CONCENPOWER®
Make Impossible to Possible

Operating Manual

Version 25.1

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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 Low Voltage parallel system with build-in inverter, model: 5 CON-BILVS，10 CON-BILVS .

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	CONCENPOWER energy storage system
BMS	Battery management system
SOC	State of charge
Inverter	The build-in inverter of this product
CONCENPOWER	Shandong King Polaris New Energy Stock CO., LTD

2. Safety

2.1 Intended Use

The energy storage system is for residential and works with a photovoltaic system. It is a high-capacity battery storage system, with the management system 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 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 CONCENPOWER 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.

2.2.5 Warning of Overvoltage

⚠ DANGER

Danger to life due to electric shock in case of over-voltages and if surge protection is missing. Over-voltages (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.

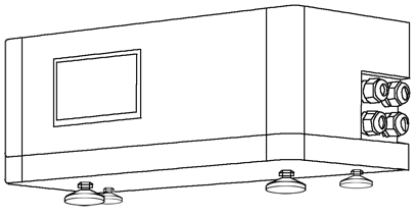
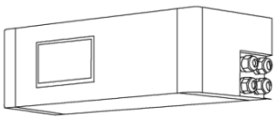
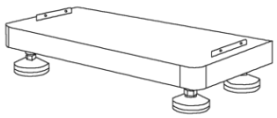
2.2.7 Notice of Property Damage

NOTE
Damage to the inverter due to sand, dust and moisture ingress Sand, dust and moisture penetration can damage the inverter and impair its functionality. • Only open the inverter 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.

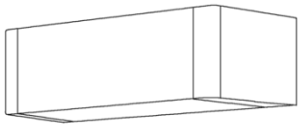
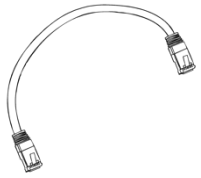
3. Scope of Delivery

Inverter and Base Package

<table>
<tr><td rowspan="4">  </td><td>  </td><td>  </td></tr>
<tr><td>Inverter *1 Pcs</td><td>Base *1 Pcs</td></tr>
<tr><td>  </td><td>  </td></tr>
<tr><td>M4*14 screw *4 Pcs</td><td>Documents *1 Pcs</td></tr>
</table>

1. **Documents:** include Operating Manual, Quick Start Guide, Service Guideline and Checklist
2. **M4*14 Countersunk screw:** Screw to fix the connection between packs, base, and inverter

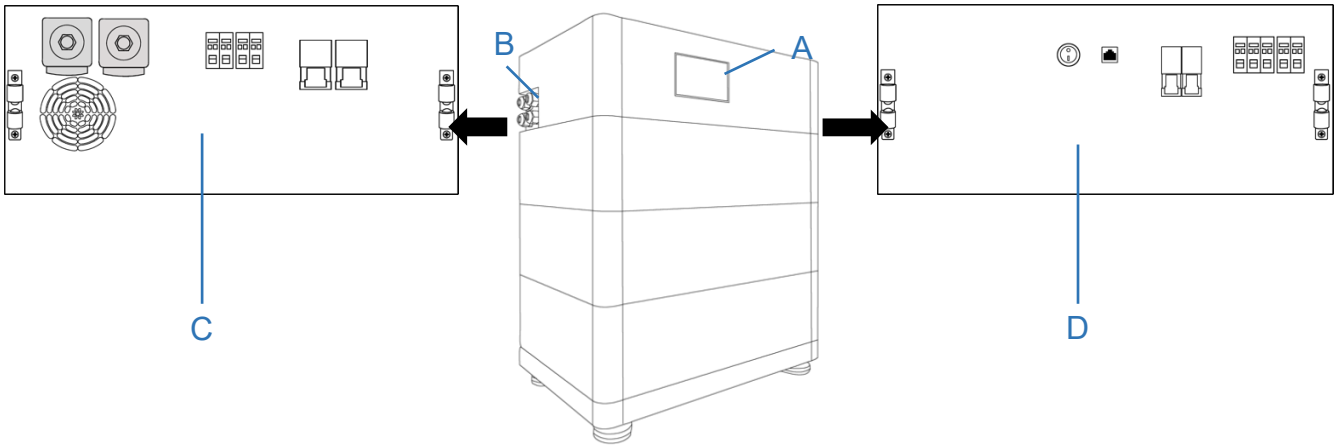
Battery pack Package

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

1. **M4*14 Countersunk strew:** Screw to fix the connection between packs, base, and inverter
2. **Battery pack positive connector:** For positive connection between battery packs or battery pack and inverter, 30cm
3. **Battery pack negative connector:** For negative connection between battery packs or battery pack and inverter, 30cm
4. **Communication cable:** For communication between battery packs and between battery packs and inverter 30cm, CAT5

4. Energy storage system overview

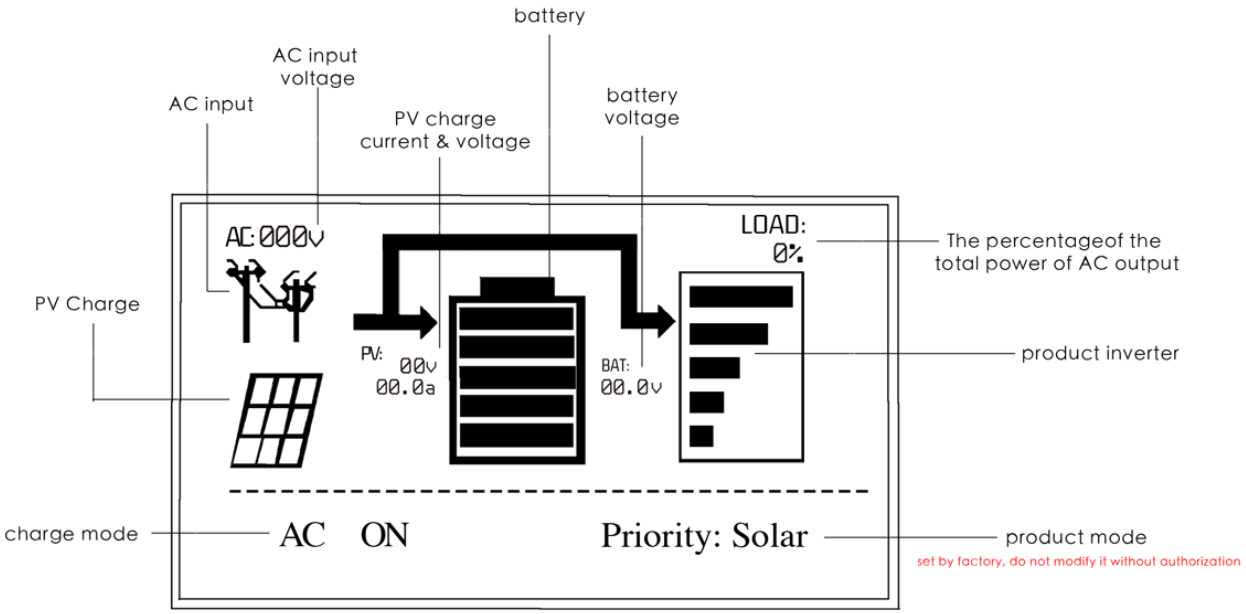
4.1 Energy storage system Description



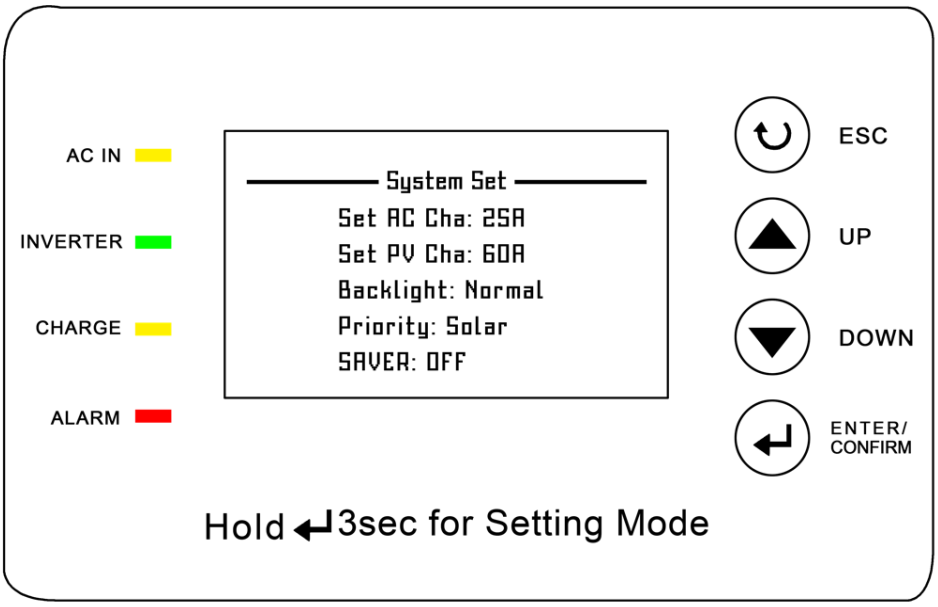
A	Screen
B	Gland area
C	Input connection area
D	Communication, output connection area

4.2 Display Interface

Management system operating system instructions



Press the ENTER/CONFIRM button for 3 seconds, enter the setting interface. (The picture shows the factory setting, ***WARNING:NO CHANGE ALLOWED!!!***).

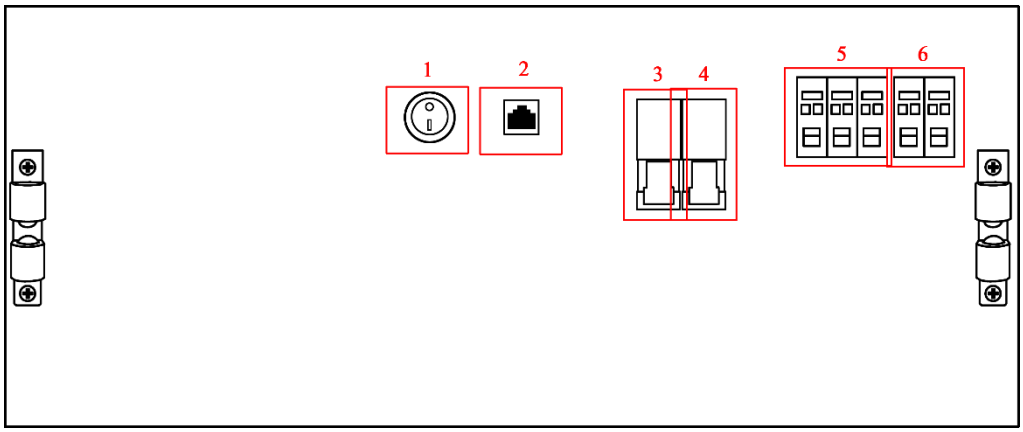


WARNING :NO Change the screen settings parameters.

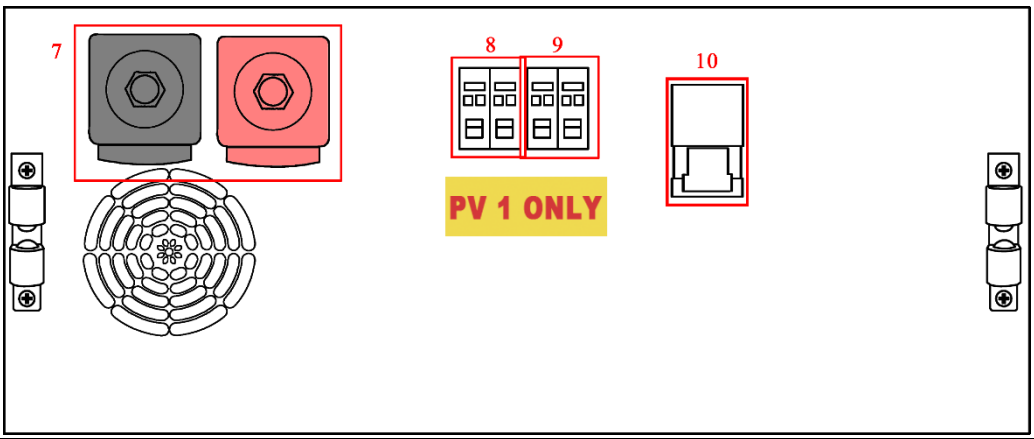
5. Electrical Connection

5.1 Overview of the Connection Area

5.1.1 Inverter Connection Area View

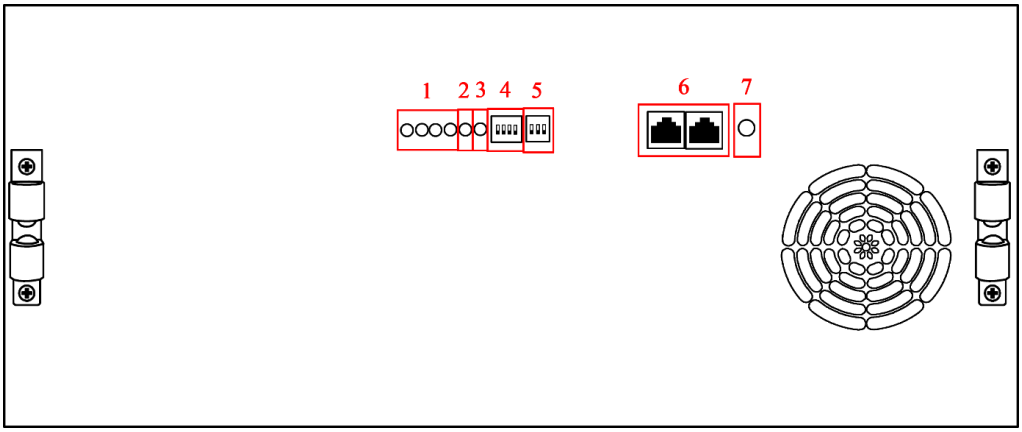


1	Inverter switch
2	RS 485 communication ports
3	AC input air switch
4	AC output air switch
5	AC input connection terminal（From left to right: L, N, G；G is public）
6	AC output connection terminal（From left to right: L, N）

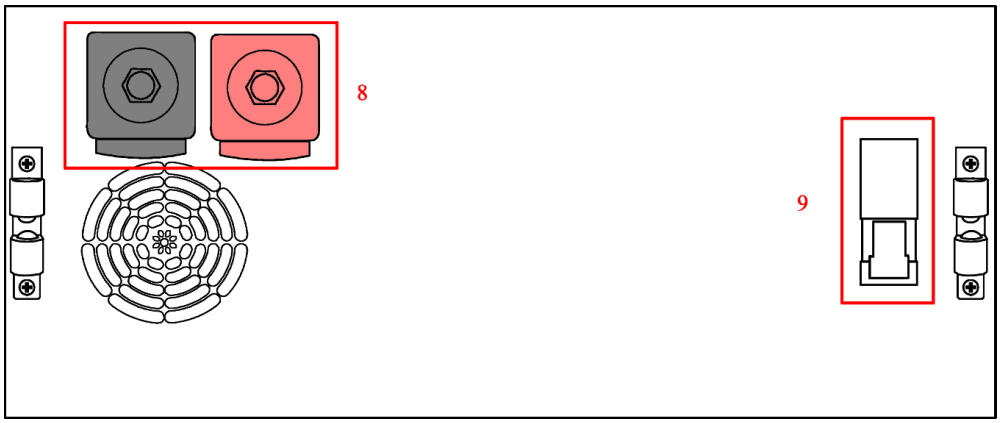


7	Positive and negative terminal posts of the battery pack (red: positive; black: negative)
8	PV input 1st road connection terminal
9	PV input 2nd road connection terminal
10	PV input 1st road air switch

5.1.2 Battery Pack Connection Area View



1	SOC of battery pack
2	Run light
3	Fault alarm light
4	Address dip
5	Mode dip (Choose single or multiple battery packs)
6	RS485 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

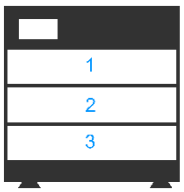
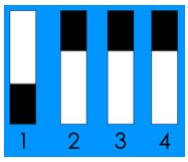
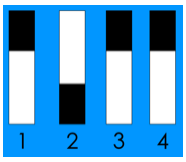
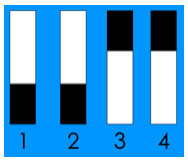
5.2 Dial code Information

5.2.1 Battery pack address dial code (Blue dip)

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

Notice: 1. The black is dial button.

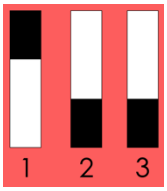
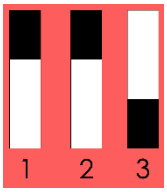
2. Dial order from top to bottom. (The battery pack at the top of the system is the No. 1)

 Address code diagram	Dial code			
	Pack No.	1 **(The top battery pack)**	2	3

5.2.2 Battery pack working mode code (Red dip)

Notice: 1. The black is dial button.

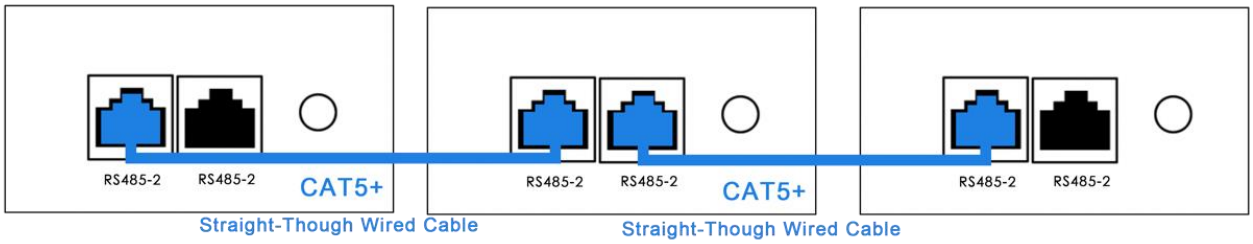
2. The battery pack works in parallel connection (as shown below).

Battery Pack Capacity	Dial code
5kWh Battery Pack	
10kWh Battery Pack	

5.3 Communication Cables Connection

Take out the communication cables from the box, insert the CAT5+ cables as shown in the following figures.

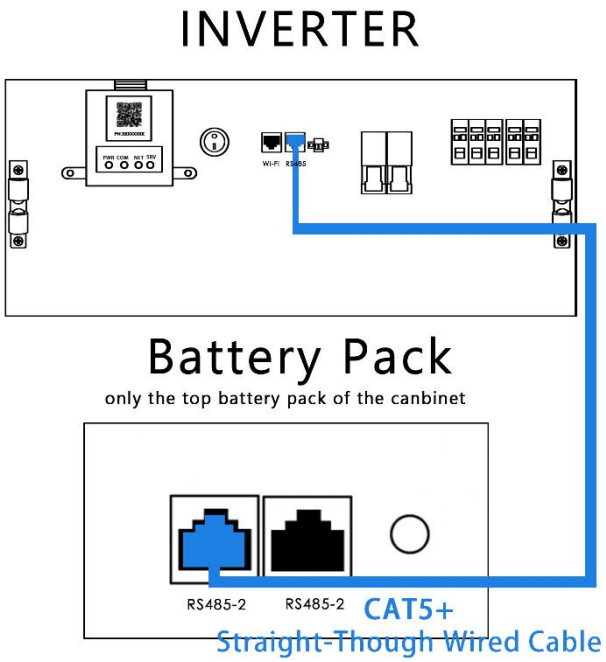
5.3.1 Between Battery packs (RS485-2 to RS485-2)



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

5.3.2 Between battery packs and inverter

Notice: The longest communication cable.



5.4 Wiring Connection

⚠ DANGER

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

- Do not touch non-insulated cable ends.

Confirm all the air switches of the system are switched off.

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

The following materials is used for AC input connection and AC output connection.

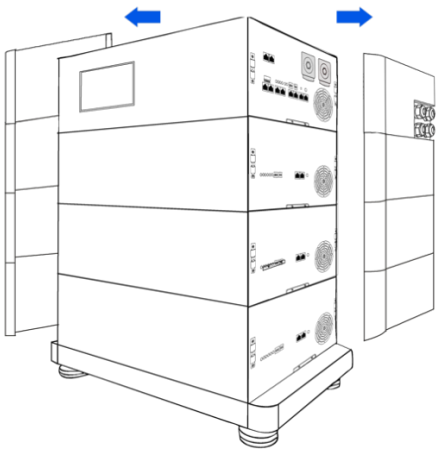
- Five power cables (2 Live line cables; 2 Null Line Cables)

Cable requirements:

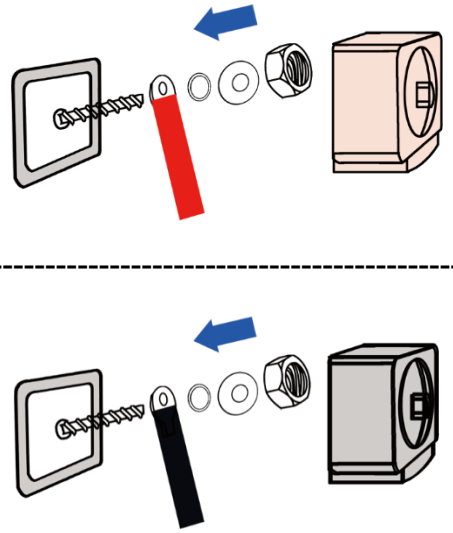
- Conductor cross-section: 6 to16 mm². The diameter of the cable should be between 6 mm to 9 mm (at least 8 AWG).
- Insulation stripping length: 16-18 mm
- Maximum cable length: 20 m

Procedure:

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



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



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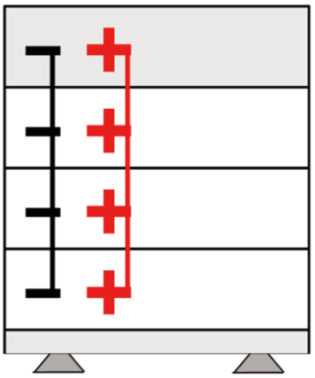
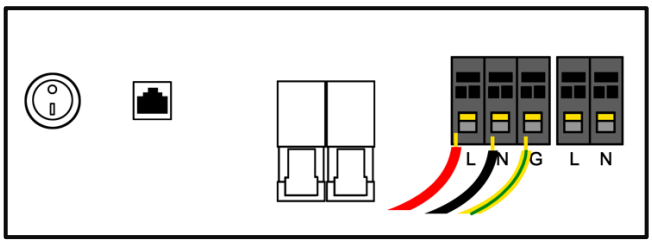
6. Ensure that the terminal points are allocated to the correct cables.
7. Make sure the wires are securely installed.
8. Please refer to the figure for parallel connection



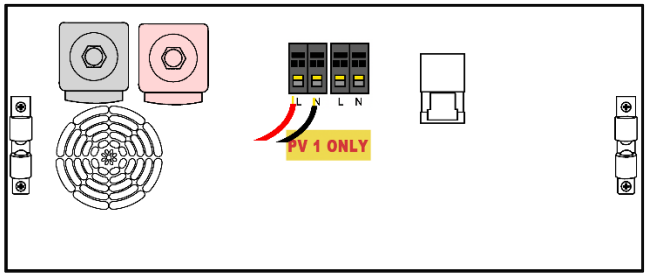
Parallel Connection

9. Strip the AC input and make the length L (on the right drawing) stripped 1-2cm longer than the tube of the terminals
10. Insert the AC cables into glands of the relative inverter cover
11. Insert the connecting cables into the corresponding connection terminals



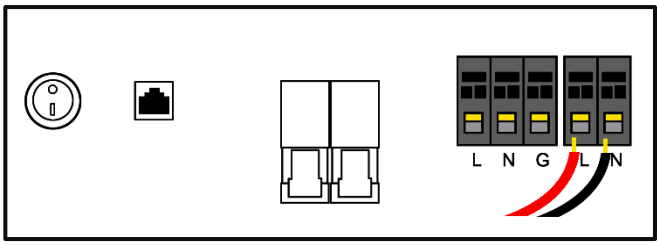
(The picture shows the connection method of AC input)

12. Strip the PV positive and negative cables and make the length L (on the right drawing) stripped 1-2cm longer than the tube of the terminal
13. Insert the PV cables into glands of the relative inverter cover
14. Insert the connecting cables into the corresponding connection terminals



(The picture shows the connection method of 1st road PV input, **PV 1 ONLY**)

15. Strip the AC output cables and make the length L (on the right drawing) stripped 1-2cm longer than the tube of the terminals
16. Insert the AC cables into glands of the relative inverter cover
17. Insert the connecting cables into the corresponding connection terminals
18. Users can connect a high-power power strip to the AC output terminal according to the actual application.



（The picture shows the connection method of AC Output）

6. Commission

⚠ QUALIFIIED PERSON

Requirements:

1 All the air switches of the system are switched off.

2 The inverter must be correctly mounted.

3 All cables must be correctly connected.

Procedure:

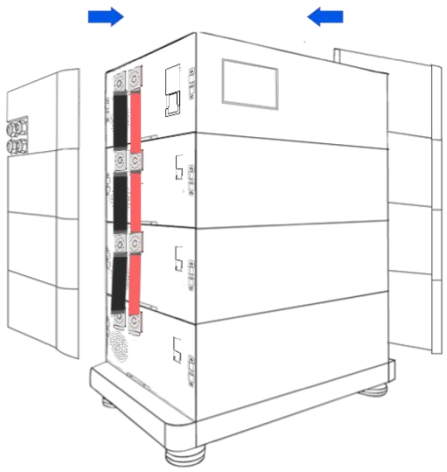
1	Make sure all cables are well connected
2	Connect the AC input cable to the utility grid (if any)
3	Make sure the AC output cable is connected. (If the AC output end is not connected to electrical appliances temporarily, please take insulation measures for the AC output connection line to avoid the risk of short and electric shock injury)
4	Check if the dialing codes are correct.
5	Push up air switches of all battery packs to ON
6	Press each ON/OFF button of battery packs from ***bottom to top***. The indicators of the battery packs will light up after the “Beep” sound.
7	Let the connected battery packs stand for about 15 minutes, do not operate the system during this period, because the system will automatically balance the connected battery packs.

8	Turn on the power switch of inverter, the management system will start and run a self-check program. Observe the screen if shows the parameter is correct.
9	Push up AC and PV input air switches to ON (if any)
10	Charge the system to 100% SOC
11	Push up AC output air switch to ON
12	After the system performs a complete charge and discharge cycle, the screen display parameters are accurate and enter the normal workbench.

7. 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 work properly
4. Confirm that the screen displays normally and there are no failure prompts
5. Fix on covers removed before



8. Extension

⚠ 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.

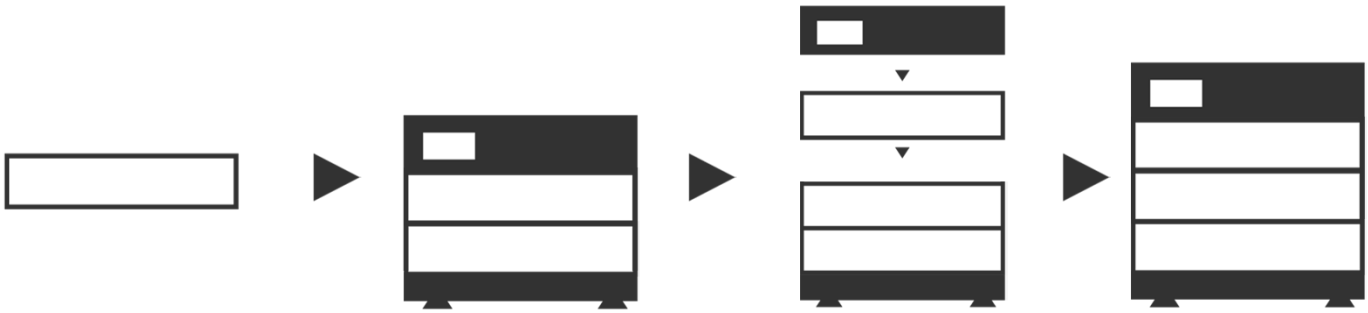
- Transport and lift the battery pack carefully. Take the weight of the battery pack into account.
- Wear suitable personal protective equipment for all work on the energy storage system.

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 (51V~53.2V).

Procedure:

1. Check the parameters of the existing system through the screen.
2. Switch off all battery packs.
3. Shut off the inverter.
4. Take the inverter off.
5. Add the new pack on top of other battery packs.
6. Put inverter back on top of the new battery pack.
7. Connect the new battery pack to the energy storage system. (Check connections and communication).
8. Configure the dial code of Single or multiple mode and address code (part4.1).
9. Switch on the energy storage system. (See more information Chapter 5)
10. Start the inverter.

Notice: 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 this system is 1 to 3.



9. 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 0.5 C (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.

10. 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 arranging a collection please contact CONCENPOWER Service Partner (see contact details at the bottom of this document).

11. Technical Data

11.1 5.12kWh Battery Pack

1-3 Battery Pack Energy storage system			
Battery Package	5.12kWh, 51.2V, 49Kg, 700*435*190mm		
Number of Packages	1	2	3
Usable Capacity	5.12kWh	10.24kWh	15.36kWh
Max. Output Current	100A	100A	100A
Peak Output Current	150A	150A	150A
Nominal Voltage	51.2V	51.2V	51.2V
Operating Voltage	40~58.4V	40~58.4V	40~58.4V
Size (L/W/H mm)	700*435*490	700*435*680	700*435*870
Weight (Kg)	95	143	192
Operating Temperature	-10℃~50℃		
Charging Temperature	Above 0℃		
Battery Type	Lithium iron phosphate Battery (LiFePO4)		
Communication	RS485, CAN		
Enclose Protection Rating	IP55		
Life Cycle	3000Times		

INVERTER	
Inverter Type	Industry Frequency Inverter
Rate Output Power	3000W / 5000W / 10000W
AC Input/Output Voltage	160-260 V / 80-130 V
AC Input/Output Frequency	50 / 60 Hz
Solar Controller	Build-in MPPT 80A *1 Road
Solar Input Voltage	60-180 V

11.2 10.24kWh Battery Pack

1-3 Battery Pack Energy storage system			
Battery Package	10.24kWh, 51.2V, 83Kg, 700*435*265mm		
Number of Packages	1	2	3
Usable Capacity	10kWh	20kWh	30kWh
Max. Output Current	200A	200A	200A
Peak Output Current	250A	250A	250A
Nominal Voltage	51.2V	51.2V	51.2V
Operating Voltage	40~58.4V	40~58.4V	40~58.4V
Size (L/W/H mm)	700*435*565	700*435*830	700*435*1095
Weight (Kg)	141	224	307
Operating Temperature	-10℃~50℃		
Charging Temperature	Above 0℃		
Battery Type	Lithium iron phosphate Battery (LiFePO4)		
Communication	RS485, CAN		
Enclose Protection Rating	IP55		
Life Cycle	3000Times		

INVERTER	
Inverter Type	Industry Frequency Inverter
Rate Output Power	3000W / 5000W / 10000W
AC Input/Output Voltage	160-260 V / 80-130 V
AC Input/Output Frequency	50 / 60 Hz
Solar Controller	Build-in MPPT 80A *1 Road
Solar Input Voltage	60-180 V

12. Contact Information

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

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