H series online UPS LED 1-3KS/L

User’s manual

Thank you for purchasing our UPS, it is safe and liable, needs few maintenance.

☆ This manual includes instructions of safety installation and operation, they help your UPS to have the longest service life. This manual also accounts the UPS work principle and relative functions.

☆ Please obey the instructions and notes stated in this manual. Keep this manual in a safe place, consult it before operation.

Safety rules

● Even if not connected to main power, high voltage may still presents at UPS outlets.

● If the external battery cord or power cord needs to be replaced, please contact our service station or franchiser for replacing to avoid fire disaster caused by insufficient capacity of such items. Don't dispose of battery or batteries group in a fire, otherwise, it can cause explosion and harm to people. Don't open the battery or do the battery damage, for the liquid spilled from battery is strongly poisonous and do harmful to body.

● Please avoid short-circuit between battery anode and cathode; otherwise, this will cause electric shock or fire.

● Don't dismantle the UPS cover, there is danger of electric shock.

● Don’t touch batteries. Batteries are not isolated with the input circuit, there is high voltage between the battery terminals and ground.

● Don’t connect with the electric equipment such as blower, heater, drilling machine etc. They may damage the UPS.

Notice:

There presents high voltage in UPS. If there is any abnormal problem present, please consult the service center and do not attempt to repair the equipment under any circumstances. The address of service center has been detailed on the warranty card.

Note: POCASA reserves the right to make changes to product described in this manual at any time and without notice for reasons of improvement.

Contents

1. Brief introduction

1.1. Technology introduction

● This UPS is a sophisticated piece of equipment with 16 bit Microprocessor and advanced software programming technology, high frequency SPWM is created to control the inverter of UPS. This simplifies the control circuit, enhances the stability of UPS, also enables the UPS to have enhanced real-time performance that makes UPS respond the variety of external environment rapidly and insure that the control circuit is compact and reliable.

● Digital control technology to avoid the temperature excursion of hardware specification

● Self-diagnoses before startup help UPS to find potential failure to avoid any losses

● Double conversion on-line topology, which makes the UPS a pure sine wave machine with constant frequency, constant voltage, low noise and no interruption with mains power fluctuation, it protect the user's equipments ideally all the time.

● No transfer time when main power fail or main power restore, meets the requirements of precision instruments.

● Standard bypass function
When UPS meets a fault, it can transfer to bypass seamlessly and provide alarm.

● Advanced voltage compensation technology, makes the wide input voltage range, reducing the battery usage, enhancing the adaptive ability against the bad mains power variation.

● Advanced wide frequency input technology
Wide input frequency range of UPS gives UPS a good compatibility with generator under field circumstances.

● The advanced PFC technology on the input of UPS, improves the input power factor close to unity, raises the power efficiency, removes the harmonic noise from UPS to utility, lowers UPS operational costs, it's really an environmental friendly protection power supply.

● Smart management function
Under mains power blackout, UPS would transfer to battery mode to supply power to loads, when battery voltage is low, UPS would protect itself and shuts down automatically. When main power restores, UPS would be turned on automatically to supply power to loads.

● Cold start function
When there is no input, UPS can be turned on with battery pack, to meet the user's emergency needs. The cold start function is quite strong. UPS can be cold started on full load situation.

● Fault operation prevention function
Every button has delay function, only when you press and hold the button for a certain time, required

operation can be activated.

● Smart management function

Under mains power blackout, UPS would transfer to battery mode to supply power to loads, when battery voltage is low, UPS would protect itself and shuts down automatically. When main power restores, UPS would be turned on automatically.

● Via internal or external SNMP card, UPS can go on internet, you can monitor and manage the UPS status through all kinds of network management system.

1.2. System and model description

H online series is an uninterruptible power supply incorporating double-conversion technology. It provides perfect protection specifically for computer equipment communication systems to computerized instruments.

Its true online double-conversion design eliminates all mains power disturbances. A rectifier converts the alternating current from the utility power to direct current. This direct current charges the batteries and powers the inverter. On the basis of this DC voltage, the inverter generates a pure sinusoidal AC voltage, which is constantly powering the loads.

Computers and peripherals are thus powered entirely by the UPS. In the event of power failure, the maintenance-free batteries power the inverter.

This manual is applicable to the following models:

1) H1KS, H2KS, H3KS are standard models with inbuilt battery.

2) H1KL, H2KL, H3KL are long backup time models, which are able to connect with the external battery bank.

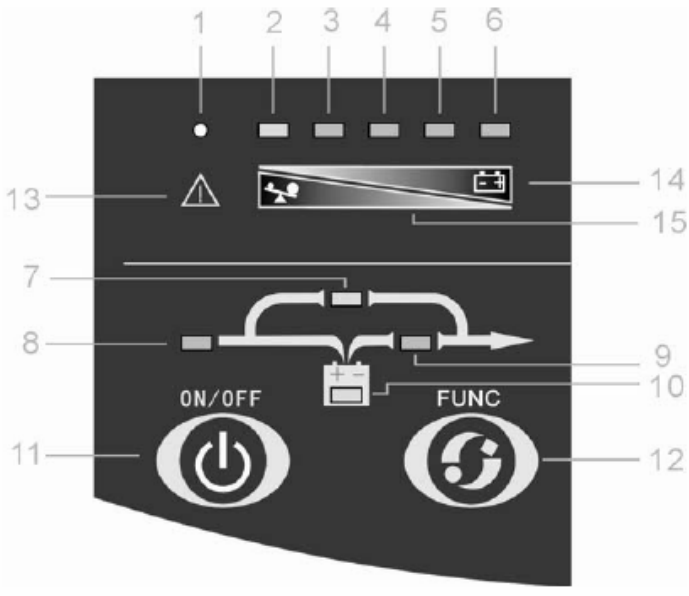
1.3. Description of commonly used symbols

The following symbols will be used in this manual and may appear during the course of your practical applications. Therefore, all users should be familiar with them and understand their meanings.

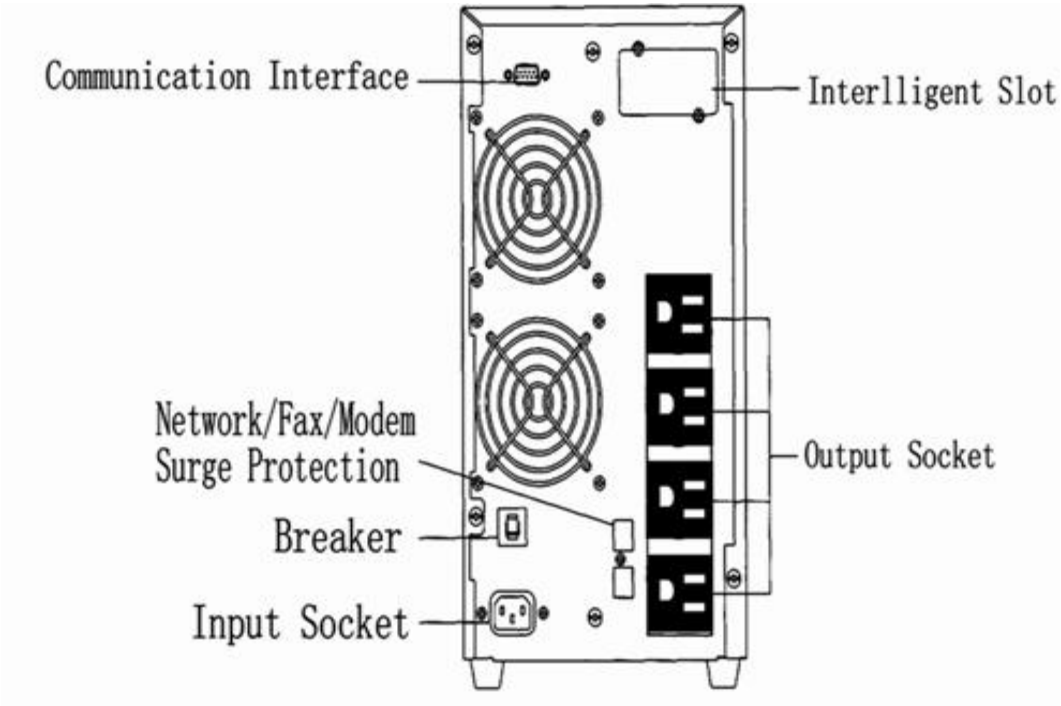
Notation and explanation	
Notation	Explanation
	Alert you to pay special attention
	Caution of high voltage
	Turn on the UPS

	Turn off the UPS
	Idle or shut down the UPS
	Alternating current source(AC)
	Direct current source(DC)
	Protective ground
	Alarm silence
	Overload indication
	Battery check
	Recyclable
	Do not dispose with ordinary trash

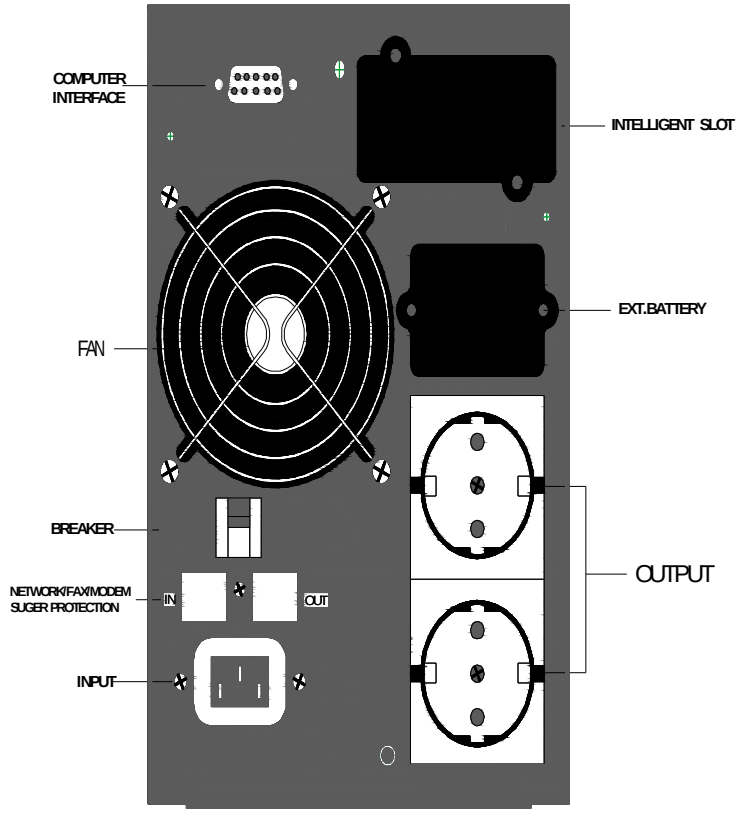
1.4. Appearance



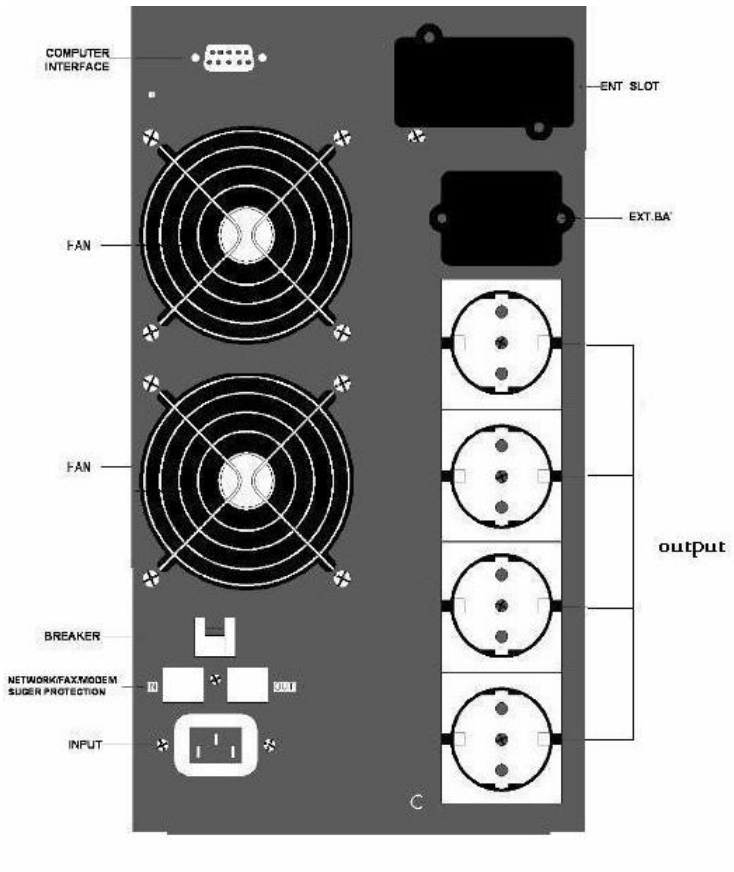
Front display panel



H2/3KS rear panel



H1KL rear panel



H2/3KL rear panel

1.5. Product specification and performance

1.5.1. General specification (standard models)

Model		H1KS(L)	H2KS(L)	H3KS(L)
Input	Voltage	220VAC		
	Frequency	46Hz-54Hz/56Hz-64Hz		
	Amperage(maximum)	12A	20A	30A
Output	Power rating	1KVA/0.7KW	2KVA/1.4KW	3KVA/2.1KW
	Voltage	220VAC (1±2%)		
	Frequency	50/60Hz±0.2		
Batteries number and type		3*12V7AH/None	8*12V7AH/None	8*12V7AH/None

1.5.2. Dimensions and weights

Model	H1KS/H1KL	H2KS/H2KL	H3KS/H3KL
Dimensions(W*H*D)(mm)	145*400*220	192*460*340	192*460*340
Net weight	14/7	34/13.5	34/14

2. Installation

2.1. Unpacking and inspection

1). When unpacking the UPS, please pay attention to the packing mode and the annex in which includes user-manual, warranty card, input power cable, output wiring socket. There should also have an external battery connection cable if the model of your equipment is of long backup type.

2). Inspect your machine to see whether it's damaged in the transportation. If damaged or some parts missing, please don't start up your UPS.

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.

2.2. Safety notes

1). Keep good air circulation around UPS and far away from water, flammable gas and corrosive.

2). Don't place UPS on the slope and there should keep good air circulation between in-vent on front panel bottom and fan out vent on back panel.

3). The environment temperature around UPS should keep in a range of 0℃~40℃.

4). There will be phenomena of condensing if the equipment is dismantled or installed under low temperature. The equipment can't be installed unless it is full dry at internal and external of the equipment, otherwise, there will be danger of electric.

5). The socket that supplies power to UPS should be placed near the UPS and easy.

Note:

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

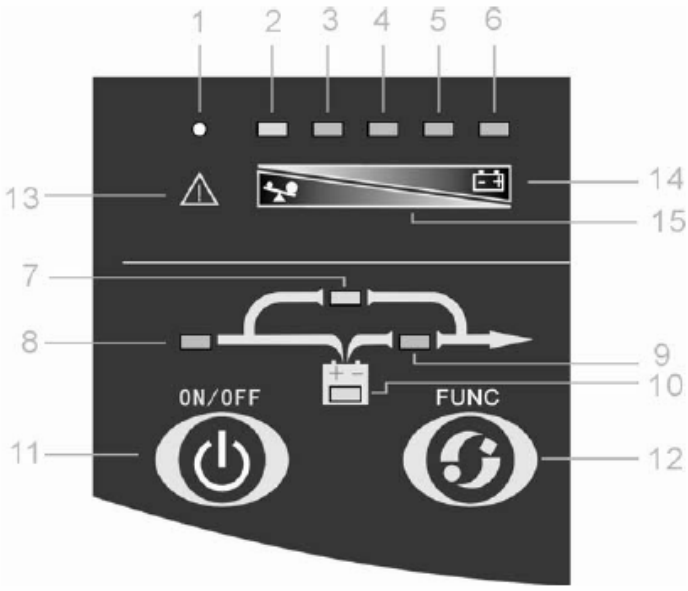
★ Plug UPS on the special power receptacle with over-current protection, the power receptacle should be connected with ground wire.

★UPS is likely to have output voltage no matter whether the power input cable is plugged in utility socket. If you wish UPS don't have output, firstly break off the switch and then cancel utility power supply.

★ For standard unit, it is recommended the batteries are charged for eight hours prior to use. UPS can automatically charge batteries as long as UPS put through power. UPS can also be used at once if battery hasn't been charged , but the back-up time will be less than the standard value.

★When connect inductance load such as laser printer to UPS, the capacity of UPS is reckoned according to the loads startup power because the startup power is higher.

2.3. The description of front panel and display lamp

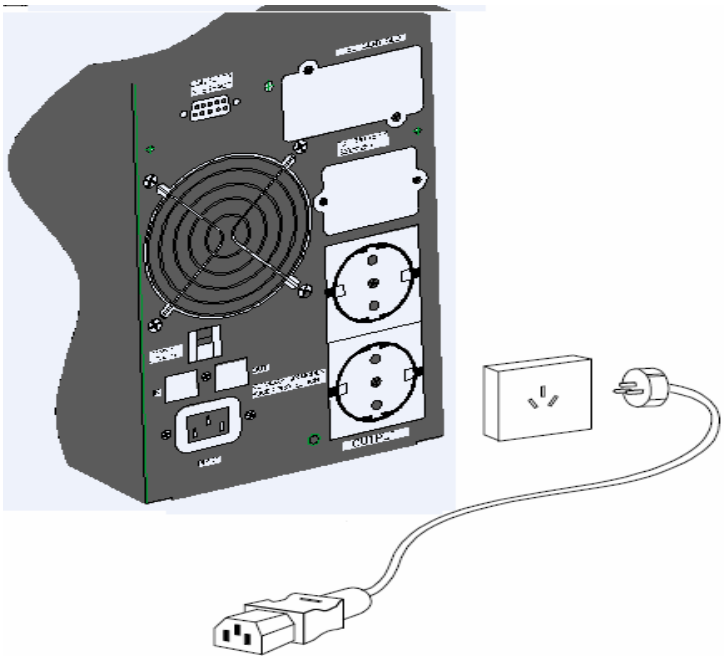


No.	Indicator	Specification	Description
1	Fault indicator	red	When the indicator on, it shows the UPS in abnormal condition , inverter output power off
2	Alarm indicator	Yellow	When the indicator alarm, it show the UPS in abnormal condition, inverter output without interruption
3	Load/battery capacity indicator	Green	In Normal mode ,the percentage of load capacity is 75~100%;the battery capacity level is 0~25%
4	Load/battery capacity indicator	Green	In Normal mode ,the percentage of load capacity is 50~75%;the battery capacity level is 25~50%
5	Load/battery capacity indicator	Green	In Normal mode ,the percentage of load capacity is 50~75%;the battery capacity level is 25~50%
6	Load/battery capacity indicator	Green	In Normal mode ,the percentage of load capacity is 0~25%;the battery capacity level is 75~100%
7	By pass indicator	Yellow	When the indicator on, it shows the UPS output bypass
8	Utility power indicator	Green	When the indicator on, it shows that the utility power is normal. When the indicator blink ,it shows the utility power is abnormal. When the indicator off, the utility power off
9	Inverter indicator	Green	When the indicator on ,it shows the UPS inverter output
10	Battery indicator	Yellow	When the indicator on,it shows the battery in normal condition, or the battery in abnormal condition

11	ON/OFF button	-	1) Turn on: by pressing the ON/OFF button more than one second,the UPS system is turened on Turn off:by pressing this button more than 1second turn off the UPS system whenever the UPS run under the normal mode/battery mode
12	Function button		1) Battery self-test: when the UPS run in normal mode ,pressing the button for more then 2 seconds can start the battery self-test 2) Silence function in battery mode :In battery mode, when the buzzer beeps, pressing and holding the function button for 2 seconds can silence the buzzer. Press the button for more than 2seconds again to resume the alarm function Note: the alarm silencing function of the Function button is valid only in battery mode, and invalid for any other UPS alarm.
13	Fault indicator mark	-	-
14	Battery capacity indicator mark	-	-
15	Load capacity indica- -tor mark	-	-

2.4. UPS input connection

When connect power cable, please use suitable socket with over-current protection. The rating for H1KS(L) should be above 6A, for H2KS(L) should be above 12A, for H3KS(L) should be above 16A.



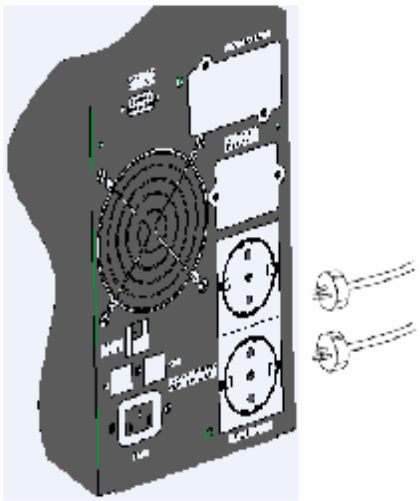
UPS input connection

2.5. UPS output connection

1). Output of H1KS(L) use socket only, please directly plug the load cable into the output socket.

2). Output of H2KS(L) and H3KS(L) not only provide socket but also offer high-currency output wiring socket, which make output wiring become easy.

UPS model	Output socket	Wiring socket
H1KS(L)	3	None
H2/3KS(L)	4	Yes



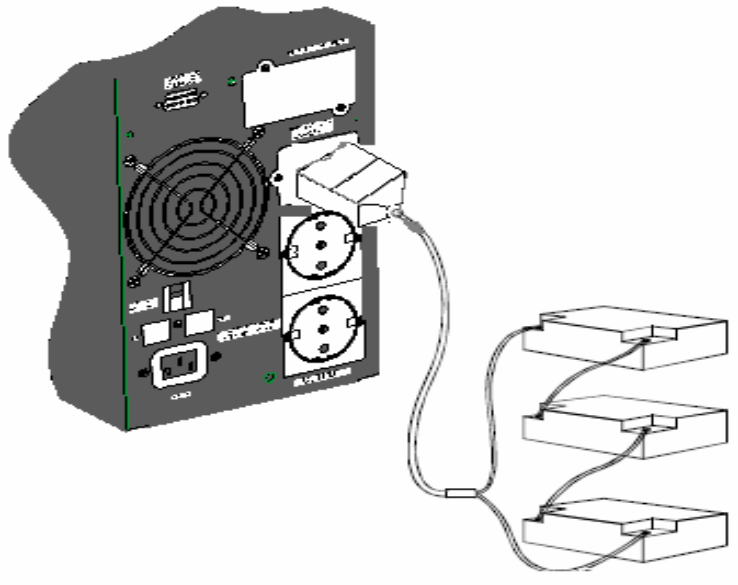
UPS output connection

2.6. External battery connection

1). Choose correct battery voltage according to the model

The batteries can't be more or less connected, otherwise UPS will work abnormal or be damaged. Battery voltage for H1KL is 36VDC; for H2KL is 96VDC; for H3KL is 96VDC.

2). One end of external battery cable is connected to UPS; the other end is open style two cables used to connect to battery pack. The process of connecting battery is very important. Operator must obey the instructions.



Long backup external battery connection

A. First connect battery group in series and ensure correct battery voltage.
B. Extended battery cable must be connected to battery first(do not connect to UPS first; otherwise there will be danger of(electric shock). Red cable connect with battery anode “+” and black cable connect with cathode” –“.
C. Don't connect any load to UPS, put through utility to UPS after the input wire has been connected well.
D. After plug the battery extended cable into UPS battery socket, the connection is completed, at the same time UPS starts to charge batteries.

3. Operation and operating mode

3.1. Operation

3.1.1. Turn on the UPS with utility power supplied (in line mode/AC mode)
※ Please firstly use of internal battery models.

A. When you operate first time, please open the battery breaker cover plate and turn on the battery breaker. Then close the battery breaker cover plate.

B. After you make sure that the power supply connection is correct, set the input breaker in the “ON” position first. At this time the fan rotates and the UPS supplies power to the load via the bypass. The UPS operates in bypass mode.

C. To power on the UPS by simply pressing the “ON” button continuously for more than 1 second.

D. When being powered on, the UPS will perform self-diagnosis, with the load/battery level LEDs turned on and then off one after another in ascending order. A few seconds later, the INV LED is turned on, the UPS is already running in utility power mode. If the utility power is abnormal, the UPS will operate in battery mode without output interruption of the UPS.

3.1.2. Turn on the UPS with no utility power supplied (in battery mode)

A. Press the “ON” button continuously for more than 1 second to power on the UPS For long back up time model(“S” model), please make sure that the battery breaker is in “ON” position.

B. During the course of starting up, the UPS has the same action as if it is connected to utility power except that the utility power LED is not turned on and the battery LED is turned on instead.

3.1.3. Turn off the UPS with utility power supplied (in line mode/AC mode)

A. Press the “OFF” button continuously for more than 1 second to turn off the inverter of the UPS immediately.

B. When being powered off, the UPS will perform self-diagnosis, the load/battery level LEDs will be turned on and then off one after another in ascending order, then the INV LED will be turned off and bypass LED will be turned on. The UPS is working in bypass mode.

C. Upon completion of the above to turn it off, output of electric current of the UPS is still present. In order to cut off the output from the UPS, simply cut off the utility power supply and the UPS will perform self-diagnosis, finally not any display is shown on the display panel and no voltage output is available from the UPS output.

3.1.4. Turn off the UPS with no utility power supplied (in battery mode)

A. Press the “OFF” button continuously for more than 1 second to power off the UPS.

B. When being powered off, the UPS will perform self-diagnosis, the load/battery level LEDs will be turned on and then off one after another in ascending order. Finally not any display is shown on the display panel and on voltage is available form the UPS output.

Suggestions: please turn off the connected loads before turning on the UPS and turn on the loads one by one after the UPS is working in INV mode. Turn off all of the connected loads before turning off the UPS.

3.2. Operating mode

3.2.1. Utility power mode

The display panel in utility power mode is shown in the following diagram, the utility power LED and the INV LED are turned on, the load level LEDs will be turned on in accordance with the load capacity connected.

A. If the battery LED is turned on and the utility power LED flashes, it indicates the voltage or frequency of the utility power has exceeded the normal range, the UPS operates in battery mode.

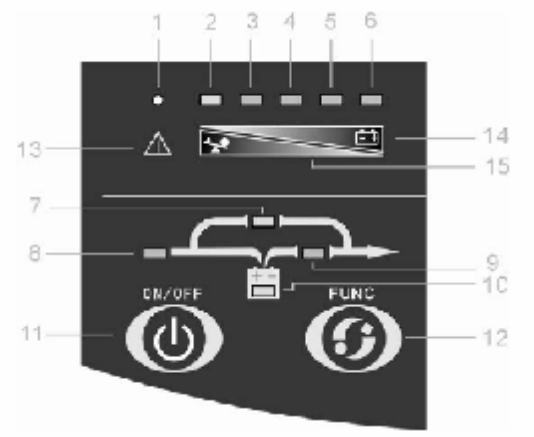


Fig 3-1: The utility power mode

B. If output overloaded, the load level LEDs will be turned on and alarm will keep twice every second. You should get rid of some unnecessary loads one by one to decrease the loads connected to the UPS less than 90% of its nominal power capacity.

Note: please follow the following steps to connect the generator;

- Activate the generator and wait until the operation is stable before supplying power of the generator to the UPS (be sure that the UPS is in idle mode). Then turn on the UPS according to the start-up procedure. After the UPS is turned on, then the loads can be connected to the UPS one by one.
- The power capacity of the AC generator should be at least twice of the UPS capacity.

3.2.2 Battery mode

The display panel in battery mode is shown in the following diagram Fig 3-2. The battery LED and the INV LED are turned on. The displayed number of the battery level LEDs will be turned on in accordance with the battery capacity. Note that the load level LEDs in utility power mode will indicate the level of the battery capacity in battery mode instead.

A. When the UPS is running in battery mode, the buzzer beeps once every 4 again, the buzzer will stop beeping (in silence mode). Press the “ON” button once again for more than 1 second to resume the alarm function.

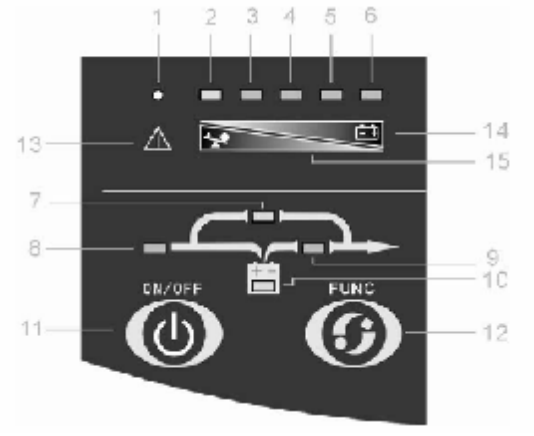


Fig 3-2: Battery mode diagram

B. When the battery capacity decreases, the number of the battery capacity LEDs turned on will be reduced. If the battery voltage descends to the alarm level, the buzzer will beep once every second to remind the users of in sufficient battery capacity and the UPS is soon going to shut down automatically. Then the load operations should be carried out promptly and the loads should be eliminated one by one.

3.2.3. Bypass mode

The display panel in bypass mode is shown in the following diagram Fig 3-3. The utility power LED and the bypass LED are lit. The displayed number of the load LEDs will be turned on in accordance with the load capacity connected. The UPS will beep once every 2 minutes in bypass mode.

- The utility power LED flashes. It shows that the voltage or frequency of the utility power has exceeded the normal range of the UPS.

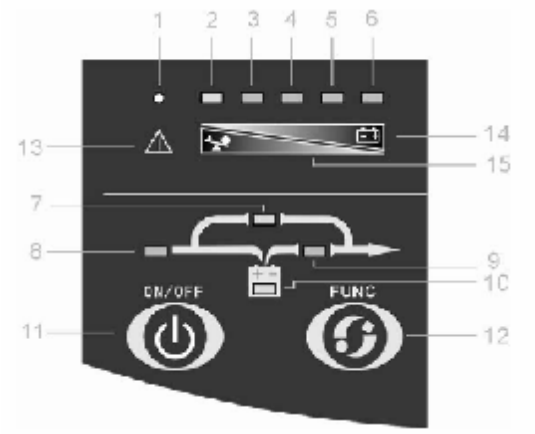


Fig 3-3: UPS bypass mode diagram

- Other indications on the display panel are the same in utility mode.
- The UPS does not have the backup function when it is in bypass mode. The power used by the load is supplied from the utility power via internal filter.

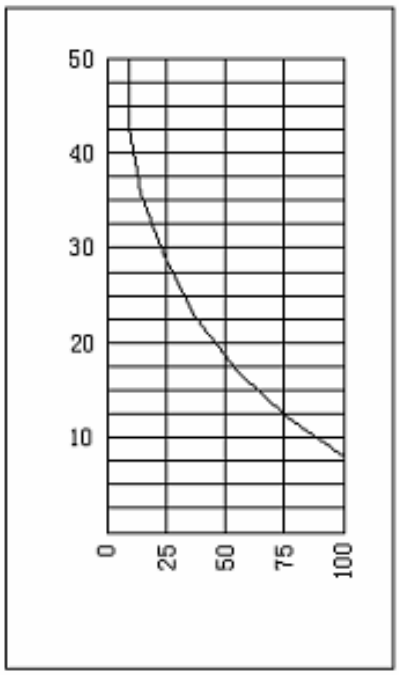
3.2.4. Abnormality mode

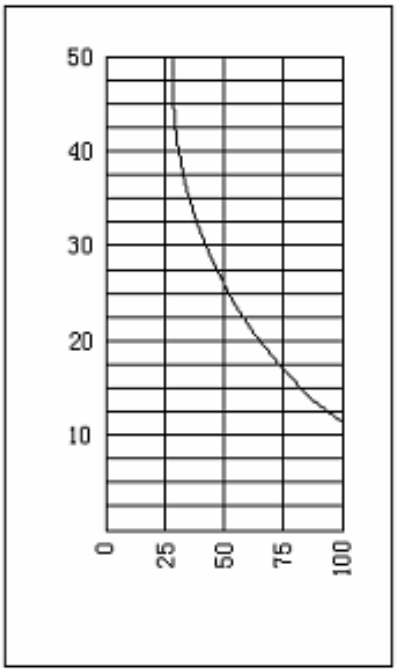
In case the fault LED is turned on when the UPS is in use, it shows that the UPS is operating in abnormal mode. Please refer to the troubleshooting in section 6 for detail.

3.2.5. Backup time for the standard model

The backup time of the long backup time model is dependent on the external battery pack capacity and the load level as well as other factors.

The backup time of standard model may vary from different models and load level, please refer to the following:





3.2.6. Communication port

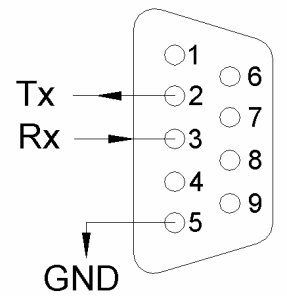
Intelligent slot

This series is equipped with an intelligent slot for web power(optional accessory) or other optional card to achieve remote management of the UPS through internet/intranet. Please contact your local distributor for further information,

RS232 Interface

The following are the descriptions and pin assignment of RS232 DB-9 port:

Baud rate: 2400bps
Data bit: 8 bit
Ending bit: 1 bit
Parity bit: none



RS232 Interface

DB-9 pin assignment:

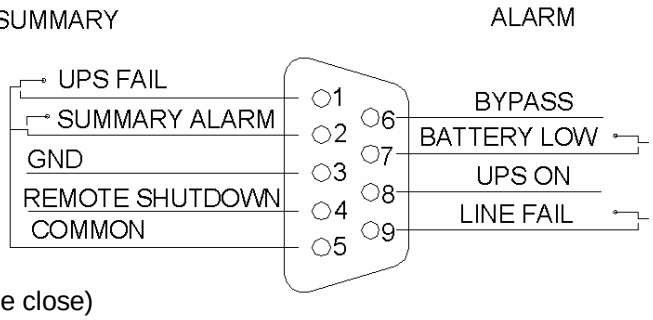
Pin number	Function description	I/O
3	Rx	Input
2	Tx	Output
5	Ground	GND

Optional AS400 interface

This optional AS400 card provides dry contact closure signal “OPEN” or “CLOSE”.

The following are the pin assignment and the descriptions of AS400 card:

PIN1：UPS failure (normally open, active close)
PIN2：Summary
PIN3：Ground
PIN4：Remote shutdown
PIN5：Common
PIN6：Bypass active (relay close)
PIN7：Battery low
PIN8：UPS On (relay close)
PIN9：Utility Power failure (normally open, active close)



AS400 Interface

3.2.7. Battery maintenance

This series UPS only requires minimal maintenance. The battery used for standard models are value regulated sealed lead-acid maintenance free battery. These models require minimal repairs. The only requirement is to charge the UPS regularly in order to maximize the expected life of the battery. When being connected to the utility power, whether the UPS is turned on or not, the UPS keeps charging the batteries and also offers the protective function of overcharging and over-discharging.

- The UPS should be charged once every 4 to 6 months if it has not been used for a long tine.

- In the regions of hot climates, the battery should be charged and discharged every 2 months. The standard charging time should be at least 12 hours.

- Under normal conditions, the battery life lasts 3 to 5 years. In case if the battery is found not in good condition, earlier replacement should be made. Battery replacement should be performed by qualified personnel.

- Replace batteries with the same number and same type of batteries.

- Do not replace the battery individually. All the batteries should be replaced at the same time following toe instructions of the battery supplier.
  Normally, the batteries should be charged and discharged once every 4 to 6 months. Charging should begin after the UPS shuts down automatically in the course of discharging, the standard charging time for the standard UPS should be at least 12 hours.

Normally, the batteries should be charged and discharged once every 4 to 6 months. Charging should begin after the UPS shuts down automatically in the course of discharging, the standard charging time for the standard UPS should be at least 12 hours.

Notice:

★Before replacing batteries, first please break off the utility switch and remove all your metallic adornment such as finger ring, watch and so on.

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

★ It is normal to have sparks when you connect battery wire to battery, it does not do harm to your body safety .

★ No anti-connection or short circuit between the battery anode and cathode forever

4. Notes for battery disposal and battery replacement

● The battery of standard unit is of valve regulated, maintenance free. It can attain expectant life only by keeping frequent charging. Regardless of UPS on or off when UPS connects to utility power, the battery is charged all the time and UPS offers protection for over-charge and over-discharge.

● Normally the battery life is three to five years and the battery must be replaced ahead of time once there presents any abnormal status. The battery replacement must only be performed by qualified personnel.

● It is inadvisable to replace a single battery. Operator should obey the instruction of battery distributor when replacing all batteries.

● The batteries should be charged and discharged once every four to six months. After UPS discharged to off, the batteries should be recharged. The charge time of standard unit must be more than 12 hours.

● The battery must be charged and discharged once every two months in high-temperature area. The charge time of standard units must be more than twelve hours.

1. If it is necessary to replace any connection cables, please purchase the original materials from the authorized distributors or service centers, so as to avoid overheat or spark resulting in fire due to insufficient capacity.

2. Do not dispose of batteries or battery packs in a fire, they may explode.

3. Do not open or mutilate batteries, released electrolyte is highly poisonous and harmful to the skin and eyes.

4. Do not short the positive and negative of the battery electrode, otherwise, it may result in electric shock or fire.

5. Make sure that there is no voltage before touching the batteries. The battery circuit is not isolated from the input potential circuit. There may be hazardous voltage between the battery terminals and ground.

6. Even though the input breaker is disconnected, the components inside the UPS are still connected with the batteries, and there are potential hazardous voltages. Therefore, before any maintenance and repairs work is carried out, switch off the breaker of the battery pack or disconnect the jumper wire of connecting between the batteries.

7. Batteries contain hazardous voltage and current. Battery maintenance such as the battery replacement must be carried out by qualified personnel who are knowledgeable about batteries. No other persons should handle the batteries.

5. Troubleshooting

The following messages are the messages that users would find on UPS when it meets some problem, with the use of such messages, users can know where the problems are and how to deal with such problems.

◆ Fault indicator on, indicates UPS has detected some fault. Buzzer beeps, indicate UPS need to be paid attention to.

◆ Several fault indicators and status indicators on, are to help the user to diagnose fault.

Problem	Possible cause	Solution
The #1 fault LED and the #6 LED are turned on, the buzzer beeps continuously	The UPS shutdown due to internal overheat	Make sure the UPS is not overloaded; the air vents are not blocked and the ambient temperature is not too high. Wait for 10 minutes for the UPS to cool down before turning on again. If failed, please contact the distributor or service center.
The #1 fault LED and the #2 and #5 LED are turned on, and the buzzer beeps continuously	The UPS output is short circuited.	Turn off the UPS. Remove all the loads. Ensure that the load is not failed or the UPS has no internal faults before turning it on again. If failed, please contact the distributor or service center.
The #1 fault LED and the #4 LED are turned on, the UPS beeps continuously	The UPS shuts down due to its internal fault.	Please contact the distributor or service center.
The #1 fault LED and the #5 LED are turned on, the UPS beeps continuously	The UPS shuts down due to its internal fault.	Please contact the distributor or service center.
The #1 fault LED and the #3 LED are turned on, the UPS beeps continuously	Overcharging protection	The charger of the UPS is failed. Please contact the distributor or service center.
The utility power LED flashes	The voltage or frequency of the utility power is out of the input range of the UPS	The UPS is running in battery mode. To save your data and close the application program. Make sure the utility power is within the input voltage or frequency range permitted by the UPS.
The #1 fault LED and the #2 LED are turned on, the UPS beeps continuously	The UPS is overloaded or the load equipment is faulty	Check the loads and remove all non-critical equipment. Recalculate the load power and reduce the number of loads connected to the UPS. Check that the loads are not failed.

The #1 fault LED and the battery LED are turned on, the buzzer beeps every second	The charge of the UPS is defective.	Please contact the distributor or service center.
Battery LED flashes	Battery low or battery not connected	Check the battery. If the battery is damaged, replace the battery immediately and ensure that the battery breaker is in “ON” position.
The utility power is normal, but the UPS can not turn in line mode	Bypass breaker in “OFF” position	Set the bypass breaker in “ON” position

Problem	Possible cause	Solution
Battery discharging time diminishes	Battery not yet been fully charge	Keep UPS connected to utility power persistently for more than 10 hours to recharge the batteries again.
	UPS overloaded	Check the loads and remove the non-critical equipment.
	Battery aged	Replace the batteries. Please contact the distributor to obtain the parts and replacement service.
The UPS cannot power on after pressing the ON button	The “ON” button is pressed too briefly	Press the “ON” button for more than 1 second.
	The UPS is not connected to the battery or the battery pack voltage is too low.	Check the battery or recharge the battery.
	UPS fault	Please connect the distributor or service center.

When you contact the service center, please provide the following information:

- Model No. and the serial No. of the UPS;
- The date when the problem arose;
- Complete description of the problem, including the LED display, alarm warning, and power condition and load capacity. If your UPS is a long backup time model, you may also provide the battery information.

Appendix: The corresponding form of the LED display

No.	Operating state		LED display										Alarm warning
			1#	2#	3#	4#	5#	6#	7#	8#	9#	10#	
1	Utility power mode	0~35% Load capacity						☆		☆	☆		None
2		36~55% Load capacity					☆	☆		☆	☆		None
3		56~75% Load capacity				☆	☆	☆		☆	☆		None
4		76~95% Load capacity			☆	☆	☆	☆		☆	☆		None
5		96~105% Load capacity		☆	☆	☆	☆	☆		☆	☆		None
6	Battery mode	0~20% Battery capacity		☆							☆	☆	Beep once every sec.
7		21~40% Battery capacity		☆	☆						☆	☆	Beep once every 4 sec.
8		41~60% Battery capacity		☆	☆	☆					☆	☆	Beep once every 4 sec.
9		61~80% Battery capacity		☆	☆	☆	☆				☆	☆	Beep once every 4 sec.
10		81~100% Battery capacity		☆	☆	☆	☆	☆			☆	☆	Beep once every 4 sec.
11	Bypass mode			↑	↑	↑	↑	☆	☆	☆			Beep once every 2 min.
12	Overloaded in utility mode and UPS still in INV mode		☆	☆	☆	☆	☆	☆		☆	☆		Beep twice every sec.
13	Overloaded in utility mode and UPS still in bypass mode		☆	☆					☆	☆			Sustained beep
14	Utility power abnormal			↑	↑	↑	↑	☆	★	↑	↑	↑	↑
15	Overloaded in battery mode, early-warning		☆	☆	↑	↑	↑	↑			☆	☆	Beep twice every sec.

16	Overload in battery mode, Cut off the output	☆	☆									Continuously beep
17	Over temperature	☆					☆	↑	↑			Continuously beep
18	Inv abnormal	☆				☆		↑	↑			Continuously beep
19	Output short circuited	☆	☆			☆		↑	↑			Continuously beep
20	BUS voltage abnormal	☆			☆			↑	↑			Continuously beep
21	Charger or battery failed	☆		☆		☆		↑	↑		★	Continuously beep
22	Battery voltage abnormal	↑	↑	↑	↑	↑	☆		☆		★	↑
23	BAT SCR failed	☆		☆			☆					Continuously beep
24	Fan abnormal	☆	☆				☆	☆	☆			Continuously beep
25	Bypass STS failed	☆				☆	☆	☆	☆			Sustained beep
26	INV RLY failed	☆			☆		☆	☆	☆			Sustained beep
27	Communication abnormal	☆		☆	☆			↑	↑			Sustained beep

☆：Solid ON ★: Flash ↑: LED display and alarm warning are dependent on other conditions.

Appendix 2: EMC grade standards

H series UPS are manufactured according to the following:
EMC international grade standard:

International standard code	Grade
*EMC	
IEC61000-4-2(ESD)	Level 4
IEC61000-4-3(RS)	Level 3
IEC61000-4-4(EFT)	Level 4
IEC61000-4-5(Surge)	Level 4
*EMI	
IEC62040-2	Class B