



**深圳优博胜电子有限公司**  
Shenzhen UPSEN Electric CO., LTD.



# User Manual

**T Series Outdoor UPS**

**1-10Kva**

Please comply with all warnings and operating instructions in this manual and on the unit strictly. Save this manual properly. Do not operate this unit before reading through all safety information and operating instructions carefully.

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# 1. Safety Introduction

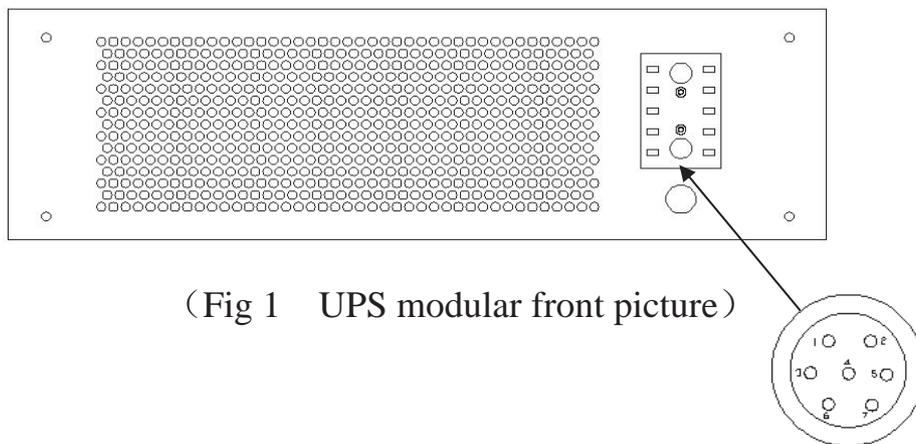
- Even no connection with utility power, 220VAC voltage may still exist at UPS output.
- Do not touch the battery connector, there is no isolation between battery and the mesh circuit. High voltage may exist between battery connector and the earth. Please check if these are high voltage before touch.
- If battery cables or power cables need to be replaced, please contact our service stations for stuff to avoid fire disaster caused by insufficient capacity of cables.
- Don't use fire to cope with the batteries, or it may burn people. Do not open or damage the batteries, the leaked electrolyte has strong poisonous ness, harmful to people.
- Please avoid short circuit between anode and cathode of battery, for it will cause spark or fire.
- Don't disassemble the UPS cover, or there may be an electric shock.

## 2. System Introduction

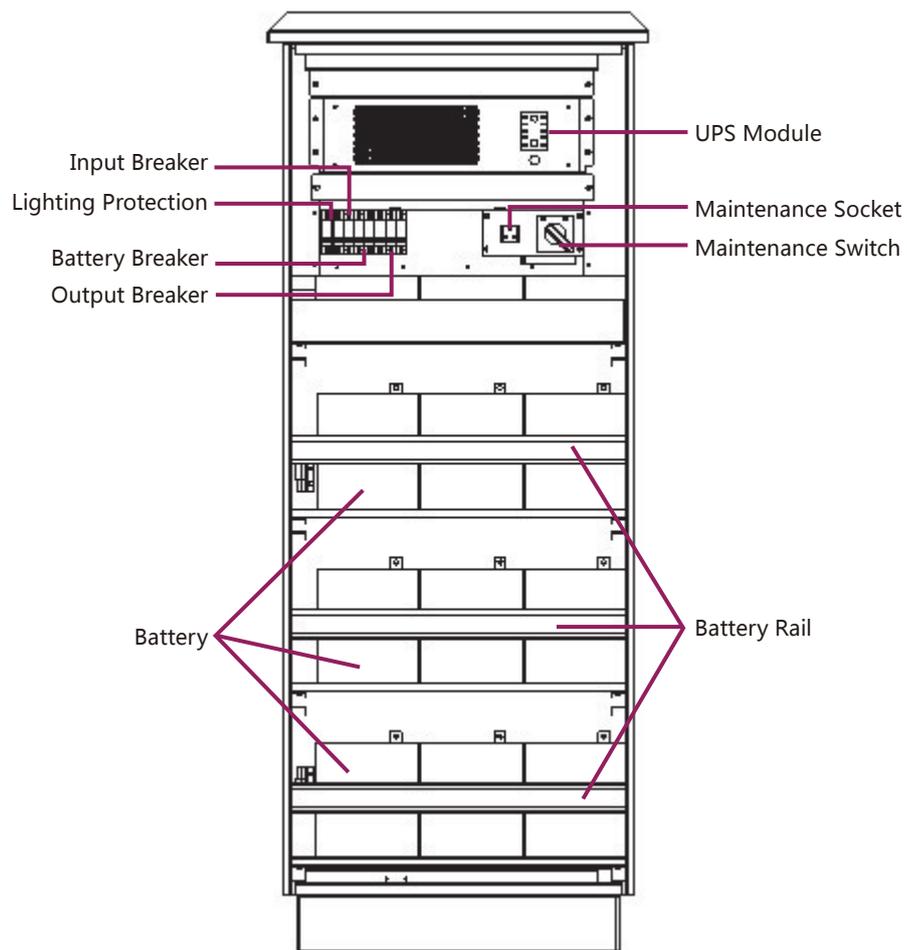
- Outdoor communication: Network equipment usually used in the remote are of the city, highway, mountain areas, environment is bad, such as high temperature, dust, raining, acid fog, power grid is very bad (voltage below 176V or higher than 296V for a long time, frequency varies often. Outdoor UPS can meet bad temperature environment, this series outdoor UPS is our fourth generation product, especially designed for high temperature, raining, thunder, typhoon coast areas.

The body adopts two layers construction, adding sunscreen on the top, rain-proof cover. Inside adding lightning protection, high-voltage protection, surge production devices. Compared with the third generation products, with better heat-insulation, dustproof, moistureproof, sunscreen, waterproof, lightning protection, surge protection, antiseptic functions. For more, the fourth generation products are more scientific and wonderful in craft.

- There are 6 layers inside, 1-4 layer is for battery installtion; 5 layer for UPS modular, lightning protection device, power distribution device, by-pass maintenance switch installtion; 6 layer for fan modular installation



- Cold start function, without AC power, can start the UPS with batteries directly meeting customer's emergency needs. Also this UPS can cold start with full load
- Use modular construction, with double doors in the front and the back, easily for installation and maintenance. Integrative case can be installed according to different installation platforms, conditions.



(Fig 2 The inner structure of the rear panel)

- High-voltage protection, (when input voltage is above 276V, cut off input, UPS work in battery model, avoid the damage of the input voltage to the PCBs).Lightning protection device, surge protection device, can eliminate the lightning stroke and the potential safety hazard which caused by the unstable rural power grid.
- On the top of the UPS with the intelligent, High-reliable cooling device, adopts modularity, easily for maintains and replacement; When inside temperature below 40C, the fan will stop running.



(Fig 3 Outdoor UPS Fan Modules)

- Whole UPS adopt 16-bit microprocessor (CPU) control and advanced software programming techniques, a direct high frequency SPWM wave to control the UPS inverter and simplify the control circuit of UPS, improve the stability of the UPS with more real-time to respond the external environment changes quickly, and ensure the machine's control circuit is more compact and reliable.
- Adopt digital control technology, avoid the inherent defects of traditional simulation control in the hardware parameters temperature drift and ensure consistency and reliability of UPS.
- The machine has a Power on Self Test function, can detect hidden fault of UPS early and avoid losses.
- With a strong load capacity and the mutational characteristics of micro-cellular base station for transmitting instantaneous power, adopt advanced IGBT power devices, enhance load capacity can work a long time at full load and saving the user's investment.
- According to the special power supply requirements of wireless communication systems and can install isolation transformer at the IP/OP of UPS.
- System adopt On-line double conversion topology design, and make a constant voltage/frequency, filter out noise, anti-interference from the pure sine wave output power supply, provide the more comprehensive and perfect protection to user equipments.
- Considering the harsh outdoor environment, adopt advanced voltage compensation technology, and make the mains input voltage range up to 176V-297V, reduce the use

frequency of the battery greatly and improve the toleration of the poor grid environment.

- Strong environmental adaptability and wide input voltage avoid large voltage changes of power grid and switch to battery energy frequently and reduce battery failure probability, adapted to power with adverse geographical conditions, the frequency range up to 46-54Hz, ensure the access to all kinds of fuel engine and meet the user requirements of oil machine application.
- Adopt the advanced times pressure power factor correction technology (PFC), make the input power factor more than 0.97 at full load and improve the utilization of power, eliminating the UPS harmonic pollution to the mains completely, and reduce the UPS operation cost, is a high cost-effective green power.
- When the mains is abnormal or normal, UPS output is zero transfer time and meet the high power standard requirements of precision equipments.
- With intelligent unattended function, UPS work under battery mode when the mains power disconnect, and the ultimate protection due to the low battery voltage and automatically shut down. When utility power is restored, UPS detect if the mains' voltage/frequency is normal, when the mains' voltage/frequency within the normal range, UPS provide power supply to load; When the mains voltage/frequency is abnormal, UPS will only charge the battery until the mains' voltage/ frequency return to the normal range, UPS provide power supply to load again.
- With the battery discharge cut-off voltage automatic adjustment function, UPS can determine the battery's discharge rate through load current detection when battery discharge automatically, and then adjust the cut-off voltage of the battery discharge to prolong battery life automatically. And has a battery protection to prevent battery over-discharge and cause permanent damage. Battery low voltage warning function can inform users to carry out the relevant operation.
- With a dry contact alarm output function (optional), provide six pairs of dry contact alarm signals: ①UPS mains failure②UPS failures ③low battery alarm ④UPS high temperature alarm ⑤Access Control alarm ⑥SPD access failure, so that communication base station can monitor the working status of UPS.

**NOTE: ①, ②, ⑤ is standard settings, ③, ④, ⑥ provided according to customer needs.**

- Provide a detailed LED display information which may be fully expressed with a different work environments, different working conditions through the LED display. Through a combination LED display can provide some common fault information code, fault information code by reference to the code form and judge failure causes of UPS, failure location, make the UPS maintenance more quickly and conveniently.
- Complete protection function, AC input/output over/low voltage protection; output overload, short circuit protection; inverter over-temperature protection; low battery voltage warning protection; battery overcharge protection; anti-surge, anti-lightning protection, multi-function integrated protection, ensure UPS system work with a more stability and reliability greatly

## 3、 Installation instruction

### 3.1 Unpacking inspection

3.1.1 Unpacking, please check the accessories to determine whether this UPS is the machine you want to purchase by examining the model of UPS front panel.

3.1.2 Check whether the UPS was damaged in transit. If found damaged or lost, please do not turn and inform carriers and distributors.

### 3.2 Whole appearance



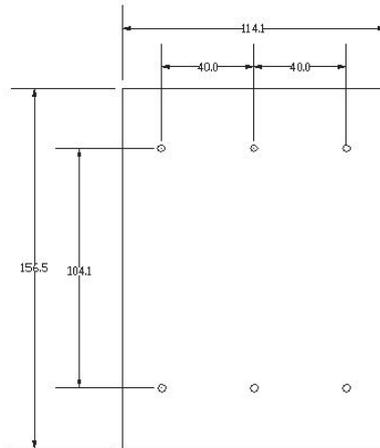
(Fig 4 the appearance of whole structure)

The whole structure is front and rear double doors, with a round door lock, when you open the door, first open the locked waterproof cover, and then put key into the keyhole, rotate 180 degrees to open the door. When you close the door, put the key into the keyhole, rotate 180 degrees to shut, remove the key that locked the door, and then covered with a waterproof cover.

UPS machine can be fixed in M10 screws on the platform directly, the UPS with the external wiring through the underside hole.

### 3.3 UPS installation

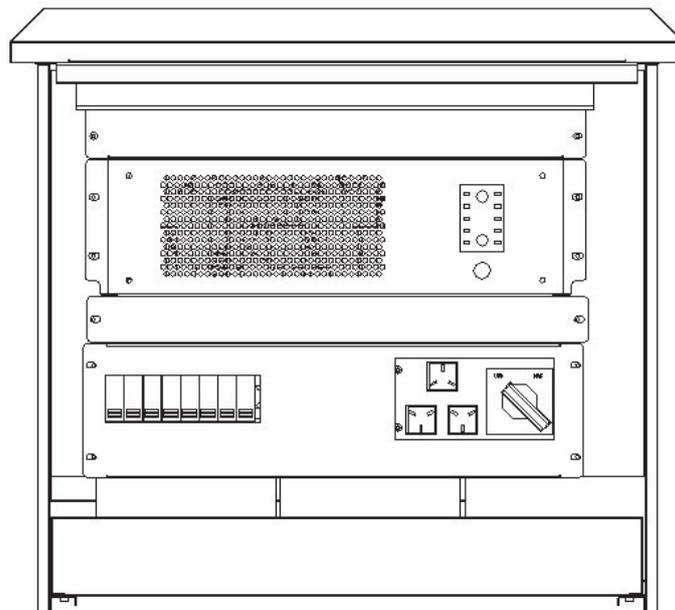
#### 3.3.1 Machine base mounting dimensions shown below



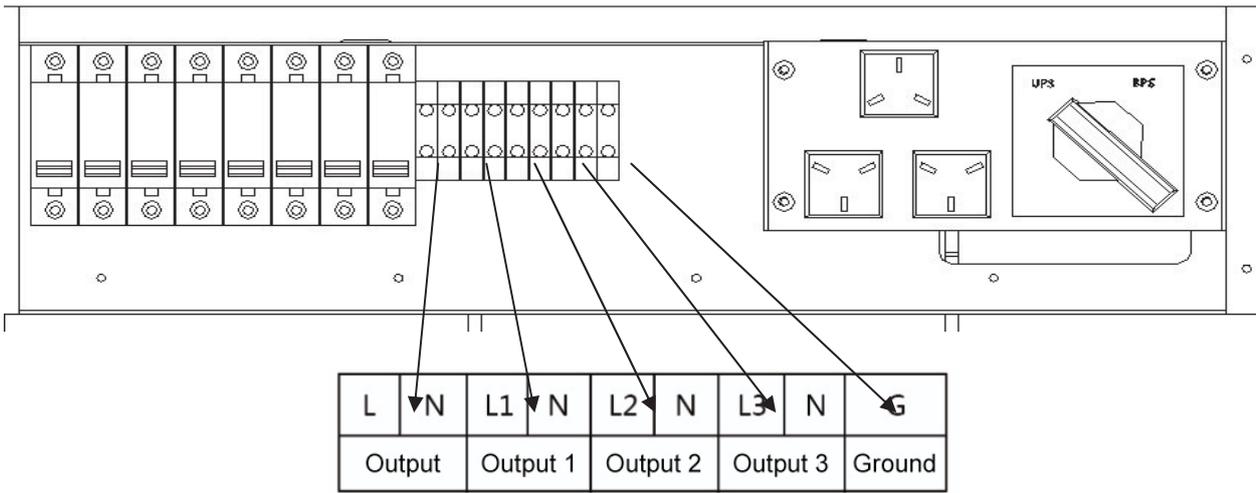
(Fig 5 5K/6K/10K base mounting location drawing)

#### 3.3.2 Connection of AC input and output lines, dry contact signal line

**3.3.3** AC input power cord connection: According to the on-site installation environment, cutting the suitable length of the input power cord and power cord jacket wave pipe, one end of the power cord connect the switchboard and the other end connect corresponding terminal blocks through the hole and waterproof protection, Fire Wire connected to the identity of INPUT (L) circuit breaker, neutral wire connected to the identified INPUT (N) circuit breaker, ground wire connected to the input terminal blocks.



(Fig 6 5K/6K/10K Internal front diagram)



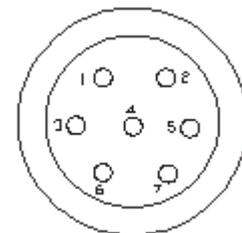
(Fig 7 Input and Output connection)

3.3.4 AC output power connection: According to the install environment, cut suitable length output power cable. on the outside of power cable, put the same length corrugated tubes, one terminal of the cable is connected to the input of the base station, the other terminal is connected on the corresponding terminal block on UPS (see Fig 7) through the waterproof holes, the live wire is connected on the terminal block which marked as OUTPUT (L), the neutral wire is connected on the terminal block which marked as OUTPUT (N), the ground wire connect on the input grounding terminal block. (there are 3 group output terminal block )

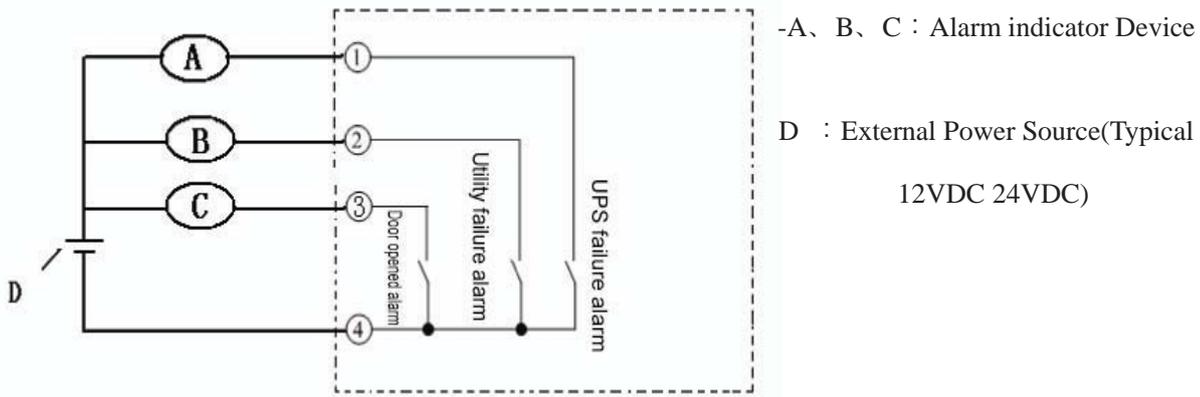
★ : Before connecting, you should confirm that all circuit breakers on the cabinet are disconnect! UPS in the closed state.

3.3.5 Dry contact signal output cable connection: According to the install environment, cut suitable length dry contact signal output cable, and put the same length corrugated tubes on it, one side of the dry contact signal output cable connected to the signal input side of the base station, the other side connect to dry contact .

Pin	Name	Introductions	Comment
1	GJ1	External alarm 1	UPS failure alarm
2	GJ2	External alarm 2	Utility failure alarm
3	GJ3	External alarm 3	
4	GND	Comm.	
5	NC	NC	
6	NC	NC	
7	NC	NC	



(Fig 8 Dry contact Pin introductions)

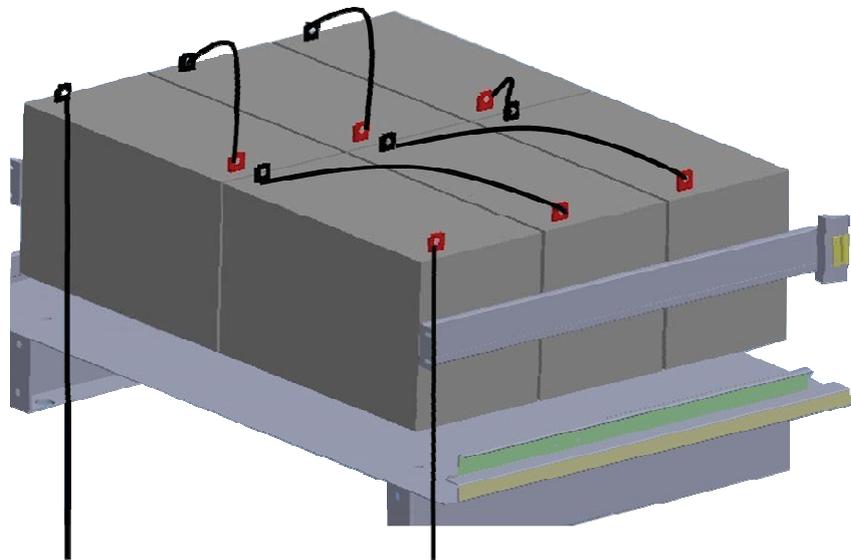


(Fig 9 Dry contact wiring diagram)

### 3.3.6 The connection of Internal Batteries

3.3.6.1 This system standard install with 100Ah battery

3.3.6.2 Battery placement : first remove the front rail which for install battery, then put the battery in the cabinet as shown, and then lock and fix the front and rear rail of the battery .

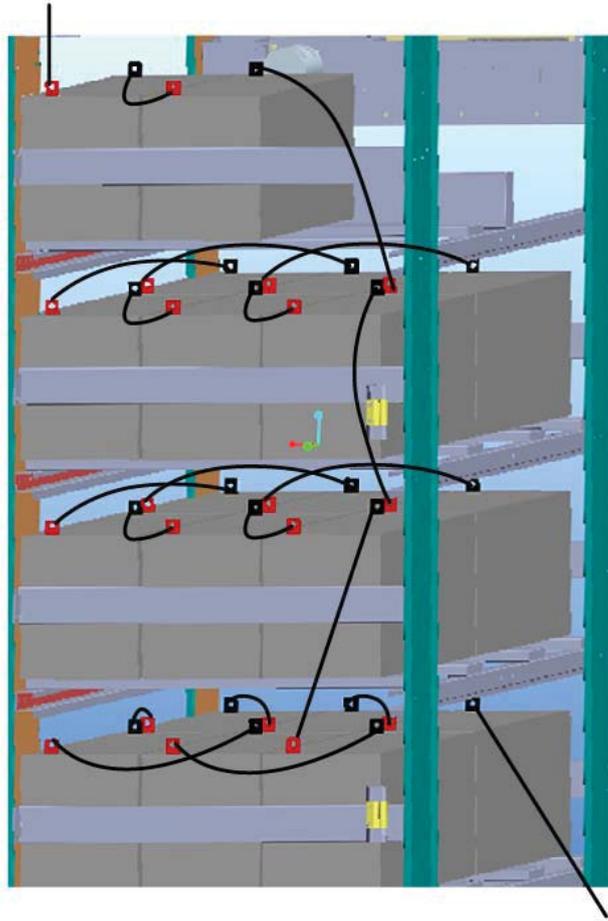


Connected to battery breaker Bat -

Connected to second layer battery breaker Bat – (the second layer Negative connect to the third layer Negative, the third layer Negative connect to the fourth layer Negative)

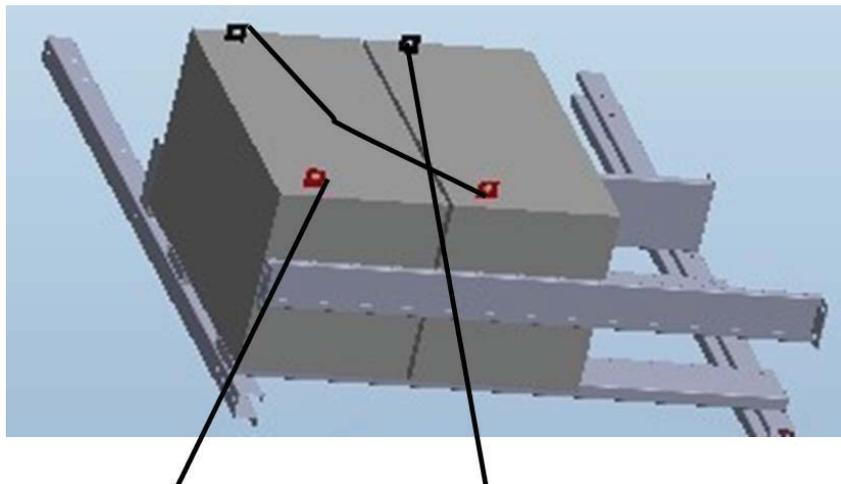
(Fig 10.1 one to three layer display method)

Connected to battery breaker Bat +



Connected to battery breaker Bat-

(Fig 10.1 the whole machine battery connection)



Connected to battery breaker Bat +

connect to third layer positive

(Fig 10.3 the fourth layer display method)

3.3.6.3: the battery connection: use the battery cable to connect the battery in series connection according to the wiring diagram, then connect the battery positive cable (red cable) to the small circuit breaker terminal which marked BATTERY(+), and then connect the battery positive cable (black cable) to the small circuit breaker terminal which marked BATTERY(-)

- ★ : Before install battery, ensure the UPS break off, ensure that all the breakers in close state! and remove all your metallic adornment such as finger ring, watch and so on.
- ★ : No reversing or short circuit between the battery anode (Bat +) and cathode (Bat-) .
- ★ :Please use the screwdriver with insulating handle. Do not lay the tools or other metallic goods on the battery.

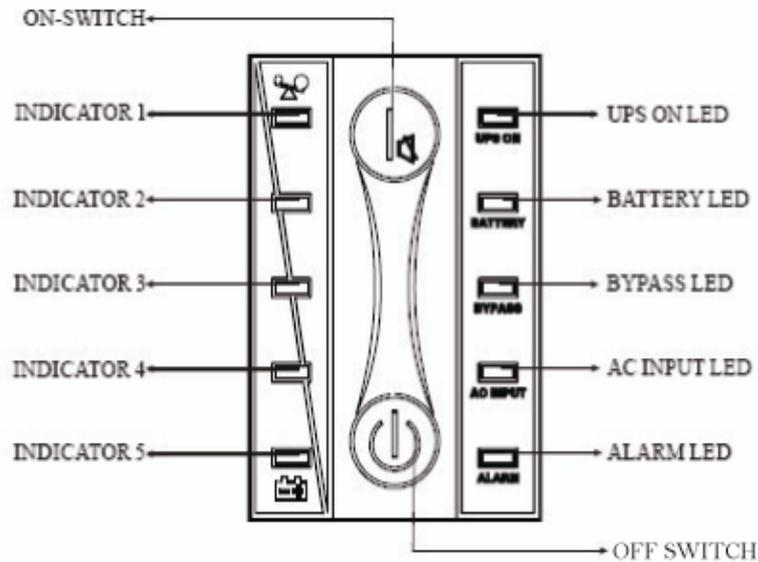
### 3.3.7 Clean the installation site

Clean the installation site and inside of the cabinet,put all the tools into the toolbox,and make sure the toolbox inventory is correct,do not leave items in the cabinet

# 4. Operation

## 4.1 Display panel and indicator

The UPS power control and operating indicators are located on the front display panel.



(Fig 11 display panel)

### **ON-SWITCH:**

- The UPS can be turned on by pressing ON-SWITCH button for at least 1 second.
- The acoustic alarm can be deactivated by pressing ON-SWITCH button for at least 1 second.

### **OFF -SWITCH:**

- The UPS can be turned off by pressing OFF-SWITCH button for at least 1 second.

### **AC INPUT LED:**

- Lights up when the mains power is normal.
- Blinks when the mains power is abnormal or the live wire and the neutral wire reversed at the input.

### **UPS ON LED:**

- Lights up when output power provided by the mains power via the inverter.

### **BATTERY LED:**

- Lights up when the mains power is failed and the inverter is powered by the batteries.

### **BYPASS LED:**

- Lights up when output power provided by the mains power via the bypass.

### **ALARM LED:**

- Lights up when the UPS system is in fault condition, at the same time, an acoustic warning signal is issued every second.

### **INDICATOR:**

- when the AC INPUT LED lighting up mean load capacity
- when the BATTERY LED lighting up mean battery capacity

#### Load / battery capacity indicator 1~5

	load capacity		battery capacity
INDICATOR 1~5	96%-105%	INDICATOR 1	1%-35%
INDICATOR 2~5	76%-95%	INDICATOR 1~2	36%-55%
INDICATOR 3~5	56%-75%	INDICATOR 1~3	56%-75%
INDICATOR 4~5	36%-55%	INDICATOR 1~4	76%-95%
INDICATOR 5~5	1%-35%	INDICATOR 1~5	96%-100%

## 4.2 Operation

### • Checking the Following Items before Turning on UPS

- Make sure all breakers are off
- Make sure input and output wires connect well
- Make sure the battery connect well
- Make sure the dry contact alarm wire is right
- Make sure the maintenance switch turn to UPS
- Make sure the input voltage and frequency are in the range of  $220(1\pm 20\%)VAC$  and  $50(1\pm 10\%)Hz$

#### 4.2.1 Turn on UPS after utility power connected

- Once utility connects, turn on the input and battery breakers, the charger starts to charge batteries; at this time input indicator on. If the bypass is enabling, the bypass indicator on, UPS is working in bypass mode.
- Press and hold the ON button for above 1s to turn on UPS.
- After turning on, UPS would run self-testing first, and then inverter indicator would light up, UPS works on utility mode.
- Turn on the output breaker, UPS supply power for load.

#### 4.2.2 DC start

- When utility is disconnected, turn on the battery breaker, press and hold the ON button for above 1s to turn on UPS.
- The startup action of UPS is as same as the action when UPS connecting to utility, but the utility indicator is off, battery indicator is on, UPS works on battery mode.
- Turn on the output breaker, UPS supply power for load.

#### 4.2.3 Shut down UPS when utility present

- Turn off UPS by pressing and holding the OFF button for more than 1s, UPS will shut down inverter's output.
- After UPS turning off, UPS would first make a self-testing, when there is no indication on panel, UPS has no output. If the bypass is enabling, the bypass

indicator on, UPS is working in bypass mode.

c. Turn off the output breaker, there is no output for load.

#### **4.2.4. Shut down UPS when utility is absent**

a. Pressing and holding the OFF button for above 1s

b. After UPS is turned off, UPS would first make a self-testing, when there is no indication on panel, UPS has no output.

c. Turn off the output breaker.

#### **4.2.5. UPS manual self-testing/remove alarm test**

a. Pressing and holding ON button for 1s when UPS is on utility mode, buzzer would sound once every 4s, led lights go round and round, and at the same time UPS runs self-testing to test UPS correlative status, 10s later exit self-testing.

b. When UPS is on backup mode, the buzzer stops beeping if you press and hold ON button for 1s, and start to beep if you press and hold the UPS ON button for 1s again.

#### **Note:**

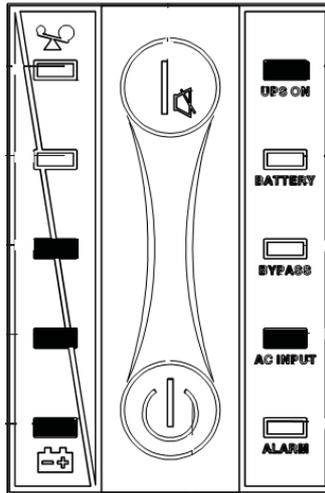
- The following process must be performed if UPS is connected with generator: First turning on generator, after it runs stably (at this time ensure UPS is no-load connected) connect output power of generator to UPS input terminal, then turn on UPS. After UPS turning on, please connect load one by one.
- It is recommended the generator capacity is as twice as UPS rated capacity.

## **4.3 Operation Mode**

### **4.3.1 In Utility Power Mode**

In utility power mode, the LED panel will show as Figure 12, at the time utility indicator light and inverter indicator light will be indicating. The load indicator light will indicate according to the capacity of connecting load.

A: If the utility power indicator light flicker, that means the Neutral cables and Line cables connect to be reverse and ups also work in utility power mode. If battery indicator light is show that means the frequency of utility voltage had exceed its normal range, and ups works in battery mode.



(Fig 12 Utility Power Mode)

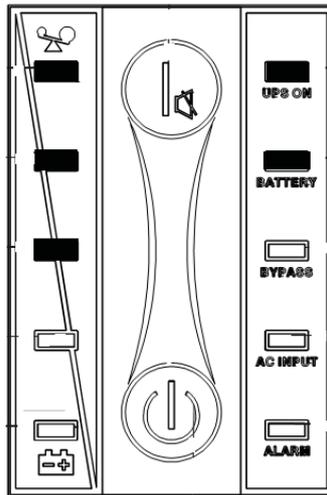
B: If load indicator light is over 100%, it will remind you connecting more over load, and buzzer will alarm once in 0.5 seconds. At the time you will move some load and let the ups load less than 100%.

C: If the battery indicator light is flicker, that means UPS not connect battery or battery voltage is very low, and you will check the battery connect ok or not, and then you test battery by pressing on turn on button over 1 second. If the connect is ok, maybe the battery fault or ageing.

#### 4.3.2 Battery Mode

In battery mode, the LED panel will be show as Figure 13, at the time the battery indicator light and inverter indicator light will be indicate. If utility is normal, the utility indicator light will be flicker. Battery indicator light will be show according to the capacity of battery.

A: In battery mode operation, the buzzer will alarm once per 4 seconds, if press the turn on button over 1 second, ups will delete the sound, and then the buzzer will not alarm again. If press the turn on button over 1 second again, the alarm will recover again.



(Fig 13 Battery Mode)

B: When battery capacity reduces, the quantity of battery indicator light indicates also will be reducing. When battery voltage reduce to alarm level (at the time battery can keep 2 minutes backup time), the buzzer will alarm once per 1 second, that means remains the battery capacity is not enough, and you have to remove some load one by one in quickly.

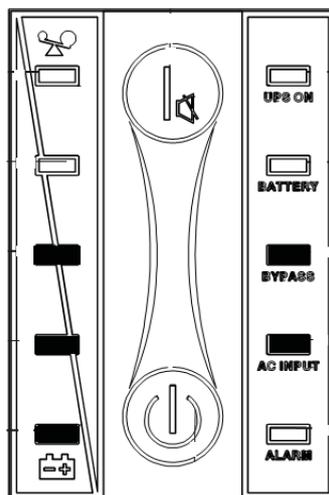
#### 4.3.3 Bypass Mode

In bypass mode, the LE panel will be show Figure 14. The utility power indicator light and bypass indicator light will be show; the load indicator light will be show according to the capacity of load. UPS will alarm once per 2 minutes.

A: If the utility indicator light flicker, that means the frequency of utility voltage had exceed normal range or the cable connect reversed for neutral cable and line cable.

B: Other panel indicator description is the same as utility power mode.

C: When UPS works in bypass mode, ups hasn't own backup functions.



(Fig 14 Bypass Mode)

## 5. Maintenance

The system would adsorb dust while working in outdoor condition, so users must clean it termly.

### 5.1. Battery Maintenance

- a. When UPS does not use or works on utility mode chronically, you need let UPS transfers to backup mode to discharge until shut down by itself, then charge the battery till full capacity every 3 or 4 months.
- b. The battery must be charged and discharged once every two months in high temperature area. The charging time of standard unit must be more than twelve hours.
- c. Normally the battery life is 5 years, and the battery must be replaced once there is any abnormal status. The replacement must be operated by qualified personnel.
- d. It is inadvisable to replace a single battery. Operator should obey the instruction of battery distributor when replacing all batteries.

#### **Note:**

- Before replacing batteries, firstly please break off the utility switch and turn off the UPS, and remove all your metallic adornment such as fingerring, watch and so on.
- Please use the screwdriver with insulating handle. Do not lay the tools or other metallic goods on the battery.
- No converting or short circuit between the battery anode and cathode forever.

### 5.2. UPS Module Replacing

When replacing UPS module, please follow the below process:

- a. First make sure UPS module turned off and battery breaker is turned off. UPS will go to bypass mode. Then turn the maintenance switch to BPS status from UPS.
- b. Turn off output breaker, and then pull out all wires connected to the UPS module. Do to make marks for reinstalling.
- c. Fixing new module to the place, connecting wires as marks, plug in plug, and lock it with screws.
- d. Turn on the input and battery breakers, UPS module will go to bypass mode. Then turn on the UPS, if the new UPS module runs normally, turn off the UPS module and let it run in bypass mode. Turn on the output breaker first, then turn the maintenance switch to UPS status and start UPS again. The UPS module will supply power for load.
- e. Send back the faulty UPS module to the service center.

#### **Note:**

The maintenance switch is only used by maintenance man! Before operating the maintenance switch, make sure UPS is turned off, otherwise the UPS would be damaged badly.

## 6. Trouble shooting

When you contact with the service personnel, following messages are required.

- UPS MODEL NO. And SERIAL NO.
- DATE of fault happened
- The whole statement of fault (include indicator statements on panel)
- Load capacity, if external batteries it still needs to offer battery equipped with conditions.

### Trouble Shooting Table

PROBLEM	POSSIBLE CAUSE	REMEDY
No indication, no warning tone even though system is connected to mains power	No input voltage	Check input cable and in breaker
BATTERY LED and warning	Battery low voltage/batteries are not connected	Battery low voltage /battery switch is not closed
AC INPUT LED blinks	Phase and neutral conductor at input of UPS system are reversed	Exchange input phase and neutral
AC INPUT LED blinks and BATTERY LED lights up	AC input voltage / frequency are out of tolerance	Check input voltage and frequency whether normal
AC INPUT and BYPASS LED lights up even though the power supply is available	UPS not switch on	Press on button "T"
UPS ON LED lights up, warning tone at intervals (every 1 or 4 seconds)	Mains power supply has failed	Battery operation: warning tone at intervals of 1 second means battery is almost empty
Battery mode backup time shorter than nominal value	Batteries not fully charged	Charge the batteries for at least 24hours .Check the capacity. If the problem still persists, consult your dealer.

## 7、Specification

Mode	HW9110E		
	5KVA	6KVA	10KVA
Rated Power	5KVA/3500W	6KVA/4200W	10KVA/7KW
Rated Voltage	220Vac		
Rated Frequency	50/60 Hz		
<b>AC Power Input</b>			
Input Voltage Range	176-279VAC		
Input Frequency range	50HZ (46Hz to 54Hz): 60HZ (56 to 64HZ)		
Frequency Following Speed	1Hz/s		
Input Power Factor	>0.98(full load)		
<b>DC Power Input</b>			
DC Voltage	240VDC		
Battery capacity	12V/38AH、12V/65AH、12V/80AH、12V/100AH etc. (option)		
Charge Current	4.8A/9.6A(option)		
<b>AC Power Output</b>			
Output Voltage Tolerance	220Vac $\pm$ 2%		
Output Frequency Tolerance	50 Hz $\pm$ 0.1HZ		
Output Waveform	Sine Wave		
Efficiency	$\geq$ 87%		
THD	Linear Load<3%;; Non-Linear Load<5%		
Crest Factor	3:1 (Max.)		
Over Load	>105%~130% transfer to bypass, load returning to normal after recovery >130% transfer to bypass, closed output in one minute		
Transfer Time	0ms:Utility Mode to Battery Mode <4ms:Inverter Mode to Bypass Mode		
<b>IP Protection Degree</b>			
IP Protection Degree	IP55		
Surge Protection Degree	C Class		
<b>Environment</b>			
Work Temperature	-40—55℃ (Battery heater option)		
Store Temperature	-40—55℃		

Relative Humidity	0—95%(Non-condensing)
Altitude	< 2000m
<b>Safety Standard</b>	
Safety Standard	IEC60950: 1999; GB4943-2001
EMI	IEC61000-4-2, GB9254-1988
EMS	IEC61000-4-2 (Level 4), IEC61000-4-3 (Level 3), IEC61000-4-4 (Level 4), IEC61000-4-4 (Level 4)
<b>Protection</b>	
Protection Function	Input/output High Voltage, Over load, Output Short, Over Temperature, Battery Low, Over Charge, Surge Protection)
<b>Dry Contact</b>	(Option)
Type	Relay
Function	①UPS failure ②Utility failure ③Door opened
<b>Other</b>	
Dimension (W*D*H) mm	904*649.5*1620
LED Display	UPS working state, Battery capacity, Load capacity
Noise	< 50db (A)
Maintenance Switch	Manual Maintenance Bypass Switch
Communication	RS232, SNMP card (option)

## 8、 Communication Interface

### RS232 Communication Interface

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

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

