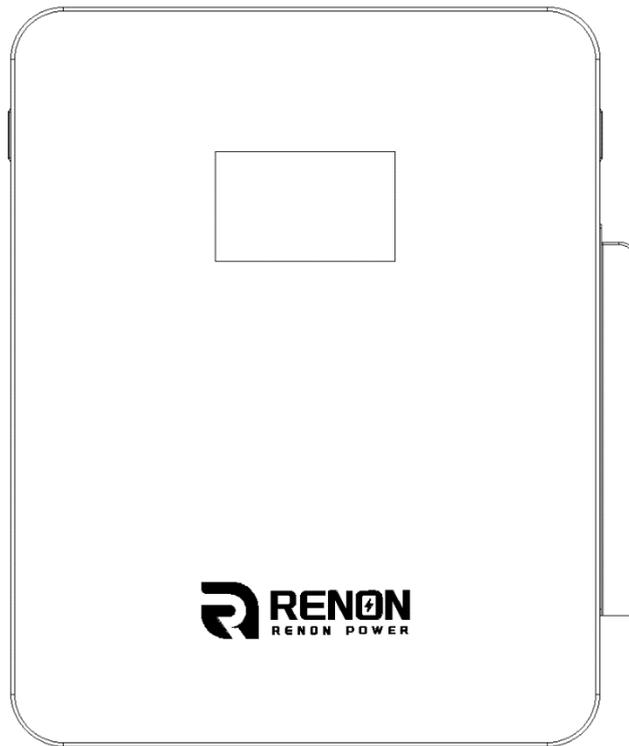




User Manual of Xcellent Series



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Revision History

Ver.	Date	Revise contents	Reviser
A00	2022.12.08	New Edition	Tom
A01	2023.02.09	Add 2 Inverter Dial Codes.	Mike, Lam & Jones
A02	2023.05.26	Update the chapter of WIFI Configuration	Mike
A03	2023.07.18	Add the Pin order select box to accessory list and it's usage to chapter 3.5.	Aaron
A04	2023.09.14	Modify the maximum number of parallel machines to 31	Vivid



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1 Safety Instructions

Safety Instructions for safety reasons, installer and user are responsible for familiarizing themselves with the contents of this document and all warnings before installation and usage.

1.1 General Safety Precautions

- Please carefully read this manual before any work is carried out on the product, and keep it located near the product for future reference.
- All installation and operation must comply with local electrical standards.
- Please ensure the electrical parameters of the product are compatible to related equipment.
- Do not open or dismantle the battery module. Electrolyte is very corrosive. In normal working conditions contact with the electrolyte is impossible. If the battery casing is damaged, do not touch the exposed electrolyte or powder because it is corrosive.
- The electronics inside the product are vulnerable to electrostatic discharge, keep it away from that.
- Do not place items or tools on the product.
- Do not damage the product by dropping, deforming, impacting, cutting.
- Keep the product away from liquid. Do not touch the product if liquid spills on it. There is a risk of electric shock.
- Do not expose the product to flammable or harsh chemicals or vapors.
- Do not paint any part of the product, include any internal or external components.
- Do not change any part of the product, especially the battery and cell.
- Besides connection under this manual, any other foreign object is prohibited to insert into any part of the product.
- The warranty claims are excluded for direct or indirect damage due to items above.
- Batteries must not be mixed with domestic or industrial waste.



- Batteries marked with the recycling symbol must be processed via a recognized recycling agency. By agreement, they may be returned to the manufacturer.

1.2 Transportation and Storage Precautions

- The batteries must be transported according to UN3480, they must be packed according to packaging requirements of Special Regulation 230 of IMDG CODE (40-20 Edition) for maritime transport, and P965 IA for air transport (SOC less than 30%). The original packaging complies with these instructions.
- If the product needs to be moved or repaired, the power must be cut off and completely shut down.
- The product must be transported in its original or equivalent package; the battery module must be placed at upright position.
- The modules are heavy. Ensure adequate and secure mounting and always use suitable handling equipment for transportation.
- If the product is in its package, use soft slings to avoid damage.
- Do not stand below the product when it is hoisted.
- During transportation, severe impact, extrusion, direct sunlight, and rain should be avoided.
- Store in a cool and dry place.
- Store the product in clean environment, free of dust, dirt and debris.
- Store the product out of reach of children and animals.
- Don't store the battery under 50% SOC for over one month, this may result in permanent damage to the battery and void the warranty.
- If the product is stored for long time, it is required to charge the battery module every 3 months, and the SOC should be no less than 90%.

1.3 Installation Precautions

- Do not install the product in an airtight enclosure or in an area without



ventilation.

- Do not install the product in living area of dwelling units or in sleeping units other than within utility closets and storage or utility spaces.
- If the Product is installed in a garage or carport, ensure there is adequate clearance from vehicles.
- While working on the product wear protective eyeglasses and clothing.
- Handle the battery wearing insulated gloves.
- Use insulated tools. Do not wear any metallic items such as watches, bracelets, etc.
- Please turn-off related circuit breakers before and during the installation to avoid electric shock.
- Do not connect any AC conductors or photovoltaic conductors directly to the battery pack. These are only to be connected to the inverter.
- Wiring must be correct, do not mistake the positive and negative cables, and ensure no short circuit with the external device.
- Over-voltages or wrong wiring could damage the battery pack and cause combustion which can be extremely dangerous.
- Make sure the product is well grounded, and comply with local specifications, the recommended grounding resistance is less than 1Ω .
- Handle with care because Li-ion Battery is sensitive to mechanical shock.

1.4 Usage Precautions

- Before starting the system, the operator should strictly check the connection terminals to ensure that the terminals are firmly connected.
- If there's a circuit breaker between battery and inverter, the breaker is supposed to be on before power on the battery.
- Do not open the product, connect, or disconnect any wires when it's working to avoid electric shock.
- Battery needs to be recharged within 12 hours after fully discharged.



- The default temperature range over which the battery can be discharged is -4 °F (-20°C) to 122°F (50°C). Frequently discharge the battery in high or low temperature may deteriorate the performance and life of the battery pack.
- The default temperature range over which the battery can be charged is 32°F (0°C) to 122°F (50°C). Frequently charge the battery in high or low temperature may deteriorate the performance and life of the battery pack.
- Do not charge or discharge a damaged battery.
- Please contact the supplier within 24 hours if there is something abnormal.

1.5 Response to Emergency Situations

- Damaged batteries are dangerous and must be handled with extreme care. They are not suitable for use and may cause danger to persons or property. If the battery pack appears to be damaged, place it in the original container and return it to an authorized dealer.
- If the battery pack is wet or submerged in water, do not allow any person access, and then contact authorized dealer for technical support.
- In case of fire, use the carbon dioxide, FM-200 or ABC dry powder fire extinguisher; if possible, move the battery pack to a safe area before it catches fire.
- If a user happens to be exposed to the internal materials of the battery cell due to damage on the outer casing, the following actions are recommended.
- In case of inhalation: Leave the contaminated area immediately and seek medical attention.
- In case of contact with eyes: Rinse eyes with running water for 15 minutes and seek medical attention.
- In case of contact with skin: Wash the contacted area with soap thoroughly and seek medical attention.
- In case of ingestion: Induce vomiting and seek medical attention.



1.6 Qualified Personnel

The installation guide part described herein is intended for use by skilled staff only. A skilled staff is defined as a trained and qualified electrician or installer who has all the following skills and experience:

- Knowledge of battery' specification and properties.
- Knowledge of the installation of electrical devices.
- Knowledge of torsion and screwdrivers for different types of screws.
- Knowledge of local installation standards.
- Electrical license for battery installation required by the country or state.
- Knowledge of the dangers and risks associated with installing and using electrical devices and acceptable mitigation methods.
- Knowledge of and adherence to this guide and all safety precautions and best practices.

For safety reasons, installers are responsible for familiarizing themselves with the contents of this document and all warnings before performing installation and usage.



2 Introduction

The Xcellent series is a lithium iron phosphate battery-based energy storage product developed and produced by RENON, it can supply reliable power for nearly all kinds of household appliances and equipment.

The Xcellent series consists of a built-in BMS battery management system, which can manage and monitor cells information including voltage, current and temperature, used to limit the balance current between different batteries when parallel use to expand capacity and power to meet the requirements of longer power supporting duration and higher power consumption.

The Xcellent series is good looking. It is suspended on the wall in daily usage. User can check status of battery from the 7 inches screen on Xcellent.

2.1 Product features

- With a DC-DC converter inside, users can extend or change battery modules whenever they want, no need to consider the quality or SOC of old modules;
- The whole product is non-toxic, pollution-free and environment-friendly;
- Cathode material is made from LiFePO₄ with safety performance and long cycle life;
- Small volume, light weight, plug-in embedded design module, easy to install and maintain;
- Working temperature range is from -4°F to 122°F (-20°C to 50°C) with excellent discharge performance and cycle life;
- Battery management system (BMS) has protection functions including over-discharge, over-charge, and over-current and high/low temperature;
- The battery has less self-discharge, up to 3 months without charging it on shelf, no memory effect, excellent performance of shallow charge and discharge;
- The system can automatically manage battery charge and discharge state; and save energy cost by various control strategy.



2.2 Specifications

Item	R-XC005161 / R-XC005161-H
Battery Chemistry	LiFePO4
Nominal Energy (kWh)	5.12
Nominal Capacity (Ah)	100
Max. Charging/Discharging Current (A)	95
Nominal Voltage (V)	51.2
Recommend Charging Voltage (V)	56.8
Max. Charging Voltage (V)	58.4
Discharge Cut-off Voltage (V)	43.2
Heating Film Resistance(Ω)	16 (-H model only)
Heating Start Temperature ($^{\circ}$ F/ $^{\circ}$ C)	41/5 (-H model only)
Operation Temperature($^{\circ}$ F/ $^{\circ}$ C)	Discharge: -4~122 / -20~50 Charge: 32~122 / 0~50
Safety Function	Over-charge, Over-discharge, Over-current, Low/High-temperature, Short-circuit Protections
Parallel Capacity	Maximum 31
Communication	RS485/CAN/Wi-Fi
Weight (lbs/kg) (Approx.)	119/54
Physical Dimensions (inches/mm) (W*D*H)	17.7*6.1*22.4/450*155*570
Level of Protection	IP20
Cycle Life	8000 cycles @77 $^{\circ}$ F(25 $^{\circ}$ C),0.5C,80%DOD,80%EOL
Designed Calendar Life	10 years



2.3 Interface Information

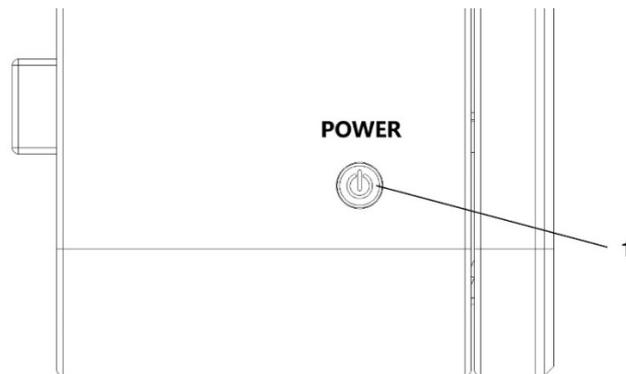


Figure 1.4.1 Power button of left side

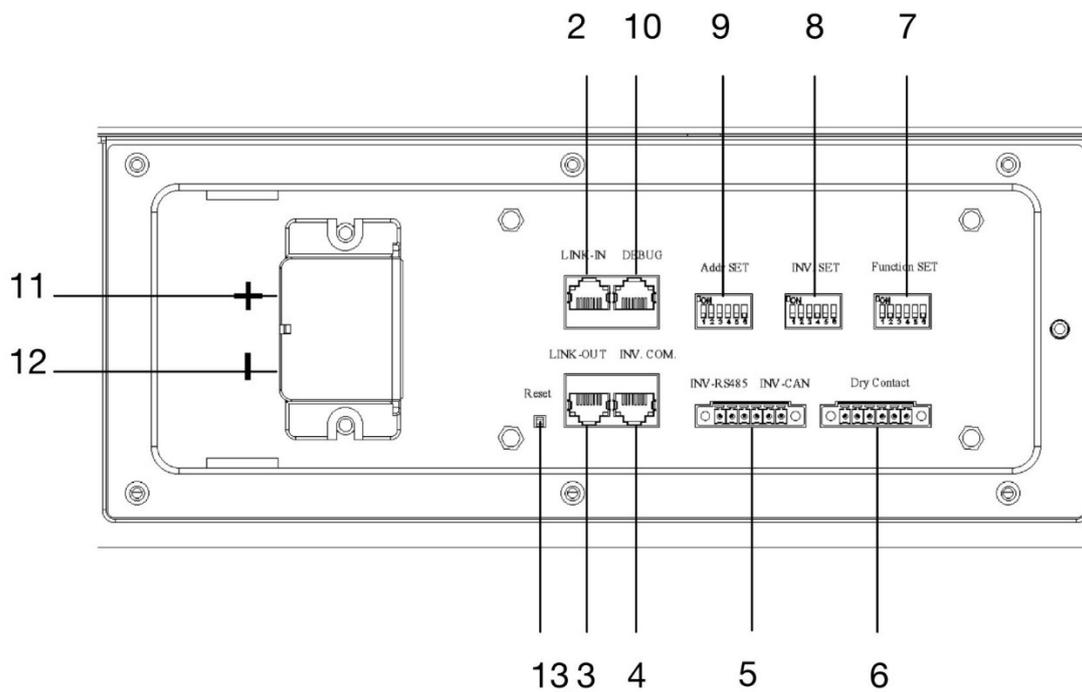


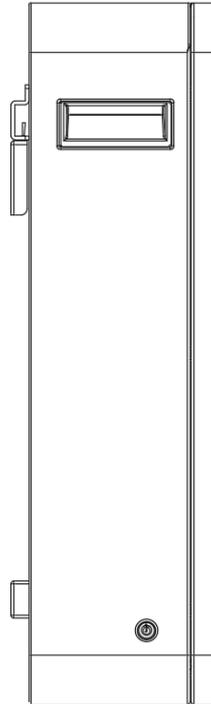
Figure 1.4.2 Battery ports of right side

No.	Instructions	No.	Instructions
1	On/Off	8	Inverter Dial Switch
2	Link-in Parallel Communication Port	9	Address Dial Switch
3	Link-out Parallel Communication Port	10	Debug Port
4	Inverter Communication Port (RJ45)	11	Power Positive
5	Inverter Communication Port (connector)	12	Power Negative
6	Dry Contact & GPIO Port	13	Reset Button
7	Function Dial Switch		



2.3.1 On/Off

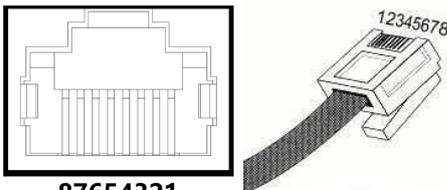
The power button is at the bottom of the left side of the battery, press it once to power on the battery, and press it again to power off.



2.3.2 Link-in Parallel Communication Port

Terminal type: RJ45

Usage: communicate with the last battery when parallel used.

Port definitions	RJ45 Pin	Function
	1	Parallel.CANL
	2	Parallel.CANH
	3	Parallel.CANGND
	4	Switch control input -
	5	Switch control input +
	6	Parallel.CANGND
	7	Address configure input -
	8	Address configure input +

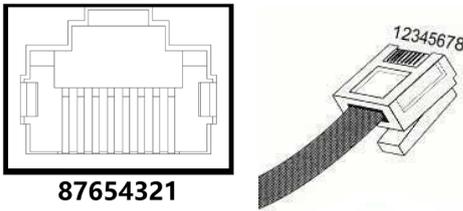


One switch power on and Automatic address configuration functions are disabled by default, contact us for support if you need these functions.

2.3.3 Link-out Parallel Communication Port

Terminal type: RJ45

Usage: communicate with the next battery when parallel used.

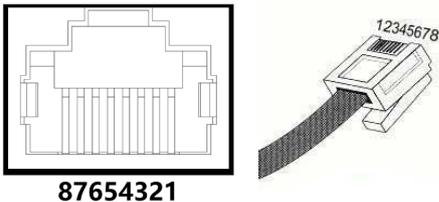
Port definitions	RJ45 Pin	Function
 <p>87654321</p>	1	Parallel.CANL
	2	Parallel.CANH
	3	Parallel.CANGND
	4	Switch control output -
	5	Switch control output +
	6	Parallel.CANGND
	7	Address configure output -
	8	Address configure output +

2.3.4 Inverter Communication Port (RJ45)

Terminal type: RJ45

Usage: communicate with inverter.

Before connect inverter with battery by communication cable, users need to check its cable sequence at first. Check the manual of inverter for definition of inverter side. Definition of battery side as below:

Port definitions	RJ45 Pin	Function
 <p>87654321</p>	1	Inverter.RS485-B
	2	Inverter.RS485-A
	3	Inverter.RS485-GND
	4	Inverter.CANGND
	5	Inverter.CANGND



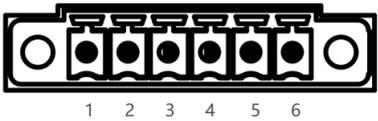
	6	Inverter.RS485-GND
	7	Inverter.CANH
	8	Inverter.CANL

2.3.5 Inverter Communication Port (connector)

Terminal type: 6-Pin terminal block

Usage: reserved for direct connection with inverter, same function as the RJ45 port (chapter " **Inverter Communication Port (RJ45)**"), only one of these two need to be used, leave it open if not used.

Defined as below:

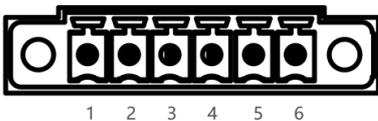
6pin Terminal	Pin	Usage
	1	Inverter.RS485-B
	2	Inverter.RS485-A
	3	Inverter.RS485-GND
	4	Inverter.CANL
	5	Inverter.CANH
	6	Inverter.CANGND

2.3.6 Dry Contact & GPIO Port

Terminal type: 6-Pin terminal block

This is for General-purpose input & output (GPIO) which reserved for future communication and used for an uncommitted digital signal pin on an integrated circuit or electronic circuit (e.g. MCUs/MPUs) board which may be used as an input or output, or both, and is controllable by software.

Defined as below:

6pin Terminal	Pin	Usage
	1	GPO_1+
	2	GPO_1-
	3	(No Connection)
	4	GPO_2+
	5	GPO_2-
	6	(No Connection)



2.3.7 Function Dial Switch

Use this dial switch to match the communication impedance, should set as below:

Optimize and enhance the communication between the batteries.

Code	Dial Code Switch Position	Definition
4		① When used as single battery. ② When used in a parallel system and not being the first or last battery.
36		③ When used as the first or last battery in a parallel system.

2.3.8 Inverter Dial Switch

Code 0~16 of this Dial Switch are used to match which brand of inverter is using.

(Please refer to Inverter Matching Guide, download from our website:

<https://www.renonpower.com/datasheet.html>

Open the website and select Ebrick LV, and download the Inverter Matching Guide.)

The definitions of code 0 ~ 16 are shown as below table.

Code	Dial Switch Position	Brand	Logo
0		(Set by software)	
1		(Reserved)	
2		Schneider_Gateway	
3		Sol-Ark	
4		Solis_LV	
5		Goodwe_LV	



6		Studer_Xtender	
7		Victron_color control	
8		SMA_LV	
9		Sermatec_LV	
10		Sofar_LV	
11		DEYE	
12		Growatt_SPF	
13		Growatt_SPH&SPA	
14		Must	
15		MEGAREVO	
16		SAJ	

Code 63 is used for special function, defined as below:

Code	Dial Code Switch Position	Definition
63		The battery enters WiFi configuration mode, see chapter 3.6 for more information.

2.3.9 Address Dial Switch

- 1) Use this Dial Switch to set the address of each battery and then turn on to activate the system when it needs to be in parallel with other battery units.
- 2) When the system only has one battery set, dial the address to 1.



- 3) When the system used in parallel mode, set the address start from 1 and increased by the number of battery units in order to communicate with other battery.
- 4) Only the battery with address of 1 is able to communicate with the inverter.
- 5) The illustration of dialing as shown below:

Code	Dial Switch Position	Definition
1		Set as battery 1 (communicate with inverter by this battery)
2		Set as battery 2
3		Set as battery 3
4		Set as battery 4
5		Set as battery 5
6		Set as battery 6
7		Set as battery 7
8		Set as battery 8
9		Set as battery 9
10		Set as battery 10
11		Set as battery 11
12		Set as battery 12
13		Set as battery 13
14		Set as battery 14
15		Set as battery 15
16		Set as battery 16
17		Set as battery 17



18		Set as battery 18
19		Set as battery 19
20		Set as battery 20
21		Set as battery 21
22		Set as battery 22
23		Set as battery 23
24		Set as battery 24
25		Set as battery 25
26		Set as battery 26
27		Set as battery 27
28		Set as battery 28
29		Set as battery 29
30		Set as battery 30
31		Set as battery 31

2.3.10 Debug Port

Terminal type: RJ45

Usage: debug port of the system which used by technician only.

Port definitions	RJ45 Pin	Function
	1	Reserved.CANL
	2	Reserved.CANH
	3	Reserved.CANGND
	4	Debug.CANGND
	5	Debug.CANGND



	6	Reserved.CANGND
	7	Debug.CANH
	8	Debug.CANL

2.3.11 Power Positive

Terminal type: Terminal for 25 mm² power cable

Usage: connect to inverter's positive terminal.

2.3.12 Power Negative

Terminal type: Terminal for 25 mm² power cable

Usage: connect to inverter's negative terminal.

2.3.13 Reset Button

Press this button for 3s to set the battery to sleep mode, press it again to wake up, also user can restore battery's factory setting by pressing down this reset button for 6s.



3 Installation and Usage

3.1 Safe Handling Guide

3.1.1 Familiar with the product

Be careful when unpacking the system. The product is heavy. Don't lift them with a pole. The weight of the modules can be found in the chapter "**Specifications**".

3.1.2 Precautions before installation

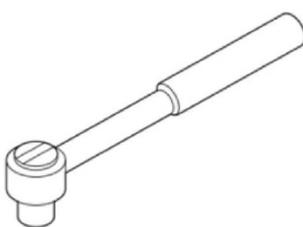
Before installation, be sure to read the contents in chapter "**Safety Precautions**", which is related to the operation safety of installation personnel, please pay attention to it.

3.1.3 Tools

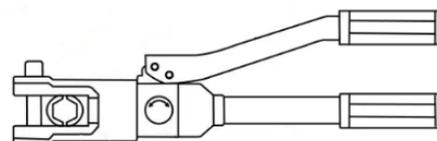
The following tools are required to install the product:



Screwdriver



Torque Wrench



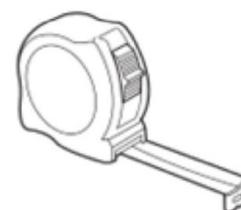
Hydraulic pliers



Drill



Level Ruler



Tapeline

Use properly insulated tools to prevent accidental electric shock or short circuits. If insulated tools are not available, cover the entire exposed metal surfaces of the available tools, except their tips, with electrical tape.

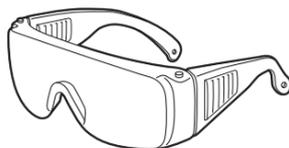


3.1.4 Safety gear

It is recommended to wear the following safety gear when dealing with the product:



Insulated gloves



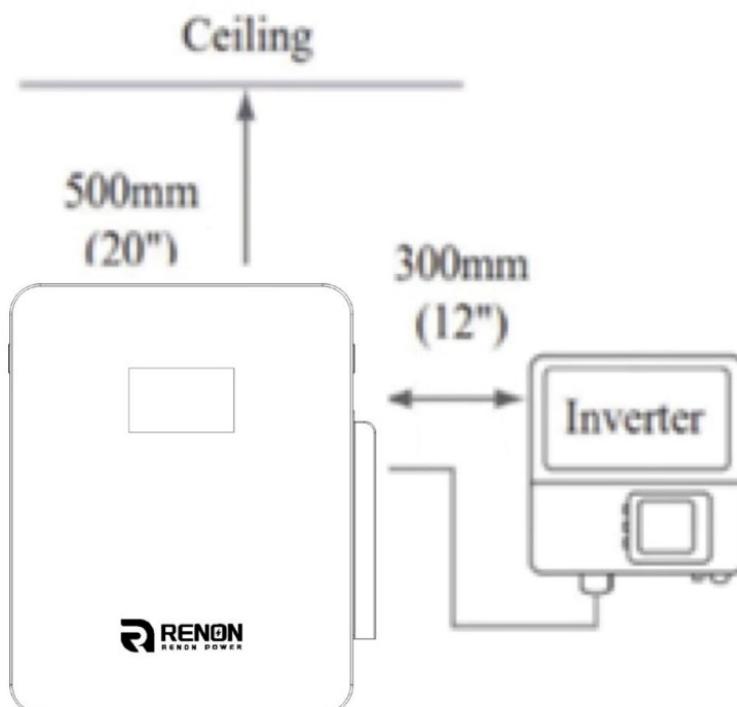
Safety goggles



Safety shoes

3.2 System Premeasurement

The battery requires adequate clearance for installation, cabling, and airflow. The minimum clearance for system configuration is given below. The cable connecting between battery pack and inverter should be in accordance with the installation guide manual of the inverter.





3.3 Installation location

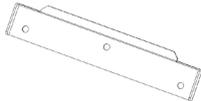
Make sure that the installation location meets the following conditions:

- The surface of the wall is smooth and perpendicular to the ground, which can bear the weight.
- The area is completely water proof.
- The area shall avoid direct sunlight.
- There are no flammable or explosive materials.
- The distance from heat source is more than 80inch(2m).
- The ambient temperature is within the range from 32°F(0°C) to 95°F(35°C).
- The humidity is maintained at a constant level.
- There is minimal dust and dirt in the area.
- Avoid installation in an area confined or with high salinity.
- Do not install outside directly.
- Do not place in an area accessible to children or pets.

3.4 Package items

After receiving the product, please unpack the boxes, and check product and packing list first, if product is damaged or lack of parts, please contact with the local retailer.

Here is the Xcellent Series Packing List:

No.	Item	Specification	Qty	Usage	Diagram
1	Xcellent	R-XC005161(-H)	1	Battery	
2	Mounting Panel	15*3*0.5(inches)/380*75*13(mm)	1	Mounting battery on the wall	
3	Embedded Screw	M8*80	3	Fix battery on the wall	



4	Power Cable- Positive (customizable)	SC25-8 to SC25-8, 60inches (1.5m), red	1	Connect positive of battery to inverter	
5	Power Cable- Negative (customizable)	SC25-8 to SC25-8, 60inches (1.5m), black	1	Connect negative of battery to inverter	
6	Communication Cable	RJ45 T568B, 80inches (2m)	1	Communication for parallel	
7	Pin order select box (optional)	3.3*1.0*0.9inches /85*26*22mm	1	Set the pin order of the communication cable of battery and inverter, cooperate with 2 standard network cable	
8	Inverter Communication Cable (Optional)	Standard RJ45 network cable, 1m	2	Connect the communication pole of battery and inverter	
9	User manual	Xcellent series	1	User manual	

3.5 Installation

- 1) Choose a proper position to drill three holes on the wall for the mounting panels. Make sure two underneath holes are aligned and the top hole is vertical to its base.

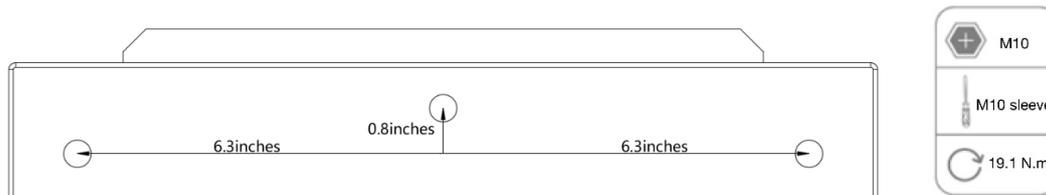


Figure 3.5.1 Position for three holes

- 2) Screw the mounting panel up by three given embedded screws. Make sure the screws are fixed tightly.
- 3) Put Xcellent on the mounting panel.

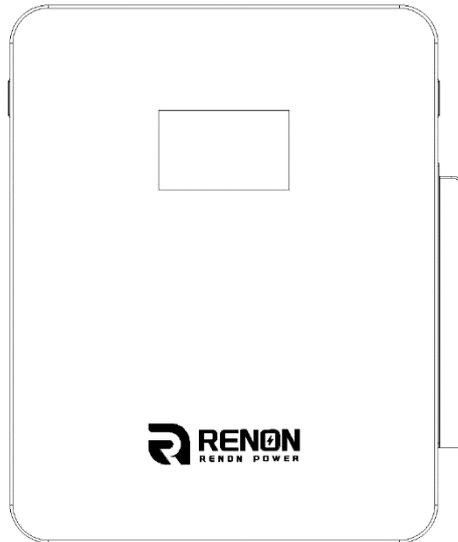


Figure 3.5.2 Put Xcellent on the mounting panel

- 4) The grounding point of the battery is at the back side, connect it with a ground wire as the graph shows below, follow the regulations of the area where the product being installed.

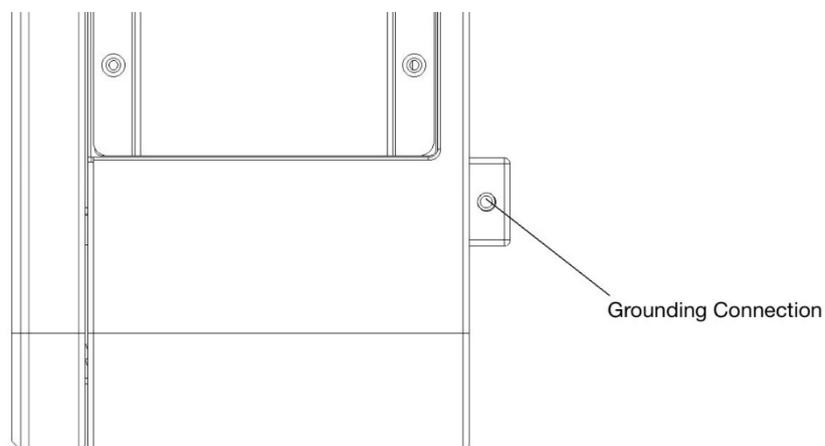


Figure 3.5.3 Grounding connection

3.6 Connection of Cable and Power

- 1) Remove the side panel.

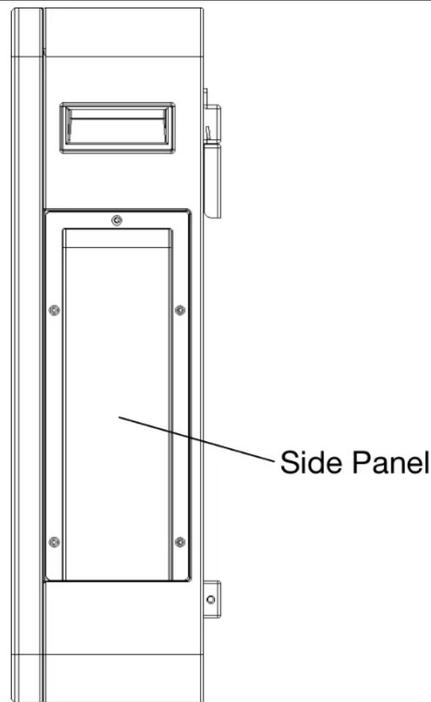


Figure 3.6.1 Side view of Xcellent

- 2) Set the address dial code (**Addr. SET**) of battery as code 1, set its function dial code (**Function SET**) as code 4 and set its inverter dial code (**INV. SET**) to the corresponding inverter's code.
- 3) Turn off the system and then connect the battery positive and negative electrode with the inverter's positive and negative electrode separately.

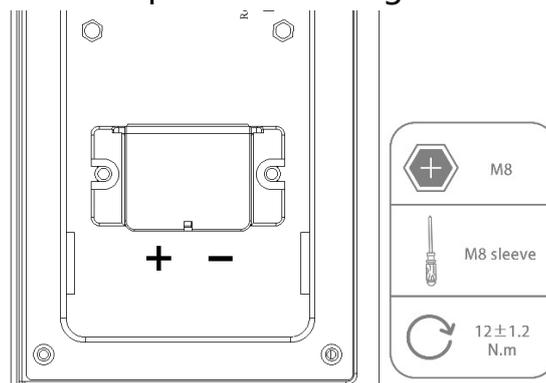
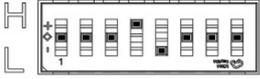
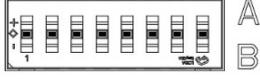
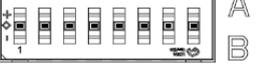
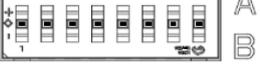
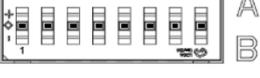


Figure 3.6.2 Power wire connection

- 4) Connect CAN/RS485 wire to the inverter port of the master controller and inverter's CAN/RS485 port.



If you are using the pin order select box, please refer to the table below to set the dial switch, according to the inverter brand. If the inverter brand is not shown in the table, please refer to the inverter manual or consult Renon's engineer.

Dial switch position		Inverter brand	Comm Mode
 CAN	 RS485	Sol-Ark, Solis, GoodWe, SMA, Sermatec, Deye, MEGAREVO, SAJ, Growatt_SPH	CAN
 CAN	 RS485	Victron	CAN
 CAN	 RS485	Studer, Sofar	CAN
 CAN	 RS485	Schneider	CAN
 CAN	 RS485	Must	CAN
 CAN	 RS485	Growatt-SPF	RS485

5) Put side panel back and screw it firmly.

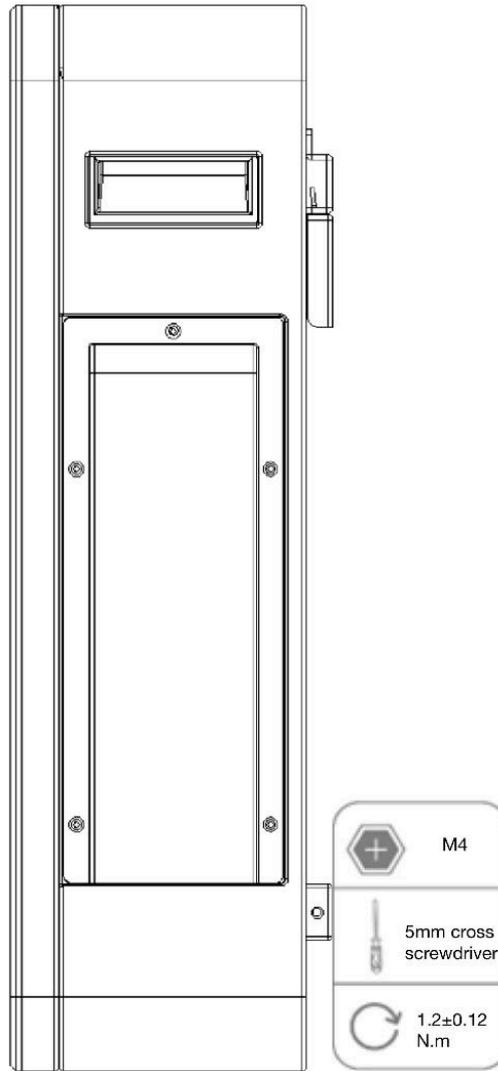


Figure 3.6.4 Mount back the side panel

6) Turn on the battery by pressing the power button. Check whether errors or warning occur on the screen.

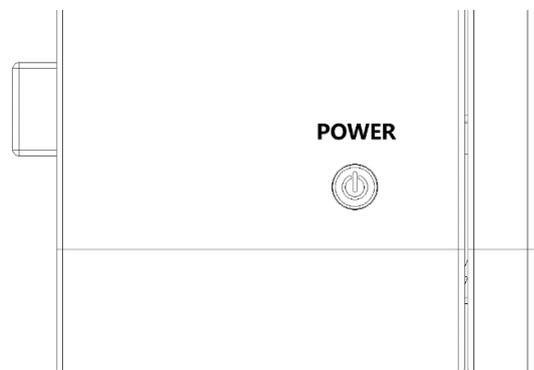
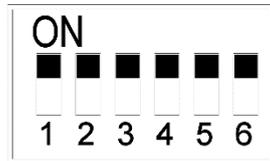


Figure 3.6.5 Power button



3.7 Wi-Fi Configuration

Set the inverter dial code (**INV SET**) to 63(111111) as shown below before Wi-Fi configuration.



- 1) Download and install RENON APP from Google or Apple Store by searching Renon Smart.



Figure 3.7.1. Install RENON APP

- 2) You may acquire the Register Code from your installer for new account registration. If you already had an account, you may use it to login the APP directly otherwise you need to create an account.

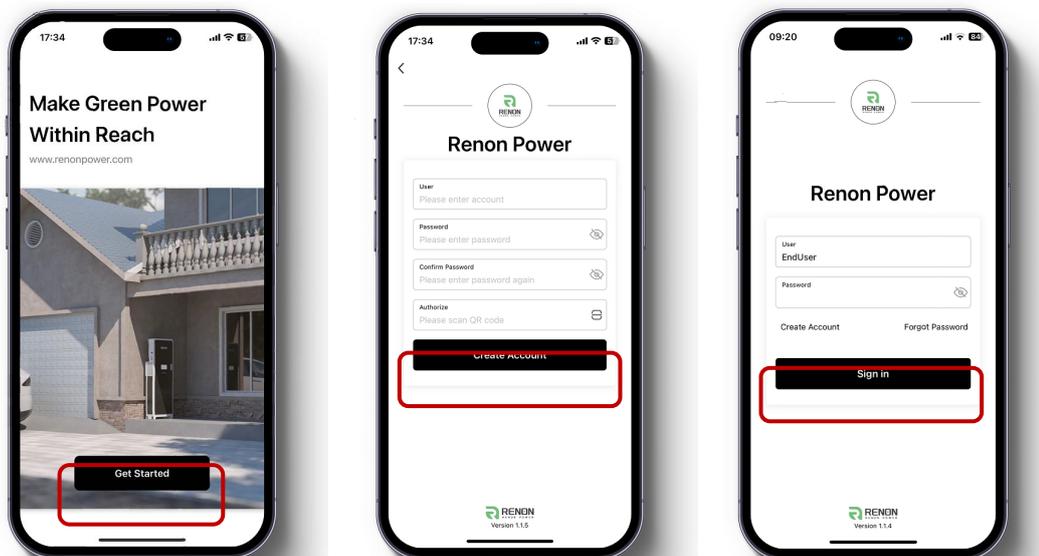


Figure 3.7.3. Start the APP & Create an account & Sign in



- 3) Turn to the page account then click the Network, following by the instruction of network setting for WIFI configuration.

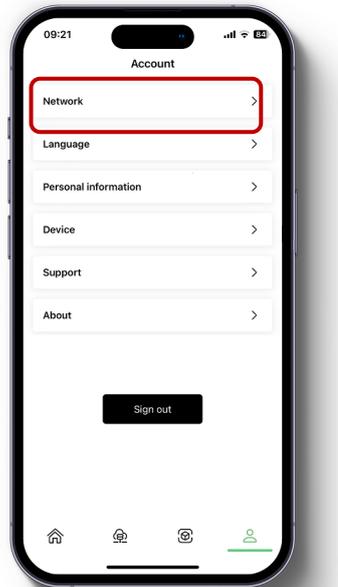


Figure 3.7.3. Network Setting

- 4) Connect your mobile phone to the WI-FI hotspot from the master controller which SSID is same as controller's serial number (SN) and the password is 12345678. Make sure this connection is successful by checking whether Wi-Fi symbol on screen shine periodicity or not.

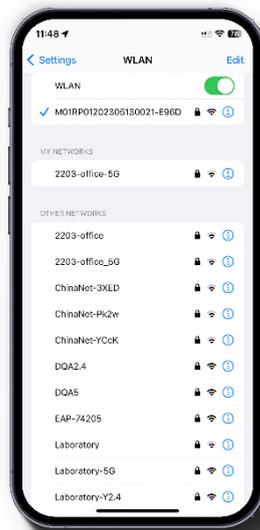


Figure 3.7.4. Connecting WIFI Hotspot of Product

- 5) Enter the SSID and password of your private WI-FI for connecting master controller to your private WI-FI. Make sure the Wi-Fi symbol on screen will shine constantly.

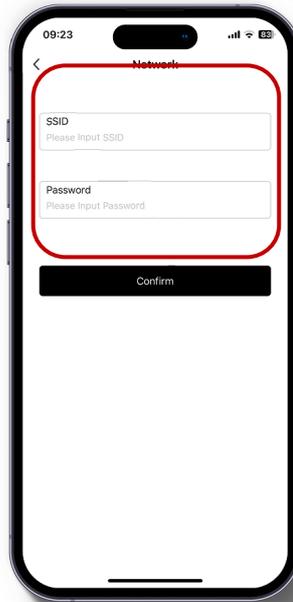


Figure 3.7.5. Connecting Private WIFI

- 6) Ask your installer to assign all your products to your account.
- 7) Turn to main page of the APP, create a plant, and set a recognizable name, your email and address for it.

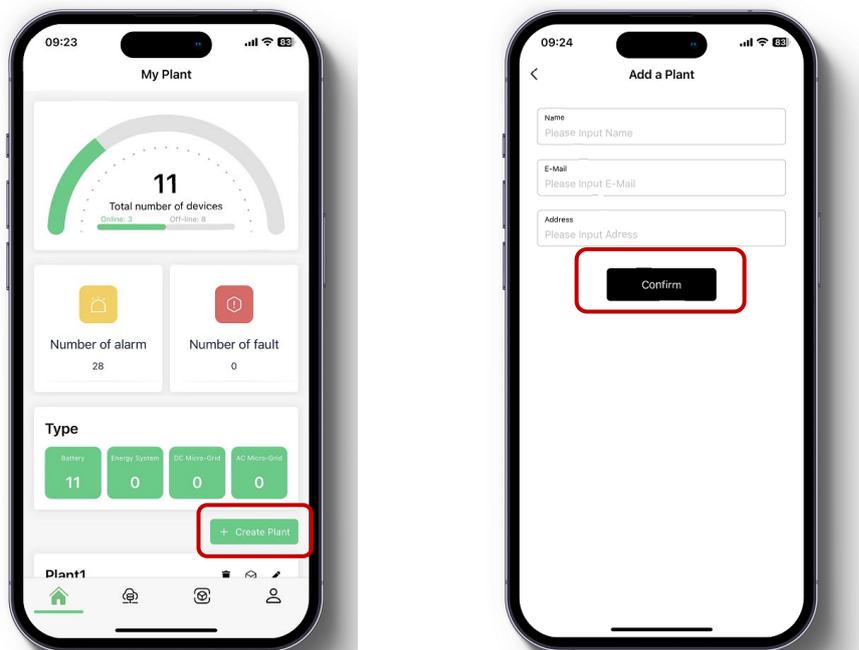


Figure 3.7.6. Create A New Plant

- 8) Click the confirm button to create your plant and all your products will show up as their SN, select proper products and confirm.

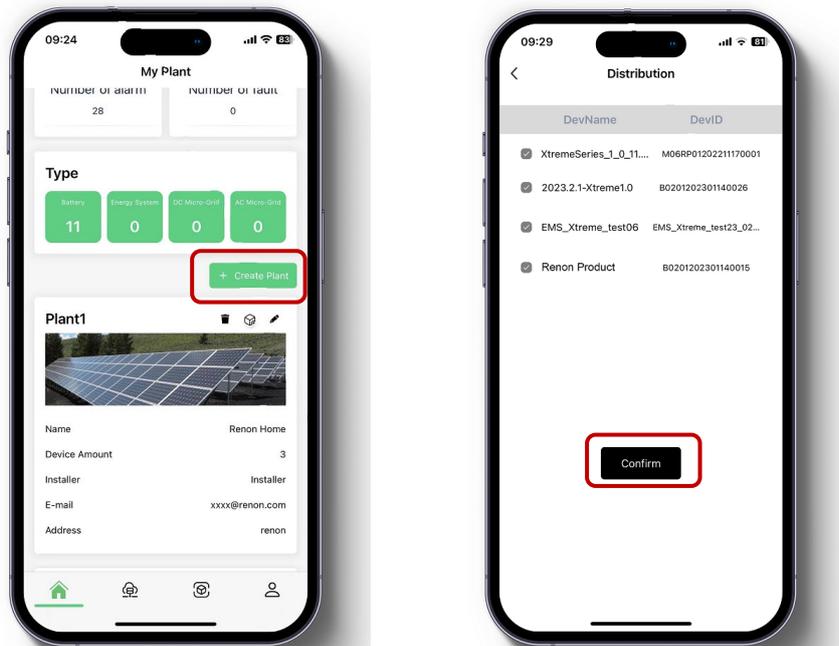


Figure 3.7.7. Manage Your Plant & Confirm Your Products

- 9) Now you can manage your products in the APP, and you can also manage them in Website, ask your installer for the site URL.

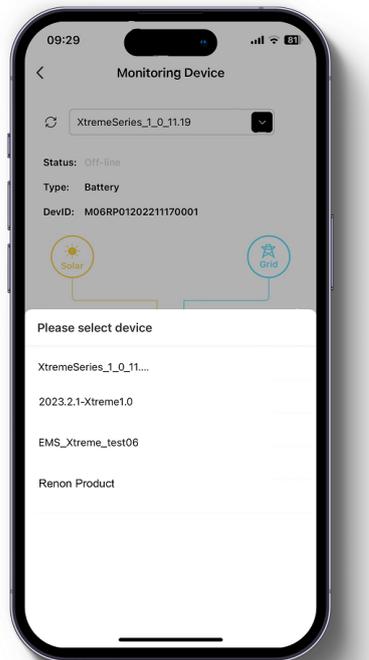


Figure 3.7.8. Manage Your Products

- 10) After the product is connected to Wi-Fi, the running status, real-time power, daily power consumption and cumulative power of the product can be monitored in real time on the network platform or mobile APP. It can also be used to configure parameters

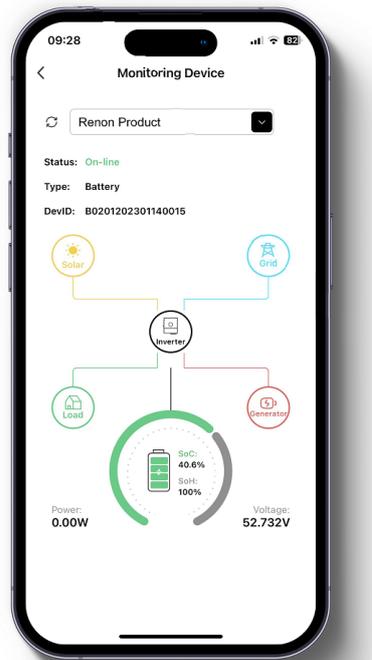


Figure 3.7.9. Monitoring Device

- 11) Set the inverter dial code to match the inverter brand after Wi-Fi configuration finished (Please refer to the chapter **2.3.3 Inverter Dial Switch**).

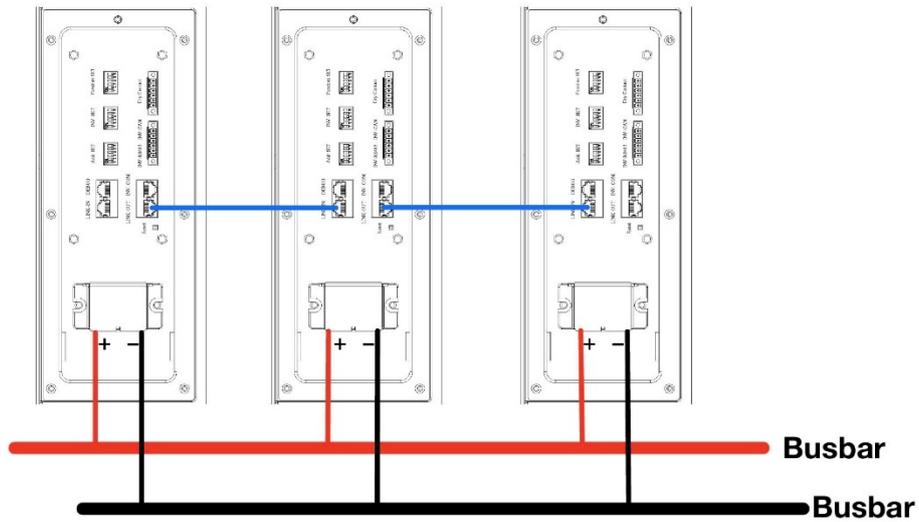
3.8 Parallel connection (Optional)

If user needs to set up a system more than one Xcellent, user can set up a parallel system.

- 1) Each Xcellent's address dial code should be set as 1,2, 3... in order. Set the inverter dial code of the battery with address of 1 to the corresponding inverter's code, please refer to chapter of inverter dial code.
- 2) Set the first battery and the last battery of the system's Function dial code (**Function SET**) as code 36 and set Function dial code of the rest of batteries as code 4.
- 3) Use parallel communication lines to connect Link-out of battery 1 to Link-in of battery 2, and Link-out of battery 2 to Link-in of battery 3, and so on.
- 4) Connect power cable of each battery and inverter directly to the busbar. Make sure the busbar can stand for the maximum current of the system. Connect INV.COM of battery with code 1 to inverter's BMS port, check the



inverter manual for knowing the signal order of its BMS port.



5) Turn on all batteries. Check whether errors or warning occurs on the screen of batteries and the inverter.



4 Monitoring Screen

4.1 LCD Screen Introduction

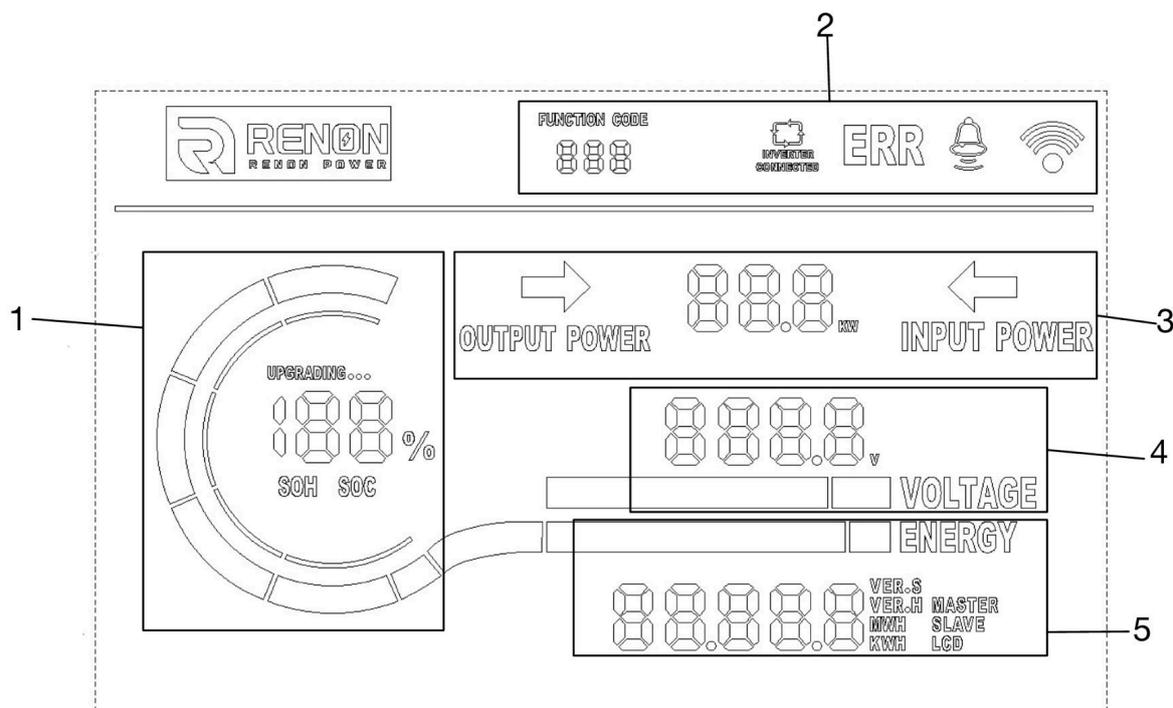


Figure 1.3.1 LCD Screen Introduction

No.	Instructions
1	Status of SOC, SOH and Upgrading
2	Status of Battery Operation
3	Status of Input or Output Power
4	Status of Battery Voltage
5	Status of Version and Accumulated Discharge Energy

4.2 Status of SOC, SOH and Upgrading

- 1) The percent number displays current SOC when underneath SOC sign lights on and current SOH when underneath SOH sign lights on, respectively. The SOC will light up 60s and then SOH light up 3s in a display cycle.
- 2) The “UPGRADING...” sign will show up when the battery is in the upgrade.



The percentage indicates the progress of the upgrade.

- 3) Two layers of cyclic annular graph show SOC and SOH of battery respectively. Inner layer is for SOH and outside one is for SOC. The table given below indicates specific details for each.

SOC	Cyclic Annular Graph Status
SOC=0%	No joint shows on.
0% < SOC ≤ 10%	The short joint shows on.
10% < SOC ≤ 20%	First joint and the short one show on.
20% < SOC ≤ 40%	First two joints and the short one show on.
40% < SOC ≤ 60%	First three joints and the short one show on.
60% < SOC ≤ 80%	First four joints and the short one show on.
80% < SOC ≤ 100%	All five joints and the short one show on.

SOH	Cyclic Annular Graph Status
SOH=0%	No joint shows on.
0% < SOH ≤ 20%	First joint shows on.
20% < SOH ≤ 40%	First and second joints show on.
40% < SOH ≤ 60%	First three joints show on.
60% < SOH ≤ 80%	First four joints show on.
80% < SOH ≤ 100%	All five joints show on.

4.3 Status of Battery Operation

1) Function Code

If there is any error or warning, the function code will show on. When the function code shows on with "ERR" , it means there are some errors occurred. The function code shows on with "🔔" is warning reminder.



2) Inverter Connection (for future use)

“INVERTER CONNECTION” sign indicates the status of connection between inverter and battery. It will show on when the connection is proper. Otherwise, it will be off.

Note: It is designed for future use.

3) Wi-Fi Connection Symbol

The symbol will show on constantly when Wi-Fi connection is good. It will shine periodically when the Wi-Fi configured for the battery cannot connect to the server. Off means the battery is waiting for Wi-Fi configuration.

4.4 Status of Input or Output Power

The arrow with different directions indicates battery’ s charging/discharging status. “OUTPUT POWER” sign and its underneath arrow shows on when battery is discharging, and “INPUT POWER” sign and its underneath arrow shows on when battery is charging. The number goes with kW indicates current power of charging/discharging.

4.5 Status of Battery Voltage

The number indicates current voltage of battery.

4.6 Status of Version and Accumulated Discharge Energy

The number shows version of software and hardware for LCD, master, and slave, accumulated discharged energy counted in kWh or MWh, respectively. Each part will keep showing on for 3 seconds and then switch to next.



5 Troubleshooting & Maintenance

5.1 Regular maintenance

- 1) Check the battery modules every 3 months to verify whether there are damages.
- 2) Check the battery modules every 3 months to verify whether the operating parameter is normal or there is no abnormal heating.
- 3) Fully charge and discharge the battery system every 3 months.
- 4) Clean the battery modules with a dry rag once a month.

5.2 Troubleshooting

The table given below also helps user to address the failure accurately.

Phenomenon	Possible Causes of Failure
Unable to turn on the battery	<ol style="list-style-type: none"> 1. Try to charge the battery by the activation charging function of the inverter when power is on.
No output after power on.	<ol style="list-style-type: none"> 1. Make sure the address dial code setting is correct, refer to the chapter of address dial code. 2. Make sure SOC is not 0% otherwise charge battery please.
Unable to communicate with inverter	<ol style="list-style-type: none"> 1. Make sure the connection of communication cable and power cable is correct, refer to the chapter of connection of cable and power. 2. Make sure the address dial code of the master controller connected to inverter is 1. 3. Make sure the inverter dial code of the master controller connected to inverter is correct, refer to the chapter of inverter dial code. 4. If you are using a pin order select box, please verify that the dialing switch is configured correctly.
Unable to be charged by inverter	<ol style="list-style-type: none"> 1. Make sure power cable connection is correct. 2. Check whether inverter has faults. 3. Check whether grid or PV is available. 4. Make sure Time of Use of the inverter setting is correct. 5. Make sure charging voltage and charging current setting



	<p>of the inverter match the parameters of the battery.</p> <ol style="list-style-type: none"> 6. Check the battery low or high temperature protection alarm. 7. Check the over current protection alarm. 8. Make sure the SOC value is below 96% (default value).
<p>Unable to discharge while SOC is not zero.</p>	<ol style="list-style-type: none"> 1. Make sure the connection of cables is correct and circuit breaker is ON. 2. Check whether inverter has faults. 3. Make sure the inverter setting is not back up mode. 4. Check whether SOC is lower than the shutdown value of the inverter. 5. Check the battery low or high temperature protection alarm. 6. Check the over current protection alarm.
<p>Error or Alarm shown on the screen</p>	<ol style="list-style-type: none"> 1. Check the battery refer to the definition of the error or warning codes. If cannot solve the problem, please contact the installer.
<p>Unable to find the battery on the APP & the cloud</p>	<ol style="list-style-type: none"> 1. Make sure the antenna is screwed properly. 2. Make sure the WIFI configuration is correct. 3. Make sure the SSID & PASSWORD of your private WIFI is correct, please enter information case-sensitively without space. 1. Make sure the frequency of the WIFI connected to the product is (2.4GHz or 2.4GHz / 5GHz dual frequency integration). 4. Make sure the WIFI signal is strong enough. 5. Make sure WIFI is working. 6. Make sure installer is distributed your products on user's account. 7. Try to restart the WIFI router.

5.3 Warning Codes

Warning Code (Sign like “🔔”)



Code	Warning type	Investigation & troubleshooting
1	Low cell voltage discharge protection	1. Low voltage level and needs to be charged
2	Overcurrent charge protection	1. Restore to factory setting. 2. Make sure the inverter's setting of max current do not exceed the max charge current of the battery.
3	Overcurrent discharge protection	1. Make sure the power of load do not exceed the power of battery.
4	Over temp charge protection	1. Make sure the battery's temperature shown on the inverter or the APP is below 55°C, otherwise turn off the battery till the temperature is below 55°C and then try to charge battery.
5	Over temp discharge protection	1. Make sure the battery's temperature shown on the inverter or the APP is below 55°C, otherwise turn off the battery till the temperature is below 55°C and then try to discharge battery.
6	Low temp charge protection	1. Make sure the battery's temperature shown on the inverter or the APP is above 0°C, otherwise turn off the battery till the temperature is above 0°C and then try to charge battery.
7	Low temp discharge protection	1. Make sure the battery's temperature shown on the inverter or the APP is above -20°C, otherwise turn off the battery till the temperature is above -20°C and then try to charge battery.
8	High ambient temp protection	1. Make sure the ambient temperature of the battery is below 50°C.
9	Cell voltage off-set protection	1. Restart the battery and see if the warning code 9 still remaining contact your installer.
10	High relay temp protection	1. Restart the battery and see if the warning code 10 still remaining contact your installer.
11	Busbar high temp protection	1. Restart the battery and see if the warning code 11 sill remaining contact your installer.
13	Low battery voltage Discharge protection	1. Need to be charged
14	Low ambient temp protection	1. Make sure the ambient temperature of the battery is above -25°C.
15	High MOS temp protection	1. Reduce the ambient temperature and restart the battery

5.4 Error Codes

Error Code (Sign like "ERR")

Code	Error Type	Investigation & troubleshooting
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100	Discharge relay fault	1. Restart the battery, and if the error code 100 still remaining or reappear, contact your installer.
101	Charge relay fault	1. Restart the battery, and if the error code 101 still remaining or reappear, contact your installer.
102	Cell failure	1. Restart the battery, and if the error code 102 still remaining or reappear, contact your installer.
103	Temperature sensor malfunction	1. Restart the battery, and if the error code 103 still remaining or reappear, contact your installer.
104	Current sensor malfunction	1. Restart the battery, and if the error code 104 still remaining or reappear, contact your installer.
105	Battery module lost communication with controller	1. Check whether the address and function dial switch are set according to the user manual. 2. Restart the battery, and if the error code 105 still remaining or reappear, contact your installer.
106	Short circuit detected	1. Make sure the external connection for both battery and inverters are proper. 2. Disconnect all external connections and restart the battery, and if the error code 106 still remaining or reappear, contact your installer.
107	Battery total voltage sensor malfunction	1. Restart the battery, and if the error code 107 still remaining or reappear, contact your installer.
108	Heating function failure	1. Restart the battery, and if the error code 108 still remaining or reappear, contact your installer.
109	Battery module address conflict	1. Check whether the function dial switch is set according to the user manual. 2. Restart the battery, and if the error code 109 still remaining or reappear, contact your installer.
110	Main controller address conflict	1. Check whether the address and function dial switch are set according to the user manual. 2. Restart the battery, and if the error code 110 still remaining or reappear, contact your installer.
111	Charge MOS malfunction	1. Restart the battery, and if the error code 111 still remaining or reappear, contact your installer.
112	Discharge MOS malfunction	1. Restart the battery, and if the error code 112 still remaining or reappear, contact your installer.
113	Addressing failure	1. Check whether the address and function dial switch are set according to the user manual. 2. Restart the battery, and if the error code 113 still remaining or reappear, contact your installer.
114	Pre-discharging fault	1. Make sure the external connection for both battery and inverters are proper. 2. Disconnect all external connections and restart the battery, and if the error code 114 still remaining or reappear, contact your installer.
115	Cluster communication failure	1. Check whether the address switch is set according to the user manual.



		2. Restart the battery, and if the error code 115 still remaining or reappear, contact your installer.
116	Battery backconnection failure	1. Restart the battery, and if the error code 116 still remaining or reappear, contact your installer.
117	External total voltage check fault	1. Restart the battery, and if the error code 117 still remaining or reappear, contact your installer.
118	Address not 1 for single battery	1. Check whether the function dial switch is set according to the user manual. 2. Restart the battery, and if the error code 118 still remaining or reappear, contact your installer.
119	Addresses are discontinuous	1. Check whether the function dial switch is set according to the user manual. 2. Restart the battery, and if the error code 119 still remaining or reappear, contact your installer.
120	Master controller communication fault	1. Check whether the function dial switch is set according to the user manual. 2. Restart the battery, and if the error code 120 still remaining or reappear, contact your installer.
200	Low cell voltage discharge safety lock	1. Restart the battery, and if the error code 200 still remaining or reappear, contact your installer.
201	High cell voltage charge safety lock	1. Restart the battery, and if the error code 201 still remaining or reappear, contact your installer.
202	Over temp charge safety lock	1. Restart the battery, and if the error code 202 still remaining or reappear, contact your installer.
203	Low temp charge safety lock	1. Restart the battery, and if the error code 203 still remaining or reappear, contact your installer.
204	Over temp discharge safety lock	1. Restart the battery, and if the error code 204 still remaining or reappear, contact your installer.
205	Low temp discharge safety lock	1. Restart the battery, and if the error code 205 still remaining or reappear, contact your installer.
206	Overcurrent charge safety lock	1. Restart the battery, and if the error code 206 still remaining or reappear, contact your installer.
207	Overcurrent discharge safety lock	1. Restart the battery, and if the error code 207 still remaining or reappear, contact your installer.