Installation Guidance

Solar Power Storage System

Inverter: SK-SU5000E

SK-SU3000E

Battery system: RS-Box 4100

RS-Box 8700

Version：1.1

Update：20161009

Statement:

For product version update or other reasons, this document will be subject to change with notice. Unless otherwise agreed, the document used as guidance only, all statements in this document, information and suggestions do not constitute any express.
Please kindly contact us for more information.

1 PREFACE

Thank you for choosing COSUN products. We will provide you good quality as well as reliable after sales service.
To protect using staffs and product, please kindly read this manual carefully which provide detailed information for products' features, structures, operate standard, maintenance and troubleshooting.

Special announcement:

COSUN hold the final explanation right of this manual.

2 INFORMATION IN THIS GUIDANCE

2.1 About this guidance

This is the installation guidance for the COSUN battery box products RS-Box4100 and RS-Box 8700. Installer must refer to the installation guidance to installation and use correctly.

2.2 Target group

This installation guidance applies only to the COSUN battery box products RS-Box 4100 and RS-Box 8700.

2.3 Additional information

Specification of the product can be changed without any notice to customers for the system improvement.

2.4 Symbols used

Symbols meanings

CAUTION:

CAUTION represent hazardous situations which can cause light injuries if not avoided

CAUTION:

CAUTION represent hazardous situations which can damage light injuries if not avoided

3 SAFETY

3.1 Warnings and notification

Installation environment requirements: COSUN RS-Box4100 and RS-Box 8700 is designed for household purposes. For installation, it must be installed in a location complying with IP20. If the Installation location does not comply with IP20 failure might be caused and the product will lose guaranteed for any related accident or damage.

3.2 Safety guidelines

CAUTION:

Li-Ion battery (energy storage unit) inside. When assembling the system, do not intentionally make a short condition between the positive (+) and negative (-) terminals of the battery box with a metallic object. All work on the RS-Box and electrical connections must be carried out by qualified personnel only. RS-Box provides a safe source of electrical energy when operated as intended and as designed. Potentially hazardous circumstances such as excessive heat or electrolyte mist may occur under improper operating conditions, damage, misuse and/or abuse. The following safety precautions and the warning messages described in this section must be observed. If any of the following precautions are not fully understood, or if you have any questions, contact Customer Support for guidance. The Safety Section may not include all regulations for your locale; personnel working with RS-Box must review applicable federal, state and local regulations as well as the industry standards regarding this product.
Installation personnel can not wear watches, etc., to avoid short circuit and human damage.

CAUTION:

Due to high weight of COSUN RS-Box 4100 and RS-Box 8700, please use hard package and do safety protection when transport, please also pay attention to the safety to avoid human damage.

4 PRODUCT OVERVIEW

4.1 Product introduction

COSUN battery box products RS-Box 4100 and RS-Box 8700 storing energy can be used in off-grid & on-grid energy storage system.
It is recommended not to use this device for other than the purpose described in this guidance.

The substitute use of this product, random change, and use of components other than sold or recommended by COSUN will nullify the product guarantee.
The system is easy for installation and maintenance.

4.2 Identifying the product

The Type Label describe the product identity and is attached on the product. For safe usage, the user must be well-informed of the contents on the Type Label. The Type Label includes:

Product Name：
Product Type：
Voltage range:
Nominal charge/discharge current:
Nominal capacity:
Operation temperature range:
Certification marks：

5 SYSTEM INSTALLATION

5.1 Installation notice

i. Before installation, check the battery open circuit voltage.

ii. Battery installation location should be apart from heat. The safety distance should be above than 0.5m.

iii. Battery connecting cables should be as short as possible, to prevent excessive line pressure drop.

iv. Batteries with different capacity, different manufacturers are not allowed for connection.

v. Before connect the batteries, the battery positive and negative poles need to be carefully checked as well to ensure correct installation.

vi. The mounting floor should be horizontal.

5.2 Package information and system configuration list

The cabinet and battery are packaged separately with cartons, the components are taken along with the cabinet or battery package, before installation, installer should read the system configuration list.

RS-Box Cabinet

RS-Battery

5.2.1 Configuration list of RS-Box

Please install RS-Box 4100/RS-Box 8700 according to table1.

Table 1 Basic configuration list

Type	RS-Box 4100	RS-Box 8700
RS-Box cabinet	1	1
RS-Battery	4	4
Power cable	3	3
Communicate cable	1	1
User manual	1	1
Installation guidance	1	1

Notice:

When checking the configuration list, please pay attention to the cabinet label, different capacity cabinet to install different capacity of the battery.

Table 2 Extend configuration list

No.	System Capacity	RS-Battery quantity		RS-Box quantity
		IFM12-800E1	IFM12-1700E1	
1	4.1KWh	4	\	1
2	8.7KWh	\	4	1

5.2.2 RS-Box configuration list with SolaX inverter

1 Phase on Grid			
Inverter Type	RS-Battery		Cabinet
	IFM12-800E1	IFM12-1700E1	
SK-SU 3000E	4	\	1
SK-SU 5000E	\	4	1

5.2.3 Installation tools

Table 3 Installation tools list

 Cross screwdriver M3~M10	 Sleeve M13	 Flat tip screwdriver M3~M6
 Diagonal cutters	 Adjustable wrench	 Knife

5.2.4 Part list

5.2.4.1 Part list of cabinet

No.	Item Description	Qty.	Purpose	Picture
1	Anchor bolt	4	Make a distance from cabinet to ground.	
2	User Manual	1	System information and using method and Warranty items.	\
3	Installation Manual	1	System installation guidance	\

***Remark**: This part list is only for one system cabinet.*

5.2.4.2 Part list of RS-Box

No.	Item Description	Qty.	Purpose	Picture
1	Power cable	3	Battery connection (40cm)	
2	Communication cable	1	Battery RS232 port connection	

5.2.5 Personal protective equipment

 Insulating shoes	 Insulating gloves

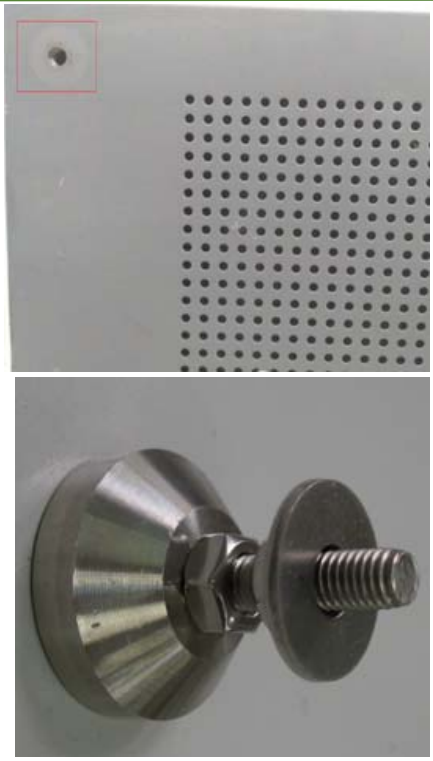
5.3 Installation

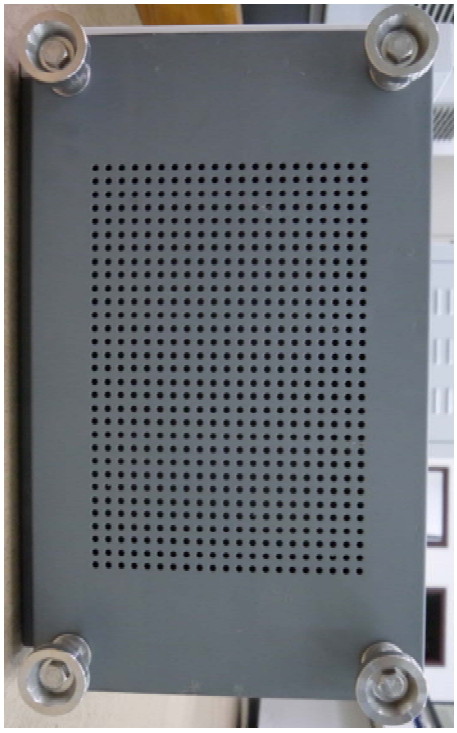
5.3.1 Open the package

Tools: Knife

5.3.2 Anchor bolt installation

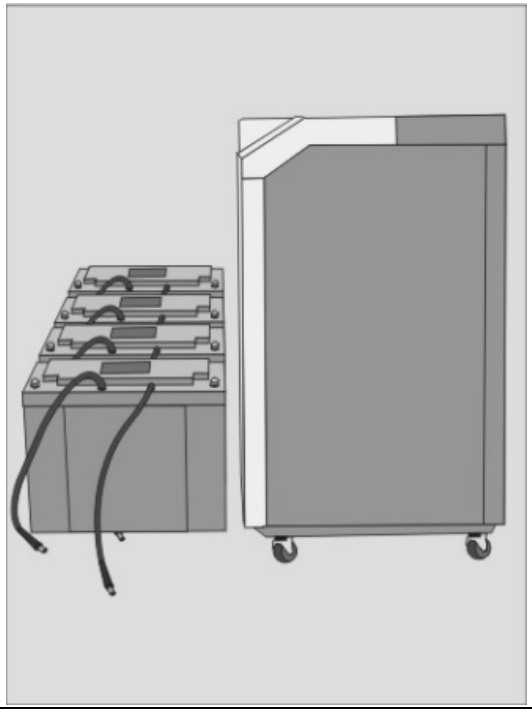
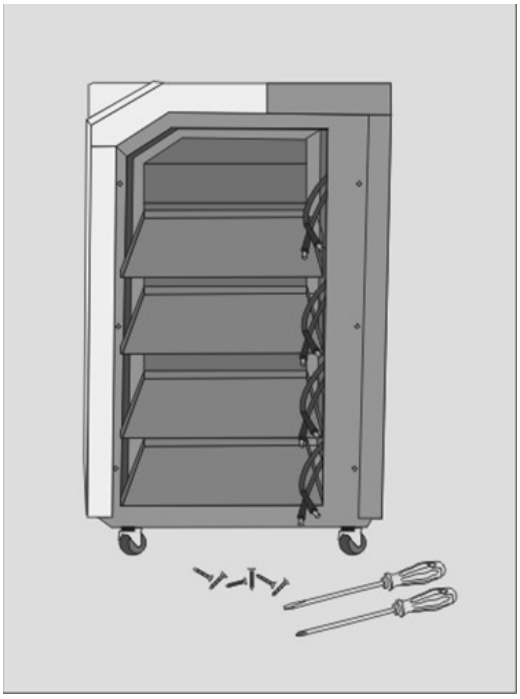
i. Install the anchor bolt, turn the anchor bolt to the appropriate height;
ii. Using Spanner to turn the second screw to lock the anchor bolt;
iii. Install the 4pcs Anchor bolt into the four hole in bottom of cabinet.

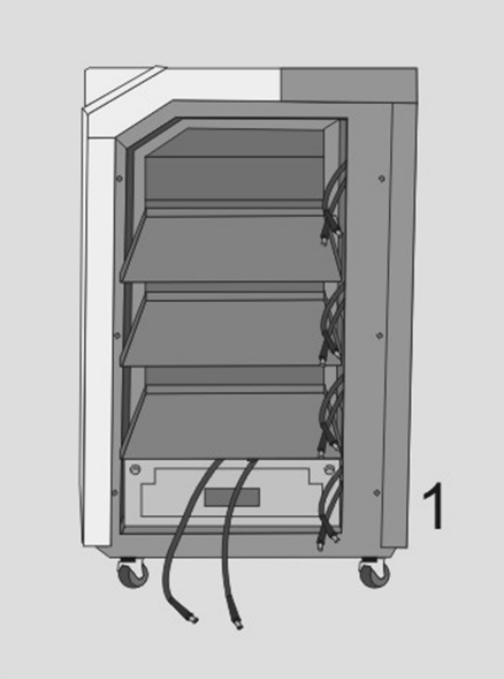
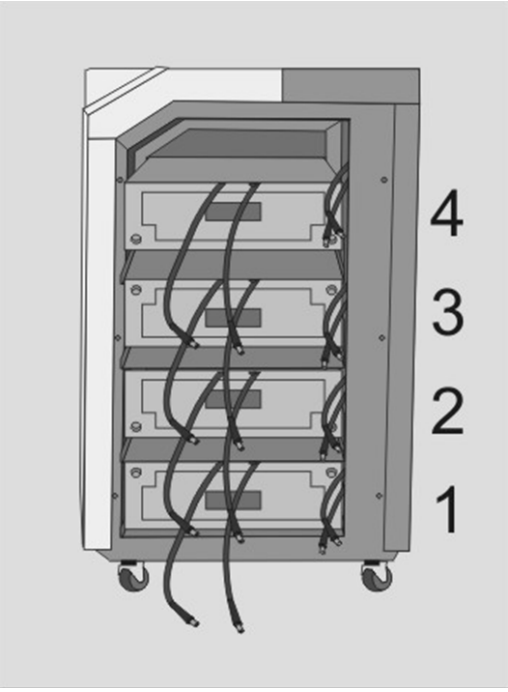
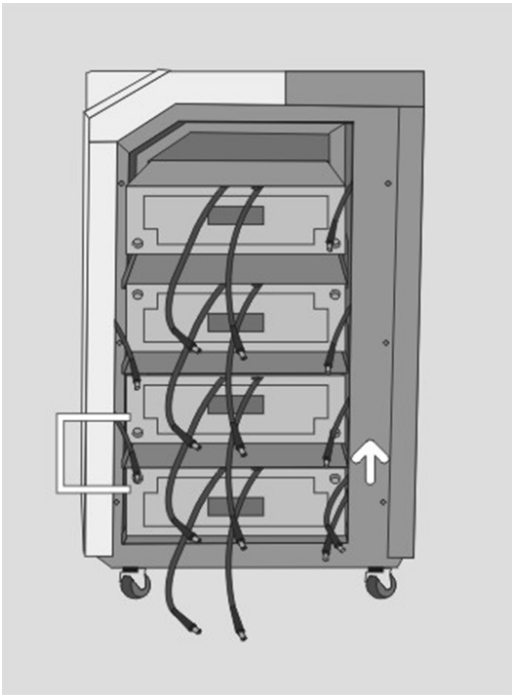
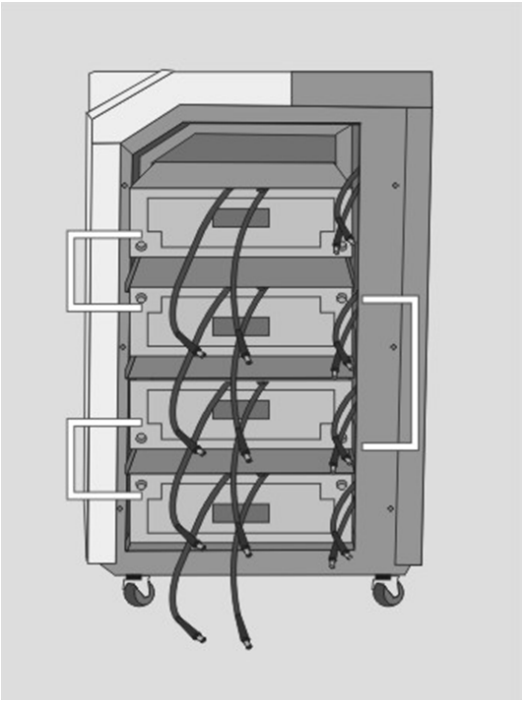


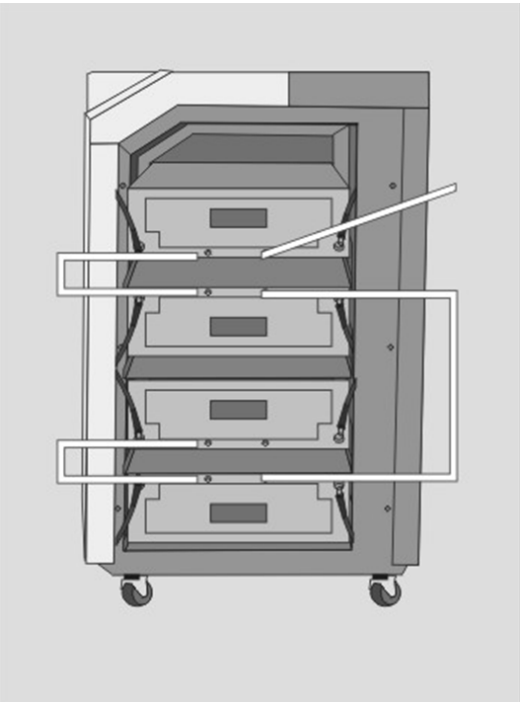
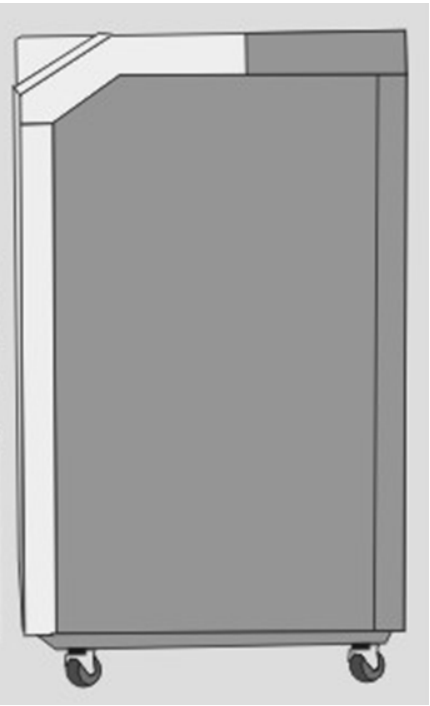


5.3.3 Battery installation

Move the cabinet to the installation place, prepare to install battery.
Open the door, take away the screws of the battery stories.

	
Check delivery for completeness. There are four batteries and a cabinet.	Open the side cover by cross screwdriver.

	
A multimeter can be applied to measure voltage. Put No.1 battery in the bottom of box. **Notice**: The left side of the battery is negative (-).	Put the other batteries in the box from bottom floor to top floor. **Notice**: For battery No.1 and No.3, right side is positive (+). For battery No.2 and No.4, right side is negative (-).
	
The 4 batteries are connected in series. For the battery No.4, the left side is positive output. For the battery No.1, the left side is negative output Connect the batteries by wires.	Connect the batteries by wires. The right terminal of the battery No.4 connects with the wire of cabinet. The right terminal of the battery No.1 connects with the wire of cabinet.

	
Connect the communication cable. Communication cables proceed from the first port to the last in series. The left communication cable of the battery No.4 connects with the communication cable of cabinet.	When everything is ready, cover the side plate.

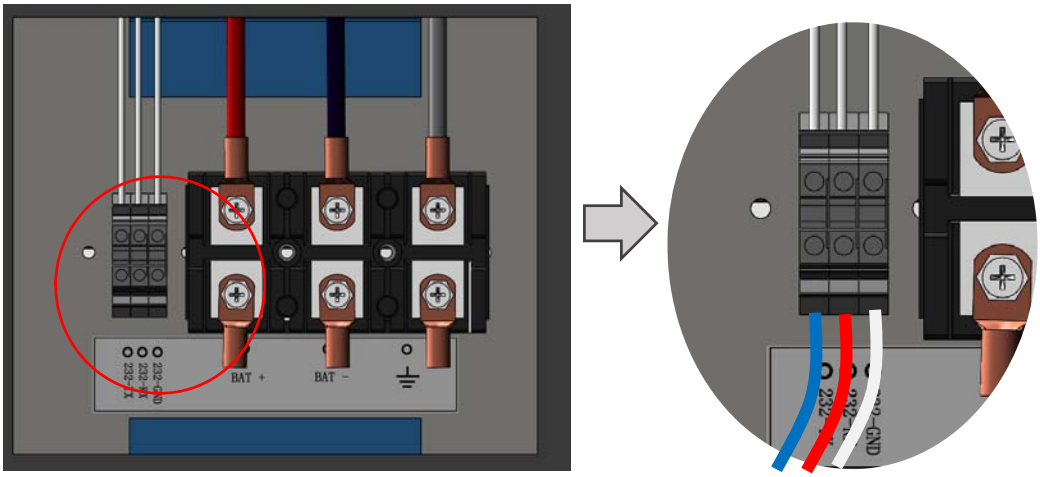
5.4 Connect to inverter

Open the back cover, you can see the power terminal and communication terminal.

5.4.1 RS232 cable connection

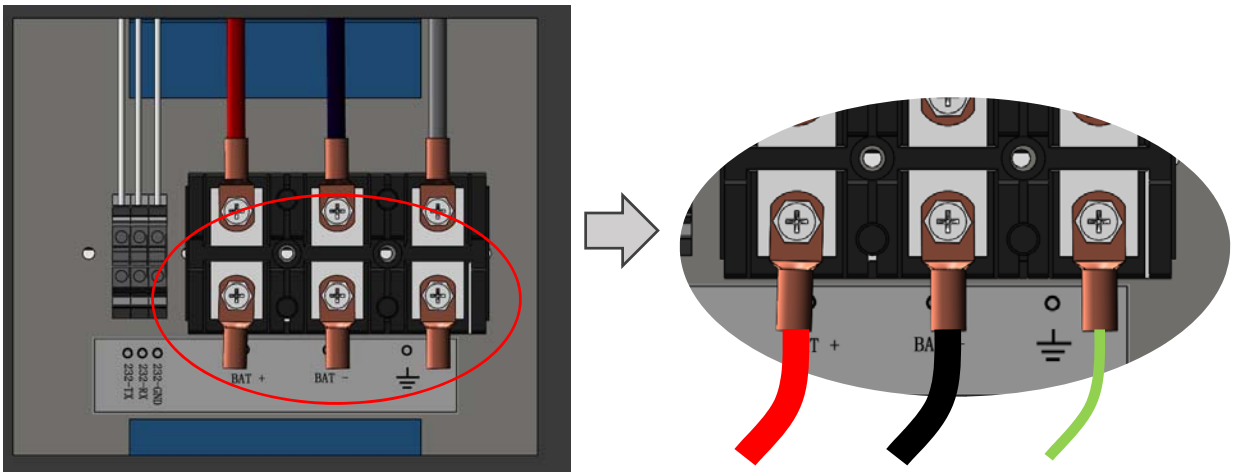
When installer does “RS232” ports connections between RS-Box and inverter, please refer to below drawing.

232-TX	Blue wire
232-RX	Red wire
232-GND	White wire

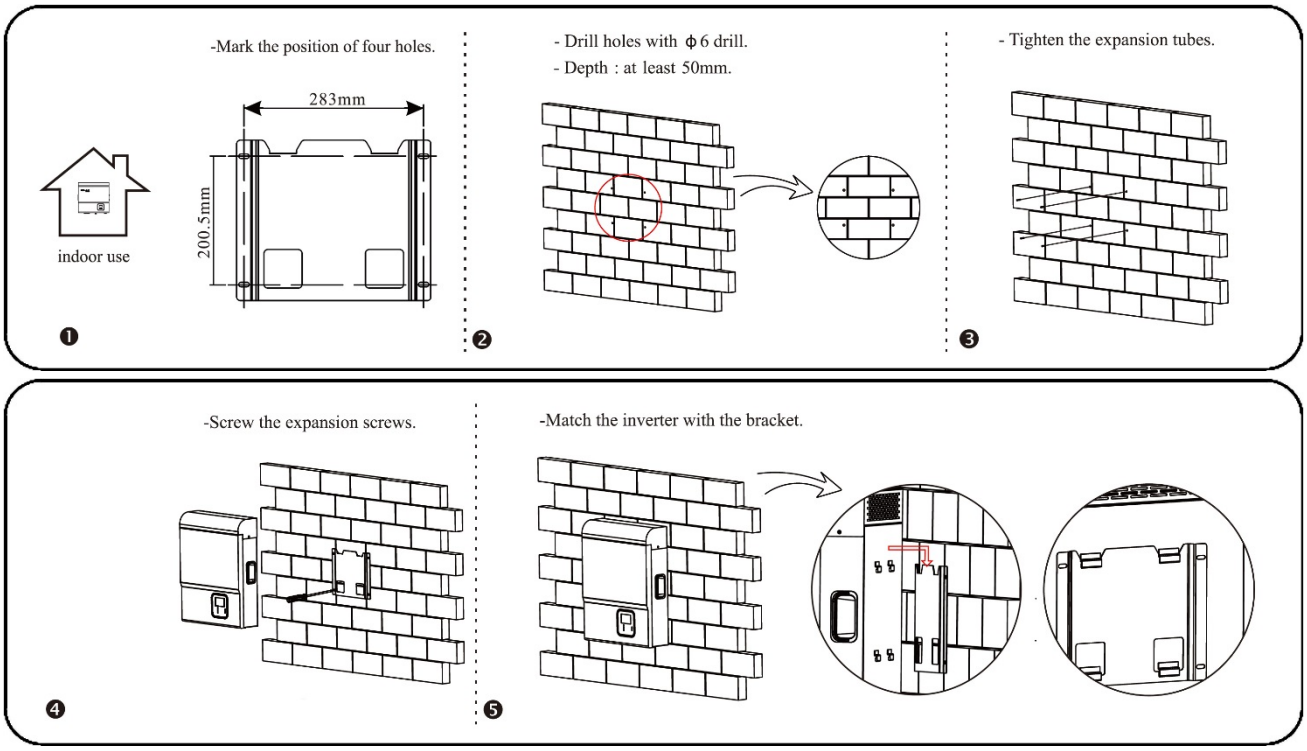


5.4.2 Power cable connection

The inverter contains a power cord connected to the battery. The red line connects with the positive (+), the blue line connects with the negative (-), tighten the screw clockwise. GND is made from 12AWG wire, tighten the screw clockwise.

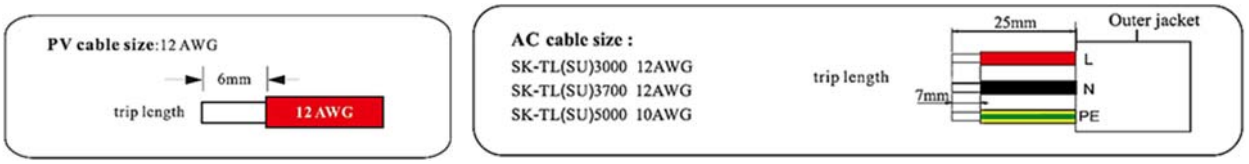


6 INVERTER INSTALLATION

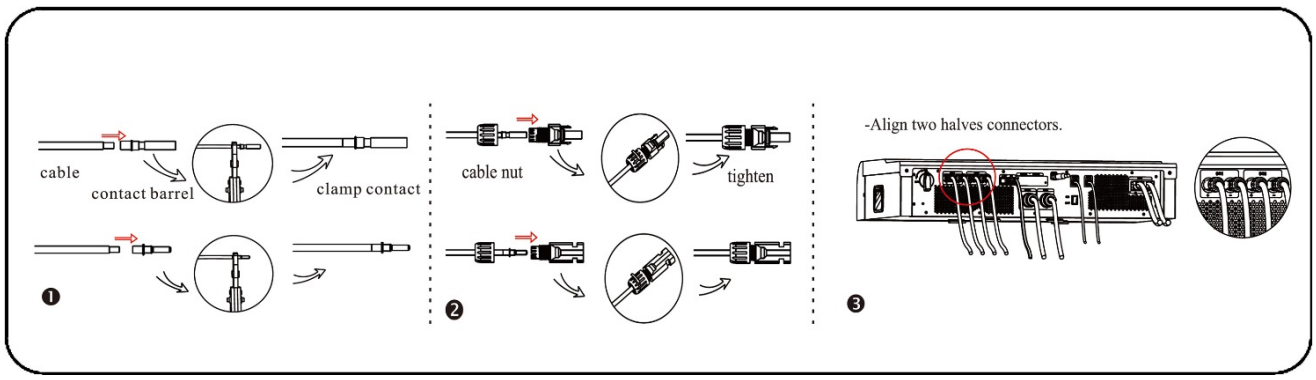


7 PV AND AC CONNECTION

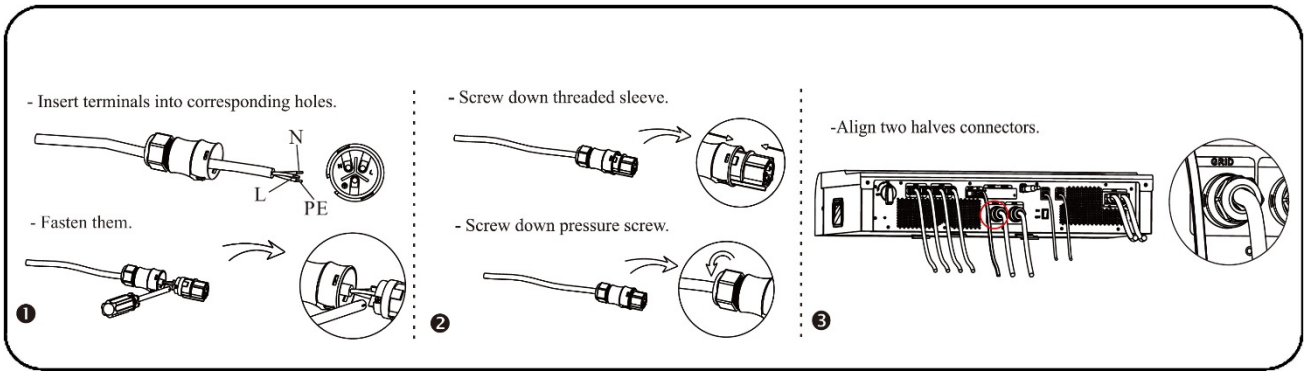
7.1 Cable size



7.2 PV connection steps



7.3 AC connection steps



8 APP USE

8.1 Preparation

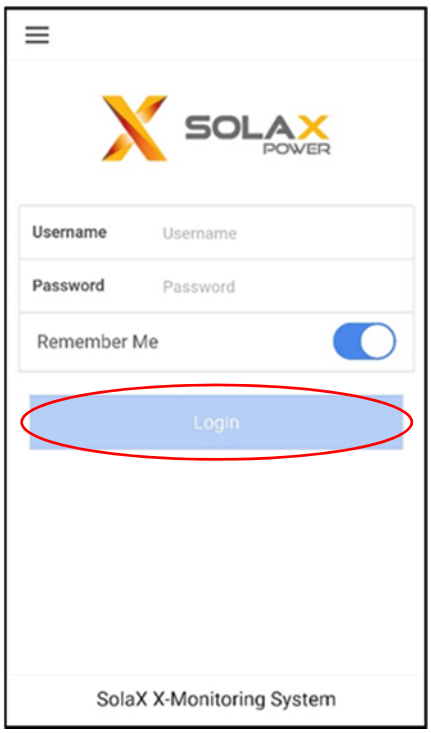
i. Confirm your registration is completed (See “User registration and Sign-in”).
ii. Make sure your mobile phone or tablet within the network state.

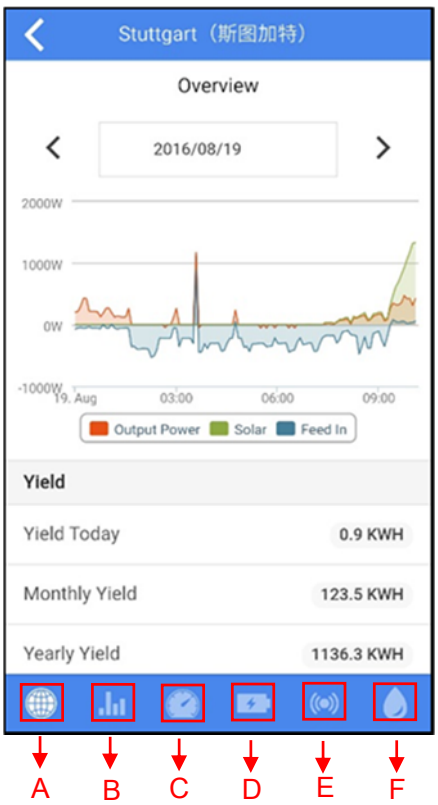
8.2 Download the APP by scan the QR code below

IOS Android Webapp

IOS: https://itunes.apple.com/cn/app/Worktile/id877984901
Android: http://www.solax-portal.com/downloads/android/solax.apk
WebAPP: http://www.solax-portal.com

8.3 Input user name and password, then click "Login"



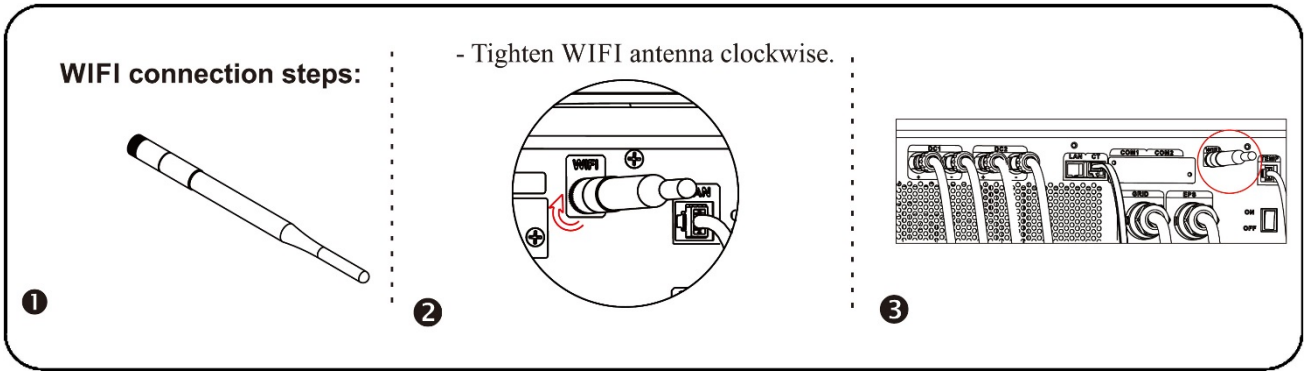


NO.	Function
A	Over view of your site
B	Yield/Consumption/Energy balance
C	Device in your site
D	Information about the battery
E	Device/Battery alarm information
F	Weather report (You should set the geographic coordinates first)

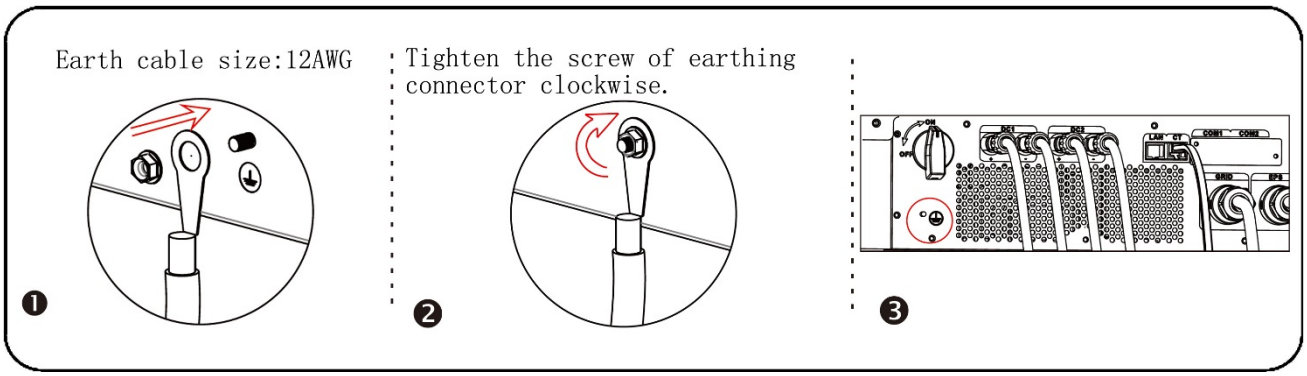
9 WIFI EARTH AND CT CONNECTION

CT- Current sensor

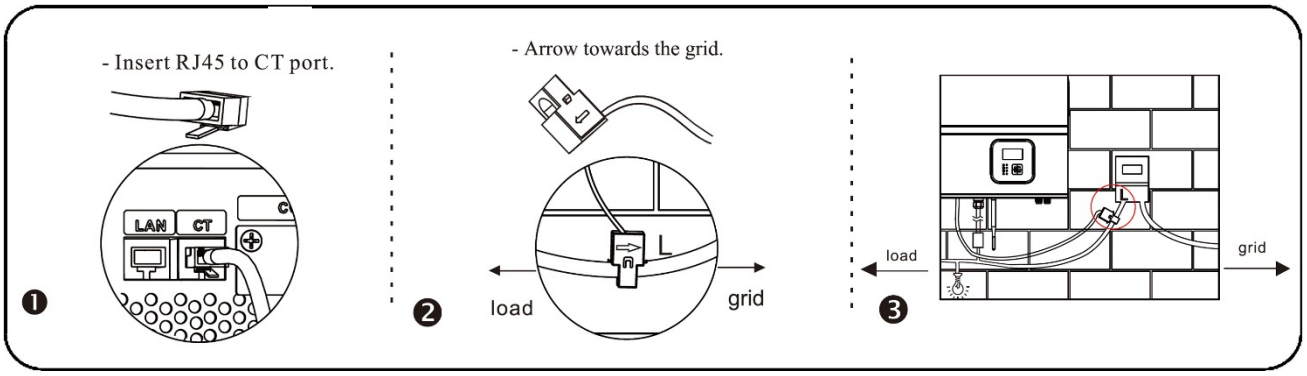
9.1 WiFi connection steps



9.2 Earth connection steps

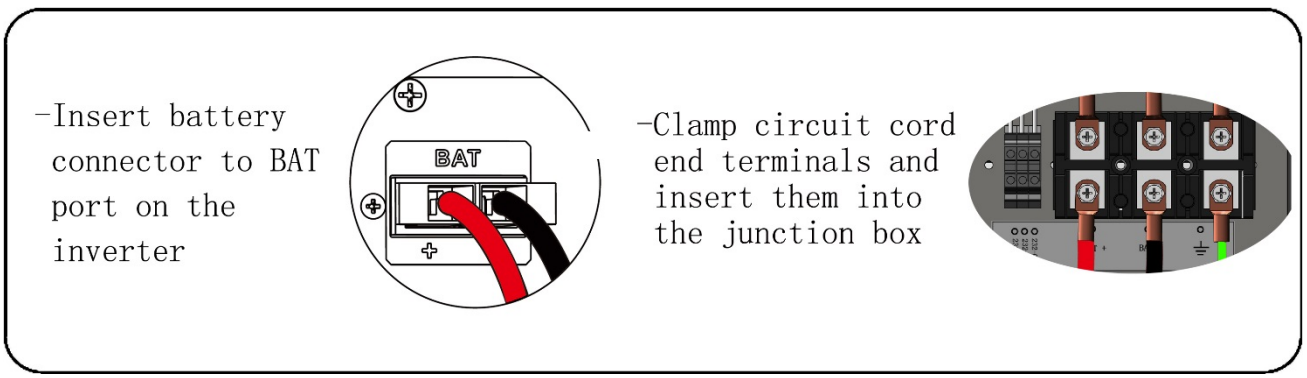


9.3 CT connection steps



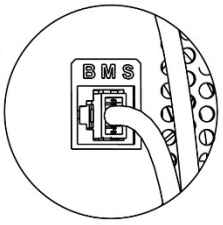
10 BATTERY CONNECTION

10.1 Power connection

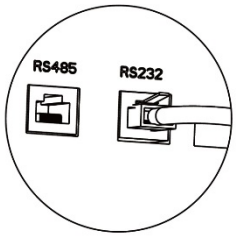


10.2 Communication connection

- Insert RJ45 side of cable into BMS port on the inverter .
Note:This communication cable is provided with battery.

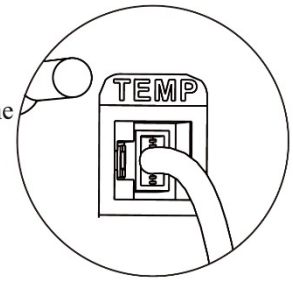


- Connect the other side to RS232 port on the battery.

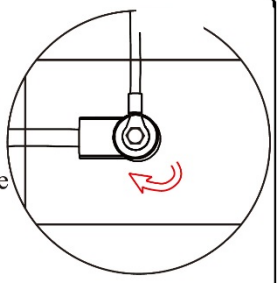


10.3 Thermal sensor connection

-Insert RJ45 side of cable into the TEMP port on the inverter.



-Place the ring side of thermal sensor near the battery.
(for sampling ambient temperature of battery)



11 EPS CONNECTION

EPS-Emergency power supply

11.1 EPS connection steps

Please refer to AC connection steps for EPS N & L line wiring (please noted that the PE line is not required on EPS installation).

11.2 EPS wiring diagram

The below diagram are for reference based on different local wiring rules, please follow the local rules for the external wiring to choose suitable wiring mode. (Diagram A: Neutral line of alternative supply must not be isolated or switched. Diagram B: Neutral line of alternative supply can be isolated or switched.)

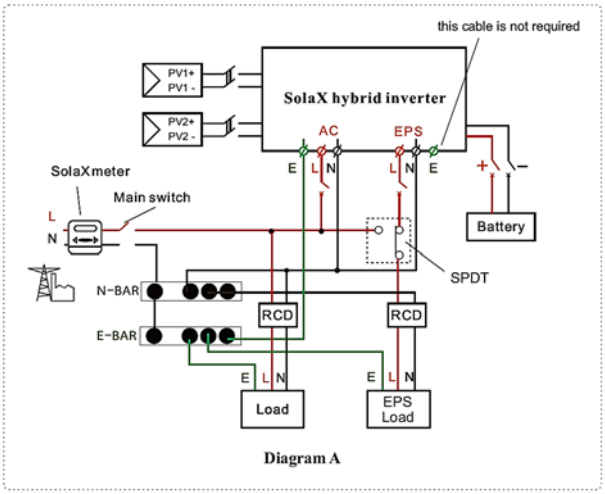


Diagram A

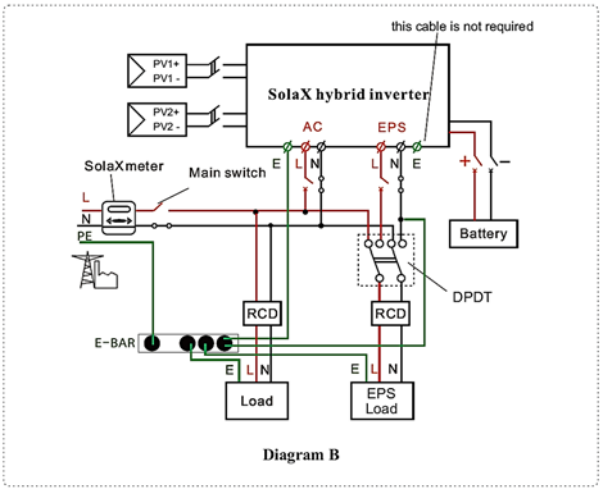


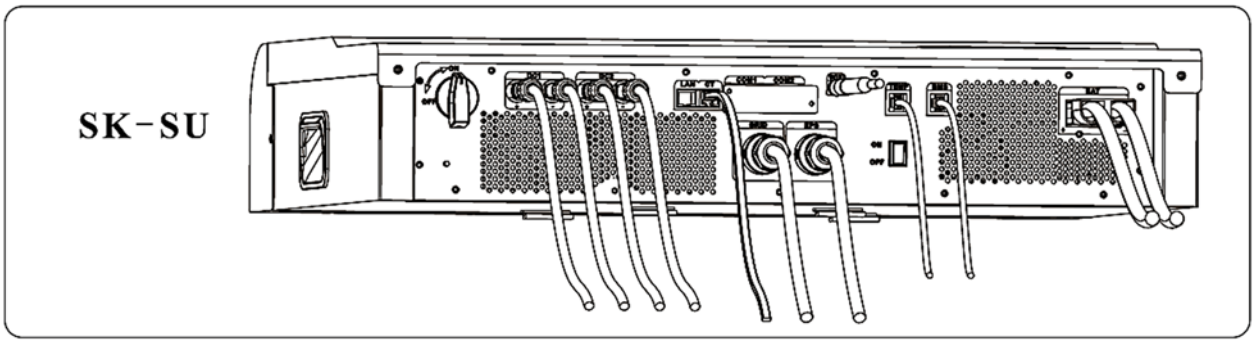
Diagram B

---It is a manual method to achieve EPS function.

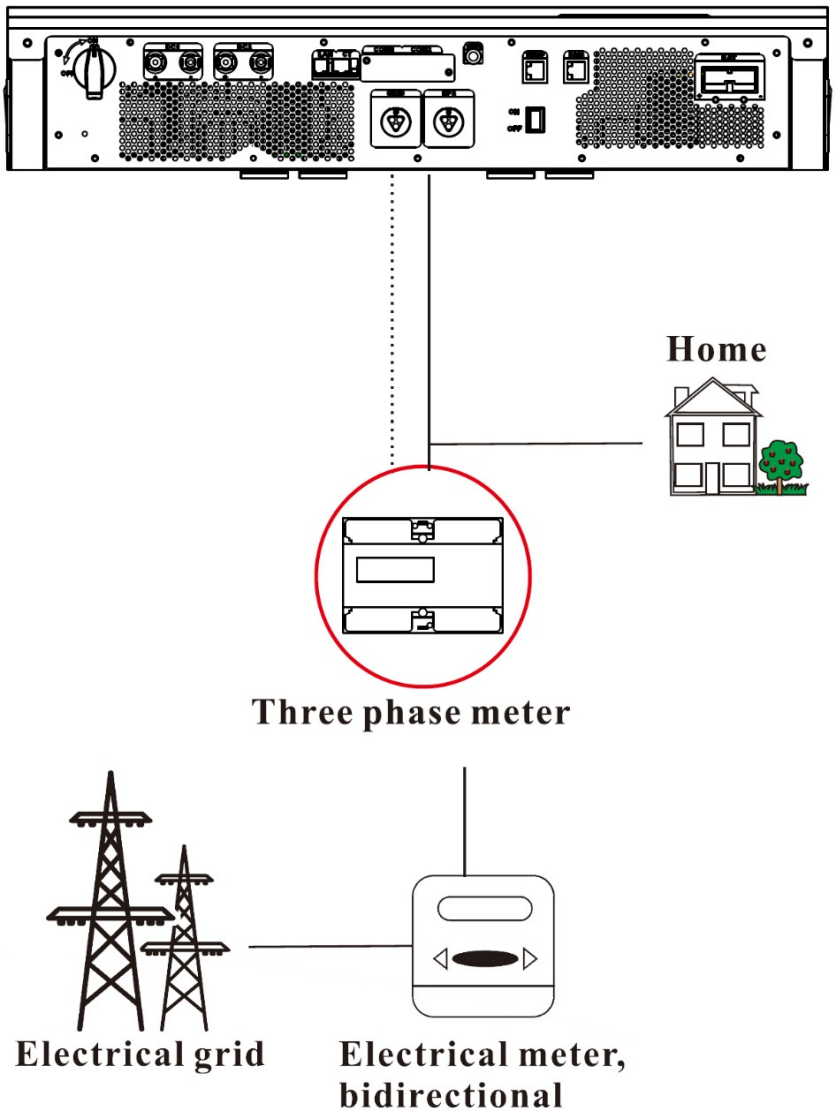
---An external switch needs to be installed, which should be suitable with EPS output current.

---If user wants to achieve EPS function automatically, please contact SolaX, SolaX can provide detailed technical solution.

12 OVERVIEW OF CONNECTION

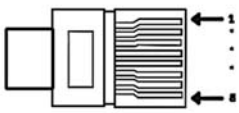


13 THREE PHASE METER INSTALLATION (DTS238-7)



13.1 Make data line to connect meter and inverter

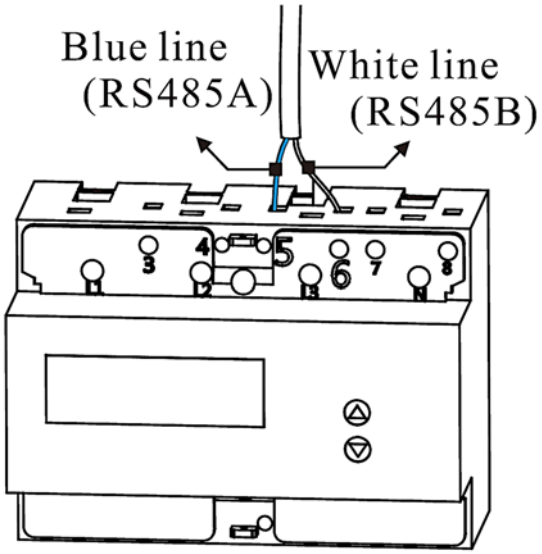
Insert communication cable into RJ45 connector following PIN definition rule.



Pin	1	2	3	4	5	6	7	8
Meter	×	×	×	RS485A (Blue)	RS485B (White)	×	×	×

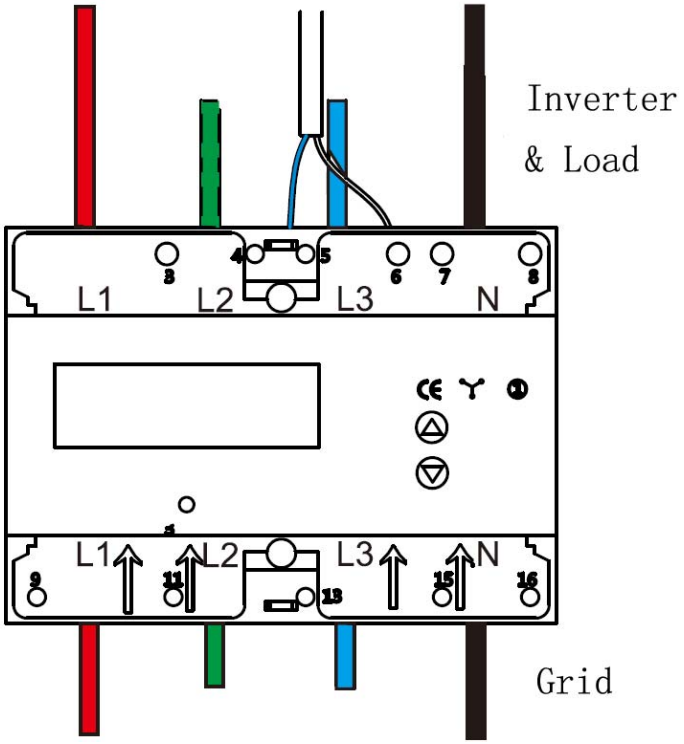
13.2 Connect communication cable between meter and inverter.

Connect RJ45 to the CT port of the inverter, and wire the other side to the meter as below.
White line connect to Port 6. Blue line connect to Port 5.



13.3 Connect power cable between meter and inverter

Choose a pair of L-wire ports (same colors as picture) as L-wire connection ports.
The black wire ports are as N-wire connection ports.
AC wires and load wires should be connected in parallel at the inverter & load side.
Arrow towards the inverter & load side.

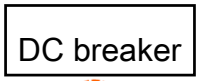


14 INVERTER POWER ON/OFF PROCEDURE

14.1 Inverter boot steps

Step 1: Turn on AC & EPS breaker.

Step 2: Turn on DC breaker.



Step 3: Turn on DC switch.

Step 4: Turn on battery switch.

Step 5: Turn on inverter switch.

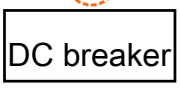
14.2 Inverter power off steps

Step 1: Turn off inverter switch.

Step 2: Turn off battery switch.

Step 3: Turn off DC switch.

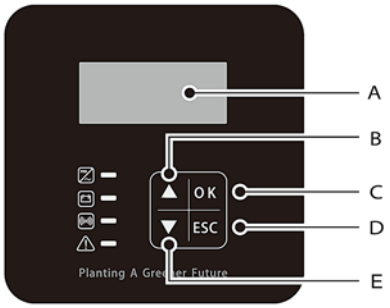
Step 4: Turn off DC breaker.



Step 5: Turn off AC & EPS breaker.

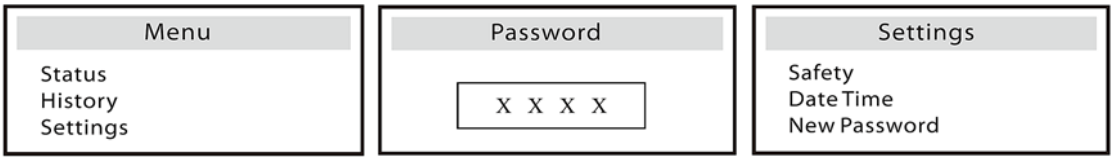
15 INVERTER PROGRAMMING GUIDE

Control Panel

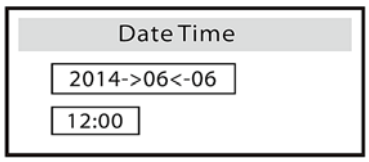


Object	Name	Description
A	LCD Screen	Display the information of the inverter.
B	Function Button	Up button: Move cursor to upside or increase value.
C		OK button: Confirm the selection.
D		ESC button: Leave from current interface or function.
E		Down button: Move cursor to downside or decrease value.

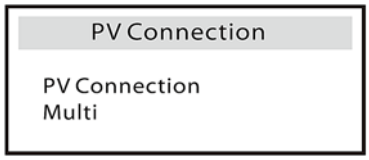
Enter the setting interface, obtain setting password from your distributor.



Set date time



Set PV connection



Comm.: Single MPP track, dual MPPT work together.

Multi: Muilt-MPP track, dual MPPT work independently.

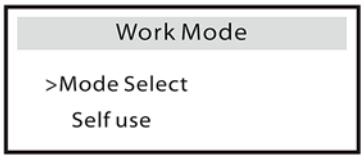
Set export control

00000 means none export.

Set work mode

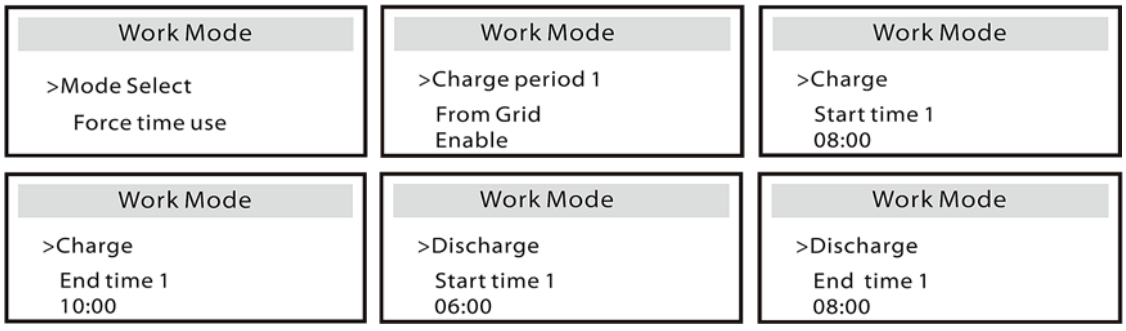
Self use mode

In this mode, the priority of the PV generated power is: local>battery>public grid.



Force time use mode setting

In this mode you can set two periods of charging and discharging time according to your wishes and can choose if charge from grid.

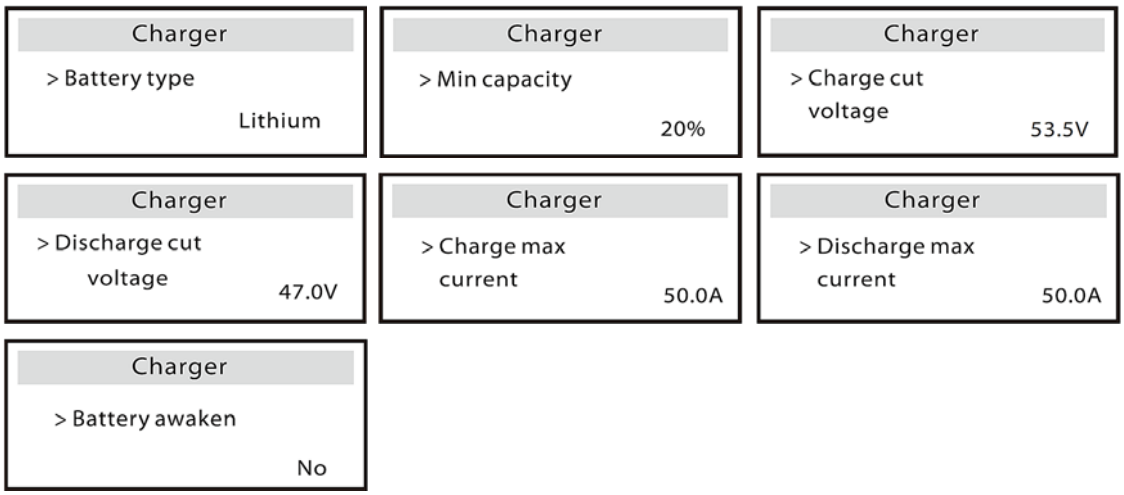


Set charge

With BMS connection, system will convert to lithium battery mode and update the default value automatically as below.

You can also set the parameters according to battery's requirements manually.

Battery awaken means if battery voltage drops too low that cannot work, please choose "Yes" to charge battery. (The BUS voltage must excess 300V)



Set EPS

-Mute option can be set “No” or “Yes”.

No means there is a beep happened while system under EPS mode.

Yes means no alert no matter is the system under EPS mode.

-Frequency can be set according to the relevant loads.

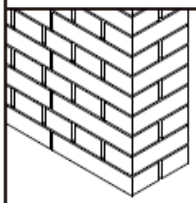
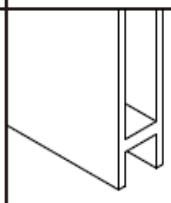
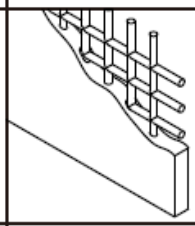
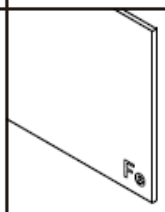
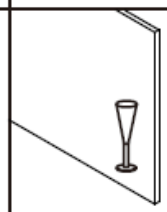
-Discharge cut voltage needs to be higher than Battery backup discharge Volt.

16 WIFI SETTING GUIDE

16.1 Preparation

i. Confirm the inverter is working properly.(the yellow light on the display is flashing)
ii. Power internet router on.
iii. Make sure the signal strength of router is strong.

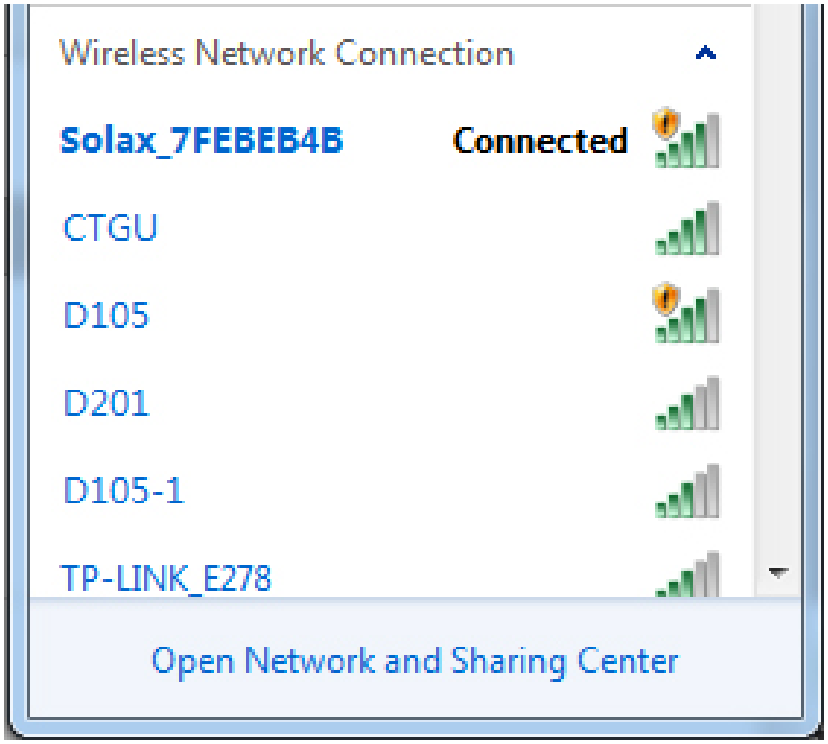
Note: The signal strength will be affected by barriers between inverter and home router.

	brick concrete	xylon	ferroconcrete	steel	plexiglas
the influence to signal strength of different material walls					
	ca.60-90%	ca.80-95%	ca.20-60%	ca.0-10%	ca.70-90%

16.2 Search and connect inverter WiFi

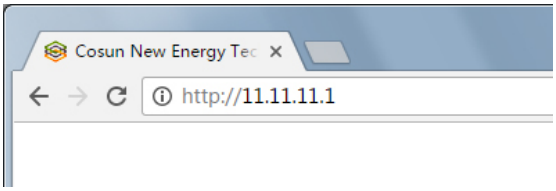
i. Use a computer/tablet to search for WiFi signal from the inverter (The SSID of WiFi signal: SolaX_xxxxxx)

ii. Connect to WiFi signal .Once connected, the computer/tablet will display as below.

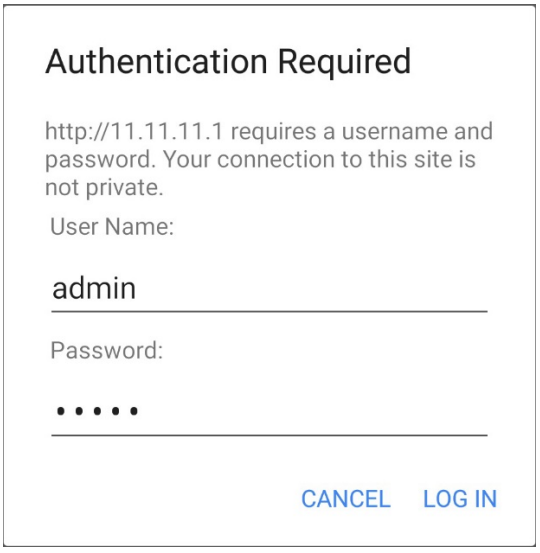


16.3 Enter the setting interface

i. Browse website: http://11.11.11.1

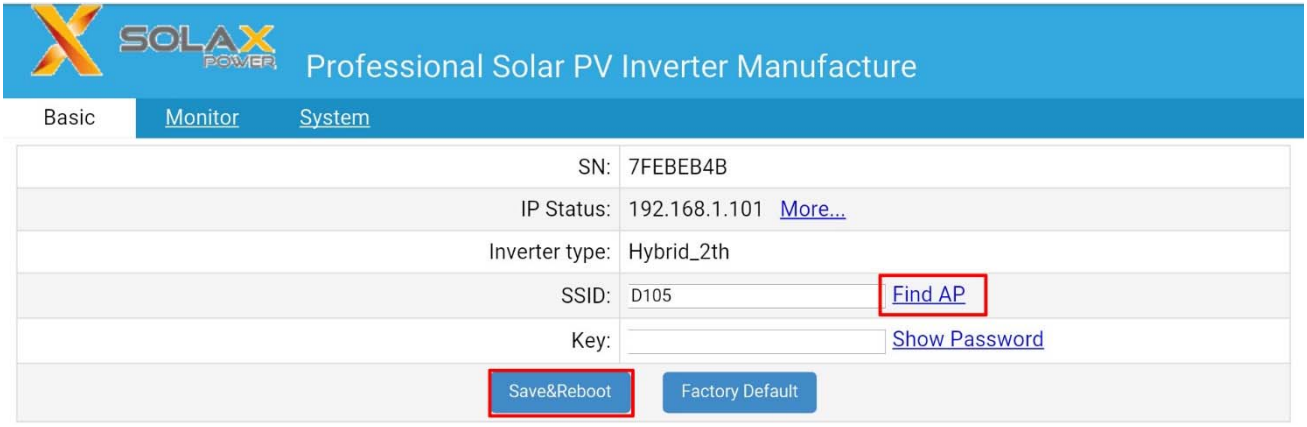


ii. Enter Username:" admin" Password: "admin”



16.4 Set network parameters

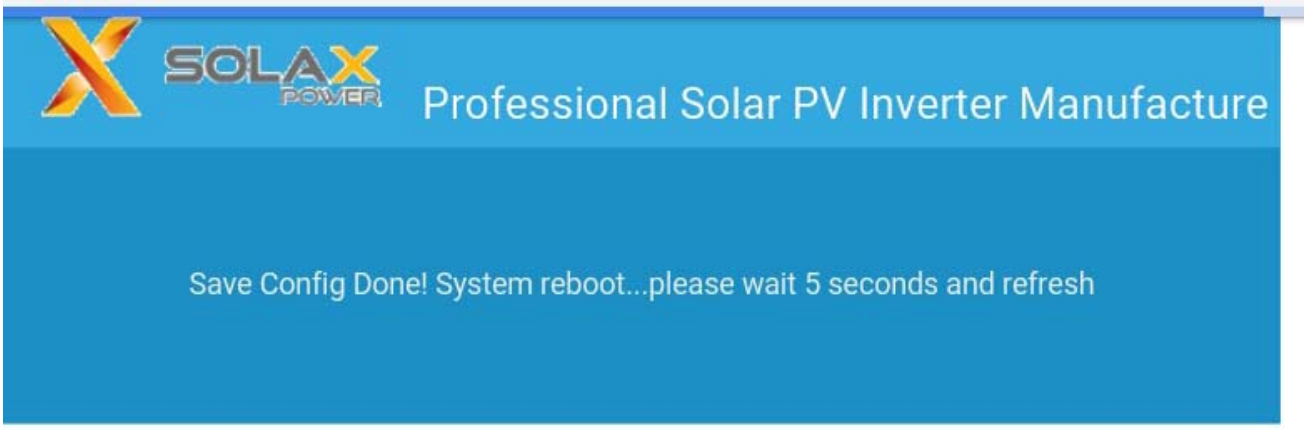
i. Connect to internet router by clicking "Find AP" or manually input home router's SSID.
ii. Enter home router's password as "key".
iii. Click "Save & Reboot".



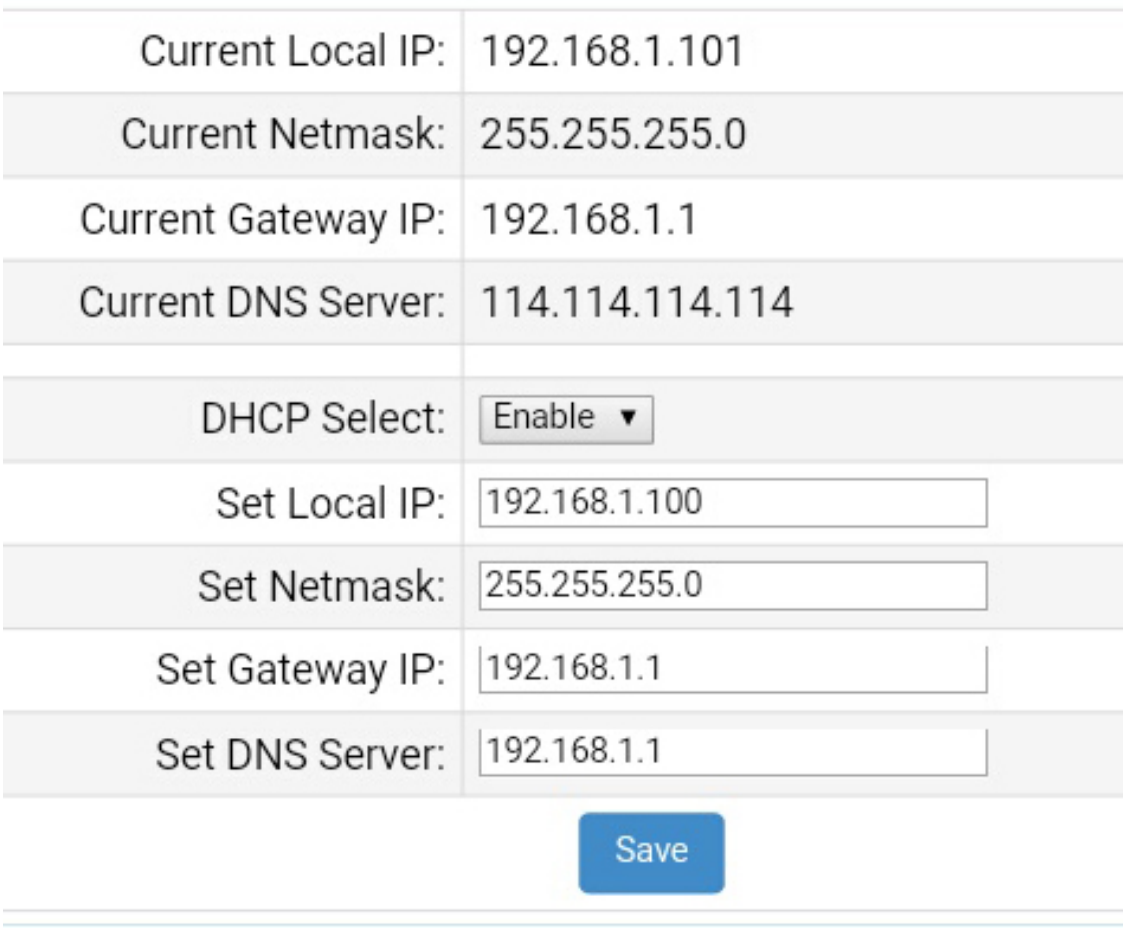
Click "Find AP" as shown below. There will be a scan page, it will search for the signal of WiFi router around. "Signal" means strength of the router.100% means the router has a good signal, 0% means the router has no signal here.

16.5 Check the connection status

i. All settings have done when below page are shown.



ii. Enter IP address"11.11.11.1"again, click the "IP Address" .If the inverter obtain the IP address from the home router as below, it means the connected successfully.



Now that connectivity is established, you can disconnect from the WiFi network on the computer/tablet you are using and reconnect to the home WiFi network ready for stage 2 of the process.

17 USER REGISTRATION AND SIGN-IN

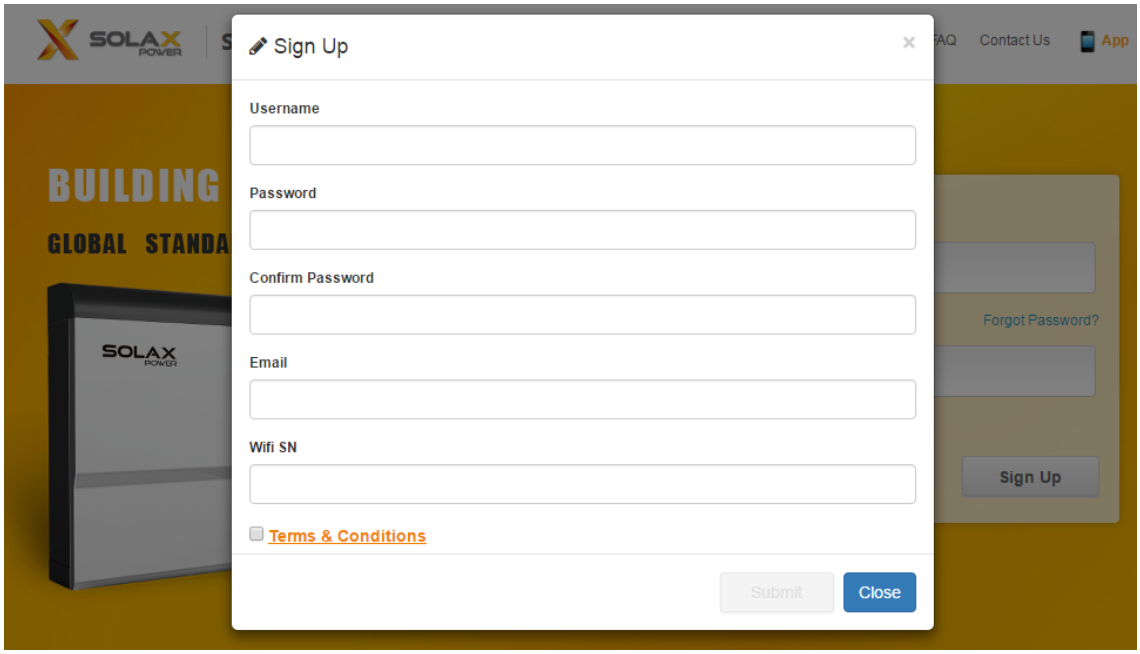
17.1 Preparation

i. Confirm WiFi configuration has done successfully.
ii. Make sure the computer or tablet within the network state.

17.2 User registration

i. Input www.solax-portal.com on web browser.
ii. Click "Sign-up" as shown below.

iii. Fill up all information shown on sign up page, then click "Submit". The registration is complete. (SN number collects from the WiFi setting network parameters page.)

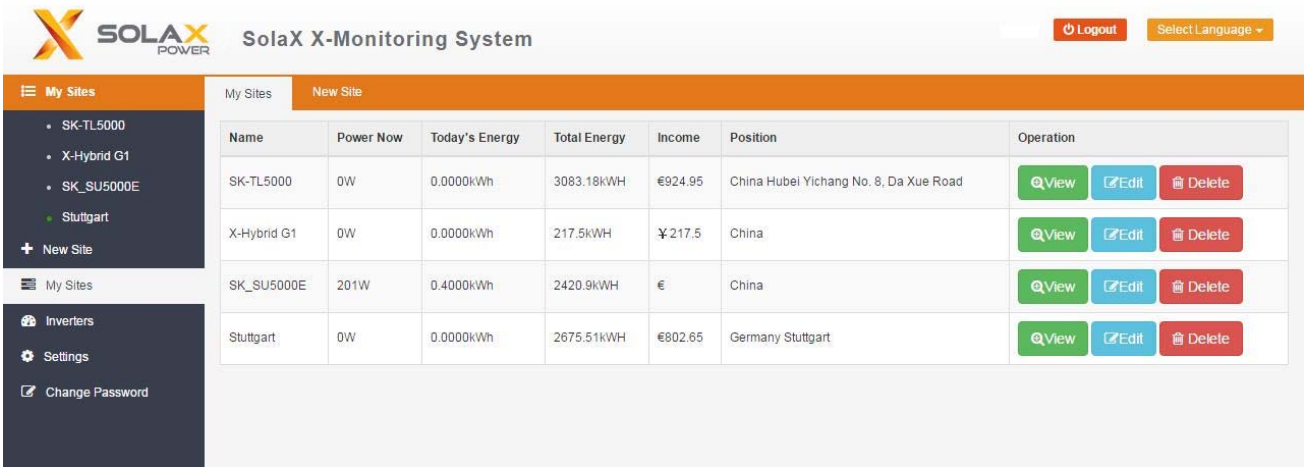


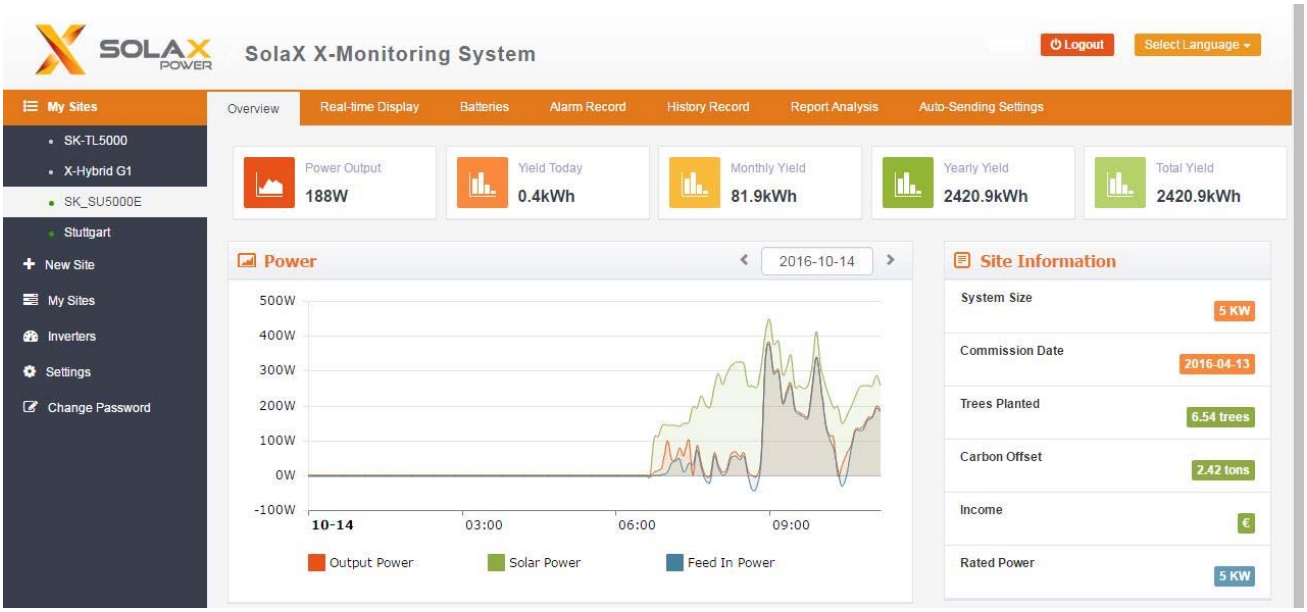
17.3 User sign-in

i. Open up www.solax-portal.com on browser.

ii. Input user name and password, then click "Login".

iii. After login successfully, users can see parameters in detail by selecting the inverter listed under "My Sites".

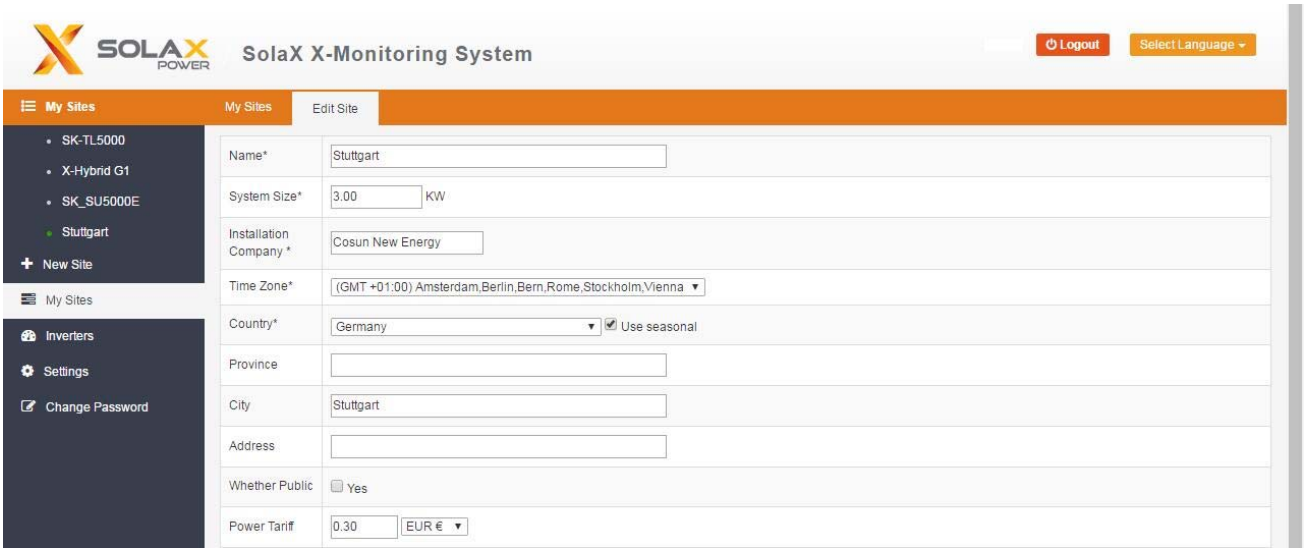




17.4 Edit and add a new site and an inverter

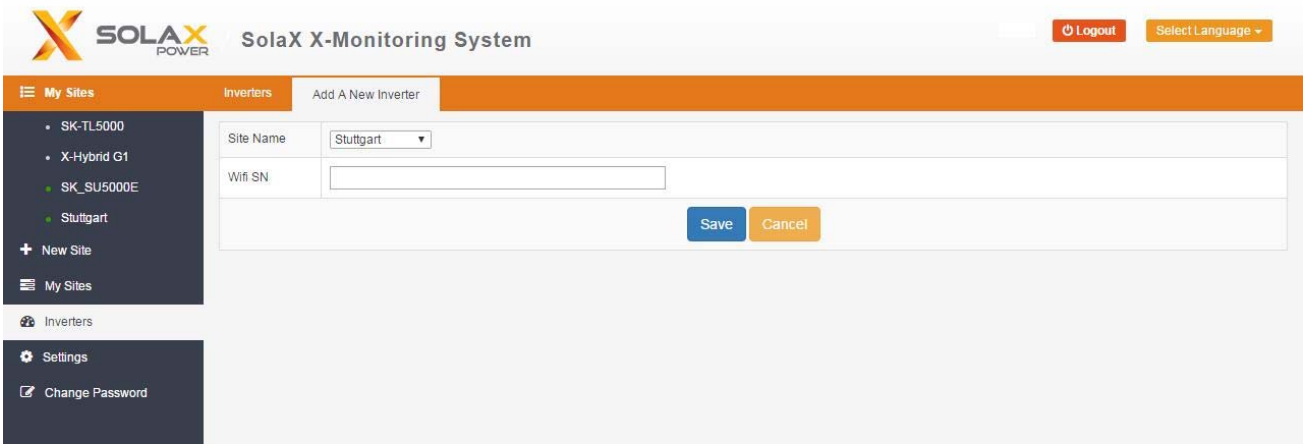
i. Edit the site—choose the site you want to edit and click "Edit" tab as below.

The page as below will display, input name, location, system size and time zone.

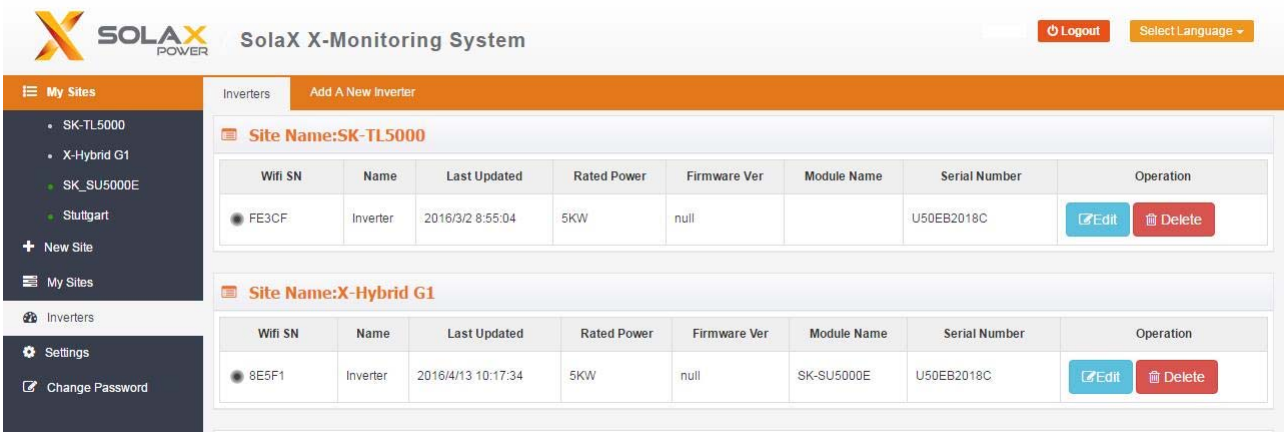


ii. Add a new site —click "+New Site" on the menu bar and the setting page is similar to editing page. It's important to input the SN of new WiFi at the bottom of the page as below.

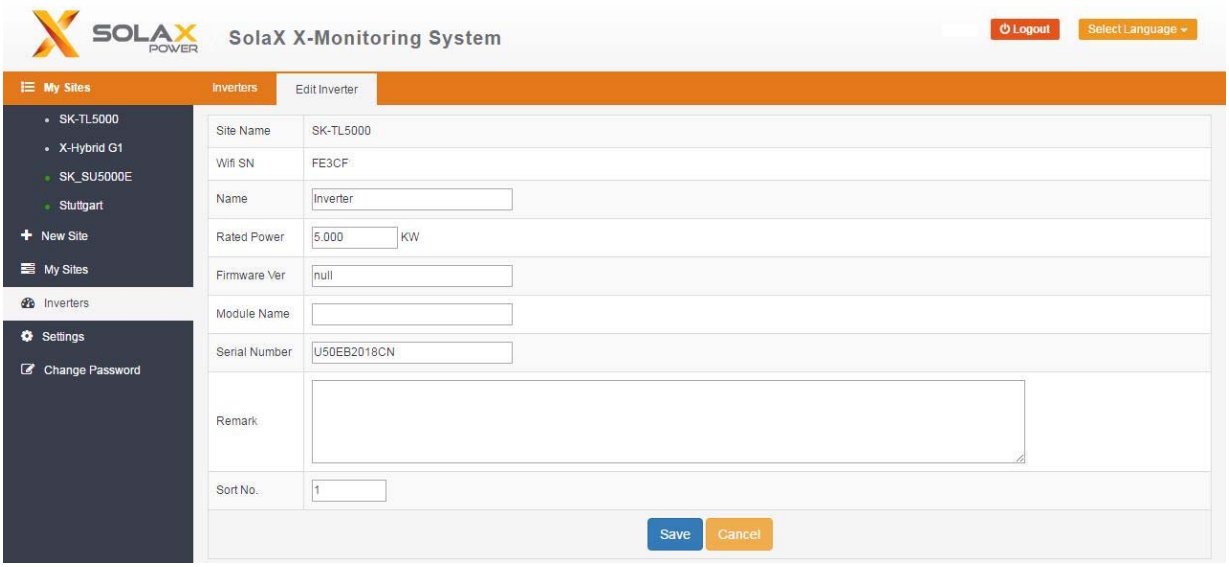
iii. Add a new inverter on one site—click" inverters" on the menu bar, then click" Add a new inverter" as below. Choose site and input SN, then click "Save" to finish.



iv. Edit the inverter—click "Inverters" on the menu bar and click "Edit" as below.

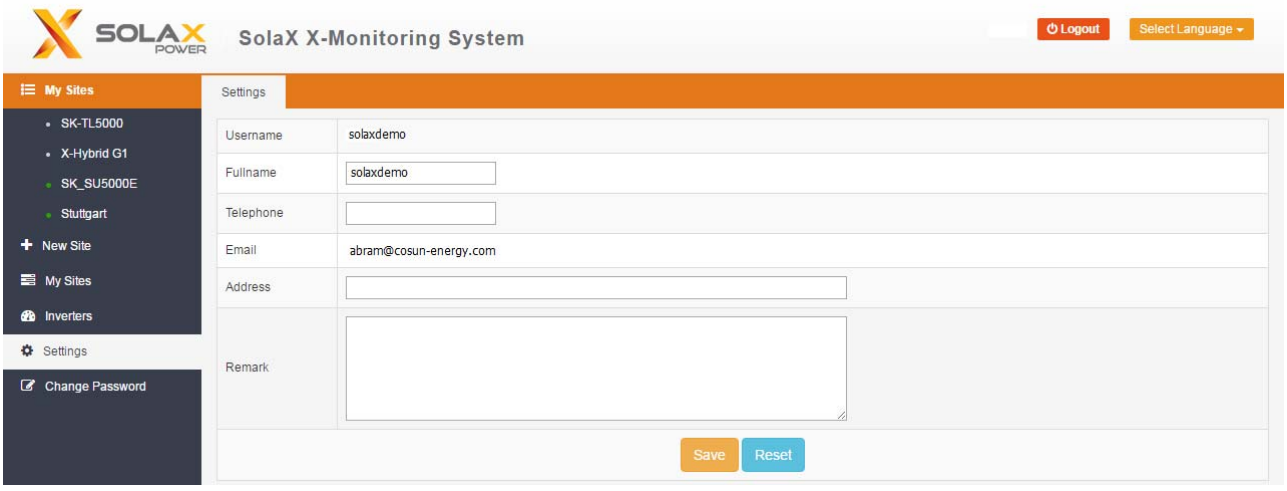


The page as below will display. Input the relevant information of the inverter, then click "Save" to finish.



17.5 User information setting

Click "Settings" on the menu, edit the user information.

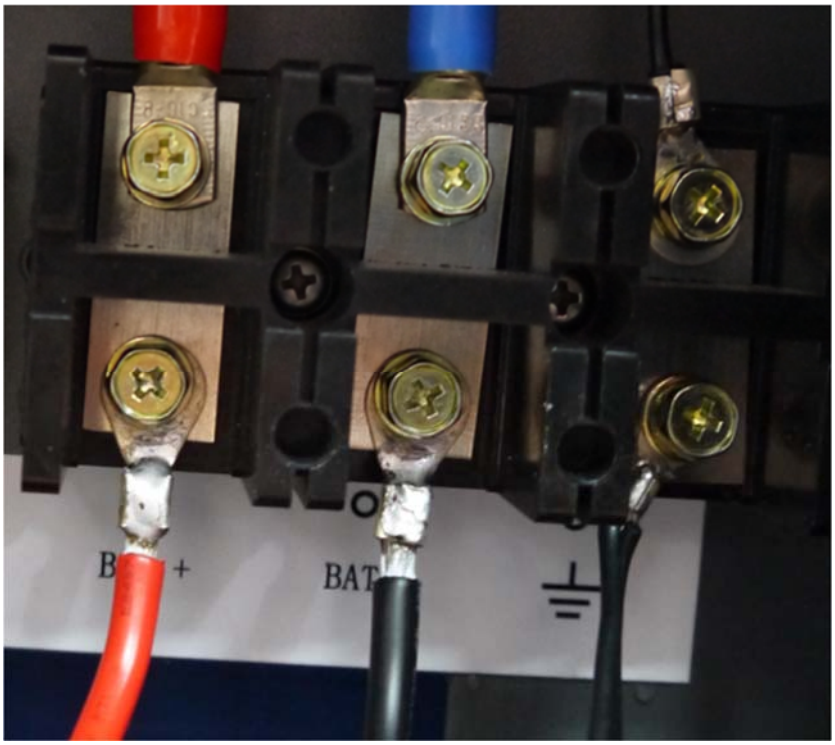


18 START SYSTEM

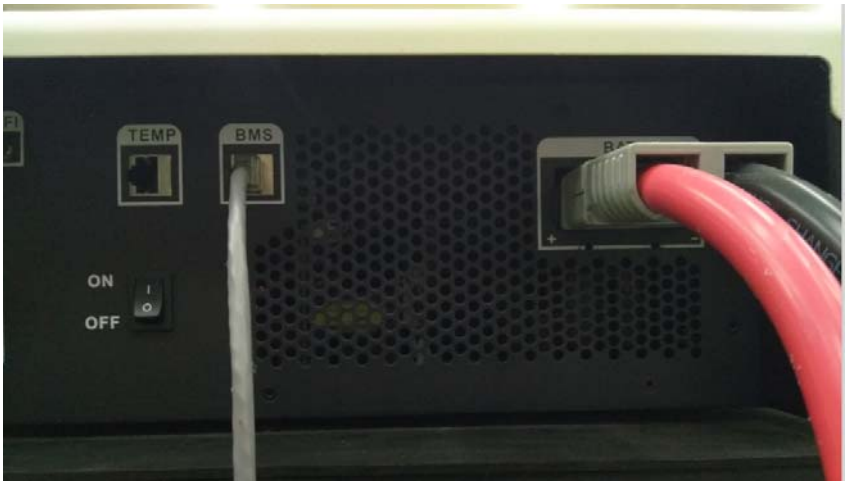
Notice: Before power on the system, operator should check the cable connection strictly till make sure of the cable connection and communication line is hard.

18.1 System activity procedures when RS-Box connect to SolaX inverter

Make sure the wiring is correct, and the battery side is as follows.



RS-Box side connection



Inverter side connection

To ensure that all the wiring is correct, start RS-Box.
Press the “ON/OFF” button on front panel of Box.
Once started, the screen of RS-Box will show status of the battery status as below:

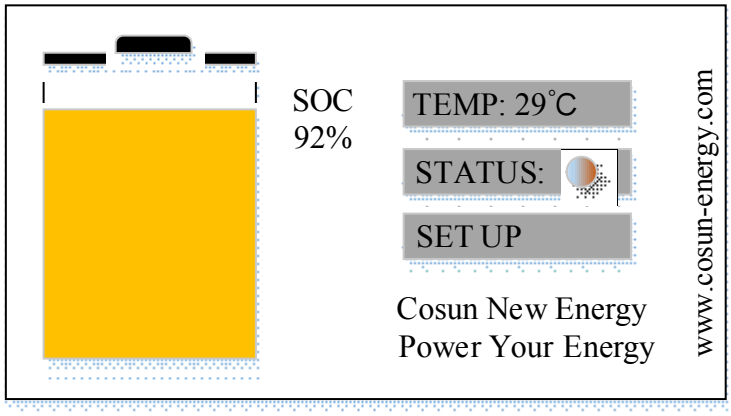


Figure 7 Display interface

The main interface is the default interface, and the battery system will automatically jump to this interface when the system started up successfully or not operated for a period of time. The information of the interface is as below. The “SOC” means state of charge; “TEMP” means the temperature of battery. “STATUS” show the status of battery system. “SET UP” is about parameter of battery.

TEMP interface

Touch the “TEMP” to enter TEMP interface. The interface show some parameters of battery.

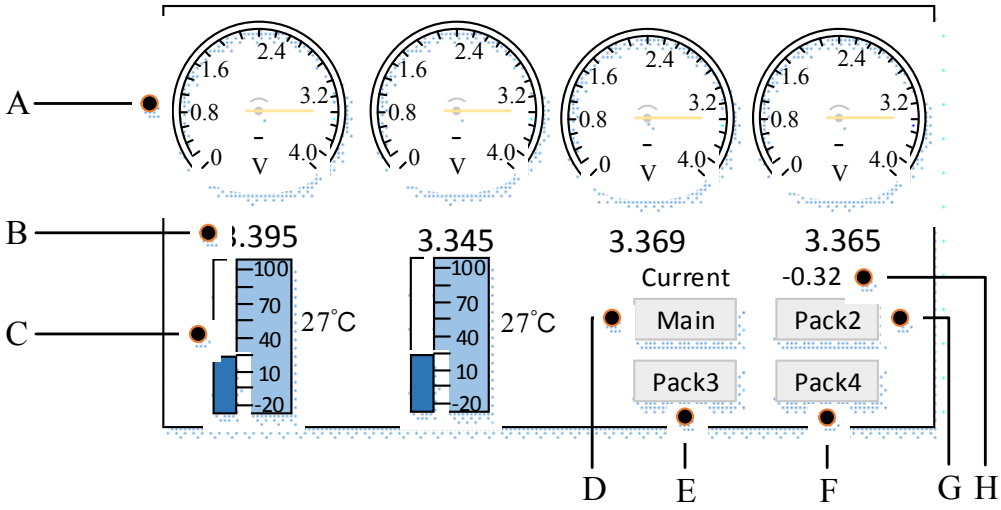


Figure 8 battery message interface

RS-Box has four 12V, 80 or 170Ah lithium iron phosphate batteries in series. Each battery contains 4 block which paralleled lots of cells. The cell nominal voltage is 3.2V. There are two temperature probes to measure temperature in each battery.

Table 5 technical noun explanation

No.	Name	Function
A	Four block voltage	The voltage of individual block in each battery is displayed by analog dial.
B	Four block voltage	The voltage of individual block in each battery is displayed by digital dial.
C	Temperature of this battery	Temperature in current battery.
D	Return to main interface	Return to main interface.
E	Pack2	Touch it can show the information of second battery.
F	Pack3	Touch it can show the information of third battery.
G	Pack4	Touch it can show the information of fourth battery.
H	Current of battery	Charge and discharge current of the battery, the charging current is +, and the discharge is -.

●STATUS interface

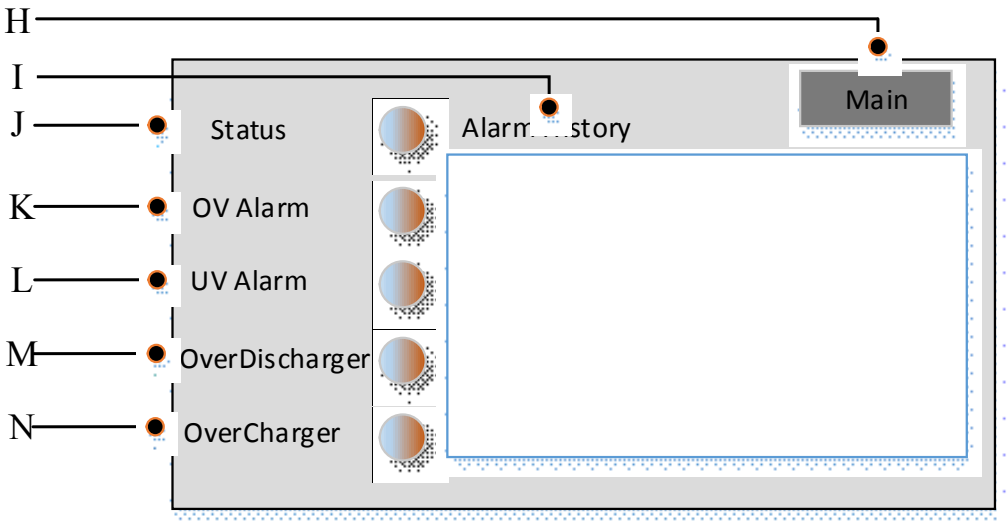


Figure 9 alarm interface

Table 6 technical noun explanation

No.	Name	Function
H	Return to main interface	Return to main interface
I	Alarm history	History of alarm
J	Status	Status
K	Over voltage alarm	Over voltage alarm, flashing when the charging voltage is higher than the protection value
L	Under voltage alarm	Under voltage alarm, flashing when the discharge voltage is lower than the value of protection
M	Over discharger	Over charging alarm, flashing when the charging current is higher than the value of protection
N	Over charger	Over discharge alarm, flashing when the discharge current is higher than the value of protection

19 STOPPING THE SYSTEM

19.1 Stopping the system when RS-Box working with SolaX inverter

To stop the system, press OFF button on the inverter. The inverter is closed, then press the button of RS-Box for several seconds until you hear ‘Snapped’.

20 NORMAL ALARM AND SOLUTION

20.1Normal alarm and solution display on RS-Box

Display on screen	Reason	Solution
OV Alarm	Over voltage alarm	Reduce the charging voltage
UV Alarm	Under voltage alarm	Stop discharge and charge it
OverDischarger	Over discharger	Reduce the discharging current
OverCharger	Over charger	Reduce the charging current