PRC-PSW-0.5K-6.25K

Pure sine wave power inverter with charger

User's Manual

Thank you for your purchase of this product. This manual describes how to use PRC-PSW series inverter. Be sure that you have read and understood the contents of this manual before using the inverter.

Be sure to read these notes before use

Safety Notes

Make sure before you use your inverter. Read these safety notes and your Owner's Manual carefully before use.
After reading these safety notes, store them in a safe place.

About the Icons

The icons shown below are used in this document to indicate the severity of the injury or damage that can result if the information indicated by the icon is ignored and the product is used incorrectly as a result.

ⓘWARNING	This icon indicates that death or serious injury can result if the information is ignored.
ⓘCAUTION	This icon indicates that personal injury or material damage can result if the information is ignored.

The icons shown below are used to indicate the nature of the instructions which are to be observed.

	Triangle icons tell you that this information requires attention ("Important").
	Circular icons with a diagonal bar tell you that the action indicated is prohibited ("Prohibited").
	Filled circles with an exclamation mark indicate an action that must be performed ("Required").

ⓘWARNING

	***After unpacking if you see serious damage of inverter or any parts off, you should give up installing it.*** You could contact with the seller or dealer.
	***You should confirm the specification of the inverter are in conformity with the contract before installation.***
	***Keep out of the reach of small children.*** This product could cause injury.
	***Make sure the inverter earthing well.*** Otherwise cause an electric shock.
	***Let professional engineer install, or contact dealer .***
	***Before connecting to the battery, make sure the battery's voltage and correct polarity.*** The reverse polarity will damage the inverter and battery, even the personal safety.
	***Any connection line of inverter, such as battery cable, power line, should be connected completely and properly placed, they can not be step on by foot and other items rolling places.***
	***Don't place inverter outdoors. If foreign objects or water get inside inverter, turn the inverter off , disconnect the AC and battery.*** If you continue to use, it may cause inverter damage or even a fire and electric shock.

For Your Safety

	***Never attempt to change or take apart the inverter(never open the case).***Failure to observe these precaution can cause fire or electric shock.
	***Don't put the inverter near fire or heat large equipment.***
	***Don't use inverter in the dust, flammable and explosive substances, high temperature, high humidity and large temperature difference area (easy condensation).*** Recommend the use of environmental temperature:-20°C-40°C.
	***Don't block the air intakes of the inverter, and avoid direct sunlight.***
	***Don't touch any parts of the inverter during a thunderstorm.*** This can cause an electric shock due to induced current from the lightning discharge.

CAUTION

	***Do not place heavy objects on the inverter.***
	***Do not cover or wrap the inverter.*** This can cause heat to build up and cause fire.
	***Do not place the inverter under the desk, even step on the inverter when it working.*** This can cause heat to build up and distort the casing.
	***Do not move the inverter while it is working.***
	***After connecting the batteries, between each battery or battery with walls or cabinet, it must be left 2cm above the gap, prohibit closely placed.*** Otherwise easily lead to over-temperature which damage the battery.
	***Regularly check the inverter's fan cover on the rear panel, if fan cover dusty, it indicates the internal components also been dusty.*** Contact your dealer to clean up.
	***Should the LCD break open as the result of a fall or outer accident, do not touch the exposed parts.***
	***If the quantity of the battery is more than one, make sure using the battery of the same model and specifications.*** Otherwise easily lead to reduce battery's life.
	***Using the appropriate charging current for the battery.*** otherwise it will reduce battery's life. For the battery and charging, read the next chapter .

About the battery and charging

Note: Firstly make sure that you do not use inferior battery, otherwise will endanger your personal and equipment safety.

The following describes the proper use of batteries and how to prolong their life. Incorrect use can shorten battery life or cause leakage, overheating, fire, or explosion. The battery mentioned in this manual are maintenance-free lead-acid battery (contain deep cycle type).

Battery usage guidelines

If the batteries are left to lie idle for long periods, remove the battery cable, and make terminal with a protective cap with properly placed, every 3-6 months batteries must be charged.

The temperature of common battery should be in the range of – 20°C and 40°C, too low temperature will cause the battery cannot release enough power. If temperature is too high, more than 40°C, it will sharply reduce the life of the battery, it may be damaged in a few days. If you must use it under high temperature, it is recommended to purchase withstands high-temperature battery.

Make sure to choose the appropriate charging current, 0.1 C is the most maintainable charging current, if you need quick charge, you can choose 0.3 C. For example: 100Ah battery, if the current is 0.1*100=10A, it is the best, and if you choose 0.3*100=30A, it is the fastest. Does not recommend blindly increase the charging current, which will make the battery life shortened greatly.

After battery connection, between the battery and the battery, between the battery and the walls or battery cabinets, it must be left with a gap of above 2 cm, making sure that heat can dissipate. Do not place the battery closely otherwise it will cause overheat to the battery.

Do not put the battery sideways or upside down.

Battery connection cables should be tightly connected on the terminals, no loosening. Otherwise it will cause high temperature or fire.

The thickness of the connecting wire should be matched with the current, if wire thickness is not enough, will cause the insulation layer of the wire melting or burning.

The connecting wire, especially the main line from the battery to the inverter, is more shorter more better in the safe range, otherwise it will cause overheat or fire for the large loss.

Before connecting the main lines of the battery(group) to the inverter, double check (with a multi-meter) positive and negative, make sure error free, then could be connected to the inverter.

Before connecting the main lines of the battery(group) to the inverter, make sure the battery switch on the rear panel is off.

■ Charging methods of PRC-PSW series inverter

First step, the **PRC-PSW** series inverter using the constant current, then constant voltage, finally floating charging mode. During the charging process, MCU monitors battery voltage, battery current and charging time, and after comprehensive measure, it provides the most appropriate charging current and voltage to the battery.

PRC-PSW series inverter has overcharge protection function. It can be combined with the temperature of the environment, to adjust the charging mode. It is impossible for the batteries to be over charging less charging.

PRC-PSW series inverter could provide with 8 type of charging options for the 8 kinds of different battery. User can choose charging mode according to their battery type by LCD manually settings.

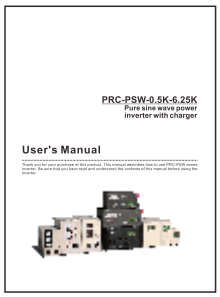
About This Manual

Before using the inverter, read this manual and the warnings in “For Your Safety”(P Ⅰ). For information on specific topics, consult the sources below.

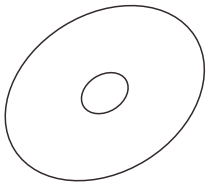
Before using

Supplied Accessories

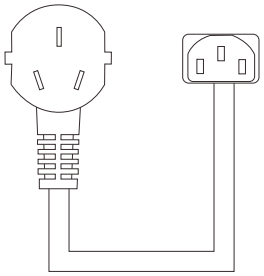
The following items are included with the inverter



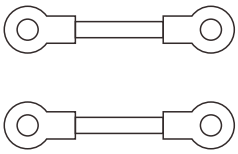
User's manual



CD-ROM (optional)



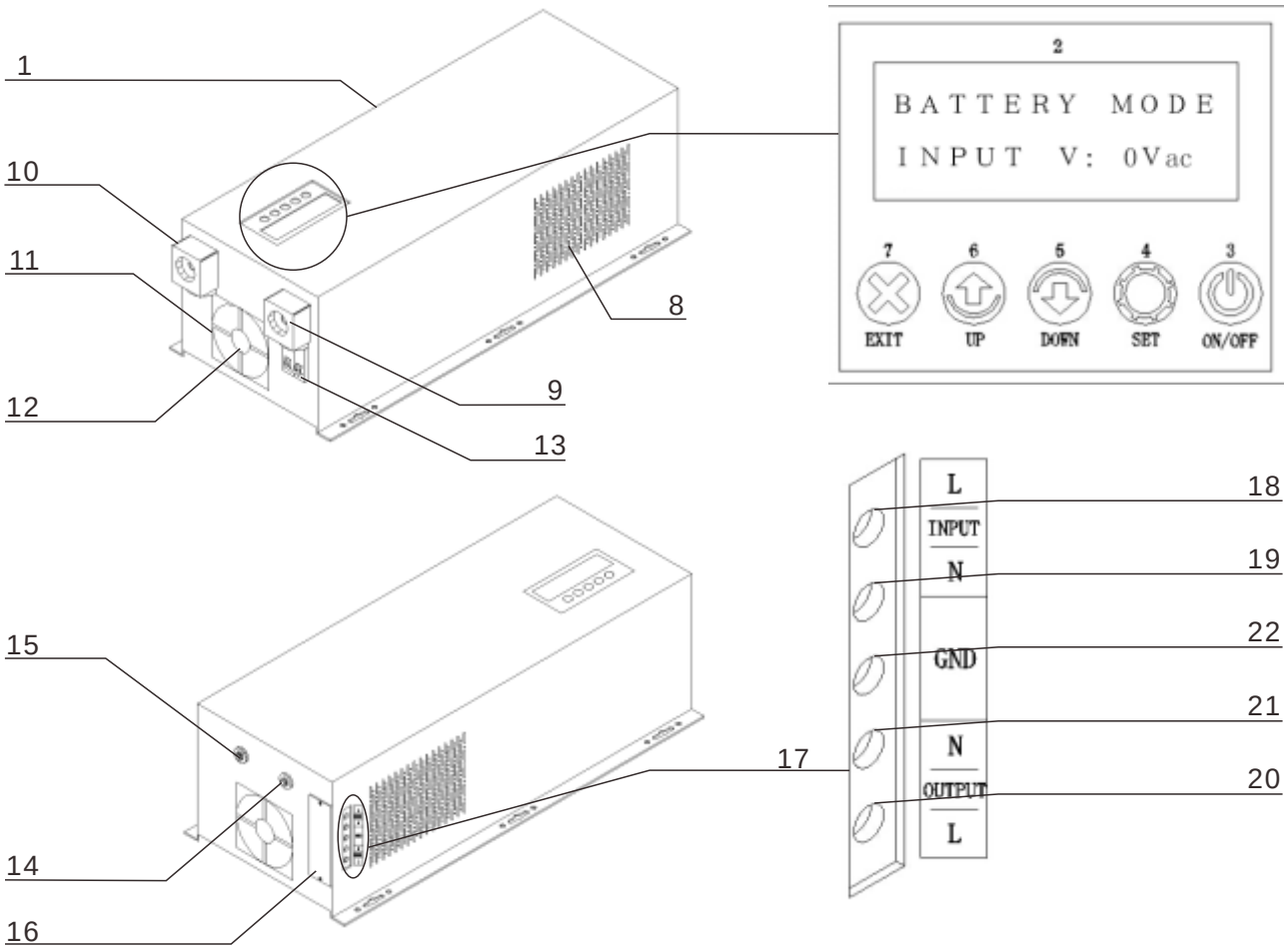
Power cord



Battery cable

Information about inverter parts, please find the corresponding description according to the code.

Note: The appearance of PRC-PSW series from 0.5 KVA to 6.25 KVA are consistent, this manual is showing one picture only, the appearance picture of 10 KVA is another figure.



1. Cover
2. LCD display panel
3. ON/OFF key
4. Parameter setting key
5. Down key
6. UP key
7. Exit key
8. Admission port
9. Terminal of battery “+”
10. Terminal of battery “-”
11. Fan guard & filter
12. Fan
13. Battery breaker
14. Output over current protector
15. Output over current protector
16. The cover of terminal block
17. Terminal block
18. AC input live line (L) point
19. AC input null line (N) point
20. Inverter output live line(L) point
21. Inverter output null line(N) point
22. Inverter ground line(G) point

Before using

Parts Explanation

Admission port
Admission port were arranged symmetrically to either side, do not block them. Otherwise this can cause heat to build up and damage the components or cause a fire.

LCD display panel
Showing the parameters of the inverter, user can set the parameters with the keys and the display panel.

ON/OFF key
Press it more than 3s can power on or power off the Inverter.

Parameter setting key
Used for confirm the selected parameters, press the key to set.

DOWN key
Used for page turning while checking the LCD display.

UP key
Used for page turning while checking the LCD display.

Quit key
Press this key when using the LCD screen to view or set parameters, return to the previous menu.

Fan guard & filter
Block large foreign bodies enter the inside of the inverter.

Fan
The heat in the inverter could be exhausted by the DC. It doesn't run continually, it is controlled by the CPU.

The battery terminal "+"
The terminal connected to the battery positive.

The battery terminal"-"
The terminal connected to the battery negative.

Breaker for battery
Before starting the inverter, the breaker should be "off" mode.
Don't attempt to disconnect the breaker while inverter is running.

Output over-current protector
Only for PRC-PSW 0.5 K-6.25K, when the capacity of load is too large and beyond the protector can withstand, over-current protector will disconnect. After disconnection, the inverter cannot supply power to load.

Terminal block cover
Used to cover wiring bar, avoid wrong wiring or get an electric shock risk.
Do not disassemble this cover plate.

Terminal block
This terminal connector is used for inverter PRC-PSW 1.5K-10K, AC and load is connected to the inverter internal circuit by the terminal connector.

Before using
AC input live line (L) point
The AC L line must be connected to the point with terminal block.

AC input null line (N) point
The AC N line must be connected to the point with terminal block.

Inverter output live line(L) point
The load L line must be connected to the point with terminal block.

Inverter output null line(N) point
The load N line must be connected to the point with terminal block.

Inverter ground line(G) point
This ground must be connected well to the ground of the national grid, never have been allowed to disconnect ground line. Otherwise this will cause electric shock when user touches the cover.

Beginning Steps

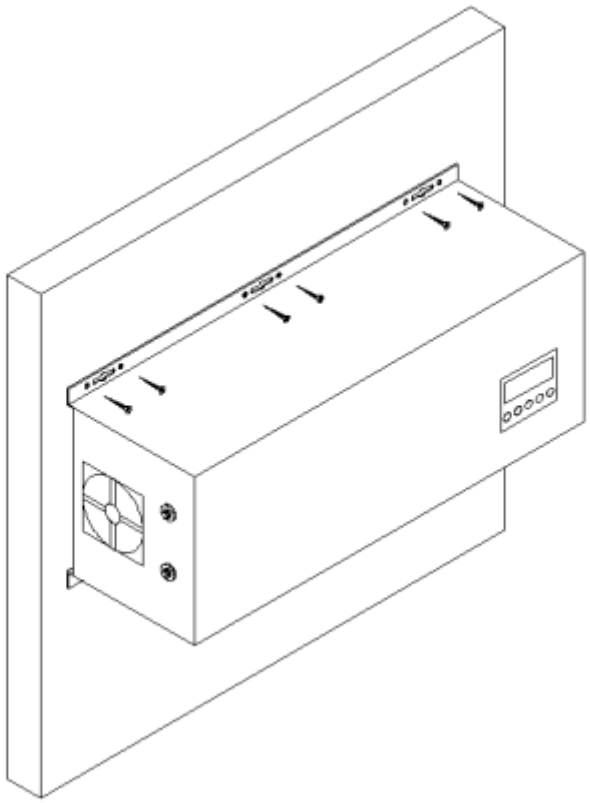
The selection of install site and environment

The Inbreaking Protection of inverter is IP20, and any parts without anti-corrosion treatment, so users should select a reliable place to install according to the following requirements.

1. The requirements of install site
   a) The install site is indoor.
   b) The install site must smooth.
   c) Reasonable distance with distribution box.
   d) The line from inverter to battery (group) within 1 meter.
   e) There are not objects within the scope of 30cm around inverter.
   f) There are no heat source near inverter and battery (group),such as the electric heater.
   g) No direct sunlight to inverter and battery (group).
   h) Cannot be installed on the ship.

2. The requirements of environment
   a) Environment should be dry, little dust, no salt fog and corrosive gas.
   b) Temperature should be: - 20? and 40? .

3. Wall mounting
   Before wall mounting, user must confirm the material of wall is so solid enough that could bear the heavy inverter. If the material of wall is woodiness or hollow brick, don't use wall mounting.
   Installation method as shown below:



User could punch holes according to actual size of inverter, then put expansion bolt in the hole and tighten the screws.
The inverter must be installed in the room and there is no water leakage on the wall.

Unpack and confirm the technical specification and installation accessories

We strongly recommend that two people at least take out the inverter after unpacking, the inverter's weight is heavy. Maybe your foot would be injured if inverter fall. After taking out, check the label of the technical specification on the cover and compared with the order contracts. If you find a discrepancy between the inverter and the contract, contact the dealer at once.

More than 1.5K (include 1.5K) inverter, on the side with a yellow "charging warning label", read it carefully.

Users should refer to the manual page 1 and check the accessories one by one. It's better to compared with your contract if you purchased other accessories. If you have questions, contact the dealer.

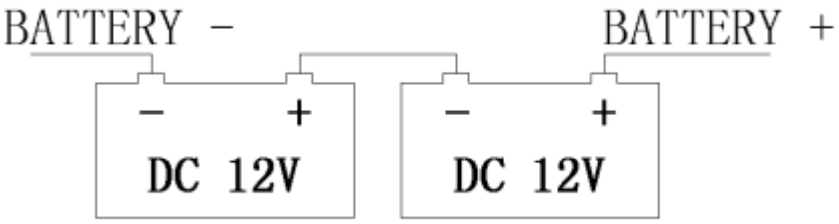
Beginning Steps

The connection of battery

Our Inverter DC system voltage : DC12V、DC24V、DC48V，the battery(group) must be selected based on the inverter voltage and required back-up time. The introduction of series connection and parallel connection as follows:

1. **Series Connection**

   Series connection, battery voltage addition, battery capacity is constant.



Note:

Series connection, connect one battery's positive "+" to the next battery's negative "-" with black cable. If more batteries, and so on.

After series finishing, check the battery voltage by the multimeter, whether the voltage is the required voltage.

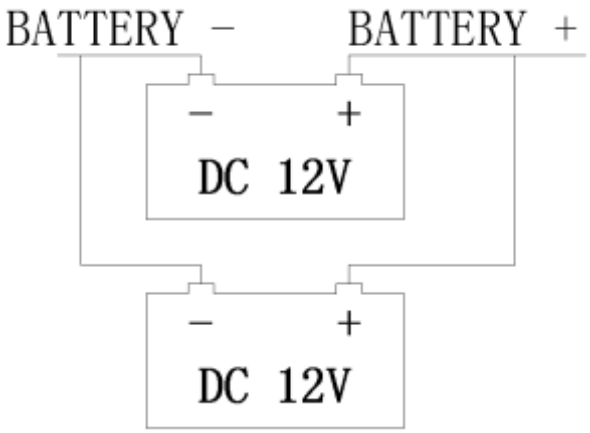
If no need connect the battery (group) to inverter immediately, the battery terminal must be wrapped by insulation tape, avoid short circuit or cause electric shock.

Check connected point one by one whether they are fastness, no loose.

It should leave more than 2cm gap among batteries for heat radiation.

2. **Parallel Connection**

   Parallel Connection, battery capacity addition, voltage is constant.



Note:

Connect one battery's positive "+" to the next battery's positive "+" with black cable, then connect the negative "-" of the two batteries, which completed the two batteries in parallel. If more batteries, and so on.

After parallel finishing, check the battery voltage by the multi-meter, whether the voltage is the required voltage.

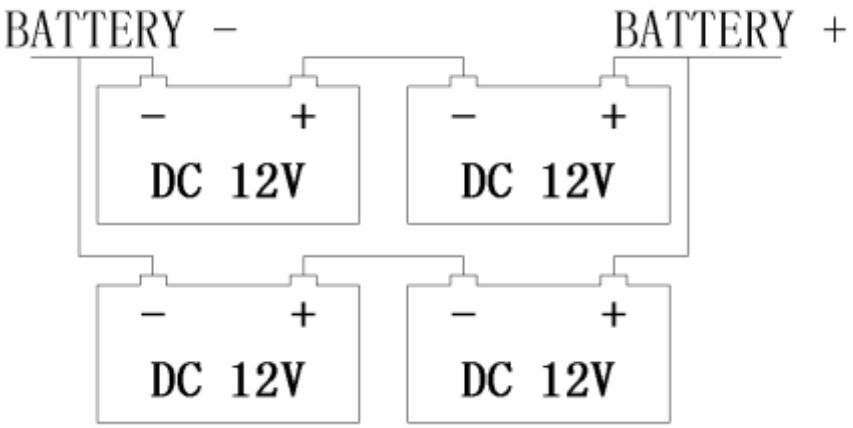
If no need connect the battery (group) to inverter immediately, the battery terminal must be wrapped by insulation tape, avoid short circuit or cause electric shock.

Check connected point one by one whether they are fastness, no loose.

It should leave more than 2 cm gap among batteries for heat radiation.

3. Mixed Connection

Mixed connection means that not only the battery is to be in series, but in parallel.



Note:

When need mixed connection, first to in series, after getting the required voltage, connect the positive and negative according to the No.2 “parallel connection”.

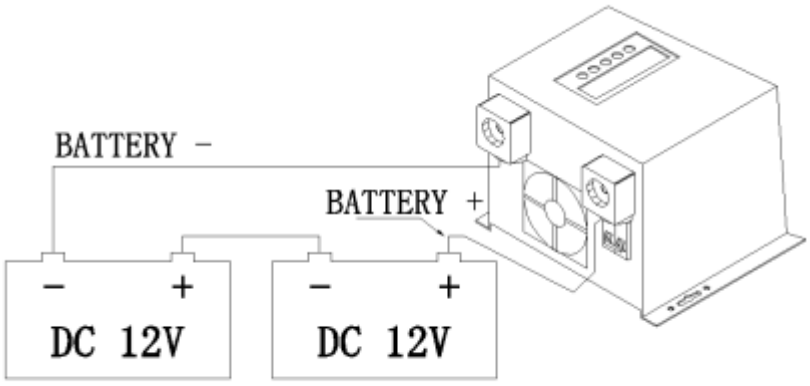
Mixed connection, the number of parallel groups should not more than three groups, otherwise it will shorten the battery life.

If no need connect the battery (group) to inverter immediately, the battery terminal must be wrapped by insulation tape, avoid short circuit or cause electric shock.

Check connected point one by one whether they are fastness, no loose.

It should leave more than 2 cm gap among batteries for heat radiation.

The connection of Inverter and Battery (Group)



Inverter and battery are connected by the battery terminal on the rear panel, Red terminal is the positive“+”，black terminal is the negative“-”.

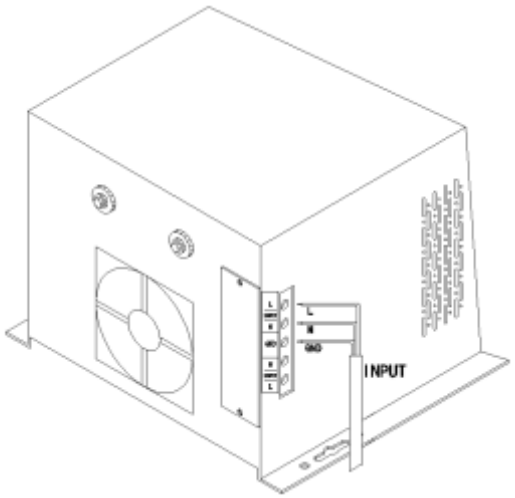
Removed the plastic casing of red and black, and then put the battery group positive and negative on the terminal, tighten the screws. Finally install the plastic casing back and tighten.

Beginning Steps

Note:
Make sure the battery breaker on the rear panel is off before finishing all of connections.

Do not reverse connection positive " + " and negative " - " , reconfirm before connecting battery to inverter terminal.

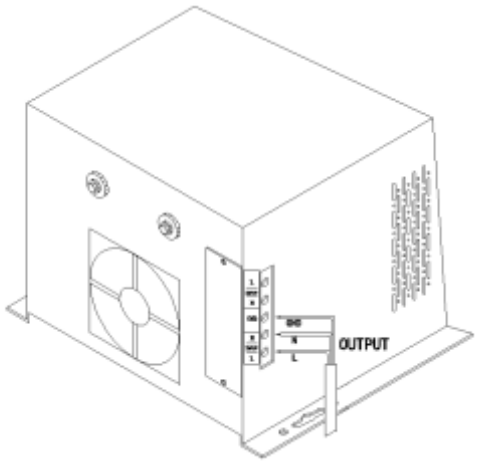
Connect Inverter to AC



As shown above, the AC is connected to inverter by the terminal connector on the rear panel.

Note:
First, remove the cover on the terminal connector.
Remove the screw of Input Line N, Line L and Line G, connect the Line N, Line L and Line G one by one to the terminal connector and tighten the screw. Make sure the connection is not loose.
Don't tear out of the stickers on terminal connector.
After finishing connecting, put on the cover back.

The connection between Inverter output and Load



As shown above, the load is connected to inverter by the terminal connector on the rear panel.

Note:
First, remove the cover on the terminal connector.
Remove the screw of output Line N, Line L and Line G, connect the Line N, Line L and Line G one by one to the terminal connector and tighten the screw. Make sure the connection is not loose.
Don't tear out of the stickers on terminal connector.
After finishing connecting, put on the cover back.

Power on & Power off

HOW TO POWER ON

Before power on inverter, make sure the batteries and loads are connected well, and related breakers are on.

The inverter can auto power on if batteries and AC are normal. That's mean inverter can normally work without operation by hands.

It's also available to power on manually. press “ON/OFF” (power button) for 3 seconds, the inverter will work.

Whatever it's AC mode or battery mode to power on, above manual operation is workable.

HOW TO POWER OFF

Whatever the inverter working at AC mode or battery mode, if user want to stop inverter, press “ON/OFF”(LCD display) for at least 3 seconds, the inverter will power off.

Note:
Power off all loads before powering off inverter.

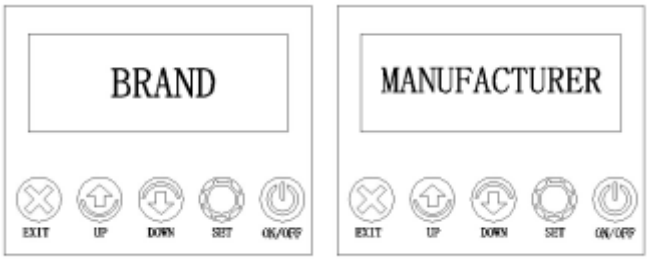
Before long-term lie idle, disconnect AC and batteries from inverter.

Display Mode

LCD Display & Parameter Setting

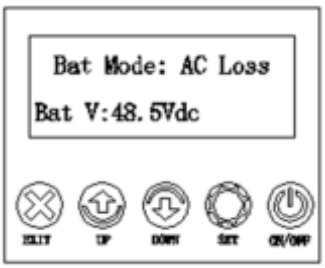
This part is to introduce how to check and set parameters by LCD display and buttons.

1. When the DC input and AC input are both normal, inverters will auto power on, the LCD display will light, and the screen shows: brand, manufacturer and the website.

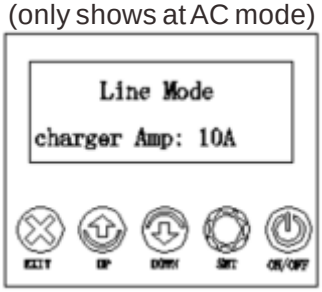


2. After inverter power on normally, the screen will show following contents:
Working mode (AC mode or Battery mode)

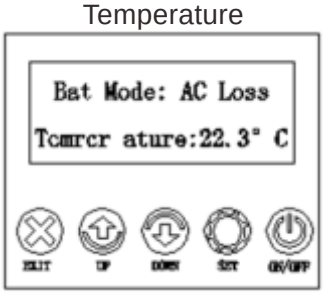
Battery voltage



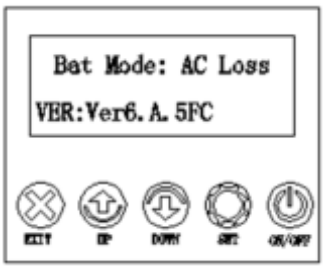
Charging current
(only shows at AC mode)



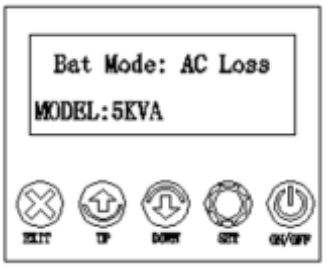
Temperature



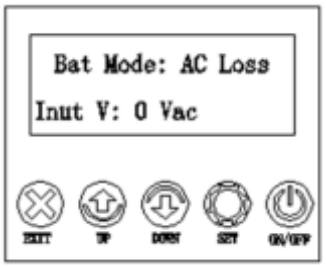
CPU version



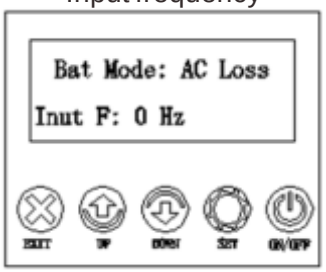
Inverter model



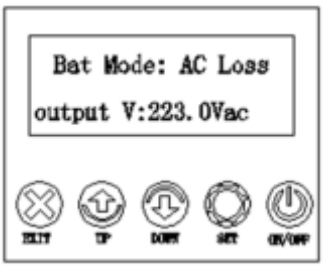
Input voltage



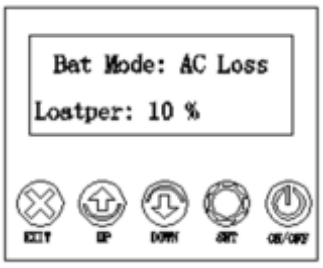
Input frequency



Output voltage



Output loading percentage
(only shows at BAT MODE)

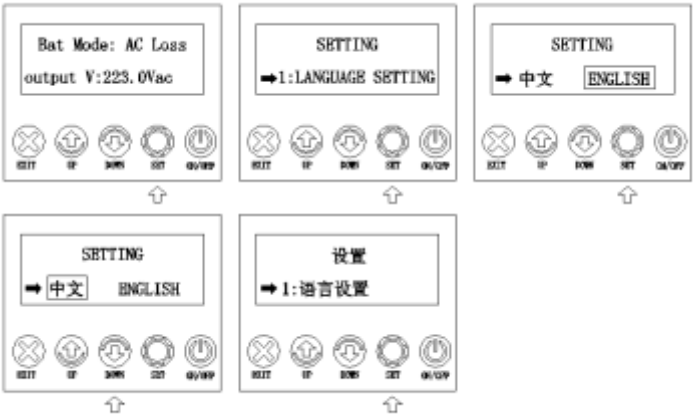


Attention: the above contents are on automatic scrolling screen, user can also check them by pressing buttons UP or DOWN.

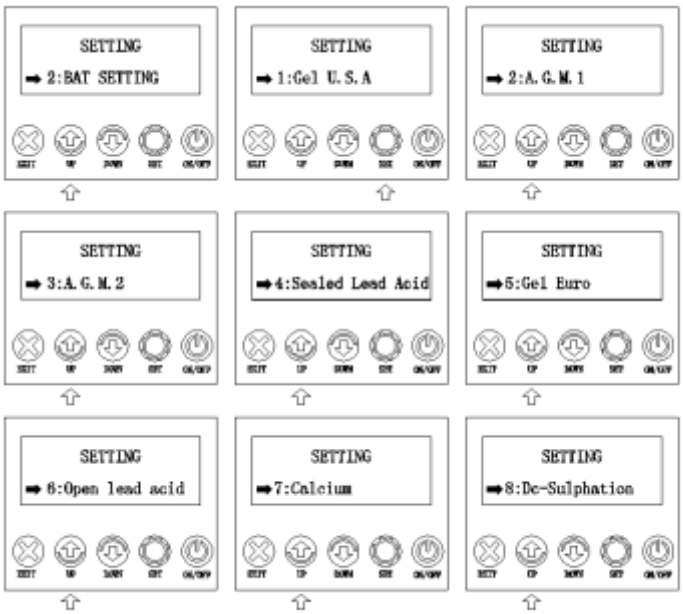
Parameter Setting

The inverter supplies 4 kinds of parameters for manual setting, details as below:

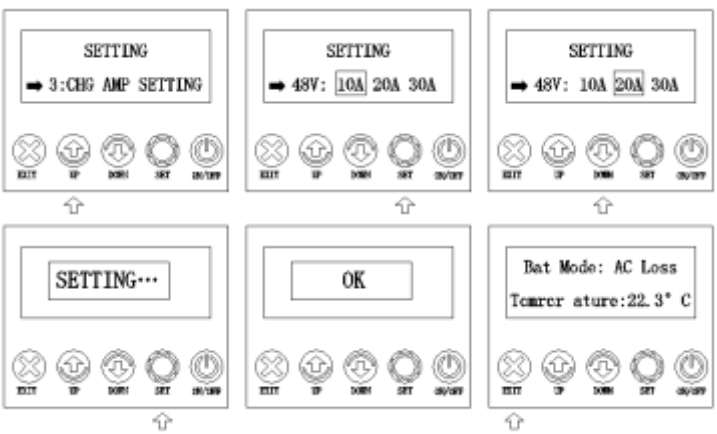
① Language setting



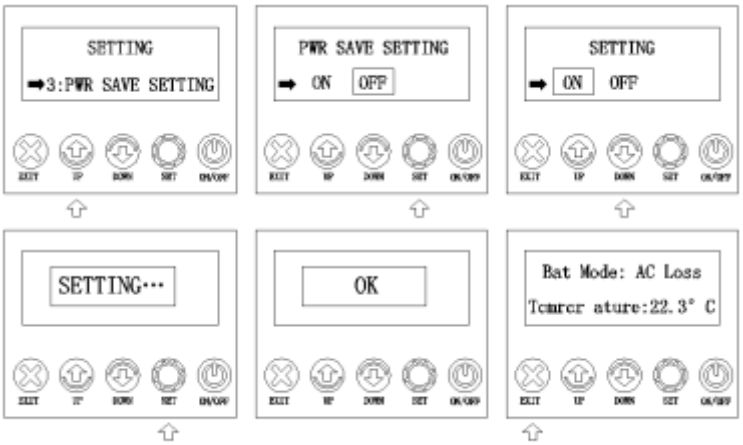
② Battery type setting



③ Charging current setting



④ Power-save setting



Note:

Any setting of those parameters should be operated in accordance with steps as below:

(1) Press SET.
(2) Press UP or DOWN, find the items want to set.
(3) Press SET again, enter the select directory of the item.
(4) Press UP or DOWN, find the parameter want to set.
(5) Press SET again, enter the selected directory of the item; confirm the selected parameter, and then the screen will display 'OK'. When complete this step, inverter have received the changing requirement, then will make the corresponding change.
(6) When you want to exit in operation, press EXIT, return to the last menu.

Instruction of the important parameter

Charging Voltage

There are 8 type of charging voltage to select according to the different kind of battery as below.

8 type of battery	Cut-off voltage(V) Fast charging	Cut-off voltage(V) Float charging
Gel U.S.A	14.0	13.7
A.G.M.1	13.8	13.4
A.G.M.2	14.3	13.7
Sealed Lead Acid	14.1	13.6
Gel Euro	14.4	13.8
Open lead acid	14.8	13.3
Calcium	15.1	13.3
Dc-Sulphation	15.5	13.5

Note:

According to the battery used by the majority of users, the factory default value of the battery voltage is :
(4) Sealed Lead Acid.

Standard Charging Current

The standard charging current of PRC-PSW series inverter

	Model	LCD optional charging current (A)	LCD factory defaults(A)
1	0.5K/12V	10 20	20
2	1K/12V	10 20 30	20
3	1K/24V	10 20	20
4	1.5K/12V	10 20 30	20
5	1.5K/24V	10 20 30	20
6	2K/24VA	10 20 30	20
7	2K/48V	10 20 30	20
8	3K/24V	10 20 50	30
9	3K/48V	10 20 30	20
10	4K/48V	10 20 30	20
11	5K/24V	10 20 30	20
12	5K/24V	10 20 50	30
13	5K/48V	10 20 30	20
14	6.25K/48V	10 20 50	30

Note:
The item "12", not recommended for users.

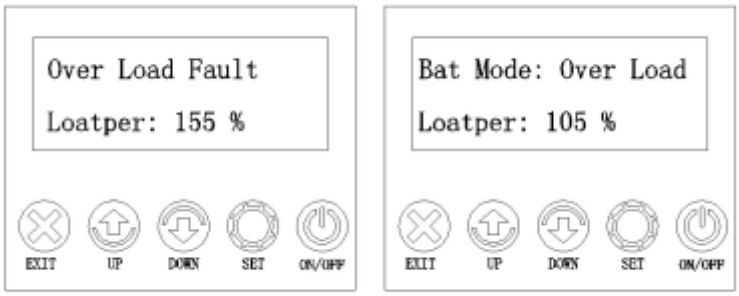
Power-save mode
When users choose power-saving mode, work pattern of inverter as below:

When inverter detect the capacity of load less than 5% inverter rated power, the inverter will auto power-off, but supply power to load, the load will run normally. After 30 seconds, inverter auto restart and check the load again, if still less than 5%, repeat the actions as above, until the capacity of load is more than 5%, inverter return to work normally.

Alarm message of LCD display

1. Over load alarm

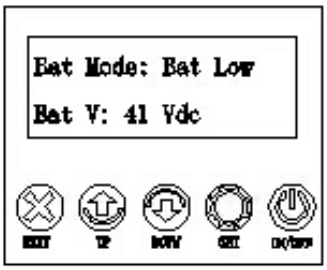
LCD display



100% overload in 0.9 second the buzzer beeps 2 times per 0.3 seconds, interval 3 seconds.
120% overload in 0.5 second the buzzer beeps 2 times per 0.15 seconds, interval 2 seconds. The inverter will auto shutdown after 30s.
150% overload in 0.75 second the buzzer beeps 3 times per 0.15 seconds, interval 1.8 seconds. The inverter will auto shutdown after 3s.

2. Battery voltage low alarm

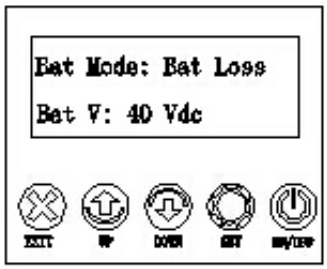
LCD display



Buzzer ring every 0.8 seconds, ring time 0.5 second.

3. Battery voltage loss alarm

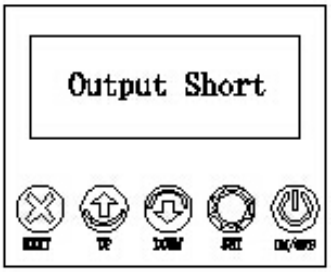
LCD display



The inverter will auto shutdown and buzzer ringing 10 seconds.

4. Output short circuit alarm

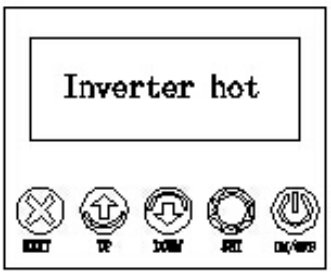
LCD display



The inverter will auto shutdown and the buzzer ringing continually 10 seconds.

5. Temperature alarm

LCD display



The inverter will auto shutdown and the buzzer ringing continually 10 seconds.

Problem and solutions

Problem	Solution
Overload alarm	Reduce the load, maybe there is a load of air conditioning or other inductive load resulting in an inverter overload alarm or shutdown.
Battery under voltage alarm	Transfer into the AC supply, if AC abnormal shutdown the inverter.
Battery voltage loss shutdown	The inverter will auto restart when the AC is normal.
Output short circuit shutdown	User's load must be short fault, remove the load at once, then to restart the inverter. If inverter is working normally, just check the loads. If inverter work abnormally, contact dealer.
Over-temperature shutdown	Check if the inverter direct sunlight, surrounded by a heat source.
The inverter cannot turn on	Press the “ON/OFF” button for 3 seconds to start. If more than 5s, inverter can't be start either. Because the pressing time is too long to make it close again
The inverter cannot turn off	Press the “OFF”(LED display) or “ON/OFF”(LCD display) button for 3 seconds.

Common Terminology

Common terminology

Inverter:
A machine that turn the DC power to AC power.

AC:
The power supply from the national grid. The AC in this user manual are AC220V 50Hz or AC110V 60Hz, single phase three lines.

Output wave form:
The wave form of the inverter output voltage, there are three types output wave from inverter in the market, square wave, modified sine wave and pure sine wave. The pure sine wave power inverter is the best choice for electric load. All of the power inverter produced from our company is pure sine wave inverter.

Output over load:
The capacity of load is more than inverter's rated power , which is over load. E.g. A 1KVA / 800Watts power inverter use with a load which is more than 800 Watts.

Output short circuit:
The most serious fault, the inverter output lines Null line (N) connects the live line (L). Always happen with the load circuit short.

Battery voltage low(loss):
The batteries continually supply power to load when inverter is working in the battery mode. So the capacity of the battery is keeping been reduced, as well as the battery voltage. For protecting the batteries, the inverter will stop work to switch stand by mode when inverter judges the battery voltage is lower than the set thresholds in the CPU.

The inverter restart automatically after the AC recovery:
For protecting the batteries, the inverter will stop work to switch stand by mode when the inverter continually discharges. There is not output voltage in this mode. It's prepare to auto start all the time. Once AC return to normal, it will auto start. If inverter was turned off by hands there is not the function.

Battery over voltage:
The battery voltage is beyond the upper limit of the voltage range.

Warranty Terms

According to the prescription, the period for protecting to fix our company's inverter is 18 months.(From the release date.) During this period, any belongs to under normal usage circumstance cause because of the product quality's problem of breakdown, our company will be responsible for giving free maintain.
In protect fix the period, if there is any breakdown which caused by the product's own quality, customers can contact your dealer and get the free repair from them or us. And please send back the return couplet to your dealer in 15 days after purchasing inverter.

The inverters that has repaired or added other functions by your own will not be accepted to repair.

Once the Warranty Card or purchasing invoice has been changed, the protection to fix immediately expired.

This card and purchasing invoice are both considered as the Protection to fix warrantees, so reserve them carefully. Lose don't repair.

Free maintain won't be given under the following circumstance:
1. Without Protection to fix warrantees.
2.The breakdown caused by the manipulation that hasn't follow the requests of the Manual.
3. The damage caused by the dismantle movement of a non-our-company authorized maintainer.
4. The breakdown, row harm or damaged because of the move or drop.
5. The damage caused by customer inappropriate preservation, maintain, or the usage.
6. The breakdown and the damage caused by the force majeure.
7. The breakdown caused by transportation.

Warranty Card

DATE OF PURCHASE:

PRODUCT MODEL:

SERIAL NUMBER:

CUSTOMER NAME:

CUSTOMER PHONE:

Agents Information