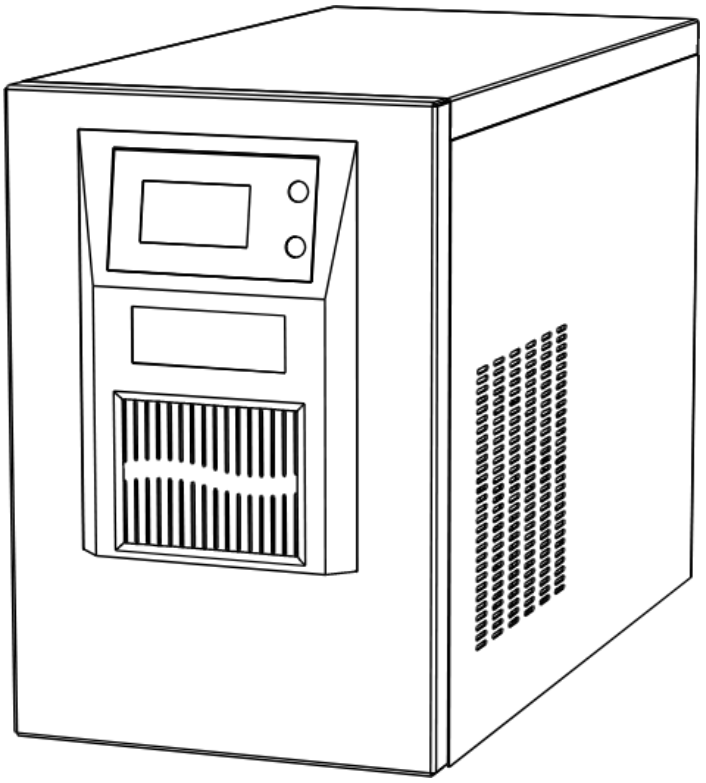
SC-V Series

Pure Sine Wave Inverter

User Manual



Athlete

(Version 2.5)

Preface

This user manual contains proprietary information about installation, operation and usage of equipment which is protected by copyright. All rights are reserved.

Please read this manual carefully before operation. Equipment should be operated by qualified personnel to ensure normal working. Please reserve this manual carefully for future reference.

Marks

The following marks and signs will be used in this product manual.

 **Warning**

Operation against the instructions will endanger user's personal safety and cause negative impact on stability of equipment and data loss. Do not remove cover. For your safety, please let qualified personnel to operate this device.

 **Caution**

Charge battery for at least 12 hours before use. Verify equipment's rated power does not exceed Inverter's rated power.

CONTENT

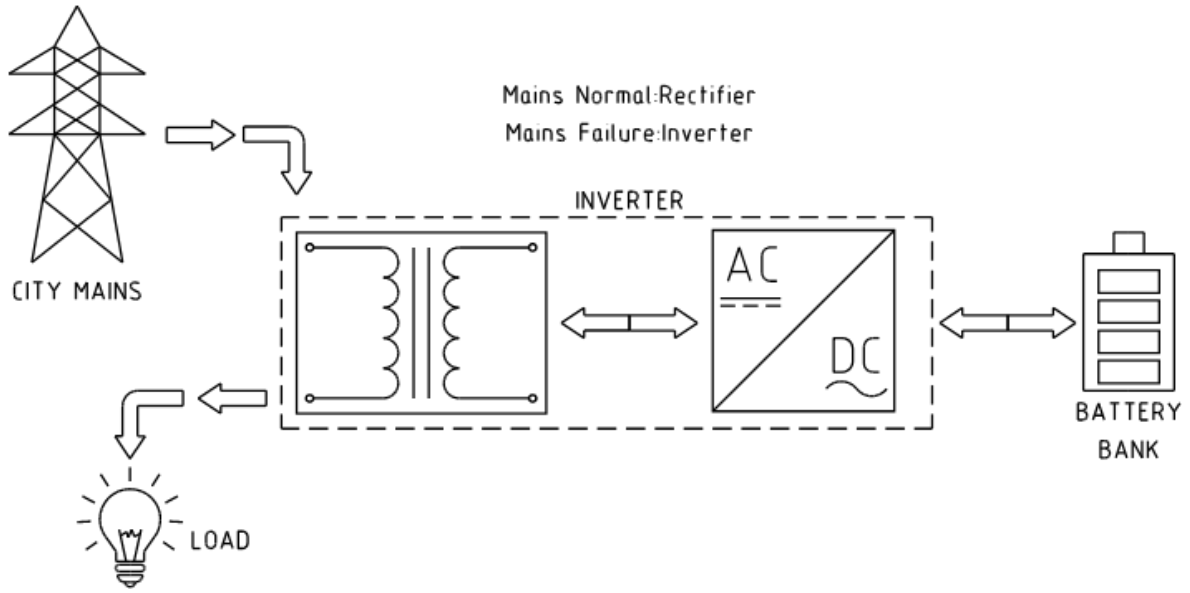
1. PRODUCT INTRODUCTION

SC-V is line-interactive Inverter that provides stable pure sine wave output power for PCs, servers and electronic equipment. Surge, sag or complete power failure during utility power transmission may interfere with the normal operation of electronic equipment. SC-V series Inverter provides standby power to protect equipment and data when utilities fail or get abnormal.

As an optional function, SC-V series Inverter communicates with local net servers and other computer system via RS232 communication sockets.RS232 socket provides information for main computer, such as voltage, current, temperature and frequency with Inverterilon2000 power management software.

2. STRUCTURE

The structure chart：



Features：

1) Sine wave output applies to different kinds of electronic products as below.
   - Capacitive load: computer, TV, game machine, LED light, energy saving lamp, etc.
   - Resistive load: filament lamp, electric water heater, electric oven, electric cooker, electric teakettle, electric radiator, etc.
   - Inductive load: air conditioner, washing machine, refrigerator, fan, transformer, induction cooker, microwave oven, etc.
2) Microcomputer control technique with high performance.
3) Wide adjustable range for input voltage, high degree of accuracy for output, automatic voltage regulation.
4) High reliability with protections for overload, short circuit, over voltage, under voltage and overheating.
5) Modularized circuit PCB design for easy installation and field-maintenance.
6) Instant auto-sensing and auto-adjustable chargers for optimized battery performance and prolonged battery longevity.
7) Efficient toroidal transformer at lowest energy loss.

3. SPECIFICATION & DATA

MODEL: SC-V		2 KVA	2.5 KVA	3 KVA	3.75 KVA	4 KVA	5 KVA	6 KVA	6.25 KVA	7.5 KVA	8 KVA	10 KVA	12.5 KVA
BATTERY		**adaptation**											
12V		√	√	√	√	X	X	X	X	X	X	X	X
24V		√	√	√	√	√	√	√	√	X	X	X	X
48V		√	√	√	√	√	√	√	√	√	√	√	√
96V		X	X	X	X	X	√	√	√	√	√	√	√
192V		X	X	X	X	X	X	√	√	√	√	√	√
Phase		Single-In, Single-Out											
Power Factor		0.8											
Display		LED											
AC INPUT													
Connection		L, N + G wire											
Voltage		145 ~ 275 Vac											
Frequency		45Hz ~ 65Hz											
Charge Current		0-30A											
AC OUTPUT													
Voltage		220V± 3%											
Frequency		50Hz/60Hz ± 0.5%											
Efficiency		> 99% in city mode ; > 80% in inverter mode											
Transfer Time		≤4ms											
Transient Reaction		When load changes between 0 and 100%, voltage < 3%											
Distortion		Pure sine wave, THD<3% Liner Load, THD<10% Non-Liner Load											
BATTERY													
Standard Model	**Battery Type**	Lead-Acid Maintenance-Free Battery											
	Typical Recharge Time	9 hours recover to 90% capacity											
	Charging Current	Default: 1.0A ± 10%; Max: 2.0A ± 10%											
	Charging Voltage	13.8Vdc ± 1% (based on single 12V battery)											
	Over Charge Ability	10 minutes at 100% ~ 125% loading; ≥ 1 minute at 125% ~ 150% loading											
Long-run Model	**Battery Type**	Depending on application											
	Charging Current	0A ~ 50A (Can adjust with software and LCD control button)											
	Backup Time	Depends on Capacity and Volume of External Batteries											
	Charging Voltage	13.8Vdc ± 1% (based on single 12V battery)											
PROTECTION													
Over Load Protection		110%, close the device in 30 seconds; 120%, close the device in 2 seconds; Overload at city power, buzzer alarms											
Short Circuit Protection		Alarms on 20 seconds and then Inverter is off											
Input High/Low Voltage Protection		Yes											
Battery High/Low Voltage Protection		Yes											

Battery Anti-Polarity Protection	Yes											
High Temperature Protection	Yes											
ALARM												
Power Failure	No											
Battery Low Voltage	Buzzer Sounds When Battery Voltage Is Down To 10.5/10.7v Per Battery (After 2nd Alarm)											
Inverter Failure	No											
Overload	No											
ENVIRONMENTAL												
Noise	< 38 Db (1 Meter)											
Temperature	0 ~ 40℃											
Humidity	10% ~ 90% (Non-Condensing)											
MANAGEMENT												
Smart RS-232/USB	Supports Windows® 2000/2003/XP/Vista/2008, Windows® 7/8, Linux, Unix, And MAC											
Optional SNMP	Power Management From SNMP Manager And Web Browser											
PHYSICAL												
Measurement (Equipment / Package)	414*144*213mm 510*230*320mm (paper box)	472*226*333mm 555*310*405mm (paper box)					552*267*495mm 632*358.5*635.5mm (wooden box)					
Net Weight / kg	14	16	18	20	22	30	31	33	36	39	41	43
Gross Weight / kg	14.5	17.5	19.5	20.5	23.5	31.5	44.5	46.5	50	52.5	54.5	56.5

4. UNPACKING

The unit is packed by firm caution in order to avoid possible damage during transportation. Please check that the packing is in good condition before initial use. Please contact with your supplier immediately if there is any damage on Inverter.

- Unpack the gift box, there should be:
- A unit of Inverter
- A user manual
- A management software (if communication function is provided)

If there is any damage caused by transportation, please return the unit to distributor for repairing or replacement.

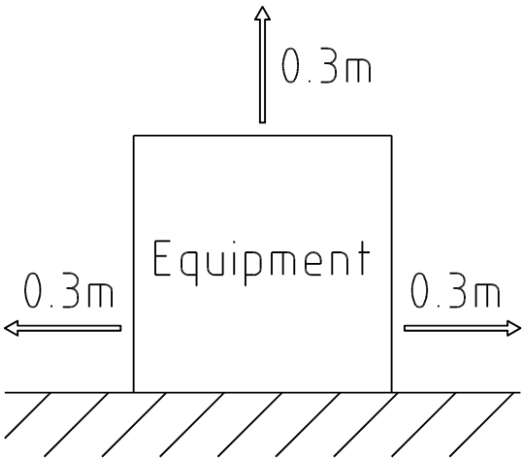
5. INSTALLATION

5.1. Check List

1) Ensure that the inverter has the correct DC voltage for your boat or vehicle system.ie 12v or 24v/48v.
2) Fit as close to the batteries as possible, the shorter the DC cables the better. Voltage drop on long cables will affect the unit's performance.
3) Do not reverse the cables! Connect the read cable to the positive terminal and the black cable to the negative terminal of the battery. In the event of reverse polarity the unit could be totally destroyed.
4) Always use the inverter in an environment which is well ventilated, not exposed to direct or a heart source, away from water, moisture, oil or grease, away from any highly inflammable substance, out of reach from children.
5) The Output Voltage of this unit must never be on your AC system at the same time as any other AC source such as 220V/230V external mains line or a generator. All external power must go through the Inverter.
6) Always switch on the Inverter first, before plugging in any appliance.
7) Under new electrical legation only professional electrocutions should install the product. Ensure the fitting instructions are fully understood before fitting this product.

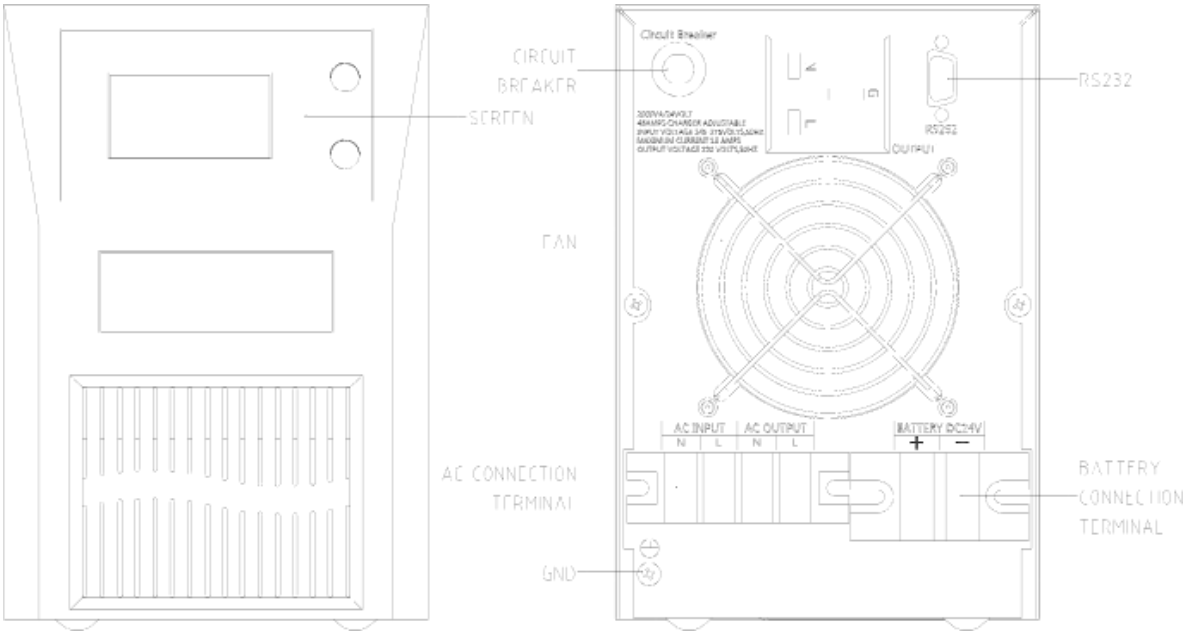
5.2. Location

- Make sure that no obstacle is at the vent.
- Keep away from hot source and avoid of sun shining directly.
- Avoid of dust and dampness.
- Please place it at a good ventilated environment. Leave 20cm gap at top and all the round of equipment to exhaust air.

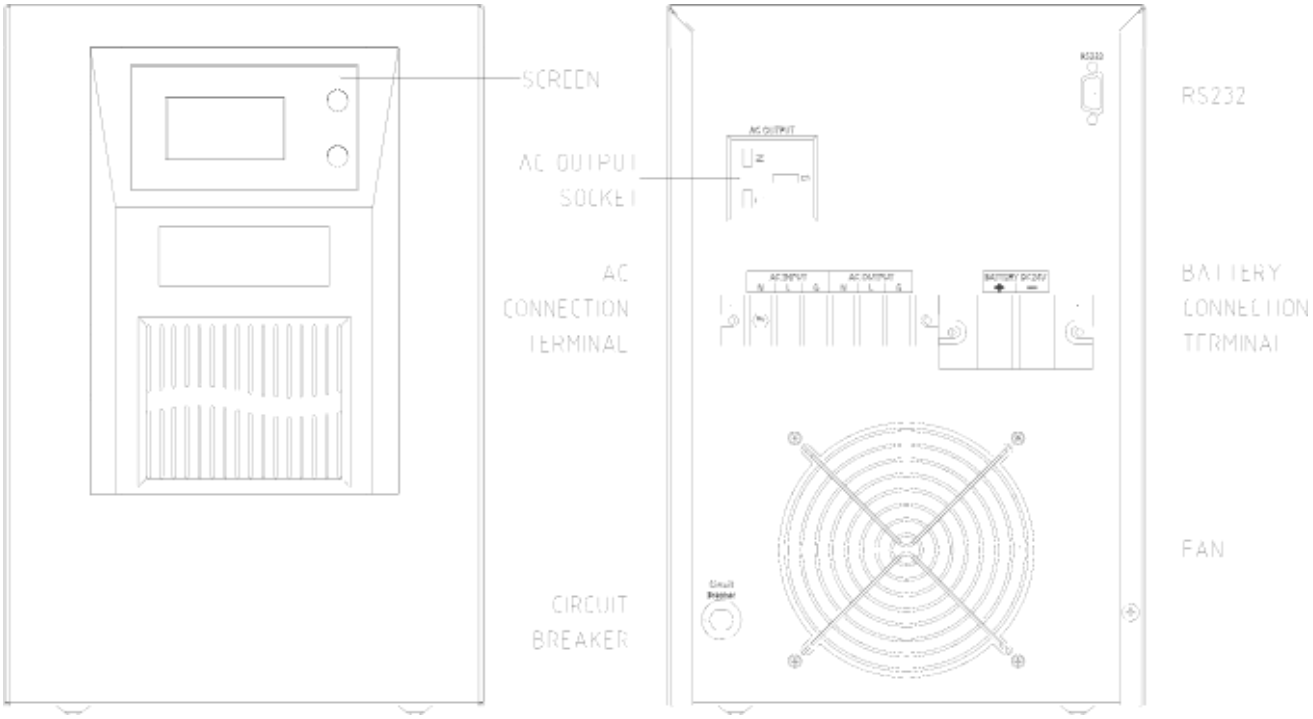


5.3. Appearance

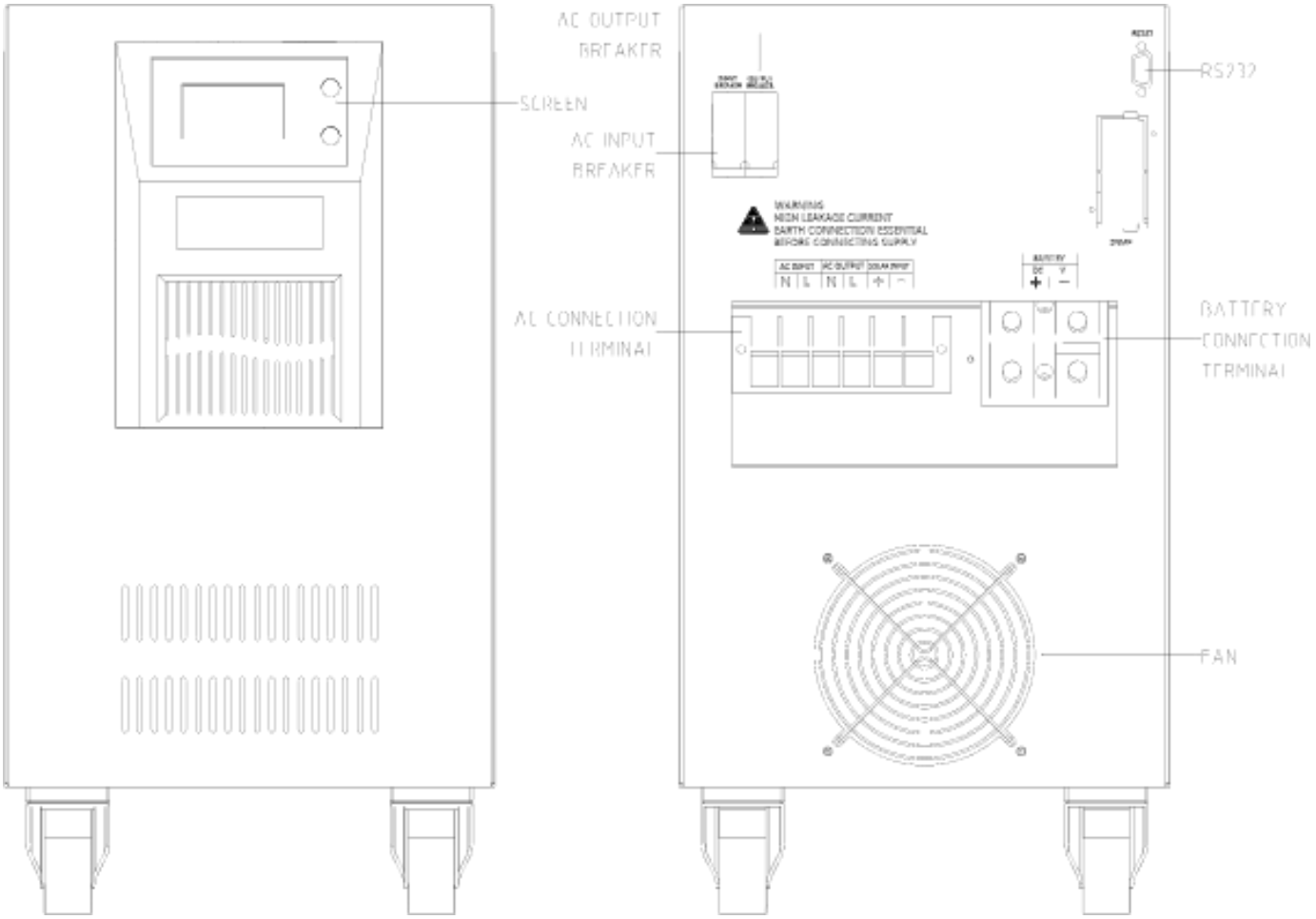
2KVA



2.5KVA-5KVA



6KVA-12.5KVA



5.4. Maximum Working Current & Recommend Cable Connection

Recommended Cable Diameter						
Max capacity (VA)	500	1000	1500	2000	3000	5000
Max current input (A)	2.3	4.5	6.0	7.3	11.5	17
Diameter of input wire/mm²	0.75	0.75	1	1.5	1.5	2.5
Max output current (A)	1.5	2.8	4.2	5.5	8.2	13.6
Diameter of output wire/mm²	0.75	0.75	1	1	1.5	2.5
Diameter of ground wire/mm²	0.75	0.75	1	1	1.5	2.5

Recommended Battery Cable Diameter		
Max BATTERY Current	**Cable run distance 0-1.54m**	**Cable run distance 1.54-4.0m**
125A-180A	50mm²	70mm²
180A-330A	70mm²	90mm²

Requirements of the cable:

- PVC insulative copper core cable.

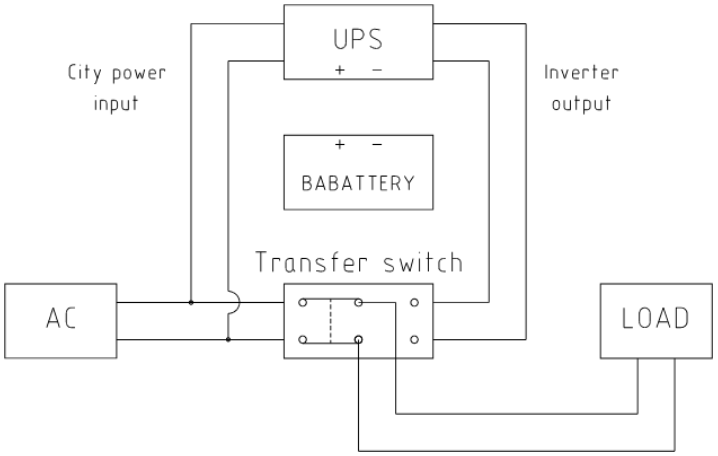
- The surrounding temperature should be less than 40℃.
- The cable can be thicker if the cable can't fit with the table above.

5.5. Battery Connection

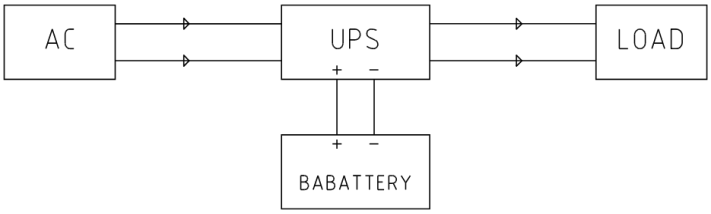
Danger

Inverter below 6KVA has no battery anti-polarity protection. Please make sure to connect the batteries correctly. Otherwise, the devices will be damaged immediately.

- To connect Inverter with built-in battery, please refer to following schematic:



- To connect Inverter with external battery, please refer to following schematic:



6. OPERATION

1 Input Voltage Display

2 Output Voltage Display

3 ON Button

4 Battery Capacity Display

5 OFF Button

6 Abnormal Condition Display

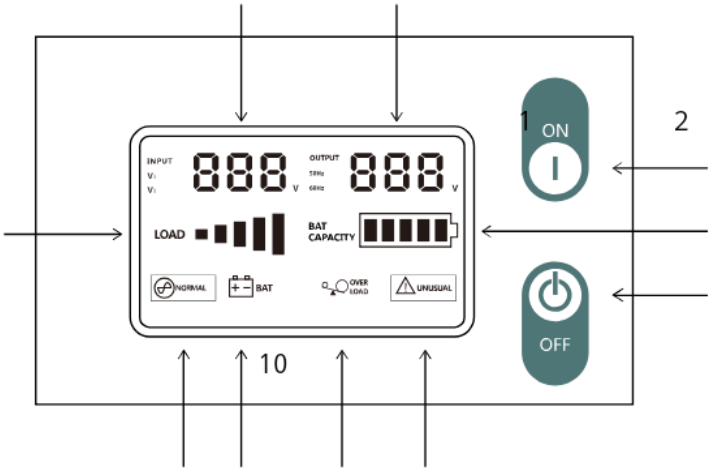
7 Overload Display

8 Charging Status Display

9 Normal Status Display

10 Load Utilization Ratio display

6.1. Control Panel



ON & MUTE button: Keep pressing this button for 2 seconds until you hearing the prompt beep, the system turns to power on. Keep pressing this button again for 2 seconds until you hear a beep, it'll switch to silent mode.

OFF button: Keep pressing this button to turn off for 2 seconds.

6.2. Working Mode

- **City Power Mode**

The City Power is available and it powers the Inverter. Meanwhile, when the city power and the battery are available, the Inverter will choose the city power as priority power supply.

- **Battery Mode**

When city power is abnormal, Inverter turns into Battery Mode with power supply from the battery

6.3. Test

Please don’t connect important loads in testing status.

When city power is cut off, you will hear alarm every 20sec, Inverter will supply uninterruptible power from

the battery, and display “0” on “INPUT VOLTAGE”.

If it beeps every 1sec, it means that the battery is empty; the Inverter will turn off soon.

*Notice: Please don’t forget to charge the Inverter after using.

6.4. Launch

- Turn on the Inverter under City Power Mode.

1) If the city power is available and it connects to the Inverter, it will turn on automatically.
2) Make sure that the data displaying in “OUTPUT VOLTAGE” volume is not “0”. If it’s “0”, press the button “POWER ON” on the front panel for 1sec.
3) After 30sec, Output Voltage will be stable.
4) Turn on the loads accordingly.

- Turn on the Inverter under Battery Mode

1) Turn on the external battery.
2) Press the button “POWER ON” on the front panel for 3sec.
3) After 30sec, Output Voltage will be stable
4) Turn on the loads accordingly

 **Warning**

If the Inverter is overloaded, the buzzer will beep. Please reduce the amount of the load and follow the instruction of user manual. Stop Output under City Power Mode

1) The Inverter is under City Power Mode and it’s normal to output current
2) Press the “POWER OFF” button of Inverter for 1sec
3) The data displaying in “OUTPUT VOLTAGE” volume is “0”

 **Danger**

Inverter cannot shutdown by the button “POWER OFF” under City Power Mode.

6.5. Shutdown under Battery Mode

1) Turn off all loads
2) Press “POWER OFF” button of Inverter for 3sec and the screen will shut off.
3) Disconnect all the loads

*Notice: Before launching or turning off Inverter, please turn off or disconnect all the loads.

6.6. Adjust Charging Current (operating in City Power Mode)

1) Turn on the Inverter and run it for 30sec.
2) Click ON + OFF 5 seconds, until the INPUT VOLTAGE shows 991 loosen the button, the INPUT VOLTAGE values shown for the current value. Inverter will display interface to adjust the charging current.
3) According to the "ON" for 2 seconds to increase, each press 1 plus 1 A; According to "OFF" for 2 seconds to reduce, each at one minus 1 A.
4) Set up after the 30 seconds automatically out of the interface display.

6.7. Adjust the Battery Type

1) Turn on the Inverter and run it for 30sec.

2) Click ON + OFF 10 seconds until the INPUT VOLTAGE display 992 loosen the button, the OUTPUT VOLTAGE in the display values for which kind of battery charging VOLTAGE. Inverter will display interface to adjust the charging voltage type.

3) According to the "ON or OFF" for 2 seconds, press 1 every time change a charging voltage

4) Set up after the 30 seconds automatically out of the interface display

6.8. Adjust the Priority Mode

1) Turn on the Inverter and run it for 30sec.

2) Click ON and OFF for 15 seconds, until the INPUT VOLTAGE display 993 loosen the button, the OUTPUT VOLTAGE display values for priority mode, 000 for the mains, 001 for the inverter priority mode. Inverter will display interface to adjust priority mode.

3) According to the "ON or OFF" for 2 seconds, press 1 every time change a priority mode.

4) Set up after the 30 seconds automatically out of the interface display.

Note: The adjustable charging current range depends on battery voltage and capacity (AH). The calculating formula is: (Rated Current) * 0.1 = Charging Current.

For example, the battery is 12V and battery capacity is 24Ah; the charging current should be 24Ah * 0.1 = 2.4A or around 2.4A. Whereas, the actual charging current should be “2A” to “3A”, which is adjusted from Inverter software or display panel.

Warning

Please do not mix batteries. It’s strongly recommended to connect batteries of the same voltage and capacity in parallel or series.

However, batteries of different capacities can be connected in parallel. For example, 12V/24Ah and 12V/100Ah batteries can be connected in parallel.

7. OPERATION INTERFACE INSTRUCTION

	Description	City power supply		Power failure			Adjust charging current
		Normal	Overload	Normal	Overload	Overload protection	
NORMAL	Supply by city power; the Inverter is under normal status	☼	☼				☼
UNUSUAL	The Inverter is inverting or abnormal						
BAT	Supply by battery			☼	☼	☼	☼
OVER LOAD	Over load		☼		☼	☼	
BAT CAPACITY	Battery capacity	Charging or full	Charging or full	☼	☼	Empty	☼
LOAD	Loading capacity	N/A	Full	N/A	Full	Empty	Empty
INPUT	Input voltage	☼	☼	000	000	000	☼
OUTPUT	Output Voltage	☼	☼	☼	☼	000	☼
Remark						Turn off automatically	

*☼: the indicator light shines

Notice: If the overload exceeds 10% under Battery Mode, it will be shut down in 30sec; if exceeds 20% and it will be shut down in 2sec.

8. SECURITY

Properly Used

- Our equipment supplies the uninterruptible power to the load.
- The equipment meets the requirement of information equipment safety regulations, compatible with office, family, business, the bank.
- External battery should be connected following related instructions strictly.

 Warning

Considering the importance of customer's personal safety, we kindly suggest that operators read product manual very carefully before using or operating should obey the instructions strictly.

It'll be a danger of high voltage in the equipment although all the switches are turned off. Any operation to move or open the equipment should be performed by "authorized professional personnel".

Safety Precautions

To ensure safety, please follow safety precaution terms:

- Please read this manual for details, do not load over the rated level.
- In case of any problems with the equipment, please cut off the electricity as soon as possible, and contact the agent immediately.
- If there's a fire on the machine, please use dry powder extinguisher to put out the fire but not the water.
- There's no switch for cutting off the city power on the equipment, we strongly recommend you to install the switch in case of the danger situation.
- Do not place any container with liquid on the equipment in order to avoid moisture against the equipment. It will cause equipment short circuited, electrocution and in danger of fire.
- This equipment should be connected to the earth for safety.

Please check the label on the back of the unit and make sure that the regulated voltage and frequency on the label meet local city power standard. Please do not operate the Inverter if it doesn’t meet the specifications. Please make sure the unit is used to support data processing equipment and do not use it for hair dryer, electric drill and laser printer.

Important Safety Instruction

- Check that the Inverter connects to the earth.
- The unit is not recommended for human’s life support system and highly critical equipment.
- Don’t locate Inverter near magnetic materials. It may result data lost.

Emergency

Radio frequency interference

This device can interfere with radio products. Please keep away from electromagnet interference sensitive products, such as transmitter, receiver, radar, metal detector, be sure to keep away from the equipment.

9. TROUBLESHOOTING

If there is any abnormity to equipment, please check as following before contacting our customer service representative:

- Whether external battery connection is correct or batteries are damaged.

- Whether the device is under city power.
- Whether the input voltage or frequency is in rated range.
- Whether the circuit breaker is in good condition.
- If not, please contact your dealer with following information:
- Model number.
- Product serial number.
- Detailed description/photos of problem (including panel indicators, sound, normal AC source status, loading capacity and external battery conditions).

10. BATTERY MAINTENANCE

ENVIE series Inverter requires little routine maintenance.

- Built-in battery of standard models are regulating valve, maintenance-free type. Please charge it regularly to have an expected longevity. When connecting to city power, whatever Inverter is “ON” or “OFF”, the battery is always in charging and it is protected with over charge and over discharge protection function.
- Before initially launching the Inverter, please charge the batteries at least 12 hours to make sure the full charge.
- If you do not use Inverter for a long time or backup battery discharge occasionally, please charge and discharge the battery every 3 to 6 months; in hot area, please charge and discharge the battery once every two months, with charging time not less than 12 hours.
- **Note:** please discharge the battery of over 50% load until Inverter is off.
- Under normal circumstances, the battery life is three to five years. If the battery is not in good condition, please replace it as soon as possible by qualified personnel.
- Please replace the battery with the same model and quantity.
- Please do not change a single battery separately; the battery replacement should be strictly followed by supplier's instructions.

 **Warning**

1) Before operation, please take off your metal possessions, such as watches, rings, etc.
2) Replace the battery wire and please purchase the new one from our company’s service station or dealers, in order to avoid heating or fire caused by insufficient capacity.
3) Don’t use fire to deal with the battery or battery pack, otherwise it will explode and hurt people.
4) Do not damage or open the battery, since the electrolyte is highly toxic, may bring harm to human body.
5) Avoid battery short circuit, otherwise it will cause fire disaster or electric shock.
6) Before touching the battery, please make sure that there is no voltage. Battery circuit loop and input voltage loop are not isolated; there might be high voltage between battery terminals and the ground.
7) Even if the input power is switched off, the internal components of Inverter might still be connected to the battery with potential danger. Therefore, before doing any repair or maintenance work, please disconnect or unplug the battery.
8) Battery has the danger of high voltage. Battery maintenance should be operated by qualified personnel with proper battery knowledge.

11. WARRANTY

We offer free service during warranty period, except for quality problems caused by human factors.

12. COMMUNICATION

Communication Interface

This series provide communicate port to realize the remote monitoring of Inverter. We can use USB, RS232 or intelligent slot (used with specialized WEBPOWER Card) as communication ports. They can provide information, such as voltage, current, temperature and frequency indicators, to monitor or control the Inverter.

DB-9 connector feet

Pin No	Description	I/O
3	Rxd	Input
2	Txd	Output
5	GND	Ground

RS232 setting

Baud Rate	2400bps
Data bits	8bit
Stop bit	1bit
Parity check bit	None