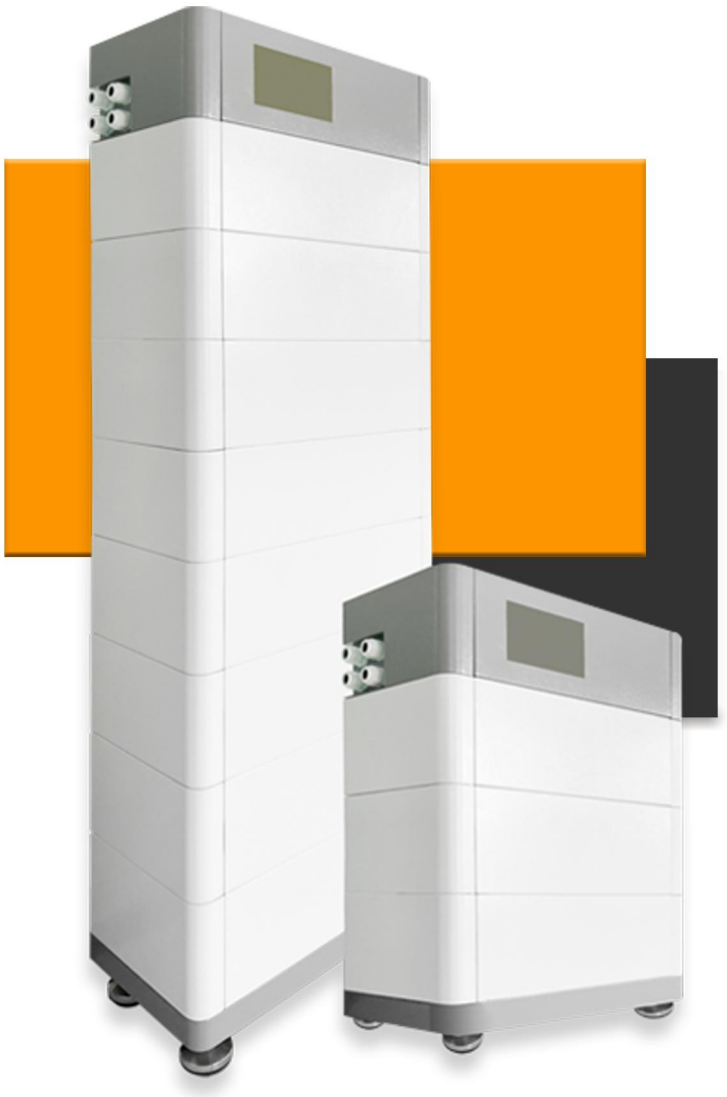
CONCENPOWER®
Make Impossible to Possible



Operating Manual

Version 24.2

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Shandong King Polaris New Energy Stock CO., LTD

1. Information on this document

1.1 Validity

This document is valid for the product of High Voltage Series Energy Storage System (Models: 2.5 CON-HVS, 5 CON-HVS, 10 CON-HVS).

1.2 Target group

The instructions in this document may only be performed CONCENPOWER qualified persons who must have the following skills:

- Knowledge of how batteries work and are operated
- Knowledge of how an inverter works and is operated
- Knowledge of, and adherence to the locally applicable connection requirements, standards, and directives
- Knowledge of, and adherence to this document and the associated system documentation, including all safety instructions
- Training in dealing with the hazards associated with the installation and operation of electrical equipment and batteries
- Training in the installation and commissioning of electrical equipment

Failure to do so will make any manufacturer's warranty, guarantee or liability null, and void unless you can prove that the damage was not due to non-compliance.

1.3 Content and structure of this document

This document contains safety information and instructions, scope of delivery, system overview, installation, electrical connection, commissioning, decommissioning, expansion, troubleshooting, maintenance and storage, disposal, and technical data. Please finish reading this document before taking any actions on the energy storage system.

1.4 Declaration of Conformity

The energy storage system described in this document complies with the applicable European directives. The certificate is available in the download area at *www.concenpower.com*.

1.5 Levels of Warning Messages

The following levels of warning messages may occur when handling the energy storage system.

⚠ DANGER
Indicates a hazardous situation which, if not avoided, will result in death or serious injury.

⚠ WARNING
Indicates a hazardous situation which, if not avoided, could result in death or serious injury.

⚠ CAUTION
Indicates a hazardous situation which, could result in minor or moderate injury

NOTE
Indicates a situation which, if not avoided, can result in property damage.

1.6 Symbols in the Document

⚠ QUALIFIED PERSON
Sections describing activities to be performed CONCENPOWER qualified persons only.

1.7 Designation in the Document

Designation in this document	Complete designation
Energy storage system (Also called battery system)	CONCENPOWER high voltage series energy storage system
BCU	Battery communication unit
BMS	Battery management system
SOC	State of charge

2. Safety

2.1 Intended Use

The energy storage system is for residential and works with a photovoltaic system. It is a high capacity LFP battery storage system, with the control unit on itself. It could be operated in on-grid, off-grid and backup modes with compatible inverters.

The energy storage system must only be used as stationary equipment.

The energy storage system is suitable for indoor and outdoor use under the conditions mentioned in Section 5.1.

The energy storage system is not suitable for supplying life-sustaining medical devices. Please ensure that no personal injury would lead due to the power outage of the energy storage system.

Alterations to the energy storage system, e.g., changes or modifications are not allowed unless the written permission of CONCENPOWER is achieved. Unauthorized alterations will void the guarantee and warranty claims. CONCENPOWER shall not be held liable for any damage caused by such changes. The type of label should always be attached to the energy storage system.

2.2 IMPORTANT SAFETY INSTRUCTIONS

The energy storage system has been designed and tested in accordance with international safety requirements. However, in order to prevent personal injury and property damage and ensure long-term operation of the energy storage system, please do read this section carefully and observe all safety information at all times.

2.2.1 Battery Pack Leakage

If the battery packs leak electrolytes, contact with the leaking liquid or gas should be avoided. The electrolyte is corrosive, and the contact may cause skin irritation and chemical burns. If one is exposed to the leaked substance, do these actions:

Inhalation: Evacuate the contaminated area and seek medical help immediately.

Eye contact: Rinse eyes with flowing water for 15 minutes and seek medical help immediately.

Skin contact: Wash the affected area thoroughly with soap and water and seek medical help immediately.

Ingestion: Induce vomiting and seek medical help immediately.

2.2.2 Firefighting Measures

The battery packs may catch fire when it is put into the fire. In case of a fire, please make sure that an ABC or carbon dioxide extinguisher is nearby. Water cannot be used to extinguish the fire. Full protective clothing and self-contained breathing apparatus are required for the firefighters to extinguish the fire.

Full protective clothing and self-contained breathing apparatus are required for the firefighters to extinguish the fire.

2.2.3 Battery Packs Handling and Storage Guide

- The battery packs and its components should be protected from damage when transporting and handling.
- Do not impact, pull, drag, or step on the battery packs.
- Do not insert unrelated objects into any part of the battery packs.
- Do not throw the battery pack into a fire.
- Do not soak the battery packs in water or seawater.
- Do not expose to strong oxidizers.
- Do not short circuit the battery packs.
- The battery packs cannot be stored at high temperatures (more than 50°C).
- The battery packs cannot be stored directly under the sun.
- The battery packs cannot be stored in a high humidity environment.
- Do not use the battery packs if it is defective, or appears cracked, broken or otherwise damaged, or fails to operate.
- Do not attempt to open, disassemble, repair, tamper with, or modify the battery packs. The battery packs are not user-serviceable.
- Do not use cleaning solvents to clean the battery packs.

2.2.4 Warning of Electric Shock

⚠ DANGER

Danger to life due to electric shock when live components or DC cables are touched The DC cables connected to an inverter may be live. Touching live DC cables results in death or serious injury due to electric shock.

- Disconnect the energy storage system and inverter from voltage sources and make sure it cannot be reconnected before working on the device.
- Do not touch non-insulated parts or cables.
- Do not remove the terminal block with the connected DC conductors from the slot under load.
- Wear suitable personal protective equipment for all work on the energy storage system.
- Observe all safety information of the inverter manufacturer.

2.2.5 Warning of Overvoltage

⚠ DANGER

Danger to life due to electric shock in case of overvoltage and if surge protection is missing. Overvoltage (e. g. in the event of a flash of lightning) can be further conducted into the building and to other connected devices in the same network via the network cables or other data cables if there is no surge protection. Touching live parts and cables results in death or lethal injuries due to electric shock.

- Ensure that all devices in the same network and the inverter are integrated into the existing surge protection.
- When laying the network cables or other data cables outdoors, it must be ensured that a suitable surge protection device is provided at the transition point of the cable from the energy storage system or the inverter outdoors to the inside of a building.

2.2.6 Caution of Weight

⚠ CAUTION

Risk of injury due to weight of the battery pack. Injuries may result if the battery pack is lifted incorrectly or dropped while being transported or installed.

- Transport and lift the battery pack carefully. Take the weight of the battery pack into account.
- Wear suitable personal protective equipment for all work on the energy storage system.

2.2.7 Notice of Property Damage

NOTE

Damage to the BCU due to sand, dust and moisture ingress Sand, dust and moisture penetration can damage the BCU and impair its functionality.

• Only open the BCU if the humidity is within the thresholds and the environment is free of sand and dust.

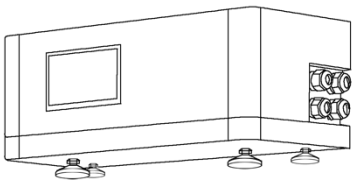
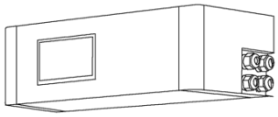
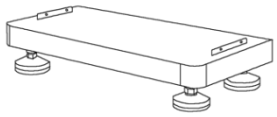
NOTE

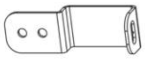
Damage to the energy storage system due to under voltages

• If the energy storage system doesn`t start at all, please contact CONCENPOWER local after-sales service within 48 hours. Otherwise, the battery could be permanently damaged.

3. Scope of Delivery

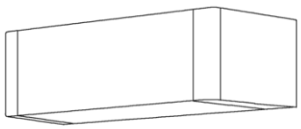
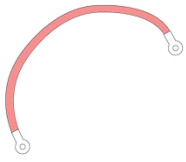
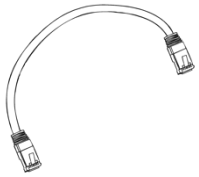
BCU and Base Package

			
	BCU *1 Pcs	Base *1 Pcs	M4*14 Countersunk strew *4 Pcs

				
Documents *1 Pcs	Hanger (BCU part) *2 Pcs	Hanger (wall part) *2 Pcs	M6*16 Countersunk strew *4 Pcs	M6 Bolt and Nut *2 Pcs

1. **Documents:** include Operating Manual, Quick Start Guide, Service Guideline and Checklist
2. **M4*14 Countersunk strew:** Screw to fix the connection between packs, base, and BCU
3. **M6*16 countersunk strew:** Strew to fix hanger (BCU part) on BCU
4. **M6 Bolt and Nut:** bolt to fix Hanger (BCU part) and Hanger (wall part)

Battery pack Package

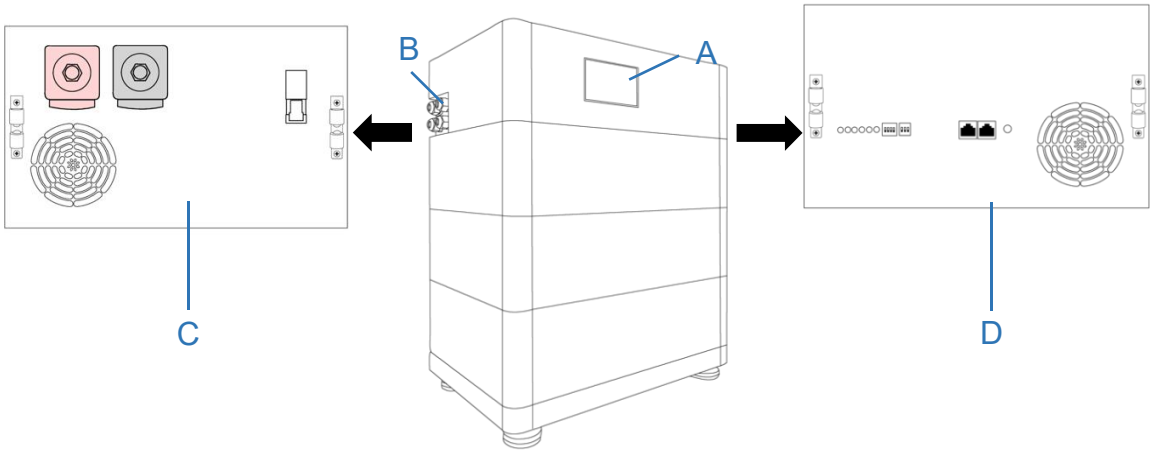
				
Battery pack *1 Pcs	M4*14 Countersunk strew *4 Pcs	Battery pack positive cable *1 Pcs	Battery pack negative cable *1 Pcs	Communication cable *1 Pcs

1. **M4*14 Countersunk strew:** Screw to fix the connection between packs, base, and BCU
2. **Battery pack positive cable:** For connection of battery pack's positive, 30cm, 8AWG
3. **Battery pack negative cable:** For connection of battery pack's negative, 30cm, 8AWG

4. **Communication cable:** For communication between battery packs or between battery pack and BCU, 30cm, CAT5

4. Energy storage system overview

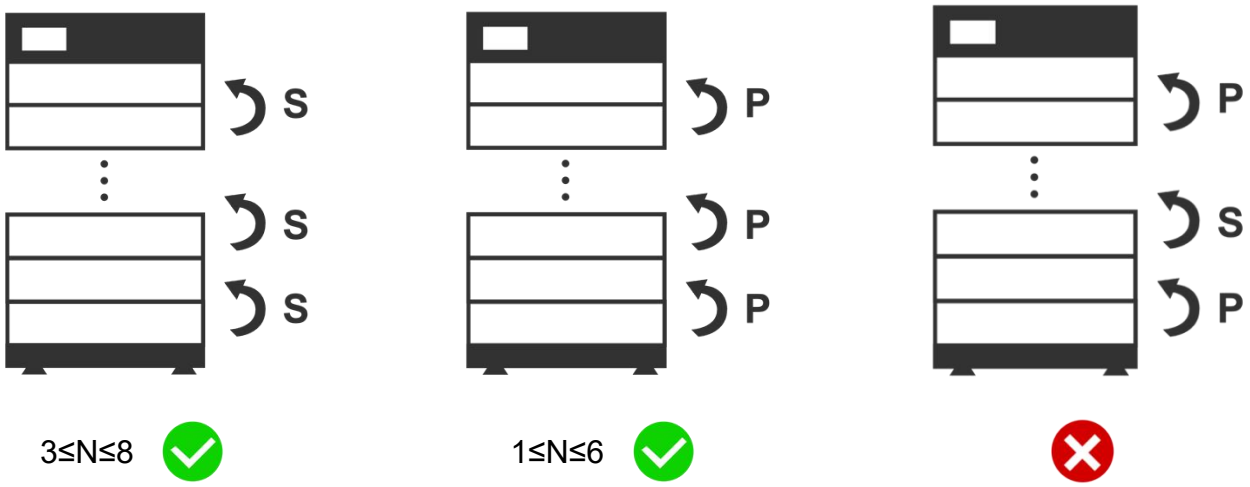
4.1 Energy storage system Description



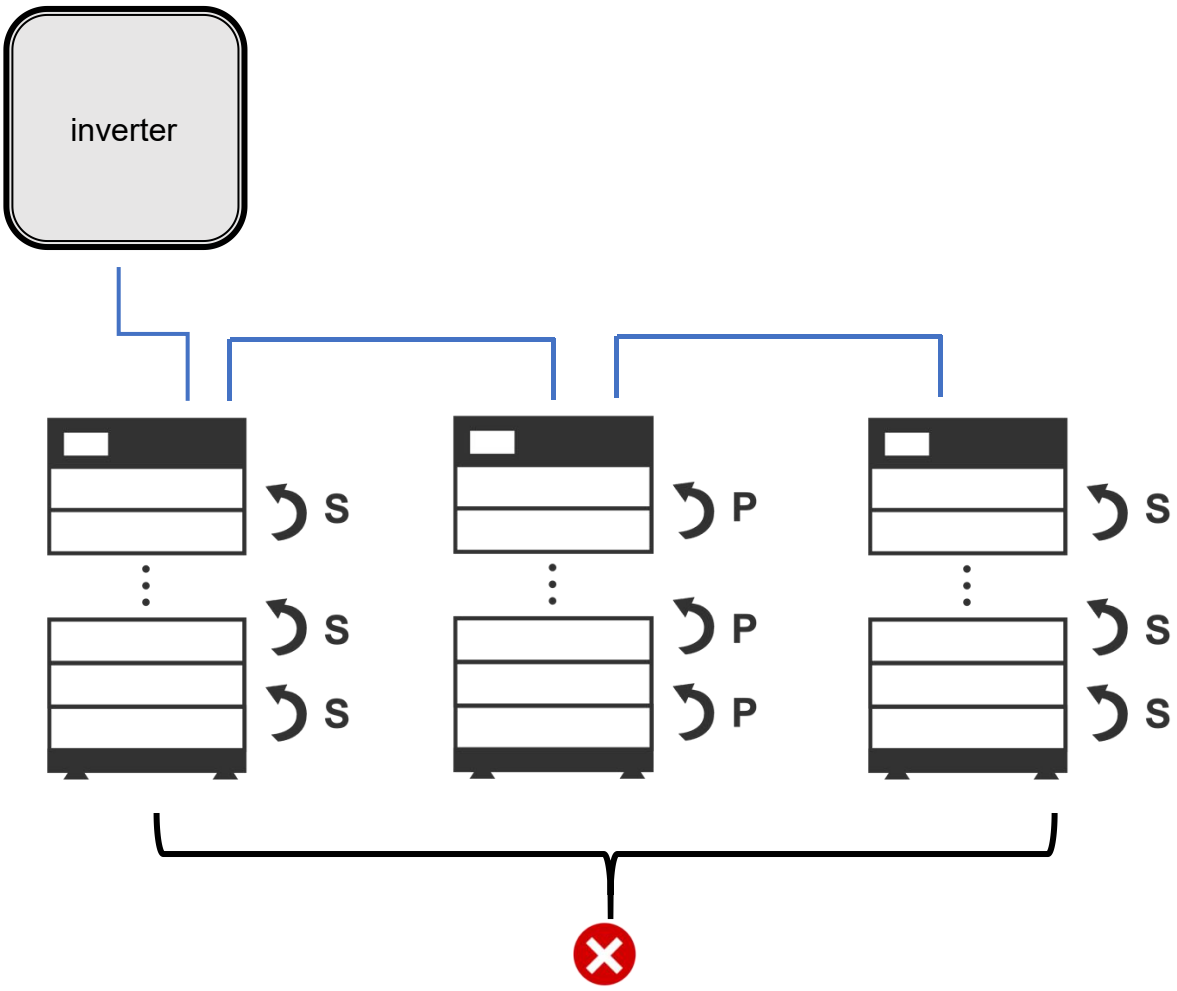
A	Touch screen
B	Gland area
C	Connection area
D	Communication and indicator area

Three to eight battery packs to series connection could be installed in one cabinet. **DIFFERENT CONNECTION MODE CAN NOT BE INSTALLED IN ONE CABINET.**

NOTICE: "P" means parallel connection; "S" means series connection



Maximum fifteen battery cabinets could be connected in parallel.

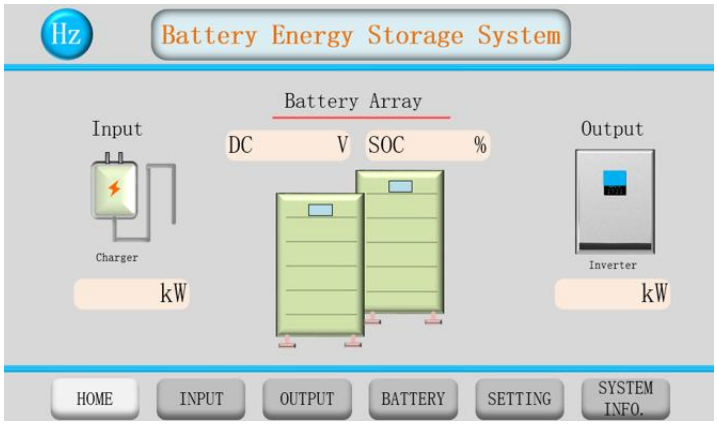


4.2 Symbol on the system

Symbol	Explanation
	Observe the documents Observe all documents supplied with the system
	Grounding conductor This symbol indicates the position for connecting a grounding conductor
	Disposal Do not dispose of the system together with household waste.

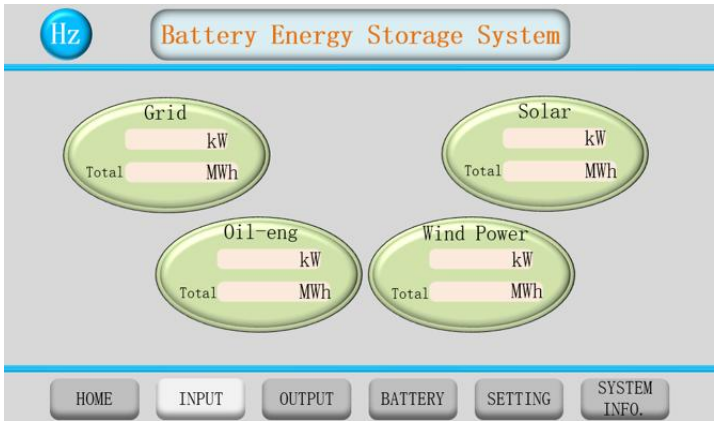
	CE marking The system complies with the requirements of the applicable EU directives.
	Place it straight up, without inclination or upside down.
	Handle with care
	Keep it dry
	Keep the battery packs away from open flame or ignition sources.
	Beware of electrical voltage.
	Beware of a danger zone This symbol indicates that the system must be additionally grounded if additional grounding or equipotential bonding is required at the installation site.
	Keep the battery packs away from children.
	Do not short circuit.

4.3 Display Interface of BMS



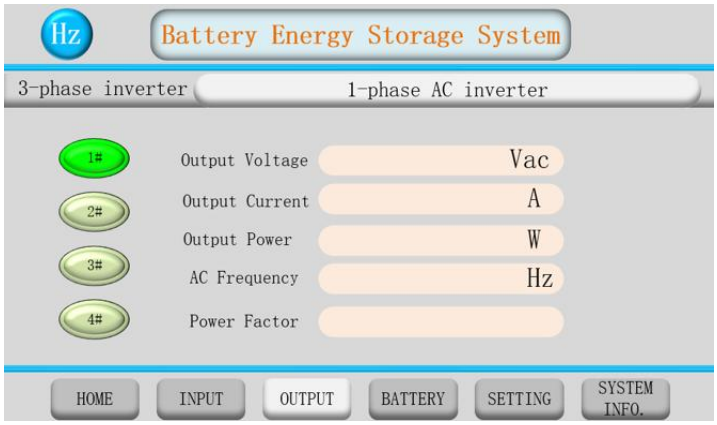
Home Page

Display the SOC, input, and output information of the whole system.



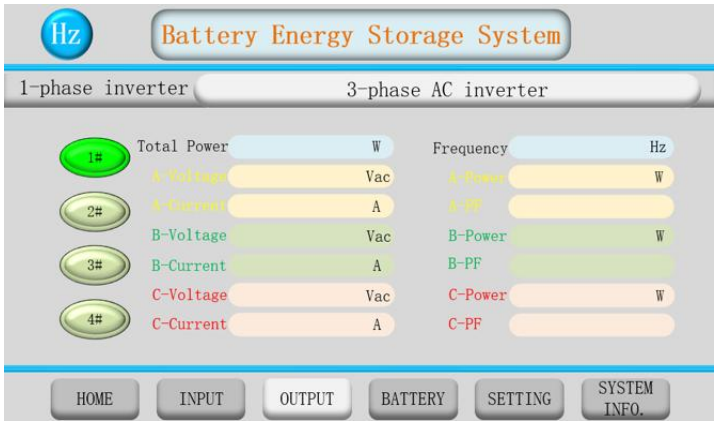
Input Page

Display information about the four different input modes.



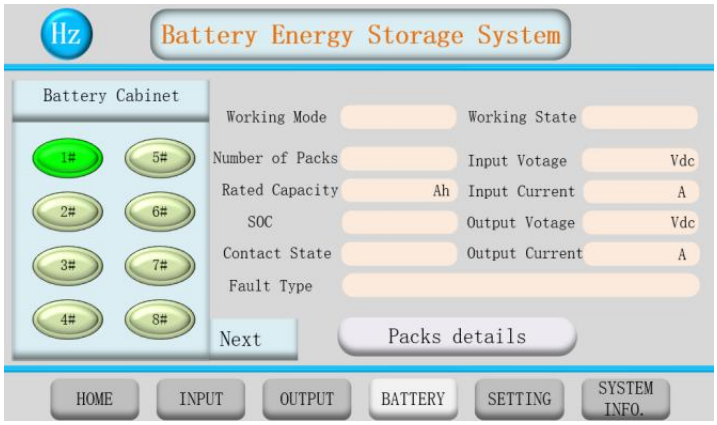
1-Phase AC Output Page

Display relative information about the 1-phase inverter.



3-Phase AC Output Page

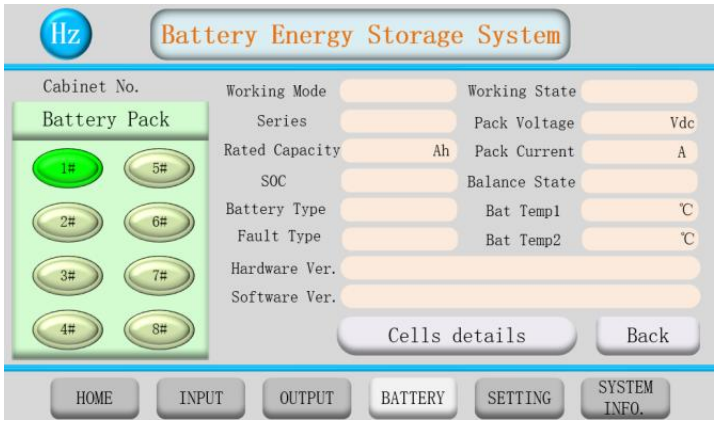
Display relative information about the 3-phase inverter.



Battery Cabinet Page --- Master

Display information about the one battery cabinet.

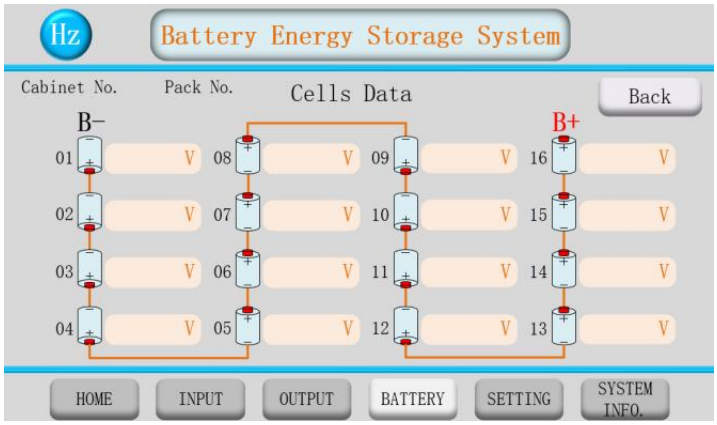
The display screen of the master cabinet can display the battery information of other slaves' cabinets. (If any)



Battery Pack Page --- Master

Display relative information about each battery pack in a battery cabinet.

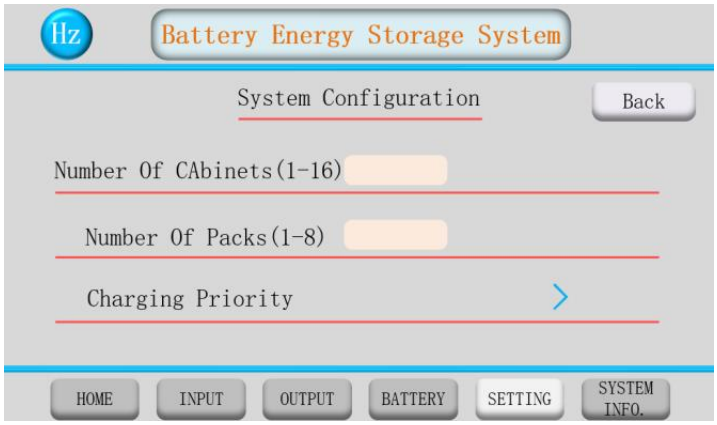
The display screen of the master cabinet can display the battery pack information of other slaves' cabinets (If any).



Battery Cell Page --- Master

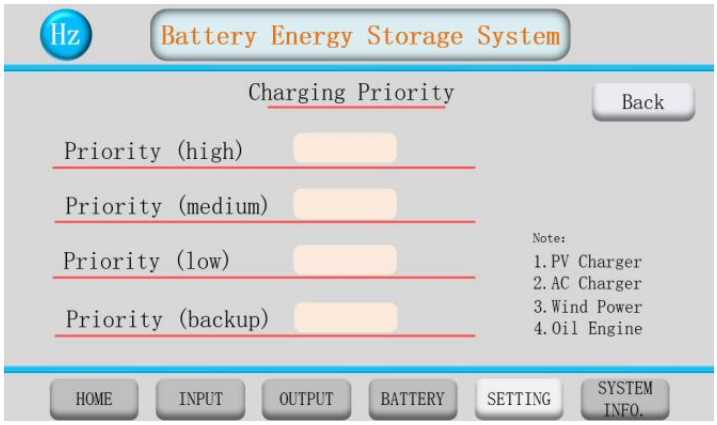
Display voltage information about each battery cell in a battery pack.

The display screen of the master cabinet can display the battery cell information of other slaves' cabinets. (If any)



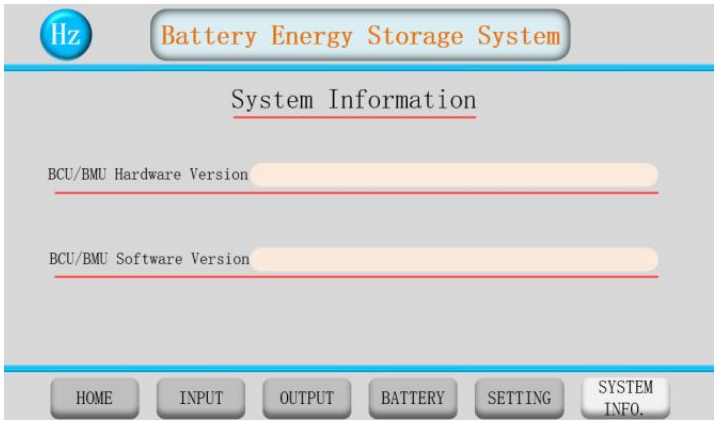
Battery Setting Page

Set the number of battery cabinets and battery packs of the energy storage system through this page



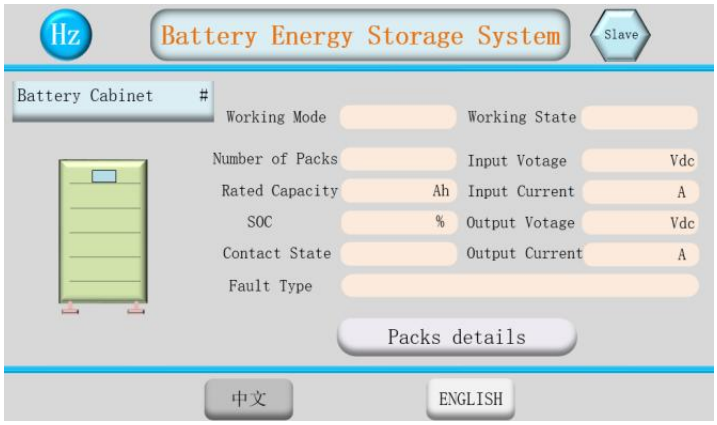
Charging Priority Page

Set the charging priority of the energy storage system through this page



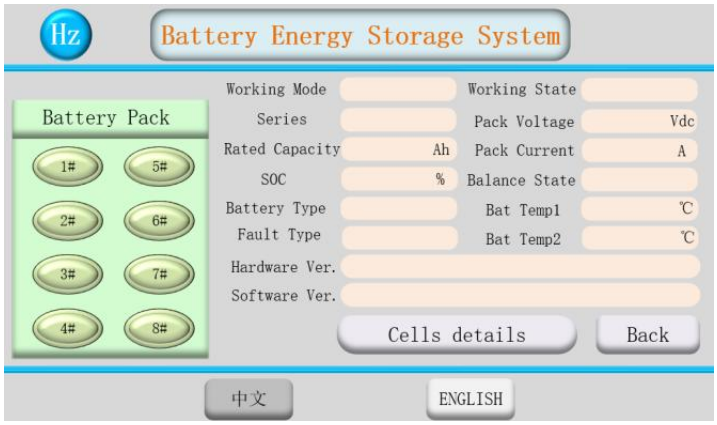
System Information

View system hardware and software version information



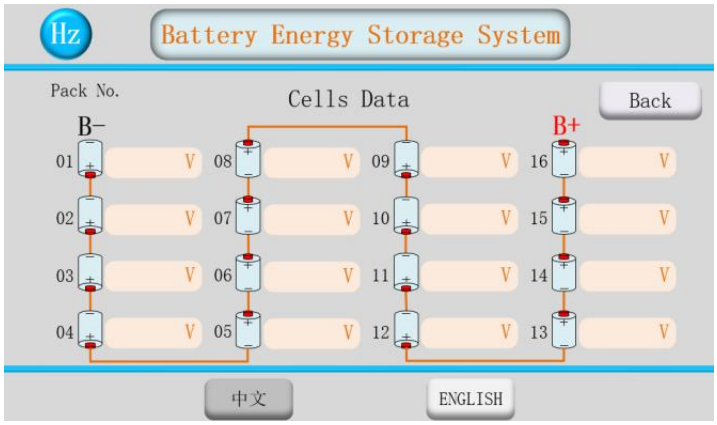
Battery Cabinet Page --- Slave

Display information about the relative slave battery cabinet.



Battery Pack Page --- Slave

Display relative information about each battery pack in a battery cabinet.



Battery Cell Page --- Slave

Display voltage information about each battery cell in a battery pack.

Number Keyboard Page

Used to enter the numbers required for system settings.

5. Installation

5.1 Requirements for Installation

5.1.1 Requirements for Installation Location

a) A solid support surface must be available (e.g., concrete or masonry).

b) The installation location must be inaccessible to children.

c) The installation location must be suitable for the weight and dimensions of the energy

storage system.

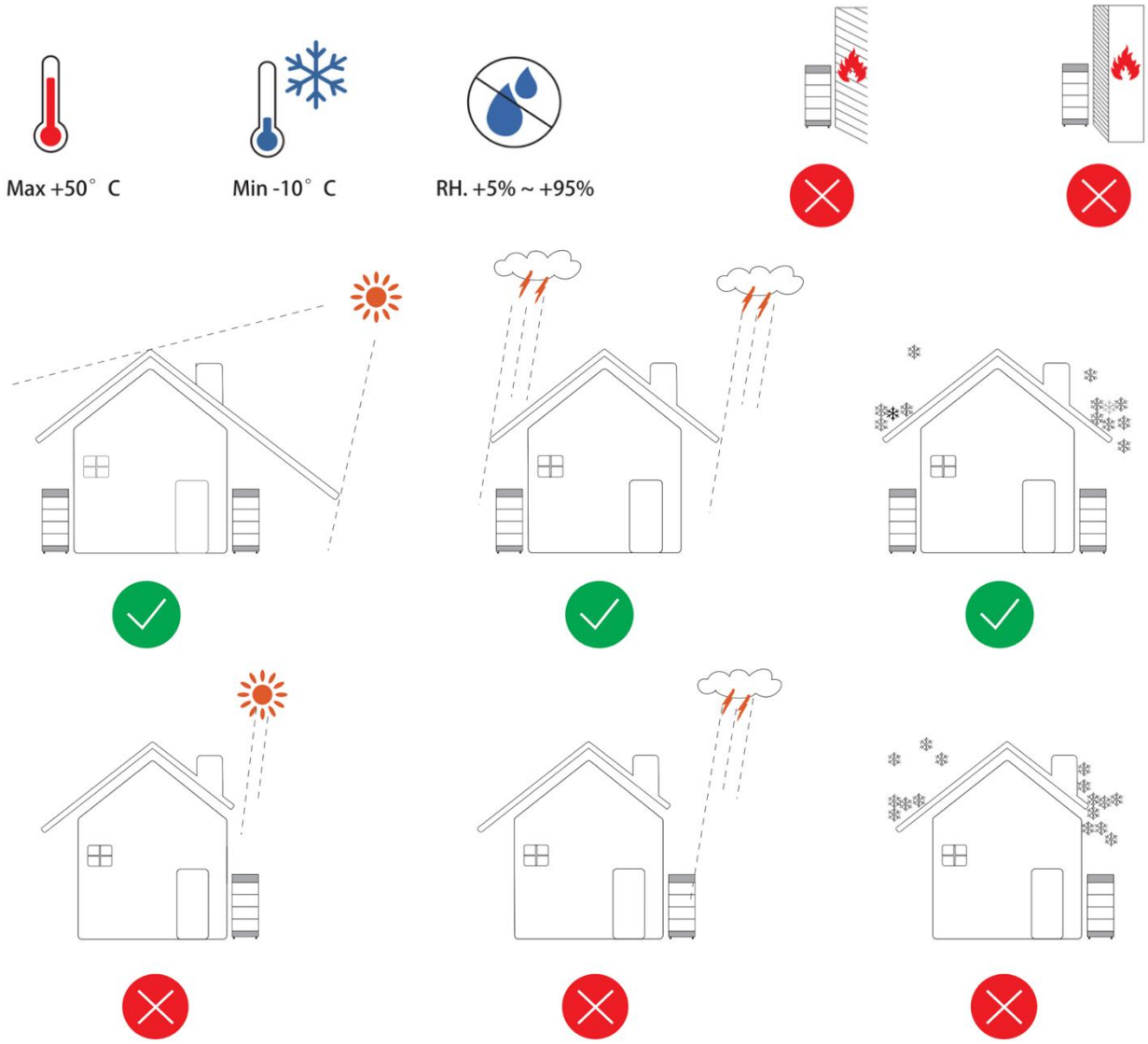
d) The installation location must not be exposed to direct solar irradiation.

e) The installation location must not be close to the fire.

f) The altitude of the installation location should be less than 3000m.

g) The ambient temperature should be between -10°C and +50°C.

h) The ambient humidity should be between 5-95%.



5.1.2 Installation Tools

The tools in the following table could be needed during the installation.

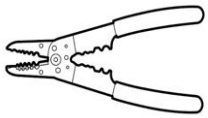
Network Wire Clamp

Pen

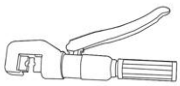
Phillips Screwdriver Bit

Flat-Head Screwdriver

Torque Wrench

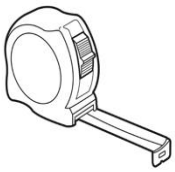


Wire Stripper



Crimping Pliers

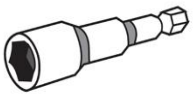
Wrench



Tape Measure

Drill

Hair Dryer



Cylinder Screwdriver

5.1.3 Safety Gear

Wear the following safety gear when dealing with the energy storage system.

Insulated gloves

Safety goggles

Safety shoes

5.1.4 Additionally Required Installation Material

x2

K

DC Cable

x2

L

Expansion Anchor Bolt(M8x40)

M

Cat5 Shield

x1

N

PE Terminal

x1

O

PE

x1

P

Heat Shrink Tubing

5.2 Installation

⚠ QUALIFIIED PERSON

⚠ DANGER

Danger to life from electric shock due to live DC cables or connectors at the energy storage system

The DC cables connected to the energy storage system may be live. Touching the DC conductors or the live components leads to lethal electric shocks.

- Do not touch non-insulated cable ends.

⚠ CAUTION

Risk of injury due to weight of the battery pack

Injuries may result if the battery pack is lifted incorrectly or dropped while being transported or installed.

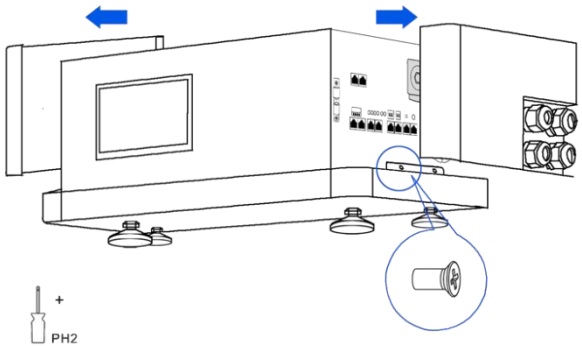
- Transport and lift the battery pack carefully. Take the weight of the battery pack into account.
- Wear suitable personal protective equipment for all work on the energy storage system.

Additionally required installation material (not included in the scope of delivery):

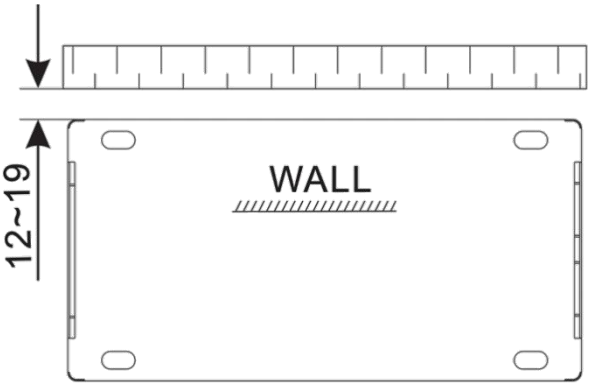
- Two screws suitable for the support surface (diameter: 8 mm)
- Where necessary, two screw anchors suitable for the support surface and the screws.

Procedure:

1. Take the BCU and base from the package out.
2. Remove the covers on both sides of the BCU.
3. Loose the four screws with screwdriver PH2.
4. Take the BCU from the base.



5. Put the installed base and feet along the wall and keep the distance of 12~19 mm between the wall and the base.



Linear Measure: mm

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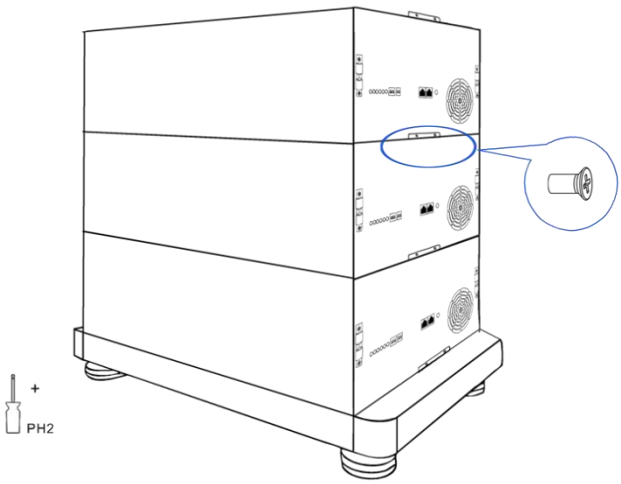
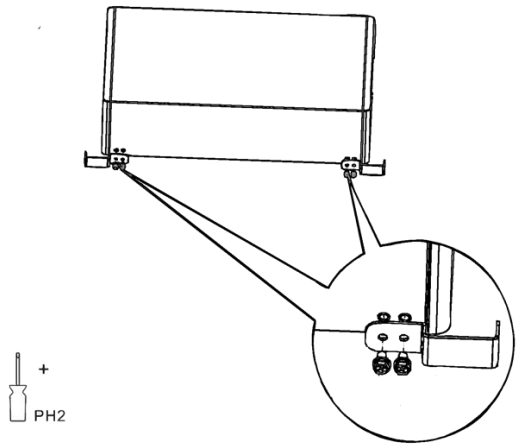
6. Take a battery pack from the package out. Put one battery pack on the base. Pay attention to the direction of the battery pack. The positive and negative connectors on the battery pack and the base should be on the same side.
7. Repeat the operations for other battery packs.



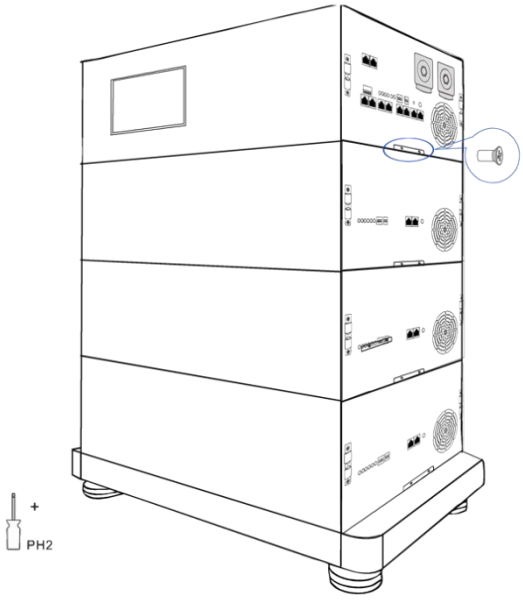
---

8. Install the hanger (BCU part) to the BCU. To do this, insert the screws (M6x16) through the hole on the BCU using a screwdriver PH2 and tighten them (torque: 5.5 Nm).



9. Put the BCU on top of the battery packs. Recommend connecting cables on the BCU first when five or more than five battery packs are needed to be installed in one tower.

10. Fix the connection between the battery pack and the base, between battery packs, and between BCU and battery pack. To do this, insert the screws (M4x14) through the holes on them, using a Phillips screwdriver (PH2) and tighten them (torque: 2 Nm).



NOTICE: If there are two or three battery cabinets connected in parallel in the energy storage system, it is recommended to pass the positive and negative cables for parallel connection through the glands first.

---

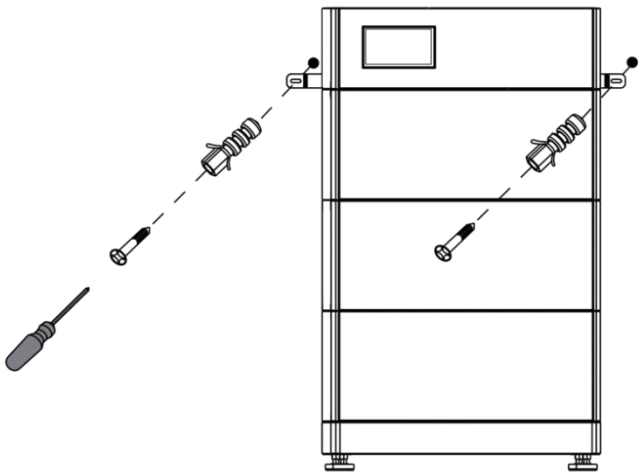
11. Hold the hanger (wall part) where it intends to be mounted on the wall and mark the position of the drill holes. Please pay attention that there may be power cables or other supply lines (e.g., gas or water) routed in the wall. Ensure that no lines are laid in the wall, which could be damaged when drilling holes.

12. Set the hanger aside and drill the marked holes.

13. Insert screw anchors into the drill holes if the support surface requires them.

14. Secure the hanger using screws (recommended M8x40).

15. Fix the two hangers (wall part and BCU part) with M6X16 bolts and nuts, using a screwdriver PH2 to tighten it (torque: 5 or 5.5 Nm).



NOTE

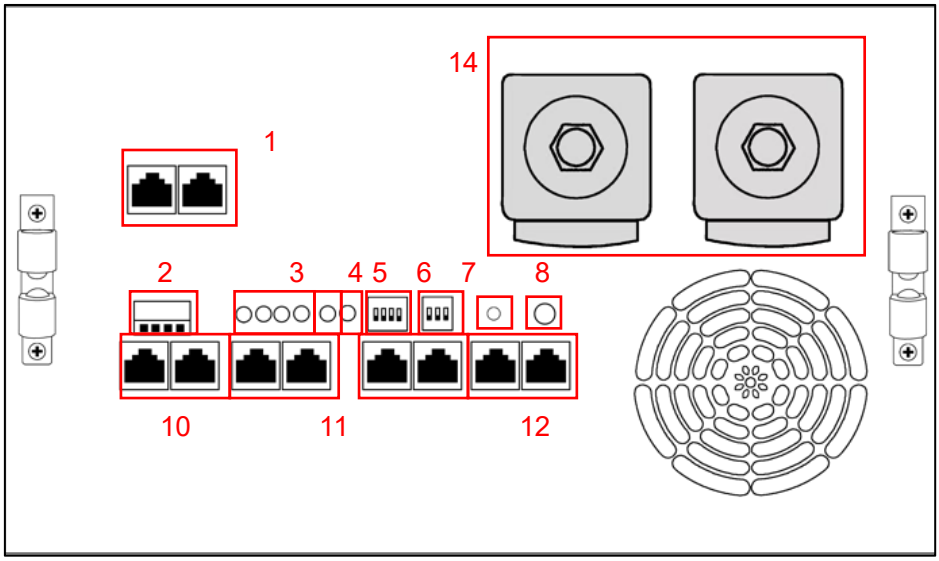
Damage to the energy storage system due to under voltages

- If the battery is installed, it should be set into operation within a month, or checked regularly, otherwise there might be damage to the batteries.

6. Electrical Connection

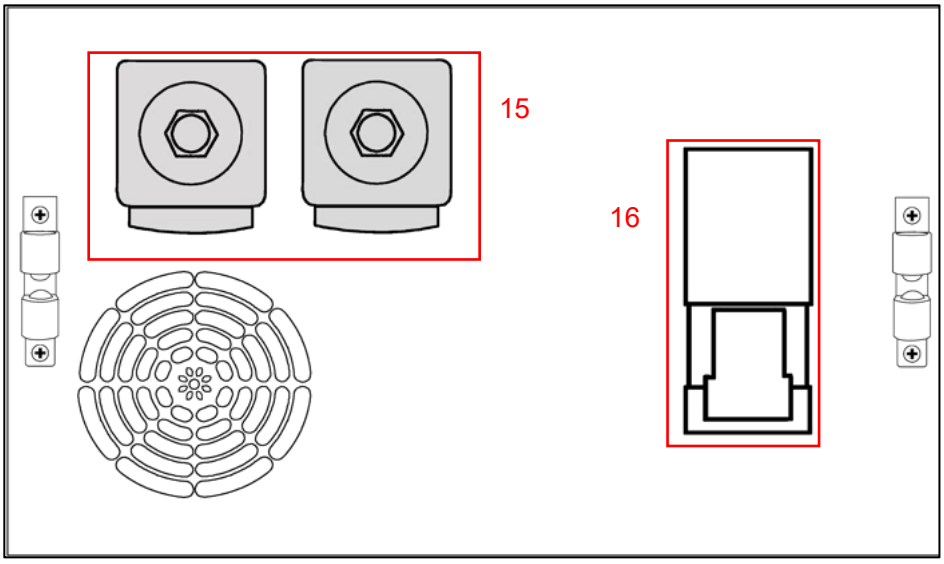
6.1 Overview of the Connection Area

6.2 BCU Connection Area View



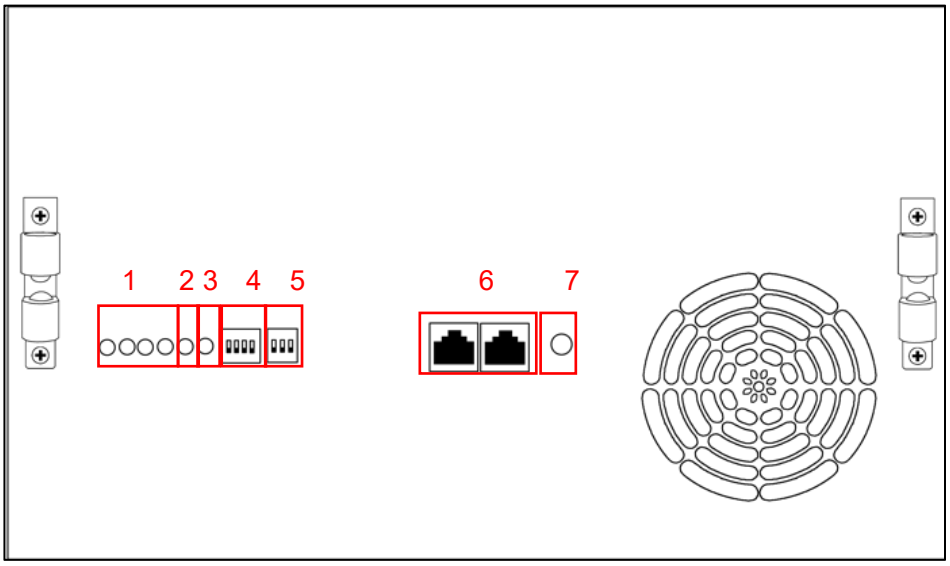
1	RS485-4 communication ports
2	Dry ports
3	SOC of battery pack
4	Fault alarm light
5	Run light
6	Address dip
7	Mode dip (choose series connection or parallel connection)
8	Reset button
9	BCU ON/OFF button
10	RS485-1, CAN-1 communication ports

11	RS485-3, CAN-3 communication ports
12	CAN-2 communication ports
13	RS485-2 communication ports
14	Positive and negative terminal posts of the battery pack (red: positive; black: negative)



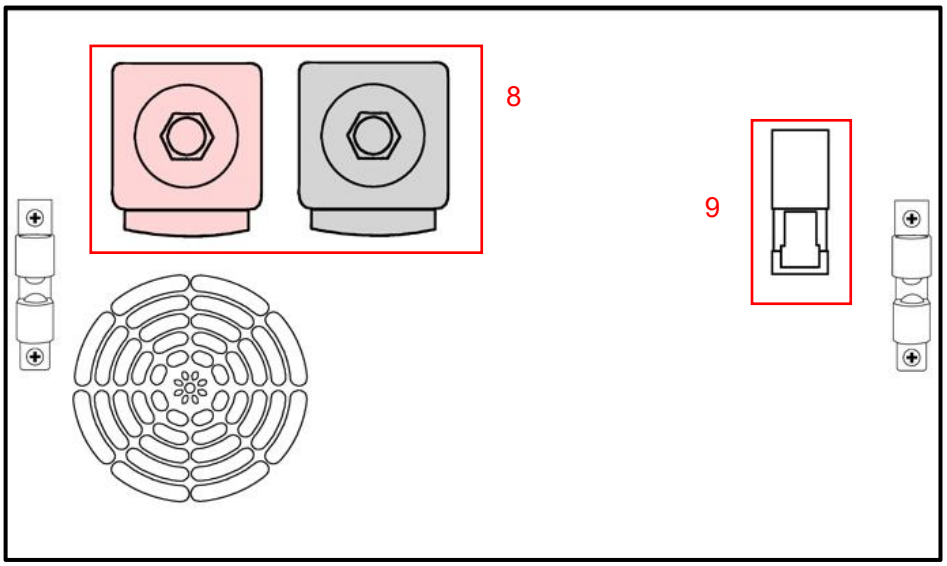
15	Positive and negative terminal posts of the battery cabinet (red: positive; black: negative)
16	BCU air switch

6.3 Battery Pack Connection Area View



1	SOC of battery pack

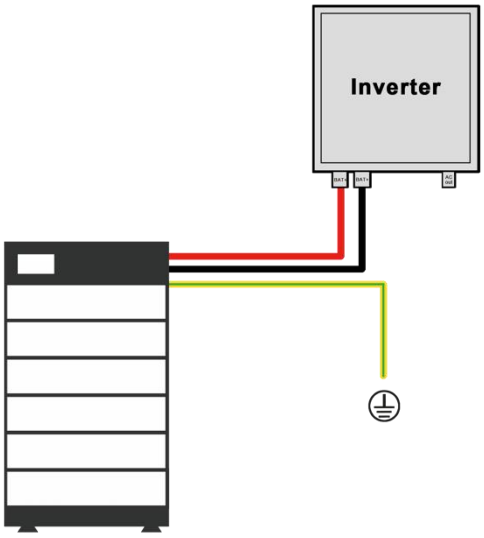
2	Fault alarm light
3	Run light
4	Address dip
5	Mode dip (choose series connection or parallel connection)
6	RS485-2, RS485-2 communication ports
7	Battery pack ON/OFF button



8	Positive and negative terminal posts of the battery pack (red: positive; black: negative)
9	Battery pack air switch

6.4 Connection diagram

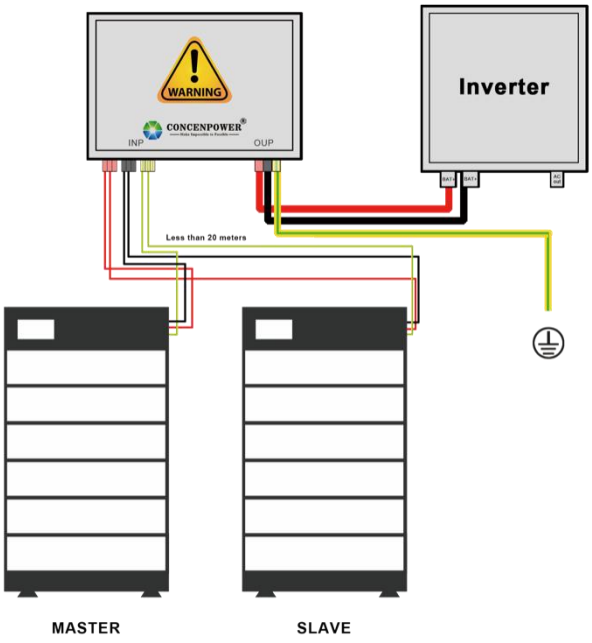
6.4.1 One Battery Cabinet



NOTICE

1. The two cables connecting the battery cabinet and the inverter must be of equal length.
2. Connecting wire specification: 8 AWG
3. The total length of power cable between each battery cabinet and the inverter should be less than 20 meters.

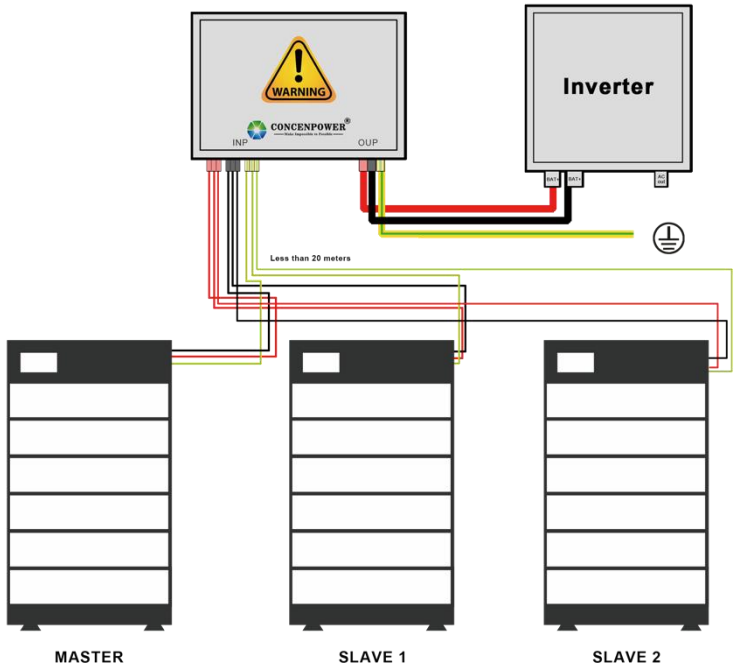
6.4.2 Two Battery Cabinets



NOTICE

1. The three cables connecting the battery cabinet and the inverter must be of equal length.
2. The length of the power cables to the combiner box should be same.
3. Connecting wire specification: 8 AWG
4. The total length of power cable between each battery cabinet and the combiner box should be less than 20 meters.
5. If the combiner box is not used, the parallel connection device should meet the following requirements.
   a) No less than IP 55 for the outdoor use.
   b) Maximum Operating Voltage,1000V DC
   c) Maximum Output Current,40A DC
   d) Breaking Current, 40A DC.

6.4.3 Three Battery Cabinets



NOTICE

1. The three cables connecting the battery cabinet and the inverter must be of equal length.
2. The length of the power cables to the combiner box should be same.
3. Connecting wire specification: 8 AWG
4. The total length of power cable between each battery cabinet and the combiner box should be less than 20 meters.
5. If the combiner box is not used, the parallel connection device should meet the following requirements.
   a) No less than IP 55 for the outdoor use.
   b) Maximum Operating Voltage,1000V DC
   c) Maximum Output Current,40A DC
   d) Breaking Current, 40A DC.

6.5 Connecting the Grounding Conductor

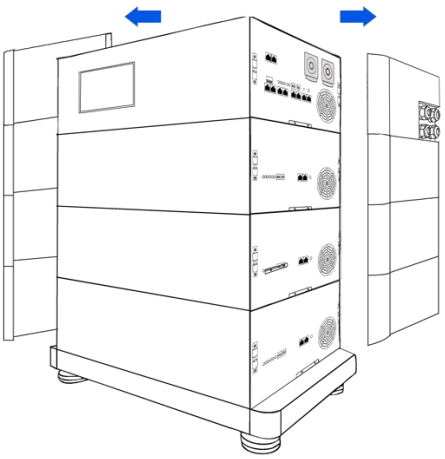
⚠ QUALIFIIED PERSON

Additionally required mounting material (not included in the scope of delivery):

a) Conductor SC10-5

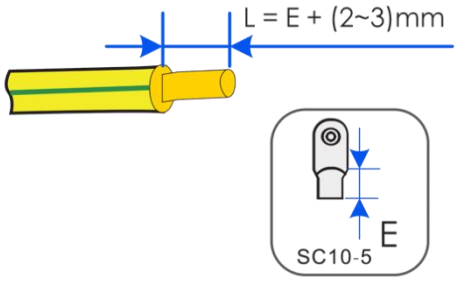
b) Grounding cable, cross-section: 10 mm²

Procedure:

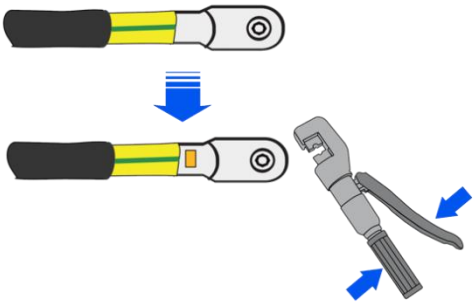


1. Remove the covers on both sides of the battery cabinet
2. Make sure all air switches are off

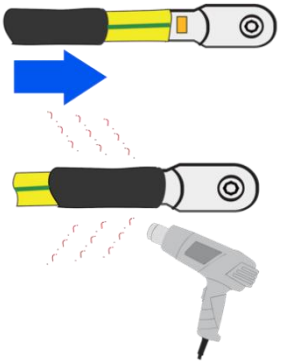
3. Strip the grounding cable and make the length L (on the right drawing) stripped 2-3 mm longer than the tube of the conductor (E on the right drawing).



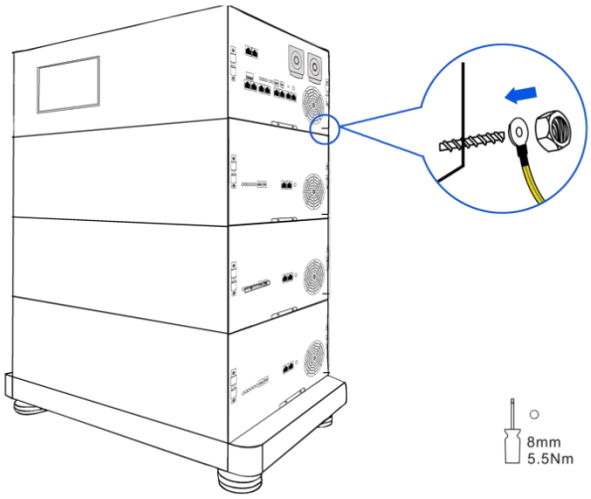
4. Get the heat shrink tubing through the cable and plug the conductor on the cable.
5. Squeeze the tube of the conductor with a crimping pliers.



6. Get the heat shrink tubing back to cover the connection part of the cable and the conductor.
7. Blow the heat shrink tubing with hot wind



8. Take the original nut on the grounding point off, then fix the PE conductor, using the same nut, with a cylinder screwdriver 8 mm, and tighten it (torque, 4 Nm)

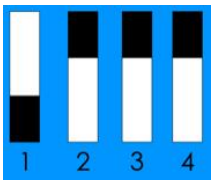
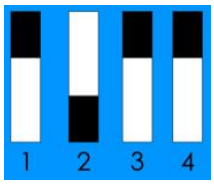
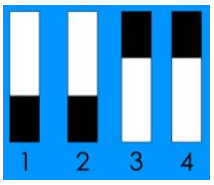
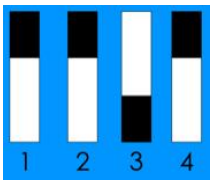
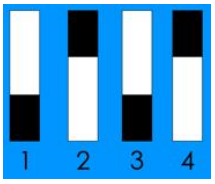
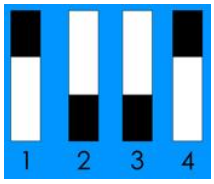
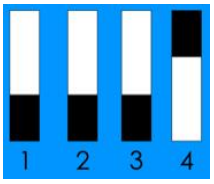
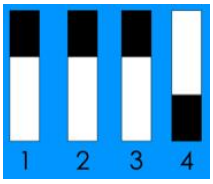


6.6 Dial code Information

6.6.1 Battery pack address (No.) dial code (Blue dip)

Please dial in numerical order, prohibit dialing jump the numerical order.

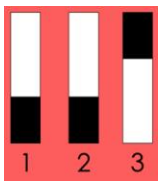
Note: The black is dial button; The number sequence is from bottom to top

Dial code				
Pack No.	1 (The bottom battery pack)	2	3	4
Dial code				
Pack No.	5	6	7	8

6.6.2 Battery packs connection mode code (Red dip)

This Product uses **series** connection between battery packs

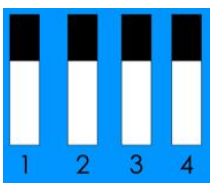
Note: The black is dial button

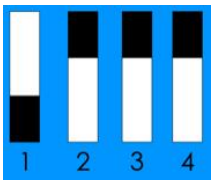
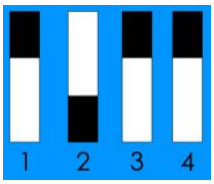
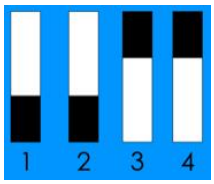
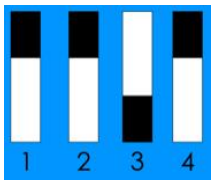
Series connection (High voltage system)	

6.6.3 Cabinet BCU address (No.) dial code (Blue dip)

Please dial in numerical order, prohibit dialing jump the numerical order.

Note: The black is dial button

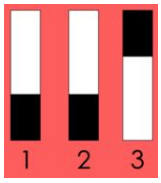
Master Dial code	
BCU No.	Master

Slaves Dial code				
BCU No.	1	2	3	4

6.6.4 Cabinet BCU connection mode code (Red dip)

In the same cabinet, the BCU needs setting as same as the battery packs. This Product uses series connection mode between battery packs, please dial code as below diagram.

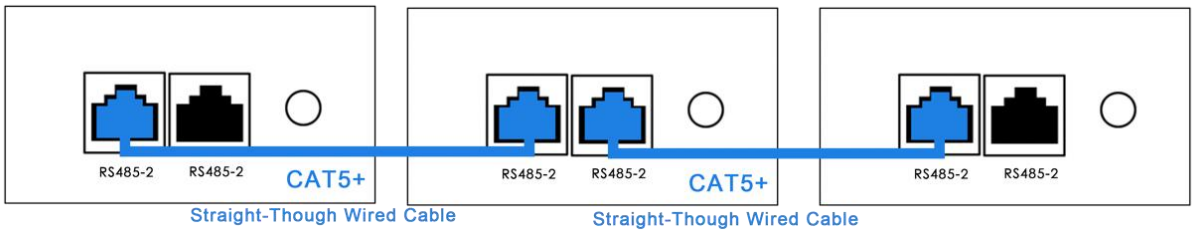
Note: The black is dial button

Series connection (High voltage system)	

6.7 Connecting the Communication Cable to other Battery Packs/Cabinets

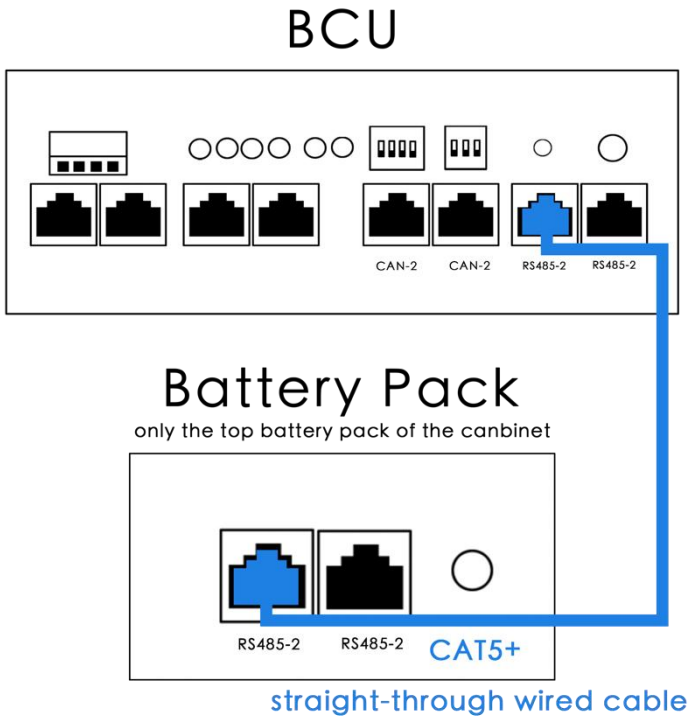
Take out the communication wires from the box, refer the diagrams below to fix them.

6.7.1 Between Battery packs (RS485-2 to RS485-2)

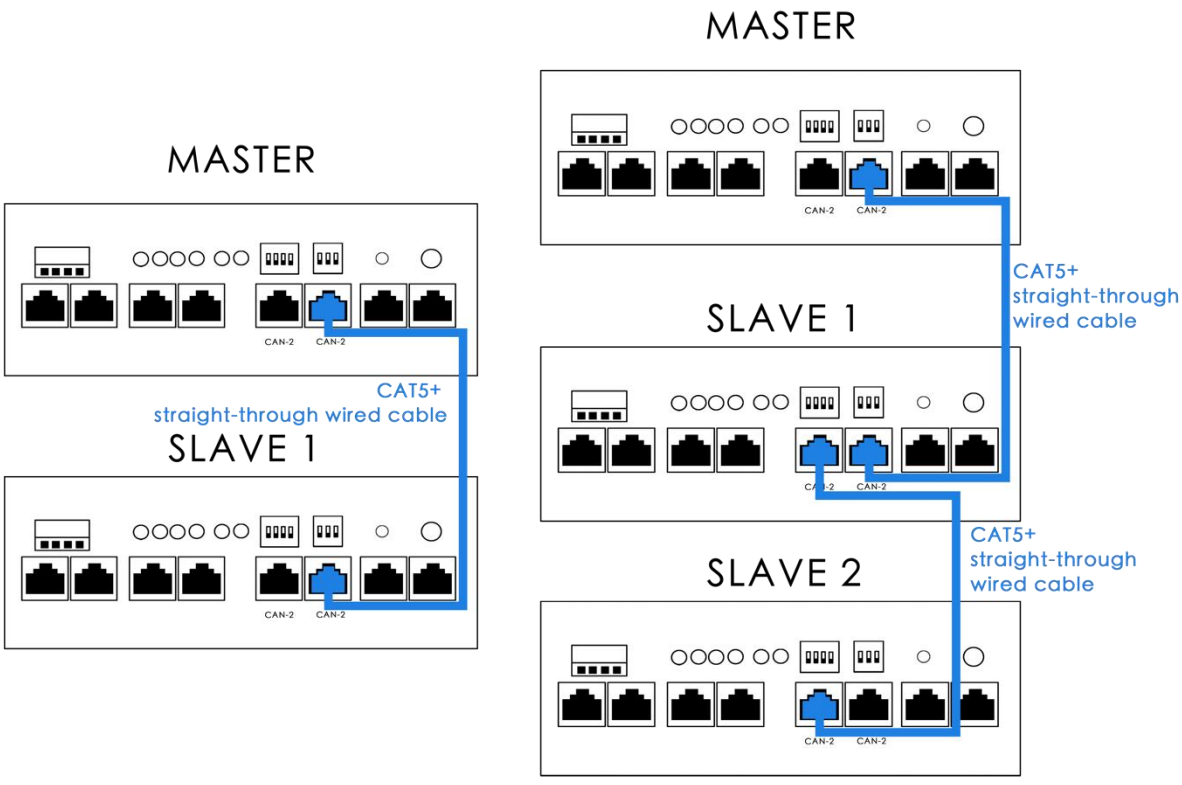


The figure shows 3 battery packs as an example, more battery packs can be deduced by analogy.

6.7.2 Between battery packs and BCU (RS485-2 to RS485-2)



6.7.3 Parallel between battery cabinets BCU (CAN-2 to CAN-2)



2 battery cabinets 3 battery cabinets

The figure shows 2 and 3 battery cabinet as an example, more battery packs can be

deduced by analogy.

NOTE: There can only be one MASTER battery cabinet, and the others are slaves.

6.8 DC Connection

⚠ DANGER

Danger to life from electric shock due to live DC cables or conductors at the energy storage system. The DC cables connected to the energy storage system may be live. Touching the DC conductors or the live components leads to lethal electric shocks.

- Do not touch non-insulated cable ends.

When two or three battery cabinets are connected, the positive power cable length of all the energy storage systems should be approximately equal, and so are the negative power cables. A junction box or Y-Bridge connectors are needed to combine these cables. You can refer to CONCENPOWER Combiner Box, which is available at our website. Please also follow the local, state, provincial, federal, or national laws, regulations, and instructions from the inverter manufacturer to choose the right junction box or Y-Bridge connectors.

Additionally required mounting material (not included in the scope of delivery):

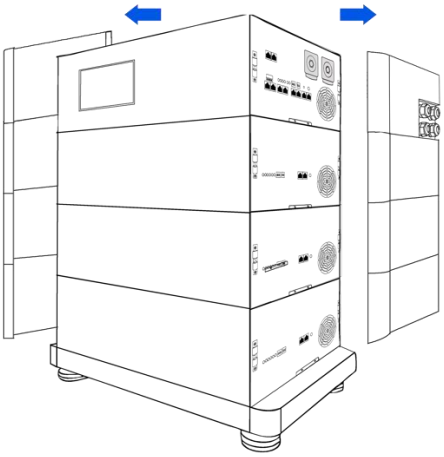
- Two DC power cables
- One DC negative cables 8AWG.In this product, battery packs use series connection. The negative cable needs longer than the total height of the battery packs.)

Cable requirements:

- Conductor cross-section: 6 to16 mm². The diameter of the cable should be between 6 mm to 9 mm (at least 8 AWG). Follow the requirements of the inverter manufacturer.
- Insulation stripping length: 16-18 mm
- Maximum cable length: 20 m

Procedure:

1. Remove the covers on both sides of the battery cabinet
2. Make sure all air switches of are off
3. Take out the positive and negative cables from the box



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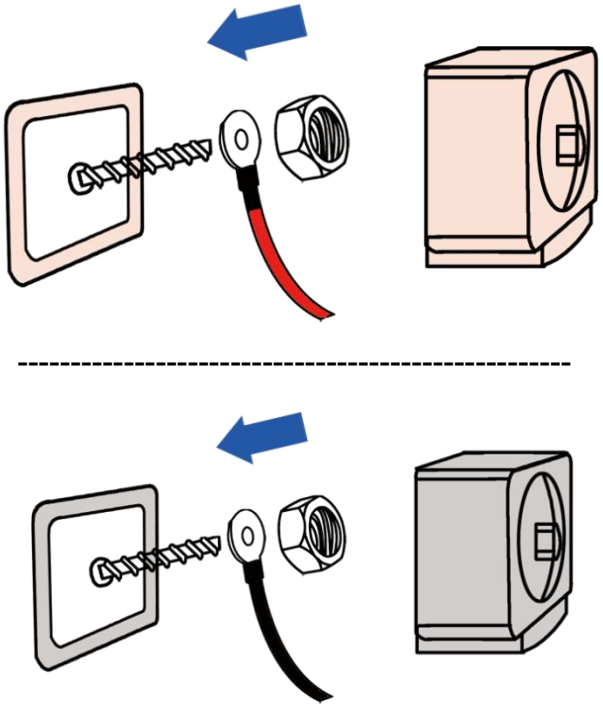
4. Remove the covers and nuts on the positive and negative terminal
5. Put the cables on the terminal, and install the nuts and cover just removed on the terminal



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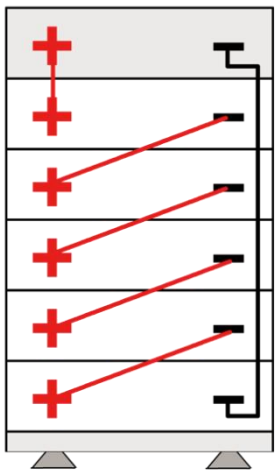
6. Ensure that the terminal points are allocated to the correct cables.
7. Make sure the wires are securely installed.
8. In this product, the battery packs need series connection. Please refer to the figure for series connection



Series Connection

7. Commission

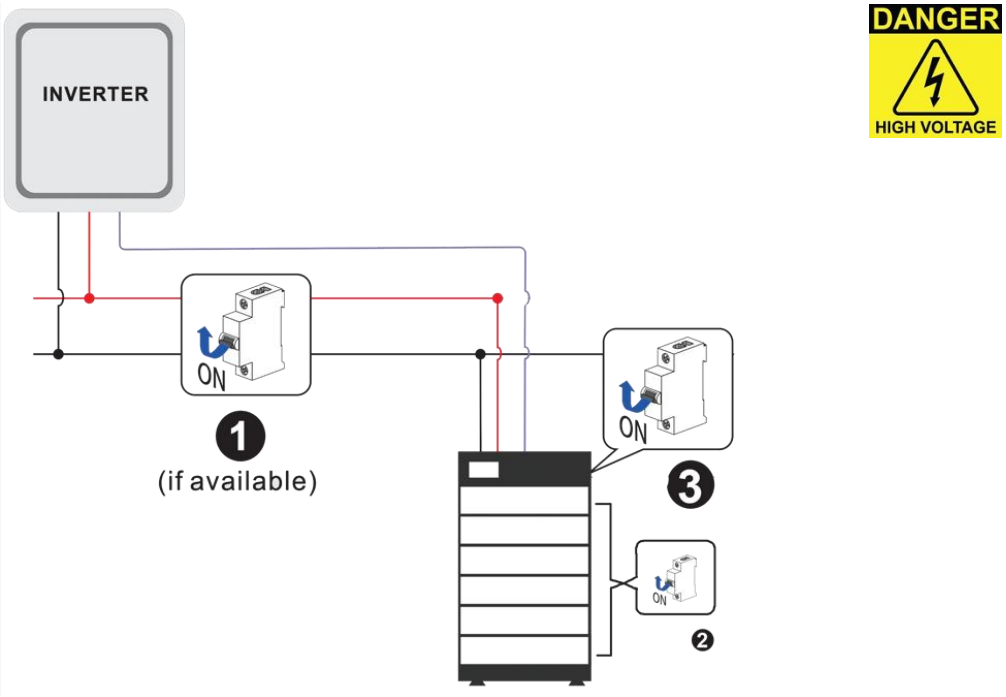
7.1 Switching on the Energy storage system

⚠ QUALIFIIED PERSON

Requirements:

- The power cable connection between the battery cabinets and the inverter is switched off.
- The inverter must be correctly mounted.
- All cables must be correctly connected.

Switch on battery system (one cabinet)

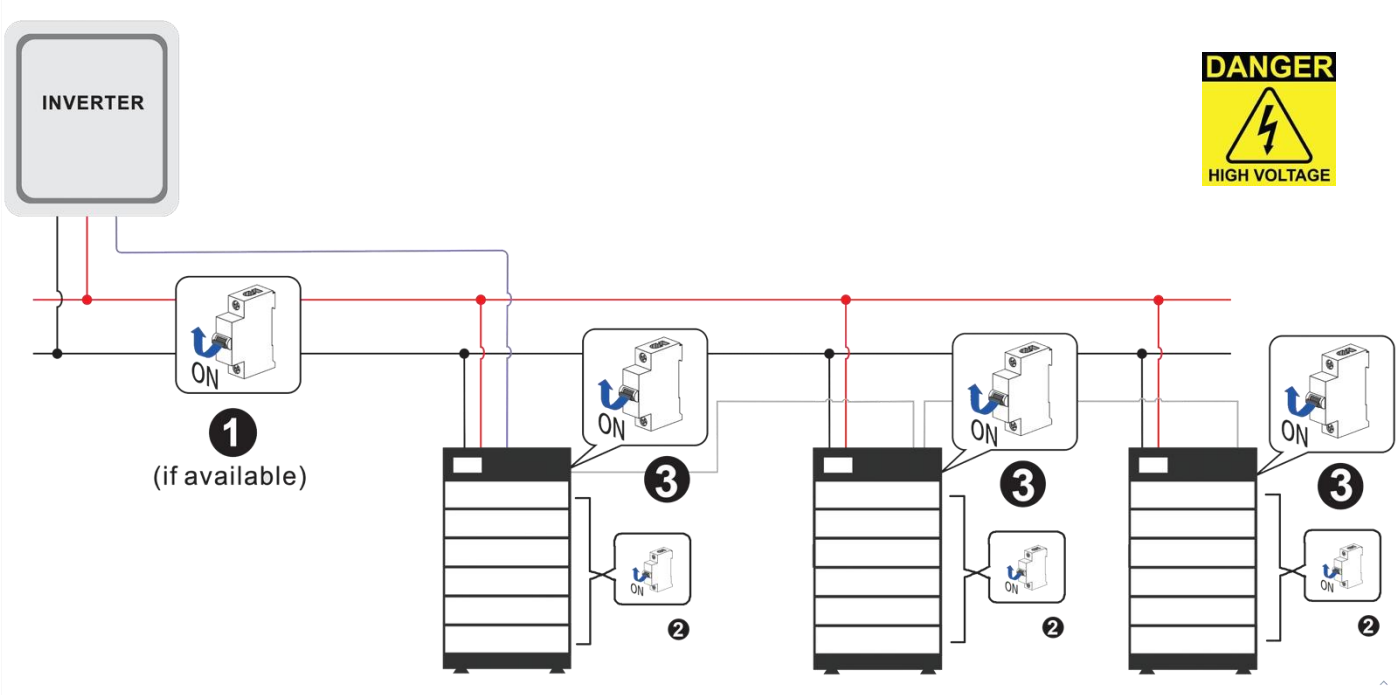


1. Switch on the air switch between the battery and inverter if there is any.
2. Push up the air switch of each battery pack to ON.
3. Push up the air switch of BCU to ON.
4. Press the ON/OFF button on the BCU communication area.
5. The device emits a “beep” sound, and the display starts to show content, which means the energy storage system is ready to work.

If it is failed to switch on the energy storage system, read Chapter 12 Troubleshooting and also the Service Guideline and Checklist. IF THE PROBLEM STILL CANNOT BE SOLVED, CONTACT

OUR LOCAL AFTER-SALE SERVICE WITHIN 48 HOURS.

Switch on battery system (two or more cabinets)



1. Turn on the air switch between the battery and inverter if there is any.
2. Push up the air switch of each battery pack of each cabinet to ON.
3. Push up the air switch of each BCU to ON.
4. Press the ON/OFF button of the master cabinet BCU.
5. The device emits a “beep” sound, and the display starts to show content, which means the energy storage system is ready to work.
6. If it is failed to switch on the energy storage system, read Chapter 12 Troubleshooting and also the Service Guideline and Checklist. IF THE PROBLEM STILL CANNOT BE SOLVED, CONTACT OUR LOCAL AFTER-SALE SERVICE WITHIN 48 HOURS.

7.2 Switch on and Commission inverter

The procedures of on-grid and off-grid applications is the same.

Procedure:

1. Mount and connect the inverter according to the inverter manufacturer`s instruction.
2. Commission and configure the inverter according to the inverter manufacturer`s instruction (RS485-3 used to communicate with inverter).

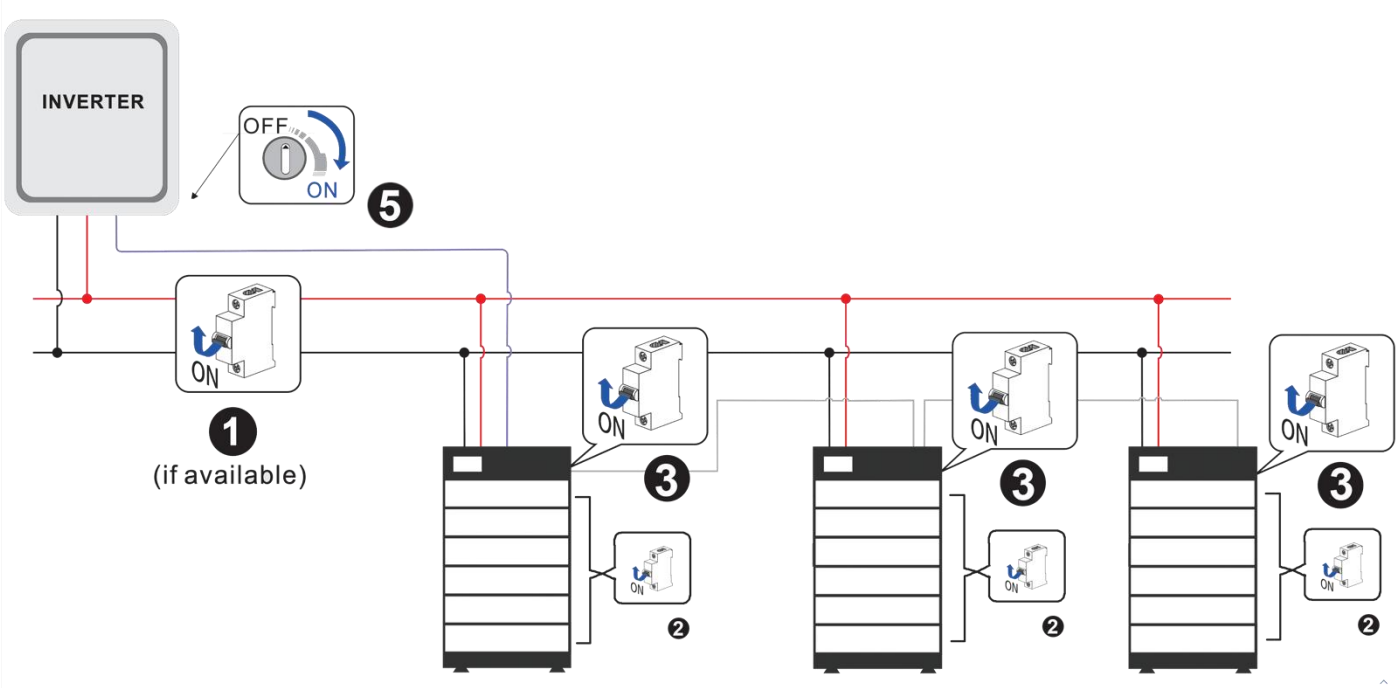
If the battery information could be read correctly, it means the connection between the energy storage system and the inverter is all right.

If the energy storage system is operating normally, but the inverter still cannot read the information of the energy storage system, go to the Chapter 12 Troubleshooting of this manual and also read the Service Guideline and Checklist.

7.3 Switching on the Energy Storage System (with inverter)

To make sure the energy storage system can work well with the inverter, please follow the right procedure to start them. The procedure is:

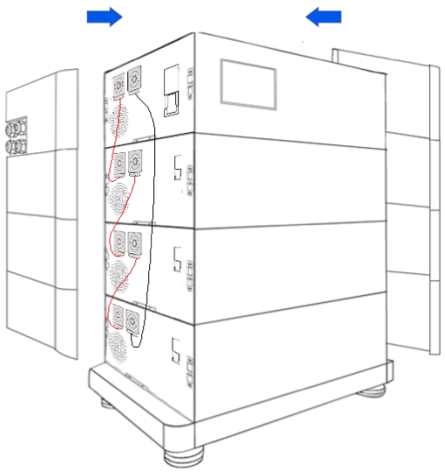
1) Turn on the switch between the inverter and battery if there is any.
2) Push up all switches of the battery packs to ON.
3) Push up all air switches of BCUs to ON.
4) Press ON/OFF button on the BCU communication area (if more than two battery cabinets, press the ON/OFF button of Master BCU only). When the Beep sound is heard, the system is powered on and the display is on.
5) Switch on the inverter.



8. Close up

Procedure:

1. Confirm that the connection cable and communication cable are connected correctly
2. Make sure all air switches are on
3. Make sure that all lights are functioning properly
4. Confirm that the screen displays normally and there is no failure prompts
5. Fix on covers removed before



9. Decommissioning

⚠ QUALIFIIED PERSON

⚠ DANGER

Danger to life from electric shock due to live DC cables or conductors at the energy storage system. The DC cables connected to the energy storage system may be live. Touching the DC conductors or the live components leads to lethal electric shocks.

- Do not touch non-insulated cable ends.

⚠ CAUTION

Risk of injury due to weight of the battery pack.

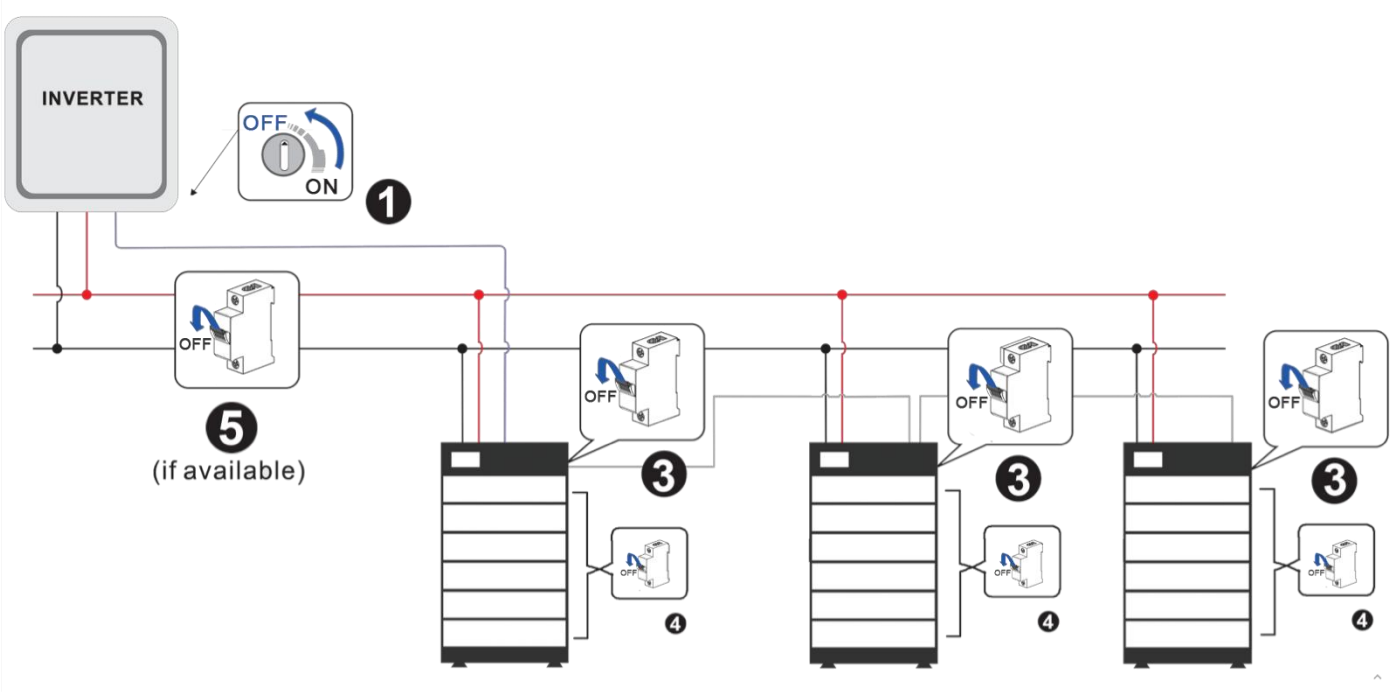
Injuries may result if the battery pack is lifted incorrectly or dropped while being transported or installed.

- Transport and lift the battery pack carefully. Take the weight of the battery pack into account.
- Wear suitable personal protective equipment for all work on the energy storage system.

9.1 Switching off the Energy storage system (with inverter)

1. Switch off the inverter.
2. Press ON/OFF button on the BCU (master cabinet) communication area for 3 seconds. When the “Beep” sound is heard, all BCUs will be closed, then whole system is powered off.

3. Push down all BCU air switches to OFF.
4. Push down all air switches of battery packs to OFF.
5. Push down the air switch between the battery and the inverter to off if there is any.



9.2 The whole procedure of decommissioning

1. Shut off the inverter.
2. Press ON/OFF button on the BCU communication area for 3 seconds. (If more than two battery cabinets, press the ON/OFF button of Master BCU only)
3. Switch off all air switches of energy storage system.
4. Switch off the breaker between the inverter and the energy storage system if there is any.
5. Loosen cable glands and remove the cover of BCU.
6. Remove output positive and negative cables of BCU.
7. Remove all covers of energy storage system.
8. Remove all cables from the energy storage system.
9. Loosen the screws on hangers between BCU and the wall. And then take off the hangers.
10. Tighten the nuts on the cable glands on the BCU cover.
11. Remove the screws connecting the BCU, battery packs and base.
12. Take the BCU from battery pack and battery packs from the base.

13. Before lifting the battery pack, ensure that the screws on both sides of them are removed.

14. Remove the hangers (BCU part).

15. If the energy storage system is to be stored or shipped, pack the system. Use the original packaging or packaging that is suitable for the weight and dimensions of the system.

16. Dispose of the energy storage system in accordance with the locally applicable battery disposal regulations.

10. Extension

10.1 Extension Battery Pack

⚠ QUALIFIIED PERSON

⚠ DANGER

Danger to life from electric shock due to live positive and negative terminals or conductors at the battery pack. The positive and negative terminal connected to the battery pack may be live. Touching the terminals or the live components leads to lethal electric shocks.

- Do not touch non-insulated terminal ends.

⚠ CAUTION

Risk of injury due to weight of the battery pack.

Injuries may result if the battery pack is lifted incorrectly or dropped while being transported or installed.

- Transport and lift the battery pack carefully. Take the weight of the battery pack into account.
- Wear suitable personal protective equipment for all work on the energy storage system.

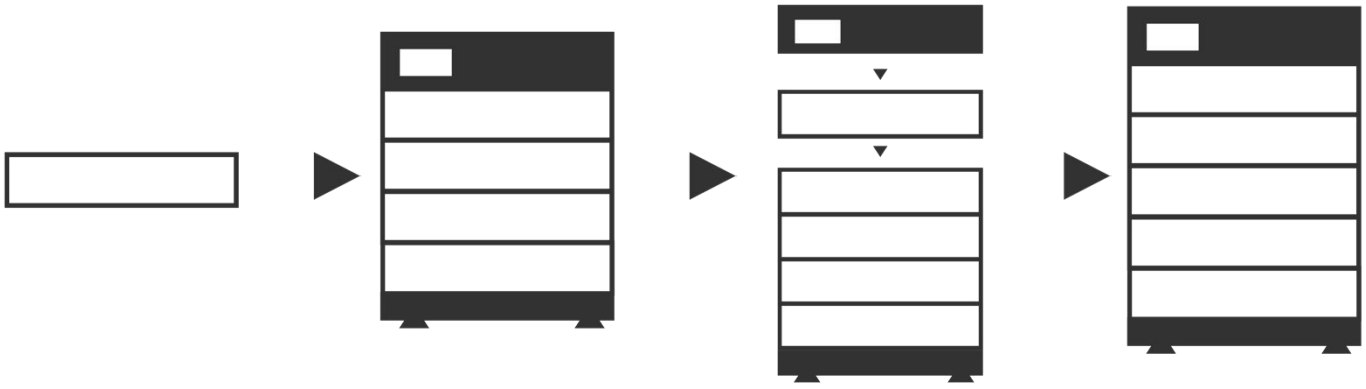
Before that, it is necessary to check whether the new battery pack is operating normally as follows: 1. Turn on the air switch of the battery pack; 2. Press the battery pack ON/OFF button: 3. Measure whether the battery pack voltage is within the normal working voltage range

Procedure:

1. Check the parameters of the existing system through the screen.
2. Shut off the inverter.
3. Switch off the energy storage system.

4. Switch off the breaker between the inverter and the battery system if there is any.
5. Remove all cables connected on the cabinet BCU and take the BCU off.
6. Add the new pack on top of other battery packs.
7. Put the BCU back on top of the new battery pack.
8. Connect the new battery pack to original battery packs in series and reconnect all cables of BCU. (Check connections and communication)
9. Configure the dial code，including connection mode and address code (part6.6).
10. Switch on the energy storage system.
11. Start the inverter.

Note: The newly added battery pack may have inaccurate SOC measurement. The system can accurately detect the SOC only after the overall energy storage system has undergone a working cycle. The number of battery packs in the high-voltage series system is 3 to 8.



10.2 Extension Battery Cabinet

⚠ QUALIFIIED PERSON

⚠ DANGER

Danger to life from electric shock due to live DC cables or conductors at the energy storage system. The DC cables connected to the energy storage system may be live. Touching the DC conductors or the live components leads to lethal electric shocks.

- Do not touch non-insulated cable ends.

⚠ CAUTION

Risk of injury due to weight of the battery pack.

Injuries may result if the battery pack is lifted incorrectly or dropped while being transported or installed.

- Transport and lift the battery pack carefully. Take the weight of the battery pack into account.
- Wear suitable personal protective equipment for all work on the energy storage system.

The number of battery packs contained in the new parallel battery cabinet should be the same as the number of battery packs contained in the original system.

Before that, it is necessary to check whether the new battery pack is operating normally as follows

Procedure:

1. Check the parameters of the existing system through the screen.
2. Shut off the inverter.
3. Switch off the energy storage system.
4. Switch off the breaker between the inverter and the battery system if there is any.
5. Refer to the section 5.2, fix and install the newly added battery cabinet.
6. Connecting new battery cabinet(s) to original system in parallel. This step may use wire combiner box. (More information in part 6.4).
7. Configure the dial code, including connection mode code and address code (part 6.6).
8. Switch on the energy storage system.
9. Start the inverter.

Note: The newly added battery cabinet may have inaccurate SOC measurement. The system can accurately detect the SOC only after the overall energy storage system has undergone a working cycle.

11. Troubleshooting

Please also see the CONCENPOWER Service Guideline and Checklist for troubleshooting. The latest version is available at our website www.concenpower.com.

11.1 Energy storage system Behavior under Fault Conditions

Error shows on BCU screen

The type of fault that has occurred is shown on the display of the energy storage system. Any system shutdown caused by any failure will cause the device to sound an alarm. If you hear an alarm sound, please confirm the type of failure in time, shut down the system and contact

after-sales service.

The clicking sound when the system is turned on is not a malfunction. Typically, there will be several clicks sound for the number of battery cabinets the system contains.

NOTE
Damage to the energy storage system due to under voltages • If the battery is installed, it should be set into operation within a month, or checked regularly, otherwise there might be damage to the batteries.

11.2 Inverter cannot Detect Battery Information

When the energy storage system is connected to the inverter, the inverter cannot detect the battery information, the possible reasons are as follows:

1. The communication line between the inverter and the energy storage system is not connected properly
2. The inverter manufacturer has not established a communication protocol with CONCENPOWER. Please refer to the parameter table of the energy storage system, and set the corresponding parameters according to the "lead-acid battery" mode of the inverter

11.3 Error Event

No.	Name	Solution
1	Over voltage protection (OVP)	The problem may be caused by charging the energy storage system. Turn off the charging of the system, wait for the system voltage to return to normal, and then the protection will be automatically released. Test the voltage of each battery pack (Service Guideline and Checklist Part 4.2). Please refer to Chapter 15 for the normal operating voltage of the battery pack.

2	Under voltage protection (UVP)	Shut down the system quickly to avoid further discharge. Check whether the system can shut down normally (by pressing the BCU ON/OFF button for 3s). - If the system cannot shut down normally, lift the BCU. Avoid further discharge of the battery, by searching the problem while the battery is completely off / BCU is lifted. Do not turn on the battery before making sure the inverter should be able to charge the battery. Test the voltage of each battery pack (Service Guideline and Checklist Part 4.2). Please refer to Chapter 15 for the normal operating voltage of the battery pack.
3	Over current protection (OCP)	Shut down the output of system. Wait for the system current to return to normal and the protection will be released automatically
4	Over temperature protection (OTP)	Shut down the system quickly to avoid further operating. Wait for the system temperature to return to normal and the protection will be released automatically
5	Under temperature protection (UTP)	The ambient temperature (more information on parameter sheet) of the system is too low, please adjust the ambient temperature.

12. Maintenance and Storage

Cleaning

It is recommended that the energy storage system 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.

Maintenance

The battery pack should be stored in an environment with a temperature range between -10°C ~ +50°C and charged regularly according to the table below with no more than 0.5C (A C-rate is a measure of the rate at which a battery is discharged relative to its maximum capacity.) to the SOC of 30% after a long time of storage.

Storage environment temperature	Relative humidity of the storage environment	Storage time	SOC
Below -10℃	/	Not allowed	/
-10~25℃	5%~70%	≤ 12 months	25%≤SOC≤60%
25~35℃	5%~70%	≤ 6 months	25%≤SOC≤60%
35~50℃	5%~70%	≤ 3 months	25%≤SOC≤60%
Above 50℃	/	Not allowed	/

NOTE

Damage to the system due to under voltages

- Charge the over-discharged system within seven days when the temperature is above 25°C.
- Charge the over-discharged system within fifteen days when the temperature is below 25° C.

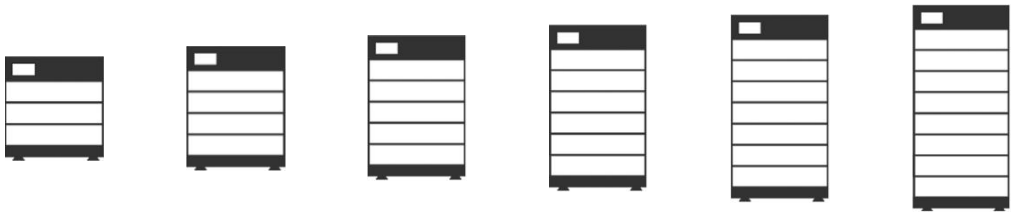
13. Disposal of Energy storage system

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

- Do not dispose of the energy storage 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.
- For more information or arrange a collection please contact CONCENPOWER Service Partner (see contact details at the bottom of this document).

14. Technical Data

14.1 2.5 CON-HVS



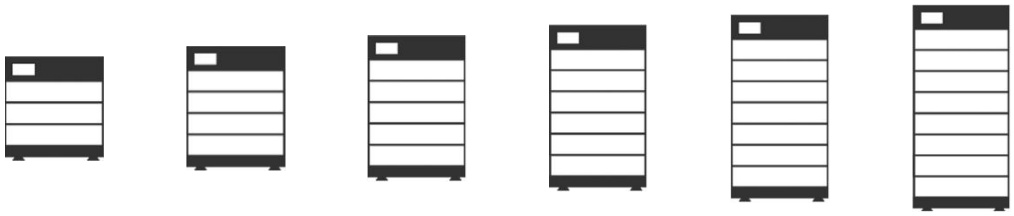
Battery Package	High Voltage Battery Pack (2.5Kwh, 51.2V, 26Kg)					
Number of Packages	3	4	5	6	7	8
Usable Capacity	7.5 kWh	10 kWh	12.5 kWh	15 kWh	17.5 kWh	20 kWh
Cont. Output Current	100A	100A	100A	100A	100A	100A
Peak Output Current	120A,1s	120A,1s	120A,1s	120A,1s	120A,1s	120A,1s
Nominal Voltage	153.6V	204.8V	256.0V	307.2V	358.4V	409.6V
Operating Voltage	120~175.2V	160~233.6V	200~292.0V	240~350.4V	280~408.8V	320~467.2V
Dimensions (H/W/D) (mm)	840* 550*300	1020* 550*300	1200* 550*300	1380* 550*300	1560* 550*300	1740* 550*300

Operating Temperature	-10℃~50℃
Battery Type	Lithium iron phosphate Battery (LiFePO4)
Communication	RS485, CAN
Enclose Protection Rating	IP55
Round-trip Efficiency	≥ 95%
Applications	OFF grid (Backup) / ON Grind + OFF Grid (Backup)

1: Test conditions: 25 °C, 100 % depth of discharge (DOD), 1C charge& 1.5C discharge

2: Refer to battery warranty letter for conditional application

14.2 5 CON-HVS



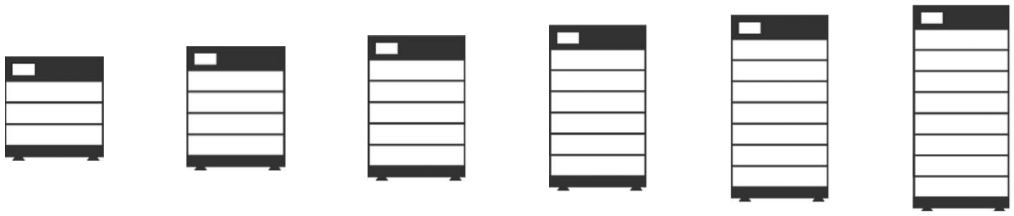
Battery Package	High Voltage Battery Pack (5KWh, 51.2V, 49Kg)					
Number of Packages	3	4	5	6	7	8
Usable Capacity	15KWh	20KWh	25KWh	30KWh	35KWh	40KWh
Cont. Output Current	120A	120A	120A	120A	120A	120A
Peak Output Current	150A,1s	150A,1s	150A,1s	150A,1s	150A,1s	150A,1s
Nominal Voltage	153.6V	204.8V	256.0V	307.2V	358.4V	409.6V
Operating Voltage	120~175.2V	160~233.6V	200~292.0V	240~350.4V	280~408.8V	320~467.2V
Dimensions (H/W/D) (mm)	870* 700*435	1060* 700*435	1250* 700*435	1440* 700*435	1630* 700*435	1820* 700*435

Operating Temperature	-10℃~50℃
Battery Type	Lithium iron phosphate Battery (LiFePO4)
Communication	RS485, CAN
Enclose Protection Rating	IP55
Round-trip Efficiency	≥ 95%
Applications	OFF grid (Backup) / ON Grind + OFF Grid (Backup)

1: Test conditions: 25 °C, 100 % depth of discharge (DOD), 1C charge& 1.5C discharge

2: Refer to battery warranty letter for conditional application

14.3 10 CON-HVS



Battery Package	High Voltage Battery Pack (10KWh, 51.2V, 83Kg)					
Number of Packages	3	4	5	6	7	8
Usable Capacity	30KWh	40KWh	50KWh	60KWh	70KWh	80KWh
Cont. Output Current	120A	120A	120A	120A	120A	120A
Peak Output Current	150A,1s	150A,1s	150A,1s	150A,1s	150A,1s	150A,1s
Nominal Voltage	153.6V	204.8V	256.0V	307.2V	358.4V	409.6V
Operating Voltage	120~175.2V	160~233.6V	200~292.0V	240~350.4V	280~408.8V	320~467.2V
Dimensions (H/W/D) (mm)	1095* 700*435	1360* 700*435	1625* 700*435	1890* 700*435	2155* 700*435	2420* 700*435

Operating Temperature	-10℃~50℃
Battery Type	Lithium iron phosphate Battery (LiFePO4)
Communication	RS485, CAN
Enclose Protection Rating	IP55
Round-trip Efficiency	≥ 95%
Applications	OFF grid (Backup) / ON Grind + OFF Grid (Backup)

1: Test conditions: 25 °C, 100 % depth of discharge (DOD), 1C charge& 1.5C discharge

2: Refer to battery warranty letter for conditional application

15. Contact Information

Note: Please also see the CONCENPOWER high voltage energy storage system Service Guideline and Checklist Service Guideline and Checklist for troubleshooting. The latest version is available at our website www.concenpower.com.

CONCENPOWER Global Service	
Official services link	Social media link
www.concenpower/servcie.com	https:// www.facebook.com/ CONCENPOWER
E-mail: techsupport.yang@concenpower.com /nevaehdu@concenpower.com	https://twitter.com/ CONCENPOWER
www.concenpower.com	https://www.linkedin.com/company/concenpower
Address: A2-A, Electricity Information Industrial Park, High-tech 7 Rd., Gaoxin District, Rizhao, Shandong, China (Mainland)	