WARRANTY

This product is designed using the most modern digital technology and under very strict quality control and testing guidelines. If however, you feel this product is not performing as it should, please contact us: **support@giandel.com.au**

We will do our best to resolve your concerns. If the product needs repair or replacement, make sure to keep your receipt/invoice, as that will need to be sent back along with the package and prepaid to GIANDEL.

Except as noted above, GIANDEL makes no warranty of any kind, express or implied, including without limitation the implied warranties of merchantability and fitness for a particular purpose. In no event shall GIANDEL be liable for indirect, special or consequential damages. This warranty only applies to GIANDEL branded products. All other name brand products are warranted by and according to their respective manufacturer. Please do not attempt to return non-GIANDEL branded products to us.

The following situations will void warranty:

1. The box is distorted, damaged or changed, and interior parts damaged because of an exterior hit or drop not reported at time of delivery.
2. Connect the DC power incorrectly reversing the polarity.
3. Dismantled or repaired the unit by an unauthorized person.
4. The unit was damaged by incorrect installation or operating method.

To find out where to buy any of our products, you may also e-mail:
support@giandel.com.au .

Welcome to use GIANDEL power inverter. If you have any query during using our inverter, please contact our service team by email:
support@giandel.com.au

V0.21.03

USER MANUAL

GIANDEL®

DC to AC
PURE SINE WAVE
POWER INVERTER

USER MANUAL

MODEL: ☐ PS-1500SAR
☐ PS-2000SAR

Warning: This manual contains important safety and operating instruction. Please read it carefully before use the unit.

SPECIFICATIONS

Model	PS-1500SAR		PS-2000SAR	
Continuous Power	1500W		2000W	
Peak Power	3000W		4000W	
Rated input Voltage	12VDC	24VDC	12VDC	24VDC
Input Voltage Range	9.5~16VDC	19~32VDC	9.5~16VDC	19~32VDC
Over Voltage Shutdown	16VDC	32VDC	16VDC	32VDC
Low Voltage Shutdown	9.5VDC	19VDC	9.5VDC	19VDC
Low Voltage Alarm	9.8VDC	19.6VDC	9.8VDC	19.6VDC
Output Voltage	110~120V / 220V ~240V ±10% (Be subjected to the rating)			
Frequency	50Hz / 60Hz ±1Hz (Refer to label)			
Wave form	Pure Sine Wave			
Efficiency	About 90%			
Over heat Protection	149±41°F			
Over load protection	1500~1700W		2000~2400W	
Short Circuit protection	YES			
Display	LCD			
USB	5VDC，Max2.4A×2			
No load current	1.2A	0.7A	1.5A	0.9A
Cooling fan	The cooling fan won't work until inverter case reach about 104°F or load exceeds 40% of rating power。			
Operating temperature	32 ~ 104°F			
Storage temperature	14 ~ 113°F			
Size (L×W×H)	443×203×100mm		443×203×100mm	
Weight	4.5Kg		4.98Kg	

Note: Due to the continuous improvement of products, the technical parameters in this manual are subject to change without prior notice.

A. BRIEF

GIANDEL power inverter is an advanced tool of power conversion, and it can supply you with AC power converted from DC power source. Not only can be used in cars, vessels and camping, but also can be used in emergency when out of electricity.

In order to use the inverter efficiently and safely, please install and use it in a proper way. Please read the instruction carefully before installing and using the appliance.

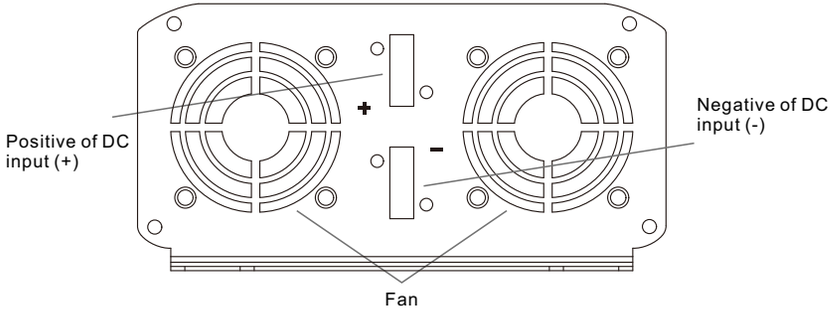
B. WARNING AND SAFETY

1) Read the manual before connecting this inverter and keep it for future reference.
2) While opening the product package, please check the integrity of the product and accessories. If there is any problem, please do not use it.

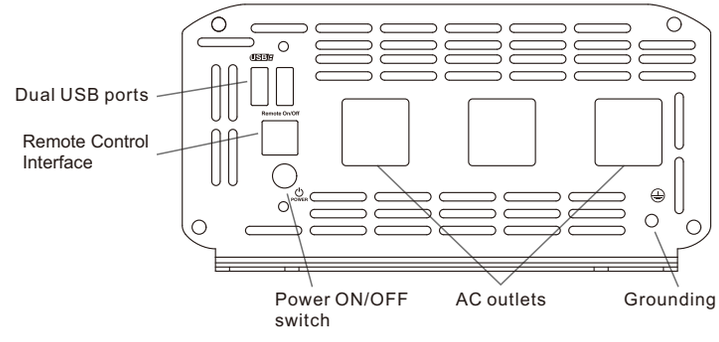
3) While connecting and using for the first time, if there is smoke or explosion sound in the product, please stop using immediately and disconnect the product from the battery and electrical appliances. This may be caused by damage during the transportation or due to moisture during storage in the warehouse before delivery. Please contact your seller in time.
4) During daily use, if there is smoke or explosion sound in the product, please don't worry, this is due to the internal fuse protection of the product. Please do not disassemble it by yourself. Please stop using the product immediately. Disconnect the product from the battery and electrical appliances. Contact the seller in time and only with seller's agreement a hired professional personnel can disassemble the product. Otherwise, it may cause electric shock, fire and serious personal injury.
5) Do not put the inverter under direct sun light or near a heating source.
6) The case of inverter will get hot during using. Do not allow flammable materials such as clothing, sleeping bags, carpet or any other flammable materials to touch the inverter. The heat from the inverter can damage these items.
7) The power inverter is designed to be used with a negative ground electrical system! Don't use with positive ground electrical systems (the majority of modern automobiles, RVs, trucks and boats are negative ground).
8) Do not disassemble the unit randomly: it may cause fire or electric shock.
9) Do not connect the negative to car chassis when use in car.
10) This device should only be serviced by a qualified technician. This item does not have any serviceable parts.
11) Prevent body contact with grounded surfaces such as pipes, radiators, ranges, and refrigerator enclosures during installation.
12) Do not operate the inverter if under the influence of alcohol or drugs. Read warning labels on prescriptions to determine if your judgement or reflexes are impaired while taking drugs. If there is any doubt, do not operate the inverter.
13) People with pacemakers should consult their physician(s) before using this product. Electromagnetic fields in close proximity to a pacemaker could cause interference to or failure of the pacemaker.
14) Keep the inverter well-ventilated. Do not place any objects on top of or next to the inverter or allow anything to cover the cooling fans;inverter will bel overheating, causing a potential fire hazard and/or damage to the inverter. Leave adequate ventilation space underneath the inverter as well; thick carpets or rugs can obstruct air flow, causing the inverter to overheat.
15) Avoid unintentional starting. Be sure the switch is in the OFF position when not in use and before plugging in any appliance. Disconnect the battery and inverter when not in use for a long time.
16) Keep inverter away from children. Don't install the inverter where it is accessible to children.
17) The power inverter will output the same AC power as utility power, please treat the AC outlets as carefully as you would your home AC outlets. Do not put anything other than an electrical appliance into the output terminal. It may cause shock or fire.
18) This product cannot be used for medical and life support equipment.

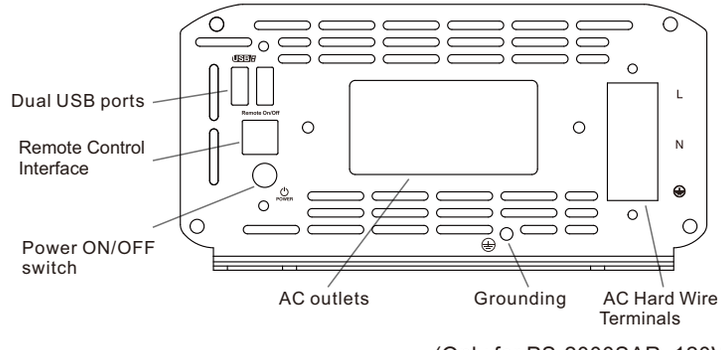
C. PARTS LIST

1) DC Input Side



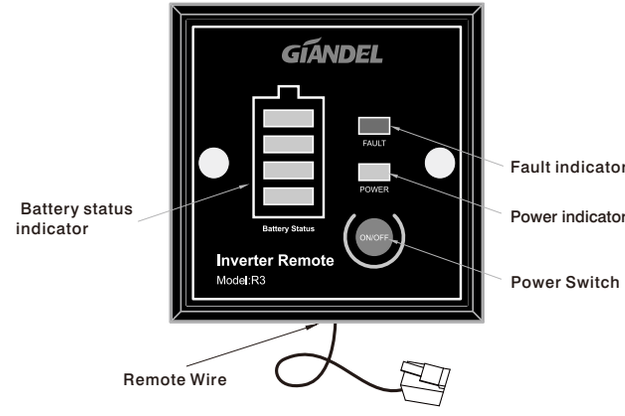
2. AC Output side





(Only for PS-2000SAR, 120V)

3. Remote controller box



D. ASSEMBLE

1) The position of mounting

First ensure that there is enough space to install the inverter, while the installation location must meet the following requirements:

(1) Drying: Do not use water or other liquids dripping on the inverter.

(2) Cool: a working environment temperature of the product is 32 ~104°F, preferably a temperature of 50~77°F, at a temperature as low as possible within this range.

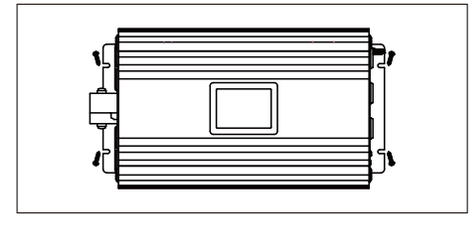
(3) Ventilation: There should be a certain distance between inverter and other objects, to avoid blocking the products vents.

(4) Clean: Do not install the products in the dusty, wood chips or other particles. If cooling fan is on, the particles involved in the inside of the product, thus affecting the normal work.

(5) Inverters and batteries when connected, will produce arcs or sparks, so there should not be around flammable objects such as gasoline, alcohol, etc.

2) Assemble the inverter

For this big power inverter, which has a heavier weight, preferably mount it on a solid platform, such as floor, table or mounting bracket fine. In order to avoid falling off, platform for supporting the product should can bear the weight of sufficient capacity, and it is good with four screws to secure the product.



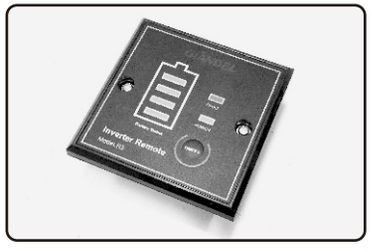
1) Assemble the remote controller box

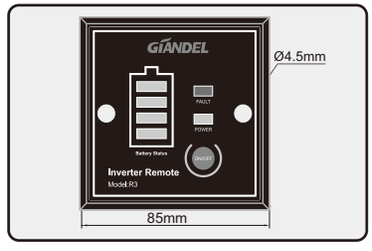
(1) Fix the remote box on flat surface (No need a hole), and use 2 screws to fix it through the two mounting holes on the remote controller.

(2) Also it is available to fix on a 86*86mm standard Electrical box.

(3) Connect the remote box and inverter with the wire.

Note: In case not connect to the remote controller, the inverter can be also used as a normal pure sine wave inverter, turned on by the power switch on the item.





E. BATTERY

1) Current and voltage

The battery is designed to supply the unit with DC input voltage and the rated voltage should be in accordance with the rated input voltage of the inverter. Any voltage exceeds the range of the input voltage of the inverter will cause over voltage or under voltage protection.

In the meantime, the battery should supply sufficient current. The small capacity battery cannot drive the large power electrical appliance. In this case, the battery will be in under voltage protection because of the over-discharge of the battery.

The simple calculation method of battery current is: load power divided by battery voltage. Due to the consumption of the inverter itself, the actual current will be about 10% larger. For example, the voltage of battery is 12VDC, and load power is 1000W, therefore, the actual current of the battery is about 1000W÷12V×110%≈91.6A.

2) Battery operating time

Battery operating time depends on battery capacity and current, and the calculation formula of operating time is: battery capacity÷current=battery capacity÷(the load power÷battery voltage×110%). For example, battery specification is 12V, 2000Ah, load power is 1000W, so the total discharging time is 2000Ah÷(1000÷12×110%)≈21.8 hours.

Note: The result of formula above is on the basic of discharging rate of 20 hours of the battery, that is, the result is from the discharging current of 2000Ah battery not exceed 100A. When the charging current exceeds this value, the discharging period will reduce. And the quantity of the electricity of the battery may also influence the result. Please refer to the specification of the battery manufacturer.

F. CONNECTION

1) Grounding

The power inverter has a terminal on the rear panel marked " Grounding "or " ⏚ ". This is used to connect the chassis of the power inverter to the ground. The ground terminal has already connected to the ground wire of AC output receptacle through the internal connecting wire.

The ground terminal must be connected to the ground wire, which depends on where the power inverter is installed. In a vehicle, connect the ground terminal to the chassis of the vehicle. In a boat, connect it to the boat's grounding systems. In a fixed location, connect the ground terminal to earth.

Warning:

- To make sure the firmness of the connection. The ground wire must be 14AWG (2.08mm^2) or even larger.
- Do not operate the power inverter without connecting to the ground. Electric shock may be resulted.

2) Connect to the battery

(1) Please do all the safety precautions before connection, and then check whether the battery voltage is in accordance with the input voltage of the inverter. Only the voltage of the battery accords with the requirements can be allowed to connect with the inverter.

(2) The connecting wire must bear enough current. Depending on the table below, please choose the input DC wire or larger one.

Rated voltage of inverter	Current max. load power	Max. current of wire	Specification of wire length≤1m	Specification of wire length1-2m	Specification of wire length≤N m
12V	1200W	100A	6AWG (13.3mm^2)	3AWG (26.67mm^2)	N×6AWG (N×13.3mm^2)
	1500W	150A	4AWG (21.15mm^2)	1AWG (42.41mm^2)	N×4AWG (N×21.15mm^2)
	2000W	200A	3AWG (26.67mm^2)	0AWG (53.49mm^2)	N×3AWG (N×26.67mm^2)
	2500W	250A	2AWG (33.62mm^2)	00AWG (67.43mm^2)	N×2AWG (N×33.62mm^2)
	3000W	300A	1AWG (42.41mm^2)	000AWG (85.01mm^2)	N×1AWG (N×42.41mm^2)
24V	1200W	50A	9AWG (6.63mm^2)	6AWG (13.3mm^2)	N×9AWG (N×6.63mm^2)
	1500W	75A	7AWG (10.55mm^2)	4AWG (21.15mm^2)	N×7AWG (N×10.55mm^2)
	2000W	100A	6AWG (13.3mm^2)	3AWG (26.67mm^2)	N×6AWG (N×13.3mm^2)
	2500W	125A	5AWG (16.77mm^2)	2AWG (33.62mm^2)	N×5AWG (N×16.77mm^2)
	3000W	150A	4AWG (21.15mm^2)	1AWG (42.41mm^2)	N×4AWG (N×21.15mm^2)

Note:

(1) The table above is only for your reference. In practice, the thick wire can be replaced by two thin parallel wires if only the total cross-sectional area of the wire meets the requirements.

(2) In high current, the input DC wire may produce voltage drop, therefore, the operating voltage should be subject to the value on the terminals. If the voltage drop is too large, you can increase the cross-sectional area or reduce the length of the lead.

(3) Connect cathode wire of the battery to the cathode terminal (black) on the rear panel of inverter and then connect the anode wire of the battery to the anode terminal (red) on the inverter, and fix them.

Warning:

(1) Please wear eye patch and work clothes when working around the battery to protect your eyes and skin from the acid and corrosive objects.

(2) Prepare enough water and soap. In case the acid material splashes on your skin, clean it by soap and water as soon as possible. If the acid material spays to your eyes accidentally, clean it by cold water and then sent to hospital.
(3) Do not put any combustible material in the location of installation for it will result in spark when connected to the battery.
(4) Keep good ventilation. The battery may produce a little inflammable gas when it works, so keep away from the inverter and it is better to install them in different space.
(5) Fix the connecting wire of the input DC, or it will result in the over-reduction of the voltage or over-temperature of the inverter.
(6) Reverse connection of the polarities or the short circuit will burn the fuse or result in the permanent damage of the internal elements of inverter.
(7) Take away the metal accouterments, such as ring or watch, when installation, to avoid the short circuit.
(8) Although there is over-voltage protection, it may also cause damage of the inverter if the input voltage is too high.

3) Connection of the AC appliance

Put the load power plug of the AC appliance into the output AC receptacle of the inverter directly.

Warning:

(1) Make sure that the switches of the inverter and appliance power are in OFF position before connection.
(2) Check the power cord. If it is damaged, it should be connected after replacement.
(3) Each outlet of the inverter has a given current rating of the manufacturer. It shall not exceed this value during use. Otherwise, the socket may be damaged by overheating and may cause an electric shock. The maximum output power of a single socket is shown in the following table:

Output socket	AC output voltage	Single socket max output current	Single socket max output power
	110~120VAC	15A	1500W
	220~240VAC	16A	3000W
	220~240VAC	13A	2500W
	220~240VAC	10A	2000W
	220~240VAC	13A	2500W

4) Connection of big load

For the appliances with a load more than the limit of AC socket, please connect to the Hard Wire Terminals (if have), and make sure the ground terminal of inverter connected with ground terminal of appliance.

G. USAGE

1) How to use inverter

(1) Check the output voltage and capacity of the battery to make sure it is in accord with the requirements of the product.
(2) Connect the battery and the DC cable of the inverter to ensure that the polarities are not connected reversely and in tight connection.
(3) Long press the switch or the remote of inverter for over 0.5s and then stop, if the indicator light on the inverter or on the remote control box is on, it means the inverter starts to work normally. This opening method can avoid turning on the unit by mistakes due to the interference or any factors.
(4) Switch off electrical appliances and put its plug to the AC output socket of inverter. Then switch on electrical appliance.
(5) The cooling fans inside the inverter do not work until the case temperature rises up to about 104°F or the load power is more than 40% of rating power.
(6) Switch off inverter and remote to stop working. At that time, the indicator lights in. Both inverter and remote controller are off. The inverter does not consume current of the battery when it is switched off.

2) How to use USB power supply

This model with USB output, can provide stable voltage 5VDC, maximum current 2.4A directly for the portable device with USB port.

Note: Before using the USB power supply, please make sure the device can be charged by USB and the maximum working current is no more than 2.4A.

H. SOFT START TECHNOLOGY

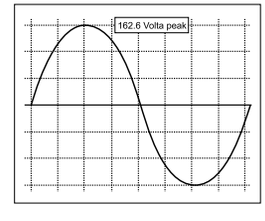
The soft start technology built into this inverter protects the unit from delivering too much AC power at once by gradually increasing the AC voltage pushed out.

To make sure that you are utilizing this feature, turn on the appliance being used before turning on the inverter. This is especially necessary for equipment that has an inductive load or electrical motor.

I. OUTPUT WAVE FORM

The output wave form of this inverter is Pure Sine Wave, which is much like the one from utility-supplied AC electricity, even more purer; pure sine wave is applicable in most of loads, including electrical equipments, such as Linear Adaptor, switching power supply, transformer, and motor and so on. Comparing with Modified wave form, for inductive loads such as refrigerator and electric fans, pure sine wave form can improve its power factor and the battery's efficiency and reduce working noises effectively from appliances. For capacitive loads such as adapter of lap-top, pure sine wave can lower the rush current at work and reduce interferences to increase reliability and prolong the life of the product.

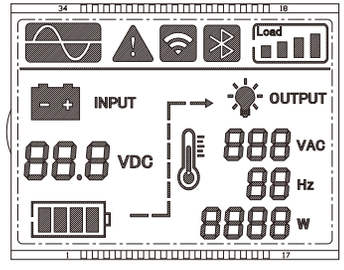
Pure Sine Wave Output
(120 VAC Model)



J. WORK INSTRUCTIONS

When item is working, the LCD display on inverter and remote controller will show battery status, input voltage, and output wattage. When item goes into protection, the LCD display on inverter and remote controller will show the following code:

(1) Warning Sign and IN: LOW is on: Input Low Voltage Protection
(2) Warning Sign and IN: HIGH is on: Input High Voltage Protection
(3) Warning Sign and OVERLOAD is on: Overload Protection or Short-Circuit Protection
(4) Warning Sign and Thermometer Sign is on: Overheat Protection



K. PROTECTION FUNCTION

1) Input Under-Voltage Alarm: When the input DC voltage is lower than 9.8V /19.6V, the buzzer will whistle intermittently to remind that the inverter will go into the under voltage protection.
2) Under Voltage Protection: The inverter will automatically shut down when the input DC voltage is lower than 9.5V/19V. The buzzer will whistle continuously and the green light is off, red light is on. Please turn off the inverter and use it after recharging the battery.
3) Over Voltage Protection: The inverter will automatically shut down when the input DC voltage is higher than 16V/32V. The buzzer will whistle continuously and the green light is off, red light is on. Please turn off the inverter and adjust the input voltage to the admissible range.
4) Overload Protection: The inverter will automatically shut down when the load is higher than the rated power. The buzzer will whistle continuously. Turn off the inverter and resume to normal operation after taking away the excessive load.
5) Short-Circuit Protection: The AC output will be automatically shut down when short circuited. It will automatically reset after the problem is solved.
6) Thermal Protection: The unit will get hot during operation. If the temperature is higher than 149°F, the inverter will automatically shut down. Then the buzzer will whistle continuously and the green light is off, red light is on. Please turn off the inverter, and continue using it after the temperature goes back to normal naturally. Meanwhile find out the factors causing the fault, such as ventilation, ambient temperature, vent, load power etc. It can avoid similar things from happening again.

L. TROUBLESHOOTING TIPS

Problem	Reason	Solutions
No output voltage, buzzer whistles continuously	Low Input DC Voltage	Low Input DC Voltage
	High Input DC Voltage	● Do not use it when the battery is charging ● Check the rated voltage of the battery and make sure that it is in the allowable range of the input voltage.
	Overload	Reduce the load power
	Over temperature	● Cut off the load and let it cool naturally for 10 to 30 minutes. ● Restart it after it resumes to normal temperature. Reduce the load. avoid blocking the vent and improve the ventilation condition.
No AC output voltage?	1.The power switch is off. 2.Poor contact with battery.	● Press the power switch for 1-2 second to turn it on. it is a long press type switch ● Check the cables and make sure they are tightly connected.
Output voltage below 100 V AC?	"True RMS"voltage meter is required to properly measure output voltage of modified wave inverter	● Test output voltage with a True RMS meter ● Try to maintain the input voltage in the range of rated power ● Change the battery of the meter then test again.
Cannot drive the load?	1.Load power is too large. Or the actual power of the appliance exceeds nominal power. 2.The starting power is larger than rated power (especially for appliances with motor) 3.Battery is too small.	● Reduce the load power, or turn on the appliance first, then turn on the inverter. ● Choose a bigger inverter ● Change a bigger battery and ensure fully charged.
Tester indicated "Open Ground"?	This is because it is not connected to a"true Earth ground ", meaning it is not connected to a metal rod stuck in the Earth. it would be impossible to do so in a boat or car while moving. The power inverter DOES NOT and cannot create a true Earth ground on its own.	● Don't need the tester to do the Grounding Test. ● Refer to the manual to do the Grounding
Starting alarm ?	The main reason is that ths instantaneous current is too large, which leads to the detection of low voltage and trigger under-voltage alarm.	Please restart the inverter several times.
Got 40V or so while testing inverter's ground wire and zero line?	This voltage has no meaning, zero line can be ground.	This is normal, there is no current leakage.

If the unit still doesn't work normally after using all the methods above, it maybe the internal faults of the circuit. Please contact seller for warranty.