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| Version | Date | Description of Revisions |
| 1 | August 30, 2006 | Approved final document. |
| 2 | February 19, 2010 | Modified ‘Related Sections’ |
| 3 | June 25, 2013 | Final Draft – Consolidated Comments Spec Update Project |
| 4 | June 25, 2013 | Incorporation of new Commissioning and Computerized Maintenance Management System Data Requirements Specification cross references. |
| 5 | August 5, 2014 | Changes to reflect renaming of commissioning specification and final review (AV). |
| **6** | **February 4, 2015** | **Finalized Specification – Reference eDOCS #5630507 v7 (AV)** |
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NOTE:

This is a CONTROLLED Document. Any documents appearing in paper form are not controlled and should be checked against the on-line file version prior to use.

**Notice:** This Document hardcopy must be used for reference purpose only.

**The on-line copy is the current version of the document.**

# GEneral

## General

### To be used if the service entrance is not contained within the motor control centre.

## Related Sections

### [Under "Related Sections", identify other Sections that are related to, and/or dependent on, the work results or information specified elsewhere. The list should be limited to Sections with specific information that the reader might expect to find in this Section, but is specified elsewhere. For example, if hardware for aluminum entrances is specified in the aluminum entrance Section, a cross-reference would be appropriate in the finish hardware Section. The purpose of this cross-referencing is for information only, to aid in finding those other requirements—not to define the scope of the Section.

### Cross-referencing here may also be used to coordinate assemblies or systems whose components may span multiple Sections and which must meet certain performance requirements as an assembly or system.

### Contractor is responsible for coordination of the Work. Contractor is responsible for being familiar with and incorporating all required elements of cross-referenced Specifications cited.

### This Section is to be completed/updated during the design development by the Consultant. If it is not applicable to the section for the specific project it may be deleted.]

### [List Sections specifying installation of products supplied but not installed under this Section and indicate specific items.]

### Section [\_\_\_\_\_\_ – \_\_\_\_\_\_\_\_\_\_\_\_]: Execution requirements for ...[item]... specified under this Section.

### [List Sections specifying products installed but not supplied under this Section and indicate specific items.]

### Section [\_\_\_\_\_\_ – \_\_\_\_\_\_\_\_\_\_\_\_]: Product requirements for ...[item]... for installation under this Section.

### [List Sections specifying related requirements.]

### Section [\_\_\_\_\_\_ – \_\_\_\_\_\_\_\_\_\_\_\_]: [Optional short phrase indicating relationship].

### Section 01250 – Substitutions

### Section 01300 – Submittals

### Section 01425 - Computerized Maintenance Management System Data Requirements

### Section 01810 – Equipment Testing and Facility Commissioning

### Section 16010 – Electrical General Requirements

### Section 16031 – Inspection and Testing

### Section 16289 – Transient Voltage Surge Suppression (TVSS)

### Section 16412 – Molded Case Breakers

### Section 16414 – Disconnect Switches – Fused and Unfused

### Section 16450 – Grounding Secondary

### Section 16480 – Grounding

### [Division 13 – SCADA and Instrumentation - insert applicable specifications]

### Design Guideline Section 21 – Development and Maintenance of Asset Inventory and Tagging

### Product requirements for [item]... for installation under this Section

## References

### Canadian Standards Association (CSA)

#### CAN/CSA-C22.2 No.31-14 10th Edition, Switchgear Assemblies.

#### CAN/CSA 22.2 No. 0.19-10 Requirements for Service Entrance Equipment

#### CAN/CSA-C22.2 No. 52-09 (R2014), Underground Secondary and Service-Entrance Cables.

#### CAN/CSA C22.2 No. 27-09 (R2013) - Busways (Tri-national Standard, with UL 857 and NMX-J-148-ANCE).

#### CAN/CSA-C22.2 No. 61010-1-12 - Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use - Part 1: General Requirements (Tri-national standard, with UL 61010-1 and ANSI/ISA-61010-1 (82.02.01)).

## Shop Drawings and Product Data

### Submit shop drawings and product data in accordance with Section 01300 – Submittals.

### Indicate the following information on the shop drawings:

#### Floor anchoring method and foundation template.

#### Dimensioned cable entry and exit locations.

#### Dimensioned position and size of bus.

#### Overall length, height and depth.

#### Dimensioned layout of internal and front panel mounted components.

## Maintenance Data

### Provide maintenance data for the service entrance board for incorporation into the manual specified in Section 01300 – Submittals.

### Provide equipment and maintenance data in accordance with Section 01425 - Computerized Maintenance Management System Data Requirements.

## Maintenance Materials

### Include:

#### [3] fuses for each type above 600 A.

#### [6] fuses for each type up to and including 600 A.

## Source Quality Control

### The Consultant shall witness final factory tests.

### Notify the Consultant in writing 5 Working Days in advance that service entrance board is ready for testing.

### Submit to the Consultant two copies of the certified Test Report(s). The Test Report(s) shall be approved by the Consultant and Region and shall be in an electronic format suitable for upload to the Region’s CMMS (Maximo).

### Submit all other required information as detailed in Design Guideline Section 21 – Development and Maintenance of Asset Inventory and Tagging in an electronic format suitable for upload to the Region’s CMMS (Maximo) in accordance with Section 01430 – Operation and Maintenance Data.

## Field Quality Control

### Perform tests in accordance with Section 16031 – Inspection and Testing and Section 01810 – Equipment Testing and Facility Commissioning.

### Check all factory made connections for mechanical security and electrical continuity.

### Check trip unit settings and fuse sizes against the co-ordination study to ensure the proper functioning and protection of components. *[Consultant to amend wording depending on whether a coordination study is a requirement stated in the Contract Documentation or an existing coordination study is suitable and available for reference].*

### Check the operation of transient voltage surge suppressor, as applicable.

### Check the operation of the Owner’s metering.

### Include time-current characteristic curves for circuit breakers and fuses.

# PRODUCTS

## Service Entrance Board

### Service Entrance Board: CSA 22.2 No. 0.19-10, Requirements for Service Entrance Equipment.

### Rating: [\_\_\_\_\_\_] V, [\_\_\_\_\_\_] phase, [\_\_\_\_\_\_] wire, [\_\_\_\_\_\_] A, short circuit current [\_\_\_\_\_\_] kA (rms symmetrical).

### Cubicles: free standing, dead front, size as indicated on the Contract Drawings

### Barrier metering section from adjoining sections.

### Utilize Multilin 750 for load metering.

### Provision for installation of Local Distribution Company (LDC) metering in the barriered section.

### Regions metering with all required CTs and PTs.

### Distribution section.

### Hinged access panels with captive knurled thumb screws.

### Bus bars and main connections: 99.3% copper or tin plated aluminum (see subsection 2.1.13 below).

### [The service entrance board shall have the bus from the load terminals of main breaker via metering section to main lugs of distribution section. OR The service entrance board shall have the cable from load terminals of main breaker to metering section and cable from metering section to lugs of distribution section.]

### [Consultant to choose the appropriate option above; confirm with the Region and amend this subsection]

### Identify phases with colour coding.

### [The Consultant to consider use of aluminum bus bars in place of copper bus bars as per Section 01250 – Substitutions. Approval for any substitution must be by the Consultant with sign-off from the Region. Insert new subsection regarding use of aluminum bus bars if required]

## Molded Case Circuit Breakers

### Refer to Section 16412 – Molded Case Circuit Breakers.

## Fusible Disconnects and Fuses

### Refer to Section 16414 Disconnect Switches – Fused and Unfused.

## Grounding

### Copper ground bus extending full width of cubicles and located at bottom.

### Lugs at each end for size 4/0 grounding cable.

## Ground Fault Unit

### Refer to Section 16480 – Grounding or Section 16450 – Grounding Secondary as applicable.

## Lightning Arresters

### Refer to Section 16670 – Lightning Protection System.

## Transient Voltage Surge Suppression (TVSS)

### Refer to Section 16289 – Transient Voltage Surge Suppression (TVSS).

## Local Distribution Company Metering

### Separate compartment and metal raceway for exclusive use of LDC metering.

### Mounting accessories and wiring for metering supplied by the LDC:

#### [\_\_\_\_\_\_] potential transformers.

#### [\_\_\_\_\_\_] current transformers.

#### Watt-hour meter.

#### Demand meter with kWh register.

### Coordinate the supply and installation of current and potential transformers for utility metering with the utility representative. The Contractor shall pay for all associated costs.

### The Contractor shall negotiate with the LDC to obtain direct LCD revenue meter access (read only basis) for the Region and supply all such wiring, connectivity and software to allow meter interrogation by the Region.

## Region’s Metering

### Digital unit with the capability to display:

#### Phase currents

#### Voltage, L-L, L-N for each phase.

#### System and per-phase power including kilowatts, vars and VA.

#### System energy including kilowatt-hours, var-hours and VA hours.

#### System demand including kilowatt demand, kVA demand and kvar demand.

#### Apparent and displacement power factor.

#### Frequency.

#### Recorded minimums and maximums of most parameters.

### Other features:

#### Operator programmed using the face plate keypad or via communications.

#### 4 line x 20 character back lit LCD display.

#### All monitored parameters shall be available for viewing on the faceplate by using the keypad to scroll through the menu features of the meter. True rms metering of distorted currents and voltages up to the 31st harmonic is required.

#### CSA listed under CAN/CSA C22.2 NO. 61010-1-12.

#### Output shall transfer the demand signal and energy consumption data to SCADA and facility energy management system, as applicable. *[Consultant to modify this subsection be consistent with Process Narrative descriptions which are part of the Contract Documents]*

#### Current and potential transformers as required.

### Install metering units generally at “eye level” in an unobscured location/position so that elevating devices are not required by the user to read and use the meter.

## Finishes

### Apply finishes in accordance with Section 16010 - Electrical General Requirements.

#### Service entrance board exterior: gray.

## Equipment Identification

### Provide equipment identification in accordance with Section 16010 - Electrical General Requirements.

### Nameplates:

#### White plate, black letters, size [7].

#### Complete board labeled: "120/208, 600 V."

#### Main disconnect labeled: "Main Breaker".

#### Branch disconnects labeled: as indicated in the Contract Documents.

# EXECUTION

## Installation

### Locate the service entrance board and fasten it to the wall.

### Connect main secondary service to line terminals of main [breaker] [disconnect switch].

### Connect the distribution breaker's load terminals to the feeders.

### Check factory made connections for mechanical security and electrical continuity.

### Run [one] grounding conductor [4/0] AWG bare copper in 38 mm conduit from ground bus to building ground.

### Check trip unit settings against the co-ordination study to ensure the proper functioning and protection of the components.

### Coordinate the supply and installation of current and potential transformers for LDC metering with the utility representative.

## Commissioning

### .1 For all commissioning activities on systems where components of this Section are integral to functionality, refer to Section 01810 – Equipment Testing and Facility Commissioning. All inspection and testing activities shall be completed in accordance with the commissioning plan that shall be provided to the Consultant prior to the commencement of commissioning activities.

**END OF SECTION**