

- 1 General
- 1.1 **GENERAL**
 - .1 Comply with the requirements of Division 1 – General Requirements and Section 26 05 01 (16010) General Electrical Provisions
- 1.2 **SUBMITTALS**
 - .1 Comply with the requirements of Division 1 – General Requirements Section - Submittals.
 - .2 In addition, provide UPS size calculation and load list.
- 2 Products
- 2.1 **COMPUTER ROOM, UNINTERRUPTIBLE POWER SUPPLY**
 - .1 Provide a single-phase, on-line UPS that meets the following minimum criteria:
 - .2 The system shall consist of a battery charger, static inverter, a bank of storage batteries, maintenance by-pass and all required accessories.
 - .3 Output will be 120VAC single-phase supply, filtered.
 - .4 Include a bumpless-transfer (wrap-around/Maintenance Bypass Switch) circuit to enable the receptacle panel (load power distribution panel) to be transferred to utility power without impacting the operation of the SCADA Servers or Ethernet Switches.
 - .5 Have an N+1 redundancy for battery and power (inverter) modules.
 - .6 Include a 10/100BASE-T Ethernet interface and windows-based management software for monitoring and alarming UPS status.
 - .7 Be capable of detecting and reporting battery or power module failure, battery voltage, current and temperature.
 - .8 Battery modules shall be hot-swappable.
 - .9 The batteries to be supplied shall be sealed maintenance-free lead acid.
- 2.2 **MANUFACTURERS**
 - .1 Eaton
- 2.3 **CONFIGURATION**
 - .1 95 The Esplanade
 - .1 Product
 - .1 Eaton 9PXM series, 12 kVA N+1 (5 - 4kVA power modules), 240 minutes battery run time at full load, c/w UPS cabinet, external battery cabinets, wall mount external by-pass switch
 - ~~.2 UPS rack to be seismic rated c/w bolt down brackets.~~
- 2.4 **UPS MODES OF OPERATION**

- .1 Normal: The input converter and output inverter shall operate in an on-line manner to continuously regulate power to the critical load. The input and output converters shall be capable of full battery recharge while simultaneously providing regulated power to the load for all line and load conditions within the range of the UPS specifications.
- .2 Battery: Upon failure of the AC input source, the critical load shall continue being supplied by the output inverter, which shall derive its power from the battery system. There shall be no interruption in power to the critical load during both transfers to battery operation and retransfers from battery to normal operation.
- .3 Recharge: Upon restoration of the AC input source, the input converter and output inverter shall simultaneously recharge the battery and provide regulated power to the critical load.
- .4 Static bypass: The static bypass shall be used to provide transfer of critical load from the inverter output to the bypass source. This transfer, along with its retransfer, shall take place with no power interruption to the critical load. In the event of an emergency, this transfer shall be an automatic function.
- .5 Maintenance bypass: The system shall be equipped with an external make-before-break rack or wall mount maintenance bypass to electrically isolate the UPS during routine maintenance and service of the UPS. The maintenance bypass enclosure shall completely isolate both the UPS input and output connections.

2.5 **BATTERY**

- .1 The UPS battery shall be of modular construction made up of swappable, fused, battery modules. Each battery module shall be monitored for voltage and temperature for use by the UPS battery diagnostic, and temperature compensated charger circuitry.
- .2 The battery jars housed within each removable battery module shall be of the valve regulated lead acid (VRLA) type.
- .3 The UPS shall incorporate a battery management system to continuously monitor the health of each removable battery module. This system shall notify the Owner in the event that a failed or weak battery module is found.

2.6 **WALL MOUNT MAINTENANCE BYPASS**

- .1 The rack or wall mount maintenance bypass shall provide power to the critical load from the bypass source, during times where maintenance or service of the UPS is required. The maintenance bypass shall provide a mechanical means of complete isolation of the UPS from the critical output distribution.
- .2 As a minimum, the maintenance bypass shall contain the following features and accessories:
 - .1 Appropriately rated switches to fully isolate the UPS during times where maintenance is required. As a part of this design there shall be a UPS input switch designated as Q1, a UPS output fused switch designated as Q2, and a wrap-around maintenance bypass switch designated as Q3. Minimum 1A/1B auxiliary contacts for the purpose of relaying status information of each switch actuator to the UPS shall be provided, along with a means of locking out the switches to inhibit operation of the bypass transfer pair. The bypass shall be available for a 208 volt input.

- .2 The bypass shall have a full length hinged front door, with locking mechanism; to allow access to the switches.
- .3 The bypass shall bear a full mimic diagram inside the hinged front door. Also associated with the mimic panel shall be indicating lights, capable of depicting proper operation of maintenance bypass circuit breaker and UPS output circuit breaker.

2.7 SOFTWARE AND CONNECTIVITY

- .1 Network adaptor: The Network Management Card shall allow one or more network management systems (NMS) to monitor and manage the UPS in TCP/IP network environments. The management information base (MIB) shall be provided in DOS and UNIX "tar" formats. The SNMP interface adaptor shall be connected to the UPS via Ethernet Port.
- .2 Unattended shutdown: The UPS, in conjunction with a network interface card, shall be capable of gracefully shutting down one or more operating systems.

2.8 REMOTE SYSTEM MONITORING

- .1 The following three methods of remote UPS monitoring shall be available:
 - .1 Web monitoring: Remote monitoring shall be available via a web browser such as Internet Explorer.
 - .2 RS-232 monitoring: Remote UPS monitoring shall be possible via either RS-232 or contact closure signals from the UPS.
 - .3 Simple Network Management Protocol (SNMP): Remote UPS monitoring shall be possible through a standard MIB II compliant platform.

3 Execution

3.1 UNINTERRUPTIBLE POWER SUPPLY

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- .2 Power interruptions shall be kept to a minimum. Power interruptions must be coordinated with the owner and all other trades by this contract. Application for the power interruptions must be submitted to the Owner at least seven days prior to the requested shut down date.
- .3 The Contractor shall provide a complete UPS System with all associated cables as required for a fully functional system.

3.2 TESTING

- .1 See Division 1 – General Requirements, Section - Start-Up, Testing and Commissioning.

3.3 TRAINING

- .1 See Division 1 – General Requirements, Section - Start-Up, Testing and Commissioning.

End of Section

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