# INVERTER/SOLAR INVERTER

**DF Series**

## User Manual

# Content


1. Installation Instructions ----------1

2. Outlook of Inverter ----------4

3. Wiring instructions----------6

4. LCD display ----------11

5. Operation----------14

6. Maintenance ----------20

7. Error and Solution ----------21

8. Technical specification ----------22

9. Appendix--485 Communication Port----------24

10. Appendix(Maintenance Record&Certificate )----------25

## Warning

**This is A class inverter. It might cause slightly radio interference in daily life. And practical measure is required to take under this condition.**

## Preface

Thank you for the purchase of inverter or solar inverter (Hereinafter referred to as inverter). Please read this manual carefully before installing and using the inverter!

## Copyright


We have been devoted to technological innovation and aims to meet the demands of its customers with better product and services. And product design and specification would be updated without prior notice. Please in kind prevail!


## 1.Installation Instructions

### 1-1: Open-package inspection

1. After opening the package, please check random accessories, including user manual (contains conformity certificate and warranty card ), 2pcs battery cables and accessories for optional functions. And check whether the inverter is still kept well after transportation, if find any broken or component missing, do not turn on the machine, feedback to the carrier and distributor.

**Note:**

- **Please keep the packing box and packing material, can be used for next delivery if needed.**
- **This series of product is very heavy (check appendix as reference), please handle with care when carrying.**

### 1-2: Installation notice

1) Install in an area of well ventilated, free of water, burning gas and corrodent.
2) Not good to put on the side, better keep good air ventilation from front panel's bottom air intake, or air outlet from back panel's fan, and side face of machine.
3) Around environment temperature should remain 0 to 40 centigrade.
4) If disassembling and operate under low temperature environment, may happen water condense, only can work till thorough dry of machine inside and outside, otherwise will be shock risk.
5) If the machine is placed for a long time, it should be confirmed that the machine is completely dry and no corrosion can be installed and used.

### 1-3:Installation steps

1) Environmental requirements

Open the package and place the inverter in a reasonable working environment. Refer to the "Installation Precautions" for specific requirements.

2) Wire diameter selection

Use a cable with a suitable wire diameter, which can not be lower than the national safety standard. The general wire diameter is selected according to the current density of not more than 5A/mm², and the length of the connecting wire is minimized to reduce the loss.

3) Connect the battery

Determine the appropriate number of battery cells according to the rated battery voltage of the inverter. Connect the battery cable to a circuit breaker that meets the breaking capacity, and then connect it to the BATTERY terminal of the inverter. Note that the positive and negative poles cannot be reversed. Otherwise, the product may be damaged.

4) Connect the load

Turn off all loads firstly, then connect the AC load to the AC output of the inverter (AC OUTPUT), confirming that the load polarity is not reversed, and ensure the load is lower than the standard power of the inverter.

5) Connect the PV(Ignore this step if there is no built-in controller)

Connect the PV cable to the circuit breaker that meets the breaking capacity, and then connect it to the PV input terminal of the inverter. the PV array open circuit voltage and short circuit current should be lower than the maximum PV input voltage and current of the rated charge controller. Note:Be careful not to reverse the polarity.

6) Connect the mains

Connect the mains input cable to a circuit breaker that meets the breaking capacity, and then connect it to the AC input terminal of the inverter. Note that the phase and polarity are not reversed.

7) Selection of circuit breaker

a. The circuit breaker on the battery side should be a DC circuit breaker whose working voltage should be greater than the rated voltage of the battery; the circuit breaker on the PV input side should be a DC circuit breaker whose working voltage should be greater than the rated voltage of the PV array; the circuit breaker on the AC input side should be an AC circuit breaker whose working voltage should be greater than the rated voltage of the mains.

b. The rated current of the circuit breaker should be about 1.5 times of the maximum current inverter during operation

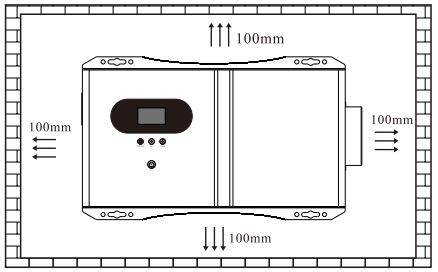
**Note:**

- **Before connecting the load to the machine, please turn off the loads firstly.**
- **This product can only protect high-voltage surges with low energy. In areas with high lightning output, it is recommended to install lightning protection devices outside the PV input terminals(Ignore this content if there is no built-in controller).**
- **To ensure the personal safety of the user and ensure the correct use of the product, please confirm that it is properly grounded before starting the machine.**
- **If user want to load an inductive load such as a motor or a laser printer which operating power is too large, the inverter rated capacity should be selected according to its peak power .The load starting power is generally 2 to 3 times of its rated power.**

**1-4: Placement**

Please leave 10cm of space for each side of inverter to keep good air circulation.

**(Only suitable for installation on concrete or other non-combustible surfaces)**



★ Avoid direct sunlight

★ Avoid dust

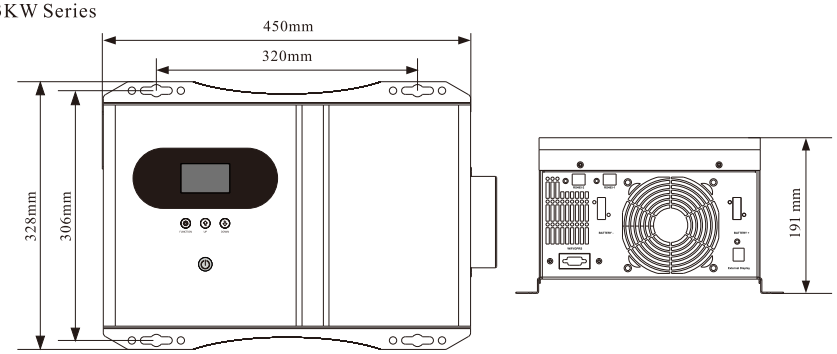
★ Avoid moisture and liquids

★ Avoid over heating

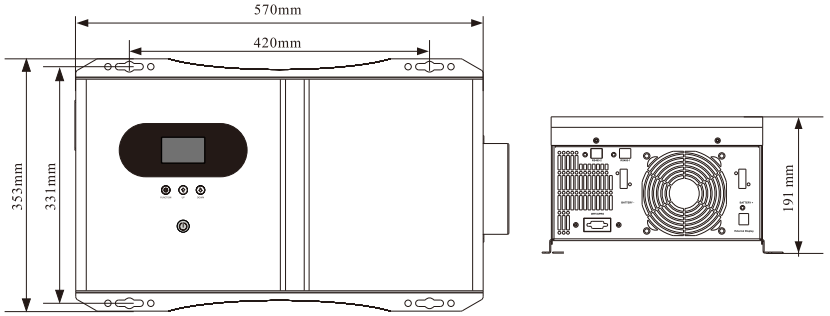
**1-5: Installation size & Wall mounted installation**

1) Installation size

a. 1KW~3KW Series

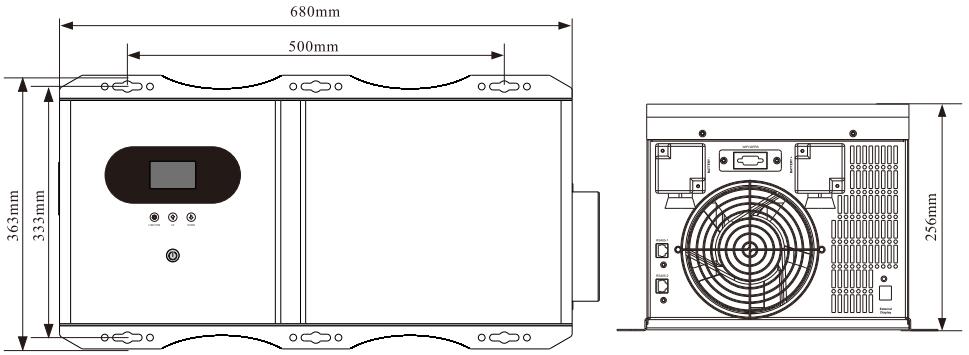



b. 4KW~7KW Series



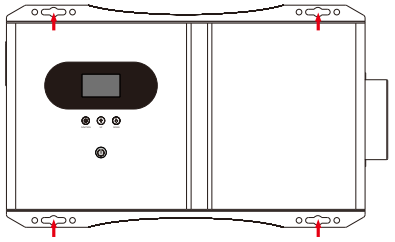



c. 8KW~12KW Series

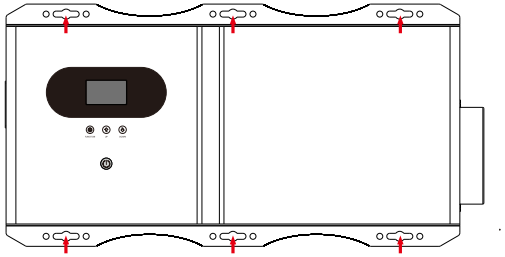



2) Wall mounted installation

Tighten four screws to install the inverter, it is recommended to use M6 expansion screws(the screws need to be purchased by the user. Please refer to the mark on the machine size drawing for the distance between mounting holes.)

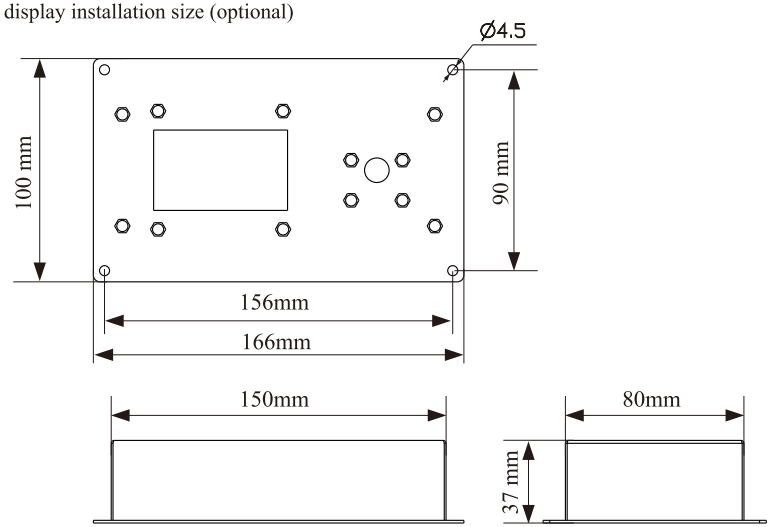


1KW~7KW Series

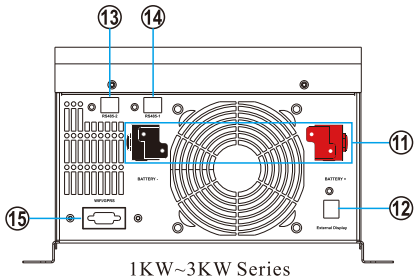


8KW~12KW Series

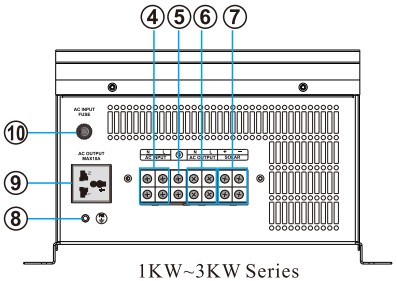
3) External display installation size (optional)



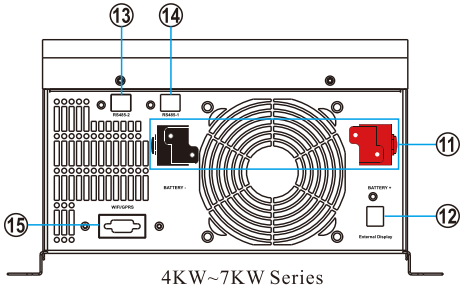
## 2. Outlook of Inverter



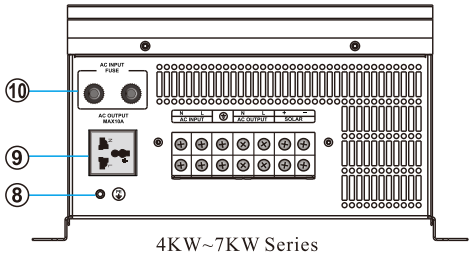

1KW~3KW Series



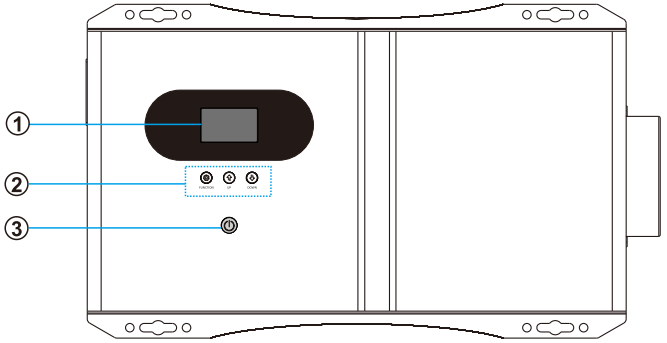

1KW~3KW Series




4KW~7KW Series




4KW~7KW Series

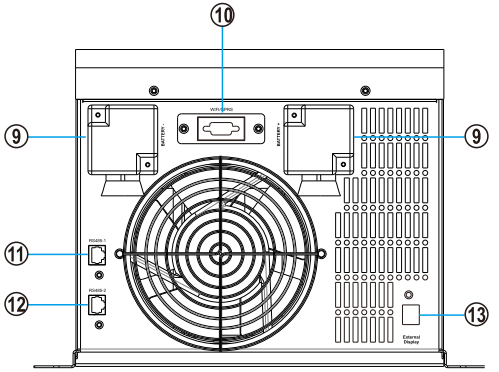


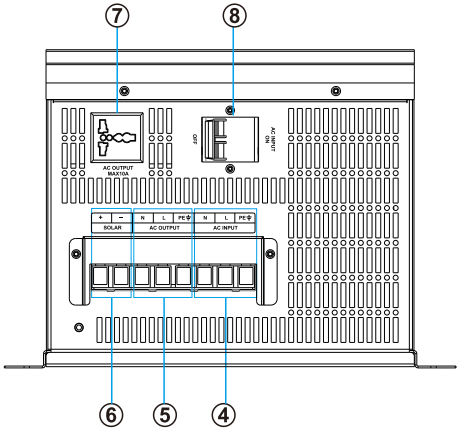

1KW~7KW Series

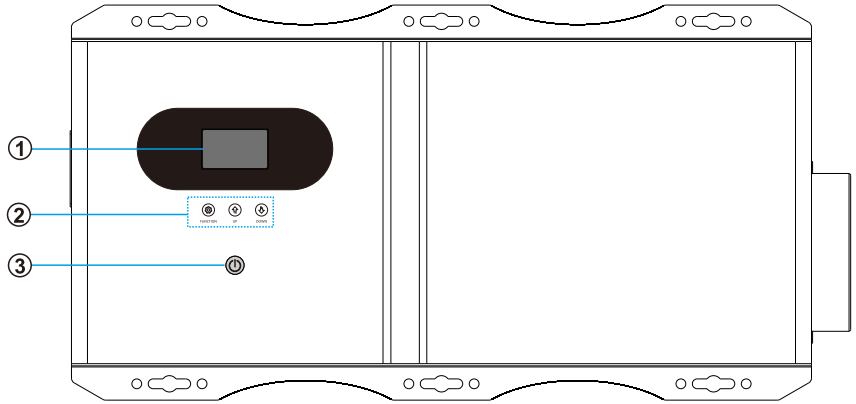
| | | |
|---|---|---|
| 1. LCD display | 2. Function button | 3. Power on/off switch |
| 4. AC input terminal | 5: Grounded(AC input/AC output) | 6. AC output terminal |
| 7. PV input terminal | 8: Grounded | 9. AC output socket |
| 10. Mains input fuse | 11. Battery input terminal | 12. External LCD display interface (optional) |
| 13. RS485-2 communication interface(Optional. If this interface is configured, the APP data collector interface is cancelled) | | |
| 14. RS485-1 communication interface | | |
| 15. APP data collector interface(WIFI/GPRS data collector(optional)) | | |

**Note : The image shown here is indicative only. The actual product may differ.**






8KW~12KW Series

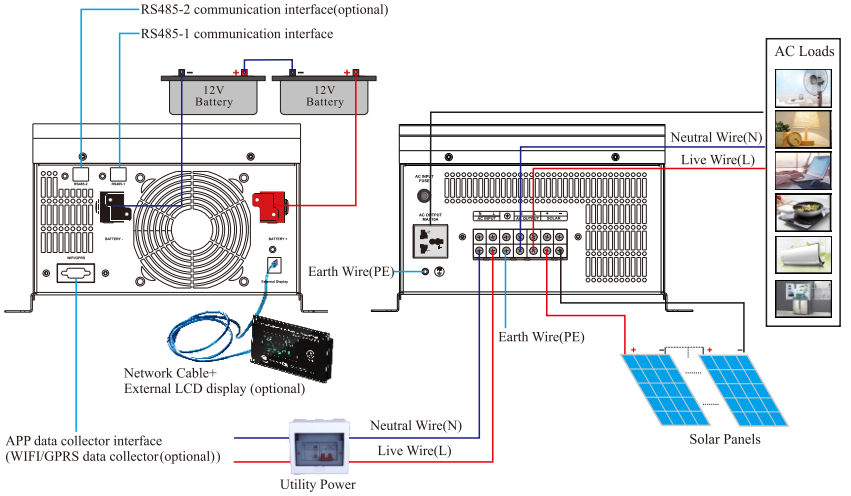
| | | |
|---|---|---|
| 1. LCD display | 2. Function button | 3. Power on/off switch |
| 4. AC input terminal(N/L/PE) | 5. AC output terminal(N/L/PE) | 6. PV input terminal |
| 7. AC output socket | 8. AC intput breaker | 9. Battery input terminal |
| 10. APP data collector interface(WIFI/GPRS data collector(optional)) | | |
| 11. RS485-1 communication interface | | |
| 12. RS485-2 communication interface(Optional. If this interface is configured, the APP data collector interface is cancelled) | | |
| 13. External LCD display interface (optional) | | |

**Note : The image shown here is indicative only. The actual product may differ.**

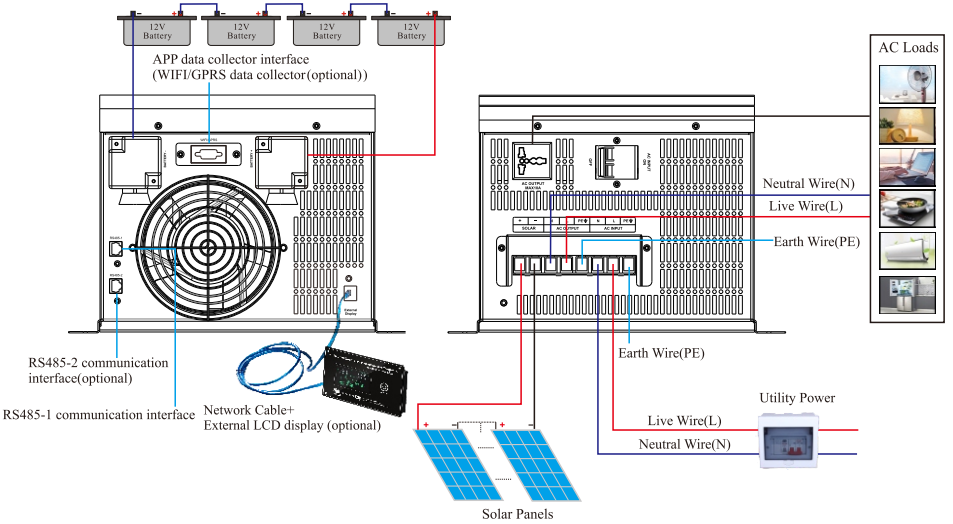
## 3. Wiring instructions

(Remarks: Please refer to the technical parameter table for specific battery voltage and solar panel parameter, This diagram is only for wiring diagram. 24V system: 2 units 12V battery cormect in series; 48V system: 4 units 12V battery cormect in series.)

3-1. 1KW~7KW Series




3-2. 8KW~12KW Series




**Note:**

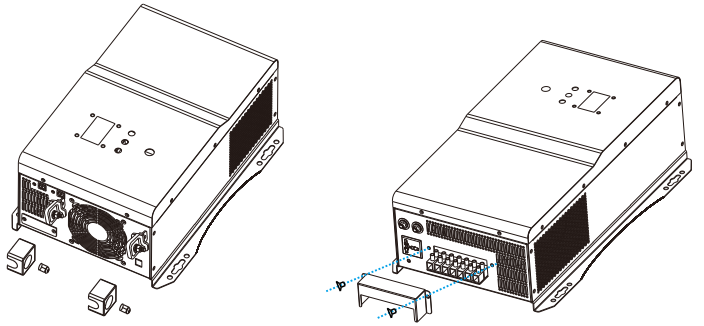
- **Please avoid reverse connection while connecting batteries and PV to the inverter;**
- **Loads for each universal AC outlet should not exceed 1KW;**
- **If a generator is used as input power, the operation is as follow: start up the generator, after it runs steadily, connect and turn on inverter. When the inverter starts to work, connect user's equipment to the AC output;**
- **Capacity of generator≥3 times of the rated capacity of inverter.**



**Preparation**

**a. 1KW~7KW Series**

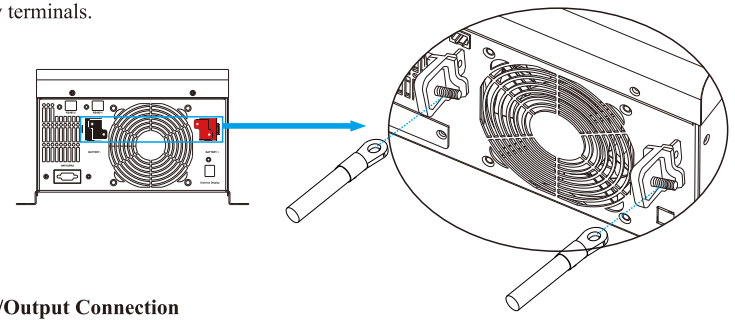
Before connecting all wirings, please take off bottom cover by removing screws as shown below.



**1) Battery Connection**

Please follow below steps to implement battery connection:

- Assemble battery ring terminal based on recommended battery cable and terminal size.
- Remove the hex nut and gasket from the battery terminal, insert the assembled battery wiring ring terminal into the battery terminal of the inverter, reinstall the gasket and lock it tightly with the hex nut. Make sure polarity at both the battery and the inverter/charge is correctly (The positive pole is connected to the positive pole and the negative pole is connected to the negative pole) connected and ring terminals are tightly screwed to the battery terminals.

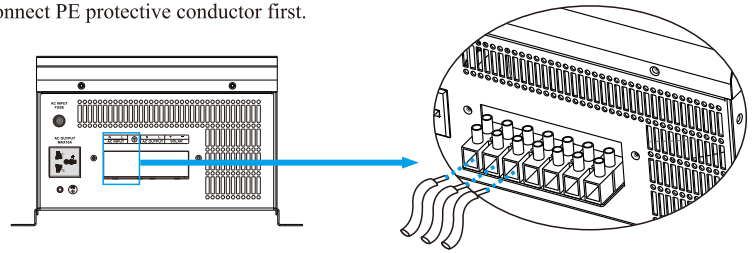


**2) AC Input/Output Connection**

**CAUTION!! There are two terminal blocks with "INPUT" and "OUTPUT" markings. Please do NOT mis-connect input and output connectors.**

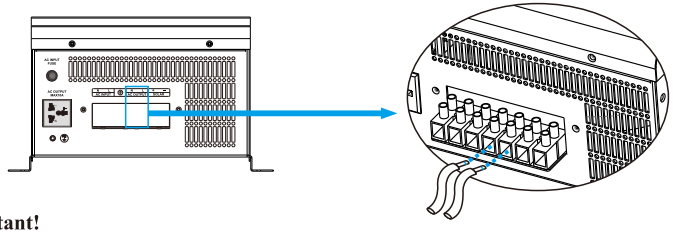
Please follow the following steps to connect the AC input / AC output cable:

- Before connecting to AC input power source, please install a separate AC breaker between inverter and AC input power source. This will ensure the inverter can be securely disconnected .
- Remove insulation sleeve 10mm for five 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.



| | |
|---|---|
| ⚠ | **WARNING:**<br>Be sure that AC power source is disconnected before attempting to hardwire it to the unit. |

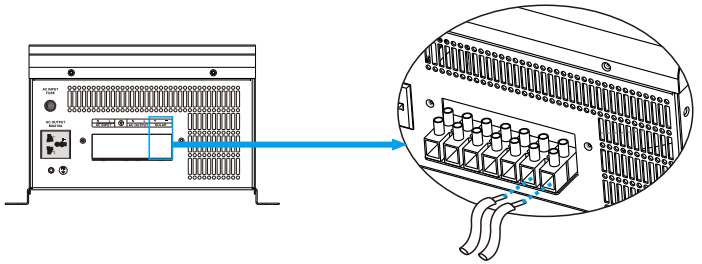
● Then, insert AC output wires according to polarities indicated on terminal block and tighten terminal screws.



**CAUTION: Important!**
**Be sure to connect AC wires with correct polarity.**

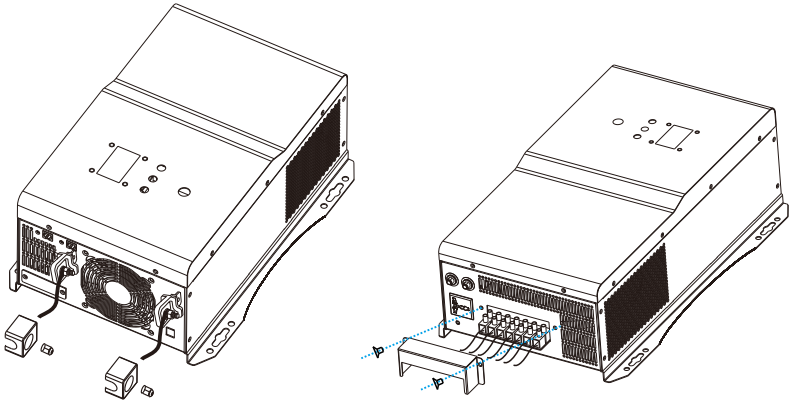
### 3) PV Connection

Please follow below steps to implement PV module connection:
● Remove insulation sleeve 10 mm for positive and negative conductors.
● Check correct polarity of connection cable from PV modules and PV input connectors. Then, connect positive pole (+) of connection cable to positive pole (+) of SOLAR input connector. Connect negative pole (-) of connection cable to negative pole (-) of SOLAR input connector.
● Make sure the polarity of the wiring is correct and the connection is firm.



### Final Assembly

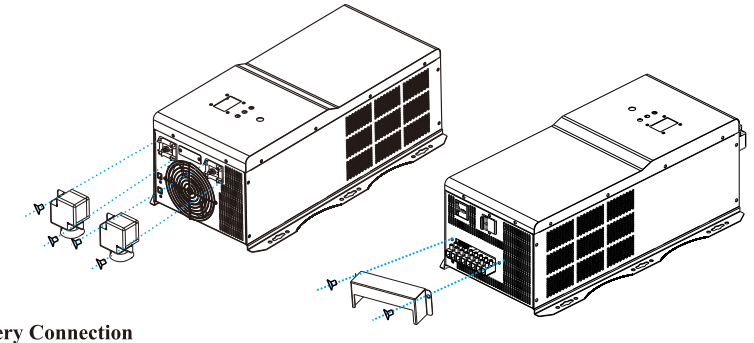
After connecting all wirings, please put bottom cover back by screwing screws as shown below.



**Note : The image shown here is indicative only. The actual product may differ.**

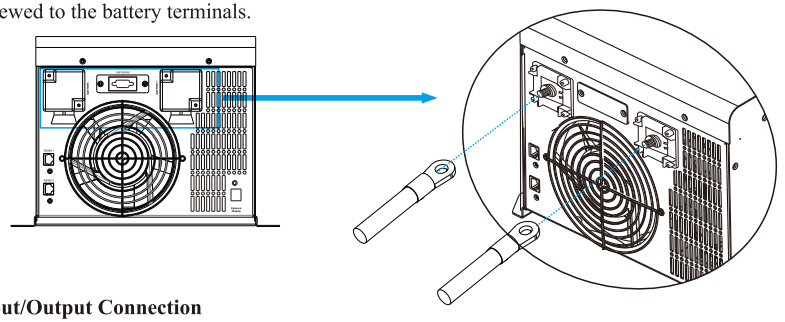


**Preparation**
**b. 8KW~12KW Series**
Before connecting all wirings, please take off bottom cover by removing screws as shown below.



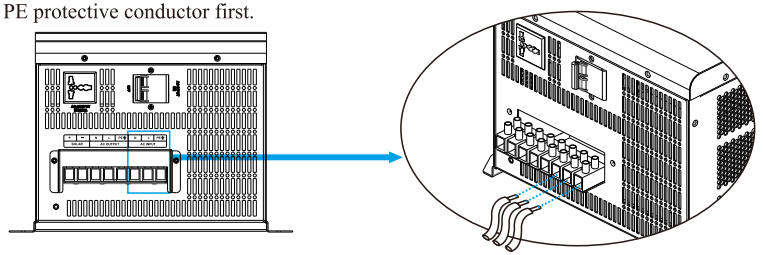
### 1) Battery Connection

Please follow below steps to implement battery connection:
● Assemble battery ring terminal based on recommended battery cable and terminal size.
● Remove the cover of the battery wiring terminal, insert the assembled battery wiring ring terminal into the battery wiring terminal of the inverter, and then install the cover of the battery wiring terminal and lock it with screws. Make sure polarity at both the battery and the inverter/charge is correctly (The positive pole is connected to the positive pole and the negative pole is connected to the negative pole) connected and ring terminals are tightly screwed to the battery terminals.



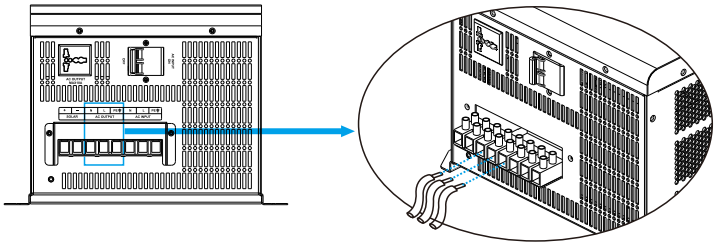
### 2) AC Input/Output Connection

**CAUTION!! There are two terminal blocks with "INPUT" and "OUTPUT" markings. Please do NOT mis-connect input and output connectors.**
Please follow the following steps to connect the AC input / AC output cable:
● Before connecting to AC input power source, please install a separate AC breaker between inverter and AC input power source. This will ensure the inverter can be securely disconnected .
● Remove insulation sleeve 10mm for 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.



| | |
|---|---|
| ⚠ | **WARNING:**<br>Be sure that AC power source is disconnected before attempting to hardwire it to the unit. |

● Then, insert AC output wires according to polarities indicated on terminal block and tighten terminal screws.



**CAUTION: Important!**
**Be sure to connect AC wires with correct polarity.**

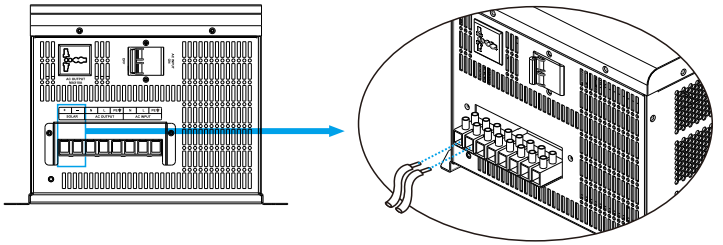
### 3) PV Connection

Please follow below steps to implement PV module connection:

● Remove insulation sleeve 10 mm for positive and negative conductors.

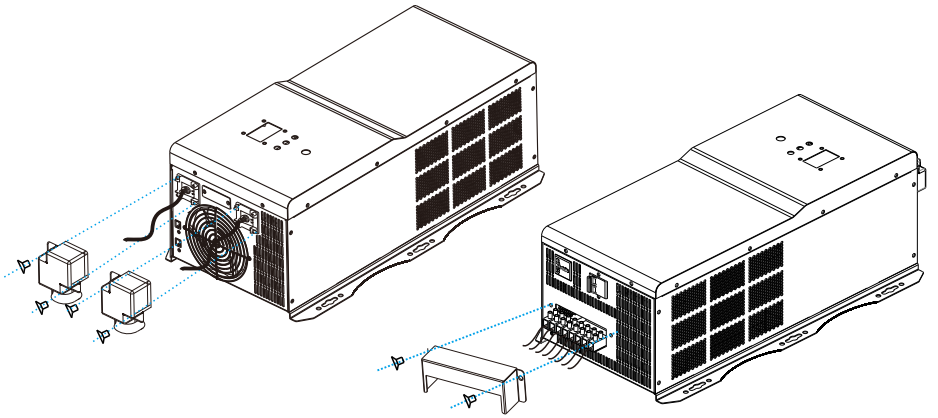
● Check correct polarity of connection cable from PV modules and PV input connectors. Then, connect positive pole (+) of connection cable to positive pole (+) of SOLAR input connector. Connect negative pole (-) of connection cable to negative pole (-) of SOLAR input connector.

● Make sure the polarity of the wiring is correct and the connection is firm.



### Final Assembly

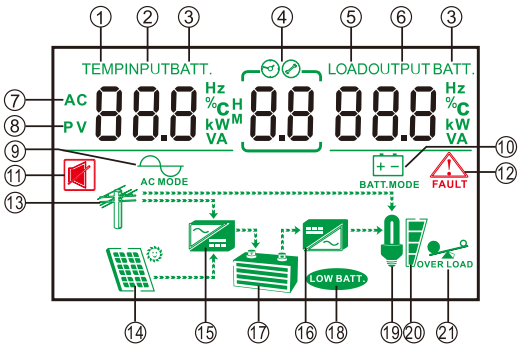
After connecting all wirings, please put bottom cover back by screwing screws as shown below.



**Note : The image shown here is indicative only. The actual product may differ.**



## 4. LCD display




### Parameter display area

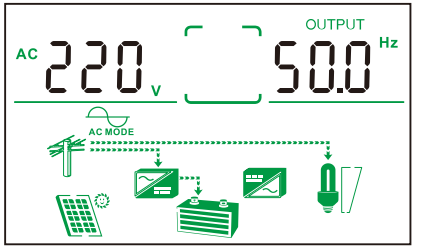
| |
|---|
| 1 TEMP: Temperature displayed |
| 2 INPUT: Mains input data displayed |
| 3 BATT: Battery data displayed |
| 4 When emergency come, shows alarm code here |
| 5 LOAD: Load data displayed |
| 6 OUTPUT: AC output data displayed |
| 7 AC: AC data displayed |
| 8 PV: PV input data displayed |

### Icon display area

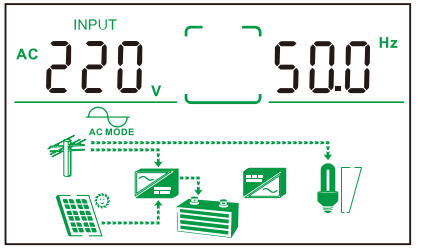
| | | |
|---|---|---|
| 9 AC MODE:AC mode(means the inverter is already on d1 or d2 (Based on the real setting value) | | |
| 10 BATT.MODE: BATT.MODE means the inverter is already on d3:battery mode | | |
| 11: Turn mute on/off | 12: FAULT: fault alarm | |
| 13: Utility | 14:Solar panel(Display when there is a built-in PV controller) | |
| 15: AC charging and PV charging icons | 16: Battery powered icons | 17: Battery |
| 18:Low battery alarm | 19：Load | |
| 20:Load capacity(The load is divided into 4 grids, and the single-grid load is 25% of the full load) | | |
| 21:Overload alarm | | |

### 3-1. Work flow chart icon introduction(Built-in solar controller)

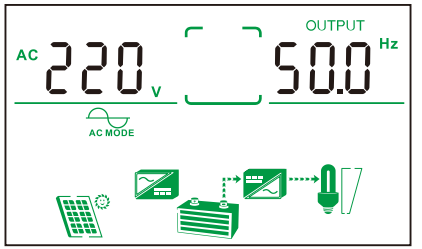
1)Mains working mode (No PV input, Only the mains charge the battery)



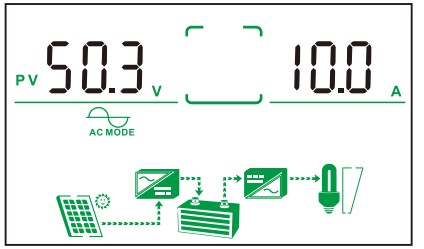

2)Mains working mode (Has PV input, the mains and the PV simultaneously charge the battery)




3)Battery working mode (No mains and PV input)

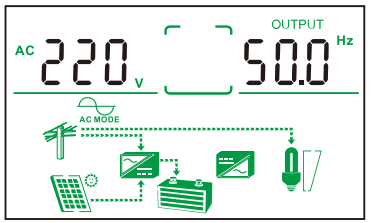



4)Battery working mode (Has PV input but no mains input, only the PV charge the battery)

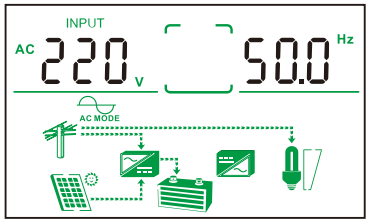


**3-2. Introduction to the work interface(Built-in solar controller)(Mains and PV input are normal )**

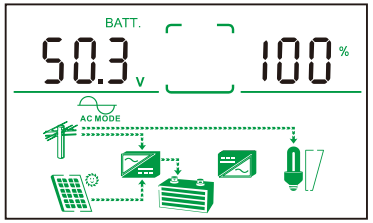
1) Output interface(Display output voltage and frequency)



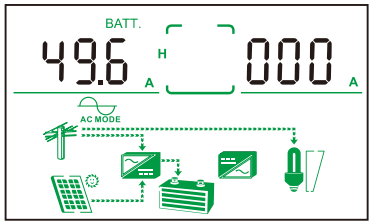

2) AC input interface(Display AC input voltage and frequency)



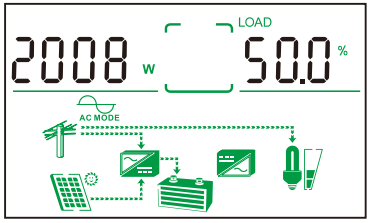

3) Battery interface(Display battery voltage and percentage)



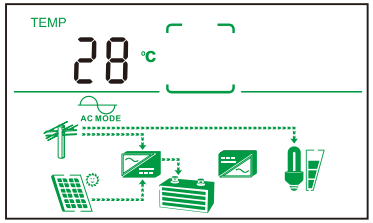

4) Battery interface (displaying the capacity and current of the battery (displayed only on the inverter that reached a communication protocol with the lithium battery, the actual display content depends on the corresponding BMS data))



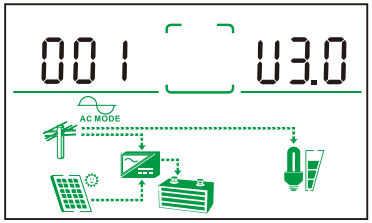

5) Loads interface(Display load power and load percentage)



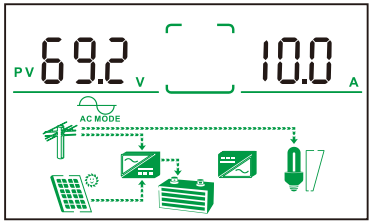

6) Internal temperature interface




7) Parameter on the left is the RS485-1 communication address of the inverter/On the right is the software version number of the inverter (communicating with the BMS)

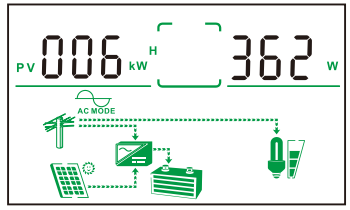



8) PV interface(Display PV voltage and PV current)

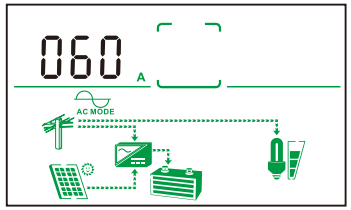





9) PV generation capacity / Actual power generation interface

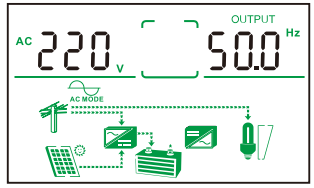



10) Controller Max charging current interface

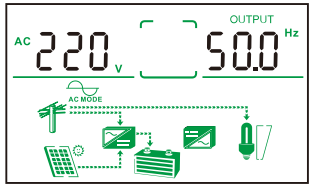



**3-3. Three working modes(Built-in solar controller)**

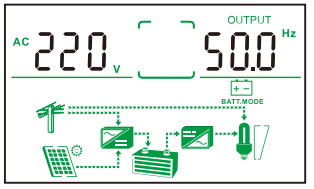
1) d1:Mains priority mode (Display AC MODE icon, the working mode depends on the setting value)




2) d2: Energy saving mode (Display AC MODE , the working mode depends on the setting value)




3) d3: Battery priority mode (Display BATT.MODE icon)




**Note:**

**1. If the inverter has no built-in solar controller, the LCD screen does not display the solar panel icon and the PV parameter interface, and the other displays are consistent.**

**2. The actual display parameters are subject to the specific model, and the picture display contents are only used as examples.**

**Remarks:Introduction to three working modes**

**1) Mains priority mode(d1)**

● When the mains is normal (in line with the mains input voltage range of the inverter), the mains charge battery (if with built-in solar controller, the mains and PV charge the battery simultaneously);on the other hand, the mains supplies stable power to the loads after stabilization. (the loads do not consume PV and battery energy);

● When the mains is abnormal(the mains exceeds the working range of the inverter or the mains supply is interrupted), the loads will be powered by the battery(if with built-in controller, when PV power rate is larger than the loads, PV will power the loads and t he surplus energy will charge the battery; when PV power rate is less than the loads, the deficiency will be made up by battery, so both PV and battery will power the loads).

**2) Battery(Solar) priority mode(d3)**

● When the battery is fully charged (regular parameters Pb:13.2VDC/single battery voltage; Li*: the battery capacity is 85%),even the mains is normal, the loads will be powered by the battery(if with built in controller, when PV power rate is larger than that of the loads, PV will fully powers the loads and the surplus energy will charge the battery; when PV power rate is less than the loads, the deficiency will be made up by battery, so both PV and battery will power the loads);

● When the battery is in low voltage (regular parametersPb: 11VDC/single battery voltage; Li*: the battery capacity is 15%) and the mains is normal, the inverter will switch to mains priority mode. The mains supplies power to the load after stabilization,and the mains charges battery simultaneously(if with built-in controller, PV and the mains charge the battery simultaneously. The loads do not consume the energy of PV and battery).

**Remarks: Under Mains Priority Mode/ Battery Priority Mode, when the mains charging current is not set as 0A, the mains charge battery; when the mains charging current is set to 0A, the mains does not charge battery, but the solar controller charges the battery.**

**3) Energy saving mode(d2)**

● Inverter works under the battery mode, once the load capacity is less than 5% of the inverter rated power, the inverter will start and stop regularly to achieve energy saving effect (ie: the machine will intermittently interrupt the inverter output); When the load is greater than 5% of the inverter rated power, the inverter will out of this energy saving mode.

## 5. Operation

**5-1: Function and setting of button on board**

**1) ⏻ button**

◆ Battery supply state: Power on, press ⏻ button for 1 second, the equipment start output; Power off, press ⏻ button for 1 second, the equipment shutdown.

◆ AC supply state: Power on, the equipment will auto start when AC supply input; Power off, press ⏻ button for 1 second, the equipment turn off output, the equipment shutdown after cut off AC supply.

**2) UP/DOWN button**

◆ Page scroll: in the main interface, short press the UP or DOWN button for 1 second to view various parameter interfaces, such as output interface, input interface, battery interface, and etc.;

◆ Parameters setting: in the parameters setting interface, short press the UP or DOWN button for 1 second to adjust the parameter value.

**3): FUNCTION button**

◆ Mute function: In the main interface, press the FUNCTION button for 1 second to turn on/off alarm.

◆ In the main interface, long press the FUNCTION button for 3 seconds to enter the parameters setting interface.

**5-2: Function setting description**

5-2-1 Introduction to function setting interface

| Interface | Descriptions | Remarks |
|---|---|---|
| A0 Working Mode | Set working mode: d1 AC input priority, d2 ECO mode, d3 solar(battery) priority | |
| A1 AC charging current | Set charging current:C0~C6 (C0=0A, C6 is max charging) | |
| A2 Constant charge voltage | Set constant charge voltage: 13V-15V/single battery voltage | Constant charge voltage |
| A3 Floating charge voltage | Set floating charge voltage: 13V-15V/single battery voltage | Floating charge voltage |
| A4 Low voltage protection point | Set low voltage protection point : 8V-13V/single battery voltage | Only available for Pb lead-acid battery |
| A5 Auto start output recover voltage | Set auto start output recover voltage: 9V-15V/single battery voltage | Only available for Pb lead-acid battery |
| A6 Mains supply to inverter supply voltage | Set mains supply to inverter supply voltage: 9V-15V/single battery voltage | Only available for Pb lead-acid battery & d3 working mode |
| A7 Inverter supply to Mains supply voltage | Set Inverter supply to Mains supply voltage: 8V-14V/single battery voltage | Only available for Pb lead-acid battery & d3 working mode |
| A8 Frequency | 50Hz/60Hz available to set | Set the mains input and inverter output frequencies |
| A9 AC output voltage | AC 105V~120V model: 105VAC/110VAC/ 115VAC/120VAC available to set<br>AC 220V~240V model: 220VAC/230VAC/ 240VAC available to set | |
| A10 Battery type | Pb Lead acid /<br>LI*: LI1(GROWATT)Lithium / LI2(Voltronic)Lithium/ LI3(PYLONTECH -1)Lithium / LI4(PACEEX)Lithium/ LI5(PYLONTECH-2)Lithium/ LI6(PYLONTECH-3)Lithium | When set to Pb lead-acid battery, the RS485 communication port communicates with external devices. When set to LI* lithium battery, RS485-1 communication port communicates with lithium battery BMS |



| | | |
|---|---|---|
| A11 Auto start output recover voltage | Set ON or OFF (default OFF) | If this function is enabled, after the inverter battery turns off the output at low voltage, the machine enters the standby state. When the battery voltage rises to the auto start output recover voltage, the machine automatically starts to restore the output |
| A12 Low voltage protection battery capacity value | Set Low voltage protection battery capacity value 0%-50% (default 5%) | Available for LI* lithium batteries |
| A13 Low voltage self-restoring battery capacity value | Set Low voltage self-restoring battery capacity value 1%-80% (default 10%) | Available for LI* lithium batteries |
| A14 Inverter supply to Mains supply battery capacity value | Set Inverter supply to Mains supply battery capacity value 0%-50%(default 15%) | Available for LI* lithium batteries& d3 working mode |
| A15 Mains supply to inverter supply voltage | Set mains supply to inverter supply voltage 50%-100%(default 85%) | Available for LI* lithium batteries& d3 working mode |
| A16 Charge end battery capacity value | Set charging end battery capacity value 80%-100% (default 100%) | Available for LI* lithium batteries |
| A17 RS485-1 Communication address | Set RS485-1 Communication address 000-247(default 001) | The IP address of the APP/RS485-2 interface is fixed 001 |
| A18 Generator function settings | Set ON or OFF (default OFF) | Note: This function needs to be turned on when the AC input is connected to a generator |

**Note:**

1. When the battery type is set to LI* lithium battery, the machine's equalizing charging voltage and floating charging voltage need to be set according to the lithium battery parameters. The lithium battery BMS must maintain normal communication with the inverter (the inverter only supports communication with the specified BMS protocol ), if the communication is abnormal, the inverter will not operate normally.

2.When the lithium battery does not need to communicate with the inverter, the battery type can be set to Pb lead-acid battery; according to the lithium battery parameters, set the corresponding parameter value of the inverter (inverter undervoltage protection value > lithium battery undervoltage value; Inverter equalizing charge/float voltage value < lithium battery overvoltage protection value).

3.The voltage value in this manual is the voltage of a single battery, the 48V system is 4 batteries, the 24V system is 2 batteries, and the 12V system is a single battery. he display value of the machine is the voltage per cell x the number of cells, which is 48V system x4, 24V system x2, and 12V system x1 (For example, if the average charging voltage of the 48V model is 14Vx4, it is 56V; And so on.)

4. Pb lead-acid battery: when setting voltage parameters, the following conditions shall be met, otherwise the inverter will report A19 fault.

1) (A2≥A3>A6≥A5>A4) Average charge voltage ≥ float charge voltage > d3 (mains → inverter) voltage ≥ low voltage recovery and power on > battery low voltage protection;

2) (A6>A7>A4) d3 (mains → inverter) voltage > d3 (inverter → mains) voltage > battery low voltage protection;

3) Low-voltage alarm voltage value (cannot be set) = low-voltage protection voltage value + 0.5V/single battery; high-voltage alarm voltage value (cannot be set) = equalizing charging voltage value + 1.3V/single battery;

4) Low-voltage alarm recovery voltage value (cannot be set) = low-voltage protection voltage value + 1V/single battery; high-voltage alarm recovery voltage value (cannot be set) = average charging voltage value + 0.8V/single battery;

5. LI* lithium battery: when setting voltage parameters, the following conditions shall be met, otherwise the inverter will report A19 fault.

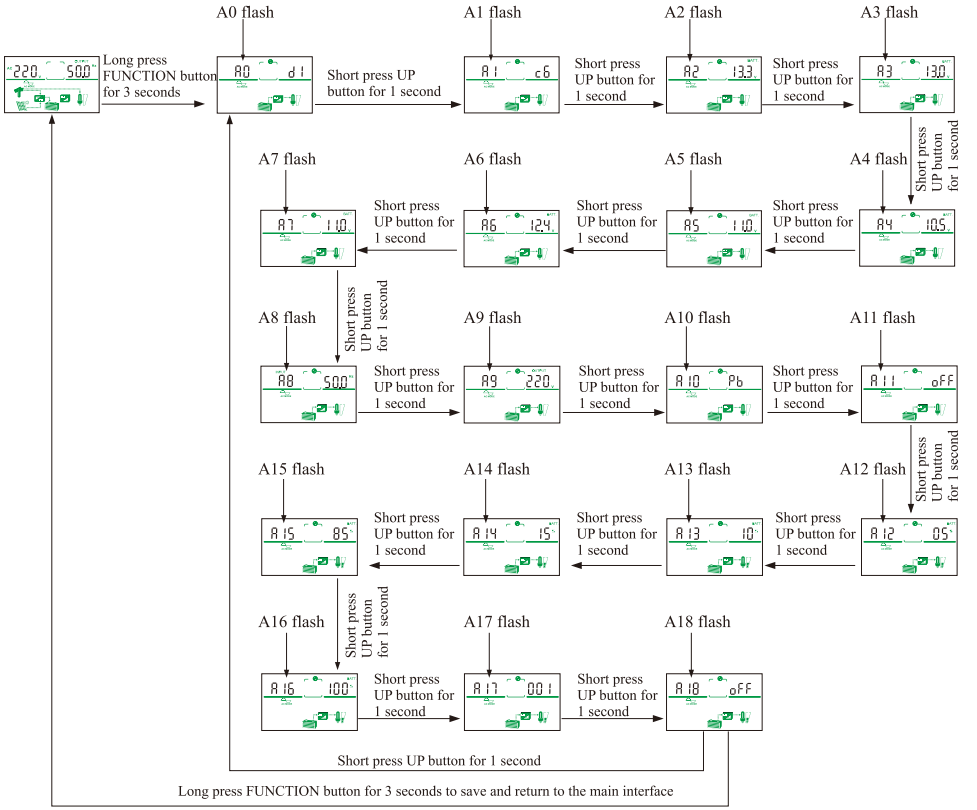
1) (A16>A15≥A13>A12) charging end battery capacity value >d3 (mains → inverter) voltage ≥ low voltage self-recovery > battery low voltage protection;

2) (A15>A14>A12) d3 (mains → inverter) voltage > d3 (inverter → mains) voltage > battery low voltage protection;

3) Low voltage alarm battery capacity value = low voltage protection battery capacity value + 5%; low voltage alarm recovery value battery capacity value = low voltage alarm battery capacity value + 1%;

4) High pressure alarm and high pressure alarm recovery press BMS.

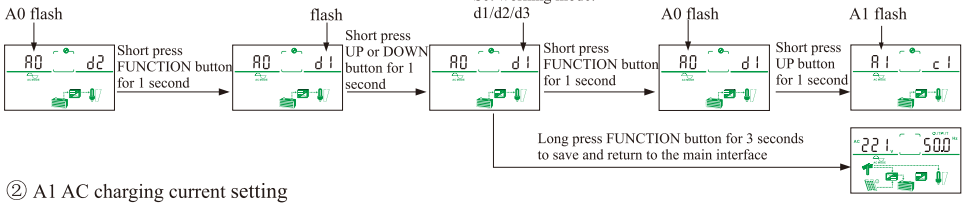
### 5-2-2 Operation guide for main interface to enter parameter setting interface



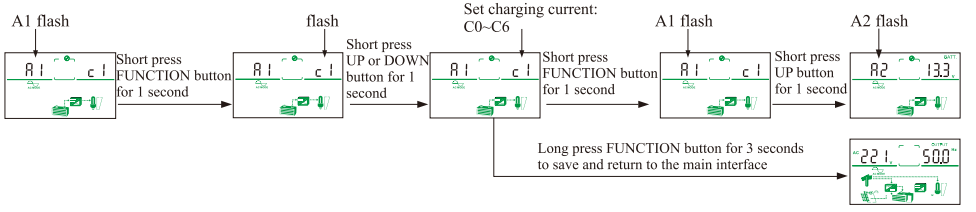

**Note: The parameter of each parameter setting interface can be viewed at this time.**

### 5-2-3 Operation guide for parameter setting in setting interface

① A0: Working priority mode setting

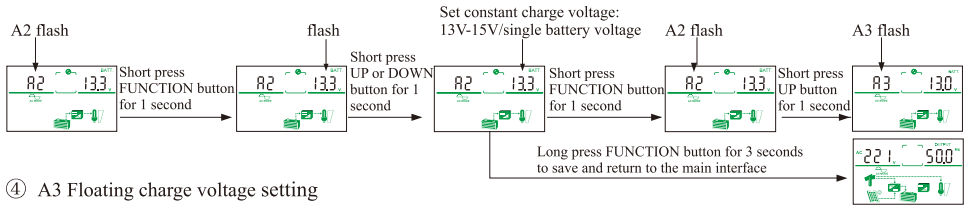



② A1 AC charging current setting

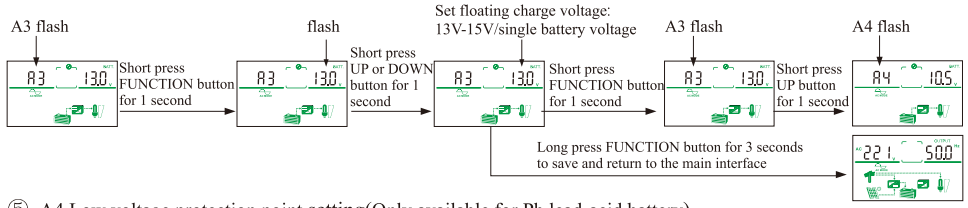




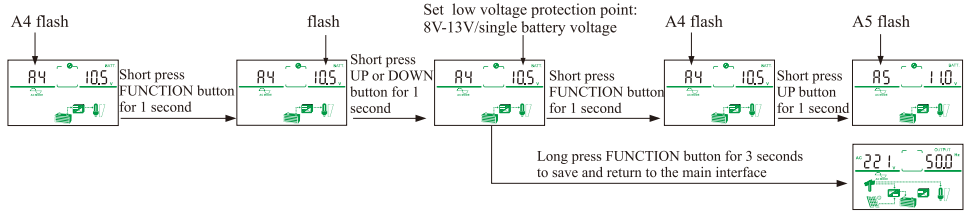

③ A2 Constant charge voltage setting



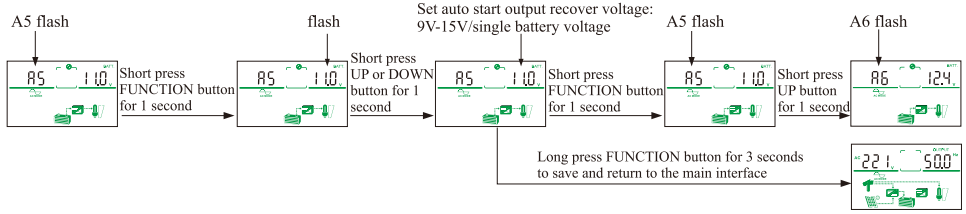

④ A3 Floating charge voltage setting



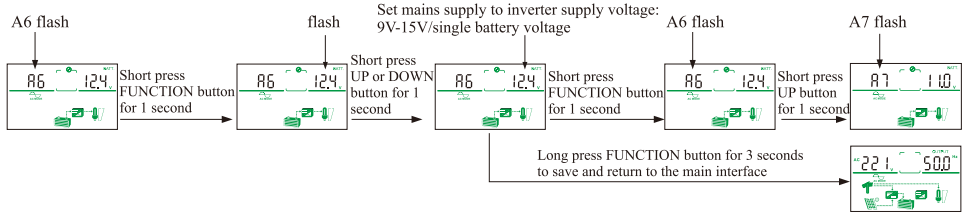

⑤ A4 Low voltage protection point setting(Only available for Pb lead-acid battery)



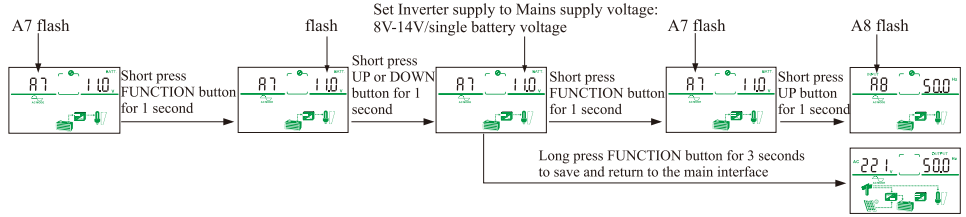

⑤ A5 Auto start output recover voltage setting(Only available for Pb lead-acid battery)



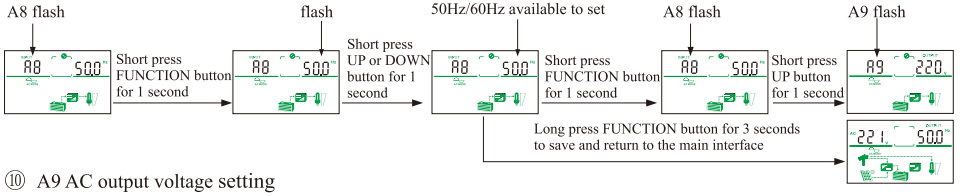

⑦ A6 Mains supply to inverter supply voltage setting(Only available for Pb lead-acid battery & d3 working mode)



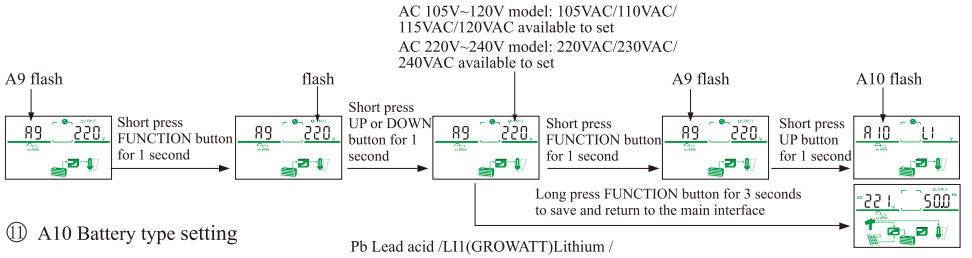

⑧ A7 Inverter supply to Mains supply voltage setting(Only available for Pb lead-acid battery & d3 working mode)



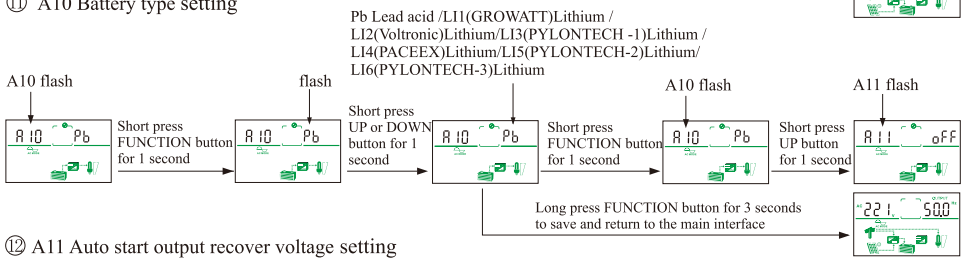
⑨ A8 Frequency setting



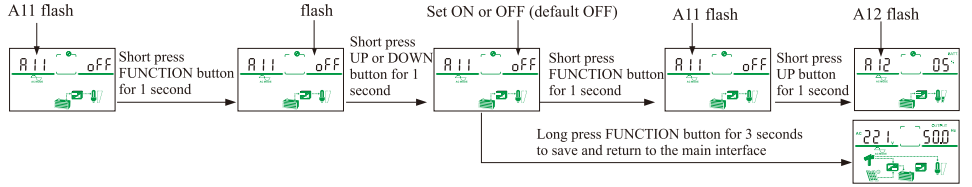

⑩ A9 AC output voltage setting



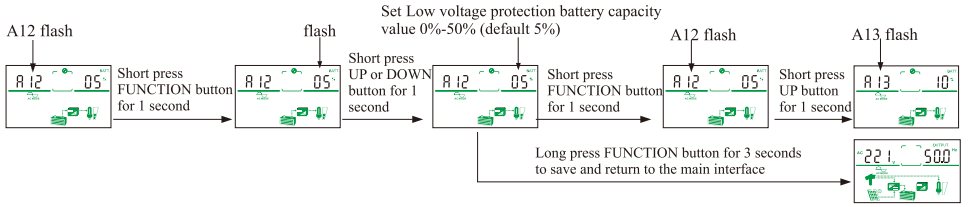

⑪ A10 Battery type setting



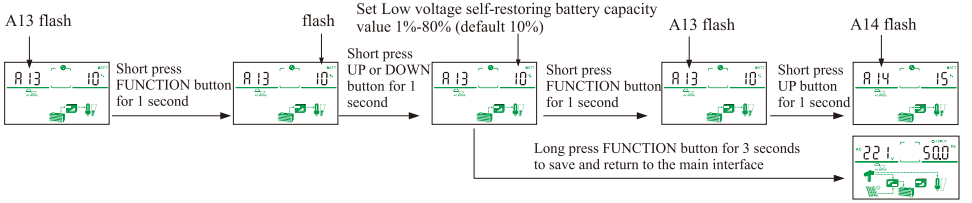

⑫ A11 Auto start output recover voltage setting




⑬ A12 Low voltage protection battery capacity value setting(Available for LI* lithium batteries)

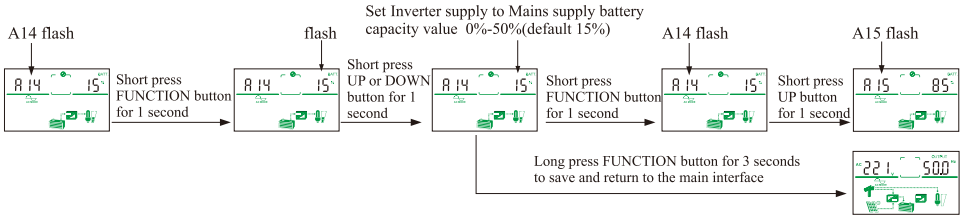



⑭ A13 Low voltage self-restoring battery capacity value setting(Available for LI* lithium batteries)

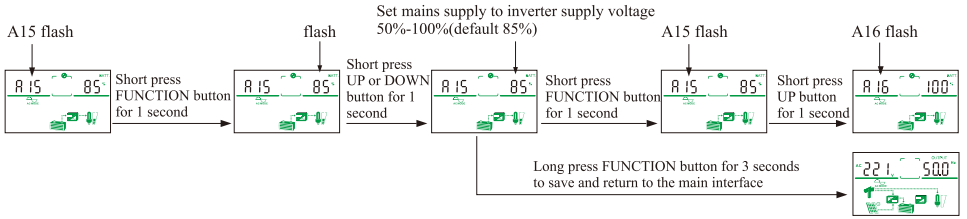




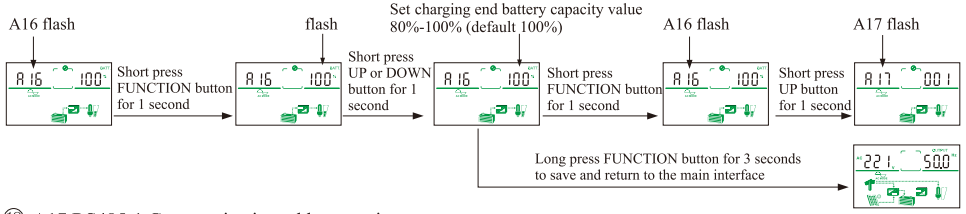

⑮ A14 Inverter supply to Mains supply battery capacity value setting(Available for LI* lithium batteries &d3 working mode)



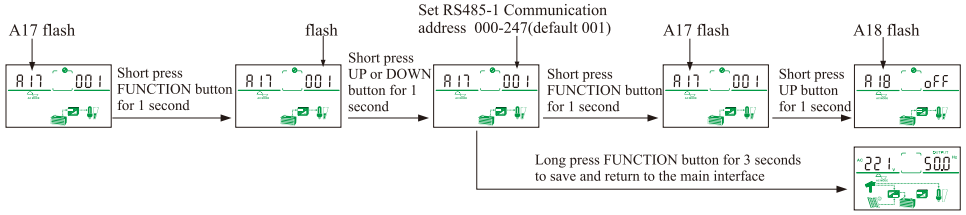

⑯ A15 Mains supply to inverter supply voltage setting(Available for LI* lithium batteries &d3 working mode)



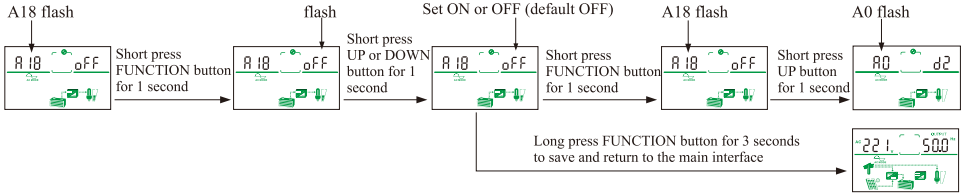

⑰ A16 Charge end batterycapacity value setting(Available for LI* lithium batteries)




⑱ A17 RS485-1 Communication address setting




⑲ A18 Generator function setting




**Note: If no operation is performed under the function setting page, data will be saved automatically after 40S and return to the main interface.**

**5-3: Steps of start up**

1) Connect loads to the AC output of inverter.

2) Connect mains power and batteries, please notice the negative andpositive side during wiring(refer to chapter 5 for wiring).

3) Press ⏻ button to start the inverter(start automatically under the state of mains power).

4) After 30s when the output is stable, start loads in turn.

**5-4: Steps of power off**

1) Disconnect loads.

2) Press ⏻ button to disconnect AC output.

3) Disconnect mains power and inverter shut down.

## 6. Maintenance

1) The inverter just needs the minimum maintenance. And life of Pb(battery) can be preserved by frequent charge.

2) Batteries should be charged for every three months if the inverter is long-term unused.

3) Lifespan of battery normally lasts for three to five years. It should be replaced in advance if any battery is found in poor state. And the replacement shall be operated by the professional.

4) Batteries should be wholly replaced by the instruction of the supplier.

5) For every three months, batteries should be discharged (until the inverter shuts down) and recharged. Every charge (by standard inverter) should last at least for 12 hours.

6) Among high temperature area, batteries should be discharged and recharged forevery two months. Every charge (by standard inverter) should last at least for 12 hours.

**Note:**

- **Please shut down the inverter and disconnect AC input before replacing batteries.**
- **Please do not wear metal jewelry such as ring or watch.**
- **Please use screwdriver with insulated handle and avoid to place tools or metal objects on batteries.**
- **Please avoid short circuit or reverse connection.**

**Warning:**

**1) Battery must not be put in the fire, which may cause explosion.**

**2) Shall not open or damage the battery. Electrolyte released will cause harm to eyes and skin and even intoxication.**



## 7. Error and Solution

**7-1: Regular error**

| Error | Reason | Solution |
|---|---|---|
| Unable to boot | Low voltage in battery or overload | Charging the battery or reduce the loads |
| Shut down with load | Low voltage in battery or overload | Charging the battery or reduce the loads |
| Alarm for boot | Low voltage in battery or overload | Charging the battery or reduce the loads |
| Heat of connector | Poor contact | Check and fasten the screws |

**7-2: Code for alarm**

| Code for alarm | Reason | Solution |
|---|---|---|
| 01 | Over temperature protection | Check and reduce some loads |
| 02 | Reversion of transformer | Please contact the supplier |
| 03 | Data-saving error | Please contact the supplier |
| 04 | Internal reference voltage error | Please contact the supplier |
| 05 | Output short circuit protection | Please check if user's equipment is short circuit. |
| 06 | Battery over voltage protection | Please contact the supplier |
| 07 | NTC error | Please contact the supplier |
| 08 | Communication failure of controller | Please contact the supplier |
| 11 | Overload alarm/protection | Please reduce the loads |
| 12 | Contra variant error | Please contact the supplier |
| 13 | Battery low voltage alarm | AC output is going to stop, please set as AC first with charging mode, and restart the inverter |
| 14 | Battery low voltage protection | Please turn into AC first with charging mode, and restart the inverte |
| 15 | AC over voltage alarm | Please check the AC input voltage |
| 16 | Battery over voltage protection | Please contact the supplier |
| 17 | The mains frequency is abnormal | A message is displayed indicating that the input frequency of the mains and generator is abnormal, Please enable the generator function |
| 19 | Voltage setting parameters are abnormal | Please check whether the setting parameters meet the setting requirements or not/Rebooting the machine can restore the last saved parameters |
| 21 | Communication failure between the inverter and lithium battery | Please check whether the communication cable connects correctly between the inverter and lithium battery |
| 22 | Lithium battery over voltage alarm | The inverter will be turned off for charging, and then return to normal. |
| 23 | Lithium battery low voltage alarm | Please charge the battery |

## 8. Technical specification

| Model: DF/DF-T | | 10212/24/48 | 15212/24/48 | 20212/24/48 | 30224/48 | 40224/48 | 50248 | 60248 | 70248 |
|---|---|---|---|---|---|---|---|---|---|
| Rated Power | | 1000W | 1500W | 2000W | 3000W | 4000W | 5000W | 6000W | 7000W |
| Battery Voltage | | 12/24/48VDC | | | 24/48VDC | | 48VDC | | |
| Size(L*W*Hmm) | | 482x328x191 | | | | 615x353x191 | | | |
| Package Size(L*W*Hmm) | | 555x370x249 | | | | 675x395x249 | | | |
| N.W.(kg) | | 14 | 15 | 17.5 | 19.5 | 24 | 26 | 29 | 31 |
| G.W.(kg) | | 15 | 16 | 18.5 | 20.5 | 25.5 | 27.5 | 30.5 | 32.5 |
| Installation Method | | Wall-Mounted | | | | | | | |
| Inside Solar controller (Optional) | Charging Mode | MPPT | | | | | | | |
| | Charging current | 30A~60A | | | | 60A~100A | | | |
| | PV Array Maximum Power | 12V system:420W(30A)/560W(40A)/700W(50A)/840W(60A);<br>24V system: 840W(30A)/1120W(40A)/1400W(50A)/1680W(60A);<br>48V system:1680W(30A)/2240W(40A)/2800W(50A)/3360W(60A) | | | | 24V system:1680W(60A)/2240W(80A)/2800W(100A);<br>48V system:3360W(60A)/4480W(80A)/5600W(100A) | | | |
| | Max PV Input Voltage(Voc) (At the lowest temperature) | 12V/24V system: 120VDC; 48V system: 180VDC | | | | | | | |
| | MPPT tracking range | 12V system: 15V-80V; 24V system: 30V-100V; 48V system: 60V-140V | | | | | | | |
| | Standby loss | ⩽3W | | | | | | | |
| | Maximum conversion efficiency | >95% | | | | | | | |

| Model: DF/DF-T | | 80248 | 10348 | 12348 |
|---|---|---|---|---|
| Rated Power | | 8KW | 10KW | 12KW |
| Battery Voltage | | 48VDC | 48VDC | 48VDC |
| Size(L*W*Hmm) | | 720x363x256 | | |
| Package Size(L*W*Hmm) | | 785x380x325 | | |
| N.W.(kg) | | 45 | 55 | 58 |
| G.W.(kg) | | 52 | 62 | 65 |
| Installation Method | | Wall-Mounted | | |
| Inside Solar controller (Optional) | Charging Mode | MPPT | | |
| | Charging current | 80A~100A | | |
| | PV Array Maximum Power | 4480W(80A)/5600W(100A) | | |
| | Max PV Input Voltage(Voc) (At the lowest temperature) | 180VDC | | |
| | MPPT tracking range | 60V-140V | | |
| | Standby loss | ⩽3W | | |
| | Maximum conversion efficiency | >95% | | |
| Input | DC Input Voltage Range | 10.5-15VDC(Single battery voltage) | | |
| | AC Input Voltage Range | 80VAC~133VAC(105VAC)/85VAC~138VAC(110VAC)/90VAC~143VAC(115VAC)/95VAC~148VAC(120VAC)/170VAC~275VAC(220VAC)/180VAC~285VAC(230VAC)/190VAC~295VAC(240VAC)(1000W~7000W)<br>87VAC~123VAC(105VAC)/92VAC~128VAC(110VAC)/97VAC~133VAC(115VAC)/102VAC~138VAC(120VAC)/185VAC~255VAC(220VAC)/195VAC~265VAC(230VAC)/205VAC~275VAC(240VAC)(8KW~12KW) | | |
| | AC Input Frequency Range | 45Hz~55Hz(50Hz) / 55Hz~65Hz(60Hz) | | |
| | Max AC charging current | 0~30A(Depending on the model) | | |
| | AC charging method | Three-stage (constant current, constant voltage, floating charge) | | |

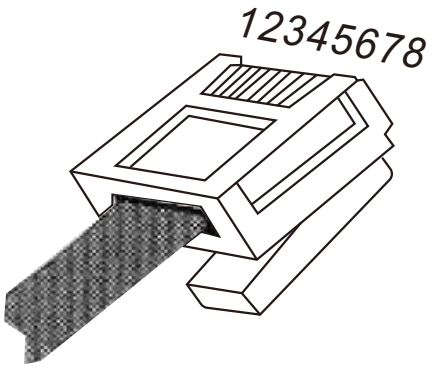


| | | |
|---|---|---|
| Output | Efficiency(Battery Mode) | ⩾85% |
| | Output Voltage (Battery Mode) | AC105V~120V model: 105VAC±2%/110VAC±2%/115VAC±2%/120VAC±2%(can be set)<br>AC220V~240V model: 220VAC±2%/230VAC±2%/240VAC±2%(can be set) |
| | Output Frequency (Battery Mode) | 50/60Hz±1%(can be set) |
| | Output Wave (Battery Mode) | Pure Sine Wave |
| | Efficiency(AC Mode) | ⩾99% |
| | Output Voltage (AC Mode) | AC105V~120V model: 105VAC±10%/110VAC±10%/115VAC±10%/120VAC±10%(can be set)<br>AC220V~240V model: 220VAC±10%/230VAC±10%/240VAC±10%(can be set) |
| | Output Frequency (AC Mode) | Follow input |
| | Output waveform distortion(Battery Mode) | ≤3%(Linear load) |
| | No load loss (Battery Mode) | ≤1% rated power |
| | No load loss(AC Mode) | ≤2% rated power(charger does not work in AC mode) |
| | No load loss (Energy saving Mode) | ⩽10W |
| Battery Type | Custom battery | Charging and discharging parameters of different types of batteries can be set through the operation panel by oneself |
| Protection | Battery lowvoltage alarm | Factory default: Pb:11V/Single battery voltage; LI*:10% of the battery capacity |
| | Battery lowvoltage protection | Factory default: Pb:10.5V/Single battery voltage ; LI*:5% of the battery capacity |
| | Battery overvoltage alarm | Factory default: Pb:15.5V/Single battery voltage; LI*:following BMS instruction |
| | Battery overvoltage protection | Factory default: Pb:17V/Single battery voltage; LI*:following BMS instruction |
| | Battery overvoltage recovery voltage | Factory default: Pb:14.5V/Single battery voltage; LI*:following BMS instruction |
| | Overload power protection | Automatic protection (battery mode), circuit breaker or insurance (AC mode) |
| | Inverter output short circuit protection | Automatic protection (battery mode), circuit breaker or insurance (AC mode) |
| | Temperature protection | >90°C(Shut down output) |
| Alarm | A | Normal working condition, buzzer has no alarm sound |
| | B | Buzzer sounds 4 times per second when battery failure, voltage abnormality, overload protection |
| | C | When the machine is turned on for the first time, the buzzer will prompt 5 when the machine is normal |
| Working Mode | | Battery First/AC First/Saving Energy Mode |
| Transfer Time | | ⩽4ms |
| Display | | LCD(External LCD display (optional)) |
| Thermal method | | Cooling fan in intelligent control |
| Communication | | RS485 communication/APP data collector interface(WIFI/GPRS data collector (optional)) |
| Environment | Operating temperature | -10°C~40°C |
| | Storage temperature | -15°C~60°C |
| | Noise | ⩽55dB |
| | Elevation | 2000m(More than derating) |
| | Humidity | 0%~95% (No condensation) |

**Above parameter revision change without notification.**

## 9. Appendix--485 Communication Port

**RS485 communication port pin definition**

| | |
|---|---|
| PIN1--------RS485-B |  |
| PIN2--------RS485-A | |
| PIN3--------NC | |
| PIN4--------NC | |
| PIN5--------NC | |
| PIN6--------NC | |
| PIN7--------NC | |
| PIN8--------NC | |



**NC: refer to as not connect.**



# Warranty Card

Customer Name: _____ Tel.: _____

Address: _____

Brand: _____ Model: _____

Serial No.: _____ Date of Purchase: _____

Bought From: _____

Invoice Number: _____ Invoice Price: _____

**Warranty Instruction**

- Please keep this warranty card as proof of maintenance.
- The warranty period is 1 year from the date of purchase.
- During the warranty period, under the condition of normal use and maintenance, if damage caused by the product's own quality, the company will provide free repair and replacement parts after verification.
- The company reserves the right to maintain and interpret all contents.

**Free maintain won't be given under the following circumstance:**

- The damage caused by the manipulation that hasn't follow the requests of the manual.
- The product has been repaired, modified by technicians other than our company's, and any internal parts of the product have been replaced by users.
- The product number has been altered or product is inconsistent with the warranty card.
- Damage caused by careless use, penetration of water or other substances into the product.
- Damage caused by accident or natural disaster.

# Certificate

**Name:** _____

**Model:** _____

**Inspectors:** _____

**Date:** _____

**Products have been tested qualified by standard and permitted to deliver.**