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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 RHI-5G Series Hybrid Inverter

Instruction Manual

(For Australia)

Ver 1.2

Ginlong Technologies Co., Ltd.

Contents

1.1 Product Description

The Solis RHI-5G 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-5G Series has 5 different models:

RHI-3K-48ES-5G, RHI-3.6K-48ES-5G, RHI-4.6K-48ES-5G, RHI-5K-48ES-5G, RHI-6K-48ES-5G

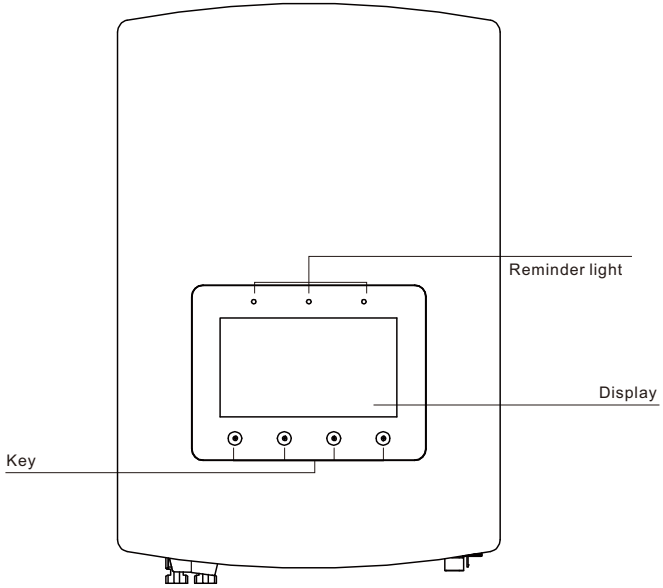


Figure 1.1 Front side view

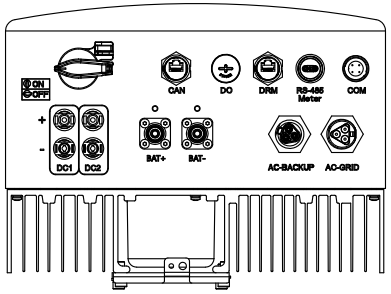
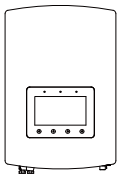


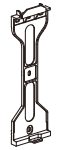
Figure 1.2 Bottom side view

1. Introduction

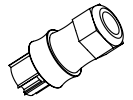
1.2 Packaging

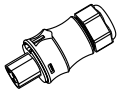
Please ensure that the following items are included in the packaging with your machine:

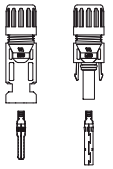

Inverter x1


Back plate x1

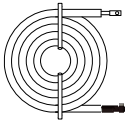

Fastening screw x3

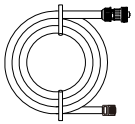

AC grid terminal x1

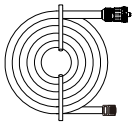

AC backup terminal x1

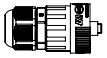

DC connector x2


RJ45 connector x1

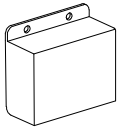

Battery Cable x2

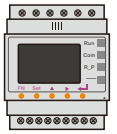

CAN cable x1


Rs485 Meter cable x1
(For Acrel Meter)

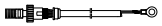

Rs485 Meter cable x1
(For Eastron Meter)


Connector x1


Terminal cover x1


Acrel Meter x1
(For Other markets)


Eastron Meter x1
(For Italian market Only)


Battery Temperature Sensor x1
(Optional)

User manual x1

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

2.1 Safety

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

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

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

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

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

2.2 General Safety Instructions

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

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

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

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

2. Safety & Warning

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

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

CAUTION:
The PV array 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 (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.

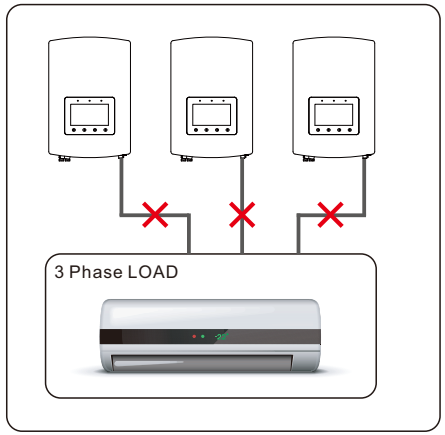
NOTE:
PV module used with inverter must have an IEC 61730 Class A rating.

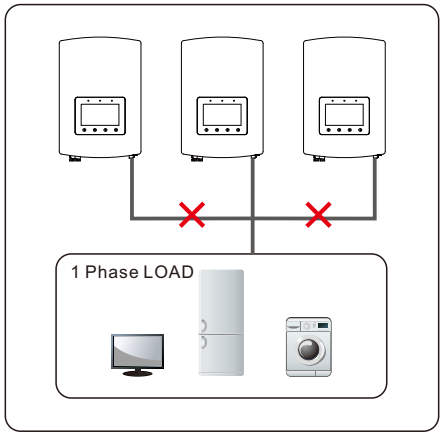
WARNING:
Operations below must be accomplished by licensed technician or Solis authorized person.

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

WARNING:
AC-BACKUP of RHI-5G Series is forbidden to connect to the grid.

WARNING:
The RHI-5G 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.
5. Single phase inverters can be used in parallel and external devices should be used in accordance with the requirements of AS/NZS 4777.1.
   Single phase inverters can't be used in multiple-phase installations.

3.1 Screen

Solis RHI-5G Series adopts 7 inch color 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).

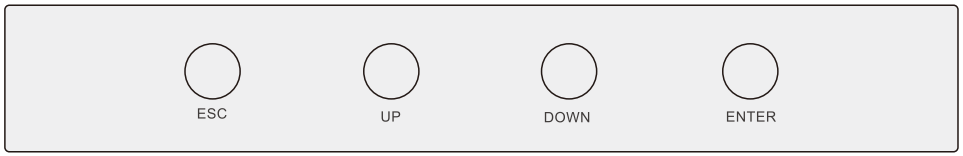


Figure 3.2 Keypad

3.3 Terminal Connection

Solis RHI-5G Series inverter is different from normal on-grid inverter, please refer to the instructions below before start connection.

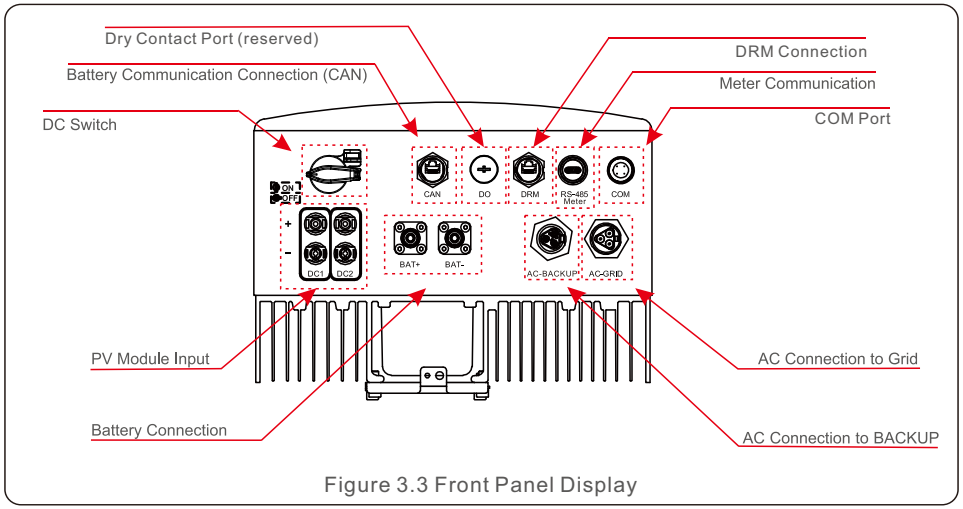


Figure 3.3 Front Panel Display

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

4.1 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 104F/40C.

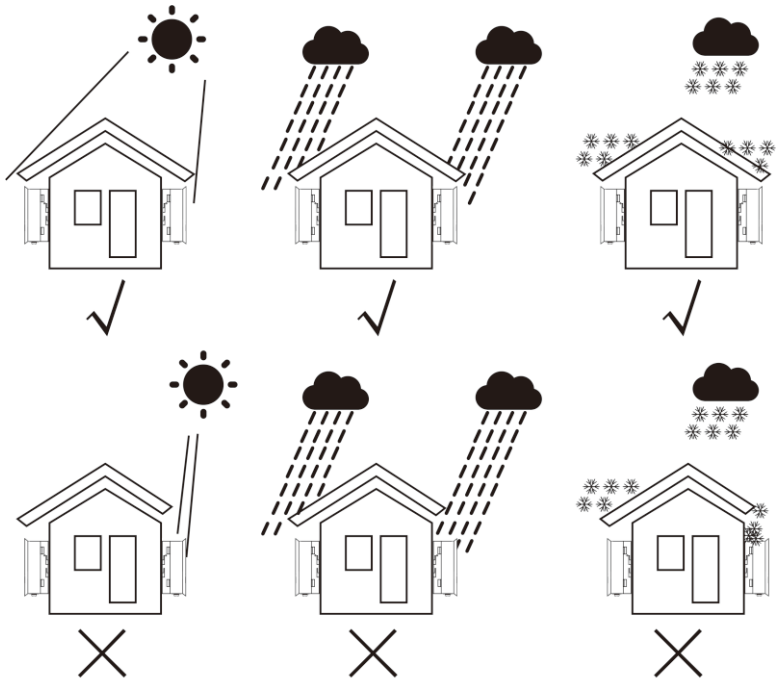


Figure 4.1 Recommended Installation locations

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 (18.3kg).
- 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 machine and the ground.

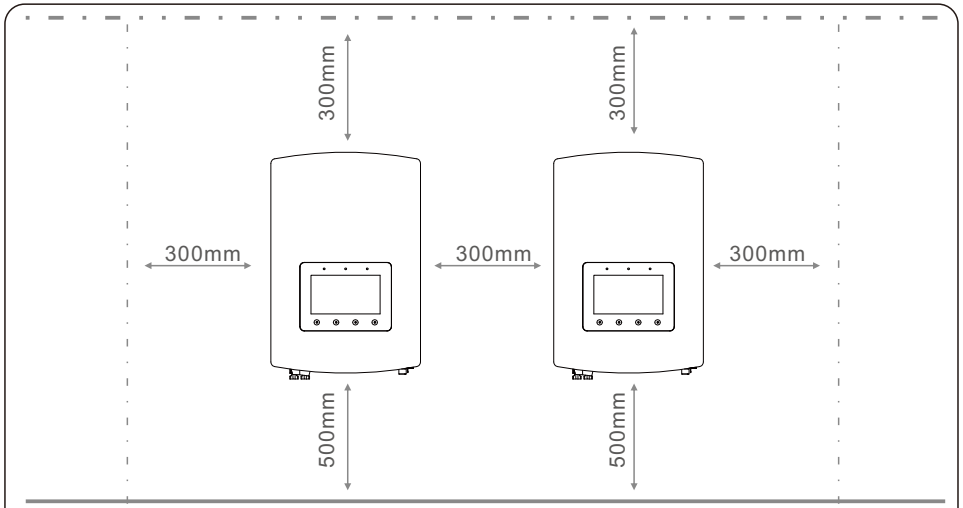


Figure 4.2 Inverter Mounting clearance

- 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.

NOTE:

This inverter complies with IEC 62109-2 clause 13.9 for earth fault alarm monitoring.

If an Earth Fault Alarm occurs, the fault code “PV-ISO PRO 01/02” will be displayed on the inverter screen / the LED indicator “Alarm” will light up.

4. Installation

4.2 Mounting the Inverter

Dimensions of mounting bracket:

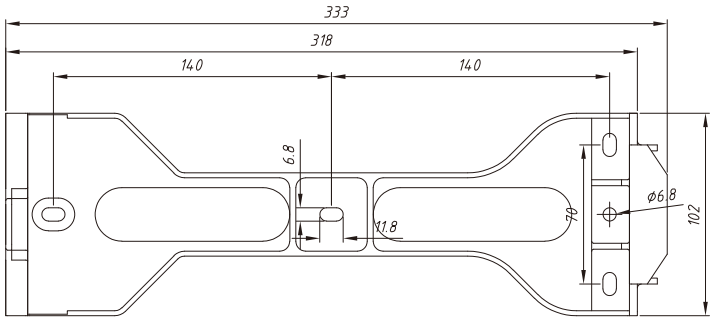


Figure 4.3 Inverter wall mounting

Once a suitable location has be found accordingly to 4.1 using figure 4.3 and figure 4.4 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.

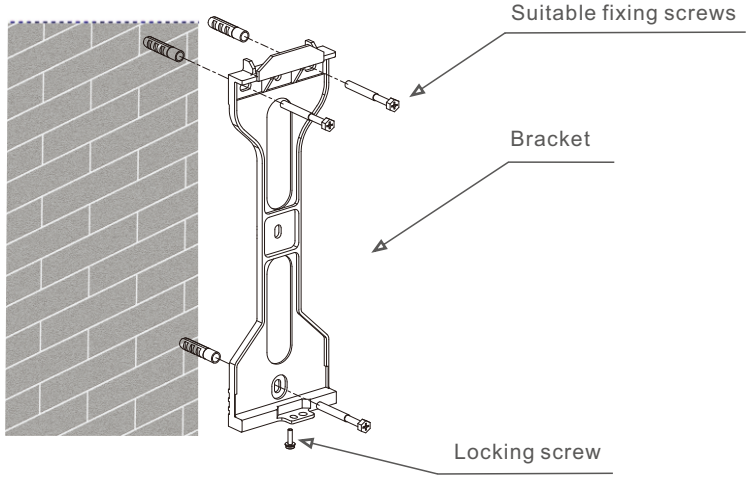


Figure 4.4 Fix bracket on the wall

WARNING:
The inverter must be mounted vertically.

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 (see Figure 4.5)

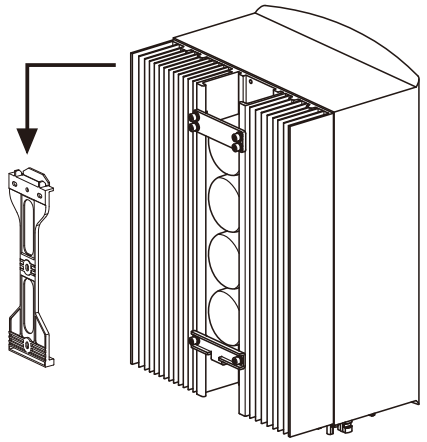


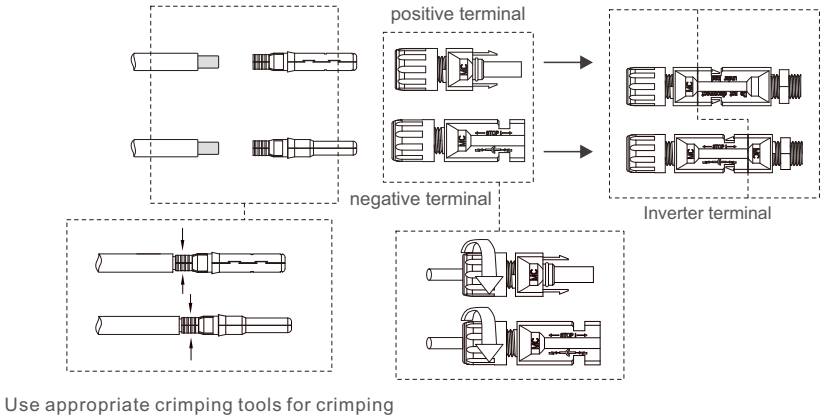
Figure 4.5 Wall Mount Bracket

4.3 PV Input Connection

Please ensure the following before connecting the inverter:

- Make sure the voltage of the PV string will not exceed the max DC input voltage (600Vdc). 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-5G Series inverter uses the MC4 connectors.
Please follow the picture below to assemble the MC4 connectors.
PV wire diameter requirements:2.5~4mm^2.



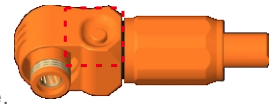
Use appropriate crimping tools for crimping

Figure 4.6

4.4 Battery Input Connection

NOTE:
If battery does not have an built-in DC breaker, please install an external DC breaker (>125A) between inverter and battery.

WARNING:
Power cables use water-proof AMPHENOL connectors. When pull out the power cable, you must press the button as indicated in the right figure.



Connect the Battery cable to the inverter and make sure the positive and negative poles are correct. A "Click" sound means fully connection and fasten the cables with the terminal protection cover as indicated in Figure 4.7.

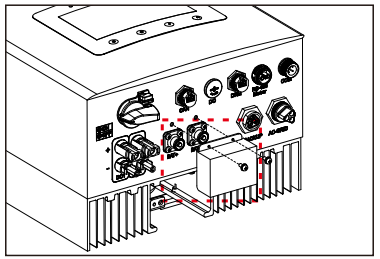


Figure 4.7 Installation of Terminal Protection Cover

NOTE:
Before connecting the battery, please carefully read the user manual of the battery and perform the installation exactly as the battery manufacturer requests.

4.5 AC Output Connection

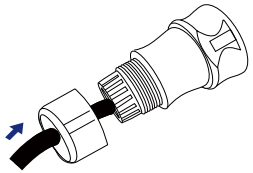
There are two AC terminals and the assembly steps for both are the same.

Take out the AC connector parts from the packaging.

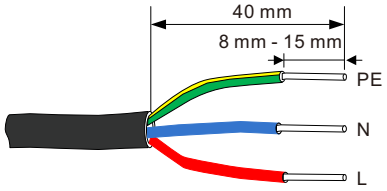
1. Make sure you use a cable within the correct specifications as shown in the image below.

Describe	Numerical value
Wire diameter	10~12mm
Traverse cross sectional area	2.5~6mm^2
Exposure Length	12mm

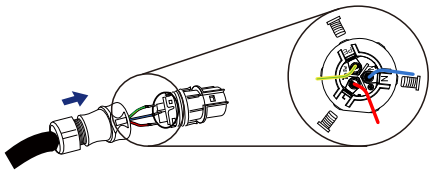
2. Lead the AC cable through the cable gland and the housing.



3. Remove a length of 40mm of the cable jacket and strip the wire insulation to a length of 8 – 15mm.



4. Each of the terminals are labeled. Ensure that the correct conductor is fastened (1.2 N.m. torque) to the correct terminal.

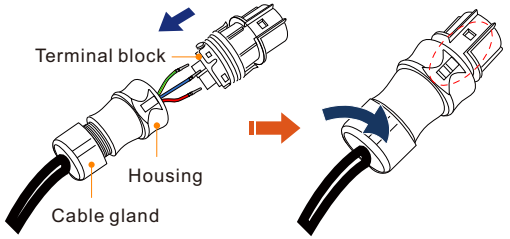


WARNING:

Observe the terminal layout of terminal block.

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

5. Make sure the rib of the terminal block and the groove on the housing engage perfectly until a “click” is heard to felt.



4. Installation

4.6 Meter Installation

Solis-RHI-(3-6)K-48ES-5G series inverter is able to connected Acrel meters or Eastron meters to fuilfill the control logic of the self-consumption mode, export power control, monitoring, etc.

Acrel 1ph meter (With CT): ACR10R-D16TE

Acrel 3ph meter (With CT): ACR10R-D16TE4 (Optional)

Eastron 1ph meter (Direct Insert): SDM120M

Eastron 1ph meter (With CT): SDM120CTM (Optional)

Eastron 3ph meter (Direct Insert): SDM630M (Optional)

Eastron 3ph meter (With CT): SDM630MCT (Optional)

Below 4.6.1 section describes the connection diagram of the Acrel 1ph meter (With CT) (Standard Accessory for all other market exclude Italy)

Below 4.6.2 section describes the connection diagram of the Eastron 1ph meter (Direct Insert) (Standard Accessory for Italian market)

4.6.1 Single phase meter installation

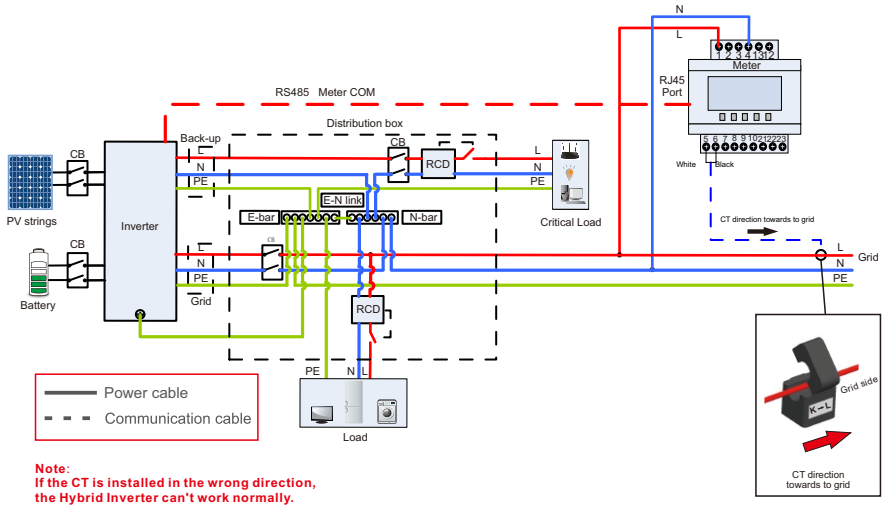


Figure 4.8

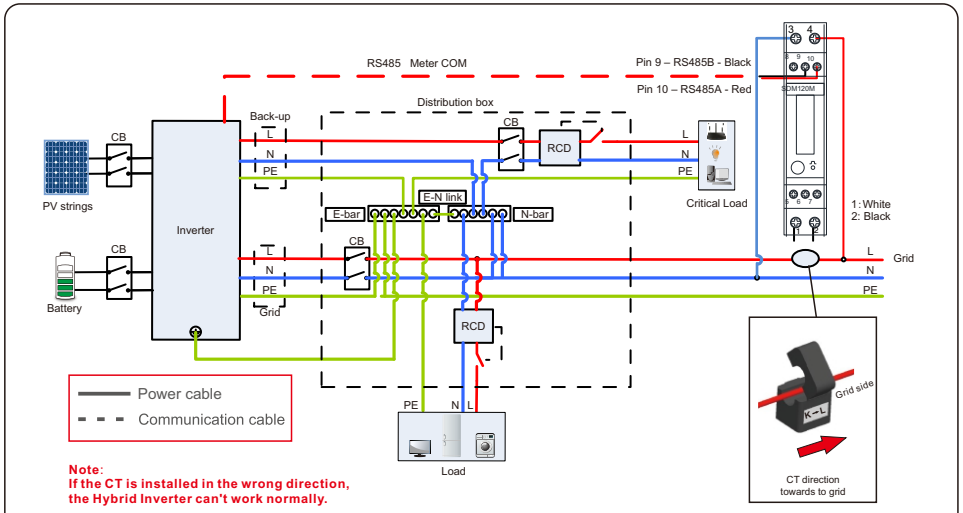


Figure 4.9

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.

4.7 Communication Cable Assembly

The RHI-5G 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.

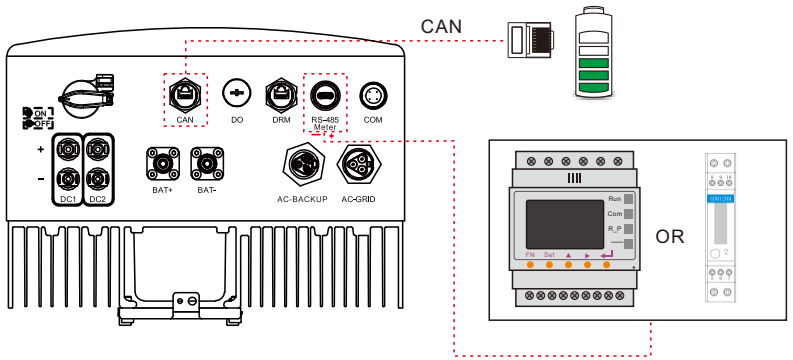


Figure 4.10

NOTE:
The CAN cable enables the communication between the inverter and Lithium batteries.

Procedure for connecting the CAN cable:

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

NOTE:
Lead-Acid and other older-technology battery types require experienced and precise design, installation and maintenance to work effectively.
For RHI series inverters there is no temperature compensation , thus client need BTS (battery temperature sensor) which is connected to CAN port at one side and battery negative pole at the other side.
BTS is optional. For further information please contact the sales manager.
For lead-acid battery , battery SOC calculation may not be accurate according to battery inconformity between cells, battery aging or other specifications of lead-acid battery etc.

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 Meter' on the other end).
2. Unscrew the swivel nut from RS485 port.
3. Insert the Two-pin terminal with RS485 label into the RS485 port, then fasten the swivel nut.
4. Connect the other end to the Meter.

4.8 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 2Nm.

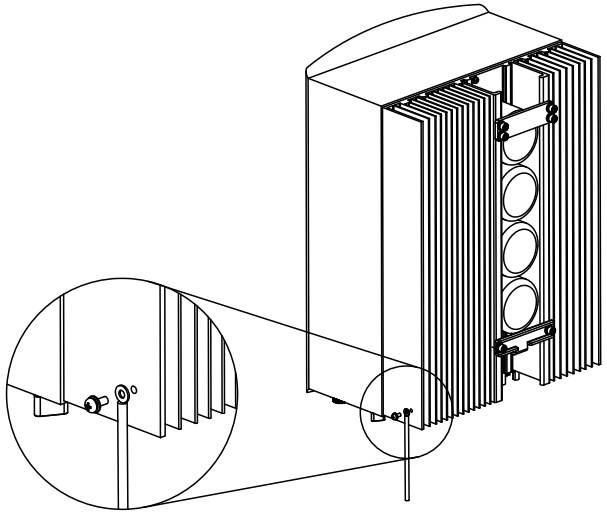


Figure 4.11 Connect the external grounding conductor

4.9 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.

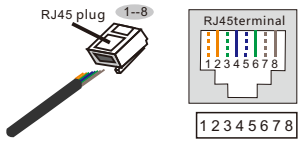
Pin	Assignment for inverters capable of both charging and discharging	Pin	Assignment for inverters capable of both charging and discharging
1	DRM 1/5	5	RefGen
2	DRM 2/6	6	Com/DRM0
3	DRM 3/7	7	V+
4	DRM 4/8	8	V-

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 4.12 RJ45 communication connection terminals

2.Use the network wire stripper to strip the insulation layer of the communication cable. According to the standard line sequence of figure 4.13 connect the wire to the plug of RJ45, and then use a network cable crimping tool to make it tight.



Correspondence between the cables and the stitches of plug
Pin 1: white and orange ; Pin 2: orange
Pin 3: white and green; Pin 4: blue
Pin 5: white and blue; Pin 6: green
Pin 7: white and brown; Pin 8: brown

Figure 4.13 Strip the insulation layer and connect to RJ45 plug

3.Connect RJ45 to DRM port.

NOTE:
To use this function, please contact the manufacturer.

4.10 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.

4.11 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.

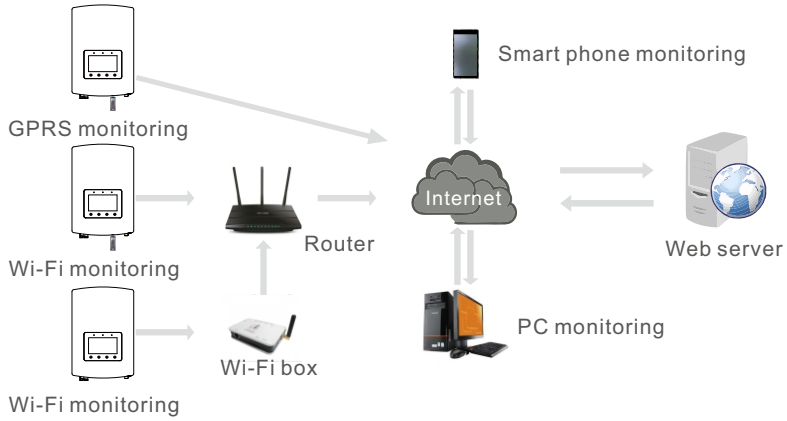


Figure 4.14 Wi-Fi or GPRS communication function

4.12 Max. over current protection device (OCPD)

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

Inverter	Rated voltage(V)	Rated output current (Amps)	Current for protection device (A)
RHI-3K-48ES-5G	230	13.0	20
RHI-3.6K-48ES-5G	230	15.7	20
RHI-4.6K-48ES-5G	230	20.0	30
RHI-5K-48ES-5G	230	21.7	30
RHI-6K-48ES-5G	230	26.1	40

Table 4.1 Rating of grid OCPD

4.13 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.

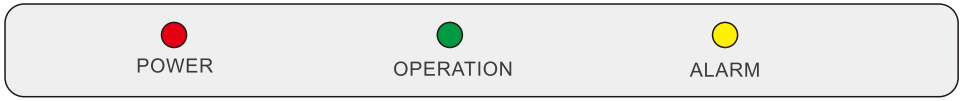
The inverter can't start to generate until the earth fault is resolved. Please refer to the troubleshooting section of this manual to resolve the earth fault or contact Solis service team for help.

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

4. Installation

4.14 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

5. Operation

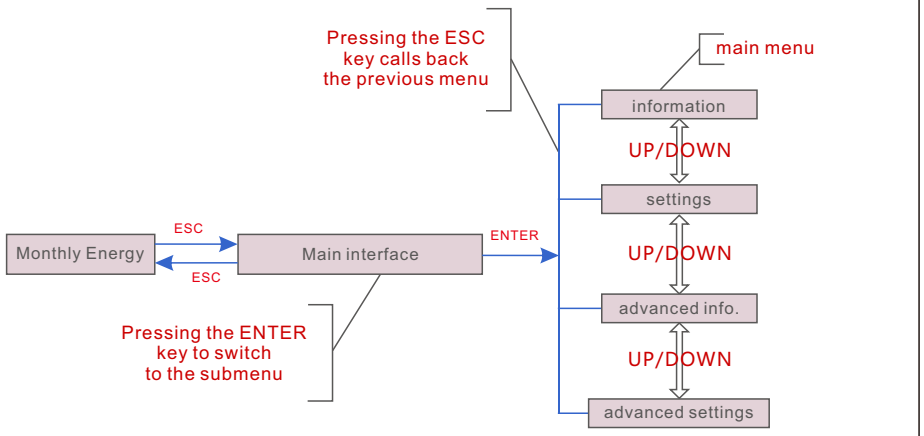


Figure 5.1 Operation Overview

5.1 Initial Display

When powering up the inverter for the first time, it is required to set the language.
Press "ENT" to select.

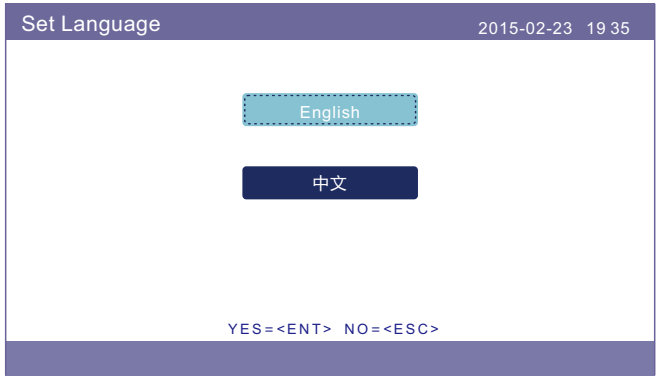


Figure 5.2 Set Language

After setting the language, press "ESC" to access the main page.

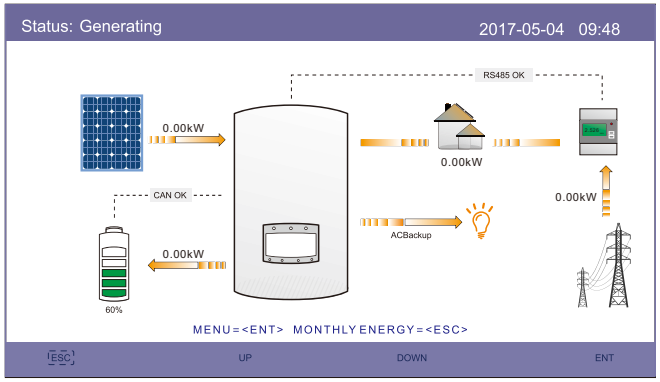


Figure 5.3 Main Page

On the main page,
Press "ESC" : View the yield data on a monthly bar charts. Then use "UP" and "DOWN" to change the date and "ENT" to move the cursor.
Press "UP" or "DOWN": View different status on the top left of the main page.
Press "ENT": Enter the main menu.

	Solar Power: When solar power is generated， an arrow indicates the direction of the power flow and the value is shown above the arrow.
	Battery: When the battery is connected successfully, it will display "CAN OK",meanwhile,battery SOC, arrow and value of power flow is shown. Otherwise, it will display "CAN Fail".
	Non-Critical Loads: Loads connected to the AC Grid port which will shutdown if the grid is in malfunction.
	Smart Meter: When the smart meter is connected successfully, it will display "RS485 OK", otherwise "RS485 Fail".
	Critical Loads: Loads connected to the AC Backup port which will be supported by battery and solar even if the grid is in malfunction.
	Grid: The arrow and value indicate the export/import power of the hybrid system.

5.2 Main Menu

There are four submenu in the Main Menu:

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

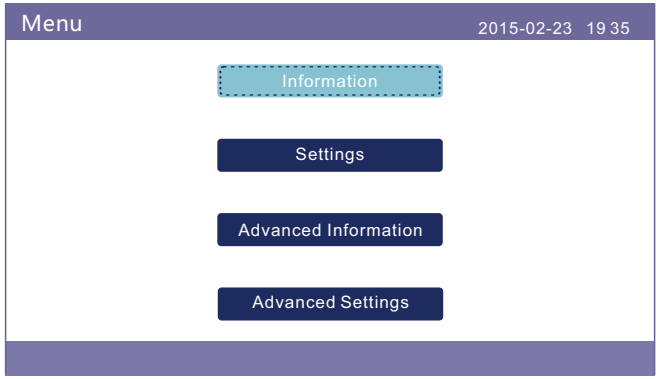


Figure 5.4 Main Menu

5.3 Information

In the "Information" section, operating data and information can be viewed.
Three pages of information can be checked by press "UP" or "DOWN".
The example display is shown in the following Figure 5.5, 5.6 and 5.7.
Values are for reference only.

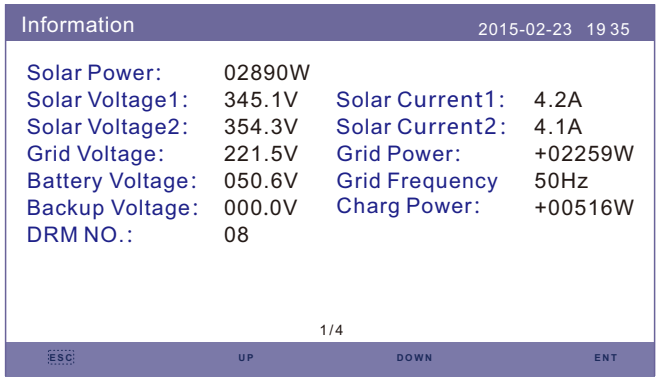


Figure 5.5 Information Page 1

5. Operation

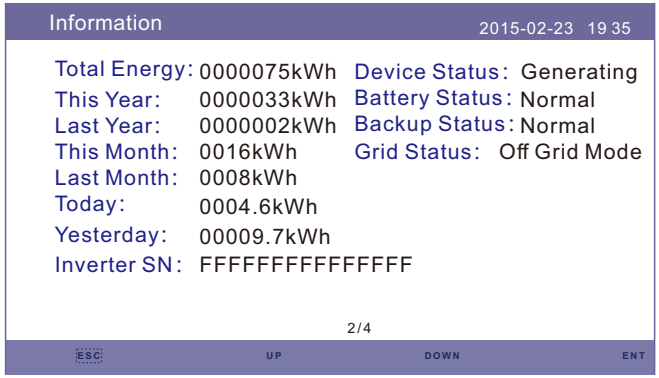


Figure 5.6 Information Page 2

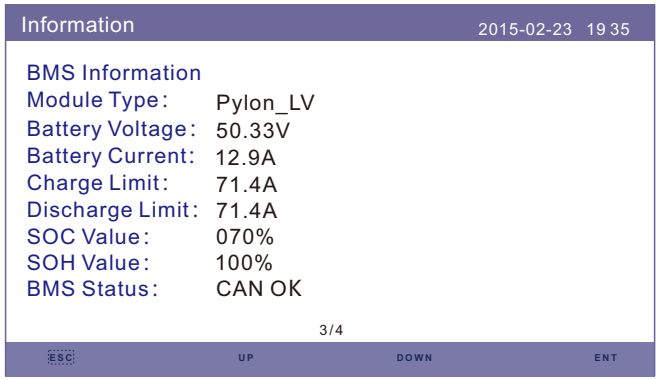


Figure 5.7 Information Page 3

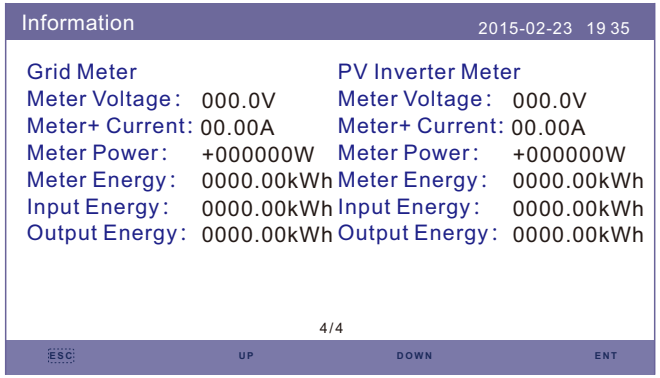


Figure 5.8 Information Page 4

NOTE:
Meter Power/Grid Power: Positive value indicates exporting power to the grid, negative value indicates importing power from the grid
Charge Power: Positive value indicates charging, negative value indicates discharging.

NOTE:
Information for "PV Inverter Meter" is only available when two Eastron meters are used and Meter Placement is selected as "Grid+PV Meter".
Details please consult Solis service department.

5. Operation

5.4 Settings

In the "Settings" section, Time/Date, Slave address and language can be modified.

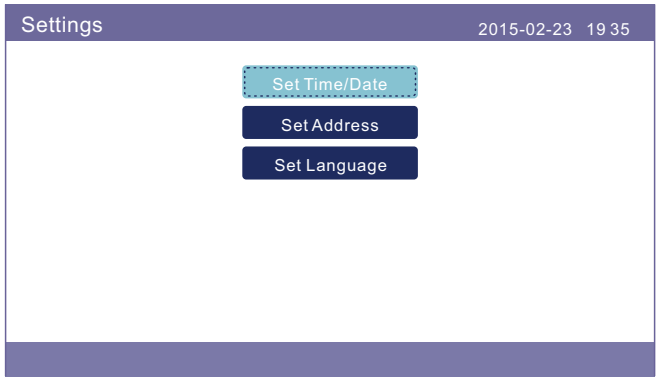


Figure 5.9 Setting

5.4.1 Set Time/Date

Set the time and date on the inverter. Must set this according to local time as it affects the daily yield calculation. (If Solis monitoring system is used, must set the correct time zone of the system, otherwise datalogger will update the inverter time based on the time zone of the system.)
Press "UP" and "DOWN" to change the value.
Press "ENT" to mover the cursor.
Press "ESC" to save the change.

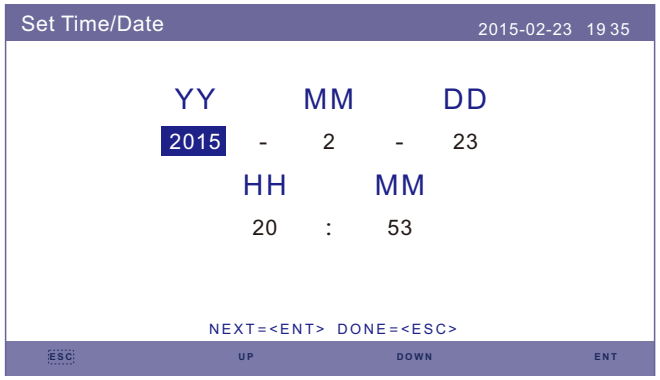


Figure 5.10 Set Time

5.4.2 Set Address

Set the slave address of the inverter. The default address is 01.

Figure 5.11 Set Address

5.4.3 Set Language

Set system language. Chinese and English are available.

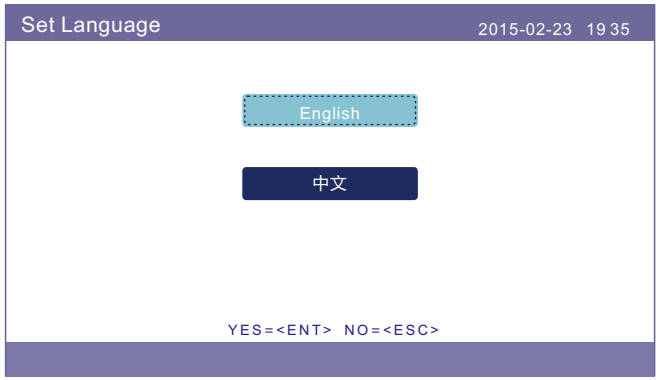


Figure 5.12 Set Language

5.5 Advanced Information

Detailed information can be viewed in this section:

1. Alarm Message
2. Running Message
3. Version
4. Communication Data.
5. Daily Energy
6. Monthly Energy
7. Yearly Energy
8. Total Energy.
9. Warning Message
10. Inspection

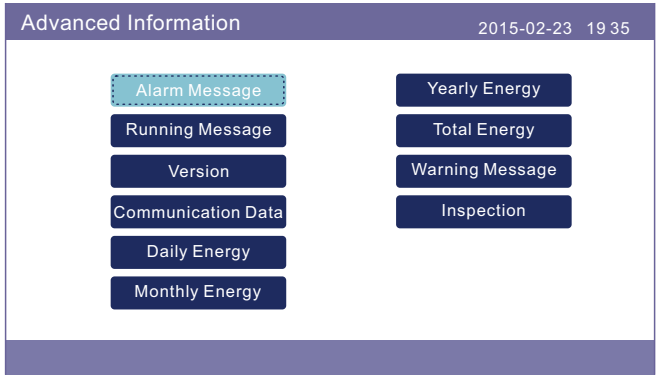


Figure 5.13 Advanced Information

5.5.1 Alarm Message

40 pages of latest alarm messages (5 per page). Alarm message shows the alarm that will lead to inverter shutdown.

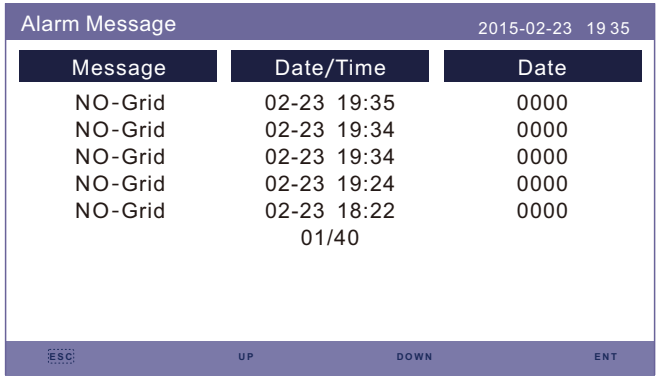


Figure 5.14 Alarm Message

5.5.2 Running Message

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

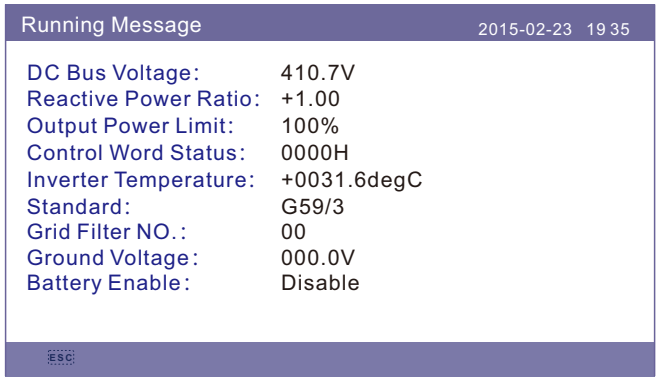


Figure 5.15 Running Message

5.5.3 Version

Inverter model number and software version can be viewed in this section. Values are for reference only..

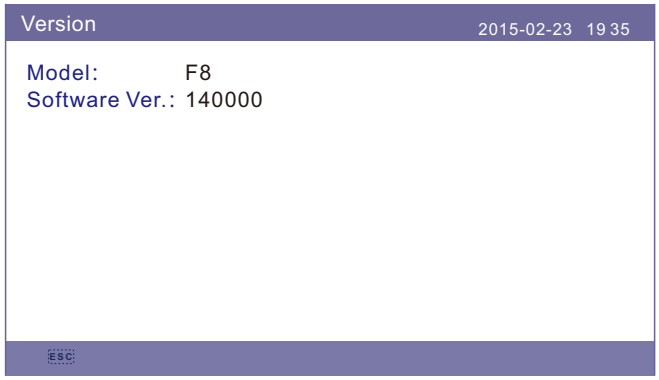


Figure 5.16 Model Version and Software Version

5.5.4 Communication Data

Internal communication data can be viewed in this section. For maintenance person only. Values are for reference only.

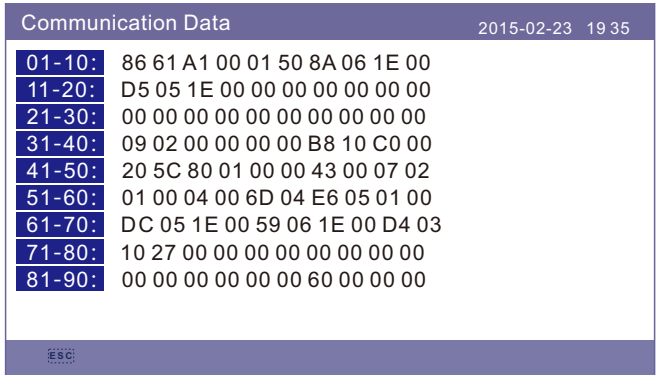


Figure 5.17 Communication Data

5.5.5 Daily Energy

The screen shows the daily energy detail of the inverter.

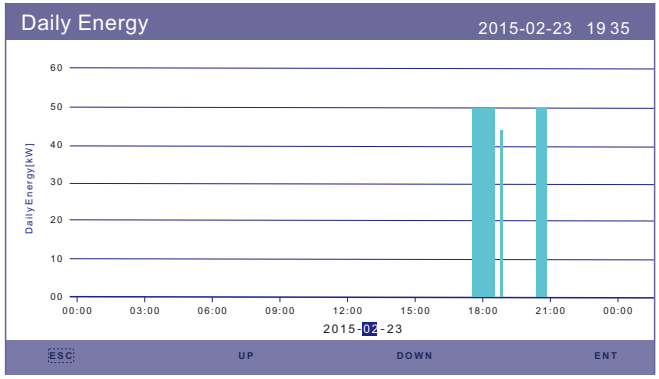


Figure 5.18 Daily Energy

5.5.6 Monthly Energy

The screen shows the inverter monthly energy detail of different month.

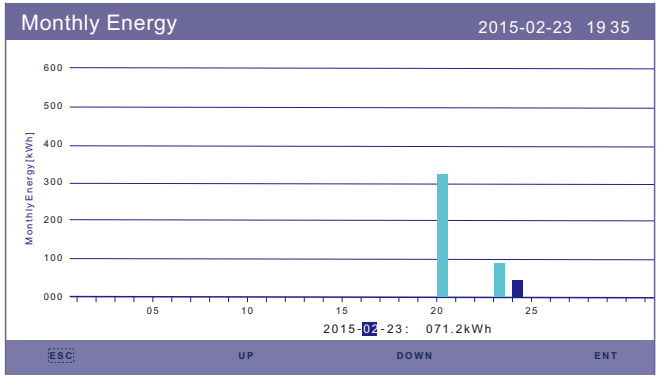


Figure 5.19 Monthly Energy

5.5.7 Yearly Energy

The screen shows the inverter yearly energy detail of different year.

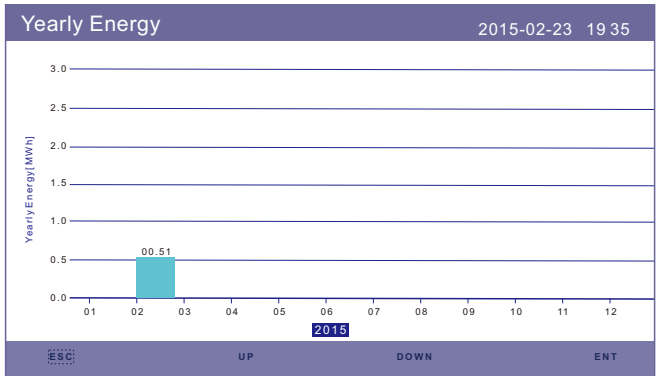


Figure 5.20 Yearly Energy

5.5.8 Total Energy

The screen shows the inverter total energy detail.

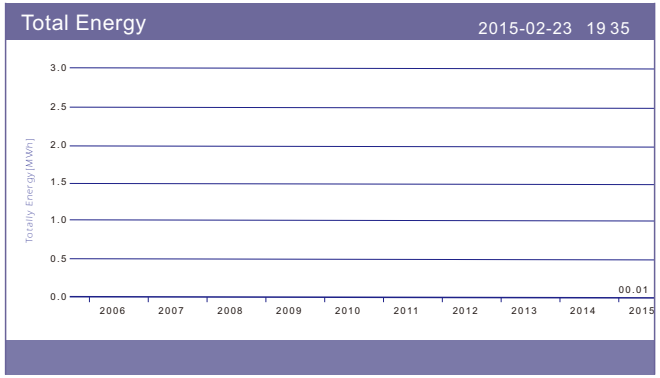


Figure 5.21 Total Energy

5.5.9 Warning Message

10 pages of latest warning messages (5 per page).
Warning message shows the warning that is abnormal but will not lead to inverter shutdown.

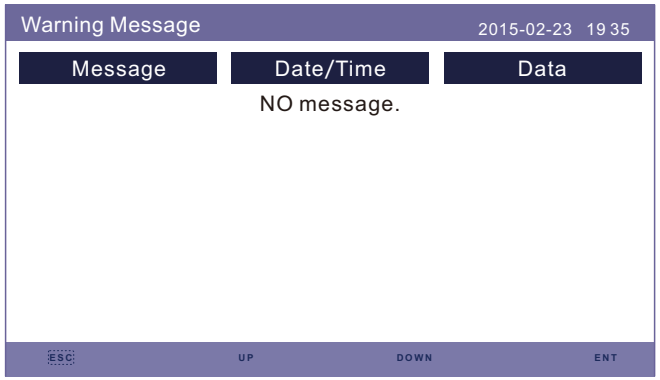


Figure 5.22 Warning Message

5.6 Advanced Settings - Technicians Only

NOTE:
This function is for authorised technicians only. Improper access and operation may result in abnormal results and damage to the inverter.
Password required – restricted access – authorised technicians only
Un-authorised access may void the warranty. (Password"0010")

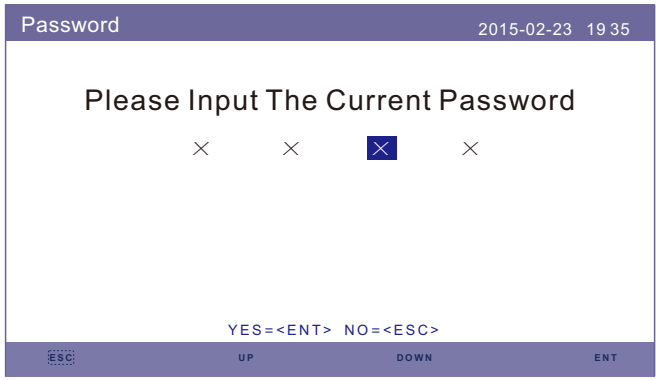


Figure 5.23 Enter Password

The default password is “0010".
Please press “down” to move the cursor, press “up” to select the number.
After enter the correct password the Main Menu will display a screen and be able to access to the following information.

1. Select Standard
2. ON/OFF
3. Calibrate
4. Reset Password
5. Restar HMI
6. Storage Energy Set
7. Export Power Set
8. HMI Update
9. DSP Update
10. BaudRate RS485
11. Special Settings

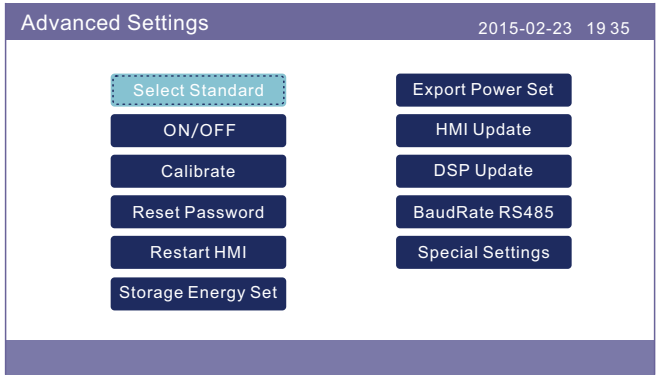


Figure 5.24 Advanced Settings

5.6.1 Select Standard

This function is used to select corresponding grid standards.

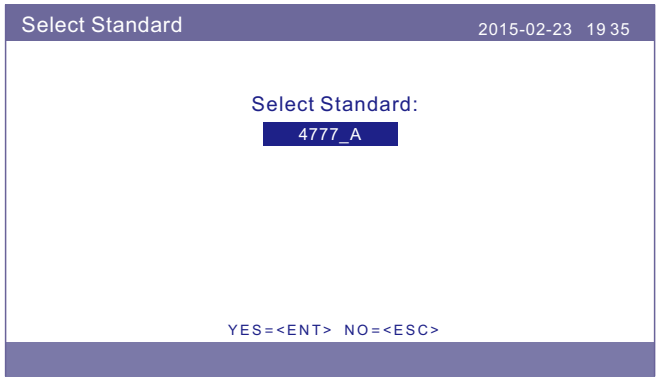


Figure 5.25 Select Standard

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:
To check the firmware version, select the standard and you will find 'firmware version' parameter. A2 is the current version that comply with AS/NZS 4777.2:2020.

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

Region	Australia A	Australia B	Australia C	New Zealand	
Standard Code Name	4777-A	4777-B	4777-C	4777-N	Setting Range
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

5.6.2 ON/OFF

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

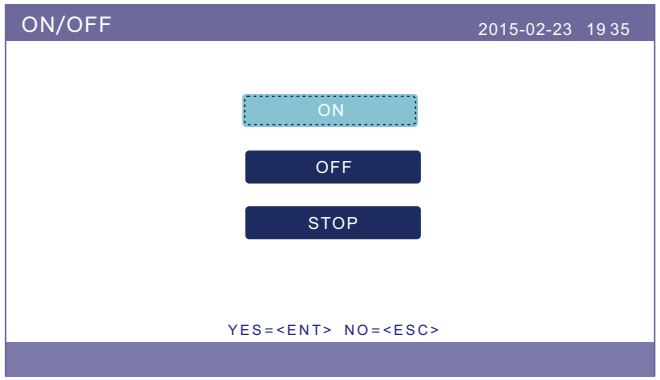


Figure 5.26 Set ON/OFF

5.6.3 Calibrate

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

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

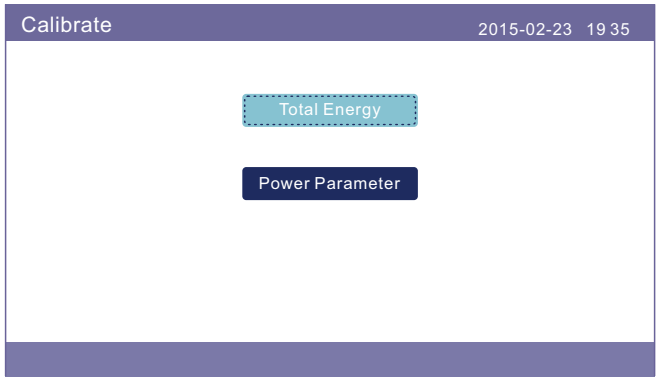


Figure 5.27 Calibrate

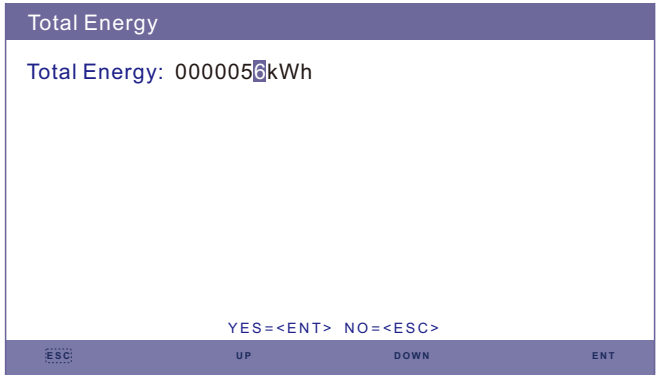


Figure 5.28 Total Energy

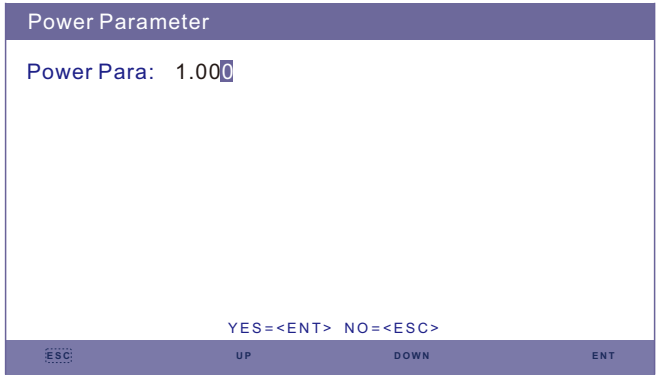


Figure 5.29 Power Parameter

5.6.4 Reset Password

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

Figure 5.30 Reset Password

5.6.5 Restart HMI

This function is to reboot the LCD screen.

5.6.6 Storage Energy Set

This section contains working mode setting, battery control setting, etc.

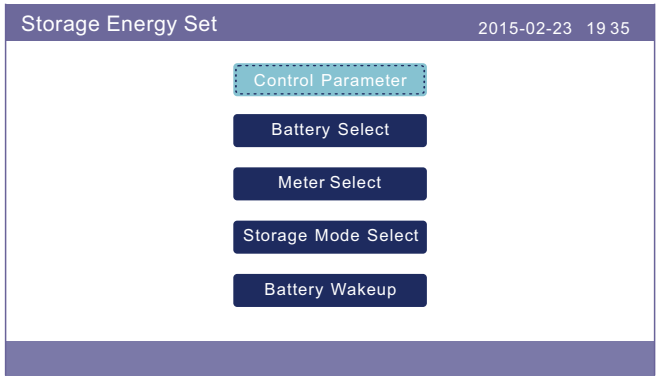


Figure 5.31 Storage Energy set

5.6.6.1 Control Parameter

Enter the Control Parameter menu as shown below:
Don't change the settings without the permission of technicians.

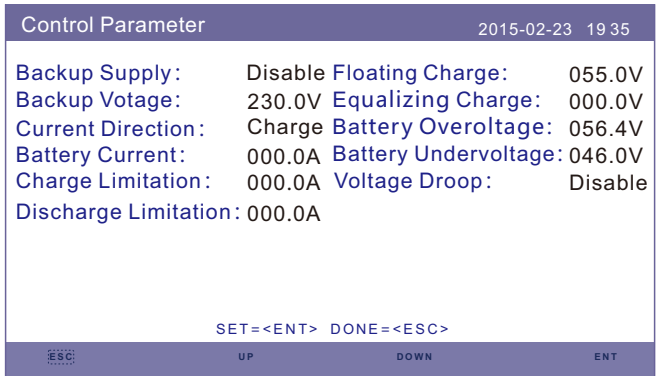


Figure 5.32 Control Parameter

5.6.6.2 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.
* ForceChg Limit (0A~100A, default 100A)
--Determine the battery charge current limit when inverter operates in force charge status.

5. Operation

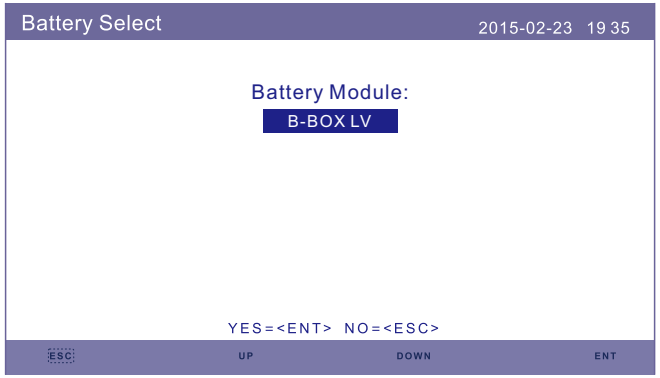


Figure 5.33 Battery Select

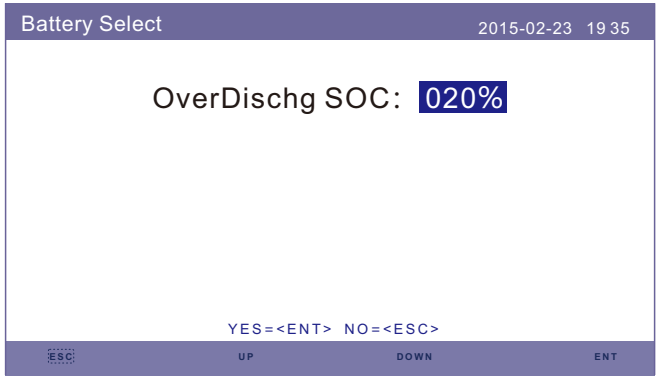


Figure 5.34 Over Discharge SOC.

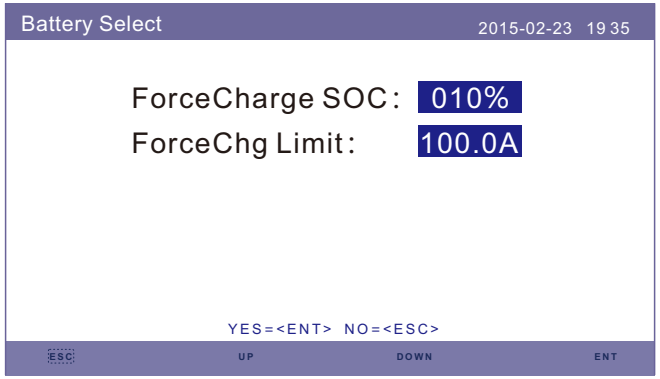
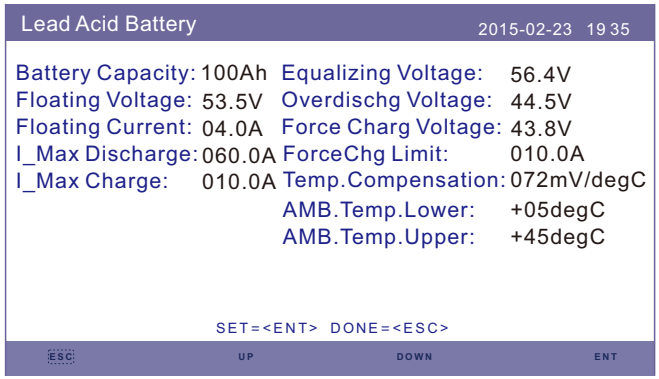


Figure 5.35 ForceCharge SOC

5. Operation

NOTE:

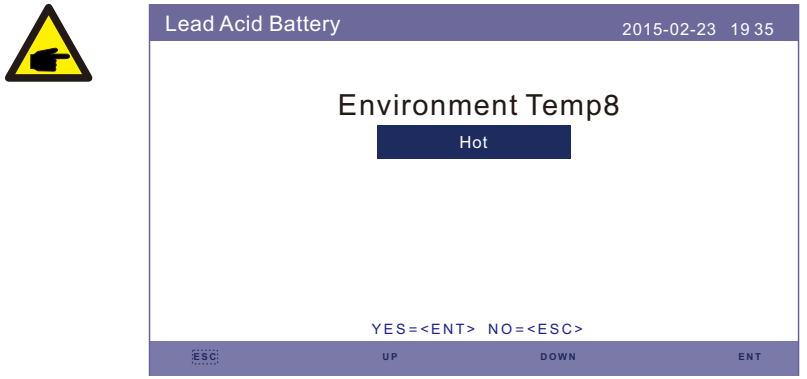
5G products support lead-acid battery. Select "Lead-Acid" in the "Battery Select" and configure the following parameters according to different lead-acid batteries.



Lead Acid Battery (Values are examples Only)

1. Battery Capacity: Define the capacity of the battery.
2. Equalizing Voltage: Define the voltage for Equalizing/Absorption charge.
3. Floating Voltage: Define the voltage for floating charge.
4. Floating Current: Define the current for floating charge.
5. Overdischg Voltage: Define the voltage that stops discharging the battery.
6. Force Charg Voltage: Define the voltage that forces to charge the battery to prevent a dead battery.
7. ForceChg Limit:Define the battery charge current limit in force charge status.
8. I_Max Discharge: Define the max discharge current for the battery.
9. I_Max Charge: Define the max charge current for the battery.
10. Temp.Compensation: Define the temperature compensation parameter for the battery.
11. AMB.Temp.Lower/Upper: Define the temperature range when the temperature compensation is effective.

After configuration, save and send.
If battery temperature sensor is connected, select "Warm".
If battery temperature sensor is not connected, select based on actual condition for fixed compensation
Cold: 5 degC Warm: 25 degC Hot: 40 degC



WARNING:

Lead-acid battery is not recommended for general customers as it requires experienced installers and technicians who can fully understand the battery parameters and configure the settings and installations correctly.
Due to the inconformity between battery cells, damages will be less likely to be avoided. Solis is not responsible for any potential damages caused by the use of lead-acid batteries.

5.6.6.3 Meter Set

These settings are used to select the meter types and meter installed locations based on the actual configuration.

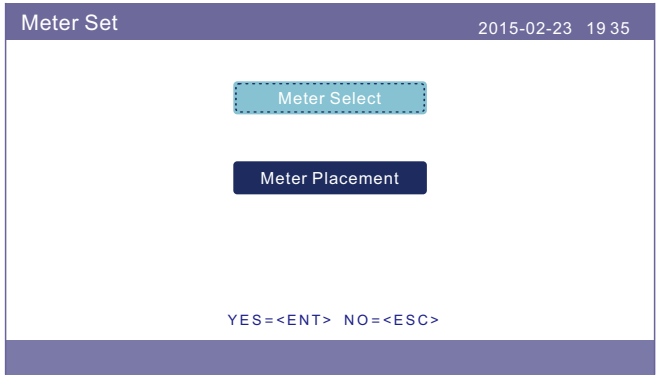


Figure 5.36 Meter Set

5.6.6.3.1 Meter Select

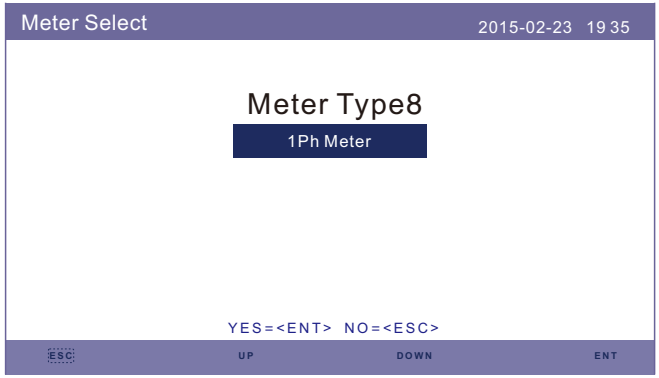


Figure 5.37 Meter Select

Meter Model	Meter Type Options
Acrel 1ph meter (With CT): ACR10R-D16TE	“1ph meter”
Acrel 3ph meter (With CT): ACR10R-D16TE4 (Optional)	“Acrel 3ph meter”
Eastron 1ph meter (Direct Insert): SDM120M	“Eastron 1ph meter”
Eastron 1ph meter (With CT): SDM120CTM (Optional)	“Eastron 1ph meter”
Eastron 3ph meter (Direct Insert): SDM630M (Optional)	“Eastron 3ph meter”
Eastron 3ph meter (With CT): SDM630MCT (Optional)	“Eastron 3ph meter”
No meter is connected	“No Meter”

5.6.6.3.2 Meter Placement

Grid: Meter is installed at the grid connection point.
Load: Meter is installed at the load branch circuit.
Grid+PV Inverter: One meter is connected at the grid connection point, the other meter is connected at the AC output port of an extra PV inverter. (Eastron Meter supported).

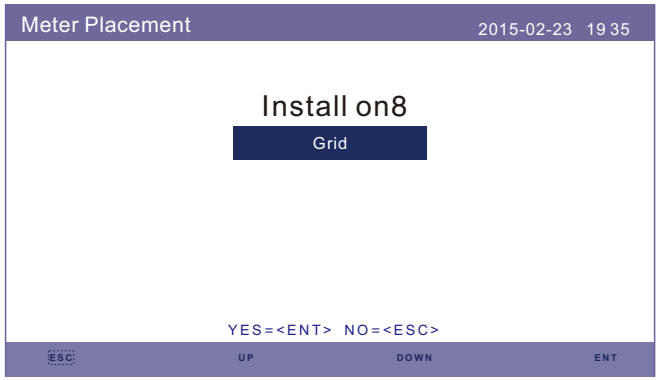


Figure 5.38 Meter Placement

5.6.6.4 Storage Mode Select

There are 5 working modes available.
1. Self Use Mode 2. Feed in Priority Mode 3. Backup Mode 4. Off Grid Mode
Please refer to Appendix 10.4 for explanations and setting instructions for each mode.

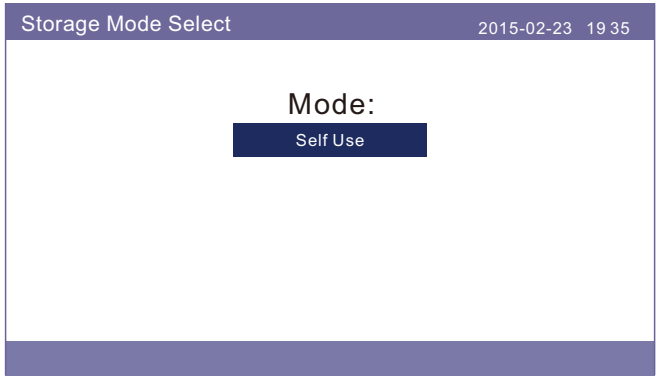


Figure 5.39 Storage Mode Select

5.6.6.5 Battery Wakeup

This function should be activated only after the installation. In the case of a low battery voltage shutdown, the inverter will shut-down. This setting can be enabled, so when the inverter detects PV or grid it wakes up the battery. This function conflicts with the battery reverse polarity protection(If the installer connects cables with wrong polarity, the inverter can protect itself from damage).To avoid the possible damage during installation, do not active battery wakeup function before finishing the first commissioning.

5.6.7 Export power Set

This function is to set the export power control.
1.Backflow Power. 2. ON/OFF. 3.Failsafe ON/OFF
Setting 1&3 are only valid when Setting 2 is set to "ON"

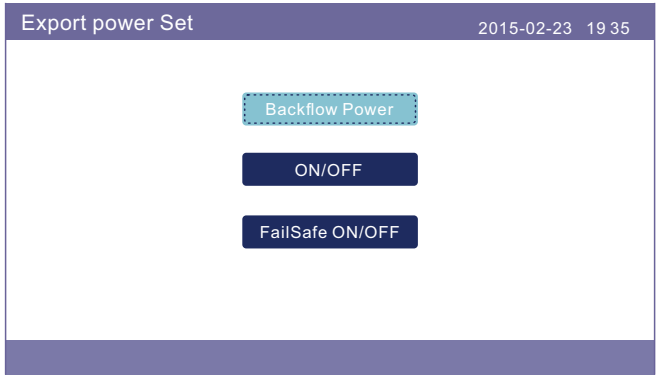


Figure 5.40 Export power Set

NOTE:
The export power control function comply with Section 6.3 of AS/NZS4777.2:2020. Inverter doesn't have the generation control limit function as in Section 6.2 of AS/NZS4777.2:2020.

5. Operation

5.6.7.1 Backflow Power

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

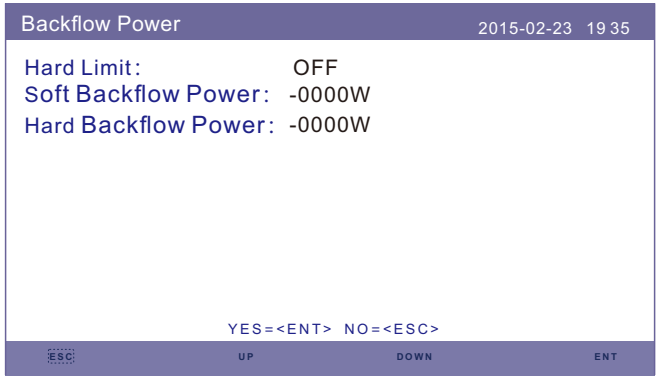


Figure 5.41 Backflow Power

5.6.7.2 ON/OFF

Enable/Disable the function.

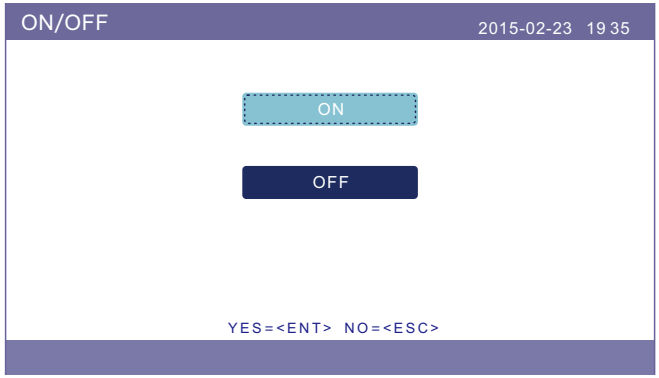


Figure 5.42 ON/OFF

5.6.7.3 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 exceeding the limit.

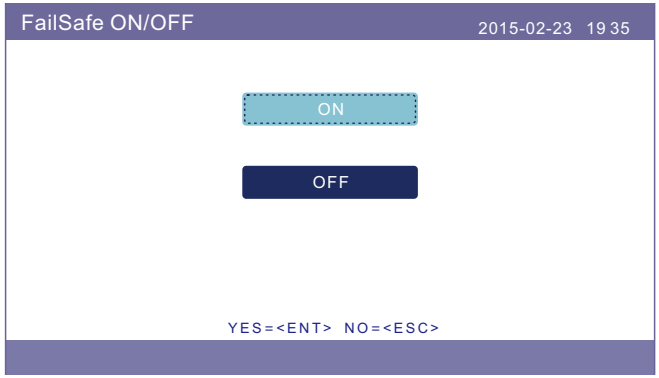


Figure 5.43 FailSafe ON/OFF

5.6.8 HMI Update

This function is used to update HMI software.
Values are for reference only.

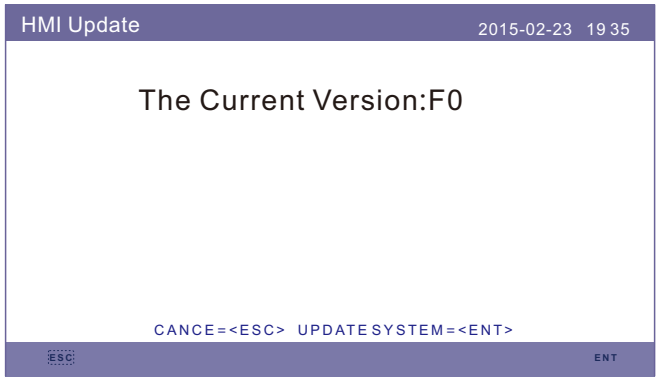


Figure 5.44 HMI Update

5. Operation

5.6.9 DSP Update

This function is used to update DSP software.
Values are for reference only.

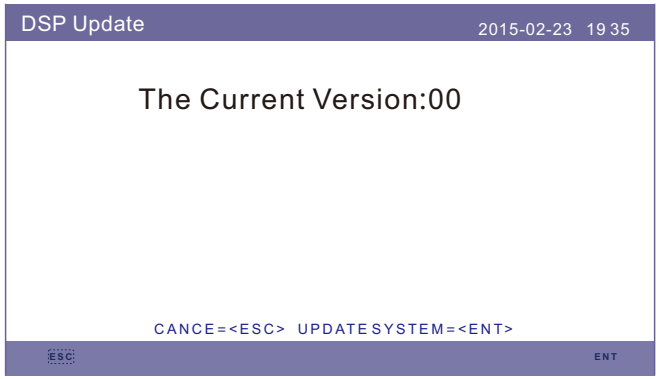


Figure 5.45 DSP Update

5.6.10 BaudRate RS485

This function is to change the internal communication Baudrate.

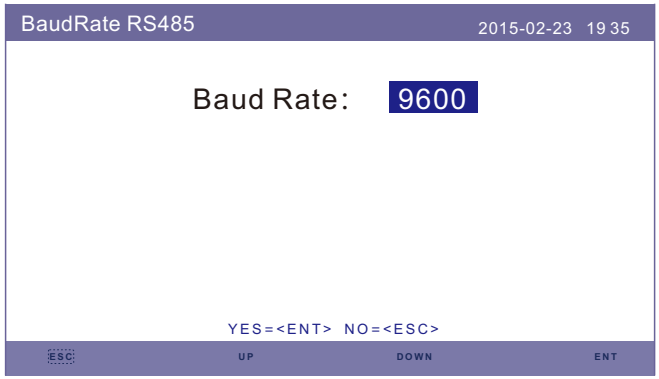


Figure 5.46 BaudRate RS485

WARNING:
This function is for maintenance personnel only, wrong operation will prevent the inverter from working properly.

5.6.11 Special Setting

There are two special settings:

1. AFCI Set

2. EPS Mode

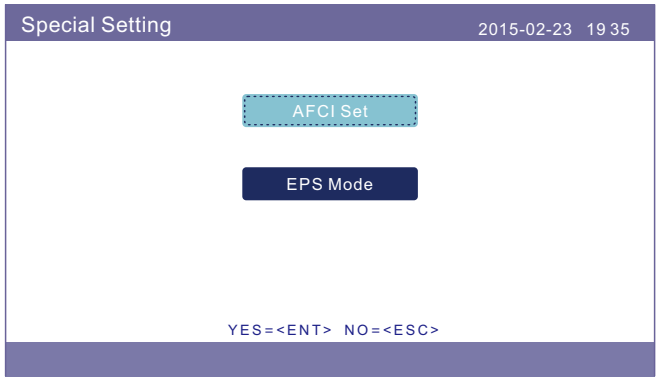


Figure 5.47 Special Setting

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.

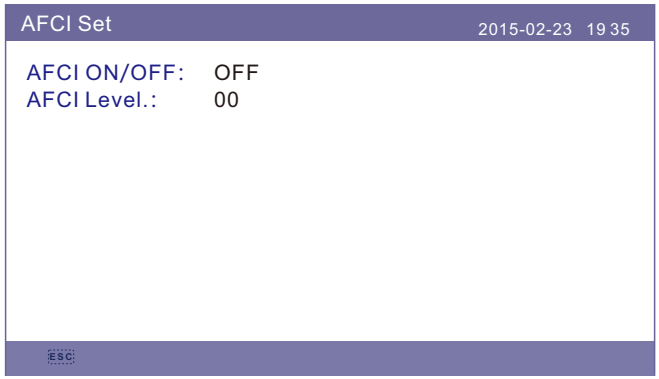


Figure 5.48 AFCI Set

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.

5. Operation

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:

Figure 5.49 ARC-FAULT

Installer needs to thoroughly inspect the DC circuit to ensure all the cables arecorrectly 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.

5.6.11.2 AFCI Set

EPS Mode needs to work with external Solis NPS switching box to achieve ATS switching function.
When grid is available, only the Grid Port is enabled and load is supported through NPS box by the grid.
When grid is lost, Grid Port will be disabled and after the “Switching Time”, the Backup Port will be enabled and then load is supported through NPS box by the Backup Port.
*It gives up the UPS function of the backup port and manually set the switching time.
This mode must work with the Solis NPS switching Box.
Otherwise it may cause some unexpected control mistakes.

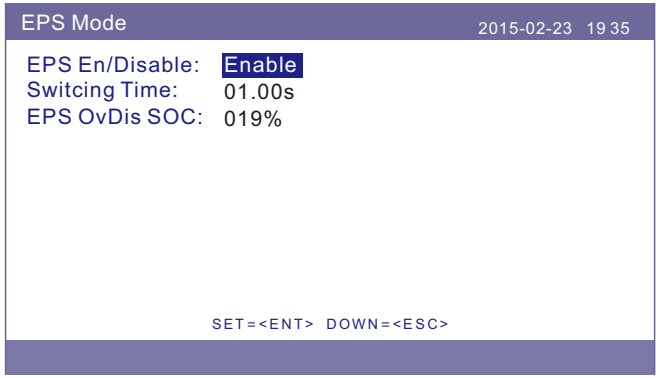


Figure 5.50 EPS Mode

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 PV 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 PV DC switch of the inverter.
3. Turn off battery breaker or battery switch button on the battery.
4. Waiting for the LCD of inverter to turn off and the system shutdown is completed.

7. Maintenance

Solis RHI-5G 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.

8. Troubleshooting

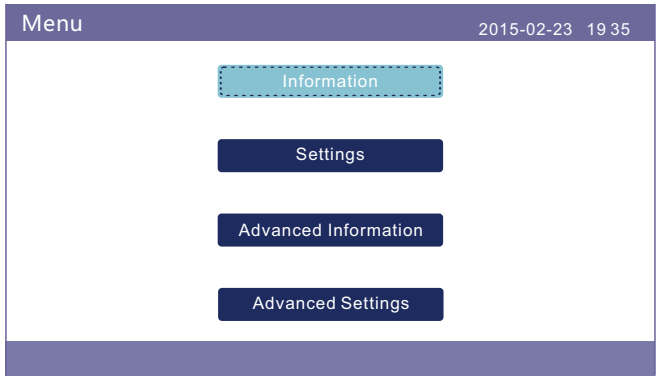
The inverter has been designed in accordance with international grid tied standards for safety, and electromagnetic compatibility requirements. Before delivering to the customer the inverter has been subjected to several test to ensure its optimal operation and reliability.

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 8.1:

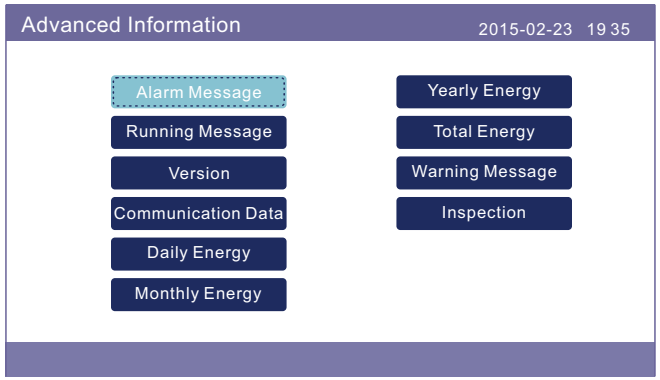
When faults occur, the “Fault” state will be shown on the main screen.
Follow the steps below to check what fault occurs.

Steps: Enter → Down → Advanced Information→ Enter →Alarm Message.

Step1: Press ENTER.
Step2: Press DOWN to select Advanced Information, then press ENTER.



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



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	
IGFOL-F	Grid current tracking fail	1. Restart inverter or contact installer.
IG-AD	Grid current sampling fail	
ILeak-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.

8. 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	Backup 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 circuit whether the battery circuit jumps. 2. Restart inverter.
Over-Load	Backup 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.

8. 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.
AFCI self-detection (model with AFCI module)	AFCI module self-detect fault	1.Restart inverter or connect technician.
Arcing protection (model with AFCI module)	Detect arc in DC circuit	1. Check inverter connection whether arc exists and restart inverter.

Table 8.1 Fault message and description

NOTE:
If the inverter displays any alarm message as listed in Table 8.1; please turn off the inverter 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.

9. Specifications

Technical Data	RHI-3K-48ES-5G	RHI-3.6K-48ES-5G
Input DC (PV side)		
Recommended max. PV power	7000W	
Max. input voltage	600V	
Rated voltage	330V	
Start-up voltage	120V	
MPPT voltage range	90-520V	
Full load MPPT voltage range	141-520V	169-520V
Max. input current	11A/11A	
Max. short circuit current	17.2A/17.2A	
Max. inverter backfeed current to the array	0A	
MPPT number/Max input strings number	2/2	
Battery		
Battery Type	Li-ion / Lead-acid	
Battery Voltage range	42 - 58V	
Battery Capacity	50 - 2000Ah	
Maximum Charging Power	3kW	
Maximum Charge/discharge current	62.5A	
Communication	CAN	
Output AC(Back-up)		
Rated output power	3kW	
Max. apparent output power	4kVA	
Back-up switch time	<20ms	
Rated output voltage	1/N/PE, 230 V	
Rated frequency	50Hz	
Rated output current	13A	
THDv(@linear load)	<2%	
Input AC (Grid side)		
Input voltage range	184-264V	
Max. input current	26.1A	
Frequency range	45-55 Hz	

9. Specifications

Technical Data	RHI-3K-48ES-5G	RHI-3.6K-48ES-5G
Output AC(Grid side)		
Rated output power	3kW	3.6kW
Rated apparent output power	3kVA	3.6kVA
Max. apparent output power	3kVA	3.6kVA
Operation phase	1/N/PE	
Rated grid voltage	230 V	
The grid voltage range	184-264 V	
Rated grid frequency	50 Hz	
AC grid frequency range	45-55 Hz	
Rated grid output current	15.7A	17.3A
Inrush current	65A 10us	
Max. output fault current	65A 10us	
Max. output overcurrent protection	17.0A	18.0A
Power Factor	>0.99 (0.8 leading - 0.8 lagging)	
THDi	<2%	
Efficiency		
Max efficiency	>97.5%	
EU efficiency	>96.8%	
Protection		
DC reverse polarity protection	Yes	
Short circuit protection	Yes	
Output over current protection	Yes	
Surge protection	DC Type Ⅱ / AC Type Ⅱ	
Ground fault monitoring	Yes	
Integrated AFCI (DC arc-fault circuit protection)	Yes	
Protection class / Over voltage category	I / II(PV), II(battery), III(AC)	

9. Specifications

Technical Data	RHI-3K-48ES-5G	RHI-3.6K-48ES-5G
General data		
Dimensions(W/H/D)	333*505*249mm	
Weight	18.3kg	
Topology	non-isolated	
Operation temperature range	-25℃ ~ +60℃	
Ingress protection	IP65	
Noise emission	<20 dB (A)	
Cooling concept	Natural convection	
Max. operation altitude	3000m	
Active anti-islanding method	Active frequency shifting	
Grid connection standard	AS/NZS 4777.2, IEC 62116, IEC 61727, IEC 60068, IEC 61683, EN 50530	
Safty/EMC standard	IEC/EN 62109-1/-2, EN 61000-6-2/-3	
Features		
DC connection	MC4 connector	
AC connection	Quick connection plug	
Display	7.0"LCD color screen display	
Communication	RS485, Optional:Wi-Fi, GPRS	
Warranty	5 years standard (extand to 20 years)	

9. Specifications

Technical Data	RHI-4.6K-48ES-5G	RHI-5K-48ES-5G
Input DC (PV side)		
Recommended max. PV power	8000W	
Max. input voltage	600V	
Rated voltage	330V	
Start-up voltage	120V	
MPPT voltage range	90-520V	
Full load MPPT voltage range	215-520V	234-520V
Max. input current	11A/11A	
Max. short circuit current	17.2A/17.2A	
Max. inverter backfeed current to the array	0A	
MPPT number/Max input strings number	2/2	
Battery		
Battery Type	Li-ion / Lead-acid	
Battery Voltage range	42 - 58V	
Battery Capacity	50 - 2000Ah	
Maximum Charging Power	5kW	
Maximum Charge/discharge current	100A	
Communication	CAN	
Output AC(Back-up)		
Rated output power	5kW	
Max. apparent output power	6kVA	
Back-up switch time	<20ms	
Rated output voltage	1/N/PE, 230 V	
Rated frequency	50Hz	
Rated output current	22.0A	
THDv(@linear load)	<2%	
Input AC (Grid side)		
Input voltage range	184-264V	
Max. input current	26.1A	
Frequency range	45-55 Hz	

9. Specifications

Technical Data	RHI-4.6K-48ES-5G	RHI-5K-48ES-5G
Output AC(Grid side)		
Rated output power	4.6kW	5kW
Rated apparent output power	4.6kVA	5kVA
Max. apparent output power	4.6kVA	5kVA
Operation phase	1/N/PE	
Rated grid voltage	230 V	
The grid voltage range	184-264 V	
Rated grid frequency	50 Hz	
AC grid frequency range	45-55 Hz	
Rated grid output current	23.0A	23.9A
Inrush current	65A 10us	
Max. output fault current	65A 10us	
Max. output overcurrent protection	24.0A	25.0A
Power Factor	>0.99 (0.8 leading - 0.8 lagging)	
THDi	<2%	
Efficiency		
Max efficiency	>97.5%	
EU efficiency	>96.8%	
Protection		
DC reverse polarity protection	Yes	
Short circuit protection	Yes	
Output over current protection	Yes	
Surge protection	DC Type II / AC Type II	
Ground fault monitoring	Yes	
Integrated AFCI (DC arc-fault circuit protection)	Yes	
Protection class / Over voltage category	I / II(PV), II(battery), III(AC)	

Technical Data	RHI-4.6K-48ES-5G	RHI-5K-48ES-5G
General data		
Dimensions(W/H/D)	333*505*249mm	
Weight	18.3kg	
Topology	non-isolated	
Operation temperature range	-25℃ ~ +60℃	
Ingress protection	IP65	
Noise emission	<20 dB (A)	
Cooling concept	Natural convection	
Max. operation altitude	3000m	
Active anti-islanding method	Active frequency shifting	
Grid connection standard	AS/NZS 4777.2, IEC 62116, IEC 61727, IEC 60068, IEC 61683, EN 50530	
Safty/EMC standard	IEC/EN 62109-1/-2, EN 61000-6-2/-3	
Features		
DC connection	MC4 connector	
AC connection	Quick connection plug	
Display	7.0"LCD color screen display	
Communication	RS485, Optional:Wi-Fi, GPRS	
Warranty	5 years standard (extand to 20 years)	

9. Specifications

Technical Data	RHI-6K-48ES-5G
Input DC (PV side)	
Recommended max. PV power	8000W
Max. input voltage	600V
Rated voltage	330V
Start-up voltage	120V
MPPT voltage range	90-520V
Full load MPPT voltage range	280-520V
Max. input current	11A/11A
Max. short circuit current	17.2A/17.2A
Max. inverter backfeed current to the array	0A
MPPT number/Max input strings number	2/2
Battery	
Battery Type	Li-ion / Lead-acid
Battery Voltage range	42 - 58V
Battery Capacity	50 - 2000Ah
Maximum Charging Power	5kW
Maximum Charge/discharge current	100A
Communication	CAN
Output AC(Back-up)	
Rated output power	5kW
Max. apparent output power	6kVA
Back-up switch time	<20ms
Rated output voltage	1/N/PE, 230 V
Rated frequency	50Hz
Rated output current	22A
THDv(@linear load)	<2%
Input AC (Grid side)	
Input voltage range	184-264V
Max. input current	26.1A
Frequency range	45-55 Hz

9. Specifications

Technical Data	RHI-6K-48ES-5G
Output AC(Grid side)	
Rated output power	6kW
Rated apparent output power	6kVA
Max. apparent output power	6kVA
Operation phase	1/N/PE
Rated grid voltage	230 V
The grid voltage range	184-264 V
Rated grid frequency	50 Hz
AC grid frequency range	45-55 Hz
Rated grid output current	26.1A
Inrush current	65A 10us
Max. output fault current	65A 10us
Max. output overcurrent protection	27.0A
Power Factor	>0.99 (0.8 leading - 0.8 lagging)
THDi	<2%
Efficiency	
Max efficiency	>97.5%
EU efficiency	>96.8%
Protection	
DC reverse polarity protection	Yes
Short circuit protection	Yes
Output over current protection	Yes
Surge protection	DC Type II / AC Type II
Ground fault monitoring	Yes
Integrated AFCI (DC arc-fault circuit protection)	Yes
Protection class / Over voltage category	I / II(PV), II(battery), III(AC)

9. Specifications

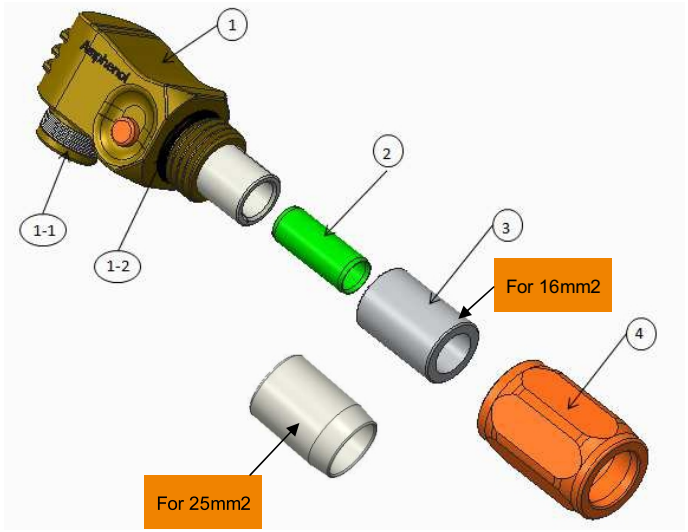
Technical Data	RHI-6K-48ES-5G
General data	
Dimensions(W/H/D)	333*505*249mm
Weight	18.3kg
Topology	non-isolated
Operation temperature range	-25℃ ~ +60℃
Ingress protection	IP65
Noise emission	<20 dB (A)
Cooling concept	Natural convection
Max. operation altitude	3000m
Active anti-islanding method	Active frequency shifting
Grid connection standard	AS/NZS 4777.2, IEC 62116, IEC 61727, IEC 60068, IEC 61683, EN 50530
Safty/EMC standard	IEC/EN 62109-1/-2, EN 61000-6-2/-3
Features	
DC connection	MC4 connector
AC connection	Quick connection plug
Display	7.0"LCD color screen display
Communication	RS485, Optional:Wi-Fi, GPRS
Warranty	5 years standard (extand to 20 years)

10.1 Battery Terminal Assembly

In order to avoid DC arc, Solis suggest to install a DC switch between the battery and RHI inverter.

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

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



①: Connector Body
1-1: Barrel sealing (Not included when no sealing requirement)
1-2: O-Ring (Not included when no sealing require ment)

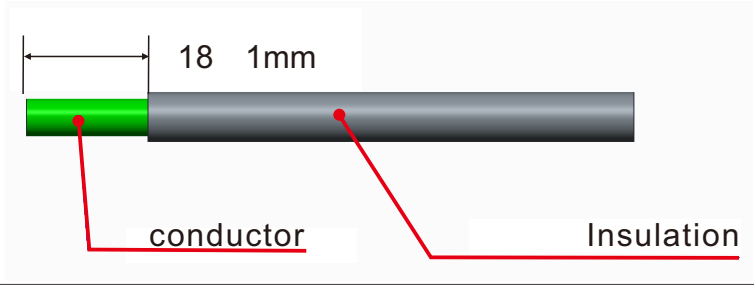
②: Barrel(Only for cable size 16mm²)

③: Grommet(Not included when no sealing requirement)

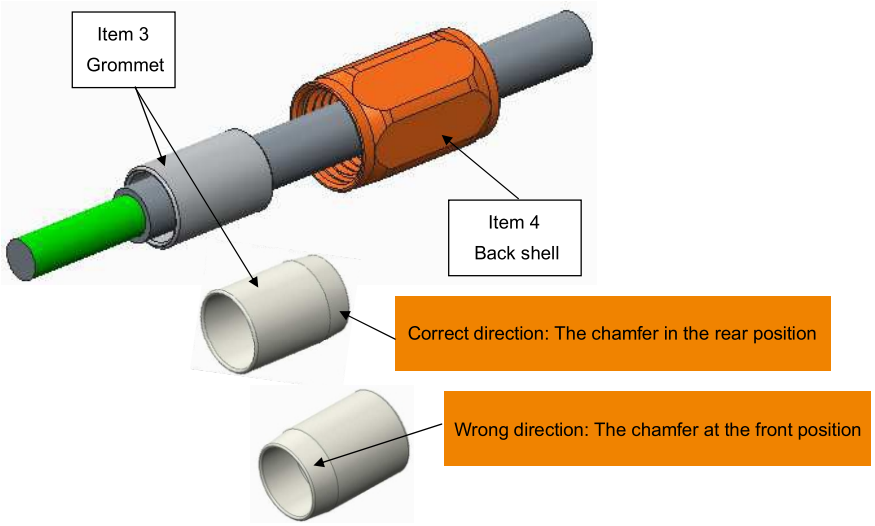
④: Back Shell

10. Appendix

Step 1: Wire cutting and stripping (Apply for 10mm² & 16mm² Cable)
Stripping conductor: 18±1mm

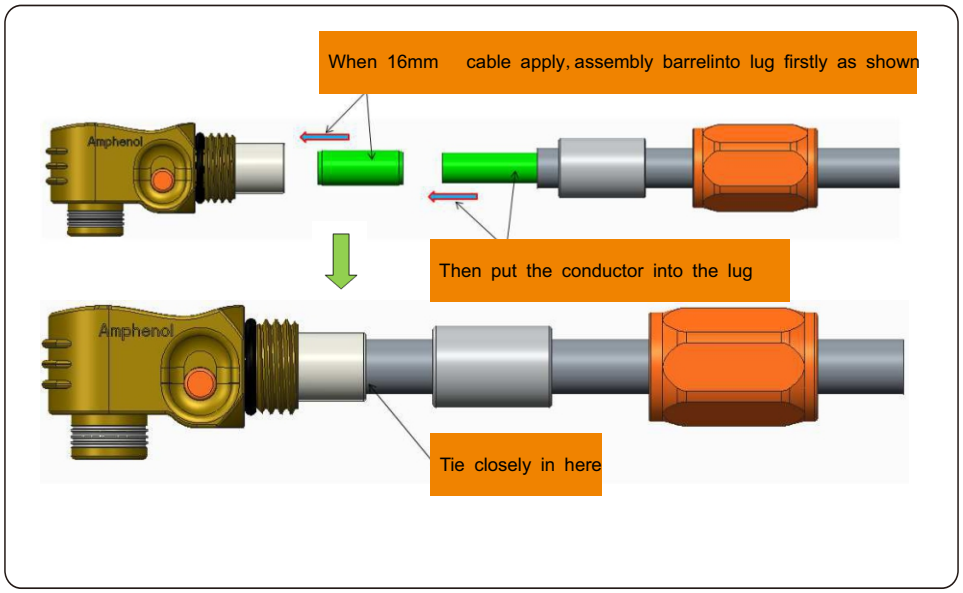


Step 2: Un-assemble item 3&4 over the cable as shown

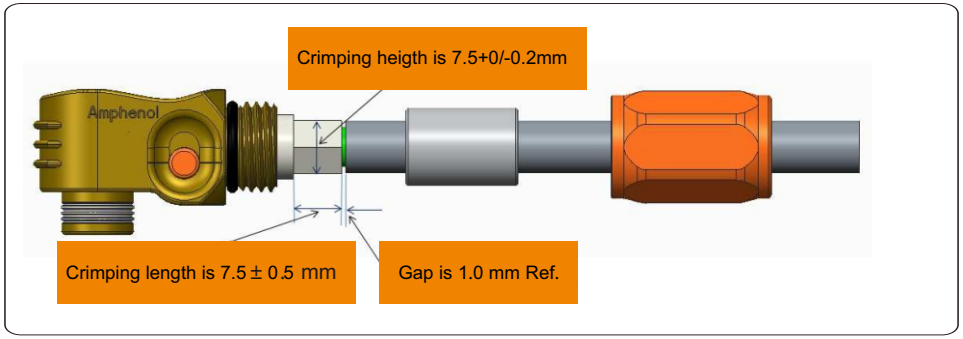


10. Appendix

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



Step 4: Crimping the lug as shown

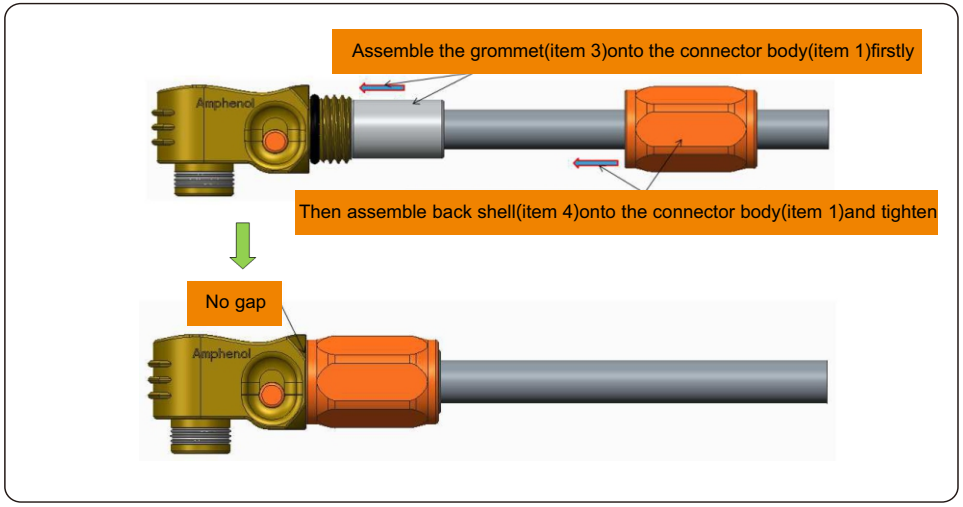


Cable size	Cable range	Crimping heigth	Cable pullout force
16 mm²	8.10±0.20 mm	7.5+0/-0.2mm	1000N Min.
25 mm²	10.20±0.20 mm		1200N Min.

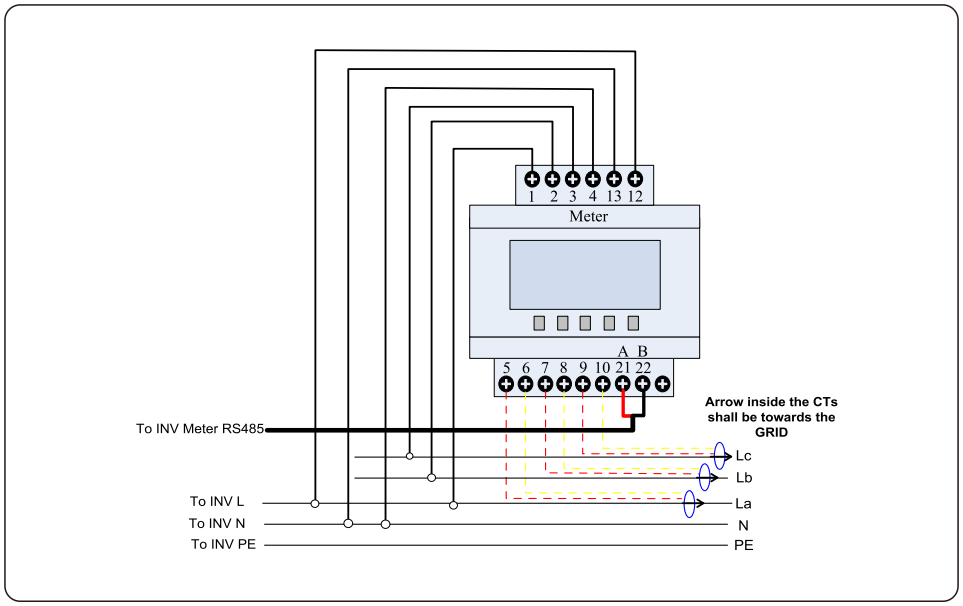
Recommended crimping tool: Manual hydraulic crimping

Die: 25 mm²

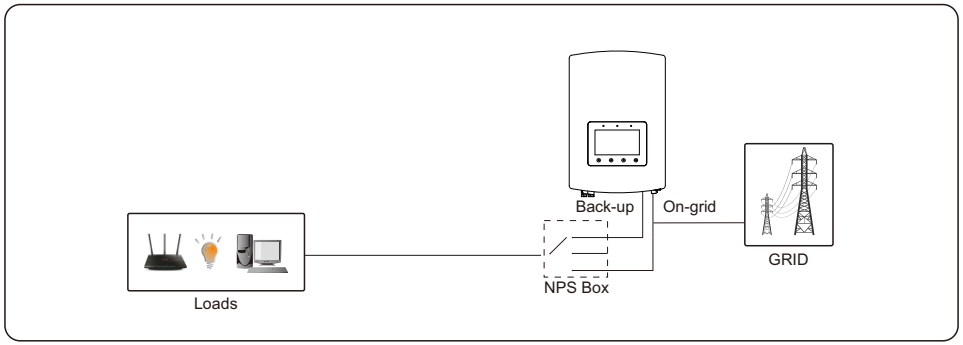
Step 5: Install grommet and back shel



10.2 Three phase meter connection



10.3 Special Back-up Connection



For some markets such as Italy, etc., the backup port and grid port should not be powered at the same time.

When the grid is present, the grid port should be used to support the loads.

When the grid is lost, the backup port should be used to support the loads.

An interlocking function between the backup port and grid port is necessary.

Therefore, a separate NPS box and firmware upgrade is needed to achieve this function.

Please consult Solis technicians for details and refer to the NPS box installation manual

10.4 Working Mode Description

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

PV Power Using Priority: Load>Battery>Grid

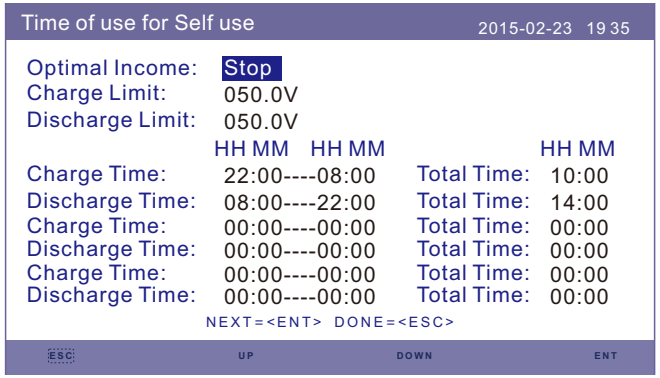
Load Support Priority: PV>Battery>Grid

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.

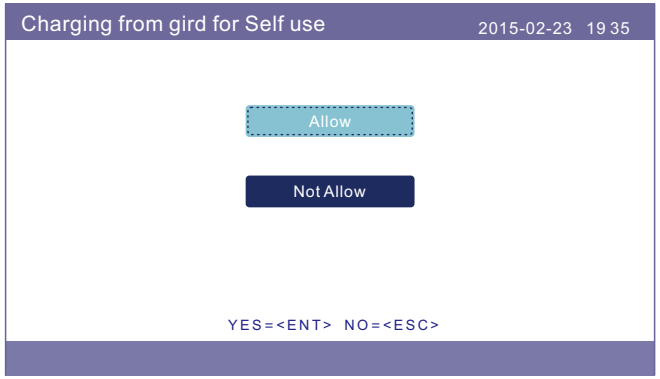
Time of use for Self use

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



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

PV Power Using Priority: Load>Grid>Battery

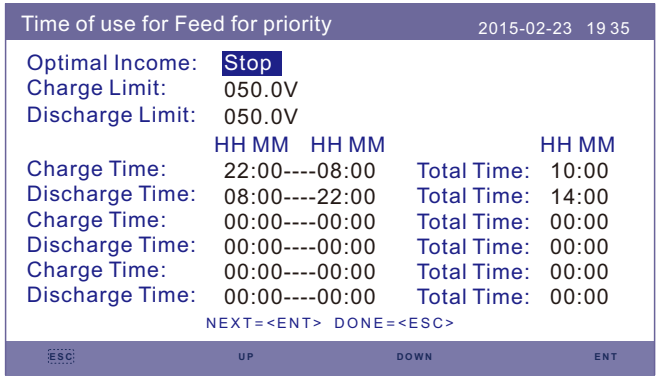
Load Support Priority: PV>Battery>Grid

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.

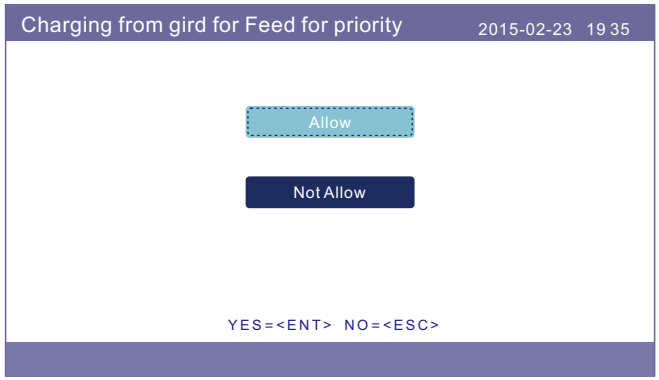
Time of use for Feed for priority

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



10. Appendix

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

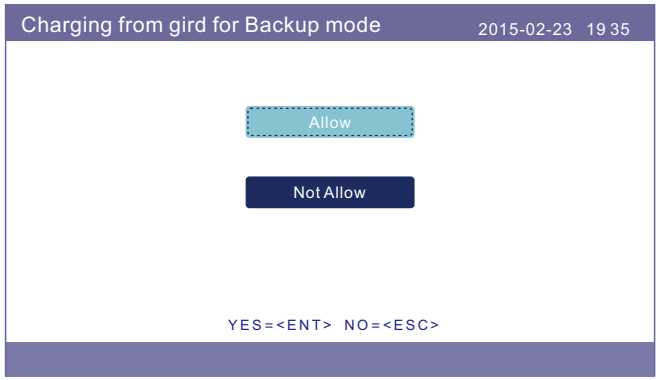
Load Support Priority: PV>Grid>Battery

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

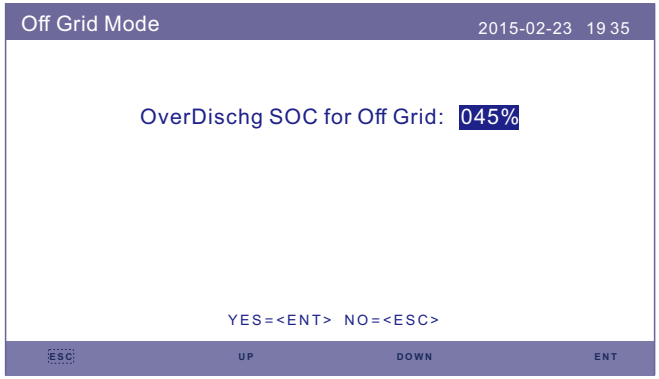
Path: Advanced Settings->Storage Energy Set->Storage Mode Select->Backup Mode->ON->Backup SOC->Charging from gird for Backup mode



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



10. Appendix

10.5 Advanced Settings

NOTE:
The following sections have restricted access. Only authorized personnel are allowed to modify the settings. Please contact Solis service team for XXXX password.

NOTE:
The standard code selection “4777_A”, “4777_B”, “4777_C” and “4777-N” already have preset default settings as required by AS/NZS 4777.2:2020. Unless specially required, customers do not need to gain access to the following sections or modify any settings inside.

Setting Path: Advanced Setting -> Password: XXXX -> STD.Mode Settings
There are several grid code related settings under STD.Mode Settings.

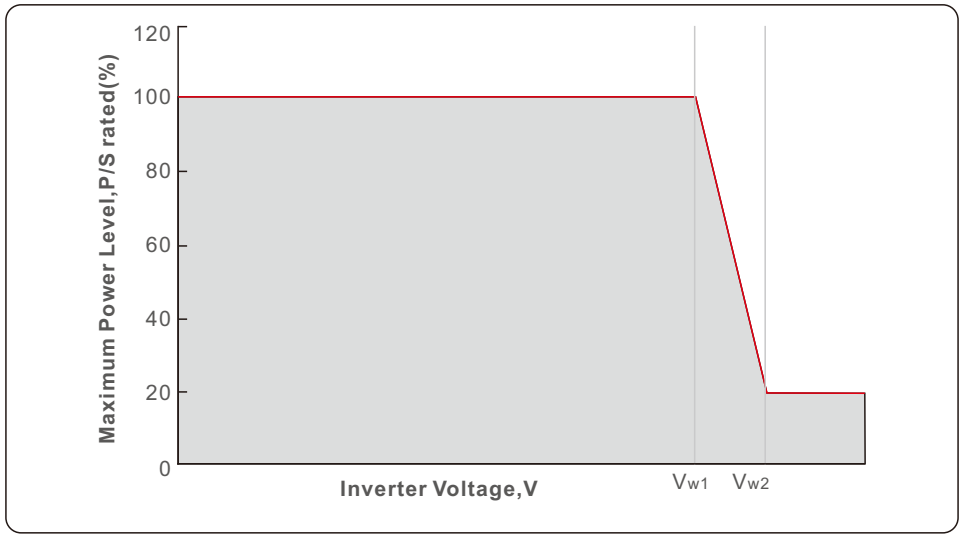
10.5.1 Working Mode Set

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.

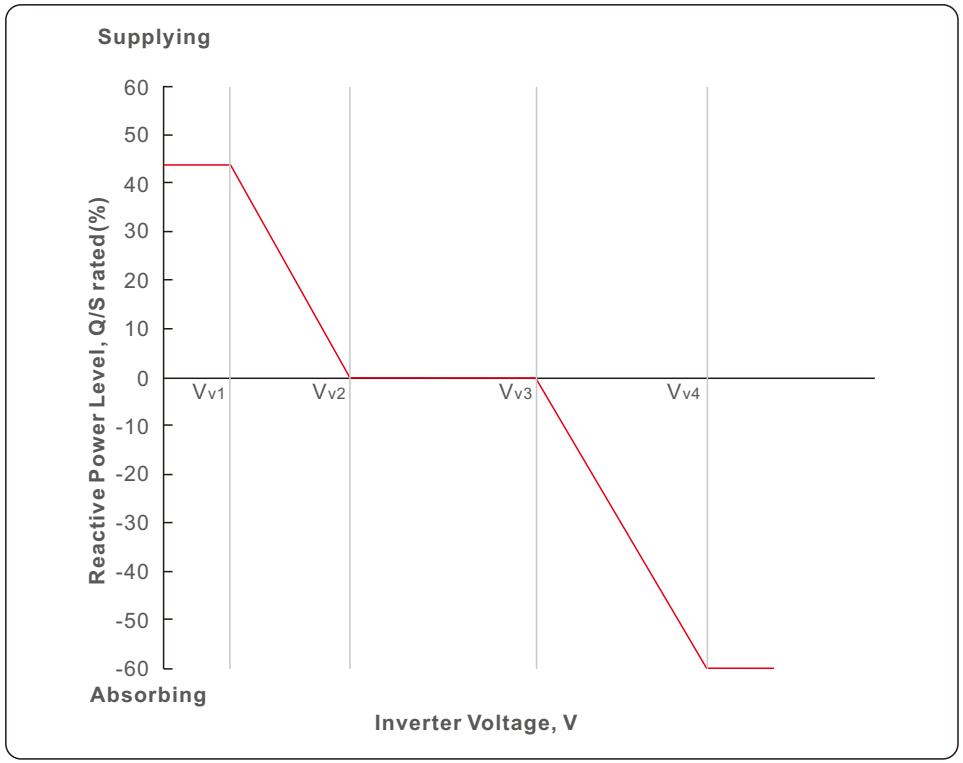
2. P Mode Settings
This P Mode Settings include 1 working mode: Volt-Watt
2.1 Volt-Watt
Description: Inverter will change the active output power based on grid voltage.

10. Appendix



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.

10.5.2 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%

10.5.3 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))

10.5.4 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)

10.5.5 DRM Settings

“DRM ON/OFF” is used to enabled or disable the functionality of the DRM port.
“DRM3” and “DRM7” are used to define the reactive power absorption for DRM3 and DRM7.
Range: 0~- 60%

10.6 Built-In DC Isolator Specification

A DC-PV2 switch , complied to AS60947.3:2018 ,within the inverter, is used as isolating device. Please check below ratings.

DC switch brand	Beijing People
Model	GHX5-32P
PV category	DC-PV2
Ue	1100V
Ie	30A
Ui	1500V
Uimp	8000V
Icw	700A
Icm	1400A
I(make)/Ic(break)	120A
Complied standard	AS 60947.3