

ENERGY TECHNOLOGIES
BUILD LIFE BETTER

RESIDENTIAL
BATTERY



CHAKRA 5.1-HX

Product Description

Contact Details

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01 TECHNICAL DATA

NOTE

The battery is not rated 0.5C continuously. Operating current derating according to the cell voltage and battery temperature.

-  Full automatic manufacturing products
-  Top-notch LFP Class A cell / Strict capacity grading
-  IP 65 design, more installation scenario
-  Modular design, 20.88~62.66kWh flexible configuration
-  Plug&play Installation, less wiring
-  Precise voltage / temperature / SOC detection
-  Three level passive and active protection
-  Build in WIFI for monitoring and firmware update
-  LCD display shows data visually



Datasheet

Model	CHAKRA 5.1-H4-1P1	CHAKRA 5.1-H5-1P1	CHAKRA 5.1-H6-1P1	CHAKRA 5.1-H7-1P1	CHAKRA 5.1-H8-1P1
	CHAKRA 5.1-H9-1P1	CHAKRA 5.1-H10-1P1	CHAKRA 5.1-H11-1P1	CHAKRA 5.1-H12-1P1	

Performance

Cell technology	LFP (LiFePO ₄)				
Battery module	5.22 kWh, 51.2 V, 45 kg (99.21 lbs)				
Number of modules	4	5	6	7	8
	9	10	11	12	
Battery usable energy [1]	20.88 kWh	26.11 kWh	31.33 kWh	36.55 kWh	41.77 kWh
	47.00 kWh	52.22 kWh	57.44 kWh	62.66 kWh	
Nominal voltage	204.8 V	256.0 V	307.2 V	358.4V	409.6 V
	460.8 V	512.0 V	563.2 V	614.4V	
Operating voltage	179.2 - 224.64 V	224 - 280.8 V	268.8 - 336.96 V	313.6 - 393.12 V	358.4 - 449.28 V
	403.2 - 505.44 V	448 - 561.6 V	492.8 - 617.76 V	537.6 - 673.92 V	
Max.charge and discharge current [2]	50 A				

Communication

Display	LCD indicator
Communication	CAN / RS485 / RS232 / Wi-Fi

General Specification

Dimension (W×D×H)	660×420×845 mm	660×420×995 mm	660×420×1145 mm	660×420×1295 mm	660×420×1445 mm
	26.0×16.5×33.3 inch	26.0×16.5×39.2 inch	26.0×16.5×45.1 inch	26.0×16.5×51.0 inch	26.0×16.5×56.9 inch
	660×420×1595 mm	660×420×1745 mm	660×420×1895 mm	660×420×2045 mm	
	26.0×16.5×62.8 inch	26.0×16.5×68.7 inch	26.0×16.5×74.6 inch	26.0×16.5×80.5 inch	
Weight	205 kg (451.9 lbs)	250 kg (551.2 lbs)	295 kg (650.4 lbs)	340 kg (749.6 lbs)	385 kg (848.8 lbs)
	430 kg (948 lbs)	475 kg (1047.2 lbs)	520 kg (1146.4 lbs)	560 kg (1245.6 lbs)	
Installation	Floor stand				
Operating temperature [3]	Charge : 0 to 50°C (32 to 122°F) Discharge: -20 to 50°C (-4 to 122°F)				
Environmental humidity	≤ 95%RH (No condensation)				
Ingress protection rating	IP 65				
Cycle life [4]	6000 Cycles or ten (10) years @ 80% DOD / 25°C/0.5C, 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

Compliance	UN38.3
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Ordering and Deliverable Part

Part	CHAKRA 5.1
	CHAKRA 5.1-HB12-PQC3

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

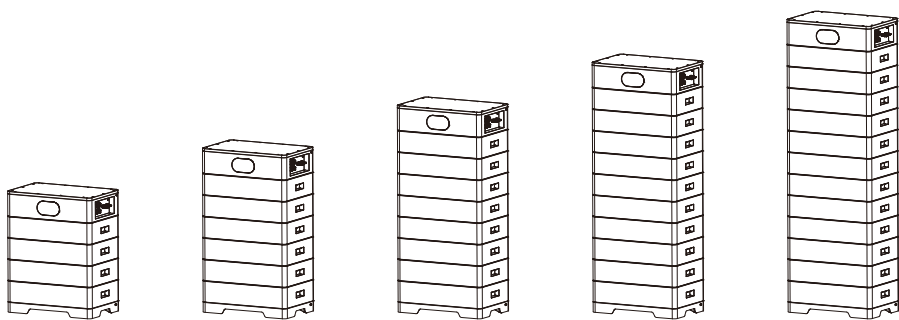
[2] There is 0.5C configurations optional in factory default.

[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, the warranty is due whichever comes first.

02 PRODUCT OVERVIEW

2.1 Brief Introduction



PRODUCT OVERVIEW

CHAKRA 5.1-HX is a high-voltage lithium battery consisting of 4-12 pcs battery modules (51.2V / 102Ah) and one BCU (Battery Control Unit) in series with an operating voltage range between 179.2V-673.92V. It is designed for commercial / industrial energy storage applications and works together with a high battery voltage hybrid inverter. CHAKRA 5.1-HX is not suitable for supporting life-sustaining medical devices.

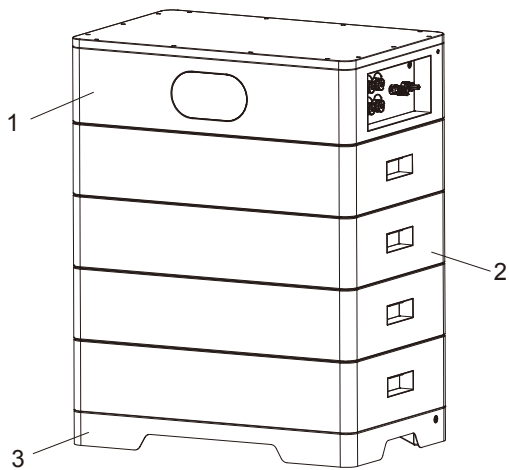
CHAKRA 5.1-HX has built-in BMS (Battery Management System, include master BMS in BCU and slave BMS in battery modules), which can manage and monitor cells information including voltage, current and temperature. Besides that, BMS can balance cells charging to extend cycle life. BMS has protection functions including over-discharge, over-charge, over-current and high/low temperature; the system can automatically manage charge state, discharge state and balance state.

Multiple CHAKRA 5.1-HX can be connected in parallel to expand capacity and power. 4 CHAKRA 5.1-H12 can be connected in parallel at most, for example, connect 4 x CHAKRA 5.1-H12 in parallel to get a 250.68kWh battery system.

CHAKRA 5.1-HX supports independent charging. When multiple CHAKRA 5.1-HX are connected in parallel, after one CHAKRA 5.1-HX is fully charged, inverter can keep charging other CHAKRA 5.1-HX until all CHAKRA 5.1-HX are fully charged.

2.2 Battery System Overview

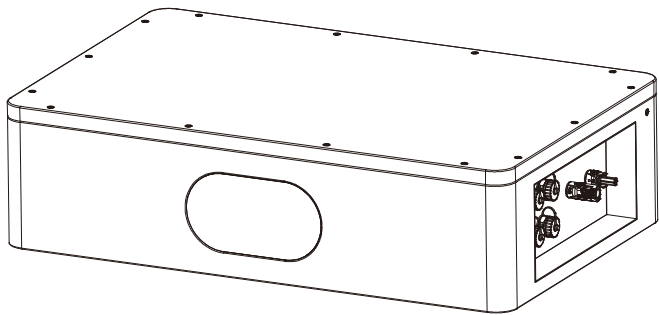
CHAKRA 5.1-HX consist of base, battery modules connected in series and BCU (Battery Control Unit).



NO.	Definition
1	BCU (Battery Control Unit)
2	Battery Module
3	Base

2.3 BCU

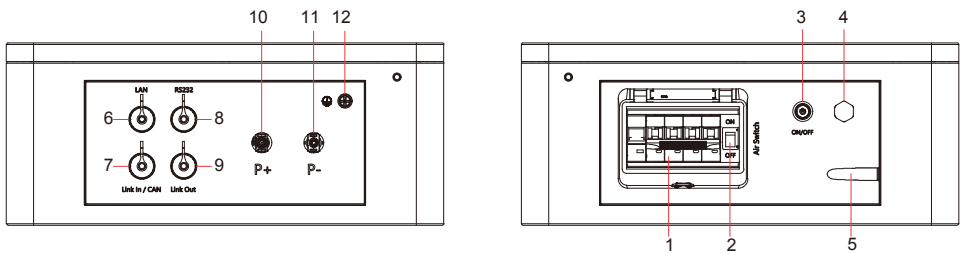
BCU include master BMS, Breaker, DC fuse, Soft-start circuit, Charge circuit, Discharge circuit, and 12V DC/DC power supply module. Master BMS controls charge voltage/current and discharge voltage/current according to the cell voltage and temperature provided by slave BMS in battery modules. Master BMS communicate with inverter through CAN communication.



2.3.1 Technical Data

Parameters	Specification
Nominal Voltage	204.8V-614.4V
Nominal Current	50A
Maximum Current	50A
Operating Temperature	Charge: 0-50°C Discharge: -20-50°C
Environmental humidity	≤95%RH
Protection Class	IP65
Weight (kg)	17.1 kg
Dimension (W*D*H)	660*420*175 mm
Communication	CAN / RS485 / RS232 / Wi-Fi

2.3.2 Port Definition



No.	Items	No.	Items
1	Power Switch	7	Link In / CAN Port
2	Shunt Tripper Switch	8	RS232 Port
3	ON / OFF Button	9	Link Out Port
4	Vent Valve	10	P+
5	Wi-Fi Antenna	11	P-
6	LAN Port	12	PE

2.3.2.1 Power Switch

MCB: Main circuit breaker.

2.3.2.2 Shunt Tripper Switch

Enable / disable shunt tripper function.

2.3.2.3 ON/OFF Button

After switch on the Power Switch, hold pressing ON / OFF Button to start / stop CHAKRA 5.1-HX.

2.3.2.4 LAN Port

Ethernet port for Wi-Fi board.

2.3.2.5 Link In / CAN Port

Parallel port and inverter CAN communication port.

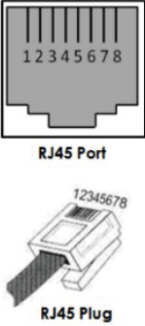
2.3.2.6 RS232 Port

PC Tool Port, for manufacturer or professional engineer to debug or service.

2.3.2.7 Link Out Port

Parallel port communication port.

Definition of RJ45 Port Pin

	NO.	LAN	RS232	Link In / CAN	LINK OUT
	Pin1	White-orange	GND	/	/
	Pin2	Orange	RS232_TX	/	/
	Pin3	White-green	RS232_RX	/	/
	Pin4	Blue	/	CANH	H
	Pin5	White-blue	/	CANL	L
	Pin6	Green	RS232_RX	IN-	OP-
	Pin7	White-brown	RS232_TX	IN+	OP+
	Pin8	Brown	GND	/	/

2.3.3 LCD Display

Display function

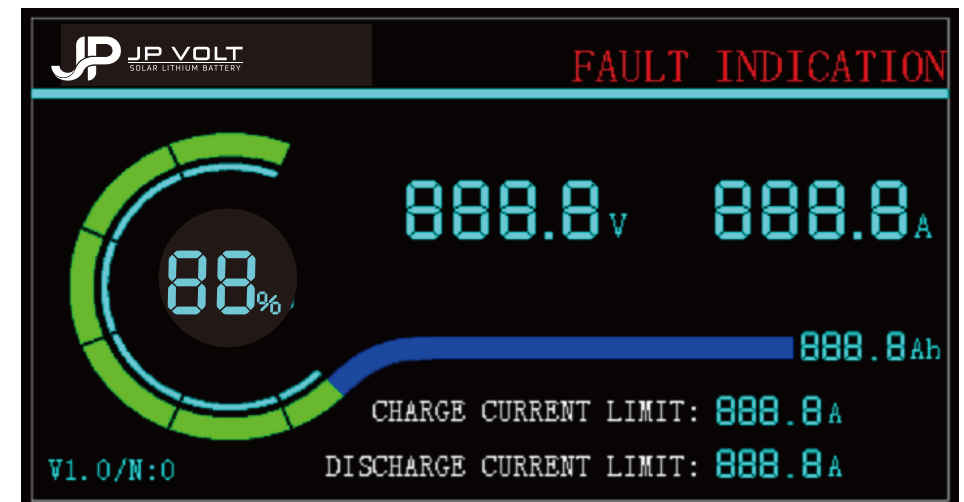
The display will display the battery system SOC, system voltage, system current, fault information, battery system rated capacity, charging current limit value, discharge current limit value, software version, and parallel address information in real time.

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.



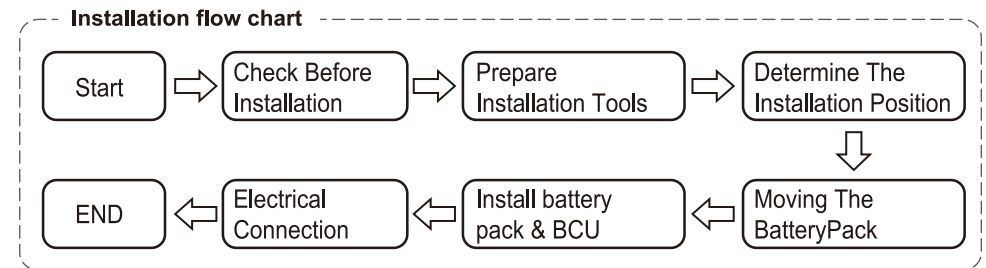
2.4 Battery Module

Battery module include 51.2V / 102Ah battery unit and slave BMS. The slave BMS collects the cell voltage and temperature of the battery unit in real time and send these message to the master BMS through internal communication.

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

Parameters	Specification
Battery Type	LiFeP04, Lithium Iron Phosphate
Nominal Voltage	51.2V
Nominal Capacity	102Ah
Nominal Energy (100%DOD)	5.22KWh
DOD	≤90%
Nominal Charging Current	50A
Maximum Charging Current	50A
Nominal Discharge Current	50A
Maximum Discharge Current	50A
Working Temperature	Charge: 0- 50°C Discharge: -20-50°C
Environmental humidity	<95%RH
Cooling	Natural
Weight (kg)	45 kg
Dimension (W*D*H)	660*420*150 mm
Ingress Protection Rating	IP65

03 INSTALLATION GUIDE



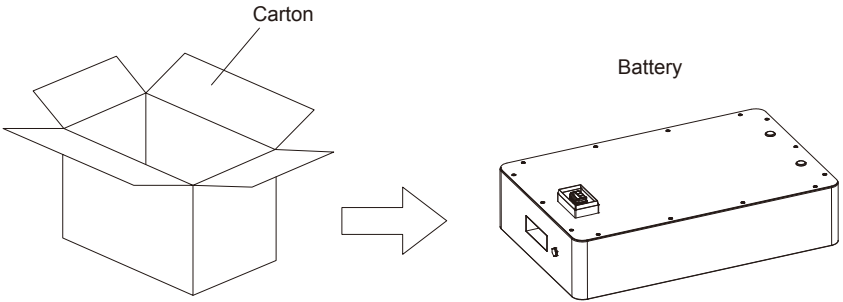
3.1 Checking Before Installation

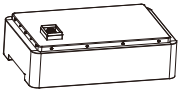
3.1.1 Checking Outer Packing Materials

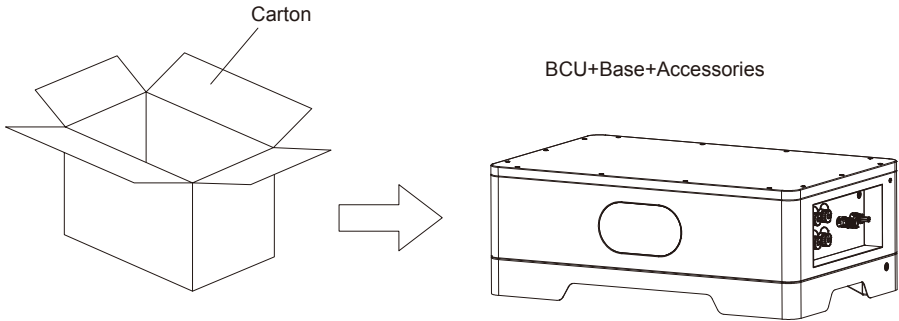
Packing materials and components may be damaged during transportation. Therefore, check the outer packing materials before installing the battery. Checking the surface of packing material for any damage, such as holes and cracks. If any damage is found, do not unpack the battery and contact the dealer 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 show the components that should be delivered.



Battery			
NO.	Pictures	Quantity	Description
1		1PCS	Battery
2		1PCS	Test report
3		1PCS	QC Certificate



BCU + Base			
NO.	Pictures	Quantity	Description
1		1PCS	BCU
2		1PCS	Base
3		1PCS	Matching resistor
4		1PCS	MC4 Wrench
5		2PCS	Wall lock fittings
6		2PCS	M6*12
7		2PCS	M6*60 Expansion bolts
8		1PCS	Test report
9		1PCS	QC Certificate
10		1PCS	Connect CAN communication cable, 1.5-meter
11		1PCS	Power cable 1
12		1PCS	Power cable 2
13		1PCS	Ground lead

3.2 Tools

Tools			
Installation	Knife 	Hammer drill (10mm) 	Socket wrench (10mm) 
	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

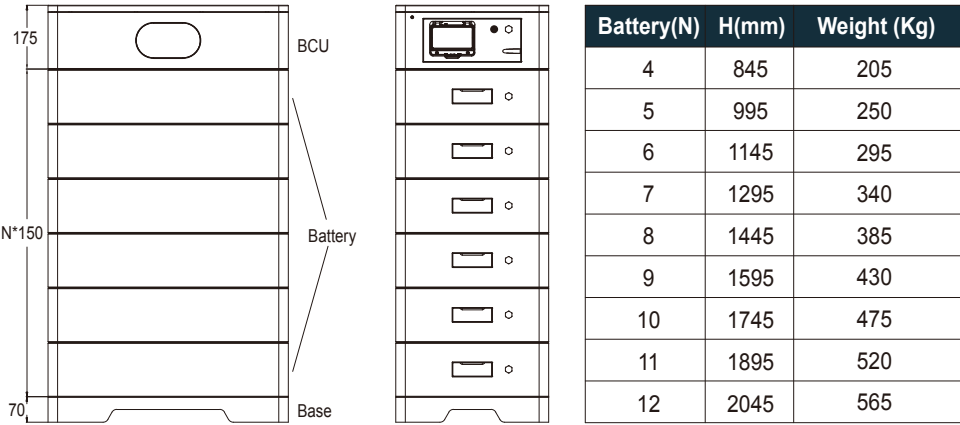
- Install the battery in the indoor environment.
- Place battery in secure location away from children and animals.
- Do not place the battery near any heat sources and avoid sparks.
- Do not expose the battery to moisture or liquids.
- Do not expose the battery to direct sunlight.
- Do not place the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

3.3.2 Installation carrier requirements

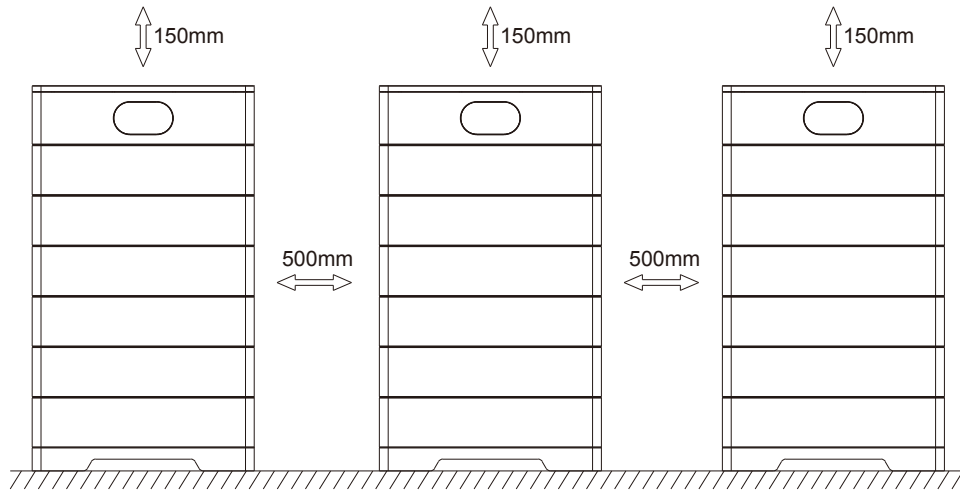
- Only mount battery on fire resistant building. Do not install batteries on flammable buildings.
- Battery is quite heavy, make sure the wall/ground can meet the load bearing requirements.

3.4 Installation Instructions

3.4.1 Dimensions



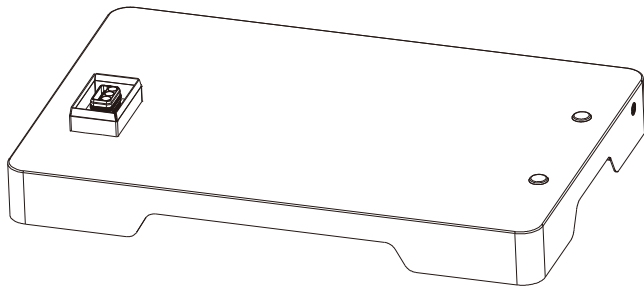
Minimum mounting interval:



3.4.2 Installation Step

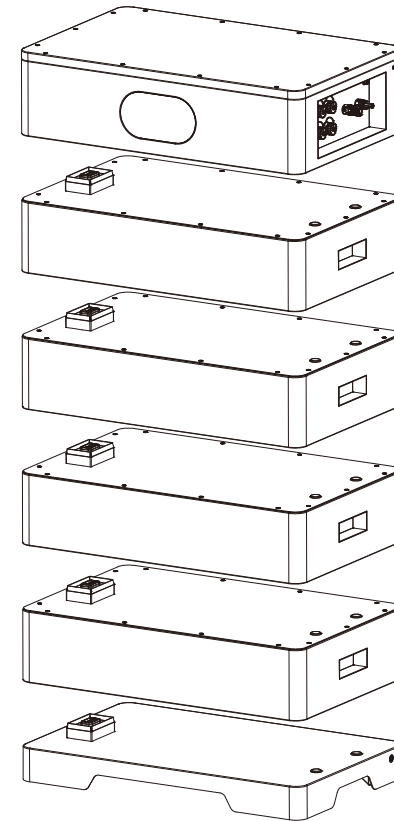
STEP 1

Put the base to installation position distance from the wall: 0 - 20mm.



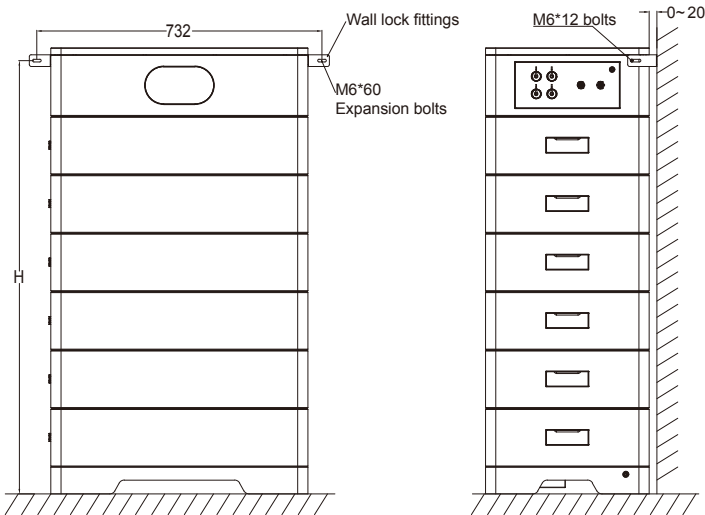
STEP 2

Put one battery to the base then stack the battery modules one by one. Finally, put the BCU on the top.



STEP 3

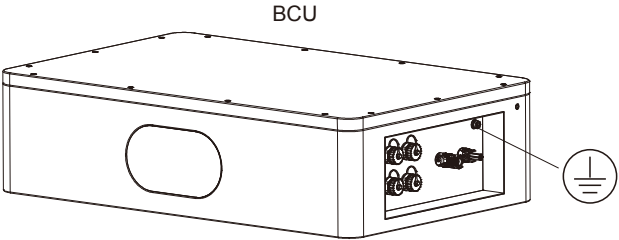
Install anti-tilt accessories.
Position the holes according to the number of modules (4-12PCS)
and drill the holes with a 10mm drill bit.



Battery	4	5	6	7	8	9	10	11	12
H(mm)	812	962	1112	1262	1412	1562	1712	1862	2012

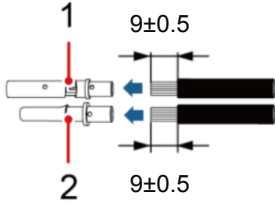
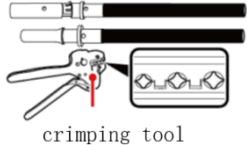
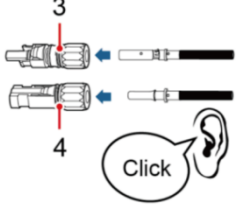
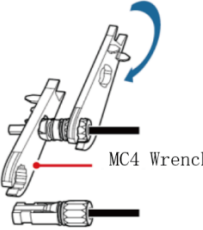
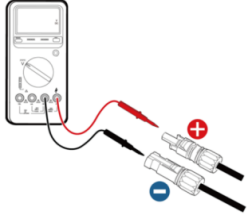
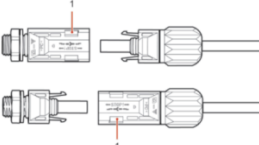
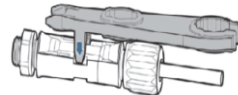
STEP4

Ground connection.
Connect PE line from BCU to ground.



STEP 5

Electrical connections.
1. Prepare power cable
You are advised to use the EV power cable with size 10mm² / or 7AWG (1000V).

		
1	2	3
1: Positive metal contact 2: Negative metal contact		3: Positive connector 4: Negative connector
		
4	5	6
		Connect to BCU
	7 Disconnect connectors	

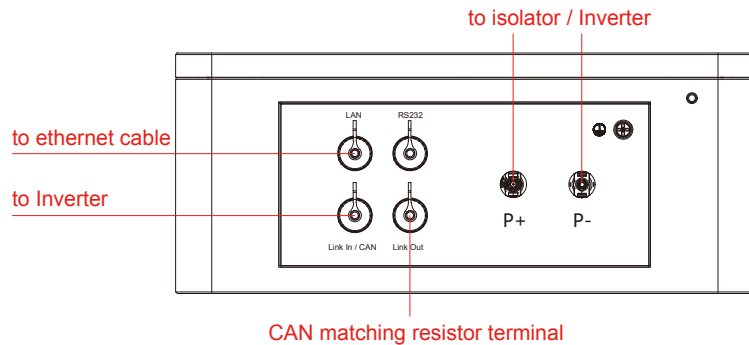
2. Prepare CAN communication cable

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 CHAKRA 5.1-HX electrical connection



Ⓐ Connect Power cable

Connect P+, P- power cable from BCU to isolator / Inverter.

Note: Reverse connection prohibited!

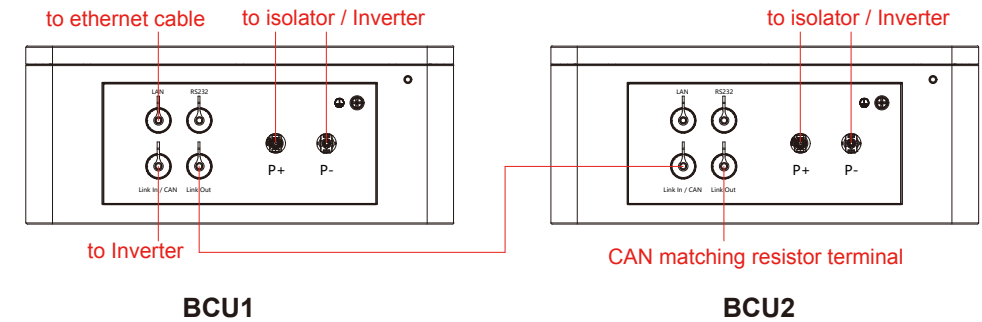
Ⓑ Connect CAN communication cable

Connect CAN cable from BCU Link In / CAN port to inverter communication port.

Ⓒ Connect CAN matching resistor terminal

Connect CAN matching resistor terminal to BCU Link Out.

4. Multiple CHAKRA 5.1-HX in parallel electrical connection



Note: BCU1 is master BCU, BCU2 is slave BCU.

Ⓐ Connect Power cable

Connect P+, P- power cable from BCU to isolator / Inverter.

Note: Reverse connection prohibited!

Ⓑ Connect CAN communication cable

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

Ⓒ Connect parallel communication cable

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

Ⓓ Connect CAN matching resistor terminal

Connect CAN matching resistor terminal to BCU2 Link Out.

STEP 6

Switch on / off CHAKRA 5.1-HX

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

1. Single CHAKRA 5.1-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 CHAKRA 5.1-HX 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 7

Monitoring

After the CHAKRA 5.1-HX 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 Maintenance

4.1 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℃	/	prohibit	/
-10~25℃	5%~70%	≤12 months	30%≤SOC≤60%
25~35℃	5%~70%	≤6 months	30%≤SOC≤60%
35~45℃	5%~70%	≤3 months	30%≤SOC≤60%
Above 45℃	/	prohibit	/

4.2 Recharge Requirements When Over Discharged

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

Recharge conditions when battery is over discharged		
Storage Environment Temperature	Storage Time	Note
-10~25℃	≤15 days	Battery Pack disconnected from inverter
25~45℃	≤7 days	

4.3 Replacement or expand capacity

Important:

Installation and maintenance of CHAKRA 5.1-HX can only be performed by professional electricians.

Attention:

High Voltage Battery Storage! Improper handling can cause danger and damage. This section describes how to remove or add battery modules to an existing CHAKRA 5.1-HX system. Please keep in mind limits of number of modules (4-12).

SOC of new module and old module from existing battery system should be similar before connection.

4.3.1 Remove modules

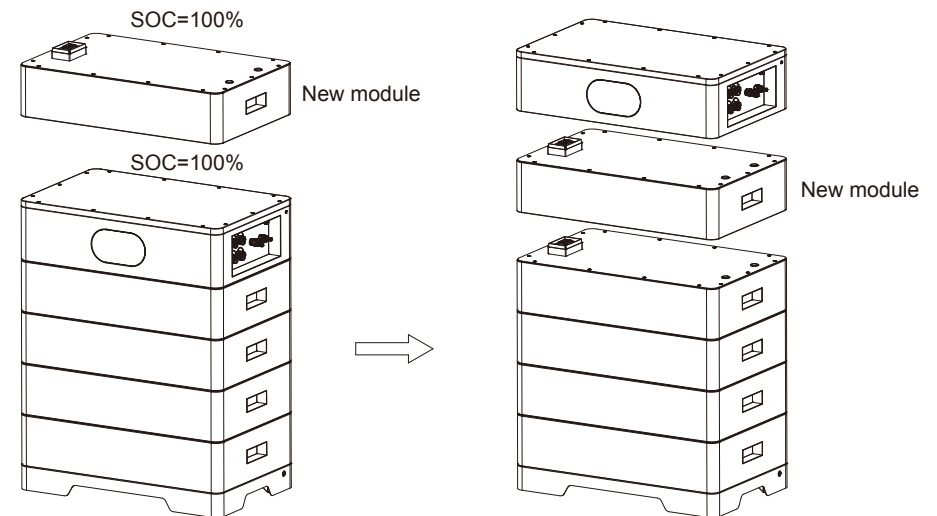
1. Before replace or expand capacity, please switch off the whole system, include inverter and Battery system.
2. Disconnect inverter from power grid, switch off the battery power supply and disconnect the connection between battery and inverter.
3. Remove modules refer to section 3.4.2.

4.3.2 Replace or extend modules

Battery modules can be replaced or extended when needed.

SOC of existing system and module to be added should be similar before connection.

1. Charge the new module to 100% SOC with a charger (charge voltage is 56.16Vdc / 50A, cut off when current is less than 5A), and charge the existing system to 100% SOC.



2. Refer to section 4.3.1 to remove BCU or remove modules that need to be replaced.
3. Add the new module on top of other battery modules.
4. Install battery system refer to section 3.4.2.
5. The battery system is ready to work. The SOC values of the modules will equalize themselves over several cycles.

05 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.