SECTION 262713 - ELECTRICITY METERING

Revise this Section by deleting and inserting text to meet Project-specific requirements.

This Section uses the term "Architect." Change this term to match that used to identify the design professional as defined in the General and Supplementary Conditions.

Verify that Section titles referenced in this Section are correct for this Project's Specifications; Section titles may have changed.

1. GENERAL
   * + 1. RELATED DOCUMENTS

Retain or delete this article in all Sections of Project Manual.

* + - * 1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
      1. SUMMARY
         1. Section includes [**electricity metering**] [**work to accommodate utility company revenue meters, and Director’s Representative's electricity meters used to manage the electrical power system**].
      2. DEFINITIONS

Retain terms that remain after this Section has been edited for a project.

* + - * 1. KY or KYZ Pulse: Term used by the metering industry to describe a method of measuring consumption of electricity (kWh) that is based on a relay opening and closing in response to the rotation of the disk in the meter. Electronic meters generate pulses electronically.
      1. SUBMITTALS
         1. Submittals for this section are subject to the re-evaluation fee identified in Article 4 of the General Conditions.
         2. Manufacturer’s installation instructions shall be provided along with product data.
         3. Submittals shall be provided in the order in which they are specified and tabbed (for combined submittals).
         4. Product Data:

For each type of meter.

For metering infrastructure components.

For metering software.

* + - * 1. Shop Drawings: For electricity-metering equipment.

Include elevation views of front panels of control and indicating devices and control stations.

Include diagrams for power, signal, and control wiring.

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.

Include series-combination rating data for modular meter centers with main disconnect device.

Retain "Block Diagram" subparagraph below if this Section includes PC-based local area data bus or link to BAS.

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.

* + - * 1. Submittals for this section are subject to the re-evaluation fee identified in Article 4 of the General Conditions.

Retain "Coordination Drawings" paragraph below to require meters to be connected to Section 260913 "Electrical Power Monitoring and Control" or other integrated control system.

* + - * 1. Show interconnecting signal and control wiring, and interface devices to show compatibility of meters.
        2. For reporting and billing interfaces and adapters, list network protocols and provide statements from manufacturers that input and output devices comply with interoperability requirements of the protocol.

Coordinate "Qualification Data" paragraph below with qualification requirements and as may be supplemented in "Quality Assurance" Article.

* + - * 1. Qualification Data: For testing agency.

Retain "Field quality-control reports" paragraph below if Contractor is responsible for field quality-control testing and inspecting.

* + - * 1. Field quality-control reports.
        2. Sample Warranty: For special warranty.
      1. CLOSEOUT SUBMITTALS

Retain "Operation and Maintenance Data" paragraph below if metering includes billing software. Note that a PC is not included in

this Section and, if needed, should be obtained separately.

* + - * 1. Operation and Maintenance Data: Include the following:

Application and operating software documentation.

Software licenses.

Software service agreement.

Device address list.

Hard copies of manufacturer's operating specifications, user's guides for software and hardware, and PDF files on a USB storage device of hard-copy Submittal.

Meter data sheet for each meter, listing nameplate data and serial number, accuracy certification, and test results.

Meter installation and billing software startup report.

* + - 1. FIELD CONDITIONS

Retain this article if interruption of existing electrical service is required.

* + - * 1. Interruption of Existing Electrical Service: Do not interrupt electrical service to facilities occupied by Director’s Representative or others unless permitted under the following conditions and then only after arranging to provide temporary electrical service according to requirements indicated:

[**Architect**] [**Construction Manager**] [**Director’s Representative**] shall be notified and issued written permission no fewer than [**two**] <**Insert number**> days in advance of proposed interruption of electrical service.

* + - 1. QUALITY ASSURANCE

Retain "Testing Agency Qualifications" paragraph below if Contractor or manufacturer is required to have independent meter certification, pretesting (testing most common failure modes), or utility testing. Retain requirement to provide services of a qualified testing agency in "Field Quality Control" Article.

* + - * 1. Testing Agency Qualifications: An NRTL.
        2. List of Completed Installations: If brand names other than those specified are proposed for use, furnish the name, address, and telephone number of at least 5 comparable installations which can prove the proposed products have operated satisfactorily for 2 years.

Edit number of hours to suit.

* + - * 1. Equipment Qualifications For Products Other Than Those Specified:

At the time of submission provide written notice to the Director of the intent to propose an “or equal” for products other than those specified. Make the “or equal” submission in a timely manner to allow the Director sufficient time to review the proposed product, perform inspections and witness test demonstrations.

If products other than those specified are proposed for use furnish the name, address, and telephone numbers of at least 5 comparable installations that can prove the proposed products have performed satisfactorily for 3 years. Certify in writing that the of the Director’s Representative 5 comparable installations will allow inspection of their installation by the Director's Representative and the Company Field Advisor.

Make arrangements with the Director’s Representative of 2 installations (selected by the Director) for inspection of the installations by the Director's Representative. Also obtain the services of the Company Field Advisor for the proposed products to be present. Notify the Director a minimum of 3 weeks prior to the availability of the installations for the inspection, and provide at least one alternative date for each inspection.

Only references from the actual Director or Director’s Representative (Security Supervisor, Maintenance Supervisor, etc.) will be accepted. References from dealers, system installers or others, who are not the actual Director’s Representative of the proposed products, are not acceptable.

Verify the accuracy of all references submitted prior to submission and certify in writing that the accuracy of the information has been confirmed.

The product manufacturer shall have test facilities available that can demonstrate that the proposed products meet the contract requirements.

Make arrangements with the test facility for the Director's Representative to witness test demonstrations. Also obtain the services of the Company Field Advisor for the proposed product to be present at the test facility. Notify the Director a minimum of 3 weeks prior to the availability of the test facility, and provide at least one alternative date for the testing.

Provide written certification from the manufacturer that the proposed products are compatible for use with all other equipment proposed for use for this system and meet all contract requirements.

* + - * 1. Company Field Advisor: Secure the services of a Company Field Advisor for a minimum of 20 working hours for the following:

Render advice regarding installation of the metering equipment.

Adjusting and testing the metering equipment.

Witness final test and then certify with an affidavit that the metering equipment is installed in accordance with the contract documents and is operating properly.

Edit number of sessions and hours to suit.

Train facility personnel on the operation and maintenance of the metering equipment (minimum of 2 one hour sessions).

Explain available service programs to facility supervisory personnel for their consideration.

* + - * 1. Service Availability: A fully equipped service organization capable of guaranteeing response time within 48 hours to service calls shall be available to service the completed Work.
      1. WARRANTY

When warranties are required, verify with Director’s Representative that warranties stated in this article are not less than remedies available to Owner under prevailing local laws.

* + - * 1. Special Warranty: Manufacturer agrees to repair or replace components of metering equipment that fail in materials or workmanship within specified warranty period.

Failures include, but are not limited to, the following:

Damage from transient voltage surges.

<**Insert failure modes**>.

Verify available warranties for units and components.

Warranty Period: Cost to repair or replace any parts for [**two**] <**Insert number**> years from date of Substantial Completion.

Extended Warranty Period: Cost of replacement parts (materials only, f.o.b. the nearest shipping point to Project site), for [**eight**] <**Insert number**> years, that failed in service due to transient voltage surges.

* + - 1. COORDINATION
         1. Electrical Service Connections:

Coordinate with utility companies and utility-furnished components.

Comply with requirements of utility providing electrical power services.

Coordinate installation and connection of utilities and services, including provision for electricity-metering components.

1. PRODUCTS

Manufacturers and products listed in SpecAgent and Masterworks Paragraph Builder are neither recommended nor endorsed by the AIA or Deltek. Before inserting names, verify that manufacturers and products listed there comply with requirements retained or revised in descriptions and are both available and suitable for the intended applications.

* + - 1. SYSTEM DESCRIPTION
         1. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
         2. Comply with UL 916.
      2. UTILITY METERING INFRASTRUCTURE

Retain first paragraph below to specify enclosures and connections for utility-supplied meters.

* + - * 1. Install metering accessories furnished by the utility company, complying with its requirements.
        2. Utility-Furnished Meters: Connect data transmission facility of metering equipment installed by the Utility.

KY and KYZ pulses, referred to in "Data Transmission" subparagraph below, are generated by a relay and each pulse represents a kWh value. KYZ pulses are generated by a Form C SPDT (three-wire) relay; KY pulses are from a Form A SPST (two-wire) relay. Counting pulses yields kWh, and counting them over demand periods yields kilowatt-hour demand (kWhd). Utilities are generally able to install meters that supply their customers with KY or KYZ pulses.

Data Transmission: Transmit pulse data over control-circuit conductors, classified as Class 1 per NFPA 70, Article 725.

Retain and revise remaining paragraphs to reflect utility company's requirements for equipment to be provided by Contractor.

* + - * 1. Current-Transformer Cabinets: Comply with requirements of electrical-power utility company.
        2. Meter Sockets:

Comply with requirements of electrical-power utility company.

Retain "Meter Sockets" subparagraph below for socket-mounted meters that are installed at locations other than modular meter centers.

Meter Sockets: Steady-state and short-circuit current ratings shall meet indicated circuit ratings.

* + - * 1. Modular Meter Center: Factory-coordinated assembly of a main service [**terminal box with lugs only**] [**disconnect device**], wireways, meter socket modules, and feeder circuit breakers arranged in adjacent vertical sections complete with interconnecting buses.

[Manufacturers:](http://www.specagent.com/Lookup?ulid=2069) Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

[Eaton](http://www.specagent.com/Lookup?uid=123457087272).

[Schneider Electric USA (Square D)](http://www.specagent.com/Lookup?uid=123457087275).

[Siemens Industry, Inc., Energy Management Division](http://www.specagent.com/Lookup?uid=123457087271).

Or equal.

Comply with requirements of utility company for meter center.

Retain first subparagraph below if compliance with the utility company providing service is insufficient and if UL listing is required by authorities having jurisdiction. UL 67 covers "panelboard" construction that includes the service connection compartment and tenant feeder breakers. It includes UL 414 and UL 869 by reference.

Comply with UL 67.

Housing: NEMA 250, [**Type 1**] [**Type 3R**] [**Type 4X**] enclosure.

Meter Socket Rating: Coordinated with connected feeder circuit rating.

Coordinate "Minimum Short-Circuit Rating" subparagraph below with Drawings for indication of available fault current at meter-center supply terminals.

Minimum Short-Circuit Rating: [**22,000**] [**42,000**] [**65,000**] [**100,000**] <**Insert number**> A symmetrical at rated voltage.

Retain first subparagraph below for meters not in a modular meter center.

Steady-state and short-circuit current ratings shall have ratings that match connected circuit ratings.

Retain one of two "Main Disconnect Device" subparagraphs below if meter center is specified to have main terminal box with main lugs. Fusible switch may require more space. Consult manufacturers' data. Coordinate with Drawings for indication of poles, frame or size, and trip or fuse.

Main Disconnect Device: Circuit breaker, series-combination rated for use with downstream feeder and branch circuit breakers and having an adjustable magnetic trip setting for circuit-breaker frame sizes of 250 A and larger. Circuit breakers shall be operable from outside the enclosure to disconnect the unit. Configure cover so it can be opened only when the disconnect switch is open.

Main Disconnect Device: Fusible switch, UL 98 Type GD, series-combination rated by fuse manufacturer to protect downstream feeder and branch circuit breakers. Switch shall be operable from outside the enclosure to disconnect the unit. Configure cover so that it can be opened only when the disconnect switch is open.

Coordinate "Feeder Circuit Breakers" subparagraph below with Drawings for indication of trip setting and interrupting capacity of circuit breakers.

Feeder Circuit Breakers: Series-combination-rated molded-case units, rated to protect downstream circuit breakers and to house load centers and panelboards that have [**10,000**] <**Insert number**>-A interrupting capacity.

Physical Protection: Tamper resistant, with hasp for padlock.

Retain one of four subparagraphs below, or revise to allow Contractor the choice. See "UL 1449 Requirements" Article in the Evaluations in Section 264313 "Surge Protection for Low-Voltage Electrical Power Circuits" for discussion of UL 1449 type designations.

Surge Protection for Main Disconnect: Factory installed, integrally mounted, UL 1449 Type 1.

Surge Protection at Main Disconnect: Field-mounted external to the device, UL 1449 Type 2, with integral disconnect and overcurrent protective device.

Surge Protection at Main Terminal Box: Factory installed, integrally mounted, UL 1449 Type 1.

Surge Protection at Main Terminal Box: Field-mounted external to the device, UL 1449 Type 2, with integral disconnect and overcurrent protective device.

* + - * 1. Arc-Flash Warning Labels;

Retain one of two "Labels" subparagraphs below. Retain first subparagraph if the overcurrent protective device arc-flash study is included in the Work of Contractor. Retain second subparagraph if overcurrent protective device arc-flash study results are indicated on Drawings.

Labels: Apply a 3-1/2-by-5-inch thermal transfer label of high-adhesion polyester for each work location included in the analysis.

Labels: Apply a 3-1/2-by-5-inch thermal transfer label of high-adhesion polyester for each work location included in the analysis. Labels shall be machine printed, with no field-applied markings.

The label shall have an orange header with the wording, "WARNING, ARC-FLASH HAZARD," and shall include the following information taken directly from the arc-flash hazard analysis:

Location designation.

Nominal voltage.

Flash protection boundary.

Hazard risk category.

Incident energy.

Working distance.

Engineering report number, revision number, and issue date.

* + - 1. ELECTRICITY METERS

Coordinate this article with Drawings.

* + - * 1. System Description: Able to meter designated activity loads, with or without external alarm, control, and communication capabilities, or other optional features.

* + - * 1. [Manufacturers:](http://www.specagent.com/Lookup?ulid=2070) Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

[Eaton](http://www.specagent.com/Lookup?uid=123457087280).

[General Electric Company (GE Power)](http://www.specagent.com/Lookup?uid=123457175495).

[Schneider Electric USA (Square D)](http://www.specagent.com/Lookup?uid=123457087279).

Or equal.

Circuit: 120/240-V ac, 100 A.

Measure: kWh, onboard LED display.

Remote-Reading Options: None.

* + - * 1. General Requirements for Meters:

See "Meter Standards and Accuracy" Article in the Evaluations for discussion about meter accuracy.

Billing Meters Accuracy: [**0.2**] [**0.5**] [**1.0**] percent of reading, complying with ANSI C12.20.

Retain one of two certification subparagraphs below.

Retain "Meter Certification" subparagraph below if required by authorities having jurisdiction. Below may also be retained as a quality-control option even if not required by authorities having jurisdiction.

Meters Certification: Certified by [**California Type Evaluation Program**] <**Insert agency**> as complying with [**4 CCR 4027, Article 2.2**] <**Insert state or Federal regulatory requirement**>.

Retain first subparagraph below if Owner or a local authority requires verification of compliance with specified standard for electronic meter accuracy.

Certify that meters comply with ANSI C12.20 requirements by a laboratory accredited by the National Voluntary Laboratory Accreditation Program (NVLAP) of the National Institute of Standards and Technology (NIST). The laboratory shall use test equipment that is certified annually and is traceable to NIST standards.

Enclosures are usually available in NEMA 250, Type 1 (standard indoor), Type 3R (indoor or outdoor) and Type 4X (indoor or outdoor with additional protection against corrosion).

Enclosure: Supplied by meter manufacturer, NEMA 250, [**Type 1**] [**Type 3R**] [**Type 4X**] minimum, with provisions for locking or sealing.

Onboard Nonvolatile Data Storage: kWh, until reset.

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.

Split-core sensor in "Type" subparagraph below is installed in switchboard or panelboard without disturbing feeder connection, but is less accurate. Solid-core sensor is usually installed in a separate compartment or in a separate current-transformer cabinet.

Type: [**Split**] [**and**] [**solid**] core, complying with recommendation of meter manufacturer.

* + - * 1. kWh Meter: Electronic [**single-phase**] [**and**] [**three-phase**] meters, measuring electricity use.

Voltage and Phase Configuration: Meter shall be designed for use on circuits with voltage rating and phase configuration indicated for its application.

Retain one of two "Display" subparagraphs below.

Display: LCD with characters not less than 0.25 inch high, indicating accumulative kWh and current kilowatt load. Retain accumulated kWh in a nonvolatile memory, until reset.

Display: Digital electromechanical counter, indicating accumulative kWh.

The demand interval in "kWhd Meter" paragraph below should be same as and coordinated with the Utility.

* + - * 1. kWhd Meter: Electronic [**single-phase**] [**and**] [**three-phase**] meters, measuring electricity use and demand. Demand shall be integrated over a [**15-minute**] <**Insert time**> interval.

Voltage and Phase Configuration: Meter shall be designed for use on circuits with voltage rating and phase configuration indicated for its application.

Display: LCD with characters not less than 0.25 inch high, indicating the following:

Accumulative kWh.

Current time and date.

Current demand.

Historic peak demand.

Time and date of historic peak demand.

Retain accumulated kWh and historic peak demand in a nonvolatile memory, until reset.

* + - * 1. KY and KYZ Pulse Totalizer:

KY and KYZ pulses are generated by a relay and each pulse represents a kWh value. KYZ pulses are generated by a Form C SPDT (three-wire) relay, and are generally more accurate and more expensive than the KY pulse-output protocol. KY pulses are from a Form A SPST (two-wire) relay. KY pulse output protocol is less expensive and less accurate than the KYZ pulse-output protocol. Counting pulses yields kWh and counting them over demand periods yields kWhd.

Retain "Pulse Totalizer" subparagraph below when the metering pulse is obtained from the revenue meter provided by the Utility, and the pulse is transmitted to the totalizer via one of the remote reading options listed in "Remote Reading Options" paragraph below. Typical number of pulse input channels is one, two, or four independently scalable KYZ pulse streams. For KY pulse streams, the number accommodated by the instrument is double that for KYZ pulses.

Pulse Totalizer: An instrument for demand and billing applications where one or more utility revenue meters stream KY or KYZ energy pulses. The instrument shall totalize kWh accumulated over the user-selected period and shall log the maximum and minimum kWhd for that period. Record each period with a date/time stamp. Time period shall be user selected from one to 60 minutes.

Pulse Input: [**One**] <**Insert number**>, individually programmable, KYZ Form C (three-wire) contact pulse channels. Pulse interval, pulse rate, and minimum pulse width shall be field adjustable, set for the pulse stream provided by the utility revenue meter.

Data Totalizing Capacity of Each Channel: Not less than 149 days at 15-minute intervals.

Instrument Power: User selectable, 120-V and 277-V ac.

Clock: Line frequency.

If remote meter reading will be implemented, select the software, then the data transmission protocol and needed options.

* + - * 1. Remote Reading Options:

KY and KYZ pulse options in first subparagraph below are generated by a relay and each pulse represents a kWh value. KYZ pulses are generated by a Form C SPDT (three-wire) relay, and are generally more accurate and more expensive than the KY pulse-output protocol. KY pulses are from a Form A SPST (two-wire) relay. KY pulse output protocol is less expensive and less accurate than the KYZ pulse-output protocol. Counting pulses yields kWh and counting them over demand periods yields kWhd.

Pulse Output: [**KY**] [**KYZ**], complete with optical sensor and interface devices.

Serial Interface: RS-232.

Serial Interface: RS-485, with [**Modbus RTU protocol**] <**Insert protocol name**>.

USB interface.

TCP/IP adapter.

* + - * 1. Potential Transformers

General Electric Co.'s Type J, having:

Insulation voltage class \_\_\_\_\_\_\_\_ volts.

Modify voltage ratio to suit.

2400/120 (20:1) voltage ratio.

Many types & configurations are available for PT’s and CT’s. Consult catalogs.

Primary fusing, 6 ampere current limiting fuses.

* + - * 1. Current Transformers

General Electric Co.'s Type J, having:

Indicate voltage class. . Word processing person: Delete underlining before adding information.

Insulation voltage class \_\_\_\_\_\_\_\_ volts.

Modify voltage ratio to suit.

200/5 current ratio.

Edit subparagraph below as required.

Configuration for bus bar or cable installation.

Retain "Current-Transformer Cabinet" paragraph below if required by manufacturer for some solid-core current sensors. Consult manufacturers' literature.

* + - * 1. Current-Transformer Cabinet: Size and configuration as recommended by metering equipment manufacturer for use with indicated connected feeder and sensors.

Include article below if custom-built meter panelbox is required.

* + - * 1. Custom-Built Meter Panelbox

Hoffman Engineering Co.'s Bulletin A-12 Enclosure:

Verify that items listed in subparagraph below suit job requirements.

Assembled complete with watthour meter, ammeter, voltmeter, selector switches, terminal strip and internal wiring, ready to be surface mounted to accept connections from remotely located potential and current transformers.

NEMA 12 construction, standard gage, hot dipped galvanized steel.

Size to accommodate the installed equipment.

Paint gray or paint to match existing equipment.

Retain "Uninterruptible Power Supply" paragraph below if needed for meter operation. Typically, this is needed for remote communications and automatic meter reading equipment options.

* + - * 1. Uninterruptible Power Supply: Single phase, 120-V ac, sized and rated to provide continuous power to meter for operations of [**48**] <**Insert number**> hours after interruption of normal power.

Output: Sine wave, total harmonic distortion less than 5 percent at full load.

Battery: Maintenance free, sealed, lead acid, and leakproof.

Control Panel: LED status display of "on-battery," "replace battery," and "overload."

See "Metering" Article in the Evaluations for discussion about using metered data to allocate utility costs.

* + - * 1. Software: PC based, a product [**of**] [**recommended by**] meter manufacturer, suitable for calculating utility cost allocation.

Utility Cost Allocation: Automatically import electricity-usage records to allocate electricity costs for the following:

First five subparagraphs below are examples of utility cost allocations that must be revised to suit Project.

At least [**15**] <**Insert number**> departments.

At least [**30**] <**Insert number**> tenants or activities.

At least [**five**] <**Insert number**> processes.

At least [**five**] <**Insert number**> buildings.

<**Insert entity**>.

Activity Billing Software: Automatically import electricity-usage records to automatically compute and prepare electricity-use statements[**and invoices**] based on electricity use[**and peak demand**]. Maintain separate directory for each allocation. Prepare summary reports in user-defined formats and time intervals.

1. EXECUTION
   * + 1. INSTALLATION
          1. Comply with equipment installation requirements in NECA 1.

Retain first paragraph below to require installation of utility company's equipment. Coordinate with Drawings. Revise to suit utility company's requirements.

* + - * 1. Install meters furnished by utility company. Install raceways and equipment according to utility company's written instructions. Provide empty conduits for metering leads and extend grounding connections as required by utility company.

Retain first paragraph below if modular meter center is specified.

* + - * 1. Install modular meter center according to switchboard installation requirements in NECA 400.
        2. Install arc-flash labels as required by NFPA 70.

Indicate wiring method on Drawings. Delete "Wiring Method" paragraph below if wiring method for meters is specified in Section 260533 "Raceways and Boxes for Electrical Systems."

* + - * 1. Wiring Method:

Install unshielded, twisted-pair cable for control and signal transmission conductors.

Minimum conduit size shall be 1/2 inch.

* + - 1. IDENTIFICATION
         1. Series Combination Warning Label: Self-adhesive labels, with text as required by NFPA 70.
         2. Equipment Identification Labels: Self-adhesive labels with clear protective overlay. For residential meters, provide an additional card holder suitable for [**printed, weather-resistant card**] [**typewritten card**] with occupant's name.
      2. FIELD QUALITY CONTROL

Retain one of first four paragraphs below. Retain first "Testing Agency" paragraph below if Owner will hire an independent testing agency.

* + - * 1. Testing Agency: Director’s Representative will engage a qualified testing agency to perform tests and inspections.

Retain "Testing Agency" paragraph below to require Contractor to hire an independent testing agency.

* + - * 1. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

Retain "Manufacturer's Field Service" paragraph below to require a factory-authorized service representative to perform tests and inspections.

* + - * 1. Manufacturer's Field Service: Engage a Company Service Advisor to test and inspect components, assemblies, and equipment installations, including connections.

Retain "Perform tests and inspections" paragraph below to require Contractor to perform tests and inspection and retain option to require Contractor to arrange for the assistance of a factory-authorized service agent.

* + - * 1. Perform tests and inspections[**with the assistance of a Company Service Advisor** ].

Retain test requirements below with any combination of paragraphs above.

* + - * 1. Tests and Inspections:

Equipment and Software Setup:

Set meter date and time clock.

Test, calibrate, and connect pulse metering system.

Set and verify billing demand interval for demand meters.

Report settings and calibration results.

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

Connect a load of known kilowatt rating, [**1.5**] <**Insert number**> kW minimum, to a circuit supplied by metered feeder.

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

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

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.

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

See Section 014000 "Quality Requirements" for retesting and reinspecting requirements and Section 017300 "Execution" for requirements for correcting the Work.

* + - * 1. Electricity metering will be considered defective if it does not pass tests and inspections.
        2. Prepare test and inspection reports.
      1. SOFTWARE SERVICE AGREEMENT

Services in this article may not be allowed for publicly funded projects.

Retain article if metering includes billing software. Note that a PC is not included in this Section and, if needed, should be obtained separately.

* + - * 1. Technical Support: Beginning at Substantial Completion, service agreement shall include software support for [**two**] <**Insert number**> years.
        2. Upgrade Service: At Substantial Completion, update software to latest version. Install and program software upgrades that become available within [**two**] <**Insert number**> years from date of Substantial Completion. Upgrading software shall include operating system and new or revised licenses for using software.

Upgrade Notice: At least [**30**] <**Insert number**> days to allow Director’s Representative to schedule and access the system and to upgrade computer equipment if necessary.

* + - 1. DEMONSTRATION
         1. [**Engage a Company Service Advisor** **to train**] [**Train**] Director’s Representative's clerical and maintenance personnel to use, adjust, operate, and maintain the electronic metering and billing software.

END OF SECTION 262713