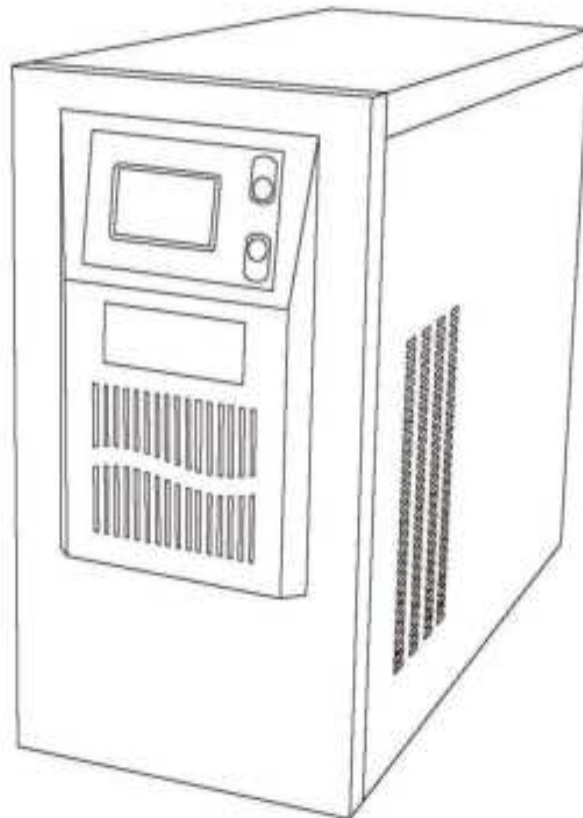


SC-VT series

3-Phase Pure Sine Wave Inverter

User Manual



(Version 2.6)

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 UPS's rated power.

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1. PRODUCT INTRODUCTION

SC-VT series is a kind of advanced low frequency, line interactive UPS system with pure sine wave output. It can provide reliable and high quality AC power supply to a wide scope of applications from computer equipment, telecommunication systems to industrial facilities.

It outputs pure sine wave on inverter mode; when normal AC source is cut, it will turn into inverter mode automatically and provide back-up power from the battery.

SC-VT series UPS has been designed and tested strictly according to the international safety regulations. As electrical and electronic equipment, safety instructions related to them must be complied with during installation, commissioning, operation and maintenance. Incorrect operation or work may result in damage to:

- The life and well-being of the operator or a third party
- The UPS and other properties that belong to the operator or a third party.

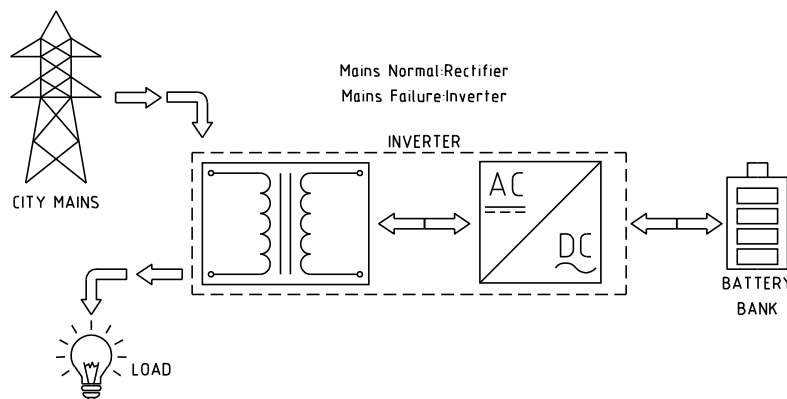
Therefore, the following safety instructions must be read and always kept in mind prior to any work.

This user manual applies to following models:

- *K is standard model with built-in battery, hereinafter referred as *K
- *KL is long-run model with external battery, hereafter referred to as *KL

2. STRUCTURE

The structure chart: (This chart bases on the operational principle of each phase)



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) Microprocessor 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

MODEL SC-VT		5KVA	6.25KVA	7.5KVA	10KVA	12.5KVA	15KVA
POWER		4000W	5000W	6000W	8KW	10KW	12KW
Phase		3-Phase in/3-Phase out					
Display		LCD or LED optional					
INPUT							
Connection		Three phase four wire plus safety ground wire					
Voltage		330Vac-460Vac					
Frequency		45Hz~ 65Hz					
OUTPUT							
Voltage		380V ± 1% (Battery Mode); 380V ± 10% (City power mode)					
Frequency		50/60Hz ± 0.5%					
Efficiency		> 99% in city power mode; > 80% in inverter mode					
Transfer Time	AC to battery mode	≤ 4ms					
	Inverter to bypass	< 3% (Battery Mode)					
Instant Reaction		When loading changes between 0 and 100%, voltage change < 3%					
Overload capability		110%, close the device in 30 seconds					
		120%, close the device in 2 seconds					
		Overload at city power, buzzer alarms					
Waveform		Pure Sine Wave, THD<3% at linear load					
BATTERY		48VDC					
Long-run Model	Battery Type	Depending on application					
	Charging Current	1A ~ 30A (Can adjust with software or LCD control button)					
	Backup Time	Depends on Capacity and Volume of External Batteries					
	Charging Voltage	55V ± 1%					
Balanced Charge Voltage		54.4-55.2Vdc					
Floating Charge Voltage		53.2-54Vdc					
PROTECTION							
Over Load Protection		Yes					
Short Circuit Protection		Alarms on 20 seconds and then UPS is off					
Input High/Low Voltage Protection		Yes					
Low Battery Alert		Yes					
Battery High/Low Voltage Protection		Yes					
Battery Anti-polarity Protection		Yes					
High Temperature Protection		Yes					
ENVIRONMENTAL							
Noise		< 45db (1 Meter)					
Temperature		0 ~ 40℃					
Humidity		20% ~ 90% (non-condensing)					
PHYSICS							
MEAS.(L*W*H)		540*266.5*495mm / 615*350*650mm					
Net Weight / Gross Weight		50kg/62.5kg	51kg/63.5kg	52kg/64.5kg	54kg/67.5kg	56g/69.5kg	58g/61.5kg
MANAGEMENT							
Smart RS-232/USB		Supports Windows® 2000/2003/XP/Vista/2008, Windows® 7/8, Linux, Unix, and MAC					
Wifit		Wifit-app					
Optional SNMP		Power management from SNMP manager and web browser					

* If the UPS is installed in a place where the altitude is above 1000m, the output voltage will be derated as follows:

Altitude (m)	1000	1500	2000	2500	3000	3500	4000	4500	5000
Derating Factor	100%	95%	91%	86%	82%	78%	74%	70%	67%

4. UNPACKING

The unit is packed carefully in order to avoid possible damage during transportation. Please check that the packing is in good condition before initial using. Please contact with your supplier immediately to repair or replace the UPS if there is any damage on it or some inner content misses.

Unpack the gift box, there should be:

- A unit of UPS
- A user manual
- Maintenance card (optional)
- Product test report (optional)
- A management software (if communication function is provided)

5. INSTALLATION

5.1 Environment

The device should be installed vertically on the ground or shelf in the proper temperature and humidity. Do not pile up other things on the device.

The equipment working temperature is 0°C-35°C (it could run for 8 hours when at 40°C, and the desirable condition of temperature is 15-25°C).

The battery lifespan will be affected when environmental temperature is over 20°C. From 20°C, by increasing every 10°C, 50% of its expected service life will be decreased.

5.2 Location

The device should be placed at a good operating environment to avoid potential damage.

- Make sure that no obstacle is at the vent.
- Keep away from hot source and avoid sun shining directly.
- Keep water, combustible gas and corrosive liquid distance.
- Avoid of dust and dampness.
- If there is water condensation on the equipment, please dry the components completely before any installation, or there is a risk of electric shock.
- Please place it at a good ventilated environment. Leave 0.3m gap at top and all the round of equipment to exhaust air.

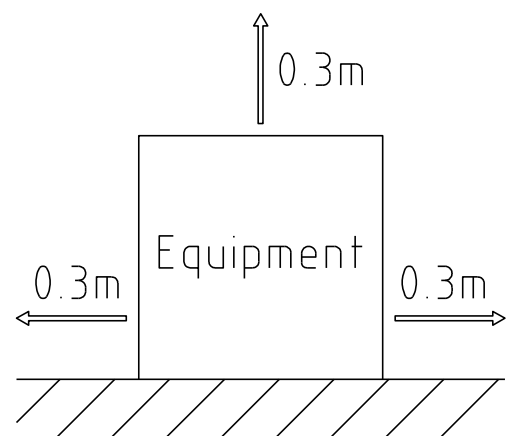
5.3 UPS Connection

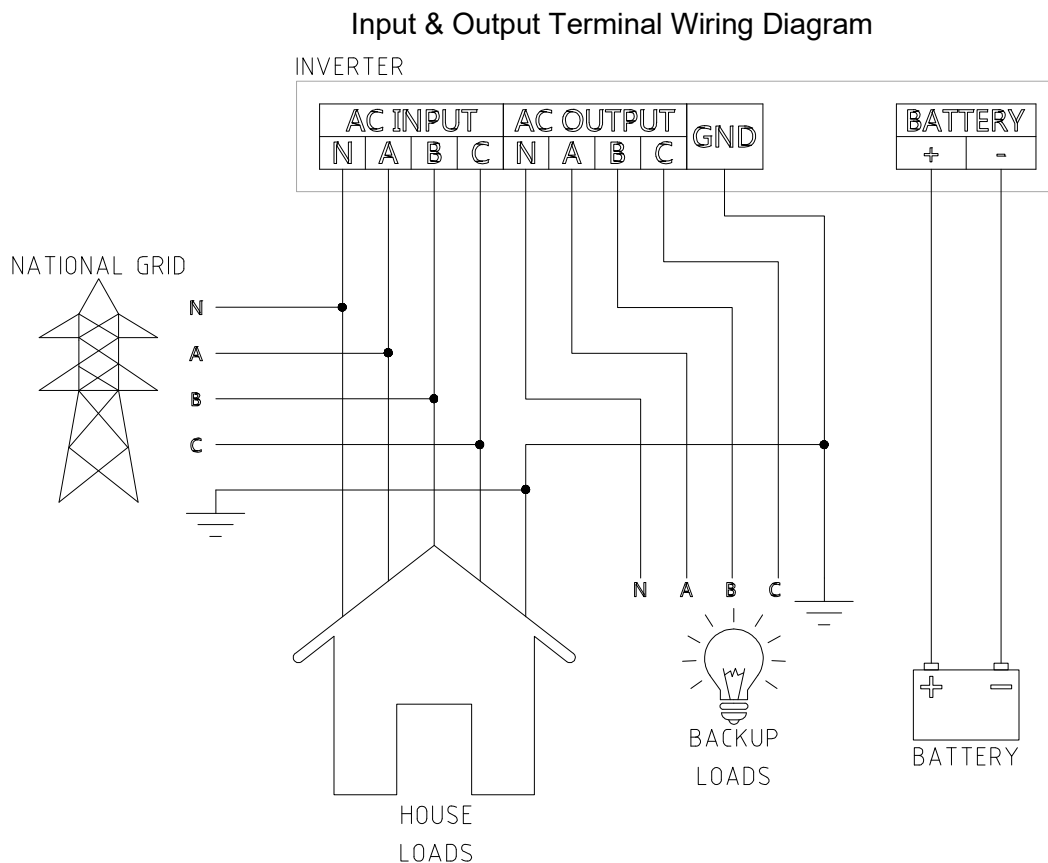


Danger

Our equipment should be installed according to local safety standard by qualified and professional personnel. They have

- been trained specially
- already look through completely and understood the manual and other related documents
- been familiar with safety requirements for electrical system





For your safety, please cut off the city power before installation.

Step 1 Open UPS terminal cover on rear panel

Step 2 Choose the right wire type for input & output power cable of the unit.

Step 3 Connect the input & output wire on the terminals. Before connecting with loads, please shut off the loads first.

Step 4 Refer the table of “Step 2” and choose the correct specification of yellow-green wires to connect with the earth.

Step 5 Make sure the connection of all wires is correct and fasten them.

Step 6 Installed leakage protection switch on UPS output terminal but it's not necessary to install it.

Step 7 Charge the battery for more than eight hours before first use. When wire connection is completed and kick “INPUT BREAKER” on, UPS will automatically check the battery status, and charge it as well. For the initial using, please charge the battery first. Otherwise, the present backup time will be less than the rated values.



Caution

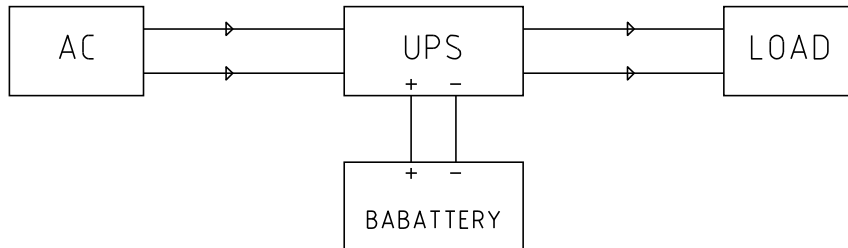
- Wiring mounting only by qualified personnel after disconnecting city power.
- All cables must be firmly attached, undamaged, properly insulated and adequately dimensioned.
- It's forbidden to use output socket with rated current less than the maximum input current of UPS. Otherwise, the socket may be burned out (refer to 3 Specification).
- The input terminal should be connected with air switch or knife switch with fuse but not leakage protection switch; socket capacity (rate current) should be at least 2.5 times of UPS input capacity.
- No matter whether UPS is connected to city power or not, UPS output is likely to be live. Although the UPS is closed, it's not sure that there is no electricity in the inner components. To ensure the UPS don't output anymore, you should shut it down first, and then disconnect city power.
- To connect UPS with inductive loads, such as motors, electric displays, laser printers etc., please

choose UPS according to the startup power of these facilities, which is usually 2 to 4 times higher than the rated power.

5.4 Battery Connection

Battery specification

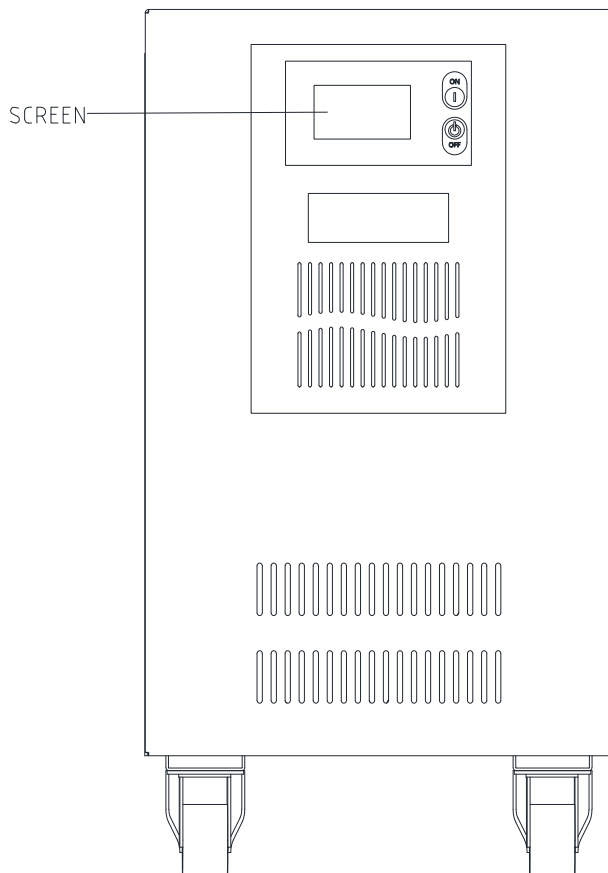
- To connect UPS with external battery, please refer to following schematic:



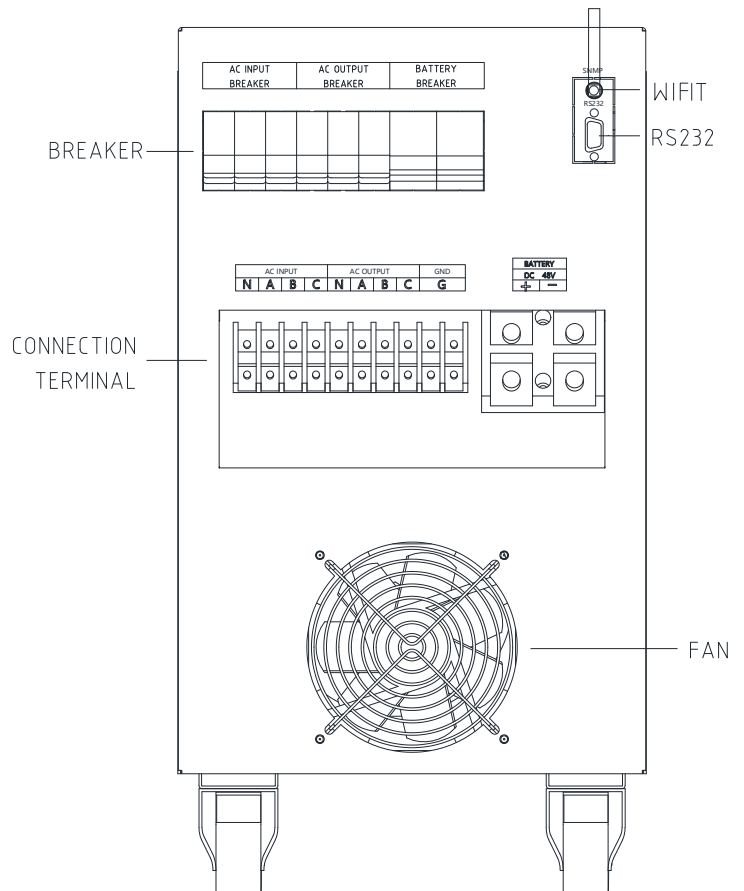
Multiple batteries assembling in parallel is acceptable, but the battery quantity should be strictly complied with following requirements, otherwise the unit cannot work normally.

5.5 Appearance

FRONT VIEW

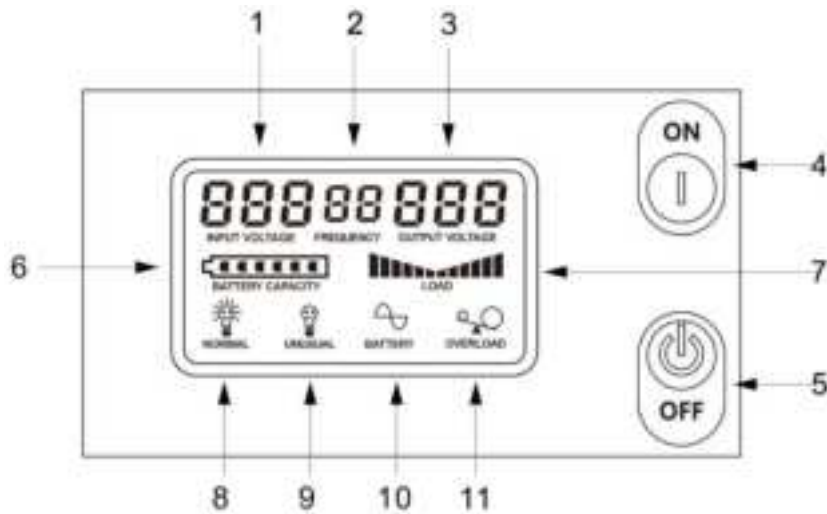


REAR VIEW



6. OPERATION

6.1 Control panel



- 1 Input Voltage Display
- 2 Frequency Display
- 3 Output Voltage Display
- 4 ON Button
- 5 OFF Button
- 6 Battery Capacity Display
- 7 Load Utilization Ratio Display
- 8 Normal Status Display
- 9 Abnormal Condition Display
- 10 Charging Status Display
- 11 Overload Display

ON & Function button:

- Keep pressing this button for 1 seconds until you hear a beep, it'll switch to silent mode.
- Keep pressing this button for 4 seconds until you hearing the prompt beep, the system turns to power on.
- In the running status of the machine keep pressing this button for 4 seconds and the screen will display the operation interface of adjusting charging current.

OFF button: Keep pressing this button to turn off for 4 seconds.

6.2 Working Mode

City power mode

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

Battery mode

When city power is abnormal, UPS turns into battery mode with power supply from the battery.

When battery capacity reduces, "BATTERY CAPACITY" indicator displays reduced cells accordingly; the buzzer beeps every second, warning that the battery capacity is not sufficient. The UPS will turn off automatically. Please take time to save the data and remove the load gradually.

Maintenance Bypass mode

Applicable case: it must supply electricity to loads when the UPS maintains.

Characteristic: the loads will be supply electricity by city power directly and the UPS does not impact the circuit.

Operation: kick the "MAINTENANCE BYPASS SWITCH" on and kick "INPUT BREAKER" off. So the UPS will shut off and it supplies electricity to loads through the bypass circuit. After maintenance, kick "INPUT BREAKER" on, and the UPS will run. Then, kick "MAINTENANCE BYPASS SWITCH" off. At this stage, the UPS control electricity quality and provide uninterrupted power to the loads normally.

The maintenance bypass switch is used in the maintenance only. Kick "MAINTENANCE BYPASS SWITCH" on but kick the other switches off. We can safely maintain internal components of the UPS, while the loads, connecting with the UPS, can run normally. There is no electricity on internal components of the UPS, and the voltage appears only in the switch part.

6.3 The First Step of Starting On



Note: The first step of starting on is very important, strictly operation follow the steps as below. You can't skip the step operation, because if you turn on the power directly through the city mains in uncertainty condition, there is a risk of damage to the machine.

- 1) Please check if the AC input switch, AC output switch, battery switch switch are off.
- 2) Please check the AC input terminals, the AC output terminals are wired correctly?
- 3) Please check the terminal connection of battery is correct; make sure the battery terminal terminal no reverse, otherwise there is a risk of damage of the inverter
- 4) Use a multimeter to measure the voltage both ends of battery pack is it the same as require by solar inverter. If the voltage is too low, it will not turn on. If the voltage is too high, there is a danger of burning the solar inverter. Turn on the battery switch and measure the battery input terminal voltage if is correct.

Press ON button about 4 seconds until hear a long beep, then observe the display. When AC input shows 0, AC output shows the voltage output. Make sure to see the AC output display output voltage is correct before you can operate the next step.

- 5) Turn on AC input switch, observe display if AC input display voltage if it corrects, and observe if the solar inverter connects to city mains.
- 6) Turn on the AC output switch to supply power to load.

6.4 Working Mode

City power mode

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Battery mode

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The maintenance bypass switch is used in the maintenance only. Kick “MAINTENANCE BYPASS SWITCH” on but kick the other switches off. We can safely maintain internal components of the UPS, while the loads, connecting with the UPS, can run normally. There is no electricity on internal components of the UPS, and the voltage appears only in the switch part.



Danger

Unqualified personnel should not operate “MAINTENANCE BYPASS SWITCH”.

6.5 Test

Please don't connect important loads in testing status.

When city power is cut off, you will hear alarm every 20sec, UPS 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.

* Please don't forget to charge the UPS after using.

6.6 Launch

Turn on the UPS under city power mode

- 1) Turn on the button “INPUT BREAKER” on the back panel
- 2) If the city power is available and it connects to the UPS, it will turn on automatically
- 3) 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
- 4) After 30sec, output voltage will be stable
- 5) Turn on the loads accordingly

Turn on the UPS under battery mode

- 1) Kick “INPUT BREAKER” off
- 2) Turn on the external battery
- 3) Press the button “POWER ON” on the front panel for 3sec. It's under inverting.
- 4) After 30sec, output voltage will be stable
- 5) Turn on the loads accordingly



Warning

If the UPS is overloaded, the buzzer will beep. Please reduce the amount of the load and follow the instruction of user manual.

6.7 Stop output under city power mode

- 1) The UPS is under city power mode and it's normal to output current
- 2) Press the “POWER OFF” button of UPS for 1sec
- 3) The data displaying in “OUTPUT VOLTAGE” volume is “0”



Danger

UPS cannot shut off by the button “POWER OFF” under city power mode.

6.8 Shut off under battery mode

- Turn off all loads
- Press “POWER OFF” button of UPS for 3sec and the screen will shut off
- Disconnect all the loads

* **Notice:** Before launching or shutting off UPS, please shut off or disconnect all the loads.

6.9 Adjust charging current

- 1) Turn on the UPS and run it for 30sec.
- 2) Press the “POWER ON” button for 4sec, UPS will display the operation interface of adjusting charging current.
- 3) When “BATTERY CAPACITY” twinkles and “BATTERY” indicator lights on, the data displaying in “OUTPUT VOLTAGE” volume is the present charging current.
- 4) Press the “POWER ON” button to increase, or “POWER OFF” button to decrease the charging current, each time 1A change.
- 5) Confirm the setting by pressing “POWER ON” button of UPS for 4sec.

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 $24\text{Ah} * 0.1 = 2.4\text{A}$ or around 2.4A. Whereas, the actual charging current should be “2A” to “3A”, which is adjusted from UPS 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 UPS is under normal status						
 UNUSUAL	The UPS is inverting or abnormal						
 BATTERY	Supply by battery						
 OVERLOAD	Over load						
 BATTERY CAPACITY	Battery capacity	Charging or full	Charging or full				
 LOAD	Loading capacity	N/A	Full	N/A	Full	Empty	
INPUT VOLTAGE	Input voltage			000	000	000	
FREQUENCY	Input/output Frequency					00	
OUTPUT VOLTAGE	Output voltage					000	
Remark			Buzz		Buzz	Turn off automatically	

*: the indicator light shines

Notice: If the overload exceeds 10% under battery mode, it will shut off in 30sec; if exceeds 20% and it will shut off in 2sec.

Type of Fault	Description	Troubleshooting
Frequency: 01	Internal fault	Please contact your supplier
Frequency: 02	Internal fault	Please contact your supplier
Frequency: 03	Internal fault	Please contact your supplier
Frequency: 04	Normal AC source input reversed	Check whether normal AC source input is in A - B - C order
Frequency: 05	Internal overheating	Check whether UPS is overloaded, whether vents are blocked, or the environment temperature is too high. Shut off UPS and restart UPS after 20mins. If it still fails, please contact your supplier.
Frequency: 06	Transformer reversed	Please contact your supplier
Frequency: 07	Sensor detects	Check if the connection between test board and control board is ok
BATTERY indicator flashes	Battery voltage is too low	Check if the battery switch is "ON" or damaged. If it's damaged, replace the battery
NORMAL indicator flashes	City power voltage or frequency beyond the UPS input range	UPS is in BATTERY mode, save data and close some devices, ensure the voltage or frequency of normal AC source is under the UPS input range
City power is normal but no input	INPUT BREAKER in the "OFF" state	Kick the "INPUT BREAKER" on
Battery discharge or battery is in low capacity	Insufficient charging	Charge battery for over 10hrs
	UPS overload	Check loading condition and remove unnecessary loads
	Battery is aging	Replace the battery, contact with your supplier to ask for new battery and accessories

Press "POWER ON" but the UPS can't launch	Press ON button too short	Press "POWER ON" for 2sec
	UPS doesn't connect with the battery or the voltage of battery is too low to support the loads	Connect UPS correctly; if the battery voltage is too low, charge the battery first, and then open UPS
	Internal fault	Please contact your supplier

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 UPS 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 UPS connects to the earth.

The unit is not recommended for human's life support system and highly critical equipment.

Don't locate UPS near magnetic materials. It may result data lost.

Emergency



Danger

Before connecting with load, please ensure that all the equipment is in off status.

Electric leakage



Danger

Be sure to connect the earth wire before the connection of other wires.

Radio frequency interference

This device can interfere 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 abnormality 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

SC-VT series UPS 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 UPS 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 UPS, please charge the batteries at least 12 hours to make sure the full charge.

If you do not use UPS 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 UPS 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

- Before operation, please take off your metal possessions, such as watches, rings, etc.
- 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.
- Don't use fire to deal with the battery or battery pack, otherwise it will explode and hurt people.
- Do not damage or open the battery, since the electrolyte is highly toxic, may bring harm to human body.
- Avoid battery short circuit, otherwise it will cause fire disaster or electric shock.
- 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.
- Even if the input power is switched off, the internal components of UPS might still be connected to the battery with potential danger. Therefore, before doing any repair or maintenance work, please disconnect or unplug the battery.
- 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. OPTION

Communication interface

This series provide communicate port to realize the remote monitoring of UPS. 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 UPS.

RS232 setting

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

DB-9 connector feet

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

