

City of Sandy Springs
Specifications for
Uninterruptable Power System/Power Conditioner for Traffic Systems

1. Requirements

This specification establishes minimum requirements for an Uninterruptable Power System/Power Conditioner for use with traffic control equipment meeting load output requirements of the UPS. (Uninterruptable Power System/Power Conditioner) The UPS shall include, but not be limited to the following: Electronics module, Integrated Power Interface Module and the Battery System. The UPS shall be capable of providing power for full run-time operation for a LED ONLY intersection. (All Vehicular and Pedestrian indications) The UPS shall provide power for critical ancillary equipment in the cabinet, such as, but not limited to, the cabinet light and fan, auxiliary receptacles (except as defined in the spec) Ethernet switches, vehicle detection systems and CCTV. The UPS shall be designed for outdoor applications in accordance with CALTRANS TEES.

The electronics shall consist of:

- a. Fully software defined, digital signal processor, Power Factor Corrected true online double conversion UPC/UPS. (Universal Power Conditioner and Uninterruptable Power Supply)
- b. 3 stage, temperature compensated battery charger
- c. Local and remote control of UPS functions
- d. Local and remote monitoring features

2. Operation

- a. The unit shall be capable of on-site programming, monitoring and operation without the use of an external device. (i.e. – portable PC) The unit shall be conform to applicable NEMA standards.
- b. The UPC/UPS shall provide continuous, fully conditioned and regulated sinusoidal (AC) power to critical devices in the traffic control cabinet. (including, but not limited to, vehicle detection systems, Ethernet switches, travel time loggers, etc.)
- c. The UPC/UPS shall provide a minimum of three sets of normally open (NO) and normally closed (NC) single pole, double throw (SPDT) dry relay contact closures, available on a panel mounted terminal block, rated at a minimum 120V/1A, and labeled so as to identify each. Typical configurations are as follows:
 - i. Energize on switch to battery power
 - ii. Energize on low battery life remaining (i.e. 40%)
 - iii. Run timer (i.e. Contact closure after 2 hours of operation)
- d. Contact closures shall be annunciated on the front panel by a visual indication, such as a discreet LED or part of a LCD screen.

- e. Operating temperature for the UPC/UPS and the batteries shall be -40°C to $+74^{\circ}\text{C}$.
- f. Upon loss of utility power the UPS shall insert battery power into the system and return to utility power upon restoration of service.
- g. The battery charging system shall be temperature-compensated and compensate over a range of $2.5 - 4.0 \text{ mV}/^{\circ}\text{C}$ per cell. The sensor shall be delivered with 10 feet of wire.
- h. Batteries shall not be recharged when the battery temperature exceeds $+50^{\circ}\text{C} \pm 3^{\circ}\text{C}$.
- i. UPC/UPS system shall be 19" rack mountable and compatible with ITS Model 340 cabinets and companion cabinets mounted adjacent and/or attached to an existing traffic control cabinet. An auxiliary generator plug assembly shall be accessible on the exterior of the cabinet. (Battery cabinet spec provided as a special provision)
- j. UPS shall be equipped to prevent malfunction feedback to the cabinet or utility service.
- k. Recharge time for the battery, from protective low cut-off to 80% or more of full capacity shall not exceed twenty (20) hours.
- l. The Bypass switch shall enable removal and replacement of the UPC/UPS without shutting down the traffic control system. The UPC/UPS shall be capable of starting when no utility line service (AC) is available.
- m. The UPC/UPS shall not interfere with the existing traffic control components.
- n. The UPC/UPS shall deliver 120 VAC output, $\pm 3\%$ with an AC input between 75 and 155 VAC without discharging the batteries.
- o. The UPC/UPS shall support a generator input without using the batteries.
- p. The unit shall have maximum dimensions of 19 inches in width, 13 inches in depth and 6 inches in height. The unit shall have a maximum weight of 35 pounds.
- q. The unit shall provide the following electrical characteristics:
 - i. Input
 - 1. Nominal voltage, 120 VAC, single phase
 - 2. Frequency, 45 to 65 Hz
 - 3. Maximum current draw, 17 amps
 - 4. Protection breaker, 20 Amps
 - ii. Output
 - 1. Nominal voltage, 120 VAC, single phase
 - 2. Power rating: minimum – 1250 VA, 875 Watts
 - 3. Voltage regulation $\pm 2\%$ for 100% step load change and from high battery to low battery condition
 - 4. Frequency 50 or 60 Hz ($\pm .25$, software selectable)
 - 5. Configuration keyed connectors and duplex receptacle
 - 6. Overload capability 110% for 10 seconds, 200% for 50 milliseconds

3. Displays, Controls and Diagnostics

- a. The UPC/UPS shall include a display and/or meter to indicate current battery charge status and conditions.
- b. Voltmeter standard "banana jacks" (+) and (-) mounted on the front panel to read the exact battery voltage drop at the inverter input.
- c. Front panel indicated 0 to 100% battery capacity.

- d. Built in TVSS (surge suppression) compliant with IEEE/ANSI C.62.4.
- e. Integral system to prevent destructive battery discharge and overcharge.
- f. Batteries shall be serviceable from the cabinet and shelf system without the need for specialized tools and/or compartment disassembly.
- g. An event counter and total hours run time accessible from the front panel display, resettable by front panel command entry.
- h. Manufacturer shall include a set of equipment lists, operation and maintenance manuals, battery data sheets, board level schematic and wiring diagrams of the system.
- i. The UPC/UPS system shall provide front panel controls for: Power ON, Cold Start, Alarm Silence, Battery Test, Bypass Breaker, DC/Battery Breaker, Battery Test Points, Auxiliary Temperature Connector and Programming Keypad.
- j. The UPC/UPS system shall provide a standard EIA 232 interface using a DB 9 connector for remote monitoring and control of system functions. Remote monitoring and full command and control software and a serial connecting cable shall be provided.
- k. A NIC (Network Interface Card) shall be provided and the UPC/UPS firmware shall support SNMP protocol and have standard UPS MIBs onboard. The system shall be capable sending SNMP messages that can be trapped with network monitoring tools such as Orion Network Performance Monitor. Remote monitoring and control shall be accessible via a WEB browser interface.

4. Battery System

- a. Individual batteries shall be:
 - i. 12 volt rating.
 - ii. Group 24 maximum case size.
- b. Battery string shall consist of a minimum of 6 batteries with a cumulative minimum rated capacity of 240 amp-hours.
- c. Batteries shall be deep cycle, sealed prismatic lead-calcium based AGM/SVRLA. (Absorbed Glass Mat/Valve Regulated Lead Acid)
- d. Batteries shall provide a connection system that shields the terminal from exposure and accidental shorting.
- e. Batteries shall be certified to operate over a temperature range of -40°C to +74°C.
- f. Batteries shall be provided with appropriate interconnect wiring and corrosion resistant mounting trays and/or brackets appropriate for the cabinet into which they will be installed.
- g. Batteries shall indicate maximum recharge data and recharge cycles. Labels shall be included identifying the date of manufacture. Batteries delivered with a manufacture date older than 6 months will be rejected.
- h. Battery Harness
 - i. Battery interconnect wiring shall be via two-part modular harness. The cables shall be protected with abrasion resistant nylon sheathing. The interconnect cables shall connect to the base module via a quick release connector. The connector shall have interlocking pins to prevent battery operation if the batteries are not connected.

- ii. Battery interconnect harness wiring shall be UL style 1015 CSA TEW or Welded Style Cable or equivalent, or proper wire gauge with respect to design current and sufficient strand count for flexibility.
- iii. Battery construction shall include heavy duty, inter-cell connection for low impedance between cells.

5. Acceptance

Each UPC/UPS shall be manufactured in accordance with a manufacturer Quality Assurance program. (QA) The QA program shall include Production QA that include statistically controlled routine tests to ensure minimum performance levels of UPC/UPS units built to meet this specification and a documented process of how problems are to be resolved. The manufacturer, or an independent testing lab hired by the manufacturer, shall perform Design Quality Testing when any design change results in any alteration to the circuit configuration or performance characteristics.

6. Materials Warranty

Manufacturers shall provide a two (2) year factory repair warranty for parts and labor on the UPC/UPS from date of acceptance by the City of Sandy Springs. Batteries shall be warranted for full replacement for two (2) years from date of purchase.