

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

- .1 Section 26 24 02 - Service Entrance Board.
- .2 Section 26 22 19 - Control and Signal Transformers.

1.2 REFERENCES

- .1 American National Standards Institute (ANSI)
 - .1 ANSI & C12.20-2010, Standard For Electricity Meters.
- .2 CSA International
 - .1 CAN3-C17-M84(R2008), Alternating - Current Electricity Metering.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for metering and switchboard instruments and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Include meter and instruments, outline dimensions, panel drilling dimensions and installation cutout template.
 - .3 Provide electrical data for instrument current and potential transformers.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
 - .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
 - .3 Storage and Handling Requirements:
 - .1 Store materials indoors and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect metering and switchboard instruments from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.
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- .4 Packaging Waste Management: remove for reuse packaging materials as specified in Construction Waste Management Plan Waste Reduction Workplan in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

1.5 LEED 2009 REQUIREMENTS

- .1 LEED Documentation:
 - .1 Submit Material Safety Data Sheets (MSDS) or product data sheets, for all site applied interior paints, coatings, adhesives, sealants, sealant primers, concrete curing compounds, etc. to ensure compliance with LEED Requirements for low emitting materials as per Section 01 35 21.

PART 2 - PRODUCTS

2.1 METER

- .1 Three-phase owners digital meter for power energy and utilities metering complete with communications capability.
- .2 Digital meter shall support the following applications:
 - .1 Power and Energy metering including: power, energy, demand and harmonics measurements. Suitable for revenue grade measurements to ANSI C12 for bill verification, and sub-metering applications.
 - .2 Power Quality Analysis.
 - .3 Cost allocation and billing.
 - .4 Demand and power factor control.
 - .5 Load studies and circuit optimization.
 - .6 Equipment Monitoring and Control including metering of utilities including high temperature hot water and domestic water supply.
 - .7 Preventative Maintenance alarms and event logging.
- .3 Digital meter technical features shall include:
 - .1 Capability to measure:
 - .1 Tru RMS 3-phase voltage, current and power.
 - .2 Instantaneous 3-phase voltage current, frequency, and power factor.
 - .3 Energy: bi-directional, absolute and net.
 - .4 Demand: rolling block, predicted, and thermal.
 - .5 32 samples per cycle.
 - .6 Harmonics: individual and total harmonic distortion up to the 15th.
 - .7 Waveform recording.
 - .8 K-Factor.

- .2 Communications requirements to include:
 - .1 Webmeter and MeterM@il allow distribution of metered data and alarms over the Internet. Provide server software and client software (3 single user licenses) if this is required.
 - .2 Ethernet port with EtherGate allows direct Ethernet-to-RS-485 data transfer.
 - .3 Built-in modem with ModemGate.
 - .4 Two RS-485 ports.
 - .5 One front panel optical port standard.
 - .6 Modbus RTU on serial, Ethernet, modem, and infrared ports.
 - .7 DNP 3.0 on serial, modem, and infrared ports.
 - .8 Modem call-back feature offers fast alarm response.
- .3 On-Board Data Logging on include:
 - .1 Scheduled or event-driven logging of up to 32 parameters.
 - .2 Sequence-of-events and min/max logging.
- .4 Setpoints for Control and Alarms to include:
 - .1 Setpoint on any parameter or condition.
 - .2 1 second operation.
- .5 Input and Outputs to include:
 - .1 4 digital inputs for status/counter functions.
 - .2 4 digital outputs for control/pulse functions.
 - .3 4 analog inputs and 4 analog outputs.
- .4 Digital meter to be programmable and settings to be adjustable by pushbutton panel integral to meter.
- .5 Indication of measurements, data logging, alarms and programming provided on digital readout panel integral to meter.

2.2 METER CABINET

- .1 Meter to be factory installed and wired in metering cabinet. Meter display and operator control functions to be front accessible when metering cabinet cover is closed.

2.3 TEST TERMINAL BLOCKS

- .1 Test terminal blocks: as required.

2.4 INSTRUMENTS TRANSFORMERS

- .1 Provide Current Transformers and Potential Transformers as required to meter a 347/600 Vac 3-Phase 4-Wire service. Current rating to match service entrance rating.
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- .2 Instrument transformers in accordance with Section 26 22 19 - Control and Signal Transformers.

2.5 SHOP INSTALLATION

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

2.6 EMCS INTERFACE

- .1 Metering system shall be capable of communicating with EMCS.

2.7 LEED 2009 REQUIREMENTS

- .1 All site applied interior paints, coatings, adhesives, sealants, sealant primers, concrete curing compounds, etc. to comply with LEED Requirements for low emitting materials as per Section 01 35 21 - LEED 2009 Requirements.

PART 3 -EXECUTION

3.1 EXAMINATION

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for metering and switchboard instruments installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate in presence of Departmental Representative.
 - .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

3.2 METERING INSTALLATION

- .1 Install meters and instruments in location free from vibration and shock.
 - .2 Make connections in accordance with diagrams.
 - .3 Connect meter and instrument transformer cabinets to ground.
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- .4 Locate meters as recommended by manufacturer.
 - .1 Use 35 mm conduit for interconnections.
 - .2 Use separate conduit for each set of current transformer connections, exclusive for metering.
- .5 Provide all necessary meter programming to ensure unit has full functionality as outlined in Part 2. Meter shall be programmed and wired to read status inputs from main circuit breaker, water pulse output and consumption via communication with water meter and alarms from padmount transformer.

3.3 FIELD QUALITY CONTROL

- .1 Conduct tests in accordance with Section 26 05 00 - Common Work Results for 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.

3.4 TRAINING

- .1 Provide four (4) hours training on site by factory trained technician and demonstrate set-up and programming of the meter.

3.5 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
 - .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
 - .3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.
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3.6 PROTECTION

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by metering and switchboard instrument installation.