SUNFLX

USER MANUAL



Solar Storage Inverter

SF 3600 | SF 4000 | SF 6000

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1. About This Manual

1.1 Purpose

Thanks for choosing Sunflx's SF 3600, SF 4000 and SF 6000 Series Solar Storage Inverter.
This manual describes the assembly, installation, operation and troubleshooting of this unit. Please read this manual carefully before installations and operations. Keep this manual for future reference.

1.2 Scope

This manual provides safety and installation guidelines as well as information on tools and wiring.

2. Safety Instructions

Symbol	Instructions
⚠ DANGER	DANGER indicates a hazardous situation which if not avoided will result in death or serious injury.
⚠ WARNING	WARING indicates a hazardous situation which if not avoided could result in death or serious injury.
⚠ CAUTION	CAUTION indicates a hazardous situation which if not avoided could result in minor or moderate injury.
NOTICE	NOTICE provide some tips on operation of products.

1. Before using the unit, read all instructions and cautionary markings on the unit, the batteries and all appropriate sections of this manual.
2. ⚠ CAUTION To reduce risk of injury, charge only deep-cycle lead acid type rechargeable batteries. Other types of batteries may burst, causing personal injury and damage.
3. Do not disassemble the unit. Take it to a qualified service center when service or repair is required. Incorrect re-assembly may result in a risk of electric shock or fire.
4. To reduce risk of electric shock, disconnect all wirings before attempting any maintenance or cleaning. Turning off the unit will not reduce this risk.
5. ⚠ CAUTION Only qualified personnel can install this device with battery.
6. Never charge a frozen battery.
7. For optimum operation of this solar storage inverter, please follow required spec to select appropriate cable size. It's very important to correctly operate this solar storage inverter.
8. Be very cautious when working with metal tools on or around batteries. A potential risk exists to drop a tool to spark or short circuit batteries or other electrical parts and could cause an explosion.
9. Please strictly follow installation procedure when you want to disconnect AC or DC terminals. Please refer

to installation section of this manual for the details.

10. A suitable fuse is suggested as over-current protection for the battery supply
11. Grounding instructions-This Solar Storage Inverter should be connected to a permanent grounded wiring system. Be sure to comply with local requirements and regulation to install this inverter.
12. Never cause AC output and DC input short circuited. Do NOT connect to the mains when DC input short circuits.
13. **⚠ WARNING** Only qualified service people are able to service this device. If errors still persist after following troubleshooting table, please send this solar storage inverter back to local dealer or service center for maintenance.

3. Introduction

The Sunflx's SF Series solar storage inverter is a combination of high frequency inverter, AC charger and high efficiency MPPT solar controller. It adopts DSP control and features high response speed, reliability, and industrial standard through an advanced control algorithm.

It is perfect for medium households and rural areas with limited power. It offers high conversion efficiency for a stable power supply and features multiple protections for safety.

Its user-friendly interface simplifies installation and maintenance, while the smart monitoring app enables real-time energy tracking, reducing electricity costs and providing clean energy for multiple application scenarios.

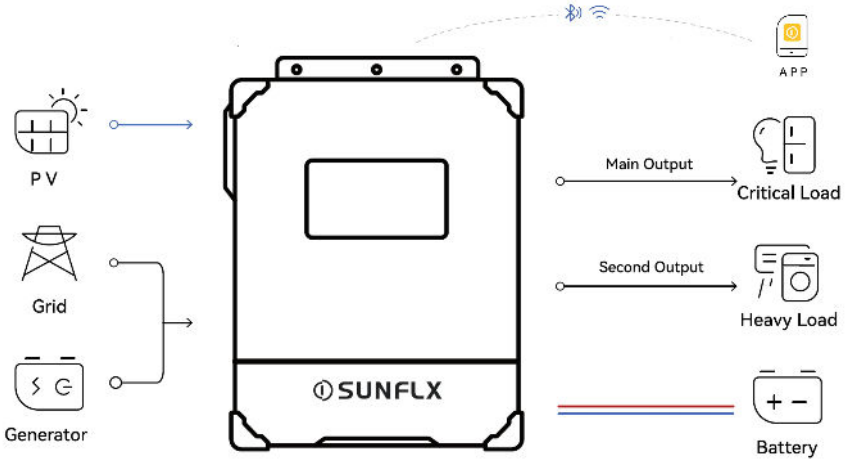
3.1 Features

1. Dual AC outputs for smart load management
2. Wide PV input voltage range 60Vdc-500Vdc
3. Compatible with lithium, lead-acid and GEL batteries
4. PV and AC dual activation
5. Support generator input
6. Feed into Grid (Optional)
7. Plug-and-play quick connection MC4 PV terminals
8. WIFI & Bluetooth monitoring (APP available)
9. Multi-customized modes for diverse scenarios
10. Dust-proof filter for harsh environment
11. Single-phase pure sine wave output
12. Smart battery charger design for optimized battery performance
13. Configurable input voltage range for home appliances and personal computers
14. Configurable AC or Solar Charge priority
15. Auto restart while AC is recovering
16. 360° protection with complete overload, over temperature, short circuit protection, over/under voltage protection
17. Cold start function

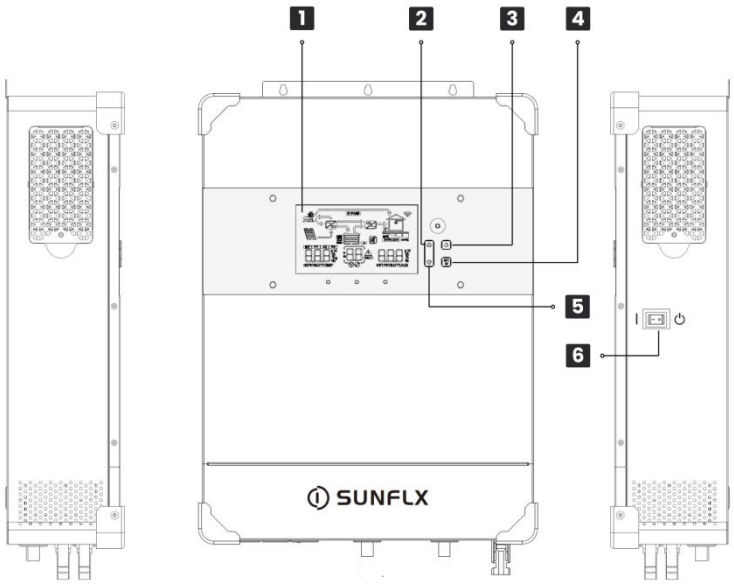
3.2 Basic System Architecture

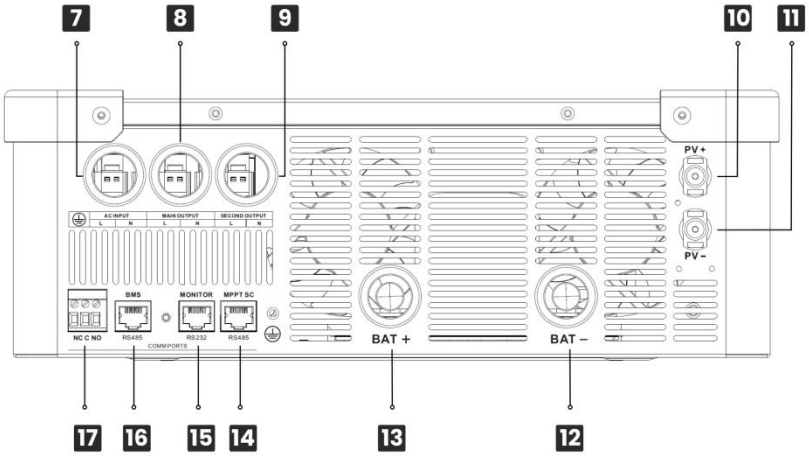
The diagram below illustrates the system application scenario of this product. A complete system consists of the following components:

1. **Solar Panel:** Convert light energy into DC power, which can either charge the battery via an inverter or be directly converted into AC power to supply the load.
2. **Grid or Generator:** Connected to the AC input, it can supply power to the load and charge the battery simultaneously. The system can also function without mains or a generator when the battery and PV module power the load.
3. **Battery:** Ensures a consistent power supply to the system load when solar energy is insufficient and mains power is unavailable.
4. **Home Load:** Supports various household and office appliances, including refrigerators, lamps, televisions, fans, air conditioners, and other AC loads.
5. **Solar Storage Inverter:** The core energy conversion device of the entire system. The actual application scenario determines the specific system wiring method.
6. **Sunflx Cloud APP**：WIFI & Bluetooth monitoring APP used for viewing and configuring parameters.



3.3 Product Overview





1. LCD display
2. Function button (UP)
3. Function button (ESC)
4. Function button (SET/OK)
5. Function button (DOWN)
6. Power on/off switch
7. AC input
8. Main output
9. Second output
10. PV+ Terminal
11. PV - Terminal
12. Battery - Input
13. Battery + Input
14. RS485 communication port (MPPT Solar Controller)
15. RS232 communication port (MONITOR)
16. RS485 communication port (BMS)
17. Dry Contact

4. Installation

4.1 Unpacking and Inspection

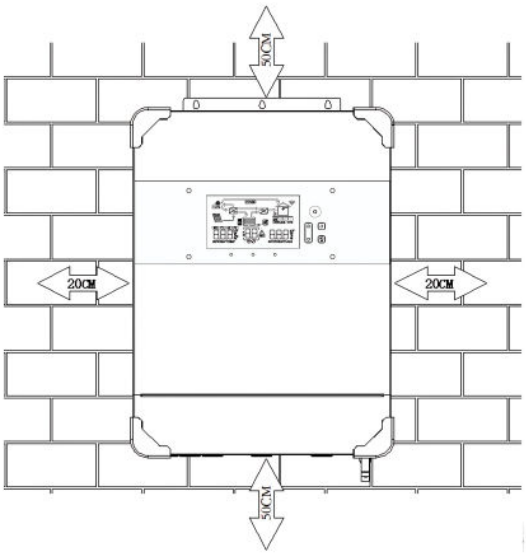
Before installation, please inspect the unit. Be sure that nothing inside the package is damaged. You should have received the following items inside of package:

- The inverter x 1
- User manual x 1
- Smart Dongle x 1
- Accessories bag x 1

4.2 Select the Mount Location

The SF series is designed for INDOOR USE ONLY (IP21). Please consider the following before selecting the installation location:

- ➢ Choose a solid wall to mount the inverter.
- ➢ Install the inverter at eye level.
- ➢ Ensure adequate space for heat dissipation around the inverter.
- ➢ Maintain an ambient temperature between -10~60℃ for optimal operation.



DANGER

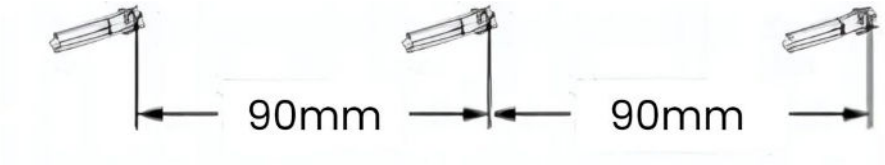
- Do not install the inverter near highly flammable materials.
- Do not install the inverter in areas with potential explosive hazards.
- Do not install the inverter with lead-acid batteries in confined spaces.

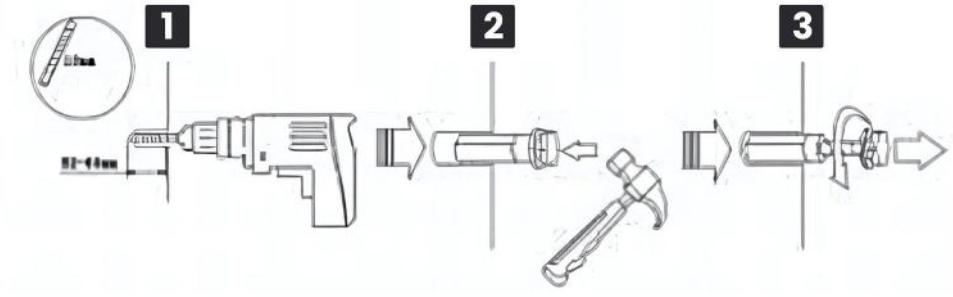
CAUTION

- Do not install the inverter in direct sunlight.
- Do not install or use the inverter in a humid environment.

4.3 Mount the Inverter

Make 3 mounting holes in the wall with a drill according to the specified dimensions, insert two expansion screws above and two M5 size screws below for fixing the inverter.





4.4 Cable & Circuit Breaker Requirement

PV INPUT

Model	Cable Diameter	Max. PV Input Current	Circuit Breaker
SF 3600	4 mm²/ 1 x 12AWG	22A	2P 25A
SF 4000	4 mm²/ 1 x 12AWG	22A	2P 25A
SF 6000	4 mm²/ 1 x 12AWG	22A	2P 25A

AC INPUT (Single Phase)

Model	Cable Diameter	Max. Input Current	Circuit Breaker	Torque value（max）
SF 3600	4 mm²/ 1 x 12AWG	30A	2P 32A	2 Nm
SF 4000	4 mm²/ 1 x 12AWG	40A	2P 50A	2 Nm
SF 6000	5.3 mm²/1 x 10AWG	40A	2P 50A	2 Nm

BATTERY CONNECT

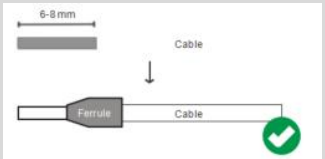
Model	Cable Diameter	Max.Battery Current	Circuit Breaker	Torque value（max）
SF 3600	22 mm²/1 x 4AWG	82A	2P 100A	2 Nm
SF 4000	54 mm²/1 x 0AWG	167A	2P 200A	2 Nm
SF 6000	34 mm²/1 x 2AWG	136A	2P 200A	2 Nm

AC OUTPUT (Single Phase)

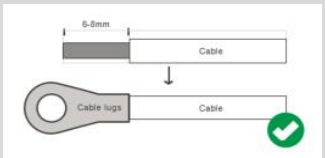
Model	Cable Diameter	Max. Output Current	Circuit Breaker	Torque value（max）
SF 3600	4 mm²/1 x 12AWG	15.7A	20A	2 Nm
SF 4000	4 mm²/1 x 12AWG	17.4A	20A	2 Nm
SF 6000	4 mm²/1 x 12AWG	26.1A	32A	2 Nm

NOTICE

AC INPUT and AC OUTPUT Cable Making：
Use a stripper to remove 6-8mm of insulation from the cable.
Attach a ferrule to the end of the cable (ferrule must be provided by user).



Battery Cable Making：
Use a stripper to remove 6-8mm of insulation from the cable.
Attach a ferrule to the end of the cable (ferrule must be provided by user).

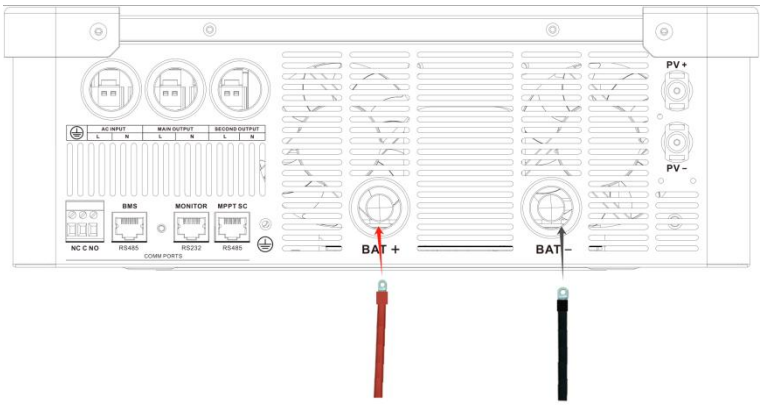


The wire diameter provided is for reference only. If the distance between the PV array and the inverter, or between the inverter and the battery, is long, using a thicker wire will reduce voltage drop and improve system performance.

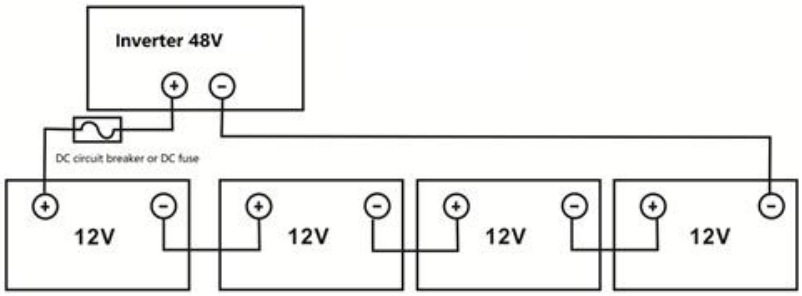
4.5 Battery Connection

Please follow the steps below to implement battery connection:

1. Use a proper copper terminal to crimp a suitable cable for battery.
2. Connect the battery cable to the correct battery terminal.
3. Tighten the cable with a nut using a special tool.



4. Connect all battery packs as below chart if battery need series connection.



DANGER

- Before connecting the battery, ensure that the circuit breaker is opened to prevent the risk of electric shock. Do not operate it with electricity.
- Ensure correct connection of the positive and negative terminals of the battery to prevent reversal, which may damage the inverter.
- Verify that the cable used meets the requirements; thin or poor-quality cables pose a serious safety hazard.

4.6 AC Input & Output Cable Connection

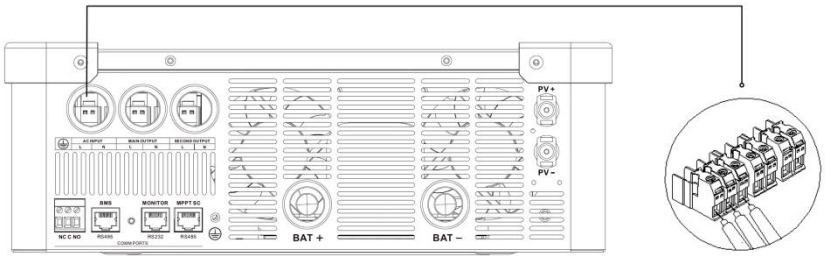
Please follow the steps below o implement AC input/output connection:

1. Before making AC input/output connection, be sure to open DC protector or disconnect first.
2. Remove insulation sleeve 10mm for six conductors. And shorten phase L and neutral conductor N 3 mm.
3. Insert AC input wires according to polarities indicated on terminal block and tighten the terminal screws. Be sure to connect PE protective conductor (⏚) first.

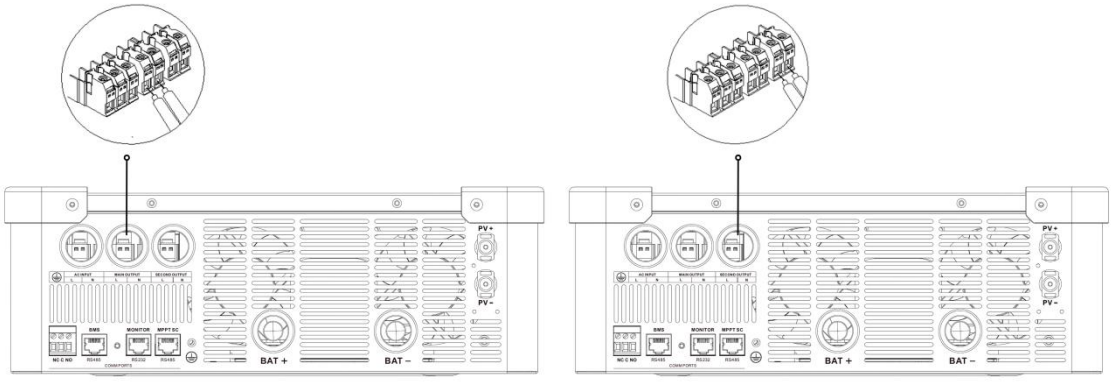
   ⏚ →**Ground (yellow-green)**

   L →LINE (brown or black)

   N →Neutral (blue)



4. Then, insert AC output wires according to polarities indicated on terminal block and tighten terminal screws. Be sure to connect PE protective conductor (⏚) first.
   ⏚ →**Ground (yellow-green)**
   L →LINE (brown or black)
   N →Neutral (blue)



Output 1: Main output
For important load.

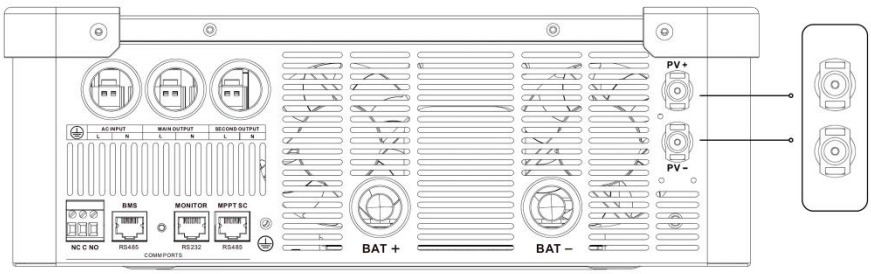
Output 2: Second output
If the battery voltage is lower than the set value, this output will be turned off.

⚠ DANGER

- Before connecting AC inputs and outputs, ensure that the circuit breaker is open to prevent the risk of electric shock. Do not operate it with electricity.
- Please ensure that the cable used meets the requirements. Thin or poor-quality cables pose a serious safety hazard.

4.7 PV Connection

Connect solar array positive and negative MC4 connector to Inverter PV+ and PV- Terminal according to the diagram below.



DANGER

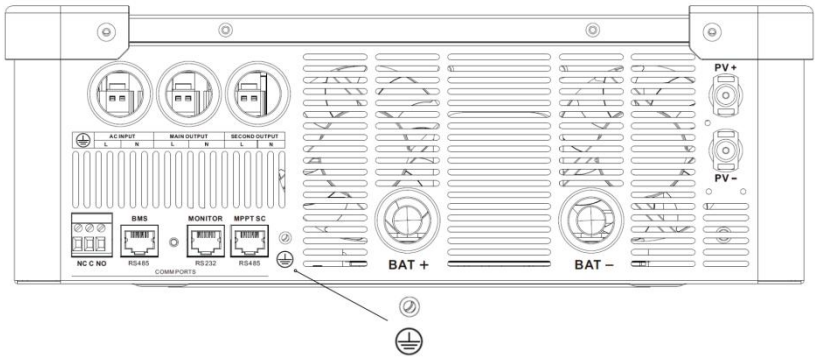
- Before connecting the PV modules, ensure the circuit breaker is opened to prevent the risk of electric shock. Do not operate it with electricity.
- Please ensure that the open circuit voltage of the PV modules in series does not exceed the maximum Open Circuit Voltage of the inverter (In the SF series, this value is 500V), as exceeding this limit may damage the inverter.
- Please ensure that the total PV input Array Power does not exceed the Max. PV Array Power.

Take 580Wp N type PV module as an example. After considering above two parameters, the recommended module configurations are listed as below table.

	PV INPUT Min in serial: 1 pcs	Q'ty of panels	Total Input power	Total Voc
Reference Solar Panel Size:2278*1134*35mm 144 cells, N type **STC condition:** Pmax:580Wp Vmp: 43.53dc Imp: 13.44A Voc: 52.47Vdc Isc: 14.07A	1 pcs in serial	1 pcs	580W	52.47 Vdc
	2 pcs in serial	2 pcs	1160W	104.94 Vdc
	3 pcs in serial	3 pcs	1740W	157.41 Vdc
	4 pcs in serial	4 pcs	2320W	209.88 Vdc
	5 pcs in serial	5 pcs	2900W	262.35 Vdc
	6 pcs in serial	6 pcs	3480W	314.82 Vdc
	7 pcs in serial	7 pcs	4060W	367.29 Vdc
	8 pcs in serial	8 pcs	4640W	419.76 Vdc
	9 pcs in serial	9 pcs	5220W	472.23 Vdc
	5 pcs in serial and 2 sets in parallel	10 pcs	5800W	262.35 Vdc
	6 pcs in serial and 2 sets in parallel	12 pcs	6960W	314.82 Vdc
	7 pcs in serial and 2 sets in parallel	14 pcs	8120W	367.29 Vdc
	8 pcs in serial and 2 sets in parallel	16 pcs	9280W	419.76 Vdc
	9 pcs in serial and 2 sets in parallel	18 pcs	10440W	472.23 Vdc

Note: The total solar Voltage = Voc* (in serial number) must be ≤ 500Vdc

4.8 Grounding Connection

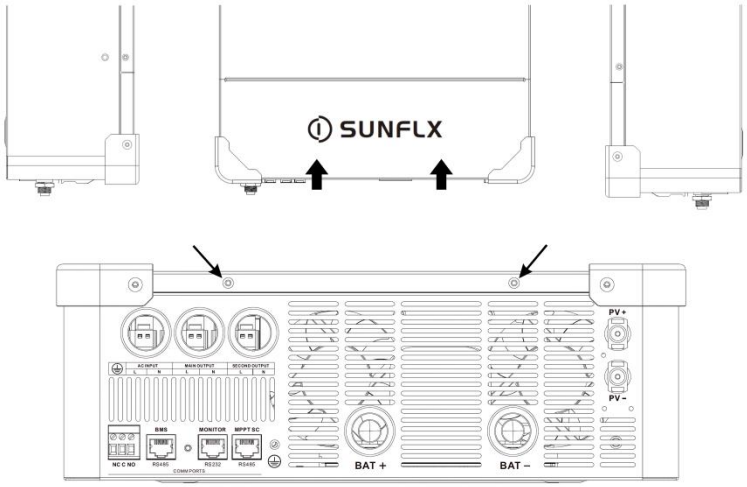


NOTICE

- The grounding cable should be at least 4 mm² in diameter and positioned as close as possible to the grounding point.

4.9 Final Assembly

After connecting all wirings, please put bottom cover back by screwing two screws as shown below.



4.10 Start up the Inverter

Step 1: Close the battery circuit breaker.
Step 2: Press the rocker switch on the bottom of the inverter to activate it; the screen and indicators will light up.
Step 3: Sequentially close the circuit breakers for PV, AC input, and AC output.
Step 4: Start the loads gradually, beginning with lower power devices and moving to larger ones.

5. Operation

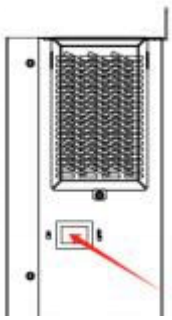
5.1 System Commissioning by Sunflx Cloud APP

Smart Dongle can connect with MONITOR port on inverter, enabling users to monitor operational status and configure parameters of the inverter using a mobile phone application.
User can scan the QR code or Search “Sunflx Cloud” to download the Mobile APP in Google Play and APP Store.



5.2 Power ON/OFF

Side view of unit



Once the unit has been properly installed and the batteries are connected well, simply press On/Off switch (located on the button of the case) to turn on the unit.

5.3 Operation and Display Panel

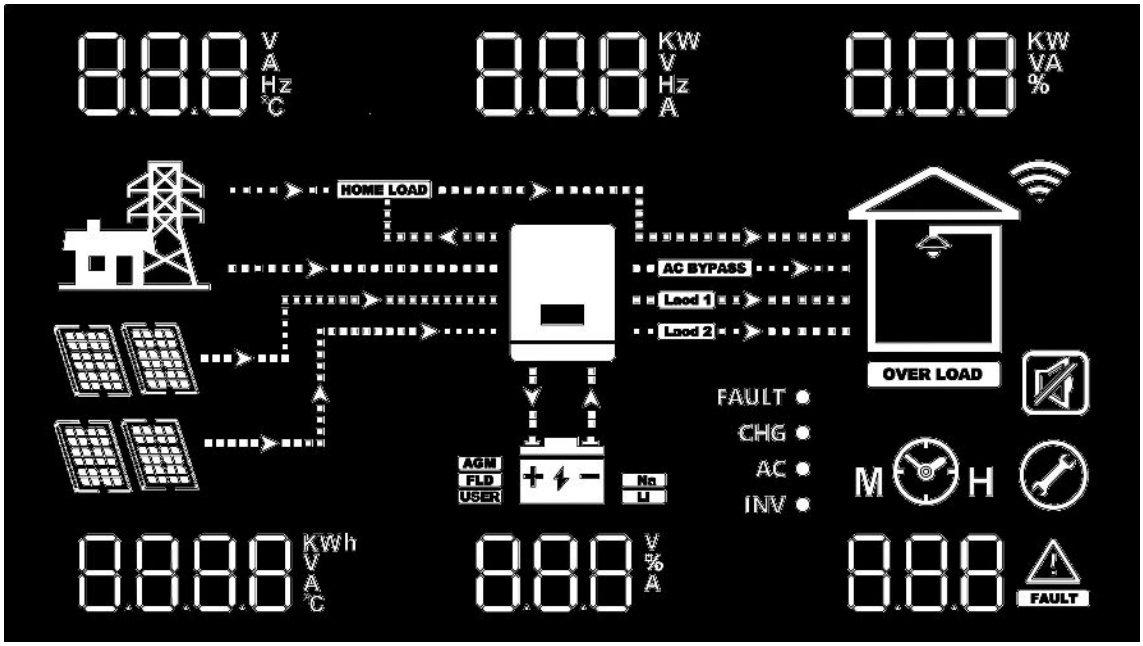
The operation and display panel, depicted in the chart below, is located on the front panel of the inverter. It consists of four function keys and an LCD display, providing information on the operating status and input/output power.

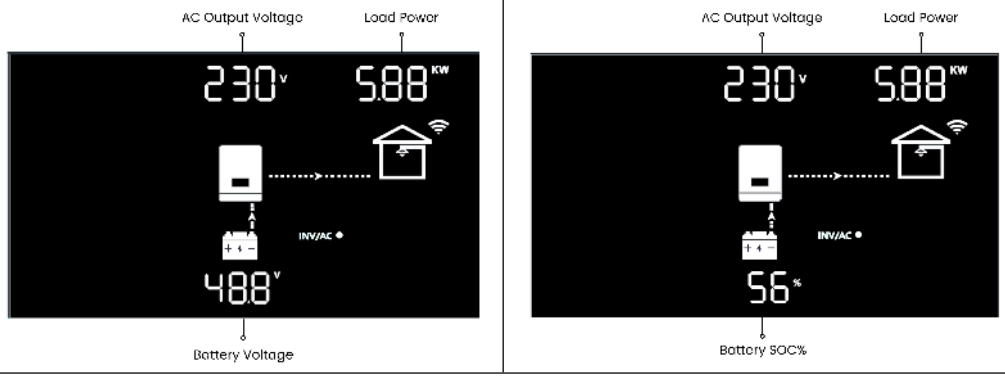
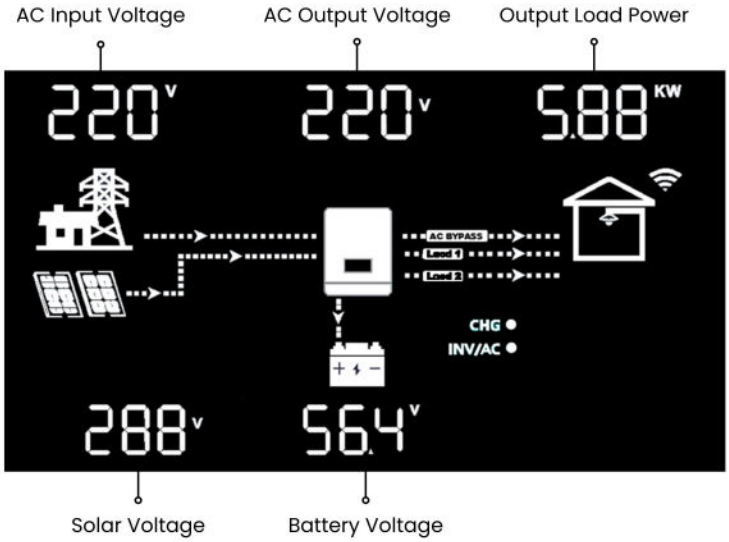
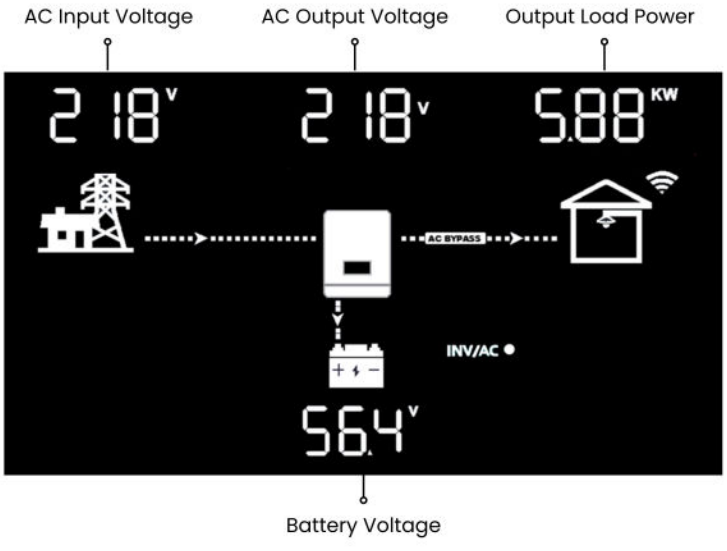


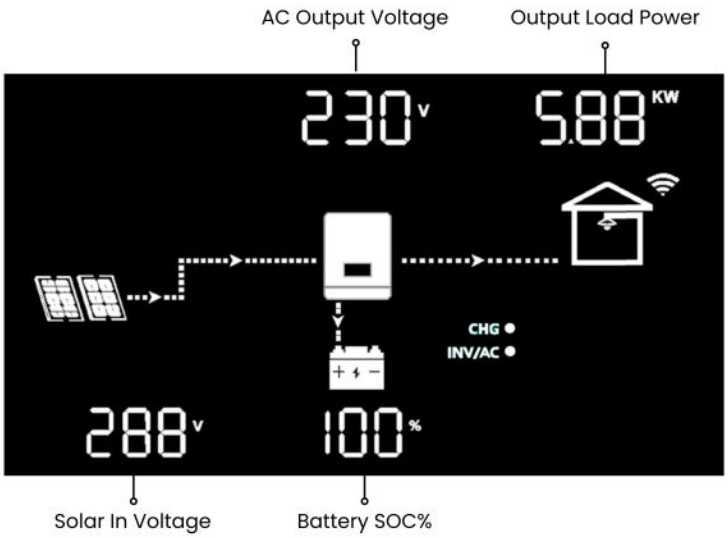
Function Key	Description
	To exit setting mode
	To go to previous selection
	To go to next selection
	To confirm the selection in setting mode or enter setting mode

LED Indicator			Messages
AC / INV	Green	Solid On	Output is powered by utility in Line mode.
		Flashing	Output is powered by battery or PV in battery mode.
CHG	Green	Solid On	Battery is fully charged.
		Flashing	Battery is charging.
⚠ FAULT	Red	Solid On	Fault occurs in the inverter.
		Flashing	Warning condition occurs in the inverter.

5.4 LCD Display Icons



Working status (Home page)	LCD Indicates
Battery discharging Inverter mode	
AC input bypass MPPT working Battery charging	
AC input bypass Battery charging	

MPPT working Battery charging	

Icon	Function description
Configuration Program and Fault Information	
	Indicates the setting programs.
	Indicates the warning and fault codes.
	Indicates overload.
Mode Operation Information	
	Indicates unit connects to the mains.
	Indicates unit connects to the PV panel.
	Indicates load is supplied by utility power.
	Indicates main output from inverter.
	Indicates second output from inverter.
Mute Operation	
	Indicates unit alarm is disabled.

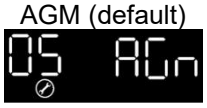
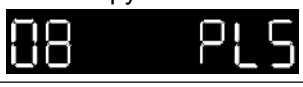
5.5 LCD Setting

After pressing and holding SET/OK button for 3 seconds, the unit will enter setting mode. Press “UP” or “DOWN” button to select setting programs. And then, press “SET/OK” button to confirm the selection or ESC button to exit.

Setting programs:

Program	Description	Selectable option	
00	Exit setting mode	Escape 	
01	Output source priority: To configure load power source priority	Utility first (default) 	Utility will provide power to the loads as first priority. Solar and battery energy will provide power to the loads only when utility power is not available.
		Solar first 	Solar energy provides power to the loads as first priority. If solar energy is not sufficient to power all connected loads, battery energy will supply power the loads at the same time. Utility provides power to the loads only when any one condition happens: - Solar energy is not available - Battery voltage drops to low-level warning voltage or the setting point in program 12.
		SBU priority 	Solar energy provides power to the loads as first priority. If solar energy is not sufficient to power all connected loads, battery energy will supply power to the loads at the same time. Utility provides power to the loads only when battery voltage drops to either low-level warning voltage or the setting point in program 12.

<table>
<tr><td rowspan="3">02</td><td rowspan="3">Maximum charging current: To configure total charging current for solar and utility chargers.

Range：10A to 120A</td><td>10A
</td><td rowspan="3">Refer to the example on the left to set the expected parameters.</td></tr>
<tr><td>60A (default)
</td></tr>
<tr><td>80A
</td></tr>
<tr><td rowspan="2">03</td><td rowspan="2">AC input voltage range</td><td>Appliances (default)
</td><td>If selected, acceptable AC input voltage range will be within 90-280VAC.</td></tr>
<tr><td>UPS
</td><td>If selected, acceptable AC input voltage range will be within 170-280VAC.</td></tr>
<tr><td>04</td><td>On-Grid</td><td>On-Grid disable (default)
</td><td>On-Grid enable
</td></tr>
<tr><td rowspan="3">05</td><td rowspan="3">Battery type</td><td>AGM (default)
</td><td>Flooded
</td></tr>
<tr><td>User-Defined
</td><td>If “User-Defined” is selected, battery charge voltage and low DC cut-off voltage can be set up in program 26, 27 and 29.</td></tr>
<tr><td>Lib
</td><td>If the inverter is connected to a lithium battery without BMS communication, the Lib option can be selected.
⚠ CAUTION
This option is only compatible with 16 Cells LFP4 battery for 48V models or 8 Cells LFP4 battery for 24V models.</td></tr>
<tr><td>06</td><td>Auto restart when overload occurs</td><td>Restart disable (default)
</td><td>Restart enable
</td></tr>
<tr><td>07</td><td>Auto restart when over temperature occurs</td><td>Restart disable (default)
</td><td>Restart enable
</td></tr>
<tr><td rowspan="3">08</td><td rowspan="3">485 BMS protocol</td><td>0.pace
</td><td>01.pylon v3.5
</td></tr>
<tr><td>02.pylon v3.6(default)
</td><td>03.growatt
</td></tr>
<tr><td colspan="2">If the communication is OK, the USER (battery type) icon on the LCD should be 1s On /1s Off.</td></tr>
</table>

<table>
<tr><td>09</td><td>Output frequency</td><td>50Hz (default)
</td><td>60Hz
</td></tr>
<tr><td rowspan="2">10</td><td rowspan="2">Output voltage</td><td>220V
</td><td>230V (default)
</td></tr>
<tr><td>240V
</td><td></td></tr>
<tr><td rowspan="3">11</td><td rowspan="3">Maximum utility charging current

Range：2A to 100A

Note: If setting value in program 02 is smaller than that in program in 11, the inverter will apply charging current from program 02 for utility charger.</td><td>2A
</td><td rowspan="3">Refer to the example on the left to set the expected parameters.</td></tr>
<tr><td>30A (default)
</td></tr>
<tr><td>80A
</td></tr>
<tr><td rowspan="8">12</td><td rowspan="8">Setting voltage point back to utility source when selecting “SBU priority” in program 01.

This parameter is also the battery voltage for the dry contact action.</td><td colspan="2">Available options in SF 4000 model:</td></tr>
<tr><td>22.0V
</td><td rowspan="3">Refer to the example on the left to set the expected parameters. Range: 21.0V-25.5V, increment of each click is 0.5V.</td></tr>
<tr><td>23.0V (default)
</td></tr>
<tr><td>25.5V
</td></tr>
<tr><td colspan="2">Available options in SF 3600/ SF 6000 model:</td></tr>
<tr><td>44V
</td><td rowspan="3">Refer to the example on the left to set the expected parameters. Range: 42.0V-51.0V, increment of each click is 1V.</td></tr>
<tr><td>46V (default)
</td></tr>
<tr><td>51V
</td></tr>
</table>

<table>
<tr><td rowspan="6">13</td><td rowspan="6">Setting voltage point back to battery mode when selecting “SBU priority” or “Solar first” in program 01.

This parameter is also the battery voltage for the dry contact reset.</td><td colspan="2">Available options in SF 4000 model:</td></tr>
<tr><td>Battery fully charged
</td><td rowspan="4">Refer to the example on the left to set the expected parameters. Range: 24.0V-29.0V, increment of each click is 0.5V.</td></tr>
<tr><td>24V
</td></tr>
<tr><td>27V (default)
</td></tr>
<tr><td>29V
</td></tr>
<tr><td colspan="2">Available options in SF 3600/ SF 6000 model:</td></tr>
<tr><td>Battery fully charged
</td><td rowspan="4">Refer to the example on the left to set the expected parameters. Range: 48.0V-58.0V, increment of each click is 1V.</td></tr>
<tr><td>48V
</td></tr>
<tr><td>54V (default)
</td></tr>
<tr><td>58V
</td></tr>
<tr><td rowspan="6">16</td><td rowspan="6">Charger source priority:
To configure charger source priority</td><td colspan="2">If this solar storage inverter is working in Line, Standby or Fault mode, charger source can be programmed as below:</td></tr>
<tr><td>Utility first
</td><td>Utility will charge battery as first priority.
Solar energy will charge battery only when utility power is not available.</td></tr>
<tr><td>Solar first
</td><td>Solar energy will charge battery as first priority.
Utility will charge battery only when solar energy is not available.</td></tr>
<tr><td>Solar and Utility (default)
</td><td>Solar energy and utility will charge battery at the same time.</td></tr>
<tr><td>Only Solar
</td><td>Solar energy will be the only charger source no matter utility is available or not.</td></tr>
<tr><td colspan="2">If this solar storage inverter is working in Battery mode or Power saving mode, only solar energy can charge battery. Solar energy will charge battery if it's available and sufficient.</td></tr>
</table>

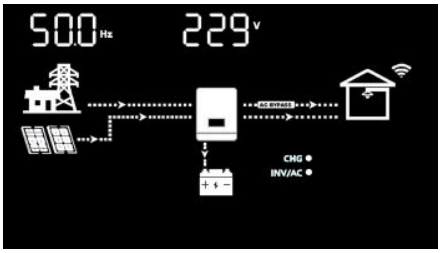
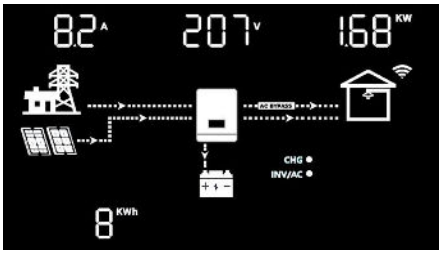
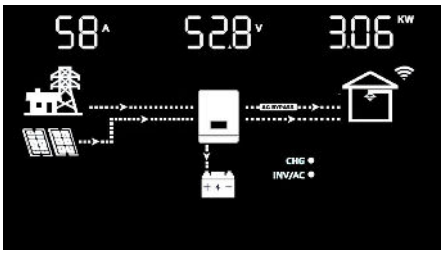
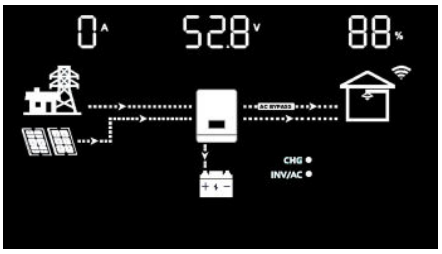
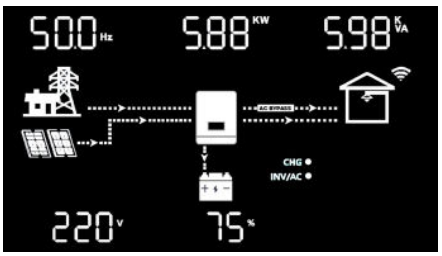
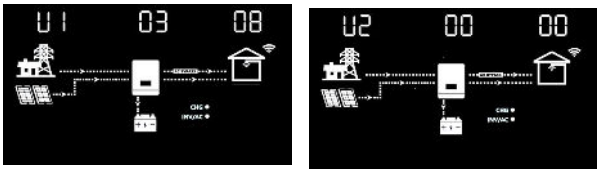
17	RTC time Setting Set the year, month, day, hour, minute, and second in sequence. After setting each value, press SET/OK to confirm and set the next value.	Year setting range: 0-99 	
		Month setting range: 0-12 	
		Day setting range: 0-31 	
		Hour setting range: 0-24 	
		Minute setting range: 0-60 	
		Seconds setting range: 0-60 	
18	Alarm control	Alarm on (default) 	Alarm off 
19	Auto return to default display screen	Return to default display screen (default) 	If selected, no matter how users switch display screen, it will automatically return to default display screen (Input voltage /output voltage) after no button is pressed for 1 minute.
		Stay at latest screen 	If selected, the display screen will stay at latest screen user finally switches.
20	Backlight control	Backlight on (default) 	Backlight off 
22	Beeps while primary source is interrupted	Alarm on (default) 	Alarm off 
23	Overload bypass: When enabled, the unit will transfer to line mode if overload occurs in battery mode.	Bypass disable (default) 	Bypass enable 
25	Record Fault code	Record enable (default) 	Record disable 

26	Bulk charging voltage (C.V voltage)	SF 4000 default setting: 28.2V 
		SF 3600/SF 6000 default setting: 56.4V 
		If self-defined is selected in program 5, this program can be set up. Setting range is from 25.0V to 31.5V for SF 4000 model and 48.0V to 61.0V for 3.6KW-48/6KW-48 model. Increment of each click is 0.1V.
27	Floating charging voltage	SF 4000 default setting: 27.0V 
		SF 3600/SF 6000 default setting: 54.0V 
		If self-defined is selected in program 5, this program can be set up. Setting range is from 25.0V to 31.5V for SF 4000 model and 48.0V to 61.0V for 3.6KW-48/6KW-48 model. Increment of each click is 0.1V.
28	Low DC cut-off voltage for second output	SF 4000 default setting: 21.0V 
		SF 3600/SF 6000 default setting: 42.0V 
		Setting range is from 20.0V to 25.5V for SF 4000 model and 40.0V to 51.0V for SF 3600/SF 6000 model. Increment of each click is 0.1V. Second Load low dc cut-off voltage will be fixed to setting value no matter what percentage of load is connected.
29	Low DC cut-off voltage	SF 4000 default setting: 21.0V 
		SF 3600/SF 6000 default setting: 42.0V 
		If self-defined is selected in program 5, this program can be set up. Setting range is from 20.0V to 25.5V for SF 4000 model and 40.0V to 51.0V for SF 3600/SF 6000 model. Increment of each click is 0.1V. Low DC cut-off voltage will be fixed to setting value no matter what percentage of load is connected.

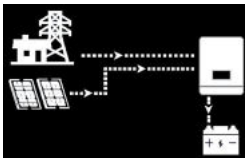
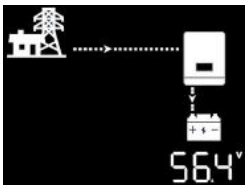
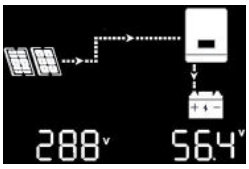
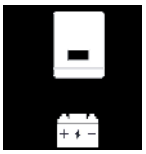
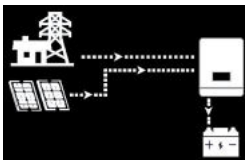
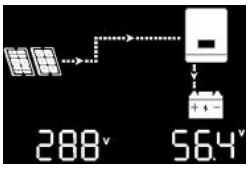
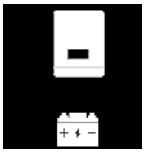
<table>
<tr><td rowspan="2">30</td><td rowspan="2">Battery equalization</td><td>Battery equalization
</td><td>Battery equalization disable (default)
</td></tr>
<tr><td colspan="2">If “Flooded” or “User-Defined” is selected in program 05, this program can be set up.</td></tr>
<tr><td rowspan="3">31</td><td rowspan="3">Battery equalization voltage</td><td colspan="2">SF 4000 default setting: 29.2V
</td></tr>
<tr><td colspan="2">SF 3600/SF 6000 default setting: 58.4V
</td></tr>
<tr><td colspan="2">Setting range is from 25.0V to 31.5V for SF 4000 and 48.0V to 61.0V for SF 3600/SF 6000 model. Increment of each click is 0.1V.</td></tr>
<tr><td>33</td><td>Battery equalized time</td><td>60min (default)
</td><td>Setting range is from 5min to 900min. Increment of each click is 5min.</td></tr>
<tr><td>34</td><td>Battery equalized timeout</td><td>120min (default)
</td><td>Setting range is from 5min to 900 min. Increment of each click is 5 min.</td></tr>
<tr><td>35</td><td>Equalization interval</td><td>30days (default)
</td><td>Setting range is from 0 to 90 days. Increment of each click is 1 day</td></tr>
<tr><td rowspan="2">36</td><td rowspan="2">Equalization activated immediately</td><td>Enable
</td><td>Disable (default)
</td></tr>
<tr><td colspan="2">If equalization function is enabled in program 30, this program can be set up. If “Enable” is selected in this program, it’s to activate battery equalization immediately and LCD main page will show “”. If “Disable” is selected, it will cancel equalization function until next activated equalization time arrives based on program 35 setting. At this time, “” will not be shown in LCD main page.</td></tr>
</table>

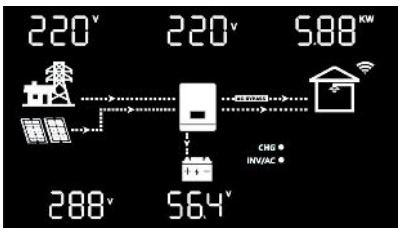
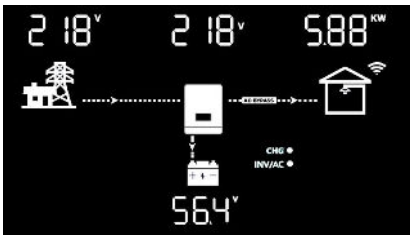
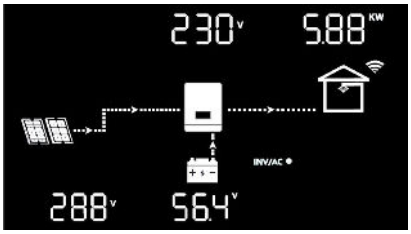
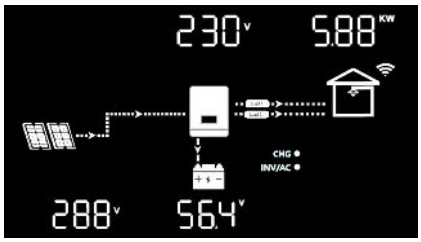
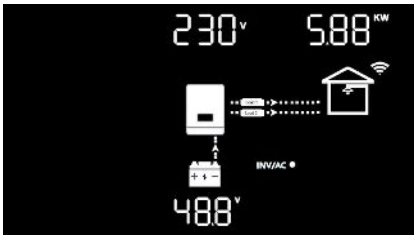
5.6 Display Setting

The LCD display information will be switched in turns by pressing “UP” or “DOWN” key. The selectable information is switched as below order: AC input, PV, battery, AC output load and software Version.

Icon	LCD Indicates
Grid icon 1s ON 1s OFF LCD display AC input frequency and voltage.	
Solar icon 1s ON 1s OFF LCD display PV input current, input voltage, MPPT power and total power generation.	
Battery icon 1s ON 1s OFF LCD display battery charging current, battery voltage and charging power.	
Battery icon 1s ON 1s OFF LCD display battery discharging current, battery voltage and battery capacity percentage.	
Output load icon 1s ON 1s OFF LCD display AC output frequency, load active power, reactive power, AC output voltage and battery and battery voltage/capacity percentage.	
Software Version	

5.7 Operating Mode Description

<table>
<tr><th>Operation mode</th><th>Description</th><th>LCD display</th></tr>
<tr><td rowspan="4">Standby mode / Power saving mode
Note:
*Standby mode: The inverter is not turned on yet but at this time, the inverter can charge battery without AC output.
*Power saving mode: If enabled, the output of inverter will be off when connected load is pretty low or not detected.</td><td rowspan="4">No output is supplied by the unit but it still can charge batteries.</td><td>Charging by utility and PV energy.
</td></tr>
<tr><td>Charging by utility.
</td></tr>
<tr><td>Charging by PV energy.
</td></tr>
<tr><td>No charging.
</td></tr>
<tr><td rowspan="4">Fault mode
Note:
*Fault mode: Errors are caused by inside circuit error or external reasons such as over temperature, output short circuited and so on.</td><td rowspan="4">PV energy and utility can charge batteries.</td><td>Charging by utility and PV energy.
</td></tr>
<tr><td>Charging by utility.
</td></tr>
<tr><td>Charging by PV energy.
</td></tr>
<tr><td>No charging.
</td></tr>
</table>

Operation mode	Description	LCD display
Line Mode	The unit will provide output power from solar and grid (solar first). It will also charge the battery at line mode.	Charging by utility and PV energy. 
	The unit will provide output power from the grid. It will also charge the battery at line mode.	Charging by utility. 
Battery Mode	The unit will provide output power from battery and PV power.	Power from battery and PV energy. 
		PV energy will supply power to the loads and charge battery at the same time. 
		Power from battery only. 

5.8 Battery Equalization Description

Equalization function is added into charge controller. It reverses the buildup of negative chemical effects like stratification, a condition where acid concentration is greater at the bottom of the battery than at the top. Equalization also helps to remove sulfate crystals that might have built up on the plates. If left unchecked, this condition, called sulfation, will reduce the overall capacity of the battery. Therefore, it's recommended to equalize battery periodically.

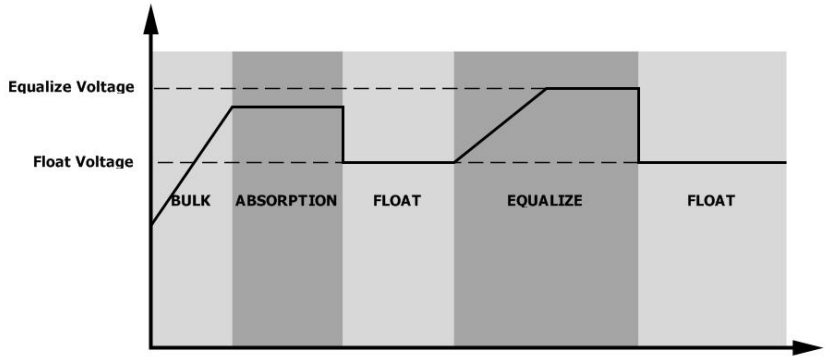
- **How to apply equalization function**

You must enable battery equalization function in monitoring LCD setting program 30 first. Then, you may apply this function in device by either one of following methods:

1. Setting equalization interval in program 35.
2. Active equalization immediately in program 36.

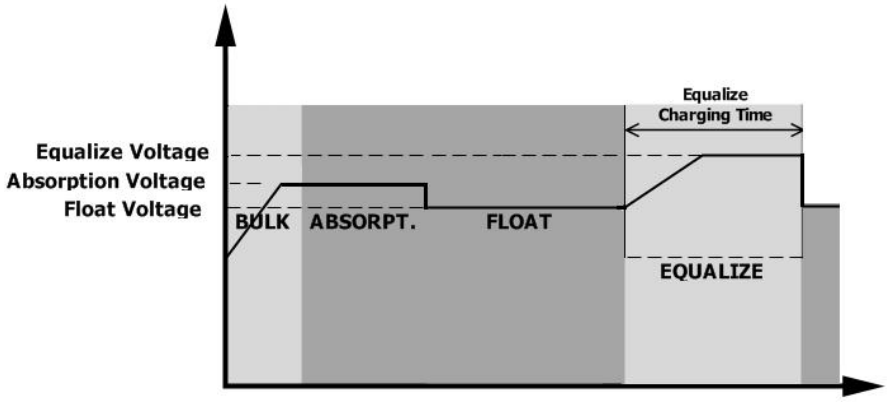
- **When to equalize**

In float stage, when the setting equalization interval (battery equalization cycle) is arrived, or equalization is active immediately, the controller will start to enter Equalize stage.

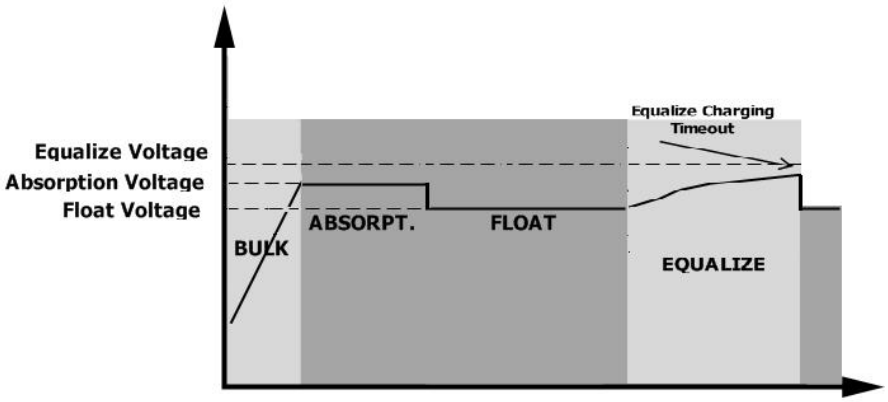


- **Equalize charging time and timeout**

In Equalize stage, the controller will supply power to charge battery as much as possible until battery voltage raises to battery equalization voltage. Then, constant-voltage regulation is applied to maintain battery voltage at the battery equalization voltage. The battery will remain in the Equalize stage until setting battery equalized time is arrived.



However, in Equalize stage, when battery equalized time is expired and battery voltage doesn't rise to battery equalization voltage point, the charge controller will extend the battery equalized time until battery voltage achieves battery equalization voltage. If battery voltage is still lower than battery equalization voltage when battery equalized timeout setting is over, the charge controller will stop equalization and return to float stage.



- **Battery Voltage Setting:**

Below the default battery voltage setting for Multiple battery types. Please note if you choose User-defined battery, please follow below sequence:

Battery Charging Voltage: [30] Equalized Charging Voltage ≥ [26] Bulk charging voltage(CV charging)≥[27] Float charging voltage＞[29] Low DC Cut-off Voltage

Battery Discharging Voltage： [13] Setting voltage point back to battery mode＞[12] Setting voltage point back to utility source＞[29] Low DC Cut-off Voltage

Parameter/Battery type	Lead-Acid battery	Flooded	Li-ion battery	User-defined
	AGM/GEL	FLd	LIB	USE
	SF 4000 Model			
Nominal DC Input Voltage	24Vdc	24Vdc	24Vdc	24Vdc
Cold Start Voltage	23.0Vdc	23.0Vdc	23.0Vdc	23.0Vdc
Low DC Cut-off Voltage @ load < 50% @ load ≥ 50%	21.5Vdc 21Vdc	21.5Vdc 21Vdc	22.4Vdc 22.4Vdc	20-24Vdc
Low DC Warning Voltage @ load < 50% @ load ≥ 50%	22.5Vdc 22Vdc	22.5Vdc 22Vdc	23.4Vdc 23.4Vdc	Low DC Cut-off Voltage+1Vdc
Low DC Warning Return Voltage @ load < 50% @ load ≥ 50%	23.5Vdc 23Vdc	23.5Vdc 23Vdc	24.4Vdc 24.4Vdc	Low DC Cut-off Voltage+2Vdc
High DC Recovery Voltage	31Vdc	31Vdc	31Vdc	31Vdc

High DC Cut-off Voltage	33Vdc	33Vdc	33Vdc	33Vdc
Bulk charging voltage	29.2Vdc	28.2Vdc	28.8Vdc	25.0-31.5Vdc
Float charging voltage	27Vdc	27Vdc	28.4Vdc	25.0-31.5Vdc
Equalize charging voltage	29.2Vdc	29.2Vdc	N/A	25.0-31.5Vdc
Battery Equalized time	60min	60min	N/A	5~900min
Battery Equalization interval (days)	30d	30d	N/A	0~90d
Battery Equalized timeout	120min	120min	N/A	5~900m

Parameter/Battery type	**Lead-Acid battery**	**Flooded**	**Li-ion battery**	**User-defined**
	AGM/GEL	**FLd**	**LIB**	**USE**
	SF 3600/SF 6000 Model			
Nominal DC Input Voltage	48Vdc	48Vdc	48Vdc	48Vdc
Cold Start Voltage	46Vdc	46Vdc	46Vdc	46Vdc
Low DC Cut-off Voltage @ load < 50% @ load ≥ 50%	43Vdc 42Vdc	43Vdc 42Vdc	44.8Vdc 44.8Vdc	40-48Vdc
Low DC Warning Voltage @ load < 50% @ load ≥ 50%	45Vdc 44Vdc	45Vdc 44Vdc	46.8Vdc 46.8Vdc	Low DC Cut-off Voltage+2Vdc
Low DC Warning Return Voltage @ load < 50% @ load ≥ 50%	47Vdc 46Vdc	47Vdc 46Vdc	48.8Vdc 48.8Vdc	Low DC Cut-off Voltage+4Vdc
High DC Recovery Voltage	62Vdc	62Vdc	62Vdc	62Vdc
High DC Cut-off Voltage	63Vdc	63Vdc	63Vdc	63Vdc
Bulk charging voltage	56.4Vdc	58.4Vdc	57.6Vdc	48-61Vdc
Float charging voltage	54Vdc	54Vdc	56.8Vdc	48-61Vdc
Equalize charging voltage	58.4Vdc	58.4Vdc	N/A	48-61Vdc
Battery Equalized time	60min	60min	N/A	5~900min
Battery Equalization interval (days)	30d	30d	N/A	0~90d
Battery Equalized timeout	120min	120min	N/A	5~900m

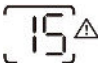
NOTICE

- If no BMS is connected, the inverter will charge according to the battery voltage with a pre-set charging curve. When the inverter communicates with the BMS, it will follow the BMS instructions to perform a more complex stage charging process.
- Cold Start Voltage: The inverter will start power load when battery reach battery cold start voltage.

5.9 Fault Reference Code

Fault Code	Fault Event	Icon on
01	Fan is locked when inverter is off.	
02	Over temperature	
03	Battery voltage is too high	
04	Battery voltage is too low	
05	Output short circuited or over temperature is detected by internal converter components.	
06	Output voltage is too high.	
07	Overload time out	
08	Bus voltage is too high	
09	Bus soft start failed	
51	Over current or surge	
52	Bus voltage is too low	
53	Inverter soft start failed	
55	Over DC voltage in AC output	
57	Current sensor failed	
58	Output voltage is too low	
59	PV voltage is over limitation	

5.10 Warning Indicator

Warning Code	Warning Event	Audible Alarm	Icon flashing
01	Fan is locked when inverter is on.	Beep three times every second	
03	Battery is over-charged	Beep once every second	
04	Low battery	Beep once every second	
07	Overload	Beep once every 0.5 second	
10	Output power derating	Beep twice every 3 seconds	
15	PV energy is low.	Beep twice every 3 seconds	
EQ	Battery equalization	None	

6. Clearance and Maintenance for Anti-Dust Kit

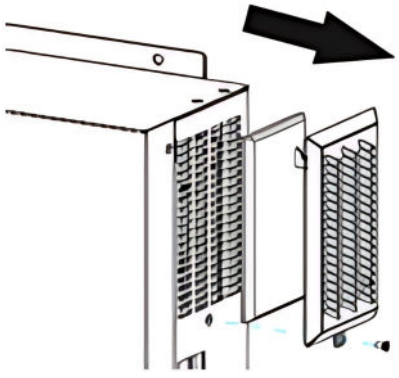
6.1 Overview

Every inverter is already installed with anti-dusk kit from factory. Inverter will automatically detect this kit and activate internal thermal sensor to adjust internal temperature. This kit also keeps dusk from your inverter and increases product reliability in harsh environment.

6.2 Clearance and Maintenance

Step 1: Please release the screws on the side of the inverter counterclockwise.

Step 2: Then, dust proof case can be removed and take out air filter foam as shown in below chart.



Step 3: Clean air filter foam and dust proof case. After clearance, re-assemble the dust-kit back to the inverter.

NOTICE

- The anti-dust kit should be cleaned from dust every one month.

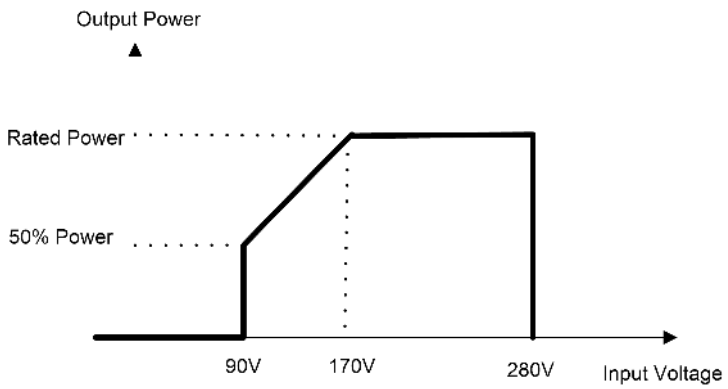
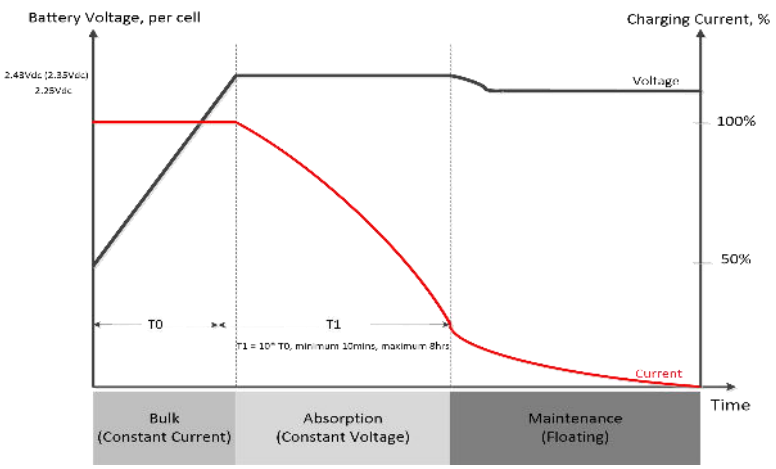
7. Specifications

Model	SF 4000	SF 3600	SF 6000	User-Settable
Nominal Battery Voltage	24Vdc	48Vdc		
Battery Type	Lithium LiFePO4/Lead-Acid/Flooded/User Defined			✓
AC INPUT				
Nominal AC Input Voltage/Waveform	230Vac/Sinusoidal (Utility or Generator)			
AC Input Range	90~280Vac (Appliances)；170Vac~280Vac (UPS)			✓
Nominal Input Frequency	50/60Hz (Auto Detection)			✓
AC Input Frequency Range	40~65±1Hz; (>42 or <63±1Hz Comeback)			
Max Bypass Current	40Amp	30Amp	40Amp	
Output Short Circuit Protection	Circuit Breaker			
Transfer Time	10ms Typical (UPS); 20ms Typical (Appliances)			
AC CHARGER				
Charging Algorithm	3-Step			
Max AC Charging Current	100Amp (@VI/P=230Vac)	60Amp (@VI/P=230Vac)	100Amp (@VI/P=230Vac)	✓
Bulk Charging Voltage	29.2Vdc (AGM/Gel) 28.2Vdc (Flooded)	56.4Vdc (AGM/Gel) 58.4Vdc (Flooded)		✓
Floating Charging Voltage	27Vdc	54Vdc		✓
Max Hybrid Charging Current (Solar & Utility)	120Amp	80Amp	120Amp	✓
PV INPUT				
Num. Of Independent MPPT Tracker	1			
MPPT Input Current	1*22Amp	1*22Amp	1*27Amp	
Max PV Array Power	6000W	4000W	7500W	

Max Solar Charge Current	120Amp	80Amp	120Amp	✓
PV Array MPPT Voltage Range	60~450Vdc			
Max PV Array Open Circuit Voltage	500Vdc			
MPPT Tracking Efficiency	99.9%			
INVERTER OUTPUT				
Num. of Output Ports (Main & Second Output)	2			
Rated Output Power of Main/Second Output *[1]	4KW/4KW	3.6KW/3.6KW	6KW/6KW	
Max. Output Current of Main/Second Output	17.4A/17.4A	15.7A /15.7A	26.1A/26.1A	
Surge Capacity	8KVA/8KW for 5 Seconds	7.2KVA/7.2KW for 5 Seconds	12KVA/12KW for 5 Seconds	
Output Voltage Waveform	Pure Sine Wave			
Overload Protection	5s@150% Load; 10s@110%~150% Load			
Output Voltage	220/230/240 Vac ± 5%			
Output Frequency	50Hz/60Hz ±1Hz			
Peak Efficiency	94%			
Low Voltage Cut-off Voltage	21.0Vdc	42Vdc		✓
High Voltage Cut-off Voltage	33.0Vdc	63Vdc		
Cold Start Voltage (When Only Connect with Battery)	23.0Vdc	46.0Vdc		
No Load Power Consumption	<35W@24VDC	<45W@48Vdc		
Parallel Capacity	NO			
GENERAL				
Operating Temperature Range	-10°C~55°C			
Storage Temperature	-15°C~ 60°C			
Humidity	5% to 95% Relative Humidity (Non-condensing)			
Altitude	<2000m			
Noise	≤60dB			
Protection Degree	IP21, Indoor Only			
Cooling Method	Intelligent Fan			

*[1] Two Output Total Power Will Not Exceed Rated Output

Net Dimension (H*W*D)	510*340*120 mm			
Net Weight	11 KG	9.5 KG	12 KG	
Warranty	2 Years			
COMMUNICATION				
Embedded Interface	RS232*1/RS485*2/Dry Contact			
Work with WIFI & Bluetooth Monitoring Dongle	YES, by RS232			
Work with Lithium Battery BMS	YES, by RS485			
CERTIFICATION				
Certification/Standard	CE (IEC61000, IEC62109); IEC61683, IEC60068; RoHS			

Output power derating: When AC input voltage drops to 170V, the output power will be derated.	
AC charging curve	

8. Trouble Shooting

Problem	LCD/LED/Buzzer	Explanation / Possible cause	What to do
Unit shuts down automatically during startup process.	LCD/LEDs and buzzer will be active for 3 seconds and then complete off.	The battery voltage is too low (<1.91V/Cell)	1. Re-charge battery. 2. Replace battery.
No response after power on.	No indication.	1. The battery voltage is far too low. (<1.4V/Cell) 2. Internal fuse tripped.	1. Contact repair center for replacing the fuse. 2. Re-charge battery. 3. Replace battery.
Mains exist but the unit works in battery mode.	Input voltage is displayed as 0 on the LCD and green LED is flashing.	Input protector is tripped	Check if AC breaker is tripped and AC wiring is connected well.
	Green LED is flashing.	Insufficient quality of AC power. (Shore or Generator)	1. Check if AC wires are too thin and/or too long. 2. Check if generator (if applied) is working well or if input voltage range setting is correct. (UPS→Appliance)
	Green LED is flashing.	Set “Solar First” as the priority of output source.	Change output source priority to Utility first.
When the unit is turned on, internal relay is switched on and off repeatedly.	LCD display and LEDs are flashing	Battery is disconnected.	Check if battery wires are connected well.
Buzzer beeps continuously and red LED is on.	Fault code 07	Overload error. The inverter is overload 110% and time is up.	Reduce the connected load by switching off some equipment.
	Fault code 05	Output short circuited.	Check if wiring is connected well and remove abnormal load.
		Temperature of internal converter component is over 120°C.	Check whether the air flow of the unit is blocked or whether the ambient temperature is too high.
	Fault code 02	Internal temperature of inverter component is over 100°C.	
	Fault code 03	Battery is over-charged.	Return to repair center.
		The battery voltage is too high.	Check if spec and quantity of batteries are meet requirements.

	Fault code 01	Fan fault	Replace the fan.
	Fault code 06/58	Output abnormal (Inverter voltage below than 190Vac or is higher than 260Vac)	1. Reduce the connected load. 2. Return to repair center
	Fault code 08/09/53/57	Internal components failed.	Return to repair center.
	Fault code 51	Over current or surge.	Restart the unit, if the error happens again, please return to repair center.
	Fault code 52	Bus voltage is too low.	
	Fault code 55	Output voltage is unbalanced.	

SunflxSolar
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sunflx.com
sales@sunflx.com

SUNFLX NEW ENERGY CO.,LTD

Headquarter: No 1-1, South Yixing Innovation Park ,Huangpu, Guangzhou,Guangdong,P.R.China

Chengdu Branch: Room 907,F9,Building A,Fucheng International Zone, No 722 Yizhou Avenue Chengdu, Sichuan,P.R.China

Manufacture Unit

F2-4,No 1. Zhanye Road,Sunde,Foshan,Guangdong,P.R.China