

SG250K3

Grid-Connected Inverter



Operation Manual
SG250K3-3A-E-Ver21-200903
Version: 2.1

Release History

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About This Manual

Aim

The aim of this Operation Manual is to give detail explanations and instructions for operation, maintenance and troubleshooting of the SG250K3 Grid Connected Inverter.

Target Readers

The Manual is provided to people who need to operate the SG250K3 grid connected inverter.

Symbols Explanation

The following symbols are used in this manual.



Warning: risk of electric shock.



Caution: risk of danger



Note: Note indicates a feature that is important either for optimal and efficient system operation



PROTECTIVE CONDUCTOR TERMINAL



Caution: risk of electric shock, Energy storage timed discharge.

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1

Safety Instructions

Chapter 1 provides some important safety instructions about SG250K3.

1. Safety Instructions



Warning: Shock Hazard

The enclosure of SG250K3 inverter may contain high voltage conductors. The enclosure doors should be kept locked during operation, except for maintenance or testing.

To avoid the risk of electric shock, do not perform any action or operation which is not included in the operating instructions unless you are qualified to do so



Warning: Shock Hazard

Death resulting from burning and electric shock upon touching the SG250K3 live components.

- Do not touch the live components of the SG250K3.
- Observe all safety regulations.



Warning: Shock Hazard

The SG250K3 Inverter will immediately shutdown if users want to open the front door during operation.

Please check the unit is thoroughly shut down and isolated from the public grid and PV arrays before open the front door,

To avoid the risk of electric shock, a minimum 10 minutes is needed for any stored potentials that still left in the inverter after shut-down to be discharged before opening the door



Warning: Lethal Voltage

Damage to the SG250K3 may result death by electric shock or fire!

- Only operate SG250K3 when it is safe to do so!
- Only operate SG250K3 when no damage is visibly apparent!



Warning: DC Voltage

The PV array will provide DC voltage to the inverter when exposed to light, which may cause an electrical shock during installation, wiring or maintenance if not covered.



Warning: Limitation of Use

The SG250K3 Grid-Connect Photovoltaic Inverter is not intended for use in connection with life support systems or other medical equipment or devices.



Caution: ESD Precautions

The SG250K3 may be damaged irreversibly by electrostatic discharge (ESD) at its components.

- During the operation of SG250K3, please observe all the ESD related safety regulations!
- Discharge any ESD by touching the grounded SG250K3 conductor before contacting any electronic components!



Caution: Tools Precautions

Thoroughly inspect the equipment prior to energizing. Verify that no tools or equipment have inadvertently been left behind.



Caution: Service Safety

Never work alone when servicing this equipment. Two persons are required until the equipment is properly de-energized, locked out and verified de-energized with a meter.



Note: Keep This Manual

Please keep this operation manual and other related document in the handy place of the SG250K3.

These documents must be available to operators and maintenance personnel at all times.

1.1. Service Safety

Never work alone when servicing this equipment. Two persons are required until the inverter is properly shut down, and verified de-energized with a meter.

1.2. Open the Door of SG250K3

Use the following procedure to shut down the SG250K3 Inverter before servicing:

1. Stop the inverter from the touch screen control menu.
2. Switch off the DC breaker (turn the switch to the "off" position) and press in the 2 handles (near the DC breaker) to make it pop out from the lock hole at both side doors, turn it right. Open the left door.
3. Switch off the AC breaker (turn the switch to the "off" position) and press in the handle (near the AC breaker) to make it pop out from the lock hole and open the right door.



Warning: Shock Hazard

The terminals of the SG250K3 PV input may have energy when the PV arrays are energized.

After shut down, wait a minimum 5 minutes should be left for all capacitors of SG250K3 to discharge and left with no potential



10 minutes

2

Introduction

Chapter 2 provides basic information about SG250K3.

2. Introduction

Chapter 2 provides basic information about SG250K3.

2.1. PV Generation System



Figure 2-1 PV generation system with SG250K3

As depicted in Figure 2-1, SG250K3 converts the DC power from the PV array to AC power and then feeds the power into the utility grid (3-phase-400V).

2.2. Basic Structure

SG250K3 is an advanced and reliable three-phase grid connected inverter for solar power generation with a rating of 250kW. The SG250K3 inverter utilizes the advanced power conversion technology with the latest IPM (Intelligent Power Module), to convert the DC power from the photovoltaic array to stable three-phase AC power and then feed the power to the utility grid through Figure 2-2 .

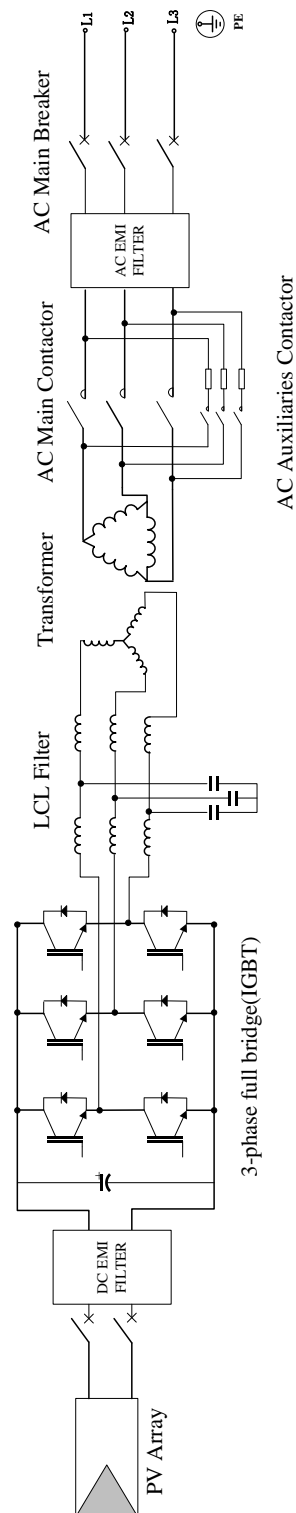


Figure 2-2 Simple circuit diagram of SG250K3

2.3. Status and Control Elements

Figure 2-3 shows the locations of basic control and information display elements that help users perform control and monitoring tasks.

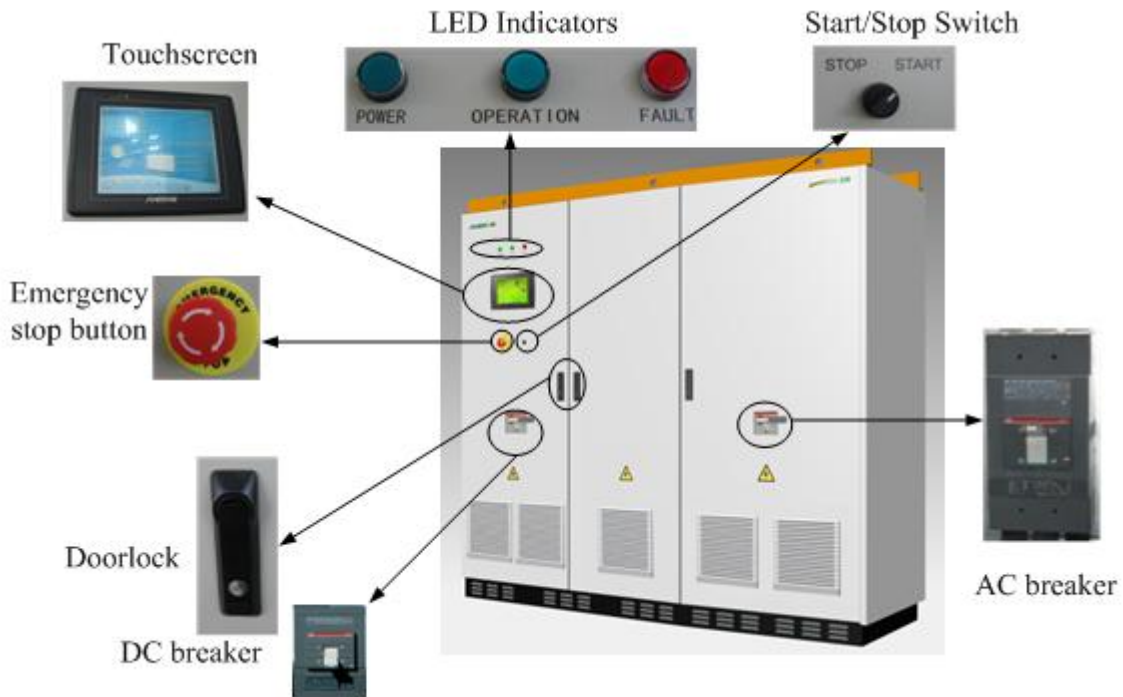


Figure 2-3 External appearance of SG250K3

Table 2-1 Data and control components

Component Name	Comments
LED Indicators	Power, Operation and Fault
touch screen control panel	Display data and perform control functions
DC breaker	DC side circuit breaker switch
AC breaker	AC side circuit breaker switch
Emergency stop button	Shut down the inverter when pressed down
Doorlock	Close or open the case of SG250K3
Start/Stop Switch	The inverter will only start when this switch is in the start position

2.3.1. The LED Indicators

There are 3 large LED indicators in the SG250K3 enclosure, as can be seen in Figure 2-3; there detail explanations are listed in Table 2-2:

Table 2-2 Large LED definitions

Indicator	Color	Definitions
Power	Green	The power supply of control circuits is OK
Operation	Green	The inverter is running in grid-connected mode
Fault	Red	A fault is occurred and not solved

2.3.2. Functions of the Touch Screen

The touch screen panel includes three main parts: the LED indicators, the touch screen display and the keys.

With this data interface component, users can easily access the running information of the unit and perform some control functions:

- Control inverter operation
- Display real-time running data
- Display fault data
- Adjusting SG250K3 parameters
- Access recorded history data

2.3.3. Emergency Stop Button

The Emergency stop button will shutdown the inverter (switch off the AC contactors and stop the IPM from working) immediately when it is punched (pressed down). The inverter must be startup manually through touch screen and keys after the button is punched.

2.3.4. Start/Stop Switch

The inverter can only be started when the **start/stop switch** is pointed to the “**start**” position.

When you turn the switch to the “**stop**” position, it will give the inverter a stop command like the same command of the emergency stop button.

The inverter can not start when the switch is pointed to the “**stop**” position.

2.3.5. DC Breaker

The DC breaker controls the DC main circuit breaker, which is the primary disconnect device for the inverter.

When the DC breaker is in the OFF position, all DC power is disconnected (not live), except the following areas:

- The input side of the AC circuit breaker (connect the utility grid)
- The DC input terminals (if the PV array is connected and energized)

To operate the inverter the DC circuit breaker switch must be in the ON position.

2.3.6. AC Breaker

The AC breaker controls the AC circuit breaker, which is also one of the primary disconnects for the inverter. When the AC breaker is in the OFF position, all AC power is disconnected (not live), except the following areas:

- The AC input terminals (connect the utility grid)
- The DC input side (if the PV array is connected and energized)

To operate the inverter the AC circuit breaker switch must be in the ON position.

3 Commissioning

Chapter 3 describes the verification and commissioning of SG250K3.

3. Commissioning

Chapter 3 describes the procedures needed to verify whether your installation of the SG250K3 is correct and how to start the inverter for the first time.

3.1. Visual Inspection

To perform a visual inspection of the SG250K3:

1. Verify the grid circuit breaker is open.
2. Verify the DC circuit breaker is open.
3. Inspect the polarity of PV input connections are correct.
4. Check all the mechanical connections and make sure there is no damage, scratch or abnormal parts
5. Check all the electrical connections and secure the wiring terminals. Make sure the DC and AC side circuit breakers are switched-off.
6. Check all the wiring of AC and DC sides are connected to the correct terminals with correct rating wires.
7. Make sure all the bolts that fix the wires are tightened and secured.

3.1.1. AC Connection Check

It must be verified that the inverter is connected to the correct grid type and that a right-hand rotary field exists on L1, L2, and L3. The value of the AC line to line voltage should be about 400 V.

3.1.2. DC Connection Check

The DC connections are from the DC combiner boxes to the inverter. The voltage on the individual DC wires should be almost the same value and must never exceed the allowable maximum DC voltage. Besides the voltage values, the polarity of the DC inputs must also be verified. All DC connections should be checked to ensure that they are mechanically tight.

3.1.3. Ground Connection Check

Make sure the ground wire goes through the hole of the ground fault detection device and connected to the ground copper bar securely.

3.1.4. Serial Communication Check (Optional)

For external communication monitoring, the data wires must be connected. Make sure that the RS485 A and B wires are connected correctly and tightened to the RS485/232 converter.

Make sure the RS485/232 converter DB9 terminal is correctly connected to the PC DB9 serial port.

3.2. Start the Inverter



Caution:

Before starting the device for the first time , all work performed on the device should be thoroughly checked.



Caution: Check the voltages in both AC and DC sides meet the requirements of SG250K3.

If all tests and measurements have been performed, and all measured values lie within the acceptable range, then the device can be switched on for the first time.

To start the SG250K3:

1. Verify 400 VAC voltage of the transformer primary side line to line voltage.
2. Close the door of the enclosure.
3. Turn the "Start/Stop Switch" to the "start" position.
3. Turn the AC breaker to the "ON" position.
4. Turn the DC breaker to the "ON" position.
5. It will take about 10 seconds for the auto-initialization of the power conversion circuit and the touch screen panel. The "POWER" LED indicator will burn; the "com" LED indicator will flash every 2 or 3 seconds.
6. If the DC voltage is below the DC voltage start point ($V_{pv} < 450V$), then the "state" of the touch screen interface will always show "Start-up";
7. the DC voltage exceeds the DC voltage start point ($V_{pv} > 450V$) for 1 minute, the SG250K3 will automatically change to "Run" state, the "OPERATION" LED will light, with the state of the touch screen menu will change to "Run".

3.3. How to Restart after Using the Emergency Stop Button

Users must manually restart the inverter according to the following procedure when the operation of the SG250K3 is stopped by punching the emergency stop button:

1. Turn the emergency stop button clockwise to release the inverter from the stop state.
2. Turn the "Start/Stop Switch" to the "Start" position
3. Perform the **stop command** in the touch screen menu. (Check section 6.7)
4. Perform the **start command** in the touch screen menu. (Check section 6.6)
5. Then the inverter will restart.

4 Operation

Chapter 4 provides instructions about how to operate the SG250K3.

4. Operation

SG250K3 is a fully automated grid-connected solar inverter with friendly user interface. The details of operation are as follows.

4.1. Operation Modes

The modes displayed in the touch screen interface include: **“Stop”**, **“Run”**, **“Stand-by”** and **“Fault”**. Their explanations are given below to understand the operation of SG250K3.

Start-up

The “start-up” state will **only appear once** in period between the inverter start and run in the **commissioning** (1st use) of the inverter, it will never show again after commissioning.

Stand-by

After commissioning, the SG250K3 will keep monitoring the system 24 hours during day, when the input current and power is very low, the SG250K3 keeps in **“Stand-by”** state.

If the input voltage exceeds 450V and holds the value for **1 minute**, the SG250K3 is ready for operation; it begins feeding power to the grid and the state changes from **“Stand-by”** to **“Run”**.

Run

After being energized, the SG250K3 tracks the PV arrays’ maximum power point (MPP) and convert the DC power to AC power.

Stop during operation

The SG250K3 will stop running if:

- The **V_{pv}** is less than **400V** for **3 minutes**.
- A failure occurs
- Manually stop the inverter through touch screen menu or punched the **“Emergency Stop Button”** or turn the **“start/stop”** switch to **“stop”** position.

Fault

If a fault occurs during operation, the SG250K3 will automatically stop the operation and disconnect the SG250K3 from the grid (switching off the AC contactor), and the touch screen will display the fault type with the **“Fault”** LED burns.

Once the fault is removed for **5 minutes**, the SG250K3 will automatically resume running.

Stop

The difference between the **“stop”** and the **“stand-by”** modes is:

The inverter can recover operation **by itself** when it is in **“stand-by”** mode.

The inverter must be **manually restart** once enter into **“stop”** mode.

The general stop state includes 2 sub-stop states:

1. The **“key stop”** means the inverter is manually stopped through touch screen stop menu
2. The **“Emer-stop”** means the inverter is manually stopped by punching the **emergency stop button** or turn the **start/stop** switch to the **stop** position.

4.2. Modes Transition

When energized, the SG250K3 switches among different modes as pictured below.

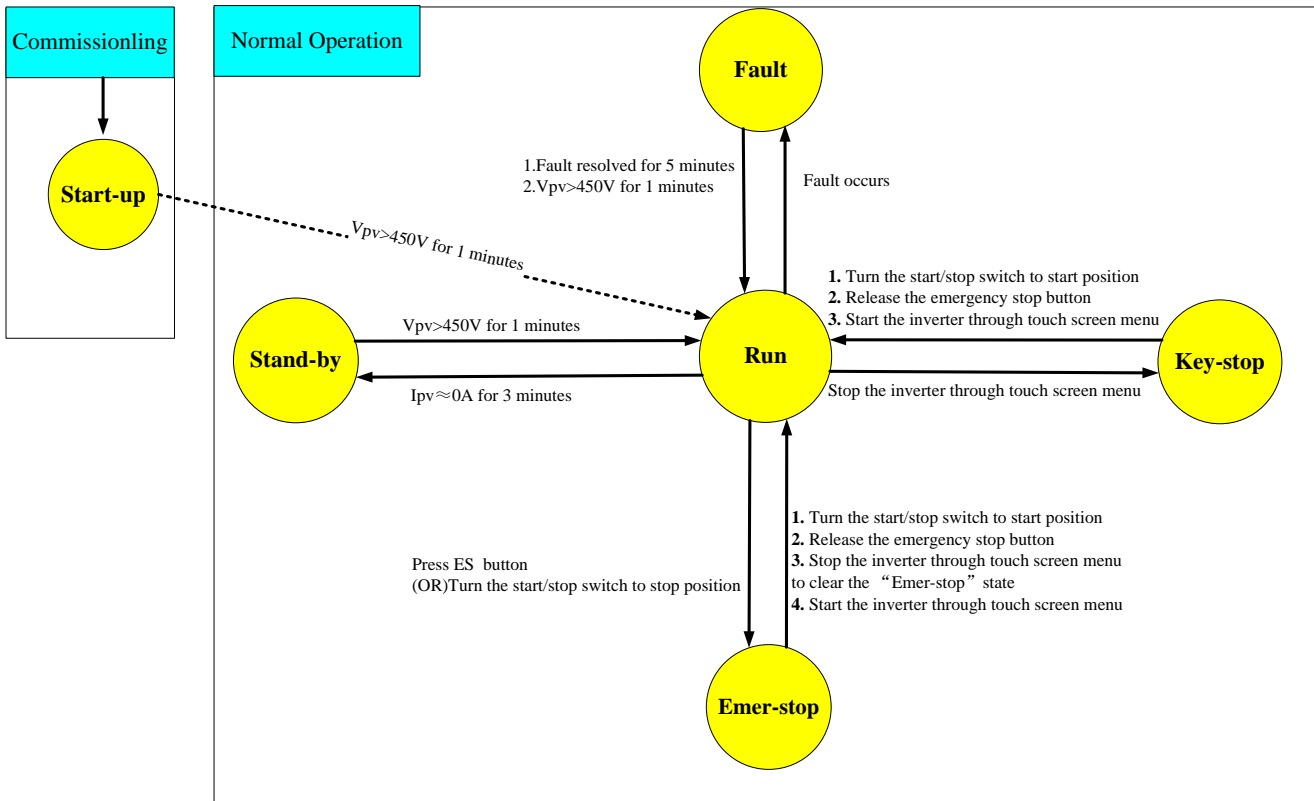


Figure 4-1 Transition of operation states

The states displayed in the touch screen menu are explained in Table 4-1.

Table 4-1 State explanations of SG250K3

State	Simple Explanation
Key-stop	The inverter is stopped by touch screen stop command
Emer-stop	1. The inverter is stopped by pressing down the emergency button 2. The inverter is stopped by turning the start/stop switch to the "stop" position
Stand-by	The inverter is ready to switch to Run mode
Start-up	The inverter is ready to switch to Run mode (only appear once during commissioning)
Run	The inverter is performing correct PV generation operation
Fault	A fault is happened ^{*1,2}

*1.the fault type will be displayed like "Vdc-high" or "Vac-low" etc.

* 2.The "Com-flt" will also be displayed in the state position in the touch screen, but in fact it is not a state, it means there is a fault between touch screen and DSP, which also means that users can not check or set parameters through touch screen control menu during this fault. **But this fault will not stop the inverter**, which is **different** from Fault condition.

5 Data Interface

Chapter 5 describes the LED indicators and touch screen data interface of SG250K3.

5. Data Interface

Users can get the running data and set parameters of SG250K3 from the LED indicators and touch screen control panel, see Figure 5-1.



Figure 5-1 SG250K3 data interface

5.1. LED Indicators

3 big LED indicators are located in the front door of SG250K3. These LED indicators help the users to quickly learn about the states of the SG250K3 inverter. Check Table 5-1 for their definitions.

Table 5-1 Meaning of LED indicators

LED Name	Meaning
POWER	The indication of control board's power supply
OPERATION	Inverter is in grid mode and working normally
FAULT	There is a fault in the power system

5.2. Touch Screen Control Panel

The touch screen control panel is mounted on the SG250K3 enclosure at eye level. Users can just touch the according function button symbols to conduct all the control or data monitoring tasks.

6 buttons right next to the touch screen are used to check or set parameters in the touch screen control menu, see Figure 5-2.



Figure 5-2 Touch screen panel

5.2.1. The Background Illumination




The background illumination of the touch screen is activated by touching the surface of the touch screen on the panel and will automatically be deactivated 2 minutes later to save power.

6 Touch screen Menu

Chapter 6 gives the detail information and explanations about the SG250K3 touch screen control menu.

6. Touch screen Control Menu

Chapter 6 gives the detail information and explanations about the SG250K3 touch screen control menu.

SG250K3 has a big size touch screen, which is more convenient for customers to operate directly, it has 3 main press buttons to operate on the main menu, **【Control】** , **【Home】**  and **【Function】** . The function of the main menu and its submenu is described in the table below.

Main menu	1 st Submenu	2 nd Submenu	3 rd Submenu
【Control】	Start/Stop	Start	
		Stop	
【Home】			
【Function】	Run-information	Real Time Data	
		Power Curve	
		E-Histogram	
	History-information	His-event	
		His-fault	
		His-data	
	Set-parameter	Sys-parameter	Language, Time, E-total adjust, Load default
		Run-parameter	
		Pro-parameter	
		Com-parameter	
	Start/Stop	Start	
		Stop	

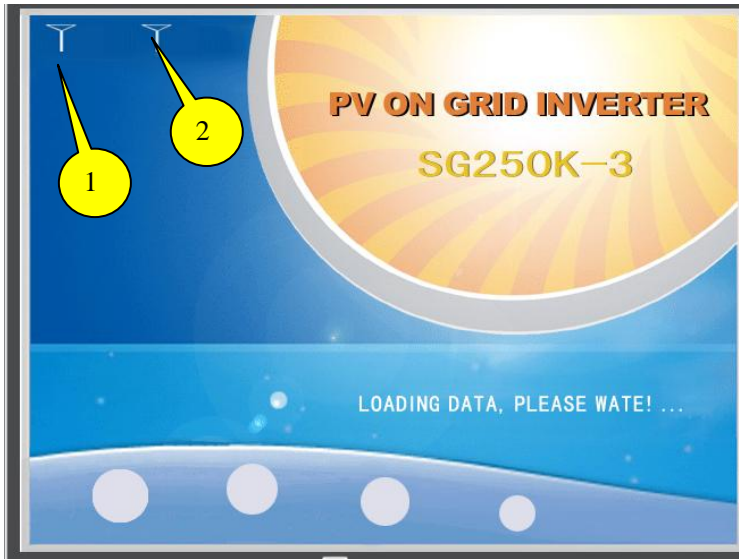
Table 1-1

NOTICE:

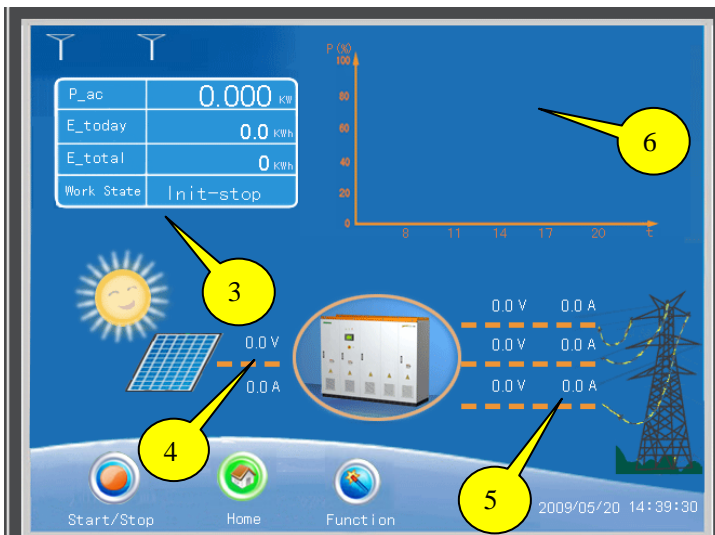


- In any case, click on the button **【Home】** to return to the main menu.

6.1. Default Menu (Main Window)



1. Initialization window, Appeared only when the PV inverter is activated;



2. Default Menu (Main Window);
3. Display the overall information.

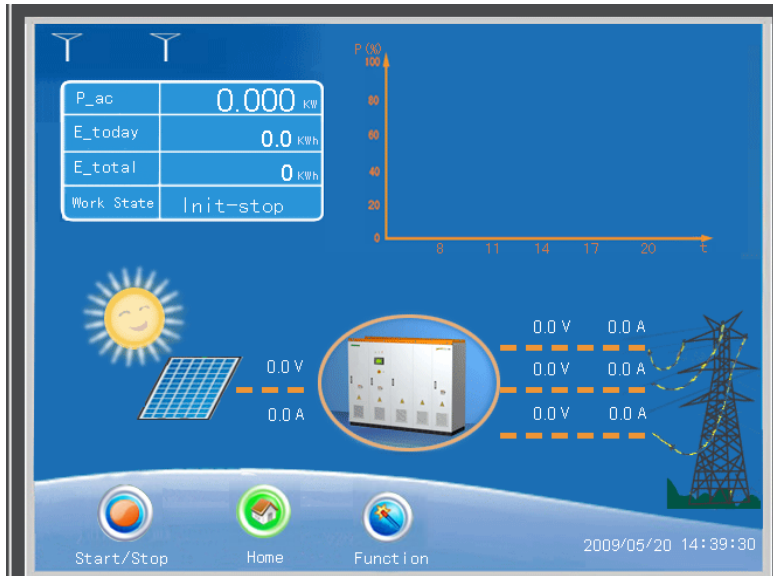
Once the touch screen is initialized for about 2-3 minutes, it will automatically changes to the default menu. In the default menu, the basic real-time running values are displayed, which includes **DC current** and **DC voltage**, the **AC phase current** and **AC line-to-line voltage**, the **operation state**, the output **AC power**, the total generated energy-“**E-total**” and the on-day generated energy-“**E-total**” and the system **time and date**.

NOTICE: Main Window Overall Info

- Note 1: Inverter Signal Indicator;
- Note 2: PC Signal Indicator;
- Note 3: Inverter status & Power generation;
- Note 4: PV array Input DC Voltage & Current;
- Note 5: 3-Phase Line Voltage & Current;
- Note 6: Statistical Chart of Power generation per hour everyday.



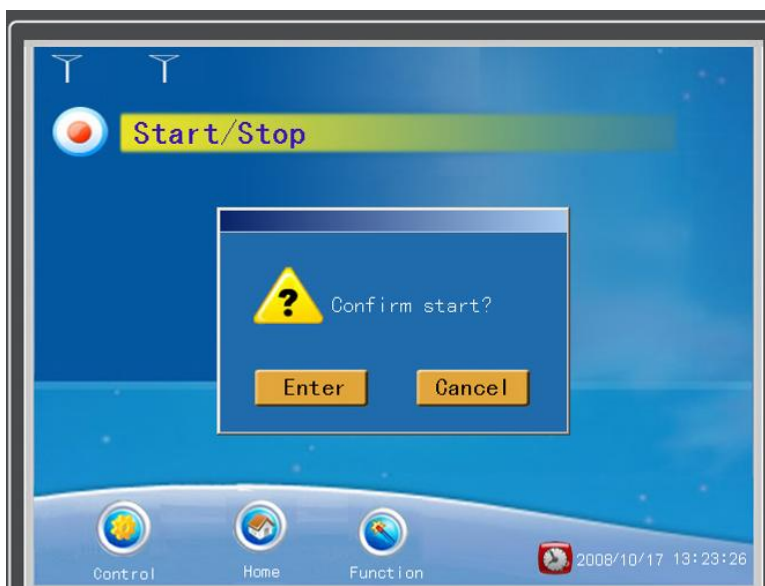
6.2. Start the Inverter



1. In the Default Menu, click on the button **【Control】**, get the popup window as below;



2. Click on the button **“Start”** to get the window as below;



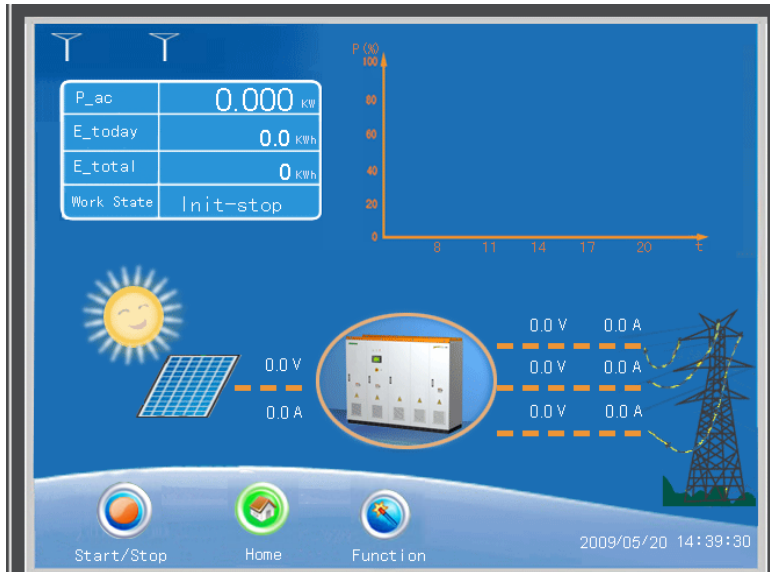
3. To run the PV Inverter by pressing **“Enter”** or press **“Cancel”** to original status;

NOTICE: Start



- You can also Start/Stop the Inverter by clicking on the button **【Function】** to select **“Start/Stop”** sub menu.

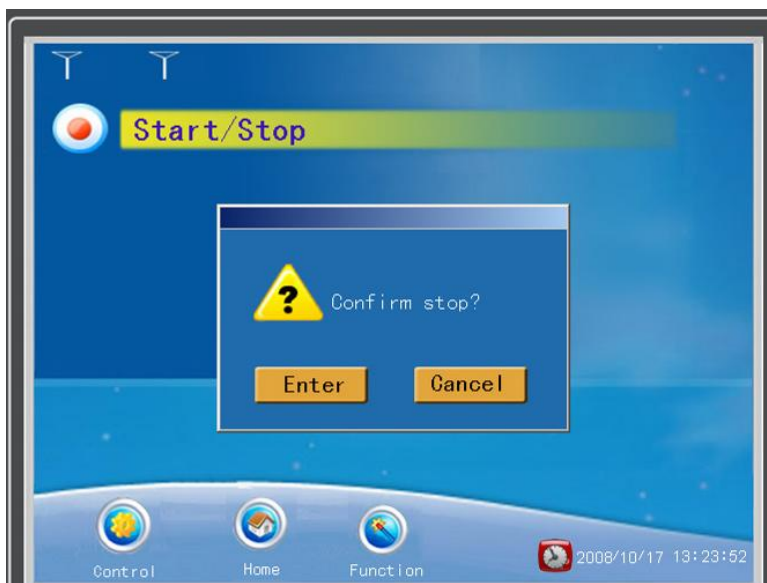
6.3. Stop the Inverter



1. In the Default menu, click on the Button **【Control】**, get the popup window as left;



2. Click on the button **“Stop”** to get the window as left;



3. Click on the button **“Stop”** To get the window as left;
4. Press **“Enter”** to confirm or press **“Cancel”** to original status;

NOTICE: Start Window



➤ You can also Start/Stop the Inverter by clicking on the button

【Function】 to select **“Start/Stop”** sub menu.



Note: Manual stop and Emergency stop

To the inverter, the emergency stop button has the same effect as the manual stop function.

They both disconnect the AC contactor and need manual Start in the touch screen menu.

6.4. Check Running Data



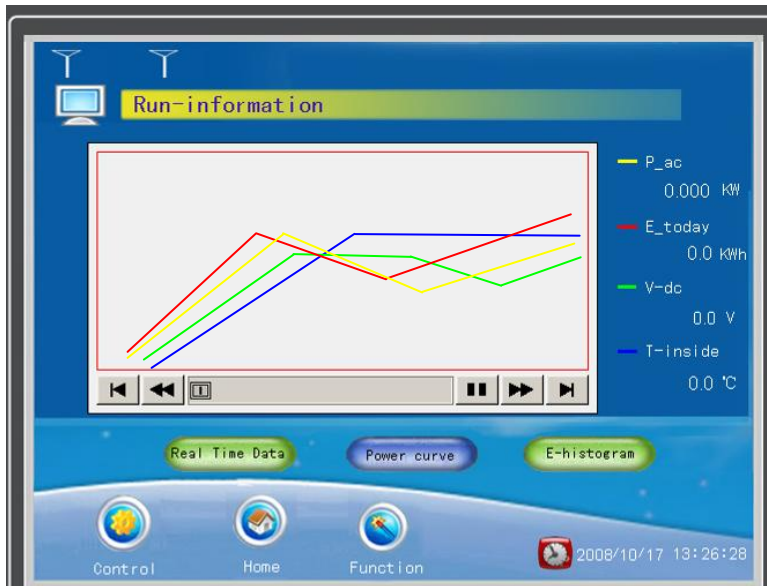
1. Click on the **【Home】** button to return to the Main Window;
2. Click on the button **【Function】**, get the menu as below;



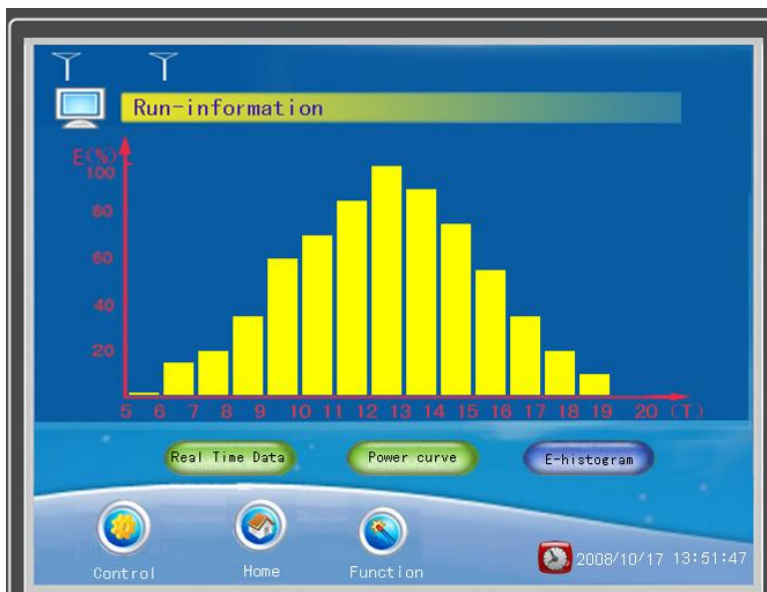
3. Click on the button "Run-information", to get the running information details with "Real Time Data", "Power Curve", and "E-Histogram".



4. Real Time Data;



5. Click on the button **“Power Curve”** to get the information as left; The **“P-today power curve”** diagram shows the power generated from 6.am to 18.pm in a single day, the data are updated every 3.75 seconds and the total diagram data will be cleared at the beginning of a new day. The P axis is marked by the percentage of the rated power 250KW.



6. The **“E-today histogram”** diagram shows the energy generated from 6.am to 18.pm in a single day, the data is updated every second and the length of the block is 1 hour. The total diagram data will be cleared at the beginning of a new day. The E axis is marked by the percentage of the 250KWH.



NOTICE:Running-information Data Explanation

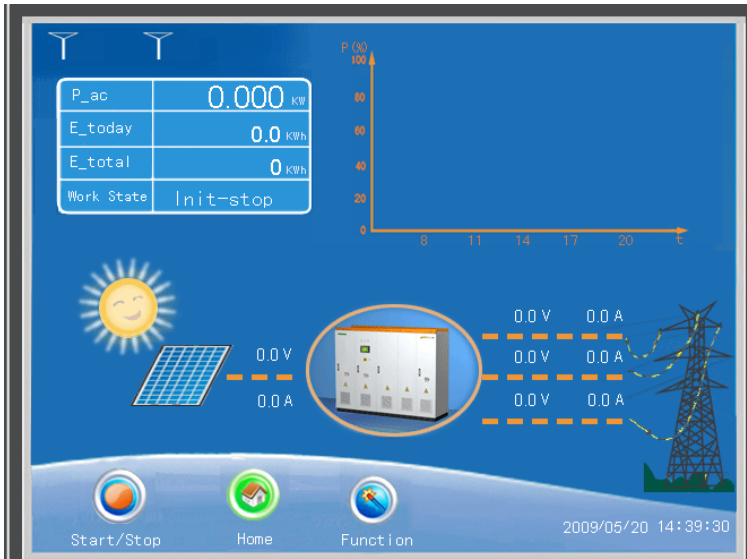
Table 1 The explanation of the data name on **“Real Time Data”**

Data name	explanation	Unit
V-grid	Grid voltage	V
I-grid	Output AC current	A
F-grid	Grid frequency	Hz
V-dc	DC Voltage (of PV array)	V
I-dc	DC Current (of PV array)	A
P-ac	Output ac power	W
E-today	Energy generated today	KWH
E-month	Energy generated this month	KWH
E-total	The total generated Energy	KWH

Table 2 The explanation of the data name on “Power Curve”

Data name	explanation	Unit
Temp	Temperature within the enclosure	°C
h-today	The Operation time of today	Min
h-total	Total hours of Operation time	H
CO2- Reduced	Reduced CO2 weight	Kg

6.5. Check History Data



1. Click on the **【Home】** button to return to the Main Window;
2. Click on the button **【Function】**, get the menu as below;



3. Click on the button "History-information", to get the long term information, details see below;



4. "History Events", "History faults", and "History data";

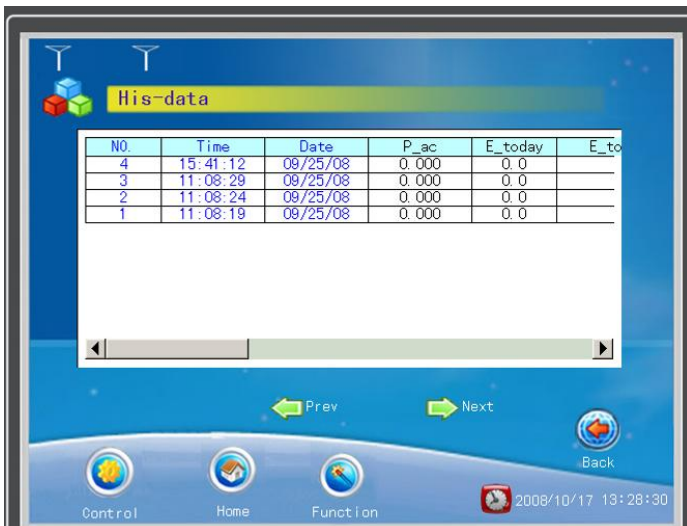
5. History Events;



6. History faults;



7. History data.



The “**His-Fault**” can log the latest 100 fault records, which includes the fault name and occurred time.

Table 6-1 Explanations of faults

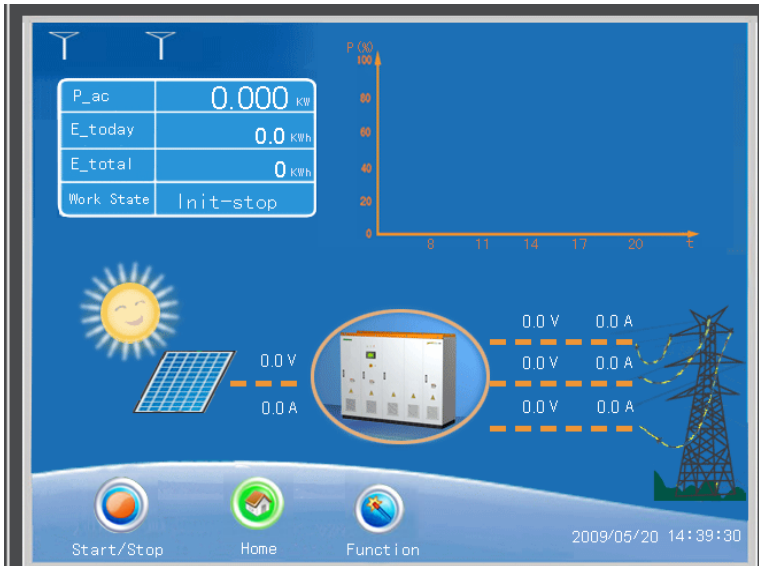
Fault type	Explanations
Vdc-high	DC voltage is too high
Vac-high	Grid voltage is too high
Vac-low	Grid voltage is too low
F-fault	Grid frequency is abnormal
Island	Island(grid in unavailable)
Dsp-flt	The control DSP malfunctions
Ipm-flt	The IPM power module malfunctions
Cntr-flt	AC side contactor malfunctions
Ttp-high	Temperature of the main transformer is too high
Temp-flt	Temperature inside the enclosure is too high
Gnd-flt	A ground fault is occurred

The “**His-Event**” can log the latest 100 events records, which includes the start, stop standby state and occurred time.

The “**His-Information**” can log the latest 100 day electrical data; the data will be recorded for every 15 minutes in a day.

6.6. Entering the Password

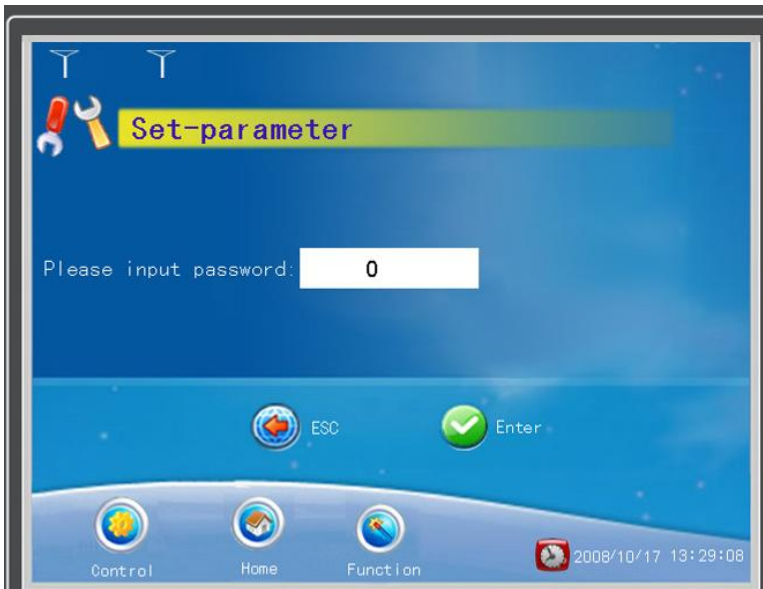
When you try to “load the default parameter setup” or “change the system parameter”, you must enter the right password. Here is an example described as follows:



1. Click on the **【Home】** button to return to the Main Window;
2. Click on the button **【Function】**, get the menu as below;



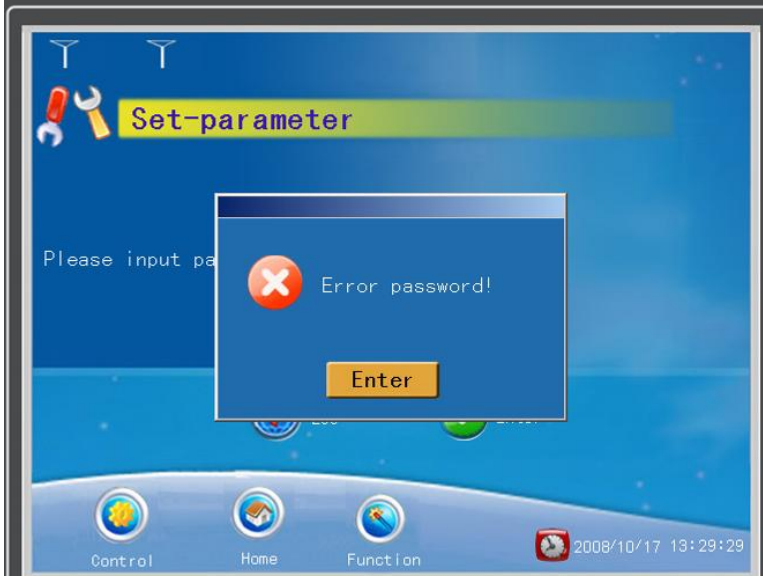
3. Click on the button “Set-parameter”, get the window as below;



- Click on the blank space to get the popup window as below;

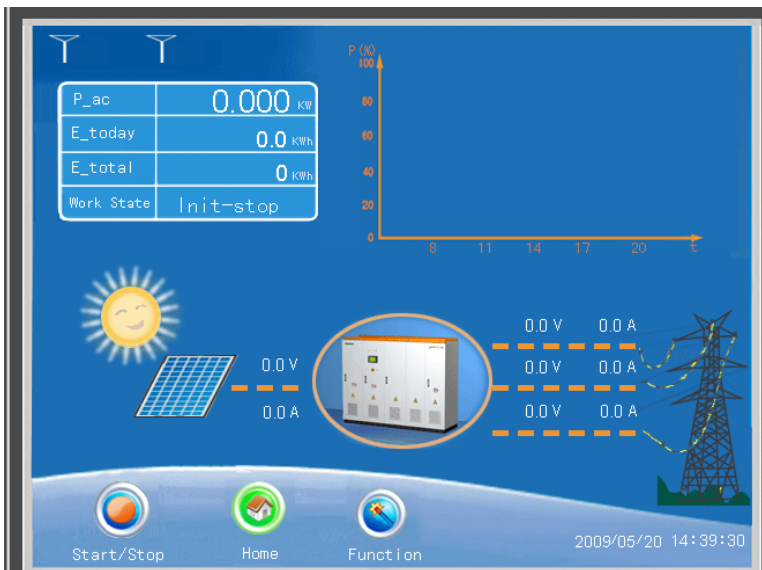


- Input the password, and then press "ENT" to confirm, if wrong number is inputted, the window will popup as next window;



- Click the button "Enter" to turn back.

6.7. Change Display Language



7. Click on the **【Home】** button to return to the Main Window;
8. Click on the button **【Function】**, get the menu as below;



9. Click on the button "Set-parameter", get the window as below after entering the right passord;



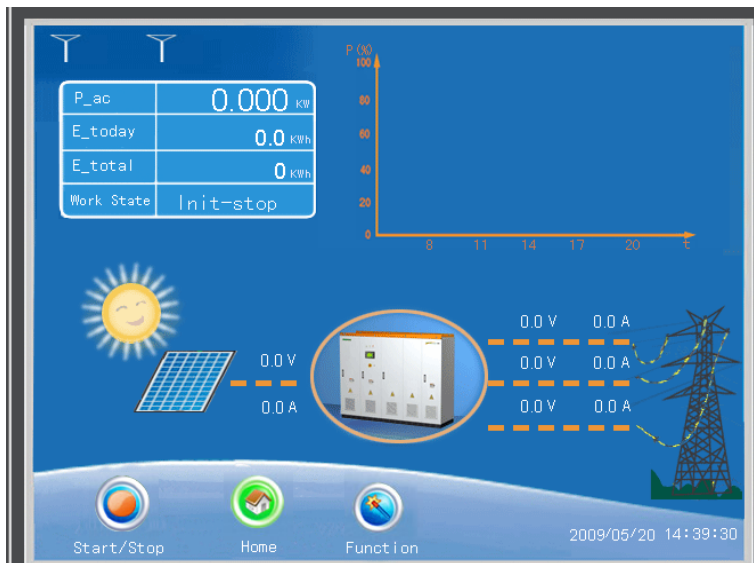
10. Click on the button "Sys-parameter" to get the window as below;



11. Click on the button "Language" to get the language setup window;

12. You can choose "English", "Chinese" or "Spanish" by entering the number "0", "1" or "2" relatively.

6.8. Change System Time



1. Click on the **【Home】** button to return to the Main Window;
2. Click on the button **【Function】**, get the menu as below;



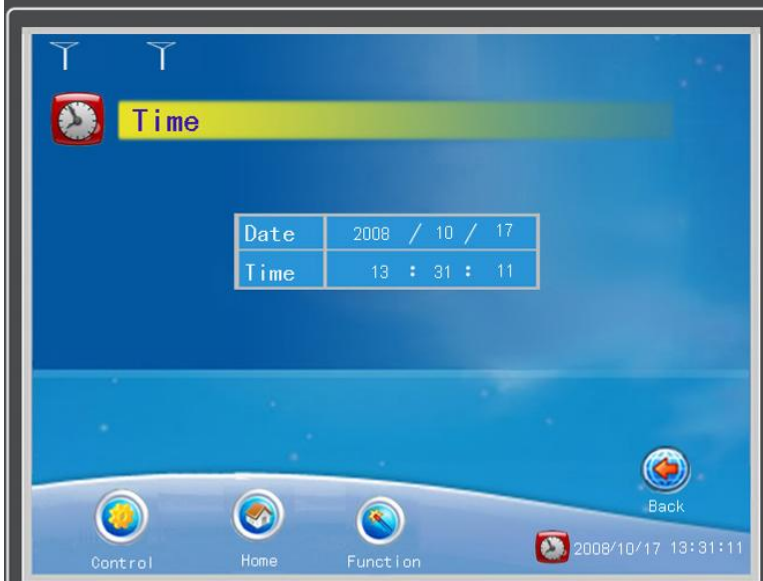
3. Click on the button **“Set-parameter”**, get the window as below after entering the right password;



4. Click on the button **“Sys-parameter”** to get the window as below;



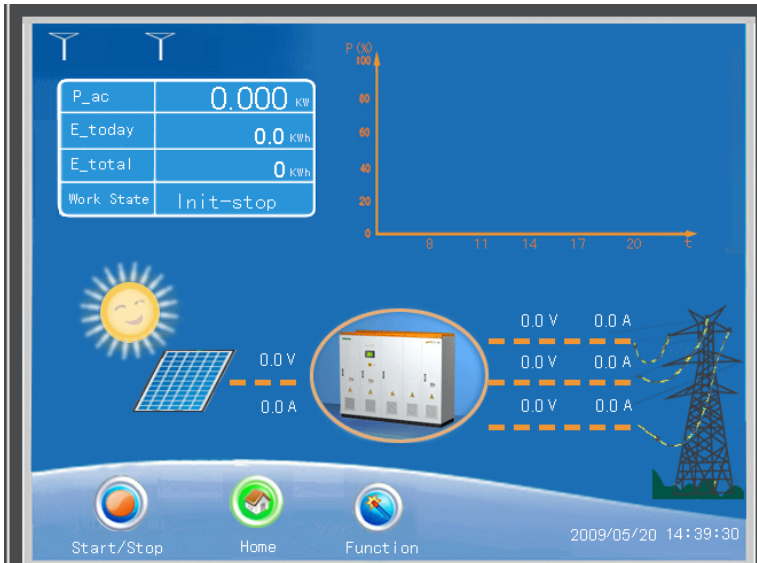
5. Click on the button "Time" to get the time setup window;



6. You can choose "English", "Chinese" or "Spanish" by entering the number "0", "1" or "2" relatively.

6.9. Parameters Adjustment

6.9.1. Generated Energy Adjustment



1. Click on the **【Home】** button to return to the Main Window;
2. Click on the button **【Function】**, get the menu as below;



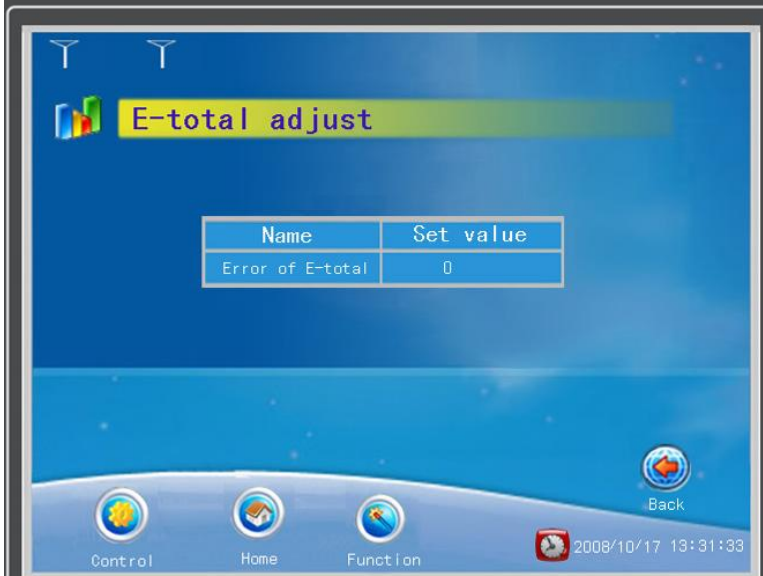
3. Click on the button "Set-parameter", get the window as below after entering the right password;



- Click on the button **"Sys-parameter"** to get the window as below;



- Click on the button **"E-total adjust"** to get the window as below;

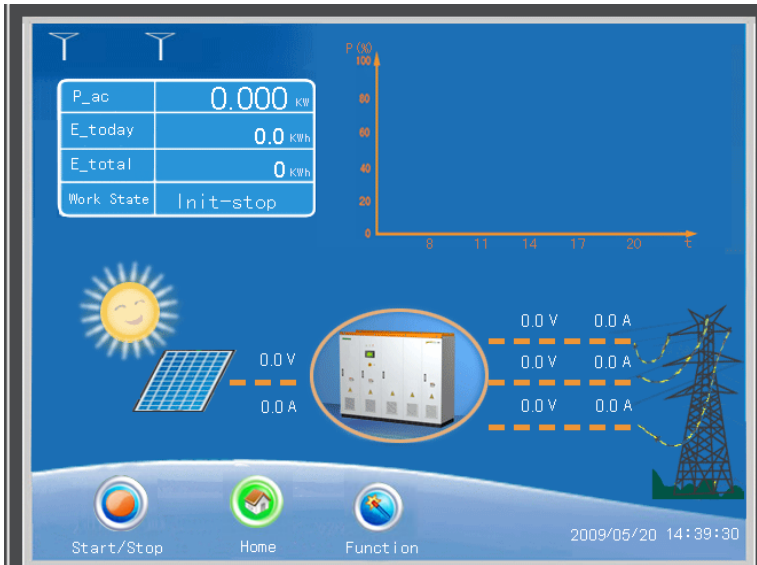


- Input the differential value that the energy readings between LCD and electric meter. This generated power adjustment screen is useful in case the total-power displayed by touch screen (E-total) has difference with reading value from the external power measuring device (like an electrical meter).

The adjustable range is from -999-+999 kWh.

$$(\text{Power-adj value}) = (\text{Real measured value}) - (\text{E-total reading value})$$

6.9.2. Load Default Setup



1. Click on the **【Home】** button to return to the Main Window;
2. Click on the button **【Function】**, get the menu as below;



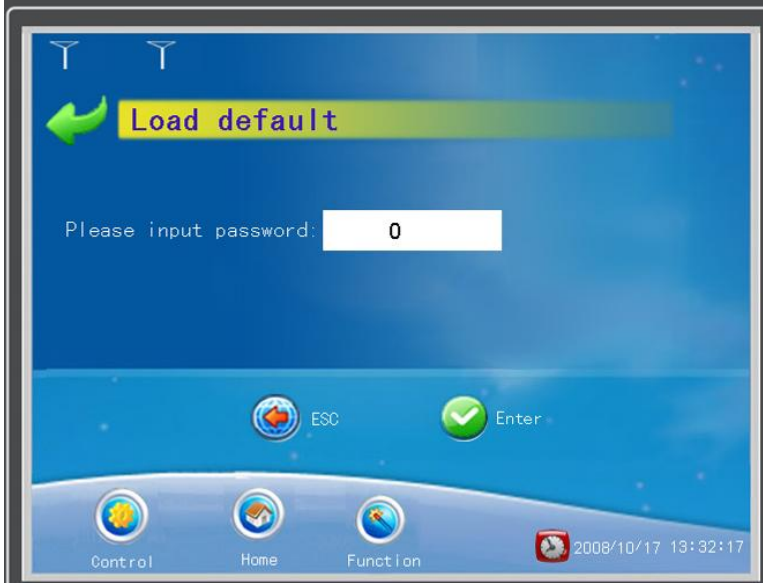
3. Click on the button **“Set-parameter”**, get the window as below after entering the right passord;



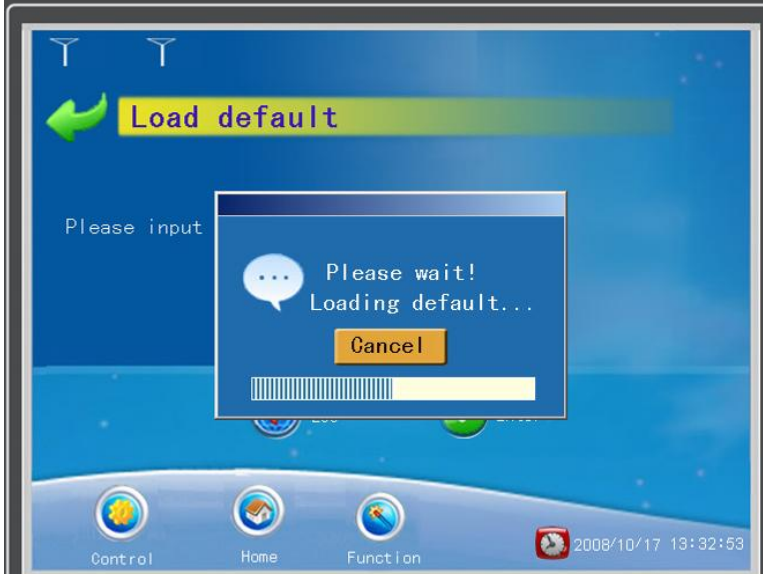
4. Click on the button **“Sys-parameter”** to get the window as below;



5. Click on the button "Load Default" to get the window as below;

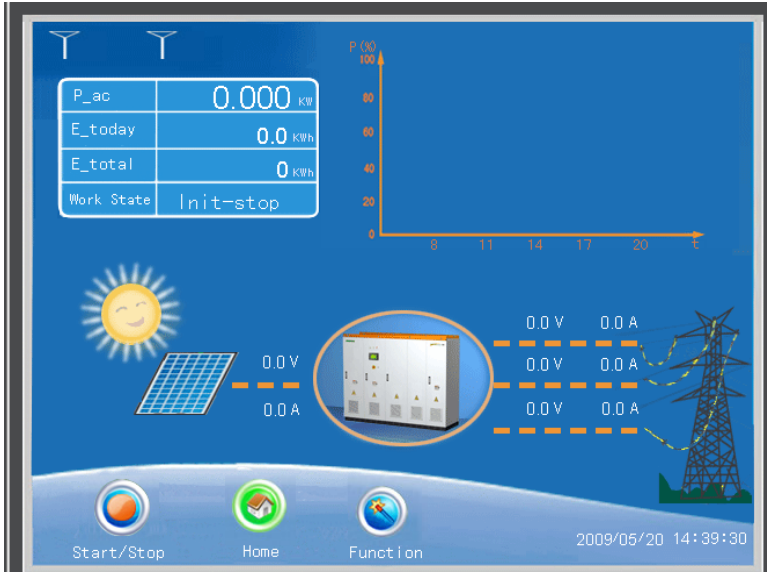


6. Input the right password, all the log history and parameters settings will return to default factory setting.

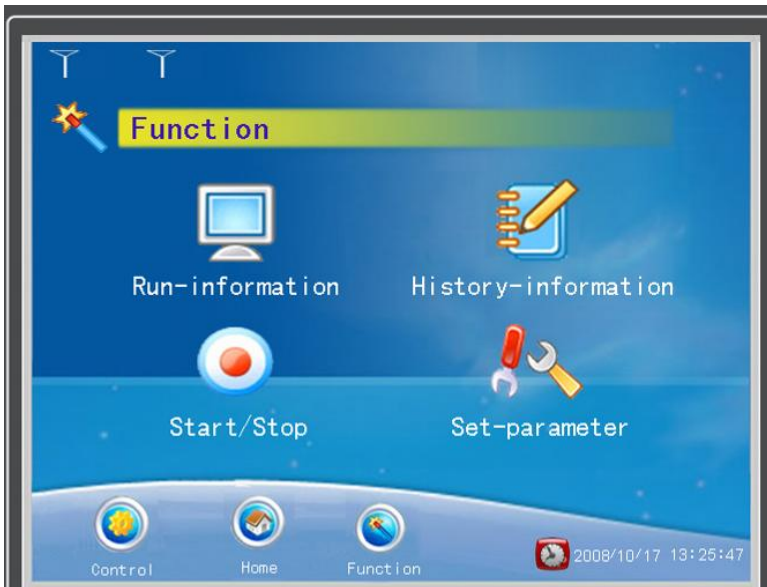


7. The process to load default is as left.

6.9.3. Set Running Parameters



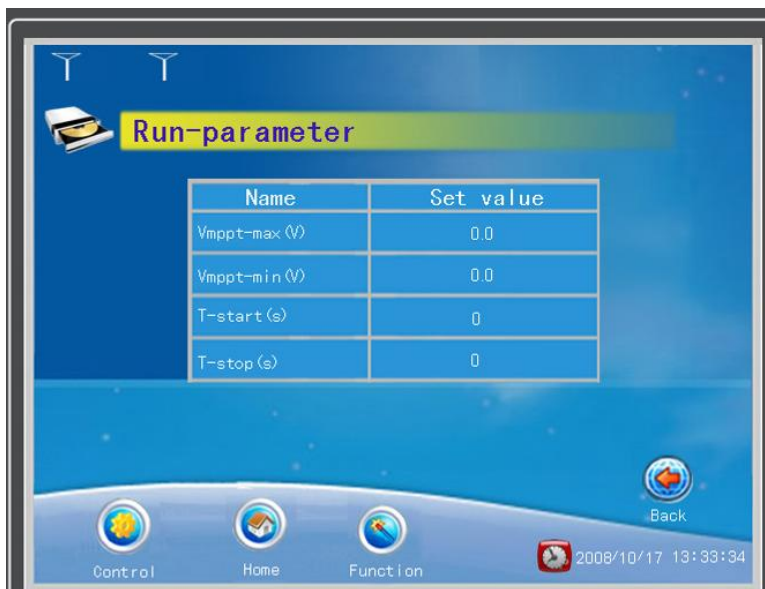
1. Click on the **【Home】** button to return to the Main Window;
2. Click on the button **【Function】**, get the menu as below;



3. Click on the button **“Set-parameter”**, get the window as below after entering the right passord;

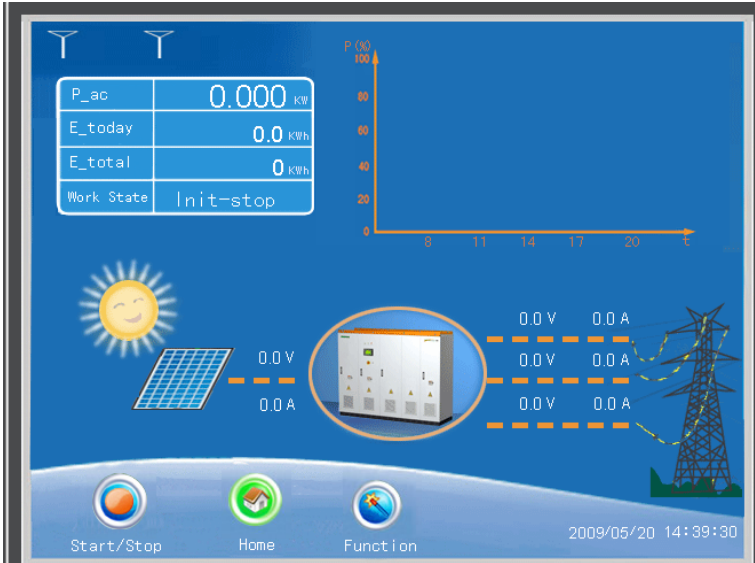


4. Click on the button **“Run-parameter”** to get the window as below;



5. Input the limit data for the running parameter at the "Set value" column.

6.9.4. Protection Parameter Limit



1. Click on the **【Home】** button to return to the Main Window;
2. Click on the button **【Function】**, get the menu as below;



3. Click on the button **“Set-parameter”**, get the window as below after entering the right password;

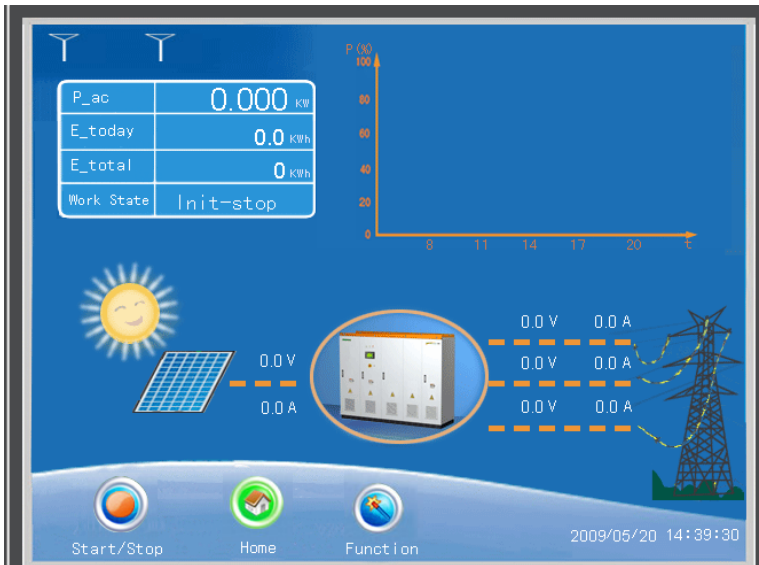


4. Click on the button **“Pro-parameter”** to get the window as below;



5. Input the limit data for the protection parameter at the "Set value" column.

6.9.5. Communication Parameter Setup



1. Click on the **【Home】** button to return to the Main Window;
2. Click on the button **【Function】**, get the menu as below;



3. Click on the button "Set-parameter", get the window as below after entering the right password;



4. Click on the button "Com-parameter" to get the window as below;



- Input the address data & Baud rate for the communication parameter at the "Set value" column.

NOTICE:



- Click on the input data area to get the popup digit keyboard to enter the number you need.

"Com-param" menu contains some basic communication parameters of the inverter when connected to external monitoring device through RS485 serial communication protocol. Please refer to the installation manual for the connection of the serial port communication.

The inverter communication address can be in the first line.

The range of the address is 0-255.

The serial communication baud rate can be adjusted through entering 0, 1 and 2 in the second line.

0 represents 9600 Baud, 1 means 4500 Baud and 2 for 2400 Baud.



Note: The Address is Important

the address parameter is very important when your solar generation application contains many inverters and each inverter should have a unique address for serial communication.

7

Maintenance

Chapter 7 describes the maintenance instructions needed to keep SG250K3 at its optimum performance.

7. Maintenance

The SG250K3 must be maintained at regular period.

Maintenance may include:

1. Inspection of electrical wiring connection
2. Functional test of components like breakers
3. Inspection of contact joints
4. Cleaning the interior of SG250K3

A recommended maintenance period required for SG250K3 is indicated in the Table 7-1 below.

Table 7-1 Maintenance period

Maintenance work	period (recommended)
Read out logged data	1 month
Clean the heatsink of power module.	12 months
Inspect the inside of the enclosure for heavy dust deposits, dirt, moisture, and water penetration from outside.	12 months
Inspect all wiring connections for looseness and secure screws if necessary.	12 months
Check adhesive warning labels and replace if necessary.	12 months
Check AC and DC main circuit breakers in a manual way	12 months
Emergency stop function test. Check the function of the emergency stop button and the touch screen stop function.	12 months

8

Troubleshooting

Chapter 8 gives the basic troubleshooting methods to the customer as a reference.

8. Troubleshooting

Chapter 8 gives the basic troubleshooting methods.

8.1. LED Indicated Fault Troubleshooting

Table 8-1 LED states during normal working

LED name	state	explanation
POWER	light	The power supply of the inner circuit is OK
OPERATION	light	The inverter is in correct grid connection working state
FAULT	shut	No fault occurs

Table 8-2 LED fault and simple troubleshooting

LED state	explanation
No LED flashes and touch screen no display	Disconnect the AC and DC voltage and keep disconnected for 5 min. Afterwards, reconnect the DC voltage and then the AC voltage. If the device does still not run it needs to be exchanged or repaired.
POWER shut	Power supply of the inverter is not working, First make sure that the grid is available and grid connection wires are OK. Disconnect the AC and DC voltage and keep disconnected for 5 min. Afterwards, reconnect the DC voltage and then the AC voltage. If the power LED never light after restart, please contact Sungrow.
Operation shut	The inverter is not in the grid connection state. First check all the AC and DC wires are correctly connected. Use multimeter to measure the DC input voltage and make sure the DC input voltage exceeds the start threshold of the inverter operation. Make sure the grid is available and parameters are within the inverter specification. If all the conditions above are checked OK and this light still not light, Please contact Sungrow.
FAULT light	A fault has occurred and is not solved. Please refer to the touch screen fault message for the detailed fault information and accordingly take troubleshooting. This LED will shut when the fault disappears. Please contact Sungrow if this LED keeps light all the time.

8.2. Touch Screen Displayed Fault Troubleshooting

If a fault occurs, the SG250K3 will generate a message and display the message in the "state:" position.

Table 8-3 Displayed Fault description and troubleshooting

Fault name	description	troubleshooting
Vdc-high	Over voltage on DC input (>880V)	Disconnect the DC input of the SG250K3. Otherwise the inverter could be severely damaged! Check the configuration of your system and measure the DC voltage before reconnecting the inverter to the DC source.
Vac-high	The grid voltage has exceeded the permissible range.	Check the grid voltage and grid connections of SG250K3. If the grid voltage lies outside the range because of local conditions, ask the electricity provider if the voltage can be adjusted at the feed-in point or if they agree to changes in the values of the monitored operational limits. If the grid voltage lies within an acceptable range and " Vac-high " or " Vac-low " faults are still being displayed, please contact the Sungrow.
Vac-low		
F-fault	The grid frequency has exceeded the permissible range.	Check the grid frequency and grid connections of SG250K3. If the grid frequency lies outside the acceptable range because of local conditions, ask the electricity provider if the voltage can be adjusted at the feed-in point or if they agree to changes in the values of the monitored operational limits. If the grid frequency lies within an acceptable range and " F-fault " is still being displayed, please contact the Sungrow.
IPM-flt	Internal power conversion IPM fault	The reason is complicated, may be due to EMI or IPM damage or over voltage etc. Measure the temperature of the heatsink, if over 80°C, wait for the inverter to recover. Please restart the inverter, If this fault frequently happens, contact Sungrow.
Island	No grid is detected by the SG250K3	Check whether the breaker in the grid side is switched on, if not, switches on the breaker. Check whether the inverter connection wiring is OK, if not, re-connect the wires. Check whether the grid is available, if

		<p>unavailable; ask the grid provider recover the grid.</p> <p>If all the conditions above are correct, but this message is still displayed, please contact the Sungrow</p>
DSP-flt	The DSP malfunction	<p>Stop the inverter and restart the inverter from touch screen, if this fault happens frequently, Please contact Sungrow.</p>
Ttp-flt	The transformer is over-heat	<p>Check the grid parameters .If all the parameters are OK and this fault happens frequently, Please contact Sungrow.</p>
Temp-flt	The heatsink of the IPM is overheat	<p>Check whether the output power is too large</p> <p>Check the cooling fan works OK</p>
Com-flt	The communication between the touch screen and the DSP	<p>An internal communication fault occurs.</p> <p>Wait for a moment to check whether this fault will disappear,</p> <p>Restart the inverter to see whether this fault happens again.</p> <p>Please contact Sungrow if this fault happens frequently.</p>
Cntr-flt	AC side contactor fault	<p>This fault is un-recoverable.</p> <p>Please contact Sungrow if this fault happens.</p>
Gnd-flt	Ground fault	<p>Check the ground wire.</p> <p>Check the ground fault detection device.</p> <p>Normally the system will recover operation after this fault is removed for 5 minutes.</p>

A

Appendix

9. Appendix A: Technical Data

The following tables list the technical data of the SG250K3. Basic production information and performance of the SG250K3 are available from these tables.

9.1. DC Parameters

Max DC Power	275KW _p
MPPT DC Voltage Range	450V—820V
Optimal MPPT Voltage	526V
Maximum DC Voltage	880 V
Maximum DC Current	600A

9.2. AC Parameters

Nominal AC Output Power	250KW
Grid Voltage	400V(310V~450V)
Operating Grid Frequency	50 Hz(47-51.5Hz)/60Hz(57-61.5Hz)
Nominal AC Current	361A
Power Factor	>0.99 at nominal power
THD of grid Current	< 3 % at nominal power
Over Voltage Category	II

9.3. Efficiency

Peak Efficiency	97.1%
European Efficiency	96.0%

9.4. Mechanical Parameters

Dimensions(W×H×D)	2400 x 2180 x 850mm
Weight	1700kg
Mounting	Placed on the floor

9.5. Environmental Parameters

Environmental category	Indoor, conditioned
Pollution Degree	PD2
Wet Location	No
Ingress Protection	IP20
Ambient Temperature	-20°C ~ 40°C
Relative Humidity (Non condensing)	<95%

9.6. Features

Galvanic Isolation Type	Low frequency transformer
Internal Consumption in stand-by	<50W
Transformer losses at night	0W
Cooling	FAN
Display	LED and LCD
Communication	RS485 ,Ethernet(Optional), GPRS(Optional)
EMC	EN61000-6-2 EN61000-6-4
Safety	EN 50178

10. Appendix B

10.1. Exclusion of Liability

The content of these documents is periodically checked and revised, when necessary, please call us or check our website www.sungrow.cn for the latest information. However discrepancies cannot be excluded. No guarantee is made for the completeness of these documents. Please contact our company or distributors to get the latest version.

Guarantee or liability claims for damages of any kind are excluded if they are caused by one or more of the following:

Improper or inappropriate use of the product

Operating the product in an unintended environment

Operating the product when ignoring relevant safety regulations in the deployment location

Ignoring safety warnings and instructions contained in all documents relevant to the product

Operating the product under incorrect safety or protection conditions

Altering the product or supplied software without authority

The product malfunctions due to operating attached or neighboring devices beyond allowed limit values.

In case of unforeseen calamity or force majeure

10.2. About us

About Sungrow

Sungrow power supply is a china-leading manufacturer of various power electronics products for renewable energy generation systems. Our products include converters, inverters, battery chargers, and other power supplies for distributable generation system in both grid-connected and stand-alone applications. The power rating of Sungrow products covers from several hundred watt to large mega-watt systems.

The pursuit of Sungrow is to help our customers acquire stable and clean power with minimum cost, maximum reliability and enhanced safety.

Trademarks



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Sungrow SG250K3 Grid Connected Inverter Operation Manual

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