

# User Manual



**2KVA-5KVA**

**Pure Sine Wave Hybrid Inverter**

|                                       |                                                               |
|---------------------------------------|---------------------------------------------------------------|
| Maximum PV array open circuit voltage | 24V:MPPT150VDC(or PWM60VDC)<br>48V:MPPT 150VDC(or PWM 105VDC) |
| Maximum solar charging current        | 60A                                                           |
| <b>Alarm</b>                          |                                                               |
| Low battery alarm                     | The buzzer beeps once a second and stops after one minute.    |
| Overload alarm                        | The buzzer keeps beeping and stops after one minute.          |
| Fault                                 | The buzzer keeps beeping and stops after one minute.          |
| <b>Environment</b>                    |                                                               |
| Temperature                           | 0~40                                                          |
| Humidity                              | C0-95 %, Non condensing                                       |
| Accoustic Noise(db)                   | <45dB                                                         |

## VI. TECHNICAL DATASHEET

| MODEL                             | 2KVA                                                                                                                                                                                                         | 2.5KVA | 3KVA   | 3.5KVA | 5KVA   |
|-----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|--------|--------|--------|
| Input                             |                                                                                                                                                                                                              |        |        |        |        |
| Capacity (VA)                     | 2000VA                                                                                                                                                                                                       | 2500VA | 3000VA | 3500VA | 5000VA |
| Voltage (DC)                      | 24/48V                                                                                                                                                                                                       | 24/48V | 24/48V | 24/48V | 24/48V |
| Nominal Voltage                   | 220VAC/110VAC                                                                                                                                                                                                |        |        |        |        |
| Voltage Range                     | 154-265VAC/77-135VAC                                                                                                                                                                                         |        |        |        |        |
| Frequency                         | 50-60Hz Auto sensing                                                                                                                                                                                         |        |        |        |        |
| Output                            |                                                                                                                                                                                                              |        |        |        |        |
| Voltage                           | 220VAC/110VAC                                                                                                                                                                                                |        |        |        |        |
| Frequency                         | 50/60Hz                                                                                                                                                                                                      |        |        |        |        |
| Waveform                          | Pure sinewave                                                                                                                                                                                                |        |        |        |        |
| Transfer time(AC to DC)           | <8ms                                                                                                                                                                                                         |        |        |        |        |
| Transfer time(DC to AC)           | <8ms                                                                                                                                                                                                         |        |        |        |        |
| Output voltage regulation         | 10%rms                                                                                                                                                                                                       |        |        |        |        |
| Bypass Mode                       | Yes                                                                                                                                                                                                          |        |        |        |        |
| Saver Mode                        | Yes                                                                                                                                                                                                          |        |        |        |        |
| Efficiency                        | >98%                                                                                                                                                                                                         |        |        |        |        |
| Protection                        |                                                                                                                                                                                                              |        |        |        |        |
| Input Protection                  | Circuit Breaker                                                                                                                                                                                              |        |        |        |        |
| Output Protection                 | Circuit Breaker                                                                                                                                                                                              |        |        |        |        |
| Battery                           |                                                                                                                                                                                                              |        |        |        |        |
| Battery Type                      | AGM-Deep Cycle,GEL LiFePO4                                                                                                                                                                                   |        |        |        |        |
|                                   | Up to 500Ah                                                                                                                                                                                                  |        |        |        |        |
| Charging current                  | 15/7A                                                                                                                                                                                                        | 24/12A | 30/15A | 40/20A | 48/24A |
| Low Level disconnect (Selectable) | 24V:(20V or 21V)<br>48V:(40V or 42V)                                                                                                                                                                         |        |        |        |        |
| LCD Indicator status              | Input AC,Output AC                                                                                                                                                                                           |        |        |        |        |
|                                   | Battery DC,Output Load                                                                                                                                                                                       |        |        |        |        |
|                                   | Alarm,Fault                                                                                                                                                                                                  |        |        |        |        |
|                                   | Battery Charge Level                                                                                                                                                                                         |        |        |        |        |
|                                   | Output Frequency                                                                                                                                                                                             |        |        |        |        |
| LED Indicator status              | AC Line In:Green                                                                                                                                                                                             |        |        |        |        |
|                                   | Inverter:Green                                                                                                                                                                                               |        |        |        |        |
|                                   | Charging:Yellow                                                                                                                                                                                              |        |        |        |        |
|                                   | Alarm:Red                                                                                                                                                                                                    |        |        |        |        |
| Battery low alarm                 | 24V:battery light discharge 23V; battery load discharge 23V@load<20% ;<br>22V@load>50%/21V@load>50%;<br>48V:battery light discharge 46V; battery load discharge 46V@load<20% ;<br>44V@load>50%/42V@load>50%; |        |        |        |        |
| Battery low recovery              | 24V:battery light discharge 24V ; battery load discharge 24V@load<20%;<br>23V@load>50%/22V@load>50%;<br>48V:battery light discharge 48V ; battery load discharge 48V@load<20%;<br>46V@load>50%/44V@load>50%; |        |        |        |        |
| DC low voltage shutdown           | 24V:battery light discharge 22V ; battery load discharge 22V@load<20%;<br>21V@load>50%/20V@load>50%;<br>48V:battery light discharge 44V ; battery load discharge 44V@load<20%;<br>42V@load>50%/40V@load>50%; |        |        |        |        |
| DC high voltage alarm and fault   | 16V/32V/64V                                                                                                                                                                                                  |        |        |        |        |
| DC high voltage recovery          | 15V/30V/60V                                                                                                                                                                                                  |        |        |        |        |
| Optional                          |                                                                                                                                                                                                              |        |        |        |        |
| Maximum PV array power            | 24V:1600W 48V:3200W                                                                                                                                                                                          |        |        |        |        |
| MPPT/PWM input voltage range      | 24V:MPPT30-150VDC(or PWM30VDC-60VDC)<br>48V:MPPT60-150VDC(or PWM60VDC-105VDC)                                                                                                                                |        |        |        |        |

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## I .ABOUT THIS MANUAL

### Purpose

This manual describes the assembly, installation, operation and troubleshooting of this unit. Please read this manual carefully before installations and operations. Keep this manual for future reference.

### Scope

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

## II .SAFETY INSTRUCTIONS



**WARNING:** This chapter contains important safety and operating instructions. Read and keep this manual for future reference.

1. Before using the unit, read all instructions and cautionary markings on the unit, the batteries and all appropriate sections of this manual.

2. CAUTION--To reduce risk of injury, charge only deep-cycle lead acid type rechargeable batteries. Other types of batteries may burst, causing personal injury and damage.

3. Do not disassemble the unit. Take it to a qualified service center when service or repair is required. Incorrect re-assembly may result in a risk of electric shock or fire.

4. To reduce risk of electric shock, disconnect all wirings before attempting any maintenance or cleaning. Turning off the unit will not reduce this risk.

5. CAUTION-Only qualified personnel can install this device with battery.

6. NEVER charge a frozen battery.

7. For optimum operation of this inverter/charger, please follow required spec to select appropriate cable size. It's very important to correctly operate this inverter/charger.

8. Be very cautious when working with metal tools on or around batteries. A potential risk exists to drop a tool to spark or short circuit batteries or other electrical parts and could cause an explosion.

9. Please strictly follow installation procedure when you want to disconnect AC or DC terminals. Please refer to INSTALLATION section of this manual for the details.

10. Fuses (4 pieces of 40A, 32VDC for 1KVA/2KVA, 6 pieces of 40A, 32VDC for 3KVA, 1 piece of 200A, 64VDC for 4KVA and 5KVA) are provided as over-current protection for the battery supply.

11. GROUNDING INSTRUCTIONS-This inverter/charger should be connected to a permanent grounded wiring system. Be sure to comply with local requirements and regulation to install this inverter.

12. NEVER cause AC output and DC input short circuited. Do NOT connect to the mains when DC input short circuits.

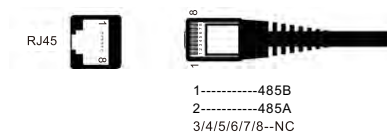
13. Warning!! Only qualified service persons are able to service this device. If errors still persist after following troubleshooting table, please send this inverter/charger back to local dealer or service center for maintenance.

## Error Codes for reference

| Display (Left) | Display (Right) | Details                                         |
|----------------|-----------------|-------------------------------------------------|
| ALA            | 021             | Inverter communication connection failure alarm |
| ALA            | 233             | Abnormal mains output alarm                     |
| ALA            | 236             | Abnormal machine load alarm                     |
| ALA            | 237             | Inverter overload alarm                         |
| ALA            | 231             | Abnormal output alarm                           |
| ALA            | 234             | High battery voltage alarm                      |
| ALA            | 235             | Low battery voltage alarm                       |
| ALA            | 241             | Memory chip read and write error alarm          |
| ALA            | 232             | Memory chip connection failure alarm            |
| ALA            | 238             | Inverter over temperature alarm                 |
| ALA            | 239             | Load-causing over temperature alarm             |
| ALA            | 242             | Host computer software planned shutdown alarm   |
| ALA            | 244             | BMS other faults                                |
| ALA            | 245             | BMS communication abnormal                      |
| ALA            | 246             | BMS charging overcurrent                        |
| ALA            | 247             | BMS discharge overcurrent                       |
| ALA            | 248             | BMS High Temperature                            |
| ALA            | 249             | BMS Low Temperature                             |
| FAL            | 102             | Inverter overload shutdown fault                |
| FAL            | 104             | Abnormal output fault                           |
| FAL            | 105             | Abnormal load fault                             |
| FAL            | 106             | Inverter over temperature fault                 |
| FAL            | 135             | High battery voltage fault                      |
| FAL            | 134             | Low battery voltage fault                       |
| FAL            | 123             | Load-causing over temperature fault             |
| FAL            | 169             | Current detection signal failure                |
| FAL            | 161             | Abnormal mains output fault                     |
| FAL            | 152             | Temperature sensor connection failure           |
| FAL            | 162             | Host computer software planned shutdown failure |

| Settings                | Display (Left) | Display (Mid) | Display (Right) | Setting range | Descriptions                                                                                                                                                                            |
|-------------------------|----------------|---------------|-----------------|---------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Bat low off restart vol | BRU            | 23            | 13.0V           | 12.0~14.0V    | After the machine is shut down abnormally, the battery voltage must be higher than the set value before it can be turned on normally                                                    |
|                         |                |               | 26.0V           | 24.0~28.0V    |                                                                                                                                                                                         |
|                         |                |               | 52.0V           | 48.0~56.0V    |                                                                                                                                                                                         |
| Battery type            | BTT            | 24            | SEL             | SEL           | Sealed Lead Acid Battery                                                                                                                                                                |
|                         |                |               | GEL             | GEL           | Gel Battery                                                                                                                                                                             |
|                         |                |               | FLD             | FLD           | Inter Cell                                                                                                                                                                              |
|                         |                |               | USER            | USER          | Customer Customization                                                                                                                                                                  |
|                         |                |               | TER             | LiCoMnNi02    | Ternary Lithium Battery                                                                                                                                                                 |
|                         |                |               | LIF             | BAT-LiFePO4   | Lithium Iron Phosphate Battery                                                                                                                                                          |
| BMS Function Switch     | BnS            | 25            | OFF             | On            | Whether to enable the BMS communication function                                                                                                                                        |
|                         |                |               |                 | Off           |                                                                                                                                                                                         |
| Bat Soc Under Lock      | BSU            | 26            | 10%             | 5~50%         | BMS low voltage SOC value, if the BMS SOC value is lower than the set value, the inverter will shut down to protect the battery                                                         |
| Bat Soc Turn To Ac      | STG            | 27            | 20%             | 5~50%         | When the working mode of the inverter is set to the battery priority mode, the inverter will be forced to enter the mains charging when the SOC of the BMS is lower than the set value. |
| Bat Soc Turn To Dc      | STB            | 28            | 95%             | 50~100%       | When the working mode of the inverter is set to the battery priority mode, the inverter resumes the DC working mode when the SOC of the BMS is higher than the set value.               |
| Bat Restart Soc         | BSR            | 29            | 50%             | 30~100%       | When the inverter is turned on, the SOC must be higher than the set value to work normally.                                                                                             |
| Factory Reset           | RS             | None          | OFF             | On            | All settings are restored to factory settings                                                                                                                                           |
|                         |                |               |                 | Off           | No recovery process, keep existing settings                                                                                                                                             |
| ECO Mode                | ECO            | None          | OFF             | On            | ECO mode switching                                                                                                                                                                      |
|                         |                |               |                 | Off           |                                                                                                                                                                                         |

When the BMS/485 communication interface is externally connected, as shown in the following figure:



### III.INTRODUCTION

This is a multi-function inverter/charger, combining functions of inverter, solar charger and battery charger to offer uninterruptible power support with portable size. Its comprehensive LCD display offers user-configurable acceptable and easy-accessible button operation such as battery charging current, AC/solar charger priority, and acceptable input voltage based on different applications.

#### Features

- Pure sine wave inverter
- Configurable input voltage range for home appliances and personal computers via LCD setting
- Configurable battery charging current based on applications via LCD setting
- Configurable AC/Solar Charger priority via LCD setting
- Compatible to mains voltage or generator power
- Auto restart while AC is recovering
- Overload/Over temperature/short circuit protection
- Smart battery charger design for optimized battery performance
- Cold start function

#### Basic System Architecture

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

- Generator or Utility.
- PV modules(option)

Consult with your system integrator for other possible system architectures depending on your requirements.

This inverter can power all kinds of appliances in home or office environment, including motor-type appliances such as tube light, fan, refrigerator and air conditioner.

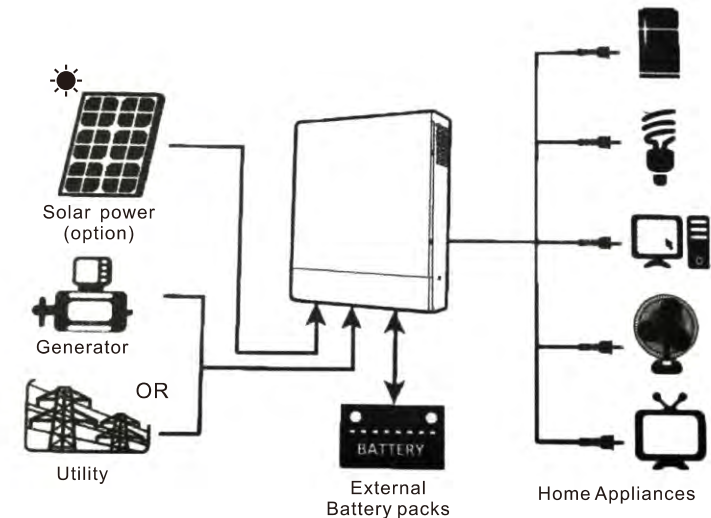
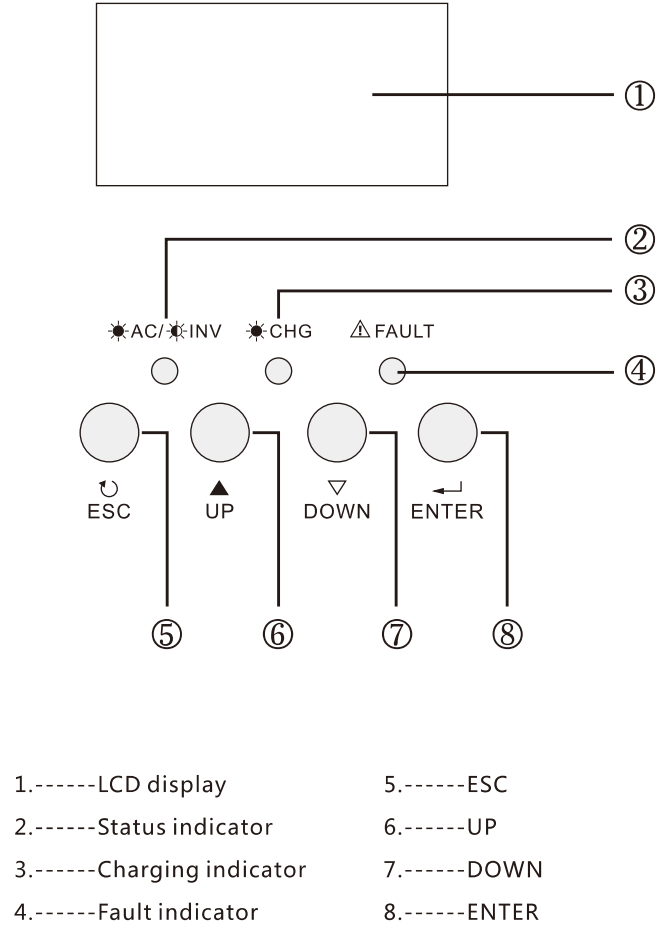


Figure 1 Hybrid Power System

Product Overview

LCD Screen



| Settings                           | Display (Left) | Display (Mid) | Display (Right) | Setting range | Descriptions                                                                                                                         |
|------------------------------------|----------------|---------------|-----------------|---------------|--------------------------------------------------------------------------------------------------------------------------------------|
| Boost charging voltage             | CU             | 06            | 14.2V           | 13.5~15.0V    | Bulk charging voltage setting, according to different types of batteries                                                             |
|                                    |                |               | 28.4V           | 27.0~30.0V    |                                                                                                                                      |
|                                    |                |               | 56.8V           | 54.0~60.0V    |                                                                                                                                      |
| Float charging voltage             | FLU            | 07            | 13.6V           | 12.5~14.0V    | Float voltage setting, according to different types of batteries                                                                     |
|                                    |                |               | 27.2V           | 25.0~28.0V    |                                                                                                                                      |
|                                    |                |               | 54.4V           | 50.0~56.0V    |                                                                                                                                      |
| Battery lockdown voltage           | COU            | 08            | 10.2V           | 9.5~11.5V     | Set the shutdown voltage point of battery protection voltage                                                                         |
|                                    |                |               | 20.4V           | 19.0~23.0V    |                                                                                                                                      |
|                                    |                |               | 40.8V           | 38.0~46.0V    |                                                                                                                                      |
| Charging voltage of mains recovery | DTA            | 09            | 12.0V           | 11.5~12.5V    | Set the battery voltage point when the mains power is involved in the solar energy priority charging mode                            |
|                                    |                |               | 24.0V           | 23.0~25.0V    |                                                                                                                                      |
|                                    |                |               | 48.0V           | 46.0~50.0V    |                                                                                                                                      |
| Charging voltage of mains off      | ATD            | 10            | 13.5V           | 13.0~14.0V    | Select the voltage point of converting from mains to solar power in solar priority mode                                              |
|                                    |                |               | 27.0V           | 26.0~28.0V    |                                                                                                                                      |
|                                    |                |               | 54.0V           | 52.0~56.0V    |                                                                                                                                      |
| Inv. output voltage                | OU             | 11            | 220V            | 200~240V      | Set the inverter output voltage                                                                                                      |
| Mains detection speed              | CST            | 12            | HI              | High speed    | Mains sensitivity settings: high medium low                                                                                          |
|                                    |                |               | IDE             | Mid. speed    |                                                                                                                                      |
|                                    |                |               | LO              | Low speed     |                                                                                                                                      |
| Inv. output frequency              | OF             | 13            | 50Hz            |               | Set inverter output frequency                                                                                                        |
|                                    |                |               | 60Hz            |               |                                                                                                                                      |
| Fault restart switch               | RA             | 14            | TE              | On            | Restart 3 times after short circuit or overload                                                                                      |
|                                    |                |               | TD              | Off           | No restart after short circuit or overload                                                                                           |
| Backlight control                  | BLC            | 15            | LON             | Always on     | The display backlight is always on                                                                                                   |
|                                    |                |               | LOF             | Always off    | The display backlight is always off                                                                                                  |
|                                    |                |               | LOD             | Delay off     | Display backlight smart switch                                                                                                       |
| Buzzer control switch              | BEC            | 16            | AON             | On            | Allows beeping in fault state                                                                                                        |
|                                    |                |               | AOF             | Off           | No beeping in any state                                                                                                              |
| Low battery alarm switch           | BOL            | 17            | OFF             | Off           | Intelligent battery protection function, it is not recommended to change                                                             |
|                                    |                |               | ON              | On            |                                                                                                                                      |
| Load limit                         | LL             | 18            | OFF             | Off           | Intelligent transformer temperature protection function, it is not recommended to change                                             |
|                                    |                |               | ON              | On            |                                                                                                                                      |
| Load alarm limit                   | LEL            | 19            | OFF             | Off           | This setting does not adapt to this inverter. Setting not available.                                                                 |
|                                    |                |               | ON              | On            |                                                                                                                                      |
| Baud rate                          | BAU            | 20            | 0               | 2400          | Set the communication baud rate                                                                                                      |
|                                    |                |               | 1               | 4800          |                                                                                                                                      |
|                                    |                |               | 2               | 9600          |                                                                                                                                      |
| Output display mode                | ODT            | 21            | 220V            | 220V          | Set display output voltage                                                                                                           |
|                                    |                |               | 110V            | 110V          |                                                                                                                                      |
| Swon bat voltage                   | BLS            | 22            | 11.5V           | 10.5~12.2V    | After the machine is shut down abnormally, the battery voltage must be higher than the set value before it can be turned on normally |
|                                    |                |               | 23.0V           | 21~24.4V      |                                                                                                                                      |
|                                    |                |               | 46.0V           | 42~48.8V      |                                                                                                                                      |

## Setting Mode/Error Codes for reference

Enter setting mode, Press "ENTER" button for 10 seconds.

Exit setting mode, Press "ESC" button repeatedly.

1.Press "UP" or "DOWN" button to choose the parameter and then press "ENTER" button.

2.When parameter is flashing, press "UP" or "DOWN" to change it and then press "ENTER" button to confirm.

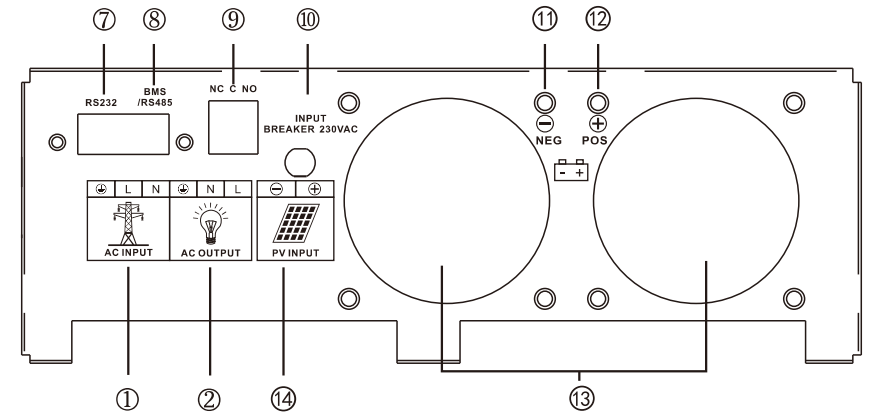
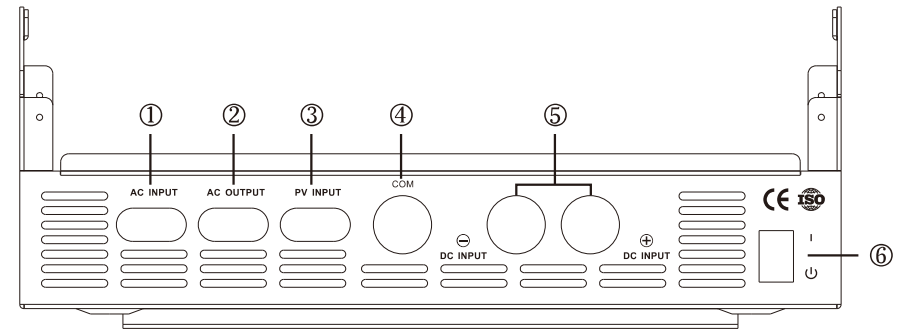
When setting: Setting icon is flashing

Setting succeed: Left-sided frame of the parameter will flash

Setting failed: FAULT light on

| Settings                     | Display (Left) | Display (Mid) | Display (Right) | Setting range       | Descriptions                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|------------------------------|----------------|---------------|-----------------|---------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Mains input voltage range    | Alr            | 00            | UPS             | Narrow range        | Mains input range is 155-265V                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|                              |                |               | APL             | Wide range          | Mains input range is 180-265V                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Mains frequency oltage range | AFr            | 01            | LO              | Narrow range        | Mains input frequency range is 45-65HZ                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|                              |                |               | HI              | Wide range          | Mains input frequency range is 40-70HZ                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Working mode                 | None           | 02            | UTI             | Mains priority      | The utility power will provide power to the load first. Only when the utility power is not enough to supply the load, the solar energy And the battery will provide power to the load.                                                                                                                                                                                                                                                                                        |
|                              |                |               | SOL             | Solar priority      | When solar energy is sufficient, solar energy will be preferentially provided to the load. When there is solar energy but not enough, the solar energy and battery power will provide power to the load at the same time. When there is no solar power, the utility will provide power to the load. At the same time, If the battery voltage drops to the low-battery warning voltage point or the set DC-to-AC voltage point, the mains will also provide power to the load. |
|                              |                |               | SBU             | Battery priority    | When solar energy is sufficient, solar energy will be preferentially provided to the load. When there is solar energy but not enough, the solar energy and battery power will provide power to the load at the same time. If the battery voltage drops to the low battery warning voltage point or the set DC to AC voltage point, the mains will provide power to the load.                                                                                                  |
| Charging mode                | None           | 03            | CUT             | Mains priority      | The energy of the mains and the solar energy charge the battery at the same time                                                                                                                                                                                                                                                                                                                                                                                              |
|                              |                |               | CSO             | Solar priority      | In the solar priority mode, when the PV meets the requirements, the battery is charged with solar energy preferentially, and when the battery voltage is too low, the mains charge will be started                                                                                                                                                                                                                                                                            |
|                              |                |               | OSO             | Solar charging only | The machine simply uses the energy of solar energy to charge the battery                                                                                                                                                                                                                                                                                                                                                                                                      |
| Mains charging current ratio | ACP            | 04            | 100%            | 10~100%             | Adjustable charging current ratio of mains                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Solar charging current ratio | SCP            | 05            | 100%            | 20~100%             | You can adjust the charging current proportional solar                                                                                                                                                                                                                                                                                                                                                                                                                        |

## Back panel



## VV2KVA-5KVA

- |                            |                                |
|----------------------------|--------------------------------|
| 1. AC input                | 8.BMS/RS485 communication port |
| 2.AC output                | 9.Dry contact                  |
| 3.PV input                 | 10.Input breaker               |
| 4.Communication port       | 11.Battery terminal negative   |
| 5.Battery input            | 12.Battery terminal positive   |
| 6.Power on/ off switch     | 13.Fan                         |
| 7.RS232 communication port | 14.Solar panel input           |

## IV. INSTALLATION

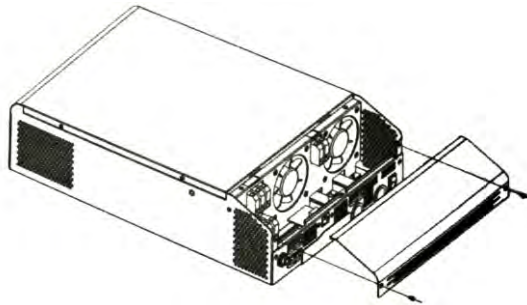
### Unpacking and Inspection

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

- The unit × 1
- User manual × 1
- Communication cable × 1

### Preparation

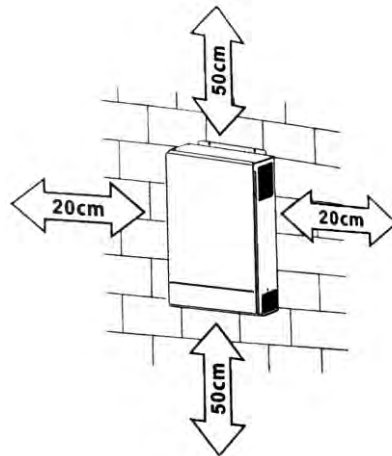
Before connecting all wirings, please take off bottom cover by removing two screws as shown below.



### Mounting the Unit

Consider the following points before selecting where to install:

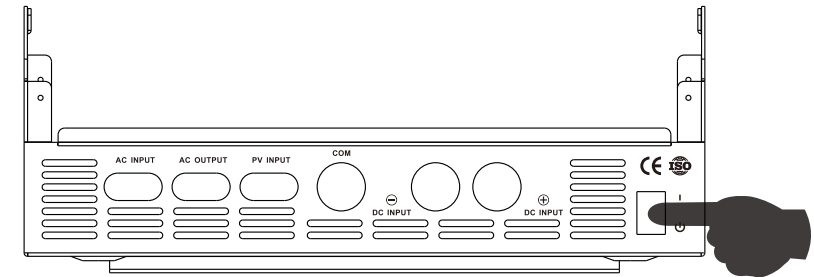
- Do not mount the inverter on flammable construction materials.
- Mount on a solid surface
- Install this inverter at eye level in order to allow the LCD display to be read at all times.
- For proper air circulation to dissipate heat, allow a clearance of approx. 20cm to the side and approx. 50cm above and below the unit.
- The ambient temperature should be between 0°C and 55°C to ensure optimal operation. The recommended installation position is to be adhered to the wall vertically
- Be sure to keep other objects and surfaces as shown in the diagram to guarantee sufficient heat dissipation and to have enough space for removing wires.



**SUITABLE FOR MOUNTING ON CONCRETE OR OTHER NON-COMBUSTIBLE SURFACE ONLY.**

## V. OPERATION

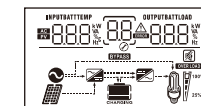
### Power ON/OFF



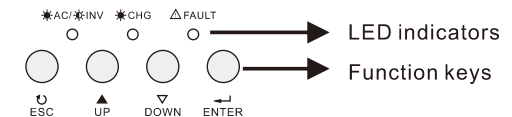
Once the unit has been properly installed and the batteries are connected well, simply press On/Off switch (located on the bottom of the case) to turn on the unit.

### Operation and Display Panel

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



→ LCD display



→ LED indicators

→ Function keys

### LED INDICATOR

| LED Indicator |        |          | Messages                                            |
|---------------|--------|----------|-----------------------------------------------------|
| ☀ AC/☀ INV    | Green  | Solid On | Output is powered by utility in Line mode.          |
|               |        | Flashing | Output is powered by battery or PV in battery mode. |
| ☀ CHG         | Yellow | Solid On | Battery is fully charged.                           |
|               |        | Flashing | Battery is charging.                                |
| ⚠ FAULT       | Red    | Solid On | The inverter is in the fault warning status.        |

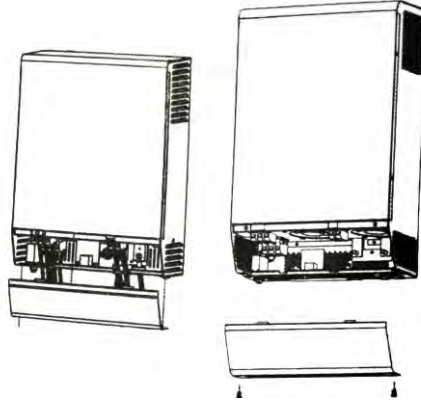
### Function Keys

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



## Final Assembly

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



## Communication Connection

Please use supplied communication cable to connect to inverter and PC. Please install a monitoring software on the computer.

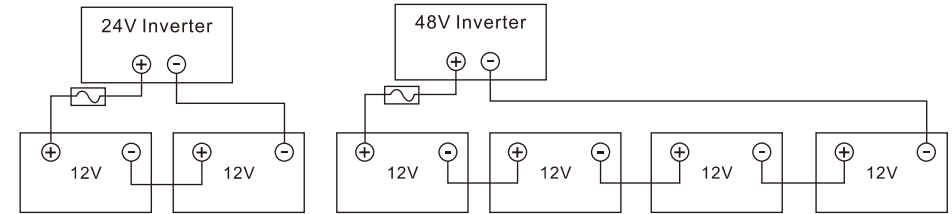
## Dry Contact Signal

There is one dry contact (3A/250VAC) available on the rear panel. It could be used to deliver signal to external device when battery voltage reaches warning level.

| Unit Status | Condition                                |                                         |                                                                                        | Dry contact port:  |        |
|-------------|------------------------------------------|-----------------------------------------|----------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|--------|
|             |                                          |                                         |                                                                                        | NC & C                                                                                               | NO & C |
| Power Off   | Unit is off and no output is powered.    |                                         |                                                                                        | Close                                                                                                | Open   |
| Power On    | Output is powered from battery or solar. | Program 02 set as UTI Utility           | Battery voltage < Low DC warning voltage                                               | Open                                                                                                 | Close  |
|             |                                          |                                         | Battery voltage > Setting value in Program 05 battery charging reaches floating stage  | Close                                                                                                | Open   |
|             |                                          | Program 02 is set as SBU or Solar first | Battery voltage < Setting value in Program 08                                          | Open                                                                                                 | Close  |
|             |                                          |                                         | Battery voltage > Setting value in Program 05 battery charging reaches floating stage. | Close                                                                                                | Open   |

## battery connection

1. Connect all battery packs as below chart.



## Connection mode of lithium battery:

The positive pole of the lithium battery is connected to the red battery terminal of the inverter, and the negative pole is connected to the black battery terminal of the inverter. The connection method is the same as that of the lead-acid battery.

If the lithium battery needs better charging effect, you can enter the setting mode of the inverter to adjust the floating charge voltage and strong charge voltage (it can be used normally without setting):

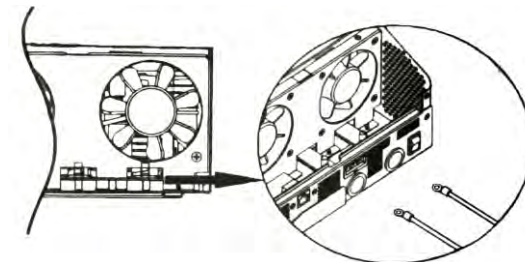
① The floating charge voltage is set to  $14V * N$  (N is the number of battery cells, such as 4 for 48V inverter, 2 for 24V inverter and 1 for 12V inverter) ;

② The strong charging voltage is set to the charging voltage/N (N is the number of battery cells) on the lithium battery parameters. For example, the charging voltage on the lithium battery parameters is 58.4V, and the strong charging voltage needs to be set to  $58.4V / 4 = 14.6V$ .

**Note:** do not mix different brands of lithium batteries, different capacities or new and old lithium batteries. Choose batteries with the same performance. When the batteries fail, change the whole battery group.

| Models        | DC Rating(Volts) | Minimum Batteries | Maximum Batteries |
|---------------|------------------|-------------------|-------------------|
| <b>2KVA</b>   | 24/48V           | 2/4               | 6/8               |
| <b>2.5KVA</b> | 24/48V           | 2/4               | 6/8               |
| <b>3KVA</b>   | 24/48V           | 2/4               | 6/8               |
| <b>3.5KVA</b> | 24/48V           | 2/4               | 6/8               |
| <b>5KVA</b>   | 24/48V           | 2/4               | 6/8               |

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





**WARNING:** Shock Hazard

Installation must be performed with care due to high battery voltage in series.



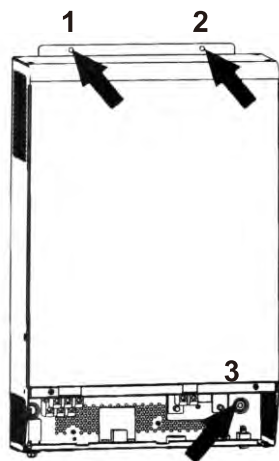
**CAUTION!!!:** Do not place anything between the flat part of the inverter terminal and the ring terminal. Otherwise, overheating may occur.

**CAUTION!!!:** Do not apply anti-oxidant substance on the terminals before terminals are connected tightly.

**CAUTION!!!:** Before making the final DC connection or closing DC breaker /disconnecter, be sure positive (+) must be connected to positive (+) and negative (-) must be connected to negative (-).

Install the unit by screwing three screws.

- 1、 2 Use the M6\*80mm expansion bolts
- 3 Use M4 or M5



| Models | Minimum DC Wire Size(rating) | Maximum DC Fuse size | DC Grounding Wire size |
|--------|------------------------------|----------------------|------------------------|
| 2KVA   | 32/16mm <sup>2</sup>         | 200/100A             | 2.5mm <sup>2</sup>     |
| 2.5KVA | 50/25mm <sup>2</sup>         | 250/160A             | 2.5mm <sup>2</sup>     |
| 3KVA   | 25/16mm <sup>2</sup>         | 160/80A              | 2.5mm <sup>2</sup>     |
| 3.5KVA | 25/16mm <sup>2</sup>         | 160/80A              | 2.5mm <sup>2</sup>     |
| 5KVA   | 50/25mm <sup>2</sup>         | 250/160A             | 2.5mm <sup>2</sup>     |

AC Wiring

This is a Safety Class I product (supplied with a protective grounding terminal).Uninterruptible protective grounding must be provided at the AC input and/or output terminals and/ or chassis grounding point located externally on the product.

AC Wiring should be connected in the following order:

- AC INPUT (Source)
- AC OUTPUT (Load)

| AC INPUT                                                                            |   |   | AC OUTPUT                                                                           |   |   |
|-------------------------------------------------------------------------------------|---|---|-------------------------------------------------------------------------------------|---|---|
|  | L | N |  | N | L |

Fig 3: AC input/Output Connections

**AC Input:** The inverter comes installed with Input protection circuit breaker. This should be switched off before the cable is installed.

Remove the AC wiring compartment cover to gain access to the AC terminal strip inside.

Run the three conductors AC INPUT (source) wiring into the wiring compartment. Connect the AC INPUT ground wire first to the ground terminal( ground symbol with circle around it) , and then connect the AC INPUT line(L) and neutral wire(N) to the corresponding AC input terminals.

**AC Output:** The inverter comes installed with Input protection circuit breaker. This should be switched off before the cable is installed a similar manner, connect the AC OUTPUT(load) wiring to the Inverter AC output terminal as was done on the AC Input.

After wiring, double check and review all connections to make sure the wires are in the correct terminals and the terminals are tight.

To ensure the best performance from your inverter system, do not use old or untested batteries. Batteries should be of the same size, type rating, and age.

**AC Safety Grounding:** During the AC wiring installation, AC input and output ground wires are connected to the inverter. The AC input ground wire must connect to the incoming ground from your AC utility source. The AC output ground wire should go to the grounding point for your loads(e. g. a distribution panel ground bus).