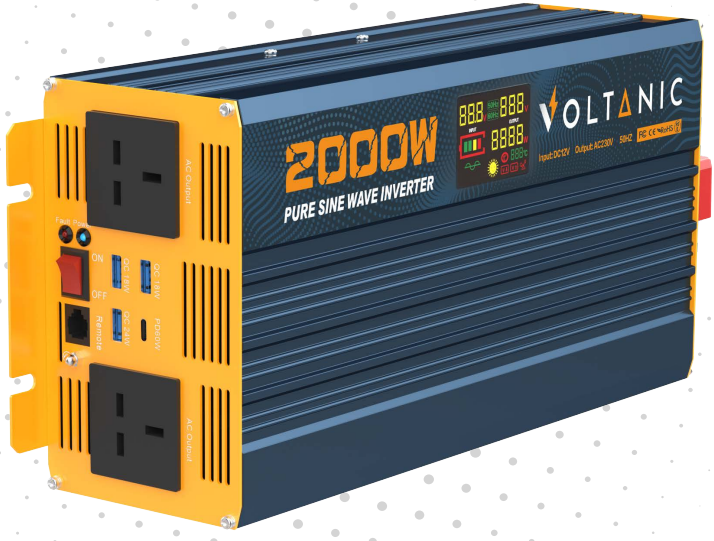
VOLTANIC

PURE SINE WAVE POWER INVERTER

GENERAL USER MANUAL



Thank you very much for purchasing our inverter. Before using the inverter, please read this manual carefully to ensure safe installation and operation.

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Safety Notice

To ensure the normal use of the inverter and your personal safety, please read and follow the safety precautions carefully.

Warning/Caution Strictly Observed Strictly Prohibited

When the inverter is connected to the battery, the DC terminal may produce sparks. Please ensure that there are no flammable gases or other flammable factors in the surrounding environment when connecting.

When the battery is charging and discharging, it will produce flammable gas. Please ensure that the inverter and battery are installed in a well-ventilated place and do not place them in a closed space.

The output terminal cannot be connected in parallel with the mains.

Please ensure that the output port does not have any contact with the mains, otherwise there is a risk of electric shock.

Keep away from children.

Please keep the inverter away from children.

Use cables correctly.

When using the inverter, do not wrap or bundle the wires, and do not use damaged cables. Otherwise, it may cause electric shock, short circuit or even fire accident.

Please do not disassemble or modify the inverter without authorization.

Unauthorized disassembly or modification of the inverter may cause electric shock or fire. If you need to disassemble it, please operate it under the guidance of technical personnel.

Keep away from water.

Wetting the inverter may cause the inverter to short-circuit, resulting in fire or electric shock. Do not touch the inverter with wet hands.

Do not place rods or other metal objects near the inverter air outlet or other openings.

This may touch internal parts and cause damage to the inverter or lead to electric shock.

Please fully insert the plug of the load device connected to the output into the socket.

If the plug and socket are not connected tightly, it may cause overheating, electric shock, or even fire. Do not use damaged plugs or loose sockets.

Using Environment

To ensure normal operation of the inverter, please install the inverter horizontally on a flat surface. The installation environment of the inverter should meet the following conditions:

1. Dry environment. The inverter cannot come into contact with water or other liquids, and do not install the inverter in a humid environment.

2. Low temperature environment. Please install the inverter in an environment of 0–40 degrees Celsius (10–25 degrees Celsius is better). Avoid direct sunlight and other high temperature factors.

3. Ventilated environment. When installing the inverter, make sure there are no other objects around the inverter and there is enough space for air flow. And ensure that the inverter fan can dissipate heat normally.

4. Low dust environment. When installing the inverter, please ensure that there is no dust around the inverter to prevent particles from entering the inside of the inverter and damaging the machine.

5. Safe environment. Please ensure that there are no fire sources, flammable gases or other dangerous factors around the inverter.

6. Stay close to the battery pack. Please install the inverter close to the battery pack and use DC battery cables of appropriate size. Improper operation may cause machine failure.

Load Precautions

Note: If you encounter any situation where certain loads cannot be used when using the inverter, please contact our after-sales email promptly, and we will do our best to solve the problem for you.

The rated power consumption and maximum power consumption of the following devices vary significantly. Please confirm that the maximum power consumption of the equipment you are using is within the maximum output capacity of this product, based on the following guidelines. Even for devices with the same rated power consumption, the maximum power consumption may vary depending on the manufacturer and model structure, and there may be cases where it cannot be used. If you are not sure about the power consumption , please contact us.

For lighting equipment [fluorescent lamps]: Take into account the power consumption of the fluorescent tube and the power consumption of the fixture (power source unit).
Example: For a lighting fixture using five 30W fluorescent tubes, the maximum power consumption guideline is 300W or higher, which is twice the total power consumption of 150W.

If the rated power consumption of the fixture (power source unit) is unknown, a guideline of more than twice the rated power consumption of the fluorescent tube will be used as the guideline for maximum power consumption.
Example: In the case of lighting equipment that uses five 30W fluorescent tubes, the guideline for maximum power consumption is 300W or higher, which is twice the total of 150W.

For equipment using motors: The maximum power consumption index of equipment using motors such as refrigerators, vacuum cleaners, washing machines, electric tools, pumps and compressors is about 3 to 8 times the rated power consumption. It mostly depends on the load you use.

Microwave oven: It is expressed as 500W, 600W, 1000W, etc., but this indicates the ability to heat food and is called harmonic output power.
Please check the rated power consumption stated on the side or back of the device and in the instruction manual, and use around 2 to 4 times that value as the guideline for the maximum power consumption.

If the required power consumption exceeds the output capability of the inverter, the device cannot be used. Please confirm that the rated power consumption of the equipment you intend to use is within the rated output capability of this product, according to the following guidelines: The rated power consumption may be stated in the specifications column of the instruction manual of the equipment you intend to use and on the back of the product.

Calculation Method of Required Capacity

To calculate the parameters required for the battery and inverter, you will need to determine the following information:

1. Total Load Power
If the power rating is in amps, multiply this number by the AC mains voltage to get an estimate for wattage.
(For example, if a kettle requires 5 amps with an AC mains voltage of 120 volts, the rated power would be 5 amps x 120 volts = 600 watts)

2. Inverter Efficiency
Our inverter have a maximum efficiency of 94% but typically run around 90%. You may use an efficiency rate of 90% as an estimate.

3. Estimated Load Runtime
Battery capacity depends on load power and run time. But since the load is not constant, it is crucial to estimate the expected runtime of the load.

4. Battery Voltage
Please select the battery voltage that matches the rated input voltage of the inverter.

Please refer to the formulas below to calculate your battery and inverter needs:

Formula to Calculate Required Inverter Wattage:

Total Load Power (W) / Inverter Efficiency = Inverter Wattage

(If the sensitive equipment is included in the devices that you connected to the inverter, the starting power of it may need to be increased by 3 to 8 times depending on the different situation. Note: It is recommended that the wattage of the inverter you purchase be higher than the calculated wattage.)

Formula to Calculate Required Battery Capacity:

Total Load Power / Inverter Efficiency * Operating Time / Battery Voltage = Battery Capacity (AH)

Formula to Calculate Battery Run Time (with Battery Capacity Known):

Battery Capacity (AH) * Battery Voltage / (Total Load Power / Inverter Efficiency) = Battery Run Time

Formula to Calculate the No-load Power Consumption of an Inverter:

Inverter Input Voltage * 0.64A = Power Consumption at No load

Simple Example Reference

Example:

Load: Lighting 20W + Laptop 100W + Smartphone Charging 6W + Coffee Maker 800W
Runtime: 2 hours
Battery voltage: 12VDC
Inverter efficiency: 90%

Calculation Method:

Inverter Power	**(20+100+6+800*4) /90% ≈ 3696W** ⚠NOTE: The coffee maker belongs to electrical appliances with motor, which requires at least 4 times the starting power.
Battery Capacity	**(20+100+6+800*4) /90%*2/12=619 AH**

Summary:

- According to the above required load, an inverter of about 4000W is required.
- When using the required load for 2 hours, you should choose a battery with a capacity of at least 619AH.

Example:

Load: Lighting 20W + Laptop 100W + Smartphone Charging 6W + Kettle 500W
Runtime: 2 hours
Battery capacity: 330AH
Inverter efficiency: 90%
Inverter voltage: 12VDC

Calculation Method:

Battery Runtime	**330*12/((20+100+6+500) /90%) ≈ 5.69H**
Power Consumption at No load	**12*0.64A=7.68W**

Summary:

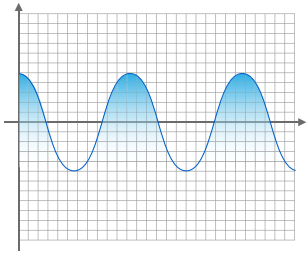
When using a battery with a capacity of 330AH, the load can be used for around 5.69 hours, with a no-load power consumption of 7.68W.

NOTE:

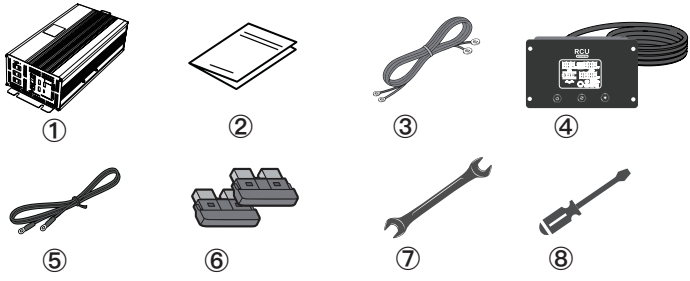
- The above content is for reference only. The actual number and capacity of batteries required may vary due to factors such as inverter rated power, load power, battery capacity, and charge-discharge ratio.
- In addition, the required capacity of the batteries also depends on whether the batteries can withstand repeated charge/discharge cycle tests.

Product Information

The waveform output waveform of this inverter is pure sine wave, which has the same high-quality as the power provided by utility and/or domestic power sources. This type of waveform is ideal for most electrical devices, appliances, and tools. The pure sine wave output of this inverter also provides more capabilities than modified sine wave inverters because it is a cleaner form of power. In addition, using pure sine wave reduces the amount of noise produced by appliances when it is working.



Package Contents



Serial Number	Accessories	Specification	Note
①	power inverter	/	● The accessories included with your inverter vary depending on its wattage. ● The 300W,600W, and 1200W inverters come with 1* cigarette lighter plug, 2* battery clip and 1* wireless remote control. ● The inverters that are over 1200W come with 2* double-headed round terminal battery cables, 1* wired remote control. ● Screwdriver for just 1200w inverters, spanner for inverters above 1200w.
②	General user manual	/	
③	Battery cables	0.8m/31.5inch	
④	Wired remote control	5m/16.4ft	
⑤	Earth wire	0.5m/19.68inch	
⑥	Fuse	/	
⑦	Wrench	/	
⑧	screwdriver	/	

Battery Cables Parameters

Specification	AWG	Cross-sectional area/mm²	Outer diameter/mm
1200W/12V	5AWG	16	4.51
1500W/12V	4AWG	20 (10*2)	5.05
2000W/12V	3AWG	25	5.64
2000W/24V	5AWG	16	4.51
2500W/12V	2AWG	35	6.67
2500W/24V	4AWG	20 (10*2)	5.05
3000W/12V	2AWG	35	6.67
3000W/24V	4AWG	20 (10*2)	5.05
3500W/12V	1/0AWG	50(25*2)	9.42
3500W/24V	3AWG	25	6.67
4000W/12V	2/0AWG	70 (35*2)	9.42
4000W/24V	2AWG	35	6.67
4000W/48V	5AWG	16	4.51
5000W/24V	2AWG	35	6.67
5000W/48V	4AWG	20 (10*2)	5.05

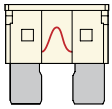
NOTE:

- In practice, a thick battery cable can be replaced by two thin battery cable as long as the total section area of the battery cables meets the requirements.
- The cable needs to be thick enough to carry the current. Otherwise, the battery cable with small cross-sections could cause a voltage drop that prevents the inverter from supplying large loads.
- When the input current of the power supply is large, the input battery cable may have a voltage drop. The actual working voltage depends on the measured value of the input terminal of the inverter. If the voltage drop is too much, it may be necessary to increase the cross sectional area or reduce the length of the battery cable.

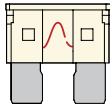
Fuse Parameters

12V	Specifi-cation	QTY	24V	Specifi-cation	QTY	48V	Specifi-cation	QTY
300W	35A32V	1	300W	20A32V	1	300W	10A32V	1
500W	40A32V	1	500W	20A32V	1	500W	10A32V	1
1200W	40A32V	2	1200W	20A32V	2	1200W	10A32V	2
1700W	40A32V	3	1700W	20A32V	3	1700W	10A32V	3
2000W	40A32V	3	2000W	20A32V	3	2000W	10A32V	3
2500W	40A32V	4	2500W	20A32V	4	2500W	10A32V	4
3000W	40A32V	5	3000W	20A32V	5	3000W	10A32V	5
3500W	40A32V	5	3500W	20A32V	5	3500W	10A32V	5
4000W	40A32V	7	4000W	20A32V	7	4000W	10A32V	7
5000W	40A32V	9	5000W	20A32V	9	5000W	10A32V	9
6000W	40A32V	11	6000W	20A32V	11	6000W	10A32V	11

Fuse replacement instructions



Intact Fuse



Burnt Fuse

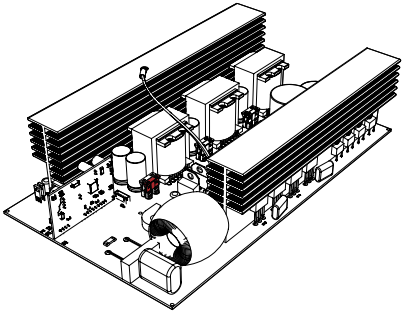
Step 1

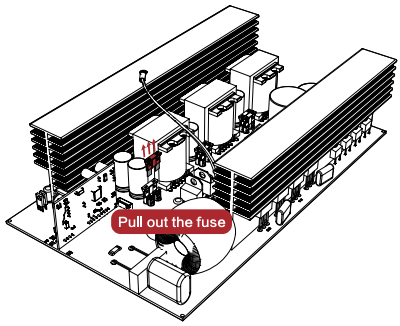
Disassemble (Remove) the inverter case, in order to avoid improper operation resulting in artificial damage to the inverter, it is recommended to contact the official email address to get the disassembly video.

Step 2

Use a tool to pull out the fuse and check it in sequence. Since there may be multiple fuses inside, it is recommended to pull out each fuse and inspect it.

(NOTE: The internal structure of the inverter is different for each power, so please check the location of the fuse carefully)





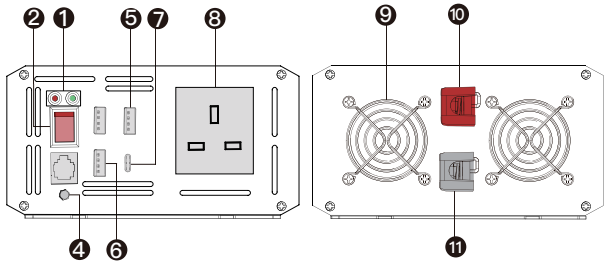
Step 3

Replace all damaged fuses with new ones and insert them.

Components Overview

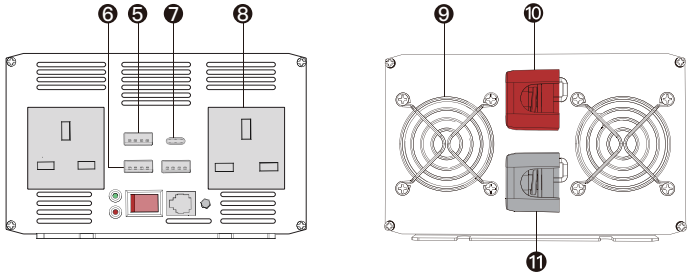
Panel Introduction

1200W



① Indicator Light
(red–fault, green–normal)
② Power Switch
③ Remote Control Jack
④ Earth Wire
⑤ QC 3.0 18W USB Port
⑥ QC 3.0 24W USB Port
⑦ PD 60W Type–C Port
⑧ AC Socket
⑨ Cooling Fan
⑩ Positive Terminal
⑪ Negative Terminal

2000W



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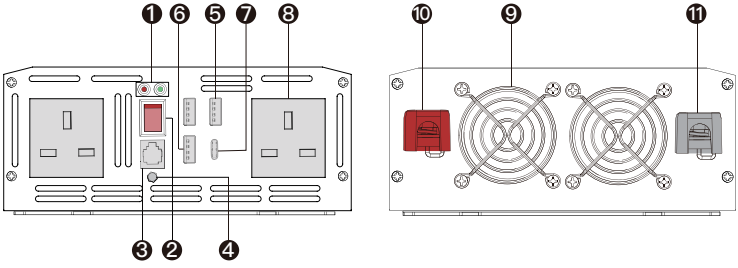
3000W



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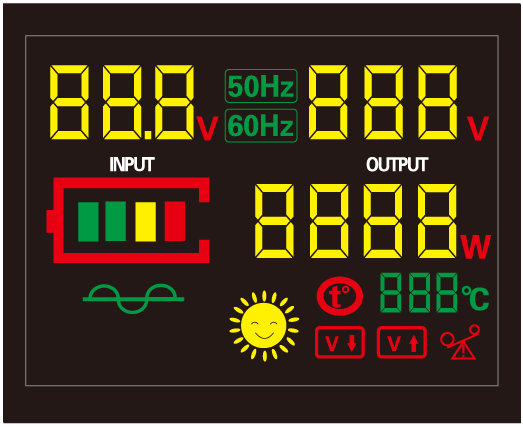
◆ LCD Display Particulars

LCD Display

Symbol Meanings on Display



Input Voltage	AC Output Voltage	Loads Power
Over Voltage Protection	Over Temperature Protection	Battery Power
Overload Protection	Pure Sine Wave	Working Temperature
Low Voltage Protection	Frequency	Normal Working

Protection Mechanisms

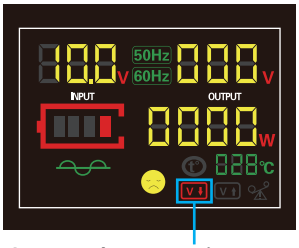
SOFT START TECHNOLOGY

Our inverters feature soft-start technology designed to protect equipment from supplying too much AC power at the same time. The soft-start feature gradually increases the incoming AC voltage, which is especially important for equipment with inductive loads or electric motors.

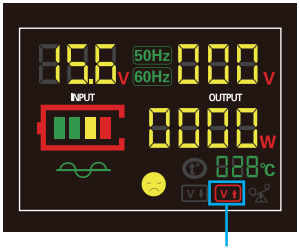
Six Protections

- Over Temperature Protection
- short Circuit Protection
- Low/over Voltage Protection
- Over Load Protection
- Battery Low/over Voltage Protection
- Reverse polarity protection

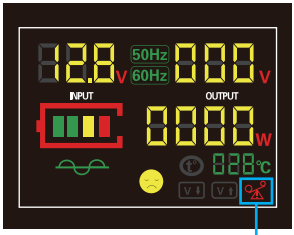
Abnormal State Description



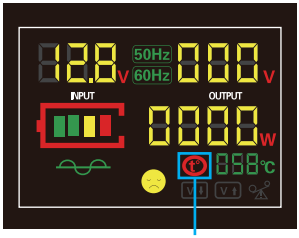
Low-volt protection



High-volt protection



Overload protection

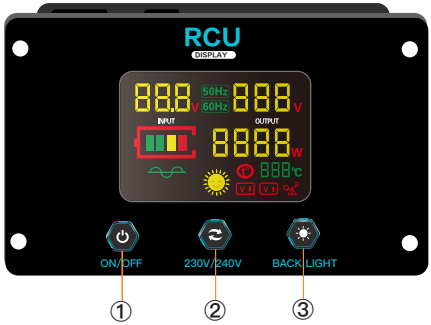


High-temp protection

Protection Mechanism Current & Voltage Range Table			
Input Voltage	12VDC	24VDC	48VDC
Input Voltage Range	9.5V–15.5V	20V–31.5V	39.5V–60V
Undervoltage Alarm Value	10±0.3V	21±0.3V	40.5±0.5V
Undervoltage Protection Value	9.5±0.3V	20±0.3V	39.5±0.5V
Undervoltage Recovery Value	12±0.3V	24±0.3V	48±0.5V
Overvoltage Protection Value	15.5±0.3V	31.5±0.3V	60±0.5V
Overvoltage Recovery Value	15±0.3V	30±0.3V	58±0.5V

◆ Remote Control Function

Wired remote control



Serial Number	Function
① Power switch	turn ON/OFF the inverter
② AC Switch	AC Output voltage can be switched according to demand (230V or 240V)
③ Back light Switch	turn ON/OFF the back light of remote display

⚠ NOTE:

- Before using the remote control panel, ensure to turn on the power switch on the inverter control panel. Failure to do so will result in the inability to start the inverter via the wired remote control.
- When using the remote switch, the power switch on the inverter cannot function, but only the remote switch can turn ON/OFF the inverter.

Operation Method

CAUTION

- Before making any electrical connections, ensure that both the inverter and the connected appliance's power switches are turned OFF.
- When switching off the inverter, make sure to turn off all connected electronic devices first. Even when the inverter is off, its capacitors may be charged, so to modify the circuitry or perform any maintenance work on the inverter, always ensure to disconnect both the DC and AC terminals.

How to Connect

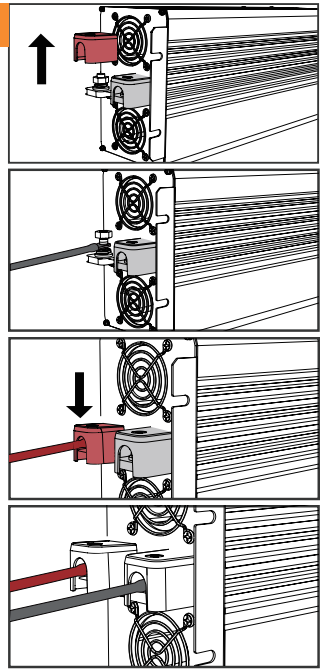
Connection on the inverter side

1. Remove the terminal cover from the main unit.

2. Attach the power input cord to the power input terminal with the attachment bolt. Connect the round terminal of the power input cord (red) to the power input terminal (red) of this product. Connect the round terminal of the power input cord (black) to the power input terminal (black) of this product.

3. After securing the power input cord to the power input terminal, attach the terminal cover to the main unit.

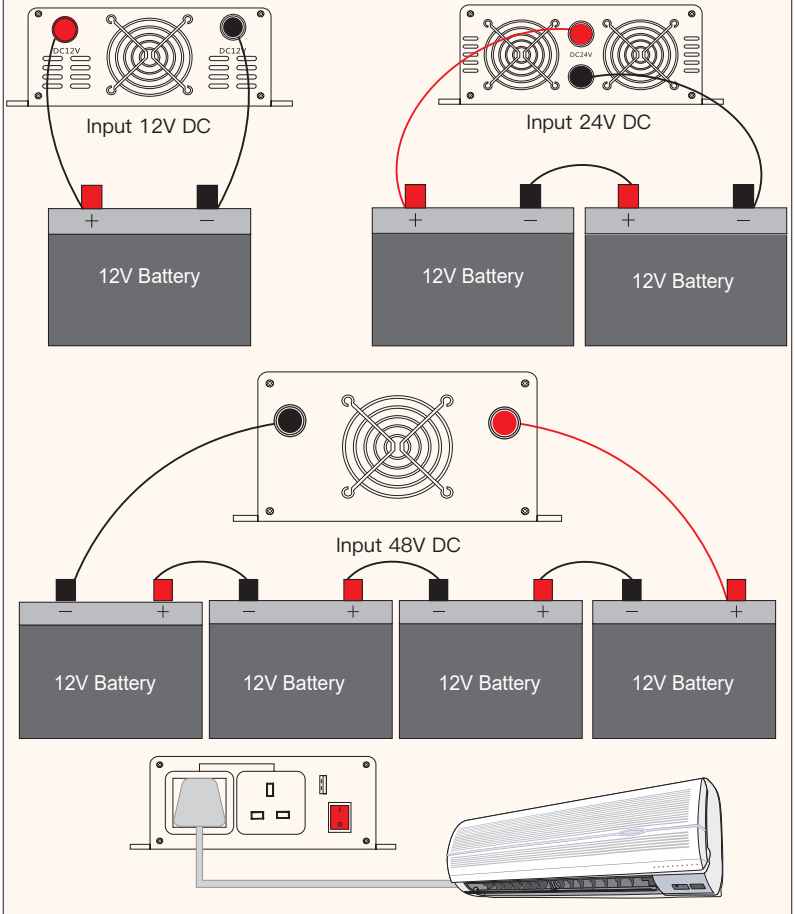
4. After completing and confirming the connection on the product side, connect the round terminal on the opposite side to the battery in the order of [+] terminal and [–] terminal.



NOTE:

The inverter is equipped with a reverse connection protection feature, which freezes the output in case of reversed connection. However, in case of such an incident, irreversible damage to the unit may occur, and it will affect the warranty.

Connection on the battery side



CAUTION

The battery provides DC input voltage to the inverter, and its rated voltage should match the rated input voltage of the inverter. Any voltage exceeding the inverter input voltage range may cause inverter overload or damage.

In addition to voltage, the capacity of the battery (measured in amp-hours) should match the power consumption of the load. Overload or undervoltage may cause system failure or equipment failure.

Where high-power electrical equipment exceeds the limit of AC outlets, connect the equipment to the hard-wired terminal, and ensure that the ground terminal of the inverter is safely connected to the ground terminal of the equipment.

1. The inverter can use one or more batteries, but it is recommended to use a battery with a capacity of 150AH or more.

2. Connect the inverter and battery with the included cables. Make sure all cables are securely attached. Improper connections may cause cable overheating or terminal breakage, which can shorten battery power supply time.

3. When the power switch is turned on, if the green LED lights up continuously, the inverter and fully charged battery are properly connected. It works fine under load.

4. If the red LED light is on, it means that the inverter has automatically entered protection mode.
Please check whether the battery voltage is too high or too low, or whether the inverter output is overloaded or short-circuited by checking the fault status displayed on the LCD.
The cause of the malfunction can be confirmed by the malfunction code displayed on the LCD. If you have any questions, please feel free to contact us.

5. If you want to use a home appliance continuously, you can get a longer power supply time by using one or more 12V batteries in parallel and using the AC power of the 12V inverter.

6. This product has 12V, 24V, and 48V types. Make sure you use the correct type you purchased.

7. The battery types applicable to this inverter include AGM, GEL, lithium-ion, SLD, EFB, FLD, etc.

Product Specification

Model Number	1200W 12/24/48	2000W 12/24/48	3000W 12/24/48	4000W 12/24/48	5000W 12/24/48
Rated Power	1200W	2000W	3000W	4000W	5000W
Peak Power	2400W	4000W	6000W	8000W	10000W
Input Voltage	12/24/48VDC	12/24/48VDC	12/24/48VDC	12/24/48VDC	12/24/48VDC
Output	230V AC±5%				
Type-C	PD60W(5V3A,9V3A,12V3A,15V3A,20V3A)				
USB Output	QC3.0 24W(4V3.6A,5V3.4A,9V2.5A,12V2A) ,QC3.0 18W*2(5V3.4A,9V2A,12V1.5A)				
Output Socket(s)	15A*2	15A*2 10A*1	15A*2 TB-2503 25A*1	15A*3 TB-2503 45A*1	15A*3 TB-2503 45A*1
Frequency	50HZ±1HZ				
Display	Color LCD Display				
Display Content(s)	Input voltage, Output voltage, Load power, Battery Capacity, Frequency, Internal temperature, Overload protection status, Over-temperature protection status, Under-voltage protection status, Over-voltage protection status				
Output Waveform	Pure Sine Wave				
Soft Start	√				
Waveform Distortion	THD < 4%				
Output Efficiency	Maximum 94%				
No-load Current (<)	0.8/0.4/0.2A	0.8/0.5/0.3A	1.2/0.9/0.5A	1.5/0.7/0.5A	2.0/1/0.6A
Cooling Method	Intelligent Cooling Fan				
Fan Start-up Condition	Fan starts running when the temperature reaches 122° F, or when the load exceeds 50%.				
Protection Function(s)	Battery under-voltage protection, over-voltage protection, output overload protection, over-temperature protection, short-circuit protection, reverse polarity protection, and so on.				
Operating Temperature	(-13° F+140° F)				
Storage Temperature	(-22° F – +158° F)				
Humidity	Maximum humidity is 90%, no condensation occurs				
Warranty	2 Years				
Product Dimension /inch	11.6*5.9*3.1	15.2*6.7*4.1	19.9*7.9*3.3	20*7.9*5.9	20*7.9*5.9
Net Weight /lb	5.7	8.9	14.0	19.9	22.3

Troubleshooting

Errer Code	Error Meaning	Reason	Solution	Protection buzz sound
	Other power source connected with the output cables	Output mistakenly connected to a live power device	Check if there are other power sources connected to the output cable	Long–medium–short buzz
	Output Short Circuit	Output short circuit	Check the circuit and load of the output	6 short buzz
	Output Overcurrent	Output current is too large, instantaneous protection.	Reduce the load	5 short buzz
	Output Overload	Output current is higher than the rated power, delay protection.	Reduce the load	4 short buzz
	Over–temperature Protection	Over Temperature	Check the fan and reduce the ambient temperature.	2 short buzz
	Battery Undervoltage	Battery input voltage too low	Charge or replace the battery	3 short buzz
	Battery Overvoltage	Battery input voltage too high	Check if the input power source or power charger is functioning properly.	3 short buzz
	DC Bus Overvoltage	DC bus voltage too high	Check the input power source	7 short buzz
	Parameter Configuration Fault	Inverter requires a restart after parameter reconfiguration.	Restart the power	
	Sampling Circuit Fault	Inverter performs self–check during power–up: Standard value for voltage static working point when output current is zero is 2.5V	Check the maintenance current sampling circuit, restart the power source.	
	DC Bus Voltage too Low	1) The DC bus voltage is below 8V after startup. 2) DC bus voltage fails to reach minimum operating voltage after a period of time after startup.	1) Check if the power tube of the rear stage are short–circuited. 2) Check the boost circuit or DC bus components in the front stage.	
	Data Memory Error	Data memory writes too frequently	Re–power on or replace the chip	
	Data Read Error	1)The data memory is not initialized during first write 2)The data memory need to restart after specification change	Restart the power	
Alarm before protection	1).Over–temperature alarm: 1 buzz each 3 seconds 2).Over–load alarm: 1 buzz each 7 seconds 3).Over–voltage alarm: 1 buzz each 15 seconds			

Warranty Card

To our amazing customers,
Thank you for choosing voltanic. All our inverters come with 2 years warranty. If you have any questions about the product, please feel free to contact our technicians/ after-sales team at support@voltanic.solar
We wish you safe & happy travels.

User information

Name:		Purchase date:	
Tel:		Address:	

Distributor/Sell name:			
Productname&model:		Series No.:	

Distributor: Date: