SUNGROW

Quick User Manual

SH5K

Grid-Connected Hybrid Inverter

SH5K-QUEN-Ver16-201803 Version：1.6

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Notice

In no case shall this manual substitute for the user manual or related notes on the device.

Contents will be periodically updated or revised due to product development. The information in this manual is subject to change without advance notice!

Make sure to read over, fully understand and strictly follow the detailed instructions in the user manual and other regulations before installation. Any violation could result in personal death, injury or damage to the device.

The latest manual can be acquired at www.sungrowpower.com.

Contact Information

Should you have any questions about this product, please contact us:

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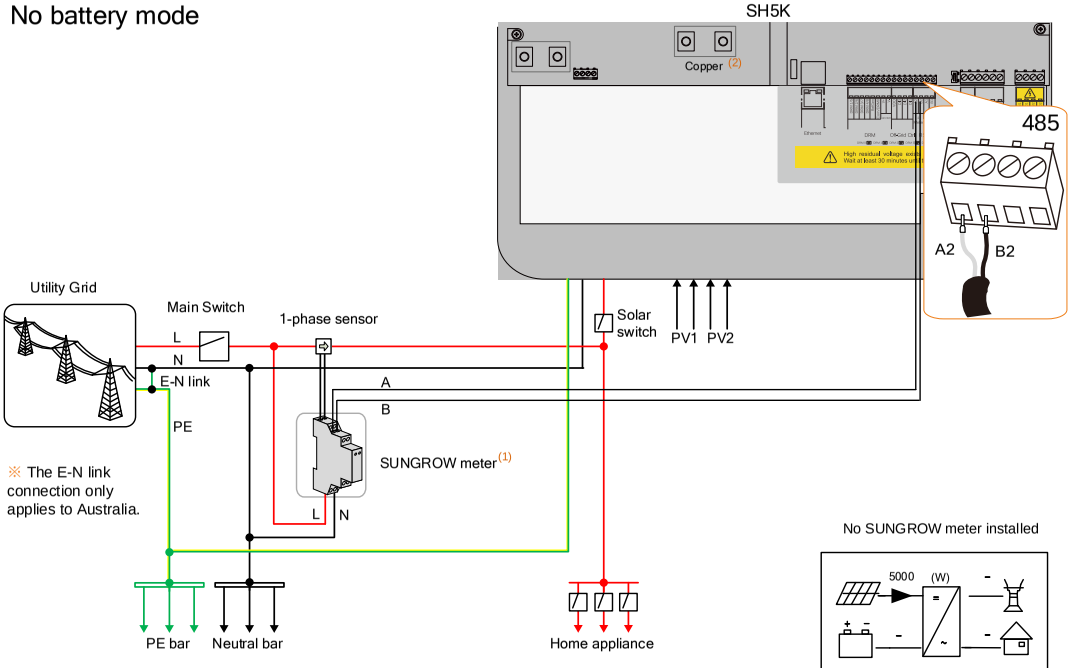
Fax:	+86 551 6532 7856

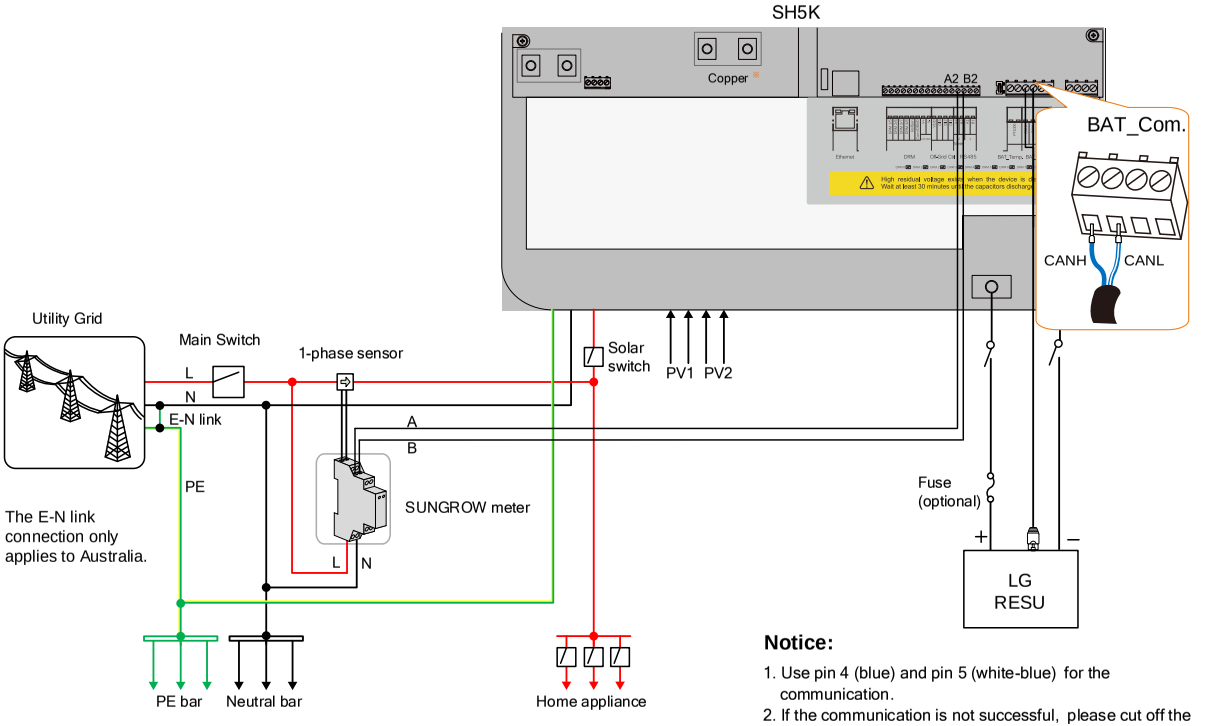
No battery mode



(1) Installation of SUNGROW meter is no required in case that the export power is set at 100% by default. And SUNGROW meter is required in case of export power at 0% to 99%.
Neither the grid power nor the load power will be displayed on the main screen in case of no SUNGROW meter installed.

(2) Installation of the copper is required in case of parallel PV input.

Sungrow/LG/GCL/Pylon (US2000B)/BlueSun/BYD Li-ion Battery

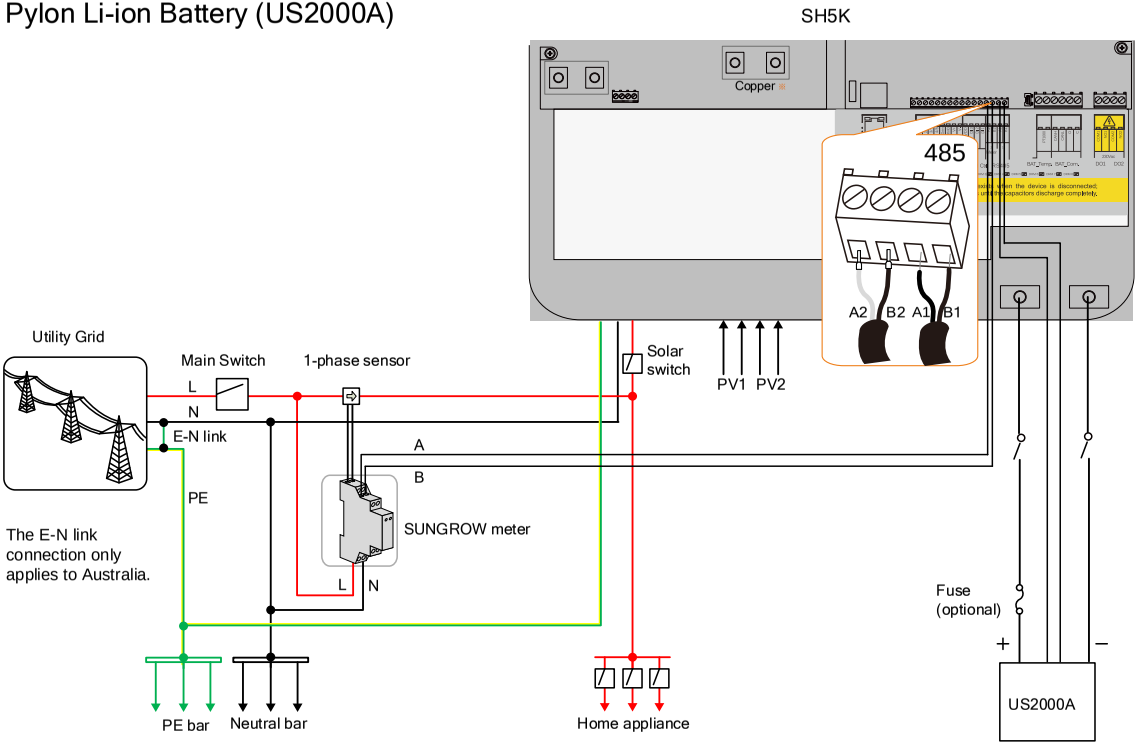


※ Installation of the copper is required in case of parallel PV input.

Notice:

1. Use pin 4 (blue) and pin 5 (white-blue) for the communication.
2. If the communication is not successful, please cut off the white-green (pin 3) and green (pin 6) wires.

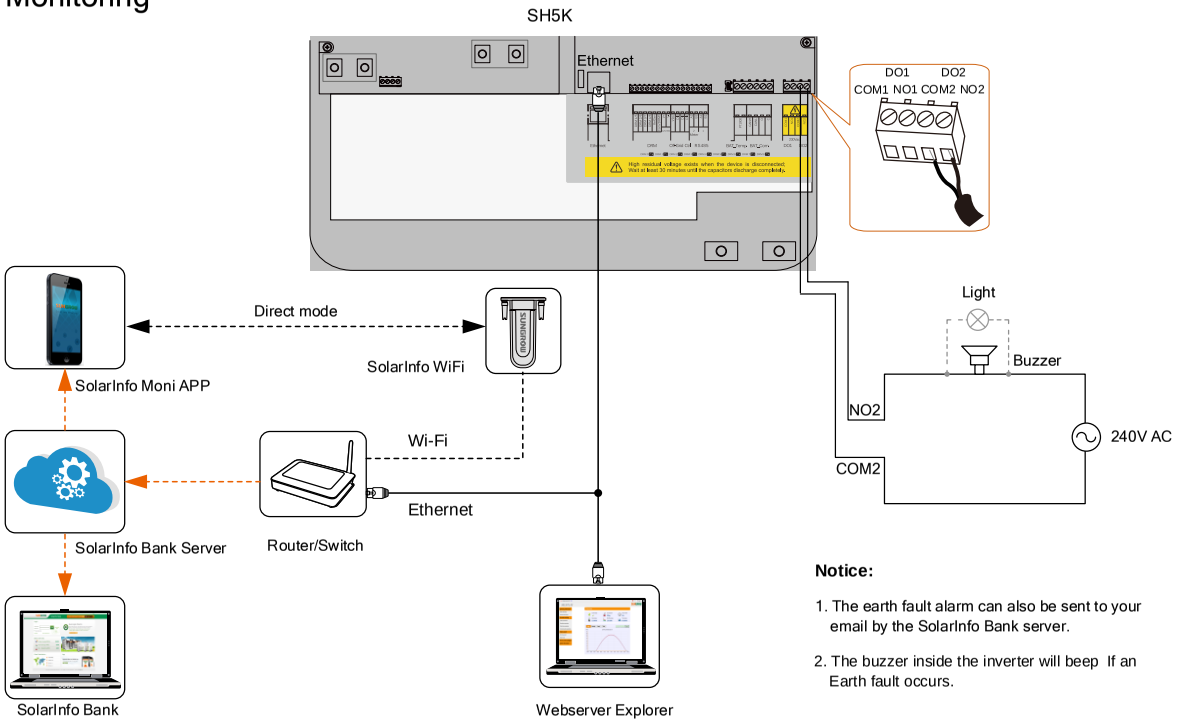
Pylon Li-ion Battery (US2000A)



※ Installation of the copper is required in case of parallel PV input.

Monitoring

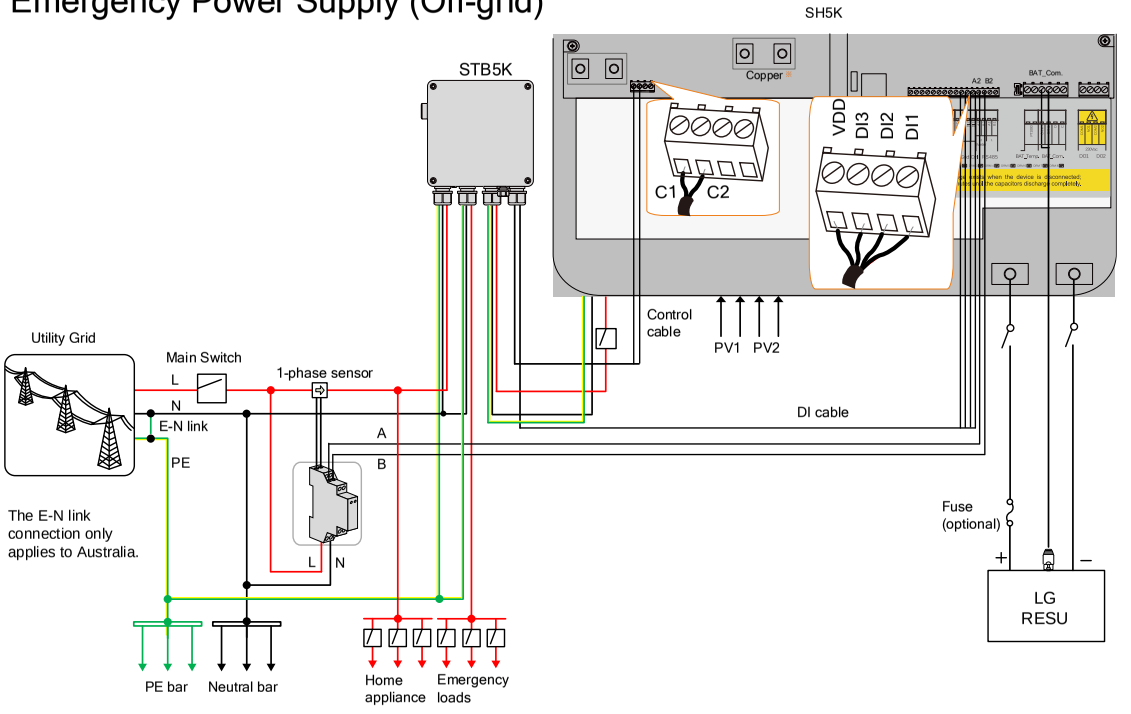
Earth Fault Alarm



Notice:

1. The earth fault alarm can also be sent to your email by the SolarInfo Bank server.
2. The buzzer inside the inverter will beep If an Earth fault occurs.

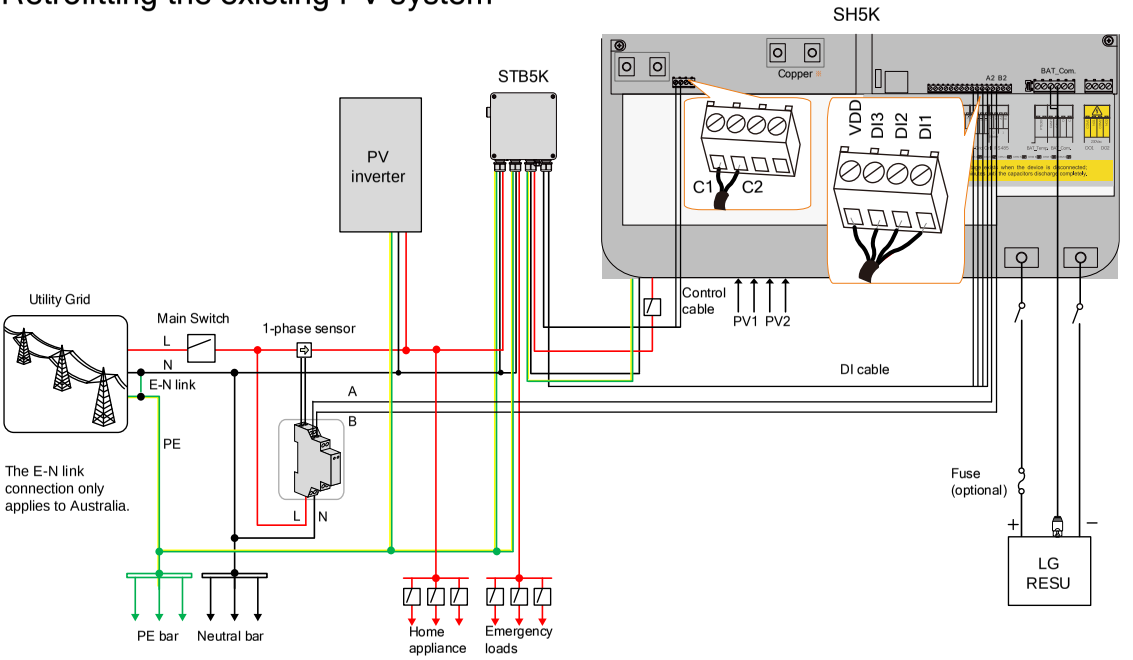
Emergency Power Supply (Off-grid)



※ Installation of the copper is required in case of parallel PV input.

The neutral lines for the grid, the loads and the inverter AC terminals are all inter-connected inside the STB5K. And it is the same for the PE lines.

Retrofitting the existing PV system



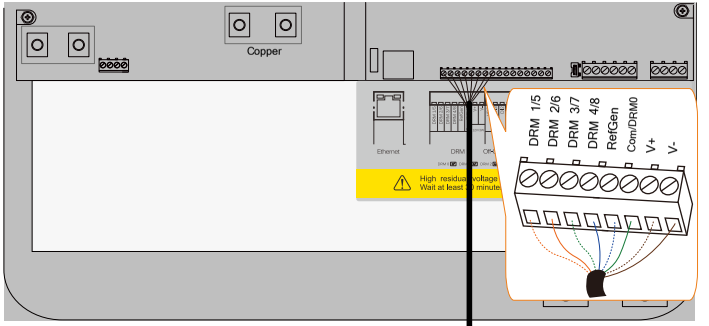
※ Installation of the copper is required in case of parallel PV input.

Only install the backup box STB5K to provide emergency power supply in an off-grid system.

The neutral lines for the grid, the loads and the inverter AC terminals are all inter-connected inside the STB5K. And it is the same for the PE lines.

DRM Function

SH5K



DRED

Demand Response Enabling Device

Mode	Asserted by shorting terminals marked:
DRM0	RefGen or Com/DRM0
DRM1 DRM5	DRM 1/5
DRM2 DRM6	DRM 2/6
DRM3 DRM7	DRM 3/7
DRM4 DRM8	DRM 4/8

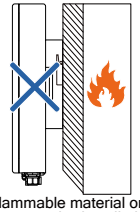
Method of asserting demand response modes

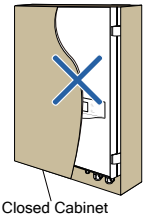
Contents

1 Installation

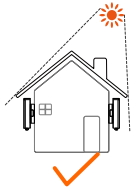
1.1 Location Requirements

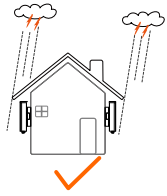
- The concrete wall should be suitable for the weight and dimensions of the inverter.
- The location should be convenient for installation, cable connection and service.
- The location should be not accessible to children.
- The location should be away from flammable materials or gas, and the environment should not be enclosed.

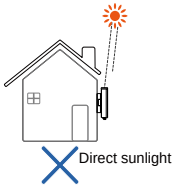


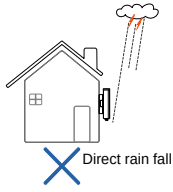


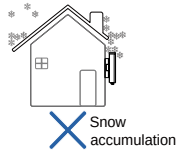
- The shaded side of the building would be better.



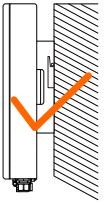


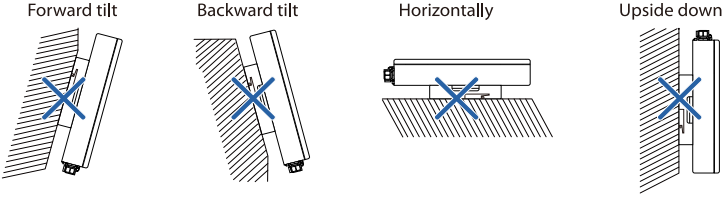




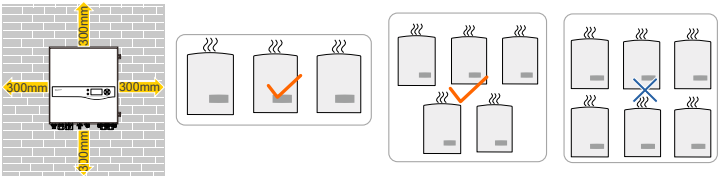


- Install vertically for sufficient heat dissipation.





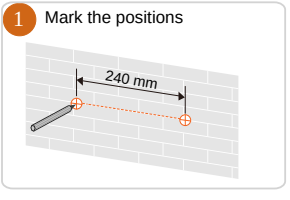
- Clearance requirements for single and multiple installation:

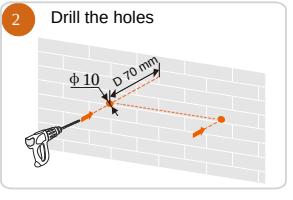


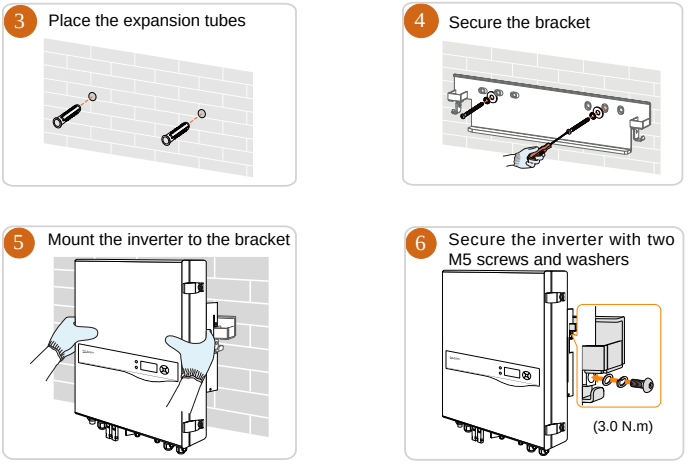
1.2 Installing the Inverter

Install the inverter on the wall by means of the wall-mounting bracket and the expansion plug sets.

The depth of the holes should be about 70 mm. Be sure to adhere to the following screw assembly sequence: self-tapping screw, spring washer, fender washer, wall-mounting bracket.







1.3 Grounding the Inverter

A second protective earth (PE) terminal is equipped at the side of the inverter. Be sure to connect this PE terminal to the PE bar for reliable grounding.

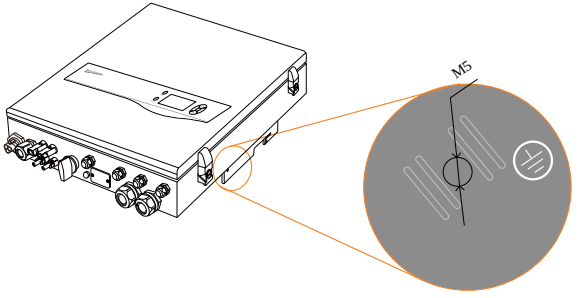
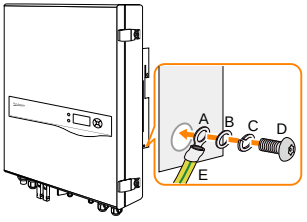


Fig. 1-1 Second PE Terminal

WARNING

In no case shall the second PE connection substitute for the PE connection on the terminal block of AC connector. Be sure to connect both PE terminals for reliable grounding. The loss of any or all rights may follow if otherwise.

Second PE Connection



Item	Description	Specification
A	Cable socket	-
B	Washer	-
C	Spring washer	-
D	Screw	M5 x 12 mm (3.0 N·m)
E	Yellow-green cable	6–10 mm^2 copper wire or 10–16 mm^2 aluminum wire

1.4 Installing the Meter

The SUNGROW meter should be installed next to the main switch. It supports a 35 mm DIN-rail installation, as shown in the following figure:

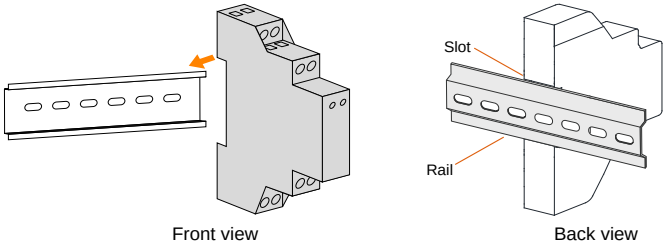


Fig. 1-2 Installing the Meter to the Rail

2 Electrical Connection

2.1 Terminal Description

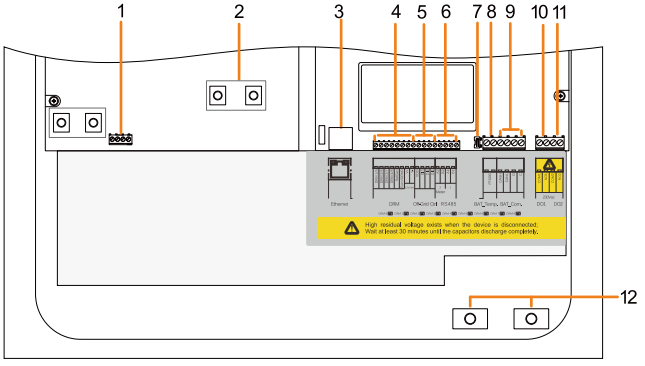
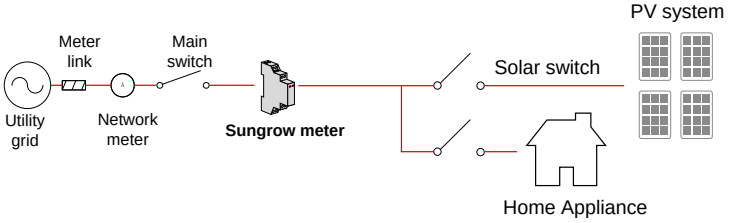


Fig. 2-1 Configuration Circuit Board Inside the Inverter

No.	Label	Connection	Tool Requirements
1	C1, C2	Backup box STB5K	Flat-head screwdriver with an open end of 3 mm
2	Copper	PV (Parallel mode)	Phillips screwdriver
3	Ethernet	Communication	-
4	DRM	Demand response enabling device (DRED)	Flat-head screwdriver with an open end of 2 mm
5	DI	Backup box STB5K	
6	RS485	A1, B1 for the battery, A2, B2 for the meter	
7	120 ohM	RS485	-
8	BAT_Temp.	Temperature sensor PT1000	Flat-head screwdriver with an open end of 3 mm
9	BAT_Com. (CANH, CANL)	Battery communication	
10	DO1	Power management	
11	DO2	Earth fault alarm	
12	BAT+, BAT-	Battery	Phillips screwdriver

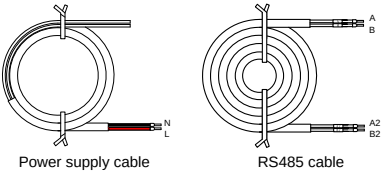
2.2 Meter Connection

The Sungrow single-phase energy meter is installed next to the main switch.



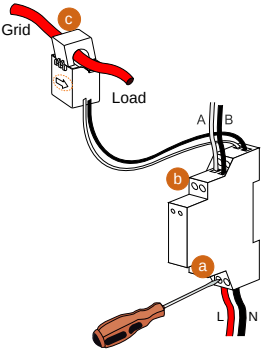
Procedure:

1. Take out the meter (with 1-phase sensor) and the cables from the packaging.



2. Connect the cables to the meter.
   a) Tighten the power supply wires to terminal **3 (L)** and terminal **6 (N)**.
   b) Tighten the RS485 wires to terminal **2 (A)** and terminal **5 (B)**.
   c) Place the 1-phase sensor around the phase wire **(L)** from the main switch.

   The CT clamp of 1-phase sensor can be placed before or after the main switch.

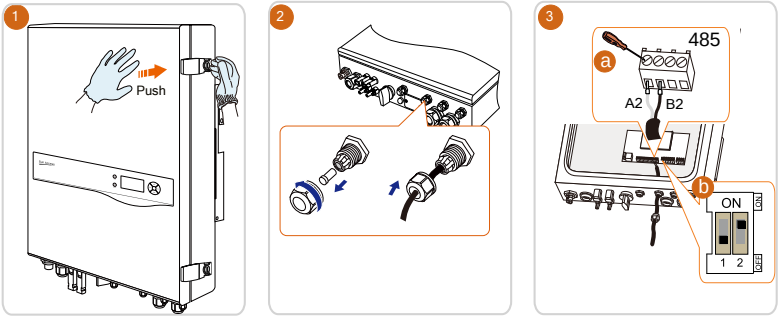


NOTICE

Make sure that the 1-phase sensor is installed in the right direction: the arrow on the sensor must point away from the grid towards the load.

3. Proceed as follows to connect the RS485 wires to the inverter.

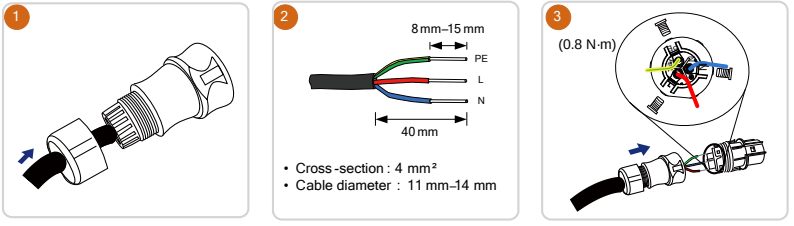
When the length of RS485 cable is longer than 100 m, push the 120ohM **(2)** switch to "**ON**" to ensure stable communication

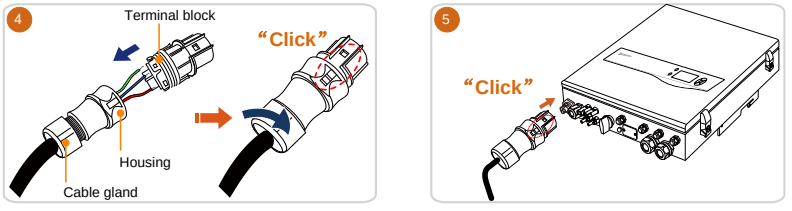


2.3 Grid Connection

Install an AC circuit breaker (recommended specification 32 A) between the inverter and the loads.

Make sure to disconnect the AC circuit breaker and secure it against reconnection before cable connection.





2.4 PV Connection

The inverter has two PV inputs and can be configured in the independent mode or parallel mode. Refer to the user manual for mode selection.

⚠ WARNING

Before connecting the PV arrays to the inverter, ensure that the impedances between the positive terminals of the PV string and Earth, and between the negative terminal of the PV string and Earth are larger than 200 kOhm.

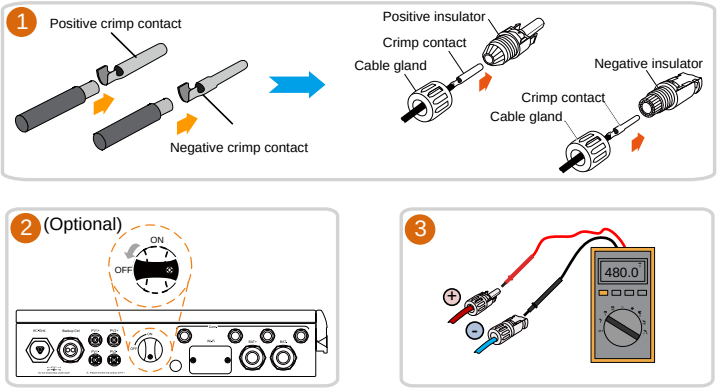
NOTICE

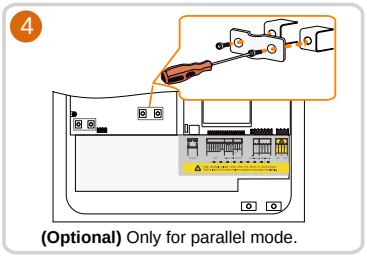
The inverter will not function properly if the DC polarities are reversed. Check the positive and negative polarities of the PV cells.

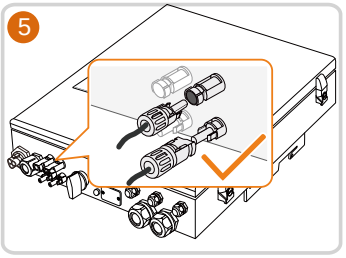
Cable Requirements

Cross-Section	Cable Diameter	Max. Withstand Voltage	Max. Withstand Current
4 mm²–6 mm² AWG12–AWG10	6 mm–9 mm	600 V	Same as short-circuit current

- Strip the insulation from the cables by 7 mm–8 mm.
- Tighten the cable gland with torque of 2.5 N·m–3.0 N·m.





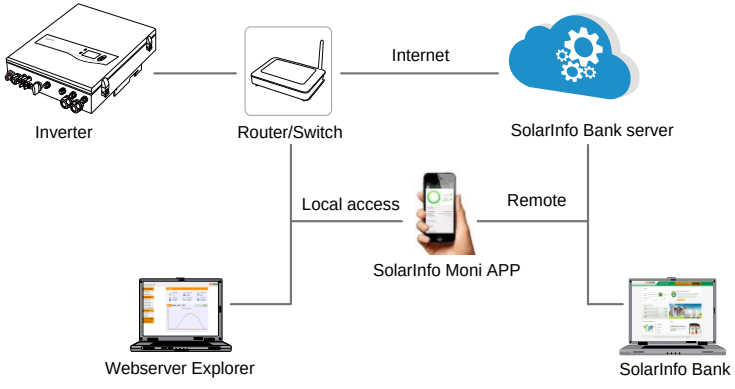


2.5 Communication Connection

2.5.1 Ethernet Connection

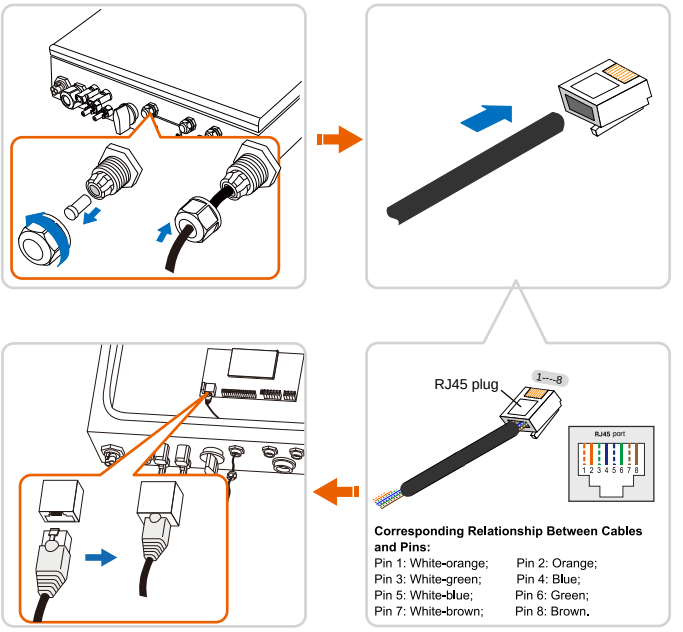
Connect the inverter to the PC through the **Ethernet** port to set up the Ethernet communication.

The Ethernet connection with a router is shown in the following figure.



Use a TIA/EIA 568B standard network cable with a diameter of 3 mm–5.3 mm.

Remove the cable jacket by 8 mm–15 mm, and use the Ethernet crimper to crimp the cable.



2.5.2 Wi-Fi Connection

1. Unscrew the waterproof lid from the Wi-Fi terminal.
2. Install the Wi-Fi module. Slightly shake it by hand to determine whether it is installed firmly.
3. Refer to the **Quick User Manual** delivered with the Wi-Fi module to configure the Wi-Fi.

2.6 Battery Connection

For the connections on the battery side, see the manuals supplied by the battery manufacturer.

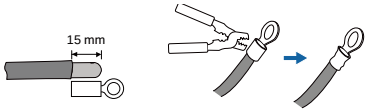
2.6.1 Connecting the Power Cable

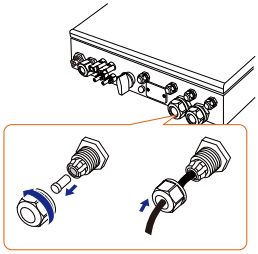
Be sure to adhere to the following screw assembly sequence: screw head, spring washer, fender washer, OT terminal.

NOTICE

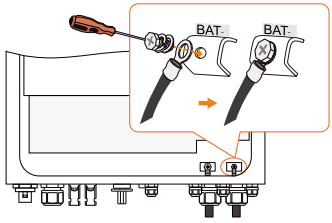
A two-pole DC circuit breaker with over-current protection (voltage rating not less than 100 V and current rating not less than 100 A) should be installed between the inverter and the battery.

Cross-section: 16 mm^2–25 mm^2,
Cable diameter: 13 mm–16 mm
OT25-6





Torque 2.5 N·m

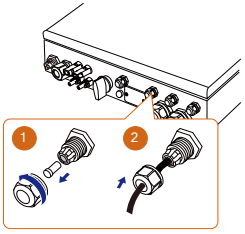


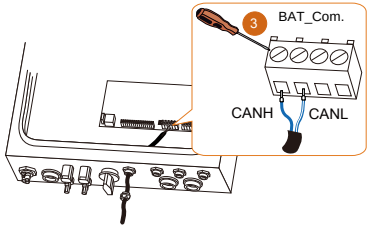
2.6.2 Connecting the CAN Cable

The CAN cable enables communication between the inverter and the Li-ion battery from LG, Sungrow, GCL, BlueSun, Pylon (US2000B) or BYD.

Take out the CAN cable from the packaging. Lead the cable through the cable gland and tighten the wires to the corresponding terminals.

CANH: blue (pin 4), **CANL:** white-blue (pin 5)





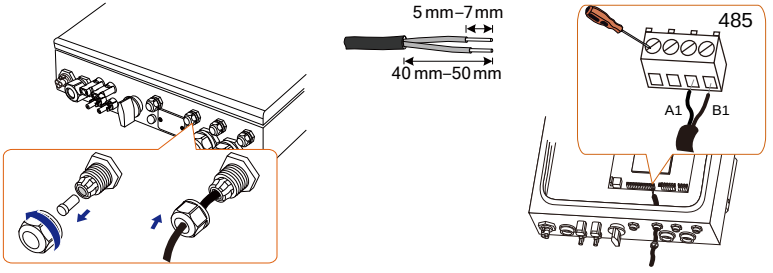
NOTICE

For GCL/BlueSun/BYD battery, please cut through the green (pin 6) and white-green (pin 3) wires from the CANH and CANL terminals to set up successful communication.

2.6.3 Connecting the RS485 Cable

The RS485 cable enables communication between the inverter and the Pylon Li-ion battery US2000A.

Cross-section: 2*0.5 mm^2, cable diameter: 3 mm–5.3 mm

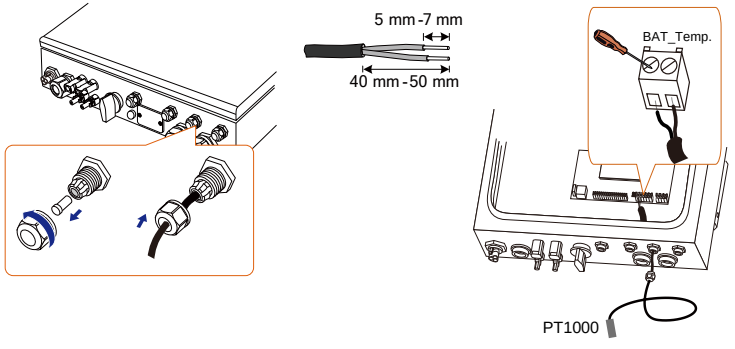


2.6.4 Connecting the Temperature Sensor

It is recommended that the PT1000 is connected to the inverter to sample the temperature of the lead-acid battery or the external environment of the battery.

The temperature sensor is located next to the lead-acid battery.

Cross-section: 1.0 mm^2, cable diameter: 3 mm–5.3 mm

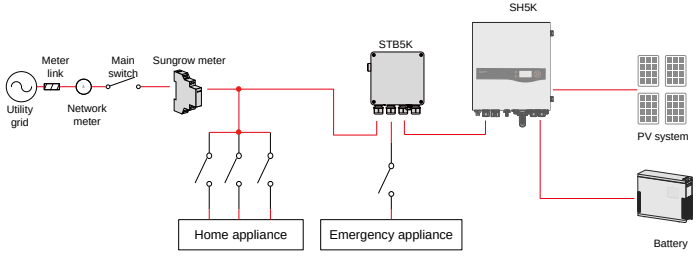


2.7 STB5K Connection (Off-grid)

The backup box is installed between the SUNGROW meter and the hybrid inverter.

If the backup box STB5K is installed, you should enable the off-grid function and set the reserved capacity via the LCD. For details, see the off-grid setting in the section "**3.2 Commissioning Procedure**".

For the installation and the cable connection of STB5K, see the Quick Installation Guide delivered with the STB5K module.



Connecting the Power Cables

WARNING

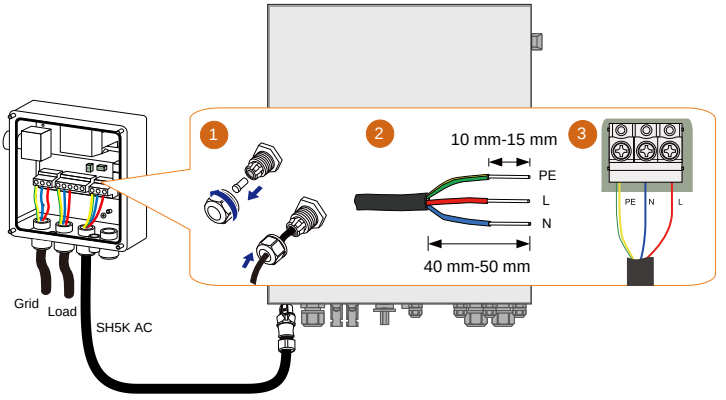
Risk of inverter damage due to incorrect cable connection. Do not connect the grid power wires to LOAD terminals.

A residual current device (RCD) should be required on the LOAD port of the backup box STB5K.

The neutral lines for the grid, the loads and the inverter AC terminals are all inter-connected inside the STB5K. And it is the same for the PE lines.

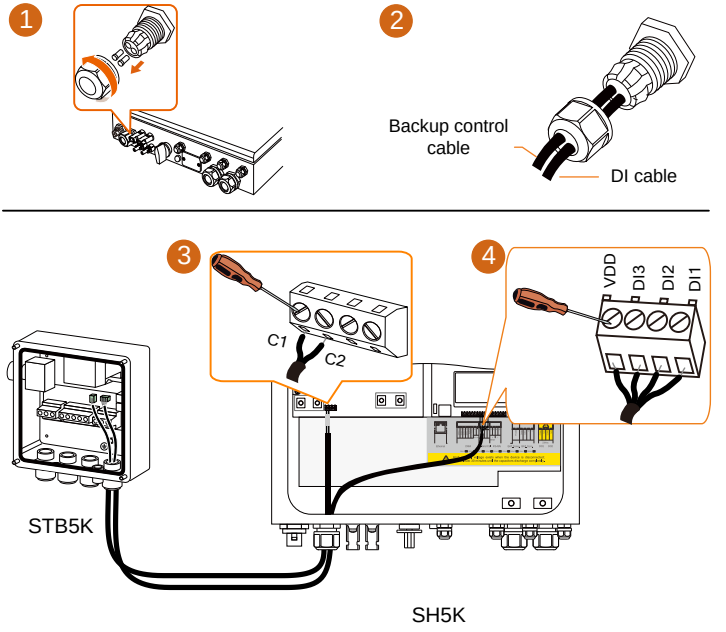
Connect terminals L1, N1 and PE to the grid, and connect terminals L4, N4 and PE to the AC terminals on SH5K.

Cross-section: 4 mm², cable diameter: 11 mm–14 mm



Connecting the Control Cable and DI Cable

The control cables (with end marks **C1** and **C2)** and the DI cable (with end marks **DI1**, **DI2**, **DI3** and **VDD)** are delivered with the backup box STB5K.

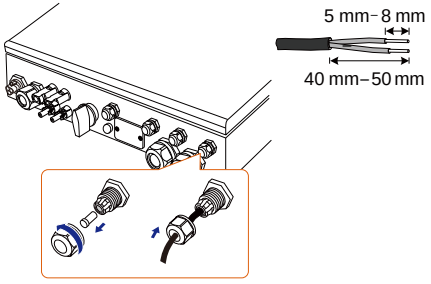


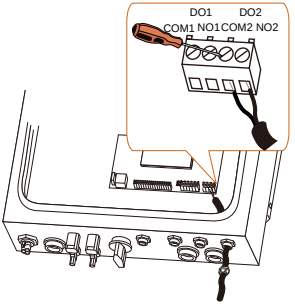
2.8 DO Connection

The inverter has two DO relays with different functions as follows:

- DO1: Consumer load control. Please choose the appropriate contactor according to the load power, e.g., the contactor types of the 3TF30 series from SIEMENS (3TF30 01-0X). The relay is activated once the conditions of the control mode are satisfied.
- DO2: Earth fault alarm. Once the inverter receives the earth fault signal, the relay closes the contact. The relay remains triggered until the fault is removed.

Cross-section: 1.0 mm^2, cable diameter: 3 mm–5.3 mm





2.9 DRED Connection

The inverter supports the DRM (Demand Response Mode) function as specified in AS/NZS 4777:2015. The terminal block inside the inverter is used for connecting to a demand response enabling device (DRED). The DRED asserts DRMs. The inverter detects and initiates a response to all supported demand response commands within 2s. The following table lists the DRMs supported by the inverter.

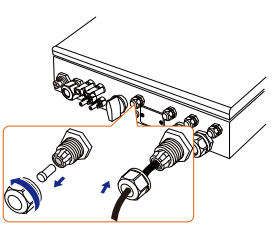
Tab. 2-1 DRMs Supported by the Inverter

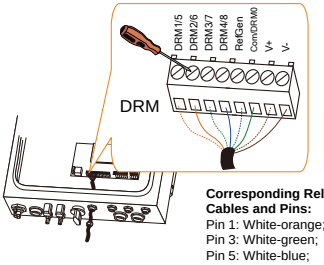
Mode	Explanation
DRM0	The inverter is in the state of "Key-stop".
DRM1	The import power from the grid is 0.
DRM2	The import power from the grid is no more than 50 % of the rated power.
DRM3	The import power from the grid is no more than 75 % of the rated power.
DRM4	The import power from the grid is 100 % of the rated power, but subject to the constraints from other active DRMs.
DRM5	The export power to the grid is 0.
DRM6	The export power to the grid is no more than 50 % of the rated power.

Mode	Explanation
DRM7	The export power to the grid is no more than 75 % of the rated power.
DRM8	The export power to the grid is 100 % of the rated power, but subject to the constraints from other active DRMs.

The DRED may assert more than one DRM at a time. The following shows the priority order in response to multiple DRMs.

Multiple Modes	Priority Order
DRM1…DRM4	DRM1 > DRM2 > DRM3 > DRM4
DRM5…DRM8	DRM5 > DRM6 > DRM7 > DRM8





Corresponding Relationship Between Cables and Pins:

Pin 1: White-orange; Pin 2: Orange;
Pin 3: White-green; Pin 4: Blue;
Pin 5: White-blue; Pin 6: Green;
Pin 7: White-brown; Pin 8: Brown.

* The cable for connecting to the DRED is not included in the delivery.

2.10 Retrofitting the Existing PV System

The SH5K hybrid inverter is compatible with any single-phase PV grid-connected inverters. An existing PV system can be retrofitted to be a PV ESS with the addition of SH5K.

The power generation from the existing PV inverter will be firstly provided to the loads and then charge the battery. With the energy management function of the SH5K, the self-consumption of the new system will be greatly improved.

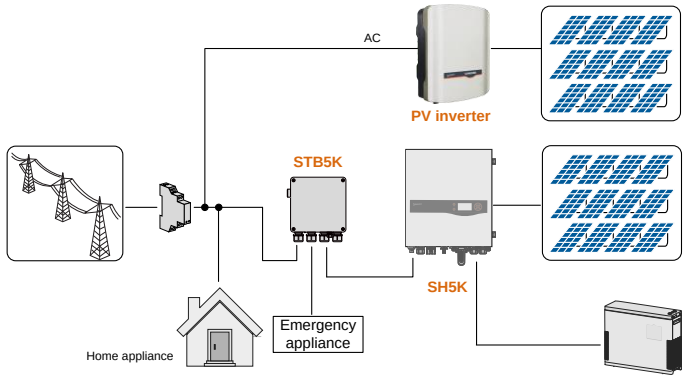
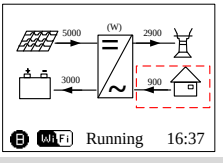


Fig. 2-2 Retrofitting the Existing PV System

The existing PV inverter works as a load in the whole system but supply PV power to the SH5K ESS, as the power flow shown on the main screen.

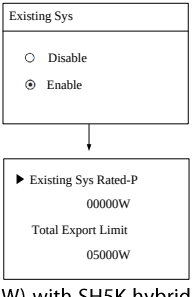


Main Screen (Press ENT)→Menu (Press ▼×2)→Settings (Press ENT)→Input password 111 (Press ENT)→Settings (Press ▼×10)→Existing Sys (Press ENT)

Existing Sys Rated-P: rated power of the existing system.

Total Export Limit: export power upper limit of the new system

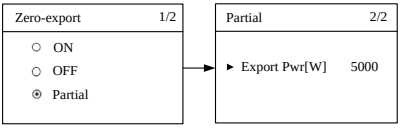
- The lower limit is the rated power of the existing PV system.
- The upper limit is ([rated power of the hybrid inverter] + [rated power of the existing PV system]).



For example, retrofit an existing PV system (rated power: 3000 W) with SH5K hybrid inverter (rated power: 5000 W). The total export limit can be set from 3000 W to 8000 W.

The export power limit can also be set via the submenu of Zero-export. Proceed as follows to perform the settings.

Main Screen (Press ENT)→Menu (Press ▼×2)→Settings (Press ENT)→Input password 111 (Press ENT)→Settings (Press ▼×2)→Zero-export (Press ENT)



NOTICE

The settings in the two submenus are from the same source. If one is changed, the other will synchronize the value.

3 Commissioning

3.1 Button Function

The inverter offers four buttons for operation. Please refer to the following table before any operation of the inverter.

Tab. 3-1 Button Function

Button	Description
▲	For navigating up or increasing the setting value.
▼	For navigating down or decreasing the setting value.
ESC	For navigating to the left, quitting the menu or canceling the settings.
ENT	For navigating to the right or confirming a selection or settings.

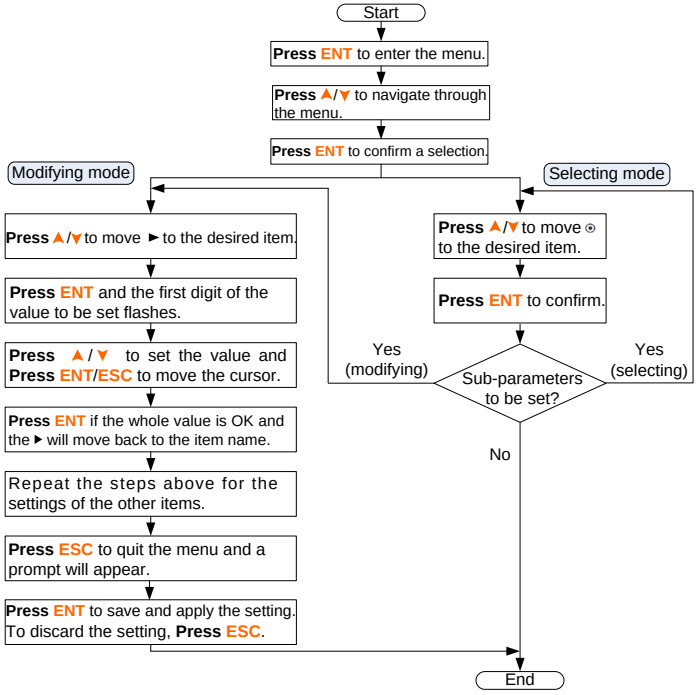
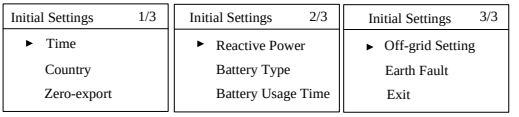


Fig. 3-1 Button Operations

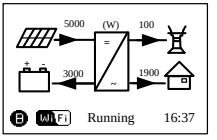
3.2 Commissioning Procedure

Before starting the inverter, make sure all the installation and connections are completed and verified. Proceed as follows to start the inverter for the first time.

1. Connect the AC circuit breaker.
2. Connect the DC circuit breaker between the inverter and the battery pack.
3. **(Optional)** Turn on the switch on the battery pack manually if the battery is equipped with a switch (such as LG Li-ion battery, Pylon Li-ion battery and lead-acid battery).
4. Rotate the DC switch to "ON". The DC switch may be integrated in SH5K or installed by the customer.
5. The LCD screen will be activated 5s later and enter the initial settings.



6. Refer to **Fig. 3-1** for button operations and complete all initial settings according to the procedure in **Fig. 3-2**.
7. Check the icons on the main screen. Refer to **Tab. 4-1** for the explanations.



8. Check the state of LED indicators.

Tab. 3-2 State Descriptions of LED Indicators

LED Label	LED State	Description
"RUN"	On	The inverter is running normally.
	Blinking	The inverter is in the process of starting.
	Off	Other states except Running and Starting. (Refer to **Tab. 4-1** for state descriptions.)
"FAULT"	On	Permanent fault or upgrade failure.
	Blinking	Other system faults or main alarms.
	Off	No fault occurs.

9. Visit www.solarinfobank.com or SolarInfo Moni APP to view inverter information. Get the related manuals at www.sungrowpower.com.

If the inverter commissioning fails, **Press** ▼ to view the current faults. Remove the existing malfunctions and then repeat starting up the inverter according to the procedure detailed in this section.

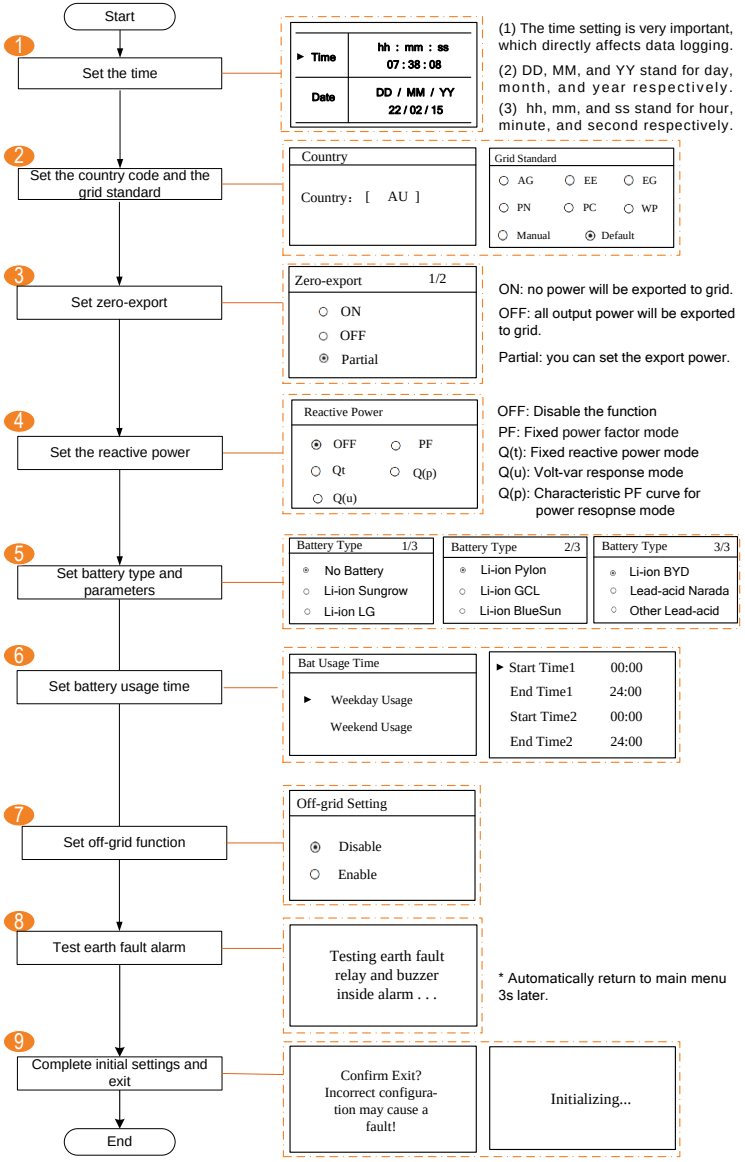


Fig. 3-2 Initial Settings

Tab. 3-3 Grid Standard Description

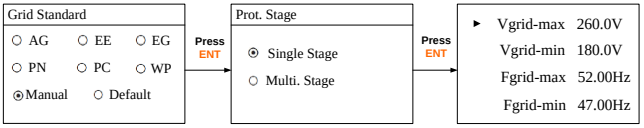
Grid company Code	Company
AG	AusGrid, NSW
EE	Ergon Energy, QLD
EG	Energex, QLD
PN	SA Power Networks,SA
PC	Powercor,VIC
WP	Western Power,WA
Default	Company not mentioned above

Tab. 3-4 Parameters of Grid Standards

Parameter	Default	AG	EE	EG	PN	PC	WP
Over-voltage							
1-V_{max} (V)	260.0	260.0	260.0	260.0	257.0	260.0	260.0
1-Time (s)	2.0	1.80	1.80	1.80	1.80	1.80	1.80
2-V_{max} (V)	265.0	265.0	265.0	265.0	265.0	265.0	265.0
2-Time (s)	0.20	0.20	0.20	0.20	0.20	0.20	0.20
Under-voltage							
1-V_{min} (V)	180.0	200.0	210.0	210.0	200.0	195.0	180.0
1-Time (s)	2.0	1.80	1.80	1.80	1.80	1.80	1.80
2-V_{min} (V)	180.0	200.0	210.0	210.0	200.0	195.0	180.0
2-Time (s)	2.0	1.80	1.80	1.80	1.80	1.80	1.80
Over-frequency							
1-F_{max} (Hz)	52.00	52.00	52.00	52.00	52.00	51.50	51.50
1-Time (s)	0.20	0.20	0.20	0.20	0.20	0.20	0.20
2-F_{max}(Hz)	52.00	52.00	52.00	52.00	52.00	51.50	51.50
2-Time (s)	0.20	0.20	0.20	0.20	0.20	0.20	0.20
Under-frequency							
1-F_{min} (Hz)	47.00	48.00	47.00	47.00	48.00	48.50	47.00
1-Time (s)	2.0	1.80	1.80	1.80	1.80	1.80	1.80
2-F_{min}(Hz)	47.00	48.00	47.00	47.00	48.00	48.50	47.00
2-Time (s)	2.0	1.80	1.80	1.80	1.80	1.80	1.80
10-min voltage							
1-$V_{10\text{-}min}$ (V)	255.0	255.0	255.0	257.0	255.0	255.0	258.0

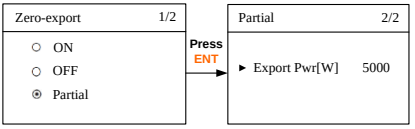
* Refer to **Tab. 4-3** for the parameter explanations.

- Set the Grid standard for the country code "AU". Set the protective parameters if you choose "Manual".



- Zero-export (Partial):

ON: no power could be exported to the grid.

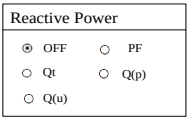


OFF: all inverter output power could be exported to the grid.

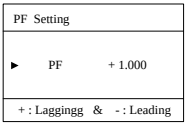
Partial: partial of the output power could be exported to the grid.

- Reactive power regulation:

OFF:
The reactive power regulation function is disabled.
The power factor (PF) is limited to +1.000.

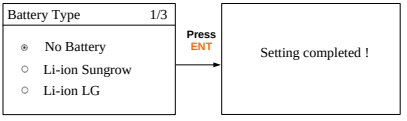


"**PF**" mode:
The inverter is capable of operating with fixed power factor.
The PF ranges from 0.8 leading to 0.8 lagging.
Leading: the inverter is sourcing reactive power to the grid.
Lagging: the inverter is sinking reactive power from the grid.
For the explanations of other modes, refer to the User Manual.

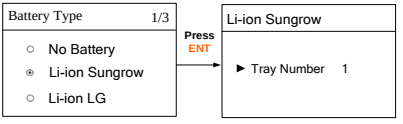


- Battery parameters:

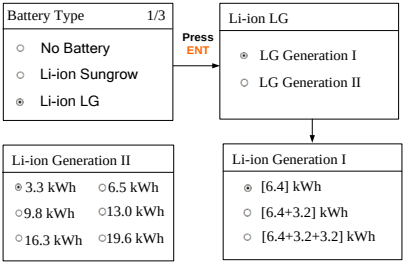
"No Battery" or "Lead-acid Narada" option:



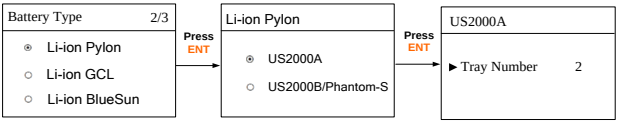
"Li-ion Sungrow" option:



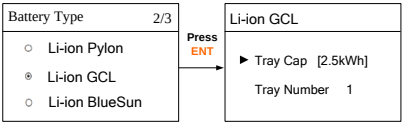
"Li-ion LG" option:
Set the battery capacity.



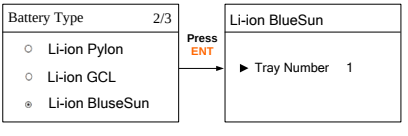
"Li-ion Pylon" option:



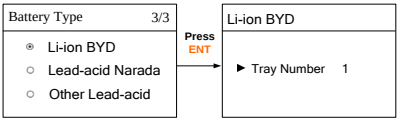
"Li-ion GCL" option:



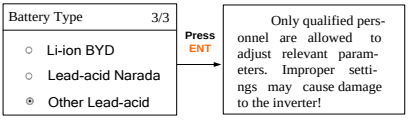
"Li-ion BlueSun" option:



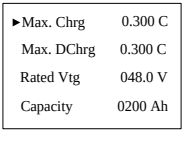
"Li-ion BYD" option:



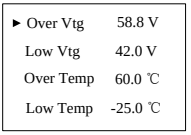
"Other Lead-acid" option:

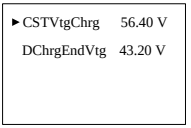


Max. Chrg / Max. DChrg:
Make sure that the charge or discharge current is not beyond the upper limit (65 A) to protect the battery from overcharging or deep discharging.
The unit ***C*** is the "capacity". If the max. charge or discharge is set to more than 65 A (e.g. C = 600 Ah, 0.3C = 180 A), then the inverter will limit the charge and discharge current to 65 A.



If the battery voltage or temperature is beyond the allowable range, the related error codes will be triggered and the protection function will be activated to stop charging or discharging.





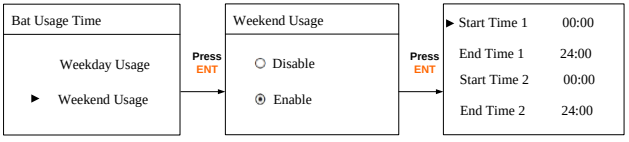
***DChrgEndVtg*:**
Stop discharging at a voltage not lower than DChrgEndVtg, so as to protect the battery from deep discharging.
The ***DChrgEndVtg*** setting value should be higher than the ***Low Vtg*** setting value.

Tab. 3-5 Description of Other Lead-acid Battery Parameter

Parameter	Description	Default	Range
Max Chrg	The upper limit of the charging current	0.300C	0.05C to 2C
Max DChrg	The upper limit of the discharging current	0.300C	0.1C to 2C
Rate Vtg	The rated voltage of the equipped battery	48.0 V	30 V to 60 V
Capacity	Capacity of the battery tray	200 Ah	10 Ah to1000 Ah
Over Vtg	The upper limit of battery voltage when charging	58.8 V	48 V to 70 V
Low Vtg	The lower limit of battery voltage when discharging	42.0 V	26 V to 48 V
Over Temp	The upper limit of battery temperature	60.0℃	20℃ to 70℃
Low Temp	The lower limit of battery temperature	-25.0℃	-30℃ to 10℃
CSTVtgChar	The voltage of constant-voltage charging.	56.4 V	40 V to 63 V
DChrgEndVtg	The voltage at which the discharging is stopped	43.20 V	30 V to 53 V

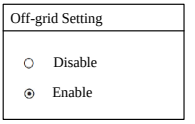
*C is the "capacity", which refers to the maximum amount of charge that a battery can store. Refer to the manufacturer's specifications for details.

- Battery usage enabled (Weekend):



- Off-grid enabled:

The off-grid function is disabled by default.
If the backup box STB5K is installed, enable this function in the initial settings. The reserved capacity is the on-grid minimum battery discharge level. The reserved battery capacity will be supplied to the emergency loads in the off-grid system.



NOTICE

In the case of commissioning failure, power off the system and wait 1 minute to commission the system again.

3.3 Result Verification

3.3.1 Meter Installation and Connection

The following figure shows the correct installation and connection of the meter. With the signal from the 1-phase sensor, the inverter determines the energy exchange with the utility grid on one phase.

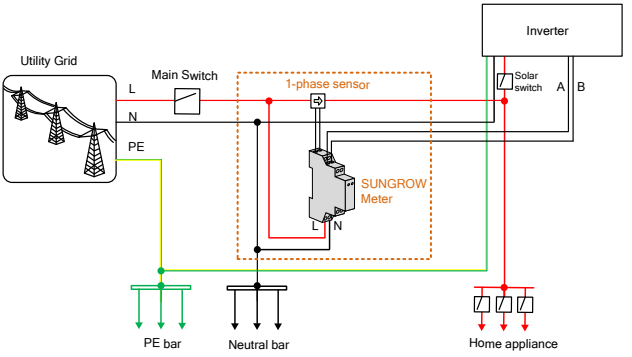


Fig. 3-3 Correct Installation and Connection of the Meter

* The CT clamp of 1-phase sensor can be placed before or after the main switch.

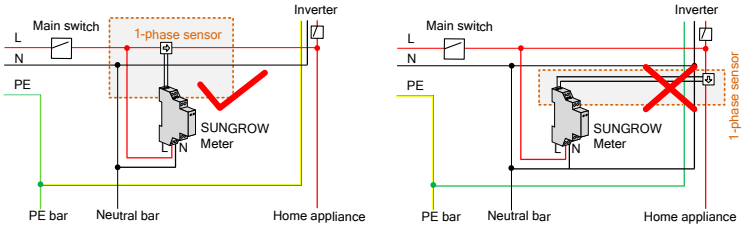
Before the verification, proceed as follows:

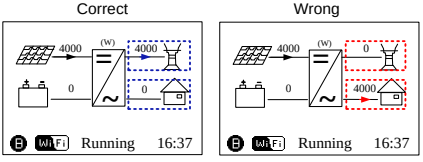
- Disconnect the DC switch between the inverter and the battery module.
- Make sure that the L line and N line are connected to the right terminals.

For Incorrect Installation Position

Make sure that the 1-phase sensor of the SUNGROW meter should be placed to the

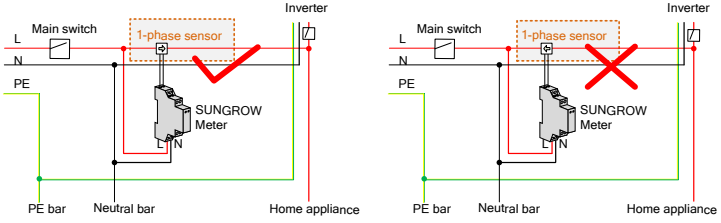
phase line (L) from the main switch. If otherwise, the energy flow indicated on the LCD will be wrong.

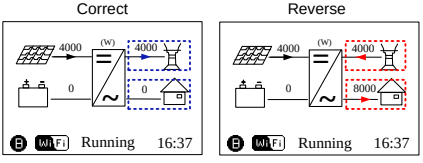


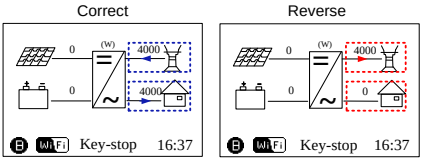
Action	LCD Display Explanation
Turn off all the household loads. All the PV power generation should be exported to the grid, as shown in the "Correct" figure.	

For Reverse Sensor Connection

Make sure that the arrow on the 1-phase sensor must point away from the grid towards the load. If otherwise, the energy flow indicated on the LCD will be wrong.



Action	LCD Display Explanation
Method 1: Turn off all the household loads. All the PV power generation should be exported to the grid, as shown in the "Correct" figure.	

Action	LCD Display Explanation
Method 2: Stop the inverter via the LCD menu and turn on the household loads. All the load power consumption should be imported from the grid, as shown in the "Correct" figure.	

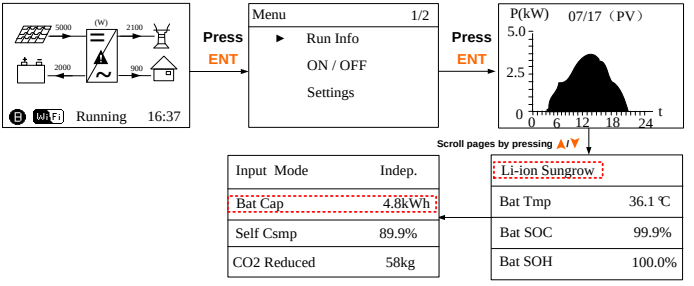
NOTICE

The reverse sensor connection will cause the communication fault 084.

To clear the fault 084, please turn off the DC sources and then restart the system after reconnecting the sensor in correct direction.

3.3.2 Battery Information

After initial settings, check the detailed battery information on the LCD display.

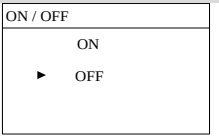


If the battery type or capacity setting is inconsistent with the actual, the charge/discharge current may be less than the actual charge/discharge ability. However, the system can operate normally. Proceed as follows to modify.

- Stop the inverter via the LCD menu.

Main Screen (Press ENT)→Menu (Press▼×1)→ON / OFF (Press ENT)

Confirm your choice by pressing **ENT**.



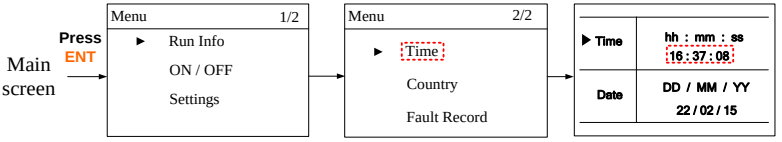
1. Reset the battery type and parameters. Proceed as follows to enter the submenu.

Main Screen (Press ENT)→Menu (Press ▼×2)→Settings (Press ENT)→Input password 111 (Press ENT)→Settings (Press ▼×8)→Battery Type (Press ENT)

2. Start the inverter via the LCD menu.

3.3.3 System Time

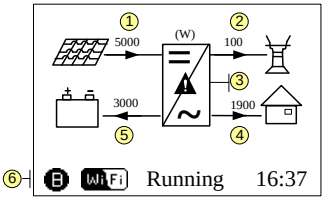
The correct system time is very important. If there is deviation between the system time and the local time, the inverter will not operate normally. The clock is in 24-hour format. Proceed as follows to set the correct time.



4 Operation

4.1 Main Screen

Refer to **Tab. 3-1 Button Function** for the operation instructions. If the inverter succeeds in commissioning, the LCD screen will enter the main screen.



No.	Description
1	Current PV input power
2	Current export power
3	Warning information
4	Total load consumption
5	Battery charge/discharge power
6	System status bar

: The inverter and the SolarInfo Bank server are successfully connected.

Wi Fi : Blinks if the Wi-Fi is not connected to the router's Wi-Fi network;
Steady if the Wi-Fi is successfully connected to the router's Wi-Fi network.

Running: The inverter is in its normal running state.

16:37: Current system time.

Neither the grid power nor the load power will be displayed on the main screen in case of no SUNGROW meter installed. The Wi-Fi icon may be not displayed when the inverter is used with some Wi-Fi modules.

Tab. 4-1 State Descriptions

State	Description
Running	After being energized, the inverter tracks the PV arrays' maximum power point (MPP) and runs with the combination of the energy management system. This mode is the normal mode.
Maintain	The system is running normally, with the battery in maintenance process. (Only for lead-acid battery)
Standby	The inverter waits for sufficient sunlight or battery level, then the DC voltage recovers. Refer to **Chapter 11** in the user manual for standby time setting.
Key-stop	The inverter will stop running by manual "OFF" through the LCD menu or with the DRM0 command from the DRED. Set to "ON" if you want to restart the inverter.
Starting	The inverter is initializing and synchronizing with the grid.
Upgrading	The DSP or LCD software is in its upgrading process.

State	Description
Fault	If a fault occurs, the inverter will automatically stop operation, trigger the AC relay and show "Fault" on the LCD with the "FAULT" indicator lit. Once the fault is removed in recovery time, the inverter will automatically resume running. Refer to **Chapter 11** in the user manual for recovery time setting.
Off-Grid	The system is disconnected from utility grid and runs as a stand-alone system.
Upd-fail	The master DSP program online upgrade failure.

NOTICE

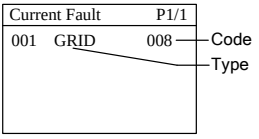
If the inverter is in standby mode for more than 10 minutes, please check:

- Whether the insolation is sufficient and the PV connection is correct.
- Whether the battery level is sufficient and the cable connection is correct.
- If no anomaly is found, disconnect the DC switch and main switch to restart.
- If it still does not work, contact SUNGROW.

4.2 Viewing the Fault Codes

Viewing Current Fault

For the ⚠ icon or the "Fault" state on the main screen, **press** ▼ to view the current faults. Refer to "**5 Troubleshooting**" for the fault definition.



Refer to the following table for the fault type explanations.

Fault Type	Explanation
GRID	Grid faults (AC side)
PV	PV faults (DC side)
SYS	System faults (inverter)
PER	Permanent faults
WARN	Warnings
BDCF	Faults of battery charge/discharge circuit
BDCPF	Permanent faults of battery charge/discharge circuit
BATW	Battery warnings
BATP	Battery protection
BATF1 / BATF2	Battery faults

Viewing Fault Records

Main Screen (Press ENT)→Menu (Press ▼×5)→Fault Record (Press ENT)

Press ▲/▼ to turn pages and view all fault records.

Fault Record		P1/1
001	15022708:55:27	010
002	15022707:11:21	501

4.3 LCD Menu

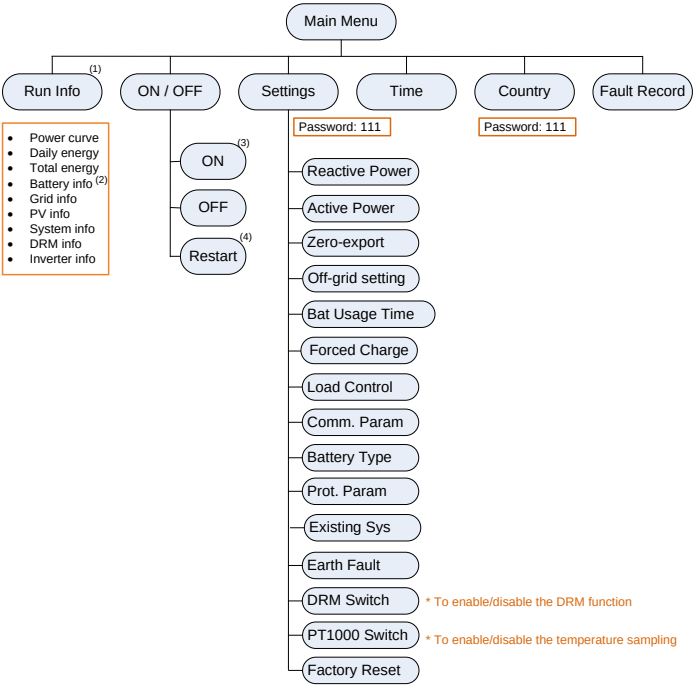


Fig. 4-1 LCD Menu Tree

(1) The power values indicated represent the average values during the time interval. The energy yields displayed are indicative only. For the actual yields, please refer to the electric energy meter.

(2) The value of battery SOH will be displayed as "--" for Pylon US2000A and GCL

battery that do not have this parameter.

(3) The DRM0 state will prohibit the "ON".

(4) The "Restart" option will appear only if an unrecoverable fault occurs.

The demand response mode (DRM), reactive power settings about Qt, Q(p), Q(u), and power derating settings are valid only for Australia.

Abbreviations

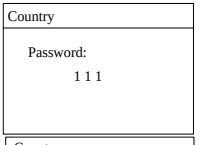
Abbreviation	Complete	Abbreviation	Complete
Csmp	Consumption	Exp	Export
Chrg	Charge	Tot	Total
Bat	Battery	Tmp	Temperature
SOC	State of Charge	SOH	State of Health
Vtg	Voltage	Curr	Current
Stt	State	Inv	Inverter
Pwr	Power	Frq	Frequency
Cap	Capacity	DRM	Demand respond mode
Ver.	Version	Ref.	Reference
CSTVtgChrg	Constant charging voltage	MDCV	Max. discharging current value
DChrg	Discharge	MCCV	Max. charging current value
Prot.	Protection	Multi.	Multiple
Comm.	Communication	DChrgEndVtg	Final discharg voltage
Sys	System	En.	Enable

4.4 Setting the Country Code

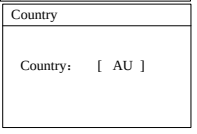
The country setting is protected with a password.

Main Screen (Press ENT)→Menu (Press ➤×4)→Country (Press ENT)

Press ▲ and **Press ENT** to input the password **111**.
Press ENT to confirm the password.



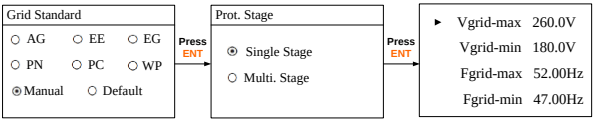
Press ▲ to choose the correct country code.
Only the codes of GB, NL, BE, CN, SA and AU are supported.



Select the correct grid standard for the country code "AU".

For parameter descriptions of other grid standards, see **Tab. 3-4**.

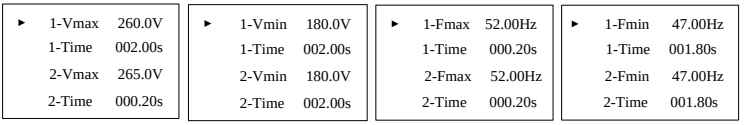
Set the single stage protective parameters manually for "AU".



Set the multiple stage protective parameters manually for "AU".

Press ▲/▼ to turn pages.

After all the settings, **Press ENT** to confirm. **Press ESC** to discard the settings.



Tab. 4-2 Descriptions of the country codes

Country Code	Full Name	Language
GB	Great Britain	English
DE	Germany	German
FR	France	French
IT	Italy	Italian
ES	Spain	English
AT	Austria	German
AU	Australia	English
CZ	Czech	English
BE	Belgium	French
DK	Denmark	English
GR_L	Greece Land	English
GR_IS	Greece Island	English
NL	Netherlands	English
PT	Portugal	English
CN	China	Chinese
SE	Sweden	English
US	America	English
SA	South Africa	English
Other	Country not included above	English

Tab. 4-3 Description of Multi. Stage Protective Parameters

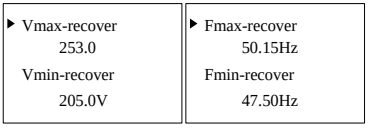
Parameter	Explanation
Max-V prot.	Over-voltage protection
1-V_{max}	Grid over-voltage 1 (V>)
1-Time	Grid over-voltage 1 (V>) tripping time
2-V_{max}	Grid over-voltage 2 (V>>)

Parameter	Explanation
2-Time	Grid over-voltage 2 (V>>) tripping time
Min-V prot.	Under-voltage protection
1-V_{min}	Grid under-voltage 1 (V<)
1-Time	Grid under-voltage 1 (V<) tripping time
2-V_{min}	Grid under–voltage 2 (V<<)
2-Time	Grid under–voltage 2 (V<<) tripping time
Max-F prot.	Over-frequency protection
1-F_{max}	Grid over-frequency 1 (F>)
1-Time	Grid over-frequency 1 (F>) tripping time
2-F_{max}	Grid over-frequency 2 (F>>)
2-Time	Grid over-frequency 2 (F>>) tripping time
Min-F prot.	Under-frequency protection
1-F_{min}	Grid under-frequency 1 (F<)
1-Time	Grid under-frequency 1 (F<) tripping time
2-F_{min}	Grid under-frequency 2 (F<<)
2-Time	Grid under-frequency 2 (F<<) tripping time

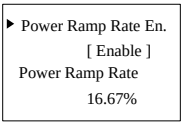
4.5 Setting the Protective Parameters

Main Screen (Press ENT)→Menu (Press ▼×2)→Settings (Press ENT)→Input password 111 (Press ENT)→Settings (Press ▼×9)→Prot. Param (Press ENT)

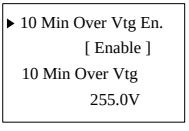
When the grid voltage or frequency reaches the recovery value, the corresponding fault code displayed on the LCD will be cleared and the inverter can start operating.



Power Ramp Rate:
The ramp up/down rate of power variation.
The power rate limit mode is enabled by default with the default set-point of 16.67 % of rated power per minute and lies in the range 5 %–100 %.



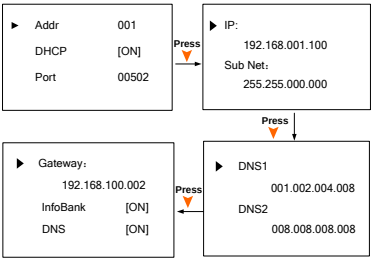
The inverter will automatically disconnect from the grid within 3 s when the average voltage for a 10 min period exceeds the set-point of *10 Min Over Vtg*.
The protective function is enabled by default with the default set-point of 255.0 V and lies in range 244 V–258 V.



4.6 Setting the Communication Parameters

Main Screen (Press ENT)→Menu (Press ▼×2)→Settings (Press ENT)→Input password 111 (Press ENT)→Settings (Press ▼×7)→Comm. Param (Press ENT)

- The communication address ranges from 1 to 247.
- The IP, sub net, gateway, DNS1 and DNS2 can be modified only when the DHCP is set to OFF.
- Acquire the IP, subnet mask, gateway, DNS1 and DNS2 from the network professional.



5 Troubleshooting

5.1 Troubleshooting of LED Indicators

Refer to "**Tab. 3-2 State Descriptions of LED Indicators**" for the definition of indicator states.

Fault Type	Troubleshooting
LED indicators and LCD screen cannot be lit	1. Disconnect the AC circuit breaker. 2. Rotate the DC Switch to "OFF". 3. Check the polarities of the DC inputs.
"RUN" indicator goes out	1. Disconnect the AC circuit breaker. 2. Rotate the DC Switch to "OFF". 3. Check the electrical connection. 4. Check whether the DC input voltage exceeds the start voltage of the inverter. 5. If all of the above are OK, please contact SUNGROW.
"Fault" indicator is lit	1. A fault is not resolved. 2. Perform troubleshooting according to the fault type on the LCD screen. 3. If it cannot be resolved, please contact SUNGROW.

5.2 Troubleshooting of Faults

When faults occur, the "Fault" state will be shown on the main screen. **Press** ▼ to view all the fault information.

- For the battery fault codes, if all the conditions are OK but the fault still occurs, contact the distributor or the battery manufacturer.
- The default ranges only apply to the grid standards in Australia. Refer to **Tab. 3-4** for the specified value.
- We need the following information to provide you with the best assistance: inverter type (e.g. string, central, grid-connected, hybrid, transformerless, single phase, triple phase, single MPPT, multiple MPPTs), or product name, serial number of the inverter, fault code/name, and a brief description of the problem.

For Inverter Side

Code	Specification	Troubleshooting
002	Grid over-voltage. (default range: 257 V–270 V)	1. Check the grid voltage. 2. If the grid voltage exceeds the permissible range, consult the utility grid for a solution.
003	Temporary grid over-voltage in the on-grid mode. (default value: 400 V)	This is a short-term fault. Wait a moment for inverter recovery or restart the system.
004	Grid under-voltage. (default range: 180 V–210 V)	1. Check the grid voltage. 2. If the grid voltage exceeds the permissible range, consult the utility grid for a solution.
005	Grid under-voltage. (default value: 180 V)	
007	Temporary AC over-current. The transient AC current has exceeded the allowable upper limit.	Wait a moment for inverter recovery or restart the system.
008	Grid over-frequency. (default range: 51.5 Hz–52 Hz)	1. Check the grid frequency. 2. If the grid frequency exceeds the permissible range, consult the utility grid for a solution.
009	Grid under-frequency. (default range: 47.0 Hz–48.5 Hz)	
010	Islanding. Abnormal connection between the system and the grid.	1. Check whether the AC circuit breaker is triggered. 2. Check whether all the AC cables are firmly connected. 3. Check whether the grid is in service.
011	DC injection over-current. The DC injection of the AC current exceeds the upper limit.	Wait a moment for inverter recovery or restart the system.
012	Leakage current over-current. The leakage current exceeds the upper limit.	1. Check whether there is a grounding fault in the PV strings. 2. Wait a moment for inverter recovery or restart the system.
014	10-minute grid over-voltage. The average grid voltage is outside the permissible range for over 10 minutes. (default range: 255 V–258 V)	1. Check whether the grid is operating normally. 2. Wait a moment for inverter recovery or restart the system.
015	Grid over-voltage. (default value: 265 V)	1. Check the grid voltage. 2. If the grid voltage exceeds the permissible range, consult the utility grid for a solution.
019	Bus over-voltage. The transient bus voltage exceeds the upper limit.	Wait a moment for inverter recovery or restart the system.

Code	Specification	Troubleshooting
021	PV1 over-current. The input current of PV1 exceeds the upper limit.	1. Check the PV input power and configuration. 2. Wait a moment for inverter recovery or restart the system.
022	PV2 over-current. The input current of PV2 exceeds the upper limit.	
024	Neutral point voltage imbalance. The deviation of the neutral point voltage exceeds the allowable limit.	1. The inverter will recover once the deviation falls below the protective limit. 2. Wait a moment for inverter recovery or restart the system.
028	Reverse polarity of the PV1 connection.	1. Disconnect the DC switch. 2. Check the polarity of the PV inputs. 3. Reconnect the PV strings if the polarity is incorrect.
029	Reverse polarity of the PV2 connection.	
037	Inner over-temperature fault. The ambient temperature inside the inverter exceeds the upper limit.	1. Check and clean the heat sink. 2. Check whether the inverter is installed in sunlight or the ambient temperature of the enclosure exceeds 45℃. If not, please contact SUNGROW for a solution.
038	Relay fault on the grid side.	Wait 5 minutes for inverter recovery or restart the system.
041, 622	Leakage current sampling fault.	Wait 5 minutes for inverter recovery or restart the system.
043	Inner under-temperature fault. The ambient temperature inside the inverter is too low	The inverter will recover once the ambient temperature rises above -25℃.
044	INV open-loop self-check fault.	Wait 5 minutes for inverter recovery or restart the system.
045	PV1 boost circuit fault.	
046	PV2 boost circuit fault.	
048	Phase current sampling fault.	
051	Load overpower fault in the off-grid mode.	If the fault persists, disconnect some non-key loads.
052	INV under-voltage fault in the off-grid mode.	Wait 5 minutes for inverter recovery or restart the system.
062	DI fault of the backup box STB5K.	1. Check whether the DI connection between the inverter and the backup box is correct. 2. Wait 5 minutes for inverter recovery.
063	The version of CPLD (complex programmable logic device)	Power off the system and program the CPLD

Code	Specification	Troubleshooting
	cannot be detected.	
064	INV over-voltage fault in the off-grid mode.	Wait 5 minutes for inverter recovery or restart the system.
065	INV under-frequency fault in the off-grid mode. (default value: 47 Hz)	
066	INV over-frequency fault in the off-grid mode. (default value: 52 Hz)	
067	Temporary grid over-voltage in the off-grid mode. (default value: 500 V)	
083	Fan2 abnormal speed warning.	1. Check if the fan is blocked. 2. Restart the system.
084	Warning for reverse cable connection of the Sungrow Meter.	1. Check whether the power cable connections are correct. 2. For Sungrow single-phase meter, check whether the CT clamp of the 1-phase sensor is correctly placed. Refer to "**3.3.1 Meter Installation and Connection**".
100	INV hardware over-current fault. The AC current exceeds the protective value.	Wait 5 minutes for inverter recovery or restart the system.
101	Grid over-frequency. (default value: 52 Hz)	Check the grid frequency.
102	Grid under-frequency. (default value: 47 Hz)	
106	The inverter is not grounded. Neither the PE terminal on the AC connection block nor the second PE terminal on the enclosure is reliably connected.	1. Check whether there is a reliable grounding connection. 2. If there is access to the ground, and the fault still exists, please contact SUNGROW for a solution. 3. Check whether the L-line and N-line are connected correctly.
107	DC injection over-voltage fault in the off-grid mode. The DC injection of INV voltage exceeds the upper limit.	The inverter will recover once the DC injection voltage falls below the recovery value.
200	Bus hardware over-voltage fault. The bus voltage exceeds the protection value.	Wait 5 minutes for inverter recovery or restart the system.
201	Bus under-voltage fault.	
202	PV hardware over-current fault. The PV1 or PV2 current exceeds the protective value.	

Code	Specification	Troubleshooting
203	The PV input voltage exceeds the bus voltage.	Check the functionality of the PV connection terminals.
204	PV1 boost short-circuit fault	The inverter may be damaged. Contact SUNGROW for a solution.
205	PV2 boost short-circuit fault	
300	INV over-temperature fault.	1. Check and clean the heat sink. 2. Check whether the inverter is installed in sunlight or the ambient temperature of the enclosure exceeds 45℃-60℃. 3. Restart the system.
302	PV insulation resistance fault.	1. Check whether the PV cable connection is intact. 3. Wait for a sunny day to check whether the system can run well.
308	Slave DSP redundant fault.	Restart the system.
309	Phase voltage sampling fault.	
312	DC injection sampling fault.	
315	PV1 current sampling fault.	
316	PV2 current sampling fault.	
317	PV1 MPPT current sampling fault.	
318	PV2 MPPT current sampling fault.	
319	System power supply failure fault.	
320	Leakage current CT self-check fault.	
321	SPI communication failure. Communication faults between the master DSP and the slave DSP.	
322	Master DSP communication fault.	
401-408	Permanent faults.	
409	All temperature sensors failed fault.	Forced restart the system.
501	FRAM1 reading warning.	1. Inverter can normally be connected to the grid. 2. Restart the system.
503-506, 511	Temperature sensor warnings.	
507	Error alarm of DO power settings.	Modify the DO control power according to the load power. Refer to "**Optimized Control**" in section 10.7.7 in the User Manual.
509	Clock reset fault.	Manually reset the clock or synchronize the clock with the network time. This will clear the

Code	Specification	Troubleshooting
		fault.
510	PV over-voltage fault.	1. Check whether the configuration of the PV array exceeds the permissible range of the inverter. 2. Wait a moment for inverter recovery or restart the system.
513	Fan1 abnormal speed warning.	1. Check if the fan is blocked. 2. Restart the system.
514	Abnormal communication warning of the Sungrow Meter. (Inverter can be normally connected to the grid.)	1. Check whether the power cable connections of the meter are correct. 2. Check whether the RS485 connection is correct. 3. Check if the 120 Ohm (2) resistor for RS485_2 is pushed to "ON" when the length of RS485 cable is longer than 100 m.
600	Temporary BDC charging over-current fault.	Wait a moment for system recovery or restart the system.
601	Temporary BDC discharging over-current fault.	
602	Clamping capacitor under-voltage fault.	1. Check the cable connection of the battery. 2. Wait a moment for system recovery or restart the system.
603	Temporary clamping capacitor over-voltage fault.	Wait a moment for system recovery or restart the system.
608	BDC circuit self-check fault.	
612	BDC over-temperature fault.	1. Check and clean the heat sink. 2. Check whether the inverter is installed in sunlight or the ambient temperature of the enclosure exceeds 45℃. 3. Restart the system.
616	BDC hardware over-current fault.	The system will resume once the battery charge/discharge current falls below the upper limit or restart the system.
620	BDC current sampling fault.	Wait a moment for system recovery or restart the system.
623	Slave DSP communication fault.	
624	BDC soft-start fault.	
800,802 804,807	BDC internal permanent faults.	Restart the system
900,901	BDC temperature sensor warnings	1. Check and clean the heat sink. 2. Check whether the inverter is

Code	Specification	Troubleshooting
		installed in sunlight or the ambient temperature of the enclosure exceeds 45℃. 3. Restart the system.
906	Transformer direction recognition error.	1. The inverter can normally be connected to the grid but charge/discharge has stopped. 2. Wait a moment for system recovery or restart the system.
910	FRAM2 warning	Restart the inverter.

For Battery Side

For the battery faults, please consult the battery manufacturer for a solution.

Code	Specification	Troubleshooting
703	Battery average under-voltage fault.	1. The inverter can normally be connected to the grid but charge/discharge has stopped. 2. Wait a moment for system recovery or restart the system.
707	Battery over-temperature fault.	1. The inverter can normally be connected to the grid but charge/discharge has stopped. 2. Check the ambient temperature of the battery location. 3. Wait a moment for system recovery or restart the system.
708	Battery under-temperature fault.	
711	Instantaneous battery over-voltage.	1. The inverter can normally be connected to the grid but charge/discharge has stopped. 2. Wait a moment for system recovery or restart the system.
712	Battery average over-voltage fault.	
714	Abnormal communication between battery and the hybrid inverter.	1. The inverter can normally be connected to the grid but charge/discharge has stopped. 2. Check the battery type and communication connection. 3. Wait a moment for system recovery or restart the system.
715	Battery hardware over-voltage fault.	1. The inverter can normally be connected to the grid but charge/discharge has stopped. 2. Wait a moment for system recovery or restart the system.
732	Battery over-voltage	1. The inverter can normally be

Code	Specification	Troubleshooting
	protection.	connected to the grid. Charge has stopped but discharge is allowed. 2. Wait a moment for system recovery.
733	Battery over-temperature protection.	1. The inverter can normally be connected to the grid but charge/discharge has stopped. 2. Check the ambient temperature of the battery location. 3. Wait a moment for system recovery or restart the system.
734	Battery under-temperature protection.	
735	Battery charging/discharging over-current protection.	1. The inverter can normally be connected to the grid but charge/discharge has stopped. 2. Wait a moment for system recovery or restart the system.
739	Battery under-voltage protection.	1. The inverter can normally be connected to the grid. Discharge has stopped but charge is allowed. 2. Wait a moment for system recovery or restart the system.
832	Battery FET fault or electrical switch failure.	1. The inverter can normally be connected to the grid but charge/discharge has stopped. 2. Check the battery port voltage and the battery communication cable connection. 3. Force a shutdown and restart the inverter and battery system. 4. Wait a moment for system recovery or restart the system.
834	Battery charging/discharging over-current permanent fault.	
836	ID competing failure.	Restart the system, if the fault persists, please contact SUNGROW for a solution.
837, 838	Battery internal faults.	1. The inverter can normally be connected to the grid but charge/discharge has stopped. 2. Check the cable connection of the battery. 3. Try to restart the inverter and battery.
839	Mismatched software version.	Contact SUNGROW for a solution.
844	Software self-verifying failure.	Restart the system, if the fault persists, please contact SUNGROW for a solution.
866	Battery precharge voltage fault.	1. The inverter can normally be connected to the grid but charge/discharge has stopped. 2. Check the battery port voltage and the
867	Battery under-voltage fault.	
868	Battery cell voltage	

Code	Specification	Troubleshooting
	imbalance fault.	battery communication cable connection.
870	Battery cable connection fault.	3. Force a shutdown and restart the inverter and battery system. 4. Wait a moment for system recovery or restart the system.
909	Low SOH (State of Health) warning.	1. The inverter can normally be connected to the grid and the charge/discharge function is normal. 2. Batteries are beyond the scope of the warranty. It is recommended to contact the distributor for replacements.
932	Battery over-voltage warning.	1. The inverter can normally be connected to the grid. Charge has stopped but discharge is allowed. 2. The system will resume after a certain time of discharging.
933	Battery over-temperature warning.	1. The inverter can normally connected be to the grid but charge/discharge has stopped. 2. Check the ambient temperature of the battery location. 3. Wait a moment for system recovery or restart the system.
934	Battery under-temperature warning.	
935	Battery charging/discharging over-current warning.	1. The inverter can normally be connected to the grid but charge/discharge has stopped. 2. Wait a moment for system recovery or restart the system.
937	Battery tray voltage imbalance warning.	1. The inverter can normally be connected to the grid and the charge/discharge functions are normal. 2. Check whether the cable connection of the battery is correct.
939	Battery under-voltage warning.	1. The inverter can normally be connected to the grid. Discharge has stopped but charge is allowed. 2. The system will resume after a certain time of charging.
964	Battery internal warning.	Consult the battery manufacturer for a solution.

6 Appendices

6.1 Inverter Technical Data

PV Input Data	
Max. PV input power	6500 W
Max. PV input voltage	600 V
Startup voltage	125 V
Nominal input voltage	360 V
MPP voltage range	125 V–560 V
MPP voltage range for nominal power	260 V–520 V
No. of MPPTs	2
Max. number of PV strings per MPPT (DC1/DC2)	1/1
Max. PV input current (DC1/DC2)	20 A (10 A / 10 A)
Max. current for input terminals	24 A (12 A / 12 A)
Short-circuit current of PV input	24 A (12 A / 12 A)
Max. inverter backfeed current to array	0 A
Battery Data	
Battery type	Li-ion battery / Lead-acid battery
Battery voltage (rated voltage / range)	48 V (32 V–70 V)
Max. charging/discharging current	65 A / 65 A
AC Input and Output Data	
Max. AC input power	3000 W
Nominal AC output power	4990 W
Nominal AC output current	21.6 A
Max. AC output apparent power	5000 VA
Max. AC output current	21.7 A
Max. inrush current (peak value / duration)	10 A / 12 ms
Max. output fault current (peak value / duration)	100 A / 3.2 ms
Max. output over-current protection	32 A
Nominal grid voltage	230 Vac
Grid voltage range	180 Vac–276 Vac (this may vary with grid standards)
Nominal grid frequency	50 Hz
Grid frequency range	45 Hz–55 Hz (this may vary with grid standards)
Total Harmonic Distortion (THD)	< 3 % (of nominal power)
DC current injection	< 0.5 % (of nominal current)

Power factor	> 0.99 at default value at nominal power (adj. 0.8 overexcited/leading–0.8 underexcited/lagging)
Protection	
Anti-islanding protection	Yes
AC short circuit protection	Yes
Leakage current protection	Yes
DC switch (solar)	Optional
DC fuse	No
Over-voltage protection	III [Main], II [PV] [Battery]
System Data	
Max. efficiency	97.7 %
Max. European efficiency	97.2 %
Max. charge / discharge efficiency	94.0 %
Isolation method (solar)	Transformerless
Isolation method (battery)	HF
Ingress protection (IP) rating	IP65
Pollution degree outside the enclosure	3
Pollution degree inside the enclosure	2
Night power consumption	< 1 W
Operating ambient temperature range	-25℃ to 60℃ (> 45℃ derating)
Allowable relative humidity range	0–100 %
Cooling method	Natural convection
Max. operating altitude	2000 m
Display	Graphic LCD
Communication	2 x RS485, Ethernet, Wi-Fi (optional), CAN
Power management	1 x Digital output
Earth fault alarm	1 x Digital output, email, buzzer inside
Analogue input	PT1000
DC connection type	MC4
AC connection type	Clamping yoke connector
Certifications	AS4777, IEC 62109-1, IEC62109-2, IEC 62040, EN 61000-6-1/-3, NRS 097-2-1:2017

Mechanical Data	
Dimensions (W x H x D)	447 mm x 510 mm x 150 mm
Mounting method	Wall-mounting bracket
Weight	20 kg
Backup Data	
Nominal voltage	230 Vac (±2 %)
Total harmonic factor output	4 % (full load)
Frequency range	50 Hz (±0.2 %)
Switch time to emergency mode	10 s
Power factor	0.8 overexcited/leading–0.8 underexcited/lagging
Max. output power	5000 W / 5000 VA
Max. output power (battery mode)	3000 W / 5000 VA

6.2 STB5K (backup box) Technical Data

Max. input / output current	25 A
Nominal AC voltage	230 Vac–240 Vac
AC voltage range	180 Vac–275 Vac
Operating ambient temperature range	-25℃ to 60℃*
Power consumption	< 3 VA / 2 W
Dimensions (W x H x D)	220 mm x 230 mm x 90 mm
Mounting method	Wall-mounting bracket
Weight	2.6 kg

Meter Technical Data

Nominal voltage	240 Vac
Input voltage range	180 Vac–286 Vac
Power consumption	< 2 W (10 VA)
Max. operating current	100 A
Grid frequency	50 Hz
Measurement accuracy	Class I
Interface and communication	RS485
Ingress protection rating	IP20
Operating temperature range	-25℃ to 75℃
Allowable relative humidity range	0–95 %
Dimensions (W x H x D)	18 mm x 117 mm x 65 mm
Mounting method	35 mm DIN-rail
Weight	0.2 kg

Exclusion of Liability

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

- inappropriate use or installation of the products;
- installing or operating the products in an unintended environment;
- ignoring relevant safety regulations in the deployment location when installing or operating the products;
- ignoring safety warnings and instructions contained in all documents relevant to the products;
- installing or operating the products under incorrect safety or protection conditions;
- altering the products or supplied software without authority;
- the product faults due to operating attached or neighboring devices beyond allowed limit values; and
- damage caused by the natural environment beyond the rated operating range of the inverter.

The use of supplied software produced by SUNGROW is subject to the following conditions:

- SUNGROW rejects any liability for direct or indirect damage arising from the use of the SolarInfo software. This also applies to the provision or non-provision of support activities.
- Using the SolarInfo software for commercial purposes is prohibited.
- Decompiling, decoding or destroying the original program, including SolarInfo software and the embedded software, is prohibited.

About Us

SUNGROW is a China-leading manufacturer of various power electronic products for renewable energy generation systems, supplying to a global customer base. Our products include converters, inverters, battery chargers and other power supplies for distributable generation systems in both grid-connected and stand-alone applications. The power rating of SUNGROW products covers from hundred watt to mega-watt systems.

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

Contact Information

Should you have any problems, please contact us through the following information. We will be more than happy to assist you!

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