

USER'S GUIDE

LEONICS®

Ultimate-X
UKA-series
(1kVA - 3kVA)

**TRUE ON-LINE DOUBLE CONVERSION
UNINTERRUPTIBLE POWER SUPPLY**

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SAFETY INSTRUCTIONS

Please read and follow this user's manual carefully and completely.

Important: Please keep this user's manual for later reference. It consists of instructions, front and rear panel, installation and operation, troubleshooting, maintenance.

If UPS does not operate properly and you cannot solve the problem using the troubleshooting information in this user's manual, please contact your LEONICS local distributor, LEONICS Service Center, send e-mail to support@leonics.com or visit www.leonics.com.

To help you much more quickly when contact us, please record the following information.

LEONICS UPS model: _____

Serial number of your UPS: _____

Purchased date: _____

Purchased from: _____

CAUTION

Risk of electric shock, DO NOT remove cover. No user serviceable part inside, please refer servicing to qualified service personnel.

1.1 Electrical safety instructions

- 1.1.1 DO NOT work alone under hazardous condition.
- 1.1.2 Short circuit current in conductor may cause severe skin burn.
- 1.1.3 Must contact certified person when user wants to connect any equipment to utility power line.
- 1.1.4 Check whether the cables, receptacles and power source are always at good condition.
- 1.1.5 To reduce short circuit risk, if you are not sure whether you have ground system, disconnect UPS from utility every time before you connect any loads to UPS. After connecting all loads to UPS already, then reconnect UPS to utility power.
- 1.1.6 DO NOT touch any metal parts of the equipments when connect to UPS.
- 1.1.7 When connecting or disconnecting communication cables between equipments, should use only one hand. This is to avoid electric shock from contact 2 surfaces which ground has different potential voltage.
- 1.1.8 Recommend to connect UPS to 3-wire power source (2 poles + ground) which connects to branch circuit, fuse or automatic cut out.

1.2 Caution! Safety instructions for installing and operating UPS

- 1.2.1 Should install UPS in dry area with good ventilation, low humidity, no chemical particles, no flammable substances. Avoid installing UPS near radio transmission station, heat dissipation equipment or direct sunlight.
- 1.2.2 UPS has ventilation grills on the back and sides. To help UPS has good ventilation, DO NOT block ventilation grills.
- 1.2.3 Should connect UPS to utility line and turn it on all the time.
- 1.2.4 When user wants to connect computer interface to UPS, turn off power switch and disconnect cable from utility line.
- 1.2.5 Turn on UPS before turning on loads to prevent surge from the loads.
- 1.2.6 DO NOT connect utility power to UPS OUTPUT. This may cause damage to your UPS.
- 1.2.7 When heavy rain, please avoid using electronic instruments including UPS to prevent it from lightning.
- 1.2.8 Use soft cloth to clean UPS when it is OFF. DO NOT clean it with any solvents.
- 1.2.9 DO NOT use UPS with life recovery instruments. The failure of UPS may cause life recovery instruments failure or effect to their performance or effect to safety system of those instruments.
- 1.2.10 Ultimate-X UKA-series UPS should be connected to electric ground.

1.3 Warning! Safety instructions for battery

- 1.3.1 There are batteries inside the UPS. Although user has disconnected it from utility power line, the UPS OUTLET or OUTPUT terminal still has electricity. Be careful of electric shock.
- 1.3.2 The internal parts of UPS may conduct electric current which is dangerous to user. UPS has no user serviceable parts. DO NOT remove or disassemble any parts of UPS. If user wants to repair UPS, please contact us or our nearest service center.
- 1.3.3 In case that user does not use or keep UPS for a long time, to preserve the battery life please follow the below instructions.
 - 1.3.3.1 Press POWER OFF button at the front side of UPS and unplug input cable from power source.
 - 1.3.3.2 In case that user does not use UPS for a long time. User should recharge battery every 3 months by plugging the input cable to power source. Then press POWER ON button at the front side of UPS and leave it at least 8 hours.

INTRODUCTION

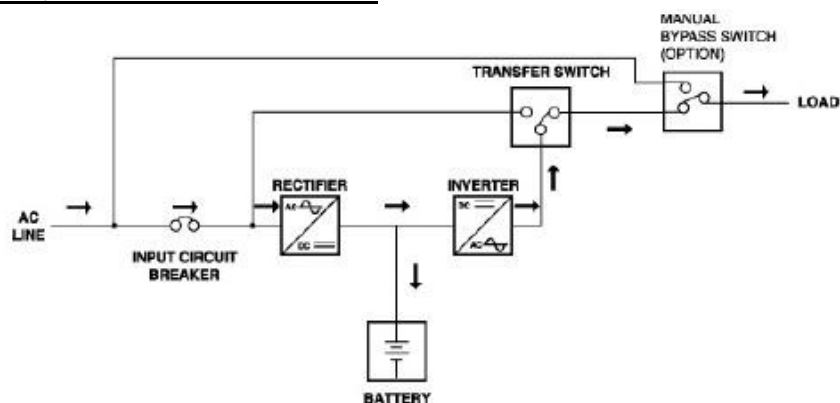
2.1 General

Leonics Ultimate-X UKA-series UPS is a True On-Line Double Conversion uninterruptible power supply which is the highest efficiency UPS system available in the present market. With microprocessor controlled, it is able to protect all kinds of power problems.

It is designed for any power sensitive electrical appliances and electronic equipments such as computers, communication equipments, medical instruments, electronic scales, measuring instruments, scientific equipments, and etc.

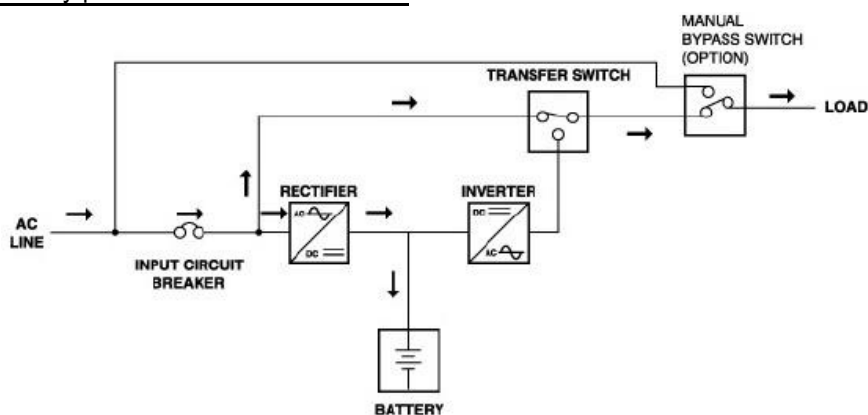
2.2 How Leonics Ultimate-X UKA-series UPS works

2.2.1 When utility power and loads are normal.



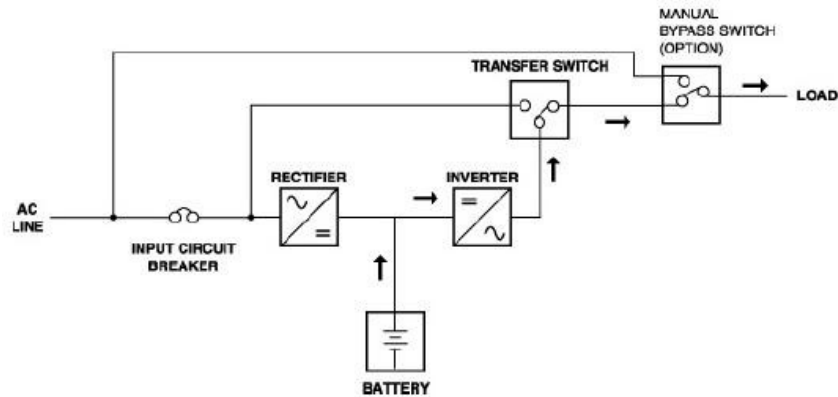
Above diagram shows how UPS works when utility power (AC line) is normal and UPS has less than 100% load. UPS converts utility power from alternative current (AC) to direct current (DC) at RECTIFIER. Some of DC power flows to charge battery to be backup power and the rest flows directly to INVERTER to invert power to high quality and stable AC power. Then supply to load.

2.2.2 When utility power is normal but overload.



Above diagram shows how UPS works when utility power is normal and UPS has more than 100% load. UPS converts utility power at RECTIFIER to charge battery only. The power supplied to load directly is from utility line.

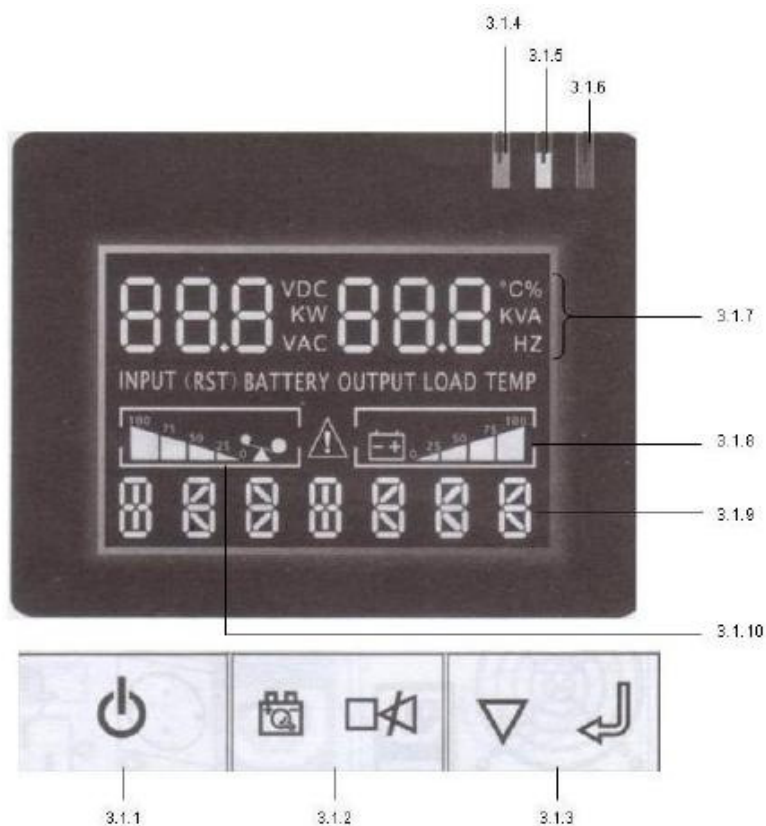
2.2.3 When utility power fails but loads are normal.



Above diagram shows how UPS works when utility power fails or blackout and UPS has less than 100% load. UPS draws backup power from battery to invert to AC power and supplies to load continuously.

FRONT AND REAR PANEL

3.1 Front panel



3.1.1 POWER ON/ POWER OFF: The button to turn on and turn off UPS.

3.1.2 FUNCTION: The button to test UPS operation and mute alarm sound.

3.1.3 MULTIFUNCTION: The button to select UPS parameters to show on LCD display.

INPUT:	Indicates input voltage and frequency.
BATTERY:	Indicates battery voltage and battery capacity in percentage.
OUTPUT:	Indicates output voltage and frequency.
LOAD:	Indicates load capacity in Watt and VA.
TEMPERATURE:	Indicates temperature inside UPS.

Remark: When press and hold the button for 2 seconds, LCD display will circularly and orderly display items from OUTPUT, LOAD, TEMPERATURE, INPUT and BATTERY every 2 seconds and it will turn to static output status when you press and hold the button for 2 seconds.

3.1.4 NORMAL OPERATION: Green LED indicates UPS is operating normally and powered by utility line (on line) or battery mode when utility power fails.

3.1.5 WARNING OPERATION: Yellow LED indicates UPS is alarming. For example, when utility power is supplied but UPS cannot start up, UPS operates on bypass mode, fan stops operation.

3.1.6 ABNORMAL OPERATION: Red LED indicates UPS has faults and does not supply power to load.

3.1.7 DATA DISPLAY: LCD part to shows the numerical value of UPS parameters.

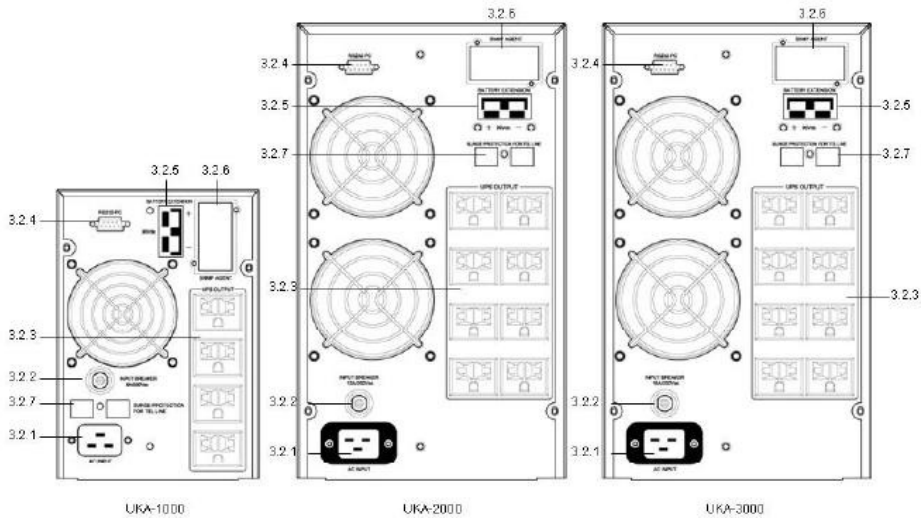
3.1.8 BATTERY LEVEL indicator: Each bar represents 25% of battery backup power starting from the smallest bar to the largest bar.

3.1.9 STATUS DISPLAY: The indicator shows UPS status and faults.

“on line”	shows when UPS is operating on utility mode (on line mode).
“on batt”	shows when UPS is operating on battery mode.
“on bps”	shows when UPS is powered directly from utility line (bypass mode).
“ups off”	shows when UPS does not supply to loads (INVERTER section does not operate).

3.1.10 LOAD LEVEL indicator: Each bar represents 25% of full load capacity starting from the smallest bar to the largest bar.

3.2 Rear panel



3.2.1 **AC INPUT:** Connect power cord to this socket.

3.2.2 **INPUT CIRCUIT BREAKER:** Protect UPS from overload or short circuit current.

3.2.3 **OUTPUT:** Connect power to load at this outlet.

3.2.4 **SMART RS-232 COMMUNICATION PORT:** Port to connect RS-232 cable to computer.

3.2.5 **BATTERY EXTENSION PORT (option):** Port to connect battery extension modules for increase the duration of backup time.

When connecting the battery extension modules, the battery voltage should be compatible with UPS voltage.

The battery voltage for UKA-1000 is 36 VDC.

The battery voltage for UKA-2000 is 96 VDC.

The battery voltage for UKA-3000 is 96 VDC.

3.2.6 **SNMP AGENT (option):** A port for connecting LAN line to computer interface network in order to monitoring the UPS status through SNMP/HTTP.

3.2.7 **SURGE PROTECTION FOR TELEPHONE LINE:** The port for plugging in telephone jack before entering fax machine, telephone, modem and computer, etc. to protect loads against voltage spikes.

INSTALLATION

Caution : The warranty will be voided, if this product has been improper installation, not following the installation instruction that mentioned in this user's guide.

4.1 Preparation

4.1.1 For 2000 VA model or lower, install the UPS at least 30 cm at the side and back to enable easy access for installation, operation and maintenance.

4.1.2 For 3000 VA model or higher, install the UPS at least 80 cm around UPS to enable easy access for installation, operation and maintenance.

4.1.3 Install at the floor that is capable of supporting the weight of UPS.

- 4.2 Connect computer network cable (if any) to RS232-PC port of UPS.
- 4.3 Plug in loads cable to UPS OUTLET.
- 4.4 Plug in INPUT CABLE to wall outlet (utility line).
- 4.5 In case of battery extension (if any), connect battery cables from battery extension module into the battery extension outlet.

OPERATION

5.1 Turning on UPS

5.1.1 Under normal utility power line (AC start)

- 5.1.1.1 Plug in the power cord to the wall outlet. UPS will start up charging battery automatically, yellow LED will light on, LCD display will indicate “ups off” and output voltage will be ‘0’, that means UPS does not supply power to load.
- 5.1.1.2 Press and hold POWER ON button for 2 seconds then INVERTER will start up operation.
- 5.1.1.3 UPS will start up self-test automatically, yellow LED will be off then green LED will light on and LCD display will indicate “on line”, that means UPS is operating on on line mode.

5.1.2 Under power failure condition (DC start)

When utility power fails, blackout or UPS input power cord is not connected to utility outlet, press and hold POWER ON button for 2 seconds to turn on UPS.

5.2 Turning off UPS

5.2.1 Under normal utility power line (AC mode)

- 5.2.1.1 Press and hold POWER ON button for 2 seconds then INVERTER will stop operation.
- 5.2.1.2 UPS will start up self-test automatically, green LED will be off then yellow LED will light on and LCD display will indicate “ups off”, that means UPS does not supply power to load.

5.2.2 Under power failure condition (DC mode)

When utility power fails, blackout or UPS input power cord is not connected to utility outlet, press and hold POWER OFF button for 2 seconds to turn off UPS.

5.3 UPS self-test and mute alarm sound

When UPS operates on on line mode, user can do UPS self-test. Press and hold FUNCTION button for 1 second, alarm will beep once every 4 seconds. UPS is self-testing and LED is lit for 10 seconds.

To mute alarm sound when UPS is self-testing on battery mode, press and hold FUNCTION button for 1 second and if you press and hold FUNCTION button for 1 second again, alarm will return to beep warning.

5.4 Bypass mode

UPS is forced bypass condition to switch power source from utility line to bypass power source. The alarm will beep sound when you turn on UPS and it is powered by utility line, UPS is overloaded or UPS has faults. LCD display will shows “on bps”, LCD graphic LOAD LEVEL and BATTERY LEVEL blocks will be indicated according to real capacity value. When UPS operates on bypass mode, it does not supply backup power and loads are powered directly by utility line.

5.5 On line mode

When UPS operates on on line mode, green LED lights on and LCD display will show "on line".

- 5.5.1 When line and neutral lines are not connected properly, LCD item INPUT characters will blink.
- 5.5.2 When UPS is overloaded, LCD graphic LOAD LEVEL blocks will blink, yellow LED will light on and alarm will beep once every half second. User should reduce some loads until load capacity is about 75% and control its capacity not exceed 100% in order to protect damage to UPS.
- 5.5.3 When battery is not ready to use or it is not connected to UPS, LCD graphic BATTERY LEVEL blocks will blink and yellow LED will light on. User should first verify at the battery poles or user can test the operation of battery by pressing and holding FUNCTION button for 1 second or contact the nearest service center.

5.6 Battery mode

When UPS operates on battery mode, green LED lights on and LCD display will show "on batt".

- 5.6.1 When UPS operates on battery mode, alarm will beep once every 4 seconds. Press and hold FUNCTION button for 1 second to mute the alarm, if you press and hold FUNCTION button for 1 second again, alarm will return to beep warning.
- 5.6.2 When UPS supplies backup power from battery until it is almost run out of power, LCD graphic BATTERY LEVEL blocks will blink, yellow LED will light on and alarm will beep every second. User needs to save data files and shutdown the loads.
- 5.6.3 When UPS input voltage or frequency exceeds input power range, LCD item INPUT characters will blink.

MAINTENANCE

- 6.1 Leonics UPS does not need any special maintenance. Just only use it according to this user's manual and place it away from dust and humid area. Anyway, if any of following items occurs, please contact us or our nearest service center.
 - 6.1.1 Cable is cut or damaged.
 - 6.1.2 Wet with any liquid.
 - 6.1.3 UPS metal cabinet is broken.
 - 6.1.4 UPS is dropped, fallen, crashed or hit.
 - 6.1.5 User notices abnormal problems under normal operation.
- 6.2 Under normal operation and continuous use, expected life time of ventilation fan is approximately 20,000 hours.
- 6.3 Even though the backup batteries are maintenance free type, user still needs to check them every year to make sure that they are still at good condition by following the procedure below,
 - 6.3.1 Turn on UPS.
 - 6.3.2 Turn on loads which are connected to UPS OUTPUT.
 - 6.3.3 Disconnect all load from utility power and check whether the loads are still working normally.
 - 6.3.4 If the loads are not working normally, that means backup batteries are spoiled.

To get the new batteries, contact us or our nearest service center.

6.4 For your safety, press POWER OFF button at the front side of UPS and unplug the UPS from utility power before maintenance.

TROUBLESHOOTING

Symptoms	Possible Causes	Solutions
LCD item section INPUT characters blink.	1. Input voltage or frequency exceeds normal input range, alarm beeps twice every second for 8 times.	UPS is operating on battery mode, save files and shutdown loads. Check to make sure input voltage or frequency is in UPS input power range.
	2. Line and neutral lines are not connected properly, alarm beeps once every 2 seconds.	Reconnect line and neutral lines properly.
LCD graphic BATTERY LEVEL blocks blink.	Battery voltage is too low or battery is not well connected.	Check the battery part and well connect it. If battery is deteriorated, please replace it.
Utility power is normal but UPS does not supply power to loads.	INPUT CIRCUIT BREAKER at the rear side of UPS has tripped.	Press the INPUT CIRCUIT BREAKER to reset.
UPS does not supply backup power or the backup time is too short.	1. Battery is not fully charged.	Connect input cable to power source and turn on UPS for at least 8 hours.
	2. The connected loads are exceeded the UPS rated capacity and UPS is overloaded.	Check load power and reduce some loads until load quantity is less than UPS rated capacity.
	3. Battery is deteriorated.	Please contact Leonics Service Center.
Press POWER ON button but UPS does not operate.	1. Press POWER ON button too fast.	Repress and hold POWER ON button for 1 second.
	2. UPS is not connected to battery or battery voltage is low and UPS is overloaded.	Well connect battery. If battery voltage is low, turn off UPS and reduce some loads then turn on UPS again.
	3. If you follow steps 1-2, the symptom still exist.	Please contact Leonics Service Center.

SPECIFICATION

MODEL		<i>UKA-1000</i>	<i>UKA-2000</i>	<i>UKA-3000</i>
CAPACITY	For computer load	1000 VA / 700 W	2000 VA / 1400 W	3000 VA / 2100 W
INPUT	Voltage	220 Vac single phase nominal voltage		
	Voltage range	± 25% of nominal voltage		
	Frequency	50 Hz ± 8% (60 Hz ± 8%) auto sensing		
	Power factor	more than 0.97 at full load		
OUTPUT	Voltage	220 Vac ± 2%		
	Phase	Single phase		
	Frequency	50 Hz ± 0.2% (60 Hz ± 0.2%)		
	Wave form	Pure sine wave		
	Harmonic distortion	< 3% of THD at linear load, < 6% of THD at non-linear load		
	Overload capability	> 110% for 30 sec. turn to bypass mode, > 150% for 300 ms. turn to bypass mode		
	Crest factor	3 : 1		
	Short circuit protection	Turn off inverter, no transfer to bypass, audible alarm (AC mode) Turn off inverter, audible alarm (Battery mode)		
	Efficiency	≥ 83%	≥ 85%	
	Protection	Overload, over voltage, under voltage, short circuit proof and low battery voltage shutdown		
BATTERY	Type	Sealed lead acid maintenance free		
	Backup time (depending on computer load)	6 - 10 minutes	8 - 15 minutes	9 - 20 minutes
	Extend backup time	option		
	Continuous recharging time	90% capacity after 6-10 hours charging		
TRANSFER TIME	Transfer time between AC mode and Battery mode	Zero time (True On-line UPS)		
PROTECTION	EMI/RFI attenuation	IEC 62040-2		
	Surge protection	IEC 61000-4-5		
INDICATOR	Front panel LED's	Green LED for normal operation Yellow LED for warning condition Red LED for abnormal operation		
	Front panel LCD's	Input voltage/frequency, battery voltage, output voltage/frequency, load in watt/VA and percent, inverter temperature Operation modes such as "on line", "on batt", "UPS off" or "on bypass"		
AUDIBLE ALARM	Buzzer	Mains Failure, Low battery, Overload, UPS fault		
INPUT PLUG		NEMA 5-15P		
OUTPUT OUTLET		4	8	
COMMUNICATION INTERFACE	DB-9 connector	RS-232 serial interface port can be connected to PC, workstation or servers with monitoring software (option)		
	SNMP/HTTP capability	option		
ACOUSTIC NOISE	At 1 metre	< 45 dBA		
ENVIRONMENT	Temperature	0 - 40°C		
	Humidity	0 - 95 % (Non-Condensing)		
DIMENSIONS	W x H x D (cm.)	14.4 x 21.5 x 41.9	19.1 x 33.9 x 47.8	
WEIGHT	Approximate in kg.	14	33	34

• UPS monitoring and management software is optional, which is not supplied with the product. This software capable to work with these OS as follow.

- MS Windows 95/98/Me/2000/XP/2003
- MS Windows 7
- MS DOS
- Novell Netware v3.1x/v4.x/v5.x
- Free BSD 4.x
- Linux

• Continuous product development is our commitment. In that manner, the above specifications may be changed without prior notice.