

Secondary Single-Phase Services 200 A Single and 400 A Multiple Self-Contained Meter Installation

ES54 S1-01

Application

This standard describes BC Hydro requirements for customer-owned surface-mounted single-phase 120/240 V 200 A single or multiple main up to 400 A secondary voltage underground services for small residential and commercial customers. These underground services shall be installed outdoors for residential customers and may be installed indoors or outdoors for commercial customers.

Revision Notes

R12 is released to update the effective date to 2025-01-01. There are no other changes in R12. The changes to R11 are repeated below and are still marked by revision lines in the left margin. Updated *References* section. Removed old Table 1 showing minimum enclosure requirements and created new Table 1 for single meter sockets and Table 2 for multiple meter sockets. Removed service cable compartment widths from Figure 2. Expanded note 1f description of galvanized steel, and 1f (iii) to allow a pole as a meter socket support structure. Added new note 1g. Edited Figures 5 and 6 to correct reference from note 4.1 to note 1f, add 22 kAIC to description of 200 A customer service main, add breaker panel photo, and add reference to note 1g. Added reference to note 4d to Figure 20. Edited note 4c to specify line-side lugs for single 200 A rated sockets and added new note 4d for multiple main 200 A and 400 A rated sockets. Added reference to CSA 22.2 No.115 to note 5. This revision released concurrently with Standards and Equipment Advisory Information Bulletin 2024-014 R1 *Revised ES54 S1-01 Secondary Single-Phase Services 200 A Single and 400 A Multiple Self-Contained Meter Installation*.

References

BC Hydro Distribution Standards


ES54 S0-02	Services General Notes
ES54 S0-04	Services General Notes Secondary Services
ES54 S0-05	Services General Notes Service Ducts and Trenches
ES54 S1-02	Secondary Single-Phase Services 320 A Self-Contained Meter Installation
ES54 S1-03	Secondary Single-Phase Services 400 A and 600 A CT-Based Meter Installation

Other BC Hydro Documents

DI S10-1	Distribution Instruction, Electric Service Connections – General
DI S10-4	Distribution Instruction, Electric Service Connections – Voltages
Secondary Metering	Requirements for Secondary Voltage Revenue Metering (750 V and less)

External Documents

BCBC	BC Building Code
BCEC	Canadian Electrical Code, Part I (CSA C22.1) adopted for BC and endorsed by Technical Safety BC (TSBC)
CSA 22.2 No. 115	Meter-mounting devices
TSBC D-EI 2017-01	Directive: Exemptions to public utilities
TSBC IB-EL 2017-04	Information Bulletin: Electrical Safety Regulation application to public utilities

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Notes

1. General

- Customer service, bonding, and grounding conductors shall be installed and terminated on the load side before BC Hydro installs utility supply cables and seals the meter socket for BC Hydro access only.
- BC Hydro continues to install larger pad-mounted transformers with higher available fault level above 10 kA to meet increasing customer load demand. New construction and upgraded customer-owned service breaker panels shall have 22 kA interrupting capacity.
- Civil work and grounding installations, including maintenance and repairs, are the customer's responsibility. See ES54 S0-05 for service duct and trench requirements on private property.
- Tables 1 and 2 show the variations of acceptable single and multiple main meter sockets, illustrated per Figures 1 and 2.

Table 1 – Minimum requirements of enclosures for single meter sockets services 200 A to 400 A

Type of enclosure	Minimum outside dimensions (mm)			Minimum KO and duct size	Minimum line side connector range
	Height	Width	Depth		
200 A single service	430	240	130	3"	Tunnel type lugs #2-3/0 Cu #2-250 kcmil Al
320 A single service	See ES54 S1-02				
400A single service	See ES54 S1-03				

Table 2 – Minimum requirements of enclosures for multiple main meter sockets services 200 A to 400 A

Type of enclosure	Utility cable compartment minimum outside dimensions (mm)			Minimum KO and duct size	Minimum line side connector range
	Height	Width	Depth		
200 A main bus multiple mains, two to four meter positions	380	210	120	3"	Tunnel type lugs #2-3/0 Cu #2-250 kcmil Al or compression lugs ½" diameter threaded stud comes with Belleville washer and hex nut
400 A main bus multiple main, two to six ⁽¹⁾ meter positions	508	440	130	3"	Tunnel type lugs #4/0 – 500 kcmil Cu/Al or compression lugs ½" diameter threaded stud comes with Belleville washer and hex nut

Note 1: BCEC rule 6-104 limits the number of customer services terminating to one utility supply service to a maximum of four customer services. For five or six services the customer shall obtain a deviation from the local authority having jurisdiction allowed in accordance with rule 2-030. The customer shall submit a copy of special permission to BC Hydro before installation.

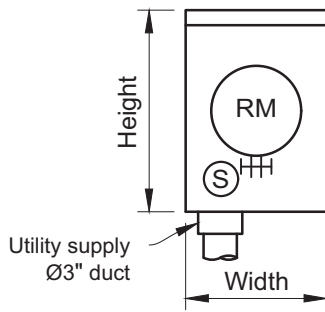


Figure 1 – 200 A single

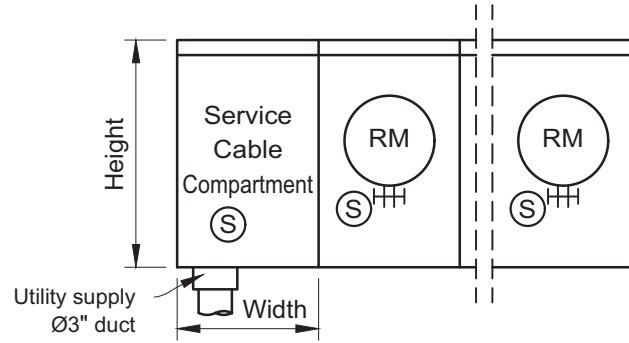


Figure 2 – 200 A and 400 A bus multiple main

- e. BC Hydro accepts both grounding options of meter socket and customer service ground in compliance with BCEC rule 10-210.
- f. Free-standing outdoor support structures for mounting customer service equipment shall be concrete, masonry, rock walls, or galvanized steel frame above grade, and shall meet the following requirements:
 - i. Support structure shall have an adequate concrete base to withstand a 1200 N-m overturning moment to prevent damage caused by vandalism; and
 - ii. BC Hydro service cables shall not be exposed to extraordinary stress caused by soil expansion and contraction due to seasonal weather changes.
 - iii. Support structures made of treated lumber and plywood are not acceptable to BC Hydro. BC Hydro will accept customer-owned poles.

Figures 3 and 4 show unacceptable and acceptable support structures.

- g. Figures 5 and 6 show examples of an acceptable 200 A combo meter socket and panel. These are not the only options available. The unmetered supply service conductors shall be inaccessible to unauthorized individuals and customers when the panel cover is removed. This can be achieved using a sealable covered raceway, interlocked barrier, or duct extension.



Figure 3 – Unacceptable support structure



Figure 4 – Acceptable support structure

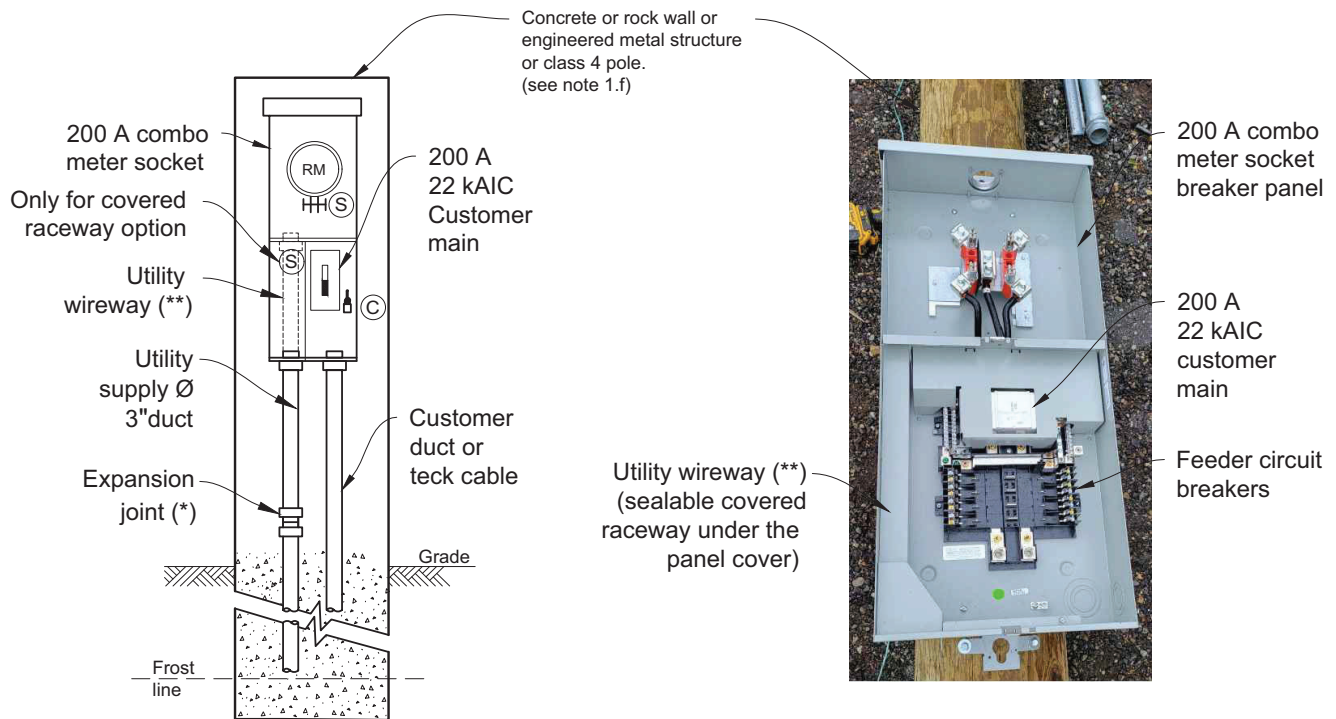


Figure 5 – 200 A hot-style combo meter socket with breaker panel

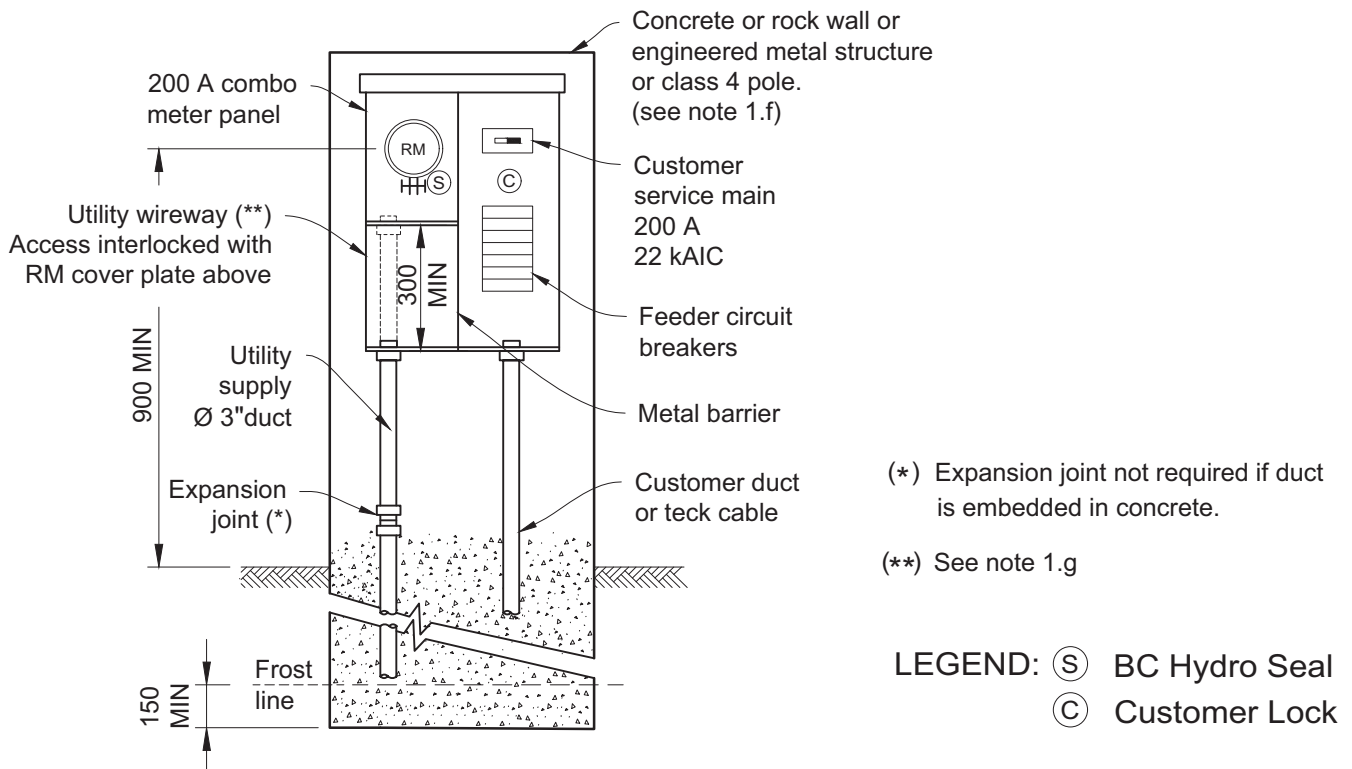


Figure 6 – 200 A combo meter panel feeder circuit breakers

2. Service in Duct

- a. Underground service duct should be installed outside the foundation walls and run on the surface of the exterior building walls as shown in Figure 7. Service duct may be installed within the foundation and building wall if encased in concrete. For further information on concrete encasement see note 3 *Concrete Encasement* in this standard.

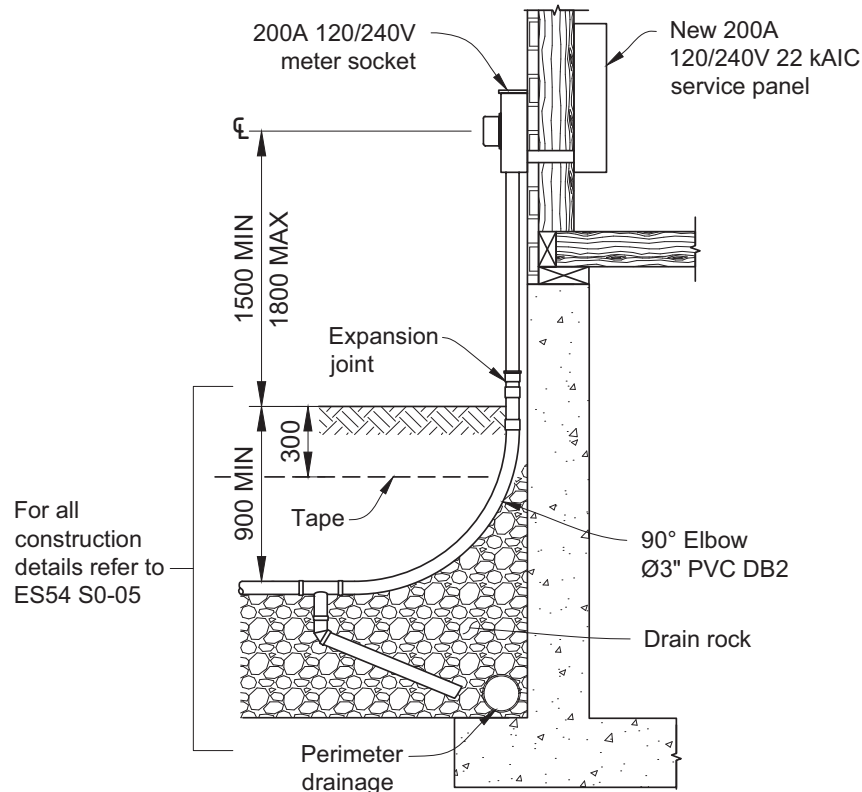


Figure 7 – Typical meter socket installed on wall surface

- b. BC Hydro accepts service ducts and meter sockets installed on a building's exterior wall finished surface as a stand-alone surface-mounted assembly. BC Hydro also accepts assemblies installed and enveloped inside a closet or cavity having an access door or removable cover. The closet or cavity shall be constructed on the building's exterior wall finished surface and be accessible from the outside. A 25 mm access cavity shall be provided around meter sockets mounted flush with the finished wall surface to allow BC Hydro crews to remove the meter socket cover. Figure 8 shows three acceptable installations.



Figure 8 – Acceptable meter sockets installed on wall surface

- c. The service duct trench shall be in a direct line-of-sight from the property line stub-off to the meter base or service duct entry into the building. The base of the trench shall be graded to the depth of the BC Hydro duct stub-off. For further information on service trench and duct installation see ES54 S0-05.
- d. The service location on the building shall be on the wall closest to the stub-off point or within 1 m back from that wall on either side.

3. Concrete Encasement

- a. Service ducts inside building walls shall be encased in concrete as a fire barrier. BC Hydro does not provide overcurrent protection for supply service cables. This requirement is consistent with BCEC Rule 6-208 for customer-owned service conductors.
- b. Figures 9 through 15 show service duct concrete encasement construction details.
- c. Concrete encasement is not required for service ducts and meter sockets installed on a building's exterior finished wall surface. See Figure 11.

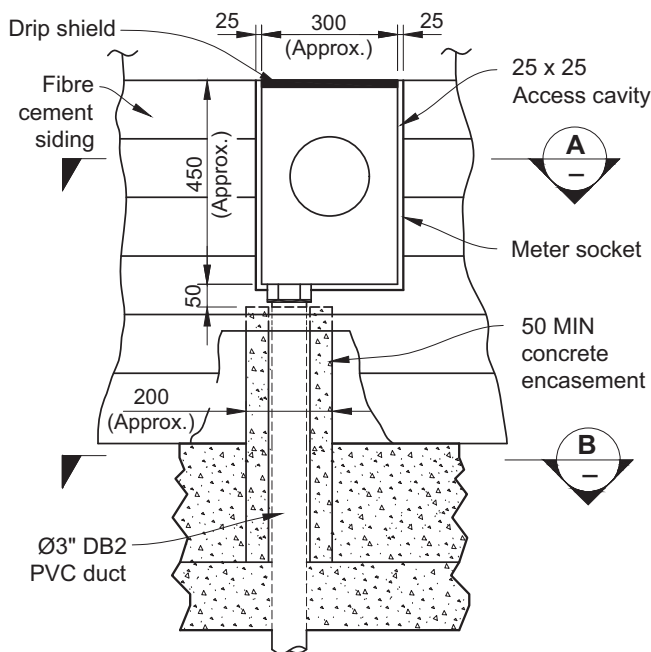


Figure 9 – Concrete encasement front elevation

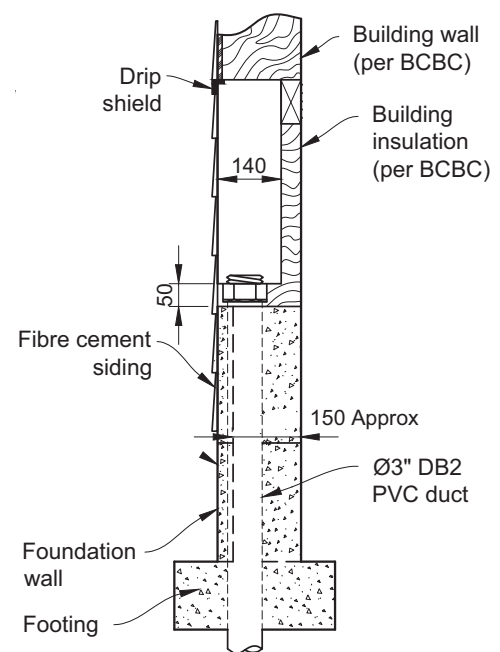


Figure 10 – Concrete encasement side elevation optional installation



Figure 11 – Concrete encasement not required

- d. For most installations, service duct installed within the building foundation and wall requires an exterior bump-out to accommodate 50 mm of concrete encasement as shown in Figure 12.

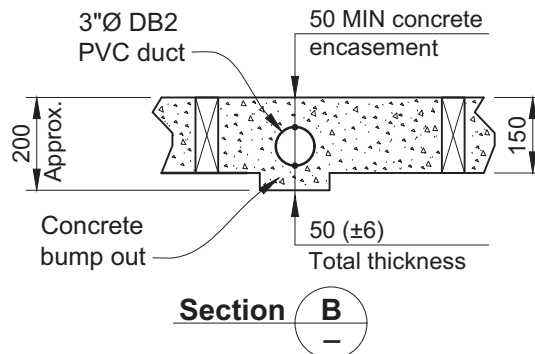


Figure 12 – Concrete encasement bump-out

- e. Concrete encasement shall be visible for inspection by the BC Hydro installer at the time of service connection. In-wall ducts without visible concrete encasement at the time of connection will be rejected. Figure 13 shows the inspection confirmation requirement.



Figure 13 – Concrete encasement bump-out inspection requirement

- f. Building contractors may install the rain screen cavity over the wall's exterior sheathing and apply fibre cement siding as an exterior finish surface to eliminate the appearance of the concrete bump-out as shown in Figure 14.

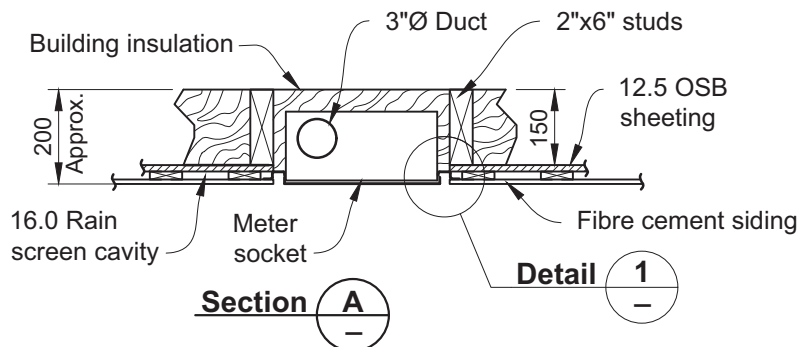


Figure 14 – Rain screen construction details

- g. A 25 mm access cavity shall be provided around meter sockets mounted flush with the finished wall surface to allow BC Hydro crew to remove the meter socket cover. Figure 15 shows access cavity construction details. Figure 16 shows an unacceptable flush-mounted meter socket without an access cavity around the meter socket.

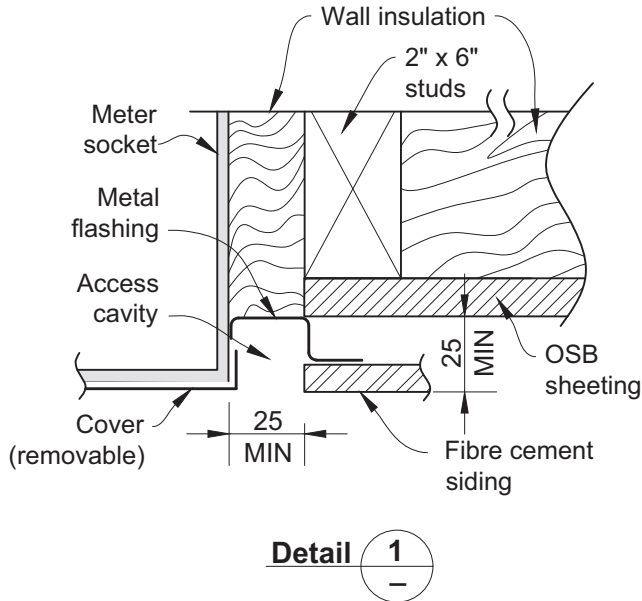


Figure 15 – Access cavity construction detail



Figure 16 – Unacceptable meter socket without access cavity

4. Meter Socket Requirements

- a. The underground service duct should enter on the left side of the meter socket to accommodate the bending radius of the incoming BC Hydro large service cables and to avoid crossing customer service conductors. See Figures 17 and 18 for typical wiring installations for 200 A 120/240 V meter socket services. A right-side service duct entry meter socket design may be accepted by the BC Hydro designer subject to accommodating the bending radius of BC Hydro service cables and avoiding crossing customer service conductors. See Figure 19 for unacceptable right-side connections.

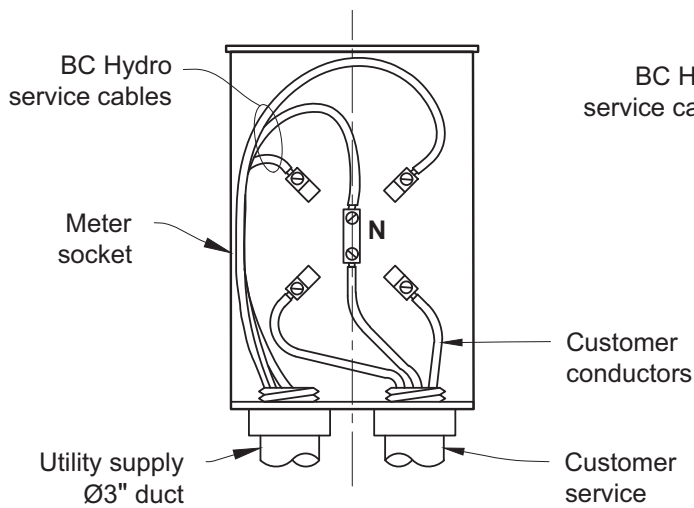


Figure 17 – 200 A meter socket hot style customer bottom exit

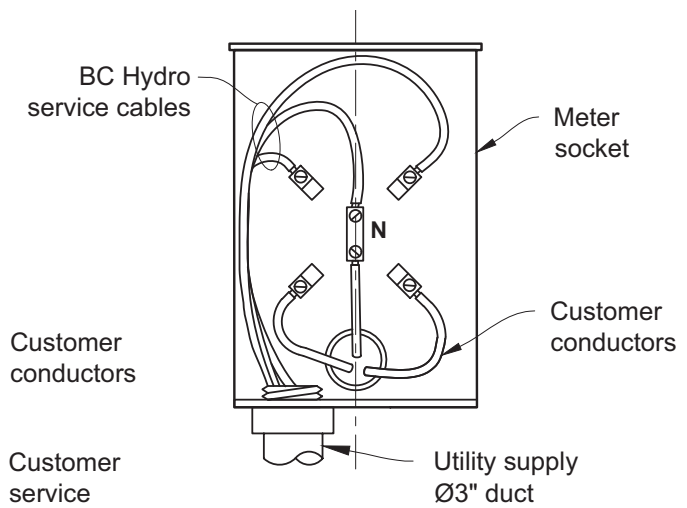


Figure 18 – 200 A meter socket hot style customer back exit

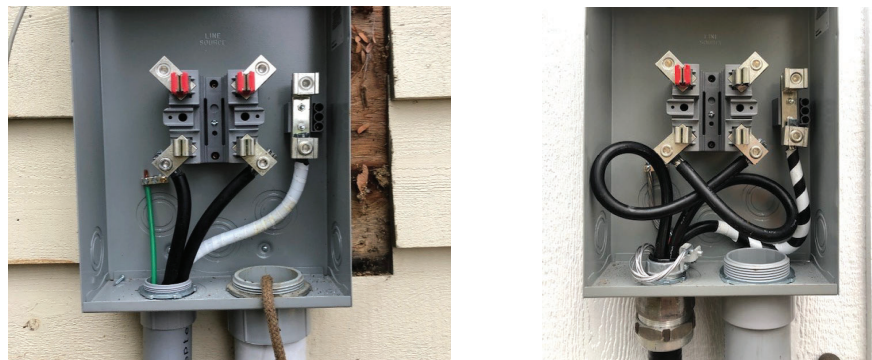


Figure 19 – Unacceptable right-side entry and customer wiring

- b. 200 A to 400 A multiple main meter sockets require a separate utility cable compartment as shown in Figure 20. An unacceptable duplex meter socket with no utility cable compartment is shown in Figure 21.

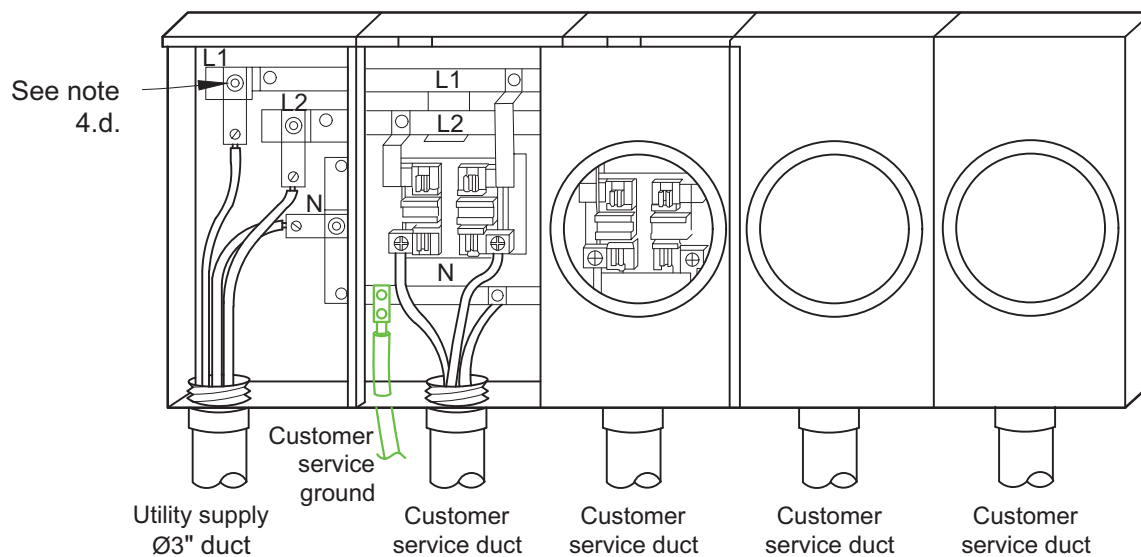


Figure 20 – Acceptable 200 A and 400 A bus multiple main meter socket

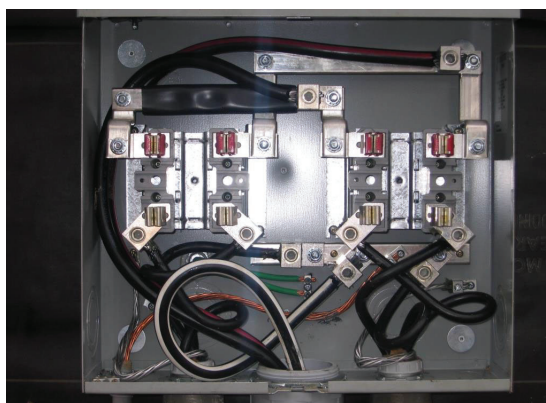


Figure 21 – Unacceptable duplex meter socket with no utility compartment

- c. Line-side lugs for single 200 A rated meter sockets shall be tunnel-type and accept the conductors listed in Table 1. All BC Hydro conductors have compact stranding.
- d. Line side lugs for 200 A and 400 A rated multiple main meter sockets shall be either tunnel-type supplied by the manufacturer or compression-type supplied and installed by BC Hydro. Meter socket buses with compression type lugs shall be equipped with ½" dia threaded studs complete with Belleville washers and hex nut for cables listed in Table 2.

5. Revenue Metering Requirements

A single 200 A meter socket or individual meters for multiple main meter sockets shall be certified in accordance with CSA C22.2 No. 115 and meet the following BC Hydro revenue metering requirements:

- a. Each meter socket enclosure dimensions shall not be smaller than the dimensions in Table 1.
- b. Each 200 A meter socket shall have a single cover plate secured to the meter socket enclosure with a pull bar having a latch tab located inside the revenue metering round cut-out with a drip flange. Split or multiple cover plates requiring a BC Hydro padlock are not acceptable to BC Hydro.
- c. After inserting, the revenue metering is fastened to the cover plate round cut-out using a seal ring, sealed for restricted access by BC Hydro only.
- d. Metered, unmetered, line, and load conductors shall not be installed inside the same raceway and shall not cross each other.
- e. Revenue meter socket cover plate removal does not require the use of tools in proximity of energized jaws to undo screws holding the revenue meter socket cover plate in place.
- f. BC Hydro no longer connects 120 V 100 A single-phase two-wire services. For such services, the customer shall supply and install a standard 120/240 V 200 A single-phase meter socket for BC Hydro to connect three-wire supply service cables and plug in a standard 200 A revenue meter. The customer could then connect 120 V 100 A single-phase two-wire service on the load side of the revenue meter.
- g. If an existing 120/240 V 200 A single or 200 A or 400 A multiple position meter socket has been submerged in water due to flooding in the affected area, the submerged meter socket shall be replaced with new meter sockets before BC Hydro can re-energize the service.
- h. For further BC Hydro revenue metering requirements of acceptable meter sockets see Secondary Metering guide.

6. Service Upgrade to 200 A

- a. If the customer wishes to upgrade an existing service to 200 A, meter socket service grounding and bonding may require upgrades to comply with applicable BCEC rules.
- b. If the existing service duct and meter socket are adequate to accept upgraded service conductors, BC Hydro will accept the existing installation. If the service duct or meter socket cannot accept the upgraded service conductors and need to be replaced, the new installation shall comply with current BC Hydro standards. Concrete encasement is not required when replacing only the meter socket.

7. Standby Generator

- a. Any standby generators shall be connected to a transfer switch on the load side of the customer service main. The transfer switch and standby generator are the jurisdiction of TSBC and shall be certified per applicable CSA standards. Verification of compliance to CSA standards and applicable BCEC rules rests with the local electrical authority having jurisdiction.
- b. BC Hydro will not accept custom-built mechanical or electrical interlock schemes as a means of service transfer between the customer service box and a customer standby generator. BC Hydro will only accept certified transfer switches specifically built for this function per applicable CSA 22.2 standards.

- c. BC Hydro will not accept third-party devices installed inside or mounted on the meter socket for connection of portable generators such as the collar shown in Figure 22. The meter socket is certified for the installation of a BC Hydro standard revenue meter only and is not certified for any other devices which would reduce life expectancy of the meter installation.
- d. BC Hydro crews are not accredited to install customer-owned third-party equipment. BC Hydro will not accept the liability of operation, maintenance, repair, and damages resulting from the failure of customer-owned third-party equipment.

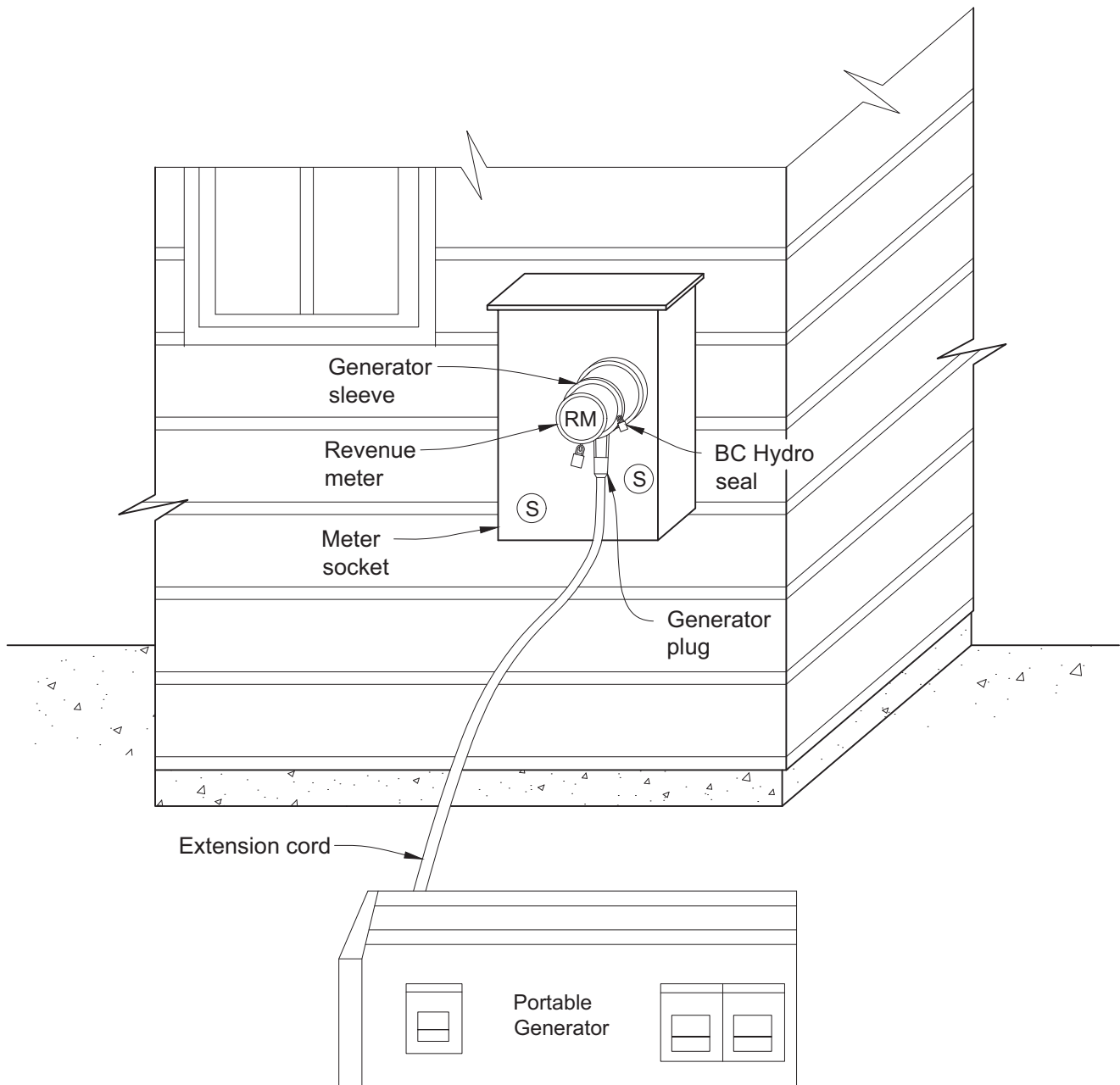


Figure 22 – Unacceptable meter socket collar for portable generators