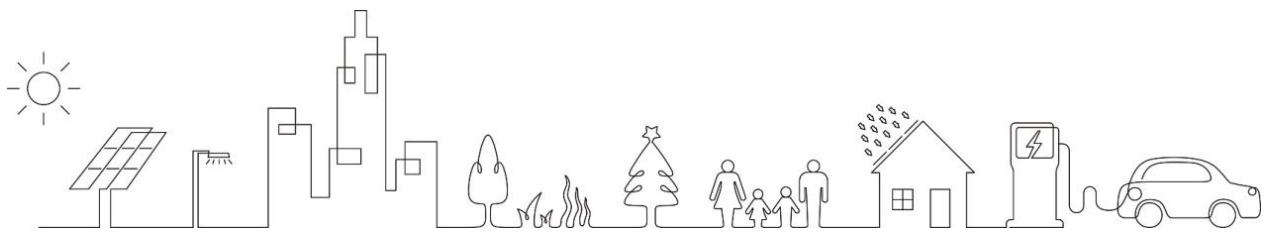
Tensorpack T
Energy Storage System
User Manual
(On-Grid, 2-Hour)



R1.0-20260513

Legal Notice

As Teplore is dedicated to the continuous iteration and update of its products, this document is subject to change owing to product version upgrade or other reasons. This document is used as a guide only, and all statements, information and recommendations contained herein do not constitute any express or implied warranty. Pictures or interfaces provided in this document are for illustration only and may vary depending on product versions or market areas.

Teplore Co., Ltd.

Headquarters (China):

8th Floor, Building 2, Keya Phase II, 59 Tianyuan West Road, Jiangning District, Nanjing

European Office:

Haraszti út 48, Budapest, 1239 Hungary

Website: www.teplore.com

E-mail: info@teplore.com

Tel.: +86 2552136163

Table of Contents

Abbreviation and Definition

Abbreviation	Definition
BMS	Battery Management System
EMS	Energy Management System
EPO	Emergency Power Off
ESS	Energy Storage System
LC	Local Controller
PCS	Power Conversion System
SPD	Surge Protection Device
UPS	Uninterruptible Power Supply

1 About This Document

1.1 Purpose

This user manual provides comprehensive instructions for the installation, commissioning, and operation of Tensorpack T-Series Energy Storage System (ESS) in grid-connected scenarios with 2-hour duration configuration (hereinafter referred to as “Tensorpack T(OG-2H)” or “the ESS”).

Specific configurations covered by this manual:

Configuration Item	Description
Application Scenario	On-Grid (OG)
Storage Duration	2-hour system (2H)
Battery Cabinet Configuration	Model: TB217 / TB241 / TB265; Quantity: 1-3
AC Control Cabinet Configuration	1 AC control cabinet with 1-3 PCS units (depending on battery cabinet quantity)
PCS Model	100kW / 130kW / 135kW

If your ESS configuration does not match the above, please contact Teplore for the appropriate manual.

1.2 Document Conventions

Statement

In this document, “equipment” refers to the products, software, components, spare parts, or services related to this document; “the company” refers to the manufacturer (producer), seller, or service provider of the equipment; “customer” refers to the entity that transports, stores, installs, operates, or maintains the equipment.

Symbol Conventions

To alert readers or users about the precautions that should be observed during installation, operation, and maintenance to ensure personal and equipment safety, this document uses the following safety symbols:

⚠ DANGER

Indicates a high potential hazard that, if not avoided, will result in death or serious injury.

⚠ WARNING

Indicates a moderate potential hazard that, if not avoided, may result in death or serious injury.

⚠ CAUTION

Indicates a low potential hazard that, if not avoided, may result in minor or moderate injury.

NOTICE

Indicates a potential hazard that, if not avoided, may result in equipment malfunction or property damage.

NOTE

Provides supplementary explanation or key details in the main text. It is not a safety alert and does not contain information related to personal injury, equipment damage, or environmental hazards.

2 Safety Precautions

2.1 Statement

Before installing or operating the equipment, please read all safety instructions carefully. It is mandatory to strictly adhere to all safety precautions, safety markings on the equipment, applicable laws, regulations, standards, and norms.

In this manual, the terms “danger”, “warning”, “caution” and “note” are not limited to all safety matters that should be followed. Customers must also comply with relevant international, national, or regional standards and industry practices. The equipment should be used in an environment that meets the requirements. Incorrect operation can lead to product damage and property loss, and even cause personal injury, for which the company is not liable.

The company is not responsible for any of the following situations or their consequences:

- Equipment damage caused by force majeure such as floods, flash floods, typhoons, earthquakes, tsunamis, lightning, volcanic eruptions, war conflicts, government bans, strikes, etc.;
- Damage caused by transportation by the customer or a third party authorized by the customer;
- Damage caused by failure to comply with the requirements of this manual;
- Installation and operation that do not comply with relevant international, national, or regional standards;
- Failure to observe the safety precautions and operating instructions specified in this manual;
- Failure to follow the safety markings indicated on the equipment;
- Installation and use of the equipment by unqualified personnel;
- Customer-provided non-standard tools that do not meet relevant standards;
- Damage caused by the customer’s intentional acts, gross negligence, operational violations, or reasons not attributable to the company.

2.2 Label Description

Labels on the equipment includes essential information for safely operating the product. It is strictly forbidden to intentionally damage or remove these labels. If the labels become blurred, damaged, or lost, they must be replaced immediately. The machine identification includes:

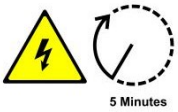
Label	Description
	Indicates high voltage danger; touching may result in an electric shock hazard.
	Advises caution for safety; avoid unnecessary contact to prevent personal injury.
	Indicates that this is a protective ground (PE) and must be securely grounded to ensure personal safety.
	Indicates the presence of lethal high voltage. After disconnecting the equipment from the external power source, wait 5 minutes before touching any internal conductive components.
	Indicates that the manual should be read before performing any operations on the product.

Table 2-1: Label description

2.3 Safety Instructions

2.3.1 General Safety

⚠ DANGER

- Touching the power grid or terminals and contacts connected to the ESS may cause fatal electric shocks.
- There is lethal high voltage inside the product; heed and follow the warning signs on the product.
- Damaged equipment or product malfunctions may cause electric shocks or fires.

2.3.2 Personal Safety

⚠ DANGER

- During equipment operation, unauthorized or incorrect operations can cause fires, electric shocks, or explosions, leading to product damage, property loss, and even personal injuries.
- During work, it is strictly forbidden to wear various conductive objects such as watches and necklaces to avoid electric shock injuries.
- During work, it is mandatory to use regulatory standard specialized insulated tools to avoid electric shock injuries or short circuits.

General Requirements

- If faults that may cause personal injury or equipment damage are discovered during work, stop the operation immediately and, after confirmation by a responsible person, take effective protective measures.
- Before powering on the equipment, ensure it is fully installed and checked by professionals.

- It is forbidden to touch or indirectly contact powered equipment; voltage at the contact points should be measured before touch to ensure there is no risk of electric shock.
- Do not touch operational fans with fingers or tools to prevent personal injury or equipment damage.
- In case of a fire, immediately evacuate the building or equipment area and press the fire alarm or call the fire department.

Personnel Requirements

- Personnel performing electrical operations on this product must have professional training and relevant operation certificates.
- Operators should have a certain level of electronic, electrical wiring, and mechanical expertise, and be fully familiar with the internal electrical principles of the product.
- Operators should be familiar with various safety precautions and relevant standards of their country/region.
- Only qualified professionals or trained personnel are allowed to install, operate, and maintain the equipment.
- Only qualified professionals are allowed to remove safety facilities and service equipment.
- Installation or operation personnel should have the ability to respond to emergencies or unexpected situations that may arise during installation or trial operation.
- Personnel involved in special scenarios such as electrical operations, working at heights, or operating special equipment must have the special operation qualifications required by their local country/region.
- Except for personnel operating the equipment, other individuals should not approach the equipment.

2.3.3 Electrical Safety

⚠ DANGER

- Before making electrical connections, ensure the equipment is undamaged, as damage may cause electric shocks or fires.
- Both the battery side and grid side may produce voltage; always use a standard voltmeter to ensure no voltage before touching.
- Disconnect the power source of the ESS; the battery will not immediately lose power, wait 10 minutes to ensure the equipment is completely de-energized before operating.
- Prevent foreign objects from entering the equipment during work as they may cause short circuits, damage, power supply derating, or personal injuries.

⚠ WARNING

- Ensure the system is reliably grounded before performing electrical installations or connections; otherwise, there may be a risk of electric shock when touching the product.
- Do not damage the grounding conductor.

General Requirements

- Installation, operation, and maintenance must be performed according to the manual's sequence; do not arbitrarily change the installation order, modify or alter the equipment.
- Permission from local electrical authorities is required for grid-connected operation.
- Erect warning signs or set up safety barriers near the equipment, and strictly prohibit non-working personnel from entering.
- Disconnect the equipment itself and the upstream and downstream switches before installing or removing power cables.

- If liquid enters the equipment, immediately turn off the power and do not continue using it.
- Before operating the equipment, carefully check that the tools used meet the requirements and are registered; after the operation, collect them back to prevent them from being left inside the equipment.

Cable Requirements

- Before installing power cables, ensure the cable labels are correct and the cable terminals have been insulated.
- The selection, installation, and routing of cables must comply with local laws, regulations, and standards.
- During the laying of power cables, avoid looping or twisting. If the power cable is found to be too short, replace it; do not make joints or soldering points in the power cable.
- All cables must be securely connected, well-insulated, and of appropriate specifications.

Grounding Requirements

- The equipment grounding impedance should meet local electrical standards.
- The equipment should be permanently connected to protective ground. Before operating the equipment, check the electrical connections to ensure the equipment is reliably grounded.
- Do not operate the equipment without installing a grounding conductor.

2.3.4 Environmental Requirements

⚠ DANGER

It is strictly forbidden to pile flammable and explosive materials around the installation site.

⚠ WARNING

- Install the equipment away from liquids, and strictly prohibit installation under locations such as water pipes and air vents where condensation can occur.
- Do not install under air conditioning vents, ventilation ducts, or windows where leakage is possible to prevent liquids from entering the equipment and causing faults or short circuits.
- The equipment should be installed in a clean, neat, and well-ventilated area; do not pile miscellaneous items within a 2-meter radius.
- Do not install the equipment in environments with radioactive radiation, high salinity, strong vibration or magnetic fields, or where fungi can easily grow.

NOTICE

Avoid opening the maintenance door of the ESS for maintenance and inspection under adverse conditions with air humidity >95% or during rainy and humid weather.

- Moisture intrusion can damage the product. To ensure the normal and safe operation of the system, pay attention to environmental humidity during routine maintenance and inspection.
- The installation site should meet the requirements for equipment ventilation and personnel evacuation.
- Before installing the equipment, ensure the installation surface is solid, free of adverse geological conditions, and meets the load-bearing requirements of the equipment.
- Before maintenance, clean the accumulated water, ice, snow, or other debris on top.
- After installing the equipment, clear empty packaging materials from the area.

2.3.5 Operation and Maintenance Safety

⚠ WARNING

- During routine operation, ensure the equipment cabinet doors are closed and locked, and the keys are removed and kept by a designated person to prevent unauthorized access and accidents.
- Except for necessary checks and maintenance, do not open the cabinet doors to prevent moisture from entering the equipment and causing short circuits and damage.
- Except for personnel operating the equipment, other individuals should not approach the equipment.
- When performing maintenance and repairs, personal protective equipment must be equipped.

NOTICE

- Do not spray any devices inside or outside the equipment.
- Do not clean the equipment with cleaning agents or expose it to corrosive chemicals.

General Requirements

- Personnel operating the equipment must be professionals and trained personnel.
- Ensure that the internal devices and systems of the battery system are completely de-energized.
- Erect clear warning signs at the disconnection points to prevent dangerous accidents caused by misoperation.
- Set up warning signs or safety barriers in the operation area.
- During checks or maintenance, ensure at least two personnel are present.

- Wear protective equipment, including safety goggles, insulated gloves, insulated shoes, and safety helmets, as necessary to ensure the safety of personnel and equipment.
- After operations, lock the maintenance door of the ESS and securely store the keys.

3 Product Description

3.1 Product Overview

Tensorpack T-Series Energy Storage System is a modular energy storage solution designed for commercial, and industrial applications. Tensorpack T ESS is available in two variants: one for on-grid applications and one for microgrid applications . This document focuses on the Tensorpack T On-Grid version.

Typical Applications

- TOU (Time of Use)

  The LC manages ESS charging or discharging according to tariff structures and load profiles. The system charges during off-peak periods and discharges during peak periods, optimizing electricity cost savings.

- DCM (Demand Charge Management)

  By regulating ESS power output based on transformer load at the grid connection point, the system prevents power demand from exceeding the set demand. This maintains consumption within demand levels and improves economic efficiency.

- PV Consumption

  When PV generation exceeds local load demand, excess energy is stored in the ESS batteries to prevent grid feed-in. The LC automatically reduces discharge power when load decreases, ensuring no energy export to the grid.

- Capacity Expansion

  Integrated with charging station monitoring systems, the LC coordinates transformer load, charging power, and ESS operation to maintain total power consumption within the transformer’s safe operating capacity.

- Ancillary Services

  Through connectivity with grid operator dispatch platforms, the system enables behind-the-meter services including demand response, peak shaving, and frequency regulation.

3.2 System Architecture

Tensorpack T(OG-2H) employs a modular separated architecture consisting of the battery system and AC control system:

- **Battery System**: Handles energy storage, integrating battery packs, high-voltage control components, air-conditioning units, fire-protection equipment, and the Battery Management System (BMS).
- **AC Control System**: Manages power conversion and system coordination, integrating PCS, Local Controller (LC), energy meters, and communication modules.
- **Interconnection**: Reliable cabinet-to-cabinet linkage via DC power cables and communication wiring.

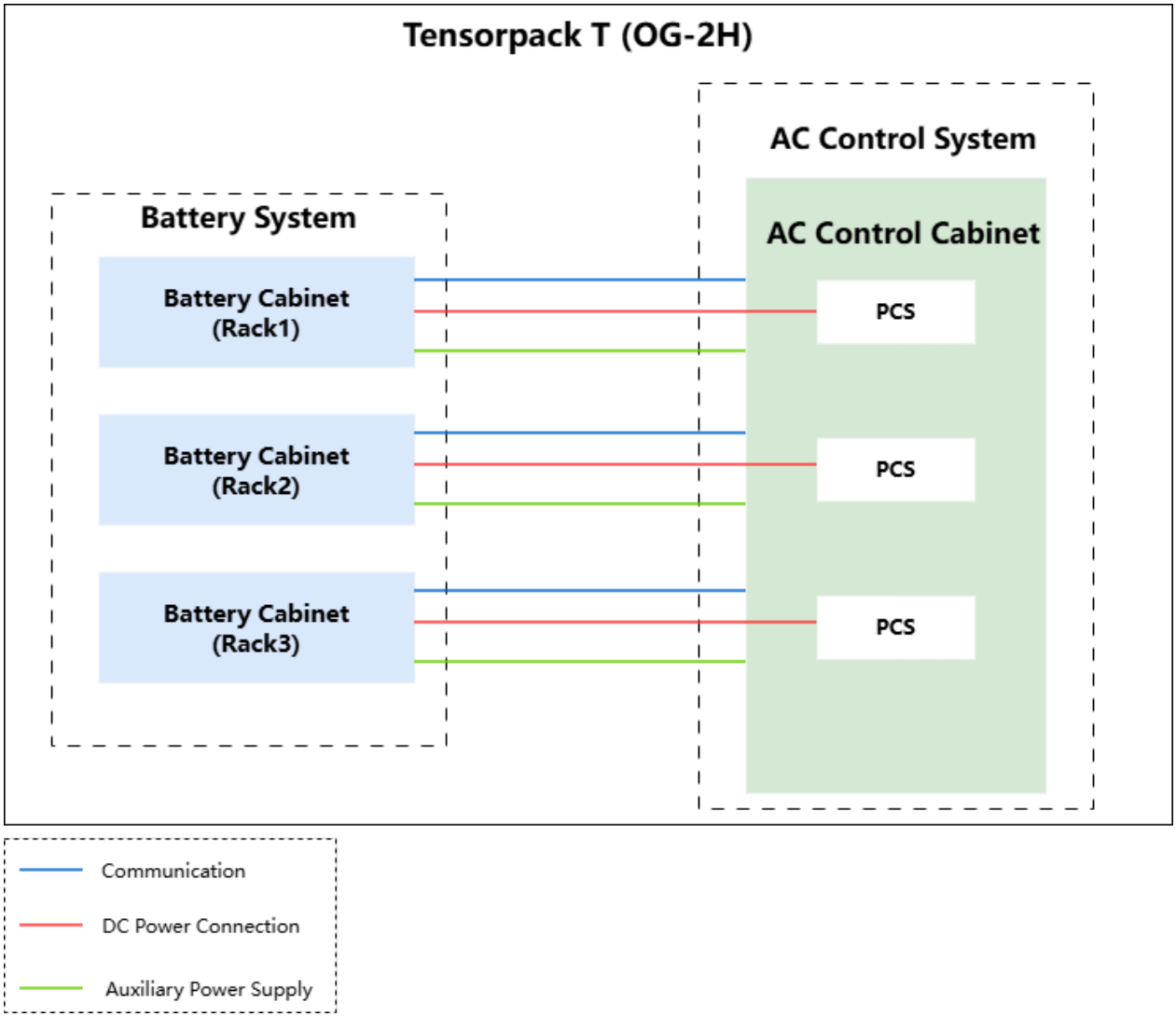


Figure 3-1: Tensorpack T(OG-2H) system architecture (example with 3 battery cabinets)

Figure 3-1 illustrates a representative example of an ESS configuration featuring three battery cabinets and a single AC control cabinet housing three PCS units.

In the 2-hour ESS, one AC control cabinet can connect to 1 to 3 battery cabinets. The number of PCS units inside the AC control cabinet matches the number of battery cabinets—one PCS per battery cabinet. The actual configuration is determined by the system's power rating requirements.

For clarity and consistency, this document uses the following shorthand notations to refer to common ESS configurations:

Configuration Notation	AC Control Cabinet (TC)	PCS Units	Battery Cabinet (TB)
1TC+1TB	1	1	1
1TC+2TB	1	2	2
1TC+3TB	1	3	3

Table 3-1: Shorthand notations of ESS

3.2.1 Circuit Diagram

Battery Cabinet

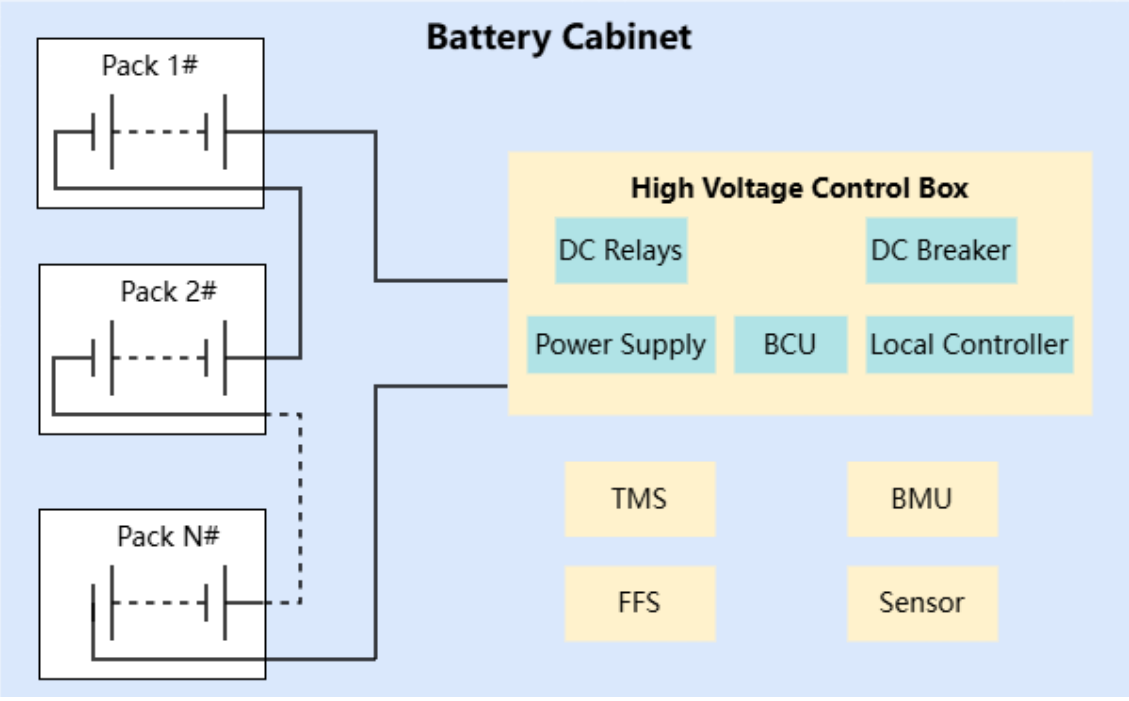


Figure 3-2: Circuit diagram: battery cabinet

AC Control Cabinet

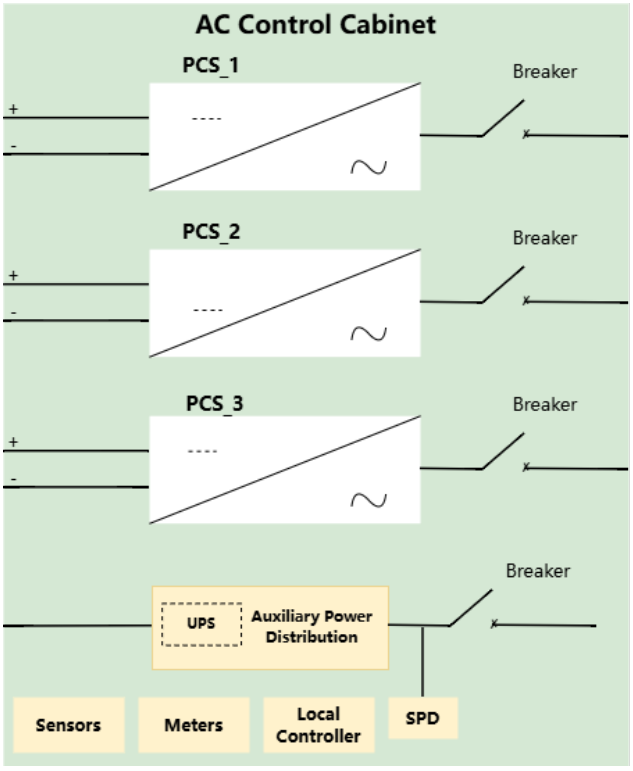


Figure 3-3: Circuit diagram: AC control cabinet (example with 3 PCS units)

NOTE

The AC control cabinet supports a scalable array of 1 to 3 PCS units, with the actual quantity determined by the project configuration.

3.2.2 Communication Topology

Figure 3-4 presents a standard system communication topology diagram of ESS.

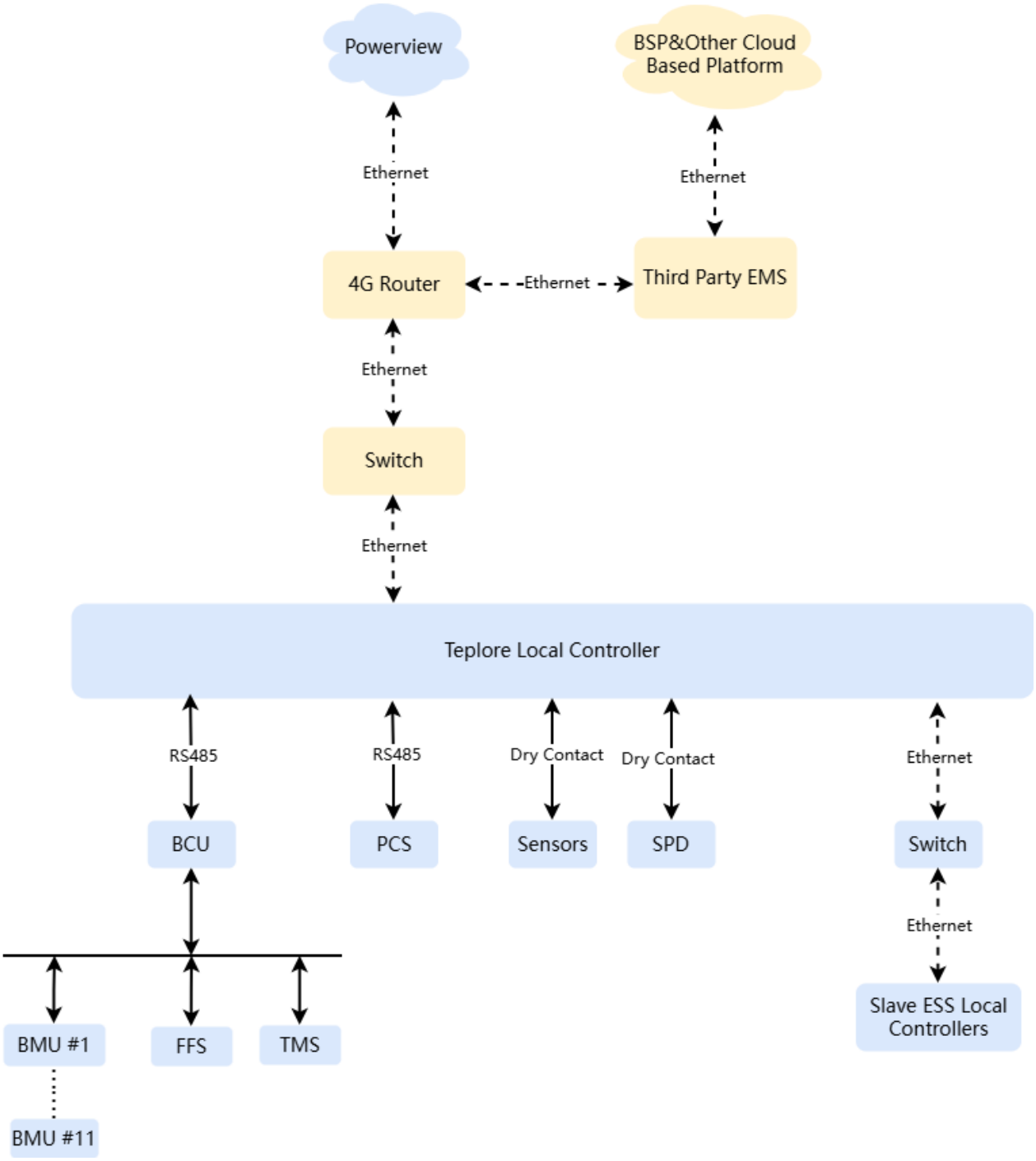


Figure 3-4: Communication topology of ESS

3.3 Model Description

Tensorpack T ESS adopts a unified model numbering convention to enable users to quickly identify product types, configuration parameters, and key characteristics. The exact model should always be verified via the equipment nameplate.

3.3.1 Battery Cabinet

The product model of the battery cabinet is divided into two fields, as shown in Figure 3-5 (using **TB217** as an example). Table 3-2 provides the description of each field.

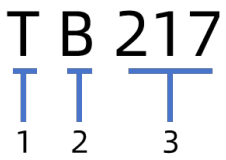


Figure 3-5: Product model - battery cabinet

Field	Description	Value Options
1	Serial product	T：Tensorpack T ESS
2	System name	B：Battery system
3	Capacity level	217：Rated capacity 217kWh 241：Rated capacity 241kWh 265：Rated capacity 265kWh

Table 3-2: Model description - battery cabinet

3.3.2 AC Control Cabinet

The product model of the AC control cabinet is divided into five fields, as shown in Figure 3-6 (using **TC100M3-OG** as an example). Table 3-3 provides the description of each field.

Figure 3-6: Product model - AC control cabinet

Field	Description	Value Options
1	Serial product	T：Tensorpack T ESS
2	System name	C：AC control system

Field	Description	Value Options
3	PCS power rating	100：The power rating of a PCS module is 100kW 130：The power rating of a PCS module is 130kW 135：The power rating of a PCS module is 135kW
4	Amount of PCS module	1：One PCS module 2：Two PCS modules 3：Three PCS modules
5	Application	OG：On-Grid version MG: Microgrid version

Table 3-3: Model description - AC control cabinet

4 System Components

This chapter provides a detailed introduction to the two primary subsystems of the ESS: the Battery System and the AC Control System.

4.1 Battery System

The Battery System consists of standardized battery cabinets, which are available in three capacity variants (TB217, TB241, TB265). All models share the same external dimensions and appearance, ensuring consistent installation and integration. The primary difference lies in the number of battery packs installed internally, which directly determines the total energy capacity of each cabinet.

4.1.1 Appearance

All three battery cabinet models (TB217, TB241, TB265) feature an identical external design as shown in Figure 4-1.

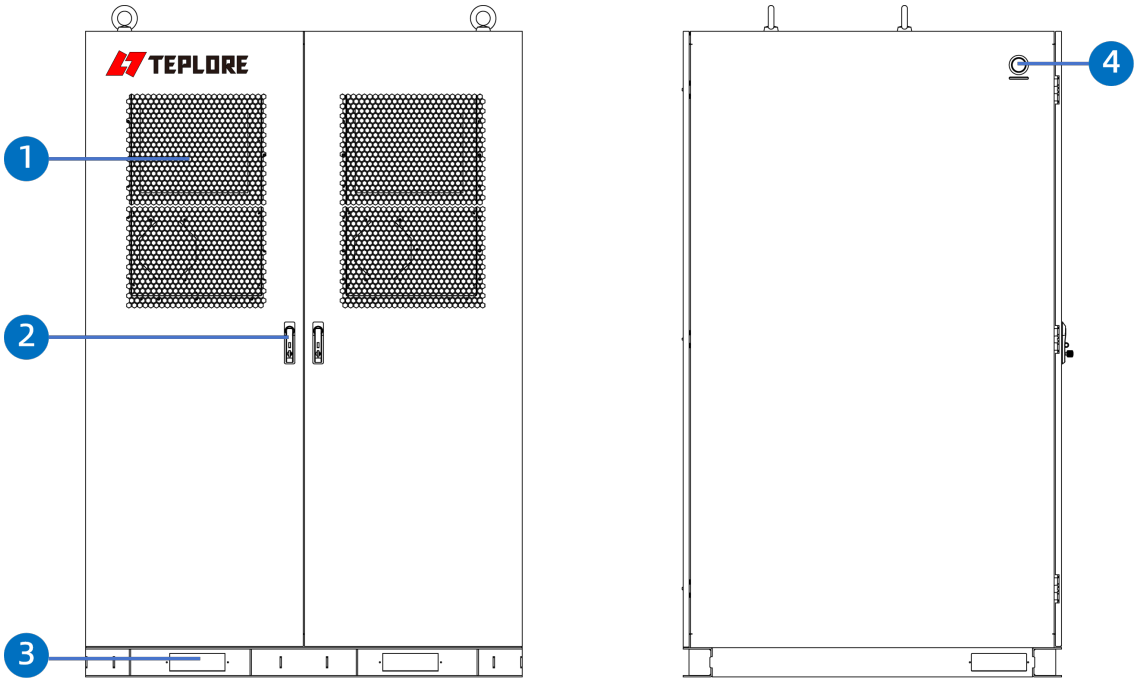


Figure 4-1: Battery cabinet appearance

No.	Name
1	Thermal Management System (TMS)
2	Door Lock
3	Forklift Hole
4	Pressure Relief Valve

Figure 4-2 demonstrates the dimensions of the battery cabinet (Unit: mm).

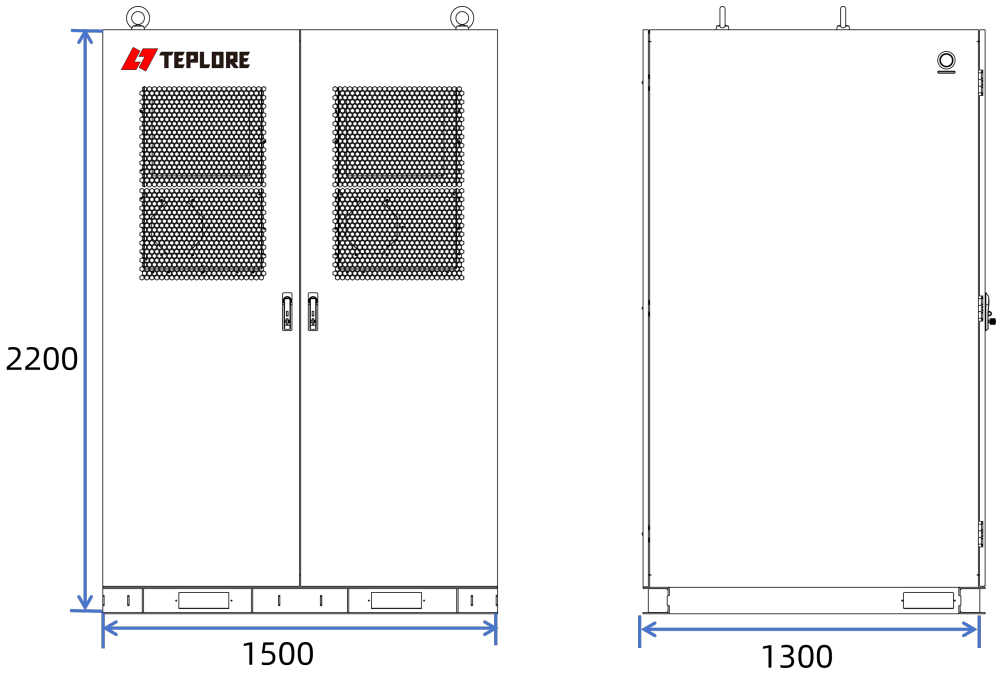


Figure 4-2: Dimensions

4.1.2 Internal Layout

Although all three models share the same external appearance, their internal configurations differ based on the number of battery packs, as summarized below:

Model	Number of Battery Packs	Rated Capacity
TB217	9	217 kWh
TB241	10	241 kWh
TB265	11	265 kWh

Table 4-1: Internal configuration comparison of battery cabinet models

Figure 4-3 shows the internal layout of three models and Table 4-2 lists all components in model TB265.

Figure 4-3: Internal layout of three models

NO.	Component
1	TMS
2	Battery Pack
3	HV Control Box
4	Gas Sensor

NO.	Component
5	Pressure Relief Valve
6	Aerosol
7	Water Immersion Sensor

Table 4-2: Component description

4.1.2.1 Battery Pack

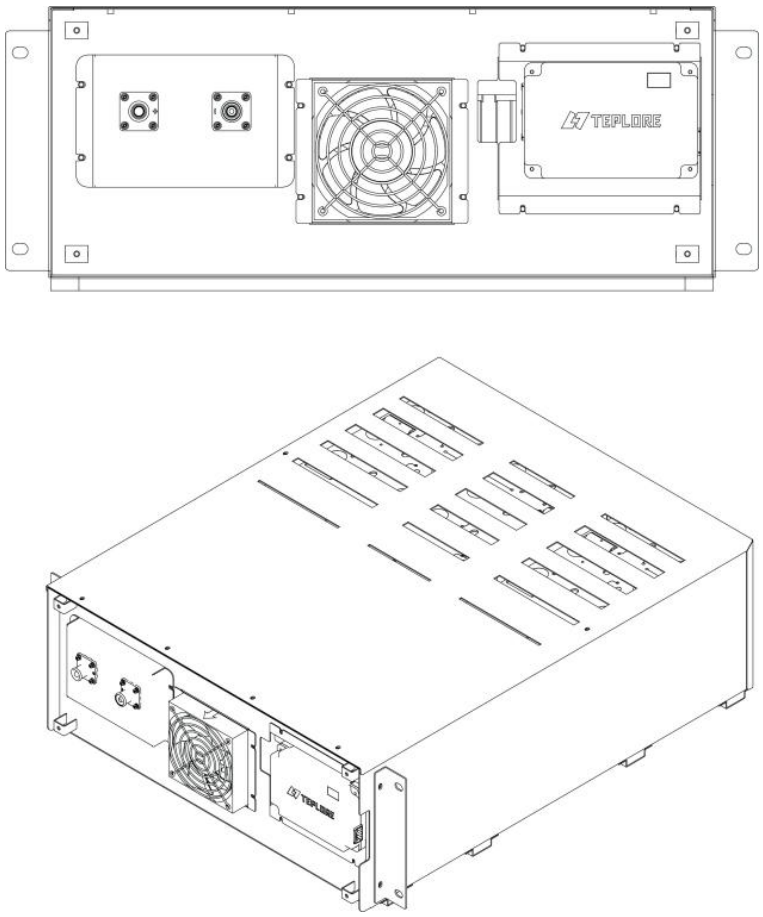


Figure 4-4: Battery pack appearance

Parameter	Specification
Dimension (W × D × H)	666mm x 762mm x 249mm
Weight	170kg
Rated Capacity	24.1kWh
C-Rate	≤0.5P
Configuration	1P24S

Parameter	Specification
Core Components	24S cells，BMU，pack fan

Table 4-3: Battery pack specifications

4.1.2.2 BMS

The Battery Management System (BMS) is the intelligent core responsible for ensuring the safety, reliability, and optimal performance of the battery pack. This hierarchical system primarily comprises the Battery Management Unit (BMU) and the Battery Control Unit (BCU).

BMU

The BMU is a critical component of the energy storage BMS, ensuring safe operation and extended battery life through precise real-time monitoring of individual cell voltage and temperature.

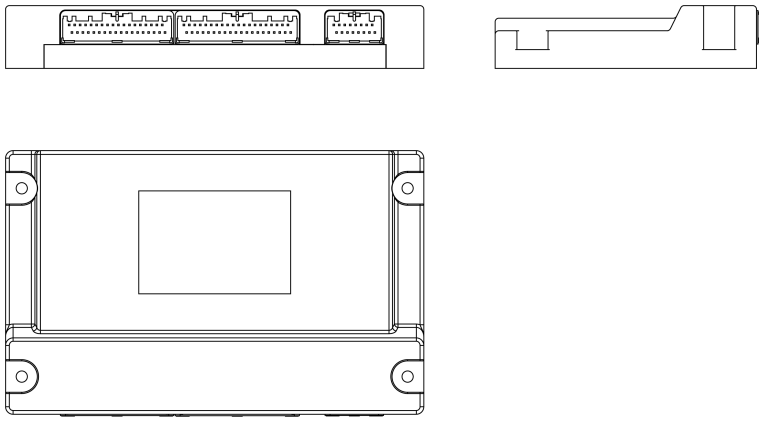


Figure 4-5: BMU appearance

Key Features:

- Accurately monitors individual cell voltage and temperature across multiple battery chemistries.
- Supports passive cell balancing to maintain pack consistency and extend battery life.
- Features robust daisy-chain communication for reliable data transmission to the master controller.
- Built with self-diagnostic capabilities and high-safety design.

BCU

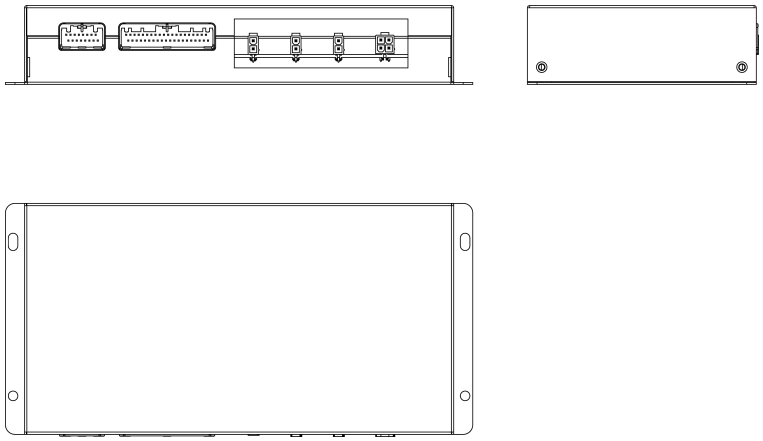


Figure 4-6: BCU Appearance

The BCU is the central control unit of the BMS, managing battery state estimation, charge/discharge, balancing, and safety functions by communicating with BMUs and external systems like PCS and EMS.

Key Features:

- Designed with high reliability and multi-layer safety protection to ensure safe battery operation under all conditions, in compliance with industry standards.
- Provides accurate battery monitoring and dependable SOC indication for efficient system operation and energy management.
- Built to withstand electrically noisy environments in storage systems, ensuring stable communication and signal integrity.
- Supports flexible system expansion and remote configuration updates via standard CAN interface, simplifying deployment and maintenance.

4.1.2.3 TMS

The Thermal Management System (TMS) consists of industrial air conditioners, water immersion sensors, and door magnets inside the cabinet.

Industrial Air Conditioner

Each side of the front door panel of the system is equipped with an industrial air conditioner. These units provide intelligent temperature control within the system, enabling preheating in extremely cold environments and cooling when the ambient temperature is high. The parameters of the industrial air conditioner are shown in Table 4-4.

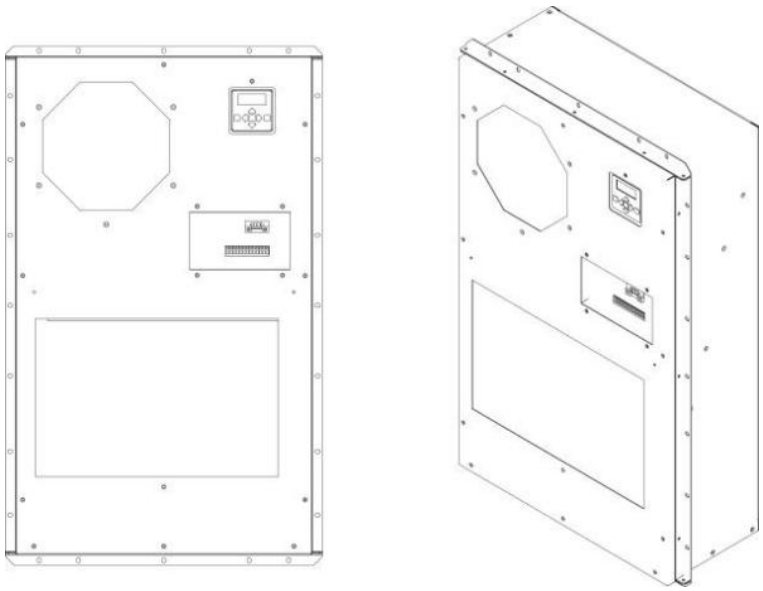


Figure 4-7: Industrial air conditioner appearance

Parameter	Specification
Configuration Quantity	2 Sets
Operating Temperature	-40℃ ~ +55℃
Refrigerant	R134a
Cooling Capacity L35	2000W
Heating Capacity	1000W
Internal Circulation Airflow	650m³/h
Power Supply Range	220V ± 15%, 50/60Hz

Table 4-4: Industrial air conditioner specification

Water Immersion Sensors

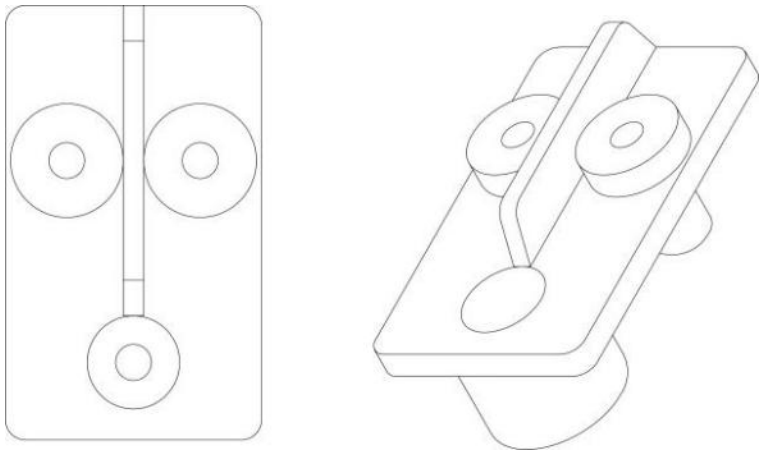


Figure 4-8: Water immersion sensors appearance

Parameter	Specification
Power Supply	24Vdc ± 10%
Operating Current	<15mA in dry state; <50mA in water alarm state
Operating Humidity	0 ~ 100% RH (no condensation)
Alarm Threshold Range	50kΩ ± 10kΩ (hysteresis value ≥5kΩ)

Table 4-5: Water immersion sensors specification

4.1.2.4 FFS

The Fire Fighting System (FFS) consists of a composite gas sensor, an aerosol unit, and pressure relief valves.

A composite gas sensor (monitoring CO, smoke, temperature, and VOC) is installed at the top of the internal space to detect the internal environment. Upon detection of thermal runaway, the aerosol fire suppression unit is triggered.

One 300g aerosol unit is installed inside the cabinet to provide total flooding fire protection within the enclosed space.

Pressure relief valves are installed on both sides of the cabinet top to maintain internal pressure stability, and prevent potential explosion hazards caused by excessive pressure during thermal runaway events.

Composite Gas Sensor

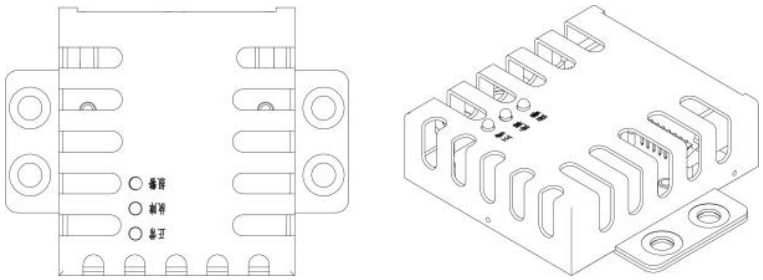


Figure 4-9: Composite gas sensor appearance

Parameter	Specification
Operating Humidity	<95%RH
Operating Pressure	55 ~ 106kPa
Detection Range	Smoke, temperature, carbon monoxide, electrolyte gas
Measurement Range	0 ~ 5000ppm, -40℃ ~ +125℃
Measurement Accuracy	<±10ppm , ±0.5℃
Data Collection Interval	1s

Table 4-6: Composite gas sensor specification

Aerosol

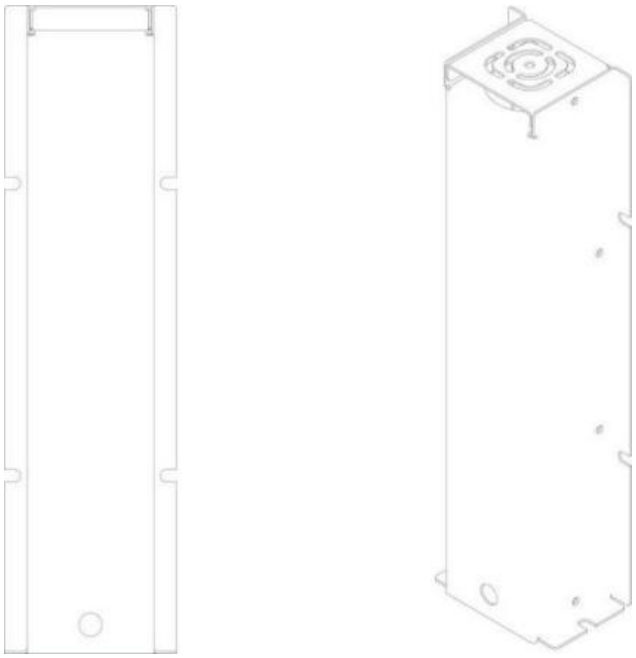


Figure 4-10: Aerosol appearance

Parameter	Specification
Activation Method	Electric start and thermal start
Thermal Start Temperature	≥170℃
Safe Current	≤200mA
Activation Current	≥700mA
Fire Extinguishing Efficiency	100g/m³ ~ 130g/m³
Protection Space	3m³

Table 4-7: Aerosol specification

Pressure Relief Valve

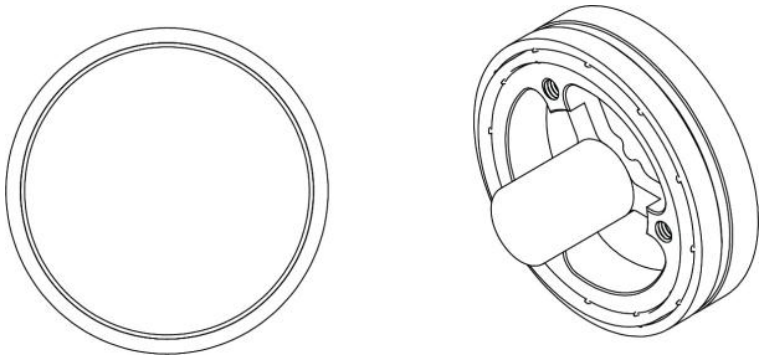


Figure 4-11: Pressure relief valve appearance

Parameter	Specification
IP Rating	IP68
Diaphragm Air Permeability	≥1L/min@1.5kPa
Burst Pressure	4±1kPa
Exhaust Area (maximum opening)	600mm^2
Temperature Resistance	-40℃ ~ +125℃

Table 4-8: Pressure relief valve specification

4.1.2.5 HV Control Box

The High-Voltage (HV) Control Box integrates a pre-charge circuit, DC contactor, DC circuit breaker, auxiliary power supply, and the System Monitoring Unit (SMU) to manage and protect the HV DC loop.

In the event of a serious system fault, the integrated DC circuit breaker disconnects the circuit to ensure battery system safety and the proper operation of control circuits.

Note: Conditional short-circuit current (Icc) = 6kA

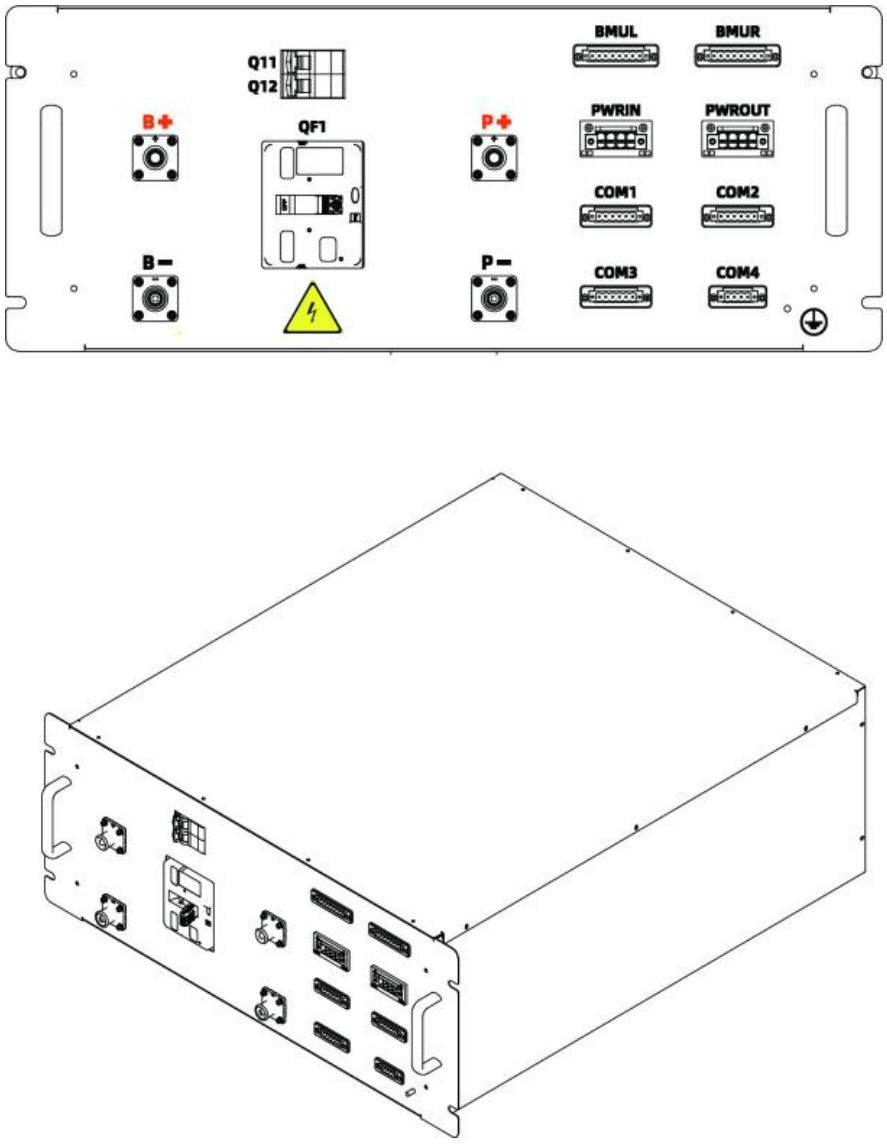


Figure 4-12: HV control box appearance

Terminal	Terminal Declaration
P+	PCS input positive
P-	PCS input negative
B+	Battery side positive
B-	Battery side negative
BMUL	Left BMU communication

Terminal	Terminal Declaration
BMUR	Right BMU communication
PWRIN	Auxiliary power input
PWROUT	Air conditioner power output
COM1	Air conditioner communication
COM2	Fire protection communication
COM3	Signal communication
COM4	Water leakage and door access monitoring input

Table 4-9: Terminal description

4.2 AC Control System

4.2.1 Appearance

Figure 4-13 demonstrates the appearance of the AC control cabinet.

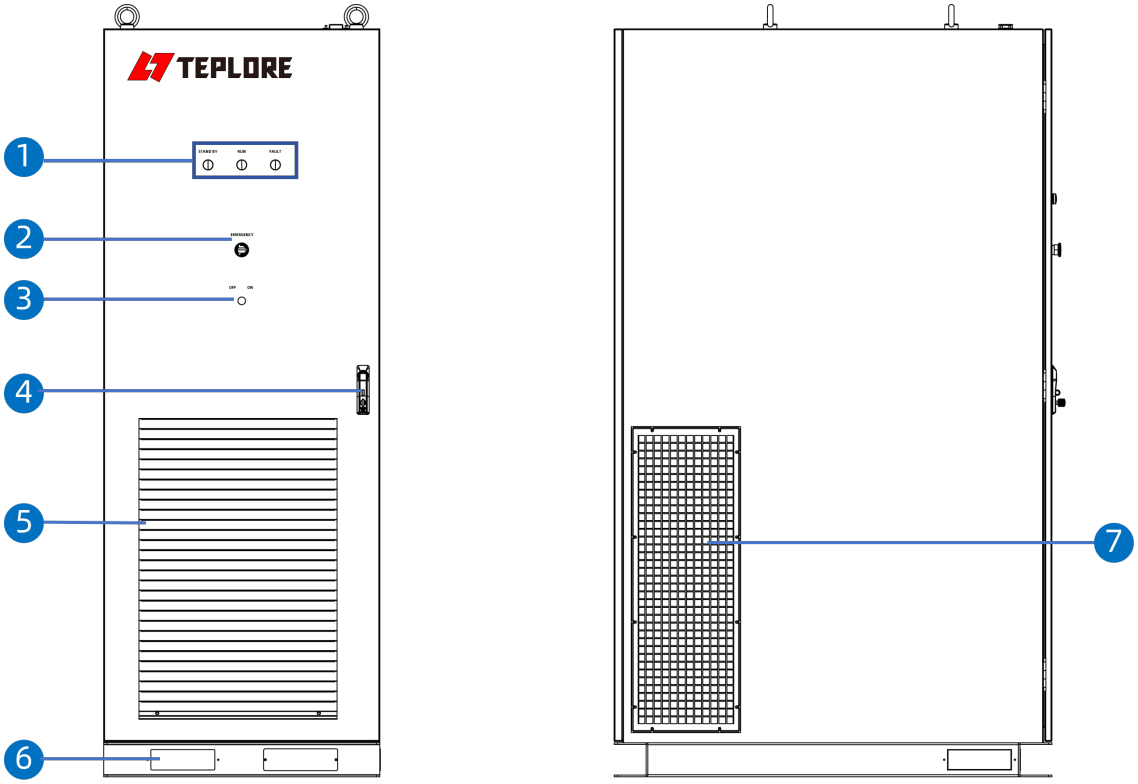


Figure 4-13: Appearance

No.	Name
1	Device Status Indicators
2	Emergency Switch
3	On-Off Switch (Rotary Type)
4	Door Lock
5	Louvers
6	Forklift Hole
7	Side Ventilation Panel

Table 4-10: Appearance description

Where, Device Status Indicators indicate three statuses: Standby, Run and Fault.

Figure 4-14 demonstrates the dimensions of the AC control cabinet (Unit: mm).

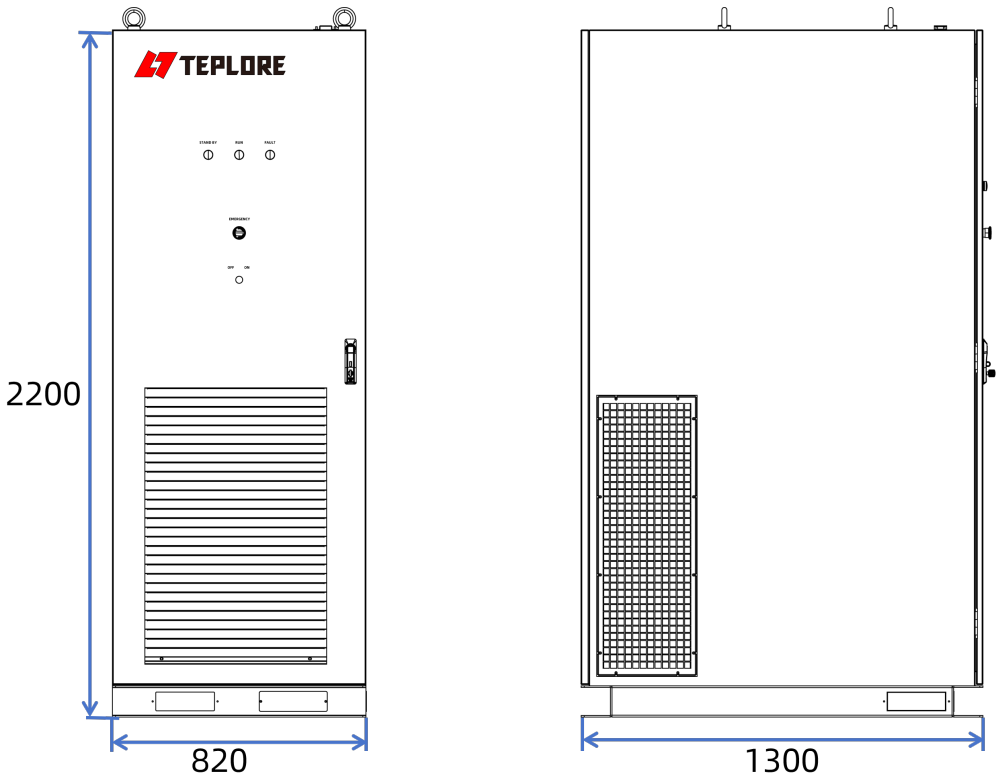


Figure 4-14: Dimensions

4.2.2 Internal Layout

The AC control cabinet supports flexible PCS configurations (1/2/3 units) to match battery cabinet quantities. Internal layouts vary based on the actual PCS count, as shown in Figure 4-15.

NOTE

Figure 4-15 uses the 100kW PCS as an example to illustrates the internal layout. The actual PCS model in delivered products shall be confirmed by the physical unit received.

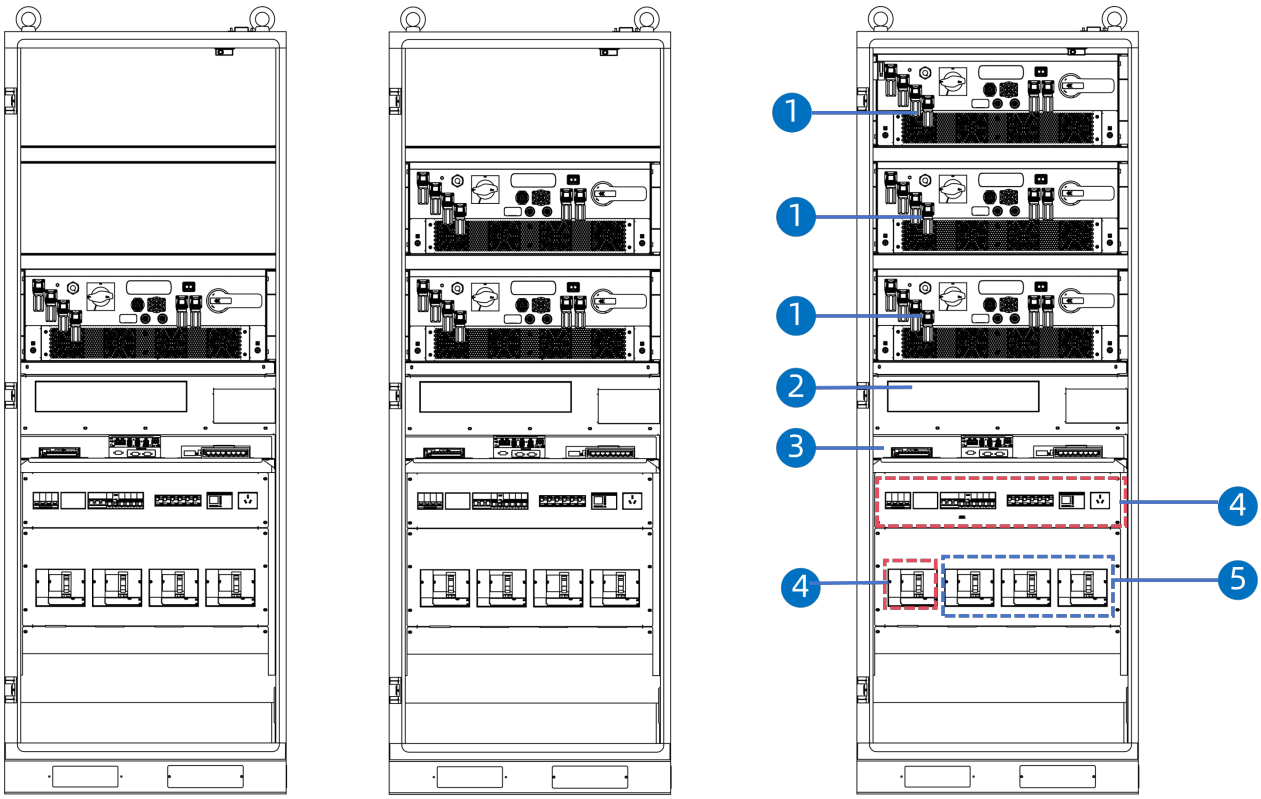


Figure 4-15: Internal layout (example with 100kW PCS)

NO.	Component
1	PCS
2	UPS (Uninterruptible Power Supply)
3	Local Controller System

NO.	Component
4	Auxiliary Power Distribution
5	Main Power Distribution

Table 4-11: Component description

Where,

- PCS

  Converts battery DC power to grid AC power bidirectionally and manages power charge/discharge.

- UPS

  Provides backup power and ensures continuous operation for critical control system during main power interruptions

- Local Controller System

  Comprises the Local Controller (LC) unit, communication modules, and other associated equipment, responsible for monitoring, and coordinating. Specific configurations may vary depending on requirements.

- Auxiliary Power Distribution

  Distributes power to auxiliary equipment in the ESS, such as air conditioners, local controllers (LCs), sensors, and other support devices.

- Main Power Distribution

  Distributes power to PCS via a dedicated molded case circuit breaker.

5 Transportation and Storage

5.1 Packaging Requirements

Cabinet Packaging Requirements:

- Pallet Securing: The cabinet shall be securely fastened to a wooden pallet using appropriate fasteners to prevent any movement during transportation.
- Main Body Wrapping: The cabinet body shall be tightly wrapped with multiple layers of shrink film to provide protection against water and dust ingress.
- Corner Protection: Foam protective pads shall be installed on all exposed edges and corners to effectively prevent impact damage during handling and transit.

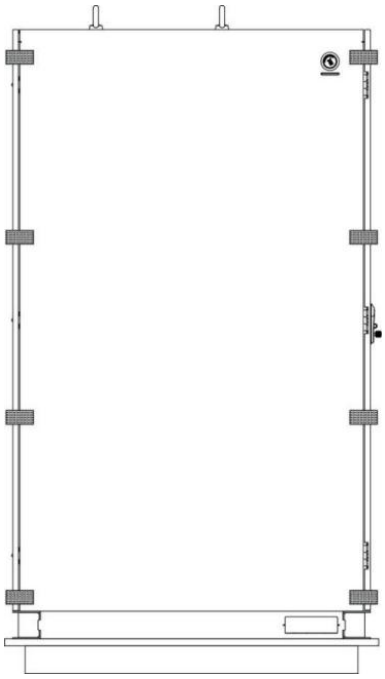


Figure 5-1: Cabinet packaging

5.2 Transportation Requirements

⚠ WARNING

- Any rough handling may cause the equipment to short circuit, damage, leak, crack, catch fire, or explode.
- Before transportation, ensure that the equipment packaging is intact and undamaged, with no unusual smells, leaks, smoke, or fire. If any of these conditions are present, do not transport.

NOTICE

Establish a controlled zone by setting up warning signs or barrier tape around the work area to prevent unauthorized personnel from entering and to ensure safe operations.

General Requirements

- Ensure all cabinet doors are securely locked before moving.
- Select appropriate forklifts or lifting tools based on site conditions. The equipment's load capacity, working radius, and swing radius must meet operational requirements.
- The cabinet tilt angle must not exceed 15° when transported with packaging. The tilt angle must not exceed 10° if the packaging has been removed.

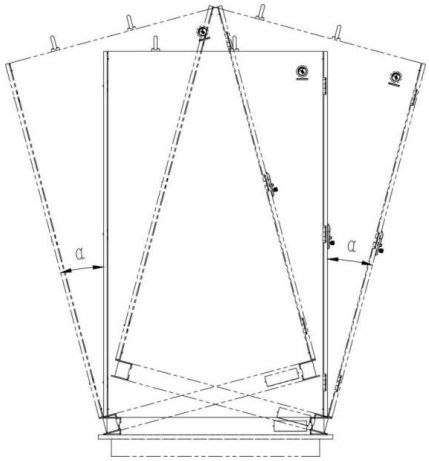


Figure 5-2: Cabinet tilt angle

- Clear all obstacles (such as trees, cables) from the transport path.
- Use necessary traction devices when operating on slopes or challenging terrain.
- Conduct transportation only under favorable weather conditions. Operations are strictly prohibited during adverse weather.
- The carrier must be qualified for hazardous materials transport. The use of open-top vehicles is strictly prohibited.
- Sea or road transport (with good road conditions) is preferred; rail and air transport are not supported. All activities must comply with international dangerous goods transportation regulations.
- Transporting the battery pack separately is strictly prohibited, and the battery system must not be disassembled at any time during transportation.

5.3 Storage Requirements

During storage, maintain relevant proof that meets product storage requirements, including temperature and humidity log data, storage environment photos, and inspection reports.

Environment Requirements

- Store in an elevated, dry, and clean area, away from rain, standing water, and vegetation.
- The ground must be level, solid, and have sufficient load-bearing capacity.
- The storage environment temperature should be between -30℃ and +60℃, and relative humidity should be maintained at 5% RH to 95% RH.
- Do not store in environments containing corrosive or flammable gases.
- Ensure all cabinet doors are securely locked before storage.
- The packaging must not be tilted or inverted.

Battery System Management

- Long-term storage of the battery system is not recommended. If necessary, the total storage duration must not exceed six months.

- For equipment stored for more than six months, perform a charge-discharge cycle prior to storage to adjust and maintain the system SOC at 30% - 40%.
- Before installation, visually inspect equipment that has been in long-term storage. After power-up and start-up, conduct comprehensive functional and safety tests by qualified personnel.

6 Site Requirements

6.1 Location Requirements

When choosing a suitable location for installing the equipment, consider the characteristics of the climatic environment and geological conditions to ensure the system operates normally under different conditions.

- The surrounding environment should be dry and well-ventilated to maintain normal operation.
- Stay away from areas concentrated with toxic and harmful gases to avoid equipment corrosion.
- Keep away from flammable, explosive, and corrosive materials to ensure safe operation.

6.2 Space Requirements

To ensure proper ventilation and facilitate routine maintenance, adequate clearance must be maintained around the equipment. The

The following figures specifies minimum clearance distances and orientation requirements for the ESS installations (Unit:mm). Figure 6-1, Figure 6-2, and Figure 6-3 correspond to configurations with one AC control cabinet (TC) paired with one, two, and three battery cabinets (TB), respectively.

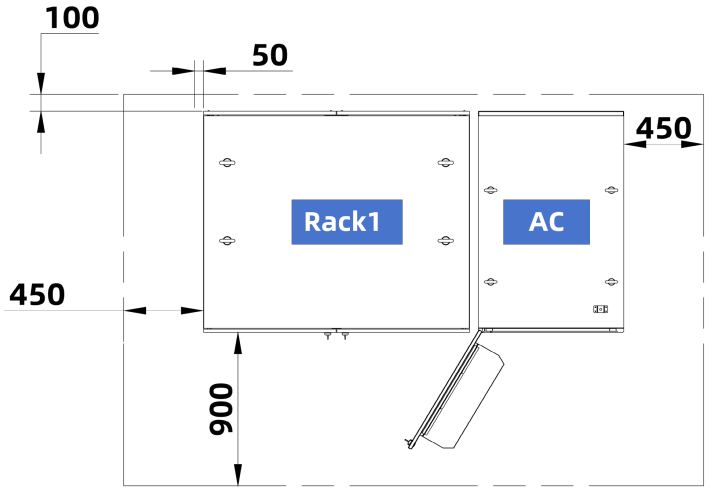


Figure 6-1: Space requirement: 1TC+1TB

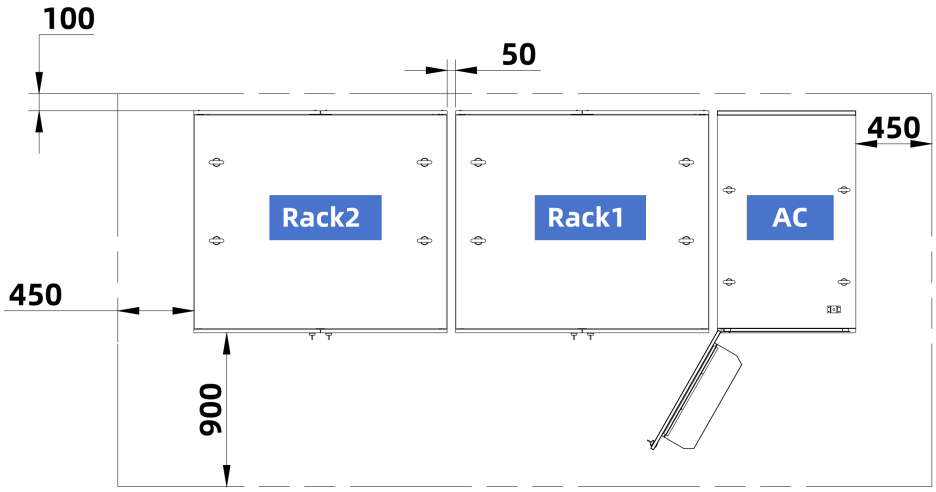


Figure 6-2: Space requirement: 1TC+2TB

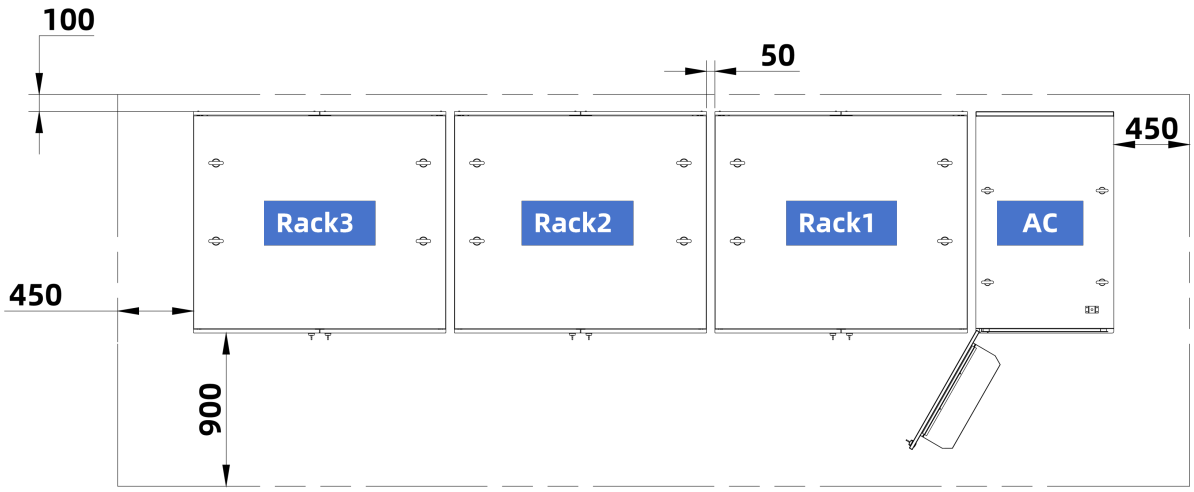


Figure 6-3: Space requirement: 1TC+3TB

- The AC control cabinet must be positioned at either end of the cabinet row (far left or far right) in the Tensorpack T ESS.

NOTE

When changing installation side of the AC control cabinet (for example, from far right to the far left), you must swap the side panels of AC control cabinet to ensure the ventilated panel faces outward (open space) and the solid panel faces the battery cabinet.

- The battery cabinet immediately adjacent to the AC control cabinet is designated as Rack1, followed by Rack2, Rack3 in sequence.

NOTE

You can identify the battery cabinets by printed label. A printed label (No.1, No.2, No.3) is typically affixed to each battery cabinet, corresponding directly to Rack1 , Rack2 and Rack3, respectively.

6.3 Foundation Requirements

Before starting foundation construction, conduct thorough research on various conditions of the equipment installation site, including geological conditions and environmental climate factors. The rationality of foundation construction determines the stability of the equipment, the smooth opening and closing of doors, and the smooth operation thereafter. To prevent significant issues or troubles during equipment placement and maintenance, design and construct the foundation according to corresponding standards to meet the requirements for equipment support, cable routing, and future maintenance.

The foundation construction should at least meet the following requirements:

- The bottom of the foundation pit must be compacted and leveled.
- The foundation should provide sufficient bearing support to handle the equipment's weight.
- To avoid rainwater erosion of the cabinet base and interior, it is recommended to elevate the cabinet, making the foundation 200mm above the highest historical water level of the installation site's ground.
- Take appropriate drainage measures based on local geological conditions.

6.4 Forklift Requirements

During system installation or maintenance, if a forklift is required to move cabinets or battery pack, the following requirements must be strictly observed.

Forklift Selection Requirements

- Use a forklift with a rated capacity of at least 3.5 tons.
- Ensure the forks meet the following dimensions:
  - Length: 1500mm - 1800mm
  - Width: 80mm - 160mm
  - Thickness: 25mm - 50mm

Handling and Operation Requirements

- Forklift operations are permitted only on level, firm, and obstacle-free surfaces.
- Move and lower the equipment slowly and steadily to ensure safety.
- Insert the forks into the designated fork holes at the bottom of the cabinet. Moving through other locations is strictly prohibited.
- After installation, seal the fork holes with the provided cover plates.

6.5 Hoisting Requirement

When hoisting equipment, strictly follow the requirements below to ensure safe, stable, and efficient operations.

Personnel and Site Safety

- Assign a certified signal person to direct the entire hoisting operation. All personnel involved must be trained and hold valid operating certifications.
- Establish an exclusion zone of 5 m to 10 m around the hoisting area. Never allow anyone to stand under the crane boom or directly beneath the suspended load.
- Perform hoisting only in clear, windless weather. Do not hoist during heavy rain, dense fog, or high winds.

Hoisting Equipment and Rope Inspection

- Crane hoisting capacity ≥ 5 t, working radius ≥ 3 m. Ensure both the crane and hoisting ropes comply with applicable safety standards.
- Hoisting ropes must be undamaged, securely attached, and have a rated load capacity no less than the total weight of the equipment.
- Securely fasten the hoisting tool to load-bearing fixtures or walls to ensure stability.

Hoisting Operation Procedures

- Position the crane as close as possible to the load to avoid long-distance lifts. Maintain the cabinet's diagonal tilt angle at ≤5° throughout the lift.
- Keep the angle between the two hoisting ropes at ≤90°.
- Lift and lower the cabinet slowly and smoothly. Do not start or stop abruptly, as this may damage internal components.
- Once the cabinet contacts the base, wait until it is fully and evenly seated before removing the hoisting ropes.
- Do not drag hoisting ropes or tools on the ground or against equipment surfaces to prevent collisions or damage.
- Secure the first hoisted cabinet in place before proceeding with subsequent units.

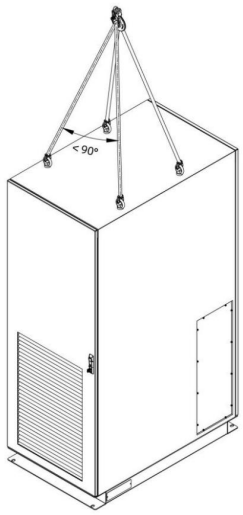
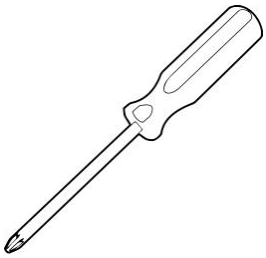
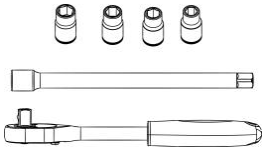
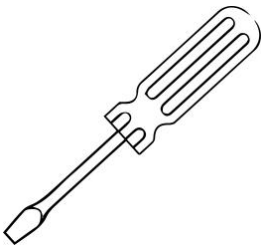
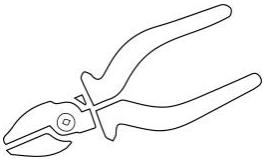
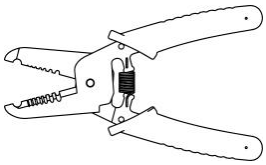
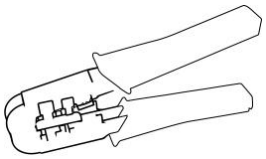
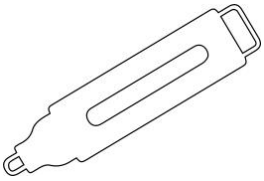
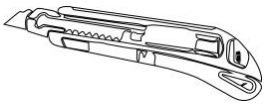
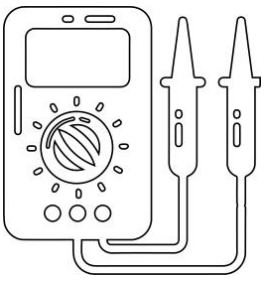
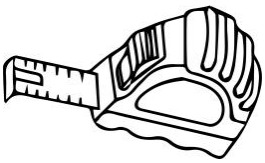
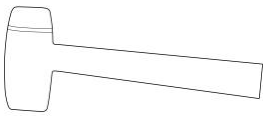
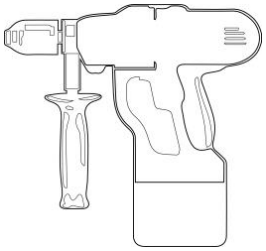
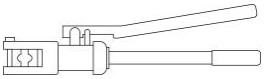
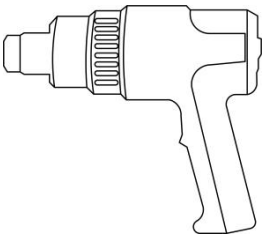


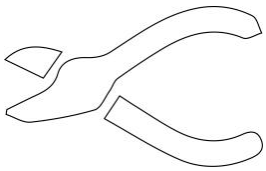
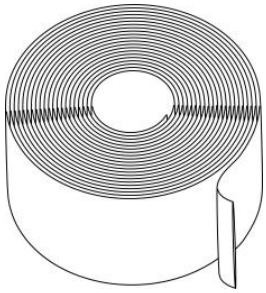
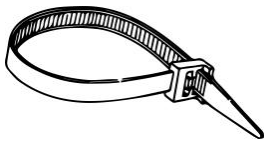
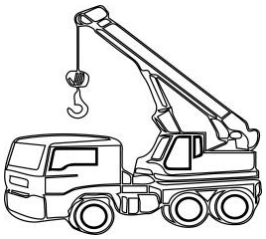
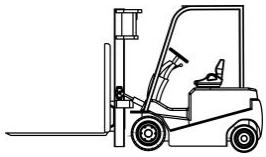
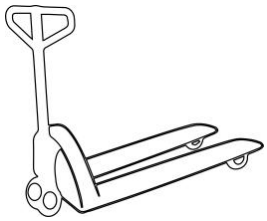
Figure 6-4: Hoisting Reference

7 Installation

7.1 Tools

This section only lists the tools required for system installation.

			
Insulated Phillips Torque Screwdriver	Socket Wrench	Insulated Flathead Torque Screwdriver	Diagonal Pliers
			
Wire Stripper	RJ45 Crimping Tool	Marker	Utility Knife
			
Leveling Ruler	Vacuum Cleaner	Multimeter	Tape Measure
			
Rubber Mallet	Impact Drill	Hydraulic Crimping Tool	Heat Gun

			
Wire Cutter	Impact Drill Bits	Heat Shrink Tubing	Cable Ties
			
Ladder	Crane	Electric Forklift	Manual Forklift

Due to varying on-site conditions, this tool list may not include all the tools that may be needed. Installers should prepare any additional tools based on the actual conditions at the site.

7.2 Pre-Installation Check

- Upon receiving the equipment, check the delivered items against the enclosed packing list to ensure all items are complete.
- Verify that the actual received cabinet matches the ordered model.
- Remove the packaging, ensuring the stability of the equipment while removing the bolts from the wooden pallet.
- If the installation environment is poor, take dustproof and anti-condensation measures after removing the packaging, such as using dust covers, plastic film, or cloth.
- Carefully inspect the product and internal equipment to ensure there is no damage.

- If a custom steel frame is required on-site, confirm that the steel frame has been installed in place and verify the placement direction of the equipment.

7.3 Installing the Equipment

Prerequisites

- According to the guidelines in Location Requirements, Space Requirements and Foundation Requirements, choose the suitable installation location.
- Prepare four M16×50 fasteners for each cabinet.

Procedure

1. Use a forklift or crane to move the cabinet to the chosen installation location, ensuring the base mounting holes align with the drilled holes.
2. Secure the cabinet at all four bottom corners with M16 fasteners as shown in Figure 7-1.

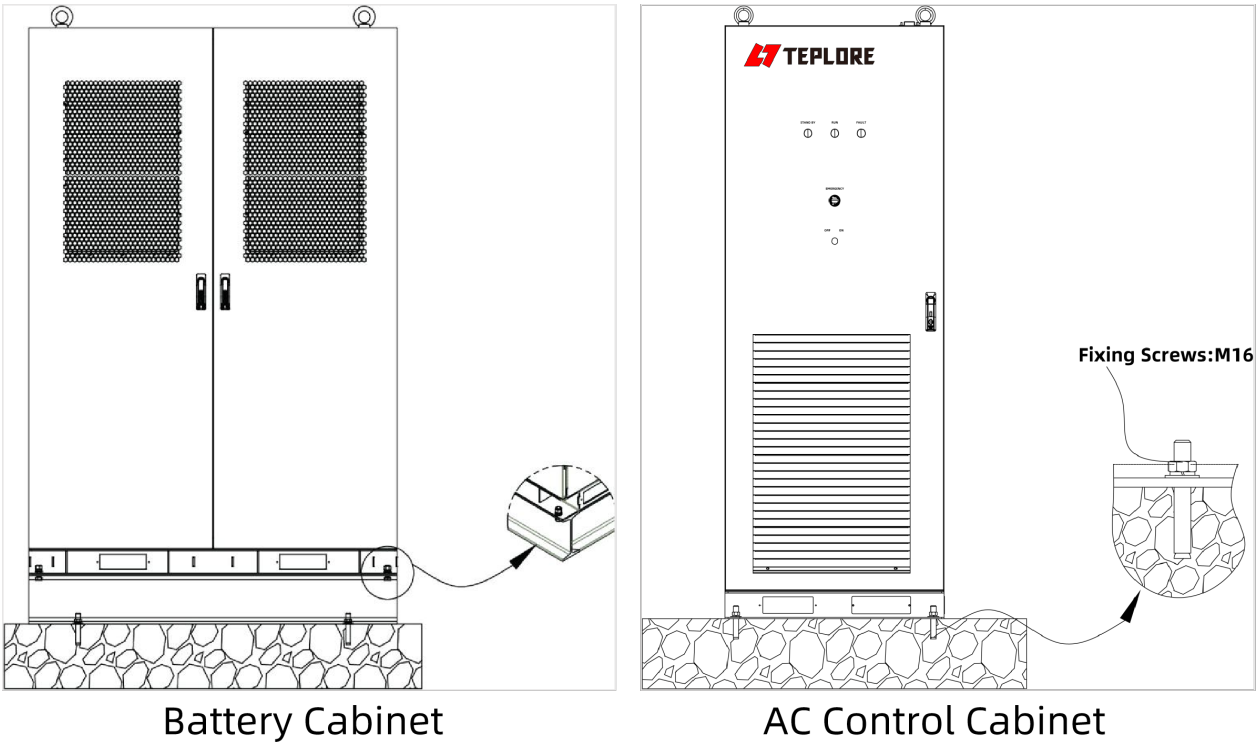


Figure 7-1: Screw the cabinets

Follow-up Procedure

1. Open the cabinet door and check all internal components for looseness or deformation, and inspect communication cables for secure connections.
2. Refer to the Electrical Connections chapter for electricity connections.

8 Electrical Connections

8.1 Pre-Connection Guidelines

Before you start electrical connections, review the following guidelines.

- The cabinet has dedicated cable entry ports at its base. All external cables must enter through these ports.
- For connections between the AC control and battery cabinets, route cables externally along the channel steel supports beneath both cabinets.

NOTE

This chapter uses TB265 and TC100M3-OG as examples for guidance. Procedures for other models are generally similar, and any differences is specifically noted.

8.2 Removing Protective Covers Before Connection

To access connection terminals inside the AC control cabinet, you need to remove the following three protective covers on the lower part of the cabinet front, as shown in Figure 8-1. Locate and unscrew the four perimeter screws for each protective cover .

NOTE

Retain all removed protective covers and screws. Reinstall them after completing all electrical connections to ensure safety and cabinet integrity.

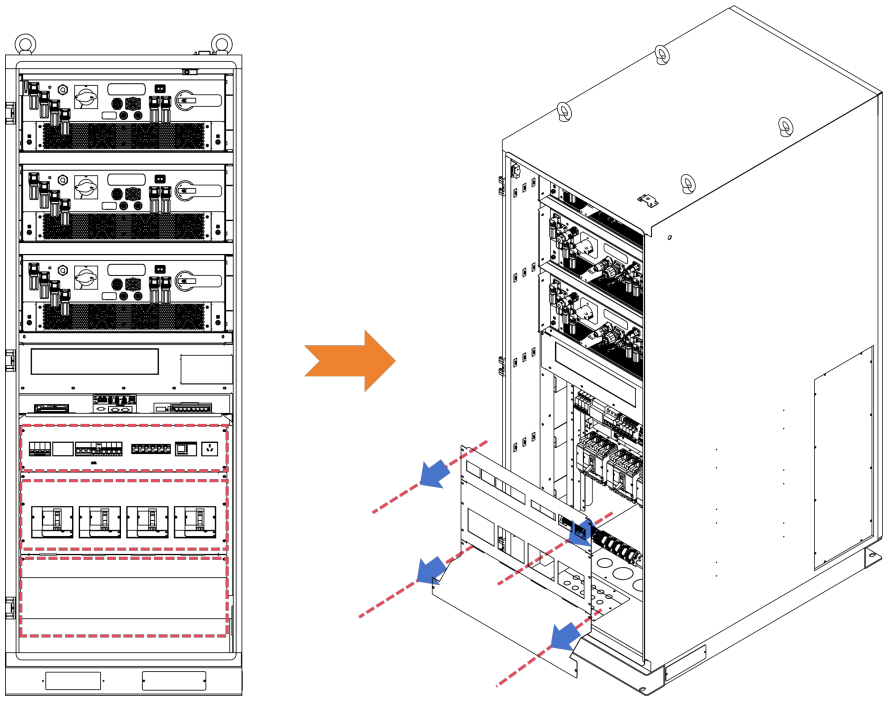


Figure 8-1: Removing protective covers

After removing covers, the internal layout of the AC control cabinet is shown in Figure 8-2.

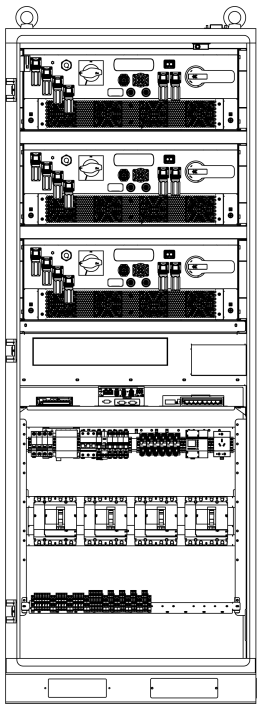


Figure 8-2: Internal layout after removing covers

8.3 Connecting Grounding Cables

Prerequisites

- Recommended cable: cross-sectional area ≥50 mm^2
- M10 fastener and compatible terminal

Procedure

Both the battery cabinet and control cabinet must be properly grounded to ensure safety.

1. Ground the enclosure of each cabinet according to on-site installation requirements.
2. Ground the grounding copper bar inside the AC control cabinet.
   a. Route the external grounding cable through the bottom entry port of the cabinet.
   b. Crimp a terminal to the grounding cable.
   c. Connect the grounding terminal to the grounding bar on the cabinet right-side panel with the M10 fastener as shown in Figure 8-3.

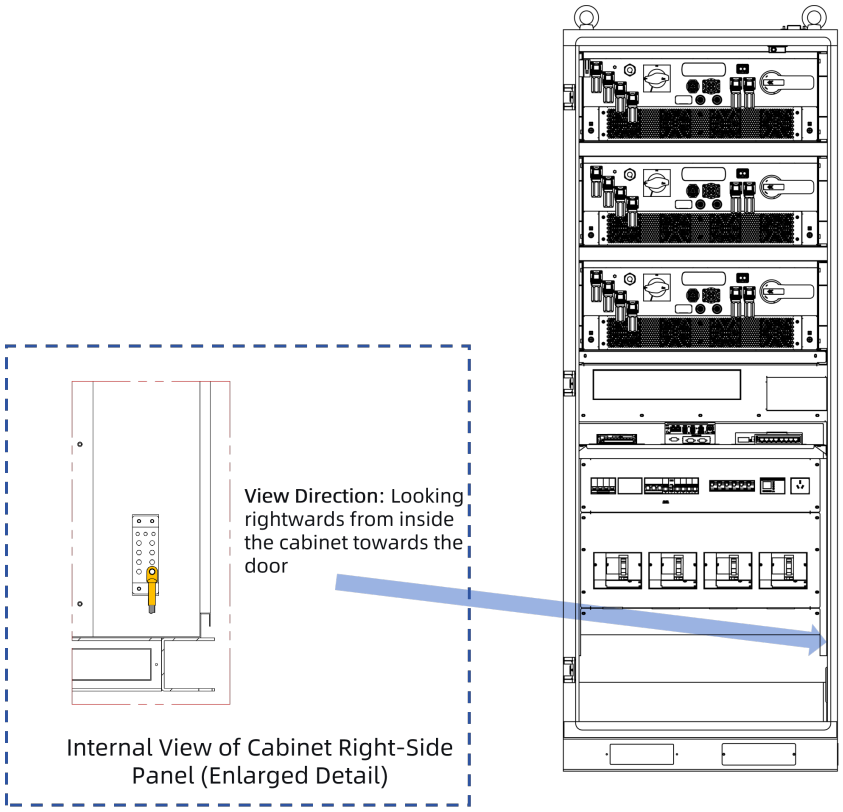


Figure 8-3: Grounding battery cabinet

8.4 Connecting Battery Pack Cables

This section provides guidance for the electrical interconnection of battery packs within the battery cabinet, as well as the connection between the packs and the HV Control Box.

Each battery pack is equipped with two terminals: **Pack+** and **Pack-**. The HV Control Box features **B+** and **B-** terminals. All terminals are color-coded to indicate polarity, matching the colors of the cable terminators:

- Orange = Positive (+)
- Black = Negative (-)

The following four cable types are provided. Each cable end is pre-colored to indicate polarity:

- Type A: 1 orange (+) + 1 black (-); standard length
- Type B: 2 orange (+)
- Type C: 2 black (-)

- Type D: 1 orange (+) + 1 black (–); slightly longer than Type A

Connect all packs and HV control box as shown in Figure 8-4.

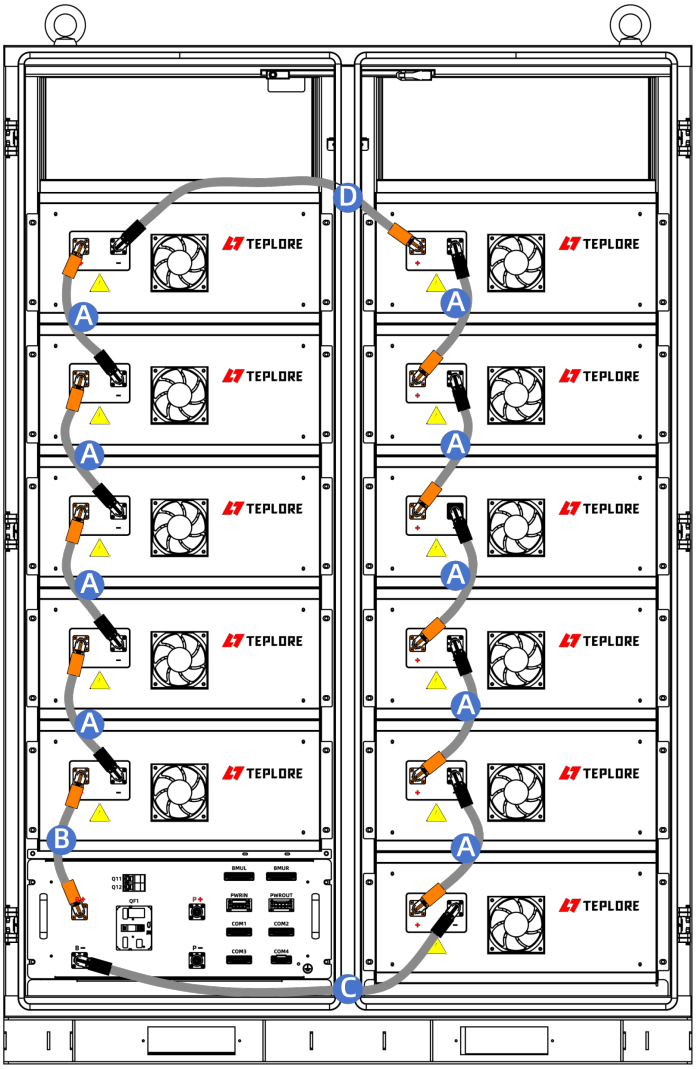


Figure 8-4: Connect battery pack cables

NOTICE

Proper polarity and correct cable selection are critical to ensure system safety, performance, and ease of maintenance. Always ensure color matching—orange cable ends must only be connected to orange terminals, and black cable ends only to black terminals.

8.5 Connecting External Communication Cables

The AC control cabinet provides the following interfaces for external communication.

Interface	Description
LC:LANB	Connects to external network devices (switches or routers), allowing third-party EMS to establish communication and exert control over the system through the network.
XR4:1H	**Door DO (Door Digital Output)**: Provides a signal that indicates the physical status (open or closed) of the cabinet door.
XR4:1L	
XR4:2H	**FSS DO (Fire/Smoke Sensor Output)**: This interface is directly connected to the cabinet's internal Fire/Smoke Sensor (FSS). Upon detection of smoke or fire, the sensor triggers this interface to provide a alarm signal.
XR4:2L	

Table 8-1: Communication interfaces

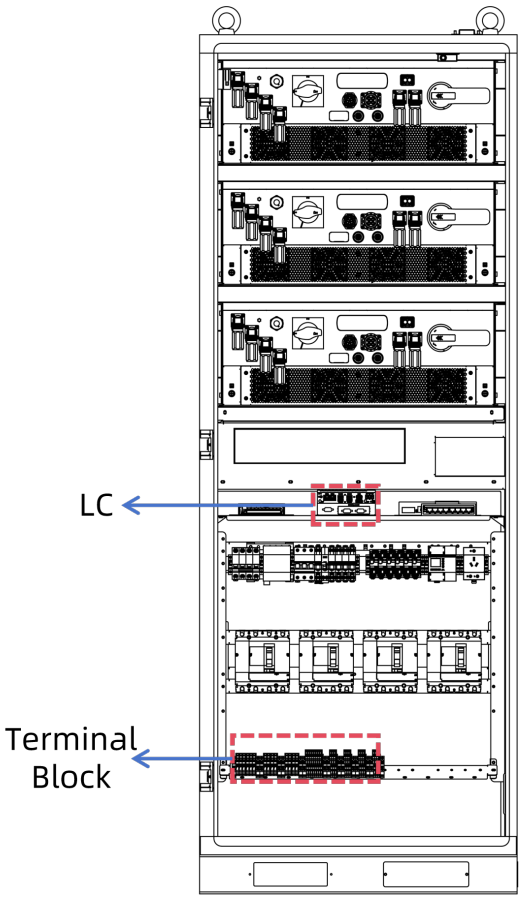


Figure 8-5: Position of communication interfaces

As shown in Figure 8-5:

- LANB is located on the LC module and can be identified by its labeled marking.
- XR4 is part of the terminal block assembly and is also clearly labeled for easy identification.

8.6 Connecting the External Power Supply

The AC control cabinet is connected to the external power supply through the main power distribution and auxiliary power distribution .

Prerequisites

- Complete Removing Protective Covers Before Connection
- Prepare installation material

Distribution Unit	Terminal	Recommended Cable Cross-Sectional Area	Fastener
Main power distribution	L phase	≥95 mm^2	M8 fasteners and compatible terminals
	N phase	≥50 mm^2	
Auxiliary power distribution	L phase	≥25 mm^2	M6 fasteners and compatible terminals
	N phase	≥16 mm^2	

NOTICE

Each battery cabinet consumes up to approximately 3kW of auxiliary power (mainly for thermal management and internal monitoring). Therefore, for an ESS with N battery cabinets, the maximum auxiliary load from the battery side is about (3 × N)kW. You must account the value when determining the capacity of the auxiliary power supply and distribution.

Procedure

1. Connect **QF01** in the main power distribution to the external power supply.
   a. Route external power cables through the bottom entry port of the cabinet.
   b. Crimp a terminal to each cable.

c. Connect power cables to circuit breaker QF01 with M8 fasteners as shown in Figure 8-6: The terminals on QF01, from left to right, are connected to the N, L1, L2, and L3 phases of the external power supply, respectively.

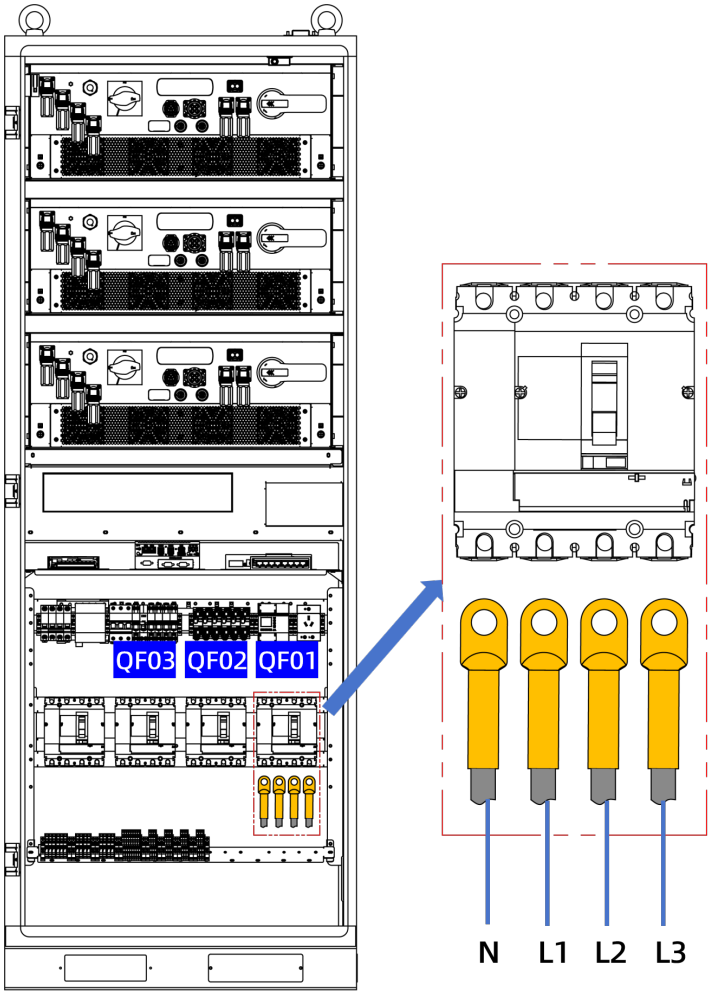


Figure 8-6: Power connections of QF01

2. Use the method described in Step 1 to connect **QF02**, and **QF03**.

NOTE

The connection instructions for QF01, QF02, and QF03 are based on a system configured with three PCS units.

- If your system has two PCS units, connect only QF01 and QF02.
- If your system has one PCS unit, connect only QF01.

Verify the number of PCS units before making external power connections.

3. Connect the auxiliary power distribution to the external power supply
   a. Route external power cables through the bottom entry port of the cabinet.
   b. Crimp a terminal to each cable.
   c. Connect power cables to circuit breaker **QF11** with M8 fasteners as shown in Figure 8-7: The terminals on QF11, from left to right, are connected to the N, L1, L2, and L3 phases of the external power supply, respectively.

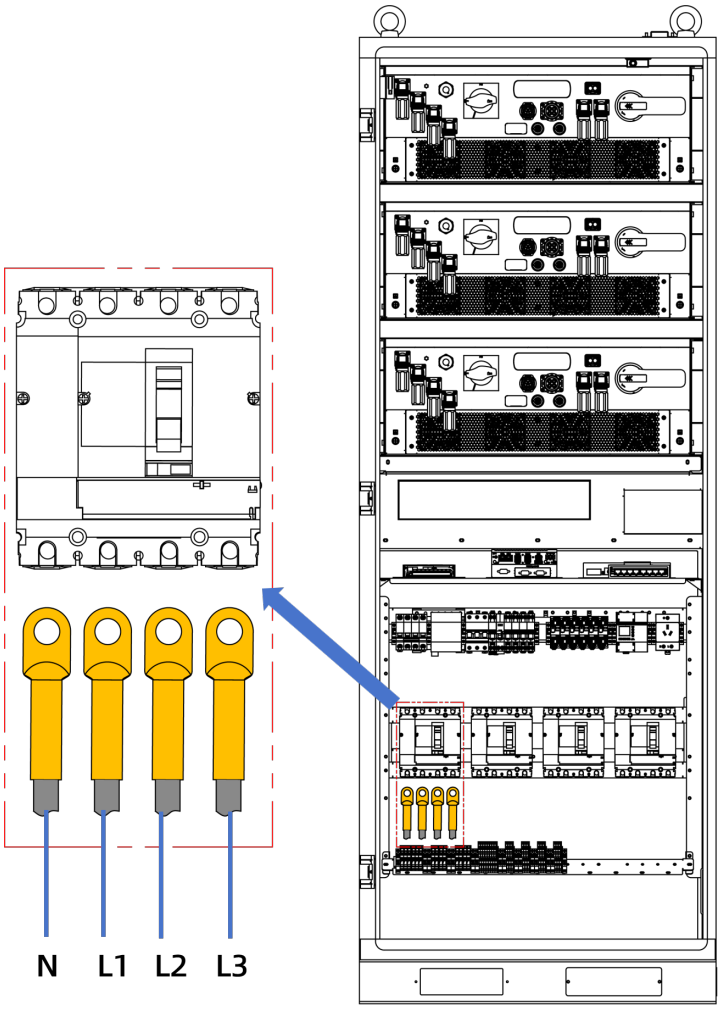


Figure 8-7: Power connections of QF11

8.7 Connecting AC Control and Battery Cabinets

8.7.1 General Notes on Inter-cabinet Wiring

In a 2-hour ESS, one AC control cabinet can be configured with 1 to 3 battery cabinets, with a corresponding number of PCS units (1–3) installed in the AC control cabinet. The cable routing diagrams and connection tables vary by ESS configuration.

First, review the general guidelines below. Then, go to the subsection that matches your ESS setup.

Connection Location

After Removing Protective Covers Before Connection, Figure 8-8 displays the positions of components on the AC control cabinet that are connected to battery cabinets.

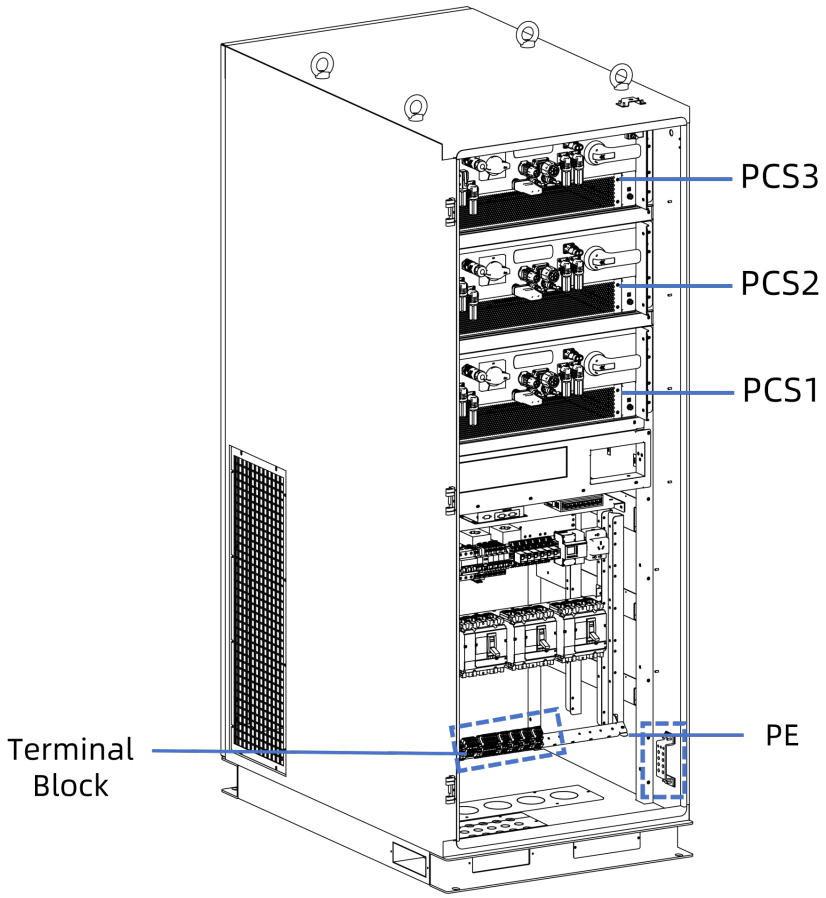


Figure 8-8: Positions of components - AC control cabinet

NOTE

XD1~XD3, and XR2 are part of the terminal block assembly and is also clearly labeled for easy identification.

The connection points for the battery cabinet are located on the HV control box, which is mounted at the bottom of the left compartment of the cabinet. Connection points are clearly identified by labels on the box panel. Refer to HV Control Box for terminal identification. The PE grounding point is located on the grounding bar at bottom of the cabinet's right section.

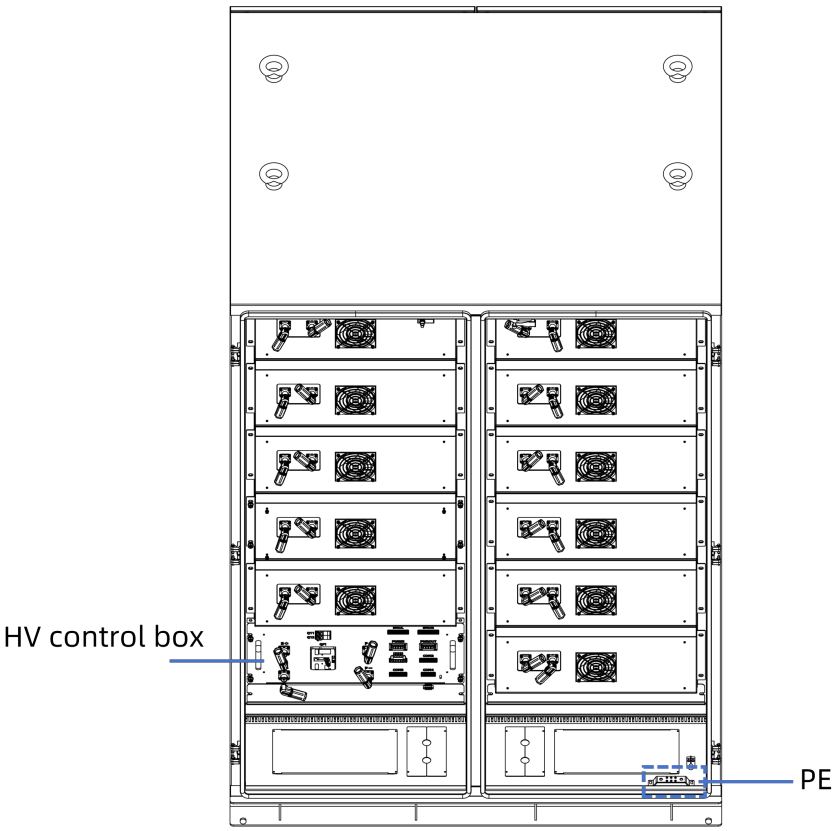


Figure 8-9: Positions of components - battery cabinet

Connection Table Columns

For each ESS configuration, an **inter-cabinet connection table** is provided to guide wiring. This table defines all electrical links between the AC control and battery cabinets, ensuring proper system integration.

All tables in this section use the same column format, defined as follows:

- **AC Control Cabinet**
  - Component: Specifies the component of the AC control cabinet where the terminal to be connected is located.
  - Terminal: Specifies the terminal to be connected. You can use the identifier to locate the specific terminal on the corresponding component.
  - Cable Label: Specifies the identifier on the corresponding end of the cable to be inserted into this terminal.
- **Battery Cabinets**
  - Battery: Specifies the battery cabinet. Battery cabinets are labeled sequentially as Rack1, Rack2, Rack3.
  - Terminal: Specifies the terminal to be connected. You can use the identifier to locate the specific terminal on the corresponding battery cabinet.
  - Cable Label: Specifies the identifier on the corresponding end of the cable to be inserted into the specified terminal.

Find Your Configuration

Refer to the following sections for different ESS configuration.

- 1TC+1TB Configuration
- TTC+2TB Configuration
- TTC+3TB Configuration

8.7.2 1TC+1TB Configuration

This section applies only to the ESS with one AC control cabinet (TC) and one battery cabinet (TB).

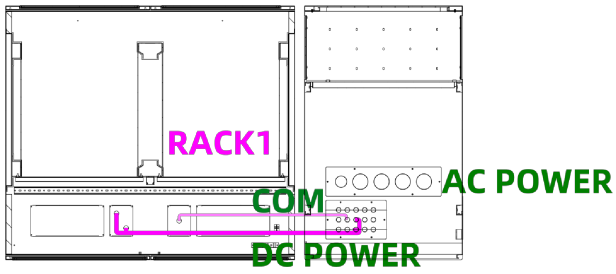


Figure 8-10: Cable routing - 1TC+1TB

AC Control Cabinet			Battery Cabinets		
Component	**Terminal**	**Cable Label**	**Battery**	**Terminal**	**Cable Label**
PCS1*	BAT.+	PCS1:BAT.+	Rack1	P+	Rack1:p+
	BAT.-	PCS1:BAT.-		P-	Rack1:p-
XD1	1	XD1:1	Rack1	PWRIN:1	Rack1-PWRIN:1
	2	XD1:2		PWRIN:3	Rack1-PWRIN:3
	3	XD1:3		PWRIN:2	Rack1-PWRIN:2
	4	XD1:4		PWRIN:4	Rack1-PWRIN:4
XR2	1H	XR2:1H	Rack1	COM3:2	Rack1-COM3:2
	1L	XR2:1L		COM3:1	Rack1-COM3:1
PE	PE	PE	Rack1	PE	Rack1:PE

Table 8-2: Inter-cabinet connections - 1TC+1TB

NOTE

*Component PCS:

- For PCS models 100kW and 130kW, connect to the **BAT.+** and **BAT.-** terminals. Use cable labels: **PCS<n>:BAT.+** and **PCS<n>:BAT.-**.
- For PCS model 135kW, connect to the **DC+** and **DC-** terminals. Use cable labels: **PCS<n>:DC+** and **PCS<n>:DC-**.

Where, n is a placeholder representing the PCS unit number (e.g., 1, 2, or 3) to uniquely identify each PCS in the system.

8.7.3 1TC+2TB Configuration

This section applies only to the ESS with one AC control cabinet (TC) and two battery cabinets (TB).

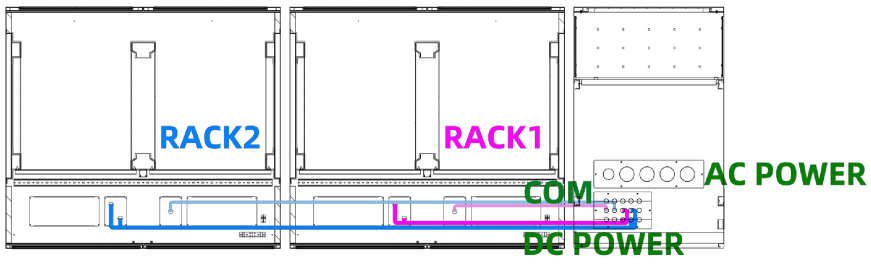


Figure 8-11: Cable routing - 1TC+2TB

AC Control Cabinet			Battery Cabinets		
Component	**Terminal**	**Cable Label**	**Battery**	**Terminal**	**Cable Label**
PCS1*	BAT.+	PCS1:BAT.+	Rack1	P+	Rack1:p+
	BAT.-	PCS1:BAT.-		P-	Rack1:p-
PCS2	BAT.+	PCS2:BAT.+	Rack2	P+	Rack2:p+
	BAT.-	PCS2:BAT.-		P-	Rack2:p-
XD1	1	XD1:1	Rack1	PWRIN:1	Rack1-PWRIN:1
	2	XD1:2		PWRIN:3	Rack1-PWRIN:3
	3	XD1:3		PWRIN:2	Rack1-PWRIN:2
	4	XD1:4		PWRIN:4	Rack1-PWRIN:4
XD2	1	XD2:1	Rack2	PWRIN:1	Rack2-PWRIN:1
	2	XD2:2		PWRIN:3	Rack2-PWRIN:3
	3	XD2:3		PWRIN:2	Rack2-PWRIN:2
	4	XD2:4		PWRIN:4	Rack2-PWRIN:4
XR2	1H	XR2:1H	Rack1	COM3:2	Rack1-COM3:2
	1L	XR2:1L		COM3:1	Rack1-COM3:1
	2H	XR2:2H	Rack2	COM3:2	Rack2-COM3:2
	2L	XR2:2L		COM3:1	Rack2-COM3:1
PE	PE	PE	Rack1	PE	Rack1:PE
	PE	PE	Rack2	PE	Rack2:PE

Table 8-3: Inter-cabinet connections - 1TC+2TB

NOTE

*Component PCS:

- For PCS models 100kW and 130kW, connect to the **BAT.+** and **BAT.-** terminals. Use cable labels: **PCS<n>:BAT.+** and **PCS<n>:BAT.-**.
- For PCS model 135kW, connect to the **DC+** and **DC-** terminals. Use cable labels: **PCS<n>:DC+** and **PCS<n>:DC-**.

Where, n is a placeholder representing the PCS unit number (e.g., 1, 2, or 3) to uniquely identify each PCS in the system.

8.7.4 1TC+3TB Configuration

This section applies only to the ESS with one AC control cabinet (TC) and three battery cabinets (TB).

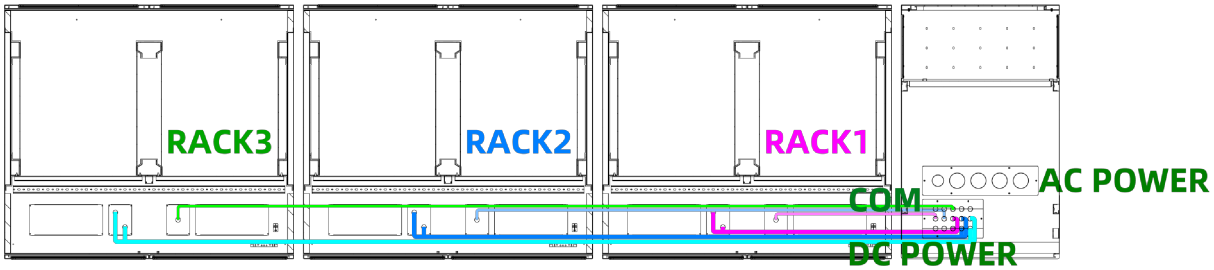


Figure 8-12: Cable routing - 1TC+3TB

AC1 Control Cabinet			Battery Cabinets		
Component	**Terminal**	**Cable Label**	**Battery**	**Terminal**	**Cable Label**
PCS1	BAT.+	PCS1:BAT.+	Rack1	P+	Rack1:p+
	BAT.-	PCS1:BAT.-		P-	Rack1:p-
PCS2	BAT.+	PCS2:BAT.+	Rack2	P+	Rack2:p+
	BAT.-	PCS2:BAT.-		P-	Rack2:p-
PCS3	BAT.+	PCS3:BAT.+	Rack3	P+	Rack3:p+
	BAT.-	PCS3:BAT.-		P-	Rack3:p-
XD1	1	XD1:1	Rack1	PWRIN:1	Rack1-PWRIN:1
	2	XD1:2		PWRIN:3	Rack1-PWRIN:3

AC1 Control Cabinet			Battery Cabinets		
Component	**Terminal**	**Cable Label**	**Battery**	**Terminal**	**Cable Label**
	3	XD1:3		PWRIN:2	Rack1-PWRIN:2
	4	XD1:4		PWRIN:4	Rack1-PWRIN:4
XD2	1	XD2:1	Rack2	PWRIN:1	Rack2-PWRIN:1
	2	XD2:2		PWRIN:3	Rack2-PWRIN:3
	3	XD2:3		PWRIN:2	Rack2-PWRIN:2
	4	XD2:4		PWRIN:4	Rack2-PWRIN:4
XD3	1	XD3:1	Rack3	PWRIN:1	Rack3-PWRIN:1
	2	XD3:2		PWRIN:3	Rack3-PWRIN:3
	3	XD3:3		PWRIN:2	Rack3-PWRIN:2
	4	XD3:4		PWRIN:4	Rack3-PWRIN:4
XR2	1H	XR2:1H	Rack1	COM3:2	Rack1-COM3:2
	1L	XR2:1L		COM3:1	Rack1-COM3:1
	2H	XR2:2H	Rack2	COM3:2	Rack2-COM3:2
	2L	XR2:2L		COM3:1	Rack2-COM3:1
	3H	XR2:3H	Rack3	COM3:2	Rack3-COM3:2
	3L	XR2:3L		COM3:1	Rack3-COM3:1
PE	PE	PE	Rack1	PE	Rack1:PE
	PE	PE	Rack2	PE	Rack2:PE
	PE	PE	Rack3	PE	Rack3:PE

Table 8-4: Inter-cabinet connections - 1TC+3TB

NOTE

*Component PCS:

- For PCS models 100kW and 130kW, connect to the **BAT.+** and **BAT.-** terminals. Use cable labels: **PCS<n>:BAT.+** and **PCS<n>:BAT.-**.
- For PCS model 135kW, connect to the **DC+** and **DC-** terminals. Use cable labels: **PCS<n>:DC+** and **PCS<n>:DC-**.

Where, n is a placeholder representing the PCS unit number (e.g., 1, 2, or 3) to uniquely identify each PCS in the system.

8.8 Reinstalling Protective Covers

After completing all electrical connections, you must reinstall all protective covers of the AC control cabinet.

1. Position the cover back onto the cabinet, aligning it with the mounting points.
2. Secure the cover by reinstalling and tightening the four perimeter screws.

9 System Power-On and Power-Off

This chapter uses a **1TC+3TB** ESS configuration, one AC control cabinet (integrated with three PCS units) and three battery cabinets, as an example to detail the ESS power-on and power-off procedures.

NOTE

For the ESS configured with **1TC+1TB** or **1TC+2TB**, the overall procedure remains largely the same. Any differences related to the number of battery cabinets is clearly indicated in the relevant steps.

9.1 Powering on the ESS

Pre-Power-On Checklist

Before powering on, verify the following items:

- All electrical connections are correct.
- Battery cabinets, and AC control cabinet are reliably grounded.
- All cable terminals have been tightened and are secure.
- All DC/AC circuit breakers and disconnectors are in the OFF position.
- All air intakes and exhausts are free from obstructions.
- All internal protective covers are securely installed.
- The emergency switch is released (reset position).

Procedure

NOTICE

The power-on sequence must strictly follow: AC control system first, battery system second.

STEP 1: Power on the AC control system.

Figure 9-1 displays switches on the main power distribution and auxiliary power distribution of the AC control cabinet and indicates the direction to close these switches.

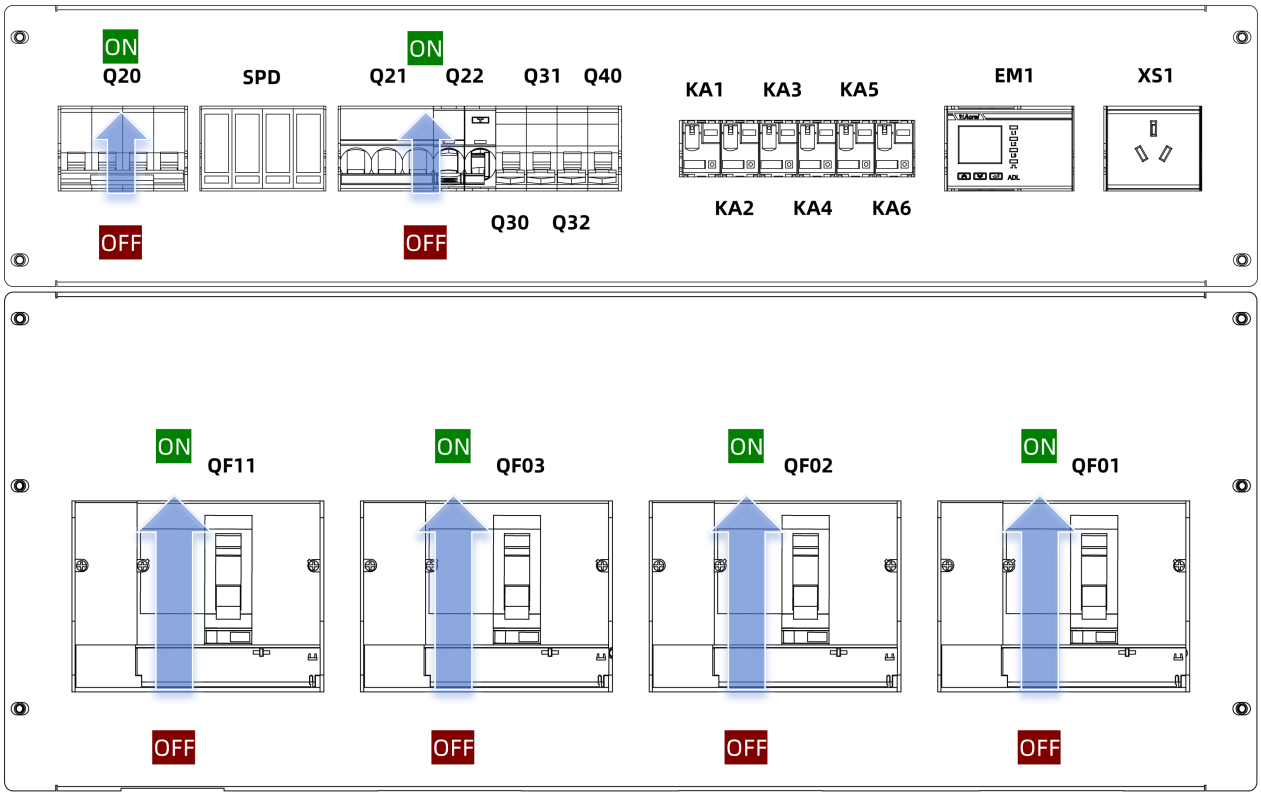


Figure 9-1: Power on - AC control cabinet

1. Close auxiliary power input circuit breaker **QF11**.
2. Close surge protector backup protection switch **Q20**.
3. Close the miniature circuit breaker **Q21**.
4. Close the miniature circuit breaker **Q30**.
5. Start UPS.
6. Close the miniature circuit breaker **Q40**.
7. Close the miniature circuit breakers (**Q31**, **Q32**, and **Q33**) for auxiliary power supply of the battery system.

NOTE

- If your ESS is configured as **1TC+2TB**, close only **Q31** and **Q32**.
- If your ESS is configured as **1TC+1TB**, close only **Q31**.

8. Close main power input circuit breakers **QF01**, **QF02**, and **QF03**.

NOTE

- If your ESS is configured as **1TC+2TB**, close only **QF01** and **QF02**.
- If your ESS is configured as **1TC+1TB**, close only **QF01**.

9. Close the power switches for each PCS unit.
   - For PCS 100kW or 130kW， close the PCS AC and DC switches.
   - For PCS 135kW, close the PCS DC switches.

NOTE

For details of how to close the PCS AC and DC switches, refer to the user manual of the corresponding PCS.

10. Rotate the On-Off switch on the cabinet door to the “**ON**” position.

STEP 2: Power on the battery system.

Figure 9-2 displays switches on HV control box of the battery cabinet and indicates the direction to close these switches.

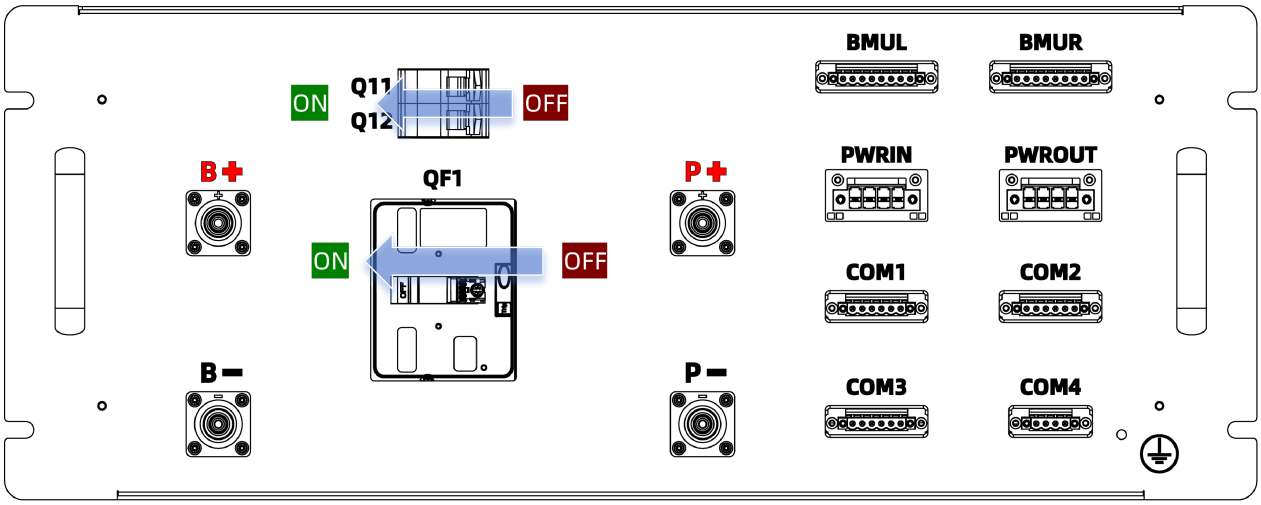


Figure 9-2: Power on - battery cabinet

For each battery cabinet， perform the following steps.

1. Close the DC molded case circuit breaker **QF1**.
2. Close the auxiliary circuit breakers **Q11** and **Q12**.

9.2 Powering off the ESS

Prerequisites

Confirm that the energy storage system has stopped running.

Procedure

NOTICE

The power-ff sequence must strictly follow: battery system first, AC control system second.

STEP 1: Power off the battery system.

Figure 9-3 displays switches on HV control box of the battery cabinet and indicates the direction to turn off these switches.

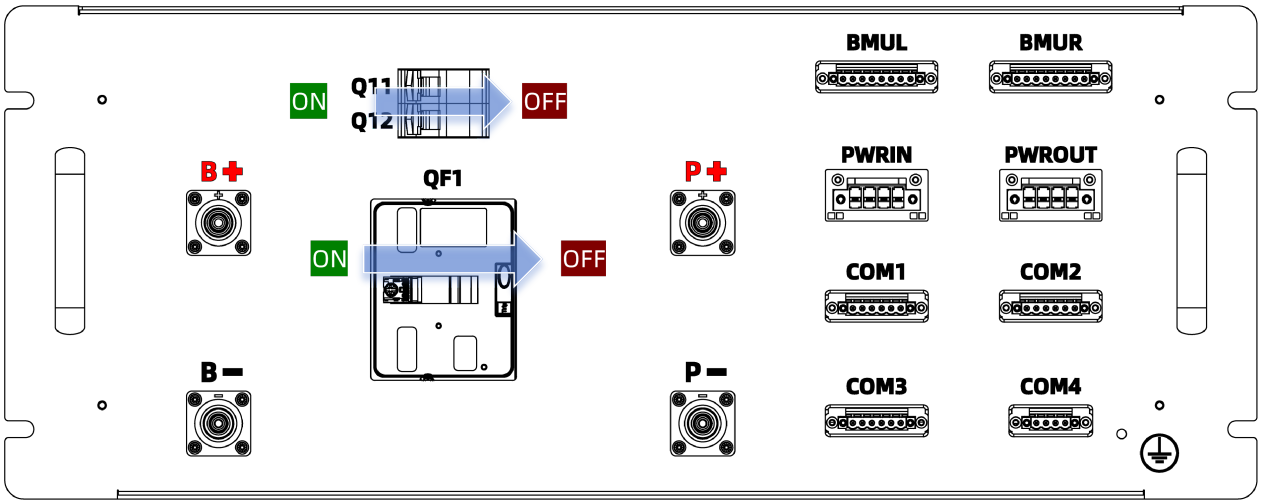


Figure 9-3: Power off - battery cabinet

For each battery cabinet， perform the following steps.

1. Turn off the auxiliary circuit breakers **Q11** and **Q12**.
2. Turn off the DC molded case circuit breaker **QF1**.

STEP 2：Power off the AC control system.

Figure 9-4 displays switches on the main power distribution and auxiliary power distribution of the AC control cabinet and indicates the direction to turn off these switches.

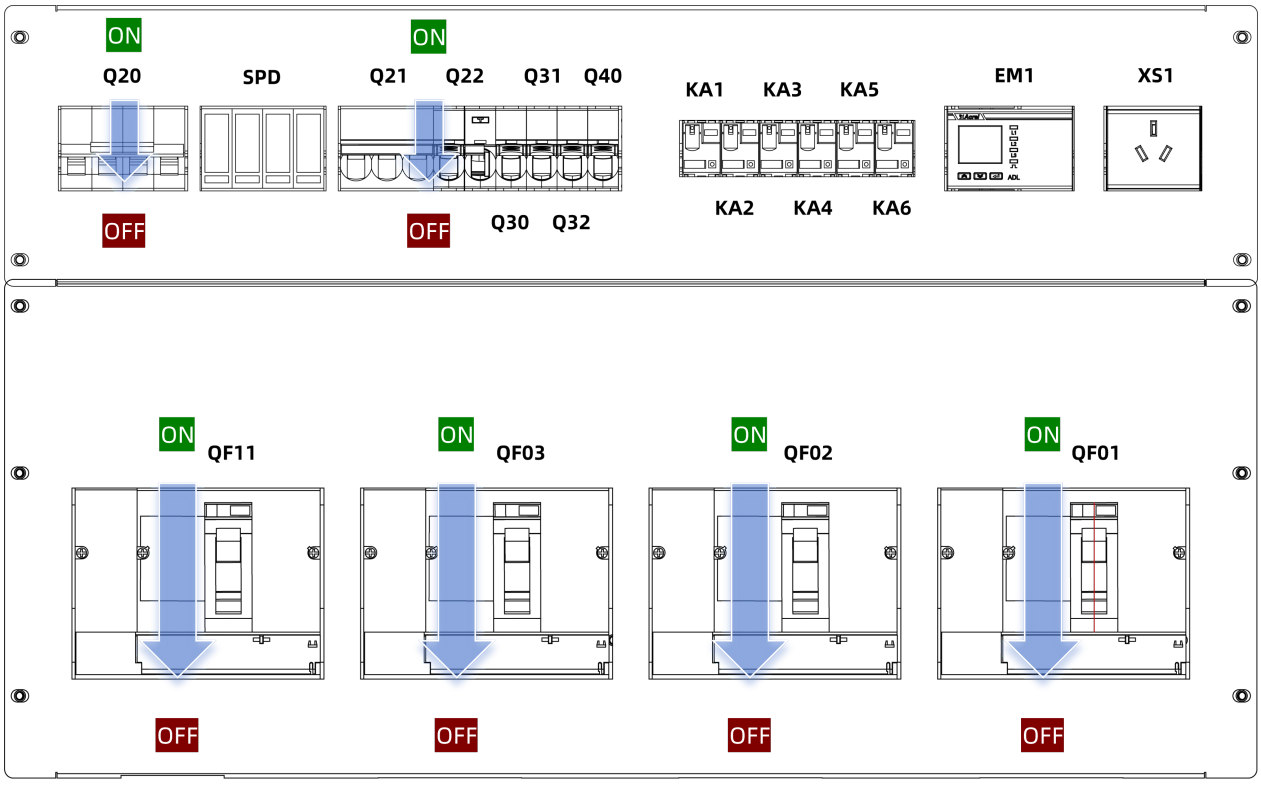


Figure 9-4: Power off - AC control cabinet

1. Rotate the On-Off switch on the cabinet door to the "**OFF**" position.
2. Disconnect the power switches for each PCS unit.
   - For PCS 100kW or 130kW, disconnect the PCS AC and DC switches.
   - For PCS 135kW, disconnect the PCS DC switches.

   NOTE

   For details of how to disconnect the PCS AC and DC switches, refer to the user manual of the corresponding PCS.
3. Turn off main power input circuit breakers **QF01**, **QF02**, and **QF03**.

   NOTE

   - If your ESS is configured as **1TC+2TB**, turn off only **QF01** and **QF02**.
   - If your ESS is configured as **1TC+1TB**, turn off only **QF01**.
4. Turn off the miniature circuit breakers (**Q31**, **Q32**, and **Q33**) for auxiliary power supply of the battery system.

NOTE

- If your ESS is configured as **1TC+2TB**, turn off only **Q31** and **Q32**.
- If your ESS is configured as **1TC+1TB**, turn off only **Q31**.

5. Turn off the miniature circuit breaker **Q40**.
6. Stop UPS.
7. Turn off the miniature circuit breaker **Q30**.
8. Turn off the miniature circuit breaker **Q21**.
9. Turn off surge protector backup protection switch **Q20**.
10. Turn off auxiliary power input circuit breaker **QF11**.

10 Contact Information

If you have any questions about this product, please contact us.

Technical Support Email: support@teplore.com

To enable faster and more efficient service, we kindly request your assistance in providing the following information:

- Project name
- Product model
- Serial number
- Brief description of the issue