CSI 263353.02EDRTHV – Static Uninterruptible Power Supply Systems
Endeavor Series

MINUTEMANUPS
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.

- cUL (Conforms to UL1778 5th edition, CSA 22.2 No. 107.3-05)
- CFR 47 FCC Part15 Subpart B, Class A
- ISO9001 & 14001
- IEC61000-4-2 (Level 3)
  Contact discharge（-Level 2：4KV）
  Air discharge（Level 3：8KV）
- 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
  IEC/EN-62040-2
  Susceptibility IEC61000-4-5 (Level 4)
- EN50091-2: 1995 Class A
- IEC/EN-62040-2
- CE compliance.
- ISTA 1A compliance
- RoHS2 WEEE 2011/65/EU Directive
- Energy Star 2.0 (208VAC input/output models)

The UPS must be cUL listed per UL Standard 1778, and shall be CE compliant.

1.3 SYSTEM DESCRIPTION

1.3.1 Module-based Design

1.3.1.1 Topology - The UPS system will be a double-conversion, online design, manufactured using a module-based concept. The UPS system will consist of a minimum (1) UPS module with an internal battery set. Additional configurations will support the use of optional external battery pack modules and isolation transformer modules.

1.3.1.2 Standard Voltage Settings: Input/output voltage specifications of the UPS, operating in AC mode, shall be: (The voltages in parenthesis are for the high voltage models):

Input: 208, 220, 230, 240VAC, single-phase, two-wire plus ground
Output: 208, 220, 230, 240VAC), single-phase, two-wire plus ground

1.3.1.3 Output Load Capacities: The specified output load capacity of the UPS shall be as follows:

5,000VA – 4,500 Watts
6,000VA – 5,400 Watts
8,000VA – 7,200 Watts
10,000VA – 9,000 Watts

1.3.2 Design Requirements – Batteries

1.3.2.1 Battery Type: Maintenance-free, sealed, non-spillable, lead acid, valve regulated.

1.3.2.2 Battery Cells: 6 cells per battery 1.67V per cell minimum

1.3.2.3 Reserve Time: Minimum 3-minutes at full load, minimum 11-minutes at half load, with ambient temperature between 20° and 30° Celsius.

1.3.2.4 Recharge Time (Internal batteries): 8-hours to 90% capacity after a full discharge.

1.3.3 Modes of Operation

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

1.3.3.1 AC Normal 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.

1.3.3.2 On Battery Mode - Upon the failure, undervoltage or overvoltage of input utility AC power, the connected AC load is supplied power by the UPS switching from the On-Line Mode to Battery Mode while using internal batteries and any optional external battery packs. There shall be no interruption in power when switching from On-Line Mode to Battery Mode. When utility AC power returns to a nominal level, the UPS will return to On-Line Mode with no interruption of power to connected devices and will begin recharging the internal batteries.

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1.3.3.3 Economy Mode – The UPS has the capability to be manually converted to 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 internal batteries. Upon the failure, undervoltage or overvoltage of input utility AC power, the UPS will transfer to On Battery Mode, to supply power to any connected equipment. When utility AC power returns to a nominal level, the UPS will automatically transfer back to Economy Mode, supplying power to connected devices and recharging the internal batteries.

1.3.3.4 Bypass Mode - During bypass operation, the utility power bypasses the inverter circuitry of the UPS 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.

A. Automatic Internal Bypass: Automatically activates when the UPS, in AC Normal Mode, detects an internal hardware or battery failure or overload.

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

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

1.3.3.6 CVCF Mode – When enabled, the UPS will operate as a frequency converter by locking the output frequency to either 60Hz or 50Hz when powering on the UPS regardless of the input utility frequency within the range of 46Hz to 64Hz. The CVCF Mode will not operate while in Bypass Mode.

2.0 PERFORMANCE REQUIREMENTS

2.1 AC INPUT TO UPS

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

2.1.2 Input: All models will provide a three-wire input terminal block for hardwire connection. 5,000VA and 6,000VA models will come with an optional strain-relief, six-foot input power cord with a standard NEMA input plug included with the UPS. The NEMA input plug of the power cord must be rated to tolerate the maximum input current of the UPS per UL1778 regulations:

5,000VA models – Hardwire or NEMA L6-30P
6,000VA models – Hardwire or NEMA L6-30P
8,000VA models – Hardwire only
10,000VA models – Hardwire only

2.1.3 Voltage Range (Non-Battery mode): With connected load greater than 50% capacity.

5,000 – 6,000VA models:	156 – 280VAC (-5/+14V)
8,000– 10,000VA models:	180 – 280VAC (-5/+14V)

2.1.4 Frequency:

Default: Auto-Select 50/60Hz (±3Hz)
Generator Mode: 40-70Hz (±6Hz)

2.1.5 Input Voltage Sensitivity Adjustment: When nominal input utility AC voltage maintains consistent levels at or near the thresholds of the UPS nominal input voltage window, causing to UPS to continuously switch between AC Normal and Battery modes, the UPS will have the capability to adjust the nominal input voltage window by +1 /-1 volt for up to a maximum of 10 volts. This adjustment setting will be accessible through the LCD display and control panel on the front of the UPS.

2.1.6 Inrush Current:

5,000VA models –200A Max Amps for 10 mS
6,000VA models –200A Max Amps for 10 mS
8,000VA models –200A Max Amps for 10 mS
10,000VA models –200A Max Amps for 10 mS

2.1.7 Current Limit:

5,000VA models – 50A Amp input circuit breaker
6,000VA models – 50A Amp input circuit breaker
8,000VA models – 63A Amp input circuit breaker
10,000VA models –63A Amp input circuit breaker

2.1.8 Current Distortion (All Models): Not to exceed 2% at 100% linear load.

2.1.9 AC Leakage Current: <3.5mA at full rated non-linear load

2.1.10 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.

2.1.11 AC Surge Energy Protection: All models will sustain input surges without damage per the IEEE C62.41 Cat. A1 standard. All models will support EN61000-4-5: 4KV

2.1.11.1 Metal Oxide Varistors: The UPS shall have Metal Oxide Varistors for surge energy protection with a minimum rating of 980 Joules.

2.1.11.2 Input Common Mode Choke: All units must have an Input common mode choke.

2.1.11.3 Voltage Transient Response: 0ns (instantaneous) Normal mode; <5ns common mode

2.1.11.4 Transient Recovery Time: <200mS.

2.2 OUTPUT OF UPS

2.2.1 Wiring Configuration: Single-phase, 2-wire plus ground

2.2.2 Output Waveform (All Modes): Pure Sinewave

2.2.3 Voltage Regulation:

2.2.3.1 AC Normal Mode: 208,220,230,240VAC (±1%)

2.2.3.2 Battery Mode: 208,220,230,240VAC (±1%) Until Low Battery Warning

2.2.3.3 ECO Mode: 208,220,230,240VAC
±10% of the rated input voltage Bypass to Inverter
±7% of the rated input voltage Inverter to Bypass

2.2.3.4 Bypass Mode: 208,220,230,240VAC (155VAC – 260VAC)

2.2.4 Frequency:

2.2.4.1 Normal Mode: 50/60Hz ±3Hz unless synchronized to the line.

2.2.4.2 Battery Mode: 50/60Hz ±0.1Hz unless synchronized to the line.

2.2.4.3 ECO Mode: 50/60Hz ±3Hz unless synchronized to the line.

2.2.4.4 Bypass Mode: 50/60Hz ±3Hz unless synchronized to the line.

2.2.4 Voltage Distortion: Not to exceed 2% at full linear load or 4% on a full non-linear load.

2.2.5 Current Distortion (All Modes): Not to exceed 4% at full linear load.

2.2.7 Dynamic Response: ±10% at 100% load change in 30ms

2.2.8 Load Power Factor Range (All Modes): 1.0 to 0.9 lagging without de-rating.

2.2.9 Output Power Factor Rating (All Modes): 0.9pf

2.2.10 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.

2.2.11 Overload Capacity: All models and all modes

2.2.11.1 On-line Mode: The UPS will provide limited operation while in Overload. When crossing the thresholds as defined in the table below, the UPS will transfer to Bypass Mode, when nominal utility power is present, and provide an audible and visual alarms until the overload condition is removed.

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

2.2.11.2 Battery Mode: The UPS will provide limited operation while in Overload. When crossing the thresholds as defined in the table below, the UPS will shut down operation. To remove the alarm, the overload must be removed and the UPS restarted.

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

2.2.12 Output Voltage in Battery Mode: 208, 220, 230, 240VAC (±1%) until low battery warning

2.2.13 Inverter (On-Battery) Output Voltage Adjustment: The Inverter (On-Battery) output voltage setting can be adjusted to 208, 220, 230 or 240VAC through the use of menu option on the front panel LCD touchscreen.

2.2.14 Efficiency:

2.2.13.1 AC Mode: 93% (Maximum) at full rated non-linear load

2.2.13.2 Battery Mode: 91% (Maximum) at full rated non-linear load

2.2.13.3 ECO Mode: 97% (Maximum) at full rated non-linear load

2.2.13.4 CVCF Mode: 92% (Maximum) at full rated non-linear load

2.2.14 Transfer time: 0 milliseconds

2.2.15 Crest Factor:

5,000– 6,000VA models: 3.0 : 1
8,000– 10,000VA models: 2.7 : 1

2.2.17 Slew Rate: ≤1Hz / Second

3.0 COMPONENTS

3.1 CHARGER

3.1.1 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 and temperature-compensating control circuitry.

3.1.1 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.

3.1.2 Automatic Restart – The UPS must, even after achieving a Low Battery Cut-Off (LBCO) shutdown during an input power failure, automatically restart and resume providing output power while operating in the battery recharge mode once input AC power is returned.

3.1.3 Battery Recharge Time - The internal battery charger must be capable of producing a charging current sufficient to replace 90% of the capacity of a fully-discharged internal battery set within 8 hours of the resumption of input AC power. Once the internal battery set is fully recharged, the charger shall provide a float charge current in order to maintain a full battery charge until the next emergency operation.

3.1.4 Overvoltage Protection – The UPS Module will include a charger over-voltage protection circuit. This circuit will disengage and shut down the charger when the charger voltage rises to a maximum pre-set limit and will issue a corresponding audible and visual fault alarm.

3.1.5 Charge Current:

3.1.5.1 Standard Charge Mode: 0.125 times the Amp-hour rating of the internal batteries. (Example: a 7.2Amp-hour battery should have a charge current of 0.90Amps at 25ºC.)

3.1.5.2 Float Mode: 0.0625 times the Amp-hour ratings of the internal batteries. Example: a (7.2Amp-hour battery should have a charge current of 0.45Amps at 25ºC.)

3.1.6 Temperature Compensation - The charger voltage will vary according to the internal ambient temperature of the UPS Module. That variance will be defined as -3.3mV/°C per cell using 12V batteries.

3.2 INVERTER

3.2.1 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.

3.2.2 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.

3.2.3 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.

3.2.4 Inverter Output Voltage Adjustment - The inverter shall have adjustable output voltages of 208, 220, 230, 240VAC.

3.2.5 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.

3.2.6 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).

3.2.7 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.

3.2.8 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

3.3 DISPLAY AND CONTROLS

3.3.1 Monitoring - 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 multi-colored, touch-screen LCD display and a LED status bar located on the front panel that provides the following:

3.3.2 LCD Display– The front panel LCD display will be a multi-colored, pressure-sensitive touchscreen, menu-based display used for the monitoring and control of the UPS.

3.3.2.1 Home Screen - The main home screen of the LCD display will provide real-time information on the following data 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

3.3.2.2 Mode of Operation – The LCD display will provide a real-time display of the condition of the UPS:

- AC Normal Mode
- Battery Mode
- Bypass Mode
- ECO Mode
- Emergency Power Off
- Fault (display Error and Warning icon)

3.3.2.2 Alarm Messages – All alarm messages will be displayed via the front panel LCD touchscreen display. This includes UPS status conditions that trigger system alarms, battery warning stages and internal fault conditions. A full list of alarm messages must be provided in the product documentation.

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

3.3.2.4 UPS Configuration: Using the front panel LCD touchscreen display, the User will be able to configure all functions and capabilities of the UPS.

3.3.2.5 UPS Event Log - The UPS will be able to report an event log that includes input warnings and a UPS fault log through the front panel LCD display.

3.3.2.6 UPS Model and Battery Information - The LCD display will provide detailed information about the UPS including Model and Serial Number information, Battery configuration and install date and the firmware revision used by the UPS.

3.3.2.7 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 control panel is pressed. Once the UPS reaches a LBW, or a fault condition occurs, the alarm will re-activate and will not be able to be muted. Once the UPS transfers to the AC mode the alarm will be reset to default.

3.3.3 LED Status Bar – The UPS will have a multi-color front panel LED Status bar that provides a reference to the current condition and operation mode of the UPS.

3.3.3.1 Green – When green, the UPS is operating in AC Normal Mode

3.3.3.2 Orange – When Orange, the UPS is operating in Battery Mode. When the UPS goes to Low Battery Warning, the LED bar will begin flashing.

3.3.3.3 Red – When Red, the UPS has detected an internal fault or battery fault.

3.3.4 Communications Ports - The UPS will feature two serial-based communication ports on the back panel of the UPS, one RS232 port and one USB port. Both ports will be able to operate simultaneously. The ports must also be capable of operating simultaneously with the Option Card slot.

3.3.4.1 RS232 Port: 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.

3.3.4.2 USB Port: The UPS will have a 2.0 Type B female USB port for connecting a USB cable between the UPS and a computer for USB communications.

3.3.5 Power Monitoring Software - The UPS must be compatible with SentryHD™ Power Monitoring Software which is used to report important status information concerning the UPS and the utility power.

3.3.6 Option Card Slot – The UPS will come with an option card slot, located on the back panel, that is compatible with multiple communication card types.

3.3.7 Remote Emergency Power Off (REPO) Port: The UPS shall have a Dinkle ECH350R-02P EPO 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 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.

3.3.8 External Battery Pack Detection Port: Connecting the External Battery Detection cable from the UPS to the Battery Pack allows the UPS to automatically detect the External Battery Pack. Once the UPS detects that there is an External Battery Pack connected it will automatically recalculate the estimated runtime based on the number of External Battery Packs detected and the attached load on the UPS. **NOTE:** The External Battery Pack can also be set through the LCD screen, the Power Monitoring Software, or the SNMP card.

3.3.9 Output Load Shedding: All models must have output receptacles electrically wired into independent circuits. Each independent circuit must have the ability to be individually controlled via the LCD display, SentryHD software, and/or the SNMP card. Terminal block output will provide continuous output power as long as utility voltage or sufficient battery power is available.

3.4 INTERNAL BATTERY SYSTEM

3.4.1 Internal Battery Configurations

5,000VA Model:	(16) 12V/5.0Ah
6,000VA Model:	(16) 12V/5.0Ah
8,000VA Model:	(16) 12V/10.0Ah
10,000VA Model:	(16) 12V/10.0Ah

3.4.2 Accepted Battery Manufacturers:

BB Batteries
CSB Batteries
YUASA Batteries

3.4.3 Low Battery Thresholds: UPS runtime in Battery Mode is determined by a combination of connected loads and the voltage of the internal and connected batteries. The Low Battery Warning Alarm can be adjusted by the User by changing the Low Battery thresholds using the front panel LCD display, SentryHD software or SNMP network card.

3.4.3.1 Low Battery Warning (Time between LBW and LBCO):

2 minutes (-15sec/+ 4min)
2 minutes (-15sec/+12min) at output load <10% load

3.4.3.2 Low Battery Cut-off: 1.75V/Cell (±3%)

3.4.4 DC Leakage Current: <30mA (±10mA) with no AC applied and the unit in the off position

3.4.5 Battery Module Connector: All UPS models must use a 2-pin Anderson connector for attaching internal battery modules to the electronics of the UPS.

3.4.6 Battery Module Connection: All UPS will ship from the manufacturer with the internal battery modules disconnected. The process to connect the internal modules during installation will require only the removal of the front panel battery door and will not require the use of any tools.

3.4.7 Hot-swappable Batteries: All units must have hot-swappable battery function. When the unit is operating in AC Normal, Bypass, ECO or CVCF modes, the user must be able to replace the batteries without turning off the UPS.

3.4.8 Battery Module Replacement: All battery modules must be removeable and replaceable via the front panel of the UPS. The battery door and module retention bracket must be removeable without the use of any tools.

3.4.9 Independent Battery Bypass: The UPS design must allow it to start-up and operate in AC Normal, ECO or CVCF modes, with utility AC power available when the internal batteries, (and the 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 to replace the internal batteries or external battery packs.

4.0 PRODUCT FABRICATION

4.1 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.

4.1.1 **Case:** All UPS will be manufactured using a metal case with a two-piece plastic front panel, including a removeable battery door. Each UPS will come with 19-inch rackmount ears installed as standard for installation in a cabinet and/or rack. Vertical (Tower), floor-mount installation is possible with optional hardware included in the original packaging.

4.1.2 **Front Panel:** The front panel assembly of the UPS will be manufactured of ABS plastic. The assembly will include a removeable battery door, LCD display and control panel insert. The battery door shall be removeable without the use of any tool. The LCD and control panel insert shall be rotatable, without the use of tools, to appropriately orient it based on horizontal or vertical installation.

4.1.3 **Rear Panel:** The rear panel of the UPS will be constructed of a metal panel and must include the following connections:

4.1.3.1 **Electrical Output Connections** - All UPS modules will include output power connections as defined in the table below:

5,000VA	(3) NEMA L6-30R, (2) NEMA L6-20R, (1) 208-240V Hardwire Terminal
6,000VA	(3) NEMA L6-30R, (2) NEMA L6-20R, (1) 208-240V Hardwire Terminal
8,000VA	(4) NEMA L6-30R, (2) NEMA L6-20R, (1) 208-240V Hardwire Terminal
10,000VA	(4) NEMA L6-30R, (2) NEMA L6-20R, (1) 208-240V Hardwire Terminal

4.1.3.2 **Electrical Input Connection**

5,000VA	6-foot 10 AWG power cord terminated with NEMA L6-30P 6 AWG power cord when terminated using a hardwire connection.
6,000VA	6-foot 10 AWG power cord terminated with NEMA L6-30P 6 AWG power cord when terminated using a hardwire connection.
8,000VA	3-wire terminal block using a 6 AWG cord
10,000VA	3-wire terminal block using a 6 AWG cord

4.1.3.3 **Electrical Protection** - All Models

Input circuit breaker

Earth-grounding lug

4.1.3.4 Communications

Option card slot

RS232 serial communication port (DB9 connector)

Female USB Type B connector

Dinkle 2 Pin remote emergency power off port

Dinkle 3 Pin External Battery Pack detect port (EXB)

4.1.3.4 Other

External battery pack connection

Internal cooling fan opening

4.2 APPEARANCE

4.2.1 **Color:** The metal portion of the UPS case shall be powder-coated using Pantone color process number B. The front panel ABS plastic assembly shall be of the same color.

4.2.2 **Printing:** The front and rear panels of the UPS shall contain white silkscreened printing.

- Front Panel: The front panel will contain the Manufacturer's logo and LED On/Off icon.
- Rear Panel: The rear panel will contain silkscreen descriptions for all ports and connectors.

4.2.3 **Labels:** All UPS will contain the following product labels:

- A yellow Battery Disconnect warning label across the top cover of the UPS
- Model Information/Ratings label on top cover of UPS
- Regulatory/Warning label on top cover of UPS
- Scannable serial number on rear panel of UPS

4.3 WIRING

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

4.4 CONSTRUCTION

The UPS shall be constructed of replaceable subassemblies, including internal battery modules. Battery modules must be replaceable by removal the front bezel and detaching the retaining bracket without the use of tools.

4.5 MOUNTING

The UPS enclosure shall be adaptable for mounting vertically or horizontally with the appropriate installation hardware. The UPS will come with rackmount brackets pre-installed and four-post rail kits included for default installation in four-post racks or cabinet. The UPS will have variations of installation formats to include:

4.5.1 **Four-post Rack/Cabinet Installation:** The UPS must be compatible with four-post cabinet and/or rack installations. A four-post rail kit will be included with the UPS.

4.5.2 Floor Mount: All UPS models will include brackets to allow for vertical installation on a floor or platform. The brackets must be expandable when the UPS is partnered with external battery packs.

4.6 UPS SYSTEM

4.6.1 Physical Characteristics

A. Dimensions (L x W x H)

5,000VA	23.27" x 17.24" x 6.81" (591*438*173 mm)
6,000VA	23.27" x 17.24" x 6.81" (591*438*173 mm)
8,000VA	28.74" x 17.24" x 8.54" (730*438*217 mm)
10,000VA	28.74" x 17.24" x 8.54" (730*438*217 mm)

B. Weights

5,000VA	122.32 lbs. (55.5 Kgs.)
6,000VA	122.32 lbs. (55.5 Kgs.)
8,000VA	170.81 lbs. (77.5 Kgs.)
10,000VA	170.81 lbs. (77.5 Kgs.)

4.7 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.

5.0 ENVIRONMENTAL CONDITIONS

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

5.1 AMBIENT ENVIRONMENTAL RANGES

5.1.1 Operating Temperature: 32ºF to 104ºF (0ºC to 40ºC).

5.1.2 Storage/Transport Ambient Temperatures: 5ºF to 122ºF (-15ºC to +50ºC).

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

5.1.4 Operating Altitude: Operating: 0 to 2,000 meters (0 to 6,562 feet).

5.1.5 Storage Altitude: Storage/Transport: 0 to 15,000 meters (0 to 49,213 feet).

5.1.6 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.

5.3 UPS HEAT DISSIPATION

5.3.1 AC Normal Mode:

5000VA Models:	1336 BTUs
6000VA Models:	1603 BTUs
8000VA Models:	2137 BTUs
10000VA Models:	2671 BTUs

5.3.2 Battery Mode:

5000VA Models:	1519 BTUs
6000VA Models:	1823 BTUs
8000VA Models:	2430 BTUs
10000VA Models:	3038 BTUs

6.0 ACCESSORIES

6.1 ISOLATION TRANSFORMER MODULE

The UPS must be compatible for use with separate Isolation Transformer Modules. The Isolation Transformer Modules will be available in two capacities, 3,000VA and 5,000VA, with each providing a physical break between the primary and secondary windings which prevent it from transferring unwanted noise from the input circuit to the output windings.

6.1.1 Cooling - Cooling of the Isolation Transformer Module must be by forced air. High quality fans shall be used to minimize audible noise.

6.1.2 Grounding - The Isolation Transformer chassis must provide proper grounding to all output receptacles and/or terminal blocks for reducing the risk of electrical shock hazard.

6.1.3 Input Power Connection - All Isolation Transformer Modules must have a strain-relief, 1.9-foot input power cord. The cord will have a minimum size of 10 AWG The input cord will be terminated with a NEMA L6-30P input connection.

6.1.4 Output Power Connections – The Isolation Transformer Modules must have the following output connections:

3,000VA	(8) NEMA 5-15/20R
5,000VA	(2) NEMA L5-30R, (4) NEMA 5-15/20R, (1) 110-120V Hardwire Terminal

6.1.5 Voltage Input Adjustment – All Isolation Transformer Modules will be selectable between 208, 220, 230 and 240V.

6.1.6 Physical Characteristics

6.1.6.1 Dimensions (L x W x H)

3,000VA	23.82" x 17.24" x 3.41" (605*438*86.5 mm)
5,000VA	23.82" x 17.24" x 3.41" (605*438*86.5 mm)

6.1.6.2 Weight

3,000VA	88.16 lbs. (40.0 Kgs.)
5,000VA	121.22 lbs. (55.0 Kgs.)

6.2 BATTERY PACK MODULE

All UPS models must have the capability to connect an unlimited number of external battery packs in daisy-chain fashion for the purpose of providing extended electrical power support of connected loads to the UPS during prolonged blackouts or extreme brown-out and surge events.

6.2.1 **DC Output Connector:** All compatible external battery packs will include an 18-inch, strain-relief output connection cord with a 6-pin Anderson 50-Amp connection plug. The Anderson connector on each battery pack will connect to a compatible UPS model or a successive, daisy-chained battery pack string, attached to the UPS.

6.2.2 **AC Input Connector:** All compatible external battery packs will have an IEC320-C14 connection on the rear panel for the purpose of attaching a bundled 6-foot IEC320 C13 to NEMA 5-15P AC input power cord.

6.2.3 **DC Input Connector:** All compatible external battery packs must include a 6-pin Anderson 50-Amp connection plug for the purpose of attaching additional battery packs in a daisy-chain format. The port must clearly be labeled and identified as the input port.

6.2.4 **AC Input Breaker:** All compatible external battery packs will include a 10-Amp rated, resettable input circuit breaker for over current protection.

6.2.5 **DC Circuit Breaker:** All compatible external battery packs will include a 50-Amp rated, output circuit breaker for over-current protection and to serve as a DC disconnect device.

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6.2.6 **External Battery Pack Detection Port (EXB):** Connecting the External Battery Detection cable from the UPS to the Battery Pack allows the UPS to automatically detect the External Battery Pack. Once the UPS detects that there is an External Battery Pack connected it will automatically recalculate the estimated runtime based on the number of External Battery Packs detected and the attached load on the UPS. **NOTE:** The External Battery Pack can also be set through the LCD screen, the Power Monitoring Software, or the SNMP card.

6.2.7 **Internal Battery Configurations:** All external battery packs will come with pre-assembled, internal battery modules, which can be removed and/or installed by the user without the need of certified electricians. The battery packs will consist of the following individual battery configurations:

BP192V5CRTXL: (16) 12V/5Ah VRLA batteries
BP192V10CRTXL: (16) 12V/10Ah VRLA batteries

6.2.8 **Internal Battery Module Connector:** All external battery pack models must use a 2-pin Anderson connector for attaching internal battery modules to the electronics of the battery pack.

6.2.9 **Internal Battery Module Connection:** All external battery packs will ship from the manufacturer with the internal battery modules connected.

6.2.10 **Internal Battery Pack Charger:** All external battery packs will include an independent, internal battery charger. The battery packs will have the capability to charge the internal batteries from the internal charger or the UPS charger.

6.2.10.1 The internal battery pack chargers will support utility input. The rated input voltage range of each battery pack will be:

BP192V5CRTXL: 120 - 300VAC
BP192V10RTXL: 120 - 300VAC

6.2.10.2 **Charge Current:** The internal battery pack chargers will provide charge current to its internal batteries and any connected downstream battery packs that are not using utility power and internal battery pack chargers. The rated charge current of each battery pack will be:

BP192V5CRTXL: 0.625Amps +/-15%
BP192V10CRTXL: 1.25Amps +/-15%

6.2.11 Construction and Mounting: All battery packs will be manufactured using a metal case with a plastic front panel, including a removeable battery door cover. Battery Pack modules will come with 19-inch rackmount ears installed and 4-post rail kits as standard for installation in a cabinet and/or rack. Vertical (Tower), floor-mount installation is possible with optional hardware included in the original packaging.

6.2.12 Physical Characteristics:

6.2.12.1 Dimensions (L x W x H):

BP192V5CRTXL: 27.20" x 17.24" x 3.41" (691*438*86.5 mm)
BP192V10CRTXL: 28.0" x 17.24" x 5.14" (711*438*130.6 mm)

6.2.12.2 Physical Weights:

BP192V5CRTXL: 98.08 lbs. (44.5Kgs.)
BP192V10CRTXL: 135.55 lbs. (61.5 Kgs.)

6.3 SNMP-BASED NETWORK CARD

The UPS must come equipped with an internal SNMP adapter card slot located on the back panel of the unit, which will connect the UPS directly to any I.P. based network using Ethernet communications. The network card must provide access to information about the status and condition of the UPS remotely over the designated network. In addition, the UPS will be accessible for assigned individuals to configure and manage the operation and performance of the UPS over the network. Aspects and details of the management capability are defined by, and limited to, the capability of the SNMP-based network card used on the UPS.

6.4 PROGRAMMABLE RELAY CARD

A Programmable Relay Card MUST be provided, as an option, to the UPS. The Programmable Relay Card is installed using the internal card slot in the UPS. This card will provide a configurable dry-contact closure communication port between the UPS and an attached device. Aspects and details of the management capability are defined by, and limited to, the capability of the relay card used on the UPS.

7.0 WARRANTY

7.1 PRODUCT WARRANTIES

The manufacturer must warrant the UPS, Isolation Transformer and Battery Pack Modules against defects in materials and workmanship for 36 months from purchase date or 42 months from date of manufacture, whichever period expires first.

7.2 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.

7.3 MANUFACTURERS 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.

8.0 QUALITY ASSURANCE

8.1 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 and ISO14001 certified.

8.2 FACTORY TESTING

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

8.3 MEAN TIME BETWEEN FAILURE

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

9.0 SUBMITTALS

9.1 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.

9.2 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.