SUN SYNK® MOBILE

SOLAR & BATTERY ENERGY STORAGE SYSTEM

USER MANUAL

SS-CS-GE-F120

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Please retain for future reference

Table of Contents

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Disclaimer

SUNSYNK LTD shall not be liable for personal injury, property loss, product damage and subsequent losses under the following circumstances.

- Failure to comply with the provisions of this manual.
- Incorrect use of this product.
- Unauthorized or unqualified personnel repair the product, disassembly the rack and perform other operations.
- Use of unapproved spare parts.
- Unauthorized modifications or technical changes to the product.

ABOUT THIS MANUAL

This manual describes the transportation and storage, mechanical installation, electrical connection, power-on and power-off operation, troubleshooting, and maintenance of the BESS.

How to Use This Manual

Please read this manual carefully before using the product and keep it properly at a place for easy access. In order to provide the best customer experience, contents of the manual may be updated and amended continuously, so it is possible that there may be some errors or slight inconsistency with the actual product.

Please refer to the actual product purchased, and the latest manual can be obtained from www.sunsynk.com or sales channels.

The figures in this manual are for reference only. The actual product received may differ.

Audience

This manual is intended for qualified technical personnel.
Installation must and can only be performed by professional technicians who meet the following requirements:

- Technical support engineers.
- Hardware installation engineers.
- Commissioning engineer.
- Maintenance engineer.

Symbol Specification

In order to ensure the personal and property safety of users when using this product, and to ensure the best and effective use of this product, this manual provides users with relevant safety information, highlighted by the following symbols.

Below is a list of symbols used in this manual. Please read it carefully to make the best use of this manual.

	Indicates an immediate and dangerous situation that, if not avoided, will result in death or serious injury.
	Indicates a moderately hazardous situation which, if not avoided, will result in death or serious injury.
	Indicates a minor hazard which, if not avoided, could result in minor or moderate injury.
	Conveys device or environment safety warning information. This could result in equipment damage, data loss, performance deterioration, or unanticipated results if not avoided. The notice does not involve personal injury.

This product is designed to be an integrated system, which must be performed by a qualified person trained in electrical engineering and familiar with lithium batteries' characteristics and safety requirements. Do not use this product if you are unsure if you possess the necessary skills to complete this integration.

Abbreviation:

Complete Designation	Abbreviations
Battery Module	Module
Battery Pack	Pack
Power Distribution Unit	PDU
Accessory box	/
Energy Storage System	BESS
Battery Base	Base

SAFETY PRECAUTIONS

Personal Requirements

The hoisting, transportation, installation, wiring, operation, and maintenance of the BESS must be carried out by professional electrical technicians in accordance with local regulations. The professional technician is required to meet the following requirements:

- Should know electronic, electrical wiring and mechanical expertise, and be familiar with electrical and mechanical schematics.
- Should be familiar with the composition and working principles of the BESS and its corollary equipment.
- Be able to quickly respond to hazards and emergencies that occur during installation and commissioning.
- Be familiar with the relevant standards and specifications of the country/region where the project is located.

Electrical Safety

DANGER

- Touching the power grid or the contact points and terminals in the devices connected to the power grid may lead to electric shock! All circuit connectors must be disconnected during maintenance.
- The battery side or the power grid side may generate voltage. Always use a standard voltmeter to ensure that there is no voltage before touching.
- Lethal voltages are present inside the product!
- Note and observe the warnings on the product.
- Respect all safety precautions listed in this manual and other pertinent document.
- Respect the protection requirements and precautions of the lithium battery.
- When the power supply is disconnected, the battery may still have electricity. Wait 10 minutes and ensure the device has no voltage before performing any operation.

WARNING

- All hoisting, transportation, installation, wiring, operation, and maintenance must comply with the relevant codes and regulations of the country where the project is located.
- Always use the product in accordance with the requirements described in this manual. Otherwise, equipment damage may occur.

NOTICE

- Place necessary warning signs or barriers near the product to prevent accidents caused by misuse or unrelated persons.

Battery Safety

It is of utmost importance to thoroughly read the owner's manual before installing or using the battery. Adhering to the instructions and warnings in this document is crucial, as failure to do so could result in electric shock, serious injury, or even death and may also damage the battery, rendering it inoperable.

Once the battery is fully discharged, it must be charged within 48 hours. Neglecting this requirement can lead to a loss of battery capacity or irreversible damage. If the battery is stored for an extended period, it should be charged every six months, ensuring the SOC (State of Charge) does not fall below 50%.

- Do not use cleaning solvents to clean batteries. Do not expose the battery to flammable or irritating chemicals or vapors.
- Do not connect the battery directly to the photovoltaic solar power wire.
- Do not paint any part of the battery, including any internal or external components.
- Please do not use batteries provided by the company with other batteries, including but not limited to batteries of other brands or batteries with different rated capacities.
- Do not insert any foreign matter into any part of the battery.
- Handle the battery with utmost care to prevent any damage, drops, or leakage. Your careful handling is key to maintaining the battery's integrity and performance.
- Do not store batteries with inflammable and explosive materials. This may cause product damage or property loss.

Maintain the battery according to this manual. Sunsynk is not responsible for insurance and claims if maintenance is not performed in accordance with this manual.

Hoisting and Transportation

Follow the procedure of work of heights when walking on the top of the container.

Installation and Wiring

In the whole process of mechanical installation, the relevant standards and requirements of the project location must be strictly observed.

Please refer to the wiring method recommended by Sunsynk.

Operation and Maintenance

Personal protective equipment must be equipped when maintaining the BESS. Maintenance personnel must wear protective equipment such as goggles, helmets, insulating shoes, and gloves.

Users are not allowed to perform battery maintenance without guidance.

Warning: Except for the maintenance operations described in this manual, do not perform other maintenance operations to avoid electric shock. If necessary, please contact Sunsynk Mobile Customer Service Center for maintenance.

Removing or repairing the battery may cause the battery to catch fire. Professionals must replace the internal parts. Do not spray paint internal or external parts of the product. Do not use cleaning agents to clean products or expose them to harsh chemicals.

Product Disposal

When the equipment is at the end of its service life, it cannot be disposed of together with domestic waste. Some parts can be recycled, and some parts will cause environmental pollution.

TECHNICAL DATA

Model		SS-CS-GE-F120
System Specification		
Max. Grid AC Input		50000W
Nominal Output Power/UPS Power		50000W
AC Output Frequency and Voltage		50/60Hz; 220/380, 230/400Vac
Grid Type		3L/N/PE
Energy Configuration		122.8kWh
Module Capacity		100Ah
Dimension (W x D x H)		1783x1059x2235mm
Weight Appr.		2100kg
AC Output Rated Current		75.8A
Battery Operating Voltage		480~700V
Charge/Discharge Current	Recommended	50A
	Nominal	100A
	Peak Discharge (2min, 25 °C)	125A
Max. Charging/Discharging Efficiency		97.6%
Humidity		15% ~ 85% (no condensing)
Battery Chemistry		$LiFePO_4$
IP Rating of Enclosure		IP55
Installation Style		Floor-Mounted
Warranty		10 years
Battery Technical Specification		
Battery Module Nominal Voltage		51.2V
Battery Module Energy		5.12kWh
Battery Usable Energy		110.5kWh
BMS Communication		CAN
Battery Module Dimension (W x D x H)		440×570×133mm
Battery Module Weight		44kg
Operating Temperature Range		Charge: 0~55 °C/Discharge: -20~55 °C
Storage Temperature		0~35 °C
Cycle Life		≥6000(@25°C±2°C,0.5C/0.5C,70%EOL)
Battery Module Certification		UN38.3, IEC62619, IEC61000

Inverter Technical Specification	
Max. PV Input Power	65000W
Max. PV Input Current	36+36+36+36A
Rated PV Input Voltage Nominal	600Vdc
Start Up DC Voltage	180Vdc
MPPT Voltage Range	150-850Vdc
Max. PV Short-circuit Current	55+55+55+55A
Number of MPPT / Number of String	4/8
Peak Power (Off Grid)	1.5 time of rated power, 10s
Power Factor	0.8 leading to 0.8 lagging
THD	<3%
DC Injection Current	<0.5%In mA
Display	LCD
Operating Temperature Range	-40°C ~ 60°C (>45°C derating)
Dimension (W x D x H)	527x294x894mm
Inverter Communication	CAN, RS485, WIFI, ETH
Safety EMC/Standard	IEC/EN 62109-1, IEC/EN 62109-2, IEC/EN 61000-6-1, IEC/EN 61000-6-2, IEC/EN 61000-6-3, IEC/EN 61000-6-4
Grid Regulation	VDE4105, IEC61727/62116, VDE0126, AS4777-2, CEI 0 21, EN50549-1, G98, G99, C10-11, UNE217002, NBR16149/NBR16150
Max. Efficiency	97.6%
MPPT Efficiency	99.9%

PRODUCT DESCRIPTION

Product Introduction

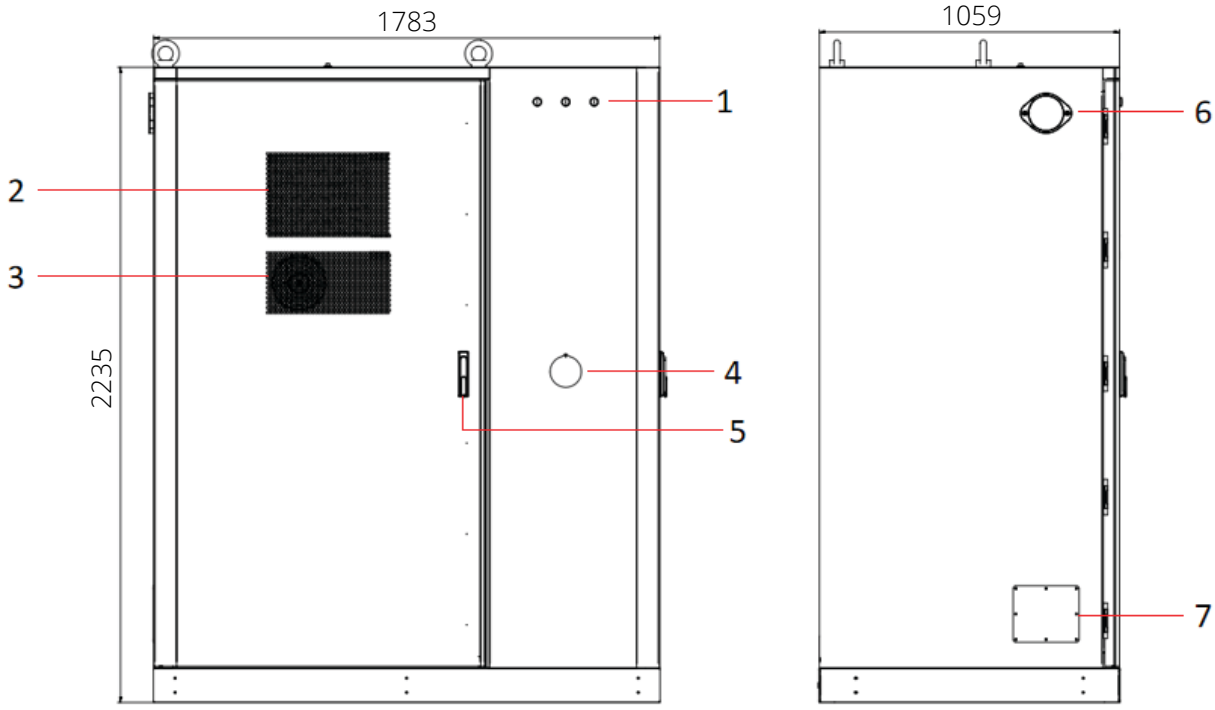
Introducing the SS-CS-GE-F120, a state-of-the-art lithium iron phosphate battery from Sunsynk Mobile, designed to support the reliable power supply of various equipment and systems. This battery excels in high-rate cyclic charging and discharging scenarios, making it ideal for demanding energy storage needs.

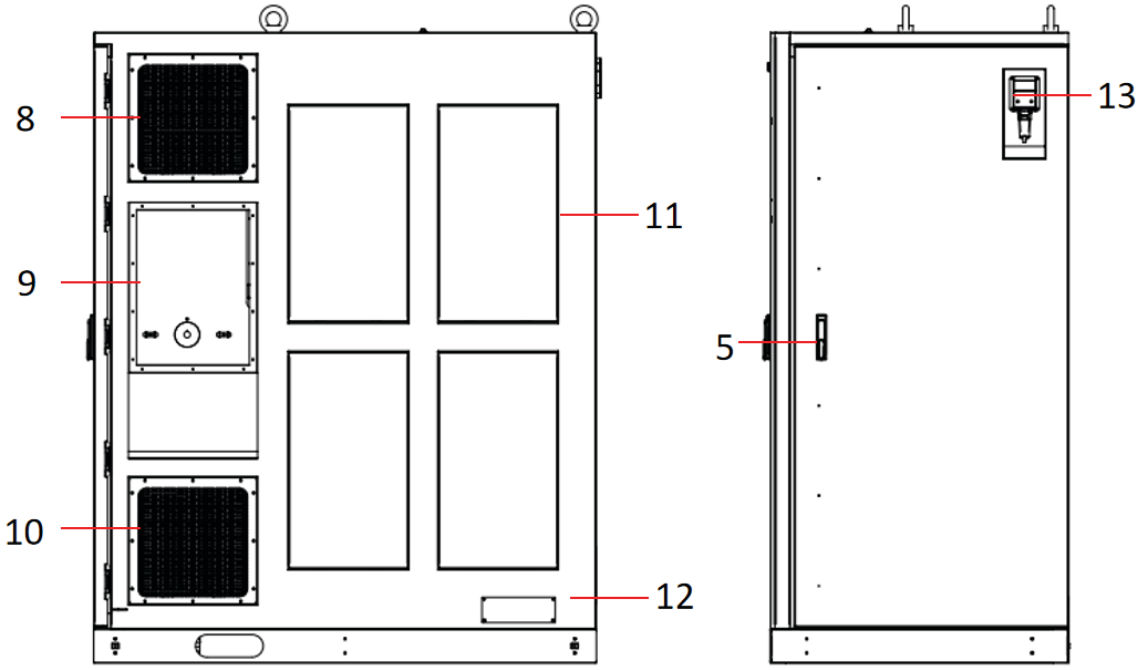
Equipped with a 50kW Power Conversion System (PCS) from Germany, the SS-CS-GE-F120 ensures efficient performance and reliability. It features a comprehensive local management system that monitors and manages voltage, current, temperature, humidity, and smoke. The advanced Battery Management System (BMS) optimizes battery capacity and prolongs the system's lifecycle, while safety is prioritized with a built-in aerosol fire suppression device and combustible gas detection exhaust system.

For enhanced capacity and longer power support, the SS-CS-GE-F120 can be expanded in parallel with up to four SS-CS-GE-F60 DC machines or six SS-CS-GE-F120 AC machines, offering scalable solutions for modern power demands. This makes the SS-CS-GE-F120 a versatile and essential component for sustainable energy solutions.

External Design

Cabinet Appearance

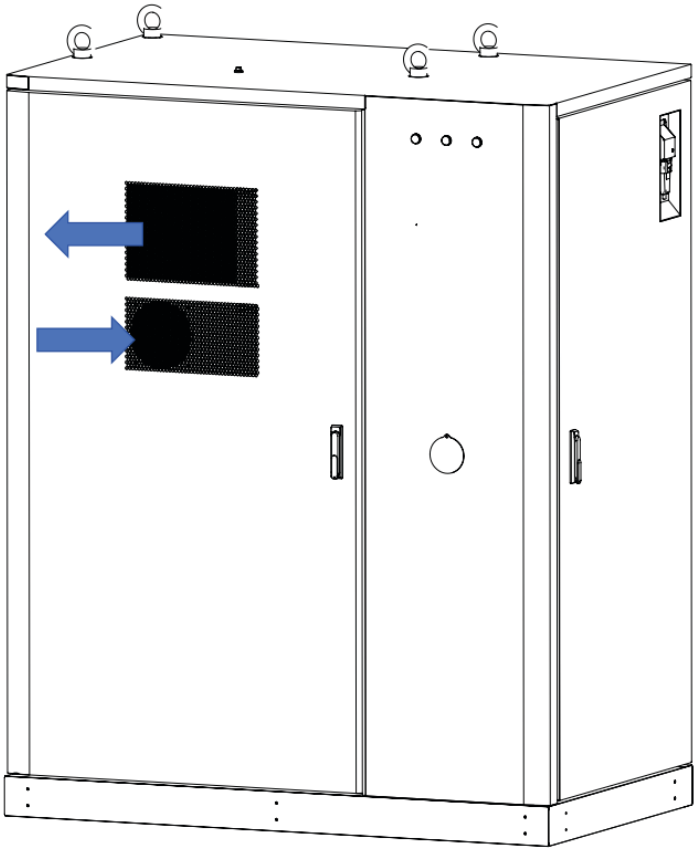




1. Indicator light: When the green light comes on, the BESS is Run. When the red light comes on, the BESS gives an alarm.	8. Electrical compartment air outlet: The heat from the distribution bin comes out of this opening.
2. Air conditioning outlet: Hot air in the air conditioner comes out from this outlet.	9. Distribution box: Equipment used for power distribution and control.
3. Air conditioning inlet: Outdoor air enters air conditioner through this opening.	10. Electrical compartment air inlet: Outdoor air enters the distribution bin through this port.
4. Emergency stop switch: When the air conditioner out of order, activate this switch to stop the BESS.	11. Explosion Relief Plate: In case of combustible gas buildup due to battery cell thermal runaway, the explosion relief plate directs the explosion safely to protect the product's main structure. This measure ensures the safety of property and personnel in the vicinity.
5. Water outlet: External incoming water and air conditioning condensed water.	12. Metal Nameplate: This plate shows detailed product specifications.
6. Breather Valve: If the level of flammable gas detected exceeds the safe limit, open the vent valve to release the gas outside the device. This action prevents the system from potential fire hazards or explosions.	13. WIFI: The reception and transmission of wireless signals convert wired network signals into wireless network signals.
7. Cable outlet: The cable outlet during parallel operation or connected to the inverter.	

Air-Conditioner Design

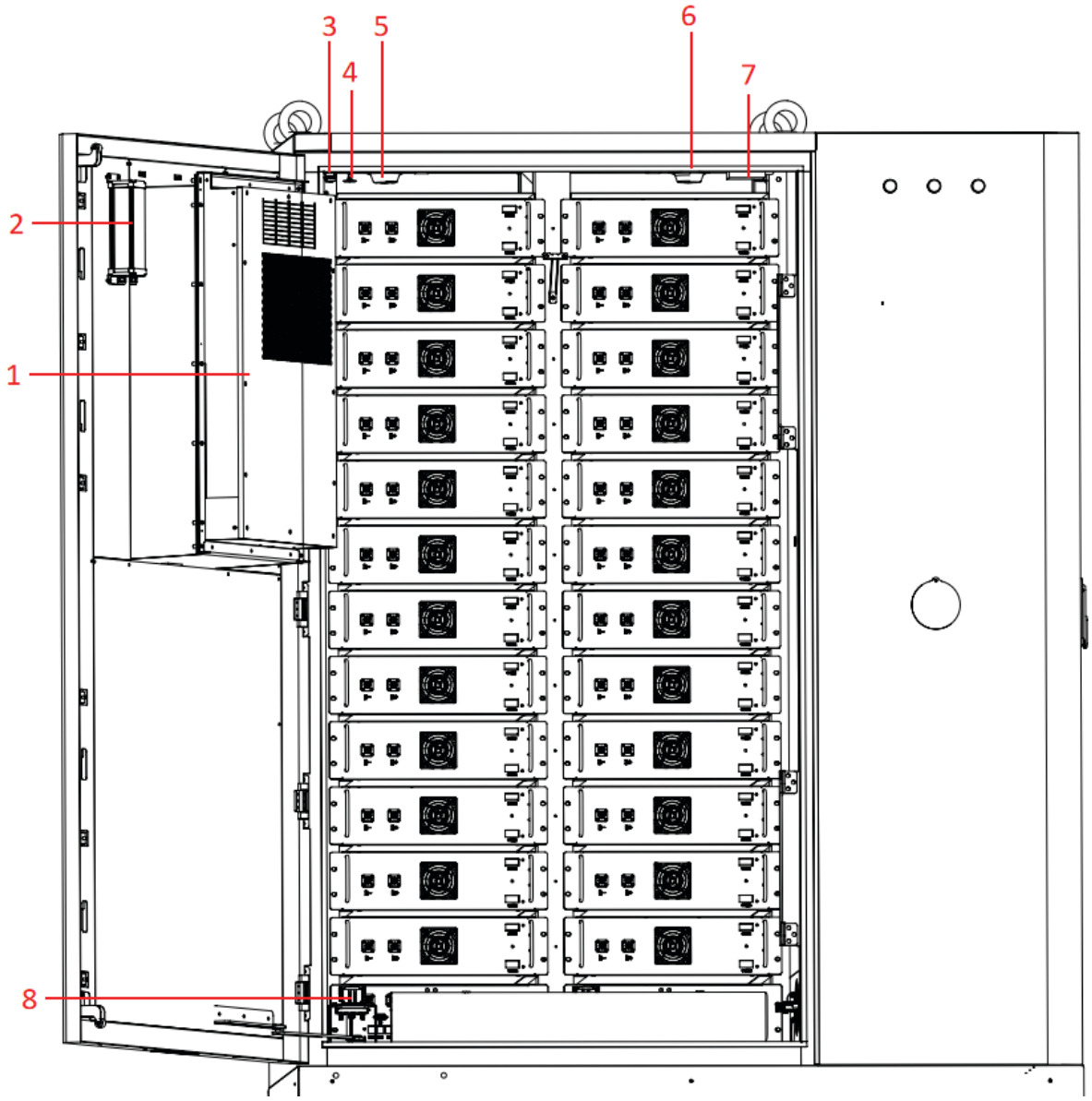
System built-in air conditioner cooling. The air conditioning system uses air cooled air conditioner, keep the BESS at a constant temperature.



Energy Storage Air Conditioning	
Model	DY-CNA20-BP
Rated Voltage:	AC 220V-240V
Rated Frequency	50/60Hz
Rated Cooling Capacity:	2100W
Rated Heating Capacity:	1650W
Rated Cooling Power Input:	900W
Rated Heating Power Input:	1700W
Rated Cooling Current:	4.15A
Rated Heating Current:	7.9A
Max.Power:	1800W
Max.Current:	8.3A
Max Operating Pressure	2.7Mpa
Max.Suction Pressure	1.6Mpa
Max.Discharge Pressure	2.7Mpa
Air Flow Volume	630m³/h
Electric Shock Prevention	I
Refrigerant	R134a/330g
Water-proof Class	IP55
Dimension (WxHxD)	478x796x306m
Net Weight	48.5kg

Internal Design

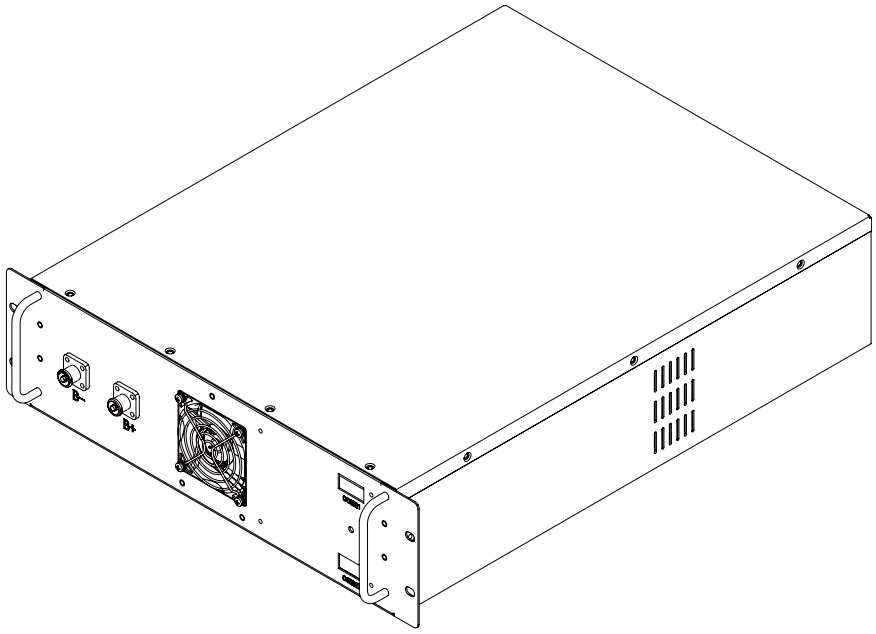
Internal Equipment

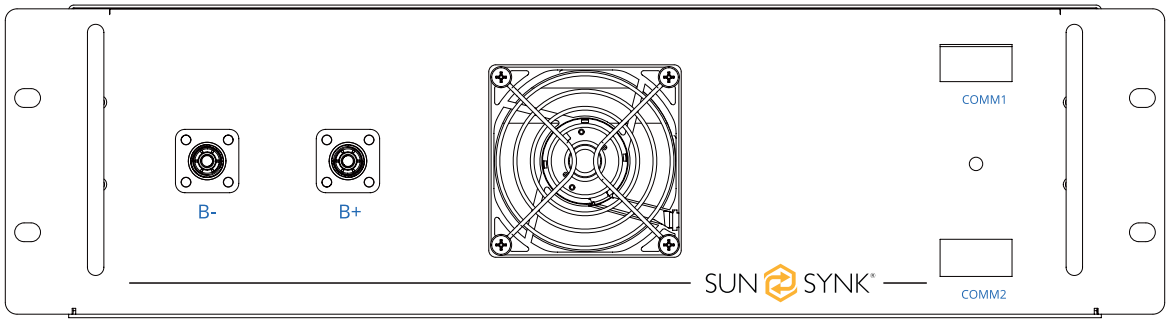


1. Air Conditioner	Cooling the BESS.
2. Aerosol Fire Suppression Device	When the BESS is detected to be on fire, aerosol is emitted to extinguish the fire.
3. Travel Switch	When the BESS is detected to be on fire, aerosol is emitted to extinguish the fire. Check whether the BESS's door is closed.
4. Fire Suppression Water Pipe	Fire suppression and cooling.
5. Smoke Detector	A device used to detect smoke in a fire and sound an alarm when smoke is detected.
6. Heat Detector	A device used to measure temperature and sound an alarm if it detects excessive temperature.
7. Combustible gas detector	Detect the concentration of combustible gases in the air.
8. Manual Service Disconnect	In order to protect the safety of technicians servicing in high voltage environments or respond to sudden events, the connection of the high voltage circuit can be quickly separated.

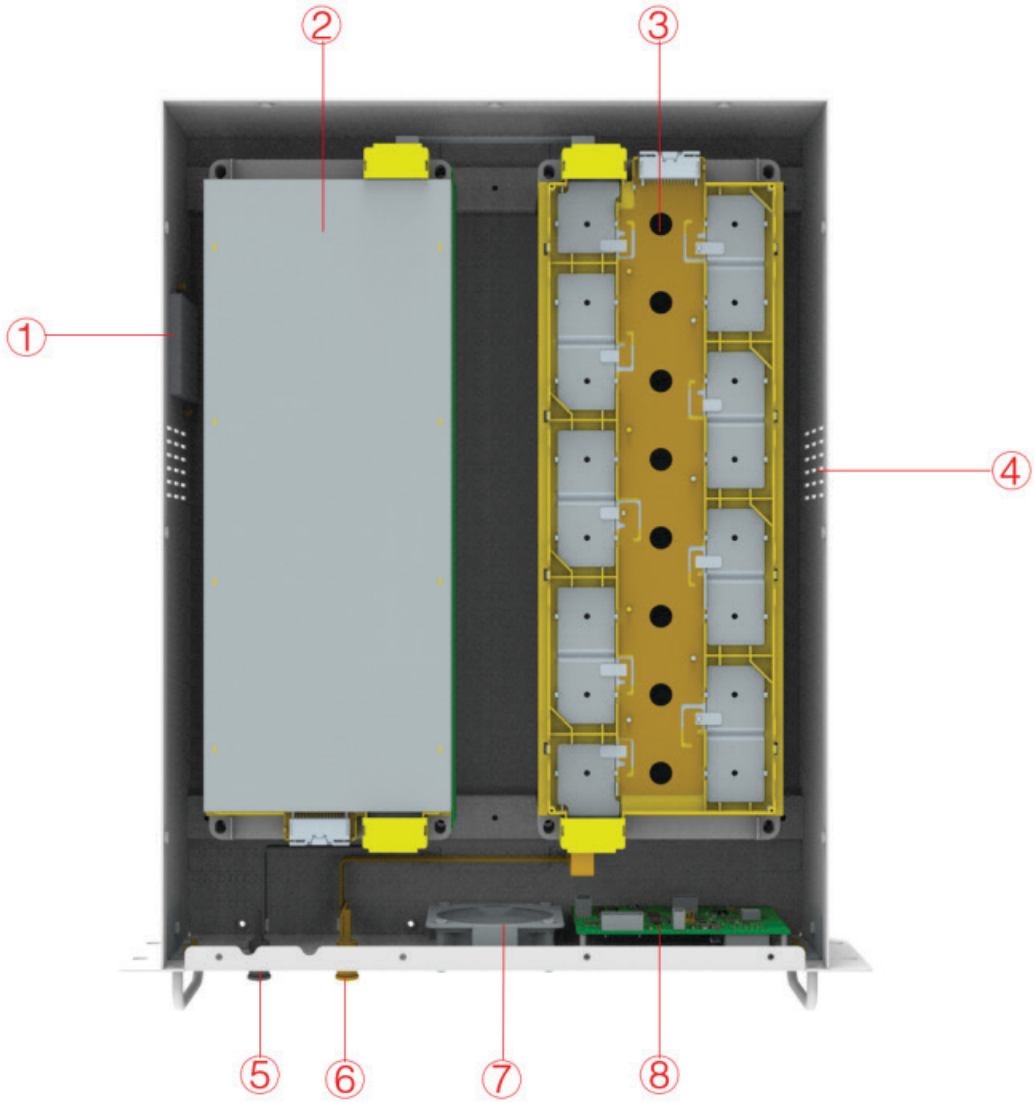
Battery Introduction

Battery Module



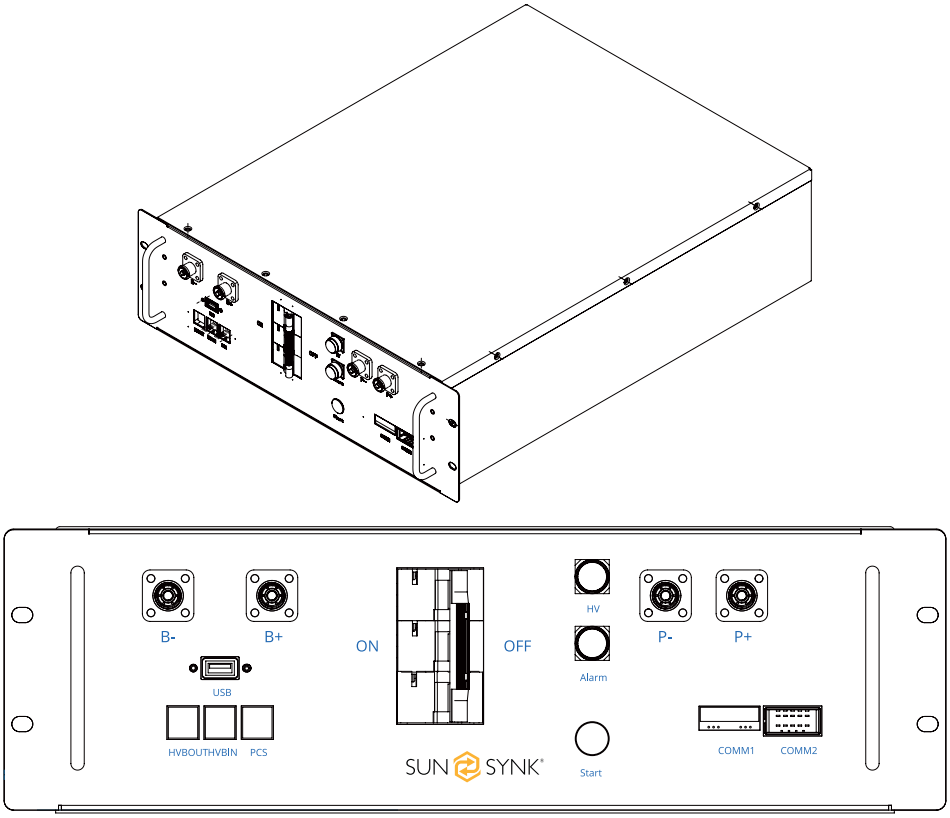


Battery Type	LiFePO4(LFP)
Nominal Voltage	51.2Vdc
Rated Capacity	100Ah
Rated Energy	5.12kWh
Nominal Charge/Discharge Current	100A
Peak. Discharge Current	125A
Charge Temperature	0~55°C
Discharge Temperature	-20°C~55°C
Storage Temperature	0°C~35°C
Ingress Protection	IP20
Dimension (W/D/H)	440*570*133mm
Weight Approximate	45kg



1. Aerosol Sensor	Detection of aerosol concentrations in the air.
2. Battery Module	Provides electrical energy storage and output.
3. CCS	Cells Contact System.
4. Vent Hole	Heat dissipation.
5. Battery Negative-	/
6. Battery Positive+	/
7. Fan	Promote internal and external air flow.
8. BMU	Battery monitoring.

Power Distribution Unit

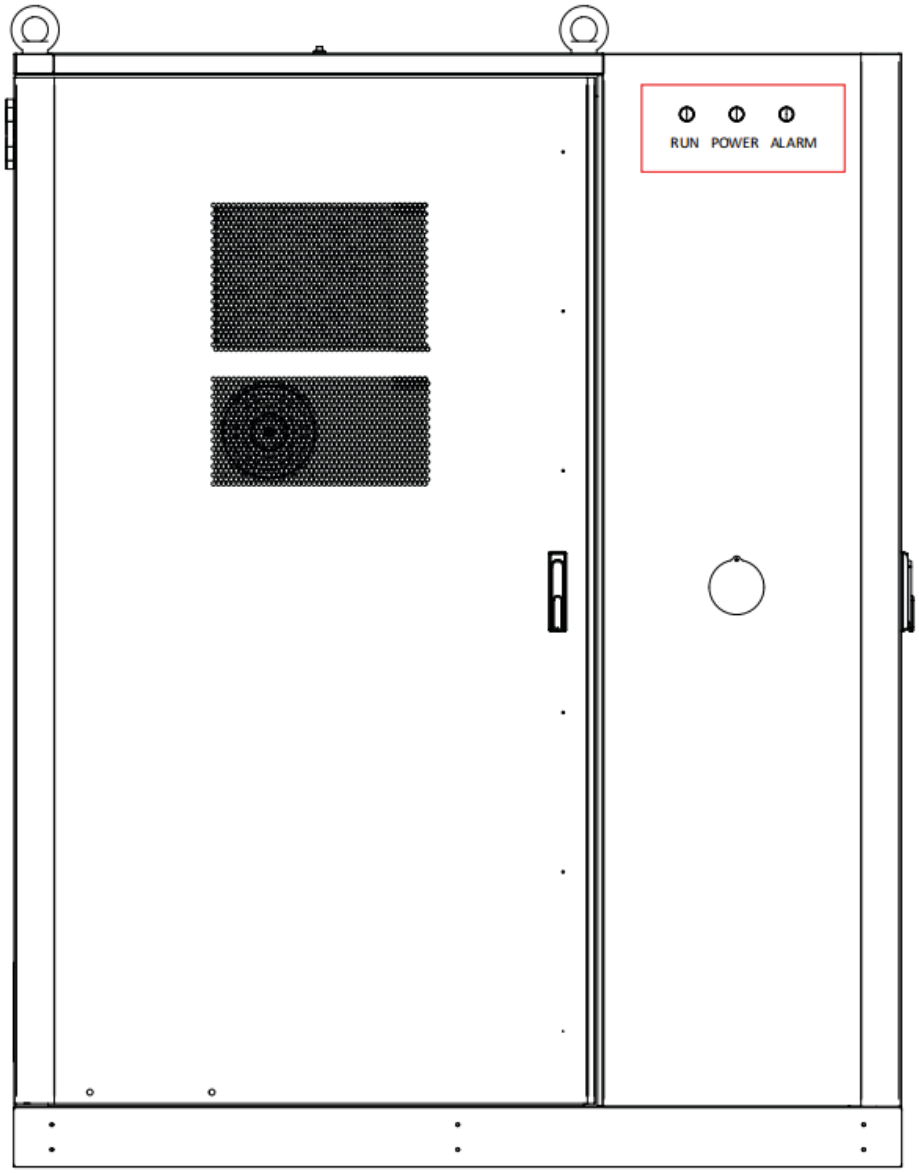


Operating Voltage	120~750Vdc
Nominal Charge/Discharge Current	100A
Max. Charge/Discharge Current	125A
DC Input Rating	12±2%V/4.15A
Operating Temperature Range	-20~65°C
Ingress Protection	IP20
Dimension (W/D/H)	440*570*150mm
Weight Approximate	17kg

Parts Description:

B-	Connection position of the common negative pole of the battery.
B+	Connection position of the common positive pole of the battery.
Air switch	Used to manually control the connection between the battery rack and external devices.
ALRM light indicator	Battery system fault alarm indicator.
HV light indicator	High-voltage hazard indicator.
PCS-	Connection position of PCS negative pole.
PCS+	Connection position of PCS positive pole.
USB	BMS upgrade interface and storage expansion interface.
OUT COM	Connection position with next GE-F-PDU communication output.
IN COM	Connection position with previous GE-F-PDU communication input.
PCS COM	Communication interface with charging and discharging equipment.
START	A start switch of 12VDC power inside the high-voltage control box.
COMM1	Communicative connection with the cabinet.
COMM2	Communicative connection with the first battery module; and providing 12VDC power for the first battery module.

Indicator Light Design



Indicator light: When the green light comes on, the BESS is RUN. When the red light comes on, the BESS gives an alarm.

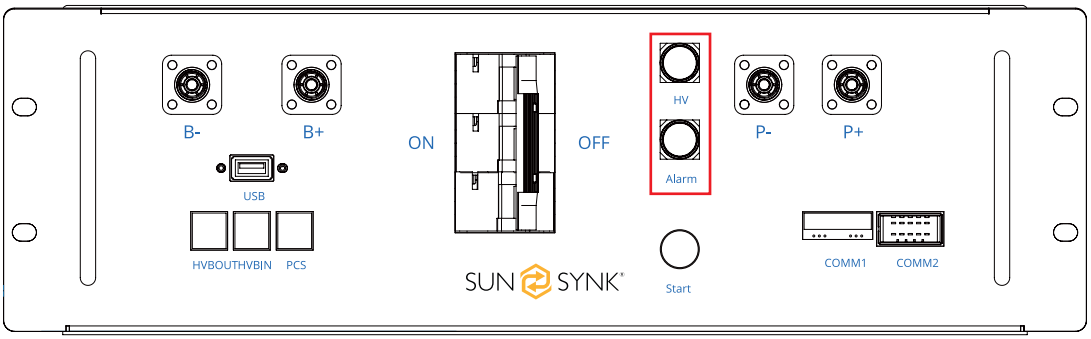
1. The following faults trigger either level 2 fault. The cabinet ALARM red light is on, the external ALARM light is on, and the RUN indicator is off.
2. If the yellow indicator is on, the system is powered on.

1	System fault	18	Discharge relay adhesion	35	Sensor second alarm (Temperature sensor and smoke sensor)
2	Charging current fault	19	Charge relay adhesion	36	Emergency stop press fault
3	Charging current fault	20	Heating relay adhesion	37	Detected combustible gas fault
4	Charging overtemperature fault	21	Extreme protection	38	Detected water sensor fault
5	Discharging overtempera-ture fault	22	Abnormal supply volt-age	39	Detected smoke sensor fault

6	Charging low temperature fault	23	Main positive relay adhesion	40	Pre-charge failed fault
7	Discharging low tempera-ture fault	24	blown fuse	41	The Charging voltage is too low
8	Pressure difference too large fault	25	BMU repeat fault	42	BMU communication fault
9	Temperature difference too large fault	26	BMU repeat fault	43	BMU number anomaly
10	High SOC fault	27	Internal CAN communication fails	44	Abnormal Mot total pressure collection
11	Cell temperature low volt-age fault	28	PCS CAN Communication fails	45	Abnormal Temperature collection of the BMS connector
12	Pre-charge resistance temperature too high	29	Abnormal PCS RS485 communication	46	Abnormal Temperature collection of the BMU connector
13	Insulation fault	30	Abnormal external total pressure collection	47	EEPROM storage fault
14	Heating film is too high fault	31	Abnormal internal total pressure collection	48	RTC clock fault
15	SOC too low fault	32	Abnormal SCHG total pressure collection	49	Current module fault
16	Total voltage too high fault	33	Voltage acquisition fault	50	Current acquisition fault
17	Total voltage too high fault	34	Temperature acquisition fault	51	Detect temperature exceedance fault

3. When the emergency stop press fault, flammable gas fault, water flooding fault, temperature exceeding fault, and smoke fault are detected, the BESS external ALARM light is on, and the RUN light is off.
4. The air conditioner is offline, the BESS external ALARM light is on, and the RUN light is off.
5. The following faults occur in the air conditioner. The BESS external ALARM light is on, and the RUN light is off.

1	High temperature alarm	9	Internal ambient temperature 1 fault	17	Inner coil temperature protection
2	Low temperature alarm	10	Internal ambient temperature 2 fault	18	Internal fan failure
3	High humidity alarm	11	Internal ambient humidity 1 fault	19	Internal fan communication fault
4	Low humidity alarm	12	Internal ambient humidity 2 fault	20	Internal fan overloaded fault
5	Electric heating protection	13	Inner coil temperature fault	21	External fan failure
6	Outdoor ambient temperature fault	14	Pressure sensor failure	22	External fan communication fault
7	Outer coil temperature fault	15	High exhaust temperature protection	23	External fan overloaded fault
8	Exhaust temperature fault	16	Outer coil temperature protection	24	Compressor startup failure
				25	Compressor communication failure



Indicator: Steady yellow indicates that the PDU works properly and the battery power circuit is closed. When the red light is on, PDU gives an alarm.

The following faults trigger any level 2 fault, the battery ALARM red light is on, the PDU ALARM light is on, and the HV indicator is off.

1	System fault	18	Discharge relay adhesion	35	Sensor second alarm (Temperature sensor and smoke sensor)
2	Charging current fault	19	Charge relay adhesion	36	Emergency stop press fault
3	Charging current fault	20	Heating relay adhesion	37	Detected combustible gas fault
4	Charging overtemperature fault	21	Extreme protection	38	Detected water sensor fault
5	Discharging overtemperature fault	22	Abnormal supply voltage	39	Detected smoke sensor fault
6	Charging low temperature fault	23	Main positive relay adhesion	40	Pre-charge failed fault
7	Discharging low temperature fault	24	blown fuse	41	The Charging voltage is too low
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10	High SOC fault	27	Internal CAN communication fails	44	Abnormal Mot total pressure collection
11	Cell temperature low voltage fault	28	PCS CAN Communication fails	45	Abnormal Temperature collection of the BMS connector
12	Pre-charge resistance temperature too high	29	Abnormal PCS RS485 communication	46	Abnormal Temperature collection of the BMU connector
13	Insulation fault	30	Abnormal external total pressure collection	47	EEPROM storage fault
14	Heating film is too high fault	31	Abnormal internal total pressure collection	48	RTC clock fault
15	SOC too low fault	32	Abnormal SCHG total pressure collection	49	Current module fault
16	Total voltage too high fault	33	Voltage acquisition fault	50	Current acquisition fault
17	Total voltage too high fault	34	Temperature acquisition fault	51	Detect temperature exceedance fault

TRANSPORT AND STORAGE

Transportation

1. Preventive Measures:

Failure to ship and store products in accordance with the requirements of this manual may void the warranty.

2. Mode of Transportation:

It can be transported by car, train, and ship.

Transportation Requirements

The following conditions should be met for the transportation of BESS:

- Ensure that the door is locked.
- Select an appropriate crane or lifting tool according to the site conditions. The lifting tool used shall have a sufficient load-bearing capacity, boom length and radius of rotation.
- Additional traction may be required if ESS needs to be transported on slopes.
- Remove all obstacles that exist or may exist on the way, such as tree branches, cables, etc. The BESS should be transported and moved under good weather conditions.
- Be sure to set up warning signs or areas to prevent non-staff from entering the lifting area and avoid accidents.
- When transporting by road, it is important to use ropes to secure the top ring of the equipment to the transport vehicle to avoid excessive tilt during transportation.

The battery products should be transported after packaging, and during the transportation process, severe vibration, impact, or extrusion should be prevented to prevent sun and rain. It can be transported using vehicles such as cars, trains, and ships.

Always check all applicable local, national, and international regulations before transporting a Lithium Iron Phosphate battery.

In some instances, transporting an end-of-life, damaged, or recalled battery may be specially limited or prohibited.

The transport of the Li-Ion battery falls under hazard class UN3480, class 9. The battery falls within packaging group PI965 Section I for transport over water, air and land.

Use Class 9 Miscellaneous Dangerous Goods and UN Identification labels for transportation of lithium-ion batteries, which are assigned Class 9. Refer to relevant transportation documents.

Class 9 Miscellaneous Dangerous Goods and UN Identification Label

Storage Requirements

- During the rainy season, prevent possible condensation or soaking of the bottom by rain.
- BESS should be stored on higher ground. Raise container bases based on site conditions. The specific height should be reasonably determined according to the geological and meteorological conditions of the site.
- Stored on dry, flat, stable ground with sufficient carrying capacity and no vegetation cover.
- The ground must be flat and dry. Before storage, ensure that BESS's door is locked.
- Storage ambient temperature: -30°C~60°C, recommended storage temperature: -30°C~25°C.

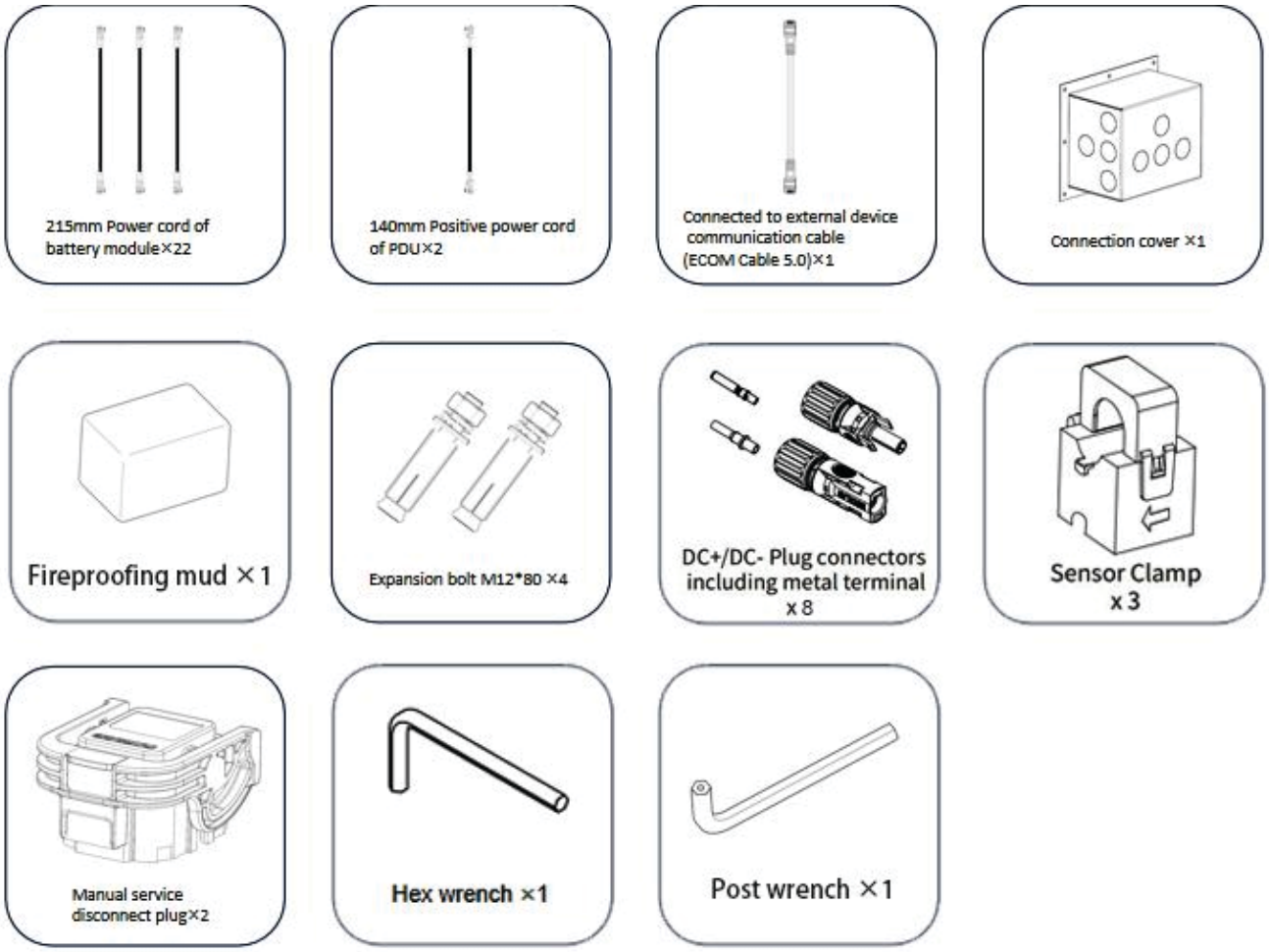
NOTICE

To ensure battery life, keep the storage temperature of the battery module between 0°C and 35°C.

- If the battery energy storage system is not used for a long time, please refer to the following table to save power. After charging is complete, turn off all switches of the battery energy storage system to ensure the lowest power consumption of the system.
- The relative humidity should be between 0 and 95% without condensation.
- The inlet and outlet of BESS should be effectively protected to prevent rain, sand and dust from penetrating into it. Check equipment regularly for damage.

Deliverables Inspection

Check whether deliverables are complete against the packing list.



- **DC+ and DC- Plug Connectors:** Includes 8 connectors, along with their metal terminals.
- **Connection Cover:** Used for on-site wire connections and installation of steel fittings.
- **Fireproof Sealant:** After connecting the PV and signal cables at the bottom of the distribution bin, apply fireproof sealant to fill any remaining gaps. This prevents insects and other pests from entering.
- **Hex Wrench:** Utilized for assembling or disassembling connections to the circuit breaker in the distribution box.
- **Post Wrench:** Used for maintenance or replacement of screws when servicing the louvers in the distribution bin.

Check BESS and internal equipment for damage. If you find any problems or have any questions, please contact the agency or Sunsynk Mobile.

Installation Environment

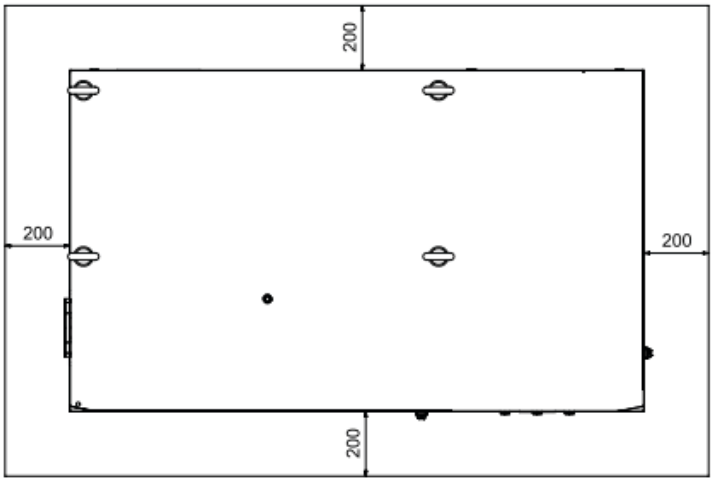
- The environment around the installation site should be dry and well-ventilated.
- The installation site should be far from the concentration of toxic, harmful gases and from flammable, explosive and corrosive materials.
- The installation site should be far from residential areas to avoid noise.

Installation Site Requirements

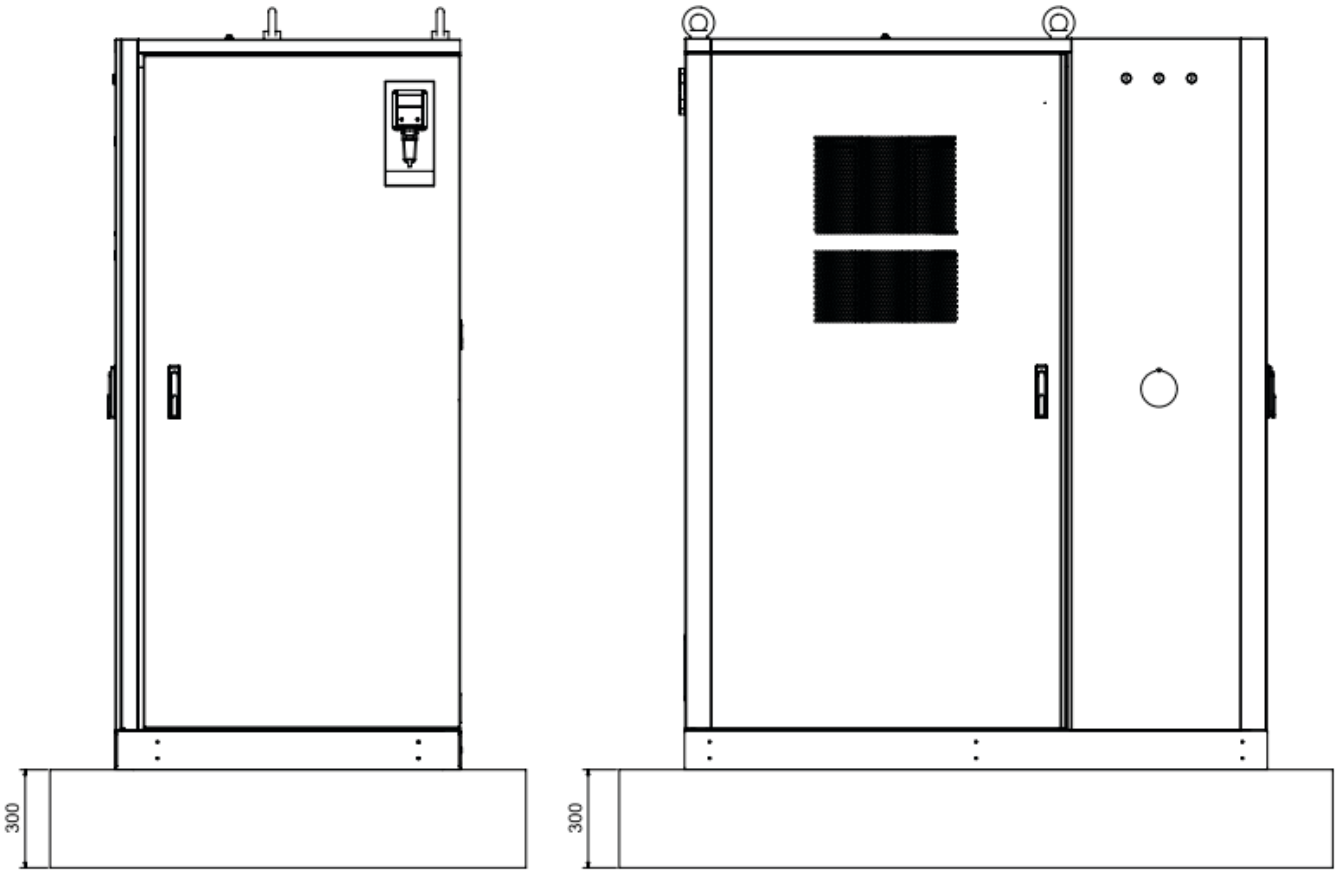
A properly constructed foundation is crucial for the successful installation of the Battery Energy Storage System (BESS). An inadequately built foundation can cause significant issues, such as hindering the proper opening and closing of doors and affecting normal operations. To ensure the BESS functions optimally, the foundation must be designed and built according to specific standards. These standards are essential to provide mechanical support, facilitate cable routing, and allow for easy access during future maintenance and repairs.

At least the following requirements shall be met during foundation construction:

- The soil at the installation site should be compact.
- Compact and fill the foundation pit to provide sufficient and effective support for the cabinet.
- Raise the foundation to prevent the cabinet base and the interior from rain erosion.
- The cross-sectional area and height of the foundation should meet the requirements. It is recommended that the base height be greater than or equal to 300mm.
- Construct the corresponding drainage in conjunction with local geological conditions.
- Build drainage systems according to local geological conditions.
- The construction party determines the foundation height according to the site geology.
- Consider cable routing when building the foundation.
- Built a maintenance platform around the foundation to facilitate later maintenance.
- During the foundation construction, reserve enough space for the AC/DC side cable trench according to the position and size of the cable inlet and outlet holes of the BESS and PCS, and pre-embed the cable conduit.
- Determine the perforating gun's specifications and quantity according to the cables' model and quantity.
- A drainage system is necessary to prevent the bottom or internal equipment of the BESS from being soaked in water during the rainy season or during heavy rainfall.
- Both ends of all embedded pipes should be temporarily sealed to prevent impurities from entering and causing trouble with later wiring.
- After all cables are connected, the cable inlet, outlet, and connector should be sealed with fireproof mud or other suitable materials to prevent rodent access.
- When installing the design base, you are advised to add protection to the PV cable at the bottom to prevent cable breakage.



Foundation Laying Drawing (Unit: mm)

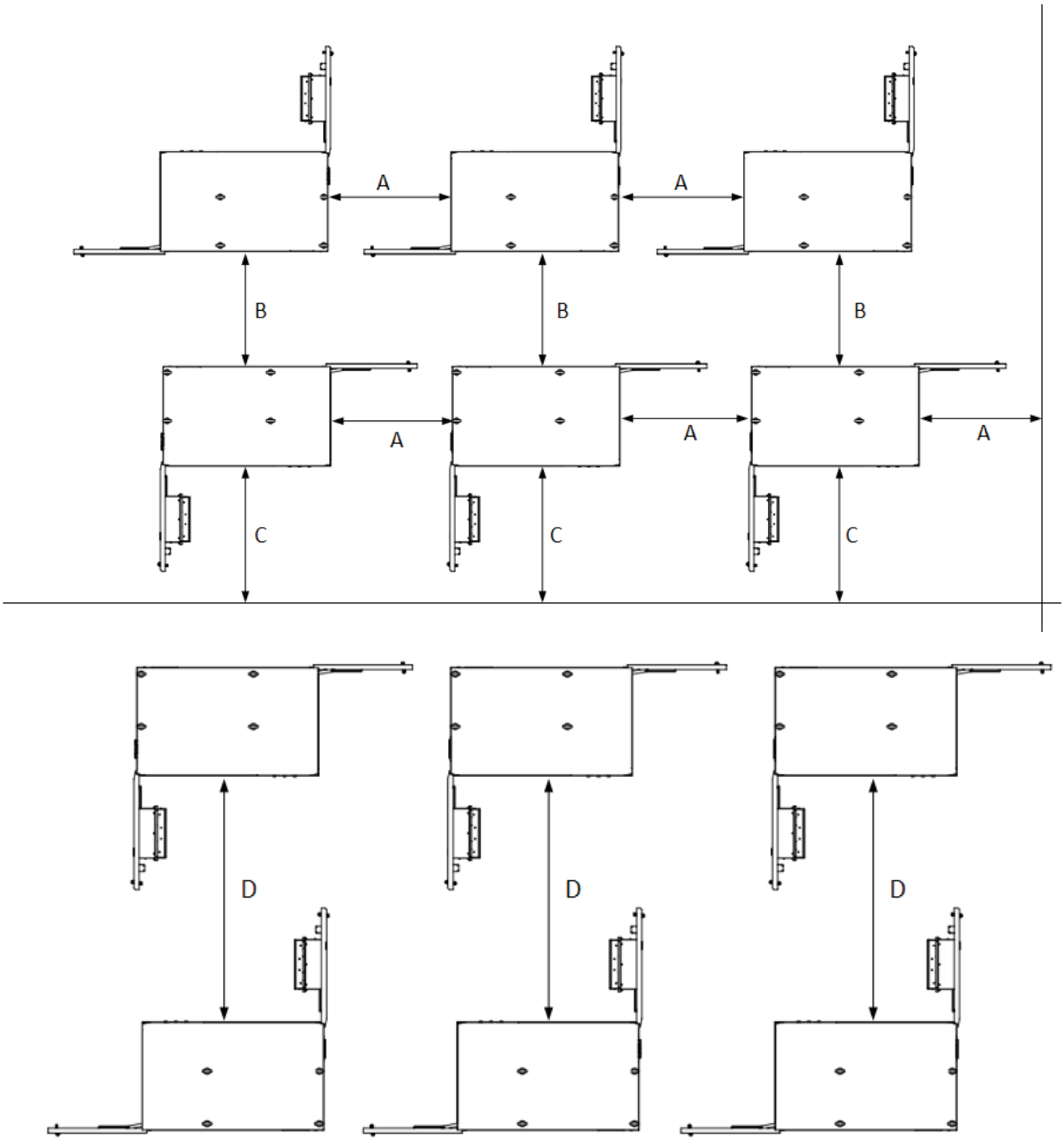


Foundation Laying Drawing (Unit: mm)

NOTICE

The dregs excavated during the foundation construction should be removed immediately to avoid affecting the hoisting in the later stage.

Installation Spacing Requirement



Installation Spacing Drawing (Unit: mm)

Serial number	Distance
A	1000
B	1600
C	1200
D	2400

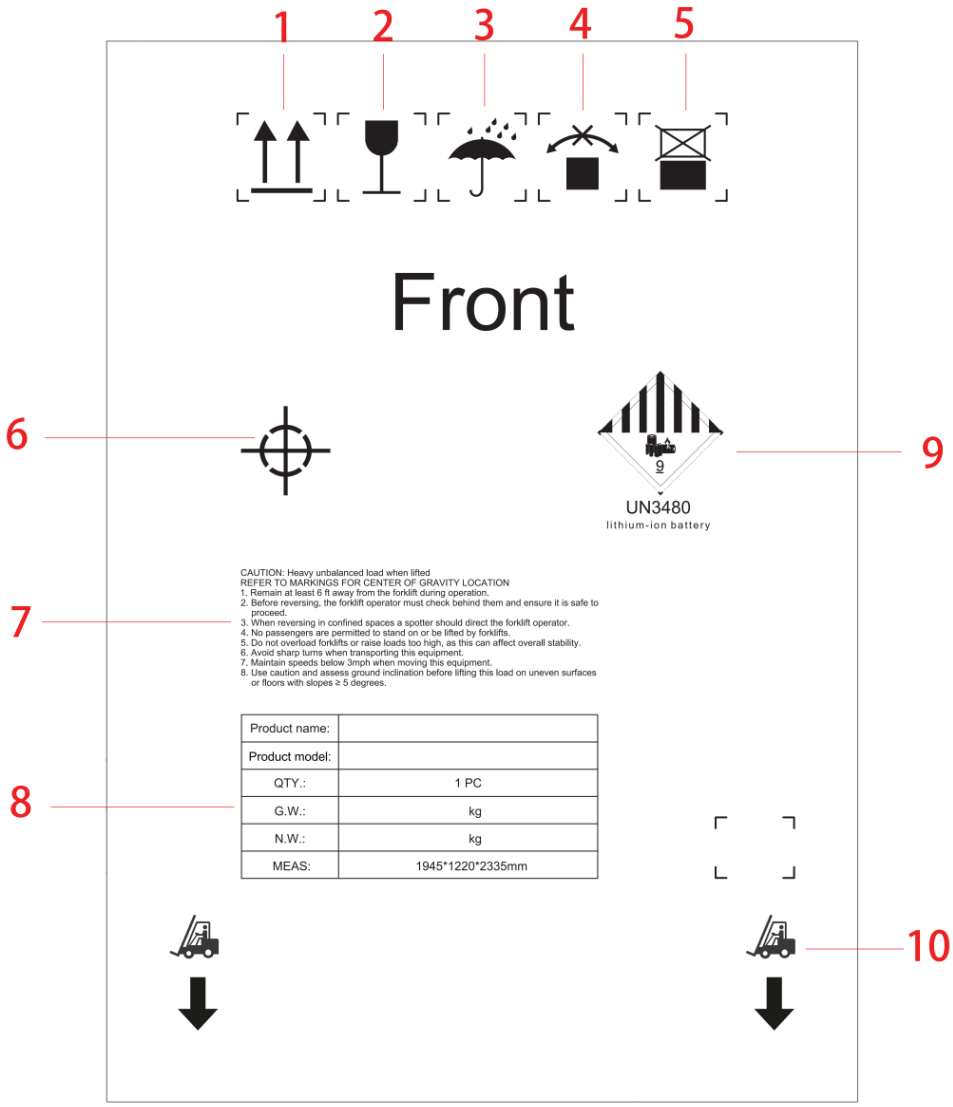
Transportation and Lifting

Transportation

Forklift Transport

If the installation site is flat, use a forklift to move the equipment. The bottom of the machine has a special forklift transport fork hole. A forklift with a rated load of more than 1500kg should be used.

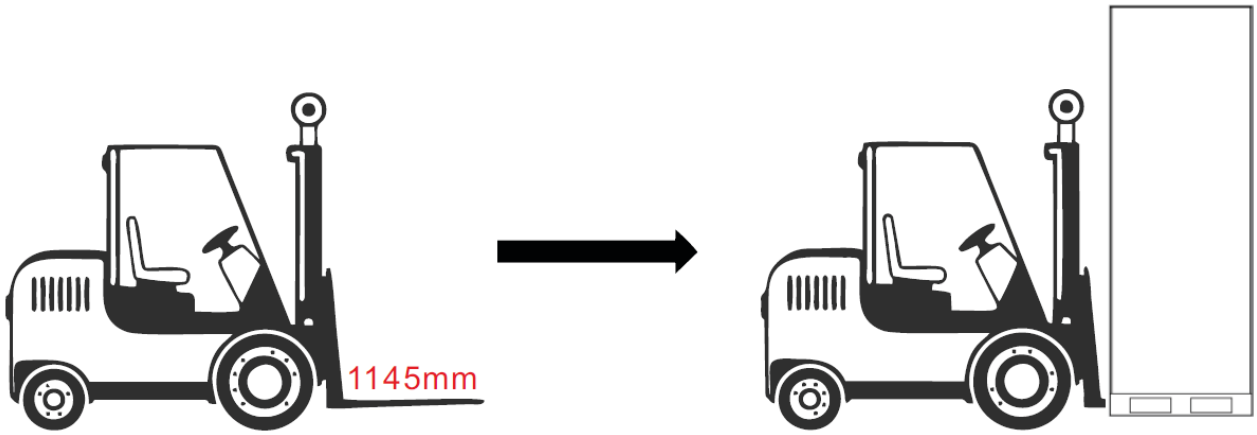
It is suggested that the forklift tooth be inserted in the location indicated below. The center of gravity is indicated in the diagram. It is suggested that forklift trucks follow safety precautions.



1	Wooden case should be placed face up
2	Fragile
3	Product should be stored against moisture
4	Prohibit to turn over product packaging during operation
5	Prohibit to stack
6	Center of gravity location
7	Forklift safety precautions
8	Product information
9	UN3480 Label
10	Forklift fork insertion position

If a forklift is used, the following requirements must be met:

- The forklift should be equipped with sufficient load capacity.
- The foot length of a forklift truck should meet the equipment requirements.



CAUTION

Heavy unbalanced load when lifted!
REFER TO MARKINGS FOR CENTER OF GRAVITY LOCATION!

NOTICE

1. Remain at least 6 ft away from the forklift during operation.
2. Before reversing, the forklift operator must check behind them and ensure it is safe to proceed.
3. When reversing in confined spaces, a spotter should direct the forklift operator.
4. No passengers are permitted to stand on or be lifted by forklifts.
5. Do not overload forklifts or raise loads too high, as this can affect overall stability.
6. Avoid sharp turns when transporting this equipment.
7. Maintain speeds below 3mph when moving this equipment.
8. Use caution and assess ground inclination before lifting this load on uneven surfaces or floors with slopes ≥ 5 degrees.

Hoisting Equipment

WARNING

Comply with crane safety procedures at all times.

Do not stand within 500-1000mm of the lifting area! During the whole lifting process, no one is allowed to stand under the boom or the workstation.

The lifting work must be stopped in bad weather. For example, in the case of strong winds, heavy rain or thick fog.

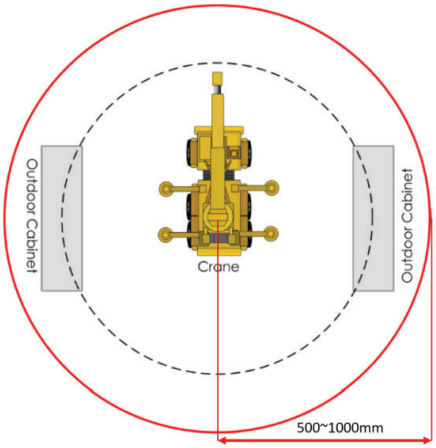
When hoisting, a 25-ton crane should be used, and the lifting arm is required to be about 38.5 meters to 40.5 meters.

When lifting the device, at least the following requirements must be met:

- All safety requirements must be met.
- A professional instructor is needed in the whole hoisting process.

- It's crucial to use slings that are strong enough to bear the weight of the devices. This is a key safety measure in the lifting process.
- Ensure that all sling connections are safe and reliable and that the lengths of the slings connected to the corner fittings are equal.
- The length of the sling can be adjusted appropriately according to the actual requirements of the site.
- It's of utmost importance that the devices remain stable and not skewed during the lifting process. This is a crucial safety requirement to prevent accidents.
- Please lift the devices from the bottom.
- Take all necessary auxiliary measures to ensure the safe and smooth lifting of the devices.

The following figure shows the crane operation during lifting the devices. In the figure, the dashed circle on the inner layer represents the crane operating range. When the crane is working, it is strictly forbidden to stand inside the solid circle on the red outer layer!



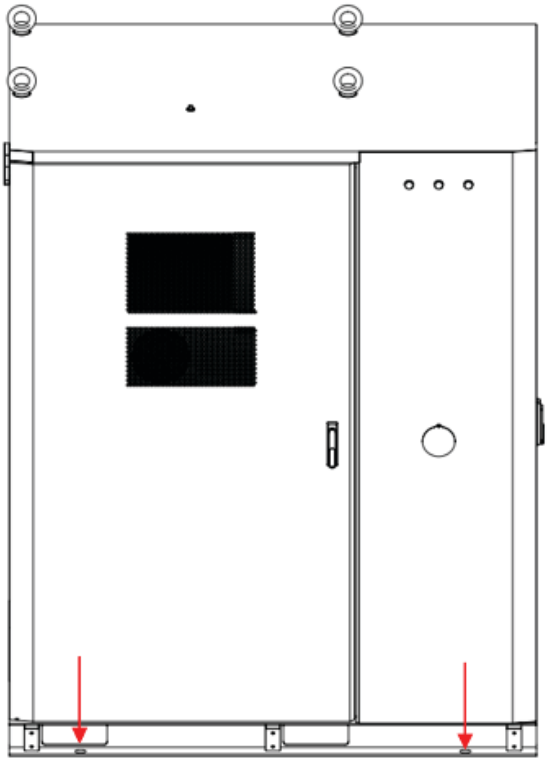
Hoisting

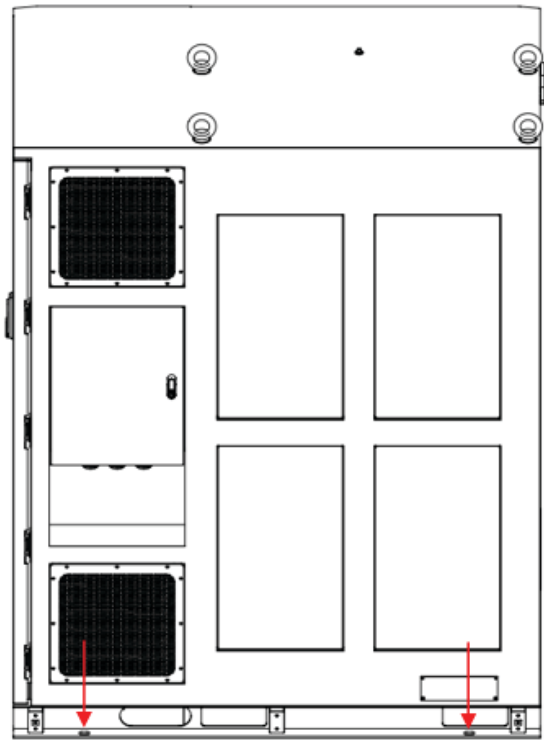
In the process of lifting the devices, each operation link should be carried out according to the following requirements:

- The equipment should be hoisted vertically and should not be dragged on any surface during hoisting.
- Check the connection between the lifting tool and the device before hoisting.
- Only lift it after confirming that the connection is secure. Once in place, the device should be gently and smoothly lowered. Do not place the device vertically, and do not shake the lifting tools.
- The place where the devices are placed should be solid and flat, with good drainage, without obstacles or protrusions.

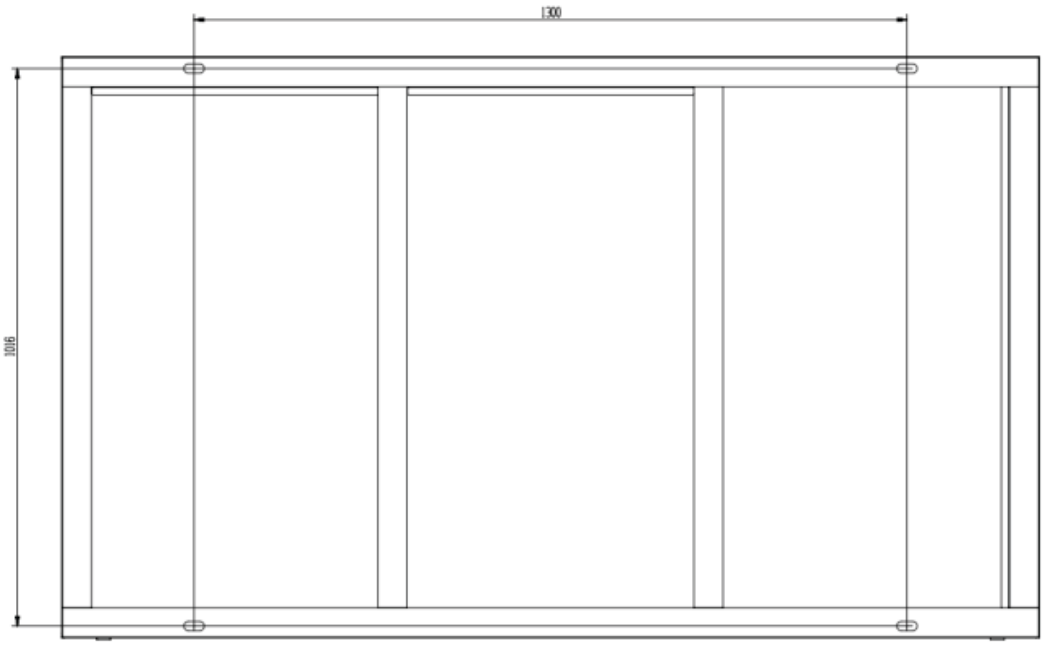
Fixing Methods

The diagram below illustrates the positions where the expansion screws should secure the bottom of the cabinet.

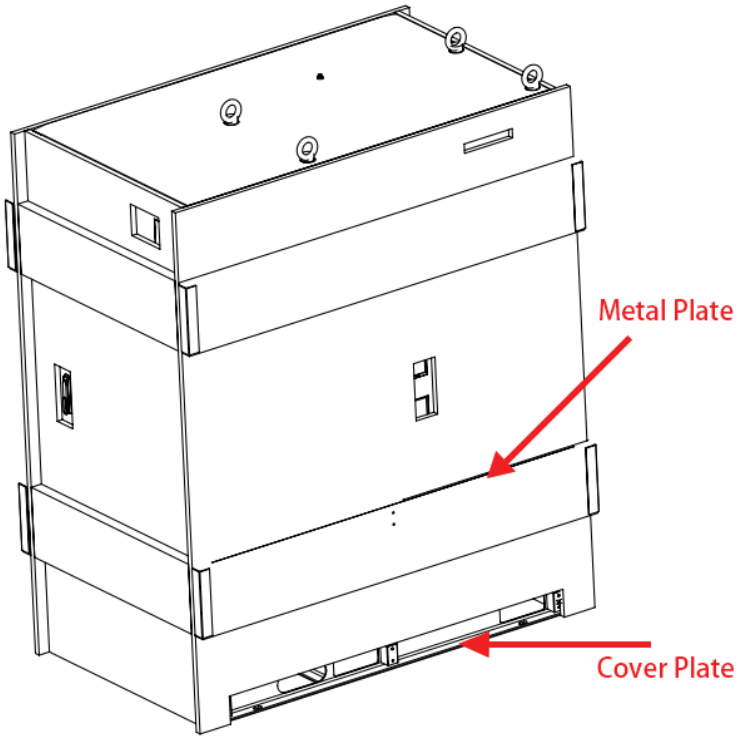




1. Using an electric hammer, drill holes in the floor based on the dimensions of the cabinet. The diagram provides the exact locations for the expansion screws.



2. Place the expansion screws into the drilled holes, then remove the gaskets and screws from them.
3. Align the cabinet with the expansion screw holes, insert the screws, and add the gaskets before tightening the nuts securely.
4. When unpacking, keep the two metal plates located at the front and back of the product packaging. These metal plates should be installed at the lower part of the cabinet after securing the expansion screws.



5. Ensure that the installation is properly completed by checking all connections and tightened screws.

ELECTRICAL CONNECTION

NOTICE

High voltage! Shock!

Do not contact live parts directly without protection!

Before installation, ensure no voltage is on the AC and DC sides.

Do not place the BESS on a flammable surface.

WARNING

Sand and moisture infiltration can damage the electrical equipment in the container or affect its operating performance! Do not perform electrical connections during sandstorms or when the relative humidity of the surrounding environment is greater than 95%. Make electrical connections when there is no wind or sand and when the weather is clear and dry.

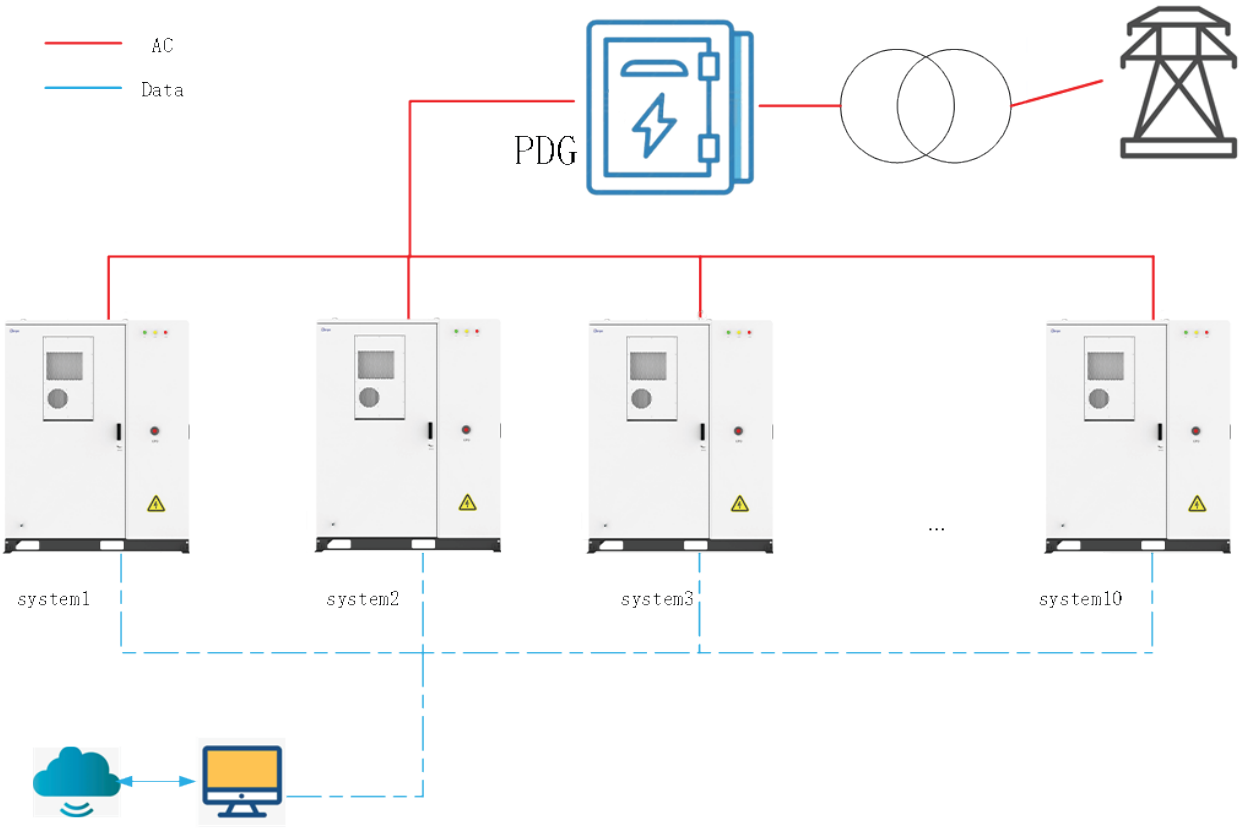
Before connecting cables, check that the polarity of all input cables is correct. Do not pull wires and cables forcibly during electrical installation. Otherwise, the insulation performance may be affected.

Make sure all cables and wires have enough room to bend. Take necessary auxiliary measures to reduce the stress on cables and wires. After each connection is complete, carefully check whether the connection is correct and secure.

Cabinet DC expander (System)

Battery Expansion (One SS-CS-GE-F120 in parallel with four SS-CS-GE-F60s)

Battery Expansion (Six SS-CS-GE-F120 in Parallel)



Electrical Connection Overview

WARNING

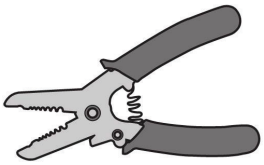
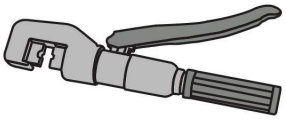
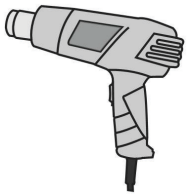
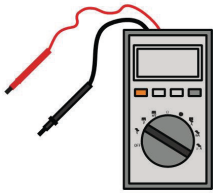
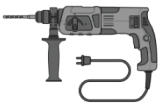
All electrical connections must be made in strict accordance with the wiring schematic.

All electrical connections must be made when the equipment is completely powered off.

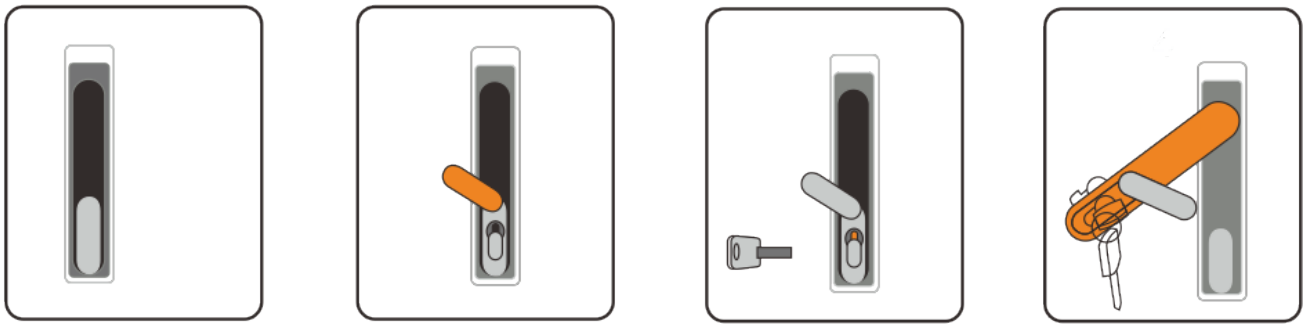
Only qualified electrical engineers can carry out work related to electrical connections. Please comply with the requirements of this manual in the "Safety Precautions" chapter. The Company shall not be liable for any injury or loss of life or property caused by ignoring these safety instructions.

Preparation Before Connection

Installation Preparation Tool

Item	Name and Graphics		
Installation Tool	 Torque Screwdriver	 Wire Stripper	 Hydraulic Pliers
	 Heat Gun	 Multimeter	 Torque Wrench
	 Electric Hammer		
Protective Tools	 Safety Gloves	 Goggles	 Safety Shoes
	 Protective Clothing		

Opening Mode



Opening Procedure:

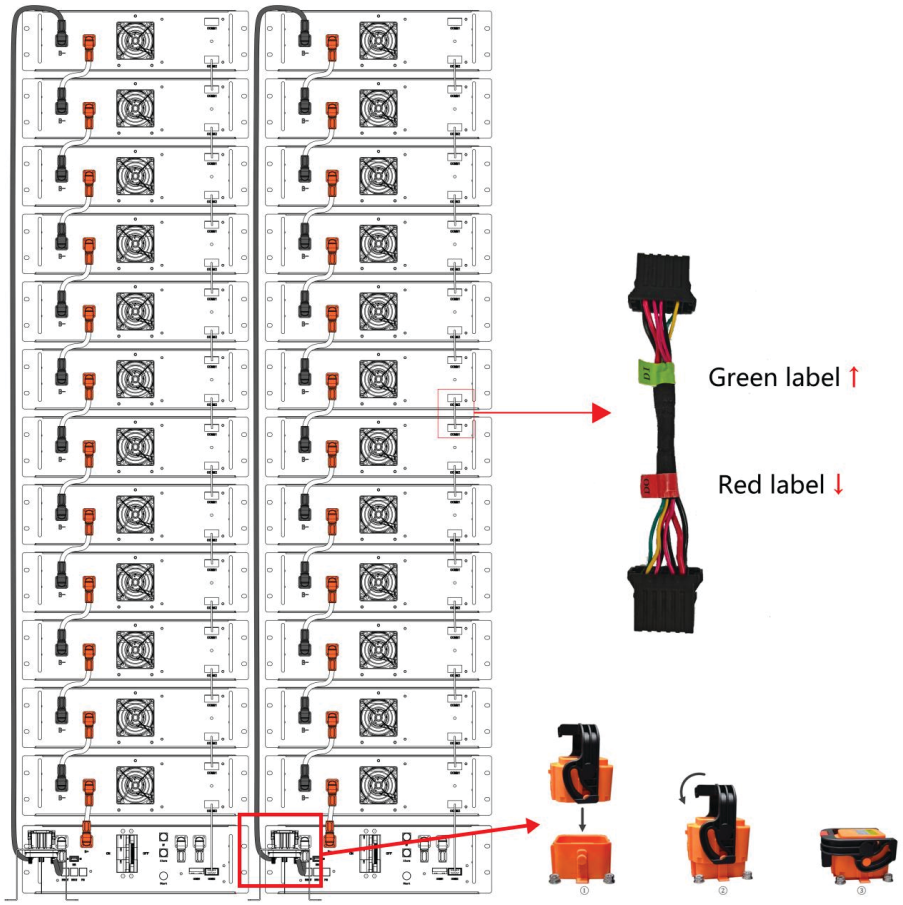
1. Locked State.
2. Move the cover above the keyhole upward.
3. Insert the door key and turn it clockwise to eject the handle.
4. Turn the handle clockwise to the position shown in the picture to open the front door.

Cable Connection

Cable Connection Inside BESS

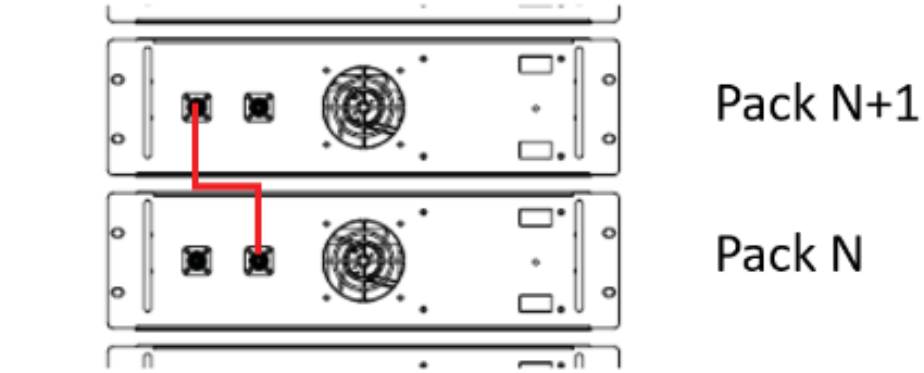
The internal battery pack power cable is connected in series.

Communication cable connection: **110mm communication cable for battery module** is used to connect the battery module to the battery module, and **200mm communication cable for PDU** is used to connect the battery module to the PDU. Note the directions of DI and DO on the communication line. Do not insert by mistake.

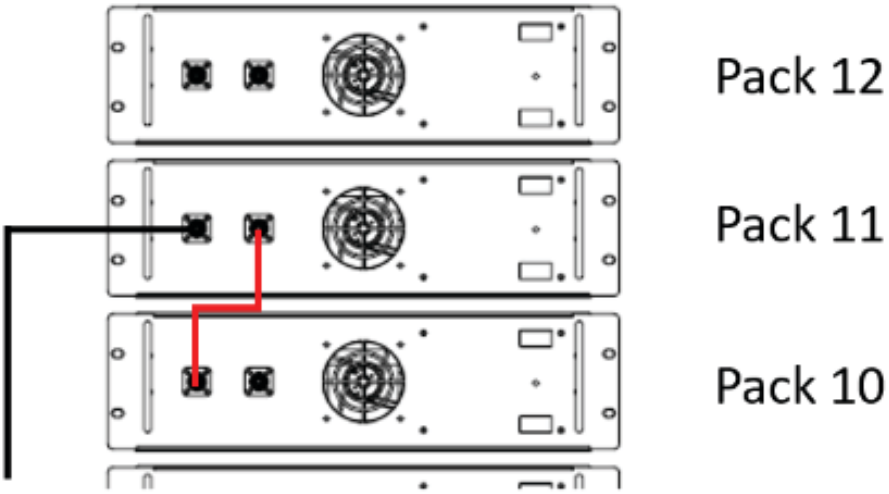


DANGER

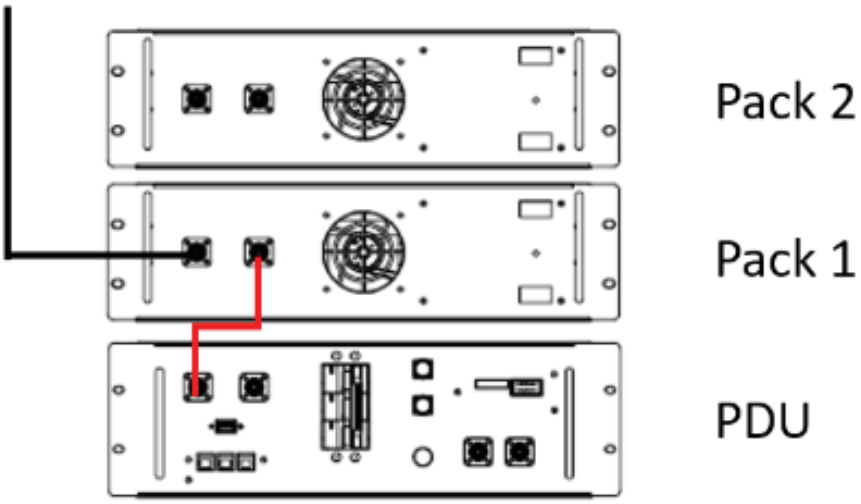
Wrong connection mode: Please do not connect as follows!



Wrong connection mode 1

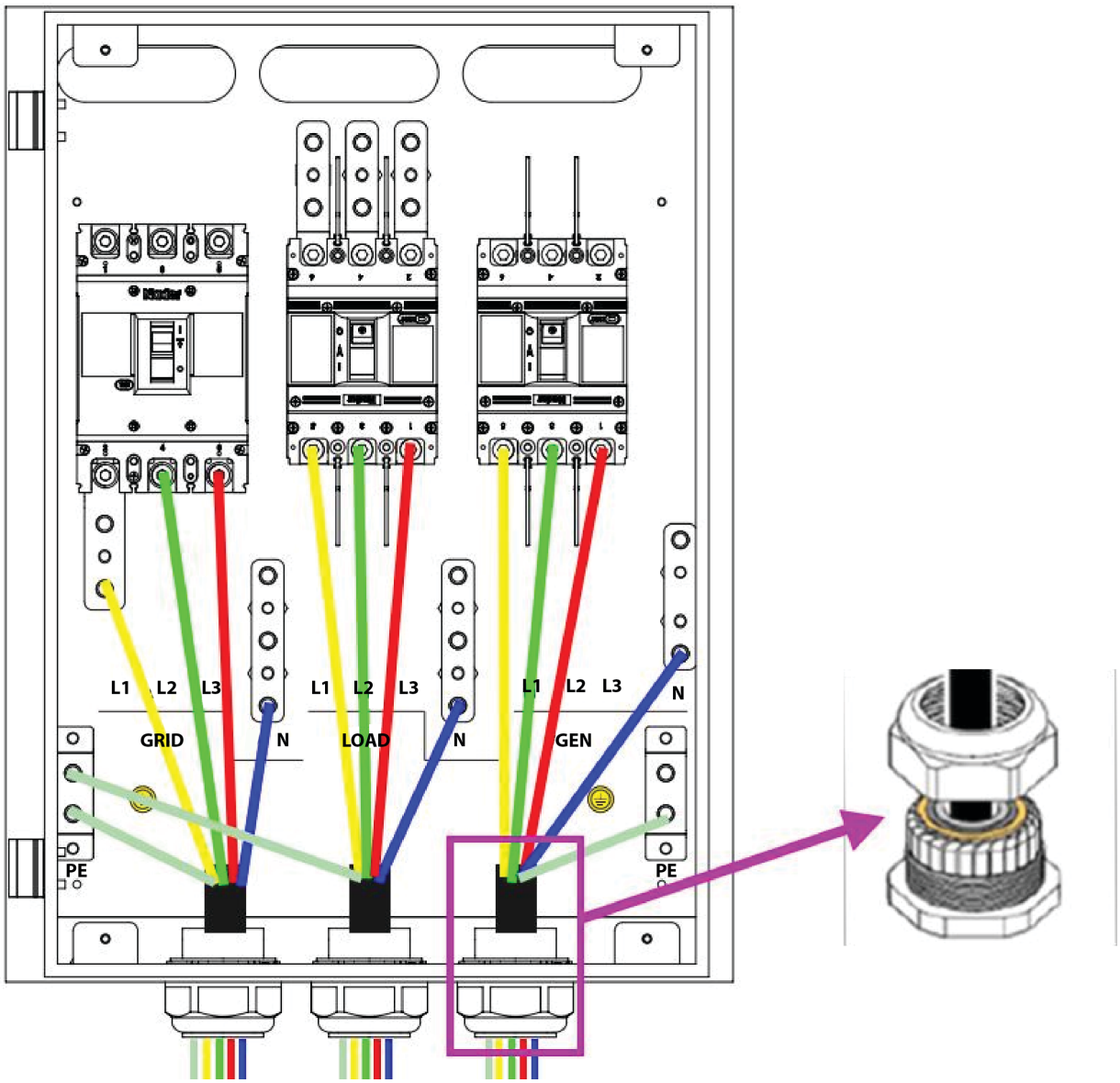


Wrong connection mode 2



Wrong connection mode 3

AC Power Distribution Cable Connection



All wiring must be performed by a qualified personnel. It is very important for system safety and efficient operation to use appropriate cable for AC input connection. To reduce risk of injury, please use the proper recommended cable as below.

LOAD, GRID, GEN, N Cable connection requirements ≥2AWG (35mm^2)

PE cable connection requirements≥6AWG (16mm^2)

Lighting protection communication use **connected to external device communication cable (ECOM Cable 5.0).**

The cable models recommended for the AC power distribution box are:

Line Mark	Cable Diameter	Crimp Terminal Model (OT terminal)
LOAD-L1, LOAD-L2, LOAD-L3	≥35 mm^2	38-8
GRID-L1, GRID-L2, GRID-L3	≥35 mm^2	38-8
GEN-L1, GEN-L2, GEN-L3	≥35 mm^2	38-8
LOAD-PE GRID-PE GEN-PE	≥20 mm^2	22-8

PV Module Wire Connection

PV Connection

The PV modules used to connected to this inverter shall be Class A rating certified according to IEC 61730.

Before connecting to PV modules, please install a separate DC circuit breaker between the inverter and PV modules. It is very important for system safety and efficient operation to use appropriate cable for PV module connection. To reduce the risk of injury, please use the proper recommended cable size as below.

WARNING

To avoid malfunction, do not connect any PV modules with possible leakage current to the inverter. For example, grounded PV modules will cause leakage current to the inverter. When using PV modules, please ensure the PV+ & PV- of the solar panel are not connected to the system ground bar.

It is requested to use a PV junction box with surge protection. Otherwise, it will cause damage to the inverter when lightning occurs on PV modules. Always work on the MPPT Voltage range and do not exceed 850Vdc on MPPT strings.

PV Module Selection

When selecting proper PV modules, please be sure to consider below parameters:

1. Open circuit voltage (Voc) of PV modules can not exceed the max. PV array open circuit voltage of the inverter.
2. Open circuit voltage (Voc) should be higher than min. start voltage and lower or equal to 850Vdc.

Inverter Model	Optional		(Standard Config.)
	30kW	40kW	50kW
PV Input Voltage	600V (180~1000V)		
PV Array MPPT Voltage Range	150-850V		
No. Of MPP Trackers	3	4	
No. Of Strings per MPP Tracker	2+2+2	2+2+2+2	

PV Module Wiring

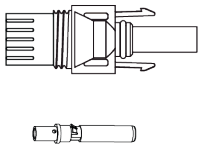
1. Switch the Grid Supply Main Switch (AC) OFF.
2. Switch the DC isolator OFF.
3. Assemble PV input connector to the inverter.
4. Use the MC4 connectors supplied by Sunsynk with the inverter.

WARNING

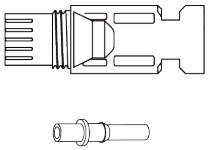
Before connection, please ensure the polarity of the output voltage of the PV array matches the DC+ and DC- symbols.

Please do not connect the PV array's positive and negative poles to the ground. This can seriously damage the inverter.

Before connecting the inverter, please make sure the PV array open-circuit voltage is within the maximum limit of the inverter.



DC+ Male Connector



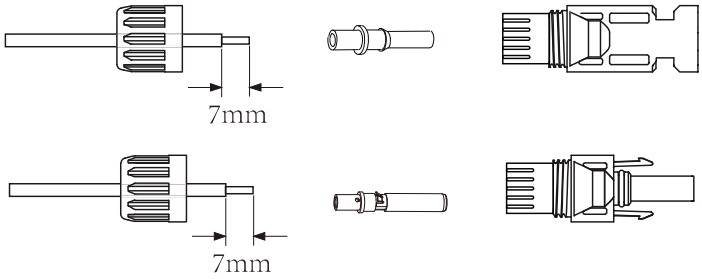
DC- Female Connector

Please utilise an approved DC cable for the PV system.

Cable Type	Cross Section (mm^2)	
	Range	Recommended Value
Industry generic PV cable (model: PV1-F)	2.5~4 (12~10AWG)	2.5 (12AWG)

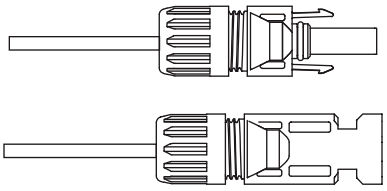
The correct steps in assembling the DC connector are explained below:

1. Strip 7mm of the plastic coating off the DC wire and disassemble the connector cap nut.

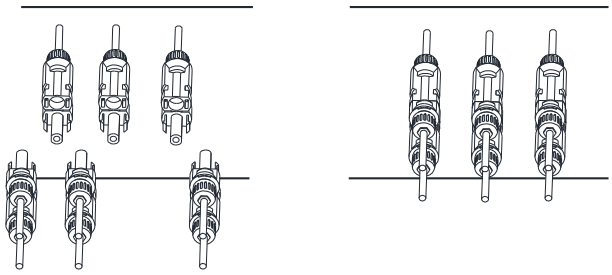


2. Crimp metal terminals with crimping pliers.

3. Insert the contact pin into the connector housing until it locks into place. Then screw the cap nut onto the connector housing. Torque to 2.5-3 N.m.



4. Finally, insert the DC connector into the positive and negative input of the inverter.

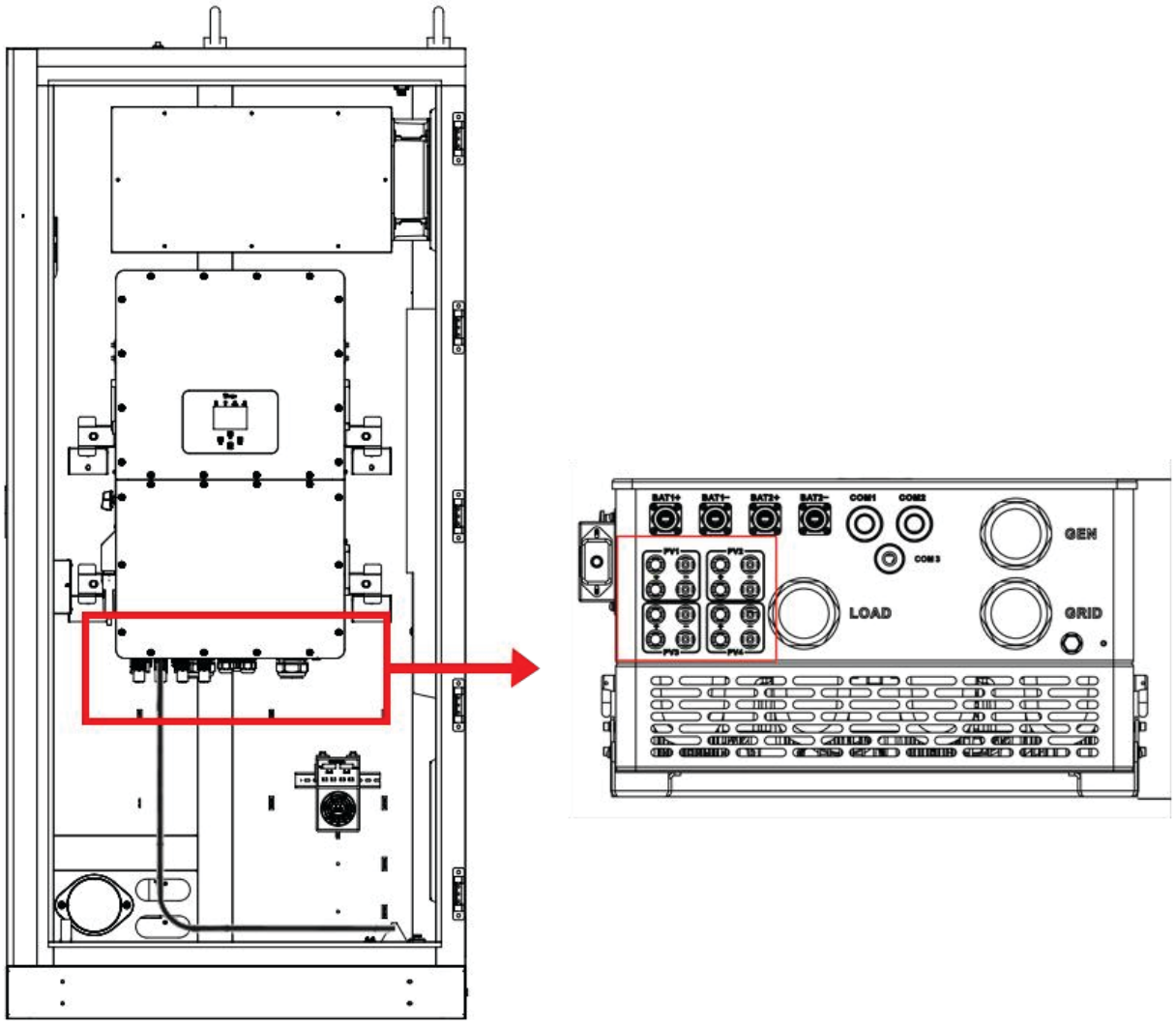


NOTICE

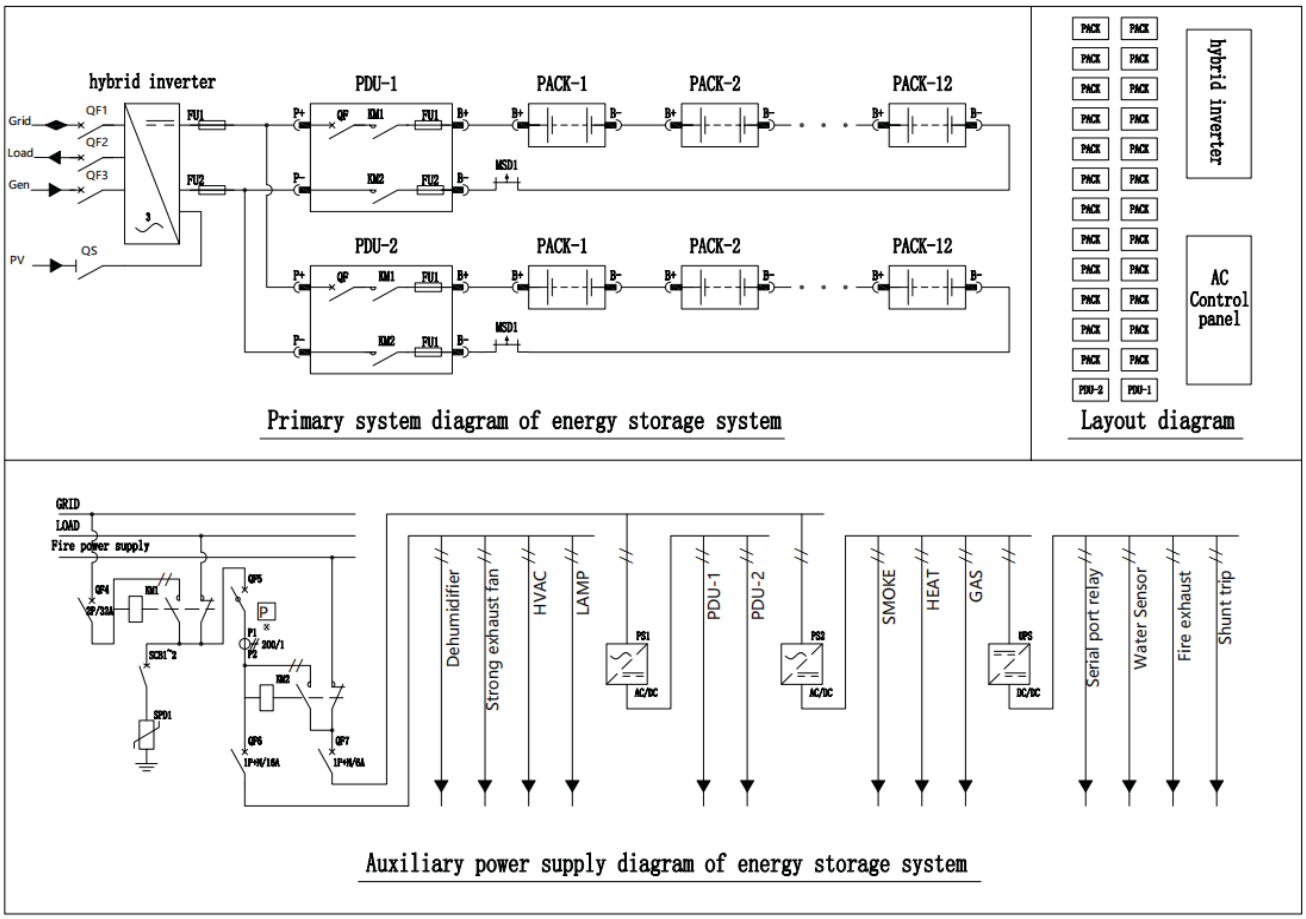
Sunlight shining on the solar panel generates voltage, and a high voltage in series can pose a danger to life. Therefore, before connecting the DC input line, ensure that the solar panel is covered with opaque material and the DC switch is turned 'OFF'. Failure to do so can result in the inverter producing high voltage, which may lead to life-threatening conditions. Please avoid switching off the DC isolator when there is high voltage or current. Technicians should wait until nightfall for safety.

Use the DC power connector provided in the inverter accessories. Do not mix connectors from different manufacturers. The maximum DC input current should not exceed 20A to prevent damage to the inverter, as this is not covered by the Sunsynk Mobile warranty.

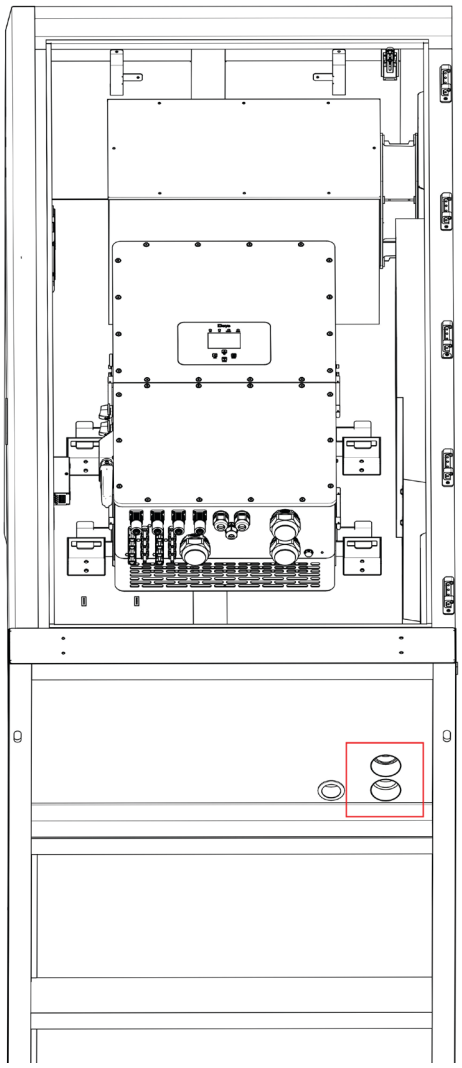
PV Wiring Description: PV

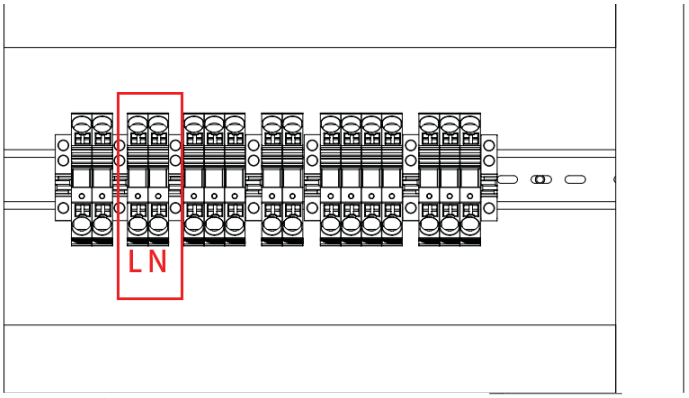


Topological Schematic Diagram



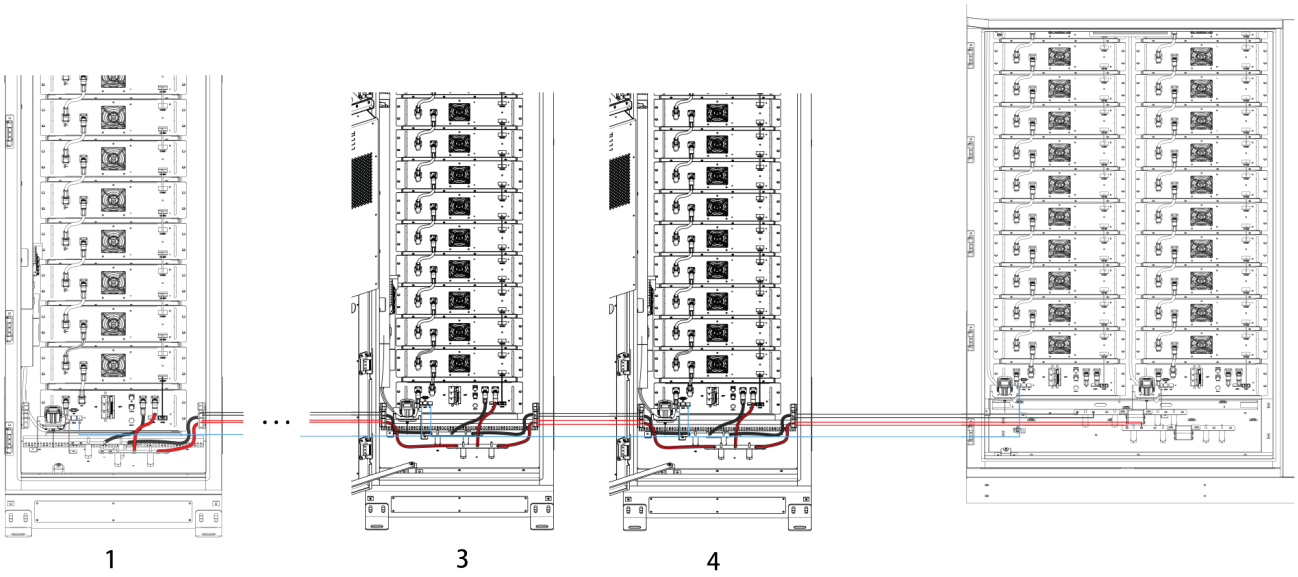
Guidelines for Backup Power Connections in Fire Alarm Systems





1. Ensure the fire power supply is connected (220Vac, 50Hz). Make sure to properly connect both the neutral and fire lines.
2. Use the bottom hole (1) to connect to the fire extinguishing power supply, using a recommended 16AWG, 3.3 square cable.

F120 and F60 Connected in Parallel

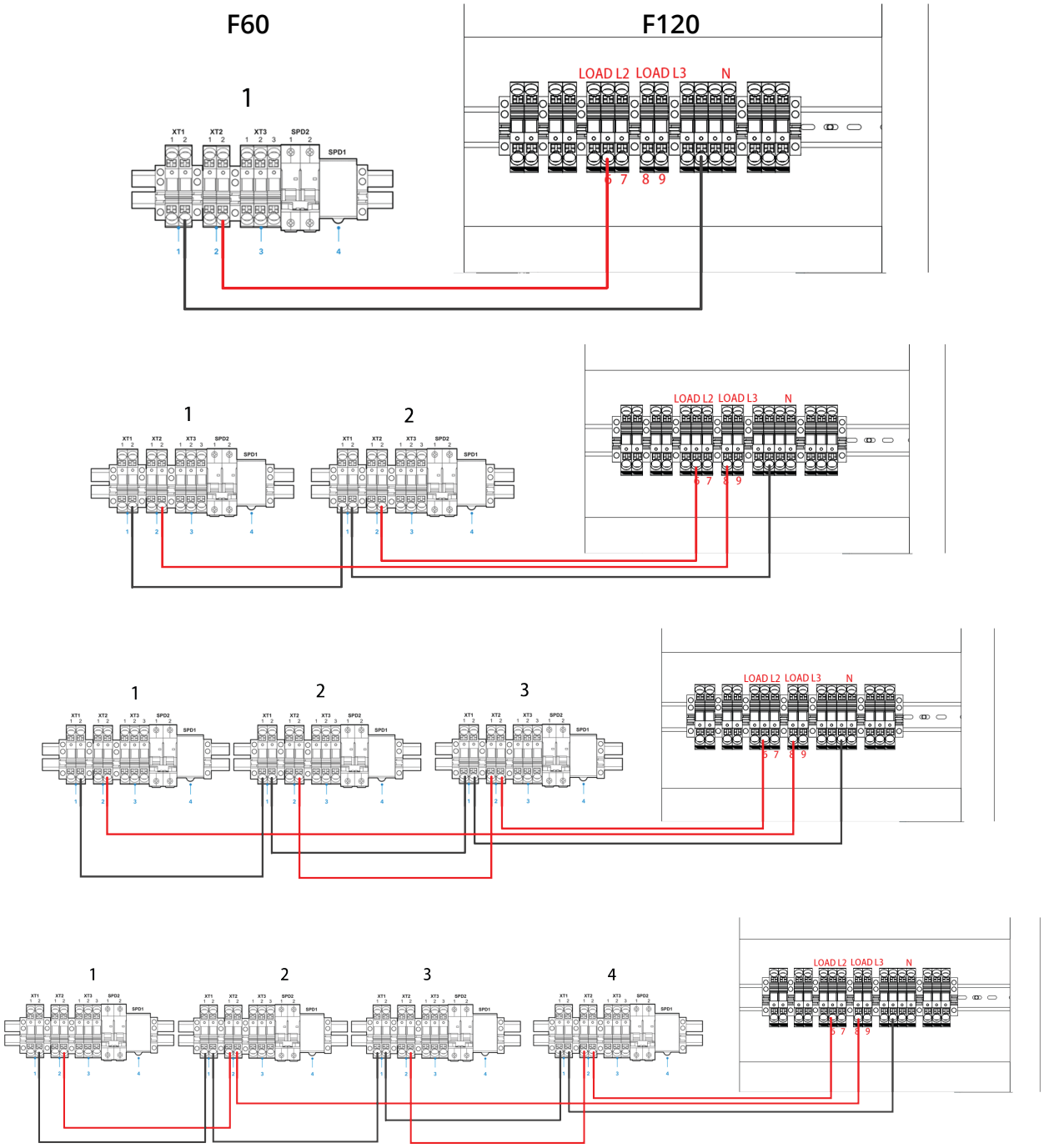


Note: Use cable cross section 22 mm^2.

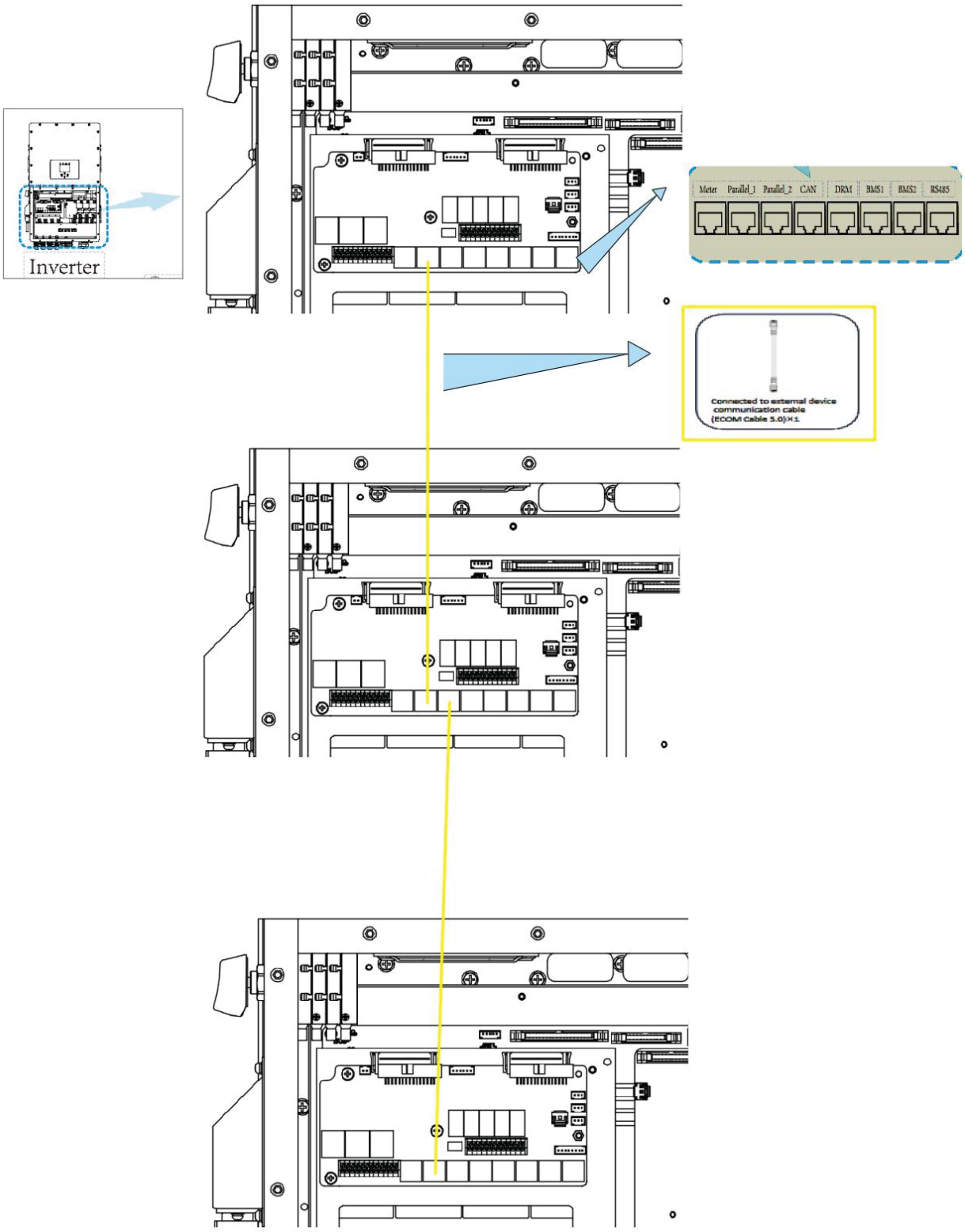
1. Connect one SS-CS-GE-F120 with up to four SS-CS-GE-F60 units in parallel.
2. Always ensure the system is powered off before wiring.
3. Identify the wires: the blue wire is for communication, while the red and black wires are the positive and negative battery connections, respectively.

F120 and F60 Parallel Auxiliary Power Wiring Diagram

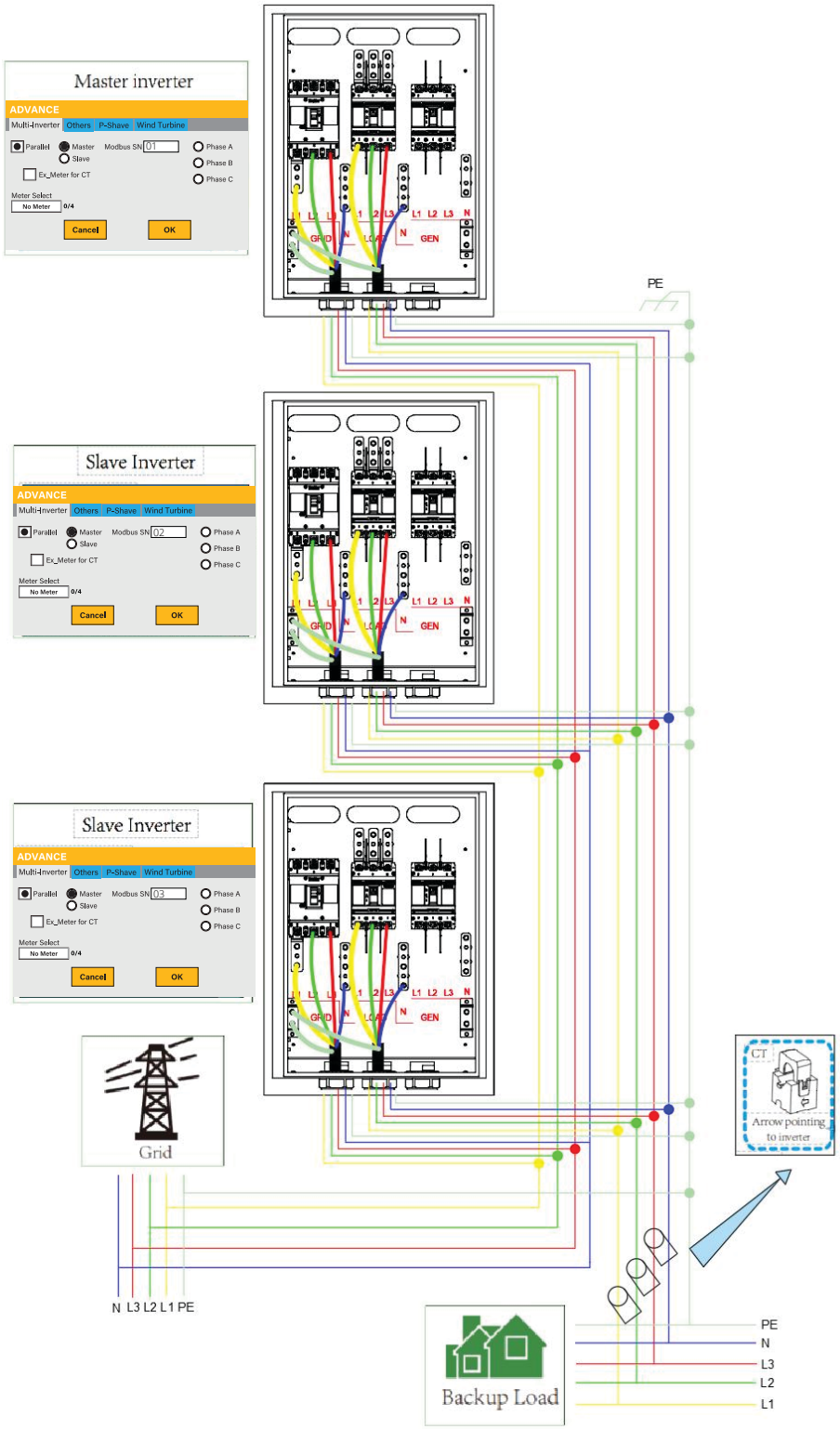
Note: Use cable 12AWG (3.3 square)



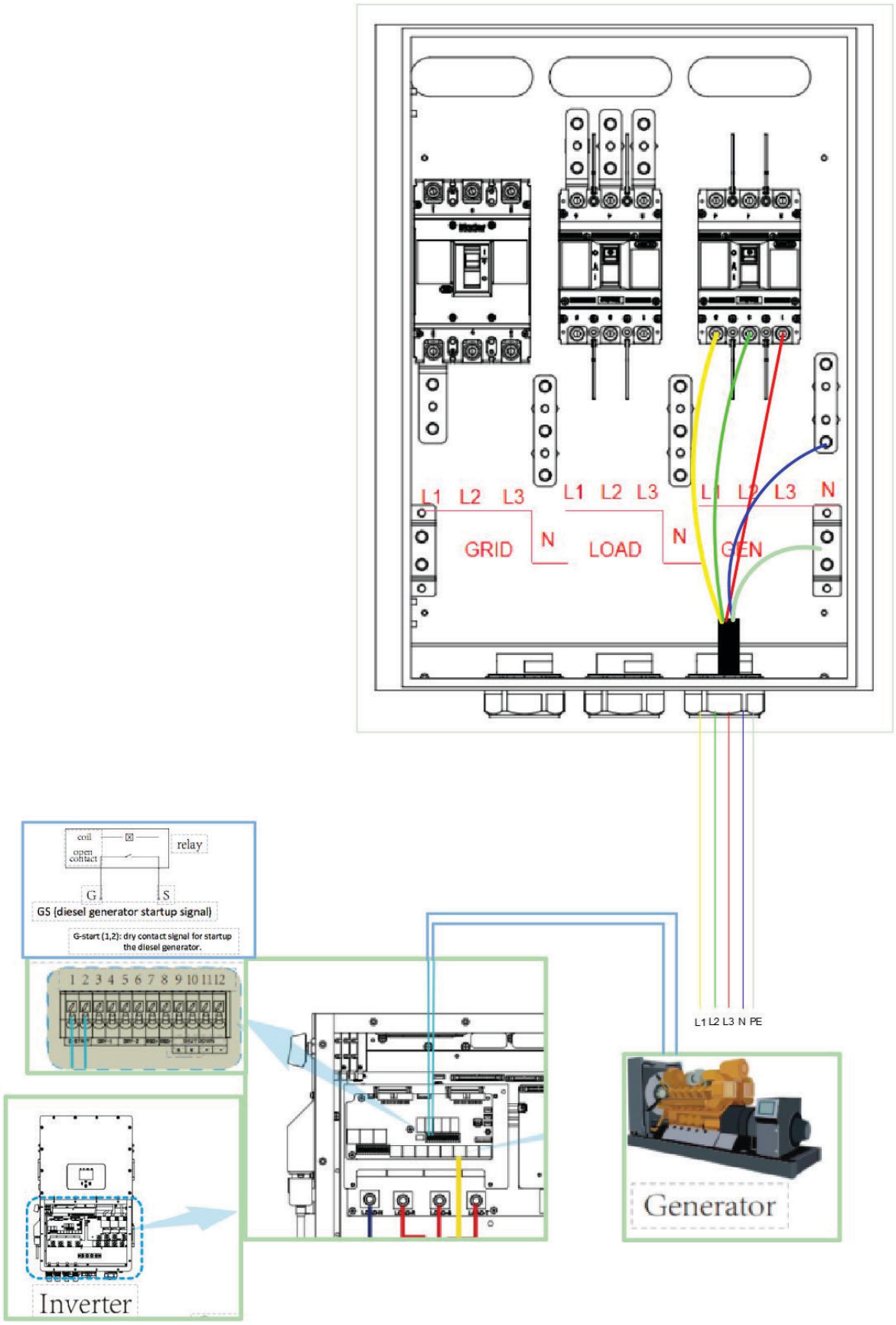
Connecting Communication Cables for F120 and Parallel Units



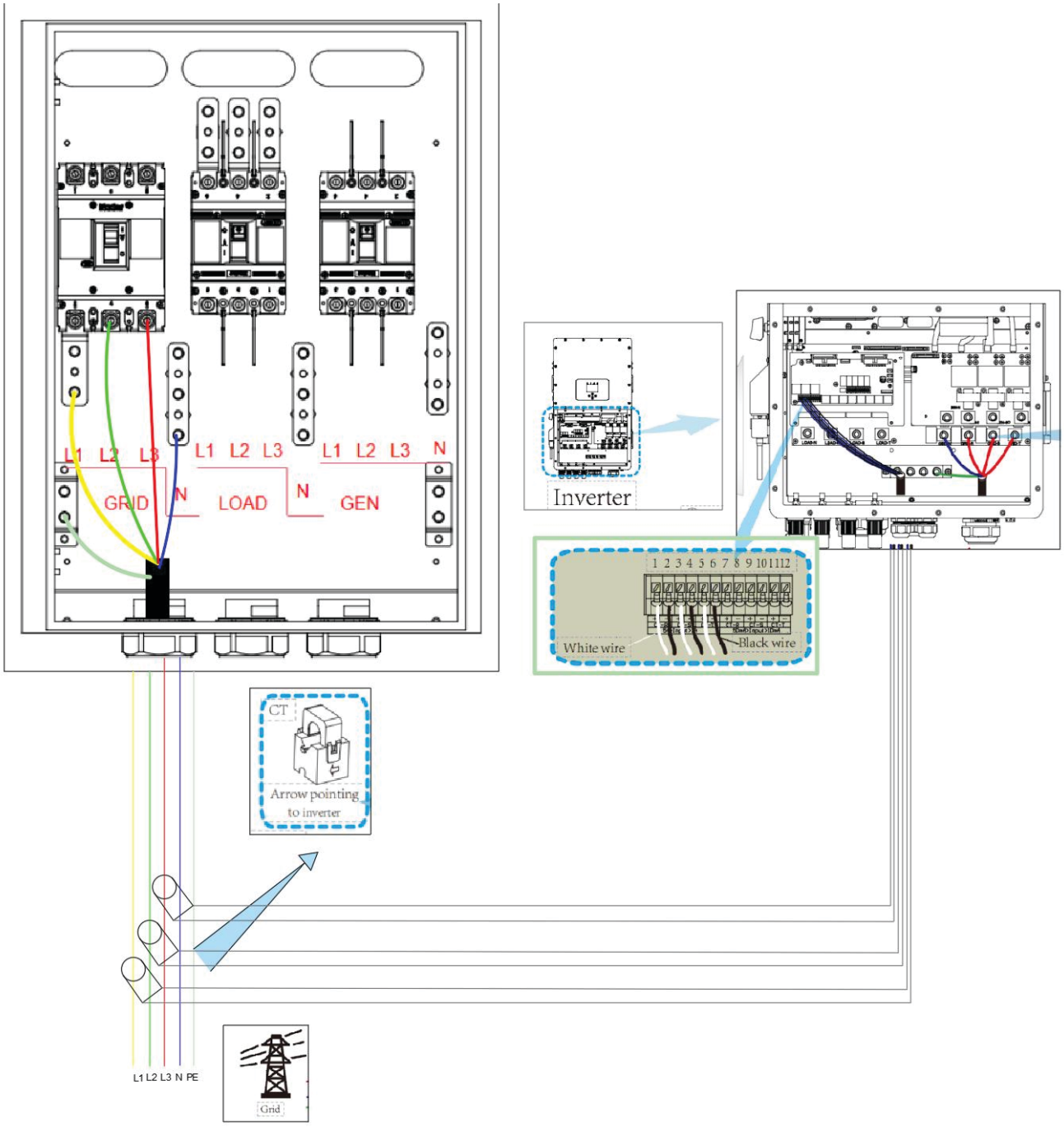
Connection of F120 and Combined F120 AC Power Distribution Cables



Wiring Instructions for Diesel Power Generation



CT Connection Instructions



Operation After Cable Connection

After completing all electrical connections, thoroughly inspect the wiring to ensure everything is correctly installed. Additionally, perform the following checks:

- Ensure all air intakes and outlets are free from any blockages.
- Seal any gaps around the cable entry points.

WARNING

- Improper sealing can allow moisture to enter the product, potentially causing damage.
- Failure to seal properly may also allow rodents to enter the product.

Locking the Cabinet Door:

- Reinstall the cable protection cover, following the reverse order of removal.
- Lock the cabinet door, remove the key, and store it securely.

Ensure the door seal remains intact and does not fold or curl when closing the cabinet door.

Battery Connection

NOTICE

When installing hazardous voltage equipment, comply with relevant regulations and local installation safety guidelines.

Follow the rules for the proper use of tools and personal protective equipment.

All connections must be made under clear guidance. Any attempt at speculation and ambiguity must be prohibited.

Tools with an insulating protective coating must be used.

ACTIVATE BESS

WARNING

BESS needs to be confirmed by professionals and approved by the local power department before it can be put into operation.

For BESS with a long downtime, check the equipment thoroughly and carefully before powering on to ensure that all indicators are normal.

Before powering on the device, check the following items:

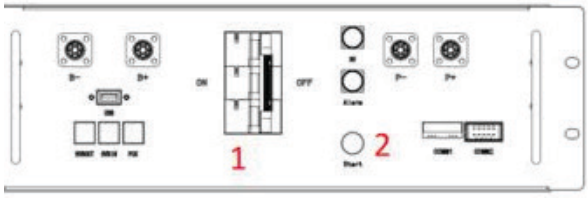
- Check whether the wiring is correct.
- Check whether the emergency stop button is released.
- Check and confirm that there is no ground fault.
- Use a multimeter to check whether the AC and DC voltage meet the starting conditions and ensure no overvoltage.
- Check and ensure no tools or parts are inside the equipment.
- Check all air intakes and outlets for blockage.

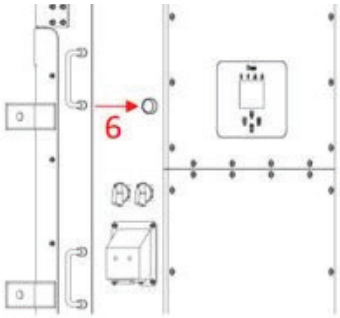
Power ON

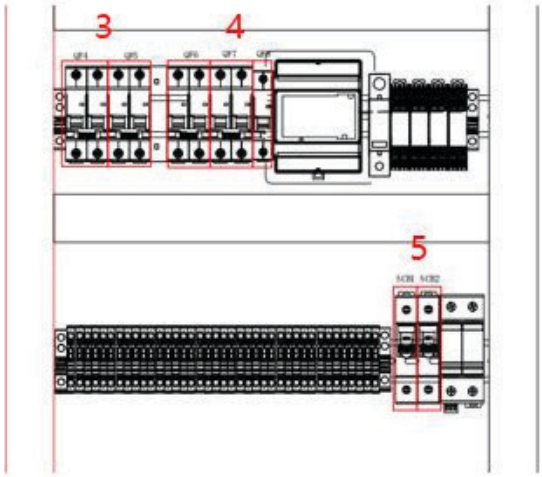
After the cables are connected:

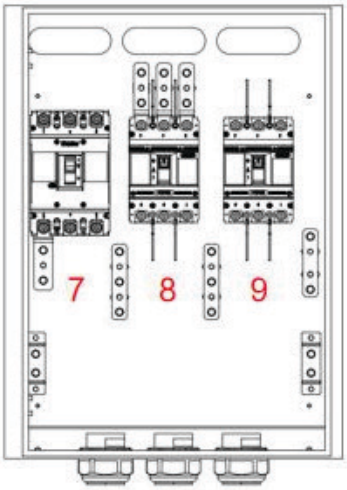
1. Open the air switch of two high-pressure boxes.
2. Press the start button on each of the two high-pressure boxes.
3. Sequentially turn on the air switches QF4, QF5, and QF6 in the power distribution area.
4. Press the PCS ON/OFF button to activate the system.
5. Finally, turn on circuit breakers QF1, QF2, and QF3 in succession.

1	Air switch/Circuit Breaker
2	START
3	QF4
4	QF5
5	QF6
6	PCS switch
7	QF1
8	QF2
9	QF3



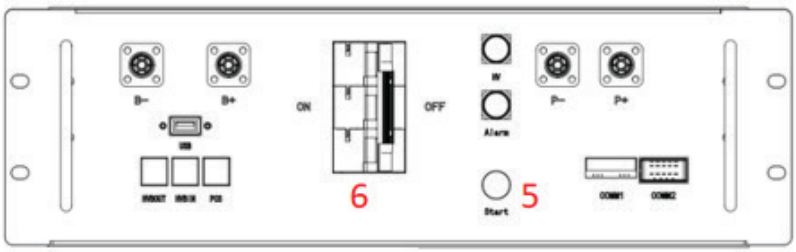


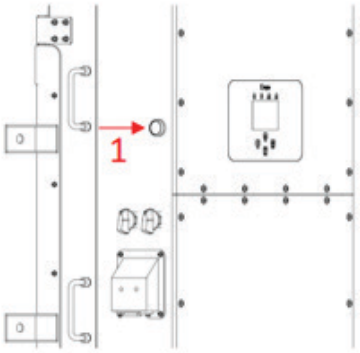


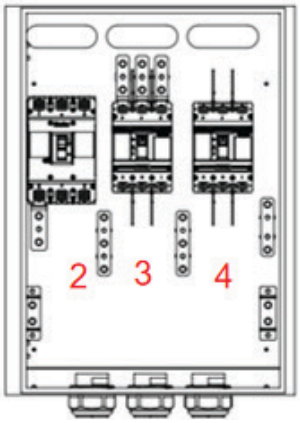


Power OFF

1. Press the PCS ON/OFF button.
2. Disconnect QF1, QF2, and QF3 successively.
3. Press the Start button of the high pressure box again.
4. Finally, disconnect the air switch of the high pressure box.



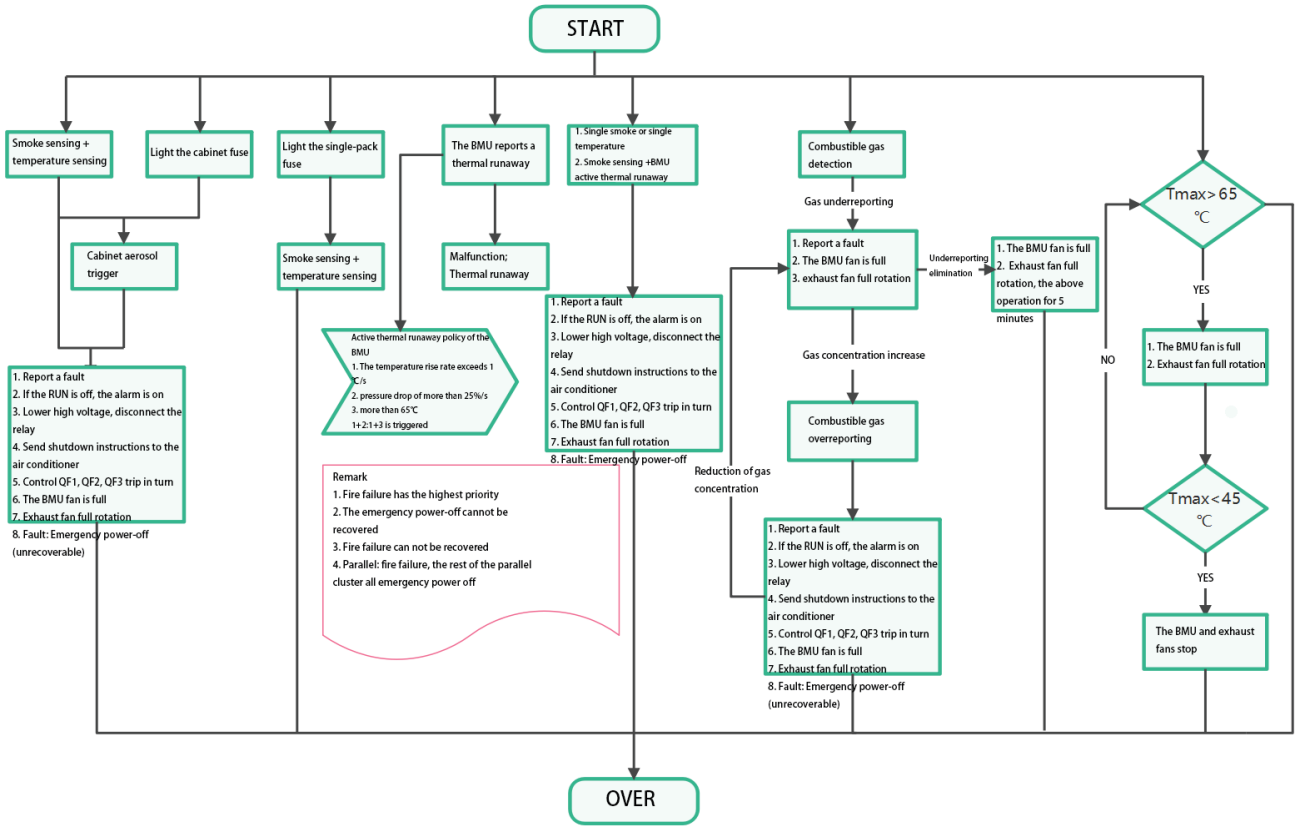




Unplanned Shut Down (Emergency)

1. Fire incidents: Contact your local fire professional.
2. EUnplanned downtime (downtime due to failure): Contact Sunsynk Mobile.

FIRE SUPRESSION SYSTEM



Fire Suppression Equipment

CAUTION

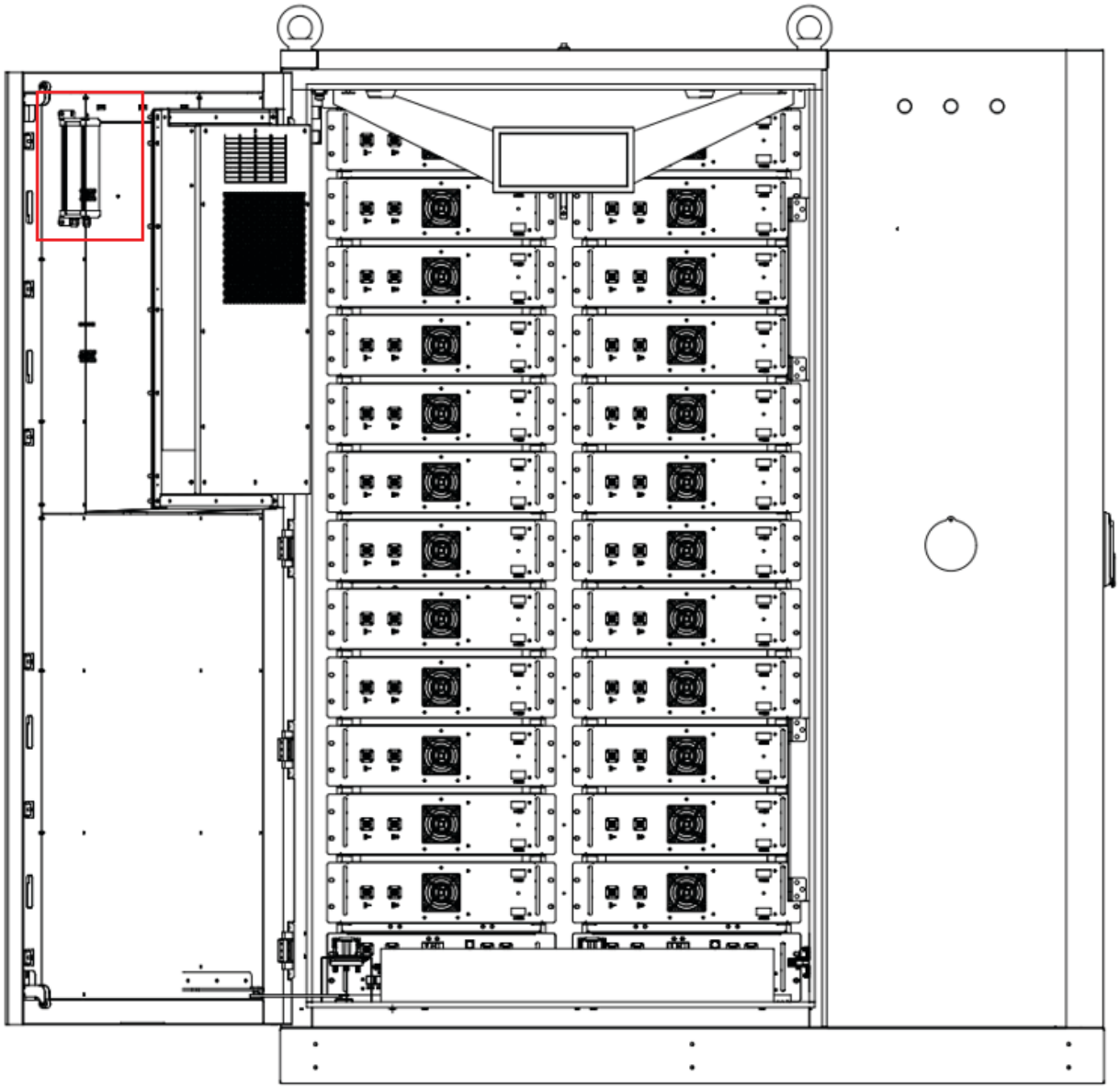
The battery is equipped with fire suppression equipment. Please comply with the fire laws and regulations of the country/region where the project is located. Regular inspection and maintenance of fire suppressing equipment is necessary to ensure its normal operation.

Aerosol Fire Suppression System

The battery is lithium iron phosphate battery, and the equipment is equipped with an aerosol fire suppression system. It is also equipped with smoke alarms and temperature alarms, and if anomalies are detected, the battery system will alarm and spray aerosols at the same time to stop the fire.

DANGER

If the fire is too large, flee as soon as possible and call the fire police.

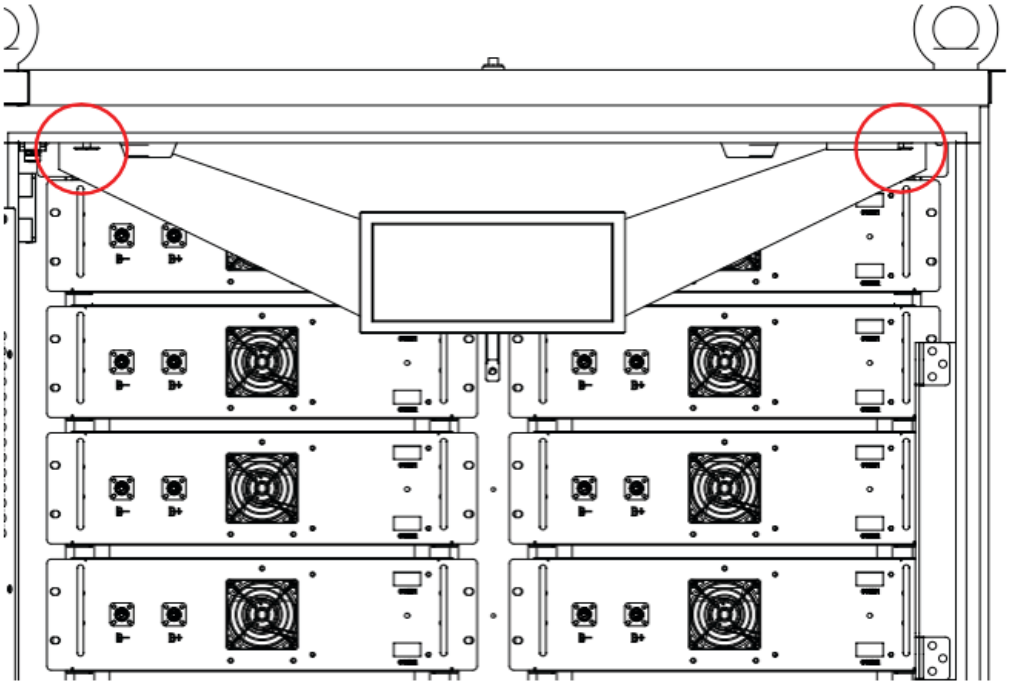


Fire Suppression Water Pipe System

NOTICE

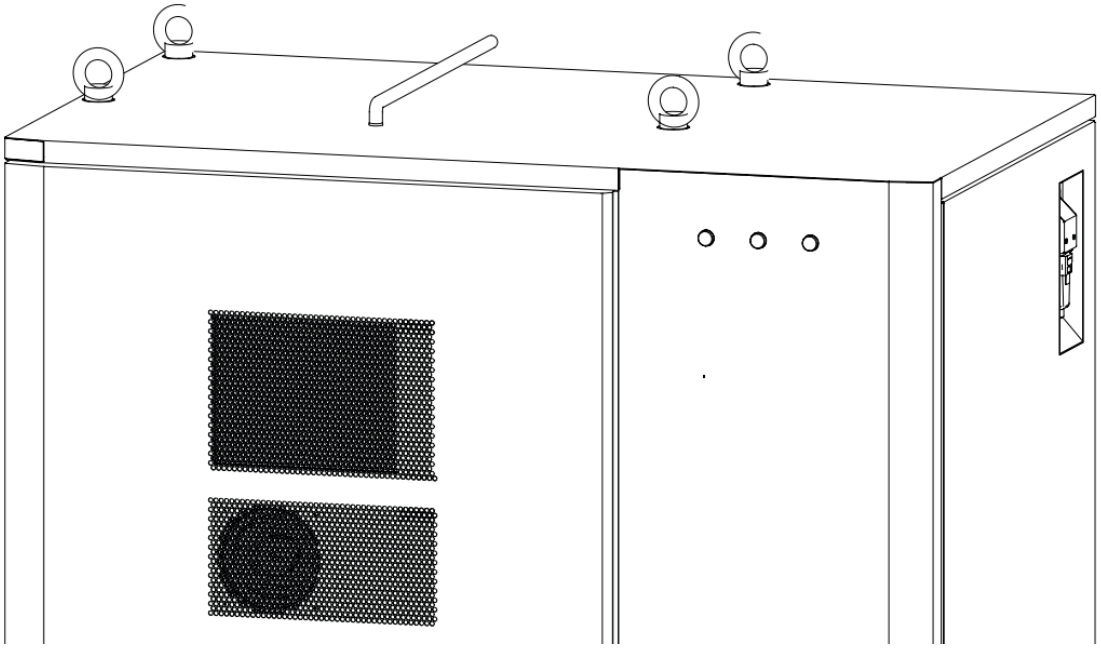
The temperature inside the BESS reaches 68ºC, and the red thermosensitive glass ball on the fire suppression water pipe explodes to spray water, fire suppression, and cool the BESS.

The recommended outer diameter of the water pipe to be installed is 1.315in, and the inner diameter is 1.049in.



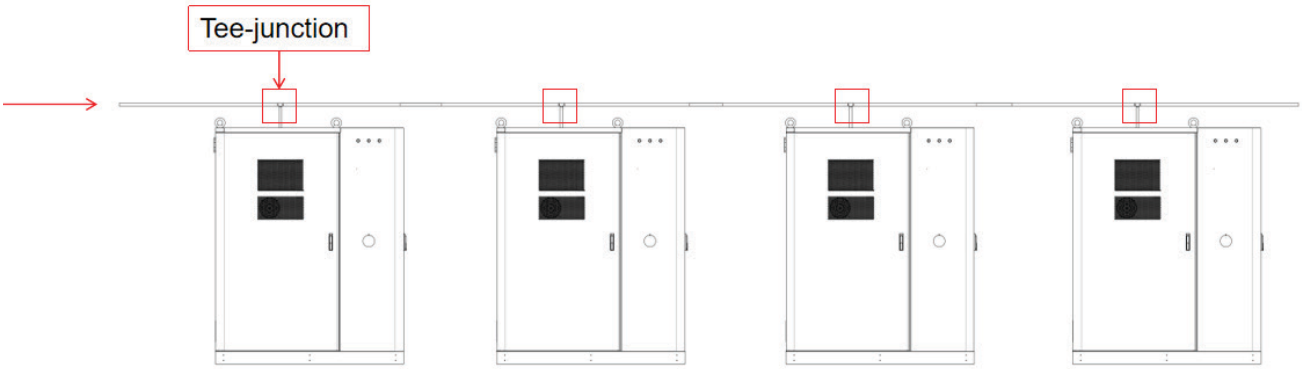
Single cabinet installation

When installing a single cabinet, you are advised to install an extension pipe (the length is based on customer requirements). Then, install an elbow water pipe and connect it with the water source to complete the water pipe installation (installation direction according to customer requirements).



Multiply Cabinet Installation

When installing multiple cabinets, you are advised to install an extension pipe (the length is based on customer requirements). Then, install Tee-junction connectors and connect them to adjacent cabinets. Finally, connect the water source (water source direction according to customer demand).



DANGER

If the fire is too large, flee as soon as possible and call the fire police.

TROUBLESHOOTING

To determine the status of the battery system, users must use additional battery status monitoring software to examine the protection mode. Refer to the installation manual about using the monitoring software. Once the user knows the protection mode, refer to the following sections for solutions.

Fault Type	Fault Generation Condition	Possible Causes	Troubleshooting
BMS fault	The cell voltage sampling circuit is faulty. The cell temperature sampling circuit is faulty	The welding point for cell voltage sampling is loose or disconnected. The voltage sampling terminal is disconnected. The fuse in the voltage sampling circuit is blown. The cell temperature sensor has failed.	Replace the battery.
Electrochemical cell fault	The voltage of the cell is low or unbalanced.	Due to large self- discharge, the cell over discharges to below 2.0V after long term storage. The cell is damaged by external factors, and short circuits, pinpricks, or crushing occur.	Replace the battery.
Overvoltage protection	The cell voltage is greater than 3.65 V in charging state. The battery voltage is greater than 58.4 V.	The busbar input voltage exceeds the normal value. Cells are not consistent. The capacity of some cells deteriorates too fast or the internal resistance of some cells is too high.	If the battery cannot be recovered due to protection against abnormality contact local engineers to rectify the fault.

Fault Type	Fault Generation Condition	Possible Causes	Troubleshooting
Under voltage protection	The battery voltage is less than 40V. The minimum cell voltage is less than 2.5V.	The mains power failure has l asted for a long time. Cells are not consistent. The ca-pacity of some cells deteriorates too fast or the internal resistance of some cells is too high.	Same as above.
Charge or dis-charge high tem-perature protection	The maximum cell temperature is greater than 60°C.	The battery ambient temperature is too high. There are abnormal heat sources around	Same as above.
Charge low temper-ature protection	The minimum cell temperature is less than 0°C.	The battery ambient temperature is too low.	Same as above.
Discharge low tem-perature protection	The minimum cell temperature is less than -20°C.	The battery ambient temperature is too low.	Same as above.

Fault Type	Potential Fault Cause
OT (Over Temperature)	BMS negative connector overtemperature
	BMS positive connector overtemperature
	Pre-charge resistor overtemperature level-2 alarm
	Heating film overtemperature level-2 alarm
	Charge overtemperature level-2 alarm
	Discharge overtemperature level-2 alarm
UT (Under Temperature)	Charge under temperature level-2 alarm
	Discharge under temperature level-2 alarm
OC (Over Current)	Charge overcurrent level-2 alarm
	Discharge overcurrent level-2 alarm
DV (Differential Voltage)	Excessive differential voltage level-2 alarm
DT (Differential Temperature)	Excessive differential temperature level-2 alarm
OV (Over Voltage)	Total charge voltage too high
	Cell overvoltage level 2 alarm
UV (Under Voltage)	Charge voltage too low
	Total discharge voltage too low
	Cell undervoltage level-2 alarm

Fault Type	Potential Fault Cause
OF (Other Fault)	Abnormal numbers of BMU
	BMU lost
	RTC clock fault
	Current module fault
	SCHG total voltage acquisition fault
	Abnormal RS485 communication
	RS485 communication failure
	PCS-CAN BUS communication failure
	Repeated BMS address fault
	Repeated BMU address fault
	Abnormal power supply voltage
	Heating relay adhesion
	SOC too low
	SOC too high
	Fuse Blown
	Charge Relay Welded
	Discharge Relay Welded
	Master Positive Relay Welded
	Temperature Acquisition Failure
	Cell voltage acquisition fault
	Inter battery communication failure
	Pre-charge failure
	Insulation level 2 alarm
	External total voltage acquisition fault
	Internal total voltage acquisition fault
	Current acquisition fault
	Limit protection
	EEPROM failure
ISO	Insulation level 2

INSPECTION, CLEANING AND MAINTENANCE

Basic Information

- The battery is not fully charged. It is recommended that the installation be completed within 3 months of the arrival of the goods.
- Do not disassemble any battery in the battery product, do not dissect the battery;
- After the battery is over-discharge, charge the battery within 48 hours. Battery products can also be charged in parallel. After the battery products are connected in parallel, the charger only needs to connect the output port of any product battery.
- Do not attempt to open or remove the battery! The battery contains no internal repairable parts.
- Before cleaning and maintaining the battery, disconnect all load and charging devices.

Maintenance Item and Period

Maintenance of Equipment

Item	Check Method
Safety function	■ Check whether the shutdown key on the touchscreen and the emergency stop button work normally. ■ Simulate shutdown.
Internal components inspection	■ Check the temperature of the radiator and the amount of dust accumulated. Clean heat-dissipation modules with a vacuum cleaner if necessary. Notice: It is necessary to check the ventilation of the air inlet. Otherwise, fault may occur due to overheating if the module cannot be cooled effectively.
Device maintenance	■ Carry out regular inspections for corrosion of all metal components. ■ Check the running parameters (especially voltage and insulation).

Maintenance (Once a year)

Item	Check Method
Outside the BESS	Check the following items, and correct immediately those failing to meet relevant requirements: ■ Check whether there are flammable objects on the top of the BESS. ■ Check whether there is any damage, flaking paint or sign of oxidization on the enclosure. ■ Check whether the lock of the cabinet door can be unlocked flexibly. ■ Check whether the sealing strip is fixed properly.
Inside the BESS	Check whether there are foreign objects, dust, dirt, and condensed water inside the BESS.
Air inlet and outlet	Check the temperature of the radiator and the amount of dust accumulated. Clean heat-dissipation modules with a vacuum cleaner if necessary
Wiring and cable layout	Completely power off the devices inside the ESS before checking. For any non-conformances found during inspection, correct them immediately. ■ Check whether the cable layout is normal and whether there is a short circuit. For any non-conformances found during inspection, correct them immediately. ■ Check whether all cable entry is well sealed. ■ Check whether there is water seepage inside the BESS. ■ Check whether the power cables are loose, and fasten them again by the torque specified previously. ■ Check whether the power cables and control cables are damaged, especially if the surface contacting the metal surface is cut. ■ Check whether the insulation tapes on the power cable terminals fall off.
Ground connection and equipotential connection	■ Check whether the ground connection is correct, and the grounding resistance shall be no more than 0.4Ω. ■ Check whether the equipotential connection inside the integrated BESS is correct.
Screw	Check whether internal screws fall off.

Every two years

Item	Check Method
System status and cleaning	Check the following items, and correct immediately those failing to meet the relevant requirements: ■ Check whether there is any damage or deformation of the container and internal devices. ■ Check if there is abnormal noise during the operation of internal devices. ■ Check whether the temperature in the container is excessively high. ■ Check whether the humidity and the amount of dust inside the container are within the normal range. Clean the equipment if necessary. ■ Check whether the air inlet and outlet of the BESS are blocked.
Warning marks	Check whether there are foreign objects, dust, dirt, and condensed water inside the BESS.
Corrosion	Check whether there is oxidation or rust inside the container.
Surge protection device and fuse	Check whether the SPD and fuse are properly fastened.

Battery Maintenance

Below is the recommended maintenance cycle. The actual maintenance cycle should be adjusted according to the specific installation environment of this product. In sandy or dusty environments, it is necessary to shorten the maintenance cycle and increase the frequency of maintenance.

Once every six months

Inspection Item	Inspection Method
Ambient Temperature and Humidity Inspection	■ Check whether the temperature in the ambient temperature record is within the operating range. ■ Check whether the humidity in the ambient humidity record is within the operating range.
Function inspection	■ Check the operating status of the DC contactor: Send the Start/Stop command in the power-off status and check whether the system works properly. ■ Measure whether the output voltage is within the range in the specification. ■ Check whether the current, voltage and temperature in the operation record of the battery cluster are within the operating ranges.

Once a year

Inspection Item	Inspection Method
Switchgear and battery module	Please check the following items and take corrective action immediately if you find any non-conformity: ■ Check the top of the battery cluster for combustibles. ■ Check whether battery clusters are fixed on the baseplate and corroded. ■ Check the box for damage, peeling paint, oxidation, etc. ■ Check the battery cluster for foreign bodies, dust, dirt, and condensate.
Wire and cable layout	■ The inspection must not be carried out until all internal devices of the battery cluster are powered off! In case of nonconformity found in inspection, take corrective actions immediately: ■ Check the cable layout for short circuits and compliance with the specifications. If case of any abnormality, take corrective actions immediately. ■ Check whether all wire inlets and outlets of the battery cluster are sealed properly. ■ Check the battery cluster for internal seepage of water. ■ Check whether the power cables and copper busbars are loose, and tighten them according to the aforesaid torque. ■ Check the power cable and communication cable for damage, especially cut marks on the surface exposed to the metal surface.
Grounding	Check whether the grounding is correct. The grounding resistance should not be greater than 4Ω.
Fan	■ Check the fan for faults (e.g. locked rotor and stalling). ■ Check the fan for abnormal noise during operation.
Screw	Check whether the screws inside the battery cluster fall off or are rusted.

Once every a two year

Inspection Item	Inspection Method
Battery cluster status and cleanliness	Check the following items. In case of non-conformity, take corrective actions immediately: ■ Check the battery cluster and internal devices for damage or deformation. ■ Check the internal devices for abnormal noise during operation. ■ Check whether the temperature inside the battery cluster is too high. ■ Check whether the internal humidity and dust of the battery cluster are within the normal ranges. If necessary, clean the battery cluster. ■ Check whether the air inlet and outlet of the battery cluster are blocked.
Warning sign	Check whether the warning sign and label are legible and dirty. If necessary, replace them.
Wire and cable	Check whether the switch gear and battery module are connected correctly and whether the battery modules are also connected correctly.
Corrosion	Check the battery cluster for internal oxidation or rust.

To maintain the system safely and efficiently, maintenance personnel must carefully read and comply with the following safety requirements:

- Hold the electrician certificate issued by the Safety Supervision Bureau and take up the post after professional training.
- Follow safety precautions, use necessary tools, and wear personal protective equipment.
- Do not wear jewelry, watches, or other metal jewelry.
- Under no circumstances, do not touch the high pressure positive and negative poles of the energy storage system with both hands.
- Before maintaining the energy storage system, turn off all high-voltage and low-voltage switches.
- Do not wash the product directly with water. Use a vacuum cleaner if necessary.
- When inserting or removing cables, it is essential to follow the regulations. Remember, any form of violent or brute force operations is strictly prohibited.
- After the maintenance is complete, clean the tools and materials in time and check whether metal objects remain inside or on the top of the product.
- If you have any questions about this product's operation and maintenance, please get in touch with the Sunsynk Mobile Customer Service center. Do not operate without authorization.

Instructions regarding maintenance of batteries:

- Servicing of batteries should be performed or supervised by personnel knowledgeable about batteries and the required precautions.
- When replacing batteries, replace with the same type and number of batteries or battery packs.
- General instructions regarding removal and installation of batteries.
- CAUTION: Do not dispose of batteries in a fire. The batteries may explode.
- CAUTION: Do not open or damage batteries. Released electrolyte is harmful to the skin and eyes. It maybe toxic.
- CAUTION: A battery can present a risk of electrical shock and high short-circuit current. The following precautions should be observed when working on batteries:
    1. Remove watches, rings, or other metal objects.
    2. Use tools with insulated handles.
    3. Wear rubber gloves and boots.
    4. Do not lay tools or metal parts on top of batteries.
    5. Disconnect charging source prior to connecting or disconnecting battery terminals.
    6. Determine if battery is inadvertently grounded. If inadvertently grounded, remove source from ground.

Contact with any part of a grounded battery can result in electrical shock. The likelihood of such shock can be reduced if such grounds are removed during installation and maintenance (applicable to equipment and remote battery supplies not having a grounded supply circuit).

BATTERY RECYCLING

When the equipment or internal equipment reaches the end of its service life, it cannot be disposed of together with domestic waste. Some internal components can be recycled, and some components will cause environmental pollution.

Recovery Process and Steps of Cathode Materials

Aluminum foil as a collector is an amphoteric metal. Firstly, it is dissolved in NaOH alkali solution to make aluminum enter the solution in the form of $NaAlO_2$. After filtration, the filtrate is neutralized with sulfuric acid solution and precipitated to obtain $Al(OH)_3$. When the pH value is above 9.0, most of the aluminum precipitates, and the obtained $Al(OH)_3$ can reach the level of chemical purity after analysis.

The filter residue is dissolved with sulfuric acid and hydrogen peroxide so that lithium iron phosphate enters the solution in the form of $Fe_2(SO_4)_3$ and Li_2SO_4 and is separated from carbon black and carbon coated on the surface of lithium iron phosphate. After filtration and separation, the pH value of the filtrate is adjusted with NaOH and ammonia water. First, iron is precipitated with $Fe(OH)_3$, and the remaining solution is precipitated with saturated Na_2CO_3 solution at 90ºC.

Since $FePO_4$ is slightly dissolved in nitric acid, the filter residue is dissolved with nitric acid and hydrogen peroxide, which directly precipitates $FePO_4$, separates impurities such as carbon black from the acid solution, leaches $Fe(OH)_3$ from filter residue respectively, and precipitates Li_2CO_3 with saturated Na_2CO_3 solution at 9ºC.

Recovery of Anode Materials

The recovery process of anode materials is relatively simple. After the separation of anode plates, the purity of copper can be more than 99%, which can be used for further refining electrolytic copper.

List of Recycling Equipment

Recovery of diaphragm

The diaphragm material is mainly harmless and has no recycling value.

List of recycling equipment

Automatic dismantling machine, pulverizes, wet gold pool, etc.

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