

SKANBATT

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MPS-HV51100HVCX
Product Description

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Technical Data

1.1 Scope

The installation and operation manual applies to the modular battery energy storage system. Please carefully read this installation and operation manual to ensure the safe installation, preliminary debugging, and maintenance of MPS-HV51100HVCX. Installation, preliminary debugging, and maintenance must be carried out by qualified and authorized personnel. Please keep this installation and operation manual and other applicable documents near the battery energy storage system, so that all personnel involved in installation or maintenance can access this installation and operation manual at any time.

[More Usable Energy]

Deep cycle DOD control

[Flexible Investment]

5.12 kWh modular design
Max 12 modules per stack, 4 stacks in parallel

[Safe & Reliable]

Cobalt Free Lithium Iron Phosphate (LFP) battery has maximum safety and 6000 cycles

[Easy Installation]

Quick plug design,
easy wiring

[Quick Commissioning]

One button ON/OFF
Automatic ID assignment

[Perfect Compatibility]

Compatible with leading PCS brands

1.2 Datasheet

DATASHEET

Model	MPS-HV51100HVC6	MPS-HV51100HVC8	MPS-HV51100HVC12
Performance			
Cell technology	LFP (LiFePO4)		
Number of modules	6	8	12
Battery usable energy [1]	30.72 kWh	40.96 kWh	61.44 kWh
Nominal voltage	307.2 V	409.6 V	614.4 V
Operating voltage	273.6 - 336.96 V	364.8 - 449.28 V	547.2 - 673.92 V
Max output current	100 A (1C)		
Charge/Discharge current	50 A / 50 A		

Communication

Display	SOC status indicator, LED indicator
Communication	CAN / RS485 / RS232
Functions	Remote upgrade, EMS, Real-time monitoring of local data

General Specification

Dimension (W*D*H)	556×630×1652 mm	566×630×1652 mm	620×630×2200 mm
	22.3×24.8×65.0 inch	22.3×24.8×65.0 inch	24.4×24.8×86.6 inch
Weight	350 kg (771.6 lbs)	430 kg (948.0 lbs)	750 kg (1653.5 lbs)
Installation	Floor stand		
Operating temperature [2]	Charge : 0 to 50°C (32 to 122) Discharge : -15 to 50°C (5 to 122)		
Environmental humidity	≤ 95%RH (No condensation)		
Protection rating	IP 20		
Cycle life [3]	6000 Cycles or ten (10) years @ 80% DOD / 25°C / 0.5°C, 70% EOL		
Scalability	Max 12 modules per stack, 4 stacks in parallel		
Application	ON Grid / ON Grid + Backup / OFF grid		
Compatible inverters	Refer to compatible inverter list. (Compatible with major PCS brands)		

Standard Compliance

UN38.3 / IEC62619 / IEC62040-1 (More available upon request)
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Ordering and Deliverable Part

Part	Battery Module: MPS-HV51100		
	BCU: MPS-HVBMJU		
	RACK: MPS-HVC6	RACK: MPS-HVC8	RACK: MPS-HVC12

[1] Test conditions: 100% depth of discharge (DOD), 0.2C rate charge & discharge at 25°C.

[2] Charge/discharge derating occurs when the temperature is below 0°C or above 45°C.

[3] Please refer to the Warranty Letter for applicable conditions, the warranty is due whichever comes first.

Product Overview

2.1 Brief Introduction

Product overview

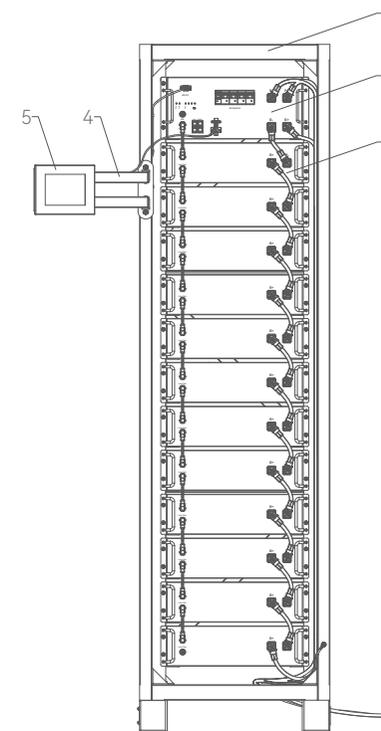
MPS-HV51100HVCX is a high-voltage lithium-ion battery system. It consists of 6\8\12 pcs battery modules (51.2V/100AH) and one BCU (Battery Control Unit) in series. It provides a reliable backup power supply for supermarkets, banks, schools, farms and small factories to smooth the load curve and achieve peak load transfer. It can also improve the stability of renewable systems and promote the application of renewable energy. MPS-HV51100HVCX is not suitable for supporting life-sustaining medical devices. MPS-HV51100HVCX is characterized by high integration, good reliability, long service life, wide working temperature range, etc. The battery energy storage system is modular. Each battery module has a capacity of 5.12 kWh. It can support up to 12 battery modules in series. Its total energy can be expanded from 30.72 kWh to 61.44 kWh.

MPS-HV51100HVCX has built-in BMS (Battery Management System, including master BMS in BCU and slave BMS in battery modules), which can manage and monitor cells information including voltage, current, and temperature. Besides that, BMS can balance cells charging to extend cycle life. BMS has protection functions including over-discharge, over-charge, over-current, and high temperature; the system can automatically manage the charge state, discharge state and balance state.

MPS-HV51100HVCX has an internal soft-start circuit, so MPS-HV51100HVCX can support the inverter without a soft-start function. MPS-HV51100HVCX supports black start function while working with compatible inverters.

2.2 Battery System Overview

MPS-HV51100HVCX consists of cabinet, battery modules connected in series, BCU (Battery Control Unit), display screen bracket and display screen.



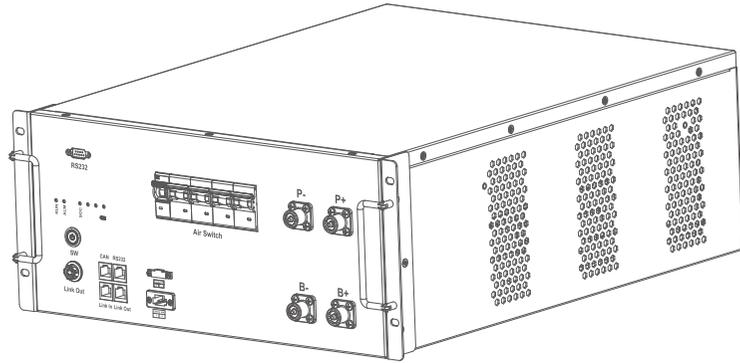
NO.	Description
1	Battery Module
2	BCU (Battery Control Unit)
3	Cabinet

NO.	Description
4	Display screen bracket
5	Display screen

2.3 BCU

BCU includes master BMS, Breaker, DC fuse, Soft-start circuit, Charge circuit, Discharge circuit, parallel independent charge control circuit and 12V DC / DC power supply module.

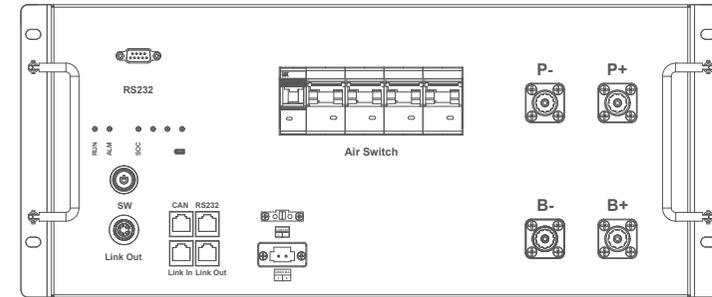
Master BMS controls charge voltage / current and discharge voltage / current according to the cell voltage and temperature provided by slave BMS in battery modules. Master BMS communicates with PCS through CAN communication.



2.3.1 Technical Data

Parameters	Specification
Operating Voltage	200 V-1000 V
Nominal Current	50 A
Maximum Current	100 A
Operating Temperature	Charge: 0-50°C, Discharge: -15-50°C
Environmental Humidity	≤95%RH
Protection Class	IP20
Cooling	Natural
Weight(kg)	22 kg
Dimension(W*H*D)	482*200*570 mm
Communication	CAN / RS232

2.3.2 LED Indicator Definition



Note:

Flash 1 - 0.25s Light / 3.75s Off

Flash 2 - 0.5s Light / 0.5s Off

Flash 3 - 0.5s Light / 1.5s Off

LED Indicators Instructions

Status	L6	L5	L4	L3	L2	L1	Descriptions	
Shut down	OFF	OFF	OFF	OFF	OFF	OFF	All OFF	
Standby	Flash 1	OFF	According to the battery level				Indicates Standby	
Charging	Normal	Light	OFF	According to the battery level				The highest capacity indicator LED flashes(Flash 2), others lighting
	Full Charged	Light	OFF	Light	Light	Light	Light	Turn to standby status when charger off
	Protection	OFF	Light	OFF	OFF	OFF	OFF	Stop charging
Discharge	Normal	Flash 3	OFF					
	UVP	OFF	OFF	OFF	OFF	OFF	OFF	Stop charging
Protection	OFF	Light	OFF	OFF	OFF	OFF	Stop discharge	
Fault	OFF	Light	OFF	OFF	OFF	OFF	Stop charging and discharge	

Charging Battery Level Indicators Instructions

Status	Charging						
	L6	L5	L4	L3	L2	L1	
Battery Level Indicator							
Battery Level (%)	0 ~ 25%	Light	OFF	OFF	OFF	OFF	Flash 2
	26 ~ 50%			OFF	OFF	Flash 2	Light
	51 ~ 75%			OFF	Flash 2	Light	Light
	76 ~ 100%			Flash 2	Light	Light	Light
	Full Charged			Light	Light	Light	Light

Discharging Battery Level Indicators Instructions

Status		Discharge					
Battery Level Indicator		L6	L5	L4	L3	L2	L1
Battery Level (%)	0 ~ 25%	Light	OFF	OFF	OFF	OFF	Light
	26 ~ 50%			OFF	OFF	Light	Light
	51 ~ 75%			OFF	Light	Light	Light
	76 ~ 100%			Light	Light	Light	Light

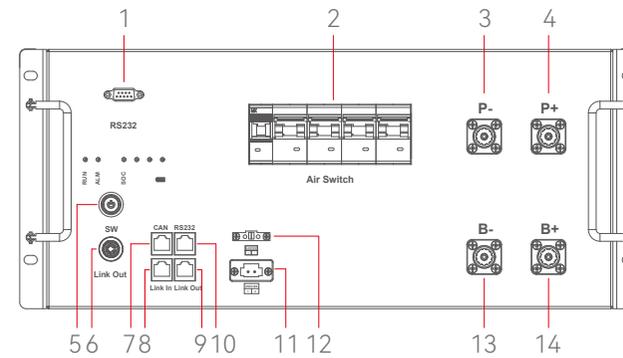
High voltage power indicator

Status LEDs:	L1	L2	L3	L4	L5	L6	Protect against fault states
	1	OFF	OFF	OFF	OFF	Light	
2	OFF	OFF	OFF	Light	Light	OFF/Light	NTC failure
3	OFF	OFF	Light	OFF	Light	OFF/Light	Precharge failure
4	OFF	OFF	Light	Light	Light	OFF/Light	Short circuit failure
5	OFF	Light	OFF	OFF	Light	OFF/Light	Faulty charging contactor
6	OFF	Light	OFF	Light	Light	OFF/Light	Discharge contactor failure
7	OFF	Light	Light	OFF	Light	OFF/Light	Pre-charge contactor failure
8	OFF	Light	Light	Light	Light	OFF/Light	Total negative contact failure
9	Light	OFF	OFF	OFF	Light	OFF/Light	Overvoltage protection of charging cells
10	Light	OFF	OFF	Light	Light	OFF/Light	Overall charging overvoltage protection
11	Light	OFF	Light	OFF	Light	OFF/Light	Charging overcurrent protection
12	Light	OFF	Light	Light	Light	OFF/Light	Discharge cell undervoltage protection
13	Light	Light	OFF	OFF	Light	OFF/Light	Discharge overall undervoltage
14	Light	Light	OFF	Light	Light	OFF/Light	Discharge overcurrent protection
15	Light	Light	Light	OFF	Light	OFF/Light	Charging high temperature and low temperature protection
16	Light	Light	Light	Light	Light	OFF/Light	High temperature and low temperature protection of discharge

Note:

1. The fault lamp ALM is not on in a normal state, at this time the SOC lamp is used as a power indication, and the fault lamp ALM is always on when the fault occurs, the SOC lamp is on according to the fault sequence number (priority sequence number from low light), if a variety of protection faults exist, the RUN lamp also needs to be on constantly.

2.3.3 Port Definition



NO.	Items	NO.	Items
1	RS232	8	BCU Link Port In
2	Air Switch	9	BCU Link Prot Out
3	P-	10	RS232 Port
4	P+	11	UNDV MA
5	SW Button	12	LCD12V
6	Link out	13	B-
7	CAN Port	14	B+

2.3.3.1 Power Switch

Main MCB: Switch ON / OFF MPS-HV51100HVCX.

2.3.3.2 SW Button

After switch ON the Air Switch, long press SW button to switch ON / OFF MPS-HV51100HVCX.

2.3.3.3 BCU Link Port / CAN Port

BCU Link Port In / Link Port Out / CAN port communication follows CAN protocol, for communication between batteries and PCS.

2.3.4 RS232 Port

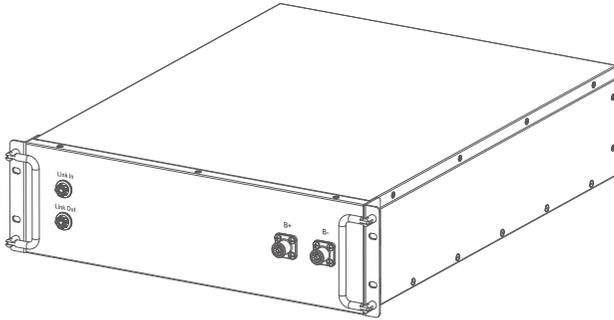
RS232 Communication Terminal (RJ45 port) follows RS232 protocol, for the manufacturer or professional engineer to debug or service.

PIN	Definition
Pin 1, PIN 8	GND
Pin 2, PIN 7	RS232_TX
Pin 3, PIN 6	RS232_RX

2.4 Battery Module

Battery module includes 51.2V / 100Ah battery unit and slave BMS. The slave BMS collects the cell voltage and temperature of the battery unit in real time and sends these messages to the master BMS through internal communication.

Slave BMS integrates a cell balance circuit, which can balance cell capacity according to the control instructions of Master BMS.

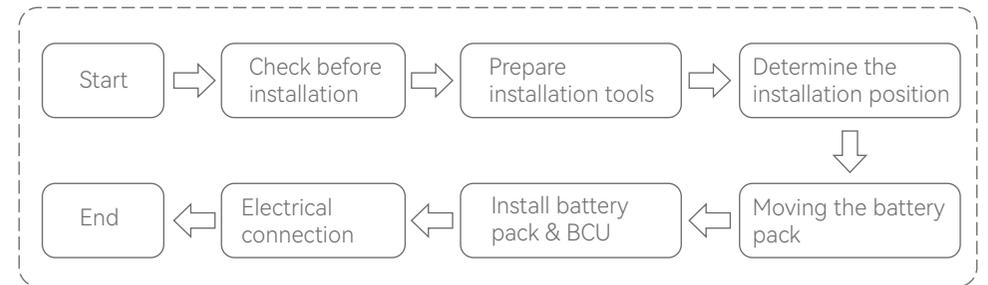


Parameters	Specification
Battery Type	LiFePO4, Lithium Iron Phosphate
Nominal Voltage	51.2 V
Nominal Capacity	100 Ah
Nominal Energy (100%DOD)	5.12 kWh
Nominal Charging Current	50 A
Maximum Charging Current	100 A
Nominal Discharge Current	50 A
Maximum Discharge Current	100 A
Operating Temperature	Charge: 0-50°C, Discharge: -15-50°C
Environmental Humidity	≤95%RH
Protection Class	IP20
Cooling	Natural
Weight(kg)	43 kg
Dimension(W*H*D)	482*130*570 mm

03

Installation Guide

Installation flow chart



3.1 Checking Before Installation

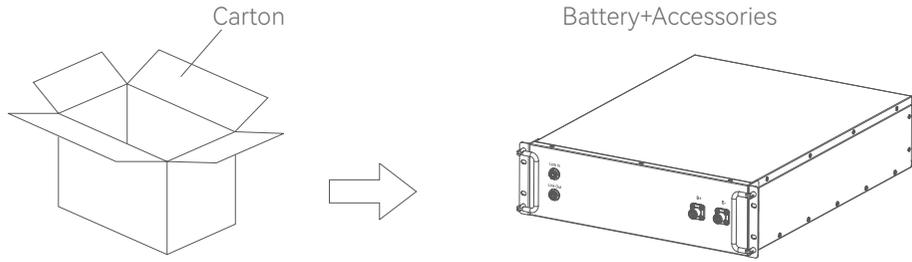
3.1.1 Checking Outer Packing Materials

Packing materials and components may be damaged during transportation. Therefore, check the outer packing materials before installing the battery. Checking the surface of the packing material for any damage, such as holes and cracks. If any damage is found, do not unpack the battery and contact the dealer as soon as possible. Remove the packing materials within 24 hours before installing the battery.

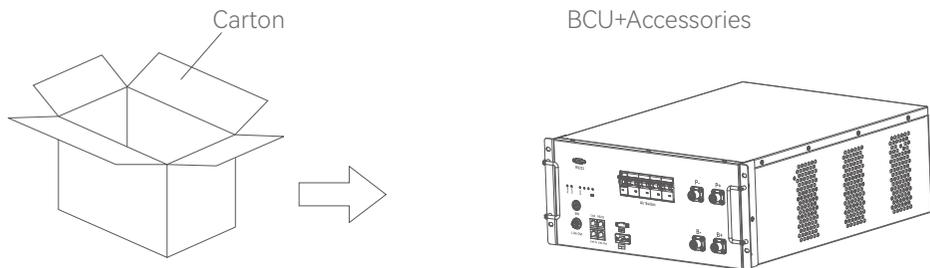
3.1.2 Checking Deliverables

After unpacking the battery, check whether deliverables are intact and complete. If any damage is found or any component is missed, contact the dealer.

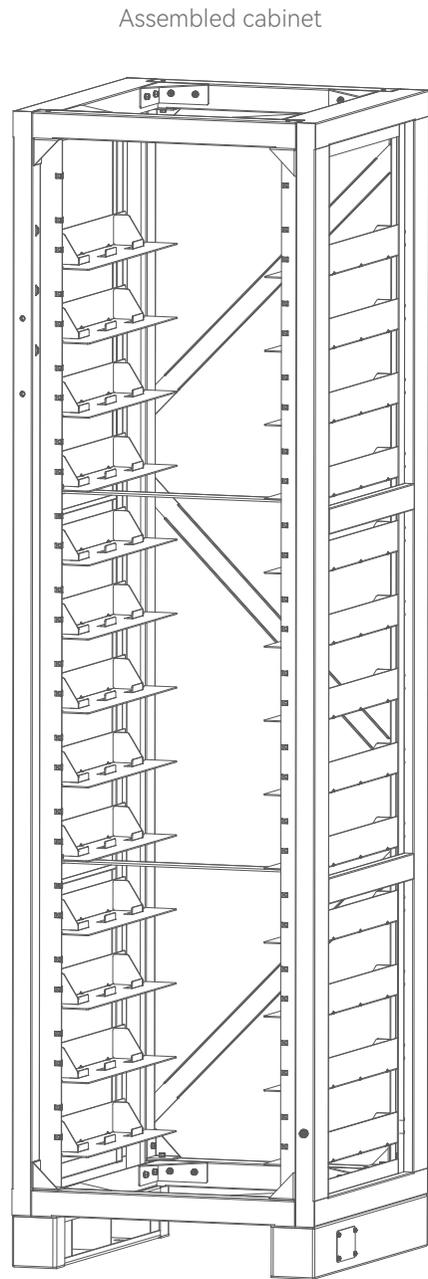
The below table shows the components that should be delivered.



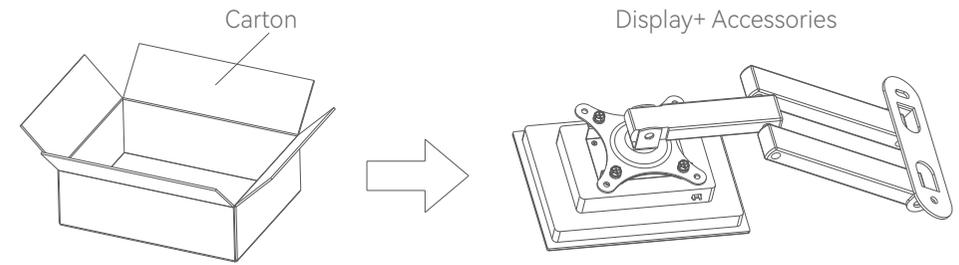
Battery			
NO.	Pictures	Quantity	Description
1		1PCS	Battery
2		1PCS	Communication cable 1
3		1PCS	Power cable 2
4		5PCS	M6*20
5		1PCS	Test Report
6		1PCS	Certificate

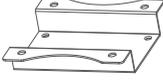
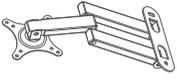
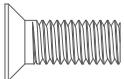
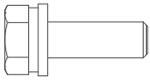


BCU			
NO.	Pictures	Quantity	Description
1		1PCS	BCU
2		1PCS	Power cable 1
3		1PCS	Power cable 3
4		1PCS	Resistor terminal
5		1PCS	120A Orange plug
6		1PCS	120A Black plug
7		2PCS	RNBS22-6
8		2PCS	RNB8-8
9		4PCS	Heat shrink bushing (Φ10*20)
10		4PCS	Heat shrink bushing (Φ15*30)
11		6PCS	M6*20
12		1PCS	Manual
13		1PCS	Test Report
14		1PCS	Certificate



One set of assembled cabinet. For the assembled cabinet, refer to the cabinet installation instructions.



Display screen (Optional)			
NO.	Pictures	Quantity	Description
1		1PCS	Display screen
2		1PCS	Transfer bracket
3		1PCS	Display screen bracket
4		1PCS	12V Power cable
5		1PCS	Communication cable 2
6		6PCS	M3*8
7		4PCS	M6*12
8		4PCS	M8*16

3.2 Tools

Model	Tools		
Installation	Knife 	Hammer drill (16mm) 	Socket wrench (10mm/13mm) 
	Rubber mallet 	Cross screwdriver 	Marker 
	Inclinometer 	Measuring tape 	
Protection	ESD gloves 	Safety goggles 	Anti-dust respirator 
	Safety shoes 		

3.3 Installation Requirements

3.3.1 Installation Environment Requirements

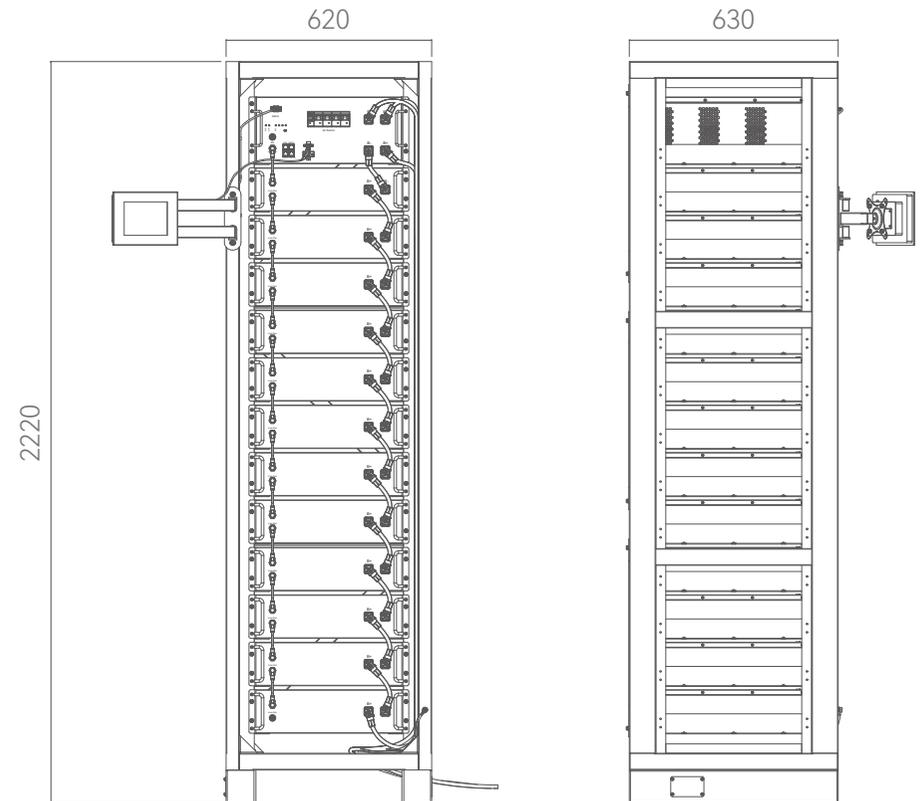
- Install the battery in the indoor environment.
- Place batteries in a secure location away from children and animals.
- Do not place the battery near any heat sources and avoid sparks.
- Do not expose the battery to moisture or liquids.
- Do not expose the battery to direct sunlight.

3.3.2 Installation Carrier Requirements

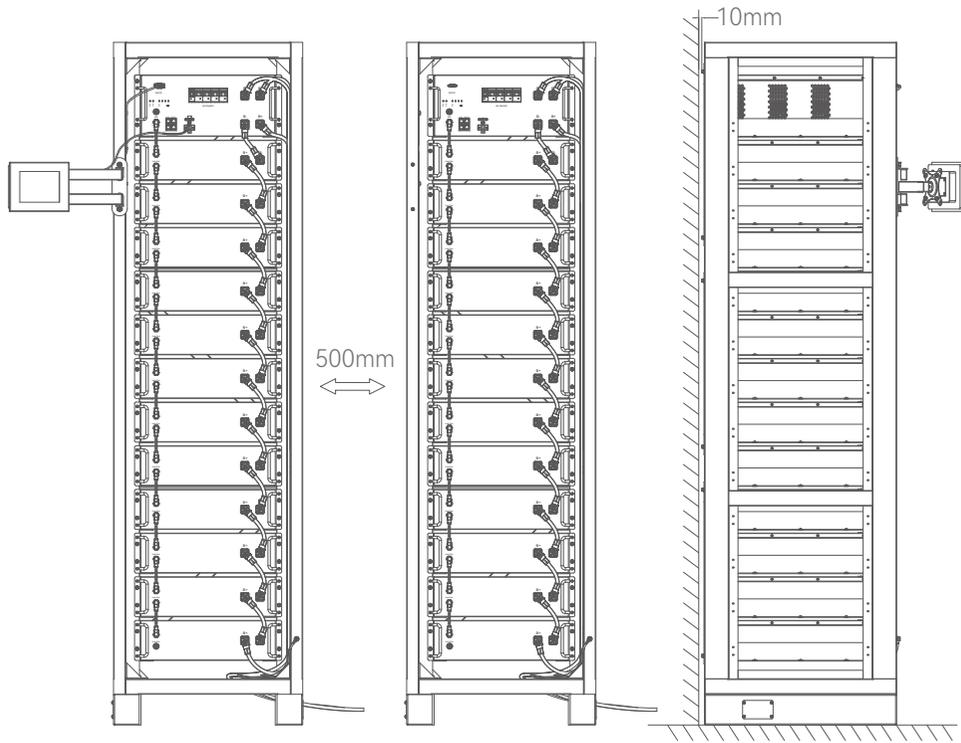
- Only mount batteries on fire-resistant buildings. Do not install batteries on flammable buildings.
- Due to the quite heavy battery, make sure the wall/ground can meet the load-bearing requirements.

3.4 Installation Instructions

3.4.1 Dimensions



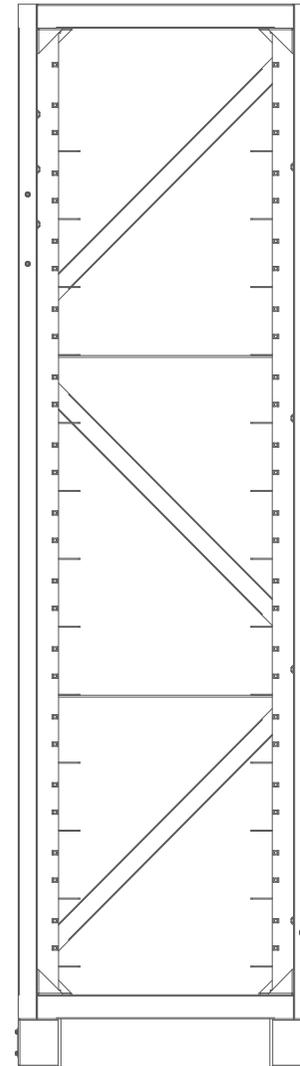
Minimum mounting interval:



3.4.2 Installation Steps

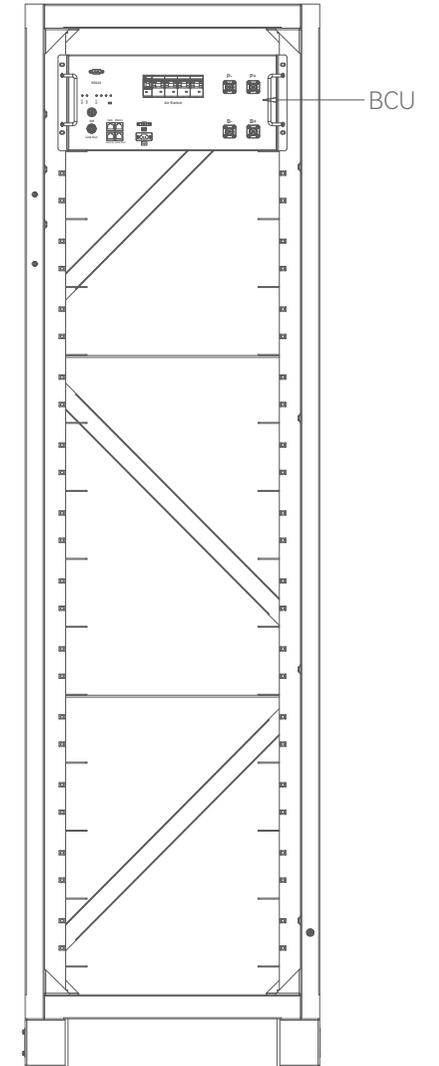
Step 1

Secure the cabinet.



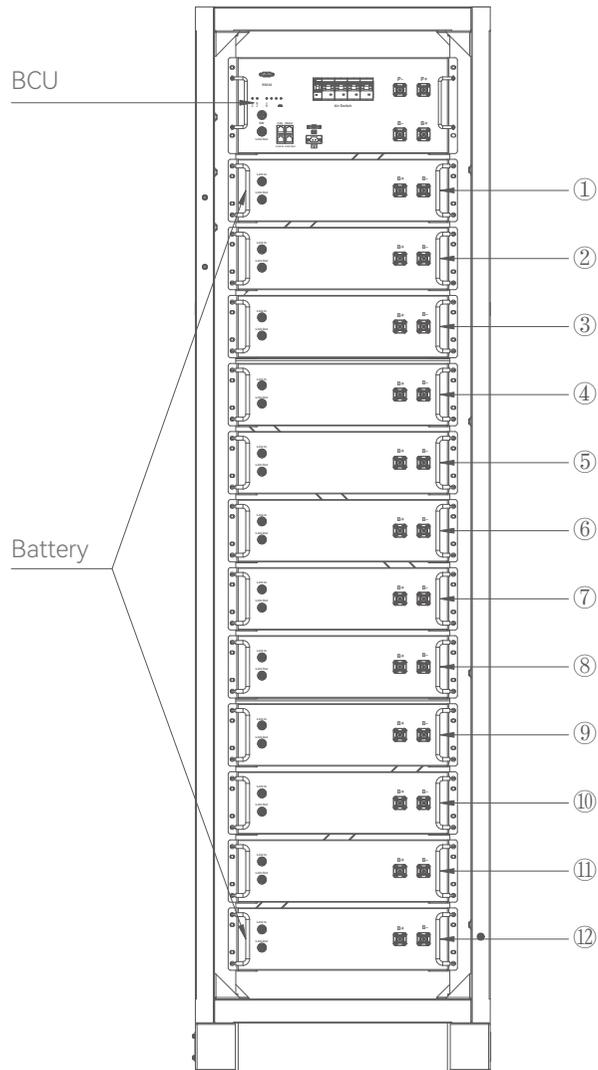
Step 2

Install the BCU into the cabinet.



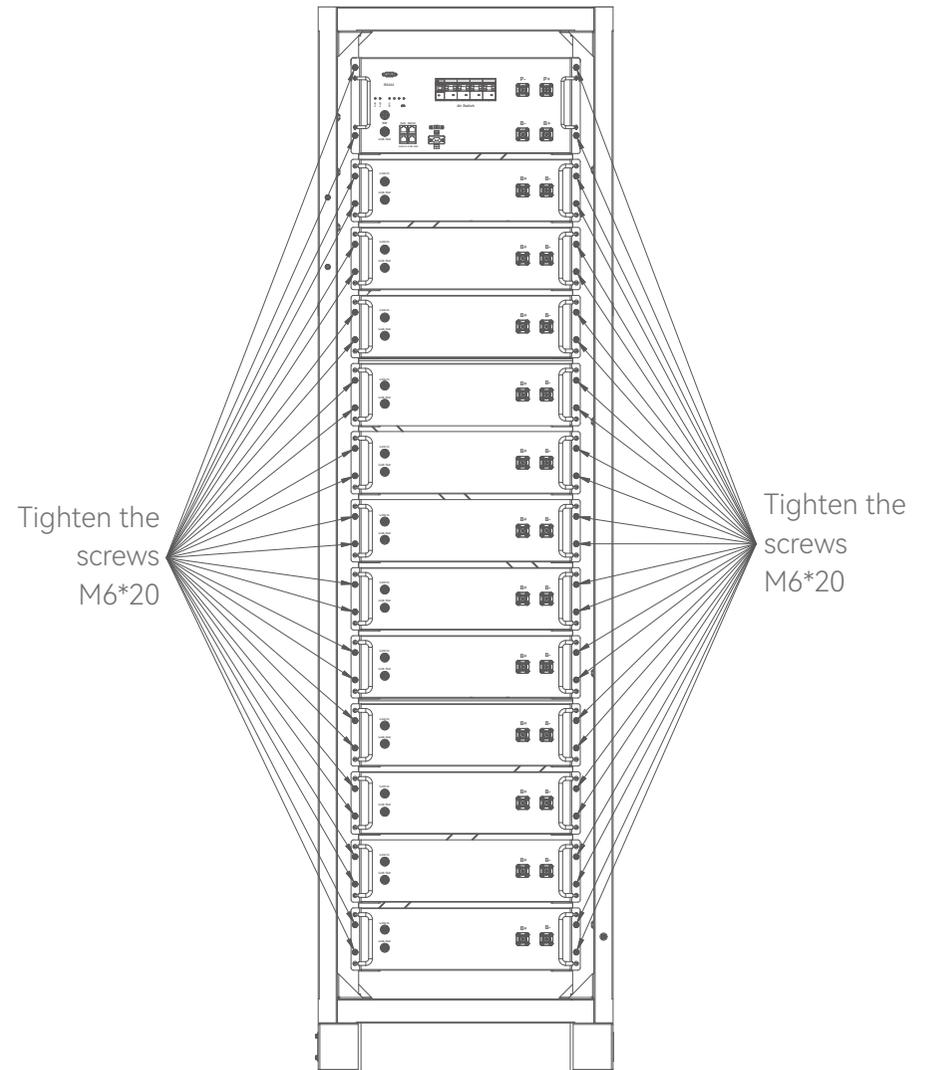
Step 3

Install the battery boxes into cabinets one by one.



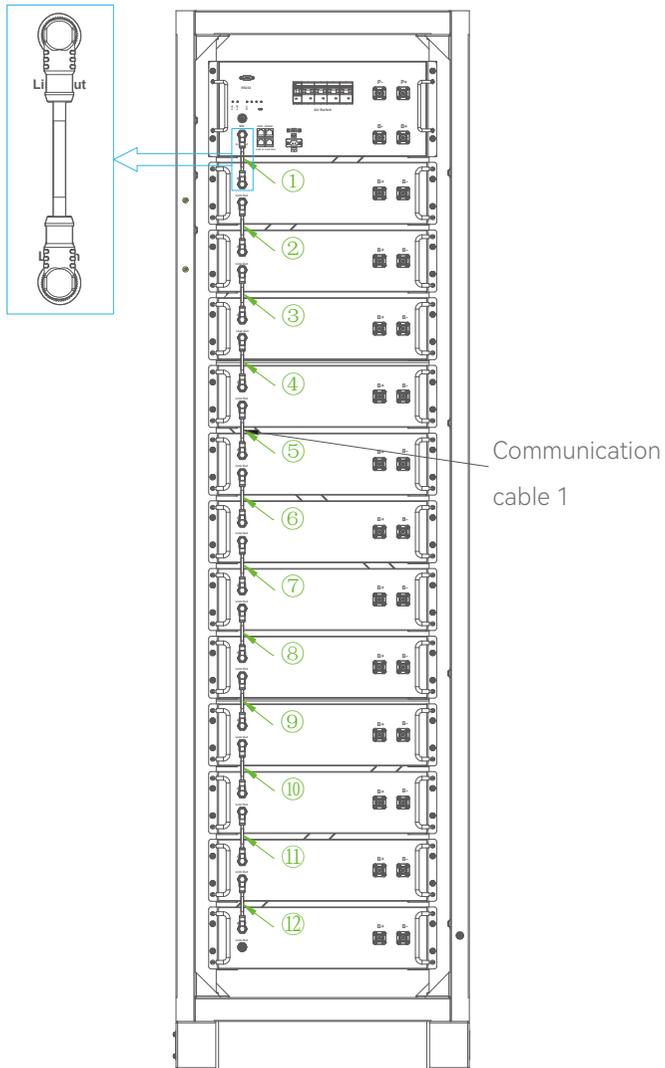
Step 4

Use screws to fix the main control box and battery box to the cabinet.



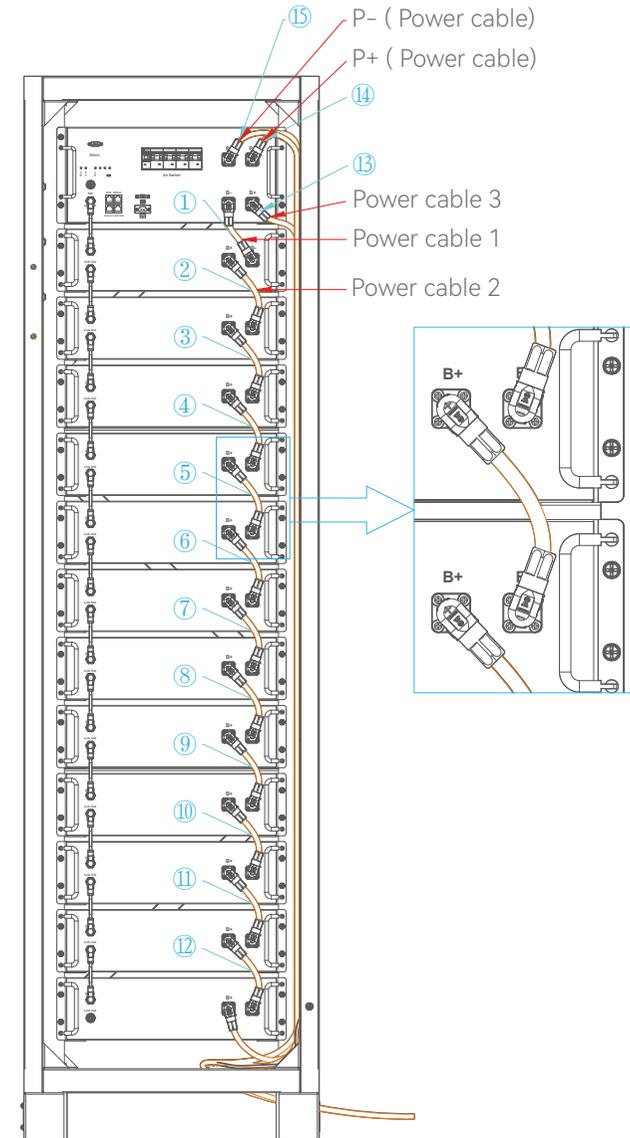
Step 5

Connect communication cables in sequence.



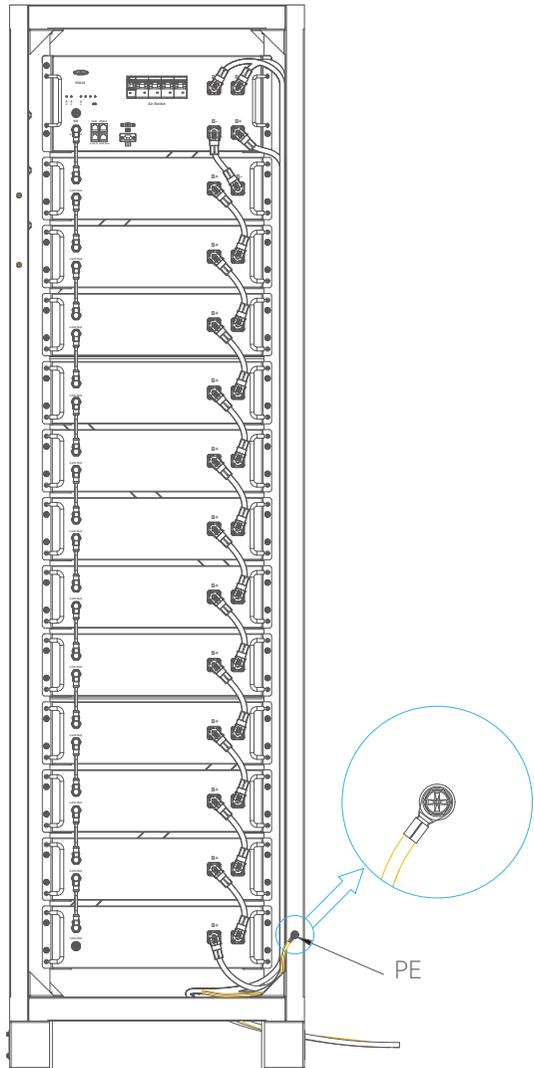
Step 6

Connect power cables in sequence.



Step 7

Connect the cabinet to the ground.

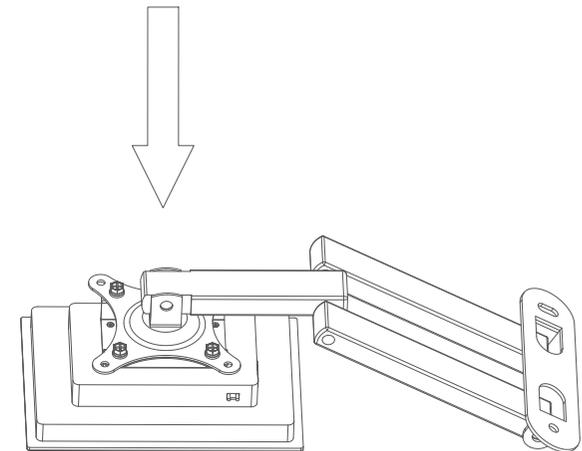
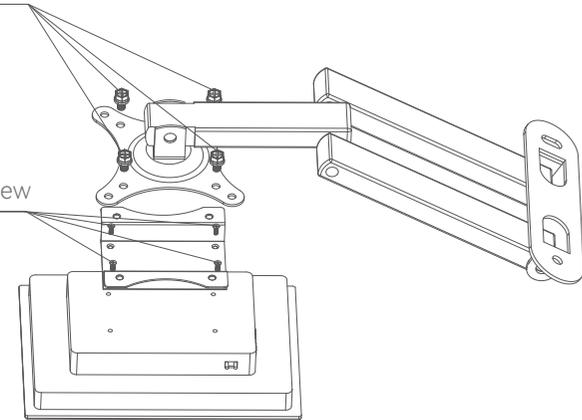


Step 8

Attach the display to the display screen bracket.

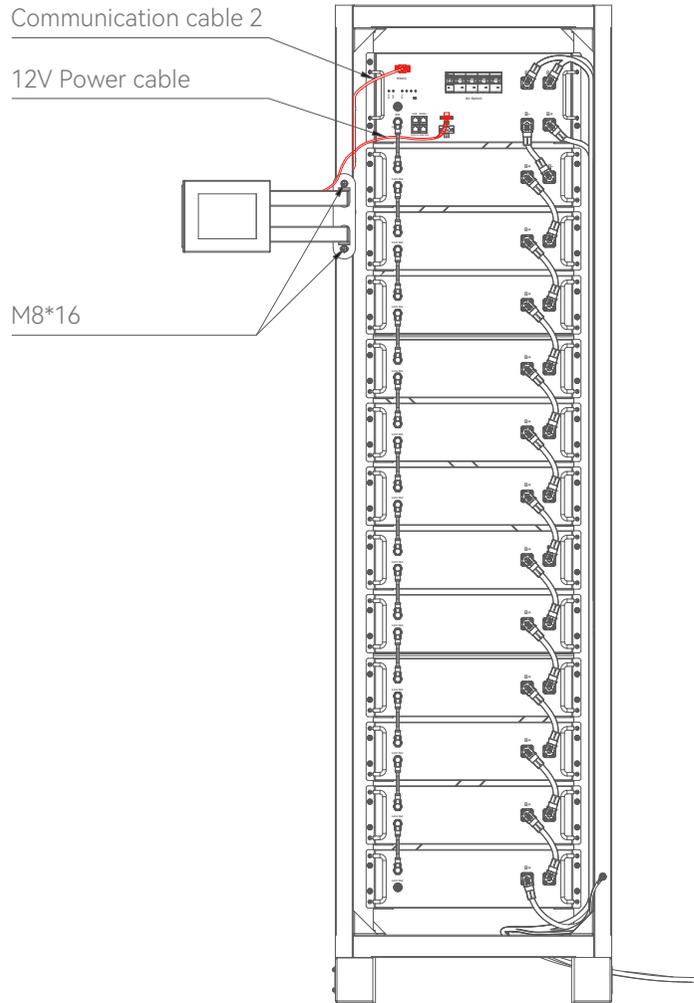
M6* 12
Combination screw

M3*8
Countersunk head screw



Step 9

Install the display and connect the communication cable and power cable.



Definition of RJ45 Port Pin for RS485 that PCS connects to the display:

PIN	Definition
Pin1,Pin8	RS485_B2
Pin2,Pin7	RS485_A2
Pin3,Pin6	GND

Step 10

Electrical connections.

1. Prepare power cable on side

You are advised to use the EV power cable with size 25mm² or 3AWG (1500V).

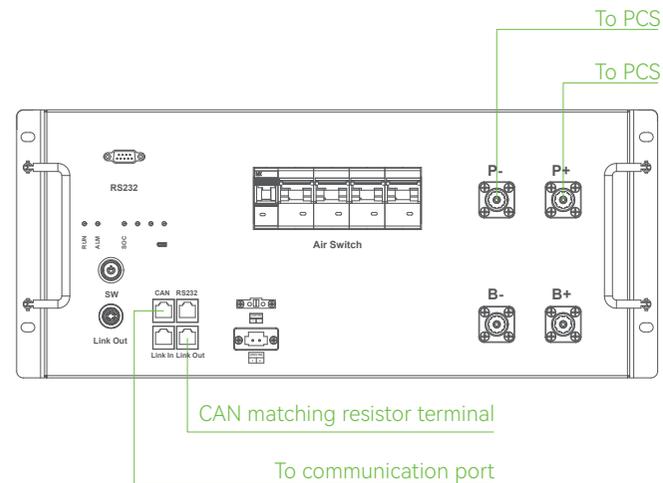
2. Prepare CAN communication cable on side

Refer to the following BCU CAN communication cable definition, according to the different inverter communication port definition, make corresponding communication terminal on site.

BCU CAN communication cable definition:

PIN	Definition
Pin 4	CAN_H
Pin 5	CAN_L

3. Single MPS-HV51100HVCX electrical connection



A. Connect power cable

Connect P+ \ P- power cable from BCU to isolation device.

B. Connect CAN communication cable

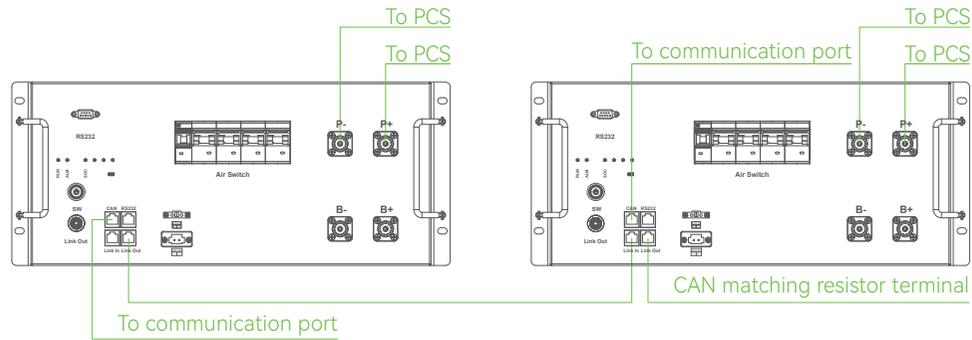
Connect CAN cable from BCU CAN port to PCS communication port.

C. Connect CAN matching resistor terminal

Connect CAN matching resistor terminal to BCU Link Out.

Note: Reverse connection prohibited!

4. Multiple MPS-HV51100HVCX parallel electrical connection



NOTE:

BCU1 is BCU of 1st MPS-HV51100HVCX; BCU2 is BCU of 2nd MPS-HV51100HVCX, and so on.

A. Connect power cable

Connect P+ \ P- power cable from BCU to isolation device.

Note: Reverse connection prohibited!

B. Connect CAN communication cable

Connect CAN cable from BCU1 CAN port to PCS communication port.

C. Connect parallel communication cable

Connect parallel communication cable from BCU1 Link Out to BCU2 Link In.

D. Connect CAN matching resistor terminal

Connect CAN matching resistor terminal to BCU2 Link Out.

Step 11

Switch ON / OFF MPS-HV51100HVCX

Note: Before Switch ON Air Switch, double check all power cables and communication cables are properly connected.

1. Single MPS-HV51100HVCX

A. Switch ON BCU Air Switch;

B. Switch ON / OFF MPS-HV51100HVCX.

1. Switch ON MPS-HV51100HVCX: Press SW button more than 3s, LED will light from L6 / L4 to L1, and then enters to automatic coding while all LED lights. After finished automatic coding, L1 to L4 shows the normal capacity, and L6 shows the running status.

2. Switch OFF MPS-HV51100HVCX: Press SW button more than 3s, LED will light from L1 to L4 / L6, then MPS-HV51100HVCX will switch OFF, then switch OFF the Air Switch.

2. Multiple MPS-HV51100HVCX in Parallel

A. Switch ON Air Switch of BCU1 and BCU2;

B. Switch ON / OFF the battery system.

1. Press SW button of BCU1 more than 3s, LED will light from L6 / L4 to L1, and then enter to automatic coding (assign BCU address and battery pack address) while all LED lights. After finished automatic coding, L1 to L4 shows the normal capacity, and L6 shows the running status.

2. Switch OFF the battery system: Press SW button of BCU1 more than 3s, LED will light from L1 to L4 \ L6, then the battery system will switch OFF, and then switch OFF the Air Switch.

Note:

1. After switching OFF battery system with SW button (Air Switch still ON), the battery system can be activated by charging the battery.

2. The battery needs to be fully charged for SOC calibration when it's switched ON for the first time.

04

Cleaning and Maintenance

4.1 Cleaning

CAUTION:

Please power off the system before cleaning.

It is recommended that the MPS-HV51100HVCX should be cleaned periodically. If the enclosure is dirty, please use a soft, dry brush or a dust collector to remove the dust. Liquids such as solvents, abrasives or corrosive liquids should not be used to clean the enclosure.

4.2 Maintenance

4.2.1 Battery Storage

Batteries should be stored in an environment with a temperature range between $-10^{\circ}\text{C} \sim +45^{\circ}\text{C}$, and maintained regularly according to the following table with 0.5C (50A) current until 40% SOC after a long time of storage.

Recharge conditions when in storage			
Storage Environment Temperature	Relative Humidity of Storage Environment	Storage Time	SOC
Below -10°C	/	prohibit	/
$-10 \sim 25^{\circ}\text{C}$	5%~70%	≤ 12 months	$30\% \leq \text{SOC} \leq 60\%$
$25 \sim 35^{\circ}\text{C}$	5%~70%	≤ 6 months	$30\% \leq \text{SOC} \leq 60\%$
$35 \sim 45^{\circ}\text{C}$	5%~70%	≤ 3 months	$30\% \leq \text{SOC} \leq 60\%$
Above 45°C	/	prohibit	/

4.2.2 Recharge Requirements When Over Discharged

Please recharge the over-discharged batteries (90% DOD) in a timeframe that is in accordance to the following table, otherwise the over-discharged battery modules will be damaged.

Recharge conditions when battery is over discharged

Recharge conditions when in storage		
Storage Environment Temperature	Storage Time	Note
$-10 \sim 25^{\circ}\text{C}$	≤ 15 days	Battery Pack disconnect to PCS
$25 \sim 45^{\circ}\text{C}$	≤ 7 days	

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DISPOSAL OF THE BATTERY SYSTEM

Disposal of the battery must comply with the local applicable disposal regulations for electronic waste and used batteries.

- Do not dispose of the battery system with your household waste.
- Avoid exposing the batteries to high temperatures or direct sunlight.
- Avoid exposing the batteries to high humidity or corrosive atmospheres.