



Solis Techview APP

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Please adhere to the actual products in case of any discrepancies in this user manual.

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 AC Coupled Inverter Instruction Manual

Ver 1.0

Ningbo Ginlong Technologies Co., Ltd.

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1. Introduction

1.1 Product Description

The Solis AC-Coupled inverter is used for upgrade the existing on-grid power generation system to a hybrid system which can work with batteries to optimize self-consumption. The Solis AC-Coupled inverter model type:

RAI-3K-48ES-5G

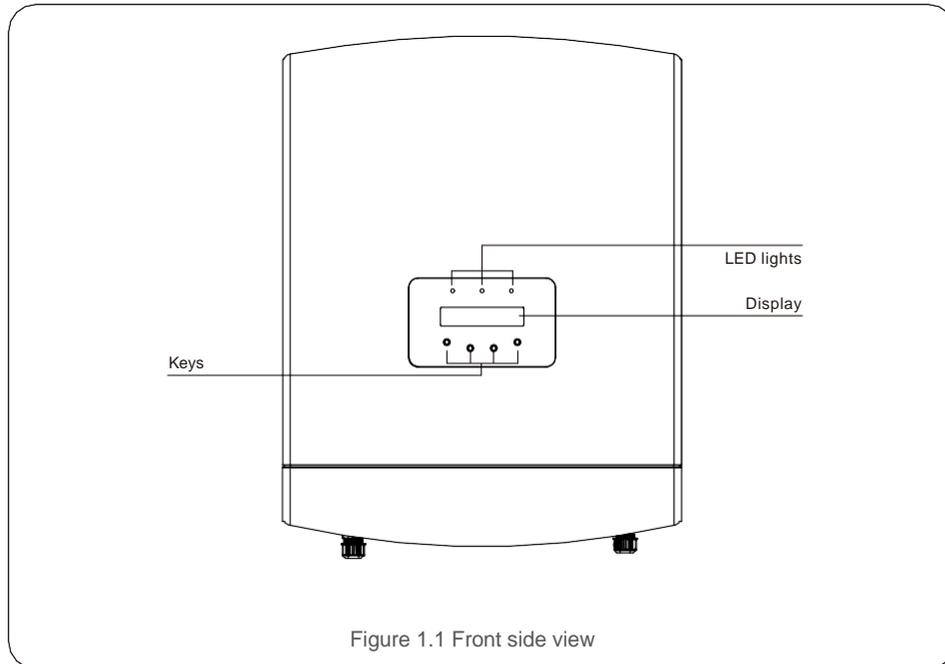


Figure 1.1 Front side view

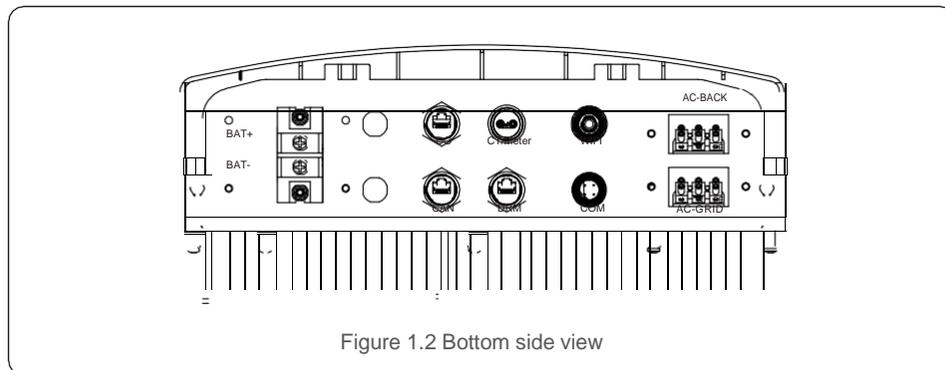
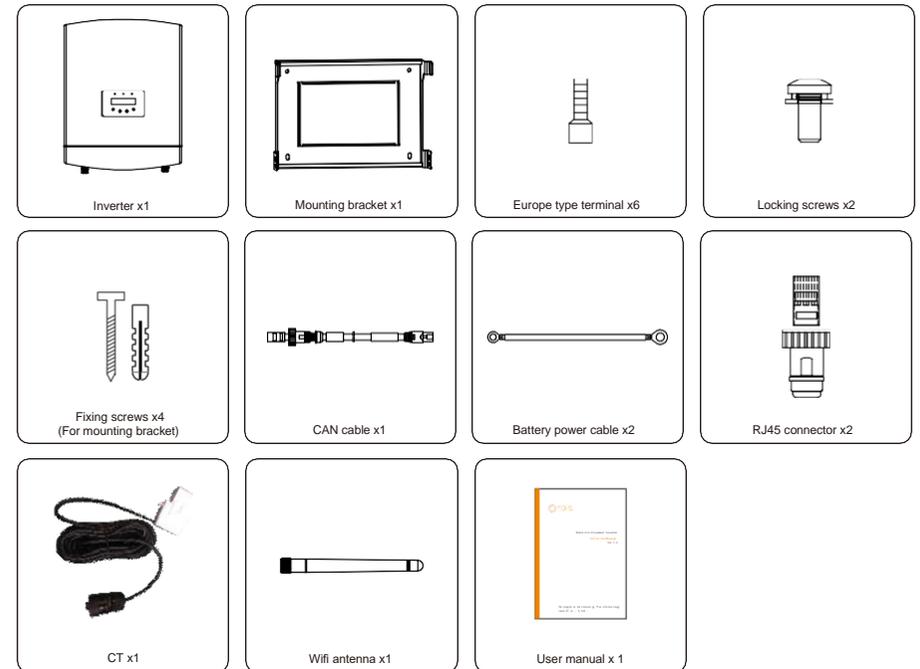


Figure 1.2 Bottom side view

1. Introduction

1.2 Packaging

Please ensure that the following items are included in the package along with your inverter:



If anything is missing, please contact your local Solis distributor.

2. Safety & Warning

2.1 Safety

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



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 positive (+) or negative (-) cable 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 7 minutes after disconnection from the utility grid and the DC input.

2. Safety & Warning



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:

Risk of electric shock from energy stored in capacitors of the Inverter, do not remove cover for 7 minutes after disconnecting all power sources (service technician only). Warranty may be voided if the cover is removed without authorization .



CAUTION:

The surface temperature of the inverter can reach up to 75°C (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.



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.

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. Overview

3.1 Screen

Solis AC-Coupled inverter adopts LCD screen, it displays the status, operating information and settings of the inverter.

3.2 Keypad

There are four keys on 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 and modify the settings (the ESC and ENTER keys).

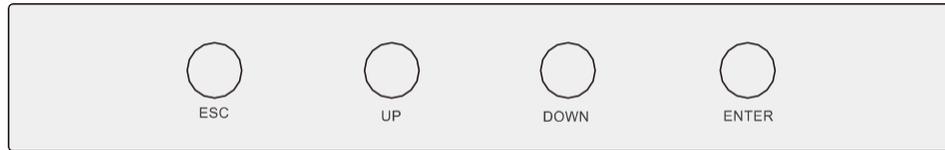


Figure 3.1 Keypad

3.3 Terminal Connection

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

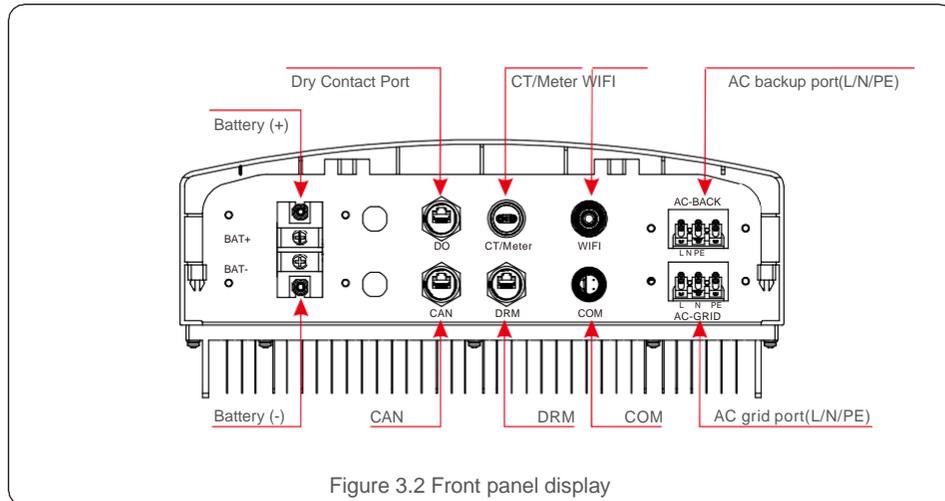


Figure 3.2 Front panel display



WARNING:

Please refer to the specification of the battery before configuration.

4. Installation

4.1 Select a Location for the Inverter

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

- Exposure to direct sunlight may cause output power derating. It is recommended to avoid installing the inverter in direct sunlight.
- It is recommended that the inverter is installed in a cooler ambient which doesn't exceed 104°F/40°C.

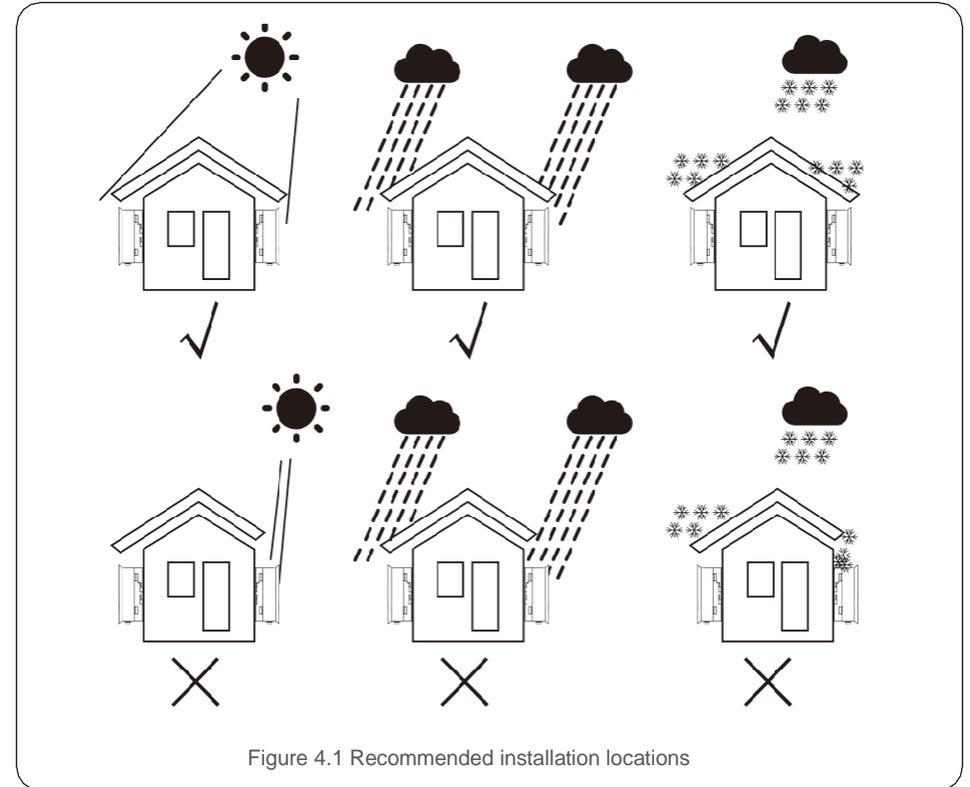
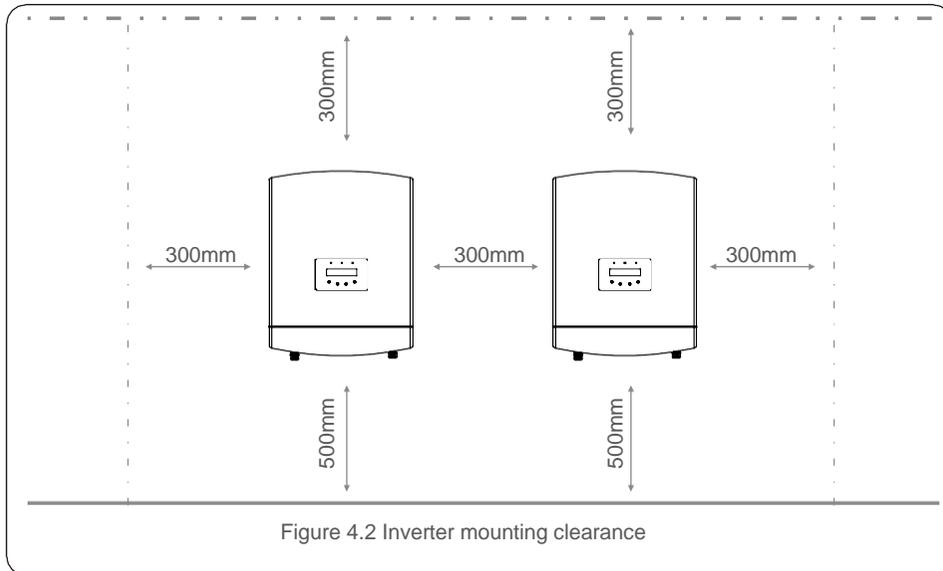


Figure 4.1 Recommended installation locations

4. Installation

- Install on a wall or strong structure capable of bearing the weight of the inverter (15kg).
- Install vertically with a maximum incline of +/- 5 degrees, exceeding this may cause output power derating.
- To avoid overheating, always make sure the flow of air around the inverter is not blocked. A minimum clearance of 300mm should be kept between inverters or objects and 500mm clearance between the bottom of the inverter and the ground.



- Visibility of the LEDs and LCD should be considered.
- Adequate ventilation must be provided.



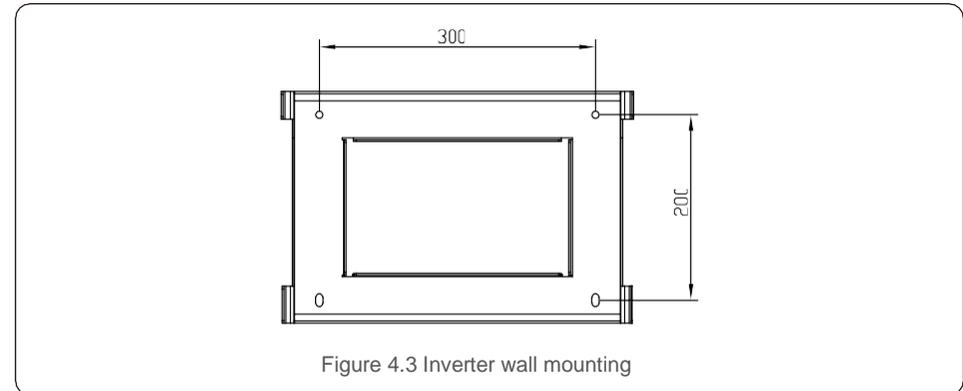
NOTE:

Nothing should be stored on or placed against the inverter.

4. Installation

4.2 Mounting the Inverter

Dimensions of mounting bracket:



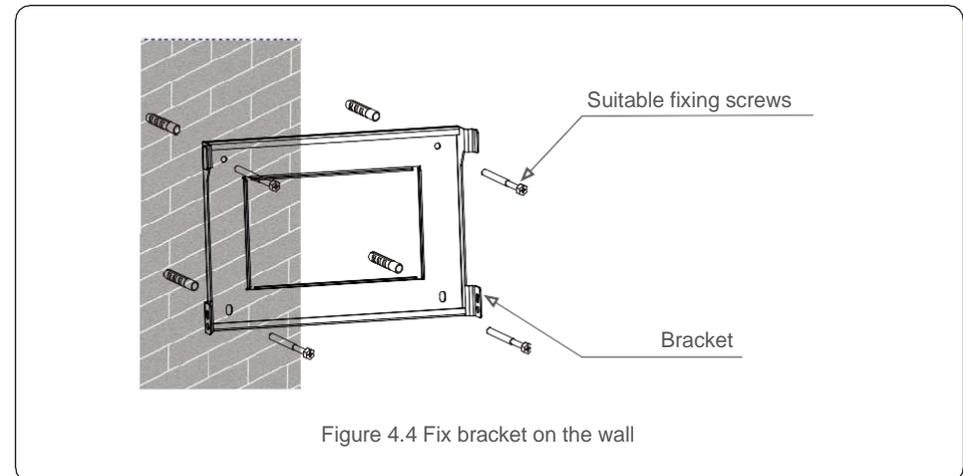
Once a suitable location has been found according to 4.1, please refer to figure 4.3 and figure 4.4 and mount the wall bracket to the wall.

The inverter shall be mounted vertically.

The steps to mount the inverter are listed below:

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.



WARNING:

The inverter must be mounted vertically.

4. Installation

2. 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 secured (see Figure 4.5)

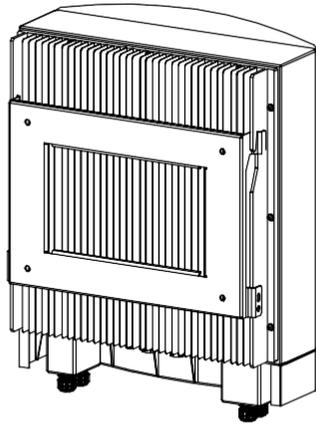


Figure 4.5 Wall mount bracket

Please make sure to remove the cover at the bottom of the inverter before assembling the terminals.

Remove the cover as shown in the picture and follow the direction to lift the cover, make sure the buckles on the left and right sides are correctly loosened.

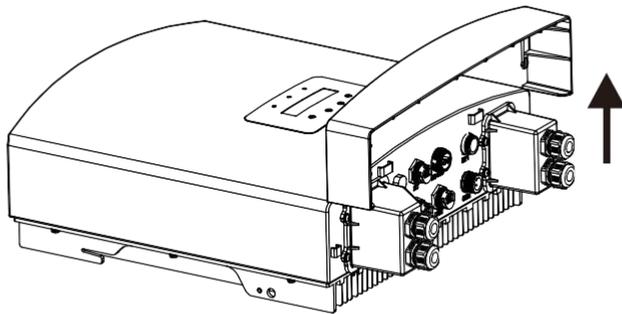


Figure 4.6 Remove the cover

4. Installation

4.3 Assemble the Battery Cables



WARNING:

Incorrect polarity of the battery cable may lead to permanent damage on the device.



WARNING:

To avoid DC Arc, Solis recommends installing DC switch between batteries and AC-Coupled Inverter.

Ensure the correct polarity of batteries before connecting to the inverter.

Step 1. Please unlock the 4*M4 screws on the battery port protection cover as shown in the below figure.

Step 2. Insert the battery power cables (in package) into the water-proof swivel nut on the cover, (Break the plastic film on it).

Step 3. Fasten the battery power cables onto the BAT+ and BAT- terminals on the inverter. Please make sure the labels on cable and inverter match up.

Step 4. Lock the 4*M4 screws and fix the cover onto the inverter.

Step 5. Connect the other side of the battery power cables to the battery.

M4 cross screws

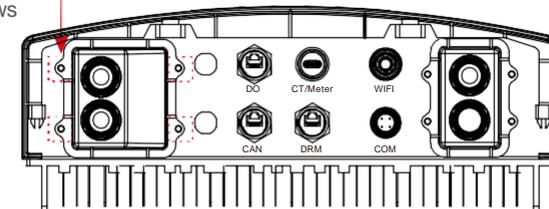


Figure 4.7

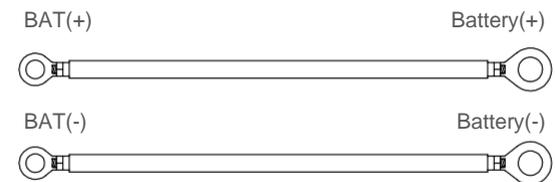


Figure 4.8

4. Installation

4.4 Assemble the AC Cables

There are two AC terminals and the assembly steps for both are the same (AC backup port and AC grid port).

Step 1. Please unlock the 4*M4 screws on the AC ports protection cover as shown in the below figure.

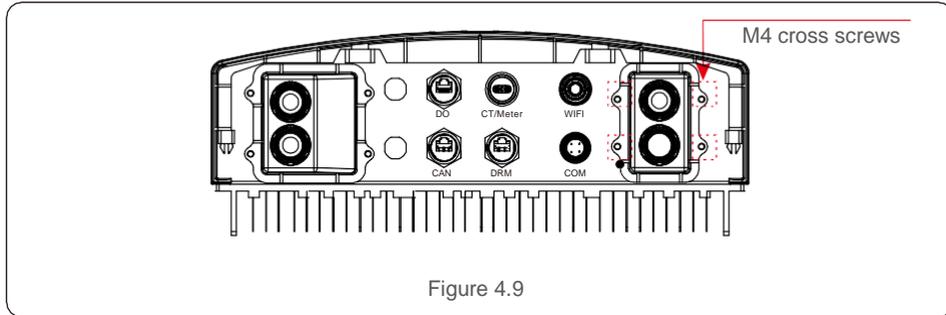


Figure 4.9

Step 2. Insert the AC grid cables and AC backup cables into the corresponding water-proof swivel nut on the cover, (Break the plastic film on it). Make sure you use a cable within the correct specifications as shown in the table below.

Remove a length of 40mm of the cable jacket and strip the wire insulation to a length of 10-12mm.

Describe	Numerical value
Wire diameter	6~12mm
Traverse cross sectional area	6mm ²
Exposure Length	12mm

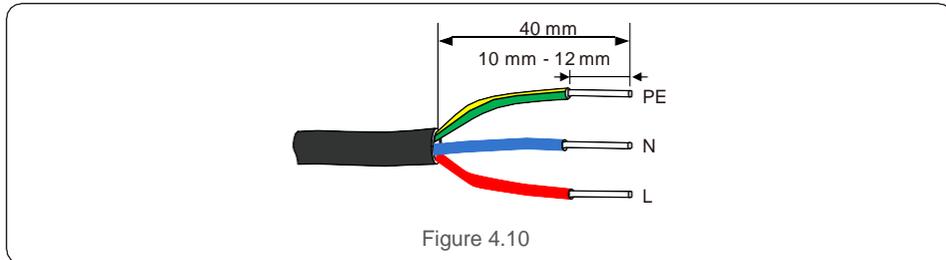


Figure 4.10

Step 3. Fasten the AC cables onto the terminals on the inverter. Please make sure the correct polarity. Ensure that the correct conductor is fastened (0.7 N.m. torque) to the correct terminal.

4. Installation

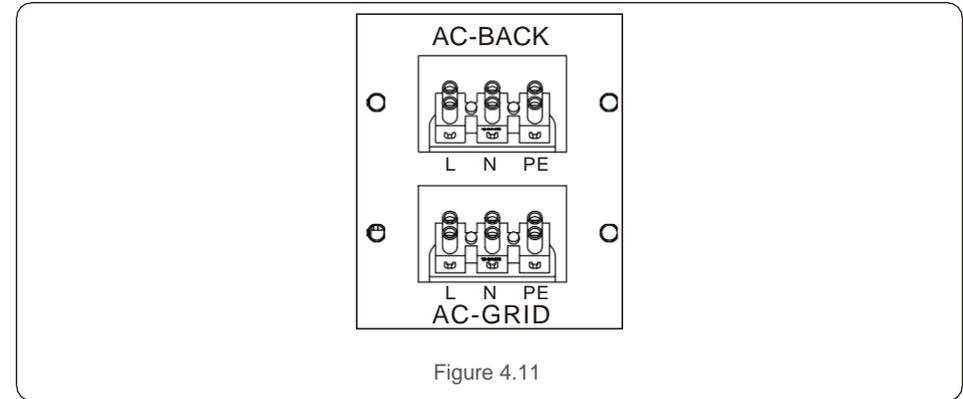


Figure 4.11



WARNING:

Observe the terminal layout of terminal block.
Do not connect the phase lines to "PE" terminal, otherwise the inverter will not function properly.

Step 4. Lock the 4*M4 screws and fix the cover onto the inverter.

4.5 CT Installation

RAI-3K-48ES-5G inverter requires a CT to measure the power flow to/from the grid.

This will provide information to the RAI-3K-48ES-5G inverter about when to charge or discharge the battery thus maximizing the self-consumption rate.

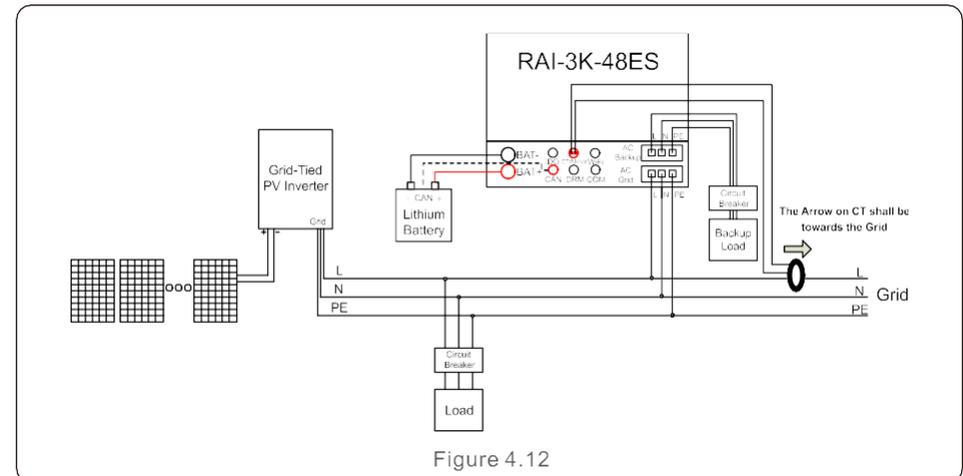


Figure 4.12

4. Installation

4. Installation

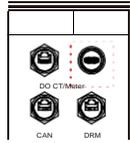


Figure 4.13 2-pin CT cable

4.6 Assemble Other Cables

1. Battery CAN communication cable



Figure 4.14



NOTE:

The CAN cable enables the communication between the inverter and the Li-ion battery from BYD, PYLON, etc. Please check for latest model compatibility before installation.

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



NOTE:

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

2. Logic interface communication cable (Only for UK)

Logic interface is required by G98 and G99 standard that can be operated by a simple switch or contactor. When the switch is open circuited the inverter can operated normally. When the switch is closed, the inverter will reduce it's output power to zero within 5s. Pin5 and Pin6 of RJ45 terminal is used for the logic interface connection.

Please follow steps below to assemble DRM RJ45 connector.

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

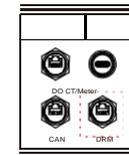
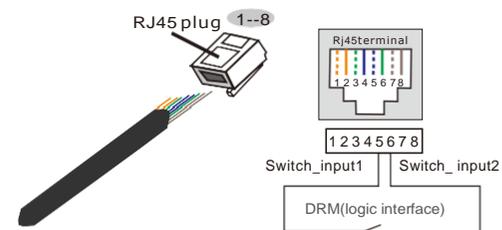


Figure 4.15 RJ45 communication connection terminals

Step 2. Use the network wire stripper to strip the insulation layer of the communication cable. According to the standard line sequence of figure 4.16 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, Pin5 and Pin6 of RJ45 terminal is used for the logic interface, other Pins are reserved.
 Pin 1: Reserved; Pin 2: Reserved
 Pin 3: Reserved; Pin 4: Reserved
 Pin 5: Switch_input1; Pin 6: Switch_input2
 Pin 7: Reserved; Pin 8: Reserved

Figure 4.16 Strip the insulation layer and connect to RJ45 plug

Step 3. Connect RJ45 to DRM port (logic interface) .



NOTE:

To use this function, please contact the manufacturer.

4. Installation

4.7 LED Indicates

There are three LED indicators on the Solis AC Coupled inverter (Red, Green, and Orange) which indicate the working status of the inverter.



Light	Status	Description
● POWER	ON	The inverter can detect DC power.
	OFF	No DC power.
● OPERATION	ON	The inverter is fully operational.
	OFF	The inverter has stopped operating.
	FLASHING	The inverter is initializing.
● ALARM	OFF	No fault condition detected.
	FLASHING	Fault condition is detected.

Figure 4.17 Status indicator lights

4. Installation

4.8 Solis TechView Illustration

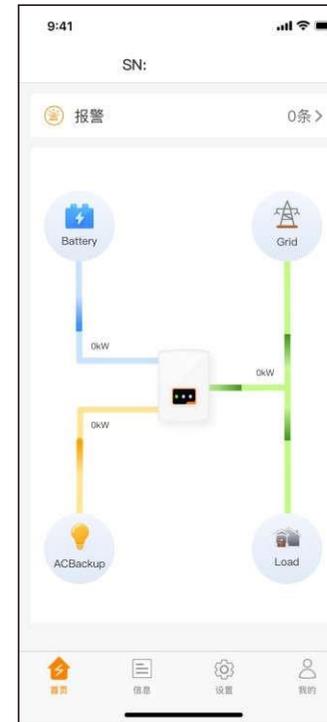


Figure 4.18

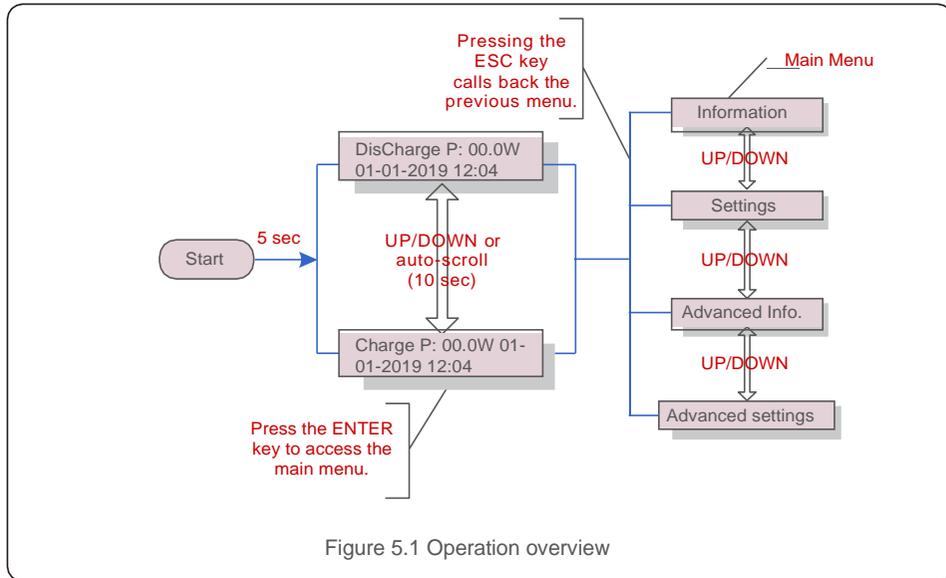
RAI series inverter can be controlled by LCD or APP (Solis TechView). For IOS system, please go to AppStore to search for "Solis TechView", then download and install it. For Android system, please go to Google Play to search for "Solis TechView", then download and install it. Besides, it can be also installed by scanning the QR code on the back cover of this manual.

To use the APP to control the inverter, you need to make sure the inverter is operating and then use your mobile device to connect the WiFi signal of the inverter (Factory defaults is Solis - inverter SN, and initial password is solis100. If any questions, please refer to Solis TechView quick guide). Then, you can enter the APP to view the information and change the settings of the inverter.

5. Operation

5. Operation

During normal operation, the display alternately shows the power and the operation status with each screen lasting for 10 seconds (see Figure 5.1). Screens can also be scrolled manually by pressing the UP and DOWN keys. Press the ENTER key to access to the Main Menu.



5.1 Main Menu

There are four submenus in the Main Menu (see Figure 5.1):

1. Information
2. Settings
3. Advanced Info.
4. Advanced Settings

5.2 Information

The Solis AC-Coupled Inverter main menu provides access to operational data and information. The information is displayed by selecting "Information" from the menu and then by scrolling up or down.

There are 5 submenus in the Information :

1. General Info
2. System Info
3. Energy Records
4. BMS Info
5. CT Info

Display	Description
Inverter SN 00000000000000	Series number of the inverter.
Device/Battery/Backup Waiting	Device/Battery/Backup Status.
Grid: Off Grid Mode	Working mode.
Wakeup: NO	Battery wakeup setting.
DRMNO.: 08	DRM No.
Model.: 00	Model number of the inverter.
SoftVer.: 500000	Firmware version of the inverter.

Figure 5.2 Information list (General Info)

Display	Description
Grid Power: +00.0kW	Grid Power
Grid Voltage: 000.0V	Grid Voltage
Grid Frequency: 00.00Hz	Grid Frequency
Battery Voltage: 000.0V	Battery Voltage
Backup Voltage: 000.0V	Backup Voltage
Charge P: 00.0kW	Battery Charge Power
DisCharge P: 00.0kW	Battery Discharge Power

Figure 5.3 Information list (System Info)

Display	Description
BattChgE Total: 000000kWh	Total battery charge energy
BattChgE Today: 000.0kWh	Today battery charge energy
BattChgE Lastday: 000.0kWh	Yesterday battery charge energy
BattDisChgE Total: 000000kWh	Total battery discharge energy
BattDisChgE Today: 000.0kWh	Today battery discharge energy
BattDisChgE Lastday: 000.0kWh	Yesterday battery discharge energy
GridGetE Total: 000000kWh	Total energy imported from grid
GridGetE Today: 000.0kWh	Today energy imported from grid
GridGetE Lastday: 000.0kWh	Yesterday energy imported from grid
Grid SendE Total: 000000kWh	Total energy exported to grid
Grid SendE Today: 000.0kWh	Today energy exported to grid
Grid SendE Lastday: 000.0kWh	Yesterday energy exported to grid
LoadE Total: 000000kWh	Total load consumption
LoadE Today: 000.0kWh	Today load consumption
LoadE Lastday: 000000kWh	Yesterday load consumption

Figure 5.4 Information list (Energy Records)

Display	Description
Battery V: 00.00V Battery I: +00.0A	Battery voltage and current
Charge Lmt: 000.0A Discharge Lmt: 000.0A	Battery charge/discharge current limitation
SOC Value: 000% SOH Value: 000%	SOC and SOH of battery
BMS Status: CAN Fail	BMS communication status

Figure 5.5 Information list (BMS Info)

Display	Description
CT Current: 00.00A	CT current
CT Power: +000000W	CT power

Figure 5.6 Information list (CT Info)

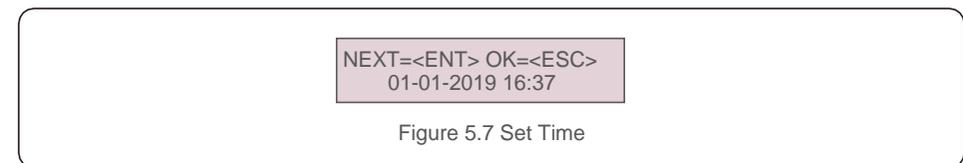
5.3 Settings

The following submenus are displayed when the Settings menu is selected:

- 1.Set Time/Date
- 2.Set Address

5.3.1 Set Time/Date

This function allows time and date setting. When this function is selected, the LCD will display as shown in Figure 5.7.



5. Operation

5.3.2 Set Address

This function is used for set the address when mutiple inverters are connected to single monitor.

The address number can be assigned from "01"to "99". The default address number is "01".



YES=<ENT> NO=<ESC>
Set Address: 01

Figure 5.8 Set address

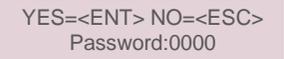
5.4 Advanced Info



NOTE:

To access to this area is for fully qualified and accredited technicians only. Enter menu "Advanced Info." and "Advanced settings" (need password) .

Select "Advanced Info." from the Main Menu. The screen will require the password as below:



YES=<ENT> NO=<ESC>
Password:0000

Figure 5.9 Enter password

The default password is "0010". Please press "down" to move the cursor, press "up" to select the number.

After entering the correct password the Main Menu will display a screen and be able to access to the following information.

- 1.Alarm Message
- 2.Warning Message
3. Running Status
- 4.Communication Data
- 5.Yield Profile

5.4.1 Alarm Message

The display shows the 100 latest alarm messages.



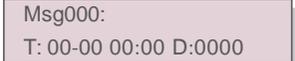
Alarm000: ACOvercurrent
T: 02-21 22:15 D: 0000

Figure 5.10 Alarm message

5. Operation

5.4.2 Warning Message

The display shows the 100 latest warning messages.



Msg000:
T: 00-00 00:00 D:0000

Figure 5.11 Warning message

5.4.3 Running Status

This function is for maintenance person to get running message.

General status includes: DC bus voltage, power factor, power l limit, inverter temperature, grid standard

Advanced status includes: Control word status, Grid filter No.,Ground voltage, etc.

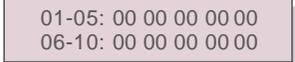


→ General Status
Advanced Status

Figure 5.12 Running status

5.4.4 Communication Data

The screen shows the internal data of the Inverter, which is for service technicians only.



01-05: 00 00 00 00 00
06-10: 00 00 00 00 00

Figure 5.13 Communication data

5.4.5 Yield Profile

The section shows the energy records of the battery, grid, load and backup port.



→ Energy Battery
Energy Grid

Figure 5.14 Yield profile

5.5 Advanced Settings



NOTE:

To access to this area is for fully qualified and accredited technicians only. Please follow 5.4 to enter password to access this menu.

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

1. Select Standard 2. Grid Switches 3. Battery Control 4. Backup Control
5. Storage Energy Set 6. STD. Mode Settings 7. Software Update
8. Export Power Set 9. Calibrate 10. Reset Password 11. Restart HMI

5.5.1 Selecting Standard

This function is used for select the grid's reference standard.

YES=<ENT> NO=<ESC>
Standard: G98

Figure 5.15 Selecting standard



NOTE:

This function is for technicians use only.

Selecting the "User-Def" menu will access to the following submenu.

→OV-G-V1: 260V
OV-G-V1-T: 1S

Figure 5.16



NOTE:

The " User-Def" function can be only used by the service engineer and must be allowed by the local energy supplier.

Below is the setting range for " User-Def". Using this function, the limits can be changed manually.

OV-G-V1: 240---270V

OV-G-V1-T: 0.1---9S

OV-G-V2: 240---300V

OV-G-V2-T: 0.1---1S

UN-G-V1: 170---210V

UN-G-V1-T: 0.1---9S

UN-G-V2: 110---210V

UN-G-V2-T: 0.1---1S

Startup-T:10---600S

Restore-T:10---600S

OV-G-F1: 50.2-53Hz(60.2-63Hz)

OV-G-F1-T: 0.1---9S

OV-G-F2: 50.2-53Hz(60.2-63Hz)

OV-G-F2-T: 0.1---9S

UN-G-F1: 47-49.5Hz(57-59.5Hz)

UN-G-F1-T: 0.1---9S

UN-G-F2: 47-49Hz(57-59.5Hz)

UN-G-F2-T: 0.1---9S

5.5.2 Grid Switches

This function is used for start up or stop working.

→Grid ON
Grid OFF

Figure 5.17 Set grid ON/OFF

5.5.3 Battery Control

This function is used for set the battery.

→Battery Select

Figure 5.18 Battery control

5. Operation

5.5.3.1 Battery Select

There are some options about battery modules. When some battery module is selected, pre-settings will be imported, user doesn't need to configure the battery parameters except for over discharge SOC and forced charge SOC.



NOTE:

Available Batteries with built-in protocol: Pylon, BYD.



Battery Select:
PYLON

Figure 5.19 Battery select

The OverDischg SOC can be set from 10% to 40%.
The ForceChagre SOC can be set from 5% to OverDischg SOC.



Overdischg SOC:
029%

Figure 5.20 Overdischg SOC

5.5.4 Backup Control

This function is used for set the backup port.



Backup ON/OFF
Backup Settings

Figure 5.21 Backup control

5. Operation

5.5.4.1 Backup ON/OFF

This switch is to enable or disable the backup port of the inverter.



Set Backup:
OFF

Figure 5.22 Backup ON/OFF

5.5.4.1 Backup Settings

Set the voltage/frequency of the backup port.
Enable or disable the voltage droop.



Backup Voltage:
230.0V

Figure 5.23 Backup settings

5.5.5 Storage Energy Set

It includes "Stg mode select" which defines different working logic of the hybrid inverter. There are two options in the Stg Mode Select: Time charging and Off-grid.

Another default mode is Auto mode (Maximize the self-consumption rate) which is not shown in the setting. Once the inverter is started, it is working in the Auto mode.

If want to switch back to Auto mode, simply turn off the other modes, then it is automatically operating in the Auto mode, even though it is NOT shown on the screen. The user can set the time periods, for when the inverter charges and discharges the batteries, using Time Charging Mode.

In installations where no grid is present, it is recommended to use Off-Grid mode.



Mode:
Off Grid Mode

Figure 5.24 Storage energy set

5.5.6 STD. Mode Settings

There are 5 settings under STD. Mode settings.

1. Working mode
2. Power Rate limit
3. Freq. Derate set
4. 10mins OV-G-V set.
5. Initial Settings



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

5.5.6.1 Enable logic interface settings

When select G98 or G99 standard to use the logic interface function, please follow below settings to enable the DRM. DRM default setting is "OFF", if DRM set "ON", but the logic interface un-connected to the switch or the switch is open, the inverter HMI will display "Limit by DRM" and the inverter output power will be limited to zero.

1. Select Initial Settings
2. Select DRM and set it "ON"

5.5.7 Software Update

There are 2 settings under Software Update.

1. HMI Update
2. DSP Update



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

5.5.8 Export Power Set

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

1. Meter/CT Select
2. EPM ON/OFF
3. Backflow Power

5.5.8.1 Meter/CT Select

There are 2 settings in this menu as below:

1. CT
2. Meter

5.5.8.2 EPM ON/OFF

There are 2 settings in this menu as below:

1. ON
2. OFF

5.5.8.3 Backflow Power

This submenu is used for set allowed power that inverter can send to grid.

YES=<ENT> NO=<ESC>
P_Backflow:-0001W

Figure 5.25 Backflow power

5.5.9 Calibrate

Maintenance or replacement could clear or cause a different value of total energy. This function allows user to revise the value of total energy to the same value as before. If the monitoring website is used the data, it will be synchronous with this setting automatically.

YES=<ENT> NO=<ESC>
Energy:000000kWh

Figure 5.26 Calibrate

5.5.10 Reset Password

This function is used for set the new password for menu "Advanced info." and "Advanced information".

YES=<ENT> NO=<ESC>
Password: 0000

Figure 5.27 Reset password

Enter the right password before set new password. 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. Operation

5.5.11 Restart HMI

The function is used for restart the HMI.



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

6. Commissioning

6.1 Preparation of Commissioning

- Ensure 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.

6.2 Commissioning Procedure

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

6.2.1 Switch on the AC-backup and AC-grid.

6.2.2 Follow the picture below to select grid standard.

YES=<ENT> NO=<ESC>
Standard:G98

6.2.3 Switch on the DC circuit breaker between inverter and battery.

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

6.2.5 The relay will make 'clicking' sounds and it will take a short-time to work automatically.

6.2.7 The system will work properly.

7. Troubleshooting

Solis AC-Coupled inverter does not require any regular maintenance. However, cleaning the heatsink will help inverter dissipating heat and increase the lifetime 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 tests to ensure its 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 7.1:

7. Troubleshooting

Alarm Message	Failure description	Solution
OV-G-V	Grid Overvoltage	Check if the grid is correctly connected, wait for the grid to be normal.
UN-G-V	Grid Undervoltage	Check if the grid is correctly connected, wait for the grid to be normal.
OV-G-F	Grid Overfrequency	Check if the grid is correctly connected, wait for the grid to be normal.
UN-G-F	Grid Underfrequency	Check if the grid is correctly connected, wait for the grid to be normal.
NO-Grid	No Grid	Check if the grid is correctly connected, wait for the grid to be normal.
OV-BUS	DC Bus overvoltage	Restart the inverter, if the fault still exists, contact Solis after-sale service.
UN-BUS	DC Bus voltage sampling Error	Restart the inverter, if the fault still exists, contact Solis after-sale service.
DC-INTF.	Battery Overcurrent	Restart the inverter, if the fault still exists, contact Solis after-sale service.
IGFOL-F	Grid Current Tracking Error	Restart the inverter, if the fault still exists, contact Solis after-sale service.
OV-G-I	Grid Overcurrent	Restart the inverter, if the fault still exists, contact Solis after-sale service.
AC Transient over current	AC Transient Overcurrent	Check if the backup port is shorted, Restart the inverter, if the fault still exists, contact Solis after-sale service.
DCInj-FAULT	Over DC injection	Restart the inverter, if the fault still exists, contact Solis after-sale service.
IGBT-OV-I	IGBT Overcurrent	Restart the inverter, if the fault still exists, contact Solis after-sale service.
OV-TEM	Internal Over Temperature	Check if the inverter installation meets the requirements listed in the manual, Restart the inverter, if the fault still exists, contact Solis after-sale service.
RelayChk-FAIL	Relay Fault	Restart the inverter, if the fault still exists, contact Solis after-sale service.
GRID-INTF02	Grid Interference 02	Restart the inverter, if the fault still exists, contact Solis after-sale service.
IG-AD	Grid Current Sampling Error	Restart the inverter, if the fault still exists, contact Solis after-sale service.
OV-IgTr	Grid Transient Overcurrent	Restart the inverter, if the fault still exists, contact Solis after-sale service.
OV-Vbatt-H	Battery Hardware Overcurrent	Check if the battery is correctly connected or the battery contactor is disconnected, Restart the battery, Restart the inverter, if the fault still exists, contact Solis after-sale service.

7. Troubleshooting

Alarm Message	Failure description	Solution
OV-ILLC	LLC Hardware Overcurrent	Restart the inverter, if the fault still exists, contact Solis after-sale service.
OV-Vbatt	Battery Overvoltage	Check if the battery overvoltage setting is reasonable, if the battery reaches its end of life.
UN-Vbatt	Battery Undervoltage	Check if the battery overvoltage setting is reasonable, if the battery reaches its end of life.
DSP-B-FAULT	Slave DSP Check Error	Restart the inverter, if the fault still exists, contact Solis after-sale service.
NO-Battery	Battery Not Connected	Check if the battery is correctly connected or the battery contactor is disconnected, Restart the battery.
OV-Vbackup	Inverting Overvoltage	Restart the inverter, if the fault still exists, contact Solis after-sale Service.
Over-Load	Backup Overload	Check if the backup port is shorted or the load is larger than the limitation.
CT-Fail	CT Installed Fail	Check if CT is correctly installed or the cables are broken/loosen .
MET_Comm_FAIL	Meter COM Fail	Check if the CT/Meter setting is correct or the cables are broken/loosen.
CAN_Comm_FAIL	Battery CAN Fail	Check if the CAN cable is correctly connected or the cables are broken/loosen.
DSP_Comm_FAIL	DSP COM Fail	Restart the inverter, if the fault still exists, contact Solis after-sale service.
Alarm-BMS	Battery BMS Alarm	Retart the battery, if fault still exists, please contact battery manufacturer or installer.
BatName-FAIL	Wrong Battery Model	Make sure the actual battery model matches the selection on inverter LCD.

Table 7.1 Fault message and description

7. Troubleshooting



NOTE:

If the inverter displays any alarm message as listed in Table 7.1; please turn off the inverter and wait for 5 minutes before restarting it . 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 Inverter;
2. The distributor/dealer of Solis 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 system configuration.
6. Your contact details.

8. Specifications

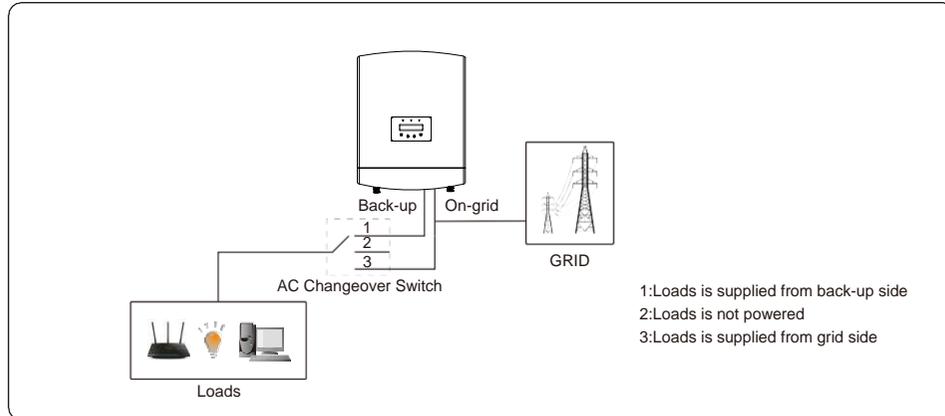
Technical Data	RAI-3K-48ES-5G
AC Output	
Norminal AC power[VA]	3000
Max. apparent AC power[VA]	1.5*Prated, 10s;1.2*Prated, 30s
Rated grid voltage[V]	230
Rated grid Frequency[Hz]	50/60
Norminal AC current[A]	13
Displacement power factor	0.8 leading to 0.8 lagging
THDi, rated power	<3%
Connection phase	Single
The inrush current[A]	28
The maximum output fault current[A]	20
The maximum output overcurrent protection[A]	40
The backfeed current to battery[A]	0
Battery	
Nominal battery voltage[V]	48
Battery voltage range[V]	40-60
Max.charge/discharge current[A]	60
Communication interfaces	CAN
Battery Type	Lithium-ion
Protection	
Battery reverse protection	Yes
Battery over and under voltage protection	Yes
Short circuit protection	Yes
Output over current protection	Yes
Output over voltage protection	Yes
temperature protection	Yes

8. Specifications

Efficiency	
Max. Battery charge efficiency	94.0%
Max. Battery discharge efficiency	94.5%
AC Output(Back-up)	
Rated power[VA]	3000
Rated voltage[V],Frequency[Hz]	230, 50/60
Rated current[A]	13
Peak output power[W], Duration[s]	1.5*Prated, 10s
Switch time[s]	<3
Total harmonic distortion (THDv, @linear Load)	<3%
Environment Limit	
Ingress protection	IP65
Operating temperature range	-25°C~60°C
Humidity	0..100%, No Condensing
Altitude[m]	2000
Noise emission(typical)[dB]	<35
System Parameters	
Demensions(WxHxD) [mm]	403*525*170
Weight [kg]	15
Standby Losses[W]	<8
Cooling concept	Natural
Topology	High frequency isolation
Communication	WiFi, RS485, CAN, DRM (logic interface)
Display	LCD & APP
Dry port	2
Standard warranty [year]	5 years (Optional:extension to 10 years)
Cetification	IEC62477-1, IEC61000-6-1/-2/-3/-4, VDE4105:2018, VDE0126, IEC62109, IEC62040.1, AS4777.2, G98, G99

9. Appendix

9.1 Special Back-up Connection



If RAI needs maintenance, then just switch AC Changeover Switch to position 3 as shown above. Thus the loads will be supplied by grid.

AC Changeover Switch is a 3rd party item not supplied by Ginlong.