

## **SECTION 4 SERVICE FACILITIES**

The City of Aspen will provide service from underground distribution facilities,

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

When The City of Aspen 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 City of Aspen 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**

In general, a building or other structure will be supplied by only one service. Additional services may, at the discretion of The City of Aspen, be provided by The City of Aspen where allowed by the applicable Tariff and permitted by 2002 *NEC*<sup>®</sup> Article 230.2, or as may be amended.

In general, not more than one service lateral or transformer installation will be installed to serve one building or group of buildings, which are located on the same plot owned by one individual or corporation. Additional services may, at the discretion of The City of Aspen, be provided by The City of Aspen where allowed by the applicable Tariff.

The policy pertaining to The City of Aspen 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 City of Aspen Electric Department for specific information.

- 1) Capacity Requirements - Additional services may be provided where The City of Aspen determines that it cannot adequately provide service at a single point of delivery.
- 2) Different Characteristics – Additional services may be provided by The City of Aspen for different voltages or phases, or for loads with different rate schedules.

For information regarding metering, refer to METERING, Meter Installation and Ownership in this Section.

### **UNDERGROUND SERVICE**

#### **Underground System - Low Voltage (0-480**

##### **Volts) General Requirements:**

- 1) Service Connection - Underground service laterals from underground distribution systems or overhead distribution systems shall be installed in accordance with The City of Aspen's Rules and Regulations.

- 2) Point of Entry - The City of Aspen shall specify the location of the underground service lateral and metering equipment location most suitable for connection with The City of Aspen's facilities. The City of Aspen 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 The City of Aspen's Electric Department to determine requirements.
- 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 twenty-four (24) inches.
- 5) Ground Movement – Slip sleeves (expansion joints) will be furnished by the Customer and shall be installed by the customer on all new underground residential meter installations in areas. An 18" length of 2 1/2" Schedule 40 or 3" Schedule 80 PVC conduit shall be installed at the bottom of the underground riser. Refer to 2002 *NEC*<sup>®</sup> Article 300.5(J) (FPN), or as may be amended and to the Illustrations Section, Drawings SC-30, SC-40, SC-50, SC-90 and TR- 10 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*<sup>®</sup> and the Public Authority having jurisdiction. The City of Aspen strongly recommends that some provision be made for future load increase. Line and load conductors are not permitted in the same raceway or conduit. No conductors, other than service conductors, shall be installed in the service lateral conduit. Junction boxes, conduit bodies (e.g. LB's), or other devices are not allowed on the underground service riser. Drawings showing typical methods for installing service-entrance conductors are contained in the Illustrations 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 when a lever type bypass meter socket is used. Refer to the Illustrations Section, Drawings SC- 140 and SC-150.

#### 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 City of Aspen 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 Illustrations Section, Drawings PM-20, PM-30 and PM-40 for customer-owned primary switchgear and Drawing CR- 100 for primary meter cabinet clearance requirements.

#### FULL LOAD REPORT

The customer applying for new service shall have an electric connect load summary conducted by a licensed electrician in order to determine if the existing transformer on the property or an adjacent property has sufficient capacity for the additional load. If the transformer is determined by the Electric Department to not be of sufficient size, then the developer will be required to pay for an upgrade to the existing transformer or pay for an additional transformer and provide a location for the latter. The location and size of the new transformer will be approved by the Electric Department. The customer

shall dedicate an easement to allow for City Utility Personnel to access the supplemental transformer for maintenance purposes, if a supplemental transformer is installed.

If an upgrade is required, the customer will pay for a new transformer rated to handle the new additional load, but will be reimbursed for the transformer placed back in the Electric Department's inventory. Due to the extended lead time of transformers, it is imperative that a customer get a "Full Load Report" form filled out and filed with the Electric Department as soon as possible. Some transformers are out up to **one year**.

A "Full Load Report" form is available for the Electric Department.

### **TRANSFORMER/EQUIPMENT INSTALLATIONS, PAD-MOUNTED**

The City of Aspen will provide an outdoor pad-mounted transformer for service to the customer's facilities such as shopping centers, office buildings, schools, large apartment buildings, etc. under the following conditions:

- 1) The City of Aspen will own, operate and maintain the primary underground installation between the adjacent distribution facilities and the transformer, including the primary cable, ducts, transformer and protective equipment.
- 2) The City of Aspen will make and maintain all connections at the transformer terminals. No customer-owned switches, fuses, etc. may be located within a fenced area designed to contain a transformer installation without written approval of the assigned The City of Aspen Engineer.
- 3) The property shall be to final grade ( $\pm 6$  inches) except at the equipment location, which shall be to exact final grade. Property pins shall be in place with the structure staked or the foundation in, prior to installation of the pad-mounted equipment and splice boxes.
- 4) The City of Aspen shall be consulted well in advance of any proposed project.
- 5) If, in the judgment of the assigned The City of Aspen Engineer, the selected location for the installation of the pad-mounted equipment is not adequately protected from traffic, or when directed by the local Public Authority, the customer shall furnish and install either a fence guardrail or guard posts to protect the pad-mounted equipment installation. The City of Aspen may elect to furnish and install the guardrail or guard posts. The installation shall conform within practical limits to the Illustrations Section, Drawing CR-90.

Further details relating specifically to transformers can be found in Section 5. Refer to the Illustrations Section, Drawings CC- 10, CC-30, CC-40, CC-50, CR-20, CR-30, CR-40, CR-50, CR-60 and CR-90 for typical pad-mounted transformer installation and clearance requirements.

### **POINT OF DELIVERY**

The point of delivery is the point where The City of Aspen'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 Illustrations Section.

It is the policy of The City of Aspen to own, operate, and maintain the electric distribution facilities up to the point of delivery. This policy is applicable to service rendered from underground facilities.

All such facilities will be installed in accordance with The City of Aspen’s Line Extension Policy and Rules and Regulations.

Copper		Aluminum	
Maximum Runs	Maximum Size	Maximum Runs	Maximum Size
5	500	5	500

**CUSTOMER-OWNED SERVICE CONDUCTORS**

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

- 1) Underground:
  - a) The number of conductors that may be terminated in a pad-mounted transformer is governed by the kVA rating of the transformer and the size of the conductors as shown in Table I below. If a customer requires a larger number and/or size of conductors than listed in Table I, a service connection cabinet will be required.

Table I

PAD-MOUNTED TRANSFORMERS				
KVA Rating	Copper		Aluminum	
	Maximum Runs	Maximum Size	Maximum Runs	Maximum Size
<b>240/120 Volt 1</b>				
<b>All Sizes</b>	2	500	2	500
<b>208 Grd Y/120 Volt</b>				
75	4	500	4	500
150	4	500	4	500
300	4	500	4	500
500	6	500	6	500
750	8	500	8	500
1000	8	500	8	500
<b>480 Grd Y/277 Volt</b>				
75	4	500	4	500
150	4	500	4	500
300	4	500	4	500
500	4	500	4	500
750	6	500	6	500
1000	6	500	6	500
1500	6	500	6	500
2000	8	500	8	500
2500	8	500	8	500

## METERING

### New Services

The City of Aspen 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 7, TEMPORARY SERVICE and the Illustrations Section, Drawings TM- 10, TM-20 and TM-30.

Before permission will be granted to energize a new service, The City of Aspen shall have an application for electric service and an inspection release.

*Note 1: In locations where there is no local Public Authority, the wireman shall submit a signed and dated letter to attesting that the electrical installation has been completed and installed according to the current NEC<sup>®</sup> and any other codes that apply before electric service is energized.*

### Existing Services

The City of Aspen may grant permission for a temporary unmetered service (closed loop/flat tap/jumpered) on an existing service for up to a maximum of three (3) calendar days. Refer to METERING, 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 three (3) days, the customer may contact The City of Aspen's to coordinate temporary meter service. Refer to Section 7, TEMPORARY SERVICE, and the Illustrations Section, Drawings TM- 10, TM-20 and TM-30.

Before permission will be granted to re-energize an existing service which has been rewired, altered, or repaired, an inspection release shall be telephoned to The City of Aspen by the local Public Authority.

### Temporary Unmetered Services

The City of Aspen 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 and permission from The City of Aspen, and all wiring shall comply with the *NEC* ® and the rules of the local Public Authority. The City of Aspen may grant permission to close a loop for up to a maximum of three (3) calendar days. Special permission by The City of Aspen's Electric Department is required to extend a closed loop beyond 90days. Permission to close a loop may be obtained in the form of an authorization number by calling The City of Aspen. Refer to Section 2, CITY OF ASPEN ELECTRIC DEPARTMENT ENERGY LIMITED TELEPHONE DIRECTORY.

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 a The City of Aspen Electric Department. 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 City of Aspen's Rules and Regulations, The City of Aspen may open the closed loop.

### Meter Installation And Ownership

In general 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 City of Aspen as detailed in SERVICES in this Section, will The City of Aspen install more than one meter.

A customer-owned service connection cabinet may be utilized to augment an installation where additional services or metering points would be desirable but are prohibited by this document. Arrangements for a service connection cabinet may be made by contacting the assigned The City of Aspen Engineer. Refer to METERING, Service Connection Cabinets (with or without Optional Customer Disconnect Switch and Metering Provisions) in this Section.

Only authorized The City of Aspen employees or qualified individuals authorized by The City of Aspen are permitted to connect, disconnect, move or remove meters. All meters, service wires, and other electrical facilities installed by The City of Aspen upon the customer's premises for delivering or measuring electrical energy to the customer shall continue to be the property of The City of Aspen. All metering equipment owned by The City of Aspen and not installed shall be returned to The City of Aspen. These facilities may be repaired, inspected, tested, relocated, replaced, or removed by The City of Aspen.

Meter locations in all instances will be determined by The City of Aspen. Normally meters shall be installed outdoors in accordance with rules in this Section governing outdoor meter installations. Prior approval from The City of Aspen's local Electric 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 Illustrations Section, Drawing SC- 10.

### Classification of Metering

Refer to Section 1 for the definition of Classification of Metering.

The City of Aspen classifies its metering installations as:

#### 1) Residential Rate:

- a) Self-Contained (Hot Sequence required.)
- b) Instrument Transformer (Hot Sequence required.)

#### 2) Commercial and Industrial Rates:

- a) Self-Contained (Cold Sequence required.)
- b) Instrument Transformer (Hot Sequence required.)
- c) Temporary Construction (Cold Sequence required for Self-Contained.)  
The type of metering used will be determined by The City of Aspen based upon the service voltage, the load supplied, the available fault current, and the applicable Rate Schedule.

Instrument transformer metering is required on residential and commercial services when the available fault current is in excess 10,000 amps. Refer to COLD SEQUENCE METERING and HOT SEQUENCE METERING in this Section.

A 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 City of Aspen's transformer unless the applicable Rate

Schedule specifies that the service be metered on the primary side of the transformer. The City of Aspen 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.

### Self-Contained Metering

Single-phase and three-phase services with loads of 320 amps or less may be metered by self-contained meters. Services where the load current is in excess of, or anticipated to be in excess of, 320 amps shall use instrument transformer (CT) metering. The connected load on self-contained metering shall not be more than the continuous duty rating of the meter socket.

### Instrument Transformer Metering, Secondary Voltage

Hot sequence is the required installation method for commercial and industrial instrument transformer (CT) metering. A cold sequence disconnect is not allowed ahead of a CT cabinet. Hot sequence is the required installation method for Residential instrument transformer metering.

The CT's and meter-socket will be supplied, owned, and maintained by The City of Aspen and shall be installed by the customer. The instrument transformer compartment in a CT cabinet, service connection cabinet, or switchgear CT compartment, and the necessary conduit and fittings shall be supplied, owned, installed, and maintained by the customer. The customer<sup>3</sup> shall terminate the line-side and load-side conductors in the CT cabinet or service connection cabinet. The secondary (metering) conductors will be supplied, owned, installed, and maintained by The City of Aspen. 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 connection cabinet, or switchgear CT compartment. Refer to METERING, CT Cabinets, Service Connection Cabinets (with or without Optional Customer Disconnect Switch and Metering Provisions) and Switchgear CT Compartments in this Section.

The following CT installations are **not** allowed:

- 1) Rack mounted on mast, pole or side of building using donut or window type CT's.
- 2) Grecian urn or over-the-bushing type CT's mounted in the The City of Aspen's distribution transformer.

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. When bar-type CT's are installed, the bolts used to make the connections shall be the largest standard diameter that will fit through the holes or slots provided for this purpose.

Conductors in CT cabinets and service connection cabinets shall be installed in accordance with the minimum wire-bending space requirements of 2002 *NEC*<sup>®</sup> Article 3 12.6, or as may be amended. Metering conduit installed below grade (underground) from the meter-socket to the CT cabinet (or compartment) shall be minimum 1~" Schedule 40 PVC. Metering conduit installed above grade (above ground) from the meter-socket to the CT cabinet (or compartment) shall be minimum 1 ~" GRC, IMC, EMT, or Schedule 80 PVC. Metering conduit shall be a continuous run between the meter socket and the CT cabinet. The conduit run shall not exceed 100 feet in length. If the conduit run exceeds 25 feet in length, the total degrees of bends shall not exceed 180<sup>0</sup>, the equivalent of two quarter bends. Junction boxes, conduit bodies (e.g. LB's), or other devices are not allowed without specific written approval from The City of Aspen's Electric Department.

The meter socket shall be bonded with a separate bonding conductor in accordance with 2002 *NEC* ® Article 250, or as may be amended.

### CT Cabinets

In addition to the general requirements in METERING, Instrument Transformer Metering, Secondary Voltage in this Section, the following requirements shall also be met:

- 1) 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 labeled as a CT enclosure.
- 3) Installations of 800 amp rating and below shall have mounting provisions for an ABB Type CBT -H bar-type CT.
- 4) Installations from 1000 to 4000 amp rating shall have a minimum 12" length removable bus section and CT support angles which will accommodate an ABB Type CLC window-type CT. The removable bus section shall have an enclosed screw type compression terminal to accommodate a minimum #12 AWG metering potential conductor.
- 5) The CT cabinet shall be furnished with factory installed landing pads and lugs for phase and neutral conductors.
- 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.
- 7) The phases and neutral shall be separated by insulating barriers.
- 8) The door shall be hinged either on the left or right side and be equipped with a hasp for a The City of Aspen padlock with a 5/16" diameter shackle.
- 9) The installation height of the CT's shall be between 2'-0" minimum and 6'-0" maximum measured from the center of the CT's to final grade. Clearance from the bottom of a wall-mounted CT cabinet to final grade shall be 3'-0".
- 10) 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 2002 *NEC*® Article 110.15, or as may be amended, 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.
- 11) 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 CT cabinet.

*Note: On some types of 400 and 800 amp bar-type CT cabinets, the neutral bus bar can be physically relocated to the center phase position for use in a 3-phase, 3-wire corner-grounded system.*

*Note: Refer to SERVICES and also METERING, Meter Installation and Ownership.*



## Switchgear CT Compartments

In addition to the general requirements in METERING, Instrument Transformer Metering, Secondary Voltage in this Section, the following requirements shall also be met:

- 1) Installations of 800 amp rating and below shall have mounting provisions for an ABB Type CBT -H bar-type CT.
- 2) Installations from 1000 to 4000 amp rating shall have a minimum 12" length removable bus section and CT support angles which will accommodate an ABB Type CLC window-type CT. The removable bus section shall have an enclosed screw type compression terminal to accommodate a minimum #12 AWG metering potential conductor.
- 3) 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.
- 4) The phases and neutral shall be separated by insulating barriers.
- 5) The door shall be hinged either on the left or right side and be equipped with a hasp for a The City of Aspen padlock with a 5/16" diameter shackle.

## PRIMARY METER INSTALLATIONS

Primary metering installations shall be 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 City of Aspen 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 City of Aspen Electric Department 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 City of Aspen's Electric Department should also be contacted in advance of construction and/or purchase of equipment. Electric Meter Engineering 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 The City of Aspen-owned primary metering cabinet, or in a customer-owned primary metering cabinet. Instrument transformers may also be allowed in a customer-owned switchgear CT compartment. Pre-approval by City of Aspen Electric Department is required for the use of metering compartments in switchgear. Construction drawings detailing all switchgear metering compartments shall be submitted to City of Aspen Electric Department for written approval. City of Aspen Electric 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 City of Aspen's Electric Department.

Refer to the Illustrations Section, Drawings PM- 10, PM-20, PM-30 and PM-40.

## METER SOCKETS

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

Purchasing, installing, connecting, and maintaining self-contained 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 2002 *NEC*<sup>®</sup>, or as may be amended, and meet any code requirements that may be enforced by the local Public Authority.

All single and multiple position meter sockets installed on The City of Aspen's system shall meet The City of Aspen's standards for these devices as listed below. The City of Aspen 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 this criteria.

Meters will not be installed unless all criteria for meter socket specifications outlined below are met:

- 1) Sockets shall be constructed from steel in accordance with Underwriters Laboratories (UL) Standard No. 414 revised March 24, 1999, for meter sockets or equal.
- 2) Sockets used in underground installations shall have the following minimum dimensions:
  - a) 200 amp – 19" height x 13" width
  - b) 320 amp - 26 1/2" height x 13" width
- 3) Temporary cover plates for meter sockets shall be constructed from a non-metallic material.
- 4) Single-phase and three-phase meter 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 only approved bypasses are the Landis & Gyr HQ and Milbank HD (Heavy Duty).
- 5) Sockets shall be equipped with an insulating, track-resistant polycarbonate safety shield.
- 6) Single-phase and three-phase, three-wire sockets shall have a fifth terminal installed in the 9 o'clock position with minimum #16 AWG wire and connected to the neutral within the socket. The City of Aspen will not furnish or install the fifth terminal.
- 7) Three-phase, four-wire sockets shall have the seventh terminal connected with minimum #16 AWG wire to the neutral within the socket.
- 8) Sockets shall have ringless style covers.
- 9) Sealing means shall provide for a plastic padlock seal with a 0.047" diameter shackle and a key type padlock with a 9/32" shackle.

**Additional Requirements for Self-Contained Multiple Metering Panels:**

- 1) Each meter socket shall have an individual ringless style cover with sealing provisions.
- 2) The panel shall have permanent barriers to isolate the customer's disconnect switch and wiring from the metering areas.
- 3) Each line-side compartment shall have provisions for The City of Aspen seal, whether or not the compartment is designed to house a meter.

**Additional Requirements for Metering Pedestals:**

- 1) Pedestals shall meet The City of Aspen and applicable code requirements.
- 2) 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.

- 3) Pedestals shall meet additional requirements shown in the Illustrations Section, Drawings SC-60 and SC-70.

#### Instrument Transformer Meter Sockets

The City of Aspen will furnish instrument transformer meter sockets. For commercial or industrial installations, The City of Aspen shall be contacted first to determine the rate, load and service voltage. The customer should contact The City of Aspen's Electric Department to obtain metering equipment and to coordinate meter installation.

### METER LOCATION AND INSTALLATION

#### Meter Location

The customer shall provide and maintain, without cost to The City of Aspen Electric Department, an easily accessible metering location. The City of Aspen Electric Department will locate an acceptable point of delivery and meter location upon the customer's request. No wiring dependent upon a meter location shall be started until a definite meter location has been established. The City of Aspen Electric Department 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 City of Aspen.

Residential self-contained and transformer-rated meters (including CT cabinets) shall be installed outdoors. The City of Aspen 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 City of Aspen's Electric Department. The relocated service entrance installation shall conform to current The City of Aspen standards.

Only commercial, industrial or apartment meter installations may be installed indoors if it is not practical to install the meters outdoors. Approval shall be obtained from The City of Aspen's Electric 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.

Mobile homes, construction trailers, and those buildings not intended as a 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 2002 *NEC*<sup>®</sup> Article 5 50.32(A), or as may be amended.

Manufactured homes may have the meter socket attached to the structure provided the structure meets the definition of a Manufactured Home as defined in 2002 *NEC*<sup>®</sup> Article 550.2, or as may be amended, and meets the requirements of 2002 *NEC*<sup>®</sup> Article 5 50.32(B), or as may be amended. 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 City of Aspen, which become inaccessible by virtue of alterations or new construction, shall be reinstalled at a point designated by The City of Aspen at the expense of the property owner.

Meters shall be installed:

- 1) In a location that will be easily accessible to The City of Aspen personnel at all reasonable hours for reading and maintenance.
- 2) In a location where they will be safe from damage.

Meters shall not be installed:

- 1) On fences, mobile homes or construction trailers.
- 2) Where the meter will, in The City of Aspen's opinion, interfere with traffic on sidewalks, driveways, hallways or passageways.
- 3) Where the meter will, in The City of Aspen's opinion, obstruct the opening of doors or windows.
- 4) In a location that may, in The City of Aspen's opinion, be considered hazardous.
- 5) Where meter reading or servicing may, in The City of Aspen's opinion, become impracticable.

### Meter Installation

Installation of line-side (ahead of the meter) facilities shall be in conformance with the Illustrations Section drawings.

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 City of Aspen 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. LB's), or other devices are not allowed without specific written approval from the Electric 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. Refer to the Illustrations Section, Drawings SC – 140 and SC – 150.

The use of line-side disconnects may be required by The City of Aspen or the local Public Authority. Line-side disconnects shall be installed on the same wall directly ahead of and within 24" of the meter. Commercial and industrial

self-contained meter installations shall comply with the requirements in COLD SEQUENCE METERING in this Section.

Outdoor meters serving structures designed for multiple occupancy, such as an office building or apartment, 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" apart.

### Meter Socket Identification

The unit number shall be plainly marked by a permanent durable means at the meter socket, corresponding main service breaker, tenant panelboard, and doorway or entrance to the apartment, office, store or other premise. The method of identifying the corresponding unit on the meter socket shall be with a stamped brass, aluminum, or stainless steel 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, are as follows:

1) Single meter sockets:

- a) Self-contained or transformer-rated ----- 4' minimum to 6' maximum
- b) Meter pedestals ----- 4' minimum to 6' maximum

2) Multiple meter sockets, vertically aligned:

- a) Indoor----- 2' minimum to 6'-6" maximum
- b) Outdoor----- 3' minimum to 6'-6" 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 *NEC*<sup>®</sup> requirements for working space as specified METER CLEARANCES in this Section and the Illustrations Section, Drawing CR- 120.

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

### METER CLEARANCES

The minimum depth of working space in front of metering equipment shall be 3', 3'-6", or 4' in accordance with 2002 *NEC*<sup>®</sup> Article 11 0.26(A)( 1) and Table 11 0.26(A)( 1), or as may be amended. The minimum width of the working space in front of metering equipment shall be the width of the metering equipment or 2'-6", whichever is greater, in accordance with 2002 *NEC* ® Article 1 10.26(A)(2), or as may be amended. Metering equipment includes cold sequence disconnects, CT cabinets, service connection cabinets, switchgear CT compartments, and meter sockets.

Refer to the Illustrations Section, Drawing CR- 120 for clearance (working space) requirements.

Clearances from Gas Meter Sets

Minimum Clearances from Gas Meter Sets and Sources of Ignition	
Minimum clearance between gas meter sets and sources of ignition.	3' 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

**Minimum Working Clearances from Gas Meter Sets**

Minimum working clearance between gasNo electrical equipment shall be installed directly above a gas meter sets and electrical equipment. As an meter or in an area 12" on either side of a gas meter set.  
 example: electric meter, breaker box, air conditioning unit, electric outlet, etc.

Working clearance between gas meter sets and other obstructions.	In all cases, sufficient working space (3' 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.
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**COLD SEQUENCE METERING**

All new, rewired, altered, or repaired commercial and industrial self-contained meter installations (all installations other than residential) require the installation of a fusible load-break safety switch with fault current-limiting fuses ahead of each individual meter. Commercial and industrial installations may be subject to available fault currents up to 100,000 symmetrical RMS amps. Current-limiting fuses shall be selected to limit faults to 10,000 symmetrical RMS amps at the meter. Fuses considered adequate to protect a meter from excessive fault currents are listed in Section 5, Tables I through V. A fuse cross-reference table is shown in Section 5, Table VI.

*Exception 1: A fault current-limiting circuit breaker may be utilized in lieu of a fusible load-break safety switch if pre-approved by The City of Aspen's Electric Department. The request for approval shall be submitted in writing, and include a fault-current analysis report sealed and signed by a registered professional engineer. All requests for approval will be responded to in written form. All calculations shall be based upon the worst-case transformer percent resistance, percent reactance, and percent impedance values shown in Section 5, Tables I through V.*

*Exception 2: Multiple commercial tenant meter sockets are permitted to have a single current-limiting main disconnect ahead of the common bus to limit fault current to 10,000 amps. Each individual meter shall have a safety switch or circuit breaker on its line-side to serve as a cold sequence disconnecting means. If a fusible load-break safety switch is utilized for the main disconnect, the current-limiting fuses shall meet the requirements in Section 5, Tables I through V. A fault current-limiting circuit breaker may be utilized for the main disconnect if The City of Aspen approved in accordance with Exception 1 above.*

*Exception 3: Single-phase commercial installations up to 320 amps are permitted to be hot sequence provided all three of the following conditions are met:*

- (1) Only one meter is served by the overhead service drop or underground service lateral.*
- (2) The available fault current is below 10,000 amps.*
- (3) The service voltage is 240 volts or less.*

*Note: Three-phase meters do not qualify for this exception except as specified in HOT SEQUENCE METERING, Residential in this Section.*

The cold sequence disconnect(s) shall contain provisions for The City of Aspen wire seal for the cover and The City of Aspen padlock in the operating handle lock-off position. Wire seals will be used by The City of Aspen to secure the enclosure from unauthorized entry and will allow the customer emergency access to reset breakers or to replace fuses. The City of Aspen padlock will only be used to lock disconnects in the off position for services that are shut off.

The cold sequence disconnect(s) shall be furnished, owned, and maintained by the customer.

Tables VII through IX in Section 5 can be used to determine if the available fault current at a single-phase electric meter socket is less than 10,000 amperes based on a specific transformer size and service conductor size and length.

## **HOT SEQUENCE METERING**

### **Residential**

Residential self-contained meter installations, both single-phase and three-phase, shall be hot sequence metering. Available fault currents in excess of 10,000 amps at the electric meter on residential applications are uncommon. In cases where the fault current does exceed 10,000 amps, instrument transformer type (CT) metering shall be utilized.

*Exception 1: Where the fault current does exceed 10,000 amps, cold sequence metering with a fault current-limiting circuit breaker may be utilized if pre-approved by The City of Aspen's Electric Department. The request for approval shall be submitted in writing, and include a fault-current analysis report sealed and signed by a registered professional engineer. Exceptions will not be granted for the use of any type of fault current-limiting fuses ahead of the meter installation. All requests for approval will be responded to in written form. All calculations shall be based upon the worst-case transformer percent resistance, percent reactance, and percent impedance values shown in Section 5, Tables I through V.*

*Exception 2: Multiple residential tenant meter sockets are permitted to have a single current-limiting main disconnect ahead of the common bus to limit fault current to 10,000 amps. Single-phase or three-phase commercial house power meters (e.g. common lighting, emergency lighting, or laundry facilities) may be protected by the current-limiting main disconnect that serves the residential meter stack. Common lighting, emergency lighting, or laundry facility meters not fed from a protected meter stack shall be cold sequence. If a fusible load-break safety switch is utilized for the main disconnect, the current-limiting fuses shall meet the requirements in Section 5, Tables I through V. A fault current-limiting circuit breaker may be utilized for the main disconnect if The City of Aspen approved in accordance with Exception 1 above.*

### Commercial and Industrial

Hot Sequence is the required installation method for commercial and industrial instrument transformer type (CT) metering. Cold sequence disconnects are not allowed ahead of the CT cabinet. Refer to COLD SEQUENCE METERING in this section.