

EPME-35-320S-R2/ESW

Three Phase – Two Ways per Phase
200 Amp 35 kV Class Eaton's CPS LRTPs
35 kV Elliott Air-Insulated *SuperWell* Bushing Wells
21.1/36.6 kV Grounded Wye Max Design, 150 kV BIL

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EPME-35-340S-R2/ESW

Three Phase – Four Ways per Phase
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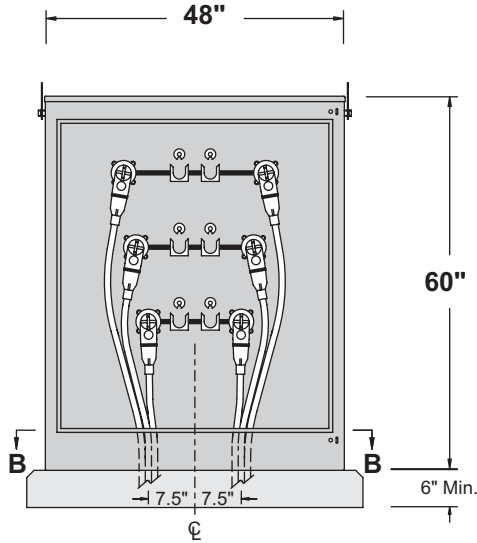
EPME-35-350S-R2/ESW

Three Phase – Five Ways per Phase
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35 kV Elliott Air-Insulated *SuperWell* Bushing Wells
21.1/36.6 kV Grounded Wye Max Design, 150 kV BIL

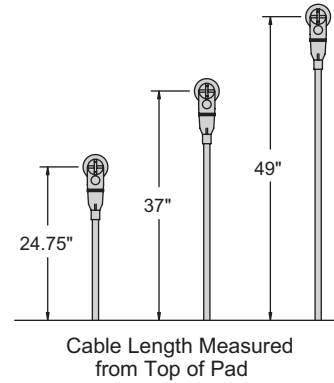
EPME-35-360S-R2/ESW

Three Phase – Six Ways per Phase
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35 kV Elliott Air-Insulated *SuperWell* Bushing Wells
21.1/36.6 kV Ground Wye Max Design, 150 kV BIL

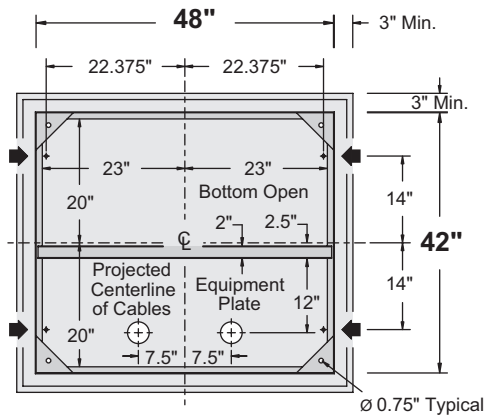
Cable Training and Anchor Bolt Locations



Front View
Door Removed

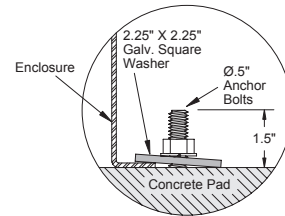


Cable Length Measured from Top of Pad

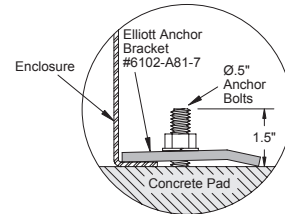


• ◀ Anchor Bolt Locations

Section BB
and Typical Pad Dimensions



Alternate #1



Alternate #2

EPME-35-320S-R2/ESW

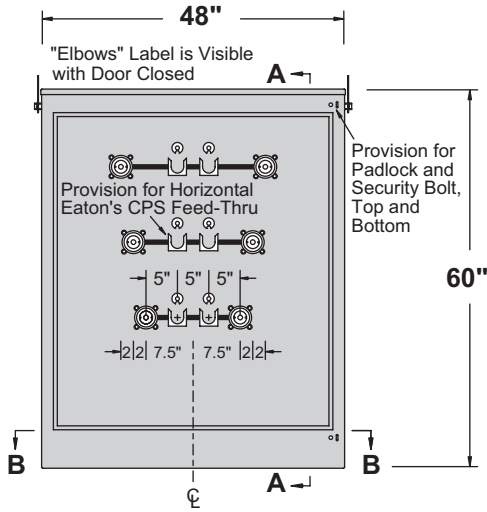
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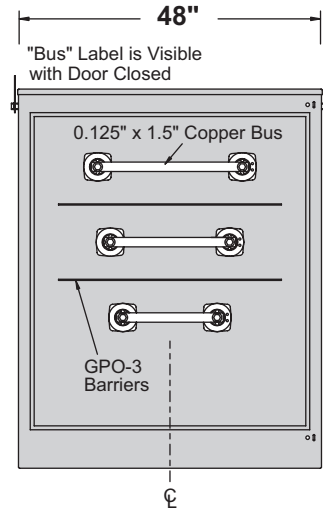


Three Phase – Two Ways Per Phase

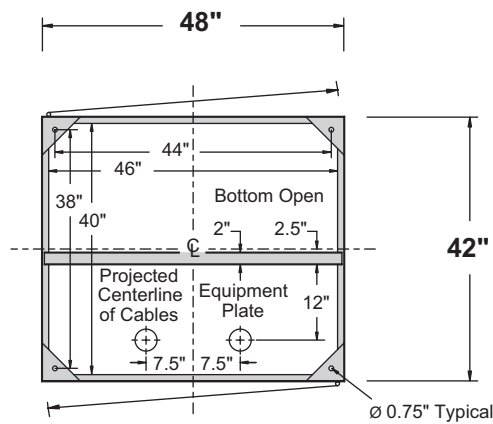
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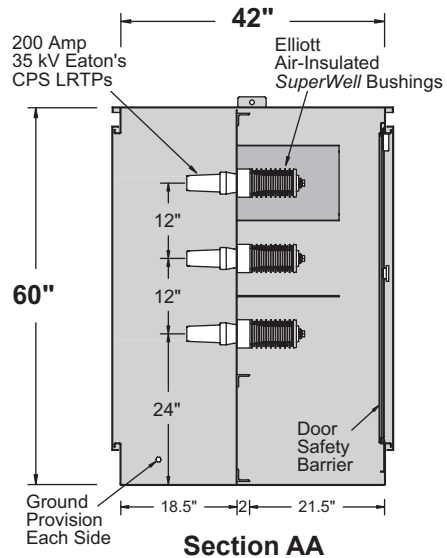
Front View
Door Removed



Rear View
Door & Door Safety Barrier Removed



Section BB



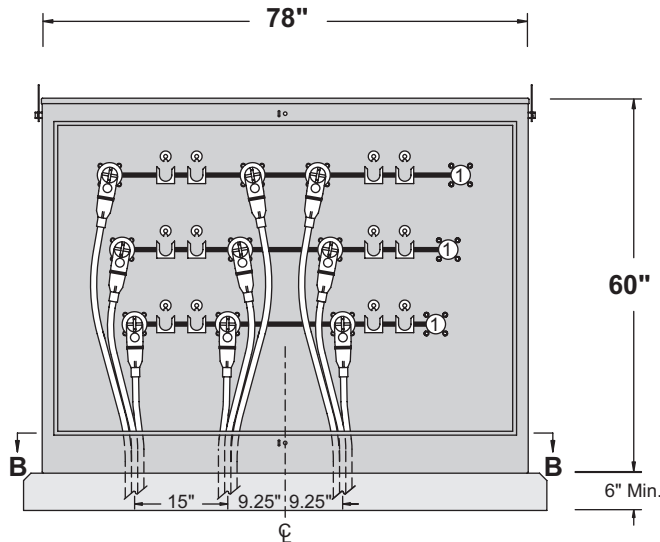
Section AA

EPME-35-320S-R2/ESW

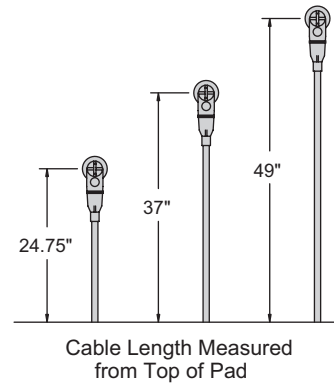
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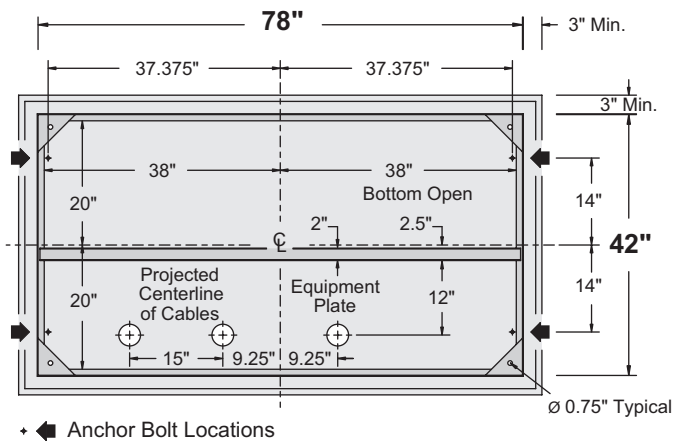
Cable Training and Anchor Bolt Locations



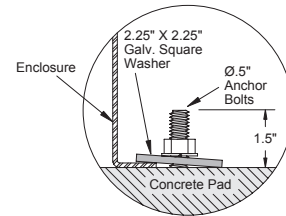
Front View
Doors Removed



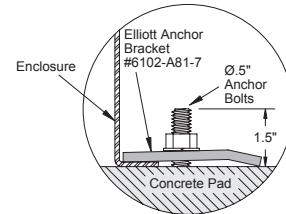
Cable Length Measured from Top of Pad



Section BB
and Typical Pad Dimensions



Alternate #1



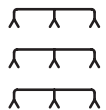
Alternate #2

① Bushing wells may be added if circuit requirements change - see page 14 in this bulletin.

EPME-35-330S-R2/ESW

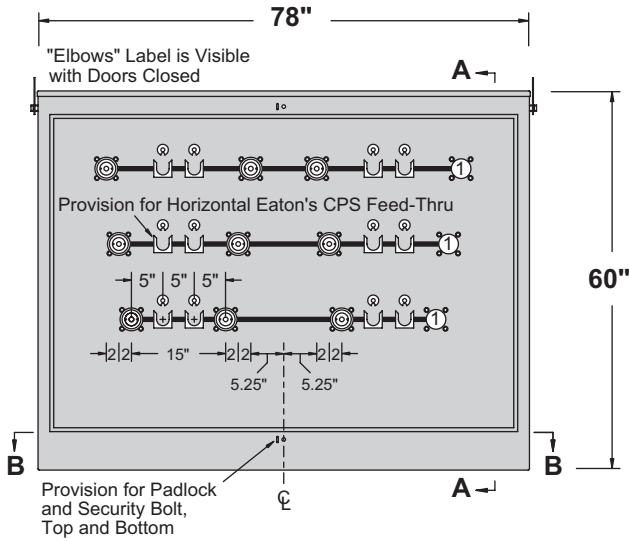
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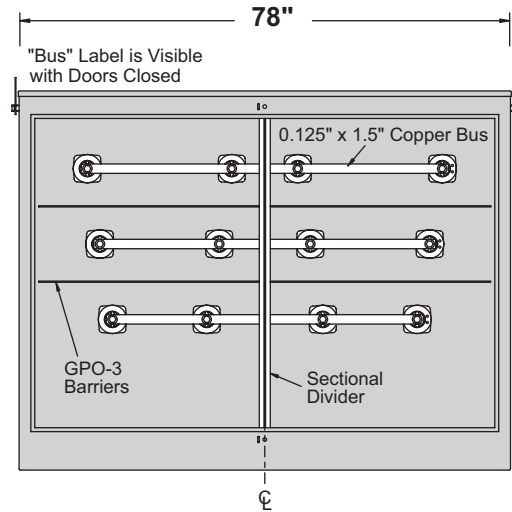


Three Phase – Three Ways Per Phase

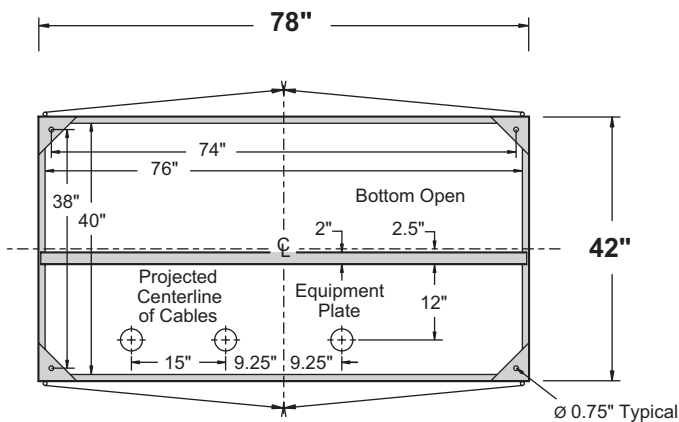
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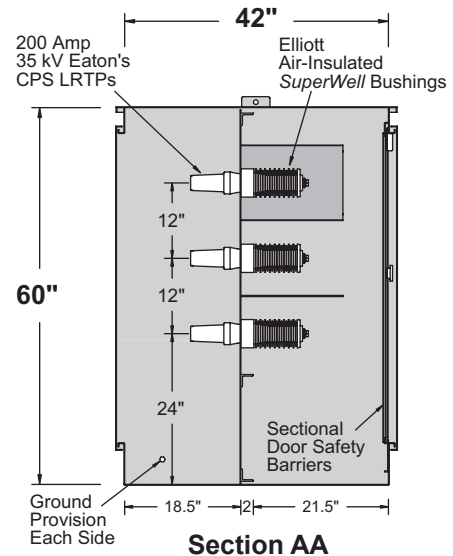
Front View
Doors Removed



Rear View
Doors & Door Safety Barriers Removed



Section BB



Section AA

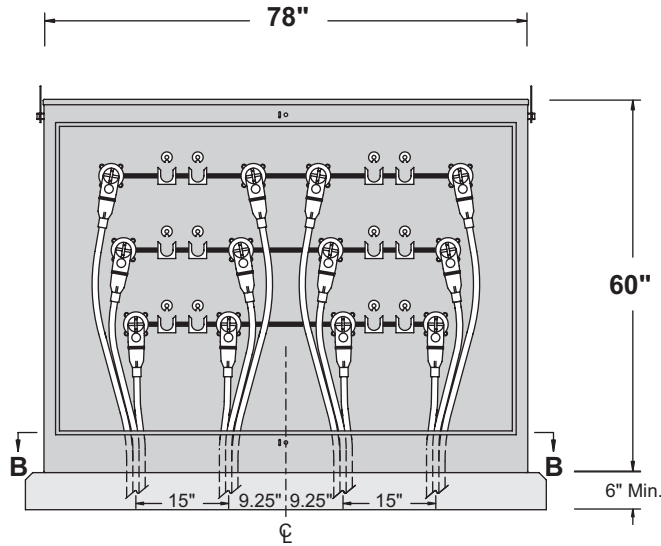
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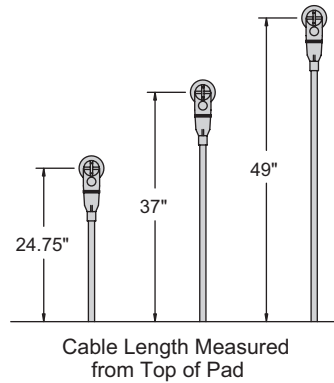
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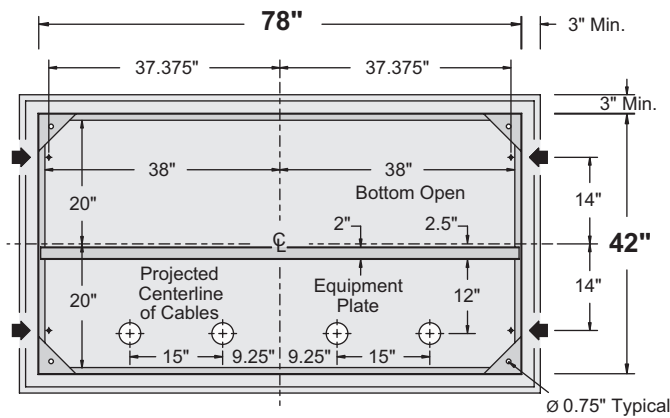
Cable Training and Anchor Bolt Locations



Front View
Doors Removed

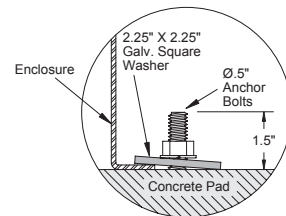


Cable Length Measured from Top of Pad

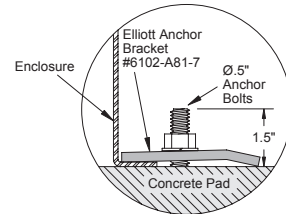


Anchor Bolt Locations

Section BB
and Typical Pad Dimensions



Alternate #1

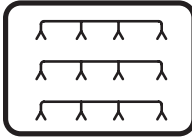


Alternate #2

EPME-35-340S-R2/ESW

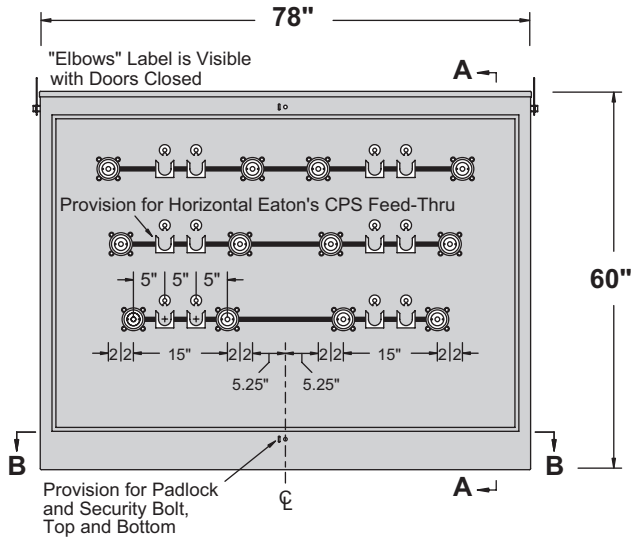
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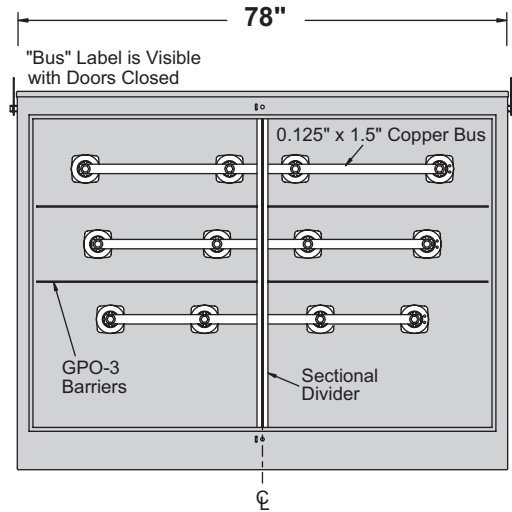


Three Phase – Four Ways Per Phase

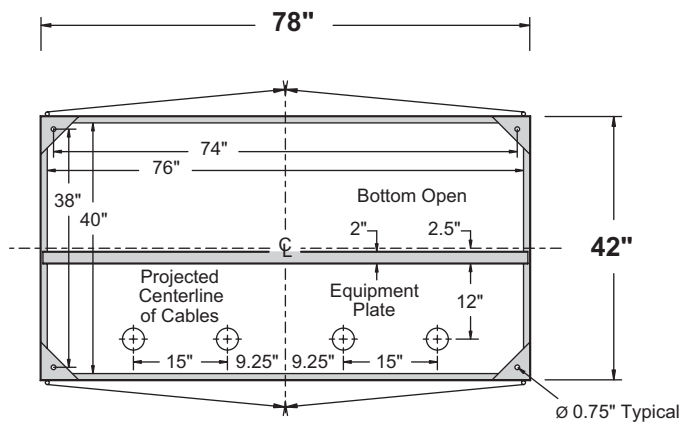
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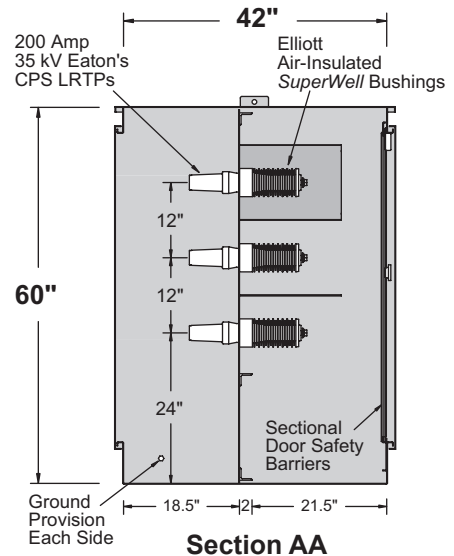
Front View
Doors Removed



Rear View
Doors & Door Safety Barriers Removed



Section BB



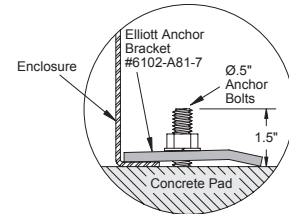
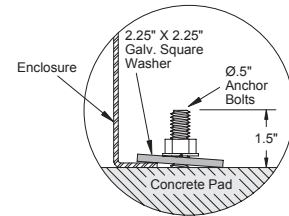
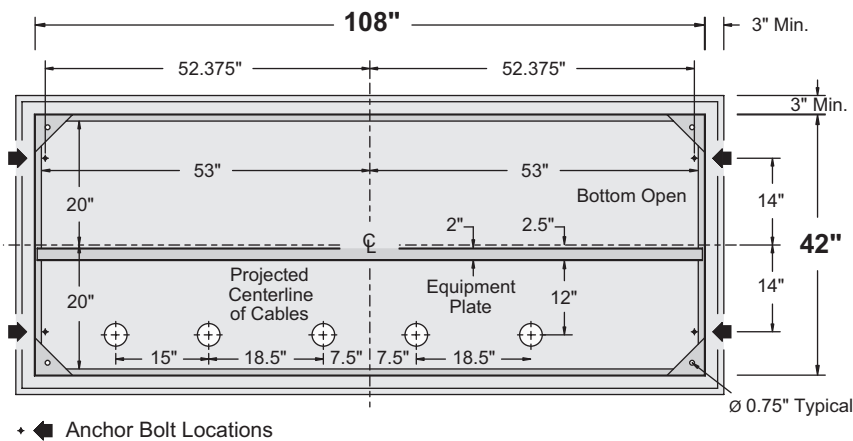
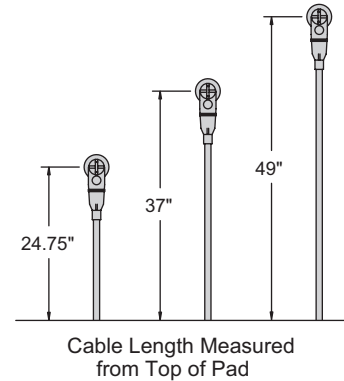
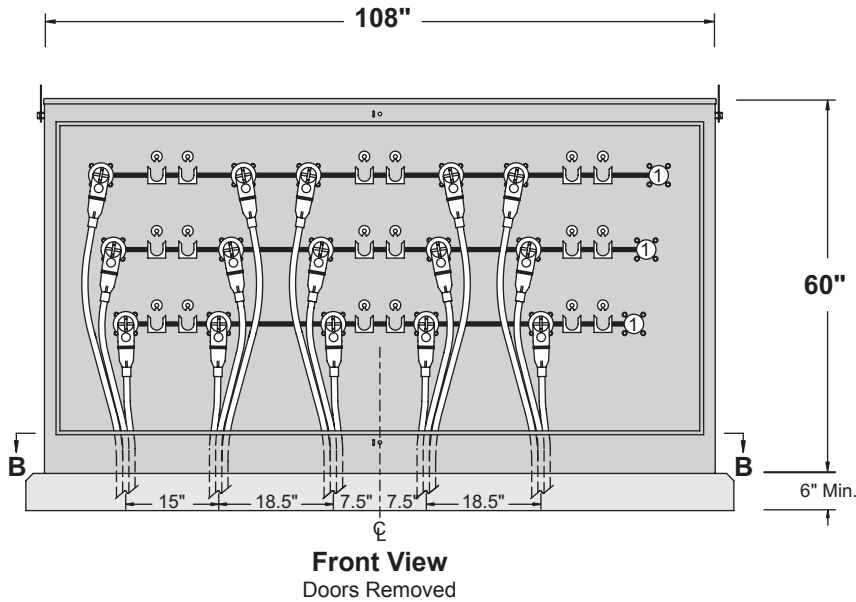
Section AA

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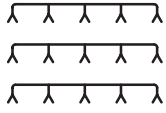


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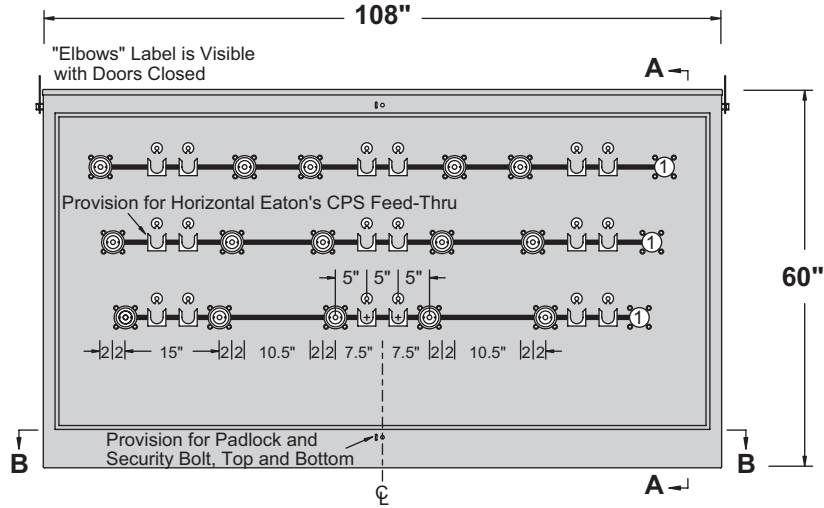
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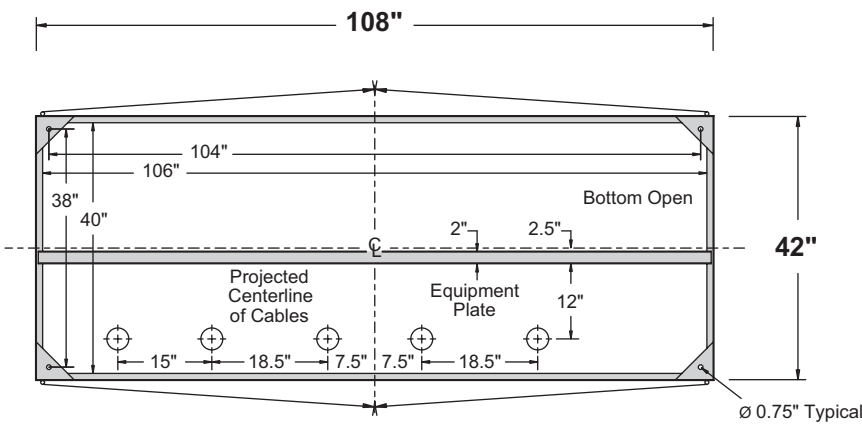


Three Phase – Five Ways Per Phase

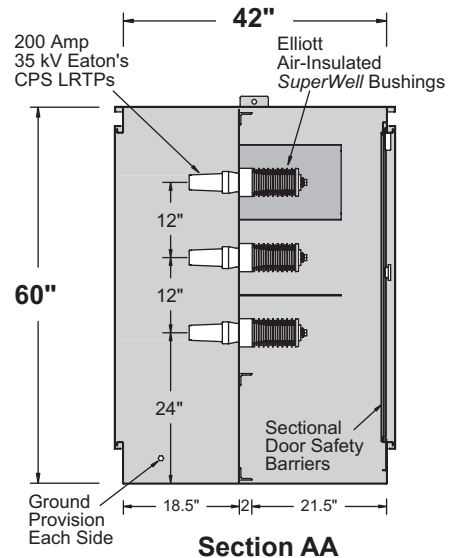
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Front View
Doors Removed



Section BB



Section AA

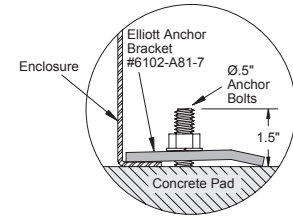
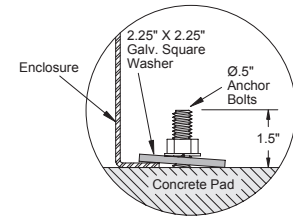
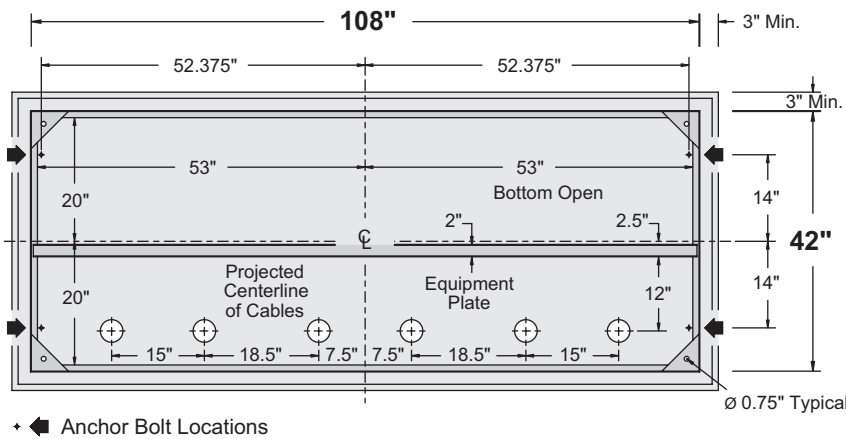
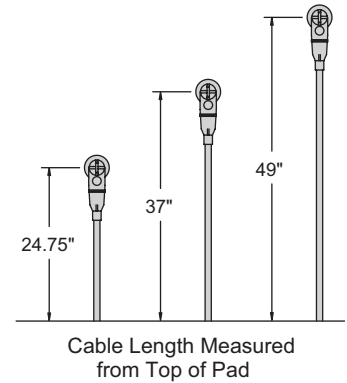
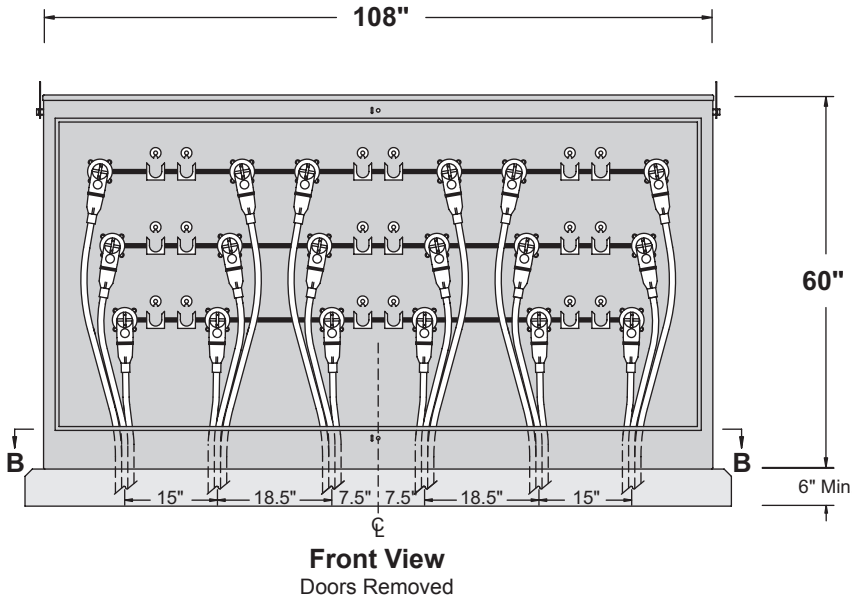
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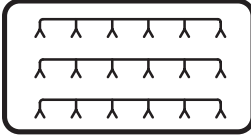
Cable Training and Anchor Bolt Locations



EPME-35-360S-R2/ESW

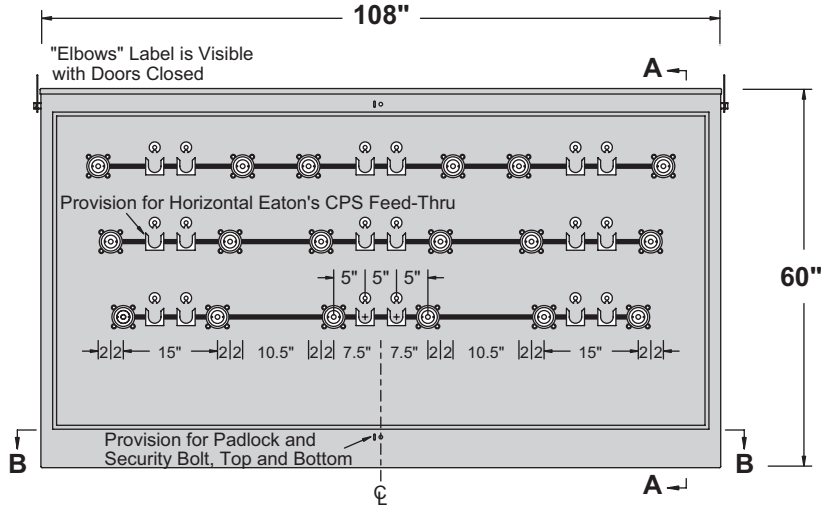
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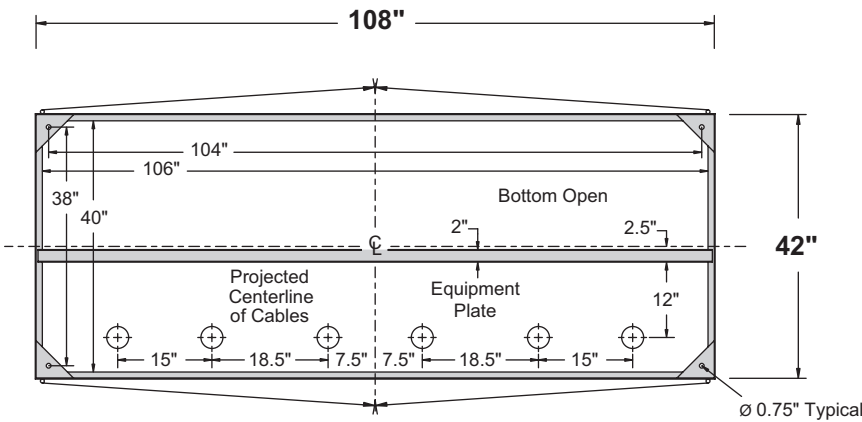


Three Phase – Six Ways Per Phase

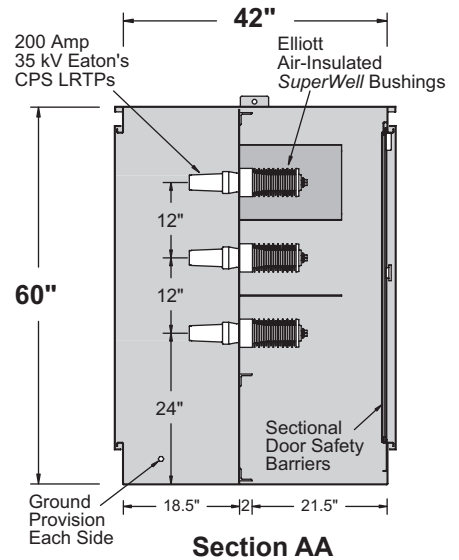
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Front View
Doors Removed



Section BB



Section AA

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Typical Specification - Page 1 of 2

General

The cable switching station shall be 35 kV class, 150 kV BIL, 200 ampere continuous current, suitable for use on 21.1/36.6 kV grounded wye max design systems. The switching station shall be constructed for connection to the utility system with Eaton's Cooper Power Systems loadbreak separable insulated connectors as described in IEEE Standard 386 200 Amp Loadbreak Interface Fig. 8 No.1A or Fig. 9 No. 1B (large 35 kV class interface). Separable insulated connectors shall be supplied by the user. The switching station shall be designed for and contain bus in a compartment separated from the elbow compartment by a steel equipment plate. Separate access shall be provided for each compartment. A door safety barrier shall be provided inside the door(s) on the bus compartment as recommended in IEEE Standard C2 (National Electrical Safety Code) Rule 381G. Tamper resistance shall meet the Enclosure Security requirements of IEEE Standard C57.12.28 (Pad-Mounted Equipment—Enclosure Integrity). Together, the tamper resistance and the door safety barrier shall resist unauthorized entry, protect authorized and unauthorized persons, and provide positive safety features when installed in areas accessible to the general public. The cable switching station shall be constructed for outdoor installation in areas subject to heavy precipitation and in areas with windblown contamination. The equipment shall be "air-insulated" and completely assembled prior to shipment.

Enclosure Construction

The enclosure shall be tamper-resistant, all-welded construction utilizing 11-gauge minimum sheet steel. Corner plates and braces shall be used as necessary to assure rigidity. The enclosure top shall be cross-kinked to provide watershed and rigidity. The enclosure shall be open bottom with a 1-inch flange inside, all around. Separate compartments shall be provided for cable termination and for buswork—each compartment equipped with its own individual access door(s) furnished with a stainless steel door holder that will latch the door open 100 degrees and 140 degrees and resist accidental closing. The equipment plate separating the two compartments shall be full length, constructed with 11-gauge minimum sheet steel braced to assure rigidity when operating the elbows. Doors shall be provided with provisions for padlocking and a recessed penta-head (or hex-head) security bolt to prevent unauthorized entry (coordinated to prevent installation of the padlock until the security bolt is tightened *when closing the door(s)* and to prevent a wrench from operating the security bolt until the padlock is removed *when opening the door(s)*). The security bolt shall be made captive with a stainless steel washer compressed to an oval shape to severely discourage removal. Hinges shall be stainless steel (with stainless steel pins not less than 0.3125-inch diameter) and shall be welded to both the enclosure and the door(s) to maintain door alignment for the life of the equipment. The

enclosure shall be nonventilated to minimize the entrance of airborne contamination, insects, rodents or reptiles. The protective finish shall include necessary grinding, cleaning and phosphatizing, two-component rust-inhibiting epoxy primer and a Pad-Mount Green two-component polyurethane top coat finish (Munsell color 7GY 3.29/1.5). The primer and top coat shall be electronically monitored during application to insure proper ratio and mixing of each component. Total average thickness of paint (after curing) shall be not less than 5 mils. The protective coating shall meet the Enclosure Coating System requirements of IEEE Standard C57.12.28 (Pad-Mounted Equipment—Enclosure Integrity). Removable lift provisions, adequate to withstand handling with normal utility equipment, shall be provided on the outside of the enclosure. Threaded openings for lift provision bolts shall be blind holes to prevent the entrance of wire or other foreign objects into the enclosure when lift provisions are removed.

Bushings and Terminals

Bushings shall be 200 ampere Elliott #1208-635B, 35 kV class (21.1 kV to ground) Air-Insulated *SuperWell* Bushings, 150 kV BIL, with female interface similar to IEEE Standard 386 Fig. 13 (600 A Deadbreak Interface No. 1, 21.1 kV) with Eaton's Cooper Power Systems Loadbreak-Reducing Tap Plugs #LRTP635 (or equal) installed for use with 21.1 kV and 21.1/36.6 kV Eaton's Cooper Power Systems Loadbreak Elbow Connectors meeting the requirements of IEEE Standard 386—200 A Loadbreak Interface Fig. 8 No.1A or Fig. 9 No. 1B (large 35 kV class interface). The bushing shall be pressure-molded cycloaliphatic epoxy with a 1.25-inch diameter copper conductor on the "air-insulated" side that is drilled and tapped 0.625-inch – 11UNC x 1-inch deep to provide direct connection of the bus and/or live parts. Leakage distance from the apparatus connection end of the bushing to ground shall be not less than 40 inches to assure trouble-free operation in a wet and/or contaminated environment. Integral shielding shall be provided to eliminate partial discharge caused by off-center mounting and mounting holes that may have sharp edges or burrs. Bushings shall mount in a 3.875-inch diameter opening and bolt in place to allow field replacement with standard tools. The bushing mounting bolts shall be self-locking stainless steel serrated-flange hex-head bolts with stainless steel bushing mounting support plates that "cut" through the enclosure protective finish to ground the integral shielding of each bushing. The head of one or more of the mounting bolts for each bushing shall include a 0.156-inch diameter hole to provide a connection to ground for the LRTP shielding ground wire as recommended by separable insulated connector manufacturers. To assure adequate strength for apparatus support, the bushing shall withstand a minimum cantilever loading of 600 pounds for five minutes without damage. The bushing interface shall be free of all voids, holes and heat sinks to assure proper mating

Typical Specification - Page 2 of 2

with separable insulated connectors. Each bushing shall be tested in free air, mounted in a grounded steel plate not less than 10 inches x 10 inches, with an Eaton's Cooper Power Systems Loadbreak Reducing Tap Plug #LRTP635 (or equal) installed in the well interface and insulated with an Eaton's Cooper Power Systems 200 Amp Insulated Protective Cap #LPC235 to accurately simulate operating conditions (*gas or liquid dielectric in the interface shall not be acceptable for this test*). Each bushing shall meet the requirements for 35 kV devices in accordance with IEEE Standard 386 (latest revision), including 100 percent production testing.

Bus

Bus shall be copper with all burrs and sharp corners removed prior to installation. Positive pressure shall be assured by use of stainless steel fasteners and lock washers at all connection points. All connections shall provide direct contact of current-carrying parts and shall not depend on current transfer through fastener thread-to-thread contact. Electrical components shall be "air-insulated" and positioned to allow visual inspection of all internal connections and components *without removing the clear-polycarbonate door safety barrier*, de-energizing or removing the equipment from service.

Barriers

Phase and ground barriers shall be provided to assure correct phase-to-phase and phase-to-ground clearances for proper operation at rated voltage. These barriers shall be glass-reinforced polyester (NEMA GPO-3 class material) not less than 0.1875-inch thick.

A removable insulating barrier with a "DANGER – Keep Out! – Hazardous voltage" sign, Elliott #7203-D2003-309, shall be located inside the door(s) on the bus compartment as recommended in Rule 381G of IEEE Standard C2 (National Electrical Safety Code). *When the enclosure width exceeds 70 inches*, the removable insulating barrier shall be divided to provide *sectional door safety barriers* with reduced size for secure handling. The door safety barrier(s) shall be constructed of 0.25-inch clear polycarbonate (Lexan or equal) and *shall completely close the door opening* and be provided with a nonconductive safety latch requiring a positive action to remove the barrier. Handles and other hardware extending through this door safety barrier shall be nonconductive material. Handles shall be keyed to prevent rotation for secure handling. *Complete visual inspection of the internal components shall be possible without removing the door safety barrier.*

Grounding Provisions

Two high-conductivity bronze eyebolt-type ground lugs, which accept #6 through #2/0 copper conductor, shall be installed in the cable terminating compartment (located on each side of the door opening in an accessible position).

Accessory Equipment

Stainless steel parking stands shall be provided in the quantity required to allow use of horizontal feed-thru bushings, parking bushings and grounding bushings. The parking stands shall be welded in place, in a position to allow the use of hot-line tools for installation of feed-thru bushings, etc. The parking stands shall be *unpainted* (except welds shall be painted) *to provide a ground* for feed-thru bushings and other devices that may be placed into the parking stands. *Keyed retainers* shall be welded centered above each pair of parking stands *to prevent slipping or accidental removal* of portable devices such as feed-thru bushings, etc.

A corrosion proof nameplate with permanent thermal transfer printing shall be installed inside one door on the elbow compartment. It shall be located at the top corner farthest from the elbows when the door is open. The nameplate will provide Type of Equipment, Model Number, Amps Continuous, kV Maximum, BIL, Serial Number, Job Number, Date Manufactured and Weight of Equipment.

Bus connections between bushings shall be displayed (on the cable side of the equipment plate) using 0.5-inch-wide solid orange-color pressure-sensitive vinyl tape. The resulting schematic shall clearly indicate the circuit arrangement of the cable switching station. The schematic shall be legible at a distance of six feet or more.

When enclosures have more than one door (or other access provision) each access shall be labeled in near proximity of the locking provisions with a pressure-sensitive vinyl label using letters not less than 0.375-inch nor more than 0.625-inch high. The label shall indicate the type of equipment behind the access (elbows, fuses, bus, etc.).

When specified, four anchor-bolt brackets, Elliott #6102-A81-7 or approved equal, shall be supplied with each cable switching station to provide a means of clamping the equipment to the concrete pad.

Packaging

Each cable switching station shall be bolted to a solid-top wood pallet (to prevent the forks of a forklift truck from entering the open bottom of the equipment) to prevent hidden damage. The equipment shall be wrapped with 0.125-inch thick polyethylene foam or other suitable material to minimize damage to the finish during shipment.

Drawings

When specified, drawings shall be furnished for each cable switching station that include:

- 1) enclosure dimensions and location of components.
- 2) proposed cable-training layout and dimensions.
- 3) proposed pad dimensions and location of anchor bolts.

Bushing Installation Instructions

The cable switching stations shown in this bulletin have equipment plates punched to accommodate the installation of additional bushings. The extra mounting holes are closed with “bushing-style” insulators or adapter plates. If circuit requirements change, bushings can be added or removed to provide the circuit arrangements shown in this bulletin. The mounting hardware used to mount the “bushing-style”

insulator or adapter plate is the same hardware used to install a bushing. There is no need to drill holes when modification is required.

NOTE: *The cable switching station must be de-energized and grounded in accordance with your company's normal safety procedure before any modifications are made.*

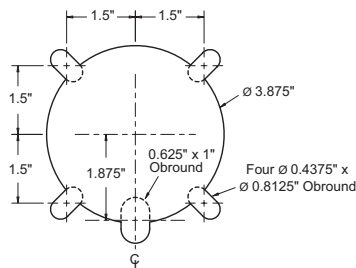
Procedure for Bushing Installation

NOTE: *The shipping cap on the bushing should be left in place to prevent contamination of the interface.*

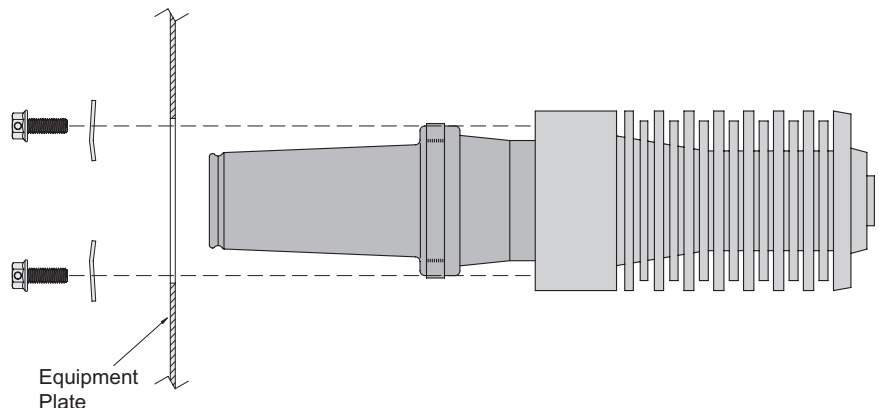
1. Remove the bus bar.
2. Remove the “bushing-style” insulator or adapter plate from the equipment plate (retain for future use).
3. Install the bushing into the mounting hole from the bus side.
4. Install the Bushing Mounting Support Plates and serrated-flange bolts. Bolts should be tightened in a uniform manner applying no more than 90 inch-pounds torque to each bolt. The Bushing Mounting Support Plates must “cut” into the mounting plate to provide a connection from the shielding to the grounded equipment mounting plate.

5. Connect the copper bus bar to the bushing just installed using hardware previously removed.
6. Tighten the bolt on both ends of the bus bar no more than 216 inch-pounds.

IMPORTANT: *Do not energize this bushing with only the shipping cap in place.* To do so would lead to failure of the bushing and create a hazard to operating personnel. *This product is designed to be used only when it is mated with an appropriate 35 kV class elbow conforming to the latest revision of IEEE Standard 386, Figure 8 - 200 Amp loadbreak interface no. 1A, 21.1/36.6 kV.* The elbow should be installed in accordance with the instructions supplied by the connector manufacturer.



Mounting Hole for Elliott #1208-635B
SuperWell Bushing with #LRTP635 Installed





**35-kV Safefront 200 Amp *SuperWell*
Source Isolated Cable Switching Station**
Pad-Mounted – Outdoor

Bulletin
450-311
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