismantled before shipping. It is required to be installed before lifting.

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

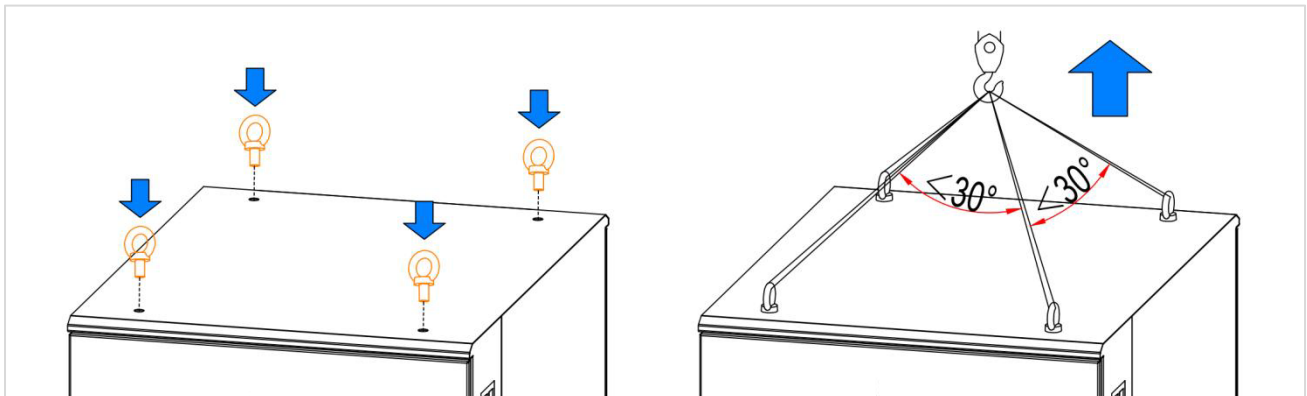


Figure 5-4 Transportation with Crane (no package, no pallet)

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

When using a crane to lift, lower, and move the 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.

5.2.3. Cabinet Foundation

Method 1: Channel steel

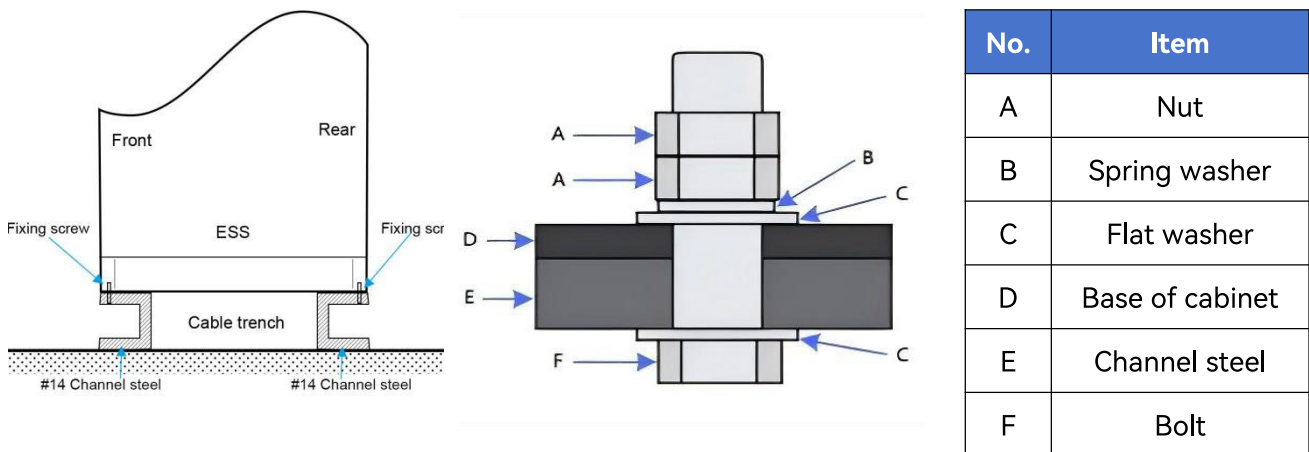


Figure 5-3. Fixing Method of Channel Steel & Screw Fixing Method

Replace the ESS cabinet on the #14 channel steel and fix it with M8 bolt. Suitable for scenarios where it is not feasible to construct a foundation, channel steel can be used to elevate the cabinet to prevent potential flooding issues.

Method 2: Concrete base



This plan is for reference only. The actual design needs to be based on the local installation environment and regulations.

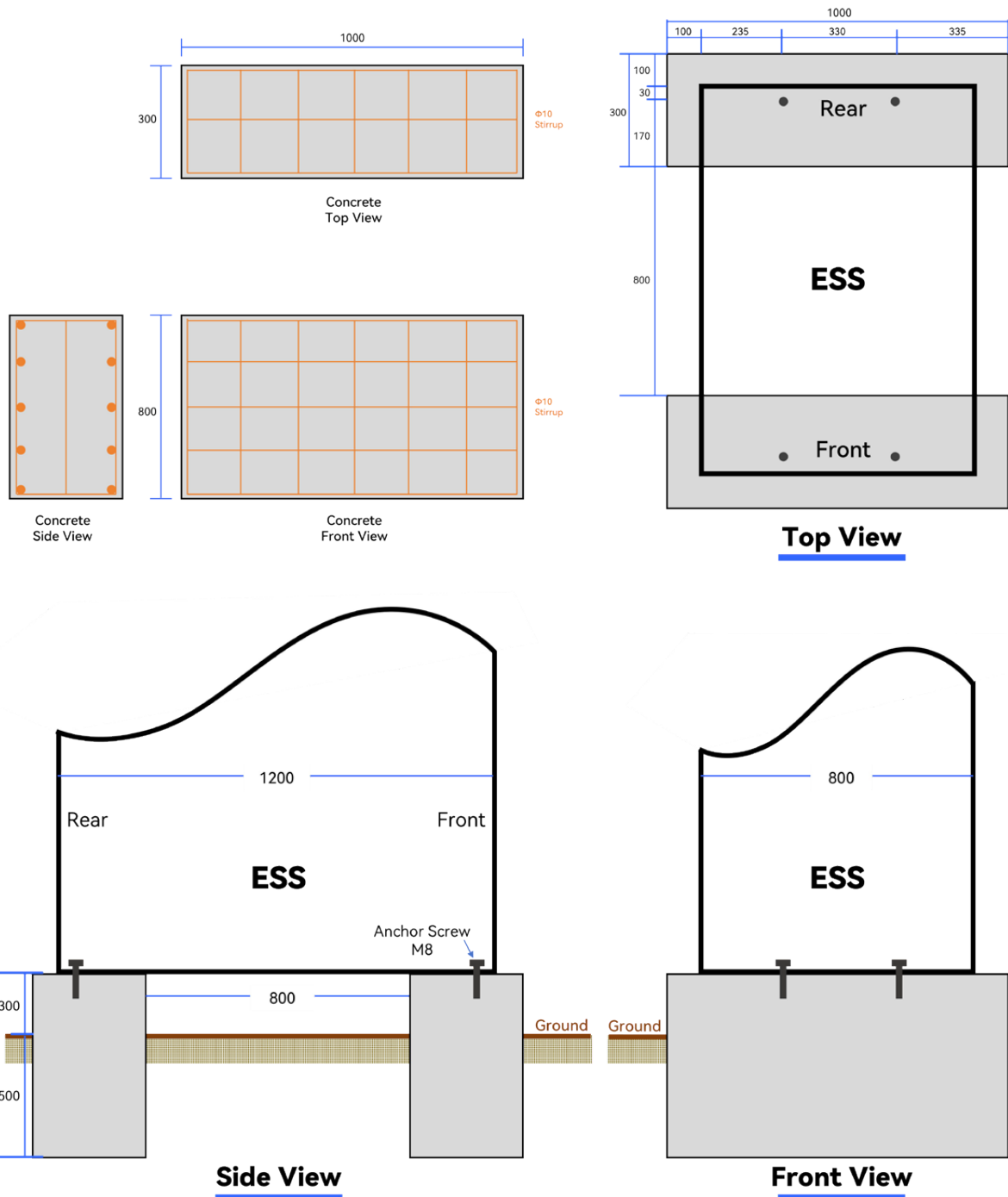


Figure 5-5 Fixing Method of Concrete Base

- 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.

5.2.4. Inverter Installation

Mounting holes for the inverter bracket have been pre-reserved on the side of the battery cabinet. Since the bracket mounting methods vary between different inverters, please confirm the brand and model of the hybrid inverter to be used with the salesperson prior to placing your order. If you need to change the inverter during installation, please contact Sunpal in advance to place an order for a custom-specific bracket.

About the installation method of hybrid inverter, please refer to the installation manual of hybrid inverter.

5.2.5. Cable Connection

5.2.5.1. 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 cabinet, as well as all other operations carried out to the 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.

5.2.5.2. 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

5.2.5.3. Overview of Wiring Area

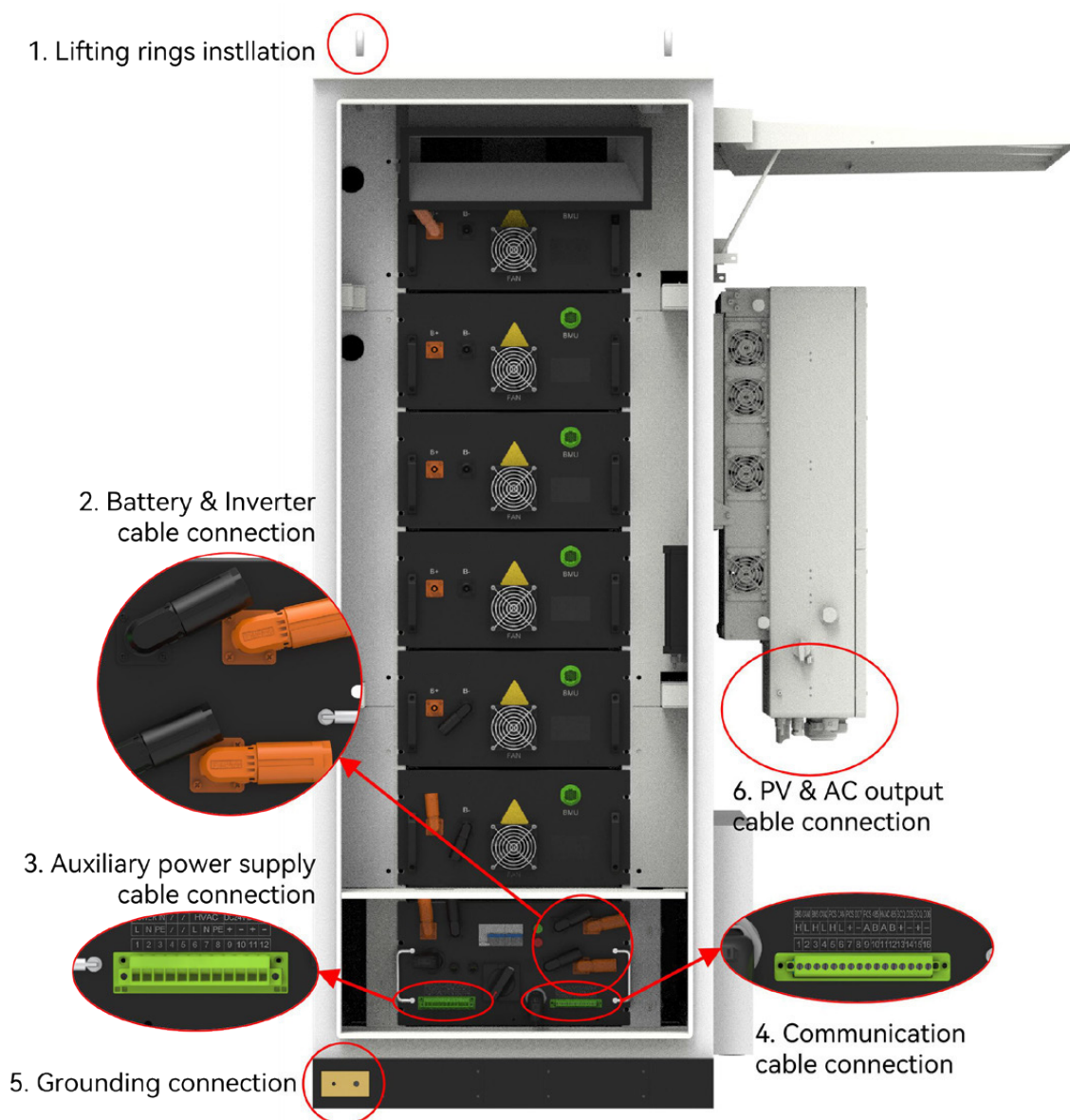


Figure 5-6 Wiring Area

The ECO-B100/120WP-2H 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
- Battery & Inverter cable connection
- Auxiliary power supply cable connection
- Communication cable connection
- Grounding connection
- PV cable connection & Inverter AC output cable connection

5.2.5.4. 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 the top of the cabinet.

5.2.5.5. Battery & Inverter Cable Connection

This process mainly involves connecting the high-voltage box in the battery cabinet to the inverter with DC power cables. The battery-side terminals have already been prepared by Elecnova in advance, along with cables of appropriate length.

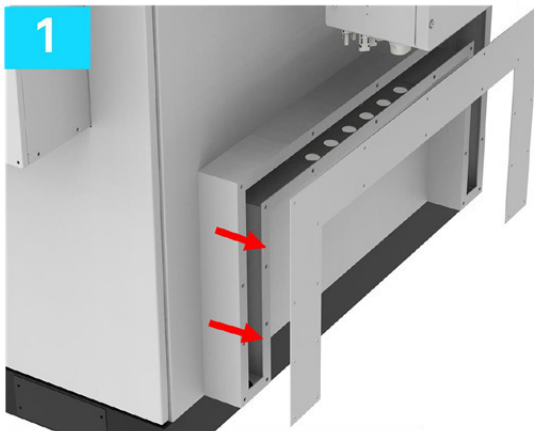
Inside the cabinet, you can find two battery connection cables prepared in advance by Elecnova.

One end of the cables is already fitted with a battery terminal connector, while the other end is not.

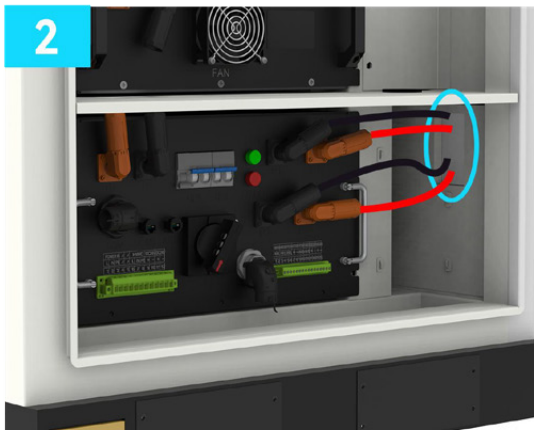
If the inverter has one battery port, please connect it to P1+ and P1-(upper one), and seal off P2+ and P2- using the plugs shipped together with the cabinet.



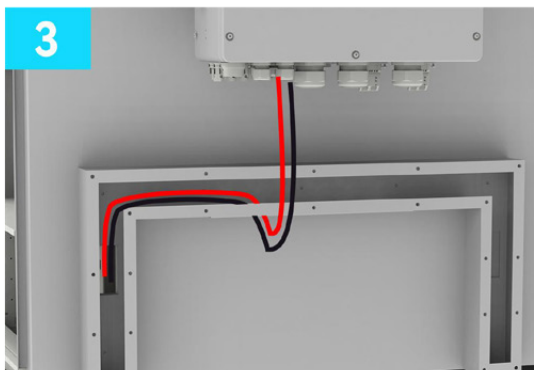
If the inverter has two battery ports, please connect to P1+ P1- and P2+ P2- separately.



Step 1: Remove the cover plate of the cable inlet channel on the side of the cabinet,



Step 2: Insert the terminal into the P+ and P- ports of the high-voltage box until you hear a "click" sound. Pull it to ensure it is firm, and pass the opposite connector-free end through the side hole (see left figure).



Step 3: After passing through the hole on the side panel (as shown in the left figure), route it through the hole at the bottom of the cable trunking (recommended to share a large loop with two battery cables), and connect it to the battery port of the hybrid inverter,

Figure 5-7 Battery Cable Connection



Please ensure that the ports correspond to the positive and negative terminals of the inverter respectively.



If the inverter has only one battery port, connect it to the P1+ and P1- terminals of the high-voltage box. If the inverter has two battery ports, you can connect them to the P1+ and P1- terminals, as well as the P2+ and P2- terminals of the high-voltage box respectively.

5.2.5.6. Auxiliary Power Supply Cable Connection

The pin1, 2, and 3 in the POWER port of the high-voltage box need to be connected to the L, N, and PE phase of the hybrid inverter's back-up output port respectively.

The OT terminals have already been installed with the cables by Elecnova before shipment, and the labels have been attached as AC-L, AC-N and AC-PE. Only need to complete the on-site installation.

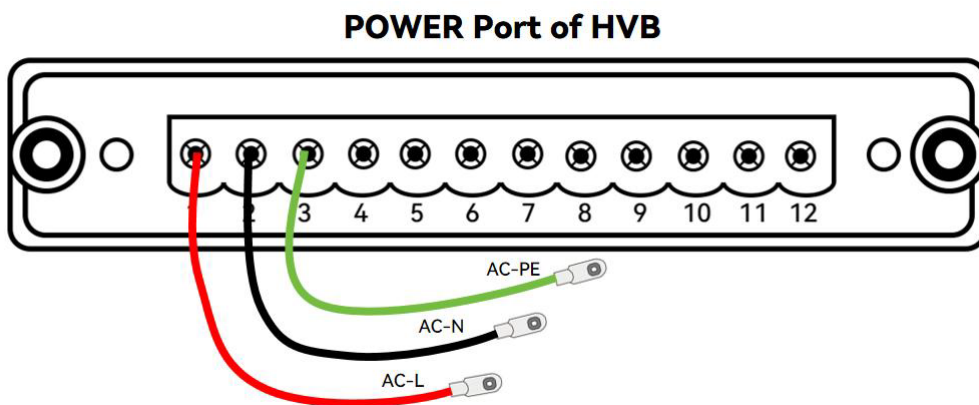


Figure 5-8 Cables from POWER Port

Step 1: Pass the end with OT terminals through the hole on the side of the cabinet, and then through the wire harness loop.

Step 2: Confirm the labels on the three wires. The red wire (AC-L) should be connected to the L1 phase on the inverter's back-up side port, the black wire (AC-N) to the N phase, and the yellow-green wire (AC-PE) to the PE phase.

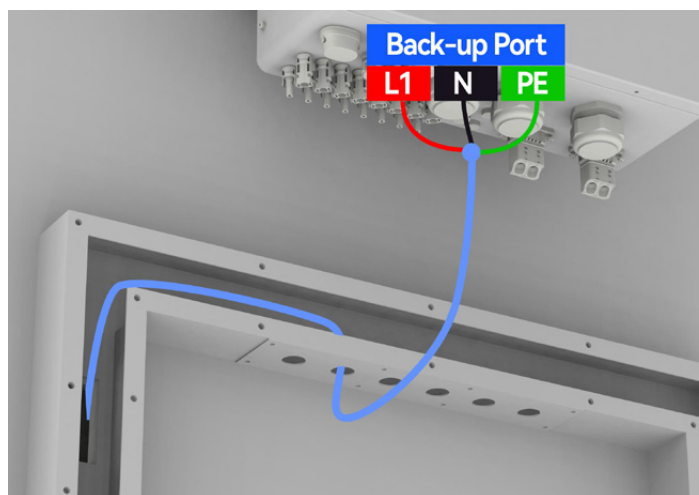


Figure 5-9 Cables pass through loops

5.2.5.7. Communication Cable Connection

1) Communication with hybrid inverter

The BMS (CAN communication), EMS (RS485 communication), and DRM (DO communication) between the battery cabinet and the inverter need to be connected correspondingly.

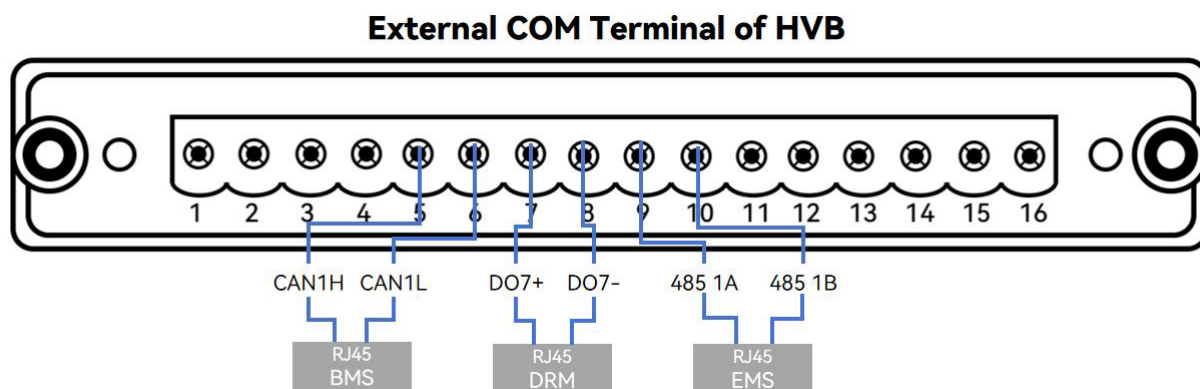


Figure 5-10 Communication Cables Connection

The communication cable for the COM port on the high-voltage box side of the battery cabinet will be pre-wired at the factory, routed through the side wiring channel, and fitted with three RJ45 connectors on the other end, labeled BMS, EMS and DRM respectively.



If the hybrid inverter you are using is Solis, you can directly plug the connectors in to BMS port, EMS port and DRM port, to complete the connection.

If the hybrid inverter you are using requires wire stripping for connection to separate ports respectively, please refer to the definitions below:

Name of RJ45	Definition	Color
BMS	CAN H	Blue
	CAN L	Blue-White
DRM	DO+	Blue-White
	DO-	Green
EMS	485A	Blue-White
	485B	Blue

2) Communication with Ethernet

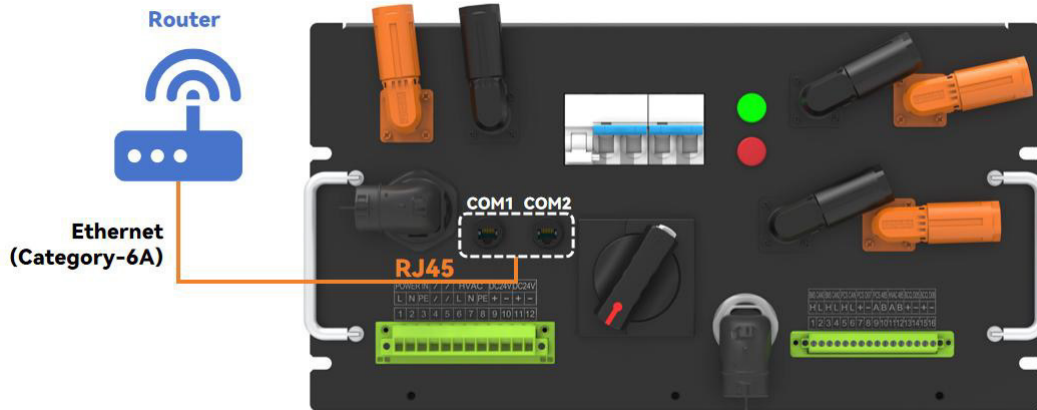


Figure 5-11 Communication connection

Port	Definition	Application
COM1	DHCP	Mainly for router
COM2	Fixed IP address	Mainly for third-party EMS

COM1 can be directly connected to the router, and COM2 can be connected to the router or a third-party EMS via manual IP address assignment.

COM1: Connect COM1 and router with 6A category Ethernet Cable.

COM2:

The detailed configuration steps are as follows:

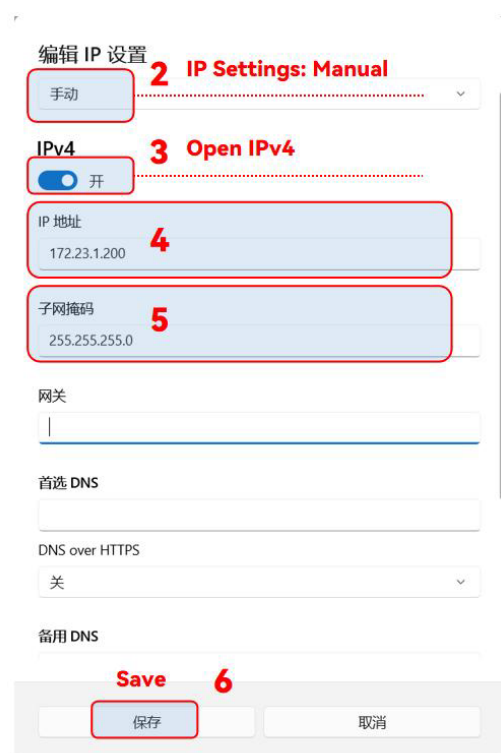
Step 1: Connect the cabinet's COM2 port and computer through RJ45, or connect them both to the same switch.

Step 2: The default IP address of the ESS container 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. The detailed steps are as follow:

1) Open the Network & Internet > Ethernet page in the computer settings. In the IP assignment section, click Edit.

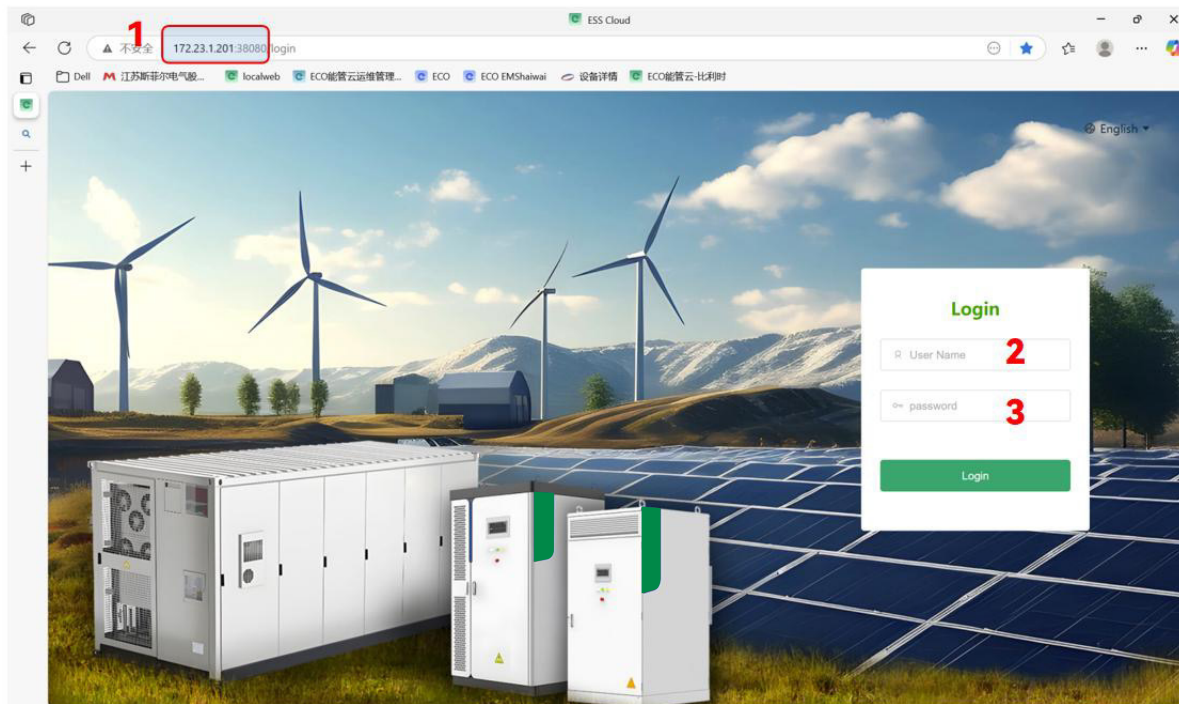


- 2) IP setting change to “Manual”.
- 3) Open “IPv4” button.
- 4) The default IP address of container’s EMS is 172.23.1.201, Set up an address for your PC with the same network segment as the EMS IP (not the IP of EMS). Eg.: 172.23.1.200
- 5) Set subnet mask as 255.255.255.0.
- 6) Save



Step 3: Then log in the local web

Connect your PC to the EMS communication port via Ethernet cable and enter "EMS IP address:Port" in the browser.(Port: 38080)



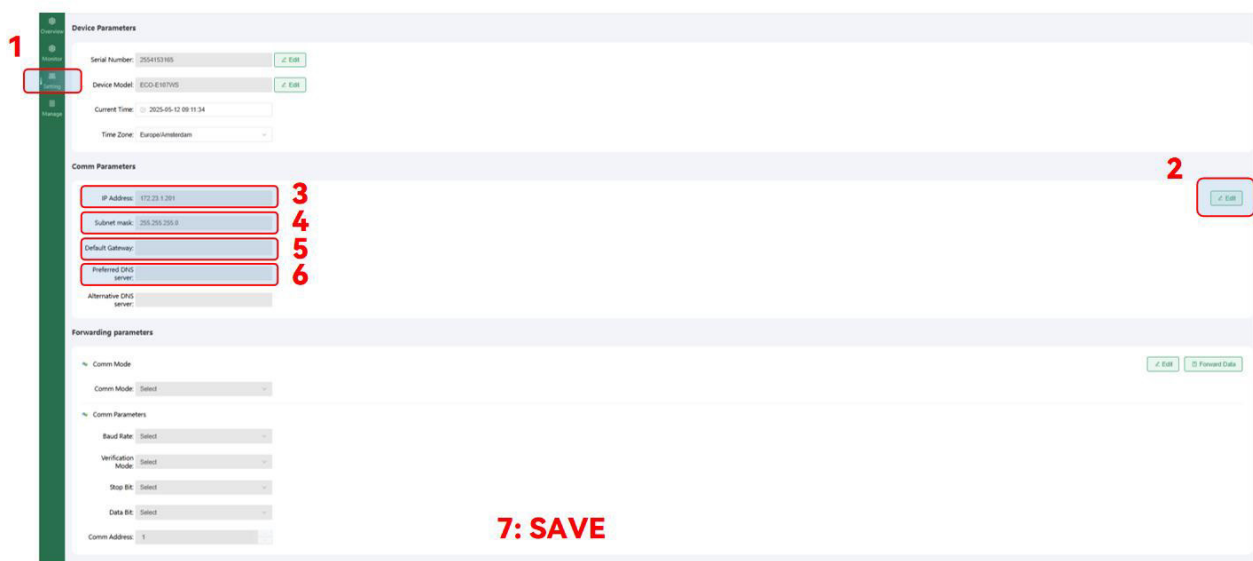
Link: 172.23.1.201:38080

Account: Config

Password: sfereems

*Please ensure the PCS is halted before operation.

Step 4: Change the container's IP address.



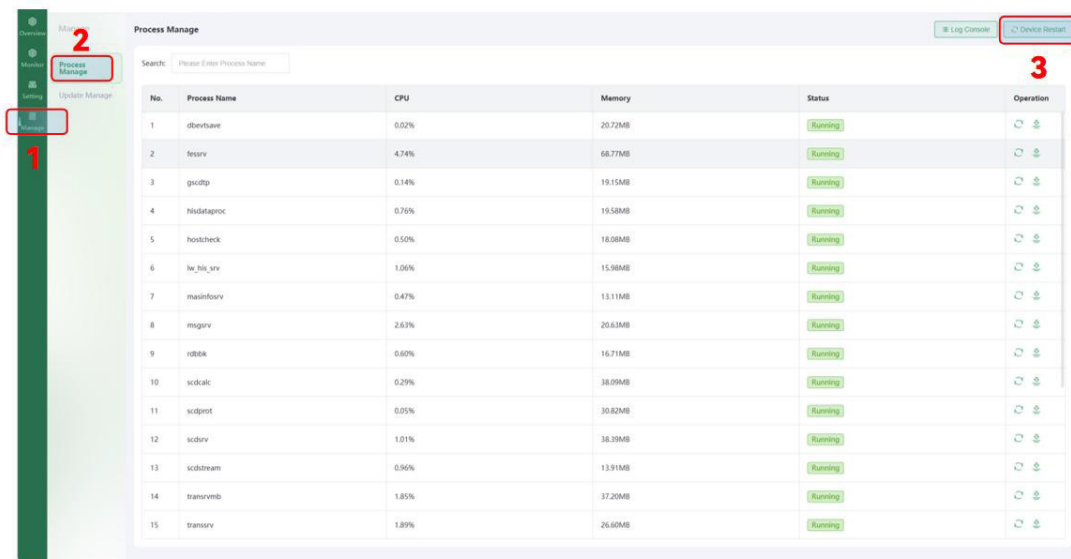
1) Select the “setting page”

2) Click the “Edit” button

- 3) Set the IP address you want and, please ensure that it is on the same network segment as your network
- 4) Subnet Mask: 255.255.255.0
- 5) Default Gateway: your gateway's IP address
- 6) Preferred DNS Server: 8.8.8.8
- 7) Save.

Step 5: Restart the EMS on the local web.

Select “Manage” → “Process Manage” → “Device Restart”.



Step 6: Remove the Ethernet cable between COM2 and computer, and then connect the COM2 to the router .

* 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.

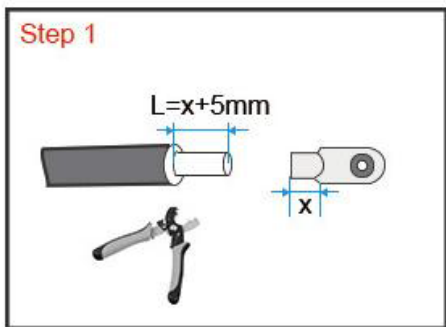
5.2.5.8. Grounding Connection

The grounding copper plate is located at the lower left corner on the back of the cabinet. The installer needs to prepare the wire themselves and configure the DT terminal.

Step 1: The grounding panel on the cabinet is equipped with both M12 and M8 screws; choose one of them.

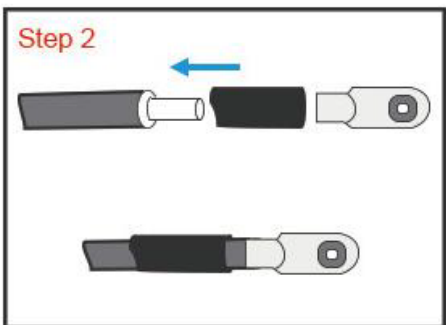
Step 2: Select PE cable of 25-50mm², connect suitable DT terminal as following steps.

Step 1



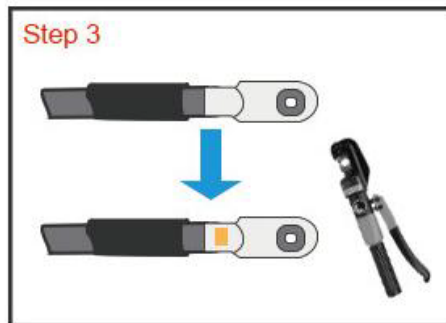
Step 1: Strip the cable with Stripping Piler, to expose copper core for a length of the-copper-nose-conduit-depth(x in figure) +5mm. Based on the cable specifications, it is recommended to use DT XX-8 copper nose terminal for wiring, where XX is the wire diameter of cable.

Step 2



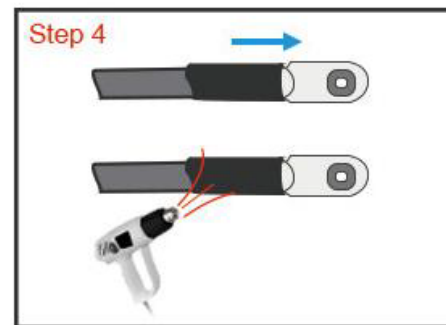
Step 2: Select a heat shrink tubing that matches the cable size. The length of the tubing shall exceed the copper nose conduit by 20mm. Slide the heat shrink tubing and DT terminal sequentially onto the cable.

Step 3



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



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 3: Install DT terminal with torque 60–70 N • m to the grounding panel.

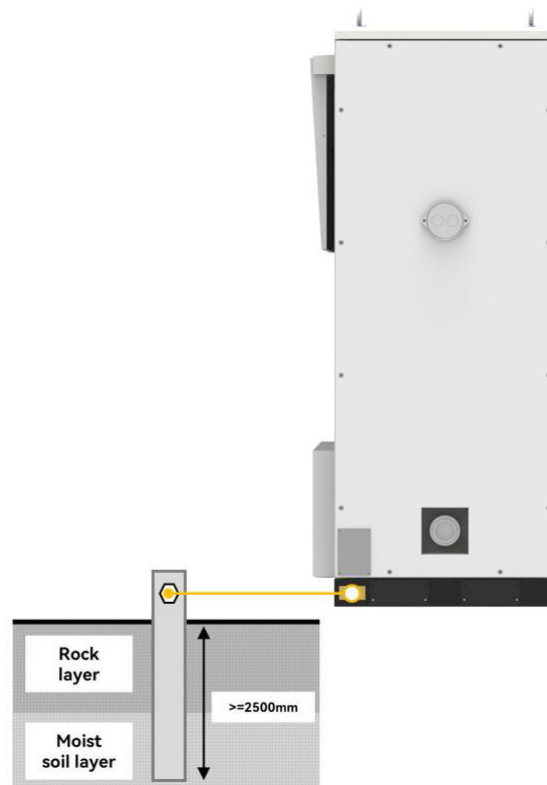


Figure 5-12 Grounding Connection

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.

5.2.6. Two cabinets connected to one hybrid inverter

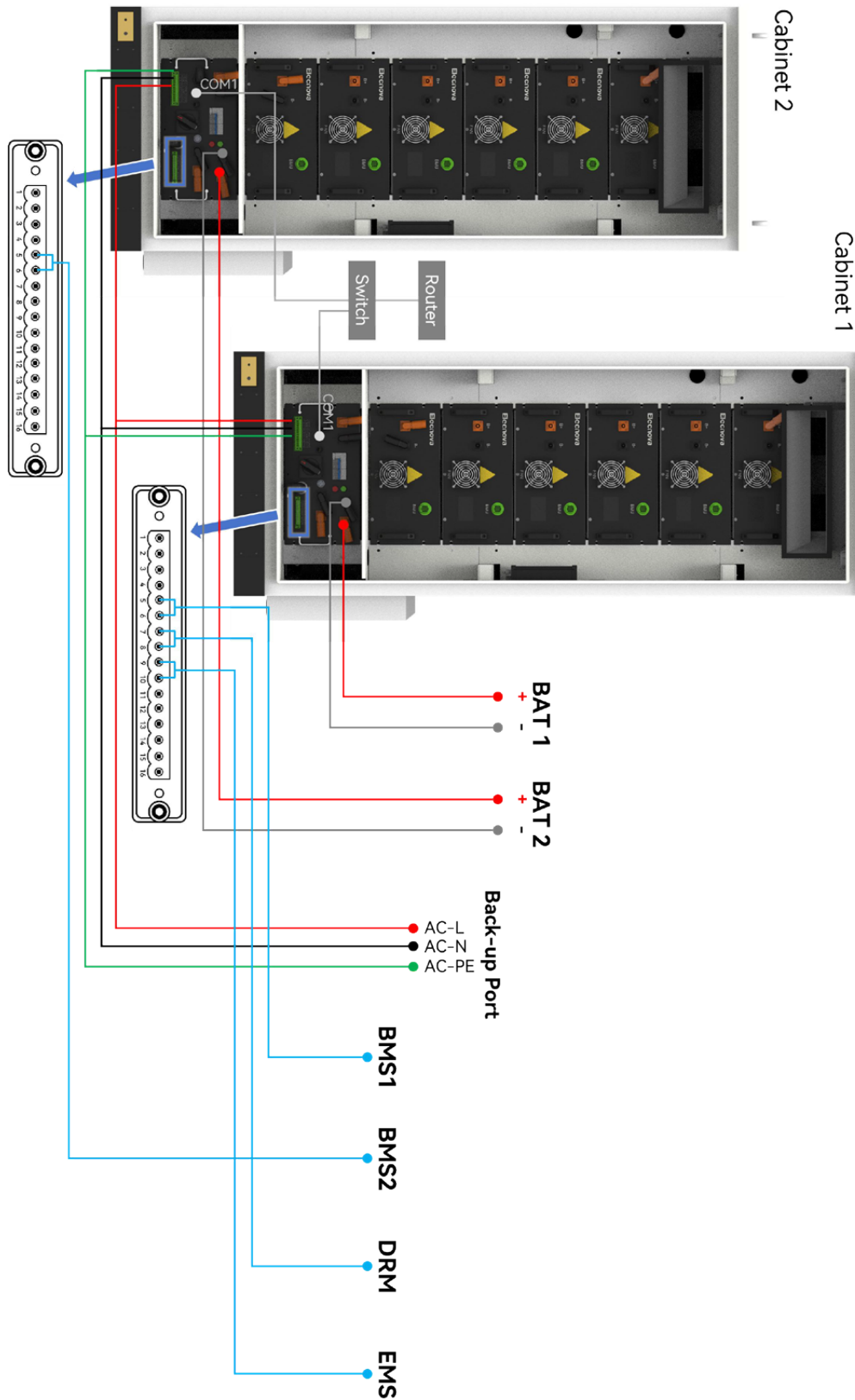


Figure 5-13 Two cabinets connected to one hybrid inverter

If you have the need of two cabinets connect to one hybrid inverter, please inform Elecnova sales or technical staff in advance.

The detailed procedures are as follows:

1. Connect the P1+/P1- power cables of the two cabinets to the BAT1+/BAT1- and BAT2+/BAT2- of the Hybrid inverter respectively.
2. Connect Pin 1/2/3 of the POWER terminal on the two cabinets to the Back-up port of the Hybrid inverter (two OT terminals share one screw) L-N-PE.
3. For External COM Terminal, first use two additional Flexible cable (0.35-1.5mm²) to connect Pin5 & Pin6 (DO7+/DO7-) of the two terminals in parallel. Then connect the corresponding ports on the Hybrid inverter side according to the following definitions:

Pin 5 / Pin 6 – Cabinet 1	CAN1H / CAN1L	BMS 1
Pin 5 / Pin 6 – Cabinet 2	CAN1H / CAN1L	BMS 2
Pin 7 / Pin 8 – Cabinet 1	DO7+ / DO7-	DRM
Pin 9 / Pin 10 – Cabinet 1	RS485 1A / RS485 1B	EMS

4. Use network cable (RJ45 connector) to connect the COM1 ports of cabinets 1 and 2 to the switch, and then connect to the router.

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 BESS 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 ID 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. Power-on&Off



During the first-time use, please perform a full charge and discharge cycle of the battery to help the system calibrate the SOC.

6.1. Power-on Operation

Before starting the external hybrid inverter, it is recommended to power on the battery cabinet firstly.

Please comply with the following steps to operate.

- 1) After completing the connection between battery cabinet and hybrid inverter, close the high voltage box switches QF1, QF2, and QF3 in sequence. Leave at least a 1-second interval between turning on each switch.
- 2) After the RUN indicator becomes steady, turn on the external hybrid inverter according to the manufacturer's instructions.

6.2. Power-off Operation

Turn off the QF1, QF2, and QF3 in sequence.



Before powering off ECO-B100/120WP-2H, please ensure that it has exited from the charge/discharge mode. Never cut off the power supply when the ESS cabinet is in charging or discharging!

7. Maintenance

7.1. Emergency Faults and Handling Methods

7.1.1. 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 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!

7.1.2. 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 cabinet supplier for maintenance after the water recedes.

Step 3: Do not start the cabinet until original supplier/manufacture examines and determines so.

7.2. System Maintenance

7.2.1. Maintenance Methods

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

Option 1:

This option is recommended for 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 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%.

7.2.2. Maintenance Interval

7.2.2.1. Interpretation of Terms

Normal Operation: The cabinet operates every day;

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

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

7.2.2.2. 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.

7.2.2.3. Maintenance under Intermittent Operation

Same as those for Normal Operation system.

7.2.2.4. Maintenance under Long-term Idle

- Keep cabinet SOC in 30%~50% during storage; Avoid long-term storage when SOC is lower than 15%. In case cabinet is to lay idle for a long time, turn off the power-consuming equipment in a timely manner.

- Check cabinet every 3 months. Make and keep the inspection records properly.
- Cabinet maintenance shall be done every 3 months to prevent battery damage.
- Before using cabinet under Long-term Idle, fully charge the cabinet at least once to restore its performance to the optimal state.

7.3. 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.

7.3.1. 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
smoke detector	Visual inspection, keep all components clean	1 months	Visual inspection	Contact after-sales service if abnormal.
heat detector				
Explosion-proof Valve				
Aerosol fire extinguishing device				

7.3.2. Air Conditioner Maintenance

1) Semi-annual maintenance intervals chart

Item	Maintenance Standard	Inspection Method	Abnormal Handling
Electrical control system	The key operation of the controller is displayed	Visual inspection	Check whether the controller has a fault alarm, and check the fault table

	normally.		according to the alarm signal.
	Normal electrical insulation.	Insulation resistance tester	Improve unqualified contacts after 10 minutes of power off.
	No looseness of electrical cables and terminals.	Visual inspection	Tighten the loose cables and terminals with a screwdriver after 10 minutes of power off.
	Contactor suction flexible, no blocking phenomenon, and visual contact suction arc and burn mark phenomenon.	Visual inspection	If serious, replace the corresponding contactor after 10 minutes of power off.
	There is no dust at the wiring panel.	Visual inspection	Clean up the dust with a brush or compressed air after 10 minutes of power off.
Appearance	The unit is clean and dust-free and free of dirt	Visual inspection	Use brush or cotton cloth to remove dust and dirt from unit after 10 minutes of power off.
	There is no dust in the fan and no foreign matter blockage at the air inlet.	Visual inspection	Clean the dust of the fan with a brush and clean the foreign matter at the air inlet after 10 minutes of power off.
Fans	The fan blades are not damaged, and the fan rotates smoothly without abnormal noise.	Visual inspection	After the power is turned off for 10 minutes, fasten the fixing screws of the fan and check whether there is any internal cable or other objects interfering with the rotation of the fan. If

			the fan fails, please replace it.
Condenser	Condenser is free from dust and foreign matter blockage.	Visual inspection	<p>Clean the condenser with compressed air or a vacuum with a brush head after 10 minutes of power off. If the fin is damaged or inverted during cleaning, you can use tweezers for simple repair. When it snows in winter, the snow around the heat exchanger should be cleaned in time.</p>
<ul style="list-style-type: none"> ● If the heat exchanger is dirty and blocked, it will affect the refrigeration and heat dissipation effect of the equipment. In the environment where the equipment is used, such as sand, oil, leaves, fibers and catkins, the inspection cycle will be reduced according to the actual situation. ● If the air condition is installed inside cabinet, the heat exchanger of the unit cannot be cleaned directly with clean water. If necessary, the air conditioner must be moved to another safe place to clean, so as not to spray water on other electronic parts and cause damage. ● After cleaning the heat exchanger, the debris needs to be cleaned out from the air conditioner. 			
Cooling system	The system has no abnormal alarm	Visual inspection	<p>A certain amount of refrigerant has been filled before delivery, and relevant parameters of the refrigeration system and system tightness have been verified. The refrigeration system is a fully enclosed system. Therefore, the user does not need to maintain the refrigeration system. When the refrigeration system fails, the system is equipped with related devices for detection and alarm, and troubleshooting is carried out according</p>

			to the alarm.
Drain-pipe	The drain pipe is free from impurities, dirty and blocked	Visual inspection	Remove debris from the inside of the drain pipeline. Winter pay attention to the drainage pipe ice blocking problem, if the occurrence of ice blocking should be dealt with in time to avoid the normal discharge of condensate water.
Filter screen	The filter is free from dust and foreign matter	Visual inspection	The filter screen is cleaned with warm water below 40 degrees, which can not be rubbed. When very dirty, you can use neutral detergent for decontamination treatment, if not very dirty, you can directly use water to clean. After cleaning the air filter, dry the water before installing it into the device, and install it strictly in accordance with the correct installation procedures.
<ul style="list-style-type: none"> The supplier's own condenser inlet air filter shall be maintained in accordance with the above method. 			

2) Annual maintenance intervals chart

Item	Maintenance Standard	Inspection Method	Abnormal Handling
Cooling system	The system has no abnormal alarm	Visual inspection	According to the alarm prompt, check the fault table for troubleshooting.
<ul style="list-style-type: none"> A certain amount of refrigerant has been filled before delivery, and relevant parameters of the refrigeration system and system tightness have been verified. The refrigeration system is a fully 			

enclosed system. Therefore, the user does not need to maintain the refrigeration system when there is no fault alarm.

8. Warranty Statement

Please refer to Limited Warranty Letter.