METERING – SECONDARY

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- Meter socket mounting M-5
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Meter socket with overhead service entrance

- 1Ø, 2-wire, all voltages, 0-100 amps M-7
- 1Ø, 3-wire, 120/240 volts, 0-320 amps M-8
- 1Ø, 3-wire, 208Y/120 volts, 0-100 amps M-9
- 3Ø, 4-wire, 208Y/120 or 480Y/277 volts, 0-200 amps M-10

Meter socket for customer owned streetlighting

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Transocket with overhead service entrance

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Transocket with underground service entrance

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- All 3Ø voltages, 400-1200 amps M-20

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Maintenance Only

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- Residential deck procedure iii
- Meter protection from Snow and Ice iv
- Maximum Fault Current Table v

GENERAL REQUIREMENTS FOR METERING

General

The information covered in this section is applicable to overhead, underground, substation, and AC network sources of supply covered in the foregoing sections of the manual.

Location of Meters and Metering Equipment

1. Outdoor metering is required for residential, one or two customer, and farm installations with 1-phase service of 200 amperes or less.
2. Meters shall be installed outdoors in cases such as summer dwellings and other premises not occupied during the entire year or not accessible during regular working hours of Company personnel.
3. For outdoor installations with an OH service drop, the centerline of all meters shall be between 4 and 6 feet from finished grade.
4. For outdoor installations with an UG service lateral, the centerline of all meters shall be between 3 and 6 feet from the finished grade.
5. For indoor installations, locate meters in the basement or other suitable and readily accessible place as near as possible to the point where the service enters the building. The Company shall have access to meters at all times. The centerline of all meters shall be between 4 and 6 feet above the floor (not applicable to ganged or grouped installations of more than 2 units as covered in Requirement 6 below).
6. For indoor group installations, the centerline of all meters shall be between 2 and 6 feet above the floor. For apartment, commercial, and other appropriate buildings of more than 2 floors, meters may be located on different floors of the building provided they are grouped in enclosures as near as practicable to the risers serving the floors and the wiring and metering layout for the building is accepted by the Company.
7. For multiple unit buildings (two or more), single-family buildings with multiple meters, and termination compartment when applicable, each meter position shall be marked on the outside of the socket or by the breaker (if available) with the address of the unit served. If the marking is on the outside of the removable cover, it shall also be marked on the inside of the meter socket in a visible location. This marking shall also be placed on the corresponding distribution panel(s). The marking shall be a permanent label with ½" block letters and may consist of individual self-stick letters or numbers, suitable for the location so as to be considered permanent.
8. There shall be a 4" clearance around the meter from all foreign objects.
9. There shall be a 3' minimum of unobstructed working space at access location of service lateral terminations and in front of all meters, measured from the meter face. Minimum 12" of horizontal clearance shall be provided on each side of meter enclosure from barrier or wall. This space shall extend from the floor or grade to a height of 6'-6". The working space shall be level and flat as practical for the entire required depth and width. At least one entrance of sufficient area shall be provided to give access to this working space.
10. The unobstructed space required in front of meter cabinets, CT compartments, and transformer loss compensation cabinets shall be as defined by the "Working Space About Electrical Equipment" section 110.26 of the **National Electric Code** (latest revision as adopted by the states of Michigan and Wisconsin). This unobstructed space shall extend from the floor, or ground, to a height of 6'-6". Equipment doors are required by the NEC to open a minimum of 90°.
11. A permanent 3' square unobstructed area around all meters, metering equipment, and other apparatus so that they can be safely read, inspected, tested, and have access to service cables. If meters are placed near areas of vehicular traffic, guards shall be installed (see M-6). Meter equipment shall not be located:
    a. In animal enclosures, attics, closets, elevator or ventilating shafts, hallways, living quarters, stairways, or rooms contain corrosive or explosive vapors (battery rooms).
    b. Near stoves, radiators, steam or hot water pipes, or within 5' of moving machinery.
    c. Above laundry equipment, plumbing fixtures or other bulky equipment.
    d. Behind shrubbery or swinging doors
    e. Within driveways, decks, patios, porches, or similar paved areas or obstructions (or over sidewalks where practicable), or where it is necessary to trespass on adjacent property.
    f. In hazardous locations as defined in articles 500 to 516 of the **National Electric Code** as amended in Michigan by the **Michigan Administrative Code** and as amended in Wisconsin by the **Wisconsin Administrative Code**..
    g. Where subject to damage from falling ice, snow or other debris. If the metering equipment cannot be moved to an area free of these hazards the necessary protection may be provided by a roof overhang or gutter that

extends a minimum of 12" past the face of the meter socket. In place of the roof overhang the customer shall provide and install a deflector that shall extend 12" past the face of the meter socket and be installed at a height greater than 6'-6" to comply with Requirements 9 & 10 above.

h. In pits or excavated areas that present tripping and falling hazards. Final grade of meter equipment working space shall not be lowered from the surrounding final grade in order to meet meter height requirements

12. Meter locations shall be free from excessive moisture, vibrations, and heat. Meters shall not be placed on partitions, insecure walls, or over doorways. Meters shall be shielded from magnetic disturbances and protected from mechanical damage, moving machinery, and belts by means of a suitable protecting cabinet.
13. 3’ clearance between gas and electric metering equipment shall be provided. See G4 for details.
14. 10’ clearance between liquefied petroleum gas equipment and electric metering equipment, or refer to the NFPA 58 for clearances.

Methods of Mounting Metering Equipment

1. Socket-type meter mounting devices installed on concrete or masonry walls shall be fastened by non-corrosive metal machine screws in lead sleeve, wedge-type expansions anchors.
2. All mounting devices for metering equipment shall be plumb.

Methods of Wiring Service Equipment and Meters

1. The knockouts of meter pedestals, sockets, or transockets shall not be used for service entrance conductors unless the knockouts are located entirely below the lowest live parts.
2. Metered and unmetered conductors shall not be installed in the same conduit, raceway, channel, gutter, or similar enclosure.
3. Meters and all associated metering equipment, service termination boxes, wire raceways, and service entrance switches containing unmetered conductors are sealed by the Company. This equipment must be designed with provisions for seals or locks as specified by the Company.
4. Termination compartments, meter mounting devices, or CT compartments shall not be used as junction boxes, pull boxes, raceways, or similar wire enclosure for additional customer circuits. Once the service entrance or feeder conductors exit the termination compartment, meter mounting device, or CT compartment they shall not re-enter the termination compartment, meter mounting device, or CT compartment.
   a. This includes taps for emergency circuits or fire alarms.
   b. At single metered installations where 2 to 6 disconnects are used in place of a single main disconnect, a customer owned junction box or switchboard section shall be installed on the load side of all Company facilities for the purpose of making taps to the individual disconnects.
   c. Customer provided termination compartments and transockets are permitted to have up to 2 circuits exiting them.
5. Sockets shall be equipped with blank covers furnished by the customer at the time of installation.
6. The rating of a single service switch or the combined rating of all service switches connected to a 1-phase 120/240 volt service shall not exceed 400 amperes unless accepted by the company.
7. A common grounding conductor shall be used to ground the service entrance equipment and the grounded circuit conductor. A grounding conductor shall not be run from the meter socket to ground or through the meter socket, termination compartment or transocket in going from the customer's main service switch or disconnect means to ground. Direct grounding of meter sockets is permissible, only on meter poles where the disconnecting means is installed at some other location. For multi-metered installations the grounding electrode conductor may be bonded to the neutral in a termination compartment. A termination compartment used in conjunction with meter stacks would be considered multi-metered.
8. Service switches/service breakers shall be installed so that any one service switch/breaker, when disconnected, shall not interrupt continuity of service to any other separately metered customer on the premises.
9. All large installations not covered by this Metering Section require special consideration and the Company shall be consulted in all cases. The customer shall submit drawings of the proposed service equipment and metering arrangement to the local We Energies job representative for acceptance.
10. Any service entrance that serves a 24-hour load, 30 days each month of 150 amperes or more, shall have a current transformer metering installation.
11. Any fire pump service where the Full Load Running Amperage (FLRA) of the pump(s) exceeds 125 amperes shall have a current transformer metering installation. Company’s utility conductors and customer’s service equipment shall be sized to match the customer’s service disconnect. Due to complexity of fire pump services installed in the downtown Milwaukee area please consult with the local We Energies Application engineer.

12. On outdoor current transformer installations, the meter cabinet and conduit shall be grounded, either by bonding to the service entrance conduit or bus duct.
13. The Company shall meter only those voltages supplied to the customer by the Company; there will be no Company metering after a customer owned stepdown transformer. Any exception to this rule must be reviewed and accepted by the company, and may only be implemented in high rise residential buildings.
14. On new installations it is the company's responsibility to ensure that the meter stops or grounding brackets are clean and provide for a good electrical contact with the meter base.
15. Multi-metered installations shall be installed so as to balance the load on the service.
16. For Communication Tower Policy and Service Termination, see pages U-31 and U-32.
17. Excess service entrance conductor slack shall not be located in the service entrance equipment.

METER SOCKET MOUNTING

Customer furnishes and installs:

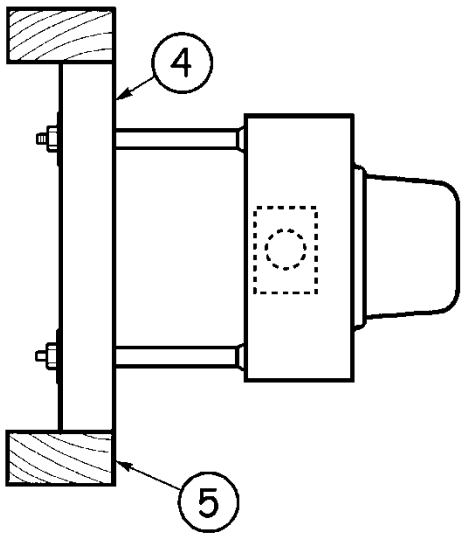
1. Company listed meter socket.
2. Galvanized bolts, nuts, and washer for mounting meter socket.
3. Galvanized thinwall spacers. They must be as long as the thickness of the finished wall, such as siding, brick, or stone (see Note 1).
4. Horizontally mounted 2”x4” wood supports or #11 gauge minimum thickness steel plates.
5. Studding for the building wall.

Company furnishes and installs:

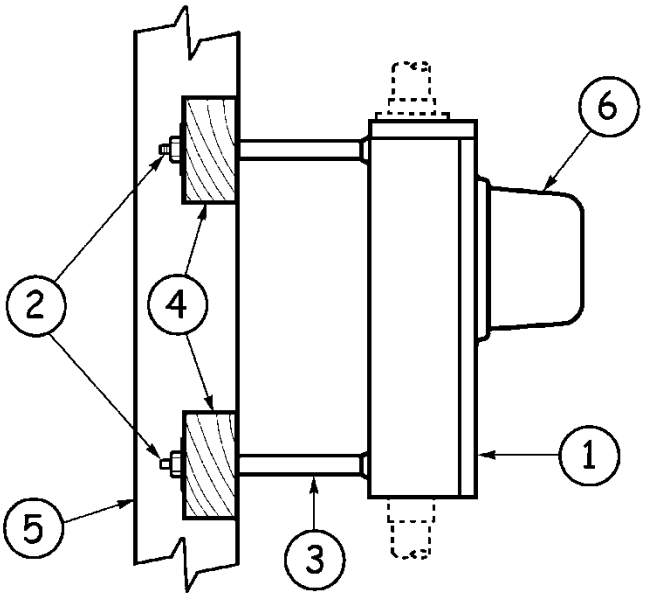
6. Watthour meter.

Note:

1. The meter socket is to be installed so that it will be securely and permanently mounted both before and after the finished wall is installed. The meter will not be installed until the socket is so mounted.



TOP VIEW



SIDE VIEW

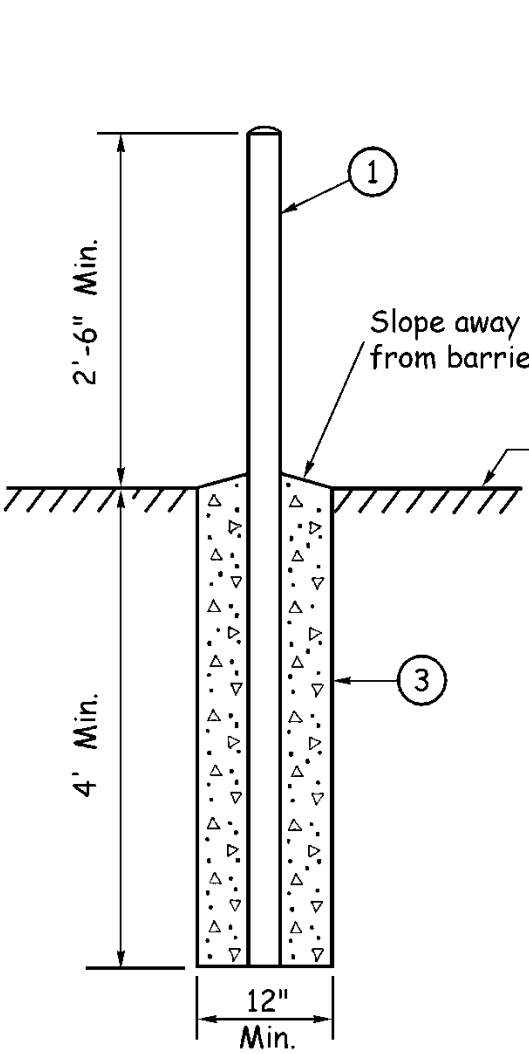
GUARDS FOR OUTDOOR INSTALLATIONS

Customer furnishes and installs:

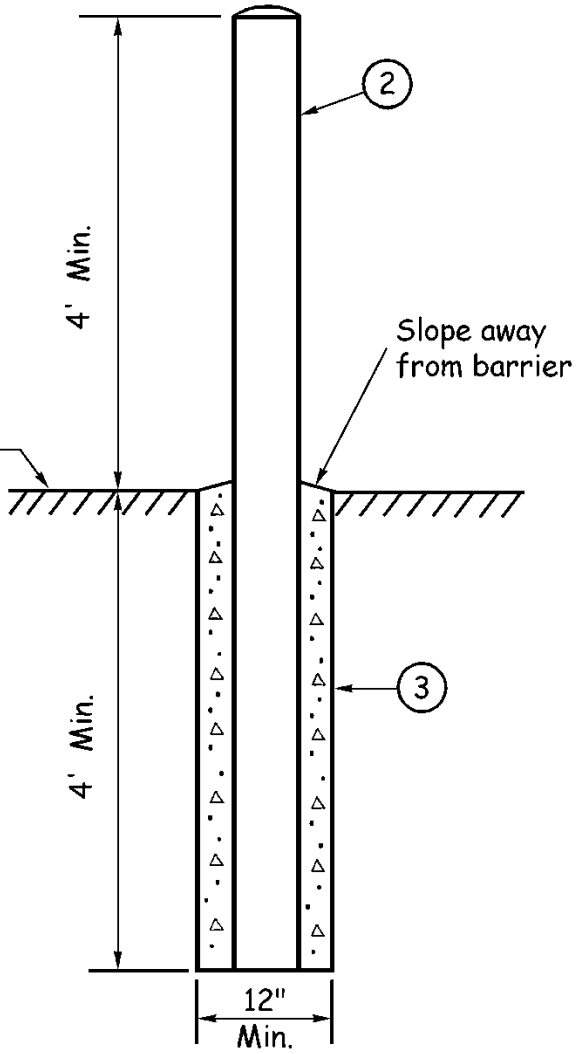
1. Galvanized steel pipe or schedule 40, 3-1/2” diameter by 6’-6” minimum length and filled with concrete. Approximately 3.4 cu. ft. of concrete is required for the foundation and filling the pipe (see Note 1).
2. Galvanized steel pipe or schedule 40, 6” diameter by 8’ minimum length and filled with concrete. Approximately 4 cu. ft. of concrete is required for the foundation and filling the pipe (see Note 1).
3. Concrete footing. A Sono tube is recommended to prevent heaving due to frost.

Notes:

1. The Company shall be consulted concerning the type, placement, and number of guards required.



LIGHT DUTY GUARD



HEAVY DUTY GUARD

METER SOCKET WITH OVERHEAD SERVICE ENTRANCE

1Ø, 2-WIRE, ALL VOLTAGES, 0-100 AMPS

120 VOLTS, 0-30 AMPS[2]

277 VOLTS, 0-60 AMPS

240[3,4] OR 480 VOLTS (UNGROUNDED)[4], 0-100 AMPS

METERING SEQUENCE: METER-SWITCH-FUSE

Customer furnishes and installs:

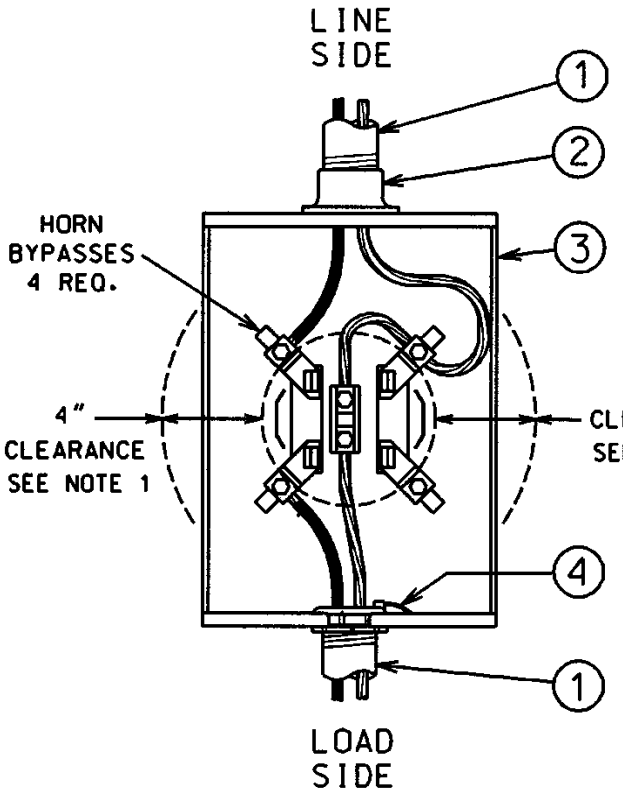
1. Conduit and conductors.
2. Water-tight hub.
3. Company listed 4-terminal meter socket (see Note 1 and sheets D-3 and D-5).
4. Metallic conduit shall be bonded to the meter socket.

Company furnishes and installs:

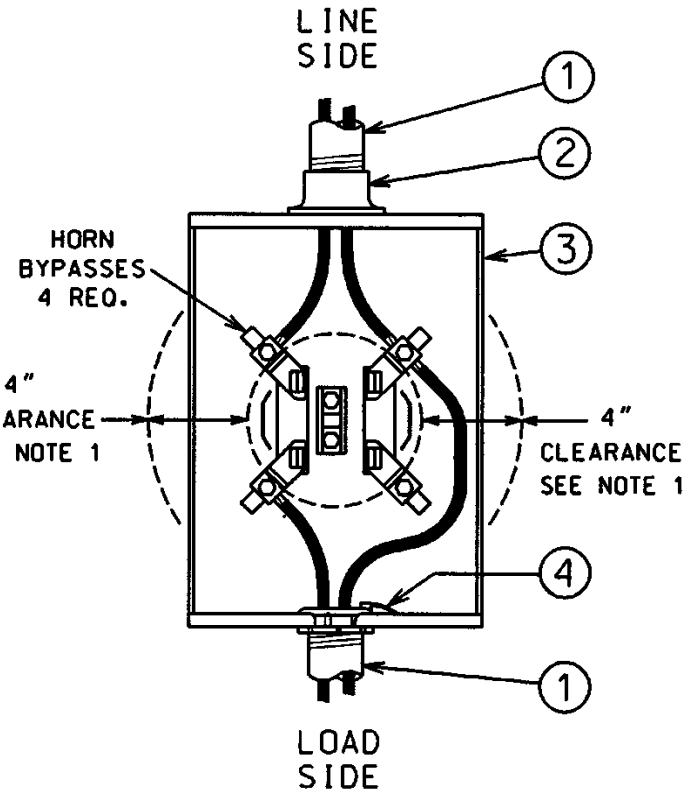
5. Watthour meter

Note:

1. Provide 4” clearance around meter from all foreign objects.
2. When supplied from a 1-phase, 3-wire, 120/240 volt grounded system or a 3-phase, 4-wire, 208Y/120 volt grounded radial system.
3. When supplied from a 3-phase, 3-wire, 240 volt grounded system.
4. For maintenance only.



120, 240, or 277 VOLTS



480 (UNGROUNDED)

METER SOCKET WITH OVERHEAD SERVICE ENTRANCE

1Ø, 3-WIRE, 120/240 VOLTS, 0-320 AMPS

METERING SEQUENCE: METER-SWITCH-FUSE

Customer furnishes and installs:

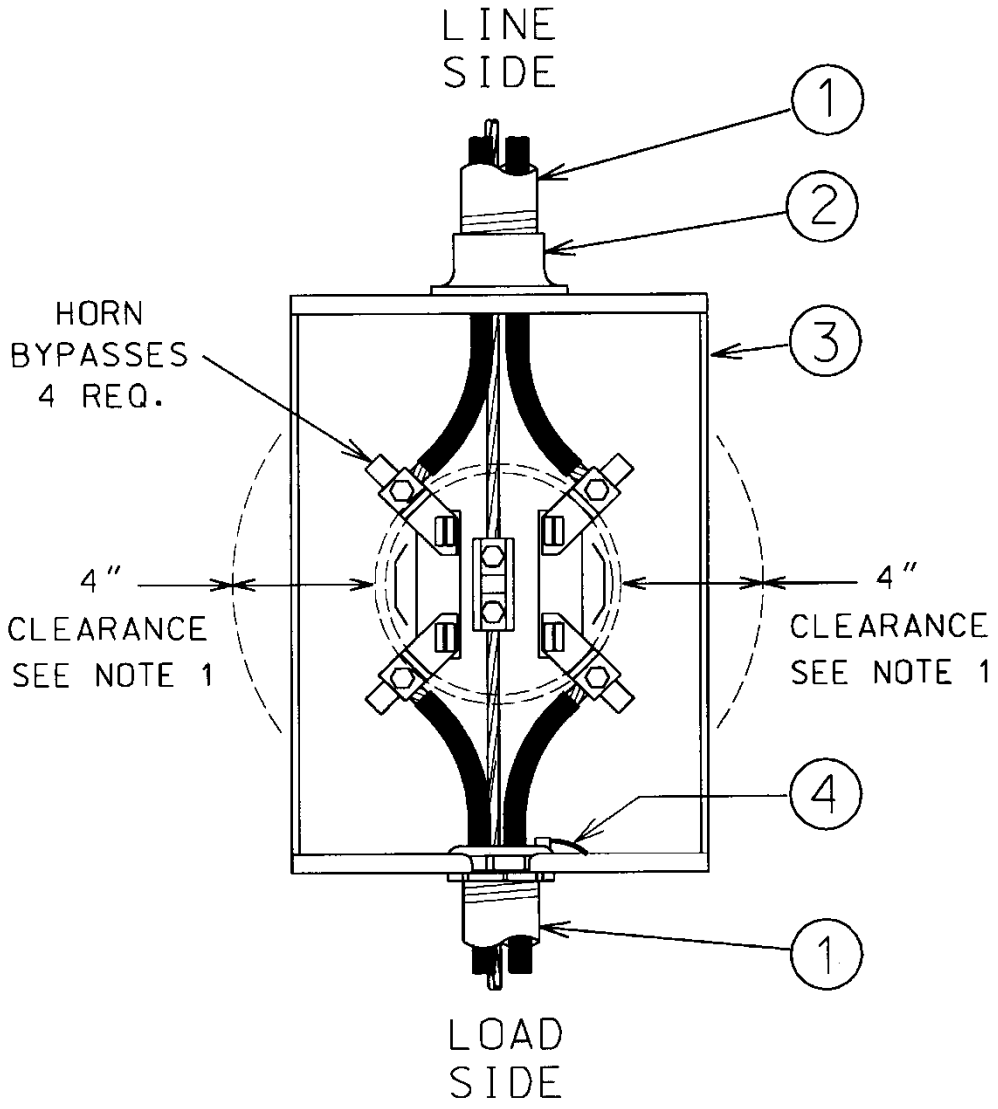
1. Conduit and conductors.
2. Water-tight hub.
3. Company listed 4-terminal meter socket (see Note 1 and sheets D-3 and D-5).
4. Metallic conduit shall be bonded to the meter socket.

Company furnishes and installs:

5. Watthour meter.

Note:

1. Provide 4” clearance around meter from all foreign objects.



METER SOCKET WITH OVERHEAD SERVICE ENTRANCE

1Ø, 3-WIRE, 208Y/120 VOLTS, 0-100 AMPS

METERING SEQUENCE: METER-SWITCH-FUSE (SEE NOTE 3)

Customer furnishes and installs:

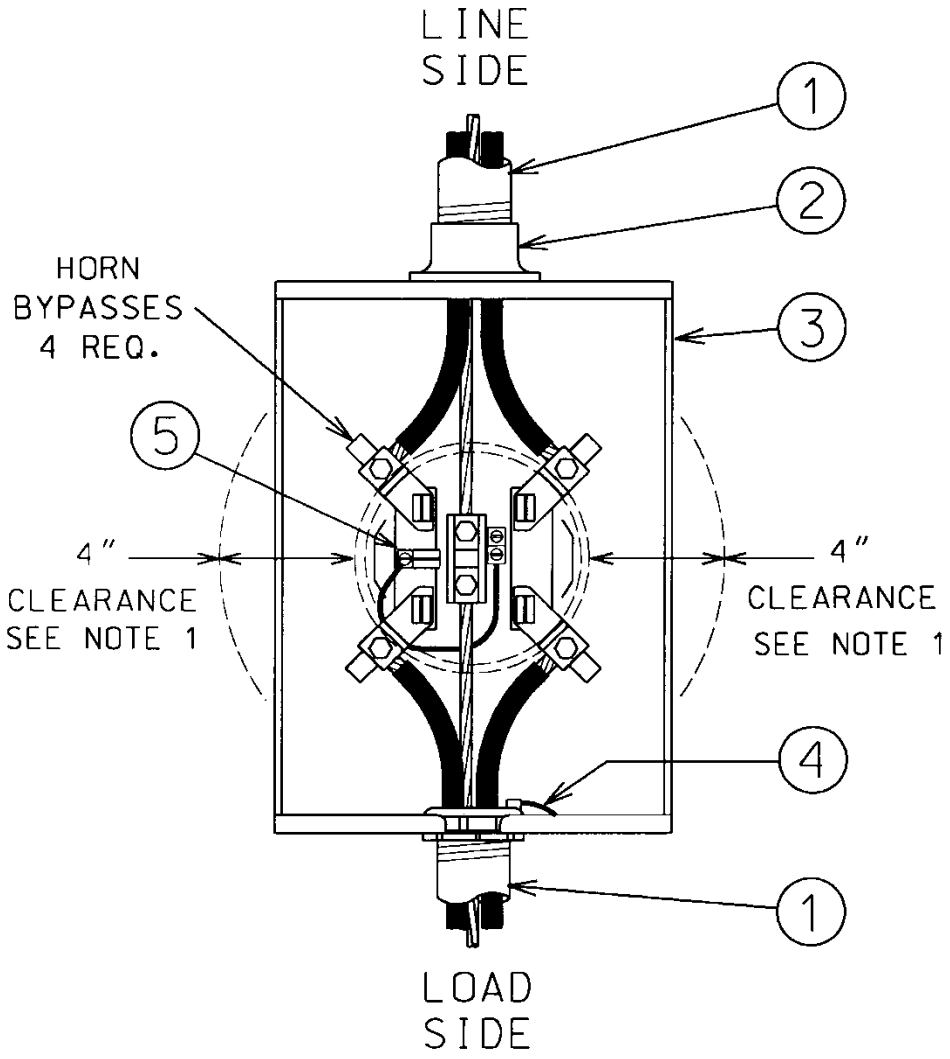
1. Conduit and conductors.
2. Water-tight hub.
3. Company listed 5-terminal meter socket (see Note 1 and sheet D-4).
4. Metallic conduit shall be bonded to the meter socket.
5. 5th terminal shall be in the 9 o'clock position (see Note 2).

Company furnishes and installs:

6. Watthour meter.

Notes:

1. Provide 4" clearance around meter from foreign objects.
2. If the potential tap from the neutral conductor to the 5th terminal is not supplied by the manufacturer, a #14 white insulated wire shall be used.
3. SW-F-M sequence may be required for indoor, 208Y/120 volt, downtown Milwaukee services.
4. Two phase wires and a neutral supplied from a 3-phase, 4-wire, 208Y/120 volt grounded system.



METER SOCKET WITH OVERHEAD SERVICE ENTRANCE

3Ø, 4-WIRE, 208Y/120 OR 480Y/277 VOLTS, 0-200 AMPS

METERING SEQUENCE: METER-SWITCH-FUSE (SEE NOTE 3)

Customer furnishes and installs:

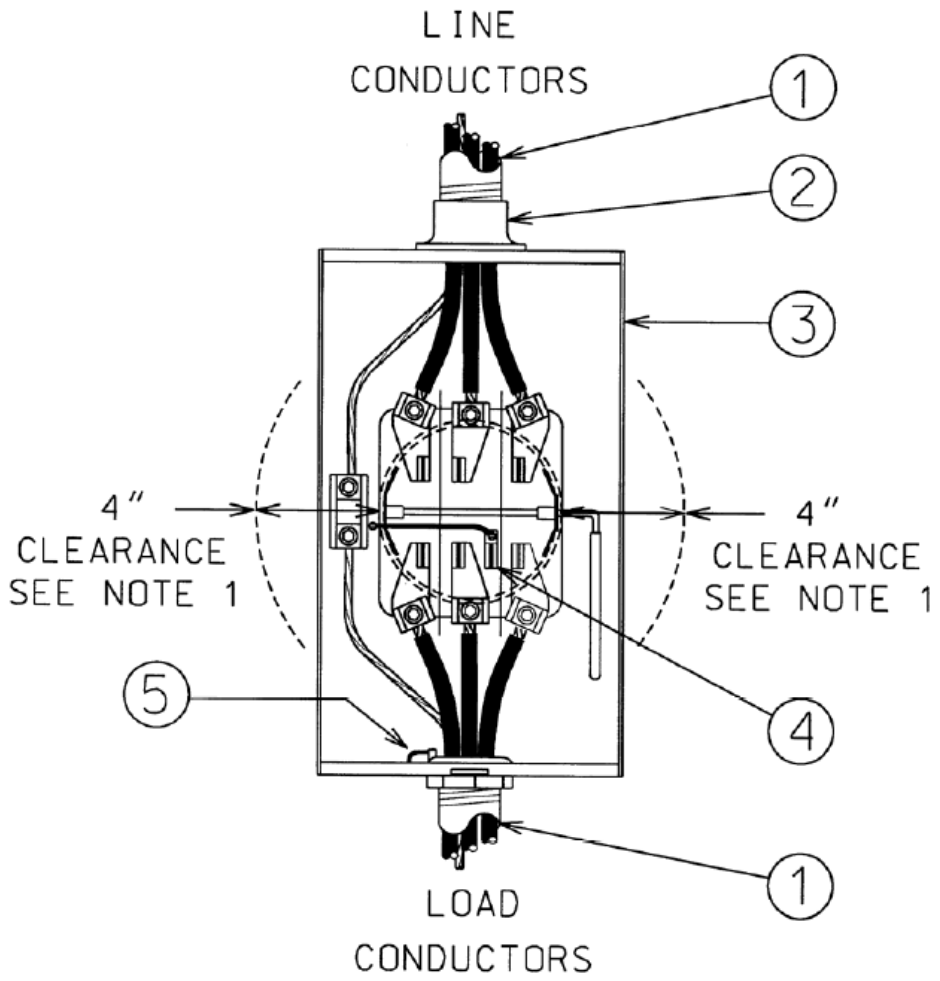
1. Conduit and conductors.
2. Water-tight hub.
3. Company listed 7-terminal meter socket (see Note 1 and sheet D-4).
4. 7th terminal with potential tap (see Note 2).
5. Metallic conduit shall be bonded to the meter socket.

Company furnishes and installs:

6. Watthour meter.

Notes:

1. Provide 4" clearance around meter from foreign objects.
2. If the potential tap from the neutral conductor to the 7th terminal is not supplied by the manufacturer, a #14 white insulated wire shall be used.
3. SW-F-M sequence may be required for indoor, 208Y/120 volt, downtown Milwaukee services.
4. Two phase wires and a neutral supplied from a 3-phase, 4-wire, 208Y/120 volt grounded system.



METER SOCKET FOR CUSTOMER OWNED STREETLIGHTING

1Ø, 3-WIRE, 240/480 VOLTS (GROUNDED), 0-200 AMPS

METERING SEQUENCE: METER-SWITCH-FUSE

Customer furnishes and installs:

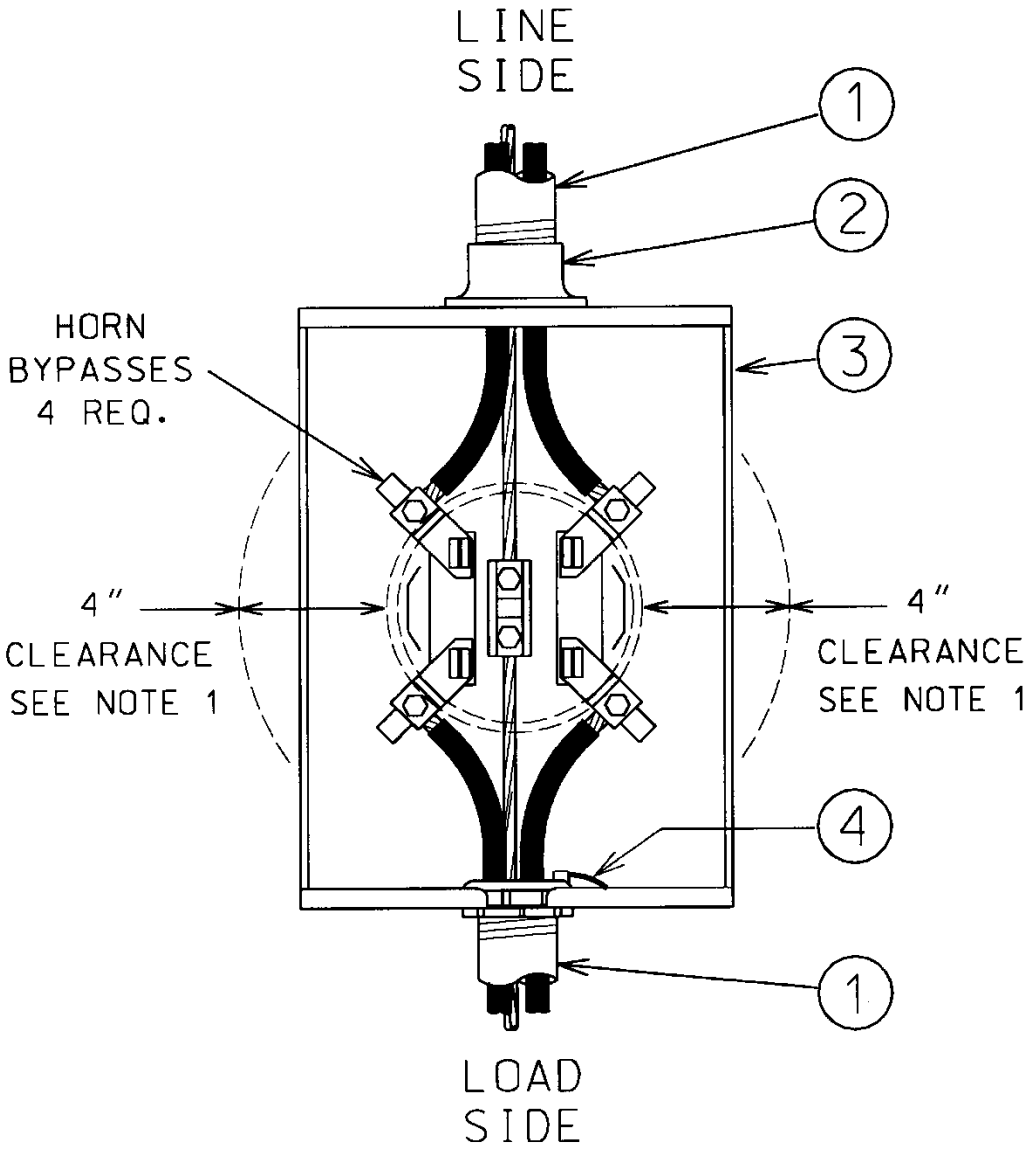
1. Conduit and conductors.
2. Water-tight hubs.
3. Company listed 4-terminal meter socket (see Note 1 and sheet D-6).
4. Metallic conduit shall be bonded to the meter socket.

Company furnishes and installs:

5. Watthour meter.

Notes:

1. Provide 4” clearance around meter from all foreign objects.



METER PEDESTAL WITH UNDERGROUND SERVICE LATERAL

1Ø, 2-WIRE, 120 VOLTS, 0-30 AMPS
1Ø, 2-WIRE, 480 VOLTS (UNGROUNDED), 0-100 AMPS (MAINTENANCE ONLY)

METERING SEQUENCE: METER-SWITCH-FUSE

Customer furnishes and installs:

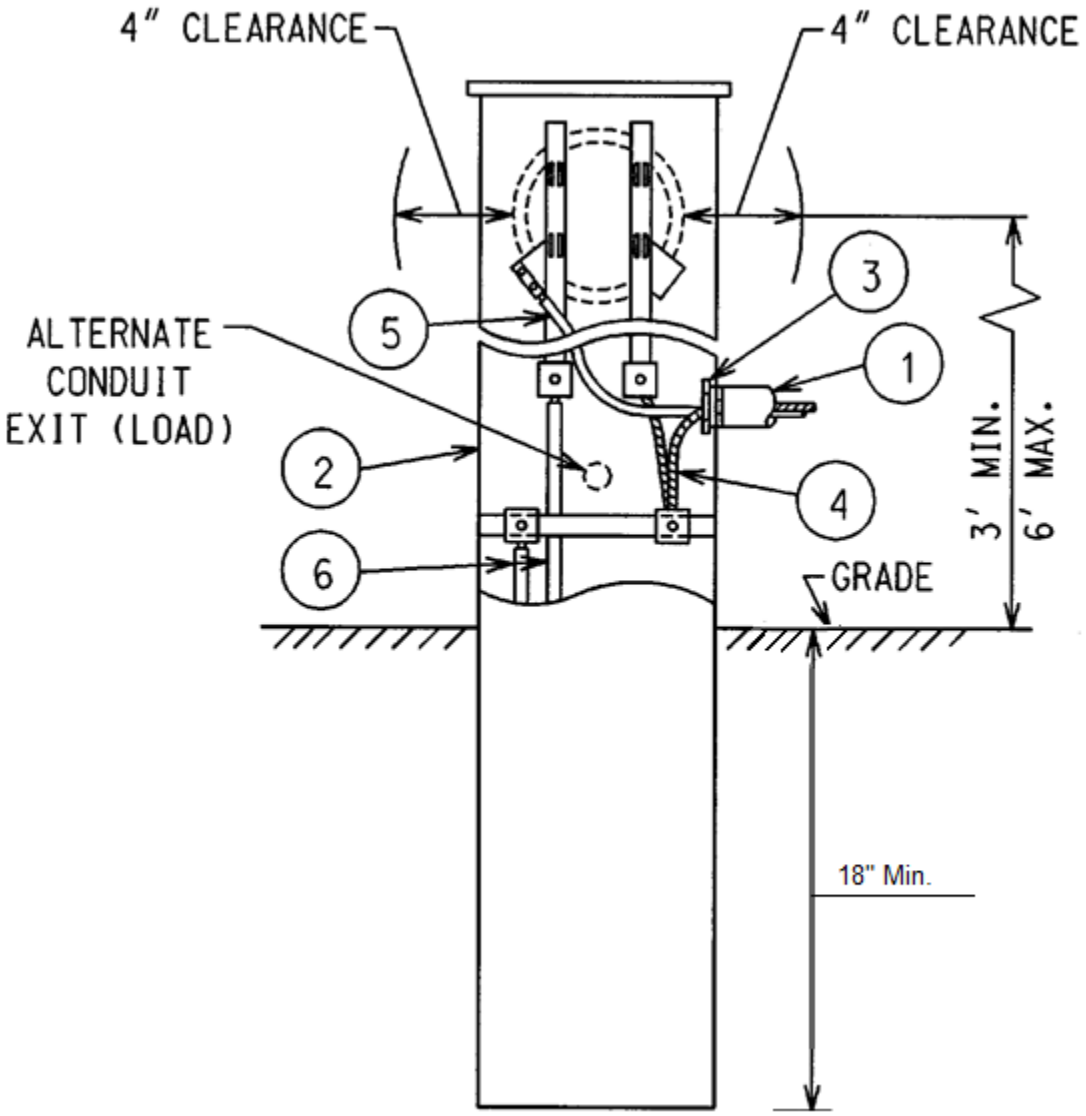
1. Service entrance conduit and conductors (see Note 1).
2. Company listed 4-terminal meter pedestal (see Note 2 & sheets D-9 and D-10).
3. Metallic conduit shall be bonded to the meter pedestal.
4. Service entrance conductor, neutral.
5. Service entrance conductor, phase or hot wire.

Company furnishes and installs:

6. Service lateral.
7. Watthour meter (not shown).

Notes:

1. Service entrance conductors must exit the pedestal below the lowest live part and above grade.
2. Provide 4” clearance around meter from all foreign objects.
3. For use with 480 Volt, 1Ø, 2-wire service, the pedestal must be rated for 480 Volts or above.



METER PEDESTAL WITH UNDERGROUND SERVICE LATERAL

1Ø, 3-WIRE, 120/240 OR 240/480 VOLTS, 0-200 AMPS

METERING SEQUENCE: METER-SWITCH-FUSE

Customer furnishes and installs:

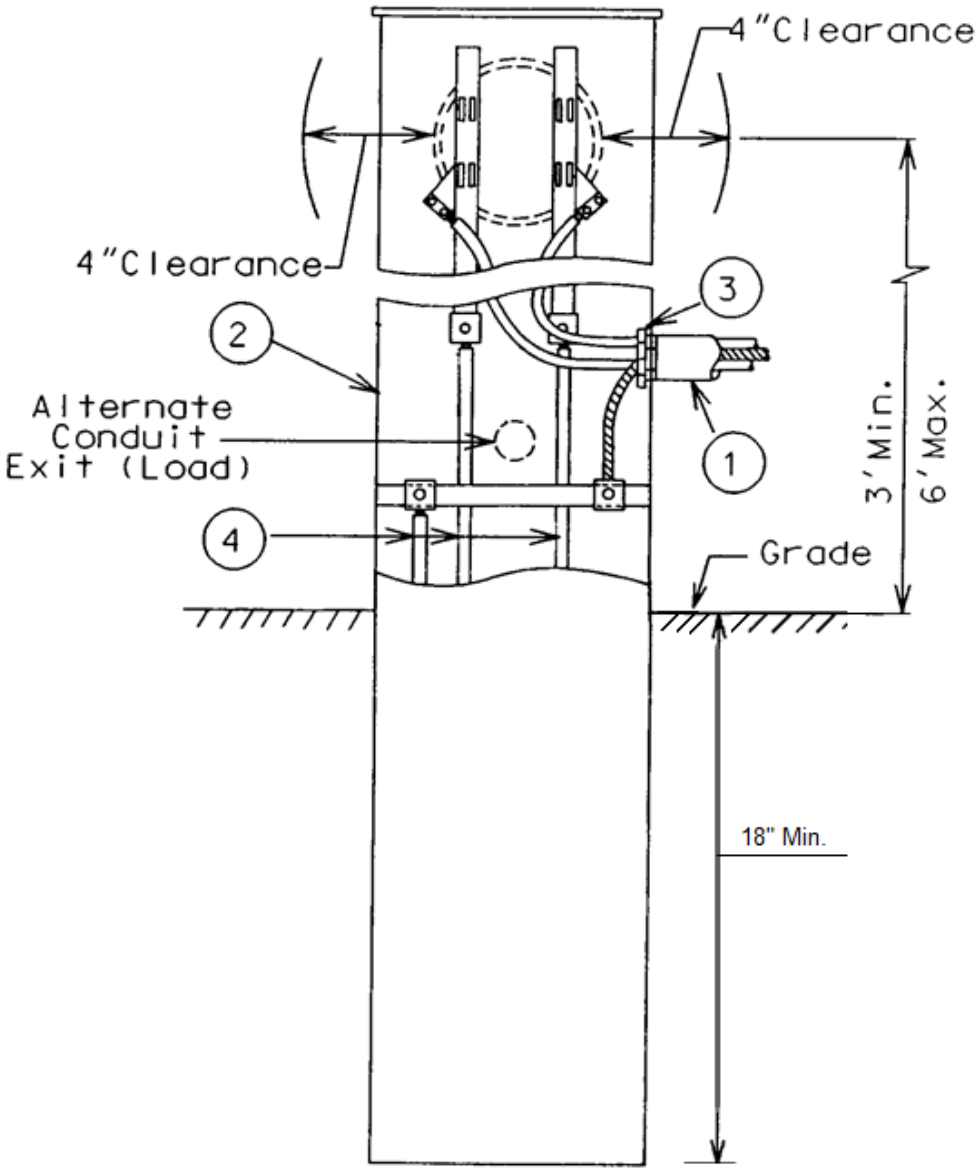
1. Service entrance conduit and conductors (see Note 1).
2. Company listed 4-terminal meter pedestal (see Note 2 & sheets D-9 and D-10).
3. Metallic conduit shall be bonded to the meter pedestal.

Company furnishes and installs:

4. Service lateral.
5. Watthour meter (not shown).

Notes:

1. Service entrance conductors must exit the pedestal below the lowest live part and above grade.
2. Provide 4” clearance around meter from all foreign objects.
3. For use with 240/480 Volt, 1Ø, 3-wire service, the pedestal must be rated for 480 Volts or above.



METER PEDESTAL WITH UNDERGROUND SERVICE LATERAL

1Ø, 3-WIRE, 120/240 VOLTS, 320 AMPS

METERING SEQUENCE: METER-SWITCH-FUSE

Customer furnishes and installs:

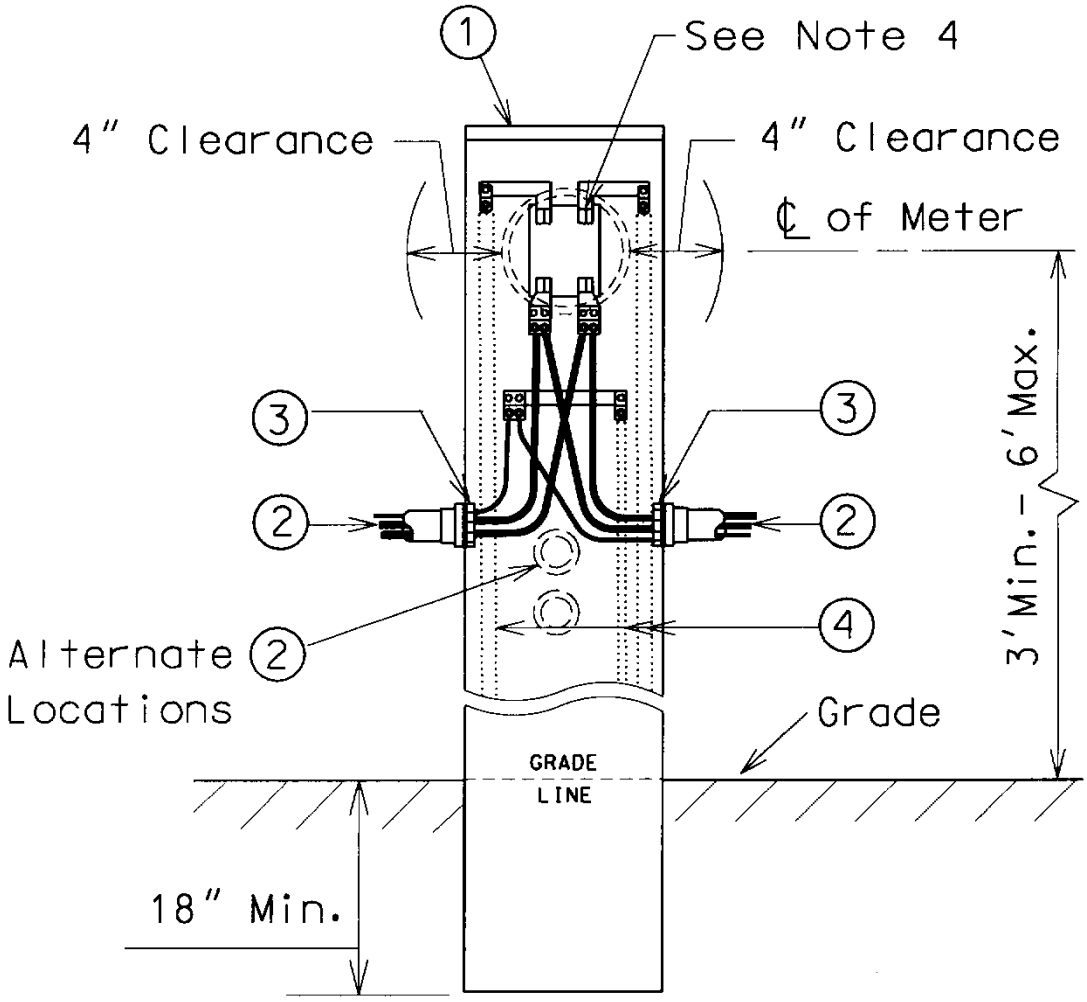
1. Company listed 4-terminal meter pedestal (see Note 1 & sheets D-9 and D-10).
2. Service entrance conduit and conductors (see Note 2).
3. Metallic conduit shall be bonded to the meter pedestal.

Company furnishes and installs:

4. Service lateral.
5. Watthour meter (not shown).

Notes:

1. Provide 4” clearance around meter from all foreign objects.
2. Service entrance conductors are allowed to leave as two circuits and must exit the pedestal below the lowest live part and above grade.
3. This equipment is rated at 320 Amps for continuous duty, which must not be exceeded.
4. Requires anti-inversion clip.



METER PEDESTAL WITH UNDERGROUND SERVICE LATERAL

1Ø, 3-WIRE, 208Y/120 VOLTS, 0-100 AMPS

METERING SEQUENCE: METER-SWITCH-FUSE

Customer furnishes and installs:

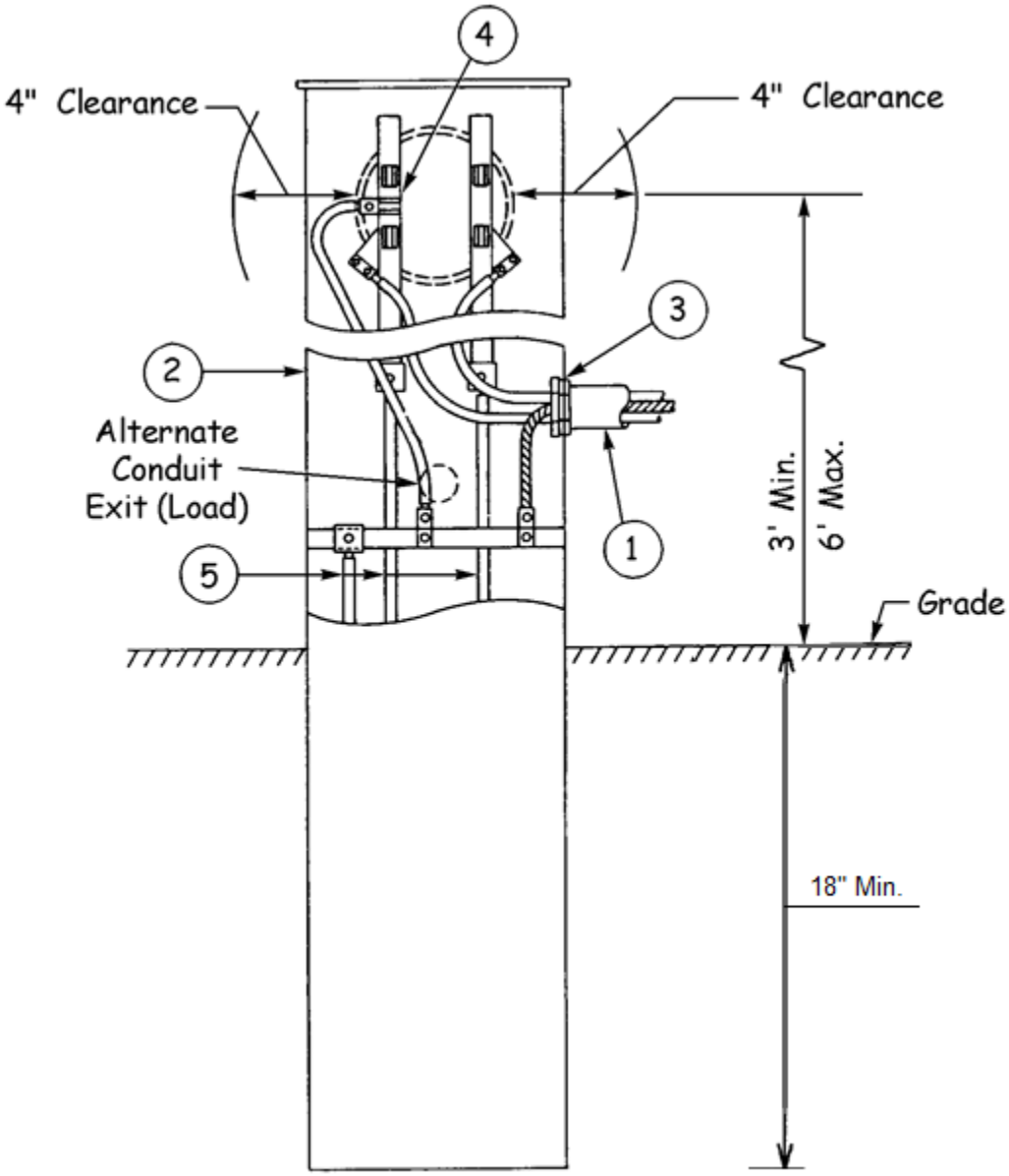
1. Service entrance conduit and conductors (see Note 1).
2. Company listed 5-terminal meter pedestal(see Note 2 & sheet D-10).
3. Metallic conduit shall be bonded to the meter pedestal.
4. 5th terminal shall be installed in the 9 o'clock position (see Note 3).

Company furnishes and installs:

5. Service lateral.
6. Watthour meter (not shown).

Notes:

1. Service entrance conductors must exit the pedestal below the lowest live part and above grade.
2. Provide 4" clearance around meter from all foreign objects.
3. If the potential tap from the neutral conductor to the 5th terminal is not provided by the manufacturer, it shall be a #14 white insulated wire for 208Y/120 Volts.
4. Two phase wires and a neutral supplied from a 3-phase, 4-wire, 208Y/120 volt grounded system.



METER PEDESTAL WITH UNDERGROUND SERVICE LATERAL

3Ø, 4-WIRE, 208Y/120 OR 480Y/277 VOLTS, 0-200 AMPS

METERING SEQUENCE: METER-SWITCH-FUSE (SEE NOTE 5)

Customer furnishes and installs:

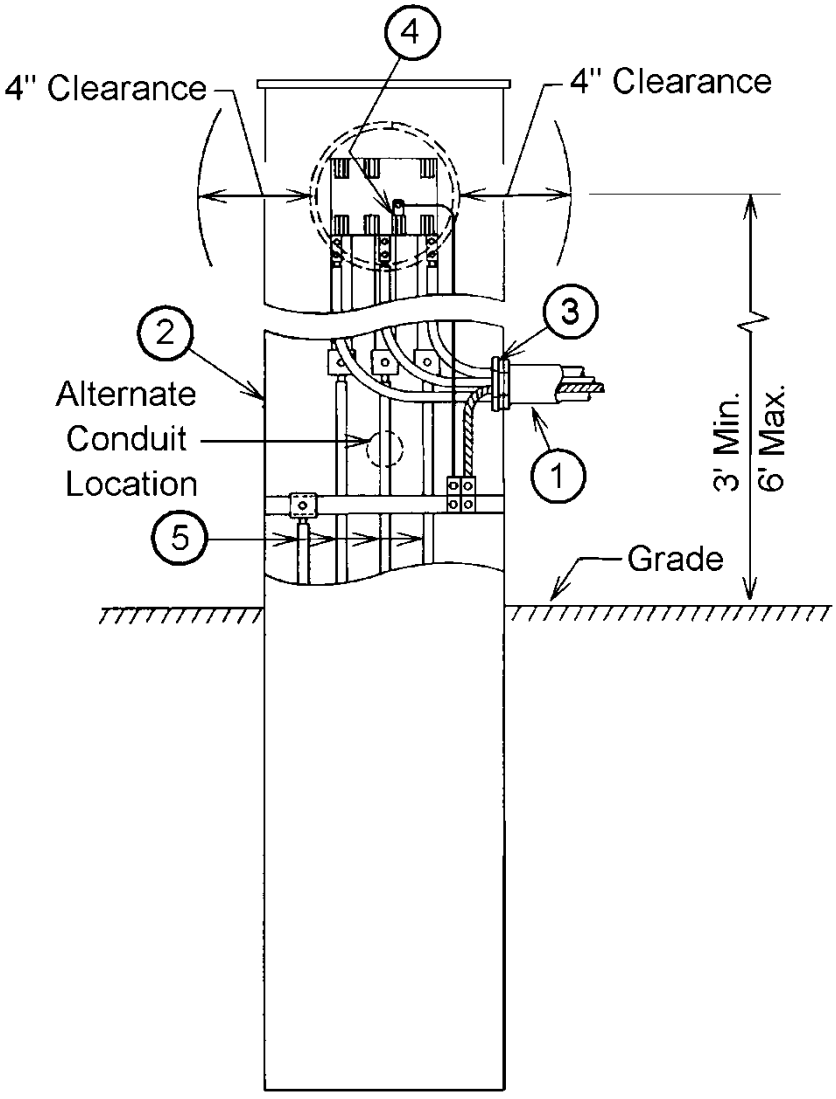
1. Service entrance conduit and conductors (see Note 1).
2. Company listed 7-terminal meter pedestal (see Notes 2, 3, & sheet D-10).
3. Metallic conduit shall be bonded to the meter pedestal.
4. 7th terminal with potential tap (see Note 4).

Company furnishes and installs:

5. Service lateral.
6. Watthour meter (not shown).

Notes:

1. Service entrance conductors must exit the pedestal below the lowest live part and above grade.
2. Provide 4” clearance around the meter from all foreign objects.
3. Pedestal extension kits are required with the pedestals approved on sheet D-10 for this type of installation.
4. If the potential tap from the neutral conductor to the 7th terminal is not provided by the manufacturer, it shall be a #14 white insulated wire.
5. SW-F-M sequence is required for indoor, 208Y/120 volt, downtown Milwaukee services.



TRANSOCKET WITH OVERHEAD SERVICE ENTRANCE

1Ø, 3-WIRE, 120/240 VOLTS, 400-800 AMPS
ALL 3Ø VOLTAGES, 400-2000 AMPS

METERING SEQUENCE: METER-SWITCH-FUSE (SEE NOTE 3)

Obtain acceptance for 1Ø installations larger than 400 amps from the company.

Customer furnishes and installs:

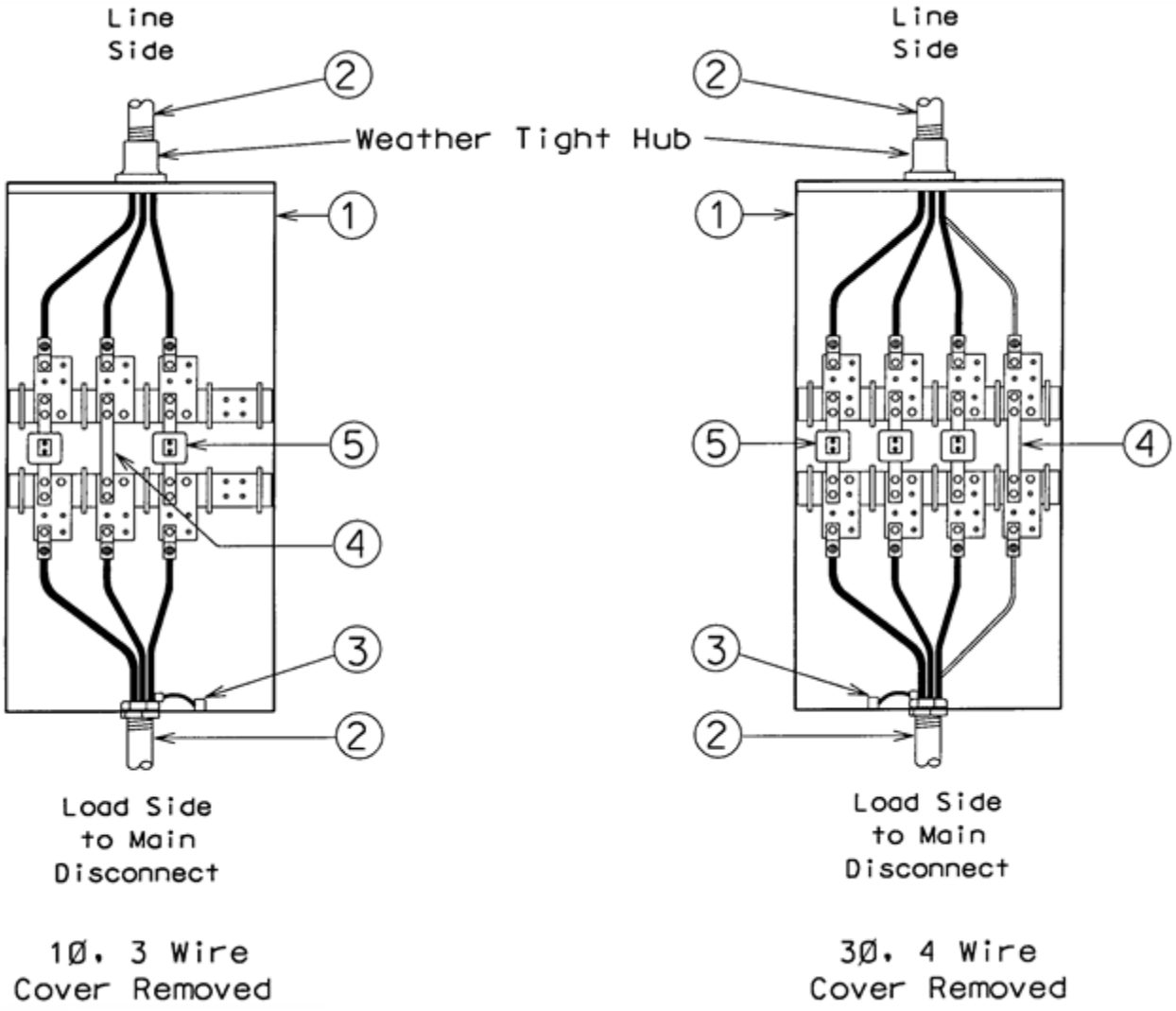
1. Company listed transocket with transformer rated meter socket (see Note 1 and sheets D-14 & D-17).
2. Service entrance conduit and conductors.
3. Metallic conduit shall be bonded to the transocket.
4. Solid bar (see Note 2).

Company furnishes and installs:

5. Current transformers.
6. Watthour meter & wiring (not shown).

Notes:

1. A 6-terminal socket is required for a 1-phase, 3-wire service; and 8-terminal socket is required for a 3-phase, 3-wire service; a 13 terminal socket is required for a 3-phase, 4-wire service.
2. For 480 volt ungrounded applications, the center phase bar (required) shall be removable.
3. SW-F-M sequence is required for indoor, 208Y/120 volt, downtown Milwaukee services.



TRANSOCKET WITH UNDERGROUND SERVICE ENTRANCE

1Ø, 3-WIRE, 120/240 VOLTS, 400-800 AMPS
ALL 3Ø VOLTAGES, 400-2000 AMPS
3Ø, 4-WIRE, 208Y/120 VOLTS OR 480Y/277 VOLTS, 400-4000 AMPS

METERING SEQUENCE: METER-SWITCH-FUSE (SEE NOTE 5)

Obtain acceptance for 1Ø installations larger than 400 amps from the company.

Customer furnishes and installs:

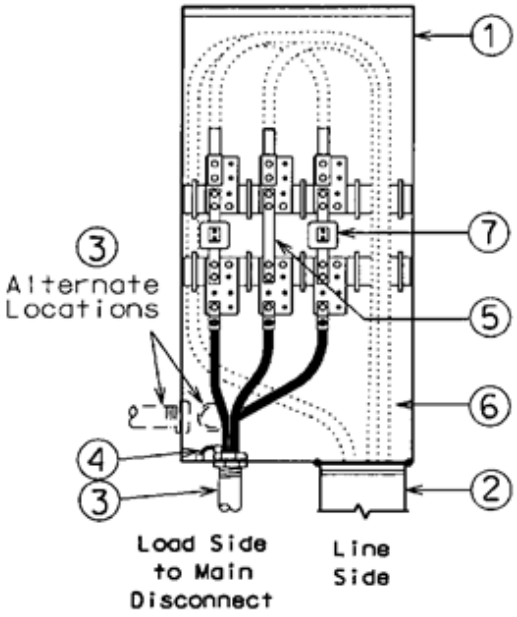
1. Company listed transocket with transformer rated meter socket (see Note 1 and sheets D-16 & D-17).
2. Service lateral conduit (800 A raceway shown).
3. Service entrance conduit and conductors.
4. Metallic conduit shall be bonded to the transocket.
5. Solid bar (see Note 2).

Company furnishes and installs:

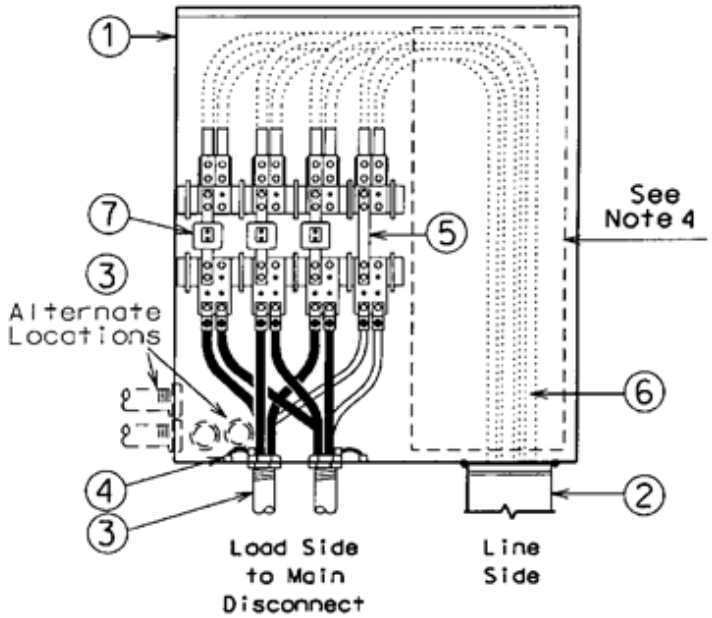
6. Service lateral & lug type terminations (see Note 3).
7. Current transformers.
8. Watthour meter & wiring (not shown).

Notes:

1. A 6-terminal socket is required for a 1-phase, 3-wire service; and 8-terminal socket is required for a 3-phase, 3-wire service; a 13 terminal socket is required for a 3-phase, 4-wire service.
2. For 480 volt ungrounded applications, the center phase bar (required) shall be removable.
3. Lug landing pads shall be provided for 600+ A terminations. 400A terminations shall use set screw connectors.
4. The wiring gutter is for the service lateral (item 6) only. No other conductors are to pass through it. The transocket shown has the wiring space on the right; units with space on the left are also available.
5. SW-F-M sequence is required for indoor, 208Y/120 volt, downtown Milwaukee services.



1Ø. 3 Wire
Cover Removed
(400 Ampere shown)



3Ø. 4 Wire
Cover Removed
(800 Ampere shown)

OUTDOOR CURRENT TRANSFORMER METERING WITH CUSTOMER DISCONNECT

1Ø, 3-WIRE, 120/240 VOLTS, 400-800 AMPS
ALL 3Ø VOLTAGES, 400-1200 AMPS

METERING SEQUENCE: METER-SWITCH-FUSE (SEE NOTE 5)

Obtain acceptance for 1Ø installations larger than 400 amps from the company.

Customer furnishes and installs:

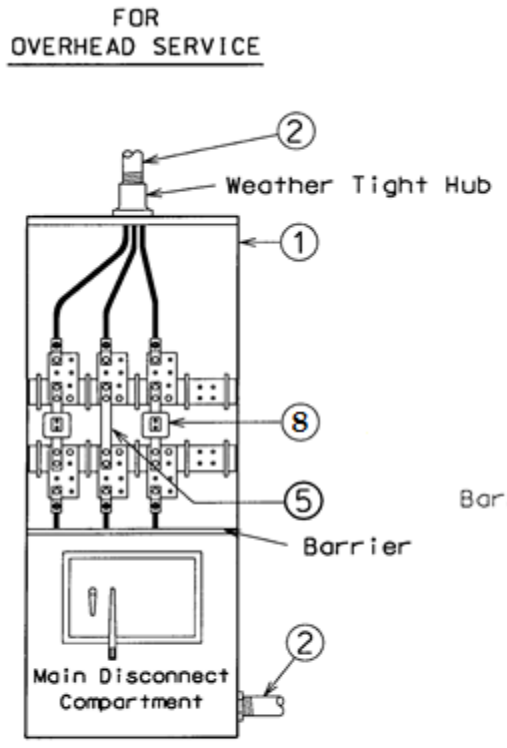
1. Company listed combination metering transformer section disconnect with transformer rated meter socket (see Note 1 and sheets D-15 & D-17).
2. Service entrance conduit and conductors.
3. Raceway, 1600A maximum (see sheet D-16).
4. Raceway for service lateral (see Note 4).
5. Solid bar (see Note 2).
6. Metallic conduit shall be bonded to the transocket.

Company furnishes and installs:

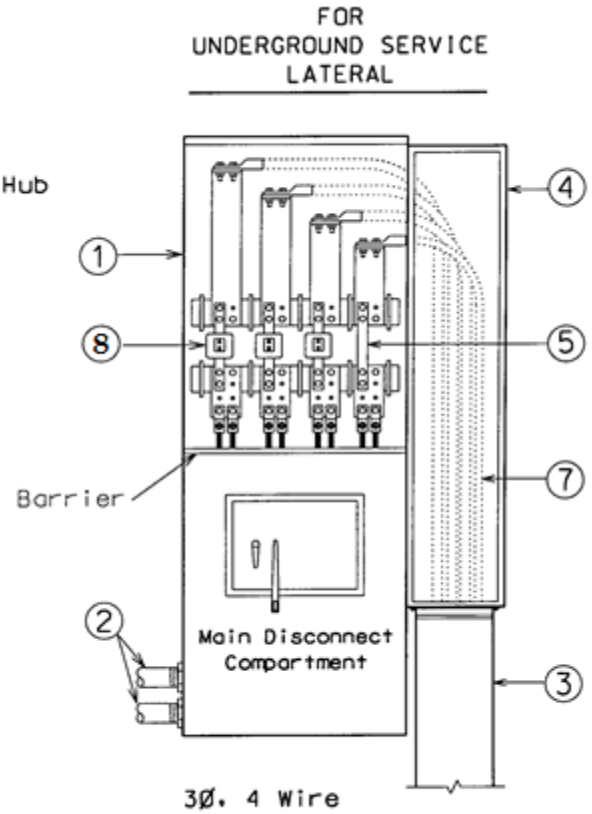
7. Service lateral & lug type terminations (see Note 3).
8. Current transformers.
9. Watthour meter & wiring (not shown).

Notes:

1. A 6-terminal socket is required for a 1-phase, 3-wire service; and 8-terminal socket is required for a 3-phase, 3-wire service; a 13 terminal socket is required for a 3-phase, 4-wire service.
2. For 480 volt ungrounded applications, the center phase bar (required) shall be removable.
3. Lug landing pads shall be provided for 600+ A terminations. 400A terminations shall use set screw connectors.
4. The raceway (items 3 & 4) is for the service lateral (item 7) only. No other conductors are to pass through it. The transocket shown has the wiring space on the right; units with space on the left are also available.
5. SW-F-M sequence is required for indoor, 208Y/120 volt, downtown Milwaukee services.



1Ø, 3 Wire
Cover Removed
From CT Compatrment
(400 Ampere Shown)



3Ø, 4 Wire
Cover Removed
From CT Compatrment
(800 Ampere Shown)

OUTDOOR PADMOUNT CURRENT TRANSFORMER METERING WITH CUSTOMER DISCONNECT

ALL 3Ø VOLTAGES, 800-3000 AMPS

Customer furnishes and installs:

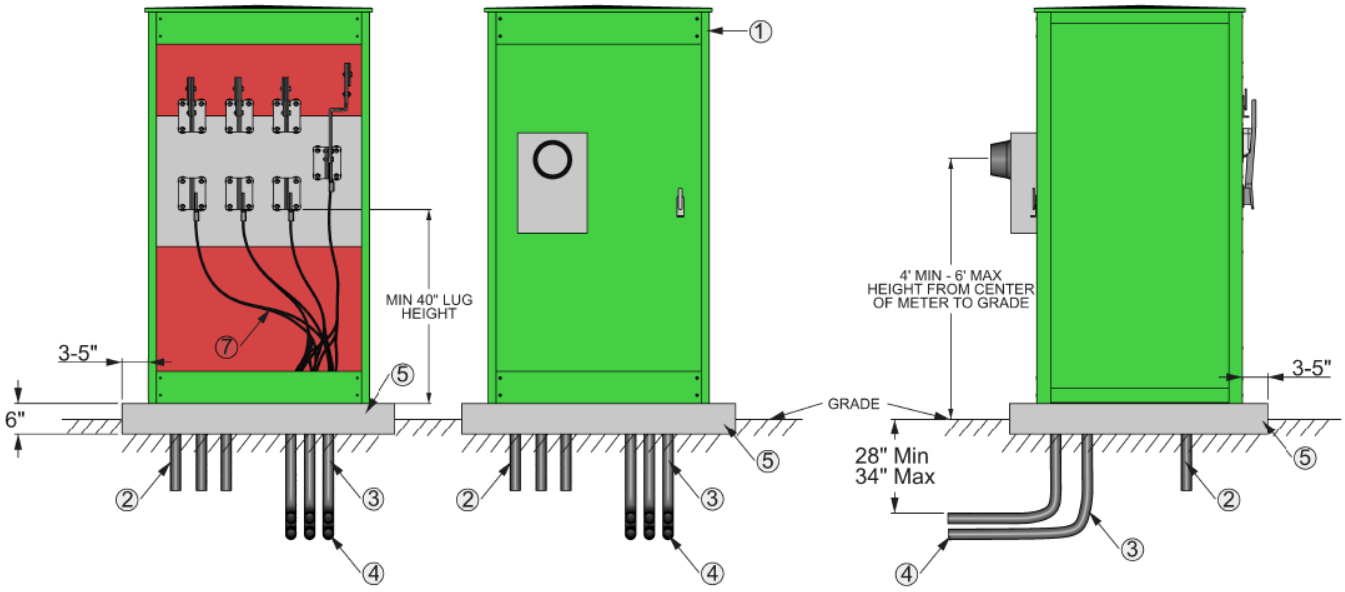
1. Company listed combination metering transformer section disconnect with transformer rated meter socket (see Note 1 and sheet D-17).
2. Service entrance conduit and conductors.
3. 4” 90 elbow with 36” radius (see Note 2).
4. Insulated conduit bushing (see Note 4).
5. Padmount Base (see Note 5)

Company furnishes and installs:

6. Current transformers (not shown)
7. Service lateral & lug type terminations (see Note 3).
8. Watthour meter & wiring (not shown)
9. Conduit Package

Notes:

1. A 6-terminal socket is required for a 1-phase, 3-wire service; and a 13 terminal socket is required for a 3-phase, 4-wire service.
2. Schedule 40 PVC, galvanized rigid, or IMC conduit shall extend to be slightly higher than level with the top of the concrete pad (no more than 3” higher). If used, metallic conduit shall be bonded. Reference page U-3 for the proper number and size of the conduits required and U-4 for conduit details. Contact the We Energies job representative for approval.
3. Lug landing pads shall be provided for 600+ A terminations.
4. Service lateral conduit shall have a temporary waterproof end cap to prevent the accumulation of water, ice, and other foreign matter from inside the conduit.
5. The concrete pad shall be 6” thick and 3-5” wider and deeper than the transocket.
6. The conduit sweeps shall be orientated to dace the transformer. See layout provided by the Company.



METER STACK SOCKET BREAKER INSTALLATION

ALL 1Ø, 3-WIRE VOLTAGES, 0-800 AMPS
ALL 3Ø VOLTAGES, 0-2000 AMPS

METERING SEQUENCE: METER-SWITCH-FUSE (SEE NOTE 14)

Customer furnishes and installs:

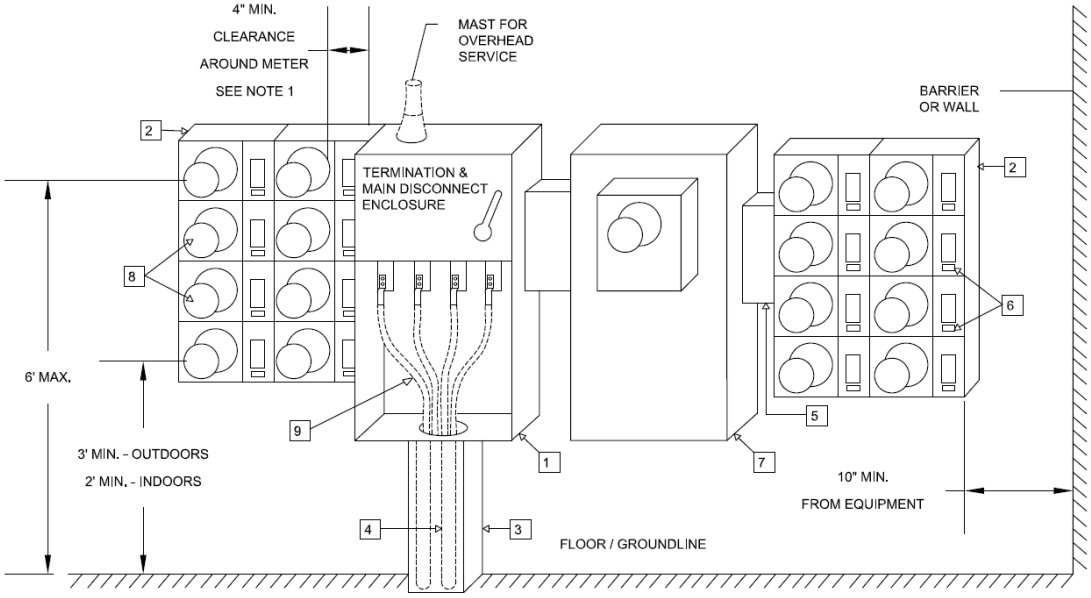
1. Company listed termination compartment, breaker/disconnect, switch/fuse combination (see sheet D-21).
2. Company listed meter stacks (see Notes 1-3 and sheets D-11 through D-14).
3. Raceway, 1600A maximum (see sheet D-16).
4. Service lateral conduit, 4" (rigid galvanized or IMC if used outdoors).
5. Spacer (see Note 1).
6. Label identifying the individual unit served by the meter position (see Note 7).
7. Company listed transocket with transformer rated meter socket (see sheets D-16 & D-17)

Company furnishes and installs:

8. Watthour meters.
9. Service lateral

Notes:

1. 4" of clearance around meter is required.
2. Where the termination/switch/fuse compartment or switch handles have less than the 4" clearance, a spacer is required (Item 5).
3. All panels shall be removable for inspection or wiring. Each meter socket shall be individually sealable.
4. Before ordering and installing meter stacks, verify that the stack will meet the minimum and maximum meter height requirements when installed.
5. SW-F-M sequence is required for indoor, 208Y/120 volt, downtown Milwaukee services.
6. Horizontal bus connected termination compartments and metering equipment shall be connected by bus. Conduit and wire extensions to metering equipment will require company approval prior to installation.
7. Each meter position shall be marked on the outside of the socket or by the breaker (if available) with the address of the unit served (see Note 7 on M-2). If the marking is on the outside of the removable cover, it shall also be marked on the inside of the meter socket in a visible location. This marking shall also be placed on the corresponding distribution panel(s). The marking shall be a permanent label with ½" block letters and may consist of individual self-stick letters or numbers, suitable for the location so as to be considered permanent.
8. Multi-metered installations shall be installed so as to balance the load on the service.



CURRENT TRANSFORMER METERING IN FREE STANDING SWITCHGEAR

1Ø, 3-WIRE, 120/240 VOLTS, 400-800 AMPS
ALL 3Ø VOLTAGES, 400-4000 AMPS

METERING SEQUENCE: METER-SWITCH-FUSE (SEE NOTE 14)

Customer furnishes and installs:

1. Company listed transformer rated meter socket (see Note 1 and Sheet D-17).
2. Conduit and Pull String (see Note 2).
3. Current transformer (CT) compartment as part of the main switchboard (see Notes 3 to 12).
4. Main breaker compartment.
5. Distribution equipment.
6. Service entrances (see Overhead or Underground sections for installation details).
7. Alternate location of the line and load side bus bar.
8. Alternate location for insulating barrier when alternate load bus is used.

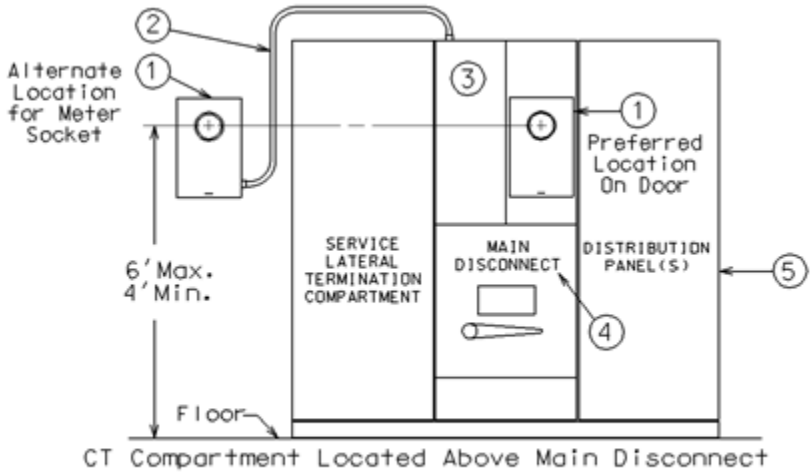
Company furnishes and installs:

9. Meter test switch (not shown).
10. Watthour meter (not shown).
11. Meter wire from the secondary side of CTs to meter (not shown).
12. CTs and necessary mounting bolts (not shown).

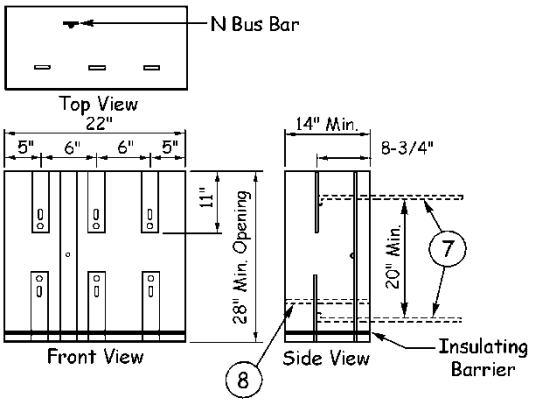
Notes:

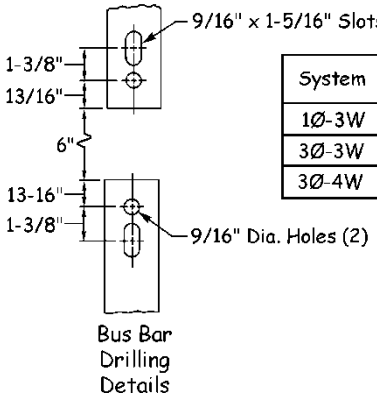
1. Meter socket shall be installed within sight of or attached to the CT compartment with the following limitations:
   a. Meter must be installed in a suitable location as outlined in the preceding General Requirements.
   b. Meter conduit shall be run exposed where practicable.
   c. Consult the company if the distance between the CT compartment and meter location exceeds 40’.
2. 1-1/4” galvanized rigid, galvanized intermediate, or, if indoors, rigid nonmetallic Schedule 40 PVC per NEMA Standard TC-2, to extend between the CT compartment and meter cabinet. If nonmetallic conduit is used, a #12 copper conductor or equivalent must be installed in the conduit to maintain continuity of equipment ground. This conductor must be bare or green covered with one or more yellow stripes. Customer to terminate the conductor on meter enclosure and grounding point in switchgear.
3. The CT compartment shall be completely enclosed; barriers between compartments shall be rigidly supported.
4. No transition bus is allowed within the CT compartment with the bus configuration shown.
5. Front of CT compartment shall be enclosed using one of the following methods:
   a. Double hinged door with sealable hasp and double bolt type latch (preferred).
   b. Single hinged door with sealable hasp and double bolt type latch.
6. The following live part clearances must be maintained: 2” phase-to-phase, 1” phase-to-ground.
7. The CT bar will be drilled to conform to EEI Pub. MSJ-11.
8. For 1-phase and 3-phase services 1200 amps or less, provide a set screw lug for a #12 gauge wire in the neutral bar for a potential tap. For 3-phase services over 1200 amps, provide a set screw lug for a #12 gauge wire in the bus bars of each phase and the neutral for the potential tap as shown in the bus bar drilling detail.
9. Bus supports shall have a minimum separation of 15” and shall consist of an insulating material such as Benelex. or equivalent, or porcelain insulators mounted on a steel channel.
10. Neutral bus must either run through or be extended back into the CT cabinet so that it is accessible for the potential tap. Working clearance between neutral bus and any live bus in the vicinity of the CT mounting must be 6” minimum. Neutral bus must not be located closer to the front of the enclosure than any live bus.
11. The compartment detail shown is for use with a 3-phase, 4-wire system. For 3-wire systems, the center phase bar is to be continuous and the neutral bar is to be omitted.
12. For services less than 1200 amps, refer to Sheet D-17 for approved CT compartments.
13. All metering compartments shall be contained within the switchgear. Conduit and wire extension from switchgear to external metering equipment is not allowed. Contact the company for acceptance prior to any construction.

14. **Send a copy of drawings of the switchgear termination and metering compartments to the local We Energies job representative for acceptance prior to any construction.**
15. SW-F-M sequence is required for indoor, 208Y/120 volt, downtown Milwaukee services.



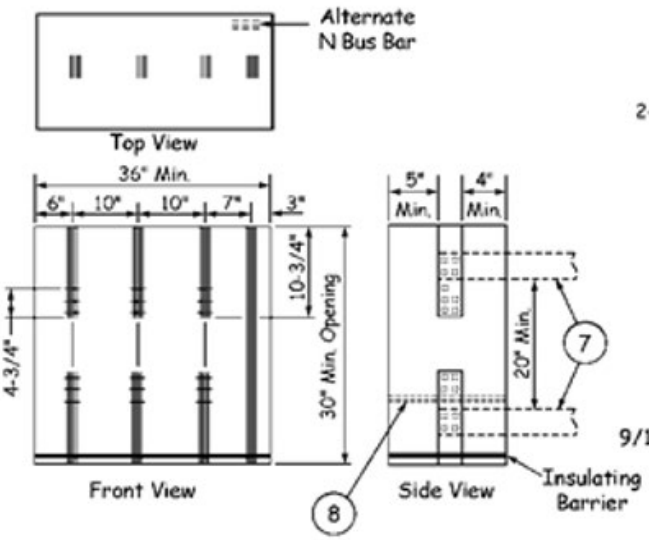
GENERAL LAYOUT

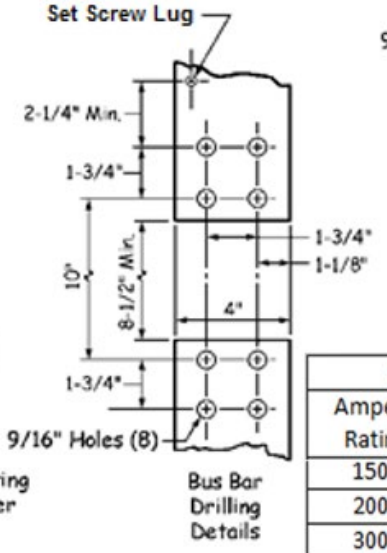


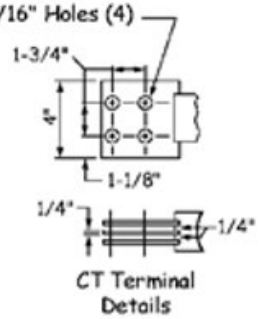


System	No. of CT's
1Ø-3W	2
3Ø-3W	2
3Ø-4W	3

1-PHASE, 120/240 VOLTS, 400-800 AMPERES
ALL 3-PHASE VOLTAGES, 400-1200 AMPERES







Current Transformer Data		
Ampere Rating	Number of CT Bars	Number of Bus Bars
1500	1	1-2
2000	1-2	1-2
3000	3	2-4
4000	4	3-4

ALL 3-PHASE VOLTAGES, Over 1200 AMPERES

MODULAR METERING IN FREESTANDING SWITCHGEAR

1Ø, 3-WIRE, 120/240 OR 208Y/120 VOLTS, 0-200 AMPS PER METER
ALL 3Ø VOLTAGES, 0-200 AMPS PER METER

Obtain acceptance from the company.

Customer furnishes and installs:

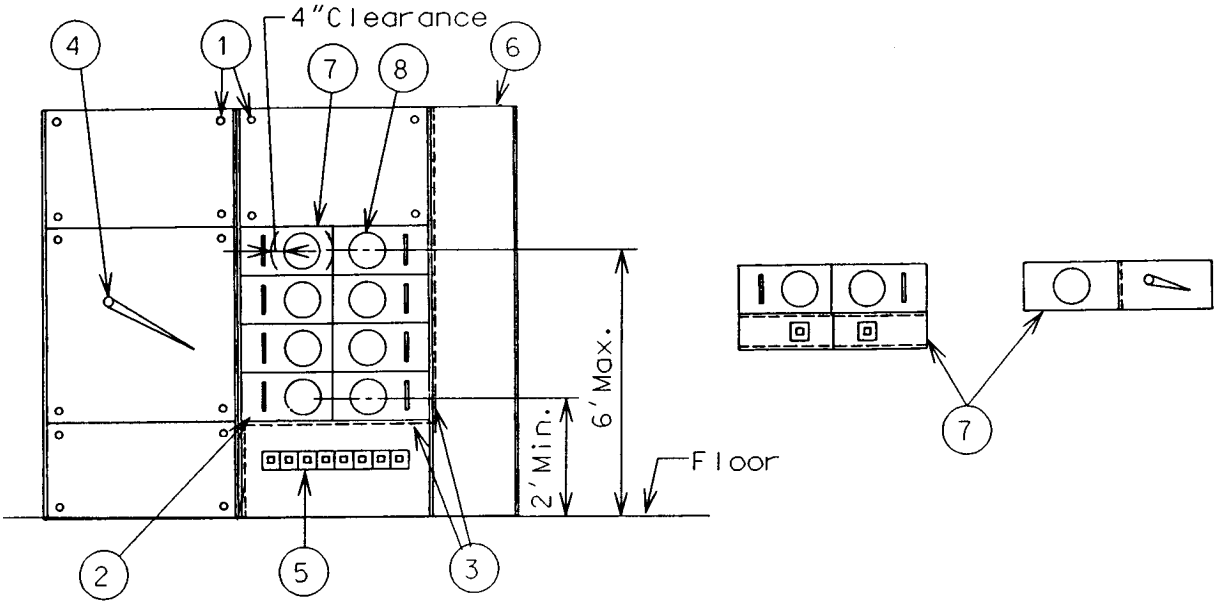
1. Provisions for sealing (see Note 1).
2. Sealable cover. Double covers must be equipped with handles.
3. Benelex or polyester barrier (see Note 2).
4. Main disconnect when required (see Note 3).
5. Individual tenant disconnects.
6. Load conductor raceway.
7. Modular meter units (see Notes 4-7 and sheet D-14).

Company furnishes and installs:

8. Watthour meters.

Notes:

1. All covers which could expose unmetered bus shall have provisions for sealing.
2. All load raceways and lugs for connection of load conductors shall be separated by barriers from the meter area and from unmetered bus.
3. This device as shown is not suitable for the direct termination of Company service conductors. See Overhead or Underground sections of the manual for the appropriate termination methods.
4. For a 3-phase, 3-wire, 480 volt meter socket, there must be a center phase disconnecting link.
5. Provide 4” clearance around meter from all foreign objects.
6. The meter disconnect combination may consist of a preassembled module designed to be inserted into a bused enclosure.
7. All metering compartments shall be contained within the switchgear. Conduit and wire extension from switchgear to external metering equipment is not allowed. Contact the company for acceptance prior to any construction.
8. Each meter position shall be marked on the outside of the socket or by the breaker (if available) with the address of the unit served (see Note 7 on M-2). If the marking is on the outside of the removable cover, it shall also be marked on the inside of the meter socket in a visible location. This marking shall also be placed on the corresponding distribution panel(s). The marking shall be permanent label with ½” block letters and may consist of individual self-stick letters or numbers, suitable for the location so as to be considered permanent.



FULLY ASSEMBLED METERING SWITCHBOARD

MAINTENANCE ONLY

OH METER SOCKET 3Ø, 3-WIRE, 240 OR 480 VOLTS (UNGROUNDED), 0-200 AMPS

METERING SEQUENCE: METER-SWITCH-FUSE

Customer furnishes and installs:

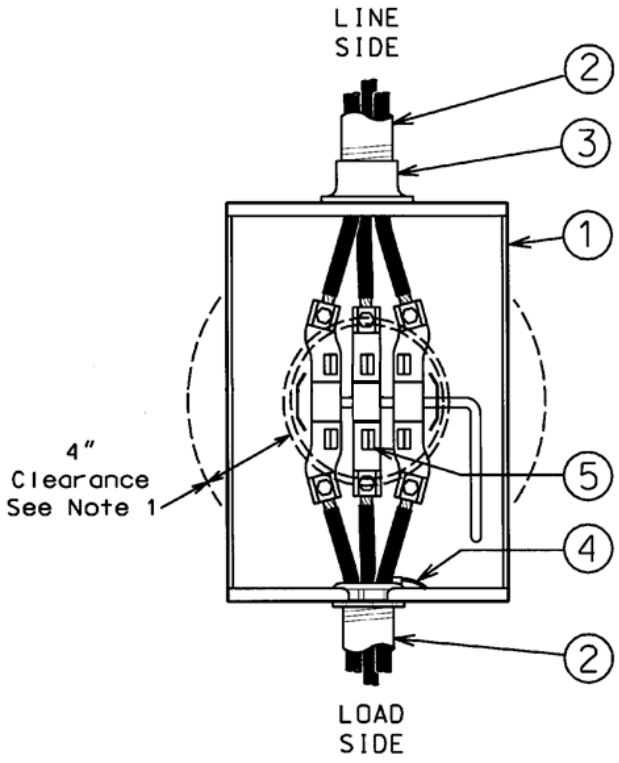
1. Company listed 5-terminal meter socket with center phase sliding link disconnect (See Note 1 and sheet D-4).
2. Conduit and service entrance conductors.
3. Water-tight hub.
4. Metallic conduit shall be bonded to the meter socket.
5. 5th terminal shall be in the 6 o'clock position (See Note 2).

Company furnishes and installs:

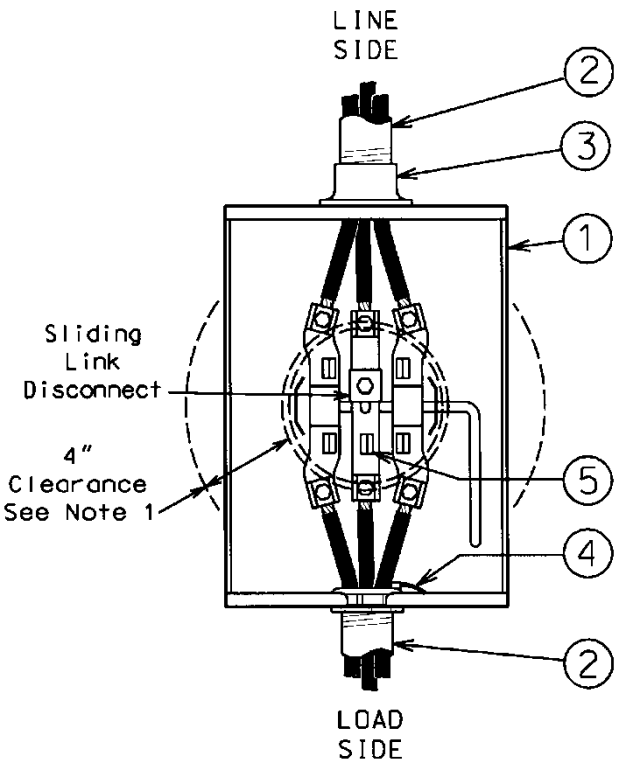
6. Watthour meter.

Notes:

1. Provide 4" clearance around meter from all foreign objects.
2. If the potential tap from the neutral conductor to the 5th terminal is not supplied by the manufacturer, a #14 black insulated wire shall be used.



3Ø, 3-Wire, 240 Volts



3Ø, 3-Wire, 480 Volts
(Ungrounded)

MAINTENANCE ONLY

UG METER SOCKET 1Ø, 3-WIRE, 120/240 VOLTS, 0-200 AMPS

METERING SQUENCE: METER-SWITCH-FUSE

Obtain acceptance for 1Ø installations from the Company.

Customer furnishes and installs:

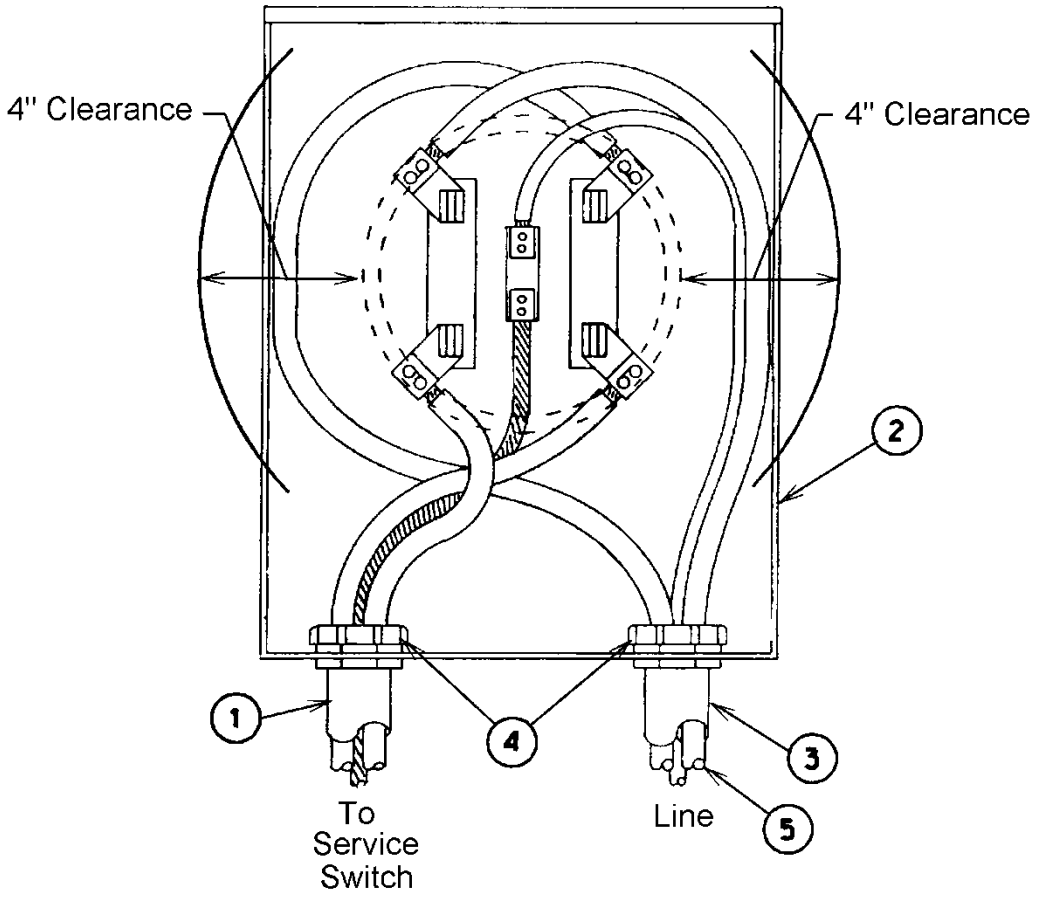
1. Service entrance conduit and conductors (see Note 1).
2. Company listed 4-terminal meter socket (see Note 2).
3. Service lateral conduit.
4. Metallic conduit shall be bonded to the meter socket.

Company furnishes and installs:

5. Service lateral.
6. Watthour meter (not shown).

Notes:

1. For a 120 volt, 2-wire service, the service entrance conductors consist of the neutral conductor and one of the phase conductors.
2. Provide 4” clearance around meter from all foreign objects.
3. The multi-position sockets listed on page D-7 can be used for new construction provided the cable raceway is used. Service lateral conduit shall not be used for new construction.
4. If meter socket needs to be replaced for any reason, an approved meter pedestal shall be used instead.



MAINTENANCE ONLY

UG METER SOCKET 1Ø, 3-WIRE, 208Y/120 VOLTS, 0-100 AMPS
UG METER SOCKET 3Ø, 3-WIRE, 240 VOLTS OR 480 VOLTS (UNGROUNDED), 0-200 AMPS

METERING SEQUENCE: METER-SWITCH-FUSE (SEE NOTE 3)

Customer furnishes and installs:

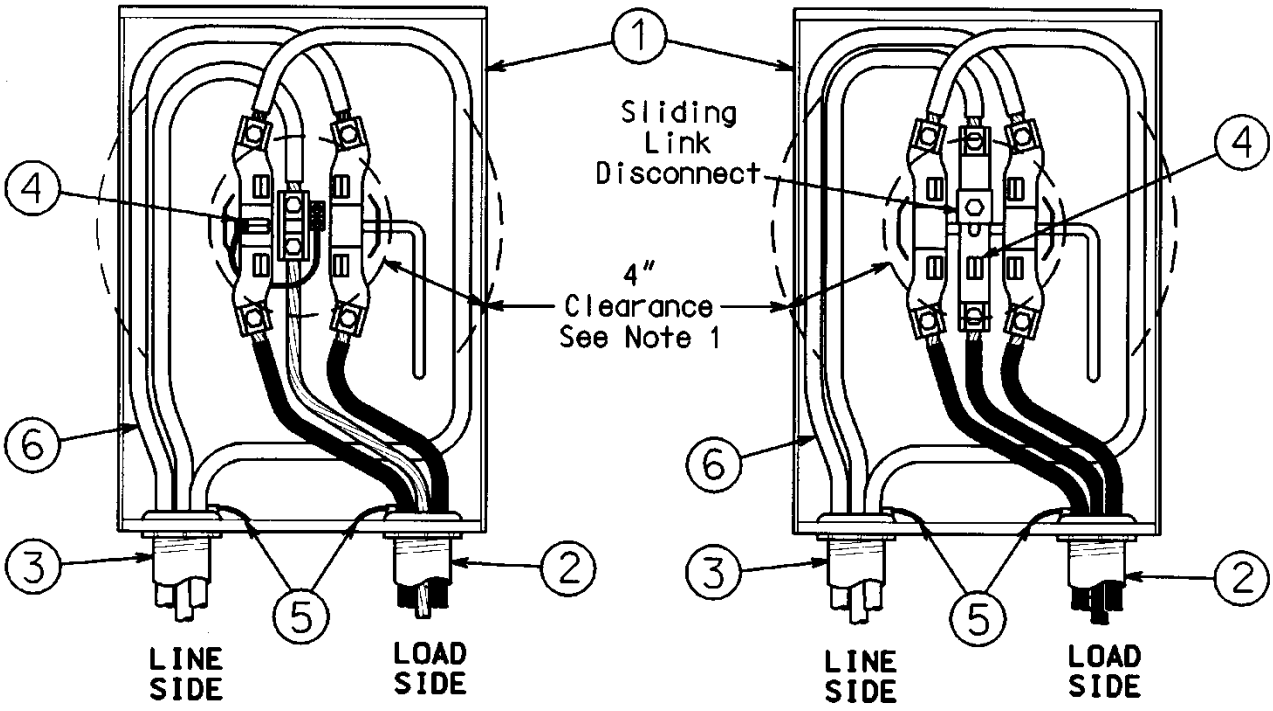
1. Company listed 5-terminal meter socket (see Note 1).
2. Service entrance conduit and conductors.
3. Service lateral conduit.
4. 5th terminal (see Note 2).
5. Metallic conduit shall be bonded to the meter socket.

Company furnishes and installs:

6. Service lateral.
7. Watthour meter (not shown).

Notes:

1. Provide 4" clearance around meter from all foreign objects.
2. For 1-phase, 208Y/120 volt and 3-phase, 240 volt, the 5th terminal shall be in the 9 o'clock position. If the potential tap from the 5th terminal to the grounded conductor is not provided by the manufacturer, it shall be a #14 white insulated wire. For 480 volt, the 5th terminal shall be in the 6 o'clock position. If the potential tap from the 5th terminal to the center phase conductor is not provided by the manufacturer, it shall be a #14 black insulated wire.
3. SW-F-M sequence is required for indoor, 208Y/120 volt, downtown Milwaukee services.
4. Two phase wires and a neutral supplied from a 3-phase, 4-wire, 208Y/120 volt grounded system.
5. If meter socket needs to be replaced for any reason, an approved meter pedestal shall be used instead (except for downtown Milwaukee services).



MAINTENANCE ONLY

UG METER SOCKET 3Ø, 4-WIRE, 208Y/120 OR 480Y/277 VOLTS, 0-200 AMPS

METERING SEQUENCE: METER-SWITCH-FUSE (SEE NOTE 3)

Customer furnishes and installs:

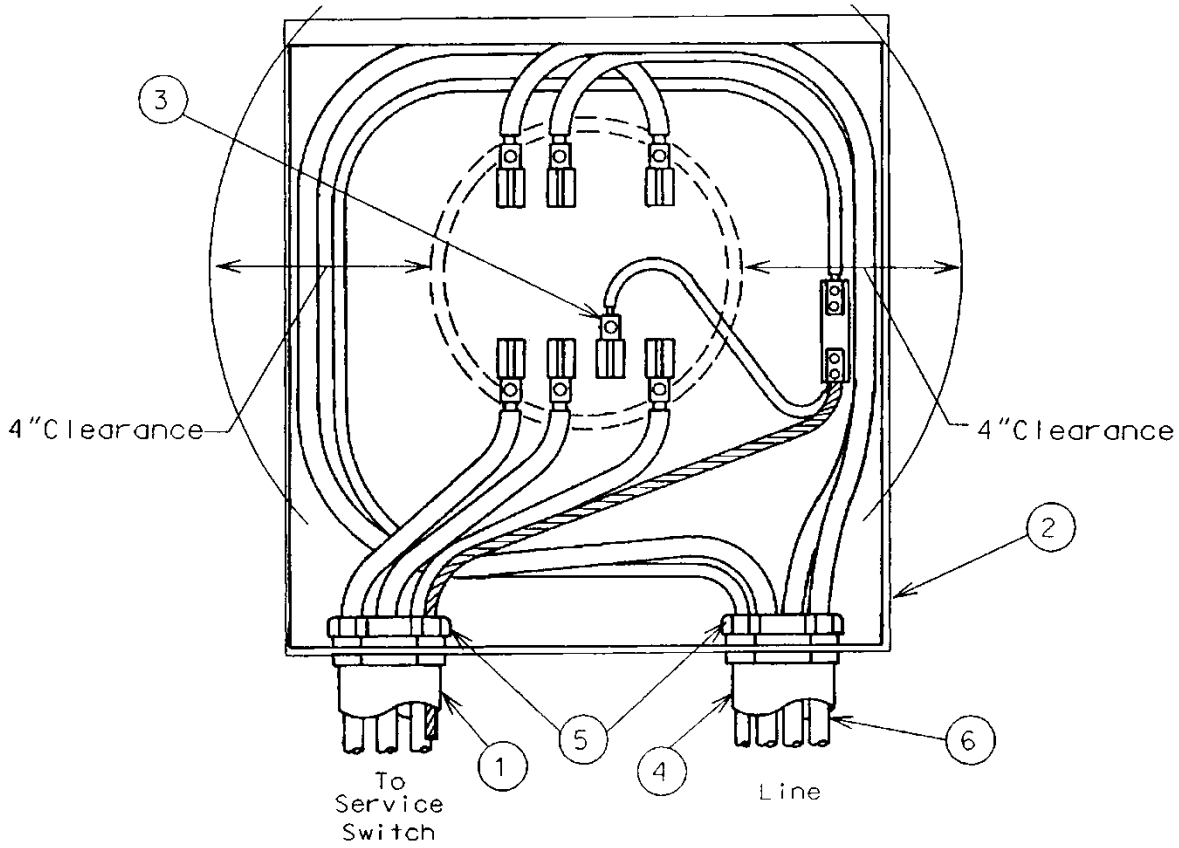
1. Service entrance conduit and conductors.
2. Company listed 7-terminal meter socket (see Note 1).
3. 7th terminal with potential tap (see Note 2).
4. Service lateral conduit.
5. Metallic conduit shall be bonded to the meter socket.

Company furnishes and installs:

6. Service lateral.
7. Watthour meter (not shown).

Notes:

1. Provide 4” clearance around meter from all foreign objects.
2. If the potential tap from the 7th terminal to the neutral conductor is not provided by the manufacturer, it shall be a #14 white insulated wire.
3. SW-F-M sequence is required for indoor, 208Y/120 volt, downtown Milwaukee services.
4. If meter socket needs to be replaced for any reason, an approved meter pedestal shall be used instead (except for downtown Milwaukee services).



MAINTENANCE ONLY

UG METER PEDESTAL 3Ø, 3-WIRE, 240 OR 480 VOLTS (UNGROUNDED), 0-200 AMPS

METERING SEQUENCE: METER-SWITCH-FUSE

Customer furnishes and installs:

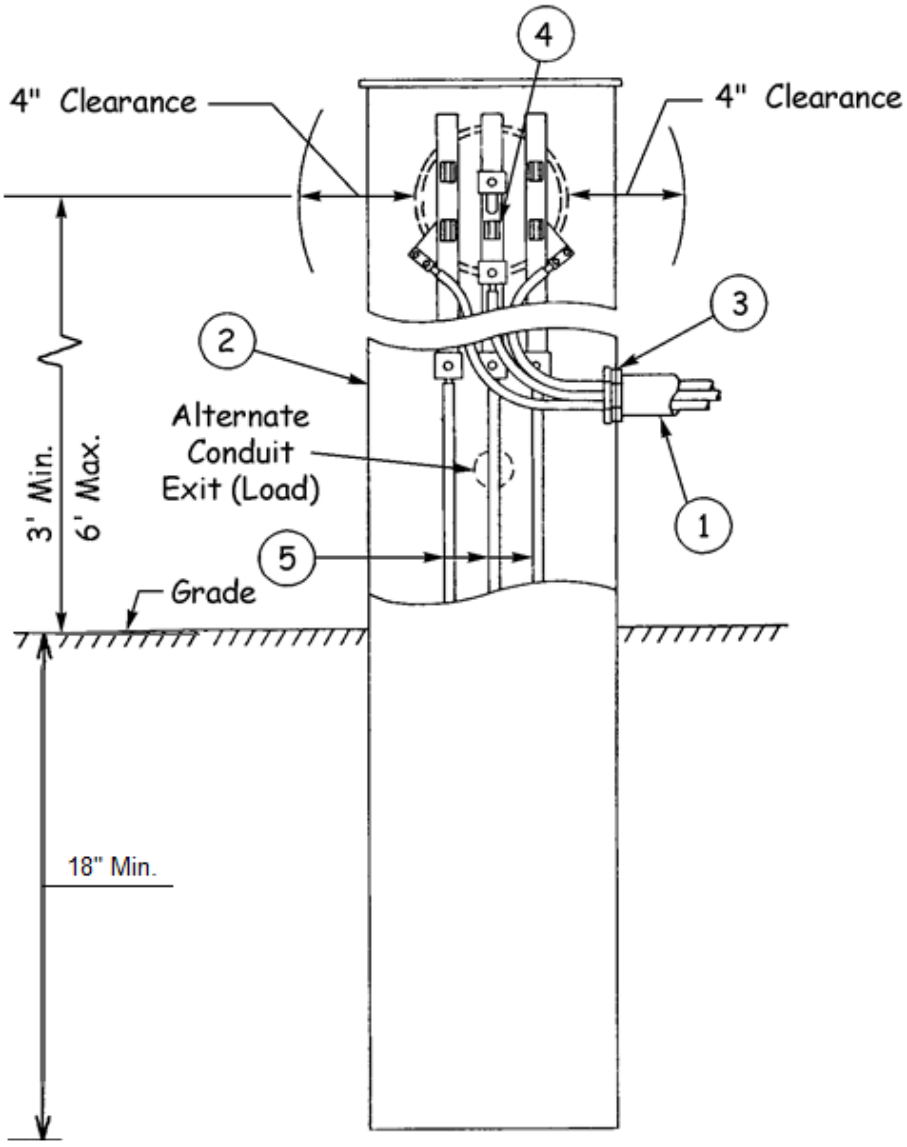
1. Service entrance conduit and conductors (see Note 1).
2. Company listed 5-terminal meter pedestal(see Note 2 & sheet D-10).
3. Metallic conduit shall be bonded to the meter pedestal.
4. 5th terminal shall be installed in the 6 o'clock position (see Note 4).

Company furnishes and installs:

5. Service lateral.
6. Watthour meter (not shown).

Notes:

1. Service entrance conductors must exit the pedestal below the lowest live part and above grade.
2. Provide 4" clearance around meter from all foreign objects.
3. If the potential tap from the neutral conductor to the 5th terminal is not provided by the manufacturer, it shall be a #14 black insulated wire for 240 or 480 Volts.
4. For 480 Volts, remove the B-phase grounding strap if present (see D-10, Note 11).



APPENDIX

CHOOSING THE PROPER METER SOCKET

In the Metering Devices book (Book 2 Section D), meter sockets are listed by the number of terminals. The intent of this article is to help the installer verify that the correct meter socket is installed. The type of meter socket is determined by the voltage, number of conductors, if the service is 1-phase or 3-phase, and the size of the service.

Types of Meters

Meters can be broken into two types: Self Contained and Transformer Rated.

Self Contained Meters contain everything needed for metering within the meter, as the name implies. Self contained meters are limited to 200 A. services, both 1-phase and 3-phase. The only exception in the We Energies service territory is the 320 A. 120/240 Volt, 1-phase meters.

The configurations for self contained meter sockets are shown in Figure 1. The number of terminals, layout of the terminals in the meter socket, and the voltages that use that configuration are shown below.

Self Contained Meter Sockets for Services

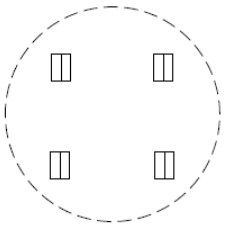
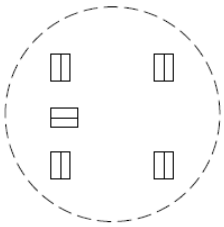
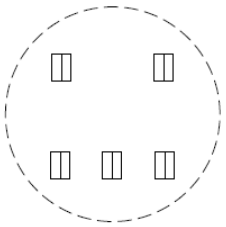
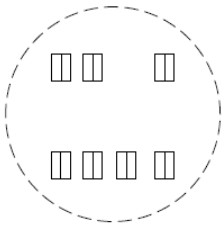
4 Terminal	5 Terminal	5 Terminal	7 Terminal
			
1Ø, 2 WIRE 30 Amp 120 VOLT	1Ø, 3 WIRE 200 Amp 208Y/120 VOLT	3Ø, 3 WIRE 200 amp 480 VOLT*	3Ø, 4 WIRE 200 Amp 208Y/120 VOLT 480Y/277 VOLT
1Ø, 3 WIRE 200 Amp 120/240 VOLT 240/480 VOLT		3Ø, 3 WIRE 200 Amp 240 VOLT Grounded BØ	
1Ø, 3 WIRE 320 Amp 120/240 VOLT		* Has a Sliding Link Disconnect for the center phase	

Figure 1

By-passes are required on all self contained meter sockets. Horn type bypasses are usually used on four terminal 1-phase and five terminal single phase, 208Y/120 Volt, 3-wire meter sockets. Occasionally horn type by-passes will be found on 3-phase meter sockets, but they are generally limited to sockets where lighter loads are anticipated.

Lever operated by-passes are found on most 3-phase meter sockets and 320A. 120/240 Volt 1-phase meter sockets. These by-passes also have a jaw release mechanism which provides a higher clamping force on the blades of the meter to improve the connection.

Transformer rated meter sockets do not require by-pass means.

The 480 Volt, 3Ø, 3-Wire Meter Socket is a 5 terminal socket with the 5th terminal in the 6 o'clock position as shown in Figure 1. This socket is also equipped with a sliding link disconnect for disconnecting the center phase when the meter is removed. To operate the link, the retaining bolt is loosened and the link drops down disconnecting the center phase. It should also be noted that generally the manufacturer provides these sockets with a bonding screw or jumper that bonds the center phase to the case. For proper operation of the customer's equipment, it is important to verify that the bonding means has been removed.

Transformer Rated Meters are used for services larger than 320A. These meters require the use of external current transformers. The current transformers are generally located in transockets or could also be in a dedicated compartment in a switchgear unit.

The configurations for transformer rated meter sockets are shown in Figure 2. Again, the number of terminals, layout of the terminals in the meter socket, and the voltages are shown below.

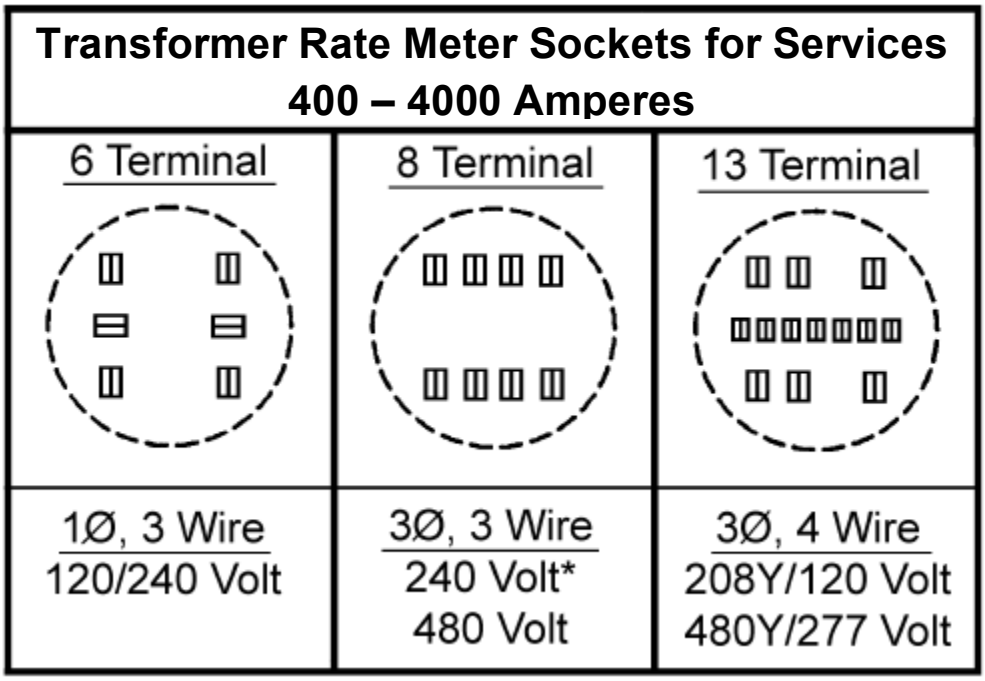


Figure 2

Transockets are supplied with the proper transformer rated meter socket by the manufacturer. If the meter socket is not the socket required for the type of service, it usually means the transocket is the wrong unit.

The transformer rated meter sockets are not supplied with other types of current transformer metering installations such as switchgear. For these other types of installations, the transformer rated meter socket must be supplied separately by the customer.

As with all electrical installations, it must be verified that the metering equipment is correct for the voltage and type of service. We hope you find this information useful. Should you have any questions regarding a service installation, please contact your local We Energies job representative.

Helpful links on the We Energies website:

Energy Service for New Construction: http://www.we-energies.com/residential/new_construction/index.htm

Customer Owned Generation: http://www.we-energies.com/business/altenergy/custgen_wisc.htm

APPENDIX
RESIDENTIAL DECK PROCEDURE

1. When building a deck, service entrance equipment must remain accessible at all times. This procedure is on how to deal with problems once decks are built around meters.
2. **Avoid installing the deck around the service entrance equipment.** If a deck is built over a service lateral and a fault on the service lateral occurs, outage times may be long and costly to repair. The Company must be able to safely work on its equipment. The National Electric Code, NEC, Article 110 *Requirements for Electrical Installations* requires the follow working space clearances be met.

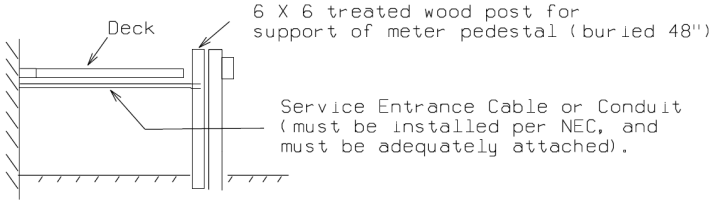
    a. *110.26(A)(1) Depth of Working Space*: A 3 ft. minimum from the front or opening of the enclosure containing live parts shall remain clear.

    b. *110.26(A)(2) Width of Working Space*: Width of working space in front of electrical equipment shall be the width of the equipment or 30 in., whichever is greater.

    c. *110.26(A)(3) Height of Working Space*: The work space shall be clear and extend from the grade to 6½ ft.

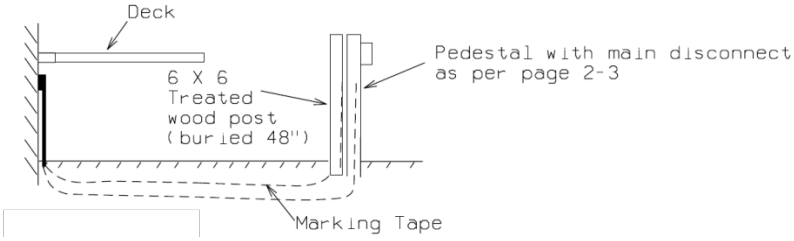
Option 1

Move meter pedestal to the edge of the deck and mount against a treated wood post. Service entrance cable can be installed in conduit under the deck and back to the dwelling.



Option 2

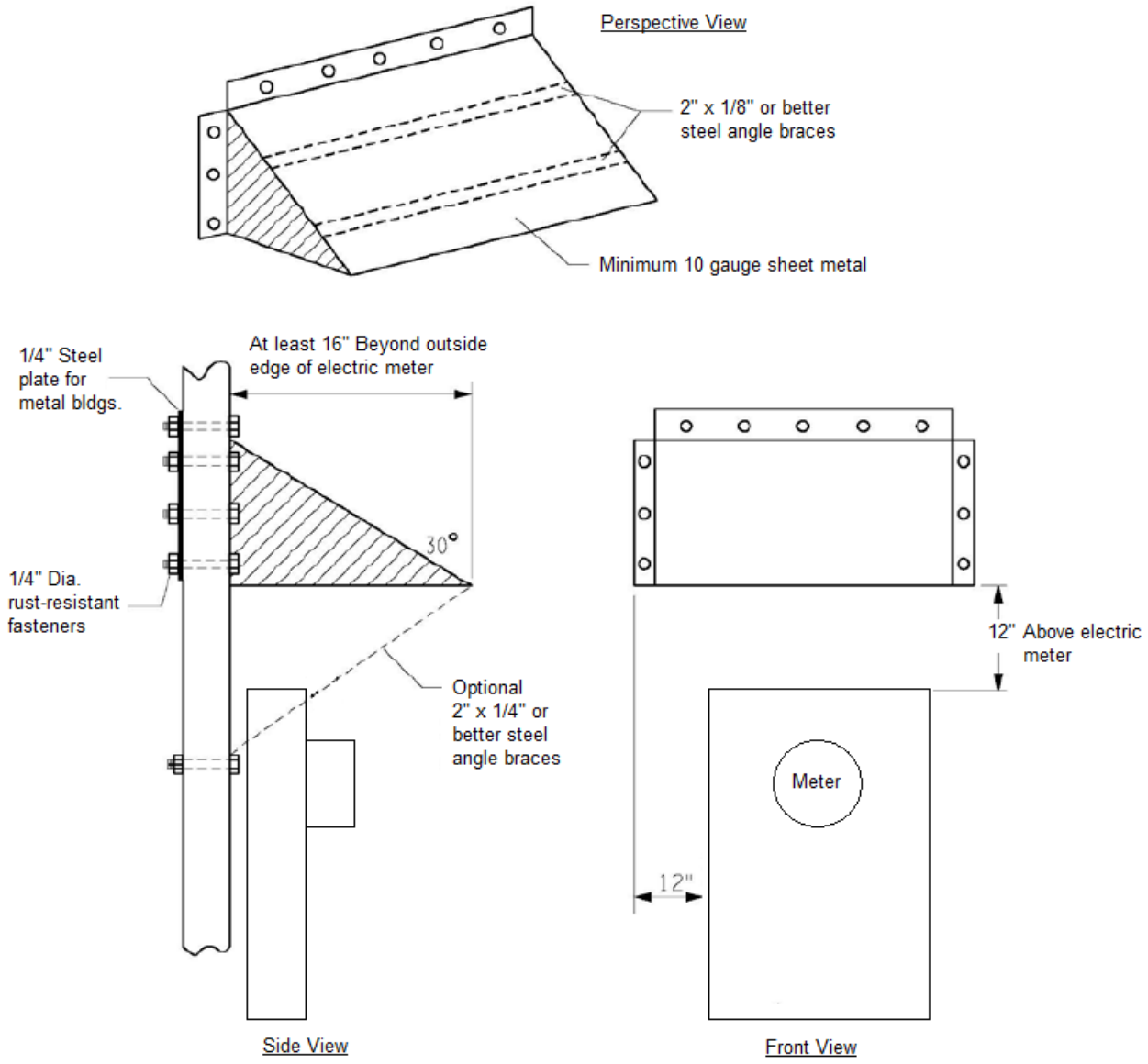
Move meter pedestal to the edge of the deck and mount against a treated wood post. Service entrance cable can be direct buried under the deck and back to the dwelling. Marking tape is required in Michigan for cable protection [NEC 300.5(D)] but not required for Wisconsin per COMM 16.300(2).



Option 3

Move meter pedestal to an area on the house away from the deck. The service entrance conduit or cable can then go around the house to the old service pedestal site. Marking tape is required in Michigan for cable protection [NEC 300.5(D)] but not required for Wisconsin per COMM 16.300(2).

APPENDIX
METER PROTECTION FROM SNOW AND ICE



APPENDIX
MAXIMUM FAULT CURRENT TABLE

Voltage	Entrance Size	Fault Current at Transformer	Fault Current with 20 foot Service	Fault Current with 40 foot Service	Fault Current with 60 foot Service
Single Phase 120/240	400	20,700	18,000	18,000	18,000
	600	34,300	30,300	26,900	24,100
	800	34,300	31,300	28,800	26,700
Three Phase 120/208	400	27,400	21,700	18,000	18,000
	600	40,700	35,600	31,300	27,700
	800	40,700	36,600	33,300	30,400
	1200	66,700	59,800	54,000	49,200
	1600	66,700	61,400	56,800	52,800
	2000	71,800	64,100	59,900	56,900
	3000	71,800	68,700	65,800	63,100
	4000	105,400	100,100	95,200	90,700
Three Phase 277/480	400	18,000	18,000	18,000	18,000
	600	28,900	27,800	26,800	25,800
	800	31,100	30,000	29,000	28,000
	1200	31,100	30,400	29,800	29,100
	1600	45,700	44,600	43,500	42,500
	2000	45,700	44,900	44,200	43,500
	3000	53,500	52,700	51,800	51,000
	4000	63,300	62,300	61,400	60,500

Note: This Table Applies Only for Cases with One Service Fed from a Transformer

Notes:

1. WARNING: This information assumes a dedicated transformer feeding one customer. If a transformer feeds a large entrance and a small service is also tapped from that transformer, the fault current will be much higher than shown here for the small entrance. Call the Company for information in this case.
2. These tables are worst-case fault currents. Fault currents depend on distance from substation, type of feeder, type (overhead vs. underground) and size of transformer, size and length of service, etc. Call the Company for information on specific locations, sizes and voltages not given, or regarding details for arc-flash analysis.
3. Minimum of 18kA service entrance equipment required.