SUNOVA SOLAR

Leading one-stop PV Supplier

Sunova-eFox Off-Grid

Energy Storage System

User Manual

www.sunova-solar.com

Version: EN V2.0

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Preface

Sunova-eFox Series Energy Storage System is a multi-functional power supply device designed to comprehensively use for residential and commercial projects. With built-in lithium battery, this system can provide uninterrupted and stable power supply, and ensure the normal use of the utility when the grid is out. This device can run in the most economical and practical mode based on the user requirement to bring objective economical benefits and not cause any environmental pollution.

This user manual mainly introduces the operation, installation and specification of the device. Please read through this user manual before install and operate the system. Please keep this user manual for future use.

Table of Contents

1 Introduction

1.1 Application

Sunova-eFox series can connect with solar panels, grid (or generator), load, it built-in lithium battery, hybrid inverter and energy management system.
Sunova-eFox has four working modes: SOL (Solar first), UEI (Utility first), SBU(Solar-Battery-Utility), SUB (Solar-Utility -Battery). These working modes are described refer to the setting part.

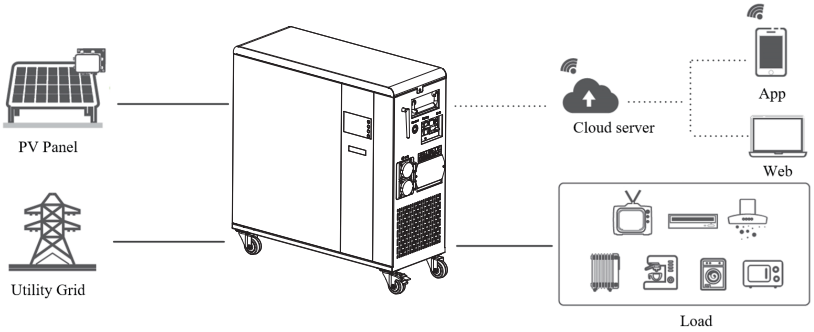
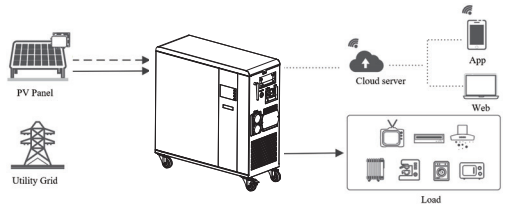
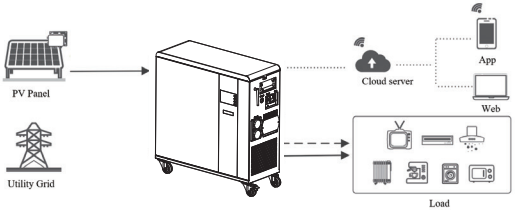
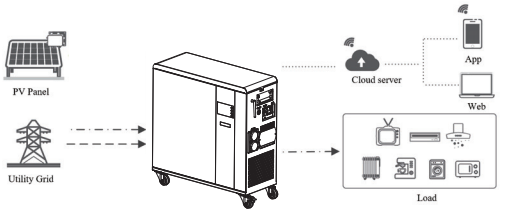


Figure 1 Sunova-eFox Working Diagram

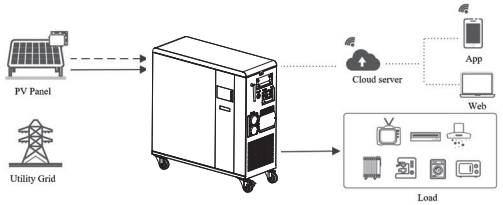
1.1.1 Operation Modes

Definition	Battery voltage too low: Lower than the value of setting 12. Battery voltage too high: Higher than the value of setting 13. Battery ----------→ PV Panel ——————→ Utility Grid — · — · — · —→

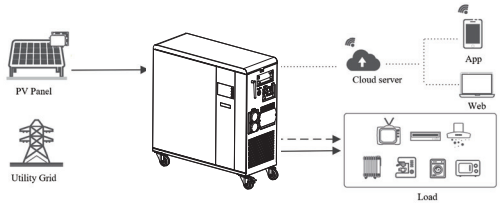
<table>
<tr>
<td rowspan="2">SOL (Solar first):
Solar energy provides power to the loads as first priority.</td>
<td>When PV power is greater than the consumption, and the battery capacity is low, the PV will supply power to the load and charge the battery at the same time.
 
</td>
</tr>
<tr>
<td>When PV power is less than the consumption, and the battery capacity is high,PV and battery suplay power to the load at the same time.
 
</td>
</tr>
<tr>
<td>UEI (Utility first):
Utility gird will provide power to the loads as first priority.</td>
<td>The grid supplies power to the load and charges the battery when the battery capacity is low.
 
</td>
</tr>
</table>

SBU(Solar-Battery-Utility) :
Solar energy provides power to the loads as first priority.

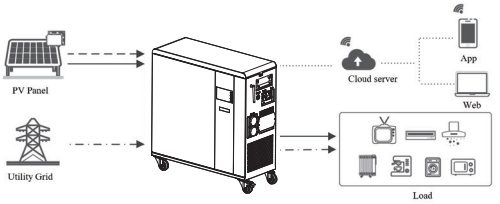
When PV power is greater than the consumption, and the battery capacity is low, the PV will supply power to the load and charge the battery at the same time.

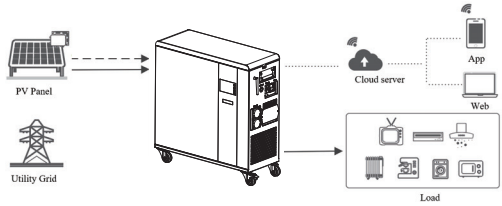


When PV power is less than the consumption, and the battery capacity is high,PV and battery suplay power to the load at the same time.



When PV power is less than the consumption, and the battery capacity is low, grid supplies the load, PV charges the battery, if there is rest PV power, supply the load.



<table>
<tr>
<td rowspan="2">SUB(Solar-Utility -Battery) :
Solar energy provides power to the loads as first priority.</td>
<td>When PV power is greater than the consumption, and the battery capacity is low,PV supplies the load and charge the battery at the same time.
 
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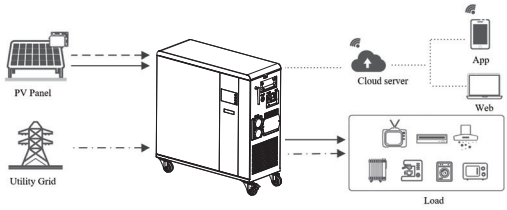
<tr>
<td>When PV power is less than the consumption, and the battery capacity is low, grid supplies power to the load, PV charges the battery, if there is rest PV power, supplies to the load.
 
</td>
</tr>
</table>

1.2 Components

After unpacking the package, please inspect the components based on the below table.

Table 1 Component list

NO.	Pictures	Description	Quantity
1		Sunova-eFox OFF-GRID Energy Storage System	1 pcs
2		WiFi module antenna	1 pcs
3		Tube terminal red	3pcs
4		Tube terminal black	3pcs
5		Tube terminal yellow	2pcs
6		User manual	1 pcs
7		Qualified Certificate	1pcs
8		Packing List	1 pcs

1.3 Sunova-eFox Dimension

The size is slightly different according to the type, below for reference.

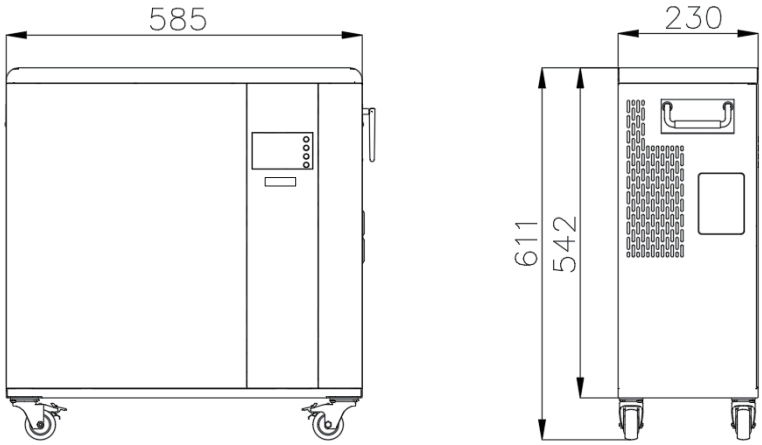


Figure 2 Sunova-eFox Dimension

1.4 Quality Inspection

Before installation, please confirm that the packaging is unbroken, and after unpacking, check that all parts are consistent with the packaging list and are in good condition.

Table 2 Quality Inspection

Operation	Warning
Check Package	No damage
Check Component	No loss or damage
Check built-in Accessory	No loss or damage

1.5 Label

	• Danger: Possibility of fatal voltage
	• Warning: Possibility of device damage or personal injury
	• Warning: Heat injure

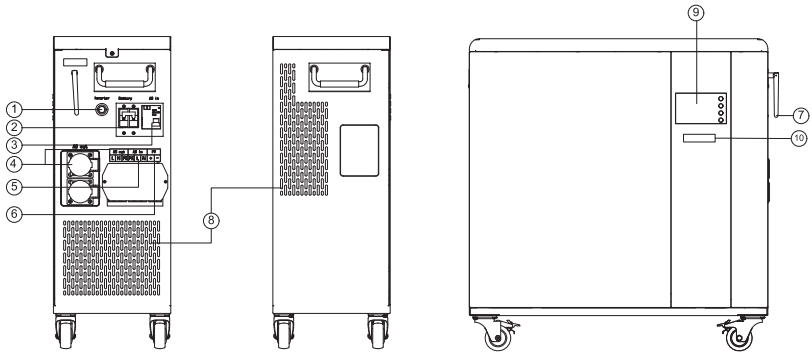
1.6 Safety

This user manual includes safety introduction. Please read this manual carefully before installing, maintaining and operating the equipment. If you do not operate in accordance with this manual, if there is equipment damage or personal injury or death, manufacturer will not be responsible for it.

	❖ Must be grounded before operation.
	❖ Do not open the cover of the storage unauthorized. The electrical parts and components inside of the storage are electrostatic. Take measurements to avoid electrostatic discharge during relevant operation.
	❖ Only qualified electricians are allowed to operate the storage under the permission of local power departments. Ensure reliable installation and electrical connection before operation ❖ Only qualified electricians are allowed to perform the maintenance, inspection, and components replacement of this product.
	❖ Do not remove any part and component of the storage unintended; Otherwise, damage to the device and physical injury may occur.

2 Installation

2.1 Device Overview



① Inverter Switch
② Battery Breaker
③ AC Input Breaker
④ AC Output
⑤ AC Input
⑥ PV Input
⑦ WiFi Antenna
⑧ Heat Dissipation Hole
⑨ LCD Screen
⑩ Battery Status Indicator

Figure 3 Device Overview

2.1.1 Device Carrying

⚠	**Warning!** **The device weight (67.6kg) may cause personal injury.** • Please note that the device weight when move or deliver the device. • Select the firm installation platform. • Use proper tools for installation. • At least two people to install.

2.1.2 Unboxing Guide

The iron buckle is sharp, please pay attention to personal safety when unboxing!

(1) Use screwdriver to pry off the top cover clasp.

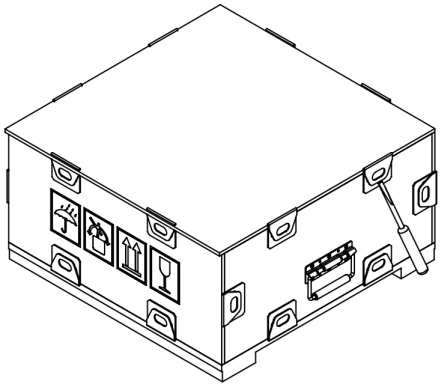


Figure 4

(2) Remove the top cover after prying off all the cover buckles.

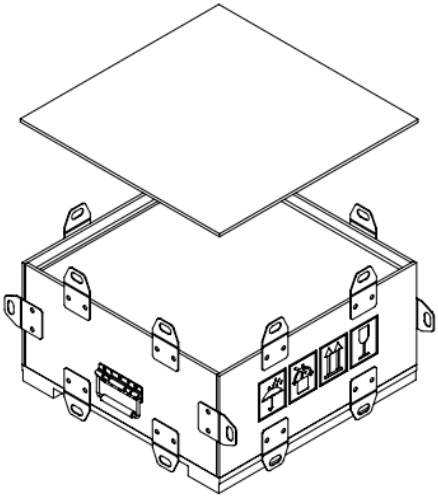


Figure 5

(3) After prying off the side cover iron buckle, remove the four side covers.

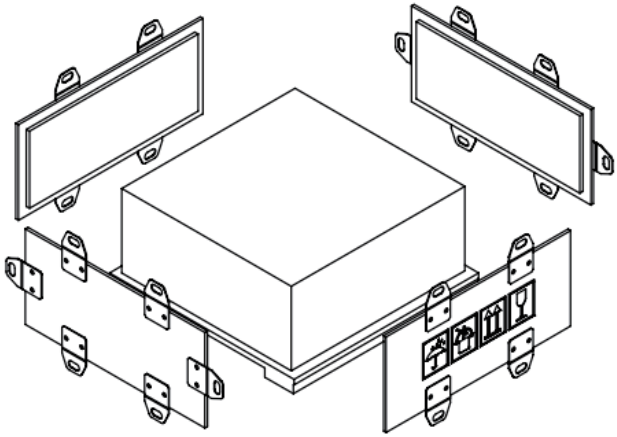


Figure 6

(4) Take out the machine; the machine is heavy, please pay attention.

⚠	**Warning:** ❖ Ensure the installed place be well ventilate and conform to device using condition. ❖ No flammable and combustible objects are allowed to put within 4m. ❖ The environmental temperature shall keep between 0℃ and 40℃.
⚠	**Warning:** ❖ No smoking and setting off fireworks nearby. ❖ Ensure clean and ventilate in the surrounding area. ❖ Ensure the wiring conform to requirement to avoid fire.

	❖ Adequate ventilation of the room or location in which the device containing vented or valve-regulated batteries is located, to prevent the accumulation of hazardous gases;
	-Servicing of batteries should be performed or supervised by personnel knowledgeable about batteries and the required precautions. -When replacing batteries, replace with the same type and number of batteries or battery packs. -CAUTION: Do not dispose of batteries in a fire. The batteries may explode. -CAUTION: Do not open or damage batteries. Released electrolyte is harmful to the skin and eyes. It may be toxic. -CAUTION: A battery can present a risk of electrical shock and high short-circuit current. The following precautions should be observed when working on batteries: a) Remove watches, rings, or other metal objects. b) Use tools with insulated handles. c) Wear rubber gloves and boots. d) Do not lay tools or metal parts on top of batteries. e) Disconnect charging source prior to connecting or disconnecting battery terminals. f) Determine if battery is inadvertently grounded. If inadvertently grounded, remove source from ground. Contact with any part of a grounded battery can result in electrical shock. The likelihood of such shock can be reduced if such grounds are removed during installation and maintenance (applicable to equipment and remote battery supplies not having a grounded supply circuit). g) Rinse acid splashes thoroughly with clear water for a long time and consider consulting a doctor. -Battery terminals and connectors shall be accessible for maintenance with the correct tools.

	❖ All electrical connections must be in accordance with local and national standards. ❖ Only with the permission of the utility grid, the storage can be connected to the utility grid. Disconnect the storage from all the external power sources before service! Do not open the enclosure when the storage is working. ❖ When the enclosure lid is removed, live components can be touched which can result in death or serious injury due to electric shock. Batteries deliver electric power, resulting in burns or a fire hazard when they are short-circuited, or wrongly installed.
	❖ All the AC cables should be equipped with correctly colored cables for distinguishing. Please refer to related standards about the wiring color.
	❖ Do not touch live parts until 5 minutes after disconnection from the power sources.

2.1.3 Installation

The device shall be indoor installed and vertical placed. The place where it is installed shall be able to ensure the stability and safety of the product.

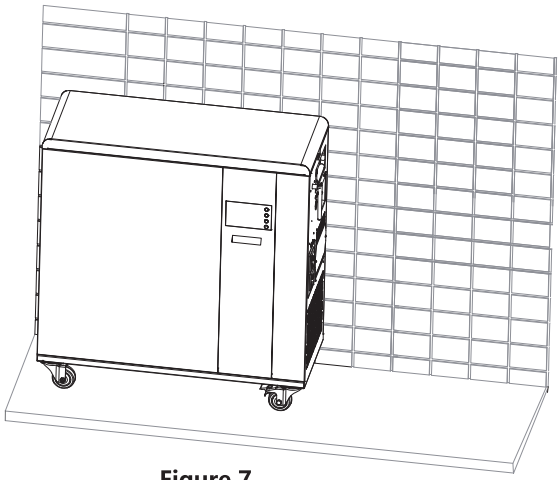


Figure 7

After installing against the wall, the caster buckle should be locked to prevent sliding.

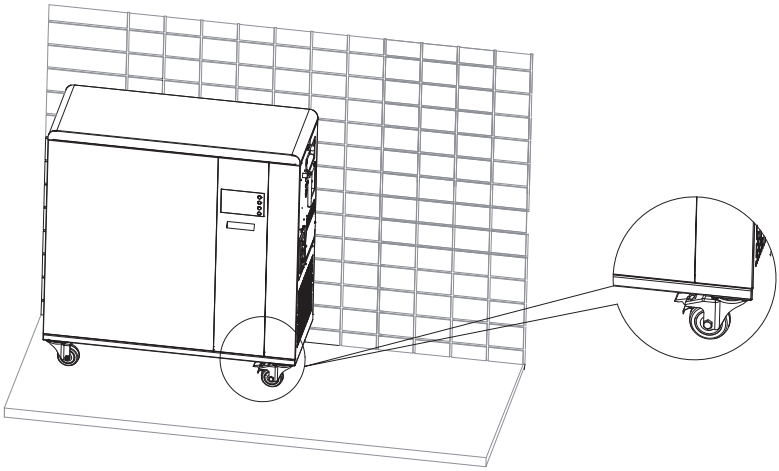


Figure 8

Other objects around Sunova-eFox should be more than 200mm away from the equipment to ensure good ventilation.

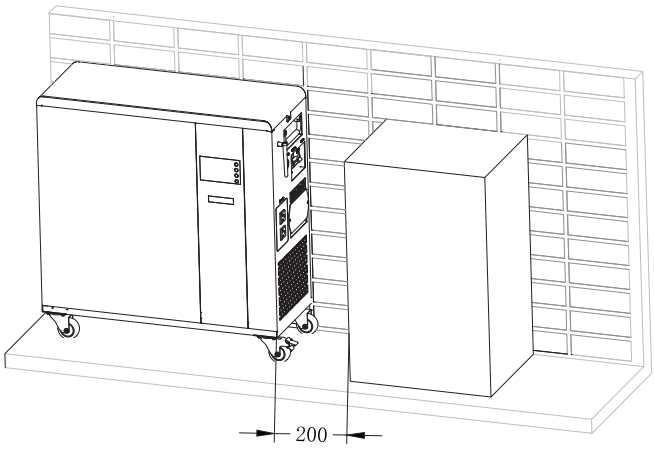


Figure 9

2.2 Electric Installation

The Sunova-eFox is ground mounted, shall put on the ground vertically.

2.2.1 Wiring Procedure

(1) Cut off the circuit breaker of grid and PV .
(2) Ensure Smart Unit be not carelessly turned on.
(3) Detach the screws on the side case.
(4) Remove the side cover case.

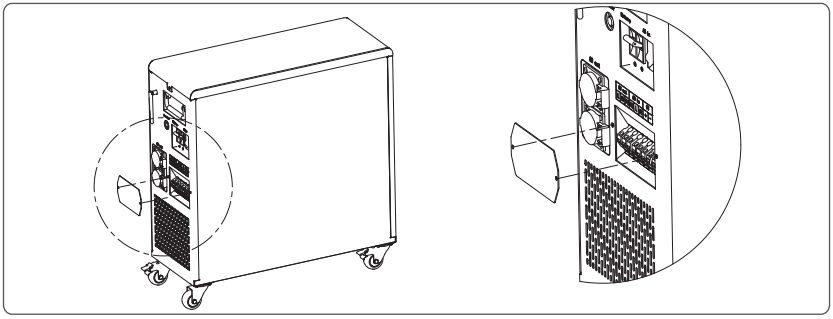


Figure 10

(5) wiring refer to the Figure 11-12

(6) Install the cover.

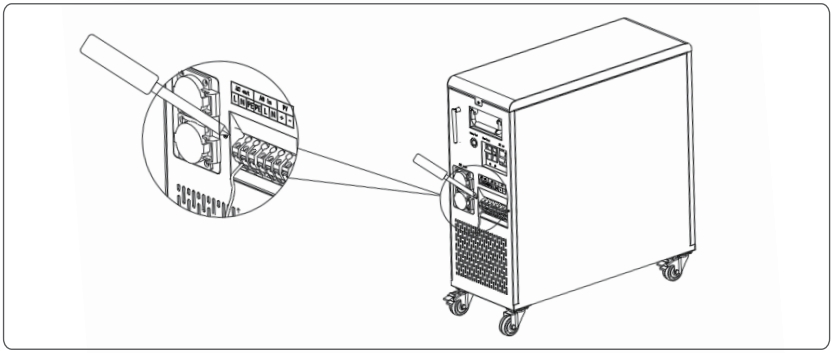


Figure 11

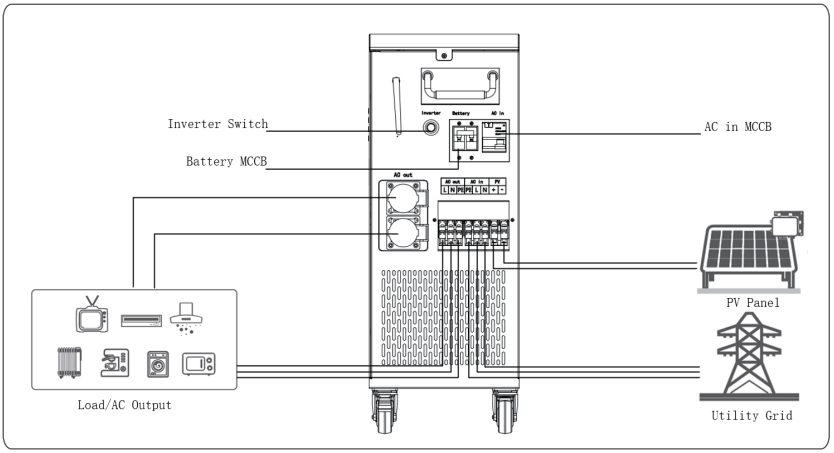


Figure 12

Table 3 Cable Size

Function	Typical Power		Cable size	Torque
Load	Sunova-eFox	3kVA/5kVA	10AWG	1.4~1.6Nm
Grid		3kVA/5kVA	10AWG	1.4~1.6Nm
PV		3kVA/5kVA	10AWG	1.4~1.6Nm

2.3 LED indication

LED status

Battery Status	Protection, alarm normal	RUN	ALM	Capacity				Description
		Green	Red	Green	Green	Green	Green	
Off		Off	Off	Off	Off	Off	Off	All off
On	Normal	Flash 1	Off	Based on capacity				No charging or discharging
	Warning	Flash 1	Flash 3					PACK low voltage
Charge	Normal	ON	Off	Based on capacity, the highest level LED flashes (flash 2), the other SOC lights is on all the times.				
	Warning	ON	Flash 3					
	Over Charge	On	Off	On	On	On	On	Stop charging
	Over Temp/Current、Failure	Off	On	Off	Off	Off	Off	
Discharge	Normal	Off	Flash 3	Based on capacity, the highest level LED flashes, the other SOC lights is on all the times.				
	Warning	Flash 3	Flash 3					
	Over Discharge	Off	Off	Off	Off	Off	Off	Stop discharging
	Over Temp/Current、Failure	Off	On	Off	Off	Off	Off	
Failure		Off	On	Off	Off	Off	Off	Stop charging and discharging

SOC status

Status		Charge				Discharge			
		L1	L2	L3	L4	L1	L2	L3	L4
Capacity	0~25%	Flash 2	Off	Off	Off	On	Off	Off	Off
	25%~50%	On	Flash 2	Off	Off	On	On	Off	Off
	50%~75%	On	On	Flash 2	Off	On	On	On	Off
	75%~100%	On	On	On	Flash 2	On	On	On	On
Run		On				Flash 3			

Flash description:

Flash 1: 0.25s on/3.75s off

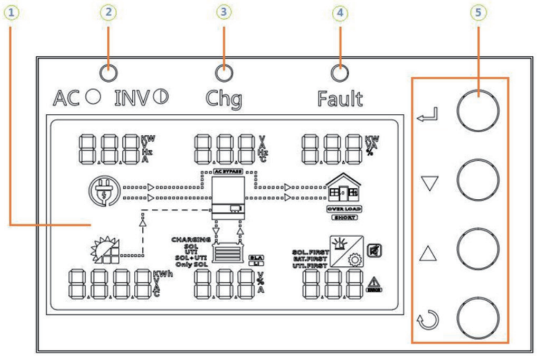
Flash 2: 0.5s on /0.5s off

Flash 3: 0.5s on, 1.5s off

3 Operation

3.1 LCD Display

The operation and display panel, shown in below chart, is on the front panel of Sunova-eFox. It includes three indicators, four function buttons and a LCD display, indicating the operating status and input/output power information.



① LCD Display
② Status Indicator
③ Charging Indicator
④ Fault Indicator
⑤ Function Buttons

Figure 13 LED Display

Table 4 LED Indicator

LED Indicator			Messages
AC / INV	Green	Solid On	Output is powered by utility grid.
		Flashing	Output 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.

Table 5 Function Button

Function Button	Description
ESC	To exit setting mode
UP	To go to previous selection
DOWN	To go to next selection
ENTER	To confirm the selection in setting mode or enter setting mode

3.2 LCD Display Icons

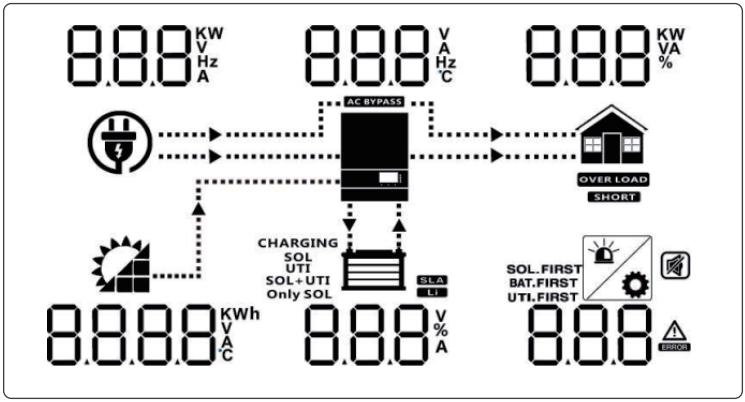


Figure 14 Display Icons

Table 6 Function Button

Icon	Description
AC Input Information	
	AC input icon
	Indicates AC input power, AC input voltage, AC input frequency, AC input current.
AC BYPASS	Indicates AC power loads by bypass.

Icon	Description
PV Input Information	
	PV input icon
	Indicate PV input power, voltage, current, etc.
Output Information	
	Inverter Icon
	Indicate output voltage, current, frequency, Inverter temperature.
Load Information	
	Load Icon
	Indicates power of load, power percentage of load.
	Indicates overload happened.
	Indicates short circuit happened.
Battery Information	
	Battery Icon
	Indicates battery voltage, energy percentage, battery current.
	Indicates SLA battery
	Indicates Lithium battery
	Indicates charging source priority: Solar first, Utility first, solar and utility, or only solar

Icon	Description
Other Information	
SOL.FIRST BAT.FIRST UTI.FIRST	Indicates output source priority: Solar first, Utility first, SBU mode or SUB mode.
	Indicates warning code or fault code.
	Indicates a warning or a fault is happening.
	Indicates it is during setting values.
	Indicates the alarm is disabled.

Table 7 Battery information

In AC mode, battery icon will present battery capacity		
Battery Status		SOC < 25%
		25%≤SOC < 50%
		50%≤SOC < 75%
		75%≤SOC

In AC mode, battery icon will present battery charging status.		
Status	**Battery SOC**	**LCD Display**
Constant current mode/Constant voltage mode	SOC < 25%	4 bars will flash in turns.
	25%≤SOC < 50%	Bottom bar will be on and the other three bars will flash in turns.
	50%≤SOC < 75%	Bottom two bars will be on and the other two bars will flash in turns.
	75%≤SOC	Bottom three bars will be on and the top bar will flash in turns.

3.3 LCD Setting

After pressing and holding ENTER button for 3 seconds, unit enter setting mode. Press "UP" or "DOWN" button to select setting programs. Then, press "ENTER" button to confirm the selection or ESC button to exit.

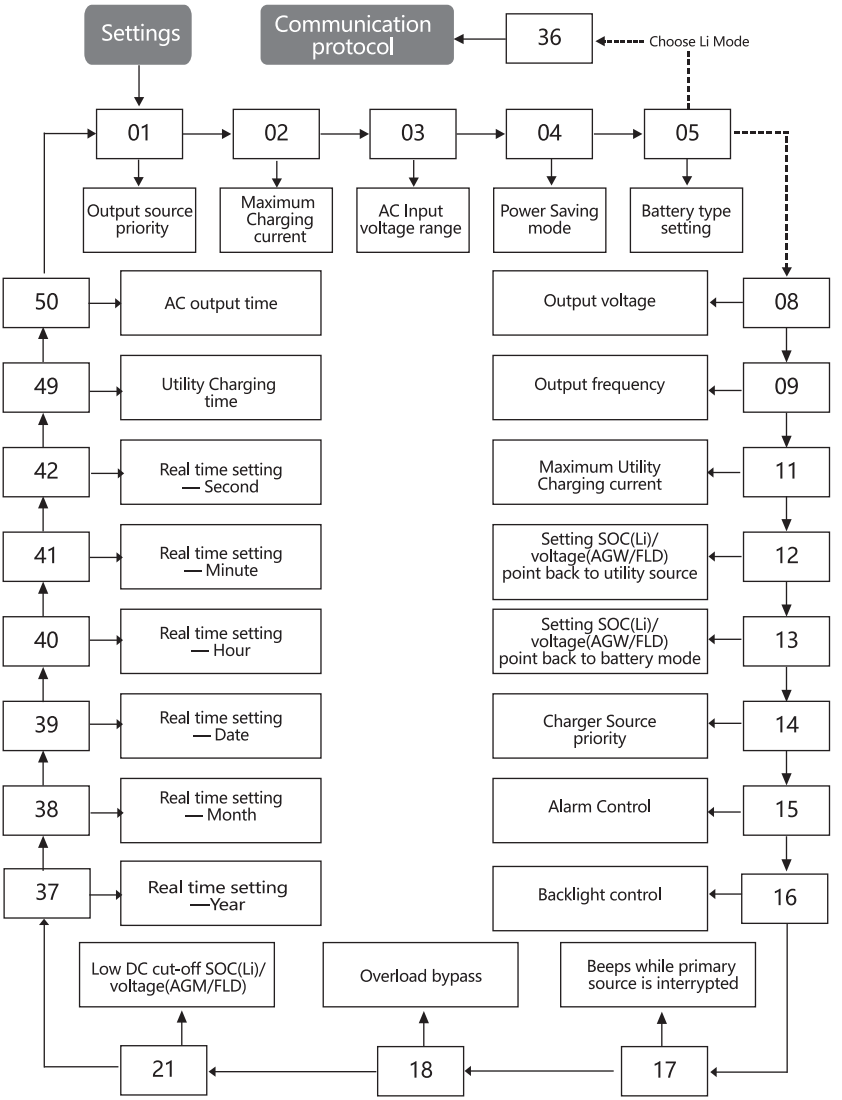
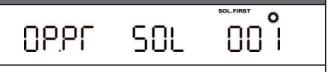
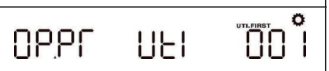
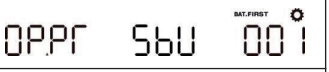
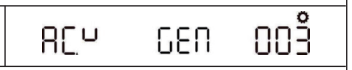
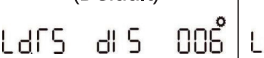


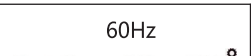
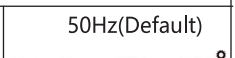
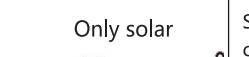
Table 8 Setting Program

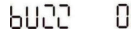
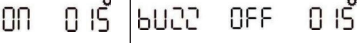
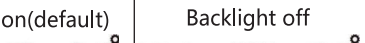
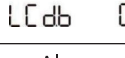
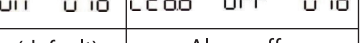
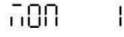
<table>
<tr><th>Program</th><th>Description</th><th colspan="2">Setting option</th></tr>
<tr><td rowspan="6">01</td><td rowspan="6">Output source priority selection:
To configure load power source priority</td><td>Solar First</td><td>  </td></tr>
<tr><td colspan="2">Solar energy provides power to the 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 grid provides power to the loads only when any below one condition happens:
-Solar energy is not available
-Battery voltage drops to low-level warning voltage or the setting point in program 12.</td></tr>
<tr><td>Utility First</td><td>  </td></tr>
<tr><td colspan="2">Utility gird 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.</td></tr>
<tr><td>SBU Priority (Default)</td><td>  </td></tr>
<tr><td colspan="2">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 grid provides power to the loads only when battery voltage drops to either low-level warning voltage or the setting point in program 12.</td></tr>
</table>

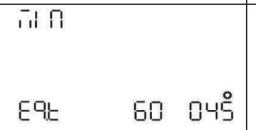
Program	Description	Setting option	
		SUB Priority	
		Solar energy provides power to the loads as first priority. If solar energy is not sufficient to power all connected loads, solar and utility gird will supply power to the loads at the same time. Battery provides power to the loads only when solar energy is not sufficient and there is no utility.	
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.	
		Generator	
		If selected, acceptable AC input voltage range will be within 90∽280Vac. In this mode, the max charging current is 30A.	
04	**Power saving mode enable/disable**	**Disable (default)**	
		If disabled, no matter connected load is low or high, the on/off status of inverter output will not be effected.	
		Enable	
		If enabled,the inverter output will be off when connected load is pretty low or not detected.	

Program	Description	Setting option	
05	Battery type	**AGM**	bAtt AGM 005
		Flooded	bAtt FLd 005
		Lithium (Default)	bAtt LI 005
		Only suitable when communicated with BMS	
		User-defined	bAtt USE 005
		If "User-Defined" is selected, battery charge voltage and low DC cut-off voltage can be set up in program 19, 20 and 21.	
		User-defined 2	bAtt USE 005
		Suitable when lithium battery without BMS communication If "User-defined 2" is selected, battery charge voltage and low DC cut-off voltage can be set up in program19, 20 and 21. It is recommended to set to the same voltage in program 19 and 20(full charging voltage point of lithium battery). The inverter will stop charging when the battery voltage reaches this setting.	
36	**RS485 communication protocol**	**Protocol 1**	PtCL L01 036
		Protocol 2	PtCL L02 036
		⋮	⋮
		Protocol 50	PtCL L50 036
	CAN communication protocol	**Protocol 51**	PtCL L51 036
		Protocol 52	PtCL L52 036
		⋮	⋮
		Protocol 99	PtCL L99 036

Program	Description	Setting option	
NOTE 1: When set the battery type as "LI" in program 05, the setting option 12,13,21 will change to display percent. At the "LI" type battery, the maximum charge current can' t be modify by the user. When the communication fail, the inverter will cut off output. If it lost the communication with the battery, you can set the battery type to "USER" for emergency, then contact the installer.			
12	Setting SOC point back to utility source when selecting "SBU priority" or "Solar first" in program 01.		Default 30%, 20%~50% Settable
13	Setting SOC point back to battery mode when selecting "SBU priority" or "Solar first" in program 01.		Default 65%, 30%~100% Settable
21	Low DC cut-off SOC, If "LI" is selected in program 05,this program can be set.		Default 10%, 5%~30% Settable
NOTE 2: When the inverter is cut-off, it must to charge by solar or utility until the SOC> setting 21+10%, the inverter will restart.			
06	Auto restart when overload occurs	Restart Disable (Default) 	Restart Enable 
07	Auto restart when over temperature occurs	Restart Disable (Default) 	Restart Enable 

Program	Description	Setting option	
08	Output voltage	230V(Default) 	220V 
		240V 	208V 
		*This setting is only available when the inverter is in standby mode (Switch off).	
09	Output frequency	60Hz 	50Hz(Default) 
		*This setting is only available when the inverter is in standby mode (Switch off).	
11	Maximum utility grid charging current.	30A (Default), 10A-40A settable  (If "Li" is selected in program 5, this program cannot be set up.) Note. If setting value in Program 02 is smaller than that in Program 11, the inverter will apply charging current from program 02 for utility charger	
14	Charger source priority: To configure charger source priority	If this off grid solar inverter is working in Line, Standby or Fault mode, Charger source can be programmed as below:	
		Solar First 	Solar energy will charge battery as first priority. Utility will charge battery only when solar energy is not available.
		Solar and Utility gird (Default) 	Solar energy and utility grid will both charge battery.
		Only solar 	Solar energy will be the only charger source no matter utility is available or not.

Program	Description	Setting option	
		If this off grid solar 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.	
15	Alarm Control	Alarm on (default) 	Alarm off 
16	Backlight control	Backlight on(default) 	Backlight off 
17	Beeps while primary source is interrupted	Alarm on (default) 	Alarm off 
18	Overload bypass	Bypass Disable 	Bypass enable (Default) 
		When enabled, the unit will transfer to line mode if overload occurs in battery mode.	
28	Address setting (for expansion)	No need to set, keep it default	
37	Real time setting---Year		Default 2018, Range 2018-2099
38	Real time setting---Month		Default 01, Range 01-12
39	Real time setting---Date		Default 01, Range 01-31
40	Real time setting---Hour		Default 00, Range 00-23
41	Real time setting---Minute		Default 00, Range 00-59
42	Real time setting---Second		Default 00, Range 00-59

Program	Description	Setting option	
43	Battery equalization	Battery equalization enable 	Battery equalization disable (default) 
		If "flooded" or "user-Defined" is selected in program 05, this program cannot be set up.	
44	Battery equalization voltage		Default 58.4V, 48.0V-58.4V Settable
45	Battery equalized time		Default 60Min, 5min-90min Settable
46	Battery equalized timeout		Default 120Min, 5min-90min Settable
47	Equalization interval		Default 30 days, 5days-90days Settable
48	Equalization activated immediately	Equalization activated immediately ON 	Equalization activated immediately OFF (default) 
		If equalization function is enabled in program 43, this program can be setup. If " ON" is selected in this program, it' s to activate battery equalization immediately and LCD main page will shows "". If" OFF "is selected, it will cancel equalization function until next activated equalization time arrives based on program 47 setting. At this time, ""will not be show in LCD main page.	

Program	Description	Setting option	
49	Utility grid charging time	0000 (Default)  	The time allows utility grid to charge the battery. Use 4 digits to represent the time period, the upper two digits represent the time when utility grid start to charge the battery, setting range is from 00 to 23, and the lower end to charge the battery, setting range is from 00 to 23. (e.g. 2320 represents the time allows utility grid end to charge the battery is from 23:00 to the next day 20:59, and the utility gird charging is prohibited outside for this period).
50	AC output time	0000 (Default) Allow inverter to power the load all day run.  	The time allows inverter to power the load. Use 4 digits to represent the time period, the upper two digits represent the time when inverter start to power the load, setting range is from 00 to 23, and the lower two digits represent the time when inverter end to power the load, setting range is from 00 to 23. (e.g. 2320 represents the time allows inverter to power the load is from 23:00 to the next day 20:59, and the inverter AC output power is prohibited outside of this period).
02/19/20/21/22/23/24/43/44/45/46/47/48		No need to set, keep it default	

3.4 Display Information

The LCD display information will be switched in turns by pressing "UP" or "DOWN" key. The selection information is switched as below order: voltage, frequency, current, power, firmware version.

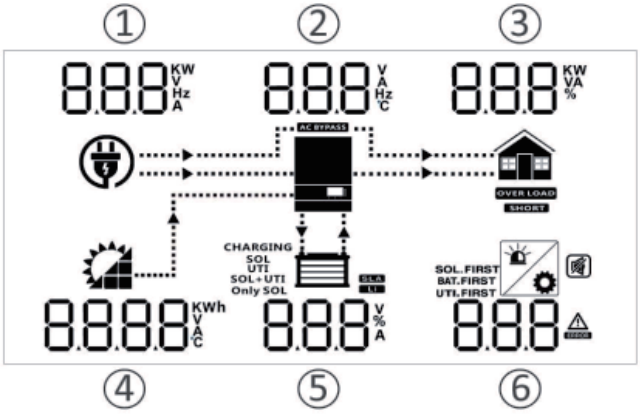
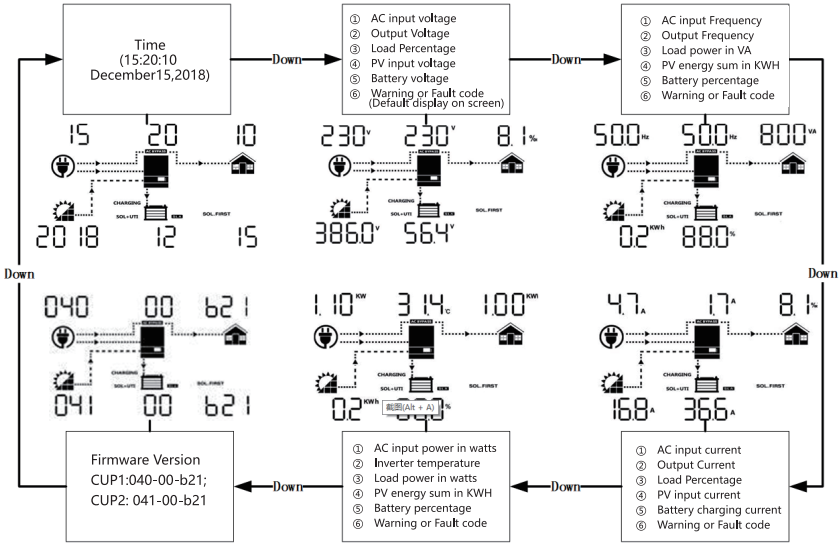
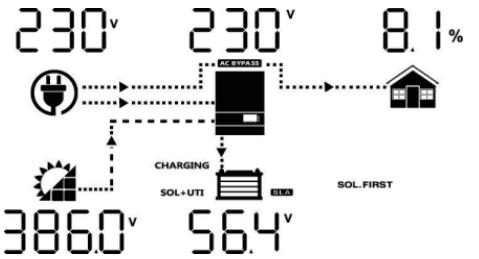
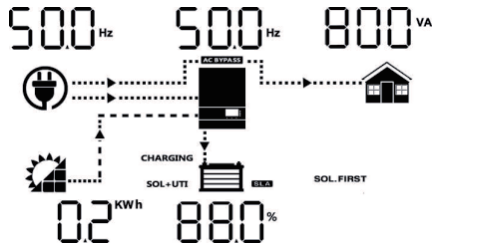
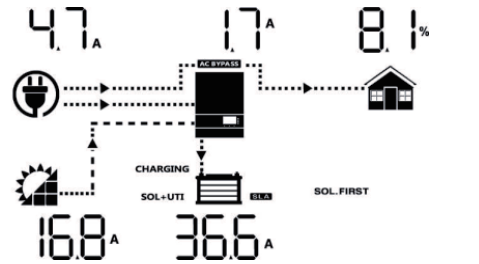
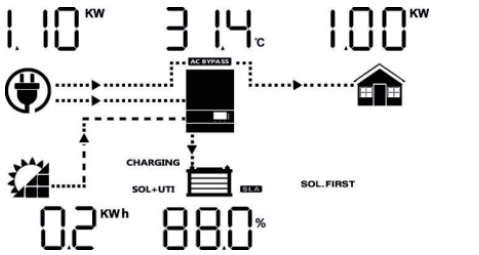


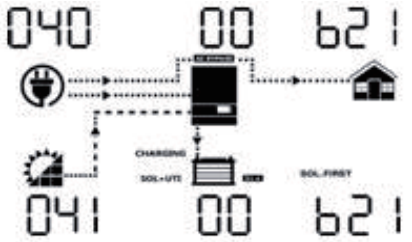
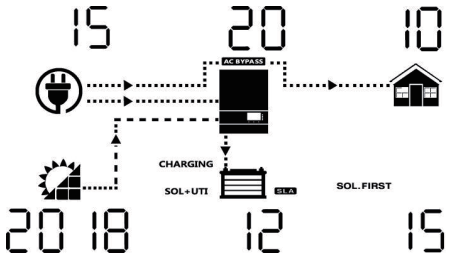
Figure 15 Display Information



3.5 Operating Mode

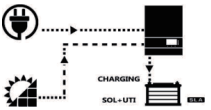
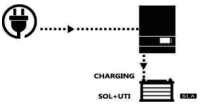
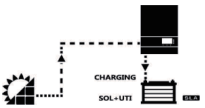
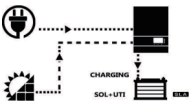
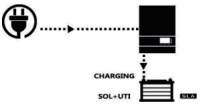
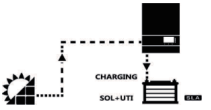
Table 9 Display Information

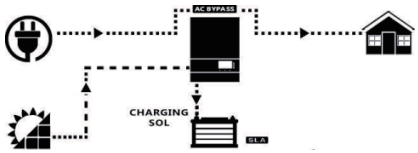
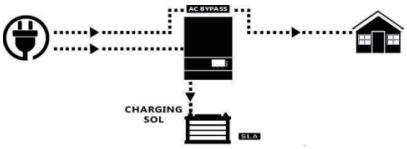
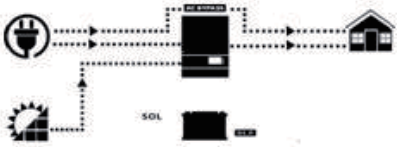
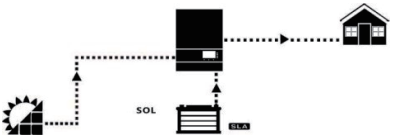
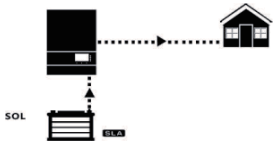
Setting Information	LCD display
① AC input voltage ② Output Voltage ③ Load Percentage ④ PV input voltage ⑤ Battery voltage ⑥ Warning or Fault code (Default display on screen)	
① AC input Frequency ② Output Frequency ③ Load power in VA ④ PV energy sum in KWH ⑤ Battery percentage ⑥ Warning or Fault code	
① AC input current ② Output Current ③ Load Percentage ④ PV input current ⑤ Battery charging current ⑥ Warning or Fault code	
① AC input power in watts ② Inverter temperature ③ Load power in watts ④ PV energy sum in KWH ⑤ Battery percentage ⑥ Warning or Fault code	

Setting Information	LCD display
Firmware Version CUP1:040-00-b21; CUP2: 041-00-b21	
Time (15:20:10, December 15, 2018)	

3.5 Operating Mode

Table 10 Operating mode description

Operation mode	Description	LCD display	
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.	No output is supplied by the unit but it still can charge batteries.	Charge by utility and PV energy 	Charging by utility 
		Charging by PV energy 	No charging 
Fault Mode Note: * Fault mode: Errors are caused by inside circuit or external reasons such as over tempera-ture, output short circuit and so on.	PV energy and utility can charge batteries	Charge by utility and PV energy 	Charging by utility grid 
		Charging by PV energy 	No charging 

Operation mode	Description	LCD display
Utility grid Mode	The unit will provide output power from the mains. It can also charge the battery at line mode.	Charging by PV energy 
		Charging by utility grid 
		No battery connected 
Battery Mode	The unit will provide output power from battery and PV power	Power from battery and PV power 
		Battery from battery power only 

3.6 Monitoring

For data monitoring, please refer to the "Monitoring System Settings" manual.

4 Maintenance

4.1 Fault Code

Fault Code	Fault Event	Icon on
01	Fan is locked	
02	Over temperature	
03	Battery voltage is too high	
04	Battery voltage is too low	
05	Output short circuited	
06	Output voltage is too high	
07	Overload time out	
08	Bus voltage is too high	
09	Bus soft start failed	
11	Main relay failed	
51	Over current or surge	
52	Bus voltage is too low	
53	Inverter soft start failed	
55	Over DC voltage in AC output	
56	Battery connection is open	
57	Current sensor failed	
58	Output voltage is too low	
80	CAN fault	
81	Host loss	

4.2 Warning Indicator

Warning Code	Warning Event	Audible Alarm	Icon flashing
01	Fan locked when inverter is on	Beep 3 times every second	
02	Over temperature	Beep once every second	
03	Battery 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 once every 3 second	
12	Solar charger stop due to low battery	Beep once every second	
13	Solar charger stop due to high PV voltage	Beep once every second	
14	Solar charger stop due to overload	Beep once every second	
15	Parallel input utility grid different	Beep once every second	
16	Parallel input phase error	Beep once every second	
17	Parallel output phase loss	Beep once every second	
18	Buck over current	Beep once every second	
19	Battery disconnect	No beep	
20	BMS communication error	Beep once every second	
21	PV power insufficient	Beep once every second	
22	Parallel forbidden without battery	Beep once every second	
25	Parallel inverters' capacity different	Beep once every second	
33	BMS communication loss	Beep once every second	
34	Cell over voltage	Beep once every second	

Warning Code	Warning Event	Audible Alarm	Icon flashing
35	Cell under voltage	Beep once every second	
36	Total over voltage	Beep once every second	
37	Total under voltage	Beep once every second	
38	Discharge over voltage	Beep once every second	
39	Charge over voltage	Beep once every second	
40	Discharge over temperature	Beep once every second	
41	Charge over temperature	Beep once every second	
42	Mosfet over temperature	Beep once every second	
43	Battery over temperature	Beep once every second	
44	Battery under temperature	Beep once every second	
45	System shut down	Beep once every second	

4.3 Specification

Model	Sunova-eFox-H-30E	Sunova-eFox-H-35E	Sunova-eFox-H-50E
Battery			
Rated voltage	51.2V	51.2V	
Voltage range	44.8~57.6V	44.8~57.6V	
Capacity	5.12kWh	5.12kWh	5.12kWh
Max. discharge rate	1C	1C	
Max. charge rate	1C	1C	
Battery type	Li-ion (LFP)	Li-ion (LFP)	
AC Output(Backup)			
Rated power	3000W	3500W	5000W
Surge power	6000W,5s	7000W,5s	10000W,5s
Rated output voltage	220/230/240V	220/230/240V	
Max. output current	13.7A	16A	22.7A
Rated frequency	50/60Hz	50/60Hz	
THDv	< 3%	< 3%	
Output wave	Pure Sine Wave	Pure Sine Wave	
Output type	AC Socket×2+Terminals	AC Socket×2+Terminals	
AC Input			
AC input voltage range	170~280V	170~280V	
AC input frequency	50/60Hz	50/60Hz	
AC charge current(Battery)	15A(10/15A Adjustable)	30A(0~60A Adjustable)	30A(0~80A Adjustable)
PV Input			
Max. PV power(Recommended)	1800W	4500W	6000W
Max. PV voltage	145V	450V	
MPPT voltage range	60~115V	120~430V	
Max PV charge current(Battery)	30A	80A	100A
General Data			
Operating temperature	0℃~55℃	0~55℃	
Storage temperature	-15℃~60℃	-15℃~60℃	
Humidity	5%~95%	5%~95%	
Cooling strategy	Fan	Fan	
Weight	64.6kg	67.6kg	67.6kg
Dimension [W x H x D]	585*611*230mm	585*611*230mm	585*611*230mm
Enclosure protection rating	IP20	IP20	
Communication	WiFi/RS485	WiFi/RS485	

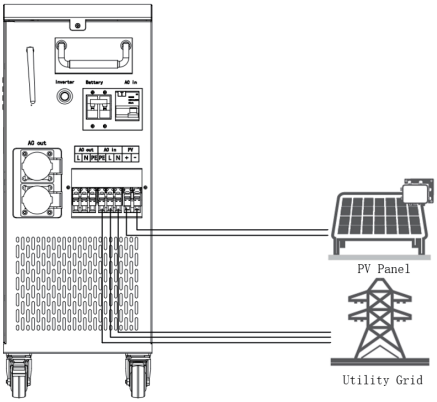
4.4 Trouble Shooting

Problem	LCD/LED/Buzzer	Explanation / Possible cause	What to do
Unit shuts down automatically during start up process.	LCD/LEDs and buzzer will be active for 3 seconds and then complete off.	The battery voltage is too low(<setting in program 5)	1. Re-charge battery. 2. Replace battery.
No response after power on.	No indication.	1. The battery voltage is far too low. 2. Battery polarity connect reversed.	1. Check if batteries and the wiring are connected well. 2. Re-charge battery. 3. Replace battery.
Mains exist but the unit works in battery mode.	Input voltage 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 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 01	Fan fault	Replace the fan.
	Fault code 05	Output short circuited.	Check if wiring is connected well and remove abnormal load.
	Fault code 02	Internal temperature of inverter component is over 100°C.	Check whether the air flow of the unit is blocked or whether the ambient temperature is too high.
	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.

Problem	LCD/LED/Buzzer	Explanation/Possible cause	What to do
Buzzer beeps continuously and red LED is on.	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 07	Overload error. The inverter is overload 110% and time is up.	Reduce the connected load by switching off some equipment.
	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.	
	Fault code 56	Battery is not connected well or fuse is burnt.	If the battery is connected well, please return to repair center.

4.5 Activation

If you accidentally discharge the battery capacity to zero and can't turn it on, you need to activate it by connecting PV or Utility grid to reuse it.



SUNOVA SOLAR

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