**Eaton Guide Specification**

**Notes and instructions to specwriter**

The following guide specification is offered for your assistance in specifying this product as part of a CSI (Construction Specification Institute) compliant document.

This guide specification has been created in MS Word and uses Word features including **Styles** and **Review** to assist in editing and formatting. You may also find it helpful to view the document in **Outline** mode when editing or selecting sections to copy/paste into your base document.

**Styles**

Styles are provided for all paragraph types described in the CSI Masterformat. Applying a Style to text will provide the correct indentation, paragraph letter/number, font, capitalization, etc…. Styles are shown on the right-hand side of the Word “Home” ribbon.



**Review**

“Notes to Specwriter” (when available) are provided using the Reviews feature in Word. To view “Notes to Specwriter” select “All Markup” in the Tracking dropdown menu on the Review ribbon. To hide notes, select “No Markup”. You can advance from one note to the next using the Previous and Next buttons on the same ribbon. In earlier versions of MSWord hide notes by un-checking ‘Comments’ under Review>SH



**Outline view**

The Outline view within Word is often helpful when editing or copying sections from this Guide Specification. Also, when pasting sections from this document into a base document the specwriter may want to consider using right-click and “Merge Formatting’ or ‘Keep Text Only” features.

section 26 24 13.15

Generator quick connect SWITCHBOARDS – low VOLTAGE

# general

## Scope

### The Contractor shall furnish and install, where indicated, a free-standing, dead-front type low voltage Generator Quick Connection Switchboard, utilizing a main circuit protective device, generator lug and receptacle connections as specified herein, and as shown on the contract drawings.

## Related Sections

### Section 16671A – Surge Protective Device

### Section 16475 – Circuit Breakers and Fusible Switches – Low Voltage

### Section 16901 – Microprocessor-Based Metering Equipment

### Section 16904 – Microprocessor Trip Units for Low-Voltage Circuit Breakers

## References

### The low voltage distribution switchboards and all components shall be designed, manufactured and tested in accordance with the latest applicable following standards:

#### NEMA PB-2

#### UL Standard 891

## Submittals – for Review/approval

### The following information shall be submitted to the Engineer:

#### Master drawing index

#### Front view elevation

#### Floor plan

#### Top view

#### Single line

#### Schematic diagram

#### Nameplate schedule

#### Component list

#### Conduit entry/exit locations

#### Assembly ratings including:

##### Short-circuit rating

##### Voltage

##### Continuous current

#### Major component ratings including:

##### Voltage

##### Continuous current

##### Interrupting ratings

#### Cable terminal sizes

#### Product data sheets

### Where applicable, the following additional information shall be submitted to the Engineer:

#### Busway connection

#### Connection details between close-coupled assemblies

#### Composite floor plan of close-coupled assemblies

#### Key interlock scheme drawing and sequence of operations

## Submittals – for construction

### The following information shall be submitted for record purposes:

#### Final as-built drawings and information for items listed in Paragraph 1.04, and shall incorporate all changes made during the manufacturing process

#### Wiring diagrams

#### Certified production test reports

#### Installation information

#### Seismic certification and equipment anchorage details as specified

## Qualifications

### The manufacturer of the assembly shall be the manufacturer of the major components within the assembly.

### For the equipment specified herein, the manufacturer shall be ISO 9001 or 9002 certified.

### The manufacturer of this equipment shall have produced similar electrical equipment for a minimum period of five (5) years. When requested by the Engineer, an acceptable list of installations with similar equipment shall be provided demonstrating compliance with this requirement.

### Provide Seismic tested equipment as follows:

#### The equipment and major components shall be suitable for and certified by actual seismic testing to meet all applicable seismic requirements of the [latest International Building Code (IBC)] [latest California Building Code (CBC) with OSHPD Amendments]. [The equipment shall have OSHPD Special Seismic Certification (OSP) Pre-Approval.]

#### The Project Structural Engineer will provide site specific ground motion criteria for use by the manufacturer to establish SDS values required.

#### The IP rating of the equipment shall be 1.5

#### The Structural Engineer for the Site will evaluate the SDS values published on the [Manufacturer’s] [OSHPD] website to ascertain that they are "equal to" or "greater than" those required for the Project Site.

#### The following minimum mounting and installation guidelines shall be met, unless specifically modified by the above referenced standards.

##### The Contractor shall provide equipment anchorage details, coordinated with the equipment mounting provision, prepared and stamped by a licensed civil engineer in the state. Mounting recommendations shall be provided by the manufacturer based upon the above criteriato verify the seismic design of the equipment.

##### The equipment manufacturer shall certify that the equipment can withstand, that is, function following the seismic event, including both vertical and lateral required response spectra as specified in above codes.

##### The equipment manufacturer shall document the requirements necessary for proper seismic mounting of the equipment. Seismic qualification shall be considered achieved when the capability of the equipment, meets or exceeds the specified response spectra.

## Regulatory Requirements

### The low-voltage switchboard shall be UL labeled.

## Delivery, Storage and Handling

### Equipment shall be handled and stored in accordance with manufacturer’s instructions. One (1) copy of these instructions shall be included with the equipment at time of shipment.

## Operation and Maintenance Manuals

### Equipment operation and maintenance manuals shall be provided with each assembly shipped and shall include instruction leaflets, instruction bulletins and renewal parts lists where applicable, for the complete assembly and each major component.

# Products

## manufacturers

### Eaton

### \_\_\_\_\_\_\_\_\_\_

### \_\_\_\_\_\_\_\_\_\_

The listing of specific manufacturers above does not imply acceptance of their products that do not meet the specified ratings, features and functions. Manufacturers listed above are not relieved from meeting these specifications in their entirety. Products in compliance with the specification and manufactured by others not named will be considered only if pre-approved by the Engineer ten (10) days prior to bid date.

## Ratings

### The assembly shall be rated to withstand mechanical forces exerted during short-circuit conditions when connected directly to a power source having available fault current 65,000 amperes symmetrical [at rated voltage] [as shown on the drawings].

### Voltage rating to be as indicated on the drawings.

## Construction

### Generator Quick Connect Switchboard shall consist of the required number of vertical sections bolted together to form a rigid assembly. The sides and rear shall be covered with removable bolt-on covers. All edges of front covers or hinged front panels shall be formed. Provide adequate ventilation within the enclosure.

### All sections of the switchboard shall be [rear] [front and rear] aligned with depth as shown on the drawings. All protective devices shall be group mounted. Devices shall be front removable and load connections front accessible enabling switchboard to be mounted against a wall.

OR

### All sections of the switchboard shall be [rear] [front and rear] aligned with depth as shown on drawings. All protective devices shall be group mounted. Devices shall be front removable and load connections front and rear accessible. Rear access shall be provided

### The switchboard shall be provided with load connection options to cross bus or mechanical outgoing cable terminations, which shall be suitable for copper or aluminum conductors.

### The assembly shall be provided with adequate lifting means.

### The switchboard shall be equal to Eaton type Generator Quick-Connect utilizing the components herein specified and as shown on the drawings.

## Bus

### All bus bars shall be [silver-plated copper] [tin-plated aluminum]. Bus ampacity of 400 to 4000 Amps shall be based on NEMA standard temperature rise criteria of 65 degrees C over a 40 degrees C ambient (outside the enclosure).

### Provide a full capacity neutral bus where a neutral bus is indicated on the drawings.

### A copper ground bus (minimum 1/4 x 2 inch), shall be furnished firmly secured to each vertical section structure and shall extend the entire length of the switchboard.

### All hardware used on conductors shall be high-tensile strength and zinc-plated. All bus joints shall be provided with conical spring-type washers.

## Wiring/Terminations

### The switchboard shall be provided with both mechanical lugs and cam-type receptacle assembly for connection of generator power phases (A, B, C), neutral and grounding conductors. All connections for phases, neutral, ground, etc., shall be clearly marked via labeling

### Each single pole cam-type receptacle shall be rated for no less than 400 amps at 90 deg C. Multiple receptacles per phase, neutral, and ground shall be utilized when amperages over 400 are requested. Contact material of the receptacle shall be composed of brass.

### Cam-type receptacles must be suitable for use in outdoor environments.

### Single pole Cam-type receptacles shall be UL 498 listed for Attachment Plugs and Receptacles and UL 1691.

### Small wiring, necessary fuse blocks and terminal blocks within the switchboard shall be furnished as required. Control components mounted within the assembly, such as fuse blocks, relays, pushbuttons, switches, etc., shall be suitably marked for identification corresponding to appropriate designations on manufacturer’s wiring diagrams.

### Where applicable all control wire shall be type SIS, bundled and secured with nylon ties. Insulated locking spade terminals shall be provided for all control connections, except where saddle type terminals are provided integral to a device. All current transformer secondary leads shall first be connected to conveniently accessible short-circuit terminal blocks before connecting to any other device. All groups of control wires leaving the switchboard shall be provided with terminal blocks with suitable numbering strips. Provide wire markers at each end of all control wiring.

## main protective device

|  |
| --- |
| **Note to Spec Writer:** Select main, tie and feeder device spec from Section 16475 as indicated and insert under 2.06, as follows: Power Circuit Breakers – Magnum DS Paragraph 2.02 and 2.03 |
| Power Circuit Breakers– Magnum SB Paragraph 2.06 and 2.07 Molded Case Circuit Breakers 1200 A and Below Paragraph 2.08 and 2.09 Molded Case Circuit Breakers Above 1200 A Paragraph 2.010 and 2.11 |
| Bolted Pressure Switches Paragraph 2.13 |
| Fusible Switches Paragraph 2.14 |

## Trip unit

|  |
| --- |
| **Note to Spec Writer:** Select trip units from Section 16904 as indicated and insert under Paragraphs 2.07 and 2.09 as follows: Power Circuit Breakers – Magnum DS Paragraph 2.05 Insulated Case Breakers – Magnum SB Paragraph 2.05 Molded Case Circuit Breakers Paragraph 2.02 and 2.04 1200 A and Below Molded Case Circuit Breakers – Paragraph 2.02 and 2.04 Above 1200 A |

## accessories

### Provide shunt trips, bell alarms and auxiliary switches as shown on the contract drawings.

## miscellaneous devices

### Provide Key interlocks between Generator Switchboard Main and Normal source breaker to prevent inadvertent interconnection and utility back feed or paralleling of unsynchronized sources

### The switchboard shall be provided with a space heater [thermostatically controlled]. Power for the space heaters shall be obtained [from a control power transformer within the switchboard] [from a source as indicated on the drawings]. Supply voltage shall be [120] [240] volts AC.

## customer metering

### Where indicated on the drawings, provide a separate customer metering compartment with a front facing hinged door and include the following:

### Current transformers for the meter shall be wired to shorting-type terminal blocks.

### [Potential transformers including primary and secondary fuses with disconnecting means] [Fused potential taps as the potential source] for metering as shown on the drawings.

### [ ]

## Enclosures

### NEMA 1 Enclosure

OR

### Outdoor NEMA 3R Enclosure

#### Outdoor enclosure shall be non-walk-in and meet applicable NEMA 3R UL requirements

#### Enclosure shall have [flat roof] [sloping roof downward toward rear]

#### Provide hinged cable entry trap door to allow cable access to generator connection receptacles and lugs while maintaining Type 3R Enclosure integrity.

#### The enclosure shall be provided with [bolt-on rear covers] [rear hinged doors] for each section

#### Doors shall have provisions for padlocking

#### Ventilating openings shall be provided [complete with replaceable fiber glass air filters]

## Nameplates

### Engraved nameplates, mounted on the face of the assembly, shall be furnished for all main and feeder circuits as indicated on the drawings. Nameplates shall be laminated plastic, black characters on white background. Characters shall be 3/16-inch high, minimum. Nameplates shall give item designation and circuit number as well as frame ampere size and appropriate trip rating. Furnish master nameplate giving switchboard designation, voltage ampere rating, short-circuit rating, manufacturer’s name, general order number, and item number.

### Control components mounted within the assembly, such as fuse blocks, relays, pushbuttons, switches, etc., shall be suitably marked for identification corresponding to appropriate designations on manufacturer’s wiring diagrams.

## Finish

### All exterior and interior steel surfaces of the switchboard shall be properly cleaned and provided with a rust-inhibiting phosphatized coating. Color and finish of the switchboard shall be ANSI 61 light gray.

## Surge Protective Device

### Provide surge protective device as specified in Section 16671A.

# execution

## Factory Testing

### The following standard factory tests shall be performed on the equipment provided under this section. All tests shall be in accordance with the latest version of ANSI and NEMA standards.

#### The switchboard shall be completely assembled, wired, adjusted, and tested at the factory. After assembly, the complete switchboard will be tested for operation under simulated service conditions to ensure the accuracy of the wiring and the functioning of all equipment. The main circuits shall be given a dielectric test of 2200 volts for one (1) minute between live parts and ground, and between opposite polarities. The wiring and control circuits shall be given a dielectric test of 1500 volts for one (1) minute between live parts and ground

### The manufacturer shall provide three (3) certified copies of factory test reports.

## Manufacturer’s Certification

### A certified test report of all standard production tests shall be available to the Engineer upon request.

## Training

### The Contractor shall provide a training session for up to five (5) owner’s representatives for \_\_\_\_ normal workdays at a job site location determined by the owner.

### A manufacturer’s qualified representative shall conduct the training session. The training program shall consist of instruction on operation of the assembly, circuit breakers, fused switches, and major components within the assembly.

## Installation

### The Contractors shall install all equipment per the manufacturer’s instructions, contract drawings and National Electrical Code.

### The assembly shall be provided with adequate lifting means and shall be capable of being moved into installation position and bolted directly to [Contractor supplied floor sills to be set level in concrete per manufacturer’s recommendations] [the floor without the use of floor sills provided the floor is level to 1/8 inch per 3-foot distance in any direction]. All necessary hardware to secure the assembly in place shall be provided by the Contractor.

## field adjustments

### The Contractor shall perform field adjustments of the protective devices as required to place the equipment in final operating condition. The settings shall be in accordance with the approved short-circuit study, protective device evaluation study and protective device coordination study.

### Necessary field settings of devices, adjustments and minor modifications to equipment to accomplish conformance with an approved short circuit and protective device coordination study, shall be carried out by the Contractor at no additional cost to the owner.