

Requirements for Manually Read Primary Service Voltage Revenue Metering (4 kV to 35 kV)

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BC Hydro 

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1. Overview

This document contains the requirements for manually read BC Hydro distribution system primary service voltage class revenue metering. The meter records the power delivered by BC Hydro to the Customer/Power Generator and, if there is generation, the power received by BC Hydro from the Power Generator.

Responsibilities are dependent upon whether the installation is:

- **Load Only** - where the **Customer** only purchases power from BC Hydro (BCH); or
- **Generation** - where the **Power Generator** typically sells power to BC Hydro but may occasionally purchase power from BC Hydro.

Possible primary service voltages include:

BC Hydro Power System	BC Hydro Primary Service Voltage Class	Nominal Voltage	CSA Equipment Voltage Class
Distribution System	35 kV *	19,920/34,500Y V 3 Phase, 4 Wire	35 kV
	25 kV	14,400/24,940Y V 3 Phase, 4 Wire	27.5 kV
	12 kV	7,200/12,470Y V 3 Phase, 4 Wire	15 kV
	4 kV	2,400/4,160Y V 3 Phase, 4 wire	5 kV
	35 kV *	19,920 V 1 Phase, 2 Wire	35 kV
	25 kV	14,400 V 1 Phase, 2 Wire	27.5 kV
	12 kV	7,200 V 1 Phase, 2 Wire	15 kV
	4 kV	2,400 V 1 Phase, 2 Wire	5 kV

* Restricted to a limited number of rural circuits in the Central Interior.

Changes to this revision are indicated by vertical lines in the left margin.

Comments are written in italics.

2. Disclaimer

This document is not intended as a design specification or as an instruction manual for the Customer/Power Generator and this document shall not be used by the Customer/Power Generator for those purposes. Persons using information included in this document do so at no risk to BC Hydro, and they rely solely upon themselves to ensure that their use of all or any part of this document is appropriate in the particular circumstances.

The Customer/Power Generator, its employees or agents must recognize that they are, at all times, solely responsible for the plant design, construction and operation. Neither BC Hydro nor any of their employees or agents shall be nor become the agents of the Customer/Power Generator in any manner howsoever arising.

BC Hydro's review of the specifications and detailed plans shall not be construed as confirming or endorsing the design or as warranting the safety, durability or reliability of the Customer/Power Generator's facilities. BC Hydro, by reason of such review or lack of review, shall be responsible for neither the strength, adequacy of design or capacity of equipment built pursuant to such specifications, nor shall BC Hydro, or any of their employees or agents, be responsible for any injury to the public or workers resulting from the failure of the Customer/Power Generator facilities.

In general, the advice by BC Hydro, any of its employees or agents, that the Customer/Power Generator's plant design or equipment meets certain limited requirements of BC Hydro does not mean, expressly or by implication, that all or any of the requirements of the law or other good engineering practices have been met by the Customer/Power Generator in its plant, and such judgement shall not be construed by the Customer/Power Generator or others as an endorsement of the design or as a warranty, by BC Hydro, or any of its employees.

The information contained in this document is subject to change and may be revised at any time. BC Hydro should be consulted in case of doubt on the current applicability of any item.

3. General

3.1 Approval

The proposed revenue metering equipment locations shall be approved by BC Hydro prior to installation and prior to energization.

3.2 Location

Revenue metering equipment:

- (a) Shall be installed in a clean readily accessible location free from severe or continual vibration; and
- (b) Shall be installed in accordance with the latest edition of the Canadian Electrical Code; and
- (c) Shall not be installed in locations which may be hazardous to persons installing, testing or maintaining the equipment; and
- (d) Shall be protected from damage due to vandalism, vehicles etc.

In accordance with Section 2 of the Canadian Electrical Code, a minimum working space of 1 m shall be provided and maintained about revenue metering equipment.

3.3 Access

BC Hydro shall have reasonable access to the revenue metering equipment to permit its reading, testing and maintenance.

For an indoor meter cabinet:

- (a) Accessibility arrangements shall be agreed upon by BC Hydro prior to approval of the proposed location; and
- (b) Where practicable, rooms containing a meter cabinet shall be accessible by a door leading directly to the exterior of the building; and
- (c) Where the meter cabinet is not accessible due to locked doors or alarm systems, keys shall be provided to BC Hydro.

3.4 Illumination

When installed indoors, the meter cabinet shall be installed in a location with a minimum illumination of:

- 100 to 200 lux horizontal at 750 mm (2' 6") above grade; and
- 100 lux vertical at the front face of the meter cabinet.

Lighting, in rooms containing indoor metering equipment, shall be controlled by a wall switch at the room entrance.

4. Point-of-Metering

4.1 Load Only

Where practicable, for load only Customers, the point-of-metering (POM) shall be on the power transformer secondary side.

However, subject to BC Hydro's approval, the POM for primary service voltage Customers may be on the power transformer primary side under the following, or other, special circumstances:

- (a) Multiple power transformer installation; or
- (b) Customer owned primary voltage powerline; or
- (c) Non-standard power transformer secondary voltage.

Where the POM is on the power transformer primary side, the revenue metering shall be in accordance with the requirements of this document.

Where the POM is on the power transformer secondary side, the revenue metering shall be in accordance with the separate BC Hydro "*Requirements for Secondary Metering Installations (750 V and Less)*" document.

The BC Hydro 12XX tariffs include an allowance for power transformer losses.

4.2 Generation

For Generation applications, the point-of-metering (POM) shall be determined for the specific situation.

Where the POM is on the power transformer primary side, the revenue metering shall be in accordance with the requirements of this document.

Where the POM is on the power transformer secondary side, the revenue metering shall be in accordance with the separate BC Hydro "*Requirements for Secondary Metering Installations (750 V and Less)*" document.

5. Voltage Transformers and Current Transformers

5.1 General Requirements

For 3 phase 4 wire interconnections, 3 voltage transformers (VTs) and 3 current transformers (CTs) shall be installed at the POM in accordance with the general requirements of this section and the specific requirements of the appropriate subsequent section.

For 1 phase 2 wire interconnections, 1 voltage transformer and 1 current transformer shall be installed at the POM in accordance with the general requirements of this section and the specific requirements of the appropriate subsequent section.

Since the revenue metering is insensitive to phase rotation direction, the references to Phase A, B and C are totally arbitrary and do not necessarily comply with other designations in the Customer/Power Generators facility. If not explicitly identified, the convention of Phase A, B and C from left-to-right or from top-to-bottom is assumed.

5.1.1 Primary Winding

The VT H1 polarity primary windings shall be connected to the phases on the BC Hydro side of the CTs. The VT H2 primary windings shall be connected to the BC Hydro system neutral. The CT H1 polarity marks shall be towards BC Hydro.

The VT or CT shall not be used to support the primary winding connections or bus. The primary winding connections shall:

- (a) Not subject the VT and CT bushings to strain; and
- (b) Facilitate the easy replacement of the VT and CT.

5.1.2 VT and CT Specification

As per the Responsibilities section of this document, for Generation applications, if the Power Generator is responsible for supplying the VTs and CTs, they shall be in accordance with the requirements of this section.

This section is not applicable to Load Only applications since BC Hydro (not the Customer) is responsible for supplying the VTs and CTs.

5.1.2.1 Measurement Canada Approval

As per the “Electricity and Gas Inspection Act and Regulations”, the VTs and CTs shall be approved by Measurement Canada in accordance with CSA Standard CAN3-C13-M83. The Measurement Canada approval number shall be permanently marked on the nameplate.

Measurement Canada maintains an online database of approved VTs and CTs at:
http://strategis.ic.gc.ca/cgi-bin/sc_mrksv/meascan31b/noa.cgi/noasrche.w

5.1.2.2 VT Requirements

The VTs shall have:

- A 0.3% accuracy class; and
- A burden adequate for the connected load; and
- A 115 V or 120 V secondary winding.

A 0.3WXY or 0.3WXYZ VT accuracy and burden is typical.

5.1.2.3 CT Requirements

The CTs shall have:

- A 0.3% accuracy class; and
- A burden adequate for the connected load; and
- A 5 A secondary winding.

A 0.3B0.9 or 0.3B1.8 CT accuracy and burden is typical.

5.1.2.4 BC Hydro Approval

The Power Generator shall submit the details of the proposed VTs and CTs, and the Measurement Canada approval numbers, to BC Hydro for approval.

5.1.3 Lightning Arrestors

Where exposed to lightning, the VTs and CTs shall be located within a lightning arrestors zone of protection.

5.2 Individual Outdoor VTs and CTs

Where individual VTs and CTs are installed on an outdoor support structure, they shall be installed in accordance with the requirements of this section.

5.2.1 Meter Cabinet at the Support Structure

Where the meter cabinet is located at the base of the support structure, armoured cables shall connect the individual VTs and CTs directly to the meter cabinet. These armoured cables shall not be installed underground.

5.2.2 Meter Cabinet not at the Support Structure

Where the meter cabinet is not located at the base of the support structure, armoured cables shall connect the individual VTs and CTs directly to a junction box located at the base of the support structure. These armoured cables shall not be installed underground.

An armoured cable shall connect the junction box to the meter cabinet. This armoured cable may be installed underground.

5.3 Outdoor Metering Kits

A metering kit consists of one or three VTs and one or three CTs mounted on a common support rack.

Where a pole top outdoor metering kit is installed, it shall be installed in accordance with the requirements of this section.

5.3.1 Meter Cabinet at the Base of the Pole

Where the meter cabinet is located at the base of the pole, an armoured cable shall connect the metering kit secondary winding terminal box directly to the meter cabinet. This armoured cable shall not be installed underground.

5.3.2 Meter Cabinet not at the Base of the Pole

Where the meter cabinet is not located at the base of the pole, an armoured cable shall connect the metering kit secondary winding terminal box to a junction box located at the base of the pole. This armoured cable shall not be installed underground.

A second armoured cable shall connect the junction box to the meter cabinet. The second armoured cable may be installed underground.

5.3.3 Typical Installation Drawing

See the separate drawing ES43 J7-01.01 in the *“BC Hydro Distribution Standards Overhead Electrical ES43 series”* document. A load only Customer with the meter cabinet at the base of the pole is illustrated. For generation applications:

- Change the designation of the “Source” side of the metering kit to “To BC Hydro”; and
- Change the designation of the “Load” side of the metering kit to “To Customer/Power Generator”.

5.4 Individual Indoor VTs and CTs

Where individual indoor VTs and CTs are installed in switchgear, they shall be installed in accordance with the requirements of this section.

5.4.1 Instrument Transformer Compartment

The VTs and CTs shall be installed in a switchgear instrument transformer compartment. The instrument transformer compartment shall:

- (a) Be barriered off from other compartments; and
- (b) Not be used as a splitter; and
- (c) Not contain devices other than the BC Hydro revenue metering equipment;
- (d) Not require access through other compartments; and
- (e) Be permanently labelled as “BC Hydro Metering”.

It is acceptable to provide openings, of sufficient size to maintain the required phase bus clearances, through the sides of the instrument transformer compartment, i.e. there is no requirement to completely barrier these openings with insulating material up to and/or contacting the phase buses.

Where it is necessary to route the VT and CT secondary winding wiring through other switchgear compartments, the VT and CT secondary winding wiring shall be installed in a continuous conduit, without access fittings, within the switchgear.

5.4.2 Instrument Transformer Compartment Doors

When (viewed through the open front instrument transformer compartment door) the phase buses are “side-by-side” and all VT and CT primary winding and secondary winding connections are readily accessible, only a front hinged instrument transformer compartment door is required. See drawing TM-A-1144.

However, when (viewed through an open instrument transformer compartment door) the phase buses are “one-behind-the-other”, both a front and a rear hinged instrument transformer compartment door shall be provided. See drawing TM-A-1145.

No means of access, other than through the hinged instrument transformer compartment door(s) shall be provided. Each door shall have provision for locking with an 8 mm (5/16”) shank padlock.

5.4.3 Interlocks

All instrument transformer compartment doors shall be key interlocked.

The provision in CSA Standard C22.2 No. 31 8.4.1.7 permitting locking in lieu of an interlock is not acceptable.

Where there is both a front and a rear door, providing a latching mechanism, that can only be released from within the switchgear instrument transformer compartment, in lieu of a second key interlock, is not acceptable. Key interlocks are required on both doors.

5.4.3.1 Load Only Applications

For **load only** applications, **where there is not a likely potential for power backfeed**, all instrument transformer compartment doors shall be key interlocked with a BC Hydro (line) side disconnect device. The key interlock shall prevent opening the instrument transformer compartment door(s) unless the disconnect device is visibly open.

For **load only** applications, **where there is a likely potential for power backfeed**, all instrument transformer compartment doors shall be key interlocked with a BC Hydro side (line) disconnect device and a Customer (load) side disconnect device(s). The key interlocks shall prevent opening instrument transformer compartment door(s) unless all disconnect devices are visibly open.

Examples of the potential for power backfeed include:

- *Where, by special permission from BC Hydro, there are multiple POMs on the Customer side of multiple power transformers and the power transformer secondary windings may be paralleled; or*
- *Where the Customer has power generation that may be synchronized with BC Hydro.*

However, where the Customer has generation connected via a BC Hydro approved transfer switch, no potential for power backfeed is deemed to exist and only a BC Hydro (line) side disconnect is required.

5.4.3.2 Generation Applications

For **generation** applications, all instrument transformer compartment doors shall be key interlocked with a BC Hydro side disconnect device and a Power Generator side disconnect device(s). The key interlocks shall prevent opening instrument transformer compartment door(s) unless all disconnect devices are visibly open.

5.4.3.3 Commissioning

Prior to energization, the Customer/Power Generator shall:

- Completely install and test the key interlock system; and
- Remove and secure any spare keys; and
- Demonstrate the complete operation of the key interlock system to the BC Hydro field meter technician.

Problems arise more frequently when the Customer/Power Generator obtains the key interlock system from one vendor and is required to mount components on equipment supplied by another vendor. All of this work must be complete and functional.

5.4.4 Neutral Bus

The neutral bus, or a neutral bus tap extension, shall be extended to the instrument transformer compartment. It shall be rigid bus not less than 25 mm x 6 mm (1" x 1/4"). Except where it connects to the ground bus, it shall be supported on insulators.

5.4.5 Ground Bus

The switchgear ground bus shall:

- (a) Be extended to the instrument transformer compartment; and
- (b) Have provision for terminating the BC Hydro installed meter cabinet conduit bonding conductor with either:
 - A 10-32 screw and washer; or
 - A mechanical connector suitable for a #12 to #8 AWG conductor.

5.4.6 Working Ground Points

In compliance with the Worker Compensation Board of British Columbia Occupational Health and Safety Regulations, working ground points, complete with a permanently mounted 25 mm (1") diameter ball type ground stud Hubbell Chance C600-2102 (or equivalent), shall be provided at the following locations within the instrument transformer compartment:

- On each side of the phase A CT; and
- On each side of the phase B CT; and
- On each side of the phase C CT; and
- On the ground bus,
i.e. a total of 7 ground studs.

Each ground stud shall be positioned for unobstructed application of a ground clamp using a hot stick.

The ground bus ground stud shall be located immediately behind the instrument transformer compartment door.

Where there is both a front and a rear instrument compartment door, a single ground bus ground stud may be located immediately behind either door.

5.4.7 VTs and CTs

5.4.7.1 Installation

The VTs and CTs should preferably be installed, and the primary winding connections made, at the switchgear manufacturer's factory. Alternatively, this work may be done by the Customer/Power Generator in the field. Regardless of where the work is done, the Customer/Power Generator shall be solely responsible for insuring that the installation is in accordance with the switchgear manufacturer's and the inspection authorities requirements.

5.4.7.2 Electrical Clearances

Minimum electrical clearances shall be in accordance with the published switchgear manufacturer's requirements.

While the following clearances are typical:

- 150 mm (6") for 12 kV class Phase-to-Phase; and
- 125 mm (5") for 12 kV class Phase-to-Ground; and
- 230 mm (9") for 25 kV class Phase-to-Phase and Phase-to-Ground;

it is essential that the specific switchgear manufacturer's requirements be maintained since the switchgear certification and electrical performance is based on maintaining the published clearances.

Clearances between the VT or CT body and adjacent VT or CT bodies and ground shall be maintained. Contact BC Hydro for specific VT/CT body clearance requirements.

5.4.7.3 Accessibility

The VT and CT primary winding terminals and secondary winding terminals shall remain accessible and the nameplates shall remain visible. The installation shall facilitate the easy replacement of the VTs, VT fuses and CTs.

When the phase buses are "one-behind-the-other", the VT secondary winding terminals typically face the side of the instrument transformer compartment. 300 mm (12") clearance should be maintained between the side of the instrument transformer compartment and the VT secondary winding terminals.

5.4.7.4 VT Installation and Connections

The VT primary winding fuses shall be in the horizontal position.

The VT H1 primary winding conductors:

- (a) Shall be sized and supported in accordance with the switchgear manufacturer's requirements with regard to clearances, fault current bracing, partial discharge etc.; and
- (b) Shall be permanently connected. *Drawout or automatic self-disconnecting VT primary winding connections are not acceptable.* and;
- (c) For 12 kV class and lower voltages, shall be not less than a #6 AWG conductor; and
- (d) For 25 kV class voltages, shall be a 1" x 1/4" rigid bus. See drawing TM-A-1146. *The fuse holder(s) for 25 kV class VTs is typically cantilevered from the primary winding VT terminal(s). The 1" x 1/4" rigid bus is required to provide support and stability to the fuse holder and to prevent its rotation.*

Each VT H2 primary winding terminal shall be connected to the neutral bus with a separate minimum #8 AWG white insulation conductor, *i.e. daisy chaining is not acceptable.*

5.4.7.5 CT Installation and Connections

The CT H1 primary polarity marks shall be towards BC Hydro. Except that, if this orientation prevents access to the secondary winding terminals, the primary winding polarity marks may be towards the Customer/Power Generator. BC Hydro shall be advised if this exception occurs. *In this instance, to correct the CT primary winding polarity reversal, BC Hydro also reverses the secondary winding polarity.*

5.4.7.6 Mounting and Grounding

The VTs and CTs shall be bolted to grounded metal panels using all of the supplied mounting holes. Paint or other protective coatings shall be removed to ensure a low impedance ground connection. Lockwashers shall be installed.

If the VTs or CTs **have** an external ground connector, it shall be connected to the ground bus with a minimum #8 AWG bare or green insulation conductor.

*If the VTs or CTs **do not have** an external ground connector, the mounting bolts and lockwashers are considered to provide adequate bonding.*

5.4.7.7 Typical Installation Drawing

See drawing TM-A-1142.

6. Meter Cabinet

6.1 Location

The meter cabinet shall be installed in a readily accessible indoor or outdoor location acceptable to BC Hydro.

6.2 Indoor Installations

The, BC Hydro stock number 372-9206 drawing G-D08-A158 Page 1, meter cabinet shall be wall mounted. The top of the meter cabinet shall be 1,500 mm (5') to 1,800 mm (6') above finished grade. Where practicable, position the door hinge on the left. *With the hinge on the right, the door lettering will be upside down.*

The meter cabinet shall be removable. The mounting method shall permit self tapping screws, used to mount devices within the cabinet, to project through the rear cabinet wall. The use of mounting hardware that is "shot" on concrete is not acceptable. The cabinet shall be mounted using all four 9.5 mm (3/8") holes on either:

- (a) 3/4" plywood backing; or
- (b) Steel support channel.

The conduit shall enter the cabinet via the bottom or lower side knockouts.

6.3 Outdoor Installations

The appropriate meter cabinet shall be installed:

Mounting	BC Hydro Stock Number	Drawing Number
Wall	372-9207	G-D08-A159 Page 1
Pole	372-9204	G-D08-A156

The top of the meter cabinet shall be 1,500 mm (5') to 1,800 mm (6') above finished grade. The meter cabinet shall be positioned with the door hinge on the left.

The meter cabinet shall be removable. The conduit shall enter the cabinet via the bottom knockouts.

6.3.1 Wall Mounting

The mounting method shall permit self tapping screws, used to mount devices within the cabinet, to project through the rear cabinet wall. The use of mounting hardware that is "shot" on concrete is not acceptable. The meter cabinet shall be mounted using all four 9.5 mm (3/8") holes.

6.3.2 Pole Mounting

The meter cabinet shall be secured to the pole using the two holes on the U shaped angle bracket.

6.4 Grounding

In accordance with Section 36 of the *Canadian Electrical Code*, an external meter cabinet ground conductor, not less than #2/0 AWG copper, shall be installed to bond the meter cabinet to the station ground grid electrode.

A #2/0 AWG copper conductor is required since, due to skin effect, its large surface area provides a low impedance path for high frequency electrical noise.

7. VT and CT Secondary Winding Wiring

7.1 General

No other devices shall be connected to the VT and CT secondary windings used by the BC Hydro revenue metering equipment.

As per the Responsibilities and Charges section of this document, BC Hydro is responsible for all VT and CT secondary winding conductor terminations. BC Hydro will wire directly to the VT and CT secondary winding terminals with the Measurement Canada approved multi-colour insulation conductors.

7.2 Cables

7.2.1 Typical Configurations

Typical cable configurations are:

From	To	Typical Cable
Individual Outdoor VTs and CTs	Junction Box or Meter Cabinet	Armoured cable strapped to VT/CT support structure
Outdoor Metering Kit	Junction Box or Meter Cabinet	Armoured cable strapped to pole
Junction Box	Meter Cabinet	Armoured cable in underground PVC conduit or above ground cable tray
Individual Indoor VTs and CTs located in the Switchgear Instrument Transformer Compartment	Meter Cabinet	Individual conductors in conduit

7.2.2 Armoured Cable Requirements

Where applicable and practicable, armoured cable between individual outdoor VTs and CTs and the junction box or meter cabinet should preferably not be installed underground.

Where applicable, armoured cable between the outdoor metering kit and the junction box or meter cabinet shall not be installed underground.

Where applicable, armoured cable from the junction box to the meter cabinet may be installed underground. Underground armoured cable shall be installed in a 3" rigid PVC conduit. It shall not be installed in rigid metal conduit or be directly buried.

The VT secondary winding circuits in the armoured cable from the individual outdoor VTs and CTs do not have overcurrent protection. To reduce the chance of a fault, these armoured cables may not be installed underground. A possible exception is made where individual outdoor VTs and CTs are installed on separate outdoor pedestals and it is impractical to provide cable support between them and the junction box or meter cabinet.

When a junction box is used, it contains a circuit breaker to protect the VT secondary winding circuits in the armoured cable between the junction box and the meter cabinet.

Water in conduits can cause crushing and expansion of conductor insulation due to repeated freezing and thawing cycles. It has been BC Hydro's experience that, since it does not expand as much as PVC conduit, rigid metal conduit installations may result in conductor insulation damage.

7.2.3 Individual Conductors in Conduit Requirements

Where applicable, a conduit shall be installed between the switchgear instrument transformer compartment and the meter cabinet.

The conduit shall be either rigid metal, EMT or rigid PVC. The conduit shall have not more than the equivalent of three 90° bends and shall not exceed 25 m in length. The conduit minimum trade size shall be:

- 1 ¼" (35) trade size for lengths up to 10 m; or
- 1 ½" (41) trade size for lengths from 10 m to 25 m.

The conduit shall be continuous and without access fittings. Except that, a "LB style" fitting may be installed immediately adjacent to the meter cabinet provided the cover remains clearly visible and has provision for the installation of a cover seal.

The conduit shall remain visible for its entire length except where it is embedded in a concrete floor or, subject to approval by BC Hydro, where it passes through a wall.

Where it is necessary to route the VT and CT secondary winding wiring through other switchgear compartments, the VT and CT secondary winding wiring shall be installed in a continuous conduit, without access fittings, within the switchgear.

A pull string shall be left in the conduit.

8. Measurement Canada

This section is applicable to Power Generators only.

As the seller of electricity, the Power Generator, is required by Measurement Canada to hold a Certificate of Registration and to be in compliance with the “*Electricity and Gas Inspection Act and Regulations*”. Power Generators shall submit a copy of their Certificate of Registration and/or the approval number to BC Hydro.

Power Generators may find additional information and forms at:

http://strategis.ic.gc.ca/epic/internet/inmc-mc.nsf/vwGeneratedInterE/h_1m02128e.html

These requirements apply for all generation applications even though BC Hydro supplies the meter(s).

The “Electricity and Gas Inspection Act and Regulations” uses the term “Contractor” to refer to the Power Generator.

9. Responsibilities and Charges

The revenue metering responsibilities and charges shall be in accordance with the specific Customer or Power Generator contractual documents. *However, the following sections indicate the typical Customer or Power Generator responsibilities and charges.*

9.1 Responsibilities

The following table defines specific responsibilities.

- BCH BC Hydro
- Cust Customer
- PG Power Generator

Item		For Load Only Applications By	For Generation Applications By
For Individual Outdoor VT and CT Applications Only			
VTs and CTs	Material	BCH	BCH or PG
	Support Structure	Cust	PG
	Installation	Cust	PG
	Primary Winding Conductor Terminations	Cust	PG
	Secondary Winding Conductor Terminations	BCH	BCH
Junction Box (where applicable)	Material	BCH	BCH
	Installation	Cust	PG
	Conductor Terminations	BCH	BCH
Cable and Connectors between: VTs and Junction Box CTs and Junction Box Junction Box and Meter Cabinet	Material	BCH	BCH
	Installation	Cust	PG
	Conductor Terminations	BCH	BCH

Item	For Load Only Applications By	For Generation Applications By	
For Outdoor Metering Kit Applications Only			
Metering Kit complete with VTs and CTs	Material	BCH	BCH
	Pole	Cust	PG
	Installation	Cust	PG
	Lightning Arrestors Material	BCH	BCH
	Lightning Arrestors Installation	Cust	PG
	Primary Winding Conductor Terminations	Cust	PG
	Secondary Winding Conductor Terminations	BCH	BCH
Junction Box at Base of Pole (where applicable)	Material	BCH	BCH
	Installation	Cust	PG
	Conductor Terminations	BCH	BCH
Cable and Connectors between the Metering Kit, Junction Box (where applicable) and Meter Cabinet	Material	BCH	BCH
	Installation	Cust	PG
	Conductor Terminations	BCH	BCH
For Individual Indoor VT and CT Applications Only			
VTs and CTs	Material	BCH	BCH or PG
	Switchgear Instrument Transformer Compartment	Cust	PG
	Installation	Cust	PG
	Primary Winding Conductor Terminations	Cust	PG
	Secondary Winding Conductor Terminations	BCH	BCH
Cable Between VTs, CTs and Meter Cabinet	Conduit Material and Installation	Cust	PG
	Cable Material	BCH	BCH
	Cable Installation	BCH	BCH
	Conductor Terminations	BCH	BCH

Item		For Load Only Applications By	For Generation Applications By
For All Applications			
Measurement Canada Certificate of Registration	Documentation	BCH	PG
Meter	Material & Installation	BCH	BCH
Meter Cabinet	Material	BCH	BCH
	Installation	Cust	PG
	Connections	BCH	BCH
Meter Cabinet Ground	Material & Installation	Cust	PG

9.2 Charges

9.2.1 Customer Charges for Load Only Applications

For a single POM, the Customer is typically not charged for the revenue metering material and labour provided by BC Hydro. However, if the Customer requests a single POM, different from the most cost effective POM determined by BC Hydro, the Customer is typically charged for the incremental cost of their requested POM.

If the Customer requests multiple POMs, the Customer is typically charged for the incremental cost associated with the additional POM.

9.2.2 Power Generator Charges for Generation Applications

The Power Generator shall lease the meter from BC Hydro. Under the terms of the lease, Hydro is responsible for the supply, programming, testing, verifying, sealing, maintaining, re-verifying, repairing and/or replacing the revenue meter in accordance with the "Electricity and Gas Inspection Act and Regulations" as administered by Measurement Canada.

The Power Generator is typically charged for all other revenue metering material and labour provided by BC Hydro.

10. Drawings

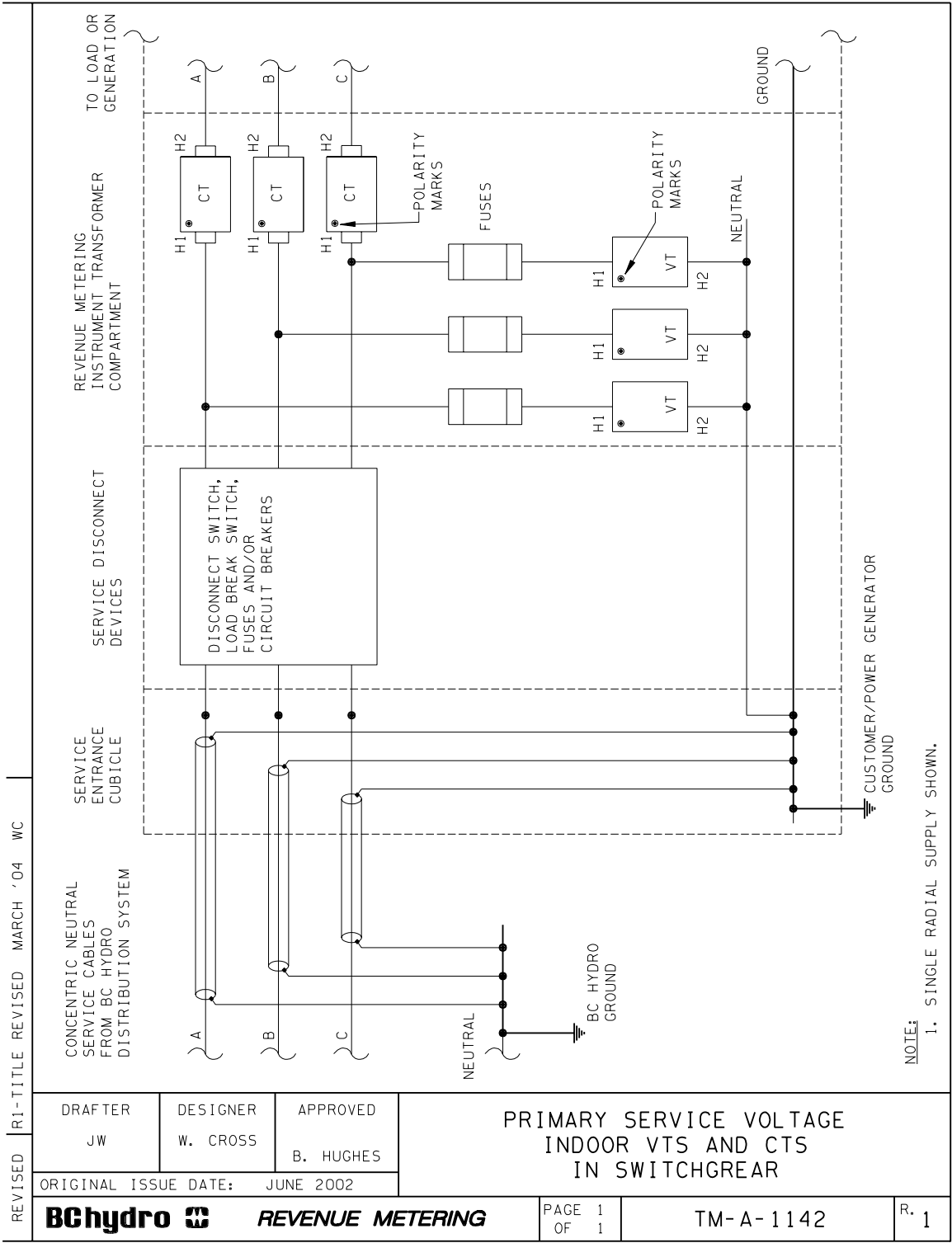
Individual Indoor VTs and CTs

TM-A-1142	Primary Service Voltage Indoor VTs and CTs in Switchgear
TM-A-1144	Switchgear Instrument Transformer Compartment "Side-by-Side" Phase Buses
TM-A-1145	Switchgear Instrument Transformer Compartment "One-Behind-the-Other" Phase Buses
TM-A-1146	Switchgear Instrument Transformer Compartment 25 kV Class VT Primary Winding Connections

Meter Cabinet

G-D08-A158 Page 1	Large Indoor Meter Cabinet
G-D08-A159 Page 1	Large Outdoor Meter Cabinet
G-D08-A156	Small Pole Mount Meter Cabinet

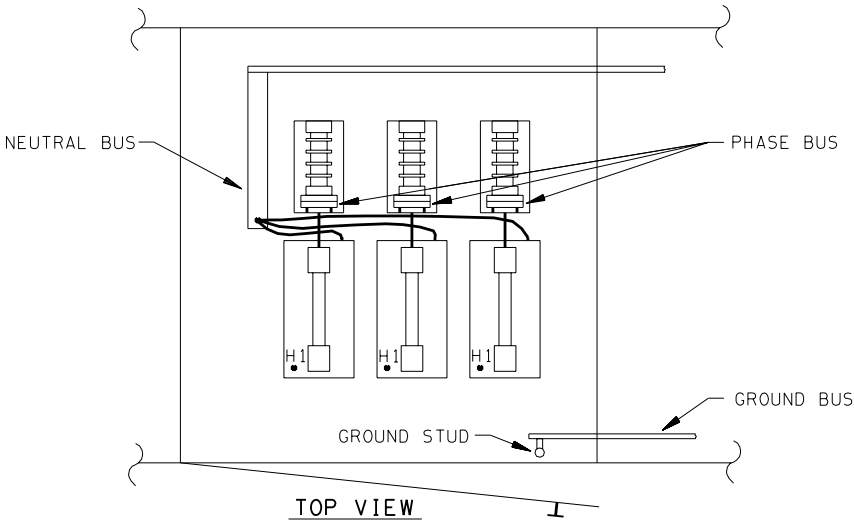
TM-A-1142



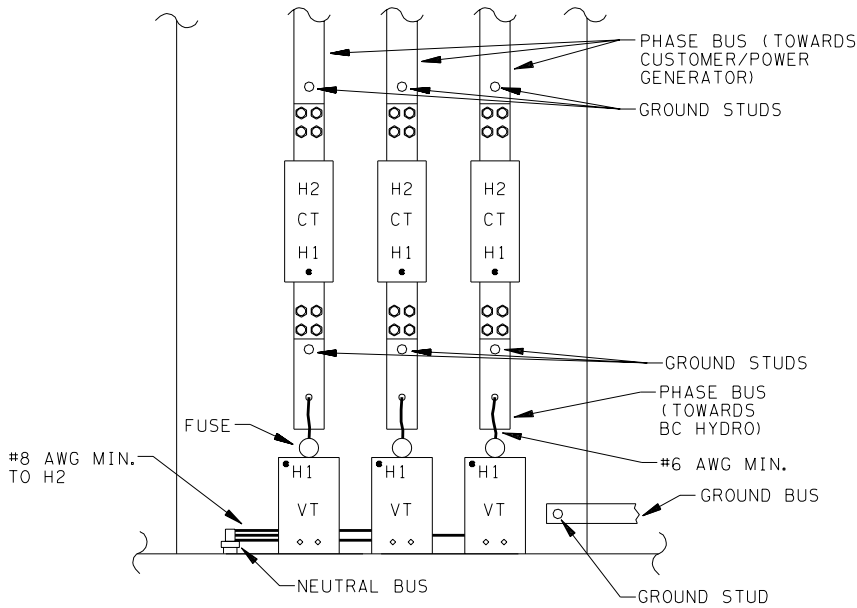
NOTE:
1. SINGLE RADIAL SUPPLY SHOWN.

REVISED R1 - TITLE REVISED MARCH '04 WC	DRAFTER JW	DESIGNER W. CROSS	APPROVED B. HUGHES	PRIMARY SERVICE VOLTAGE INDOOR VTS AND CTS IN SWITCHGEAR
	ORIGINAL ISSUE DATE: JUNE 2002			
		REVENUE METERING		PAGE 1 OF 1
				TM-A-1142
				R. 1

TM-A-1144



TOP VIEW

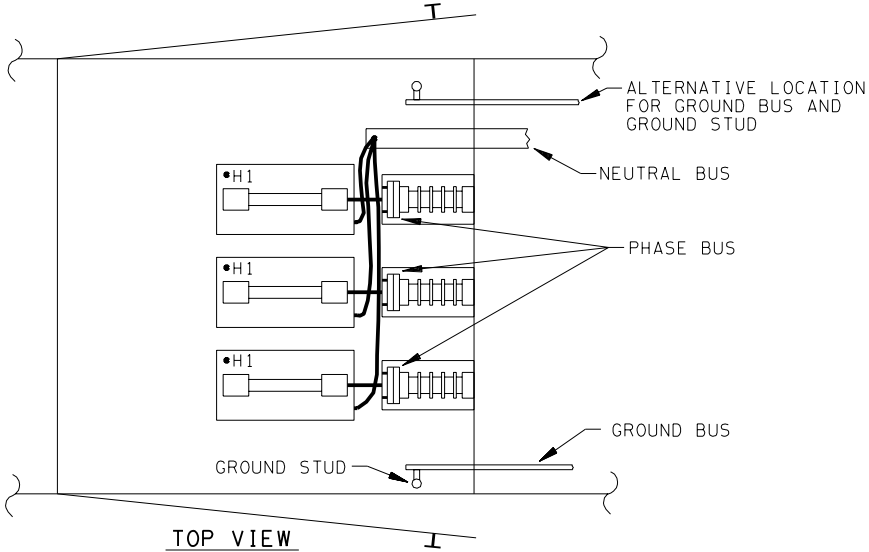


FRONT VIEW

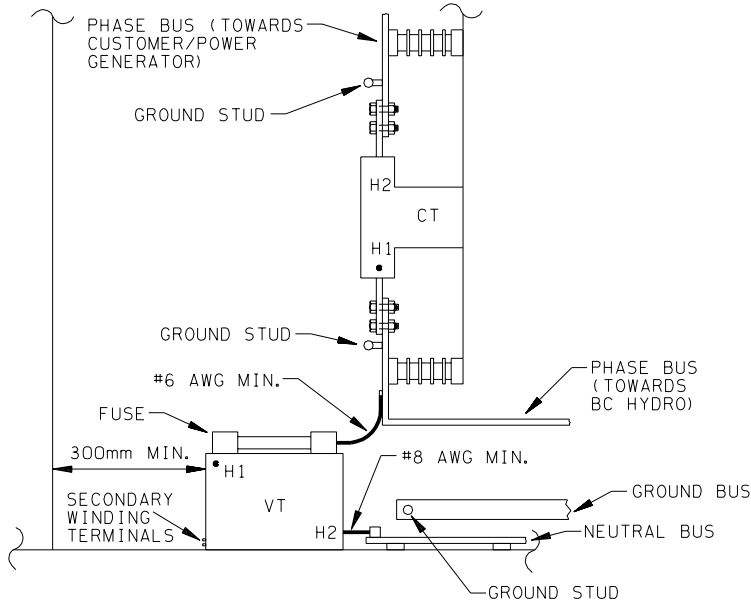
- NOTES:**
1. 12 kV CLASS 4 WIRE 3 ELEMENT ILLUSTRATED.
 2. ONLY A FRONT DOOR IS REQUIRED.

REVISED	DRAFTER JW	DESIGNER W. CROSS	APPROVED B. HUGHES	SWITCHGEAR INSTRUMENT TRANSFORMER COMPARTMENT "SIDE-BY-SIDE" PHASE BUSES
	ORIGINAL ISSUE DATE: APRIL 2004			
	BChydro REVENUE METERING			
	PAGE OF	1 1	TM-A-1144	R. O

TM-A-1145



TOP VIEW

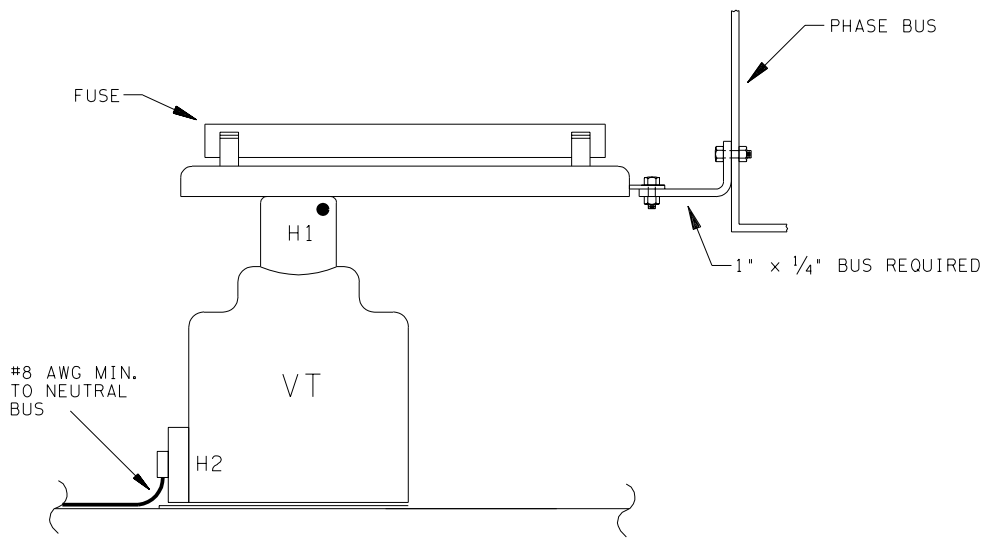


FRONT VIEW

- NOTES:**
1. 12 kV CLASS 4 WIRE 3 ELEMENT ILLUSTRATED.
 2. BOTH A FRONT AND A REAR DOOR ARE REQUIRED.

REVISED	DRAFTER JW	DESIGNER W. CROSS	APPROVED B. HUGHES	SWITCHGEAR INSTRUMENT TRANSFORMER COMPARTMENT "ONE-BEHIND-THE-OTHER" PHASE BUSES	
	ORIGINAL ISSUE DATE: MARCH 2004				
	BChydro		REVENUE METERING	PAGE 1 OF 1	TM-A-1145

TM-A-1146



NOTE:

- 1. THE 1 X 1/4" BUS IS REQUIRED TO PROVIDE SUPPORT AND STABILITY TO THE FUSE HOLDER AND TO PREVENT ITS ROTATION.

REVISED	DRAFTER JW	DESIGNER W. CROSS	APPROVED B. HUGHES	INDOOR 25 kV VT PRIMARY WINDING CONNECTION	
	ORIGINAL ISSUE DATE: APRIL 2004				
	BChydro		REVENUE METERING		PAGE 1 OF 1

G-D08-A158 Page 1

R. 4- GROUNDING NOTE CHANGE. FEB. '01 SC

R. 5- HINGE DIM. REV. SEPT. '01 SC

R. 6- SIDE DIMENSION CHANGE. NOV. '03 PR

R. 7- TITLE REVISED. APRIL '04 WC

FRONT VIEW
WITH DOOR REMOVED

SECTION A-A

SIDE VIEW

DRAW PULL CATCH

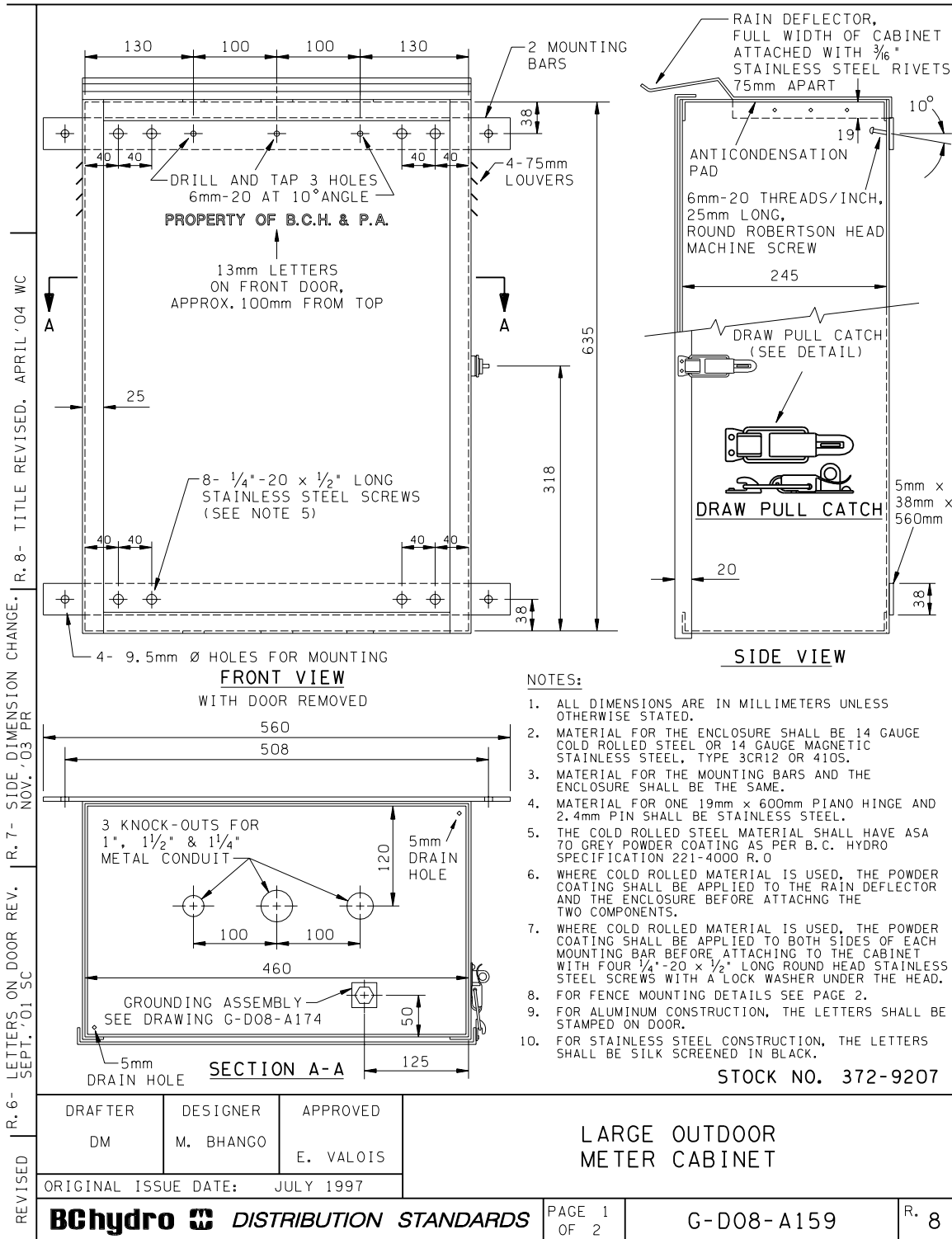
NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE STATED.
2. MATERIAL SHALL BE 10 GAUGE ALUMINUM.
3. MATERIAL FOR ONE 19mm x 600mm PIANO HINGE AND 2.4mm PIN SHALL BE STAINLESS STEEL.
4. THE CONSTRUCTION DETAILS ARE SHOWN ON PAGE 2.
5. FOR GROUNDING HOLE LOCATIONS ON BACK OF CABINET, SEE DETAIL "A" ON PAGE 2.

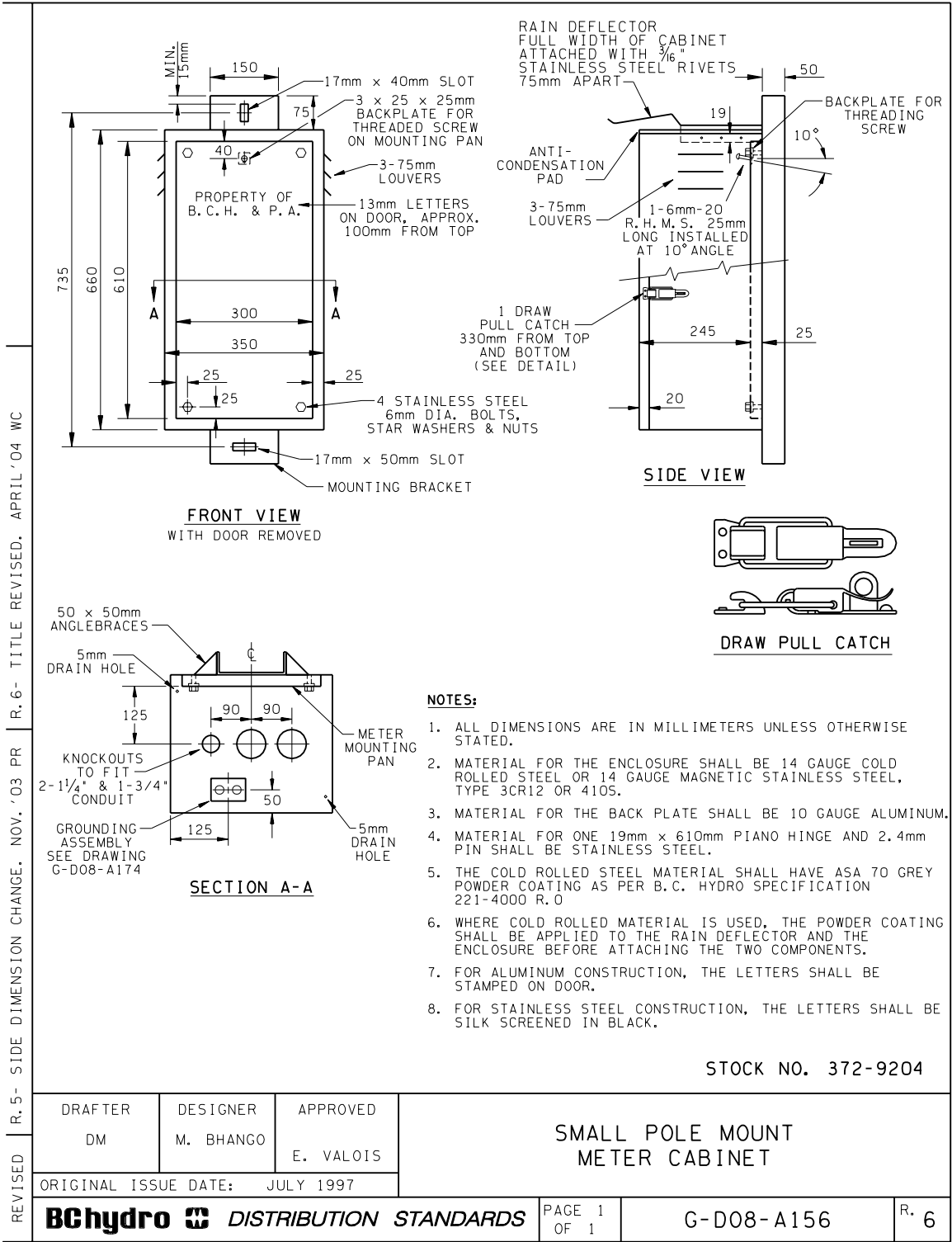
STOCK NO. 372-9206

DRAFTER DM	DESIGNER CHEONG HUI	APPROVED E. VALOIS	LARGE INDOOR METER CABINET
ORIGINAL ISSUE DATE: JULY 1997			
BGhydro DISTRIBUTION STANDARDS		PAGE 1 OF 2	G-D08-A158 R. 7

G-D08-A159 Page 1



G-D08-A156



REVISED | R. 5- SIDE DIMENSION CHANGE, NOV. '03 PR | R. 6- TITLE REVISED, APRIL '04 WC