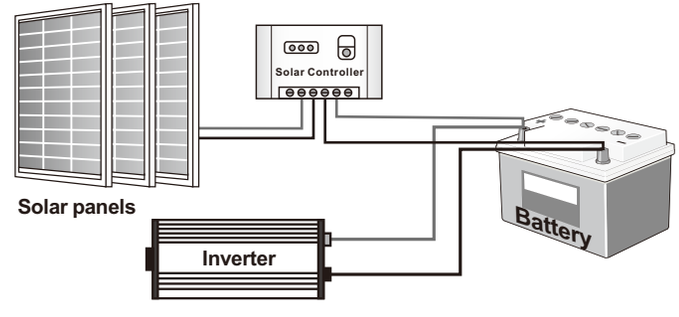
GIANDEL®

DC to AC
PURE SINE WAVE
POWER INVERTER

USER MANUAL



MODEL: PS-2000ATS □
PS-3000 ATS □

International application No. PCT/CN2023/131406

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

USER MANUAL

GIANDEL®

www.giandel.com 769-486-2790
support@giandel.com.au

V0.26. 01

1. SPECIFICATIONS

Model	PS-2000ATS		PS-3000ATS	
Input Voltage	12VDC	24VDC	12VDC	24VDC
Rated Power	2000W		3000W	
Output overload power	2200W		3200W	
Surge Peak Power	(At 120V: 4100W, error < 10%) for 2 seconds (resistive load)		(At 120V: 6100W, error < 10%) for 2 seconds (resistive load)	
DC Input Range	9.5~16VDC ± 0.3VDC	19-32VDC ± 0.5VDC	9.5~16VDC ± 0.3VDC	19-32VDC ± 0.5VDC
High Input Voltage Protection	Default: DC16V ± 0.5V	Default: DC32V ± 0.5V	Default: DC16V ± 0.5V	Default: DC32V ± 0.5V
Input Low-voltage Protection	LEAD ACID (DC9.5VDC), NCM (11.2VDC), LiFeP04/GEL (10.4V)	The protection voltage is set according to the battery type selected by the external toggle switch: (ACID) 19V for lead-acid battery, (NCM) 22.4V for ternary lithium battery, and (LiFePO4/GEL) 20.8V for lithium iron phosphate and gel batteries. Protection is activated, and the buzzer alarms. When the input voltage returns to 25V, the product resumes normal operation.	LEAD ACID (DC9.5VDC), NCM (11.2VDC), LiFeP04/GEL (10.4V)	The protection voltage is set according to the battery type selected by the external toggle switch: (ACID) 19V for lead-acid battery, (NCM) 22.4V for ternary lithium battery, and (LiFePO4/GEL) 20.8V for lithium iron phosphate and gel batteries. Protection is activated, and the buzzer alarms. When the input voltage returns to 25V, the product resumes normal operation.
Input Low-voltage Alarm	LEAD ACID (DC9.8VDC), NCM (11.5VDC), LiFeP04/GEL (10.7VDC)	The intermittent buzzer reminder will be triggered at the following voltage values, based on the battery type selected by the external toggle switch: Lead-Acid Battery (ACID): 19.6V, Ternary Lithium Battery (NCM): 23V, Lithium Iron Phosphate and Gel Battery (LiFePO4/GEL): 21.4V.	LEAD ACID (DC9.8VDC), NCM (11.5VDC), LiFeP04/GEL (10.7VDC)	The intermittent buzzer reminder will be triggered at the following voltage values, based on the battery type selected by the external toggle switch: Lead-Acid Battery (ACID): 19.6V, Ternary Lithium Battery (NCM): 23V, Lithium Iron Phosphate and Gel Battery (LiFePO4/GEL): 21.4V.

Model	PS-2000ATS		PS-3000ATS	
Output Voltage	110~120VAC ± 10%			
Output Frequency	60Hz ± 1Hz			
Output Wave Form	Pure sine wave (THD⩽3%)			
Efficiency	About 90%			
Normal Working status	The green light flashes during inverter output operation, stays constantly lit when using utility power output, and lights up red during protection.			
Mains Power Priority	Mains Power Priority is the default setting. When the utility voltage drops below 80V, the output switches to the inverter; when the voltage recovers above 100V, it switches back to utility power. The conversion time is less than 20ms.			
High Temperature Protection	60 ± 5℃ (140 ± 41℉)			
Output Short-circuit Protection	Protect in 0.1 Second. Automatic restart after 30 seconds.			
Input Reversed Polarity Protection	Protect in 0.1-5 Seconds			
Overload Protection	Stop working in 0.1 second. Automatic restart for 3-5 seconds.			
Remote Control	Wireless Remote and Wired Remote			
Function Settings	1. Working Temperature Display (Wired Remote) 2.Countdown Shutdown Setting (Wired Remote) 3.Battery Type Setting (Side Panel Toggle Switch) 4.N/G (Neutral-to-Ground) Connection Toggle Switch			
USB Output	Fast charge USB Type-A×1,USB Type-C×1			
No Load Current	0.6A-2A	0.3-1.5A	0.5A-2.5A	0.25-1.5A
Intelligent Cooling Fan	1. Cooling fan works when temperature around 3100±41°F or load ⩾1000W and stop running around 95±41°F or load ⩽800W 2. Remarks: Overload power will start the fan and stop after 60 seconds.		1. Cooling fan works when temperature around 100±41°F or load ⩾1500W and stop running around 95±41°F or load ⩽1300W 2. Remarks: Overload power will start the fan and stop after 60 seconds.	
Working Temperature	-22 ~ 122°F (-30 ~ 50°C)			
Storage Temperature	-22 ~ 122°F (-30 ~ 50°C)			
Size (L×W×H)	44x26.5x11cm		47x26.5x11cm	
Weight	4.8kg	4.6kg	5.6kg	5.3kg

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

2. INSTRUCTION

The power inverter product line is used for back-up power. The power inverter transforms DC (direct current) electricity into AC (alternating current) power that can be used for running a wide variety of tools and appliances. This inverter is perfect for providing mobile power in cars, boats and work trucks. The inverter can also be utilized as a back-up source of electricity in the event of an electrical failure or for several off-grid applications such as camping or in your RV.

This high surge power product is a major invention and innovation technology of our research team in the inverter industry. We applied for international patent PCT application number PCT/CN2023/131406 in 2024.

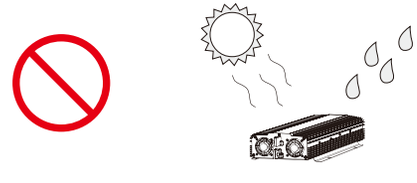
The innovation focus of this newly produced patented technology is the high surge peak power (120V) for 2 seconds, which can achieve continuous output power about twice as high as the peak power and maintain it for 2 seconds. Please view the oscilloscope video on our website or store, this is a wonderful innovation! If you are an electrical engineer or electronics professional, you will understand the importance of the innovative performance we are introducing! The nominal peak power of inverter products in the same industry that you see in the market is the theoretical value, which cannot be displayed on an oscilloscope for 2 seconds. This solves the problem of insufficient ability to start inductive loads in high-frequency inverters designed and manufactured with transistors since the invention of transistors in the 1950s. Our innovative technology maintains the surge peak power for 2 seconds, aiming to provide sufficient starting time for inductive loads and enable them to be started at once. This new feature provides a good experience for starting air compressors, air conditioners, coffee machines, washing machines, and high-power electric tools in one go. It has the feature of strong load capacity as low-frequency inverters. This is a significant achievement of my research team last year!

Please read this instruction manual carefully and make sure your inverter is installed properly before using make sure your inverter is installed properly before using.

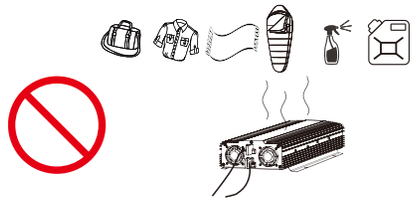
3. WARNING AND SAFETY

- **For first-time use or reuse after a long-term storage , please keep the inverter working without load for 30 minutes to 1 hour to pre-charge the capacitors, which will help extend the product's lifespan.**
- While opening the product package, please check the integrity of the product and accessories. If there is any problem, please do not use it.
- 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.
- 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.
- Prevent body contact with grounded surfaces such as pipes, radiators, ranges, and refrigerator enclosures during installation.
- Do not operate the inverter if under the influence of alcohol or medicine. Read warning labels on prescriptions to determine if your judgement or reflexes are impaired while taking medicine. If there is any doubt, do not operate the inverter.
- 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.
- This product cannot be used for medical and life support equipment.

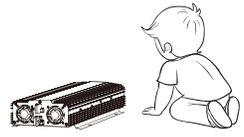
- **Do not** expose the unit under direct sunlight or get close to heat sources.
  Do not use the unit in rain or damp environments. The normal working temperature is -30-50℃, and the ideal temperature is10-25℃.



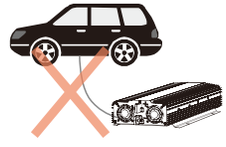
- **Avoid** the working unit contact with poor heat resistance or flammable materials.



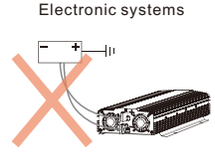
- **Keep children away from the inverter and its components**



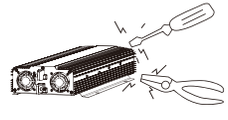
- While using inverters in vehicle, it is prohibited to use the chassis or frame as wires to connect the input terminals of inverter, the provided cables or special cables should be used.



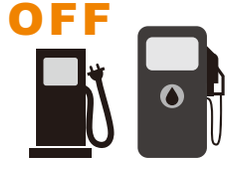
- This inverter is suitable for electronic systems with negative grounding, and should not be connected to electronic systems with positive grounding (currently, most vehicles and ships use negative grounding)



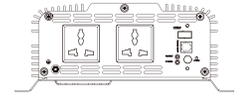
- **Do not** disassemble the unit randomly: it may cause fire or electric shock. This device should only be serviced by a qualified technician.



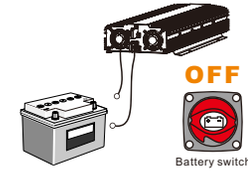
- When the inverter is installed in vehicle, it must be turned off before entering the petrol station to ensure safety.



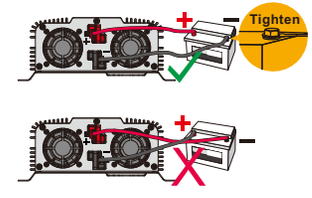
- Keep the output port clean and tidy



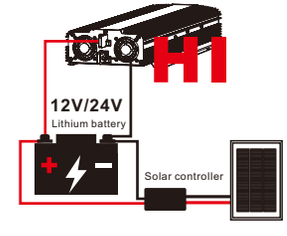
- Disconnect the inverter and battery if not use for a long time to avoid accidental start-up.



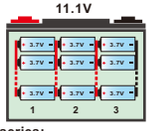
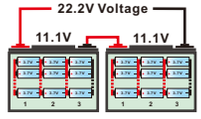
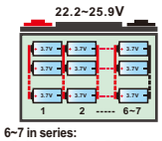
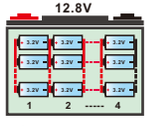
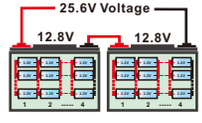
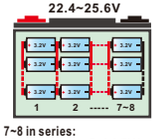
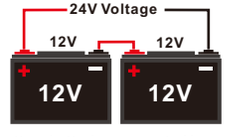
- Tighten connection needed, poor connection will cause voltage drop or posts melt. Reversely connect the cables for 0.1-5 seconds will blow the fuses. Do not reverse connect cables.



- The lithium battery usually has its own protection voltage which may be different with inverter's. The battery usually shuts down for over charging at about 14.5V /29V which will cause inverter stop working for no input voltage or HI for direct charging from charger.

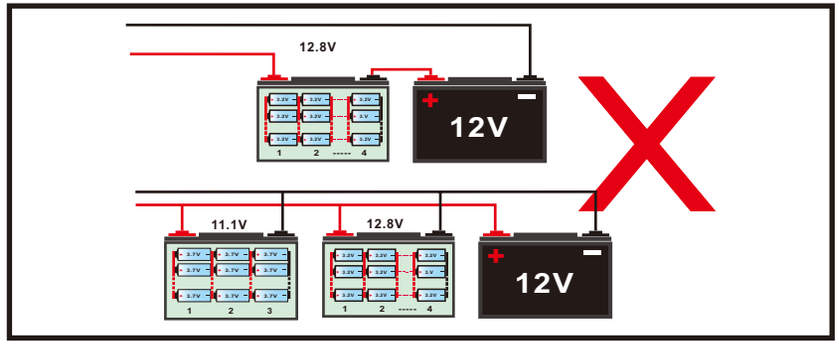


● Inverter support battery types

Inverter Version / Battery type	12V Inverter	24V Inverter
NCM (Ternary lithium battery)	 ✓ 3 in series: Only supports 3 3.7V battery cells in series ,with a voltage of approximately 11.1V,and a voltage of approximately 12.6V when fully charged.	 2 battery packs with 3 strings  ✓ 6~7 in series: Only supports 6~7 3.7V battery cells in series ,with a voltage of approximately 22.2~25.9V,and a voltage of approximately 25.2~29.4V when fully charged.
LiFePO4 (Lithium iron phosphate battery)	 ✓ 4 in series: Only supports 4 3.7V battery cells in series ,with a voltage of approximately 12.8V,and a voltage of approximately 14.8V when fully charged.	 2 battery packs with 4 strings  ✓ 7~8 in series: Only supports 7~8 3.7V battery cells in series ,with a voltage of approximately 22.4~25.6V,and a voltage of approximately 25.9~29.6V when fully charged.
ACID/GEL (Lead acid / Gel battery)	 ✓	 ✓ 2 battery batteries connected in series

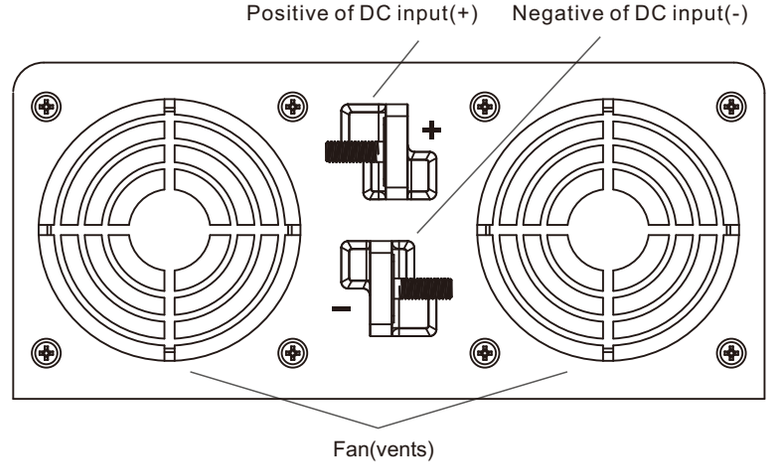
WARNING: ⚠

Prohibit series and parallel connection of different types of batteries, only batteries of same type and batch can be connected series or parallel !

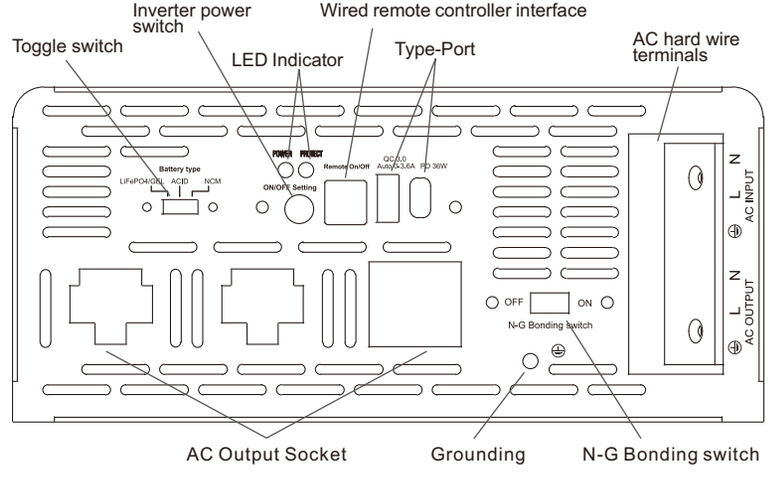


4. PARTS LIST

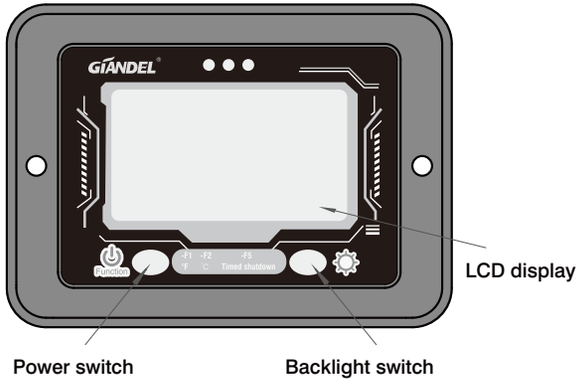
(1) DC Input Side



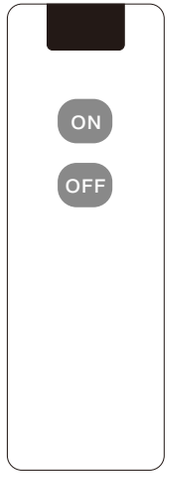
(2) AC Input Side



(3) Remote controller box



(4) Model R9 Wireless Remote



1. Operation：Long press ON for 1s to turn on the inverter, long press OFF for 1S to turn off it.
2. Quantity of remote Matched pairs the inverter：max.10 pieces of wireless remote with frequency 433M .
3. How to make the matched pairs：Press and hold the power button for about 5 seconds while the device is turned off. If you hear a continuous "2 beeps" sound, release the button and press any button on the remote control within 5 seconds to pair. If the pairing is successful, you will hear a "beep" sound and display the captured remote control key before exiting. Otherwise, it will automatically exit after 5 seconds of inactivity. Wireless remote control works within a range of approximately 20 meters under obstacle free conditions.
4. Paired key viewing and clearing: After the inverter enters pairing mode, long press the button for 2 seconds to clear all paired keys. Short press the button to switch to show 10 sets of hexadecimal wireless remote control keys. A display of 0 indicates that there is no key at that location. Otherwise, pairing may inevitably result in incorrect pairing of other remote controls pressed at the same time. In case of incorrect pairing, you can perform a key clearing operation and re pair.

5. INSTALLATION

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 -30-50℃, preferably a temperature of 10-25℃, 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 install the products in the dusty, wood chips or other particles, If cooling fan is turned on, the particles involved in the inside of the product, thus affecting the normal work.

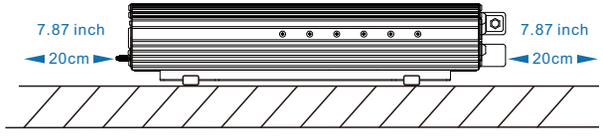
(5) While inverters and batteries connected, will produce arcs or sparks, so there should not be around flammable objects such as gasoline, alcohol, etc.

2) Install the inverter

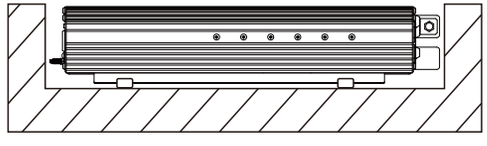
Mounting position precaution

(1) The inverter should be installed indoors or in a carriageon a platform or support frame with good load-bearing capacity , and should not be installed in a narrow space. A space of 8" (20cm) should be reserved around it for heat dissipation, ventilation, and to avoid collisions between the inverter and the inner wall. It should be kept away from rainwater, dust, and kept clean, dry, and tidy.

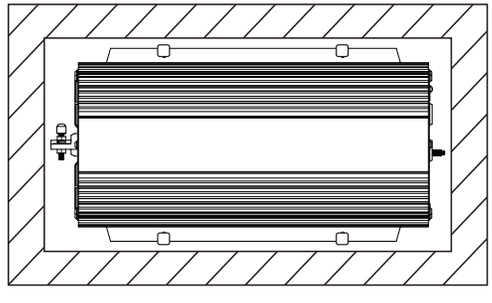
(2) Be sure to affix the product with screws to keep it from falling or moving



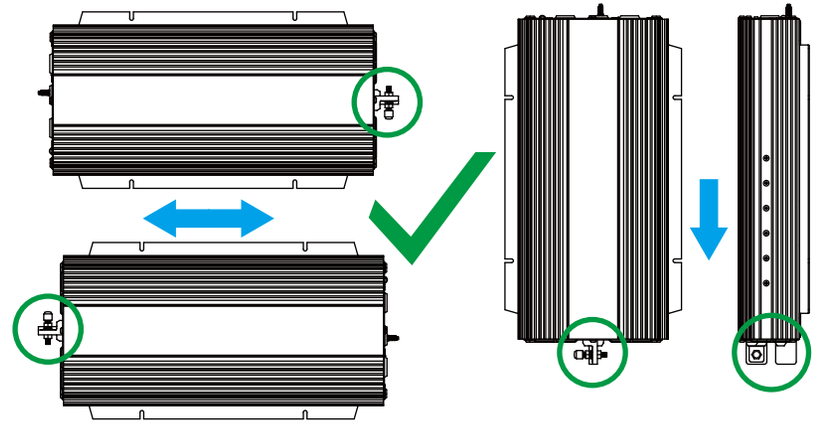


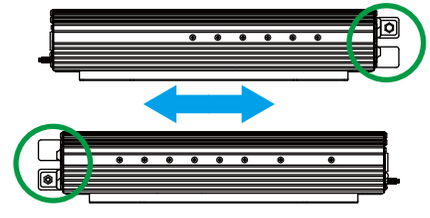


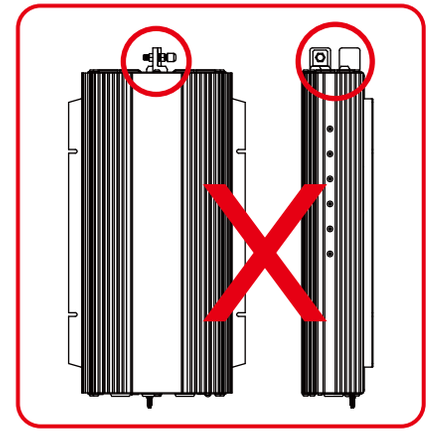




Mounting Directions: The inverter can be mounted to a suitable horizontal or vertical panel. Please keep 8" (20cm) adequate ventilation space for the cooling fan. If you mont the inverter vertically, please keep the DC terminals side downward.



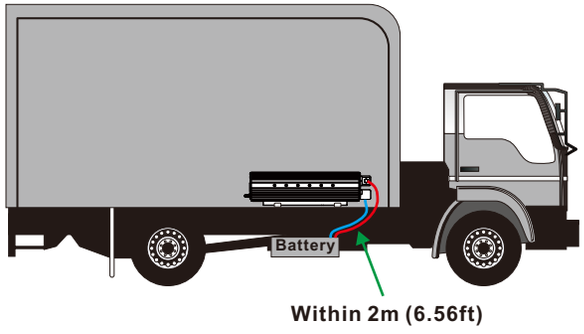


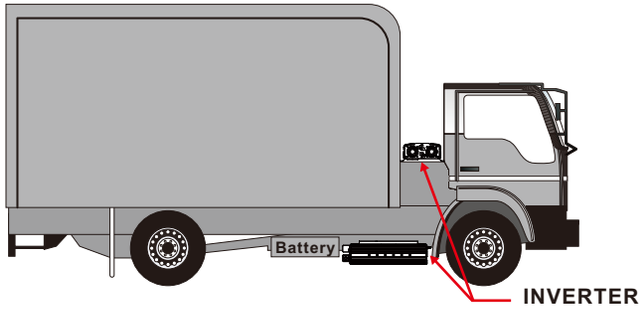


Installation in a truck or trailer :

(1) Do not install the unit outside the carriage or at the bottom of the frame. Shock proof pads must be installed for firmly fixing .

(2) If possible, the cable length should be shortened to within 2 meter and refer to the cable length specification table in the manual to choose suitable cables.





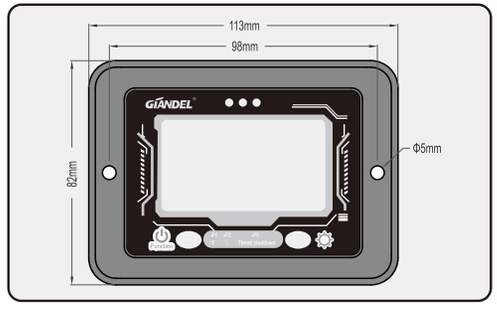
3) Installation of remote control box

(1) Fixed on the plane with an opening, then fix two screws directly on the position of two installation holes of the remote control box.

(2) The remote control box can also be installed on the base of electrical socket.

(3) Connect the connection between the remote control box and the inverter.

Note: This product can also be used as a common inverter without connecting the remote control box.



6. BATTERY

1) Current and voltage of battery

The battery is used to supply the DC input voltage required by the product, and its rated voltage must be in line with the rated input voltage of the inverter, beyond the input voltage range of the inverter, and the cross connection will cause the product to be under voltage or under voltage protection.

At the same time, the battery must provide enough current for inverter, a small capacity battery is not able to drive high power appliances, in this case, usually due to excessive current and battery discharge the battery terminal voltage low, under voltage protection products appear.

The simple formula for the battery current is the load power / the battery voltage. As the inverter itself will be part of the loss, so the actual current will be greater than this value of about 10%. For example: the battery voltage is 12VDC, the load power is 1000W, then the actual current size of the battery is about 1000W÷12V×110%=91.6A

2) Battery working time

The using time of battery depends on battery capacity (AH) and the power of the connected load (W), the calculating method is: Time (hours) =battery capacity (AH) x battery output voltage (V) x efficiency rate ÷ electrical power of using (W) such as the 12V DC input inverter uses the 12V battery, if the battery capacity is 2000AH and at this time the inverter is driving 1000W power load, the efficiency rate is 90% when the battery is full, according to the formula above, the battery use time =2000(AH) / (1000 / 12x110%) = 21.8 (Hour). This means the battery can be used for 21.8 hours.

Note: The above formula is the calculation result of the battery discharging rate in 20 hours, that is, when the discharging current of 2000 Ah battery does not exceed 100A, the discharging time will be shortened when the discharging current exceeds this value. This part can refer to the battery manufacturer's specifications, and whether the battery is fully charged will also affect this result.

3) Battery size recommendation

Inverter Version	Inverter Rating power	Max Current (A)	Battery for lasting 1 hour	Battery for lasting 2 hours	Batteries for N hours
12V	600W	57	70	140	Nx70AH
	1000W	95	115	230	Nx115AH
	1200W	114	140	280	Nx140AH
	1500W/1600W	152	180	360	Nx180AH
	2000W/2200W	209	250	500	Nx250AH
	2500W	238	290	580	Nx290AH
	3000W	285	340	680	Nx340AH
	4000W	380	460	920	Nx460AH
	5000W	475	570	1140	Nx570AH

NOTE:

1. The battery specifications provided in the above table are for reference only. The selection and use of the battery should also refer to the battery instructions, especially for Lithium battery and LifePO4 batteries, such as: whether the maximum discharge current of the battery meets the working current of the product; Whether the low-voltage protection of the battery is within the working range of the product, etc. Furthermore, whether the battery is fully charged or false capacity labeled which will lead to insufficient working hours of the product. According to the life span of the battery, the battery capacity will decline after long term of use, which will also affect the working hours of the product.

2. Recommend using "Deep Cycle" or Marine rated batteries.

WARNING: ⚠

1. Do not connect different brand or different capacity, specification of batteries in series or parallel, it is unsafe and may damage the batteries or inverter.

2. **The inverter can be used while charging battery by solar system.** But it's not recommended to use inverter while the battery is being charged by mains power or shore power. Because the DC output ripple purity from different chargers is different, when charge battery by the charger whose input and output isolation circuit is fail, it will easily damage the capacitors and important semiconductor inside inverter, such as mosfets and integrated circuit. In the long term, this will shorten the lifespan of inverter. When the inverter is used while

charging battery by mains/ shore power, the voltage fluctuation at both ends of the battery is relatively large, **and the ripple voltage and current will cause the following adverse factors:**a. The battery cannot be fully charged when the inverter is working, and the charging voltage ripple will affect battery life.

b. While charging battery, the ripple voltage and current are large, and the input voltage and current are unstable, which will affect the working efficiency of the inverter and easily damage the product.

c. The charging device that charges the battery may cause high charging voltage, which will trigger the inverter input high voltage protection and affect the work of the inverter. If it happens, the charging device must be disconnected.

3. Although using inverter while battery is charging by solar system won't do harm to battery, it is still recommended to set the charging voltage(with connected battery) be lower than inverter high input protection voltage. And please turn on inverter and then connect solar system, this will effectively avoid the high virtual voltage from solar system trigger inverter input high voltage protection.

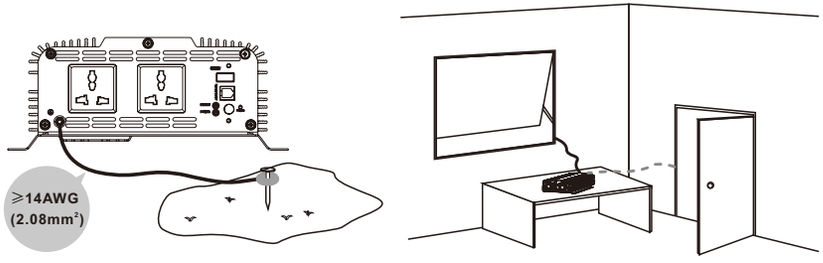
7. CONNECTION

1) Grounding

The power inverter has a terminal on the back 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 will vary depending on where the power inverter is installed.

1.In some fixed available position	Connect the ground terminal to the earth
2.Indoor conditions	A. Connect to household metal water pipes, metal frames (door frames, window frames) connected to the earth B. Connect to the nails on the wall or ground which contact to the earth C. Connect to the grounding system of the mains grid which is connected to the ground wire of the socket (Note: this connection must be operated by a professional electrician)
3. Outdoor conditions	Connect one end of earth wire to the inverter grounding terminal, the other end to the nail and insert to the earth.
4. In a Vehicle, boat or ship	Connect to the chassis of vehicle or grounding system of boat, ship.



WARNING: ⚠

- **Connect the earth terminal of inverter to any wall, floor or objects connected to the ground.**
- **To make sure the firmness of the connection. The ground wire must be 14AWG (2.08mm²) or even larger.**
- **Do not operate the power inverter without connecting to ground. Electric shock hazard may result.**

2) Connect to 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 12 voltage of the battery accords with the requirements can be allowed to connect with the 12V inverter.

(2) Secure the provided Negative (black) DC cable connect to the Negative (-) bolt on the inverter, and the other end to the Negative (-) post on the battery.

(3) Secure the provided Positive (Red) DC cable to the Positive (+) bolt on the inverter, and the other end to the Positive (+) post on the battery.

(4) The nuts of the connection posts must be tightened to ensure well connected.

(5) The input cables must be able to withstand sufficient current. If its cross-sectional area is too small, it will cause a significant voltage drop, which will prevent the product from carrying high-power loads. Refer to the below table to choose suitable cables.

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	1500W	150A	4AWG (21.15mm²)	1AWG (42.41mm²)	N×4AWG (N×21.15mm²)
	2000W	200A	3AWG (26.67mm²)	0AWG (53.49mm²)	N×3AWG (N×26.67mm²)
	3000W	300A	1AWG (42.41 mm²)	2×1AWG (84.82mm²)	N×1AWG (Nx42.41mm²)
	4000W	400A	0AWG (53.49mm²)	2×0AWG (107 mm²)	N×0AWG (Nx53.49mm²)
	5000W	500A	00AWG (67.43 mm²)	2×00AWG (135mm²)	N×1AWG (Nx67.43mm²)

NOTICE:

1. The above table is only for your reference. In practice, the thick wire can be replaced by two thin parallel wires if only the total section acreage 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 acreage of the section or reduce the length of the lead. The recommended length of lead is less than 1m.

3. Connect cathode wire of the battery to the cathode terminal (black) on the back 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 avoid the acid and corrosive objects harm your eyes and skin.

(2) Prepare enough water and soap. In case the acid materials contact eyes or skin, clean it by soap and water as soon as possible. If the acid materials spay to your eyes accidentally, clean it by cold water immediately and then sent to hospital.

(3) Do not put any combustible material in the location of installation for spark will result when it is 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 the over-reduction of the voltage or over-temperature of the wire.

(6) Reversed polarity for 0.1-5 seconds will burn out built-in fuses, or may cause permanent damage to internal components.

(7) Take away the metal accouterment, such as ring or watch, while installing 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.

(9) 3*3.7V(24V: 6*3.7V) lithium batteries in series reach 12.6V(25.2V) when fully charged, and four(eight) such batteries reach 16.8V (33.6V), both exceeding the product's operating voltage range. Although overvoltage protection function is provided, excessively high input voltage may still damage the inverter.

3) Connection of the AC appliance

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

WARNING: ⚠

1. Make sure that the switches of appliance power are in OFF position before connection.
2. Check the power cord. If it is damaged, it should be connected after replacing.

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 or 20A	1500W/2400W
	220~240VAC	16A	3000W
	220~240VAC	13A	2500W
	220~240VAC	10A	2000W
	220~240VAC	13A	2500W

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), make sure the ground terminal of inverter connected with ground terminal ⏚ of appliance.

WARNING: ⚠

Inductive loads like refrigerator, A/C, pump, Microwave etc require a large rush of power to start, they can draw up to 3-10 times of their rating power, so with same rating power, the inverter may not power up the inductive loads. An inverter with 3-10 times of the rating may be required.

Resistive Loads like toasters, heat pads, electric stove etc work by generating heat which draw high current, a typical battery bank would be drained quickly. Therefore bigger battery group may require.

⚠ **Caution:** Don't overload the inverter.

4) Hard wire block terminals

The hard wire block terminals are specially designed for heavy duty loads over 1500Watts. Please refer to the bellow table to choose suitable wires:

Input Voltage	Max power of load	Output Voltage	Max current	Wire for 1 meter	Wire for 1-2 meter	Wire for N meter
12V / 24V	2000W	120V	17A	13AWG 2.6mm²	10AWG 5.26mm²	N×2.6mm²
	2200W		18A	13AWG 2.6mm²	10AWG 5.26mm²	N×2.6mm²
	2500W		21A	12AWG 3.3mm²	9AWG 6.63mm²	N×3.3mm²
	3000W		25A	11AWG 4.2mm²	8AWG 8.37mm²	N×4.2mm²
	4000W		33A	10AWG 5.26mm²	7AWG 10.55mm²	N×5.26mm²
	5000W		42A	9AWG 6.63mm²	6AWG 13.30mm²	N×6.63mm²

8. 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 remoter 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 that 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 40℃or the load power is more than 40% of rated power.

(6) Switch off inverter and remoter to stop working. At that time, the indicator lights in. Both inverter and remoter are off. The inverter does not consume current of the battery when it is switched off.

2) How to use USB power supply

(1) USB Type-A port × 1:

- QC output: 5V--3.6A, 9V--2.5A, 12V--2A Note: (Test voltage is above 13V)

- Fast charging with a maximum output of 24W
- Supports fast charging protocols: QC3.0/QC2.0/BC1.2DCP/AFC/SCP/CP/PE2.0

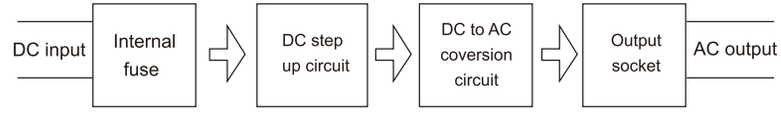
2) USB Type-C port × 1:

- PD output: 5V--3A 9V--3A 12V-3A Note: (Test voltage is above 13V)
- Maximum output power of fast charging 36W
- Support for fast charging: PD3.0/ PD2.0/ PPS/ BC1.2DCP/ QC4/ QC3.0/ QC2.0/AFC/FCPS/SCP/PE2.0
- The fast charging output protocol is determined by the mobile phone charging request, and the maximum power that can be achieved during charging is subject to actual testing.

9. OPERATIONAL PRINCIPLE

The inverter converts DC to AC, conversion process is divided into two steps, the first step is to convert low voltage DC to high voltage DC , the second step is using the full bridge converter tech to convert high voltage direct current into alternating current.

The conversion circuit adopts advanced power device and high frequency power conversion technology. Compared with the traditional inverter using the power frequency transformer, it has the characteristics of small size, light weight and high conversion efficiency etc.



10. SOFT START TECHNOLOGY

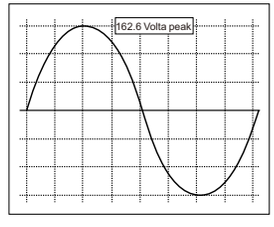
This inverter has soft start technology, which means that after turning on the inverter switch, the output voltage gradually increases from low to normal value. This feature can reduce the large current surge at the moment of starting the appliance, helping to start loads that are difficult to start.

11. OUTPUT VOLTAGE & WAVEFORM

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)



12. WORK INSTRUCTIONS

Normal working state: The green light is on during normal operation, and the red light is on during protection.

13. PROTECTION FUNCTIONS

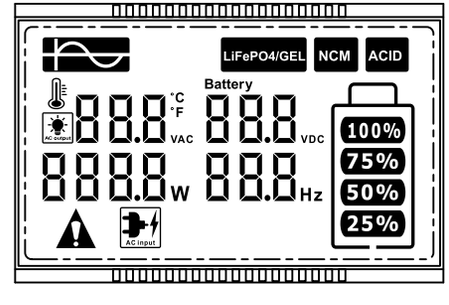
1. Input low voltage reminder: Set the voltage value according to the battery type selected by the external toggle switch setting function (lead-acid battery (ACID) 9.8V/19.6V, ternary lithium battery (NCM) 11.5V/23V, lithium iron phosphate battery and gel battery (LiFePO4/GEL) 10.7V/21.4V) reminder, intermittent buzzing;
2. Input low voltage protection and recovery voltage (LO): Protection value:lead-acid battery (ACID) 9.5V/19V, ternary lithium battery (NCM) 11.2V/22.4V, LiFePO4/GEL 10.4V/20.8V. When the input voltage returns to 12.5V/25V, the product resumes normal operation.

3. Input overvoltage protection and recovery voltage (HI): DC16V/32V, buzzer alarm red light on, when the input voltage returns to 14V/28V, the product resumes normal operation.
4. Output short circuit protection (OL): Yes, it can be restarted. The buzzer will sound an alarm and restart after 20 seconds.
5. Continuous protection: Overload and short circuit protection output will not recover after 3 consecutive protections.
6. Work protection temperature (based on display): 60℃ ± 5℃, buzzer alarm, restart when temperature ≤50℃.
7. Buzzer protection alarm automatic shutdown function: After protection, the alarm will sound for 1 minute and stop.
8. Output power overload reminder and protection:

1. Output overload reminder power: greater than 2200<4200W (3200<6200W), enter overload protection state after intermittent buzzing for 2 seconds.
2. Output overload reminder recovery power: ≤ 2000W (3000W)
3. Output surge protection power: ≥ 4200W(6200W), buzzer beeps continuously, restart after 20 seconds.
4. Test conditions: When fully loaded, the input voltage is 13V, and the instantaneous battery current is more than 440A/220A(660A/300A)

14. R11C WIRED REMOTE

1. **Display:** ①DC input Voltage, ②AC output voltage, ③Frequency, ④Power of load, ⑤Symbol of battery level, ⑥Battery Type, ⑦Symbol of Pure Sine Wave.



2. Operation:

1) Power On: Long press the power button on the inverter or remote until you hear a "beep" (hold for more than 1 second), then release. The buzzer will sound a second "beep" to indicate completion. Soft start time: 3-6 seconds.

2) Backlight Key: Press once to turn the backlight on; press again to turn it off.

3) Power Off: Long press the power button on the inverter or remote until you hear a "beep" to complete shutdown.

4) Power-On Beep Meaning: The first beep indicates power-on and soft start initiation; the second beep indicates startup completion.

5) Backlight Key: Press once to turn the backlight on; press again to turn it off.

3. When Using Mains Power:

The AC input mains power icon lights up. When using the inverter, the icon remains off.

4. Working Temperature Display (F1/F2):

① Fahrenheit Temperature: On the main interface, single-click the F1 key to switch to Fahrenheit display; single-click again to return to AC voltage display.

② Celsius Temperature: On the main interface, double-click the F2 key to switch to Celsius display; single-click again to return to AC voltage display.

③ The displayed temperature is the working temperature near the front-end MOSFET (at the thermistor location), Error: ±5℃.

5. Countdown shutdown timer (F5):

1) ① The countdown shutdown timer function is represented by F5, which can be set from 1 minute to 100 hours, and the time can be set with an tolerance of ± 2 seconds / hour.

② To enter the countdown shutdown time setting interface: On the main interface, continuously single-click the function key until the screen displays F5, then release the key to enter the setting.

③ During the last 10 seconds of the countdown, a "beep-beep" sound will provide a protective status prompt. The timing is unaffected. If shut down midway, the countdown setting will be cleared due to power loss.

2) After the countdown ends: The product stops working. The display turns off and then shuts down. Long press any key to restart.

3) Shutdown Time Adjustment Operation:

A. When the time is flashing, it is in an adjustable state. Settings can be changed from hours to minutes, with the value switching every 5 seconds.

B. A short press of the key increases the value. A long press of the key clears the value to zero.

C. If no shutdown time is set, the setting interface will automatically exit after 10 seconds.

4) Countdown Shutdown Interface:

A. After setting a shutdown time, the interface automatically exits and displays the countdown time in hours, minutes, and seconds.

B. On the countdown display interface, a single click returns to the main interface, and the countdown task runs in the background. A long press until a "beep" sound clears and closes the countdown shutdown task.

C. If a countdown shutdown task is running in the background, continuously single-clicking the key on the main interface until F5 is displayed will re-show the countdown time.

6. Battery level display:

The bottom first bar of battery icon blinks: ≤ According to the set protection voltage (default 9.5V)+0.3V,

① The bottom first bar of battery icon lights up:>According to the set protection voltage (default 9.5V)+0.3V, 25%

② The bottom two bars of battery icon light up: ≥ 11.5V, 50%,

③ The bottom three bars of battery icon light up: ≥ 12.5V, 75%

④ The bottom four bars of battery icon light up: ≥ 13.5V, 100%

7. Output Terminal (N/G) Leakage Connection Switch: When set to the ON position, the internal neutral line and the ground wire are bonded; when set to the OFF position,neutral and ground wire are not bonded .The primary function of this N/G bonding switch is to complete the protective earth circuit when an external residual current device (RCD) is installed. When an appliance generates a leakage current, the current flows back through the ground wire, creating an unbalanced zero-sequence current within the externally installed RCD. If this current reaches the RCD's protection threshold, it will immediately trip to provide protection. However, note that since this product is an isolated inverter, when no external RCD is installed, the switch must be set to the OFF position to disconnect the internal N/G connection for better safety.

15. HOW TO CHANGE FUSE

1. Firstly disconnect the inverter and external batteries, solar panels, load etc all the connections.
2. Unscrew the side plate screws and pull out the bottom plate.
3. Use pliers to clamp fuse inside the product, and pull out .
4. Replace the same specifications of the fuse, and then install the bottom and side panels, and screw well.






16. TROUBLESHOOTING TIPS

Problem	Reason	Solutions
No output voltage and buzzer sounds continuous or intermittent and shutdown?	An alarm is triggered when the input voltage is too low. The 12V version defaults to below 9.8 ± 0.3VDC, and the 24V version defaults to below 19.6 ± 0.3VDC to start the alarm.	● Recharge the battery ● Battery may be too small. Please refer to instruction for recommended battery sizes. ● Check the cable connections and ensure the cable sizes are sufficient. Use provided cables if included. The shorter and thicker cables the better. ● One or some of the batteries in the battery group may be defective, remove the defective battery ● The inline fuse (if has) may be too small.
	High input DC voltage. The input battery voltage is above 16V(12V version) or 32V (24V version)	● Check the battery charger is not connected to the battery. ● Do not use it when the battery is charging Disconnect the solar panel while the battery is fully charged. ● Confirm whether the input battery is correct.
	Overload	Reduce the load power or choose a bigger inverter.
	Over temperature	● Turn 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 . 3. Inline fuse(if has) may be burnt.	● 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 . ● Check the inline fuse is fine or remove circuit breaker to test the inverter again. ● One or some of the batteries in the battery group may be defective, remove the defective battery.
Output voltage below 100Vac (110-120V inverter) or 200 Vac (220-240V inverter) ?	A True RMS multi 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 even less power than the size of inverter?	1 . Power of load is too large, or the actual power of the appliance exceeds the max power of inverter. 2 . The starting power is larger than rated power (especially for appliances with motor, this kind of inductive loads require a large rush of power to start. Even a 80W fridge may need a 1000 watt inverter) . 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. ● The inline fuse(if has) may be too small. ● Choose the shorter and thicker cables.

Problem	Reason	Solutions
Starting alarm ?	The main reason is that the instantaneous current is too large, which leads to the detection of low voltage and triggles 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.
Cooling Fan noisy	Object may be stuck in fan	Inspect fan area at rear of unit to ensure no object is obstructing fan movement.

⚠ **WARNING: REVERSE CONNECTED THE CABLES WILL DAMAGE THE INVERTER AND VOID YOUR WARRANTY!**

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.

17. WARRANTY

GIANDEL warrants all the brand new products against defects in materials and workmanship for 18 months effective from the date of purchase.

GIANDEL will replace any products that are found to be defective due to manufacturer flaws based on eligibility. Refunds issued by GIANDEL must be purchased directly from GIANDEL and are only available to the original purchaser within the first 30 days. We do not issue refunds for items bought by third party retailers.

The warranty is not transferable. GIANDEL is not responsible in any way for any damages, losses or inconveniences caused by equipment failure by user negligence, abuse or use non-compliant with the user manual or any additional safety, use or warnings included in the product package and manual.

The warranty only covers purchase within the 48 contiguous states of United States of America if you purchased from the USA. For purchases made outside the 48 contiguous states such as AK, HI, PR or Canada, we will replace the unit under the warranty upon receipt of a proven defect by Video or Picture. However, the replacement will only ship to a freight forwarder or address within the 48 contiguous United States. The consumer is responsible for arranging shipment outside of the 48 contiguous states.

GIANDEL assumes no liability for damage caused using this product other than for its intended use or as instructed in the user manual. Some states do not allow this exclusion or limitation of incidental or consequential losses, so the foregoing disclaimer may not apply to you. This warranty gives you specific legal rights and you may also have other rights which may vary from state to state.

The following situations will void warranty:

1. The box is distorted, damaged or changed and interior parts damaged for an exterior hit or drop not reported at delivery time;
2. Connect the battery cables incorrectly and reversing the polarity
3. Dismantled or repaired the unit by an unauthorized person
4. The product was damaged for incorrect installation or operation.
5. Plug any AC power / Shore power / Generator to AC outlets.

Defective products & Returns

If your product is defective within the warranty period, please email our Customer Care Team at support@giandel.com.au . To expedite your issue, please provide the following 4 items:

1. Copy of the invoice, order information showing the date of purchase.
2. Serial Number which usually found nearby the side cooling fan.
3. Picture or video of the issue or defect that you are experiencing
4. Shipping address information.