

## York University Building Standards

*Note to the Designer/Architect/Engineer: These standards are basic minimum criteria to be met in preparing the final project specifications for this section, which is the responsibility of the Designer*

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## **1.0 GENERAL**

### **1.1 SUMMARY**

A Section Includes:

1. Metering requirements for service entrance equipment (switchboard).

### **1.11 GENERAL REQUIREMENTS:**

Each building at York University's Keele and Glendon campuses shall be equipped with a networked electrical meter, additionally there may be instances (namely for billing purposes) where additional electrical meters shall be installed to monitor and report on the electrical consumption of individual areas or tenants of a building such as food servicers and or other tenants.

In addition to a dedicated electrical meter, each building at York University's Keele and Glendon campuses is required to have a separate natural gas, chilled water, potable water, and steam meter.

### **1.2 REFERENCES:**

As required comply and/or certified with/by:

Canadian Standards Association (CSA) listed equipment, assemblies and materials

Measurements Canada Revenue, electricity reference standard

International Organization for Standardization (ISO) 9002 Quality

Assurance Standard for manufacturing

## **2.0 PRODUCTS**

### **2.01 Digital Power Instrumentation Package – FULL FEATURED**

- .1 The Digital Power Instrumentation Package shall be a true RMS, bi-directional, four quadrant meter capable of measuring, calculating and directly displaying on the front panel display the following information in user programmable groups.
  1. Voltage, Current, kW, kVAR, kVA Power Factor, harmonics, demand, minimums and maximums for each phase and totals for all

- phases. KWh, kVARh, kVAh totals for all phases. Voltage and current unbalance, frequency, k-factor.
2. Harmonic distortion for each voltage and current input, provided as individual harmonic magnitudes up to the 15th harmonic.
- .2 The Digital Power Instrumentation Package shall:
1. Require no PTs on voltage inputs for Delta or Wye (Star) systems up to 600 VAC.
  2. Have a graphical backlit LCD panel display that can be mounted up to 6 feet (1.8 meters) from the metering device.
  3. Include four (4) digital (status) dry-contact inputs.
  4. The Instrument shall include 512kB of non-volatile memory (NVRAM) to store a time-stamped event log capable of storing at least 500 events. Two (2) programmable data recorders that can each store up to 16 channels of historical trend data to record any measured or derived value to allow storage of any 32 parameters.
  5. The instrument shall support multiport communications that provides two ports for RS-485 communications and can interface with multiple software and control systems. The meter shall support ION, DNP3.0, Modbus TCP and Modbus RTU protocols, through serial or Ethernet communications.
  6. Include 10BaseT Ethernet communications port and Ethergate communications networking capabilities
  7. Have an on-board WebMeter functionality that allows a standard Internet browser to point directly to the meter via the Ethernet port for viewing real-time data and set-up information.
  8. The Instrument shall provide setpoint control of internal recording mechanisms and all digital output relays as follows:
    - a) 12 programmable setpoints shall be provided, each of which can respond to out-of-range and alarm conditions for any measured or internally derived values.
  9. Meet the following standards:
    - Measurement Canada Revenue approved.
    - Certified to CAN/CSA-C22.2 No.1010-1
    - Manufactured under ISO 9002 Quality Assurance Standard
    - Have accuracy specifications that comply with ANSI C12.16 Class 10.
- .3 Approved Manufacturers
1. The Digital Power Instrumentation Package shall be equivalent to the following models:
    - a) Power Measurement ION7330 Model P7330R0B0B0E0A0A
    - b) Approved equivalent.

**2.02 Instrument Transformers**

- .1 Current Transformers (CTs)
  1. All Current Transformers shall be donut type with a 5A secondary unless noted otherwise.
  2. CTs shall be Measurement Canada type approved or have a minimum accuracy of 0.3%.
  3. All CT secondaries shall terminate in CT shorting blocks before being wired to the meter.
  4. One CT is required for each phase being metered.
- .2 Potential Transformers (PTs).
  5. PTs shall be supplied as required.
  6. PTs shall be wired line-neutral for Wye systems and line-line for delta systems.
  7. CTs shall be Measurement Canada type approved or have a minimum accuracy of 0.3%.
  8. Meters shall not be powered from the PT secondaries.
  9. Voltage inputs shall be fed from a dedicated 15A breaker in distribution panel where practical.
  10. Supply and install appropriate 1A fuses.

**2.03 Meter Enclosures**

- .1 The digital meters shall NOT be installed in switchgear and must be remote mounted in a separate enclosure.
- .2 Where meters are not installed in distribution equipment, the meters shall be installed in pre-wired, NEMA 12, CSA approved enclosures.
  1. Multiple meters may be installed in the same enclosure.
  2. Meters supplied from two different switch-boards or different sources cannot be installed in the same enclosure.
  3. Meters shall be wired according to manufacturer's recommended method.
  4. Meter control power shall be from a separate source or control power transformer and not from the phase inputs to the meter.

**2.04 Communications / Networking Components**

- .1 To enable the meters to communicate to the central monitoring software, CAT5 – 10BaseT Ethernet shall be run to each meter enclosure. One meter shall have Ethernet connectivity and provide Ethergate network gateway communications to other meters in the same enclosure.
- .2 Routers or other required networking components shall be provided according to York University's standard.

**2.05 Monitoring and Reporting Software**

- .1 The contractor shall allow for two days of on-site system configuration to integrate the new meters into the existing ION Enterprise and ION EEM software package. The work shall include:
  1. Modifying the single line diagram as required.
  2. Developing new energy and demand reports to allow for sub-billing.
- .2 New energy consumption and billing reports shall be created in ION EEM. The report configuration shall match existing reports.
- .3 Any work shall be coordinated with the end user prior.
- .4 The software shall be of be configured and commissioned by approved system integrator, or by Schneider Electric Services.

**2.06 Warranty and Service**

- .1 The manufacturer warrants the products it supplies for a period of one (1) year from the acceptance date.
- .2 Warranty Service may be performed by the manufacturer or authorized representative.

**3.0 EXECUTION****3.1 Acceptable Installers**

- .1 The instrument shall be installed by a qualified electrical contractor.

**3.2 Installation**

- .1 All power supply and communications wiring connections shall be performed in accordance with the guidelines set out in the product documentation.
- .2 All voltage sensing connections to instrumentation shall be made with 2A fuses.
- .3 Where practical, the meters voltage inputs shall be from a dedicated breaker.

- .4 Appropriately sized current transformers must be installed on each phase and must be installed with CT shorting blocks. All CTs with 5A secondary shall have CT shorting blocks.
- .5 Meters must be powered from an auxiliary power supply, and not powered from the PTs.
- .6 The installation must be in accordance with the Electrical Safety Authority permit requirements.
- .7 All communications networking including hubs, routers, etc. shall be provided by the contractor in accordance with the applicable standards and approved by York University.

3.3 Configuration

- .1 The meters shall be properly configured for the system.
- .2 Any power quality settings on the meters shall be configured so the meter’s disturbance capture and transient detection is enabled.
- .3 Communications networking shall be tested and proved to be working before acceptance by York University.

3.4.1 Locations

- .1 The instrument shall be installed as on the drawings and in the following locations:

Location	# Meters in Enclosure	Conductor Size	CT Size	Model

End of Section 26 09 02