

# Introduction

Thank you for choosing our **Uninterruptible Power Supply** product for protection of your electrical devices.

**The LTM Series** Uninterruptible Power Supply (UPS) was manufactured using the latest technology. We recommend you to read this manual to learn many specifications and superior features of your new UPS.

We do pay attention to the environmental impacts of this product. Some example of our measures to protect environment are as follows:

- ✓ *Product design is based on economical size and high efficiency approach.*
- ✓ *Quality and uninterruptible power is provided without distorting source voltage.*
- ✓ *Manufacturing is carried out in our ISO 14001:2004 Environment Management System certified factory.*
- ✓ *It is ensured that battery and metal wastes are disposed properly.*

To discover the entire range of our products and to receive up-to-date information, please visit our web site: .....

## Before you call us...

If you require assistance for a failure or any related issues, call our **Technical Support Center**. For quick assistance, please have the following information available.

<b>Model</b>	<b>LTM Series</b>
<b>Power (VA)</b>	.....
<b>Serial Number</b>	.....
<b>Purchase Date</b>	.....
<b>Customer</b>	.....

*The LTM Series products are protected under a patent. Therefore, implementation of our proprietary technology by competitors is not permitted. Given the relevant standards and technology, device hardware configuration may be changed without notice. Technical specifications and dimension information are not binding unless formally confirmed by us.*

# **IMPORTANT SAFETY INFORMATION (BE SURE TO READ)**

## **Life Safety**



- ! The UPS has its own power source (batteries). Therefore, there may be live power at the output even if the mains voltage is disconnected.*
- ! There is dangerous level of voltage in the UPS, and it must be opened by an authorized service personnel only.*
- ! Do not expose batteries to extreme high temperatures to prevent fire risks.*
- ! Do not attempt to open the battery. Chemical composition of the battery may be dangerous for your skin and eyes.*
- ! Do not taste, eat, chew, swallow and inhale the battery contents. Contact your local doctor in such cases immediately.*
- ! Adhere to all regulations that govern disposal of waste batteries.*

## **Safety of UPS**



- ! Do not operate the UPS at environment temperatures or relative humidity that exceeds the limits given in the manual.*
- ! Never operate the UPS in liquid environments or in overly humid environments.*
- ! Never allow water or foreign substances to penetrate in the UPS.*
- ! Never expose the UPS to direct sunlight or a direct heat source.*
- ! The UPS' useful life is 10 years.*

## **Replacement and Recycling of Batteries**



- ! Battery poses electric shock hazard and short circuit risk.*
- ! Replace only with batteries of same type, capacity, number and dimensions.*
- ! Battery replacement must be carried out by trained service personnel only.*
- ! Remove metal accessories such as wristwatch, ring, etc. and wear rubber shoes and gloves.*
- ! Use tools with insulated handles.*
- ! Make sure that battery connections are not grounded by mistake.*
- ! Do not leave tools or metal pieces on batteries.*
- ! **Batteries must be recycled.** Return mutilated batteries to any recycling facility or to company where you initially purchased them along with packaging material of new batteries.*

## Special Safety Information



**!** *UPS' electrical connections must be provided as shown in the manual.*

**!** *Be sure to check the compatibility of the UPS power to mains voltage and to total load that will be supplied with UPS.*

**!** *UPS must be stored in a dry environment between -10°C and 45°C temperatures prior to commissioning.*

**!** *UPS must be operated at least once a month continuously for 24 hours to charge the batteries.*

**!** *Because the battery life commences on the manufacture date, storage life is limited.*

**!** *UPS is designed to operate at height, operating environment temperature, relative humidity rate, and handling and storage conditions described in UPS manual.*

**!** *Special design and protection measures are essential for non-normal operating conditions. Such non-normal operating conditions include:*

- *Harmful fume, dust, abrasive dust;*
- *Humidity, vapor, bad weather, frost;*
- *Explosive dust and gas mixtures;*
- *Extreme temperature changes;*
- *Poor ventilation;*
- *Exposure to direct or radiated temperature from other sources;*
- *Intensive electromagnetic field;*
- *Harmful radioactivity levels;*
- *Insects, pests, fungus, etc.*

**The UPS must always be installed in compliance with:**

- ✓ *HD 384.4.42 S1: Electrical Installations of Buildings Part 4: Protection for Safety Chapter 42: Protection Against Thermal Effect*
- ✓ *HD 384.4.482.S1: Electrical Installations of Buildings Part 4: Protection for Safety Chapter 48: Choice of Protective Measures as a Function of External Influences Section 482: Protection Against Fire Where Particular Risks or Danger Exist*

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# 1. OVERVIEW

## 1.1 LTM Series

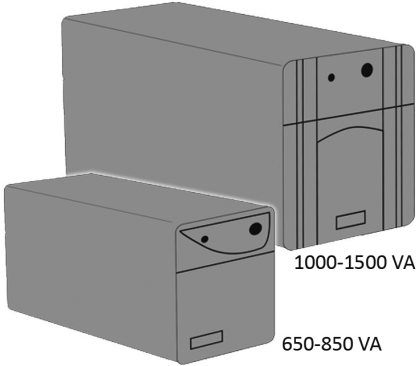


Figure 1.1 UPS Box

Dimensions	
UPS Power (VA)	Width x Height x Depth (mm)
650-850	100 x 140 x 310
1000-1500	146 x 163 x 349

Weight	
UPS Power (VA)	Net Weight (kg)
650	5.0
850	5.6
1000	8.8
1250	9.1
1500	11

Table 1.1 Dimensions and Weight Table

## 1.2 Front Panel

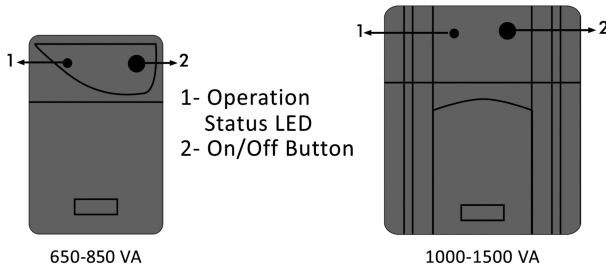


Figure 1.2 Front Panel

No.	Operation Status LED	Description
1	Green	Normal Mode
	Orange	Battery Mode
	No Light	Completely Off or Sleep Mode

No.	Button	>3 seconds (Press and hold longer than 3 seconds)	<3 seconds (Press less than 3 seconds)
2	On/Off	<ul style="list-style-type: none"> <li>✓ Switching on</li> <li>✓ Switching off</li> </ul>	<ul style="list-style-type: none"> <li>✓ Turning on warning sound</li> <li>✓ Turning off warning sound</li> </ul>

Table 1.2 Front Panel Function Table



## 2.3 Connection

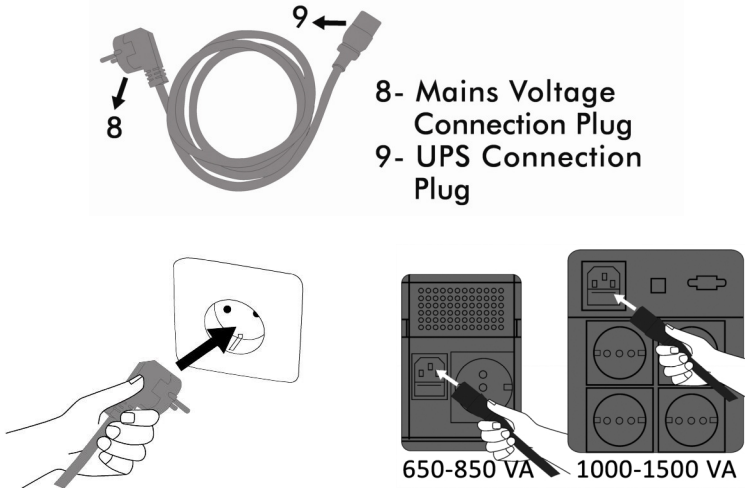


Figure 2.2 Patch Cord Connection Plugs

## 2.4 Communication with PC (standard for 1000VA, 1250VA and 1500VA)

You can monitor the UPS over USB (standard) or RS232 (optional) port using UPSilon2000 software that you will install on your computer. Using this software, you can monitor real-time UPS voltage and current information, battery information, malfunctioning warnings, etc. and save long term logs with graphics. In addition, software shuts down your computer and/or server safely in case of any electrical power outage.

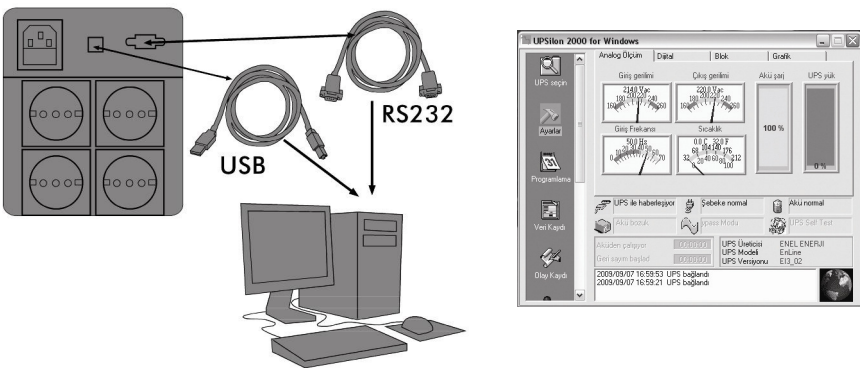


Figure 2.3 USB and RS232 Communication

# 3. OPERATION

## 3.1 Switching On

### 1. Switching on mains voltage:

- a. Plug the patch cord to mains voltage socket first (Figure 3.1) and then to input socket (Figure 3.2).

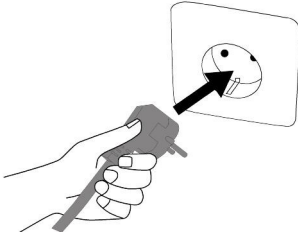


Figure 3.1

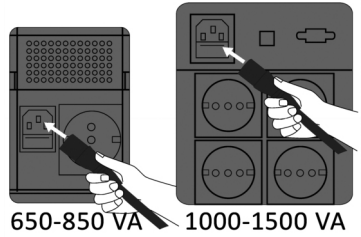


Figure 3.2

- b. Press and hold On/Off button until a warning beep sounds (Figure 3.3). If mains voltage and frequency are within the limits, the Operation Status LED lights in green. Then, you can connect your loads to output socket(s) (Figure 3.4). If they are out of limits, the Operation Status LED lights in orange (See: Start on Battery).

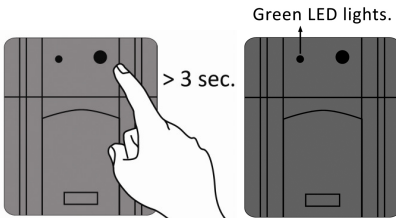


Figure 3.3

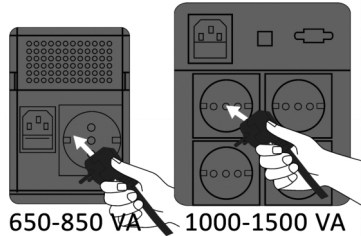


Figure 3.4

### 2. Cold Start:

- a. The UPS can be started up from the battery without mains connection (Cold Start). Press and hold On/Off button until a warning beep sounds (Figure 3.5). The Operation Status LED lights in orange. Once the Operation Status LED is orange, you can connect your loads to output socket(s) (Figure 3.6).

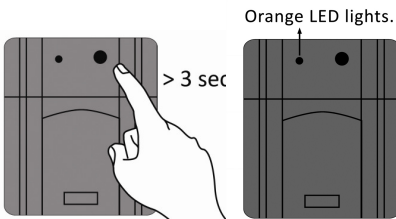


Figure 3.5

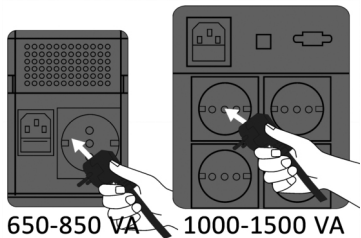


Figure 3.6



**In cases where mains voltage and/or mains frequency are out of tolerance limits, the UPS will start on battery even if mains connection is provided.**

## 3.2 Switching Off

1. **If the UPS is in Normal Mode:** Switch off your loads safely. Press and hold *On/Off* button until the warning beep silences (Figure 3.7). Observe that the green coloured *Operation Status LED* fades out (Figure 3.8).

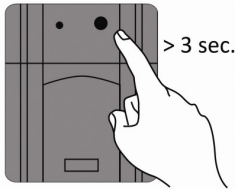


Figure 3.7

Green LED fades out.

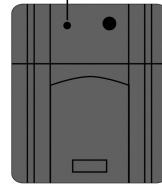


Figure 3.8



**When you disconnect the patch cord, unplug the UPS connection first. Then, unplug the mains voltage connection.**

2. **If the UPS is in Battery Mode:** Switch off your loads safely. Press and hold *On/Off* button until the warning beep silences (Figure 3.9). Observe that the orange coloured *Operation Status LED* fades out (Figure 3.10).

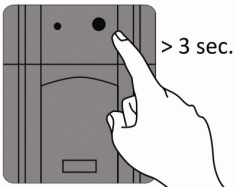


Figure 3.9

Orange LED fades out.

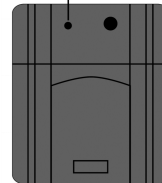


Figure 3.10

## 3.3 Operation Modes

The LTM Series UPS has *Line-Interactive UPS* technology. When the mains voltage and the frequency are within the limit values, the UPS performs *Automatic Voltage Regulation (AVR)* and overvoltage protection. At the same time, the UPS transfers the mains to the output and charges the battery from the mains. If the mains voltage and/or the frequency go out of the limit values, the UPS supplies the load(s) from the battery. The load(s) are not affected by this transition.

With the AVR feature, if the mains voltage is between 176Vac and 195Vac, the AVR increases the mains voltage by 25Vac and transfers it to the output. If the mains voltage is between 240Vac and 264Vac, the AVR decreases the mains voltage by 25Vac and transfers it to the output. If the mains voltage is less than 176Vac

or more than 264Vac, the UPS starts operating from the battery. LTM Series UPS has the following operation modes.

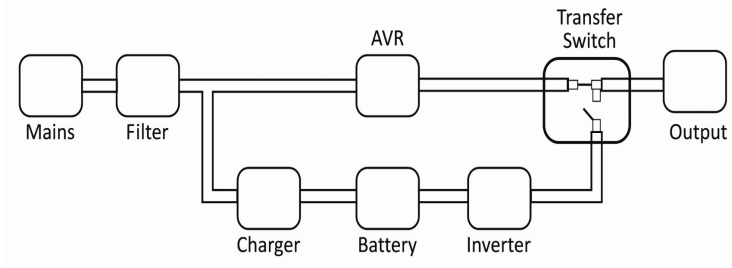


Figure 3.11 Line-Interactive Operation Principle

**Normal Mode**

The mains voltage passes from the filter and the AVR. Then, it is transferred to the output via the transfer switch. The charger charges the battery simultaneously.

**Battery Mode**

The charger and the AVR stop operating. The inverter uses power from the battery and provides the required voltage for the output. The required voltage is transferred to the output via the transfer switch.

**Sleep Mode**

This operation mode provides the efficient utilization of the battery capacity and maintains the charger. The UPS works in *Sleep* mode in the following conditions:

- a. When the UPS is plugged to the mains, it starts operation in *Sleep* mode. The charger charges the battery even if the UPS is not switched on.
- b. If the load percentage is less than 5% in battery mode, the UPS shuts down the output and starts operating in *Sleep* mode.
- c. If the battery capacity is 0%, the UPS shuts down the output and starts operating in *Sleep* mode. If the mains voltage and the frequency are between the limit values, the UPS starts operating in *Normal* mode automatically.

**3.4 Overload**

The UPS shuts down the output and protects your equipments and itself at the end of the overloading periods which are specified below.

Overload Percentage	Power (VA)					Operation Period
	650	850	1000	1250	1500	
%110-%130	715-845	935-1105	1100-1300	1375-1625	1650-1950	20 sec.
>%130	>845	>1105	>1300	>1625	>1950	3 sec.

Table 3.1 Overload Table

### 3.5 Audio Warnings

Subject	Alarm	Warning Info
Battery	2 times consecutively at every 10 sec.	Battery Mode
	3 times consecutively at every 5 sec.	Low Battery
Overload	Once at every 1 sec.	Overload ( <i>see 3.4 Overload</i> )
Fault	2 times consecutively at every 3 sec.	Overcurrent, Short Circuit

Table 3.2 Audible Warnings Table

**a. Battery Mode:**

When the mains voltage and/or frequency go out of the limit values or the UPS is started up from the battery, alarm beeps consecutively 2 times in every 10 seconds.

**b. Low Battery:**

When the battery capacity is less than 20%, alarm beeps consecutively 3 times at every 5 seconds. When the battery capacity reaches to 0%, the UPS shuts down the output and starts operating in *Sleep* mode.

**c. Overload:**

At the end of the periods which are specified in the *Table 3.1*, alarm beeps once at every 1 second. In this situation, the loads which are connected to the output power socket must be reduced.

**d. Overcurrent:**

When an instant overcurrent is drawn from the UPS in normal or battery mode, alarm beeps consecutively 2 times at every 3 seconds.



**Since laser printers require high power and overcurrent, they must not be connected to the UPS.**

**e. Short Circuit:**

When a short circuit occurs at the output of the UPS in normal or battery mode, the output shuts down immediately and alarm beeps consecutively 2 times at every 3 seconds. In this situation, the output electrical installation must be checked for the short circuit.

## 4. TROUBLESHOOTING



**Make sure you go through the table below before contacting the Technical Service.**



**Cable connections and fuse checkings must be done by qualified service personnel.**

<b>Failure Description</b>	<b>Probable Failure</b>	<b>Solution</b>
<i>UPS is not turned on and the Operation Status Led is off.</i>	<i>The On/Off button is pressed too short.</i>	<i>Press and hold the ON/OFF button for at least three seconds.</i>
	<i>The battery capacity is fully discharged.</i>	<i>Plug the UPS to the mains at least 8 hours.</i>
	<i>Problem with the electronic board.</i>	<i>Contact the Technical Service.</i>
<i>The UPS always works in battery mode.</i>	<i>The fuse blown.</i>	<i>Check the fuse. Replace it and try again (Figure 4.1).</i>
	<i>Mains voltage and/or frequency out of limits.</i>	<i>Shut down your loads and wait until the mains voltage and the frequency are between the limit values.</i>
	<i>Problem with extension cord or patch cord connection.</i>	<i>Check extension cord and connections.</i>
	<i>Problem with the electronic board.</i>	<i>Contact the Technical Service.</i>
<i>The period of the battery operation is very short.</i>	<i>The battery is not fully recharged.</i>	<i>Check it again when the batteries are charge for at least 8 hours.</i>
	<i>The electronic board or the battery is damaged.</i>	<i>Contact the Technical Service.</i>
<i>The UPS always beeps.</i>	<i>It is overload alarm.</i>	<i>Check the load ratio. Lower the loads connected to the UPS output.</i>
	<i>It is overcurrent alarm.</i>	<i>Switch off the UPS and switch on again.</i>
	<i>Problem with the electronic board.</i>	<i>Contact the Technical Service.</i>

Table 4.1 Troubleshooting Table

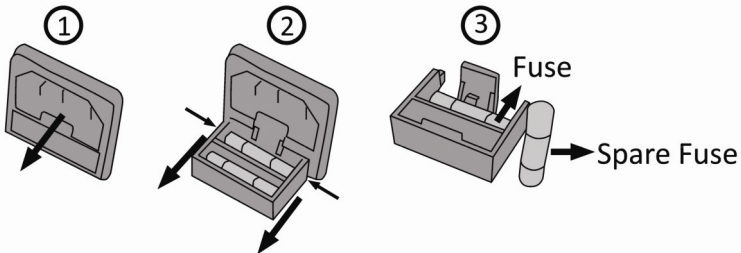


Figure 4.1 Replacement of the Fuse

## 5. MAINTENANCE



***The UPS should only be opened by authorized personnel.***



***The UPS must be completely off during maintenance. Mains and battery connections must be disconnected and batteries must be moved away from the UPS.***



***Follow the 'Important Safety Information' and 'Installation' instructions during the maintenance.***

- ! The electronic boards and the fans should be cleaned regularly.
- ! The ventilation holes on the lid should be cleaned regularly.
- ! The UPS body should be cleaned with a soft and moist cloth.
- ! The sturdiness of cable connections, screws and sockets should be checked.
- ! The board supply voltages should be measured and checked.
- ! The components on the boards and the other hardware should be checked.
- ! The voltages of the batteries should be checked by measuring the voltages separately.
- ! The accuracy of the calibration and the adjustments should be checked.
- ! The dust, the heat and the temperature in the UPS room should be checked.
- ! The instructions in the '*Important Safety Information and Installation*' should be complied.

## 6. TECHNICAL SPECIFICATIONS

TECHNICAL SPECIFICATIONS					
LTM SERIES					
Power (VA)	650	850	1000	1250	1500
<b>INPUT</b>					
Voltage	220 / 230 Vac				
Voltage tolerances	-25% / +20%				
Frequency	50 / 60 Hz				
Frequency tolerances	± 10%				
<b>OUTPUT (on mains)</b>					
Voltage	220 / 230 Vac				
Voltage tolerances	± 10%				
Frequency	50 / 60 Hz				
Frequency tolerances	± 10%				
<b>OUTPUT (on battery)</b>					
Voltage	220 / 230 Vac (modified sine wave)				
Voltage tolerances	± 5%				
Frequency	50 / 60 Hz				
Frequency tolerances	± 0.5%				
Power factor	0.5				
<b>OVERLOAD CAPACITY</b>					
110%	Continuously				
125%	60 sec.				
150%	10 sec.				
> 150%	3 sec.				
<b>GENERAL</b>					
Technology	Line-interactive				
Control	Microprocessor				
Communication	not available	USB (standard), RS232 (optional)			
Transfer time	< 5ms				
Remote monitoring	UPSilon				
Cold start	Standard				
Power inlet	IEC320-C13/C14				
Power outlet	1 x F-type	4 x F-type			
Recharge time	6h (up to 90% capacity)				
<b>ENVIRONMENT</b>					
Operating temperature	from 0 °C up to +40 °C (from 20 °C to 25 °C for maximum battery life)				
Relative humidity	0% - 85% (without condensation)				
Maximum altitude	2000 m				
Noise level	< 45 dB (A)				
<b>UPS CABINET</b>					
Dimensions (W x D x H) (mm)	100 x 310 x 140		146 x 349 x 163		
Weight (kg)	5	5.6	8.8	9.1	11
Degree of protection	IP20				
Colour	RAL7012				
Battery quantity	1		2		
Battery capacity (Ah)	7	9	7		9
<b>STANDARDS</b>					
Certificates	EN 62040-1 (Safety), EN 62040-2 (EMC)				
UPS LIFETIME	10 years				

**AUTHORIZED TECHNICAL SERVICE**

