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If you encounter any problem on the inverter, please find out the inverter S/N and contact us, we will try to respond to your question ASAP.

Solis RHI Series Hybrid Inverter

Instruction Manual

Ver 1.0

Ningbo Ginlong Technologies Co., Ltd.

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1.1 Product Description

Solis RHI series inverter is designed for residential hybrid system, which can work with battery to maximize self-consumption for the owner. The unit can work at both on-grid mode and off-grid mode, the work mode changes automatically.

Solis RHI series inverter contain 3 models which are listed below:

RHI-3K-48ES RHI-3.6K-48ES RHI-5K-48ES

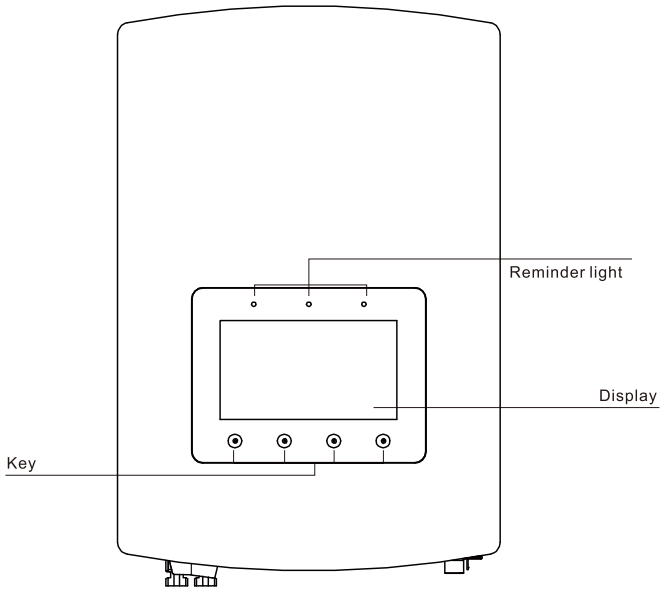


Figure 1.1 Front side view

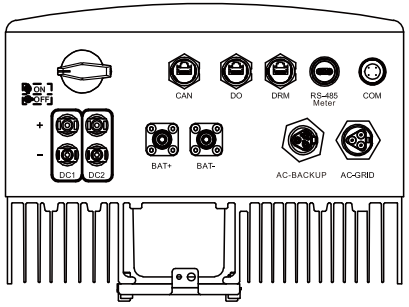
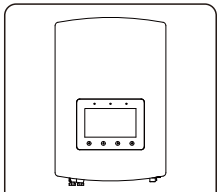
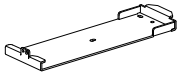


Figure 1.2 Bottom side view

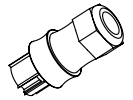
1.2 Packaging

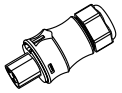
When you receive the inverter, ensure that all the parts listed below are included:

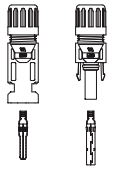

Inverter x1


Back plate x1

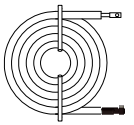

Fastening screw x3

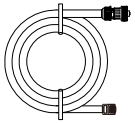

AC terminal x1

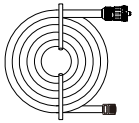

AC load terminal x1

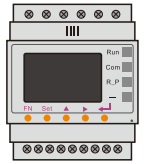

DC connector x2


RJ45 connector x1(Only for AUS.)


Battery Cable x2


CAN cable x1


RS485 Meter cable x1



Meter x1


User manual x1

If anything missing, please contact with your sales or Solis local office.

2.1 Safety

The following types of safety instructions and general information appear in this document as describedbelow:

DANGER:
"Danger"indicates a hazardous situation which,if not avoided,will result in death or serious injury.

WARNING:
"Warning"indicates a hazardous situation which,if not avoided,could result in death or serious injury.

CAUTION:
"Caution"indicates a hazardous situation which,if not avoided,could result in minor or moderate injury.

NOTE:
"Note"provides tips that are valuable for the optimal operation of your product.

2.2 General Safety Instructions

WARNING:
Only devices in compliance with SELV (EN 69050) may be connected to the RS485 and USB interfaces.

WARNING:
Please don't connect PV array positive(+) or negative(-) to ground, it could cause serious damage to the inverter.

WARNING:
Electrical installations must be done in accordance with the local and national electrical safety standards.

WARNING:
Do not touch any inner live parts until 5 minutes after disconnection from the utility grid and the PV input.

2. Safety & Warning

WARNING:
To reduce the risk of fire, over-current protective devices (OCPD) are required for circuits connected to the Inverter.
The DC OCPD shall be installed per local requirements. All photovoltaic source and output circuit conductors shall have disconnects that comply with the NEC Article 690, Part II. All Solis single phase inverters feature an integrated DC switch.

CAUTION:
Risk of electric shock. Do not remove cover. There is no user serviceable parts inside. Refer servicing to qualified and accredited service technicians.

CAUTION:
The PV array (Solar panels) supplies a DC voltage when they are exposed to sunlight.

CAUTION:
Risk of electric shock from energy stored in capacitors of the Inverter. Do not remove cover for 5 minutes after disconnecting all power sources(service technician only). Warranty may be voided if the cover is removed without unauthorized .

CAUTION:
The surface temperature of the inverter can reach up to 75℃ (167 F).
To avoid risk of burns, do not touch the surface of the inverter while it's operating.
Inverter must be installed out of the reach of children.

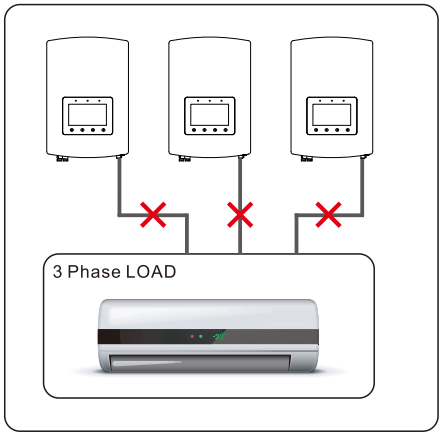
NOTE:
PV module used with inverter must have an IEC 61730 Class A rating.

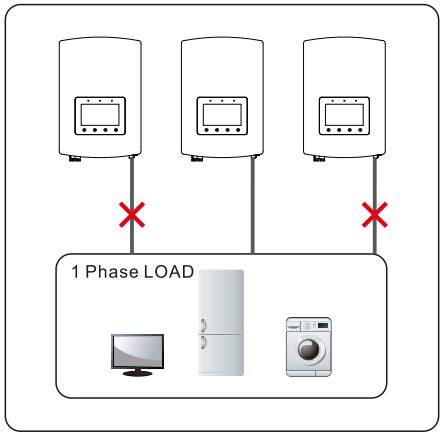
WARNING:
Operations below must be accomplished by licensed technician or Solis authorized person.

WARNING:
Operator must put on the technicians' gloves during the whole process in case of any electrical hazards.

WARNING:
AC-LOAD of RHI series is forbidden to connect with the grid.

WARNING:
AC-LOAD of RHI series is forbidden to connect in parallel, or Ginlong will not take any responsibility,and will invalid the warranty.





WARNING:
Please refer to the specification of the battery before configuration.

2.3 Notice For Use

The inverter has been constructed according to the applicable safety and technical guidelines. Use the inverter in installations that meet the following specifications ONLY:

1.Permanent installation is required.

2.The electrical installation must meet all the applicable regulations and standards.

3.The inverter must be installed according to the instructions stated in this manual.

4.The inverter must be installed according to the correct technical specifications.

3.1 Screen

Solis RHI series adopts 7 inch color screen, it displays the status, operating information and settings of the inverter.

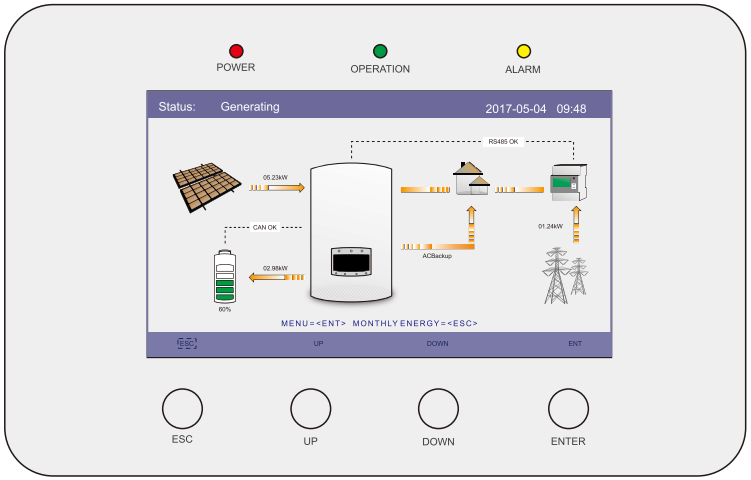
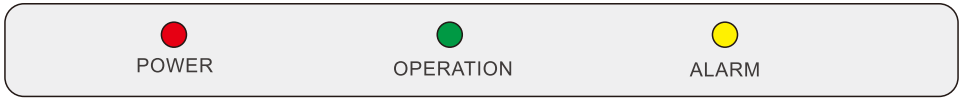


Figure 3.1 Front Panel Display

3.2 LED Indicates

There are three LED lights on RHI inverter (Red, Green, Orange), which indicate the working status of the inverter.



Light	Status	Description
POWER	ON	The inverter can detect DC power
	OFF	No DC power or low DC power
OPERATION	ON	The inverter is operating properly.
	OFF	The inverter has stopped to supply power.
	FLASHING	The inverter is initializing.
ALARM	ON	Alarm or fault condition is detected.
	OFF	The inverter is operating properly.
	FLASHING	The inverter is working with partial functions.

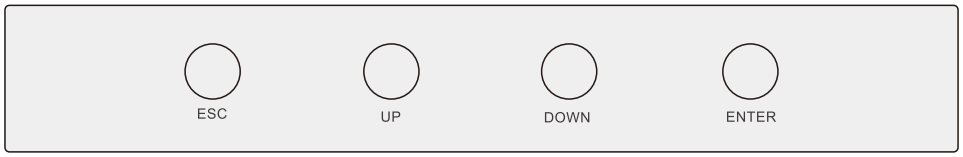
Table 3.1 Status Indicator Lights

3. Overview

3.3 Keypad

There are four keys in the front panel of the Inverter(from left to right): ESC, UP, DOWN and ENTER keys. The keypad is used for:

- Scrolling through the displayed options (the UP and DOWN keys);
- Access to modify the adjustable settings (the ESC and ENTER keys).



3.4 Terminal Connection

Solis RHI series inverter is different from normal on-grid inverter, please refer to the instructions below before start connection.

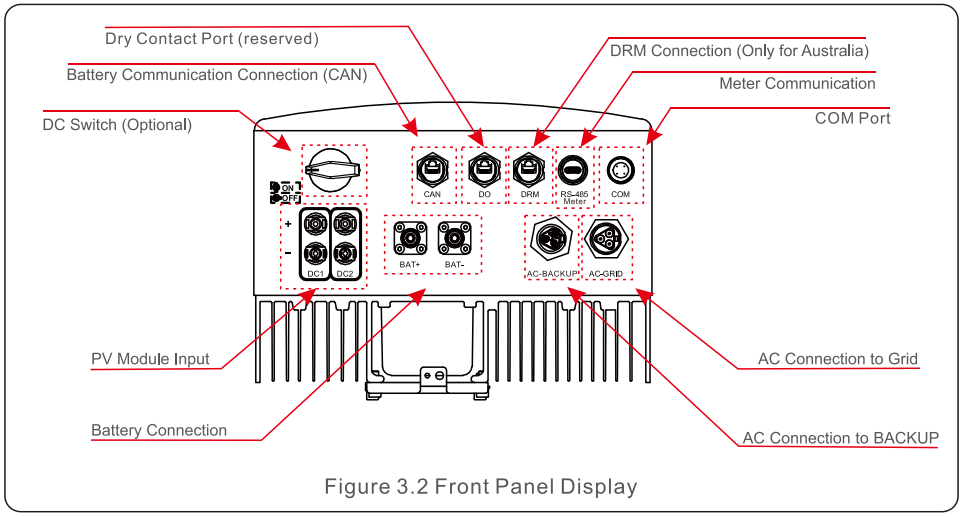


Figure 3.2 Front Panel Display

4. Installation

4.1 Select a Location for the Inverter

To select a location for the inverter, the following criteria should be considered:

- Do not install in small closed spaces where air can not circulate freely. To avoid overheating, always make sure the flow of air around the inverter is not blocked.
- Exposure to direct sunlight will increase the operational temperature of the inverter and may cause output power limiting. Ginlong recommends inverter installed to avoid direct sunlight or raining.
- To avoid over heating ambient air temperature MUST be considered when choosing the inverter installation location. Ginlong recommends using a sun shade minimizing direct sunlight when the ambient air temperature around the unit exceeds 104°F/40°C.

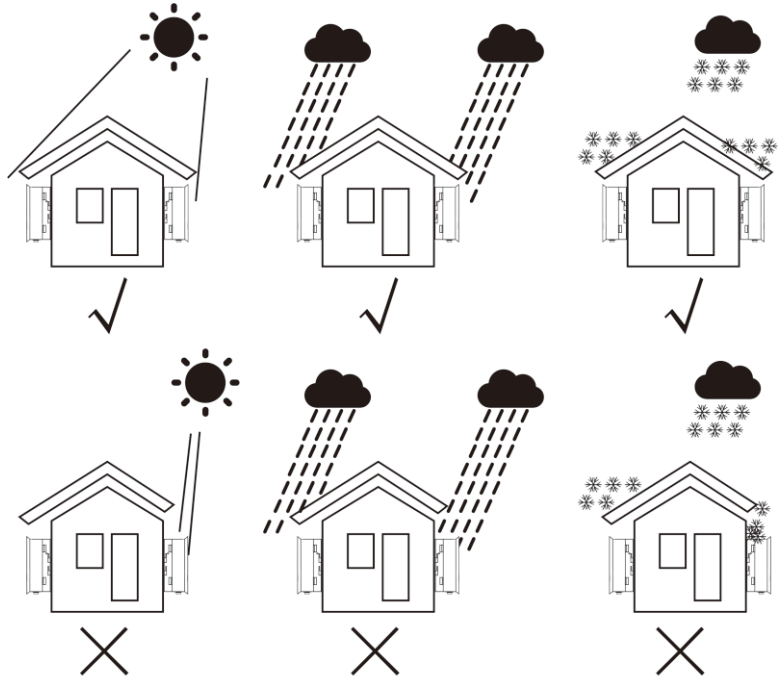


Figure 4.1 Recommended Installation locations

- Install on a wall or strong structure capable of bearing the weight.
- Install vertically with a maximum incline of +/- 5° . If the mounted inverter is tilted to an angle greater than the maximum noted, heat dissipation can be inhibited, and may result in less than expected output power.
- When 1 or more inverters are installed in one location, a minimum 300mm clearance should be kept between each inverter or other object. The bottom of the inverter should be 500mm clearance to the ground.

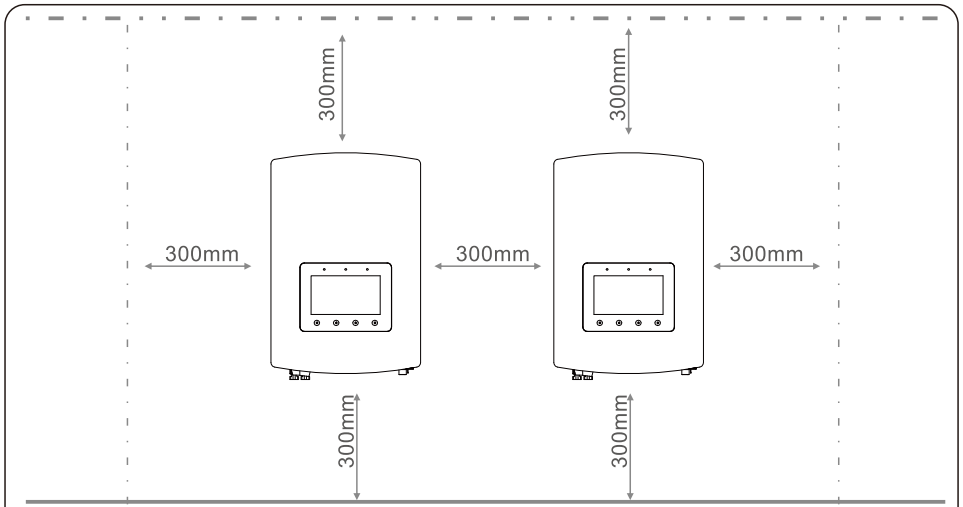


Figure 4.2 Inverter Mounting clearance

- Visibility of the LED status indicator lights and the LCD located at the front panel of the inverter should be considered.
- Adequate ventilation must be provided if the inverter is to be installed in a confined space.

NOTE:
Nothing should be stored on or placed against the inverter.

4.2 Mounting the Inverter

Dimensions of mounting bracket:

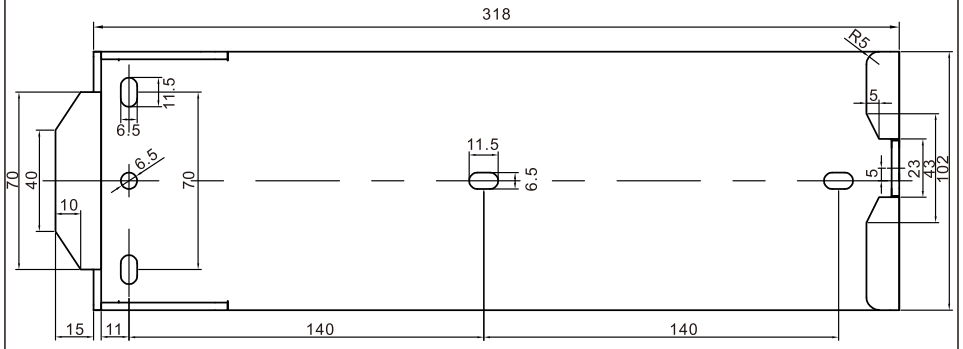


Figure 4.3 Inverter wall mounting

Please see Figure 4.4 for instruction on mounting the inverter to a wall or pillar.

The inverter shall be mounted vertically. The steps to mount the inverter are listed below:

1. According to the figure 4.1, select the mounting height of the bracket and mark the mounting holes. For brick walls, the position of the holes should be suitable for the expansion bolts.

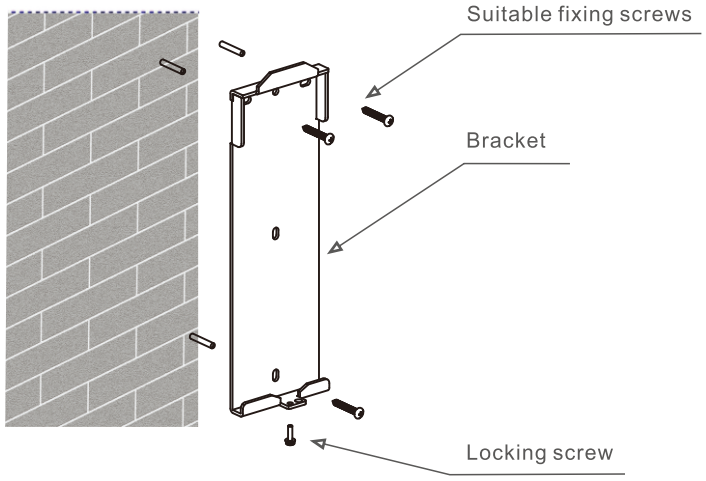


Figure 4.4 Fix bracket on the wall

2.Make sure the bracket is vertical and the mounting holes (in Figure 4.4) are marked correctly. Drill the holes into the wall or pillar at your marks.

3.Use the suitable screws to fix the bracket to the wall.

WARNING:
The inverter must be mounted vertically.

4.Lift up the inverter (be careful to avoid body strain), and align the back bracket on the inverter with the convex section of the mounting bracket. Hang the inverter on the mounting bracket and make sure the inverter is secure (see Figure 4.5)

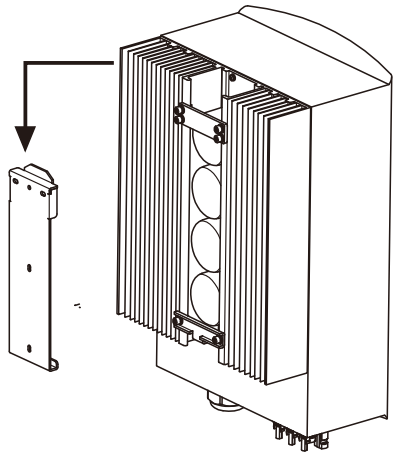


Figure 4.5 Wall Mount Bracket

4. Installation

4.3 PV Input Terminal Assembly

Solis RHI series inverter using MC4 connectors, please follow the picture below to assemble the PV input terminal.

- Make sure the voltage of PV string will not exceed the max DC input voltage;
- Make sure the poles are correct before connecting to the inverter;
- Make sure the DC switch, battery, AC-LOAD and AC-Grid side are all at off state before connecting the PV string to the inverter;
- Make sure the PV resistance to ground is higher than 20KOhm, or the system might be harmful.

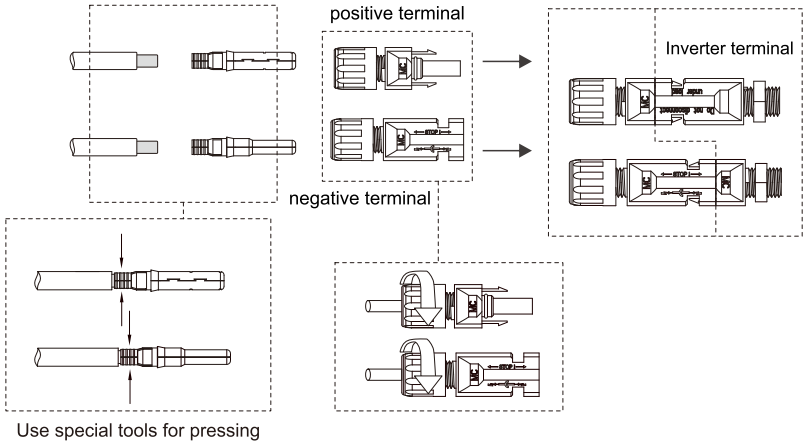


Figure 4.6

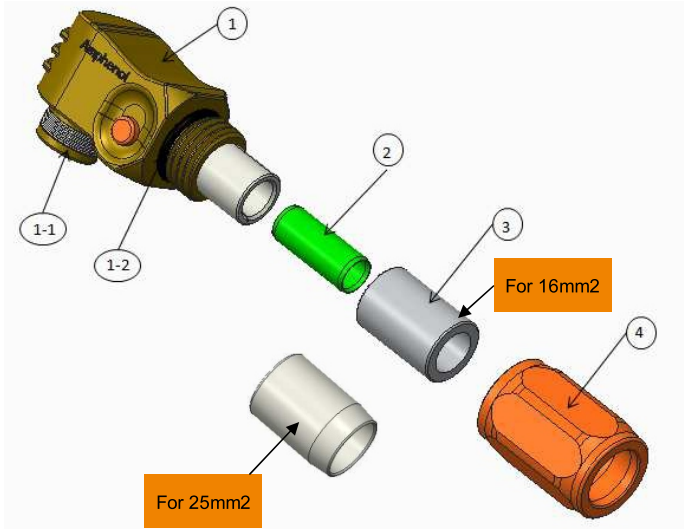
4.4 Battery Terminal Assembly

In order to avoid DC arc, Solis suggest to install a DC switch between the battery and RHI inverter. (At least 65A)

- Make sure the polarities of battery is correct before connecting to the inverter;
- Please follow the instructions below to choose the battery power cable.

NOTE:
Power cable uses water-proofed AMPHENOL connectors. It must keep pressing this Lock Button during pulling out the power plug.

4. Installation



①: Connector Body

1-1: Barrel sealing (Not included when no sealing requirement)

1-2: O-Ring (Not included when no sealing require ment)

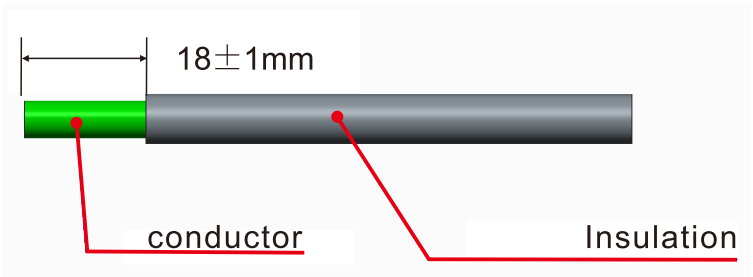
②: Barrel(Only for cable size 16mm²)

③: Grommet(Not included when no sealing requirement)

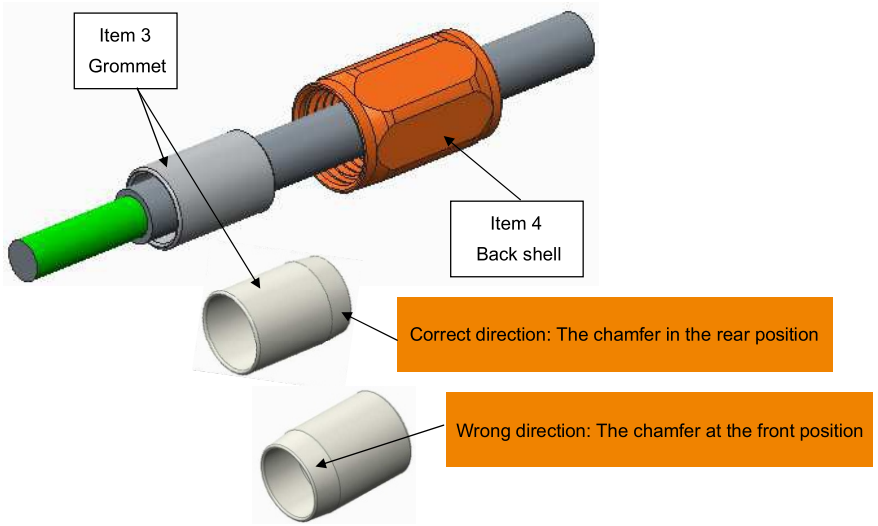
④: Back Shell

Step 1: Wire cutting and stripping (Apply for 10mm² & 16mm² Cable)

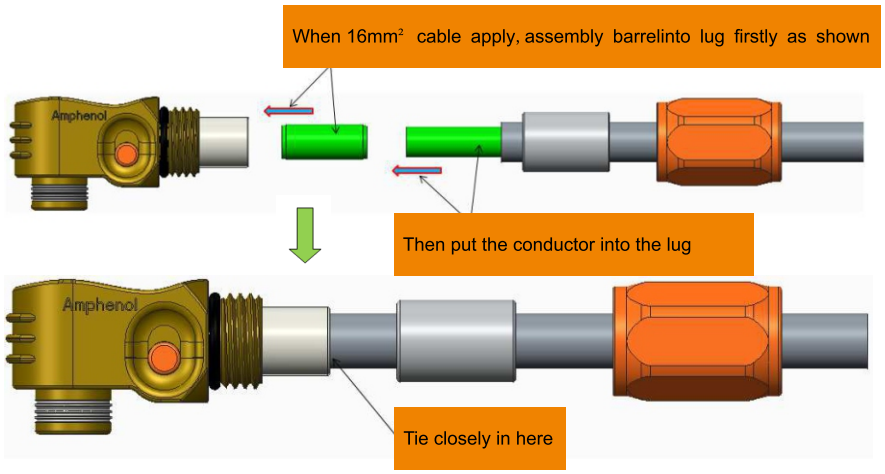
Stripping conductor: 18±1mm



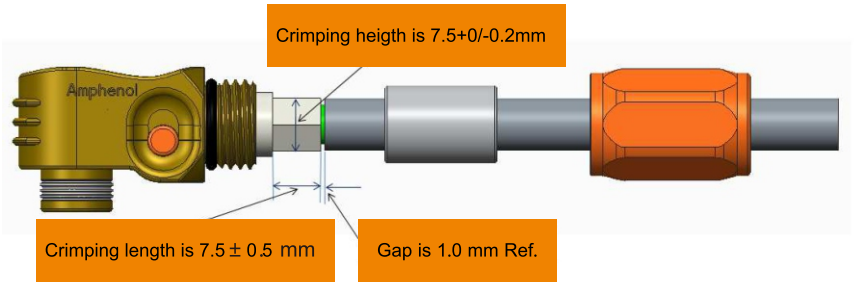
Step 2: Un-assemble item 3&4 over the cable as shown



Step 3: Put the barrel and the cable conductor into the lug



Step 4: Crimping the lug as shown

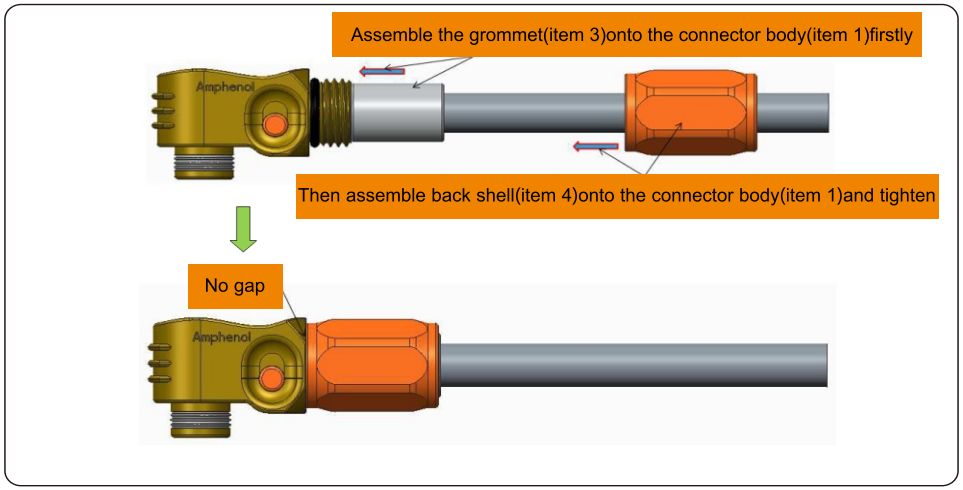


Cable size	Cable range	Crimping heigth	Cable pullout force
16 mm²	8.10±0.20 mm	7.5+0/-0.2mm	1000N Min.
25 mm²	10.20±0.20 mm		1200N Min.

Recommended crimping tool: Manual hydraulic crimping

Die: 25 mm²

Step 5: Install grommet and back shell

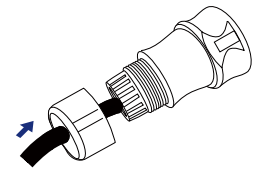


4.5 Assembling the AC Connector

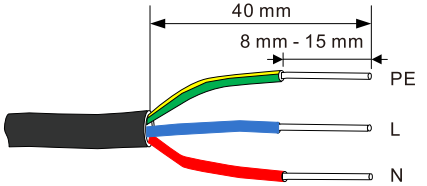
There are two AC terminals in accessory box, the steps to assemble them are the same.
Take out the AC connector parts from the packaging.

1. Lead the AC cable through the cable gland and the housing.

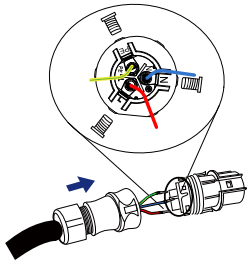
Describe	Numerical value
Wire diameter	10~12mm
Traverse cross sectional area	2.5~6mm²
Exposure Length	12mm



2. Remove the cable jacket by 40 mm, and strip the wire insulation by 8 mm-15mm.



3. Fully insert the conductors to the corresponding terminal and tighten the screws with the torque 1.2 N.m.Pull cables outward to check whether they are firmly installed.



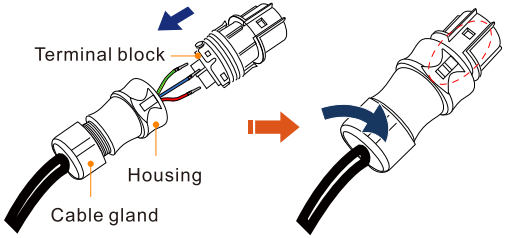
4. Installation

WARNING:

Observe the terminal layout of terminal block.

Do not connect the phase lines to “PE” terminal, otherwise the inverter will not function properly.

4. Assemble the housing, the terminal block and cable gland. Make sure that the rib of the terminal block and the groove on the housing engage perfectly until a "Click" is heard or felt.



4.6 Meter Installation

There is a meter in the accessory box, and the meter can communicate with the inverter to enable export power management fucntion.

Follow the picture below to install the meter and CT clamp.

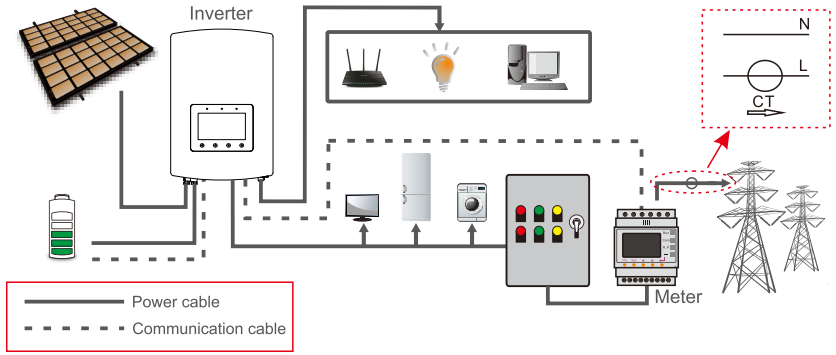


Figure 4.7

4.7 Communication Cable Assembly

RHI system requires one RS485 cable which communicates with meter and one CAN cable communicates with battery.The picture below shown the assemble of RS485/CAN communication cables.

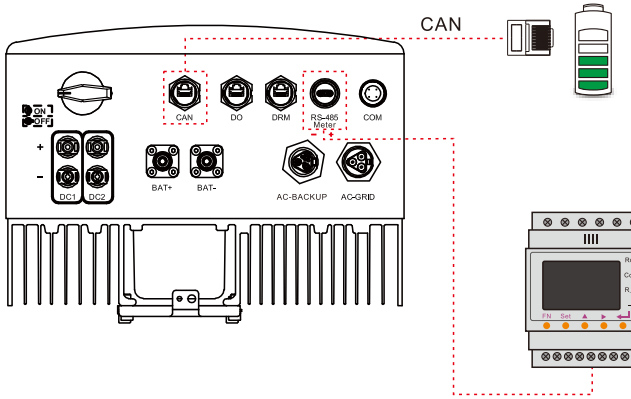


Figure 4.8

NOTE:

The CAN cable enables the communication between the inverter and the Li-ion battery from LG, BYD, GCL, Pylon or BlueSun.

Please check for latest model compatibilty before installation

Procedure for connecting the CAN cable:

1. Take out the CAN cable (terminal marks ‘CAN' on one end and 'to Battery' on the other end).
2. Unscrew the swivel nut from CAN port.
3. Insert the RJ45 terminal with CAN label into the CAN port, then fasten the swivel nut.
4. Connect the other end to the battery.

NOTICE:

For CAN cable pin 4 (blue) and pin 5 (white-blue) are used for the communication.

4. Installation

Procedure for connecting the RS485 cable:

1. Take out the RS485 cable (terminal marks ‘RS485' on one end and 'to Battery' on the other end).
2. Unscrew the swivel nut from RS485 port.
3. Insert the Two-pin terminal with RS485 label into the RS485 port, then fasten the swivel nut.
4. Connect the other end to the Meter

4.8 DRED port connections(Only for Australia)

DRED means demand response enable device. The AS/NZS 4777.2 required inverter need to support demand response mode(DRM). This function is for inverter that comply with AS/NZS 4777.2 standard. Ginlong 4G single phase inverter is fully comply with all DRM. A RJ45 terminal is used for DRM connection.

Pin	Assignment for inverters capable of both charging and discharging
1	DRM 1/5
2	DRM 2/6
3	DRM 3/7
4	DRM 4/8
5	RefGen
6	Com/DRM0
7	V+
8	V-

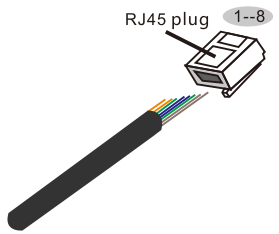
NOTE:
Ginlong hybrid inverter is designed to provide 12V power for DRED.

Please follow below steps to assemble RJ45 connector.

1.Insert the network cable into the communication connection terminal of RJ45.

Figure 4.9 RJ45 communication connection terminals

2.Use the network wire stripper to strip the insulation layer of the communication cable. According to the standard line sequence of figure 4.10 connect the wire to the plug of RJ45, and then use a network cable crimping tool to make it tight.



Correspondence between the cables and the stitches of plug

Pin 1: white and orange； Pin 2: orange
Pin 3: white and green； Pin 4: blue
Pin 5: white and blue； Pin 6: green
Pin 7: white and brown； Pin 8: brown

Figure 4.10 Strip the insulation layer and connect to RJ45 plug

3.Connect RJ45 to DRM port.

4.9 Solis RHI Energy Storage System Schematic

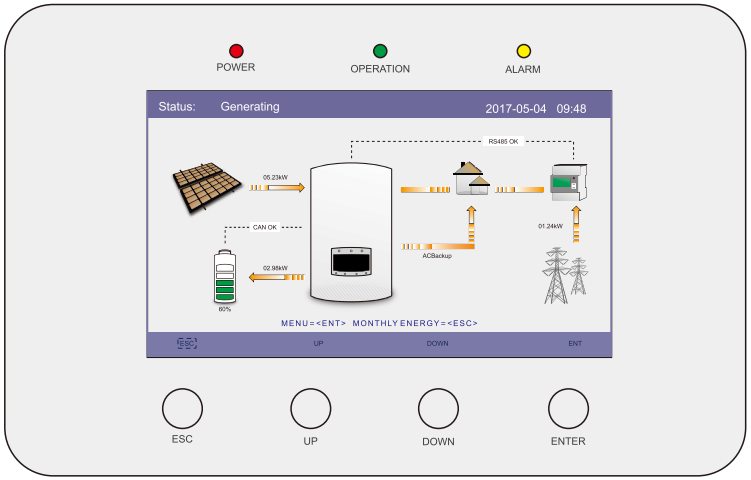


Figure 4.11

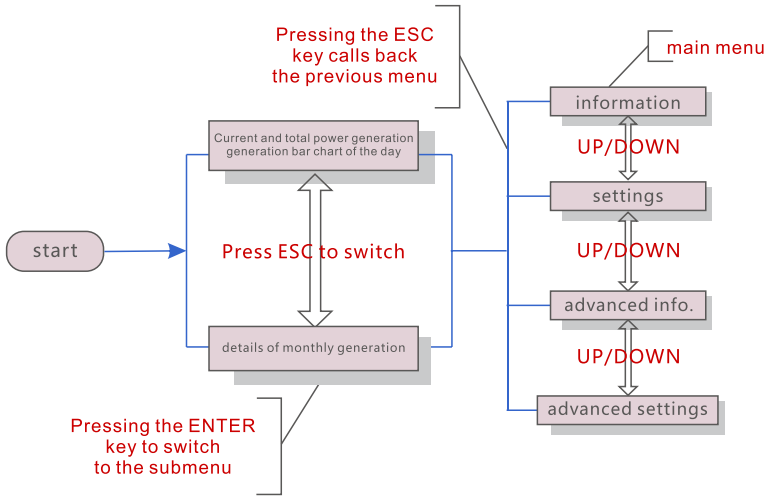


Figure 5.1 Operation overview

5.1 Interface

The initial interface of the inverter shows the current operation status, current power, generation of the day/month/year, and total generation.And through the bar chart, we can view the generation information of the day.

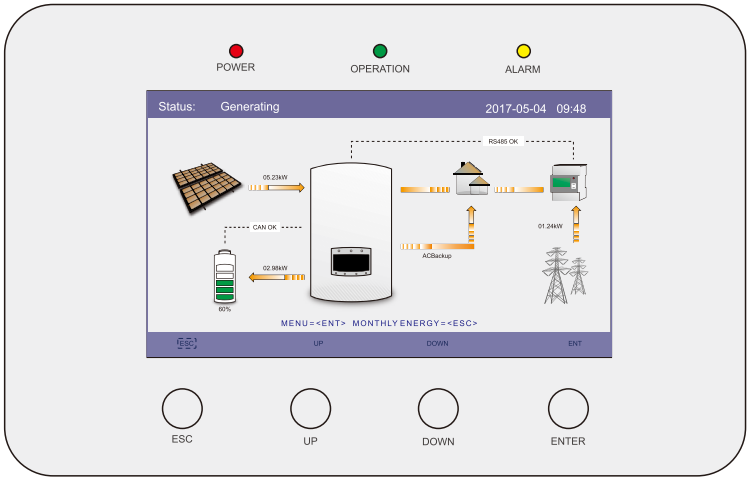


Figure 5.2 The initial interface

5.1 .1Main Menu

There are four submenu in the Main Menu:

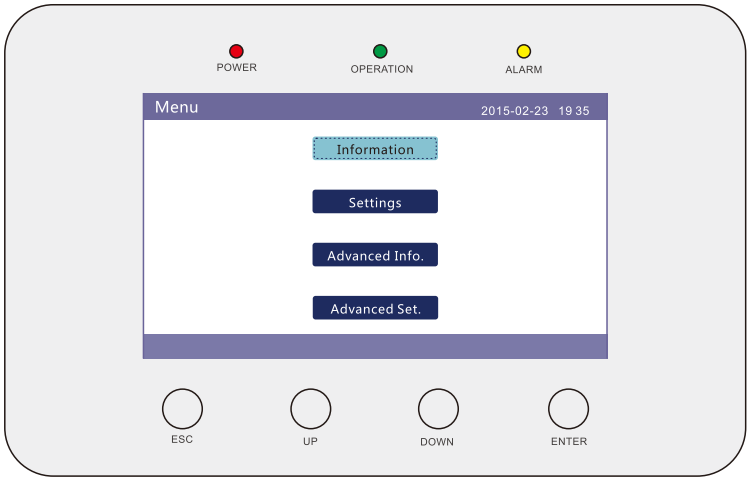


Figure 5.3 Main menu

5.2 Information

The inverter LCD provides access to operational data and information. Select "Information" sub menu, turn the page by scrolling up or down.

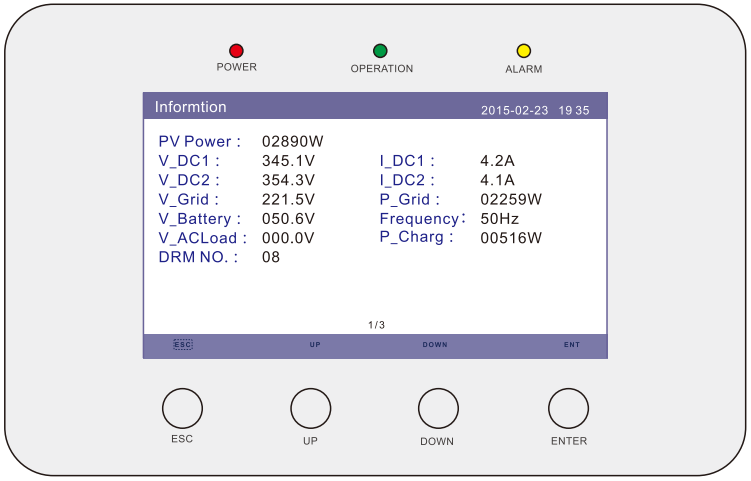


Figure 5.4 Information(1)

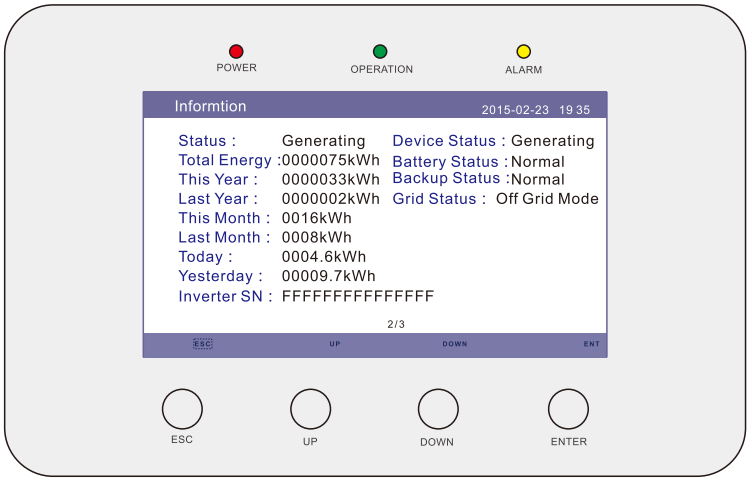


Figure 5.5 Information(2)

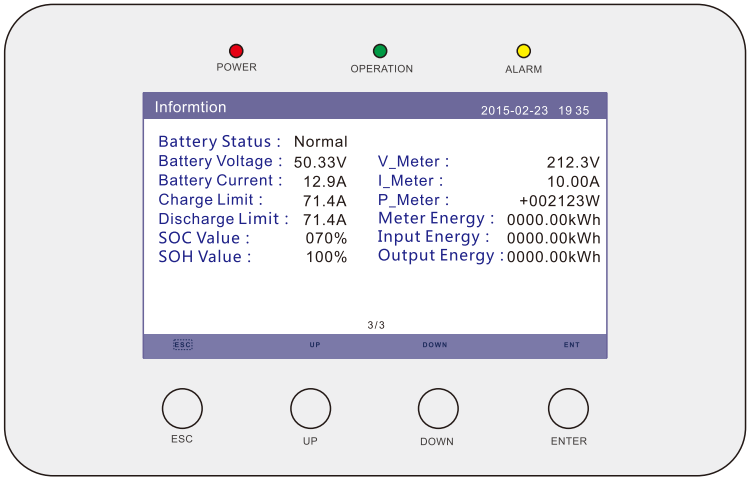


Figure 5.6 Information(3)

5.3 Settings

The following interface are displayed when the Settings menu is selected, and press the UP/DOWN keys to select different option, press the ENTER key to enter the submenu.

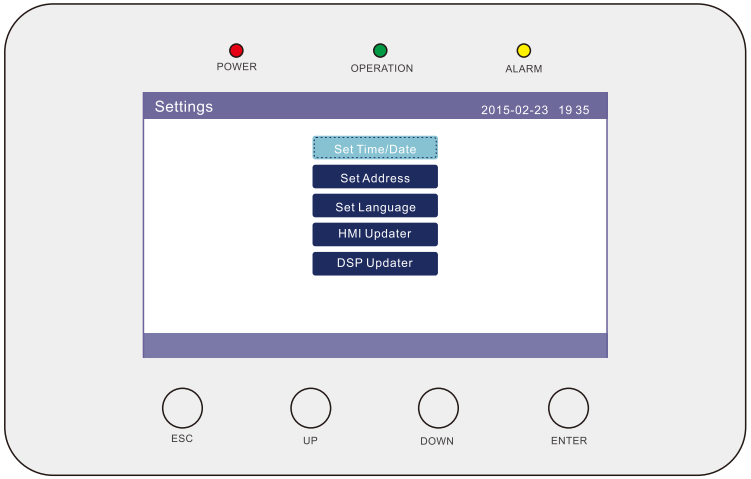


Figure 5.7 Setting

5.3.1 Set Time

This function allows time and date setting. When this function is selected, the LCD will display a screen as shown in Figure 5.8

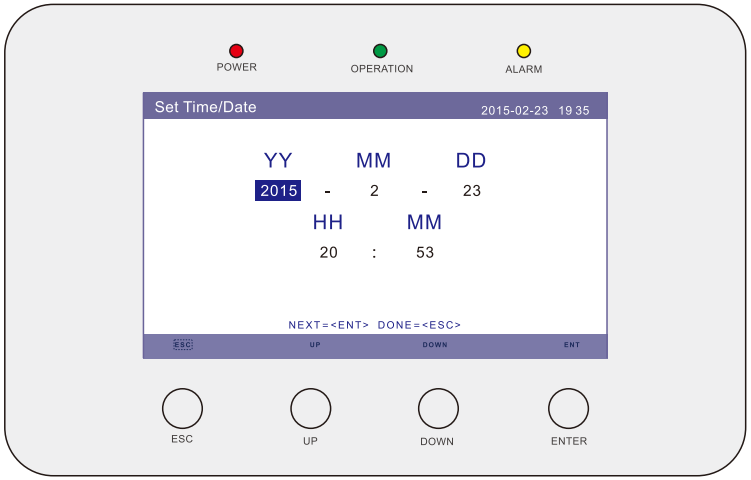


Figure 5.8 Set time

Press the UP/DOWN keys to set time and data. Press the ENTER key to move from one digit to the next (from left to right). Press the ESC key to save the settings and return to the previous menu.

5.3.2 Set Address

This function is used to set the address when muti inverters are connected to single monitor. The address number can be assigned from “01”to “99”(see Figure 5.9). The default address number of Solis Hybrid Inverter is “01”.

Figure 5.9 Set address

Press the UP/DOWN keys to set the address. Press the ENTER key to save the settings. Press the ESC key to cancel the change and return to the previous menu.

5.3.3 Set Language

This function is used to set the language of inverter LCD display.

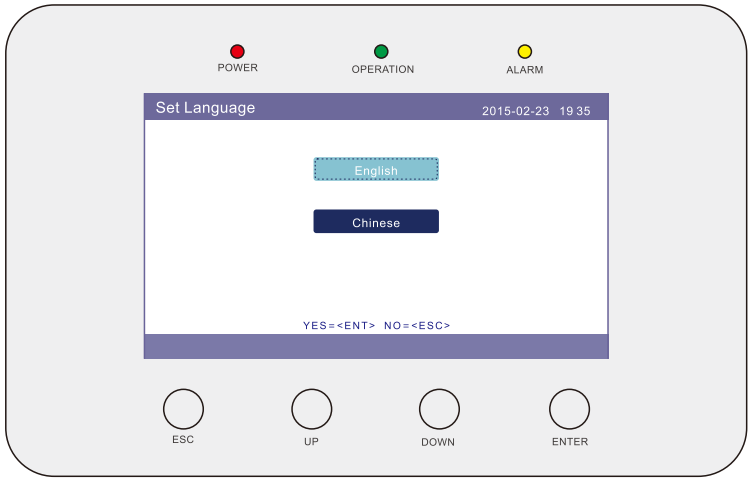


Figure 5.10 Set language

5.3.4 HMI Updater

This function is used to update HMI software.

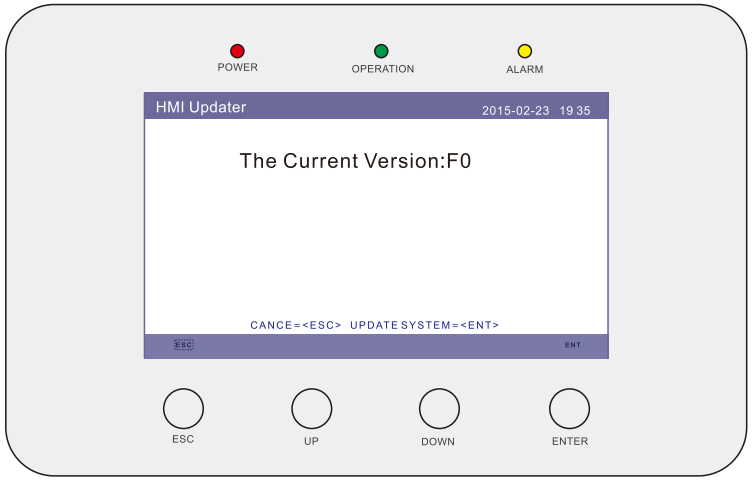


Figure 5.11 HMI updater

5.3.5 DSP Updater

This function is used to update DSP software.

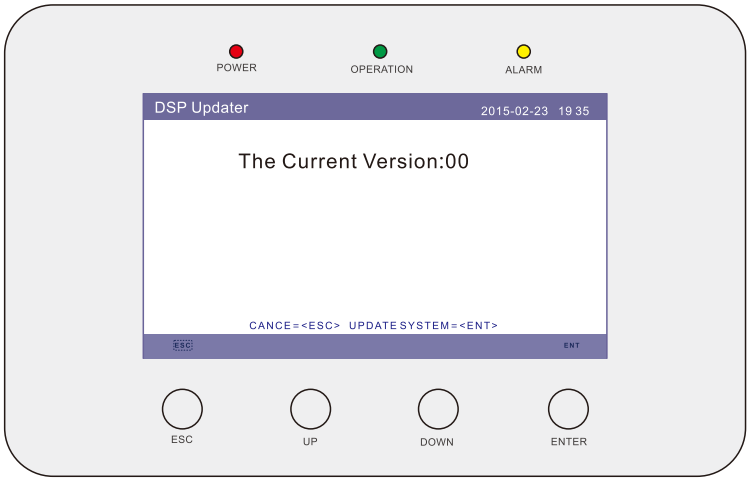


Figure 5.12 DSP updater

WARNING:
These function is applicable by maintenance personnel only, wrong operation will prevent the inverter from working properly.

5.4 Advanced Info - Technicians Only

NOTE:
Password required – restricted access – authorised technicians only
Un-authorised access may void the warranty.

Select Advanced Info from main menu, the LCD screen show the password is needed:

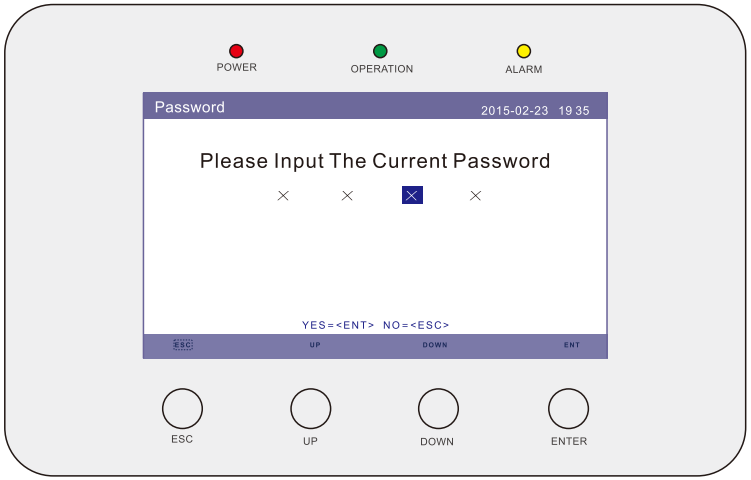


Figure 5.13 Enter a password

The default password is "0010", press the DOWN key to move cursor, press the UP key to change the figure for input password, after entering correct password, the LCD will show as below:

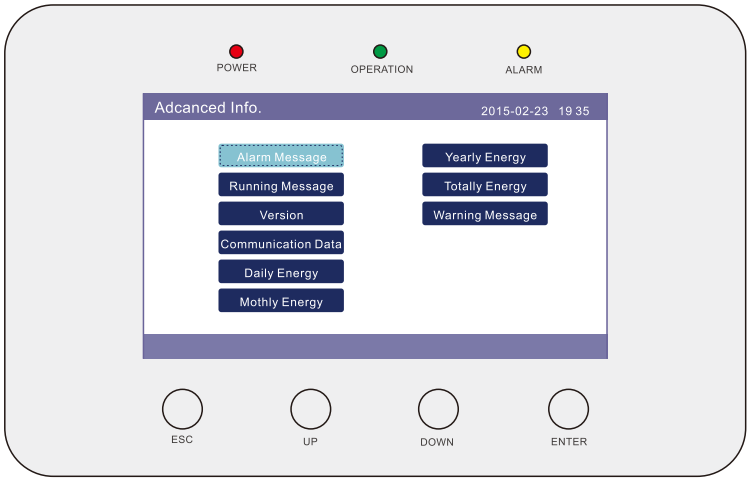


Figure 5.14 Advanced information

The screen can be scrolled manually by pressing the UP/DOWN keys.
Pressing the ENTER key gives access to a submenu.

5.4.1 Alarm Message

The display shows the 40 latest alarm messages (see Figure 5.15).
Screens can be scrolled manually by pressing the UP/ DOWN keys.

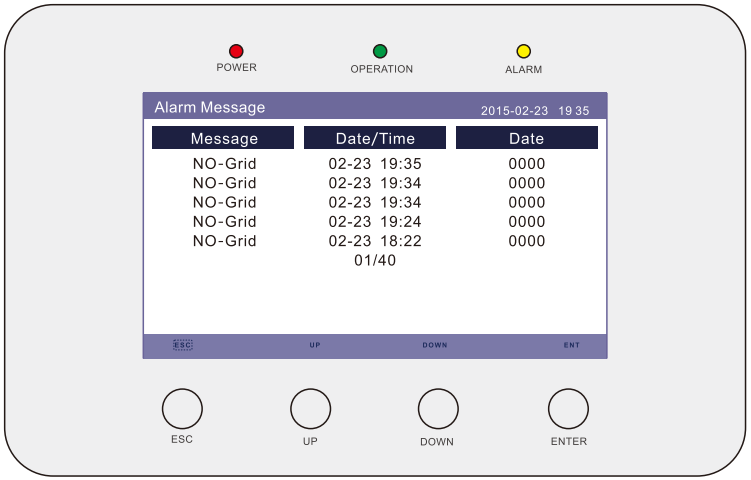


Figure 5.15 Alarm message

5.4.2 Running Message

This function is for maintaince person to get running message such as internal temperature, Standard NO. etc.
Screens can be scrolled manually by pressing the UP/DOWN keys.

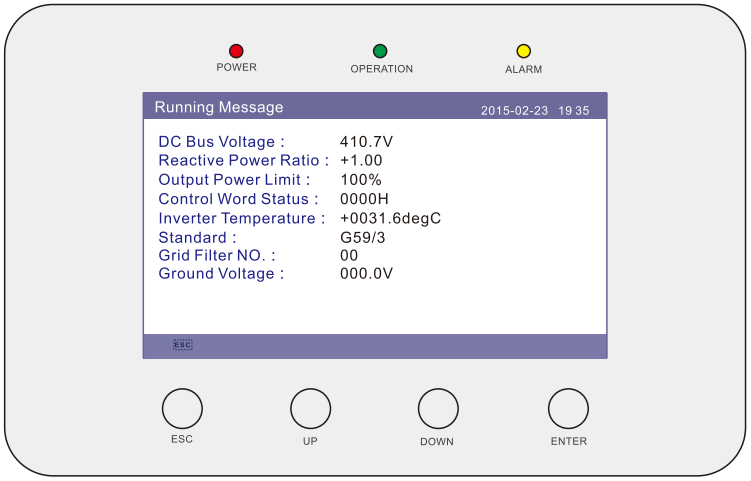


Figure 5.16 Running message

5.4.3 Version

The screen shows the model version and the software version of the Inverter (see Figure 5.17).

Figure 5.17 Model Version and Software Version

5.4.4 Communication Data

The screen shows the internal data of the inverter (see Figure 5.18), which is for service technicians only.

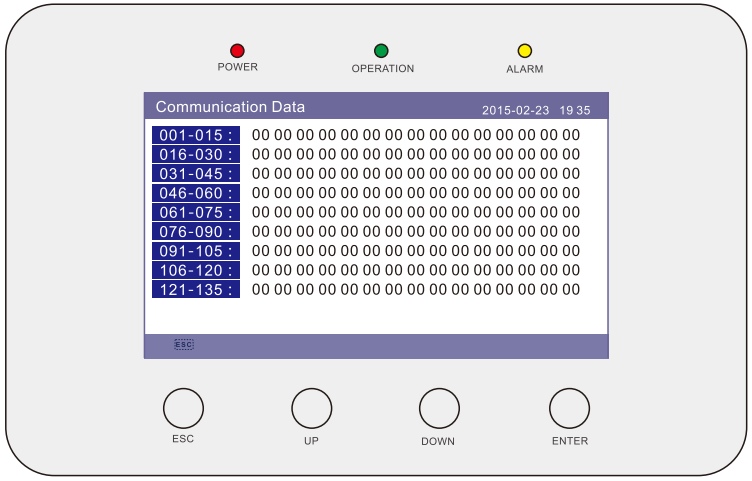


Figure 5.18 Communication data

5.4.5 Daily Energy Information

The screen shows the daily energy detail of the inverter (see Figure 5.19)

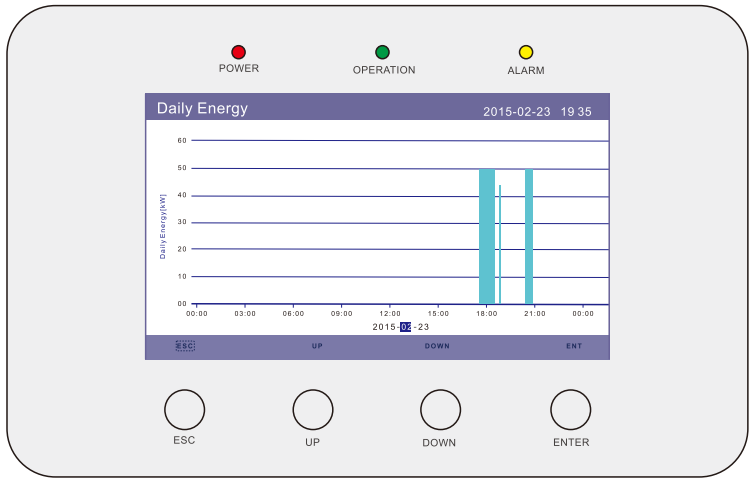


Figure 5.19 Select date for daily energy

Press the Enter key to move cursor, press the UP/DOWN keys to select energy power detail of different date.

5.4.6 Monthly Energy Detail

The screen shows the inverter monthly energy detail of different month (see Figure 5.20).

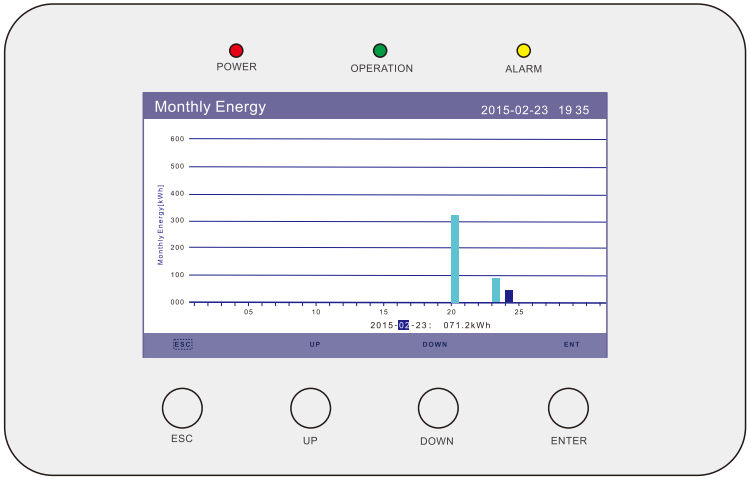


Figure 5.20 Monthly power generation details

Press the Enter key to move cursor, press the UP/DOWN keys to select energy power detail of different date.

5.4.7 Yearly Energy Detail

The screen shows the inverter yearly energy detail of different year (see Figure 5.21).

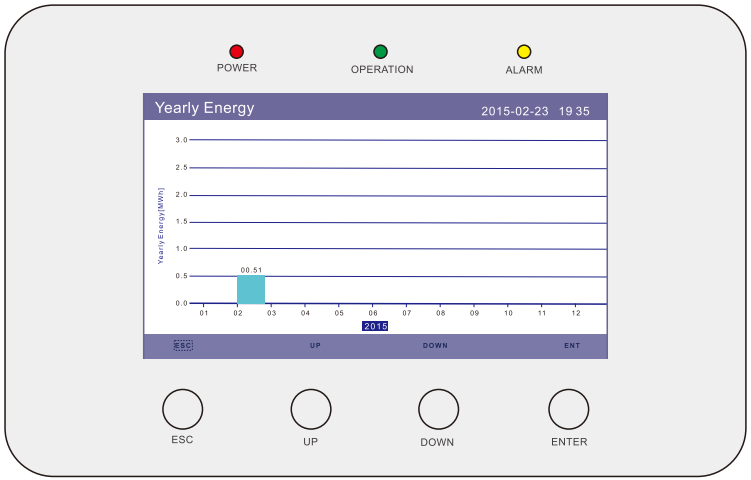


Figure 5.21 Annual generating capacity details

Press the UP/DOWN keys to switch to view monthly energy of different year.

5.4.8 Total Energy Detail

The screen shows the inverter total energy detail(see Figure 5.22)

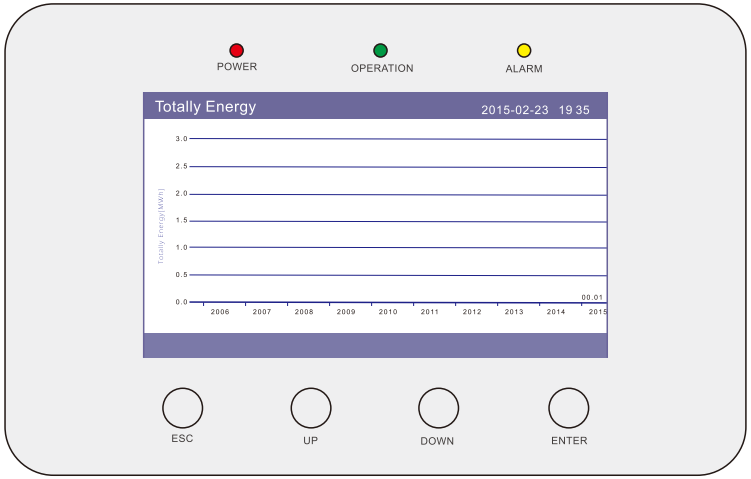


Figure 5.22 Total generating capacity details

5.4.9 Warning Message

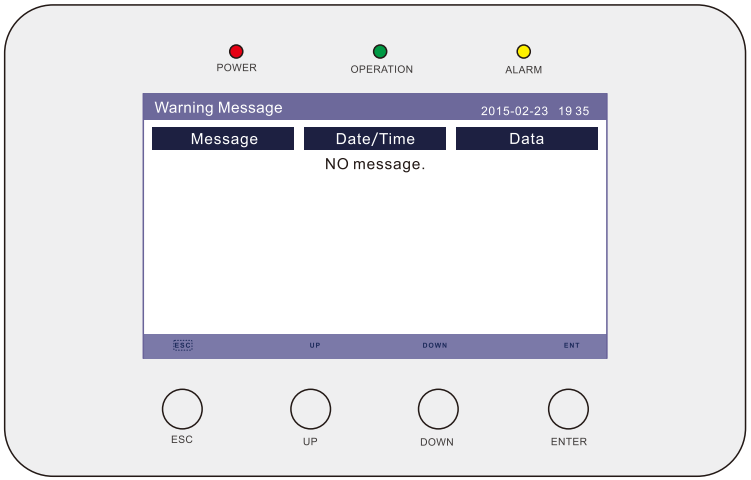


Figure 5.23 Warning message

5.5 Advanced Settings - Technicians Only

NOTE:
This function is for authorised technicians only. Improper access and operation may result in abnormal results and damage to the inverter.
Password required – restricted access – authorised technicians only
Un-authorised access may void the warranty.

Select Advanced Settings from the Main Menu to access the following options:

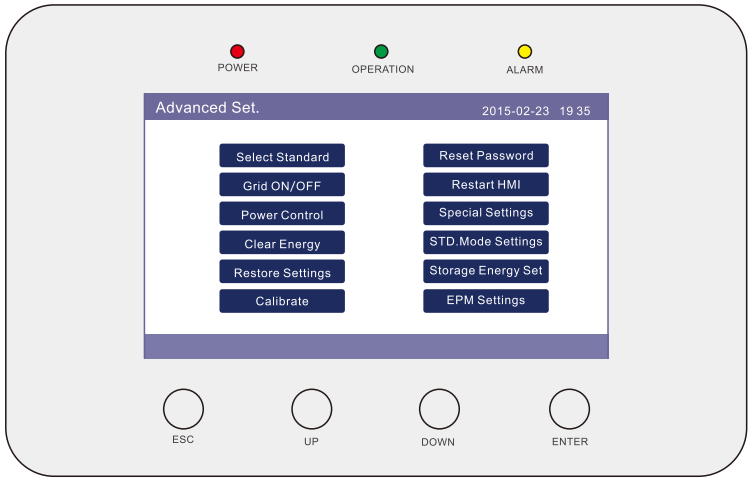


Figure 5.24 Advanced settings

5.5.1 Select Grid Standard

NOTE:
This is for service technicians only. The inverter is customized according to the local standard before shipping, there should be no requirement to set the standard.

NOTE:
The "User-Def" function can be only used by the service engineer and changing protection level must be allowed by the local grid company.

Select grid standard (Figure 5.25)

5. Operation

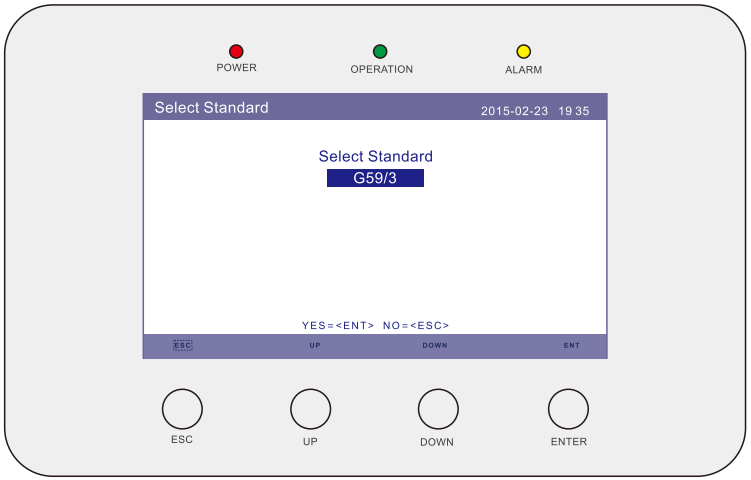


Figure 5.25 Select national standards

Press the UP/DOWN keys to select the standard (AS4777,VDE4105,UL-1741, G59/3, CQC and “User-Def” function).Press the ENTER key to confirm the setting. Press the ESC key to cancel changes and returns to previous menu.

5.5.2 Grid ON/OFF

This function is used to start or stop the generation of the inverter (see Figure 5.26).

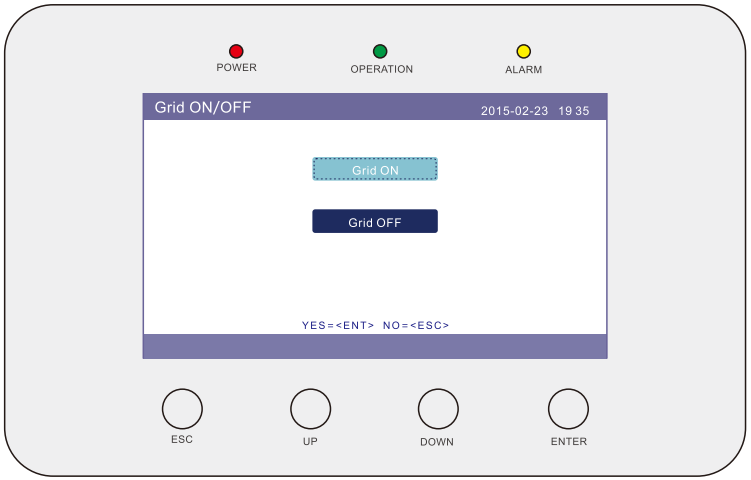


Figure 5.26 Set Grid ON/OFF

Press the DOWN key to move the cursor, Press the UP key to revise the value.
Press the ENTER key to execute the setting.
Press the ESC key to return to the previous menu.

5.5.3 Power Control

Active and reactive power can be set through power control button.

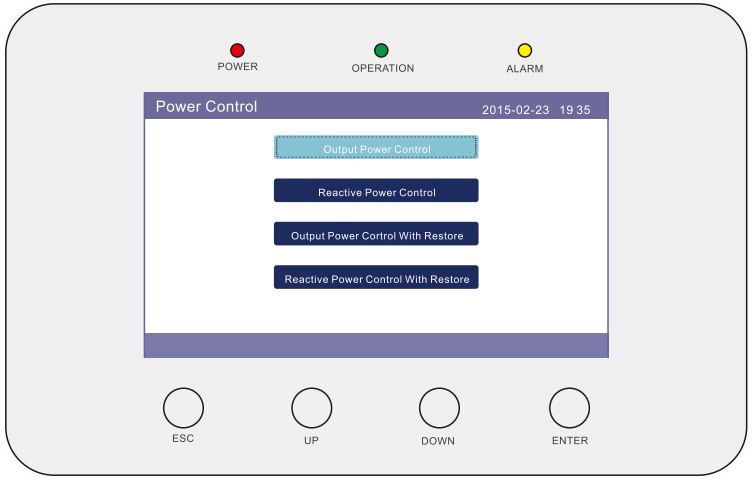


Figure 5.27 Power control

This function is applicable by maintenance personnel only, wrong operation will prevent the inverter from reaching maximum power.

5.5.4 Clear Energy and Restore Factory Settings

Clear Energy can reset the history yield of inverter, restore factory settings means all the settings are restored to default settings.

These two functions are applicable by maintenance personnel only, wrong operation will prevent the inverter from working properly.

5.5.5 Calibrate

Warranty or maintenance may result in reseting total generating data, this function allow the maintenance personnel to amend the total generating data of replacement inverter to the original one.

By using our data monitoring hardware, the data on monitoring website can automatically synchronize with the preset total generating power of inverter.

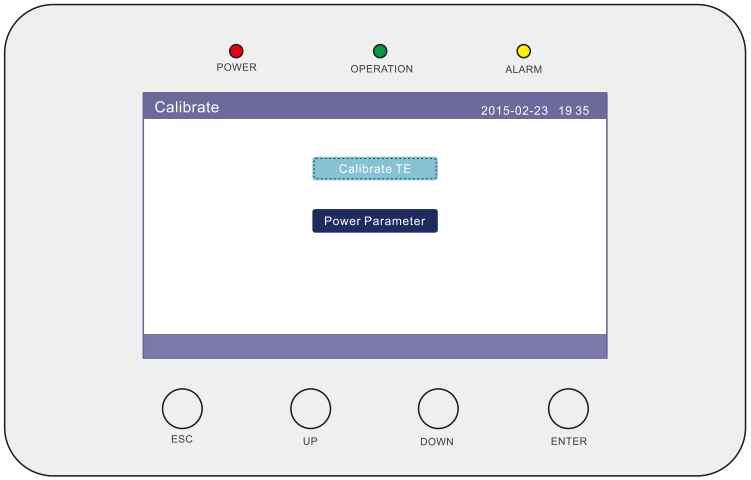


Figure 5.28 Calibrate

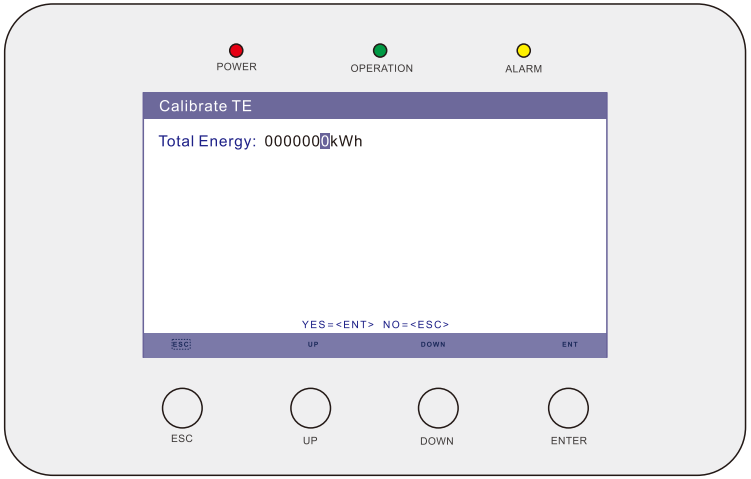


Figure 5.29 Calibrate TE

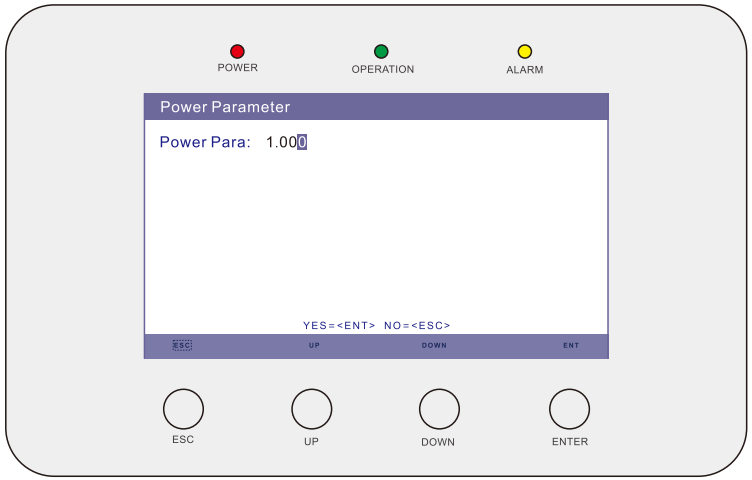


Figure 5.30 Power parameter

Press the DOWN key to move the cursor, Press the UP key to revise the value. Press the ENTER key to execute the setting. Press the ESC key to return to the previous menu.

5.5.6 Reset Password

Reset Password：In this page, user can reset the inverter password, but the original password remains.

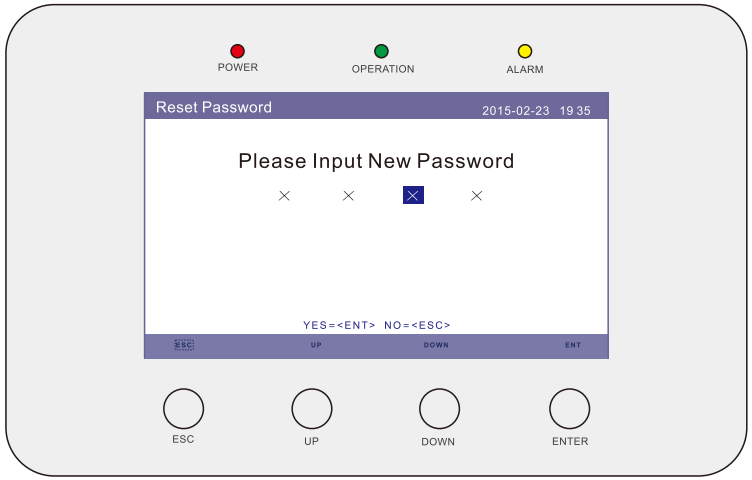


Figure 5.31 Reset password

5.5.7 Reset HMI

This function is to reboot the LCD screen.

5.5.8 Special Settings

There are three sub-menus as shown as in figure 5.32.

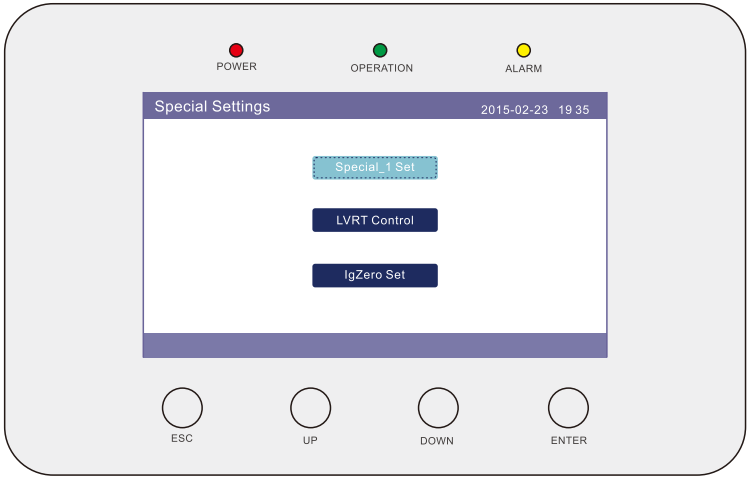


Figure 5.32 Special settings

WARNING:
These function is applicable by maintenance personnel only, wrong operation will prevent the inverter from working properly.

5. Operation

5.5.9 STD. Mode Settings

There are 5 settings under STD. Mode Settings.

1. Working Mode Set 2. Power Rate Limit 3. Freq Derate Set 4. 10mins Voltage Set 5. Initial Settings

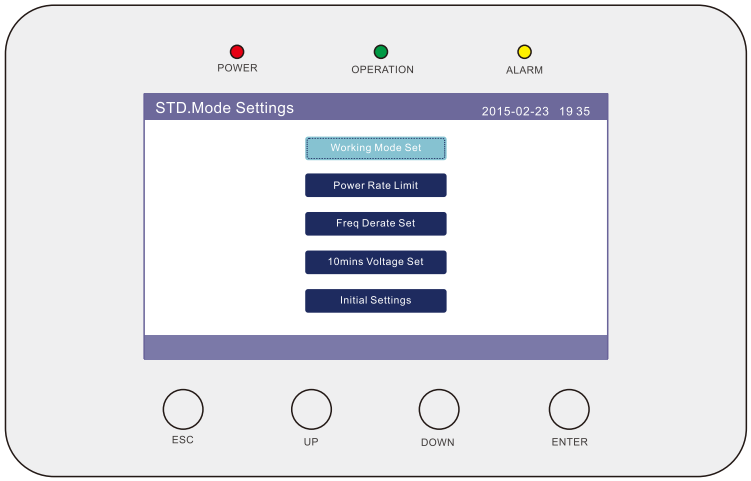


Figure 5.33 STD.Mode Settings

There are 5 alternatives in working mode submenu.

1. Fixed PF 2. Reac-power 3. P-factor 4. Volt-Watt 5. Volt-Var.

Different standard has different sub-menu, and the default setting is NULL.

For example: If you select the G59/3, you may see NULL in the Working Mode Set menu as shown as in figure 5.34, and if you select the AS4777 you may see them all.

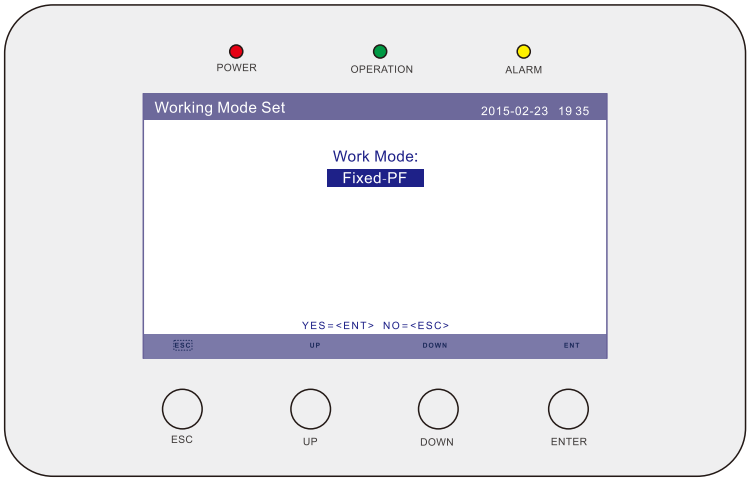


Figure 5.34 Working mode set

5.5.10 EPM Settings

This function is to set EPM settings.

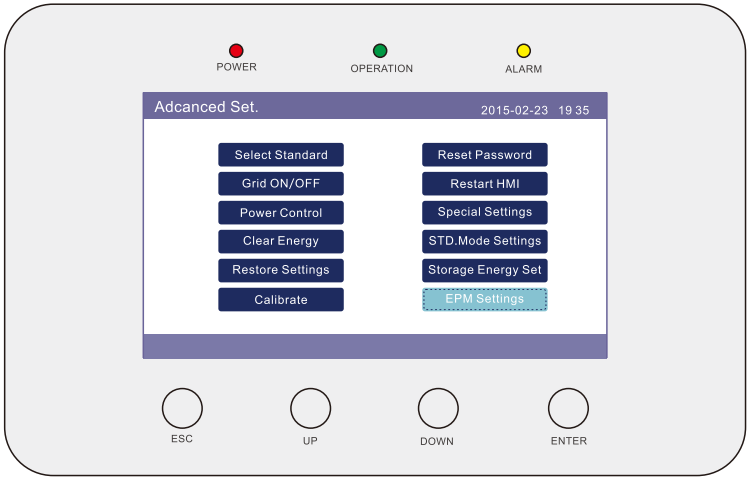


Figure 5.35 EPM settings

There are 2 items in the sub-menu as shown as below:

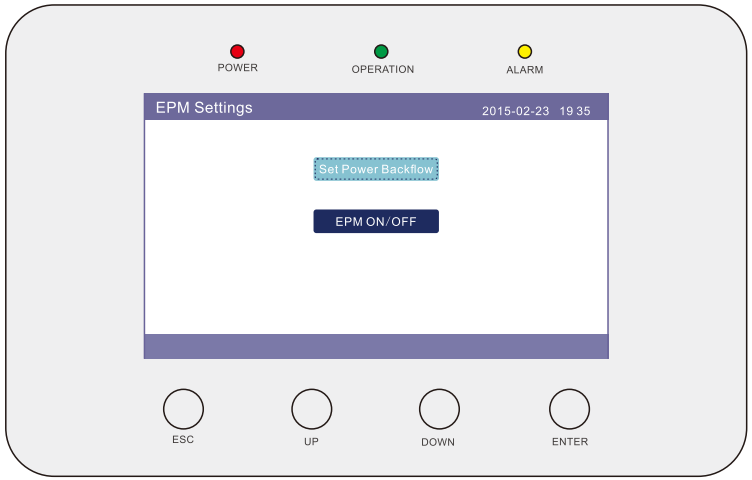


Figure 5.36 EPM Settings

5.5.10.1 Set Power Backflow

This sub-menu is used for setting allowed power that inverter can export to grid.

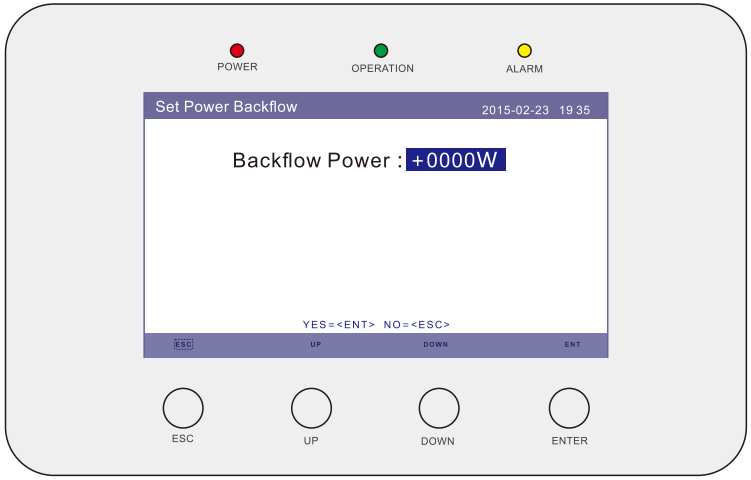


Figure 5.37 Set Power Backflow

Press the UP/DOWN keys to set data.

Press the ENTER key to set backflow power

Press the ESC key to cancel the settings and return to the previous menu.

5.5.10.2 EPM ON/OFF

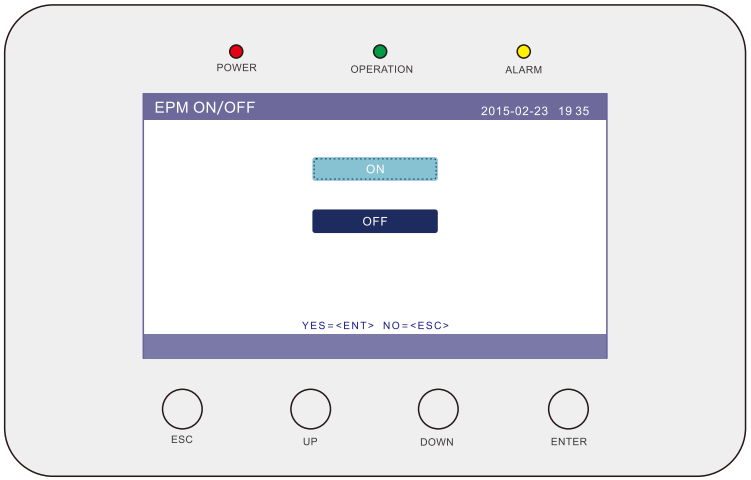


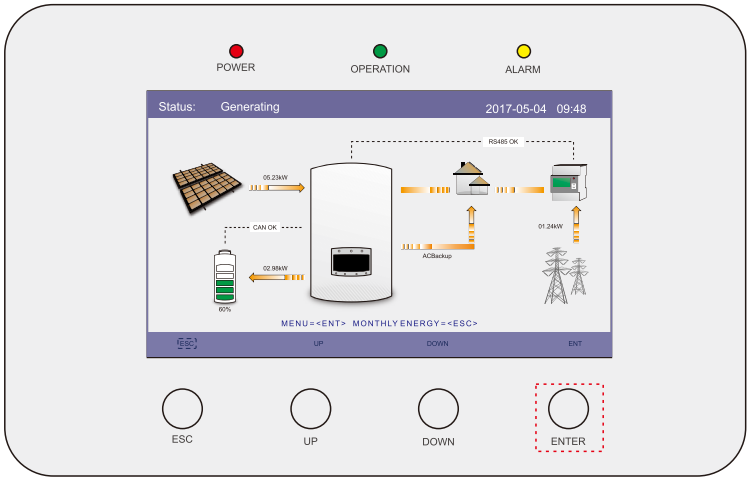
Figure 5.38 EPM ON/OFF

Press the UP/DOWN keys to set ON/OFF.Press the ENTER key to set done .
Press the ESC key to the previous menu.

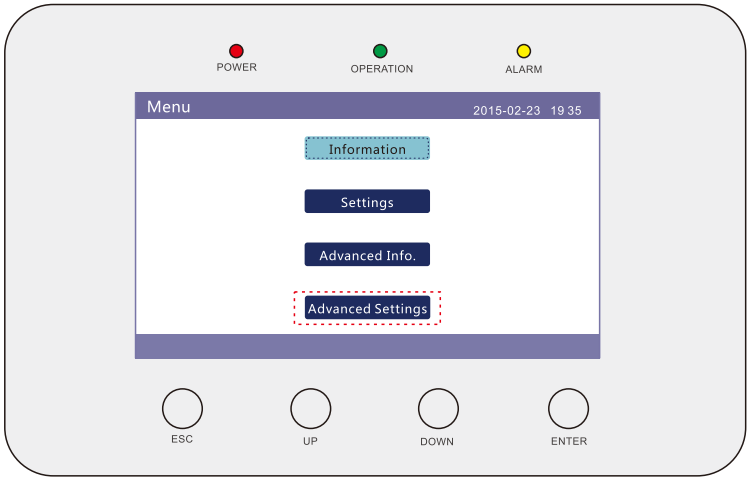
6.1 How to enter the configuration page?

Switch on the battery to power up the inverter, and follow the steps below to enter the configuration page.

Steps: Enter → Down → Advanced Setting → 0010 → Enter → Storage Energy Setting → SE Parameter Setting, Battery Select, Storage Mode Select, Battery Wakeup

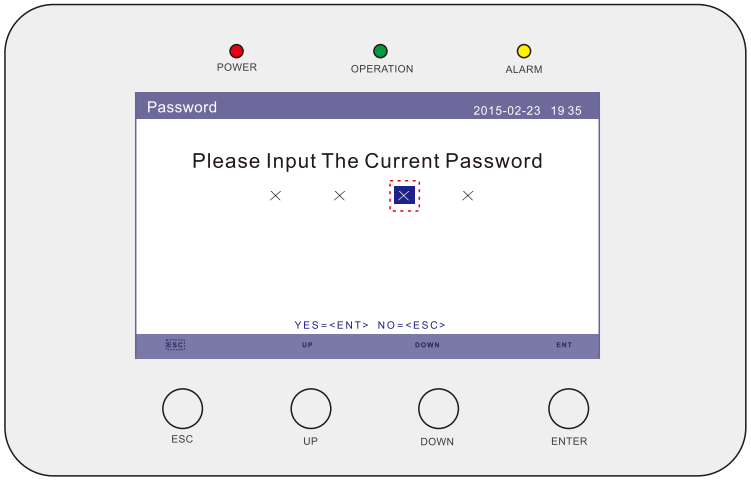


Step2: Press DOWN to select Advanced Settings, then press ENTER

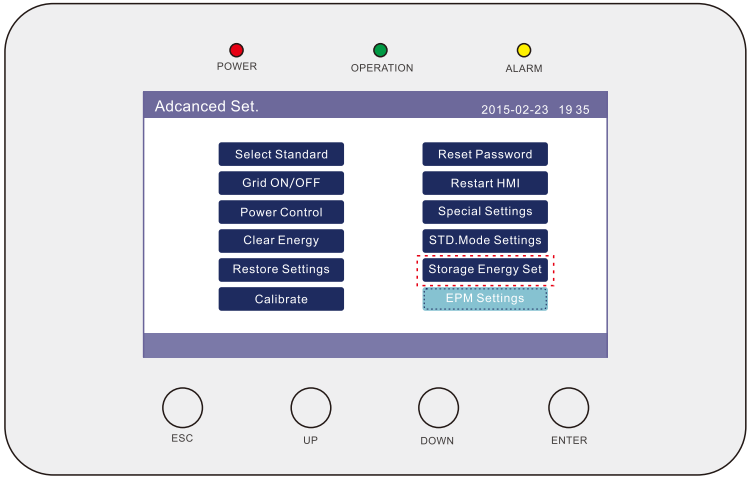


6. System Configuration

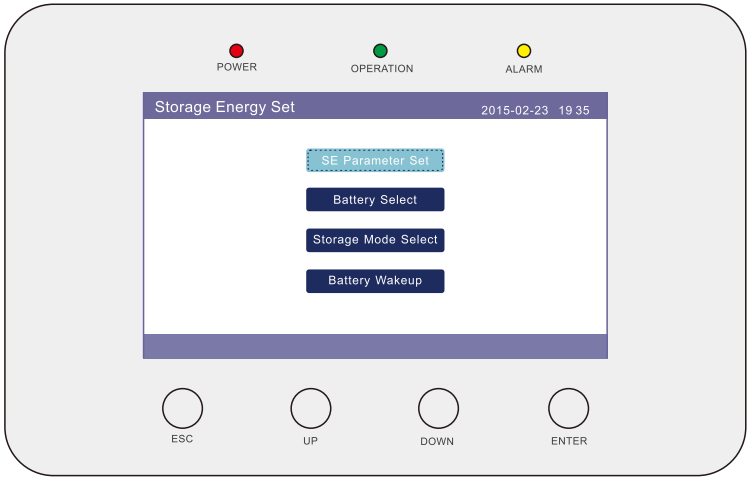
Step3: Press DOWN to select the third X,press UP, then press ENTER



Step4: Press DOWN to select Storage Enerty Set,then press ENTER

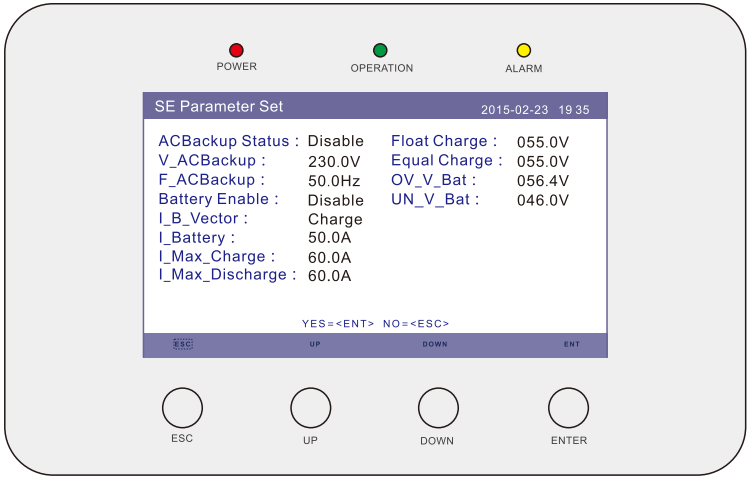


Step5: select one of the submenus shown as below



6.2 SE Parameter Set

Enter the SE Parameter Set menu that shown as below:



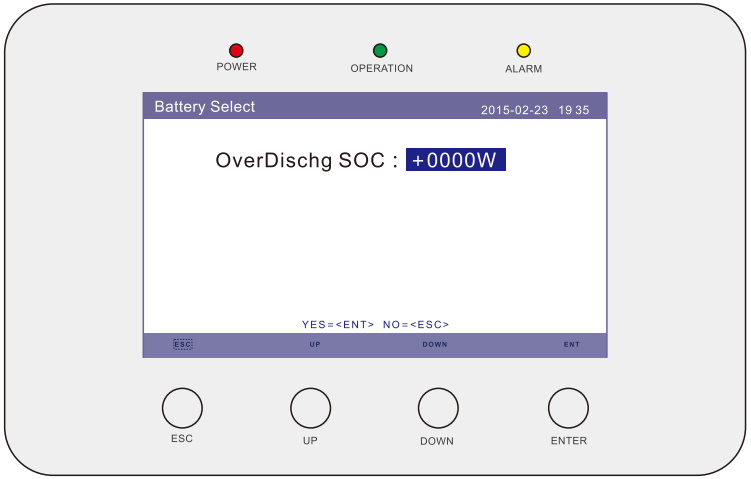
NOTE:

A.When “I_Battery”, “I_Max_Charge” and “I_Max_Discharge” cross each other, the priority is to protect the battery, like the setting above, the max charge current is not 60A, but 50A.

B.Equal charge function is for some special battery, which requires the battery to be charged to full after a certain time period.

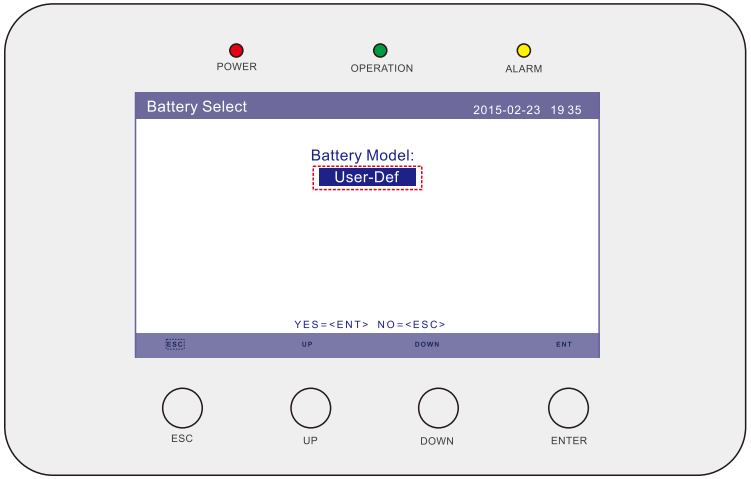
6.3 Battery Select

Enter the “Battery Select” page, there are some battery model choice, When battery model is selected, pre-settings will be imported, user doesn't need to configure the battery parameters except for over discharge SOC.



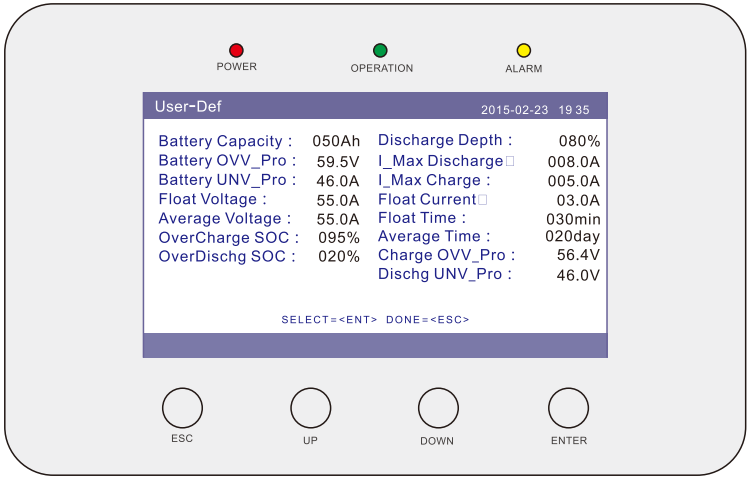
Overdischarge SOC can also use as the remaining SOC when users want to alter battery reserve for grid fail.

If your battery is not included, please choose “User-Def” to configure the battery parameters. You can press UP or Down to select User-Def.



6. System Configuration

Then press ENTER to modify the defaults.



①Battery Capacity: 050Ah, set the capacity of the battery bank;

② Battery OVV_Pro: 59.5V, set the max voltage of battery can be charged to;

③ Battery UNV_Pro: 46.0V, set the mini voltage of battery can be charged to;

④ Float Voltage: 55.0V, set the voltage at float charge mode;

⑤ Average Voltage: 55.0V, set the voltage at float charge mode;

⑥ Overcharge SOC: 095%, set the max SOC of battery can be charged to;

⑦ Overdischarge SOC: 020%, set the mini SOC of battery can be charged to;

⑧ Discharge Dept: 081%, set percentage of battery power can be discharged;

⑨ I_Max_Discharge: 005.0A, set the max discharge current of battery;

⑩ I_Max_Charge: 005.5A, set the max charge current of battery;

⑪ Float Current: 03.0A, set the charge current to get ready for float charge mode;

⑫ Float Time: 030min, since the charge current is lower than float current, after the float time, the inverter will get into float charge mode;

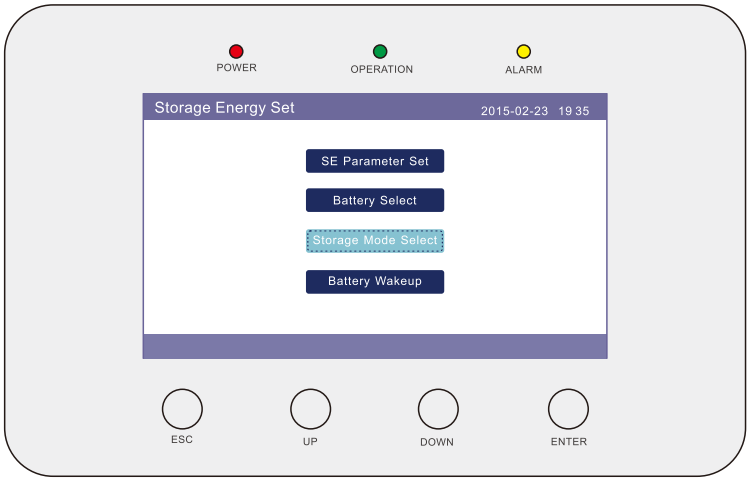
⑬ Average Time: 000day, set the time period for inverter to charge the battery once to full;

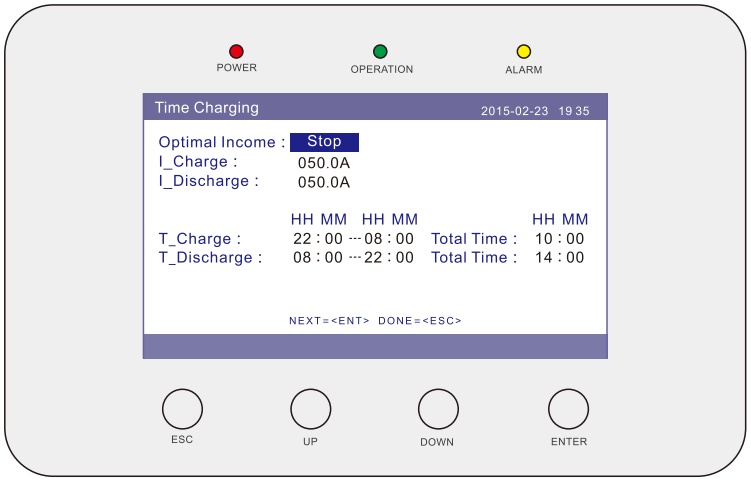
⑭ Charge OVV_Pro: 56.4V, set max voltage of battery can be charged to;

⑮ Discharge UNV_Pro: 46.0V, set the mini vltage of battery can be discharged to.

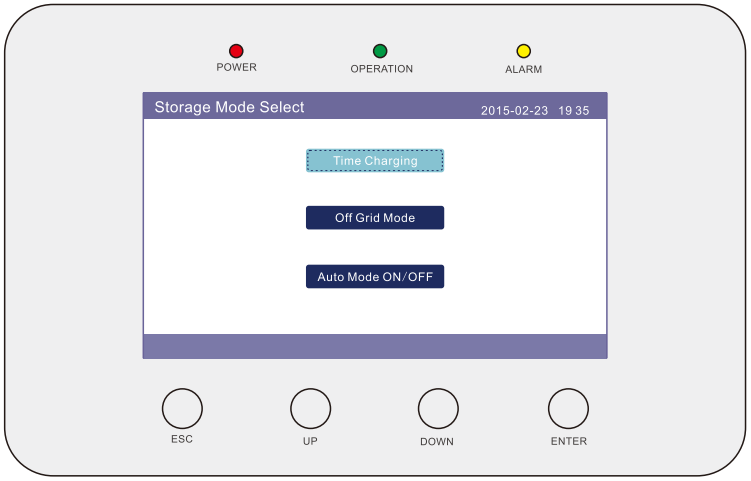
6. System Configuration

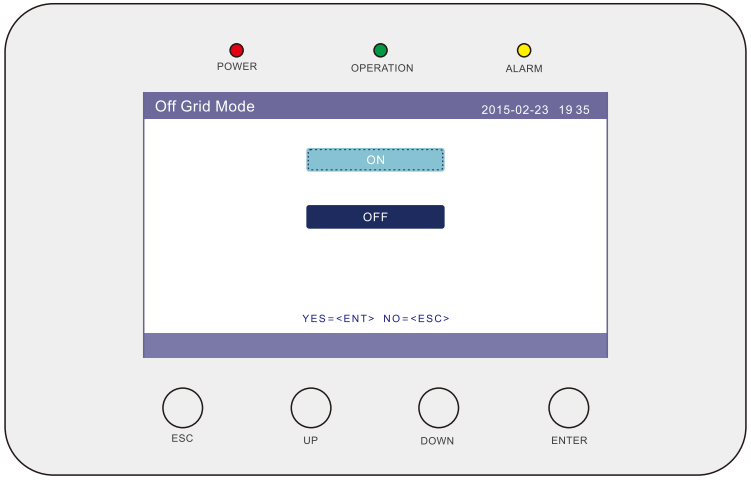
6.4 Storage Mode Select





There are three items in the Storage Mode Select：Time charging, Off Grid Mode and Auto Mode ON/OFF.



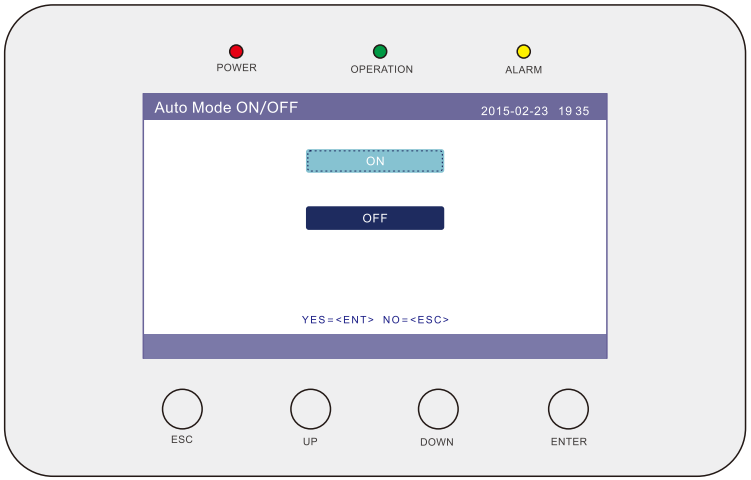


When the hybrid inverter start up, Auto Mode is the default on. which can maximize self consumption of the PV power.

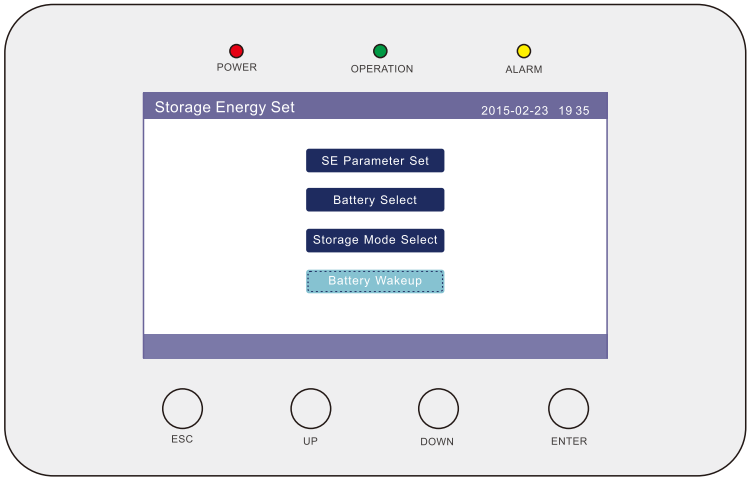
When the users want to charge or discharge the battery at any time they want, they can enable the Time Charging Mode and the set the time they want.

For the users in where there is no grid available, Off Grid Mode is recommended to be enable.

6. System Configuration



6.5 Battery Wakeup



This function should be done after installation.

This function is suggested to active after installlation.

When the inverter detects the battery voltage is near 0V, that probably caused by the battery over discharge, it will try to wake up the battery.

This function conflicts with the battery reverse polarity protection(If the installer connects cables with wrong polarity, the inverter can protect itself from damage).

To avoid the possible damage during installation, do not active battery wakeup function before finishing the first commissioning.

7. Commissioning

7.1 Preparation of Commissioning

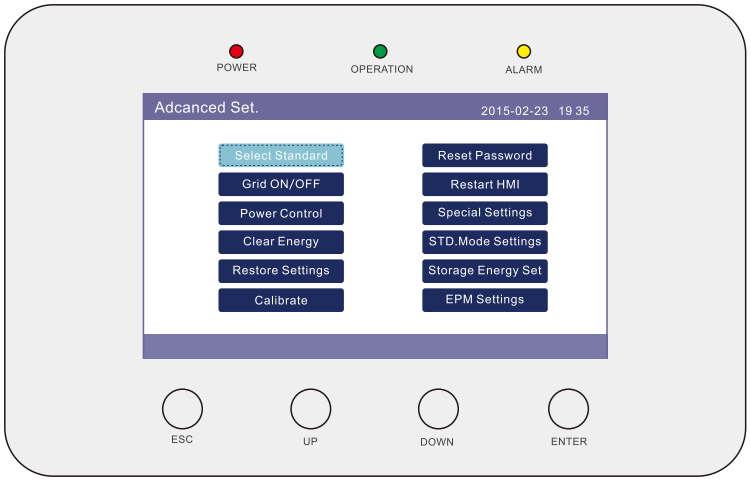
- The installation sites for all the devices are accessible for operation,maintenance and service
- Check and confirm that the inverter is firmly installed.
- Space for ventilation is sufficient for one inverter or multiple inverters.
- Nothing is left on the top of the inverter or battery module.
- Inverter and accessories are correctly connected.
- Cables are routed in safe place or protected against mechanical damage.
- Warning signs and labels are suitably affixed and durable.

7.2 Commissioning Procedure

If all the items mentioned above meet the requirements, proceed as follows to start up the inverter for the first time.

7.2.1 Switch on the AC circuit breaker;

7.2.2 Follow the picture below to select correct safety country;



7.2.3 Refer to “Part 5” to configure the parameters.

7.2.4 Switch on the DC circuit breaker between inverter and battery;

7.2.5 (Optional) When the battery equipped is LG Li-ion battery, Pylon Li-ion Battery, or BYD battery, turn on the switch on the battery manually;

7.2.6 Rotate the DC switch to “ON”. The DC switch may be integrated in RHI inverteror installed separately;

7.2.7 The system will work properly.

Solis RHI Series inverter does not require any regular maintenance. However, clean the heat-sink will help inverter dissipating heat and increase the life time of inverter.The dirt on the inverter can be cleaned with a soft brush.

CAUTION:
Do not touch the surface when the inverter is operating. Some parts may be hot and cause burns. Turn OFF the inverter (refer to Section 6.2) and let it cool down before you do any maintenance or cleaning of inverter.

The LCD and the LED status indicator lights can be cleaned with cloth if they are too dirty to be read.

Note:
Never use any solvents, abrasives or corrosive materials to clean the inverter.

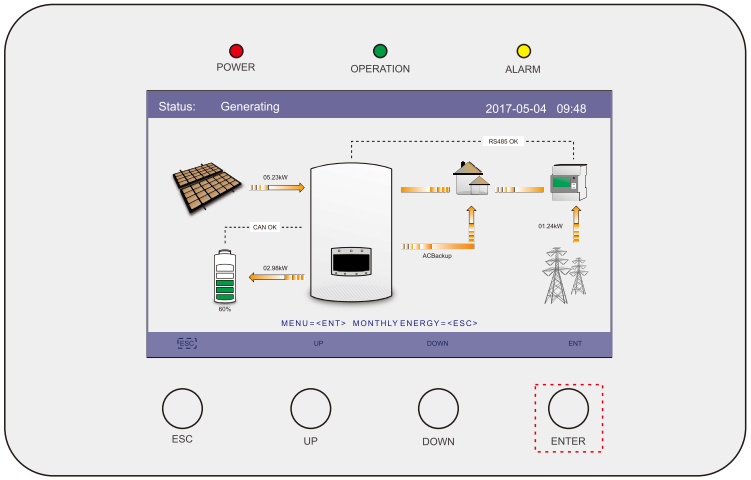
The inverter has been designed in accordance with international grid tied standards for safety, and electromagnetic compatibility requirements. Before delivering to the customer the inverter has been subjected to several to ensure it's optimal operation and reliability.

In case of a failure the LCD screen will display an alarm message. In this case the inverter may stop feeding energy into the grid. The alarm descriptions and their corresponding alarm messages are listed in Table 8.1:

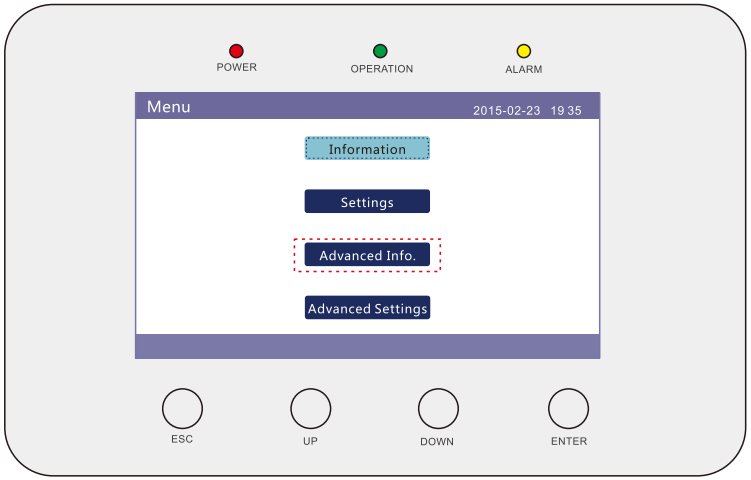
When faults occur, the "Fault" state will be shown on the main screen. Follow the steps below to check what fault occurs.

Steps: Enter → Down → Advanced Info.→ 0010 → Enter →Alarm Message

Step1: Press ENTER

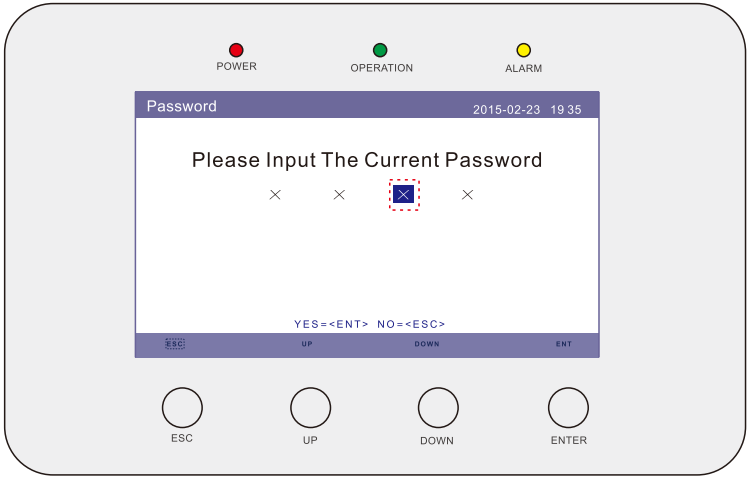


Step2: Press DOWN to select Advanced Info, then press ENTER

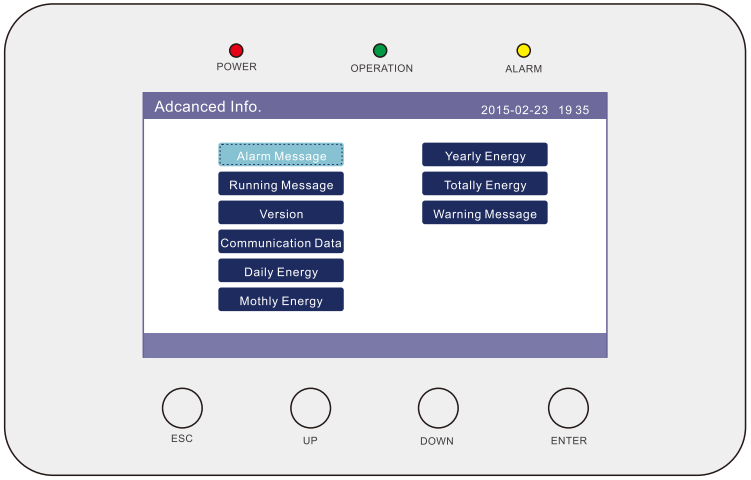


8. Troubleshooting

Step3: Press DOWN to select the third X,press UP, then press ENTER



Step4: Press DOWN to select Alarm Message,then press ENTER.



Alarm Message	Failure description	Solution
No power	Inverter no power on LCD	1.Check PV input connections 2.Check DC input voltage (single phase >120V, three phase >350V) 3.Check if PV+/− is reversed
LCD show initializing all the time	can not start-up	1.Check if the connector on main board or power board are fixed. 2.Check if the DSP connector to power board are fixed.
OV-G-V01/02/03/04	Over grid voltage	1.Resistant of AC cable is too high. Change bigger size grid cable 2.Adjust the protection limit if it's allowed by electrical company.
UN-G-V01/02	Under grid voltage	1.Use user define function to adjust the protection limit if it's allowed by electrical company.
OV-G-F01/02	Over grid frequency	
UN-G-F01/02	Under grid frequency	
G-IMP	High grid impedance	
NO-GRID	No grid voltage	1.Check connections and grid switch. 2.Check the grid voltage inside inverter terminal.
OV-DC01/02/03/04	Over DC voltage	1.Reduce the module number in series
OV-BUS	Over DC bus voltage	1.Check inverter inductor connection 2.Check driver connection
UN-BUS01/02	Under DC bus voltage	
GRID-INTF01/02	Grid interference	1.Restart inverter 2.Change power board
OV-G-I	Over grid current	
IGBT-OV-I	Over IGBT current	
DC-INTF OV-DCA-I	DC input overcurrent	1.Restart inverter 2.Identify and remove the string to the fault MPPT 2.Change power board
IGFOL-F	Grid current tracking fail	1.Restart inverter or contact installer.
IG-AD	Grid current sampling fail	
OV-TEM	Over Temperature	1.Check inverter surrounding ventilation. 2.Check if there's sunshine direct on inverter in hot weather.
INI-FAULT	Initialization system fault	1.Restart inverter or contact installer.
DSP-B-FAULT	Comm. failure between main and slave DSP	
12Power-FAULT	12V power supply fault	
PV ISO-PRO 01/02	PV isolation protection	1.Remove all DC input, reconnect and restart inverter one by one. 2.Identify which string cause the fault and check the isolation of the string.

8. Troubleshooting

Alarm Message	Failure description	Solution
ILeak-PRO 01/02/03/04	leakage current protection	1.Check AC and DC connection 2.Check inverter inside cable connection.
RelayChk-FAIL	Relay check fail	1.Restart inverter or contact installer.
DCinj-FAULT	High DC injection current	1.Restart inverter or contact installer.
AFCI Check FAULT	AFCI module self check fault	1.Restart inverter or contact installer.
ARC-FAULT	ARC detected in DC circuit	1.Check if there's arc in PV connection and restart inverter.

Table 8.1 Fault message and description

NOTE:

If the inverter displays any alarm message as listed in Table 8.1; please turn off the inverter (refer to Section 5.2 to stop your inverter) and wait for 5 minutes before restarting it (refer to Section 5.1 to start your inverter). If the failure persists, please contact your local distributor or the service center. Please keep ready with you the following information before contacting us.

1. Serial number of Solis Single Phase Inverter;
2. The distributor/dealer of Solis Single Phase Inverter (if available);
3. Installation date.
4. The description of problem (i.e. the alarm message displayed on the LCD and the status of the LED status indicator lights. Other readings obtained from the Information submenu (refer to Section 6.2) will also be helpful.);
5. The PV array configuration (e.g. number of panels, capacity of panels, number of strings , etc.);
6. Your contact details.

9. Specifications

Technical Data	RHI-3K-48ES	RHI-3K-48ES	RHI-3K-48ES
Input DC(PV side)			
Max. DC input power	4kw	5kw	6.5kw
Max. power per MPPT	4kW		
The max DC input voltage	600Vdc		
Nominal DC voltage	330V		
Start-up DC voltage(V)	120		
MPPT operating voltage range	90-520V		
Full load MPPT voltage range	141-520V	169-520V	234-520V
MPPT Number	2		
The rating max dc input current(A/B)	11A/11A		
Max. Short Circuit current for each MPPT	17.2A/17.2A		
Battery			
Battery Type	Li-ion		
Battery Voltage range	42 - 58V		
Battery Capacity	50 - 2000Ah		
Maximum Charging Power	3000W		
Maximum Charge/discharge current	62.5A/62.5A		
Output AC(Back-up)			
Rating output power	3kW		
Max. apparent output power	4kVA, 10sec		
Back-up switch time	<10ms		
Operation phase	L-N-PE		
Rating grid voltage	220/230/240Vac		
Rating frequency	50/60Hz		
Rating output current	13A		
THDi	2%(linear load)		
Output AC(Grid side)			
Rating output power	3kW	3.6kW	5kVA(4.6kVA for 4105)
Max. apparent output power	3. 3kW	4kW	5.5kVA(4.6kVA for 4105)
Max. apparent power from grid	5.5kVA		
Operation phase	L-N-PE		
Rating grid voltage	220/230/240Vac		

9. Specifications

The grid voltage range	180~270Vac		
Rating grid frequency	50/60Hz		
AC grid frequency range	47-52Hz or 57-62Hz		
Rating grid output current	13A	15.7A	21.7A
Max. output current	15. 7A	16A	23.8A(21.7 for AUS)
Max. output current from grid	23.9A		
Output power factor	1 (default) and 0.8leading ... 0.8lagging adjustable		
THDi	<2%		
Efficiency			
Max efficiency of Solar Inverting	>97. 5%		
European efficiency of Solar Inverting	>96.8%		
Max efficiency of Battery Inverting	>95%		
Max efficiency of Battery charging	>95%		
Protection			
Ground fault monitoring	Integrated		
Residual current mornitoring unit	Integrated		
DC AFCI	Optional		
DC reverse polarity protection	Yes		
Protection class/Over voltage category	I/IV		
General data			
Dimensions(W/H/D)	333*505*249mm		
Weight(kg)	17		
Operation temperature range	-25℃~60℃		
Protection degree	IP65		
Inverter Topology	High frequency insolation (for battery)		
Noise emission (typical)	<20dBA		
Cooling concept	Natural convection		
Design lifetime	>20 years		
Grid connection standard	En50438, G83/2, G59/3, AS4777.2:2015, VDE0126-1-1, IEC61727, VDE N4105		
Safty/EMC standard	IEC62040-1, IEC62109-1/-2, AS3100, , NB/T 32004, EN61000-6-1, EN61000-6-3		
AC and DC Connections	Quick Connection		
Display	7.0"LCD color screen display		
Interface	CAN/RS485/WiFi/GPRS optional		
Warranty	5 years standard (extend to 20 years)		