



Solis RHI Series Hybrid Inverter

(RHI-3P(5-10)K-HVES-5G) **Instruction Manual**

(For Australia)

Ver 1.3

Ginlong Technologies Co., Ltd.
No. 57 Jintong Road, Binhai Industrial Park, Xiangshan, Ningbo,
Zhejiang, 315712, P.R.China.
Tel: +86 (0)574 6578 1806
Fax: +86 (0)574 6578 1606
Email: info@ginlong.com
Web: www.ginlong.com

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.



Ginlong Technologies Co., Ltd.

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1. Introduction

1.1 Product Description

The Solis RHI series is designed for residential hybrid systems, which can work with batteries to optimize self-consumption. The unit can operate in both off- and on-grid modes.

The Solis RHI series has 4 different models:

RHI-3P5K-HVES-5G, RHI-3P6K-HVES-5G, RHI-3P8K-HVES-5G, RHI-3P10K-HVES-5G

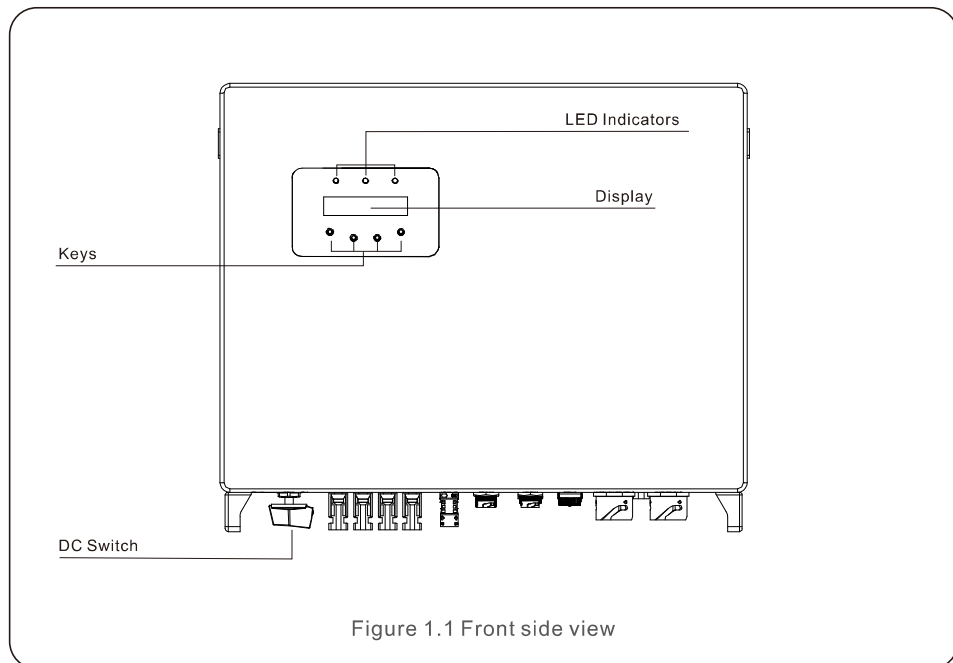


Figure 1.1 Front side view

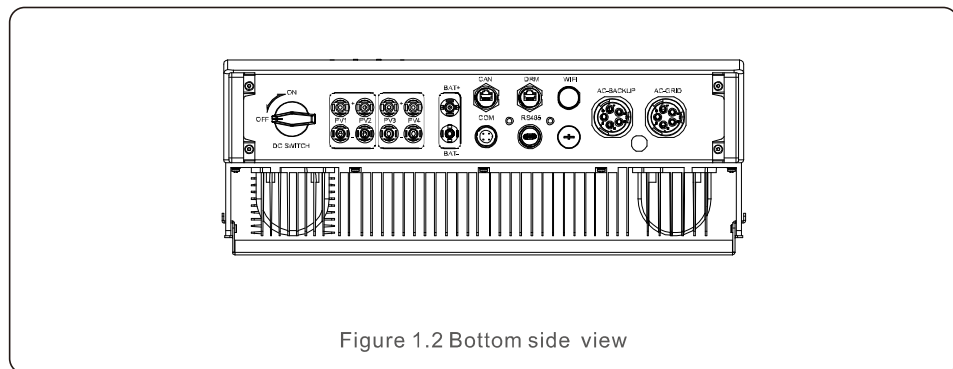
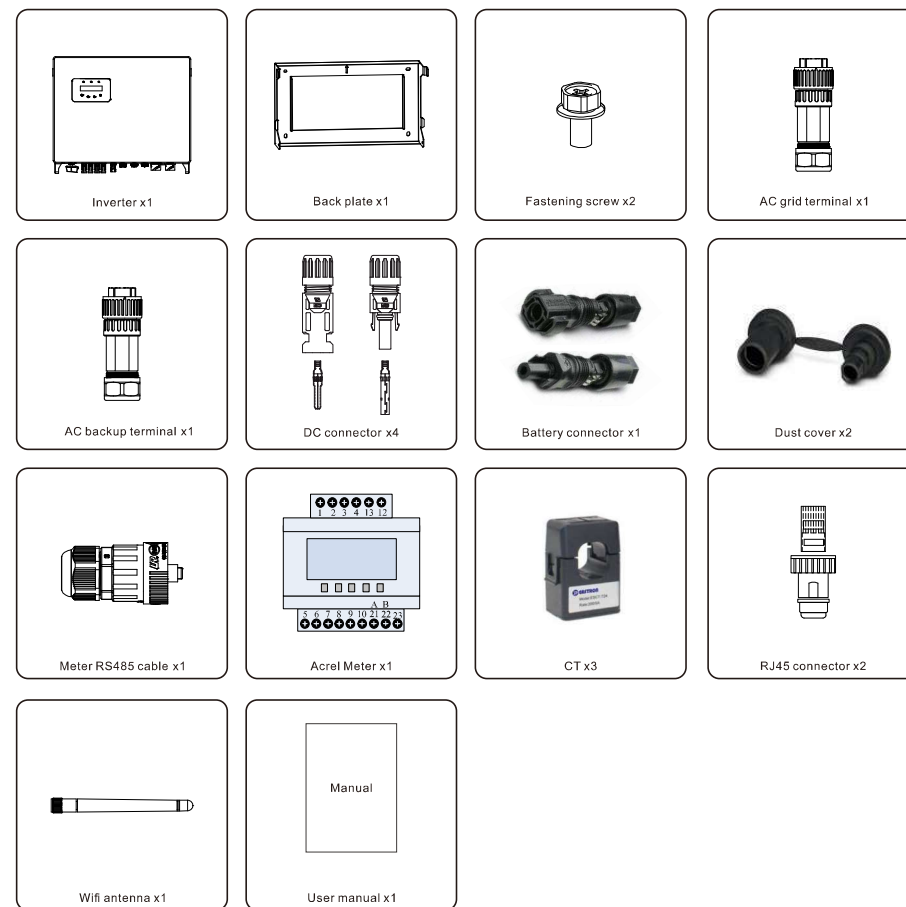


Figure 1.2 Bottom side view

1. Introduction

1.2 Packaging

Please ensure that the following items are included in the packaging with your machine:



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 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 isolators that comply with the NEC Article 690, Part II.



NOTE:

A suitable external DC isolation switch shall be installed for battery, to meet local standard requirements and installation regulations..



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 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 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.



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:

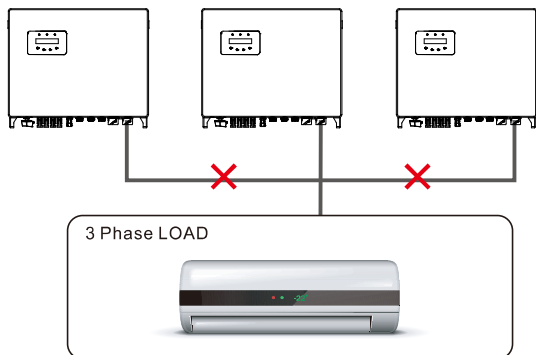
AC-BACKUP of RHI series is forbidden to connect to the grid.

2. Safety & Warning



WARNING:

The RHI series does not support parallel (three- and single-phase) operation on the AC-BACKUP port. Parallel operation of the unit will void 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. Overview

3.1 Screen

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

3.2 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 and modify the settings (the ESC and ENTER keys).



Figure 3.2 Keypad

3.3 Terminal Connection

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

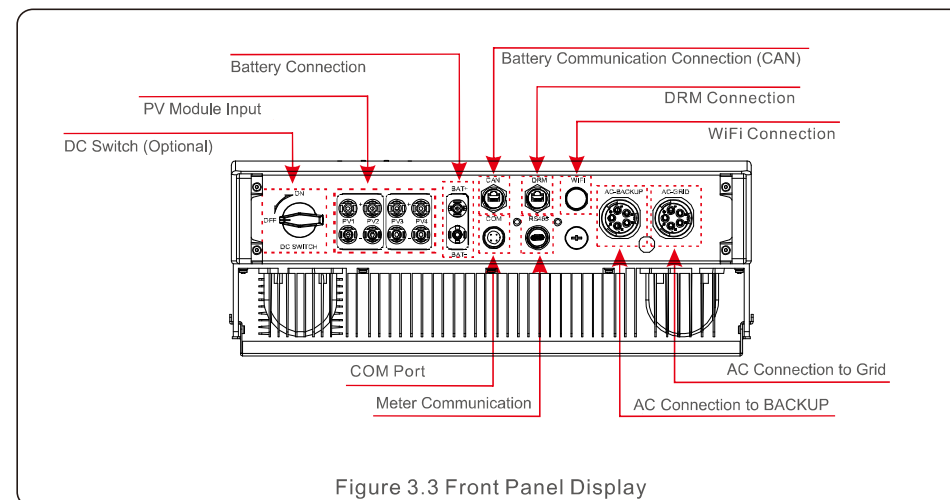


Figure 3.3 Front Panel Display



WARNING:

Please refer to the specification of the battery before configuration.

4. Installation

4.1 Product handling

Please review the instruction below for handling the inverter:

- 1 The red circles below denote cutouts on the product package. Push in the cutouts to form handles for moving the inverter (see Figure 4.1).

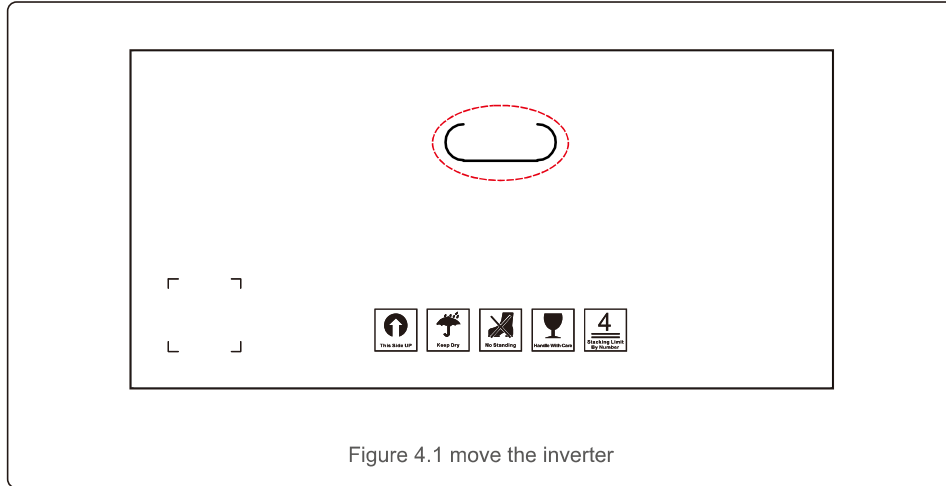


Figure 4.1 move the inverter

2. Open the carton, then handle both sides of inverter through the area denoted dotted line. (see figure 4.2).

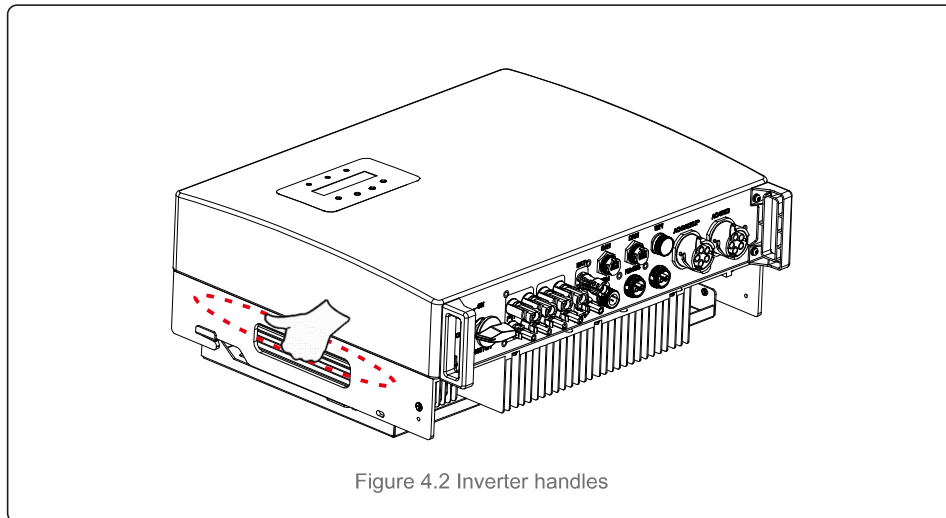


Figure 4.2 Inverter handles

4. Installation

4.2 Product Storage

If the inverter is not to be installed immediately, storage instructions and environmental conditions are below:

- Use the original box to repackage the inverter, seal with adhesive tape with the desiccant inside the box.
- Store the inverter(s) in a clean and dry place, free of dust and dirt.
- Storage temperature must be between -40°C and 70°C and the humidity must be between 0 and 100% non-condensing.
- Stack no more than four (4) inverters high.
- Keep box(es) away from corrosive materials to avoid damage to the inverter enclosure.
- Inspect packaging regularly. If packaging is damaged (wet, pest damage, etc), repackage the inverter immediately.
- Store the inverter(s) on a flat, hard surface - not inclined or upside down.
- After long-term storage, the inverter needs to be fully examined and tested by qualified service or technical personnel before using.
- Restarting after a long period of non-use requires the equipment to be inspected and, in some cases, the removal of oxidation and dust that has settled inside the equipment will be required.

4. Installation

4.3 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 104F/40C.

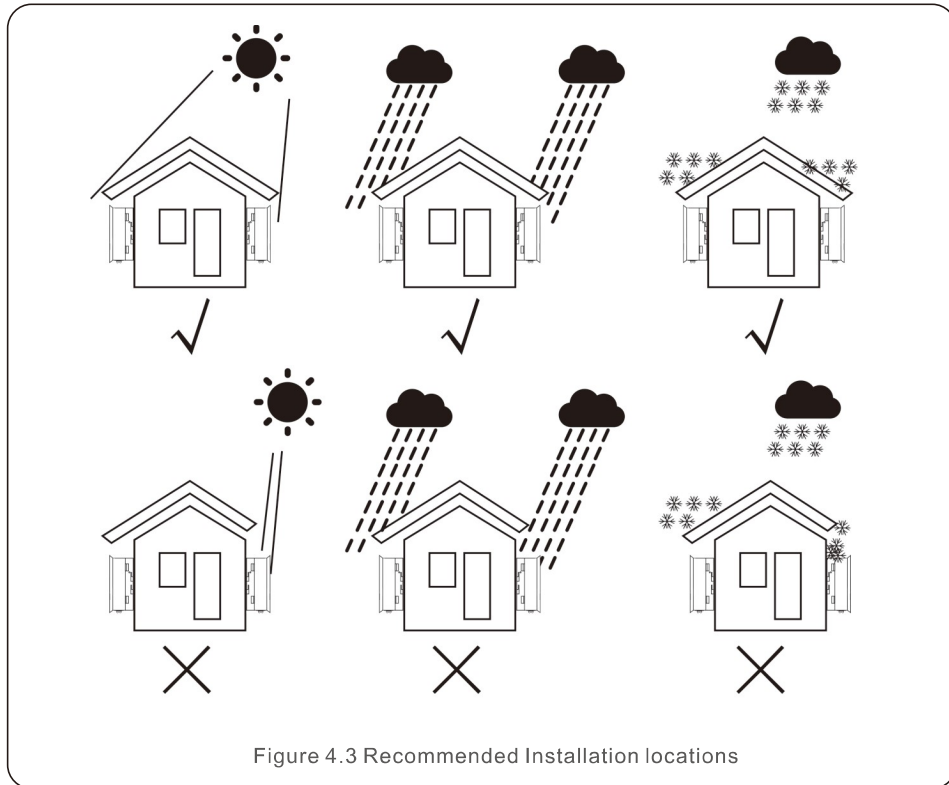


Figure 4.3 Recommended Installation locations



WARNING: Risk of fire

Despite careful construction, electrical devices can cause fires.

- Do not install the inverter in areas containing highly flammable materials or gases.
- Do not install the inverter in potentially explosive atmospheres.

4. Installation

- Install on a wall or strong structure capable of bearing the weight of the machine (24kg).
- 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 500mm should be kept between inverters or objects and 500mm clearance between the bottom of the machine and the ground.

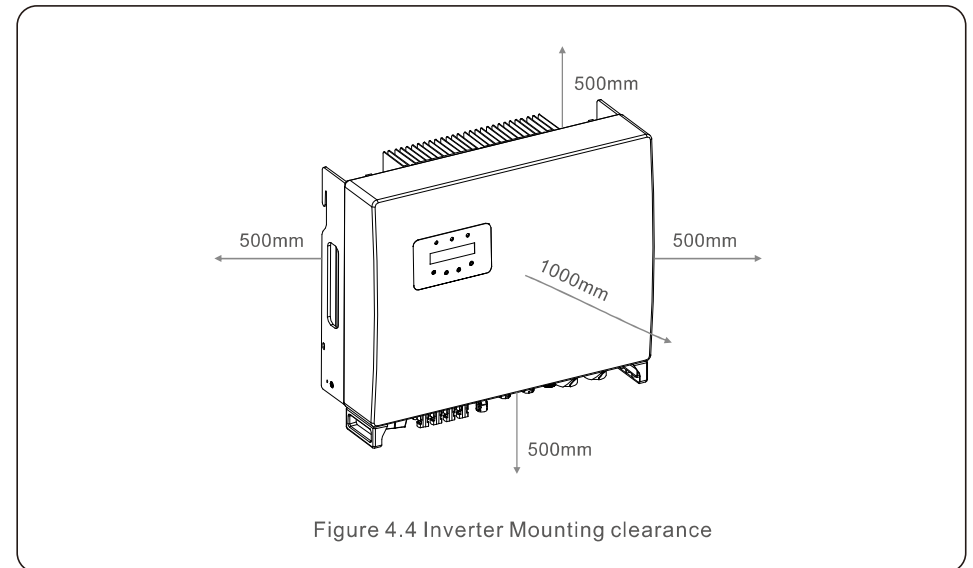


Figure 4.4 Inverter Mounting clearance

- 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

4.4 Mounting the Inverter

Dimensions of mounting bracket:

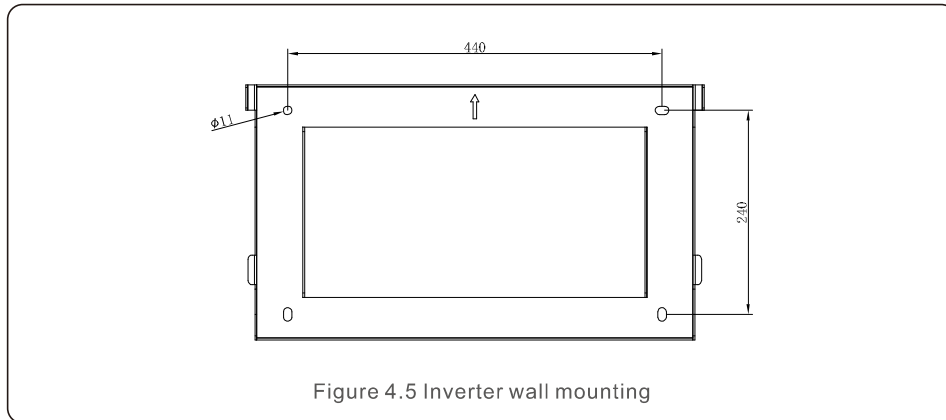


Figure 4.5 Inverter wall mounting

Once a suitable location has been found accordingly to 4.3 using figure 4.5 and figure 4.6 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.

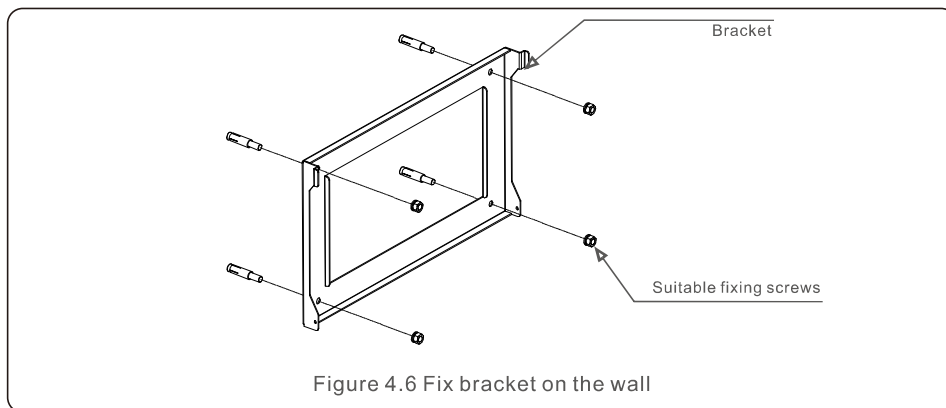


Figure 4.6 Fix bracket on the wall



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 secure.

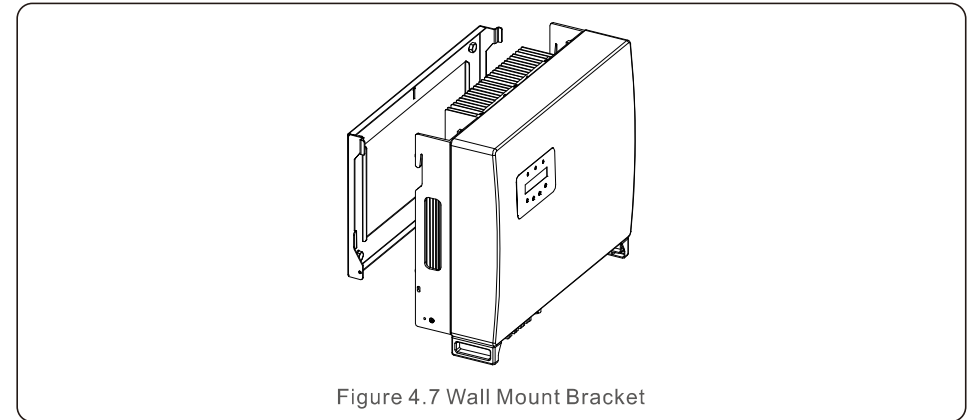


Figure 4.7 Wall Mount Bracket

4.5 PV Input Terminal Assembly

Please ensure the following before connecting the inverter:

- Make sure the voltage of the PV string will not exceed the max DC input voltage (1000Vdc).
Violating this condition will void the warranty.
- Make sure the polarity of the PV connectors are correct.
- Make sure the DC-switch, battery, AC-BACKUP, and AC-Grid are all in their off-states.
- Make sure the PV resistance to ground is higher than 20K ohms.

The Solis RHI series inverter uses the MC4 connectors. Please follow the picture below to assemble the MC4 connectors.

PV wire cross-sectional area requirements: 2.5~4mm².

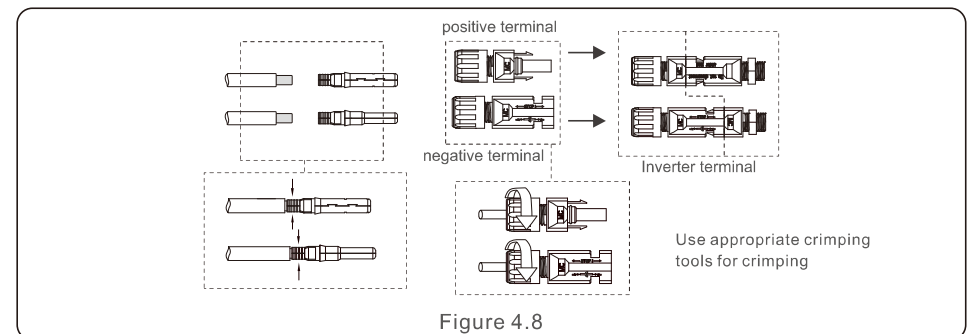


Figure 4.8

4. Installation

4.6 Battery Terminal Components

Quick connector is used for battery connection. The connector is suitable for tin-plated cables with a conductor cross section of 2.5-6mm² (AWG14-10).
 Battery cable outside diameter range: 5.5mm - 8.0mm.



NOTE:

A bladed screwdriver with a 3-mm wide blade is required to perform the connection.

- Step 1. Strip 15mm off the conductor using a suitable stripping tool for this.
- Step 2. Open the spring using a screwdriver as below. (see figure 4.9)
- Step 3. Insert the stripped wire with twisted litz wires all the way in.
 The wire ends have to be visible in the spring. And then close the spring. (see figure 4.10)
- Step 4. Push the insert into the sleeve and tighten the cable gland with 2N.m torque. (see figure 4.11)
- Step 5. Fit the connectors to the battery ports at the bottom of the inverter with correct polarity and a "click" sound. (see figure 4.12)

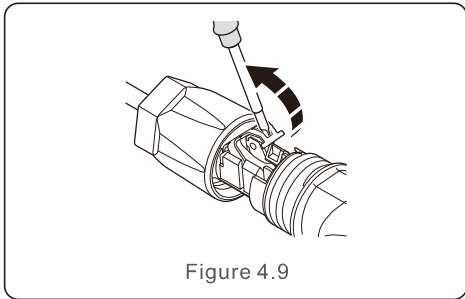


Figure 4.9

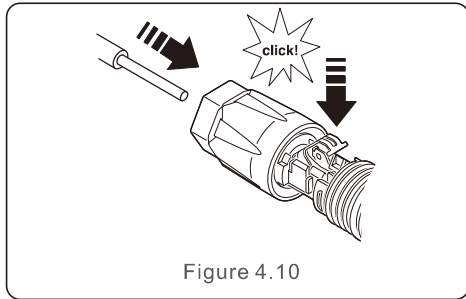


Figure 4.10

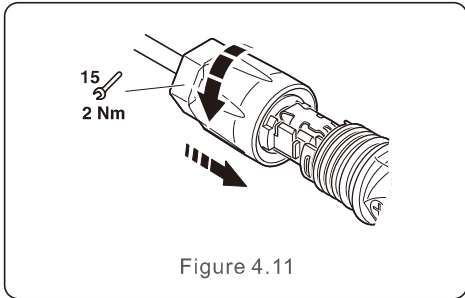


Figure 4.11

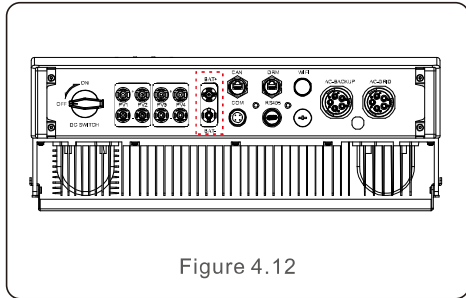


Figure 4.12

4. Installation

4.7 Assembling the AC Connector

There are two AC terminals and the assembly steps for both are the same.

Take out the AC connector parts from the packaging.

- 1. Make sure you use a cable within the correct specifications as shown in the image below.

Describe	Numerical value
Wire diameter	13~25mm
Traverse cross sectional area	6~13mm ² (10-6AWG)
Exposure Length	13mm

Table 4.1



Internal of AC connector signs "L1", "L2", "L3", "N" and "PE⊕" five connection ports (see Figure 4.15). Three live wires are connected the "L1", "L2" and "L3" terminals respectively; ground wire connects "PE⊕"; neutral wire connects "N" terminal:

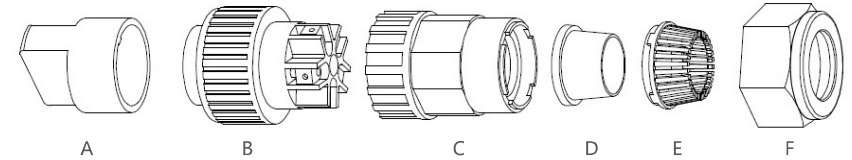


Figure 4.13 AC connector

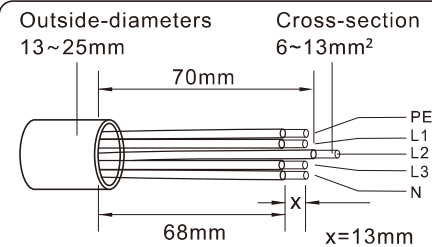


Figure 4.14 Stripped and bared wire

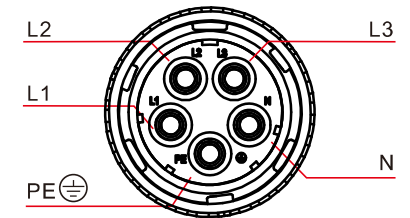


Figure 4.15 Internal structure of AC connector

4. Installation

A) Stripped the insulation sleeve of cable for 70mm, so that bared copper-cored connector reaches for 13mm. Cable through nut and sleeve of socket element, insert corresponding terminals and tighten with allen wrench (see figure 4.16). Torque is 1.5-2.5Nm.

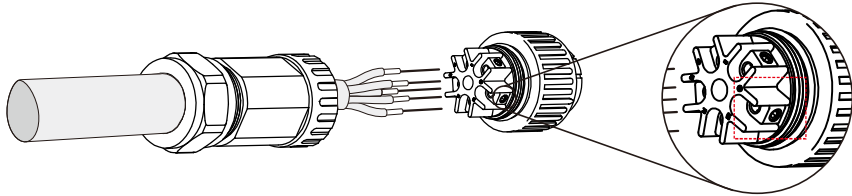


Figure 4.16 Connected cable



Tighten cable with 3 mm allen wrench(focus in dotted box, see figure 4.16). Allen screw is easy to drop off, don't screw out completely.



B) Clip plastic fixture (Auxiliary tighten) in socket element , tighten adapter in socket element, then tighten swivel nut with 2.5-4Nm torque (see figure 4.17).

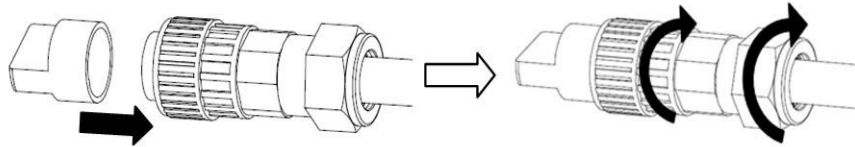


Figure 4.17 Assembly AC terminal

C) Connect AC connector with inverter, then tighten AC connector for clockwise, until hearing a slight clicking sound indicates connection succeed.(see figure 4.18)

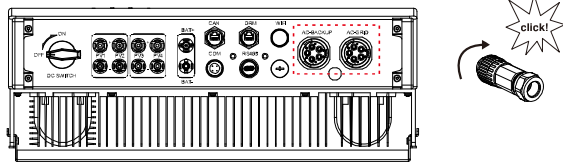


Figure 4.18 AC connector to inverter

4. Installation

4.8 Meter Installation

The Solis RHI series inverter integrated export power control function, this function need connect a 3-Phase power meter for export power controlling.

4.8.1 Three Phase Meter Installation

Please follow below picture to install the 3-phase power meter and CT.

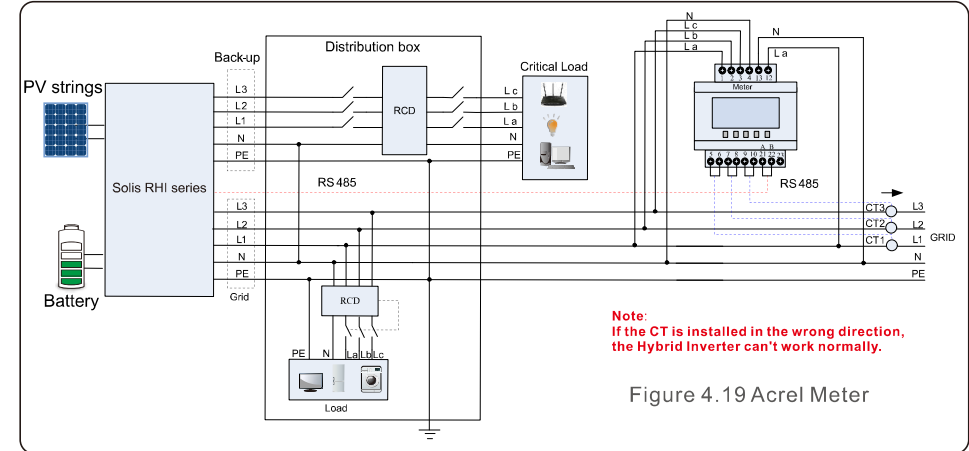


Figure 4.19 Acrel Meter

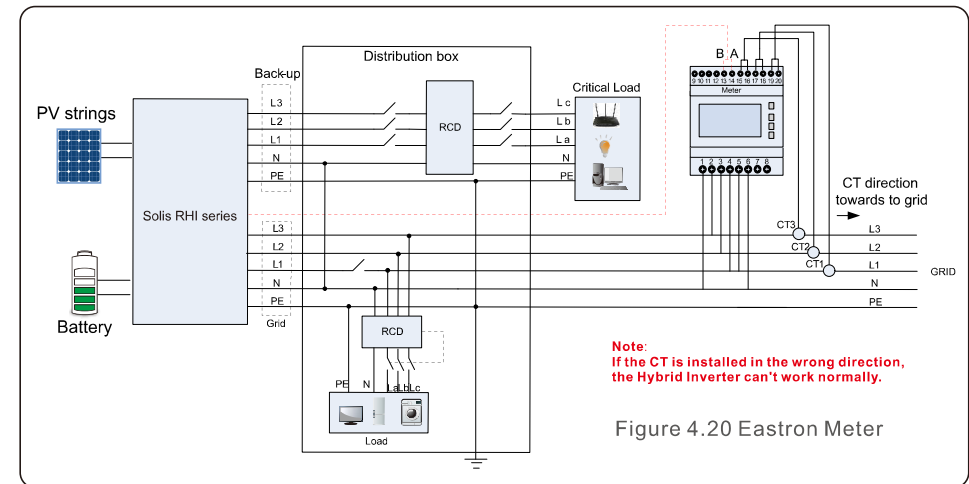


Figure 4.20 Eastron Meter



NOTE:

To maintain the neutral continuity in standalone mode, as required by Australian safety code, the neutral cable on the AC-Backup port and AC-Grid Port must be connected together.

4. Installation

4.9 Communication Cable Assembly

The RHI series inverter uses RS485 cable to communicate with the Meter and CAN to communicate with the battery's BMS. The image below shows the assembly of the RS485/CAN communication cables.

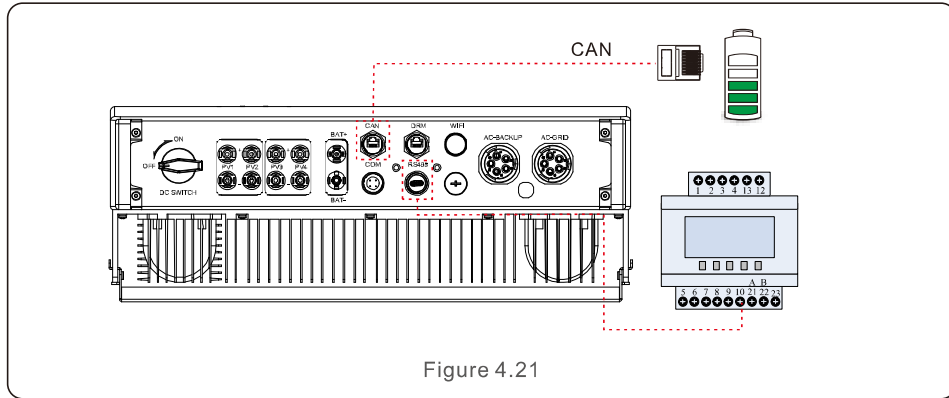


Figure 4.21



NOTE:

The CAN cable enables the communication between the inverter and the Li-ion battery, please check for latest model compatibility before installation.

Procedure for connecting the CAN cable:

1. Take out the CAN cable (terminal marks 'CAN' on one end and 'to Meter' 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.



NOTE:

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

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. Installation

4.10 External Ground Connection

An external ground connection is provided at the right side of inverter.

Prepare OT terminals: M4. Use proper tooling to crimp the lug to the terminal.

Connect the OT terminal with ground cable to the right side of inverter. The torque is 2N.m.

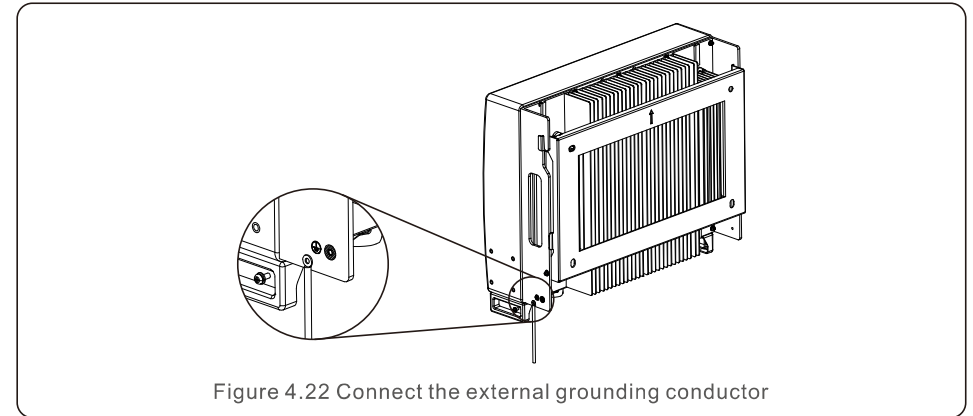


Figure 4.22 Connect the external grounding conductor

4.11 DRED port connections

DRED means demand response enable device. The AS/NZS 4777.2:2020 required inverter need to support demand response mode(DRM). This function is for inverter that comply with AS/NZS 4777.2:2020 standard.

A RJ45 terminal is used for DRM connection.

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



NOTE:

Solis hybrid inverter is designed to provide 12V power for DRED.

Please follow below steps to assemble RJ45 connector.

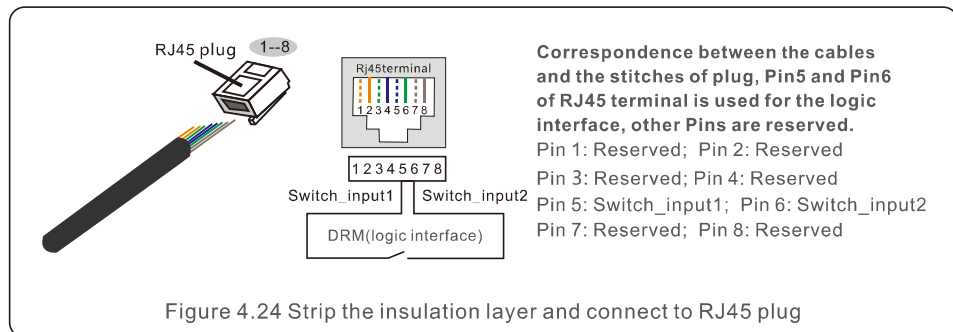
1. Insert the network cable into the communication connection terminal of RJ45.



Figure 4.23 RJ45 communication connection terminals

4. Installation

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



3. Connect RJ45 to DRM port.

4.12 LED Indicates

There are three LED indicators on the RHI 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	ON	Fault condition is detected.
	OFF	No fault condition detected.
	FLASHING	Either the grid or solar cannot be detected.

Table 4.2 Status Indicator Lights

4. Installation

4.13 External Residual Current Device(RCD)

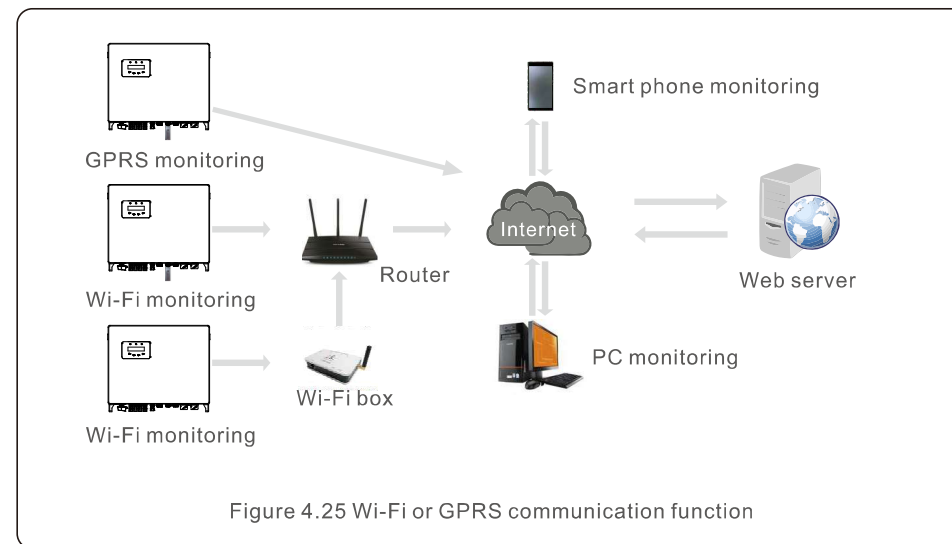
All series of Solis inverters are integrated with an internal residual current device to protect against any potential d.c component and a.c component of residual current.

Therefore, all Solis inverters, due to the design, are not able to feed in DC fault current to the system which fully complies with IEC60364-7-712.

If an external RCD is required to be installed by local regulations, Solis recommends installing a Type-A RCD with a threshold current higher than 100mA.

4.14 Inverter Monitoring Connection

The inverter can be monitored via Wi-Fi or GPRS. All Solis communication devices are optional. For connection instructions, please refer to the Solis Monitoring Device installation manuals.



4. Installation

4.15 Max. over current protection device (OCPD)

To protect the inverter's AC grid connection conductors, Solis recommends installing AC breakers that will protect against overcurrent. The following table defines OCPD ratings for these inverters.

Inverter	Rated voltage(V)	Max output current (Amps)	Current for protection device (A)
RHI-3P5K-HVES-5G	400	8.0	10
RHI-3P6K-HVES-5G	400	9.6	16
RHI-3P8K-HVES-5G	400	12.8	16
RHI-3P10K-HVES-5G	400	14.4	20

Table 4.3 Rating of grid OCPD

4.16 Earth Fault Alarm

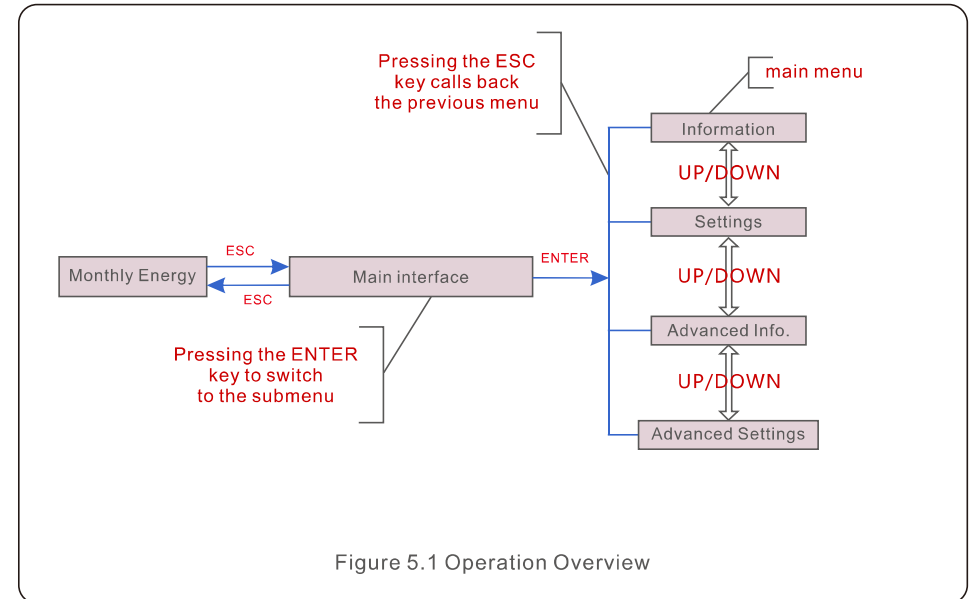
Solis inverters fully comply with IEC62109-2 in terms of earth fault alarm (PV insulation detection and protection). When the earth fault on PV side happens, the yellow alarm indicator will flash and the alarm code "PVISO-PRO" will show up on the LCD screen.

Inverter should be installed in a high traffic area to ensure the alarm to be noticed.

The inverter can't start to generate until the earth fault is resolved. Please refer to the troubleshooting section of this manual to resolve the earth fault or contact Solis service team for help.

For the earth fault happened on battery inputs, customer shall install external alarm and monitoring device to comply AS/NZS 5139.

5. Operation



5.1 Main Menu

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

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

5. Operation

5. Operation

5.2 Information

In the information section, operating data and information data can be viewed.

Sub-sections include:

1. General Info
2. System Info
3. Energy Records
4. PV Energy Records
5. BMS Info
6. Meter Info

The example displays are shown in the following figures.

Values are for reference only.

Display	Duration	Description
Inverter SN: FFFFFFFFFFFFFF	10 sec	Shows the inverter serial number.
Device: Waiting	10 sec	Shows the status of the device.
Battery: Waiting	10 sec	Shows the status of the battery.
Backup: Waiting	10 sec	Shows the status of the backup circuit.
Grid: Waiting	10 sec	Shows the status of the AC grid.
DRMNO. : 08	10 sec	Shows the DRM operating mode (Effective for UK/AUS).
Model. : 00	10 sec	Shows the model number of the device.
SoftVer. : 000000	10 sec	Shows the firmware version of the device.

Figure 5.2 General Information

Display	Duration	Description
V_DC1: 000.0V I_DC1: 000.0A	10 sec	V_DC1: Shows input 01 voltage value. I_DC1: Shows input 01 current value.
V_DC2: 000.0V I_DC2: 000.0A	10 sec	V_DC2: Shows input 02 voltage value. I_DC2: Shows input 02 current value.
V_A: 000.0V I_A: 000.0A	10 sec	V_A: Shows the grid's voltage value. I_A: Shows the grid's current value.
V_B: 000.0V I_B: 000.0A	10 sec	V_B: Shows the grid's voltage value. I_B: Shows the grid's current value.
V_C: 000.0V I_C: 000.0A	10 sec	V_C: Shows the grid's voltage value. I_C: Shows the grid's current value.
Grid Frequency 00.00Hz	10 sec	Shows the grid's frequency value.
Battery V: 000.0V Battery I: 000.0A	10 sec	Battery V: Shows the battery voltage. Battery I: Shows the battery current.
Backup V: 000.0V Backup P: 00.0kW	10 sec	Backup V: Shows the voltage of the backup port Backup P: Shows the power of the backup port.
Charge P: 00.0kW DisCharge P: 00.0kW	10 sec	Charge P: Shows the battery charging power. Discharge P: Shows the battery discharging power.

Figure 5.3 System Information

5. Operation

5. Operation

Display	Duration	Description
BattChgE Total: 000000kWh	10 sec	Shows the total battery charged energy.
BattChgE Today: 000.0kWh	10 sec	Shows today's battery charged energy.
BattChgE Lastday: 000.0kWh	10 sec	Shows yesterday's battery charged energy.

Figure 5.4 Energy Records

Display	Duration	Description
PV E Total: 000000kWh	10 sec	Shows the total PV generation.
PV E Today: 000.0kWh	10 sec	Shows today's PV generation.
PV E Lastday: 000.0kWh	10 sec	Shows yesterday's PV generation.
PV E ThisMonth: 000000kWh	10 sec	Shows PV generation of this month.
PV E LastMonth: 000000kWh	10 sec	Shows PV generation of last month.
PV E Thisyear: 000000kWh	10 sec	Shows PV generation of this year.
PV E Lastyear: 000000kWh	10 sec	Shows PV generation of last year.

Figure 5.5 PV Energy Records

Display	Duration	Description
Battery V: 000.0V Battery I: +00.0A	10 sec	Battery V: Shows battery voltage(From BMS). Battery I: Shows battery current(From BMS).
ChargeLmt: 000.0A DischargeLmt: 000.0A	10 sec	ChargeLmt: Shows battery charge current limit(From BMS). DischargeLmt: Shows battery discharge current limit(From BMS).
ChargeVLmt: 000.0V DischargeVLmt: 000.0V	10 sec	ChargeVLmt: Shows battery charge voltage limit(From BMS) DischargeVLmt: Shows battery discharge voltage limit(From BMS).
SOC Value: 000.0% SOH Value: 000.0%	10 sec	SOC value: Shows battery state of charge. SOH value: Shows battery state of health..
BMS Status: CAN Fail	10 sec	Shows that Battery BMS communication status.

Figure 5.6 BMS Information

Display	Duration	Description
PhaseA Power: +000000W	10 sec	Shows phase A power on the meter.
PhaseB Power: +000000W	10 sec	Shows phase B power on the meter.
PhaseC Power: +000000W	10 sec	Shows phase C power on the meter.
Meter Energy: 000000.00kWh	10 sec	Shows the energy record on the meter.
Output Energy: 000000.00kWh	10 sec	Shows the export energy record on the meter.
Input Energy: 000000.00kWh	10 sec	Shows the import energy record on the meter.
Meter Status: RS485 Fail	10 sec	Shows meter communication status.

Figure 5.7 Meter Information

5. Operation

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 a screen as shown in Figure 5.8.



NEXT=<ENT> OK=<ESC>
01-01-2020 00:00

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



YES=<ENT> NO=<ESC>
Set Address: 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. Operation

5.4 Advanced Information



NOTE:

To access to this area is for fully qualified and accredited technicians only. Enter menu "Advanced Info." (Password "0010").

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



Input Password
X X X X

Figure 5.10 Enter password

After enter 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

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

5.4.1 Alarm Message

The display shows the 100 latest alarm messages.
Screens can be scrolled manually by pressing the UP/ DOWN keys.
Press the ESC key to return to the previous menu.



Alm000: MET_Comm-FAIL
T: 00-00 00:00 D:0000

Figure 5.11 Alarm Message

5. Operation

5.4.2 Warning Message

The display shows the 100 latest warn messages.
Screens can be scrolled manually by pressing the UP/ DOWN keys.
Press the ESC key to return to the previous menu.

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

Figure 5.12 Warning Message

5.4.3 Running Status

This function is for maintenance person to get running message such as internal temperature, Standard NO. etc.(Values are for reference only).

— General Status
Advanced Status

Figure 5.13 Running Status

Display	Duration	Description
DC Bus Voltage: 000.0V	10 sec	Shows DC bus voltage.
Power Factor: +00.0	10 sec	Shows power factor of the inverter.
Power Limit%: 000%	10 sec	Shows the power output percentage of the inverter.
Inverter Temp: +000.0degC	10 sec	Shows internal IGBT temperature of the inverter.
Grid Standard:	10 sec	Shows current effective grid standard.
Flash State: 00000000	10 sec	Reserved for Solis Technicians

Figure 5.14 General Status



NOTE:

The advanced status is reserved for Solis technicians.

5. Operation

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 5.15 Communication Data

5.4.5 Yield Profile

The yield profile includes: Energy Battery, Energy Grid and Energy Backup.
All the historical energy generation records can be easily viewed in this section.

— Energy Battery
Energy Grid

Figure 5.16 Communication Data

5. Operation

5.5 Advanced Settings



NOTE:

To access to this area is for fully qualified and accredited technicians only. Enter menu "Advanced settings" (Password "0010").

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

Input Password
X X X X

Figure 5.17 Enter password

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. Reset Password
10. Restart HMI
11. Self Test CEI 0-21
12. Compensation Set

5.5.1 Selecting Standard

This function is used to select the grid's reference standard (see Figure 5.18).

YES=<ENT> NO=<ESC>
Standard:AS4777-A

Figure 5.18 Selecting Standard

Press the UP/DOWN keys to select the standard 4777-A, 4777-B, 4777-C and 4777-N for compliance with AS/NZS4777.2:2020. The standard AS4777-15 is for AS/NZS4777.2:2015.



NOTE:

This function is for technicians use only.

5. Operation



NOTE:

For different countries, the grid standard needs to be set as different according to local requirements. If there is any doubt, please consult Solis service technicians for details.

The default protection settings and setting range for different regions are showing below:

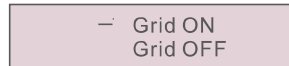
Region	Australia A	Australia B	Australia C	New Zealand	Setting Range
Standard Code Name	4777-A	4777-B	4777-C	4777-N	
OV-G-V1	265V	265V	265V	265V	230-276V
OVGV1-T	1.5S	1.5S	1.5S	1.5S	1-2S
OV-G-V2	275V	275V	275V	275V	230-276V
OVGV2-T	0.1S	0.1S	0.1S	0.1S	0.1-2S
UN-G-V1	180V	180V	180V	180V	38-230V
UNGV1-T	10S	10S	10S	10S	10-11S
UN-G-V2	70V	70V	70V	70V	38-230V
UNGV2-T	1.5S	1.5S	1.5S	1.5S	1-2S
OV-G-F1	52HZ	52HZ	55HZ	55HZ	50-55HZ
OVGF1-T	0.1S	0.1S	0.1S	0.1S	0.1-2S
OV-G-F2	52HZ	52HZ	55HZ	55HZ	50-55HZ
OVGF2-T	0.1S	0.1S	0.1S	0.1S	0.1-2S
UN-G-F1	47HZ	47HZ	45HZ	45HZ	45-50HZ
UNGF1-T	1.5S	1.5S	5S	1.5S	1-6S
UN-G-F2	47HZ	47HZ	45HZ	45HZ	45-50HZ
UNGF2-T	1.5S	1.5S	5S	1.5S	1-6S
Startup-T	60S	60S	60S	60S	10-600S
Restore-T	60S	60S	60S	60S	10-600S
Recover-VH	253V	253V	253V	253V	230-276V
Recover-VL	205V	205V	205V	196V	115-230V
Recover-FH	50.15Hz	50.15Hz	50.15Hz	50.15Hz	50-52Hz
Recover-FL	47.5Hz	47.5Hz	47.5Hz	47.5Hz	47-50Hz
Start-VH	253V	253V	253V	253V	230-276V
Start-VL	205V	205V	205V	196V	115-230V
Start-FH	50.15Hz	50.15Hz	50.15Hz	50.15Hz	50-52Hz
Start-FL	47.5Hz	47.5Hz	47.5Hz	47.5Hz	47-50Hz

Table 5.1

5. Operation

5.5.2 Grid Switches

This function is used to start or stop the generation of the inverter.



Grid ON
Grid OFF

Figure 5.19 Set Grid ON/OFF

Screens can be scrolled manually by pressing the UP/DOWN keys.

Press the ENTER key to save the setting.

Press the ESC key to return to the previous menu.

5.5.3 Battery Control

This section is used to select the corresponding battery and set the battery wakeup function.



Battery Select

Figure 5.20 Battery Control

5.5.3.1 Battery Select

This product is compatible with multiple battery models. Please refer to the latest compatible battery list on Solis company website.



WARNING:

Inverter must be installed with compatible battery models. Any defect, damage or collateral loss due to using a non-compatible battery is not in the scope of inverter warranty or compensation.

Please refer to the battery compatible list on Solis company website for information on latest compatible battery models.

For above compatible battery modules, Only three parameters need to be defined:

* OverDischg SOC (10%~40%, default 20%)

--Inverter will not discharge the battery when the OverDischg SOC is reached.

Battery self-discharge is unavoidable, SOC may go lower than the limit if the battery can't get charged for a long period of time.

* ForceCharge SOC (5%~OverDischg SOC, default 10%)

--To prevent the battery going into sleep mode, when the ForceCharge SOC is reached, inverter will charge the battery using the power from either PV or Grid.

5. Operation



Battery Select:
PYLON

Figure 5.21 Battery Select

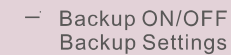


Overdischg SOC:
020%

Figure 5.22 Overdischg SOC

5.5.4 Backup Control

This section is used to set the configuration of the backup port.



Backup ON/OFF
Backup Settings

Figure 5.23 Backup Control

5.5.4.1 Backup ON/OFF

This switch can enable/disable the electrical connection of the backup port.



Set Backup:
OFF

Figure 5.24 Backup ON/OFF

5.5.4.2 Backup Settings

This section shows the parameter of the backup port.



Backup Voltage:
230.0V

Figure 5.25 Backup Settings

5.5.5 Storage Energy Set

There are two settings available in this section: Meter select and Storage Mode Select.



Figure 5.26 Storage Energy Set

5.5.5.1 Meter Select

The setting is used to select the meter type based on the actual configuration.



Figure 5.27 Meter Type

5.5.5.2 Storage Mode Select

Mode 1: Self-Use Mode Logic(Maximize the usage of PV)

PV Power Using Priority: Load>Battery>Grid

Load Support Priority: PV>Battery>Grid

Battery Charging Power comes from PV. (If "Charging From Grid" is allowed, it can also come from Grid)

If "Time of Use" is "Run", the logic will follow the charging/discharging settings and time settings as defined in "Time of Use". For those undefined period of time, it will still follow the Self-Use logic.

Time of use for Self use

Path: Advanced Settings->Storage Energy Set->Storage Mode Select->Self-Use Mode->

ON->Time of use for Self use

Charging from gird self use

Path: Advanced Settings->Storage Energy Set->Storage Mode Select->Self-Use Mode->

ON->Charging from gird for Self use

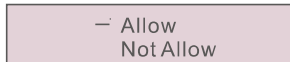


Figure 5.28

Mode 2: Feed In Priority Mode Logic(Feed the excess PV to Grid in order to gain s subsidies)

PV Power Using Priority: Load>Grid>Battery

Load Support Priority: PV>Battery>Grid

Battery Charging Power comes from PV. (If "Charging From Grid" is allowed, it can also come from Grid)

If "Time of Use" is "Run", the logic will follow the charging/discharging settings and time settings as defined in "Time of Use". For those undefined period of time, it will still follow the Feed in Priority logic.

Time of use for Feed for priority

Path: Advanced Settings->Storage Energy Set->Storage Mode Select->

Feed in Priority Mode->ON->Time of use for Feed for priority

Charging from gird for Feed for priority

Path: Advanced Settings->Storage Energy Set->Storage Mode Select->

Feed in Priority Mode->ON->Charging from gird for Feed for priority

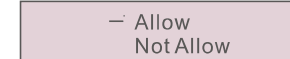


Figure 5.29

Mode 3: Backup Mode Logic(Keep the Battery at a certain SOC and only use it during power outage)

Backup Mode Logic: Keep the Battery at a certain SOC and only use it during power outage.

Backup SOC Setting Range: From Battery "Overdischarge SOC" to 100%

PV Power Using Priority: Battery>Load>Grid

Load Support Priority: PV>Grid>Battery

Battery Charging Power comes from PV. (If "Charging From Grid" is allowed, it can also come from Grid)

* The "Backup Mode" is not applicable for Lead-acid batteries.

Charging from gird for Backup mode

Path: Advanced Settings->Storage Energy Set->Storage Mode Select->Backup Mode->

ON->Backup SOC->Charging from gird for Backup mode

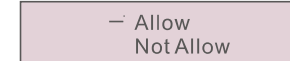


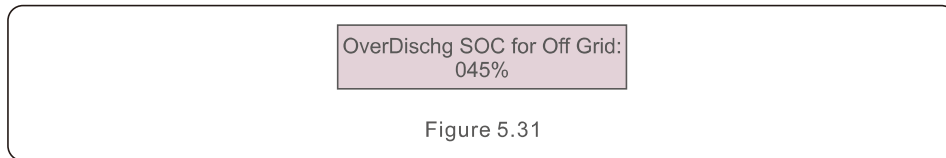
Figure 5.30

Mode 4: Off-Grid Mode Logic(For Off-grid use and AC-Grid Port Disconnected)

OverDischg SOC for Off-Grid Setting Range: From Battery “Forcecharge SOC” to 100%
 PV Power Using Priority: Load>Battery
 Load Support Priority: PV>Battery
 Battery Charging Power comes from PV.

Off Grid Mode

Path: Advanced Settings->Storage Energy Set->Storage Mode Select->Off-Grid Mode->
 ON->Off Grid Mode



5.5.6 STD Mode settings

There are 9 settings under STD. Mode Settings.

1. Working Mode Set
2. Power Rate Limit
3. Freq Derate Set
4. 10mins Voltage Set
5. Q3Tau Settings
6. P3Tau Settings
7. Control Switches
8. Initial Settings
9. DRM Settings

5.5.6.1 Working Mode Set

Solis AU version inverters have the following working mode settings:

1. NULL
2. P Mode Settings
3. Q Mode Settings

1. NULL

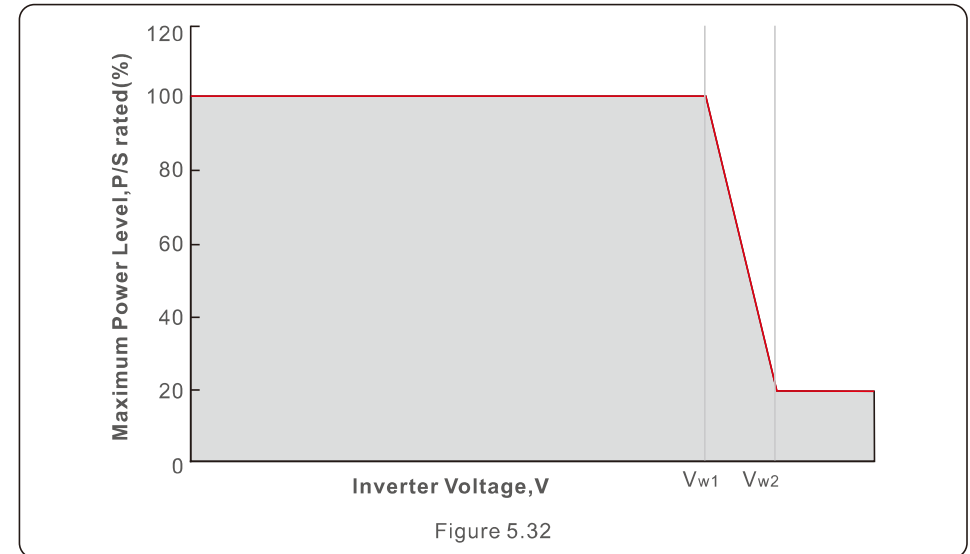
Description: Inverter will not be under any working mode.

2. P Mode Settings

This P Mode Settings include 1 working mode: Volt-Watt

2.1 Volt-Watt

Description: Inverter will change the active output power based on grid voltage.



Status: Enable/Disable (Note: This is used to enable or disable the Volt-Watt mode)

Voltage 1: 207V

P-Limit 1: 100%

Voltage 2: 220V

P-Limit 2: 100%

Voltage 3 (Vw1):

235-255V (Default: 4777-A(253V); 4777-B(250V);4777-C(253V);4777-N(242V))

P-Limit 3: 100%

Voltage 4 (Vw2):

240-265V (Default: 4777-A(260V); 4777-B(260V);4777-C(260V);4777-N(250V))

P-Limit 4: 0%-20% (Default: 20% for 4777-A; 4777-B; 4777-C; 4777-N)

3. Q Mode Settings

This Q Mode Settings include 5 working modes:

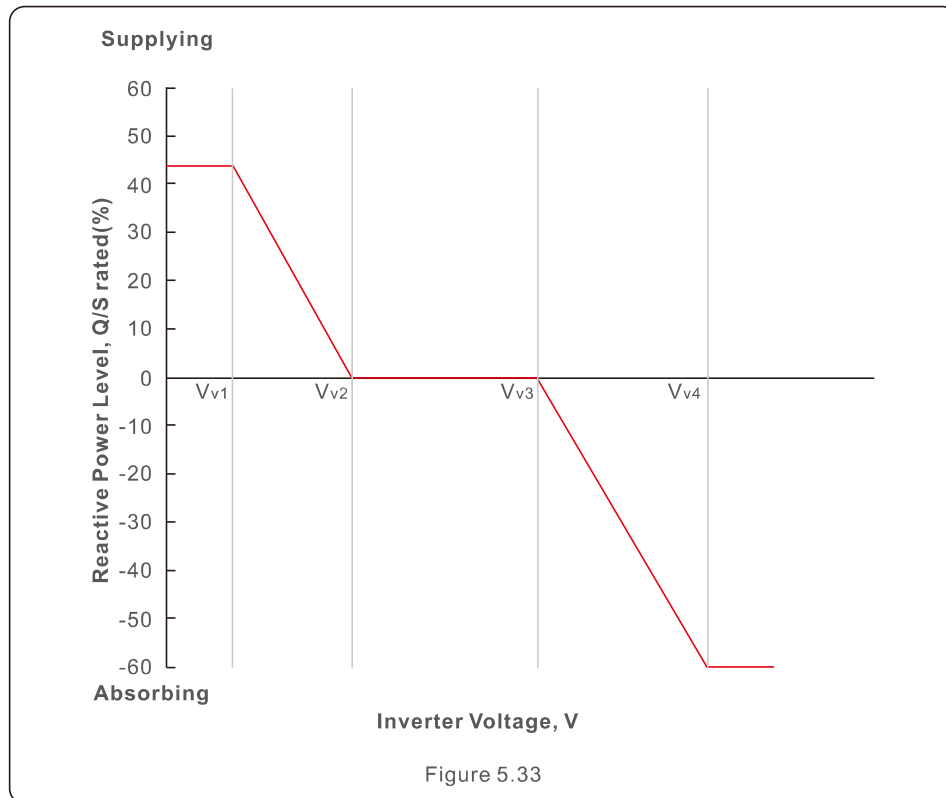
Disable, Volt-Var, Fixed-PF, Reac-Power, P-factor

3.1 Disable

Description: This mode will disable the reactive power response working modes

3.2 Volt-Var

Description: Inverter will change the reactive output power based on grid voltage.



Voltage 1 (Vv1):

180-230V (Default: 4777-A(207V); 4777-B(205V);4777-C(215V);4777-N(207V))

Voltage 2(Vv2) :

180-230V (Default: 4777-A(220V); 4777-B(220V);4777-C(230V);4777-N(220V))

Voltage 3(Vv3) :

230-265V (Default: 4777-A(240V); 4777-B(235V);4777-C(240V);4777-N(235V))

Voltage 4(Vv4) :

230-265V (Default: 4777-A(258V); 4777-B(255V);4777-C(255V);4777-N(244V))

Leading(Supplying) :

+30~+60% (Default: 4777-A(+44%); 4777-B(+30%);4777-C(+44%);4777-N(+60%))

Lagging(Absorbing) :

-30%~-60% (Default: 4777-A(-60%); 4777-B(-40%);4777-C(-60%);4777-N(-60%))

3.3 Fixed PF

Description: This mode is to set a fixed power factor output

Range: -0.8~+0.8

Default: 1

3.4 Reac-Power

Description: This mode is to set a fixed reactive power output

Range:-60%~+60%

Default: 0%

3.5 Power-PF

Description: This mode is not required in Australia.

5.5.6.2 Power Rate Limit

To set the power rate limits for increase and decrease in power level per minute.

Wgra+: 5-100%, Default:16%

Wgra-: 5-100%, Default:16%

5.5.6.3 Freq Derate Set

To set the frequency response limits for response to a decrease/increase in frequency.

OVF_Start(F_ULCO): 50.1Hz~50.5Hz

(Default: 4777-A(50.25Hz), 4777-B(50.15Hz), 4777-C(50.5Hz), 4777-N(50.2Hz))

OVF_Stop(F_Pmin): 51Hz~53Hz

(Default: 4777-A(52Hz), 4777-B(52Hz), 4777-C(53Hz), 4777-N(52Hz))

UNF_Start(F_LLCO): 49.5Hz~49.9Hz

(Default: 4777-A(49.75Hz), 4777-B(49.85Hz), 4777-C(49.5Hz), 4777-N(49.8Hz))

UNF_Stop(F_Pmax): 47Hz~49Hz

(Default: 4777-A(48Hz), 4777-B(48Hz), 4777-C(47Hz), 4777-N(48Hz))

5.5.6.4 10mins Voltage Set

To set the 10mins average protection limit.

Range: 244V to 258V

Default: 4777-A (258V); 4777-B(258V); 4777-C(258V); 4777-N(249V)

5.5.6.5 DRM Settings

“DRM ON/OFF” is used to enabled or disable the functionality of the DRM port.

“AU DRM Q Set” is used to define the reactive power absorption for DRM 3 or DRM 7.

Range: 0~- 60%

5. Operation

5.5.7 Software Update

The software update includes the HMI and DSP. Corresponding firmware version can be checked in this setting. Press "ENT" to enter the upgrading mode.



– HMI Update
DSP Update

Figure 5.34 Software Update

5.5.8 Export power Set

This function is to set the export power control.

1. EPM ON/OFF

2. Backflow Power

3. Failsafe ON/OFF

Setting 2 and 3 are only valid when Setting 1 is set to "ON".

5.5.8.1 EPM ON/OFF

Enable/Disable the function.

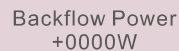


EPM ON/OFF
OFF

Figure 5.35 EPM ON/OFF

5.5.8.2 Backflow Power

Determine the allowed backfeed power. (System export to the grid)



Backflow Power
+0000W

Figure 5.36 Backflow Power

5.5.8.3 FailSafe ON/OFF

When this Failsafe function is ON, the inverter will shutdown once it loses communication with the meter in case of any backflow power exceeds the limit.



FailSafe ON/OFF
ON

Figure 5.37 FailSafe ON/OFF

5. Operation

5.5.9 Reset Password

Reset Password: In this menu, user can reset the inverter password, but the admin password is always valid.



Input New Password
X X X X

Figure 5.38 Reset Password

5.5.10 Restart HMI

This function is to reboot the LCD screen.

5.5.11 Self Test CEI 0-21

This function is only available when Italian standard CEI021 is selected.

5.5.12 Compensation Set

This function is used to calibrate inverter output energy and voltage.

Two sections are included: Power Parameter and Voltage Parameter.



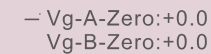
– Power Parameter
Voltage Parameter

Figure 5.39 Compensation Set



YES=<ENT> NO=<ESC>
Power Para.:1.000

Figure 5.40 Power Parameter



– Vg-A-Zero:+0.0
Vg-B-Zero:+0.0

Figure 5.41 Voltage Parameter

5.6.11 Special Setting

There are two special settings:

1. AFCI Set
2. EPS Mode



– AFCI Set
EPS Mode

Figure 5.42 Special Setting

5.6.11.1 AFCI Set

Inverters have the built-in AFCI function which can detect the arc fault on the DC circuit and shut down the inverter to prevent a fire disaster.



AFCI ON/OFF:
ON

Figure 5.43 AFCI Switch



AFCI Level:
00

Figure 5.44 AFCI Level



WARNING:

The "AFCI Level" is reserved for technicians ONLY. Do not change the sensitivity otherwise it will lead to frequent false alarms or malfunctions. Manufacturer is not responsible for any further damages caused by unauthorized modifications.



WARNING:

The setting corresponds to the current status as well which can be used to inspect the ON/OFF state of the AFCI function.

During the normal operation, if an DC arc is detected, the inverter will shut down and give out the following alarm:



Restart Press ESC 3s

Figure 5.45 ARC-FAULT

Installer needs to thoroughly inspect the DC circuit to ensure all the cables are correctly fastened.

Once the DC circuit issue has been fixed or it is confirmed to be OK, press "ESC" for 3s and wait for the inverter to restart.

6. Commissioning & Shutdown

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.

1. Turn on inverter DC switch
2. Turn on battery breaker or battery switch button on the battery.
3. Select the grid standard code.
4. Configure the parameters.
5. Switch on AC backup and AC grid.
6. Verify inverter initializing.

6.3 Shutdown procedure

1. Turn off the AC isolator at the grid connection point.
2. Turn off the DC switch of the inverter.
3. Turn off the DC switch between inverter and battery.
4. Waiting for the LCD of inverter to turn off and the system shutdown is completed.

7. Troubleshooting

Solis RHI Series 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 test 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

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 Information → Enter → Alarm Message.

Step1: Press ENTER.

Step2: Press DOWN to select Advanced Information, then press ENTER.

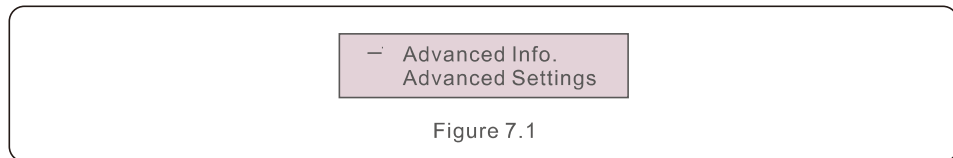


Figure 7.1

Step3: Enter password.

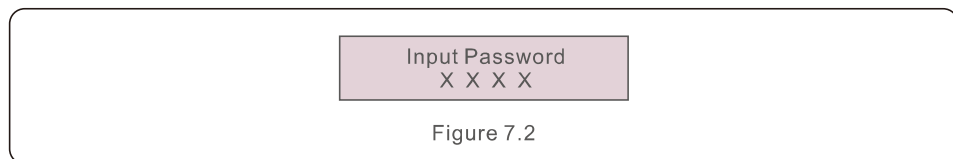


Figure 7.2

Step3: Press DOWN to select Alarm Message, then press ENTER.

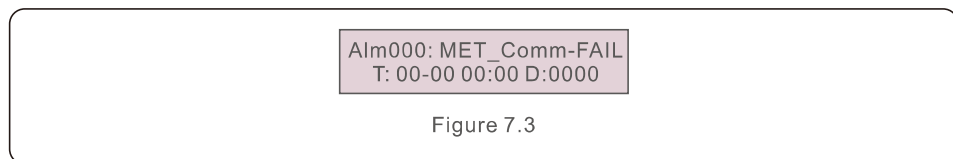


Figure 7.3

7. Troubleshooting

Alarm Message	Failure description	Solution
ARC-FAULT	ARC detected in DC circuit	1. Check if there's arc in PV connection and restart inverter.
AFCI Check FAULT	AFCI module self check fault	1. Restart inverter or contact installer.
DCinj-FAULT	High DC injection current	1. Restart inverter or contact installer.
DSP-B-FAULT	Comm. failure between main and slave DSP	1. Restart inverter or contact installer.
DC-INTF	DC input overcurrent	1. Restart inverter. 2. Identify and remove the string to the fault MPPT. 3. Change power board.
G-IMP	High grid impedance	1. Use user define function to adjust the protection limit if it's allowed by electrical company.
GRID-INTF01/02	Grid interference	1. Restart inverter. 2. Change power board.
IGBT-OV-I	Over IGBT current	1. Restart inverter or contact installer.
IGFOL-F	Grid current tracking fail	
IG-AD	Grid current sampling fail	
lLeak-PRO 01/02/03/04	leakage current protection	1. Check AC and DC connection. 2. Check inverter inside cable connection.
INI-FAULT	Initialization system fault	1. Restart inverter or contact installer.
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.
NO-Battery	Unconnected battery	1. Check the wire of battery power is connected correctly or not. 2. Check the output voltage of battery is correctly or not.
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.
NO-GRID	No grid voltage	1. Check connections and grid switch. 2. Check the grid voltage inside inverter terminal.
OV-BUS	Over DC bus voltage	1. Check inverter inductor connection. 2. Check driver connection.

7. Troubleshooting

Alarm Message	Failure description	Solution
OV-DC01/02/03/04	Over DC voltage	1. Reduce the module number in series.
OV-DCA-I	DC input overcurrent	1. Restart inverter. 2. Identify and remove the string to the fault MPPT. 3. Change power board.
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.
OV-G-I	Over grid current	1. Restart inverter. 2. Change power board.
OV-G-F01/02	Over grid frequency	1. Use user define function to adjust the protection limit if it's allowed by electrical company.
OV-IgTr	AC side transient overcurrent	1. Restart inverter. 2. Return-factory repair.
OV-ILLC	LLC hardware overcurrent	
OV-VBackup	Bypass overvoltage fault	
OV-TEM	Over Temperature	1. Check inverter surrounding ventilation. 2. Check if there's sunshine direct on inverter in hot weather.
OV-Vbatt1	The detection of battery overvoltage	1. Check the protect point for over voltage sets correctly or not. 2. Restart inverter.
OV-Vbatt-H	Battery overvoltage hardware fault	1. Check the circle whether the circuit for battery power jumps. 2. Restart inverter.
Over-Load	Bypass overload fault	1. Check the load of Backup port is over rating output power or not. 2. Reduce the load of Backup port, then restart inverter.
PV ISO-PRO01/02	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.
RelayChk-FAIL	Relay check fail	1. Restart inverter or contact installer.

7. Troubleshooting

Alarm Message	Failure description	Solution
UN-BUS01/02	Under DC bus voltage	1. Check inverter inductor connection. 2. Check driver connection.
UN-G-F01/02	Under grid frequency	1. Use user define function to adjust the protection limit if it's allowed by electrical company.
UN-G-V01/02	Under grid voltage	
12Power-FAULT	12V power supply fault	1. Restart inverter or contact installer.

Table 7.1 Fault message and description



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 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.

8. Specifications

Technical Data	RHI-3P5K-HVES-5G	RHI-3P6K-HVES-5G
Input DC (PV side)		
Recommended max. PV power	8000W	9600W
Max. input voltage	1000V	
Rated voltage	600V	
Start-up voltage	160V	
MPPT voltage range	200-850V	
Full load MPPT voltage range	200-850V	240-850V
Max. input current	13A/13A	
Max. short circuit current	16.5A/16.5A	
Max. inverter backfeed current to the array	0A	
MPPT number/Max input strings number	2/2	
Battery		
Battery Type	Li-ion	
Communication	CAN/RS485	
Battery Voltage range	160 - 600V	
Maximum charging Power	5kW	6kW
Maximum Charge/discharge current	25A	
Communication	CAN	
Output AC(Grid-side)		
Rated output power	5kW	6kW
Rated apparent output power	5kVA	6kVA
Max. apparent output power	5kVA	6kVA
Operation phase	3/N/PE	
Rated grid voltage	400V	
The grid voltage range	320-480V	
Rating grid frequency	50 Hz	
AC grid frequency range	45-55 Hz	
Rating grid output current	8.4A	10.0A
Max. output current	8.4A	10.0A
Inrush current	31.8A, 10us	
Max. output fault current	31.8A, 10us	
Max. output overcurrent protection	31.8A	
Power factor	> 0.99 (0.8 leading to 0.8 lagging)	
THDi	< 2%	

8. Specifications

Output AC(Back-up)		
Rated output power	5kW	6kW
Peak apparent output power	10kVA, 60 sec	12kVA, 60 sec
Back-up switch time	< 40ms	
Rated output voltage	3/N/PE, 400V	
Rated frequency	50 Hz	
Rated output current	7.3A	8.7A
THDv(@linear load)	<2%	
Efficiency		
Max. efficiency of Solar Inverting	98.4%	
EU efficiency of Solar Inverting	97.7%	
MPPT efficiency	99.9%	
Battery charge/discharge efficiency	97.5%	
Protection		
Anti-islanding protection	Yes	
Insulation Resistor detection	Yes	
Residual current monitoring unit	Yes	
Output over current protection	Yes	
Output short protection	Yes	
Output over voltage protection	Yes	
DC switch	Yes(PV2 Switch)	
DC reverse polarity protection	Yes	
PV overvoltage protection	Yes	
Battery reverse protection	Yes	

8. Specifications

General data	
Dimensions(W/H/D)	535*455*185mm
Weight	25.1kg
Topology	non-isolated
Self consumption (Night)	< 15 W
Operation temperature range	-25°C ~ +60°C
Relative humidity	0-100%
Overvoltage category	II(PV), III(MAINS)
Active anti-islanding method	Active frequency shifting
Ingress protection	IP65
Noise emission	<30 dB (A)
Cooling concept	Natural convection
Max.operation altitude	4000m
Grid connection standard	AS/NZS 4777.2:2020, IEC 62116, IEC 61727, IEC 60068, IEC 61683, EN 50530
Safety/EMC standard	IEC 62109-1/-2 ,EN 61000-6-1/-3
Features	
DC connection	MC4 connector
AC connection	Quick Connection plug
Display	LCD, 2X20 Z
Communication	RS485, Optional:Wi-Fi, GPRS
Warranty	5 years (extend to 20 years)

8. Specifications

Technical Data	RHI-3P8K-HVES-5G	RHI-3P10K-HVES-5G
Input DC (PV side)		
Recommended max. PV power	12800W	16000W
Max. input voltage	1000V	
Rated voltage	600V	
Start-up voltage	160V	
MPPT voltage range	200-850V	
Full load MPPT voltage range	210-850V	200-850V
Max. input current	26A/13A	26A/26A
Max. short circuit current	32.5A/16.5A	32.5A/32.5A
Max. inverter backfeed current to the array	0A	
MPPT number/Max input strings number	2/3	2/4
Battery		
Battery Type	Li-ion	
Communication	CAN/RS485	
Battery Voltage range	160 - 600Vdc	
Maximum charging Power	8kW	10kW
Maximum Charge/discharge current	25A	
Communication	CAN	
Output AC(Grid-side)		
Rated output power	8kW	10kW
Rated apparent output power	8kVA	10kVA
Max. apparent output power	8kVA	10kVA
Operation phase	3/N/PE	
Rated grid voltage	400V	
The grid voltage range	320-480V	
Rating grid frequency	50 Hz	
AC grid frequency range	45-55 Hz	
Rating grid output current	13.4A	16.7A
Max. output current	13.4A	16.7A
Inrush current	31.8A, 10us	
Max. output fault current	31.8A, 10us	
Max. output overcurrent protection	31.8A	
Power factor	> 0.99 (0.8 leading to 0.8 lagging)	
THDi	< 2%	

8. Specifications

Output AC(Back-up)		
Rated output power	8kW	10kW
Peak apparent output power	16kVA, 60 sec	
Back-up switch time	< 40ms	
Rated output voltage	3/N/PE, 400V	
Rated frequency	50 Hz	
Rated output current	11.6A	14.5A
THDv(@linear load)	<2%	
Efficiency		
Max. efficiency of Solar Inverting	98.4%	
EU efficiency of Solar Inverting	97.7%	
MPPT efficiency	99.9%	
Battery charge/discharge efficiency	97.5%	
Protection		
Anti-islanding protection	Yes	
Insulation Resistor detection	Yes	
Residual current monitoring unit	Yes	
Output over current protection	Yes	
Output short protection	Yes	
Output over voltage protection	Yes	
DC switch	Yes(PV2 Switch)	
DC reverse polarity protection	Yes	
PV overvoltage protection	Yes	
Battery reverse protection	Yes	

8. Specifications

General data	
Dimensions(W/H/D)	535*455*185mm
Weight	25.1kg
Topology	non-isolated
Self consumption (Night)	< 15 W
Operation temperature range	-25°C ~ +60°C
Relative humidity	0-100%
Overvoltage category	II(PV), III(MAINS)
Active anti-islanding method	Active frequency shifting
Ingress protection	IP65
Noise emission	<30 dB (A)
Cooling concept	Natural convection
Max. operation altitude	4000m
Grid connection standard	AS/NZS 4777.2:2020, IEC 62116, IEC 61727, IEC 60068, IEC 61683, EN 50530
Safety/EMC standard	IEC 62109-1/-2, EN 61000-6-1/-3
Features	
DC connection	MC4 connector
AC connection	Quick Connection plug
Display	LCD, 2X20 Z
Communication	RS485, Optional:Wi-Fi, GPRS
Warranty	5 years (extend to 20 years)

9. Appendix

9.1 Built-In DC Isolator Specification

Model	GHX5-32P
Rated insulation voltage	1500V
Rated impulse withstand voltage	8000V
Suitability for isolation	Suitable for isolation
Rated operational current	30A
Utilization category	DC-PV2
Rated short-time withstand current(Icw)	700A
Rated short-circuit making capacity(Icm)	1400A
Rated breaking capacity	4*Ie 120A