



Product Specifications

**Guide Specification for TreStar® 924
40-75 kW
Three-Phase
Emergency Lighting
Uninterruptible Power System**

4-1-2009

SECTION 1.0 SCOPE AND SYSTEMS RATING

1.1 Specification

This Specification defines the electrical and mechanical characteristics and requirements for a continuous duty, three phase, uninterruptible power system. This system shall utilize "true on-line" transistor based pulse width modulated (PWM) inverter incorporating Isolated Gate Bipolar Transistor (IGBT) technology. The inverter is a microprocessor controlled, solid-state device within the uninterruptible power system. The uninterruptible power system, hereafter referred to as the UPS, shall provide high quality AC power for sensitive electronic equipment loads.

The UPS shall consist of a rectifier/charger, battery, inverter, protective devices, static transfer switch, synchronizing and phase lock circuitry, and controls required to provide regulated, uninterrupted, conditioned power to the critical load.

The UPS shall include all mechanical and electrical devices that will automatically provide continuity of electrical power within the defined limits without interruption upon failure or degradation of the commercial power source. Continuity of conditioned electric power shall be maintained for the defined period of time by the battery system. Upon return of the utility power source, the UPS shall automatically assume the load, while simultaneously recharging the batteries.

1.2 Modes of Operation

The UPS shall be designed to operate as an on-line reverse transfer system in the following modes:

1.2.1 Normal:

The critical AC load is supplied continuously by the inverter. The rectifier/charger derives power from a utility AC source and supplies DC power to the inverter while simultaneously float charging a battery system. The inverter converts the DC power into clean and regulated AC power that is then supplied to the critical load through the static transfer switch.

1.2.2 Emergency:

Upon failure or degradation of the utility AC power, the critical AC load supplied by the inverter will draw its power from the batteries. There shall be no interruption of power switching from utility AC power to batteries or while switching from batteries back to utility AC power upon its restoration. While the battery powers the UPS, indication for actual battery backup time shall be provided.

1.2.3 Recharge:

Upon restoration of utility AC power, even if the batteries are completely discharged, the UPS will restart. The rectifier/charger shall "walk-in" and gradually assume the inverter and battery recharge loads. If the bypass source is within acceptable limits, the UPS will retransfer the critical load back to the inverter.

1.2.4 Bypass:

When the inverter overload capacity is exceeded, the static transfer switch shall perform a transfer of the load from the inverter to the bypass source with no interruption in power to the critical load.

1.2.5 Maintenance Bypass:

If for some reason the UPS has to be taken out of service for maintenance or repair, the UPS shall be provided with an internal maintenance bypass switch to enable a load transfer from the inverter to the bypass source with no interruption of power to the critical load. Bypass isolation shall be complete, all serviceable components are to be isolated: i.e. over-current protective devices, rectifier, inverter, static switch and transformers.

1.3 System Ratings

1.3.1 UPS Unit

Input / Output Voltages: Specification for the UPS shall be:

For 50 kVA (SE3050/50-xx):

Primary input: 480Vac, three-phase, 3-wire (plus ground), 208Vac, three-phase, 3-wire (plus ground) input is available as an option.

UPS Output: 208Y/120Vac or 480Y/277Vac available

For 65 and 75 kVA (SE3075/65-xx; SE3075/75-xx):

Primary input: 480Vac, three-phase, 3-wire (plus ground). 208Vac, three-phase, 3-wire (plus ground) input is available as an option.

UPS Output: 208Y/120Vac or 480Y/277Vac available

NOTE: Specify input/output voltage requirements at time of order for all modules.

1.3.1.2 Output Load Rating: Specification for the UPS shall be:

SE3050/40, 40kW / 40kVA
SE3050/50, 50kW / 50kVA
SE3075/65, 65kW / 65kVA
SE3075/75, 75kW / 75kVA

1.3.1.3 Battery

The battery shall be of the valve regulated lead acid type, comprised of enough multi-cell batteries to meet the DC voltage levels of the UPS.

240 cells for SE3050/XX and SE3075/XX

1.3.1.4 Battery Cabinet:

The battery cabinet shall be constructed of the same materials used in the UPS cabinetry and shall be of the "line-up-and-match" type. The battery cabinet shall include slide-out shelves for mounting of the batteries and to provide access for ease of maintenance. A fuse will be utilized for short-circuit protection. (Battery racks are available as an alternative to using battery cabinets.)

SECTION 2.0 GENERAL REQUIREMENTS

2.1 System Description

2.1.1 Rectifier/Charger

The rectifier section of the power converter module shall utilize fast acting Silicon Controlled Rectifiers (SCR's). This device shall be a six-pulse, phase-controlled, solid-state device. It shall be capable of receiving utility input and rectifying it to produce Direct Current (DC) power at levels sufficient enough to supply the load via the inverter, and recharge the battery.

2.1.1.1 Input Protective Devices:

The rectifier/charger shall include protection against primary power surges, (except for lightning transients) and under or over voltage conditions. This protection is provided via Circuit Breakers, Fuses, and Microprocessor Control of the rectifier/charger.

2.1.1.2 Filtering:

Sufficient filtering of the rectifier/charger output shall be provided to prevent damage to the battery. Ripple voltage shall not exceed 2% RMS. Voltage variation shall not exceed 1% at any load condition 0 -100%.

2.1.1.3 In-Rush Limiting:

The rectifier/charger shall be equipped with a "walk-in" feature. When the primary power is applied to the rectifier/charger, the current surge shall be limited to 25% of the full rated output current and shall gradually increase to full load rating within 10 seconds.

2.1.1.4 Rectifier/Charger Capacity:

The rectifier/charger shall have sufficient capacity to supply full load current to the inverter while recharging a fully discharged battery. Battery charge current shall be adjustable up to 10% of rectifier maximum output current at any UPS load condition.

2.1.1.5 Automatic Restart:

Upon restoration of utility AC power after a power outage, the rectifier/charger shall automatically restart, "walk-in", and gradually assume the inverter and battery recharge loads.

2.1.1.6 Rectifier/Charger Input Current Limit:

The rectifier/charger shall have an "on generator" function, which when activated by an external dry contact opening (user supplied), shall reduce the battery charge current limit to a level that ensures that the UPS will draw current equivalent to 100% load or less.

2.1.1.7 Rectifier/Charger Battery Test:

The rectifier/charger can run a diagnostic test of the batteries by briefly placing them under load. This test shall be accomplished by reducing the output voltage of the rectifier/charger. This test is set by the factory to occur weekly and can be adjusted. The rectifier shall remain on and in the circuit should the battery fail to meet criteria. If any fault is detected an alarm will

flash on the diagnostic panel. Measurements taken will be compared with the diagnostic algorithm in the microprocessor to confirm the integrity of the battery.

2.1.2 Inverter:

The inverter section of the power converter module shall utilize Isolated Gate Bipolar Transistors (IGBT's). This solid-state device that incorporates pulse width modulation (PWM) technology, is capable of accepting the output of the rectifier/charger or the battery system voltage and delivering AC power within specified limits to the critical load bus. The inverter shall be microprocessor controlled and include all necessary timing logic and control circuits.

2.1.2.1 Inverter Start-Up:

The inverter shall automatically startup when a start command is generated and shall be stable and ready to deliver power to the load within 2 seconds.

2.1.2.2 Inverter Protection:

Inverter IGBT's shall be protected by fast acting, current limiting fuses and current limiting circuits. The inverter shall be capable of running indefinitely with the batteries disconnected. For rapid removal of the inverter from the critical load, the inverter control electronics shall instantaneously turn off the inverter transistors when the inverters capacity is exceeded. Simultaneously, the static transfer switch shall transfer the load to utility power without interruption to maintain continuous power to the critical load.

2.1.2.3 Inverter Oscillator:

The inverter shall contain an oscillator capable of operating and maintaining the output frequency of the inverter within specified limits. The inverter oscillator shall be capable of frequency synchronization and phase locking to the utility power source frequency. When operating as a slave to the utility power and a failure occurs in the slaving signal, the inverter oscillator shall automatically revert to a free running state and maintain the specified limits. The oscillator shall not drift more than 0.1% while operating at maximum rated operating temperature.

2.1.2.4 Inverter Transformer:

A dry type power isolation transformer shall be provided for the inverter AC output. The transformer shall have a minimum K rating of 30. The transformer shall have a single primary winding and not be a single point of failure. The transformer shall have insulation of class "H" and not exceed the temperature limit of the insulation class of material when operating at full load at maximum ambient temperature.

2.1.2.5 Inverter DC Protection:

The inverter shall be automatically protected at the following DC voltage levels, which shall be independently adjustable for UPS application flexibility.

DC Over voltage Shutdown = 2.40 V/cell

DC Under voltage Shutdown = 1.75 V/cell

2.1.2.6 Phase Balance:

Electronic controls shall be provided to regulate each phase so that an unbalanced load will not cause the output voltage to go outside of the specified voltage unbalance or phase displacement limits.

2.1.3 Static Transfer Switch:

An internally mounted static transfer switch and bypass circuit shall be provided as an integral part of the UPS. The static switch shall be naturally commutated high speed devices (SCR's)

rated to conduct full load current continuously while on inverter or bypass power (reserve source). The reserve portion of the static switch shall be designed to avoid back-feed into the utility supply. Failure of one SCR shall not effect the operation of the UPS and the failure shall be shown on the LCD display. Over current protection in the bypass mode will be through fuses.

2.1.3.1 Bypass Transfer:

The static switch shall automatically and successfully transfer the critical load from the inverter to the bypass source (reserve) under the following conditions:

- DC voltage out-of-limits failure
- Inverter failure
- Critical load current exceeds inverter overload rating
- Over-temperature develops within the inverter
- Manual command is given

Reserve Transfer shall be automatically inhibited, whenever bypass source parameters are outside predetermined (adjustable) limits, or UPS output and bypass are not synchronized and phase locked.

2.1.3.2 Retransfer:

The static switch shall automatically and successfully retransfer the critical load from the bypass source to the inverter under the following conditions:

- Inverter output voltage returns to within specified limits.
- Critical load current reduces to within inverter overload rating.

2.1.4 Separate Bypass Feed:

The UPS shall be capable of being supplied with a separate bypass feed. This feed eliminates the single point of failure of the primary input by offering two (2) separate paths for the power flow. This feature also allows two or more UPS modules to be installed in an isolated redundant configuration.

2.1.5 Synchronizing Equipment:

The static switch shall include all necessary logic circuitry for fully automatic frequency synchronization and phase locking of the UPS inverter output to the bypass/reserve power source.

2.1.6 Maintenance Bypass Switch:

Bypass switching shall allow the critical load to be fed from the bypass/reserve power source, while providing isolation of the static switch during maintenance. Provision for testing of the UPS operation without affecting or disconnecting the critical load shall be provided.

SECTION 3.0 ELECTRICAL SPECIFICATIONS

3.1 Rectifier/Charger

Input:

- a. Nominal Voltage 208 VAC, three phase (plus ground) 480 VAC, three phase (plus ground)
- b. Voltage Limit: $\pm 20\%$ from nominal voltage (-15% for battery recharge)
- c. Frequency: 57 - 63 Hz
- d. Operation Current Inrush: "Walk-in" from 25% maximum to 100% full load rating in 10 seconds
- e. Power Factor: 0.82 minimum at full load, nominal conditions

Output:

- a. Nominal Voltage: 288 VDC; 480 VDC, "Float " Operation: 2.27 VDC per cell
- b. Regulation: $\pm 1\%$ maximum for input voltage and DC variations
- c. Temperature Compensation: 0.13 float volts per cell per $^{\circ}\text{C}$
- d. Ripple Voltage: Less than 2% RMS voltage, with inverter fully loaded and battery disconnected
- e. Nominal Current: Sufficient to operate inverter at full rated load for any of the above voltages and to concurrently recharge the battery set within 10-times the discharge time period to 90% full charge.
- f. Overload Current: 125% of nominal current
- g. Battery AC current ripple: <1% nominal
- h. Protection: Electronic current limiting, input breaker, and input fuses

3.2 Static Transistorized (IGBT) Inverter

3.2.1 Power Rating:

UPS output ratings are shown at unity power factor. Other power factor loads can be supported.

3.2.2 Input:

Shall operate within specification over the nominal rectifier/charger output range and minimum battery voltage of 1.65 volts per cell.

3.2.3 Output Voltage:

480/277 or 208/120 VAC-60HZ, 3 Phase (plus ground), adjustable by $\pm 5\%$ of nominal.

3.2.4 Output Regulation:

Balanced Loads: $\pm 1\%$ balanced load - Phase Angle $120^{\circ} \pm 1^{\circ}$

Unbalanced Loads: $\pm 3\%$ 100% unbalanced load - Phase Angle $120^{\circ} \pm 3^{\circ}$

3.2.5 Output Waveform:

Sinusoidal

3.2.6 Frequency Stability:

Normally synchronized to utility line over frequency range of $\pm 0.75\%$ or optionally $\pm 1.5\%$, $\pm 3\%$, $\pm 6\%$; free running $\pm 0.05\%$. Slew rate ≤ 1.0 Hz/Sec

3.2.7 Output Dynamic Response:

$\pm 5\%$ maximum deviation, recovering to within 2% of nominal during a sudden 100% load application or removal in less than 20ms.

3.2.8 Overload Rating:

150% for 1 minute

125% for 10 minutes

3.2.9 Harmonic Content:

Linear loads: Max. Voltage THD $< 3\%$

100% non-linear load: Max. Voltage THD $< 5\%$

3.2.10 Efficiency (AC-AC):

Minimum: 87-92% at Full Load

3.3 Static Transfer Switch

3.3.1 Power Rating:

Static switch is continuous duty power rated.

3.3.2 Overload Ratings:

> 1 Minute 125%

1 Minute 150%

30 cycles 1000%

5 cycles 1500%

3.3.3 Transfer Characteristics:

Transfer time from inverter: Less than 0.5ms to utility power when both sources are in phase lock, and vice versa. Automatic 5 second delay before allowing retransfer from utility power to inverter after transferring from inverter to utility power.

Transfer time from inverter to utility when both sources are not in phase lock: 20 ms (To prevent damage by phase reversal to the load.)

SECTION 4.0 GENERAL ELECTRICAL REQUIREMENTS

4.1 Applicable Documents:

The UPS shall be designed in accordance with the applicable sections of the current revision of the following documents. Where conflict arises between these documents and statements made herein, the statements in this specification shall prevail.

UL Standard 924
NEMA PE-1
ASME
ASA-C-39.1-1984
FCC PT 15, Subpart J, Class B
National Electric Code
OSHA
IEEE 587 ANSI C 62.41-1980
ISO 9000

4.2 Wiring:

Wiring practices, materials and coding shall be in accordance with the requirements of the National Electric Code, NFPA 70 and other applicable codes and standards. The internal neutral sizing of the UPS shall be 1.7 times the line capacity.

SECTION 5.0 MECHANICAL STANDARDS

5.1 Cabinet:

The UPS unit, comprised of the rectifier/charger, inverter, static transfer switch, and maintenance bypass switchgear shall be housed in a single, free standing NEMA type 1 enclosure. Cabinet doors and covers shall be removable for expedient servicing, adjustments, and installation. The UPS cabinet shall be structurally adequate, have casters for ease of maintenance and installation, and have provisions for forklift handling. The cabinet shall be front and top access only for service.

5.2 Material:

All materials and components making up the UPS shall be new, of current manufacture, and shall not have been in prior service except as required during factory testing. All bus bars shall be copper.

5.3 Thermal Design:

Forced redundant air-cooling shall be provided to ensure that all components are operated within specification with air entry at the base and exit at the rear. The enclosure shall be mounted with 4 inches (100 mm) of free space at the back for ventilation.

5.4 Serviceability:

The UPS shall be constructed of replaceable subassemblies. Printed circuit assemblies shall be plug-in. The main control printed circuit and boards shall be interchangeable across the entire product range.

5.5 Finish:

The UPS and battery cabinets shall be cleaned, primed and painted off-white.

SECTION 6.0 MONITORING AND CONTROLS

6.1 General:

The UPS unit shall incorporate the necessary controls, instruments and indicators to allow the operator to monitor the system status and performance, as well as take any appropriate action.

6.2 Controls:

The following minimum operator controls shall be provided.

1. Circuit Breakers: Rectifier AC input, UPS inverter output.
2. Switches: Bypass AC input, Maintenance Bypass input, Bypass AC Output.
3. Inverter Start: Inverter start push-button to permit inverter start operation.
4. Audible Alarm Silence: Cancels internal audible alarm until a new alarm occurs. A red LED shall indicate alarm and alarm accepted conditions.

6.3 Mimic Panel:

The UPS shall have a Mimic Panel with Light Emitting Diodes (LED's) to indicate the following modes of operation and conditions:

Rectifier normal operation	Green
Battery normal operation	Green
Inverter normal operation	Green
Reserve supply normal operation	Green
Load/static switch normal operation	Green
Rectifier/charger alarm	Green-flashing
Battery alarm	Green flashing
Inverter alarm	Green-flashing
Reserve supply alarm	Green-flashing
Load/static switch alarm	Green flashing

6.4 Display Panel

6.4.1 Controls:

Provisions to monitor the operating parameter of the UPS shall be displayed in a two line x 20 character illuminated Liquid Crystal Display (LCD) controlled by push buttons. By using the appropriate user switches it shall be possible to display the following:

Power History:

Accesses all alarms and all UPS operating parameters ten seconds before and one second after the inverter stops.

Rectifier:

Selects module to display alarms, voltage, and total DC current.

Battery:

Selects module to display alarms, voltage and battery current with polarity. When the battery supplies the inverter, the unit shall display autonomy time remaining. A change in load shall cause the autonomy indicator to instantaneously indicate the new autonomy time at the new load.

Inverter:

Selects module to display alarms, voltage, phase to neutral and frequency measurements.

Reserve Supply:

Selects module to display alarms, voltage, phase to neutral and frequency measurements.

Load/Static Switch:

Selects module to display alarms, current per phase, frequency measurements, percentage load capacity per phase and the peak factor (IPK/IRMS) of each phase of the load current. It shall be possible to display the total time the load has been supplied by the inverter and by reserve and number of mains failures and the total duration of these failures.

6.4.2 Rectifier/Battery

Alarms:

Primary supply fail	Phase sequence error
Battery fault	Battery contactor open
Shutdown imminent	Battery discharging
DC voltage high	DC voltage low
Input breaker open	DC feedback fault
Battery recharge inhibited	Verify DC feedback
Harmonic filter open	Rectifier alarm
PCB supply fault	Rectifier blocked

6.4.3 Inverter

Alarms:

Inverter fault	Out of synchronization
Over temperature	Bypass switch closed
Shutdown imminent	System test mode
DC voltage high	DC voltage low
Desaturation	PCB Supply Fault
Inverter not running	Inverter inhibited
Inverter blocked	Inverter voltage
Inverter volts low	Overload
Stop due to overload	Current limit
Inverter static switch fault	Inverter feedback fault
Inverter freq. out of range 8%	Verifying inverter frequency
Inverter freq. out of range 1%	Verifying battery contactor

6.4.4 Reserve, Load

Alarms:

Load on reserve	Load not supplied
Inverter fault	Bypass switch closed
Reserve fault	Reserve frequency fault
Reserve voltage	Reserve voltage
Static switch fault	Overload
Output breaker open	Reserve breaker open
Phase sequence error	Backfeed protection active
Static switch blocked on inverter	Inverter static switch fault
Static switch blocked on reserve	Reserve inhibited

6.4.5 Power History:

All alarms and measurements that occur ten seconds before and one second after the inverter stops shall be stored by the microprocessor. It shall be possible to display all the above in

increments of 0.1 seconds. The information shall be scanned at a rate of 100 ms, giving a total of 110 samples for a given period.

6.4.6 Automatic Battery Checking:

The charging status of the battery shall be automatically monitored and if out of preset limits the condition shall be shown on the LCD. The monitor shall detect an open battery cell, shorted cell, or a deteriorated cell.

6.4.7 Battery Temperature Compensation:

The rectifier charger shall automatically adjust float voltage 0.13% per °C. (Only applicable for factory supplied battery cabinets)

6.5 Remote Monitoring and Control

6.5.1 RS-232-C Asynchronous Serial Communications:

Digital bi-directional communications shall be possible between one or more remote computers, terminals, or modem and the UPS via an RS-232-C port. The UPS RS-232-C output shall be via a DB9 plug connector connected to a multi-com adapter for two independent interfaces (*capable of Interfacing with optional On-line Statistical Monitoring Software*) that assist with diagnosis/review of critical fault conditions and can initiate remote communications, reporting disturbances of operation.

6.5.2 IBM AS/400™ Interface:

Volts free relay contacts shall be incorporated conforming to the requirements of the IBM AS/400 computer. UPS to computer interfaces via internal relays. This interface shall be via DB9 socket and be capable of simultaneous indication of the following four critical conditions:

- UPS On
- Bypass Active
- Utility Failure
- Battery Low

6.5.3 Remote Alarm Interface:

The UPS shall have the capability to remotely transmit alarm functions via a DB15 socket configured for use with an optional remote alarm enunciator panel and capable of annunciating the following six conditions to the optional display panel or a customer's Building Automation System:

- System Normal
- Inverter Failure
- Reserve to Load Activated
- Primary Supply Failure
- Shutdown Imminent
- General Alarm Condition Occurred

SECTION 7.0 ENVIRONMENTAL RATINGS

7.1 Ambient Temperature

The UPS unit shall be capable of continuous operation under the following temperature conditions:

18°F (-10°C) to 104°F (40°C)
Max temperature (8 hrs) = 104°F (40°C)
Note: optimum battery temperature = 77°F (25°C)

7.2 Relative Humidity:

The UPS unit shall be capable of continuous operation with a relative humidity up to 95% non-condensing at 77°F (25°C).

7.3 Altitude:

The UPS unit shall be capable of normal operation without de-rating at an altitude ranging from 0 to 5,000 feet (0 to 1,500 meters).

7.4 Audible Noise Level:

Audible noise generated by the UPS shall not exceed <55 dBA (50 kVA), <62 dBA (75 kVA) when measured at 1 meter in front of the power converter using scale "A" of a standard ASA sound level measuring device.

7.5 Grounding:

The AC power neutral shall be electrically isolated from the chassis ground except for RFI filters. Bonding of the neutral to the ground, if desired, shall not affect operation. The SE3050/XX and SE3075/XX models produce a separately derived source; as such, the output neutral needs to be connected to ground per NEC requirements.

SECTION 8.0 BATTERY

8.1 Battery:

The batteries shall be a heavy-duty industrial type and be of the valve regulated lead-acid (VRLA) type.

The batteries shall be operated in floating mode under normal operating conditions.

SECTION 9.0 FACTORY TESTING

9.1 Factory Testing:

Before shipment, the manufacturer shall completely test the system to factory standards to assure compliance with the specification. Each subassembly shall undergo thorough testing prior to installation in the system. The total system shall be exposed to a functional load test and shall be subjected to a minimum of 8 hours "burn-in" test prior to shipment.

A complete test report shall be available for each unit and kept on file for future reference.

SECTION 10.0 UPS COMMISSIONING

10.1 Site Start-Up:

The manufacturer's field service representative shall provide site start-up and testing during normal working hours (M/F-8/5). Individual scheduling requirements can usually be met with ten working days advance notice. Site testing shall consist of a complete test of the UPS and accessories by the UPS manufacturer in accordance with manufacturer's standards.

Commissioning must be performed by manufacturer's approved service representative for warranty to apply.

SECTION 11.0 LIMITED WARRANTY

11.1 UPS Limited Warranty:

The UPS warranty shall be in effect for twelve months after initial start-up but no more than eighteen months after shipment, whichever occurs first. The warranty shall cover all parts and labor for units commissioned by manufacturer's approved service representative.

11.2 Battery Limited Warranty:

The battery manufacturer's standard warranty shall be passed through to the end user.

SECTION 12.0 QUALITY

12.1 Materials:

All materials, parts, and components used shall be new and of the highest grade.

12.2 System Reliability:

The UPS MTBF shall not be less than 50,000 hours for the inverter and 200,000 hours for the load.

SECTION 13.0 INSTALLATION AND OPERATION DATA

13.1 Operating and Maintenance Manuals:

The specified UPS system shall be supplied with one copy of the User's Manual. Additional copies may be ordered at an additional charge from the manufacturer.

SECTION 14.0 FIELD ENGINEERING SUPPORT

14.1 Field Engineering Support:

The UPS manufacturer shall have available a nationwide field service organization staffed by factory trained Field Service Engineers dedicated to the start-up, maintenance and repair of UPS equipment. The manufacturer shall have a toll free service telephone number answered 24 hours a day / 365 days a year.

SECTION 15.0 OPTIONS

16.1 Remote Alarm Unit (RAU):

A separate alarm unit shall be provided and shall include at least the following monitoring and alarm functions:

- System normal
- UPS alarm
- Shutdown imminent

Mains failure
Load on reserve
Inverter fault
LED test
Alarm mute
ON/OFF switch

16.2 Input Harmonic Filter:

The UPS system shall be provided with an optional input harmonic filter to reduce input total harmonic current distortion (THDi) to < 10 %.

SECTION 16.0

QUALIFYING EXPERIENCE

16.1 Qualifying Experience

The manufacturer shall have a minimum of ten years experience in the design, manufacture, and testing UPS systems. This specification outlines the minimum requirements for a UPS. Every supplier shall provide a specification compliance statement with its proposal referencing each section of this specification.

16.2 Approved Manufacturer

Staco Energy Products Company

301 Gaddis Blvd

Dayton, Ohio 45403

www.stacoenergy.com