



Fully Liquid Cooling C&I Battery System

User Manual

HESS-261-2h

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1. About This Manual

Thank you for using this product. This manual provides product information, installation, operation, and maintenance instructions for the Fully Liquid Cooling C&I Battery System from Hoymiles Power Electronics Inc. (hereinafter "Hoymiles"). Please read this manual carefully before using the product and keep it in a place where it can be easily accessed.

1.1 Validity

This manual applies to the following model: HESS-261-2h.

Unless otherwise specified, the terms "Fully Liquid Cooling C&I Battery System", "Rechargeable Li-ion Battery System", and "ESS" mentioned in this document refer to the aforementioned product.

1.2 Audience

This manual is intended for professional technicians who are responsible for the installation, operation, and maintenance of Energy Storage System. They are required to meet the following requirements:

- Have electronic, electrical wiring, and mechanical expertise, and be familiar with electrical and mechanical schematics.
- Have received professional training related to the installation and commissioning of electrical equipment and hold relevant qualifications.
- Be able to quickly respond to hazards or emergencies that occur during installation and commissioning.
- Be familiar with the relevant standards and specifications of the country/region where the project is located.
- Read this manual thoroughly and understand the safety instructions.

1.3 Legal Notice

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No part of this document may be reproduced or transmitted in any form or by any means without prior written consent of Hoymiles Power Electronics Inc.

1.4 Trademarks

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All other trademarks and trade names mentioned in this document are the property of their respective holders.

1.5 Others

The information in this document is subject to change without notice. Users can obtain the latest manual from:

www.hoymiles.com.

Every effort has been made in the preparation of this document to ensure the accuracy of the contents. If users have any questions or find errors in the manual, please contact [Hoymiles Customer Service](#) and specify the manual version (bottom of the the manual).

1.6 Revision History

Version	Date	Description
REV1.0	April 3, 2025	Document Creation
REV1.1	July 18, 2025	Updated 3.2.2 Internal
REV1.2	Oct. 28, 2025	Updated 2.1 Symbol Conventions Updated 3.6 Nameplate Updated 4.4.2 ESS Storage Requirements Updated 4.4.3 Battery Storage Requirements Updated Appendix A : Technical Specifications

2. Safety Information

Before transporting, storing, installing, operating, and maintaining the equipment, read this document, and follow all the safety instructions on the equipment and in this manual.

Incorrect operation or work may cause:

- Injury or death to the operator or a third party.
- Damage to the product and other properties.

NOTE

- The safety instructions in this manual are only supplements and cannot cover all the precautions that should be followed. Perform operations considering actual on-site conditions.
- Hoymiles shall not be held liable for any damage caused by violation of general safety operation requirements, general safety standards, or any safety instruction in this manual.

2.1 Symbol Conventions

This manual contains important safety instructions, which are highlighted with the following symbols, to ensure personal and property safety during usage, or to help optimize the product performance in an efficient way.

Please carefully understand the meaning of these warning symbols to better use the manual.

Symbol	Description
 DANGER	DANGER indicates high-risk potential hazards that, if not avoided, will result in death or serious injury.
 WARNING	WARNING indicates moderate-risk potential hazards that, if not avoided, could result in death or serious injury.
 CAUTION	CAUTION indicates potential risks that, if not avoided, could result in minor or moderate physical injuries or equipment damage.
 NOTE	NOTE indicates additional information, emphasized contents or tips to help you solve problems or save time.

Please pay attention to the symbol inside and outside the cabine:

Symbol	Description
	High voltage inside! Risk of electric shock by touching it!
	Firmly ground the protective ground terminal to ensure the safety of operators.
	CE mark of conformity. EU/EEA Importer.
	TÜV mark of conformity.
	Read this manual carefully before any operation on the product.
	Do not dispose of the inverter together with household waste.
	Attention to safety! Please be aware of the potential risks before performing any operation on the equipment.
	Do not place the equipment near heat sources or fire sources.
	Do not store any flammable or explosive materials in the equipment area.

	Do not expose the equipment to toxic substances.
	Live equipment! Risk of electric shock by touching it!

2.2 Personal Safety

 DANGER	• Ensure that power is off during installation. Do not install or remove a cable with power on. Transient contact between the core of the cable and the conductor will cause electric arcs, sparks, fire, or explosion, which may result in personal injury. • Do not smoke in the equipment area, as it may cause fire, electric shocks, or explosion, resulting in property damage, personal injury, or even death. • Before operations, remove conductive objects such as watches, bracelets, bangles, rings, and necklaces to prevent electric shocks. • During operations, use dedicated insulated tools to prevent electric shocks or short circuits. The dielectric withstanding voltage level must comply with local laws, regulations, standards, and specifications.
 WARNING	• During operations, wear personal protective equipment such as protective clothing, insulated shoes, goggles, safety helmets, and insulated gloves. • Only qualified professionals or trained personnel are allowed to install, operate, and maintain the equipment.
 CAUTION	• Do not power on the equipment before it is installed or confirmed by professionals. • Do not touch the power supply equipment directly or with conductors such as damp objects. Before touching any conductor surface or terminal, measure the voltage at the contact point to ensure that there is no risk of electric shock. • Do not touch a running fan with your hands, components, screws, tools, or boards. Otherwise, personal injury or equipment damage may occur. • Do not stop protective devices. Pay attention to the warnings, cautions, and related precautionary measures in this document and on the equipment. • Do not touch operating equipment because the enclosure is hot. • If there is a likelihood of personal injury or equipment damage during operations, immediately stop, report the case to the supervisor, and take feasible protective measures. • In the case of a fire, immediately leave the building or the equipment area and activate the fire alarm or call emergency services. Do not enter the affected building or equipment area under any circumstances.

2.3 Storage and Installation Environment Safety

 DANGER	- Do not place the equipment near heat sources or fire sources, such as smoke, candles, heaters, or other heating devices. Overheat may damage the equipment or cause a fire. - Do not expose the equipment to flammable or explosive gas or smoke. Do not perform any operation on the equipment in such environments. - Do not store any flammable or explosive materials in the equipment area.
 WARNING	- Do not perform any operations on the equipment (including but not limited to handling, installation, electrical connection, powering on, maintenance, and working at heights, etc.) in harsh weather conditions such as lightning, rain, snow, and level 6 or stronger wind. - Do not install the equipment in an area with strong vibration, noise, or electromagnetic interference. - Do not install the equipment near liquids. Do not install it under areas prone to condensation, such as under water pipes and air exhaust vents, or areas prone to water leakage, such as air conditioner vents, ventilation vents, or feeder windows of the equipment room. Ensure that no liquid enters the equipment to prevent faults or short circuits. - Keep the storage, installation and operating environments of the equipment within the allowed ranges. Otherwise, its performance and safety will be compromised.
 WARNING	- Ensure that the equipment is stored or installed in a clean, dry, and well ventilated area with proper temperature and humidity and is protected from dust and condensation. - Ensure that the ground in the installation environment is solid, free from spongy or soft soil, and not prone to subsidence. The site must not be located in a low-lying land prone to water or snow accumulation, and the horizontal level of the site must be above the highest water level of that area in history. - When installing the equipment, ensure that the installation surface is flat enough and the foundation is solid enough to bear the weight of the equipment.

2.4 Mechanical Installation Safety

 DANGER	- Before installation, disconnect all electrical connections to prevent electrical hazards. - During installation, comply with the instructions of on-site supervisors and equipment operating procedures to ensure safe and compliant installation.
 WARNING	- Before handling equipment, ensure that the cabinet is securely fastened with a balanced center of gravity. Otherwise, tipping or falling cabinets may cause bodily injury and equipment damage. - Ensure that all installation tools are ready and inspected by a professional organization. Do not use tools that have signs of scratches or fail the inspection, or whose inspection validity period has expired. Ensure that the tools are secure and not overloaded. - Do not drill holes into the equipment. Doing so may affect the sealing performance and electromagnetic containment of the equipment and damage components or cables inside. Metal shavings from drilling may short-circuit boards inside the equipment.

2.5 Electrical Connection Safety

 DANGER	• Before connecting cables, ensure that the equipment is intact. Otherwise, electric shocks or fire may occur. • Before connecting cables, turn off the switches of the equipment and its upstream and downstream switches. Otherwise, personal injury may occur. • Prevent foreign matter from entering the equipment during operations. Otherwise, equipment short-circuits or damage, load power derating, power failure, or personal injury may occur. • Operators must comply with electrical connection operation standards. Otherwise, electric shocks or fire may occur.
 DANGER	Danger to life due to a high voltage inside equipment! Comply with the following requirements: • Use dedicated insulated tools to avoid electric shocks or short circuits. • Be sure to use special insulation tools during cable connections. • Note and observe the warning symbol on the equipment, and perform operations following the safety instructions. • Operators must be accompanied by another person to ensure personal safety.
 WARNING	When connecting grounding cables, comply with the following requirements: • For the equipment that needs to be grounded, install the ground cable first when installing the equipment and remove the ground cable last when removing the equipment. • Ensure that the grounding impedance of the equipment complies with local electrical standards. • Do not work on the equipment in the absence of a properly installed ground conductor. • Do not damage the ground conductor.
 WARNING	When connecting cables, comply with the following requirements: • When selecting, installing, and routing cables, follow local safety regulations and rules. • Ensure that all cables are properly connected and insulated, and meet specifications. • When routing power cables, ensure that there is no coiling or twisting. • When cable connection is completed or paused for a short period of time, seal the cable holes with sealing putty immediately to prevent small animals or moisture from entering. • After completing the cable connection, ensure that the cables are not exposed and the insulation is not damaged.
 CAUTION	• When connecting cables, observe ESD (Electrostatic Discharge) protection regulations and wear ESD clothing and ESD gloves or a wellgrounded ESD wrist strap. • Do not route cables near the air intake or exhaust vents of the equipment.

2.6 Operation Safety

 DANGER	• Do not open cabinet doors while the equipment is running. • Do not touch switches, cables, or other components while the equipment is running. Otherwise, electric shocks may occur.
 WARNING	• To prevent damage or fire due to high temperature, ensure that the exhaust vents or heat dissipation systems are not obstructed or covered by other objects while the equipment is running. • Do not touch the equipment surface. High temperature may cause scalds.

2.7 Maintenance Safety

 DANGER	Before equipment maintenance, turn off the switches of the equipment and its upstream and downstream switches. Otherwise, personal injury may occur.
 CAUTION	• Check the fire safety of the ESS regularly, at least once a month. • Check equipment connections periodically, ensuring that all screws are securely tightened and all cables are not damaged. • If fault diagnosis and troubleshooting need to be performed, take the following safety measures: – Disconnect the power supply. – Check whether the equipment is live. – Install a ground cable. Hang warning signs and set up fences.

2.8 Battery Safety

 DANGER	Do not connect the positive and negative poles of a battery. Otherwise, the battery may be short-circuited. To avoid battery short circuits, do not maintain batteries with power on. • Do not expose batteries to high temperatures or heat sources. Battery overheating may cause leakage, smoke, flammable gas release, thermal runaway, fire, or explosion. • Protect batteries from mechanical vibration, falling, collision, punctures, and strong impact. Otherwise, the batteries may be damaged or catch fire. • To avoid leakage, smoke, flammable gas release, thermal runaway, fire, or explosion, do not disassemble, change, or damage batteries. • There is a risk of fire or explosion if the model of the battery in use or used for replacement is incorrect. Please contact Hoymiles technical support for battery replacement.
 WARNING	• Before installing and commissioning batteries, prepare fire fighting facilities, such as fire sand and carbon dioxide fire extinguishers, according to construction standards and regulations. • Before operating batteries, prepare and install fire fighting facilities that comply with local laws and regulations are installed. • After batteries are discharged, charge them in time to avoid damage due to overdischarge.

2.9 Other Safety

 CAUTION	To prevent misuse or accidents caused by unrelated personnel during installation, daily maintenance, or inspection of the equipment, observe the following: • Attach "Do not switch on" labels near the upstream and downstream switches or circuit breakers to prevent accidental connection. • Place warning signs or strips near the operation area. • Remove the cabinet door key and keep it properly after operation.
 CAUTION	• All operations on the equipment must comply with national or regional standards. • At least two personnel must be present onsite to perform installation, routine maintenance, inspection, and other operations. • If issues not mentioned in the manual arise or if you are unsure how to proceed with certain operations, please contact Hoymiles technical support.

3. Overview

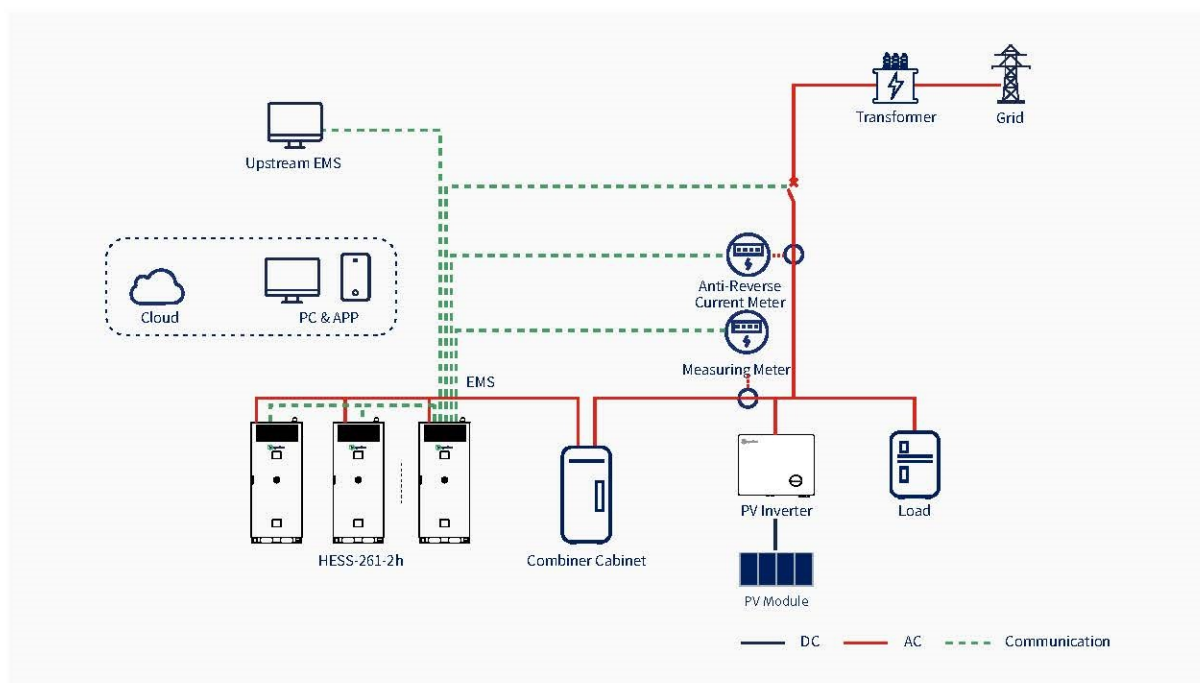
3.1 Networking Architecture

The Energy Storage System (ESS) is a device or system capable of storing electrical energy and releasing it on demand. It is widely used in power systems, renewable energy, electric vehicles, and other fields. The basic components of an ESS include:

- Energy storage units (common types: batteries, supercapacitors, flywheels, etc.)
- Power Conversion System (PCS)
- Energy Management System (EMS)
- Thermal management system
- Safety system

Hoymiles HESS Series Fully Liquid Cooling C&I Battery System adopts an All-in-One design philosophy, combining batteries, energy storage converters, and local EMS into a single unit. Equipped with a fully liquid cooling heat dissipation solution, this design not only enhances the system safety but also significantly improves its overall efficiency.

A typical networking architecture diagram is as follows:



3.2 Model Description

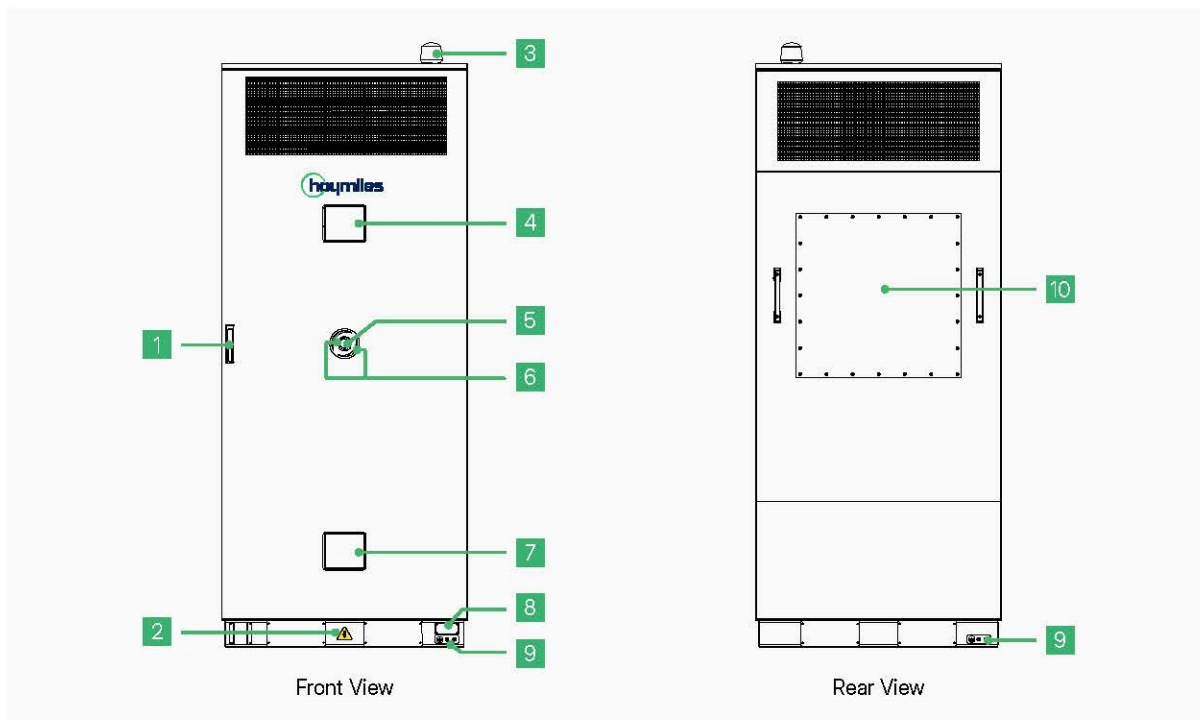
HESS-261-2h

1 2 3

NO.	Name	Description
1	Product Family Name	HESS: Fully Liquid Cooling C&I Battery System from Hoymiles Power Electronics Inc.
2	Nominal Battery Energy	261: 261kWh
3	Charge/Discharge Time	2h: The equipment requires 2 hours for a single charge or discharge cycle.

3.3 Components

3.3.1 Appearance

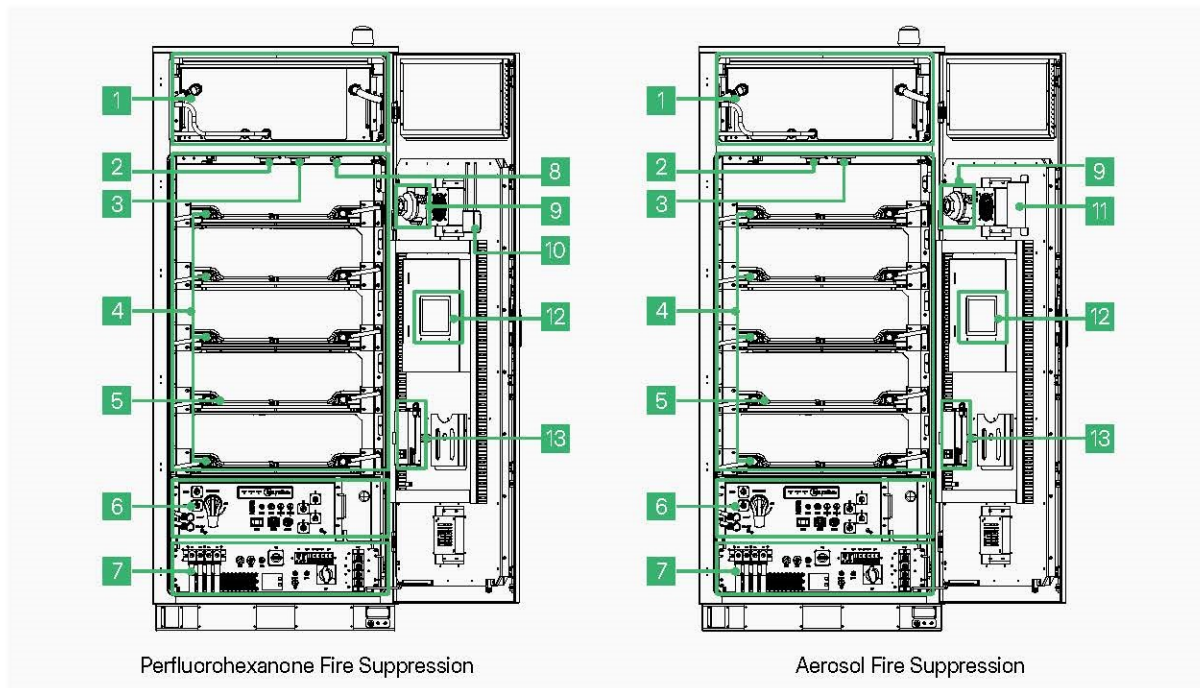


NO.	Name	Description
1	Cabinet Door Lock	To open or close the cabinet door, use the key provided.
2	High Voltage Symbol	High voltage inside! Risk of electric shock by touching it!
3	Fire Alarm Horn/Strobe	Generates alarms when severe fault or fire alarm occurs.
4	Explosion-Proof Fan Outlet	Air outlet of the air duct for the explosion-proof fan.
5	Emergency Stop Switch	Stops the ESS and disconnects the internal AC switch in emergencies.
6	Indicator	Indicates the working status of the ESS. For indicator description, refer to: 3.5 Indicator .
7	Explosion-Proof Fan Inlet	Air inlet of the air duct for the explosion-proof fan.
8	Nameplate	Includes the ESS model and serial number (SN).
9	PE Terminal	Firmly ground the protective ground terminal to ensure the safety of operators.
10	Explosion Relief Panel	Optional component. If an explosion occurs inside the cabinet, the explosion relief panel will automatically open to reduce the pressure and gas concentration inside.

NOTE

The figures in this document are for reference only.

3.3.2 Internal

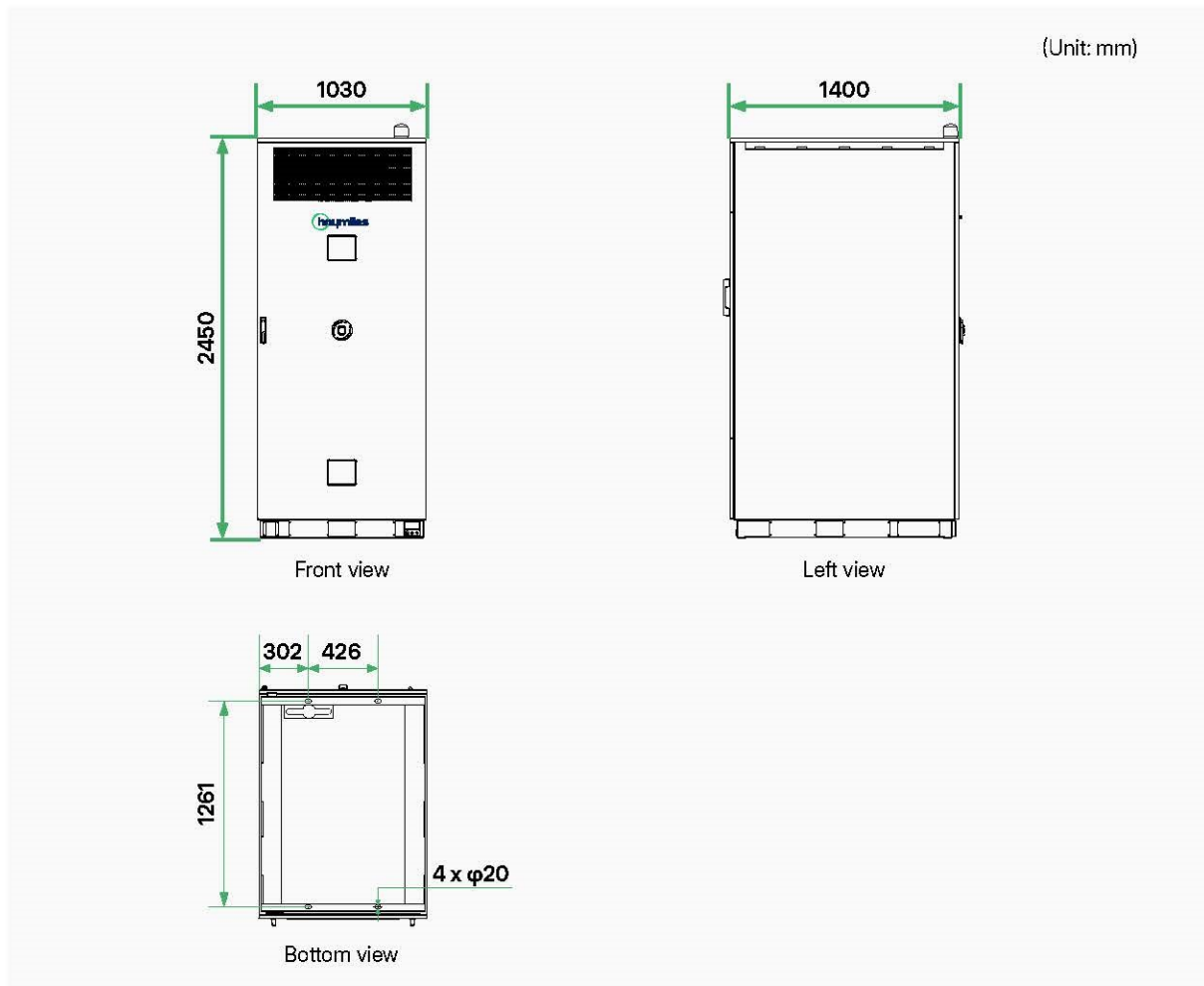


No.	Name	Description
1	Liquid-Cooling Controller	Maintains the temperature of battery PACKs, PCS, and other components within an appropriate range.
2	Smoke Detector	Detects the real-time presence of smoke in the cabinet.
3	Temperature Detector	Measures the real-time ambient temperature in the cabinet.
4	Battery RACK	Includes five battery PACKs.
5	Liquid-Cooling Piping Network	Connects the liquid-cooling controller to the battery PACKs, PCS, and other components to transfer coolant.
6	PCS	Model: HPCS125 PCS exchanges energy between the batteries and the grid.
7	Wiring Area	Wiring and switching area, refer to 6.1 Wiring Overview .
8	Fire Sprinkler	When the cabinet temperature exceeds a predetermined threshold, the fire sprinkler releases perfluorohexanone into the enclosure to releases extinguishant.
9	Combustible Gas Detector	Detects the real-time presence of flammable gases in the cabinet.
10	4G Module	The 4G module connects the HESS to the IoT.
11	Aerosol Fire Suppression Device	When the aerosol fire suppression device senses the high temperature, it automatically starts and releases extinguishant.
12	EMS	Energy Management System, which schedules and monitors energy of the overall system.
13	Environment Management System	Includes the dehumidifier and water immersion detector. Dehumidifier: Used for dehumidification inside the ESS. Water Immersion Detector: Detects water based on the resistance change between both electrodes.

NOTE

The figures in this document are for reference only.

3.4 Product Dimensions



NOTE

The figures in this document are for reference only.

3.5 Indicator

Status		Description			
		AC Input Main Circuit Breaker Status	Fire Suppression System Alarm Status	Non-Fire Suppression System Alarm Status	PCS Status
	Not lit	OFF	No alarm	No alarm	-
	Blinking red	ON	Level II or higher alarm	No alarm	-
	Steady red	ON	Level I or no alarm	Level III or higher alarm	-
	Blinking green	ON	Level I or no alarm	Level II or lower alarm	Standby or Stop
	Steady green	ON	Level I or no alarm	Level II or lower alarm	Running

3.6 Nameplate

Trademark, Product Type, and Model

hoy miles Fully Liquid Cooling C&I Battery System HESS-261-2h

Nominal Battery Energy	261kWh
Rated Capacity	314Ah
DC Voltage Range	728V - 936VDC
Maximum Continuous DC Power	130.6kW
Maximum Continuous DC Current	173A
Rated Battery Voltage	832VDC
Rated Grid Voltage Range	340 - 440VAC
Rated Grid Power	125kW
Maximum AC Current	198.6A
Rated Grid Frequency	50Hz
AC Connection Mode	3P3W / 3P4W
Auxiliary Supply Voltage	230V
Maximum Auxiliary Supply Current	24.6A
Auxiliary Supply Frequency	50Hz
Wiring Mode	L/N/PE
Battery Designation	FpP74/D6/207/526P/55M/-30+50/85
Operating Temperature	-30°C to +50°C
IP Rating	IP66
Protective Class	Class I
Weight	< 2700kg
Dimensions(W×H×D)	1030×2450×1400mm

Technical Specifications

Serial Number (SN)

S/N: XXXXXXXXXXXXX

Safety Symbols and Certification Marks

CE, YONYUNSHI CERTIFIED, and various safety symbols.

Hoymiles Information

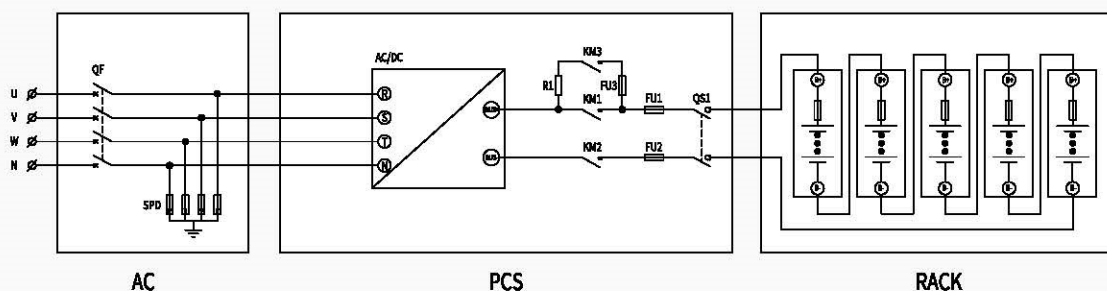
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NOTE

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3.7 Circuit Principle

The ESS can control the PCS to charge the battery with energy from the grid or discharge the battery's energy back to the grid.



3.8 Function Description

Peak Shaving and Valley Filling

Users can set different charge/discharge schedules for different months based on time-of-use electricity prices and consumption patterns.

In this scenario, multiple charge/discharge schedules can be configured, with options for daily repetition or specific time-period execution. Meanwhile, higher-priority schedules can be set for public holidays or temporary load arrangements.

Once the scenario configuration takes effect, the system will intelligently determine the priority of schedules for each date and time period to control ESS charging or discharging. This helps reduce peak loads and fill valleys to

minimize grid peak-valley differences.

Demand Management

When the load power exceeds the set demand power or the maximum demand generated in the current month, the edge EMS reduces the ESS charging power to stabilize the excess power and reduce demand charges.

This scenario includes two modes: Demand Following and Demand Control. Select the appropriate mode based on the end-user's basic electricity tariff structure. The demand control mode can be used to manage surplus PV power fed into the grid when photovoltaic (PV) systems are configured.

Anti - Reverse Current

For application scenarios where reverse power flow into the grid is not allowed:

During the ESS charging period: If PV systems are present, the edge EMS coordinates PV generation to prioritize supplying the load. Excess energy is used to charge the energy storage system. If the ESS and load cannot absorb the excess energy, PV generation is limited to prevent reverse power flow into the grid.

During the ESS discharging period: If the load cannot absorb both PV generation and the energy discharged from the ESS, the edge EMS limits PV generation and reduces the storage discharge power to avoid reverse power flow from PV or storage into the grid.

Off-Grid Power Supply

In off-grid scenarios, the ESS provides stable voltage and frequency support for the local grid to ensure reliable power supply. This application scenario supports the addition of AC/DC PV systems to extend the off-grid power supply duration.

Backup Power Supply

Grid Normal: The ESS operates in grid-connected mode, implementing peak shaving, dynamic capacity expansion, anti-backflow, and demand management to achieve grid-connected benefits.

Grid Abnormal: The ESS switches to off-grid mode, outputting stable voltage and frequency to provide reliable power supply to regional loads, addressing power interruptions or emergencies.

Remote Control

The ESS can operate in remote mode, accepting dispatch commands from a virtual power plant (VPP) platform. It charges/discharges according to grid requirements, provides energy or ancillary services, and participates in electricity market transactions to generate revenue.

Parallel Control

Grid-Connected: Up to 16 units (125kW/261kWh each) can be paralleled.

Off-Grid: Up to 8 units can be paralleled.

Flexible Configuration: Scalable combinations (125kW/261kWh to 2MW/4MWh) allow phased investment to meet project requirements.

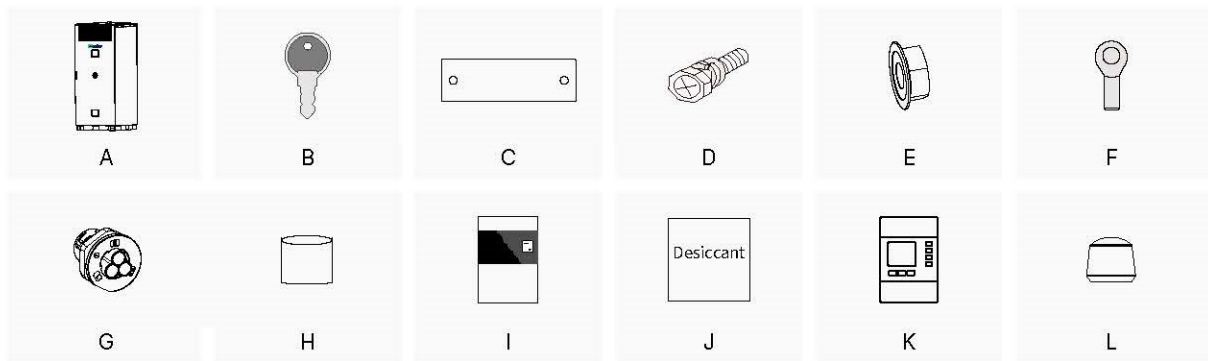
4. Handling, Unpacking and Storage

Before handling or unpacking, please ensure to read and comply with the information in the "[Safety Information](#)" section.

 DANGER	Transport, handle and unpack the ESS with caution. Otherwise, the batteries may be short-circuited or damaged (such as leakage and crack), catch fire, or explode.
 WARNING	• Do not perform any operations on the equipment (including but not limited to handling, installation, electrical connection, powering on, maintenance, and working at heights, etc.) in harsh weather conditions such as lightning, rain, snow, and level 6 or stronger wind. • Transportation and storage service providers must have the qualifications for dangerous goods operations required by local laws, regulations, and standards. • Before transportation, make a compliant and accurate declaration. Ensure that the battery packaging, labels, and markings are intact and there is no abnormal smell, leakage, smoke, or fire. Otherwise, the batteries must not be transported. • The packing case must be solid and strong. Handle the packages with care and take moisture-proof measures during loading, transportation, and unloading. Do not place the packages on one side or upside down. Bind the packages securely to avoid displacement. Ensure that the dangerous goods labels are visible.
 WARNING	• Do not move a battery by holding its terminals, bolts, or cables. Otherwise, the battery may be damaged. • Keep batteries in the correct direction during transportation. They must not be placed upside down or tilted, and must be protected against falling down, mechanical impact, rains, snows, and falling into water during transportation. • Before transporting a faulty battery (with scorch, leakage, bulge, or water intrusion), insulate its positive and negative terminals, pack it, and place it in an insulated explosion-proof box as soon as possible. Record information such as the site name, address, time, and fault symptom on the box. • When transporting faulty batteries, avoid approaching flammable material storage areas, residential areas, or other densely populated places, such as mass transit facilities or elevators. • When moving and transporting the liquid-cooling controller, keep it horizontally. Do not place it upright or upside down.

4.1 Delivery List

Check every item received against the delivery list. The delivery list is as follows:



No.	Name	Description
A	Fully Liquid Cooling C&I Battery System (hereinafter "ESS")	—
B	Cabinet Key	1
C	Protective Plates	2 specifications, 4 pieces each
D	Stainless Steel Hexagon Combination Bolts	M10*18: 2, M5*14: 32
E	M16 Hexagon Carbon Steel Zinc-Nickel Alloy Flat Flange Nuts	6
F	OT Terminals	SC95-10: 5, SC50-10: 1
G	XT1 Connector	1
H	Fireproof Sealing Putty	1
I	Documentation	Quality Inspection Report: 1, Certificate Card: 1, in the cabinet
J	Desiccants	2, in the cabinet
K	Measuring Meter	1, Optional
L	Fire Alarm Horn/Strobe	1, Optional

4.2 Unpacking

4.2.1 Check Before Unpacking

The equipment has been thoroughly tested and was subject to a strict inspection before delivery. However, damage may still occur during transportation. Please conduct a detailed inspection before signing for the product.

No.	Item	Checked	
		Yes	No
1	Check that there is no damage on the equipment packaging.	☐	☐
2	Check that the delivered items are complete and match both the delivery list and the order.	☐	☐
3	Unpack the box/package and check that all internal equipment is not damaged.	☐	☐
4	Check that the stainless steel nameplates, internal labels, warning labels, QR codes, and all SN codes are not damaged, scratched, or blurred.	☐	☐

Unpack the box/package and carefully inspect the ESS for evidence of damage. If you discover any damage during transportation and unpacking, contact the shipping company or Hoymiles, and provide photos or videos of the damage.

Do not discard the original equipment packaging. After the equipment is decommissioned and removed, it is recommended to store it in the original packaging.

4.2.2 Unpacking Procedure

 CAUTION	During unpacking, avoid scratches or damage to the product caused by unpacking tools.
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Please follow the steps below to unpack:

Step 1: Remove the external paper corner protectors and wrapping film from the ESS.

Step 2: Use a forklift or crane to lift the ESS and place it in the designated position.

Step 3: Recycle the original packaging and store it in a dry environment.

4.3 Handling

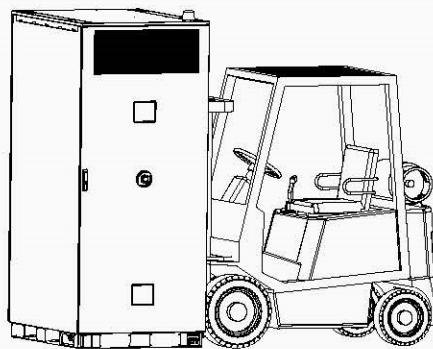
4.3.1 Handling with A Forklift

 WARNING	- Do not use a manual pallet truck to move the cabinet on a slope. - Only a powered industrial forklift can be used to move the cabinet on a slope. The forklift must have sufficient power and its center of gravity must be stable to ensure safety during handling on a slope. - The forklift tynes must be in the middle of the ESS and must extend out of the cabinet during handling.
 CAUTION	- Conduct a trial before handling. Adjust the forklift tines position if misaligned. Only proceed to lift the ESS after confirming proper alignment, then handle it to the designated location. - Ensure slow and steady operation when using a forklift to lift, move, and place the ESS. - During handling, its tilt angle α must be less than or equal to 10°. - Forklifts are prohibited from long-distance handling or traversing slopes to prevent damage. - Lift and place the cabinet gently to prevent shocks or vibrations. Ensure no feet are under the forklift during lowering. - The ESS may obstruct the forklift driver's view. It is recommended to assign personnel to guide the driver. - Place the ESS on a solid and level ground.

Please follow the steps below for forklift handling:

Step 1: Adjust the width of the forklift tynes to align with the bottom of the ESS and insert them into the bottom gap.

Step 2: Ensure that the center of the ESS is positioned over the center of the forklift tynes, then lift the cabinet and place it in the designated location.



NOTE

Forklift requirements: The load-bearing capacity $\geq 3500\text{kg}$, the tyne length $\geq 1500\text{ mm}$;

4.3.2 Handling with A Crane

 WARNING	• Only trained and qualified personnel are allowed to perform hoisting operations. • Install temporary warning signs or fences to isolate the hoisting area. • Ensure that the foundation where hoisting is performed meets the loadbearing requirements. • Ensure that hoisting tools are firmly secured onto a fixed object or wall that meets the loadbearing requirements before hoisting. • Do not stand or walk under the crane or the hoisted objects during hoisting • Do not drag ropes and hoisting tools or bump the hoisted objects against hard objects during hoisting.
 CAUTION	• Before hoisting, ensure that the front door is locked to prevent it from suddenly opening during transportation, which may result in a fire or personal injury. • The ESS is equipped with lifting holes for crane fixation. Before hoisting, perform a test lift to ensure that the lifting ropes can bear the weight of the ESS (The load-bearing capacity $\geq$ 3500kg, the length of each rope $\geq$ 2.5m). • Ensure that the center of the hook vertically aligns with the center of the ESS to prevent tilting or dropping during lifting. • Lift and place the cabinet gently to prevent shocks or vibrations.

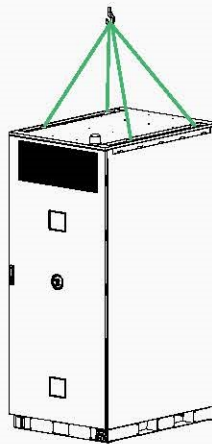
Please follow the steps below for crane handling:

Step 1: Remove the external paper corner protectors and wrapping film from the ESS.

Step 2: Pass the lifting ropes through the lifting holes on the top of the ESS and secure them tightly.

Step 3: Adjust the position of the hook to ensure that its center vertically aligns with the center of the ESS.

Step 4: Lift the ESS vertically and place it in the designated position.



NOTE

Paper corner protectors and wrapping film do not need to be removed during hoisting before ESS installation.

4.4 Storage Requirements

4.4.1 Storage Environment

Item	Requirements
Storage temperature	-40°C to +70°C
Storage humidity	0% - 100%RH (non-condensing)
Environment	Store the ESS in a dry, clean, and ventilated indoor environment.

4.4.2 ESS Storage Requirements

Before storing the ESS, please ensure to read and comply with the information in the "[Safety Information](#)" section.

 WARNING	- It is recommended to store the ESS in a dry, clean, and ventilated indoor environment that is free from sources of strong infrared or other radiations, organic solvents, corrosive gases, and conductive metal dust. Do not expose the ESS to direct sunlight or rain and keep it far away from sources of heat and ignition. - Store the ESS separately to avoid mixing with other equipment. The site must be equipped with qualified fire fighting facilities, such as fire sand and fire extinguishers.
 CAUTION	- If equipment are unpacked but will not be used immediately, put them back in the original packaging with the desiccant. If the original packaging is lost, please contact Hoymiles technical support engineer for repacking requirements. - Place desiccants inside the cabinet before storage. Periodically inspect desiccant conditions and replace them promptly. Before power-on and long-term operation, remove the desiccants from the ESS. - Place the ESS correctly according to the signs on the packing case during storage. Do not place the ESS upside down, lay it on one side, or tilt it.
 CAUTION	It is recommended that the ESS be used soon after being deployed onsite. The ESS stored for an extended period or not put into use shall be charged periodically. Otherwise, the ESS may be damaged. - It is recommended to charge the ESS every six months. - If charging is necessary, the ESS must be charged by Hoymiles technical support engineer as required and then returned to their original packaging after charging. - Only trained and qualified personnel are allowed to charge batteries. Wear insulated gloves and use dedicated insulated tools during the operation. - The AC mains input voltage at the charging station must be within the range of 340 to 440VAC. - If a battery experiences an abnormality such as bulging or smoking during charge, stop charging immediately and dispose of it. - Observe onsite during charge and handle any exceptions promptly.

4.4.3 Battery Storage Requirements

Before storing the battery, please ensure to read and comply with the information in the "[Safety Information](#)" section.

 WARNING	Ensure that batteries are stored in a dry, clean, and ventilated indoor environment that is free from sources of strong infrared or other radiations, organic solvents, corrosive gases, and conductive metal dust. Do not expose batteries to direct sunlight or rain and keep them far away from sources of heat and ignition.
--	--

4.4.4 Liquid-Cooling Controller Storage Requirements

Before storing the liquid-cooling controller, please ensure to read and comply with the information in the "[Safety Information](#)" section.

 WARNING	Ensure that liquid-cooling controllers are stored in a dry, clean, and ventilated indoor environment that is free from sources of strong infrared or other radiations, organic solvents, corrosive gases, and conductive metal dust. Do not expose liquid-cooling controllers to direct sunlight or rain and keep them far away from sources of heat and ignition.
 CAUTION	Before storing the liquid-cooling controller, follow these steps to drain the coolant: • Place a liquid collection container below the filling/draining port. • Open the ball valve on the filling/draining port pipeline. • Drain all coolant, then close the ball valve on the filling/draining port pipeline.

5. Mechanical Installation

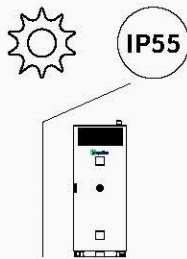
Before mechanical Installation, please ensure to read and comply with the information in the "[Safety Information](#)" section.

 DANGER	- Before installation, disconnect all electrical connections to prevent electrical hazards. - During installation, comply with the instructions of on-site supervisors and equipment operating procedures to ensure safe and compliant installation.
 WARNING	- An unfavorable installation environment will affect the performance of the ESS. For environment requirements, refer to 5.1 Installation Environment Requirements. - Ensure that all necessary tools are ready and inspected by a professional organization. Do not use tools that have scratches or fail the inspection or whose inspection validity period has expired. Ensure that the tools are secure and not overloaded.

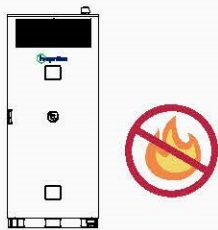
5.1 Installation Environment Requirements

To ensure safe operation, extend service life, and maintain optimal performance, select the ESS installation location according to the following requirements:

Item	Requirements
Site, Space, Foundation	For details, refer to the "HESS-261-2h Site Requirements" and the "HESS-261-2h Installation Video."
Altitude	Conventional version ≤ 2000 m, high altitude version ≤ 4000 m
Ambient temperature	-30°C to $+55^{\circ}\text{C}$ ($> 50^{\circ}\text{C}$, derating operation)
Relative humidity	0% to 100%RH(noncondensing)



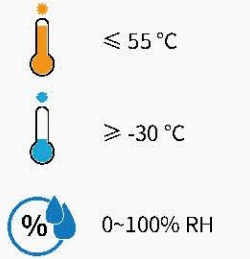
IP55 Protection



No flammables, No explosives



Dry, clean, and well-ventilated



Ambient temperature and relative humidity

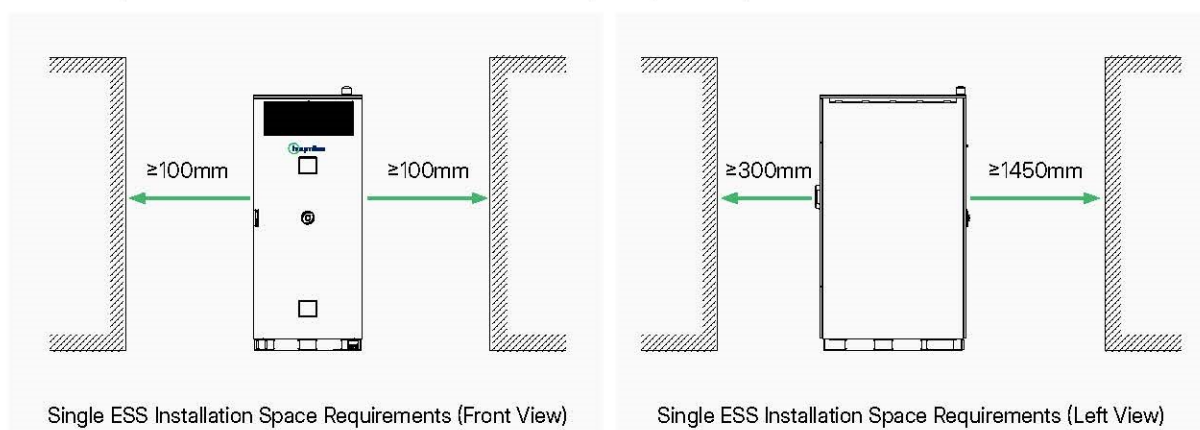
$\leq 55^{\circ}\text{C}$

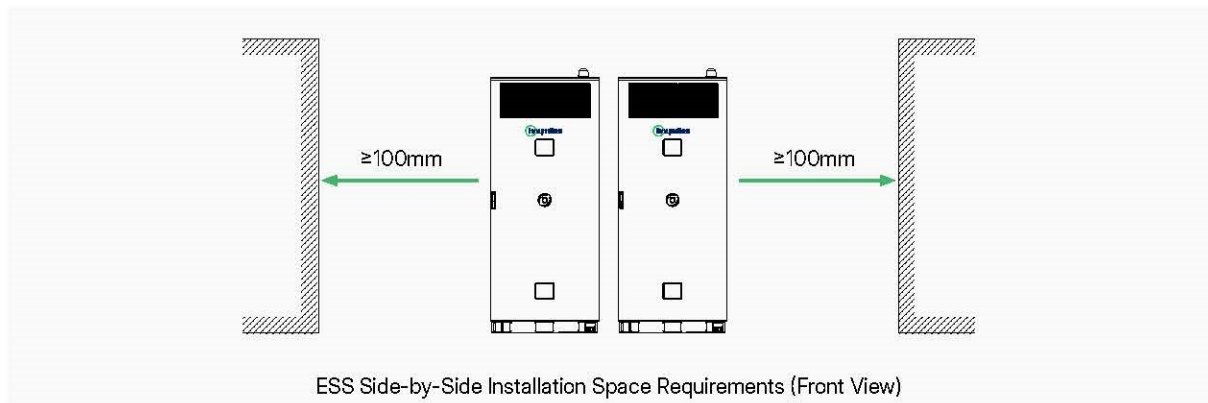
$\geq -30^{\circ}\text{C}$

0~100% RH

5.2 Installation Space Requirements

During ESS installation, ensure that sufficient distance is maintained between the ESS and walls or other equipment to meet requirements for minimum maintenance access, escape routes, and ventilation.



**NOTE**

The dimensions marked in the figure represent the minimum space requirements for non-containerized ESS installations. If conditions allow, choose larger spacing to ensure efficient operation.

5.3 Installation Tools

Installation tools include but are not limited to the following recommended tools. Other auxiliary tools may be used if necessary.

Goggles	Dust mask	Earbuds	Insulated gloves	Insulated shoes	Utility knife	Marker	Level
Flat-head screwdriver (M2, M3, M4)	Phillips screwdriver (M3, M4, M8)	Socket Combination (8, 10, 17mm)	Cable cutter	Wire stripper	Hydraulic pliers	Crimping tool	Torque Wrench (M12)
Lifting rope	OT/DT terminal	Heat gun	Multimeter	ESD gloves	Phase sequence detector	Rubber mallet	

5.4 Installation procedure

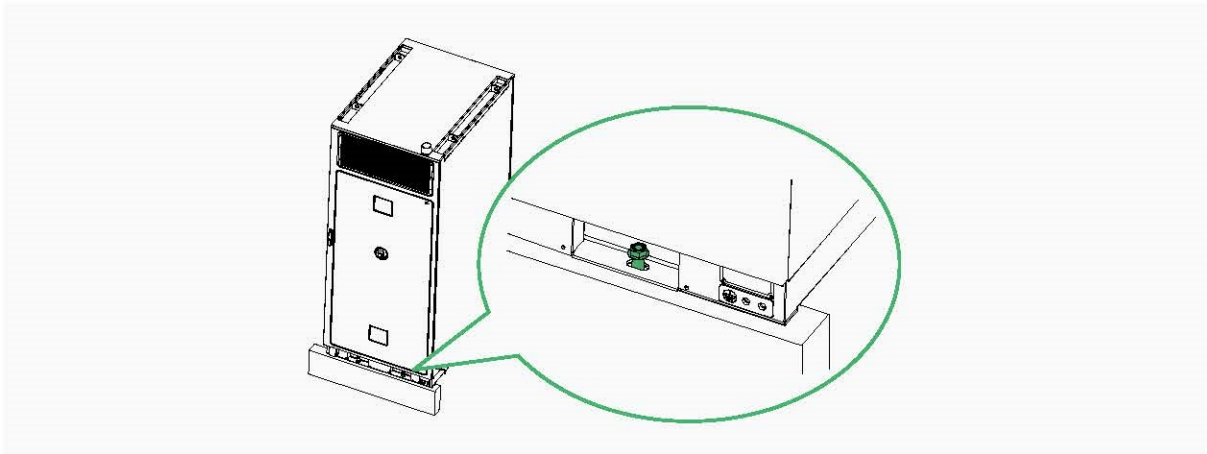
Please follow the steps below for fixed installation:

Step 1: Mark the positions of buried screws on the foundation and fix them at the marked locations using brackets or templates. (Screw spacing refer to [3.4 Product Dimensions](#))

Step 2: Pour the concrete and ensure the screws are firmly bonded with the concrete.

Step 3: Use a forklift or crane to transport the ESS to the installation site and align it with the buried screws.

Step 4: Secure the ESS with M16 nuts provided in the accessories.



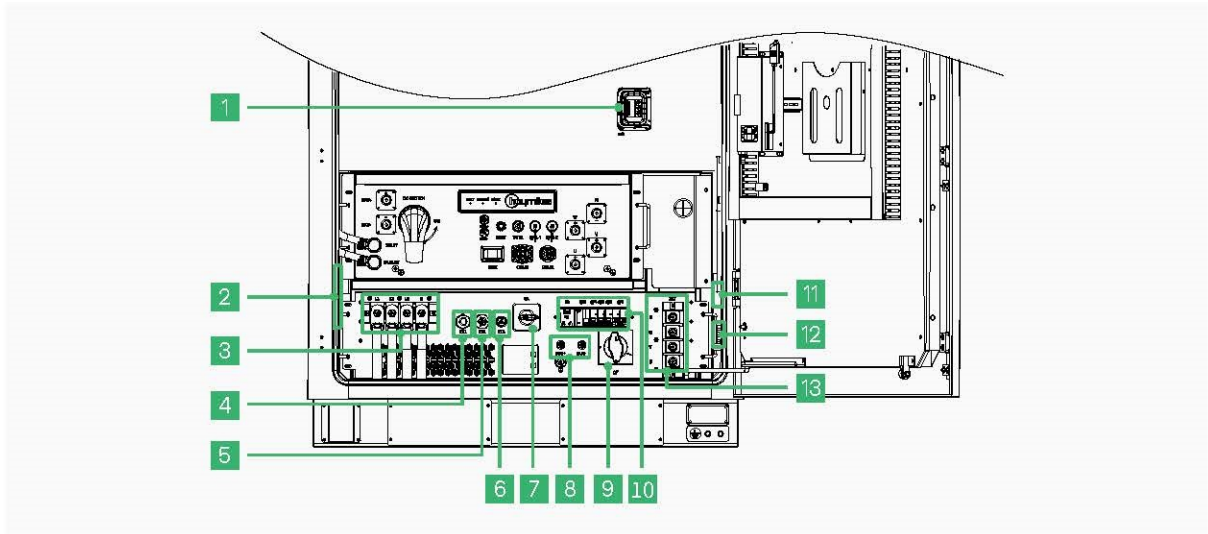
6. Electrical Connection

Before electrical connection, please ensure to read and comply with the information in the "[Safety Information](#)" section.

 DANGER	• Before electrical connections, turn off the switches of the equipment and its upstream and downstream switches. Ensure zero voltage on both the AC and DC sides and the equipment is de-energized. Otherwise, personal injury may occur. • Before electrical connections, ensure that the internal AC circuit breaker and DC load switch are in the OFF position, the UPS is powered OFF, and the Maintenance Switch Disconnect(hereinafter "MSD") is not inserted. • Strictly follow the wiring symbols inside the equipment when performing wiring operations.
 WARNING	• Install the ground cable first when installing the equipment and remove the ground cable last when removing the equipment. • Live parts must be properly handled and isolated with insulating materials to prevent personnel injury.

6.1 Wiring Overview

All input and output terminals of the ESS are located under the cabinet, and each terminal is symbol as shown in the figure below.



No.	Name	Description
1	MSD	Maintenance switch disconnect
2	Switch(Optional)	Multi-cabinet communication connection
3	AC Terminal	Grid-side AC connection
4	Auxiliary Power Port	External auxiliary power supply input
5	Liquid-Cooling Controller Port	Liquid-cooling controller power interface
6	Explosion-Proof Fan Port	Explosion-proof fan power interface
7	Auxiliary Power Transfer Switch (SA)	Switches between external auxiliary power supply and internal main circuit power supply modes
8	DC Bus Terminals	Positive and negative terminals of the DC bus
9	Main Circuit Breaker (QF)	Main switch on the AC side
10	Circuit Breakers (QF1-QF5)	QF1: Auxiliary power main switch QF2: UPS power switch QF3: Liquid-cooling controller power switch QF4: Explosion-proof fan power switch QF5: Maintenance socket power switch XS: Maintenance socket
11	Network Port Adapter	Multi-cabinet communication connection
12	Auxiliary Terminal	External dry contacts and communication connections
13	AC Box Output Terminals (2XT)	—

6.2 Cable Specifications

The selected cables must meet the following requirements:

- The cables must have sufficient current-carrying capacity, which depends on environmental conditions, conductor insulation types, installation methods, conductor material, cross-sectional area, and other factors.
- The wire diameter of all cables must be selected based on the maximum current on the AC and DC sides of the PCS with a safety margin.
- Cables on the same side must use identical specifications and types.
- Flame-retardant cables and flame retardants are required.

The following table lists the recommended cable specifications:

No.	Name	Cable Specifications (Recommend)	Connector/Terminal Specification	Quantity	Description
1	AC Cable	ZRC-YJV22-0.6/1kV-4*95+1*50	M10 Combination Screws	1	Must meet maximum current-carrying capacity
2	Auxiliary Power Supply Cable	3*6mm ²	EN040-1103-101	/	Optional. Required when using an external auxiliary power supply. Must meet the maximum current-carrying capacity.
3	Auxiliary Dry Contacts Cable	2*1.5mm ²	Tube Terminals	1	—
4	Communication Cable	RVVSP 2*0.75	Tube Terminals	4	—
5	Ethernet Cable	CAT5E	RJ45	1	—



CAUTION

- All wire diameters in the table are for copper wires. If an aluminum alloy cable is used,, select wire diameters and quantities with equivalent current-carrying capacity.
- The input paths and cable specifications in the table are recommended for standard ESS. For special applications, perform wiring based on specific site conditions and local wiring regulations.
- AC cables and communication cables should maintain a safe distance to avoid crossing and prevent short circuits.

6.3 Ground Connection



WARNING

Failure to properly ground the grounding cable may result in:

- Fatal electric shock to operators during equipment faults.
- Equipment damage caused by lightning strikes.
- Equipment operational fault occurs.



CAUTION

- The grounding connection must comply with the standards and regulations of the country/region where the project is located.
- Connections between the equipment and ground electrodes must be secure and reliable.
- The ground resistance must not exceed 4 Ω after grounding is completed.

6.3.1 Grounding Methods

Method 1: The ESS is grounded through the PE grounding conductor.

Method 2: Connect the PE ground terminal of the ESS to the equipotential bonding device at the installation site or electrical room. The equipotential bonding device is then connected to the earth or grounding grid. The ground resistance must not exceed 4 Ω .

6.3.2 Grounding Inside the Cabinet

Step 1: Select a ground cable with a cross-sectional area of at least 50 mm². Use a wire stripper to remove an appropriate length of insulation.

Step 2: Slide a heat-shrink tube onto the ground cable, then crimp an OT terminal to the core wire.

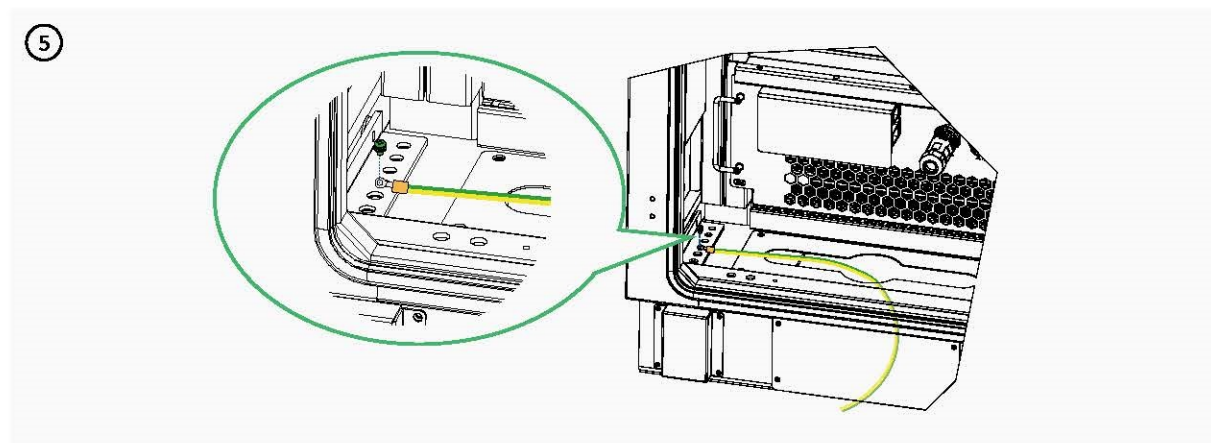


Step 3: Use a hydraulic crimper to crimp the OT terminal.

Step 4: Cover the crimped area with a heat-shrink tube and apply heat with a heat gun to shrink the tube.



Step 5: Secure the ground cable to the internal grounding copper busbar using M10 combination screws.



Step 6: Connect the other end of the ground cable directly to the earth or grounding grid, or connect it through an equipotential bonding device.

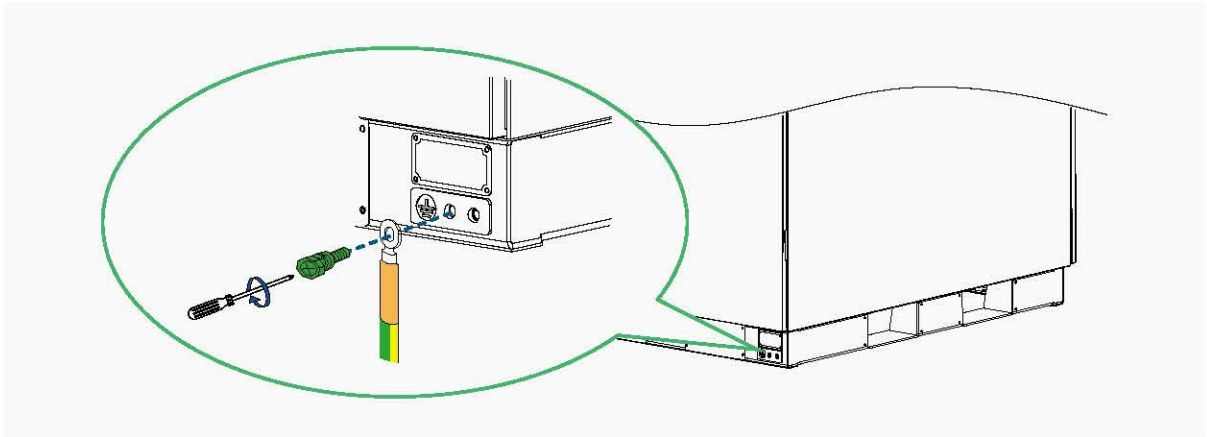
6.3.3 Grounding Outside the Cabinet

Ground Cable

Step 1: Select a ground cable with a cross-sectional area of at least 50 mm². Use a wire stripper to remove an appropriate length of insulation.

Steps 2 to 4: Refer to [Steps 2 to 4 of the Grounding Inside the Cabinet](#).

Step 5: Secure the ground cable to the ground points (both front and rear ground points) using M10 combination screws.



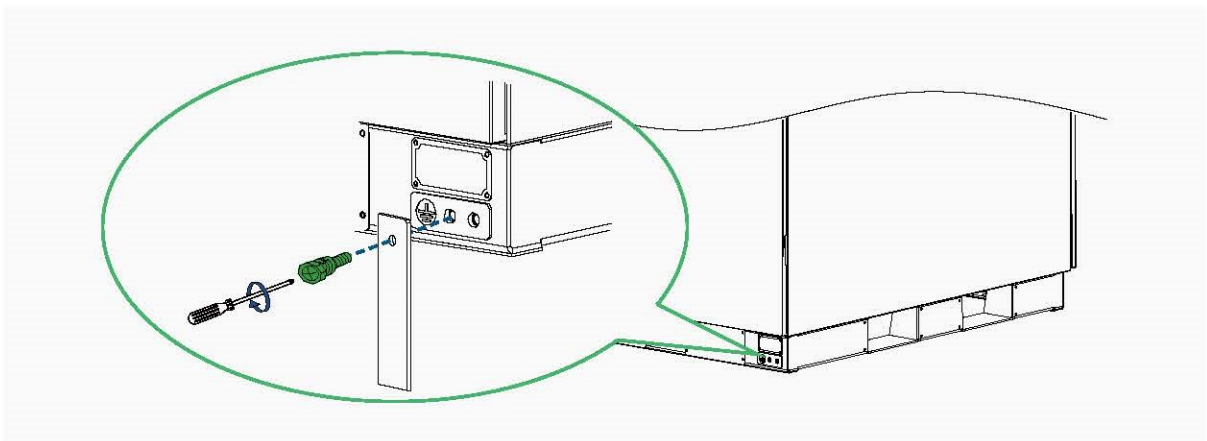
Step 6: Connect the other end of the ground cable directly to the earth or grounding grid, or connect it through an equipotential bonding device.

NOTE

The ESS enclosure and internal components requiring grounding (such as SPD) have been connected to the ground terminals at the bottom of the cabinet prior to factory shipment.

Flat Ground Bar

Step 1: Secure the flat ground bar to the ground points (both front and rear ground points) using M10 combination screws.



Step 2: Connect the other end of the flat ground bar directly to the earth or grounding grid, or connect it through an equipotential bonding device.

6.4 AC Connection

 WARNING	Before AC side wiring, ensure the AC main circuit breaker is disconnected and no voltage at the connection terminals.
 CAUTION	- Obtain approval from the national or local electric utility company before connecting the equipment to the grid and strictly comply with all grid-related safety regulations and instructions. - The lengths of the phase cables from the AC side of the ESS to the grid-tied cabinet switch should be consistent.

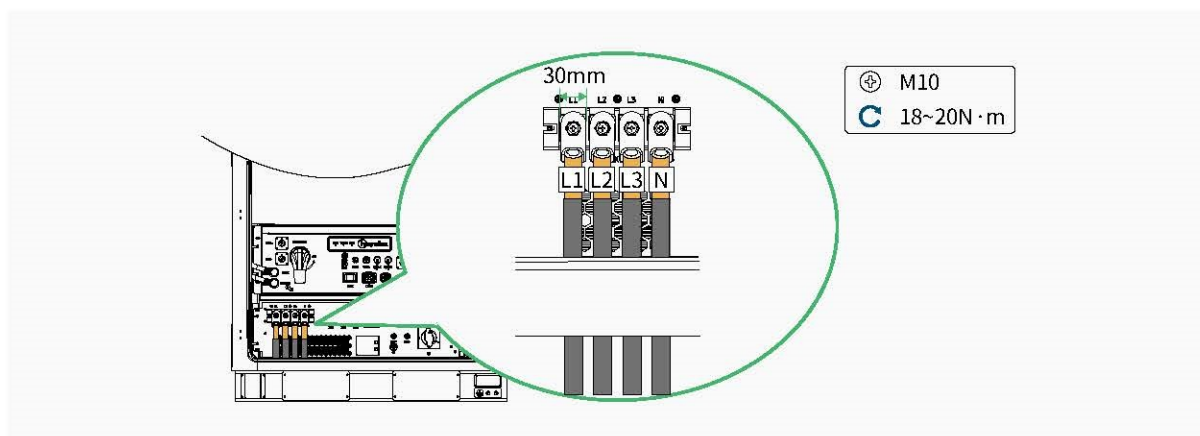
Step 1: Ensure that both the AC circuit breaker and the PCS DC load switch are disconnected.

Step 2: Ensure that all the circuit breakers on the downstream grid side are disconnected.

Step 3: Identify the R, S, and T phases of the AC connection cables and mark them.

Step 4: Route the cables through the cable hole at the bottom.

Step 5: Perform wiring using M10 bolts, washers, flat washers, and M10 hex nuts.



Step 6: Ensure that the wiring is correct and secure.

 CAUTION	- The length of terminal screws shall match the thickness of crimping terminals to ensure secure crimping between terminals and copper busbars. - After wiring, inspect the connection between crimping terminals and copper busbars for trapped heat-shrink tubes. If the tube is found compressed in the joint, immediately remove it to prevent increased contact resistance and potential equipment damage due to overheating. - After wiring is completed, use a multimeter to measure phase-to-phase voltages to ensure that the neutral wire is correctly connected. Then, use a phase sequence detector to check L1/L2/L3 phase sequence. If the phase sequence is incorrect, rewire immediately and retest until the phase sequence meets the grid requirements.
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6.5 Auxiliary Power Supply Connection

The auxiliary power supply port is shown in the figure below:

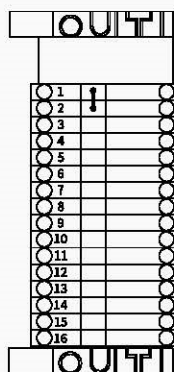


XT1

Symbol	Name	Description
XT1:1	Auxiliary Power Supply L	The XT1 connector is the auxiliary power input, used for external auxiliary power supply connection, with the input power supply required to meet Overvoltage Category II.
XT1:2	Auxiliary Power Supply N	
XT1:3	Auxiliary Power Supply PE	

6.6 Auxiliary Terminal Connection

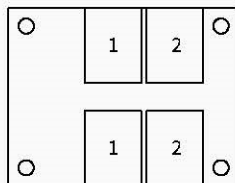
The auxiliary terminal is shown in the figure below:



Symbol	Name	Description
X1:1	External E-stop	Remove short clip when connecting external E-stop
X1:2	External E-stop	
X1:3	External anti-reverse current meter 485A	User wiring for external anti-reverse current meter communication
X1:4	External anti-reverse current meter 485B	
X1:5	Internal meter 485A	Pre-connected when the optional internal meter is selected
X1:6	External measuring meter 485A	—
X1:7	Internal meter 485-B	Pre-connected when the optional internal meter is selected
X1:8	External measuring meter 485B	—
X1:9	Liquid-cooling controller 485A	Pre-connected when the optional internal liquid-cooling controller is selected
X1:10	External fire panel 485A	—
X1:11	Liquid-cooling controller 485B	Pre-connected when the optional internal liquid-cooling controller is selected
X1:12	External fire panel 485B	—
X1:13	Reserved (undefined) 485A	—
X1:14	Reserved (undefined) 485B	—
X1:15	Switch power +	Pre-connected when optional switch is selected; Reserved otherwise
X1:16	Switch power -	

6.7 Network Port Adapter Connection

The Network port adapter is shown in the figure below:



Symbol	Name	Description
ZJB:1	Multi-cabinet communication connection	Connect port 1 to the internal switch when the ESS serves as a master.
ZJB:2	Reserved	Connect port 1 to the master's switch when the ESS serves as a slave.

6.8 MSD Installation

The MSD (Manual Service Disconnect) is a critical safety component of the battery pack, and has two primary functions:

1. Maintenance Safety: Enables manual disconnection of the high-voltage circuit during maintenance, repair, or emergencies to ensure personnel safety.
2. Fault Protection: Rapidly interrupts the circuit in case of battery pack faults (such as short circuits, overcurrent) to protect the battery pack and connected device.

MSD Installation Steps

Step 1: Ensure that both the AC circuit breaker and the PCS DC load switch are disconnected.

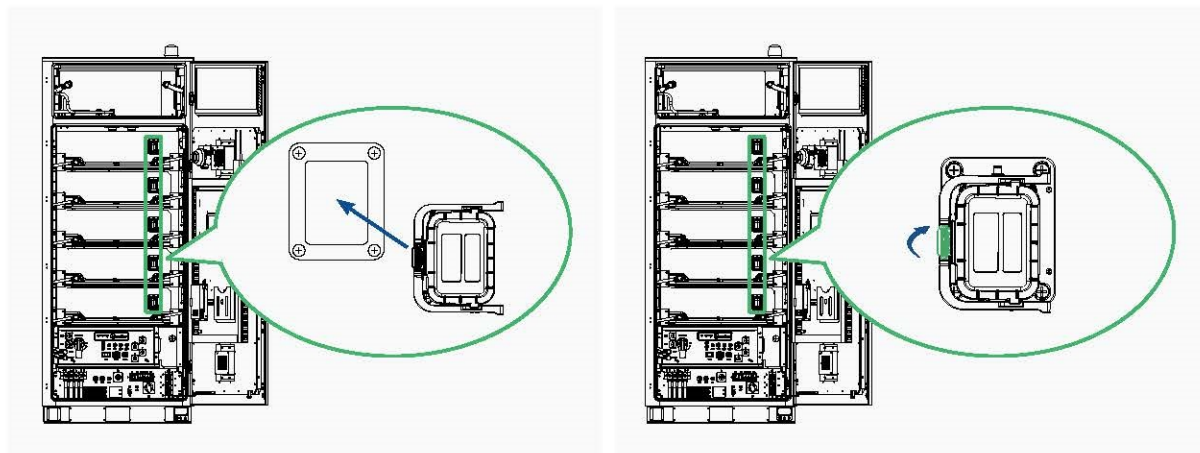
Step 2: Ensure that all the circuit breakers on the downstream grid side are disconnected.

Step 3: Ensure that the installation environment is clean and dry, and equipped with necessary anti-static measures. Inspect MSD components for integrity, ensuring no damage or missing parts.

Step 4: Open the MSD lever and insert the MSD into the MSD socket position, ensuring it is securely and firmly installed.

Step 5: Close the MSD lever and fasten the safety latch. Reconfirm that the MSD is securely installed without any looseness or displacement.

Step 6: Repeat the above steps to complete the installation of other MSDs.



6.9 Check After Connection

After installation, a comprehensive inspection of the mechanical installation and electrical connections is required. Please follow the items listed in the table below for a detailed check, and make detailed records during the inspection process. If any non-compliant items are identified, immediate corrective actions should be taken.

No.	Item		Checked	
			Yes	No
1	Mechanical installation	The cabinet is intact and free from deformation or damage.	☐	☐
2		The cabinet base is securely fixed and stably supported.	☐	☐
3		Surrounding space of the cabinet meets requirements.	☐	☐
4		Ambient temperature, humidity, and ventilation meet requirements.	☐	☐
5		Cooling air flows smoothly.	☐	☐
6		Cabinet sealing and protection are intact and reliable.	☐	☐
7	Electrical connections	Ground the cabinet correctly according to the requirements of the power distribution system.	☐	☐
8		Grid-side voltage matches the ESS's rated output voltage.	☐	☐
9		Grid-side phase sequence is correct, and tightening torque meets requirements.	☐	☐
10		Communication wiring is correct and keeps a certain distance from other cables.	☐	☐
11		MSD is installed correctly and securely.	☐	☐
12		All cable labels are correct, clear, and complete.	☐	☐
13		Insulation protective covers are intact, and danger and warning labels are clear and complete.	☐	☐
14	Others	All unused cables are tied with insulated cable ties.	☐	☐
15		No conductive dust, tools, parts, or foreign objects are left inside the cabinet.	☐	☐
16		No condensation or icing is observed inside the cabinet.	☐	☐

7. Initial operation

Before initial operation, please ensure to read and comply with the information in the "[Safety Information](#)" section.

 DANGER	During operation: - Do not touch any live components to prevent electric shocks. - Do not contact any terminals to prevent electric shocks. - Do not power on the equipment if the AC wiring phase sequence is incorrect. Otherwise, the operation may result in equipment damage or safety incidents.
 CAUTION	- If any abnormal conditions are observed during operation, immediately power off the equipment and rectify the faults. - Before power-on and long-term operation, remove the desiccants from the cabinet and dispose of them according to the applicable local waste disposal act. If the ESS is powered off immediately after being powered on, keep the desiccants in the cabinet.

7.1 Check Before Power-On

No.	Item	Checked	
		Yes	No
1	Installation environment complies with 5.1 Installation Environment Requirements , and space meets 5.2 Installation Space Requirements .	☐	☐
2	Grounding copper busbar and AC terminal connections are correct, secure, and safe.	☐	☐
3	All cables are intact, well-insulated, appropriately sized, and securely connected.	☐	☐
4	Cable trench supports are properly installed, and cable routing meets requirements.	☐	☐
5	No tools, drilling debris, or foreign objects are left inside the cabinet.	☐	☐
6	DC input polarity is correct, voltage $\leq$ PCS maximum allowable input.	☐	☐
7	The AC-side voltage is within the allowable range, the frequency is stable, and the phase sequence is correct. Ensure that the neutral wire is not mistakenly connected to the phase wire.	☐	☐
8	AC circuit breaker and DC disconnect switch are disconnected.	☐	☐
9	E-stop button is released, and the equipment is ready for operation.	☐	☐
10	MSD is installed and locked.	☐	☐

7.2 Power-On Operations

 CAUTION	During operation, turn on the DC load switch first, and then turn on the AC-side power supply after you have confirmed that there is no fault. Otherwise, equipment damage may occur.
--	--

Step 1: Ensure that the ESS is fault-free refer to [7.1 Check Before Power-On](#), and ensure that all protective measures for the operators are in place.

Step 2: Turn on the circuit breaker on the AC side grid-connected cabinet.

Step 3: Sequentially close the PCS DC load switch QS and the main AC circuit breaker QF.
The PCS power indicator will turn blue.

Step 4: For external auxiliary power supply: Rotate the switch SA to the left "External", then sequentially close QF1 - QF5.

For internal auxiliary power supply: Rotate the switch SA to the right "Internal", then sequentially close QF1 - QF5.

The explosion-proof fan will perform a startup self-test, and the liquid cooling controller will also perform a startup self-test.

Step 5: Start the UPS by pressing and holding the UPS Start button for 2 seconds. The UPS will be powered on and will work normally after completing the self-check. The power indicator lights for the switch and 4G router will illuminate, the EMS screen be activated, and the water immersion transmitter indicator will illuminate. The dehumidification device will also perform a startup self-test.

Step 6: If there is no error, the power-on process is completed.

7.3 Power-Off Operations



During operation, turn off the DC load switch first, and then turn off the AC-side power supply to prevent equipment damage.

Shutdown operations are divided into two scenarios: shutdown for normal maintenance or inspection, and shutdown due to faults or emergencies. Perform the shutdown operation according to the actual circumstances as described in this section.

7.3.1 Normal Power-Off

For maintenance or inspection, follow the steps below:

Step 1: Sequentially disconnect the PCS DC load switch, circuit breakers QF1 to QF5, and the main AC circuit breaker QF. Press and hold the UPS shutdown button for 2 seconds to turn off the UPS. Rotate the switch SA to the middle "OFF".

Step 2: Disconnect the AC switch of the grid-connected cabinet. If the ESS is in external power supply mode, disconnect the external power supply.

Step 3: The ESS is powered off.



- Before opening the cabinet door for maintenance, ensure that the AC-side power supply and auxiliary power supply are turned off.
- The PCS remains live for 20 minutes after shutdown! Operators must wait at least 20 minutes or discharge the system before opening the components. Use a multimeter to confirm that there is no voltage before any operations.

7.3.2 Emergency Power-Off

For fault or other emergencies follow the steps below:

Step 1: Press the E-stop button on the cabinet door. The ESS will stop operating and automatically disconnect the internal AC switch.

Step 2: After ensuring that the AC circuit breaker is off, manually disconnect the PCS DC isolation switch, turn off the circuit breakers QF1 to QF5, press and hold the UPS shutdown button for 2 seconds to power off the UPS. Rotate the switch SA to the middle "OFF".

Step 3: Disconnect the AC switch of the grid-connected cabinet. If the ESS is in external power supply mode, disconnect the external power supply.

Step 4: The ESS is powered off.

Step 5: After troubleshooting, rotate the E-stop button to reset.



- Before opening the cabinet door for maintenance, ensure that the AC-side power supply and auxiliary power supply are turned off.
- The PCS remains live for 20 minutes after shutdown! Operators must wait at least 20 minutes or discharge the system before opening the components. Use a multimeter to confirm that there is no voltage before any operations.



WARNING

Frequent use of this method may cause equipment damage. Please follow the above steps for power-off only in emergency situations.

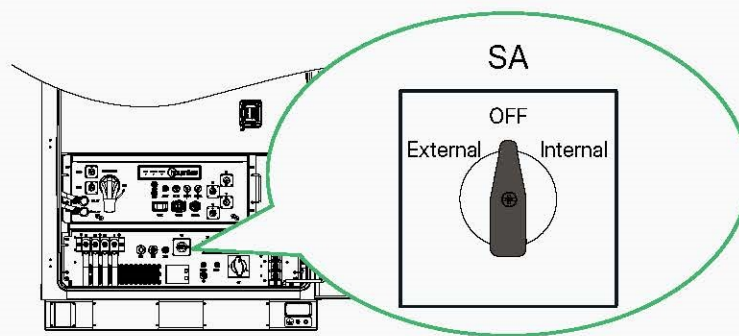
7.4 Auxiliary Power Supply Switching

The AC auxiliary power supply of the ESS has two modes: external auxiliary power supply and internal main circuit power supply, which can be selected according to on-site requirements.

The power supply mode can be switched by switch SA:

- Rotate the switch SA to left "External" to set the ESS to external auxiliary 220V power supply mode.
- Rotate the switch SA to right "Internal" to set the ESS to internal main circuit 220V power supply mode.
- Rotate the switch SA to middle "OFF" to disconnect the auxiliary circuit.

The position of the transfer switch SA is shown in the figure below:



7.5 Follow-up Procedure

After confirming that all installations and electrical connections are correct and the **Initial** operation is successful, proceed with the following steps:

Step 1: Seal the PCS cable holes using the fireproof sealing putty.

Step 2: Seal the cable holes for power cables and communications cables using the fireproof sealing putty.

Step 3: Reinstall the external bottom protective plate for the ESS.

8. System Commissioning

For details about how to deploy and commission the ESS on the app, see "[User Manual_C&I S-Miles Cloud \(Web\)_Global_EN](#)".

9. Maintenance and Troubleshooting

Before performing maintenance or inspection operations, be sure to read and comply with the information in the "[Safety Information](#)" section.

 DANGER	Before equipment maintenance, comply with the following requirements: • Turn off the switches of the equipment and its upstream and downstream switches, and disconnect the internal power supply connections. Otherwise, personal injury may occur. • Ensure that the ground cables are properly grounded. • Wear protective equipment when operating the equipment.
 WARNING	• Use an electroscope of a proper voltage level to check whether the equipment is energized and ensure that the equipment is completely powered off. • When operating a potentially charged component, block or wrap them with insulation plates or insulation tapes. • After completing the operation, ensure that no irrelevant metal devices such as screws and washers are left inside the equipment.
 CAUTION	• Attach "Do not switch on" labels near the upstream and downstream switches or circuit breakers to prevent accidental connection. • Place warning signs or strips near the operation area.

9.1 Maintenance

The internal components of the ESS are susceptible to ambient temperature, humidity, dust, and vibration, which may lead to aging and wear, and potential faults. Therefore, routine and periodic maintenance is required to ensure normal operation and extend service life.

Please perform periodic maintenance on the ESS according to the following table:

Maintenance Item	Check Item	Troubleshooting	Power Off Required or Not	Door Opening Required or Not
Routine Maintenance				
Routine Maintenance	Monitor the input/output voltage/current and operating status of the ESS cabinet in real-time, and assign personnel to conduct regular inspections. Perform timely maintenance if any abnormal operation of the equipment or abnormal voltage/current is detected.	Contact Hoymiles technical support engineer to evaluate and handle the problem.	NO	NO
	Check that there are no abnormal noises inside the cabinet.			
	Check that there are no odors inside the cabinet.			
	Read the internal temperature of the ESS cabinet and observe for abnormalities.			
Semi-annual Maintenance				
Cabinet	Check that the cabinet door lock is intact.	Replace the door lock.	NO	NO
	Check that there is no obvious paint peeling or rust on the cabinet.	Repaint the damaged part.		

Maintenance Item	Check Item	Troubleshooting	Power Off Required or Not	Door Opening Required or Not
Cabinet	Check that the cabinet exterior is free from obvious coating peeling and scratches.	Contact Hoymiles technical support engineer to evaluate and handle the problem.	NO	NO
	Check that there is no foreign objects around the rear explosion relief panel.	Remove any foreign objects.		
	Check that the air filter is not damaged or distorted.	Replace the filter.		
	Check and clean the air filter and the outdoor fan vent to ensure that there is no scale, dirt, or blockage.	Clean the air filter and the outdoor fan vent (You are advised to use a vacuum cleaner, cloth, or brush to clean the air filter. You do not need to remove the air filter for cleaning).		
	Check that there is no dust buildup at the vents of the cabinet.	Clean up the dust.		
	Check that the protective tube for the communications cable on the rear of the cabinet is intact and secured.	Replace the damaged protective tube in a timely manner and reinforce the falling part.		
	Check that the smoke exhaust vent of the cabinet is not dirty or blocked.	Clean the smoke exhaust vent of the cabinet.		
	Check that there are no potential hazards, contaminants, or rubbish around the unit.	Handle potential hazards and clean up rubbish.		
Liquid-Cooling Controller	Check that the pump works properly without abnormal noise.	Replace the liquid-cooling controller.	NO	YES
	Check whether the coolant level is below the MIN level.	If the coolant level is below the MIN level, add coolant until it reaches the MAX level.	YES	
	Check that all cable wiring screws are tightened.	Tighten the screws.	YES	YES
	Check that the ventilation openings of the cabinet is not dirty or blocked.	Clean up the dust and blocked.		
	Check that all terminals are secured.	Reconnect the cables.		
Liquid-Cooling Piping Network	Check that no leakage occurs on the liquid-cooling piping network and coolant inlet and outlet.	Replace the leakage component or liquid-cooling controller.	YES	YES
	Check that the dehumidifying fan screws are secured and not deformed.	Reconnect the cables.		

Maintenance Item	Check Item	Troubleshooting	Power Off Required or Not	Door Opening Required or Not
PACK	Check that there is no obvious damage, paint peeling off, or rust on the appearance.	Contact Hoymiles technical support engineer to evaluate and handle the problem.	YES	YES
	Check that no leakage occurs on the coolant inlet and outlet of the pack and the metal edges at the bottom of the pack.	Leakage at the coolant inlet and outlet: Replace the male connectors of the stop valves at the inlet and outlet after draining the coolant. Other cases: Replace the pack.		
	Check that cables are securely connected.	Secure the cables.		
	Check that cables are intact, especially that the cable sheath contacting a metal surface is intact.	Replace the faulty cable.		
	Check that the ground cable is securely connected.	Reconnect the ground cables to ensure reliable grounding.		
PCS	Check for leakage at the coolant inlet and outlet of the PCS.	Replace the male connectors of the stop valves at the inlet and outlet after draining the coolant.	YES	YES
	Check that the enclosure is not damaged or deformed.	Contact Hoymiles technical support engineer to evaluate and handle the problem.		
	Check that the parameters are set correctly.			
	Check that cables are securely connected.	Secure the cables.		
	Check that cables are intact, especially that the cable sheath contacting a metal surface is intact.	Replace the faulty cable.		
	Check that the ground cable is securely connected.	Reconnect the ground cables to ensure reliable grounding.		
Fire Suppression System	Check that the detectors are normal and that the inspection indicators blink properly.	Replace the faulty component.	YES	YES
	Carry out spot checks on the detectors with smoke or heat generated by using dedicated devices.			

NOTE

In harsh scenarios such as deserts and catkins, perform maintenance based on the site requirements to ensure that there is no blockage or dust buildup.

9.2 Forced Start Function of Liquid-Cooling Controller

The liquid-cooling controller is equipped with a local forced start function. In low-temperature environments, if the equipment has been shut down for a long period and needs to be restarted, the user can heat the liquid-cooling controller by HMI.

NOTE

The HMI for the liquid-cooling controller is an optional device. Please contact Hoymiles sales engineer to obtain it.

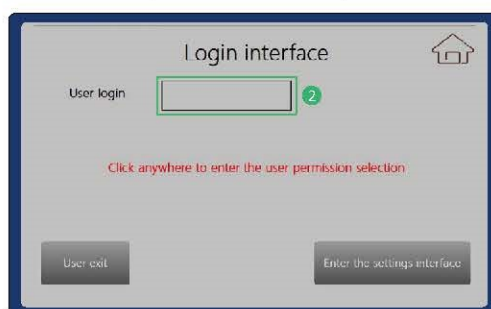
The steps to heat the liquid-cooling controller are as follows:

Step 1: Connect the HMI to the communication interface of the liquid-cooling controller.

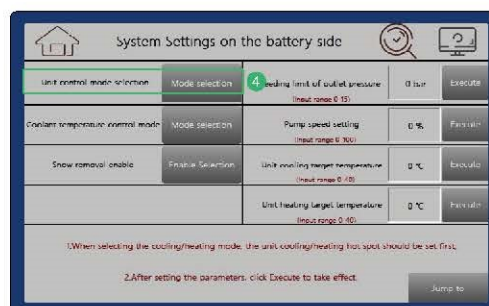
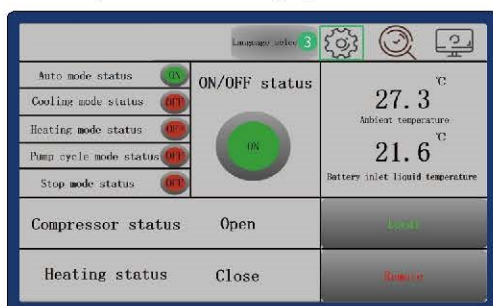
Step 2: Power on the HMI and enter the main interface. Click the "Local" in the lower-right corner to enter the login interface.



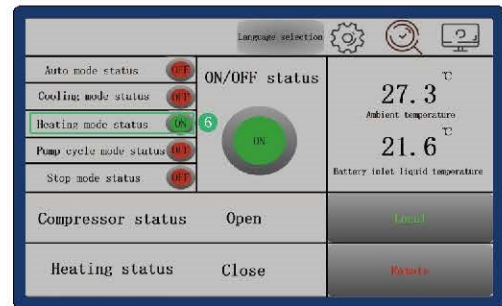
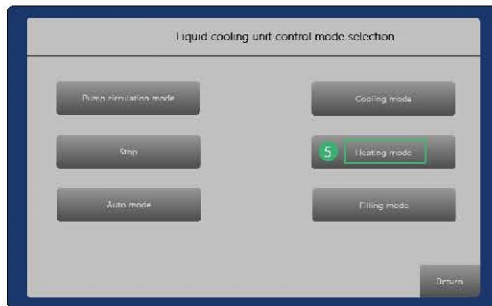
Step 3: Click "User login", select "Administrator", enter the default password "456", and click "Login".



Step 4: Return to the main interface and click "Settings" in the upper-right corner. On the System Settings on the battery side command page, click "Unit control mode selection".



Step 5: Click "Heating Mode" to activate the heating function. The "Heating Mode Status" indicator on the main interface will turn green.



No.	Mode	Description	Comment
1	Cooling Mode (Active)	The compressor drives the refrigerant to perform a cooling cycle. The evaporator transfers the refrigerant's cooling capacity to the coolant, thereby cooling the energy storage battery cells. The coolant carries heat from the PCS to the radiator, where it is dissipated using ambient air (at lower ambient temperatures). Alternatively, the coolant transfers heat from the PCS to the water-to-water heat exchanger, where it is cooled by the lower-temperature battery-side coolant (at higher ambient temperatures).	Compressor starts
2	Cooling Mode (Passive)	The radiator transfers environmental cooling capacity to the PCS coolant, which then passes through the water-to-water heat exchanger to cool the battery coolant, thereby cooling both PCS and cells.	—
3	Heating Mode	The electric heater (PTC) heats the coolant, which in turn heats the cells.	—

9.3 Troubleshooting

9.3.1 Alarm Severity and Protection Actions

No.	Alarm Severity	Protection Action		Comment
		Basic	Fire Suppression	
1	Level I (Minor Alarm)	Alarms Only	Alarms Only	Automatically Reset
2	Level II (Moderate Alarm)	Charge Prohibited, Discharge Allowed.	Fire Alarm Horn/Strobe	Automatically Reset
		Discharge Prohibited, Charge Allowed.	Open push rod and fan for ventilation	
		Charge/Discharge Prohibited, PCS Standby	—	
3	Level III (Major Alarm)	Charge/Discharge Prohibited	Fire Alarm Horn/Strobe	Automatically Reset
		PCS Shutdown	—	
4	Level IV (Critical Alarm)	Charge/Discharge Prohibited	Fire Alarm Horn/Strobe	Manually Reset
		PCS Shutdown	Close push rod and fan	
		Disconnect Main and Auxiliary Circuit Breakers	Release fire extinguishing agent	

9.3.2 EMS Troubleshooting

No.	Alarm Name	Alarm Severity	Protection Action	Possible Cause	Suggestion
1	PCS Communication Fault	III	Charge/ Discharge Prohibited + Shutdown	1. Communication wiring abnormality. 2. PCS unresponsive.	1. Check whether the communications cable is loose, disconnected, or incorrectly connected. If yes, reconnect the cable. 2. Restart the system by power cycling. 3. If the alarm persists, contact technical support.
2	BMS Communication Fault			1. Communication wiring abnormality. 2. BMS unresponsive.	
3	Anti-Reverse Current Meter Communication Fault			1. Communication wiring abnormality. 2. Anti-reverse current meter unresponsive.	
4	Manager Measuring Meter Communication Fault	I	Alarms Only	1. Communication wiring abnormality. 2. Manager measuring meter unresponsive.	

9.3.3 PCS Troubleshooting

No.	Alarm Name	Alarm Severity	Protection Action	Possible Cause	Suggestion
1	Grid Overvoltage	III	Charge / Discharge Prohibited + Shutdown	Actual grid overvoltage.	Check whether the grid voltage is normal.
				Grid sampling circuit abnormality.	Check whether the grid voltage sampling circuit is normal.
				Fault protection parameter setting is unreasonable.	Check whether the grid overvoltage threshold is within a reasonable range.
				—	If none of the above causes are confirmed, contact technical support.
2	Grid Undervoltage			Actual grid undervoltage.	Check whether the grid voltage is normal.
				Grid sampling circuit abnormality.	Check whether the grid voltage sampling circuit is normal.
				Fault protection parameter setting is unreasonable.	Check whether the grid undervoltage threshold is within a reasonable range.
				—	If none of the above causes are confirmed, contact technical support.
3	Grid Overfrequency			Actual grid overfrequency.	Check whether the grid frequency is normal.
				Grid sampling circuit abnormality.	Check whether the grid frequency sampling circuit is normal.
				Fault protection parameter setting is unreasonable.	Check whether the grid overfrequency threshold is within a reasonable range.
				—	If none of the above causes are confirmed, contact technical support.

No.	Alarm Name	Alarm Severity	Protection Action	Possible Cause	Suggestion
4	Grid Underfrequency	III	Charge / Discharge Prohibited + Shutdown	Actual grid underfrequency.	Check whether the grid frequency is normal.
				Grid sampling circuit abnormality.	Check whether the grid frequency sampling circuit is normal.
				Fault protection parameter setting is unreasonable.	Check whether the grid underfrequency threshold is within a reasonable range.
				—	If none of the above causes are confirmed, contact technical support.
5	TRIP Fault			Overvoltage on the DC side or overcurrent on the AC side.	If the alarm occurs repeatedly, contact technical support.
6	AC Hardware Overcurrent			Excessive current on the AC side.	
7	DC Hardware Overcurrent			Excessive current on the DC side.	
8	Half-Bus Hardware Overvoltage			Half-bus overvoltage on the DC side.	
9	A-Phase IGBT Drive Disconnection			IGBT failure.	Contact technical support.
10	B-Phase IGBT Drive Disconnection			IGBT failure.	Contact technical support.
11	C-Phase IGBT Drive Disconnection			IGBT failure.	Contact technical support.
12	DC Main Switch Fault			Adhesion of switch contact.	Check whether the switch contact are adhesive.
				Feedback signal disconnection.	Check whether the switch feedback circuit is functioning correctly.
				Feedback signal disconnection.	Check whether the control signal circuit is functioning correctly.
				—	If the alarm persists, contact technical support.
13	AC Instantaneous Overvoltage			Instantaneous overvoltage on the AC side.	If the alarm occurs repeatedly, contact technical support.
14	IGBT Overheating			Overtemperature is caused by overloading, abnormal water circulation, fan failure, etc.	Check whether the water circulation is normal, the air duct is blocked, the fan is damaged, and check whether the ambient temperature is too high.
				Overtemperature is caused by abnormal temperature sampling.	Check whether the temperature sampling is normal.
				—	If the alarm persists, contact technical support.

No.	Alarm Name	Alarm Severity	Protection Action	Possible Cause	Suggestion
15	Relay Inductor Overheating Fault	III	Charge / Discharge Prohibited + Shutdown	Overtemperature is caused by overloading, abnormal water circulation, fan failure, etc.	Check whether the water circulation is normal, the air duct is blocked, the fan is damaged, and check whether the ambient temperature is too high.
				Overtemperature is caused by abnormal temperature sampling.	Check whether the temperature sampling is normal.
				—	If the alarm persists, contact technical support.
16	Relay Inductor Low Temperature Fault			Actual low temperature is caused by abnormal water circulation, etc.	Check whether the water circulation is normal, and check whether the ambient temperature is too low (The actual temperature below -35°C is considered as normal protection).
				Low temperature is caused by abnormal temperature sampling.	Check whether the temperature sampling is normal.
				—	If the alarm persists, contact technical support.
17	Inlet Overheating Fault			Overtemperature is caused by overloading, abnormal water circulation, fan failure, etc.	Check whether the water circulation is normal, the air duct is blocked, the fan is damaged, and check whether the ambient temperature is too high.
				Overtemperature is caused by abnormal temperature sampling.	Check whether the temperature sampling is normal.
				—	If the alarm persists, contact technical support.
18	Inlet Low Temperature Fault			Actual low temperature is caused by abnormal water circulation, etc.	Check whether the water circulation is normal, and check whether the ambient temperature is too low (The actual temperature below -35°C is considered as normal protection).
				Low temperature is caused by abnormal temperature sampling.	Check whether the temperature sampling is normal.
				—	If the alarm persists, contact technical support.

No.	Alarm Name	Alarm Severity	Protection Action	Possible Cause	Suggestion
19	Outlet Overheating Fault	III	Charge / Discharge Prohibited + Shutdown	Overtemperature is caused by overloading, abnormal water circulation, fan failure, etc.	Check whether the water circulation is normal, the air duct is blocked, the fan is damaged, and check whether the ambient temperature is too high.
				Overtemperature is caused by abnormal temperature sampling.	Check whether the temperature sampling is normal.
				—	If the alarm persists, contact technical support.
20	Outlet Low Temperature Fault			Actual low temperature is caused by abnormal water circulation, etc.	Check whether the water circulation is normal, and check whether the ambient temperature is too low (The actual temperature below -35°C is considered as normal protection).
				Low temperature is caused by abnormal temperature sampling.	Check whether the temperature sampling is normal.
				—	If the alarm persists, contact technical support.
21	Cavity Overheating Fault			Overtemperature is caused by overloading, abnormal water circulation, fan failure, etc.	Check whether the water circulation is normal, the air duct is blocked, the fan is damaged, and check whether the ambient temperature is too high.
				Overtemperature is caused by abnormal temperature sampling.	Check whether the temperature sampling is normal.
				—	If the alarm persists, contact technical support.
22	Cavity Low Temperature Fault			Actual low temperature is caused by abnormal water circulation, etc.	Check whether the water circulation is normal, and check whether the ambient temperature is too low (The actual temperature below -35°C is considered as normal protection).
				Low temperature is caused by abnormal temperature sampling.	check whether the temperature sampling is normal.
				—	If the alarm persists, contact technical support.
23	Battery Overvoltage			Battery voltage is too high.	Check whether the battery voltage is within a normal range.
					Check whether the battery overvoltage threshold is set correctly.

No.	Alarm Name	Alarm Severity	Protection Action	Possible Cause	Suggestion
24	Battery Undervoltage	III	Charge / Discharge Prohibited + Shutdown	Battery voltage is too low.	Check whether the battery voltage is within a normal range. Check whether the battery undervoltage threshold is set correctly.
25	Battery Polarity Reversed			The positive and negative electrodes of the battery are connected reversely.	Check whether the PCS positive and negative buses are connected correctly to the battery.
				Abnormal sampling circuit.	Check whether the grid voltage sampling circuit is normal.
26	DC Slow Start Timeout			DC slow start time is too long.	Check whether the grid voltage and battery voltage are within a normal range. Check whether the AC switch is functioning correctly. If the alarm persists, contact technical support.
27	Carrier Synchronization Failure			The carrier synchronization cable is not securely connected.	Check whether the carrier synchronization cable is securely connected.
				The relevant function code parameters are not set correctly.	Check whether the relevant function code parameters are within a reasonable range.
28	BMS E-Stop Fault			DI2 is reserved to receive the BMS emergency stop command.	Check whether the reserved DI2 is at a low voltage.
29	DC Software Overcurrent			Excessive current on the DC side.	Check whether the overcurrent parameters on the DC side are within a reasonable range.
30	Grid Voltage RS Sampling Fault			Sampling circuit abnormality.	Contact technical support.
31	Grid Voltage ST Sampling Fault				
32	Grid Voltage TR Sampling Fault				
33	Inverter Phase A Voltage Sampling Fault				
34	Inverter Phase B Voltage Sampling Fault				
35	Inverter Phase C Voltage Sampling Fault				
36	Module Current A Sampling Fault				
37	Module Current B Sampling Fault				

No.	Alarm Name	Alarm Severity	Protection Action	Possible Cause	Suggestion
38	Module Current C Sampling Fault	III	Charge / Discharge Prohibited + Shutdown	Sampling circuit abnormality.	Contact technical support.
39	Bus Current Sampling Fault				
40	Battery Voltage Sampling Fault				
41	Bus Vpo Sampling Fault III				
42	Bus Von Sampling Fault				
43	Overloading	II	Charge / Discharge Prohibited + Standby	PCS overcurrent running for too long.	Confirm if the power dispatch command exceeds PCS specifications.
44	AC Switch Closure Timeout			Grid synchronization time is too long.	If the alarm occurs repeatedly, contact technical support.
45	Grid Phase-Locked Loop (PLL) Fault			Grid PLL is malfunctioning.	
46	Parallel CAN Communication Timeout			CAN communication connection cable is disconnected.	Check whether the CAN communication cable is normal.
				No host in the parallel system.	Check whether there is a host in the communication system
47	Parallel CAN Number Conflict			Multiple equipments have the same identifier.	Check whether there are two or more equipments with the same identifier in the communication system.
48	Parallel CAN Host Conflict			There are multiple hosts in the system.	Check whether there two or more hosts in the communication system.
49	Full Bus Software Overvoltage			Actual overvoltage on the DC bus.	Check whether the bus voltage is normal.
				Bus voltage sampling circuit abnormality.	Check whether the bus voltage sampling circuit is normal.
				Fault protection parameter setting is unreasonable.	Check whether the bus voltage threshold is within a reasonable range.
				—	If none of the above causes are confirmed, contact Hoymiles technical support engineers.

No.	Alarm Name	Alarm Severity	Protection Action	Possible Cause	Suggestion
50	Full Bus Software Undervoltage	II	Charge / Discharge Prohibited + Standby	Actual undervoltage on the DC bus.	Check whether the bus voltage is normal.
				Bus voltage sampling circuit abnormality.	Check whether the bus voltage sampling circuit is normal.
				Fault protection parameter setting is unreasonable.	Check whether the bus undervoltage threshold is within a reasonable range.
				—	If none of the above causes are confirmed, contact technical support.
51	DCI Limit Exceeded			DC component of AC-side current exceeds limit.	Check whether the current sampling circuit is disconnected.
					Contact technical support.
52	DCV Limit Exceeded			DC component of AC-side voltage exceeds limit.	Contact technical support.
53	Abnormal control command tracking			PWM drive line abnormality (reversed connection, disconnection, etc.).	Check the PWM drive line.
				Sampling circuit abnormality(voltage/ current sampling circuit reversed or disconnected, etc.).	Check the voltage/current sampling circuit.
		—	Contact technical support.		

9.3.4 BMS Troubleshooting

No.	Alarm Name	Alarm Severity	Protection Action	Possible Cause	Suggestion
1	PACK Overvoltage	III	Charge/ Discharge Prohibited + Shutdown + Dry Contact Output Active	The voltage of the battery PACK is too high.	Check that the ESS is not charged and check whether an alarm indicating abnormal battery sampling is generated. If yes, handle the alarm by referring to the alarm handling suggestions. If no alarm indicating abnormal battery sampling is generated, wait for 5 minutes and check whether the alarm is cleared. If the alarm persists, contact technical support.

No.	Alarm Name	Alarm Severity	Protection Action	Possible Cause	Suggestion
2	PACK Undervoltage	III	Charge/ Discharge Prohibited + Shutdown + Dry Contact Output Active	The voltage of the battery PACK is too low.	Check that the ESS is not charged and check whether an alarm indicating abnormal battery sampling is generated. If yes, handle the alarm by referring to the alarm handling suggestions.
	If no alarm indicating abnormal battery sampling is generated, wait for 5 minutes and check whether the alarm is cleared.				
	If the alarm still persists, connect to the grid for charging within 48 hours.				
	If the alarm still persists after the ESS is charged for 1 hour, contact technical support.				
3	RACK Overvoltage			The voltage of the battery RACK is incorrect.	Check whether the number of battery packs configured on the PC interface is consistent with the number of battery packs installed onsite. If not, adjust it to be consistent.
	Check whether the total voltage sampling cable is loose, or disconnected. If yes, reconnect the cable.				
	If the alarm persists, contact technical support.				
4	RACK Undervoltage			The voltage of the battery RACK is incorrect.	Check whether the number of battery packs configured on the PC interface is consistent with the number of battery packs installed onsite. If not, adjust it to be consistent.
	Check whether the total voltage sampling cable is loose, or disconnected. If yes, reconnect the cable.				
	If the alarm persists, contact technical support.				
5	PACK Overtemperature			The liquid-cooling controller is faulty.	Check for any liquid-cooling controller alarms. If yes, handle the alarm by referring to the alarm handling suggestions.
				Overtemperature caused by the fault of the cell NTC.	Open the battery pack front panel and replace the faulty BMU.
				—	If the alarm persists, contact technical support.

No.	Alarm Name	Alarm Severity	Protection Action	Possible Cause	Suggestion
6	PACK Low temperature	III	Charge/ Discharge Prohibited + Shutdown + Dry Contact Output Active	The liquid-cooling controller is faulty.	Check for any liquid-cooling controller alarms. If yes, handle the alarm by referring to the alarm handling suggestions.
				Low temperature caused by the fault of the cell NTC.	Open the battery pack front panel and replace the faulty BMU.
				—	If the alarm persists, contact technical support.
7	Battery Temperature Inconsistent			The cell inconsistency is severe.	Wait for 30 minutes and check whether the alarm is cleared.
				The cell temperature sampling is abnormal.	If this alarm still exists, prioritize resolving alarms of liquid-cooling controller and BMU temperature sampling fault
				—	If the alarm persists, contact technical support.
8	Battery Voltage Inconsistent			The cell inconsistency is severe.	Wait for 30 minutes and check whether the alarm is cleared.
				The cell voltage sampling is abnormal.	If this alarm still persists, prioritize resolving alarms of BMU temperature sampling fault.
				—	If the alarm persists, contact technical support.
9	Master-Slave Communication Fault			The BMU communication is abnormal.	Check whether the communications cable is loose, disconnected, or incorrectly connected. If yes, reconnect the cable.
				The BMU is faulty.	Replace the BMU.
10	PACK Voltage Sampling Fault			The FPC connector is loose, the cable is disconnected, or the BMU is faulty.	Remove and reinstall the FPC connector to the BMU and check whether the alarm persists. If yes, replace the BMU.
					If the alarm persists after the BMU is replaced, replace the battery pack.
					If the alarm persists, contact technical support.
11	PACK Temperature Sampling Fault			The FPC connector is loose, the cable is disconnected, or the BMU is faulty.	Remove and reinstall the FPC connector to the BMU and check whether the alarm persists. If yes, replace the BMU.
		If the alarm persists after the BMU is replaced, replace the battery pack.			
		If the alarm persists, contact technical support.			

No.	Alarm Name	Alarm Severity	Protection Action	Possible Cause	Suggestion
12	CAN Hall Sensor Communication Fault	III	Charge/ Discharge Prohibited + Shutdown + Dry Contact Output Active	The communication cable is disconnected.	Check whether the communications cable is loose, disconnected, or incorrectly connected. If yes, reconnect the cable. If the alarm persists, contact technical support.
13	Inconsistent Between RACK Voltage and Accumulated Voltage	II	Charge/ Discharge Prohibited, Standby	The total voltage value of RACK is incorrect.	Check whether the number of battery packs configured in the PC interface matches the number installed onsite. If not, adjust it to be consistent. Check whether the total voltage sampling cable is loose, or disconnected. If yes, reconnect the cable. If the alarm persists, contact technical support.
14	EMS Communication Fault	I	Alarm Only	The communication cable is disconnected.	Check whether the communications cable is loose, disconnected, or incorrectly connected. If yes, reconnect the cable. If the alarm persists, contact technical support.

9.3.5 Liquid-Cooling Controller Troubleshooting

No.	Alarm Name	Alarm Severity	Protection Action	Possible Cause	Suggestion
1	Liquid Level Alarm	I	Alarm Only	The coolant is insufficient or there is no coolant.	Fill coolant in the coolant tank until it is higher than the MIN line. If the alarm still persists after refilling, contact technical support.
2	System High Pressure			High pressure > system limit 4.2MPa.	If the alarm occurs repeatedly, contact technical support.
3	Excessive Outlet Water Pressure of the Battery			> 2.8bar	
4	Excessive Outlet Water Pressure of the PCS			> 2.8bar	
5	Pressure Fault of High-Temperature/Pressure Sensor			The Sensor is experiencing a short circuit or open circuit.	
6	Battery Inlet Temperature Sensor Fault			The Sensor is experiencing a short circuit or open circuit.	If the alarm occurs repeatedly, contact technical support.
7	Battery Inlet Pressure Sensor Fault			The Sensor is experiencing a short circuit or open circuit.	
8	Battery Outlet Temperature Sensor Fault			The Sensor is experiencing a short circuit or open circuit.	

No.	Alarm Name	Alarm Severity	Protection Action	Possible Cause	Suggestion
9	PCS Inlet Temperature Sensor Fault	I	Alarm Only	The Sensor is experiencing a short circuit or open circuit.	If the alarm occurs repeatedly, contact technical support.
10	PCS Outlet Temperature Sensor Fault			The Sensor is experiencing a short circuit or open circuit.	
11	PCS Inlet Pressure Sensor Fault			The Sensor is experiencing a short circuit or open circuit.	
12	Battery Water pump fault			The power supply to the water pump is abnormal or the cable to the water pump is loose or damaged.	Check the power supply and wiring connections to the battery pump; Power off and then power on, If the alarm occurs repeatedly, contact technical support.
13	PCS Water pump fault			The power supply to the water pump is abnormal or the cable to the water pump is loose or damaged.	Check the power supply and wiring connections to the PCS; Power off and then power on, If the alarm occurs repeatedly, contact technical support.
14	Compressor Fault			The power supply to the Compresso is abnormal or the cable to the water pump is loose or damaged.	Check the power supply and wiring connections to the compressor ; Power off and then power on, If the alarm occurs repeatedly, contact technical support.
15	Temperature Fault of Low-Temperature/ Pressure Sensor			The Sensor is experiencing a short circuit or open circuit	If the alarm occurs repeatedly, contact technical support.
16	Pressure Fault of Low-Temperature/Pressure Sensor			The Sensor is experiencing a short circuit or open circuit	
17	Temperature Fault of High-Temperature/ Pressure Sensor			The Sensor is experiencing a short circuit or open circuit	

9.3.6 Fire Suppression System Troubleshooting

No.	Alarm Name	Alarm Severity	Protection Action	Possible Cause	Suggestion
1	Low Pressure of Firefighting Bottle	I	Alarm Only	Equipment Fault.	If the alarm occurs repeatedly, contact technical support.
2	Abnormal Pressure Feedback of Firefighting Bottle				
3	Abnormal Explosion Relief Panel				
4	Explosion-Proof Fan Fault			The fan power input or feedback cable is abnormal, or the fan is fault.	Check whether the power input cable and control cable of the explosion-proof fan are disconnected or whether the cable connectors are exposed. If yes, reconnect the cables. If not, use a multimeter to check whether the cables are broken.
					Check whether the fan is damaged or burnt. If yes, replace the fan.
					If the alarm persists, contact technical support.
5	Smoke Abnormality	I	Alarm Only	The humidity inside the cabin is too high, the sensor is dusty, or the cabin is on fire.	Observe the system remotely for 30 minutes to check whether other exceptions (such as abnormal battery voltage, battery temperature, and combustible gas concentration) occur. During the remote observation, do not approach the ESS or open the ESS doors.
					If no exception is found during the 30-minute remote observation, send trained personnel to the site and observe the system for 30 minutes from a safe distance. If there is smoke or fire, evacuate onsite personnel as soon as possible, call the fire emergency service, and provide firefighters with related.
					If no exception is found during remote observation and onsite observation, open the ESS doors and check and replace the smoke detector.
6	Temperature Abnormality			The cabinet is on fire or the sensor is faulty.	Observe the system remotely for 30 minutes to check whether other exceptions (such as abnormal battery voltage, battery temperature, and combustible gas concentration) occur. During the remote observation, do not approach the ESS or open the ESS doors.

No.	Alarm Name	Alarm Severity	Protection Action	Possible Cause	Suggestion
6	Temperature Abnormality	I	Alarm Only	The cabinet is on fire or the sensor is faulty.	If no exception is found during the 30-minute remote observation, send trained personnel to the site and observe the system for 30 minutes from a safe distance. If there is smoke or fire, evacuate onsite personnel as soon as possible, call the fire emergency service, and provide firefighters with related product information, including the battery pack type, ESS capacity, and battery pack location. If no exception is found during remote observation and onsite observation, open the ESS doors and check and replace the temperature detector.
7	High Concentration of Combustible Gas			The gas concentration is high or the detector is faulty.	Observe the system remotely for 30 minutes to check whether other exceptions (such as abnormal battery voltage, battery temperature, and combustible gas concentration) occur. During the remote observation, do not approach the ESS or open the ESS doors. If no exception is found during the 30-minute remote observation, send trained personnel to the site and observe the system for 30 minutes from a safe distance. If there is smoke or fire, evacuate onsite personnel as soon as possible, call the fire emergency service, and provide firefighters with related product information, including the battery pack type, ESS capacity, and battery pack location. Do not enter the affected building or equipment area under any circumstances, and do not open the ESS doors. Isolate and monitor the site. Keep irrelevant personnel away from the site. After the fire is extinguished, the site must be handled by professionals in accordance with local laws and regulations. Do not open the ESS doors without permission. If no exception is found during remote observation and onsite observation, open the ESS doors and check and replace the combustible gas detector.
8	Temperature Detector Alarm			Equipment Fault.	If the alarm occurs repeatedly, contact technical support.
9	Smoke Detector Alarm				
10	CO Detector Alarm				

No.	Alarm Name	Alarm Severity	Protection Action	Possible Cause	Suggestion
11	O ₂ Detector Alarm	I	Alarm Only	Equipment Fault.	If the alarm occurs repeatedly, contact technical support.
12	VOC Detector Alarm				
13	3.3V Alarm of Sensor Module Alarm in PACK Firefighting			PACK Firefighting Device Fault.	
14	GND Alarm of Sensor Module Alarm in PACK Firefighting				
15	Sensor Module Detached Alarm of PACK Firefighting				
16	Puncture Valve Alarm of PACK Firefighting				
17	Smoke Detector Alarm of PACK Firefighting				
18	NTC Alarm of PACK Firefighting				
19	CO Detector Alarm of PACK Firefighting				
20	VDD 5V Alarm of PACK Firefighting				
21	Flash Alarm of PACK Firefighting				
22	Smoke Not Tuned to Zero of PACK Firefighting				

9.3.7 Environment Control System Troubleshooting

No.	Alarm Name	Alarm Severity	Protection Action	Possible Cause	Suggestion
1	E-Stop Alarm	IV	Charge / Discharge Prohibited + Shutdown + Disconnect Main and Auxiliary Circuit Breakers	1. The E-Stop button is pressed. 2. The feedback cable to the E-Stop button is disconnected.	1. Rectify the system fault first. 2. After the fault is rectified, rotate the E-Stop button out. 3. Check whether the cable to the E-Stop button is disconnected or whether the cable connector is exposed. If not, use a multimeter to check whether the cable to the E-Stop button is broken. 4. If the alarm persists, replace the E-Stop button
2	Water Alarm	III	Charge / Discharge Prohibited + Shutdown	Water accumulates in the ESS or the sensor is faulty.	1. Check whether there is water inside the ESS cabinet. If yes, drain the water. If not, replace the water sensor. 2. If the alarm persists after the replacement, contact technical support.
3	SPD Fault	III	Charge / Discharge Prohibited + Shutdown	The detection cable is disconnected or the SPD is faulty.	1. Check whether the SPD signal cable is loose and whether the cable connector is exposed. 2. Check whether the SPD indicator changes its color or is burnt. If the color has changed, replace the SPD. 3. If the alarm persists, contact technical support.
4	ESS Door Open	I	Alarm Only	The ESS door is open.	1. Check whether the door is completely closed. If not, close the door completely. 2. Check whether the cable to the door limit switch is disconnected. If yes, connect the cable properly. 3. Check whether the door status sensor is displaced or the door panel is deformed. If yes, restore it to the original status. If not, replace the sensor. 4. If the alarm persists, contact technical support.

Appendix A : Technical Specifications

Model	HESS-261-2h
DC Side	
Cell Type	LFP3.2V / 314Ah
Pack Configuration	1P52S / 52.25kWh
System Configuration	1P260S
Battery Voltage Range	728 - 936VDC
Nominal Battery Energy	261kWh
Rated Charge/Discharge Rate	≤ 0.5P
Temperature Detection	Battery cell + Module + Positive and Negative terminals
AC Side (On-Grid)	
Rated Output Power	125kW (@50°C)
Maximum Output Power	137.5kW
Rated Grid Voltage Range	340 - 440VAC
Rated Grid Frequency	50/60Hz, ±5Hz
THDi	< 3% (@Rated power)
Icc	318A
AC Access Method	3P3W / 3P4W
AC Side (Off-Grid)	
Rated Output Power	125kW (@50°C)
Rated Output Voltage Range	340 - 440VAC
Rated Grid Frequency	50/60Hz
THDu	< 3% (Linear load)
DC Injection	< 1% Un (Balanced linear load)
Efficiency	
Rated Round-trip Efficiency	≥ 88.4%
Maximum Round-trip Efficiency	90.3%
Overload	
Overload Capacity	Operate for a long time at 1.1 times (137.5kW@45°C), Operate for no less than 1 minutes at 1.2 times the rated load
General Data	
Dimensions (W×H×D)	1030 mm × 2450 mm × 1400 mm
Weight	< 2700kg
Operating Temperature	-30 to +55°C (> 50°C, derating operation)
Operating Humidity	0 - 100%RH (non-condensing)
Altitude	≤ 2000 m (Optional ≤ 4000 m)
IP Rating	IP55
Cooling Method	Fully liquid cooling (PCS + Battery)
Noise	70dB (Optional 60dB)
Fire Suppression System	Perfluorohexanone + PACK-level fire protection + Water fire protection + Interlocked exhaust ventilation + Pressure relief (Optional) + Aerosol (Optional)
AC Inlet Method	Front bottom inlet
Display and Communication	
Communication Interface	RS485, Ethernet, DIO
Communication Protocol	MODBUS-RTU, MODBUS-TCP, DL/T645
Cloud Service	Default S-Miles Cloud (Support third-party cloud platforms)
Standard and Regulation	
Grid Code Compliance	GBT 34120-2023, EN 50549-1/-2/-10, PGMcv 1.4, Synergrid Listed, G99/1-10/03.24, ENA Listed, VDE-AR-N 4105/11.18, DIN VDE V 0124-100/06.20, VDE-AR-N 4110/4120, ZEREZ Listed, CEI 0-21, CEI 0-16, RESP-73/2020, 2016/631 EU (INC RfG), PSE 2018, PTPIREE Listed, RD244, UNE217001:2020
Production Compliance	EN/IEC 62477-1:2012, IEC 62619:2022, EN IEC 61000-6-2/4:2019, IEC 63056:2020, GB/T 34131-2023, GB/T 36276-2023, UN38.3 Rev.8, IEC60730-1 AnnexH, IEC 61683, EN&IEC 62920

* Subject to actual product shipment

Appendix B : Maintenance Services

I. Quality Assurance

SGA POWER SINGAPORE PTE.LTD. will provide free repair or replacement for products that malfunction during the warranty period. Maintenance service is subject to the following conditions:

- Provide the complete product invoice.
- The product must be within the warranty period.
- The trademark/nameplate on the product must be clearly visible.
- Information such as the device model, serial number(SN), and Alarm ID/name must be provided.

NOTE

1. After replacement, unqualified products shall be processed by SGAPower.
2. The customer shall give SGAPower a reasonable period to repair the faulty device.

II. Disclaimer

Hoymiles shall not be liable for any of the following circumstances or their consequences:

- The entire machine or components have exceeded the free warranty period.
- Damage caused by transportation not arranged by SGAPower.
- Installation or usage environments are beyond stipulations of relevant international standards.
- Malfunctions or damage caused by installation, repair, modification, or disassembly performed by service providers or personnel not authorized by SGAPower.
- Damage resulting from storage or operation of the equipment in harsh environments beyond those specified in this manual.
- Damage caused by force majeure events such as earthquakes, floods, volcanic eruptions, debris flows, lightning strikes, fires, wars, armed conflicts, typhoons, hurricanes, tornadoes, and other extreme weather conditions.
- Damage caused by other reasons not attributable to our company, such as negligence, intentional acts, gross negligence, or improper operation.

NOTE

For faulty products in any of above cases, if the customer requests maintenance, paid maintenance service may be provided based on the judgment of SGAPower.

III. Contact Information

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