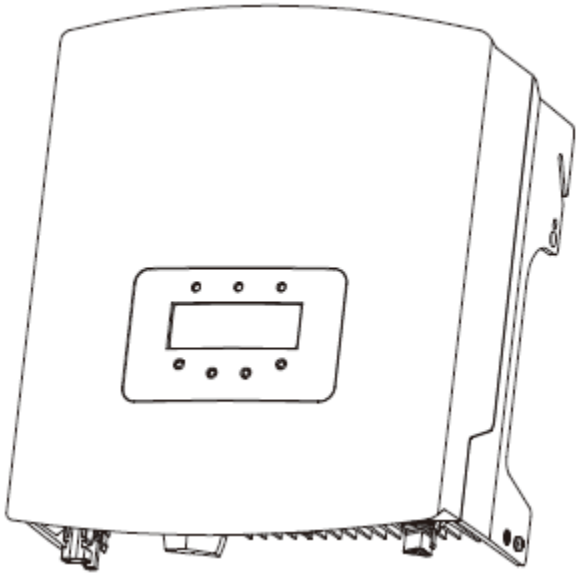
Solar PV User Manual



Solis 4G Mini Single Phase Inverter

Table of Contents

1 Introduction

1.1 Equipment Supplier

Clean Energy Ireland Ltd
Rathard, Aherla, Co. Cork
Telephone: 021 428 9407
www.cleanenergyireland.ie
Info@cleanenergyireland.ie

1.2 Equipment Installer & Commissioner

As Above.

1.3 About this Document.

No liability is accepted for incorrect use, unauthorized changes to the assembly components, or the resulting consequences. All information and instructions in this manual refer to the current state of development.

Figures and illustrations used.

Due to the possibility of setting and printing errors, and to the need for continuous technical change, please understand that we cannot accept liability for the correctness of the data.

The current version of the General Terms of Business applies. All photographs used are for illustrative purposes only. These assembly instructions contain proprietary information. All rights and changes to these assembly instructions are reserved.

2 Overview

2.1 Front Panel Display

2.2 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 can detect DC power
	OFF	No DC power or low DC power
OPERATION	ON	The inverter is operating properly.
	OFF	The inverter has stopped to supply power.
	FLASHING	The inverter is initializing.
ALARM	ON	Alarm or fault condition is detected.
	OFF	The inverter is operating without fault or alarm.

▲ Table 3.1 Status Indicator Lights

2.3 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).

2.4 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.

3 Start and Stop

3.1 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.

3.1.1 Inverter Working Status

When inverter working normally,there would be 5 status :

Generating:Inverter is working normally
LimByTemp: Inverter power limited by over ambient temperature.
LimByFreq: Inverter power limited by over grid frequency
LimByVg: Inverter power limited by over grid voltage
LimByVar: Inverter power limited by generating reactive power.

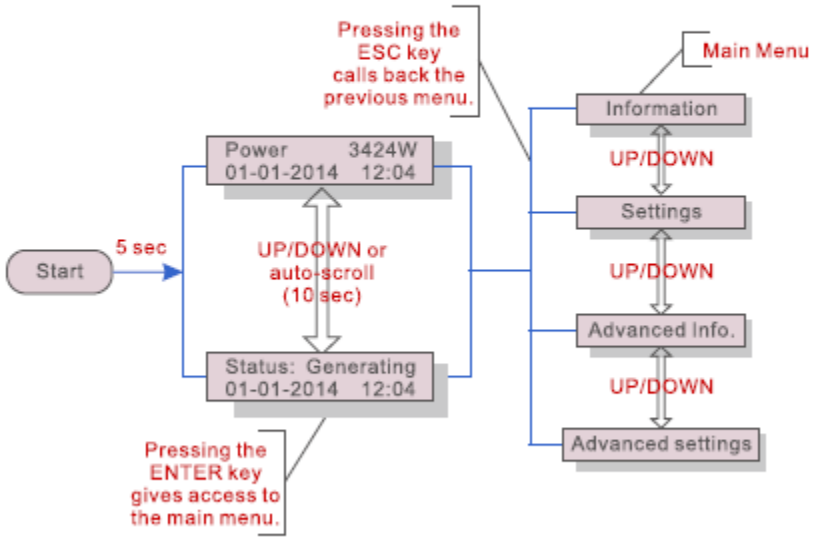
3.2 Stop the Inverter

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.

4 Operation

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

4.1 Main Menu

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

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

4.2 Information

The Solis Single Phase 4G 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 I_DC1 5.1A	10 sec	V_DC1: Shows input 01 voltage value. I_DC1: Shows input 01 current value.
V_Grid 230.4V I_Grid 8.1A	10 sec	V_Grid: Shows the grid's voltage value I_Grid: Shows the grid's current value.
Status: Generating Power: 1488W	10 sec	Status: Shows instant status of the Inverter. Power: Shows instant output power value.
Grid Frequency F_Grid 50.06Hz	10 sec	F_Grid: Shows the grid's frequency value.
Total Energy 0258458 kwh	10 sec	Total generated energy value
This Month: 0123kwh Last Month: 0123kwh	10 sec	This Month: Total energy generated this month. Last Month: Total energy generated last month.
Today: 15.1kwh Yesterday: 13.5kwh	10 sec	Today: Total energy generated today. Yesterday: Total energy generated yesterday.
Inverter SN 00000000000000	10 sec	Display series number of the inverter.
Export_P: +0000W Export_I: 00.0A	10 sec	Power of ERM. Current of EPM.
Work Mode: NULL DRM Number: 08	10 sec	Work Mode: The work mode of inverter. DRM Number: Show the number 01-08.
Meter EnergyP 0000000. 00kWh	10 sec	Meter EnergyP: The active power.

▲ Table 6.1 Information list

4.2.1 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.

(a) (b)

▲ Figure 6.2 Locks and Unlocks the Screen of LCD

4.3 Settings

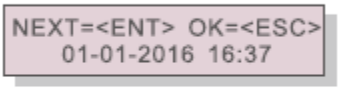
The following submenus are displayed when the Settings menu is selected:

1.Set Time

2.Set Address

4.3.1 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 data. Press the ENTER key to move from one digit to the next (from left to right). Press the ESC key to save the settings and return to the previous menu.

4.3.2 Set Address

This function is used to set the address when muti inverters are connected to single monitor. The address number can be assigned from "01"to "99"(see Figure 6.4). The default address number of 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.

4.4 Advanced Info – Technicians Only

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

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

▲ Figure 6.5 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.Alarm Message 2. Running Message 3.Version 4. Daily Energy 5. Monthly Energy 6. Yearly Energy 7. Daily Record 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.

4.4.1 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

4.4.2 Running Message

This function is for maintaince person to get running message such as internal temperature, Standard NO. etc.

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

4.4.3 Version

The screen shows the model version and the software version of the Inverter (see Figure 6.7).

▲ Figure 6.7 Model Version and Software Version

4.4.4 Daily Energy

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

▲ Figure 6.8 Select date for daily energy

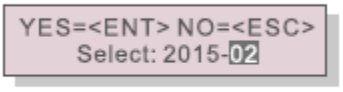
Press DOWN key to move the cursor to day, month and year, press UP key to change the digit. Press Enter after the date is fixed.

▲ Figure 6.9 Daily energy

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

4.4.5 Monthly Energy and Yearly Energy

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



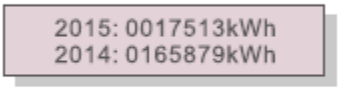
▲ Figure 6.10 Select month for monthly energy

▲ 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

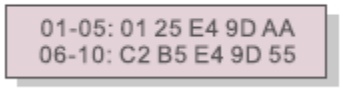
Press UP/DOWN key to move one date from another.

4.4.6 Daily Record

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

4.4.7 Communication Data

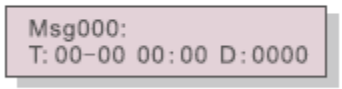
The screen shows the internal data of the Inverter (see Figure 6.14), which is for service technicians only.



▲ Figure 6.14 Communication Data

4.4.8 Warning Message

The display shows the 100 latest warn 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

4.5 Advanced Settings – Technicians Only

NOTE:
To access to this area is for fully qualified and accredited technicians only.

5 Maintenance

Solis Mini Single Phase 4G Inverter does not require any regular maintenance. However, cleaning the dust on heat-sink will help the inverter to dissipate the heat and increase its life time. 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.

6 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:

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

Alarm Message	Failure description	Solution
ILeak-PRO 01/02/03/04	Leakage current protection	1.Check AC and DC connection 2.Check inverter inside cable connection.
RelayChk-FAIL	Relay check fail	1.Restart inverter or contact installer.
DCinj-FAULT	High DC injection current	1.Restart inverter or contact installer.

▲ Table 8.1 Fault message and description

NOTE:

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

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