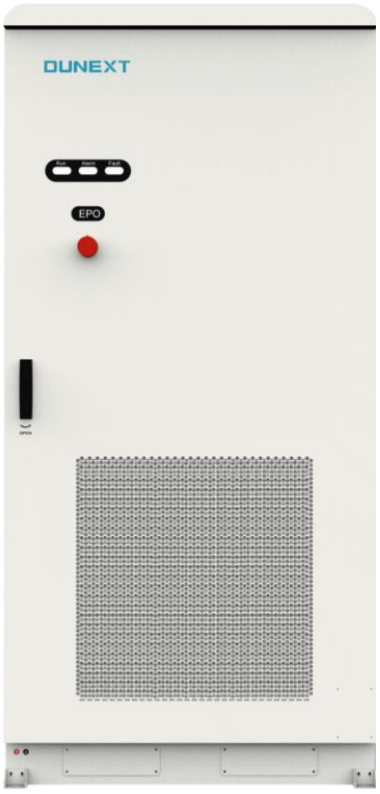


PCC Series

User Manual

V_1.0 Date 2025/09/24

Notice

This manual contains important safety instructions, installation, electrical connections, commissioning, maintenance, and troubleshooting of the equipment.

Save the manual!

This manual must be stored carefully and be available at all times.

Copyright Declaration

Dunext reserves the right of final interpretation. This manual may be updated according to user' s or customer' s feedback. The information in this manual is subject to change without notice. Every effort has been made to ensure the accuracy of the contents of this manual, but nothing mentioned herein expresses or implies any other information.

Please check our website at http: // www.dunext.com for latest version.

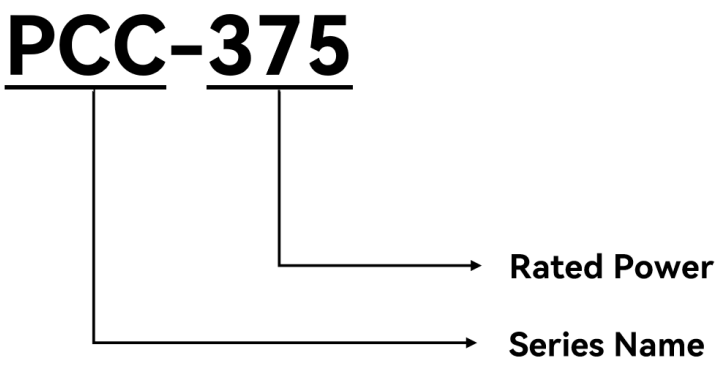
Contents

About This Manual

Overview

Please read the product manual carefully before installation, operation, or maintenance of the PCC. This manual contains important safety instructions and installation instructions that must be followed during installation and maintenance of the equipment.

Designation explanation of the PCC:



No.	Meaning	Description
1	Series Name	PCC: On/off-grid switching cabinet
2	Rated Power	75: Rated power is 75kVA 125: Rated power is 125kVA 250: Rated power is 250kVA 375: Rated power is 375kVA

Intended Audience

This manual is intended for technical professionals for installation, commissioning and maintenance of the product. The technical personnel have to be familiar with the product, local standards, and electric systems.

Symbol Conventions

The following types of safety instructions and general information appear in this document as described below:

Symbol	Description
 DANGER!	'Danger' indicates a hazard with a high level of risk that, if not avoided, will result in death or serious injury.
 WARNING!	'Warning' indicates a hazard with a medium level of risk that, if not avoided, will result in death or serious injury.
 CAUTION!	'Caution' indicates a hazard with a low level of risk that, if not avoided, could result in minor or moderate injury.
NOTICE NOTICE!	'Notice' indicates a situation that, if not avoided, could result in equipment or property damage.
 NOTE!	'Note' provides tips that are valuable for the optimal operation of the product.

Change History

Changes between document issues are cumulative. The latest document issue contains all the changes made in earlier issues.

Issue 01 (2025-09-24)

This issue is used for first application

1 Safety Precautions

1.1 Operator Requirements

A qualified operator is a person who has the necessary knowledge, professional training and experience to:

- Operators are required to obtain certificates that comply with local regulatory requirements.
- Protect and maintain the equipment in accordance with relevant safety standards.
- The operators have the ability to provide safe first aid.
- Comply with local regulations, standards and regulations.

Operators must ensure that:

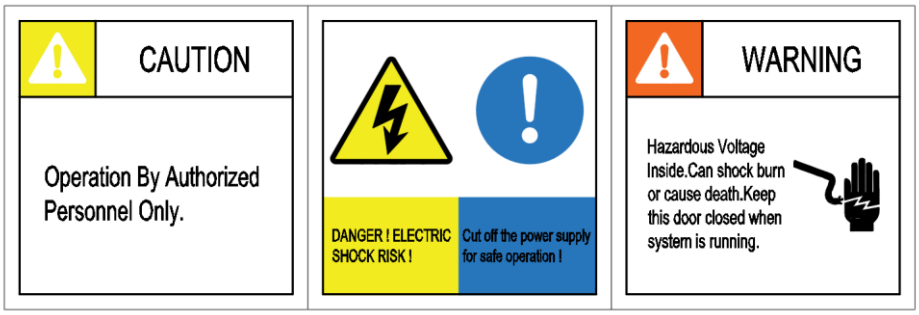
- Before commissioning and shutting down the disconnecting circuit breaker, all basic information and step-by-step instructions must be understood, especially the safety instructions for assembly and installation, which must be strictly followed.
- Do not change the size or rating of fuses.
- Appropriate measuring devices must be used and appropriate standards and instructions must be followed. The operating manual of the measuring device must be understood before any measurement is made.
- Do not open the device during operation.
- If required on site, construction machinery such as forklifts and cranes must be operated by qualified operators.
- When the equipment is connected to a power source, a safety officer must be appointed to ensure that switches are not turned on during maintenance.

- Operators should wear work clothes and protective equipment and be equipped with special tools in accordance with local laws and regulations.
- The installation work must be performed by professional operators.
- During the wiring process, two or more operators are not allowed to connect a wire at the same time.
- During the installation process, each completed project must be checked once and cross-checked is required.
- The equipment must be installed in order and no steps can be skipped.
- An isolation zone must be set up during installation to prevent unauthorized personnel from entering the site.
- Do not remove or alter the nameplate.
- The cabinet door must not be opened on rainy days.
- The software, enclosure and components of the device may not be changed without the manufacturer's authorization. If the software, enclosure and components of the device are changed, the corresponding liability and warranty will be invalidated.
- When the PCC is installed independently or used in combination with other energy storage systems, a surge protection device must be installed on the energy storage system.
- All operations of the system should comply with the instructions in the User Manual. If the equipment is damaged due to violation of the instructions, the relevant liability and warranty will be invalidated.

1.2 Label Description

Before performing any operation, the operator must read and understand the product and the labels attached.

Figure 1-1 Safety labels



2 Product Introduction

2.1 Product Overview

Energy storage technology has been recognized as an important part of the six links of power generation, transformation, transmission and distribution, application and energy storage in the operation of the power system. The PCC is used to switch between the on-grid and off-grid mode of PowerHill.

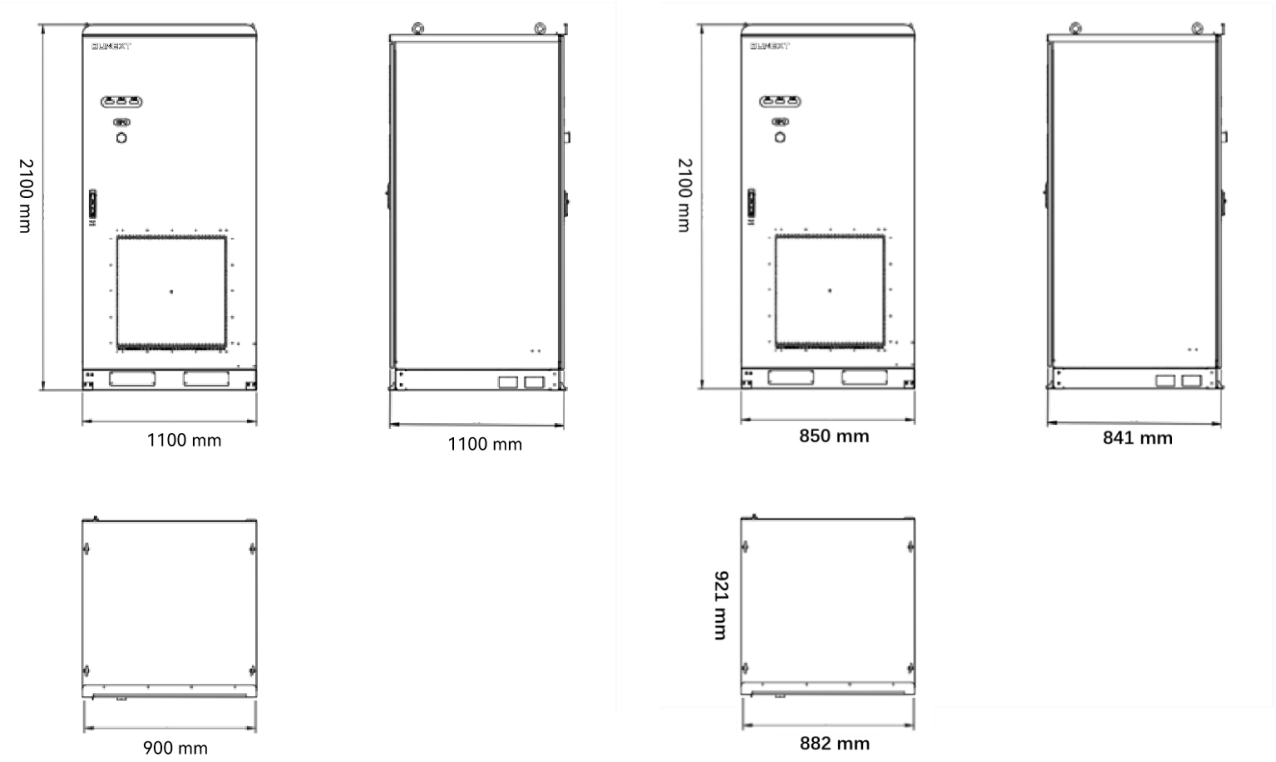
The PCC includes an isolation transformer, PCC controller, switching contactor, grid circuit breaker, bypass circuit breaker, load circuit breaker, etc.

- The isolation transformer plays the role of isolation and increasing short-circuit impedance, and is used to isolate the PCS from the power grid.
- PCC controller is the core of the PCC, which mainly controls the on-grid and off-grid operation of the PCS.
- The switching contactor connects or disconnects the power grid.
- The grid circuit breaker is connected to the grid and is used to protect and disconnect loads and PowerHill.
- The bypass circuit breaker connects the grid to the load and is used when the energy storage system or PCC control system fails to ensure that the load is powered directly from the grid.
- The load circuit breaker is connected to the load side to protect and disconnect the load.

 **NOTE!**	This product only contains PCC.

2.2 Appearance Introduction

Figure 2-1 PCC dimensions (Left: PCC-375, Right: other PCC models)



The specific length and width shall be subject to the parameter table.

Figure 2-2 Front view of PCC

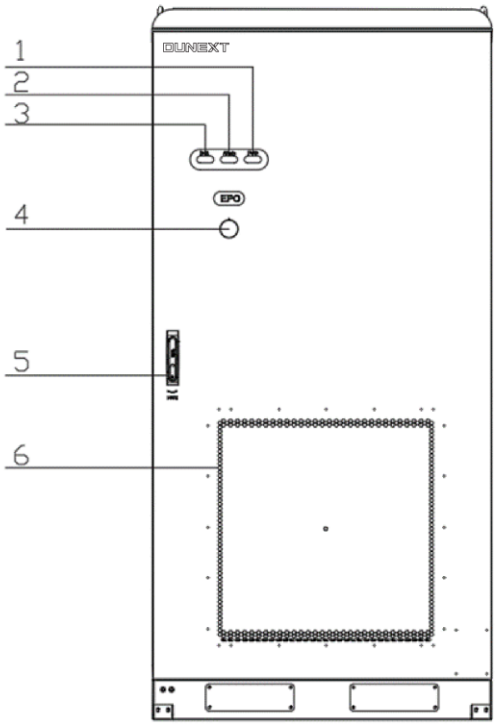


Table 2-1 Front view of PCC

No.	Name	Function
1	Fault indicator	Solid red indicates a system failure and the system stops running.
2	Alert indicator	Solid yellow indicates that a system alarm has occurred, but it does not affect system operation.
3	Operation indicator	Solid green indicates operation, flashing indicates standby
4	Emergency stop	The system stops when the button is pressed
5	Door lock	Locking the cabinet door requires a specific key to open it
6	Air Inlet	Cabinet cooling air inlet

NOTE!	Do not operate the emergency stop button unless it is an emergency.

2.3 Components Introduction

Figure 2-3 Structure design of PCC front view (door opened)

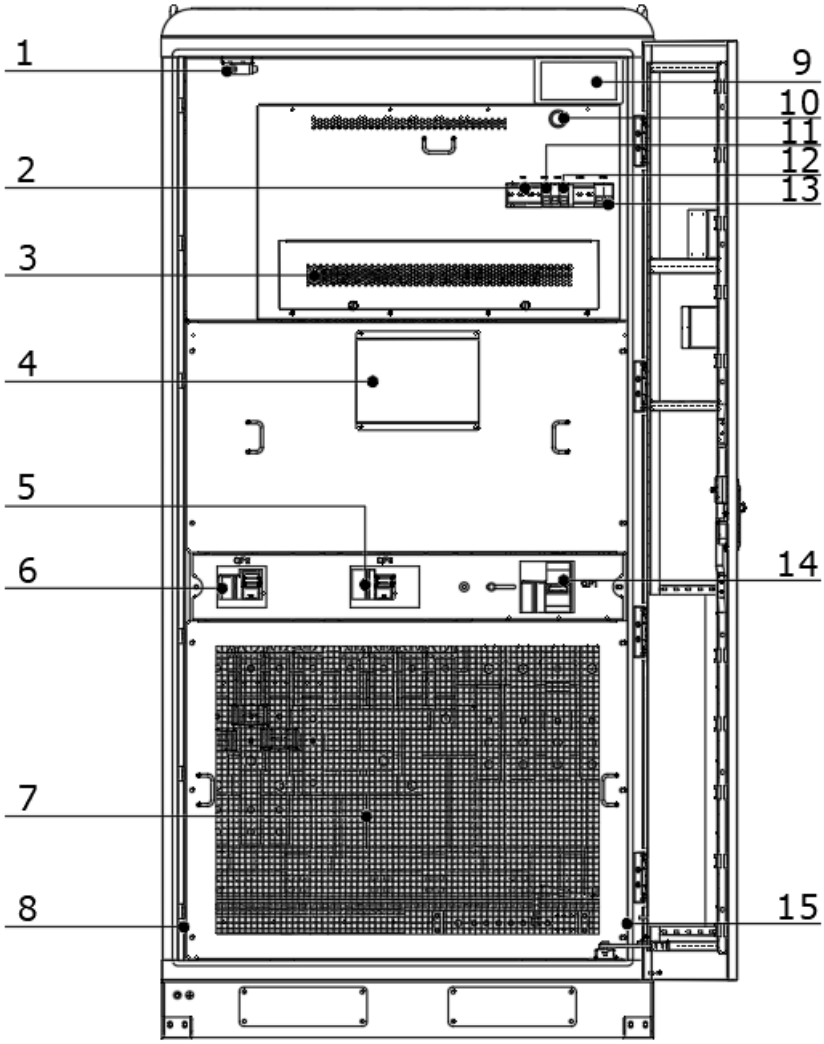


Table 2-2 Structure design of PCC

No	Name	Function
1	Door limit switch	Access control function, an alarm will sound when the door is opened
2	Load meter	Metering of load power consumption
3	Internal terminal block	PCC control circuit terminal block
4	AC contactor	Grid circuit on/off
5	Bypass circuit breaker	Used in case of failure of PCC or PCS
6	Load side circuit breaker	Connect to the load
7	Transformer	Electrical isolation
8	JP1 external communication terminal block	PowerHill off-grid signal access
9	Transformer temperature display	Display the three-phase temperature of the transformer winding
10	Battery activation button	Activate the battery
11	Fuse	Switch power supply input side protection
12	Auxiliary power supply circuit breaker	Auxiliary power supply on/off and protection
13	Battery Breaker	Battery on/off and protection
14	Grid side circuit breaker	Access to the power grid
15	JP2 external communication terminal block	PowerHill 485 and CAN communication access

2.4 Product Parameters

Detailed parameters of PCC are shown in the table below:

Parameter model	PCC-75	PCC-125	PCC-250	PCC-375
Basic parameters				
Rated power	75kVA	125kVA	250kVA	375kVA
Wiring mode	3P4W+PE			
Rated voltage	AC400V			
Voltage range	AC400V±15%			
Rated frequency	50/60Hz			
Frequency range	50/60 (±2.5) Hz			
Long-term overload capacity	110%			
Off-grid to On-grid switching time	13 ~ 24ms	25 ~ 42ms	33 ~ 58ms	40 ~ 65ms
On-grid to Off-grid switching time	5 ~ 17ms	18 ~ 20ms	28 ~ 46ms	33 ~ 50ms
Rated output current	86A	172A	344A	516A
Allowable maximum current	100A	200A	400A	600A
Maximum efficiency	99%			
Automatic protection function	Grid side over-voltage, under-voltage, over-frequency, under-frequency, over-temperature, emergency stop, output overload protection			
General parameters				
Isolation transformer	Integrate			
Degree of protection	IP54			
Cooling method	Forced air cooling			
Corrosion protection grade	C3			
Operating temperature	-20℃ ~ 50℃			
Relative humidity	0-95% (non-condensing)			
Operating altitude	< 2000m			
Noise	≤75dB			
Dimension (W * D * H)	850mm*900mm*2100mm		1100mm*900mm*2100mm	
Maximum weight	1000kg		2000kg	
Communication interface	1 RS485, 1 CAN			
Communication protocol	Modbus-RTU, CAN2.0B			

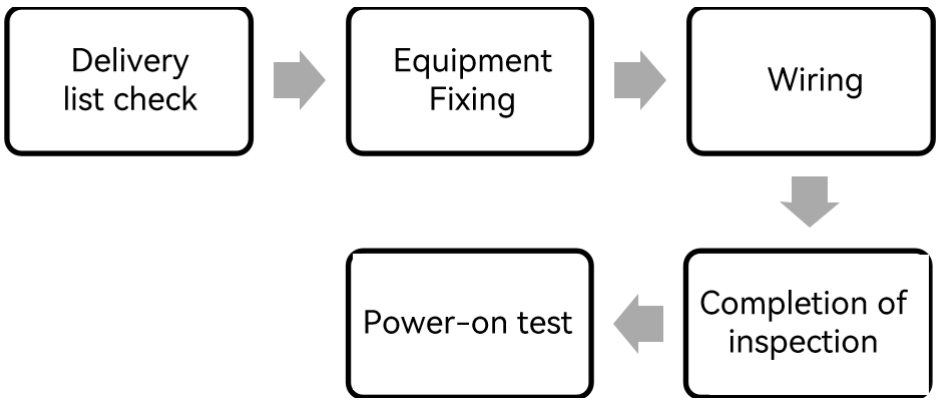
3 Installation

3.1 Installation Preparation

Please check the delivery list for delivery contents.

3.1.1 Installation Process

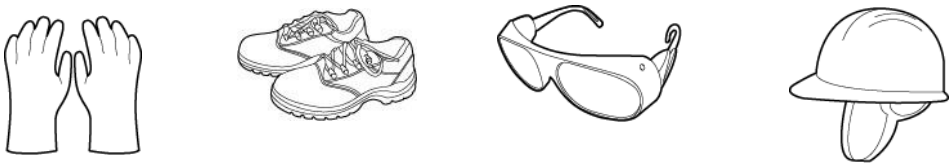
Figure 3-1 Installation process



3.1.2 Installation Tools

When performing on-site installation at the project site, installation tools need to be prepared in advance.

Figure 3-2 Protective tools



Insulated Gloves Safety Shoes Goggles Safety Helmet

Table 3-1 Tool list

No.	Recommended Tools	Quantity	Description
1	Electric forklift	1	Rated load ≥ 2 T; used for unloading and handling
2	Impact drill bit and M12 drill bit	1 set	Drill holes in the ground; place expansion screws (4 - M12)
3	Hammer	1	Press the expansion bolts into place
4	Socket tools	1 set	M12 socket: used to tighten expansion bolts M8 socket: Terminal securing.
5	Insulated torque wrench	1	Check and mark the torque value
6	Adjustable wrench	1	Tighten the bolts for the cable connections.
7	Diagonal pliers	1	Cut off the nylon tie on the bag
8	Slotted screwdriver/crowbar	1	Unpacking operation

3.1.3 Installation Environment Requirements

The installation site environment requirements are shown in the following table:

Table 3-2 Installation environment requirements

No.	Item	Requirement
1	Ambient temperature range	-20℃ ~ 50 ℃ (When the battery temperature exceeds 40℃, the output power decreases)
2	Allowable altitude	< 2000m (derating above 2000m)

No.	Item	Requirement
3	Permissible humidity	0 ~ 95 % (non-condensing)
4	Installation Basic Requirements	For specific requirements, see 3.1.4
5	Installation space requirements	For specific requirements, see 3.1.4

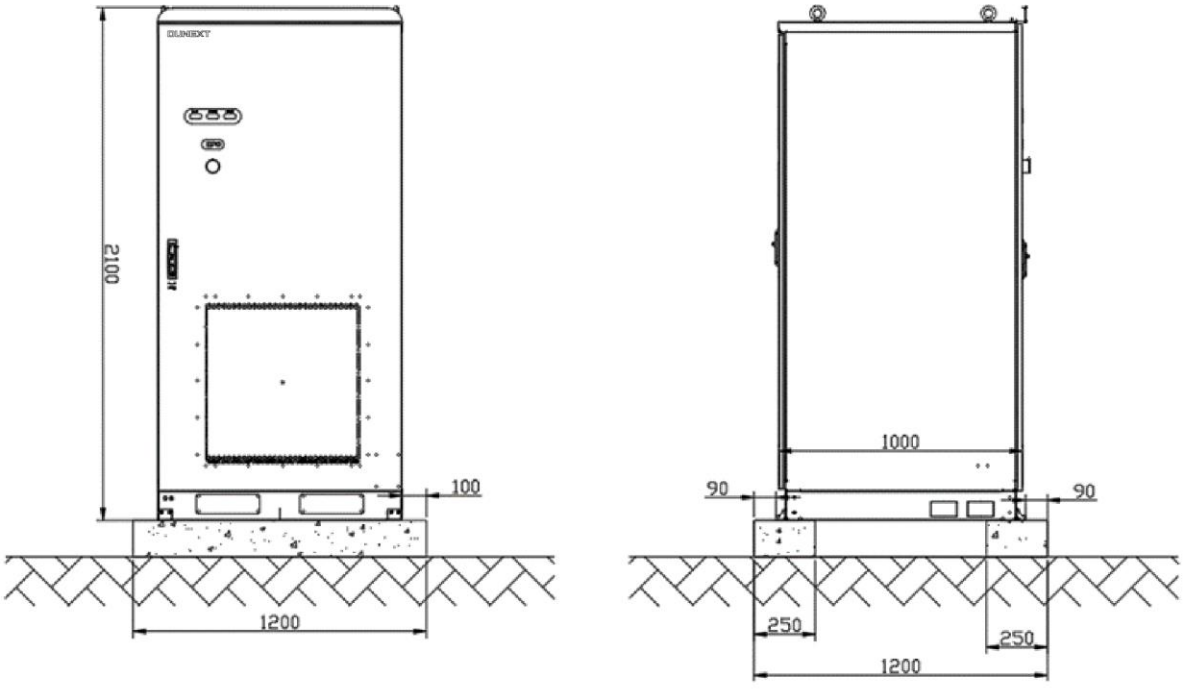
WARNING!	Do not install or commission the PCC when it is raining.

3.1.4 Site Installation Foundation

This PCC should be fixed on the concrete foundation. Please build the installation foundation in advance according to the figure below.

Figure 3-3 Installation foundation (PCC-375)

Unit: mm

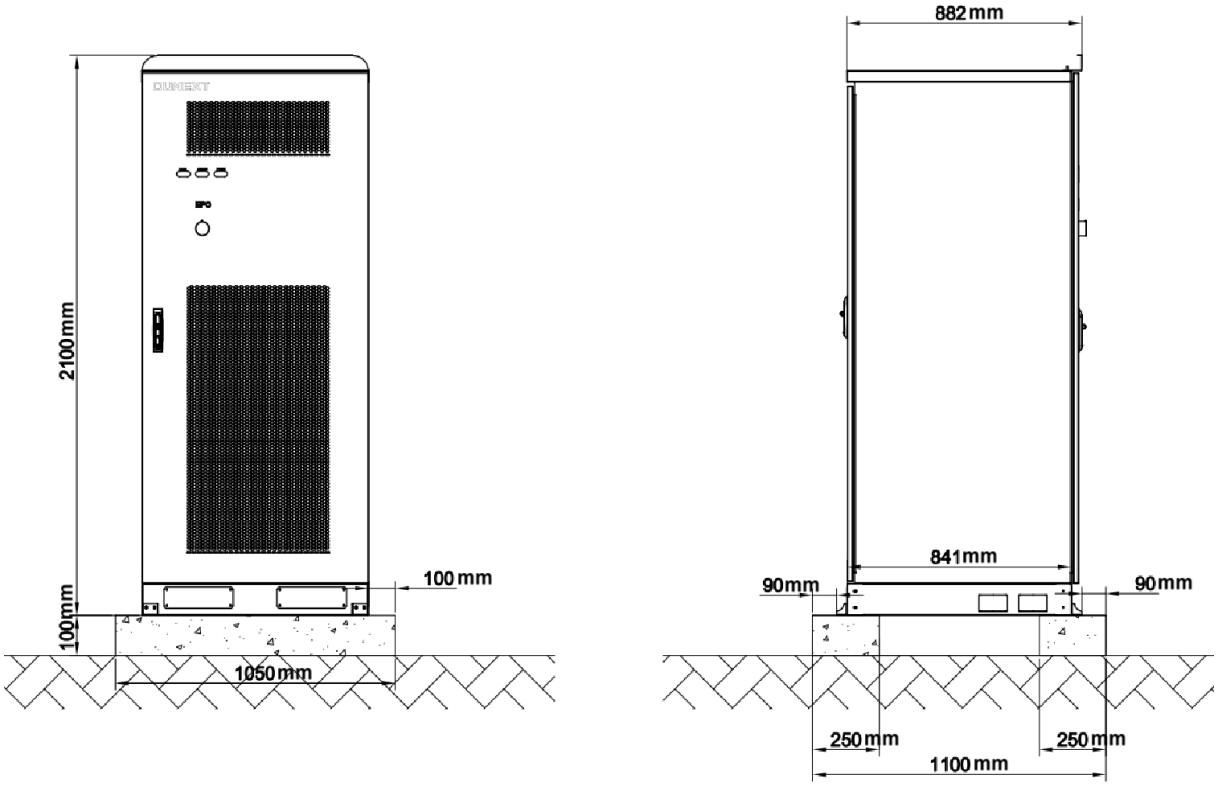


Front View **Side View**

Table 3-3 Installation foundation requirements (PCC-375)

No.	Category	Parameters
1	Minimum hardening area	L≥1200mm, W≥1200mm
2	Installation foundation height	H≥100 mm (higher than the highest flood level in history)
3	Mounting base load capacity	Load capacity> 2 t/m²
4	Foundation service life	≥20 years
5	Foundation levelness	3mm/m²

Figure 3-4 Site installation foundation (other PCC models)



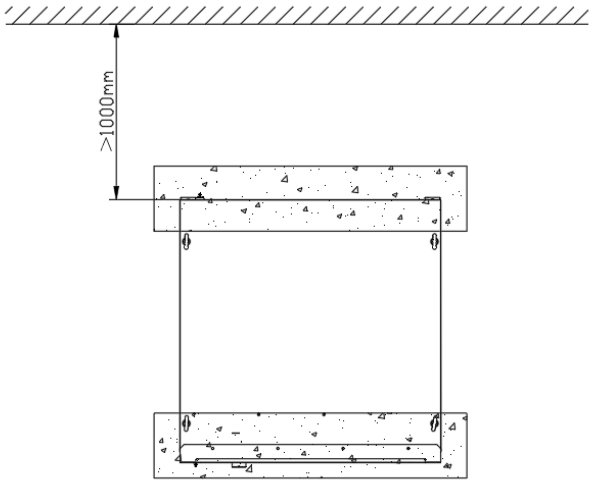
Front View **Side View**

Table 3-4 Installation base requirements (other PCC models)

NO.	Item	Description
1	Minimum Hardening Area	L≥1100mm, W≥1050mm
2	Installation foundation height	H ≥ 100 mm (higher than the highest historical flood level)

NO.	Item	Description
3	Bearing capacity of mounting base	Bearing capacity > 1.5 t/m²
4	Foundation service life	≥ 20 years
5	Foundation levelness	3mm/m²

Figure 3-5 Installation of a single PCC



3.1.5 Product Transportation

DANGER!	• During transportation, the surrounding area must be checked and clear security cordons must be set up for safety protection. • During the transportation process, no unrelated personnel shall enter the transportation danger zone.

Forklifts are required to meet the following requirements.

Table 3-5 Forklift requirements

Item	Description
Forklift specifications	Maximum weight of the PCC is about 1.6t , and it needs to be equipped with an electric forklift with a rated load ≥ 1.6t.
Fork length	Since the width and depth of the PCC are close to 1m, it is recommended to use a fork with a length of > 1.2m.

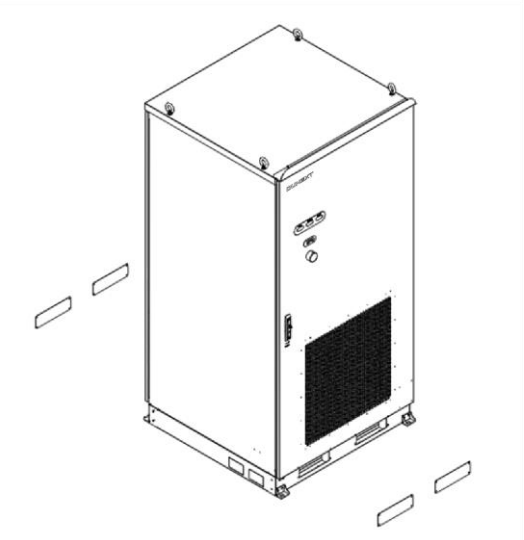
Item	Description
Width of forklift hole	Forklift hole of this product is 225 mm wide, and the distance between the centers of two holes is 425 mm. Therefore, it is recommended to use a wide-spaced fork.
Fork position	Adjust the fork position so that the distance between the fork and the back of the cabinet is less than 50mm, and the distance of the far fork protruding to the right side of the cabinet is more than 50mm; slowly lift the fork, and when the product reaches the desired position, put it down and move it out of the base. The fork is at the back of the cabinet without the air conditioner.

WARNING!	• Only the forklift can be used for the transportation of PCC. • When moving this product, please use an electric forklift with movable forks. Manual forklifts are not recommended. • When transporting with a forklift, protection should be provided to avoid damage to the surface of the equipment. • When transporting by forklift, the cabinet should be secured to the forklift with belts/safety ropes.

Transportation method: front insertion

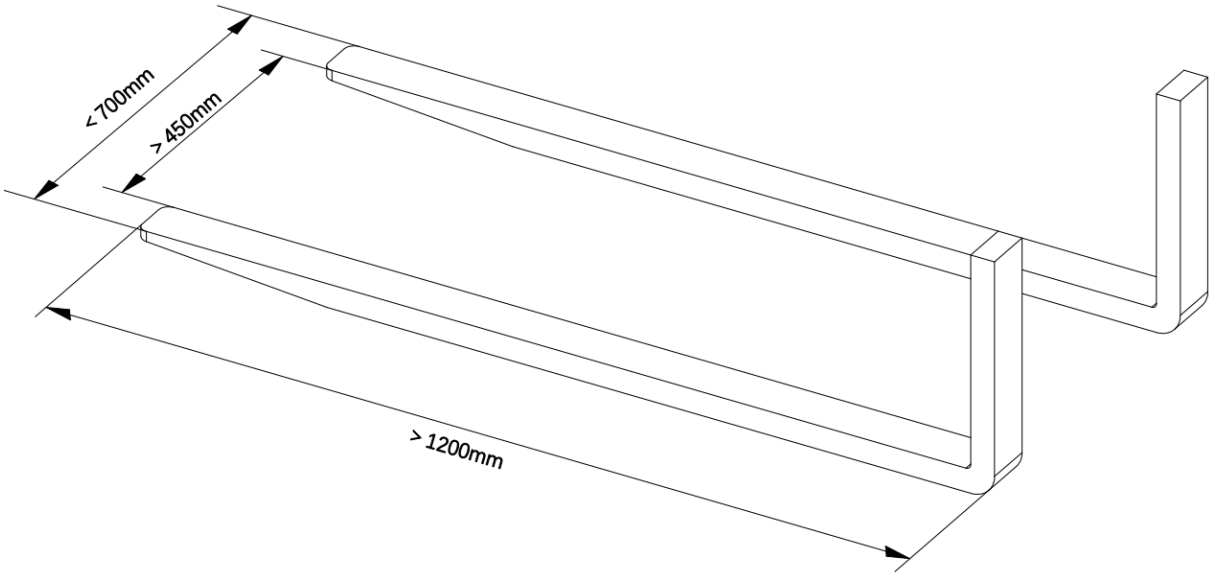
1. Remove the fork hole cover and confirm the fork hole

Figure 3-6 Front cover removal



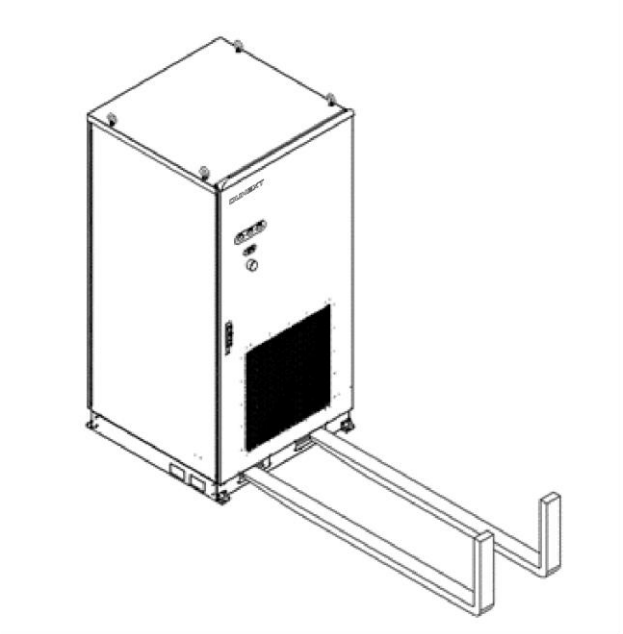
2. Fork arm requirements

Figure 3-7 Forklift arm size requirements



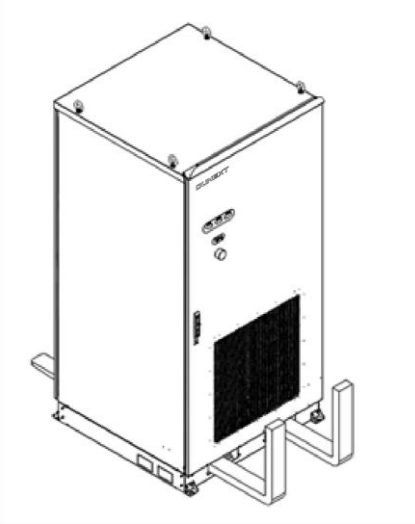
3. Fork entrance

Figure 3-8 Forklift arm inserts from the front hole



4. Transportation

Figure 3-9 Forklift arm carries from the front side



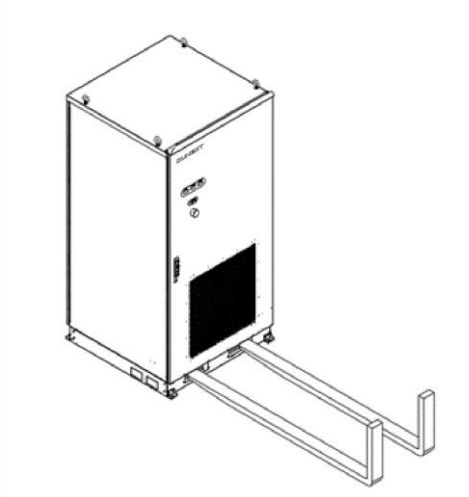
Requirements:

The forklift should be inserted into the holes as shown in the figure below, so that the distance between the fork and the rear side of the cabinet is less than 50mm.

The rear end of the forklift needs to extend out of the cabinet for at least 50mm

5. Put down the fork and quit.

Figure 3-10 Forklift arm exits from the front side



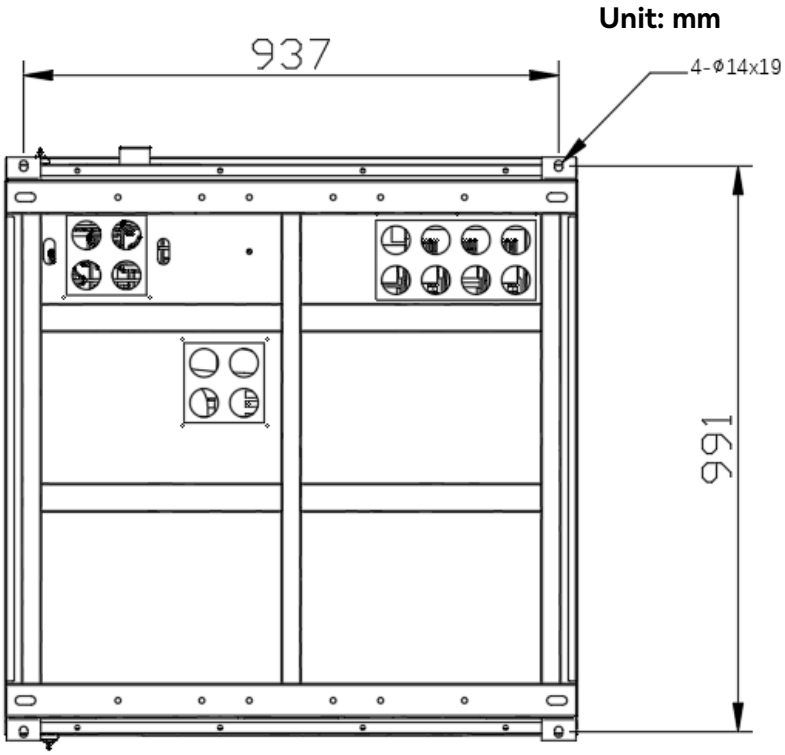
3.2 Fixation of Cabinet

Before fixing the cabinet, please check if it's placed in a qualified position.

- Prepare an M12 hammer drill and check the specifications and quantity of the expansion screws;
- Ground drilling: Aim the hammer drill at the center of the fixed installation base hole, and drill holes according to the following hole positions (a total of 4 holes on the front and back of the equipment) with a depth of 120mm.

NOTE!	It is necessary to drill holes before placing the PCC, because the external backbone will block the hammer drill from drilling holes.

Figure 3-11 Fixing hole at the bottom of PCC



- Bolt installation: After removing the hole slag, put the expansion bolts (4 pcs) into the corresponding holes, hammer them to the bottom with a hammer,

install the nuts + washers and tighten them with a sleeve, and confirm the torque with a torque wrench (M12: 96 NM);

Figure 3-12 Expansion bolts

3.3 External Wiring

Regarding the wiring of PCC, please connect all wiring correctly according to the instructions in this chapter.

DANGER!	• Wiring should be done by a qualified electrician. The electrician should confirm that all cables are connected correctly. • Wiring operation requires at least two operators. One operator performs wire operation, and the other operator monitors and reminds to avoid misoperation. • Before wiring, please make sure all switches are off. • The operator shall bear all consequences of any damage or accident caused by improper operation. • The PCC is connected to the power grid system, and the power grid system should have lightning protection measures.

3.3.1 Product Switch Position

DANGER!	• Before wiring, please make sure all switches are off. • Protective equipment must be worn when connecting, including goggles, insulating gloves and safety shoes.

The following table lists all the switches in the PCC

Figure 3-13 Switches in PCC

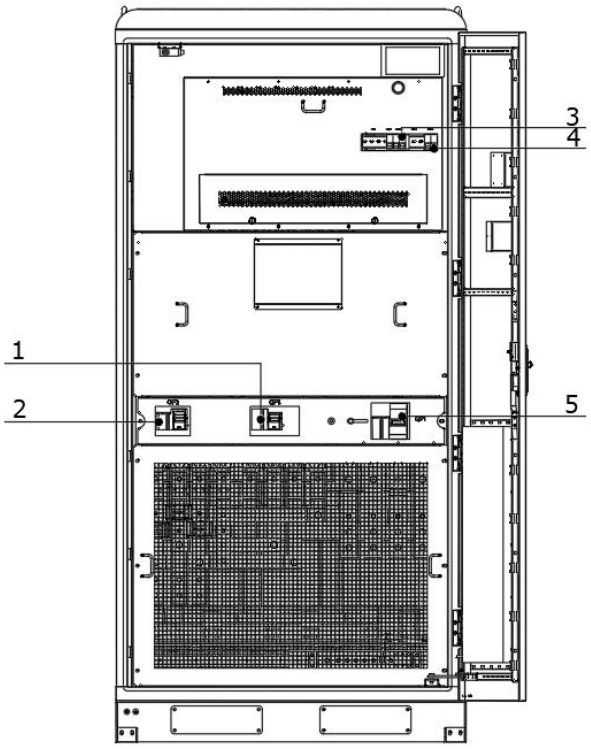


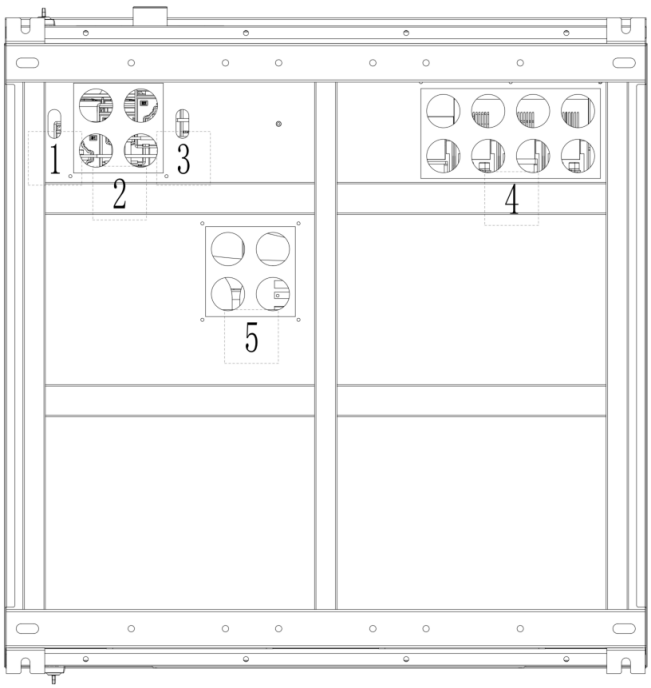
Table 3-6 Switches in PCC

No.	Switch Name and Type	Factory Status	Function
1	Bypass circuit breaker	Off	Bypass
2	Load circuit breaker	Off	Load supply
3	Micro circuit breaker for control circuit	Off	Control power supply
4	Battery micro circuit breaker	Off	Battery on/off
5	Grid circuit breaker	Off	Grid supply

3.3.2 Product Wiring

All external ports are arranged in the PCC. Details are as follows:

Figure 3-14 Positions of cable holes at the bottom of the cabinet



1 Comm cable hole 2 Grid cable hole 3 Comm cable hole
4 Load cable hole 5 Transformer cable hole

Figure 3-15 Grounding location

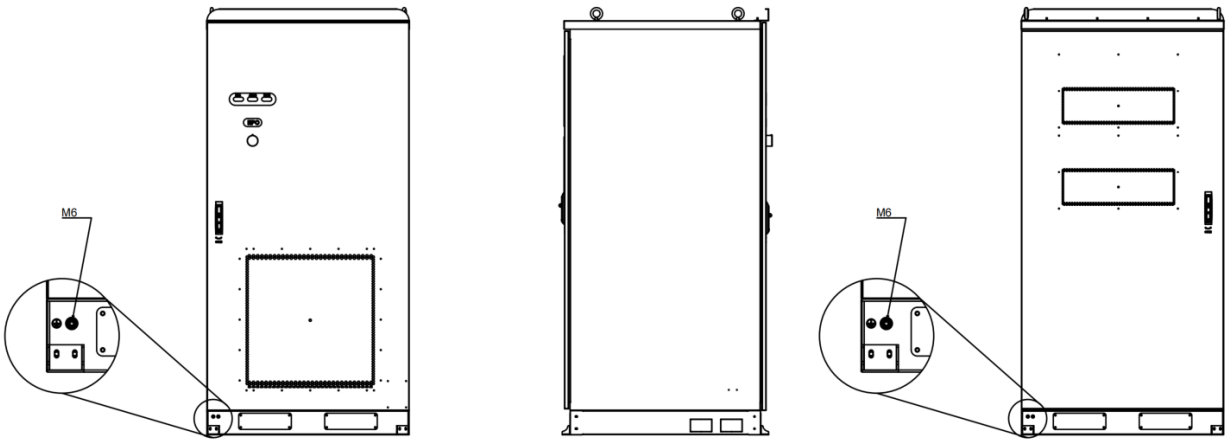


Figure 3-16 Wiring location in PCC

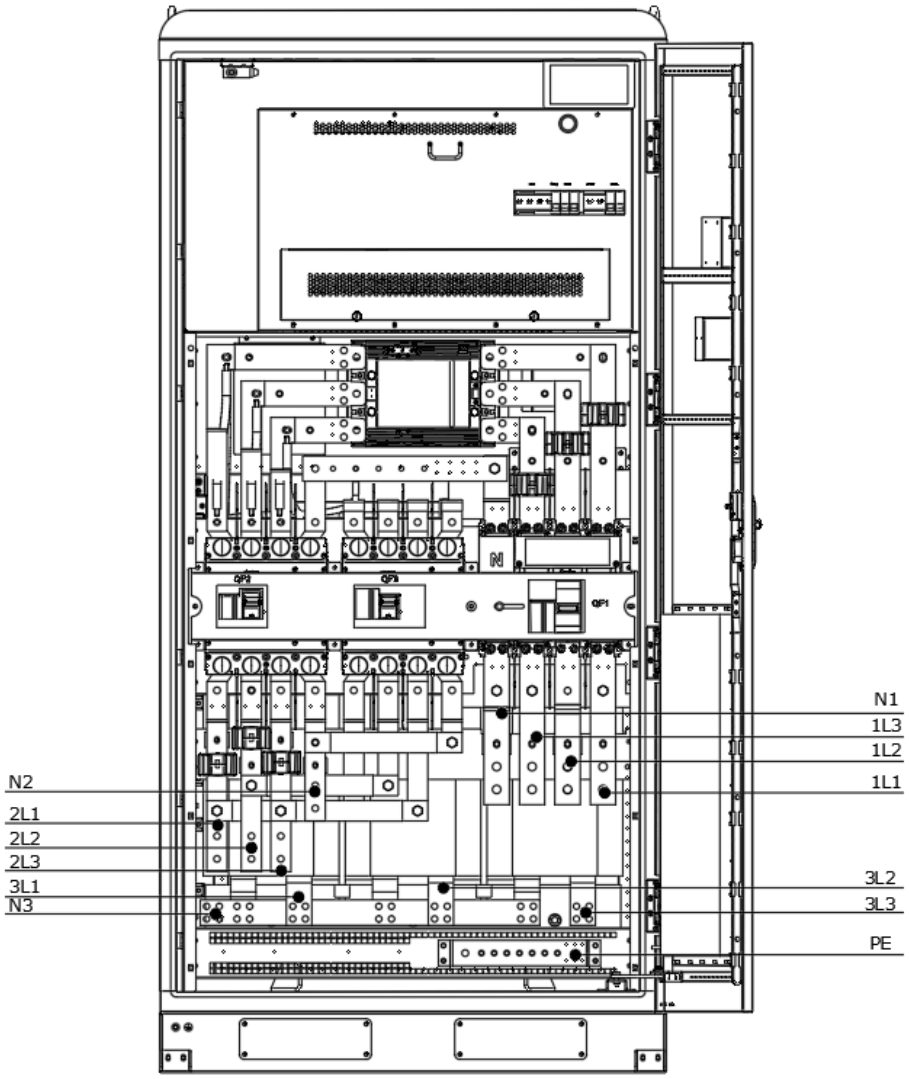


Table 3-7 Wiring location in PCC

No.	Name	Function
1	N1	Grid N
2	1L3	Grid L3
3	1L2	Grid L2
4	1L1	Grid L1
5	N2	Load N
6	2L3	Load L3
7	2L2	Load L2

No.	Name	Function
8	2L1	Load L1
9	N3	Connect to PCS
10	3L3	Connect to PCS
11	3L2	Connect to PCS
12	3L1	Connect to PCS
13	PE	Grounding

3.3.3 Communication Wiring

The external signal and communication wiring of the PCC are shown in the figure below:

Figure 3-17 Signal and external communication ports

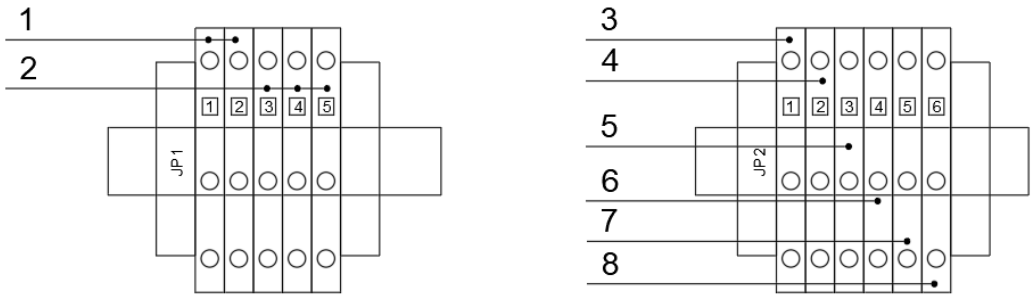


Table 3-8 Signal and external communication ports

NO.	Item	Function	Remarks
1	PCC-COM	On/off-grid common terminal	Common terminal of on/off-grid
2	PCC-Y1	On/off-grid signal	Signal disconnection indicates off grid, and signal connection indicates grid-tied.
3	A1	485 Communication A	Communicate with PowerHill
4	B1	485 Communication B	Communicate with PowerHill
5	GND1	485 grounding	Shield grounding
6	H2	CAN communication H	Communicate with PowerHill
7	L2	CAN communication L	Communicate with PowerHill
8	GND2	CAN grounding	Shield grounding

3.3.4 Grounding

The grounding port of the PCC enclosure is an M8 nut, and the cross-sectional area of the PE cables need to be selected according to the table below:

Table 3-9 Cross-sectional area of PE cables

Cross-sectional Area for Main Circuit Conductor S (mm^2)	External Protective Earth Conductor Sp (mm^2)
S≤16	S
16 < S≤35	16
35 < S	S/2

3.4 Inspection after Installation

WARNING!

Another operator needs to double-check the wiring to confirm that all cables are connected correctly.

3.4.1 Wiring Inspection

Please refer to Section 3.3 External Wiring to ensure that all cables are connected correctly.

NOTE!

To avoid affecting the communication quality, the on-site communication cables should not be too long, and the wiring of external connection lines should be protected by pipes.

3.4.2 Bolt Torque Check

Make sure all bolts are tightened as follows. After confirming the torque, put a red mark on the bolt as an identification.

Table 3-10 Bolt torque check

No.	Location	Fastener	Specifications
1	PCC and ground fixing	4-M12*60	96±5N·m
2	Grounding cable	M8 hexagonal nut	10±1N·m

4 Power-on Steps

4.1 Check Before Power-on

Step 1: Ensure that the wiring inspection work in Section 3.4 is completed;

Step 2: Confirm whether the cabinet is installed vertically on the ground;

Step 3: Check whether the internal wiring of the PCC is reliable and has no looseness or falling off.

4.2 Power-on Process

 DANGER!	• Before powering on, ensure that the pre-power-on check is completed. • The power-on operation requires at least two operators. One operator performs the power-on operation, and the other operator monitors and reminds to avoid misoperation. • The operator shall bear all consequences of any damage or accident caused by improper operation.

Figure 4-1 Switches in PCC

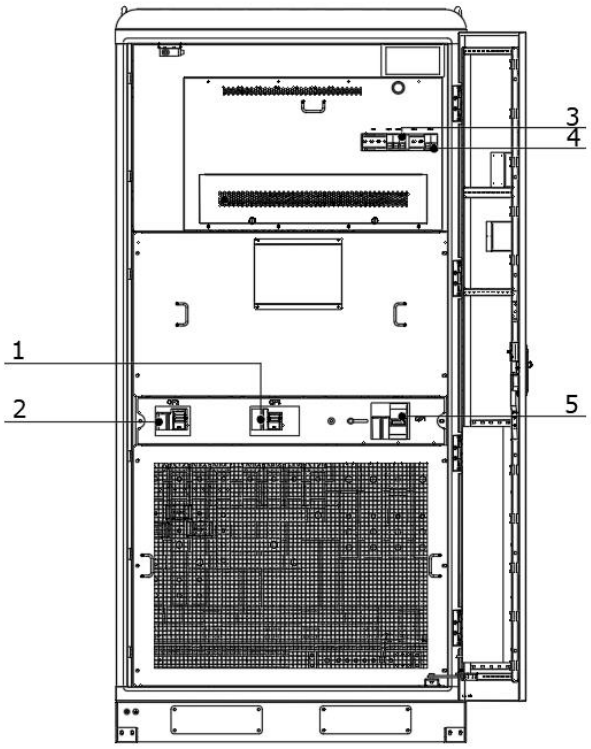


Table 4-1 Switches in PCC

No.	Switch Name and Type	Factory Status	Function
1	Bypass circuit breaker	Off	Bypass
2	Load circuit breaker	Off	Load supply
3	Micro circuit breaker for control circuit	Off	Control power supply
4	Battery micro circuit breaker	Off	Battery on/off
5	Grid circuit breaker	Off	Grid supply

The PCC is powered on in three steps:

Step 1: Turn on the grid circuit breaker;

Step 2: Turn on the load circuit breaker;

Step 3: Turn on the micro circuit breaker for control circuit and the battery micro circuit breaker.

Follow the steps in sequence. If the PCC is in normal condition, after power-on, the operation indicator, fault indicator, and alert indicator will light up in sequence, and then the operation indicator will flash. The PCC is automatically connected to and disconnected from the grid. The PCC controller will automatically detect whether the front-end grid is energized and control the contactor to switch automatically.

After the grid is energized, if the PCS in PowerHill does not operate, the switching contactor will be turned on after about 2 minutes. If the PCS is in off-grid operation, the switching contactor will be turned on after about 5 minutes. After turning on the contactor, the PCS is in on-grid mode, and the operation indicator light is always on.

After the grid is connected, if the grid fails, the switching contactor will be automatically turned off, and it is in off-grid mode.

4.3 Power-off Process

Power-off procedure of PCC is divided into three steps:

Step 1: Disconnect the micro circuit breaker for control circuit and the battery micro circuit breaker;

Step 2: Disconnect the grid circuit breaker;

Step 3: Disconnect the load circuit breaker.

After completing the above steps, the indicator light of the PCC will be off.

When the PowerHill fails or the PCC control circuit fails and needs to be repaired, and the load needs power supply, disconnect the grid circuit breaker and the load circuit breaker, and move the middle push/pull rod of the circuit breaker to the left. At this time, the bypass circuit breaker can be turned on, and the grid power is directly supplied to the load through the bypass circuit breaker.

 **NOTE!**	If the battery is not used for power supply, turn off the battery micro circuit breaker.

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