



Shenzhen EENOVANCE Energy Technology CO., LTD.

Room 401, Building 2, Yufengda Industrial Park, No. 1008 Guangqiao Avenue,
Yulu Community, Yutang Streets, Guangming District, SHENZHEN.PRC.

Tel: +86 0755-8656 6313

service@eenovance.com

www.eenovance.com

CHAKRA 2.5-HX Pro

PRODUCT DESCRIPTION

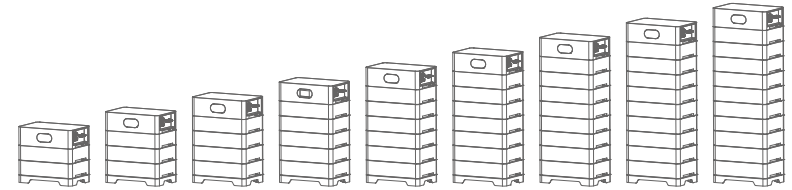
CONTENTS

1	Technical Data	1-2
2	Product Overview	3
2.1	Brief Introduction	3
2.2	Battery System Overview	4
2.3	BCU	5
2.3.1	Technical Data	5
2.3.2	Port Definition	6-7
2.3.3	LCD Display	8
2.4	Battery Module	9
3	Installation Guide	10
3.1	Checking Before Installation	10
3.1.1	Checking Outer Packing Materials	10
3.1.2	Checking Deliverables	10-12
3.2	Tools	13
3.3	Installation requirements	14
3.3.1	Installation environment requirements	14
3.3.2	Installation carrier requirements	14
3.4	Installation Instructions	14
3.4.1	Dimensions	14
3.4.2	Installation Step	15-22
4	Maintenance	23
4.1	Battery storage	23
4.2	Recharge Requirements When Over Discharged	23
4.3	Replacement or expand capacity	24
4.3.1	Remove modules	24
4.3.2	Replace or extend modules	25
5	Disposal of the Battery System	26

TECHNICAL DATA

NOTE

The battery is not rated 1C continuously. Operating current derating according to the cell voltage and battery temperature.



Model	CHAKRA 2.5-H2 Pro	CHAKRA 2.5-H3 Pro	CHAKRA 2.5-H4 Pro	CHAKRA 2.5-H5 Pro	CHAKRA 2.5-H6 Pro
	CHAKRA 2.5-H7 Pro	CHAKRA 2.5-H8 Pro	CHAKRA 2.5-H9 Pro	CHAKRA 2.5-H10 Pro	

Performance					
Cell technology	LFP (LiFePO ₄)				
Battery module (Wh/V)	2.56 kWh, 51.2 V, 30 kg (67 lbs)				
Number of modules	2	3	4	5	6
	7	8	9	10	
Battery usable energy [1]	5.12 kWh	7.68 kWh	10.24 kWh	12.8 kWh	15.36 kWh
	17.92 kWh	20.48 kWh	23.04 kWh	25.60 kWh	
Nominal voltage	102.4 V	153.6 V	204.8 V	256.0 V	307.2 V
	358.4 V	409.6 V	460.8 V	512.0 V	
Operating voltage	89.6 - 112.32 V	134.4 - 168.48 V	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	
Max. charge and discharge current [2]	50 A				

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

General Specification					
Dimension (W*D*H)	570×370×525 mm	570×370×665 mm	570×370×805 mm	570×370×945 mm	570×370×1085 mm
	22.4×14.6×20.6 inch	22.4×14.6×26.1 inch	22.4×14.6×31.6 inch	22.4×14.6×37.2 inch	22.4×14.6×42.7 inch
	570×370×1225 mm	570×370×1365 mm	570×370×1505 mm	570×370×1645 mm	
	22.4×14.6×48.2 inch	22.4×14.6×53.7 inch	22.4×14.6×59.2 inch	22.4×14.6×64.7 inch	
Weight	86 kg (189.60 lbs)	117 kg (257.94 lbs)	148 kg (326.28 lbs)	179 kg (394.63 lbs)	210 kg (462.97 lbs)
	241 kg (531.3 lbs)	272 kg (599.66 lbs)	303 kg (668.00 lbs)	334 kg (736.34 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)				
Protection rating	IP 65				
Cycle life [4]	6000 Cycles or ten (10) years @ 80% DOD / 25°C / 0.5C, 70% EOL				
Scalability	Max 10 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 inverter 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	CHAKRA 2.5-H Pro (Battery module)
	CHAKRA 2.5-H Pro-BQU (Battery Control Unit)

[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, the warranty is due whichever comes first.

PRODUCT OVERVIEW

2.1 Brief Introduction

PRODUCT OVERVIEW

CHAKRA 2.5-HX Pro is a high-voltage lithium battery consisting of 2-10 pcs battery modules (51.2V / 50Ah) and one BCU (Battery Control Unit) in series with an operating voltage range between 80V-1000V. It is designed for commercial / industrial energy storage applications and works together with a high battery voltage hybrid inverter. **CHAKRA 2.5-HX Pro is not suitable for supporting life-sustaining medical devices.**

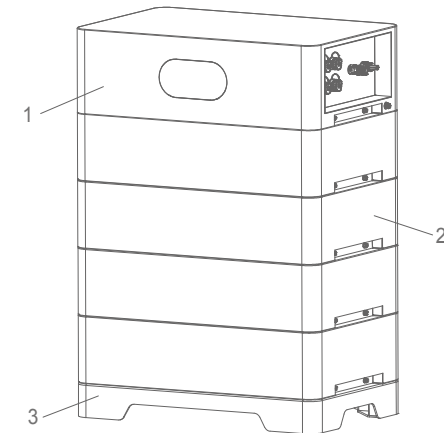
CHAKRA 2.5-HX Pro has built-in BMS (Battery Management System, include master BMS in BCU and slave BMS in battery modules), which can manage and monitor cells information including voltage, current and temperature. Besides that, BMS can balance cells charging to extend cycle life. BMS has protection 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 2.5-HX Pro can be connected in parallel to expand capacity and power. 4 CHAKRA 2.5-HX Pro can be connected in parallel at most, for example, connect 4 x CHAKRA 2.5-H10 Pro in parallel to get a 100kWh battery system.

CHAKRA 2.5-HX Pro supports independent charging. When multiple CHAKRA 2.5-HX Pro are connected in parallel, after one CHAKRA 2.5-HX Pro is fully charged, inverter can keep charging other CHAKRA 2.5-HX Pro until all CHAKRA 2.5-HX Pro are fully charged.

2.2 Battery System Overview

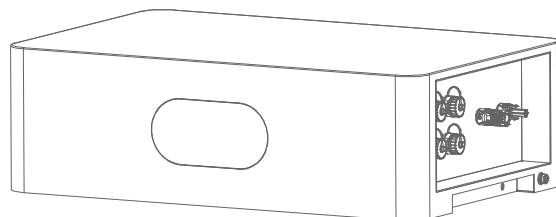
CHAKRA 2.5-HX Pro consist of base, battery modules connected in series and BCU (Battery Control Unit).



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

2.3 BCU

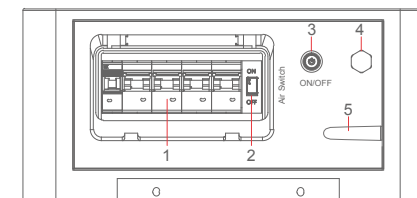
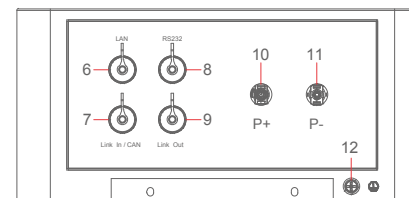
BCU include master BMS, Breaker, DC fuse, Soft-start circuit, Charge circuit, Discharge circuit, and 12V DC/DC power supply module. Master BMS controls charge voltage/current and discharge voltage/current according to the cell voltage and temperature provided by slave BMS in battery modules. Master BMS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



2.3.1 Technical Data

Parameters	Specification
Nominal Voltage	80V-1000V
Nominal Current	25A
Maximum Current	50A
Operating Temperature	Charge: 0-50°C Discharge: -15-50°C
Environmental humidity	≤95%RH
Protection Class	IP65
Weight (kg)	15 kg
Dimension (W*D*H)	570*370*175 mm
Communication	CAN / RS232 / RS485 / 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 2.5-HX Pro.

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.

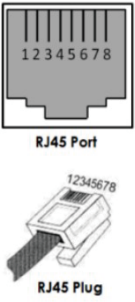
2.3.2.6 RS232 Port

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

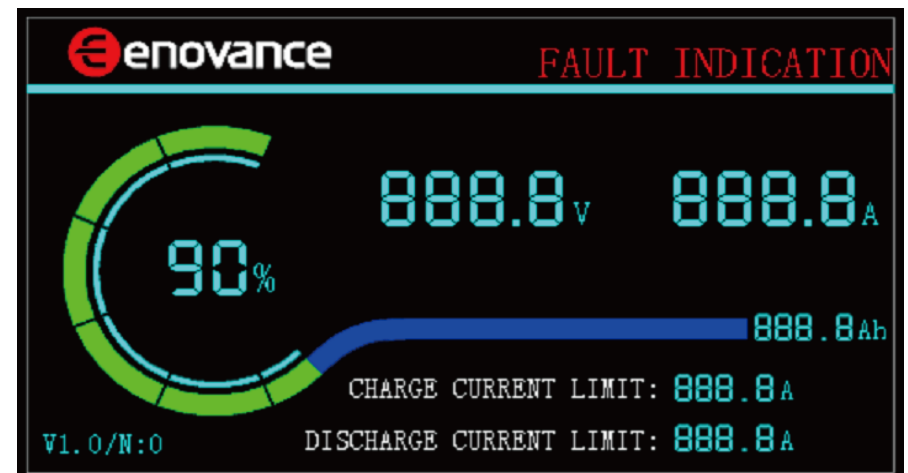
The display will display the battery system SOC, system voltage, system current, fault information, battery system rated capacity, charging current limit value, discharge current limit value, software version, and parallel address information in real time.

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.



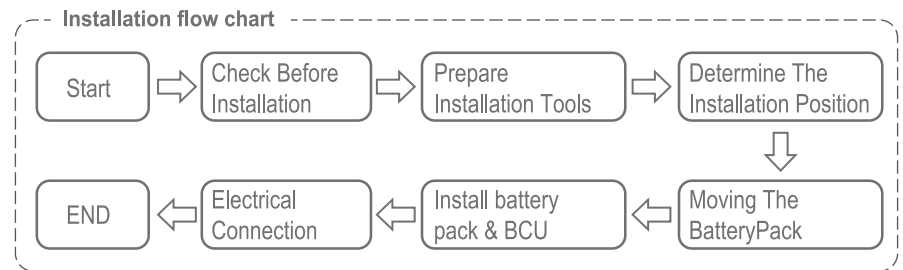
INSTALLATION GUIDE

2.4 Battery Module

Battery module include 51.2V / 50Ah 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	LiFePO ₄ , Lithium Iron Phosphate
Nominal Voltage	51.2V
Nominal Capacity	50Ah
Nominal Energy (100%DOD)	2.5 KWh
Usable Energy (90%DOD)	2.25 KWh
DOD	≤90%
Nominal Charging Current	25A
Maximum Charging Current	50A
Nominal Discharge Current	25A
Maximum Discharge Current	50A
Working Temperature	Charge: 0~ 50°C Discharge: -15~50°C
Environmental humidity	<95%RH
Cooling	Natural
Weight (kg)	30 kg
Dimension (W*D*H)	570*370*160 mm



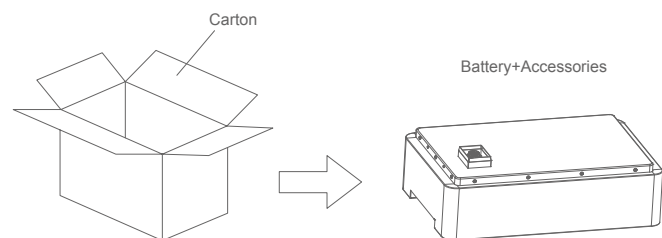
3.1 Checking Before Installation

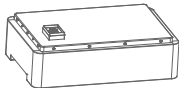
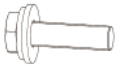
3.1.1 Checking Outer Packing Materials

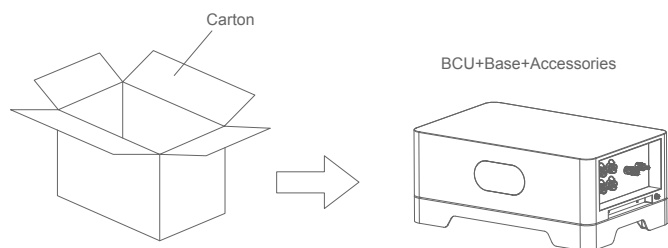
Packing materials and components may be damaged during transportation. Therefore, check the outer packing materials before installing the battery. Checking the surface of packing material for any damage, such as holes and cracks. If any damage is found, do not unpack the battery and contact the dealer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

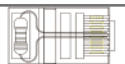
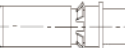
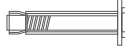
3.1.2 Checking Deliverables

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
3		4PCS	M5*12
4		1PCS	Test report
5		1PCS	QC Certificate



BCU + Base			
NO.	Pictures	Quantity	Description
1		1PCS	BCU
2		1PCS	Base
3		1PCS	Matching resistor
4		1PCS	Metal in BAT+ connector
5		1PCS	Metal in BAT- connector
6		1PCS	BAT+ connector
7		1PCS	BAT- connector
8		4PCS	RJ45 waterproof
9		2PCS	MC4 Wrench
10		1PCS	Mounting Bracket
11		1PCS	backboard
12		10PCS	M5*12
13		4PCS	M6*60 Expansion bolts
14		1PCS	Manual
15		1PCS	Test report
16		1PCS	QC Certificate
17		1PCS	Connect CAN communication cable, 2-meter

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.

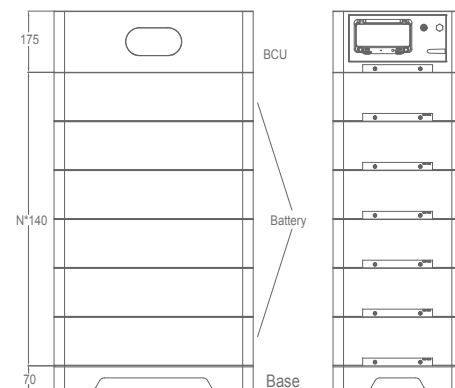
3.3.2 Installation carrier requirements

- 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.

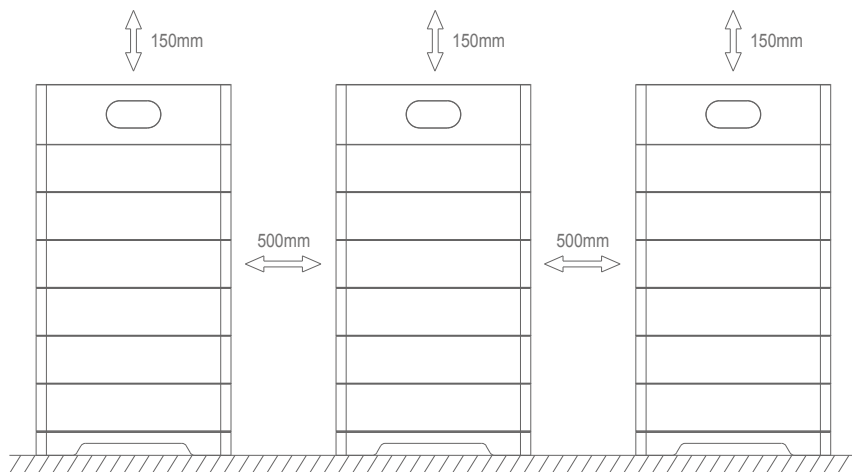
3.4 Installation Instructions

3.4.1 Dimensions

Battery(N)	H(mm)	Weight (Kg)
2	525	86kg (189.60 lbs)
3	665	117kg (257.94 lbs)
4	805	148kg (326.28 lbs)
5	945	179kg (394.63 lbs)
6	1085	210kg (462.97 lbs)
7	1225	241kg (531.3 lbs)
8	1365	272kg (599.66 lbs)
9	1505	303kg (668.00 lbs)
10	1645	334kg (736.34 lbs)



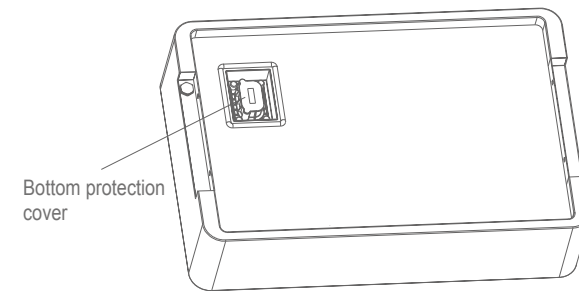
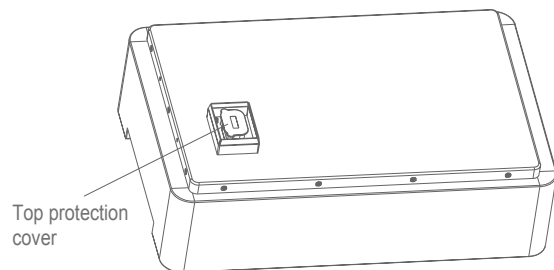
Minimum mounting interval:



3.4.2 Installation Step

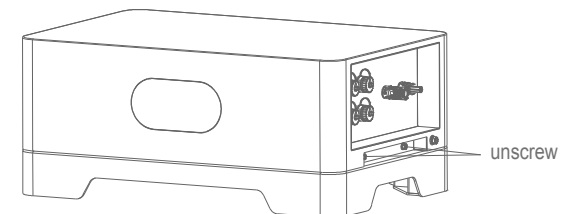
Note:

Remove the top and bottom protection cover before you stack the battery module and BCU together.



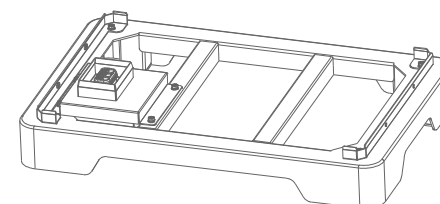
STEP 1

Unscrew and separate BCU and base.



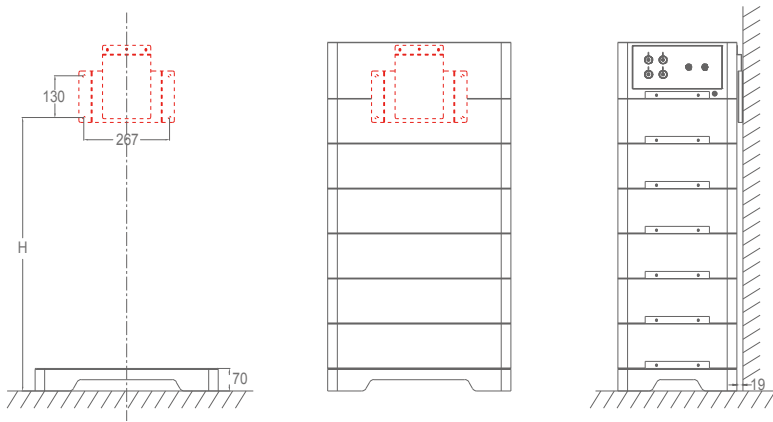
STEP 2

Put the base to installation position.

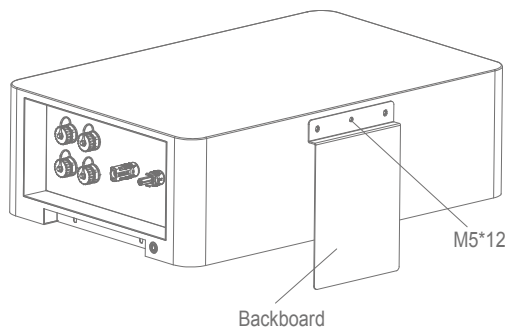


STEP 3

If battery module is more than 5 (include 5), mounting bracket shall be installed.
Position the holes according to the number of modules (5-10PCS)
and drill the holes with a 10mm drill bit.

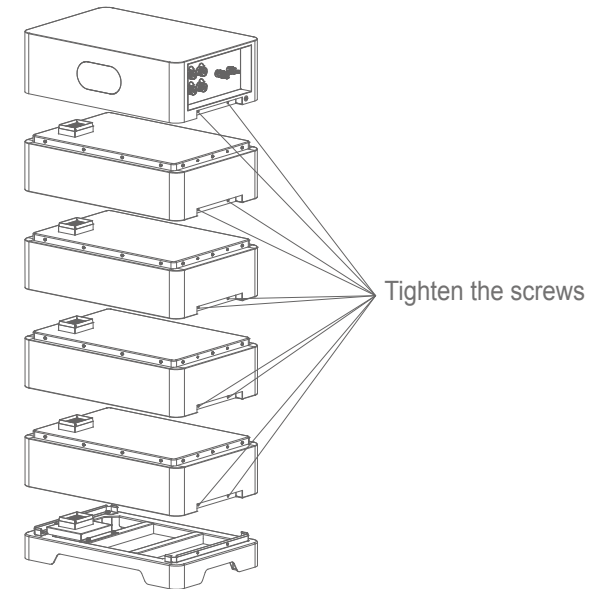


Battery	5	6	7	8	9	10
H(mm)	710	850	990	1130	1270	1410



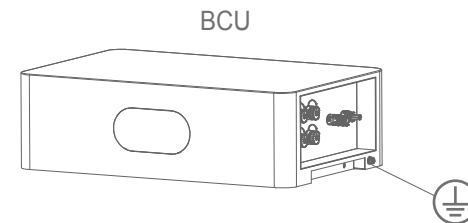
STEP 4

Put one battery to the base, then stack the battery modules one by one. Tighten the screws to lock the battery module before stacking next battery module.
Finally, put the BCU on the top.



STEP 5

Ground connection.
Connect PE line from BCU to ground.

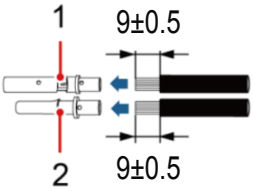
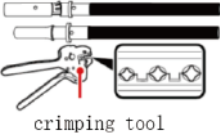
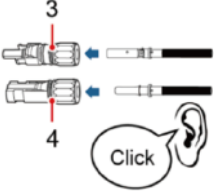
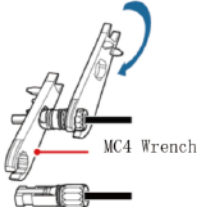
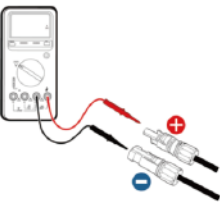
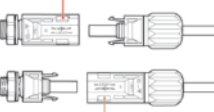
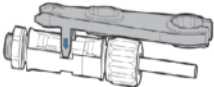


STEP 6

Electrical connections.

1. Prepare power cable

You are advised to use the EV power cable with size 10mm² / 8AWG (1500V, 50A).

		
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

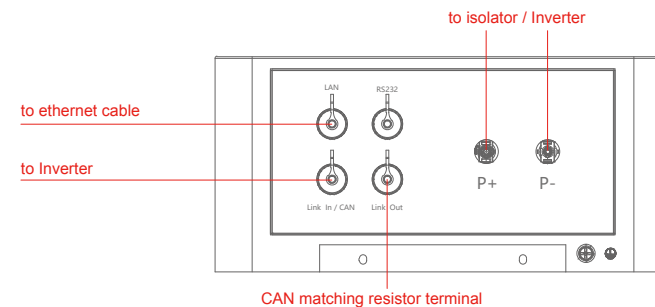
2. Prepare CAN communication cable

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 2.5-HX Pro electrical connection



Ⓐ Connect Power cable

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

Note: Reverse connection prohibited!

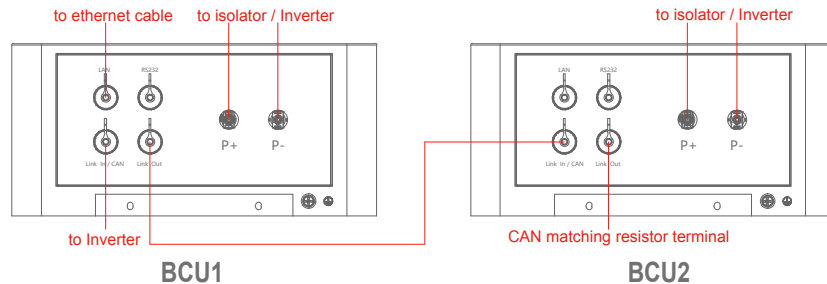
Ⓑ Connect CAN communication cable

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 2.5-HX Pro 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 7

Switch on / off CHAKRA 2.5-HX Pro

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

1. Single CHAKRA 2.5-HX Pro

Power-on:

- Switch on BCU Power Switch;
- Press ON / OFF Button more than 3s, LCD display will be on and system start the automatic and start up.

Power-off:

- Press ON / OFF Button more than 3s, LCD display will be off.
- Switch off the Power Switch.

2. Multiple CHAKRA 2.5-HX Pro in Parallel

Power-on:

- Switch on all the BCU Power Switch;
- 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 1, other slaves are 2,3,4.

Power-off:

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

STEP 8

Monitoring

After the CHAKRA 2.5-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.

MAINTENANCE

4.1 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 (25A) 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 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
$-10 \sim 25^{\circ}\text{C}$	≤ 15 days	Battery Pack disconnected from inverter
$25 \sim 45^{\circ}\text{C}$	≤ 7 days	

4.3 Replacement or expand capacity

Important:

Installation and maintenance of CHAKRA 2.5-HX Pro 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 2.5-HX Pro system. Please keep in mind limits of number of modules (2-10).

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.

05

DISPOSAL OF THE BATTERY SYSTEM

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

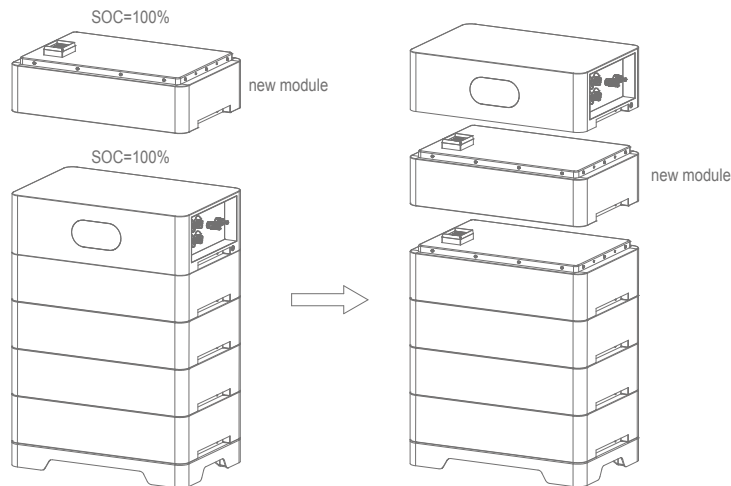
- Do not dispose of the battery system with your household waste.
- Avoid exposing the batteries to high temperatures or direct sunlight.
- Avoid exposing the batteries to high humidity or corrosive atmospheres.

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 / 25A, cut off when current is less than 2.5A), 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.