

262713S02 ELECTRICITY METERING - BUILDING METERING

1. General

This specification defines the equipment, devices, and programming requirements required to add an electrical meter to campus facilities for services 600 Volts or less. Exceptions are to be approved by Utilities and Energy Management.

2. Building Meter

- 2.1. All setup parameters required by the meter and data logging shall be stored in non-volatile memory and retained in the event of a power interruption, including a real-time clock with battery backup.
- 2.2. The meter shall be able to be applied in three-phase, three- or four-wire, 60 hertz systems.
- 2.3. The meter shall have a rated supply voltage from 125 to 250VDC and 100 to 480VAC.
- 2.4. Three phase loads shall utilize three current transformers and three potential transformers as needed. 2.5 stator installations are not allowed. Further details on Current Transformers can be found in Section 4.
- 2.5. Accuracy Class
 - 2.5.1. Measurement accuracy IEC 61557-12 PMD/[SD|SS]/K70/0.2.
 - 2.5.2. Active energy accuracy IEC 62053-22 Class 0.2 S ANSI C12.20 Class 0.2.
 - 2.5.3. Reactive energy accuracy IEC 62053-23 Class 2.
- 2.6. Metering devices shall communicate BACnet IP or BACnet MS/TP and be compatible with the University of Kentucky's Building Automation System (BAS). Selection of the communication protocol should be done in conjunction with UEM Controls personnel based on availability of existing networking infrastructure. Further networking information is available in Section 3.
- 2.7. Where possible, the display shall be remotely mounted in door of switchgear or enclosure to allow separation from other metering components.
- 2.8. Display shall be a backlit LCD.
- 2.9. The maximum mounting height of any power meter or circuit monitor display is six (6) feet above finished floor and a minimum of four (4) feet above finished floor. No Exceptions!
- 2.10. Measurements passed to BAS (minimum but not limited to): real, apparent, and reactive power (kW, kVa, kVar), real energy (kWh), frequency (Hz), phase current (A), phase-to-phase and phase-to-neutral voltage (V), and power factor. See Table 1 at the end of this standard for point and trend details.
- 2.11. Approved metering devices for use on the University of Kentucky Campus are as follows:
 - 2.11.1. Schneider PM5563 (or Schneider PM5563RD for remote display)
 - 2.11.2. Eaton PXM1100 (or Eaton PXM1100T for remote display)
 - 2.11.3. Shark 250 with PROTOCOM BACnet Gateway Kit

3. Network & Communications

- 3.1. The Building Meter shall be connected to the University of Kentucky's BAS BACnet server.
- 3.2. All required programming, network drops, and ancillary equipment to connect to University of Kentucky's building automation system shall be supplied by the contractor.
- 3.3. BACnet Device ID and/or MSTP Network numbers and Device Names shall only be assigned by Controls Engineering Manager or Facilities Systems Manager. Device ID,

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MSTP Network Number and Device Names assignment shall be the sole responsibility of the University of Kentucky.

- 3.4. The Division of Networking & Infrastructure within University of Kentucky Information Technology Services (ITS) shall approve all required HUBs, routers, and/or switches required to interface to the campus WAN network. The cost for this work shall be included by the controls manufacturer. Obtain pricing from the UK ITS prior to bid.
 - 3.5. BACnet devices shall be connect to UK's Environmental VLAN and appropriate IP addresses assigned as provided by UK ITS.
4. Current Transformers
 - 4.1. Current Transformers shall be sized appropriately for the service being monitored with consideration to future growth of the load. Current Transformers shall be revenue grade solid core with a 5 amp secondary and a minimum rating factor of 1.5 @ 30 °C. CT Accuracy shall be ANSI 0.3 Class.
 - 4.2. When metering a Pad mount transformer, utilize CT's designed for installation over the low voltage secondary bushing such as Itron Type R6P and GE Model JAB-0C 600v or equal. Terminate metering CT secondary's using ring lugs on a vertically mounted 6 position short circuiting terminal block. CT secondary shall be ordered: Phase "A" Polarity, Phase "A" Non Polarity, Phase "B" Polarity, Phase "B" Non Polarity, Phase "C" Polarity, Phase "C" Non Polarity.
 - 4.3. For connecting meter device secondary's that extend beyond the cabinet, a 6 post short circuiting terminal block with color coded conductors in a cable shall be used. THHN or equal stranded copper wire shall be used for Current Transformer installation. For wire lengths 25 feet or less, 12 AWG shall be used. For wire length 25 feet to 50 feet, use 10 AWG. For lengths 50 feet to 80 feet, use 8 AWG. Lengths longer than 80 feet are not permitted without permission from the Utilities and Energy Management. Wire ends are to be appropriately terminated.
5. Documentation
 - 5.1. Provide a complete set of system documentation in a digital format for library archival. Documentation to include installation, calibration, operation, maintenance and repair manuals of sufficient detail to enable customer to install, calibrate, operate, maintain and repair the complete system. Documentation also to include warranty details, circuit schematics, wiring interconnection diagrams and necessary mechanical drawings.
 - 5.2. The local meter/display shall be labeled in a durable method with the following information:
 - 5.2.1. Campus Power Meter
 - 5.2.2. Building Name, Building Number, Room Number
 - 5.2.3. Meter ID # (UK Assigned)
 - 5.2.4. Meter Instance Number (UK Assigned) or equivalent
 - 5.2.5. Meter IP Information (UK Assigned) or equivalent

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Table 1: Power Meter Data Points (Building Level)		
Points for BAS:	Trend Frequency:	Alarm:
Device Status	COV	Offline
Instantaneous Power (kW)	600 seconds	no alarm
Apparent Power (kVA)	no trend	no alarm
Reactive Power (kVAR)	no trend	no alarm
Real Energy (kWh)	600 seconds	no alarm
Voltage A-B	600 seconds	no alarm
Voltage B-C	600 seconds	no alarm
Voltage C-A	600 seconds	no alarm
Voltage A-N	no trend	no alarm
Voltage B-N	no trend	no alarm
Voltage C-N	no trend	no alarm
Current A	600 seconds	no alarm
Current B	600 seconds	no alarm
Current C	600 seconds	no alarm
Power Factor	600 seconds	no alarm