PowMr

HYBRID INVERTER

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Prouduct Manual

Version 1.0 (29/09/2022)

Table of Contents

1. Technical Parameters

	POW-SunSmart 3.6KW	POW-SunSmart 5.6KW
Battery Input Parameters		
Supported battery type	Li-Ion or Lead-acid	Li-Ion or Lead-acid
Nominal battery voltage (V)	48	48
Battery input voltage range(V)	40~60	40~60
Max. charge voltage (V)	≤60 (Configurable)	
Max. charge current (A)	50 (Configurable)	80 (Configurable)
Max. discharge current (A)	80 (Configurable)	120 (Configurable)
Battery capacity（Ah)(Recommend)	70~1000	100~1500
Charge for Li-Ion battery pack	Communicating with BMS of the battery pack	
PV String Input Parameters		
Max. DC input power (W)	4500	6800
Max. DC input voltage (V)	500	
MPPT voltage range (V)	120~450	
Start-up voltage (V)	150	
Max. input current (A)	12	15
AC Output Parameters (Back-Up) (Feed to essential load)		
Max. output power (W)	3600	5500
Max. output apparent power (VA)	3600	5500
Peak output apparent power (VA)	7200	11000
Max. output current (A)	16	24
Nominal output voltage (Vac)	220/230/240 (Configurable) single phase	
Nominal output frequency (Hz)	50/60(+/-0.2%) (Configurable)	
Max. Bypass Current(A)	40	
Shift Time(Bypass and inverter)(ms)	10	
Output THD (Resistor load)	< 3%	
AC input parameters (On-grid) (Bypass to essential load & Charge the battery/ Feed to home load)		
Max. input power (W) Bypass to essential load & Charge the battery	3600	5500
Max.output power (W) Feed to home load	3600	5500
Max.apparent input power (VA) Bypass to essential load & Charge the battery	3600	5500
Max.apparent output power (VA) Feed to home load	3600	5500
Nominal input/output voltage (V)	220/230/240(Auto adjusted to fit home gird) single phase	
Nominal input/output frequency (Hz)	50/60(Auto adjusted to fit home gird)	
Max. bypass current(A)	40	
Shift time(Bypass and inverter)(ms)	10	
Efficiency		
Max. Efficiency	97.6%	
Max. Battery to Load Efficiency	94.0%	
Europe Efficiency	97.0%	
MPPT Efficiency	99.9%	
Protection		
Battery over charge protection	Integrated	
Battery low voltage protection	Integrated	
Over temperature protection	Integrated	
Output over load protection	Integrated	
Output short circuit protection	Integrated	

	POW-SunSmart 3.6KW	POW-SunSmart 5.6KW
Output over voltage protection	Integrated	
Certifications & Standards		
Grid regulation	VDE-AR-N4105, UNE217001,G100	
Safety regulation	IEC/EN62109-1/2	
EMC	IEC/EN61000-6-1/3	

2. SAFETY INSTRUCTIONS

⚠ **WARNING!**

Life-Threatening Risks DUE TO FIRE OR ELECTROCUTION
The SunSmart Hybrid Inverter can only be installed by a qualified licensed electrical contractor.This is not DIY product

■ Be sure to read this manual thoroughly before installation
■ Do not attempt to install the inverter by yourself.Installation work must be performed following national wiring standards by authorized personnel only. Do not turn on the power until all the installation work is completed
■ Always use an individual power supply line protected by a circuit breaker and operating on all wires with a distance between contacts of at least 3mm for this unit.
■ The unit must be correctly grounded and the supply line must be equipped with a suitable breaker and RCD for the protection of the operator.
■ The unit is not explosion-proof,do not install the product in an explosive atmosphere.
■ Never touch electrical components immediately after the power supply has been turned off since the system can still have residual energy, which may cause electric shock. Therefore after turning off the power,always wait **for at least 5 minutes** before touching electrical components.
■ This unit contains no user-serviceable parts.Always consult an authorized contractor for repairs
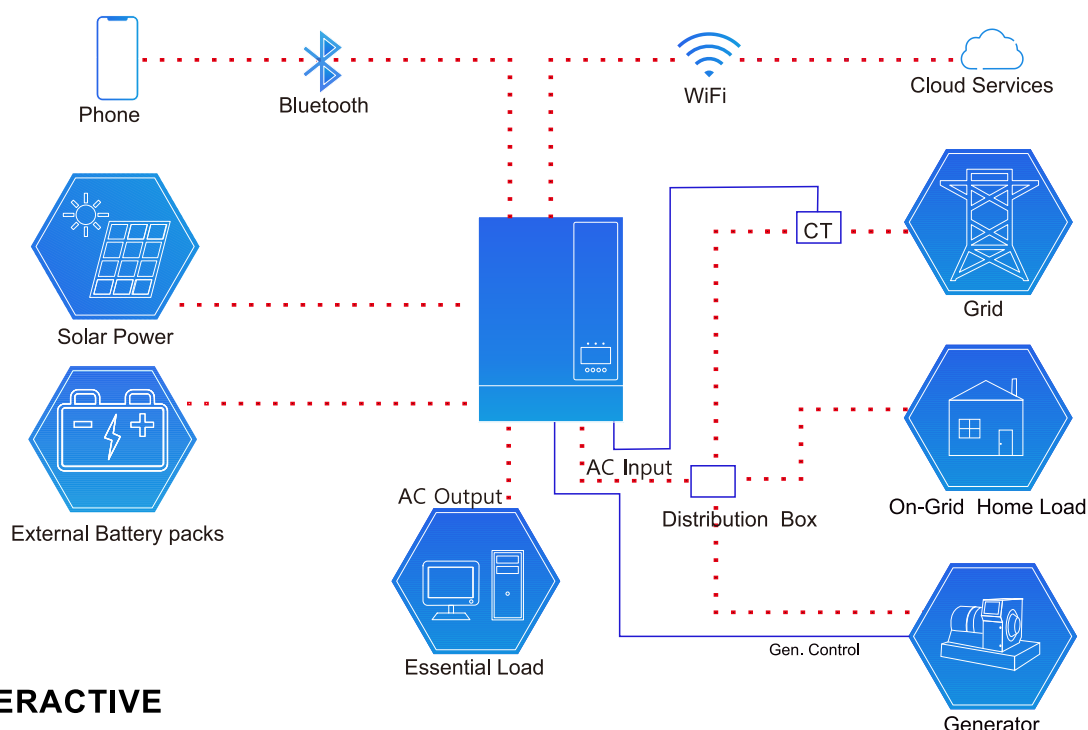
3. System Overview

3.1 Product Overview

The SunSmart Hybrid Inverter is a highly efficient power management equipment that allows the user to hit those 'parity' targets by managing power flow from multiple sources such as solar ,main electrical grid,generator,and effectively storing and releasing electric power to meet the demand of utility usage

1. PV connectors
2. Battery input connectors
3.Power ON/OFF Switch
4.Inverter LED indicators
5.LCD display
6.Function buttons
7.AC output
8.AC input
9.Ground connection
10.WIFI port
11.Gen. connector
12.Circuit breaker
13.CAN bus port/RS485 port
14.CT connector
15.GND

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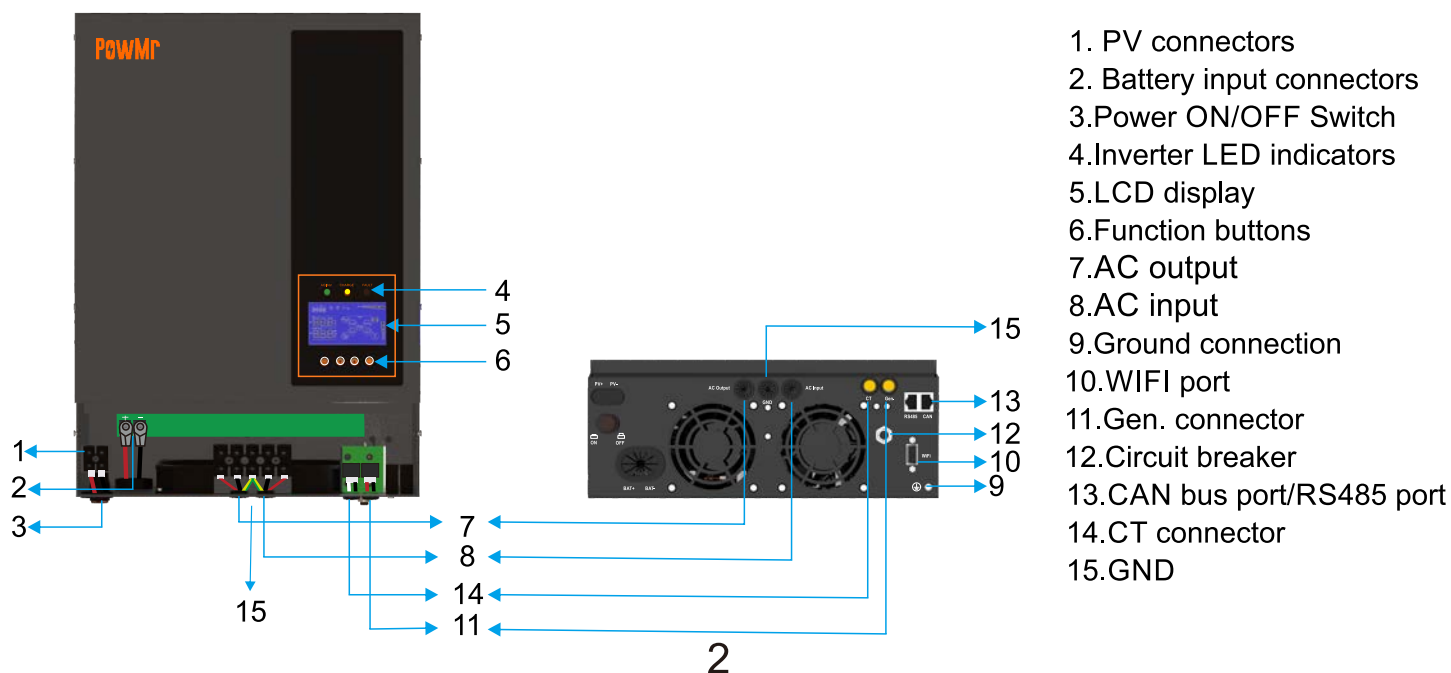
3.2 Basic System Architecture

The following illustration shows the basic application for this inverter/charger. It also includes the following devices to have a complete running system:

Phone
Bluetooth
WiFi
Cloud Services
Solar Power
Grid
CT
External Battery packs
AC Output
AC Input
Distribution Box
On-Grid Home Load
Essential Load
Gen. Control
Generator

3.3 INTERACTIVE

- Easy and simple to understand display
- Supporting Wi-Fi and Bluetooth
- Visual power flow screen
- Built-in MPPT Charger and AC Charger
- Smart settable 3-stage charging for optimized battery performance

3.4 COMPATIBLE

- Compatible with main electrical grid voltages or power generators
- On-grid, and off-grid pure sine wave inverter
- Auto restart while AC is recovering

3.5 CONFIGURABLE

- Fully programmable controller
- Programmable multiple operation modes: LIMIT function mode (Economic mode) No limit function mode(UPS mode)
- Configurable battery charge/discharge current and voltage based on applications
- Charger and discharge work time control.

3.6 SECURE

- Overload/over-temperature/short-circuit protection
- Smart battery charger design for optimized battery protection /Battery over charge and discharge protection.
- Limiting function installed to prevent excess power overflow to grid ("Zero export")

3.7 APPLICATIONS

- Marine (vessel power management)
- Power shedding (home/office/factory)
- UPS (Uninterrupted Power Supply)
- Remote locations with solar and wind generators
- Building sites
- Military locations
- Telecommunication

3.8 Work Mode explanation:

3.8.1 Limit function mode(Economic mode)
(Using peak cutting and valley filling to save money)
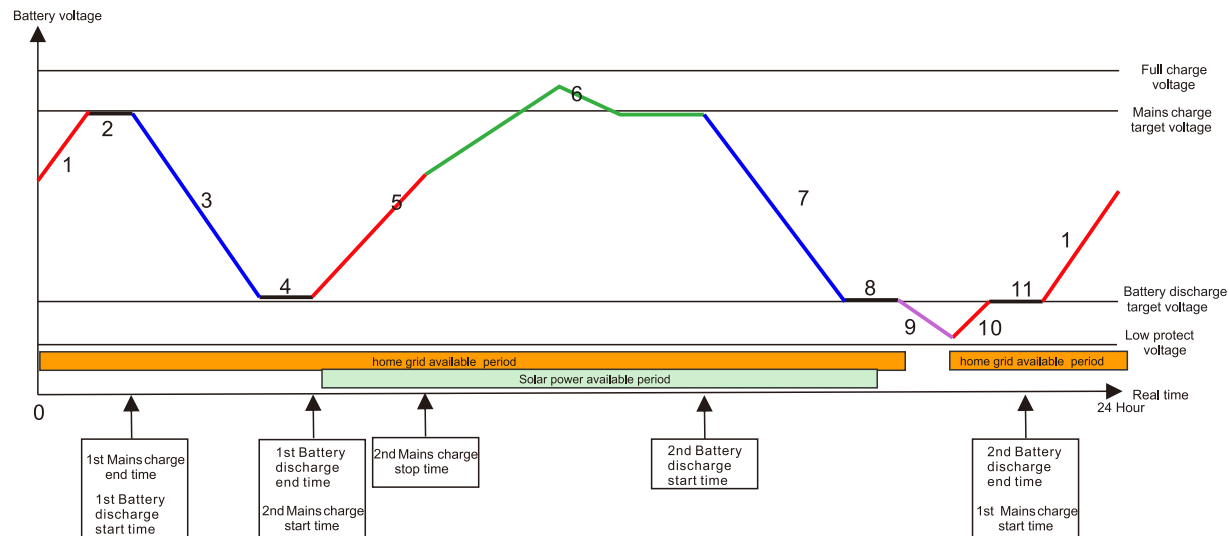
According to the time coordinate, in the time period from "xx mains charge start time" to " xx mains charge end time", mains will charge the battery pack until the battery voltage reaches to " mains charge target voltage". This time period should be in low electric price time.

From"xx battery discharge start time" to " xx battery discharge end time", the inverter will feed power to home load and the load connected to the AC output, the limit function should be available in this time period to limit the feed power never higher than total loads(after CT), to keep "Zero export". This time period should be in high electric price time.

The MPPT solar charger will work all time when the solar energy is available, in the "Solar power available period", the solar energy will charge the battery pack in "mains charge" period and will feed power to home grid in "the battery discharge" period. If the battery voltage is higher than the " main charge target voltage", then the solar energy will feed power to home grid arbitrarily, but the limit function will still be available. If the solar power is higher than the home load, the extra solar power will charge the battery pack too.

About the voltage of the battery pack:

Section "1", "5" : Mains charge section. In these sections, the battery pack voltage will increase until reaches to "mains charge target voltage".

Section "10", Mains charge section. If the battery voltage is lower than the "battery discharge target voltage" after U P S function, it will be charged to "battery discharge target voltage" arbitrarily. Section "2", "4", "8" and "11" : Keeping voltage section.

Section "6": Solar energy feeds power to home grid and charges the battery pack.

Section "3" and "7": "battery discharge" section. In these sections, the battery pack voltage will decrease until reaches to "battery discharge target voltage".

Section "9": U P S function enabled section.

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The battery pack volume from "battery discharge target voltage" to "Low protect voltage" is for essential loads like Computers, or refrigerators that the AC power can't be interrupted when the home grid is not available. If you have no essential loads, then you can set the "battery discharge target voltage" near to "Low protect voltage" to get more usable battery volume for charge and discharge.
If you want to keep more battery volume for essential loads when the home grid is not available,you can set the "battery discharge target voltage" much higher.
When the home grid is available, the AC output terminal is bypassed and connected to the home grid.

3.8.2 NO limit function mode(UPS mode)

In this work mode, the inverter can only be discharged via AC output, and can't feed the home grid, Under UPS, the inverter is only capable of powering essential loads that are connected with the AC output terminal .
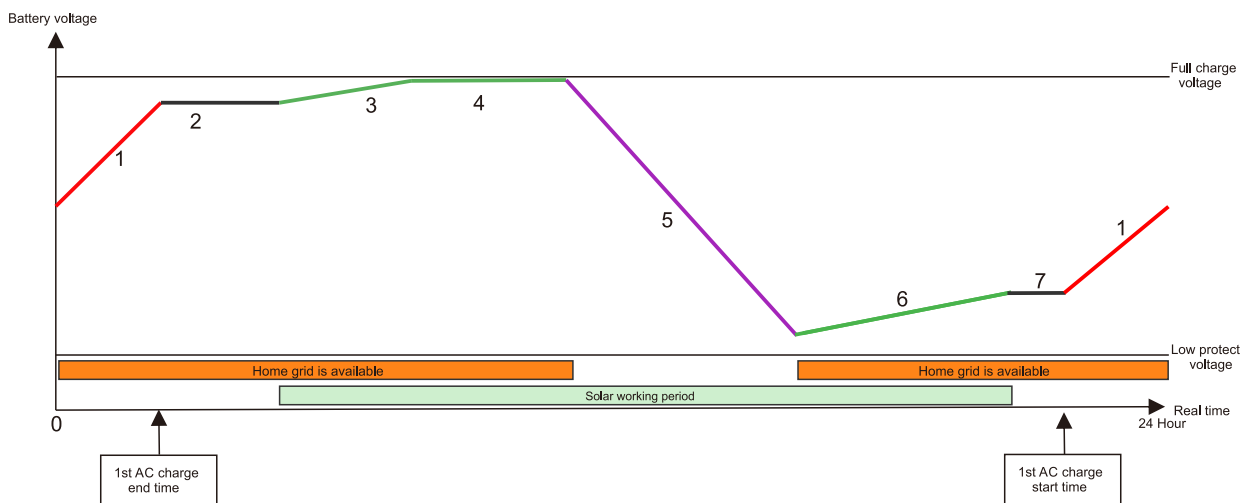
According to the time coordinate, in the time period from "xx mains charge start time" to "xx mains charge end time", the home gird will charge the battery pack until the battery pack will be fully charged, you also can set the 2nd mains charge time period, if you want to save electric charge money, the time periods should be in low electric price time.
The MPPT solar charger will work all time when the solar energy is available, in the "Solar power available period", the solar energy will charge the battery pack, If the battery pack is full, then the solar energy will power the essential loads connected with AC output terminal.

About the voltage of the battery pack:

Section "1":Mains charge section.
Section "2" and "7": keeping voltage section.
Section "3" and "6": The battery pack is charged by solar energy.
Section "4": Extra solar energy powers the essential loads.
Section "5": UPS function enabled section, the essential loads are powered by AC output.
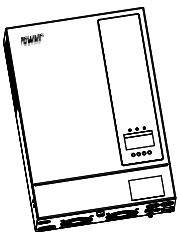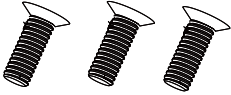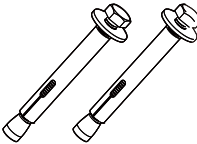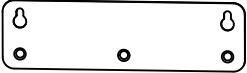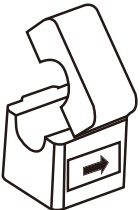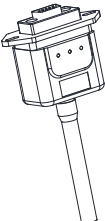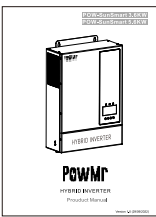
When the home gird is available, the AC output terminal is bypassed and connected to the home grid.

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4. INSTALLATION

4.1 Parts List

SunSmart HYBRID INVERTER	1pcs	Screws M5X10	3pcs	Expansion bolts M6X60	2pcs	Wall mounting bracket	1pcs
Current transformer ID	1pcs	WiFi plug (Optional)	1pcs	User manual	1pcs	Dust cover	2pcs

4.2 DO NOT install the inverter in the following areas:

■ Areas with high salt content, like the marine environment, will deteriorate metal parts, causing the parts to fail or the unit to leak water

■ Areas filled with mineral oil or containing a large amount of splashed oil or steam, such as a kitchen. It will deteriorate plastic parts, causing the parts to fail or the unit to leak water.

■ Areas that generate substances that adversely affect the equipment, such as sulfuric gas, chlorine gas, acid, or alkali. It will cause the copper pipes and brazed joints to corrode, which can cause refrigerant leakage.

■ Areas that can cause combustible gas to leak, Contain suspended carbon-fiber or flammable dust, or volatile inflammable such as paint thinner or gasoline.

■ Areas where there may be gas leaks and settles around the unit. It can cause fires.

■ Areas where animals may urinate on the unit or ammonia may be generated.

■ High altitude areas above 4000 meters above sea level.

■ Environments where precipitation or humidity are above 95%

■ Areas where the air circulation is too low.

Please be advised:

■ Install the indoor unit, outdoor unit, power supply cable, transmission cable, and remote control cable at least 1 meter (3.3feet) away from a television or radio receivers. This will prevent TV reception interference or radio noise. Even if they are installed more than 1m apart, it is still possible to receive noise under some signal conditions.

■ If children under 10 years old may approach the unit, take Precautions against the children from reaching the unit

■ Install the indoor unit on the wall At a height of 160 cm (5.3feet) from the floor.

4.3 Considering the following points before selecting where to install:

■ Please select a vertical wall with load-bearing capacity for installation,Concrete or other non-flammable surfaces ,Installations steps are shown below .
■ Install this inverter at eye level in order to allow the LCD display to be read at all times.
■ For proper air circulation to dissipate heat,allow a clearance of approx.50cm to the side and approx 50cm above and below the unit ,and 100cm to the front.
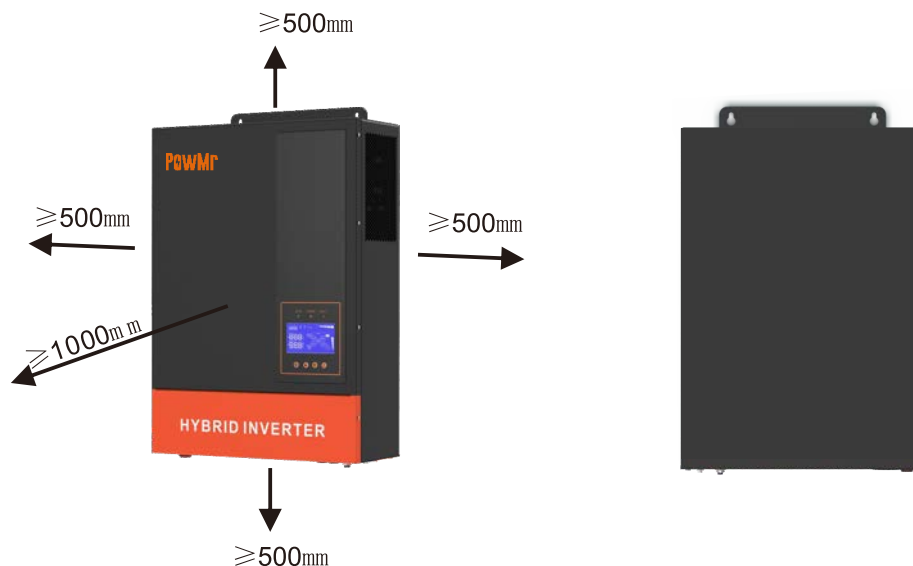
4.4 Mounting the inverter
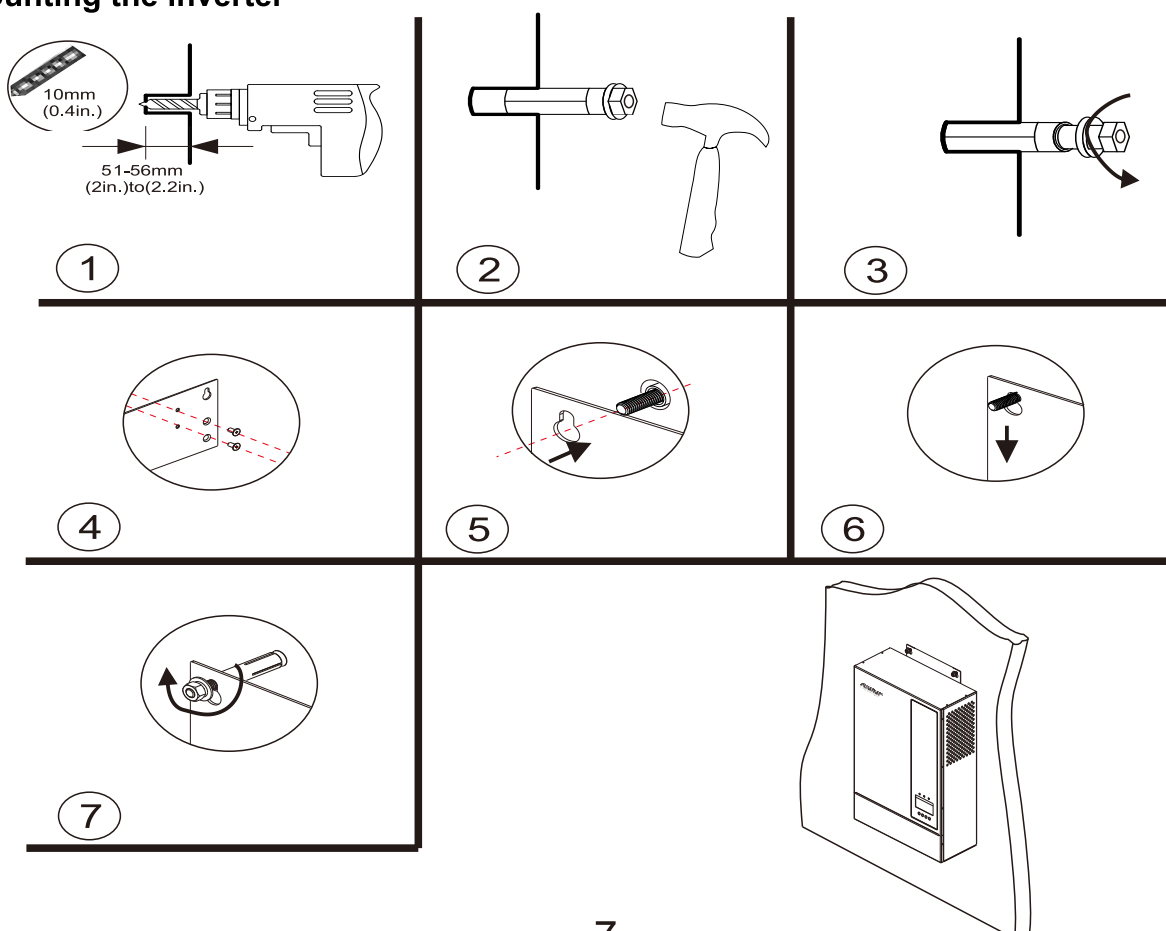
4.5 Cables Selection

There are four essential cables needed to set up the system, which are listed below

    PV Cable (connect solar panels and inverter)

    Battery Cable (connect battery and inverter)

    AC output Cable (connect backup load and inverter)

    AC input Cable (connect utility power and inverter)

4.5.1 PV string and cable selection:

Before you connect the solar panels to the inverter, a suitable specification of cables should be selected. The selection of specifications of the cables is according to the total power of the solar panels and the connecting method of solar panels. You should calculate the maximum current that will transit through the cables, we mark it as Imax. First, calculate the total Pmax of the solar panels that will be connected to the inverter, we mark it as TPmax, then calculate the total Voc of them, we mark it as TVoc.
Because same model PVs will be connected in series mostly, so:
    1) Imax = Imp.
    2) TPmax = N*Pmax.
    3) TVoc = N*Voc.

TVoc should be > 150V and < 500V. 150V is the min. PV string voltage that will reach at the installation side(according to the max. Temperature) and 500V is the max. PV string voltage that will reach at the installation side(according to the min. Temperature).

Example of determining the sizing of the PV cable is conducted under the assumption of using 10 of 400W solar panels, with Pmax = 400W; Voc=41.2V; Vmp = 34.2V; Imp = 11.7A.

Series Connection：

    1) Imax = Imp=11.7A.
    2) TPmax = 10*400W = 4000W.
    3) TVoc = 10*41.2V = 412V.

Hence, based on Imax = 11.7A, refer to American Wire Gauge Chart, Max current column. The corresponding cable should be 11AWG (refer to American Wire Gauge Chart, Max current column)

Here are some suggestions for each of the cable listed. However, each individual system will need to do some calculations in order to find the optimal cable based on the circumstances described in the examples above.

4.5.2 PV Cable

Model	Wire Size	Max Current (A)	Cable(mm^2)
3.6Kw	11 AWG	12	4.17
5.5Kw	10 AWG	15	5.26

4.5.3 Battery Cable

Model	Wire Size	Max Current (A)	Cable(mm^2)
3.6Kw	3 AWG	80	26.7
5.5Kw	1 AWG	120	42.4

4.5.4 AC output Cable & AC input Cable

Model	Wire Size	Max Current (A)	Cable(mm^2)
3.6Kw	10 AWG	15	5.26
5.5Kw	8 AWG	24	8.37

Table: American Wire Gauge (AWG) Cables / Conductor Sizes and Properties

AWG	Diameter [inches]	Diameter [mm]	Area [mm2]	Resistance [Ohms /1000 ft]	Resistance [Ohms/ km]	Max Current [Amperes]	Max Frequency for 100% skin depth
0 (1/0)	0.3249	8.25246	53.5	0.0983	0.322424	150	250 Hz
1	0.2893	7.34822	42.4	0.1239	0.406392	119	325 Hz
2	0.2576	6.54304	33.6	0.1563	0.512664	94	410 Hz
3	0.2294	5.82676	26.7	0.197	0.64616	75	500 Hz
4	0.2043	5.18922	21.2	0.2485	0.81508	60	650 Hz
5	0.1819	4.62026	16.8	0.3133	1.027624	47	810 Hz
6	0.162	4.1148	13.3	0.3951	1.295928	37	1100 Hz
7	0.1443	3.66522	10.5	0.4982	1.634096	30	1300 Hz
8	0.1285	3.2639	8.37	0.6282	2.060496	24	1650 Hz
9	0.1144	2.90576	6.63	0.7921	2.598088	19	2050 Hz
10	0.1019	2.58826	5.26	0.9989	3.276392	15	2600 Hz
11	0.0907	2.30378	4.17	1.26	4.1328	12	3200 Hz
12	0.0808	2.05232	3.31	1.588	5.20864	9.3	4150 Hz
13	0.072	1.8288	2.62	2.003	6.56984	7.4	5300 Hz
14	0.0641	1.62814	2.08	2.525	8.282	5.9	6700 Hz
15	0.0571	1.45034	1.65	3.184	10.44352	4.7	8250 Hz
16	0.0508	1.29032	1.31	4.016	13.17248	3.7	11 k Hz
17	0.0453	1.15062	1.04	5.064	16.60992	2.9	13 k Hz
18	0.0403	1.02362	0.823	6.385	20.9428	2.3	17 kHz
19	0.0359	0.91186	0.653	8.051	26.40728	1.8	21 kHz
20	0.032	0.8128	0.518	10.15	33.292	1.5	27 kHz
21	0.0285	0.7239	0.41	12.8	41.984	1.2	33 kHz
22	0.0254	0.64516	0.326	16.14	52.9392	0.92	42 kHz
23	0.0226	0.57404	0.258	20.36	66.7808	0.729	53 kHz
24	0.0201	0.51054	0.205	25.67	84.1976	0.577	68 kHz
25	0.0179	0.45466	0.162	32.37	106.1736	0.457	85 kHz
26	0.0159	0.40386	0.129	40.81	133.8568	0.361	107 kHz
27	0.0142	0.36068	0.102	51.47	168.8216	0.288	130 kHz
28	0.0126	0.32004	0.081	64.9	212.872	0.226	170 kHz
29	0.0113	0.28702	0.0642	81.83	268.4024	0.182	210 kHz
30	0.01	0.254	0.0509	103.2	338.496	0.142	270 kHz
31	0.0089	0.22606	0.0404	130.1	426.728	0.113	340 kHz
32	0.008	0.2032	0.032	164.1	538.248	0.091	430 kHz
33	0.0071	0.18034	0.0254	206.9	678.632	0.072	540 kHz
34	0.0063	0.16002	0.0201	260.9	855.752	0.056	690 kHz
35	0.0056	0.14224	0.016	329	1079.12	0.044	870 kHz
36	0.005	0.127	0.0127	414.8	1360	0.035	1100 kHz
37	0.0045	0.1143	0.01	523.1	1715	0.0289	1350 kHz
38	0.004	0.1016	0.00797		2163	0.0228	1750 kHz
39	0.0035	0.0889	659.6		2728	0.0175	2250 kHz
			0.00632	831.8			
40	0.0031	0.07874	0.00501	1049	3440	0.0137	2900 kHz

Note: Before connecting all wires,please take off the bottom cover by removing two screws as shown below.

4.6 Connecting the Batteries

Insert the terminal of the battery cable flatly into the battery connector of the inverter and make sure the bolts are tightened with a torque of 2-3Nm,Make sure polarity at both the battery and the inverter/charge is correctly connected and terminals are tightly screwed to the battery terminals

Battery -

Battery +
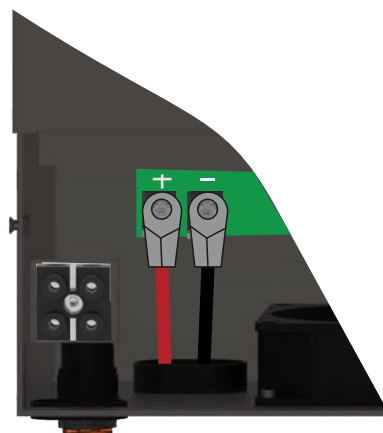
4.7 Connecting the AC

⚠️ **WARNING!**

All wiring and cable sizing must follow the wiring regulations and code of practices of whichever country you live in .
There are two terminal blocks with "AC Input","AC Output",markings,Please DO NOT mix-connect input and output connectors.
Be sure to connect AC wires with The correct polarity.

AC Output

GND

GND
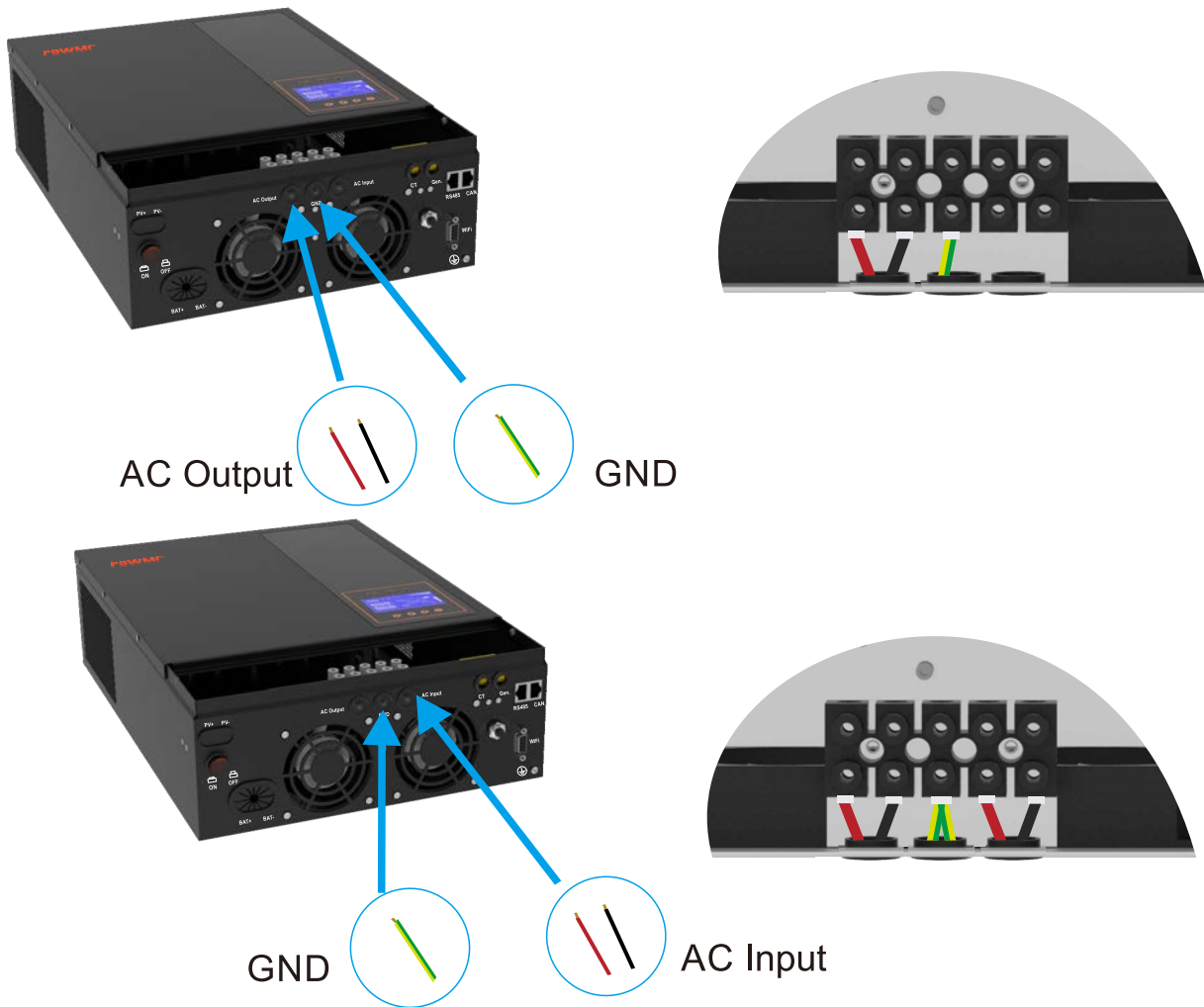
AC Input

- Before making AC input/output connection,be sure to disconnect the utility grid first
- Remove insulation sleeve 10mm for the six conductors.
- Insert AC input wires according to polarities indicated on terminal block and tighten the terminal screws.Be sure to connect PE protective conductor first.
- Make sure the wires are securely connected.

4.8 Connecting the PV

⚠ **WARNING!**

All wiring must be performed by a qualified personnel.
It's very important for system safety and efficient operation to use appropriate cable for PV module connection.
To avoid any malfunction, do not connect any PV modules with possible current leakage to the inverter. For example, grounded PV modules will cause current leakage to the inverter. When using PV modules, please be sure NO grounding.
It is Required to use PV junction box with surge protection. Otherwise,it will cause damage on The inverter when lightning occurs on PV modules.
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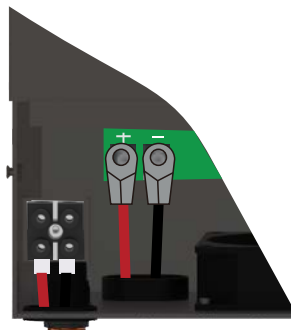
■ Insert PV wires according to polarities indicated on The terminal block and tighten the terminal screws.Be sure to connect PE protective conductor first.
■ Make sure the wires are securely connected.

4.9 Connecting the Generator

⚠ **WARNING!**

All wiring must be performed by a qualified personnel.
It's very important for system safety and efficient operation to use appropriate cable for Gen. module connection.
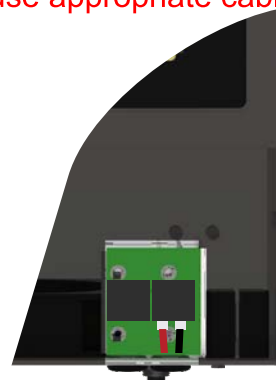
■ Insert GEN.wires according to polarities indicated on terminal block and tighten the terminal screws.Be sure to connect PE protective conductor first.
■ Make sure the wires are securely connected.

4.10 Connecting the Ground

⚠ **WARNING!**

All wiring must be performed by a qualified personnel.
It's very important for system safety and efficient operation to use appropriate cable for the Ground connection.
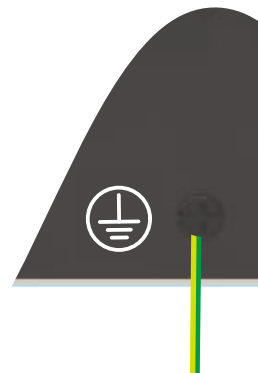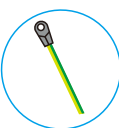
4.11 Connecting the WiFi

For the configuration of Wi-Fi Plug,please refer to illustrations of the Wi-Fi Plug.

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WiFi

4.12 Installing the CT Coil to get LIMIT function

The CT coil is one of the most important parts of the SunSmart inverter. This device reduces the power of the inverter to prevent feeding power to the grid. This feature is also known as "Zero Export".

■ Fit the coil (sensor) around the live cable on the main fuse feeding the building and run the cable back to the inverter. This cable can be extended up to an extra 10m using a similar cable.

■ Connect the other end of the CT coil into the inverter terminals marked as CT coil

IMPORTANT

If the CT coil is clamped to the live cable in the wrong way then this variable will have negative instead of positive values when the power is flowing into the house/inverter. Also, the inverter export limiting function will not work properly.

CT
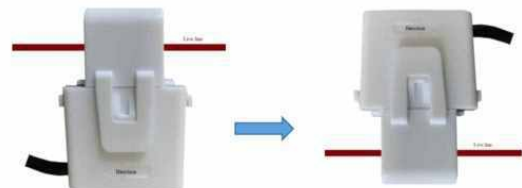
5. OPERATION

5.1 Switching on

Once the SunSmart hybrid inverter has been fixed into a suitable location,solar panels wired, batteries connected,and AC wired to a fuse board or power block,it is time to turn on the device.

5.2 Buttons

There are four buttons on the panel, Configuration ⚙ ,Up 🔼 ,Down 🔽 and Home 🏠 , from left to right.

5.3 LCD screen

LCD screen can display the relevant information about the operation of the machine ,and display the Settings of the machine.

13
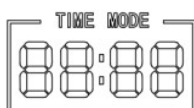
5.3.1

This area displays the real-time and the number of settings displayed during the setting process.
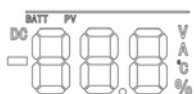
5.3.2

This area displays information about the batteries and solar modules connected to the unit as well as the Thermometer reading inside the unit.

Include:

1. The working voltage and current of the solar module;
2. Battery operating voltage,capacity,charging current,discharge current;
3. Internal temperature of the machine;

Operation to change display contents;
The display content of this part can be switched by pressing the two buttons and on the left.
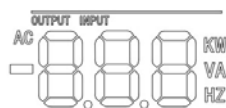
5.3.3
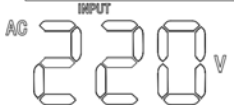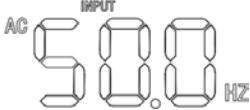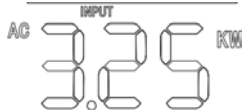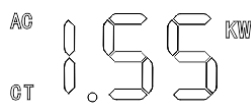
This area displays information about ac input and output while the machine is working.
Includes:

1. AC output voltage of the inverter;
2. AC output current of the inverter;
3. AC output power(KW) of the inverter;
4. AC output power(KVA) of the inverter;
5. AC input(home grid or generator) voltage;
6. A C input(home grid or generator) current;
7. AC input(home grid or generator) power;
8. AC input(home grid or generator) frequency ;

The display content of this part can be switched by pressing the two buttons and on the left.

LCD Display	Function	LCD Display	Function
52.6	Battery voltage	220	AC output voltage (Inverter)
12.8	Battery charge /discharge current Positive number is discharge current, negative number is charge current	2.5	AC output current (Inverter)
350	PV voltage	3.25	AC output power(KW) (Inverter)
5.0	PV current	3.52	AC output power(KVA) (Inverter)

LCD Display	Function	LCD Display	Function
30℃	Internal temperature	AC 220 V INPUT	AC input voltage (Grid or Gen.)
AC 50.0 HZ INPUT	AC input frequency	AC 15.2 A INPUT	AC input current negative number is current feeding to home gird.
		AC 3.25 KW INPUT	AC input power(KW) negative number is power feeding to home gird.
		AC 1.55 KW CT	CT detected power (KW)

5.3.4 LOAD

This area displays the total power of the load.The greater the load power,the more the number of bars displayed ,and vice versa.

5.3.5 This area displays the battery capacity.The larger the battery capacity,the more
BATT bars are displayed ,and vice versa.

5.3.6

This area shows whether the machine is connected to Bluetooth ,WIFI,and whether it has PayGo function.Each models of the machine display different contents in this part.Display icon,that there is a corresponding function,otherwise do not display.

5.3.7
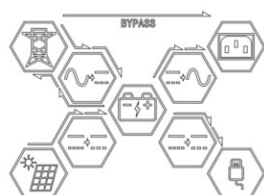
This area shows the operating status of the machine.The corresponding arrows indicate the direction of energy flow.When the corresponding arrow flashes,it means that the energy in this part is flowing in the direction of the arrow.
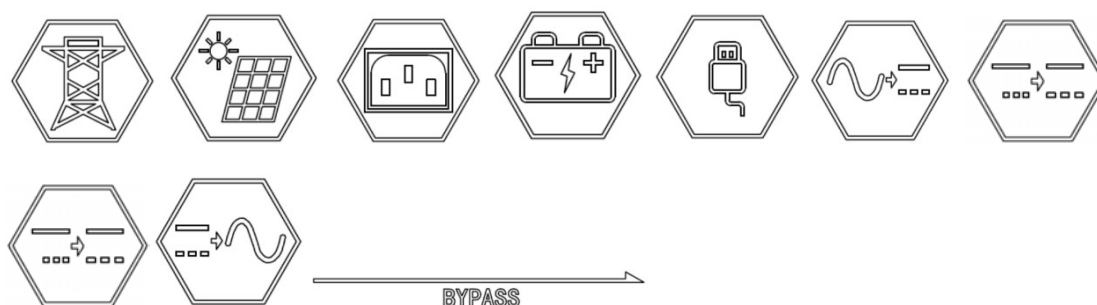
The ICONS above from left to right represent:

1) Utility grid, 2)connected solar module,3)AC output, 4)Batteries connected, 5)DC load,
6) The internal AC charging module of the machine, that is, charging the battery
through the power grid. 7)The DC-DC module, connected to the solar module,
represents the MPPT charging module inside the machine. 8)The DC-DC module
adjacent to the DC load is the DC output module inside the machine.(Note: This feature is
customizable and not standard.) 9)Represents the internal inverter module of the machine,
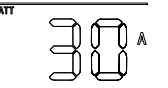which converts the input DC into ac output. 10) the AC bypass module.
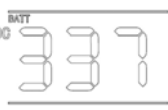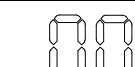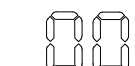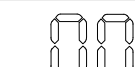
Machine function and parameter setting:
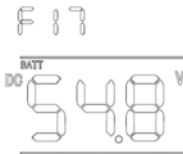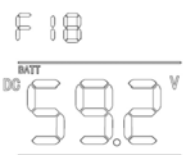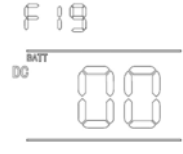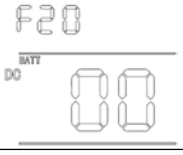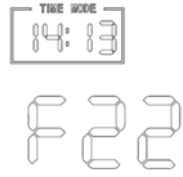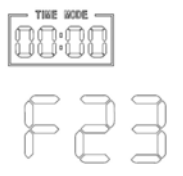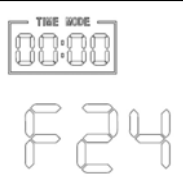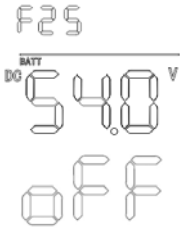
When you press ⚙ for about 3 seconds,It will enter the configuration interface,
you can build all configurations by using these four buttons.Short press ⚙ ,you can
select the configuration page that you want to set up.Short press ⚙ ,you can select
the number that you want to change on the same page.Short press ▲ and ▼ ,you
can change the content that you selected.Press ⚙ longer than 2S, then the configuration
page will return back to the previous page.

When you finish the configurations,then you can press ⚙ for about 3 seconds to quit,
or you just stop pressing any button, then the configuration procedure will quit
automatically in about 10 seconds.

There are many configurations that you can set up:

Function	Descriptions	Options	Factory default setting
F01	Backlight setting	00:Turn off the Backlight 01:The backlight will automatically turn off after 30 seconds 02:The backlight is always on	01
F02	Alarm sound setting	00:Turn off the sound alarm 01:The sound is automatically turned off after 30 seconds 02:The sound is always going on	01
F03	Connection mode	00: Standalone mode 01: Single phase host mode 02: Split-phase host mode 03: Three-phase host mode 04: Slave mode	00
F04		Reserved	
F05	Overload protection restarts setting *1	00:Disable 01:Enable	01

Function	Descriptions	Options	Factory default setting
F06 00	Overtemperature protection restarts setting [2]	00:Disable 01:Enable	01
F07 00	Battery type setting	00:User 01:Battery pack	00
F08 BATT DC 337	Battery capacity setting(AH)	Short press ▲ button,number plus1,long press ▲ button,quick continuous plus, short press ▼ button,number miuns1,long press ▼ button,quick continuous minus.	100
F09 00	Work mode setting	00:No limit function mode(UPS mode) 01: Limit function mode(Economic mode)	00
F10 00	Generator control setting	00:Disable(default) 01: Enable When it is set to enable, the work mode will be "No limit function mode"	00
F11 00	AC output voltage setting	00: 220V 01: 230V 02: 240V	01
F12 00	Frequency setting	00: 50Hz 01: 60Hz	00
F13 BATT DC 42.0 V	Battery low voltage protection setting	Short press ▲ button,number plus1,long press ▲ button,quick continuous plus, short press ▼ button,number miuns1,long press ▼ button,quick continuous minus.	45.0
F14 BATT DC 30 A	Max. discharge current setting		80(3.6KW)/120(5.5KW)
F15 BATT DC 50.4 V	Recovery voltage setting		50.0
F16 BATT DC 57.6 V	Boost charge voltage setting		56.0

Function	Descriptions	Options	Factory default setting
F 17 BATT DC 54.8 V	Float charge voltage setting		56. 0
F 18 BATT DC 53.2 V	Equalize charge voltage setting	Short press ▲ button,number plus1,long press ▲ button,quick continuous plus, short press ▼ button,number miuns1,long press ▼ button,quick continuous minus.	57. 0
F 19 BATT DC 00	Equalize charge time setting (minutes)		60
F20 BATT DC 00	Equalize charge interval time setting(Days)		90
F2 1 BATT DC 58 A	Maximum charge current setting		30(3.6KW)/50(5.5KW)
TIME MODE 14:13 F22	Real-time setting	Short press ⏱ button to switch between minutes and hours . short press ▲ button,number plus1,long press ▲ button,quick continuous plus, short press ▼ button,number minus1,long press ▼ button,quick continuous minus.	
TIME MODE 00:00 F23	Mains charge time control. Set start time of the 1st charge period .	Short press ⏱ button to switch between minutes,hours and on/off option. short press ▲ button,number plus1,long press ▲ button,quick continuous plus, short press ▼ button,number minus1,long press ▼ button,quick continuous minus.	00:00
TIME MODE 00:00 F24	Mains charge time control. Set end time of the 1st charge period .		23:59
F25 BATT DC 54.0 V oFF	Set the 1st mains charge period target voltage "on" indicates that mains charge is allowed during this period,and "off"indicates that mains charge is not allowed during this period	Short press ▲ button,number plus1, long press ▲ button,quick continuous plus,short press ▼ button,number miuns1,long press ▼ button,quick continuous minus.The on/off Option is changed by short pressing ▲ or ▼ , times just can be adjusted when the state is "oFF".	56.0 on

Function	Descriptions	Options	Factory default setting
TIME MODE **00:00** **F26**	The battery discharges to the loads time control. Set start time of the 1st discharge period .	Short press ⟳ button to switch between minutes,hours and on/off option. short press ▲ button,number plus1,long press ▲ button,quick continuous plus, short press ▼ button,number minus1,long press ▼ button,quick continuous minus.	00:00
TIME MODE **00:00** **F27**	The battery discharges to the loads time control. Set end time of the 1st discharge period .		00:00
F28 **BATT** **DC 49.0 V** **oFF**	Set the 1st battery discharge period target voltage "on" indicates that the battery discharge is allowed during this period, and "off"indicates that the battery discharge is not allowed during this period	Short press ▲ button,number plus1,long press ▲ button,quick continuous plus, short press ▼ button,number miuns1,long press ▼ button,quick continuous minus. The on/off Option is changed by short pressing ▲ or ▼ ,times just can be adjusted when the state is "oFF"	49.0 oFF
F29	Mains charge time control. Set start time of the 2nd charge period	The same as F26 and F27	00:00
F30	Mains charge time control. Set end time of the 2nd charge period .		00:00
F31 **BATT** **DC 56.0 V** **oFF**	Set the 2nd mains charge period target voltage "on" indicates that the mains charge is allowed during this period,and "off"indicates that the mains charge is not allowed during this period	The same as F28	56.0 oFF
F32	The battery discharges to the loads time control. Set start time of the 2nd discharge period .	The same as F26 and F27	00:00
F33	The battery discharges to the loads.time control. Set end time of the 2nd discharge period		00:00
F34 **BATT** **DC 49.0 V** **oFF**	Set the 2nd battery discharge period target voltage "on" indicates that the battery discharge is allowed during this period, and "off" indicates that the battery discharge is not allowed during this period	The same as F28	49.0 oFF
F35 **BATT** **DC 30 A**	Maximum current of the battery discharges to the loads	short press ▲ button,number plus1,long press ▲ button,quick continuous plus, short press ▼ button,number minus1,long press ▼ button,quick continuous minus.	50(3.6KW) /70 (5.5KW)

Remarks:

*1, If overload protection restart is set to Enable mode, the AC output will be automatically restored in 5 minutes after the device enters overload protection. If it is set to Disable, the system Will not restart.

*2, If overtemperature protection restart Setting is set to Enable mode,when the device is in overtemperature protection mode, the AC output automatically recovers after the device cools down to normal temperature. If It is set to Disable, the system Will not restart.

6. Fault Code

Error code	Description	Solutions
E14	When off grid usage, the battery discharge current has exceeded the "maximum discharge current" set in the battery settings page	1.Disconnect some AC loads from AC output. 2. Set the the "maximum discharge current" setting much high in the battery settings page if it is possible.
E15	AC output has short-circuited or has been connected with very big load.	1.Check the AC output. 2.Don't connect too big load to AC output.
E16	AC over current fault of hardware	1. Please check whether the backup load power is within the range or not; 2. Restart and check whether it is in Normal state; 3.Seek help from us, If it can not go back to normal state
E20	DC over current fault of the hardware	1. Check PV module connect and battery connect; 2. Turn off the DC switch and AC switch and then wait one minute,then turn on the DC/AC switch again; 3.Seek help from us, If it can not go back to normal state.
E35	AC_OVER_LOAD	Check the connected AC loads, if total loads power is higher than rated power, reduce the loads
E60	Heat sink high temperature failure	Heat sink temperature is too high 1. Check whether the work environment temperature is too high; 2. Turn off the inverter for 10mins and restart; 3. Seek help from us, If it can not go back to normal state.
E61	DC busbar voltage is too high	Check the battery voltage If too many PCS battery packs were connected in series, you need to remove some of them.
E62	DC busbar voltage is too low	Check the battery voltage 1.If the battery voltage is too low, using PV or grid to charge the battery; 2.If too few battery packs were connected in series, you need to add some battery packs.

Maintenance of the System
The inverter is low maintenance, however,It is important to clean all the cooling fans and air ducts to maintain a dust free condition. Check if there are no fault codes and Lithium battery communication is Stable. Weekly cleaning statement: Suggest micromesh filters as an available option. Micro ants here are a real problem.

7. Weight and Dimension of the Hybrid Inverter

Model	POW-SunSmart 3.6KW	POW-SunSmart 5.6KW
Net Weight	9Kg	11Kg
Gross Weight	10Kg	12Kg
Product Size	440x307x121(mm)	440x307x121(mm)
Packing Size	530x380x190(mm)	530x380x190(mm)