SUNFLX

USER MANUAL



Solar Storage Inverter

SF 1200 SE | SF 2400 SE | SF 3600 SE

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1. About This Manual

1.1 Purpose

Thanks for choosing Sunflx's SF 1200 SE, SF 2400 SE and SF 3600 SE Series Solar 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. Read all instructions and cautionary markings on the unit, batteries, and manual sections before use.
2. ⚠ CAUTION Charge only deep-cycle lead acid rechargeable batteries to avoid injury and damage. Other types may burst.
3. Do not disassemble the unit. For service or repair, take it to a qualified center to prevent electric shock or fire risks.
4. Disconnect all wiring before maintenance or cleaning to reduce the risk of electric shock. Simply turning off the unit is not sufficient.
5. ⚠ CAUTION Only qualified personnel should install this device with a battery.
6. Follow the required specifications to select the appropriate cable size for optimal inverter/charger operation.
7. Follow the installation procedure carefully when disconnecting AC or DC terminals. Refer to the installation section of the manual.
8. Grounding instruction: Connect this inverter/charger to a permanently grounded wiring system, complying with local regulations.
9. Never short-circuit the AC output and DC input. Do not connect to the mains if the DC input is short-circuited.
10. ⚠ WARNING Only qualified service personnel should service this device. If issues persist after

troubleshooting, return the inverter/charger to a local dealer or service center.

3. Introduction

SF series is a new type of solar energy storage inverter control inverter integrating solar energy storage & utility charging and energy storage, AC sine wave output. 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. Built-in MPPT solar charger
2. Compatible with lithium, lead-acid and GEL batteries
3. 30V low Inverter start voltage, work with 1 pcs solar panel
4. Multi-customized modes for diverse scenarios
5. Equalization charging function
6. Feed into grid(optional)
7. Cost-effective with most stable quality
8. Dust-proof filter for harsh environment
9. WIFI & Bluetooth monitoring, APP available (optional)
10. Single-phase pure sine wave output
11. Smart battery charger design for optimized battery performance
12. Configurable input voltage range for home appliances and personal computers
13. Configurable AC or Solar Charge priority
14. Auto restart while AC is recovering
15. 360° protection with complete overload, over temperature, short circuit protection, over/under voltage protection
16. Cold start function

3.2 Basic System Architecture

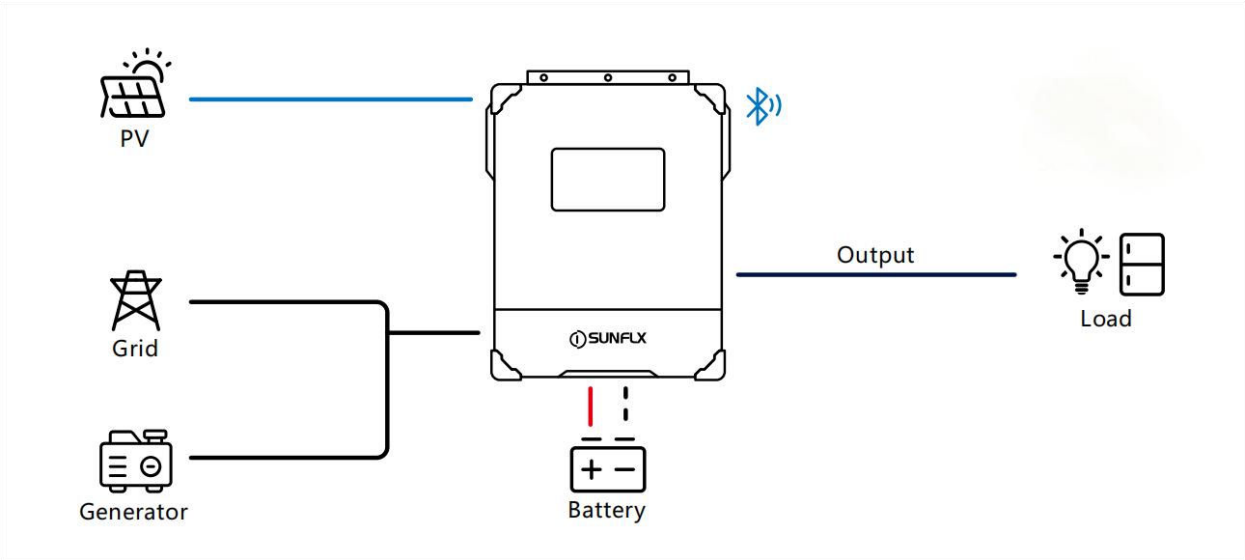
The diagram below illustrates the system application scenario of this product. A complete system consists of the following components:

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

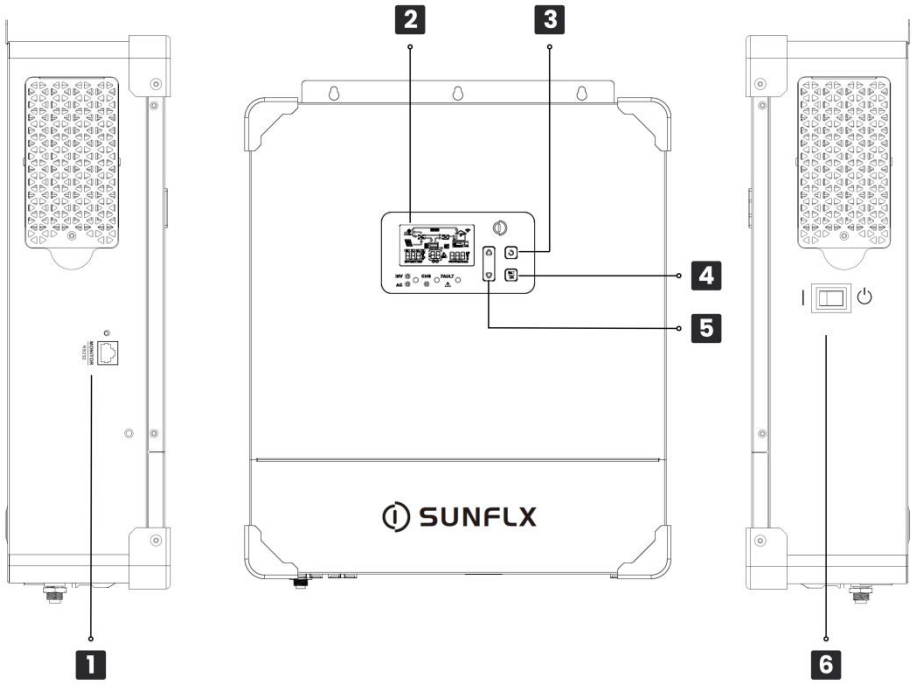
power is unavailable.

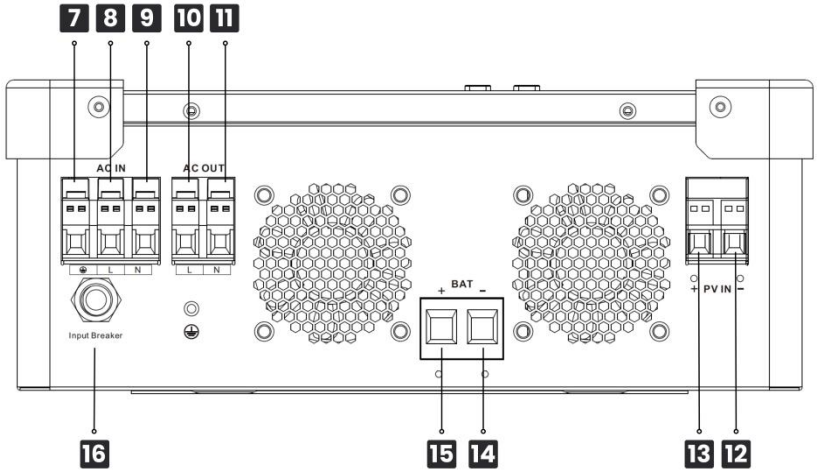
4. **Home Load:** Supports various household and office appliances, including refrigerators, lamps, televisions, fans, air conditioners, and other AC loads.

5. **Solar Storage Inverter:** The core energy conversion device of the entire system. The actual application scenario determines the specific system wiring method.



3.3 Product Overview





1. RS-232 communication port
2. LCD display
3. Function button (ESC)
4. Function button (SET/OK)
5. Function button (UP/DOWN)
6. Power on/off switch
7. AC Input - Ground
8. AC Input - L
9. AC Input - N
10. AC Output - L
11. AC Output - N
12. PV - input
13. PV + input
14. Battery - Terminal
15. Battery + Terminal
16. Input Breaker

4. Installation

4.1 Unpacking and Inspection

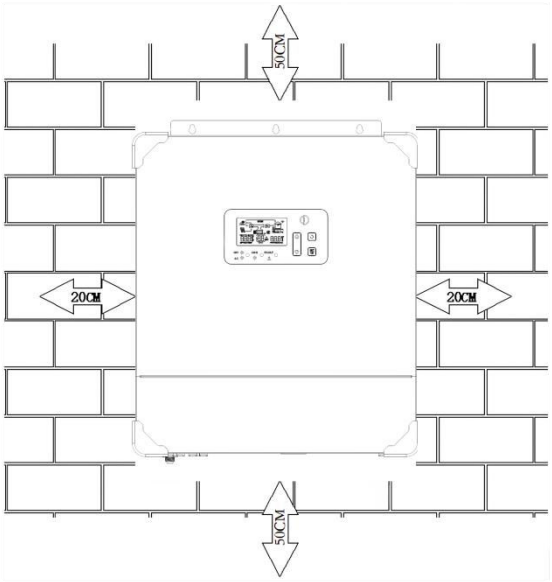
Before installation, please inspect the unit. Be sure that nothing inside the package is damaged. You should have received the following items inside of package:

- The inverter x 1
- User manual x 1
- Accessories bag x 1
- Smart Dongle (Optional)

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

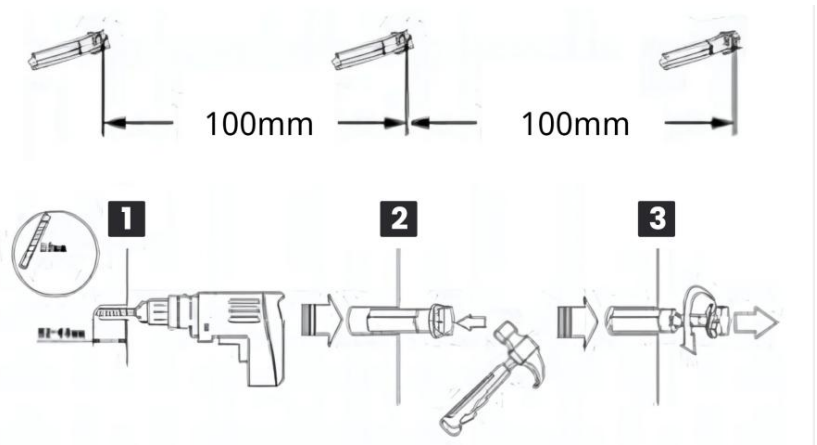
- Do not install the inverter near highly flammable materials.
- Do not install the inverter in areas with potential explosive hazards.
- Do not install the inverter with lead-acid batteries in confined spaces.

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 1200 SE	2 mm²/ 1 x 14AWG	11A	2P 20A
SF 2400 SE	2 mm²/ 1 x 14AWG	11A	2P 20A
SF 3600 SE	4 mm²/1 x 12AWG	18A	2P 20A

AC INPUT (Single Phase)

Model	Cable Diameter	Max. Input Current	Circuit Breaker	Torque value（max）
SF 1200 SE	2 mm²/1 x 14AWG	16A	2P 16A	2 Nm
SF 2400 SE	4 mm²/1 x 12AWG	20A	2P 20A	2 Nm
SF 3600 SE	4 mm²/1 x 12AWG	30A	2P 32A	2 Nm

BATTERY CONNECT

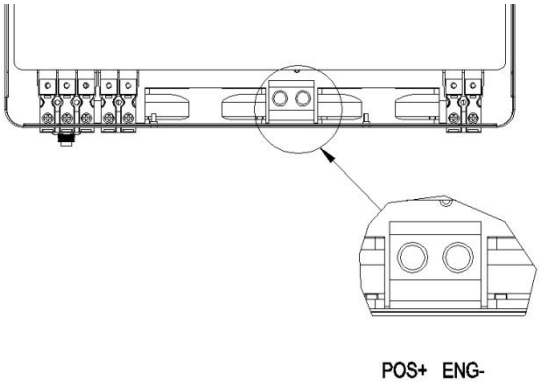
Model	Cable Diameter	Max.Battery Current	Circuit Breaker	Torque value（max）
SF 1200 SE	22 mm²/1 x 4AWG	112A	2P 150A	2 Nm
SF 2400 SE	22 mm²/1 x 4AWG	112A	2P 150A	2 Nm
SF 3600 SE	35 mm²/1 x 2AWG	163A	2P 200A	2 Nm

AC OUTPUT (Single Phase)

Model	Cable Diameter	Max. Output Current	Torque value（max）
SF 1200 SE	2 mm²/1 x 14AWG	16A	2 Nm
SF 2400 SE	4 mm²/1 x 12AWG	20A	2 Nm
SF 3600 SE	4 mm²/1 x 12AWG	30A	2 Nm

4.5 Battery Cable Connection

Connect the positive and negative cable of the battery according to the diagram below.

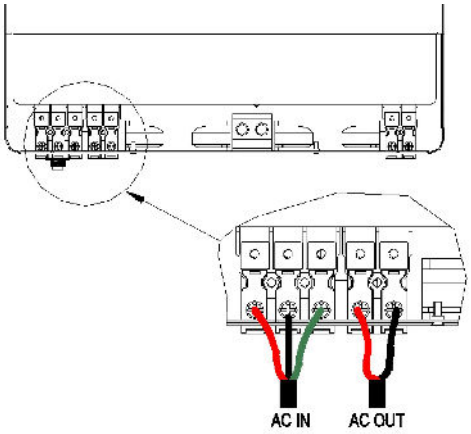


DANGER

- 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

Connect the live, neutral, and ground wires according to the positions and order shown in the diagram below.

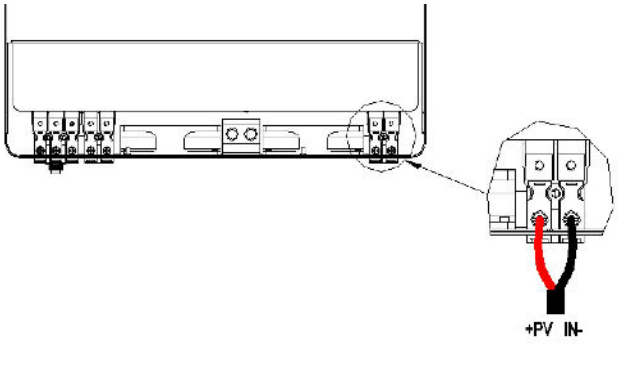


DANGER

- 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 Cable Connection

Connect the positive and negative cable of the solar panel according to the diagram below.



DANGER

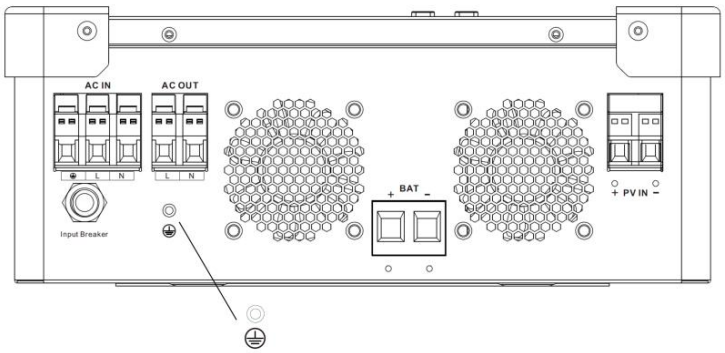
- Before connecting the PV modules, ensure the circuit breaker is opened to prevent the risk of electric shock. Do not operate it with electricity.
- Please ensure that the open circuit voltage of the PV modules in series does not exceed the maximum Open Circuit Voltage of the inverter (In the SF series , this value is 450V), 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.

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	PV INPUT Min in serial: 1 pcs	Q'ty of panels	Total Input power	Total Voc
	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 ≤450Vdc

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 (Optional)

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.

Download on the App Store

Get it on Google Play

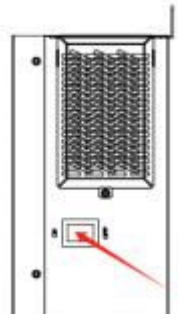


NOTICE

- SF 1200/2400/3600 SE Work with WIFI & Bluetooth Monitoring Dongle (optional)

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

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.

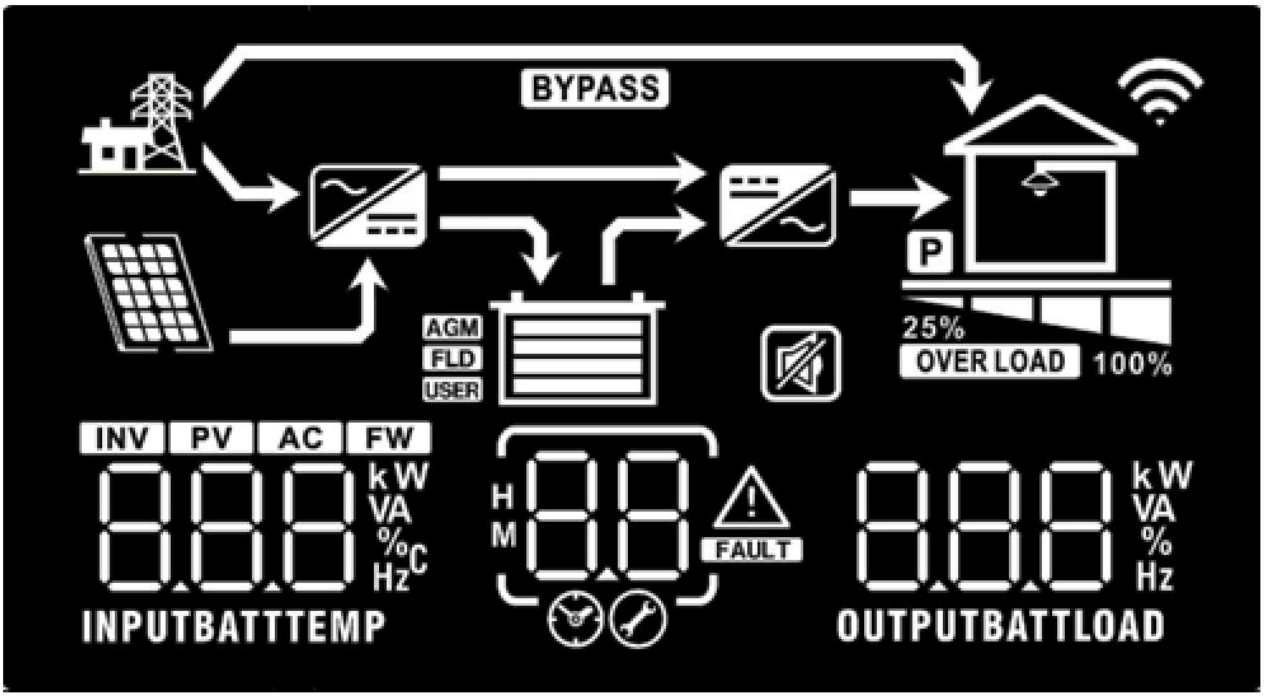
The operation and display panel, depicted in the chart below, is located on the front panel of the inverter. It consists of four function keys and an LCD display, providing information on the operating status and input/output power.



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



Icon	Function description
Input Source Information	
	Indicates the AC input.
	Indicates the PV input
	Indicate input voltage, input frequency, PV voltage, charger current (if PV in charging for SF 3600 SE model), charger power, battery voltage.
Configuration Program and Fault Information	
	Indicates the setting programs.
	Indicates the warning and fault codes. Warning:  flashing with warning code. Fault:  lighting with fault code.
Output Information	
	Indicate output voltage, output frequency, load percent, load in VA, load in Watt and discharging current.
Battery Information	
	1. Indicates battery type. 2. Indicates battery level by 0-24%, 25-49%, 50-74% and 75-100% in battery mode and charging status in line mode.

In AC mode, it will present battery charging status.

Status	Battery voltage	LCD Display
Constant Current mode / Constant Voltage mode	<2V/cell	4 bars will flash in turns.
	2 ~ 2.083V/cell	Bottom bar will be on and the other three bars will flash in turns.
	2.083 ~ 2.167V/cell	Bottom two bars will be on and the other two bars will flash in turns.
	> 2.167 V/cell	Bottom three bars will be on and the top bar will flash.
Floating mode. Batteries are fully charged.		4 bars will be on.

In battery mode, it will present battery capacity.

Load Percentage	Battery Voltage	LCD Display
Load >50%	< 1.85V/cell	
	1.85V/cell ~ 1.933V/cell	
	1.933V/cell ~ 2.017V/cell	
	> 2.017V/cell	
Load < 50%	< 1.892V/cell	
	1.892V/cell ~ 1.975V/cell	
	1.975V/cell ~ 2.058V/cell	
	> 2.058V/cell	

Load Information				
	Indicates overload.			
	Indicates the load level by 0-24%, 25-49%, 50-74% and 75-100%.			
	0%~24%	25%~49%	50%~74%	75%~100%
				
Mode Operation Information				
	Indicates unit connects to the mains.			
	Indicates unit connects to the PV panel.			
	Indicates load is supplied by utility power.			
	Indicates the utility charger circuit is working.			
	Indicates the DC/AC inverter circuit is working.			
Mute Operation				
	Indicates unit alarm is disabled.			

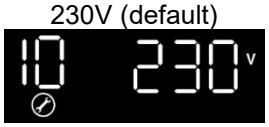
5.5 LCD Setting

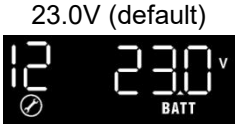
After pressing and holding SET/OK button for 3 seconds, the unit will enter setting mode. Press “UP” or “DOWN” button to select setting programs. And then, press “SET/OK” button to confirm the selection or ESC button to exit.

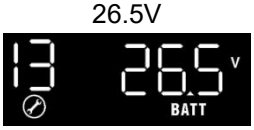
Setting programs:

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.

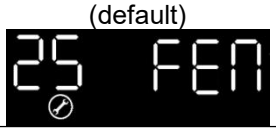
02	Maximum charging current: To configure total charging current for solar and utility chargers. (Max. charging current = utility charging current + solar charging current)	10A 	20A 
		30A 	40A 
		50A 	60A (default) 
		70A 	80A 
03	AC input voltage range	Appliances (default) 	If selected, acceptable AC input voltage range will be within 90-280VAC.
		UPS 	If selected, acceptable AC input voltage range will be within 170-280VAC.
05	Battery type	AGM (default) 	Flooded 
		Lithium Battery 	User-Defined  If “User-Defined” is selected, battery charge voltage and low DC cut-off voltage can be set up in program 26, 27 and 29.
06	Auto restart when overload occurs	Restart disable (default) 	Restart enable 
07	Auto restart when over temperature occurs	Restart disable (default) 	Restart enable 
09	Output frequency	50Hz (default) 	60Hz 

<table>
<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="4">11</td><td rowspan="4">Maximum utility charging current

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>10A
</td></tr>
<tr><td>20A
</td><td>30A (default)
</td></tr>
<tr><td>40A
</td><td>50A
</td></tr>
<tr><td>60A
</td><td>80A
</td></tr>
<tr><td rowspan="10">12</td><td rowspan="10">Setting voltage point back to utility source when selecting “SBU priority” or “Solar first” in program 01.</td><td colspan="2">Available options in SF 1200 SE model:</td></tr>
<tr><td>11.0V
</td><td>11.3V
</td></tr>
<tr><td>11.5V (default)
</td><td>11.8V
</td></tr>
<tr><td>12.0V
</td><td>12.3V
</td></tr>
<tr><td>12.5V
</td><td>12.8V
</td></tr>
<tr><td colspan="2">Available options in SF 2400/3600 SE model:</td></tr>
<tr><td>22.0V
</td><td>22.5V
</td></tr>
<tr><td>23.0V (default)
</td><td>23.5V
</td></tr>
</table>

		24.0V 	24.5V 
		25.0V 	25.5V 
13	Setting voltage point back to battery mode when selecting “SBU priority” or “Solar first” in program 01.	Available options in SF 1200 SE model:	
		Battery fully charged 	12.0V 
		12.3V 	12.5V 
		12.8V 	13.0V 
		13.3V 	13.5V (default) 
		13.8V 	14.0V 
		14.3V 	14.5V 
		Available options in SF 2400/3600 SE model:	
		Battery fully charged 	24V 
		24.5V 	25V 
		25.5V 	26V 
		26.5V 	27V (default) 

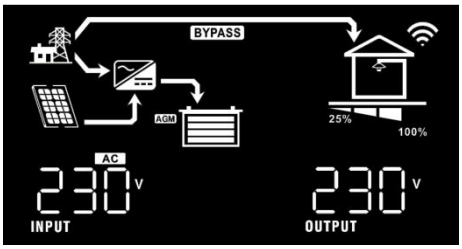
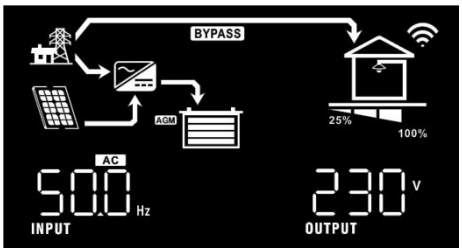
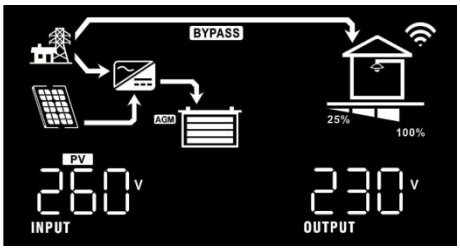
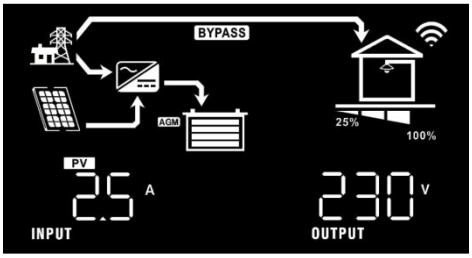
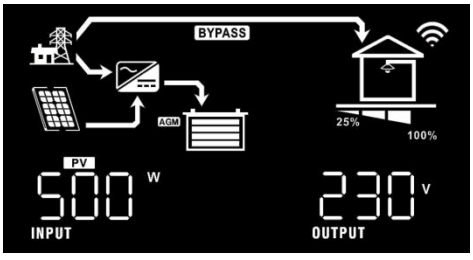
		27.5V 	28V 
		28.5V 	29V 
16	Charger source priority: To configure charger source priority	If this inverter/charger is working in Line, Standby or Fault mode, charger source can be programmed as below:	
		Utility first 	Utility will charge battery as first priority. Solar energy will charge battery only when utility power is not available.
		Solar first 	Solar energy will charge battery as first priority. Utility will charge battery only when solar energy is not available.
		Solar and Utility (default) 	Solar energy and utility will charge battery at the same time.
		Only Solar 	Solar energy will be the only charger source no matter utility is available or not.
		If this inverter/charger 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.	
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.

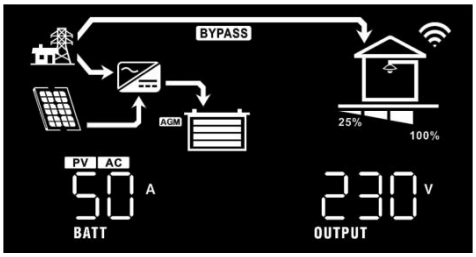
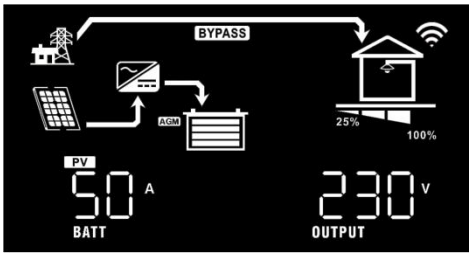
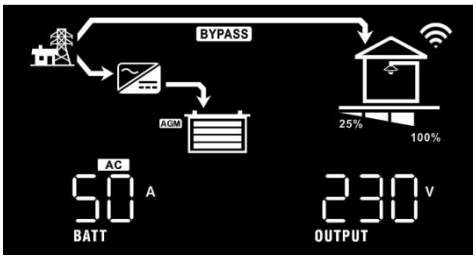
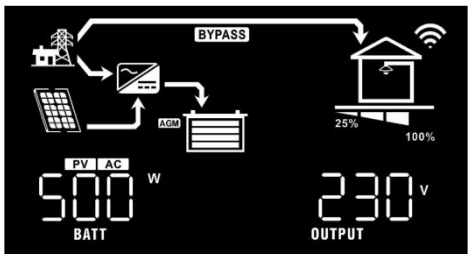
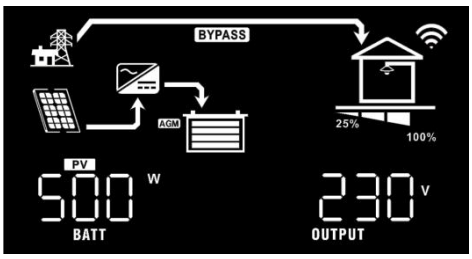
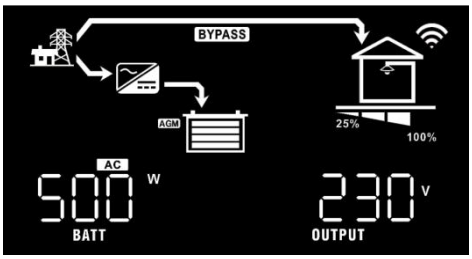
20	Backlight control	Backlight on (default) 	Backlight off 
22	Beeps while primary source is interrupted	Alarm on (default) 	Alarm off 
23	Overload bypass: When enabled, the unit will transfer to line mode if overload occurs in battery mode.	Bypass disable (default) 	Bypass enable 
25	Record Fault code	Record enable (default) 	Record disable 
26	Bulk charging voltage (C.V voltage)	SF 1200 SE default setting: 14.1V 	
		SF 2400/3600 SE default setting: 28.2V 	
		If self-defined is selected in program 5, this program can be set up. Setting range is from 12.0V to 15.5V for SF 1200 SE model，25.0V to 31.5V for SF 2400/3600 SE model. Increment of each click is 0.1V.	
27	Floating charging voltage	SF 1200 SE default setting: 13.5V 	
		SF 2400/3600 SE default setting: 27.0V 	
		If self-defined is selected in program 5, this program can be set up. Setting range is from 12.0V to 15.5V for SF 1200 SE model，25.0V to 31.5V for SF 2400/3600 SE model . Increment of each click is 0.1V.	
29	Low DC cut-off voltage	SF 1200 SE default setting: 10.5V 	
		SF 2400/3600 SE default setting: 21.0V 	

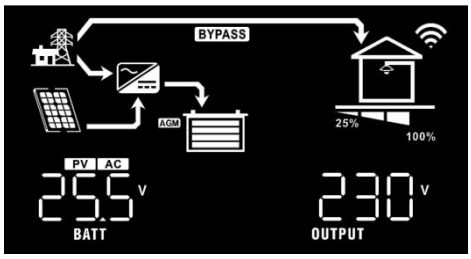
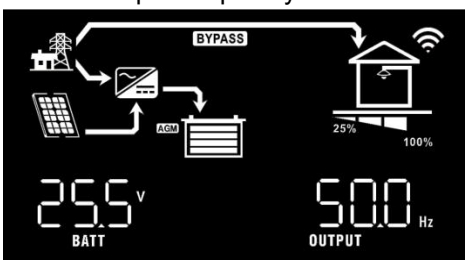
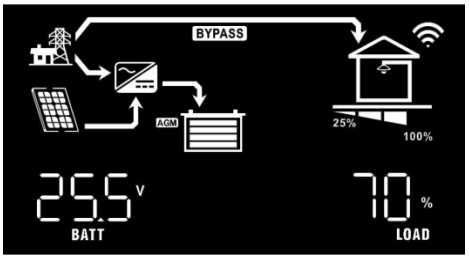
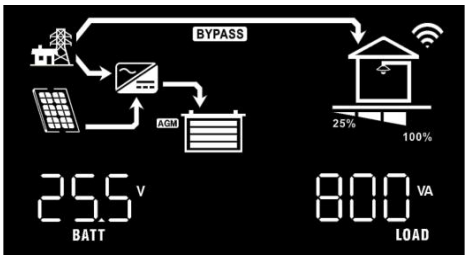
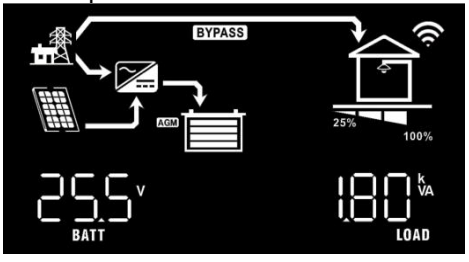
		If self-defined is selected in program 5, this program can be set up. Setting range is from 10.5V to 12.0V for SF 1200 SE model, 20.0V to 25.5V for SF 2400/3600 SE model. Increment of each click is 0.1V. Low DC cut-off voltage will be fixed to setting value no matter what percentage of load is connected.	
30	Battery equalization	Battery equalization 	Battery equalization disable (default) 
		If “Flooded” or “User-Defined” is selected in program 05, this program can be set up.	
31	Battery equalization voltage	SF 1200 SE default setting: 14.6V 	
		SF 2400/3600 SE default setting: 29.2V 	
		Setting range is from 12.5V to 16V for SF 1200 SE model, 25.0V to 31.5V for SF 2400/3600 SE model. Increment of each click is 0.1V.	
33	Battery equalized time	60min (default) 	Setting range is from 5min to 900min. Increment of each click is 5min.
34	Battery equalized timeout	120min (default) 	Setting range is from 5min to 900 min. Increment of each click is 5 min.
35	Equalization interval	30days (default) 	Setting range is from 0 to 90 days. Increment of each click is 1 day
36	Equalization activated immediately	Enable 	Disable (default) 
		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.	

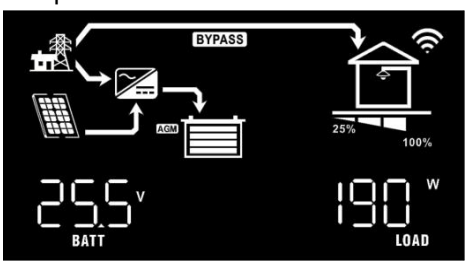
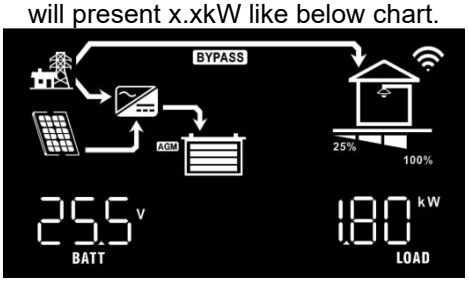
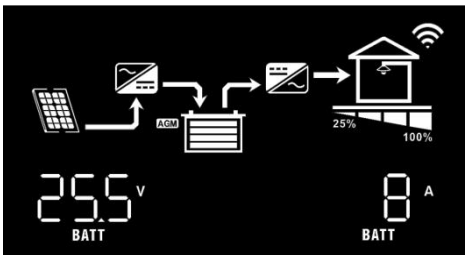
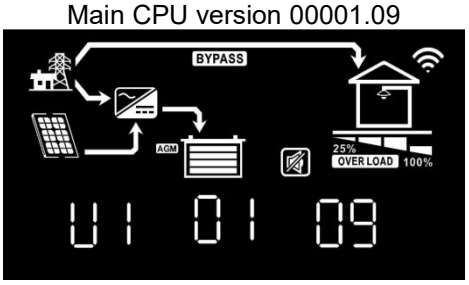
5.6 Display Setting

The LCD display information will be switched in turns by pressing “UP” or “DOWN” key. The selectable information is switched as below order: input voltage, input frequency, PV voltage, charging current, charging power, battery voltage, output voltage, output frequency, load percentage, load in Watt, load in VA, load in Watt, DC discharging current, main CPU Version.

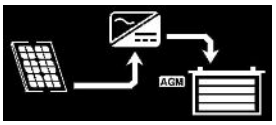
Selectable information	LCD display
Input voltage/Output voltage (Default Display Screen)	Input Voltage=230V, output voltage=230V 
Input frequency	Input frequency=50Hz 
PV voltage	PV voltage=260V 
PV current	PV current = 2.5A 
PV power	PV power = 500W 

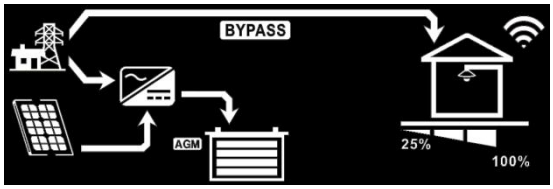
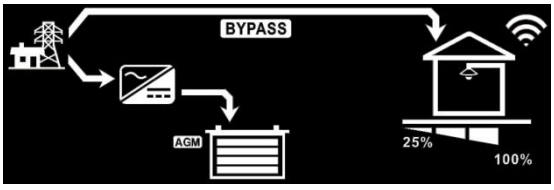
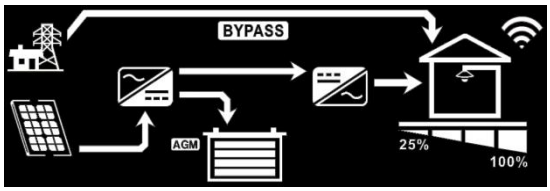
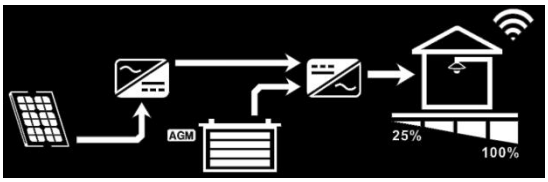
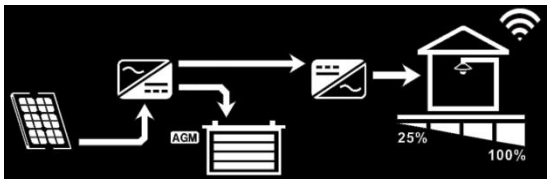
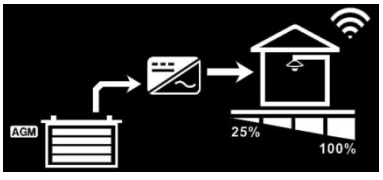
Charging current	AC and PV charging current=50A  PV charging current=50A  AC charging current=50A 
Charging power	AC and PV charging power=500W  PV charging power=500W  AC charging power=500W 

Battery voltage and output voltage	Battery voltage=25.5V, output voltage=230V 
Output frequency	Output frequency=50Hz 
Load percentage	Load percent=70% 
Load in VA	When connected load is lower than 1kVA, load in VA will present xxxVA like below chart.  When load is larger than 1kVA (≧1KVA), load in VA will present x.xkVA like below chart. 

Load in Watt	When load is lower than 1kW, load in W will present xxxW like below chart.  When load is larger than 1kW (≧1KW), load in W will present x.xkW like below chart. 
Battery voltage/DC discharging current	Battery voltage=25.5V, discharging current=8A 
Main CPU version checking	Main CPU version 00001.09 

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 the mains. It will also charge the battery at line mode.	Charging by utility and PV energy. 
	The unit will provide output power from the mains. It will also charge the battery at line mode.	Charging by utility. 
		If “solar first” is selected as output source priority and solar energy is not sufficient to provide the load, solar energy and the utility will provide the loads and charge the battery at the same time. 
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.

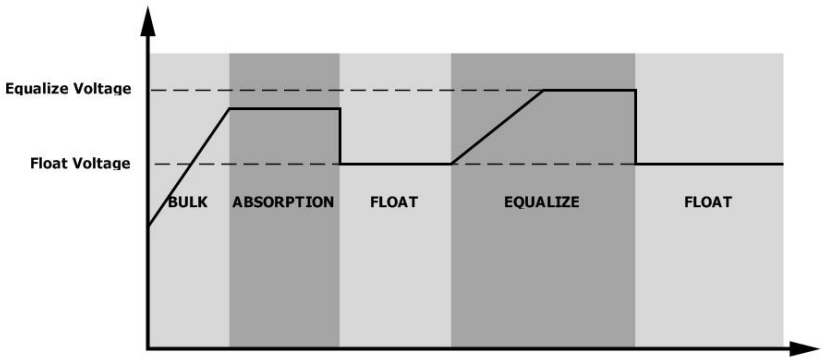
- **How to apply equalization function**

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.

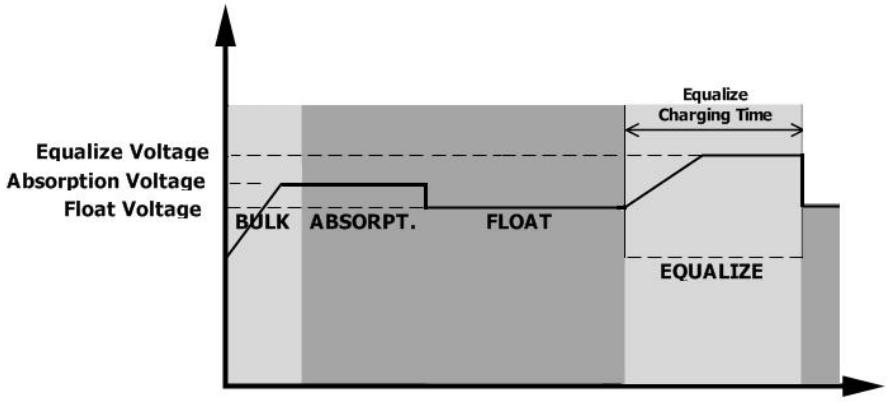
- **When to equalize**

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.

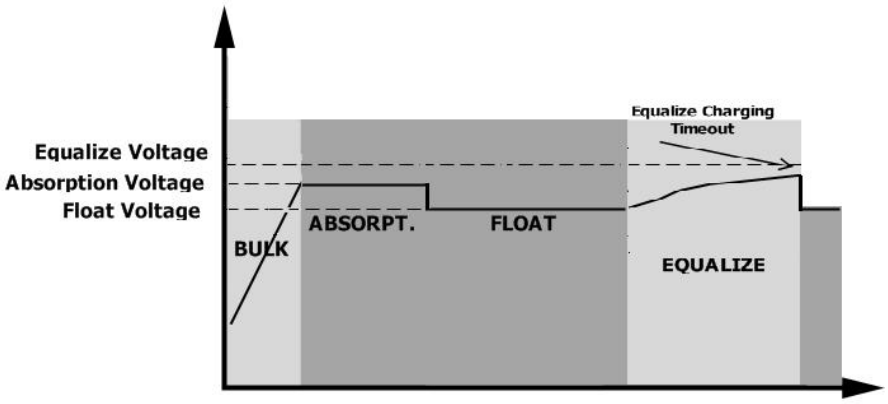


- **Equalize charging time and timeout**

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 1200/2400/3600 SE Model			
Nominal DC Input Voltage	12/24Vdc	12/24Vdc	12/24Vdc	12/24Vdc
Cold Start Voltage	11.5/23.0Vdc	11.5/23.0Vdc	11.5/23.0Vdc	11.5/23.0Vdc
Low DC Cut-off Voltage @ load < 50% @ load ≥ 50%	10.7/21.5Vdc 10.5/21Vdc	10.7/21.5Vdc 10.5/21Vdc	11.2/22.4Vdc 11.2/22.4Vdc	12V:10-12Vdc 24V:20-24Vdc
Low DC Warning Voltage @ load < 50% @ load ≥ 50%	11.5/22.5Vdc 11.0/22Vdc	11.5/22.5Vdc 11.0/22Vdc	11.7/23.4Vdc 11.7/23.4Vdc	12V: Low DC Cut-off Voltage+0.5Vdc 24V: Low DC Cut-off Voltage+1Vdc
Low DC Warning Return Voltage @ load < 50% @ load ≥ 50%	11.7/23.5Vdc 11.5/23Vdc	11.7/23.5Vdc 11.5/23Vdc	12.2/24.4Vdc 12.2/24.4Vdc	12V: Low DC Cut-off Voltage+1Vdc 24V: Low DC Cut-off Voltage+2Vdc
High DC Recovery Voltage	14/31Vdc	14/31Vdc	14/31Vdc	14/31Vdc
High DC Cut-off Voltage	16/33Vdc	16/33Vdc	16/33Vdc	16/33Vdc

Bulk charging voltage	14.6/29.2Vdc	14.1/28.2Vdc	14.4/28.8Vdc	12V:12.5-15.8Vdc 24V:25.0-31.5Vdc
Float charging voltage	13.5/27Vdc	13.5/27Vdc	14.2/28.4Vdc	12V:12.5-15.8Vdc 24V:25.0-31.5Vdc
Equalize charging voltage	14.6/29.2Vdc	14.6/29.2Vdc	N/A	12V:12.5-16Vdc 24V: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

NOTICE

- Cold Start Voltage: The inverter will start power load when battery reach battery cold start voltage
- SF 1200/2400/3600 SE do not support BMS connection.

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

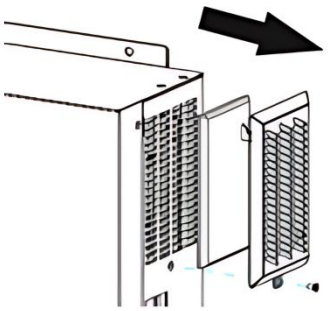
6.1 Overview

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.

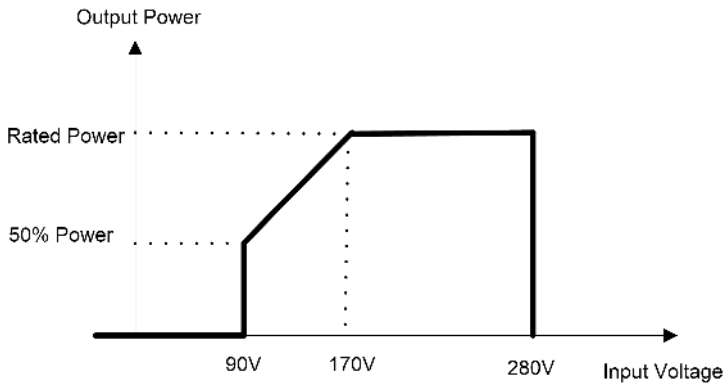
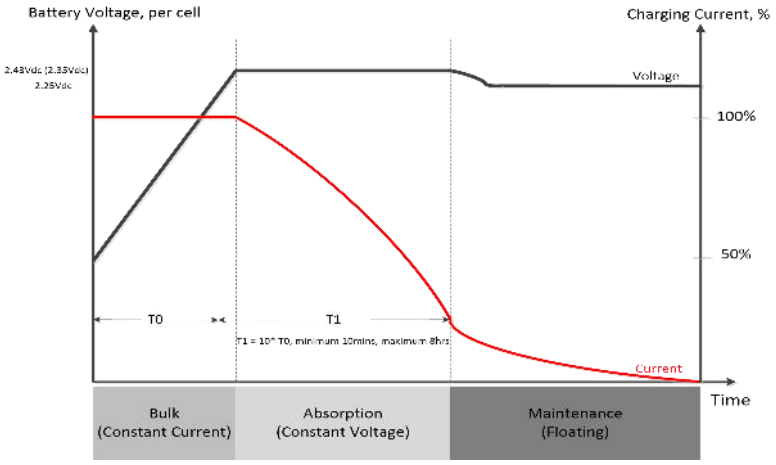
NOTICE

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

7. Specifications

Model	SF 1200 SE	SF 2400 SE	SF 3600 SE	User-Settable
Nominal Battery Voltage	12Vdc	24Vdc	24Vdc	
Battery Type	Lithium LiFePO4/ Lead-Acid/Flood / 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	16Amp	20Amp	30Amp	
Output Short Circuit Protection	Circuit Breaker			
Transfer Time	10ms Typical (UPS); 20ms Typical (Appliances)			
AC CHARGER				
Charging Algorithm	3-Step			
Max. AC Charging Current	60Amp (@VI/P=230Vac)	60Amp (@VI/P=230Vac)	80Amp (@VI/P=230Vac)	✓
Bulk Charging Voltage	14.6Vdc (AGM/Gel) 14.1Vdc (Flooded)	29.2Vdc (AGM/Gel) 28.2Vdc (Flooded)	29.2Vdc(AGM/Gel） 28.2Vdc(Flooded）	✓
Floating Charging Voltage	13. 5Vdc	27Vdc	27Vdc	✓
Max. Hybrid Charging Current (Solar & Utility)	60Amp	60Amp	80Amp	✓
PV INPUT				
Num. of Independent MPPT Tracker	1			
MPPT Input Current	1*11Amp	1*11Amp	1*18Amp	
Max. PV Array Power	2000W	3000W	4000W	
Max. Solar Charge Current	60Amp	60Amp	80Amp	✓
PV Array MPPT Voltage Range	30~400Vdc			
Max. PV Array Open Circuit Voltage	450Vdc			
MPPT Tracking Efficiency	99.9%			
INVERTER OUTPUT				
Num. of Output Ports	1			
Rated Output Power	1200W	2400W	3600W	

Max. Output Current	5.2A	10.4A	15.7A	
Surge Capacity	2400VA/2400W for 5 Seconds	4800VA/4800W for 5 Seconds	7200VA/7200W 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	92%	93%	94%	
Low Voltage Cut-off Voltage	10.5Vdc	21.0Vdc		✓
High Voltage Cut-off Voltage	16.0Vdc	33.0Vdc		
Cold Start Voltage (When only Connect with Battery)	11.5Vdc	23.0Vdc		
No Load Power Consumption	<25W@12Vdc	<35W@24Vdc		
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			
Dimension (H*W*D)	395*285*110mm	395*285*110mm	395*335*108 mm	
Weight	5.7 KG	6.1 KG	7.3 KG	
Warranty	2 Years			
COMMUNICATION				
Embedded Interface	RS232*1			
Work with WIFI & Bluetooth Monitoring Dongle(optional)	YES, by RS232			
Work with Lithium Battery BMS	NO			
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	

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