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# Standards for Electric Meter Installation and Use



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# ➡ Foreword

At Black Hills Energy, public safety and concern for the well-being of our employees and those we work with are our unwavering priorities. Zero incidents, each and every day, is the only outcome we can accept.

To achieve that objective, we provide this newly revised manual of *Standards for Electric Meter Installation and Use*. These standards are enforced throughout our company and among public and private entities and individuals.

### SAVE TIME, AVOID UNNECESSARY EXPENSE

Second to safety, these standards can help you save time and reduce the risk of costly project delays due to improper or inadequate installations. New, rewired, altered or repaired wiring intended for connection to our distribution system must comply with the rules of our company, the *National Electrical Code®*, the *National Electrical Safety Code®* and any other codes or regulations in the area served.

### LARGE OR COMPLICATED PROJECTS

While it's up to each individual to study, understand and observe all applicable codes, laws and regulations, this manual is one source for helping you do so. Questions concerning large and/or complicated electrical projects must be directed to the company's local office in advance of work beginning. If you don't, your negligence puts lives at risk and could result in costly property damage that you will be responsible for paying.

### WE DO NOT CONDUCT INSPECTIONS

The company does not assume the function of inspecting customers' wiring for adequacy, safety or compliance with electrical codes, rules and regulations. Such responsibility remains with the customer and the public authority.

### **OUR COMPLETE RULES AND REGULATIONS**

Our complete Rules and Regulations are state-based and can be found in our operating tariffs as filed with the respective state regulatory agencies, or online at:

### **Black Hills Energy**

blackhillsenergy.com/rates

### FILING FOR AN EXCEPTION

A company representative will discuss requests for exceptions to these standards only under extenuating circumstances. The request must be submitted in writing using the form included in these standards, well advance of construction and/or the purchase of equipment.

Requests are evaluated on a case-by-case basis and granted or denied in a written response. Exceptions will not be granted verbally.

To request an exception, please photocopy the form on pages 3 and 4 of this manual. The form also is located on our website. Fully complete the form and send it to the address for your state, listed below. You can also email us at bhuh.meterlab.forms@blackhillscorp.com.

### **REGULAR REVIEW AND REVISIONS**

We review these standards regularly to address constant progress in the development of materials and methods, and make revisions accordingly. We encourage you to join us in this task.

If you believe there's a safer, more efficient or more reliable way to do something, we encourage you to let us know. Your suggestion will receive thoughtful review and we may add to or replace a current standard thanks to you.

Electric Meter Services P.O. Box 1400 Rapid City, SD 57709



# Exception/Revision Form

This form is to be used when requesting exceptions or revisions to the *Black Hills Corporation Standards for Electric Meter Installation and Use*. Please print legibly or type.

I seek a revision to the following section(s):

I seek an exception to the following section(s):

Exceptions will not be granted if reliability or safety is compromised or if such exception is in violation of *NEC*<sup>®</sup> or local codes.

Address of job:	 	
City:	State:	ZIP code:

This section is responsible for the following problem(s):

# Exception/Revision Form (Continued)

This form is to be used when requesting exceptions or revisions to the *Black Hills Corporation Standards for Electric Meter Installation and Use.* Please print legibly or type.

I request the following exception/revision(s): \_\_\_\_\_

This practice will maintain/improve safety and reliability by:

Note: Please attach applicable site drawings, specifications or applicable information

Submitter:		Date:
Company name:		
Company address:		
City:	State:	Zip code:
Email:		
Telephone:	Cell:	_ Fax:
Approved by:		

# Section 1: Definitions

Note: The following definitions are furnished for the appropriate interpretation of this document and are not necessarily universally accepted definitions.

### **ACCESS POINT**

The point defined by the intersection of the customer's property line and the companyowned conductors crossing it, which serves that customer. When a customer is to be served from a distribution line in an easement on the customer's property, the access point is the pole for overhead (OH), the switch cabinet bay for primary underground (UG) or the splice box or pedestal for secondary underground (UG) from which the company-owned conductors will be fed.

### **AMI - ADVANCED METERING INFRASTRUCTURE**

System that measures, collects and analyzes energy usage.

### **AMR - AUTOMATED METER READING**

An automated method of reading registers. (Indexes)

### **APPLICANT**

The property owner, lessee, sub-lessee, their agent and/or contractor, who is applying for electric service from the company.

### AUTHORIZED CLOSED LOOP

Authorized use of electric service that is temporarily not being metered. (See definition for CLOSED LOOP)

#### AUTHORIZED COMPANY REPRESENTATIVE

Company employee authorized to administer policy and to interact with the customer, or other qualified individuals authorized by the Company to perform related duties.

### **BUS DUCT**

A preassembled unitized device containing a secondary electrical bus.

### **CLASSIFICATION OF METERING**

Commercial and Industrial (See definition

for COMMERCIAL AND INDUSTRIAL METERING), Residential (See definition for RESIDENTIAL METERING)

### **CLOSED LOOP**

Temporary unmetered electric service. (See definitions for FLAT TAP and JUMPERED)

### **COMMERCIAL AND INDUSTRIAL METERING**

Metering of any service used for the operation of a business, whether or not for profit, shall be considered as a commercial or industrial enterprise. Includes metering of all services other than residential.

### COMMISSION

Public Utilities Commission of Colorado, South Dakota Public Utilities Commission and Public Service Commission of Wyoming.

### COMPANY

The operating Companies of Black Hills Corporation<sup>™</sup>

### **COMPANY PROPERTY**

All lines, wires, apparatus, instruments, meters, load management equipment, transformers and materials supplied by the company at its expense or under its standard policies.

### CONDUIT

Standard tubular material used for mechanical protection of electrical systems which may be exposed, buried beneath the surface of the ground or encased in a building structure as required. (See definition for DUCT) Note: For the purpose of this publication, the terms Conduit and Duct are used interchangeably.

### **CONSTRUCTION ALLOWANCE**

The portion of the construction cost performed by the company at its expense.

### **CONSTRUCTION TRAILER**

A structure built on a permanent chassis designed to be transportable which is intended for installation on a site without permanent foundation.

### CONTRACTOR

Any person, company or corporation acting under contractual agreements for either the company or for the customer.



### **CURRENT TRANSFORMER (CT)**

An instrument transformer designed for the measurement or control of current.

### CUSTOMER

The applicant or user of electric service in whose name the service with the company is listed.

### **DATA PULSES**

Output pulses (KYZ) generated by the electric meter for use by the customer.

### **DEAD-END EQUIPMENT**

Various devices used to terminate service conductors.

#### **DIVERSION OF ELECTRICITY**

Unauthorized connection to the company's electric facilities where electric service is being used and not metered. (e.g. when the electric meter has been bypassed without a closed loop authorization from the company).

### DUCT

Standard tubular material used for mechanical protection of electrical systems which may be exposed, buried beneath the surface of the ground or encased in a building structure as required. (See definition for CONDUIT) Note: For the purpose of this publication, the terms Conduit and Duct are used interchangeably.

#### EMT

Electric Metallic Tubing (NEC<sup>®</sup>)

### **EXCEPTION PROCESS**

Method for approval of non-standard designs.

### **EXCESS FACILITIES**

In those instances where the company provides distribution or metering facilities at the customer's request, in excess of the facilities necessary to supply service to the customer, the customer shall be required to contract to pay the company for such facilities and to pay the company annually an amount to cover the cost of insurance, replacement (or cost of removal), licenses, fees, taxes, operation, maintenance and appropriate allocable administrative and general expenses of such excess distribution facilities.

### **FLAT TAP**

Temporary unmetered electric service. (See definitions for CLOSED LOOP and JUMPERED)

#### GAIN

Cutting a flat spot into a pole or attaching a metal device to a pole which has a flat surface on one side.

#### GRC

Galvanized Rigid Conduit (NEC®)

#### **HIGH-LEG**

The phase having the higher phase voltage to ground on a 4-wire delta-connected service, where the midpoint of one phase winding is grounded.

### ICE AND SNOW SHIELD, METER

A protective device used to prevent falling ice or snow from damaging the electric meter.

#### IMC

Intermediate Metallic Conduit (NEC®)

### INSPECTOR

The electrical inspector of the public authority.

### **INSTRUMENT TRANSFORMER**

A transformer that reproduces in its secondary circuit, the voltage or current proportional to its primary circuit.

### **ISOLATED TRANSFORMER BANK**

A transformer bank which provides electrical service to a single customer (dedicated transformer).

#### JOINT USE AGREEMENT

A contractual agreement made between the company and a third party allowing the use of company property or facilities.

#### JUMPERED

Temporary unmetered electric service. (See definitions for CLOSED LOOP and FLAT TAP)

### MANUFACTURED HOME

A structure which is transportable and intended for installation on a permanent foundation meeting the definition of a manufactured home as defined in current *NEC*<sup>®</sup>.

### **MEANS OF ATTACHMENT**

Fittings used to attach service-drop conductors.

### **METER/METERING EQUIPMENT**

The equipment necessary to measure the customer's electric energy use and demand including meter socket, instrument transformers, protective device and meter.

### **MOBILE HOME**

A structure built on a permanent chassis designed to be transportable and intended for installation on a site without permanent foundation.

### **MULTIPLE METER CENTER**

A pre-assembled multiple metering unit or fabricated meter center using meter sockets where two or more customers are metered at a common location.

### NEC® - NATIONAL ELECTRICAL CODE®

A publication of the National Fire Protection Association, Inc.

### NESC® - NATIONAL ELECTRICAL SAFETY CODE®

A publication of the Institute of Electrical and Electronic Engineers, Inc., as adopted by ANSI.

### **NOMINAL VOLTAGE**

Designation of the value of the normal effective difference in potential between any two appropriate conductors of the circuit.

### **NON-STANDARD DESIGN**

Construction not conforming to the company's standard method of design. Non-standard designs must be approved through the company's exception process. The customer may be charged for the additional cost incurred by the company.

### **POINT OF ATTACHMENT**

The point at which the service-drop conductors are attached to a building or other structure.

### **POINT OF DELIVERY**

Point where the company's electric facilities are first connected to the electric facilities of the customer.

### **PRIMARY METERING**

Metering of services above 480V nominal.

### **PUBLIC AUTHORITY**

The municipal, county or state authorities having inspectors and jurisdiction to inspect electrical installations.

### PVC

Polyvinyl Chloride (NEC®)

### RACEWAY

Any channel for holding bus bars, cables or wires, which is designed for this purpose.

### **RESIDENTIAL METERING**

Metering of services used for the exclusive use of the individual customer for domestic purposes.

### **READILY ACCESSIBLE**

An area that can be casually accessed through a doorway, ramp, window, stairway or permanently mounted ladder by a person on foot who neither exerts extraordinary physical effort nor employs special tools or devices to gain entry. A permanently mounted ladder is not considered a means of access if the bottom rung is 8 feet. or more from the ground or other permanently installed accessible surface.

### **RULES AND REGULATIONS**

The rules, regulations and condition of service as filed with the commission.

### SECONDARY CONDUCTORS

That part of the company's distribution system, which connects the secondaries of the company's distribution transformers to the service drop or service lateral.

### SERVICE

The furnishing of electric energy for the exclusive use of an individual customer.

### SERVICE TERMINATION CABINET

Cabinet required when the number and/or size of conductors exceeds the company's limit for terminating in a specified pad-mounted transformer.

### **SERVICE DROP**

The overhead service conductors from the last distribution pole or other aerial distribution support to and including the splices connecting to the serviceentrance conductors at the building or other structure.



# SERVICE-ENTRANCE CONDUCTORS, OVERHEAD SYSTEM

The service conductors between the terminals of the customer's service equipment and the point of connection to the service drop conductors.

# SERVICE-ENTRANCE CONDUCTORS, UNDERGROUND SYSTEM

The service conductors between the terminals of the customer's service equipment and the point of connection to the service lateral.

### SERVICE EQUIPMENT

Necessary equipment, usually consisting of a circuit breaker or fusible disconnect switch and their accessories, located near the point of entrance of the supply conductors to a building and intended to constitute the main control and means of cutoff for the supply to that building.

### SERVICE LATERAL

The underground service conductors between the company secondary distribution system and/ or transformer terminals and the connection to the service-entrance conductors in a terminal box or meter socket located outside the building wall. Where the meter is located in the building and no terminal box exists outside the building, the point of connection shall be considered the point of entrance of the service conductors into the building.

### SERVICE MAST

The service mast is the conduit containing the serviceentrance conductors where the point of attachment and the connection between the service drop and the service-entrance conductors is located above the roofline. The conduit extends to a point, and the weather head is located, above the roof eave. The conduit passes through the eave of the building or extends past the roofline without passing through the eave. The means of attachment is attached to the service mast.

### SERVICE RISER

The service riser is the conduit containing the serviceentrance conductors where the point of attachment and the connection between the service drop and the service-entrance conductors is located on a pole or below the roofline of the building being served. The conduit extends to a point, and the weather head is located, below the roof eave. The means of attachment is secured to the pole or building and is not attached to the service riser.

### **SERVICE TERRITORY**

Colorado, South Dakota, Montana and Wyoming.

### **VOLTAGE TRANSFORMER (VT)**

An instrument transformer intended for use in the measurement or control of a circuit and designed to have its primary winding connected in parallel with the circuit.

### **VOLTAGE UNBALANCE**

Maximum voltage deviation from average voltage.



# Section 2: General Information

Our rules and regulations mandate the terms and conditions under which electric service is supplied, and govern all classes of service in all territories served by our electric utilities. Those rules and regulations are subject to termination, change or modification, in whole or in part, at any time.

Some parts of our rules and regulations differ by state. The documents are on file and available from each state's public utilities commission, at any of our local utility offices, and on our website, www.blackhillsenergy.com. State commission contact information is also available on our website.

Our services are also subject to the information in this Black Hills Corporation Standards for Electric Meter Installation and Use, the National Electrical Code<sup>®</sup> and the National Electrical Safety Code<sup>®</sup>.

Our corporation and its business units assume absolutely no responsibility for compliance with all rules, regulations and local or state codes, including NEC®- and NESC®-related, that govern manufacturers, suppliers, electricians, facility owners or managers, engineers or other consultants.

Any waiver at any time of the company's rights or privileges under the rules and regulations will not be deemed a waiver as to any breach or other matter subsequently occurring.

### **OUR OPERATING RULES AND PRACTICES IN BRIEF**

The following are brief statements of our operating rules and practices. These statements affect the majority of connections made to our lines. For more information, please contact a company representative.

### **EFFECTIVE DATE**

This edition of the Black Hills Corporation Standards for Electric Meter Installation and Use may be used at any time on or after the publication date. Additionally, this edition shall become effective no later than Feb. 1, 2025 in all service areas.

### INTENT

The word "shall" indicates provisions that are mandatory.

The word "should" indicates provisions that are normally and generally practical for the specified conditions.

The word "may" indicates possibility.

The words "recommend" and "recommended" indicate provisions considered desirable, but not intended to be mandatory.

Exceptions to a rule have the same force and effect required or allowed by the rule to which the exception applies. All requests for exceptions shall be submitted in writing and will be responded to in writing. Verbal exceptions will not be granted.

Requirements of the NEC<sup>®</sup>, NESC<sup>®</sup>, or the public authority which are more stringent than the requirements of this document will take precedence.

### **APPLICATION FOR SERVICE**

The customer may contact the local area office to secure information relative to any application for new electric service connections or changes in existing service. Service telephone number for the company:

### Black Hills Energy: 888-890-5554

Before an electric service connection can be made to the customer's (applicant's) wiring system, it is necessary that:

- 1. The customer has made application for service.
- 2. The applicant has met all requirements of the Black Hills Corporation Standards for Electric Meter Installation and Use and the rates, rules, regulations and extension policy in effect and on file with the commission at the time of application.
- 3. The company has completed its construction.
- 4. The public authority has notified the company of approval of the installation by providing an inspection release.

Where no public authority has jurisdiction, the



company, for the customer's protection, may require written confirmation from the wiring electrician that the customer's installation conforms to the *National Electrical Code*<sup>®</sup>.

The company does not assume responsibility for the design, operation or condition of the customer's installation.

The company may make service available from either overhead or underground facilities. In cases where there are aesthetic considerations or where complicated overhead physical situations exist, the company may recommend the installation of underground facilities.

The company will not install facilities to serve a customer until the customer agrees to take the service under the applicable rate schedule and all applicable charges for construction and service, as required by the company's extension policy, are paid to the company. Additional costs incurred for digging in frost conditions when insufficient time was provided to estimate, plan, schedule and construct the necessary facilities prior to the onset of frost conditions will be paid by the customer as a non-refundable charge.

The company shall not under any circumstances be required to make an extension, which would be unprofitable and thereby cause undue hardship upon other customers of the company.

It is extremely important that the company be consulted in advance of the finalization of the customer's plans regarding the company's electric service requirements.

### **RATE SCHEDULES**

Electric service is supplied to customers under the company's established rates, rules, regulations and marketing programs as approved by the applicable commission having jurisdiction in each state. A company representative will assist the customer in understanding the company's rates and in applying them to the customer's load conditions.

### SERVICE AND LIMITATIONS

Service will be supplied to the customer from the company's nearest suitable power line of sufficient capacity to furnish adequate service at the service voltage available. Service shall not be used by the customer for purposes other than those specified in the applicable rate schedule.

### CLOSED LOOP / FLAT TAP / JUMPERED

Closed loops may be granted by special permission of the company. If permission cannot be obtained, service must be supplied through a temporary meter. Refer to Section 4, *TEMPORARY UNMETERED SERVICES*.

### CONNECTION

Connection to or disconnection from the company's distribution system shall be made by an **authorized company representative**. Under no circumstances will the customer be permitted to climb the company's poles, access the company's underground facilities or make connections to the company's lines, except as specified in *SAFETY, UNLOCK, OPEN AND/OR DE-ENERGIZE ANY ELECTRIC POWER EQUIPMENT PROCEDURES* in this section.

The company shall be notified when it is necessary to cut the meter seal due to situations where the electric service must be disconnected during an emergency or where necessary to access the meter socket by an **authorized company representative**. No persons, other than employees or agents of the company, may relocate or remove meters or other equipment owned by the company.

### CUSTOMER-OWNED METER EQUIPMENT RESTRICTIONS

Under no circumstances shall customers' equipment:

- 1. Be connected to, or in any way be served from, the secondary terminals of the voltage and/or current metering transformers.
- 2. Be installed within any metering enclosures including, but not limited to, metering transformer cabinets, transformer compartments or meter sockets.
- 3. Be connected to an unmetered bus or conductor.
- 4. No third party devices will be allowed on company metering facilities unless an authorized company representative has approved the installation or application.
- 5. Customer CT's will be allowed on the load side wires on a case-by-case basis using the exception form.

### **DIVERSION OF ELECTRICITY**

Under no circumstances shall devices or attachments be connected to the company's facilities in such a manner as to permit the use of unmetered energy except in emergencies where specifically authorized by the company. Refer to Section 4, *TEMPORARY UNMETERED SERVICES*.

### **EASEMENTS FOR COMPANY'S FACILITIES**

The customer shall provide, at the request of and at no cost to the company, necessary easements and suitable land area or building space owned and controlled by the customer for installation, construction, reconstruction, maintenance, operation, control and use of the company's overhead and/or underground facilities used or useful to render service to the customer.

### **CUSTOMER'S RESPONSIBILITY**

The customer shall give authorized employees of the company access to the premises of the customer in order to obtain information concerning connected load, to measure or test service, to read meters, to maintain equipment or for other purposes incidental to the supplying of electric service.

It is the responsibility of the customer to adequately protect the company's equipment located on the customer's property against damage. The customer shall be responsible for any damages or loss resulting from improper protection or neglect.

Pad-mounted transformers, switchgear and metering equipment shall be installed with adequate clearances for normal maintenance work as specified in Section 5 and the Drawings Section.

Underground distribution facilities will not be installed until the property is to final grade (±6 inches), the property pins are installed, and the structure is staked or foundation is installed as applicable. Grade at pad-mounted equipment shall be to exact final grade. In some installations, company-approved conduit may be required (consult with your local company representative).

Customers shall connect their equipment so that the load at the point of delivery will be balanced as nearly as practicable. Where three-phase service (except 3-phase, 4-wire delta) is supplied, the customer will attempt to connect equipment so that the load in any one phase at the point of delivery will not exceed the load in any other phase by more than 10 percent.

### **CUSTOMER-OWNED FACILITIES**

Distribution facilities, either overhead or underground, beyond the company's point of delivery are to be installed, maintained and operated by the customer under all the following conditions:

- 1. All energy is to be metered at one location.
- 2. Each installation is subject to the provisions of the company's rules and regulations, the applicable rate schedule, and the approval of the company.
- 3. Under rates providing for delivery at secondary voltages, the company will install and maintain only a single transformer installation for the customer, except as specified in Section 4, *SERVICES*.
- 4. The company will not install or permit the installation of any customer-owned equipment on company poles. Consult with your company representative.
- 5. The customer's distribution system shall be in conformance with the *National Electrical Code®*, the wiring regulations of the public authority, and the company's rules and regulations.
- 6. The distribution facilities of the customer beyond the point of delivery shall be connected to the company's distribution system at one central point through protective devices, approved by the company, installed and maintained at the expense of the customer.
- 7. Customers shall maintain their distribution system (to include the meter socket) in a safe operating condition so that it does not constitute a hazard to themselves or to other customers or persons. The company assumes no responsibility for inspection of the customer's lines and facilities and shall not be liable for injury to persons or damage to property when occurring on or caused by the customer's lines or equipment.
- 8. Distribution facilities beyond the point of delivery shall be installed, owned, operated and maintained by the customer. Such facilities shall be located on and traverse only land owned or controlled by the customer. A customer who is taking service under a commercial or industrial rate may cross dedicated public streets, alleys or other public ways upon approval of the company and the public body having jurisdiction, so long as such facilities are necessary



for the purpose of serving customer's contiguous buildings or locations which are separated only by such streets, alleys and ways, and provided that such contiguous buildings or locations are used for an integral purpose. The customer's distribution facilities shall be installed in compliance with the *National Electrical Code®*, the *National Electrical Safety Code®*, the wiring regulations of the public authority having jurisdiction and the company's rules and regulations.

9. Refer to Section 4 for additional requirements for customer-owned facilities.

### SAFETY

Refer to federal regulations and individual state laws concerning safety requirements relating to high voltage power lines of public utilities, which produce, transmit or deliver electricity. The following explanations should not be regarded as a substitute for reading the laws, but are meant to highlight some of the major points.

### **Overhead Safety**

Caution: Overhead wires and conductors are not insulated for protection from contact. Please exercise care when working near overhead facilities.

### **Underground Safety**

Caution: Stakes, flags or painted lines mark the locations of underground utilities. Please hand dig very carefully within 18" on each side of the markings.

Anyone planning to dig in or near a public road, street, alley, right-of-way or utility easement shall notify the company of your intent, no less than 48 hours (two working days) before you dig. Call the telephone number listed below for your locale.

Colorado One Call	1-800-922-1987 or 8	311
One Call of Wyoming	1-800-849-2476 or 8	311
South Dakota One Call	1-800-781-7474 or 8	311
Montana One Call	1-800-424-5555 or 8	311

Utility facilities may be buried along the rear, side and front property lines in any of the residential areas. Residential service lines may cross homeowner's front and back yards. Many facilities are also located within the street, alley or highway rights-of-way.

### **CHANGE OF GRADE**

The grade in any public right-of-way or easement shall not be changed without first contacting the company to determine if electric facilities are contained within the right-of-way or easement. Permission may be granted to change the grade by the company area engineering department if the grade change will not affect the minimum clearance requirements. Company construction may be necessary if the grade change will necessitate moving equipment or facilities. The company area engineering department can provide an estimate for the cost to relocate facilities when necessary to provide adequate clearance.

# UNLOCK, OPEN AND/OR DE-ENERGIZE ANY ELECTRIC POWER EQUIPMENT PROCEDURES

The company established procedures to assure maximum safety to protect all individuals prior to unlocking, opening and/or de-energizing electric power equipment where access by unauthorized personnel is required. The following procedures apply to, but are not limited to, energized company facilities such as vaults, transformers, manholes, switchgear and secondary pedestals:

- 1. The customer/contractor shall request and receive access authorization prior to the company representative unlocking, opening and/or de-energizing any electric power equipment.
- Normally, a transformer will not be permanently energized until the secondary service is complete. In cases where it is necessary to leave the transformer energized, such as installing additional secondary conductors, the company representative will unlock the transformer and stand by while work is performed and relock the transformer when the work is completed.
- 3. When a de-energized transformer is opened by the company representative for a contractor to pull cable, the contractor shall relock the transformer and notify the company representative before leaving the worksite.
- 4. Charges for work may apply when company personnel are required to open and close transformers or other electric equipment and stand by while work is performed around energized equipment. The company representative will determine the amount to be charged.

### **ENERGIZATION OF ELECTRIC SERVICE**

The company will not energize an electric service or set meters on new, rewired, altered or repaired wiring installations unless all of the following conditions have been met:

- The premises served have been properly identified by the customer. Permanent tags must be installed with the correct unit number or address permanently stamped on a brass, aluminum, stainless steel or plastic tag permanently affixed to the meter socket.
- 2. An inspection release from the local public authority has been received by the company.
- 3. The company representative has verified that the service entrance shows no continuity, load or voltage feedback on the load-side terminals of the electric meter socket or CT metering installation.
- 4. The company representative has verified that the customers' equipment has a mechanical means to disconnect and isolate equipment from the load-side terminals of the self-contained electric meter socket or current transformers (CT's). This requirement includes, but is not limited to, any load produced by transformers (dry-type or oil-filled) that are used for a separately derived system.

# **Note 1:** Once a service is energized, it shall be the customer's responsibility to turn on breakers or close disconnecting switches.

5. The company representative has verified that the electric service meets all of the requirements in Section 4.

**Note 2:** The meter socket shall meet all requirements listed under *METER SOCKETS* in Section 4.

# Section 3: Character of Service Available

Contact the company for information regarding availability of any desired type of service in a given locale. Delays and perhaps unnecessary expense may be avoided by contacting the company in advance of construction.

### **TYPES OF SERVICE**

The service voltages listed below may not be available in each of the company's service territories. The company will assist in determining whether the service voltage requested is offered under the company's tariffs within the service territory. These service voltages are all derived from grounded transformer banks. Depending upon the service voltage, either the neutral or one phase conductor is grounded at the supply transformer and will be run from the transformer installation to the meter socket. Customers requiring an ungrounded service for operation of a ground detection system, or for other operations permitted by the National Electric Safety Code, shall submit an exception request detailing the special circumstances necessitating the request.

1Ø 3W - 120/240VAC or 120/208VAC

- 1. 3Ø 4W Wye 120/208VAC or 277/480VAC
- 2. Distribution (Primary) Voltage
- 3. Transmission Voltage

### **METER SOCKETS FOR TYPES OF SERVICE**

Customers accepting three-phase service from an open-delta transformer bank (only acceptable in certain circumstances when approved by BHE) shall sign a liability waiver form indicating the customer's acceptance of potential damage to customer's equipment due to voltage unbalance.

- 1. Self-Contained Supplied by the customer (Refer to Section 4, *METER SOCKETS*):
  - a. 120/240 1Ø 3W 4 terminal meter socket
  - b. 120/208 1Ø 3W 5 terminal meter socket
  - c. 120/208 3Ø 4W Wye 7 terminal meter socket
- 2. Transformer Rated (CT's) Refer to Section 4, *METER SOCKETS*:
  - a. 1Ø 3W 8 terminal meter socket
  - b. 3Ø 4W Wye 13 terminal meter socket

### **DISTRIBUTION (PRIMARY) SERVICE**

Electric energy will be supplied at the voltage of the company's distribution line of adequate capacity for the load to be served. The company will advise the applicant as to the primary voltage available and will specify the location of the primary metering installation. Primary service is not available in company's network service area.

### **TRANSMISSION SERVICE**

Electric energy will be supplied at the voltage of the company's existing transmission lines at locations specifically approved by the company. Such service will be supplied only in locations accessible to the company's transmission lines.

# Section 4: Service Facilities

The company will provide service from either overhead or underground distribution facilities, depending upon availability and initial construction costs. Where there is a choice of overhead versus underground service, the company will normally offer the form requiring the least initial construction cost, in which case the customer may elect to choose the alternate, but charges will apply.

The customer should confer with the company representative before purchasing equipment, beginning construction of a proposed installation or altering existing service installations. The company representative will determine if the type of service and voltage desired by the customer is available, determine if additions to the company's facilities will be required and contact the company's local electric meter department to secure a definite meter location and point of delivery. The company representative will arrange for all necessary alterations.

When the company is required by order of a public authority to alter its distribution system, necessitating a change in the location of the point of delivery, the company will designate a new point of delivery. The customer, at his expense, shall relocate the service entrance conductors and metering equipment to the new point of delivery.

#### SERVICES

A building or other structure will be supplied by only one service, in accordance with *NEC*<sup>®</sup> Article 230.2, or as may be amended.

The policy pertaining to the company providing additional services for a building or group of buildings will vary depending upon the service territory. In most cases, additional charges for initial construction and perpetual maintenance costs will apply for the additional service(s). Contact the company representative for specific information. Only one service (point of delivery) will be provided to a building or other structure, except as specified below:

- 1. **Special Conditions** Additional services *may* be provided by the company for:
  - a. Fire pumps.
  - b. Emergency systems.
  - c. Legally required standby systems.
  - d. Optional standby systems.
  - e. Parallel power production systems.
  - f. Systems designed for connection to multiple sources of supply for the purpose of enhanced reliability.
- Special Occupancies Additional services may be provided by the company for:
  - a. Multiple-occupancy buildings where the company determines that there is no available space for service equipment accessible to all occupants.
  - b. A single building or other structure where the company determines that such building or structure is sufficiently large to make two or more services necessary.
- Capacity Requirements Additional services may be provided where the company determines that it cannot adequately provide service at a single point of delivery.

For information regarding metering, refer to *METER INSTALLATION AND OWNERSHIP* in this Section.

### **OVERHEAD SERVICE**

**Overhead System — Low Voltage (0-480 Volts)** General Requirements:

 Service Connection — Overhead service drop conductors will be installed and connected to service entrance conductors in accordance with the company's rules and regulations.



- 2. **Point of Attachment** The company will specify the location of the service-entrance conductors most suitable for connection to the company's lines.
  - a. The company may require the customer to furnish and/or install the physical means of attachment.
  - b. The point of attachment shall be located within 24 inches of the weather head and at a point nearest the company's facilities to be used to provide service. Refer to the Drawings Section, *Drawing* 1410-SV2.
  - c. The point of attachment shall be located such that adequate clearance can be obtained for the service drop from trees, awnings, patio covers, foreign wires, adjacent buildings, swimming pools, etc. Service drops shall not pass over adjacent private property, except where permitted by easement. Specified heights and clearances may be maintained by use of an approved service mast through the roof. Refer to the Drawings Section, *Drawing* 1430-CL2.
  - d. Vertical Clearance from Ground Refer to NESC® Article 232 and Table 232-1, or as may be amended. Service-drop conductors, where not in excess of 750 volts nominal, shall have the following minimum clearances from final grade:
    - 1. 12 feet over spaces and ways subject to pedestrians or restricted traffic only.

**Exception 1:** Where the height of a residential building does not permit the 12 foot clearance, 10.5 foot clearance for insulated service drops limited to 300 volts to ground and 10-foot clearance for insulated service drops limited to 150 volts to ground are permitted.

2.16 feet over driveways, parking lots and alleys.

**Exception 2:** Where vehicles exceeding 8 feet in height are not normally encountered nor reasonably anticipated, service drop clearances over residential driveways only may be reduced to, 12.5-foot clearance for insulated service drops limited to 300 volts to ground and 12-foot clearance for insulated service drops limited to 150 volts to ground are permitted.

- 3.16 feet over other land traversed by vehicles.
- 4. Drip loops shall meet the same clearances as specified above for service drops.

**Exception 3:** Where the height of a residential building does not permit the specified clearance, 10.5-clearance for insulated drip loops limited to 300 volts to ground and 10-foot clearance for insulated drip loops limited to 150 volts to ground are permitted. Refer to the Drawings Section, Drawing 1430-CL3.

- e. The point of attachment shall not be higher than 30 feet above final grade.
- 3. Service Mast Supports Service masts shall be 2-inch minimum GRC metallic conduit. If the service attachment point is higher than 48 inches above the roof, the mast shall be supported by braces or guys to withstand the strain imposed by the service drop. Conduit couplings shall not be installed above the roofline. Refer to the Drawings Section, *Drawing 1430-CL1* showing typical installation methods. Only the company's power service-drop conductors shall be attached to a service mast. Phone loops, cable TV conductors, grounding clamps, etc. shall not be attached to the service mast. Refer to *NEC®* Article 230-28 or as may be amended.
- 4. Ice and Snow Shield A service mast and/or meter ice and snow shield may be required on all new or rewired services in locations with heavy snowfall or ice loading. Check with the company representative to determine requirements for your locale.
- 5. Service Drops The allowable length of service drop conductors shall be governed by the slope of the ground, intervening trees and obstructions, and the size of the conductor required. Maximum length of service drop conductor to residential is 100 feet. The allowable length of larger service drop conductors is proportionately shorter and may require the installation of a service pole (lift pole). Contact your company representative.

- Service Poles (Lift Poles) Where the length of the service drop conductors is excessive or the size of the conductor would cause undue mechanical strain upon either the customer's structure or the company's line pole, a service pole may be required. A suitable easement may be required before such installation is made.
- 7. Service Entrance Conductors Service entrance conductors shall have a current carrying capacity at least as great as that required by the National Electrical Code<sup>®</sup> and the public authority having jurisdiction. The company strongly recommends that some provision be made for future load increase. A sufficient length of wire, but in no case less than 24 inches on residential or 36 inches on commercial services, shall extend from the service weather head for connection to the company's service drop. Line and load conductors are not permitted in the same conduit. No conductors, other than service entrance conductors, shall be installed in the service entrance conduit. All line-side (non-metered) conductors shall be in a continuous length of conduit from the point of delivery to the meter socket or disconnect. Junction boxes, conduit fittings (e.g. LB's), raceways or other devices are not allowed without specific approval from the company's local electric meter department.
- 8. When a disconnect is allowed (permission must be granted by the company prior to installation) on the line side of the meter, it must be an unfused, lockable disconnect.

### Overhead System — Primary Voltage (Above 480 Volts)

Because of safety precautions, which must be exercised in the utilization of energy at voltages in excess of 480 volts, the company shall be consulted in regard to service entrance, transformer location and meter installation details for this class of service before construction is started.

Overhead service of 2,400 volts or greater will not be attached directly to a building except where such building is used as a substation or transformer room. Refer to the Drawings Section, *Drawing 1450-PM1* for typical installation of primary voltage service.

#### **UNDERGROUND SERVICE**

**Underground System – Low Voltage (0-480 Volts)** General requirements:

- 1. **Service Connection** Underground service laterals from underground distribution systems to overhead distribution systems shall be installed in accordance with the company's rules and regulations.
- Point of Entry The company shall specify the location of the underground service lateral and metering equipment location most suitable for connection with the company's facilities. The company will not run an underground service lateral through a basement wall or above the first floor level.
- 3. Ice and Snow Shields A meter ice and snow shield may be required on all new or rewired services in locations with heavy snowfall or ice loading. Check with the company's local electric meter department to determine requirements for your locale.
- 4. Underground Service Laterals Installation of underground service laterals shall not be made until property is to final grade (+6 inches), property pins are in place, and the cable route is free of obstructions. Customer-owned commercial and industrial service laterals shall be installed in customer-owned duct. Direct burial conductor (e.g. type USE) may be allowed when authorized by the local public authority. All service laterals shall be installed at a depth of not less than 24 inches.
- 5. Ground Movement Slip sleeves (expansion joints) will be required by the company and shall be installed on all new underground residential and commercial meter installations. An 18 inch length of Schedule 40 or Schedule 80 PVC conduit shall be installed at the bottom of the underground riser. Refer to NEC® Article 300.5(J) (FPN), or as may be amended and to the Drawings Section, Drawings 1410-SV4, 1410-SV5, 1410-SV8, 1440-TR2 for typical slip sleeve installations.
- 6. Service Entrance Conductors Service entrance conductors shall have a current carrying capacity at least as great as required by the National Electrical Code® and the public authority having jurisdiction. The company strongly recommends that some provision be made for future load increase. Line and load conductors are not permitted in the same conduit. No conductors, other than service conductors, shall be installed in the service lateral



conduit. Junction boxes, conduit bodies (e.g. LB's), raceways or other devices are not allowed on the underground service riser. Drawings showing typical methods for installing service-entrance conductors are contained in the Drawings Section.

- 7. Conductors in Meter Socket Line-side and load-side conductors entering and leaving an underground meter socket shall only enter and exit through opposite sides of the socket. The center knockout in the bottom of the socket, if provided. shall not be utilized. Line conductors shall enter through the knockouts provided at either end of the bottom horizontal surface of the meter socket. The line conductors shall be routed along the outermost edges of the meter socket allowing for conductor settling. The knockouts on either end of the horizontal surface or the knockouts provided on the vertical surfaces of the meter socket may be used for load conductors. Load conductors shall exit the right side of the meter socket on lever-type bypass meter sockets.
- 8. When a disconnect is allowed (permission must be granted by the company prior to installation) on the line side of the meter, it must be an unfused, lockable disconnect.

### Underground System – Primary Voltage (Above 480 Volts)

Because of safety precautions, which must be exercised in the utilization of energy at voltages in excess of 480 volts, the company shall be consulted in regard to service entrance, transformer location and meter installation details for this class of service before construction is started. Refer to the Drawings Section, *Drawing* 1450-PM2.

### **POINT OF DELIVERY**

The point of delivery is the point where the company's electric facilities are first connected to the electric facilities of the customer. The point of delivery for the various classifications of service is shown throughout the Drawings Section.

It is the policy of the company to own, operate and maintain the electric distribution facilities up to the point of delivery. This policy is applicable to service rendered from either overhead or underground facilities. All such facilities will be installed in accordance with the company's line extension policy and rules and regulations as filed with the commission.

### **CUSTOMER-OWNED SERVICE CONDUCTORS**

The number and size of customer-owned conductors that may be terminated to company facilities is limited by the type of installation as follows:

- 1. Overhead-to-Overhead:
  - a. Service-entrance risers on a building are limited to a maximum number of two (2) with a single set of conductors in each riser. When additional service entrance risers are required, refer to the Exception Process.
  - b. The conductor size shall not exceed 750 kcmil.

### 2. Underground:

a. The number of conductors that may be terminated in a pad-mounted transformer may be governed by the kVA rating of the transformer and the size of the conductors. If a customer requires a larger number of conductors than 6 per phase and/or size of conductors, 750 kcmil max, a service termination cabinet may be required. If welding wire is being used, the customer must provide connections.

### **CUSTOMER-OWNED SERVICE TERMINATION CABINETS**

A service termination cabinet may be required when the total number conductors or size of the conductors exceeds the value of 6-750 kcmil per phase. If a service termination cabinet is required, it shall be purchased, installed and maintained at the expense of the customer. Fiberglass pad shall also be installed by the customer that will accommodate the service termination cabinet. Arrangements for the utilization of a service termination cabinet may be made by contacting the assigned company representative. Refer to the Drawings Section, *Drawing 1440-TR3*.

### **TEMPORARY UNMETERED SERVICES**

The company will not authorize a closed loop on new electrical services. For existing services, a temporary unmetered service (closed loop/flat tap/jumpered) may or may not be allowed in the service territory or locale where electric service is needed. Before closing a loop, the customer shall obtain a wiring permit from the local public authority, approval from an **authorized company representative**, all wiring shall comply with the *NEC*<sup>®</sup> and the rules of the local public authority. The company may grant permission to close a loop for up to a maximum of seven (7) calendar days. Permission to close a loop may be obtained in the form of an authorization number

by contacting the company office nearest you and speaking with an **authorized company representative**. Special permission by the company's local electric meter department is required to extend a closed loop beyond seven days.

Electric energy used during the period of the closed loop will be estimated and billed at the appropriate rate. The customer of record will be responsible for the energy used.

On any wiring installation where a meter has been disconnected, the meter shall not be reconnected by anyone except an **authorized company representative**. Closing a manual bypass mechanism or installing jumpers in the meter socket is not permitted and will be considered a closed loop, which requires prior permission.

If any wiring being served on a closed loop is not installed in accordance with the company's rules and regulations, the company may open the closed loop.

#### **NEW SERVICES**

The company will not permit a temporary unmetered service (closed loop/flat tap/jumpered) on new electrical services. Service may be supplied from a temporary meter panel prior to an inspection release on new services. Refer to Section 5, *TEMPORARY SERVICE* and the Drawings Section, *Drawings 1420-TM1, 1420-TM2, 1420-TM3*.

Before permission will be granted to energize a new service, the company shall have an application for electric service and an inspection release from the local public authority.

### **EXISTING SERVICES**

The company may grant permission for a temporary unmetered service (closed loop/flat tap/jumpered) on an existing service for up to a maximum of seven (7) calendar days. Refer to *TEMPORARY UNMETERED SERVICES* in this Section.

If a temporary unmetered service is not allowed in the service territory or locale where electric service is needed, or if the length of time that temporary service is required exceeds seven (7) days, the customer may contact the company to coordinate temporary meter service. Refer to Section 5, *TEMPORARY SERVICE* and the Drawings Section, *Drawings 1420-TM1, 1420-TM2, 1420-TM3*. Before permission will be granted to re-energize an existing service which has been rewired, altered or repaired, an inspection release shall be received by the company from the local public authority.

#### **METER INSTALLATION AND OWNERSHIP**

All service to a customer will be supplied by a single service and only one meter will be installed at an address or single unit of a multi-unit building. Only in the event that more than one service is allowed by the company as detailed in *SERVICES* in this section, will the company install more than one meter. This requirement may exclude some generation production meters.

A customer-owned service termination cabinet may be utilized to augment an installation where additional services or metering points would be desirable but are prohibited by this document. Refer to SERVICE TERMINATION CABINETS (with or without Optional Customer Disconnect Switch) in this section.

ONLY AUTHORIZED COMPANY REPRESENTATIVES ARE PERMITTED TO CONNECT, DISCONNECT, MOVE OR REMOVE METERS. All meters, service wires and other electrical facilities installed by the company on the customer's premises for delivering or measuring electrical energy to the customer shall continue to be the property of the company. All metering equipment owned by the company and not installed shall be returned to the company. These facilities may be repaired, inspected, tested, relocated, replaced or removed by the company.

Meter locations in all instances will be determined by the company. Meters shall be installed outdoors in accordance with rules in this section governing outdoor meter installations. Prior approval from the company's local electric meter department is required if an indoor meter location is necessary.

The meter socket, service mast, service riser or any conduit containing conductors on the line side of meters shall not be covered or concealed except when necessary to pass through roof eaves or through floor structures within a building. Refer to the Drawings Section, *Drawing 1410-SV2*.

### **CLASSIFICATION OF METERING**

Refer to Section 1 for the definition of Classification of Metering. The company classifies its metering installations as:

### 1. Residential Rate:

- a. Self-contained
- b. Instrument transformer
- c. Temporary construction

### 2. Commercial and Industrial Rate:

- a. Self-contained
- b. Instrument transformer
- c. Primary metering
- d. Temporary construction

The type of metering used will be determined by the company based upon the service voltage, load supplied by the customer, the available fault current and the applicable rate schedule.

Residential service lateral may be extended to a structure containing not more than six residential units provided all meters are grouped at one location and all units are separately metered on residential rates.

All services shall be metered on the secondary side of the company's transformer unless the applicable rate schedule specifies that the service be metered on the primary side of the transformer. The company may install its meter on either side of the transformer and losses occurring between the point of delivery and the meter will be computed and added to, or subtracted from, the reading of the meter. Company area engineering department and rate department approvals are required for primary rate installations and will only be considered under extenuating circumstances.

### **SELF-CONTAINED METERING**

Single-phase services with a total connected load of 320 amps or less and three-phase services with a total connected load of 200 amps or less shall be metered by self-contained meters. Services where the total connected load is in excess of, or anticipated to be in excess of, these ratings shall use instrument transformer (CT) metering. The total continuous load on self-contained metering shall not be greater than 200 amps on a 200 amp meter socket or 320 amps on a 320 amp meter socket. The total amp rating of the main disconnect(s) shall not exceed 225 amps for a 200 amp continuous duty rated meter socket or 400 amps for a 320 amp continuous duty rated meter socket.

All billing/revenue meters are to have the polarity of the line side terminals wired to the utility distribution. The production meter shall have the polarity of line side terminals wired to the customer's generation.

# Note: 277-480 volt installation shall use instrument transformer (CT) metering.

All self-contained single position and/or modular (multiposition) meter sockets that are of either single-phase or three-phase design shall be furnished, owned and maintained by the customer. All self-contained meter sockets shall be UL listed and labeled and will be inspected by the local public authority for compliance to the *NEC*<sup>®</sup> and any other applicable codes. The construction of the meter sockets shall also conform to the company's standards as described in *METER SOCKETS* in this Section.

**Note:** The service-entrance conductor connected to the high-leg of an existing 3-phase, 4-wire delta-connected system shall be durably and permanently marked at both ends of the conductor by an outer finish that is orange in color in accordance with current *NEC*<sup>®</sup>, and shall be installed in the far right hand position of the meter mounting block. Refer to the Drawings Section, *Drawing 1460-MD4*.

# INSTRUMENT TRANSFORMER METERING, SECONDARY VOLTAGE

All 277/480 volt installations will be instrument transformer rated and meter housing will have a separate compartment (dual compartment) to house the metering voltage transformer pack.

The CTs and VT Pack will be supplied, owned, and maintained by the company. The meter socket, instrument transformer compartment in a CT cabinet, service termination cabinet, or switchgear CT compartment and the necessary conduit and fittings shall be supplied, owned, installed and maintained by the customer. Customer-owned equipment, other than service conductors, shall not be installed in the space dedicated to instrument transformers.

All current transformers (CT's) shall be installed in a CT cabinet, service termination cabinet, dedicated distribution transformer, or switchgear CT compartment. Refer to CT CABINETS, SERVICE CONNECTION CABINETS (with or without Optional Customer Disconnect Switch) and SWITCHGEAR CT COMPARTMENTS in this Section.

### The following CT installation is not allowed:

• Rack mounted on mast, pole or side of building using donut or window type CT's.

The CT's shall be installed in such a manner that the secondary (metering) terminals are readily accessible from the door of the CT compartment. The CT's shall be mounted such that the H1 "white dot" marking for polarity is on the line side. For production meters, the "white dot" shall be facing the customers generation.

Conductors in CT cabinets and service termination cabinets shall be installed in accordance with the minimum wire-bending space requirements of current NEC<sup>®</sup>. It is preferred that the line side conductors terminate on the top bus bar but we will make exceptions for some installations. Metering conduit installed below grade (underground) from the meter-socket to the CT cabinet (or compartment) shall be minimum 1-1/4" Schedule 40 PVC. Metering conduit installed above grade (above ground) from the meter-socket to the CT cabinet (or compartment) shall be minimum 1-1/4" GRC, IMC, or EMT. Metering conduit shall be a continuous run between the meter socket and the CT cabinet. The conduit run shall not exceed 30 feet in length. Installations requiring conduit runs greater than 30 feet may be allowed with an approved exception from the company metering department. Refer to the company's electric meter department exception process. Junction boxes, conduit bodies (e.g. LBs) or other devices are not allowed without prior approval from the company's local electric meter department.

The meter socket shall be bonded with a separate bonding conductor in accordance with current *NEC*<sup>®</sup>.

### **CT CABINETS**

In addition to the general requirements in *INSTRUMENT TRANSFORMER METERING, SECONDARY VOLTAGE* in this Section, the following requirements shall also be met:

 The CT cabinet (enclosure) shall meet NEMA 3R standards and shall be factory labeled "NEMA 3R".

- 2. The CT cabinet shall be UL listed and approved and labeled as a CT enclosure.
- The CT cabinet will be furnished with factory lugs for phase and neutral conductors and provision for use with standard bar type CTs.
- The CT cabinet must be rated and /or installed to meet appropriate short circuit current rating (see NEC<sup>®</sup> and public authority having jurisdiction).
- 5. The maximum allowable service size is 800 amps. For services larger than 800 amps refer to the electric meter department exception process.
- 6. The neutral bus shall have a grounding lug which will accommodate one #12 AWG solid through two #10 AWG stranded wire(s) for the metering neutral conductors. The door shall be hinged either on the left or right side and be equipped with a hasp for a company padlock with a 5/16 inch diameter shackle.
- 7. The installation height of the CTs shall be between 3 feet minimum and 6 feet maximum measured from the center of the CTs to final grade. The minimum clearance from the bottom of a wall-mounted CT cabinet to final grade shall be 2 feet.
- 8. The service entrance conductor connected to the high-leg of a 3-phase, 4-wire delta system shall be durably and permanently marked at both ends of the conductor by an outer finish that is orange in color in accordance with current NEC® and shall be installed in the right-hand phase position for vertical bus or the bottom phase position for horizontal bus in the CT cabinet.

# SINGLE CUSTOMER DEDICATED PADMOUNT TRANSFORMERS

- Current transformers can be installed on the secondary bushings of a dedicated 3-phase padmounted distribution transformer serving a single customer (not allowed in Cheyenne). Metering will not be allowed on the secondary bushings of a pad-mounted transformer that serves more than one customer.
- 2. Current transformers will not be allowed on the secondary bushings of a single-phase padmounted transformer without prior approval through the electric meter department exception process.



# SERVICE TERMINATION CABINETS (with or without Optional Customer Disconnect Switch)

Single point services to multiple buildings may be metered with a pad-mounted service termination cabinet with or without a customer disconnect switch. The use of a service termination cabinet with a customer disconnect switch allows the customer the ability to de-energize his own service for equipment maintenance without calling the company to schedule an outage. It also allows the metering and service disconnect to be located at a point that is mutually advantageous to both the customer and the company. Refer to the Drawings Section, *Drawing 1440-TR3*.

### Note: Refer to *SERVICES* and also *METER INSTALLATION AND OWNERSHIP* in this Section for clarification on the allowable number of service and metering points.

In addition to the general requirements in *INSTRUMENT TRANSFORMER METERING, SECONDARY VOLTAGE* in this section, the following requirements shall also be met:

- 1. All buildings shall be served from the same transformer.
- Maximum connected loads over 3,000 amps: A company representative should be consulted well in advance of any construction so that all design and construction work of both parties may be properly coordinated. Installations of 800 amp rating and below may have mounting provisions for bar-type CTs.
- Installations from 1,000 amp rating shall have a minimum 12-inch length removable bus section and CT support angles which will accommodate window-type CTs. The removable bus section shall have an enclosed screw type compression terminal to accommodate a minimum #12 AWG metering potential conductor.
- 4. The neutral bus shall have a grounding lug which will accommodate one #12 AWG solid through two #10 AWG stranded wires for the metering neutral conductors.
- 5. The door(s) shall be hinged either on the left or right side and be equipped with a hasp for a Company padlock with a 5/16 inch diameter shackle.
- 6. The phase arrangement on 3-phase installations shall be A, B, C front-to-back, top-to-bottom, left-to-right when viewed from the front of the equipment.

7. The service entrance conductor connected to the grounded-leg of a 3-phase, 3-wire corner-grounded delta system shall be installed in the center phase position in the service connection cabinet.

The customer shall install the pad and pad-mounted secondary termination cabinet in accordance with the Drawings Section, *Drawing 1440-TR3.* 

### SWITCHGEAR CT COMPARTMENTS

In addition to the general requirements in *INSTRUMENT TRANSFORMER METERING, SECONDARY VOLTAGE* in this Section, the following requirements shall also be met:

**Note:** Maximum connected loads over 3,000 amps: A company representative should be consulted well in advance of any construction so that all design and construction work of both parties may be properly coordinated.

- 1. Installations of 800 amp rating and below may have mounting provisions for Standard Bar Type CT.
- 2. Instrument transformers may also be allowed in a customer-owned switchgear CT compartment.
- Installations 1,000 amps or greater rating shall have a minimum 12 inch length removable bus section and CT support angles which will accommodate window type CTs. The removable bus section shall have an enclosed screw type compression terminal to accommodate a minimum #12 AWG metering potential conductor.
- 4. A metering neutral lug, which will accommodate one #12 AWG solid through two #10 AWG stranded wires for the metering neutral conductors, shall be available near the front of the CT compartment so that it can be safely accessed even if the switchgear is energized.
- 5. All instrument transformer compartments shall have barriers between adjacent areas.
- 6. The door shall be hinged either on the left or right side and be equipped with a hasp for a Company padlock with a 5/16 inch diameter shackle.
- The installation height of the CT's shall be between 2 feet minimum and 4 feet maximum measured from the center of the CT's to the bottom of the switchgear.

- 8. The phase arrangement on a 3-phase installation shall be A, B, C front-to-back, top-to-bottom, left-to-right when viewed from the front of the switchgear, except for a 3-phase, 4-wire delta system in accordance with the current NEC<sup>®</sup> exception, or as may be amended. The high-leg of a 3-phase, 4-wire delta system shall be installed in the right-hand phase position for a vertical bus or the bottom phase position for a horizontal bus in the switchgear CT compartment.
- 9. The grounded leg on a 3-phase, 3-wire cornergrounded delta system shall be installed in the center phase position in the switchgear CT compartment.
- 10. The installation height of the CTs shall be between 3-foot minimum and 6-foot maximum measured from the center of the CTs to final grade. The minimum clearance from the bottom of a wall-mounted CT cabinet to final grade shall be 2 feet.

### **PRIMARY METER INSTALLATIONS**

Primary metering installations shall be preferably located on the customer's property within a distance of 5 feet to 25 feet from the access point. Primary metering installations require coordination between the customer and the company regarding technical details and location. Service at distribution primary voltage requires special engineering considerations; therefore, it is necessary to determine availability of this type of service. The company representative should be consulted well in advance of the time the service will be required so that all design and construction work of both parties may be properly coordinated. The company representative will work with the meter department in advance of construction and/or purchase of equipment. The company representative will provide a set of specifications upon customer request. This will reduce the risk of project delays or expensive changes during construction.

Primary voltage installations use both current and voltage instrument transformers regardless of the load current. The primary meter installation will be installed on a company-owned pole or in a primary metering cabinet. The ownership of the primary metering cabinet depends upon the service territory. Pre-approval by the electric meter department is required for the use of metering compartments in switchgear. Construction drawings detailing all switchgear metering compartments shall be submitted to electric meter engineering for written approval. The electric meter department will provide switchgear meter compartment specifications to engineers and contractors on request. The associated meter socket shall not be mounted on the customer's switchgear unless specifically approved by the company's local electric meter department. Refer to the Drawings Section, *Drawings 1450-PM1, 1450-PM2*.

### **METER SOCKETS**

### Self-Contained 200 Amp and 320 Amp Meter Sockets

Purchasing, installing, connecting and maintaining selfcontained meter sockets shall be the responsibility of the customer. All meter sockets shall be UL listed and labeled, used in accordance with their labeling, installed per the current *NEC*<sup>®</sup> and meet any code requirements that may be enforced by the local public authority.

All single and multiple position meter sockets installed on the company's system shall meet the company's standards for these devices as listed below. Company electric meter personnel are instructed not to install a meter at a location where the meter socket does not comply with **all criteria listed below**. Meter sockets will be considered un-approved unless they adhere to these criteria.

### METERS WILL NOT BE INSTALLED UNLESS ALL CRITERIA FOR METER SOCKET SPECIFICATIONS OUTLINED BELOW ARE MET:

- Individual meter sockets shall be constructed from steel in accordance with Underwriters Laboratories (UL) Standard No. 414 revised March 24, 1999, or as may be amended. Sockets constructed from aluminum or nonmetallic materials are not allowed. All sockets must have a ringless, single piece lid.
- 2. Individual meter sockets, excluding side-wired type which are bussed on the line side of the meter, used in underground installations shall have the following minimum dimensions:
  - a. 200 amps 19 inches height x 13 inches width.
  - b. 320 amps 26 1/2 inches height x 13 inches width.
- 3. Meter sockets used in overhead installations shall have a hub size of not less than 2 inches.
- 4. Temporary cover plates for meter sockets shall be constructed from a non-metallic material.
- Single-phase meter sockets shall be rated for either 200 or 320 amps continuous duty and three phase meter sockets shall be rated 200 amps continuous duty. Residential single phase sockets shall be equipped



with horn-type, or lever bypass, commercial single phase and three phase sockets shall be equipped with an approved lever-actuated locking-jaw bypass constructed such that the bypass lever cannot be in the bypass position with the socket cover installed. The bypass handle shall be located on the right side of the meter block when facing the meter block. Refer to the Drawings Section, *Drawing 1460-MD1*.

- 6. Single-phase and three-phase, three-wire sockets may have a fifth terminal connected to the neutral within the socket with minimum #16 AWG wire. (Please check with your local meter department) The fifth terminal shall be installed in the 9 o'clock, rather than the 6 o'clock, position if the meter block design allows. The company will not furnish or install the fifth terminal. Floating fifth terminal will not be allowed. Refer to the Drawings Section, *Drawing 1460-MD2, 1460-MD3*.
- 7. Three-phase, four-wire sockets shall have the seventh terminal connected to the neutral within the socket with minimum #16 AWG wire. Refer to the Drawings Section, *Drawing* 1460-MD4, 1460-MD5.
- 8. Single-phase sockets shall have ringless style covers. No screws are allowed on meter covers.
- 9. Sealing means shall provide for a plastic padlock seal with a 47-inch diameter shackle and a key type padlock with a 9/32-inch shackle.
- 10. 320A meter sockets shall have an anti-inversion clip installed in the top right terminal.

### ADDITIONAL REQUIREMENTS FOR SELF-CONTAINED MULTIPLE METERING PANELS

- 1. Multiple metering panels shall be constructed from steel or aluminum. Panels constructed from non-metallic materials are not allowed.
- 2. Each meter socket shall have an individual ringless style cover with sealing provisions. No screws are allowed on meter covers.
- 3. The panel shall have permanent barriers to isolate the customer's disconnect switch and wiring from the metering areas.
- 4. Each line-side compartment shall have provisions for a company seal, whether or not the compartment is designed to house a meter.
- 5. Multiple metering panels that have a door that completely encloses the utility metering must have provisions for utility access and must have prior approval.

- 6. Units shall be marked in accordance with meter socket identification as outlined in this section (see page 27).
- 7. Meter collars of any nature are not allowed on multiple meter panels.

### ADDITIONAL REQUIREMENTS FOR COMBINATION METERING DEVICES

- 1. Combination of metering devices, such as meter/main and meter/panel, shall be constructed from steel or aluminum. Devices constructed from non-metallic materials are not allowed.
- 2. Combination metering devices shall have permanent barriers to isolate the customer's disconnect switch and wiring area from the metering area.
- 3. Combination metering devices shall have separate covers on the customer's disconnect switch and wiring area and on the metering area.
- 4. Combination devices that have a door that completely encloses the utility metering must have provisions for utility access and must have prior approval.

# ADDITIONAL REQUIREMENTS FOR METERING PEDESTALS

- 1. Metering pedestals shall be constructed from steel or aluminum. Pedestals constructed from non-metallic materials are not allowed.
- 2. Pedestals shall be furnished, installed and maintained by the customer.
- 3. Pedestals shall meet company and applicable code requirements.
- 4. Pedestals shall be adequately supported to maintain the vertical alignment of the meter in a level and plumb position throughout the life of the installation.
- 5. Pedestals shall meet additional requirements shown in the Drawings Section, *Drawings 1410-SV5, 1410-SV5.1, 1410-SV6, 1410-SV7, 1440-TR2.1, 1440-TR2.2.*

### **INSTRUMENT TRANSFORMER SOCKETS**

The company shall be contacted first to determine rate, load, and service voltage. The company will also coordinate the installation of metering equipment and the instrument meter socket.

Contact the local utility meter department for availability and/or exchange of instrument transformer meter sockets.

### **ELECTRIC METER APPLICATION TABLE**

	METER	METER VOLTAGE	NO. OF METER	METER CLASS	SC/TR	SOCKET
SERVICE CONFIGURATION	FORM	RATING	LUGS	AMPS	INST.	ΤΥΡΕ
*120 VOLT, 2-WIRE, 1-PH	1S	120	4	100	SC	4T, 100A
200 AMP MAIN DISCONNECT (1 WIR	E MAX/PHAS	E)				
120/208 VOLT, 3-WIRE, 1-PH, NETWORK	125	120 or 120-480	5	200	SC	5T, 200A
120/240 VOLT, 3-WIRE 1-PH	25	240 or 120-480	4	200	SC	4T, 200A
120/208 VOLT, 4-WIRE, 3-PH WYE	16S (15S, 14S)	120-480	7	200	SC	7T, 200A
277/480 VOLT, 4-WIRE, 3-PH WYE	9S (8S)	120-480	13	20	INST.	13T, 20A
*120/240 VOLT, 4-WIRE, 3-PH DELTA	16S (15S, 14S)	120-480	7	200	SC	7T, 200A
*240 VOLT, 3-WIRE, 3-PH	12S	120-480	5	200	SC	5T, 200A
*480 VOLT, 3-WIRE, 3-PH	35S (5S)	120-480	8	20	INST.	8T, 20A
400 AMP MAIN DISCONNECT (2 WIR	RE MAX/PHAS	SE)				
120/208 VOLT, 3-WIRE, 1-PH, NETWORK	12S	120 or 120-480	5	320	SC	5T, 320A
120/240 VOLT, 3-WIRE 1-PH	2S	240 or 120-480	4	320	SC	4T, 320A
120/208 VOLT, 4-WIRE, 3-PH WYE	9S (8S)	120-480	13	20	INST.	13T, 20A
277/480 VOLT, 4-WIRE, 3-PH WYE	9S (8S)	120-480	13	20	INST.	13T, 20A
*120/240 VOLT, 4-WIRE, 3-PH DELTA	9S (8S)	120-480	13	20	INST.	13T, 20A
*240 VOLT, 3-WIRE, 3-PH	35S (5S)	120-480	8	20	INST.	8T, 20A
*480 VOLT, 3-WIRE, 3-PH	35S (5S)	120-480	8	20	INST.	8T, 20A
>400 AMP MAIN DISCONNECT						
120/208 VOLT, 3-WIRE, 1-PH, NETWORK	35S (5S)	120-480	8	20	INST.	8T, 20A
120/240 VOLT, 3-WIRE 1-PH	35S (5S)	120-480	8	20	INST.	8T, 20A
120/208 VOLT, 4-WIRE, 3-PH WYE	9S (8S)	120-480	13	20	INST.	13T, 20A
277/480 VOLT, 4-WIRE, 3-PH WYE	9S (8S)	120-480	13	20	INST.	13T, 20A
*120/240 VOLT, 4-WIRE, 3-PH DELTA	9S (8S)	120-480	13	20	INST.	13T, 20A
*240 VOLT, 3-WIRE, 3-PH	35S (5S)	120-480	8	20	INST.	8T, 20A
*480 VOLT, 3-WIRE, 3-PH	35S (5S)	120-480	8	20	INST.	8T, 20A
PRIMARY SERVICE 1 OR 3 PH, AVAIL	ABLE VOLTAG	<u> 5600 VC</u>	DLTS			
1-WIRE, 1-PH	35	120 or 120-480	5	20	INST.	6T, 20A
3-WIRE, 3-PH	35S (5S)	120-480	8	20	INST.	8T, 20A
4-WIRE, 3-PH	9S (8S)	120-480	13	20	INST.	13T, 20A

\*Indicates service configuration is not allowed on new installations, listings are for reference only.

# ELECTRIC METER APPLICATION TABLE NOTES (On previous page, 26)

**Note:** All 277/480 or 480 volt services will require metering instrument voltage transformers to reduce voltage to < 480 volts.

**Note:** 9S (8S), 16S (15S, 14S), 35S (5S) indicates electronic meter is capable of being applied to multiple service configurations (forms).

**Note:** 120-480 volt indicates electronic meter is capable of being applied to wide voltage range.

**Note:** When utilizing electronic meters capable of multiple form and voltage, an application and/or voltage sticker should be applied to the meter or meter housing.

### **METER LOCATION**

The customer shall provide and maintain, without cost to the company, an easily accessible metering location. The company will locate an acceptable point of delivery and meter location upon the customer's request for service. No wiring dependent upon a meter location shall be started until a definite meter location has been established. The company will not be responsible for the relocation of the service attachment, service entrance or meter socket resulting from an improper location chosen by the customer, which does not meet the requirements of the company.

Residential self-contained and transformer-rated meters (including CT cabinets) shall be installed outdoors. The company will determine meter locations in all instances. Residential meters originally installed outdoors that, due to alterations or additions to the residence, become enclosed within the building structure (e.g. enclosed patio or garage), where access through a doorway is required, shall be relocated to an outdoor location designated by the company's local electric meter department. The relocated service entrance installation shall conform to current company standards.

Only commercial, industrial or apartment meter installations may be installed indoors if it is not practical to install the meter(s) outdoors. Approval shall be obtained from the company's local electric meter department before an indoor location is determined. Approved indoor meter installations shall be grouped together in a common room or other suitable space, which is located where they will be readily accessible at all reasonable hours for reading, testing and other maintenance purposes. Indoor installations may require a provision for the installation of an external antenna as needed.

Mobile homes, construction trailers and those buildings not intended to be dwelling units, such as, but not limited to, contractor's onsite offices, sales offices, mobile studios, mobile stores or construction job dormitories intended for sleeping purposes only, shall have the meter socket located adjacent to and in line of sight of the structure it supplies. The meter socket shall not be mounted on or attached to the structure. Refer to *NEC*<sup>®</sup>. Refer to the Drawings Section, *Drawings 1410-SV3, 1410-SV6.* 

Manufactured homes may have the meter socket attached to the structure provided the structure meets the definition of a manufactured home as defined in the current *NEC*<sup>®</sup> and meets the requirements of the current *NEC*<sup>®</sup>. The manufactured home shall be installed on and secured to a permanent foundation and shall provide the necessary structural support for the meter socket attachment.

Meters originally installed in accessible locations satisfactory to the company, which become inaccessible by virtue of alterations or new construction, shall be reinstalled at a point designated by the company at the expense of the property owner.

### Meters shall be installed:

- 1. In a location that will be easily accessible to company personnel at all reasonable hours for reading and maintenance.
- 2. In a location where they will be safe from damage.
- 3. Three feet from any building opening, such as door or window.

### Meters shall NOT be installed:

- 1. On fences, mobile homes or construction trailers.
- 2. Where the meter will, in the company's opinion, interfere with traffic on sidewalks, driveways, hallways or passageways.
- 3. Where the meter will, in the company's opinion, obstruct the opening of doors or windows.

- 4. In a location that may, in the company's opinion, be considered hazardous.
- 5. Where meter reading or servicing may, in the company's opinion, become impracticable.

### **METER INSTALLATION**

Installation of the meter socket is the responsibility of the customer. Meter sockets and associated equipment, both indoors and outdoors, shall be mounted securely and plumb. Expansion bolts, plugs or anchors shall be used where attachment is made to masonry, concrete or plaster walls.

The customer shall provide suitable protective equipment approved by the company if a meter location puts the meter at risk of damage from any means, including falling ice or snow from roof overhangs.

All line-side unmetered conductors shall be in a continuous length of conduit from the point of delivery to the meter socket, cold sequence disconnect or CT cabinet. No conductors other than line-side conductors shall be permitted in line-side conduits, troughs or lug landings. Access to the line-side conductors shall be sealable. Junction boxes, conduit bodies (e.g. LBs) or other devices are not allowed without specific approval from the local electric meter department.

On an underground service, the center knockout in the bottom of the socket, if provided, shall not be utilized. Line conductors shall enter through the knockout provided at the left end of the bottom horizontal surface of the meter socket. The line conductors shall be routed along the outermost edges of the meter socket allowing for ground settling, which could pull the line conductors down. Either the knockout on the right end of the bottom horizontal surface, the lower knockout on the right vertical surface, or the lower knockout on the back vertical surface of the meter socket may be used for load conductors. Load conductors shall not exit the left side of the meter socket. Meters serving structures designed for multiple occupancy, such as an office building or apartment building, shall be grouped together at a point nearest the service entrance. Individual meter sockets may be placed as close together as the fittings will permit, but in no case less than 2 inches apart.

### **METER SOCKET IDENTIFICATION**

The unit number shall be plainly marked by a permanent durable means at the meter socket, corresponding unit on the meter socket shall be with a stamped brass, aluminum, stainless steel or plastic tag securely attached to the meter socket. The stamped tag shall be attached to the exterior, non-removable portion of the meter socket or at the individual meter main disconnect. Any other means of identification is not acceptable.

### **METER MOUNTING HEIGHTS**

The mounting height of meters, measured from the center of the meter to final grade or platform outdoors, or to the floor when installed indoors, is as follows:

- 1. Single meter sockets:
  - a. Self-contained or transformer-rated 4 foot 6-inch minimum to 5 foot 6-inch maximum. Preference is 5 feet 6 inches to center of meter.
- 2. Multiple meter sockets, vertically aligned:
  - a. Indoor -2-foot minimum to 6 foot 6-inch maximum.
  - b. Outdoor 3-foot minimum to 6 foot 6-inch maximum.

The height of multiple meter sockets, either horizontally or vertically aligned, shall be evenly distributed from the center point of the meter stack between the upper and lower height limitations.

If a platform is used to achieve the required mounting heights for a meter installation, it shall be permanent and accessible by a stairway. The minimum horizontal dimensions of the platform shall meet the current *NEC*<sup>®</sup> requirements for working space as specified in *METER CLEARANCES* in this Section.

Mounting heights are also shown throughout the drawings in the Drawings Section.

### **METER CLEARANCES**

The minimum depth of working space in front of metering equipment shall be 3 feet, 3 feet six inches or feet in accordance with current *NEC*<sup>®</sup>. The minimum width of the working space in front of metering equipment shall be the width of the metering equipment or 2 feet six inches, whichever is greater, in accordance with current *NEC*<sup>®</sup>. Metering equipment includes CT cabinets, service connection cabinets, switchgear CT compartments and meter sockets. Meter sockets shall be installed at least 3 feet from any building opening, such as a door or window. Meter sockets shall be installed at least 6 feet from a mechanically induced air intake.



### **CLEARANCES FROM GAS METER SETS**

MINIMUM CLEARANCES FROM GAS METER SETS AND CO OR MECHANICALLY INDUCED AIR TANKS	MMON BUILDING OPENINGS
Minimum working clearance between gas meter sets and electrical equipment. As an example: electric meter, breaker box, air conditioning unit, electric outlet, etc.	No electrical equipment shall be installed directly above a gas meter or in an area 12 inches on either side of a gas meter set.
Working clearance between gas meter sets and other obstructions.	In all cases, sufficient working space (3 feet preferred) in front of and on either side of the gas meter and associated piping shall allow access for inspection, reading, replacement, or necessary maintenance.
Minimum clearance between gas meter sets and sources of ignition.	3 feet radially from the discharge point of the regulator or relief valve. The 3-foot clearance from a source of ignition is measured from the vent or source of release (discharge port), not from the physical location of the meter set assembly.

See Drawings Section, Drawing 1430-CL4.

# ➡ Section 5: Special Types of Service

### **TEMPORARY SERVICE**

Temporary service may be made available prior to the installation of the permanent meter. Temporary service shall be restricted to as short a time as possible, such as the time necessary for the construction of a building. Temporary service will be provided by the company in accordance with its established rate schedules, electric service connection policy, and line extension policy. Temporary Services shall be in accordance with current *NEC*<sup>®</sup> Standards.

### **General Requirements for Temporary Service**

The service address shall be prominently displayed on the temporary service installation. Entry into and connections within all pad-mounted or underground facilities will be made by the company.

The meter socket shall be furnished and installed by the customer. Temporary service installations shall be braced as shown in the respective drawings in the Drawings Section to withstand normal service drop tension and normal use of the facility.

Temporary meter service panels shall not be attached to vehicles or trailers. Refer to the Drawings Section, *Drawings 1420-TM2, 1420-TM3, 1420-TM4* for acceptable temporary meter panel designs. In the event that a temporary service installation fails or collapses, it will be disconnected by the company until repaired by the customer.

The service equipment shall be "rain tight" (NEMA 3R) and all 120 volt, single-phase, 15, 20 and 30 amp circuits shall be equipped with ground-fault circuit interrupters in accordance with the current *NEC*<sup>®</sup>.

# DISTRIBUTION CONNECTED CUSTOMER-OWNED GENERATION

The customer shall inform the company of plans to install and connect generating equipment to the company's system. It is in the best interest of both the company and the customer to obtain company interconnection acceptance and approvals before the customer completes final designs or purchases any equipment. Customerowned generating equipment shall be installed without causing adverse effects to the company's or customer's equipment and without introducing potentially dangerous situations to the company's personnel or the public.

A copy of the company's interconnection guidelines must be obtained and followed to ensure proper installation. The guidelines can be obtained from the company representative that is assigned to the geographic area that includes the proposed generation interconnection site.

The company will not assume any responsibility for the protection of the customer's facility or any portion of the customer's electrical equipment. The customer is fully responsible for protecting his equipment from damage caused by faults or other disturbances on the company's system.

The company will review the customer's design for interconnection acceptance only. The company will not approve the reliability or adequacy of the customer's design.

### **DATA PULSES - EXISTING SERVICES ONLY** Meter Pulses Generated For Customer Use as Data to Their Load Management System

Data pulses are generated by an electric meter at a rate which is proportional to the load. Customers may purchase data pulses which, when accumulated over a demand interval and multiplied by a pulse value, will represent the customer's demand. The customer's calculated demand and corresponding demand interval will not duplicate the company's billing demand and demand interval but will be useful in controlling the customer's demand limits.

Customer accessible data pulse wiring will be provided within a junction box located next to the existing meter. A data pulse will consist of a change in state of a Form "C" contact with the "K" lead serving as the common terminal. The meter pulse contacts are rated 100 milliamps at 120 volts AC or DC.

The pulse initiator and the associated pulse value are an integral part of the demand meter. The selection of equipment for a particular installation will determine the pulse value. The pulse value will be provided at the



time of the pulse installation, but may change due to necessary changes in metering equipment. The kWh pulse value given to the customer will be for a 3-wire Form C connection. If the customer's load controller uses a 2-wire Form A connection, the kWh pulse value must be multiplied by a factor of 2. The following formula can be used to determine the kWh value per pulse.

# **kWh Pulse Value =** $\frac{Kh X CT Ratio X PT Ratio}{Pulses/Revolution x 1,000}$

The company reserves the right to interrupt pulses at any time in order to test or change the meter and to change the pulse value whenever it becomes necessary to upgrade the metering equipment. Every effort will be made to notify the customer when it becomes necessary to interrupt pulses for equipment maintenance. The customer will be notified of any change to the pulse values.

Drawings Section, *Drawing 1470-LM1* shows possible metering configurations supplying customer data pulses.

# Drawings

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1440-TR	48
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<b>12.</b> s docum	REPRESENTATIVE FOR RECOMMENDATIONS.					
12.	REPRESENTATIVE FOR RECOMMENDATIONS.					
	CUSTOMER OWNED GUYING, WHEN REQUIRED, TO BE ADEQUATE FOR WIRE SIZE AND SPAN LENGTHS. SEE YOUR COMPANY					
	C. SLIP SLEEVES ARE REQUIRED ON ALL PVC RISERS.					
	B. NO LB ELBOWS ON LINE SIDE CONDUIT ALLOWED, ALL CORNERS SHALL BE OF THE SWEEP VARIETY.					
	A.A. KISEK CONDULT TO MATCH TRENCH CONDULT SIZE & SCHEDULE. IF NO TRENCH CONDULT, MIN. 2" SCHEDULE 80 REQUI					
11.						
11	CONDUITEOD METED DISED EDOM METED CAN TO 18" DELOW CRADE.					
	I. WHEN USING MULTIPLE METER HOUSINGS THE SERVICE ADDRESS SHALL BE CLEARLY MARKED AND PERMANENTLY ATTACH TO THE EXTERIOR OF THE MAIN BODY OF METER SOCKET BY MEANS OF A PERMANENT STAMPED BRASS, ALUMINUM, STAINLESS STEEL OR PLASTIC TAG AND HAVE ADDRESS PERMANENTLY WRITTEN ON INSIDE OF METER SOCKET (NOT UD)					
	H. IF SELF CONTAINED METER HOUSING IS NOT ATTACHED TO A BUILDING, A SERVICE DISCONNECT WILL BE REQUIRED ON THE LOAD SIDE OR ADJACENT TO THE METER HOUSING. BOTH DISCONNECT AND WIRE ON THE LOAD SIDE WILL BE CUSTOMER OWNED.					
	G. A WALL MOUNTED METER HOUSING SHOULD BE ON THE FRONT OR SIDE WALL OF THE STRUCTURE, PREFERABLY THE WALL CLOSEST TO THE POWER SERVICE POINT (TRANSFORMER, PEDESTAL, POLE). A BACK OR REAR WALL IS NOT RECOMMENDED METER HOUSING LOCATION. THE METER SHOULD REMAIN ACCESSIBLE WITHOUT PASSING THROUGH RESTRICTED AREAS, GATES, OR FENCES.					
	F. ALL METERS TO BE OUTSIDE OF BUILDINGS - NOT INSIDE.					
	E. METER HOUSINGS SHALL CONFORM TO ALL COMPANY CRITERIA. (REFER TO SECTION 4, METERING)					
	D. ALL PERMANENT SELF CONTAINED METER HOUSINGS MUST BE AT LEAST 200 AMP AS PER COMPANY STANDARDS AND INSTALLED LEVEL IN ALL DIRECTIONS.					
	C. ANY RESIDENTIAL METER HOUSING MUST HAVE HORN OR LEVER BYPASS.					
	B. ANY COMMERCIAL INDIVIDUAL SELF CONTAINED METER HOUSING MUST HAVE LEVER BYPASS .					
	A. ALL METER HOUSINGS TO BE RING-LESS, NO RING TYPE.					
10.	METERING REQUIREMENTS: (METER FURNISHED BY COMPANY)					
	D. ALL GROUND RODS TO BE EMBEDDED BELOW PERMANENT MOISTURE LEVEL PER N.E.C.					
	C. ALL GROUND RODS TO BE INSTALLED IN UNDISTURBED EARTH.					
	B. GROUND RODS 8' LONG 5/8" GROUND ROD, AS PER CURRENT ISSUE OF N.E.C.					
	A. GROUND WIRE - NO. 6 COPPER MINIMUM - IN SEPARATE CONDUIT NOT IN WITH COMPANY WIRE.					
9.	GROUNDING REQUIREMENTS:					
8.	WHEN PRACTICAL, EQUIPMENT OR OTHER OBSTRUCTIONS SHALL MAINTAIN A MINIMUM CLEARANCE OF TEN (10) FEET AWAY FR A COMPANY POLE. THIS INCLUDES ITEMS SUCH AS TEMPORARY SERVICE PEDESTALS OR POLES, METER PEDESTALS, COMMUNICAT PEDESTAL, PADMOUNT TRANSFORMERS, FENCES, ETC.					
7.	CUSTOMER HAS RESPONSIBILITY TO PROVIDE AND MAINTAIN A THREE (3) FOOT CLEARANCE FROM ALL TREE LIMBS FOR THE ELECTRICAL OVERHEAD SERVICE FROM THE POLE TO THE SERVICE ATTACHMENT ON THE CUSTOMERS BUILDING OR DWELLING.					
6.	THREE (3) FEET MINIMUM WORKING SPACE REQUIRED BETWEEN ELECTRICAL METER AND ANY OTHER OBSTRUCTION ATTACHED 1 THE BUILDING. (SEE N.E.C. REQUIREMENTS)					
5.	CUSTOMER OWNED METERING EQUIPMENT, SWITCHING DEVICES, CONDUITS, CONDUCTORS, LUMINARIES, ETC., ARE NOT TO BE MOUNTED ON COMPANY POLES.					
4.	OVERHEAD PERMANENT SERVICE DROPS SHALL BE SUPPORTED ON COMPANY APPROVED POLE, WALL, OR STRUCTURE. THE MAXIMUM SERVICE DROP LENGTH FROM COMPANY POLE TO THE SERVICE DEPENDS UPON CONDUCTOR SIZE. CONSULT WITH YOUR COMPANY REPRESENTATIVE TO DETERMINE THE MAXIMUM DISTANCE. PERMANENT SERVICE MUST MEET COMPANY STANDARDS.					
3.	PERMANENT SERVICES MUST BE LOCATED WHERE THE METER WILL BE PROTECTED FROM MECHANICAL INJURY. BLACK HILLS ENERGY WILL NOT BE RESPONSIBLE FOR THE RELOCATION OF A METER SOCKET THAT DOES NOT MEET COMPANY STANDARDS.					
2.	AN ELECTRICAL WIRING PERMIT AND INSPECTION SHALL BE OBTAINED FROM THE AUTHORITY HAVING JURISDICTION BEFORE SERVICE CAN BE PROVIDED.					
1.	THE COSTOMER SHALL MAKE EARLY CONTACT WITH A BHE CONSTRUCTION PLANNER OR SPECIALIST FOR PERMANENT SERVICE AND METER HOUSING LOCATION.					

PERMANENT ELECTRIC SERVICE

1470-LM

AWN BY:

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DATE

## **Black Hills Energy**

Black Hills Energy

1410-SV1





- 3. CUSTOMER DISCONNECT EQUIPMENT -- WEATHER TIGHT -- MINIMUM CAPACITY 30 AMPERES. SWITCH BOX MUST BE COVERED WHEN INSPECTED.
- 4. MINIMUM CONDUCTOR NO. 6 COPPER OR NO. 4 ALUMINUM. MUST BE 24" IN LENGTH OUTSIDE WEATHERHEAD.
- 5. POINT OF ATTACHMENT FOR SERVICE MUST BE PROVIDED BY CUSTOMER, 1/2" MIN. EYE BOLT WITH INSULATED DEADEND. NO HOUSE KNOBS.
- AN ELECTRICAL INSPECTION APPROVING THE SERVICE FOR CONNECTION MUST BE COMPLETED BY AUTHORITY HAVING JURISDICTION BEFORE 6. PERMANENT SERVICE CAN BE PROVIDED.
- 7. SEE 1410-SV1 FOR ANY OTHER REQUIREMENTS.

THIS DOCUMENT IS REFERENCED IN THE STANDARDS FOR ELECTRICAL METER INSTALLATION AND USE, RESIDENTIAL CONSTRUCTION HANDBOOK . MAINTAINED BY ENGINEERING STANDARDS

си воок: МЕТЕ	REVISION DATE	APPROVED BY:	PERMANENT OVERHEAD SERVICE		
DRAWN BY:	REVISION NO.	APPROVAL DATE	FOR CLISTOMER OWNED POLE	DRAWING #	
TG	05			1410-SV3	Black Hills Energy

# **Black Hills Energy**

410-SV



#### UPDATED FEBRUARY 202



# NOTES:

- 1. FOR PEDESTAL DETAIL SEE: 1410-SV5.1, FOR U.L. APPROVED, FACTORY MADE METER/PEDESTAL CABINET WITH SERVICE DISCONNECT SEE 1410-SV6. OTHER DESIGNS MUST BE PRE-APPROVED BY A COMPANY REPRESENTATIVE.
- 2. METER CAN MUST BE COMPANY APPROVED RINGLESS TYPE AND INSTALLED LEVEL IN ALL DIRECTIONS. ALL COMMERCIAL SELF CONTAINED METER CAN INSTALLATIONS MUST HAVE A LEVER BYPASS RESIDENTIAL, A HORNED OR LEVER BYPASS.
- 3. CUSTOMER DISCONNECT REQUIRED WEATHER TIGHT SELF CONTAINED SWITCH BOX MUST BE COVERED WHEN INSPECTED.
  - A. SINGLE PHASE MINIMUM CAPACITY 30 AMPERES. TO MAXIMUM CAPACITY OF 400 AMPERES.
  - B. THREE PHASE SERVICES OVER 200 AMPERES, MUST BE INSTRUMENT METERED.
  - C. ALL 480 VOLT SERVICES, MUST BE INSTRUMENT RATED.
- 4. GROUND WIRE NO. 6 COPPER MINIMUM.
- 5. GROUND ROD -- 8' LONG -- 5/8" GROUND ROD. AS PER CURRENT ISSUE OF N.E.C..
- 6. CONTACT LOCAL UTILITY FOR TRENCHING SPECIFICATIONS AND RESPONSIBILITIES.
- 7. AN ELECTRICAL WIRING PERMIT FOR PERMANENT SERVICE AND INSPECTION APPROVING THE SERVICE FOR CONNECTION MUST BE OBTAINED FROM AUTHORITY HAVING JURISDICTION BEFORE SERVICE CAN BE PROVIDED.
- 8. SERVICE ENTRANCE CUSTOMER WILL PROVIDE:
  - A. COMMERCIAL FROM A PAD MOUNT TRANSFORMER TO CUSTOMERS SERVICE ENTRANCE;
    - \* ALL SECONDARY CONDUCTORS FOR PUEBLO CO DISTRICT, CONTACT LOCAL ELECTRIC UTILITY PLANNER.
    - \* WHEN REQUIRED BY LOCAL UTILITY, ALL PVC CONDUIT ELECTRIC U.L. LISTED PER LOCAL ELECTRIC UTILITY SPEC. • MINIMUM 2" SCHEDULE 80
  - B. COMMERCIAL FROM OVERHEAD TRANSFORMERS:
    - \* CONTACT LOCAL COMPANY REPRESENTATIVE ABOUT OWNERSHIP AND INSTALLATION.
  - C. RESIDENTIAL FROM OVERHEAD OR PADMOUNT TRANSFORMER TO CUSTOMERS SERVICE ENTRANCE:
    - \* COMPANY WILL PROVIDE ALL LINE SIDE CONDUCTORS, AND POLE CONDUIT WHEN REQUIRED BY LOCAL UTILITY, ALL OTHER CONDUIT.
- 9. UNDERGROUND SERVICE LINE MUST BE COVERED OR BACK FILLED BEFORE SERVICE WILL BE ENERGIZED.
- 10. SEE 1410-SV1 FOR ANY OTHER REQUIREMENTS.

 

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CU BOOK:
REVISION DATE
APPROVED BY:

METER
06/20/24
SELF CONTAINED UNDERGROUND PERMANENT SERVICE - STEEL POST
METERING STANDARDS DRAWING # 1410-SV5
Image: Construction Handbook And Commercial Construction H



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### **Black Hills Energy**

470-LN

1410-SV



### 1420-TM2

#### JPDATED FEBRUARY 202



6

POINT OF

DELIVERY

SERVICE DROP

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### NOTES:

- 1. a. 10' ABOVE FINISHED GRADE WHERE ALL OF THE FOLLOWING CONDITIONS ARE MET
  - 1. ACCESS IS LIMITED STRICTLY TO PEDESTRIANS.
  - 2. MULTI-PLEX CONDUCTORS ARE USED.
  - 3. CONDUCTORS ARE 150V OR LESS TO GROUND.
  - POLE TO BE MINIMUM OF 14' LONG, BURIED 3'-6", GUYED AS NEEDED.
  - b. 12' ABOVE GRADE WHERE ALL OF THE FOLLOWING CONDITIONS ARE MET:

1. RESIDENTIAL AND COMMERCIAL AREAS NOT SUBJECT TO TRUCK TRAFFIC.

- 2. CONDUCTORS ARE 300V OR LESS TO GROUND. POLE TO BE MINIMUM OF 16' LONG, BURIED 4', GUYED AS NEEDED.
- c. 15' ABOVE GRADE WHERE ALL OF THE FOLLOWING CONDITIONS ARE MET:

1. RESIDENTIAL AND COMMERCIAL AREAS NOT SUBJECT TO TRUCK TRAFFIC.

2. CONDUCTORS ARE OVER 300V TO GROUND.

POLE TO BE MINIMUM OF 20' LONG, BURIED 4', GUYED AS NEEDED.

d. FOR TEMPORARY SERVICE ACROSS PUBLIC ROAD/ALLEY, LOCAL ELECTRIC UTILITY APPROVAL REQUIRED.18' ABOVE PUBLIC STREETS AND ALL OTHER AREAS SUBJECT TO TRUCK TRAFFIC.

ANCHOR ROD

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CUSTOMER OWNED GUYING

POLE TO BE A MINIMUM OF 25', BURIED 4'-6", GUYED AS NEEDED.

e. A 6" X 6" PRESSURE TREATED POST

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- 2. METER CAN MUST BE COMPANY APPROVED AND INSTALLED LEVEL IN ALL DIRECTIONS, RINGLESS TYPE.
- 3. CUSTOMER DISCONNECT EQUIPMENT MUST BE WEATHERPROOF AND HAVE A MINIMUM CAPACITY 30 AMPERES. SWITCH BOX MUST BE COVERED WHEN INSPECTED.
- 4. GROUND WIRE #6 COPPER MINIMUM, #4 WHERE REQUIRED BY NEC
- 5. GROUND ROD 8' LONG BY 5/8" GROUND ROD.
- 6. MINIMUM CONDUCTOR #8 COPPER OR #6 ALUMINUM. MUST BE 24" IN LENGTH OUTSIDE WEATHERHEAD.
- 7. POINT OF ATTACHMENT FOR SERVICE MUST BE PROVIDED.
- 8. A PERMIT FOR TEMPORARY SERVICE OR AN ELECTRICAL WIRING PERMIT APPROVING THE SERVICE FOR CONNECTION MUST BE OBTAINED BEFORE SERVICE CAN BE PROVIDED.
- 9. SEE 1410-SV1 FOR ANY OTHER REQUIREMENTS.

THIS DOCUMENT I	S REFERENCED IN 1	THE STANDARDS FOR	ELECTRICAL METER INSTALLATION AND USE, RESIDENTIAL CONSTRUCTION HAN	DBOOK AND COMMERCIAL CONSTRUCTION HANDBOOK. MAINTAINED	BY ENGINEERING STANDARDS.
си воок: METER	REVISION DATE 06/20/24	APPROVED BY:	OVERHEAD		
DRAWN BY: TG	REVISION NO. 5	APPROVAL DATE	TEMPORARY SERVICE	1420-TM2	Black Hills Energy



### **Black Hills Energy**

# 470-LM



### 1420-TM4

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UPDATED FEBRUARY 2025





### 1430-CL4

1420-1

1430-CL

1440-TR



1460-MD

440-TR



### 1440-TR2





### 1440-TR2.2



440-TR



### 1450-PM1

UPDATED FEBRUARY 2025



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		OH PRIMARY METER	RING PARTS LIST
QTY		ITEM #	15kV PRIMARY CT'S
	EA	00451008	200:5 ABB KOR-11ER
	EA	00451009	400:5 ABB KOR-11E
	EA	04980059	600:5 ABB KOR-11E
QTY		ITEM#	25kV PRIMARY CT'S
	EA	00451010	100:5 ABB KOR-15CE
	EA	00451011	200:5 ABB KOR-15CER
QTY		ITEM #	PRIMARY VT'S
	EA	00451015	63.5:1 ABB VOG-11 7620/120V
	EA	00451016	60:1 ABB VOG-11 4200/120V
	EA	00451017	120:1 ABB VOY-15G 14400/120V
QTY		ITEM #	SOCKETS & TEST SWITCHES
	EA	00451018	10 PROBE TEST SWITCH
	EA	00451021	208V METER SOCKET 13 TERM
	EA	00582096	RACK, PRIMARY METERING, 3 PHASE

MISC MATERIAL LIST					
ORDERED FROM	QTY		DESCRIPTION	PART #	
	10	ΕA	1" STRAIGHT NIPPLES LIQUIDTIGHT	LT43F-NEW	
	9	ΕA	1" 90 LIQUIDTIGHT CONNECTOR		
	1	ΕA	13 TERMINAL SOCKET	115299	
	2	ΕA	1"T BODY	34928	
	51	FT	1" CARFLEX LIQUIDTIGHT	2492	
	3	ΕA	INS VINYL RING TERMINAL	RC10-12	
	22	ΕA	INS VINYL RING TERMINAL	RC10-14	
WAREHOUSE	7	ΕA	GROUNDING LUGS	00448200	
WAREHOUSE	6	FT	INSULATED COPPER	00361020	
WAREHOUSE	9	ΕA	2 HOLE PADDLES	00712020	
WAREHOUSE	50	FT	METERING WIRE	00880050	
WAREHOUSOE	30	FT	#6 OH COPPER	00360600	
WAREHOUSE	6	EA	<sup>1</sup> 2" BOLT, NUT, FLAT WASHERS, LOCK WASHERS	00200002	
BORDER STATES	1	ΕA	TEN POLE TEST SWITCH	2-1249F-37	

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CU BOOK: METER DRAWN BY: TG	REVISION DATE 1/09/24 REVISION NO. 01	APPROVED BY: DATE	PRIMARY METERING POLE	PERMANENT SERVICE DRAWING # 1450-PM1 SHEET: 2 of 2	Black Hills Energy

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![](_page_58_Figure_2.jpeg)

### 1460-MD2

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![](_page_59_Figure_3.jpeg)

### **Black Hills Energy**

1460-MD

![](_page_60_Figure_2.jpeg)

### 1460-MD4

10-5

1420-TM

1430-CL

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![](_page_61_Figure_3.jpeg)

### **Black Hills Energy**

1440-TR

![](_page_62_Figure_2.jpeg)

### 1470-LM1

UPDATED FEBRUARY 2025

![](_page_63_Figure_3.jpeg)

### **Black Hills Energy**

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UPDATED FEBRUARY 2025

➡ Notes		

![](_page_65_Picture_4.jpeg)

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