

Section 16620
Branch Circuit Monitor System Specification

1.0 General Requirements

1.01 Scope

- A. Furnish factory assembled Branch Circuit Monitor System (BCMS) system in accordance with the contract documents and the following specification with all elements to conform to all relevant standards of manufacturing and construction, including but not limited to, NFPA 70, IEEE 519-1991, UL1950, CSA C22.2, NEMA AB-1, NEMA PB-1, NEC, and all relevant local codes.
- B. Work of this section, as shown or specified shall be in accordance with the requirements of the contract documents.
- C. The bidder shall participate in determining of the means available for receiving and handling the equipment.
- D. Off loading, installation, interconnecting cables and lugs and all associated costs are the responsibility of the contractor. Installation shall be in accordance with the manufacturer's recommendations.

1.02 Work Included

- A. Furnish components for Branch Circuit Monitor System (BCMS) units as herein specified for installation under another contract.
- B. Provide all materials and services for manufacturing, testing, and delivery to a designated jobsite. The work required under this contract shall include the following:
 - 1. Furnishing Branch Circuit Monitor System (BCMS) system as herein specified.
 - 2. Complete configuration drawings and installation drawings.
 - 3. Factory tests as herein specified.

1.03 Submittal Requirements

- A. The information with the bid shall include, but are not limited to, the following items:
 - 1. Technical proposal, including specification and description of all components and current ratings of circuit breakers and operation.
 - 2. Outline and installation drawings showing dimensions and weight of the equipment, along with external power cable connections and recommended cable entrances and exits.
 - 3. Proposed fabrication schedule, factory test dates and delivery date per contract documents.
 - 4. Warranty schedule
- B. Bidders shall provide a compliance review of all specifications and addenda. The review will be a paragraph-by-paragraph designating Compliance ("C"), Deviation ("D"), Exception ("E") and a numbered footnote with reasons for the proposed deviation or exceptions and how the intent of the specification will be satisfied.

1.04 Shop Drawings

- A. Prepare and submit for review detailed shop drawings for the equipment furnished hereunder. Upon receipt of purchase order, four (4) sets of shop drawings shall be submitted within two weeks of accepted purchase order, prior to proceeding with any fabrication or assembly of equipment.
- B. All submittals shall be a complete package properly indexed and cross-referenced. Submittals shall contain all required and detailed information.

1.05 Operating and Maintenance Instructions and Manuals

- A. The seller shall submit one (1) set of operating and maintenance instructions and manuals, covering completely the operation and maintenance of the equipment furnished hereunder to the owner. One (1) set of the parts list and manual for each item of equipment shall be furnished to the owner. Maintenance manuals shall include but not limited to trouble shooting charts, schematics and wiring diagrams.
- B. Provide sufficient operation and maintenance instruction for building operators, with on-the-job factory trained engineers representing the manufacturers. The instruction shall be scheduled at time(s) convenient to the Owner's personnel.

1.06 Installation

- A. Installation shall be in compliance with all the manufacturer's recommendations and local codes. The manufacturer or an authorized representative shall perform all warranty troubleshooting. Site testing shall be done by the authorized electrician at the jobsite.

1.07 Guarantee

- A. The Branch Circuit Monitor System (BCMS) system shall be warranted by the manufacturer to be free from defects in workmanship and material for a period of (12) twelve months from shipment. Warranty shall include all costs of repair, parts, labor, travel and living expenses for the service personnel.

1.08 Standards

- A. The Branch Circuit Monitor System (BCMS) shall be listed to UL and CSA standards.

2.0 Product Specification

2.01 General

- A. The Branch Circuit Monitor System (BCMS) shall be designed for real-time information on branch circuit parameters to allow site Power Network Managers / Owners to monitor the electrical current and power usage of each individual branch circuit. Each BCMS module shall monitor and provide data for up to 84 branch breakers. In addition, the BCMS shall be scalable: distribution panels shall be wired in a "daisy chain or star" network and connected to a central monitoring device to allow for monitoring of an entire distribution system down to load level connection, locally or remotely.

The innovative modular design of the BCMS shall allow the end user to install the BCMS integrated as part of any of custom distribution system or as a retrofit kit to an existing NEMA enclosed lighting panel system.

All BCMS data collected shall be made available to remote points via Modbus RTU protocol.

- B. The BCMS shall be utilized in many different critical power monitoring systems, including:
 - 1. Active monitoring down to the branch circuit level for data centers. This information can be used for billing purposes of individual customers that are users in a collocation facility.
 - 2. Predictive maintenance through real time readings of current usage – shall allow the Site Manager to see a circuit overload situation on individual breakers before they occur. The Site Manager can then tap in to other available sources before problems occur thus preventing any unnecessary tripping of circuits and equipment downtime.
- C. Each Branch Circuit Monitor System (BCMS) shall be designed for the data center environment.
- D. Once the system is placed in its final position, the units shall be secured to the panelboard.
- E. All Branch Circuit Monitor System (BCMS) current transformer assemblies shall be designed for 1" centers, adaptable for branch circuit breakers.
- F. The Branch Circuit Monitor System (BCMS) shall be factory installed or shall be retrofitted in to most existing supplied distribution systems.
- G. All wiring shall be rated per the National Electric Code.
- H. The Distribution Power Panel system shall include a computer grade single point ground in accordance with FIPS Pub 94 and all requirements of NEC.
- I. **OPTIONS**
 - 1. The BCMS data shall be made available to remote points via any standard interface such as RS232/422.

2.02 Electrical Characteristics

- A. Control Power Requirements: 120 VAC (transformer, fuse & connections provided)
- B. Frequency: 60 Hz, 50 Hz optional
- C. Accuracy: Current -- 2% or 0.1 Ampere, which ever is greatest
- D. Full Load Rating: 30 amps

- E. Overload Capacity: 115% full load rating, continuous
X6 full load rating, load inrush
- F. Allowable current crest factor: 3

2.03 **Communications**

- A. Type: Modbus RTU via RS422/485 interface
- B. Connection: 2-wire or 4-wire (jumper select)
- C. Address: 1 to 255 32 STD, 255 optional
- D. Baud Rate: 9600

2.04 **Environmental Requirements**

- A. Storage temperature shall be between -40°C to +40°C (-40°F to 104°F).
- B. Operating temperature shall be between 0°C to +40°C (32°F to 104°F).
- C. Relative humidity from 0% to 90% non-condensing.
- D. Altitude to a maximum of 10,000 feet.

3.0 **Execution**

3.01 **Packaging and Shipping**

- A. The manufacturer shall provide adequate packaging to ensure there is not damage to the unit(s) while in transport.
- B. The manufacturer shall provide adequate notice to the contractor of shipping and arrival times
- C. The contractor shall provide for receiving and storage of any units prior to installation. Unit storage should be provided in accordance to the environmental conditions outline in this specification.

3.02 **Field Service**

- A. All field service work shall be performed by the manufacturer's trained and certified personnel.
- B. A 24 -hour telephone service organization shall be provided and the phone numbers displayed on the door of each enclosure.

3.03 **Installation**

- A. The contractor shall provide labor for the installation of the new equipment in accordance to the manufacturer. All rigging for unloading and installation shall be the responsibility of the contractor. The manufacturer shall assist the contractor as required in interpreting the installation instructions.
- B. The manufacturer shall provide all inter-cabinet wiring as required.
- C. The contractor shall install the equipment as shown on the drawings and insure all required working clearances are maintained.
- D. Following installation, the manufacturer shall verify the correct installation of the BCMS.

3.04 **Acceptance**

- A. Final Acceptance shall occur when the units are shipped and received with no damage to the jobsite.