

DARTMOUTH FACILITIES METERING

This document is for Project Managers and others involved in metering installations

Dartmouth facility metering provides both energy data and facility monitoring to FO&M. FO&M controls technicians, energy analysts and facility engineers access the data via software where the meter data is gathered, logged, and monitored. All facility energy shall be metered and totaled for electrical and thermal energy consumption.

Electric meters provide both energy measurement data to Dartmouth's Energy Management software for revenue billing and power monitoring data. Dartmouth's Energy Management software which collects the meter data are - Kepware KepServer, Factory Talk Energy Metrix and Rockwell VantagePoint. Dartmouth's Electrical Power monitoring system software is - Schneider Electric Struxureware Power Monitoring Expert.

Flow and Energy Flow meters, i.e., steam, condensate, hot water, and chilled water meters, provide both energy data to Dartmouth's Energy Management software and flow data to Dartmouth's Building Management systems, including Honeywell's EBI and Johnson's Metasys. The preferred communication protocol is BACnet IP, with some legacy Modbus TCP/IP still available.

Water meters are currently the property of the Town of Hanover and access to metered water data can be made available using their vendor's website.

All Energy Management, Building Management and Power Monitoring software exists on Dartmouth secure servers (virtual) which are managed by Dartmouth ITS department. The meters all communicate via Dartmouth campus network infrastructure which is managed by Dartmouth College Network Services. Access to servers by outside vendors is highly restricted; a vendor can apply for remote access through a sponsored account on an annual or one-time basis. Vendors shall have the project manager contact the DC FOM Controls Shop for an Energy Management System Account Application.

See Design Guidelines for meter specifications for each division.

Abbreviations:

DCNS	Dartmouth College Network Services
DC-ITS	Dartmouth Information Technology Services
DC-FO&M/DC-FOM	Dartmouth College Facilities Operations & Management
DC FOM EL Shop	Dartmouth College Facilities Operations & Management Electrical Shop

Abbreviations:

Meter Technician	DC FOM Electric shop meter technician
Energy Analyst	DC FOM Energy Analyst

Electric Meters

1. Install meters - *by Electrician*
 - a. Install meters, CTs, shorting blocks, voltage reference, control power and interconnecting wires, per manufacturer's specifications and other sections of the Dartmouth design guidelines.
 - b. Install network jumper cable from meter (Ethernet gateway) to network outlet. Multiple meters in same switchboard and/or on same floor shall be interconnected on meter wiring bus per manufacturer's instructions.
2. Obtain IP address and internal BACnet ID of the meter. No default IDs may be used – *by Project manager (or Meter Technician if no project manager)*.
 - a. IP address/BACnet ID must be provided by DC FOM Controls Shop.
 - b. IP address shall be requested by initiating a work order to the DC FOM Controls shop a minimum of one week prior to meter startup. Work order shall describe meter type, name of meter, and location.
3. Install Network jack (cables, test, punchdown, etc.) – *by DCNS approved Network Contractor*.
 - a. Connectivity test to network jack by DCNS.
4. Startup meter and connect to PME software using ION Setup– *typically by Schneider technician, but can be done by Meter technician if accepted by DC FOM EL shop supervisor*.
 - a. Project Manager shall schedule Schneider technician with FOM –EL shop. Plan for ½ day per meter. Provide notification of PME connection schedule to DC-FOM Electrical Engineer and FOM Energy Analyst.
 - b. FOM-EL shop shall arrange for Schneider technician to have access to the server where ION Setup runs and accesses the meter database (Manchester2). Access shall be via remote desktop and an online session working together with FOM Meter technician and/or DC-FOM electrical engineer. Schneider technician must have the following information made available to him/her:
 - i. IP address and name, including gateway and mask.
 - ii. Any particular alarm or monitoring setup requirements (as specified by DC-FOM Engineering).
 - iii. Name of meter, building,
 - iv. Provide CT ratio info

- c. Schneider technician shall set up graphics - location and name of building
 - d. FOM Meter technician shall test installation by reviewing PME online for correct operation and graphics.
5. Set up Energy Management software – by *Meter technician*
 - a. Work with FOM Energy Analyst. PM shall give one week notice prior to scheduling.
 - b. All energy meters shall be connected and configured to the energy management software within ten days of commencing energy consumption.
 - c. Need to know what data is needed; Energy data at a minimum
 - d. Need to know the internal BACnet ID of the meter. No default IDs may be used; an ID must be provided by DC FOM Controls Shop.
 - e. Need to know which fields or registers correspond to the data required.
 - f. FOM-EL meter tech shall test by reviewing Energy Management software online for correct operation and graphics.
6. Project Manager shall ensure that all of the above steps are completed and provide sign-off sheet to FOM-Engineering and to O&M files upon completion.

Flow and Energy Flow Meters – Steam, Condensate, Hot Water, and Chilled Water

2. Install meters - by *Contractor or Meter technician. Note that some items must be installed by manufacturer's representative.*
 - a. Install meters, connecting wires, control power per manufacturer's specifications and other sections of the Dartmouth design guidelines.
 - b. Install network jumper cable from meter to network outlet.
3. Obtain IP address and internal BACnet ID of the meter. No default IDs may be used – by *Project manager (or Meter Technician if no project manager).*
 - a. IP address/BACnet ID must be provided by DC FOM Controls Shop.
 - b. IP address shall be requested by initiating a work order to the DC FOM Controls shop a minimum of one week prior to meter startup. Work order shall describe meter type, name of meter, and location.
4. Install Network jack (cables, test, punchdown, etc.) – by *DCNS approved Network Contractor.*
 - a. Connectivity test to network jack by DCNS.
5. Startup meter and connect to Energy Management software– by *Meter technician*
 - a. Work with FOM Energy Analyst. PM shall give one week notice prior to scheduling.
 - b. All energy meters shall be connected and configured to the energy management software within ten days of commencing energy consumption.

- c. Meter technician shall test by reviewing Energy Management software online for correct operation and graphics.
6. Connect meter to Building Management System (BMS) only if required by project specification. - *by Meter technician and Controls Vendor/DC.*
 - a. Arrange for BMS vendor startup. PM shall coordinate with the project controls vendor to ensure that the meter is configured to the BMS. In the case where there is no controls vendor, the PM shall contact the DC FOM Controls shop for configuration.
 - b. Must have the following available:
 - i. IP address and name, BACnet ID, including gateway and mask
 - ii. Any particular alarm or monitoring setup requirements (as specified by DC-FOM Engineering).
 - iii. Name of meter, Name of building,
 - c. BMS vendor shall set up graphics.
 - d. Meter technician and DC shall verify completion by reviewing Building Management online for correct operation and graphics.
 - i. Work with DC Controls shop.