

**Part 1            General**

**1.1            SECTION INCLUDES**

- .1        Materials, components, cabinets, instruments and installation for metering and switchboard Instruments.

**1.2            RELATED SECTIONS**

- .1        Section 01 33 00 - Submittal Procedures.
- .2        Section 01 11 00 - General Requirements.
- .3        Section 26 05 00 - Common Work Results for Electrical.

**1.3            REFERENCES**

- .1        American National Standards Institute (ANSI)
  - .1        ANSI C39.1 (current issue), Requirements, Electrical Analog Indicating Instruments.
- .2        Canadian Standards Association, (CSA International)
  - .1        CAN3-C17 (current issue), Alternating - Current Electricity Metering.

**1.4            PRODUCT DATA**

- .1        Submit product data in accordance with Section 01 33 00 - Submittal Procedures.
- .2        Indicate meter, outline dimensions, panel drilling dimensions and include cutout template, coordinate complete installation.

**1.5            WASTE MANAGEMENT AND DISPOSAL**

- .1        Separate and recycle waste materials in accordance with Section 01 74 19 - Waste Management and Disposal.
- .2        Remove from site and dispose of all packaging materials at appropriate recycling facilities.
- .3        Collect and separate for disposal packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.
- .4        Divert unused wiring materials from landfill to metal recycling facility as approved as outlined in Waste Management Plan.
- .5        Fold up metal banding, flatten and place in designated area for recycling.

**Part 2            Products**

**2.1            METER**

- .1      Power Quality Meter
- .2      Mounted in a Separate Enclosure from Power Panel, C/W test block and CTs.
- .3      Ratings: 277/480 Vac, 3Ph, 4W

**2.2            METER CABINET**

- .1      Sheet steel CSA enclosure to Enmax standards with meter backplate, to accommodate meters, test terminal block and associated equipment, factory installed and wired.

**2.3            TEST TERMINAL BLOCKS**

- .1      Test terminal blocks: as required.

**2.4            METER READOUT**

- .1      Instantaneous Current: Voltage, Frequency, Current, Active (kW), reactive (kvar), and apparent (kVA) power factor and frequency, Voltage and current unbalance
- .2      Energy Values: Active, Reactive, Apparent
- .3      Harmonic readings: As a minimum up to the 31st harmonic
- .4      Transient Readings.

**2.5            METER RATING**

- .1      Power Quality Meter with Advanced Power Quality Measurement Accuracy.
- .2      Provide a high accuracy power meter meeting the requirements set forth in this specification. Note any exceptions taken with a detailed description.
- .3      Basic requirements of the Power Quality meter are as follows:
  - .1          Voltage inputs: The device shall be capable of interface with a 277 VAC (line-to-neutral) or 480 VAC (line-to-line) System.
- .4      Input-current
  - .1          Rated nominal current 1A, 2A, 5A, 10A
  - .2          Measurement range 0.005 - 20 A autoranging (standard range)
  - .3          Permissible overload 500 A rms for 1 s, non-recurring (5A)
- .5      Transient detection, data and waveform recording, IEC 61000-4-30 Class A & EN50160.
- .6      Harmonic Measurement, up to 31<sup>st</sup> harmonic for all voltage and current inputs
- .7      Accuracy:
  - .1          Current and voltage accuracy 0.25% + 0.05 % full scale

- .2 Power accuracy Real (kW) 0.5% reading
- .3 Apparent (kVA) 0.5% + 0.1%
- .4 Reactive (kvar) 1.5% reading
- .5 Energy accuracy
  - .1 Real (kWh) 0.5% reading
  - .2 Apparent (kVAh) 1.0% reading
  - .3 Reactive (kvarh) 1.5% reading

## **2.6 DATA RECORDING**

- .1 Min/max of instantaneous values
- .2 Historical Logs: Up to 30 days, including harmonic readings.
- .3 Waveform Logs
- .4 Trending/Forecasting

## **2.7 INTERNAL MEMORY**

Minimum 300kB Non-Volatile Internal Memory

## **2.8 COMMUNICATIONS**

- .1 Minimum Two RS-485 ports
- .2 Minimum One 10Base-T Ethernet (RJ45) port
- .3 Minimum One 33.6k universal internal modem (RJ11) port

## **2.9 Display**

- .1 An easy-to-read front panel with a back-lit LCD screen supports local data display and basic setup.

## **2.10 SHOP INSTALLATION**

- .1 Install meters and instrument transformers in separate compartment of switchboard.
- .2 Install instruments on switchboard.
- .3 Ensure adequate spacing between current transformers installed on each phase.
- .4 Verify correctness of connections, polarities of meters, instruments, potential and current transformers, transducers, signal sources, electrical supplies.

## **Part 3 Execution**

### **3.1 METERING INSTALLATION**

- .1 Install meters in location free from vibration and shock.

- .2 Make connections in accordance with diagrams.
- .3 If applicable, ensure power factor corrective equipment connected on load side of meter.
- .4 Connect meter and instrument transformer cabinets to ground.
- .5 Locate meters within 9 m of instrument transformers. Use 32 mm conduit for interconnections. Use separate conduit for each set of current transformer connections, exclusive for metering.

### **3.2 FIELD QUALITY CONTROL**

- .1 Conduct tests in accordance with Section 26 05 00 - Common Work Results - Electrical and in accordance with manufacturer's recommendations.
- .2 Perform simulated operation tests with metering, instruments disconnected from permanent signal and other electrical sources.
- .3 Verify correctness of connections, polarities of meters, instruments, potential and current transformers, transducers, signal sources and electrical supplies.
- .4 Perform tests to obtain correct calibration.
- .5 Do not dismantle meters and instruments.

**END OF SECTION**