

# Installation

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# Introduction

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## Qualified Persons

### **WARNING**

Only qualified persons knowledgeable in the installation, operation, and maintenance of overhead and underground electric distribution equipment, along with all associated hazards, may install, operate, and maintain the equipment covered by this publication. A qualified person is someone trained and competent in:

- The skills and techniques necessary to distinguish exposed live parts from nonlive parts of electrical equipment
- The skills and techniques necessary to determine the proper approach distances corresponding to the voltages to which the qualified person will be exposed
- The proper use of special precautionary techniques, personal protective equipment, insulated and shielding materials, and insulated tools for working on or near exposed energized parts of electrical equipment

These instructions are intended only for such qualified persons. They are not intended to be a substitute for adequate training and experience in safety procedures for this type of equipment.

## Read this Instruction Sheet

### **NOTICE**

Thoroughly and carefully read this instruction sheet and all materials included in the product's instruction handbook before installing or operating source-transfer PMH Pad-Mounted Gear. Become familiar with the Safety Information on pages 4 through 6 and Safety Precautions on page 7. The latest version of this publication is available online in PDF format at [sandc.com/en/contact-us/product-literature/](http://sandc.com/en/contact-us/product-literature/).

## Retain this Instruction Sheet

This instruction sheet is a permanent part of the source-transfer PMH Pad-Mounted Gear. Designate a location where users can easily retrieve and refer to this publication.

## Proper Application

### **WARNING**

The equipment in this publication is only intended for a specific application. The application must be within the ratings furnished for the equipment. Ratings for the source-transfer PMH Pad-Mounted Gear are listed in the ratings table in S&C Specification Bulletin 663A-31. The ratings are also on the nameplate affixed to the product.

**Warranty**

The warranty and/or obligations described in S&C's Price Sheet 150, "Standard Conditions of Sale—Immediate Purchasers in the United States," (or Price Sheet 153, "Standard Conditions of Sale—Immediate Purchasers Outside the United States"), plus any special warranty provisions, as set forth in the applicable product-line specification bulletin, are exclusive. The remedies provided in the former for breach of these warranties shall constitute the immediate purchaser's or end user's exclusive remedy and a fulfillment of the seller's entire liability. In no event shall the seller's liability to the immediate purchaser or end user exceed the price of the specific product that gives rise to the immediate purchaser's or end user's claim. All other warranties, whether express or implied or arising by operation of law, course of dealing, usage of trade or otherwise, are excluded. The only warranties are those stated in Price Sheet 150 (or Price Sheet 153), and THERE ARE NO EXPRESS OR IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. ANY EXPRESS WARRANTY OR OTHER OBLIGATION PROVIDED IN PRICE SHEET 150 (OR PRICE SHEET 153) IS GRANTED ONLY TO THE IMMEDIATE PURCHASER AND END USER, AS DEFINED THEREIN. OTHER THAN AN END USER, NO REMOTE PURCHASER MAY RELY ON ANY AFFIRMATION OF FACT OR PROMISE THAT RELATES TO THE GOODS DESCRIBED HEREIN, ANY DESCRIPTION THAT RELATES TO THE GOODS, OR ANY REMEDIAL PROMISE INCLUDED IN PRICE SHEET 150 (OR PRICE SHEET 153).

**Warranty  
Qualifications**

The standard warranty contained in the seller's standard conditions of sale (as set forth in Price Sheet 150) does not apply to source-transfer PMH Pad-Mounted Gear where fuse units, fuse unit end-fittings, holders, refill units, or switch blades of other than S&C manufacture are used in conjunction with S&C SML Mountings. Nor does it apply to source-transfer PMH Pad-Mounted Gear where other than Fault Fiter® Electronic Power Fuses, S&C Switch Blades, or the current-limiting fuses listed in Table 1 of S&C Information Bulletin 660-50 are used in conjunction with Fault Fiter Electronic Power Fuse Mountings and S&C Holders designed therefor, or when current-limiting fuses are applied other than as set forth under the "Recommended Voltage Ratings" section of S&C Information Bulletin 660-50.

The seller's standard warranty does not apply to major components not of S&C manufacture, such as remote terminal units and communication devices, including hardware, software, resolution of protocol-related matters, and notification of upgrades or fixes for those devices.

## Safety Information

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### Understanding Safety-Alert Messages

Several types of safety-alert messages may appear throughout this instruction sheet and on labels and tags attached to the product. Become familiar with these types of messages and the importance of these various signal words:

#### **DANGER**

“DANGER” identifies the most serious and immediate hazards that will likely result in serious personal injury or death if instructions, including recommended precautions, are not followed.

#### **WARNING**

“WARNING” identifies hazards or unsafe practices that can result in serious personal injury or death if instructions, including recommended precautions, are not followed.

#### **CAUTION**

“CAUTION” identifies hazards or unsafe practices that can result in minor personal injury if instructions, including recommended precautions, are not followed.

#### **NOTICE**

“NOTICE” identifies important procedures or requirements that can result in product or property damage if instructions are not followed.

### Following Safety Instructions

If any portion of this instruction sheet is unclear and assistance is needed, contact the nearest S&C Sales Office or S&C Authorized Distributor. Their telephone numbers are listed on S&C’s website [sandc.com](http://sandc.com), or call the S&C Global Support and Monitoring Center at 1-888-762-1100.

#### **NOTICE**

Read this instruction sheet thoroughly and carefully before installing the source-transfer PMH Pad-Mounted Gear.

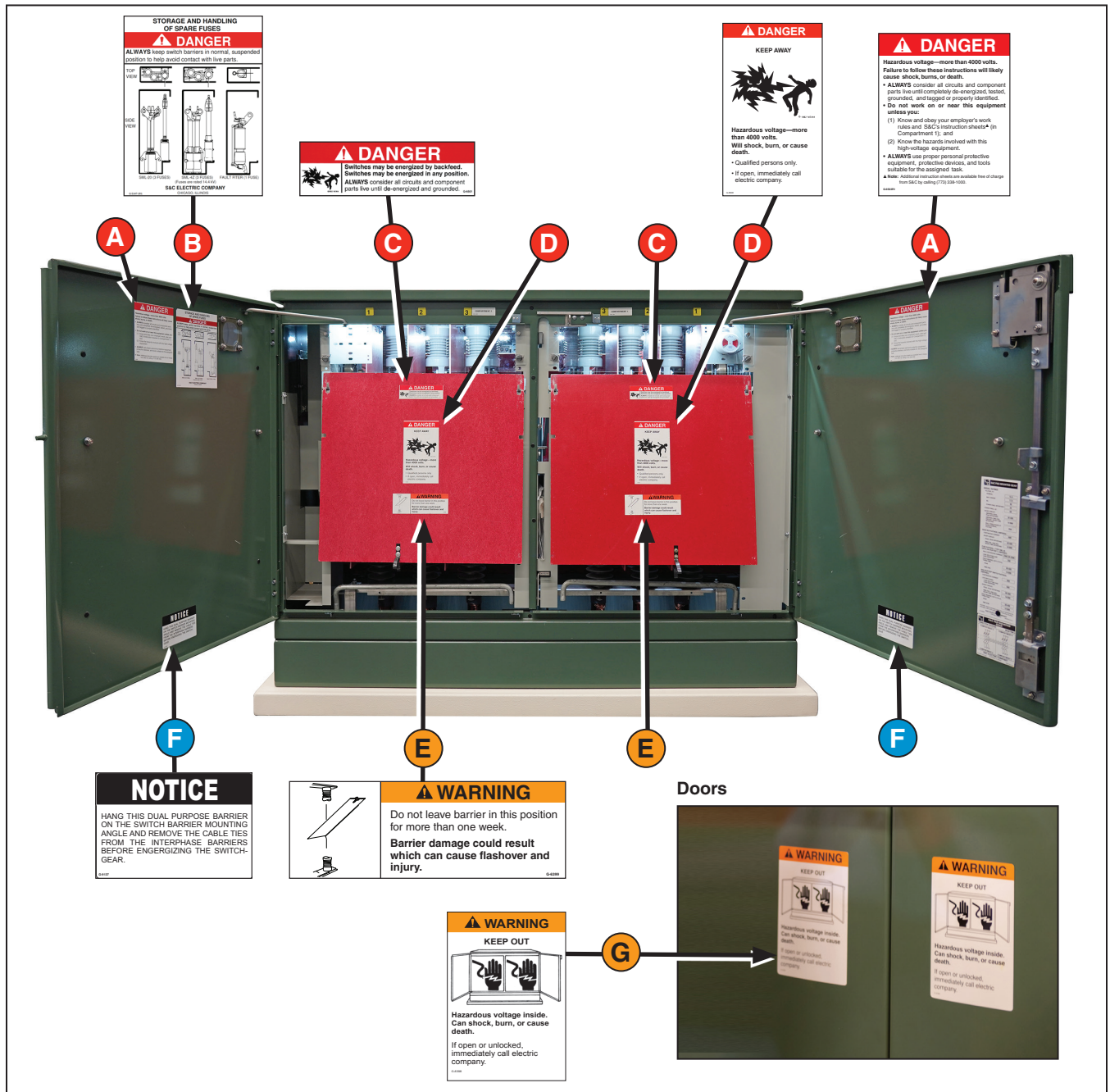


### Replacement Instructions and Labels

If additional copies of this instruction sheet are required, contact the nearest S&C Sales Office, S&C Authorized Distributor, S&C Headquarters, or S&C Electric Canada Ltd.

It is important that any missing, damaged, or faded labels on the equipment be replaced immediately. Replacement labels are available by contacting the nearest S&C Sales Office, S&C Authorized Distributor, S&C Headquarters, or S&C Electric Canada Ltd.

Location of Safety Labels

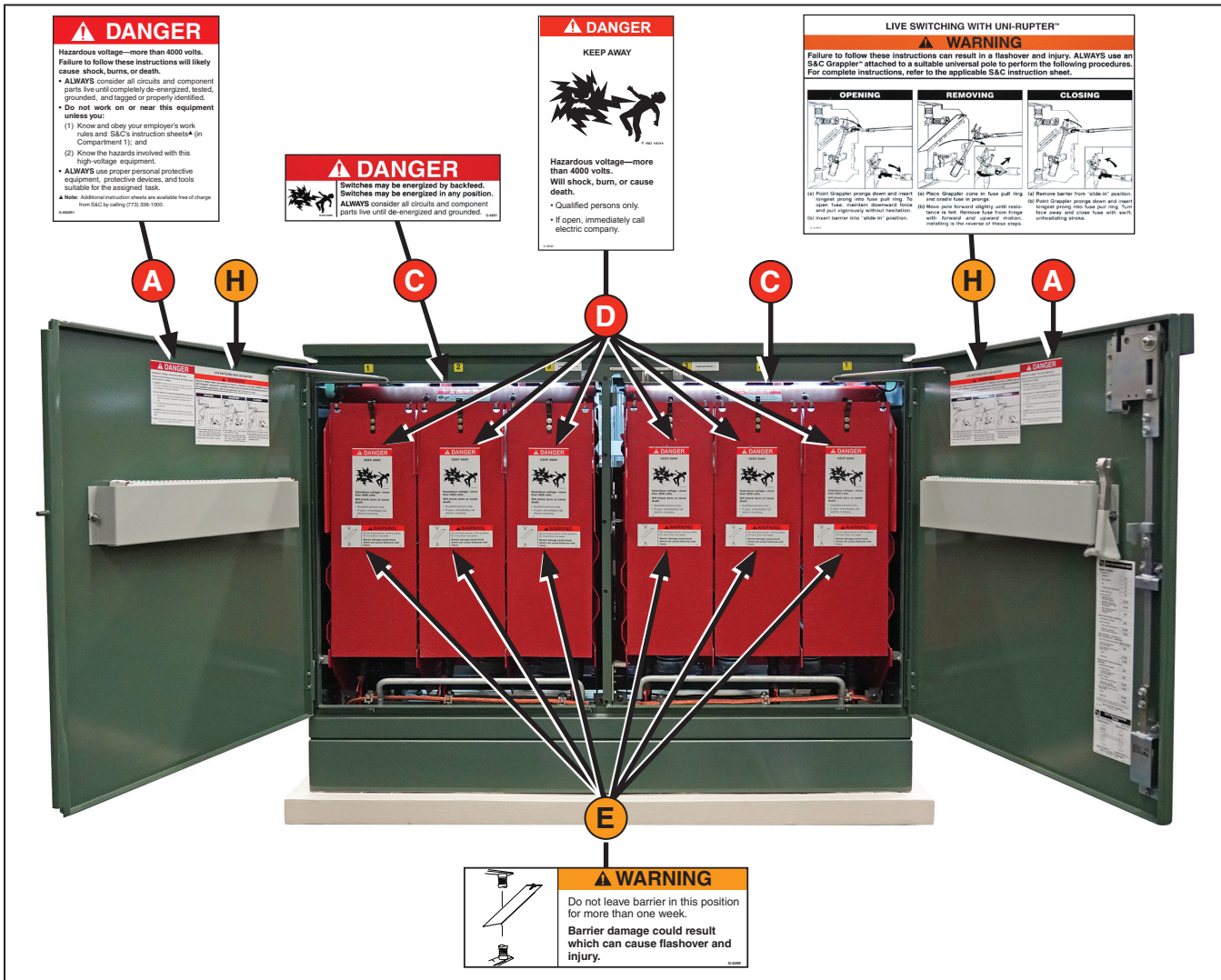


Reorder Information for Safety Labels

Location	Safety Alert Message	Description	Part Number
A	<b>⚠ DANGER</b>	Hazardous voltage —more than 400 volts . . .	G-6503
B	<b>⚠ DANGER</b>	Storage and handling of spare fuses	G-5147-1R1
C	<b>⚠ DANGER</b>	Switches may be energized . . .	G-6501
D	<b>⚠ DANGER</b>	Keep away. . .	G-6500
E	<b>⚠ WARNING</b>	Do not leave barrier in this position . . .	G-6399
F	<b>NOTICE</b>	Hang this dual purpose barrier . . .	G-9137
G	<b>⚠ WARNING</b>	Keep out . . .	G-6398

# Safety Information

## Location of Safety Labels



## Reorder Information for Safety Labels

Location	Safety Alert Message	Description	Part Number
A	<b>⚠ DANGER</b>	Hazardous voltage —more than 400 volts . . .	G-6503
H	<b>⚠ WARNING</b>	Live switching with Uni-Rupter . . .	G-6369
C	<b>⚠ DANGER</b>	Switches may be energized . . .	G-6501
D	<b>⚠ DANGER</b>	Keep away . . .	G-6500
E	<b>⚠ WARNING</b>	Do not leave barrier in this position . . .	G-6399

**⚠ DANGER**



**S&C Source-Transfer PMH Pad-Mounted Gear operates at high voltage. Failure to observe the precautions below will result in serious personal injury or death.**

Some of these precautions may differ from your company's operating procedures and rules. Where a discrepancy exists, follow your company's operating procedures and rules.

1. **QUALIFIED PERSONS.** Access to S&C Source-Transfer PMH Pad-Mounted Gear must be restricted only to qualified persons. See the "Qualified Persons" section on page 2.
2. **SAFETY PROCEDURES.** Always follow safe operating procedures and rules.
3. **PERSONAL PROTECTIVE EQUIPMENT.** Always use suitable protective equipment, such as rubber gloves, rubber mats, hard hats, safety glasses, and flash clothing, in accordance with safe operating procedures and rules.
4. **SAFETY LABELS.** Do not remove or obscure any of the "DANGER," "WARNING," "CAUTION," or "NOTICE" labels.
5. **HIGH-VOLTAGE ISOLATION.** Switch operators and controls are isolated from high voltage in grounded, metal-enclosed compartments. Access to these components is controlled by padlockable covers, which incorporate a nonremovable manual handle. Other low-voltage components, such as meters, selector switches, toggle switches, etc., are similarly isolated.
6. **TEST FOR VOLTAGE.** Test for voltage using proper high-voltage test equipment before touching any device to be inspected, serviced, or repaired in the high-voltage compartments.
7. **ENERGIZED COMPONENTS.** Always consider all parts live until de-energized, tested, and grounded. Voltage levels can be as high as the peak line-to-ground voltage last applied to the unit. Units energized or installed near energized lines should be considered live until tested and grounded.
8. **GROUNDING.**
  - Make sure the pad-mounted gear enclosure is properly grounded to the station or facility ground.
  - After the gear has been completely disconnected from all sources of power and tested for voltage, install suitable grounding cables in all compartments before touching any device that is to be inspected, replaced, serviced, or repaired in the high-voltage compartments.
9. **MAINTAINING PROPER CLEARANCE.** Always maintain proper clearance from energized components.
10. **SWITCH POSITION.**
  - Always confirm the **Open/Close** position of Mini-Rupter® Switches by visually observing the position of the switch blades.
  - Switches may be energized by backfeed.
  - Switches may be energized in any position.
11. **PADLOCKS.** Non-removable, manual handles in high-voltage compartment doors and hinged-padlockable covers, as well as hinged-bolted panels, have provisions for padlocks that must be in place and secured at all times unless work is being performed inside the enclosure. Padlocks must be installed and secured on manual switch operating handles at all times unless the switch is being operated.
12. **KEY INTERLOCKS.** Key interlocks (if applicable) must be in place. Check the operating sequence of key interlocks to verify proper sequencing. After the switchgear is installed, destroy all duplicate keys or make them accessible only to authorized persons so the key interlock scheme will not be compromised. Key interlocks are not security locks.
13. **MECHANICAL CABLE INTERLOCKS.** Mechanical cable interlocks are provided to prevent access to fuses unless the switch is open and to prevent operation of stored-energy switch operators when the enclosure door is open. Do not attempt to operate any switch when the enclosure door is open. Periodically, verify these interlocks are functional.
14. **DO NOT APPLY UNDUE FORCE.** Do not apply any undue force when attempting to open a door. The use of undue force may damage the door-latching mechanism. If optional key interlocks are provided, make certain the interlocks are in their correct positions to allow door opening.
15. **FUSE HANDLING.**
  - Make sure fuses are disconnected from all power sources (including backfeed) before being inspected or replaced.
  - Always store fuses in a clean, dry location.
  - Do not store end-fittings, holders, interrupting modules, or fuses in termination compartments unless the unit is equipped with the optional **Fuse Storage** feature.
16. **BACKFEED.** Mini-Rupter Switches and fuses may be energized by backfeed.

## Overview

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The following instructions are for installation of source-transfer PMH Pad-Mounted Gear equipped with the Micro-AT Source-Transfer Control. This switchgear is a totally self-contained switching and protection package providing fault protection and fully automatic two-way source transfer for critical loads requiring a high degree of service continuity. Source-transfer PMH models that include the Micro-AT Source-Transfer Control provide programmed control of all switching functions associated with automatic source transfer.

Refer to S&C Instruction Sheet 663-503 for instructions regarding operation of source-transfer PMH Pad-Mounted Gear. For instructions about field programming and operation of the Micro-AT control, refer to S&C Instruction Sheet 515-500. These instruction sheets, along with a catalog dimensional drawing showing cable-locating and anchor bolt dimensions, are included in the "Installation and Operation Information Kit" provided with the switchgear.

Wiring diagrams for the switchgear and associated options are also provided in the kit. All personnel involved with the installation and operation of the equipment should be thoroughly familiar with the contents of the information kit.

The catalog number stamped on the nameplates affixed to the outside of the doors of the pad-mounted gear is suffixed with letter-number combinations. These suffixes indicate the inclusion of options, such as key interlocks. Refer to Specification Bulletin 663A-31 for a complete listing of the available options for the switchgear.



### Inspection

Examine the shipment for external evidence of damage as soon after receipt as possible, preferably before removal from the carrier's conveyance. Check the bill of lading to make sure all listed shipping skids, crates, and containers are present.

If there is visible loss and/or damage:

1. Notify the delivering carrier immediately.
2. Ask for a carrier inspection.
3. Note condition of shipment on all copies of the delivery receipt.
4. File a claim with the carrier.

If concealed damage is discovered:

1. Notify the delivering carrier within 15 days of receipt of shipment.
2. Ask for a carrier inspection.
3. File a claim with the carrier.

Also, notify S&C Electric Company in all instances of loss or damage.

### Packing

The source-transfer PMH Pad-Mounted Gear is fastened to a wood skid for shipment. Any components specified, such as fuses, refill units, fuse holders, end fittings, etc., are packed separately and shipped within the enclosure if they fit.

At the first opportunity, remove all packing materials (cardboard, paper, foam padding, etc.) from the outside of the gear. This will prevent the finish from being damaged by rainwater absorbed by the packing materials and will also prevent wind-induced abrasion from loose cardboard.

### Storage

The source-transfer PMH Pad-Mounted Gear should be installed and energized immediately. When the gear is energized, voltage sensor secondary-burden resistors generate sufficient heat to help prevent condensation in the low-voltage control compartment. If the gear cannot be installed immediately, store it in a clean, warm, dry room.

## Shipping and Handling

### Handling

#### **WARNING**

When handling the gear with an overhead hoist, observe standard lifting practices as well as the following general instructions.

**Failure to follow these precautions can result in injury and equipment damage.**

Follow these steps to lift and move the pad-mounted gear:

- STEP 1.** Make sure the lifting tabs are securely bolted to the enclosure before lifting the gear.
- STEP 2.** Use 6-foot (183-cm) or longer hoist slings of equal length to prevent overstressing the enclosure during lifting.

#### **WARNING**

Use care when lifting the gear. The side of the gear where the low-voltage control compartment is located is heavier than the other side. The gear will tilt when lifting. **Failure to lift the gear properly may lead to injury and equipment damage.**

- STEP 3.** Arrange the hoist slings to distribute the lifting forces equally between the lifting tabs. See Figure 1.
- STEP 4.** Avoid sudden starts and stops.

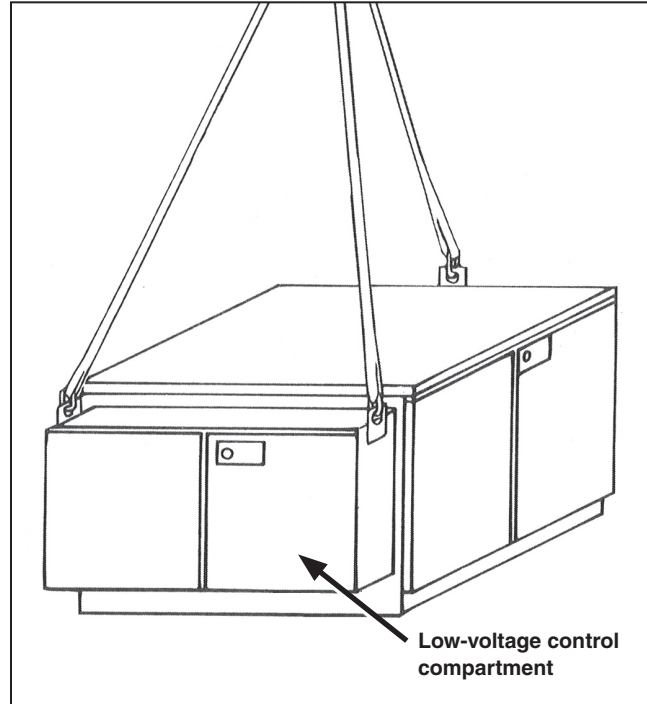


Figure 1. The hoist sling arrangement.

### Access to the Interior

Access to the interior of S&C Pad-Mounted Gear and its low-voltage control compartment is controlled by the Penta-Latch® Mechanism, which must be opened with a pentahead socket wrench or tool, except when hexhead actuators are specified.

The latching mechanism is coordinated with the provisions for padlocking so the mechanism can be unlatched only after the padlock has been removed, and the padlock can be installed only after the door has been securely closed and completely latched.

### Opening the Front Doors

#### NOTICE

Do not force the doors open. Forcing a door can damage the latching mechanism.

Follow these steps to open the doors:

**STEP 1.** Use a pentahead socket wrench or tool to unlatch the Penta-Latch Mechanism by rotating the actuator counterclockwise approximately 60 degrees against spring resistance until a distinct click is heard and the actuator reaches its stop. See Figure 2. This single motion unlatches the mechanism and recharges the latching spring for the subsequent closing operation.

**STEP 2.** Pull the door open and secure it with the door holder. See Figure 3.

#### NOTICE

If optional key interlocks are furnished, correctly position the interlocks so the doors can be opened.



Figure 2. To unlock the doors, turn the pentahead socket wrench 60° counterclockwise against spring resistance until a “click” is heard and the wrench reaches its stop.

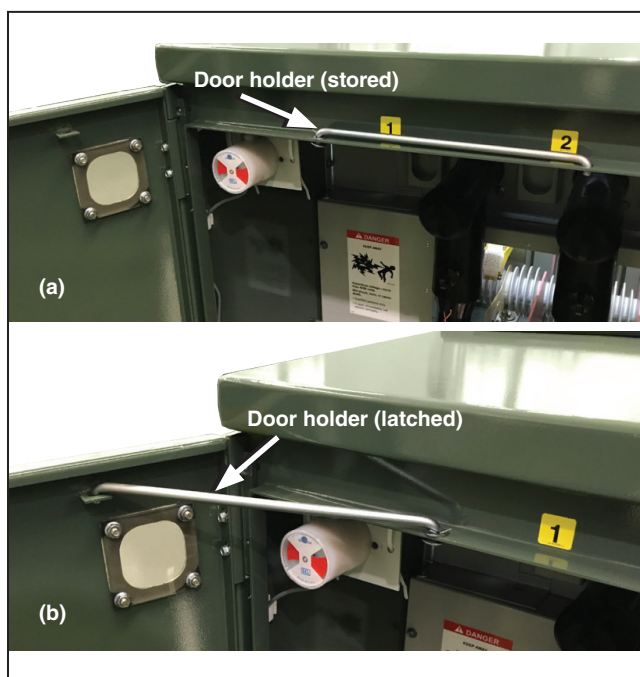


Figure 3. Using the door holder to hold the door open.

## Installation

**STEP 3.** *For double-door models of pad-mounted gear:* The left-hand door to the interior of the gear is secured closed by a rotating latch and is overlapped by the right-hand door, which is equipped with the Penta-Latch Mechanism. The left-hand door can be opened after opening the right-hand door, removing the tie wrap securing it for shipment, and disengaging the rotating latch by rotating it upward. See Figure 4.

The left-hand door to the low-voltage control compartment is secured closed by two captive screws and is overlapped by the right-hand door. This door can be opened after opening the right-hand door and loosening the screws securing it in place.

### Closing the Front Doors

Complete the following steps to close the doors:

**STEP 1.** Close the left-hand door and secure it as appropriate with the captive screws or with the latch by rotating the latch downward over the stop on the outer edge of the door. See Figure 4. The right-hand door latches automatically when the door is closed.

*To close a door equipped with the Penta-Latch Mechanism:* Place one hand at the midpoint of the door-front near the edge and firmly push the door closed. When the latch points are positively engaged, the spring mechanism will trip to latch the door.

**STEP 2.** Pull outward on the cover of the Penta-Latch Mechanism to verify the door has latched securely. If it has not, use a pentahead (or hexhead, when applicable) socket wrench or tool to rotate the actuator counterclockwise until a distinct click is heard and the actuator reaches the stop.

If the actuator will not rotate counterclockwise, the mechanism was already charged for closing but was not closed properly. Close the door again, making sure all latch points engage completely and simultaneously.

**STEP 3.** Insert a padlock into the hasp when the door is securely latched.



**Figure 4.** Rotate the latch upward to disengage the left-hand door, as shown above. To secure the left-hand door closed, rotate the latch downward over the stop on the outer edge of the door.

## Placing the Gear

Complete the following steps when placing the gear:

- STEP 1.** At the installation site, remove all separately packaged components shipped in the pad-mounted gear enclosure and set them aside in a protected area.
- STEP 2.** Unbolt the enclosure from its skid and lift the unit onto the mounting pad, observing the precautions in the “Handling” section on page 10.
- STEP 3.** Open the doors to the interior of the gear and secure them with the door holders.
- STEP 4.** Refer to the catalog dimensional drawing furnished and verify the enclosure compartments are positioned correctly and the unit is properly aligned with respect to the anchor bolts or flush anchors.

**Note:** If excess lengths of direct-buried cable are in place and they must be fed into the enclosure compartments as the unit is being lowered, the doors must be opened (with door holders in place) to allow any excess cable to feed over the door stiles.

If switch interphase and end barriers (where applicable) are removed to facilitate this procedure, note their position to ensure correct reinstallation.

It should not be necessary to remove any upper barriers. Refer to Step 1(b) of the Cable Terminations section on page 14 for instructions on removal of switch barriers.

- STEP 5.** Level the pad-mounted gear enclosure using metal shims as required between the mounting pad and the enclosure. Shim the enclosure until the tops of the compartment doors are even. For two-compartment units, shim the enclosure until the top of each door is parallel with the top of the gear.
- STEP 6.** Secure the enclosure to the pad using the anchor brackets provided. See the anchor-bolt detail on the catalog dimensional drawing. Make sure all compartment doors open and latch closed without binding. Binding indicates enclosure distortion which must be corrected with additional shimming.

## Cable Terminations

Complete the following steps to terminate the cables:

**STEP 1.** To facilitate makeup and connection of cable terminations to switch terminals, switch inter-phase and end barriers (where applicable) can be removed by loosening the wing-head screw that secures each barrier to the barrier-support angle.

- (a) Remove the tie wraps securing the wing-head screws for shipment. The screw will remain attached to the barrier, which is supported at the switch frame by the barrier guide. See Figure 5 on page 15.
- (b) Lift the barrier from the guide and place it in a location where the barrier will not be damaged.

**STEP 2.** Optional cable guides, if specified, include cable-support brackets (packed separately) and mounting angles (factory installed when an optional base spacer, 12-inch (30.5-cm) minimum, is specified; packed separately otherwise).

Using the hardware furnished, attach the mounting angles (if packed separately) to the tabs provided on the sidewalls of the compartments and attach the cable-support brackets to the angles. See Figure 5 on page 15. Do not remove the protective sheet from the saddle of the bracket or install the cable wrap until instructed to do so in Step 4 on page 18.

**STEP 3.** Make up cable terminations following the cable-terminator manufacturer's instructions.

### **WARNING**

While the interior of source-transfer PMH Pad-Mounted Gear is protected from direct exposure to the elements, it is inherently an outdoor environment—and requires selection and application of cable-terminating devices accordingly. Terminations must incorporate adequate leakage distance between the exposed conductor and the stress-relief cone, across a surface of non-tracking material (or surface rendered non-tracking by properly taping with a suitable material). Furthermore, to maintain the rated BIL, the following minimum clearances are required. See Figure 6 on page 16:

- From energized parts to electrical ground: 6 inches (152 mm) at 14.4 kV; 7½ inches (191 mm) at 25 kV
- From energized parts to fiberglass-reinforced polyester barriers: 1 inch (25 mm) at 14.4 kV; 2¼ inches (57 mm) at 25 kV
- From terminator skirts to fiberglass-reinforced polyester barriers: ½-inch (13 mm) at 14.4 kV; 1¼-inch (32 mm) at 25 kV

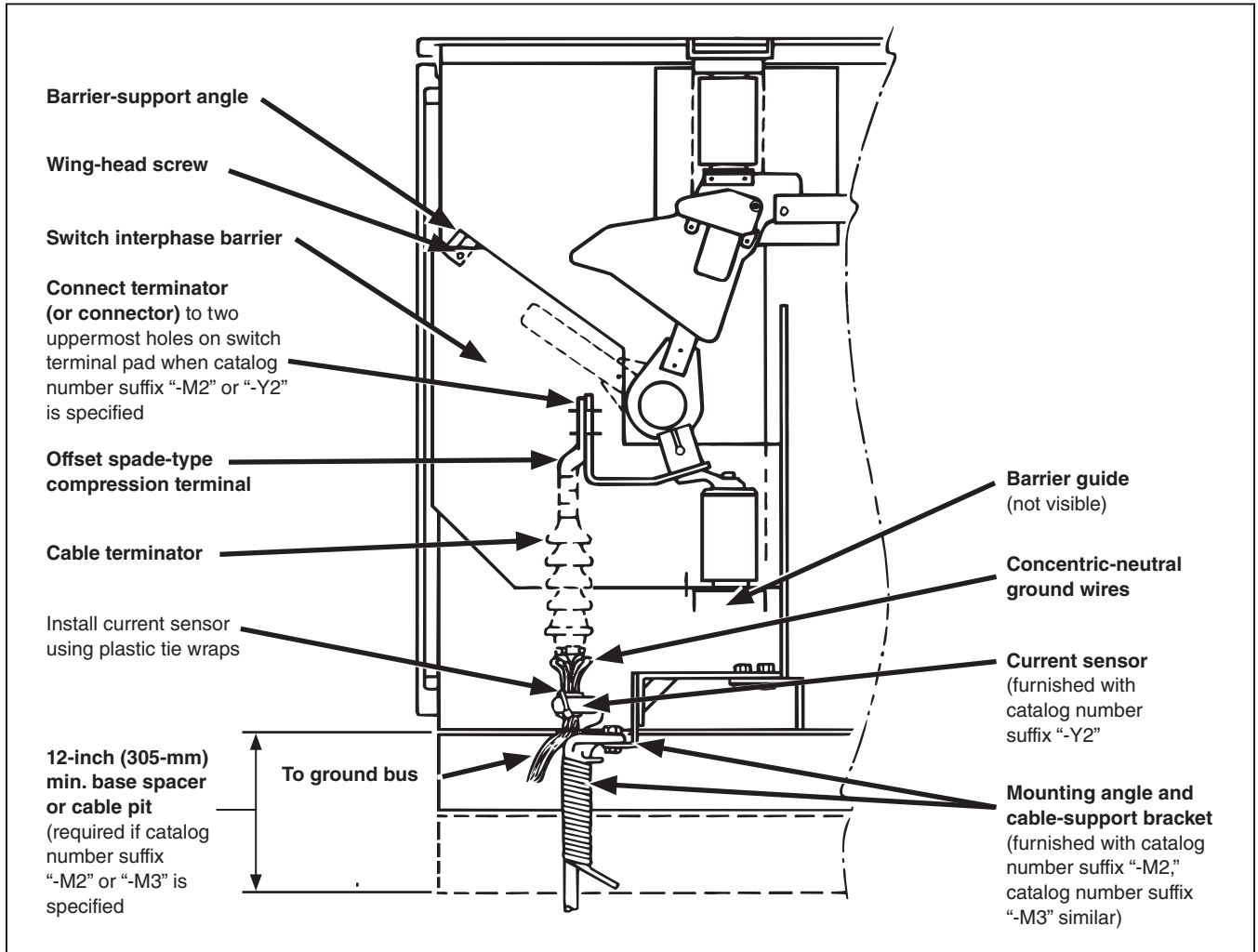
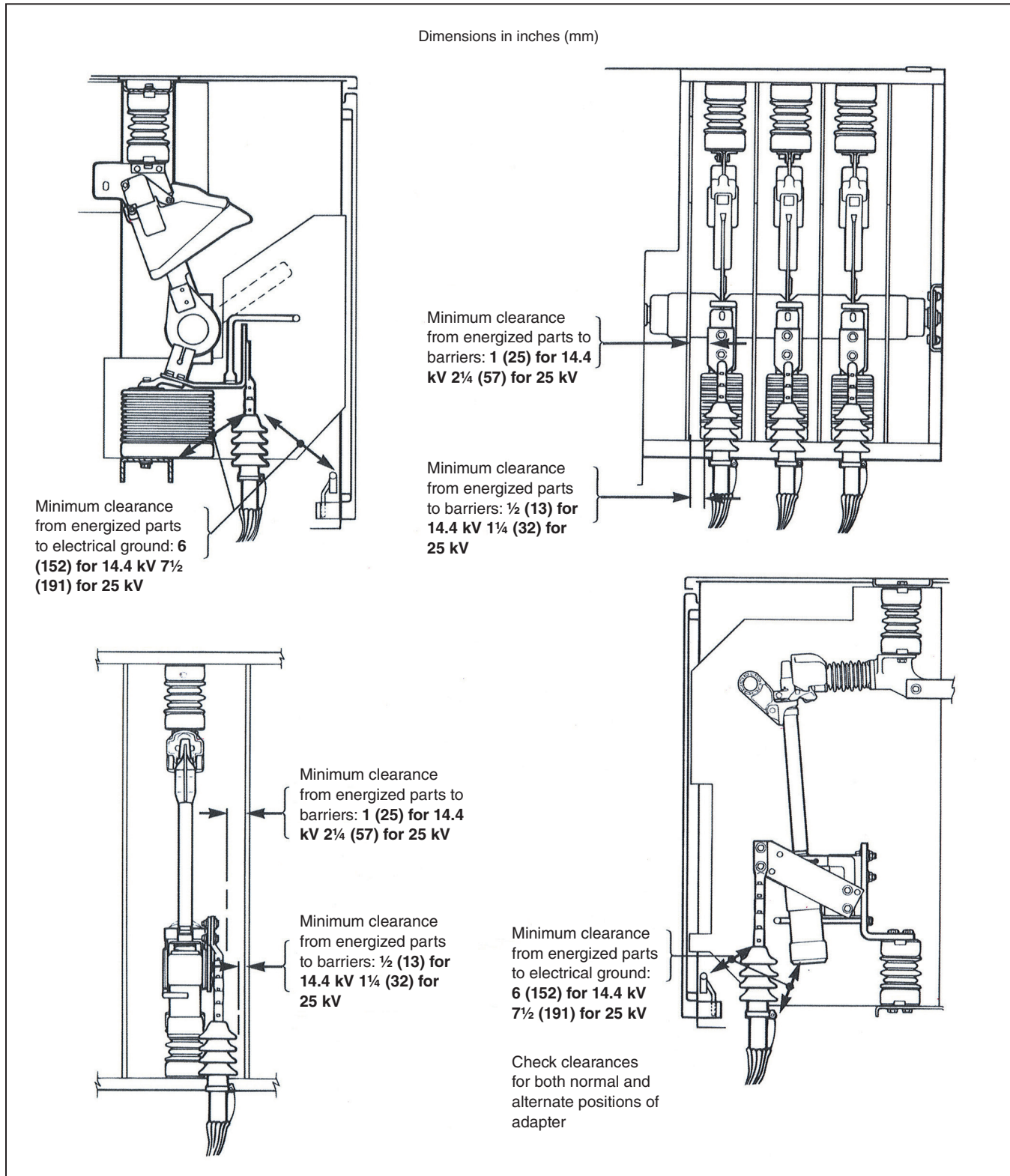


Figure 5. Side view of the switch showing the interphase barrier attachment points, terminal-pad connections, and installation of the current sensors (furnished with the optional Overcurrent Lockout feature) and optional cable guides.



**Figure 6. Minimum clearances that must be maintained when installing cable terminators.**



Two-position cable-terminator adapters are provided at the fuse hinge assemblies. See Figure 7. These adapters can be placed in their alternate positions when required for increased clearance from energized parts to grounded parts of the cable terminators.

Switch terminal pads are furnished with three mounting holes. In general, cable terminators may be connected to the two lower holes in the switch terminal pads. However, if the pad-mounted gear includes optional cable guides for switch terminals or current sensors, cable terminators must be connected to the two uppermost holes in the switch terminal pads. See Figure 5 on page 15.

### NOTICE

When connecting cable terminators, avoid placing any intentional strain on switch or fuse terminals. Do not use the connecting bolts to pull the cables into alignment. Place each connector flat against the corresponding switch or fuse terminal pad with the bolt holes aligned. Failure to follow these precautions can cause misalignment of the switch or fuse.

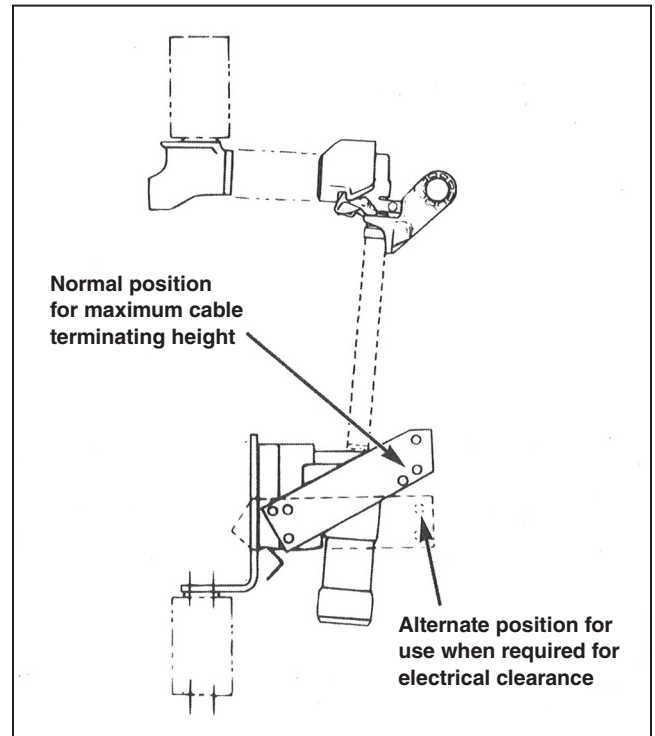


Figure 7. The fuse assembly showing the alternate arrangement of the two-position cable-terminator adapters.

## Installation

**STEP 4.** Before connecting the cable terminators to the aluminum terminal pads, thoroughly wire-brush aluminum contact surfaces to remove any dirt or foreign materials as well as natural surface oxides. Immediately coat both contact surfaces to  $\frac{1}{2}$ -inch (13 mm) beyond the joint with a uniform layer of Penetrox® A. Then, make the connections as follows. See Figure 8:

**For aluminum connectors:** Use  $\frac{1}{2}$ -inch aluminum or galvanized steel hardware with two Belleville spring washers (not furnished) as shown in Detail A of Figure 8. Before tightening the connecting bolts, complete the installation of optional cable guides (where applicable) by following the cable-support manufacturer's instructions. Torque aluminum bolts to the manufacturer's specifications. Torque steel bolts to 50 foot-pounds (67.79 N-m) or, in the absence of a torque wrench, tighten each bolt until the Belleville washers are flat. Then, back off one-half turn. Do not use lockwashers with Belleville washers.

**For tinned copper or tinned bronze connectors:** Use  $\frac{1}{2}$ -inch galvanized steel hardware with one Belleville spring washer (not furnished) against the aluminum terminal pad and one galvanized steel flat washer against the tinned connector as shown in Detail B of Figure 8. Before tightening the connecting bolts, complete the installation of optional cable guides (where applicable) following the cable-support manufacturer's instructions. Torque the bolts to 50 foot-pounds (67.79 N-m) or, in the absence of a torque wrench, tighten each bolt until the Belleville washer is flat. Then, back off one-half turn. Do not use lockwashers with Belleville washers.

● The use of untinned copper or bronze connectors is not recommended.

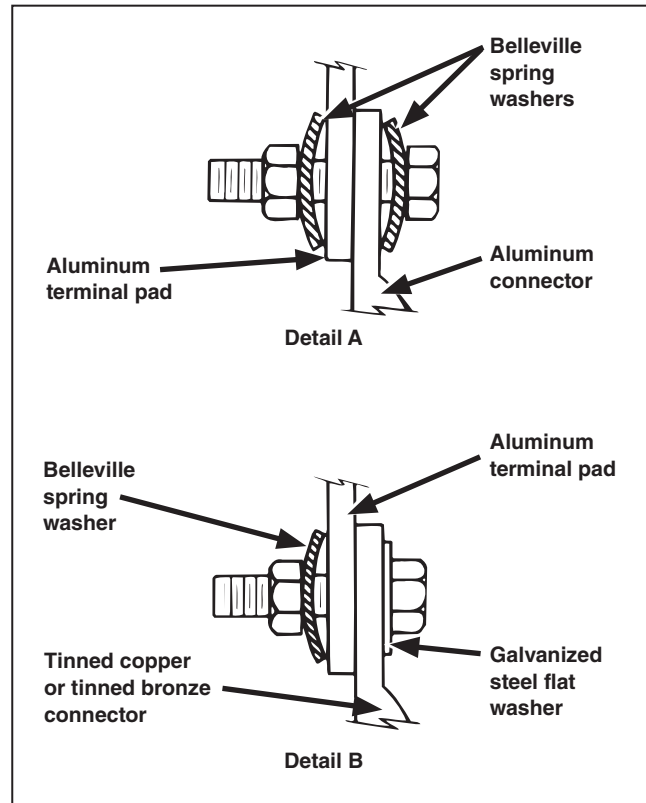


Figure 8. The terminal-pad connections.

**STEP 5.** Connect the cable concentric-neutral ground wires and the ground pads inside the pad-mounted gear enclosure to the system ground facility in accordance with the user's standard grounding practice.

Use the equivalent of 4/0 copper cable (or cable sized in accordance with the user's standard practice) in either a single or multiple connection to realize the maximum momentary rating of the gear. For a multiple connection, cables smaller than 1/0 copper or equivalent should not be used.

### S&C Current Sensors

#### **WARNING**

Low-voltage wiring routed inside the pad-mounted gear enclosure must be a minimum of 6 inches (152 mm) at 14.4 kV and 7½ inches (191 mm) at 25 kV away from components that will be energized at high voltage. Do not place wiring where it might fall onto a component that will be energized at high voltage, such as the bus, or where it will be in the way of moving parts.

**Failure to maintain proper clearance can result in a flashover, injury, and equipment damage.**

#### **NOTICE**

Openings made into the low-voltage control compartment must be sealed with a suitable compound to prevent the entry of moisture or animals. Failure to properly seal the openings can result in damage to the electronic components.

#### **NOTICE**

Do not install the current sensors on unshielded cables or on cables where the insulation is exposed but ungrounded (for example, where dielectric tape or heatshrink tubing is used). These current sensors are intended for application at ground potential and can be damaged by the voltage gradient between the cable insulation and ground.

#### **NOTICE**

Twelve current sensors are required for source-transfer pad-mounted gear furnished with optional switch-terminal adapters that permit two cables per phase. Install the current sensors in accordance with the wiring diagram provided.

The automatic source-transfer scheme will not operate properly when only six current sensors are installed.

Six S&C Current Sensors (packed separately) are provided for units furnished with the optional **Overcurrent Lockout** feature.

The leads from the current sensors in each switch compartment must be connected to a terminal block located in the associated terminal-block compartment, behind the bolted panel labeled "Terminal Blocks." See Figure 9.

The bottom plate in each terminal-block compartment is removable to facilitate drilling an entrance hole for the lead wires. When conduit is not used, protect the lead wires from abrasion against the knockout opening with a rubber grommet or by taping. Then, apply a suitable compound to fill the space between the lead wires and the opening to prevent entry of moisture or animals.

**Note:** The terminal blocks furnished with the optional auxiliary switches, optional **Remote Indication** feature, or optional **Supervisory Control** feature are also located in the terminal-block compartments. Refer to the applicable wiring diagram and make the connections as required.

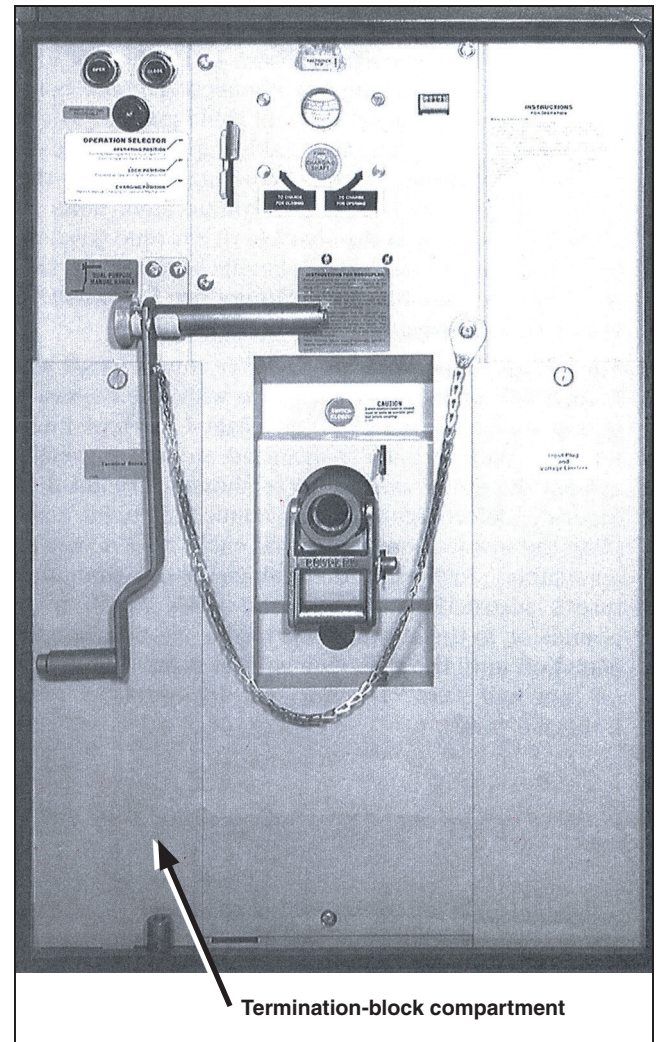


Figure 9. The left side of the low-voltage control compartment showing the left terminal-block compartment (the right terminal-block compartment is similar).

## Installation

Complete the following steps to install the current sensors:

- STEP 1.** Refer to the applicable wiring diagram and make the appropriate connections from the current sensors (with polarity marks on top) to the terminal blocks. Then, attach each current sensor to its associated high-voltage cable as follows:
- Remove the ¼—20 gap nut on the current sensor. With polarity marks on top, open the current sensor and place it around the appropriate high-voltage cable. Then, replace and securely tighten the gap nut.
  - Secure the current sensor to the high-voltage cable at a point below the cable terminator or stress cone using the plastic wire ties furnished. See Figure 10. The current sensor may be placed against the cable grounded concentric neutral and the concentric neutral must be brought back through the sensor or it may be placed against the cable semiconducting jacket and the terminator drain wire must be brought through the sensor.

- STEP 2.** Connect the cable concentric-neutral ground wires and ground pads inside the pad-mounted gear enclosure to the system ground facility in accordance with the user's standard grounding practice. Use the equivalent of 4/0 copper cable (or cable sized in accordance with the user's standard practice) in either a single or multiple connection to realize the maximum momentary rating of the gear. For a multiple connection, cables smaller than 1/0 copper or equivalent should not be used.

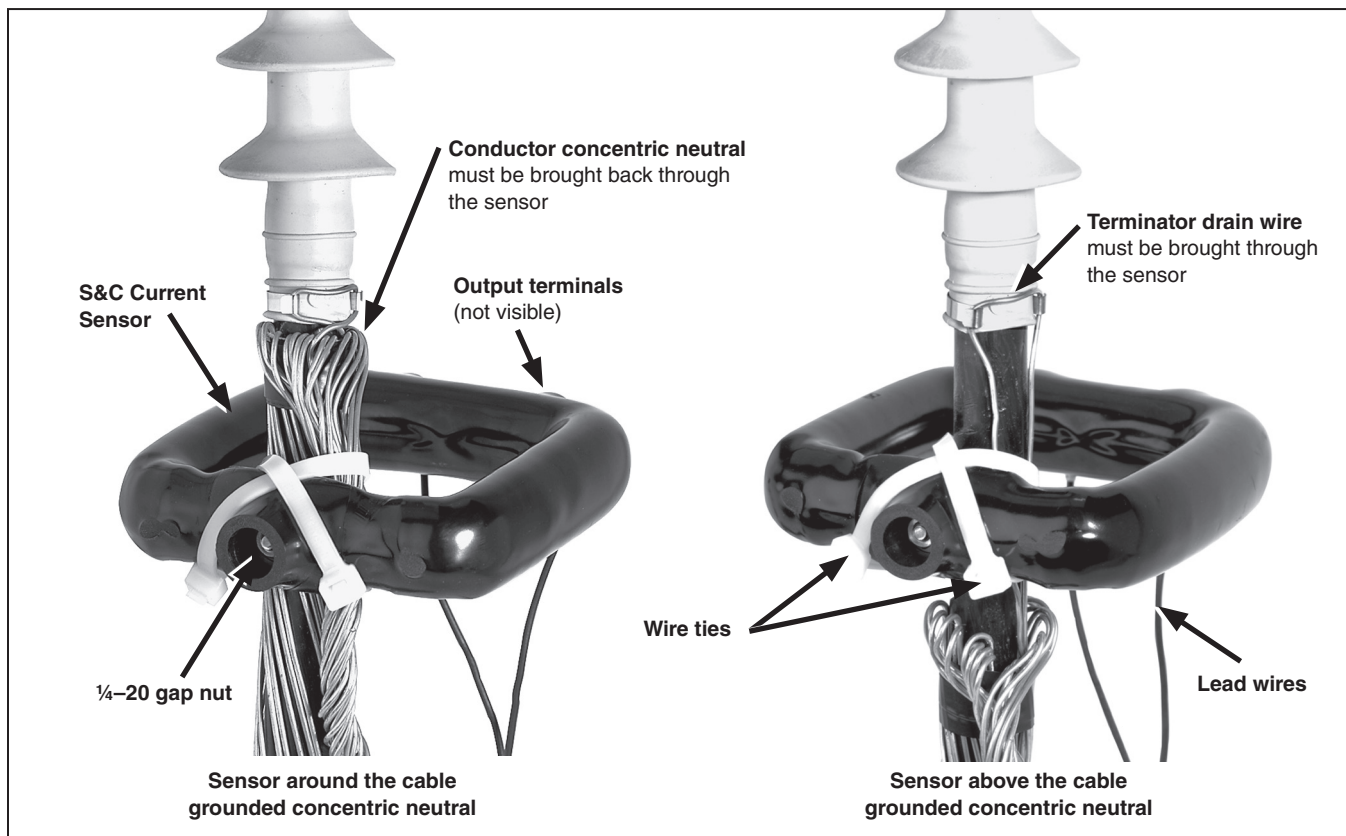


Figure 10. The typical method for attaching an S&C Current Sensor to high-voltage cable.

## Fault Indicators

Optional mounting provisions for fault indicators are available. Fault indicators are to be furnished by the user and installed in accordance with the manufacturer's instructions. If mounting provisions are specified, mount the fault indicators on the mounting brackets and attach the associated sensors to the cables below the cable terminators.

## Completing the Installation

Complete the following steps to complete the installation:

- STEP 1.** Optional surge arresters and optional mounting provisions for base-mounted surge arresters are available. These options include mounting provisions, surge arresters (when specified), and hard-drawn copper connectors to connect the surge arresters to the terminal pads of the Mini-Rupter Switch.

Install and connect surge arresters in accordance with the manufacturer's instructions.

### **WARNING**

Always use the hard-drawn copper connectors provided to connect the surge arresters to the Mini-Rupter Switch. Do not use flexible leads. **Use of flexible leads can result in a flashover, injury, and equipment damage.**

- STEP 2.** If any switch interphase or end barriers (where applicable) were removed to facilitate cable termination, reinstall them now. Position the rear of each barrier in the appropriate support notch of the barrier guide mounted on the base of the Mini-Rupter Switch. Then, tighten the wing-head screw of the barrier securely to the barrier-support angle at the front of the switch compartment. Make sure the clearance from the barriers to energized parts and from the barriers to terminator skirts conforms to the minimum dimensions specified in Step 3 on page 14.

### **WARNING**

Verify the rear of each switch barrier is correctly positioned in its support notch on the switch frame and the front of the barrier is securely fastened to the barrier-support angle. **Failure to properly reinstall the switch barriers will reduce the clearance between the barriers and energized parts or terminator skirts, and can result in a flashover, injury, and equipment damage.**

## Installation

- STEP 3.** Check functional operation of key interlocks, if furnished.

### **WARNING**

An extra set of keys is provided with pad-mounted gear that has optional key interlocks. These keys are for use only during installation. After installation, either: (1) destroy the extra set of keys or (2) make them accessible only to authorized persons. This will maintain the integrity of the key-interlock scheme.

**Failure to maintain the integrity of the key interlock scheme may lead to equipment damage, personal injury, or death.**

**Note:** Key interlocks are not security locks and are not a substitute for padlocks.

### **NOTICE**

If optional key interlocks are furnished, correctly position the interlocks so the doors can be opened.

- STEP 4.** Make sure the doors open and close without binding and the shimming of the pad-mounted gear enclosure is adequate. A resilient closed-cell gasket on the bottom flange of the enclosure protects the finish from being scratched during installation and isolates it from the alkalinity of the concrete foundation. This gasket also helps seal the enclosure to the foundation and guard against entry of rodents, insects, or weeds, and to discourage tampering.

If the gasket does not compensate for an uneven foundation, grout the bottom of the enclosure as necessary. The grout should be recessed enough to permit caulking. To complete the installation, caulk around the bottom of the enclosure with a weather-proof compound applied with a standard caulking gun.

A room-temperature vulcanizing (RTV) silicon-rubber compound is recommended. Apply a suitable compound to fill the spaces between the cable and the conduit, and cap all empty conduits to prevent the entry of moisture or animals.

- STEP 5.** Remove the lifting tabs and replace the bolts to plug the blind-tapped holes.
- STEP 6.** Check the interior of the pad-mounted gear. Remove all foreign materials and tools that may have been mislaid, and sweep the interior clear of debris.
- STEP 7.** Remove the tie wraps securing the dual-purpose barriers to the inside of the door.
- STEP 8.** Wipe barriers, insulators, switches, fuses, and terminators clean with a mineral-spirits solvent and dry with a clean cloth.
- STEP 9.** Hang dual-purpose front barriers in their normal, suspended positions. Also install optional inner barrier panels, if furnished.

### **WARNING**

Dual-purpose front barriers must be wiped clean before placing them in the **Slide In** position. Do not leave dual-purpose front barriers in the **Slide In** position for more than one week. These barriers are intended for temporary use in the **Slide In** position while work is being performed. If the barriers are left in this position for an extended period of time, there is the possibility of corona discharge to the barriers.

**Prolonged exposure to corona discharge can damage the barriers and result in a flashover, injury, and equipment damage.**



- STEP 10.** Store spare SMU-20® Fuse Units or SM-4® Refill Units (as applicable) in the fuse-storage racks inside the fuse-compartment doors. Storage for Fault Fiter® Electronic Power Fuses or current-limiting fuses cannot be provided in these racks.
- STEP 11.** Wipe down the exterior of the enclosure with a clean, damp cloth. To preserve the integrity of the surface, refinish any scratches or abrasions with S&C touch-up finish and red-oxide primer, which are available in aerosol spray cans. See S&C Specification Bulletin 663A-31 for catalog number information used for ordering. No other finish or primer is approved. The area to be touched up should be cleaned to remove all oil and grease. Sand the area, removing any traces of rust that may be present, and make sure all edges are feathered before applying primer.
- Note:** Labels indicating the area around the pad-mounted gear must be kept clear so work on the gear can be done safely are provided. These labels (or equivalent labels) should be affixed to the exterior of the gear.

When the installation is completed, refer to S&C Instruction Sheet 663-503 for operating instructions regarding the pad-mounted gear and source-transfer control.

## Dielectric Testing

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When high-voltage dielectric tests will be performed on source-transfer PMH Pad-Mounted Gear, special precautions should be taken to prevent damage to the voltage sensors and voltage limiters. Refer to S&C Instruction Sheet 591-500.