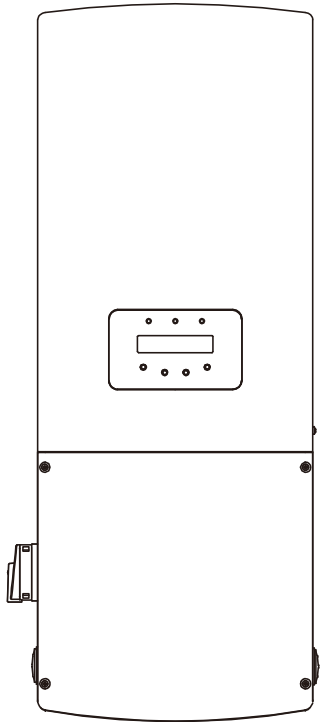
Grid Support Utility Interactive Inverter

# Solis 4G Single Phase Inverter

-US version

## Installation and Operation Manual

Solis-1P2.5K-4G-US, Solis-1P3K-4G-US, Solis-1P3.6K-4G-US,
Solis-1P4K-4G-US, Solis-1P4.6K-4G-US, Solis-1P5K-4G-US
Solis-1P6K2-4G-US



Manufacturer: Ginlong (Ningbo) Technologies Co.,Ltd., Ningbo, Zhejiang, P.R.China

US Office: 565 Metro Pl. S. Suite 3214, Dublin OH 43017, USA

Toll-free: 866.438.8408 I Email: sales@ginlong.com I ussales@ginlong.com

Web: www.ginlong.com

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

**SunSpec Certified**

**Comply with CA Rule 21/ Certified to UL 1741 SA**



Ver 1.1

# Contents

# Contents

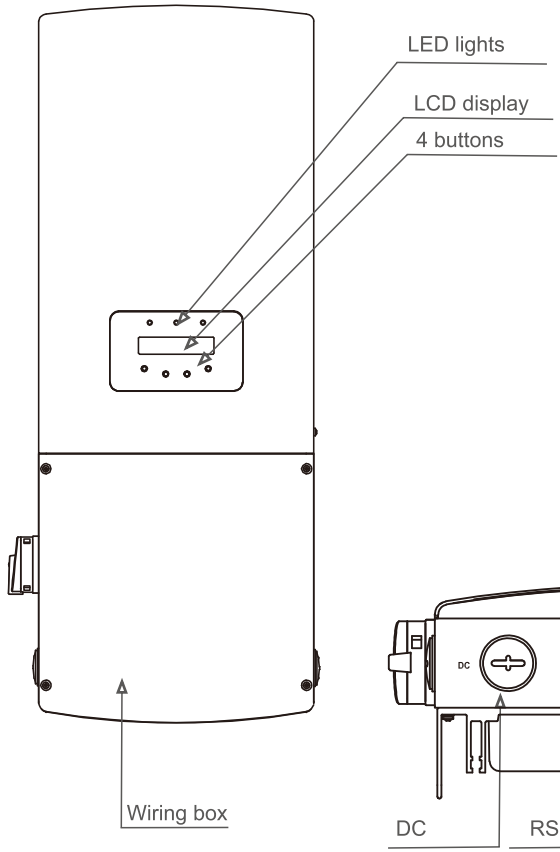


# 1. Introduction

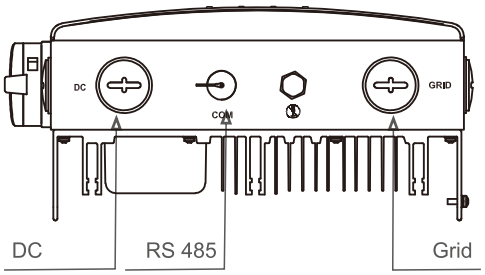
## 1.1 Product Description

Solis single phase US series inverters can transfer DC power from PV panels into AC power and feed into the grid.

Solis single phase US series inverters contain 7 models which are listed below:
Solis-1P2.5K-4G-US, Solis-1P3K-4G-US, Solis-1P3.6K-4G-US, Solis-1P4K-4G-US, Solis-1P4.6K-4G-US, Solis-1P5K-4G-US, Solis-1P6K2-4G-US




▲ Figure 1.1 Front side view

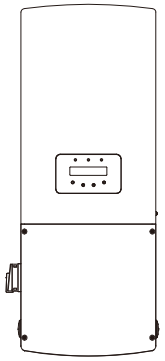



▲ Figure 1.2 Bottom side view

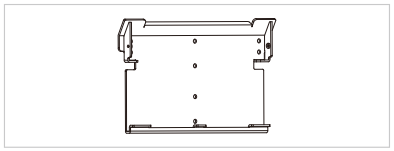
# 1. Introduction

## 1.2 Packaging

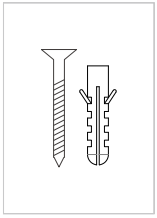
When you receive the inverter, ensure that all the parts listed below are included:



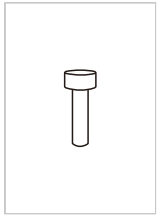
1



2



3



4


5

| Part # | Description | Number |
|---|---|---|
| 1 | PV grid tie inverter | 1 |
| 2 | Wall mounting bracket | 1 |
| 3 | Expansion screws | 4 |
| 4 | Locking screws | 2 |
| 5 | Manual | 1 |

▲ Table 1.1 Parts list



# 2.Safety Instructions

Improper use may result in potential electric shock hazards or burns. This manual contains important instructions that should be followed during installation and maintenance. Please read these instructions carefully before use and keep them for future reference.

## 2.1 Safety Symbols

Safety symbols used in this manual, which highlight potential safety risks and important safety information, are listed as follows:

**WARNING:**
WARNING symbol indicates important safety instructions, which if not correctly followed, could result in serious injury or death.

**NOTE:**
NOTE symbol indicates important safety instructions, which if not correctly followed, could result in some damage or the destruction of the inverter.

**CAUTION:**
CAUTION, RISK OF ELECTRIC SHOCK symbol indicates important safety instructions, which if not correctly followed, could result in electric shock.

**CAUTION:**
CAUTION, HOT SURFACE symbol indicates safety instructions, which if not correctly followed, could result in burns.

## 2.2 General Safety Instructions

**WARNING:**
Do not connect PV array positive(+) or negative(-) to ground, it may cause serious damage to the inverter.

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

# 2.Safety Instructions

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

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

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

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

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

## 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.

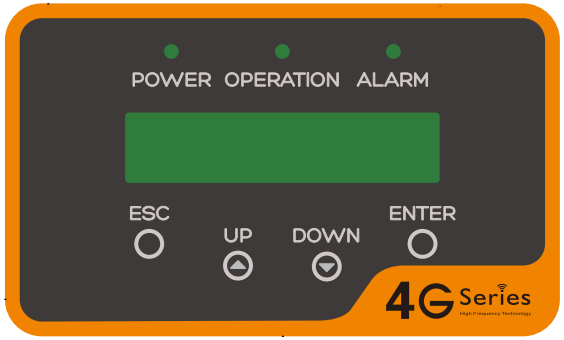
4.The inverter must be installed according to the correct technical specifications.

5.To startup the inverter, the Grid Supply Main Switch (AC) must be switched on, before the solar panel's DC isolator shall be switched on. To stop the inverter, the Grid Supply Main Switch (AC) must be switched off before the solar panel's DC isolator shall be switched off.



# 3. Overview

## 3.1 Front Panel Display




▲ Figure 3.1 Front Panel Display

## 3.2 LED Status Indicator Lights

There are three LED status indicator lights in the front panel of the inverter. Left LED: POWER LED (red) indicates the power status of the inverter. Middle LED: OPERATION LED (green) indicates the operation status. Right LED: ALARM LED (yellow) indicates the alarm status. Please see Table 3.1 for details

| Light | Status | Description |
|---|---|---|
| POWER | ON | The inverter detects DC power. |
| | OFF | No DC power or low DC power. |
| OPERATION | ON | The inverter is operating properly. |
| | OFF | The inverter has stopped to supply power. |
| | FLASHING | The inverter is initializing. |
| ALARM | ON | Alarm or fault condition is detected. |
| | OFF | No fault or alarm is detected. |

▲ Table 3.1 Status Indicator Lights

## 3.3 Keypad

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

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

## 3.4 LCD

The two-line Liquid Crystal Display (LCD) is located on the front panel of the Inverter, which shows the following information:

- Inverter operation status and data;
- Service messages for operator;
- Alarm messages and fault indications.





## 4.1 Select a Location for the Inverter

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

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

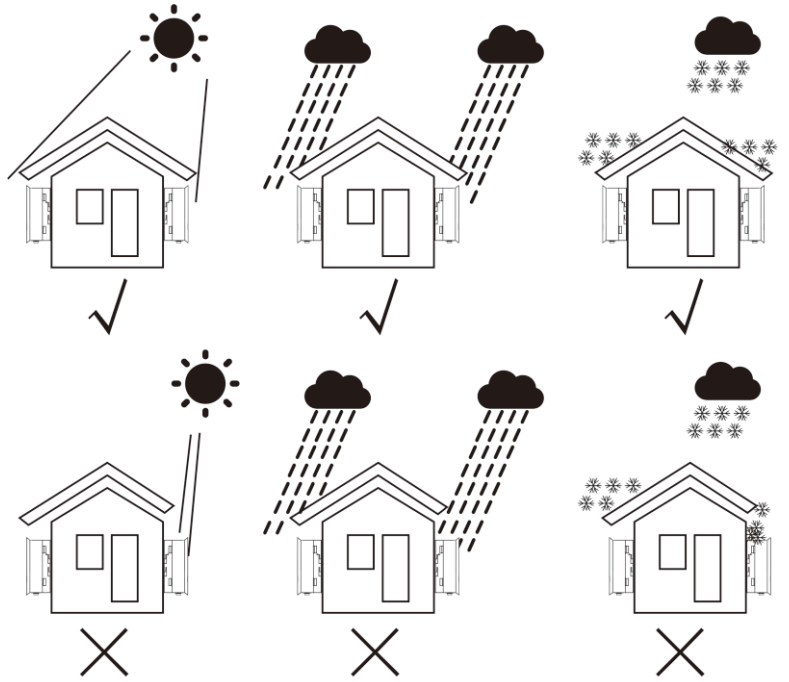
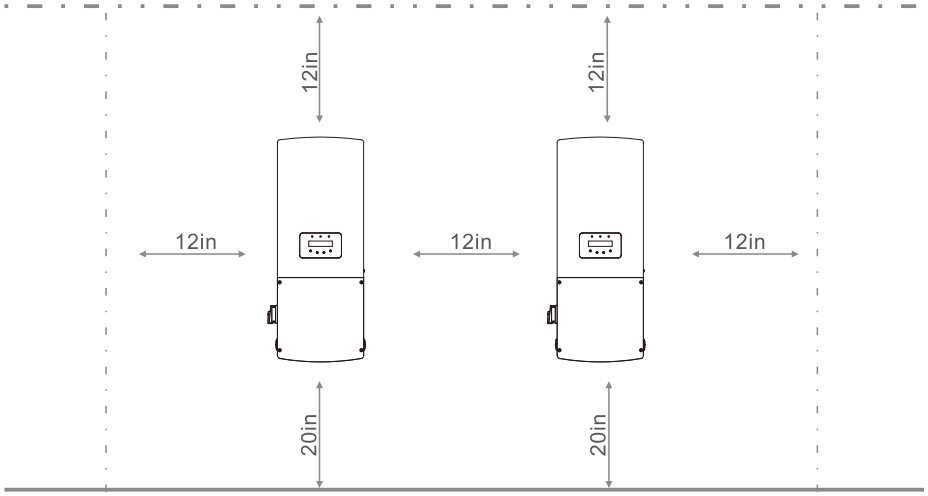


Figure 4.1 Recommended Installation Locations

- Install on a wall or strong structure capable of bearing the weight.
- Install vertically with a maximum incline of +/- 5° . If the mounted inverter is tilted to an angle greater than the maximum noted, heat dissipation will be inhibited, and may result in power limiting.
- When one or more inverters are installed in one location, a minimum of 12 inches of clearance should be kept between each inverter or other objects. The bottom of the inverter should have 20 inches of clearance to the ground.




▲ Figure 4.2 Inverter Mounting Clearance

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

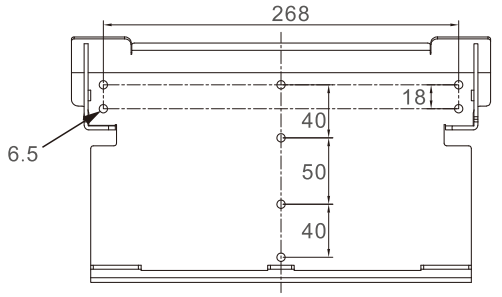
NOTE:
Nothing should be stored on or placed against the inverter.



4. Installation

## 4.2 Mounting the Inverter

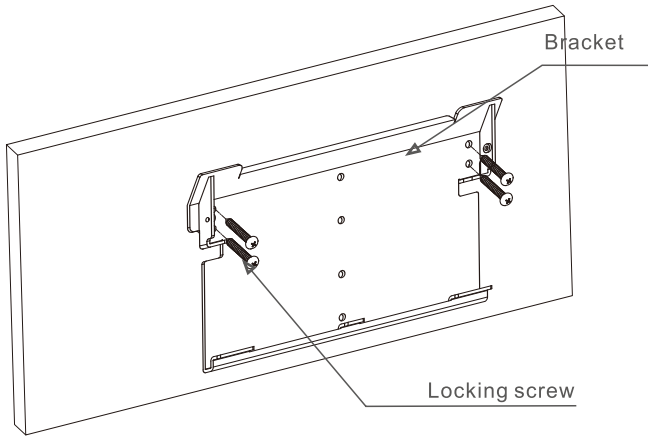
Dimensions of mounting bracket:



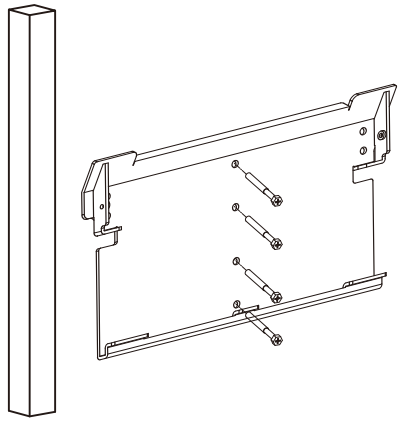

▲ Figure 4.3 Inverter Wall Mounting

Please see Figure 4.4 and Figure 4.5 for instruction on mounting the inverter to a wall.
The inverter shall be mounted vertically. The steps to mount the inverter are listed below:

1. According to the figure 4.2, 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 Inverter Wall Mounting



▲ Figure 4.5 Inverter Pillar Mounting

2.Ensure the bracket is horizontal and the mounting holes (in Figure 4.4 and Figure 4.5) are marked correctly. Drill the holes into the wall or pillar at your marks.

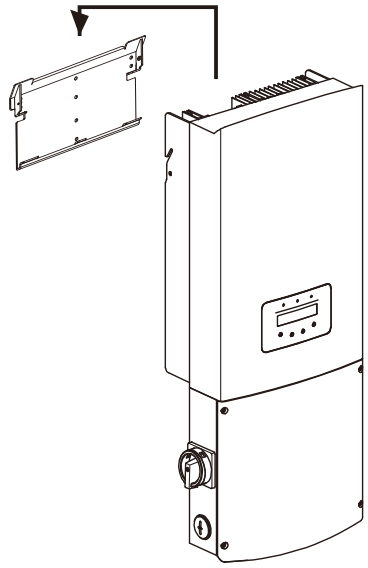
3.Use the suitable screws to fix the bracket to the wall.

**WARNING:**
The inverter must be mounted vertically.

4.Lift up the inverter (be careful to avoid body strain), and align the back bracket on the inverter with the convex section of the mounting bracket. Hang the inverter on the mounting bracket and ensure the inverter is secure (see Figure 4.6)

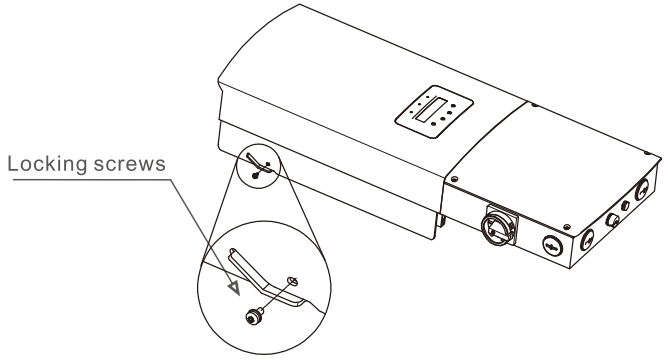


4. Installation



▲ Figure 4.6 Wall Mount Bracket

5. Use M4*9 screws to fix the side of the inverter to the mount bracket.



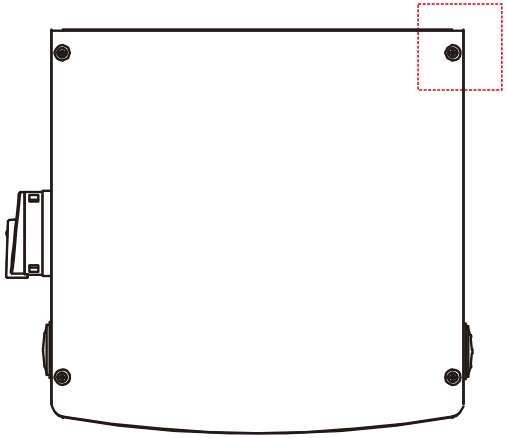

▲ Figure 4.7 Fix the Inverter

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 ensure the inverter is secure (see Figure 4.7)

## 4.3 Electrical Connections

Place the wiring box cover on the wiring box ensuring it is oriented correctly and start the screws. Apply pressure to the cover and tighten the screws in a cross pattern.

Tighten screws to 1.7 N·m or 15.05 In-Lbs torque settings



▲Figure 4.8 Bottom Side of Inverter

Before making electrical connections, double check to ensure the steps below are strictly followed:

a. Switch the Grid Supply Main Switch (AC) OFF.

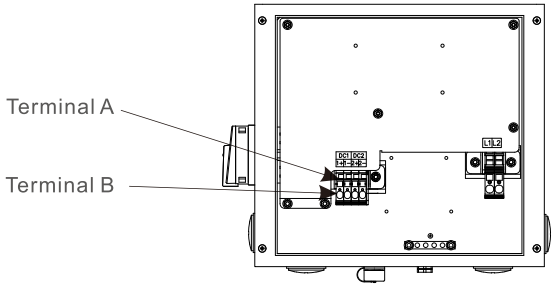
b. Switch the DC Switch OFF.

Please see figure 4.9,there are four knockouts in the wiring box. The two knockouts on the left (bottom and side) are for the DC conduit entry. The two knockouts on the right (bottom and side) are for the AC conduit entry. All knockouts in the wiring box can accept trade size 1 inch (ID) conduit.



4. Installation

### 4.3.1 Terminal Connections




▲ Figure 4.9 Connection Area of Inverter

Strip the end of the wire ¾" minimum to 1" maximum. Use a slotted (flat-blade) screwdriver, insert the screwdriver in Terminal A (top) and insert the wire into Terminal B (bottom) of the Rapid Termination wiring block. While holding the wire in place, remove the screwdriver and the Rapid Termination spring terminal block will fix the wire in place. Use the labels on the Rapid Termination wiring block to ensure proper polarity.

### 4.3.2 Connect PV Side of Inverter

**Warning**:

Before connecting inverter, ensure the PV array open circuit voltage is within the limit of the inverter. Otherwise the inverter could be damaged.

DO NOT connect the PV array positive or negative to ground. This can cause serious damage to the inverter.

The inverter cannot accept PV strings wired in parallel.

Before connection, ensure the PV array strings are correct polarity and match the proper "DC+" and "DC-" symbols you will connect them to.

Use qualified DC cable for PV system.

| Cable type | Cross section | |
|---|---|---|
| | Range | Recommended value |
| Industry generic PV cable ( model:PV1-F ) | 4.0~6.0 (12~10AWG) | 4.0 (12AWG) |

▲Table 4.1 DC cable size

Damage to the DC disconnect due to enlarged knockouts.
Enlarged knockouts enable moisture to penetrate the DC disconnect which could damage electronic components in the DC Disconnect.

Please refer to figure 4.9, The acceptable wire size range is from **12 AWG to 8 AWG**, copper conductors only; refer to local code for appropriate wire size.

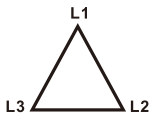
## 4.3.3 Connect Grid Side of Inverter

The Solis 2.5-6kW Single Phase inverters can be connected to a 208V or 240V grid.
The default setting is for a 240VAC single phase grid.
Ground must be connect to the PE terminal.

| Cable type | Cross section | |
|---|---|---|
| | Range | Recommended value |
| Industry generic grid cable | 4~25mm² (12~4AWG) | 10-25mm² (8-4AWG) |

▲Table 4.2 Grid cable size

There are two cable connection point for each phase, one for grid, one for AC power of RSD.

| GRID STANDARD |  | | |  | | |
|---|---|---|---|---|---|---|
| | **208V~** 3PH-△-3W | | | **240V~** SPLIT-PHASE | | |
| **TERMINAL** | L1 | L2 | N | L1 | L2 | N |
| Connection requiement | Yes | Yes | No | Yes | Yes | No |

▲Table 4.3 Grid Terminal Connection

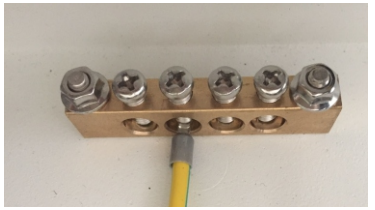


4. Installation

## 4.3.4 Ground Connection

**Internal ground connection point**

Please see figure 4.10. Both DC and AC ground cable can be connect to ground terminal above DC switch. The acceptable wire size for ground is **12AWG to 4 AWG.** The torque setting is 26 in-lbs (3 Nm) .

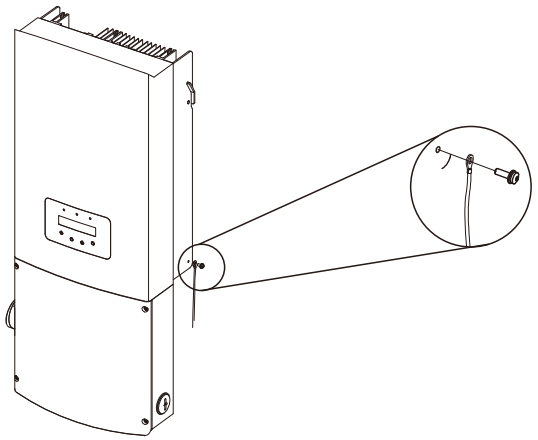


▲ Figure 4.10 Grounding Terminal on Heat-Sink

**External ground connection point**

An external ground connection is provided at the right side of the 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 the inverter.
The torque setting is 20 in-lbs (2Nm).



▲ Figure4.11 Connect the External Grounding Conductor

### 4.3.5 Max. Overcurrent Protection Device (OCPD)

To protect the inverter's AC grid connection conductors, Solis recommends installing breakers that will protect against overcurrent. The following table defines OCPD ratings for the Solis 2.5-6kW single phase inverters.

| Inverter | Rated voltage(V) | Rated output power (kW) | Current for protection device (A) |
|---|---|---|---|
| Solis-1P2.5K4-4G-US | 240/208 | 2.5/2.5 | 20/20 |
| Solis-1P3K-4G-US | 240/208 | 3/3 | 20/20 |
| Solis-1P3.6K-4G-US | 240/208 | 3.6/3.6 | 20/30 |
| Solis-1P4K-4G-US | 240/208 | 4/4 | 30/30 |
| Solis-1P4.6K-4G-US | 240/208 | 4.6/4.6 | 30/30 |
| Solis-1P5K-4G-US | 240/208 | 5/5 | 30/40 |
| Solis-1P6K2-4G-US | 240/208 | 6/5.2 | 40/40 |

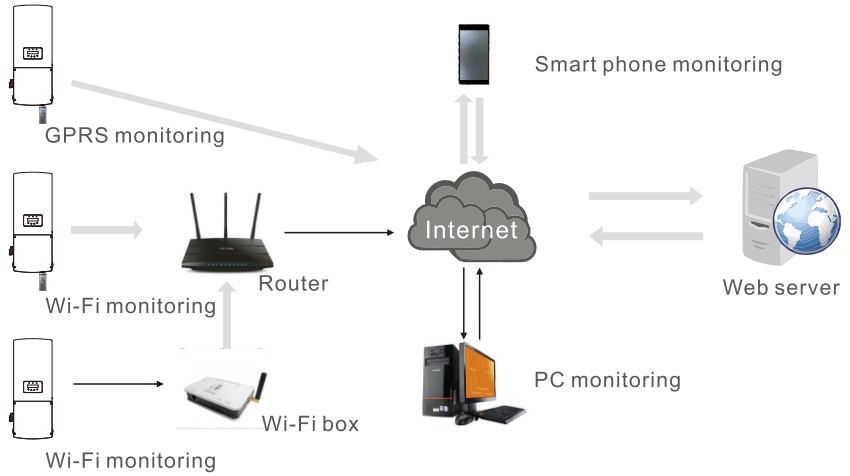
▲Table 4.4 Rating of Grid OCPD

### 4.3.6 Inverter Monitoring Connection

The inverter can be monitored via Wi-Fi or Cellular.
All Solis communication devices are optional (Figure 4.9).
For connection instructions, please refer to the Solis Monitoring Device installation manuals.







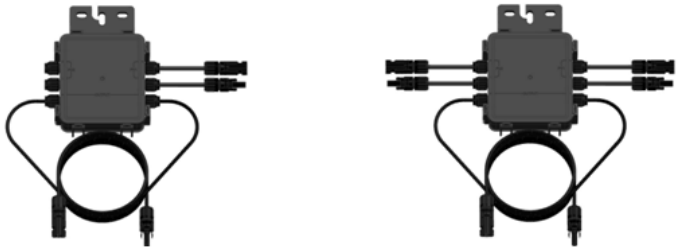

▲Figure 4.12 Wi-Fi Communication Function

### 4.3.7 Module Level Rapid Shutdown (Optional)

For systems that are required to meet NEC 2017, Solis has an optional Module Level Rapid Shutdown. This product provides a panel level shutdown feature that brings the panel voltage to a safe level in case of a disaster situation.
This function is vital for the safety of firefighters and relevant personnel.

#### 4.3.7.1 Rapid Shutdown Components

The inverter is equipped with MLRSD transmitter inside the wiring box and customers can choose to apply Solis External MLRSD Receivers on the PV modules to achieve rapid shutdown function. The Solis MLRSD is designed based on NEC code 2017 requirement 690.12 and fully complies with UL1741.



▲Figure 4.13 Solis-MLRSD-R1-1G & Solis-MLRSD-R2-1G

4. Installation

## 4.3.7.2 Connection and Functional Diagram

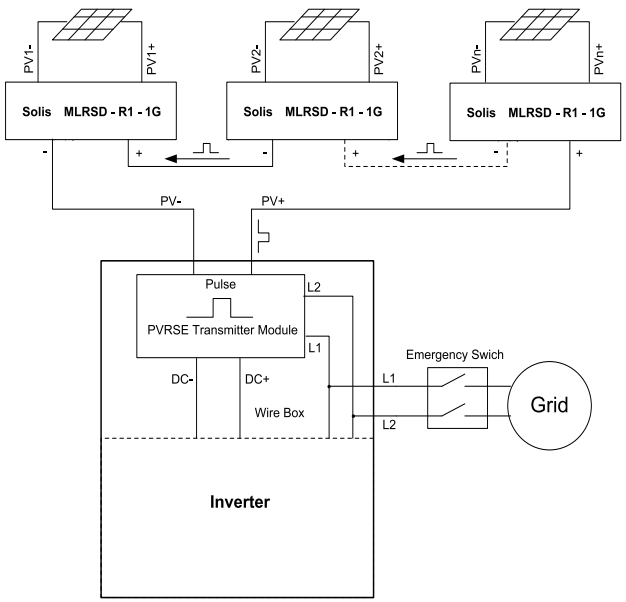



Figure 4.14 System Diagram (Single)

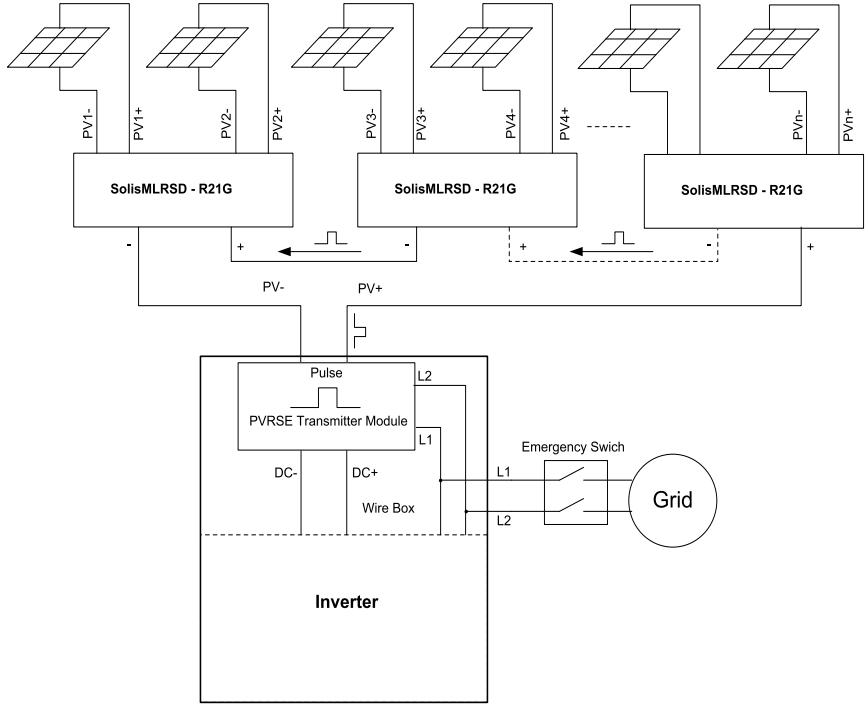



Figure 4.15 System Diagram (Dual)

The transmitter inside the wiring box sends a PLC signal along the DC circuit while the inverter is in operation. When the external emergency breaker is switched off, the transmitter will cease to transmit the PLC keep alive signal.
The MLRSD will shut down within 10 seconds of interruption of the keep alive signal.

4. Installation

### 4.3.7.3 Self-Test Function

The Solis MLRSD has built in self-test circuitry to ensure proper operation.

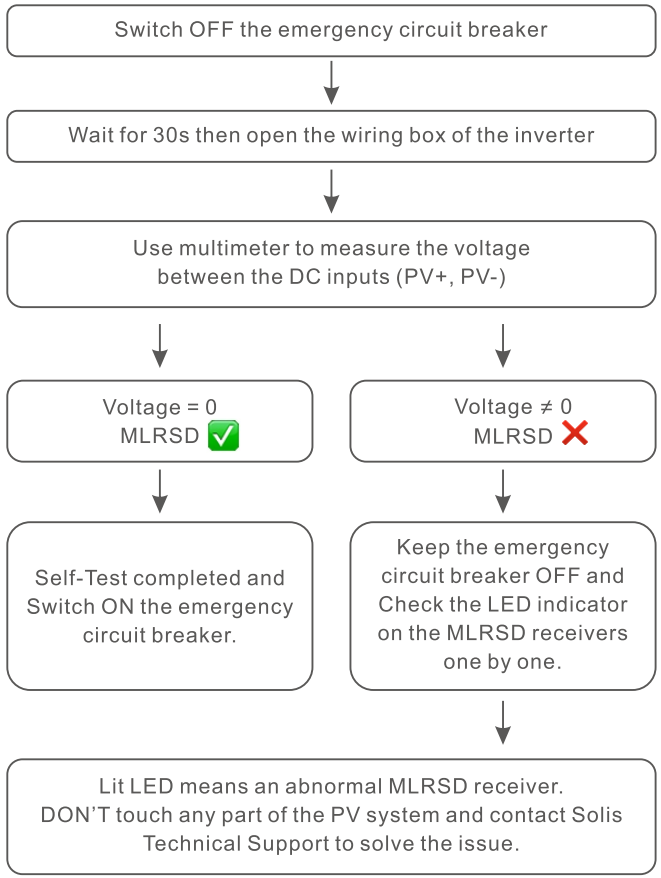



Figure 4.16 Self-Test Troubleshooting Diagram

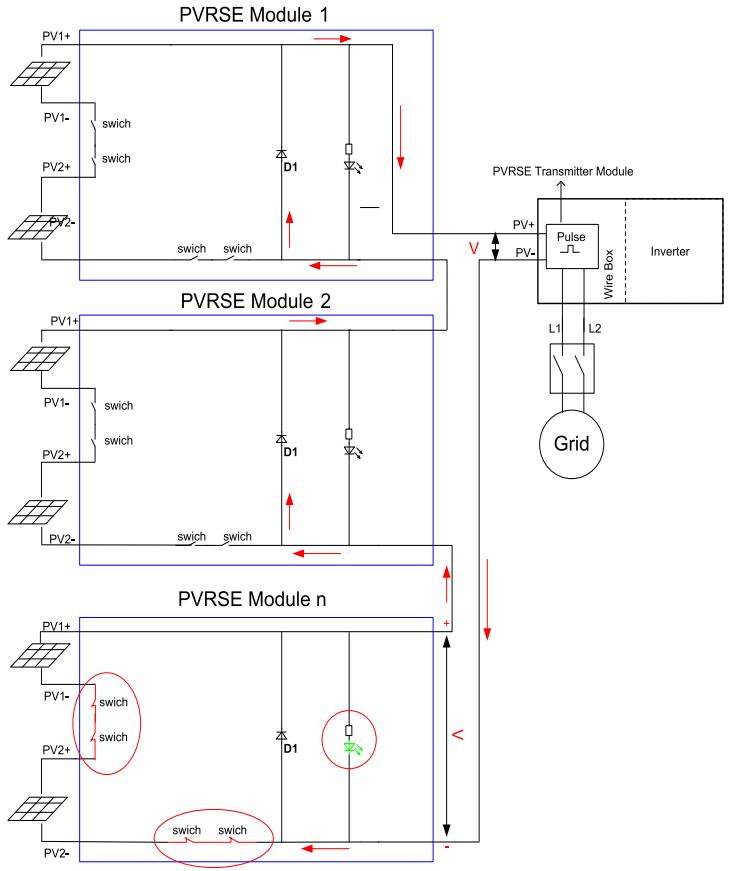



Figure 4.17 Self-Test Function of Solis MLRSD

**WARNING:**
All circuit connections to the MLRSD must be performed by certified personnel.

**NOTE:**
MLRSD function can be enabled by installing or replacing transmitter board inside the wiring box. Operation must be performed by certified personnel.

## 5.1 Start the Inverter

To start up the Inverter, it is important that the following steps are strictly followed:

1. Switch the grid supply main Switch (AC) ON first.
2. Switch the DC switch ON. If the voltage of PV arrays are higher than start up voltage, the inverter will turn on. The red LED power will light.
3. When both the DC and the AC sides supply to the inverter, it will be ready to generate power. Initially, the inverter will check both its internal parameters and the parameters of the AC grid to ensure that they are within the acceptable limits. At the same time, the green LED will flash and the LCD displays the information of INITIALIZING.
4. After 30-300 seconds (depending on local requirement), the inverter will start to generate power. The green LED will be on continually and the LCD displays GENERATING.

**WARNING:**
Do not touch the surface when the inverter is operating. It may be hot and cause burns.

## 5.2 Inverter Working Status

Five inverter working statuses:

**Generating:** Inverter is working normally.

**LimByTemp:** Inverter power limited by over ambient temperature.
Check if inverter has proper air ventilation.
Check if inverter is in direct sunshine and ambient temperature is high.

**LimByFreq:** Inverter power limited by over grid frequency.
Verify settings in 6.5.8.3 as this can be activated by Rule 21 requirements.
When grid frequency increases above the normal operating threshold, the output power will be limited.

**LimByVg:** Inverter power limited by over grid voltage.
Verify settings in 6.5.8.1, working mode 6, as this can be activated by Rule 21 requirements.
This is normal for UL1741SA requirement.
When grid voltage increases above the normal operating threshold, the output power will be limited.



5. Start & Stop

**LimByVar:** Inverter power limited by generating reactive power.
Verify settings in 6.5.8.1, working mode 4, as this can be activated by Rule 21 requirements.

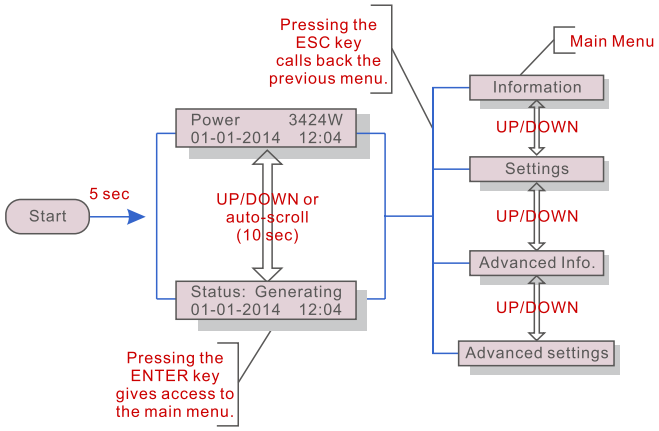
The inverter will generate more reactive power when the grid needs it. The active output power will be limited.

## 5.3 Stop the Inverter

To stop the Inverter, the following steps must be strictly followed:

1. Switch the Supply Main Switch (AC) OFF.
2. Wait 30 seconds. Switch the DC Switch OFF. All the LEDs of the inverter will be off in one minute.

During normal operation, the display alternately shows the power and the operation status with each screen lasting for 10 seconds (see Figure 6.1). Screens can also be scrolled manually by pressing the UP and DOWN keys. Press the ENTER key to access to the Main Menu.




▲ Figure 6.1 Operation Overview

## 6.1 Main Menu

There are four submenus in the Main Menu (see Figure 6.1):

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

## 6.2 Information

The Solis single phase inverter main menu provides access to operational data and information. The information is displayed by selecting "Information" from the menu and then by scrolling up or down.





| Display | Duration | Description |
|---|---|---|
| V_DC1: 350.8V<br>I_DC1: 5.1A | 10 sec | V_DC1: Shows input 01 voltage value.<br>I_DC1: Shows input 01 current value. |
| V_DC2: 350.8V<br>I_DC2: 5.1A | 10 sec | V_DC2: Shows input 02 voltage value.<br>I_DC2: Shows input 02 current value. |
| V_Grid: 230.4V<br>I_Grid: 8.1A | 10 sec | V_Grid: Shows the grid's voltage value<br>I_Grid: Shows the grid's current value. |
| Status: Generating<br>Power: 1488W | 10 sec | Status: Shows instant status of the Inverter.<br>Power: Shows instant output power value. |
| Grid Frequency<br>F_Grid 60.06Hz | 10 sec | F_Grid: Shows the grid's frequency value. |
| Total Energy:<br>0258458 kwh | 10 sec | Total generated energy value. |
| This Month: 0123kwh<br>Last Month: 0123kwh | 10 sec | This Month: Total energy generated this month.<br>Last Month: Total energy generated last month. |
| Today: 15.1kwh<br>Yesterday: 13.5kwh | 10 sec | Today: Total energy generated today.<br>Yesterday: Total energy generated yesterday. |
| Inverter SN:<br>00000000000000 | 10 sec | Display serial number of the inverter. |
| Work Mode: NULL<br>DRM Number: 08 | 10 sec | Work Mode: The work mode of inverter.<br>DRM Number: Shows the number 01-08. |
| Export_P: +0000W<br>Export_I: 00.0A | 10 sec | Exported real power.<br>Exported current. |
| Meter Energy P<br>0000000.0kWh | 10 sec | Metered Active Power. |

▲ Table 6.1 Information List

### 6.2.1 Lock Screen

Pressing the ESC key returns to the Main Menu. Pressing the ENTER key locks (Figure 6.2(a)) or unlocks (Figure 6.2 (b)) the screen.


▲ Figure 6.2 Locks and Unlocks the Screen of LCD

## 6.3 Settings

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

**1. Set Time 2. Set Address**

### 6.3.1 Set Time

This function allows time and date setting. When this function is selected, the LCD will display a screen as shown in Figure 6.3.


▲ Figure 6.3 Set Time

Press the UP/DOWN keys to set time and date. 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.

### 6.3.2 Set Address

This function is used to set the address when multiple inverters are connected to a single gateway.

The address number can be assigned from “01”to “99”(see Figure 6.4). The default address number of a Solis Single Phase Inverter is “01”.


▲ Figure 6.4 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.



6. Operation

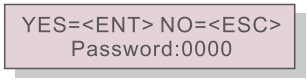
## 6.4 Advanced Info - Technicians Only

**NOTE:**

This area is for fully qualified and accredited technicians only.

Enter menu “Advanced Info.” and “Advanced settings” （need password）.

Select “Advanced Info.” from the Main Menu. The screen will require the password as below




▲ Figure 6.5 Enter password

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

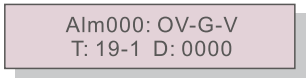
After entering the correct password the Main Menu will display a screen and be able to access to the following information.

**1.Alarm Message 2. Running message 3.Version 4. Daily Energy 5. Monthly Energy 6. Yearly Energy 7. Daily Records 8.Communication Data 9. Warning Message**

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.

### 6.4.1 Alarm Message

The display shows the 100 latest alarm messages (see Figure 6.6). Screens can be scrolled manually by pressing the UP/ DOWN keys. Press the ESC key to return to the previous menu.




▲ Figure 6.6 Alarm Message

### 6.4.2 Running Message

This function is for maintenance personnel to get running message.

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

### 6.4.3 Version

The screen shows the model version.
Press “UP” and “DOWN” at the same time for 5s.  Software version will be shown as well.

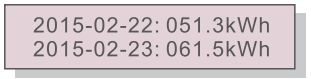

▲ Figure 6.7 Model Version and Software Version

### 6.4.4 Daily Energy

The function is for checking the energy generation for selected day.


▲ Figure 6.8 Select Date for Daily Energy

Press DOWN key to move the cursor to day, month and year, press UP key to change the digit. Press Enter after the date is fixed.




▲ Figure 6.9 Daily Energy

Press UP/DOWN key to move from one date to another.

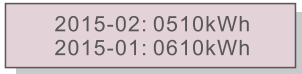
### 6.4.5 Monthly Energy and Yearly Energy

The two functions are for checking the energy generation for selected month and year.

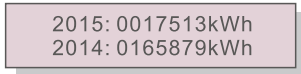


▲ Figure 6.10 Select Month for Monthly Energy ▲ Figure 6.11 Select Year for Yearly Energy

Press DOWN key to move the cursor, press UP key to change the digit.
Press Enter after the month/year is fixed.




▲ Figure 6.12 Month Energy




▲ Figure 6.13 Yearly Energy

Press UP/DOWN key to move from one date to another.



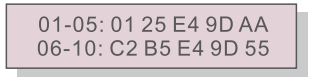
6. Operation

### 6.4.6 Daily Records

The screen shows history of changing settings. Only for maintance personel.

### 6.4.7 Communication Data

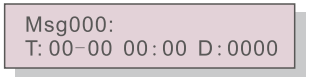
The screen shows the internal data of the Inverter (see Figure 6.14), which is for service technicians only.




▲ Figure 6.14 Communication Data

### 6.4.8 Warning  Message

The display shows the 100 latest warning messages (see Figure 6.15). Screens can be scrolled manually by pressing the UP/ DOWN keys. Press the ESC key to return to the previous menu.




▲ Figure 6.15 Warning Message

## 6.5 Advanced Settings - Technicians Only

**NOTE:**
This area is for fully qualified and accredited technicians only.
Please follow 6.4 to enter password to access this menu.

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

**1.Select Standard  2.Grid ON/OFF  3.Clear Energy  4. Reset Password**
**5. Power Control  6.Calibrate Energy  7.Special settings  8. STD. Mode Settings**
**9. Restore settings  10.HMI Update  11.Export Power Set  12.Restart HMI**
**13.Debug Parameter  14.DSP Update  15.Compensation Set**

### 6.5.1 Selecting Standard

This function is used to select the grid's reference standard (see Figure 6.16).


▲ Figure 6.16

Press the UP/DOWN keys to select the standard (UL-240V-A, UL-208V-A, UL-240V, UL-208V, R21P3-240, R21P3-208, ISONE240, ISONE208, R21P3-24A, R21P3-20A, ISONE240A, ISONE208A, MEX-CFE , User-Def, etc.).
Press the ENTER key to confirm the setting.
Press the ESC key to cancel changes and returns to previous menu.

There are 12 settings for USA and CSA market, UL-240V, UL-208V, R21P3-240, R21P3-208, ISONE240 and ISONE208 are the settings for inverters without AFCI Function.

UL-240V-A, UL-208V-A, R21P3-24A, R21P3-20A, ISONE240A and ISONE208A are the settings for inverters with AFCI Function. The default grid setting is 240V.

**NOTE:**
The default setting is 240V single phase “UL-240V” or “UL-240V-A”, Otherwise, refer to local requirements.

**NOTE:**
This function is for technicians use only.

Selecting the “User-Def” menu will access to the following submenu (see Figure 6.17),


▲ Figure 6.17

**NOTE:**
The " User-Def" function can be only used by the service engineer and must be allowed by the providing utility.

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

| | |
|---|---|
| OV-G-V1: 220---300V | OV-G-F1: 50.2-53Hz(60.2-63Hz) |
| OV-G-V1-T: 0.1---9S | OV-G-F1-T: 0.1---9S |
| OV-G-V2: 220---300V | OV-G-F2: 51-53Hz(61-63Hz) |
| OV-G-V2-T: 0.1---1S | OV-G-F2-T: 0.1---9S |
| UN-G-V1: 110---210V | UN-G-F1: 47-49.5Hz(57-59.5Hz) |
| UN-G-V1-T: 0.1---9S | UN-G-F1-T: 0.1---9S |
| UN-G-V2: 110---210V | UN-G-F2: 47-49Hz(57-59Hz) |
| UN-G-V2-T: 0.1---1S | UN-G-F2-T: 0.1---9S |
| Startup-T : 10-600S | Restore-T: 10-600S |



6. Operation

Press the UP/DOWN keys to scroll through items. Press the ENTER key to edit the highlighted item. Press the UP/DOWN keys again to change the setting. Press the ENTER key to save the setting. Press the ESC key to exit to save and send changes or cancel changes and return to the Advanced Settings Menu.

### 6.5.2 Grid ON/OFF

This function is used to start up or stop the power generation of Solis Single Phase Inverter (see Figure 6.18).


▲ Figure 6.18 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.

### 6.5.3 Clear Energy

Clear Energy can reset the history yield of the inverter.

### 6.5.4 Reset Password

This function is used to set the new password for menu “Advanced info.” and “Advanced information” (see Figure 6.19).


▲ Figure 6.19 Set New Password

Enter the right password before set new password. Press the DOWN key to move the cursor, Press the UP key to revise the value. Press the ENTER key to execute the setting. Press the ESC key to return to the previous menu.

### 6.5.5 Power Control

This section is for setting the active and reactive power.
Within this section there are five functions:
**1. Set output power 2. Set Reactive Power 3. Out_P With Restore**
**4. Rea_P With Restore 5. Select PF Curve**

Functions 1-4 are used to set inverter output power and reactive power. With restore means the change will not revert to default after restart. The default setting for functions 1-4 are 100% for output power and 0 for reactive power.
Function 5 “select PF curve” will set a custom power factor curve for different grid standards. 00 is null. 01 is the PF Curve for VDE4105, 02 is the PF Curve for Brazil.
Other selections are reserved. The default setting is 00.

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

### 6.5.6 Calibrate Energy

Maintenance or replacement could clear or cause a different value of total energy. Use this function to revise the value of total energy to the same value as before. If the monitoring website is used the data will be synchronize with this setting automatically.
(see Figure 6.20).

YES=<ENT> NO=<ESC>
Energy:0000000kWh

▲ Figure 6.20 Calibrate Energy

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

### 6.5.7 Special Settings

There are 11 settings in this menu:

**1. Grid Filter Set 2. Relay_protect Set 3. ILeak_Protect Set 4. GROUND_Protect Set**
**5. GRID INTF. 02 Set 6. MPPT Parallel Mode 7. Cnst. Voltage Mode 8. V/FRT Set**
**9. IgZero_COMP. Set 10. PI Set 11.IgADCheckPRO Set**

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

#### 6.5.7.1 Grid Filter Set

Press the ENTER key to show the submenu of Grid Filter Set.
Press the UP/DOWN key to select the value.
Press the ENTER key to save the setting and return to the previous menu.





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

#### 6.5.7.2 Relay_Protect Set

This function is for maintenance personnel only, wrong operation could disable inverter important function.

#### 6.5.7.3 ILeak_Protect Set

This function is for maintenance personnel only, wrong operation could disable inverter important function.

#### 6.5.7.4 GROUND_Protect Set

This function is for maintenance personnel only, wrong operation could disable inverter important function.

#### 6.5.7.5 GRID INTF.02 Set

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

#### 6.5.7.6 MPPT Parallel Mode

This is used for parallel strings into different inverter MPPTs.
Press enter and press up or down to change the settings(see Figure 6.21).

YES=<ENT> NO=<ESC>
MPPTParallel: STOP

▲ Figure 6.21 MPPT Parallel Set

Selecting RUN will enable parallel strings setup.Both MPPT channels will operate in parallel.
Selecting STOP disables parallel string setup.Both MPPT channels will operate separately.
**The default setting is STOP (disabled).**

6. Operation

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

### 6.5.7.7 Cnst. Voltage Mode

This function is used for fixed input voltage(see Figure 6.22).

CV Mode: STOP
Voltage: 600V

▲ Figure 6.22 Cnst. Voltage Set

Selecting RUN will enable fixed input voltage. The inverter will not operate if the input voltage is lower than the set voltage. Selecting STOP will disable this function.
**The default setting is STOP (disabled).**

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

### 6.5.7.8 V/FRT Set

There are 5 option under this setting:
1.LVRT_CQC 2.LVRT.GN 3.LVRT-BAR are not used for the US ,
The function VRT_US (voltage ride through) and FRT_US (frequency ride through) two operation is used for UL1741SA (see Table 6.2,Table 6.3).
Selecting the setting to RUN will enable the inverter grid protection limits of UL 1741 SA requirements. Selecting the STOP setting will enable the inverter grid protection limits of IEEE 1547 requirements. The default setting is STOP.

| Region | System Frequency Default Settings | Minimum Range of Adjustability (HZ) | Ride-through until | Ride-Through Operational Mode | Trip Time | Remarks |
|---|---|---|---|---|---|---|
| 1 | f＞62 | 62.0-64.0 | // | Not Applicable | 0.16S | // |
| 2 | 60.5＜f≤62 | 60.1-62.0 | 299S | Mandatory Operation | 300S | Enter protected state |
| 3 | 58.5＜f≤60.5 | // | // | Continuous Operation | // | // |
| 4 | 57.0＜f≤58.5 | 57.0-59.9 | 299S | Mandatory Operation | 300S | Enter protected state |
| 5 | f≤57.0 | 53.7-57.0 | // | Not Applicable | 0.16S | // |

▲ Table 6.2 Frequency ride through

| Wear pressure | Region | voltage(% nominal voltage) | | Ride-through until | Operating mode | Maximum time limit |
|---|---|---|---|---|---|---|
| | | 240Va.c. | 208Va.c. | | | |
| 1 | Hv2 | V≥288 | V≥249.6 | // | Not Applicable | 0.16S |
| 2 | Hv1 | 264＜V＜288 | 228.8＜V＜249.6 | 12S | Momentary Cessation | 13S |
| 3 | NN | 211.2≤V≤264 | 183.04≤V≤228.8 | // | Continuous Operation | // |
| 4 | Lv1 | 168≤V＜211.2 | 145.6≤V＜183.04 | 20S | Mandatory Operation | 21S |
| 5 | Lv2 | 120≤V＜168 | 104≤V＜145.6 | 10S | Mandatory Operation | 11S |
| 6 | Lv3 | V＜120 | V＜104 | 1S | Momentary Cessation | 1. 5S |

▲ Table 6.3 Voltage ride through

The voltage and frequency ride through limit is fixed.

VRT_US: STOP
FRT_US: STOP

▲ Figure 6.23 V/FRT Set

### 6.5.7.9 IgZero_COMP.Set

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

### 6.5.7.10 PI Set

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

### 6.5.7.11 IgADCheckPRO Set

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

### 6.5.8 STD. Mode Settings

Selecting “STD Mode. Settings” displays the sub-menu shown below:

**1. Working Mode Set 2. Power Rate Limit 3. Freq Derate Set 4. 10mins Voltage Set**
**5. Power Priority 6. Initial Settings 7. Voltage PCC Set 8. Freq-Watt**

#### 6.5.8.1 Working Mode Set

There are TWO situations with different grid standards selected.

##### 6.5.8.1.1 With UL Standard selected

**NOTE:**
The following modes are for "UL-480V", "UL-480V-A".

Solis US version inverters have Seven working modes:

**1. NULL 2. Volt-watt 3. Volt-Var 4. Fixed-PF 5. Reac-power 6. Power-PF 7. VgWatt-UL**

Based on UL1741SA, working mode 1,3,4,7 can be used by grid operator.

**1.NULL**

Description: Inverter is not under any working mode.

**2. Volt-Watt (Not Required)**

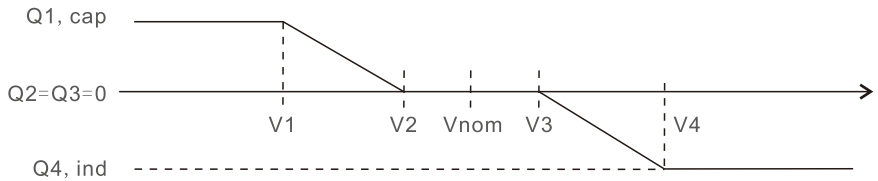
Description: Inverter will change the active output power based on voltage change.

Note: This Setting is NOT required by UL1741SA Standards.

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

**3. Volt-Var (Default)**

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




▲ Figure 6.24 Volt-VAR curve for Q(V)





Default Settings for UL1741SA:

Q1: (0-60%) Default +30% Q4: (-60%-0%) Default -30%

Rated 240V Grid

V1:(192-240V) Default 210V V2: (192-240V) Default 236V

V3:(240-288V) Default 243V V4: (240-288V) Default 264V

Rated 208V Grid

V1:(166-208V) Default 182V V2: (166-208V) Default 205V

V3:(208-240V) Default 211V V4: (208-240V) Default 229V

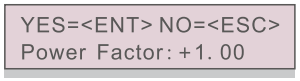

▲ Figure 6.25 Volt-VAR

**4.Fixed-PF**

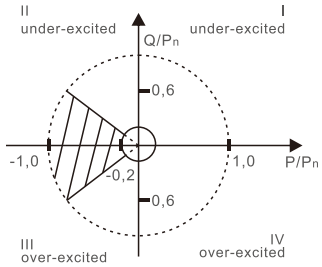
Description: Inverter will output power with fixed power factor.

Setting Range: -0.8 to +0.8

Default value is PF = 1




▲Figure 6.26 Fixed-PF




▲ Figure 6.27 PF Range

**5. Reac-Power (Not Required)**

Description: Inverter will generate reactive power based on changing output power.

Note: This Setting is NOT required by UL1741SA Standards.

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

6. Operation

**6. P-Factor (Not Required)**

Description: Inverter will change power factor based on changing output power.

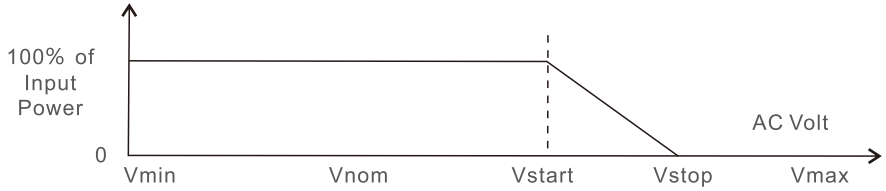
Note: This Setting is NOT required by UL1741SA Standards.

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

**7.VgWatt-UL**

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

Note: This is the Volt-Watt Setting for UL1741SA Standards.




▲ Figure 6.28 Volt-Watt characteristic

Default Settings for UL1741SA:

Rated 240V Grid

V1:less than V2

V2:less than Vstart

V3 (Vstart): (240-288V) Default264V

V4 (Vstop): (264-312V) Default 288V

P1:100% P2:100% P3: 100% P4:0%

Rated 208V Grid

V1:less than V2

V2:less than Vstart

V3 (Vstart): (208-250V) Default229V

V4 (Vstop): (229-270V) Default 250V

P1:100% P2:100% P3: 100% P4:0%

Voltage1 : 210V
Voltage2 : 236V

▲ Figure 6.29 Vgwatt-UL

## 6.5.8.1.2 With Rule21 Standard selected

**NOTE:**
The following modes are for "R21P3-480", "R21P3-48A".

Solis US version inverters have Ten working modes:

**1. NULL 2. Volt-watt 3. Volt-Var 4. Fixed-PF 5. Reac-power 6. Power-PF 7. VgWatt-UL**

Based on Rule21, working mode 1,2,3,4 can be used by grid operator.

**NOTE:**
The other three working mode"P1-V-Watt","P1-V-Var" and "P1-V-P&V-Q" are NOT applicable for settings.

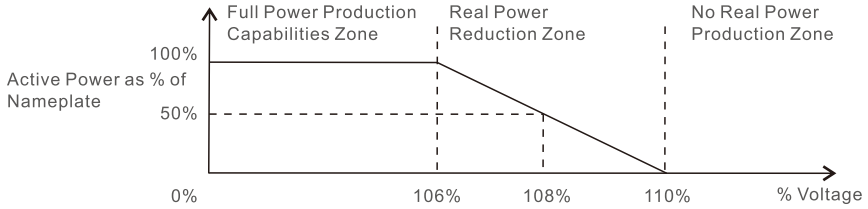
**1.NULL (Mode Reset)**

Description: Inverter is not under any working mode.

**2. Volt-Watt**

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

Note: This is the Volt-Watt Setting for Rule21 Standards.




▲ Figure 6.30 Volt-Watt characteristic

Default Settings for Rule21 Standards:

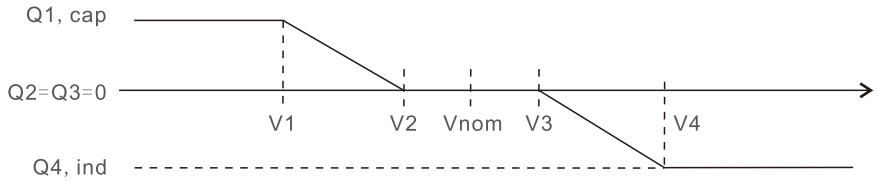
Rated 240V Grid
V1:less than Vstart
V2 (Vstart): (240-288V) Default 254V
V3 (Vstop): (240-288V) Default 264V
V4: larger than Vstop
P1:100% P2:100% P3: 0% P4:0%

Rated 208V Grid
V1:less than Vstart
V2 (Vstart): (208-250V) Default 221V
V3 (Vstop): (208-250V) Default 229V
V4: larger than Vstop
P1:100% P2:100% P3: 0% P4:0%

6. Operation

**3. Volt-Var**

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




▲ Figure 6.31 Volt-VAR curve for Q(V)

Default Settings for Rule21 Standard:

Q1: (0-60%) Default +30%  Q4: (-60%-0%) Default -30%

Rated 240V Grid

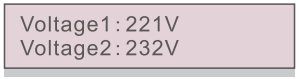
V1:(192-264V) Default 220V  V2: (192-264V) Default 232V

V3:(240-288V) Default 248V  V4: (240-288V) Default 256V

Rated 208V Grid

V1:(166-229V) Default 191V  V2: (166-229V) Default 201V

V3:(208-250V) Default 215V  V4: (208-250V) Default 223V



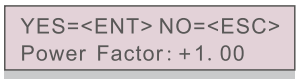

▲ Figure 6.32 Volt-VAR

**4.Fixed-PF**

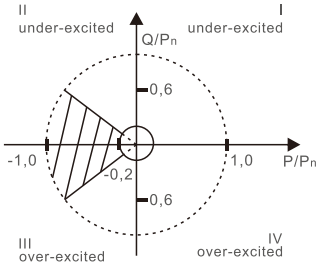
Description: Inverter will output power with fixed power factor.

Setting Range: -0.8 to +0.8

Default value is PF = 1




▲ Figure 6.33 Fixed-PF




▲ Figure 6.34 PF Range

**5. Reac-Power (Not Required)**

Description: Inverter will generate reactive power based on changing output power.

Note: This Setting is NOT required by Rule21 Standards.

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

**6. P-Factor (Not Required)**

Description: Inverter will change power factor based on changing output power.

Note: This Setting is NOT required by Rule21 Standards.

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

**7.VgWatt-UL (Not Required)**

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

Note: This Setting is NOT required by Rule21 Standards.

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

**8. Enable both Volt-Var and Volt-Watt modes**

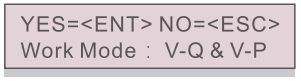
Description: Rule21 requires both Volt-var and Volt-watt modes can be enabled.

To set both modes (Volt-var in high priority)

Step 1: Select and set Volt-watt mode at first.

Step 2: Enter "Working Mode" again and select and set Volt-var mode then.

Step 3: To check the priority, a new mode will appear as "V-Q & V-P" which indicates (Q) Volt-var is in high priority.



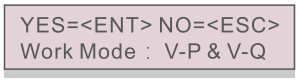

▲ Figure 6.35 Work Mode

To set both modes (Volt-watt in high priority)

Step 1: Select and set Volt-var mode at first.

Step 2: Enter "Working Mode" again and select and set Volt-watt mode then.

Step 3: To check the priority, a new mode will appear as "V-P & V-Q" which indicates (P) Volt-watt is in high priority.




▲ Figure 6.36 Work Mode

To reset dual-mode or exit the dual-mode situation

Step 1: Select "Null" mode at first.

Step 2: Enter "Working Mode" again. Redo above dual-mode setting steps to reset OR set other modes to exit dual-mode situation.

**NOTE:**

To check the Volt-watt and Volt-var priority, simply enter the working modes.
V-Q&V-P indicates Volt-Var First V-P&V-Q indicates Volt-Watt First

### 6.5.8.2 Power Rate Limit

This function is used for changing power ramp up rate.

When the inverter initializes or string MPPT changes, the ramp up rate is limited.

**The default setting is stop (disable).**

The setting range is from 10% to 600%, This will change the power change rate per minute.

If these values are changed the inverter may not conform to UL 1741 SA or IEEE 1547 standard.


▲ Figure 6.37 Power Rate Limit



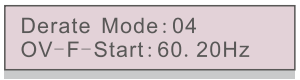


### 6.5.8.3 Freq Derate Set

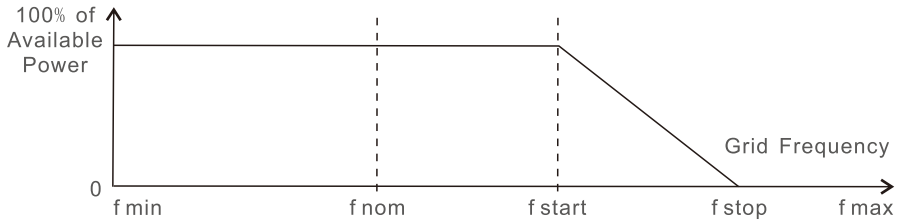
This setting is applicable when UL Standards are selected.

There are five frequency derate modes in this menu when UL-208/240 grid standard is selected. Modes 00 – 03 are disabled. Mode 04 is used for UL 1741 SA frequency derating settings. Within this mode the user can set the frequency start and stop points.

**The default setting is 00( disabled).**




▲ Figure 6.38 Freq Derate Set




▲ Figure 6.39 Freq-Watt characteristic

Over frequency load shedding F start range is 59.936-60.036Hz.

The default setting is 60.036Hz.

Descending rate: 5%Pn/0.1Hz.

F stop range: 61-64Hz. Default setting is 62Hz. Recovery rate: 5%Pn/0.1Hz.

Press the Enter key to select the mode or frequency.

Press Up/Down to set. Press ESC to save the settings.

### 6.5.8.4 10mins Voltage Set

This function is disabled and not used for the US.

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

### 6.5.8.5 Power Priority

This setting is used to determine the priority between Active Power Control (Watt) and Reactive Power Control (Var).


▲ Figure 6.40 Power Priority

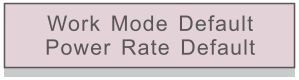
Two options are available: Watt First and Var First.

This setting determines the priority when both Volt-Watt and Volt-Var modes are enabled.

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

### 6.5.8.6 Initial Settings

This setting will allow the working modes from 6.5.8.1 to 6.5.8.4 to be set back to default.




▲ Figure 6.41 Initial Settings

### 6.5.8.7 Voltage PCC Set

Set the voltage at the PCC point.

This setting is required by RULE 21 requirements.

PCC: Point of Common Coupling, the point where a Local EPS is connected to an Area EPS.

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



6. Operation

### 6.5.8.8 Freq-Watt

This setting is used to control real power based on the frequency excursion

This setting is applicable when Rule21 Standards are selected.

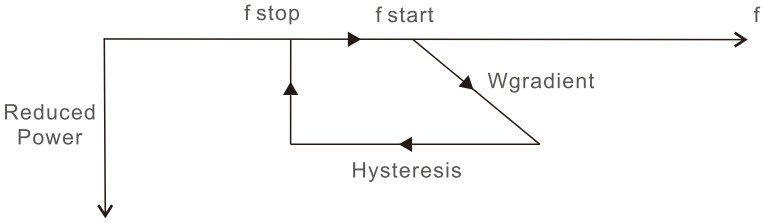

▲ Figure 6.42 Freq-Watt (1)

Start Freq: This is the frequency that active power reduction starts.

WGradient: This is the active power reduction rate in terms of the frequency.

Stop Freq: This is the frequency that stops the correction cycle.

Hysteresis: This indicates whether hysteresis is enabled.




▲ Figure 6.43 Freq-Watt (2)

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

### 6.5.9 Restore Settings

Restore settings will set all items in 6.5.7 special settings to default.
The screen shows as below:


▲ Figure 6.44 Restore Settings

Press the Enter key to save the setting after setting grid off.

Press the ESC key to return the previous mean.

### 6.5.10 HMI Update

This function is used for update the LCD program.

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

### 6.5.11 Export Power Set

This setting is for export power control. Please don't change settings in this item.

This setting is used for update inverter with export power control accessory. Please don't change setting in this menu.

### 6.5.12 Restart HMI

The function is used for restart the HMI.

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

### 6.5.13 Debug Parameter

This function is used for manufacturer maintenance personnel only.

### 6.5.14 DSP Update

The function is used for update the DSP.

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





### 6.5.15 Compensation Set

This function is used to calibrate inverter output energy and voltage. It will not impact the energy count for inverter with RGM.
Two sections are included: Power Parameter and Voltage Parameter.
The screen shows:

```
YES=<ENT> NO=<ESC>
Power para: 1. 000
```

▲ Figure 6.45 Power Rate Limit

Press the Down key to move the cursor.
Press the Up key to change the digit.
Please press the Enter to save the setting and press the ESC key to return to the previous menu.

This setting is used for grid operators, do not change this setting unless specifically instructed to.

## 6.6 Arc fault (AFCI version)

Solis single phase inverters have a built-in AFCI function which can detect an arc fault within the DC circuit. If the arc fault happens, it can only be removed manually.
During normal operation, if arc fault happens in the DC circuit, the inverter will stop output and the LCD will show:

```
ARC-FAULT
Restart Press ESC 3s
```

▲Figure 6.46 Arc Fault

Please check DC cables and connections to identify the source of possible arcing. Then **press <ESC> for 3 seconds**, the inverter will restart.

## 7.Maintenance

Solis single phase inverter does not require any regular maintenance. However, cleaning the dust on the heat sink will help the inverter to dissipate heat and increase its life expectancy. The dust can be removed with a soft brush.

**CAUTION:**
Do not touch the inverter's surface when it is operating. Some parts of the inverter may be hot and cause burns. Turn off the inverter (refer to Section 5.2) and wait for a cool-down period before before any maintenance or cleaning operation.

The LCD and the LED status indicator lights can be cleaned with a damp 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 is designed in accordance with the most important international grid-tied standards and safety and electromagnetic compatibility requirements. Before delivering to the customer, the inverter has been subjected to several tests to ensure its optimal operation and reliability.

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

| Alarms | Cause | Solution |
|---|---|---|
| No Information (Blank Screen) | • Input voltage low/missing<br>• Polarity reversed<br>• Main board damaged | **Test – DC switch OFF**<br>• Check PV connections<br>• Check polarity<br>• Check voltage >120V Single, >350V three<br>**Test – DC Switch ON**<br>• Check voltage >120V Single, >350V three<br>• If DC voltage is “0” replace inverter |
| Initializing (Inverter stuck in this mode) | • Inverter is waiting for driving signal | **Test – DC switch OFF**<br>• Check PV connections<br>• Check polarity<br>• Check voltage >120V Single, >350V three<br>**Test – DC Switch ON**<br>• Check voltage >120V Single, >350V three<br>• A cable may have been damaged or loosened in shipping replace inverter |
| OV-G-V: Over Grid Voltage | • Inverter detects grid voltage as too high | **Test – DC switch OFF**<br>• Check AC at the inverter<br>• If AC measures high, adjust upper limit with permission from utility<br>**Test – DC Switch ON, full power**<br>• Check AC at inverter test points<br>• Compare with LCD<br>• If AC measures high, cables between inverter and interconnect are too small<br>• Check ampacity and voltage drop calculations<br>• Verify appropriate Grid Standard |
| UN-G-V: Under Grid Voltage | • Inverter detects grid voltage as too low | **Test – DC switch OFF**<br>• Check AC at the inverter test points<br>• If AC measures low, adjust lower limit with permission from utility<br>• Check LCD voltage reading, may be a bad measurement circuit<br>**Test – DC Switch ON**<br>• Verify appropriate Grid Standard<br>• Replace inverter |

| Alarms | Cause | Solution |
|---|---|---|
| OV-G-F: Over Grid Frequency | • Inverter detects grid Frequency as too high | **Test – DC switch OFF**<br>• Check frequency at the inverter test points<br>• If Frequency measures high, adjust upper limit with permission from utility<br>• Check LCD reading, may be a bad measurement circuit<br>**Test – DC Switch ON**<br>• Verify appropriate Grid Standard<br>• Replace inverter |
| UN-G-F: Under Grid Frequency | • Inverter detects grid Frequency as too low | **Test – DC switch OFF**<br>• Check frequency at the inverter test points<br>• If Frequency measures low, adjust lower limit with permission from utility<br>• Check LCD reading, may be a bad measurement circuit<br>**Test – DC Switch ON**<br>• Verify appropriate Grid Standard<br>• Replace inverter |
| NO-GRID | • Inverter does not detect the grid | **Test – DC switch OFF**<br>• Check AC at the inverter test points<br>• L-L, L-GND<br>• Do NOT tell me 240VAC<br>• Check LCD reading, may be a bad measurement circuit<br>**Test – DC Switch ON**<br>• Check grid standard<br>• Replace inverter |
| OV-DC: DC voltage is too high | • Inverter detects High DCV | **Test – DC switch OFF**<br>• Check DC at the inverter test points<br>• If DCV is high, too many panels in the string<br>**Test – DC Switch ON**<br>• Check LCD reading, may be a bad measurement circuit<br>• Replace inverter |



8. Troubleshooting

| Alarms | Cause | Solution |
|---|---|---|
| OV-BUS: DC BUS voltage is too high | • Inverter detects High DCV on internal bus | **Test**<br>• Measure DC and AC voltages<br>• Compare with LCD<br>• Replace inverter<br>• Internal damage<br>• Wire came loose during shipping |
| UN-BUS: DC BUS voltage is too low | • Inverter detects low DCV on internal bus | **Test**<br>• Measure DC and AC voltages<br>• Compare with LCD<br>• Replace inverter<br>• Internal damage<br>• Wire came loose during shipping |
| GRID-INTF: Grid unstable | • Inverter detects grid instability, internal fault current high | **Test – With DC Switch OFF**<br>• Measure AC voltage<br>• Test AC line for THD<br>• Test – With DC Switch ON<br>**Test AC line for THD**<br>• Multiple inverters/turn one off<br>• Impedance matching adjustment or box<br>• Internal damage<br>• Wire came loose in shipping |
| INI-FAULT: Initialization Protection | • Master and Slave DSP have different values | **Reset Inverter**<br>• DC switch OFF<br>• Wait until all lights/LCD turn off<br>• DC switch ON<br>• Replace inverter |
| OV-TEM: Temperature Protection | • Inverter detects high ambient temperature >60C | **Inspect installation**<br>• Check heatsink for obstructions/ventilation<br>• Is inverter in direct sunshine<br>• Measure ambient temperature near inverter<br>• If temp is in range replace inverter |

# 8. Troubleshooting

| Alarms | Cause | Solution |
|---|---|---|
| PV ISO-PRO 01/02: Ground Protection | • Inverter detects low DC insulation resistance | **Inspect installation**<br>• Reset inverter<br>• Note weather conditions when alarm occurs<br>• Measure insulation resistance<br>• If normal, measure in SAME weather as alarm<br>• Physically check cables<br>• Replace inverter |
| AFCI Check FAULT | • AFCI module self check fault | **Reset Inverter**<br>• DC switch OFF<br>• Wait until all lights/LCD turn off<br>• DC switch ON<br>• Replace inverter |
| ARC-FAULT | • Inverter detects arc in DC circuit | **Inspect installation**<br>• Check cable with string tester<br>• Physically check cables<br>• Inspect panel junction boxes<br>• Inspect cable connections<br>• Reset inverter<br>• Replace inverter |

Table 8.1 Fault messages and descriptions

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

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

# 9. Specifications

# 9. Specifications

| Model | Solis-1P2.5K-4G-US |
|---|---|
| Max. DC input power (Watts) | 3000 |
| Max voltage (Volts) | 600 |
| Startup voltage (Volts) | 60 |
| Full power MPPT voltage range (Volts) | 114-450 |
| Operating MPPT voltage range (Volts) | 50-450 |
| Max usable input current per MPPT (Amps) | 11+11 |
| Max short circuit input current (Amps) | 17.2+17.2 |
| Number of MPPT | 2 |
| Inputs per MPPT | 2 |
| Nominal output power 240V grid (Watts) | 2500 |
| Nominal output power 208V grid (Watts) | 2500 |
| Nominal grid voltage (Volts) | 240/208 |
| Operating voltage range (Volts) | 183-228(for 208V rated)/211-264(for 240V rated) |
| Max. overcurrent protection device 240/208V (Amps) | 20/20 |
| Max.output current for 208V grid (Amps) | 12.0 |
| Max.output current for 240V grid (Amps) | 10.4 |
| Max backfeed current (Amps) | 0 |
| DC Overvoltage Category (OVC) | II |
| AC Overvoltage Category (OVC) | III |
| Max output fault current (Amps) and duration (ms) | 20/200 |
| Output power factor range | 0.8leading~0.8lagging |
| Grid current THD | <3% |
| Nominal grid frequency (Hertz) | 60 |
| Operating frequency range (Hertz) | 59.5-60.5 |
| Peak efficiency | 97.8% |
| CEC weighted efficiency | 97.0% |
| MPPT efficiency | >99.5% |
| Integrated AFCI (DC arc-fault circuit protection) | Yes |
| Residual current monitoring | Yes |
| Rapid shutdown | Optional |
| Dimensions (inch / cm) | 13.9*31.9*6.5in (352*810*164mm) |
| Weight (lbs / kg) | 33.1lb (15kg) |
| Topology | Transformerless |
| Ambient operating temperature range | -25℃~60℃/-13℉-140℉ |
| Enclosure type | NEMA 4X |
| Noise emission (typical) | <30 dBA |

| Model | Solis-1P2.5K-4G-US |
|---|---|
| Cooling concept | Natural convection |
| Max. operating altitude without derating | 13120ft (4000m) |
| Designed lifetime | >20 years |
| Module Level RSD-NEC 2014/2017-690.12 | Yes (Built-in Transmitter) |
| Revenue Grade Meter-ANSI C12.20 | Optional |
| Compliance | UL 1741, UL 1741SA, UL 1998, ISO-NE UL 1699B, IEEE 1547, FCC Part 15 (Class A & B), CAN/CSA C22.2 107.1-1, Rule 21 Phase I II&III |
| Operating surroundings humidity | 0~100% Condensing |
| Conduit connention | 2 knockout for 3/4" conduit at bottom and side |
| Display | LCD, 2×20 Z. |
| Interface | RS485, optional WiFi and cellular |
| Communication Protocol | Sunspec |
| Warranty Terms | 10 Years STD (Extendable to 20 Years) |

# 9. Specifications

| Model | Solis-1P3K-4G-US |
|---|---|
| Max. DC input power (Watts) | 3600 |
| Max voltage (Volts) | 600 |
| Startup voltage (Volts) | 120 |
| Full power MPPT voltage range (Volts) | 137-520 |
| Operating MPPT voltage range (Volts) | 90-520 |
| Max usable input current per MPPT (Amps) | 11+11 |
| Max short circuit input current (Amps) | 17.2+17.2 |
| Number of MPPT | 2 |
| Inputs per MPPT | 2 |
| Nominal output power 240V grid (Watts) | 3000 |
| Nominal output power 208V grid (Watts) | 3000 |
| Nominal grid voltage (Volts) | 240/208 |
| Operating voltage range (Volts) | 183-228(for 208V rated)/211-264(for 240V rated) |
| Max. overcurrent protection device 240/208V (Amps) | 20/20 |
| Max.output current for 208V grid (Amps) | 14.4 |
| Max.output current for 240V grid (Amps) | 12.5 |
| Max backfeed current (Amps) | 0 |
| DC Overvoltage Category (OVC) | II |
| AC Overvoltage Category (OVC) | III |
| Max output fault current (Amps) and duration (ms) | 20/200 |
| Output power factor range | 0.8leading~0.8lagging |
| Grid current THD | <3% |
| Nominal grid frequency (Hertz) | 60 |
| Operating frequency range (Hertz) | 59.5-60.5 |
| Peak efficiency | 97.8% |
| CEC weighted efficiency | 97.0% |
| MPPT efficiency | >99.5% |
| Integrated AFCI (DC arc-fault circuit protection) | Yes |
| Residual current monitoring | Yes |
| Rapid shutdown | Optional |
| Dimensions (inch / cm) | 13.9*31.9*6.5in (352*810*164mm) |
| Weight (lbs / kg) | 33.1lb (15kg) |
| Topology | Transformerless |
| Ambient operating temperature range | -25℃~60℃/-13℉-140℉ |
| Enclosure type | NEMA 4X |
| Noise emission (typical) | <30 dBA |



# 9. Specifications

| Model | Solis-1P3K-4G-US |
|---|---|
| Cooling concept | Natural convection |
| Max. operating altitude without derating | 13120ft (4000m) |
| Designed lifetime | >20 years |
| Module Level RSD-NEC 2014/2017-690.12 | Yes (Built-in Transmitter) |
| Revenue Grade Meter-ANSI C12.20 | Optional |
| Compliance | UL 1741, UL 1741SA, UL 1998, ISO-NE UL 1699B, IEEE 1547, FCC Part 15 (Class A & B), CAN/CSA C22.2 107.1-1, Rule 21 Phase I II&III |
| Operating surroundings humidity | 0~100% Condensing |
| Conduit connention | 2 knockout for 3/4" conduit at bottom and side |
| Display | LCD, 2×20 Z. |
| Interface | RS485, optional WiFi and cellular |
| Communication Protocol | Sunspec |
| Warranty Terms | 10 Years STD (Extendable to 20 Years) |

# 9. Specifications

| Model | Solis-1P3.6K-4G-US |
|---|---|
| Max. DC input power (Watts) | 4000 |
| Max voltage (Volts) | 600 |
| Startup voltage (Volts) | 120 |
| Full power MPPT voltage range (Volts) | 164-520 |
| Operating MPPT voltage range (Volts) | 90-520 |
| Max usable input current per MPPT (Amps) | 11+11 |
| Max short circuit input current (Amps) | 17.2+17.2 |
| Number of MPPT | 2 |
| Inputs per MPPT | 2 |
| Nominal output power 240V grid (Watts) | 3600 |
| Nominal output power 208V grid (Watts) | 3600 |
| Nominal grid voltage (Volts) | 240/208 |
| Operating voltage range (Volts) | 183-228(for 208V rated)/211-264(for 240V rated) |
| Max. overcurrent protection device 240/208V (Amps) | 20/30 |
| Max.output current for 208V grid (Amps) | 17.3 |
| Max.output current for 240V grid (Amps) | 15.0 |
| Max backfeed current (Amps) | 0 |
| DC Overvoltage Category (OVC) | II |
| AC Overvoltage Category (OVC) | III |
| Max output fault current (Amps) and duration (ms) | 30/200 |
| Output power factor range | 0.8leading~0.8lagging |
| Grid current THD | <3% |
| Nominal grid frequency (Hertz) | 60 |
| Operating frequency range (Hertz) | 59.5-60.5 |
| Peak efficiency | 97.8% |
| CEC weighted efficiency | 97.0% |
| MPPT efficiency | >99.5% |
| Integrated AFCI (DC arc-fault circuit protection) | Yes |
| Residual current monitoring | Yes |
| Rapid shutdown | Optional |
| Dimensions (inch / cm) | 13.9*31.9*6.5in (352*810*164mm) |
| Weight (lbs / kg) | 33.1lb (15kg) |
| Topology | Transformerless |
| Ambient operating temperature range | -25℃~60℃/-13℉-140℉ |
| Enclosure type | NEMA 4X |
| Noise emission (typical) | <30 dBA |



9. Specifications

| Model | Solis-1P3.6K-4G-US |
|---|---|
| Cooling concept | Natural convection |
| Max. operating altitude without derating | 13120ft (4000m) |
| Designed lifetime | >20 years |
| Module Level RSD-NEC 2014/2017-690.12 | Yes (Built-in Transmitter) |
| Revenue Grade Meter-ANSI C12.20 | Optional |
| Compliance | UL 1741, UL 1741SA, UL 1998, ISO-NE UL 1699B, IEEE 1547, FCC Part 15 (Class A & B), CAN/CSA C22.2 107.1-1, Rule 21 Phase I II&III |
| Operating surroundings humidity | 0~100% Condensing |
| Conduit connention | 2 knockout for 3/4" conduit at bottom and side |
| Display | LCD, 2×20 Z. |
| Interface | RS485, optional WiFi and cellular |
| Communication Protocol | Sunspec |
| Warranty Terms | 10 Years STD (Extendable to 20 Years) |

# 9. Specifications

| Model | Solis-1P4K-4G-US |
|---|---|
| Max. DC input power (Watts) | 4800 |
| Max voltage (Volts) | 600 |
| Startup voltage (Volts) | 120 |
| Full power MPPT voltage range (Volts) | 182-520 |
| Operating MPPT voltage range (Volts) | 90-520 |
| Max usable input current per MPPT (Amps) | 11+11 |
| Max short circuit input current (Amps) | 17.2+17.2 |
| Number of MPPT | 2 |
| Inputs per MPPT | 2 |
| Nominal output power 240V grid (Watts) | 4000 |
| Nominal output power 208V grid (Watts) | 4000 |
| Nominal grid voltage (Volts) | 240/208 |
| Operating voltage range (Volts) | 183-228(for 208V rated)/211-264(for 240V rated) |
| Max. overcurrent protection device 240/208V (Amps) | 30/30 |
| Max.output current for 208V grid (Amps) | 19.2 |
| Max.output current for 240V grid (Amps) | 16.7 |
| Max backfeed current (Amps) | 0 |
| DC Overvoltage Category (OVC) | II |
| AC Overvoltage Category (OVC) | III |
| Max output fault current (Amps) and duration (ms) | 30/200 |
| Output power factor range | 0.8leading~0.8lagging |
| Grid current THD | <3% |
| Nominal grid frequency (Hertz) | 60 |
| Operating frequency range (Hertz) | 59.5-60.5 |
| Peak efficiency | 98.1% |
| CEC weighted efficiency | 97.0% |
| MPPT efficiency | >99.5% |
| Integrated AFCI (DC arc-fault circuit protection) | Yes |
| Residual current monitoring | Yes |
| Rapid shutdown | Optional |
| Dimensions (inch / cm) | 13.9*31.9*6.5in (352*810*164mm) |
| Weight (lbs / kg) | 33.1lb (15kg) |
| Topology | Transformerless |
| Ambient operating temperature range | -25℃~60℃/-13℉-140℉ |
| Enclosure type | NEMA 4X |
| Noise emission (typical) | <30 dBA |



# 9. Specifications

| Model | Solis-1P4K-4G-US |
|---|---|
| Cooling concept | Natural convection |
| Max. operating altitude without derating | 13120ft (4000m) |
| Designed lifetime | >20 years |
| Module Level RSD-NEC 2014/2017-690.12 | Yes (Built-in Transmitter) |
| Revenue Grade Meter-ANSI C12.20 | Optional |
| Compliance | UL 1741, UL 1741SA, UL 1998, ISO-NE UL 1699B, IEEE 1547, FCC Part 15 (Class A & B), CAN/CSA C22.2 107.1-1, Rule 21 Phase I II&III |
| Operating surroundings humidity | 0~100% Condensing |
| Conduit connention | 2 knockout for 3/4" conduit at bottom and side |
| Display | LCD, 2×20 Z. |
| Interface | RS485, optional WiFi and cellular |
| Communication Protocol | Sunspec |
| Warranty Terms | 10 Years STD (Extendable to 20 Years) |

# 9. Specifications

| Model | Solis-1P4.6K-4G-US |
|---|---|
| Max. DC input power (Watts) | 5500 |
| Max voltage (Volts) | 600 |
| Startup voltage (Volts) | 120 |
| Full power MPPT voltage range (Volts) | 210-520 |
| Operating MPPT voltage range (Volts) | 90-520 |
| Max usable input current per MPPT (Amps) | 11+11 |
| Max short circuit input current (Amps) | 17.2+17.2 |
| Number of MPPT | 2 |
| Inputs per MPPT | 2 |
| Nominal output power 240V grid (Watts) | 4600 |
| Nominal output power 208V grid (Watts) | 4600 |
| Nominal grid voltage (Volts) | 240/208 |
| Operating voltage range (Volts) | 183-228(for 208V rated)/211-264(for 240V rated) |
| Max. overcurrent protection device 240/208V (Amps) | 30/30 |
| Max.output current for 208V grid (Amps) | 22.1 |
| Max.output current for 240V grid (Amps) | 19.2 |
| Max backfeed current (Amps) | 0 |
| DC Overvoltage Category (OVC) | II |
| AC Overvoltage Category (OVC) | III |
| Max output fault current (Amps) and duration (ms) | 30/200 |
| Output power factor range | 0.8leading~0.8lagging |
| Grid current THD | <3% |
| Nominal grid frequency (Hertz) | 60 |
| Operating frequency range (Hertz) | 59.5-60.5 |
| Peak efficiency | 98.1% |
| CEC weighted efficiency | 97.0% |
| MPPT efficiency | >99.5% |
| Integrated AFCI (DC arc-fault circuit protection) | Yes |
| Residual current monitoring | Yes |
| Rapid shutdown | Optional |
| Dimensions (inch / cm) | 13.9*31.9*6.5in (352*810*164mm) |
| Weight (lbs / kg) | 33.1lb (15kg) |
| Topology | Transformerless |
| Ambient operating temperature range | -25℃~60℃/-13℉-140℉ |
| Enclosure type | NEMA 4X |
| Noise emission (typical) | <30 dBA |



9. Specifications

| Model | Solis-1P4.6K-4G-US |
|---|---|
| Cooling concept | Natural convection |
| Max. operating altitude without derating | 13120ft (4000m) |
| Designed lifetime | >20 years |
| Module Level RSD-NEC 2014/2017-690.12 | Yes (Built-in Transmitter) |
| Revenue Grade Meter-ANSI C12.20 | Optional |
| Compliance | UL 1741, UL 1741SA, UL 1998, ISO-NE UL 1699B, IEEE 1547, FCC Part 15 (Class A & B), CAN/CSA C22.2 107.1-1, Rule 21 Phase I II&III |
| Operating surroundings humidity | 0~100% Condensing |
| Conduit connention | 2 knockout for 3/4" conduit at bottom and side |
| Display | LCD, 2×20 Z. |
| Interface | RS485, optional WiFi and cellular |
| Communication Protocol | Sunspec |
| Warranty Terms | 10 Years STD (Extendable to 20 Years) |

# 9. Specifications

| Model | Solis-1P5K-4G-US |
|---|---|
| Max. DC input power (Watts) | 6000 |
| Max voltage (Volts) | 600 |
| Startup voltage (Volts) | 120 |
| Full power MPPT voltage range (Volts) | 228-520 |
| Operating MPPT voltage range (Volts) | 90-520 |
| Max usable input current per MPPT (Amps) | 11+11 |
| Max short circuit input current (Amps) | 17.2+17.2 |
| Number of MPPT | 2 |
| Inputs per MPPT | 2 |
| Nominal output power 240V grid (Watts) | 5000 |
| Nominal output power 208V grid (Watts) | 5000 |
| Nominal grid voltage (Volts) | 240/208 |
| Operating voltage range (Volts) | 183-228(for 208V rated)/211-264(for 240V rated) |
| Max. overcurrent protection device 240/208V (Amps) | 30/30 |
| Max.output current for 208V grid (Amps) | 24.0 |
| Max.output current for 240V grid (Amps) | 20.8 |
| Max backfeed current (Amps) | 0 |
| DC Overvoltage Category (OVC) | II |
| AC Overvoltage Category (OVC) | III |
| Max output fault current (Amps) and duration (ms) | 30/200 |
| Output power factor range | 0.8leading~0.8lagging |
| Grid current THD | <3% |
| Nominal grid frequency (Hertz) | 60 |
| Operating frequency range (Hertz) | 59.5-60.5 |
| Peak efficiency | 98.1% |
| CEC weighted efficiency | 97.0% |
| MPPT efficiency | >99.5% |
| Integrated AFCI (DC arc-fault circuit protection) | Yes |
| Residual current monitoring | Yes |
| Rapid shutdown | Optional |
| Dimensions (inch / cm) | 13.9*31.9*6.5in (352*810*164mm) |
| Weight (lbs / kg) | 33.1lb (15kg) |
| Topology | Transformerless |
| Ambient operating temperature range | -25℃~60℃/-13℉-140℉ |
| Enclosure type | NEMA 4X |
| Noise emission (typical) | <30 dBA |



# 9. Specifications

| Model | Solis-1P5K-4G-US |
|---|---|
| Cooling concept | Natural convection |
| Max. operating altitude without derating | 13120ft (4000m) |
| Designed lifetime | >20 years |
| Module Level RSD-NEC 2014/2017-690.12 | Yes (Built-in Transmitter) |
| Revenue Grade Meter-ANSI C12.20 | Optional |
| Compliance | UL 1741, UL 1741SA, UL 1998, ISO-NE UL 1699B, IEEE 1547, FCC Part 15 (Class A & B), CAN/CSA C22.2 107.1-1, Rule 21 Phase I II&III |
| Operating surroundings humidity | 0~100% Condensing |
| Conduit connention | 2 knockout for 3/4" conduit at bottom and side |
| Display | LCD, 2×20 Z. |
| Interface | RS485, optional WiFi and cellular |
| Communication Protocol | Sunspec |
| Warranty Terms | 10 Years STD (Extendable to 20 Years) |

# 9. Specifications

| Model | Solis-1P6K2-4G-US |
|---|---|
| Max. DC input power (Watts) | 7200 |
| Max voltage (Volts) | 600 |
| Startup voltage (Volts) | 120 |
| Full power MPPT voltage range (Volts) | 273-520 |
| Operating MPPT voltage range (Volts) | 90-520 |
| Max usable input current per MPPT (Amps) | 11+11 |
| Max short circuit input current (Amps) | 17.2+17.2 |
| Number of MPPT | 2 |
| Inputs per MPPT | 2 |
| Nominal output power 240V grid (Watts) | 6000 |
| Nominal output power 208V grid (Watts) | 5200 |
| Nominal grid voltage (Volts) | 240/208 |
| Operating voltage range (Volts) | 183-228(for 208V rated)/211-264(for 240V rated) |
| Max. overcurrent protection device 240/208V (Amps) | 40/40 |
| Max.output current for 208V grid (Amps) | 25.0 |
| Max.output current for 240V grid (Amps) | 25.0 |
| Max backfeed current (Amps) | 0 |
| DC Overvoltage Category (OVC) | II |
| AC Overvoltage Category (OVC) | III |
| Max output fault current (Amps) and duration (ms) | 40/200 |
| Output power factor range | 0.8leading~0.8lagging |
| Grid current THD | <3% |
| Nominal grid frequency (Hertz) | 60 |
| Operating frequency range (Hertz) | 59.5-60.5 |
| Peak efficiency | 98.1% |
| CEC weighted efficiency | 97.0% |
| MPPT efficiency | >99.5% |
| Integrated AFCI (DC arc-fault circuit protection) | Yes |
| Residual current monitoring | Yes |
| Rapid shutdown | Optional |
| Dimensions (inch / cm) | 13.9*31.9*6.5in (352*810*164mm) |
| Weight (lbs / kg) | 33.1lb (15kg) |
| Topology | Transformerless |
| Ambient operating temperature range | -25℃~60℃/-13℉-140℉ |
| Enclosure type | NEMA 4X |
| Noise emission (typical) | <30 dBA |



# 9. Specifications

| Model | Solis-1P6K2-4G-US |
|---|---|
| Cooling concept | Natural convection |
| Max. operating altitude without derating | 13120ft (4000m) |
| Designed lifetime | >20 years |
| Module Level RSD-NEC 2014/2017-690.12 | Yes (Built-in Transmitter) |
| Revenue Grade Meter-ANSI C12.20 | Optional |
| Compliance | UL 1741, UL 1741SA, UL 1998, ISO-NE UL 1699B, IEEE 1547, FCC Part 15 (Class A & B), CAN/CSA C22.2 107.1-1, Rule 21 Phase I II&III |
| Operating surroundings humidity | 0~100% Condensing |
| Conduit connention | 2 knockout for 3/4" conduit at bottom and side |
| Display | LCD, 2×20 Z. |
| Interface | RS485, optional WiFi and cellular |
| Communication Protocol | Sunspec |
| Warranty Terms | 10 Years STD (Extendable to 20 Years) |