

CSI 263353.03EPL – Static Uninterruptible Power Supply Systems  
EnterprisePlus LCD Series

**MINUTEMAN UPS**  
**EnterprisePlus LCD Series**  
**Product Specifications**  
**750VA – 3000VA**  
**Single-Phase Uninterruptible Power Supply Systems**

## 1.0 GENERAL

### 1.1 SUMMARY

This product specification will outline and define the electrical and mechanical features for line-interactive, true sinewave, solid-state, uninterruptible power supply (UPS) systems. 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.

Both 120V and 208V models:

- UL1778 4<sup>th</sup> edition, cUL listed (CSA 22.2 No. 107.3-05 2<sup>nd</sup> edition)
- FCC Part 15 Category B
- FCC Part 68, Subpart F
- ANSI C62.41, Category A
- EN61000-3-2
- EN61000-3-3
- EN62040-2
- IEC61000-2-2
- IEC61000-4-2
- IEC61000-4-3
- IEC61000-4-4
- IEC61000-4-5
- IEC61000-4-6
- IEC61000-4-8
- CE compliance mark
- ISTA 1A certification
- ISO9001 & 14001
- RoHS2 - WEEE 2011/65/EU Directive
- Energy Star (1500VA, 2000VA & 3000VA)

### 1.3 SYSTEM DESCRIPTION

#### 1.3.1 Design Requirements – UPS Module

- A. Voltage Settings** – Input/output voltage specifications of the UPS, operating in AC mode, shall be: (The voltages in parenthesis are for the 208/240V models):

System Input: 120/125VAC models: 0 – 165VAC, single-phase, two-wire plus ground  
208/240VAC models: 0 – 300VAC, single-phase, two-wire plus ground

System Output: 120/125VAC, single-phase, two-wire plus ground  
208/240VAC, single-phase, two-wire plus ground

**B. Output Load Capacity** – The specified output load capacity of the UPS shall be as follows:

750VA – 600 Watts  
1000VA – 800 Watts  
1500VA – 1200 Watts  
2000VA – 1760 Watts  
3000VA – 2560 Watts

### 1.3.2 Design Requirements - Batteries

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

### 1.3.3 Modes of Operation

The UPS shall be designed to operate as a line-interactive system in the following modes:

- A. Normal Mode** – The critical AC load is supplied by the input power source to the UPS. Any non-hazardous harmonics and/or anomalies are filtered through internal electronics of the UPS. Internal batteries are simultaneously float-charging through a two-stage process.
- B. Boost Mode** – During a sag of input power starting at 105VAC (189/215VAC) down to 78VAC (150/185VAC), the internal two-stage transformer of the UPS will supplement utility AC voltage, raising the level of the sag, to a nominal AC voltage output level without the use of internal batteries. The UPS must be able to operate indefinitely in this mode until utility AC voltage rises to a minimum of 109VAC (196/223VAC).
- C. Buck Mode** - With a surge of input power starting at 128VAC (236/260VAC) and continuing up to 164VAC (271/290VAC), the internal, two-stage buck transformer will suppress, or buck, the utility AC voltage to nominal AC output voltages without the use of internal batteries. The UPS must be able to operate indefinitely in this mode until utility AC voltage drops to a maximum of 124VAC (229/252VAC).
- D. Battery Mode** – Upon failure or overvoltage of input power to the UPS, the connected AC load is supplied power by the UPS switching from Normal Mode to the inverter while using the internal batteries. There shall be a minimum interruption in power lasting, typically, no more than 6 milliseconds. When nominal input power returns to the UPS, it will return to Normal Mode with an interruption of, typically, no more than 6 milliseconds.
- E. Recharge Mode** – Upon restoration of nominal input power to the UPS, after an input power outage causing the UPS to switch to Battery Mode, the internal charger shall automatically start recharging the internal batteries.
- F. DC Cold Start Mode** – The UPS shall start and operate 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):** 78 – 164VAC (150 – 271/185 – 290VAC).

**C. Frequency:** Auto-Select, Auto-sensing 50/60Hz (+/- 6Hz.).

**D. Inrush Current:**

120/127VAC models

750VA model – 35 Amps for 5mS

1000VA model – 35 Amps for 5mS

1500VA model – 150 Amps for 5mS

2000VA model – 181 Amps for 5mS

3000VA model – 158 Amps for 8.3mS

208/240VAC models

1500VA model – 48.5 Amps for 1.24mS

3000VA model – 69 Amps for 2.1mS

**E. Current Limit:**

120/127VAC models

750VA model – 12 Amp input circuit breaker

1000VA model – 15 Amp input circuit breaker

1500VA model – 20 Amp input circuit breaker

2000VA model – 30 Amp input circuit breaker

3000VA model – 40 Amp input circuit breaker

208/240VAC models

1500VA model – 15 Amp input circuit breaker

3000VA model – 20 Amp input circuit breaker

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

120/125VAC models – 1000 Joules

208/240VAC models – 800 Joules

**G. Surge Protection:** 120VAC models will sustain input surges without damage per the ANSI C62.41 Cat. A standard. All models will support EN61000-4-5: 2KVA

**H. Voltage Transient Response:** 0nS – Normal mode, <5nS – Common Mode.

**I. Transient Recovery Time:** <25mS.

#### 1.3.4.2 AC Output, UPS Inverter

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

**B. Output Waveform:** True sinewave.

**C. Voltage Regulation:** 120/125VAC (208/240VAC) models: Not to exceed +/-5% until Low Battery Warning.

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

- E. Voltage Distortion:** 120/125VAC models: Not to exceed 5% at full linear load.  
208/240VAC models: Not to exceed 5% at full linear load
- F. Current Distortion:** 120/125VAC models: Not to exceed 5% at 50% linear load.  
208/240VAC models: Not to exceed 5% at 50% linear load.
- G. Load Power Factor Range:** 1.0 to 0.8 lagging without de-rating.
- H. Output Power Factor Rating:** Rated KVA at the following ratings per model:
- 750VA model – 0.8pf  
1000VA model – 0.8pf  
1500VA model – 0.8pf  
2000VA model – 0.88pf  
3000VA model – 0.853pf
- I. Overload Capacity:** AC Mode or DC Mode - All models:
- 110% for 20 seconds until shutdown  
125% for 10 seconds until shutdown  
150% immediate shutdown
- J. Inverter Output Manual Adjustment:** 120, 125VAC (208/240VAC).
- K. Efficiency:** AC Mode >93% at full load, DC Mode >83% at full load.
- L. Dynamic Response:** +/- 10% at 100% load change in 30 milliseconds.
- M. Transfer time:** 6-milliseconds, typical.

### 1.3.4.3 Independent Battery Bypass

The UPS design must allow it to start-up and operate in Normal, Boost, or Buck 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.

## 1.3.5 Output Load Shedding

All models will have output receptacles electrically wired into three independent circuits. Two of the independent circuits must have the ability to be individually controlled via management software or SNMP card. The third circuit will provide continuous output power as long as utility voltage or sufficient battery power is available.

### 1.3.5.1 Load Bank Configurations

120/125VAC models:

- 750VA: (2) programmable receptacle banks of (3) NEMA 5-15R  
(1) always-on bank of (2) NEMA 5-15R
- 1000VA: (2) programmable receptacle banks of (3) NEMA 5-15R  
(1) always-on bank of (2) NEMA 5-15R
- 1500VA: (2) programmable receptacle banks of (3) NEMA 5-15R  
(1) always-on bank of (2) NEMA 5-15R
- 2000VA: (2) programmable receptacle banks of (4) NEMA 5-15/20R  
(1) always-on bank of (1) NEMA L5-20R

- 3000VA: (1) programmable receptacle bank of (4) NEMA 5-15/20R  
 (1) programmable receptacle bank of (3) NEMA 5-15/20R  
 (1) always-on bank of (1) NEMA L5-30R

208/240VAC models:

- 1500VA: (1) programmable receptacle bank of (4) NEMA 6-15R  
 (1) programmable receptacle bank of (2) NEMA 6-15R  
 3000VA: (1) programmable receptacle bank of (4) NEMA 6-15/20R  
 (1) programmable receptacle bank of (2) NEMA 6-15/20R  
 (1) always-on bank of (1) NEMA L6-30R

### 1.3.6 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.

### 1.3.7 Hot-Swappable Batteries

All units must have hot-swappable battery function. When the unit is operating in the normal AC, Boost and Buck modes, 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:** UPS Module: 32°F to 104°F (0°C to 40°C).  
 Battery Module: 32°F to 104°F (0°C to 40°C).
- 1.4.2 Storage/Transport Ambient Temperatures:** 5°F to 113°F (-15°C to +45°C).
- 1.4.3 Relative Humidity:** 0 to 95% non-condensing.
- 1.4.4 Altitude:** Operating: 0 to 3,000 meters (0 to 10,000 feet).  
 Storage/Transport: 0 to 15,000 meters (0 to 50,000 feet).
- 1.4.5 Audible Noise:** 750-1500VA models: ≤45dBA  
 2000 – 3000VA models: ≤60dBA

## 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 UPS Module**

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

### **1.6.2 Battery**

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

## **1.7 QUALITY ASSURANCE**

### **1.7.1 Manufacturer Qualifications**

A minimum of twenty-five 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 and 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 standing vertically or mounting on a wall with appropriate mounting hardware supplied by the manufacturer of the UPS. The UPS enclosure can be mounted horizontally on the floor using brackets 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 shall be constructed of replaceable subassemblies. Any internal battery modules shall be replaceable by removing the front bezel and detaching the retaining bracket.

## **2.1.4 Physical Characteristics of All Models, (H x W x D):**

### **A. Dimensions of All Models:**

750VA: 3.5 inches x 19 inches x 17.4 inches

1000VA: 3.5 inches x 19 inches x 17.4 inches

1500VA: 3.5 inches x 19 inches x 17.4 inches

2000VA: 3.5 inches x 19 inches x 24 inches

3000VA: 3.5 inches x 19 inches x 24 inches

### **B. Physical Weights of All Models:**

750VA: 41.2 lbs.

1000VA: 43.7 lbs.

1500VA: 44.1 lbs.

2000VA: 72.1 lbs.

3000VA: 78.0 lbs.

## **2.1.5 UPS Heat Dissipation, All Models:**

### **A. AC Mode:**

750VA Models: (100 – 150) BTUs

1000VA Models: (150 – 200) BTUs

1500VA Models: (250 – 300) BTUs

2000VA Models: (300 – 350) BTUs

3000VA Models: (500 – 550) BTUs

### **B. Inverter Mode:**

750VA Models: (300 – 350) BTUs

1000VA Models: (400 – 450) BTUs

1500VA Models: (600 – 650) BTUs

2000VA Models: (900 – 950) BTUs

3000VA Models: (1,300 – 1,350) BTUs

## **2.1.6 Cooling**

Cooling of the UPS shall be by forced air. High-quality, variable speed, (which is based on internal UPS temperature), 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. The UPS will also provide an external grounding stud.

## **2.1.8 Input Power Cord**

The UPS shall come included with a power cord of no less than ten (10)-feet in length. The cord for all 120VAC models will be connected to the UPS using a strain-relief assembly. All 208VAC models will be connected to the UPS using an IEC connector input.

**2.1.9 Input Power Plug/Connector****A. 120/125VAC Models:**

750VA: NEMA 5-15P straight blade plug.  
 1000VA: NEMA 5-15P straight blade plug.  
 1500VA: NEMA 5-15P straight blade plug.  
 2000VA: NEMA 5-20P straight blade plug.  
 3000VA: NEMA L5-30P locking plug.

**B. 208/240VAC Models:**

1500VA: IEC320 C14 power inlet connector on the unit with a power cord with an IEC320 C13 to NEMA 6-15P straight blade plug.  
 3000VA: IEC320 C20 power inlet connector on the unit with a power cord with an IEC320 C19 to NEMA L6-30P locking plug.

**2.1.10 Output Power Receptacles****A. 120/125VAC Models:**

750VA: (8) NEMA 5-15R (All battery supported)  
 1000VA: (8) NEMA 5-15R (All battery supported)  
 1500VA: (8) NEMA 5-15R (All battery supported)  
 2000VA: (8) NEMA 5-15/20R, (1) NEMA L5-20R (All battery supported)  
 3000VA: (7) NEMA 5-15/20R, (1) NEMA L5-30R (All battery supported)

**B. 208/240VAC Models:**

1500VA: (6) NEMA 6-15R (All battery supported)  
 3000VA: (6) NEMA 6-15/20R, (1) NEMA L6-30R (All battery supported)

**2.1.11 Telephone/Network Protection**

The UPS shall have a RJ11/45 connector on the rear panel for protecting a single line phone/fax/modem or 10/100-base T network.

**2.1.12 Remote Emergency Power Off (REPO) Port**

The UPS shall have a RJ11 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 pin4 to pin5 for approximately 0.5 seconds in order to shutdown 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.

**2.1.13 External Battery Pack Connector**

All designated extended runtime UPS models will include an Anderson 30-Amp connection port on the rear panel for attaching one or more external battery pack(s). The models included with this feature are listed below:

120/125VAC Models:

E750RTXL2U  
 E1000RTXL2U  
 E1500RTXL2U  
 E2000RTXL2U  
 E3000RTXL2U



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208/240VAC Models:

E1500RTXLT2U

E3000RTXLT2U

## 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 inverter.

#### 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 eight 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  $-3.3\text{mV}/^{\circ}\text{C}$  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 105% and up to 110% of full load current for 20 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 of 110% of its full-load rating for 20 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 Output Power Transformer**

A dry-type power transformer shall be provided for the AVR AC output only. It shall have copper wiring exclusively. The transformers hottest spot winding temperature shall not exceed the temperature limit of the transformer insulation class of material when operating at full load at maximum ambient temperature.

### **2.2.2.5 Inverter Output Voltage Adjustment**

The inverter shall have adjustable output voltages of 120 and 125VAC (208/240VAC).

### **2.2.2.6 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.

### **2.2.2.7 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).

### **2.2.2.8 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.

### **2.2.2.9 Output Frequency**

The output frequency of the inverter shall be microprocessor controlled. The microprocessor shall regulate the inverter output frequency to +/- 0.1% for steady state and transient conditions. Total frequency deviation, including short time fluctuations and drift, shall not exceed 0.1% 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 display panel will include dedicated display icons for the following information:
- AC Normal
  - AVR Mode (Boost and Buck) – The AC Normal icon will flash off and on
  - On Battery
  - Overload
- B. 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
  - Connected Load Capacity
  - Battery Capacity
  - Estimated runtime in the AC and DC modes
  - Site Wiring Fault (display SWF icon)
  - 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 a Weak/Bad or disconnected battery and 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 120/125VAC models, the input power cord must be removed from AC utility power. The 208/240VAC models have an input circuit breaker that must be turned off to completely shut off the UPS unit.

### **2.2.3.4 Power Monitoring Software**

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

### **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 9-pin D-shell connector shall also provide simulated contact closure, for AC Fail and Low Battery Warning alarms. The UPS will also have a USB port for connecting a USB cable between the UPS and a computer for USB communications. Both the RS232 and USB ports must be capable of operating simultaneously.

### **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, the Overload icon will flash off and on and the LCD will display corresponding error code, if the unit senses an overload on the output. The alarm will turn off if the overload load is removed.
- The alarm will sound 3 beeps every five minutes, the Weak/Bad/Disconnected battery icon will turn on, and the LCD will display corresponding error code if the battery is Weak/Bad or disconnected. 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 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 Optional SNMP Card, (For all models):**

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 I.P. 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 an unlimited number of UPS, using installed SNMP cards, through a single management window on a networked computer platform.

#### **2.2.4.2 Programmable Relay Card, (For all models):**

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 10/2000/XP/2003/7 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.

## **2.2.5 External Battery Packs, (For extended runtime models only):**

External battery packs will be designed and built specifically to maintain the same look and feel of the UPS models defined herein. The internal batteries in the battery pack will accept charging current either from the UPS or via an internal charger.

### **2.2.5.1. UPS connector**

The battery pack must use a 30-Amp Anderson connection for attachment to the UPS.

### **2.2.5.2 AC Input Connector**

The battery pack (s) shall have an IEC 320 AC input connector for the internal chargers.

### **2.2.5.3 Circuit Breaker**

The battery pack (s) shall have a 40Amp DC circuit breaker for over-current protection and to serve as a DC disconnect device.

### **2.2.5.4 Construction and mounting**

The battery pack enclosure shall be adaptable for standing vertically or mounting on a wall with appropriate mounting hardware supplied by the manufacturer of the battery pack. The battery pack enclosure can be mounted horizontally on the floor using brackets 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 battery pack shall be constructed of replaceable subassemblies. Any internal battery modules shall be replaceable by removing the front bezel and detaching the retaining bracket.

### **2.2.5.5 Physical Characteristics of All Models:**

#### **A. Dimensions: (H x W x D):**

36VDC Battery Pack: 3.5 inches x 19 inches x 17 inches

72VDC Battery Pack: 3.5 inches x 19 inches x 17 inches

#### **B. Physical Weights of All Models:**

36VDC Battery Pack: 52.2 lbs.

72VDC Battery Pack: 56 lbs.

#### **C. Internal charger**

The external battery pack will contain an independent, 2.4-Amp internal battery charger. The charger can accept an external power via an input power cord supporting either 115VAC or 230VAC input power, selectable via a dip switch on the rear panel.

#### **D. Internal Battery Configurations**

36VDC: (6) 12-volt, 7 Amp/hour batteries

72VDC: (6) 12-volt, 9 Amp/hour batteries

### **3.0 Manufacturers Warranty and Service**

#### **3.1 Manufacturer's Warranty Procedure**

Within the first thirty-six (36) months, 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.