SECTION 16430

METERING

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

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

B. Related Sections:

1. Section 16420 - Service Entrance
2. Section 16425 - Switchboards

1.02 REFERENCES

A. Specify Underwriters Laboratories (UL) listed equipment, assemblies and materials.


1.03 SUBMITTALS

A. Require submittals under the provisions of Section 16010 - Basic Electrical Requirements and 01300 - Submittals.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Instrument Transformers:

1. Potential Transformer:

   a. Metering Potential Transformers:
      i. Potential transformers are to be installed with all kWh meters on systems above 120/208 volts
      ii. 0.3 metering accuracy classes
      iii. Placed in the switch gear and protected by 1 AMP 3 pole breaker
      iv. All metering is presently 3 phase 4 wire systems
      v. Land on (terminated at) a terminal block in the switchgear.
2. Current Transformers: (ANSI/IEEE C57.13 & C37.20)

   a. Metering Current Transformers:

   **Current transformers are required for any service above 20 amps.**

      i. Provide a four point shorting terminal strip for the C.T. wiring in the switchgear.
      
      ii. Rating factor of 4.0 @ 30 degrees centigrade or 3.0 @ 55 degrees to allow greater thermal capacity under loads at levels above 5 amps for greater billing accuracy.
      
      iii. .3 accuracy class 0.3B1.8 or 0.15 B1.8 (preferred)

         a) Size the current transformers according to the maximum current for the switchboard providing 4 step multi-ratio CT, each step will increase by 200 or 400, for a 1600 AMPS switchboard the CT tap will be 400, 800, 1200, 1600. Each CT wire shall be marked with the CT value on both ends of the wire.

         b) All CT wiring will terminate to the shorting block(s) to accommodate 4 CT wiring located in the metering cabinet.

3. Parts List:

   a. Specified Parts:

      All electrical metering will require a test switch block.

   b. Test Switch:

      i. ABB Flexitest type FT-1 or other by approval from Utility Services

      ii. Each test switch shall be identified red for voltage and black for current.

      iii. Each test switch shall be identified beneath test block with phenolic label:

<table>
<thead>
<tr>
<th>VOLTAGE</th>
<th>CURRENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>A B C</td>
<td>A N B N C N</td>
</tr>
</tbody>
</table>

B. Meter Manufacture:

Power Logic 8600 series from main energy metering, series 7300 for sub metering, or approved equal from the Manager of Utility Services.
1. Meter specifications

a. Electrical meter specifications for 8600 and 7300 series metering:

General:
- Current accuracy per meter specification 0.1% (8600), 0.25% (7300)
- Voltage accuracy per meter specification 0.1% (8600), 0.25% (7300)
- Energy and power accuracy 0.2 (8600), 0.5% (7300)

Instantaneous rms values:
- Current, voltage, frequency
- Active, reactive, apparent power Total and per phase
- Power factor Total and per phase
- Current measurement range (auto ranging) 0.01 - 20A

Energy values:
- Active, reactive, apparent energy
- Settable accumulation modes

Demand values:
- Current Present and max. values
- Active, reactive, apparent power Present and max. values
- Predicted active, reactive, apparent power
- Synchronisation of the measurement window
- Demand modes Block, sliding

Power quality measurements:
- Harmonic distortion Current and voltage
- Individual harmonics
- Waveform capture
- Detection of voltage swells and dips
- Adaptive waveform capture
- Detection and capture of transients

Data recording:
- Disturbance waveform capture and power quality report
- Min/max of instantaneous values

Data logs:
- Event logs
- Trending
- Alarms
- Time stamping

GPS synchronization:

Communication:
- RS 485 / RS 232 (Com 1 to 4)
- RS 485 port
- Infrared port
- Modbus protocol
PART 3 - EXECUTION

3.01 INSTALLATION

A. The above instrumentation and miscellaneous equipment to be installed by manufacturer of switchboard.

B. Shall comply with the two wiring diagrams at the end of this section.

C. Provide potential transformer, ratio and polarity tests and wiring checks.

D. Provide current transformer, ratio and polarity tests and wiring checks.

E. Provide an Ethernet connection to each meter.

F. Metering and test switch must be installed and accepted before permanent power will be established to the facility.

G. Meter wiring.

1. Stranded #14 or 12 AWG. for Potentials and #10 AWG from CT to test block, #12 from test block CT to meter CT input.
2. Color coded Black (A), Red (B), Blue (C), White (N) for potentials.
3. Color coded Brown (A), Orange (B), Yellow (C), Green (Ground) for currents.
4. All terminations shall have compression type connectors either stud or ring type for potentials and ring type only for current.

H. Contractor to verify current transformer polarity to the electrical meter, changing polarity via electrical meter software is not permitted. The same will apply for voltage potentials circuits.

I. Install the electrical meter and the disconnect test switch at 72\" or less AFF.

J. For all other electric meter applications and installations (i.e. sub-meters), contact Utilities Generation & Distribution for details.

K. Non-state funded projects shall reimburse Utilities Generation & Distribution for the cost and installation of the electric meter.
4.01 SPECIAL REQUIREMENTS

A. No other device other revenue meters shall be allowed to be connected with these current transformers.

B. Secondary wiring from current transformers shall be terminated at terminal block provided with shorting screws, before connecting with meter, with #12 AWG size conductors. All secondary wirings shall use ring type connectors.

C. From PowerLogic ION meters data output to CU server shall be carried out through Cat 5 or Cat 6 with 22 AWG Ethernet cables to a dedicated Ethernet connection at the patch panel. Use Belden cable 7958A or equivalent from the switchboard meter section to the patch panel.

D. The metering cabinet shall be marked with phenolic label with the CT and PT name plate.

END OF SECTION 16430