SECTION 26 27 13 – ELECTRICITY METERING

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes Owner's electricity meters used to manage electrical power system.

1.3 DEFINITIONS

A. KY or KYZ Pulse: Term used by metering industry to describe method of measuring consumption of electricity (kWh) that is based on relay opening and closing in response to rotation of disk in meter. Electronic meters generate pulses electronically.

1.4 ACTION SUBMITTALS

A. Product Data:

1. For each type of meter.
2. For metering infrastructure components.
3. For metering software.

B. Shop Drawings: For electricity-metering equipment.

1. Include elevation views of front panels of control and indicating devices and control stations.
2. Include diagrams for power, signal, and control wiring.
3. Wire Termination Diagrams and Schedules: Include diagrams for power, signal, and control wiring. Identify terminals and wiring designations and color-codes to facilitate installation, operation, and maintenance. Indicate recommended types, wire sizes, and circuiting arrangements for field-installed wiring, and show circuit protection features. Differentiate between manufacturer-installed and field-installed wiring.
4. Block Diagram: Show interconnections between components specified in this Section and devices furnished with power distribution system components. Indicate data communication paths and identify networks, data buses, data gateways, concentrators, and other devices used. Describe characteristics of network and other data communication lines.

C. Qualification Data: For testing agency.

D. Field quality-control reports.

E. Sample Warranty: For special warranty.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: In addition to items specified in Section 017823 "Operation and Maintenance Data," include following:

1. Application and operating software documentation.
2. Software licenses.
3. Software service agreement.
4. Device address list.
5. Hard copies of manufacturer's operating specifications, user's guides for software and hardware, and PDF files on USB storage device of hard-copy Submittal.
6. Meter data sheet for each meter, listing nameplate data and serial number, accuracy certification, and test results.
7. Meter installation and billing software startup report.

1.6 QUALITY ASSURANCE

A. Testing Agency Qualifications: NRTL.

1.7 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of metering equipment that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, damage from transient voltage surges.
2. Warranty Period: Cost to repair or replace parts for 2 years from date of Substantial Completion.
3. Extended Warranty Period: Cost of replacement parts (materials only, f.o.b. nearest shipping point to Project site), for 8 years, that failed in service due to transient voltage surges.

1.8 COORDINATION

A. Electrical Service Connections:

1. Coordinate with utility companies and utility-furnished components.
    a. Comply with requirements of utility providing electrical power services.
    b. Coordinate installation and connection of utilities and services, including provision for electricity-metering components.

PART 2 - PRODUCTS

2.1 SYSTEM DESCRIPTION

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by qualified testing agency, and marked for intended location and application.

B. Comply with UL 916.

2.2 ELECTRICITY METERS

A. System Description: Able to meter designated activity loads, with or without external alarm, control, and communication capabilities, or other optional features.

1. Comply with ANSI C12.1 and ANSI C12.20, 0.2 accuracy class.
2. Ambient Temperature: Minus 22 degrees F to plus 158 degrees F.
3. Humidity: Zero to 95 percent, noncondensing.

B. General Requirements for Meters:

1. Certify that meters comply with ANSI C12.20 requirements by laboratory accredited by National Voluntary Laboratory Accreditation Program (NVLAP) of National Institute of Standards and Technology (NIST). Laboratory shall use test equipment that is certified annually and is traceable to NIST standards.
2. Enclosure: Supplied by meter manufacturer, NEMA 250, Type 1 minimum, with provisions for locking or sealing.
3. Identification: Comply with requirements in Section 260553 "Identification."
4. Onboard Nonvolatile Data Storage: kWh, until reset.
5. Sensors: Current-sensing type, supplied by electronic meter manufacturer, with current or voltage output, selected for optimum range and accuracy for meters indicated for this application.
    a. Type: Solid core, complying with recommendation of meter manufacturer.

C. kWhd Meter: Electronic 3-phase meters, measuring electricity use and demand. Demand shall be integrated over 15-minute interval.

1. Voltage and Phase Configuration: Meter shall be designed for use on circuits with voltage rating and phase configuration indicated for its application.
2. Display: LCD with characters not less than 0.25 inch high, indicating following:
    a. Accumulative kWh.
    b. Current time and date.
    c. Current demand.
    d. Historic peak demand.
    e. Time and date of historic peak demand.
3. Retain accumulated kWh and historic peak demand in nonvolatile memory, until reset.

D. Remote Reading Options:

1. Pulse Output: KYZ, complete with optical sensor and interface devices.
2. Serial Interface: RS-232.
3. Serial Interface: RS-485, with Modbus RTU protocol.
4. USB interface.
5. TCP/IP adapter.

E. Uninterruptible Power Supply: Single phase, 120V ac, sized and rated to provide continuous power to meter for operations of 48 hours after interruption of normal power.

1. Output: Sine wave, total harmonic distortion less than 5 percent at full load.
2. Battery: Maintenance free, sealed, lead acid, and leakproof.
3. Control Panel: LED status display of "on-battery," "replace battery," and "overload."

PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with equipment installation requirements in NECA 1.

B. Install arc-flash labels as required by NFPA 70.

C. Wiring Method:

1. Comply with requirements in Section 260519 "Low-Voltage Power Conductors and Cables."
2. Minimum conduit size shall be 1/2 inch.

3.2 IDENTIFICATION

A. Comply with requirements for identification specified in Section 260553 "Identification." Equipment Identification Labels: Self-adhesive labels with clear protective overlay.

3.3 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.

B. Tests and Inspections:

1. Equipment and Software Setup:
    a. Set meter date and time clock.
    b. Test, calibrate, and connect pulse metering system.
    c. Set and verify billing demand interval for demand meters.
    d. Report settings and calibration results.

e. Set up reporting and billing software, insert billing location names and initial constant values and variable needed for billing computations.

2. Connect load of known kilowatt rating, 1.5 kW minimum, to circuit supplied by metered feeder.

3. Turn off circuits supplied by metered feeder and secure them in off condition.

4. Run test load continuously for 8 hours minimum, or longer, to obtain measurable meter indication. Use test-load placement and setting that ensures continuous, safe operation.

5. Check and record meter reading at end of test period and compare with actual electricity used, based on test-load rating, duration of test, and sample measurements of supply voltage at test-load connection. Record test results.

6. Generate test report and billing for each tenant or activity from meter reading tests.

C. Electricity metering will be considered defective if it does not pass tests and inspections.

D. Prepare test and inspection reports.

3.4 SOFTWARE SERVICE AGREEMENT

A. Technical Support: Beginning at Substantial Completion, service agreement shall include software support for 2 years.

B. Upgrade Service: At Substantial Completion, update software to latest version. Install and program software upgrades that become available within 2 years from date of Substantial Completion. Upgrading software shall include operating system and new or revised licenses for using software.

1. Upgrade Notice: At least 30 days to allow Owner to schedule and access system and to upgrade computer equipment if necessary.

3.5 DEMONSTRATION

A. Engage factory-authorized service representative to train Owner's clerical and maintenance personnel to use, adjust, operate, and maintain electronic metering and billing software.

END OF SECTION