ENERGY TECHNOLOGIES
BUILD LIFE BETTER

RESIDENTIAL
BATTERY

RT 5.12-HX
Product Description

Contact Details

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CONTENTS

01 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 RT 5.12-HX. 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.

Versatile Solutions

Meet diverse home energy needs with LFP batteries that ensure safety and reliability.

Hassle-Free Setup

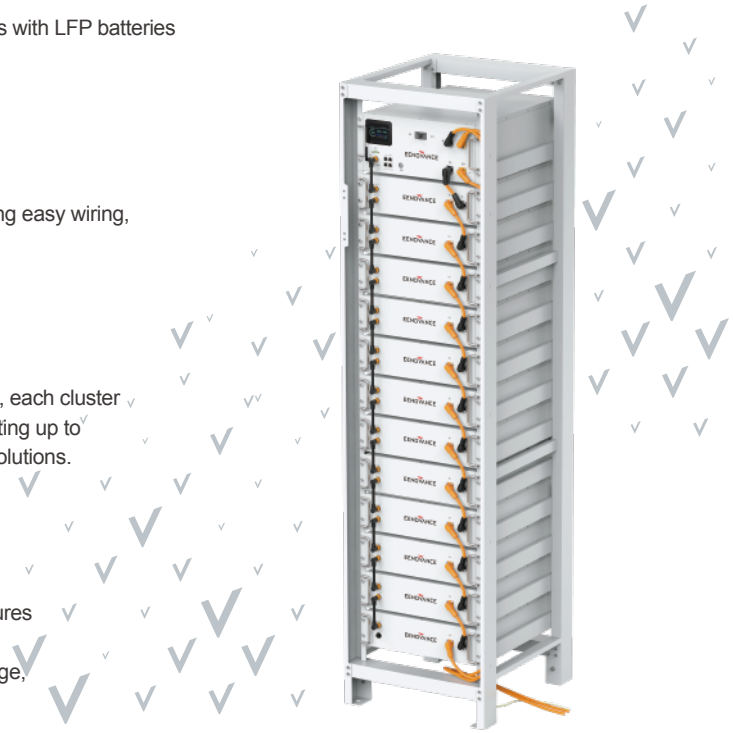
Quick-connect coupling, facilitating easy wiring, and effortless maintenance.

Flexible and Expandable

With a 5.12 kWh modular design, each cluster supports up to 12 packs, connecting up to 15 clusters for versatile energy solutions.

Self-developed BMS

Built-in self-developed BMS ensures comprehensive protection and automatically manages charge, discharge, and cell balancing.



1.2 Datasheet

DATASHEET

Model	RT 5.12-H4	RT 5.12-H5	RT 5.12-H6	RT 5.12-H7	RT 5.12-H8
	RT 5.12-H9	RT 5.12-H10	RT 5.12-H11	RT 5.12-H12	
Performance					
Cell technology	LFP (LiFePO4)				
Number of modules	4	5	6	7	8
	9	10	11	12	
Battery usable energy [1]	20.48 kWh	25.6 kWh	30.72 kWh	35.84 kWh	40.96 kWh
	46.08 kWh	51.2 kWh	56.32 kWh	61.44 kWh	
Nominal voltage	204.8 V	256 V	307.2 V	358.4 V	409.6 V
	460.8 V	512 V	563.2 V	614.4 V	
Operating voltage	179.2 - 224.64 V	224.0 - 280.80 V	268.8 - 336.96 V	313.6 - 393.12 V	358.4 - 449.28 V
	403.2 - 505.44 V	448.0 - 561.60 V	492.8 - 617.76 V	537.6 - 673.92 V	
Max.charge and discharge current [2]	100 A				
Communication					
Display	LCD display				
Communication	CAN / RS485 / RS232 / Wi-Fi / LAN				
General Specification					
Dimension (W×D×H)	566×630×1652 mm				
	22.3×24.8×60.0 inch				
	566×630×2220 mm				
	22.3×24.8×87.4 inch				
Weight	250 kg (551.2 lbs)	295 kg (650.4 lbs)	340 kg (749.6 lbs)	385 kg (848.8 lbs)	430 kg (948.0 lbs)
	615 kg (1355.9 lbs)	660 kg (1455.1 lbs)	705 kg (1554.3 lbs)	750 kg (1653.5 lbs)	
Installation	Floor stand				
Operating temperature [3]	Charge : 0 to 50°C (32 to 122°F) Discharge: -15 to 50°C (5 to 122°F)				
Environmental humidity	≤ 95%RH (No condensation)				
Ingress protection rating	IP 20				
Warranty Period [4]	10 years				
Scalability	Max 12 modules per stack, 15 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					
Compliance	UN38.3 / IEC62619 / IEC62040-1 / IEC61000-6-2 / IEC61000-6-4 / IEC62477-1 (More available upon request)				
Ordering and Deliverable Part					
Part	RT-5.12-QC-A (Battery Pack)				
	RT 5.12-H-BCU (Battery Control Unit)				
	RT-R8-A, RT-R12-A (Battery Rack)				

[1] Test conditions: 100% depth of discharge (DOD), 0.2C rate charge & discharge at 25°C.
[2] There is 0.5C or 1C configurations optional in factory default.
[3] Charge/discharge derating occurs when the temperature is below 0°C or above 45°C.
[4] Please refer to the Warranty Letter for applicable conditions.

02 Product Overview

2.1 Brief Introduction

Product overview

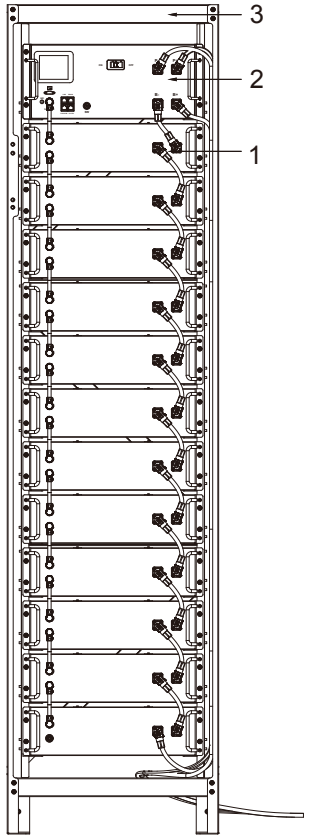
RT 5.12-HX is a high-voltage lithium-ion battery system. It consisting of 4-12 pcs battery modules (51.2V/100AH) and one BCU (Battery Control Unit) in series. It provides a reliable backup power supply for supermarkets, banks, schools, farms and small factories to smooth the load curve and achieve peak load transfer. It can also improve the stability of renewable systems and promote the application of renewable energy. RT 5.12-HX is not suitable for supporting life-sustaining medical devices.RT 5.12-HX 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 20.48 kWh to 61.44 kWh.

RT 5.12-HX 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.

RT 5.12-HX has an internal soft-start circuit, so RT 5.12-HX can support the inverter without asoft-start function. RT 5.12-HX supports black start function while working with compatible inverters.

2.2 Battery System Overview

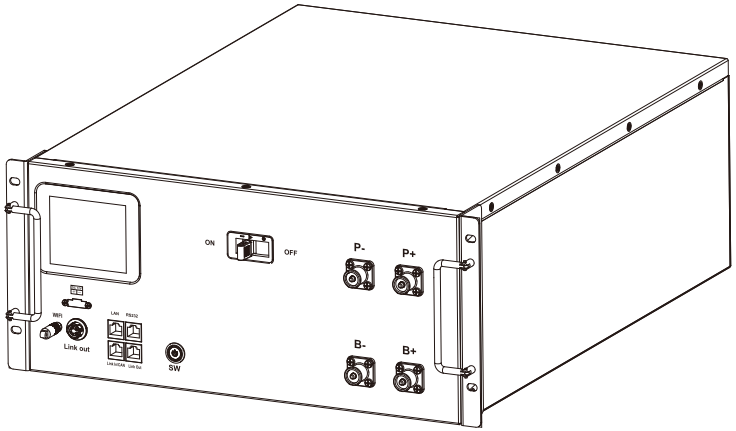
RT 5.12-X consists of cabinet, battery modules connected in series, BCU (Battery Control Unit).



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

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
Maximum Current	100 A
Operating Temperature	Charge: 0 - 50°C, Discharge: -15-50°C
Environmental Humidity	≤95%RH
Ingress Protection Rating	IP20
Cooling	Natural
Weight(kg)	22 kg
Dimension(W*H*D)	482*200*570 mm
Communication	CAN / RS485 / RS232 / Wi-Fi / LAN

2.3.2 LCD Display

Display function

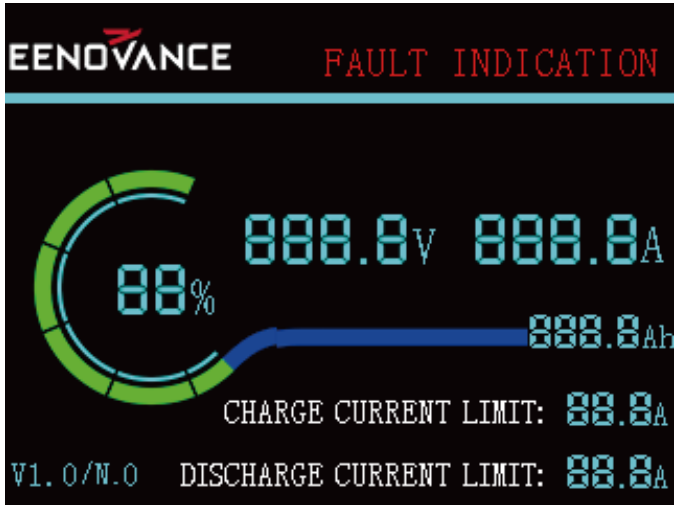
The display will display the battery system SOC, system voltage, system current, fault information, battery system rated capacity, charging current limit value, discharge current limit value, software version, and parallel address information in real time.

Wake up

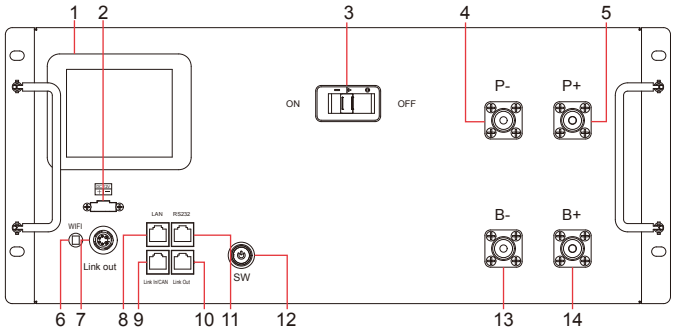
1.Press the ON / OFF Button once to wake up not hold pressing.
2.The LCD remains on when a fault occurs, otherwise it enters sleep mode after one minute.

Sleep mode

1.LCD will enter sleep mode after one minute normal operation.



2.3.3 Port Definition



NO.	Items	NO.	Items
1	LCD	8	LAN Port
2	DC 12V	9	BCU Link Port In/CAN
3	Power Switch	10	BCU Link Port Out
4	P-	11	RS232 Port
5	P+	12	SW Button
6	WIFI	13	B-
7	Link out	14	B+

2.3.3.1 Power Switch

Main MCB: Switch ON / OFF RT 5.12-HX.

2.3.3.2 SW Button

After switch ON the Power Switch, long press SW button to switch ON / OFF RT 5.12-HX.

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.

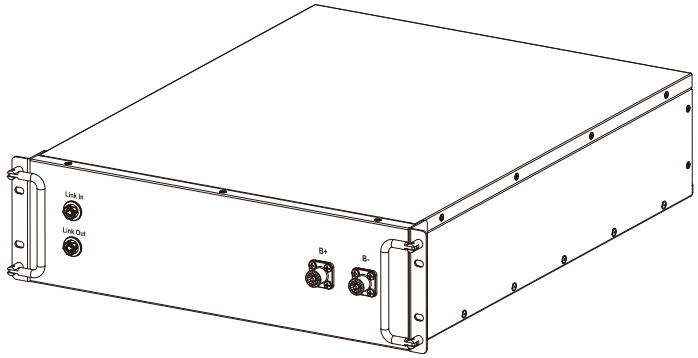
2.3.4 RS232 Port

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

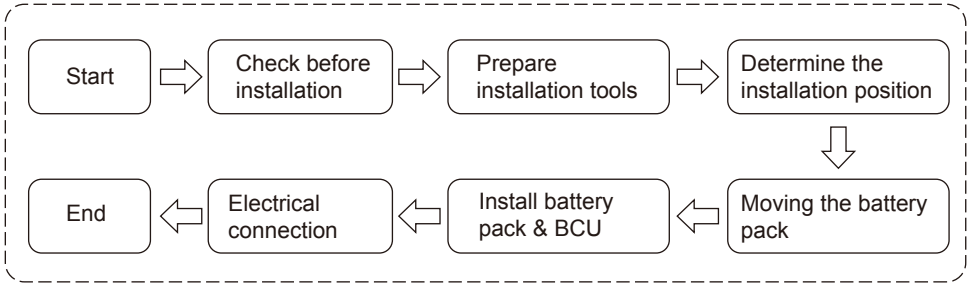
Battery module includes 51.2V / 100Ah battery unit and slave BMS. The slave BMS collects the cell voltage and temperature of the battery unit in real time and sends these messages to the master BMS through internal communication.
Slave BMS integrates a cell balance circuit, which can balance cell capacity according to the control instructions of Master BMS.



Parameters	Specification
Battery Type	$LiFePO_4$ Lithium Iron Phosphate
Nominal Voltage	51.2 V
Nominal Capacity	100 Ah
Usable Energy (100%DOD)	5.12 kWh
DOD	< 90%
Maximum Charging Current	100 A
Maximum Discharge Current	100 A
Temperature	Charge: 0 - 50°C, Discharge: -15-50°C
Operating Humidity	≤95%RH
Ingress Protection Rating	IP20
Cooling	Natural
Weight(kg)	43 kg
Dimension(W*H*D)	482*130*570 mm

03 Installation Guide

Installation flow chart



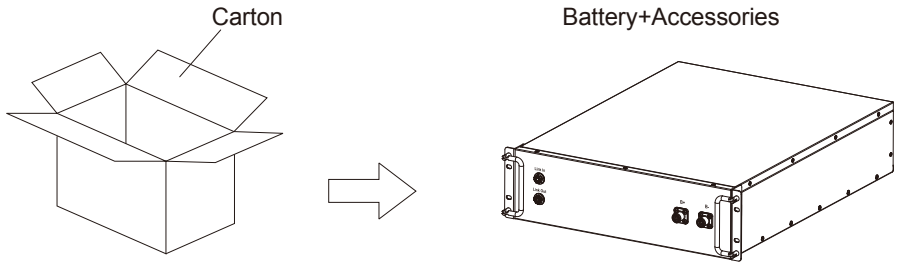
3.1 Checking Before Installation

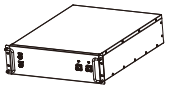
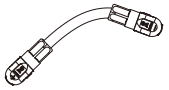
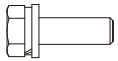
3.1.1 Checking Outer Packing Materials

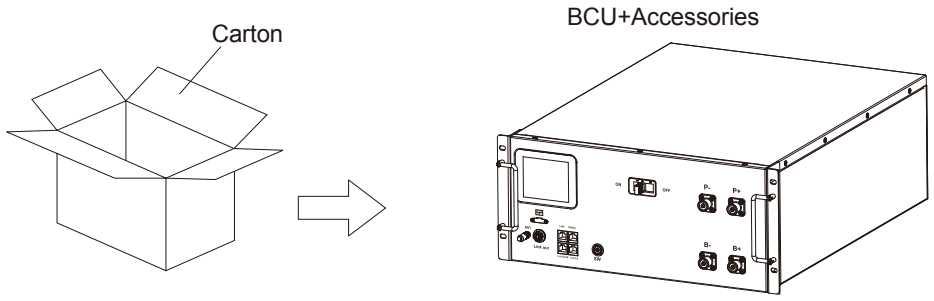
Packing materials and components may be damaged during transportation. Therefore, check the outer packing materials before installing the battery. Checking the surface of the packing material for any damage, such as holes and cracks. If any damage is found, do not unpack the battery and contact the dealer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

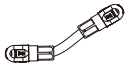
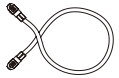
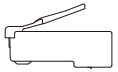
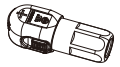
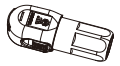
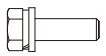
3.1.2 Checking Deliverables

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.

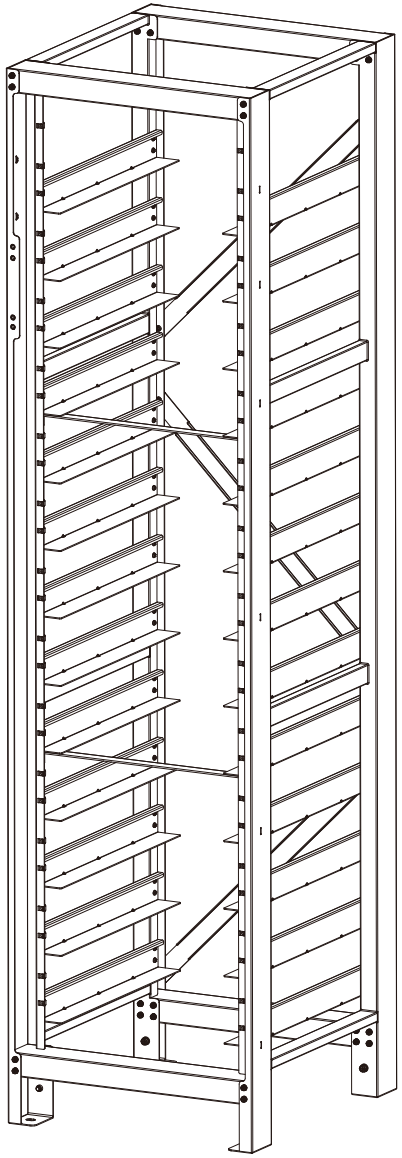


Battery			
NO.	**Pictures**	**Quantity**	**Description**
1		1PCS	Battery
2		1PCS	Communication cable 1
3		1PCS	Power cable 2
4		5PCS	M6*20
5		1PCS	Test Report
6		1PCS	Certificate



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

Assembled rack



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

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

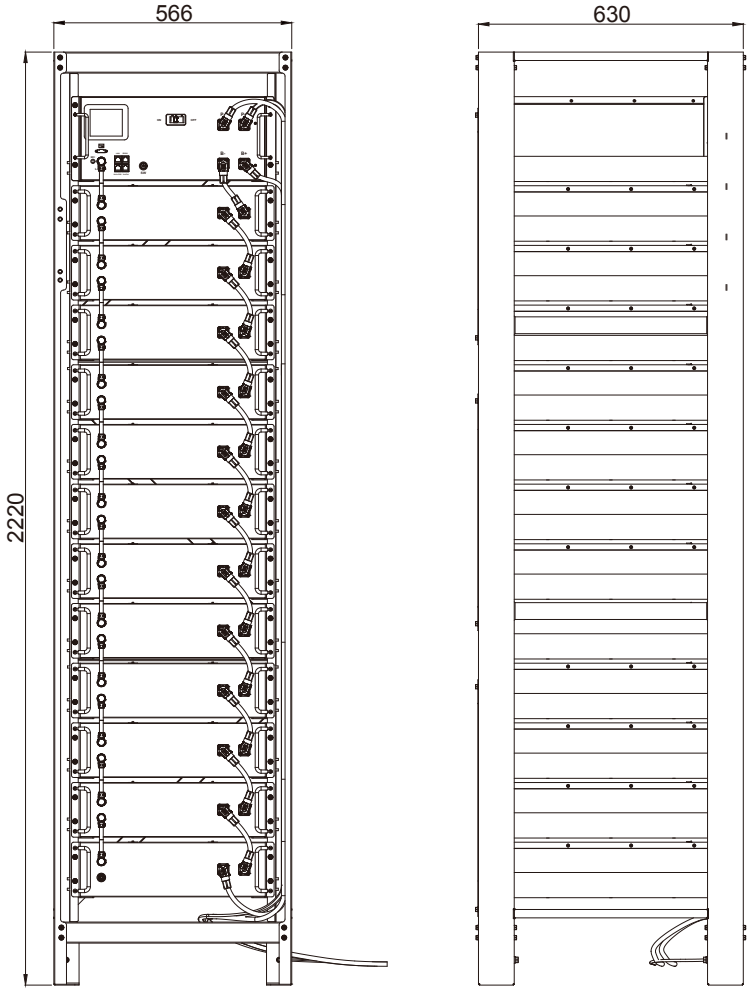
•Install the battery in the indoor environment.
•Place batteries in a secure location away from children and animals.
•Do not place the battery near any heat sources and avoid sparks.
•Do not expose the battery to moisture or liquids.
•Do not expose the battery to direct sunlight.

3.3.2 Installation Carrier Requirements

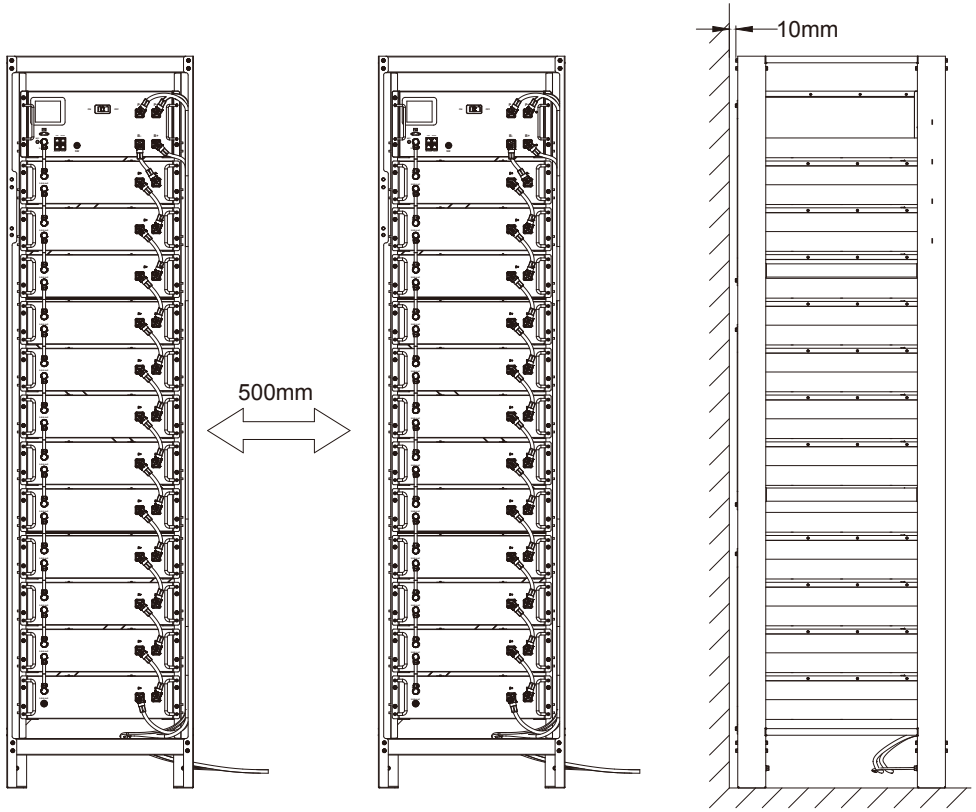
•Only mount batteries on fire-resistant buildings. Do not install batteries on flammable buildings.
•Due to the quite heavy battery, make sure the wall/ground can meet the load-bearing requirements.

3.4 Installation Instructions

3.4.1 Dimensions



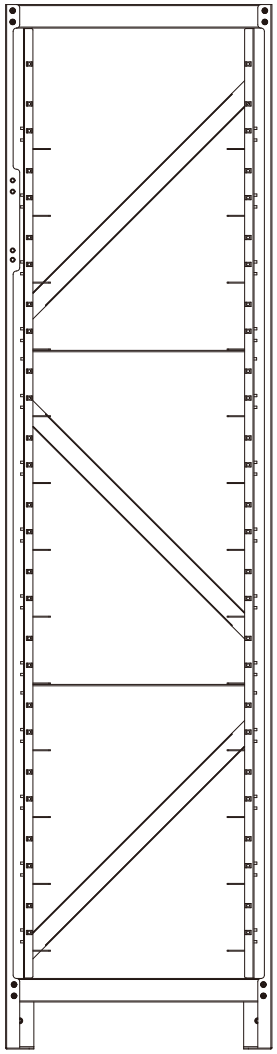
Minimum mounting interval:



3.4.2 Installation Steps

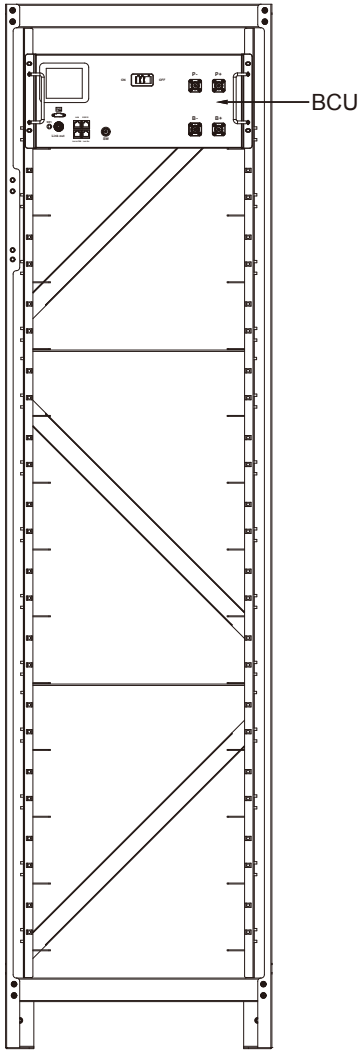
Step 1

Secure the rack.



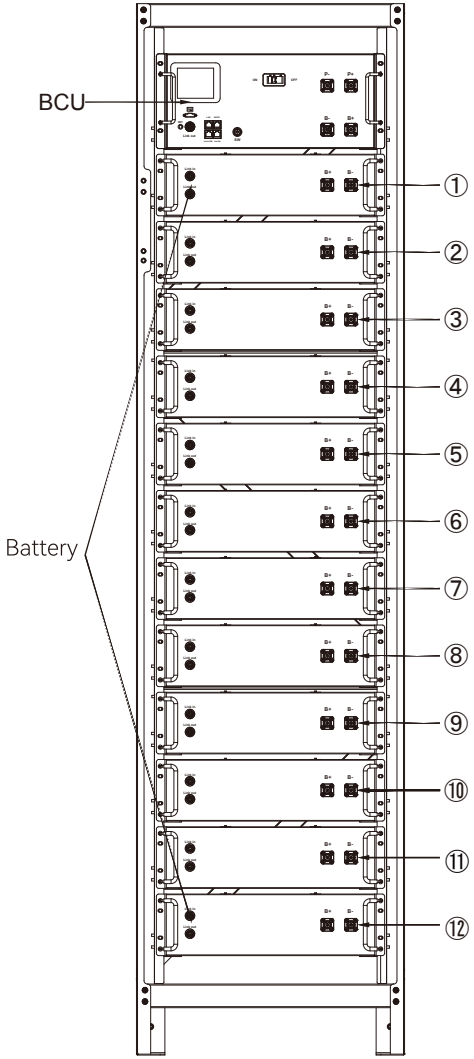
Step 2

Install the BCU into the rack.



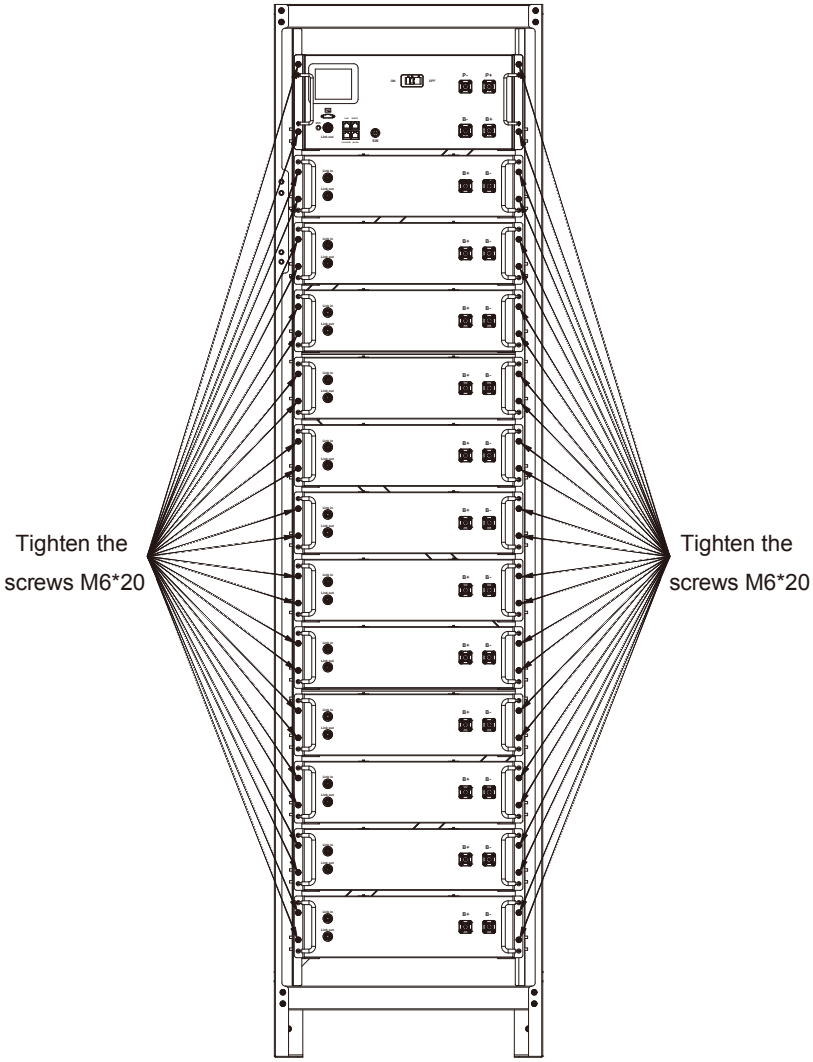
Step 3

Install the battery boxes into rack one by one.



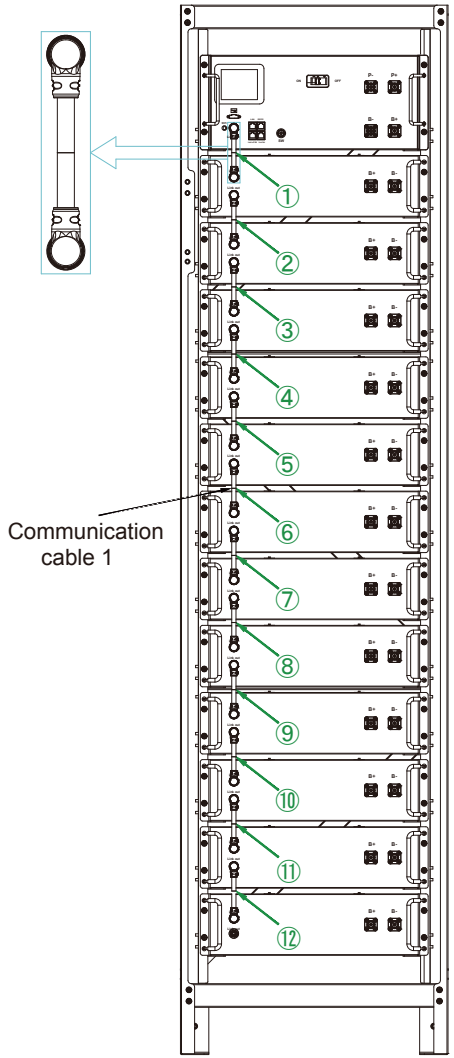
Step 4

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



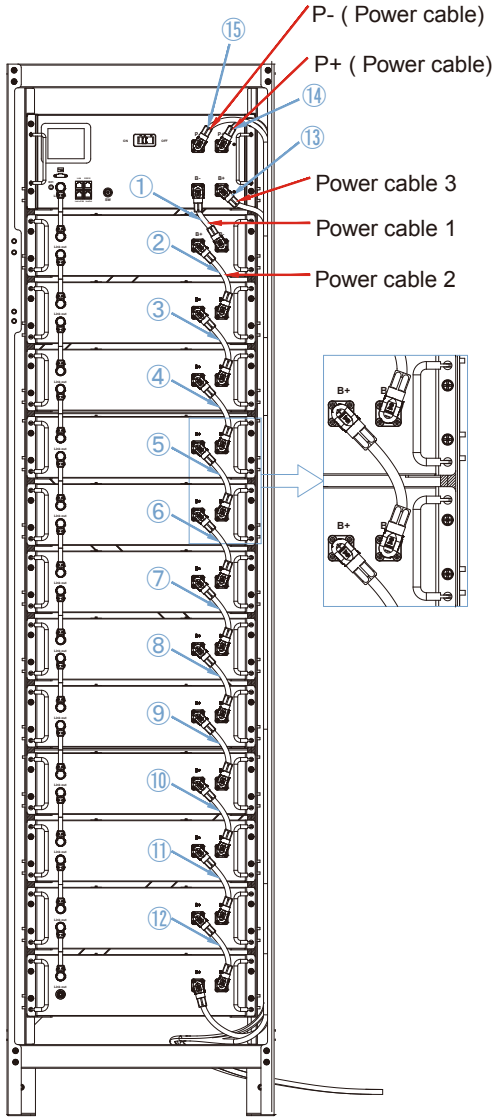
Step 5

Connect communication cables in sequence.



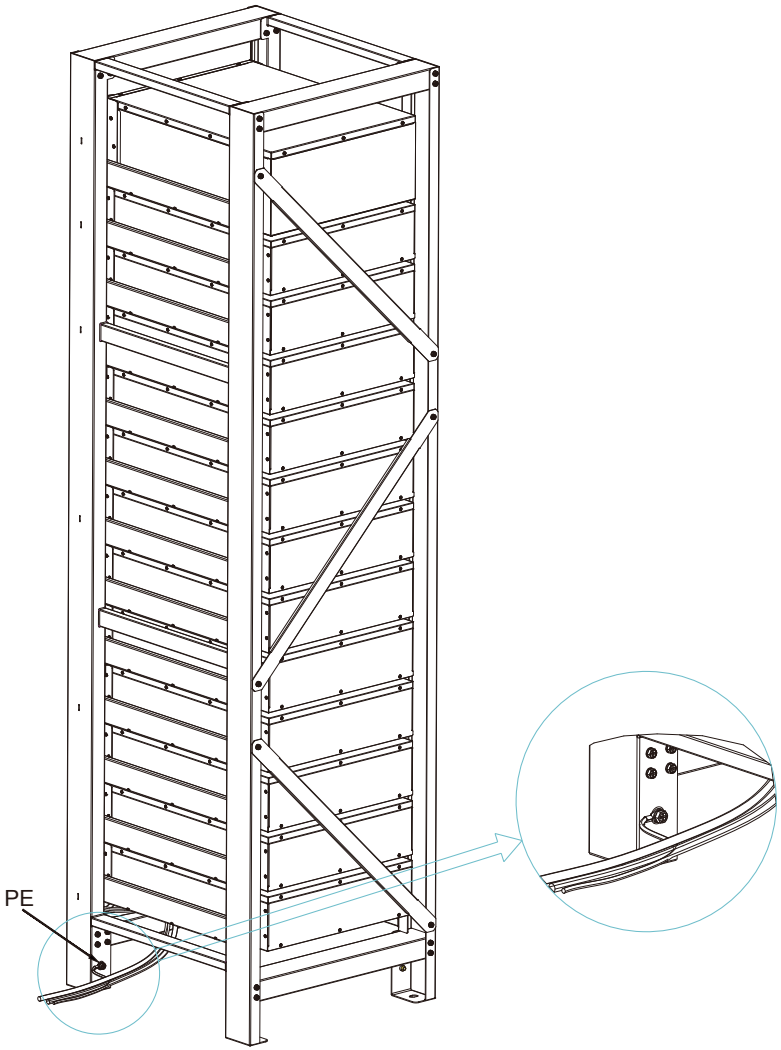
Step 6

Connect power cables in sequence.



Step 7

Connect the rack to the ground.



Step 8

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

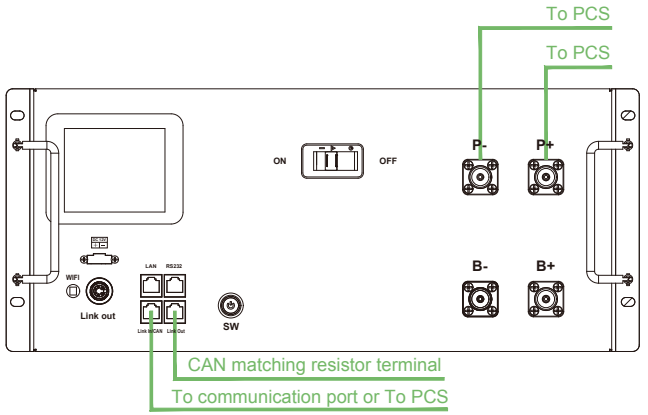
Refer to the following BCU CAN communication cable definition, according to the different inverter communication port definition, make corresponding communication terminal on site.

BCU CAN communication cable definition:

PIN	Definition
Pin 4	CAN_H
Pin 5	CAN_L

NOTE: BCU CAN communication cable only pin4 and pin5 are connected.

3. Single RT 5.12-HX electrical connection



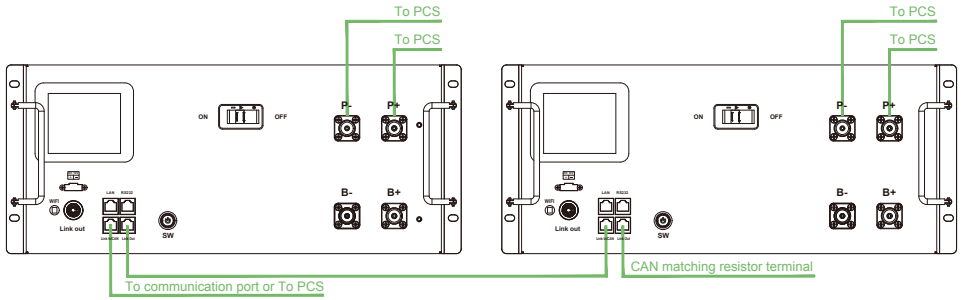
A. Connect power cable
Connect P+ \ P- power cable from BCU to isolation device.

Note: Reverse connection prohibited!

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

C. Connect CAN matching resistor terminal
Connect CAN matching resistor terminal to BCU Link Out.

4. Multiple RT 5.12-HX parallel electrical connection



NOTE:
BCU1 is BCU of 1st RT 5.12-HX; BCU2 is BCU of 2nd RT 5.12-HX, 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 9

Switch ON / OFF RT 5.12-HX

Note: Before switch on Power Switch, double check all power cables and communication cables are properly connected.

1. Single RT 5.12-HX

Power-on:

A. Switch on BCU Power Switch;

B. Press ON / OFF Button more than 3s, LCD display will be on and system start the automatic and start up.

Power-off:

A. Press ON / OFF Button more than 3s, LCD display will be off.

B. Switch off the Power Switch.

2. Multiple RT 5.12-HX Pro in Parallel

Power-on:

A. Switch on all the BCU Power Switch;

B. Press ON / OFF Button of BCU1(master) more than 3s, LCD display will be on.After finished automatic coding, LCD display will show parallel address. Master address is 0, other slaves are 1,2,3.

Power-off:

A. Press ON / OFF Button of BCU1(master) more than 3s, all the LCD display will be off.

B. Switch off all the BCU Power Switch.

STEP 10

Monitoring

After the RT 5.12-HX Pro is put into use, the user can view the status of the product through the provided website and APP.For details, please refer to the Monitoring Platform User Manual .

04 Cleaning and Maintenance

4.1 Cleaning

CAUTION:
Please power off the system before cleaning.
It is recommended that the RT 5.12-HX 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°C+45°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	/
-10~25°C	5%~70%	≤12 months	30%≤SOC≤60%
25~35°C	5%~70%	≤6 months	30%≤SOC≤60%
35~45°C	5%~70%	≤3 months	30%≤SOC≤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
-10~25°C	≤15 days	Battery Pack disconnect to PCS
25~45°C	≤7 days	

05 Disposal of the Battery System

Disposal of the battery must comply with the local applicable disposal regulations for electronic wasteand 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.