

Electric Meter and Service Equipment

1.0 General

- 1.1 All electric meter equipment and/or meter centers within the service area of Huntsville Utilities shall be located and installed as directed by Huntsville Utilities Electric Engineering. There shall be no exceptions, and it is the responsibility of the customer and their designated representatives and contractors to secure direction and requirements for the location and placement of metering equipment from Huntsville Utilities Electric Engineering and to comply with these requirements and direction.
- 1.2 All meter equipment shall be readily accessible to all Huntsville Utilities Electric System employees at all times. This includes ready vehicle access with large vehicles including, but not limited to, bucket and crane trucks used or needed to service this type of equipment, regardless of need for the specific equipment involved. Metering and service equipment shall be external to buildings and customer equipment served and shall not be blocked by fencing, customer equipment, landscaping, customer or public vehicles, building proximity, or other issues. Specific clearance requirements for individual service equipment are available from Huntsville Utilities Electric Engineering. When specific site conditions warrant, Huntsville Utilities Electric Engineering may consider exceptions. The customer and their representatives should expect to comply with the requirements of Huntsville Utilities.
- 1.3 Where individual meter sockets are utilized, only Huntsville Utilities Approved Meter Sockets are acceptable. A copy of the Huntsville Utilities Approved Meter Socket List is available from Huntsville Utilities Electric Engineering Services.
- 1.4 All services over 200 amps will require individual approval on the specifics of the installation.
- 1.5 Power will not be made available, or will be discontinued if the service does not comply with these specifications. For example, a service located such that it would be enclosed by a future addition must be moved prior to construction of the addition. Failure to relocate the service prior to construction will result in disconnection of the service.
- 1.6 All individual meters shall be located such that the center of the meter shall be between 3.5 ft. and 5 ft. above finish grade. The center of all meters located in stacked meter centers shall be between 2.5 ft. and 6 ft. above finish grade. All instrument transformers shall be located such that the lowest part of the transformer is between 2 ft. and 5 ft. above finish grade.
- 1.7 Meter sockets or sections and instrument transformer cabinets or sections of meter centers shall not be used as splice boxes. No other circuits shall pass through them.
- 1.8 When communications equipment bonding is desired at the meter socket due to poor access to the customer grounding system, a supplemental grounding electrode and associated grounding conductor may be installed from the meter socket neutral conductor using the appropriate connector in accordance with applicable codes. This grounding system may not be used as a required portion of the customer service grounding system.

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- 1.9 The customer is responsible for securely mounting all cabinets, sockets, conduit, and associated equipment.
- 1.10 All service conductors which are supplied by the customer must be sized according to applicable code based on the labeled maximum rating of the protective device fed. (For example, a 500 amp plug or tap setting in an 800 amp breaker will require conductors with 800 amp ampacity.) Neutral conductor sizing must include faulted conditions and/or harmonics where applicable. Maximum individual conductor size is 750 MCM.
- 1.11 When multiple meters are grouped at one physical location, each meter socket and associated main disconnect must be clearly and permanently marked to indicate the service fed, and the associated address. Labeling must be on both the interior of the socket and on the outside of the socket cover. Lettering must be clearly visible, legible, and as large as practical up to two in. high, and not less than one eighth of an inch (1/8 in.) in height.
- 1.12 Exterior surfaces of meter sockets operating in excess of 240 volts nominal shall be painted red, and clearly marked to indicate the operating voltage. Lettering of this marking shall be not less than 2 in. high.
- 1.13 Except for exterior surfaces of meter sockets operating in excess of 240 volts nominal, as noted above, exterior of meter sockets, cabinets, and associated conduits may be painted as the customer desires. However, such paint shall not interfere with access or operation of this equipment, nor obscure any required marking or labeling, including catalog number. The meters, conductors, instrument transformers, and associated switch or control equipment shall NOT be painted in any way.
- 1.14 The customer shall not allow any non-utility personnel to tamper with sealed metering components, or any service or electrical equipment on the source side of the meter in any manner. (Exception- Trained, licensed electricians may work on unsealed source side protective equipment and/or conductors as directed by Huntsville Utilities) Electricians are NOT allowed to cut the seal of metering equipment, even for repair. Contact Huntsville Utilities if there is a need to access sealed equipment.
- 1.15 No ungrounded service will be provided. Wye services will be grounded at the wye point. Delta services will be center grounded between two phases for 4 wire delta, or corner grounded for 3 wire delta. Customers desiring ungrounded or impedance grounded service will be required to take primary metered service from the grounded wye primary distribution system.

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2.0 Instrument Type Metering

- 2.1 The term instrument transformers includes both current transformers or “CTs” and potential transformers or “PTs”.
- 2.2 Instrument transformer sections shall be designed to accommodate standard instrument transformers commonly used by Huntsville Utilities. Instrument transformer cabinets or sections of meter centers shall not contain any bus or cable connections other than those required connections to instrument transformers themselves. No other circuits shall pass through instrument transformer cabinets or sections. No customer splices or connections shall be made in instrument transformer cabinets or sections. Barriers and covers of adjacent compartments, which do contain connections, shall be arranged to readily facilitate removal of the bus or cable passing through current transformers.
- 2.3 Instrument transformer compartments and buswork shall be sized and arranged to accommodate both window and padmount style CTs. These compartments shall be sized to allow installation of 3 potential transformers measuring up to 8 in. in any direction, in addition to the 3 required CTs. Any bus or conductors which feed transformer rated services must be sized to accommodate our standard current transformers i.e. they must fit within a maximum 3 in. X 4 in. oval window. As a result, all services which exceed 1200 amps of maximum bus or protective device size shall require a separate transformer. Instrument transformer services utilizing more than 2 conductors per phase require coordination with the Electric Meter Shop prior to issue of CTs.
- 2.4 For normal structure mounted instrument meter installations, Huntsville Utilities will supply a meter socket, Cts, and Pts as required. The customer is responsible for picking up the Cts and socket from Huntsville Utilities Electric Meter Shop. The customer is responsible for providing and mounting the instrument transformer cabinet or section, as well as required internal and external brackets. The customer is responsible for securely mounting the instrument cabinet or section, the instrument rated socket, and for providing and mounting a 1 in. conduit from the socket to the instrument transformer cabinet or section.
- 2.5 The customer is responsible for providing and installing all conduits and conductors from the power source through the CTs to the customer main disconnect(s) in accordance with Huntsville Utilities specifications and applicable codes. These conductors must have fully adequate ampacity for the main(s) being fed after all applicable de-rating factors are applied. Verification of adequacy should be obtained from the jurisdictional inspection authority and from Huntsville Utilities prior to installation. Conduits must be appropriate for the conductors and service involved.
- 2.6 The conduit run from the instrument cabinet or section must contain less than 300 degrees of total bend and employ only long sweep bends or accessible LB style fittings. Maximum length of conduit run is 25 ft.

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- 2.7 All individual meters shall be located such that the center of the meter shall be between 3.5 ft. and 5 ft. above finish grade. The center of all meters located in stacked meter centers shall be between 2.5 ft. and 6 ft. above finish grade. All instrument transformer cabinets or compartments shall be located such that the lowest part of the mounted instrument transformer is between 2 ft. and 5 ft. above finish grade.
- 2.8 Metering equipment shall be in the immediate proximity of the overcurrent device(s) served and clearly marked to indicate the circuits(s) and load(s) served, and the address of the account. The customer is responsible for securing direction and instructions as to the size and mounting requirements of this metering equipment from Huntsville Utilities Electric Engineering.
- 2.9 Minimum size of instrument transformer cabinet or compartment shall include a clear unobstructed volume of at least four cubic ft. for single phase service of not more than 240 volts nominal, 5 cu. ft. for single phase service of not more than 480 volts nominal, 6 cu. ft. for two or three phase service of not more than 240 volts nominal, or 9 cu. ft. for two or three phase service of not more than 480 volts nominal. The minimum dimension in any direction shall be not less than 12 in. Cabinet clear space in depth from front to back shall be not less than 12 in. from the face of the CT mounting bracket or board to the inside face of the door. **NOTE: Minimum sizes are based on instrument transformer space requirements only, and are generally not practical for wire pull considerations. Cabinet sizes should be INCREASED to readily accommodate the number and size of conductors involved. Consider cabinet location and orientation relative to the total pull when determining cabinet size.**
- 2.10 Instrument transformer cabinets shall be of weatherproof NEMA 3 design, and shall be lockable and pry resistant per ANSI C57-12.28.
- 2.11 Instrument cabinets may utilize slotted interior panel, unistrut or 3/4 in. nominal marine grade plywood for instrument transformer mounting. Customer is responsible for securely mounting the Current transformers within the cabinet, orienting them so that the line (marked) side is towards the source, with the secondary terminals facing out towards the door. When potential transformers are required (services in excess of 240 volts), the current transformers must be mounted in a manner which allows space for mounting the potential transformers. Huntsville Utilities will provide both current and potential transformers, and will install potential transformers only, along with required meter wiring.
- 2.12 Instrument cabinets or sections, and instrument rated meter sockets must be visibly bonded to the customer service ground.

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3.0 Meter Center Requirements

- 3.1 All components and installations shall comply with all aspects of the NEC, NESC, current editions, ANSI C12 Standards, and International Building Code as adopted by the City of Huntsville.
- 3.2 All metering and switchgear components shall be UL listed where such material is available.
- 3.3 Metering sections of switchgear shall be sealable using padlock type seals and contain no components or connections requiring routine maintenance. Access to these sections will not be provided to the customers except in the case of component failure. Breaching sealed equipment is in violation of State Law and is punishable by fine and or imprisonment. All meter section cover fasteners shall be captive. External hex nuts and wing nuts are unacceptable fasteners.
- 3.4 All meter socket covers shall be constructed to facilitate use of a standard plastic blank meter socket cover when no meter is installed. The cover shall fit properly within the normal metal socket cover. **Meter socket covers shall be ringless style.**
- 3.5 All Main disconnects, as well as emergency, standby, and cogeneration switches, shall be readily lockable with padlock type locks in the off position. In addition, multi-position lockout/tagout devices shall be maintained on site.
- 3.6 All sections of switchgear shall be clearly and permanently labeled with compartment contents and current and voltage ratings, including operating voltage of the service. Metering and breakers sections shall indicate loads fed.
- 3.7 The front panel of meter sockets operating in excess of 240 volts nominal shall be painted red, in addition to the required operating voltage markings. Lettering of this marking shall be not less than 2 in. high.
- 3.8 All meter equipment shall be hot sequence (i.e., metering equipment shall be electrically ahead or on the source side of the overcurrent device(s) served). When circumstances require a main disconnect or overcurrent protection on the source side of any metering, that disconnect or overcurrent equipment must be clearly labeled relevant to the metering equipment to preclude future connection of any equipment which could bypass the metering. This requires prior approval on a case-by-case basis from Huntsville Utilities Electric Engineering.
- 3.9 No unmetered control voltage or current is allowed. All control transformers and circuits, as well as fire protection circuits shall be fed from a metered service, such as a house panel.
- 3.9.1 Approved jaw clamping lever bypass switches are required for all three phase self-contained plug in style meter socket assemblies. Approved jaw clamping lever bypass switches are suggested, but not presently required for all 120/240 volt single phase self-contained plug in style meter socket assemblies for dwelling and non-dwelling units with service capacity not to exceed 200 amps.

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- 3.9.2 Instrument rated sockets require approved test switches. Contact Huntsville Utilities Electric Meter Shop for present requirements for test switches.
- 3.10 Clearly marked access to a grounding conductor or bus shall be provided to facilitate bonding of communications facilities.
- 3.11 The customer is responsible for providing and installing conductors from the utility source (typically a transformer or secondary cabinet) to the meter center main. These conductors must have fully adequate ampacity for the main(s) being fed after all applicable de-rating factors are applied. Verification of adequacy should be obtained from the jurisdictional inspection authority and from Huntsville Utilities prior to installation. Conduits must be appropriate for the conductors and service involved.
- 3.12 Clear working space shall be not less than the greater of that provided by NEC, NESC, IBC, or a zone extending the greater of 8 in. beyond the extreme left edge and extreme right edge of all cabinets, sockets, or fasteners involved, or at least 18 in. to the right and left of the center of the outside meters involved. This clear working space must extend at least 36 in. from the furthest projection of the equipment involved, whether cabinet face, switch handle, opened hinged cabinet door or meter face. For the purposes of space consideration, the meter face shall be considered to project 12 in. beyond the cabinet or socket face. This equates to 48 in. beyond the socket cover. Where meter assemblies are located on opposing walls, the required clear workspace cannot overlap. There shall be no infringement of any type, either temporary or permanent, including vegetation or material accumulation on this required working space. Required working space cannot overlap with required egress passage ways or routine traffic routes of non-utility personnel. Where available voltages exceed 240 volts nominal, at least 2 widely spaced access paths to the workspace shall be maintained. All access requirements from Section 1 must be maintained.
- 3.13 When metering sections are covered, concealed, or secured by meter center doors, fencing, or screening, the front and each visible end of the enclosure shall be clearly marked to indicate metering equipment, and the address of each service fed from the installation. Such labeling shall be permanent with lettering not less than 2 in. high.
- 3.14 When metering sections are covered, concealed, or secured by meter center doors, fencing, or screening, such doors, fencing, screening, etc. shall either be always unlocked, or any locking hardware used shall include provisions for unlocking by Huntsville Utilities employees at any time without using any key other than the standard Huntsville Utilities Electric System Key. Huntsville Utilities may supply a padlock separate from any customer locking provisions (double lock or lock box) if deemed appropriate by Huntsville Utilities. The method of securing the facilities used must comply with the International Building Code, the National Electric Code and National Electric Safety Code, and be approved by Huntsville Utilities.
- 3.15 When potential transformers are required (all services over 240 volts), the customer must arrange the current transformers and wire to accommodate installation of potential transformers, which will be installed by Huntsville Utilities.

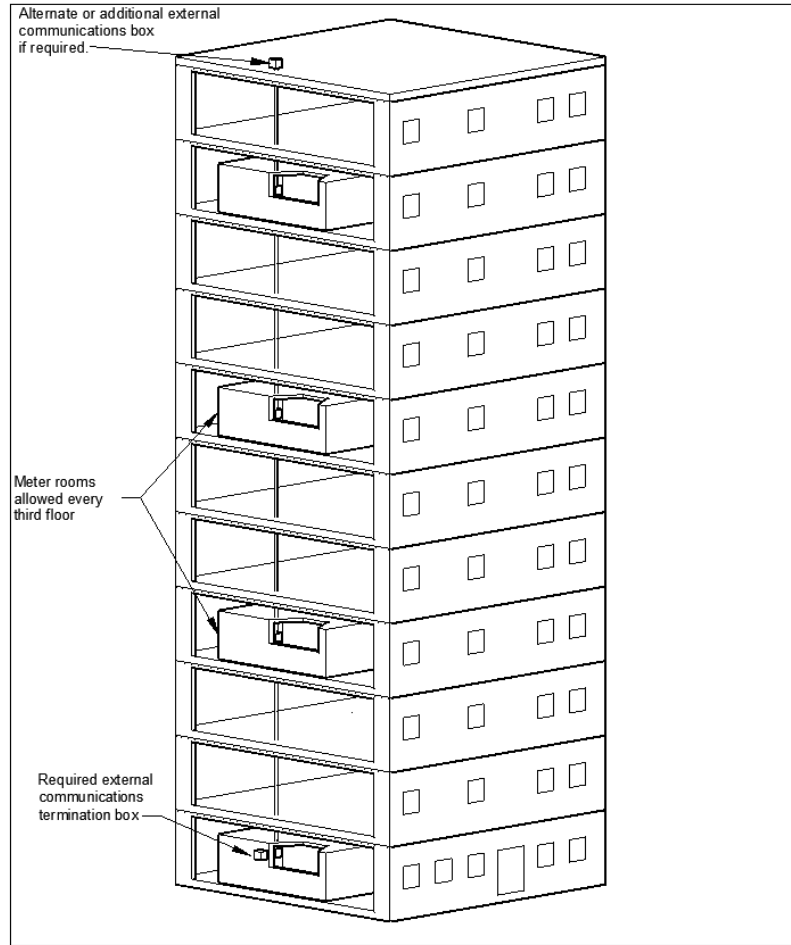
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- 3.16 Any bus or conductors which feed transformer rated services must be sized to accommodate our standard current transformers. (I.e. they must fit within a 3 in. x 4 in. oval window.) As a result, all services which exceed 1200 amps of maximum bus or protective device size shall require a separate transformer
- 3.17 The customer is responsible for providing and installing all conduits and conductors from the power source through the CTs to the customer main disconnect(s) in accordance with Huntsville Utilities specifications and applicable codes. These conductors must have fully adequate ampacity for the main(s) being fed after all applicable de-rating factors are applied. Verification of adequacy should be obtained from the jurisdictional inspection authority and from Huntsville Utilities prior to installation. Conduits must be appropriate for the conductors and service involved.
- 3.18 **Note:** service of metering equipment, including installation or removal of meters, often requires interruption of the power supply to the entire meter center for the duration of the work performed.

4.0 Metering Rooms (Allowed on High Rise Buildings only)

- 4.1 Metering rooms are typically only allowed in buildings three stories high or higher. Exceptions must be approved by the Electric Operations Director in consultation with the Engineering Services Director and the Electric Meter Manager. Metering rooms will be located on the ground floor and then every third floor thereafter and each room shall be located with at least one exterior wall.
- 4.2 Metering room must be clearly marked as Meter Room, with addresses of metered services.
- 4.3 The room must contain electrical service equipment only - it shall not be used as a storage area or be part of an individual occupied space.
- 4.4 Adequate lighting, convenience outlets, and environmental controls to maintain temperature below 80 degrees Fahrenheit shall be maintained.
- 4.5 Provisions for future remote access to all meters via phone, radio, and internet shall be required. The customer shall be required to provide the ongoing costs associated with phone and internet access once installed.
- 4.6 Meter rooms of upper floors shall be oriented in vertical alignment whenever possible.

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4.7 Communication Requirements for Metering Rooms

- 4.7.1 To accommodate Huntsville Utilities metering infrastructure and communication to the mesh radio network, a 2 in. conduit shall be routed between meter rooms and out to an external termination enclosure at a location approved by Huntsville Utilities to accommodate required meter communications conductors. In the event fire-stopped barrier penetrations are required a 4 in. Hilti Speed Sleeve (or equivalent) shall be installed to accommodate coax to an external RF antenna location. 8 in. x 8 in. x 6 in. minimum sized pull boxes shall be located on each side of the penetration to accommodate access to the sleeve. Ready access to the pull box lids shall be provided.
- 4.7.2 A 2 in. conduit shall be provided from the bottom most or top most meter room. The conduit shall not exceed 100 ft. in length and shall include a temporary conduit cap. A metal, NEMA 3R enclosure (8 in. x 8 in. x 6 in. minimum) shall be provided by the customer for mounting the external RF antenna. The enclosure shall be located between 8 ft. and 12 ft. from ground level and accessible by ladder or a bucket truck. The 2 in. conduit shall be terminated internally and be accessible through a front cover. AMI staff to approved cabinet mounting and access to antennae.

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- 4.7.3 If necessary, an accommodation may be made to allow the antennae enclosure to be mounted on the roof. (Prior written approval by Huntsville Utilities required) The 2 in. conduit shall be terminated internally and accessed through a front cover. Accessibility to the enclosure by HU personnel is required.
- 4.7.4 The conduit shall also include a pull string (or fiber tape) rated at 600 ft.-lbs. Conduit shall not exceed 270 degrees of bends. The only opening in the conduit shall be in the meter rooms. No other openings along the route of the conduit are allowed without prior written permission from Huntsville Utilities.

5.0 Meter Room Safety Requirements

- 5.1 When meter rooms are allowed, the rooms shall be readily accessible, including the following features:
- 5.2 Emergency Exit(s) directly to the exterior of the building shall be provided. Doors which latch shall have functional panic hardware. Any locking hardware used shall include provisions for unlocking by Huntsville Utilities employees at any time without using any key other than the standard Huntsville Utilities Electric System Key. Huntsville Utilities may supply a padlock separate from any customer locking provisions (double lock or lock box) if deemed appropriate by Huntsville Utilities. The method of securing the facilities used must comply with the International Building Code, the National Electric Code and National Electric Safety Code, and be approved by Huntsville Utilities.
- 5.3 For rooms containing equipment operating at voltages above 240 volts, at least two such exits, either unsecured or with panic hardware and widely separated, shall be provided.
- 5.4 Clear, unobstructed, and adequate access to equipment and working space shall be maintained at all times.
- 5.6 Required working clearances are measured from the most extreme extension of all equipment involved - typically meter face, switch handle, door swing, etc. For measurement purposes, the maximum meter size shall be assumed to extend 12 in. beyond the face of the meter socket.
- 5.7 A service parking area immediately adjacent to the room suitable for use by a bucket truck shall be provided and maintained. This area shall be kept clear of obstructions for use by Huntsville Utilities service and EMS personnel.
- 5.8 Arc Flash constraints. - No metering equipment shall be installed in any customer room or enclosure containing any electrical equipment with a potential arc flash energy level calculated to be in excess of 8 calories per cm².

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5.8.1 All calculations must be made by an Electrical Engineer with experience in Arc Flash calculations using approved methodology, and must be based on infinite bus assumption using the next larger standard transformer size above the size anticipated for installation at the facility as well as the actual transformer size anticipated. All calculations must also recognize the containment and reflection of energy within the room based on the assumption of all exits being closed when the arc initiates. Huntsville Utilities reserves the right to refuse acceptance of calculations based on methodology, assumptions utilized, or opinion of the Utilities Engineering personnel. All arc flash energy calculations must be calculated based on the assumption that access covers or panels are removed, and personnel are physically working on the equipment. No additional separation distance can be included. Available methods for energy reduction and dissipation include, but are not limited to equipment selection, barriers, exhaust plenums, increase in enclosed space volume, energy redirection, permanent openings, etc.

6.0 Replacement of Electric Meter and Service Equipment

6.1 Material and equipment used to replace pre-existing Electric Meter and Service Equipment must meet all present requirements for new Electric Meter and Service Equipment at the time of installation.

6.2 In rare cases, exceptions to certain limited specifics of the requirements may be granted upon written approval from Huntsville Utilities, and agreement by the Authority Having Jurisdiction. An example of a potential exception which might in some circumstances be approved would be to continue a previously granted exception. Exceptions are normally based on site specific conditions.

7.0 Emergency Replacement of Failed Electric Meter and Service Equipment

7.1 Huntsville Utilities may with approval of the Authority Having Jurisdiction consider additional exceptions which do not decrease the safety or suitability of function of the installation based on specific circumstances discovered and documented at the time of replacement.

8.0 Exceptions

8.1 All exceptions and changes to these specifications are at the exclusive discretion of Huntsville Utilities, except that they shall not interfere with the code or legally conferred authority of the Authority Having Jurisdiction (Local Inspection Department or Governing Authority). In no case should the contractor, owner, or operator of the facilities expect or rely on the possibility of an exception being granted.

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