CPS PSW 3.125M

Power Conversion System SKID

User Manual



Shanghai CHINT Power Systems Co., Ltd.

Version: 1.1 Date: Sept 2026 Doc No: 9.0020.1270A0

Revision history

Rev.	Date	Content
V 1.0	Jul.2026	First version
V 1.1	Sept.2026	Add ≥20mm requirement in fig. 4 1 Clearance requirement

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About This Manual

Document Purpose and Scope

This manual is intended to provide users with comprehensive technical guidance during the processes of transportation, storage, installation, commissioning, and routine maintenance.



- Please hand over this manual to a designated person for safekeeping.
- Before performing any operations, please read this manual carefully and ensure that you fully understand all the contents.

Main Content

This manual includes instructions on how to operate the equipment (such as how to debug and properly shut down the equipment), the maintenance plan for the equipment, and considerations for the handling and recycling of system hardware. Therefore, before using this system, please be sure to read this manual carefully and operate the equipment according to the methods described in this manual, otherwise it may cause equipment damage or personal injury.

The abbreviations and related terms mentioned in this manual can be fully understood by referring to the "*Terms and Definitions*" section in annex 4.

Target Audience

This manual is suitable for:

- Owner
- After-sales service engineer
- Installation engineer
- Operation and maintenance engineer

Symbol Introduction

The symbols in this document are defined as follows:



DANGER!

DANGER indicates a hazardous situation with high level of risk which, if not avoided, will result in death or serious injury.



WARNING!

WARNING indicates a hazardous situation with medium level of risk which, if not avoided, could result in death or serious injury.



CAUTION!

CAUTION indicates a hazardous situation with low level of risk which, if not avoided, could result in minor or moderate injury.



NOTICE!

NOTICE indicates a hazardous situation which, if not avoided, could result in equipment working abnormally or property loss.



IMPORTANT!

IMPORTANT! indicates important supplementary information or provides skills or tips that can be used to help you solve a problem or save your time.

Important information

- Operational Compliance

  Read this manual carefully before use, follow the instructions strictly, and observe all safety precautions on product labels and within this manual.

- Applicability of Laws and Standards

  In addition to the safety instructions in this manual, you must comply with relevant international, national, or regional laws, regulations, standards, and industry requirements.

- Limitation of Liability

  The Company shall not be liable for any personal injury, death, or property loss resulting from improper equipment use or violation of safety requirements.

Version upgrade

Due to product updates and improvements, the manual content will be updated, adjusted, and revised accordingly. Please refer to the actual product for the product you purchased. You can obtain the latest version of the manual materials through the corresponding sales channels, or you can log in to our official website to download the latest version of the operation and maintenance manual.

1. Safety Information



- Please read this user manual carefully before the installation and operation of this equipment. Chint reserves the right to refuse warranty claims for equipment damage if users fail to install the equipment according to the instructions in this manual.
- Failure to follow these instructions and other relevant safety procedures may result in voiding of the warranty and/or damage to the PCS or other property.

1.1. Safety and Compliance Overview

Operational compliance

Read this manual carefully before use, follow the instructions strictly, and observe all safety precautions on product labels and within this manual.

Applicability of laws and standards

In addition to the safety instructions in this manual, you must comply with relevant international, national, or regional laws, regulations, standards, and industry requirements.

Limitation of liability

The Company shall not be liable for any personal injury, death, or property loss resulting from improper equipment use or violation of safety requirements.

1.2. Personnel Safety and Qualifications

IMPORTANT!

Only qualified professionals are allowed to install, operate or maintain equipment.

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.
- Non-standard and improper operations on the energized equipment 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.

DANGER!

- 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.
- During the normal operation of the equipment, opening battery compartment doors is not allowed. To open them, wait until the system operation is completed before performing operations and maintenance.

CAUTION!

- During operations, wear personal protective equipment such as protective clothing, insulated shoes, goggles, safety helmets, and insulated gloves.

- Before installing equipment in a cabinet, 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.
- When working at heights, wear a safety helmet and safety harness or waist belt and fasten it to a solid structure. Do not mount it on an insecure moveable object or metal object with sharp edges. Make sure that the hooks will not slide off.

1.2.1. Personnel Requirements

- Personnel operating the equipment should be thoroughly familiar with this manual;
- Personnel operating the equipment should be thoroughly familiar with the working principles of the equipment;
- Personnel operating the equipment should be thoroughly familiar with local electrical regulations and standards;
- Only qualified personnel who hold valid electrical knowledge certificates or qualifications, comply with regulatory requirements and safety standards, and have extensive experience in this type of work can operate on circuits and equipment.
- Only qualified personnel familiar with battery PACK and safety precautions can perform the installation and operation of battery PACK. Do not allow unauthorized personnel to access the battery PACK.
- Personnel operating the equipment must be trained and qualified electrical workers; otherwise, they cannot operate the equipment. Improper or incorrect operation may cause serious harm to the operator;
- Transportation, installation, and commissioning can only be performed by professionals designated by the manufacturer;

1.2.2. Authorized Access & Site Control

- **Only authorized professionals** may remove safety barriers, open enclosures, or access internal components. Strictly prohibit unauthorized personnel, untrained individuals, and children from entering the equipment area.
- Personnel performing live-line work, work at heights, or operating specialized hoisting machinery must hold specific task-based certifications required by the local jurisdiction.
- Operating the equipment while under the influence of alcohol, drugs, or in a state of extreme fatigue is strictly prohibited.

1.2.3. Mandatory PPE

Mandatory PPE complying with local statutory standards must be worn throughout on-site operations:

- Eye protection

  Safety goggles or face shield to shield against sparks, debris, or accidental electrical contact;

- Hand protection

  Insulated gloves rated for the circuit voltage, plus work gloves to prevent abrasion; Insulated gloves rated for circuit voltage; work gloves for mechanical protection against cuts;

- Foot protection

  Insulated safety shoes to prevent electric shock or ground current paths;

- Head protection

  Hard hat to protect against overhead hazards and falling objects;

- Body protection

  Protective clothing or work suit to minimize skin exposure.

1.3. Electrical Safety Principles



- No flammable or explosive items should be stored inside or near the equipment.
- High-voltage energy remains in capacitors. Failure to wait for the full discharge duration may cause electric shock, severe injury, or death.



- Regularly inspect the safety equipment within the system to ensure that the safety equipment is reliable.
- Regularly inspect the safety equipment within the system to ensure that the safety equipment is reliable.
- Before installing and commissioning batteries, prepare firefighting facilities, such as fire sand and carbon dioxide fire extinguishers, according to construction standards and regulations. Before putting into operation, ensure that firefighting facilities that comply with local laws and regulations are installed.



The static electricity generated by human bodies may damage the electrostatic sensitive components on boards, please wear anti-static gloves before touching electronic components.

1.3.1. Basic Electrical Requirements

To prevent electric shock or arc flash injuries, all on-site operations must adhere to the following behavioral standards:

- Eliminate conductive paths by removing all metallic jewelry—including watches, rings, and necklaces—prior to accessing electrical connections.
- Prohibit direct contact with any power terminal or conductor surface until zero voltage is verified via testing.

- Only use certified insulated tools with voltage ratings that align with the specific equipment requirements.
- Never operate power equipment with wet hands, damp clothing, or in the presence of water accumulation.

1.3.2. De-energization and Discharge Protocol

Strictly follow this procedure BEFORE opening the enclosure for maintenance:

- Physically isolate and lock out all AC and DC switches from both the equipment and utility grid sides.
- Verify zero voltage at all contact surfaces using a calibrated multimeter or voltage tester before proceeding.

1.3.3. Grounding Standards

- Establish the protective earth (PE) connection FIRST during installation and disconnect it LAST during removal.
- The equipment must maintain a permanent and reliable connection to the earth potential via PE cables, with impedance meeting local electrical standards.
- Do not operate the equipment if the ground conductor is missing or damaged. Direct grounding of PV strings is prohibited unless an isolation transformer is added to the AC side.

1.3.4. Cabling and Connection Requirements

- Route cables away from heat sinks, ventilation vents, or other high-temperature areas. Ensure adequate safety clearance between cables and heat-generating components to prevent insulation degradation.
- Do not join or weld power cables. If necessary, use a longer cable meeting the required specifications.
- Ensure all terminals are tightened to the specified torque and cable insulation is intact. Damage caused by faulty external power systems or incorrect voltage is excluded from the warranty.

1.3.5. Ingress and Contamination Protection

- Prevent tool fragments, metal shavings, screws, nuts, or cable ties from falling into the equipment. Such materials can trigger short circuits, component failure, or power loss.
- Ensure water, condensation, or any liquids do not enter ventilation openings or internal spaces.
- The use of water, alcohol, oils, or solvents for cleaning electrical components, internally or externally, is strictly prohibited.

1.3.6. External Electrical Risk Protection

- The complete system must implement lightning protection compliant with IEC standards. Damage resulting from substandard lightning protection is excluded from the warranty。
- Consult local utility companies before selecting grid codes. Incorrect configurations may result in the revocation of operating permits.
- Equipment failures triggered by grid voltage surges or external power system faults are not covered by the warranty.
- Before installing and debugging the batteries, please prepare fire-fighting facilities in accordance with construction standards and regulations, such as fire sand and carbon dioxide fire extinguishers. Before putting them into operation, ensure that the firefighting facilities installed are in compliance with local laws and regulations.

1.4. Environment and Site Safety

NOTICE!

- The ground where the equipment is stored must be solid and reliable.
- When maintaining a liquid-cooled battery system, maintain the battery clusters sequentially. That is, when maintaining a specific battery cluster, only the corresponding battery compartment door of that cluster may be opened; it is strictly prohibited to open multiple battery compartment doors simultaneously (unless multiple clusters require simultaneous maintenance operations).
- After the liquid-cooled battery system maintenance is completed, the battery compartment doors should be closed immediately; after the doors are closed, the dehumidification air conditioner must first operate to control the humidity inside the compartment to 50% before the system can operate again.

1.4.1. Prohibited Installation Environments

Strictly prohibit deploying the equipment in the following environments that may compromise system integrity, trigger safety incidents, or void the warranty:

- **Flammable and Explosive Zones:** Do not install or operate the equipment in locations containing flammable or explosive gases, smog, chemical vapors, or dust.

- **High-Risk Water Areas:** Do not install the equipment directly under water pipes, air conditioning vents, ventilation openings, or windows prone to condensation or leakage. Ensure the installation site is above the historical highest water level and never in areas susceptible to flooding.
- **Extreme Thermal Stress:** Avoid installing the equipment in direct sunlight to prevent efficiency loss. Keep the equipment away from open flames or heat sources (e.g., heaters, boilers). Ensure ventilation and heat dissipation systems are never obstructed or covered.
- **Salt and Corrosive Environments:** Outdoor installation in salt-affected areas (e.g., within 500 meters of the coast) is prohibited unless the equipment holds specific protective certification. Avoid exposure to corrosive gases, volatile solvents, or metallic dust.
- **Avoid low-lying and flood-prone areas.** The installation site that the device is to be located must be higher than the highest water level in history. Since winds and wind-driven waves from rivers, lakes, and seas can affect the device, the foundation must be built higher than the maximum wave height in history.

1.4.2. Site Infrastructure & Structural Requirements

- **Ground Support & Stability**

  The installation ground must be solid, level, and free from subsidence. Do not deploy the equipment on soft or spongy soil.

- **Structural Verification**

  Before mounting, confirm that brackets, poles, or walls are stable and capable of safely supporting the total equipment weight and environmental loads to prevent tilting or collapse.

- **Electromagnetic Limits**

  The magnetic field strength at the installation site should be less than 4 Gauss to ensure the proper operation of internal electronic components.

1.4.3. Vegetation & Site Cleanliness

- **Vegetation Control**

  For outdoor installations, clear weeds around the equipment regularly. It is recommended to harden the ground beneath the equipment (e.g., using cement or gravel) according to the area specified in technical specifications.

- **Waste Removal:** Upon completion of installation, immediately remove all packaging materials, foam, plastics, and cable ties from the equipment area to eliminate fire hazards and maintain ventilation.

1.4.4. Fire emergency Protocols

- **Immediate Evacuation:** In the event of a fire, all personnel must leave the building or equipment area immediately.
- **Alarming:** After evacuation, immediately activate the fire alarm system or call local emergency services.
- **Prohibited Re-entry:** Do not re-enter the affected area under any circumstances until emergency responders confirm it is safe.

1.5. Mechanical Safety

1.5.1. Tool and Structural Integrity

- **Tool Compliance:** Only use complete tools certified by professional organizations. Do not use tools with cracks, scratches, or those past their calibration expiry. Ensure tools are not overloaded.
- **Paint Protection:** Promptly repair any paint scratches caused during transport or installation. Equipment with damaged coating must not be exposed for extended periods to prevent metal substrate corrosion.

1.5.2. Handling and Hoisting Safety

- **Mechanical Assistance:** When using forklifts or pallet jacks, ensure proper tine positioning and securely lock the equipment to the carrier with ropes before movement to prevent tipping.
- **Professional Hoisting:** Hoisting must be performed by certified professionals. Standing or walking beneath hoisted objects is strictly prohibited. Ensure the angle between hoisting ropes meets safety design requirements.

1.5.3. Elevated Work Standards

- Ladder selection

  When performing live-line work, wooden or insulating material-made ladders must be used. Before use, it is necessary to ensure the ladder’s load-bearing capacity and check the integrity.

- Stability requirements

  For single ladders, maintain a 75-degree angle with the ground and implement anti-slip measures. If used to access a platform, the ladder must extend at least 1 meter above the platform level. Make sure the ladder is placed firmly and held steady.

- When working at heights, wear a safety helmet and safety harness or waist belt and fasten it to a solid structure. Do not mount it on an insecure moveable object or metal object with sharp edges. Make sure that the hooks will not slide off.

1.5.4. Drilling Prohibition

- Hardware damage risk

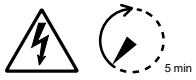
  Any form of drilling on the equipment enclosure or structural components is strictly prohibited. Drilling will result in:

  - Destroying seal integrity, allowing moisture and dust infiltration;
  - Compromising Electromagnetic Compatibility (EMC) shielding;
  - Metal shavings falling inside, triggering circuit board shorts or severe electrical incidents.

- Site preparation

  If drilling is required for site preparation (not on the equipment), pre-identify buried pipes and cables. Immediately clean all shavings after drilling to prevent them from entering the equipment area.

1.6. Labels On the Equipment

Symbols	Meaning
	**Warning - Electric Shock Hazard!** Do not touch system connectors or terminals. Do not open the closed door unless proper lockout/tagout procedures and related training have been performed in accordance with local regulations and requirements.
	**Energy danger:** Pay attention to the danger of electric shock, and please operate the machine 5 minutes after the discharge is completed.
	**High Temperature:** This product complies with international safety standards, but it generates heat during operation. Therefore, never touch the cooling fin or the metal surface of the PCS SKID during operation.

	**Protective earthing.** Connect the metal casing of the electrical equipment to the ground to prevent electric shock accidents.
	**CE certification.** This equipment has passed CE certification

1.7. Lockout/Tagout Guidance



- Always follow all applicable lockout/tagout procedures. Failure to follow proper lockout/tagout procedures may result in serious injury or death.
- When power is applied to the equipment, dangerous voltages exist on certain components. To prevent accidental death or injury, non-professionals should not touch any components inside the enclosure. To reduce the risk of electric shock, ensure all equipment is reliably grounded.



The doors of the equipment must remain closed unless access to the interior is required. If possible, personnel should maintain a safe distance from the enclosure when the equipment is powered. When working near the equipment, always comply with local and national lockout/tagout guidelines. Lockout and tagout procedures must meet or exceed the requirements mentioned before.

Attention

All guidelines proposed in the Chint safety document. Before entering a potentially hazardous area or starting work on the equipment, please complete the following regulations:

- Identify and wear protective clothing and protective shoes.
- Identify and isolate all power sources and stored energy.
- Use appropriate lockout/tagout devices. When locking/tagging the equipment, do not touch anything inside the equipment unless explicitly instructed in the work procedure.
- Before starting work, complete the site-specific lockout/tagout procedures and safety checklist.

2. System Introduction

System application

The system can receive dispatch instructions from LEMS or third-party EMS to control batteries, PCS, and transformer for charging, discharging and grid connection operations. It supports various application scenarios such as grid-connected power dispatching, grid-forming operation, off-grid and microgrid power supply, and black-start capability, meeting the power system's needs in peak shaving and valley filling, renewable energy integration, reserve frequency regulation, and grid self-recovery.

Advantage

- Modular integrated solution with string-level management, with two modules in parallel and flexible combination of 2/4-hour schemes.
- Dual- stage DC high-voltage solution, with safer High-voltage ride-through (HVRT) capability.
- Grid-forming operation, millisecond-level virtual inertia support, rapidly stabilize the grid.
- Support station-level black start function, meet regional power supply support and guarantee requirements.
- Compatible with environmental-friendly gas RMU (Ring Main Unit) and multi-shunt arc schemes, meet customer environmental protection and safety requirements.
- The AC side has IEC and UL global certifications, improve project construction efficiency.

2.1. Model Description

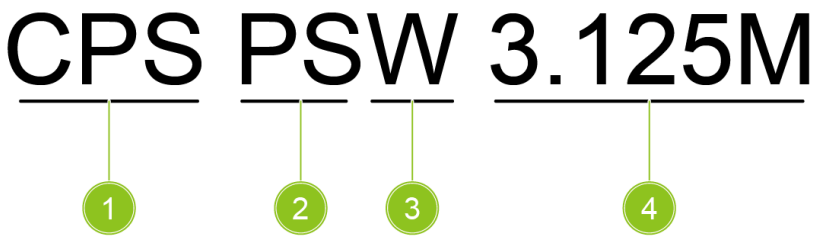


Fig. 2-1 Model introduction

No	Name	Definition
1.	CPS	Chint Power System
2.	PS	Pre-installed energy storage system
3.	W	AC/DC integrated system
4.	3.125M	Power: 3.125MW

2.2. Dimensions

Overview

The system is delivered in a form of a non-standard container (25.15HQ).

The dimensions and appearance are shown below.

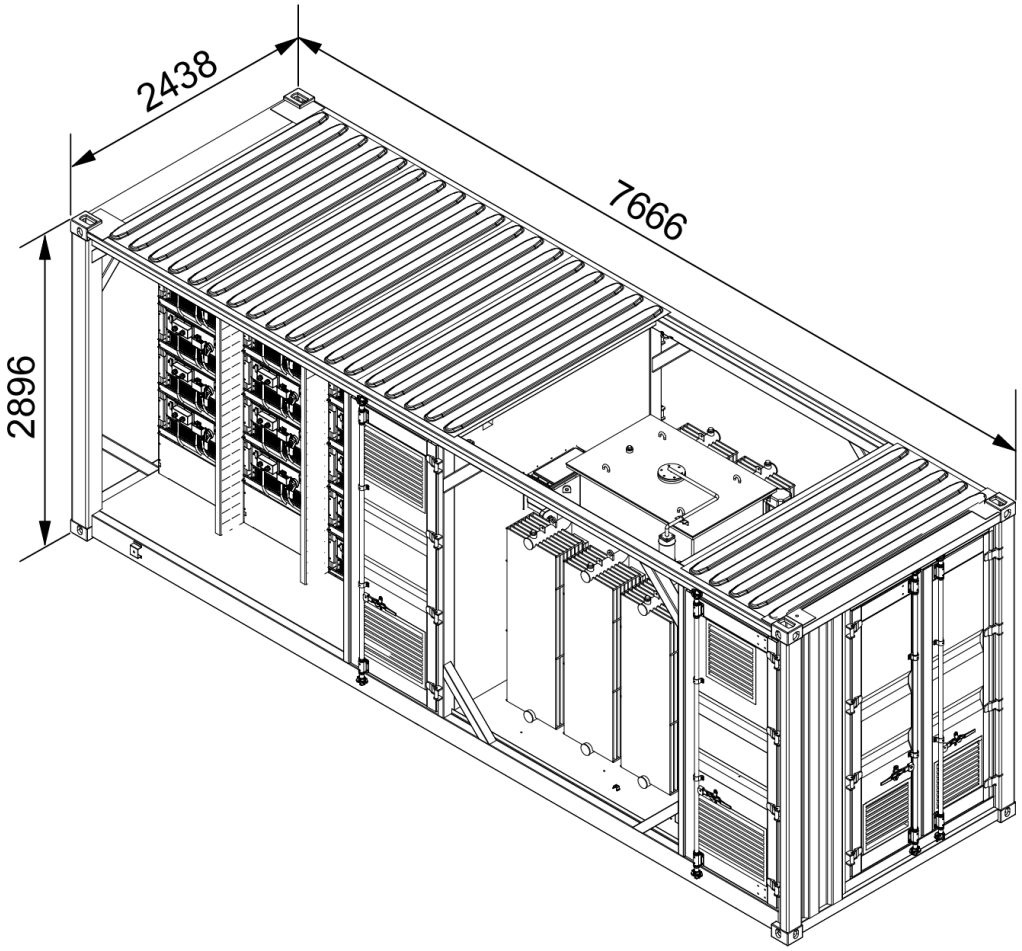


Fig. 2-2 Dimensions (Unit: mm)

2.3. Parameters

Model Name	CPS PSW 3.125M
DC Input	
Max. DC Input Voltage	1500V
Min. DC Voltage	875V
DC Voltage range for nominal power	950-1500V
Number of CPS ECB200KTL PCS Units	16
Number of DC inputs	8
AC output	
Rated power	3125kVA/31250kW
Rated grid frequency	50/60Hz
Medium voltage ranging	6-35kV
Vector Group	Dy1, Dy11
Cooling class	ONAN
Insulating fluid	Biodegradable oil, FR3 type or equivalent
Environment	
Protection degree	IP54
Cooling	Forced air cooling
Operating temperature range	-4°F to +113°F / -20°C to +45°C * For the condition of -22°F to +140°F / -30°C to +60°C, consult the manufacturer for solutions.
Storage temperature range	-22°F to +140°F / -30°C to +60°C
Operating humidity	0-95% (no condensation)

Operating altitude	9843ft/3000m (>6562ft/2000m derating)
Display and communication	
Communication	RS485 / Ethernet / CAN
Modbus data mapping	CPS
Mechanical	
Dimensions (W x H x D)	7666×2896×2438mm
Weight	18000kg
Safety	
Certifications and standards	IEC 62109, IEC 62477, IEC 61000, IEC 62920, EN 50549-2:2019, EN 50549-10:2022, RfG:2016, NC RfG:2018, PTPiREE:2021, UNE 217001:2020, RD 647:2020, RD 1699:2011, RD 661:2007, RD 413:2014, UNE 217002:2020, NTs Version 2.1, VDE 4110, VDE 4120
Smart-grid features	Volt-Ride Thru, Freq-Ride Thru, Ramp-Rate, PF, Volt-VAR, Freq-Watt, Volt-Watt
Protective functions	
Black start	Yes
Reverse polarity protection	Yes
Overvoltage protection	Yes
Grid monitoring	Yes
Ground fault monitoring	Yes
Active / reactive power response time	< 100ms

2.4. Nameplate

Location

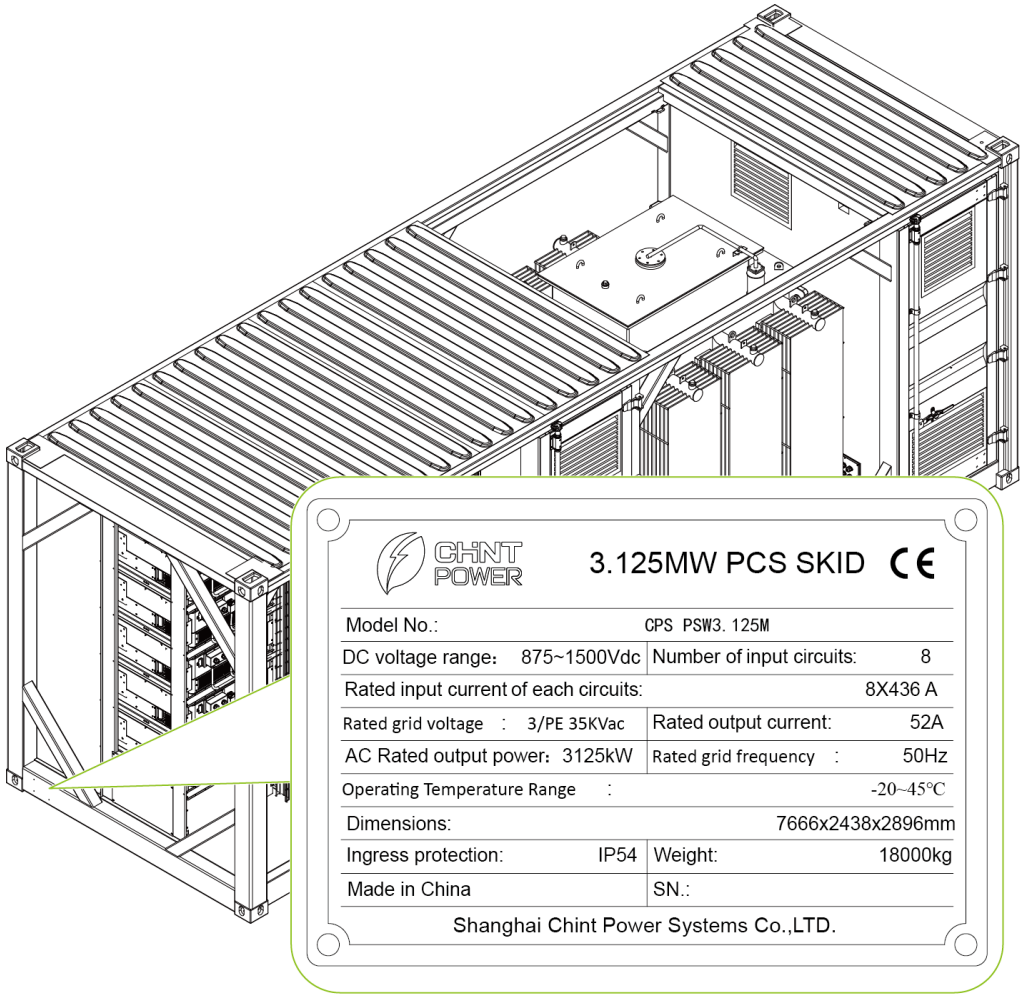


Fig. 2-3 PCS SKID nameplate

2.5. Circuit Diagram

The basic principle of the PCS SKID and battery container is shown in the following figure. The DC output cables from the battery container (CPS ES-6251kWh Liquid Cooling Battery Energy Storage System (BESS)) is connected to the DC copper bars in the DC combiner cabinet, and then converted into three-phase AC voltage (3*800VAC) through PCS, and then connected to the power grid after step-up.

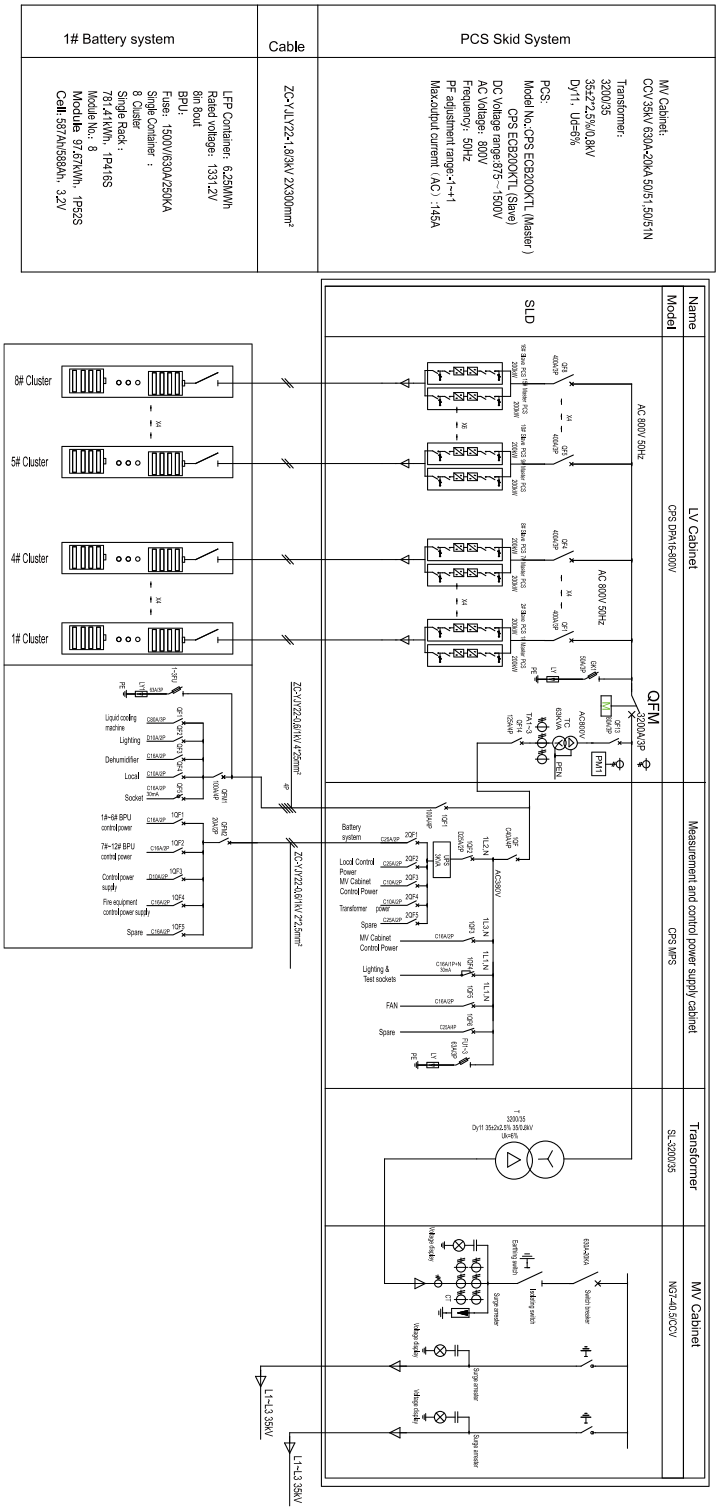


Fig. 2-4 Circuit diagram

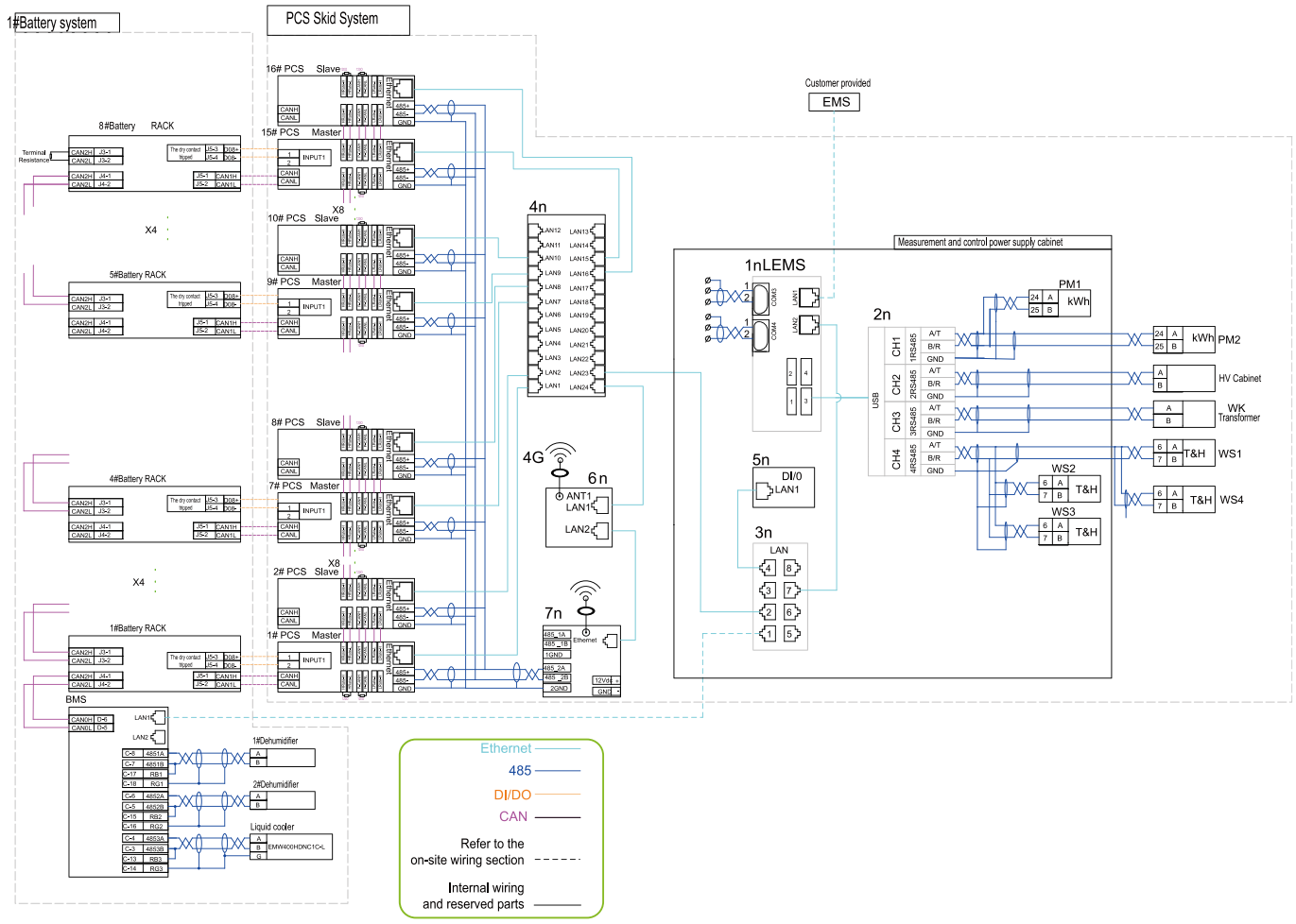


Fig. 2-5 Communication diagram

Communication with background upper computer

- Each PCS SKID is reserved with 3 Ethernet signal interfaces and 2 optical fiber interfaces for communication with the background. The communication cable shall be a shielded network cable, and both ends of the crystal plug with a straight-through twisted pair shall comply with the 568B standard. Each group of twisted pairs shall correspond to each other at both ends one by one, and the same color shall be kept consistent in the corresponding slots of the crystal plugs at both ends.
- For remote monitoring of multiple PCS SKID, the Ethernet interface or optical fiber interface on the PCS SKID is connected in parallel with the corresponding interface of another PCS SKID and connected to the monitoring background upper computer through the bus.

2.6. System Annotation

Overview

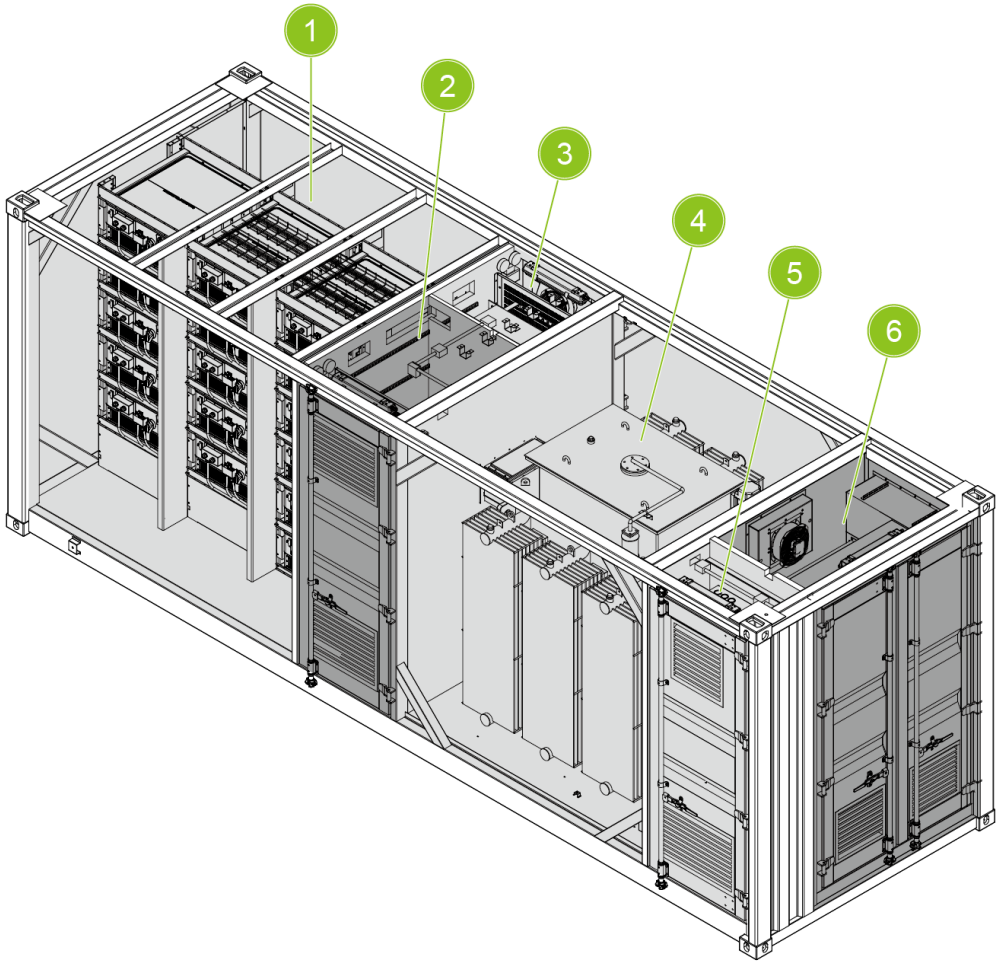


Fig. 2-6 System Annotation

No.	Name
1	PCS compartment
2	DC combiner cabinet
3	AC combiner cabinet
4	Transformer compartment
5	Control power cabinet
6	RMU (Ring Main Unit)

2.7. PCS compartment

Overview

The PCS compartment contains 16 PCS units (1) in total, the layout is shown below.

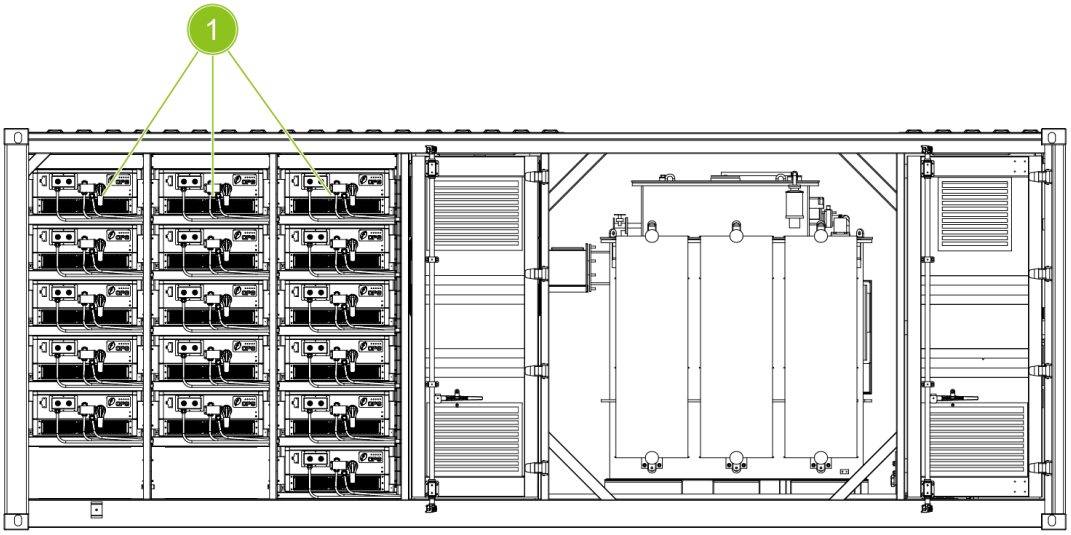


Fig. 2-7 PCS compartment layout

2.7.1. PCS unit

Overview



Fig. 2-8 PCS appearance

The key features of PCS unit are as follows:

- Integrated DC disconnect switch
- Protection functions for enhanced reliability and safety
- Full power capacity up to 45°C

- IP66 outdoor rated
- Integrated DC-DC bi-directional converter
- Wide DC voltage range, suitable for different batteries
- Modular design, easy for maintenance

LED indicator

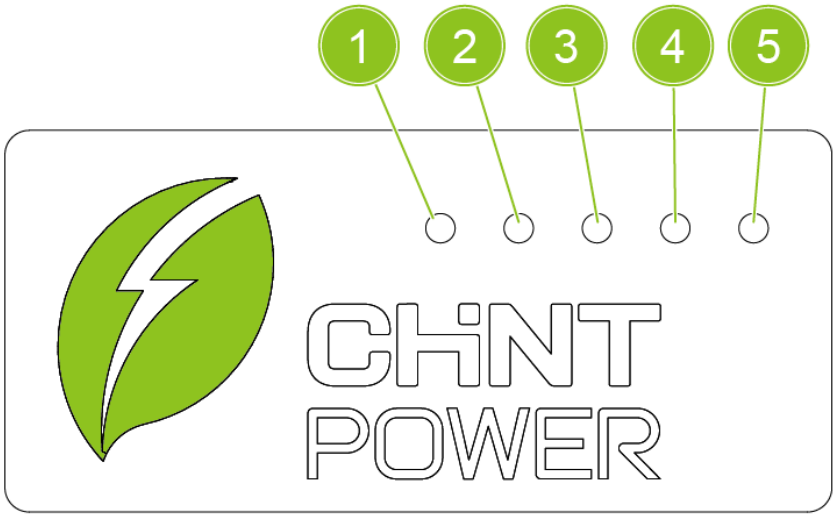


Fig. 2-9 PCS indicator

No.	LED lights	Name	Status	Indication
1	POWER	Working power indicator	Light on	Energized (control panel starts to work)
			Light off	Power supply not working
			Slow flash	The system is not powered on or the communication between MCU and DSP is abnormal
2	RUN	Grid-tied operation indicator	Light on	In grid-tied power generation state
			Slow flash	Derated running status (light on 0.5s, light off 2.0s)
			Light off	In other operation status or power supply not working
3	GRID	Grid status indicator	Light on	Grid on
			Light off	Power supply not working

No.	LED lights	Name	Status	Indication
			Flash	Grid fault (light on 0.5s, light off 2.0 s)
4	FAULT	Fault status indicator	Light on	Indicates a Fault
			Slow flash	Indicates Alarm (light up 0.5s, light off 2s)
			Fast flash	Protective action (light up 0.5s, light off 0.5s)
5	RE/LO	Remote/local status	Light on	Remote control mode is enabled
			Light off	Remote control mode is disabled

Circuit diagram of PCS

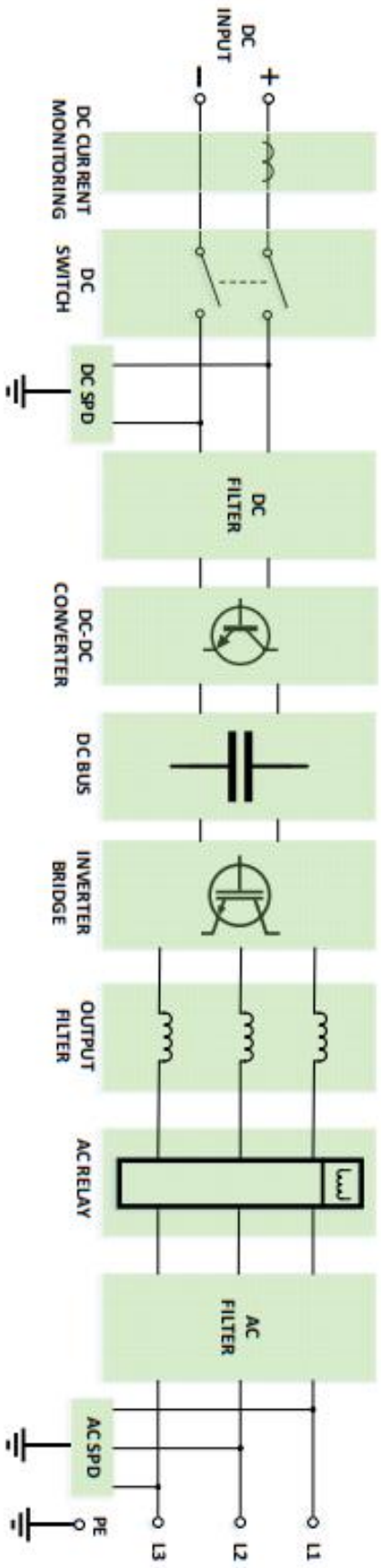


Fig. 2-10 Circuit diagram of PCS

2.8. DC Combiner Cabinet

Overview

The confluence junction copper bars are in the DC combiner cabinet.

The positive and negative cables from the battery container combiner cabinet are respectively connected to the positive and negative copper bars.

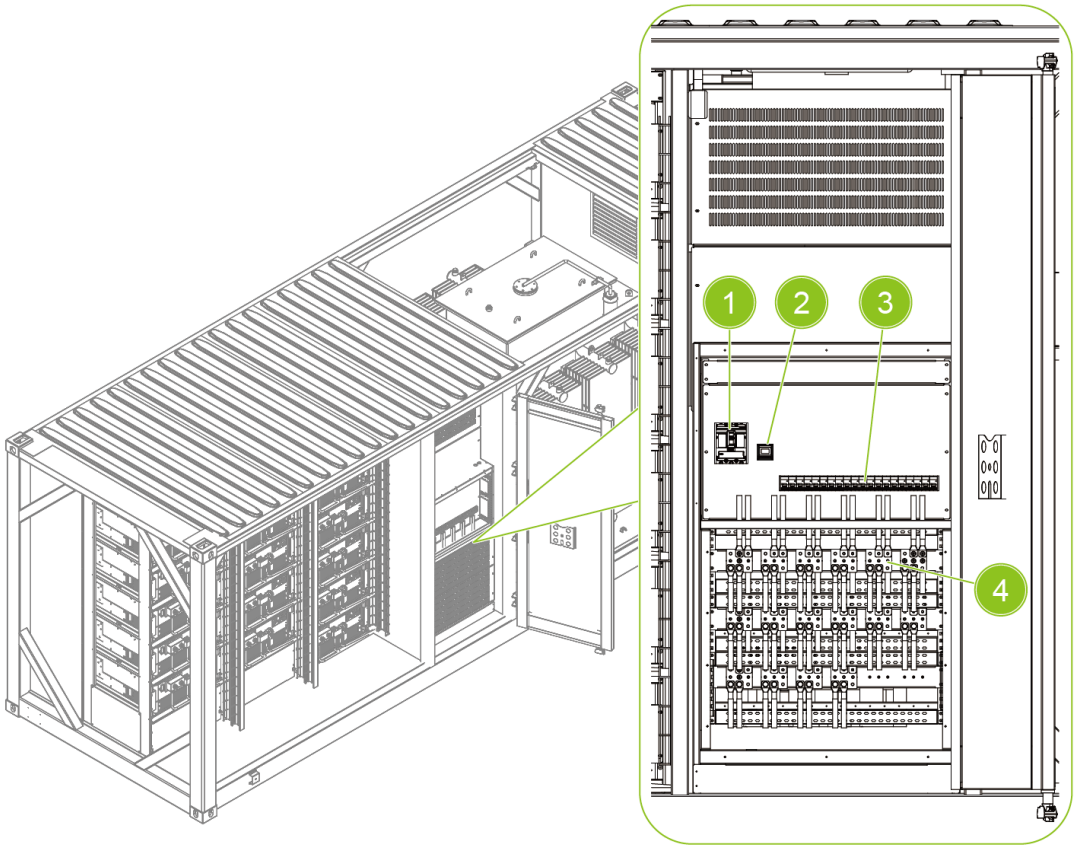


Fig 2-11 DC wiring side

No.	Name	Description
1	Molded case circuit breaker	Power switch of 400V battery container
2	Temperature controller	Monitor temperature and humidity of LV compartment
3	Circuit Breaker	Power switch of 230V LV compartment
4	DC copper bar	Connect DC cables

DC copper bar

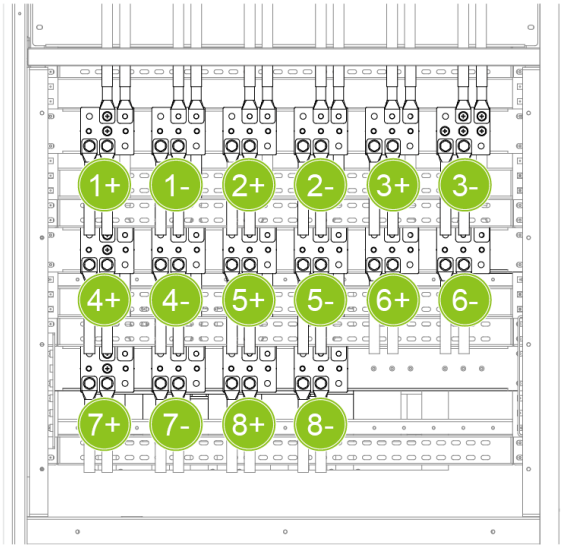


Fig 2-12 DC copper bar

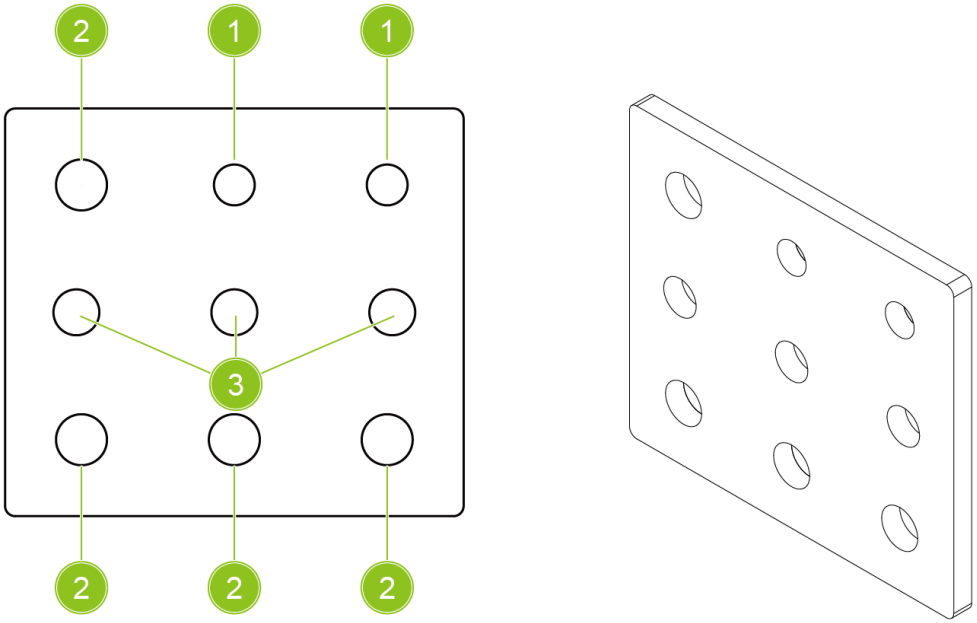


Fig. 2-13 Copper Bar for DC wiring (unit: mm)

1. M8 hole
2. M10 hole
3. Insulating post hole

2.9. AC Combiner Cabinet

The AC combiner cabinet contains one air circuit breaker and several molded case circuit breakers.

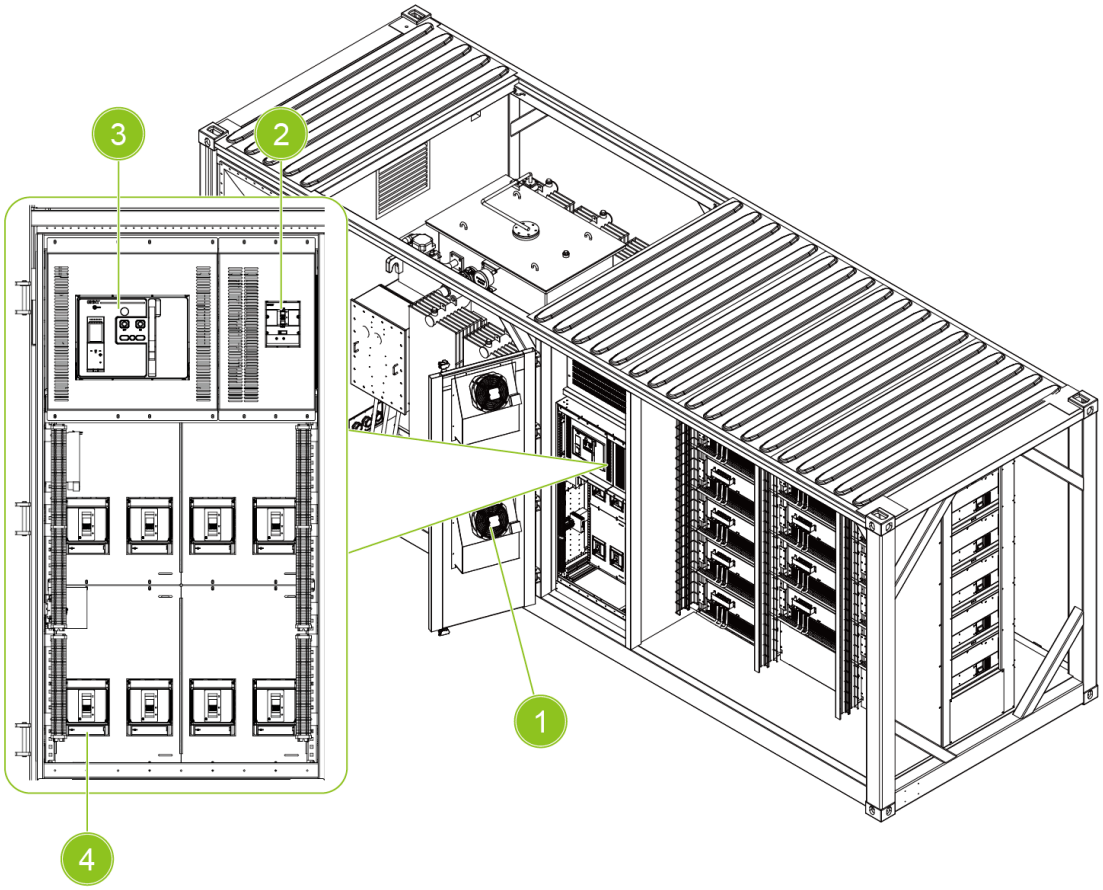


Fig 2-14 AC combiner cabinet

No.	Name	Description
1	Fan	Cooling the AC combiner cabinet
2	Molded case circuit breaker	Input switch of auxiliary transformer
3	Air circuit breaker	800V main circuit switch
4	Molded case circuit breaker	800V PCS branch switch

2.10. Control Power Cabinet

The control power cabinet contains measurement and control box, fan, lighting fixtures, and emergency lighting system.

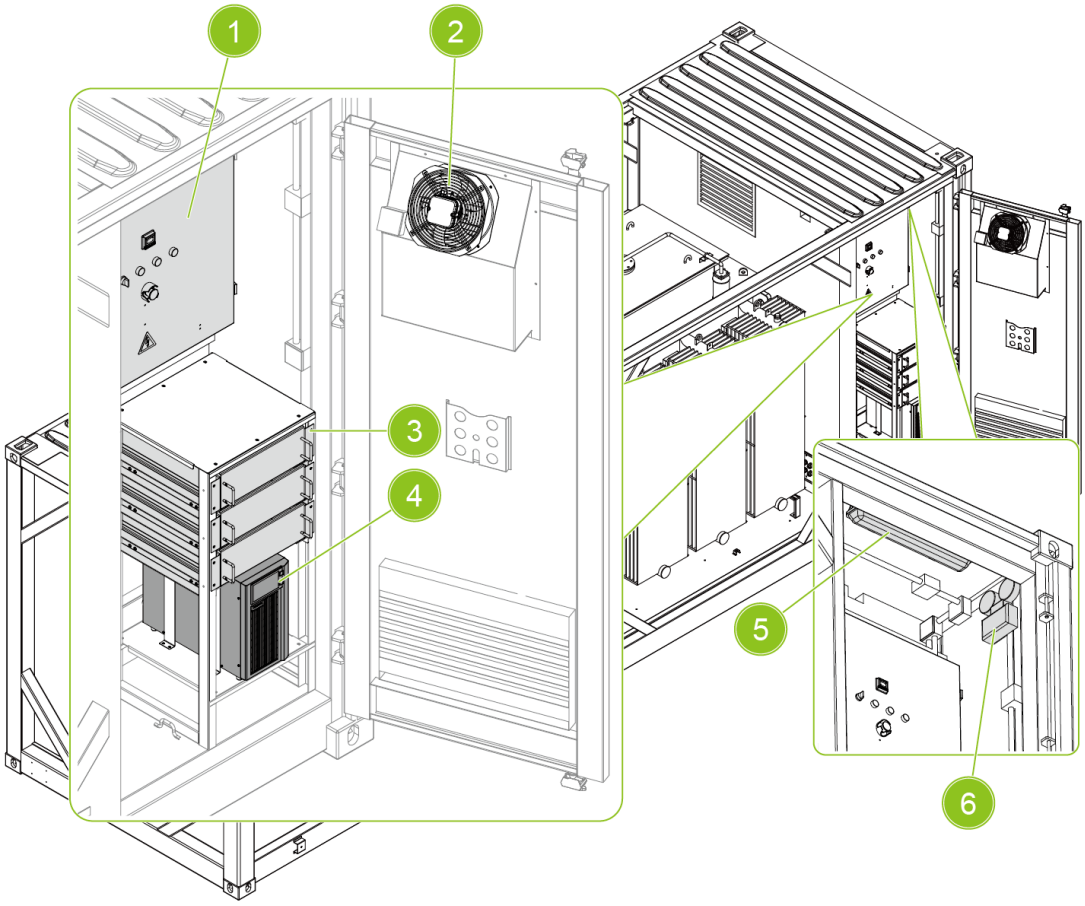


Fig. 2-15 Control power cabinet

No.	Name	Description
1	Measurement and control box	Including circuit breakers, communication module, ethernet switch, and LC
2	Fan	Cooling fan of control power cabinet
3	UPS battery	Supply power to UPS
4	UPS	Uninterruptible power supply
5	Light	/
6	Emergency light	/

2.10.1. Measurement and Control Box

The measurement and control box consists of circuit breakers, communication module, ethernet switch.

Appearance

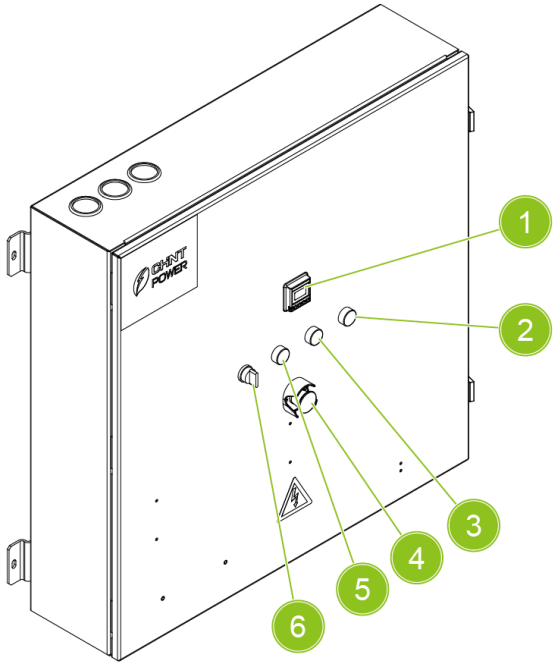


Fig. 2-16 Measurement and control box

1. Temperature and humidity controller
2. Utility power supply indicator
3. UPS power indicator
4. Emergency stop button
5. Failure indicator
6. RMU fan switch

Interior components

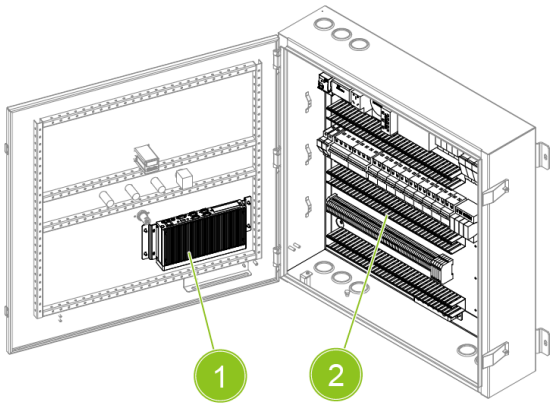


Fig 2-17 Interior components of Measurement and control box

1. LEMS (Local energy Management system)
2. Electrical panel

Local controller

The local controller is the energy dispatch and management center of the ESS. LC is the brain of the ESS, mainly responsible for collecting all BMS data, PCS data, and grid-side data, issuing control commands to various parts, controlling the operation of the entire ESS, and reasonably arranging the operation of the PCS. The local controller can operate automatically according to preset charging/discharging time, power and operation modes, or accept dispatch commands.

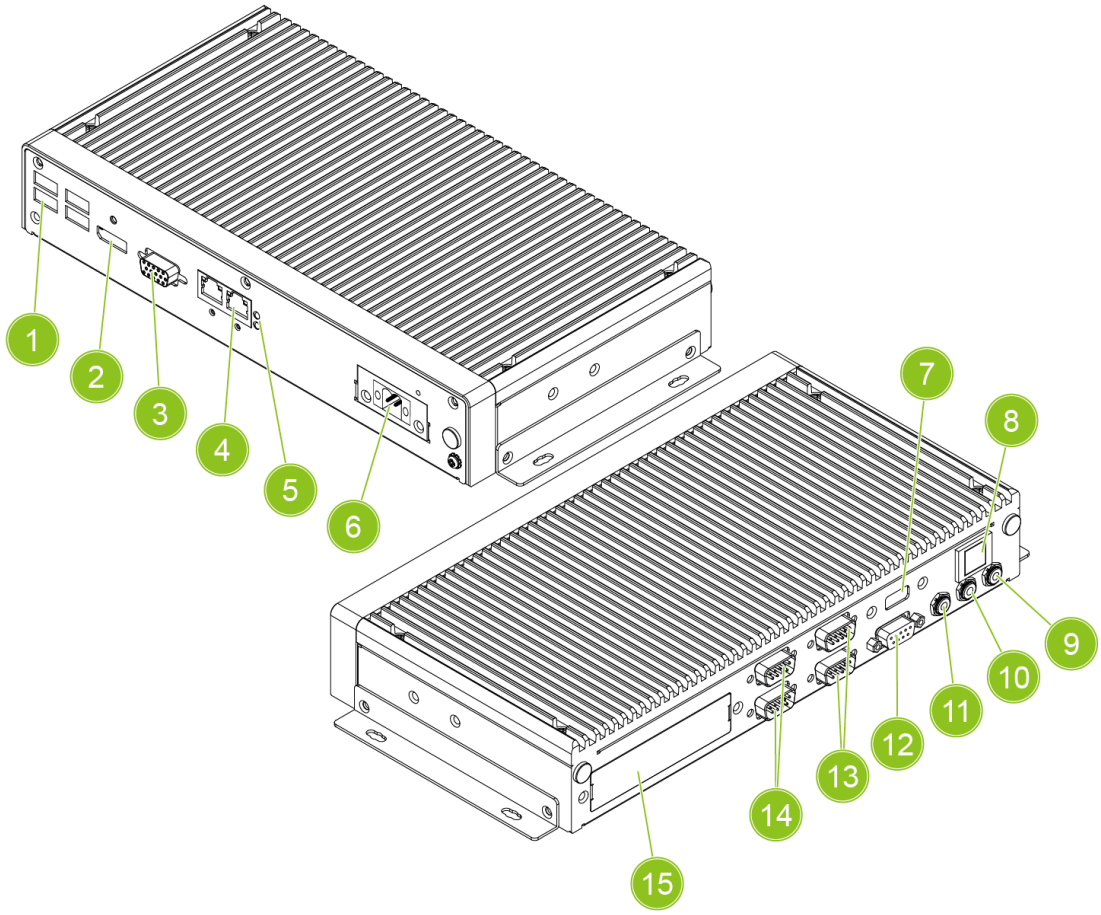


Fig. 2-18 Interfaces of LC

1. USB 1-4	2. HDMI	3. VGA	4. LAN 1 & 2
5. PWR & HDD led	6. DC input	7. USB 5	8. On/Off button
9. LINE-IN	10. LINE-OUT	11. MIC	12. Digital IO
13. COM 2 & 4	14. COM 1 & 3	15. i door module	

2.10.2. UPS

Overview

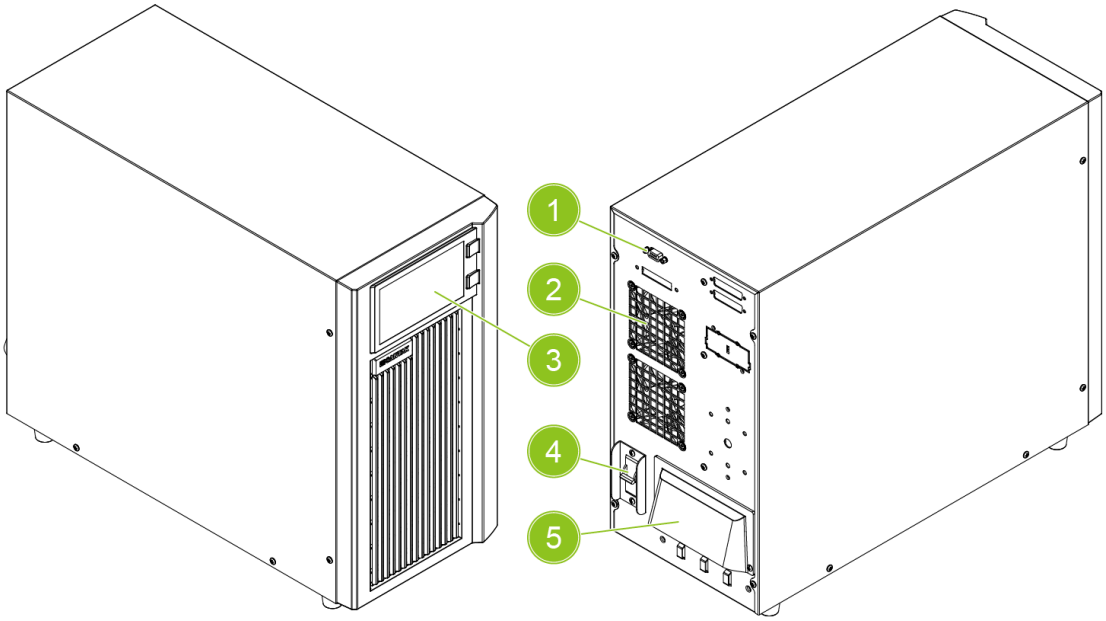


Fig. 2-19 UPS

1. Computer interface
2. Fan
3. UPS control panel
4. Input protection switch
5. Terminal cover

UPS panel

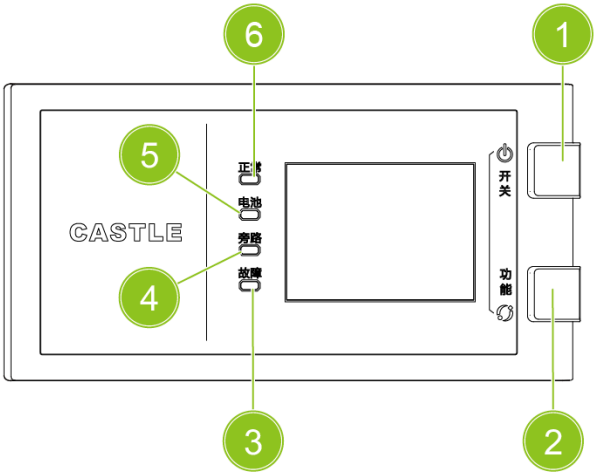


Fig. 2-20 UPS panel

No.	Name	Description
1	Power-on button	/
2	Power-off button	/

No.	Name	Description
3	Fault indicator	Light on: UPS is in fault state, and with bypass output (not EPO and short circuit).
		Light off: No fault occurs.
4	Bypass indicator	Light on: UPS is in ECO mode (normal indicator is on) or in bypass powered state.
		Flash per 1 second: Bypass anomaly
5	Battery indicator	Light on: USP is powered by battery, and normal indicator is on.
		Flash per 1 second: Charger anomaly or battery anomaly.
6	Normal indicator	Light on: The UPS is operating normally and the power modules supply power to the critical loads.
		Light off: The load is powered by bypass (non-ECO mode) or no output voltage.

2.11. Transformer

Overview

The transformer compartment contains a medium voltage transformer. The transformer can convert the low voltage output by the PCS to a grid compatible high voltage.

The transformer integrates accessories such as pressure relief valve, step switch, oil level gauge, pressure gauge, oil temperature gauge, oil filling valve and oil drain valve. The functions of each accessory are shown below.

Photo	Name	Description
	Oil filling valve	When the oil level in the transformer tank is low, open the oil filling valve.
	Pressure relief valve	When the oil pressure in the tank reaches 55kPa, the valve will automatically release.
	Pressure gauge	The pressure gauge is used to read the pressure value inside the oil tank.
	Oil level gauge	If the oil level value falls below the lowest mark on the oil level gauge or below the oil level mark required for safe operation of the transformer, the transformer will stop running. When the oil level is too high, open the oil drain valve to lower the oil level. When the oil level is too low, disconnect the transformer and check the oil tank for oil leakage.
	Oil temperature gauge	The oil temperature alarm temperature is 100℃. When the oil temperature reaches this value, the alarm signal will be sent to the intelligent measurement and control cabinet or communication device (provided by customer). The oil temperature trip temperature is 105℃. When the oil temperature reaches this value, the trip signal will be sent to the intelligent distribution cabinet or client communication device. At the same time, the transformer will be disconnected from upstream and downstream equipment.

Photo	Name	Description
	Winding Thermometer	The oil temperature alarm temperature is 100℃. When the oil temperature reaches this value, the alarm signal will be sent to the intelligent power distribution cabinet or client communication device. The oil temperature trip temperature is 105℃. When the oil temperature reaches this value, the trip signal will be sent to the intelligent measurement and control cabinet or communication device (provided by customer). At the same time, the transformer will be disconnected from upstream and downstream equipment.
	Oil drain valve	When the oil level is too high or maintenance is required, the oil drain valve needs to be opened.
	Step switch	The step switch has five positions: 1, 2, 3, 4, and 5.

2.12. Ring Main Unit (RMU)

Overview

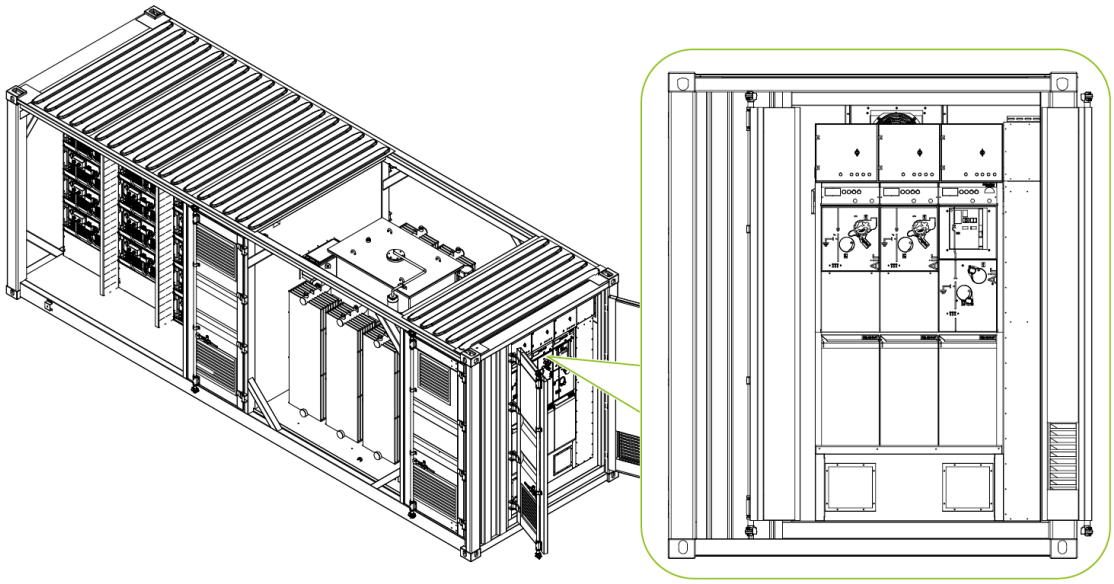


Fig 2-21 RMU location

Cabinet names vary with cabinet manufacturers, as shown in the following table.

Cabinet names	Abbreviation	Manufacturer
Direc cable connection unit	D	Schneider Electric / Siemens / CHINT
Load break switch unit	C	Schneider Electric / Siemens / CHINT
Vacuum circuit breaker unit	V	Schneider Electric / Siemens / CHINT

NOTICE!

The RMU supports customization by customer.

Refer to other manual

For more information about RMU, please refer to the user manual of corresponding model and brand.

2.13. Optional Product Configuration

PCS SKID supports the following optional configuration.

No.	Configuration	Function
1	Metering instrument	Measurement of control load



You need to confirm what optional functions are required for the PCS SKID before ordering, ensure that the delivered PCS SKID meets the use requirements.

3. Transportation and Storage

3.1. Transportation

3.1.1. Transportation Requirements

Statement

The internal components of the cabinet have been installed and fixed before leaving the factory, allowing for whole machine transportation.

The equipment is transported to the power station site by a freight company, and the on-site power station management personnel will be contacted in advance to negotiate and arrange specific delivery and unloading. The transportation after delivery and unloading needs to be completed by the on-site power station construction personnel.



DANGER!

- During the transportation and handling of the cabinet, it is necessary to comply with the operational safety regulations of the country/region where the project is located.
- All equipment used during transportation needs to be maintained.
- All personnel involved in handling and securing should receive appropriate training, especially in safety.



WARNING!

Keep batteries in the correct direction during transportation. They must not be placed upside down or tilted, and must be protected against falling, mechanical impact, rains, snows, and falling into water during transportation.



NOTICE!

- Transportation and storage service providers must have the qualifications for dangerous goods operations required by local laws, regulations, and standards.

- Rigid box trucks shall be used for transportation and pickup trucks are prohibited.

NOTICE!

Always keep in mind the mechanical parameters (such as dimensions and weight) of the cabinet during transportation and handling.

Safe transportation and handling protocols for energy storage systems

To ensure the safety and integrity of the equipment during logistics and on-site installation, the following guidelines regarding regulatory compliance, packaging, and handling must be strictly observed:

- **Regulatory Compliance and Classification**

  In accordance with the UN Recommendations on the Transport of Dangerous Goods (TDG/UN Orange Book), battery systems are classified as Class 9 hazardous materials. Consequently, all shipments must successfully undergo the specific testing protocols outlined in Part III, Subsection 38.3 of the UN Manual of Tests and Criteria. Logistics operations must adhere to applicable international and local regulations, such as the IMDG Code for sea freight, ADR for road transport, and relevant local standards. All packaging, labeling, and declarations must meet the regulatory requirements of the origin, transit, and destination countries.

- **Transportation Mode and Route Selection**

  Maritime and road transport via established highways are the recommended modes of shipment. Rail and air transport are generally prohibited unless specific exemptions are granted. Routes should be selected to minimize vibration and shock, avoiding uneven terrain that could compromise the structural integrity of the cargo.

- **Pre-Shipment Inspection and Declaration**

  Prior to dispatch, a rigorous inspection is mandatory. The cargo must be accurately declared, and the packaging must be verified as intact, with no signs of leakage, smoke, abnormal odors, or fire hazards. Any unit exhibiting these defects is strictly forbidden from entering the supply chain.

- **Packaging and Moisture Protection**

  Robust packaging capable of withstanding transit stresses is required. Measures must be taken to prevent moisture ingress and physical displacement during loading and unloading. Packages must remain upright at all times; tilting or inverting the cargo is prohibited. Dangerous goods labels must be clearly visible and affixed according to safety standards.

- **Segregation and Compatibility**

Unless explicitly permitted by safety regulations, dangerous goods must not be co-loaded with foodstuffs, pharmaceuticals, animal feed, or sharp objects. Where mixed loading of compatible goods is allowed, appropriate segregation must be maintained—typically using a physical barrier of equivalent height and maintaining a minimum clearance (e.g., 0.8 meters) to prevent cross-contamination or damage.

- **Handling of Defective Units**

  Defective batteries exhibiting physical damage (scorching, bulging, leakage) require immediate isolation. Terminals must be insulated, and the unit should be secured in an explosion-proof container. Detailed incident logs, including location, time, and symptoms, must accompany the shipment. During transit, such cargo must be routed away from populated areas and critical infrastructure.

- **Storage and Environmental Controls**

  Equipment should be stored vertically in a dedicated area, separated from heat sources and protected from precipitation. Stacking must adhere to the manufacturer's specified limits to prevent crushing damage. The storage environment must be monitored, as prolonged exposure to extreme temperatures or humidity can degrade product specifications.

- **Damage Assessment**

  If the external packaging is compromised or if the equipment has been subjected to impact or improper orientation, a professional technical assessment is required before installation or commissioning.

Site operations and positioning

- **Equipment Selection and Site Preparation**

  Select appropriate lifting machinery, such as cranes or forklifts, based on the specific weight and dimensions of the cabinet. It is imperative that the chosen equipment possesses a load-bearing capacity significantly exceeding the unit's weight to ensure a safety margin. Prior to moving, the path must be cleared of all obstacles, including overhead cables, vegetation, or debris.

- **Environmental Conditions and Safety Perimeters**

  Lifting and positioning operations should only be conducted under favorable weather conditions; operations must cease during high winds, heavy rain, or poor visibility. A designated safety zone must be established using warning signs or caution tape to prevent unauthorized personnel from entering the lifting area.

- **Maneuvering on Inclines**

  If the equipment must be traversed across sloped surfaces, specialized traction devices or additional anchoring measures are required to prevent slippage or tipping. Extreme caution is advised when navigating gradients.

- **Placement and Foundation Requirements**

  The cabinet must be positioned on a solid, level foundation with adequate drainage capabilities. The ground must be free of protrusions that could destabilize the base. During the landing phase, the unit should be lowered gently; dragging, sliding, or forceful pushing of the cabinet is strictly prohibited to prevent structural deformation. The unit should rest solely on its designated base supports.

3.1.2. Crane Lifting





Falling hazard or death.

- It is strictly prohibited to lift directly using the hoisting rope. Before lifting, hoisting lugs must be installed.
- Prior to commencing any lifting operations, all operators and on-site personnel must be fully familiar with and strictly adhere to the local laws, regulations, industry standards, and on-site safety operating procedures. Any non-compliant operation may result in severe safety incidents and legal liabilities.
- All personnel involved in lifting operations (including crane operators, signalmen, and ground support staff) must undergo professional training and possess valid corresponding operation certifications. During operations, all personnel are required to correctly wear appropriate Personal Protective Equipment (PPE), such as safety helmets, protective footwear, and gloves.
- During the entire process of lifting the equipment, it is necessary to strictly follow the safety operation procedures of the crane.
- Unauthorized personnel are strictly prohibited from entering the exclusion zone. As shown in Fig. 3-1, the radius must be $R \geq A + 5$ m. Standing or walking under the crane boom or the suspended load is strictly forbidden.
- In case of severe weather conditions, such as heavy rain, thick fog, strong wind, etc., the lifting operation should be stopped.
- Minimum crane lifting capacity: 20 T.

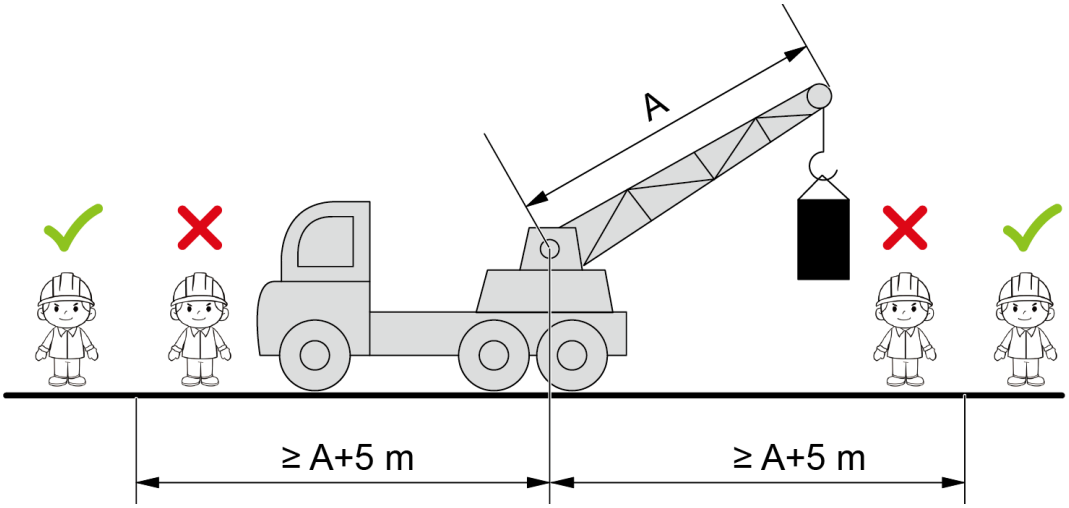


Fig. 3-1 Crane lifting radius requirement

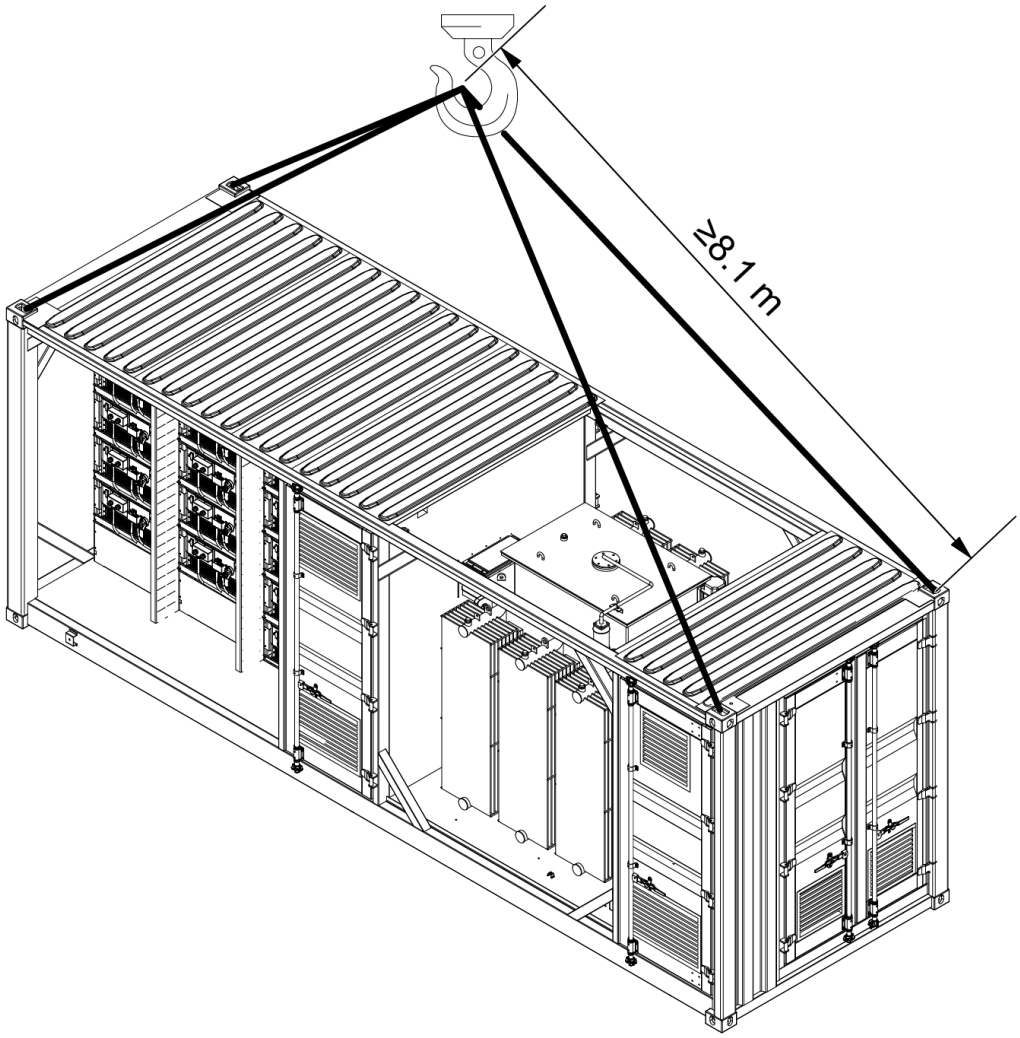


Fig. 3-2 Hoisting

Technical requirements

- The length of single lifting belt must be longer than 8.1 m, as shown in figure 3-2.
- Hoisting speed ≤5 meters/minute.
- During hoisting, the cabinet should be well protected from being scratched or worn, especially at the points where the lifting rope contacts the cabinet.
- The maximum external dimensions of the cabinet: 7666×2896×2438 mm.
- The estimated total weight of the PCS SKID: 18 T.
- The lifting equipment and ropes should be considered with sufficient safety factors by a professional hoisting company.

3.2. Storage

IMPORTANT!

- If the equipment is not put into use immediately upon arrival, please store the equipment in accordance with the following requirements.
- Damage to the equipment caused by improper storage is not covered by the warranty.

3.2.1. System Storage Requirements

Item	Requirement
Package	Do not store without the original packaging. If the package has been opened, it must be put back into the original packaging and sealed with tape.
Safe storage environment	Temperature -30℃~60℃; humidity≤95%RH (without condensation).
Recommended storage environment	Temperature: 0~35℃; humidity≤85%RH (without condensation)
Chemical protection	Keep away from corrosive substances such as acids and alkalis; the air must not contain flammable gases.
Storage location	The system should be stored in a dry warehouse to avoid exposure and rain. No harmful gases, flammable or explosive products and corrosive chemicals are allowed in the warehouse. Keep away from mechanical impact, heavy pressure and strong magnetic field. Avoid direct sunlight and the distance to heat source should be more than 2 m away.

Safety Warning

Handle with care during stacking to prevent equipment tipping, which could cause personal injury or equipment damage.

Temporary Outdoor Storage

Stacking on pallets is strictly prohibited. Must be covered with waterproof tarps to prevent erosion from rain or standing water.

3.2.2. Periodic Maintenance and Activation

Regular inspection

- It is recommended to inspect the outer packaging of the equipment every three months. If the packaging is damaged (such as due to moisture or insect damage), the packaging material must be replaced in a timely manner.

Activation after long time storage

- If the equipment has been stored for more than 1 year, you need to contact CHINT or distributor to inspect and test the equipment first.

4. Installation

NOTICE!

Do not open the cabinet door when the humidity is high (relative humidity ≥ 80% continuously), for example, on rainy days. If the cabinet door is open for 0.5 hour or longer when the humidity is high, manually perform forced dehumidification. Otherwise, the equipment may fail or the microgrid may collapse.

IMPORTANT!

All personnel involved in installation activities should receive training on the equipment and possess relevant experience. Personnel must meet all the pre-requisites for training and must complete the system training. These personnel include:

- Service personnel who carry out any installation work within the scope of the owner's work as specified in this document.
- Owner representatives who carry out any installation work within the scope of the owner's work as determined in this document.
- Before installing equipment in the cabinet, ensure that the cabinet is firmly fixed and the center of gravity is balanced. Otherwise, the cabinet may tip over or fall, which could cause personal injury and equipment damage.

4.1. Installation Requirements

NOTICE!

Before installing devices in the 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.

4.1.1. Site Selection Requirements

NOTICE!

The location selection of equipment and fire safety must comply with local laws and regulations. Reference standards include but are not limited to NFPA 855 "Standard for Installation of Stationary Energy Storage Systems"

Site requirements

- Do not install the equipment in environments prone to fire or explosion. Fire-fighting facilities must be safe, available and compliant.
- The installation site must have good ventilation and be equipped with interfaces for the water fire protection system.
- Ensure that the installation location is higher than the historical highest water level in the area. Do not deploy it in areas that may be flooded by water.
- The equipment should be installed 30 meters away from third-party wireless communication facilities.

4.1.2. Clearance Requirements

Appropriate distance must be reserved between the PCS SKID and walls and other equipment to meet the requirements of minimum maintenance access, escape routes and ventilation, as shown in the following figure and table.

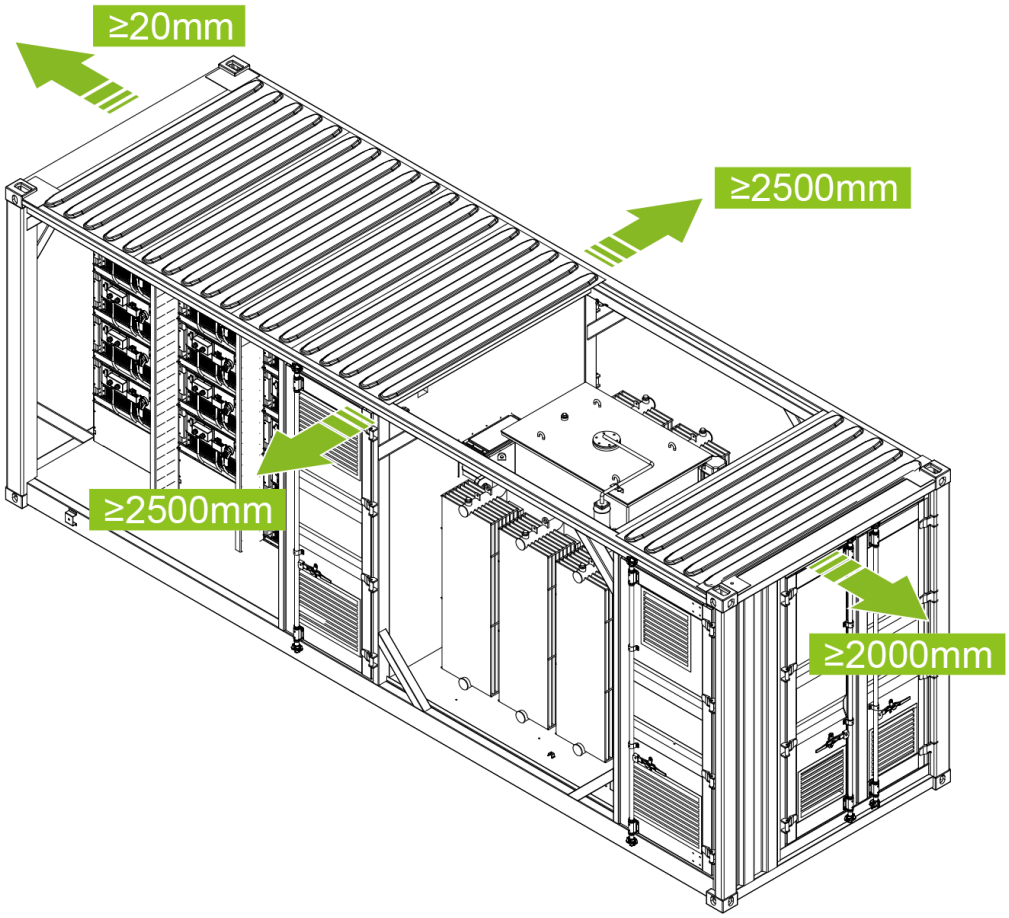


Fig. 4-1 Clearance requirement

4.1.3. Foundation Requirements

- The equipment must be installed on a structure with a cement foundation with flame-retardant materials on the surface or a structure supported by channel steel. It is essential to ensure that the foundation is flat, solid, safe, reliable, and has sufficient load-bearing capacity. Any depression or tilting on the foundation surface is strictly prohibited.
- Low cement piers with sufficient supporting capacity shall be set up on the foundation to ensure the firm installation of the PCS SKID and meet the requirements of cable wiring, and incoming and outgoing positions for cables should be reserved at the same time. The recommended scheme is shown in the following figure:

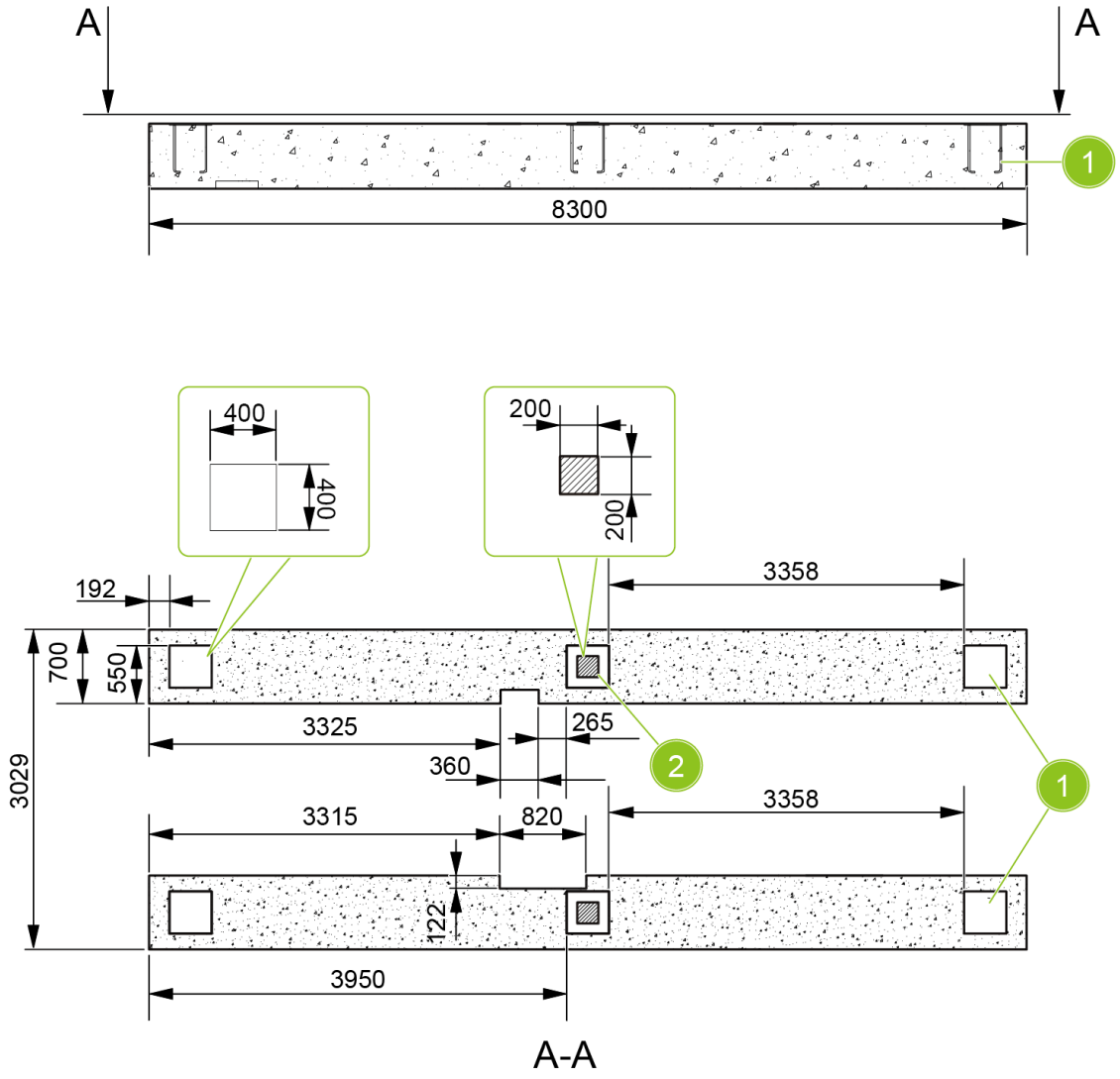


Fig. 4-2 Foundation overview

1. Steel plate (pre-embedded) 2. Cushion plate

- The equipment can be welded to the foundation steel plate or connected by other methods with equivalent firmness.

Technical Notes

- This drawing is for reference only and is intended to be used as a reference for customers to design the foundation. It cannot be used as a foundation construction drawing.
- Cable trenches should be preset according to the overall design of the power station and the incoming and outgoing cables at the bottom of the equipment when foundation is built. The specific wiring position of the PCS SKID shown in figure 4-3.
- The foundation reference plane of the equipment needs to be above the horizon and higher than the maximum precipitation height at the project site.

- The total weight of the equipment is approximately 18 tons. It is recommended that the minimum support weight of the foundation exceeds twice the total weight of the equipment.
- The flatness tolerance of the entire foundation shall be controlled within ±2mm; if the foundation flatness exceeds this requirement, after the equipment is installed, it may cause the cabinet door to fail to open and close normally, or even result in permanent deformation that cannot be repaired. Please strictly follow this requirement.

Location of incoming and outgoing line holes

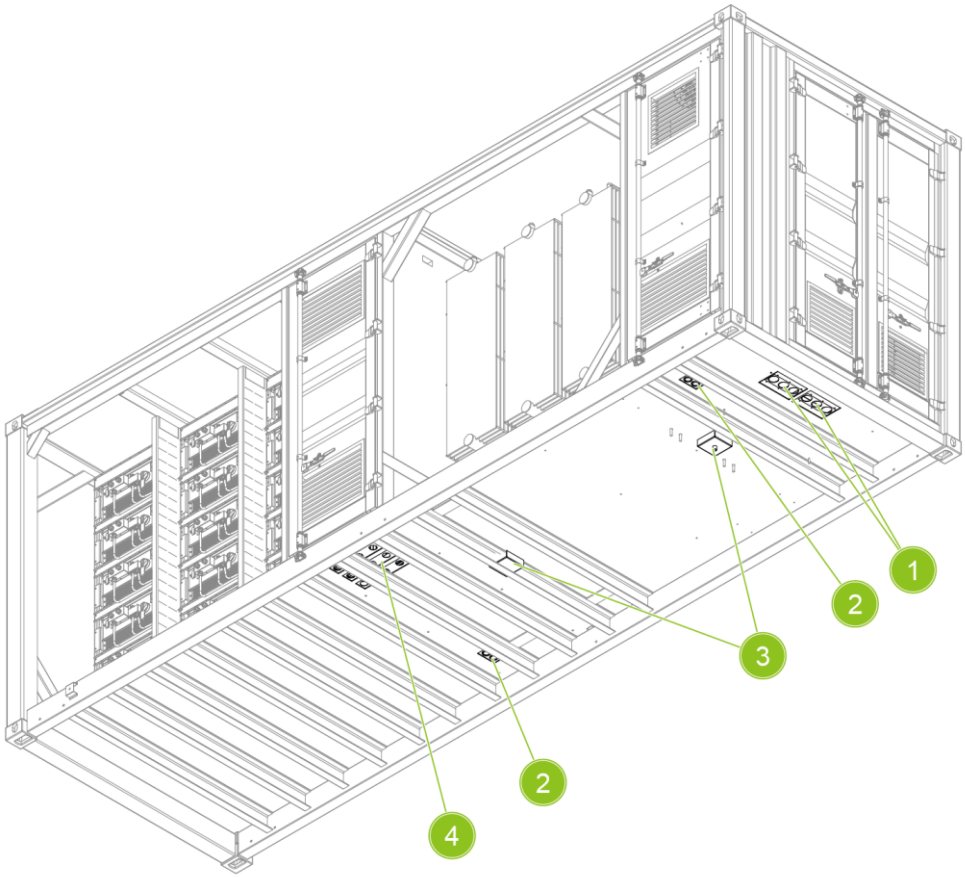


Fig. 4-3 Bottom line holes

1. RMU wiring hole
2. Communication/distribution wiring hole
3. Oil leakage hole
4. DC wiring hole

4.2. System Unpacking Inspection

4.2.1. Precautions

IMPORTANT!

- When removing packaging, use tools carefully to avoid scratching the equipment.
- During the equipment packaging removal process, ensure the equipment remains stable and balanced, and take appropriate protective measures.
- If the installation environment is poor, such as the presence of dust, corrosive gases, splashing water, and drastic temperature differences, etc., do not remove the packaging. If the packaging has been removed, please take dust-proof and anti-condensation measures (such as using dust covers, plastic films, or fabric covers) to avoid condensation or dust accumulation.

4.2.2. Scope of Delivery

Item	Name	Qty	Remark
1	Container	1	/
2	Control power cabinet	1	/
3	Combiner cabinet	1	/
4	3200KVA Transformer	1	Equipped with a moisture absorber
5	200KW PCS	16	/
6	NG7 Cabinet	1	/
7	NG7 Control lever	1	/
8	System equipment drawing	4	Transformer data SE data Container schematic design drawings Container wiring diagram
9	Door lock	4	/
10	Key	6	Door key: 4 Transformer high and low pressure box: 2

Item	Name	Qty	Remark
11	Cable accessories (Optional)	1	T-shaped head 6pcs.etc
12	Box cushion block	2	T16*200*200
13	Insulating carpet	2	T3.0*362*2788
15	Fireproof putty	5	/

4.2.3. Safety Inspection

Requirements

- The equipment involves high voltage and strong currents. Operation without professional supervision is prohibited. Operators must enhance their sense of safety and vigilance and always wear personal protective equipment (PPE), especially insulating gloves. The equipment must not be turned off or opened without authorization while it is running. In the event of an accident, quickly disconnect the main circuit breaker and ensure an immediate response is made to the responsible personnel.
- Pay attention to the weather conditions and enhance safety awareness during rainy days. Check the working environment where the equipment is located to ensure it is clean and tidy. Inspect whether the fire safety equipment is well-maintained and whether the escape routes are unobstructed.
- Ensure that the equipment has no insulation faults, and the insulation resistance of all busbars to ground is not less than 2.5MΩ as specified by national standards.

4.3. Installation



Before installation, please make sure the foundation is finished.

Steps

1. Put the 2 cushion plates (1) on the foundation, refer to figure 4-2.
2. Hoist the equipment onto the steel plate (2) of foundation.

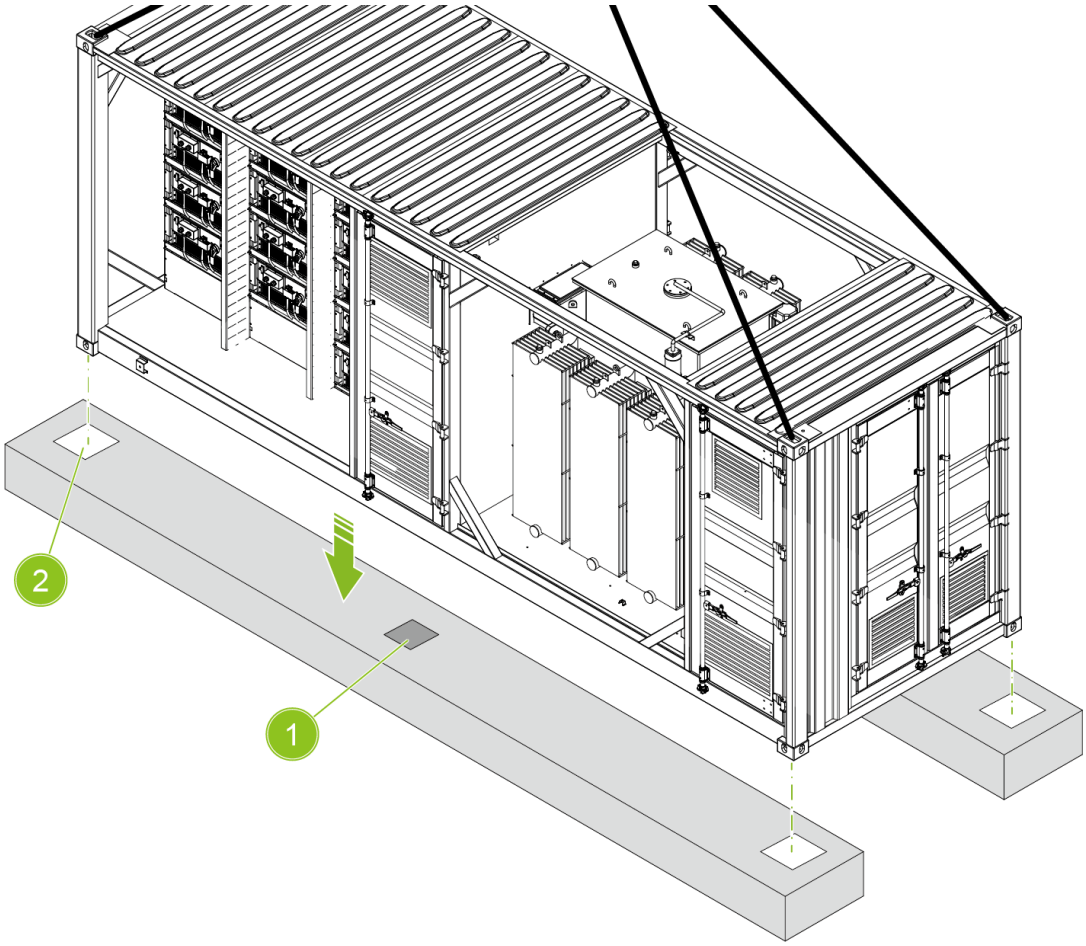


Fig. 4-4 Hoist the equipment on the foundation

3. Weld the four corners to the steel plates.

NOTICE!

- When conducting welding operations, please strictly follow the local laws and regulations.
- Welding personnel must possess the necessary qualifications.
- Fire prevention measures must be taken around the equipment.

5. Cable Connection



WARNING!

- Do not wear watches, rings, jewelry or other metal items.
- Before entering the construction site, correctly wear a helmet to protect your head. Also, wear insulating gloves and safety shoes.
- Use tools with good insulation to prevent accidental electric shock or short circuit.



IMPORTANT!

Before cable connection:

- Read the 1.3 Electrical Safety Principles carefully;
- Prepare PPE and tools by referring to Annex 1 & 2.



IMPORTANT!

To facilitate on-site cable connection, the wiring between the internal devices of the equipment has all been completed before leaving the factory. You only need to finish the following connections between external device and the equipment:

- Grounding
- AC power line wiring
- Communication wiring

5.1. Cable Specifications

NOTICE!

The cable diameter should adhere to applicable regional cable specifications. Key considerations in choosing an appropriate cable encompass its current-carrying capacity, insulation and construction type, connection method (direct burial), surrounding environmental temperature, and the allowable voltage drop across the circuit.

Prepare the cables by referring to the table below.

Table 5-1 Recommended cable specifications

Name	Cable type	Conductor cross sectional area
Grounding cable	Cable specialized for outdoor use	70-95 mm^2
DC cable	Outdoor 2-core wire	Cuprum, 150 mm^2 Aluminum, 300 mm^2
Control cable	6-core copper wire	6*1 mm^2
Secondary power supply cable	Flame-retardant Class C cross-linked polyethylene insulated steel tape armored power cable. 4-core and 2-core copper wire.	4*25 mm^2 2*2.5 mm^2
COM cable	Shielded twisted pair	TC-ER AWG17 3P+AB

Tool preparation (for reference)

No.	Tools	Specification	Purpose description
1	Open-end wrench	14 mm	M8 hexagon head screw
2	Open-end wrench	17 mm	M10 hexagon head screw
3	Open-end wrench	19 mm	M12 hexagon head screw
4	Straight screwdriver	3 mm	Dry contact wiring
5	Sleeve	7 mm	M4 nut
6	Sleeve	10 mm	M6 nut

No.	Tools	Specification	Purpose description
7	No.2 Phillips head screwdriver	0.8-1N·m (7.1-8.9 in-lb)	ST5.0xL13mm Phillips-slot self-tapping screw
8	No.2 Phillips head screwdriver	1.2 N·m (10.6 in-lb)	M4X10 Phillips-slot combination screw
9	Torque wrench	10 N·m (88.5in-lb)	M16/M12 two-headed screw
10	Torque wrench	12.5 N·m (110.6 in-lb)	M8 bolt
11	Torque wrench	25 N·m (221.3 in-lb)	M10 hexagon head screw
12	Torque wrench	40 N·m (354.0 in-lb)	M12 nut
13	Torque wrench	50 N·m (442.5 in-lb)	M12 hexagon head screw
14	Torque wrench	140±5 N·m (1283 ~ 1391 in-lb)	M16x50 combined screws

5.2. Grounding Connection

Overview

The grounding system comprises both the equipotential bonding inside the PCS Skid and the termination at the external grounding points.

- Internal grounding

  Before leaving the factory, the equipotential bonding connections among all equipment in the PCS SKID have been finalized and are collectively routed to the grounding copper busbar.

- External grounding

  To facilitate grounding, two grounding points are preset outside the PCS SKID, one is in the front of PCS, the other is in the the diagonal corner (beside the transformer).

NOTICE!

It is recommended to ground both the two grounding point.

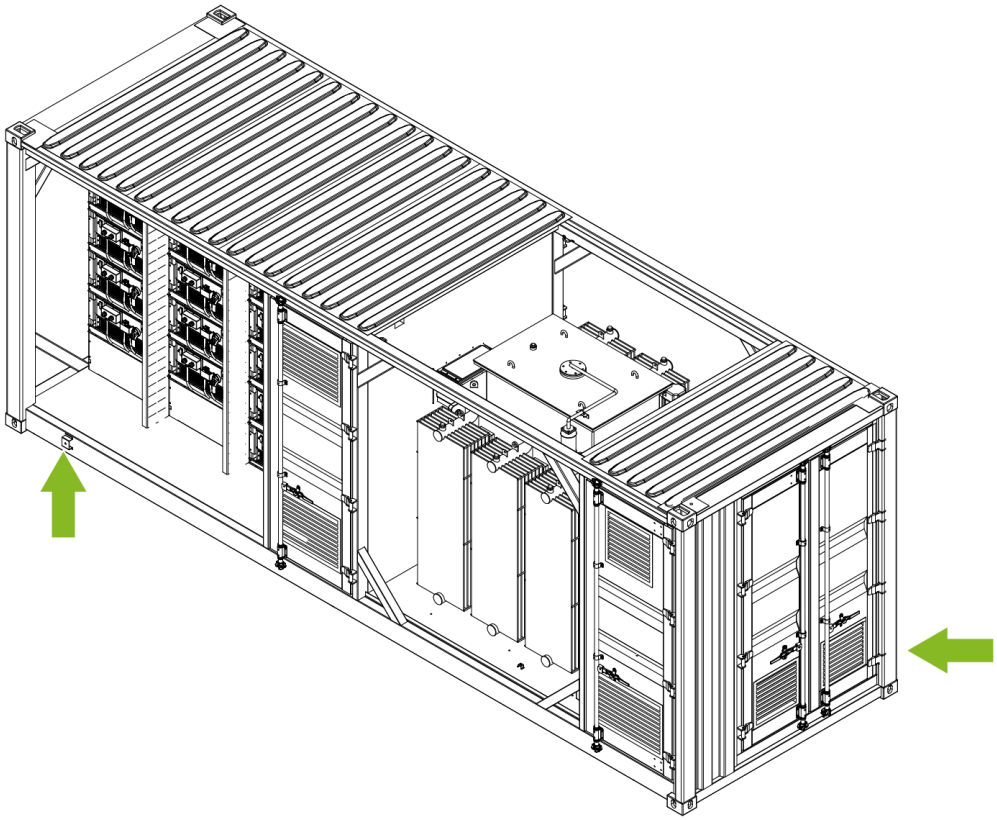


Fig. 5-1 External grounding point

Grounding method 1

1. Prepare the grounding terminal (TLK35-8 is recommended).

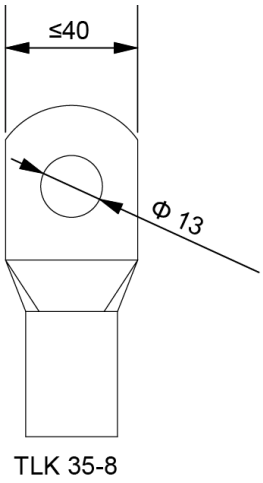


Fig. 5-2 Grounding terminal (Unit: mm)

2. Strip off wire and prepare heat shrink tubing as shown below.

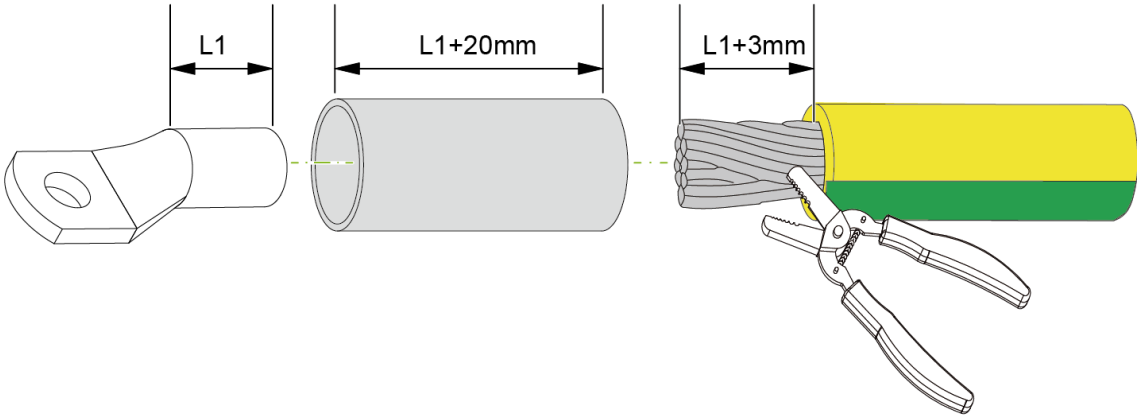


Fig. 5-3 Strip wire and prepare heat shrink tubing

3. Install the heat shrink tubing and crimp wire and terminal.

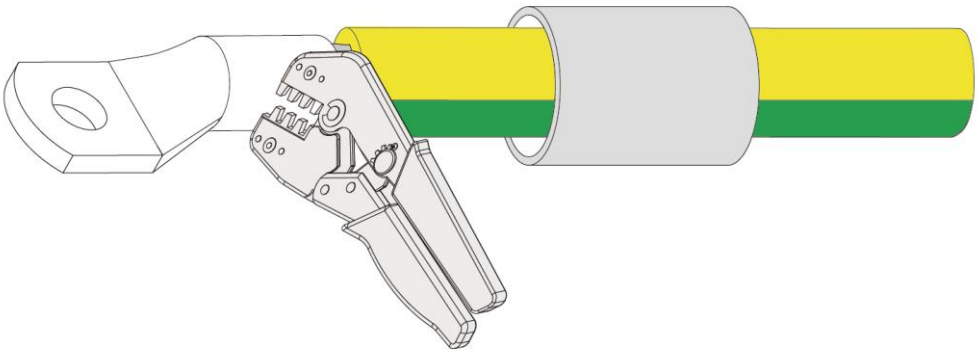


Fig. 5-4 Crimp wire on the terminal

4. Seal heat shrink tubing by using hot air gun.

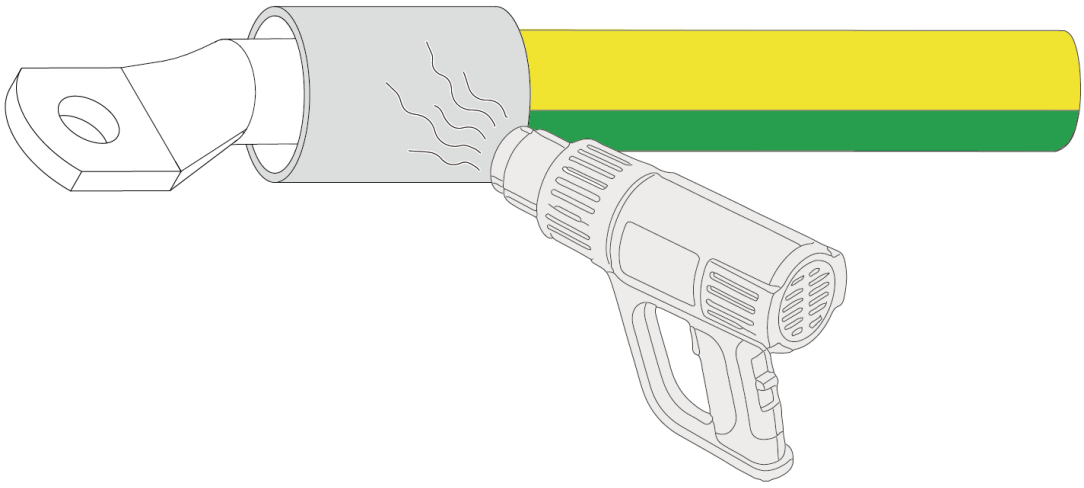


Fig. 5-5 Seal the heat shrink tubing

5. Tighten the grounding terminal with M12 combined bolt (prepared by customer).

   Torque: 50±5 N·m (398 ~ 487 in-lb).

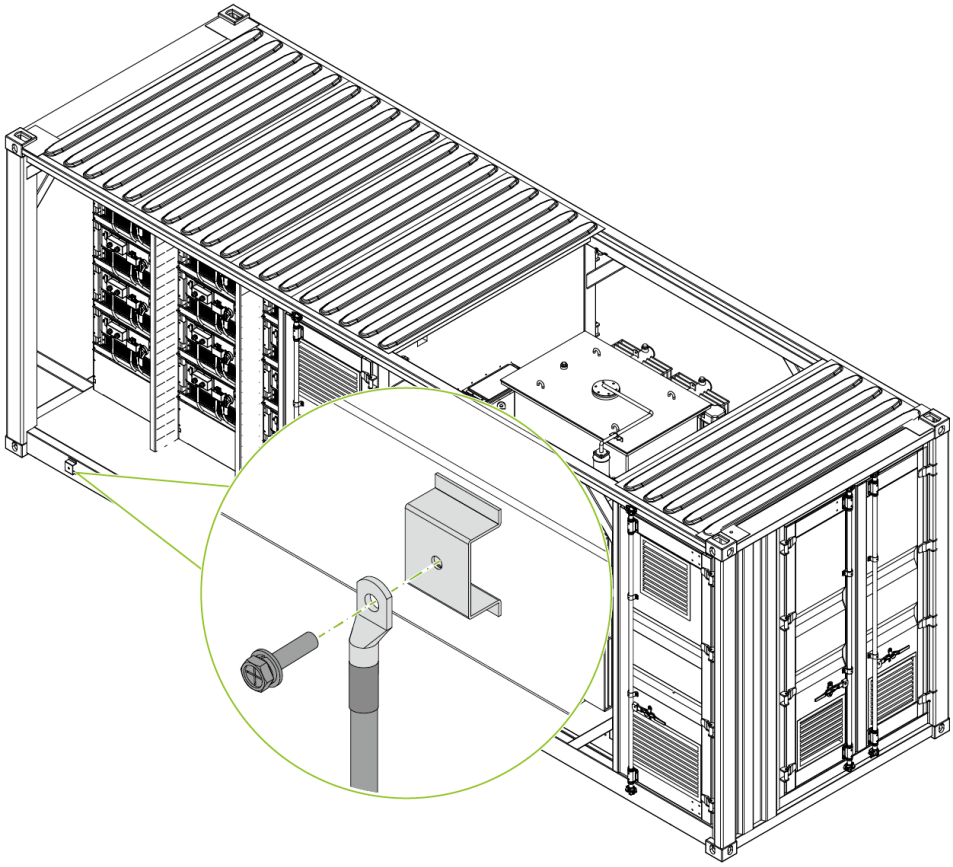


Fig. 5-6 Connect the grounding cable

Grounding method 2

1. Prepare galvanized flat steel as the following figure.

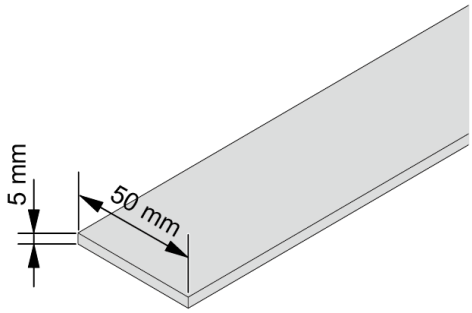


*Fig. 5-7 50*5mm galvanized flat steel*

2. Drill the installation hole on the galvanized flat steel. Tap the hole with a tap.

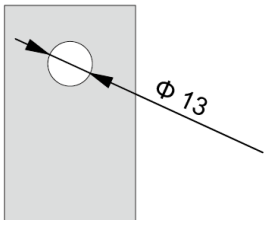


Fig. 5-8 Drill installation hole

3. Tighten the galvanized flat steel on the grounding with M12 combined bolt (prepared by customer).

   Torque: 50±5 N·m (398 ~ 487 in-lb).

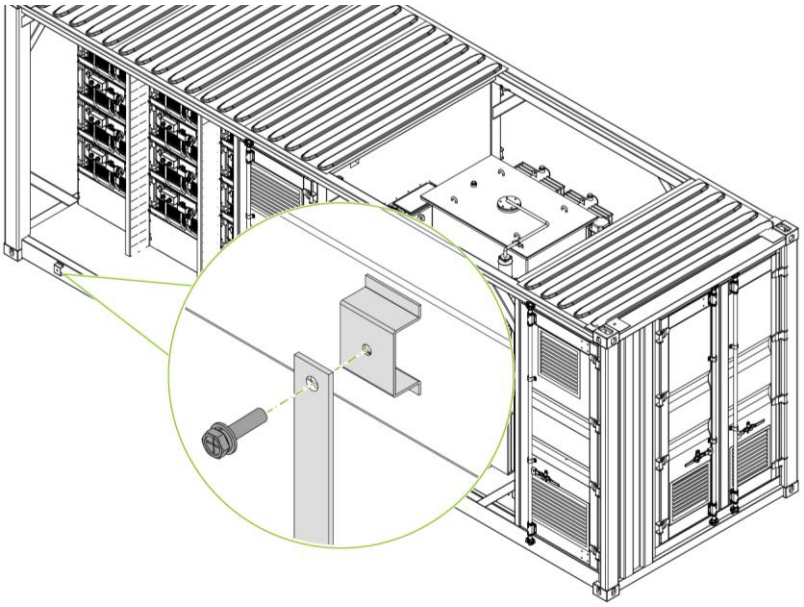


Fig. 5-9 Tighten the galvanized flat steel

4. Weld the other side of galvanized flat steel to the substation grounding net.

5.3. Connection Instruction of Electrical Component

This section introduces the connection methods of different electrical components, include:

- Molded case circuit breaker.
- Miniature circuit breaker
- Terminal block

5.3.1. Connection of Molded Case Circuit Breaker

1. Prepare the terminal (TLK25-6 and TLK35-6 is recommended).

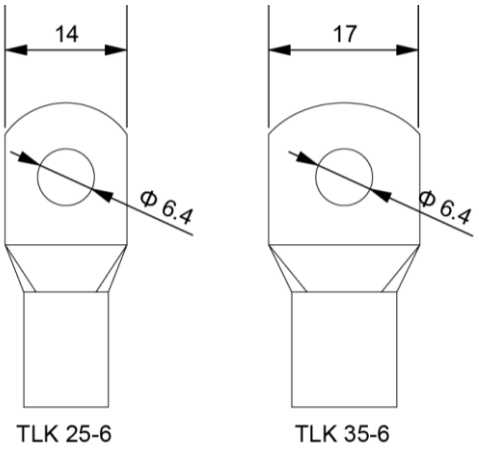


Fig. 5-10 TLK25-6 & TLK35-6

2. Connect the cable and terminal in the same way of grounding cable, you can refer to figure 5-1~5-3
3. Loosen and take off the hex socket combination bolt (1).

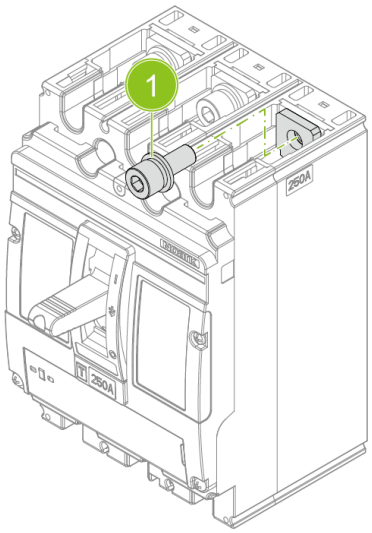


Fig. 5-11 Take off the bolt

4. Align the terminal (2) hole with the hole of molded case circuit breaker, tighten the hex socket combination bolt.

   Torque: 12.5 N.m.

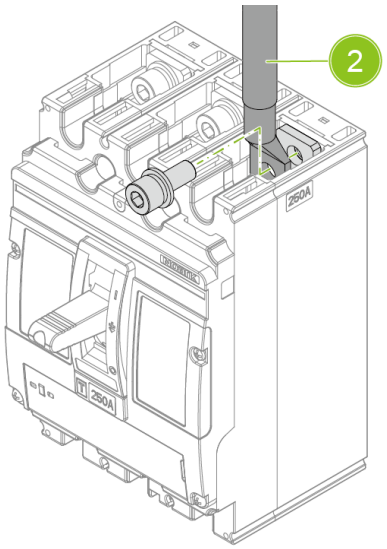


Fig. 5-12 Fix the terminal

5.3.2. Connection of Miniature Circuit Breaker

1. Prepare the tube terminal by referring to the figure below.

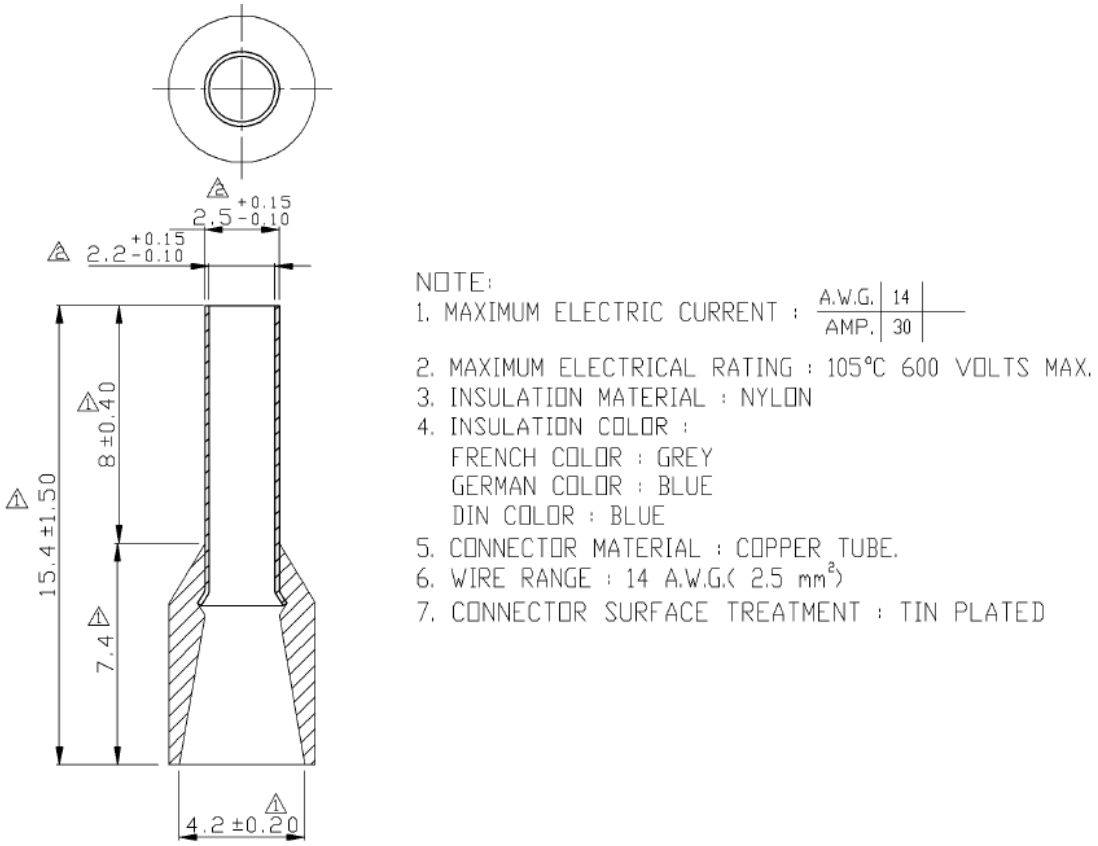


Fig. 5-13 Tube terminal information

2. Strip the jacket and insulation layer of the cable to the appropriate length, exposing the conductor. Insert the conductor into the tube terminals until contacting the terminal's barrel end, align the cable insulation edge with the terminal's crimping wings, then crimp firmly to secure the connection.

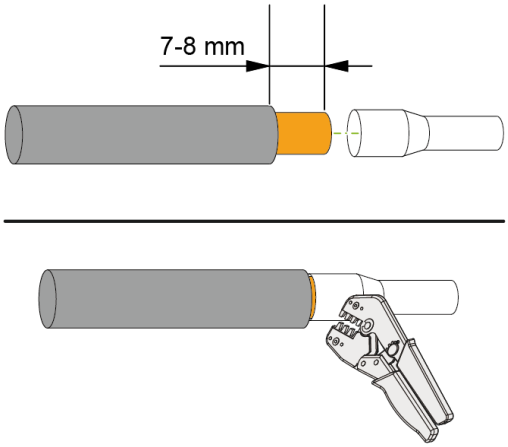


Fig. 5-14 Connect the tube terminal and cable

3. Loosen the screw of miniature circuit breaker, insert the tube terminal until contact the end, then tighten the screw.

   Torque: 2.0 N·m.

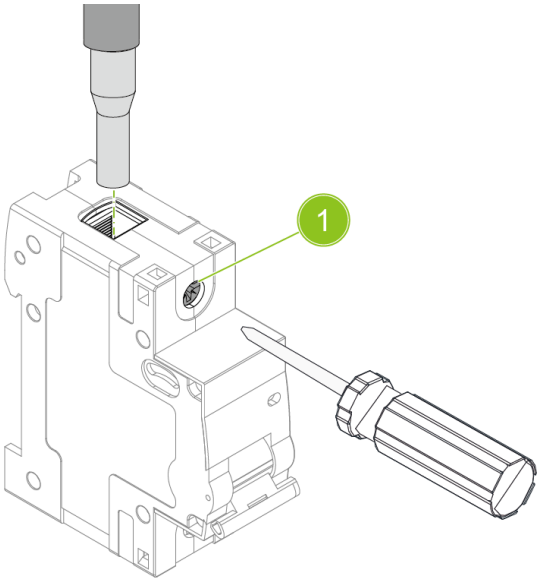


Fig. 5-15 Insert the tube terminal

5.3.3. Connection of Terminal Block

1. Strip the jacket and insulation layer of the cable to the appropriate length, exposing the conductor.

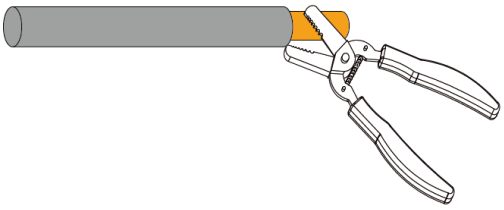


Fig. 5-16 Strip the insulation layer

2. Prepare tube terminal according to the cable diameter.
3. Insert the conductor into the tube terminals (Recommend) until contacting the terminal's barrel end, align the cable insulation edge with the terminal's crimping wings, then crimp firmly to secure the connection.

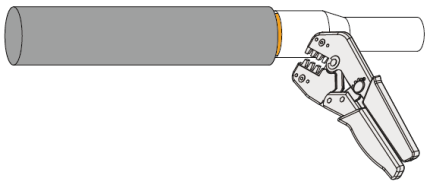


Fig. 5-17 Connect cable to tube terminal

4. Loosen the screw of the terminal.
5. Insert the conductor into the terminal strip until contact the end and tighten the screw.

   Torque: refer to the table 5-2 below.

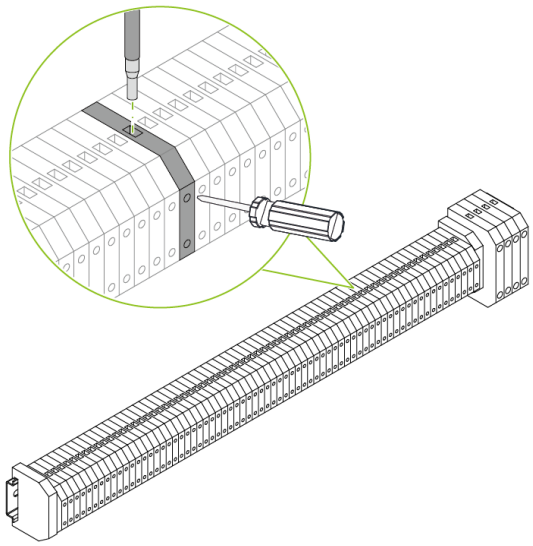


Fig. 5-18 Connect cable to terminal block

Table 5-2 Torque of terminal block

Screw	Torque
M2.5	0.5 N·m
M3	0.7～1.0 N·m
M3.5	1.0 N·m
M4	1.5～2.0 N·m
M5	2.5 N·m

5.4. RMU Wiring

The connection terminals of the PCS SKID and external medium-voltage equipment are located inside the RMU.

Refer to Other Manual

On site, refer to the specific manual of the RMU for wiring position.

Cable label	Origin: RMU cabinet	Terminal point (consumer substation)	Cable (Prepared by customer)
1#1DY-1	D cabinet (A, B, C)	Grid-tied cabinet (L1, L2, L3)	33kV 3*120mm²

T-shape connector installation

You can also click https://mp.weixin.qq.com/s/fDqxf0Qns9gkmXod7jSozw to see the installation video.

Step 1. Prepare the cable.

1. Remove copper shield against the end of cold/heat shrink tube.
2. Bevel the semi-conductive layer cut for 3mm to make smooth transition to insulation. Bevel the edge of insulation for 2mmx45°.
3. Wrap the phase marking strip to the cold/heat shrink tube according to original phases.

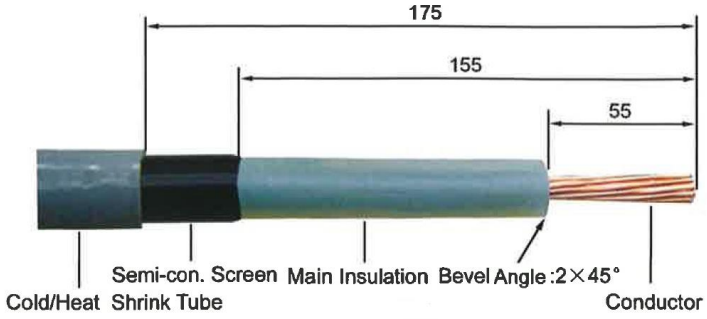


Fig. 5-19 Prepare the cable (Unit: mm)

NOTICE!

When beveling the semi-conductive layer cut, ensure that the knife edge faces the semi-conductive layer so as not to damage insulation. There should be no scratching, cutting trace or conductive particles on the insulation.

Step 2. Install semi-conductive tape.

1. Stretch the semi-conductive tape to 150% of its original length, wrap around the semi-conductive screen and cold/heat shrink tube (few loops on semi-conductive screen first to level with cold/heat shrink tube), forming a cylinder stage of 10-15mm wide, 4~5mm thick.

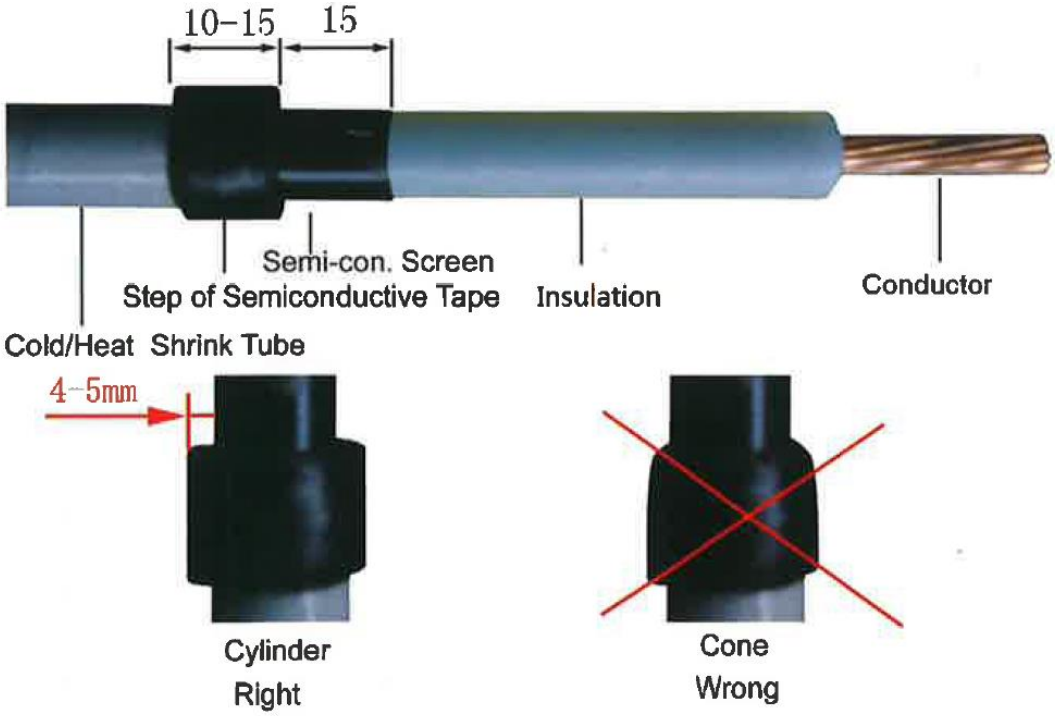


Fig. 5-20 Wrap Semi-conductive Tape

NOTICE!

First wrap-around semi-conductive screen until it is level with the surface of cold/heat shrink tube. The semi-conductive tape must be wrapped into a cylinder: Other shapes will cause location problems. Keep the semi-conductive tape clean and stretched to 150% of its original length.

Step 3. Clean the insulation layer.

Check the main insulation. If there are remaining semiconductive particles or knife marks, they can be polished clean with fine sandpaper. If there are remaining semiconductive particles or knife marks, they can be polished with fine sandpaper. Use cable cleaning paper to clean the main insulation and the semiconductive layer from the main insulation towards the semiconductive layer in one go. Do not clean in the opposite direction to avoid bringing the semiconductive particles onto the main insulation.

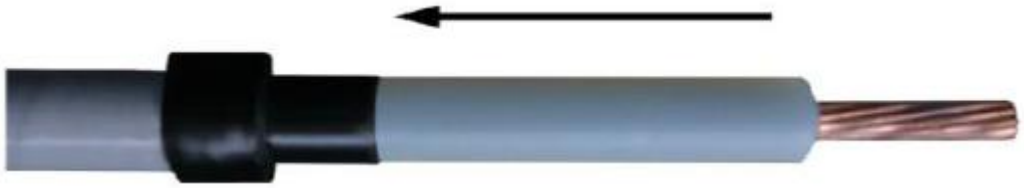


Fig. 5-21 Clean the insulation layer

Step 4. Install the cable adapter.

1. Protect the conductor with PVC tape (1).
2. Apply insulating grease (2) on the cable.
3. Insert the cable into the adapter until the conductor is fully exposed.

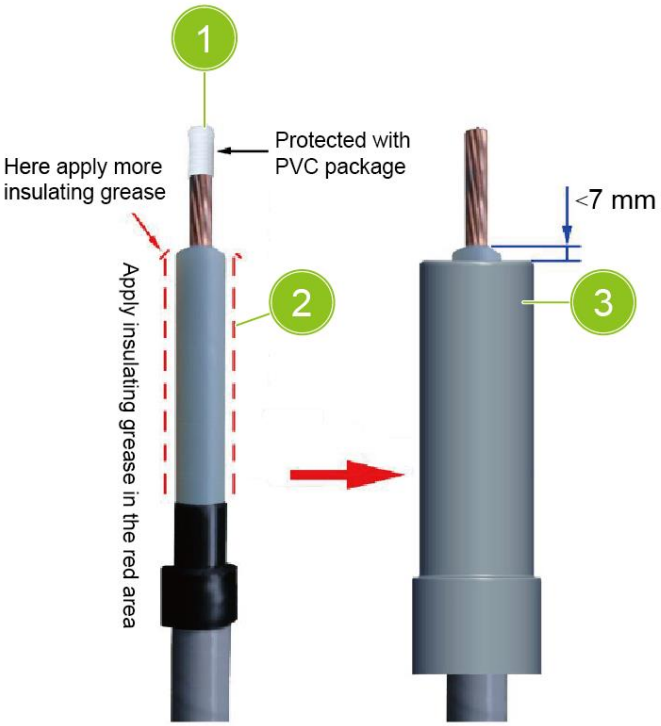


Fig. 5-22 Install the adapter

4. Remove the PVC tape and grease.

Step 5. Use the crimping pliers to press the wiring terminals onto the cable conductor in three times.

NOTICE!

The plane of the wiring terminals should be parallel to the end face of the socket. After protecting the outer surface of the stress body, use a sanding belt to remove the burrs on the terminals. Use a clean paper to wipe off all the metal conductive particles and dust.

Step 6. Install front T-shaped connector.

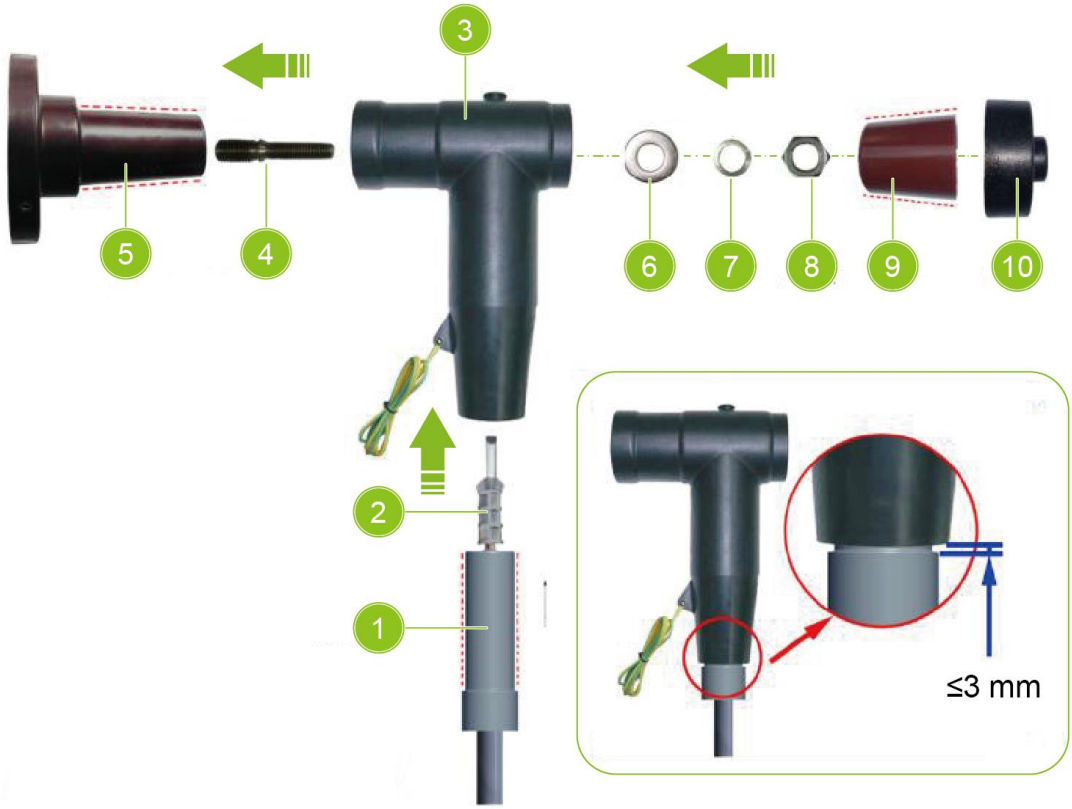


Fig. 5-23 Installation diagram of the front T-shaped connector

1. Cable adapter	2. Terminal	3. T-shaped connector	4. Two-headed screw
5. Bushing	6. Flat washer	7. Spring washer	8. Hex nut
9. Insulated plug	10. End cap		

1. Evenly apply a layer of grease on the surface of the cable adapter (1) and the surface of the inner hole of T-shaped connector.
2. Crimp the terminal (2), perform a three-step crimping process using a crimping tool to secure the terminal onto the cable conductor.
3. Push the cable into the lower hole of the T-shaped connector (3) to ensure that the terminal is in place and the terminal hole is centered. Refer to figure 5-22.

NOTICE!

The distance between the plug body exposed outside the large step surface of the stress body is less than 3mm.

4. Tighten the M16/M12 two-headed screw (4) into the bushing (5) (Torque: 10 N·m), with the M16 end (thicker side) forward, clean the mounting hole of T-shaped connector, surface of cable adapter and surface of bushing.



Fig. 5-24 Tighten the two-headed screw

5. After cable cleaning, apply grease to the cleaned mounting hole of T-shaped connector, surface of cable adapter and surface of bushing.



Fig. 5-25 Clean and apply grease

6. Push the T-shaped connector into the bushing and the lugs are set on the stud.
7. If the T-shaped connector is no longer needed to be connected, successively assemble flat washer (6), spring washer (7) and hex nut (8) onto the T-shaped connector. Tighten the hex nut into thread of two-headed screw (4) with supplied socket (Torque: 40 N·m). Clean and lubricate the mating interfaces of T-shaped connector and insulated plug. Screw the insulated plug (9) in place and put on the end cap (10). Refer to figure 5-22.
8. Repeat steps 1-5 to install the other two T-shaped connectors, ensuring a minimum spacing of 5mm between phase connectors.

NOTICE!

The mating interfaces must be clean and lubricated with lubricating grease.

9. Fix the trifurcation part of the cable and ground the cable earth wire per relevant system earthing requirements.
10. Mark the phase color.

Step 7. Install the rear T-shaped connector.

1. Remove the cap, plug, nut, spring washer, and flat washer from the front T-shaped connector in sequence.
2. Install the connecting rod (11) into the front T-shaped connector (12).
3. Install the rear T-shaped connector (13)a in the same way of front T-shaped connector, refer to step 6.

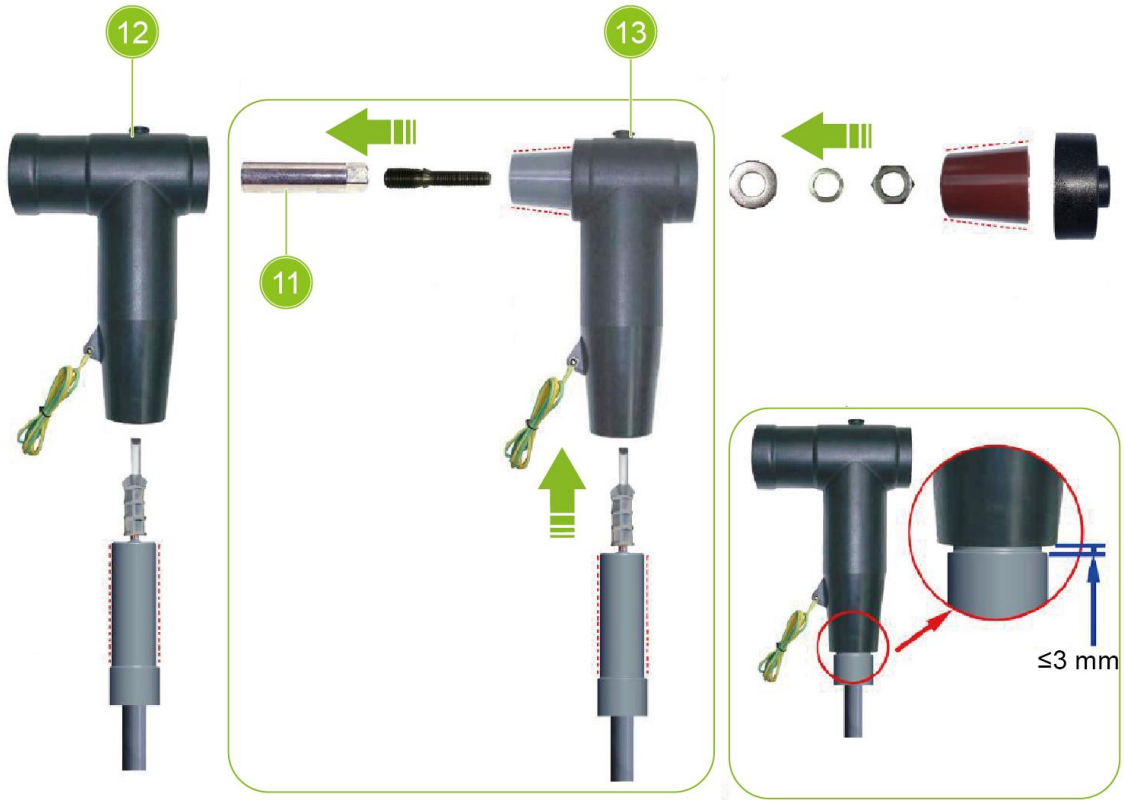


Fig. 5-26 Install the rear T-shaped connector

Step 8. Pass the steel branch through the bushing, and place the hex nut, the spring washer, and the flat washer in turn. Hold the steel branch against the stud, install the nut and washer, and tighten the nut with a torque of no less than 40 N·m (354 in-lb).



Fig. 5-27 Install the nut and washer

5.5. DC Combiner Cabinet Wiring

To get the best performance from your PCS SKID, follow these guidelines:

- Ensure that the maximum output voltage of the battery cluster is lower than 1500V.
- Ensure that the polarity on the DC input side is correct, i.e. the positive pole of the battery cluster is connected to the positive DC input of the PCS SKID, and the negative pole of the battery cluster is connected to the negative input of the PCS SKID.

Cable routing

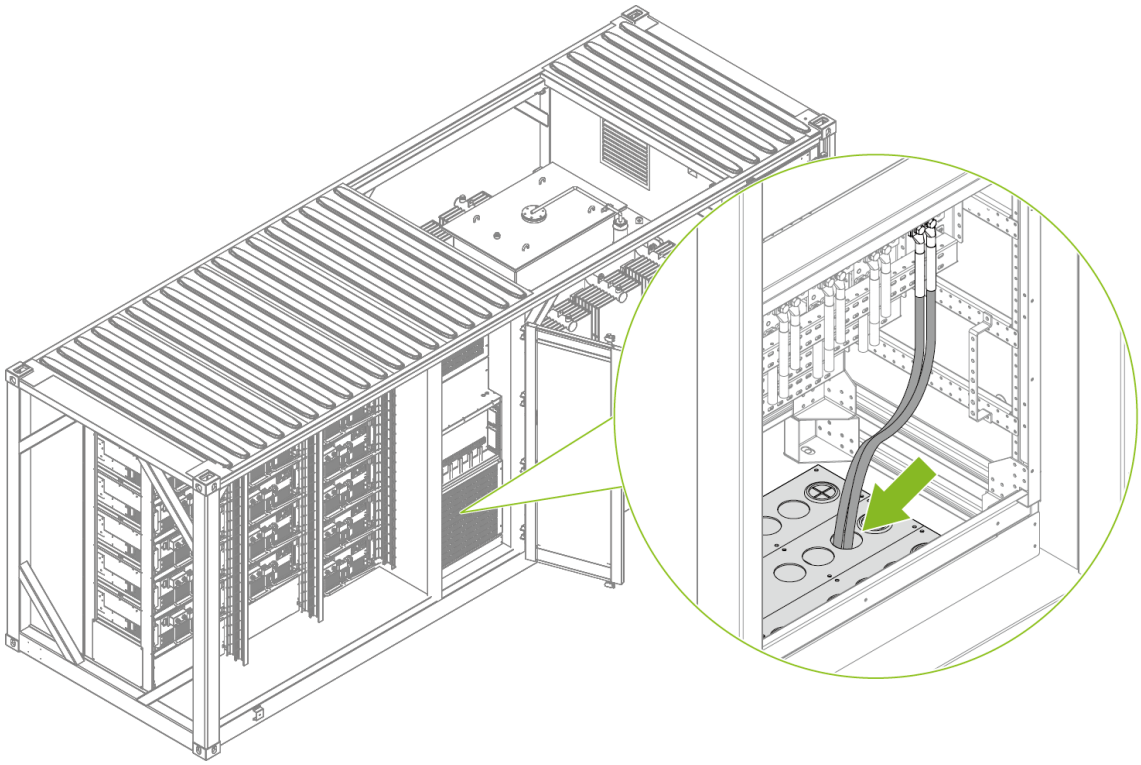


Fig. 5-28 Cable routing of DC cables

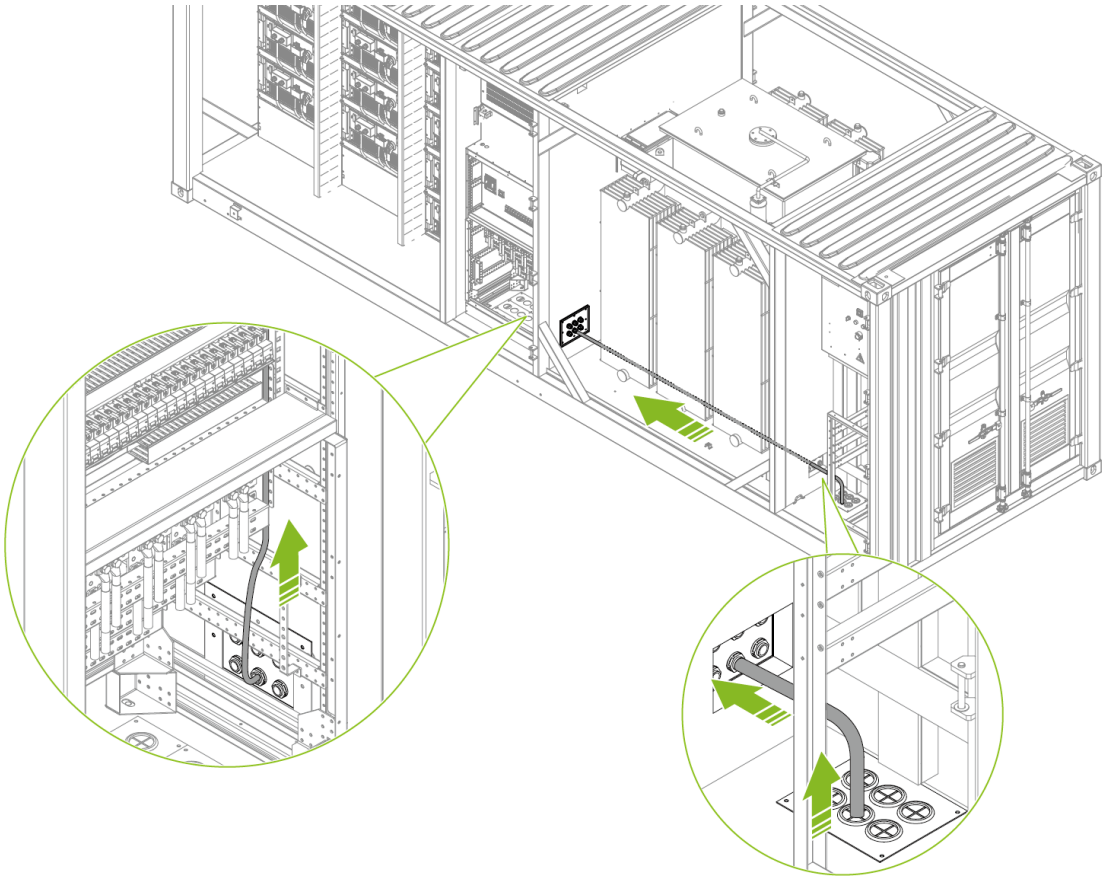


Fig. 5-29 Cable routing of the other cables in combiner cabinet

5.5.1. DC Cable Connection

Location

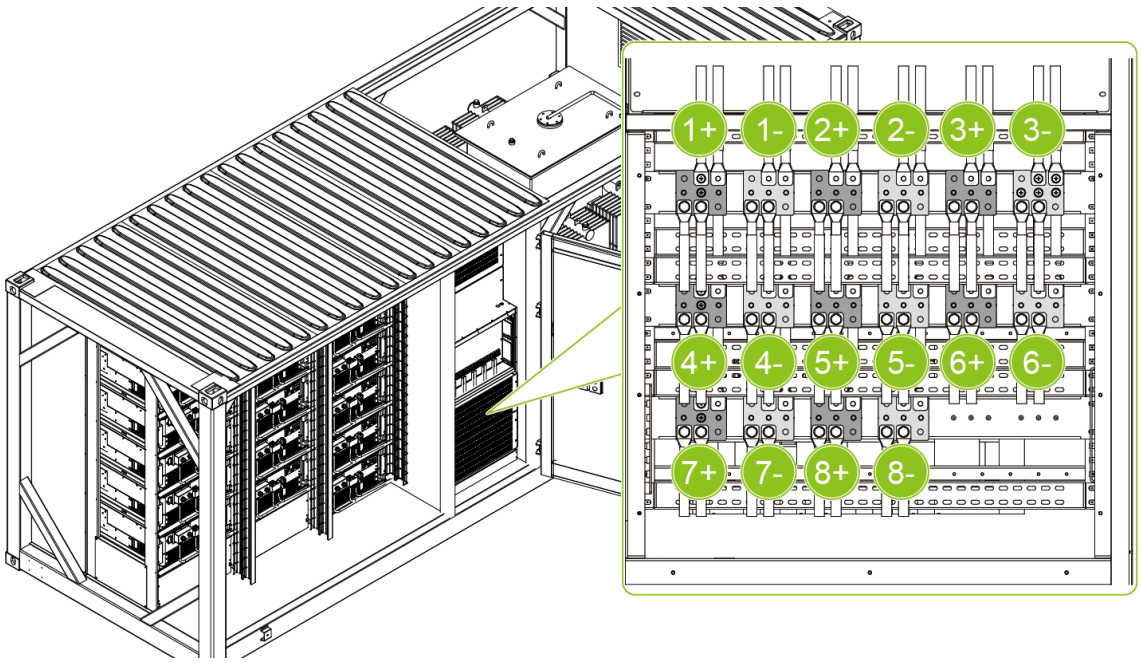


Fig. 5-30 DC terminal

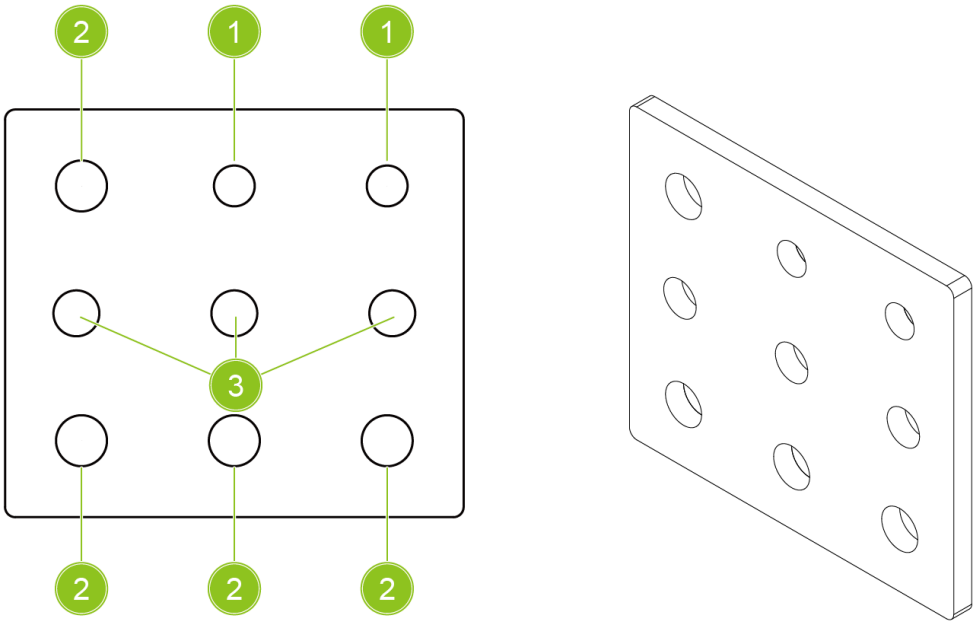


Fig. 5-31 Copper Bar for DC wiring (unit: mm)

1. M8 hole 2. M10 hole 3. Insulating post hole

Table 5-3 Recommendations for DC wiring

Item	Value
Recommended cable diameter	≥95mm² Cu or ≥120mm² Al
Bolt	M8 or M10
Torque	M8: 12.5 N·m (110.6 in-lb) M10: 25.0 N·m (221.2 in-lb)

Connection information

Table 5-4 Information of DC wiring between battery container and PCS SKID

Cable label	Recommended cable	From Battery container combiner cabinet	To PCS SKID DC combiner cabinet
1#1DY-1	ZC-YJLY22-1.8/3kV 2X300mm²	1L+	1DC+
		1L-	1DC-
1#1DY-2	ZC-YJLY22-1.8/3kV 2X300mm²	2L+	2DC+
		2L-	2DC-
1#1DY-3	ZC-YJLY22-1.8/3kV 2X300mm²	3L+	3DC+
		3L-	3DC-
1#1DY-4		4L+	4DC+

Cable label	Recommended cable	From Battery container combiner cabinet	To PCS SKID DC combiner cabinet
	ZC-YJLY22-1.8/3kV 2X300mm²	4L-	4DC-
1#1DY-5	ZC-YJLY22-1.8/3kV 2X300mm²	5L+	5DC+
		5L-	5DC-
1#1DY-6	ZC-YJLY22-1.8/3kV 2X300mm²	6L+	6DC+
		6L-	6DC-
1#1DY-7	ZC-YJLY22-1.8/3kV 2X300mm²	7L+	7DC+
		7L-	7DC-
1#1DY-8	ZC-YJLY22-1.8/3kV 2X300mm²	8L+	8DC+
		8L-	8DC-

Connection Steps

1. Prepare the DC wiring terminal (KS70-10).

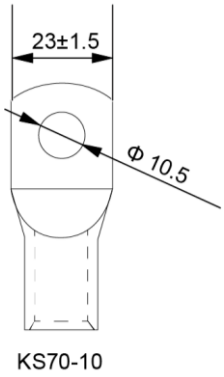


Fig. 5-32 DC wiring terminal (unit: mm)

2. Insert the DC cables into the cabinet through the container bottom hole. Refer to figure 5-22.
3. Strip off wire and prepare heat shrink tubing as shown below.

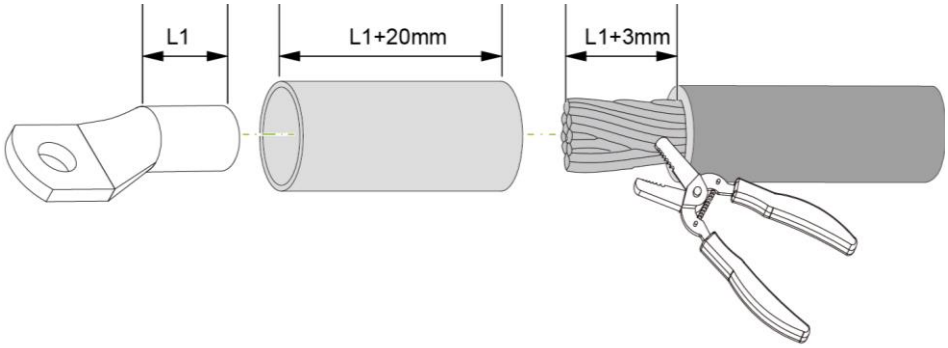


Fig. 5-33 Strip wire and prepare heat shrink tubing

4. Install the heat shrink tubing and crimp wire and terminal.

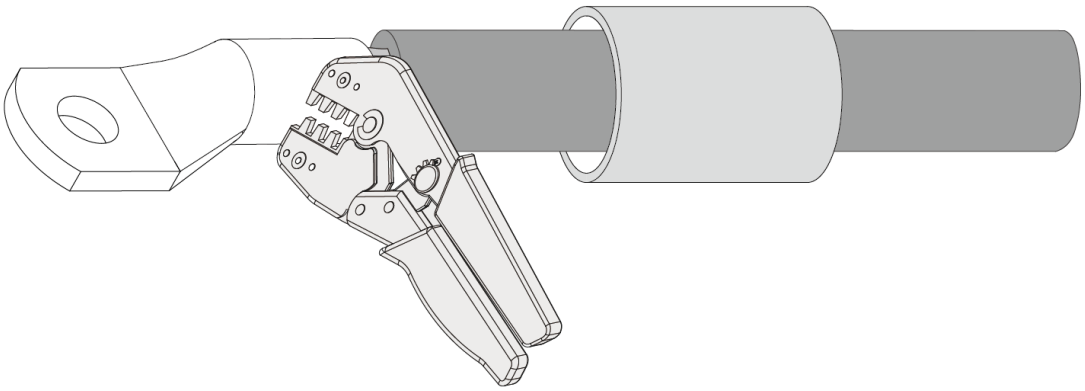


Fig. 5-34 Crimp wire on the terminal

5. Seal heat shrink tubing by using hot air gun.

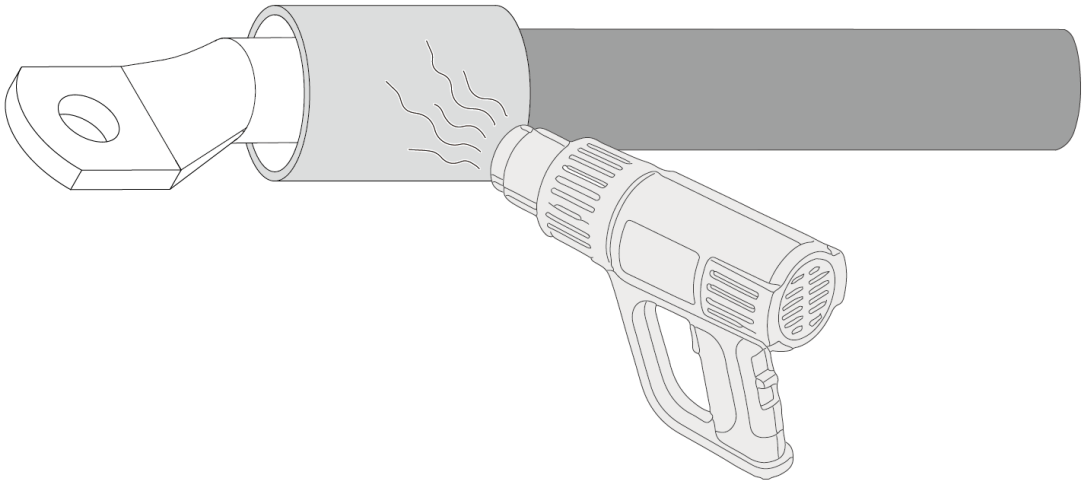


Fig. 5-35 Seal the heat shrink tubing

6. Connect the DC positive and negative cables to the positive and negative copper bars of PCS SKID combiner cabinet accordingly, refer to table 5-4 Information of DC wiring between battery container and PCS SKID for detail.
7. Tighten the terminal on the copper bar.

- It is recommended to use standard copper terminals or copper-aluminum composite terminals.
- Copper or aluminum-core cables with an operating temperature of 90°C or above are recommended.
- Hexagonal cross section is recommended for the crimping of wiring terminals and cables with 2-3 times.
- Please confirm the number of DC input channels, select an appropriate cable diameter, then fix the wiring terminal on the copper bar according to the connection method shown in the following figure, and lock it with a torque wrench.

  Torque: M8: 12.5 N·m (110.6 in-lb), M10: 25.0 N·m (221.2 in-lb)

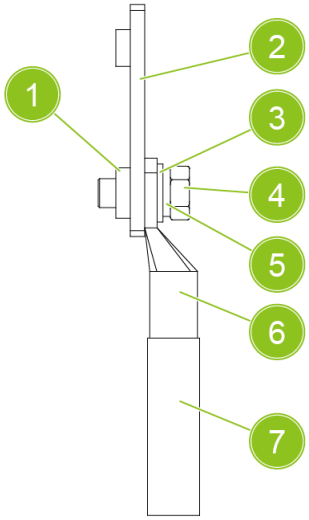


Fig. 5-36 Connection of DC Input Cable

1. Swage nut
2. Copper bar
3. Flat washer
4. Screw
5. Spring washer
6. Terminal
7. Cable

5.5.2. PCS Fault Dry Contact Connection

Terminal block location

Before connection, loosen the 6 M6 combination screws and remove the cover.

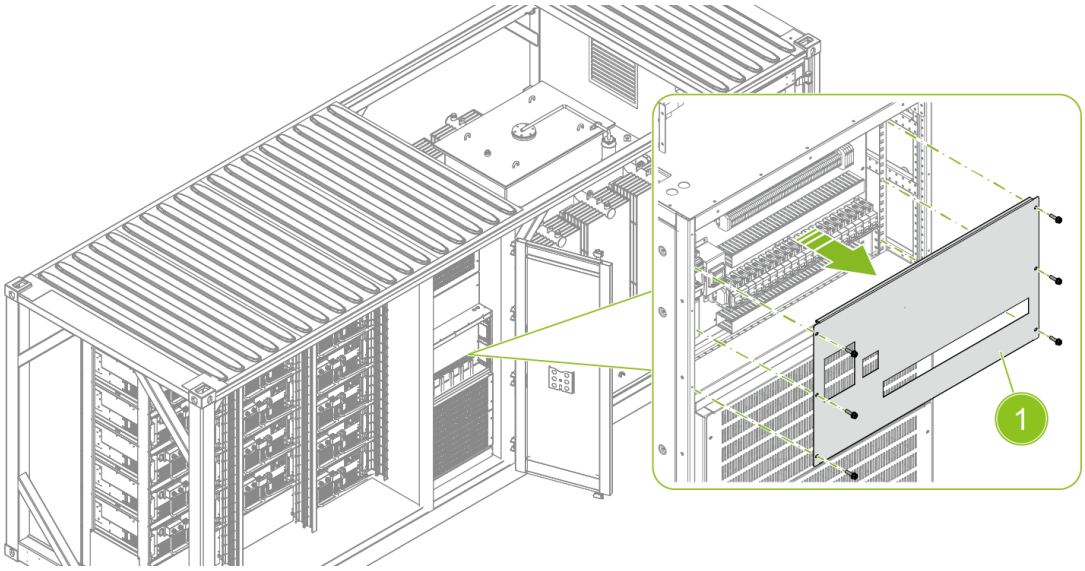


Fig. 5-37 Remove the cover

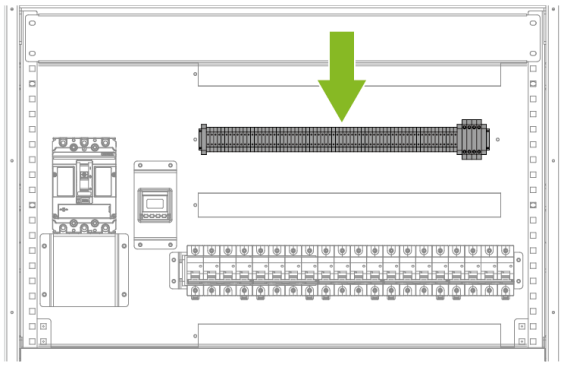


Fig. 5-38 Fault dry contact terminal block

Connection information

Cable label	From battery container power distribution box	To PCS SKID combiner cabinet	Cable
1#1KX-2	5XT-1	4XT-45	Control cable 1mm²
	5XT-2	4XT-46	
	5XT-3	4XT-47	
	5XT-4	4XT-48	
1#1KX-3	5XT-5	4XT-49	Control cable 6*1mm²
	5XT-6	4XT-50	

Cable label	From battery container power distribution box	To PCS SKID combiner cabinet	Cable
	5XT-7	4XT-51	
	5XT-8	4XT-52	
1#1KX-4	5XT-9	4XT-53	Control cable 6*1mm²
	5XT-10	4XT-54	
	5XT-11	4XT-55	
	5XT-12	4XT-56	

Connect steps

1. Route the cable into the DC combiner cabinet by referring to figure 5-28.
2. Put the cables in the wire duct (2) and fix the cables with cable ties (3).

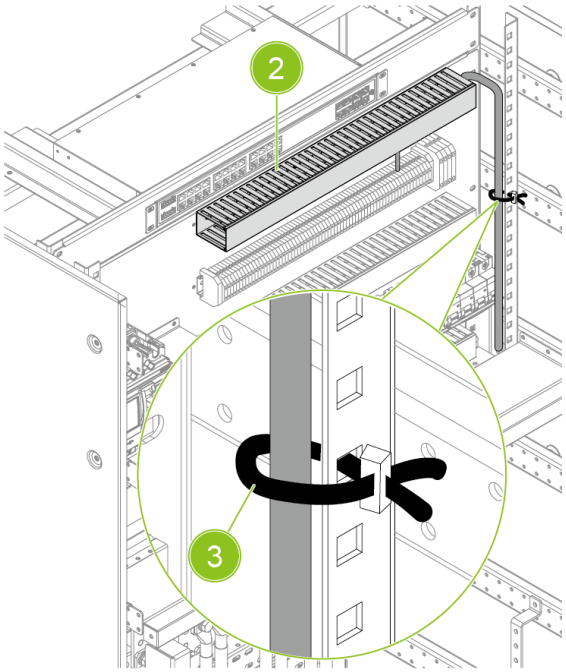


Fig. 5-39 Fix the cables

3. Connect the cable to the terminal strip, refer to 5.3.3 Connection of Terminal Block.

5.5.3. CAN Communication Connection

Terminal block location

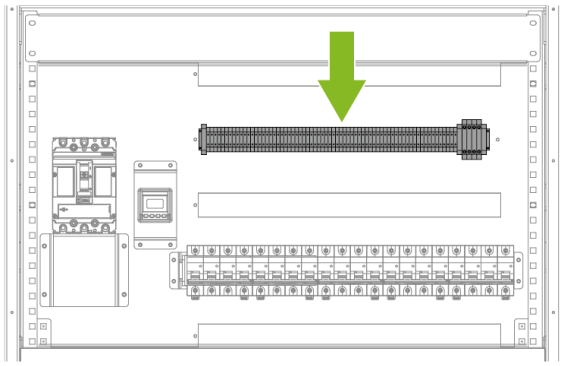


Fig. 5-40 Fault dry contact terminal

Connection information

Cable label	From battery container power distribution box	To PCS SKID DC combiner cabinet	Cable
1#1TX-1	4XT-31	4XT-6	Shielded twisted pair, TC-ER AWG17 3P+AB
	4XT-32	4XT-7	
	4XT-33	4XT-8	
	4XT-34	4XT-9	
	4XT-47	4XT-18	
1#1TX-2	4XT-35	4XT-10	Shielded Twisted Pair, TC-ER AWG17 3P+AB
	4XT-36	4XT-11	
	4XT-37	4XT-12	
	4XT-38	4XT-13	
	4XT-49	4XT-19	
1#1TX-3	4XT-39	4XT-14	Shielded twisted pair, TC-ER AWG17 3P+AB
	4XT-40	4XT-15	
	4XT-41	4XT-16	
	4XT-42	4XT-17	
	4XT-51	4XT-37	
1#1TX-4	4XT-43	4XT-25	

Cable label	From battery container power distribution box	To PCS SKID DC combiner cabinet	Cable
	4XT-44	4XT-26	Shielded twisted pair, TC-ER AWG17 3P+AB
	4XT-45	4XT-27	
	4XT-46	4XT-28	
	4XT-53	4XT-38	

Connection steps

Connection steps are same as section 5.5.2 PCS Fault Dry Contact Connection.

5.5.4. Secondary power supply connection

Location

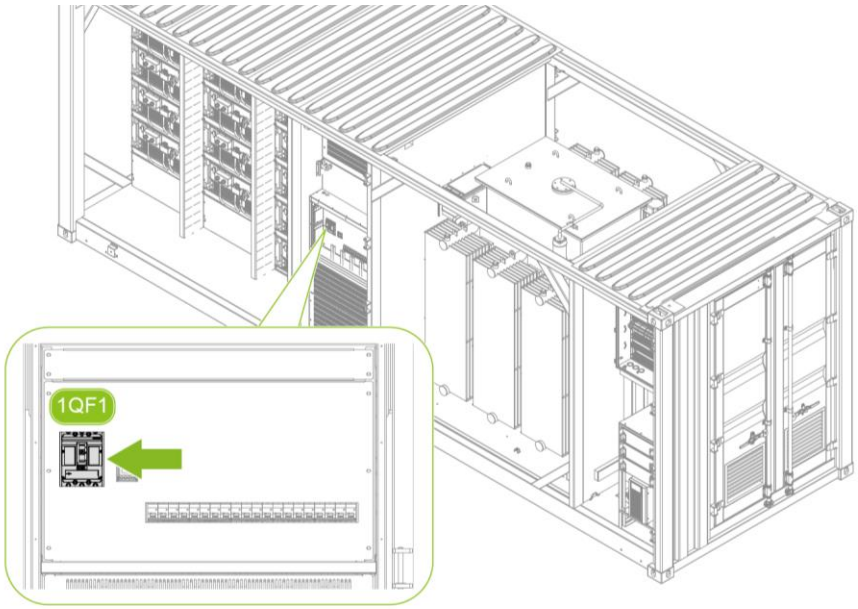


Fig. 5-41 Secondary power supply connection

Connection information

Cable label	Terminal of Battery container combiner cabinet	Terminal of control power cabinet	Cable
1#1DY1-9	QFM-1	1QF1-2	ZC-YJY22-0.6/1kV 4*25 mm²
	QFM-2	1QF1-4	
	QFM-3	1QF1-6	
	QFM-4	N	

Connection steps

1. Connect cable to the molded case circuit breaker 1QF1 in DC combiner cabinet. Refer to 5.3.1 Connection of Molded Case Circuit Breaker.

5.6. Measurement and Control Box Wiring

In measurement and control box, you need to finish the following connections:

- Secondary power supply connection
- Battery container control signal connection
- BMS communication connection
- External communication and signal acquisition connection

NOTICE!

The wiring panels for different projects will be different.

Images and description only for reference purpose, please refer to the actual item.

Cable routing

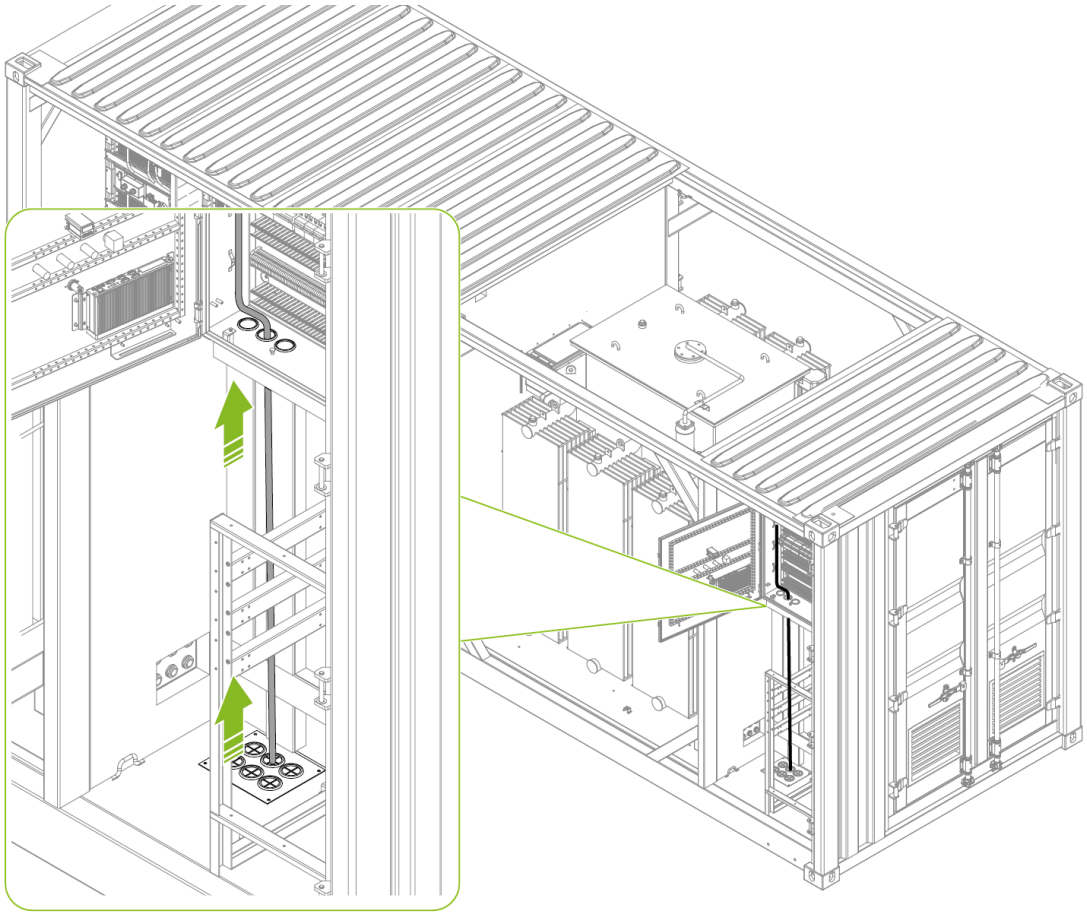


Fig. 5-42 Cable routing in measurement and control box

5.6.1. Secondary power supply connection

Location

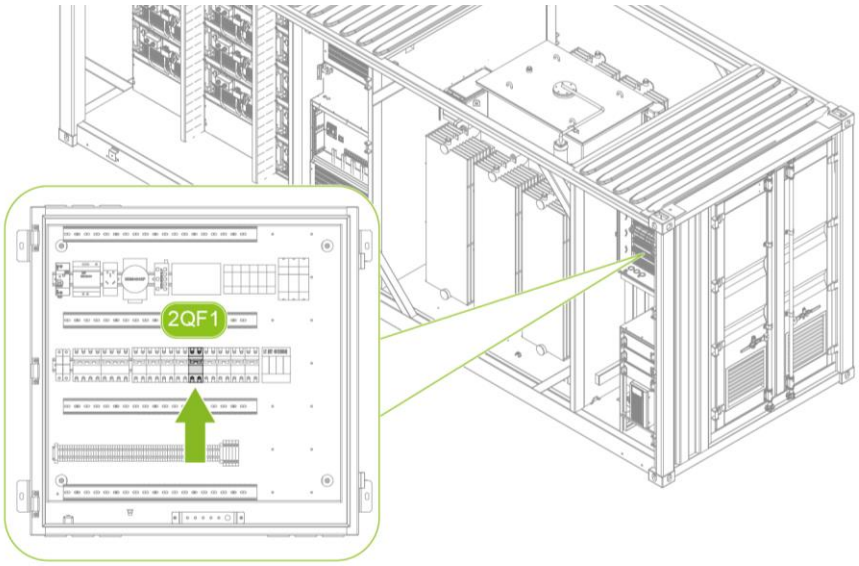


Fig. 5-43 Secondary power supply connection

Connection information

Cable label	From battery container power distribution box	To PCS SKID control power cabinet	Cable
1#1DY10	QFM1-1	2QF1-2	ZC-YJY22-0.6/1kV 2*2.5 mm²
	QFM1-3	2QF1-4	

Connection steps

1. Route the cable into the measurement and control box by referring to figure 5-41.
2. Put the cables in the wire duct (1) and fix the cables with cable ties (2).

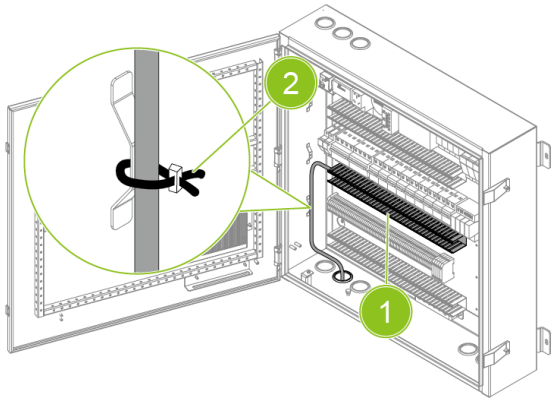


Fig. 5-44 Fix the cable

3. Connect the cable to the terminal block, refer to 5.3.2 Connection of Miniature Circuit Breaker.

5.6.2. Control Signal Connection

Terminal location

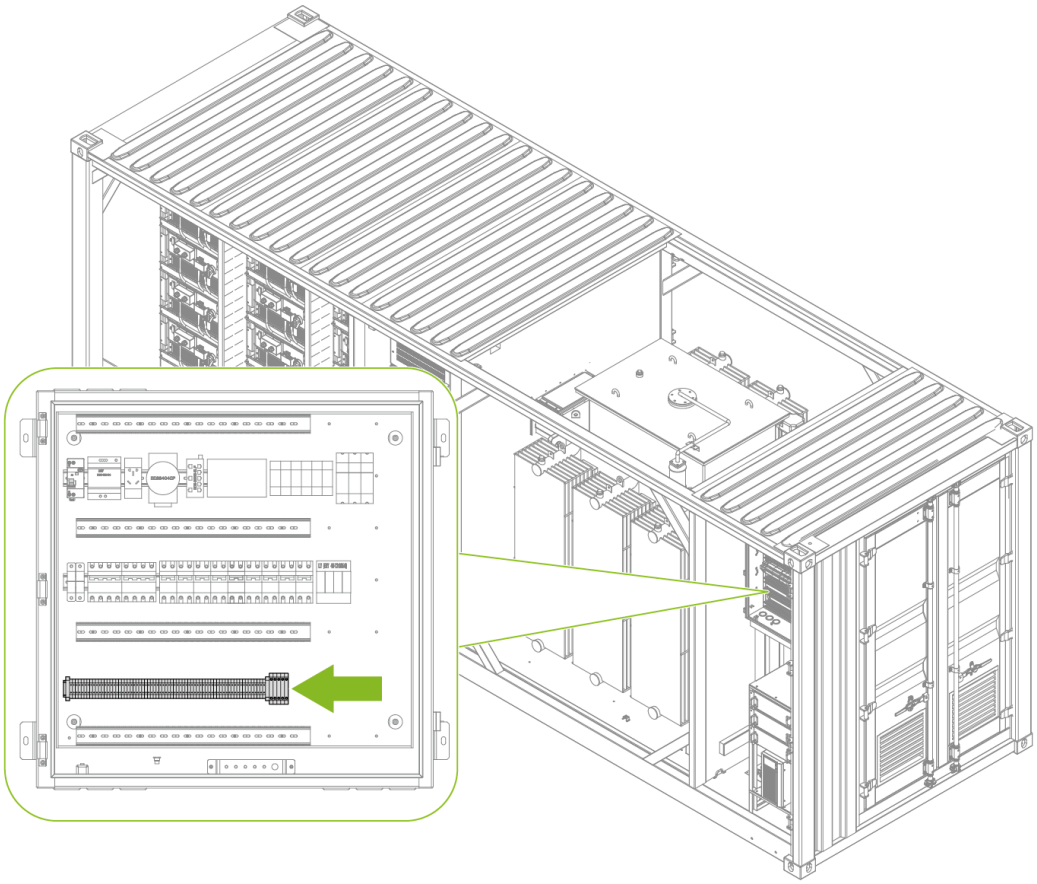


Fig. 5-45 Terminal block location

Connection information

Cable label	From battery container combiner cabinet	To PCS SKID control power cabinet	Cable
1#1KX-1	2XT-25	3XT-32	Control cable 4*1mm²
	2XT-26	3XT-34	

Connection steps

1. Route the cable into the measurement and control box by referring to figure 5-41.
2. Put the cables in the wire duct (1) and fix the cables with cable ties (2).

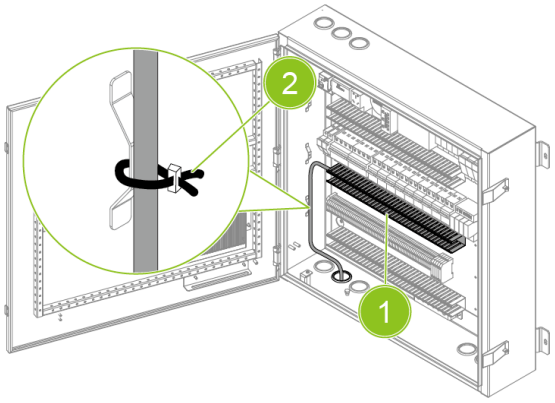


Fig. 5-46 Fix the cable

3. Connect the cable to the terminal block, refer to 5.3.3 Connection of Terminal Block.

5.6.3. BMS Communication Connection

Location

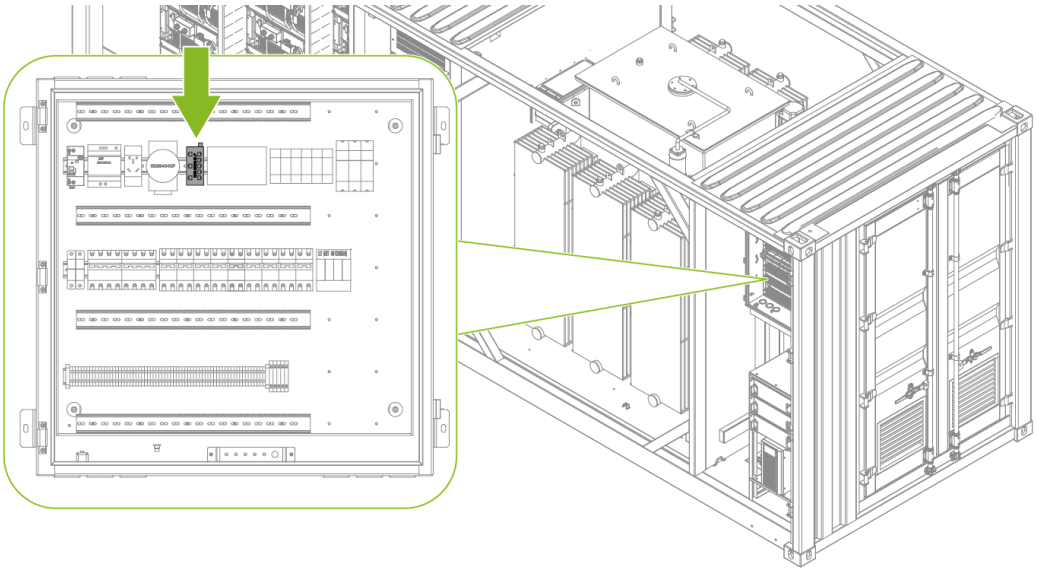


Fig. 5-47 BMS communication location

Connection information

Cable label	From: Battery container power distribution box	To: PCS SKID control power cabinet	Cable
1#TX-6	Level 3 BMS/(LAN1)	Measurement and control box 3n（LAN1)	SFTP Cat5e

Connection steps

1. Prepare the SFTP Cat5e cable with CAT5e Shielded RJ45 connector.
2. Insert the connector into the LAN1.

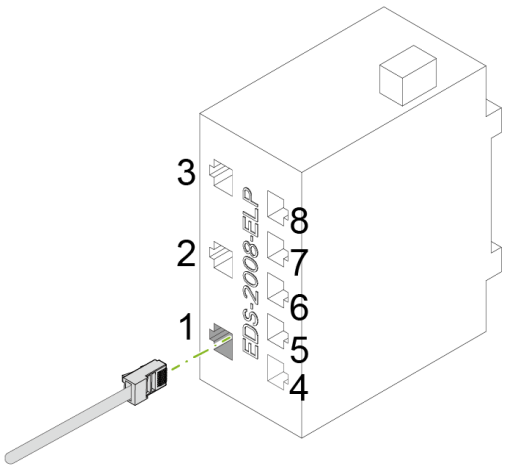


Fig. 5-48 LAN 1

5.6.4. External Communication and Signal Acquisition Connection

Location

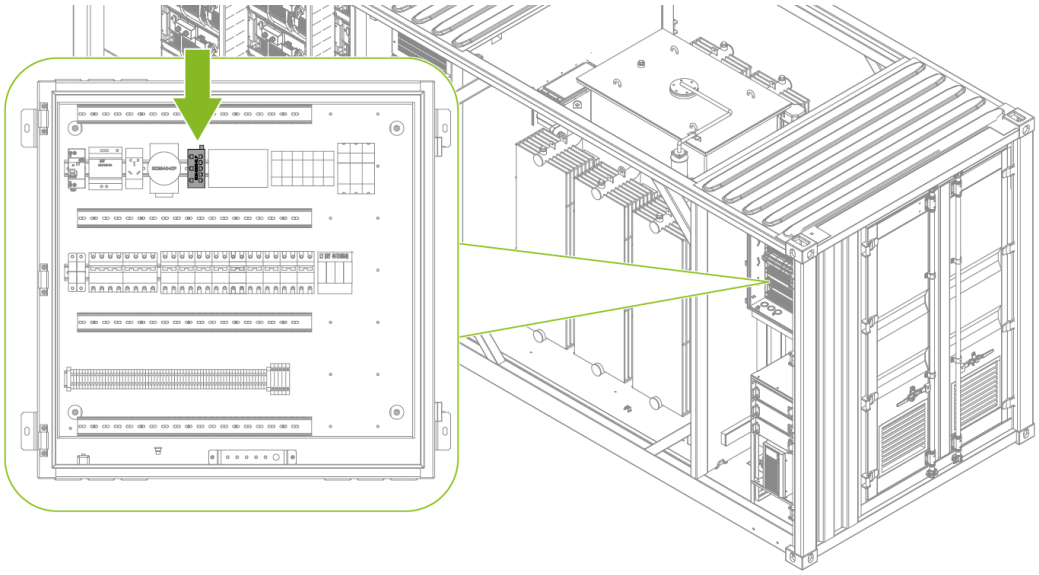


Fig. 5-49 External Communication and Signal Acquisition Connection

Connection information

Cable label	From PCS SKID	To user power station	Cable
1#TX-1	1n-LAN or 3n-LAN5	User monitoring platform	SFTP Cat5e
1#TX-2	4XT-22	RS485A	shielded twisted pair
	4XT-23	RS485B	

Refer to section 5.5.2 PCS Fault Dry Contact Connection to check the location of 4XT-22 and 4XT-23.

5.7. Apply Sealant

NOTICE!

Apply fireproof putty around every bottom incoming cable to prevent water vapor, circulation air and condensing from entering the cabinet.

1. Apply fireproof putty around the AC cable.
2. Apply fireproof putty around the grounding cable and COM cables.

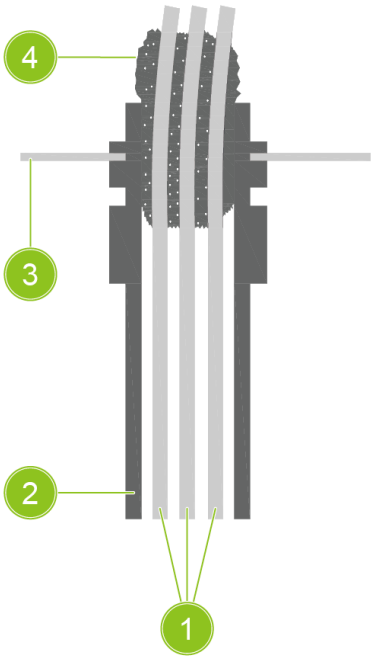


Fig. 5-50 Apply sealant

No.	Name	Note
1	Cable	/
2	Conduit	/
3	Wire box	/
4	Sealant	Fireproof putty

6. Emergency Handling Procedure



WARNING!

To avoid death, personal injury or product damage, please follow all safety procedures stipulated in the national "Environmental Health and Safety (EHS) Guidelines".

Chint's principle is to protect everyone, including employees, customers, and contractors, from potential harm and health damage that may arise from work activities. Chint will provide and maintain a safe and healthy working environment, equipment, and work systems for all employees, and provide them with the necessary information, training, and supervision for this purpose.

Chint will attach great importance to health and safety and comply with all statutory requirements.

6.1. Emergency Stop

Emergency stop button location

The emergency stop button is on the panel of Measurement and control box, you can refer to 2.10.1 Measurement and Control to see detail.

Scenarios of emergency stop



DANGER!

In any of the following situations, you must push the emergency stop button immediately.

- Fire and thermal runaway:

  Cabinet smoking, catching fire, severe deformation and overheating of the casing, or a distinct burnt smell.

- Liquid leakage:

  Electrolyte leakage, bubbling, or the cabinet being soaked in water (such as during heavy rain or pipe burst).

- Electric shock and leakage:

  Personnel experiencing electric shock, or a continuous tingling sensation when touching the cabinet.

- Severe abnormal noise:

  Abnormal loud noises such as cracking sounds or the opening of pressure relief valves inside the cabinet.

- Mechanical damage:

  Severe deformation or tilting of the cabinet due to impact, drop, etc.

- Control system failure:

  Severe fault alarms displayed on the monitor and inability to stop the machine through software, or the equipment continuing to charge and discharge out of control.

Mandatory regulations after emergency stop



Do not attempt to reset until the fault is resolved:

- After pressing the emergency stop button, the cause must be thoroughly investigated and the fault must be eliminated by professionals. Otherwise, it is strictly prohibited to unscrew (reset) the button and power on.
- The power-on steps after resetting the emergency stop button, you can refer to 7.1 Power on procedure in page 98.



It is necessary to record:

- In the equipment operation log, record the pressing time, cause, phenomenon and subsequent handling results in detail.

Important distinction

NOTICE!

Normal Shutdown:

- During routine maintenance, routine inspections, or planned downtime, please use the normal power-on and power-off procedures (such as touch screens, monitoring systems, or normal power switches).

NOTICE!

Prohibited Actions:

- It is strictly forbidden to use the emergency stop button as a regular switch. Frequent operations may damage the equipment or cause unexpected shutdowns.

6.2. Fire

6.2.1. Classification of Fire Hazards

Table 6-1 Classification of fire hazards

No.	Fire risk	Detailed description	Corresponding measures
1	Internal short circuit	Dangers of low battery voltage, overheating, and battery swelling	The system is certified by UL 9540, and the rack is certified by IEC 62619, UL 1973, and EMC safety tests.
2	External fire source	If the temperature exceeds 130°C, there is a risk of battery failure and fire	The equipment body has a fireproof insulation layer, keep the equipment away from fire and heat sources.
3	External heat source		
4	External short circuit	During the installation process, or if the fuse is not installed properly, there may be risks of external short circuits, arc flashes, and fires.	Install the screws according to the manual and conduct a comprehensive inspection to ensure each one is tightened.
5	Loose screws	Causes excessive contact resistance, heating at the connection points and cables	

6	Overcharging	This situation only occurs when the system does not detect BMS faults, protections, parameter errors, or communication failures	The system complies with the UL1973 standard, has a dual protection system of software and hardware, and has low risk
7	Over-discharge		

6.2.2. Fire Risk Deduction

Consider from five aspects: component safety, battery cell safety, electrical safety (BMS), mechanical safety, and environmental safety.

Component safety

Table 6-2 Components comply with IEC standards

No.	Component name	Compliance standard number
1	Plastic Components	IEC 60707
2	Fuse	IEC 60269
3	Relay	IEC 60947
5	Anti-corrosion	IEC 60068

Battery cell safety

Battery design complies with standards such as UL1642, IEC62133, UN38.3, etc.

Environmental Safety

Preventive measures: temperature monitoring, UL94-V0 material, metal casing, safety valve design, BMS high-temperature protection, etc.

6.2.3. Identify Fire Hazards

Ignition source

There are no obvious ignition sources in the equipment environment, and smoking is prohibited near the equipment;

Combustion fuel

No fuel, no large amount of paper; only some maintenance record paper.

Work process

No process will cause serious fire hazard.

6.2.4. Measures When There is Fire

Actions to take after hearing the alarm

- Do not approach, do not open the door, and leave immediately.
- Only when your own safety is ensured can you remotely cut off the power supply.
- Immediately notify the relevant person in charge to investigate the cause of the alarm.

Actions to be taken after discovering a fire

- Use the nearest fire alarm call point to raise the alarm.
- Report to the safe assembly point.
- Call the fire brigade using a mobile phone (after leaving the equipment).
- Contact them after the fire brigade arrives.
- Even if you are confident, do not attempt to handle small fires.
- Do not put yourself in danger of fire.

6.3. Flood and Water Disaster

- Under the premise of ensuring personal safety, power off the system; for the system power-off operation procedure, please refer to Section 6 System Power On/Off Operation Procedures.
- If any part of the cabinet is submerged in water, do not touch the device to avoid electric shock.
- Do not use batteries that have been flooded; contact a battery recycling company for disposal.

7. Operating Procedures

7.1. Power on Procedure

7.1.1. Inspection before Power-on

Inspection items	Acceptance criteria
Equipment appearance	The appearance of the equipment is completed without damage, rust and paint peeling. If there is paint peeling, please carry out touch-up operation. Equipment labels are clearly visible. Damaged labels should be replaced promptly.
Cable appearance	The protective cable wrapping is intact and there is no obvious damage. The threading cable and hose are in good condition.
Cable connection	The cable connection location is the same as the design. The terminals are made in accordance with the specifications, and the connection is firm and reliable. The labels at both ends of each cable are clear, and the labels are oriented in the same direction. The wiring meets the principle of strong and weak electricity separation.
Cable arrangement	The cables are neat and beautiful. The wire buckle joints are cut neatly, and no spikes are exposed. Allowance shall be reserved at the turning as required and shall not be tightened. The cables are straight and smooth, and the cables in the cabinet do not cross.
Cabinet cleaning	The interior of the cabinet is clean and tidy, free of excess cables, wire ends, terminals and tools. There are no obvious sundries outside the equipment.

7.1.2. Power-on Operation Procedures

1. In the control power cabinet, press the key of UPS for 3 seconds, the UPS power indicator light is ON, the red indicator light of UPS power on the panel of LV cabinet is on, and the power supply of the control loop is normal.

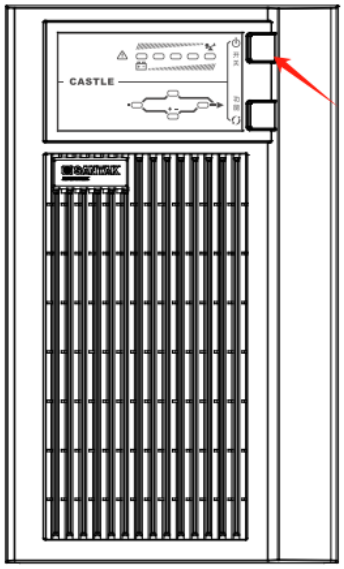


Fig. 7-1 Power on the UPS

2. Unlock the buckles (1) and open the door.

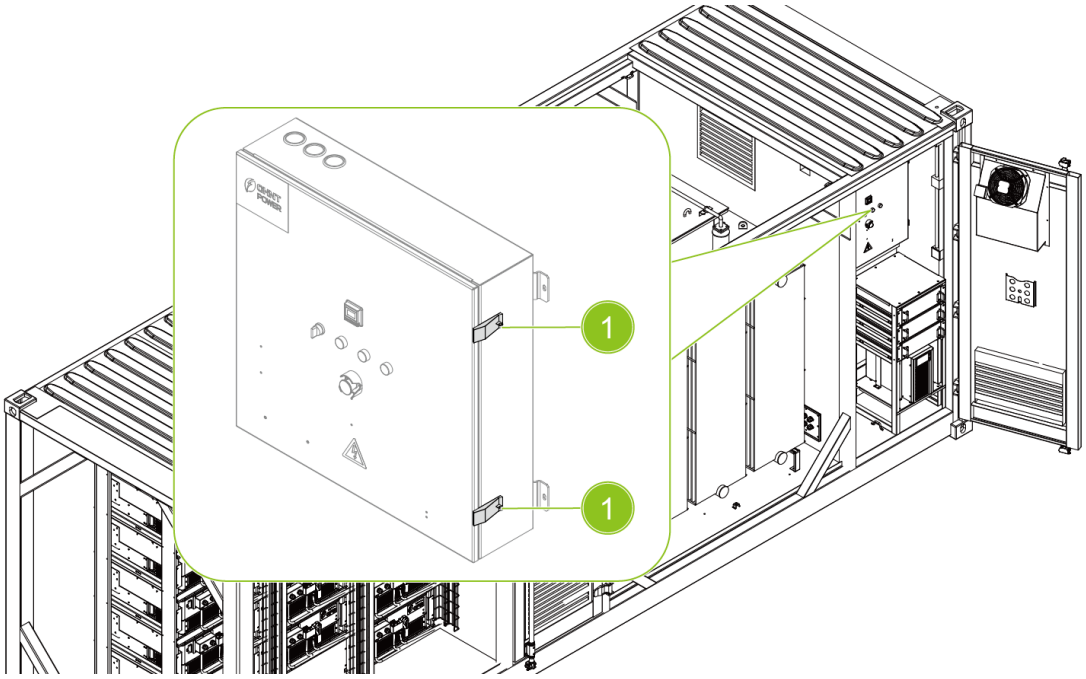


Fig. 7-2 Open the inner cabinet door

3. Close micro circuit breaker 2QF1-2QF5 (2) in the Measurement and control box.

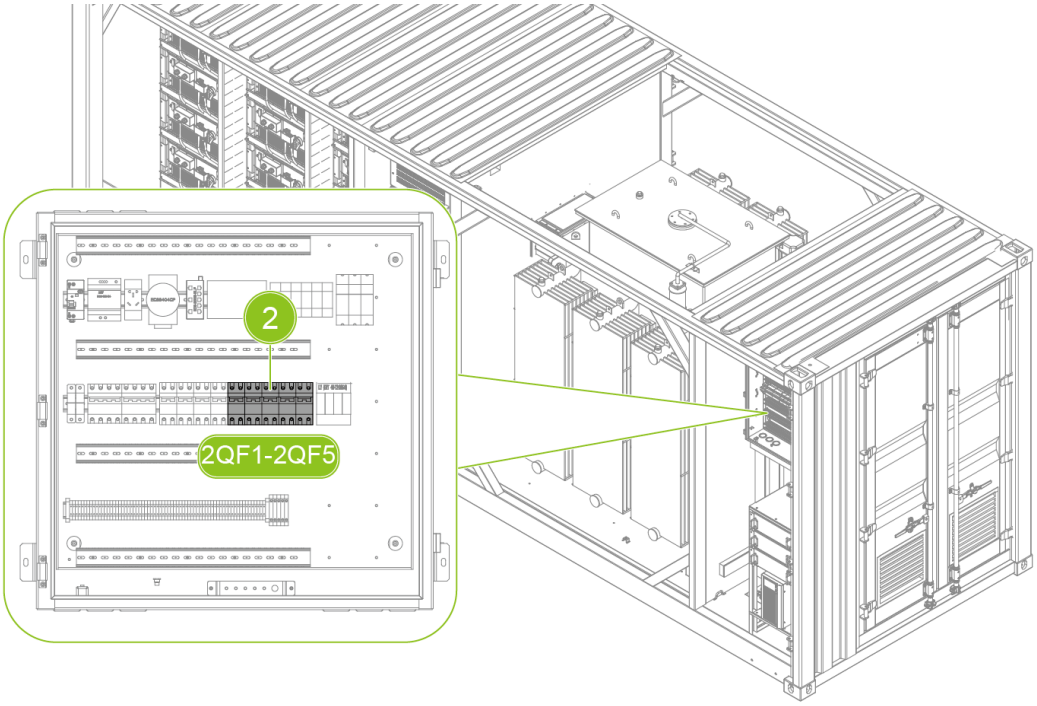


Fig. 7-3 Close 2QF1-2QF5 micro circuit breaker

4. Move to the corresponding battery container, close the QFM2 and 1QF1-1QF4 miniature circuit breaker. Close the plastic case circuit breaker QFM1, miniature circuit breaker QF1-QF5.

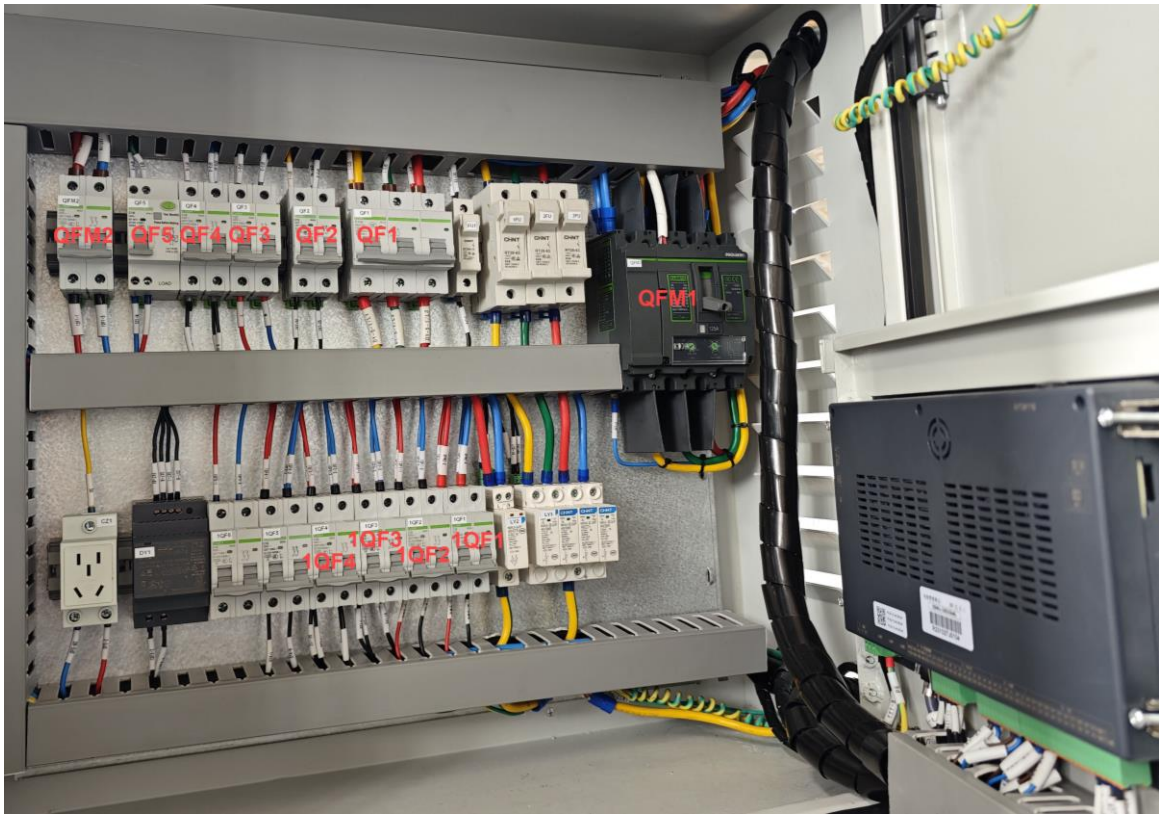


Fig. 7-4 Circuit breaker of battery container

5. Move to the AC combiner cabinet, and successively close the molded case circuit breakers QF1-QF8.

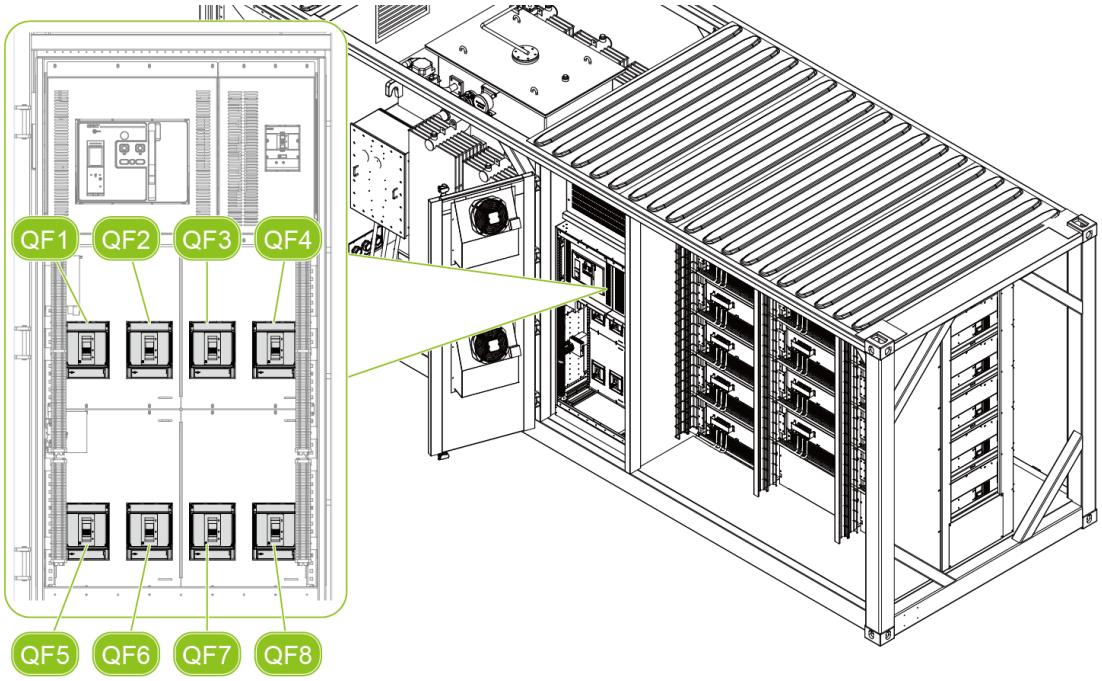


Fig. 7-5 Molded case circuit breakers QF1-QF8

6. Move to the RMU of PCS SKID, close the miniature circuit breakers 1QF (3) and 2QF (4).

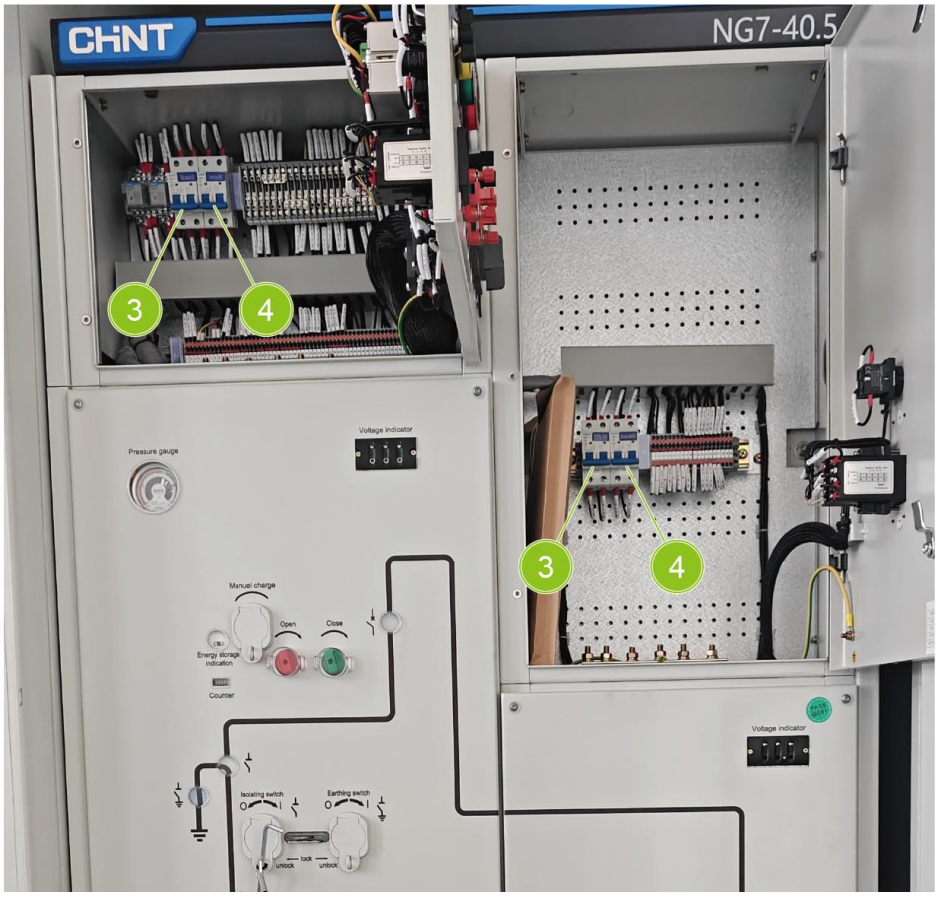


Fig. 7-6 Close 1QF and 2QF in RMU

7. Using the NG7 control lever (provided in accessory) to rotate the grounding switch (5) of the RMU to the dividing position, then rotate the isolating switch (6) to the closing position, and then manually rotate the circuit breaker closing knob (8) and press the closing button (7), then the circuit breaker is closed and the live display DXN (9) light is on.

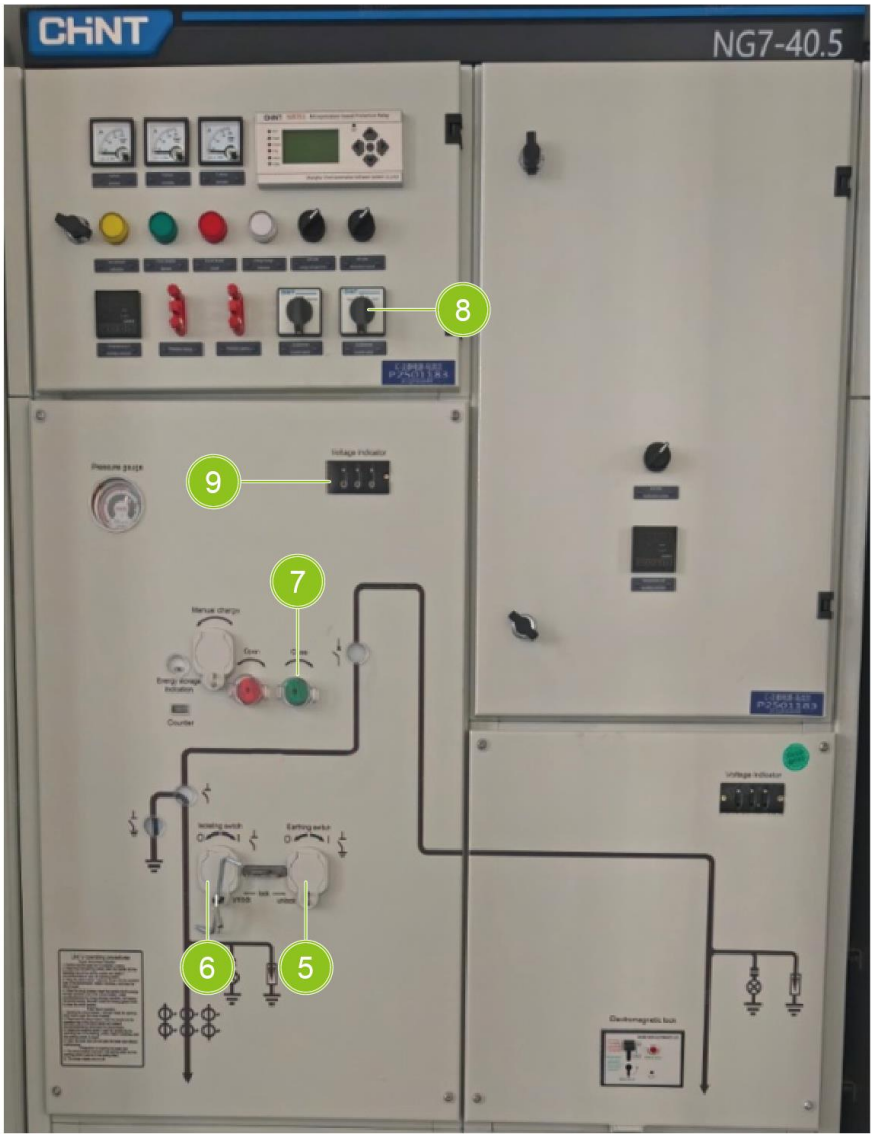


Fig. 7-7 RMU panel

NOTICE!

During the first power-on, three no-load closing operations should be performed on the transformer at the rated voltage.

8. Move to the AC combiner cabinet, successively close the QFM (10) and the molded case circuit breaker QF13 (11).

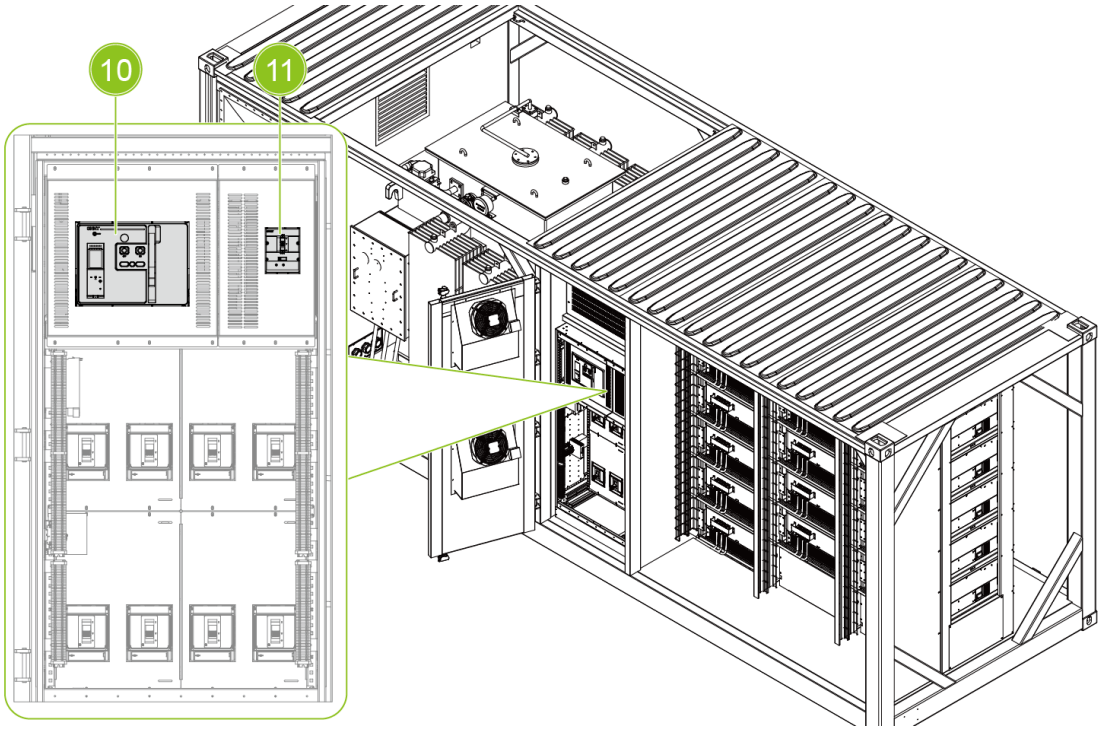


Fig. 7-8 Close QFM and QF13

9. Move to the DC combiner cabinet, successively close the molded case circuit breaker 1QF1 (12) and miniature circuit breaker QF14 (13).

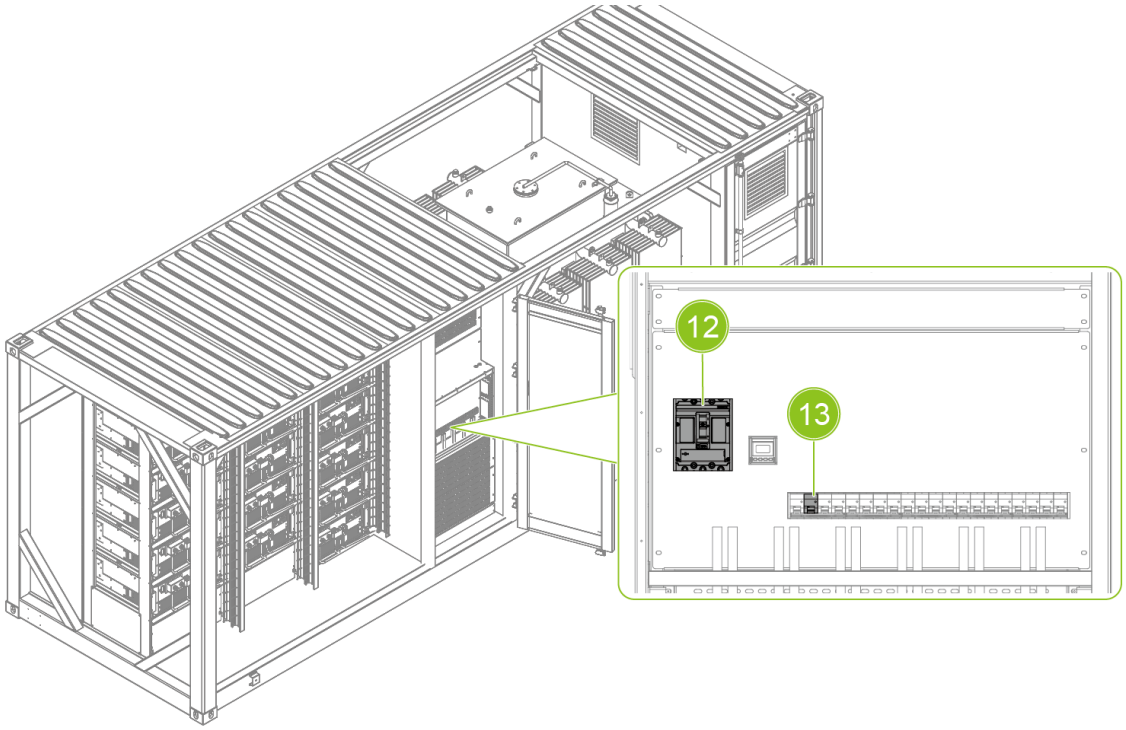


Fig. 7-9 Close 1QF1 and QF14

10. Move to the Measurement and control box, close the miniature circuit breaker 1QF (14) and 1QF2-1QF5 (15). Verify that the white indicator light of utility power supply is on, the grid circuit power supply is normal, and the UPS interface shows the grid mode.

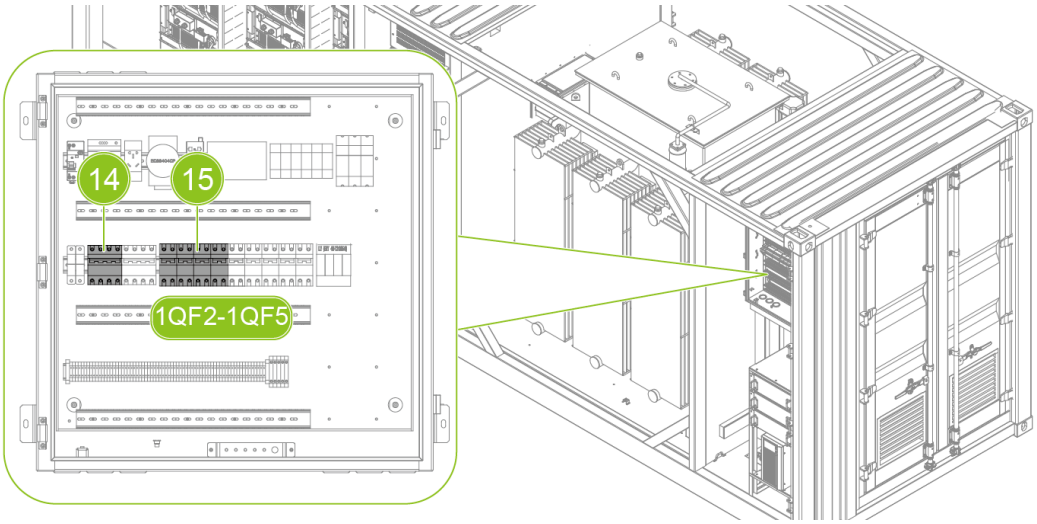


Fig. 7-10 Close 1QF and 1QF2-1QF5

11. Move to the BMS screen of battery container, check if there is any fault code. After solving the fault, conduct the next operation.
12. Move to the PCS compartment, rotate the all the DC isolation switches (16) of PCS units counterclockwise to the ON position.

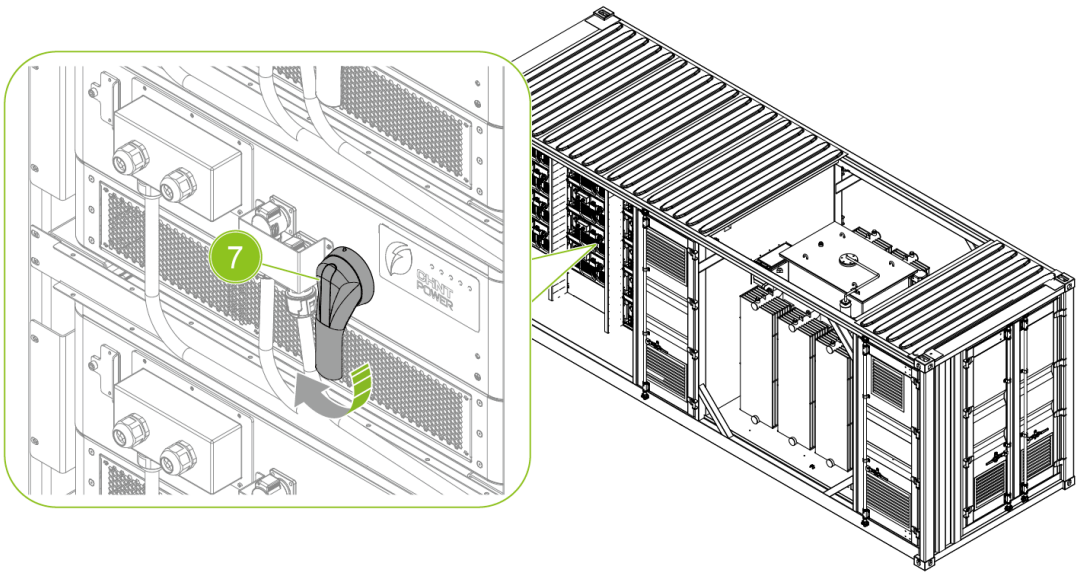


Fig. 7-11 PCS DC isolation switch

NOTICE!

The position of DC isolation switch in figure 7-11 is “OFF”.

13. After the battery container is powered on, and PCS startup instructions are sent through the EMS system and charge and discharge strategies are carried out. Keep the PCS SKID running (no-load) for at least 10 minutes.
14. Press the opening button (17) and waiting for at least 5 minutes, then press the closing button (18) and waiting for at least 5 minutes.

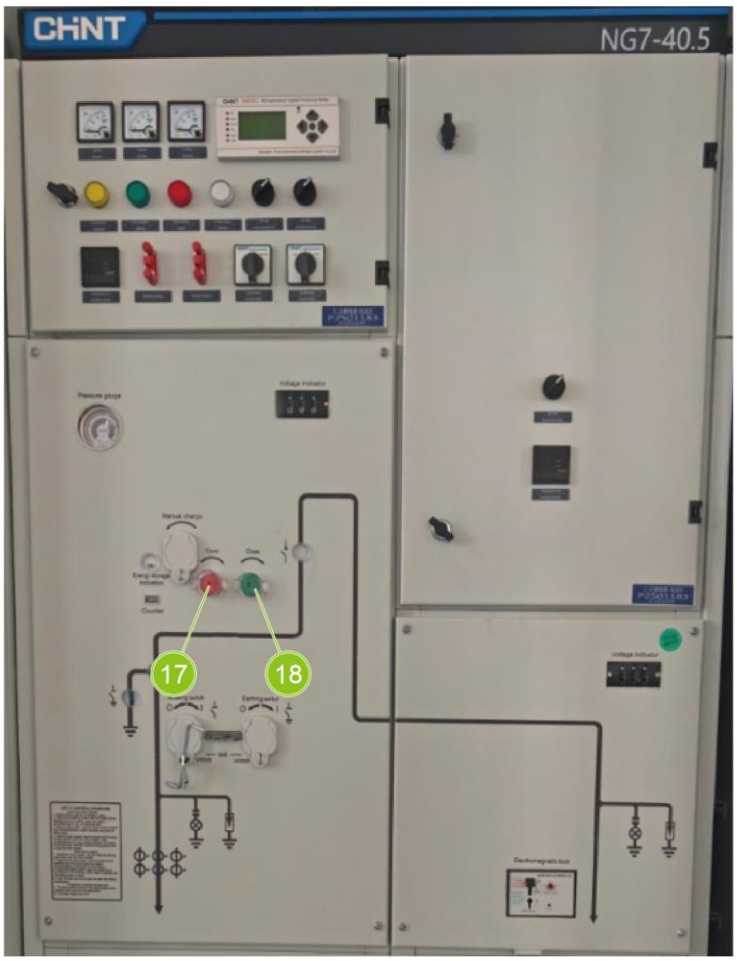


Fig. 7-12 Opening and closing button

15. Repeat step 14 for 4 times.

7.1.3. Inspection after Power-on

1. Measure the 3-phase line voltage of grid (L1-L2, L1-L3 and L2-L3).
   - If the voltage is within allowable range, the 3-phase voltage is in balance.
   - If the grid voltage deviation is too large, adjust the transformer turns ratio by professional personnel.
2. Check if the equipment control loop is powered on normally, the panel power indicator light is on and the web interface communication is normal.
3. Check if there are abnormal noise, overheating, smoking and unpleasant smell.
4. Check if there are any fault signals on the local controller web interface.



To ensure the continuous and safe operation of the system throughout its entire life cycle, we need to conduct daily inspection and record-keeping.

7.1.4. Equipment Status Check

General requirements

- Restore all the removed protective covers and fix them firmly.
- Clear the work site and remove flammable and explosive items.
- Ensure normal ventilation in the venue.
- Check if there are any objects inside the axial flow fan or air conditioner.
- Recheck the status and functions of the equipment and its upstream and downstream switches.
- Check if there is any damage to the wiring inside the equipment and whether the PCS cable plug is loose.
- Wiring strictly in accordance with the schematic diagram. All connections should be firm and loose bolts should be re-tightened.
- Check the PE equipotential bonding: the grounding terminal of the internal equipment is connected to the equipotential bonding point of the equipment, and the overall grounding is reliable.

7.2. EMS Operation Procedures



The EMS system can be used to control the startup and shutdown of the PCS SKID and set the power.

For more information, please refer to the EMS user manual.

7.3. Power-off Procedure

1. Set the power-off command in the EMS system.



For more information, please refer to the EMS user manual.

2. Move to the measurement and control box, successively open the miniature circuit breaker 1QF (1) and 1QF2-1QF5 (2).

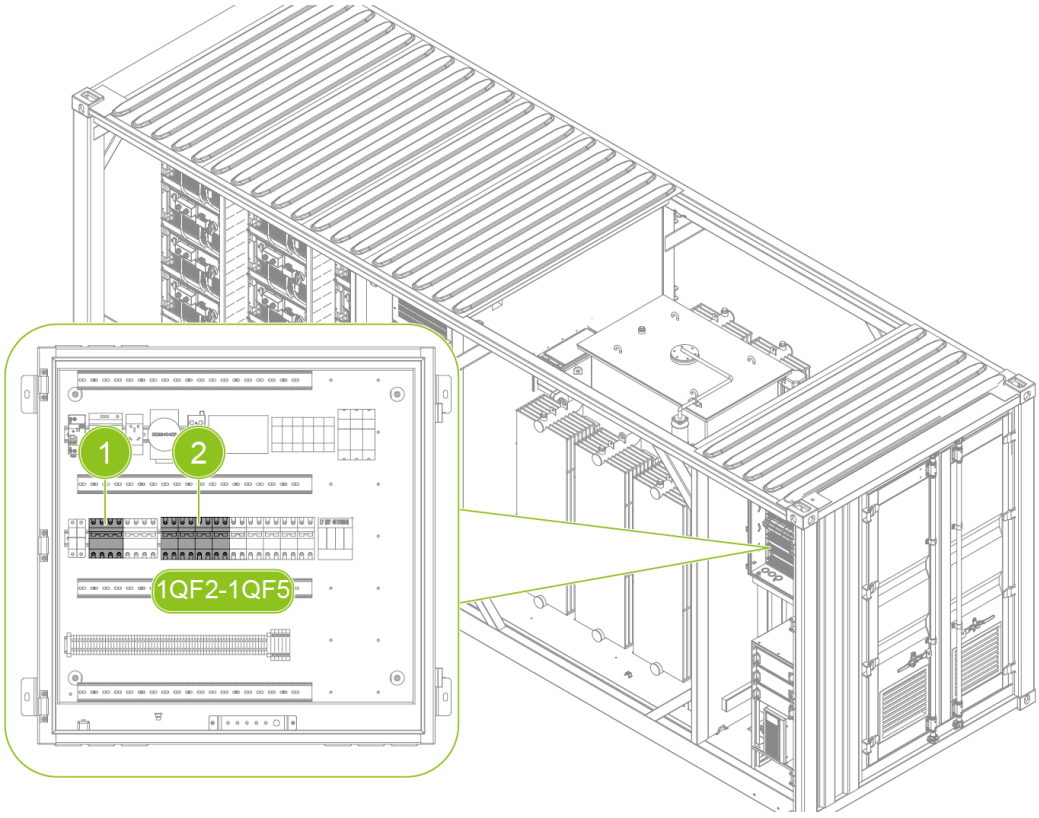


Fig. 7-13 Measurement and control box

3. Move to RMU and manually rotate the braker knob (5) of the circuit breaker, then the circuit breaker is opened and the DXN light (6) of the live display is off, and then use the operating lever to rotate the isolation switch (7) to the open position.

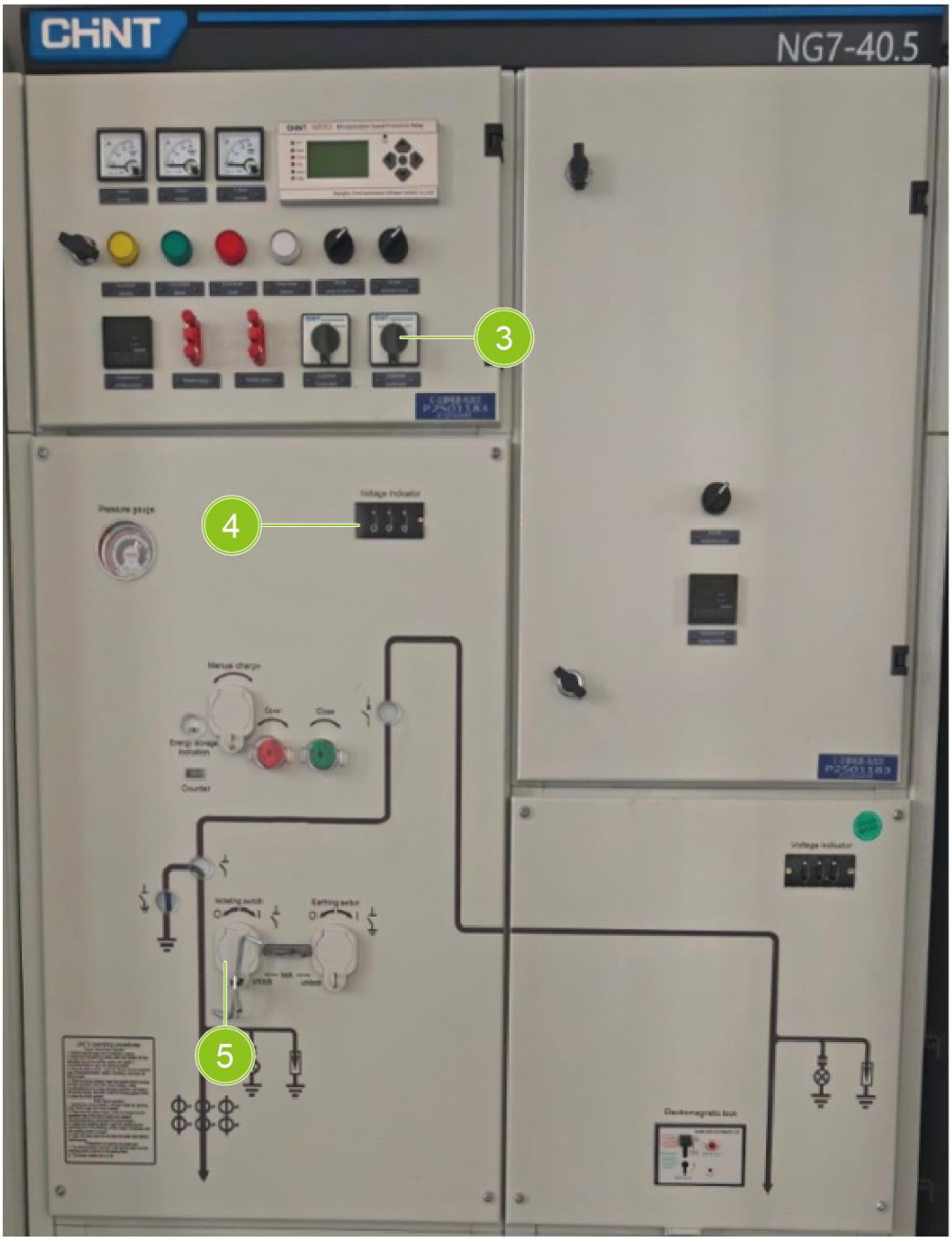


Fig. 7-14 RMU (CHINT as example)

4. Successively open the micro circuit breaker 2QF1-2QF5 (6) in the measurement and control box.

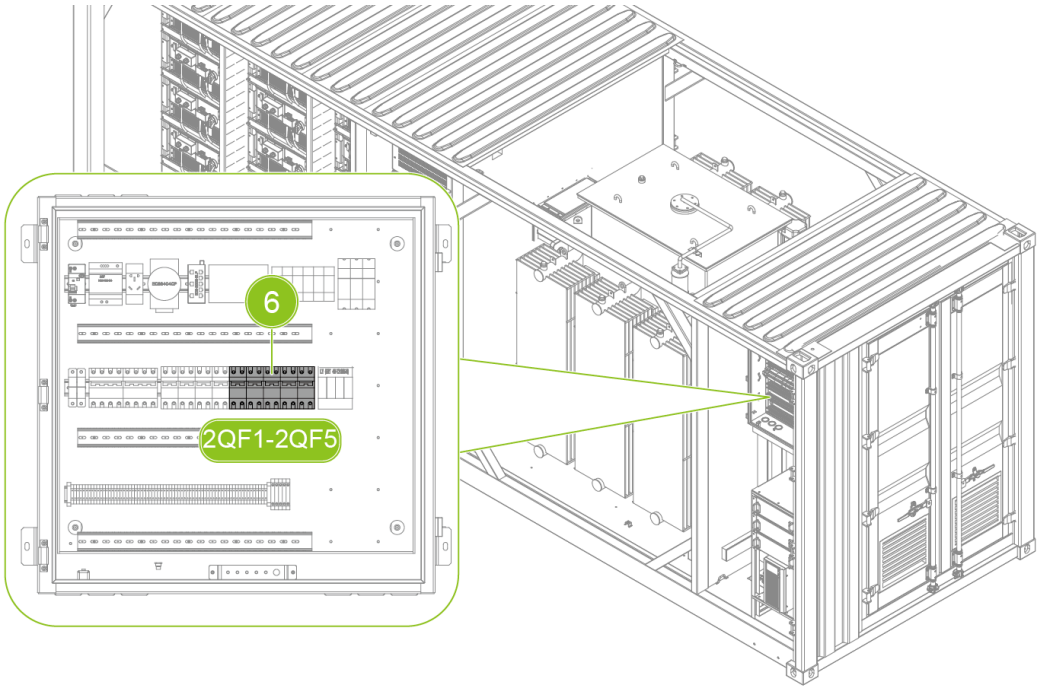


Fig. 7-15 2QF1-2QF5 micro circuit breaker

5. Long press the UPS power on/off button for 3 seconds to shut down the UPS.

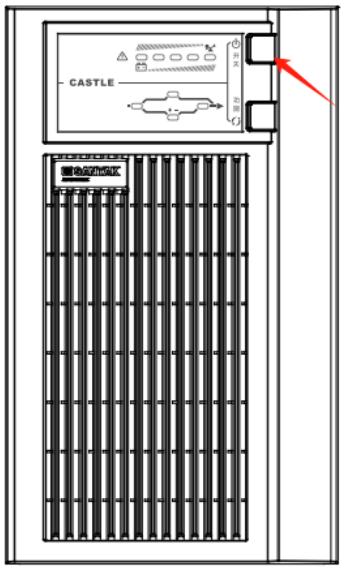


Fig. 7-16 Power off the UPS

6. Clockwise rotate the DC isolation switches (7) of all the PCS units to the OFF position; (If the power outage is for a short time, this operation may not be performed).

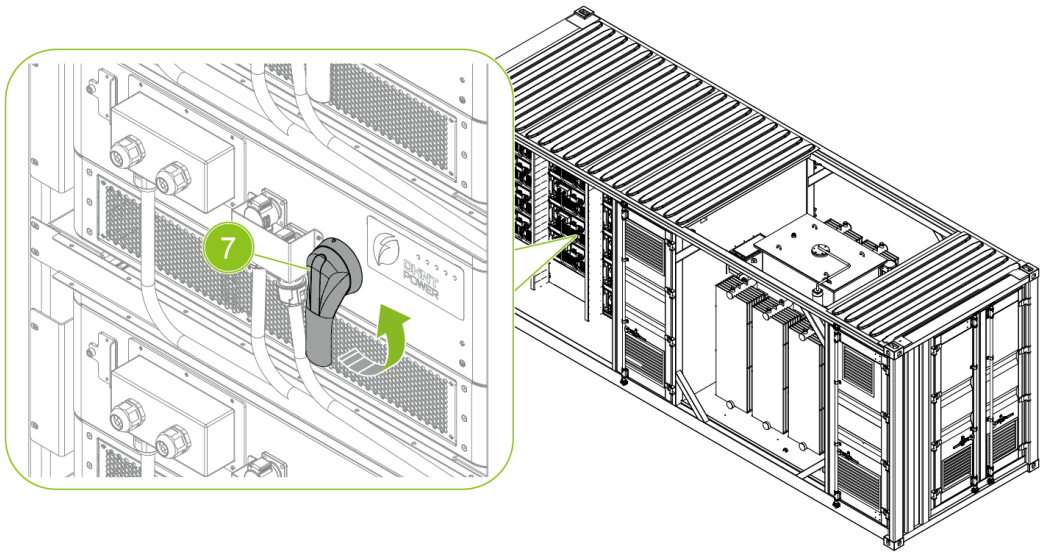


Fig. 7-17 PCS DC isolation switch

7. Successively open the molded case circuit breaker QF1-QF8 and air circuit breaker QFM (8) in the AC combiner cabinet.

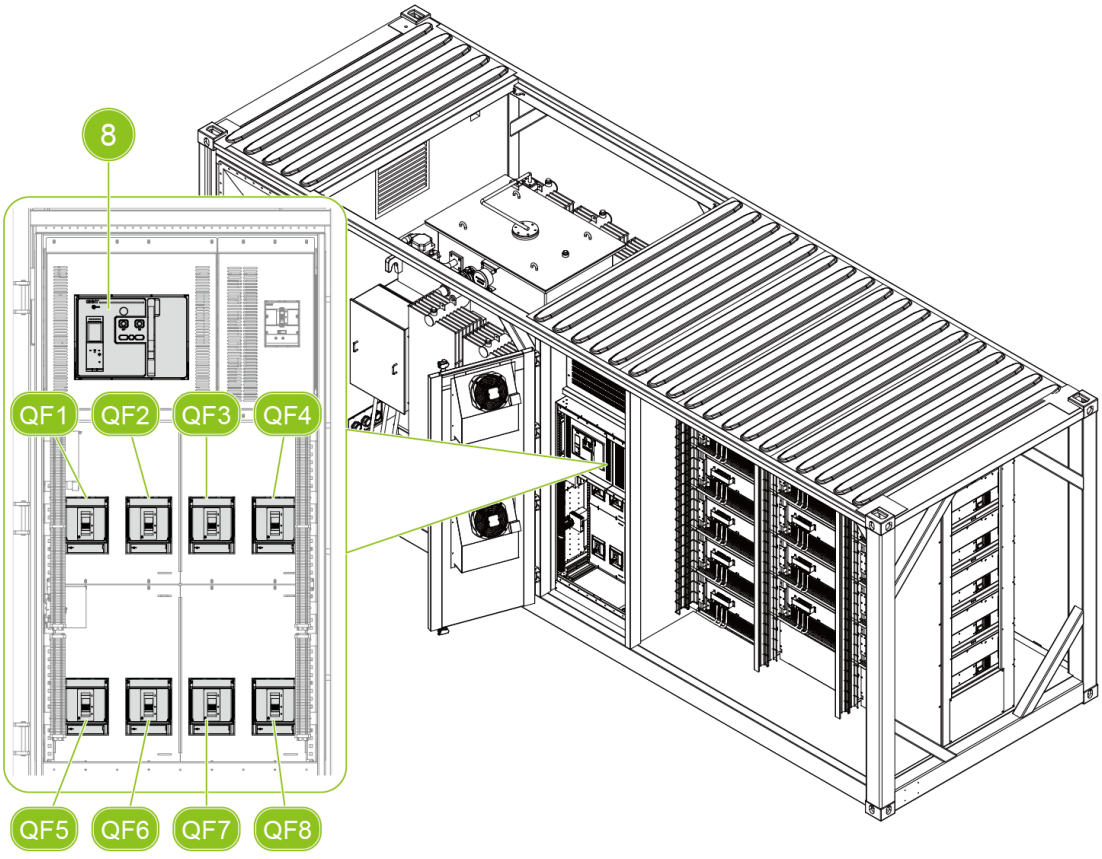


Fig. 7-18 Open QF1-QF8

8. Open the molded case circuit breaker QF13 (9).

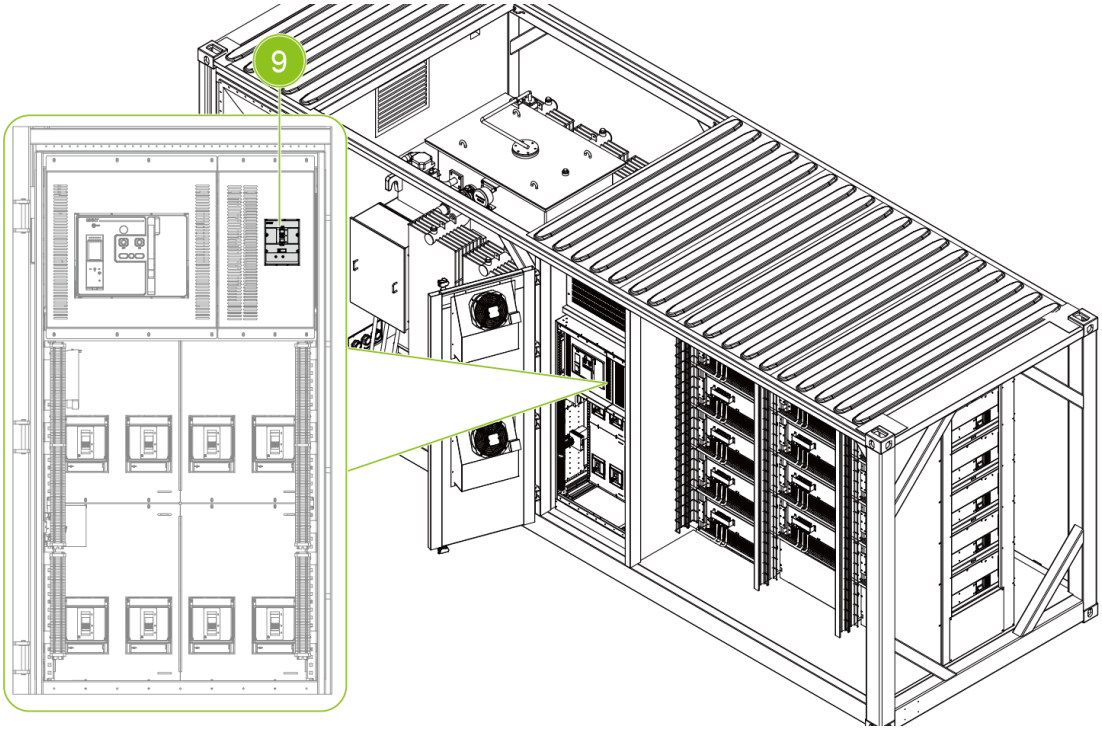


Fig. 7-19 Open QFM and QF13

9. Move to the DC combiner cabinet, open the molded case circuit breaker 1QF1 (10) and miniature circuit breaker QF14 (11).

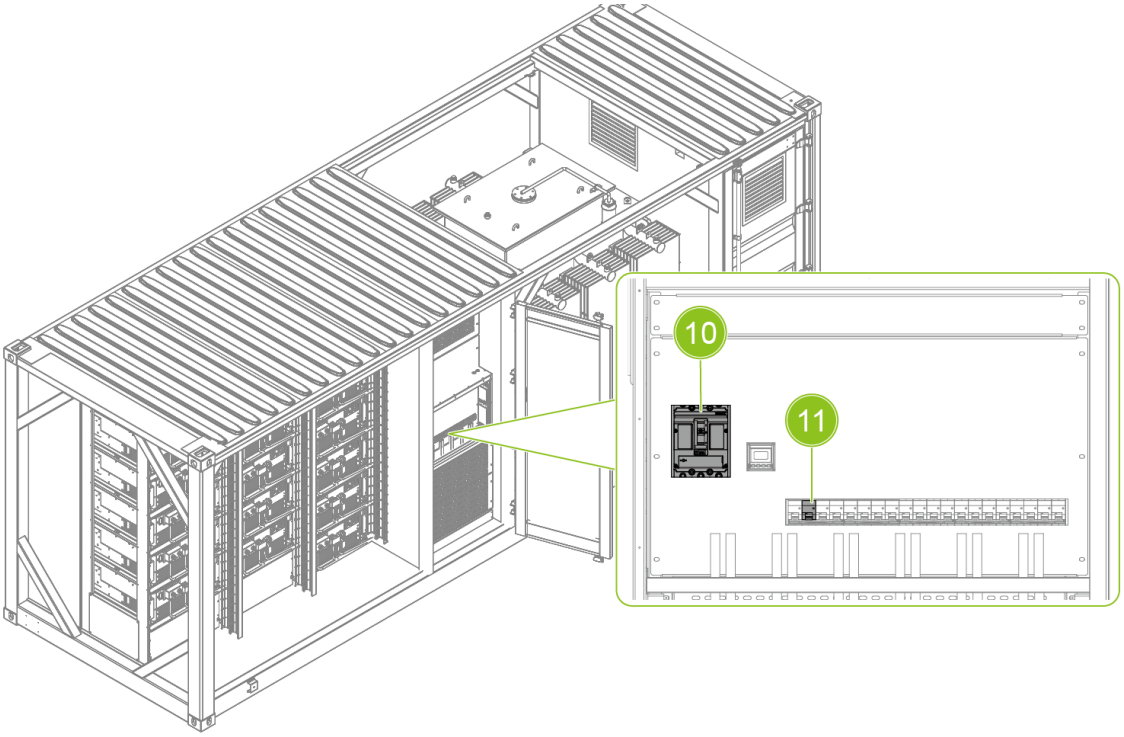


Fig. 7-20 Close 1QF1 and QF14

10. Move to the corresponding battery container, successively disconnect the molded case circuit breaker QFM1, mini circuit breaker QF1-QF4, QFM2, 1QF1-1QF5.



Fig. 7-21 Circuit breaker of battery container

8. Maintenance and Replacement



Before conducting maintenance operations, please power off the equipment by referring to section 7.6 Power-off Procedure.



The operation and maintenance of equipment must be performed by qualified and authorized personnel.

Some maintenance items require the system to be shut down first.

8.1. Maintenance

Environmental factors such as ambient temperature, humidity, dust, and vibration accelerate aging and wear of internal components in the PCS SKID, potentially leading to operational failures. Regular maintenance is therefore essential to ensure normal functionality and extend service life.

All actions aimed at maintaining the PCS SKID in optimal operating condition fall under the scope of maintenance work.

5 safety rules

- Professionals ensure that PCS SKID cannot be re-energized accidentally.
- Use electrical inspection equipment to ensure that the interior of the PCS SKID is completely de-energized.
- Have the necessary ground and short-circuit connections made by professionals.
- For possible live parts near the operating part, use insulating cloth to cover them.
- Check whether the escape route is blocked.

Overview

The PCS SKID has IP54 protection grade and is suitable for outdoor use. However, harsh environment or long-term operation will cause the aging of the PCS SKID or damage to the internal equipment. Regular

maintenance and inspection of the PCS SKID, and replacement of aging and damaged components will effectively prolong its service life and improve the performance of internal equipment.

8.1.1. Regular maintenance

Table 6- 1 Regular maintenance

Item	Method	Maintenance intervals
System clean	1. Check the temperature and dust of the PCS. Clean enclosure if necessary. 2. Check if the air inlet and outlet as well as air vent filter are normal. Clean the air inlet and outlet as well as air vent filter, with soft brush or vacuum cleaner, if necessary.	6 months to 1 year (depending on the installation environment)
Cable entry	Check whether the cable entry is insufficiently sealed or the gap is excessively large, and reseal the entry when necessary.	Once a year
Electrical connection	1. Check whether all cables are firmly in place. If loose, please tighten all the cables referring to 3.5 Electrical connection. 2. Check for cable damage, especially whether the cable surface is scratched or smooth. Repair or replace the cables if necessary.	6 months to 1 year

8.1.2. Maintenance period

To ensure the good operation of the equipment in the PCS SKID, the PCS SKID should be maintained regularly.

The maintenance intervals given in this section are reference values. The actual maintenance period should be reasonably determined based on the actual environmental conditions of the project site. If the operating environment of the PCS SKID is relatively harsh, such as in a desert area, the corresponding maintenance period should be shortened. Internal and external cleaning, anti-corrosion and anti-rust work, etc., should be more frequent.

If the PCS SKID is installed in a desert area, it is recommended that the inside and outside of the PCS SKID should be carefully inspected and thoroughly cleaned after each sandstorm.

8.1.3. Maintenance items

Routine inspection and maintenance must comply with the relevant regulations of the power company. Inspection, maintenance and repair can only be performed by trained personnel who are familiar with the equipment. Personnel must be certified and comply with safety regulations issued by the power company.

Table 9- 1 Maintenance items

Inspection item	Inspection method	Period
System Status and Cleaning	Check whether the PCS SKID and internal equipment are damaged or deformed.	Once a month
	Check whether there is abnormal noise during the operation of the internal equipment.	
	Check whether the temperature inside the PCS SKID is too high.	
	Check that warning signs, labels, etc. are clearly visible and not defaced. Replace if necessary.	
	Check whether the humidity and gray scale are too heavy, and clean the equipment if necessary.	
	Check whether there is oxidation or corrosion signs inside the PCS SKID. If any, remove rusts.	
Cable connection	Check whether the power cable is loose. If it is loose, tighten it according to the torque specified in the manual.	Once every half a year after the first commissioning and once every two years thereafter.
	Check whether the power cables and control cables are damaged, especially whether the skin in contact with the metal surface has any signs of cuts.	
	Check whether the insulating wrapping tape of the power cable terminal is peeled off.	
Fan / heat exchange	Clean or replace the dust filter.	

Inspection item	Inspection method	Period
	Check the operating status of the fan/heat exchanger.	Once every half a year after the first commissioning, and once every half a year to once a year thereafter.
	Check whether the fan / heat exchanger makes abnormal sound during operation.	
Equipment maintenance	For maintenance of various internal equipment, please refer to relevant manuals.	/
RMU	Check the SF6 barometer to see if the pointer is within the green range. If the pointer approaches red, please stop the operation and replenish gas to it.	Once a month
	Check the live indicator and check whether the L1 / L2 / L3 indicators are normal. If it is abnormal, please replace the L1 / L2 / L3 indicators when the power is off.	
Transformer	Check the transformer oil level indicator. If the oil level is low, please power off the PCS SKID and fill in oil in time.	Once a month
	Check whether there is oil leakage around the pressure relief valve. If any, tighten the valve.	
	Check the sheath of low-voltage cabinet and medium-voltage cabinet to see if there is oil leakage. If any, tighten the valve. Check whether there is oil leakage at the joint between the transformer radiator and the oil tank flange. If any, please tighten the valve in time.	
	Check whether the real-time temperature of the oil thermometer is normal. If abnormal,	

Inspection item	Inspection method	Period
	measure the resistance of PT1/PT2 and PT3 with a multimeter. If the result is unqualified, it means that the temperature controller is faulty and needs to be repaired in time.	
	During operation, check whether the sound of the transformer is normal.	
Low voltage cabinet	Check whether the lightning arrester indicator is normal (green) or faulty (red).	Once a month
	Check for condensation on inside panels and top cover.	
Other equipment	Replace damaged lamps promptly.	When necessary
	Replace damaged smoke sensors and fire extinguishers promptly.	
	Replace the temperature and humidity controller in time.	
	Clean the screen	Once half a year
	Replace the screen	Once a year

8.2. PCS Maintenance

8.2.1. Daily Inspection Items

Daily inspection items should follow the key points below:

Table 8-1 Daily inspection items

No.	Daily Inspection Items	Confirm
1	The input and output voltage and current of the PCS, as well as its operating status, need to be monitored in real-time. Designated personnel should observe at fixed points. If any abnormalities in the converter's operation or voltage/current are detected, timely maintenance should be performed.	
2	Listen to the PCS for any abnormal noises.	
3	No abnormal odor is detected inside the PCS.	
4	Read the internal temperature of the PCS and observe that the temperature is within the normal range.	

Regular Inspection Items

The quarterly inspection every three months mainly focuses on areas that are difficult to inspect during daily checks and routine operations.

Table 8-2 Regular inspection items

No.	Regular Inspection Items	Confirm
1	Check the appearance of the PCS for no damage or rust.	
2	Use a temperature measuring instrument to detect that the internal temperature of the PCS is normal.	
3	Check that the ventilation, ambient temperature, humidity, dust, and other environmental conditions around the PCS meet the requirements.	
4	Check for aging or damage in the cable insulation layer. If found, add corresponding insulation measures or replace the cable.	
5	Check the wiring bolts for signs of aging or burning, and manually shake them to confirm they are in a tightened state.	

After maintenance is completed, check against the maintenance checklist one by one to ensure no maintenance items are missed. Confirm that the above maintenance process is correct, and this maintenance is completed.

Table 8-3 PCS maintenance record

No.	Device name	Phenomenon description	Maintenance personnel	Maintenance date

8.2.2. Replace the PCS



For more information, please refer to the PCS user manual.



There is high voltage in the live parts of the PCS. Touching live parts may result in death or severe electric shock damage.

- Wear appropriate Personal Protective Equipment (PPE) during maintenance.

8.2.3. Replace the cooling fan of PCS



For more information, please refer to the PCS user manual.

8.3. Paint Repair Measures

Case 1

Surface dirt caused by water stains and dust can be cleaned

Illustration	Step
	1. Use a rag (or other scrubbing tool) dampened with water to scrub the dirty parts of the surface. 2. If it cannot be cleaned with water, scrub with 97% alcohol until the surface cleanliness reached an acceptable range. (You can also try to use a non-corrosive cleaner commonly used in your area)

Material
• Rag • Water • Alcohol or other non-corrosive cleaning agents

Case 2

The surface is dirty & the topcoat is damaged, and the surface traces cannot be cleaned.

Illustration	Step
	1. Use sandpaper to polish the rough or scratched parts of the surface paint to make the surface smooth.
	2. Using a cloth dampened with water or 97% alcohol, scrub the damaged area to remove surface stains.

	3. After the surface is dry, use a soft brush to touch up the scratched parts of the paint, and try to keep the paint brushing as uniform as possible.

Material
• Sandpaper • Rag • Water • Alcohol • Brush • Paint (RAL7035)

Case 3

The primer is damaged and the substrate is exposed.

Illustration	Step
	1. Use sandpaper to polish the rough or scratched parts of the surface paint to make the surface smooth.
	2. Using a cloth dampened with water or 97% alcohol, scrub the damaged area to remove surface stains and dust.
	3. After the surface is dry, spray zinc-rich primer to protect the exposed parts of the substrate. The coating shall completely cover the exposed substrate.
	4. After the primer is dry, use a soft brush to touch up the damaged parts, and try to keep the paint brushing as uniform as possible.

Material:

- Sandpaper
- Rag
- Water
- Alcohol
- Zinc rich primer
- Brush
- Paint (RAL7035)

8.4. Filter Screen Maintenance

Filter location

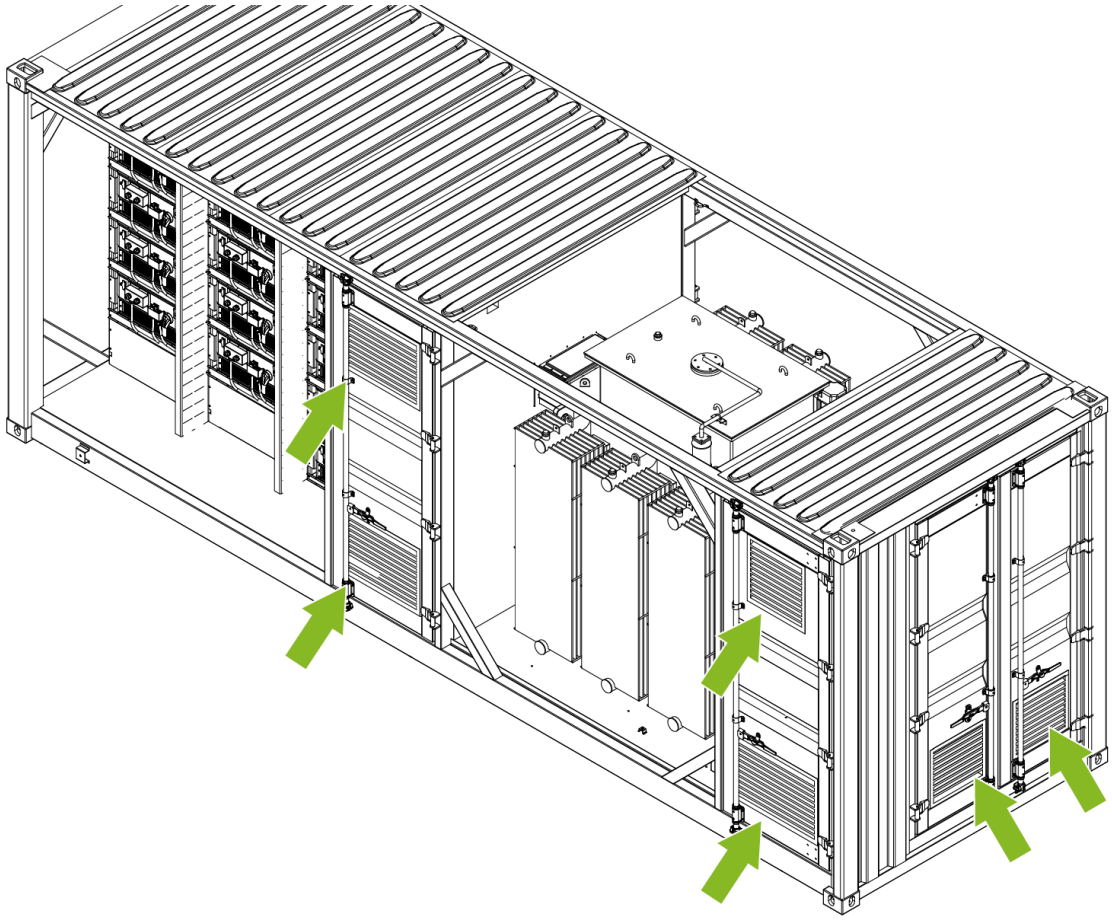


Fig. 8-1 Filter location

8.4.1. Maintenance

Item	Inspection method	Note
Filter inspection	• Regularly (it is recommended to do once a month or depending on the environment) open the filter screen frame from the outside or inside. • Remove the old filter cotton and check for blockage, damage or moisture. • Insert the new filter cotton of the same specification in the original direction, ensuring that the edges are spread out and tightened without any gaps or leaks.	/

Item	Inspection method	Note
Rainproof blade inspection	• Check if there are any debris such as leaves, plastic bags, bird droppings, etc. blocking between the rainproof blades.	/
Frame and sealing inspection	• Check if the connecting bolts of the entire frame of the blinds are loose with the container wall panels. • Inspect if the outer frame sealing strips are aged, damaged or fallen off.	/
Salt spray and corrosion inspection	• For energy storage stations located in coastal areas or in regions with high salt spray, it is necessary to conduct regular inspections to check for any signs of rust or corrosion on the aluminum surface of the louvers and the filter frame.	/

8.4.2. Filter Replacement

NOTICE!

The replacement methods for all filter elements are the same. In this section, the filter of RMU cabinet door is used as an example.

1. Open the RMU door.

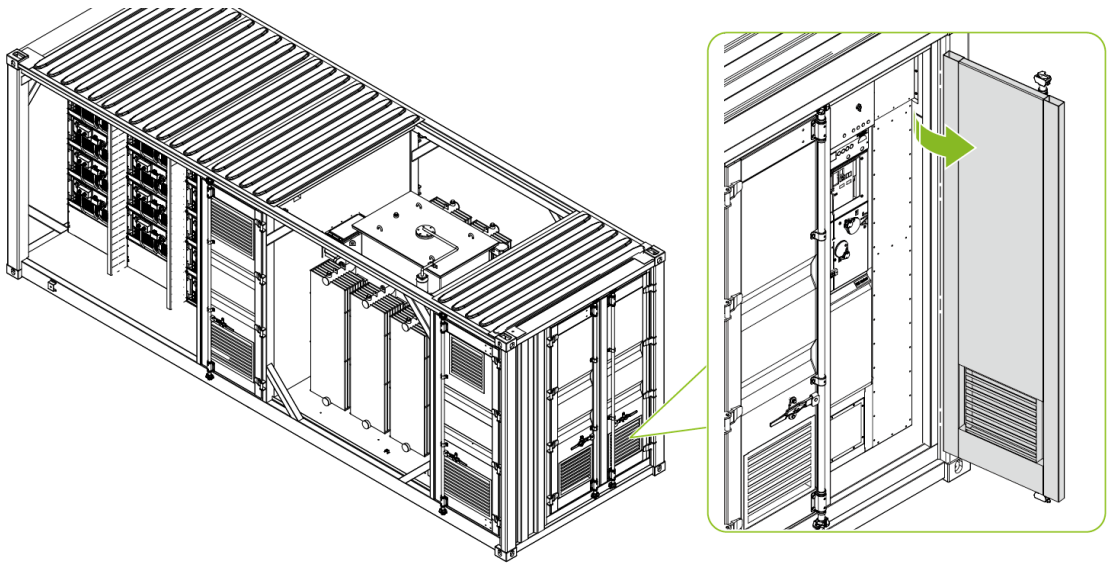


Fig. 8-2 Open the RMU door

2. Rotate the buckle (1) and take off the filter (2).

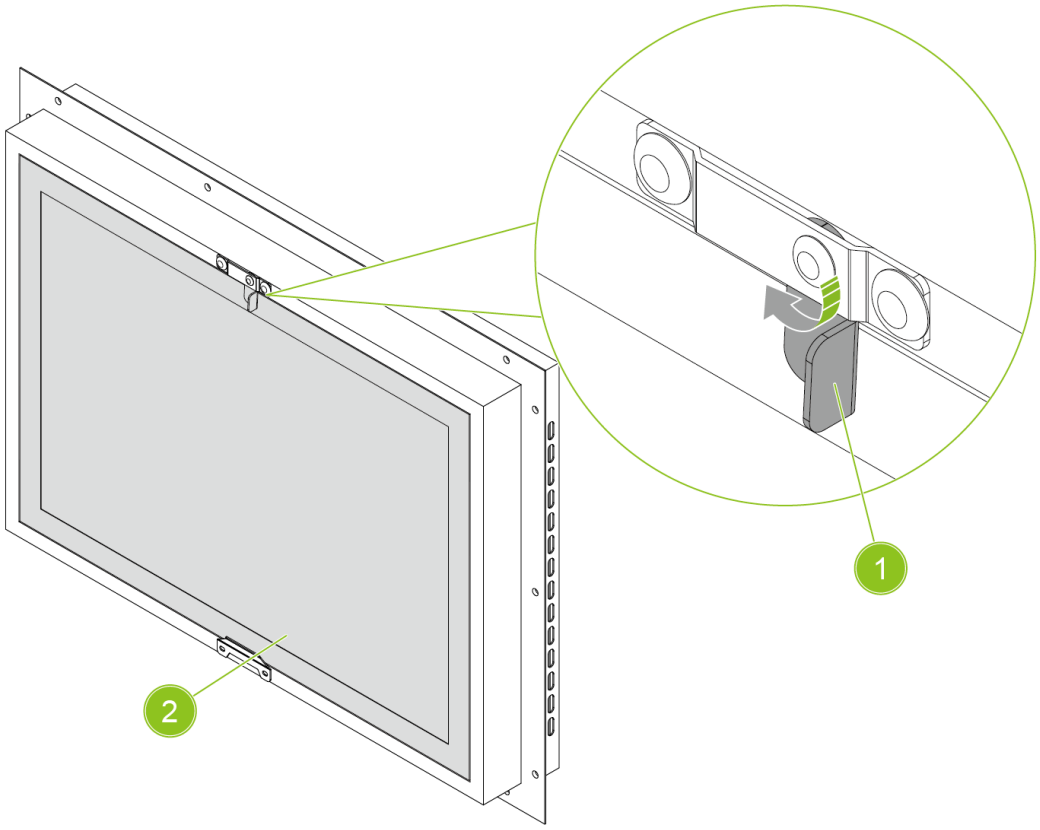


Fig. 8-3 Rotate the buckle

3. Install the new filter in reverse order.

9. PCS Troubleshooting

Fault name	Fault explanation	Fault cause	Fault handling
TempSensor Err	Prompt detection of abnormal temperature	1.Temperature Sensor socket connector has poor contact; 2.Temperature Sensor is damaged;	1.Observe temperature display; 2.Switch off 3-phase working power supply and then reboot the system; 3.Contact service personnel
CommErr	Communication inside PCS fails	Terminal block connecters of internal communication wires have poor contact	1.Observe for 5 minutes and see whether the alarm will be eliminated automatically; 2.Switch off 3-phase power supply and then reboot the system; 3.Contact service personnel
ExtFanErr	Cooling fan failure by visual check	1.Fan is blocked; 2.Fan service life has expired; 3. Fan socket connecter has poor contact.	1.Observe for 5 minutes and see whether the alarm will be eliminated automatically; 2.Check for foreign objects on fan blades; 3.Switch off 3-phase power supply and then reboot the system; 4.Contact service personnel
EepromErr	Internal alarm	Internal memory has a problem	1.Observe for 5 minutes and see whether the alarm will be eliminated automatically; 2.Contact service personnel
TempOver	Ambient or internal temperature is too high	1.Ambient temperature outside the PCS is too high; 2.Fan is blocked;	1.Confirm that external ambient temperature is within the specified range of operating temperature; 2.Check whether air inlet is blocked; 3.Check whether fan is blocked;

Fault name	Fault explanation	Fault cause	Fault handling
		3.Convection airflow is insufficient due to improper installation.	4.Check whether the location of installation is appropriate or not; 5.Observe for 30 minutes and see whether the alarm will be eliminated automatically; 6.Contact service personnel
GridV.OutLim	Grid voltage exceeds the specified range	1.Grid voltage is abnormal; Power grid breaks down 2.Cable connection between the PCS and the grid is poor;	1.Observe for 10 minutes and see whether the alarm will be eliminated automatically; 2.Check whether the grid voltage is within the specified range; 3.Check whether the cable between the PCS and power grid is disconnected or has any fault 4.Contact service personnel
GridF.OutLim	Grid frequency is abnormal, or power grid is not detected	1.Grid frequency is abnormal; 2.Cable connection between the PCS and the grid is poor;	1.Observe for 10 minutes and see whether the alarm will be eliminated automatically; 2.Check whether the grid frequency is within the specified range; 3.Check whether the cable between the PCS and power grid is disconnected or has any fault; 4.Contact service personnel
Battery VoltOver*	Battery voltage exceeds the specified value	Battery overvoltage	1.Observe for 30 minutes and see whether the alarm will be eliminated automatically; 2.Check whether battery voltage exceeds the specified range; 3.Turn off the battery input switch, wait for 5 minutes, and then turn on the switch again; 4.Contact service personnel
GFCI.Err	System leakage current is too high	1.Excessive parasitic capacitance on battery	1.Observe for 10 minutes and see whether the alarm will be eliminated automatically;

Fault name	Fault explanation	Fault cause	Fault handling
		module due to environmental factor; 2.Grounding is abnormal; 3.Internal PCS fault	2.Detect whether the electrical connection is abnormal 3.Contact service personnel
IntProtect 0010~0620	Internal protection of the PCS	Protection procedure occurs inside the PCS	1.Observe for 10 minutes and see whether the alarm will be eliminated automatically; 2.Contact service personnel
IntFault 0010~0150	Internal fault of the PCS	Fault occurs inside the PCS	1.The PCS can be forced to restart once if it is required by operation and if it is confirmed that there is no other problem; 2.Contact service personnel

10. Quality Assurance

10.1. Liability Exemption

NOTICE!

The Company shall not be liable for any consequences or losses arising from the following circumstances and reserves the right to refuse warranty services.

1. Exceed the quality assurance period of the product.
2. Cannot provide product serial number or the SN is not clear/complete. Incorrect or inappropriate use of the product (including installation and use).
3. Damage during transportation/storage/handling.
4. Misuse, abuse, intentional damage, negligence or accidental damage.
5. Improper commissioning, testing, operation, maintenance or installation performed by customer, including but not limited to:
   - Failure to meet safe operating environment or system requirements of external electrical parameters provided in written document;
   - Failure to operate the covered product in accordance with the product's operating manual or user guide;
   - Relocate and reinstall systems not in accordance with the requirements of Chint power;
   - Unsafe electrical or chemical environment or other similar kind of conditions;
   - Direct failure caused by wrong voltage or faulty power system;
   - Unauthorized disassembly of the products, or unauthorized modification of the product or provided software;
6. Entrust installation, maintenance personnel not designated by the CHINT to install, repair and disassemble the products.
7. Damages caused by ignoring the safety warnings in the manual or break the rules in relevant statutory safety regulations.
8. Damages caused by operating environment beyond the requirements of the product user manual or failure to commissioning, install, use and maintain the equipment according to the requirements of the product user manual.
9. Unforeseen disasters or irresistible accidents (including but not limited to acts of public enemies, acts of government agencies or domestic or foreign institutions, vandalism, riots, fires, floods,

typhoons, explosions or other disasters, epidemic or quarantine restrictions, labor disturbances or labor shortages, accidents, cargo embargoes or any other events beyond the control of CHINT).

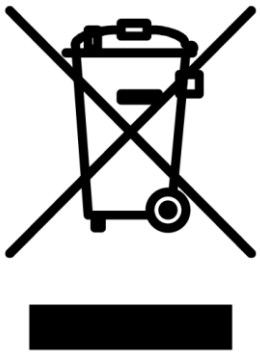
10. The lightning protection measures have not been implemented or are not in accordance with standards (The systems' lightning protection measures should comply with the relevant national and IEC standards; otherwise, it may result in damage to photovoltaic devices such as modules, inverters, distribution facilities, etc., due to lightning strikes).
11. Equipment failure or software damage caused by using non-standard components/accessories, connection of incompatible configurations (such as batteries, etc.) or other brand products or accessories without permission, improper configuration selection/storage/use.
12. Abnormal battery degradation or damage caused by improper use or maintenance.
13. Other circumstances that are not covered by the company's after-sales warranty agreement.

10.2. Quality Clause (Warranty Clause)

1. For products that fail during the warranty period, our company will repair or replace new products free of charge;
2. Customer shall present the invoice of the product and date of purchase. At the same time, the trademark on the product should be clearly visible, otherwise we have rights to refuse quality assurance.
3. The unqualified product under replacement should be returned to our company;
4. It is necessary to provide a reasonable time for the company to overhaul the equipment.
5. For more warranty terms, refer to the applicable standard warranty policy in place at time of purchase.

If you have any questions about the equipment, please contact us, we will be very happy to help you.

11. Disposal





This device cannot be disposed of and scrapped as household waste.

When the service life of the equipment or its internal components expires, please dispose of or recycle it in accordance with the applicable electrical waste disposal or recycling laws in the installation location.

Annex

Annex 1 Personal Protective Equipment List

No.	Category	Sample	Requirements
1	Safety Helmet		Before entering the construction site, the helmet should be used correctly to protect the head; The helmet should meet the requirements of ANSI Z89.1 "Industrial Safety Helmets"
2	Electrician's Clothing		Field service personnel need to wear electrician uniforms
3	Protective shoes		During the transportation and installation of equipment, protective shoes must be worn; Field service personnel need to wear protective shoes
4	Insulating gloves		On-site maintenance personnel need to wear insulated gloves
5	Mask		On-site service personnel need to wear masks
6	Protective glass		Shield the eyes from hazards like flying debris, chemical splashes, or intense light.

Annex 2 List of Tools

No.	Name	Material	Specification	Sample	Qty.	Remarks	Calibration date	Validity Period
1	Laptop	/	/		2	Important Tool		
2	Tape Measure	Steel	5 m		1	Important Tool		
3	Wrench (insulated)	Stainless steel	1 complete set		1	Important Tool		
4	Socket wrench (insulated)	Stainless steel	1 complete set		1	Important Tool		
5	Insulated torque wrench	Stainless steel	1 complete set		2	Important Tool		
6	Screwdriver	Stainless steel	1 complete set		1	Important Tool		

No.	Name	Material	Specification	Sample	Qty.	Remarks	Calibration date	Validity Period
7	Gradient meter (level)	Aluminum alloy	1000mm		1	Important Tool		
8	Electric wrench				1	Important Tool		
9	Electric drill				1	Important Tool		
10	Multimeter				1	Important Tool		
11	Battery tester		HIOKI 3564		1	Important Tool		
12	Forklift				1	Important Tool		

Annex 3 Suggestions on Anti-corrosion Grades

Grade	Degree of corrosion	Typical environment
C3-M	Medium	Coastal cities' buildings, low-salinity coastal areas, and production sites with condensate water.
C4-M	High	Coastal industrial zone, port facilities, chemical plants, bridges, high-salinity coastal areas.
C5-M	Extreme high	Offshore drilling platforms, cross-sea bridges, ships, areas that are frequently exposed to seawater splashing or immersion.

Annex 4 Terms and Definitions

Terms	Definitions
Battery PACK	Battery assembly consisting of battery cells connected in series, parallel, or both, with a pair of positive and negative output terminals, which should also include housings, management and protection components.
Battery cluster	Battery assembly that is connected by the battery PACK in series and can run independently after being connected with a PCS and ancillary facilities, which shall also include the battery management system, monitoring and protection circuit, electrical and communication interfaces and other components.
PCS	Power Conversion System, accepts the EMS or BMS requirements, and charges and discharges batteries.
RMU	Ring Main Unit, the core switchgear used in ring power supply networks of medium-voltage distribution networks
ONAN	Oil Natural Air Natural
ESMU	Energy Storage Management Unit, the master control module in BMS, which communicates with the main control module to query the information inside the module, and summarizes the information of multiple battery clusters; communicates with HMI to query on the corresponding HMI; communicates with the background to query in the corresponding background; communicates with PCS to control the charging and discharging of PCS; and inputs and outputs dry contacts as required, and communicates with air conditioning, fire protection and other system equipment as required.
LC	Local controller
Circulation	When the battery PACK is charged and discharged once as per the specified standard, it is considered as a cycle.
Measurement unit	Unit of voltage: "V" (volt) Unit of current: "A" (ampere) Unit of power: "W" (watt) Unit of capacity: "Ah" (Ampere-Hour) Unit of energy: "Wh" (Watt-Hour) Unit of internal resistance: "mΩ" (milliOhm) Unit of temperature: "℃" (degree Celsius) Unit of length: "mm" (millimeter) Unit of time: "s" (second) Unit of frequency: "Hz" (Hertz) Unit of mass: "kg" (kilogram) Unit of force: "N" (Newton)

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