

1.0 Scope

1.1 This specification covers the requirements for furnishing and delivering free-standing, self-contained, cabinet enclosed 15kV rated air-insulated live-front pad-mounted switchgear with 600 amp interrupter switches and/or 200 amp fuses configured as shown in Figure 1 and as specified in the District's Special Provisions sheet.

1.2 This switchgear is intended for use in 60 hertz, three-phase, 12470 volt grounded-WYE underground distribution systems.

1.3 This switchgear will be used for sectionalizing and protecting underground distribution express feeders, subloops, and laterals as well as switching and protecting transformers.

1.4 This switchgear shall be designed for outdoor installation and operation. It shall be designed for mounting on a concrete pad.

2.0 General

2.1 The manufacturer shall be responsible for ensuring compatibility among all components of the switchgear.

2.2 The manufacturer shall be solely responsible for the performance of the basic switch components as well as the complete integrated assembly as rated.

2.3 Upon the District's request, the manufacturer shall provide sufficient notice to allow the District or its representatives to inspect the switchgear during its manufacture and to witness any or all tests performed on it.

2.4 The manufacturer shall furnish, upon request, certified tests establishing the electrical ratings of the switchgear, including ratings of the basic switches and fuse components.

2.5 The manufacturer shall provide product information for the pad-mounted switchgear with the initial bid or as changes are made for, but not limited to, the following:

- A. Internal and external dimensions
- B. Electrical specifications
- C. Weight of unit
- D. Method of latching and stops on doors

3.0 Reference Standards

Except as modified by this specification, the switchgear furnished shall comply with the requirements of the latest revisions of all applicable ANSI, IEEE and NEMA standards in addition to the standards listed below:

IEEE C37.73 IEEE Standard Requirements for Pad-Mounted Fused Switchgear

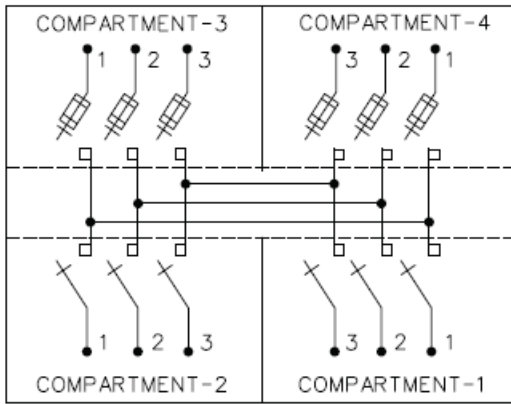
ANSI C57.12.28 ANSI Standard for Switchgear and Transformers Pad-Mounted Equipment Enclosure Integrity

ANSI C2 National Electrical Safety Code

Dist. Matl. Std. 890526.1 Padmount Equipment Danger Label

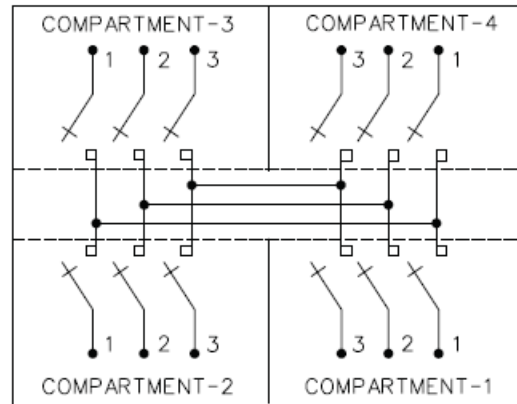
Dist. Matl. Std. 890534.1 Padmount Equipment Warning Label

4.0 Connection Diagrams and Material ID Numbers



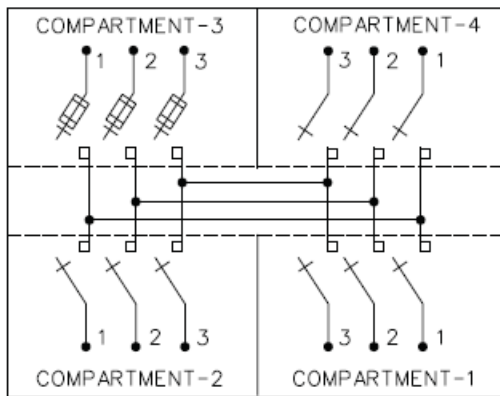
PMH-9 TYPE

Cat. ID 802092



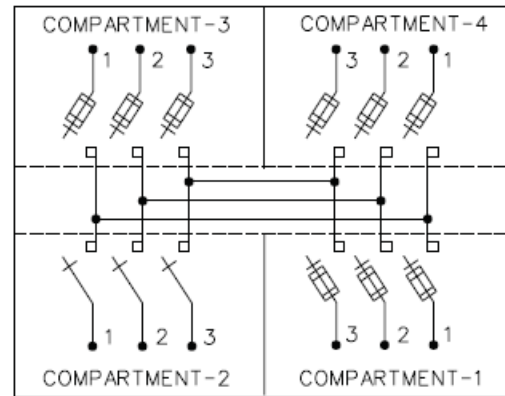
PMH-10 TYPE

Cat. ID 802109



PMH-11 TYPE

Cat. ID 802117



PMH-12 TYPE

Cat. ID 802125

FIGURE 1

5.0 Ratings

5.1 The switchgear shall have the following electrical ratings:

Power Frequency	60 Hz
Nominal Voltage	14.4kV
Maximum Voltage	15.5kV
BIL	95kV
Main Bus Continuous Current	600A

Three-Pole Interrupter Switches

Continuous Current	600A
Load Dropping Current	600A

Two-Time Fault Closing Duty Cycle

RMS Asymmetrical at 14.4kV	20,000A
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Fuses (S&C Type SML-4Z) with Integral Load Interrupter

Continuous Current (Fuse)	200A
Load Dropping Current (Fuse)	200A

One-Time Fault Closing Duty-Cycle

Capability, RMS Asymmetrical at 14.4kV	20,000A
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Two-Time Fault Closing Duty-Cycle

Capability, RMS Asymmetrical at 14.4kV	12,500A
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Short Circuit Ratings of All Components

RMS Symmetrical	12,500A
RMS Asymmetrical	20,000A

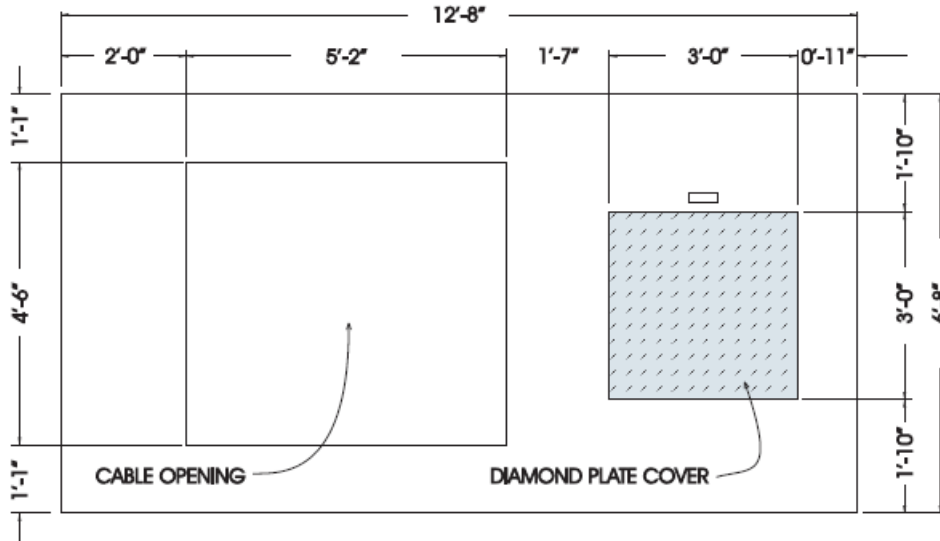
5.2 Fuse mountings shall have a minimum three-phase RMS symmetrical short circuit interrupting rating of 200 MVA at 14.4kV.

6.0 Enclosure

6.1 General

- A. The switchgear cabinet shall be of unitized construction (not structural frame and bolted sheet).
- B. The cabinet, including the doors, shall be of 11 gauge steel sheet.
- C. All structural joints and butt joints shall be welded, and the external seams shall be ground flush and smooth.

- D. The base shall be square and smooth to enable it to rest solidly on a smooth concrete surface. The base shall consist of continuous 90° flanges, 1-inch minimum width, turned inward and welded at the corners for bolting to a concrete pad.
- E. The cabinet shall have adequate size and strength for fuse handling, fuse exhaust and venting, and shall withstand all pressure build-up during interruption without permanent distortion or damage to any portion of the structure.
- F. The cabinet shall be so designed to permit free flow ventilation from bottom to top to minimize condensation without sacrificing security.
- G. The cabinet shall meet or exceed ANSI C57.12.28 tamper resistance requirements.



Pad-Mounted Switchgear Vault Cover

FIGURE 2

6.2 Dimensions

- A. The maximum external dimensions of the switchgear enclosure shall not exceed 68 inches wide x 64 inches deep x 52 inches high (not counting the lifting tabs).
- B. The enclosure shall be dimensioned such that it will fit over the 62 inch wide x 54 inch deep cable opening in the District's standard pad-mounted switchgear vault cover, illustrated in Figure 2.

6.3 Roof

- A. The cabinet roof shall be constructed so as to shed water. If two roofs are used, water shall not collect at their intersection.
- B. The roof shall be undercoated with a heavy coat of an insulating "no-drip" compound to prevent condensation of moisture on its inside surface.

6.4 Access

- A. Access into the cabinet shall be through the doors to the switch and fuse compartments only.
- B. The design of the cabinet, bus work, and support insulators shall be such that all support insulators shall be completely visible without disassembly (in order to facilitate inspection and cleaning).

6.5 Doors

- A. All doors shall include a three-point latching scheme that requires doors to be latched before the padlock shackle can be inserted. The door handles shall be padlockable and shall use a hood to protect the padlock from tampering. This door latching scheme shall require only a single padlock per door or per set of double doors. Each door handle shall be provided with a recessed penta head bolt as part of its security system.
- B. Doors shall be bulkhead type, side-hinged to swing open horizontally. Top-hinged, clam shell type doors are unacceptable.
- C. Doors shall be equipped with stainless steel hinge assemblies and hinge pins.
- D. Each door shall be equipped with a zinc-nickel plated steel door-holder located above the door opening. These holders shall be hidden from view when the door is closed. It shall not be possible for the door-holders to swing inside the enclosure. The door-holders shall hold the doors open at an angle of at least 103° and at most 120°.

6.6 Barriers

- A. All enclosures shall include compartmentalization between three-phase circuits to permit isolated access to individual circuits while other circuits are energized. Steel barriers shall separate side-by-side compartments.
- B. Insulating interphase and end barriers of NEMA GPO3-grade red fiberglass-reinforced polyester shall be provided for each three-phase interrupter switch and each fuse. Additional insulating barriers of the same material shall separate the front compartments from the rear compartments.
- C. Each three-phase interrupter switch and each fuse position shall be provided with dual purpose front barriers of NEMA GPO3-grade red fiberglass-reinforced polyester to meet NESC Rule 381G of ANSI C2.
 - These barriers, in their normal vertical hanging positions, shall guard against inadvertent contact with live parts. A window panel shall be provided to allow viewing of the switch position without removing the barriers.
 - It shall be possible to easily lift out the dual purpose front barriers in the switch compartments and then insert them between the blades and contacts when the switches are open.
 - It shall be possible to easily lift out the dual purpose front barriers in the fuse compartments and then insert them in the open gap when the fuses are in the disconnect position.
 - The dual purpose front barriers shall be designed such that the enclosure doors can be closed and locked with the switches and fuses in their open positions and the barriers in the slide-in position.
 - The dual purpose front barriers shall prevent inadvertent contact with energized parts at the top of the switch or fuse positions when barriers are in the slide-in position.

6.7 Lifting Tabs

- A. Lifting tabs shall be removable.
- B. A resilient material shall be placed between the lifting tabs and the enclosure to prevent the tabs from scratching the enclosure finish. To help retard corrosion, the resilient material shall be closed-cell to prevent moisture from being absorbed and held between the tabs and the enclosure in the event that the lifting tabs are not removed.

6.8 Finish

- A. The finish of the switchgear cabinet shall meet or exceed the requirements of ANSI C57.12.28, latest revision. Combined primer and topcoat thickness shall be no less than 3.0 mils. Paint and primer shall be lead free. A certified test abstract to indicate compliance with these requirements shall be furnished upon request.
- B. The topcoat of the finish shall be dark green Munsell No. 7GY 3.29/1.5.
- C. A resilient closed-cell material, such as PVC gasket, shall be applied to the entire underside of the enclosure bottom flange to protect the finish on this surface from scratching during handling and installation. This material shall isolate the bottom flange from the alkalinity of a concrete foundation to help protect against corrosive attack.

7.0 Grounding Provisions

7.1 Grounding Pads

- A. A ground connection pad shall be provided in each compartment of the pad-mounted gear. The pads shall be welded to the interior of the enclosure near the cable entrances.
- B. The pads shall be of unpainted copper-faced steel, unpainted stainless steel or unpainted galvanized steel. The pads shall be a minimum of 2 inches x 3-1/2 inches with two 1/2-13 UNC tapped holes, a minimum 7/16 inch deep, spaced 1-3/4 inches center-to-center.
- C. The grounding pads shall be capable of carrying the fault duty of the switchgear.

7.2 Grounding Studs

- A. Each switch terminal, fuse terminal and compartment ground terminal shall have a grounding stud for attaching working grounds equipped with duckbill type clamps.
- B. The grounding studs shall be of galvanized steel.
- C. The compartment grounding studs shall be a minimum of 10 inches long.
- D. The grounding studs shall be located such that the working ground clamps may be easily applied or removed with a hotstick.
- E. The grounding studs shall be capable of carrying the fault duty of the switchgear.

8.0 Buses

8.1 All buses shall be of copper or aluminum.

8.2 All joints shall have suitable hardware and treatment to prevent harmful oxidation and loss of optimum contact pressure.

8.3 Bus and interconnections shall withstand the stresses associated with short circuits up through the maximum rating of the switchgear.

9.0 Cable Terminal Pads

9.1 All cable terminal pads shall be of tinned copper.

9.2 All cable terminal pads shall have two - 9/16 inch holes spaced 1-3/4 inch center-to-center for connecting cable terminators.

9.3 The cable terminal pads shall be located such that the bottom cable terminator mounting hole is at least 16 inches above the bottom surface of the switchgear cabinet.

9.4 There shall be ample space around the cable terminal pads to accommodate 3M coldshrink, or District approved equivalent, outdoor type 1000 kcmil 15 kV cable terminators with rainskirts.

10.0 Interrupter Switches

10.1 All interrupter switches shall be dry type, in-air, three-pole, externally group operable through an operating handle external to the enclosure.

10.2 An operating handle shall be provided for each interrupter switch. The switch-operating handle shall be secured to the inside of the switch operating hub pocket by a corrosion-resistant chain. The handle shall be stored behind the switch operating hub access door.

10.3 The switch-operating hub pocket shall include a padlockable access cover that shall use a hood to protect the padlock from tampering.

10.4 The group-operated interrupter switches shall be actuated through a nondefeatable quick-make, quick-break mechanism installed by the switch manufacturer. The quick-make, quick break mechanism shall assure high speed closing and opening of the switches independent of the speed of the manual switch operating handle and operating hub.

10.5 The manual operating handle shall include an over-travel stop feature to prevent the operator from overpowering the mechanism and possibly breaking parts in the drive train.

10.6 Labels or targets to indicate switch positions shall be provided in all switch operating hub pockets.

10.7 Interrupter switch contacts shall be silver-plated and backed up by stainless steel springs to provide constant high-contact pressure.

10.8 Circuit interrupting shall take place completely within the interrupter, with no external arc or flame. Any exhaust shall be vented in a controlled manner.

10.9 Interrupter switches shall have a readily visible open gap when in the open position to allow positive verification of switch position. Each interrupter switch compartment shall include a removable window panel located above the dual purpose barriers to permit visual checking of the interrupter switch position after opening the compartment door. The preferred installation of this window panel is to mount it on threaded studs equipped with large wing nuts readily accessible from the door side of the cabinet.

10.10 Bearings shall be maintenance-free or sealed type, with all-temperature lubricants, and shall be capable of free-operation through a specified temperature range.

11.0 Fuse Mountings

11.1 Each fuse compartment shall be equipped with mountings to accommodate three S&C SML-4Z power fuseholders designed for S&C SM-4 power fuses.

11.2 FUSEHOLDERS AND FUSES SHALL NOT BE PROVIDED UNDER THIS SPECIFICATION.

11.3 All power fuse mountings are to have a built-in load-break device in the contact assembly to provide live switching ability using only a standard hotstick with station prong, without the necessity of opening the line switches to isolate and replace a single blown fuse unit.

11.4 Live-switching shall be accomplished by a firm steady opening pull on the fuse pull ring with a hook stick. No separate load-interrupting tool shall be required.

11.5 Circuit interruption shall take place completely within the integral load interrupter with no external arc or flame.

11.6 The integral load-interrupter and the fuse shall be provided with separate fault-closing contacts and current carrying contacts. The fuse hinge shall be self-guiding and, together with the fault-closing contacts, shall guide the fuse into the current

carrying contacts during closing operations. Circuit-closing inrush currents and fault currents shall be picked up by the fault-closing contacts, not by the current-carrying contacts or interrupting contacts.

11.7 A storage rack shall be provided in each fuse compartment to accommodate up to six S&C SM-4 fuse refill units.

12.0 Fuse Handling Tool

A fuse handling tool recommended for use by the fuse manufacturer shall be furnished with each switch.

13.0 Labeling

13.1 Warning Labels

The manufacturer shall not install exterior warning labels but shall leave space for the District's labels as indicated herein.

- A. The District will provide and install a warning label conforming to the requirements of the latest revision of District Material Standard 890534.1 on the outside of each door of each switch and fuse compartment.
- B. The District-installed warning labels will be conspicuously located on the upper half of the doors. The top edge of the warning labels will be in alignment with the top edge of the doors.

13.2 Danger Labels

The District uses the danger label specified below and will provide the names of its approved suppliers upon request.

- A. A danger label conforming to the requirements of the latest revision of District Material Standard 890526.1 shall be provided on the inside of each door of each switch and fuse compartment and on the front and back of each switch and fuse position dual purpose insulating barrier.
- B. The danger labels shall be conspicuously located on the upper half of the doors and barriers.

13.3 Nameplate

The outside of each door, or set of double doors, of the switchgear shall be provided with a durable corrosion-resistant nameplate indicating:

- Name of manufacturer
- Date of manufacture
- Model no.
- Catalog no.
- Serial no.

13.4 Ratings Label

The inside of each door, or set of double doors, shall be provided with a ratings label. This label shall include the ratings required in section 5.0 of this specification.

13.5 Connection Diagram

The inside of each door, or set of double doors, and the inside of each switch operating hub access cover shall be provided with a three-line connection diagram of the switchgear. The diagram shall show the interrupter switches, fuses with integral

load interrupters and bus.

13.6 Compartment and Phase Identification

- A. The number of each compartment shall be clearly labeled with a decal on the inside of the switchgear cabinet. The preferred location for each decal is on the face of the cabinet directly above each compartment.
- B. Each switch and fuse position phase shall be labeled with a decal on the inside of the switchgear cabinet.
- C. Phase identification labels shall be located on the face of the cabinet directly above each phase position.

14.0 Instruction Manual

One instruction manual covering installation, operation and maintenance of the equipment shall be provided with each switchgear cabinet. This manual shall be packaged in a weatherproof bag or envelope and secured on the inside of the door of compartment no. 1.

15.0 Certification

Upon the District's request, the manufacturer shall provide certified test reports verifying that the equipment meets or exceeds the electrical ratings, tamper resistance and finish required by this specification.

16.0 Packaging

16.1 Each switchgear shall be completely assembled and packaged in accordance with good commercial practice to ensure safe delivery without damage to the finish or any other part of the unit.

16.2 Provisions shall be made to protect switchgear shipped on flatbed trucks from contamination of the cabinet exterior and interior from rocks, dirt, insects and other foreign materials encountered in shipment.

16.3 Each switchgear shall be shipped on a nonreturnable wood pallet designed for handling with a forklift. Pallets shall have a minimum of 3-1/2 inches of vertical clearance for the forks. Pallets shall be of adequate strength to withstand normal shipping and handling of the switch.

16.4 Switchgear shall be shipped so that they may be removed from the truck or trailer by forklift.

16.5 No material or other switchgear shall be stacked or carried on top of the switchgear.

16.6 The serial number of each padmount switch shall be listed on the packing list.

17.0 Bidders' Data

For each model of pad-mounted switchgear, each bidder shall submit the following with their proposal:

- A description of any proposed changes, additions or exceptions to this specification along with reasons for the departure.
- Outline drawings with overall dimensions.
- One instruction manual covering installation, operation and maintenance of the equipment.
- A statement of all electrical tests given and whether these tests apply to all units or only to sample units.
- Information concerning construction details.

- Statement of Warranty
- Complete data and information as requested in section 2.5 of this specification.

18.0 Evaluation of Bids

The following factors will be considered in the analysis and evaluation of bids and subsequent bid award:

- Base price
- Escalations
- Past performance of bidder and product
- Conditions of Warranty
- Construction and operation details
- Adherence to specifications
- Manufacturing ability
- Delivery schedule

19.0 Inspection

After delivery, each pad-mounted switchgear will be inspected for defects and conformance to this specification.

The supplier (or its representative) will be notified of all deficiencies. Mutual arrangements shall be made for correcting the deficiencies at no expense to the District. Any subsequent testing required due to the deficiencies will be at the supplier's expense.

20.0 General Bidding Conditions

The attached General Bidding Conditions are made a part of this specification.