1. Safety instruction

Abstract

This chapter mainly introduce the safety marks and notes of 1KVA-3KVA series on-line UPS. Read this chapter carefully before operating on the equipment.

1.1 Safety instruction

There is dangerous voltage and high temperature inside the UPS. During the installation, operation and maintenance, please abide the local safety instructions and relative laws, otherwise it will result in personnel injury or equipment damage. Safety instructions in this manual act as a supplementary for the local safety instructions.

Our company will not assume the liability that caused by disobey of safety instructions. Please note the following:

1.Don't use the UPS when the actual load exceeds the rated load.

2.There are high-capacity batteries in the standard type UPS. You mustn't open the enclosure or it will lead to electric shock. If it needs internal maintenance or battery replacement, please send it to the designated site.

3.Internal short-circuit of the UPS will cause electric shock or fire. So don't place the containers equipped with liquid on the top of the UPS so as not to cause danger of electric shock and so on.

4.Don't put the UPS in a place with high temperature or humidity as well as the corrosive gas, much dust.

5.Keep good air circulation between in-vent on front panel and out-vent on back panel.

6.Avoid direct sunlight or near heat-dispensed objects.

7.In case that the smoke appears on the UPS, please cut off the power as soon as possible and contact the dealer service site.

2. Product Introduction

2.1 The appearance of the product

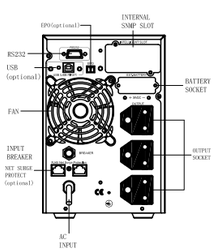


Fig. 1 1KVA Rear Panel view

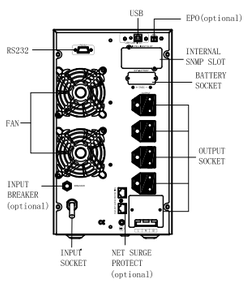


Fig. 2 2/3KVA Rear Panel view

OUTPUT SOCKET TYPE	
US STANDARD SOCKET	
INTERNATIONAL STANDARD SOCKET	INDIAN STANDARD SOCKET
UNIVERSAL SOCKET	SOUTH AFRICA SOCKET
GERMANY STANDARD SOCKET	AUSTRALIAN-STYLE SOCKET
WIRING SOCKET	

Fig. 3 output socket Type

2.2 The principle of the product

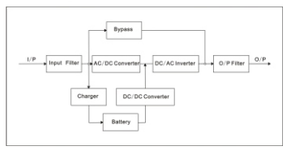


Fig 4 UPS Principle Diagram

1.input filter: Complete filtering the input AC utility power to provide the clean power for UPS.

2.AC/DC converter: Convert the filtered AC mains to DC and boost the DC for DC/AC inverter.

3.DC/DC booster: When the UPS works in battery mode, the circuit boosts the DC for DC/AC inverter.

4. DC/AC inverter: Convert the boosted DC to stable AC output.

5.Bypass: When overload or failure of inverting happen in the UPS, it transfers to bypass mode to supply power to loads.

6.Charger: Standard unit provides 1A; long backup unit provides 6A.

7. Battery: Sealed Lead Acid Battery.

8.Output filter: Complete filtering the output of the UPS to provide the clean power for loads.

3. Installation

3.1 Unpacking and inspection

1. Unpacking the UPS and check that whether it's damaged during the transportation. If damaged or some parts missing, don't start the machine and inform the carrier and franchiser.
2. Check the annex (please consult Appendix Table 1).
3. Check if the equipment is just what you wanted to purchase. You can affirm through inspecting the model number on back panel of the equipment.

3.2 Notes

1. Please place the UPS in a clean, stable environment, avoid the vibration, dust, too humidity, flammable gas and liquid, corrosive.
2. The ambient temperature around UPS should keep in a range of 0℃～40℃. If UPS works above 40℃, it is required that the rated value of the largest load decreases 12% while the temperature increases every 5℃ . The highest temperature cannot be more than 50℃ when UPS works.
3. UPS should be placed in a sufficiently ventilated place.

3.3 Long backup external battery connection

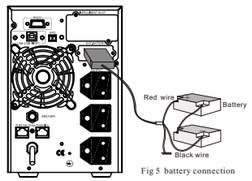


Fig 5 battery connection

⚠ Warning:

★Before installing battery, make sure that UPS and breaker are all turned off. Remove all your metallic adornment such as finger ring, watch, and so on before connecting battery.

★No anti-connection or short circuit between the battery anode and cathode forever. Red cable connect with battery anode "+" and black cable connect with cathode "-".

★Please use the screwdriver with insulating handle. Do not lay the tools or metallic goods on the battery.

⚠ Notice:

★When using the external battery, It is best to use external battery cable which matches with the equipment.

★When connecting load to UPS, first turn off load and then connect the power cable and finally turn on load one-by-one.

★Inductance loads such as motor, fluorescent lamp, photocopier are strictly prohibited connecting to UPS to avoid damage.

★Plug UPS on the special socket with over-current protection, the power socket that used should be connected with ground wire.

★UPS is likely to have output voltage no matter whether the power input cable is plugged in mains input socket. If you wish UPS have no output, first break off the switch and then cancel the mains.

★When connect laser printer, select the capacity of UPS according to the UPS start power because the startup power is higher.

4. Panel display, operation and running

The operation is simple, operators only need to read the manual and follow the operation instructions listed in this manual without any special training.

4.1 Faceplate display illumination

4.1.1 Keys function

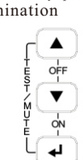


Fig 6 front panel buttons instruction

1KVA–3KVA

HIGH FREQUENCY LCD SERIES UPS

USER MANUAL

ON key (+)

Press and hold this key for more than half a second to turn on the UPS.

OFF key (+)

Press and hold this key for more than half a second to turn off the UPS.

TEST/MUTE key (+)

Press and hold the key for more than 1 second in Line mode or economical mode: UPS runs the self-test function.

Press and hold the key for more than 1 second in battery mode: UPS runs the mute function.

INQUIRING key or

Non-function setting mode:

Press and hold the key for more than half a second (less than 2 seconds): Indicate the items of the LCD item section orderly.

Press and hold this key for more than 2 seconds: Circularly and orderly display the items every 2 seconds, when press and hold the key for some time again, it will turn to output status.

Function setting mode:

Press and hold the key for more than half a second (less than 2 seconds): Select the set option.

Function setting key

Non-function setting mode:

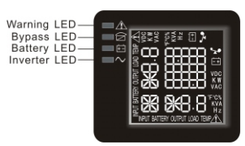
Press and hold the key for more than 2 seconds: Function setting interface.

Function setting mode:

Press and hold the key for more than half a second (less than 2 seconds): Affirm the set option.

Press and hold the key for more than 2 seconds, exit from this function setting interface.

4.1.2 The function of LED indicators



Warning red LED is on: UPS is fault. For example: Overload beyond the allowed time, inverter fault, BUS fault, over temperature fault etc.

Bypass yellow LED is on: UPS is alarming. For example: Bypass mode supply power and etc.

Battery yellow LED is on: UPS is alarming. For example: Battery mode supply power and etc.

Inverter green LED is on: UPS is normally powered by mains or battery mode.

After starting the UPS, the four LEDs will light and go out one-by-one. It circulates several times until starting the UPS successful.

NOTE: As to the LED indication in different modes, please refer to the LED display panel and warning table.

4.1.3 LCD display functions

LCD display comprises numerical value section, capacity graphics section, fan-status graphics section and charger-status graphics section.

Numerical value section—display the corresponding numerical value of inquiring items(output, load, temperature, input, battery), for example, as the graphics shows above, the output voltage is 220v, the output frequency is 50Hz.

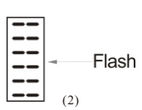
Capacity graphics section—display the capacity of the battery and load. Every pane represents 20%capacity. As graphics showed above, the capacity of the battery is 80%-100% (5 panes), the load reaches 40%-60%(3 panes). When UPS is overload, the icon will flash, when capacity of battery is too low or disconnected, the icon will also flash.

Fan-status graphics section—display if the fan works normally. When the fan works normally, it will show the dynamic fan blades rotating; when the fan works abnormally, the icon will keep on flashing with the warning .

Charger-status graphics section—display the status of the charger. When charger works normally, the corresponding icon will vary dynamically and orderly, just as Graphics (1);

(1)

when charger works abnormally, the icon will flash in a whole, as Graphics(2):



(2)

When UPS is in battery mode, the number of the icons of the charger-state section will vary according to the changeable capacity of the battery (pane). For example, there are five panes in Fig.A,(as the right picture of the Graphics(3) shows), so the corresponding number of icons is five rows(as the left picture of the Graphics(3) shows),, followed by this rule.

(3)

4.2 Operation

4.2.1 Start up operation

Turn on the UPS in line mode

①Once mains power is plugged in, the UPS will charge the battery, at the moment, LCD shows that the output voltage is 0, which means UPS has no output. If it is expected to have output of bypass, you can set the bps "ON" by LCD setting menu.

②Press and hold the ON key for more than half a second to start the UPS, then it will start the inverter.

③Once started, the UPS will perform a self-test function, LED will light and go out circularly and orderly. When self-test finishes, it will come to line mode, the corresponding LED lights, UPS is working in line mode.

Turn on the UPS by DC without mains power

①When mains power is disconnected, press and hold the ON key for more than half a second to start UPS.

②The operation of UPS in the process of start is almost the same as that when mains power is in. After finishing the self-test, the corresponding LED lights and UPS is working in battery mode.

4.2.2 Turn off operation

Turn off the UPS in line mode

①Press and hold the OFF key for more than half a second to turn off the UPS and inverter.

②After UPS shutting down, LED go out and there is no output. If output is needed, you can set bps "ON" on LCD setting menu.

Turn off the UPS by DC without mains power

①Press and hold the OFF key for more than half a second to turn off the UPS.

②When turning off the UPS, it will do self-testing firstly. LED light and go out circularly and orderly until there is no display on the panel.

4.2.3 UPS self-test/mute test operation.

①When UPS is in line mode, press and hold the self-test/mute key for more than 1 second, LEDs light and go out circularly and orderly. UPS comes to self-test mode and tests its status. It will exit automatically after finishing testing, LED resume.

②When UPS is in battery mode, press and hold the self-test/mute key for more than 1 second, the buzzer stops beeping. If you press and hold the self-test/mute key for one more second, it will restart to beep again.

4.3 Parameter setting

UPS has setting function. It can run the setting on any mode. After setting, it will become effective at once when meets some standards. The set information can be saved only when the battery connected and normally turning off the UPS.

The operation of setting is as following:

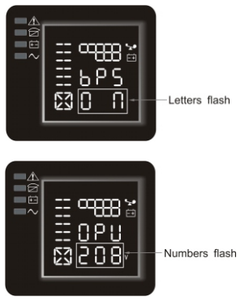
4.3.1 Bypass mode setting/Output voltage setting

① Enter the setting interface. Press and hold the function setting key for more than 2 seconds, then come to setting interface, Press and hold the function setting key for more than half a second(less than 2 seconds), select the function setting, choose the bypass output , Output voltage setting interface, at the moment, the letters "bPS" "OPU"will flash as following:

②Enter the Bps/OPU setting interface. Press and hold the function setting key for more than half a second(less than 2 seconds), then come to setting interface of bPS, at this time, the letters "bPS" /"OPU"will light for a long time. The "ON"(or OFF) or numerical value below the Bps/OPU will flash.

Press and hold the inquiring key or more than half a second(less than 2 seconds) to determine whether the bPS function is used or not. If used,the corresponding word is "ON", if not, the word is "OFF", It can be determined by yourself.

Press and hold the inquiring key or more than half a second (less than 2 seconds), select the numerical value in accordance with "OPU" function. The provided voltages are 208v, 220v, 230v, 240,you can choose anyone by yourself (The default is 220v)



③Confirm the Bypass output/output voltage selecting interface. After selecting ON or OFF or numerical value, press and hold the function setting key ⊙ for more than half a second (less than 2 seconds). Now, the bPS/OPU setting function is completed and The "ON"(or OFF) or numerical value below the Bps/OPU will light without flash.
④Exit from the setting interface. Press and hold function setting key ⊙ for more than half a second (less than 2 seconds), exit from the setting interface and return to main interface.

⚠ NOTE:
When setting the output voltage, you'd better cut off the load of the UPS first.

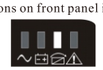
4.4 Parameters inquiring

Press and hold the inquiring key⊙or⊙or more than half a second(less than 2 seconds) to inquire about items. The inquired items include input, battery, output, load, temperature. Press and hold the inquiring key⊙for more than 2 seconds, LCD begins to display the items circularly and orderly which transfer to another every 2 seconds. Press and hold the key for some time again, it will return to output status.

4.5 Run mode

4.5.1 Bypass mode

LED indications on front panel in bypass mode are as following:



Bypass yellow LED is on, the buzzer beeps once every 2 minutes . The warning red LED is on when beeping, LCD displays are according to the exact load and battery capacity.

Turn to bypass mode under the following two conditions:
①Turn off the UPS in line mode while start the bypass output.
②Overload in line mode.
NOTE: When UPS is working in bypass mode, it has no back up function.

4.5.2 Line mode

LED indications on front panel in line mode are as following: The inverter green LED is on.

When input AC mains is in line with the working conditions, UPS will work in line mode.

4.5.3 Battery mode

LED indications on front panel in battery mode are as following: both the inverter green LED and battery yellow LED are on, the buzzer beeps once every 4 seconds. The warning red LED is on when beeping.

When the mains power down or instable, UPS will turn to battery mode at once.

4.5.4 Fault mode

LED indications on front panel in fault mode are as following: warning red LED is on

Fault mode (LCD interface on which the fault code display)
When UPS has fault. The warning LED is on and the buzzer beeps. UPS will turn to fault mode. UPS cuts off the output and LCD display fault codes. At the moment, you can press the mute key to make the buzzer stop beeping temporarily to wait for maintenance. You can also press the OFF key to shut down the UPS when confirm that there is no serious fault.

NOTE: As for corresponding information of the fault code, please refer to Fault Code information Table in Appendix.

⚠ NOTICE :
★The following process must be performed if UPS is connected with generator:
★First turn on generator, after it runs stably connect output power of generator to UPS input terminal, then turn on UPS. After UPS turned on, please connect load one-by-one.

★It is recommended that the generator capacity is as twice as UPS rated capacity
★You'd better not use the ECO mode when the quality of the input AC mains is not good。

5. Maintenance

Only minimum maintenance is required for this series of UPS. The battery is sealed lead acid maintenance free. It only needs to be kept charging to obtain the expected life. Whether it is started or not, the UPS would charge batteries once it is connected to mains and provide protection for over-charging and deep discharging.

5.1 Battery maintenance

1. It is recommended that the batteries are manually charged or discharged once every three or four months if UPS has not been used for a long time or the power is long-term uninterruptible. The battery will be fully discharge to low-voltage protection shutdown. Then it needs to be fully charged once.
2. In high temperature area, batteries should be manually charged and discharged once every two months. The process is the same as that said above.
3. Under normal circumstances of using, the battery working life is three to five years. If you find that the battery do not act well such as obviously shortening of backup time, too much imbalance on battery voltage so on, the battery should be replaced as soon as possible, which must be performed by qualified personnel.
4. When replace battery, it is recommended to change battery all together instead of changing separately.

⚠ NOTICE :
★Before replacing batteries, first please turn off the UPS and break off the mains. Remove your metallic adornment such as finger ring, watch and so on.

★When replace batteries, please use the screwdriver with insulating handle. Do not lay the tools or metallic goods on the battery.

★Never reverse or short circuit between the battery anode and cathode.

6. Troubleshooting and performance of product

The following messages are the information that users would find on UPS when it meets some problems. Users can judge if the fault is caused by external factors and know how to deal with it by making full use of the information.

1.Fault indicator on, indicates that the UPS has detected some faults.
2.Buzzer beeps, indicates that UPS need to be paid attention to, if beeps for a long time, it means that there is something wrong with the machine.
3.If you need help, contact our service department, the following messages should be provided for analysis:
◆UPS MODEL NO. and SERIAL NO.
◆Date of fault happened
◆Detailed description of the problem (include indicator statements on panel)

6.1 LED indication and warning table

Appendix 1:The corresponding working status of indications

NO	Working status	Indication				Warning	Remarks
		Nor	Bat	Bps	Fau		
1	Line mode						
	Normal voltage	●				None	
	High/low voltage protection, turn to battery mode	●	●		★	Once every four seconds	
2	Battery mode						
	Normal voltage	●	●		★	Once every four seconds	
	Battery Voltage abnormal warning	●	★		★	Once per second	
3	Bypass mode						
	Main AC Normal voltage in bypass mode			●	★	Once every two minutes	Eliminate after starting the UPS
	Main AC high voltage warning in bypass mode				★	Once every four seconds	
	Main AC low voltage warning in bypass mode				★	Once every four seconds	
4	Battery disconnect warning						
	Bypass mode			●	★	Once every four seconds	Affirm if the battery switch is closed
	Inverting mode	●			★	Once every four seconds	Affirm if the battery switch is closed
	Power up or start					Six times	Affirm if the battery is connected well
5	Output overload protection						
	Overload warning in line mode,	●			★	Twice per seconds	Remove the less important loads
	Overload in line mode, protection			●	●	Long beeps	Remove the less important loads
	Overload warning in battery mode	●	●		★	Twice per second	Remove the less important loads
	Overload in battery mode, protection	●	●		●	Long beeps	Remove the less important loads
6	Overload warning in bypass mode			●	★	Once every 2 seconds	Remove the less important loads
7	Fan fault (fan icon flash)	▲	▲	▲	★	Once every 2 seconds	Check if the fan is blocked by object.
8	Fault mode				●	Long beeps	If display fault code and ⚠ icon lights, contact for maintenance when you can't deal with it by yourself.

Appendix2：Fault Codes

Fault project	Fault causation	Before failure operat iong mode			
		Bypass mode	Line mode	Battery mode	Test mode
BUS fault	+BUS high		5	1	40
	-BUS high		25	21	41
	+BUS low		35	31	70
	-BUS low		55	51	71
	BUS imbalance		82	83	84
	BUS soft start failure	62			
Inverter fault	Inverter voltage high		4	24	42
	Inverter softstart failure		14	34	52
	Inverter softstart failure	63			
	BUS discharger failure	61			
Over heat		33	6	8	43
Inverter short			16	2	44
Over load			3	9	45
Fan fault		36	28	38	46
Charger fault		7	17		
Over charger		11	12		

● _indicator lights for a long time
★ _indicator flashes
▲ _the status of indicator depends on other conditions

NOTE: When UPS has fault, it is convenient for you to know the working status of UPS and the exact information about the fault promptly by referring to the two tables listed above.

6.2 Troubleshooting

When the fault occurs, firstly, perform troubleshooting by referring to the troubleshooting table. If the fault still exists, please contact the franchiser.

Fault	Cause	Solution
The "INPUT" letters on LCD display section flashes	Anti-connection of mains live and neutral or mains is out of range	Re-connect the input power cable and make a correct connection
Battery capacity indicator flashes	Battery low voltage or battery disconnected	Check UPS battery, connect battery well, if battery damaged, replace it
Mains normal, but UPS has no input	UPS input breaker open circuit	Press the breaker for reset
Short back up time	Battery not fully charged	Keep UPS connecting with mains power for more than 8 hours, recharge battery
	UPS overload	Check the usage of loads, remove some redundant devices
	Battery aged	When replace battery, contact franchiser to get battery and relative assembly
UPS doesn't startup after pressing the ON key	Didn't press the combination keys of "on"	Press the two keys at the same time
	UPS has no battery connected or battery voltage low and too many loads connected	Connect UPS battery well, if battery voltage low, please turn off UPS and remove some loads, then start UPS
	Fault occurs inside UPS	Contact supplier for servicing
The icon of charger status on LCD display flashes and buzzer beeps once per second	Charger doesn't work normally or battery aged	Contact supplier for servicing

6.3 EMC standard/Safety standard

◆Our product are manufactured according to the following EMC international grade standard and has passed the CE authentication :

EMC standard number	Safety standard number
IEC62040-2	IEC62040 - 1
IEC61000-4-2	GB4943-5
IEC61000-4-3	
IEC61000-4-4	
IEC61000-4-5	

6.4 Product Performance

Model		1KVAH	2KVAH	3KVAH
Rated capacity		800W/1000VA	1600W/2000VA	2400W/3000VA
input	input	Single phase and earthing		
	Voltage range	115±5VAC-295±5VAC		
	Frequency range	46Hz-54Hz@50HZ/56Hz-64Hz@60HZ		
	Power factor	≥0.98		
	Bypass range	(176±5~255±5) VAC(adjustable)		
	Current harmonic	< 15% (100% nonlinear load)		
output	Output style	Single phase and earthing		
	Rated voltage	208VAC/220VAC/230VAC/240VAC		
	Power factor	0.8		
	Voltage precision	±2%		
	Output Frequency — Line mode	1、When input frequency is in the range,the output frequency is the same as that of input. 2、When input frequency is out of the range,the output frequency is (50/60 ± 0.2) Hz when turn to battery mode		
	Output Frequency — Battery	(50/60 ± 0.2) Hz		
	Crest ratio	3:1		
	Transfer time	Mains ←→ battery = 0ms		
		Mains ←→ bypass< 4ms		
	Overload capacity — Battery mode	108%±5%<load≤150%±5% > 30s cut off output and warn.		
	Overload capacity — Line mode	150%±5%<load < 200%±5%>300ms cut off output and warn		
		108%±5%<load≤150%±5% > 30s transfer to bypass and warn		
	efficiency — Line mode	150%±5%<load < 200%±5%>300ms transfer to bypass and warn		
	efficiency — Battery mode	Full load≥ 86%		
	Output voltage distortion	Full load≥ 84%		
		≤3% (100% linear load)		
		≤5% (100% nonlinear load)		
Battery	Input battery voltage	36VDC	72VDC	96VDC
	Internal battery capacity	/	/	/
	Internal battery type	12V/7AH sealed lead acid maintenance free battery (only refers to standard UPS)		
	Backup time	Full load≥ 4min(only refers to standard UPS), As for long backup UPS, the backup time is determined by the capacity of battery.		
	Charge current(A)	6	6	6

◆ Work Environment

Model	1KVA-3KVA series
Temperature	0℃ ~ 40℃
Relative humidity	0 ~ 95% non-condensing
Altitude	< 1500m. when > 1500m, lower the rated power for use
Store temperature t	-25℃ ~ 55℃

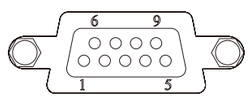
◆ Mechanical Specification

Model	Battery voltage	Dimension W*D*H (mm)	Net weight/Gross weight(kg)
1KVAS	24VDC	144*400*215	9.7/10.7
	36VDC		12/13
1KVAH	24VDC		5.6/6.6
	36VDC		5.8/6.8
2KVAS	48VDC	191*469*339	20/22
	72VDC		24.5/26.5
	96VDC		28.5/31
2KVAH	48VDC		11.4/13.4
	72VDC		11.4/13.4
	96VDC		11.4/13.4
3KVAS	72VDC		24.6/26.6
	96VDC		29/31.5
3KVAH	72VDC		11.6/13.6
	96VDC		11.9/13.9

6.5 Communication interface

6.5.1 RS232 communication interface

This UPS provides a standard DB9 communication interface on its rear panel, the definition of the pins is as following:



Pin	Definition
1、4、6、7、8、9	No use
2	Transmit
3	Receipt
5	GND

6.5.2 RS232 cable specifications

When connecting the UPS with PC by RS232 cable, it needs to use the standard RS232 cable, the detailed cable NO. are as following:

PIN 1 (hole) to computer serial port	PIN 2 (needle) to UPS serial port
2	2
3	3
5	5