

- CAR series** Modified Sine Wave Inverter
- P series** Pure Sine Wave Inverter

User Manual

DC TO AC POWER INVERTER



ISO9001: 2008  **RoHS**  

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1. Introduction

Thank you for purchasing our CAR and P series power inverter.

Our power inverters are compact and high efficient inverters, and are leaders in the field of high frequency inverters.

Our power inverter converts low voltage, direct current (DC) to 110V/220 volt modified sine wave (MSW) or pure sine wave (PSW) alternating current (AC).

By connecting the power inverter directly to the 12/24/48V battery, you can turn your vehicle into a mobile office, or have power to run entertainment electronics.

Read this guide before installing and using the power inverter, and please reserve it for future reference.

2. Important Safety Instructions

Important: Read and save this owner's guide for future reference.

This chapter contains important safety and installation instructions for our CAR and P series power inverters. Each time, before using the power inverter, read all instructions and cautionary marking on or provided with inverter and all appropriate sections of this guide.

! DANGER **ELECTRICAL SHOCK HAZARD**

- ◆ Do not expose the inverter to rain, snow, spray, or bilge water. This inverter is designed for indoor use only.
- ◆ Do not operate the inverter if it has received a sharp blow, been dropped, has cracks.
- ◆ Do not disassemble the inverter. Internal capacitors remain charged after all power is disconnected.
- ◆ Disconnect both AC and DC power from the inverter before attempting any maintenance or cleaning or working on any circuits connected to the inverter. See note below.
- ◆ Do not operate the inverter with damaged or substandard wiring.
- ◆ Make sure that all wiring is in good condition and is not undersized.

Failure to follow these instructions will result in death or serious injury.

Note: Turning off the inverter using the ON/OFF switch on the front panel will not reduce an electrical shock hazard.

! DANGER
FIRE AND BURN HAZARD

- ◆ Do not cover or obstruct the air intake vent openings and /or install in a zero-clearance compartment.

Failure to follow these instructions will result in death or serious injury.

! DANGER
EXPLOSION HAZARD

- ◆ Charge only properly rated (such as 12V) lead-acid (GEL, AGM, Flooded, or lead-calcium) rechargeable batteries because other battery types may explode and burst.
- ◆ Do not work in the vicinity of lead-acid batteries. Batteries generate explosive gases during normal operation.
- ◆ Do not install and /or operate in compartments containing flammable materials or in locations that require ignition-protected equipment.

Failure to follow these instructions will result in death or serious injury.

Note:

1. Follow these instructions and those published by the battery manufacturer and the manufacturer of any equipment you intend to use in the vicinity of the battery. Review cautionary markings on these products and on the engine.
2. The inverter contains components which tend to produce arcs or sparks.
3. Do not install and / or operate the inverter in compartments containing flammable materials or in locations that require ignition-protected equipment. Prohibited locations for the installation and use of the inverter include, but are not limited to, space containing petrol-powered machinery, fuel tanks, as well as joints, fittings or other connections between the components of the fuel system.

CAUTION
RISK OF DAMAGE TO THE INVERTER

- ◆ Never allow the inverter to come in to contact with any chemicals or substances such as battery acid.
- ◆ Never place the inverter unit directly above batteries, gases from a battery will corrode and damage the inverter.
- ◆ Do not place a battery on top of the inverter.
- ◆ The inverter will not operate high wattage appliances over the output power limit or surge power limit.
- ◆ This is not a toy-keep away from children.

Failure to follow these instructions can damage the unit and/or damage other equipment.

3. Protection Features

Our power inverters are equipped with numerous protection features to guarantee safe and trouble-free operation:

Low battery alarm	Alerts you if the battery has become discharged to 10.5V or lower.
Low battery voltage shutdown	Shuts the inverter down automatically if the battery voltage drops below 9.5 volts. This feature protects the battery from being completely discharged.
High battery voltage shutdown	Shuts the inverter down automatically if the input voltage rises to 15.5 volts or more.
Over load shutdown	Shuts the inverter down automatically if the loads connected to the inverter exceed the inverter's operating limits.
Over thermal shutdown	Shuts the inverter down automatically if its internal temperature rises above an unacceptable level.
Output short circuit shutdown	Shuts the inverter down automatically if a short circuit is detected in the circuitry connected to the inverter's output.
Reverse polarity protection	If polarity connection is incorrect, the internal fuse will blow.
Earth Fault Protection	The inverter complies with the standard current leakage allowance. When large current leakage to earth terminal occurs. The protection circuit will be activated and shut down the inverter, to prevent electric shock. The only way to restart the inverter is to turn it off, unplug the faulty AC appliances and then turn the inverter ON.

Note: All protection is automatically recovered. To protect the battery, if the unit needs to be restarted after lower voltage protection, the voltage of DC input factory setting: modified sine wave inverter is 11.8V; pure sine wave inverter is 12.6V

4. Location

The power inverter must only be installed in a location that is:

Dry The inverter must be installed in a dry location not subject to moisture especially rain, spray, or splashing bilge water.

Cool The inverter should not be exposed to metal fillings or any other form of contamination.

Ventilated The ambient air temperature should be between 0-40°C (32-104°F) for best performance.

Safe Ventilation openings on the inverter must not be obstructed. If the inverter is mounted in a tight fitting compartment, the compartment must be ventilated with cut-outs to prevent the inverter from overheating.

Close to battery The inverter is not ignition-protected equipment, so it cannot be installed in areas containing gasoline tanks or fittings which require ignition - protected equipment. We recommend that it is safest not to install any kind of electrical equipment including the inverter in these areas.

Protected from battery gases The inverter should be installed as close as possible to the batteries, but not in the same compartment to prevent corrosion. Avoid excessive cable lengths and use the recommended wire sizes. We recommend that installing with battery cables sized to achieve less than 3% voltage drop on battery cables under full load. This will maximize the performance of the inverter.

5. Principle of Operation

There are two working stages in the power inverter:

◆ The first stage: A DC to DC conversion process that raises the lower voltage DC at the inverter input to 300volts DC.

◆ The second stages: An inversion stage that converts the high voltage DC into 110volts or 230volts AC (rms). DC to DC conversion stage uses modern high frequency power conversion techniques that have replaced the bulky transformers found in less technologically advanced models. The inverter stage uses advanced power MOSFET transistors in a full bridge configuration.

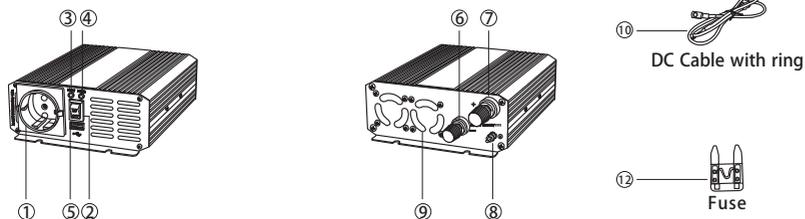
6. Inverter Components and Diagrams

◆ Materials List

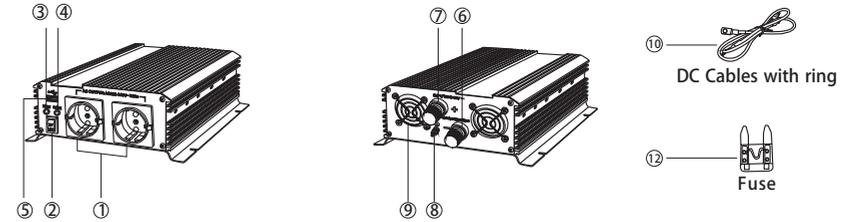
The package includes a power inverter unit, user manual, DC cables and spare fuse(s).

Figure 1 (6.1, 6.2, 6.3, 6.4, 6.5, 6.6)

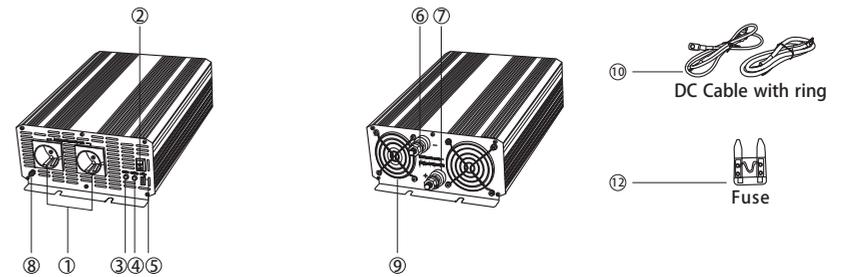
6.1 Modified sine wave inverter 800W



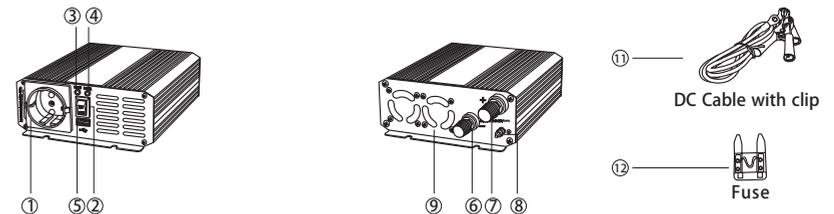
6.2 Modified sine wave inverter 1000W~1600W



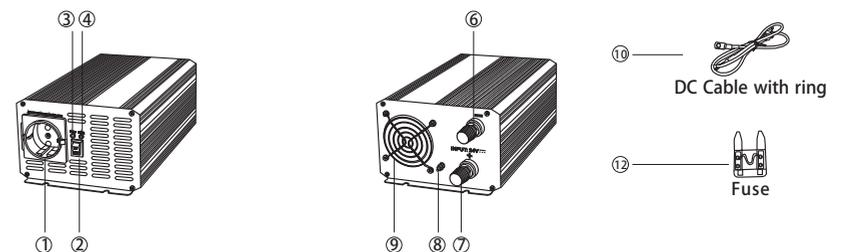
6.3 Modified sine wave inverter 2000W~5000W



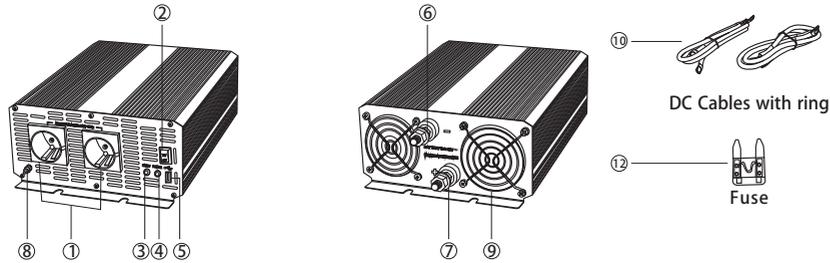
6.4 Pure sine wave inverter 300W~600W



6.5 Pure sine wave inverter 1000W



6.6 Pure sine wave inverter 1500W~4000W

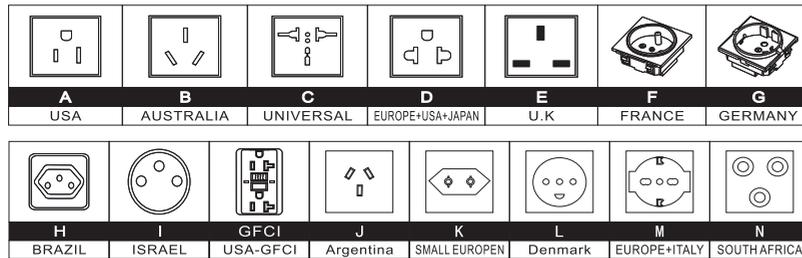


◆ Indication:

① AC outlets are used to power loads

Please see the pictures as follows, the AC outlet socket types may vary.

Figure 2



② ON/OFF Switch turns the inverter's control circuit on and off. This switch is not a power disconnect switch.

③ Fault light (red) indicates that the inverter has shutdown due to inverter overload, over temperature, short circuit, leakage or a fault.

④ Power light (green) indicates the inverter is operating.

⑤ The USB port has a 5V 2.1A output. Connect the external USB-compatible appliance to the USB port to charge it or provide power to it (such as a mobile phone, tablet, camera, light, fan, radio etc).

The USB output is permanently on when the power inverter is connected to a 12V input voltage.

⚠ **Warning:** The USB port on the power inverter is not designed for transferring data.

◆ Do not connect memory sticks, MP3 player or similar data storage external appliances.

◆ Do not connect any data transfer cables to the USB port!

⑥ Negative DC input terminal always connect to the negative terminal of the battery via a negative DC input cable (black battery cable). The negative DC input terminal is coloured black.

⑦ Positive DC input terminal always connect to the positive terminal of the battery via a positive DC input cable (red battery cable). The positive DC input terminal is coloured red.

⚠ **Warning:** Do not reverse the polarity of battery connection. The wrong connection will result in a blown fuse(s) inside the unit and may cause a permanent damage to the inverter.

⑧ Chassis ground screw: Earthing of the inverter.

⑨ High-speed cooling fan must not be obstructed for the proper operation of the inverter. When the inverter is mounted, the ventilation opening on the DC panel must not point up or down.

⑩ DC cable with ring: Connect the ring on one end of the red cable to the red terminal on the inverter, and connect the ring on the other end to the battery. Do the same with the black cable.

⑪ DC cable with clip: Can also be used to connect the battery and inverter. Connect the clip on one end of the cable to the battery, and the ring on the opposite end of the cable to the inverter.

⚠ **Warning:** Symptoms of low battery power can result from cables that are either excessively long or an insufficient gauge. Substantial power loss and reduced battery operating time results from inverters installed with cables that are not able to supply full power.

Notes: The installer/operator should be especially aware of the requirements to maintain secure, tight, water-resistant electrical connections and to provide for strain relief for DC cables and appliance wiring. Cable insulation must be the appropriate type for the environment.

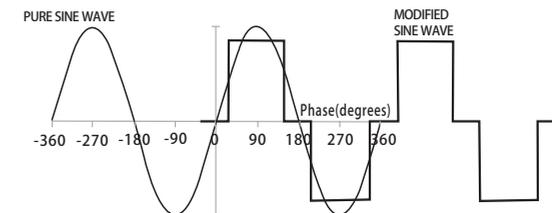
⑫ There is an internal fuse(s) inside the inverter, and spare fuse(s) inside the packaging.

Note: For added polarity protection, the fuse(s) will blow when an incorrect connection is made. Once replaced with correct polarity, the inverter will start working again. If the inverter does not work after replacing the fuse, please contact an engineer as the inverter may be damaged.

7. Inverter Output Waveform

The AC output waveform of the CAR series inverter is known as "modified sine wave", P series inverter output waveform is "pure sine wave".

Figure 3



Modified sine wave and pure sine wave comparison

The modified sine wave has an RMS (Root mean square) voltage of 110/230volts, which is the same as standard household power. Most AC voltmeters (both digital and analog) are sensitive to the average value of the waveform rather than the RMS value. They are calibrated for RMS voltage under the assumption that the waveform measured will be a pure sine wave. These meters will not read the RMS voltage of a modified sine wave correctly. They will read about 20 to 30 volts low when measuring the output of the inverter. For accurate measurement of the output voltage of this unit, use a true RMS reading voltmeter such as Fluke 87III, Fluke 8060A, Fluke 77/99 series or Beckman 4410.

INTERFERENCE WITH SOME EQUIPMENT

◆ Buzz in Audio Equipment

Some inexpensive stereo systems may emit a buzzing noise from their loudspeakers when operated from the inverter. This occurs because the power supply in the audio System does not adequately filter the modified sine wave produced by the inverter.

The only solution is to use a sound system that has a high quality power supply.

◆ Television Reception

When the inverter is operating, it can interfere with television reception on some channels.

If interference occurs, try the following:

1. Make sure that the chassis ground screw on the rear of the inverter is solidly connected to the ground system of your vehicle or home.
2. Make sure that the television antenna provides an adequate (“ snow-free ”) signal and that you are using good quality cable between the antenna and the television.
3. Keep the cables between the battery and the inverter as short as possible, and twist them together with two to three twists per foot.(this minimizes radiated interference from the cables.)
4. Move the television as far away from the inverter as possible.
5. Do not operate high power loads with the inverter which the television is on.

8. Choose the Battery

◆ Battery Requirements

Battery type and battery size strongly affect the performance of the power inverter. Therefore, you need to identify the type of loads your inverter will be powering and how much you will be using them between charges. To determine the minimum battery size that you need to operate appliances, please follow these steps:

1. Determine the wattage of each appliance and/or tool you will need to simultaneously operate from the inverter. To do this, read the labels on the equipment to be operated. Usually, power consumption is shown in watts. If it is shown in amps, multiply by 110V/230V to determine the

wattage.

2. Estimate the number of hours the equipment will be in use between battery recharges.

3. Determine the total watt-hours of energy by multiplying the wattage of your appliance by the time it will be working (in hours). For example, 60W laptop working for 5 hours will require $60W \times 5h = 300Wh$ (watt-hours) of energy. 250W TV working for 30 min will require $250W \times 0.5h = 125Wh$.

4. Calculate the approximate amp-hours (Ah) which the battery bank will have to supply to your appliance to enable it to work for a certain amount of watt-hours, by dividing watt-hours by 10 (for 12V battery bank), or 20 (for 24V battery bank) or 40 (48V battery bank). E.g. 300Wh for laptop from a 12V inverter will require $300Wh / 10 = 30Ah$ of battery energy.

5. Add all the amp-hours (Ah) for each appliance to get the total battery capacity required for your system.

Note: Some appliances required high surge power to start, then consume less power. And some appliances are not operating for long periods of time. For example, a typical home-use coffee maker draws 500watts during its brew time of 5minutes, but it maintains the temperature of the pot at about 100watts. Typical use of a microwave is only a few minutes, sometimes at lower power. Some exceptions to brief operating times are lamps, TVs and computers.

Important: The power inverter must be connected only to batteries with a normal output voltage of 12 volts when you use a 12V inverter. The unit will not operate from a 6 volt battery, and will sustain permanent damage if connected to a 24 volt battery.

Caution: Loose connectors may cause overheated wires and melted insulation. Check to make sure you have not reversed the polarity. Reverse polarity connection will result in a blown fuse and may cause permanent damage to the inverter.

◆ The Calculation of the Battery’s Back Up Time

The battery’s back up depends on the battery capacity (Ah) and your appliances power (Watt)

The method to calculate the backup time:

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

For example:

Battery capacity = 150Ah

Input voltage = 12Volt

Loading power = 600Watt

So:

$(150Ah \times 12V) / 600Watt = 3 \text{ Hours}$

Note: this calculation of back-up time produces a theoretical value, and doesn’t take into account the self-consumption of the inverter. The actual back-up time may be significantly shorter than this value, particularly for larger loads, old and partially discharged batteries.

◆ Recharging Batteries

When possible, recharge your batteries when they are approximately 50% discharged, or sooner. This gives the batteries a much longer life cycle than recharging when they are more deeply discharged.

Our inverter has a battery low voltage shutdown around 10Vdc. With moderate to heavy loads, this will protect against over-discharging the battery. If the inverter is running only light loads it is advisable to recharge before the inverter low voltage shutdown point is reached.

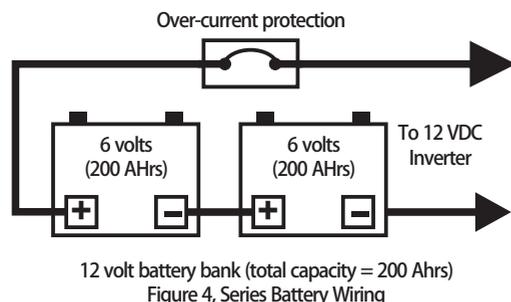
For more information on maintaining batteries, consult your battery's manufacturer.

For information about our battery chargers, please contact us.

◆ Batteries Wiring

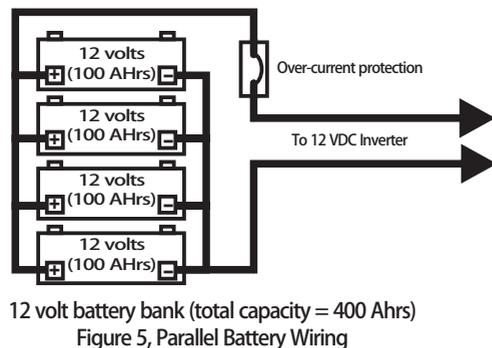
1. SERIES WIRING

Wiring batteries in a series increases the total battery bank output voltage. A series connection combines each battery in a string until the voltage matches the inverter's DC requirement. Even though there are multiple batteries, the capacity remains the same. In the example below (Figure 4), two 6VDC/200Ah batteries are combined into a single string—resulting in a 12VDC /200Ah bank.



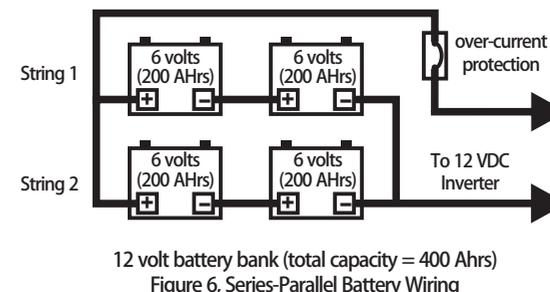
2. PARALLEL WIRING

Wiring the batteries in parallel increases the total run time the batteries can operate the AC loads. A parallel connection combines overall battery capacity by the number of batteries in the string. Even though there are multiple batteries, the voltage remains the same. In the example below (Figure 5), four 12 VDC/100Ah batteries are combined into a single 12VDC/400Ah battery bank.



3. SERIES - PARALLEL WIRING

A series-parallel configuration increases both voltage (to match the inverter's DC requirements) and capacity (to increase run time for operating the loads) using smaller, lower voltage batteries. In the example below (Figure 6), four 6 VDC/200Ah batteries are combined into two strings resulting in a 12VDC/400Ah battery bank.



◆ Best use of Battery Power

Make sure any appliances are energy efficient and turned off after use. Use energy saving LED light bulbs. Wherever possible, charge with solar panels or wind generators. Do not allow lead acid batteries to remain discharged for long periods of time, they lose capacity (amps hours).

9. Mounting and Connecting the Inverter

◆ Mounting the Inverter

⚠ Warning: Ensure there is ventilation when using batteries. Batteries may generate flammable gas during charging or discharging.

The inverter (1000W to 5000W models) has four slots in its mounting bracket that allow the unit to be fastened against a bulkhead, floor, wall or other flat surface. Mount the inverter only on a surface made of non-combustible materials (if concerned, mount the inverter in an appropriate enclosure with ventilation). Make sure there are no sources of heat affecting the unit.

It is more electrically efficient to use longer AC wiring than DC wiring, so install the inverter as close as possible to the 12 /24/48V DC power source (Battery).

The inverter can be operated in any position, however, if it is to be mounted on a wall, mount it horizontally (Figure 4) so that indicators, switches, outlets and terminal blocks located on the front panel are visible and accessible. If inverter is to be installed in a moving vehicle, we strongly recommend that the inverter be shock-mounted either on the floor (in a clear, safe area) or on a secure flat surface.

Figure 7

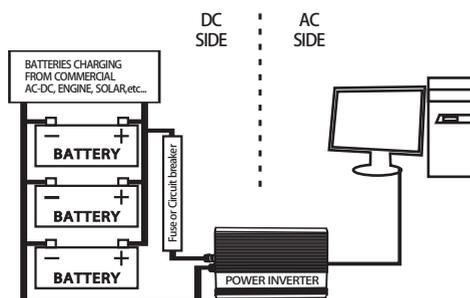


◆ System Connection

When you connect the battery to the inverter, please bear in mind the correct voltage (e.g. a 12V inverter should be connected to a 12V battery)

The inverter will provide you 110/230VAC when powered by a 12/24/48VDC source. This manual does not describe all of the possible types of battery configurations, battery charging configuration and battery isolation configurations. Figure 8 below shows the typical connection.

Figure 8



Note: For safety purposes, you can connect a DC-rated fuse or DC-rated circuit breakers on the positive cable line in your power system, following recommendations below.

Select a fuse or circuit breaker with a proper rating (e.g. 100A DC for 1000W 12V inverter, 150A DC for 1500W 12V inverter etc.). You can roughly estimate the maximum current that the inverter will be taking at full power by dividing the nominal power rating of the inverter by the battery voltage. E.g. 2000W 12V inverter will have the maximum continuous current $2000W / 12V = 167A$ that can theoretically be drawn by the inverter from the battery. In reality it might be a bit higher current at full power due to energy losses and inverter self-consumption. So the current rating of the fuse or circuit breaker should be taken marginally higher than the result of this formula.

◆ Connection and Installation Steps:

1. Check to be sure the inverter's power switch is turned off and that no flammable fumes are present.
2. Identify the positive (+) and negative (-) battery terminals.
3. Install a fuse holder or breaker close to the positive (+) terminal of the battery.
4. Connect a length of wire on one side of the fuse holder or circuit breaker. Connect the other

end of the wire to the positive (+) terminal of the inverter.

5. Connect a length of wire between the inverter's negative (-) terminal and the battery's negative (-) terminal.
6. Connect a short length of wire to the other terminal of the fuse holder or circuit breaker. Mark it "positive" or "+".
7. Connect the free end of the fuse or breaker wire to the positive terminal of the battery.
8. Insert a suitable fuse in the fuse holder.
9. Check to be sure that all connections between battery clips, terminals and fuses are secure and tight.

Note: Sparking is normal for the first connection.

Make sure you have good secure connections- Do not over-tighten.

10. Operating the AC Appliances

1. When you have confirmed that the AC appliances to be operated are turned off, plug an appliance cord into the AC outlet on the front panel of the inverter.
2. Turn ON the inverter.
3. Turn the appliance on.
4. Plug in additional appliances and turn them on.

Note: 1. Plug the cord from the AC appliances you wish to operate into the AC receptacle. When the inverter turns ON, the red and green LEDs will both light up for 3-5seconds. The red LED will then turn off, and the green LED will remain on, to indicate that the inverter is functioning. Make sure the combined load requirement of your equipment does not exceed inverter's output rating.

2. Turn OFF the inverter. The over load LED may briefly "blink" and the audible alarm may also sound a short "chirp." This is normal. This same alarm may also sound when the inverter is being connected to or disconnected from.
3. When using an extension cord from the inverter to an appliance the extension cord should not be longer than 50 feet.
4. When connecting further appliances, please ensure that the highest power appliance is plugged in and switched on first, followed by any smaller appliances.

Caution: The inverter is engineered to be connected directly to standard electrical and electronic equipment. Do not connect the power inverter to household or RV AC distribution wiring. Do not connect the power inverter to any AC load circuit in which the neutral conductor is connected to ground (earth) or to the negative of the battery source.

⚠ Warning: Do not connect to AC distribution wiring.

◆ Operating Tips

Rated versus actual current draw of equipment

Most electrical tools, appliances and audio/video equipment have labels that indicate the power consumption in amps or watts.

Be sure that the power consumption of the item you wish to operate is less than inverter's rating power. (If the power consumption is rated in amps, simply multiply by the AC volts (110V or 230V) to determine the wattage). The inverter will shutdown if it is overloaded. The overload must be removed before the inverter will restart.

Resistive loads are the easiest for the inverter to run. However, larger resistive loads, such as electric stoves or heaters, usually require more wattage than the inverter can deliver. Inductive loads, such as TV's and stereos, require more current to operate than do resistive loads of the same wattage rating. Induction motors, as well as some televisions, may require 2 to 6 times their wattage rating to start up. The most demanding in this category are those that start under load, such as compressors and pumps. To restart the unit after a shutdown due to overloading, remove the overload if necessary, then turn the power switch OFF and then ON.

11. Fuse Replacement

The inverter is protected by an integral electronic unit and will automatically reset. In addition, this inverter is equipped with a fuse(s), located inside the inverter. If reverse polarity connection is detected, the fuse(s) will blow. A qualified person can open the unit to replace the fuse(s), making sure the inverter is fully disconnected and briefly switched on and off to discharge internal capacitors. There are spare fuses inside the inverter packaging. Please ensure that the same size fuse(s) are used as a replacement.

Caution: High voltage and high temperature inside!

12. Trouble Shooting

No AC output; red LED lit, green LED not lit

Possible Cause	Suggested Solution
DC input below 10volts(battery low voltage)	Recharge or replace battery.
Inverter overheat → thermal shutdown	Remove or reduce load, wait for inverter to cool.

No AC output; red & green LED not lit

Possible Cause	Suggested Solution
Inverter fuses open	Open the inverter case, change the fuse.
	Or contact technical support.

Non-continuous AC output; red LED lit on & off, green LED lit

Possible Cause	Suggested Solution
Inverter output power limited by overload/short circuit protection circuit	Reduce load or remove short circuit

Reduce load or remove short circuit

Possible Cause	Suggested Solution
The voltmeter used is not a true RMS meter	Change to use a true "RMS" voltmeter when you measure the AC voltage output from "modified sine wave inverter" .

No AC output (latch up); red & green LED lit

Possible Cause	Suggested Solution
Earth fault protection is activated by excessive current leakage from the load	Unplug the faulted load.

The battery backup time shorter than expect

Possible Cause	Suggested Solution
The inverter chosen is too small	Recharge or replace battery.
Battery poor quality or damaged	Remove or reduce load, wait for inverter to cool.
Battery empty or lower voltage	Recharge for the battery, or use good quality charger to charge the battery.

No AC output; red LED lit, green LED not lit

Possible Cause	Suggested Solution
Current dissipation in DC cables is too high	Use heavy cables and shorten the cables.

Low battery alarm sounds abnormal

Possible Cause	Suggested Solution
Bad connection or wiring	Tighten all DC connections.

Low battery alarm sounds

Possible Cause	Suggested Solution
Low battery voltage	Recharge or replace battery.

Low battery alarm sounds

Possible Cause	Suggested Solution
Low battery voltage	If appliance does not start, then appliance is drawing excessive wattage and will not work with inverter

Low battery alarm sounds

Possible Cause	Suggested Solution
Appliance too close to inverter	Keep inverter and antenna distant from each other. Use shielded antenna cable. Connect antenna with amplifier.

Specifications for CAR Series Power Inverter:

Model	CAR800U	CAR1KU	CAR1.2KU	CAR1.6KU	CAR2KU	CAR2.5KU	CAR3KU	CAR4KU	CAR5KU
Rated Power (Watts)	800W	1000W	1200W	1600W	2000W	2500W	3000W	4000W	5000W
Surge Power(few seconds)	1600W	2000W	2400W	3200W	4000W	5000W	6000W	8000W	10000W
Voltage (AC)	100/110/120V AC or 220/230/240V AC								
AC Voltage Regulation	10%								
Frequency (Hz)	50/60Hz ± 3								
Waveform	Modified Sine Wave 								
USB port	5V 500mA or 800mA or 2.1A (optional)								
Efficiency	≥ 85%								
Voltage (DC)	12/24/48V DC								
Voltage Range (DC)	9.5~15V / 19~30V / 38~60V DC								
Replaceable Fuse	12V	50A*2	40A*4	40A*4	40A*6	30A*8	30A*10	30A*12	30A*18
	24V	25A*2	20A*4	20A*4	20A*6	15A*8	15A*10	15A*12	15A*18
	48V	10A*4	10A*4	10A*4	10A*6	7.5A*8	7.5A*10	7.5A*12	7.5A*18
Low Voltage Shutdown	12V	10V ± 0.5V	11 ± 0.5V	15 ± 0.5V	24V	20V ± 1V	22 ± 1V	48V	
Low Voltage Alarm									
Over Voltage Shutdown									
Short Circuit Protection									
Over Temperature Shutdown									
Polarity Reverse Protection									
Over Load Protection									
Earth Leakage Protection									
Operating Temperature Range									
Cooling Fan									
Unit Dimensions(L*W*H)	21.5*15*5.8cm	27.5*20.8*7.7cm	32.5*20.8*7.7cm	34.5*23*10.8cm	42*23*10.8cm	49	5.3	6.2	8.2
	Unit Weight (kg)	1.5	2.5	2.5	3.2	4.9	5.3	6.2	8.2
Output Outlets									

Note: The specifications are subject to change without prior notice.

13. Specification

Specifications for P Series Inverter:

Output	Model	P-300	P-400	P-600	P-1000	P-1500	P-2000	P-3000	P-4000	
	Rated Power (Watts)	300W	400W	600W	1000W	1500W	2000W	3000W	4000W	
Protection Function	Surge Power(few seconds)	600W	800W	1200W	2000W	3000W	4000W	6000W	8000W	
	Voltage (AC)	100/110/120V AC or 220/230/240V AC								
	AC Voltage Regulation	± 10%								
	Frequency (Hz)	50/60Hz ± 3								
	Waveform	Pure Sine Wave 								
	USB port	5V 500mA or 800mA or 2.1A(optional)								
	Efficiency	≥ 90%								
	Voltage (DC)	12/24/48V DC								
	Voltage Range (DC)	10~15.5V / 20~31V / 40~62V DC								
	Replaceable Fuse	12V	40A*1	50A*1	40A*2	30A*4	30A*6	30A*8	30A*12	30A*16
24V		20A*1	25A*1	20A*2	15A*4	15A*6	15A*8	15A*12	15A*16	
48V				10A*2	7.5A*4	7.5A*6	7.5A*8	7.5A*12	7.5A*16	
Low Voltage Shutdown	12V	10.5V ± 0.5V	11.5V ± 0.5V	15.5V ± 0.5V	24V	21V ± 1V	23V ± 1V	48V	42V ± 2V	
Low Voltage Alarm									46V ± 2V	
Over Voltage Shutdown									62V ± 2V	
Short Circuit Protection										
Over Temperature Shutdown										
Polarity Reverse Protection										
Overload Protection										
Earth Leakage Protection										
Operating Temperature Range										
Soft Start										
Cooling Fan	Unit Dimensions(L*W*H)(CM)	21.5*15*5.8	26*15*7.77	31.6*15*9.75	37.2*23*10.8	48.8*23*10.8	53.8*23*10.8	7.7	9.0	
	Unit Weight (kg)	1.4	2.0	2.0	3	4.7	4.9	7.7	9.0	
Output Outlets										

Note: The specifications are subject to change without prior notice.

14. Maintaining the Inverter

Minimal maintenance is required to keep your inverter operating properly, periodically you should:

- ◆ Clean the exterior of the unit with a dry cloth to prevent the accumulation of dust and dirt (make sure the unit is unplugged and fully disconnected when doing this).
- ◆ Ensure that DC cables are secure and fasteners are tight.
- ◆ Make sure the ventilation openings on the DC panel and bottom of the inverter are not clogged.

15. Disposal Instructions

Home electronic equipment: If you no longer wish to use this appliance, please take it to the applicable collection point or deliver it to a public recycling location for old electronic equipment. Electronic equipment shall under no circumstances be disposed of in the same manner as normal household waste (see the crossed-out garbage can symbol below).

Further disposal instructions: **Hand over the appliance in a condition that will allow for safe recycling and disposal.** Remove all batteries from the appliance in advance and prevent any liquid containers from being damaged. Electronic equipment may contain harmful substances. Improper use or malfunction caused by damage may adversely affect human health and harm the environment during recycling.



16. Warranty

This inverter is covered by a one year warranty. During this period, any breakdown under normal usage guidelines or owing to the quality of the product will be eligible for a free repair or replacement (at the discretion of the manufacturer or distributor). When claiming a service under warranty, the customer will be required to present details of their order to verify the purchase and establish the order date (such details could include the order number, full name, address, postcode etc). The customer might also be asked to fill in a warranty support form to provide further details about the problem.

Many problems can be resolved over the phone, email and remotely so the service engineers will always attempt to do this first. If the problem remains, the customer will be asked to send the inverter (at their cost) to a service centre address for further testing, and a repair or replacement if required. The repaired or replaced unit will be delivered to the customer free of charge within the

country of the service centre.

The following damages and conditions are excluded from the warranty:

- 1) Wrong battery polarity connection
- 2) Connection of the AC inverter output to another power source (generator, mains power, another inverter etc) or AC distribution wiring in a vehicle, boat or a house.
- 3) Damage occurred during shipment
- 4) Contact with water, chemicals or any other reactive materials
- 5) Incorrect usage, abuse, negligence or conditions that do not follow the guidance provided in this manual
- 6) Unauthorised opening, modifications or attempted repair of the inverter
- 7) Breakdown or damage caused by mechanical impact or excessive vibration
- 8) Lightning, natural disasters and force majeure