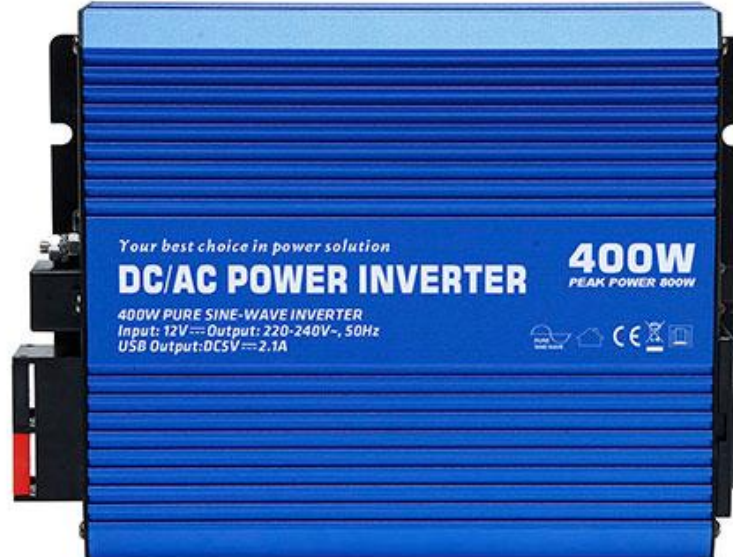


Power Inverter User Manual



Catalog

1. Product Overview.....	1
2. Safety Instructions.....	1
3. Protection Functions.....	3
4. Mounting Location.....	4
5. Operating Principles.....	4
6. Inverter Bill of Materials and Safety Instructions.....	5
7. Inverter Output Waveform.....	7
8. Battery Selection.....	8
9. Installation and Connection.....	10
10. Operation & Running.....	12
11. Fuse Replacement.....	13
12. Common Failures.....	13
13. Product Specification.....	15
14. Product Maintenance.....	16
15. Disposal of Scrap.....	16
16. Warranty.....	16

1. Product Overview

Thank you for purchasing and utilizing a P-Series power inverter.

This compact design is the leading high frequency inverter.

It converts low voltage DC power into 110/220v sine wave AC power.

By connecting the inverter directly to a 12/24v battery, you can turn your car into a mobile office for charging electronic devices.

2. Safety Instructions

IMPORTANT: Keep this manual handy for reference!

This manual contains safety instructions as well as installation instructions for the P-Series. Be sure to read the instructions carefully and the precautions on the unit before installing and using the inverter.

Danger!

Electrocution hazard

- ◆Do not allow the inverter to come into direct contact with rain, snow, spray and sewage. This product should only be used in an indoor environment.
- ◆Do not use the inverter when it has been subjected to severe shock, dropped or cracked.
- ◆Do not use the inverter when it has been subjected to severe shock, dropped or cracked.
- ◆Be sure to switch all AC DC power sources when performing any maintenance cleanup work as well as wiring work. See notes below.
- ◆Do not connect damaged or substandard cables to the inverter.
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- ◆Do not connect damaged or substandard cables to the inverter.

Note: There is still a risk of electric shock when the switch on the inverter panel is turned off.

Danger!

Fire and burn hazard.

- ◆Do not cover or block the inverter vents and do not install the inverter in a zero clearance chamber.
- ◆Do not connect a transformerless battery charger to the inverter, there is a danger of overheating.

Failure to refer to the above points may result in damage to the inverter or even damage to the inverter.

Danger!

Danger of explosion

◆ Charge only lead-acid (gel, AGM, liquid-rich or lead-calcium) rechargeable batteries with the corresponding rated voltage (e.g. 12 V), as other types of batteries may cause an explosion.

◆ Do not work near lead-acid batteries. Batteries produce explosive gases during normal operation.

◆ Do not install or operate the inverter in a room containing flammable materials or in a place requiring fire protection.

Failure to observe the above points may result in damage to the inverter.

Notes:

1. Follow the above guidance notes as well as those for batteries and equipment that may be used in the vicinity of the battery. Observe the warning labels on these products and on the engine.

2. This product contains components that are prone to arcing or sparking.

3. Areas requiring fire protection include any place where gasoline machinery, fuel tanks, and joints and fittings between fuel system components are located.

Note:

Be careful of the following conditions to avoid damaging the inverter:

◆ When reading gravity or filling the batteries, please be careful not to let the battery acid drip on the inverter.

◆ Do not place the inverter body directly on the batteries; the gases produced by battery operation can corrode and damage the inverter.

◆ Do not place the battery on the inverter.

◆ The inverter cannot carry loads that exceed its rated power and peak power.

◆ This is not a toy, so keep it out of the reach of children.

Failure to observe the above points may result in damage to the inverter.

3. Protection Functions

This inverter is equipped with powerful protection features to ensure its safety and ease of use.

Under-voltage alarm	Alerts when the battery voltage falls below 10.5v.
Battery under-voltage cut-off protection	Automatically cuts off the output when the battery voltage falls below 9.5v. This function prevents the battery from being over-discharged.
Battery over-voltage cut-off protection	Automatically cuts off the output when the battery voltage is higher than 15.5v.
Overload cut-off protection	Automatically cuts off the output when the load power exceeds the rated power of the inverter.
Overheating cut-off protection	Automatically cuts off the output when the body temperature exceeds the normal range.
Output short-circuit cut-off protection	Automatically cuts off the output when a short circuit occurs in the inverter output current.
Reverse polarity protection	The fuse will burn out when the positive and negative terminals are reversed.
Ground fault protection	This inverter follows strict leakage current standards. In the event of a high current leakage to ground, the protection circuit activates and shuts down the inverter to prevent electric shock. To restart the inverter you need to turn off the inverter switch, disconnect the faulty load and then turn the switch back on.

Note: All protection functions will recover by themselves. To protect the battery, restart the inverter after undervoltage protection, the DC input voltage is factory set to 11.8v for corrected wave inverters and 12.6v for sine wave inverters.

4. Mounting Location

The inverter may only be installed in the following locations:

Dry The inverter must be installed in a dry, moisture-insensitive location, avoiding installation in areas with rain, spray or sewage. **Cooling** The inverter must not be exposed to metallic materials or other contamination.

Ventilation Ambient air temperature of 0-40°C (32-104°F) is optimal.

Safety Do not block the inverter's ventilation openings. If the inverter is installed in an accessory compartment where the equipment is tightly packed, ventilation must be maintained to prevent the inverter from overheating.

Close to Batteries The inverter does not have ignition protection, so it should not be installed in areas containing fuel tanks or fittings that require ignition protection equipment. It is recommended not to install any electrical equipment, including the inverter, in these areas.

Keep away from battery gas Install the inverter as far away from the power supply as possible and not in the same box to prevent corrosion. Avoid excessive cable lengths, it is recommended to use the recommended wire sizes. It is recommended that the cables on which the batteries are mounted are capable of achieving less than 3% of the voltage by fully loading the battery cables, this will maximize the performance of the inverter.

5. Principles of Operation

The inverter has two stages of operation:

Stage 1: The DC to DC conversion process, which raises the lower DC voltage input to the inverter to 300 V.

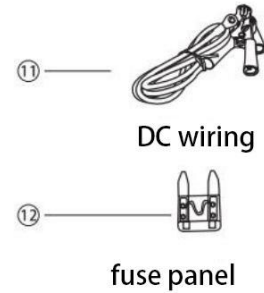
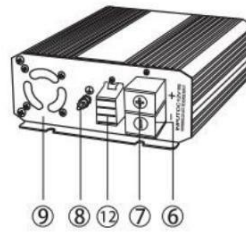
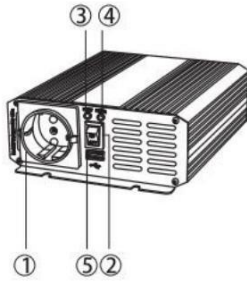
Stage 2: The stage of realizing the inverter's function, which converts the high voltage DC power to 110V or 220V AC power. The DC to DC conversion stage utilizes modern high-frequency power conversion technology, replacing the less technologically advanced and bulky transformers.

6. Inverter Bill of Materials and Safety Instructions

◆List of products and accessories

Includes complete inverter, manual, DC cable and fuse.

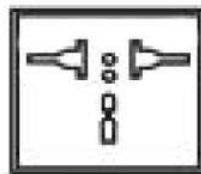
200w~400w sine wave inverter



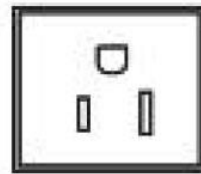
◆Instructions for use

1. AC Interface Connect the load.

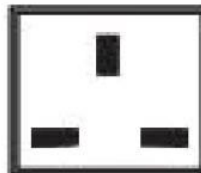
See the following figure for AC AC interface type selection.



Universal



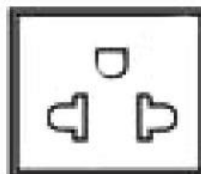
USA



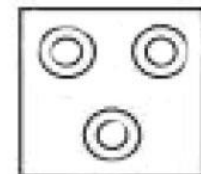
U.K



Australia



European



South Africa

2. ON/OFF button Controls the inverter on/off.

3. Power light (red) indicates that the inverter is not functioning properly due to overload, overheating, short circuit, leakage, etc.

4. Power light (green) indicates that the inverter is functioning normally.

5. The USB connector outputs DC 5V 500mA, 800mA or 2.1A to carry USB devices (e.g. light bulbs, fans, radios).

When the inverter is connected to an input voltage of 12v, this USB can be used for continuous output.

WARNING: This USB connector cannot be used for data transfer.

- ◆ Do not connect memory sticks, mp3 players or similar external data storage devices.
- ◆ Do not connect any data transfer cable to this port.

6. Negative Direct Input (-) This terminal must be connected to the negative terminal of the battery using the negative DC input cable (black power cable). The negative DC input terminal is black.

7. Positive DC Input (+) This terminal must be connected to the positive terminal of the battery using the positive DC input cable (red power cable). The positive DC input is red.

WARNING: Do not reverse the poles of the cables, as doing so will cause the fuse to blow and may cause permanent damage to the inverter.

8. Grounding port Port: that connects to the ground wire.

9. High Speed Chiller For proper operation of the inverter, do not block the chiller. Do not install the inverter with the DC panel vents facing up or down.

10. DC cable (with loop tab) Connect the positive red wire to the positive terminal of the inverter and the negative black wire to the negative terminal of the inverter.

11. DC cable (with clamp) It connects the inverter to the battery. The clamp end connects to the battery and the other end connects to the inverter. WARNING: Low battery voltage conditions can be caused by cables that are too long or not of the correct gauge. Failure of the cable and inverter to provide sufficient power will result in significant power loss and reduced battery operating time.

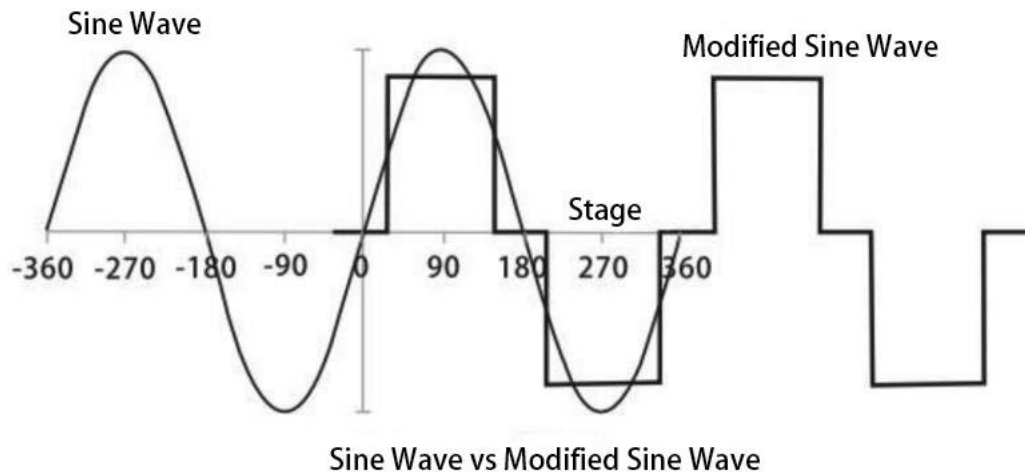
NOTE: The installer/operator should pay particular attention to its safe, tight, watertight circuitry and provide strain relief for DC cables and electrical wiring. Cable insulation must be suitable for the environment.

12. Fuses This inverter has built-in fuses. Spare fuses are available for replacement.

Note: This fuse is for reverse connection protection. In the event of an incorrect connection, the fuse will blow to protect the inverter. After replacing the fuse, the inverter can recover by itself. If the inverter still does not work properly after replacement, please contact a technician.

7. Inverter Output Waveform

The output waveform of P series inverter is sinusoidal. Fig. 3 Comparison of Modified Waveform and Sine Waveform.



The RMS voltage of the corrected waveform is 110V or 220V, the same as standard household power. Most AC voltmeters (digital and analog) detect the average value of the waveform, not the RMS value of the rms. Their RMS standard is based on the assumption of a purely positive waveform. The RMS values detected by all these voltmeters are not accurate for corrected waves. Their readings will be reduced by about 20 to 30 v. To accurately check the voltage of this inverter, an RMS voltage detector is required.

Interference with equipment

◆ Audio Equipment

Some simple audio devices may have a humming sound from their speakers when connected to the inverter. This is due to the fact that the power supply in the audio device does not filter the correction waves from the inverter very well. This problem can be solved by using an audio device with a high quality power supply.

◆ TV

When the inverter is running, there may be problems with the reception of certain channels on the TV. If such problems occur, try the following:

1. Make sure that the inverter's ground truck or the room's grounding system is well connected.
2. Ensure the signal strength of the TV antenna (snow resistance) and the quality of the antenna cable.
3. Minimize the length of the connection cable between the battery and the inverter to minimize the radiation interference of the cable.
4. Keep the inverter as far away from the TV as possible.
5. Reduce the load power of the inverter as much as possible when the TV is in operation.

8. Battery Selection

◆ Battery Requests

Battery type and size greatly affect the performance of the inverter. Therefore, it is necessary to distinguish the type of load as well as the power. In order to arrive at the minimum battery capacity that can be used, the following steps need to be performed:

1. Find out the total power of the loads carried at the same time. This can be known from the specification labels of each load. Typically, power consumption is labeled in watts. If the units supplied are in amperes, multiply by the voltage 110v/220v to get the required power.
2. Estimate the maximum amount of time the load will be used on a single occasion.
3. Determine the total power usage, total run time and average power consumption in watts, dividing by 20 for a 12V system or 40 for a 48V system.

In order to calculate the approximate charge of a 24v battery, it is necessary to know the current required to carry the AC equipment. The easiest way to do this is to divide the continuous operating power of the AC load by 20.

For example, if the load's continuous power is 2000w at 24v supply voltage, the current is $2000/20=100$ amps. Please connect all the loads that require battery power.

Note: Some devices will have high peak power at startup and lower power during normal operation. There are also devices that are used for short periods of time. For example, an average home coffee maker will draw 500W for the 5 minutes it takes to make the coffee and 100W to keep it warm, while a microwave oven is a short duration device and often operates at a very low power level.

Important: When using a 12V inverter, only use batteries with an output voltage of 12V. If a 6V battery is used, the inverter will not work. The inverter may even be permanently damaged when connected to a 24V battery.

Note: Loose connections may cause the cable to overheat or even burn out. Make sure that the poles are not reversed, as this can cause the fuse to blow and permanently damage the inverter.

◆ Calculation of battery backup time

The backup time of the battery is determined by the battery capacity and the rated power of the load. Calculation of backup time:

Battery capacity (Ah) * Input voltage (Volt) / Load power (Watt)

Example: Battery capacity = 150Ah

Input voltage = 12Volt

Load power = 600Watt

Calculate $(15Ah * 12V) / 600Watt = 3$ Hours

Note: The formula yields a theoretical value, the actual hours will be shorter.

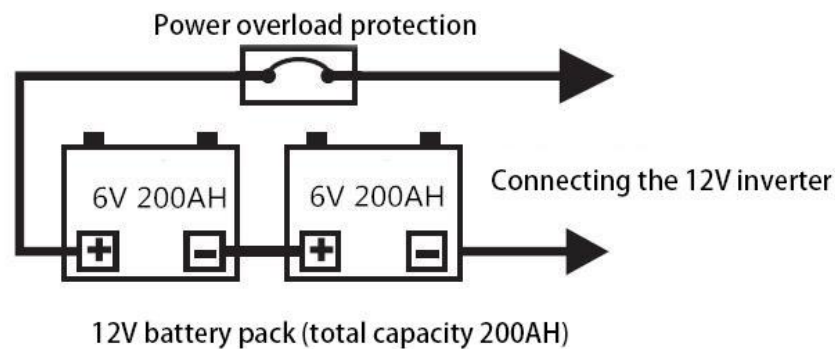
◆Charging of storage batteries

When conditions permit, charge the battery when it is 50% discharged or earlier. This will extend the life of the battery. The inverter activates the undervoltage cutoff protection at 10Vdc. This protection prevents the batteries from being over-discharged when connected to high-power loads. If the inverter is only carrying lighting equipment, charge before the voltage drops below the undervoltage protection.

For more information on battery maintenance, please consult your battery manufacturer. For more information on battery chargers, please contact us.

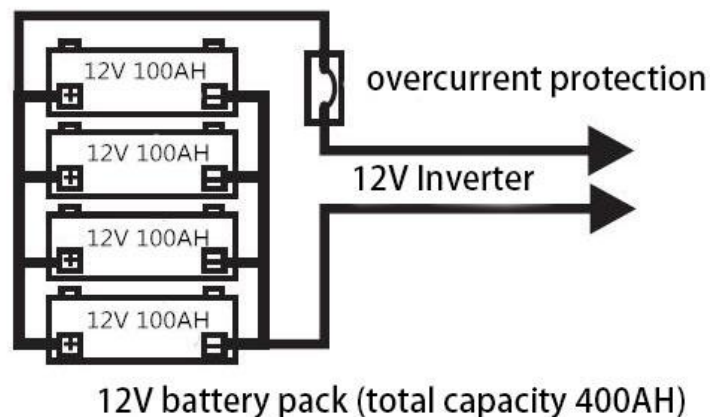
1. Series wiring

Connecting batteries in series increases the output voltage of the battery. Connect multiple batteries on the same line until their output voltage matches the inverter DC voltage. Even if more than one battery is connected, its total charge remains the same. As shown in Figure (4), two 6V DC/200Ah batteries are connected in series to form a 12V DC/200Ah combination battery.



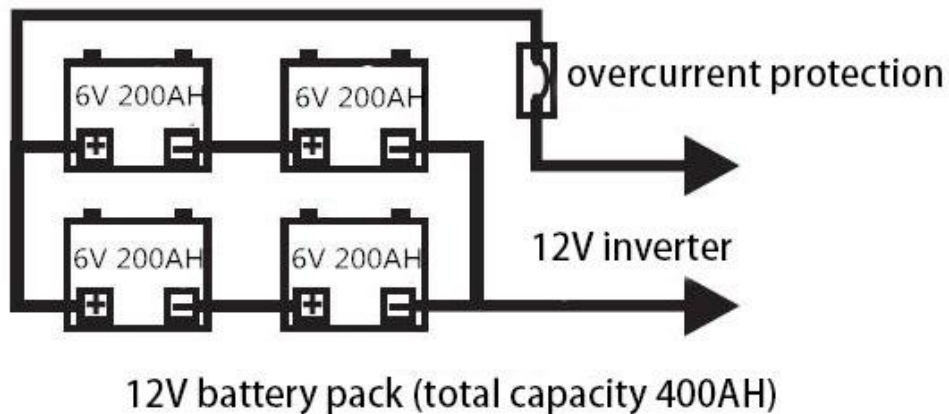
2. Parallel wiring

Connecting batteries in parallel extends the battery's carry time. The total battery capacity of a parallel battery circuit depends on the number of batteries connected in parallel. The voltage remains constant even if more than one battery is connected. As shown in Figure (5), four 12V DC/100Ah batteries are connected in parallel to form a 12V DC/400Ah combination battery.



3. Series-parallel combination wiring

Series-parallel combination wiring allows the connection of several small-volume, low-voltage batteries to simultaneously increase the total circuit voltage (to meet the inverter voltage requirements) and capacity (to extend the battery's load time). As shown in Figure (6), four 6V DC/200Ah batteries are combined to form a 12V DC/400Ah combination battery.



◆ Battery maintenance

Ensure that the load is in perfect working order and turn off the load after use. Use energy efficient light bulbs. Use solar panels or wind energy systems for charging when conditions permit. Do not allow lead-acid batteries to discharge for long periods of time as this will reduce their service life.

9. Installation and Connection

◆ Installing the Inverter

WARNING: Ensure that the battery is in a ventilated environment. Flammable gases may be generated during charging and discharging of the battery.

The inverter (1000W~5000W models) has 4 mounting holes to allow the unit to be well fixed to walls, floors and other flat surfaces. Ideally, the mounting surface should be smooth. The use of longer AC cables and shorter DC cables will result in better power utilization, so it is recommended that the inverter be mounted as close as possible to a 12V/24V/48V DC power source (battery).

This inverter can be operated in any location. If it is to be mounted on a wall (Fig. 7), mount it horizontally so that the display panel, switches and terminals are easily accessible. For mounting on a vehicle, it is strongly recommended that the inverter be protected against vibration.

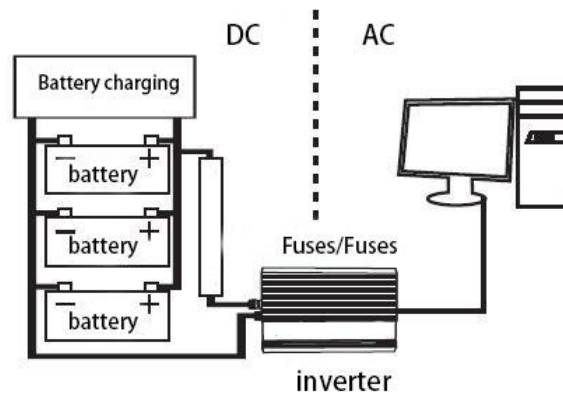
Figure 7



◆ System wiring

When connecting the batteries to the inverter, make sure the voltage is correct (e.g. 12v inverter should be connected to 12v batteries)

The inverter is capable of supplying 110/220v AC when connected to a 12/24v DC power source. This instruction manual is not exhaustive as to the specifications of each type of battery, battery charging performance, and battery insulation. Refer to Figure 8 for an example wiring diagram.



NOTE: For safety, a DC fuse or circuit breaker can be connected to the positive terminal of the system. Refer to the following recommendations when shopping for a fuse or circuit breaker.

Select a fuse or circuit breaker with appropriate power rating (e.g., 150A_{dc} for 1000w, 200A_{dc} for 1500w) Know the rated short-circuit current of the battery and select a fuse that can withstand this current.

◆ Wiring and Installation Procedure

1. Make sure the inverter switch is off and no flammable gas is generated before wiring and installation.
2. Identify the positive (+) and negative (-) terminals of the battery.
3. Install the fuse holder or circuit breaker near the positive (+) terminal of the battery.
4. Connect one end of the cable to the fuse holder or circuit breaker and the other end to the positive (+) terminal of the inverter.
5. Connect the negative terminal (-) of the inverter to the negative terminal (-) of the battery with a cable.
6. Select a small piece of cable and connect one end to the fuse holder or circuit breaker and mark it as positive (+).

7. Connect the other end of the cable in 6 to the positive (+) terminal of the battery.
8. Insert the fuse into the fuse holder.
9. Make sure all cables and terminals are securely tightened.

NOTE: It is normal for sparking to occur during the first connection. Make sure the wiring is secure. Do not over tighten the cables.

10. Operation & Running

1. After ensuring that the load (AC device) switch is off, connect its power cord to the AC output connector of the inverter.
2. Turn on the inverter switch
3. Turn on the load switch
4. Follow the above steps to continue to add other loads and start.

Annotation:

1. After connecting the load, turn on the inverter switch, the red light and green light will be on at the same time and last for 3~5 seconds. Then the red light turns off and the green light stays on, indicating that the inverter is operating normally. Please make sure the total power required by the load does not exceed the rated output power of the inverter.
2. When the inverter is turned off, the overload signal light may flash briefly and the alarm device may sound. Don't worry, this is normal. The same may happen when the inverter is connected or disconnected from the battery.
3. When using an extension cord to connect a load to the inverter, make sure the cord is no longer than 50 inches.
4. If you want to carry more than one load, connect the more powerful load first, then the less powerful load.

NOTE: This inverter should be connected directly to qualified electrical and electronic equipment. Do not connect to household or RV AC distribution circuits. Do not connect the inverter to any AC load circuit where the neutral conductor is connected to ground or the negative terminal of the battery.

WARNING: Do not connect the inverter to an AC power distribution line.

◆ Operating tips

Rated and actual current consumption of the device

Most electronic tools, devices, and video and audio equipment are labeled with their power consumption (in amps or watts).

Make sure that the power consumption of the load is less than the power rating of the inverter. (If the load is only labeled for amperage, simply multiply it by the DC voltage (110v or 220v) to arrive at the wattage.) The inverter will activate overload protection in the event of an overload.

Operation will continue only after the overload problem has been eliminated.

Inverters can easily carry resistive loads. However, high power resistive loads such as electric furnaces and heaters usually require higher power requirements from the inverter. Inductive loads such as TVs and stereos have higher current requirements. Inductive motors such as some TVs may require 2-6 times their rated power to start. Loads with very high starting power requirements are compressors and pumps. If the inverter is to be restarted after overload protection, remove the overloaded device first. If necessary, the inverter can be switched off and on again.

11. Fuse Replacement

The inverter is protected by an integrated circuit and can be reset automatically.

In addition, the inverter is equipped with a built-in fuse. In the event of a reverse positive or negative connection, the fuse will blow to protect the inverter.

The inverter base plate needs to be opened when renewing the fuse. A number of fuses are supplied for replacement.

Replace the fuse with one of the same size as the original fuse. Normally, after replacing the fuse, the inverter will work again by itself. If the inverter still does not work properly after replacement, please contact a technician.

Note: There is a danger of high voltage and high temperature inside the unit.

12. Common Failures

No AC Output: Red light is always on, green light is not on

Failure Causes	Method Settle an Issue
DC input below 10v (low battery voltage)	Charge or replace the battery
Inverter overheating→overheating protection activation	Remove the load and wait for the inverter temperature to return to normal

No AC Output: Red light and green light are not on

Failure Causes	Method Settle an Issue
Fuse open	Open the inverter housing and replace the fuse
	Contact technicians

Unstable AC Output: Red light is intermittent, green light is always on

Failure Causes	Method Settle an Issue
Inverter output limited due to overload or short circuit protection	Reducing loads or troubleshooting short circuits

Measured AC Voltage Below Standard Value

Failure Causes	Method Settle an Issue
Voltmeter not used to measure RMS	To measure the exact voltage of the corrected waveform inverter, use a voltmeter that can measure the RMS value.

No AC Output (Latch-up Effect): Red and Green Lamps are always on

Failure Causes	Method Settle an Issue
Load leakage activates inverter grounding protection	Troubleshooting load leakage

Battery Backup Time Too Short

Failure Causes	Method Settle an Issue
Inverter power rating too small	Please use an inverter with a higher power rating.
Poor quality or damaged batteries	Battery replacement
Battery low voltage	Charge the battery or use a good quality battery charger

The Inverter can only Carry Low Power AC Appliances

Failure Causes	Method Settle an Issue
Excessive current consumption in DC cables	Use heavy-duty cables and shorten cable lengths

Improper Undervoltage Alarm

Failure Causes	Method Settle an Issue
Line connection problems	Reinforcement of all DC connections

Undervoltage Alarm

Failure Causes	Method Settle an Issue
Low battery voltage	Charging or replacing batteries

AC Equipment Not Working

Failure Causes	Method Settle an Issue
Excessive starting load	If the unit does not work, it requires too much starting power for this inverter and needs to be replaced with a larger inverter.

TV/radio interference; blurred images, beeping from player

Failure Causes	Method Settle an Issue
Equipment too close to inverter	Maintain a certain distance between the inverter and the antenna. Use a hidden antenna. Connecting the antenna amplifier

13. Product Specification

200w power inverter specifications

Rated Power	200W
Impulse Power	400W
Output Voltage($\pm 5\%$)	110V/220V
Output Frequency	50/60Hz $\pm 3\%$
No-load Current Consumption	$\leq 0.5A$
Output Waveform	Pure sine wave
USB Output	5V 2.1A
Protection Function	Under-voltage reminder, automatic shutdown, over-temperature, over-voltage, short circuit, reverse polarity, leakage, overload protection
Input Voltage	12V/24V
Fuse	30A*1/15A*1
Cooling Fan Product Dimensions	With load and temperature control
Weight (net)	0.89kg
Size	226*108*62mm
Certification	CE-EMC/LVD,ROHS

400w power inverter specifications

Rated Power	400W
Impulse Power	800W
Output Voltage($\pm 5\%$)	110V/220V
Output Frequency	50/60Hz $\pm 3\%$
No-load Current Consumption	$\leq 0.5A$
Output Waveform	Pure sine wave
USB Output	5V 2.1A
Protection Function	Under-voltage reminder, automatic shutdown, over-temperature, over-voltage, short circuit, reverse polarity, leakage, overload protection
Input Voltage	12V/24V
Fuse	50A*1/25A*1
Cooling Fan Product Dimensions	With load and temperature control
Weight (net)	1.4kg
Size	215*155*58mm
Certification	CE-EMC/LVD,ROHS

Note: Parameters are subject to change without notice.

14. Product Maintenance

Basic maintenance is necessary for the inverter to work better. The following operations should be performed at intervals:

- ◆ Clean the outside of the unit with a damp cloth to prevent dust and dirt from accumulating.
- ◆ Check that the DC cables are securely tightened.
- ◆ Make sure that the vents on the DC panel and the bottom of the inverter are not blocked.

15. Disposal of Waste Products

If you no longer use this equipment, please take it to the appropriate collection point or to the public recycling office for used and end-of-life electronic equipment. Under no circumstances should electronic equipment be disposed of in the same way as normal household waste (see the electrical and electronic waste symbol below). Please note that electronic equipment may contain hazardous substances. Damage caused by improper use or malfunction can endanger human health and cause environmental pollution.



16. Warranty

Warranty Description

As stipulated, the warranty period is valid for one year from the date of obtaining the invoice. During the warranty period, under normal use, any failure due to the quality of the product, our company will provide free repair. During the warranty period, if there is any failure caused by the quality of the product itself, the user can bring the purchase invoice and the completed customer receipt to the company's authorized maintenance center for free repair.

1. If the product is modified and disassembled by the user, it will not be repaired.
2. Once the warranty card or purchase invoice is found to have traces of modification, the warranty service will be invalidated immediately.
3. Warranty card and purchase invoice are regarded as maintenance warranty, please keep them properly. If they are lost, the warranty will not be honored.

Free repairs will not be granted under the following conditions:

1. No proof of warranty.
2. Failure to follow the manual requirements to operate and cause failure.
3. The product is disassembled and repaired by units or individuals not authorized by the Company.
4. Failure due to human reasons such as moving, falling.
5. The product is damaged due to improper maintenance and use by the user.
6. Easy to wear parts are not under warranty.
7. Failure due to force majeure.