

SG100K3

Grid-Connected Inverter



Operation Manual
SG100K3-3A-E-Ver65-200907
Version: 6.5

About This Manual

Aim

The aim of this Operation Manual is to give detail explanations and instructions for operation, maintenance and troubleshooting of the SG100K3 Grid Connected Inverter.

Target Readers

The Manual is provided to people who need to operate the SG100K3 grid connected inverter.

IMPORTANT SAFETY INSTRUCTIONS

SAVE THESE INSTRUCTIONS

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 SG100K3.

1. Safety Instructions



Warning: Shock Hazard

The enclosure of SG100K3 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 SG100K3 live components.

- Do not touch the live components of the SG100K3.
- Observe all safety regulations.



Warning: Shock Hazard

The SG100K3 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 5 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 SG100K3 may result death by electric shock or fire!

- Only operate SG100K3 when it is safe to do so!
- Only operate SG100K3 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 SG100K3 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 SG100K3 may be damaged irreversibly by electrostatic discharge (ESD) at its components.

- During the operation of SG100K3, please observe all the ESD related safety regulations!
- Discharge any ESD by touching the grounded SG100K3 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 SG100K3.

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. Emergency Stop Button

The Emergency stop button will shutdown the inverter (disconnect the AC contactor) immediately when it is punched (pressed down).

The inverter must be started up manually through LCD control menu if users want to recover the operation after the button is punched.

Check "Start the inverter" of chapter 6 for details.

1.3. AC Circuit Breaker

The AC circuit breaker is one of the primary disconnects for the inverter. The inverter's doors cannot be opened until the switch of the AC circuit breaker is in the OFF position. When the AC main switch is in the OFF position, all AC power is disconnected (not live), except the following areas:

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

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

1.4. DC Circuit Breaker

The DC circuit breaker is also the primary disconnect for the inverter. The inverter's doors cannot be opened until the switch of the DC circuit is in the OFF position.

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

- The input side of the AC main switch (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.

1.5. Open the Door of SG100K3

Use the following procedure to shut down the SG100K3 Inverter before servicing:

1. Stop the inverter from the LCD control menu.
2. Switch off the AC main switch (turn the switch to the "off" position)
3. Switch off the DC main switch (turn the switch to the "off" position).
4. Press in the handle to make it pop out from the lock hole, turn it right.
5. Now you can open the front door.



Warning: Shock Hazard

The terminals of the SG100K3 PV input may have energy when the PV arrays are energized.

After shut down, wait a minimum **90 minutes** should be left for all capacitors of SG100K3 to discharge and left with no potential



90 minutes

2

Introduction

Chapter 2 provides basic information about SG100K3.

2. Introduction

Chapter 2 provides basic information about SG100K3.

2.1. PV Generation System

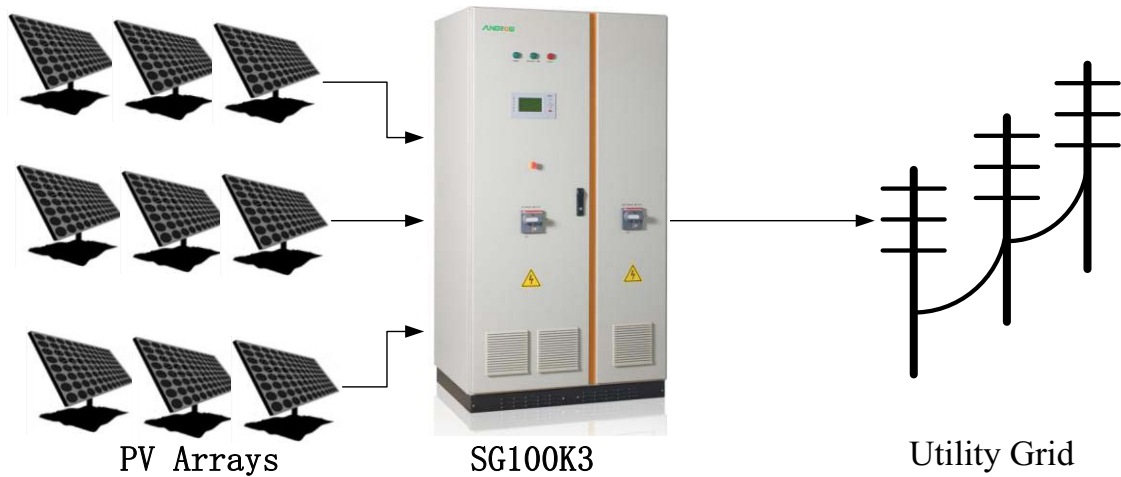


Figure 2-1 PV generation system with SG100K3
As depicted in Figure 2-1, SG100K3 converts the DC power from the PV array to AC power and then feeds the power into the utility grid (3-phase-400V).

2.2. Basic Structure

SG100K3 is an advanced and reliable three-phase grid connected inverter for solar power generation with a rating of 100kW.

The SG100K3 inverter utilizes the advanced power conversion technology with the latest IGBT, 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 filter and isolation transformer, see Figure 2-2 .

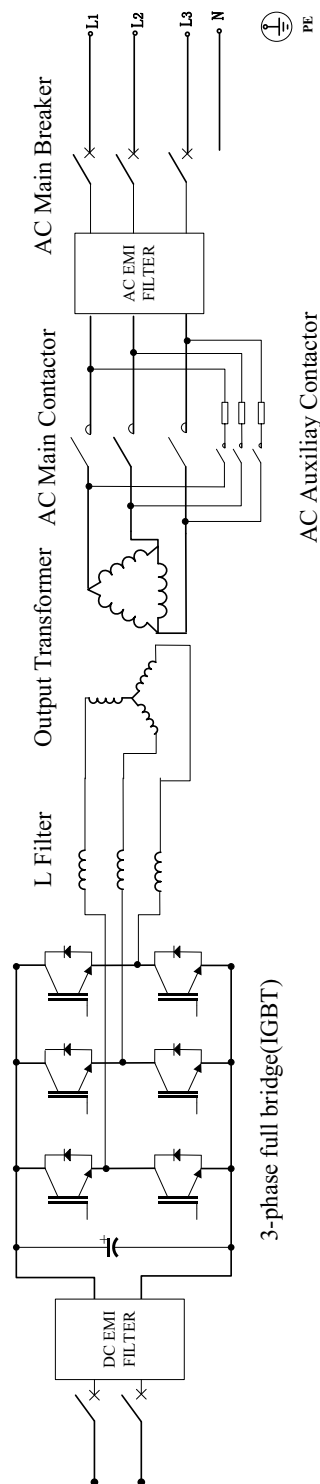


Figure 2-2 Simple circuit diagram of SG100K3

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.

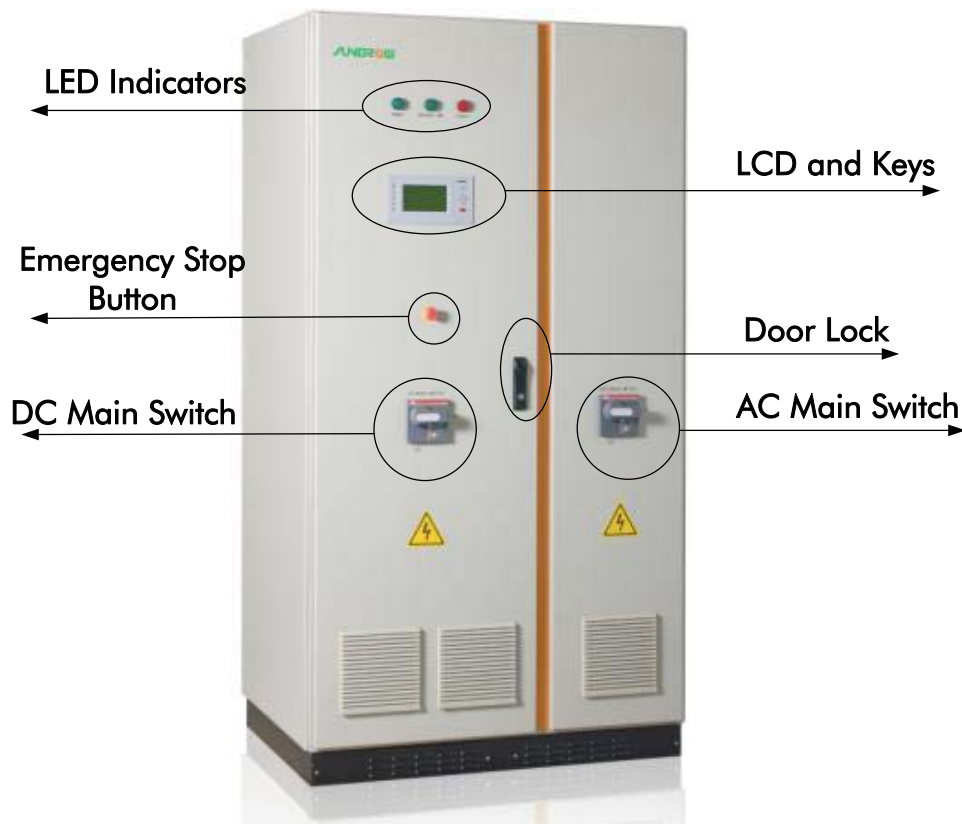


Figure 2-3 External appearance of SG100K3

Table 2-1 Data and control components

Component Name	Comments
LED Indicators	Power, Operation and Fault
LCD control panel	Display data and perform control functions
DC main switch	DC side circuit breaker switch
AC main switch	AC side circuit breaker switch
Emergency stop button	Shut down the inverter when pressed down

2.3.1. The LED Indicators

There are 3 large LED indicators in the SG100K3 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 LCD Control Menu

The LCD panel includes three main parts: the LED indicators, the LCD 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 SG100K3 parameters
- Access recorded history data

For details about the LCD panel, please refer to chapter 5.

2.3.3. Emergency Stop Button

The Emergency stop button will shutdown the inverter (switch off the AC contactors and stop the IGBT from working) immediately when it is punched (pressed down).

The inverter must be startup manually through LCD and keys after the button is pressed.



Caution:

Improper use of the emergency stop button causes damage to the SG100K3! Only use the emergency stop switch in an emergency.

2.3.4. DC Main Switch

The DC main switch controls the DC main circuit breaker, which is the primary disconnect device for the inverter. The inverter's doors cannot be opened until the switch of the DC circuit is in the OFF position.

When the DC main switch 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.

2.3.5. AC Main Switch

The AC main switch controls the AC circuit breaker, which is also one of the primary disconnects for the inverter. The inverter's doors cannot be opened until the switch of the AC circuit breaker is in the OFF position. When the AC main switch 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.



Caution

Improper switch-on/off sequence of the DC and AC main switches will cause damage to the SG100K3 due to large stress!

For start operation, be sure to first switch on the AC main switch and then the DC main switch.

For stop operation, be sure to first switch off the AC main switch and then the DC main switch.

3 Commissioning

Chapter 3 describes the verification and commissioning of SG100K3.

3. Commissioning

Chapter 3 describes the procedures needed to verify whether your installation of the SG100K3 is correct and how to start the inverter for the first time.

3.1. Visual Inspection

To perform a visual inspection of the SG100K3:

1. Inspect the polarity of PV input connections are correct.
2. Check all the mechanical connections and make sure there is no damage, scratch or abnormal parts
3. Check all the electrical connections and secure the wiring terminals.
4. Check all the wiring of AC and DC sides are connected to the correct terminals with correct rating wires.
5. 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, L3 and Neutral. 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 SG100K3.

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 SG100K3:

1. Verify 400 VAC voltage of the grid line to line voltage.
2. Close the door of the enclosure.
3. Turn the AC main switch to the "ON" position.
4. Turn the DC main switch to the "ON" position.
5. It will take about 10 seconds for the auto-initialization of the power conversion circuit and the LCD panel. The "POWER" LED indicators both in the enclosure and in the LCD panel 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 ($V_{pv} < 470V$), then the "state" of the LCD interface will always show "Start-up";
7. If the DC voltage exceeds the DC voltage start point ($V_{pv} > 470V$) for 5 minute, the SG100K3 will automatically change to "Run" state, the "OPERATION" LED in the enclosure and the "RUN" LCD will both light ,with the state of the LCD menu will change to "Run".

3.3. How to Restart the Inverter after Using the Emergency Stop Button

Users must manually restart the inverter according to the following procedure when the operation of the SG100K3 is stopped by punching the emergency stop button:

1. Turn the emergency stop button clockwise to release the inverter from the stop state.
2. Perform the **stop command** in the LCD menu. (Check section 6.7)
3. Perform the **start command** in the LCD menu. (Check section 6.6)
4. Then the inverter will restart.

4 Operation

Chapter 4 provides instructions about how to operate the SG100K3.

4. Operation

SG100K3 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 LCD interface include: “**Start-up**”, “**Stand-by**”, “**Run**”, “**Fault**” and “**Stop**”. Their explanations are given below.

Once the AC and DC connections are OK, all the parameters meet requirements, the AC and DC main switches are closed, The SG100K3 will auto start.

Start-up

If the input voltage exceeds 470V and holds the value for **5 minute**, the SG100K3 is ready for operation; it begins feeding power to the grid and the state changes from “**Start-up**” to “**Run**”.

Stand-by

Standby-mode is entered for insufficient input power ($I_{pv} \approx 0A$ for 1 minutes), at stand-by mode the inverter will disconnect the AC contactor and wait until the DC voltage recovers to 470V for 3 minutes.

Run

After being energized, the SG100K3 tracks the PV arrays’ maximum power point (MPP) and convert the DC power to AC power.

Fault

If a fault occurs during operation, the SG100K3 will automatically stop operation, disconnect the AC contactor and the display the fault type in the LCD panel with the “**Fault**” LED burns.

Once the fault is removed for **5 minutes**, the SG100K3 will automatically resume running.

Stop

The SG100K3 will stop operation by manually stopping the inverter through LCD menu or pressing down the “**Emergency Stop Button**”, this condition needs manual restart through LCD menu.

During the “**Stop**” mode, the SG100K3 will block the driving signals that control the switching IGBT and disconnect the SG100K3 from the grid by switching off the AC contactor.

4.2. Modes Transition

When energized, the SG100K3 switches states from different modes as pictured below. When deactivated, the SG100K3 return to the operating mode "Stop".

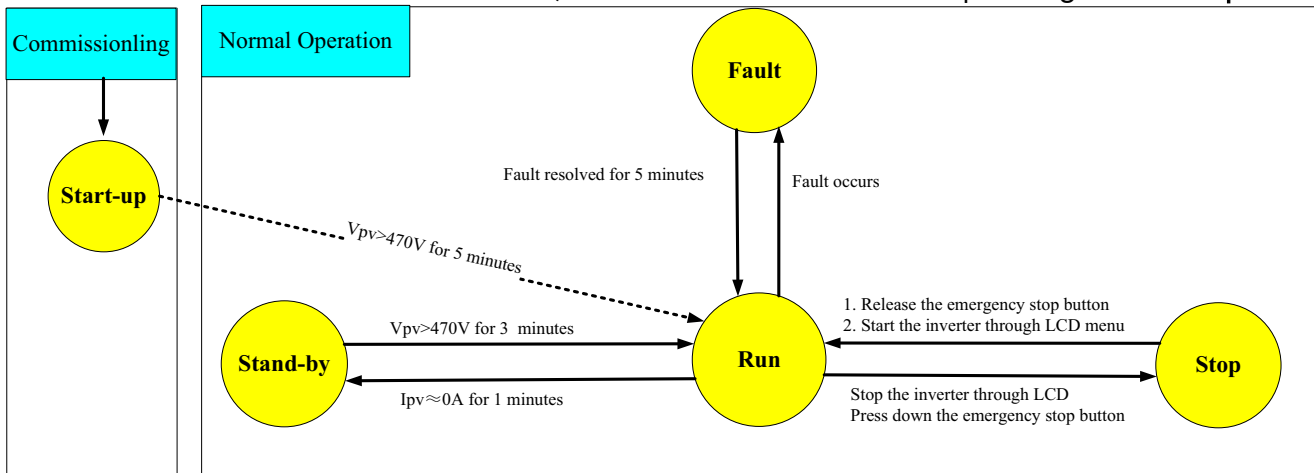


Figure 4-1 Transition of operation states

*"start-up" state will **only appear once** in the **commissioning** (1st time use) of the inverter, it will never show again after commissioning.

*V_{pv} is the DC input voltage; P_{pv} is the DC input power

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

Table 4-1 State explanations of SG100K3

Possible displayed State	Explanation
RUN	The inverter is in operation and output power to the grid
STOP	The operation is stopped by stop command
Start-up	The inverter is under activation
Stand-by	The operation is ceased by insufficient PV power
*Fault type	A fault is occurred and not solved
Com-flt	*Fault of communication between LCD and DSP

*the characters "Fault type" itself will not be displayed during a fault condition, but the real fault type will be displayed like "**Vdc-high**" or "**Vac-low**" etc.

* The "**Com-flt**" shows that there is a fault between LCD and DSP, which also means that users can not check or set parameters through LCD 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 LCD data interface of SG100K3.

5. Data Interface

Users can get the running data and set parameters of SG100K3 from the LED indicators and LCD control panel, see Figure 5-1.

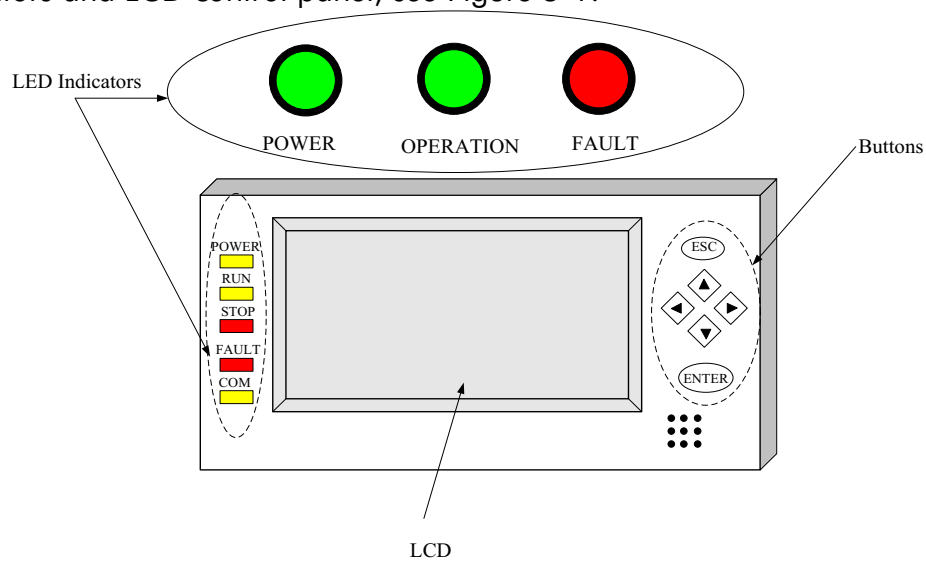


Figure 5-1 SG100K3 data interface

5.1. LED Indicators

3 big LED indicators are located in the front door of SG100K3 and 5 smaller LED indicators in the LCD panel.

These LED indicators help the users to quickly learn about the states of the SG100K3 inverter. Check Table 5-1 for their definitions.

Note that the big "POWER", "OPERATION" and "FAULT" LED indicators share the same meaning with small "POWER", "RUN" and "FAULT" indicators.

Table 5-1 Meaning of LED indicators

LED Name	Meaning
POWER	The indication of control board's power supply
RUN	Inverter is in grid mode and working normally
STOP	When the SG100K3 stops operation
FAULT	There is a fault in the power system
COM	Communication indication between inverter and PC

5.2. LCD Control Panel

The LCD control panel is mounted on the SG100K3 enclosure at eye level. 6 buttons right next to the LCD are used to check or set parameters in the LCD control menu, see Figure 5-2.

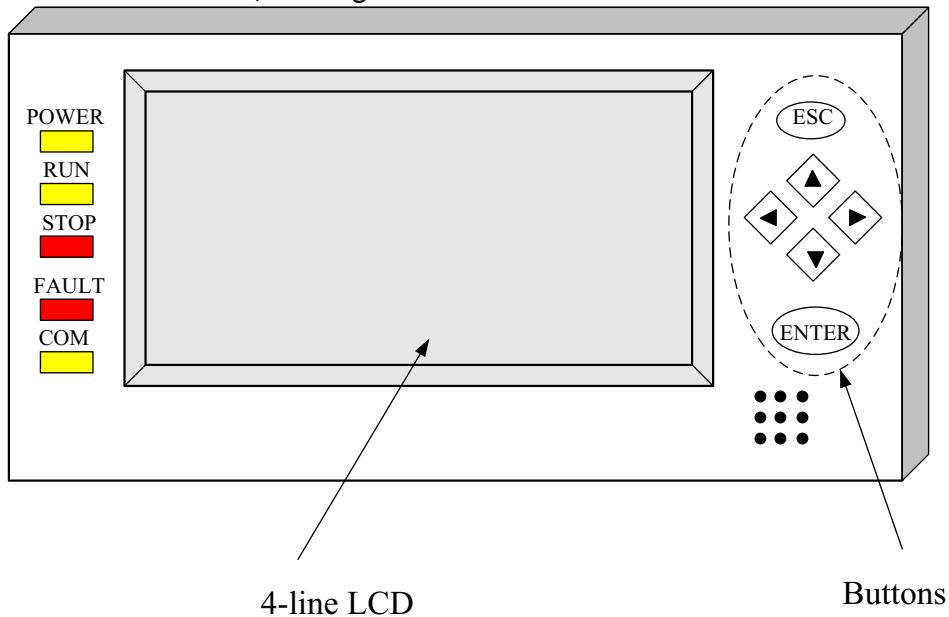


Figure 5-2 LCD panel

5.2.1. Definitions of Control Buttons

Please refer to Table 5-2 for the definitions of 6 control buttons.

Table 5-2 Definitions of buttons

Button	function
ESC	<ul style="list-style-type: none"> cancels / ends the present function answers questions with "No" returns to the previous menu
▲	<ul style="list-style-type: none"> moves up to the previous line increases the present value
▼	<ul style="list-style-type: none"> moves down to the next line decreases the present value
▶	<ul style="list-style-type: none"> moves to the right value
◀	<ul style="list-style-type: none"> moves to the left value
ENTER	<ul style="list-style-type: none"> selects a function from the menu selects a value confirms changes answers questions with "Yes"





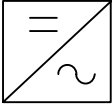









5.2.2. The Background Illumination

The background illumination of the LCD is activated by pressing any button on the panel and will automatically be deactivated 2 minutes later to save power.

5.2.3. Explanation of the Display Symbols

The SG100K3 display has four lines. Multiple display symbols are used, which are explained in the following Table 5-3.

Table 5-3 Explanations of symbols used in the control menu

Symbol	Explanations
General Symbols	
	There is sub-level menu Press "Enter" to move to next menu
	There are more display menus below. Press "↓" to move to next menu
	This menu indicates some information needed to be care about
Specific Symbols	
	The PV array
	The Inverter
	One phase of the grid
	This menu displays data
	General control menu.
	Control the start/stop of the inverter.
	Communication parameters setting menu
	Energy adjustment menu
	General parameter menu
	Time setting menu
	Language setting menu

6

LCD Control Menu

Chapter 6 gives the detail information and explanations about the SG100K3 LCD control menu.

6. LCD Control Menu

Chapter 6 gives the detail information and explanations about the SG100K3 LCD control menu.

6.1. The Total Display Menu

The total display menu is given in the Figure 6-1 below.

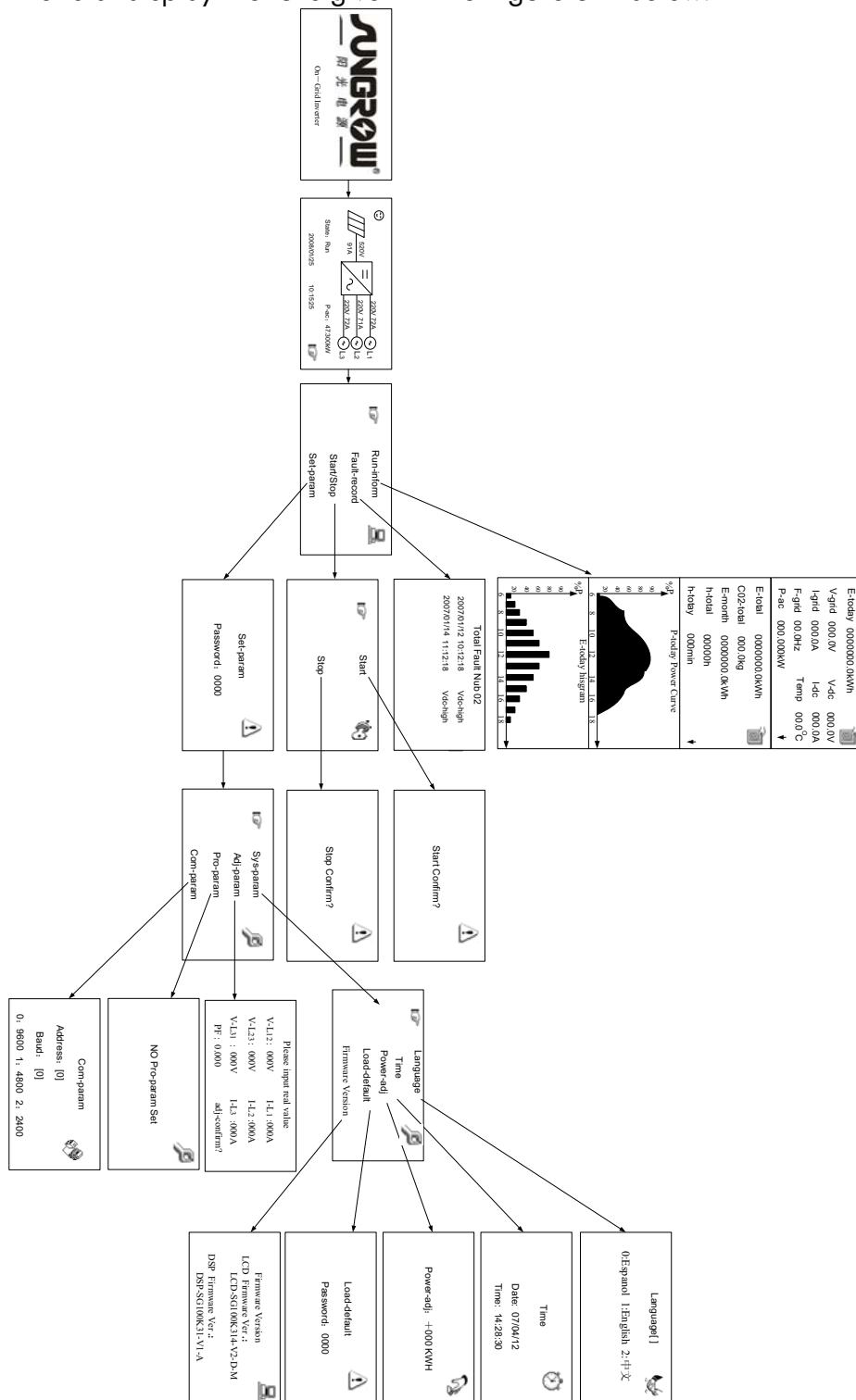


Figure 6-1 Total display menu tree

6.2. Additional Explanation of the LCD Menu

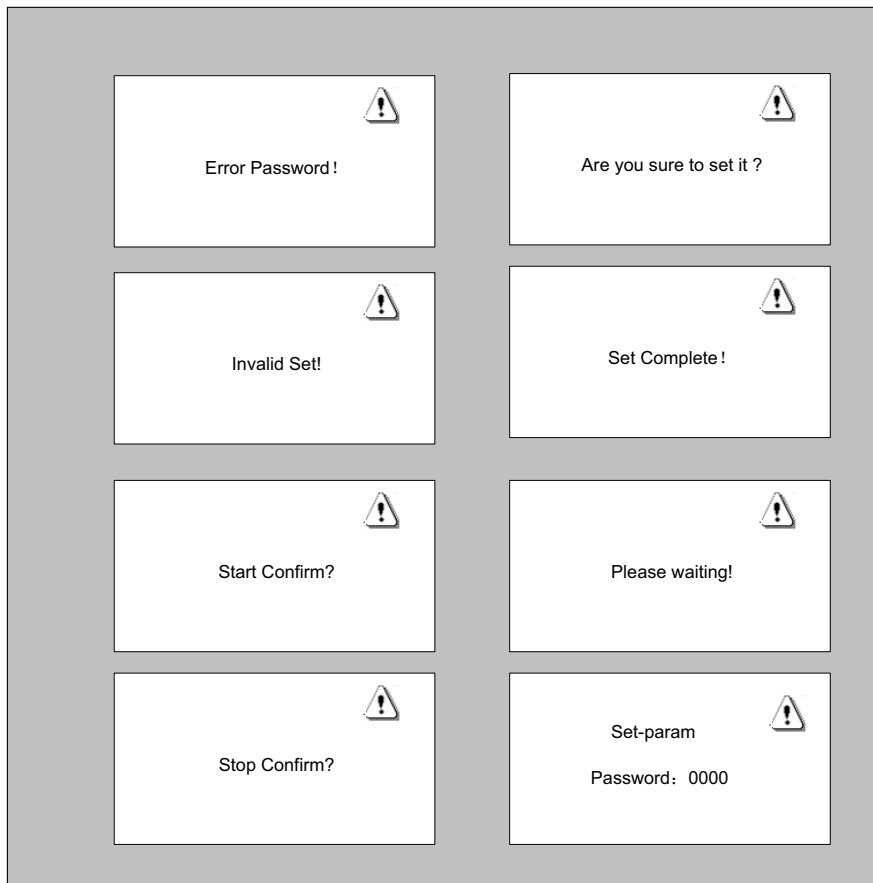
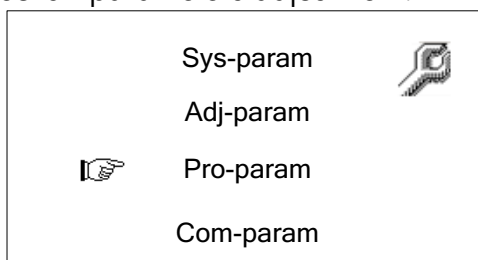


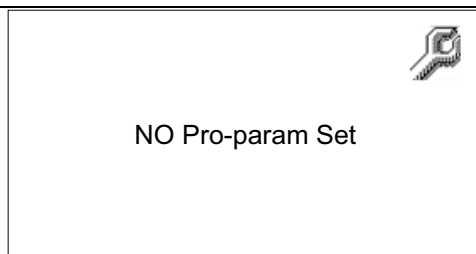
Figure 6-2 Prompting message menu

Figure 6-2 shows all the prompting messages not included in the total display menu but will be displayed in the LCD.

Note that the **"Pro-param"** menu contains no valid setting; it is kept for future protection parameters adjustment.



1. Select **"Pro-param"**
2. Press **"ENTER"**



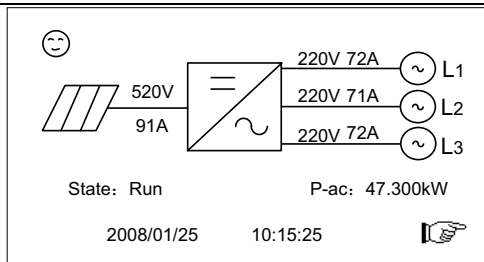
3. No protection parameters can be set or adjusted

6.3. The Default Display Menu

The LCD is initialized upon energized of the SG100K3. A starting menu will be displayed during initialization, which shows the manufacture name and the type of the inverter.



1.The initialization menu
Only appear once after activation



2.The Default menu
Display basic running parameters

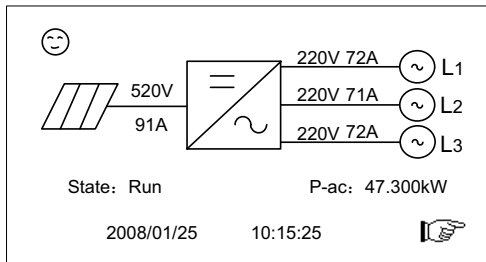
Once the LCD is initialized for about 2-3 minutes, it will automatically changes to the default menu. In the default menu, the basic real-time running values are displayed, which includes **DC current** and **DC voltage**, the **AC phase current** and **AC line-to-neutral voltage**, the **operation state**, the output **AC power** and the system **time and date**.



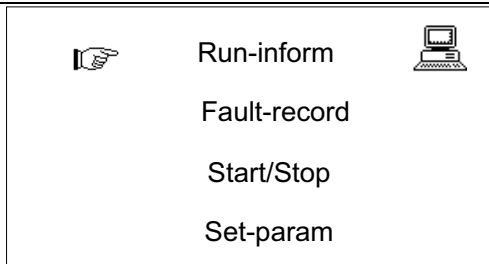
Note: Fault displayed in the State

Fault type will be displayed in the "State" of the default menu when a fault occurs.

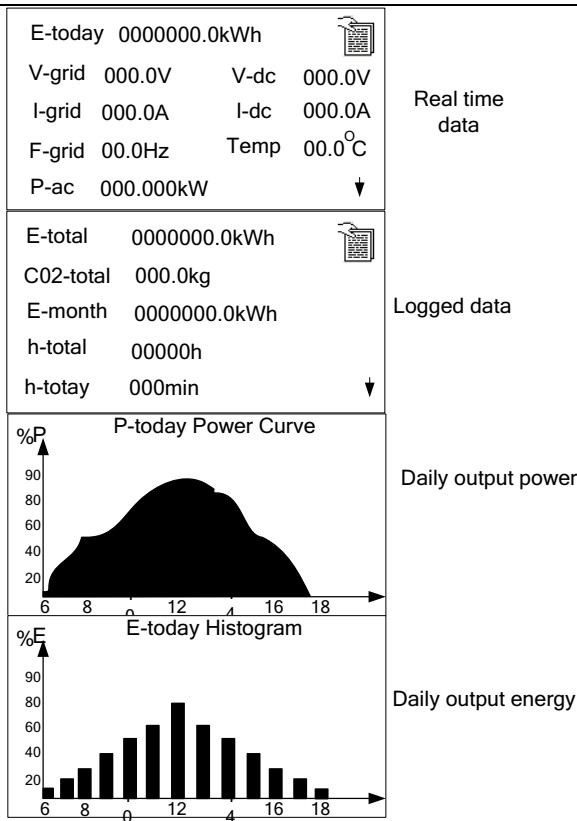
6.4. Check Complete Running Parameters



1. In the default menu
2. Press "ENTER" or "▶" to enter the general control menu



3. Navigate the hand-pointer to the "Run-inform"
4. Press "ENTER" button to access the sub-menus of running parameters



5. Use "▼" to move among these 4 menus to check parameters. This level menus contains 4 separate menus:
 - 1) the real-time data
 - 2) the logged data
 - 3) Daily output power diagram
 - 4) Daily output energy diagram

Please refer to Table 6-1 and Table 6-2 for the explanations of displayed running data.

Table 6-1 Explanation of electrical parameters

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 6-2 Explanation of non-electrical parameters

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-total	Reduced CO2 weight	Kg

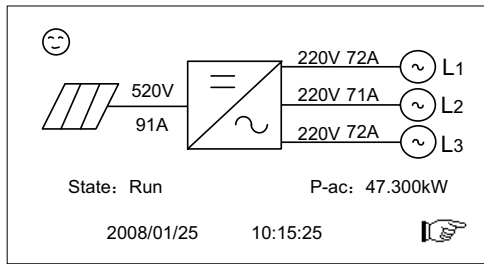
1. The internal logged data includes: total energy generated since the first start-**"E-total"**, energy generated within the current month-**"E-month"**, total running time in hour-**"h-total"**, the total running time within today- **"h-today"**, and the weight of the CO2 which can be avoided by using the green PV plant-**"CO2-total"**.

2. The **real time data includes**: daily generated energy **"E-today"**, the grid voltage **"V-grid"**, the grid frequency **"F-grid"**, the grid current **"I-grid"**, the DC voltage **"V-grid"**, DC current **"I-grid"**, the inverter's inside temperature **"Temp"** and today's running minutes **"h-today"**.

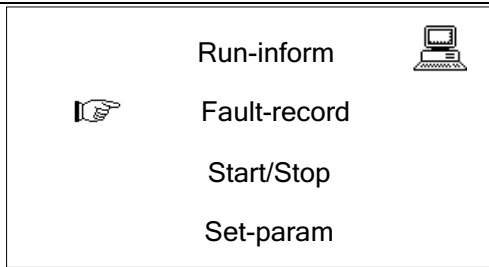
3. The **"P-today power curve"** diagram shows the power generated from 6.am to 18.pm in a single day, the data are updated every 3.75 seconds and the total diagram data will be cleared at the beginning of a new day. The P axis is marked by the percentage of the rated power 100KW.

4. 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 100KWH.

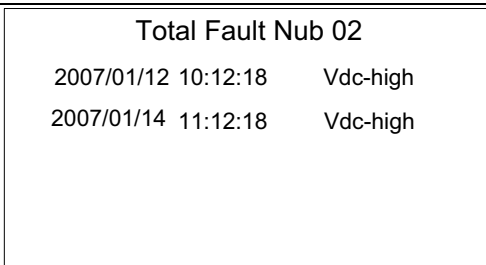
6.5. Check Fault Records



1. In the default menu
2. Press "ENTER" or "▶" to enter the general control menu



3. Navigate the hand-pointer to the "Fault-record" and press "ENTER" button.



4. Press "▼" button to move to left fault records.

The "Fault-record" can log the latest 20 fault records, which includes the fault name and occurred time.

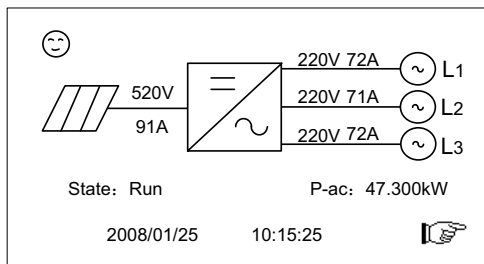
Note that one screen can only display 7 fault records, press "▼" button to move to next fault records if necessary.

Table 6-3 Explanations of faults

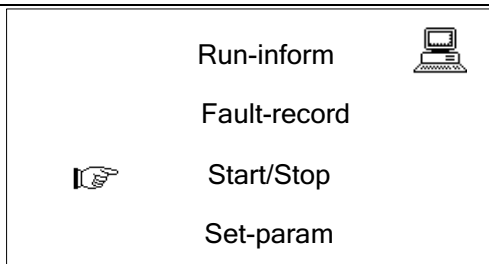
Fault type	Explanations
Vdc-high	DC voltage is too high
Vac-high	Grid voltage is too high
Vac-low	Grid voltage is too low
F-fault	Grid frequency is abnormal
Island	Island(grid in unavailable)
Dsp-flt	The control DSP malfunctions
Ipm-flt	The IGBT power module malfunctions
Cntr-flt	AC side contactor malfunctions
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

Please refer to chapter 8 for the troubleshooting.

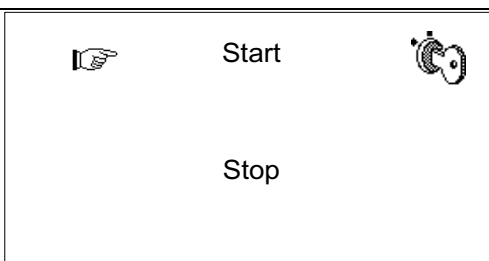
6.6. Start the Inverter



1. In the default menu
2. Press "ENTER" or "▶" to enter the general control menu



3. Navigate the hand-pointer to the "Start/Stop" and press "ENTER" button.



4. Navigate the hand-pointer to the "Start" and press "ENTER" button.



5. Press "ENTER" button to confirm the start command.

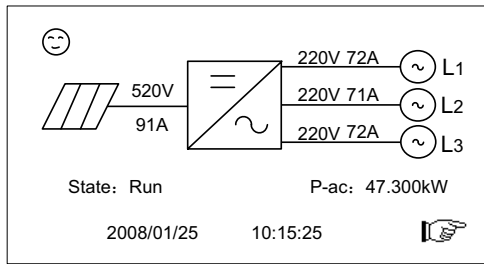
Note: Auto Start and Manual Start



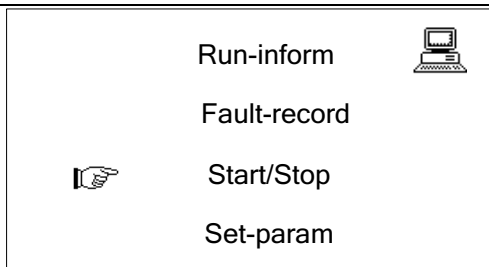
Normally the inverter will auto start when specifications are met or faults are removed.

The start function of the control menu is provided in case the inverter needs a restart after being stopped by pressing down the emergency stop button or perform manual stop in the LCD menu.

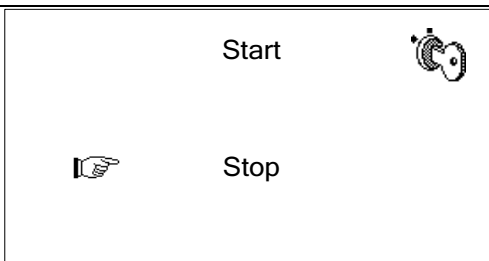
6.7. Stop the Inverter



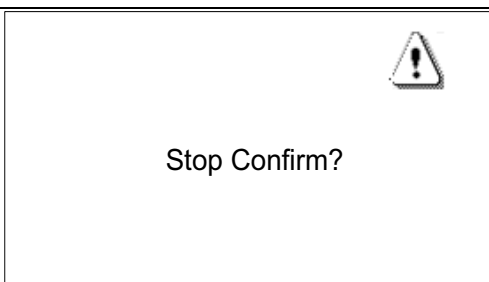
1. In the default menu
2. Press "ENTER" or "▶" to enter the general control menu



3. Navigate the hand-pointer to the "Start/Stop" and press "ENTER" button.



4. Navigate the hand-pointer to the "Stop" and press "ENTER" button.



5. Press "ENTER" button to confirm the stop command.



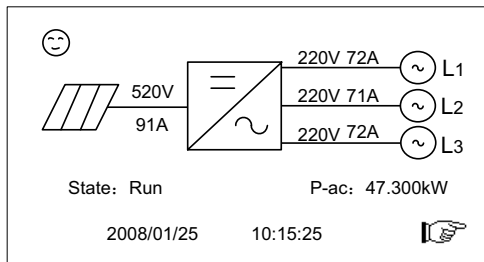
Note: Manual stop and Emergency stop

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

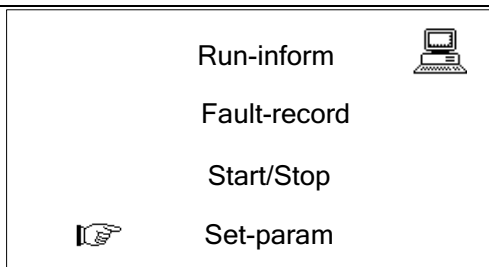
They both disconnect the AC contactor and need manual Start in the LCD menu.

6.8. Enter the Password

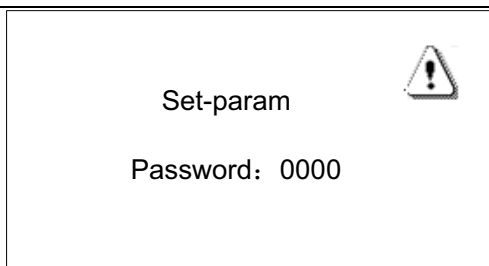
SG100K3 parameters are password protected, which means they can only be adjusted upon entry of a password. To enter the password, proceed as follows:



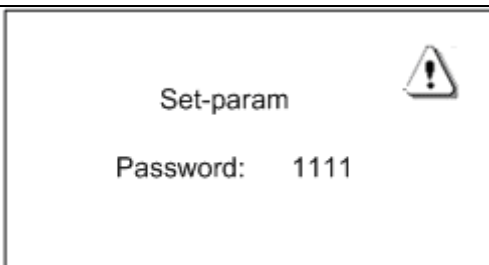
1. In the default menu
2. Press "ENTER" or "▶" to enter the general control menu



3. Navigate the hand-pointer to the "Set-param" and press "ENTER" button.

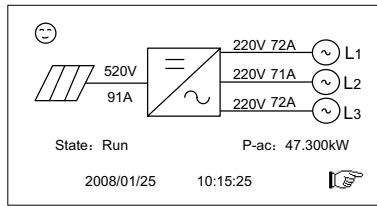


4. Use "◀" and "▶" to choose digits, employ "▲" and "▼" to increase or decrease number.

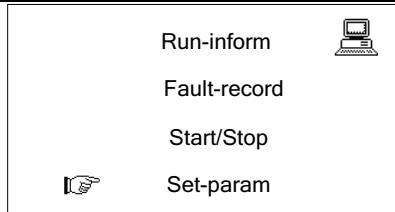


5. Press "ENTER" button to confirm the password input. Note that the default password is 1111.

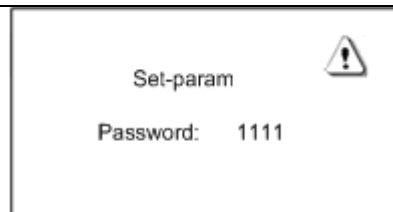
6.9. Change Display Language



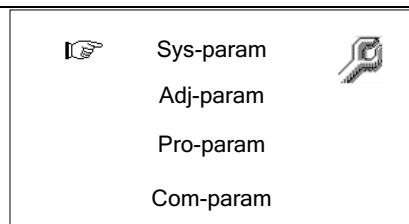
1. In the default menu
2. Press "ENTER" or "▶" to enter the general control menu



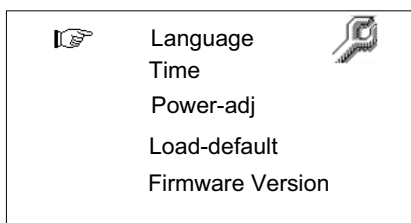
3. Navigate the hand-pointer to the "Set-param" and press "ENTER" button.



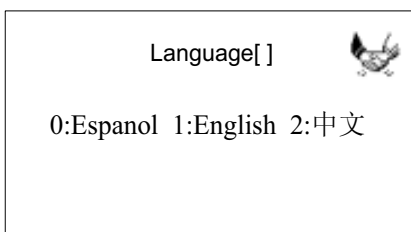
4. Press "ENTER" button to confirm the password input. Note that the default password is 1111.



5. Navigate the hand-pointer to the "Sys-param" and press "ENTER" button.

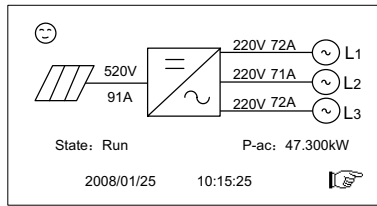


6. Move the hand-pointer to the "Language" and press "ENTER" button.

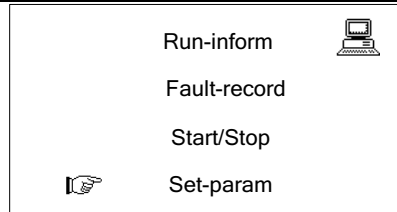


7. Use "▲" or "▼" to change number between 0, 1 and 2. 0 represents Spanish and 1 means English and 2 for Chinese.
8. Choose the number you want and press "Enter" to confirm your choice.

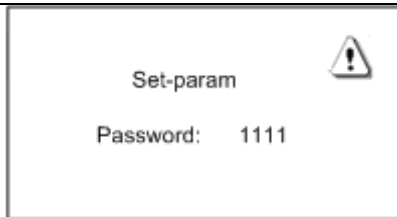
6.10. Change Date and Time



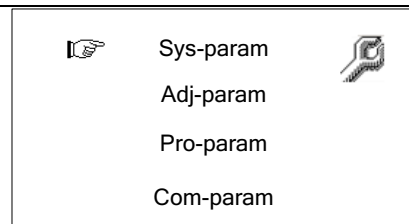
1. In the default menu
2. Press "ENTER" or "▶" to enter the general control menu



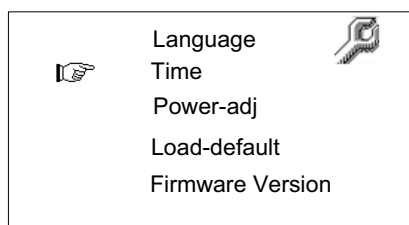
3. Navigate the hand-pointer to the "Set-param" and press "ENTER" button.



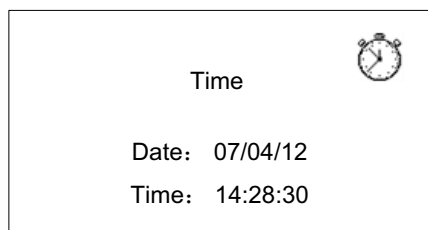
4. Press "ENTER" button to confirm the password input. Note that the default password is 1111.



5. Navigate the hand-pointer to the "Sys-param" and press "ENTER" button.



6. Move the hand-pointer to the "Time" and press "ENTER" button.



7. Use "◀" and "▶" to choose digits, employ "▲" and "▼" to increase or decrease number.
8. Input the number you want according to your local time and press "Enter" to confirm them.

6.11. Output Energy Value Adjustment

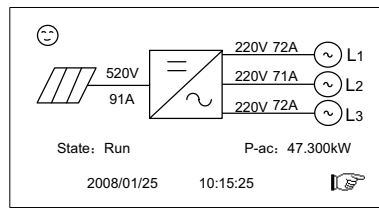
	<ol style="list-style-type: none"> 1. In the default menu 2. Press "ENTER" or "▶" to enter the general control menu
	<ol style="list-style-type: none"> 3. Navigate the hand-pointer to the "Set-param" and press "ENTER" button.
	<ol style="list-style-type: none"> 4. Press "ENTER" button to confirm the password input. Note that the default password is 1111.
	<ol style="list-style-type: none"> 5. Navigate the hand-pointer to the "Sys-param" and press "ENTER" button.
	<ol style="list-style-type: none"> 6. Move the hand-pointer to the "Power-adj" and press "ENTER" button.
	<ol style="list-style-type: none"> 7. Use "◀" and "▶" to choose digits, employ "▲" and "▼" to increase or decrease number. 8. Input real value you read from your electric meter and press "Enter" to confirm them.

Note that the positive symbol "+" can also be changed to negative symbol "-". This generated power adjustment screen is useful in case the total-power displayed by LCD (**E-total**) has difference with reading value from the external power measuring device (like an electrical meter).

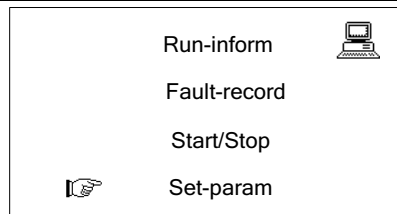
The adjustable range is from -999-+999 kWh.

(Power-adj value) = (Real measured value) - (E-total reading value)

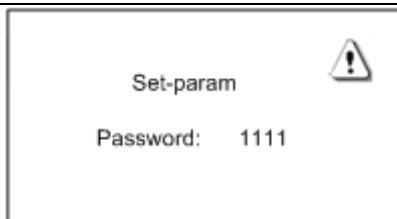
6.12. Load Default Setting



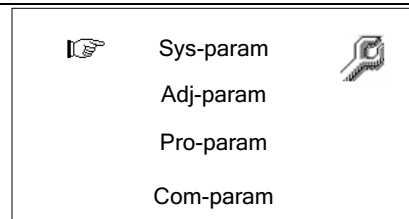
1. In the default menu
2. Press "ENTER" or "▶" to enter the general control menu



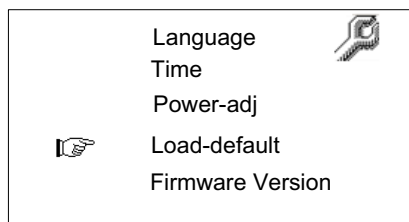
3. Navigate the hand-pointer to the "Set-param" and press "ENTER" button.



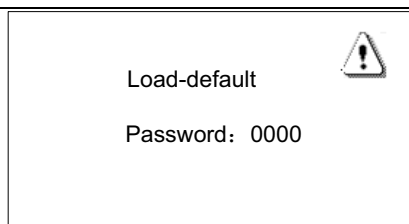
4. Press "ENTER" button to confirm the password input. Note that the default password is 1111.



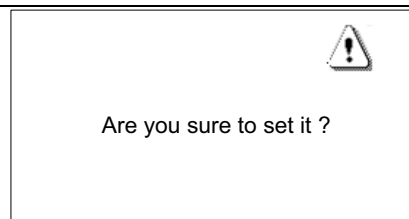
5. Navigate the hand-pointer to the "Sys-param" and press "ENTER" button.



6. Move the hand-pointer to the "Load-default" and press "ENTER" button.



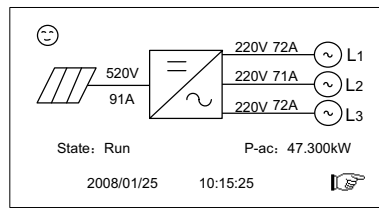
7. Input correct password 1111 and press "Enter".



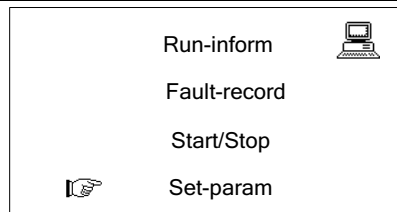
8. Press "Enter" to re-confirm your load default command.

After load default, all the logged data and fault will be cleared.

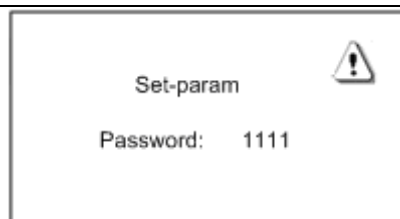
6.13. Check the Firmware Version



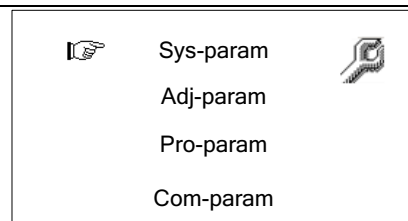
1. In the default menu
2. Press "ENTER" or "▶" to enter the general control menu



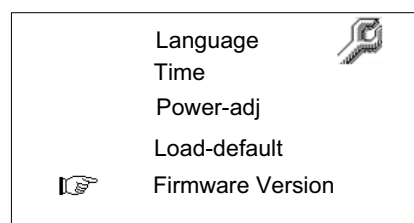
3. Navigate the hand-pointer to the "Set-param" and press "ENTER" button.



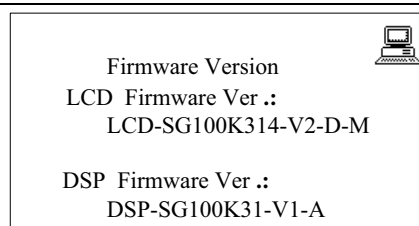
4. Press "ENTER" button to confirm the password input. Note that the default password is 1111.



5. Navigate the hand-pointer to the "Sys-param" and press "ENTER" button.

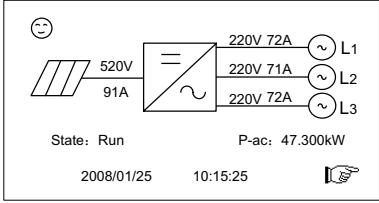
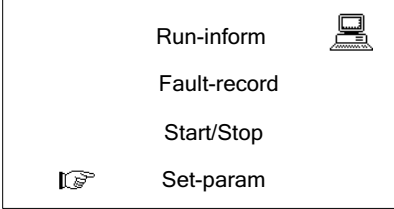

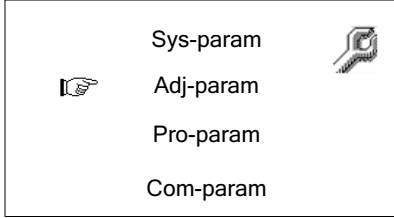
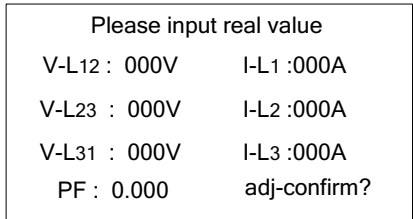


6. Move the hand-pointer to the "Firmware Version" and press "ENTER" button.



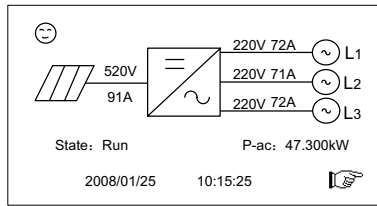
7. User can identify the LCD and DSP firmware versions of the inverter; this may be helpful during maintenance or troubleshooting.

6.14. Measured Real-time Value Adjustment

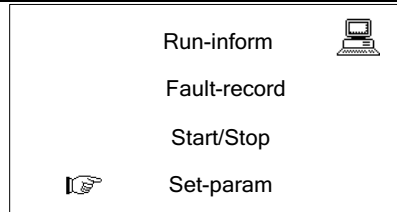
	<ol style="list-style-type: none"> 1. In the default menu 2. Press "ENTER" or "▶" to enter the general control menu
	<ol style="list-style-type: none"> 3. Navigate the hand-pointer to the "Set-param" and press "ENTER" button.
	<ol style="list-style-type: none"> 4. Press "ENTER" button to confirm the password input. Note that the default password is 1111.
	<ol style="list-style-type: none"> 5. Navigate the hand-pointer to the "Adj-param" and press "ENTER" button.
	<ol style="list-style-type: none"> 6. Use "◀" and "▶" to choose digits, employ "▲" and "▼" to increase or decrease number. 8. Input real value you read from your electric meter and press "Enter" to confirm them.

The "Adj-param" menu is designed to adjust the difference between the LCD displayed value and the users measured real value through automatically calculate the coefficient and perform the adjustment of displayed real data. "V-L12", "V-L23", "V-L31" are the user measured three phase line to line voltage, "I-L1", "I-L2", "I-L3" are the user measured three phase current. PF is measured power factor.

6.15. Communication Parameters Setting



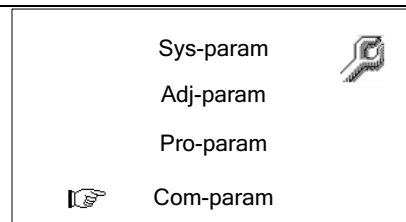
1. In the default menu
2. Press "ENTER" or "▶" to enter the general control menu



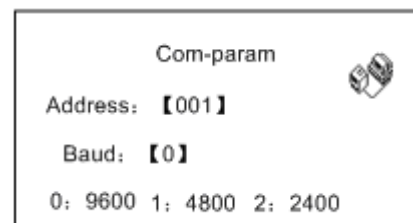
3. Navigate the hand-pointer to the "Set-param" and press "ENTER" button.



4. Press "ENTER" button to confirm the password input. Note that the default password is 1111.



5. Navigate the hand-pointer to the "Com-param" and press "ENTER" button.



6. Use "◀" and "▶" to choose digits, employ "▲" and "▼" to increase or decrease number.
8. Input the **address** and **baud rate** you want.

"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 4800 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 SG100K3 at its optimum performance.

7. Maintenance

The SG100K3 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 SG100K3

A recommended maintenance period required for SG100K3 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 LCD 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 LCD no display	Disconnect the AC and DC voltage and keep disconnected for 90 minutes. 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 90 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 LCD 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. LCD Displayed Fault Troubleshooting

If a fault occurs, the SG100K3 will generate a message and display the message in the "state:" position.

Table 8-3 LCD Fault description and troubleshooting

Fault name	description	troubleshooting
Vdc-high	Over voltage on DC input (>880V)	Disconnect the DC input of the SG100K3. 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 SG100K3. 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 SG100K3. 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 IGBT fault	The reason is complicated, may be due to EMI or IGBT damage or over voltage etc. Measure the temperature of the heatsink, if over 80°C, wait for the inverter to recover. This fault cannot be restarted from LCD menu. Wait for the inverter restart after 5minutes or disconnect the AC source then reconnect the grid to restart the inverter manually. If this fault frequently happens, contact Sungrow.
Island	No grid is detected by the SG100K3	Check whether the breaker in the grid side is switched on, if not, switches on the breaker. Check whether the inverter connection wiring

		<p>is OK, if not, re-connect the wires.</p> <p>Check whether the grid is available, if 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>This fault cannot be restarted from LCD menu.</p> <p>Wait for the inverter restart after 5minutes or disconnect the AC source then reconnect the grid to restart the inverter manually. 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 IGBT 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 LCD 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 SG100K3. Basic production information and performance of the SG100K3 are available from these tables.

9.1. DC Parameters

Max. DC Power	110KW _p
MPPT DC Voltage Range	450V to 820V
Max. DC Voltage	880 V
Max. DC Current	250A

9.2. AC Parameters

Nominal AC Output Power	100KW
Grid Voltage	400V(310V~450V)
Operating Grid Frequency	50 Hz(47-51.5Hz)
Nominal AC Current	145A
Power Factor	>0.99 at nominal power
THD of grid Current	< 3% at nominal power
Over Voltage Category	II

9.3. Efficiency

Peak Efficiency	97.0%
European Efficiency	96.4%

9.4. Mechanical Parameters

Dimensions(W×H×D)	1020 x 1964 x 770mm
Weight	900kg
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 ~ 55°C
Relative Humidity (Non condensing)	<95%

9.6. Features

Galvanic Isolation Type	Low frequency transformer
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.sungrowpower.com 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 SG100K3 Grid Connected Inverter Operation Manual

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