

MINUTEMAN UPS
Endeavor Series
Product Specifications
5,000VA – 10,000VA
Single-Phase Uninterruptible Power Supply

1.0 GENERAL

1.1 SUMMARY

This product specification will outline and define the electrical and mechanical features for a true on-line, double conversion, true sinewave, solid-state, uninterruptible power supply (UPS) system. The UPS shall provide high-quality, regulated AC power to sensitive electronic equipment connected to the system.

1.2 STANDARDS

The UPS system shall be designed and manufactured in accordance with the applicable sections of the current revision of the following regulatory organizations codes. Where a conflict may arise between these standards made herein, the statements in this specification shall govern.

- cTUVus (Conforms to UL1778 4th edition, CSA 22.2 No. 107.3-05)
- FCC Part 15/ANSI C63.4 Class B
- ISO9001 & 14001
- IEC61000-4-2 (Level 4)
- IEC61000-4-3 (Level 3)
- IEC61000-4-4 (Level 4)
- IEC61000-4-5 (Level 4)
- IEC61000-4-6 (Level 3)
- IEC61000-4-8 (Level 3)
- IEC62040-1-1
- IEEE C62.41 Category A1
- EN50091-2: 1995 Class A
- CE compliance mark
- ISTA 1A certification
- RoHS2 WEEE 2011/65/EU Directive
- Energy Star (208VAC input/output models)

The UPS must be cTUVus listed per UL Standard 1778, and shall be CE certified.

1.3 SYSTEM DESCRIPTION

1.3.1 Modular Design

The UPS system will be manufactured in a modular concept. The UPS system will consist of a minimum (1) UPS module and (1) Battery module. Additional

configurations will support the addition of a Transformer module and/or an external maintenance bypass module.

- A.** The following models numbers will consist of a single UPS module and battery module:

ED5200RTXL
ED6200RTXL
ED8200RTXL
ED10200RTXL

- B.** The following models numbers will consist of a single UPS module, a Transformer module and a battery module:

ED5000RTXL
ED6000RTXL
ED8000RTXL
ED8000RTXL5TF
ED10000RTXL
ED10000RTXL5TF

- C.** The following models numbers will consist of a single UPS module, a battery module and an external maintenance bypass module:

ED5200RTXLMB
ED6200RTXLMB
ED8200RTXLMB
ED10200RTXLMB

- D.** The following models numbers will consist of a single UPS module, a Transformer module, a battery module and an external maintenance bypass module:

ED5000RTXLMB
ED6000RTXLMB
ED8000RTXLMB
ED8000RTXL5TFMB
ED10000RTXLMB
ED10000RTXL5TFMB

1.3.2 Design Requirements – UPS System

- A. Voltage** - Input/output voltage specifications of the UPS shall be:

System Input: 0 – 300VAC, single-phase, two-wire plus ground.

System Output, (UPS module only): 208VAC, 220VAC, 230VAC, 240VAC single-phase, two-wire plus ground.

System Output, (with Transformer module): 120VAC, 208VAC, 240VAC single-phase, two-wire plus ground.

- B. Output Load Capacity** - The specified, combined, output load capacity of the UPS shall be listed as follows:

ED5000RTXL, ED5000RTXLMB: 4556VA

ED5200RTXL, ED5200RTXLMB:	5000VA
ED6000RTXL, ED6000RTXLMB:	5556VA
ED6200RTXL, ED6200RTXLMB:	6000VA
ED8000RTXL, ED8000RTXLMB:	6889VA
ED8000RTXL5TF, ED8000RTXL5TFMB:	7556VA
ED8200RTXL, ED8200RTXLMB:	8000VA
ED10000RTXL, ED10000RTXLMB:	8889VA
ED10000RTXL5TF, ED10000RTXL5TFMB:	9556VA
ED10200RTXL, ED10200RTXLMB:	10000VA

1.3.3 Design Requirements – Batteries

- A. **Battery Cells:** Maintenance-free, sealed, non-spillable, lead acid, valve regulated.
- B. **Reserve Time:** Minimum 3-minutes at full load, minimum 11-minutes at half load, with ambient temperature between 20° and 30° Celsius.
- C. **Recharge Time:** Eight hours to 90% capacity after a full load discharge.

1.3.4 Modes of Operation

The UPS shall be designed to operate as a true on-line, double conversion, extended runtime system in the following modes:

- A. **On-Line Mode** - The critical AC load is supplied by the inverter power source. Any non-hazardous harmonics and/or anomalies are filtered through Power Factor Correction (PFC) circuitry. The internal batteries are simultaneously float-charging.
- B. **On Battery Mode** - Upon failure or overvoltage of utility AC power, the connected AC load is supplied power by the UPS switching from the On-Line mode to the Battery mode while using batteries. There shall be no interruption in power when switching from the On-Line mode to the Battery mode. When utility AC power returns, the UPS will return to On-Line mode with no interruption of power.
- C. **Economy Mode** – When operating the UPS in Economy mode, the input utility power will bypass the inverter circuit and connect directly to the output of the UPS, powering the connected equipment while simultaneously charging the batteries. During a blackout, brownout or overvoltage event, the UPS will transfer to the On Battery mode, powering the connected equipment. When utility power returns or is at an acceptable level, the UPS will automatically transfer back to Economy mode and start recharging the batteries.
- D. **Recharge Mode** - Upon restoration of AC utility power, after a utility AC power outage, the internal charger shall automatically start recharging the batteries.
- E. **Bypass Mode** - During bypass operation, the utility power bypasses the inverter circuitry and is passed directly through the UPS to the connected loads. During this mode of operation, the UPS will only provide power to the connected loads when nominal utility power is available.
 - Automatic Internal Bypass: Automatically activates when the UPS detects an internal hardware or battery failure or an overload

- Manual Bypass: Engaged by authorized individuals when the UPS needs to be serviced or taken out of service for maintenance or replacement.

F. DC Cold Start Mode - The UPS shall start and operate without AC utility power applied.

1.3.5 Performance Requirements

1.3.5.1 AC Input to UPS

A. Wiring Configuration for Standard Units: Single-phase, 2-wire plus ground.

B. Voltage Range (Non-Battery mode):

5000 – 6000VA models: 156 – 280VAC
8000 – 10000VA models: 180 – 280VAC

C. Frequency: Auto-Select 50/60Hz (40-70Hz)

D. Power Factor: > 0.9 lagging minimum at nominal input voltage and full rated UPS output load.

E. Inrush Current: < 200 Amps for < 0.4mS

F. Current Limit:

5000 – 6000VA models: 40 Amps
8000 – 10000VA models: 63 Amps

G. Surge Energy Rating: The UPS shall have Metal Oxide Varistors for surge energy protection with a rating of 1050 Joules

H. Surge Protection: All units must sustain input surges without damage per ANSI C62.41 Cat. A1 standard.

All models: EN61000-4-5: Level 4

I. Power Factor Correction (PFC): The UPS will have power factor correction circuitry that corrects the input power factor to within 99% of unity and blocks the load-generated harmonic distortion from getting back to the input AC line.

J. Current Distortion: Linear loads: Not to exceed 8% at full load and normal line voltage

K. Voltage Transient Response: 0 nS – Normal mode. <5 nS – Common mode.

L. Transient Recovery Time: 1.2μS - Normal mode, <50μS – Common mode.

1.3.5.2 AC Output, UPS Inverter

A. Wiring Configuration: Single-phase, 2-wire plus ground.

B. Output Waveform: True sine wave.

C. Voltage Regulation: Not to exceed +/-2% until Low Battery Warning.

D. Frequency: Nominal Frequency +/- 0.1Hz unless synchronized to the line.

E. Voltage Distortion: Not to exceed 2% at full linear load or 3% on a full non-linear load.

F. Load Power Factor Range: 1.0 to 0.9 lagging without de-rating.

G. Output Power Rating: Rated kVA at 0.9 lagging power factor

H. Overload Capacity (Battery Mode):

- On-line Mode: Up to 110% of rated load: 10 minutes
Up to 125% of rated load: 5 minutes
Up to 150% of rated load: 30 seconds

- Battery Mode: Up to 110% of rated load: 10 minutes
Up to 125% of rated load: 5 minutes
Up to 150% of rated load: 30 seconds

I. Inverter Output Adjustment:

ED5200RTXL (MB):	208, 220, 230, 240VAC
ED6200RTXL (MB):	208, 220, 230, 240VAC
ED5000RTXL (MB):	208, 240VAC
ED6000RTXL (MB):	208, 240VAC
ED8200RTXL (MB):	208, 220, 230, 240VAC
ED10200RTXL (MB):	208, 220, 230, 240VAC
ED8000RTXL5TF (MB):	208, 240VAC
ED10000RTXL5TF (MB):	208, 240VAC
ED8000RTXL (MB):	208, 240VAC
ED10000RTXL (MB):	208, 240VAC

Inverter output voltage adjustments must be performed via optional output voltage selector software available from the UPS supplier.

J. Efficiency: $\geq 90\%$ at full rated load.

K. Dynamic Response: $\pm 5\%$ at 100% load change in 30ms

L. Transfer time: 0 milliseconds

M. Crest Factor:

5000 – 6000VA models:	3.0 : 1
8000 – 10000VA models:	2.7 : 1

N. Slew Rate: $\leq 1\text{Hz} / \text{Second}$

1.3.6 Independent Battery Bypass:

The UPS design must allow it to start-up and operate in On-line or Economy Mode with utility AC power available when internal batteries, (and external battery packs), have failed, are removed, or produce insufficient power for the UPS to operate in battery mode. The device must provide spike and surge protection during this stage, as well. It shall not be necessary to remove power or unplug the UPS in order to replace the internal batteries.

1.3.7 Current Monitoring

All units will have current monitoring circuitry on the UPS output receptacles to measure the combined total load of all the receptacles. This circuitry shall be used to calculate actual load.

1.3.8 Hot –swappable Batteries

All units must have hot-swappable battery function. When the unit is operating in the normal AC mode, the user must be able to replace the batteries without turning off the UPS.

1.4 ENVIRONMENTAL CONDITIONS

The UPS shall be able to withstand the following environmental conditions without damage or degradation of operating characteristics:

1.4.1 Operating Ambient Temperature: 32°F to 104°F (0°C to 40°C).

1.4.2 Storage/Transport Ambient Temperatures: 5°F to 122°F (-15°C to +50°C).

1.4.3 Relative Humidity: 0 to 95% non-condensing.

1.4.4 Altitude:

- Operating: 0 to 2,000 meters (0 to 6,562 feet).
- Storage/Transport: 0 to 15,000 meters (0 to 49,213 feet).

1.4.5 Audible Noise: Noise generated by the UPS under any condition of normal operation shall not exceed 60dBA, measured at 1 meter from the surface of the UPS.

1.5 SUBMITTALS

1.5.1 Proposal Submittals: Submittals with the proposal shall include:

- System configuration and description
- Product catalog, brochures and/or data sheets
- Functional relationship of equipment including weights, and dimensions.
- Descriptions of equipment to be furnished, including deviations from these specifications.
- Size and weight of shipping units to be handled by installing contractor.

1.5.2 UPS Delivery Submittals

Submittals upon UPS delivery shall include one (1) User's manual that shall include a functional description of the equipment, safety precautions, instructions, operating procedures and battery replacement instructions.

1.6 WARRANTY

1.6.1 UPS Module

The UPS manufacturer shall warrant the UPS against defects in materials and workmanship for 36 months from purchase date or 42 months from date of manufacture, whichever period expires first.

1.6.2 Transformer Module

The UPS manufacturer shall warrant the UPS transformer module against defects in materials and workmanship for 36 months from purchase date or 42 months from date of manufacture, whichever period expires first.

1.6.3 Battery Module

The UPS manufacturer shall warrant the UPS battery pack(s) against defects in materials and workmanship for 36 months from purchase date or 42 months from date of manufacture, whichever period expires first

1.6.4 Maintenance Bypass Module

The UPS manufacturer shall warrant the UPS Bypass module against defects in materials and workmanship for 36 months from purchase date or 42 months from date of manufacture, whichever period expires first.

1.7 QUALITY ASSURANCE

1.7.1 Manufacturer Qualifications

A minimum of thirty years’ experience in the design, manufacture, and testing of solid-state UPS systems is required. The system shall be designed and manufactured according to world-class quality standards. All production manufacturing facilities shall be ISO9001 & ISO14001 certified.

1.7.2 Factory Testing

Before shipment, the manufacturer shall fully and completely test the system to assure compliance with the specification.

1.7.3 Mean Time Between Failure

The UPS shall have a mean time between failure, (excluding batteries), of 100,000 hours.

2.0 PRODUCT

2.1 FABRICATION

2.1.1 UPS System

2.1.1.1 Physical Characteristics

A. Dimensions (H x W x D):

ED5200RTXL (MB):	7.0” x 17.3” x 26”
ED6200RTXL (MB):	7.0” x 17.3” x 26”
ED5000RTXL (MB):	10.5” x 17.3” x 26.2”
ED6000RTXL (MB):	10.5” x 17.3” x 26.2”
ED8200RTXL (MB):	10.3” x 17.3” x 24.6”
ED10200RTXL (MB):	10.3” x 17.3” x 24.6”
ED8000RTXL5TF (MB):	13.8” x 17.3” x 26.2”
ED10000RTXL5TF (MB):	13.8” x 17.3” x 26.2”
ED8000RTXL (MB):	15.42” x 17.3” x 25.9”
ED10000RTXL (MB):	15.42” x 17.3” x 25.9”

B. Weights (in lbs.):

ED5200RTXL:	115.8
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ED6200RTXL:	115.8
ED5000RTXL:	198.5
ED6000RTXL:	198.5
ED8200RTXL:	181.0
ED10200RTXL:	181.0
ED8000RTXL5TF:	263.7
ED10000RTXL5TF:	263.7
ED8000RTXL:	339.7
ED10000RTXL:	339.7
ED5200RTXLMB:	128.6
ED6200RTXLMB:	128.6
ED5000RTXLMB:	211.3
ED6000RTXLMB:	211.3
ED8200RTXLMB:	193.8
ED10200RTXLMB:	193.8
ED8000RTXL5TFMB:	276.5
ED10000RTXL5TFMB:	276.5
ED8000RTXLMB:	352.5
ED10000RTXLMB:	352.5

2.1.1.2 Materials - All materials of the UPS shall be new, of current manufacture, high grade and free from all defects and shall not have been in prior service except as required during factory testing.

The maximum working voltage, current, and di/dt of all solid-state power components and electronic devices shall not exceed 90% of the ratings established by their manufacturer. The operating temperature of solid-state component sub-assembly shall not be greater than 90% of their ratings.

2.1.1.3 Construction and Mounting - The UPS enclosure shall be adaptable for standing vertically or horizontally on the floor with the appropriate mounting hardware supplied by the manufacturer. It shall also be capable of mounting within a 19" or 23" wide rack or cabinet structure with the appropriate mounting hardware supplied by the manufacturer.

The UPS module shall be constructed of replaceable subassemblies.

2.1.1.4 UPS Heat Dissipation (BTUs):

A. AC Mode:

ED5200RTXL (MB):	1707
ED6200RTXL (MB):	2048
ED5000RTXL (MB):	1707
ED6000RTXL (MB):	2048
ED8200RTXL (MB):	2730
ED10200RTXL (MB):	3413
ED8000RTXL5TF (MB):	2730
ED10000RTXL5TF (MB):	3413
ED8000RTXL (MB):	2730
ED10000RTXL (MB):	3413

B. Inverter Mode:

ED5200RTXL (MB):	1536
ED6200RTXL (MB):	1843
ED5000RTXL (MB):	1536
ED6000RTXL (MB):	1843

ED8200RTXL (MB):	2457
ED10200RTXL (MB):	3072
ED8000RTXL5TF (MB):	2457
ED10000RTXL5TF (MB):	3072
ED8000RTXL (MB):	2457
ED10000RTXL (MB):	3072

2.1.2 UPS Module

2.1.2.1 Wiring - Wiring practices, materials and coding shall be in accordance with the requirements of the National Electrical Code (ANSI/NFPA 70).

2.1.2.2 Cooling - Cooling of the UPS will be by forced air, using internal fans. High-quality, variable speed, (which is based on internal UPS temperature), fans will be used to minimize audible noise.

2.1.2.3 Grounding - The UPS chassis shall provide proper grounding to all output receptacles and/or terminal blocks for reducing the risk of electrical shock hazard.

2.1.2.4 Input Power Connection - All UPS modules will come with a 3-post hardwire terminal block, designed for a standard 2-wire plus ground installation. All listed models under 8000VA will include, in the shipping package, an optional 10-foot, 10AWG power cord with an attached NEMA L6-30P plug, designed to attach to the input terminal block.

2.1.2.5 Output Power Connections – All UPS modules will utilize a hardwire terminal block for output connectivity to connected loads, branch circuits, a transformer module or an external bypass.

2.1.2.6 Remote Emergency Power Off (REPO) Port

The UPS shall have a 2-pin connector on the rear panel of the UPS for the exclusive purpose of providing a REPO communication port. The REPO port connects the UPS to a user-installed REPO switch. In the AC or Battery mode, short pin1 to pin2 for approximately 0.5 seconds in order to shut down the UPS. The UPS must be powered off and then back on via the ON/OFF switch located on the front panel to restart the UPS.

2.1.2.7 Parallel Port

The Parallel Port is used for the communication between two UPS and the Maintenance Bypass Switch, (MTBS), for parallel operation.

2.1.2.8 External Battery Connection

All models will include a 50-Amp connection port on the rear panel for attaching one or more external battery pack(s).

2.1.3 Transformer Module

2.1.3.1 Cooling - Cooling of the UPS shall be by forced air. High quality fans shall be used to minimize audible noise.

2.1.3.2 Grounding - The UPS chassis shall provide proper grounding to all output receptacles and/or terminal blocks for reducing the risk of electrical shock hazard.

2.1.3.3 Input Power Connection - All transformer modules will come with a 3-post hardwire input terminal block, designed for a standard 2-wire plus ground installation.

2.1.3.4 Output Power Connections – Each Transformer will support that include a combination of NEMA straight-blade receptacles, NEMA locking-receptacles and hardwire terminals. Specific output configurations for UPS systems containing a transformer module are listed below:

ED5200RTXL (MB):	Hardwire Terminal Block
ED6200RTXL (MB):	Hardwire Terminal Block
ED5000RTXL (MB):	(6) NEMA 5-15/20R (1) NEMA L6-20R (1) NEMA L6-30R
ED6000RTXL (MB):	(6) NEMA 5-15/20R (1) NEMA L6-20R (1) NEMA L6-30R
ED8200RTXL (MB):	Hardwire Terminal Block
ED10200RTXL (MB):	Hardwire Terminal Block
ED8000RTXL5TF (MB):	(6) NEMA 5-15/20R (1) NEMA L6-20R (1) NEMA L6-30R
ED10000RTXL5TF (MB):	(6) NEMA 5-15/20R (1) NEMA L6-20R (1) NEMA L6-30R
ED8000RTXL (MB):	(8) NEMA 5-15/20R (1) NEMA L6-20R (1) NEMA L6-30R
ED10000RTXL (MB):	Hardwire Terminal Block (8) NEMA 5-15/20R (1) NEMA L6-20R (1) NEMA L6-30R Hardwire Terminal Block

2.1.3.5 Voltage Input Adjustment – All transformer modules will be selectable between 208V and 240V.

- The 5000/6000VA transformer modules will have a rear-panel switch to select between 208V and 240V.
- The 8000/10000VA transformer modules will have a separate connection on the terminal block for either 208V or 240V.

2.1.4 Battery Module

2.1.4.1 Input Connection - The battery module must use a 50-Amp connection port for attachment to the UPS or additional battery modules when daisy-chaining.

2.1.4.2 Output Connection - The battery module must use a 50-Amp connection port for attachment to additional battery modules when daisy-chaining

2.1.4.3 Circuit Breaker - The battery module will have a 50Amp DC circuit breaker for over-current protection and to serve as a DC disconnect device.

2.2 COMPONENTS

2.2.1 Charger

- 2.2.1.1 General** - The term charger shall denote the solid-state equipment and controls necessary to convert incoming AC power to regulated DC power for battery charging. The charger shall be a pulse-width modulated, switching-type with constant voltage/current limiting control circuitry.
- 2.2.1.2 DC Filter** - The charger shall have an output filter to minimize ripple voltage into the battery. Under no conditions shall ripple voltage into the battery exceed 2% RMS. The filter shall be adequate to insure that the DC output of the charger will meet the input requirements of the Converter and DC/DC booster circuits.
- 2.2.1.3 Automatic Restart** - Upon restoration of utility AC power, after a utility AC power outage, the UPS shall automatically restart and resume the battery recharge mode.
- 2.2.1.4 Battery Recharge** - The charger shall be capable of producing battery-charging current sufficient to replace 90% of the battery-discharged power within 8 hours. After the battery is recharged, the charger shall maintain the battery at full charge until the next emergency operation.
- 2.2.1.5 Overvoltage Protection** - There shall be charger over-voltage protection so that if the charger voltage rises to the pre-set limit, the charger will turn off and issue a fault alarm.
- 2.2.1.6 Temperature Compensation** - The charger voltage will vary according to the internal ambient temperature of the UPS. That variance will be defined as - 3.3mV/°C per cell using 12V batteries.

2.2.2 Inverter

- 2.2.2.1 General** - The term inverter shall denote the solid-state equipment and controls to convert DC power from the Converter or the DC/DC Booster circuits to regulated AC power for supporting the critical load.
- 2.2.2.2 Overload Capability** - The inverter shall be capable of supplying current and voltage for overloads exceeding 125% and up to 150% of full load current for 30 seconds. A status indicator and audible alarm shall indicate overload operation.
- 2.2.2.3 Fault Clearing and Current Limit** - The inverter shall be capable of supplying an overload current up to 150% of its full-load rating for 30 seconds. For greater currents or longer time duration, the inverter shall have electronic current-limiting protection to prevent damage to components. The inverter shall be self-protecting against any magnitude of connected output overload. Inverter control logic shall sense and disconnect the inverter from the critical AC load without the requirement to clear protective fuses.
- 2.2.2.4 Inverter Output Voltage Adjustment** - The inverter shall have adjustable output voltages of 208, 220, 230, 240VAC.
- 2.2.2.5 Fuse Failure Protection** - Power semiconductors in the inverter unit shall be fused so that loss of any one power semiconductor will not cause cascading failures.
- 2.2.2.6 Inverter DC Protection** - The inverter shall be protected by the following disconnect levels:
- DC Overvoltage Shutdown.
 - DC Over-current Shutdown
 - DC under-voltage Warning (Low Battery Reserve).
 - DC under-voltage Shutdown (End of Discharge).

2.2.2.7 Over-discharge Protection - To prevent battery damage from over-discharging, the UPS control logic shall automatically turn off the inverter at a predetermined level as to not damage the batteries.

2.2.2.8 Output Frequency - The output frequency of the inverter shall be microprocessor controlled. The microprocessor shall regulate the inverter output frequency to +/- 0.1Hz (during the battery mode) for steady state and transient conditions. Total frequency deviation, including short time fluctuations and drift, shall not exceed 0.1Hz from the rated frequency unless synchronized to utility power

2.2.3 Display and Controls

2.2.3.1 Monitoring and Control - The UPS shall be provided with a microprocessor-based unit status display and controls section designed for the convenient and reliable user operation. The UPS shall have a LCD display located on the front panel that provides the following information:

A. The LCD Icon display panel will include dedicated display icons for the following information:

- AC Normal
- On Battery
- Overload
- Bad Battery
- Fault

B. LCD display will also have a real-time meter to display, in numeric fashion, the following data (Selection of the items can be made from the scroll button on the front panel) and the two Fault conditions:

- Input Voltage
- Input Frequency
- Output Voltage
- Output Frequency
- Output kVA, kW
- Connected Load Capacity
- Battery Capacity
- Estimated runtime in the AC and DC modes
- Bypass Mode
- ECO Mode
- Emergency Power Off
- Fault (display Error code and Warning icon)

2.2.3.2 Load and Battery Metering - The LCD Display will have two bar graphs for measuring load and battery status:

- The Load capacity bar graph will display the amount of the load (percent) on the Battery Backup output receptacles when the UPS is operating in AC mode.
- The Battery capacity bar graph will display the percent of charge in the AC mode. It will display the Battery capacity (percent) remaining in the Battery mode and it will indicate a Low Battery Warning.

2.2.3.3 Controls - UPS start-up operations shall be accomplished through the front panel pushbutton control. To initiate a complete shutdown of the UPS, the UPS module input and Battery Pack module circuit breakers must be turned off.

2.2.3.4 Power Monitoring Software - The UPS shall be provided with SentryHD™ Power Monitoring Software to report important status information concerning the UPS and the utility power.

2.2.3.5 Communications Ports - The UPS shall have a 9-pin subminiature D-shell connector on the rear panel of the UPS for connecting a RS232 communication cable between the UPS and the computer for RS232 communications. The port must be capable of operating simultaneously with the Option Card slot.

2.2.3.6 Alarm Messages - The following alarm messages shall be displayed via the LCD display located on the front panel:

- While operating in the battery mode, the AC Normal Icon will turn off and the On-Battery Icon will turn on and the alarm will sound once every 10 seconds until the unit reaches Low Battery Warning (LBW). The alarm will turn off if utility power returns.
- When the unit reaches a Low Battery Warning, the LCD will display an error code and the alarm will sound 2 beeps every 5 seconds until the unit reaches Low Battery Cut-off (LBCO) then the alarm will turn off.
- The alarm will sound continuous and the LCD will display corresponding error code, if the unit senses an internal fault. The alarm will remain on until the unit is turned off.
- The alarm will sound continuous and the Overload icon will illuminate with the respective error code, if the unit senses an overload on the output. The alarm will turn off if the overload is removed.
- The alarm will sound 3 beeps every 5 minutes, if the battery is weak/bad or disconnected and the Weak/Bad Battery icon will illuminate with the respective error code. The alarm will remain in this state until the battery is recharged, replaced, or reconnected

2.2.3.7 Audible Alarm Silencer - When the unit is operating in Battery Mode, the audible alarm can be silenced when the alarm silencer button on the LCD panel is pressed. Once the UPS reaches a LBW, or a fault condition occurs, the alarm will be activated. Once the UPS transfers to the AC mode the alarm will be reset to default.

2.2.4 Accessories (Optional)

2.2.4.1 SNMP Card - The UPS shall come equipped with an internal SNMP adapter card slot located on the backplane of the unit, which will connect the UPS directly to any IP-based network using Ethernet communications. The UPS will become a managed device on the network. From a network management station, the system administrator shall be capable of monitoring important system measurements, alarm status, and alarm history data. The network administrator shall also be capable of executing battery tests, observing the results of such tests, and turning the UPS on and off via his SNMP communication network. In the event of a utility failure, the SNMP shall continue with live communication without the requirement of additional or separate UPS equipment until such time

as the UPS shuts down for Low Battery. On resumption of utility power, the SNMP card shall resume full SNMP communication automatically. The optional SNMP card shall also be capable of HTTP communications when SNMP management is not available or practical. Using most industry standard web browsers as an interface, the system administrator shall have access to all information available through the web interface. Included with the optional SNMP Card will be SNMP Manager software. The software will be able to monitor and control 50-100 UPS, using installed SNMP cards, through a single management window on a networked computer platform.

2.2.4.2 Programmable Relay Card - A Programmable Relay Card shall be provided, as an option, to the UPS. The Programmable Relay Card is installed using the internal card slot in the UPS. When installed, the card will provide a configurable dry-contact closure communication port between the UPS and an attached device. A terminal block with a ground, common and six relay contacts are used for monitoring alarm events on the UPS to an attached device through a user-customized cable. The card is programmed using a Hyper-terminal application. An included feature will be the ability of the card to provide signals to Windows NT4/2000/XP/2003 for notification of power failure and low battery status on the connected UPS. Up to three computers may be configured for both the power failure and low battery status. Up to six computers may be configured for a single signal.

2.2.4.3 Additional Battery Module(s) - The battery pack module will include sealed, non-spillable, lead-acid, valve regulated battery cells housed in a separate cabinet that matches the UPS cabinet styling to form an integral system line-up. A battery disconnect circuit breaker shall be included for isolation of the battery pack from the UPS module. Installation rail kits shall be provided for installation into a 19' rack or cabinet. An optional set of tower installation kits shall be included for installation of the UPS in a vertical format for use on a floor. The set of stands shall be of a design so as to interconnect with the control UPS to form a solid configuration.

A. Multiple Battery Pack Installations: The battery pack module shall be designed with the ability to be daisy-chained in a string of up to four units without an external battery pack charger.

B. Unlimited Runtime Installations: For installations requiring battery runtimes that exceed the capacity of four daisy-chained battery pack modules, additional battery pack modules may be daisy-chained to the UPS by connecting an external battery pack charger on every fourth battery module in the string.

3.0 Manufacturers Warranty and Service

3.1 Manufacturer's Warranty Procedure

Within the first thirty-six (36) months from the date of purchase, any defect or malfunction of the UPS device shall require contact with the manufacturer for diagnosis. If required the manufacturer will provide the customer with a Return Materials Authorization, (RMA), number to send the defective product to the factory for repair or replacement, at the discretion of the manufacturer. It will be the responsibility of the customer to provide transportation of the unit to the factory. Once repaired, or replaced, the manufacturer will incur ground freight expense to return the product to the customer

3.2 Extended Warranties

A complete offering of optional, extended repair or replacement warranties for both the UPS system and additional battery modules shall be available. An extended warranty package will

replace the original manufacturer's warranty and, at the manufacturer's discretion, will either replace the defective equipment or repair it for a total of sixty months from the date of purchase.