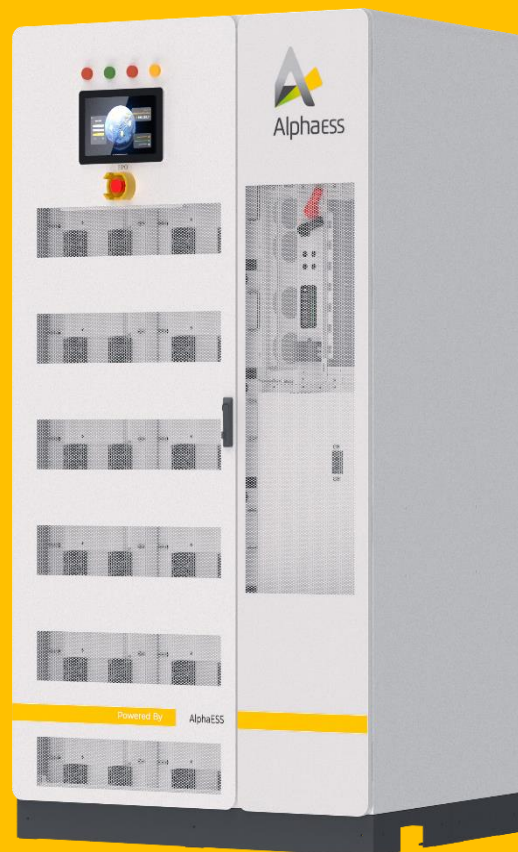


# INSTALLATION MANUAL OF ENERGY STORAGE SYSTEM STORION-H30



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## Preface

After years of dedicated research and development by AlphaESS, the STORION-H30 lithium-ion battery indoor energy storage system has been successfully applied to many sites. This high-tech product with excellent quality and stable performance, is widely used in electric power supply industry today.

This manual is designed to provide comprehensive guidance on product installation, including safety instructions, product introduction, and installation procedures.

## Symbol Convention

The following symbols may appear in this manual, and their meanings are as follows.

Symbol	Description
	Indicates a potential risk that could lead to system failure or fault alarm if not avoided.
	Indicates a medium level of risk that could lead to system damage or injury if not avoided.
	Indicates a high level of risk that could lead to serious injury or even death if not avoided.
	Provides supplementary information about the important content in the document. 'Note' does not convey safety alarm information and is not related to information about personal injury, system damage, or environmental harm.

## Terminology

### 1. Battery Management Systems (BMS)

It is used to monitor the operating information (such as voltage, current, temperature, battery protection parameters, etc.) of battery cells, battery packs, and system units, and intelligently evaluate the state of charge (SOC) and health status (SOH) and accumulated energy to protect the safety of battery

### 2. Energy Management Systems (EMS)

EMS encompasses data acquisition and monitoring system and is used for automatic generation control, economic dispatch control, power system status and safety analysis.

### 3. Battery System (BESS)

BESS comprises battery (series-parallel connection) and battery management system (BMS), and is used to connect DC side of H30 indoor machine.

### 4. Energy Storage Systems (ESS)

ESS is a combination of BESS and H30 indoor machine, and can function as an independent power supply or be controlled by a monitoring system.

### 5. Photovoltaic (PV)

PV, which refers to Photovoltaic Power System, is a new type of power generation system that converts the radiant energy of sunlight into electric energy directly by utilizing the photovoltaic effect of the semiconductor material in the solar cell.

### 6. Photovoltaic Convergence Boxes

Users can connect a certain number of photovoltaic cells with identical specifications in series to form photovoltaic series, and then connect multiple photovoltaic series in parallel with the photovoltaic junction box. The power can be output through the DC circuit breaker, and a fully functional PV power generation system can be established in conjunction with the H30 indoor unit.

## 7. Grid-connected Systems

Grid-connected systems usually consist of photovoltaic arrays, H30 indoor units, battery system, and the grid.

When the electric energy generated by the PV string is sufficient, the surplus electric energy can be fed into the grid. Conversely, when the electric energy generated by the PV string and battery system is insufficient, the grid can supply power to the load.

## 8. Off-grid Systems

Off-grid systems are suitable for areas without grid or where the grid power is unstable. These systems usually consist of photovoltaic arrays, energy storage inverters, battery systems and generators. When the battery power is sufficient, the photovoltaic and battery supply the power to the load. However, when the battery power is insufficient, the generator will charge the battery system and supply power to the load.



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## 1. Safety Instructions

### Statement

This manual contains important information about the installation of the product. Please read it carefully before operation.

Please keep this manual in a safe place for future reference during installation, operation and maintenance.

Please strictly follow the instructions in this manual for installation, operation and maintenance to avoid product damage, personnel injury and property damage.

For systems where commissioning has not been completed, make sure to switch off the system (batteries, H30 indoor unit, etc.) before the installer leaves the site.

In the event of a fault occurring during normal system operation, please begin by troubleshooting using the provided fault checklist. If the problem remains unresolved, please contact an AlphaESS engineer promptly and make sure to turn the system (batteries, H30 indoor unit etc.) off before the AlphaESS engineer replies.

To ensure optimum reliability and meet warranty requirements, the energy storage system must be installed, operated and maintained in accordance with the instructions in this manual. We do not accept any liability for violations of general safety operating requirements or breaches of safety standards related to the design, manufacturing and use of our products. Please note that any damage to the product resulting from such violations will not be covered by the warranty.

### 1.1 Operators' Qualifications

- Operators must hold a professional qualification from AlphaESS or one authorised by AlphaESS.
- The operator must be familiar with the product, including its composition and operational principles.
- The operator must be familiar with the product manual and follow it strictly to install, operate and maintain the product.
- Make sure that at least two operators are present when performing any product-related work. Do not carry out maintenance work until the product has been disconnected from power.

## 1.2 Personal Safety

- Place clear signs next to the circuit breakers of PV, battery, H30 indoor unit and the distribution box to prevent accidents caused by accidental switching.
- Place warning signs or set up safety warning strips around the operating area.
- Ensure that the electrical parameters are in accordance with the requirements. Use a multimeter measure the electrical components when connecting the system, doing trial operation, or maintaining the product. Please use the multimeter correctly to ensure the safety of personnel.
- High voltage in the system may have a risk of fatal electric shock if touched accidentally, so it is important to take precautions when conducting energised tests.
- Ensure that the connection and operation of the system comply with the relevant regulations to prevent arcing or electric shock.



**The following installation tools and protective equipment are required**

**for the installation, operation and maintenance process.**

**Table 1-1 Installation Tools**

No.	Name	Model Specifications (Accuracy)	Unit	Quantity
1	Diagonal pliers	/	pcs	1
2	Screwdrivers	2/4/6/8mm	pcs	1
3	Cable ties	/	pcs	1
4	Multimeter	DC 1000V	pcs	1
5	Impact drills	/	pcs	1
6	Socket spanner	Socket spanner sets	pcs	1
7	Open-end spanners	Open-end spanner set	pcs	1
8	Socket torque spanners	/	pcs	1
9	PV Cable Plugging Tool	/	pcs	1

Table 1-1 Protective Equipment

No.	Name	No.	Name
1	Safety shoes	4	Protective goggles
2	Safety helmet	5	Dust masks
3	Safety gloves		

### 1.3 Product Safety

- Warning signs contain important information for the safe operation of the product; it is important to make sure they are clear and visible. Any damage should be avoided, and if any occurs, the signs should be replaced immediately.
- The key must be removed after the system has been officially operated or maintenance has been completed.
- To prevent component damage caused by touching or inappropriate operation of circuit board or other electrostatic-sensitive components, please avoid unnecessary contact with the board.
- Please avoid opening the product in rainy or wet weather for maintenance or servicing, etc.



**During maintenance, all products must be disconnected from power and maintained strictly in accordance with the relevant requirements of this manual.**

### 1.4 Electrical Safety

#### 1.4.1 Grounding Requirements

1. When installing the product, make sure to install the protective earth wire first. Likewise, when removing the product, ensure that the protective earth wire is the last component to be disconnected.
2. The system should be permanently grounded. Before operating the system, check the electrical connections to ensure the system is reliably grounded.
3. Do not damage the earth conductor.



**It is strictly forbidden to install the system before grounding.**

### 1.4.2 Wiring Requirements

1. For safety, connect the power cable from the battery to the high-voltage box before assembling the system battery following the earth wire connection.
2. Cables used in high-temperature environments may cause insulation deterioration and breakage. The distance between the cable and heat-generating device or heat source area should be at least 30mm.
3. Cables of the same type should be tied together, while cables of different types should be separated by a minimum distance of 30 mm, without twisting or crossing.
4. All cables used in the product must be securely connected, well insulated and of the correct gauge.
5. When communication cables need to pass through power cables, keep the angle between the two cables as close to 90° as possible.

## 1.5 Installation Environment

**Table 1-3 Installation Environment**

Environmental Parameters			Unit	Installation Environmental Conditions	Environmental Conditions for Transport and Storage		Notes
Projects	Parameters	Storage			Shipping		
Climatic conditions	Temperature	Low temperature	°C	-10	0	-20	
		High temperature	°C	+50	+35	+45	
	Pressure	Low pressure	kPa	79.5	/		
		High Pressure	kPa	106	/		
	Humidity	Low relative humidity	%	0	0	0	At 20°C or below
		High relative humidity	%	90	80	90	

		Condensation	Yes/ No	None	None		No condensation inside the product within a relative humidity range of 0 to 90%.
	<b>Elevation</b>	Low altitude	m	0	0	0	When the altitude exceeds 3000m above sea level, the maximum limit should be reduced according to 5.11.2 of GB/T3859.2-1993.
		High altitude	m	3000	3000	3000	
<b>Notes</b>	This system requires indoor installation and does not support outdoor installation. The ideal indoor temperature for installation should be within 15°C - 35°C.						

**The following scenarios are not allowed for installation:**

- High humidity, salinity (e.g. coastal, desert, etc.) area.
- Flooded areas.
- Earthquake zones (additional safety measures are required here).
- Areas with frequent changes in ambient temperature.
- Sites above 3000m altitude.
- Places with explosive or potentially explosive atmospheres.
- Places with highly flammable materials or gases.
- Places close to water sources (e.g. taps, downpipes, sprinklers, etc.).
- Sites with weak, uneven support surfaces.
- Premises that do not meet fire protection requirements (e.g. no fire sand, no dry powder fire extinguishers, etc.).



**The ideal indoor temperature for installation should be within 25°C - 35°C.**

## 1.6 Transportation Requirements

When moving large products that are still in transport boxes or pallets, use a forklift to lift the cabinet from the bottom and move it. Please refer to Figure 1.

When transporting batteries, to avoid dropping the product due to excessive weight, it is recommended to have 2 people carry it. Please do not transport it from positions A or B. Additionally, make sure to keep the batteries away from any liquids during transport. Please refer to Figure 1 & Figure 1.

When handling the battery, do not handle the connectors marked as A and B. Instead, apply force to the front handle and the box when handling it. Please ensure that the product is fixed securely before moving. During transportation, keep the product in an upright position, avoid stacking it or turning it upside down, and maintain a vertical tilt of no more than 30 degrees, ensuring there are no other objects on top.

When installing and maintaining the battery, please take care and prevent the battery module from falling. It is recommended that all operators wear protective footwear with high safety factor and strong protective capabilities to avoid foot injuries.

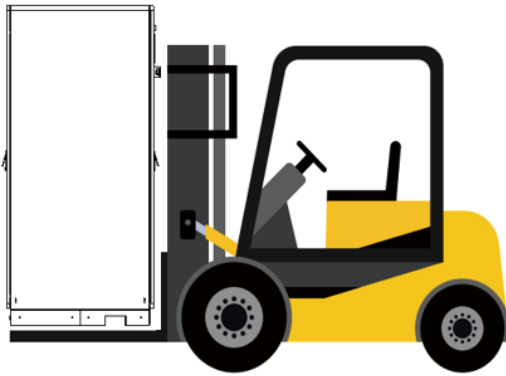


Figure 1-2 Large product handling

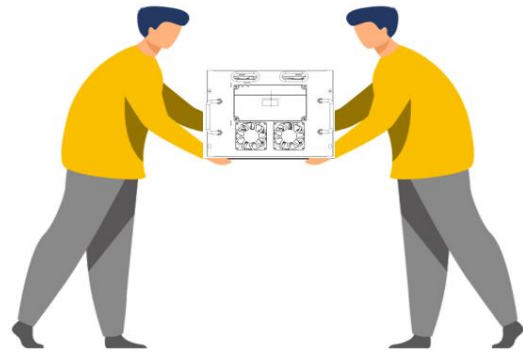


Figure 1-3 Small product handling



Figure1-4 Schematic diagram of the location of the no handling points A and B



**Do not grab the components in the red circle while transporting the battery.**

**When handling the battery, do not grab it by the connectors marked as A and B. Instead, apply force to the front handle and the box when handling it. Please ensure that the product is fixed securely before moving. During transportation, keep the product in an upright position, avoid stacking it or turning it upside down, and maintain a vertical tilt of no more than 30 degrees, ensuring there are no other objects on top.**

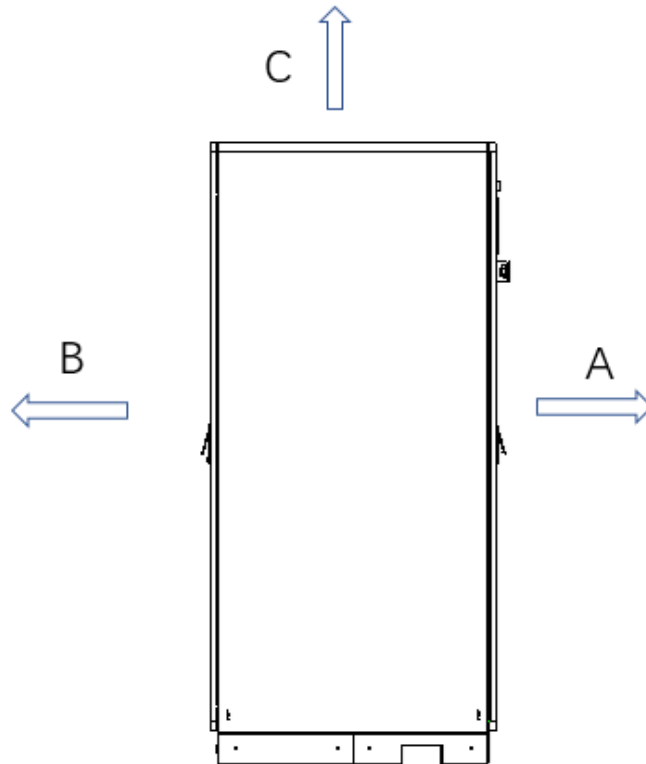
**When installing and maintaining the battery, please take care and prevent the battery module from falling. It is recommended that all operators wear protective footwear with high safety factor and strong protective capabilities to avoid foot injuries.**



## 1.7 Mounting Position

### 1.7.1 H30 Indoor Unit

When installing the H30 indoor unit, ensure that there is sufficient space for ventilation and heat dissipation as well as installation and maintenance. For detailed installation requirements, please refer to Figure 1.



**Figure 1-5 H30 indoor unit installation location**

$A \geq 800\text{mm}$ , ensure that the front door of the cabinet can be fully opened to ensure ventilation and heat dissipation, providing sufficient space for operation and maintenance.

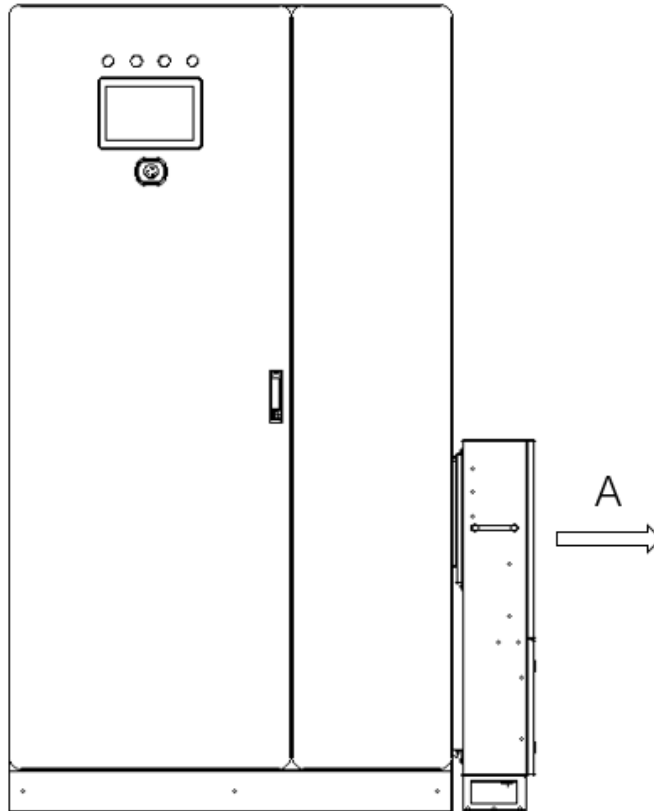
$B \geq 800\text{mm}$ , ensure that the rear door of the cabinet can be fully opened to ensure ventilation and heat dissipation, providing sufficient space for operation and maintenance.

$C \geq 500\text{mm}$ , ensure enough installation space above the cabinet and antenna height.



**Please ensure that the H30 indoor unit is installed with the A/B/C mounting distance.**

### 1.7.2 External ATS Installation



**Figure 1-6 ATS wall-mounted solution installation position**

$A \geq 600\text{mm}$ , ATS has sufficient space for operation and maintenance.

## 2. Product introduction

### 2.1 Product Description

#### 2.1.1 Schematic Diagram of the Grid-Connected System

The H30 energy storage system supports grid-connected application modes. A diagram of the grid-connected system is shown below:

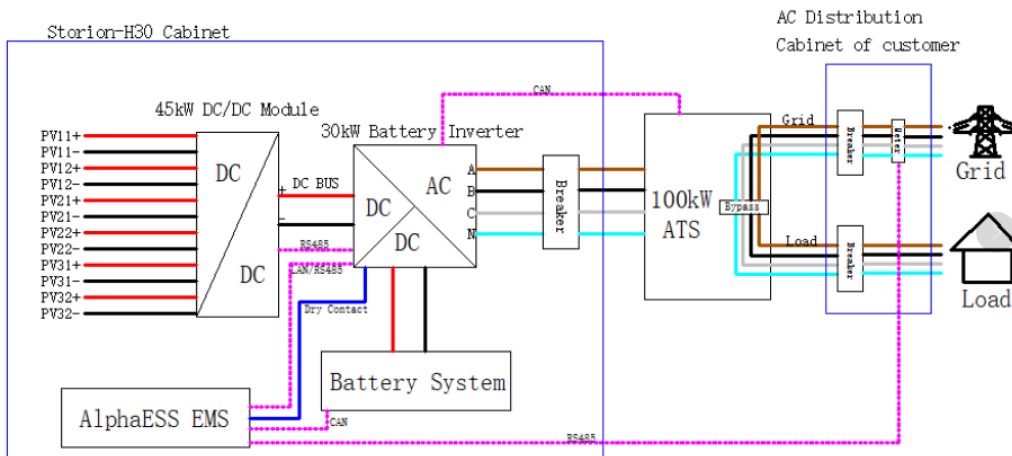


Figure 2-1 Schematic diagram of the DC grid-connected system

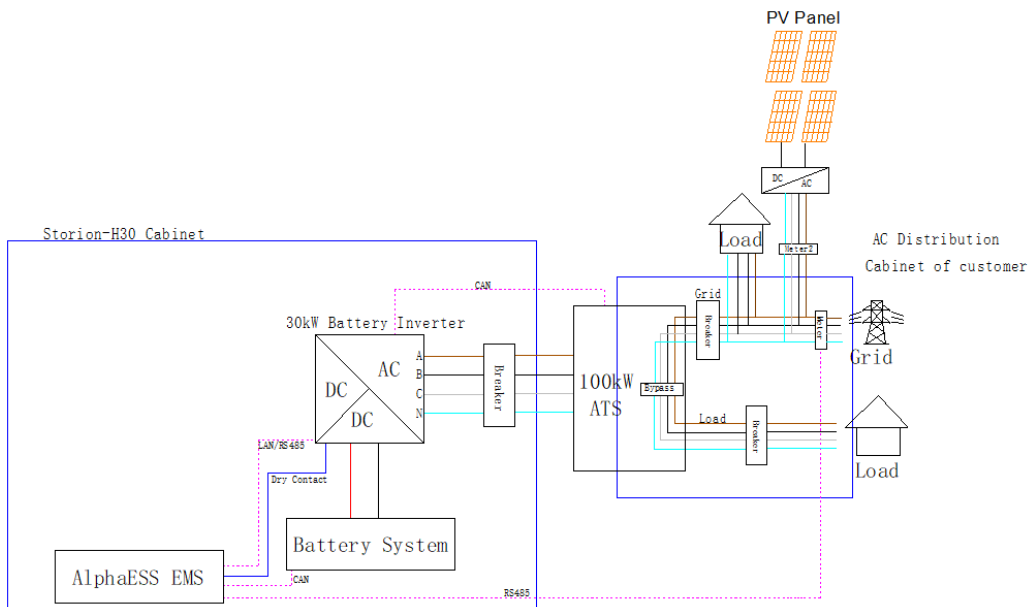


Figure 2-2 Schematic diagram of the AC grid-connected system

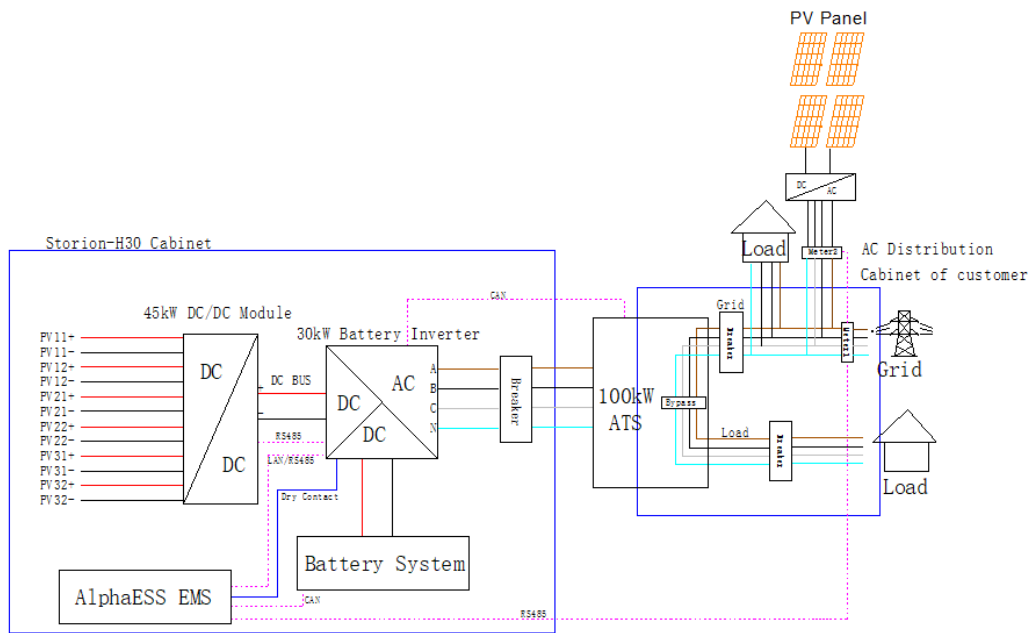


Figure 2-3 Schematic diagram of the Hybrid grid-connected system



The dotted lines indicate the communication lines, the solid lines indicate the power lines.

## 2.2 Product Features

Lithium iron phosphate batteries produced by AlphaESS are characterised by their long life and high reliability and are capable of meeting the requirements of a wide range of energy storage systems.

The system is highly modular design, and is easy to assemble, transport and maintain. The system uses real-time equalisation technology to ensure a high degree of consistency between battery modules.

The system is designed as a detachable structure, compact, flexible, easy to install and test and is able to meet the needs of different working environments and types of work applications.

The system is equipped with advanced thermal management technology to enable the system to operate in the optimum temperature environment.

The system is equipped with local, remote monitoring and control functions.

The system enables flexible scheduling of the power system through communication between the BMS, the H30 indoor unit and the monitoring system.

## 2.3 Products Composition

### 2.3.1 Appearance Introduction

For the appearance of the H30 energy storage system, please refer to Figure 2.

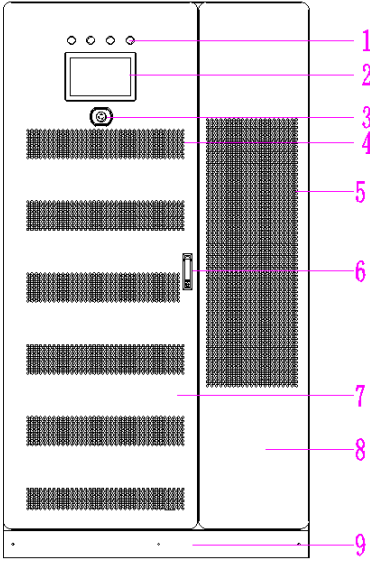
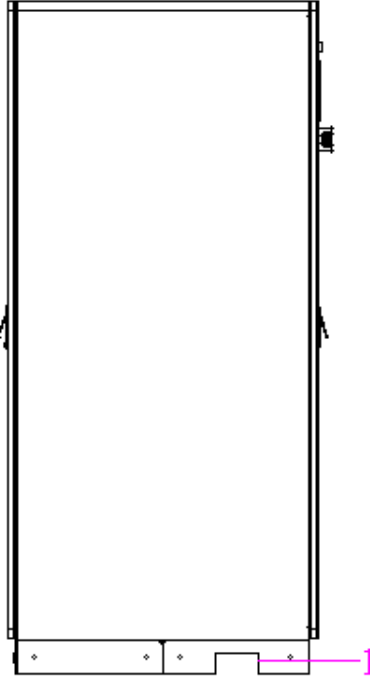


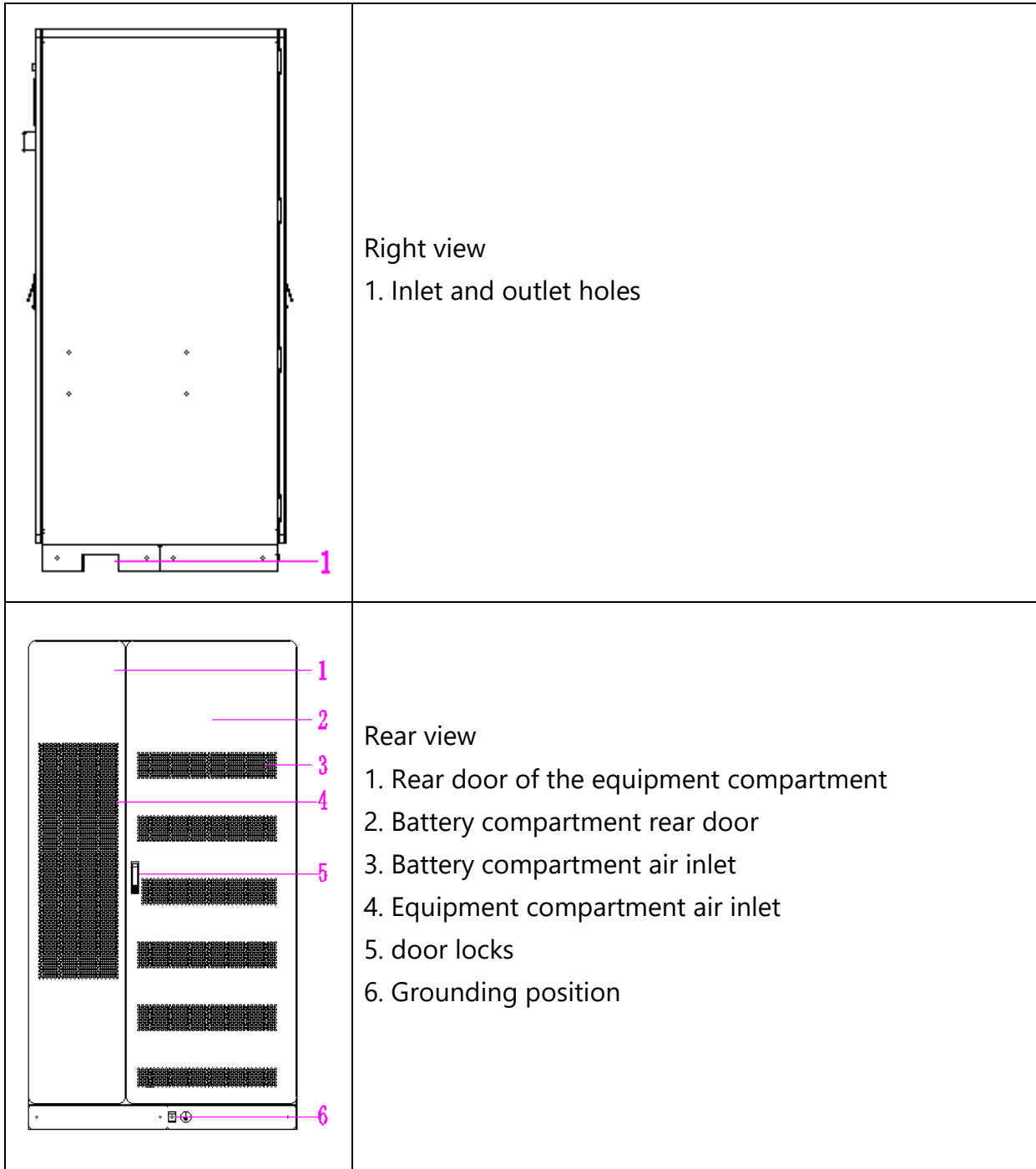
Figure 2-4 H30 system



\*The above pictures are for reference only, please refer to the actual product received!

Table 2-1 Product appearance of H30

View	Description
 <p>The diagram shows the front view of the H30 cabinet. It features a control panel at the top with three indicators (1) and an HMI (2). Below the HMI is an emergency stop button (3). The cabinet has two main compartments: a battery compartment with an air outlet (4) and an equipment compartment with an air outlet (5). The battery compartment has a front door (7) with door locks (6). The equipment compartment has a front door (8). A bottom sealing plate (9) is located at the base of the cabinet.</p>	<p>Front view</p> <ol style="list-style-type: none"> <li>1. Indicators</li> <li>2. HMI</li> <li>3. Emergency stop button</li> <li>4. Battery compartment air outlet</li> <li>5. Equipment compartment air outlet</li> <li>6. Door locks</li> <li>7. Battery compartment front door</li> <li>8. Front door of the equipment compartment</li> <li>9. Bottom sealing plate</li> </ol>
 <p>The diagram shows the left view of the H30 cabinet. It highlights the inlet and outlet holes (1) located at the bottom of the cabinet.</p>	<p>Left view</p> <ol style="list-style-type: none"> <li>1. Inlet and outlet holes</li> </ol>



**\*The above pictures are for reference only, please refer to the physical**

**received!**

### 2.3.2 Description of the Function of the Indicator Light

At the top of the indoor HMI there are four indicators showing the main operating status of the system: POWER, RUN, ON-GRID and FAULT.

**Table 2-2 Description of LED indicators**

Name	Colour	Description
POWER	Red	Always on when the system is powered, always off when the system is not powered
RUN	Green	Always on when the system operates normally with power output, always off when the system is in standby or switched off
ON-GRID	Yellow	Always on when the system is connected to the grid, always off when the system is off-grid or shut down
FAULT	Red	When the system is running, the light flashes slowly (5S/time); when the system has fault, the light is always on; at other times it is always off

**Table 2-3 Description of each LED display status and operation**

Name	Description
POWER on, RUN on, ON-GRID off, FAULT off	System is in normal operation
POWER on, RUN on, ON-GRID off, FAULT always on or flashing	FAULT flashes during system operation indicate a system alarm, constant light indicates a system fault
POWER on, RUN off, ON-GRID off, FAULT off	System is in standby mode



### 2.3.3 Indoor Cabinet Size Parameters

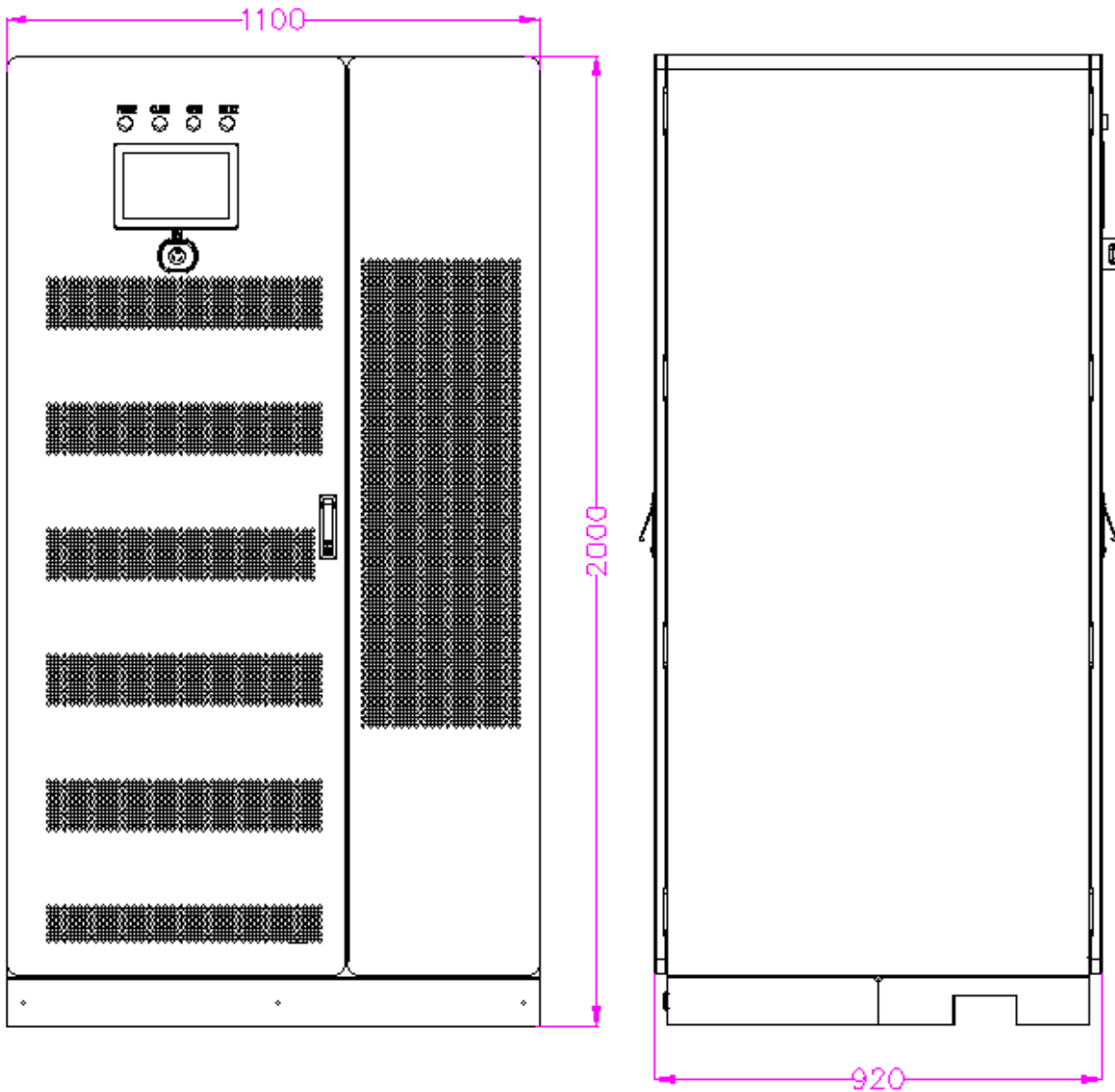
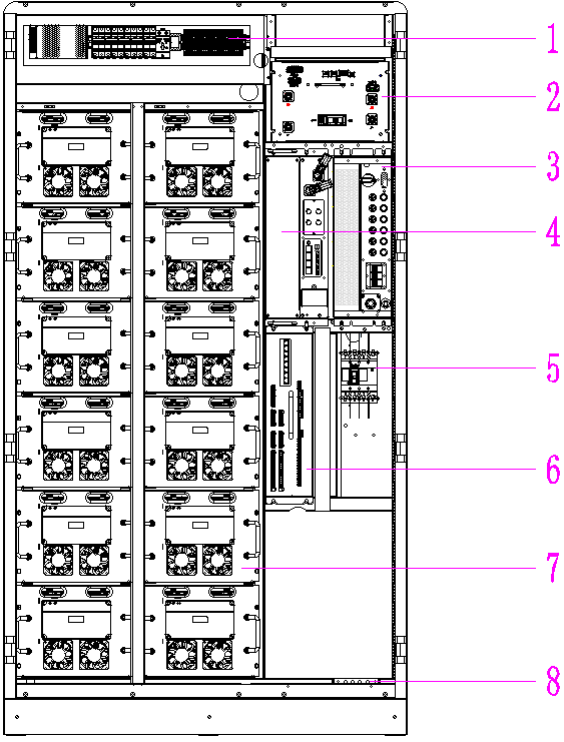
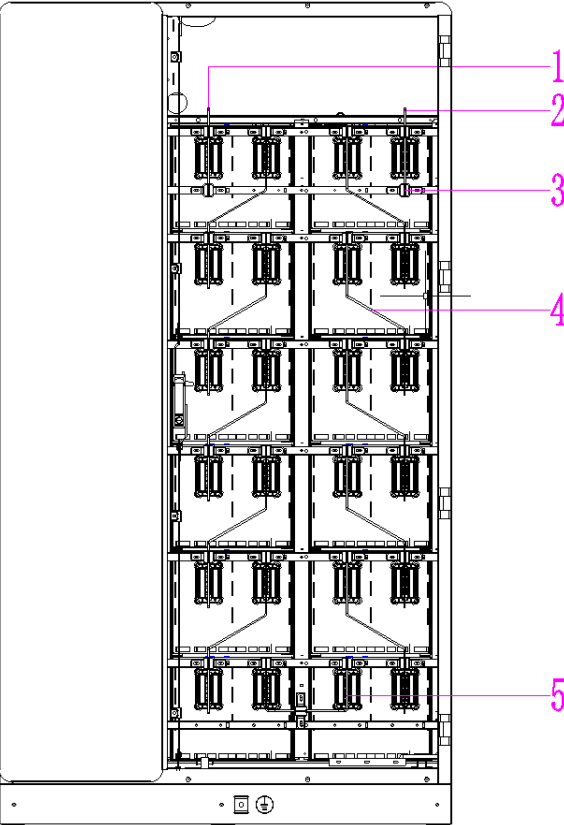


Figure 2-5 Indoor unit dimensions

### 2.3.4 Interior Design of Indoor Cabinets

The system is an all-in-one design, combining the DC/AC module, DCDC module, ATS module and energy storage battery system into one system, with the ATS module being an external wall-mounted solution (described in the installation section).

Table 2-4 System configuration description

View	Description
 <p>A detailed technical drawing of the front panel of a power system cabinet. The cabinet is divided into two main vertical sections. The left section contains two columns of battery units, each with a fan. The right section contains various electronic modules and terminal blocks. Eight pink callout lines with numbers 1 through 8 point to specific components: 1 points to terminal blocks at the top right; 2 points to a high voltage box below them; 3 points to DC/DC modules; 4 points to DC/AC modules; 5 points to a PCS output switch; 6 points to an EMS unit; 7 points to the battery units; and 8 points to an earthing row at the bottom right.</p>	<p>Front view</p> <ol style="list-style-type: none"> <li>1. Terminal blocks and distribution boxes</li> <li>2. High voltage box</li> <li>3. DC/DC modules</li> <li>4. DC/AC modules</li> <li>5. PCS output switch</li> <li>6. EMS</li> <li>7. Batteries</li> <li>8. Earthing row</li> </ol>
 <p>A technical drawing showing the internal battery connection layout from a front perspective. It shows two columns of battery units connected by a network of copper strands. Five pink callout lines with numbers 1 through 5 point to specific parts: 1 points to the top positive copper row; 2 points to the top negative copper row; 3 points to brass mounting brackets; 4 points to copper strands connected in series between batteries; and 5 points to a copper strand (jumper) between batteries.</p>	<p>Front view</p> <ol style="list-style-type: none"> <li>1. Total positive copper row</li> <li>2. Total negative copper row</li> <li>3. Brass mounting brackets</li> <li>4. Copper strands connected in series between batteries</li> <li>5. Copper strand (jumper) between batteries</li> </ol>

### 2.3.5 Overview of Equipment Operating Switch Positions

The H30 indoor system contains the relevant operating switches, the high voltage box plastic case switch, the DC/DC module manual switch, the PCS output switch, the operating position of each switch in the system is shown in Figure 2-6, the function of each switch in the system is described in Table 2-5.

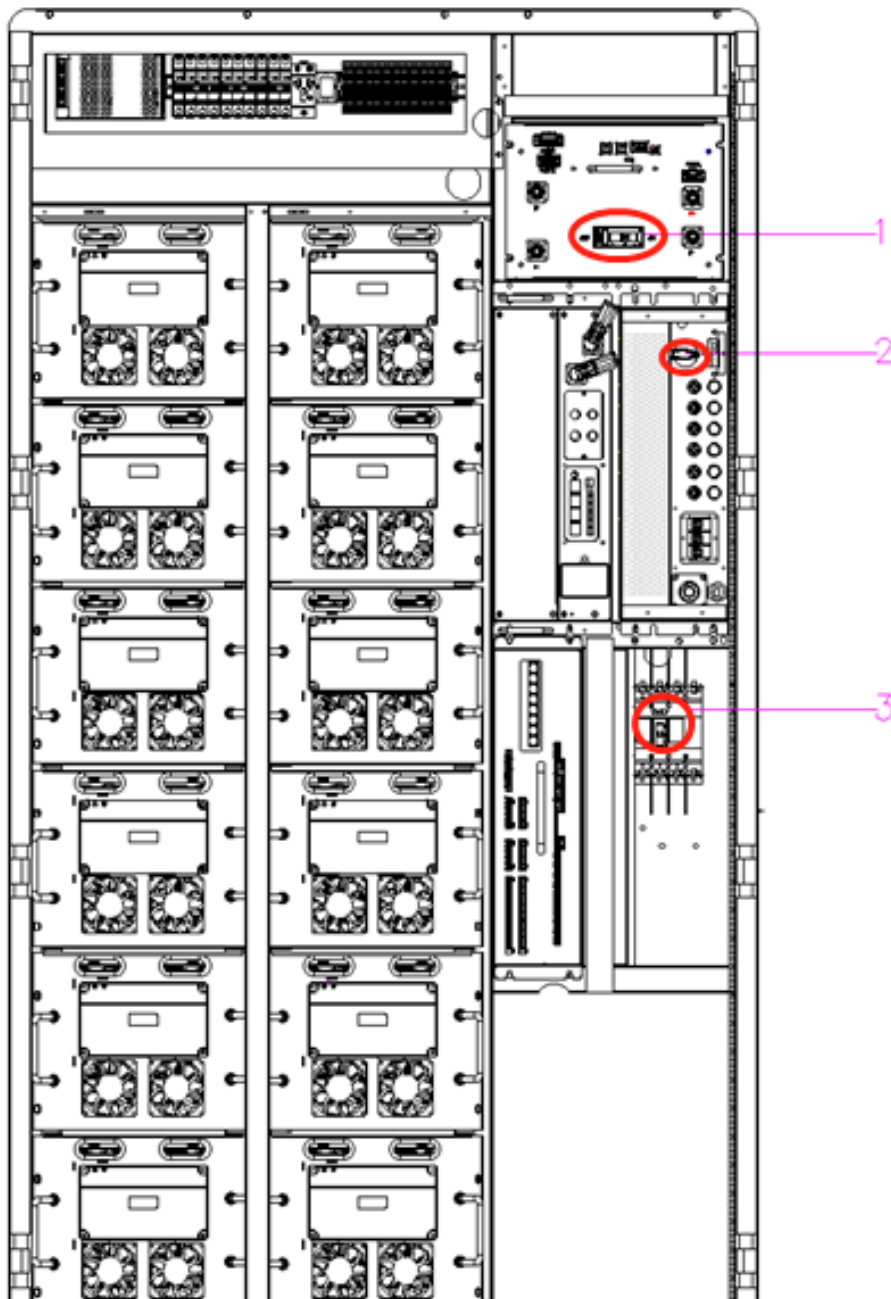


Figure 2-6 Indoor unit dimensions

Table 2-5 Description of equipment switches

No.	Equipment switches	Description
1	High voltage box plastic case switch	Control battery DC system power-up
2	Manual switching of DC/DC modules	Control the input to the PV
3	PCS output switch	Control PCS AC output

**2.3.6 Cable Entrance Design**

For easy cable connection on site, all cables between the devices inside the indoor unit have been connected prior to delivery.

The cables connecting the indoor unit to the external equipment can enter the interior through either the bottom cable entry or the side cable entry of the indoor unit.

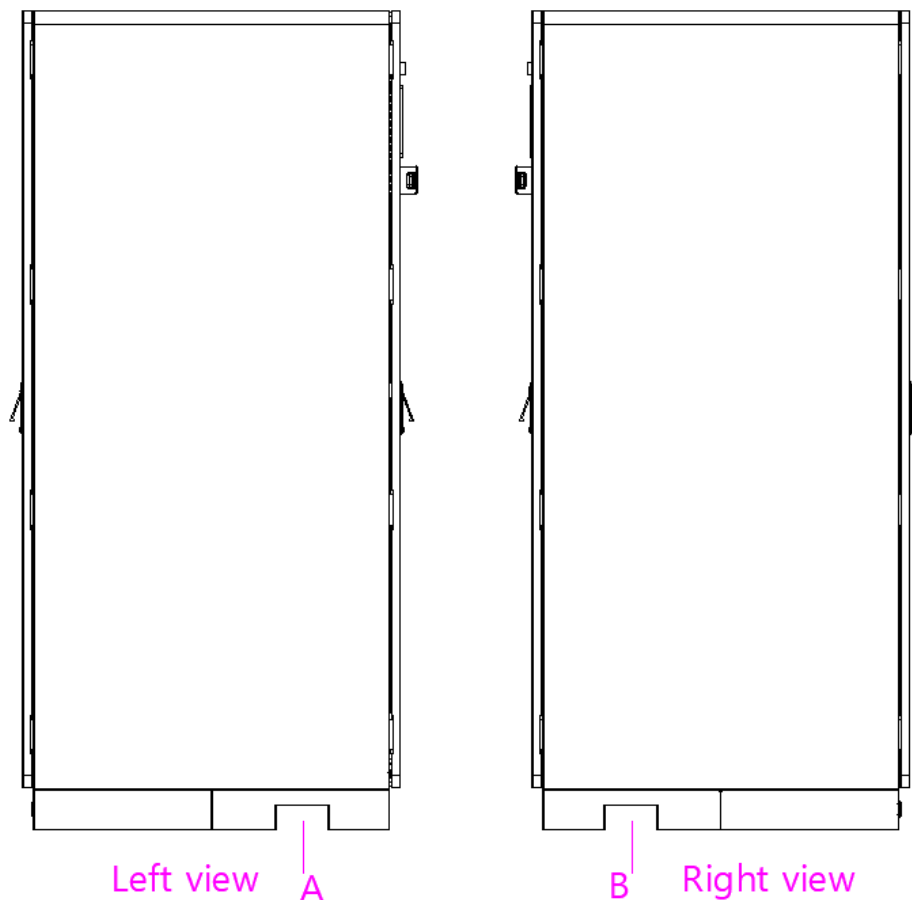


Figure 2-7 Diagram of system inlet and outlet holes

**Table 2-6 Description of inlet and outlet ports**

<b>No.</b>	<b>Description</b>	<b>Size</b>
A	Inlet and outlet holes on the left side of the system	57*128mm
B	Inlet and outlet holes on the right side of the system	57*128mm

### 3. Product Components Introduction

#### 3.1 M38210-S Quick-Insert Back-Plug Battery

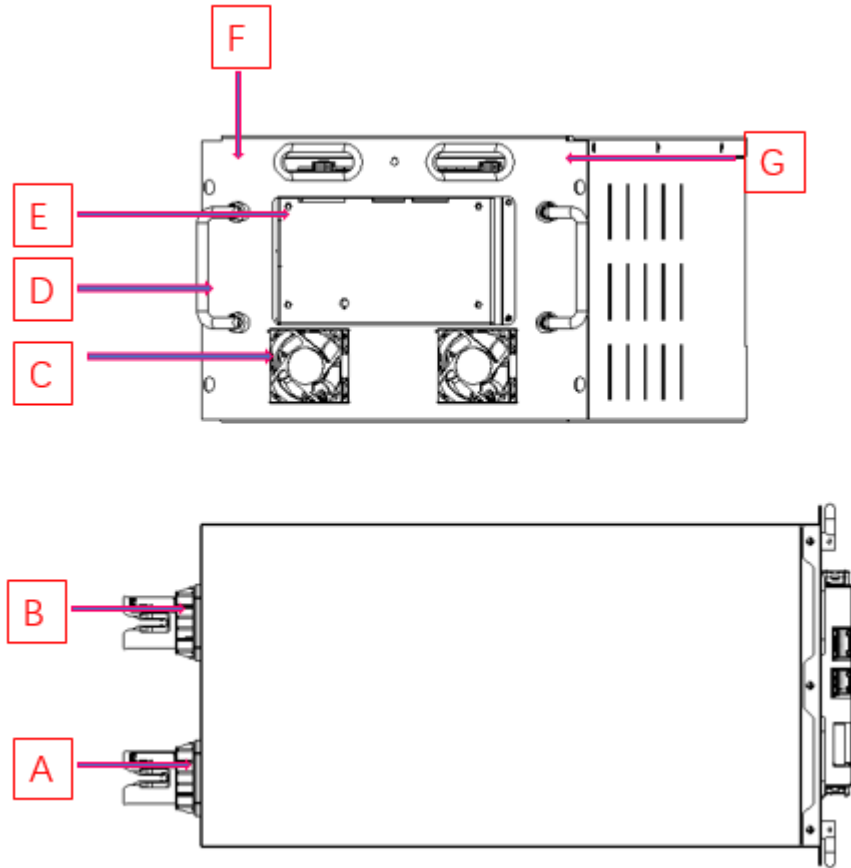


Figure 3-1 Battery diagram

Table 3-1 Appearance

No.	Description	No.	Description
A	Battery Negative terminal	E	BLMU
B	Battery Positive terminal	F	Boxes
C	Fans	G	Fixed lugs
D	Handles		

Table 3-2 Technical specifications

No.	Description	Technical Specifications	Notes
1	Model	M38210-S	
2	Cell formation method	12S2P	
3	Rated voltage	38.4V	
4	Voltage range	36~43.2V	
5	Rated capacity	210Ah	Maximum charge/discharge current: 0.5C
6	Rated energy	8.1kWh	
7	Operating power consumption	<2W	
8	Sleep mode power consumption	<100mW	Battery sleeping mode
9	Maximum charge/discharge current	105A	Constant current mode
10	DC internal resistance	<10mΩ	Factory default
11	Ambient temperature for transport/storage	-20°C~45°C	
12	Operating temperature range	-10°C~50°C	
13	Communication mode	CAN	
14	Weight	62kg	
15	Permissible working ambient humidity	15%~85%	

### 3.2 M7790-S Quick-Insert Back-Plug Battery

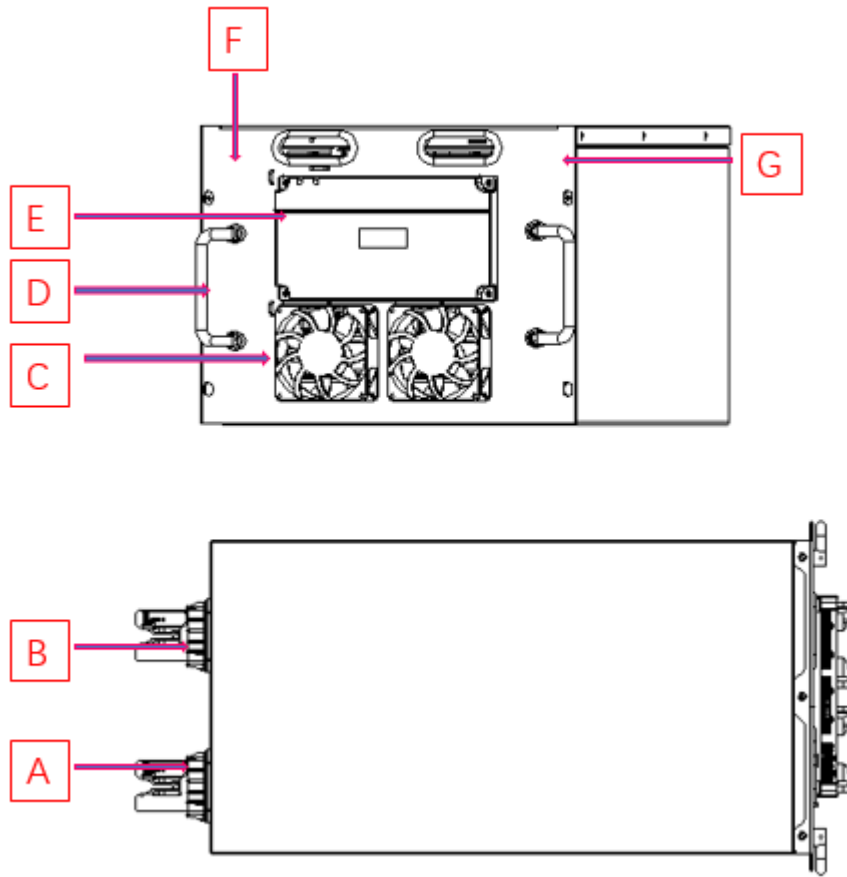


Figure 3-2 Battery diagram

Table 3-3 Appearance

No.	Description	No.	Description
A	Battery Negative terminal	E	BLMU
B	Battery Positive terminal	F	Boxes
C	Fans	G	Fixed lugs
D	Handle		



Table 3-4 Technical specifications

No.	Description	Technical Specifications	Notes
1	Model	M7790-S	
2	Cell formation method	24S1P	
3	Rated voltage	76.8V	
4	Voltage range	72 to 84.48V	
5	Rated capacity	90Ah	Max. charge/discharge current 1C
6	Rated energy	6.9kWh	
7	Operating power consumption	<2W	
8	Sleep mode power consumption	<100mW	Battery sleep mode
9	Maximum charge/discharge current	90	Constant current mode
10	DC internal resistance	<10mΩ	Factory default
11	Ambient temperature for transport/storage	-20°C~45°C	
12	Operating temperature range	-10°C~50°C	
13	Communication mode	CAN	
14	Weight	62kg	
15	Permissible working ambient humidity	15%~85%	

### 3.3 High Voltage Box

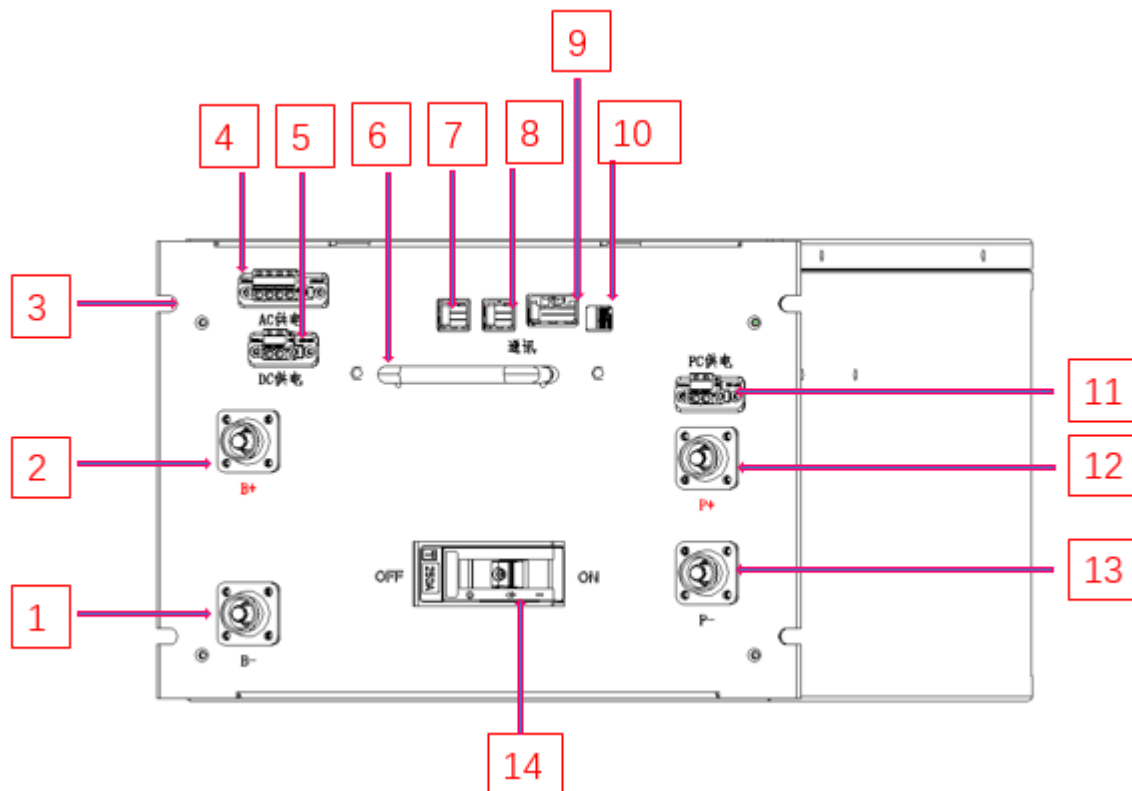


Figure 3-3 Diagram of the high voltage box

Table 3-5 Appearance

No.	Description	No.	Description
1	Negative input	9	BLMU to BMU communication port (CAN)
2	Positive input	10	Dipswitch
3	Mounting points × 4	11	SCADA screen power supply port
4	AC power	12	Positive output
5	DC power	13	Negative output
6	Handles	14	Plastic Case Switches
7	BMU communication port (CAN)	15	
8	BMU communication port (CAN)	16	

Table 3-6 Technical specifications

No.	Description	Technical Specifications
1	Model	HV900105
2	Operation voltage range	200 ~ 900V
3	Module connection	M38210-S & M7790-S in series
4	Rated current	105A
5	Weight	20kg
6	Power consumption	<10W
7	Colour	RAL7035

### 3.4 EMS4.0 Modules and Interface Definitions

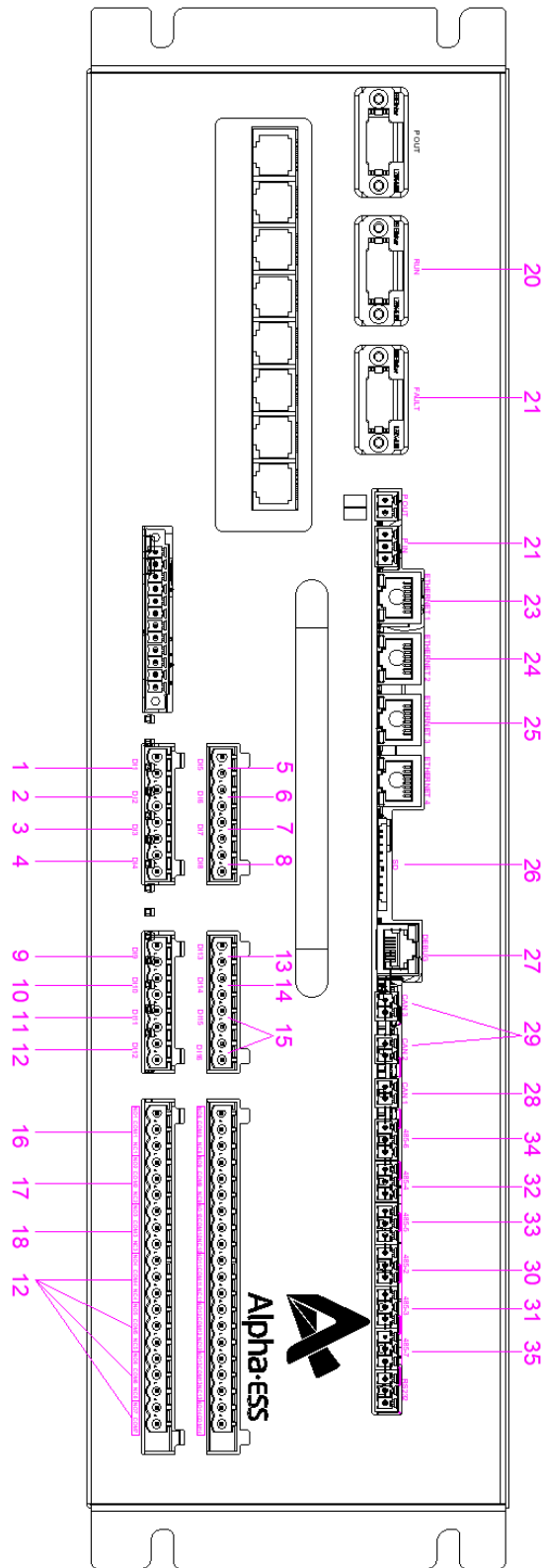


Figure 3-4 Schematic diagram of the EMS4.0 module

Table 3-7 Interface definitions

No.	Interface Name	Interface Definition	Notes
1	DI1	Emergency stop signal	Remote signal (external normally closed)
2	DI2	Distribution main switch break feedback	Remote signal (external normally closed) (break - normally open close - normally closed)
3	DI3	Fire system failure	Remote signal (external normally closed)
4	DI4	Fire alarms (temperature/smoke/combustible gas alarms)	Remote signal (external normally closed)
5	DI5	Firefighting actions	Remote signal (external normally closed)
6	DI6	Dual power mains signals	Remote signal (external normally open)
7	DI7	Dual power supply backup signal	Remote signal (external normally open)
8	DI8	SPD signal (lightning strike)	Remote signal (external normally closed)
9	DI9	Flood signals	Remote signal (external normally closed)
10	DI10	Access control signals	Remote signal (external normally open)
11	DI11	RRCR_K1	External normally open
12	DI12	RRCR_K2	External normally open
13	DI13	RRCR_K3	External normally open
14	DI14	RRCR_K4	External normally open

15	DI15~16	Undefined	Wet node (active input)
16	DO1	Distribution main switch breakers	Remote control (normally open contact) As the coil is connected, an on/off signal with a closing time > 200 MS is required to achieve the breaking action
17	DO2	Oiler start/stop	Normally open nodes
18	DO3	BMS fault signal feedback	Normally closed nodes
19	DO4~8	Undefined	
20	SYS_RUN_LED	Running LEDs	Active switch signal with 24 V output
21	SYS_FAULT_LED	Fault LED	Active switch signal with 24 V output
22	24V_IN	Input power	EMS power supply
23	LAN1	SCADA_FS	LAN1 via the switch to SCADA. Default IP of LAN1 of EMS: 192.168.200.101
24	LAN2	Energy storage converters	PCS via switch LAN2 default IP: 192.168.200.102
25	LAN3	Reserved	LAN3 default IP: 192.168.200.103
26	SD card	SD card	
27	DEBUG	Commissioning port	
28	CAN1	BMS	
29	CAN2~3	Reserved	
30	RS485-2	Photovoltaic inverters	
31	RS485-3	Oilers	

32	RS485-4	HMI/SCADA_FS	Connected to COM1 of SCADA_FS
33	RS485-5	Electricity meters	
34	RS485-6	Charging piles	
35	RS485-7	Air conditioning	

### 3.5 PWS2-30P-CN Inverter

30kW High Power Density Bi-directional Power Conversion System DC-Coupled Solution

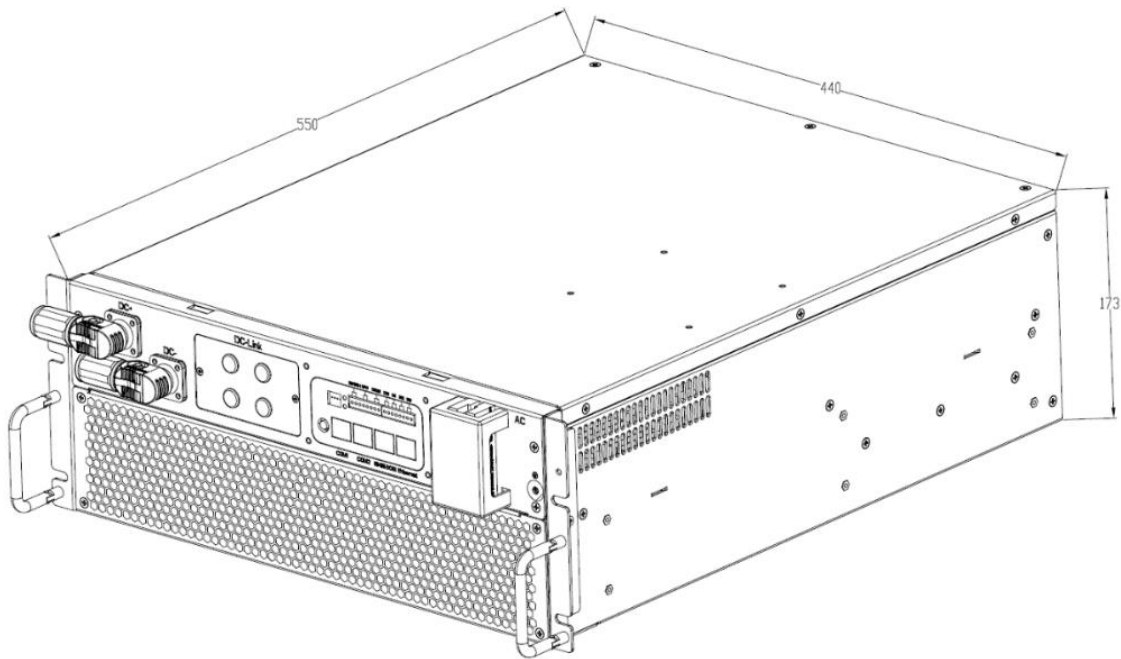


Figure 3-5 Dimensions of PWS2-30P-CN modular machine model (unit: mm)

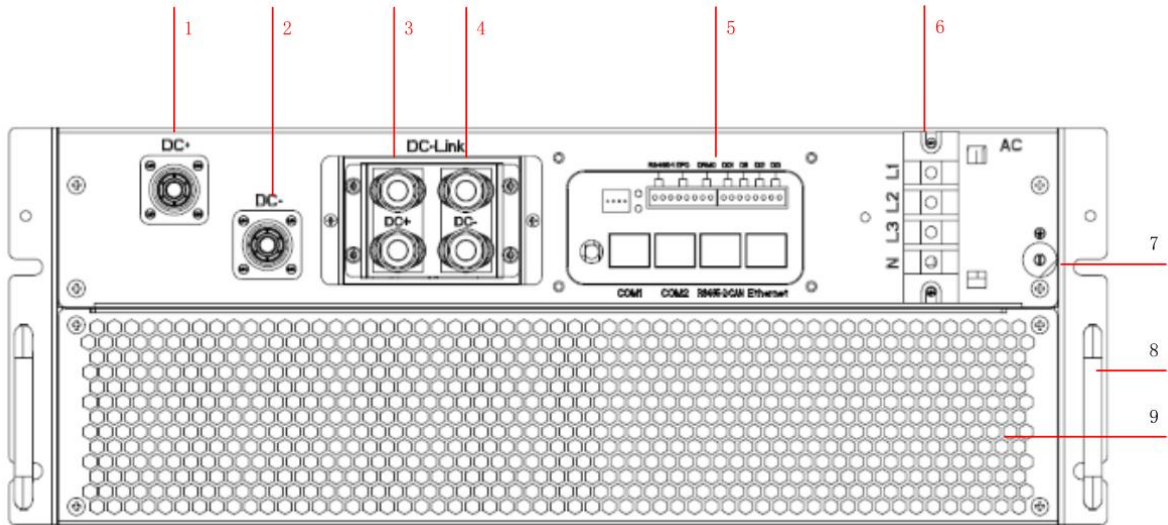


Figure 3-6 Appearance of front side of PWS2-30P-EX / PWS2-29P-EX

No.	Name	Description
1	Positive DC port	To connect positive power cables to the battery cabinet
2	Negative DC port	To connect negative power cables to the battery cabinet
3	DC bus positive	MC4 terminal*2
4	DC bus negative	MC4 terminal*2
5	Signal interface area	External communication interface
6	AC terminal	AC wiring
7	Ground terminal	Grounding protection wire fixed point
8	handle	Extraction module, not for load-bearing
9	Vent	Fan cover and air duct vents



### 3.6 PDS1-45K/PDS1-60K DC/DC Converter

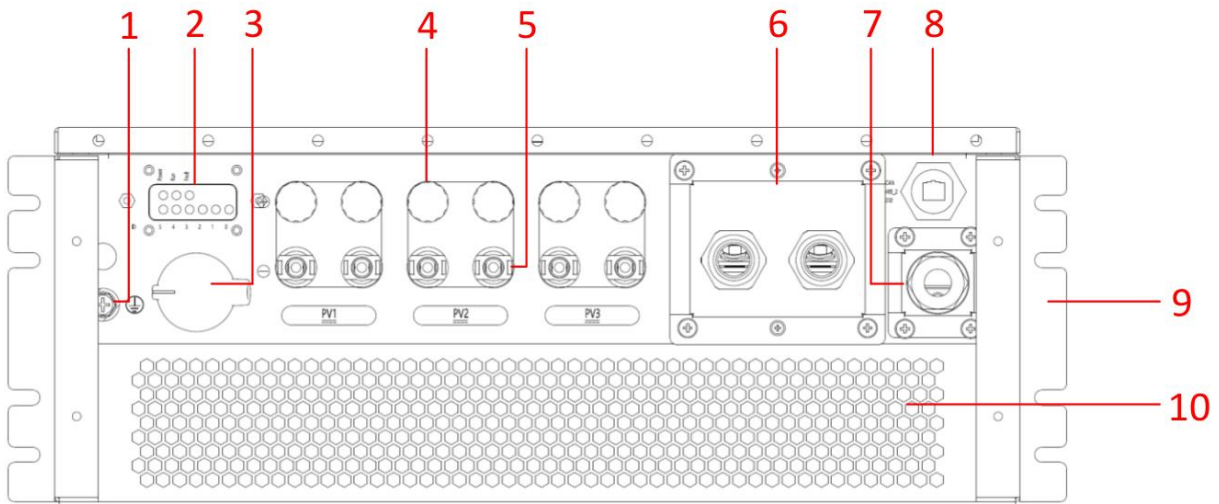


Figure 3-7 PDS1-45K/PDS1-60K module model panel appearance diagram

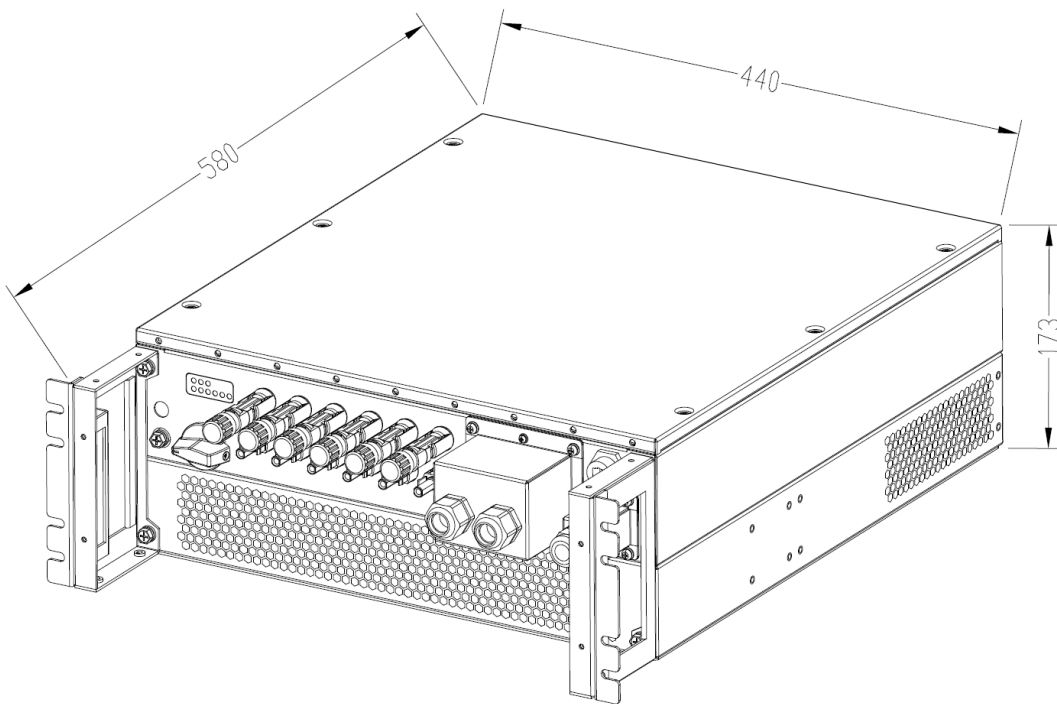


Figure 3-8 PDS1-45K/PDS1-60K module external dimension diagram (unit: mm)

No.	Name	Description
1	Ground terminal	Grounding protection wire fixed point
2	Indicator light	To indicate the working status and ID of the module

3	PV input switch	To turn on/off the PV input. (To avoid power device life attenuation because of the impact current, do not turn on the switch when the PV voltage is higher than 100V.)
4	PV positive input port	MC4 terminal*6 To connect positive power cables to the photovoltaic module
5	PV negative input port	MC4 terminal*6 To connect negative power cables to the photovoltaic module
6	DC output port	To connect power cables to the PCS system
7	Signal interface	External communication interface
8	Reserve signal interface	Not supported at present
9	Handle	Extraction and install module, not for load-bearing
10	Vent	Fan cover and air duct vents

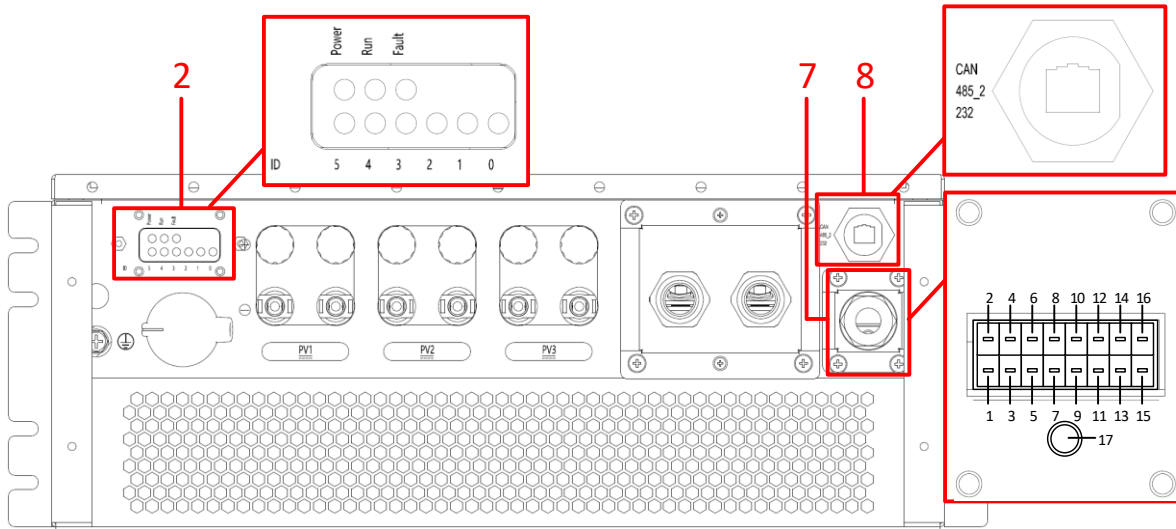


Figure 3-9 Communication panel and display panel

Table 3-8 Technical parameter table

No.	Pin Definition	Description
2	Indicator light	Power: Module power indicator Run: Module run indicator Fault: Module fault indicator ID0-ID5: Module six-digit ID code, used to indicate the module serial number
7	Signal interface. 1/3: 485B_1(PCS) 2/4: 485A_1PCS) 5/6: R_485_1(PCS) 7/8: R_485_2(Reserve) 9/10: R_CAN(Reserve) 11/13: GND 12/14: Dry in 15: GND_ios 16: Dry out_ios	1/2/3/4: RS485_1 differential signal, connect to PCS or EMS. 5/6: 120 ohms matching resistor access signal for 485_1(PCS); Short the Pin5 and Pin6 to enable it. 7/8: 120 ohms matching resistor access signal for 485_2(Reserve); Short the Pin7 and Pin8 to enable it. 9/10: 120 ohms matching resistor access signal for CAN(Reserve); Short the Pin9 and Pin10 to enable it. 11/13: GND of Dry in signal. 12/14: EPO dry contact input signal; Connect to EMS or PCS or others.

		<p>15/16:DO OC output (Reserve).</p> <p>17: Grounding screw holes of RS485 communication cable shielding layer.</p>
8	<p>Reserve signal interface</p> <p>1: CAN_H(Reserve)</p> <p>2: CAN_L(Reserve)</p> <p>3: 485A_2(Reserve)</p> <p>4: 485B_2(Reserve)</p> <p>5: RS232_T(Reserve)</p> <p>7: RS232_R(Reserve)</p> <p>6/8: GND</p>	<p>1/2: CAN differential signal (Reserve, not supported at present).</p> <p>3/4: RS485_2 differential signal (Reserve, not supported at present).</p> <p>5/7: RS232 differential signal (Reserve, not supported at present).</p> <p>6/8: GND of RS232_T and RS232_R.</p>

### 3.7 ATS PWD-100M

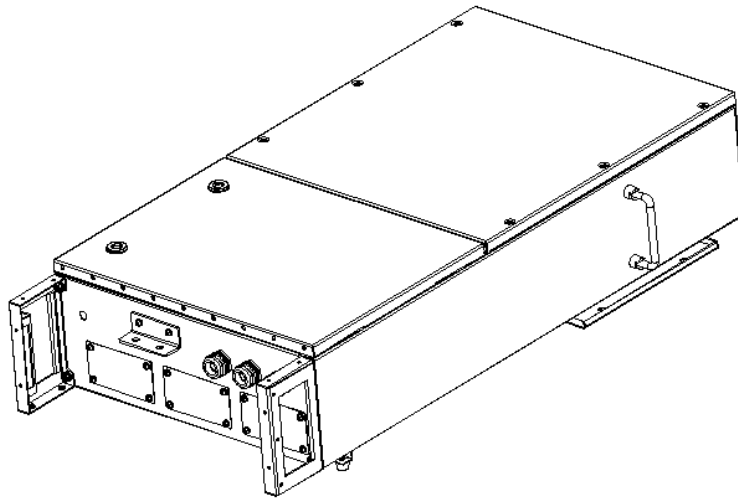


Figure 3-10 PWD-100M-O Intelligent Switching Box External Dimensions

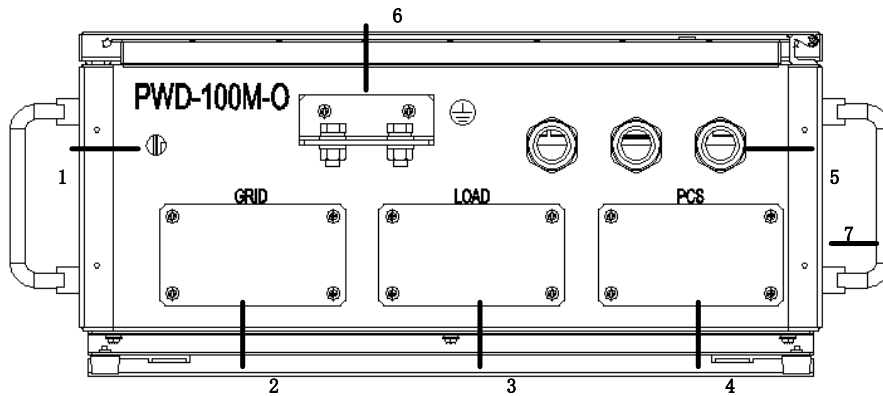


Figure 3-11 PWD-100M-O front panel

No.	Name	Description
1	Pneumatic pressure reducing valve	Prevents expansion when the internal temperature of the module is high
2	Grid terminal	Grid side inlet baffle (remove this baffle during installation)
3	Load side terminals	Load side inlet baffle (remove this baffle during installation)
4	PCS side terminal block	PCS side inlet baffle (remove this baffle during installation)
5	Signal line waterproof terminal	External communication port
6	Grounding terminal	Grounding protection wire fixed point
7	Handle	For chassis support

## 4. Installation

### 4.1 Product Installation



Before unpacking, please check the package for obvious signs of damage. If there are signs of damage, do not unpack, check the system model and contact your dealer as soon as possible.


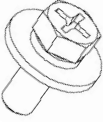
After unpacking, please check that each product is in good condition and contact your dealer as soon as possible if there is any visible damage to the exterior.


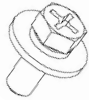



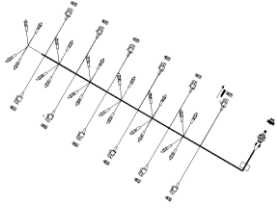
#### 4.1.1 Parts List



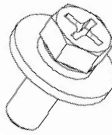


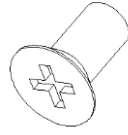
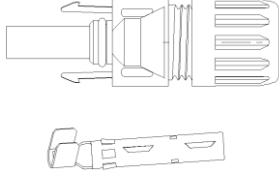
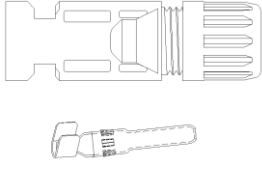


Please check the parts list before installing the product. Please do not connect power cables or communication cables indiscriminately and check the material number before wiring.

Table 4-1 List of parts

M7790-S Battery (Optional)			
			
33500399 (BT-BT) Quantity: 1 Inter-battery communication lines Communication cable (390mm)	40100088 Quantity: 4 Battery fixing screw, 4 X M6*14		

Batteries - Batteries			
<b>M38210-S Battery (Optional)</b>			
			
33500600(BT-BT) Quantity: 1 Inter-battery communication lines Communication cable (385mm) Batteries - Batteries	40100088 Quantity: 4 Battery fixing screw 4 X M6*14		
<b>System Accessories</b>			
			
33201648 Quantity: 1 Battery - High voltage box (positive) 1900mm (to be	33201647 Quantity: 1 Battery - High voltage box (negative)	36000086 Ties, quantity: 20	Fan power supply harness Quantity: 1 33500463 (to be pre-installed in the system)

<p>pre-installed in the system)</p>	<p>2100mm (to be pre-installed in the system)</p>		
			
<p>33500627 (BT - HV) Quantity: 1 BT-HV (communication) 1800mm (to be pre-installed in the system)</p>	<p>41500004 Quantity: 20 Tie 4*200mm nylon</p>	<p>40100134 Quantity: 2 Screws GB/T9074.13 Stainless steel M8*25 Phillips socket combination screws</p>	<p>40200021 Quantity: 2 Nut GB/T 6177.1-2000 Stainless steel body M8 Hexagonal flange face</p>
			
<p>33500216 Quantity: 1 Other Wires UL1332 22AWG 39000038 Other Colours 50mm Communication Harnesses Termination Resistors - Harnesses</p>	<p>M4 Cross countersunk head screws Quantity: 2</p>	<p>PV terminal Male connector Quantity: 6 sets</p>	<p>PV terminal Female connector Quantity: 6 sets</p>



## 4.1.2 H30 Indoor Unit Installation

### 4.1.2.1 Transport Conditions

The various devices in the H30 indoor unit, except for the battery section, are fixed in the indoor unit before delivery

When transporting indoor units, take care of transport.



**The following conditions need to be met to transport a mobile H30 in-**

**door unit:**

- Each cabinet door of the H30 indoor unit is locked tightly.
- Choose the right forklift truck for the site conditions. Selected tools must have sufficient load-bearing capacity.
- Additional traction devices may be required if movement on slopes etc. is needed.
- Remove any obstacles that are or may be present during the move, such as trees, cables, etc.
- The H30 indoor unit should be selected for transport movement in good weather conditions whenever possible.
- Always install warning signs or warning strips to prevent non-workers from entering the lifting and transport area to avoid accidents.

### 4.1.2.2 Forklift Transport

If the installation site is flat, the H30 indoor unit can be transported with a forklift truck. The bottom of the H30 indoor unit is equipped with fork holes specifically for forklift transport. The battery H30 indoor unit is moved through the front fork holes.



**If using forklift transport methods, the following requirements shall be**

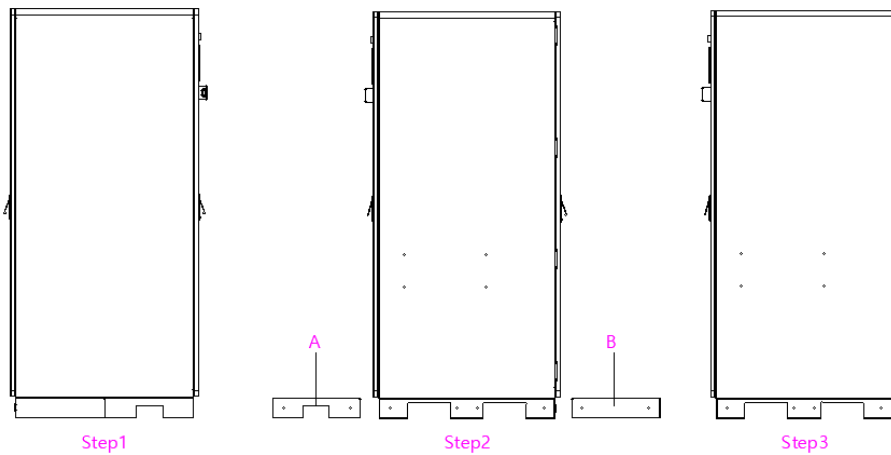
**met:**

- The forklift truck should be equipped with an adequate load capacity (minimum 2 tonnes).
- The length of the pins should be at least 1100mm.
- The pins should be inserted into the forked jacks on the bottom of the workstation (see the diagram below for the location of the forked jacks). Insert the pins of the stake
- The foot depth should be the depth of the pile, i.e. 1100mm.

- The H30 indoor unit should be transported, moved and set down slowly and steadily. Attempted transport is recommended.
- Should only place the H30 indoor unit in a smooth place. The area should be free of any obstacles or bulges.

**4.1.2.3 Pre-Transport Preparation for Forklift Trucks**

The first step before transporting the H30 indoor unit by forklift truck is to remove the outer wooden box and the second step is to remove the decorative cover.



**Figure 4-1 Illustration of the disassembly of the decorative cover**

**Table 4-2 Table of instructions for decorative covers**

No.	Description
A	Front trim flap
B	Rear trim flap

**Table 4-3 Decorative cover steps**

Step	Description
Step 1	Remove cabinet body from the wooden box
Step 2	Remove A and B
Step 3	Forklift transportable condition



The decorative cover is reversed at the end of the indoor unit installation

wiring operation.

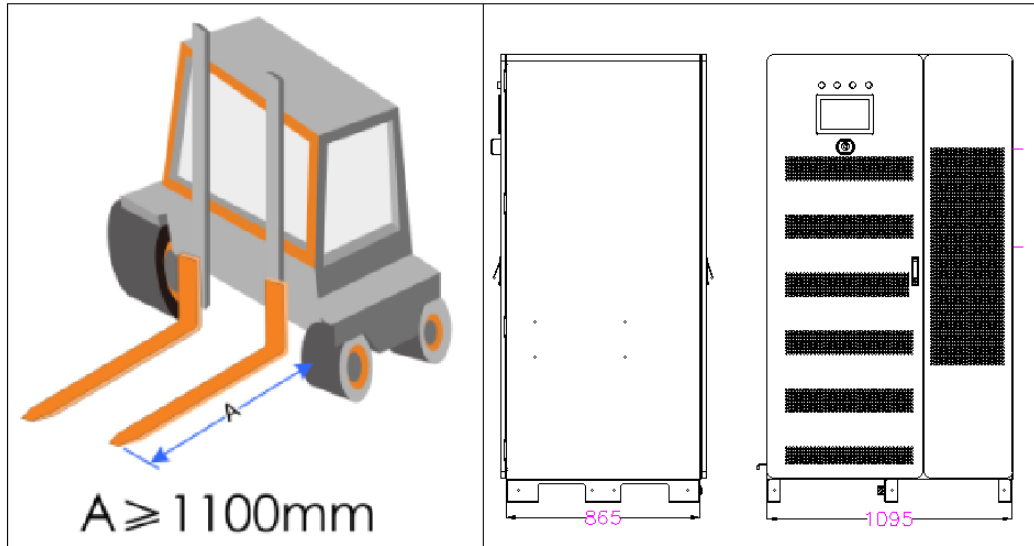


Figure 4-2 Schematic diagram of forklift transport in two directions

#### 4.1.2.4 H30 Equipment Installation

After moving the H30 indoor unit to the installation position with a forklift or other tool, secure its base with M12 screws, see Figure 4-.

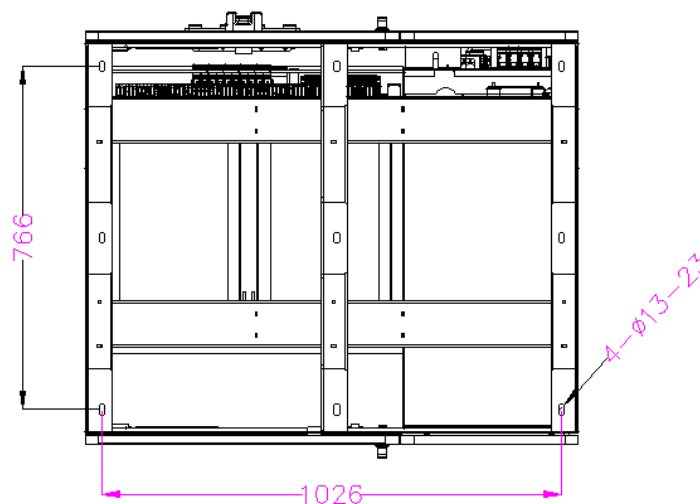


Figure 4-3 Schematic diagram of the base



The wiring holes are located on the bottom of the H30 indoor unit. The

cable is threaded into the cable slot through the wiring holes in the base.

When the H30 indoor unit needs to be fixed to the channel steel,  $\Phi 14$  holes should be punched in the channel steel and screws should be used to fix the H30 indoor unit to the channel steel, please refer to Figure 4-3.

When the H30 indoor unit needs to be fixed to the concrete floor, holes need to be drilled in the floor and screws need to be used to fix the H30 indoor unit to the concrete floor, please refer to Figure 4- Connect the grounding point on the lower rear door of the H30 indoor unit to the site grounding point using an earth wire and tighten with a bolt after connection.

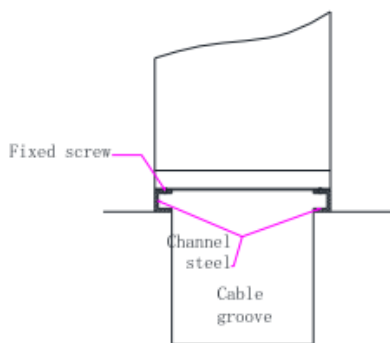


Figure 4-4 Fixed to channel

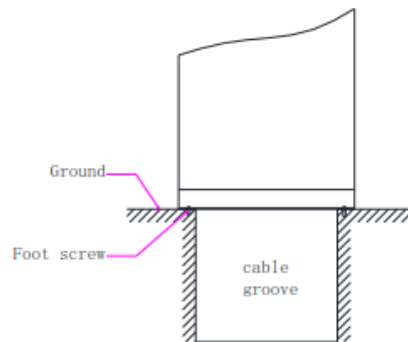


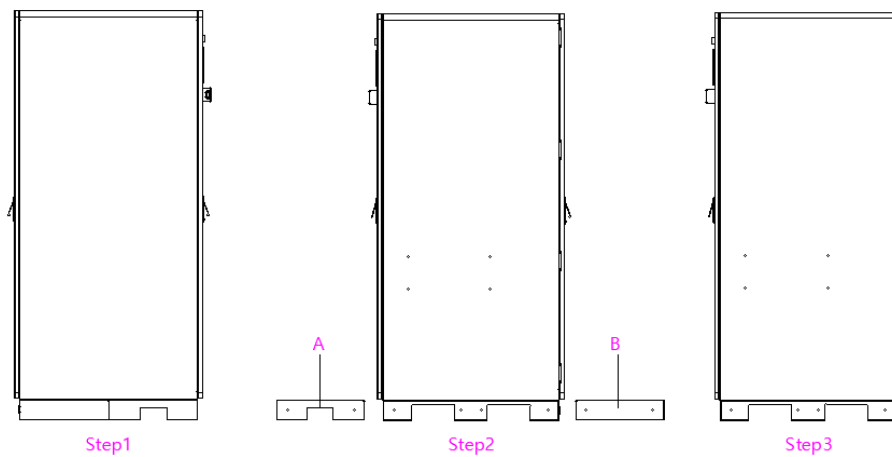
Figure 4-5 Fixed to concrete floor



**Make sure that the H30 indoor unit is reliably earthed. If it is not connected or is loose, it may cause an electric shock. It is recommended that the earth wire is protected by painting the outside of the earth terminal after installation.**

#### 4.1.2.5 Interior Cabinet Decorative Cover Installation

When the H30 indoor unit installation is finished, the decorative cover of the H30 unit needs to be installed in place. The decorative cover is shipped with the goods placed inside the cabinet. Remove the decorative cover from the body of the substrate before installation. Incoming installation please refer to Figure 4-6.



**Figure 4-6 diagram of the decorative cover assembly**

**Table 4-4 List of parts for the decorative cover assembly**

No.	Description
1	Front cover plate
2	Back cover plate
3	M4*8 stainless steel screws

**Table 4-5 Installation steps for decorative covers**

Step	Description
Step 1	Remove the front cover plate, the rear cover plate and the M4*8 stainless steel screws from the cabinet
Step 2	Assemble the front and rear cover panels to the indoor cabinet in the pattern shown
Step 3	Final state of the front and rear cover plates fixed to the indoor cabinet with M4*8 stainless steel screws

### 4.1.3 Wall-Mounting of ATS Equipment

ATS wall mounting on the right side of the indoor unit

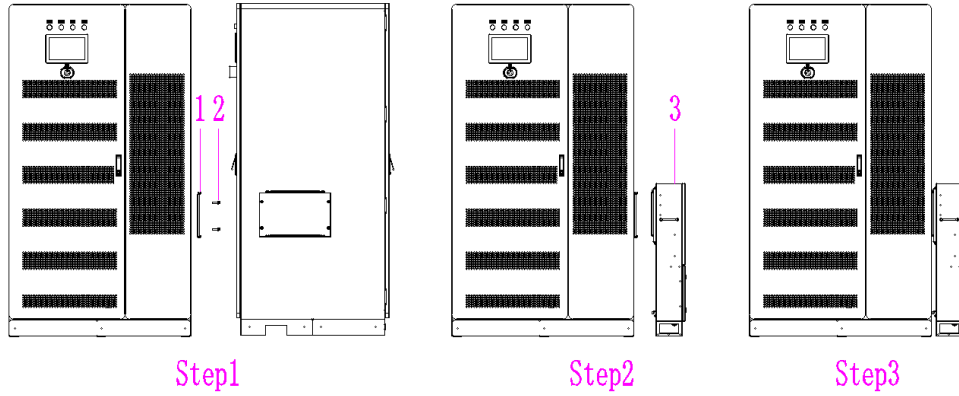


Figure 4-2 Illustration of ATS wall-mounted equipment installation

Table 4-6 List of parts for STS wall mounting

No.	Description
1	ATS wall mounting plate (accessory in STS box)
2	ATS wall mounting plate mounting screws
3	ATS equipment body

Table 4-7 ATS wall mounting procedure

Step	Description
Step 1	using four ATS wall mounting plate mounting screws to install ATS wall mounting plate to the right side of the H30 indoor unit
Step 2	ATS equipment wall-mounted directly on ATS wall-mounting plate
Step 3	Final installation status of ATS equipment

## 4.2 Electrical Safety Installation

### 4.2.1 Grounding Requirements

- 1 When the product is installed, the protective earth wire must be installed first. When dismantling, the protective earth wire must be removed last.
- 2 The system should be permanently earthed. Before operating the system, the electrical connections of the system should be checked to ensure that the system is reliably earthed.

3 Damage to the earth conductor is prohibited.



**It is strictly forbidden to install the system before grounding, the first step is to ground the system externally, followed by the connection of the power cable of the back-plug system, after which the rest of the system is installed.**

#### **4.2.2 External Earthing of the System**

The H30 indoor system includes internal earthing and external earthing, and the earthing of the system's internal equipment is completed prior to delivery.

The diagram below shows the location of the external grounding point. The earth resistance must be measured after the earth connection. The earth resistance value must also be determined in accordance with the relevant standards of the country/region where the project is located.

In addition, the recommended size of the earthing wire used for the external earthing of the system is greater than or equal to 16mm<sup>2</sup>.

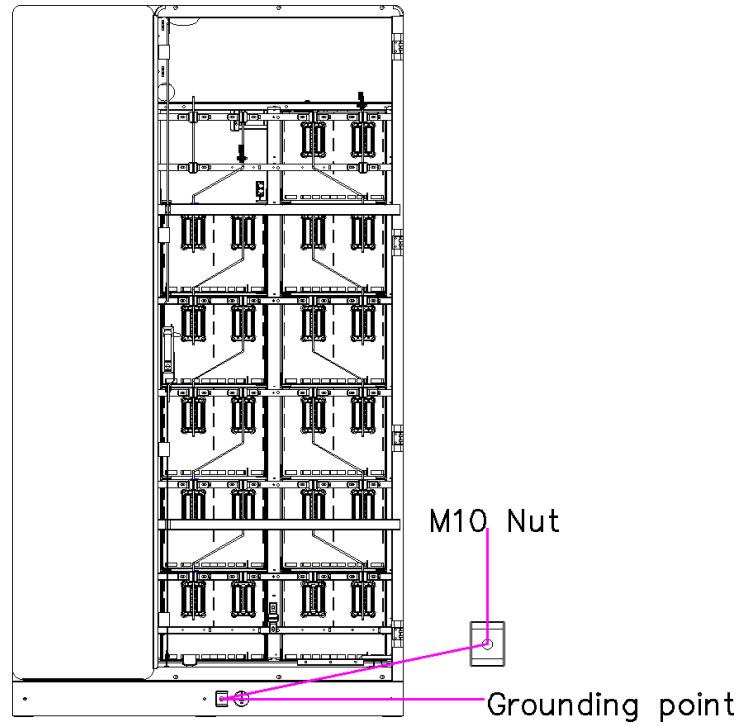


Figure 4-9 Diagram of the external earthing of the H30 indoor system



After the system is externally earthed, before opening the cabinet door to install the system, the power cable of the back plug system must be connected first, it is strictly forbidden to connect the power cable after installing the battery pack.

### 4.2.3 Back-Plug System Power Cable Connection

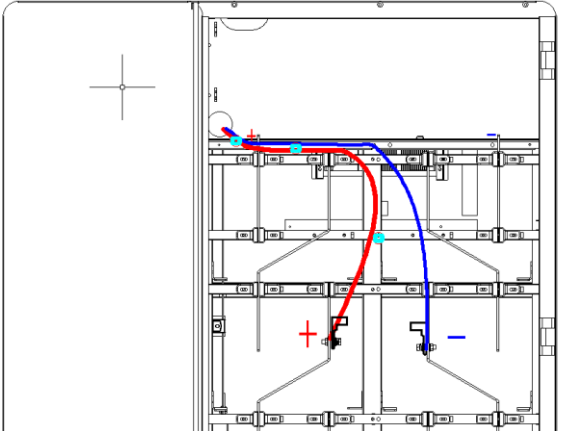
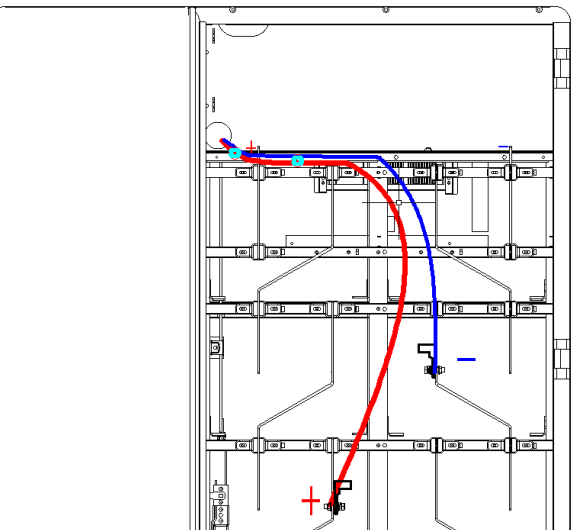
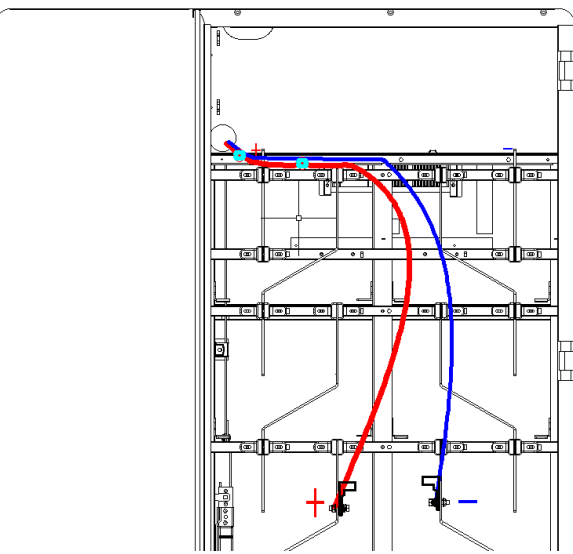
#### 4.2.3.1 Battery Power Cable Side Connection

Please use the mounting screws and nuts in the system accessories list to connect the positive and negative terminals shown in the illustration in each battery cluster with the positive and negative power cable of high-voltage box.

Number of Batteries	Positive Battery Access Point	Negative Battery Access Point	Wiring Diagram
---------------------	-------------------------------	-------------------------------	----------------



<p><b>12</b></p>	<p>BT1 B+</p>	<p>BT12 B-</p>	<p>A technical wiring diagram showing the connection between BT1 B+ and BT12 B-. A red line starts at BT1 B+ on the left, goes up, then right, then down, and finally right to BT12 B- on the right. A blue line also runs from BT1 B+ to BT12 B- along the top. A red '+' sign is at the BT1 B+ terminal, and a blue '-' sign is at the BT12 B- terminal.</p>
<p><b>11</b></p>	<p>BT1 B+</p>	<p>BT11 B-</p>	<p>A technical wiring diagram showing the connection between BT1 B+ and BT11 B-. A red line starts at BT1 B+ on the left, goes up, then right, then down, and finally right to BT11 B- on the right. A blue line also runs from BT1 B+ to BT11 B- along the top. A red '+' sign is at the BT1 B+ terminal, and a blue '-' sign is at the BT11 B- terminal.</p>
<p><b>10</b></p>	<p>BT1 B+</p>	<p>BT10 B-</p>	<p>A technical wiring diagram showing the connection between BT1 B+ and BT10 B-. A red line starts at BT1 B+ on the left, goes up, then right, then down, and finally right to BT10 B- on the right. A blue line also runs from BT1 B+ to BT10 B- along the top. A red '+' sign is at the BT1 B+ terminal, and a blue '-' sign is at the BT10 B- terminal.</p>
<p><b>9</b></p>	<p>BT1 B+</p>	<p>BT9 B-</p>	<p>A technical wiring diagram showing the connection between BT1 B+ and BT9 B-. A red line starts at BT1 B+ on the left, goes up, then right, then down, and finally right to BT9 B- on the right. A blue line also runs from BT1 B+ to BT9 B- along the top. A red '+' sign is at the BT1 B+ terminal, and a blue '-' sign is at the BT9 B- terminal. A crosshair symbol is located to the left of the diagram.</p>

<p><b>8</b></p>	<p>BT1 B+</p>	<p>BT8 B-</p>	
<p><b>7</b></p>	<p>BT1 B+</p>	<p>BT7 B-</p>	
<p><b>6</b></p>	<p>BT1 B+</p>	<p>BT6 B-</p>	

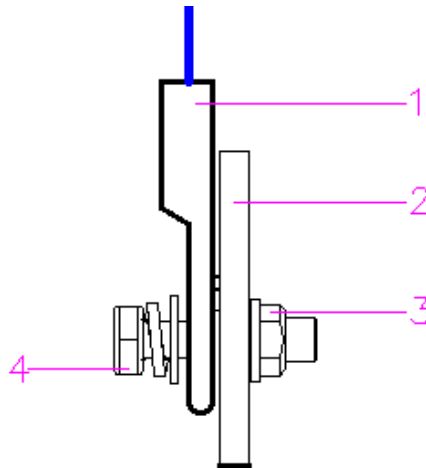
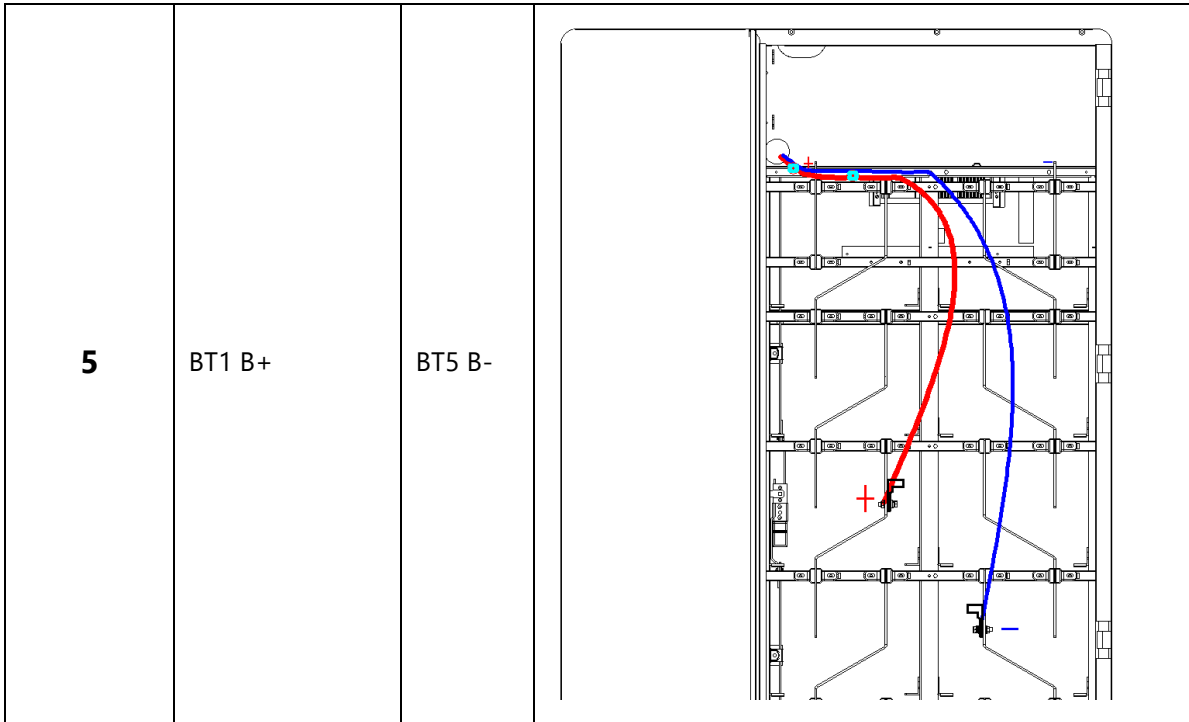


Figure 4-10 Diagram of wire harness and copper connection

Table 4-9 Configuration of wire harness and copper connections

No.	Description
1	Power cables (system comes pre-assembled)
2	Copper bar (system to be pre-installed)
3	M8 flange nut (in system accessories)
4	Triple combination screw M8 (in system accessories)

4.2.4 Battery Installation

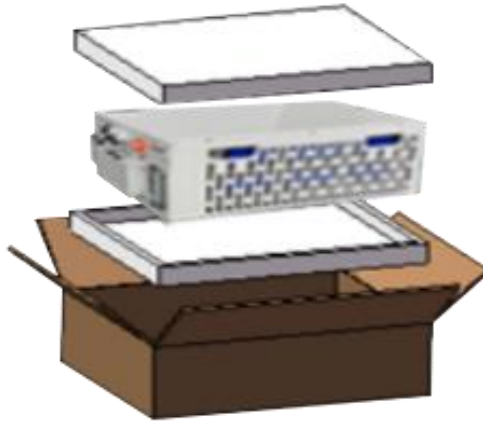


Figure 4-10 Battery pack unpacking diagram

Step	Description
Step 1	Unpack all batteries and do not lose the internal parts
Step 2	Check the battery type on the battery label.
Step 3	Remove the harness cover mounting screws (M4*8 Phillips triple combination screws) B with a Phillips screwdriver, then remove the harness cover A.
Step 4	Place the same cluster of batteries in the same battery holder with serial numbers 01 to 12 in order (if less than 12 batteries, also installed in order) and secure the batteries to the battery holder using the matching screws.

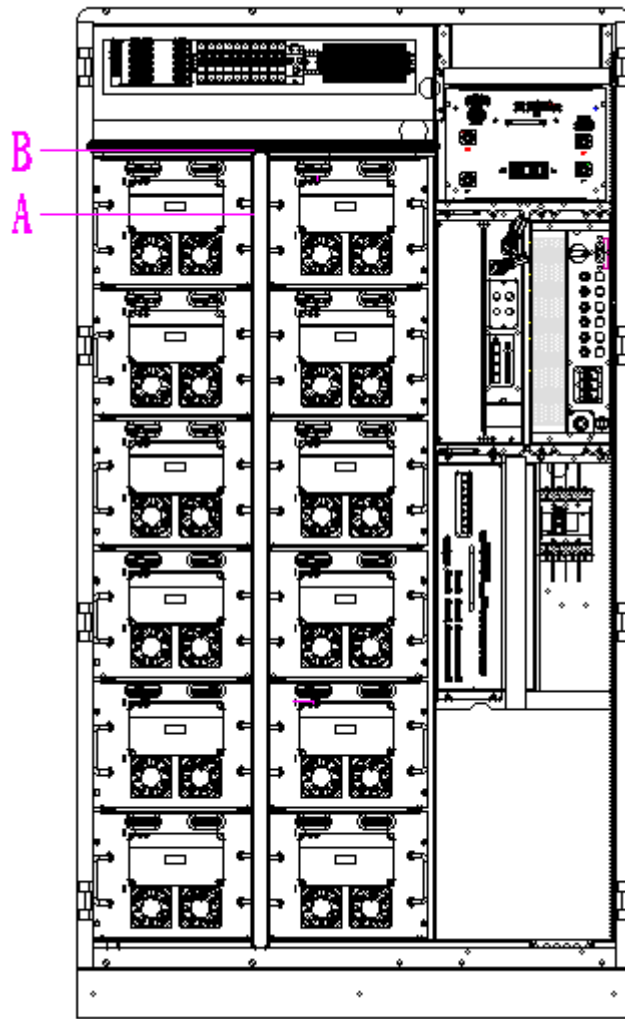
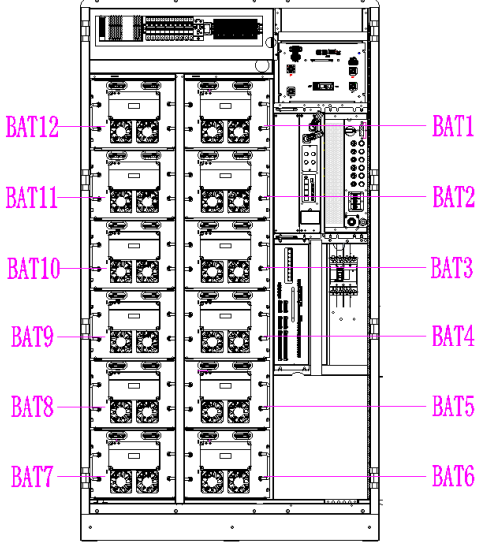
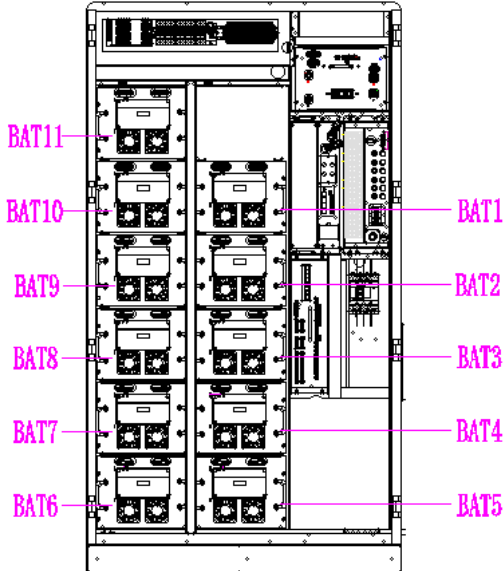


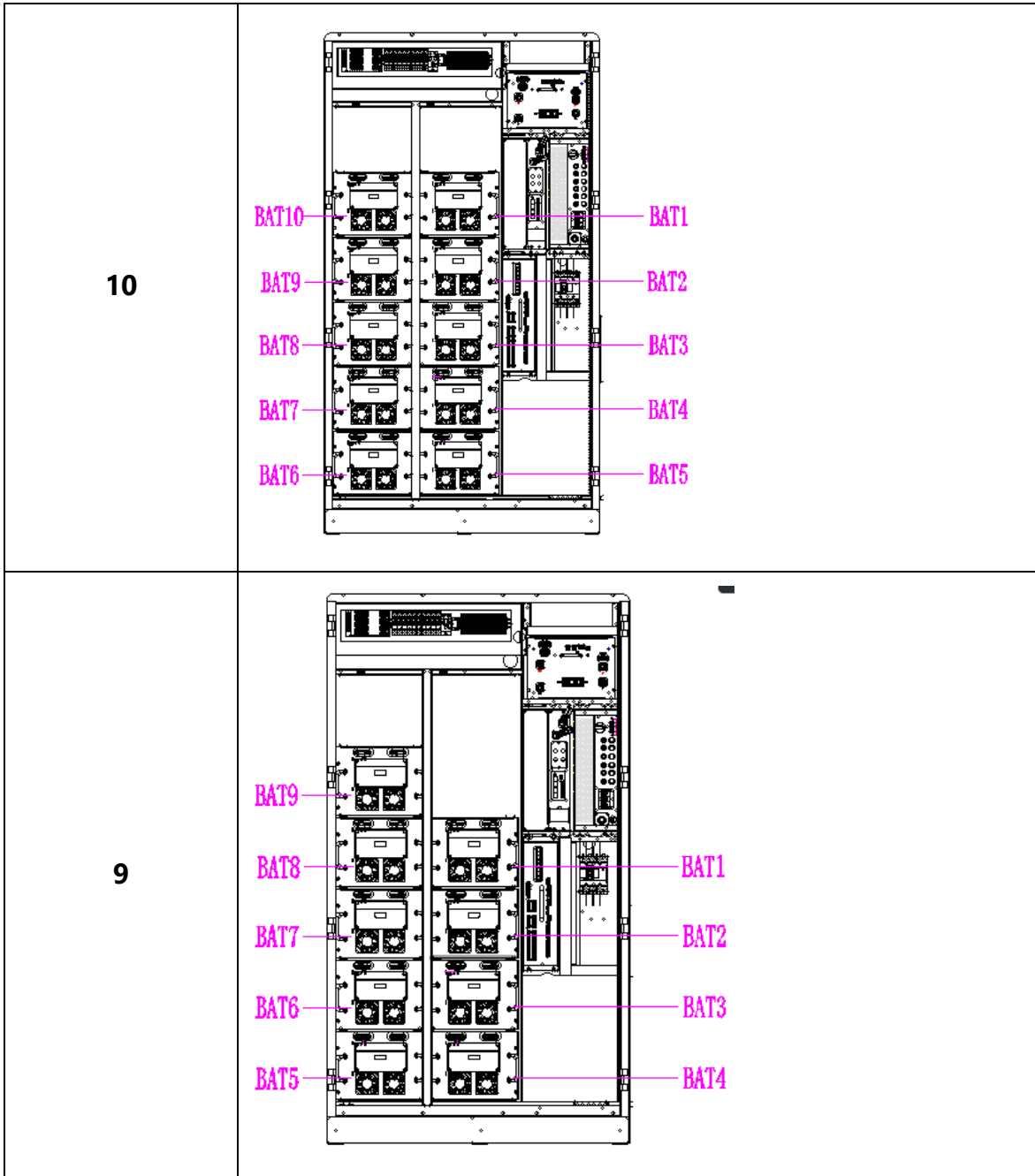
Figure 4-11 Schematic diagram of the wire harness cover

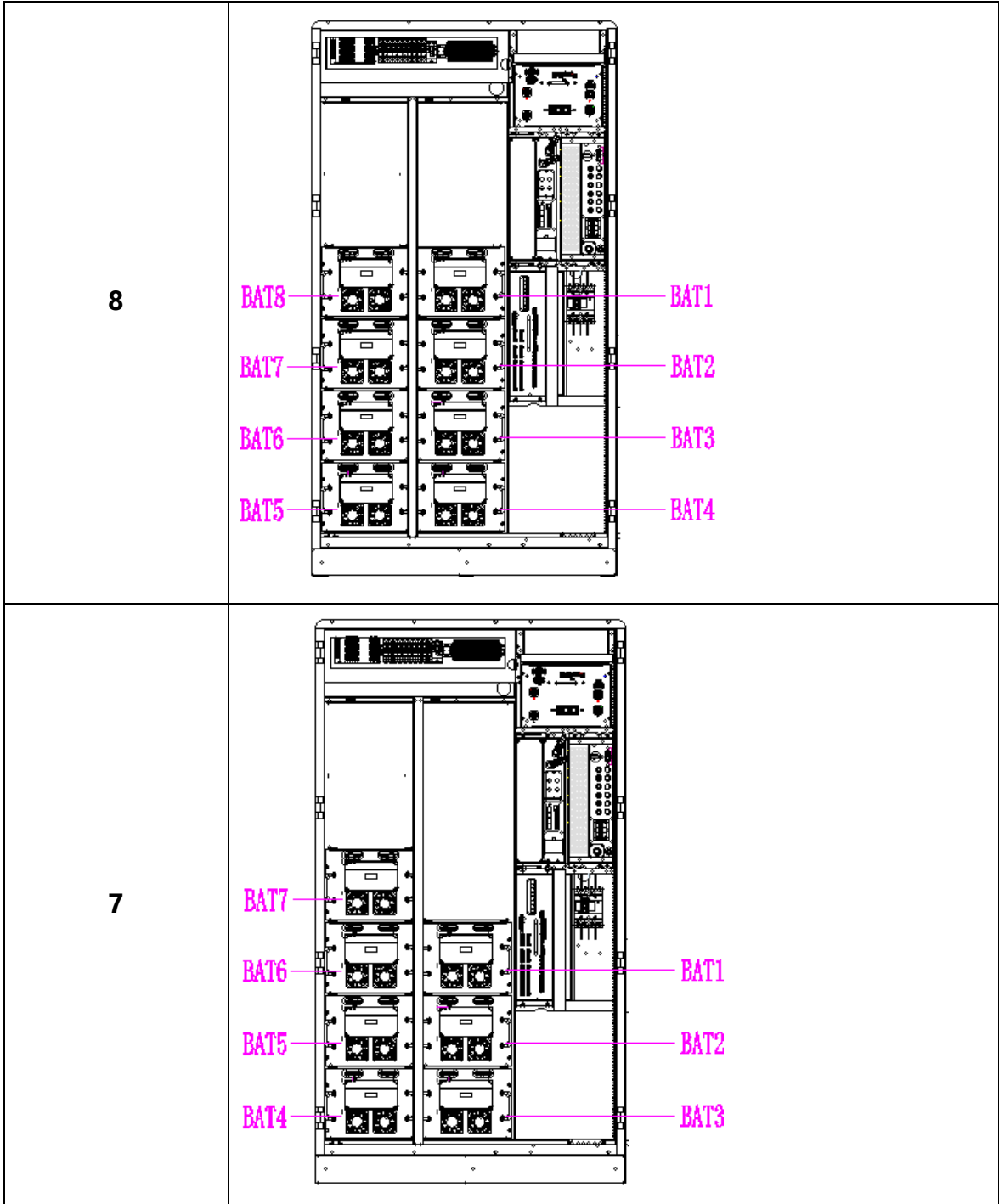
Table 4-11 Wire Harness Cover Related Materials Table

No.	Description
<b>A</b>	Wire harness cover
<b>B</b>	Wire harness cover mounting screws (M4*8 Phillips triple combination screws)

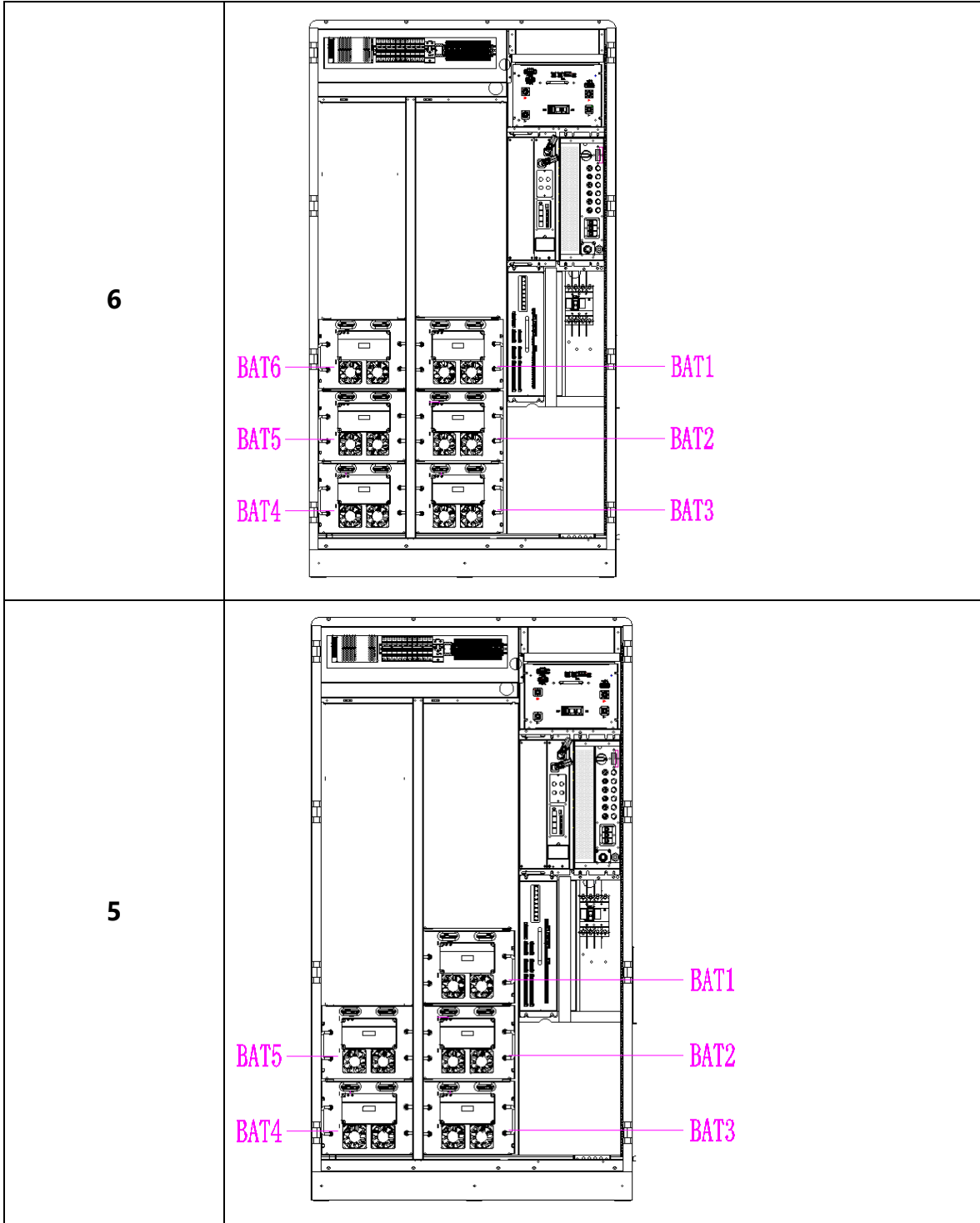
Table 4-12 Battery installation diagram

Number of Batteries Configured	Batteries' Installation Positions and Sequence
12	 <p>The diagram shows a battery cabinet with 12 batteries. The batteries are arranged in two columns of six. The left column is labeled BAT12 to BAT7 from top to bottom. The right column is labeled BAT1 to BAT6 from top to bottom.</p>
11	 <p>The diagram shows a battery cabinet with 11 batteries. The left column has 6 batteries labeled BAT11 to BAT6 from top to bottom. The right column has 5 batteries labeled BAT1 to BAT5 from top to bottom.</p>









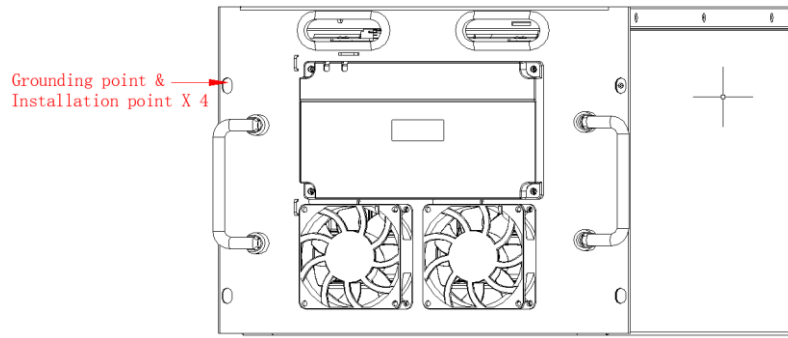


Figure 4-13 Battery grounding diagram

Before wiring, secure the battery to the battery holder with the 4 triple combination screws.



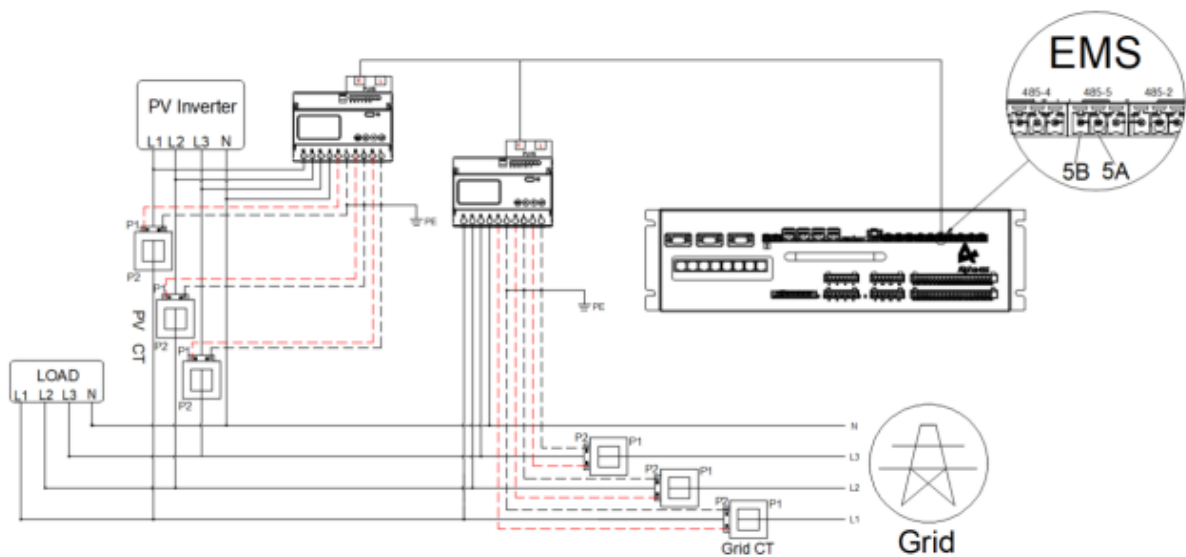
The earth resistance should be less than 4Ω.

### 4.2.5 Meter

#### 4.2.5.1 Meter Installation Wiring

Meter connection in different modes

Grid Meter	PV Meter	Mode
√ √ √	× ×	DC
√ √ √	√ √ √	AC/Hybrid



PIC\_7 (Acrel ADL3000)

PIC\_7 (Acrel ADL3000) wiring diagram

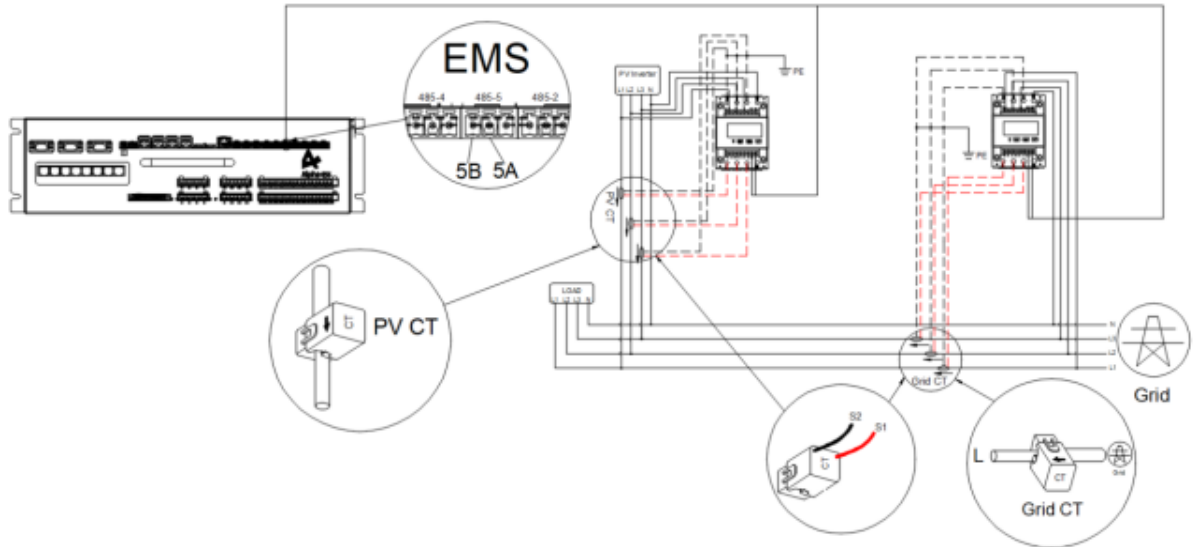
For H30 installation, please wire as shown in the diagram(three phase four wire). Pay attention to the positive direction of the transformer and the position of the two lines of the transformer into the meter (e.g. Ia\* to S1, Ia to S2).

Wiring location description of Acrel three phase meter (with CT)

Grid CT	PV CT	GRID
Ia*-----S1	Ia*-----S1	Ua-----L1
Ia-----S2	Ia-----S2	Ub-----L2
Ib*-----S1	Ib*-----S1	Uc-----L3
Ib-----S2	Ib-----S2	N-----N
Ic*-----S1	Ic*-----S1	
Ic-----S2	Ic-----S2	

Wiring of communication connected Meter (Acrel) and EMS

Grid Meter	PV Meter	EMS	Signal
21(Meter) - 5A(EMS)	21(Meter) - 5A(EMS)	5A (EMS)	RS485_A
22(Meter) - 5B(EMS)	22(Meter) - 5B(EMS)	5B (EMS)	RS485_B
Internet cable_3 (GreenWhite)----- 5A(EMS)	Internet cable_3 (GreenWhite)-- 5A(EMS)	5A (EMS)	RS485_A
Internet cable_6(Green)--5B(EMS)	Internet cable_6(Green)--5B(EMS)	5B (EMS)	RS485_B



**PIC\_8 (Chint Meter)**

PIC\_8 (Chint) wiring schematic diagram

For H30 installation, please wire as shown in the diagram (three phase four wire). Pay attention to the direction of the transformer and the position of the two wires of the transformer into the meter (e.g. 1 to S1, 3 to S2).

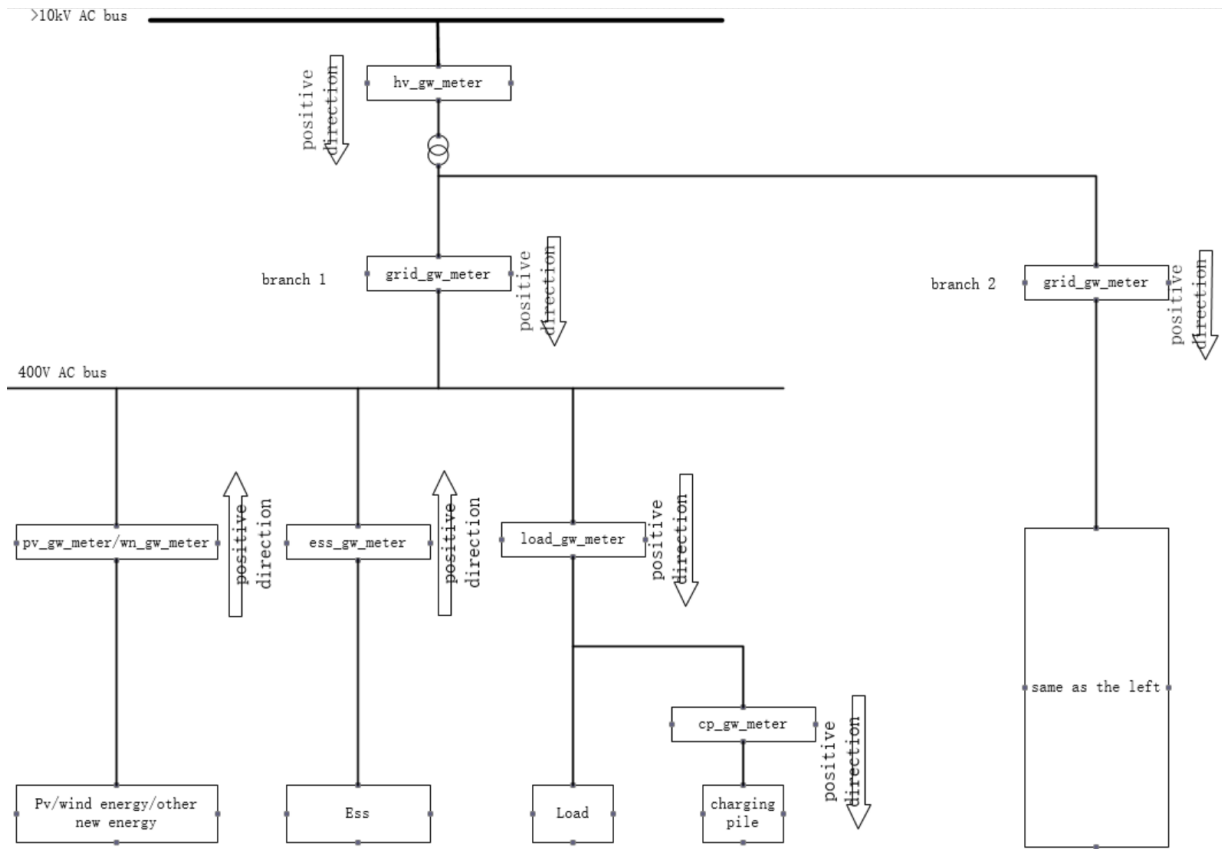
Wiring location description of Chint three phase meter (with CT)

Grid CT	PV CT	GRID
1-----S1 (Red)	1-----S1 (Red)	2-----L1
3-----S2 (Black)	3-----S2 (Black)	5-----L2
4-----S1 (Red)	4-----S1 (Red)	8-----L3
6-----S2 (Black)	6-----S2 (Black)	10-----N
7-----S1 (Red)	7-----S1 (Red)	
9-----S2 (Black)	9-----S2 (Black)	

Wiring of communication connected Meter (Chint) and EMS

Grid Meter	PV Meter	EMS	Signal
24(Meter) - 5A(EMS)	24(Meter) - 5A(EMS)	5A (EMS)	RS485_A
25(Meter) - 5B(EMS)	25(Meter) - 5B(EMS)	5B (EMS)	RS485_B

### 4.2.5.2 Diagram of the Positive Direction of the Meter Wiring



The positive direction corresponding to the positive value of the energy storage meter is defaulted as shown above. H30 is installed with a grid shut-off meter and a PV grid-connected meter;

### 4.2.5.3 Division of Communication Addresses for Meter Devices

Type of Meter	Lower limit of equipment communication address	Upper limit of equipment communication address	Description	
<b>Grid gateway meter</b>	101	109	grid_gw_meter	The communication address of the metered device is set from the lower address limit

<b>Energy storage and grid-connected meter</b>	111	119	ess_gw_meter	lbid
<b>Photovoltaic grid-connected meter</b>	121	129	pv_gw_meter	lbid
<b>Charging station gateway meter</b>	131	139	cp_gw_meter	lbid
<b>Wind energy grid connection point gateway meter</b>	141	149	wn_gw_meter	lbid
<b>Load shut-off meter</b>	151	159	load_gw_meter	lbid
<b>Energy storage internal self-consumption meter</b>	161	169	ess_in_gw_meter	lbid
<b>High voltage side shut-off meter</b>	171	179	hv_gw_meter	lbid

H30 has grid gate meters and PV grid-connected meters, please set the address as shown above; the device communication address is set from the low address; for example: 101 for grid gate meters and 121 for PV grid-connected meters.

**4.2.5.4 Example of Setting the Communication Address of the Astronergy Meter DTSU666**

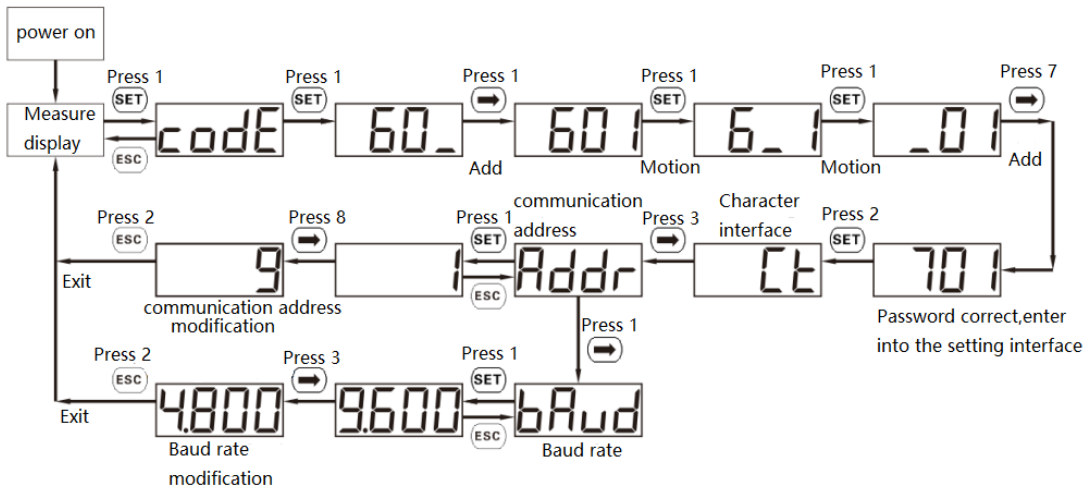


Diagram 5 Setting examples for communication address and baud rate

**4.2.5.5 Example of Setting the Communication Address of an Ankersy Meter ADL3000**

Under any display item in the display menu, press **SET** to enter the "PASS" interface, then press **←** to display "0000", press **←** after prompting to enter the password, if the password is incorrect, then return to "0000". "If the password is correct, then set the parameters, select BUS, find ADDR and press **SET** to enter the "SAVE" interface after setting according to the "meter address division rules". Press **←** under "YES" to save and exit, or press **←** under "NO" to exit directly without saving.

Table 7 Description of the setup menu

No.	First-level Menu		Second-level Menu		
	Symbols	Meaning	Symbols	Meaning	Scope
1	BUS	Communi- cation settings	ADDR	Correspond- ence ad- dress setting	1-247
			Baud	Baud rate selection	19200, 9600, 4800, 2400, 1200
			Parity	Validation Selection	None, Even
			HI	645 high 6- digit table number	000000-999999
			LO	645 lower 6- digit table number	000000-999999
2	Sys	System settings	PL	Network se- lection	3P4L: three phase, four-wire 3P3L: three-phase, three-wire
			EF.E	Compound rate options	EF: compound rate E: Non-repetitive rates
			CoDE	Password setting	1-9999
			LED	Backlight time setting	1-9999
3	In.	Variable ratio set- ting	Pt	Voltage ratio	1-9999
			Ct	Current ratio	1-9999



## 4.3 Electrical Connections

### 4.3.1 Safety Precautions

The following safety precautions should be observed throughout the electrical connection process and all other operations on equipment such as energy storage systems.

- Disconnect all external connections of the energy storage integrated system and the connection with the internal power supply of the device.
- Ensure that the disconnections are not accidentally re-energised.
- Use a multimeter to ensure that the inside of the appliance is completely uncharged.
- Apply the necessary earthing.
- Insulate and cover the adjacent energized parts of the operating election, insulated fabric made of insulting material is used.

### 4.3.2 Open the Cabinet Door

Open the door before the cable is connected

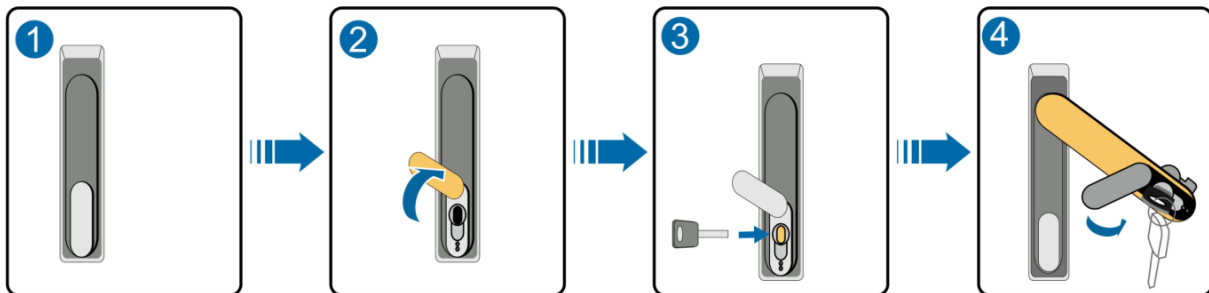


Figure 4-12 Schematic diagram of the door opening procedure

Table 4-13 Illustration table of door opening steps

Steps	Description
1	Locked status
2	Move the cover upwards over the locking hole
3	Insert the door key and turn clockwise
4	Turn the handle clockwise to the position shown in the diagram to open the front door.

### 4.3.3 Communication Cable Connection

#### 4.3.3.1 Battery Side Connection

Depending on the configuration differences between items, configure the communication wires among batteries (see Table 4-1 Parts List for specific part numbers) and the sequence of connection and the location of the termination resistors are shown in Table 4-14: Schematic diagram of connection sequence of communication cable and the location of the termination resistors. Please use the communication wires from the battery parts list to connect the batteries with each other.

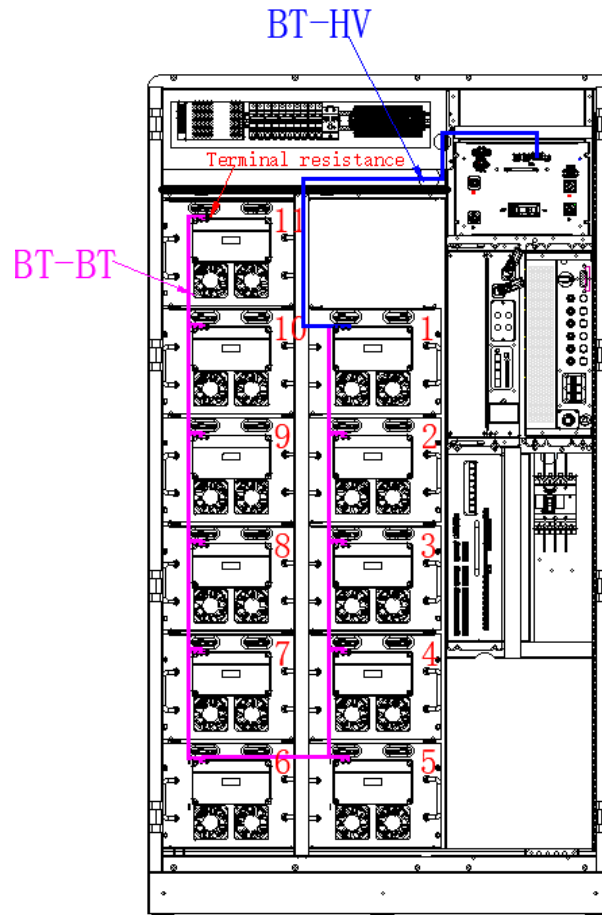


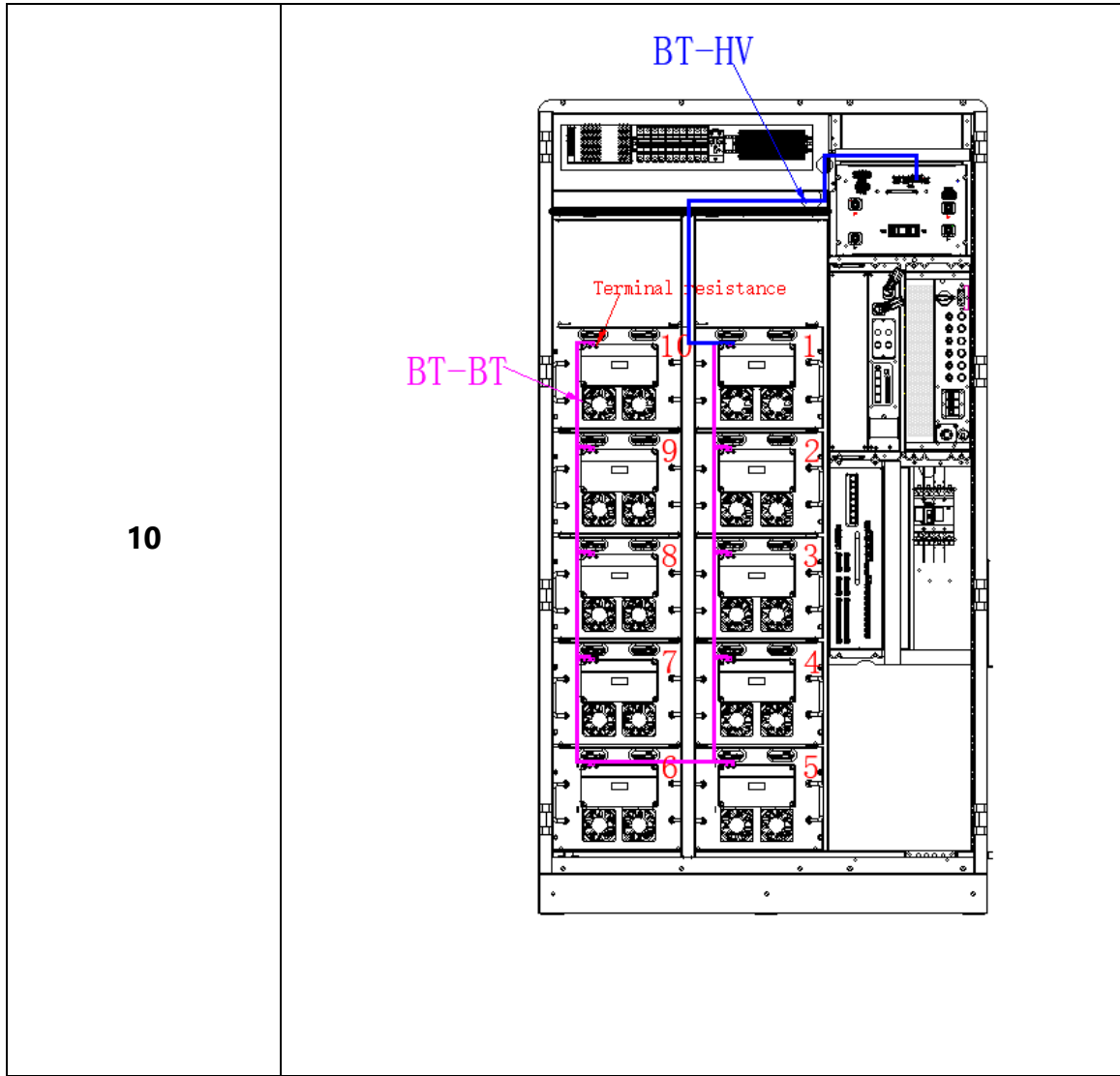
**Communication lines among batteries as well as terminal resistor material numbers.**

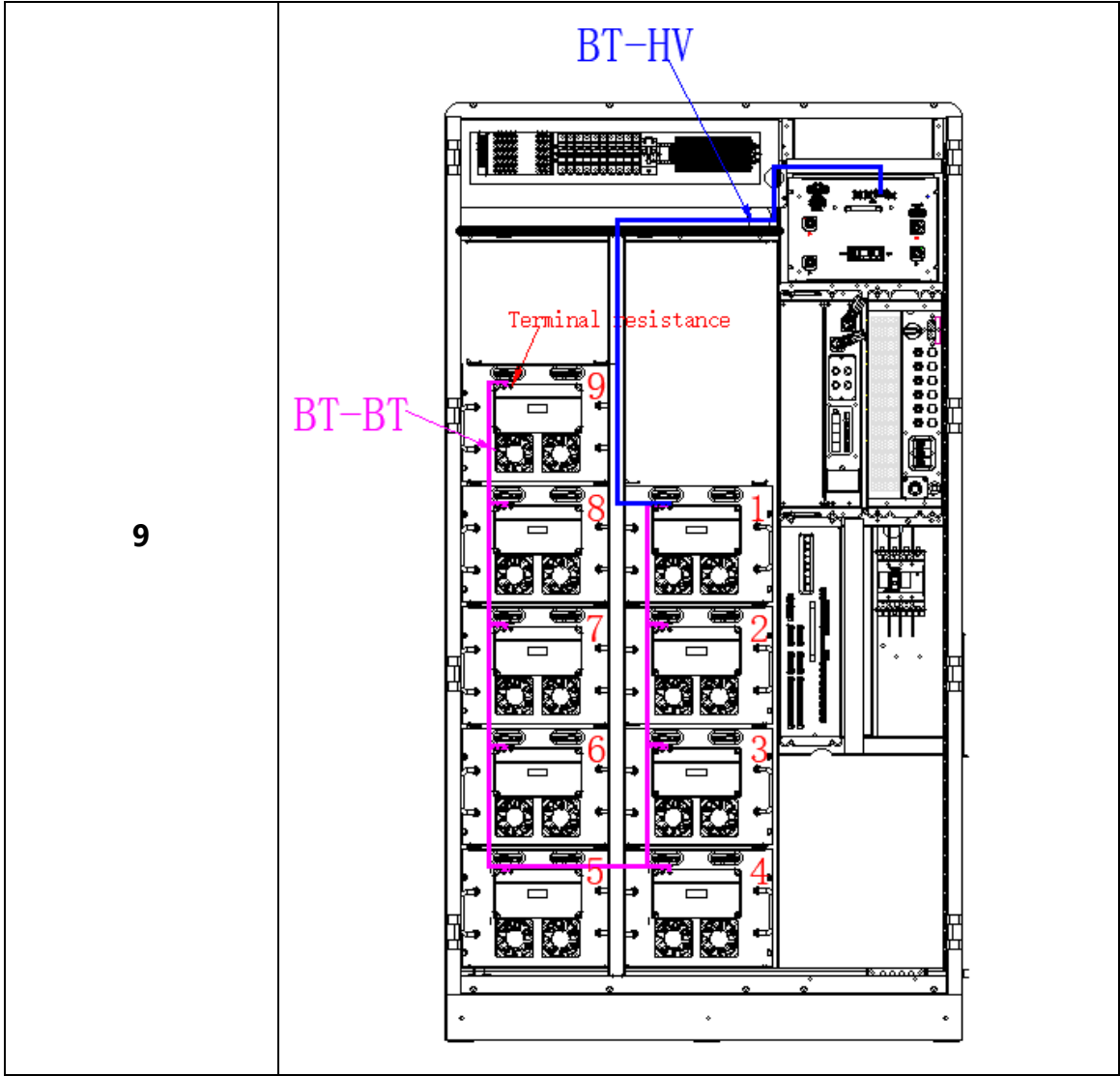
**Table 4-14 Schematic diagram of connection sequence of communication cable and the location of the termination resistors**

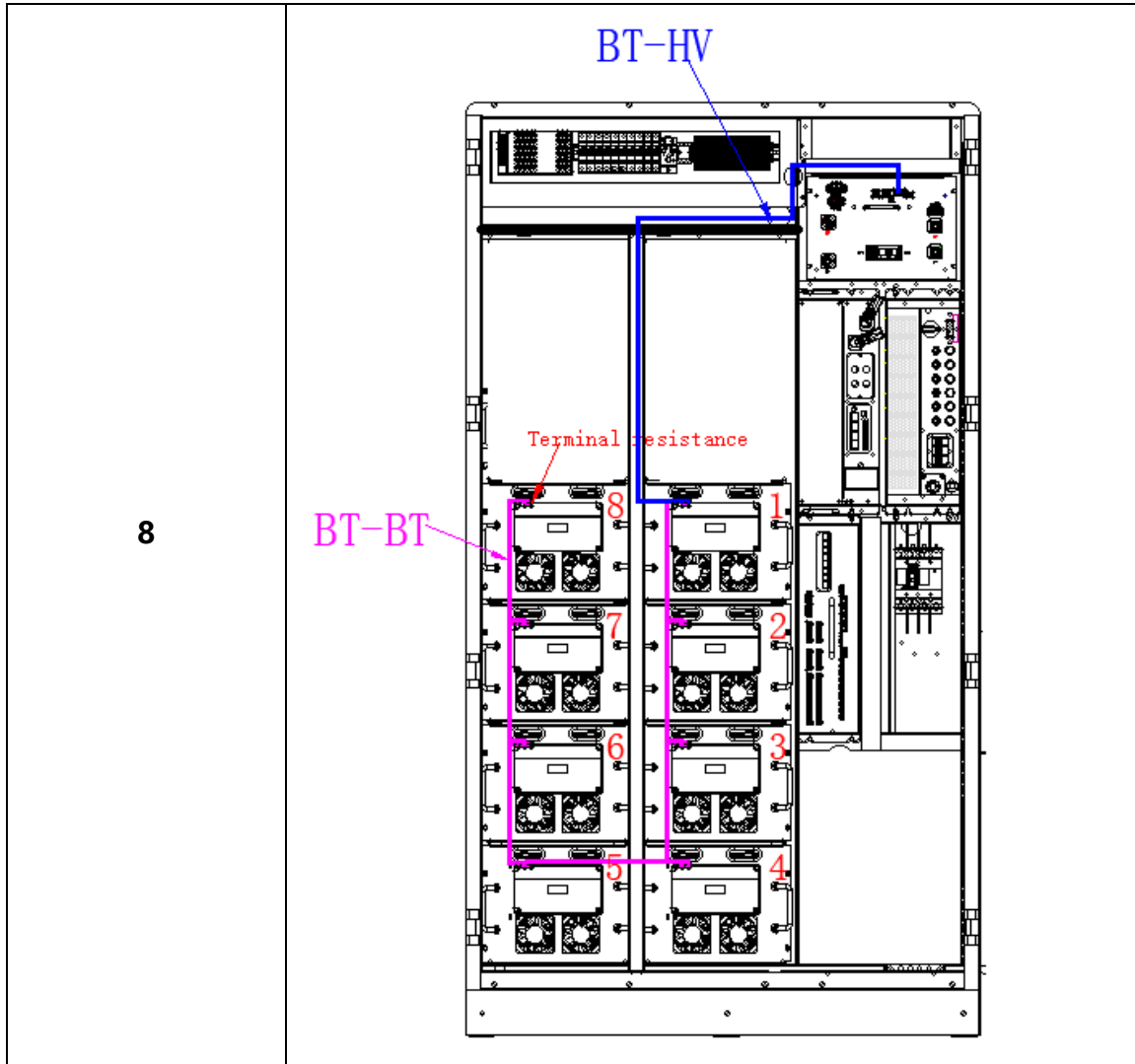
<p><b>Number of batteries</b></p>	<p><b>Diagram showing the sequence of communication cable connections and the location of the termination resistors</b></p>
<p>12</p>	

11









8

BT-BT

BT-HV

Terminal resistance

8

7

6

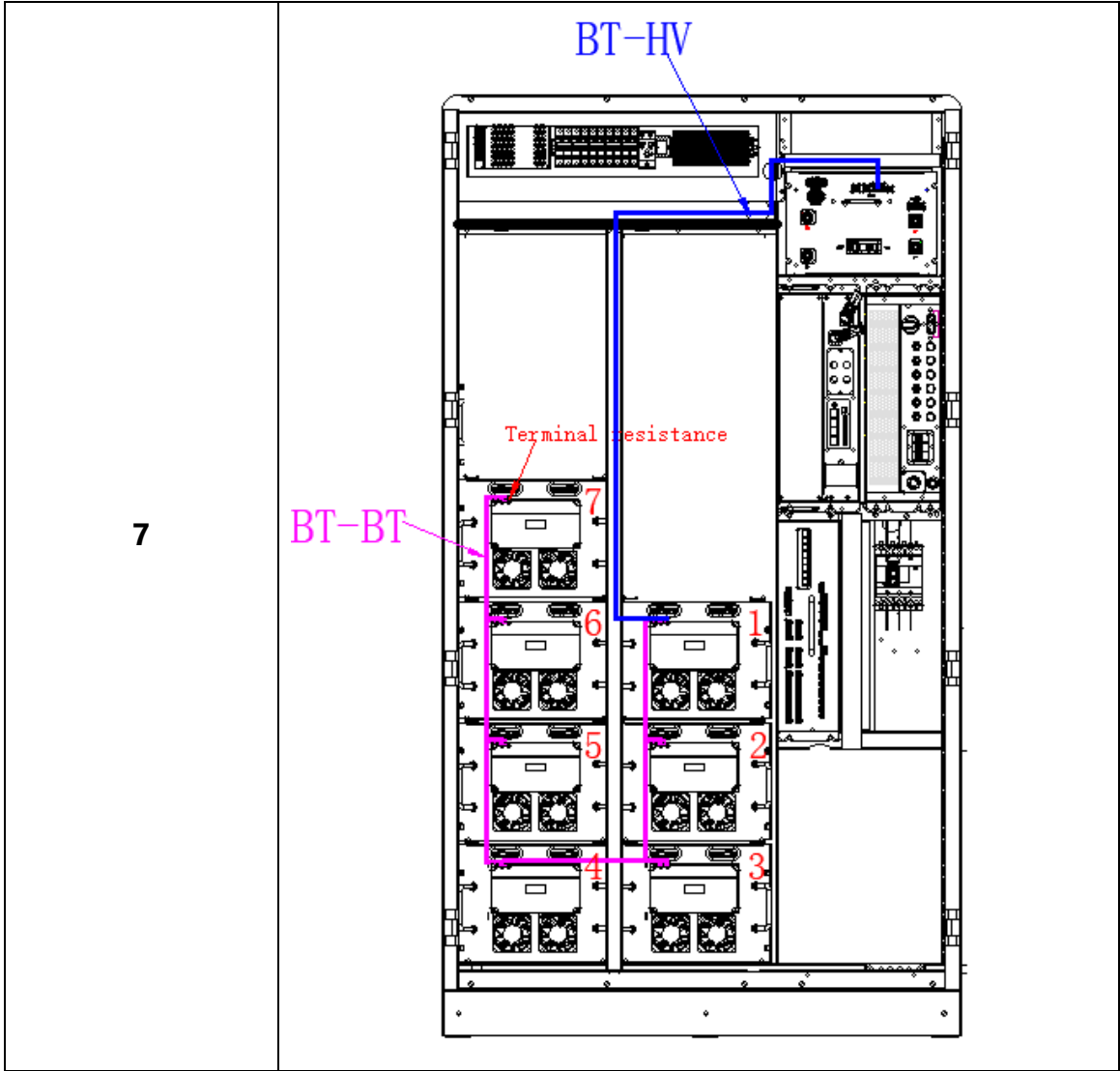
5

1

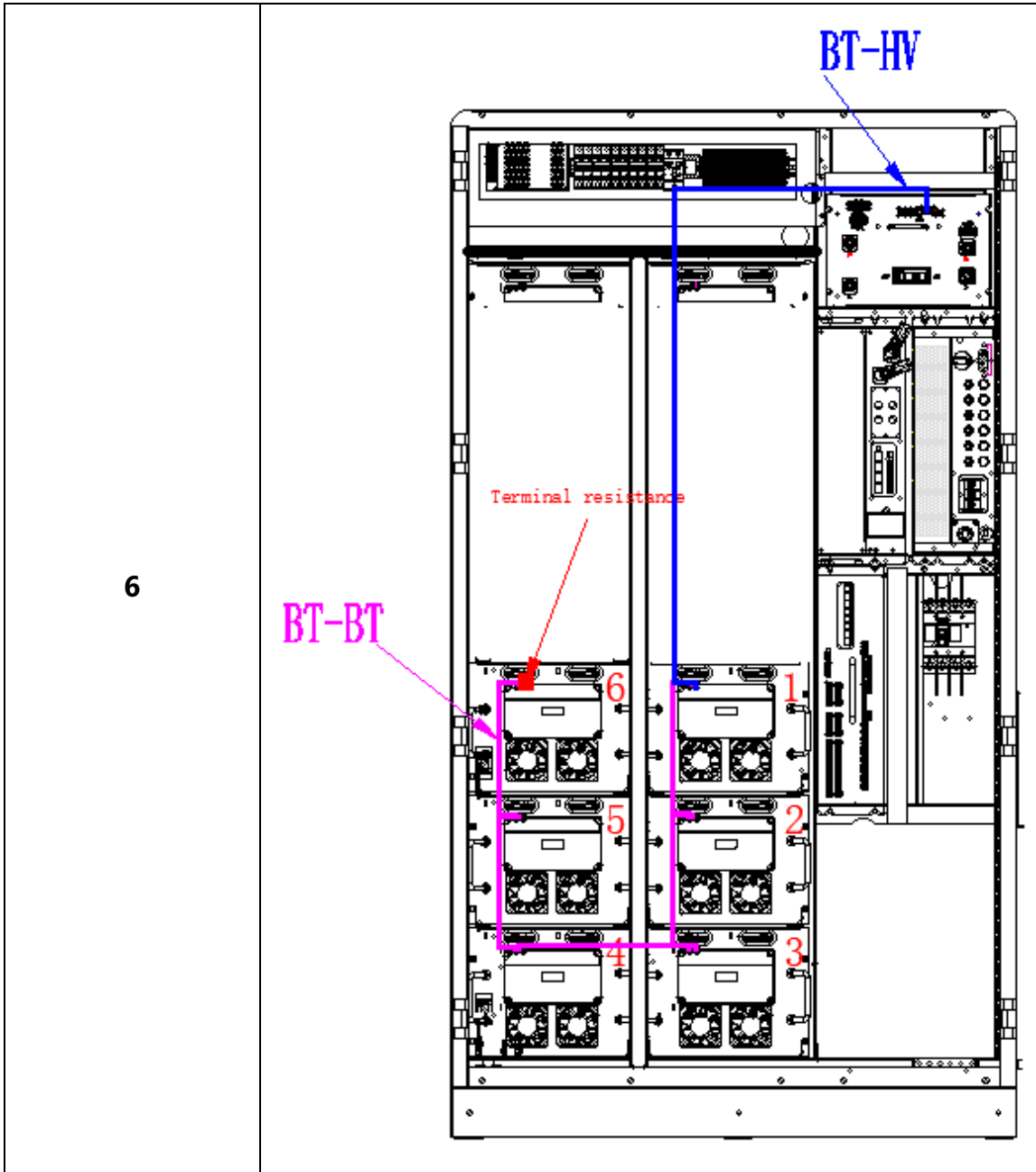
2

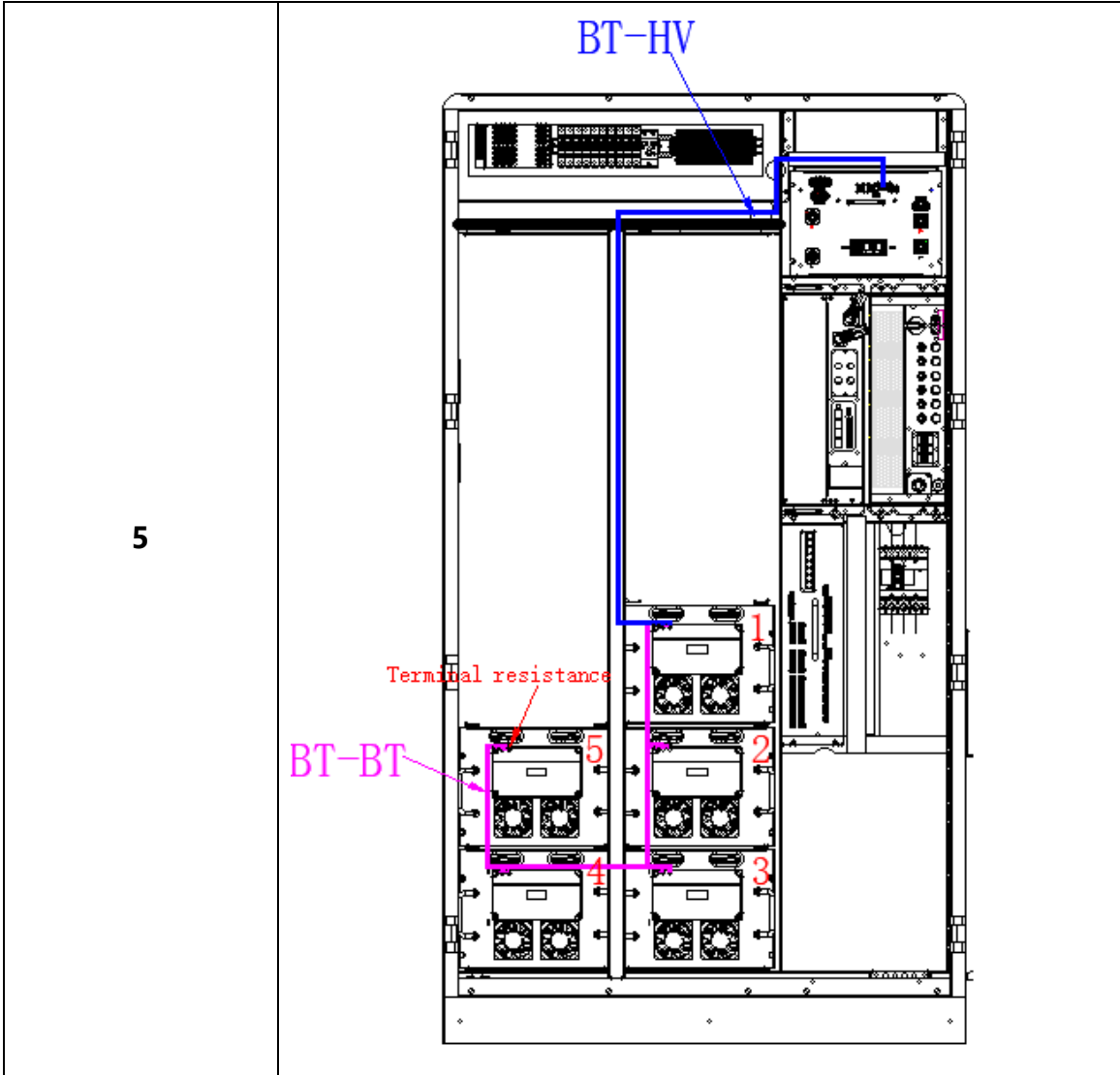
3

4









- Please use the terminal resistance from the System Accessories parts list and plug it into the CAN port of last battery of each battery cluster.
- Connect the (CAN port) on top of the high voltage box with the (LMU port) high voltage box by using the communication cable from the system accessories parts list.
- Connect the (DC port) above the high voltage box with the battery (LMU supply port) by using the fan power supply harness from the system accessories parts list.

### 4.3.3.2 Communication Connection between ATS and PCS

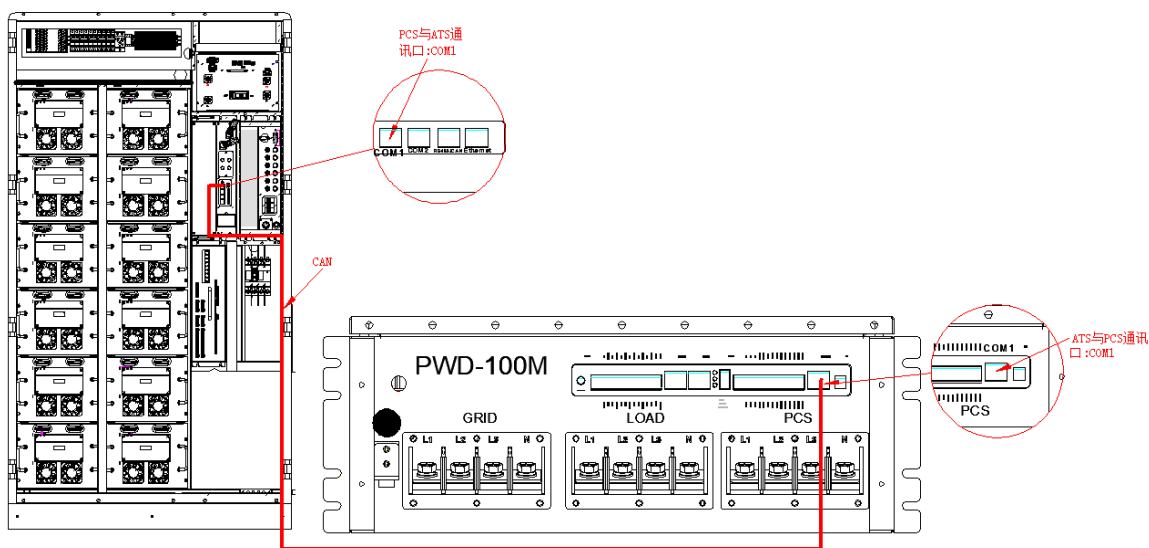


Figure 4-14 Communication connection between ATS and a single PCS

The communication between the ATS and the PCS uses CAN, which uses super category 6 network cable, and the interface at both ends is RJ45 network port. When there is only one ATS and one PCS in the system for networking, the dip switches 1 and 2 of the ATS should be dialed down and 3 and 4 dialed up, while the dip switch 4 of the PCS should be dialed up and all other dip switches of the PCS should be dialed down.

### 4.3.3.3 RRCR Connection

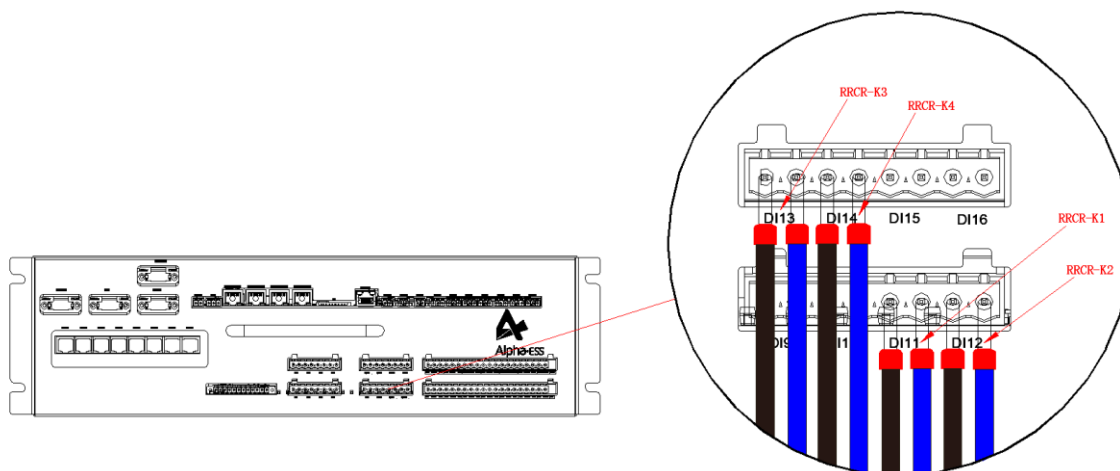


Figure 4-15 Communication connection between EMS and RRCR

The EMS is adapted to the German external device RRCR, which performs the action of adjusting the maximum feed-in power with an external normally open signal, where DI11 is connected to RRCR\_K1, DI12 to RRCR\_K2, DI13 to RRCR\_K3 and DI14 to RRCR\_K4.

### 4.3.4 Fan Power Supply Harness Connection

1. Please use the fan power supply harness in the system parts list, and connect them to the designated locations in the diagram following the numbering on the harness. BL power supply ports J1-J12, fan power supply ports J101-J1201 & J102-J1202 should be connected to the corresponding positions shown in the diagram. If the battery cabinet is not fully installed, please still connect the wires as illustrated in the diagram.

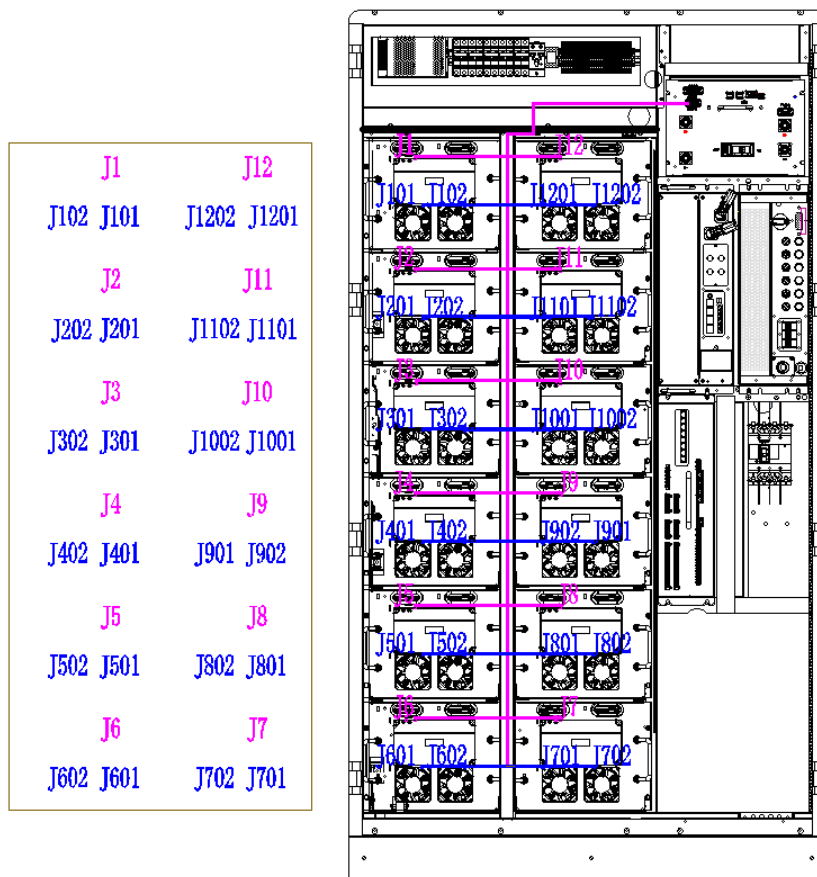


Figure 4-16 Fan power supply harness

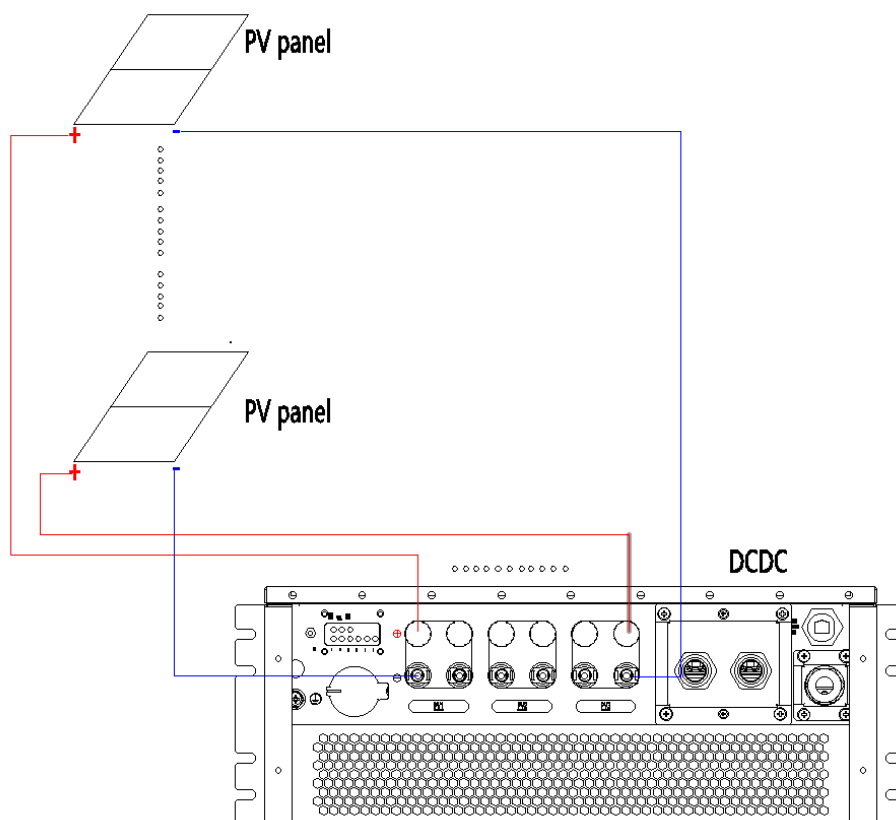
### 4.3.5 PV Side Connection

- Measure the PV voltage with a multimeter to ensure that the PV voltage is within the PV input voltage range of the DCDC module, which is 200-830V.
- Disconnect the PV circuit breaker from the DCDC module and make sure that there is no voltage between the positive and negative PV inputs before wiring.
- Connect the positive PV terminal with the "PV+" of the PV side DC switch on the DCDC module.
- Connect the negative PV terminal with the "PV-" of the PV-side DC switch on the DCDC module.
- Make sure the wiring is secure.

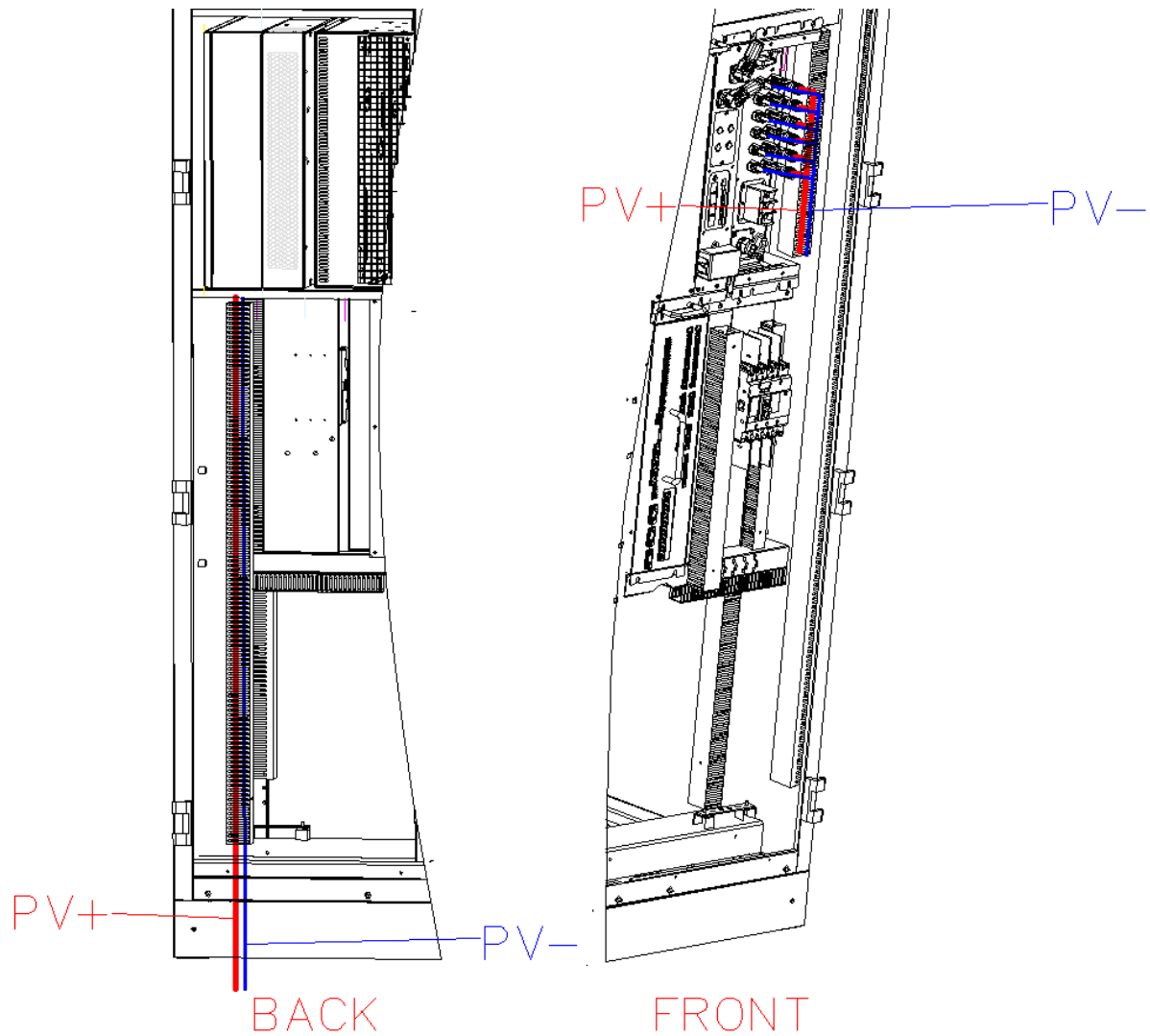
**Table 4-15 Description of photovoltaic cables**

Rated Power	Recommended Size for Copper-core DC Cables
45 kW	10 mm <sup>2</sup>

The PV connections are shown in the following Figures 4-17 and 4-18.



**Figure 4-17 PV side wiring**



**Figure 4-18 PV inlet and routing path**

- Connect the positive PV string harness through the bottom of the cabinet, through the wiring path shown in Figure 4-24, with the positive terminal of the DCDC module, see Figure 4-24 for wiring diagram.
- Connect the negative PV string harness through the bottom of the cabinet, through the wiring path shown in Figure 4-24, with the negative terminal of the DCDC module, see Figure 4-24 for wiring diagram.
- If there are 2 or more PV strings then repeat steps 1, 2 and 3 and connect with the DCDC module.



**The DC/DC connections are labeled and should be connected in groups.**

**For instance, PV1+ and PV1- should be grouped together, as PV2+ and PV2-, and PV3+ and PV3-.**

### 4.3.6 AC Side Connection

#### 4.3.6.1 AC Side with ATS Wiring

- Ensure that the AC side is wired in the correct phase sequence.
- Disconnect the AC circuit breaker in the H30 indoor unit.
- Use a multimeter to measure and ensure that there is no voltage on the cable connected to the copper strip.
- Phases L1 / L2 / L3 and N of the AC circuit breaker on the PCS side of the H30 indoor unit, is connected to the PCS side of the ATS, phases L1 / L2 / L3 and N respectively.
- Make sure the wiring is secure.

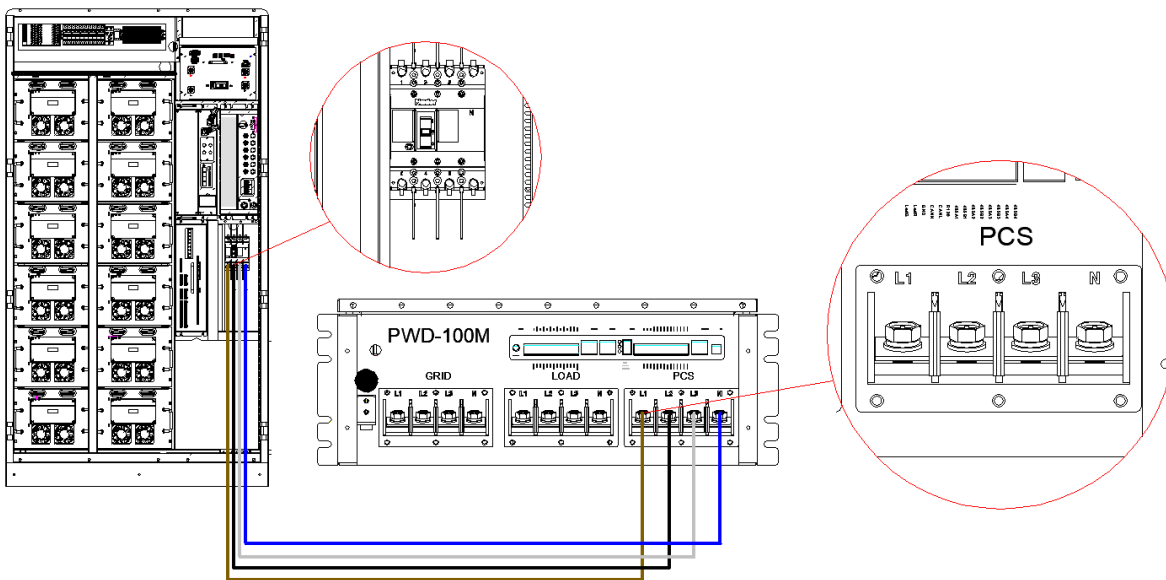



Figure 4-25 Three-phase, four-wire AC wiring diagram

Table 4-16 AC Cable Description

Rated Power	Recommended Size of Copper-core Cable
30 kW	≥16 mm <sup>2</sup>
 <p><b>Before wiring, use a multimeter to measure the AC voltage side and ensure that there is no voltage at the connection point!</b></p>	

### 4.3.7 Sealed Inlet and Outlet Holes

Once the wiring is complete, the inlet and outlet holes of the system should be sealed with fireproof mortar.

### 4.3.8 Description of the External Wiring of the ATS

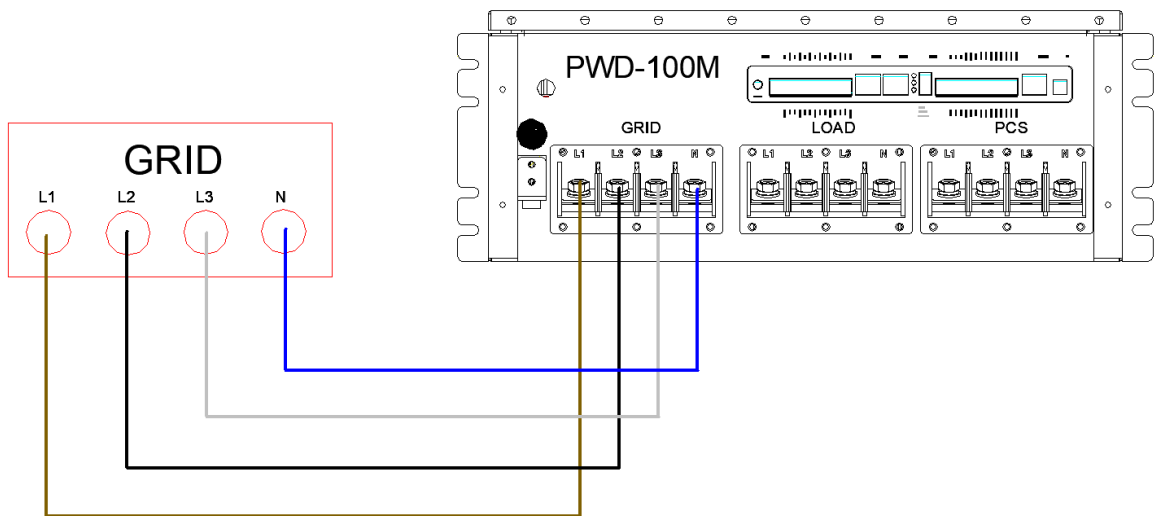
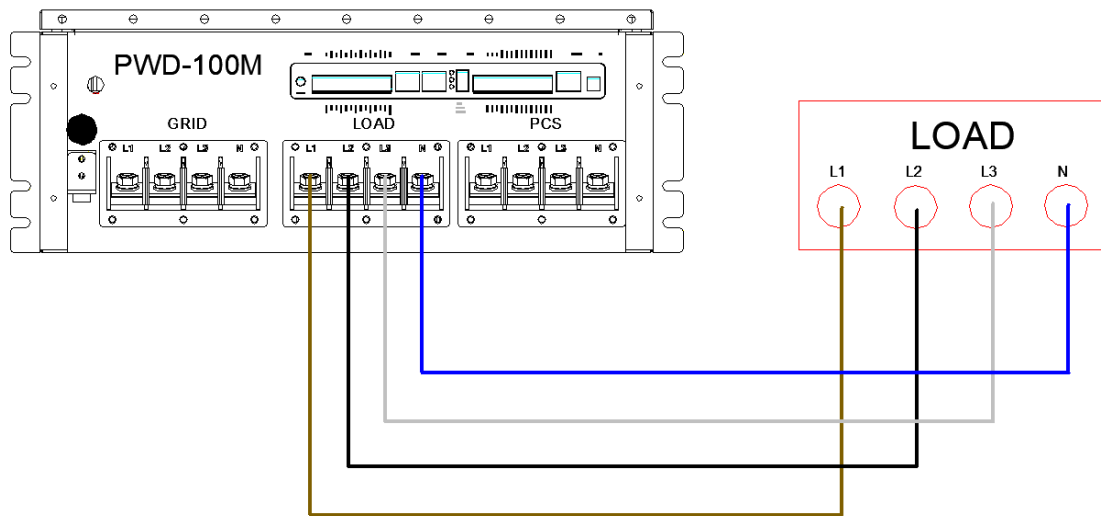


Figure 4-26 Illustration of ATS and GRID wiring





**Figure 4-27 Illustration of ATS and LOAD wiring**

1. Measure the wiring positions of GRID and LOAD of ATS with a multimeter;
2. Ensure that there is no voltage at the GRID and LOAD wiring positions of the ATS;
3. Connect phases L1 / L2 / L3 / N of the GRID side of the ATS with phases L1 / L2 / L3 / N of the GRID respectively (see Figure 26), ensuring that correct wiring sequence and tightened wiring;
4. Connect phases L1 / L2 / L3 / N of the LOAD side of the ATS with phases L1 / L2 / L3 / N of the LOAD respectively (see Figure 27), ensuring that correct wiring sequence and tightened wiring;
5. The external wiring of the ATS (ATS to GRID and LOAD) cable must not be less than  $70\text{mm}^2$ .



**Once the wiring is complete, plug the inlet holes with fireproof mortar or other fire-retardant, well-sealed material.**

## 5. Checks before System Start-up

The following steps are required after the system has been wired and before starting up:

1. Measure the input voltage of the high voltage box with a multimeter. The normal voltage range should be 700~830V;
2. Measure the input insulation resistance (B+ to ground / B- to ground) of the high-voltage box, insulation resistance value  $\geq 1\text{M}\Omega$ ;
3. For further details, please refer to the operation instructions manual.

## 6. Technical Service Contact

If you have any technical questions about our products, please contact our service hotline. The contact information is provided at the end of this manual. Please provide the following information to help you with the necessary assistance:

- A. System configuration
- B. Product serial number (SN)
- C. Software version number
- D. Fault information
- E. PV module information




## 7. System Installation Torque Force Table

No.	Location	Specifications and Materials	Quantity	Torque (Nm)
1	Single battery fixed	Screw, triple hexagon cross, M6*14, stainless steel	4pcs	5±10%
2	AC Plastic Case	Stainless steel screw M8, grade 4.8 bolt, white zinc plated	4pcs	10±10%
3	ATS wall panels	Stainless steel screw M8	4pcs	10±10%
4	Back plug copper row DC positive and negative	Stainless steel screw M8 Nut, flange, M8.	2pcs	10±10%
5	External earth fixed	M10*35 Stainless steel screws	1pcs	15±10%



**Please follow the recommended torque force value in the table and provide feedback to the AlphaESS engineers if there are any special or unusual circumstances.**

### Alpha ESS Co., Ltd.

 +86 513 8060 6891  
 info@alpha-ess.com  
 www.alphaess.com  
 No. 1086 Bihua Road, Tongzhou District, Nantong City, Jiangsu Province, China

### Alpha ESS Suzhou Co., Ltd.

 +86 512 6828 7609  
 info@alpha-ess.com  
 www.alphaess.com  
 Building 10-A, Canal Town Industrial Park, 99 Taihu E Rd, Wuzhong District, Suzhou, Jiangsu Province, China

### Alpha ESS Shenzhen Co., Ltd.

 +86 0755 2850 3653  
 service.pps@alpha-ess.com  
 www.alphaess.com  
 Bantian Xinghe WORLD B 1302, No. 1 Yabao Rd, Bantian Street, Longgang District, Shenzhen, Guangdong Province, China





### Alpha ESS Australia Pty. Ltd.

 +61 02 9000 7676  
 techsupport@alphaess.au  
 www.alphaess.com  
 8/15-21 Gibbes Street, Chatswood, NSW 2067 Australia

### Alpha ESS Europe GmbH

 +49 610 3459 1601  
 europe@alpha-ess.de  
 www.alphaess.de  
 Paul-Ehrlich-Straße 1a, Langen, Hessen D-63225 Germany




### Alpha ESS Italy S.r.l.

 +39 339 462 4288  
 info@alpha-ess.it  
 www.alphaess.com  
 Via Don Minzoni, 17, Calenzano Firenze 50041 Italy



### Alpha ESS International Pte. Ltd.

 +65 6513 1125 / +65 6513 1126  
 Singapore@alpha-ess.com  
 2 Corporation Road #01-06A Corporation Place 618494 Singapore

### Alpha ESS UK Co., Ltd

 +44 145 354 5222  
 info@alpha-ess.com  
 Drake house, Long street, Dursley, gl11 4hh UK



### Alpha ESS Korea Co., Ltd

 info@alpha-ess.com  
 2F, 19-4, Nohyeong 11-gil, Jeju-si, Jeju-do, Republic of Korea

### Alpha ESS USA, Inc.

 +1 408 368 7828  
 usa@alpha-ess.com  
 Unit 5 2180 S Ivanhoe St, Denver, CO 80222 USA

### Alpha ESS South Africa (Pty.) Ltd.

 measervice@alpha-ess.com  
 Johannesburg, South Africa