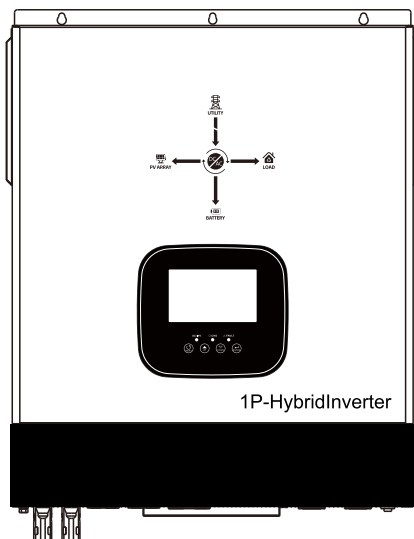


USER'S MANUAL

----- Ai SOLAR INVERTER -----

8KW-12KW (App Keypad)



-Pay-As-You-Go
-Rent-To-Own

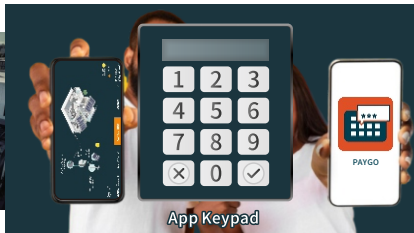


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ABOUT THIS MANUAL

Notice

The purchased products, services and features are stipulated by the contract made between supplier and the customer. All or part of the products, services and features described in this document may not be within the purchase scope or the usage scope.

Unless otherwise specified in the contract, all statements, information, and recommendations in this document are provided "AS IS" without warranties, guarantees or representations of any kind, either express or implied.

The information in this document is subject to change without notice. Every effort has been made in the preparation of this document to ensure accuracy of the contents, but all statements, information, and recommendations in this document do not constitute a warranty of any kind, express or implied.

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.

The following cases are not within the scope of warranty

1. Out of warranty.
2. Series number was changed or lost.
3. Battery capacity was declined or external damaged.
4. Inverter was damaged caused of transport shift, remissness, ect external factor
5. Inverter was damaged caused of irresistible natural disasters.
6. Not in accordance with the electrical power supply conditions or operate environment caused damage.

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. Fuse(1 piece of 200A/63VDC for 8KW model, 2 pieces of 150A/63VDC parallel for 10-12KW model) is 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.

INTRODUCTION

This is a multi-function inverter/charger, combining functions of inverter, solar charger and battery charger to offer uninterrupted power support with portable size. Its comprehensive LCD display offers user-configurable 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.

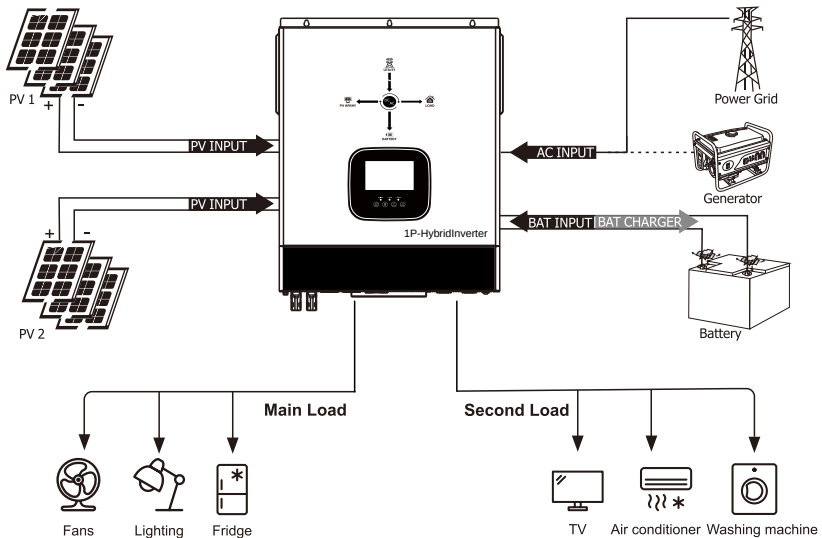
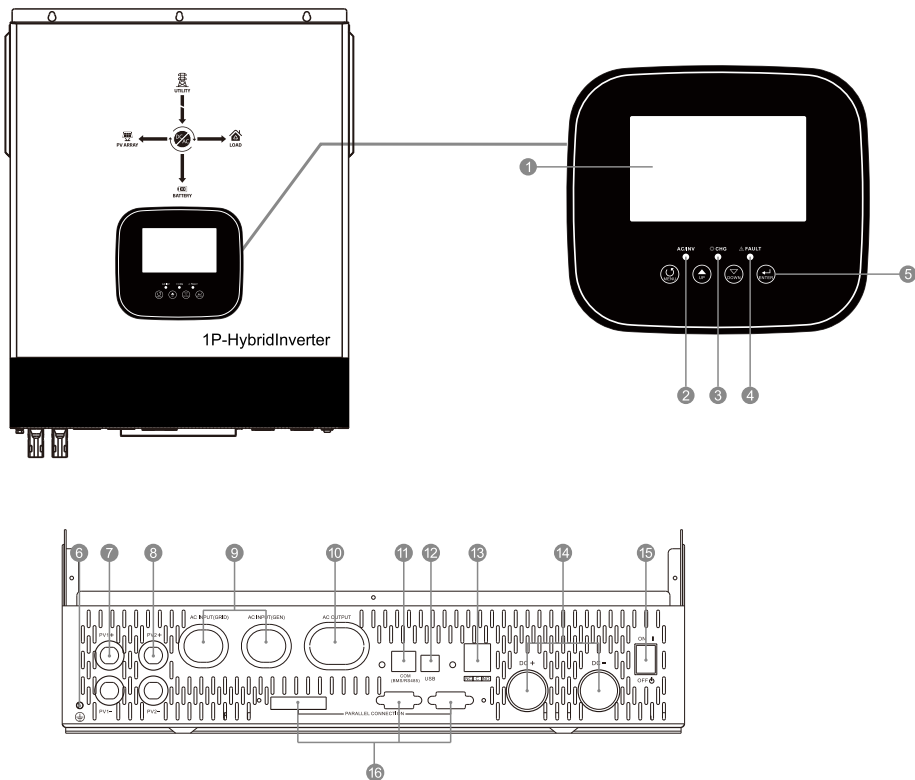


Figure 1 Hybrid Power System

Product Overview



1. LCD display

2. Status indicator

3. Charging indicator

4. Fault indicator

5. Function buttons

6. Ground

7. PV1

8. PV2

9. AC input
10. AC output

11. RS485/BMS communication port

12. USB port

13. Dry contact

14. Battery Input

15. Power ON/OFF Switch

16. Parallel communication port (only for parallel model)

17. keypad APP



INSTALLATION

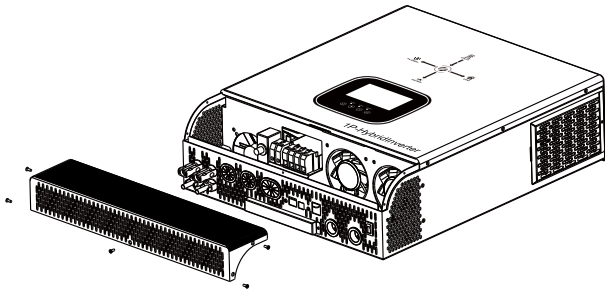
Unpacking and Inspection

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 x 1
- User manual x 1
- USB cable x 1

Preparation

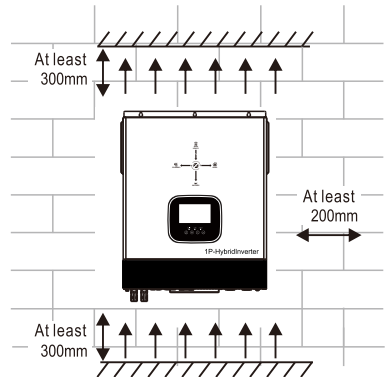
Before connecting all wirings, please take off bottom cover by removing screws as shown below.



Mounting the Unit

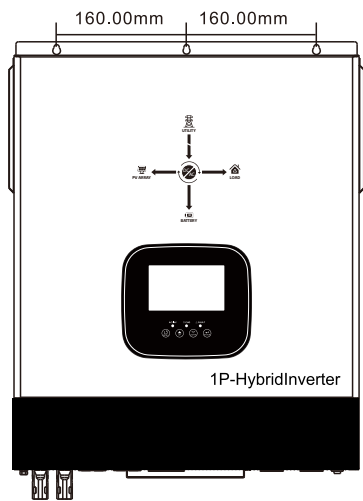
Consider the following points before selecting where to install:

- 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. 200 mm to the side and approx. 300 mm 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.**

Install the unit by screwing three screws



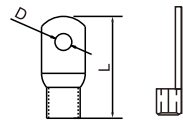
Battery Connection

CAUTION: For safety operation and regulation compliance, it's requested to install a separate DC over-current protector or disconnect device between battery and inverter. It may not be requested to have a disconnect device in some applications, however, it's still requested to have over-current protection installed. Please refer to typical amperage in below table as required fuse or breaker size.

WARNING! All wiring must be performed by a qualified personnel.

WARNING! It's very important for system safety and efficient operation to use appropriate cable for battery connection. To reduce risk of injury, please use the proper recommended cable and terminal size as below.

Ring terminal:

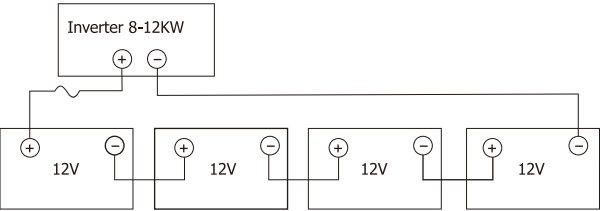


Recommended battery cable and terminal size:

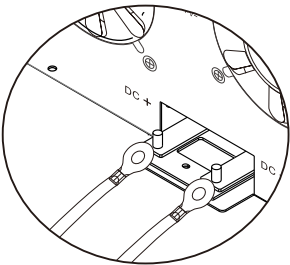
Model	Typical Amperage	Battery Capacity	Wire Size	Cable mm ² (each)	Ring Terminal Dimensions		Torque Value
					D(mm)	L(mm)	
8KW	160A	200AH	1*1/0AWG	53	8.4	43.2	5 Nm
10KW	200A	200AH	1*3/0AWG	85	8.4	50.2	5 Nm
11KW	210A	250AH	1*3/0AWG	85	8.4	50.2	5 Nm
12KW	220A	250AH	1*3/0AWG	85	8.4	50.2	5 Nm

Please follow below steps to implement battery connection:

- 1. Assemble battery ring terminal based on recommended battery cable and terminal size.
- 2. Connect all battery packs as units requires. It's suggested to connect at least 200Ah capacity battery for 8KW-10KW model; at least 250Ah capacity battery for 11KW-12KW.



3. Insert the ring terminal of battery cable flatly into battery connector of inverter and make sure the bolts are tightened with torque of 5 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/disconnector, be sure positive (+) must be connected to positive (+) and negative (-) must be connected to negative (-).

AC Input/Output Connection

CAUTION!! 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 during maintenance and fully protected from over current of AC input. The recommended spec of AC breaker is 70A for 8–12KW.

CAUTION!! There are two terminal blocks with "IN" and "OUT" markings. Please do NOT-misconnect input and output connectors.

WARNING! All wiring must be performed by a qualified personnel.

WARNING! It's very important for system safety and efficient operation to use appropriate cable for AC input connection. To reduce risk of injury, please use the proper recommended cable size as below.

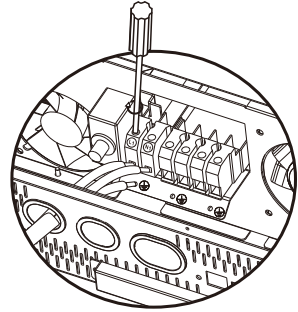
Suggested cable requirement for AC wires

Model	Gauge	Torque Value
8-12KW	8 AWG	1.4~ 1.6Nm

Please follow below steps to implement AC input/output connection:

1. Before making AC input/output connection, be sure to open DC protector or disconnecter first.
2. Remove insulation sleeve 10mm for twelve conductors. And shorten phase L and neutral conductor N 3mm.
3. Insert AC input wires according to polarities indicated on terminal block and tighten the terminal screws.
Be sure to connect PE protective conductor (⊕) first.

⊕ → **Ground (yellow-green)**
L1 → **LINE (brown or black)**
N1 → **Neutral (blue)**

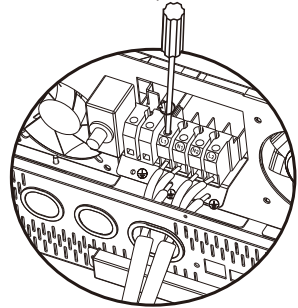


WARNING:

Be sure to that AC power source is disconnected before attempting to hardwire it to the unit.

4. Then, insert AC output wires according to polarities indicated on terminal block and tighten terminal screws.
Be sure to connect PE protective conductor (⊕)first.
This inverter is equipped with dual-output. There are four terminals(L1/N1,L2/N2)available on output port. It is to set up through LCD program or monitoring software to turn on and off the second output.
Refer to "LCD setting"section for the details.

⊕ → **Ground (yellow-green)**
L1 → **LINE (brown or black)**
N1 → **Neutral (blue)**
L2 → **LINE (brown or black)**
N2 → **Neutral (blue)**



5. Make sure the wires are securely connected.

CAUTION: Important

Be sure to connect AC wires with correct polarity. If L and N wires are connected reversely, it may cause utility short-circuited when these inverters are worked in parallel operation.

CAUTION: Appliances such as air conditioner are required at least 2~3 minutes to restart because it's required to have enough time to balance refrigerant gas inside of circuits. If a power shortage occurs and recovers in a short time, it will cause damage to your connected appliances. To prevent this kind of damage, please check manufacturer of air conditioner if it's equipped with time-delay function before installation. Otherwise, this inverter/charger will trig overload fault and cut off output to protect your appliance but sometimes it still causes internal damage to the air conditioner.

PV Connection

CAUTION: Before connecting to PV modules, please install separately a DC circuit breaker between inverter and PV modules.

WARNING! All wiring must be performed by a qualified personnel.

WARNING! It's very important for system safety and efficient operation to use appropriate cable for PV module connection. To reduce risk of injury, please use the proper recommended cable size as below.

Model	Typical Amperage	Cable Size	Torque Value
8KW	18A/18A	10AWG	1.4 ~ 1.6 Nm
10-12KW	27A/27A	10AWG	1.4 ~ 1.6 Nm

PV Module Selection:

When selecting proper PV modules, please be sure to consider below parameters:

1. Open circuit Voltage (Voc) of PV modules should not exceed max. PV array open circuit voltage of inverter.
2. Open circuit Voltage (Voc) of PV modules should be higher than the start-up voltage.
3. Max. Power Voltage (Vmpp) of PV modules should be close to best Vmp of inverter or within Vmp range to get best performance. If one PV module can not meet this requirement, it's necessary to have several PV modules in series connection. Refer to below table.

Note:* Vmp: panel max power point voltage.

The PV charging efficiency is maximized while PV system voltage is close to Best Vmp.

Maximum PV module numbers in Series: Vmpp of PV module*X pcs = Best Vmp or Vmp range of inverter.

PV module numbers in Parallel: Max. charging current of inverter/Imp

Total PV module numbers=maximum PV module numbers in series*PV module numbers in parallel

Solar Charging Mode	
INVERTER MODEL	8-12KW
Max. PV Array Open Circuit Voltage	500Vdc max(single model)/450Vdc max(parallel model)
PV Array MPPT Voltage Range	90~450Vdc max(single model)/90~430Vdc max(parallel model)
MPPT Number	2
Start-up Voltage(VOC)	80Vdc

Recommended PV module configuration(per independent MPPT)

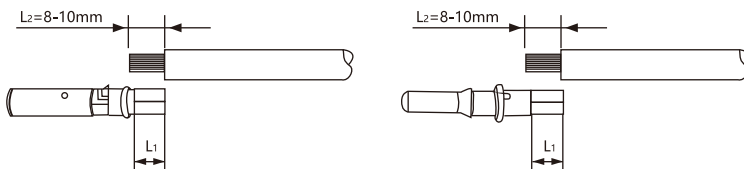
PV Module Spec(reference)	Total input power	Solar input1 + Solar input2	Q'ty of modules
Maximum power(Pmax):330W Max.Power Voltage(Vmpp):38.70V Max.Power Current(Impp):8.54A Open Circuit Voltage(Voc):46.1V Short Circuit Current(Isc):9.17A	1320W	4 pieces in series + open	4pcs
		open + 4 pieces in series	
	1980W	6 pieces in series + open	6pcs
		open + 6 pieces in series	
	2640W	8 pieces in series + open	8pcs
		open + 8 pieces in series	
		4 pieces in series + 4 pieces in series	
	3960W	6 pieces in series, 2 strings in parallel + open	12pcs
		open + 6 pieces in series, 2 strings in parallel	
		6 pieces in series + 6 pieces in series	
	5280W	8 pieces in series, 2 strings in parallel + open	16pcs
		open + 8 pieces in series, 2 strings in parallel	
		8 pieces in series + 8 pieces in series	
	5940W	9 pieces in series, 2 strings in parallel + open	18pcs
		open + 9 pieces in series, 2 strings in parallel	
		9 pieces in series + 9 pieces in series	
	6600W	5 pieces in series, 2 strings in parallel + 5 pieces in series, 2 strings in parallel	20pcs
	7920W	6 pieces in series, 2 strings in parallel + 6 pieces in series, 2 strings in parallel	24pcs
	9240W	7 pieces in series, 2 strings in parallel + 7 pieces in series, 2 strings in parallel	28pcs
	10560W	8 pieces in series, 2 strings in parallel + 8 pieces in series, 2 strings in parallel	32pcs
	11880W	9 pieces in series, 2 strings in parallel + 9 pieces in series, 2 strings in parallel	36pcs

Please follow below steps to implement PV module connection:

Connecting DC Input Power Cables

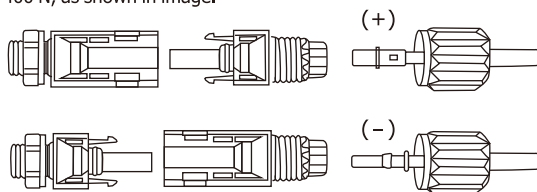
Step1 Remove cable glands from the positive and negative connectors.

Step2 Take out metal terminals from accessory package ,Wiring as illustrated in image.

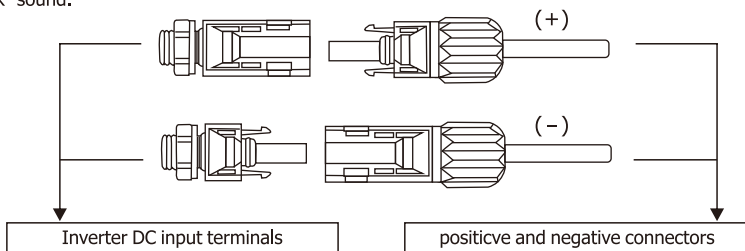


Step3 Insert the positive and negative power cables into corresponding cable glands.

Step4 Insert the stripped positive and negative power cables into the positive and negative metal terminals respectively and crimp them using a clamping tool. Ensure that the cables are crimped until they cannot be pulled out by force less than 400 N, as shown in image.

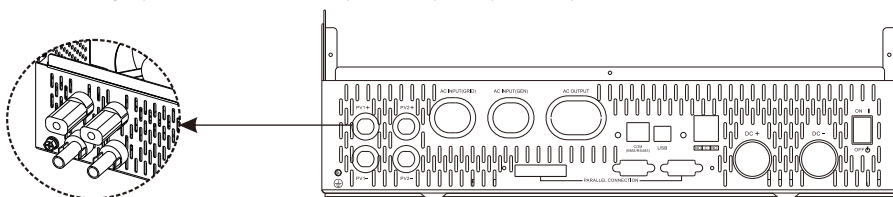


Step 5 Insert the positive and negative connectors into corresponding DC input terminals of the Inverter until you hear a "click" sound.

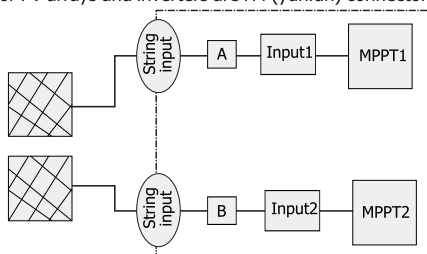


Conditions for DC Connection

The Inverter single-phase inverter has 2 independent input : input A & input B



The diagram drawing of DC side is shown as below, notice that the connectors are in paired (male and female connectors). The connectors for PV arrays and inverters are H4 (yunfan) connectors;



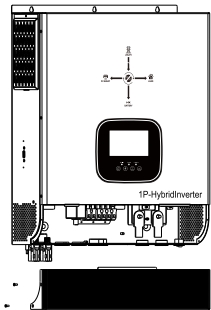
Suggestions for the PV modules of the connected strings:

► Same type

► Same quantity of PV modules connected in series

Final Assembly

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



Communication Connection

Please use supplied communication cable to connect inverter and PC. Download the software by link on the first page of this manual into computer and follow on screen instruction to install the monitoring software.

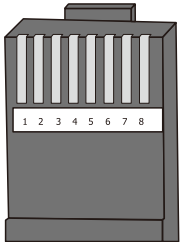
For the detailed software operation, please consult the seller if you have any questions.

WARNING: It's forbidden to use network cable as the communication cable to directly communicate with the PC port or battery with BMS. Otherwise, the internal components of the controller will be damaged.

WARNING: RJ45 interface is only suitable for the use of the company's supporting products or professional operation.

Below chart show RJ45 Pins definition

Pin	Definition	Function
1	RS-485-B	PC communication
2	RS-485-A	
3	GND	
4	CANH	BMS communication
5	CANL	
6		
7		
8		

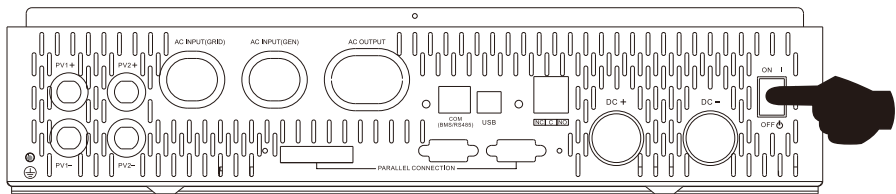


Dry Contact Signal

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 Utility			Close	Open
	Output is powered from Battery or Solar	Program 01 set as utility	Battery voltage<Setting value in Program 19	Open	Close
			Battery voltage>Setting value in Program 21 or Program 39 or battery charging reaches floating stage	Close	Open
		Program 01 set as SBU, SUB, SOL	Battery voltage<Setting value in Program 20 or Program 38	Open	Close
			Battery voltage>Setting value in Program 21 or Program 39 or battery charging reaches floating stage	Close	Open

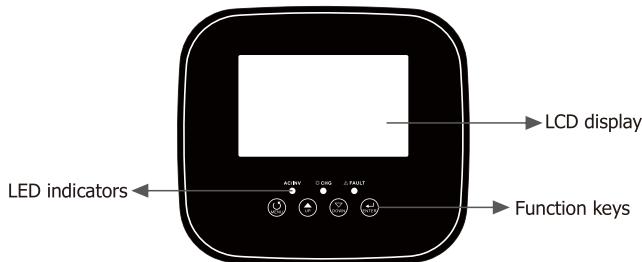
Power ON/OFF



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.



LED Indicator

LED Indicator			Messages
AC/ INV	Green	Solid On	Output is powered by grid in Line mode.
		Flashing	Output is powered by battery or PV in battery mode.
CHG	Yellow	Flashing	Battery is charging or discharging.
FAULT	Red	Solid On	Fault occurs in the inverter.
		Flashing	Warning condition occurs in the inverter.

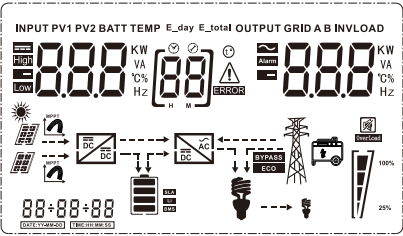
Function Keys

Function Keys	Description
MENU	Enter reset mode or setting mode go to previous selection.
UP	Increase the setting data. Long press 5s for Switch the WIFI mode.
DOWN	Decrease the setting data.
ENTER	Enter setting mode and Confirm the selection in setting mode go to next selection or exit the reset mode.

Paygo Function

Function Steps	Description
WIFI connect	Connecting the WIFI SSID name "SSEXXXXXX"
Input right code	In the APP paygo page enter the right make the inverter works

LCD Display Icons



Icon	Function description	
Input Source Information and Output Information		
	Indicates the AC information	
	Indicates the DC information	
	Indicate input voltage, input frequency, PV voltage, battery voltage and charger current. Indicate output voltage, output frequency, load in VA, load in Watt and discharging current.	
Configuration Program and Fault Information		
	Indicates the setting programs	
	Indicates the warning and fault codes. Warning:  flashing with warning code. Fault:  lighting with fault code.	
Battery Information		
	Indicates battery level by 0-24%, 25-49%, 50-74% and 75-100% in battery mode and charging status in line mode.	
In AC mode, it will present battery charging status.		
Status	Battery voltage	LCD Display
Constant Current mode/Constant Voltage mode	<2V/cell	4 bars will flash in turns
	2V/cell~2.083v/cell	Bottom bar will be on and the other three bars will flash in turns.
	2.083V/cell~2.167V/cell	Bottom two bars will be on and the other two bars will flash in turns.
	>2.167V/cell	Bottom three bars will be on and the top bar will flash.
Batteries are fully charged.		4 bars will be on.

In battery mode, it will present battery capacity.					
Load Percentage		Battery Voltage		LCD Display	
Load > 50%	<1.717V/cell				
	1.717V/cell~1.8V/cell				
	1.8V/cell~1.883V/cell				
	>1.883 V/cell				
50%> Load>20%	<1.817V/cell				
	1.817V/cell~1.9V/cell				
	1.9 V/cell ~1.983V/cell				
	>1.983 V/cell				
Load<20%	<1.867V/cell				
	1.867V/cell~1.95V/cell				
	1.95V/cell~2.033V/cell				
	>2.033 V/cell				
Load Information					
		Indicates overload.			
		Indicates the load level by 0-24%, 25-49%, 50-74% and 75-100%.			
		0%~24%	25%~49%	50%~74%	75%~100%
					
Mode Operation Information					
		Indicates unit connects to the mains.			
		Indicates unit connects to the PV panel.			
		Indicates load is supplied by utility power.			
		Indicates the solar charger circuit is working.			
		Indicates the DC/AC inverter circuit is working.			
Mute Operation					
		Indicates unit alarm is disabled.			

TROUBLE SHOOTING

Problem	LCD/LED/Buzzer	Explanation / Possible cause	What to do
Unit shuts down automatically during startup process.	LCD/LEDs and buzzer will be active for 3 seconds and then complete off.	The battery voltage is too low ($< 1.91V/Cell$)	1. Re-charge battery. 2. Replace battery.
No response after power on.	No indication.	1. The battery voltage is far too low. ($<1.4V/Cell$) 2. Battery polarity is connected reversed. Input protector is tripped	1. Check if batteries the wiring are connected and well. 2. Re-charge battery. 3. Replace battery.
Mains exist but the unit works in battery mode.	Input voltage is displayed as 0 on the LCD and green LED is flashing.	Input protector is tripped	Check if AC breaker is tripped and AC wiring is connected well.
	Green LED is flashing.	Insufficient quality of AC power (Shore or Generator)	1. Check if AC wires are too thin and/or too long. 2. Check if generator (if applied) is working well or if input voltage range setting is correct. (Appliance= $>$ wide)
When the unit is turned on, internal relay is switched on and off repeatedly.	LCD display and LEDs are flashing	Battery is disconnected.	Check if battery wires are connected well.
Buzzer beeps continuously and red LED is on.	Fault code 07	Overload error. The inverter is overload 110% and time is up.	Reduce the connected load by switching off some equipment.
	Fault code 05	Output short circuited.	Check if wiring is connected well and remove abnormal load.
	Fault code 02	Internal temperature of inverter component is over $90^{\circ}C$.	Check whether the air flow of the unit is blocked or whether the ambient temperature is too high.
	Fault code 03	Battery is over-charged.	Return to repair center.
		The battery voltage is too high.	Check if spec and quantity of batteries are meet requirements.
	Fault code 01	Fan fault	Replace the fan.
	Fault code 06/58	Output abnormal (Inverter voltage below than 202Vac or is higher than 253Vac)	1. Reduce the connected load. 2. Return to repair center
	Fault code 08/09/53/57	Internal components filed.	Return to repair cente
	Fault code 51	Over current or surge	Restart the unit, if the error happens again, please return to repair center.
	Fault code 52	Bus voltage is too low	
	Fault code 55	Output voltage is unbalanced	
	Fault code 56	Battery is not connected well or fuse is burnt.	If the battery is connected well, please return to repair center.

GUARANTEECERTIFICATE

Serial No.: _____

Customer's Name				Contact Person	
Address				Telephone No.	
Product/Model:		Post Code		Fax No.	
Date of purchase			Expire Date		
Dealer Signature			Customer Signature		

GUARANTEECERTIFICATE

Serial No.: _____

Customer's Name				Contact Person	
Address				Telephone No.	
Product/Model:		Post Code		Fax No.	
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