

MINUTEMAN POWER TECHNOLOGIES
Encompass-LCD Tower UPS Series
Product Specifications
1000VA – 3000VA
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 double conversion, on-line, 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 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.

- FCC: Part 15, Subpart B Class A/ANSI C63.4:2009, Class A
- ISO: 9001 & 14001
- UL: (UL1778 5th Edition & CSA 22.2 no. 107.3-14 / R:2014)
- CE:
- IEEE/ANSI: EN62040-2:2006 Category C2
 IEC61000-2-2:2002
 IEC61000-4-2:2009
 IEC61000-4-3:2006+A1:2008+A2:2010
 IEC61000-4-4:2012
 IEC61000-4-5:2014
 IEC61000-4-6:2014
 IEC61000-4-8:2010
 C62.41 Category A1
- RoHS: WEEE 2011/65/EU & 2015/863/EU Directives

1.3 SYSTEM DESCRIPTION

1.3.1 Design Requirements:

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

System Input: 55 – 150VAC (load dependent), single-phase, two-wire plus ground.

System Output: 110, 120, 127VAC single-phase, two-wire plus ground.

B. Output Load Capacity – The specified output load capacity of the UPS shall range between 1000-3000VA with a 0.9 lagging power factor.

1.3.2 Design Requirements – Batteries

- A. **Battery Cells:** Maintenance-free, sealed, non-spillable, lead acid, valve regulated.
- B. **Reserve Time:** A minimum of 2 minutes at a full, measured load, with ambient temperature between 20° and 30° Celsius.
- C. **Recharge Time:** Internal batteries to 90% capacity within eight hours after return of nominal AC power from low battery cut-off.

1.3.3 Modes of Operation – The UPS shall be designed to operate as a true on-line, double conversion system in the following modes:

- A. **On-Line Mode** – The critical 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, brownout or overvoltage of utility AC power, the connected load is supplied power by the UPS switching from the On-Line mode to the Battery mode while using the internal 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 internal batteries.
- E. **Bypass Mode:** An automatic internal bypass will activate when the UPS detects an internal hardware failure, battery failure or an overload.
- F. **DC Cold Start Mode** – The UPS shall start and operate in the Battery Mode without AC utility power applied.

1.3.4 Performance Requirements

1.3.4.1 AC Input to UPS

- A. **Wiring Configuration for Standard Units:** Single-phase, 2-wire plus ground.
- B. **Voltage Range (Non-Battery mode):** 55 – 150VAC, (load dependent), for all models
- C. **Frequency:** Auto-Select 50/60Hz (+/- 6Hz.)
- D. **Power Factor:** 0.9 lagging minimum at nominal input voltage and full rated UPS output load
- E. **Input Protection:** All units will have a re-settable input circuit breaker to prevent excessive overload in AC mode, rated for the following:

- 1KVA models: 20 Amps
- 1.5KVA models: 20 Amps
- 2KVA models: 30 Amps
- 3KVA models: 40 Amps

F. Inrush Current:

- 1KVA models: 27 Amps for 17ms
- 1.5KVA models: 43 Amps for 17ms
- 2KVA models: 57 Amps for 17ms
- 3KVA models: 78 Amps for 17ms

G. Current Limit:

- 1KVA models: 20 Amp input circuit breaker
- 1.5KVA models: 20 Amp input circuit breaker
- 2KVA models: 30 Amp input circuit breaker
- 3KVA models: 40 Amp input circuit breaker

H. Surge Energy Rating: All UPS shall use Metal Oxide Varistors for input surge protection, rated for the following:

- 1KVA models: 140 joules
- 1.5KVA models: 254 joules
- 2KVA models: 254 joules
- 3KVA models: 254 joules

I. Surge Protection: All models will be capable of sustaining input surges without damage per: EN61000-4-5: 2KV**J. Power Factor Correction (PFC):** $\geq 99\%$ at nominal input voltage and full load**K. Current Distortion:**

- Linear loads: Not to exceed 3.2% at full linear load and normal line voltage
- Non-linear loads: Not to exceed 7% at full non-linear load and normal line voltage

K. Voltage Transient Response: 0nS – Normal mode, <5nS – Common mode.**L. Transient Recovery Time:** <25mS**M. Back-feed Protection:** All models will provide back-feed protection to utility power by providing an isolation relay at the input of the UPS.**1.3.4.2 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 $\pm 2\%$ until Low Battery Warning.**D. Frequency:** Nominal Frequency 50/60Hz ± 0.2 Hz unless synchronized to the line.

E. Voltage Distortion:

- Linear loads: $\leq 3\%$ at full-rated linear load
- Non-linear loads: $\leq 6\%$ at full-rated non-linear load

F. Load Power Factor Range: 1.0 - 0.9 lagging without de-rating.**G. Step Load:** All models must be able to support a fifty percent rated load increase, with the batteries at a fifty percent charge, without dropping the connected loads.**H. Output Power Rating:** Rated KVA at 0.9 lagging power factor for all models.**I. Overload Capacity:** All Models will operate for the following durations based on the size of the overload:

- On-line Mode: The UPS will transfer to Bypass mode after the listed time.

- $\leq 105\%$ of rated load – Continuous
 - 106% to 110% of rated load – 2 minutes
 - 111% to 125% of rated load – 1 minute
 - 126% to 150% of rated load – 30 seconds
 - $> 150\%$ of rated load – Immediate

- Battery Mode: The UPS will shut down after the listed time

- $\leq 105\%$ of rated load – Continuous
 - 106% to 110% of rated load – 2 minutes
 - 111% to 125% of rated load – 1 minute
 - 126% to 150% of rated load – 30 seconds
 - $> 150\%$ of rated load – Immediate

- Economy Mode: The UPS will transfer to Bypass mode after the listed time.

- $\leq 105\%$ of rated load – Continuous
 - 106% to 110% of rated load – 2 minutes
 - 111% to 125% of rated load – 1 minute
 - 126% to 150% of rated load – 30 seconds
 - $> 150\%$ of rated load – Immediate

J. Inverter Output Adjustment: 110, 120, 127VAC. Inverter output voltage adjustments must be performed via the LCD screen.**K. Efficiency:**

- $> 89\%$ Full load in On Line mode (AC – AC)
 - $> 97\%$ Full load in Economy mode for models

L. Dynamic Response: $\pm 5\%$ at 100% load change in 30ms**M. Transfer time:**

- 0ms from Online mode to On Battery mode
 - 8ms from Economy mode to On Battery mode

N. Crest Factor: 3:1

1.3.5 UPS System Test - The UPS must be able to perform an internal self-test of both the electronics and batteries, reporting any detected faults through Audio, Visual or software communication alarms. Self-tests must be performed through the following procedures:

- Power On: The UPS will perform an automatic self-test when proper AC utility is available and the unit is powered on by pressing the ON button.
- Front Panel: While the UPS is operating in On-line mode the UPS can perform a self-test when the Function and Page UP buttons are pressed simultaneously.
- Software: The UPS can perform a self-test when accessed via a computer either through the power monitoring software or the optional SNMP card, (when properly installed).

1.3.6 Independent Battery Bypass – When the UPS is operating in Normal mode, and input utility power is within the nominal range of the UPS, it must be able to provide a filtered and a regulated output to connected loads with dead internal batteries or without internal batteries.

1.3.7 Output Load Shedding – All models will have output receptacles electrically wired into two independent circuits. The two circuits must have the ability to be individually controlled via management software and SNMP.

The 3KVA has a third circuit, which will be configured as Always On and can only be disabled when the output of the entire UPS is shut off.

1.3.6.1 Load Bank Configurations

- 1KVA models: Load Bank 1 – (3) NEMA 5-15R
Load Bank 2 – (3) NEMA 5-15R
- 1.5KVA models: Load Bank 1 – (3) NEMA 5-15R
Load Bank 2 – (3) NEMA 5-15R
- 2KVA models: Load Bank 1 – (4) NEMA 5-15/20R
Load Bank 2 – (4) NEMA 5-15/20R
- 3KVA models: Load Bank 1 – (4) NEMA 5-15/20R
Load Bank 2 – (4) NEMA 5-15/20R
Load Bank 3 – (1) NEMA L5-30R (Always On)

1.3.8 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.

1.4 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: All models: 32°F to 104°F (0°C to +40°C).

1.4.2 Storage/Transport Ambient Temperatures: All models: 14°F to 122°F (-10°C to +50°C).

1.4.3 Relative Humidity: All models: 10 to 90% non-condensing.

1.4.4 Altitude:

All models: Operating: 0 to +3,000 meters (0 to +10,000 feet).

All models: Storage/Transport: 0 to +15,000 meters (0 to +50,000 feet).

1.4.5 Audible Noise: Noise generated by the UPS under any condition of normal operation shall not exceed 55dBA when 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.
- 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 All Models – The UPS manufacturer shall warrant all UPS models, including internal batteries, 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 year’s 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 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.

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

2.1.3 Construction and Mounting - The UPS enclosure shall be adaptable for floor or tabletop installations. With appropriate support, the units can be mounted on a shelf.

The UPS shall be constructed of replaceable subassemblies. Any internal battery modules shall be replaceable, by hand, by removing the front bezel and detaching the retaining bracket. The replacement of batteries should not require the use of any tools.

2.1.4 Physical Characteristics:

A. Dimensions:

- 1KVA models: Height: 10.2 in. Width: 6.1 in. Depth: 15.9 in.
- 1.5KVA models: Height: 11.4 in. Width: 6.8 in. Depth: 17.4 in.
- 2KVA models: Height: 11.4 in. Width: 6.8 in. Depth: 17.4 in.
- 3KVA models: Height: 12.6 in. Width: 7.6 in. Depth: 22.4 in.

B. Weights:

- 1KVA models: 28.2 lbs.
- 1.5KVA models: 48.1 lbs.
- 2KVA models: 48.1 lbs.
- 3KVA models: 73.0 lbs.

2.1.5 UPS Heat Dissipation:

A. AC Mode:

- 1KVA models: 341 BTUs
- 1.5KVA models: 410 BTUs
- 2KVA models: 546 BTUs
- 3KVA models: 819 BTUs

B. Inverter Mode:

- 1KVA models: 338 BTUs
- 1.5KVA models: 461 BTUs
- 2KVA models: 491 BTUs
- 3KVA models: 1014 BTUs

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

2.1.7 Grounding – The UPS chassis shall provide proper grounding to all output receptacles for reducing the risk of electrical shock hazard.

2.1.8 Input Power Connection – All UPS models shall come included with a power cord of no less than six (6)-feet in length. The cord for all models will be connected to the UPS using a strain-relief assembly.

2.1.9 Input Power Plug/Connector – All UPS models must have a NEMA input plug, molded to the input power cord, rated to the following:

- 1KVA models: NEMA 5-15P straight blade plug
- 1.5KVA models: NEMA 5-15P straight blade plug
- 2KVA models: NEMA 5-20P straight blade plug
- 3KVA models: NEMA L5-30P locking plug

2.1.10 Output Power Receptacles

- 1KVA models: 6-Battery Backup/Surge (All NEMA 5-15R)
- 1.5KVA models: 6-Battery Backup/Surge (All NEMA 5-15R)
- 2KVA models: 8-Battery Backup/Surge (All NEMA 5-15/20R)
- 3KVA models: 9-Battery Backup/Surge (8-NEMA 5-15/20R / 1-NEMA L5-30R)

2.1.11 Network Surge Protection – All models will have two RJ45 connectors, located on the back panel, for input and output surge protection of a standard (10/100/1000 Base T) Ethernet network.

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 will be battery independent and will operate regardless of battery voltage or installation. The charger shall be a two-stage, pulse-width modulated, temperature-compensated, switching-type charger with constant voltage/current limiting control circuitry.

2.2.1.2 Charge Modes – The charger will have two modes of operation, the standard charge mode and float charge mode.

- Standard mode: The charge voltage will be 0.125 times the Amp/hour rating of the internal batteries of the respective UPS
- Float mode: The charge voltage will be 0.0625 times the Amp/hour rating of the internal batteries of the respective UPS

2.2.1.3 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.

2.2.1.4 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.

2.2.1.5 Battery Recharge - The charger shall be capable of producing battery-charging current sufficient to replace 90% of the battery-discharged power within eight (8) hours. After the battery is recharged, the charger shall maintain the battery at full charge until the next emergency operation.

2.2.1.6 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.

2.2.1.7 Temperature Compensation – The charger will vary the voltage charge of the batteries by $-3.3\text{mV} / ^\circ\text{C} / \text{cell}$ (using a 12V battery).

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 111% and up to 150% of full load current at least thirty seconds. A status indicator and audible alarm shall indicate overload operation.

2.2.2.3 Fault Clearing and Current Limit - For currents of greater than 150% or for overload currents occurring for a time greater than the capability of the UPS, 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 load without the requirement to clear protective fuses.

2.2.2.4 Inverter Output Voltage Adjustment - The inverter shall have adjustable output voltages of 110, 120, 127VAC.

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 for steady state and transient conditions. Total frequency deviation, including short time fluctuations and drift, shall not exceed 0.2Hz from the rated frequency unless synchronized to utility power.

2.2.3 Battery System

2.2.3.1 Hot-swappable - All units must have hot-swappable battery function. When the unit is operating in the AC Normal or Economy mode, the user must be able to replace the batteries without shutting down the UPS.

2.2.3.2 Internal System Voltage - All models must have the internal batteries configured to support the following DC Bus voltages:

- 1KVA models: 24VDC
- 1.5KVA models: 48VDC
- 2KVA models: 48VDC
- 3KVA models: 72VDC

2.2.3.3 Approved Battery Manufacturers - The only approved battery manufacturers for use in the UPS or the optional external battery packs, are the following:

- China Storage Battery
- YUASA Battery
- B&B Battery

2.2.4 Display and Controls

2.2.4.1 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. LCD Icon Display - The LCD display panel will include dedicated display icons for the following information:

- AC Normal
- On Battery
- Overload
- Site-wiring Fault
- Fault Alarm
- Alarm Silenced
- Service Required

B. LCD Numeric Display - The 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 Current
- Connected Load Capacity (as a percentage)
- Battery Voltage
- Estimated runtime of connected loads (in minutes)
- Internal temperature of the UPS (in Celsius)

2.2.4.2 LED Displays – The UPS display panel will consist of five LED readouts denoting the following operations of the UPS:

- AC Present (Green): Illuminated when utility power is available. The LED is extinguished when the UPS operates in Battery Mode
- Load Bank 1 (Green): Illuminated when Load Bank 1 is active
- Load Bank 2 (Green): Illuminated when Load Bank 2 is active
- Bypass (Yellow): Illuminated when the UPS is in Bypass Mode
- Weak/Bad Battery (Red): Illuminated when the UPS detects a weak, bad or disconnected battery. The LED is extinguished if the battery condition of the UPS is satisfactory.

2.2.4.3 Controls - UPS operations shall be accomplished through the use of six front panel pushbutton controls.

- ON: Press and hold the button until the UPS beeps twice, (up to four seconds), to turn on the UPS. The button also silences the alarm when pressed while the UPS is in battery mode.
- OFF: Press and hold the button until the UPS beeps twice to turn off the UPS.
- Enter: Saves all configuration changes made to the UPS through front panel.
- Page Up: The Page Up button has split capabilities. It is used to changes to UPS settings and also can scroll up through a list of UPS settings or displays.
- Page Down: Scrolls down through a variety of UPS settings or displays.
- Function: Simultaneously pressing the Function and Page Up button will initiate a ten-second battery test.

2.2.4.4 Power Monitoring Software - The UPS shall be provided with Power Monitoring Software to report important status information concerning the UPS and the utility power. The software must also be able to perform a graceful shutdown of connected loads prior to the shutdown of the UPS.

2.2.4.5 Communications Ports – The UPS will have one each of a RS232 and USB communication port. The ports will be used to communicate with the power monitoring software and will allow the user to configure, monitor and manage the UPS. The RS232 and USB ports will be able to provide simultaneous communications.

A. RS232 – The RS232 communication port will be comprised of a 9-pin subminiature D-shell connector on the rear panel of the UPS for connecting a RS232 communication cable between the UPS and a computer for RS232 communications.

B. USB – The USB port will be HID-compliant and comprised of a USB 2.0 Type B connector for communications between the UPS and a computer.

2.2.4.6 Option Card Slot – The UPS shall come equipped with an internal option card slot located on the back panel of the unit. This card slot shall be compatible with either an SNMP card or a programmable relay card. Any card inserted into the option slot must be compatible with the standard Minuteman protocol.

2.2.4.7 Emergency Power Off (EPO) Port – The UPS shall have a 2-pin connector on the rear panel of the UPS for the exclusive purpose of providing a EPO communication port. The EPO port connects the UPS to a user-installed switch. In the Normal, Economy or On Battery mode, short pin1 to pin2 for approximately 0.5 seconds in order to shut down the UPS. In order to restart the UPS after enabling the EPO from AC or Economy mode, the UPS must be powered off and then back on via the ON and OFF buttons located on the front panel of the UPS. To restart the UPS from an EPO shutdown while in Battery mode, the ON button must be pressed once nominal utility power returns.

2.2.4.8 Alarm Messages – In addition to an audible alarm the following visual alarm messages shall be displayed via the LCD and LED displays located on the front panel:

- On Battery: While operating in the battery mode, the AC Present LED will turn off and the power flow icon will change to the battery mode power flow on the LCD panel. The alarm will sound once every 10 seconds until the unit reaches Low Battery Warning (LBW). The power flow icon will change to the AC mode power flow, the audible alarm will shut off and the

AC Present LED will illuminate if utility power returns prior to Low Battery Cut-off (LBCO).

- Low Battery Warning: When the UPS reaches a Low Battery Warning, the LCD will display a specific Error Code for Low Battery Warning and the alarm will sound 2 beeps every 5 seconds until the unit reaches Low Battery Cut-off (LBCO).
- UPS Fault: When the UPS detects a hardware and/or internal fault, the UPS will sound a continuous alarm and the LCD panel will display a corresponding Error Code. Both the audible and visual alarms will remain on until the unit is shut down.
- Overload: When the UPS detects a connected load greater than 106% of the rated capacity of the UPS, a continuous alarm will sound the Overload Icon will illuminate with a corresponding Error Code. The alarm will remain on until the excess load is removed or the UPS self-protection circuit shuts down the UPS.
- Weak/Bad/Disconnected Battery: During a self-test, if the UPS detects a weak, bad or disconnected battery, the Weak/Bad Battery LED icon will illuminate, (Red), and the LCD panel will display the corresponding Error Code. The audible alarm will beep three times every five minutes until the batteries are recharged, reconnected or replaced or the UPS passes a subsequent self-test.
- Site Wiring Fault: If the UPS detects a faulty input ground or reversed polarity, the Site Wiring Icon on the LCD panel will illuminate with a respective Error Code. The displays will remain illuminated until the wiring faults are removed from the input.

2.2.4.9 Audible Alarm Silencer - When the unit is operating in Battery Mode, the audible alarm can be silenced when the ON button on the front display panel is pressed and released. Once the UPS reaches the Low Battery Warning stage, or a fault condition occurs, the alarm will reactivate and cannot be silenced. Once the UPS transfers to the AC mode the alarm will be reset to default.

2.2.5 Accessory Management Cards (Optional)

2.2.5.1 SNMP Card - The insertion of a Simple Network Management Protocol (SNMP) card into the Option Card Slot will allow the UPS to connect directly to an IP-based network using Ethernet communications. With the SNMP Card properly installed and connected, the UPS will then become a managed device on a Local Area Network (LAN). The UPS shall be accessible over the network to all authorized individuals either through a Network Management System (NMS) or via a standard web browser. Authorized individuals shall be able to monitor all aspects of the UPS operation, including important system measurements, alarm status, and alarm history data. Additionally, authorized users shall be able to execute battery tests, observe the results of such tests, and turn the UPS on and off via LAN. In the event of a utility failure, the SNMP card shall continue with live communications without the requirement of additional or separate UPS equipment until such time as the UPS shuts down for Low Battery Cut-Off. On resumption of utility power, the SNMP card shall automatically resume full communications over the LAN.

The optional SNMP card shall also be capable of HTTPs communications when SNMP management is not available or practical. Using most industry-standard

web browsers as an interface, authorized users 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.

2.2.5.2 Programmable Relay Card - A Programmable Relay Card, installed using the Option Card Slot in the UPS, 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/2003/7/8/10 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.

2.2.6 External Battery Packs (Optional) – The battery power pack shall 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. Each battery power pack shall be designed with the ability to be daisy chained, in an unlimited number, from the UPS, for unlimited runtimes while operating in battery mode. Battery cells shall be mounted in metal cases designed to exactly match the width and height dimensions and installation of the control UPS. A battery disconnect circuit breaker shall be included for isolation of the battery pack from the UPS module. Each battery power pack will be charged via the internal charger located in the UPS.

2.2.6.1 Multiple Battery Pack Installations: Each battery pack shall be designed with the ability to be daisy-chained without an external battery pack charger.

2.2.6.2 UPS connector – The external battery pack will have a five (5) –pin Anderson connector, rated for 40 Amps, located on the back panel of the battery pack, for exclusive use in attaching to the UPS an additional battery pack, for the purpose of daisy-chaining to achieve extended runtime of connected loads. The Anderson connector must be individually keyed to match the respective UPS model for which it is designated

2.2.6.3 Daisy-chain Connector – The external battery pack will have a five (5) –pin Anderson connector, rated for 40 Amps, located on the back panel of the battery pack, for attaching to the UPS an additional battery pack, for the purpose of daisy-chaining to achieve extended runtime of connected loads. The Anderson connector must be individually keyed to match only the same type of battery pack used with the respective UPS.

2.2.6.4 DC Circuit Breaker

- 24-volt Battery Packs – 40 Amp
- 48-volt Battery Packs – 40 Amp
- 72-volt Battery Packs – 40 Amp

2.2.6.6 Construction and mounting – The battery pack enclosure shall be a metal case design with replaceable battery module assemblies. Any internal battery modules shall be replaceable by removing the cover of the battery pack and detaching the retaining bracket.

2.2.6.7 Physical Characteristics of All Models:**A. Dimensions: (H x W x D):**

- 24-volt models: Height: 10.2 in., Width: 6.1 in., Depth: 14.1 in.
- 48-volt models: Height: 11.4 in., Width: 6.8 in., Depth: 17.4 in.
- 72-volt models: Height: 11.4 in., Width: 6.8 in., Depth: 23.4 in.

B. Physical Weights of All Models:

- 24-volt models: 32.6 lbs.
- 48-volt models: 60.6 lbs.
- 72-volt models: 89.3 lbs.

3.0 Manufacturer's Warranty and Service**3.1 Manufacturer's Warranty Procedure**

Within the first thirty-six (36) months of purchase or forty-two months from date of manufacture, whichever occurs first, 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 replacement and parts and labor maintenance warranties for both the UPS system and the battery system shall be available. An extended warranty package shall be available to either replace the defective equipment or repair it for a total of sixty months from the date of purchase.