SECTION 26 09 13
ELECTRICAL POWER MONITORING AND CONTROL

PART 1 - GENERAL

1.1 SCOPE

A. This section defines low voltage power metering for use in AC systems. These low voltage power meters may be applied on systems direct voltage measurements rated up to 600V (L-L) and 346V (L-N) without Potential Transformers (PT's).

1.2 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

B. ***[Related Sections include the following:***
   1. ***Section 26 09 26.03 – Lighting Control Devices***
   2. ***Section 26 23 00 – Low Voltage Switchgear***
   3. ***Section 26 24 13 – Switchboard***
   4. ***Section 26 24 16 – Panelboards***
   5. ***Section 26 24 19 – Motor Control Centers]***

1.3 SUBMITTALS

A. Submit shop drawings and product data for approval and final documentation in the quantities listed according to the Conditions of the Contract. Customer name, customer location and customer order number shall identify all transmittals.

B. ***[Final Documents: Record documentation to include wiring diagrams, [certified test reports,] instruction and installation manuals.]***

1.4 RELATED STANDARDS

A. Meet the following recognized standards for application in hardened environments:
   1. Device must meet all international standards for Safety and Construction applicable to this type of device:
      a. ANSI C12.20, 0.5% Revenue requirements
   2. The meter shall also meet the followings standard compliances:
      a. UL, CSA and CE Approvals:
         1.) UL 61010-1, 3rd Edition
         2.) UL 61010-2-030, 1st Edition
         3.) CAN/CSA-C22.2 NO. 61010-1, 3rd Edition
         4.) CE approved.
   3. The meter shall meet the following Safety / Construction Standards:
      a. IEC61010-1 (EN61010-1): Safety Requirements for Electrical Equipment, Control and Laboratory Use.
      b. CAN/CSA C22.2 No. 61010-1 3rd Edition: Safety requirements of Canadian Standard Association.

1.5 QUALITY ASSURANCE.

A. Manufacturer Qualifications: Manufacturer of this equipment shall have a minimum of 10 years' experience producing similar electrical equipment.
   1. Comply with requirements of latest revisions of applicable industry standards.
   2. No recalibration shall be required.

1.6 DELIVERY, STORAGE AND HANDLING

A. Store and handle in strict compliance with manufacturer's instructions and recommendations. Protect from potential damage from weather and construction operations. If the meters are

installed in equipment, store the equipment so condensation will not form on or in it. If necessary, apply temporary heat where required to obtain suitable service conditions.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. ***[The low voltage power meter shall be one of the following types of MD Networked Metering System by Siemens Industry Inc. or pre-approved equal.***
   a. ***[MD3HDRDN]***
   b. ***[MD3HDCDN]***
   c. ***[MD12HDCDN]***
   d. ***[MD24HDCDN]***
   e. ***[MD48HDCDN]***

Approved manufacturers are as follows:
1. ***SIEMENS (ACCESS)***
2. ***.]***

2.2 COMPONENTS

A. Revenue accurate multifunction power meter.
   1. Provide a high accuracy power meter meeting the requirements set forth in this specification. Note any exceptions taken with a detailed description.
      a. Meter shall be a Siemens MD Networked Metering System with options and features described in this section.
   2. The meter shall have at least the following features:
      Current inputs: **Select one or all that apply.** The meter(s) shall be ***[MD3HDRDN and it shall accept three 333mV nominal current inputs.][MD3HDCDN and it shall accept three 333mV nominal current inputs.][MD12HDCDN and it shall accept twelve 333mV nominal current inputs.][MD24HDCDN and it shall accept twenty-four 333mV nominal current inputs.][MD48HDCDN and it shall accept forty-eight 333mV nominal current inputs.]***
      The current inputs are capable of measuring up to 333mV RMS. All current inputs provide:
      1.) IEC 61000-4-4 EFT Severity Level 4 protection of 4kV.
      2.) IEEE 37.90.1 Electrical Oscillatory SWC protection of 2.5kV.
      b. The meter shall have four voltage inputs (L1, L2, L3, and N). The voltage inputs can measure from 0 to 346 Vrms (line-to-neutral) or from 0 to 600 Vrms (line-to-line).
         1.) MD24HDCDN and MD48HDCDN shall have two sets of four voltage inputs which allow measurements of two voltage sources.
      c. The meter shall have provisions for direct connection (requires no PTs) for Wye (Star) systems up to 346VAC (line-to-neutral) or 600VAC (line-to-line). All voltage inputs provide:
         1.) Dielectric withstand of 3600VAC RMS, 60Hz for 1 minute.
         2.) AC line surge protection of 6kV.
      d. Power supply:
         1.) 90-600VAC 50/60Hz
            a.) 500mA maximum input current.
         2.) USB power during PC configuration.
      e. Operating frequency: 50/60Hz.
      f. Standard Communications ports shall be
         1.) RJ45 TCP 10 and 100 Mbit/s Copper Ethernet communication.
         2.) RS-485 communication.
         3.) USB.
      g. The meter shall have the following communications ports:
         1.) ***[Modbus RTU (RS-485) serial***

Modbus will be programmable to communicate at speeds from 9600 to 115.2Kbits per second.]

2.) ***[BACnet MS/TP (RS-485) serial***
BACnet will be programmable to communicate at speeds from 9600 to 115.2Kbits per second.]

3.) ***[Modbus TCP (RJ45) ethernet.]***

4.) ***[BACnet IP (RJ45) ethernet.]***

5.) ***[Under voltage Alarm Output.]***

6.) ***[Pulse inputs for the following meters:***

a.) ***[MD12HDCDN four pulse Inputs to customer dry contact pulse output, Max pulse rate 10Hz]***

b.) ***[MD24HDCDN two pulse Inputs to customer dry contact pulse output, Max pulse rate 10Hz]***

c.) ***[MD48HDCDN two pulse Inputs to customer dry contact pulse output, Max pulse rate 10Hz.]]***

h. Inputs/Outputs: The meter shall have:

1.) Dry Digital Inputs, Max pulse rate 10Hz:

a.) MD12HDCDN - four.

b.) MD24HDCDN - two.

c.) MD48HDCDN - two.

2.) One Dry Digital Alarm Outputs – rated 0-30VDC max, 50mA max.

i. A universal counter shall be designed into the meter to count pulses coming into the digital inputs for measuring variables such as Water, Air, Gas, Electric and Steam (excluding MD3HDCDN and MD3HDRDN models).

j. A/D Sample Rate shall be at least 30 samples per cycle.

k. Meter design shall be:

1.) A background-illuminated LCD.

2.) Ingress protection for all models except for MD3HDRDN- IP30

3.) An overview size of:

a.) MD3HDRDN -7.51”L (191mm) X 3.24”W (82mm) X 1.48” H (38mm).

b.) MD3HDCDN -10.12”L (257mm) X 5.50”W (140mm) X 2.12” H (54mm).

c.) MD12HDCDN -9.76”L (248mm) X 9.88”W (251mm) X 3.15” H (80mm).

d.) MD24HDCDN -13.27”L (337mm) X 9.88”W (251mm) X 3.15” H (80mm).

e.) MD48HDCDN -13.27”L (337mm) X 9.88”W (251mm) X 3.15” H (80mm).

2.3 OVERVIEW

A. The meter shall be able to be upgraded in the field without removing the meter.

B. The meter shall measure the following variables as standard without optional plug-in modules or optional cards:

1. Basic Measurements
   a. Voltage (l-n) per phase, Voltage (l-l) per phase, Voltage (l-l) average, Voltage (l-n) average, Current per phase, Current average total, Active Power (kW) per phase and total, Apparent Power (kVa) per phase and total, Reactive Power (kVAR) per phase and total.
2. Advanced Measurements (Included)
   a. Apparent Power factor (per phase and total), Displacement Power factor (per phase and total), Power THD (per phase and total), Frequency, Meter running counter, Pulse input counter (except for MD3HDCDN and MDHDRDN models).
3. Energy Measurements
   a. Energy (kWh) net/import/export, Apparent energy (kVAh) net/import/export, Reactive energy (kVARh) net/import/export, Peak power demand (kW), and Apparent power (kVA) peak demand.

C. The meter shall display “actual” readings on the display. No manual calculation shall be required to obtain actual readings.

D. The meter shall have integrated web pages to display real-time data.

E. The meter shall have hardware write protection prevents write access to the device, both via the communication interface and on the display.

F. The meter shall be field programmable as follows:
   1. Basic parameters: Voltage input scale, voltage mode (Wye, Delta, single phase), current input scale, auxiliary input scales, and communications setup parameters are programmable via the communications port using a portable or remotely located computer terminal.
   2. Provisions must be made to ensure that programming through the front panel is secured by password.

2.4 DESIGN

A. The MD Networked Metering System meter shall be available in the following unit design configurations:
   1. ***[MD3HDRDN - 3 Channels HD Meter with rail mount enclosure]***
   2. ***[MD3HDCDN - 3 Channels HD Meter with wall mount enclosure]***
   3. ***[MD12HDCDN - 12 Channels HD Meter with wall mount enclosure]***
   4. ***[MD24HDCDN - 24 Channels HD Meter with wall mount enclosure]***
   5. ***[MD48HDCDN - 48 Channels HD Meter with wall mount enclosure]***

PART 3 - EXECUTION

3.1 INSTALLATION

A. The Contractor shall furnish, install, and terminate all communication conductors and associated conduits external to any factory supplied equipment.

B. All communication conductor wiring and routing shall be per the manufacturer's recommendations and as shown on the contract drawings.

C. Additional connections to metering systems, where applicable, shall be done in the field by ***[the manufacturer’s start-up service group.][the installing contractor.]***

3.2 ADJUSTING AND CLEANING

A. No adjustments are required.

B. Clean exposed surfaces using manufacturer recommended materials and methods.

3.3 TESTING

A. Perform factory and installation tests in accordance with applicable NEC, NEMA and UL requirements.

3.4 WARRANTY

A. Equipment manufacturer warrants that all goods supplied are free of non-conformities in workmanship and materials for five years from date of shipment.

3.5 ***[STARTUP SERVICES***

A. ***[Engage a factory-authorized service representative to perform startup service.***

B. ***Train Owner's maintenance personnel on procedures and schedules for energizing and de-energizing, troubleshooting, servicing and maintaining equipment and schedules.***

C. ***Verify that the [meter is][meters are] installed and connected according to the Contract Documents.***

D. ***Verify that electrical control wiring installation complies with manufacturer's submittal by means of point-to-point continuity testing. Verify that wiring installation complies with requirements in Division 26 Sections.***

E. ***Complete installation and startup checks according to manufacturer's written instructions.]***

3.6 SUPPORT

A. The electrical equipment manufacturer shall provide a 24x7, 1-800 number for telephone support.

B. PMCS Vendor shall provide training at a dedicated training facility within their Power Monitoring Headquarters, complete with software, devices, and demonstrations.

C. The PMCS vendor shall also provide on-line support for technical information and literature.

END OF SECTION