

25 05 00 ENERGY AND WATER METERING REQUIREMENTS

APPLICATION

All energy utilities and water shall be metered at the individual building level (at a minimum) and meters shall be connected to UD Energy Metering infrastructure and Building Automation Systems (BAS).

Metering shall include Electricity, Chilled Water, Hot Water (heating and domestic), Steam, and Water (domestic and make-up). Energy metering shall, at a minimum, meter the main services to building. Utilities serving any leased or sub divided spaces, or any spaces or loads that are, or will be, billable to separate business units, shall be metered as well. Large individual loads may also be required to be metered for data acquisition and control purposes.

Electricity, Water, and Gas feeds to buildings that require establishing accounts, and/or have specific metering requirements, with the City of Newark, Delmarva Power (Pepco), or other external utility, must be coordinated with Facilities Financial Services and the UD Manager, Energy Systems, prior to account setup.

All installed metering systems shall meet, or exceed, the equipment manufacturer's installation requirements and be commissioned according to the manufacturers and UD, and/or UD commissioning agent, requirements. Where required, unobstructed pipe runs shall be adequate straight pipe, without tees or any other fittings or valves, upstream and downstream of flow meters per manufacturer's requirements. The A/E or design consultant shall provide equipment/systems information and installation requirements specific to the projects applications and requirements.

Metering systems certification and calibration certificates and related information shall be provided to the UD Manager, Energy Systems.

Thermal Energy, Steam, and Water Meters shall report totalized energy, and/or fluid volume, to PME electric meters via pulse output and shall also report all measured and calculated parameters to the BAS via 4-20mA signals. The attached topology drawing provides design basis interconnection scenario. For situations where pulse outputs and Analog outputs are precluded or prohibited, Modbus TCP communications shall be provided.

ELECTRIC METERS (Non-Primary)

Electric meters shall be in enclosures separate from switchgear and panel boards, properly rated for local conditions.

1. **Meter and Enclosure–**
 - a. For building main service, Schneider Electric PM8000 in factory enclosure with 24VDC power supply.
 - i. Part Number: 9761E8000R1A
 - b. For sub-metering downstream of building main service, Schneider Electric PM5560/PM5563 in factory enclosure with 24VDC power supply.
 - i. Part Number: 9761E5560R1A
 - c. For applications with multiple downstream sub meters and/or additional Digital or Analog inputs or outputs consult UD Manager, Energy Systems.
2. **Current Transformers – (3) Solid Core 5A CT’s.** Specifics TBD with wire size and ratio requirements
 - a. Solid Core Metering Class CT: Flex-Core: Model 180RL, 19RL, 125, 126.
3. **Meter Enclosures – INTERNAL USE ONLY**
 - a. This section is for internal UD use only. Any project based meter must provide Schneider Electric factory enclosures.
 - b. **Enclosure –**
 - i. Hoffman: A16N12BLP with A1612PP sub plate
 - ii. Provide Ground bar
 - c. **Shorting Block – (3) CT Capacity with cover and shorting screw parking**
 - i. Flexcore: IKU6SC, or eqv.
 - d. **Current Transformers – (3)**
 - i. Solid Core: Flex-Core: Model 180RL, 19RL, 125, 126.
 - ii. Split Core: Flex-Core Model FC
 - e. **Control Power Transformer – AS NECESSARY**
 - i. 50VA, 240/480Vac to 120Vac, attached fuses and fuse pullers.
 - ii. Schneider Electric 9070TF50D1 and fuse puller 9070FP1
 - f. **OCPD and Disconnect – Provide overcurrent protection and load break disconnection means for voltage inputs. (5) 480V 2A circuits; [(3) for PT’s + (2) for control power and 24V Power Supply];**
 - i. Bussmann CCP-3-30cc

ELECTRIC METERS (Primary, City of Newark Revenue, and Power Quality)

Meters for primary service and campus wide power quality applications shall be Schneider Electric ION 7650 meters [M7650 U1 C 0 B 6 E0 N 0 A]. CTs and enclosure requirements will be provided for specific applications. Shop drawings for such enclosure must be approved directly by UD Engineering Services and UD Electric Shop.

Primary electric service installation and/or maintenance shall be coordinated with The City of Newark, UD Electric Shop, and UD Engineering Services.

For non-revenue metering situations the PM8000 may be substituted for Power Quality data collection. This will be on case by case basis and will need to be approved by UD Manager, Energy Systems.

THERMAL ENERGY METERS – Chilled Water and Hot Water

ONICON Flow Meter/Transmitter and BTU Meter/Computer

1. SYSTEM-10 BTU Meter w/ BACnet/IP and (4) 4-20mA analog output card
 - a. Pulse Output (to ION Electric Meter): Total Energy
 - b. Analog Outputs (to BAS): Flow Rate, Energy Rate, Supply Temp, Return Temp
 - c. BACnet/IP and Modbus TCP: Onicon BACnet/IP card provides for Modbus TCP as well.
2. Electromagnetic Flow meter
 - a. F-3500 Insertion
 - b. F-3100, F3200 Flanged
3. Temp Sensors
 - a. Matched temperature probes, thermo wells, and hot taps kits as required by manufacturer.
4. All components shall be properly located and installed to insure accurate measuring of energy content of metered utility.
5. Units
 - a. All energy calculations shall be shown in BTU and BTH/hr
 - b. Default display and pulse value shall be Value x 100k BTU

NETWORK CONNECTIONS

1. An Ethernet connection shall be provided near each electrical meter and Ethernet equipped thermal energy or steam meters.

STEAM METERS –

Steam meter provided shall be appropriate for the flow regime and conditions present. Metering system shall be appropriately sized and located to capture entire flow regime.

1. Meter locations
 - a. New construction: Steam metering system shall be designed and installed, including straight line piping, to allow for a steam meter system capable of capturing entire flow range at highest accuracy possible.
 - b. Retrofits: Steam metering system shall be designed and installed to allow for the greatest amount of range and accuracy possible given existing physical constraints.
2. Meter Transmitter Capabilities
 - a. Transmitter shall provide three (3) analog outputs for
 - i. Flow Rate, Temp, and Pressure
 - b. Transmitter shall provide one (1) pulse outputs or dry contact for
 - i. Totalized Energy
3. Meter Transmitter Configuration
 - a. Transmitter shall be configurable via a web interface provided by direct Ethernet connection to meter transmitter. No special software shall be required to configure meter and/or transmitter
4. Units
 - a. Units shall be BTU and LBs
 - b. Default total energy output to be Value x 1MMBTU

WATER METERS – Domestic and Make-up

1. Main water feeds to new construction or renovations that require new service from the City of Newark shall use metering as required by the City of Newark and shall be coordinated with the City, Facilities Financial Services, and the UD Manager, Energy Systems.
2. Domestic cold and hot water (not covered under Thermal Energy meters) to leased, subdivided, or otherwise separately billable spaces shall be metered and report back to the Enterprise Energy Management system.
3. Water feeds to cooling towers, process makeup systems, or other use that will not use sewer shall be metered report back to the Enterprise Energy Management system.
4. Water meters shall be NSF rated for potable water where required and shall be rated for appropriate water temperature.
5. Meters shall come equipped with dry-contact for pulse output of totalized water consumption.
6. Design Basis
 - a. DLJ Multi-jet series with pulse output.

BASIC METER INTERCONNECTION TOPOLOGY

Output cabling: (1) 16AWG stranded, shielded, twisted pair per signal.

