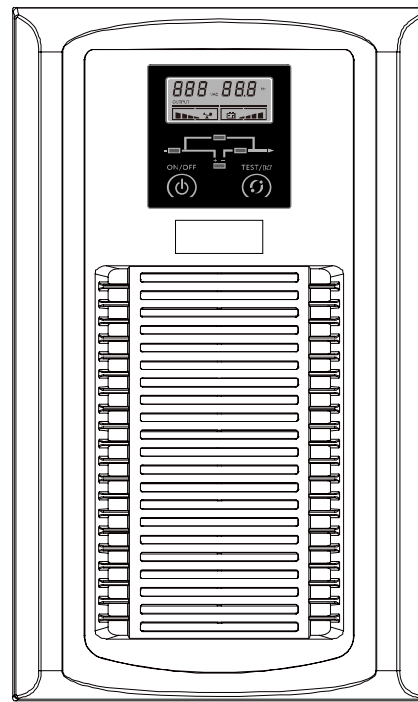
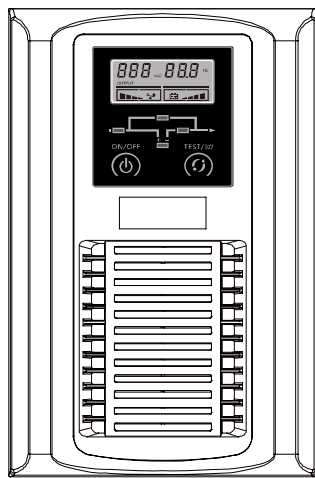


# On Line UPS



## LUC-1000E / LUC-2000E / LUC-3000E User Manual

## Save This Manual

Please read this manual carefully prior to storage, installation, wiring, operation and maintenance of the UPS.

This manual contains important instructions and warnings that you should follow during the storage, installation, wiring, operation and maintenance of the UPS. Failure to follow these instructions and warnings will void the warranty.

Please note that only qualified and trained technician can do installation, wiring, operation and maintenance of the UPS.

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# 1. Introduction

## 1-1 Product Introduction

The LUC-E Series is true online double-conversion UPS. It provides perfect protection for critical load such as computer system. It can eliminate almost all mains power disturbances. The input AC current can be corrected to a wave following the mains voltage, so it is a high power factor system. Through the PWM control technology, the output voltage can be a pure & stable sine wave AC voltage.

When the mains input become abnormal, the controller will stop the AC/DC and start the DC/DC section immediately to make sure the DC/AC (inverter) section can continue to work. After the mains input come back to normal range, the DC/DC will be stopped and the AC/DC works again. So the load is always power-supplied through inverter without any interrupt if the UPS is turned on.

The LUC-E Series also provides an internal bypass path so that the load can be powered by mains input directly when the UPS is off or failed.

The LUC-E Series is equipped with an internal charger for batteries which charges the batteries when the mains are within a reasonable range under “bypass mode” or “line mode”.

## 1-2 Appearance

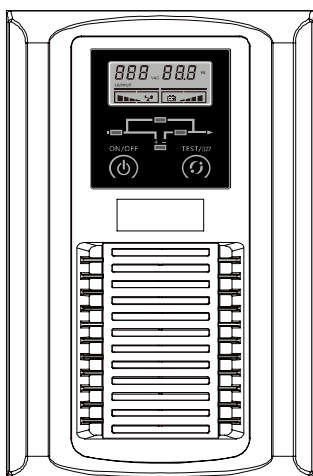


Figure 1 : 1KVA UPS Appearance

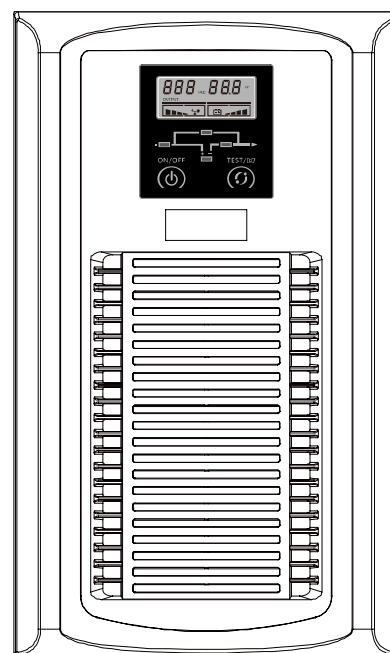


Figure 2 : 2KVA / 3KVA UPS Appearance

### 1-3 Front Panel



Figure 3 : Front Panel

Name	Light Color	Description
ON / OFF	N/A	<ol style="list-style-type: none"> <li>1. Press ON/OFF button for 1 second to turn on UPS. UPS would send a beep to indicate the power-on status</li> <li>2. Press ON/OFF button for 1 second to turn off UPS when UPS is in line mode or battery mode.</li> <li>3. Press ON/OFF button for 3 seconds to clear the fault status of UPS.</li> </ol>
TEST	N/A	<ol style="list-style-type: none"> <li>1. In line mode, press test button for 2 seconds to test the battery.</li> <li>2. Press test button for 2 seconds in battery mode, UPS would be muted. To resume the alarm, press test button again for 2 seconds.</li> <li>3. Press test button for 10 seconds, UPS would be muted. To resume the alarm, press test button again for 10 seconds. The key tone and battery voltage under alarm (every second buzzer beep twice) cannot be muted.</li> <li>4. Press test button for 0.5 seconds, UPS would turn from main menu to sub-menu in sequence.</li> </ol>
Bypass LED	Orange	To indicate that the UPS is in bypass mode, and the load current is directly from the mains power.
Line LED	Green	To indicate that the mains input is normal.
Inverter LED	Green	To indicate that the load current is supplied from the mains power or battery via the inverter.
Battery LED	Orange	To indicate that the UPS is in battery mode, and the load current is from battery via the inverter.

## 1-4 Rear Panel

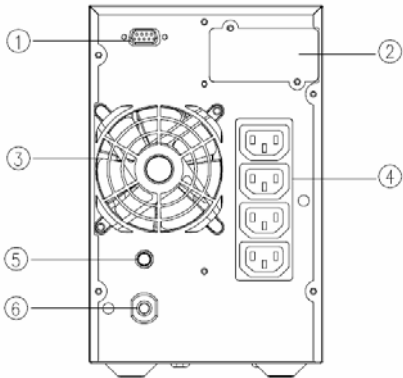


Figure 4 : 1KVA

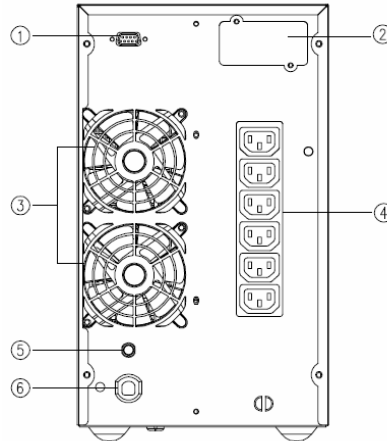


Figure 5 : 2KVA

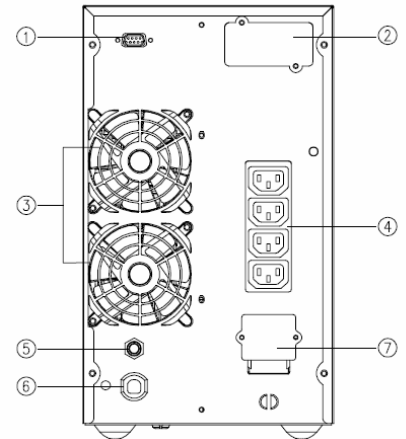


Figure 6 : 3KVA

No.	Description
1.	Communication port (RS232)
2.	Intelligent card slot
3.	Fan
4.	Output socket
5.	Mains input protection
6.	Mains input power cord
7.	Output terminal block

## 2. Mode Description

### 2-1 Line Mode

Line mode means that the mains input is rectified/converted by the AC/DC section and then inverted to stable output by DC/AC section. In line mode, the output is well-regulated and good to the loads. If the mains get abnormal, the UPS will transfer to battery mode without interruption. In line mode, Line LED and Inverter LED are turned on constantly.



Figure 7 : Line Mode

- If Line LED flashes, it means that the input may have something wrong, such as input L and N line reversed or the grounding wire is not connected properly.
- If the load level is higher than 100%, the buzzer will beep once every 0.5 second as a warning for the over-loading condition. The user should remove unnecessary loads one by one, until the load level become lower than 100%.
- If the Battery LED flashes, it means that the battery is not connected or the battery level is too low. In this case please check the connection of battery and press test button for 2 seconds to test the battery. If the connection is normal, it's possible the battery is failed or aged. Please refer to the common troubleshooting table in chapter 4.



Connecting AC Generator as Input : Remove the loads connected to UPS first. Activate the generator and connect the output of generator with the input of UPS until the generator operates stably, then turn on the UPS and add the loads one by one. Please choose the generator with output capacity which is twice larger than the UPS capacity.

### 2-2 Battery Mode

Battery mode means that the battery power goes through the DC/DC section to the inverter (DC/AC) and output a stable backup power when the mains are failed. If the mains recovered, the UPS will transfer to line mode without interruption. In battery mode, Battery LED and Inverter LED



are turned on constantly. If Line LED flashes at the same time, it means that the input mains is abnormal.



Figure 8 : Battery Mode

- In battery mode, Buzzer beeps once every 4 seconds. Press test button for 2 seconds in battery mode, UPS would be muted. To resume the alarm, press test button again for 2 seconds.
- When the voltage of battery decline to the lower limit, buzzer beeps once every second to warn the low battery status and remind user to turn off the loads.
- User may check the backup function by turning on the UPS without connecting the mains input.

### 2-3 Bypass Mode

Bypass mode means that the UPS provides the power through the internal bypass path to load directly without any regulation. If the controller detects the mains is abnormal, it will shut off the output to protect the load. The bypass voltage/frequency range and default output status (on/off) could be set by software tool. In bypass mode, Line LED and Bypass LED are turned on constantly. Buzzer beeps once every 2 minutes.



Figure 9 : Bypass Mode

- If Line LED flashes, it means that the input may have something wrong, such as input L and N line reversed or the grounding wire is not connected properly.
- The description of other LEDs is the same as line mode.
- UPS backup function is not enabled under bypass mode.

## 3. Installation and Wiring

### 3-1 Unpacking and Inspection



Unpack the package and check the contents. The shipped package contains : UPS and user manual.



Inspect the appearance of the UPS to see if there is any damage during transportation. Do not turn on the unit and notify the dealer immediately if there is any damage or lack of some parts.

### 3-2 Installation Environment



Do not install and operate the UPS if there is water condensation which may occur if the UPS is moved suddenly from a cold environment to a warm one. The UPS must be absolutely dry before being installed and operated. Please allow an acclimatization time of at least 2 hours. Otherwise hazard of electric shock may exist!



Do not install the UPS in the environment where it is damp or would be exposed to direct sunlight or heat. Ensure the UPS is far away from water, inflammable gas and corrosive agents.



Do not block the air vents on the housing of UPS. The UPS must be installed in a location with good ventilation. Ensure enough space on each side for ventilation.

### 3-3 Wiring



Installation and Wiring must be performed in accordance with the local electrical laws and regulations.



The UPS must be securely grounded. If there are external UPS battery cabinets, please make sure the battery cabinets have the equipotential earth bonding to the UPS main cabinet.



Do not connect Input N wire and output N wire together.



An appropriate switch device as backup protection for over-current or short-circuit should be provided in the input mains.

### 3-4 Battery



Strictly follow the principle of “same voltage, same type” when connecting multi battery packs in parallel.



DC breaker or fuse must be used as a protection device between the external battery pack and the UPS. The specification of protections must match the UPS's specification.

### **3-5 Installation Steps**

- Make sure the wire / circuit breaker / socket are enough for the current rating of UPS to avoid the hazards of electric shock and fire.
- Make sure the mains switch in the building is switched off.
- Make sure the UPS is not turned on before wiring operation.
- Turn off all loads firstly before connecting to the UPS.
- Make sure the protective earth ground is correctly connected.
- Connect the loads to the UPS through the outlet sockets.
- Connect the input power cord of UPS to mains.

## 4. Communication Port

### 4-1 RS232

The communication port (RS232) is for the connection with PC which is installed with monitoring software. Pin assignment of the DB-9 connector is shown below:

Pin No.	Definition
2.	TXD (output)
3.	RXD (input)
5.	GND

### 4-2 Intelligent Card

Intelligent card - AS400 card, NMC card and CMC card are optional. The intelligent card is inserted into intelligent card slot.

- AS400 card: Monitor the UPS by using the AS400 management function if the system has AS400 interface.
- NMC card: Communication with the PC via internet for remote monitoring and control of the UPS.
- CMC card: a centralized-control card for remote monitoring

## 5. Operation



Do not disconnect the earth wire on the UPS or the wiring terminals of grounding point at any time since this would result in the void of protective earth for the UPS and all connected loads.



Do not try to disassemble the original part of the UPS before turning off and disconnecting it from the mains power & external battery.



The UPS output socket may be electrically lived even if the UPS system is not connected to the mains power source.



Make sure no liquid or foreign objects enter the UPS.



Turn off the mains input switch and external battery switch immediately in the event of electric shock or fire closed to the UPS.

### 5-1 Turn On the UPS with Utility (AC Source)

- Press the on/off button of the UPS front panel continuously for more than 1 second. The buzzer will beep once, the numeric area of LCD display will be lighted in sequence, after a few seconds of self-diagnosis, the UPS will be turned on in normal mode (line mode) and feed the output power with constant AC voltage, if the mains abnormal, UPS will shift into battery mode after self-diagnosis.



- When the UPS enters line mode normally, the Inverter LED will be on, the Bypass LED and Battery LED will be off. There will be no beep from buzzer.
- Press the battery test button for 0.5 second, UPS will show the information on LCD display as followings in a circular order.



## 5-2 Turn On the UPS with Battery (DC Source) Only

This UPS can be started directly with DC source (battery), without AC source.

- Press the on/off button of the UPS front panel continuously for more than 1 second. The buzzer will beep once, the numeric area of LCD display will be lighted in sequence, after a few seconds of self-diagnosis, the UPS will be turned to the battery mode and feed the output power with constant AC voltage.



- When the UPS enters battery mode normally, the Inverter LED, and Battery LED will be on, the Bypass LED will off.
- Press the battery test button for 0.5 second, UPS will show the information on LCD display as followings in a circular order.



- To remind, UPS is under battery mode, it would send out beep once per 4 seconds, and user can enable/disable the buzzer by pressing battery test button for 2 seconds.

**\* Note: If the UPS shuts down in battery mode automatically, it will resume to line mode automatically when the mains power is recovered.**

## 5-3 Connect Loads to UPS

After turning the UPS on, the loads can be switched on, and it is recommended to switch on the loads one by one.

- If it is necessary to connect the inductive load such as a printer to the UPS, the start-up power should be considered for determining the capacity of the UPS because the power consumption for inductive load during start-up could be large.
- If the UPS is overloaded, the buzzer will beep twice every second as warning.
- If the UPS is overloaded, some loads must be switched off or decreased immediately. It is

recommended that the total loads connected to the UPS be less than 80% of UPS's nominal output power rating to prevent the overloading during transient time and make the system more satiable.

- If the overloading time is too long in line mode, the UPS will transfer to bypass mode. After the overloading disappeared, it will return to line mode. If the overloading time is too long in battery mode, the UPS will cut off the output and then shutdown according battery level

#### **5-4 Charge the Battery**

- When the UPS is connected to normal mains, the charger will start to work and charge the batteries automatically.
- It is suggested to charge the batteries for 10 hours at least before the UPS performs battery mode. Otherwise the backup time may be less than the expected value.

#### **5-5 Discharge the Battery**

- When the UPS is in battery mode, the buzzer will start beep according to different battery level. If the battery voltage drops to the alarming level, the buzzer will start beep rapidly (once every sec) to remind the user that the capacity of battery is too low and the UPS will be shutdown automatically soon. The user may switch off some non-critical loads to avoid the shutdown alarming and prolong the backup time. If no more non-critical loads can be switched off at that time, it's better to shut down rest loads as soon as possible to protect the important loads or save data. Otherwise there might be a risk of data loss or damage loads by power interrupted after batteries discharged.
- If the user found the buzzer is noisy under battery mode, the beep could be muted by pressing the test button for 2 seconds.
- The backup time may vary from different environmental temperature and load type.

#### **5-6 Test the Battery**

- The user may check the battery level or aging status when the UPS is under normal mode (line mode) by pressing test button for 2 seconds to enter battery test mode.
- To make the system more reliable, the UPS will automatically perform battery test on regular basis. The default period is once per 90 days.
- The battery test could be performed by sending command from monitoring software through the communication port.
- If the UPS enters the battery test mode, the buzzer will beep once, and Line/Bypass/Inverter/Batter LEDs will be on and off one by one, which allows the user to check the battery level in this mode.



### 5-7 Turn Off the UPS with Utility (AC Source)

- To turn off the UPS, please press the ON/OFF button continuously for more than 1 second.
- After pressing the button, UPS will have no output. If the mains power is normal, the Line LED will turn on. If there is no mains power, 10 seconds later, the numeric area of LCD display will be lighted in sequence, finally all the LCD and LED will be blackout, and UPS shutdown completely.

***\* Note: If the UPS bypass mode is enabled, the output socket will still have voltage directly from mains power after switching the UPS off.***

***\* Note: There is a risk of power interruption for the loads if the UPS works in bypass mode.***

- To turn off the output of UPS and shut down the UPS completely, it is recommended the mains power of UPS shall be disconnected.

***\* Note: please make sure all the loads are prepared or turned off before shutting down the UPS.***

### 5-8 Turn Off the UPS with Battery (DC Source) Only

- To turn off the UPS in battery mode, please press the ON/OFF button continuously for more than 1 second.
- After pressing the ON/OFF button, the buzzer will sound beep once. The numeric area of LCD display will be lighted in sequence, finally all the LCD and LED will be blackout, and UPS shutdown completely.

***\* Note: please make sure all the loads are prepared or turned off before shutting down the UPS.***

## 6. Trouble Shooting

If the LCD display shows any abnormal code / warning code, please follow the solutions below.

Code	Alarm	Possible Cause	Solution
A04	Decide by other warning	Line abnormal	Input line abnormal, wait for line resume
A07	Beep every 2 minute	L/N connection reverse	Check L/N and the ground connection is OK
A08	Decide by other warning	Bypass abnormal	Input line abnormal, wait for line resume
A10	Beep every 1 second	Battery abnormal or disconnect	Check battery connection is OK
A11	Beep every 1 second	Battery voltage low	Re-charger battery before use, if battery damaged, please contact to service people
A12	Continuously beep	Battery voltage over charged	Belong to UPS normal protection behavior
A15	Beep every 1 second	Overload warning	Check the power connected to UPS, and load off the unnecessary device
A16	Beep every 1 second	Fan abnormal	
A18	Continuously beep	Charger abnormal	
F01	Continuously beep	Bus Soft Start up fail	
F02	Continuously beep	Bus voltage too high	
F03	Continuously beep	Bus voltage to low	Contact distributor or service center
F05	Continuously beep	Bus short	
F06	Continuously beep	Inverter Soft Start up fail	
F07	Continuously beep	Inverter voltage too high	
F08	Continuously beep	Inverter voltage too low	
F10	Continuously beep	Output short	
F22	Continuously beep	Overload fault	Load off the unnecessary device, make sure the load power lower than the rating power
F23	Continuously beep	Over temp fault	Make sure the intake wasn't blocked, and the indoor temp wasn't to high
F29	Continuously beep	Converter fail	
F55	Continuously beep	NTC open	
F57	Continuously beep	Battery damaged	Contact distributor or service center
F59	Continuously beep	Battery over charged	
F62	Continuously beep	Inverter capacitor open	

## 7. Maintenance



No matter the UPS is connected to the mains power or not, the output may have electricity. The parts (battery, capacitor) inside the unit may still have hazardous voltage after turning off the UPS.



Make sure to disconnect the batteries before carrying out any kind of maintenance or repair. The battery may result in electrical shock.



Verify that no voltage between the battery terminals and the ground is present before maintenance or repair. In this product, the battery circuit is not isolated from the input voltage. Hazardous voltages may occur between the battery terminals and the ground.



Verify that no hazardous voltage exists in the energy storage capacitor before maintenance or repair.



Remove all jewellery, wristwatches, rings and other metal personal goods before maintenance or repair.



Only use tools with insulated grips and handles when maintaining or repairing.



Disconnect the charging source prior to connecting or disconnecting battery terminals.



Do not short the positive and negative of the battery electrode. Batteries have a high short-circuit current and may cause a risk of serious shock or fire.



When changing the batteries, replace them with the same quantity and the same type of batteries.



Do not attempt to dispose the batteries by burning them as it could cause explosion. The batteries must be rightly deposited according to local regulation.



Do not open or destroy the batteries. Effluent electrolyte can cause injury to the skin and eyes and may be toxic to the environment.



Do not dispose of batteries in a fire. The batteries may explode.



Please replace the fuse only with a fuse of the same type and of the same amperage in order to avoid fire hazards.

### 7-1 UPS

Check the UPS quarterly and inspect:

- Whether the UPS, LCD, LED and alarm function are operating normally.
- Whether the UPS works in bypass mode (normally the UPS will work in online mode). If yes, check if any error, overload, internal fault, etc. occurs.
- Whether battery voltage is normal. If the battery voltage is too high or too low, find the root

cause.

#### UPS Cleaning:

Regularly clean the UPS, especially the slits and openings, to ensure that the air freely flows into the UPS to avoid overheating. If necessary, use an air-gun to clean the slits and openings to prevent any object from blocking or covering these areas.

#### **7-2 Battery**

- The battery used for standard models are valve regulated sealed lead-acid maintenance free battery. It shall be charged regularly in order to maximize the expected life for the battery. When being connected to the mains power, whenever 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 shall be recharged once every 4 to 6 months if it is not going to be used for a long time.
- In the regions with hot climates, the battery should be recharged/ discharged every 2 months. The recharging time should be >12 hours.
- In normal conditions, the battery life lasts 3 to 5 years. If the battery is found in bad condition, earlier replacement is recommended.
- Do not replace the battery individually. All batteries must be replaced at the same time following the instructions of the supplier.

#### **7-3 Fan**

Higher temperatures shorten fan life. When the UPS is running, please check if all fans work normally and make sure if the ventilation air can move freely around and through the UPS. If not, replace the fans.

#### **\* Note:**

- ***Please ask your local dealer for more maintenance information. Do not perform maintenance if you are not trained for it.***

## 8. Specification

Model		LUC-1000E	LUC-2000E	LUC-3000E
Capacity		800W	1600W	2400W
Input	Voltage Range	110VAC - 300VAC		
	Frequency	40Hz - 70Hz		
	THD	< 10%		
Output	Voltage	208 / 220 / 230 / 240VAC		
	Voltage Regulation	± 2%		
	Frequency	50Hz or 60Hz ± 0.05Hz (Battery Mode)		
	Waveform	Pure Sine Wave		
	THD	< 4% (Linear Load)		
Efficiency	AC Mode	> 89%		
	Battery Mode	> 83%		
Battery	Type	12V 9A * 2pcs	12V 9A * 4cs	12V 9A * 6cs
	Recharge Time	7Hrs to 90%		
Transfer Time	Line <-> Battery	0ms		
	Bypass <-> Line	< 4ms		
Display	LCD	Input & Output Voltage / Frequency, Load%, Battery% / Voltage		
Alarm	Battery Mode	Beeping Every 4 Seconds		
	Battery Low	Beeping Every Second		
	Overload	Beeping Twice Every Second		
	Fault	Beeping Continuously		
Communication	Interface	RS232, USB (Optional), SNMP (Optional)		
Environment	Temperature	0 ° C - 40 ° C		
	Humidity	20 – 90%, non-condensing		
	Noise	< 50dB at 1M		
Dimension	D X W X H (mm)	345 x 144 x 229	393 x 190 x 328	
Net Weight	Kgs	9.2	17.2	22.6