



User Manual

Solar Power Storage System

Inverter: SK-SU5000E

SK-SU3000E

Battery system: RS-Box 4100

RS-Box 8700

20161121

Version: 1.1

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1 INFORMATION IN THIS MANUAL

1.1 About this manual

This user manual introduces the RS-Box product information, using guidance, safety caution items and normal failure and actions can be done by user. When using the RS-Box, if had any abnormal failure or urgent occurs, please contact with the after service center.

1.2 Target Group

This user manual applies for the RS-Box 4100, RS-Box 8700.

1.3 Intend usage

The RS-Box can be used in household energy storage application, includes on grid system. It can be used in conjunction with the photovoltaic inverter.

1.4 RS-Box & RS-battery definition

COSUN battery box products- RS-Box 4100~RS-Box 8700are defined as below:

RS-Box: Battery-Box

RS-Battery: battery unit with nominal voltage is 12V, will be installed inside the cabinet as an energy storage module.

1.5 Identifying the Product

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

Product Name:

Product Type:

Voltage range:

Nominal charge/discharge current:

Nominal capacity:

Operation temperature range:

Certification marks:

2 SAFETY

2.1 Safety precaution

Warning, notice and caution

Users are kindly requested to use the battery which is delivered from COSUN COMPANY LIMITED in strict accordance with the Datasheet and remarks include at the end of the document.

COSUN COMPANY LIMITED will not guarantee against any accidents occurring due to use outside those written in this Datasheet.



WARNING



Do not crush, Dispose according to safety regulations (Do not dispose in fire or water).
Recharge Battery at least every 6 months (incl. when in storage).
Once discharged, recharge battery within 48hours.
Do not expose to temperatures above 55°C.
Must be grounded correctly. Do not put front panel face down.
Do not short, reverse polarity or connect in series.
Disconnect from power and load before maintenance.
May only be used by qualified professionals.

NOTICE

Inadvertent operation of damaged RS-Box can lead to a hazard situation that may result in serious injury due to electrical shock. Only can operate RS-Box when it is technically faultless and in an operationally safe stat. Regularly check the RS-Box for visible damage. Make sure that all safety equipment is freely accessible at all time. If RS-Box is damaged, do not touch it.

Please contact your after sale service if a significant event message is shown on LCD or APP of inverter, please immediately contact your after service center.

CAUTION

Li-ion battery inside, when disassemble the system, do not intentionally short the positive(+) and negative(-) terminals with metallic objects.

All works on system and electrical connections must be carried out by qualified personnel only.

A potentially hazard circumstance such as excessive heat or electrolyte mist may occur due to incorrect operation, damage, abuse. The safety precautions and the warning messages described are not fully understood, or if you have any questions, please contact after service 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.

When transport the system with package type, remove the battery from cabinet and transport them separately.

2.2 Safety guidelines for installation

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 4100~8700, please use hard package and do safety protection when transport, please also pay attention to the safety to avoid human damage.

3 TECHNICAL PARAMETERS

	RS-Box 4100	RS-Box 8700
Battery Type	Lithium Iron phosphate battery	
Battery module type	RS- Battery	
Rated battery energy (0.2C charge & discharge at @+25°C)	4.1 kWh	8.7 kWh
Output power	Max 3kW	Max 6kW
Usable battery energy	3.69kWh	7.83kWh
Nominal voltage	51.2V	
Charging efficiency	99 %	
Working voltage range	49.5V-54.5V	
Communication	RS232	
Cabinet Net Dimension	Width 330* depth 540* mm height 800 (Without anchor bolt)	
Net Weight	70Kg	110Kg
IP level	IP20	

RS-BOX must be working in the requirements of the ambient temperature, charge and discharge temperature requirements are as follows.

Charge temp. (°C)	Normal current(A)	
	RS-Box 4100	RS-Box 8700



0~45°C	40	80
Discharge temp. (°C)	\	
-10~60°C	40	80

4 TECHNICAL NOUN EXPLANATION

No.	Terms	comment
1	Discharge	Battery output power to load or other equipment
2	Charge	Battery get power from power supply(such as DC charger)
3	Full charged	Battery had been full charged, SOC is 100%.
4	Idle	Battery is on status of neither charge nor discharge and had not full charged.
5	Shutdown mode	Power off
6	SOC	Status of capacity
7	Battery voltage	The voltage between B+/B-
8	Pack voltage	The voltage between P+/P-
9	Cell voltage	single cell voltage
10	Failure	Battery or BMS are broken, to need change new unit
11	Alarm	Battery will stop charge or discharge immediately
12	Protect	Battery stop charge or discharge (e.g cell is over voltage), and it is resumable.

5 PRODUCT OVERVIEW

5.1 RS-Box System Brief introduction

RS-Box is the name of battery box, as the energy storage part in the electric power system in household, the box carries COSUN's lithium iron phosphate battery with excellent performance.



Figure 1 External drawing



Figure 2 Internal drawing

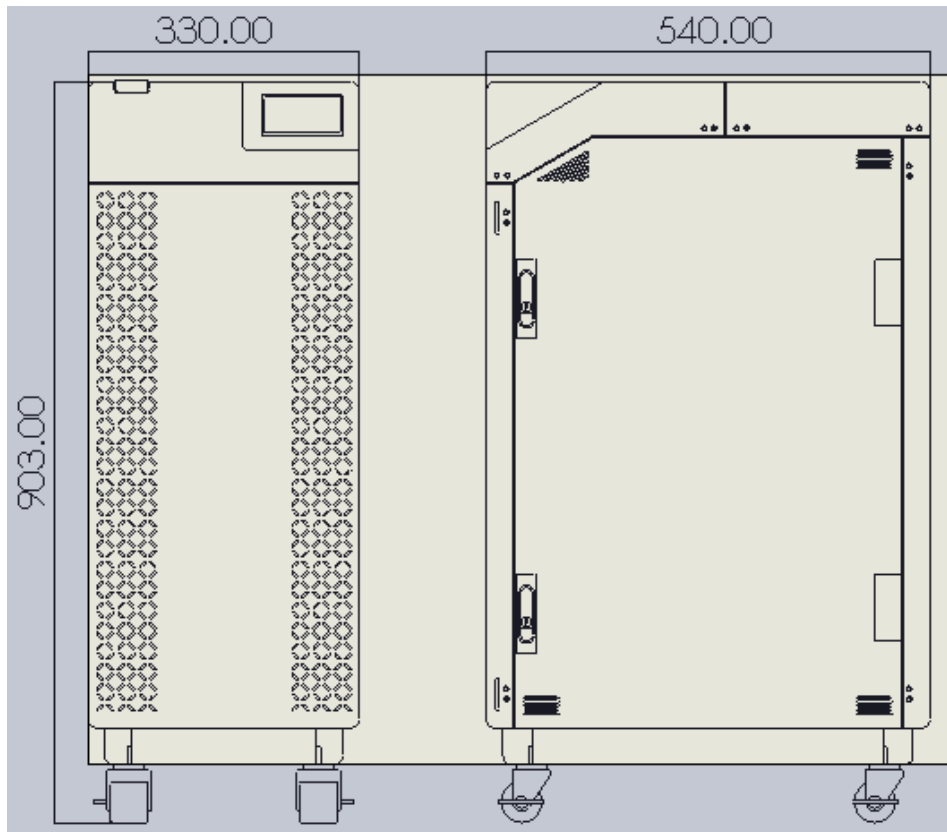


Figure 3 Structure dimension drawing

5.2 RS-Box configuration table

Table 1 configuration list

No.	Component	Name	Description
1	Cabinet	RS-Box Cabinet	The Cabinet to install the Box-battery inside and provide DC output
2	Battery	RS-Battery	Battery module with 12V170Ah/80Ah.
3	BMU	BMU	Battery management unit. Provide communication with external equipment.
4	Key	Key	ON/OFF the system



5.3 RS-Box System diagram

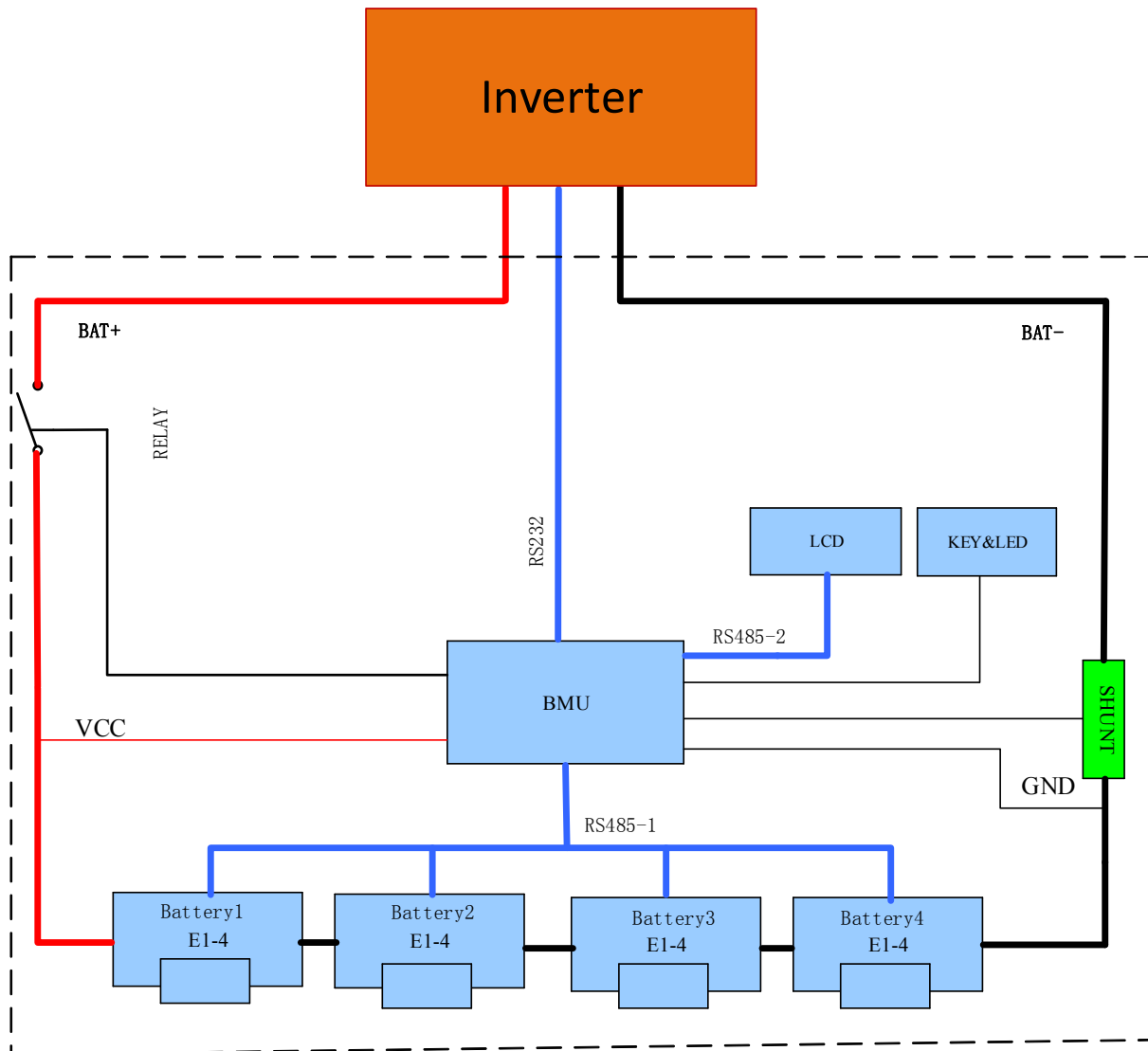


Figure 4 System diagram

5.4 General introduction of BMU

BMU is battery management unit which installed in cabinet, it as an function part in RS-Box system to manage the battery's charge and discharge, select information from battery and report to inverter.

Main function:

RS232Communicate with inverter

RS485 communicate with battery

Other Communication interface for maintenance

Charge and discharge protect





5.5 General introduction of RS-Box

5.5.1 RS-Box brief introduction



Figure 5 RS-Box overview

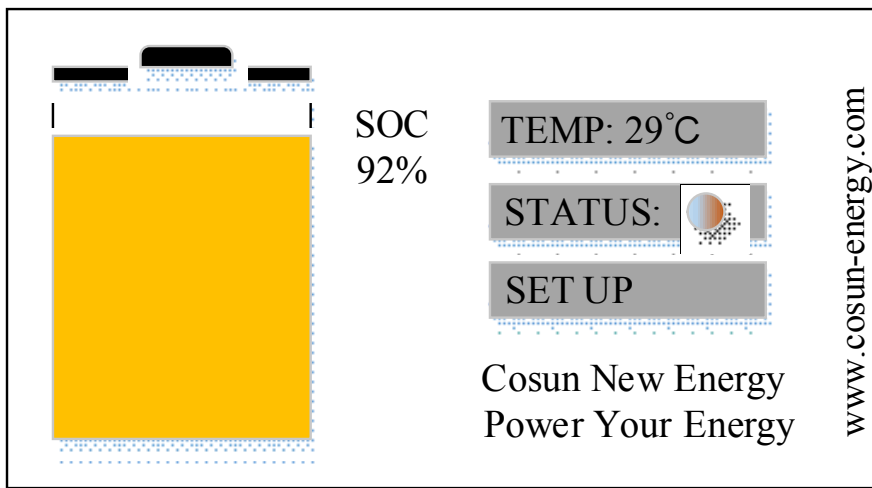


Figure 6 Display interface



5.6 Battery technical parameters

5.6.1 Charge & Discharge performance parameters

Table 2 Charging parameters

No.	Item		Requirement			Unit	Remark
			Min.	Max.	Typical		
1	Charge voltage	RS-Box 4100		54.5	53.5	V(DC)	
		RS-Box 8700					
2	Charge current	RS-Box 4100	0	60	40	A	0~45°C
		RS-Box 8700	0	120	80		

Table 3 Discharging parameters

No.	Item		Requirement			Unit	Remark
			Min.	Max.	Typical		
1	Discharge voltage	RS-Box 4100	49.5	54.5	51.2	V(DC)	
		RS-Box 8700					
2	Discharge current	RS-Box 4100		60	40	A	-10~60°C
		RS-Box 8700		120	80		



5.6.2 Operating environment

Table 4 Operating environment parameters

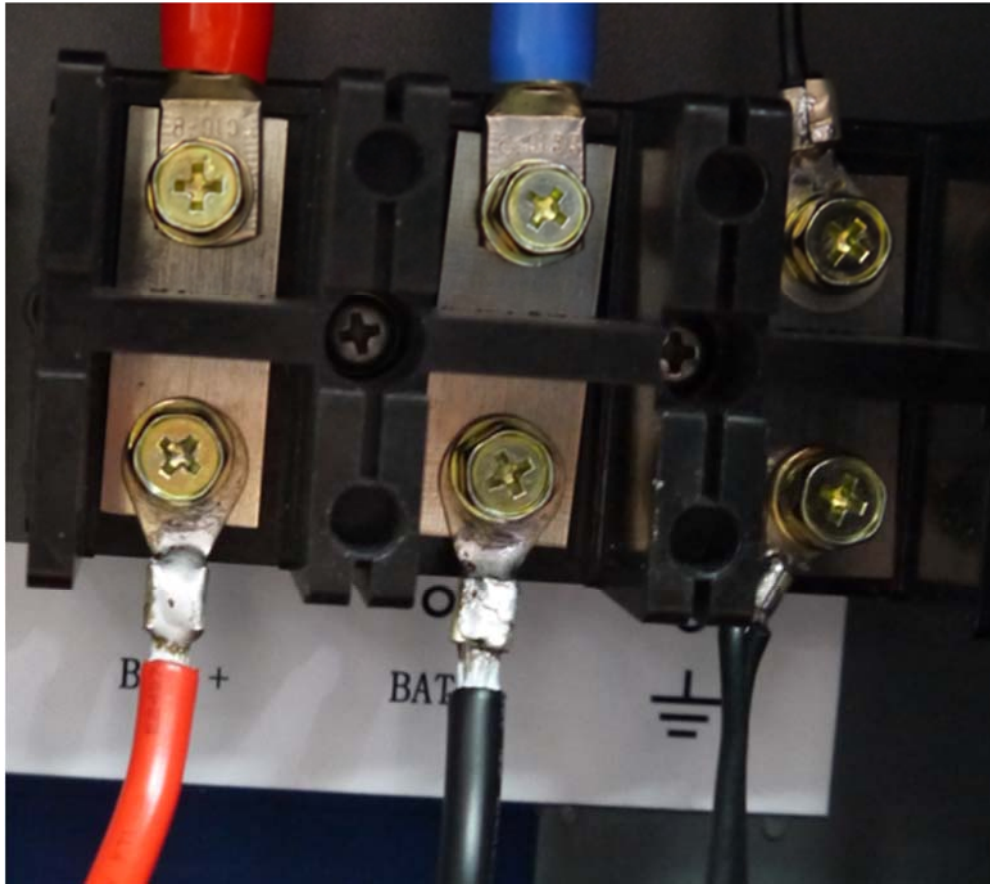
No.	Item	Requirement			Unit	Remark
		Min.	Typical	Max.		
1	Discharging temperature	-10	25	60	°C	
2	Charging temperature	0	25	45	°C	
3	Relative humidity	5		95	%	
4	Absolute humidity	0.26		25	g/m ³	
5	Elevation	-	2000	-	m	
6	Cooling	Do not need peripheral cooling equipment				
7	IP level	20				
8	Storage and Temperature	When storage temperature is 25°C, should charge-discharge battery at least one cycle every 12 months or charge battery according to the "NEXT CHARGE" label in package.				
		When storage temperature is 35°C, should charge-discharge battery at least one cycle every 6 months.				
		When storage temperature is 45°C, should charge-discharge battery at least one cycle every 3 months.				
9	Low voltage maintenance	Must charge the battery within 15 days at the conditions of battery exit the system automatic cause by low voltage protection with working temperature is 25°C.				
		Must charge the battery within 7days at the conditions of battery exit the system automatic cause by low voltage protection with working temperature is 45°C.				

6 START SYSTEM

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

6.1 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.

i. Press the all the “ON/OFF” button on front panel of Box;

Once start, the screen of RS-Box will show status of the battery status as below:

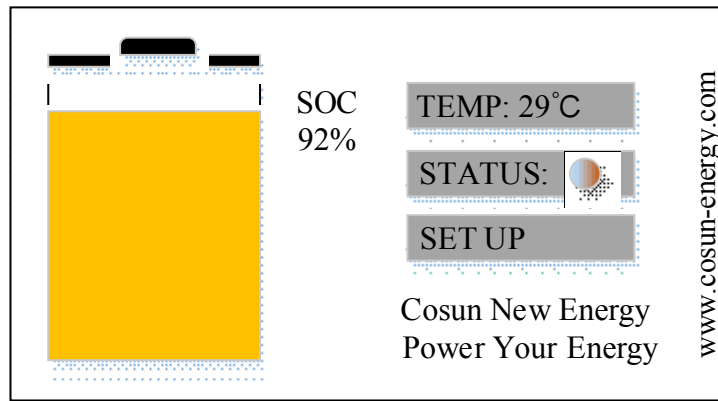


Figure 7 Display interface

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.

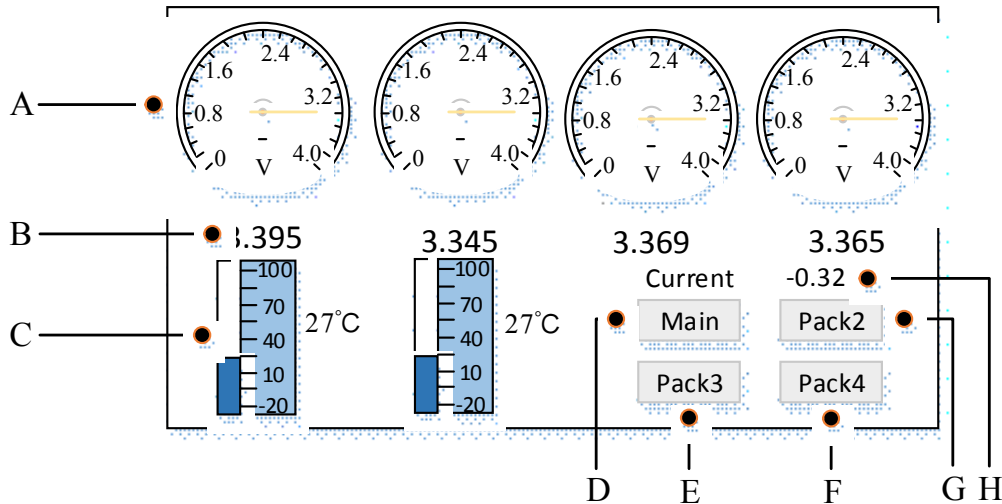


Figure 8 battery message interface

RS-Box has four 12V, 80/170A lithium iron phosphate battery in series. Each PACK contains 4 block which nominal voltage is 3.2V. There are two temperature probes to measure temperature in the PACK.



Table 5 technical noun explanation

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

●STATUS interface

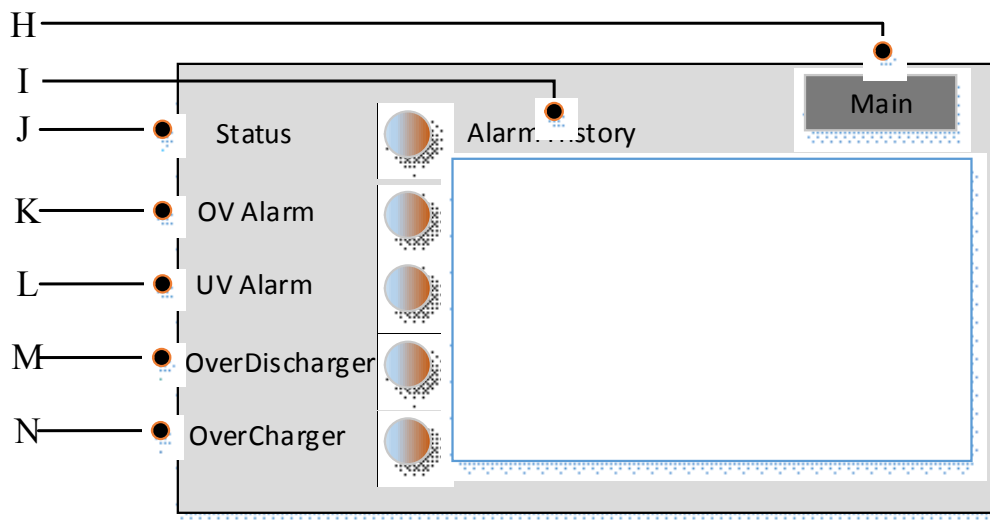


Figure 9 alarm interface



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

7 STOPPING THE SYSTEM

7.1 Stopping the system when RS-Box working with solaX inverter

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



8 CLEANING AND MAINTENANCE

8.1 Cleaning

The RS-Box system is recommended to be cleaned periodically. If the enclosure is in a dirty condition, please use a soft and dry brush or a vacuum to remove the dirt.



Do not use liquids such as solvents, abrasives or corrosive liquids in the enclosures.

8.2 Maintenance

The RS-Box should be installed in position with temperature range of -10°C~+40°C. And the humidity is less than 80%. The load-bearing of battery's package is less than 150Kg.

The capacity of module before delivery is 30%. So after long time storage the module need do maintenance. Charge battery with 0.1C (5A) for 5 hours when maintenance. Detail information please check table 7.

Table 7 Maintenance time

Temperature	Months
25°C	12
35°C	6
45°C	3

9 DISPOSE SPECIAL SITUATION

9.1 Battery over discharged maintenance

When battery over discharge which may caused by black out, continuously rainy day.,etc, the battery can provide energy is limited, user should pay attention to the backup time of the battery, please connect us.

9.2 Catastrophic accidents

Catastrophic accidents, including lightning, floods, earthquakes, fires and other disasters, can bring unpredictable damage to the whole system.

10 Normal alarm and solution

10.1 Normal 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

11 WARRANTY

COSUN provide warranty when this product is installed and used according to description in user manual, installation manual and warranty letter.



12 LOGIN IN AFTER SERVICE WEB

In order to get after service in time, after installation, please login your RS-Box information in our after service operator web: www.cosun-energy.com

13 CONTACT

For technical problems or inquiries for usage, please contact our installation company. To receive customer support, the following information is required.

Product type

Serial Number

Connected PV module type and number

Option equipment

Detailed description with pictures of the support case and system Any using problem please contact us by below address:

Contact us:

China

Cosun New Energy Technology Co., Ltd.

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Telephone: + 86-717-6398925

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