Installation of Arc-Resistant Models

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June 22, 2009 © S&C Electric Company
**Introduction**

**Qualified Persons**

**WARNING**

The equipment covered by this publication must be installed, operated, and maintained by qualified persons who are knowledgeable in the installation, operation, and maintenance of overhead electric power distribution equipment along with the associated hazards. A qualified person is one who is trained and competent in:

- The skills and techniques necessary to distinguish exposed live parts from non-live 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 the special precautionary techniques, personal protective equipment, insulating 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**

Read this instruction sheet thoroughly and carefully before installing or operating your S&C Manual PME Pad-Mounted Gear. Familiarize yourself with “Safety Information” on page 4.

**Retain this Instruction Sheet**

This instruction sheet is a permanent part of your S&C Manual PME Pad-Mounted Gear. These instructions should be stored in the low-voltage connection enclosure, using the instruction manual holder.

**Proper Application**

**CAUTION**

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 this gear are listed on the ratings label on the interior of the doors (right-hand door only for double-door models.)

**General**

The following instructions cover installation of arc-resistant models of S&C Manual PME Pad-Mounted Gear which features elbow-connected encased components and is available in ratings of 14.4 kV and 25 kV. Switch terminals are equipped with 600-ampere-rated bushings and fuse terminals are equipped with 200-ampere-rated bushing wells. Bushing and bushing-well interfaces are in accordance with ANSI/IEEE Standard 386 to accept all standard separable insulated connectors and inserts. Parking stands are provided adjacent to each bushing and bushing well.

Refer to S&C Instruction Sheet 665-610 for instructions regarding operation of Manual PME Pad-Mounted Gear. The 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 gear. Wiring diagrams for the gear 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 optional features, such as key interlocks (Catalog Number Suffix “-C1”, “-C3”, or “-C4”). Refer to “OPTIONAL FEATURES” on page 16 for a complete listing of the available options for the gear.
Warranty

The warranty and/or obligations described in S&C’s standard conditions of sale, as set forth in Price Sheet 150, 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 immediate purchaser’s or end user’s exclusive remedy and a fulfillment of all seller’s liability. In no event shall seller’s liability to immediate purchaser or end user exceed the price of the specific product which gives rise to 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, 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 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.

The seller’s warranties are contingent upon the installation and adjustment of PME pad-mounted gear in accordance with S&C’s applicable instruction sheets, data sheets, and/or data bulletins.

The standard warranty contained in seller’s standard conditions of sale (as set forth in Price Sheet 150) does not apply to S&C Manual PME 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 SME Mountings. Nor does it apply to S&C Manual PME Pad-Mounted Gear where other than Fault Fiter Electronic Power Fuses, S&C Switch Blades, or selected current-limiting fuses 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 “Current-Limiting Fuses for Use in S&C PME Pad-Mounted Gear,” in S&C Instruction Sheet 665-510.
Safety Information

Understanding Safety-Alert Messages

There are several types of safety-alert messages which may appear throughout this instruction sheet as well as on labels attached to the S&C Manual PME Pad-Mounted Gear. Familiarize yourself with these types of messages and the importance of the various signal words, as explained below.

⚠️ DANGER

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

⚠️ WARNING

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

⚠️ CAUTION

“CAUTION” identifies hazards or unsafe practices which can result in minor personal injury or product or property damage 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 you do not understand any portion of this instruction sheet and need assistance, contact your nearest S&C Sales Office or S&C Authorized Distributor, or call S&C Headquarters at (773) 338-1000, Monday through Friday between 8:30 AM and 5:00 PM Central Standard Time. (In Canada, call S&C Electric Canada Ltd. at (416) 249-9171, Monday through Friday between 8:00 AM and 5:00 PM Eastern Standard Time.)

⚠️ DANGER

Read this instruction sheet thoroughly and carefully before installing or operating your S&C Manual PME Pad-Mounted Gear.

Replacement Instructions and Labels

If you need additional copies of this instruction sheet, contact your 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 your nearest S&C Sales Office, S&C Authorized Distributor, S&C Headquarters, or S&C Electric Canada Ltd.
S&C Manual PME 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, insofar as practicable, are shipped within the enclosure.

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.

Inspect 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 that all shipping skids, crates, and containers listed thereon 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:
5. Notify the delivering carrier within 15 days of receipt of shipment.
6. Ask for a carrier inspection.
7. File a claim with the carrier.

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

When handling the gear with an overhead hoist, observe standard lifting practices as well as the general instructions below. Failure to follow these precautions can result in serious personal injury or equipment damage.

1. Make sure that the lifting tabs are securely bolted to the enclosure before lifting the gear.
2. Use 6-foot or longer hoist slings of equal length to prevent overstressing the enclosure during lifting. (Four-foot hoist slings are acceptable for two-compartment pad-mounted gear models: PME-4 and -5.)
3. Arrange the hoist slings so as to distribute the lifting forces equally between the lifting tabs. See Figure 1.
4. Avoid sudden starts and stops.

Figure 1. Hoisting arrangements.
TO OPEN DOORS: Access to the interior of S&C Pad-Mounted Gear is controlled by the S&C Penta-Latch® Mechanism, which must be opened with a pentahead socket wrench or tool except when hexhead actuators (Catalog Number Suffix “-B1” or “-B2”) are specified. The latching mechanism is coordinated with the provisions for padlocking such that 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.

Use a pentahead socket wrench or tool (a hexhead socket wrench or tool when Catalog Number Suffix “-B1” or “-B2” is specified) to unlatch the Penta-Latch Mechanism by rotating the actuator counterclockwise approximately 60º against spring resistance until a distinct “click” is heard and the actuator reaches its stop. Refer to Figure 2. This single motion unlatches the mechanism and recharges the latching spring for the subsequent closing operation. Pull the door open and secure it with the door holder.

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

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

For double-door models of pad-mounted gear, the left-hand door 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 and disengaging the rotating latch. To disengage the latch, rotate it upward. See Figure 3 on page 7.
**TO CLOSE DOORS:** Close the left-hand door, where applicable, and secure it with the latch by rotating the latch downward over the stop on the outer edge of the door. See Figure 3. The right-hand door of double-door models of pad-mounted gear is equipped with the Penta-Latch Mechanism which 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. See Figure 2 on page 6. When the latch points are positively engaged, the spring mechanism will trip to latch the door.

Pull outward on the cover of the Penta-Latch Mechanism to verify that 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 its 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 that all latch points engage completely and simultaneously. Once the door is securely latched, a padlock may be inserted into the hasp.
Installation

Placement

**Step 2** At the installation site, remove all separately packaged components shipped within the pad-mounted gear enclosure, including the steel deflectors. Two-compartment models are furnished with two large deflectors; four-compartment models are furnished with four large deflectors and two small deflectors. Set these items aside in a protected area.

Open the doors to the interior of the gear and secure them with the door holders. Refer to the catalog dimensional drawing and verify that the enclosure compartments are positioned correctly for this installation; reposition the gear if necessary. Unbolt the enclosure from its skid.

The pad-mounted gear enclosure will be bolted directly to the mounting pad using user-furnished \( \frac{3}{4} \)-inch diameter anchor bolts and supplied hardware. Refer to the anchor bolt detail in Figure 4. *Anchor brackets and hold-down clamps must not be used.*

![Figure 4. Anchor bolt detail.](image)

**CAUTION**

To be arc-resistant, the pad-mounted gear enclosure must be securely attached to the mounting pad in accordance with the anchor bolt plan shown on the catalog dimensional drawing.

Following the precautions given under “Handling” on page 5, lift the unit a few feet in the air and caulk along the entire underside of the enclosure bottom flange using room-temperature vulcanizing (RTV) silicon-rubber compound. The RTV is to be applied directly to the gasket. The enclosure can now be lifted onto the mounting pad and secured following the instructions on page 9.
If excess lengths of direct-buried cable are to be fed into the termination compartments as the unit is lowered, special attention must be paid to the cable position in the fuse termination compartments. Open the doors and secure them with the door holders, to allow the cable to be fed over the door stiles. Then, as the enclosure is being lowered into place, feed the cables for connection to the fuse terminals between the horizontal cable guides, as shown in Figure 5 and the cable-training tag affixed to the enclosure.

**NOTICE**

To avoid interference with the TransFuser™ Mountings, the cables to be connected to the fuse terminals must be fed between the horizontal cable guides.

Special cable training is not required in the switch termination compartments.
Make sure all compartment doors open and latch closed without binding.

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**Figure 5.** Cables in fuse-termination compartments must be trained between horizontal cable guides as shown to prevent interference with operation of the TransFuser Mounting.
After mounting the enclosure to the mounting pad, the deflectors are to be assembled to the unit. First, bolt one of the large deflectors to the bottom of a switch or fuse compartment frame using the supplied 5/16-inch serrated nuts. Refer to Figures 6, 7, and 8. Repeat for the other compartment(s).

Figure 6. Large deflector.

Figure 7. Deflector assembly.

Figure 8. Close-up of deflector assembly.
On four-compartment models, install the two small deflectors. Refer to Figure 9. Each small deflector is installed behind the two large deflectors. Then bolt the small deflector into place using the supplied ½-inch serrated nuts.

Confirm that the complete deflector assembly installation matches Figure 7 on page 10.

Figure 9. Small deflector.

⚠️ CAUTION

To be arc-resistant, the pad-mounted gear enclosure deflectors must be properly installed.
Switch terminals are equipped with 600-ampere-rated bushings, and fuse terminals are equipped with 200-ampere-rated bushing wells. Bushing and bushing-well interfaces conform to ANSI/IEEE Standard 386 to accept all standard separable insulated connectors—“elbows”—and inserts. Appropriate elbows and inserts must be supplied and installed by the user. Before installing elbows and inserts, remove the shipping covers from bushings and bushing wells. Ground each insert by connecting a short ground wire from the insert to the ground tab directly above the bushing well. See Figure 9 on page 11.

Switch-termination compartments cannot accommodate 600-ampere elbows manufactured by Blackburn when piggybacked.

Figure 10. Bushings for Mini-Rupter® Switches are available with and without studs to accommodate all 600-ampere elbows.
DANGER

When grounding inserts, minimize the length of the ground wire. Use of a longer ground wire can result in a flashover to energized parts inside the component compartment and serious personal injury or death when the TransFuser Mounting is rotated to the closed position.

Verify that cables in termination compartments for fuses are correctly positioned between the cable guides. Then terminate the cables with the elbows, following the elbow manufacturer’s instructions.

NOTICE

Do not allow solvents used to clean cables prior to termination to contact the viewing windows. The solvent can permanently etch the polycarbonate material.

The 600-ampere bushings supplied in S&C Manual PME Pad-Mounted Gear are equipped with a stud as standard. Bushings are available without studs (Catalog Number Suffix “-M1”) to accommodate 600-ampere elbows that do not require a stud. See Figure 9 on page 12.

Step 4 Connect the cable concentric-neutral ground wires to the ground bails and rods provided, making sure that cables have sufficient mobility to allow the elbows to be moved from bushings to parking stands. Connect 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. Note: Concentric-neutral ground wires must be positioned so that they will not interfere with TransFuser Mounting operation when the elbows are on the parking stands.

Fault Indicators

Step 5 Optional mounting provisions for fault indicators (Catalog Number Suffix “-F1” or “-F2”) 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.
Step 6 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.

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

**NOTICE**

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

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

Step 7 Make sure that doors open and close without binding. To complete the installation, caulk around the bottom of the enclosure using room-temperature vulcanizing (RTV) silicone-rubber compound applied with a standard caulking gun. 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 rodents.

Step 8

1. Remove the lifting tabs and replace the bolts to plug the blind-tapped holes.
2. 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.
3. Store spare SMU-20 Fuse Units, SM-4 Refill Units, or Fault Fiter Interrupting Modules (as applicable) in the fuse-storage racks inside the fuse-compartment doors.
4. 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. Order Catalog Number 9999-058 for olive-green finish, 9999-080 for light gray finish, and 9999-061 for red-oxide primer. 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 that all edges are feathered before applying primer.
5. Labels indicating the area around the pad-mounted gear that must be kept clear so that work on the gear can be done safely are provided in the “Installation and Operation Information Kit.” These labels (or equivalent labels) should be affixed to the exterior of the gear.
6. Upon completion of these installation instructions, refer to S&C Instruction Sheet 665-510 for operating instructions.
Dielectric Testing

For the convenience of users who normally perform electrical tests on system components such as pad-mounted gear, appropriate withstand test values are given in the table below:

<table>
<thead>
<tr>
<th>Voltage Rating, kV</th>
<th>Test Voltage Withstand, kV</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>60-Hertz, RMS</td>
</tr>
<tr>
<td>Nom</td>
<td>Max©</td>
</tr>
<tr>
<td>14.4</td>
<td>17.0</td>
</tr>
<tr>
<td>25</td>
<td>27■</td>
</tr>
<tr>
<td>25</td>
<td>29◆</td>
</tr>
</tbody>
</table>

© Maximum voltage ratings are lower than the values listed when current-limiting fuses are used. Consult the appropriate current-limiting fuse manufacturer for complete fuse ratings.

© Ac withstand tests made on this equipment after shipment by S&C should be conducted at no more than 0.75 times the values shown. When making ac tests, the time duration for application of the test voltage should be limited to less than 10 seconds.

© The column headed “Dc” is given as a reference only for those making dc tests and represents values believed to be appropriate and approximately equivalent to the corresponding power-frequency withstand test values specified for components of this voltage class. The presence of this column in no way implies any requirement for a dc withstand test on these components.

© Dc withstand tests made on this equipment after shipment by S&C should be conducted at no more than 0.75 times the values shown. When making dc tests, the test voltage should be raised in discrete steps—one minute per step.

■ With S&C SME-20 or SME-4Z Power Fuses.

◆ With Fault Filter Electronic Power Fuses or without fuses.
Specifications

## OPTIONAL FEATURES

<table>
<thead>
<tr>
<th>Item</th>
<th>Suffix to be Added to Pad-Mounted Gear Catalog Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Light Gray Outdoor Ultradur® Finish instead of Olive Green</td>
<td>-A2</td>
</tr>
<tr>
<td>Stainless-Steel Enclosure①</td>
<td>With Olive Green Outdoor Ultradur Finish</td>
</tr>
<tr>
<td></td>
<td>With Light Gray Outdoor Ultradur Finish</td>
</tr>
<tr>
<td>Hexhead Actuator for use in lieu of pentabeak actuator on all Penta-Latch Mechanisms</td>
<td>For use except when option suffix “-F2” is specified</td>
</tr>
<tr>
<td></td>
<td>For use when option suffix “-F2” is also specified</td>
</tr>
<tr>
<td>Key Interlocks to prevent paralleling of switches in Compartments 1 and 2</td>
<td></td>
</tr>
<tr>
<td>Key Interlocks to prevent opening fuse termination-compartment doors unless all switches are locked open</td>
<td></td>
</tr>
<tr>
<td>Key Interlocks. Combines functions of options “-C1” and “-C3” above</td>
<td></td>
</tr>
<tr>
<td>Fuse-Storage Feature for three spare fuse assemblies per compartment②</td>
<td>Located in Compartment 1</td>
</tr>
<tr>
<td></td>
<td>Located in Compartment 2</td>
</tr>
<tr>
<td></td>
<td>Located in Compartments 1 and 2</td>
</tr>
<tr>
<td>Mounting Provisions for a Fault Indicator in each switch compartment</td>
<td>Without viewing window in door</td>
</tr>
<tr>
<td><strong>Note:</strong> Accommodates three-phase indicator with single-phase sensors</td>
<td>With viewing window in door</td>
</tr>
<tr>
<td>600-Ampere Bushings Without Studs, at switch terminals</td>
<td></td>
</tr>
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</table>

① When this optional feature is specified, the entire exterior of the enclosure is fabricated from 11-gauge Type 304 stainless steel.

② Fuse assemblies (fuse holders or fuse units with end fittings) are not included. For units equipped with Fault Filter Electronic Power Fuse Mountings, only two spare Fault Filter Electronic Power Fuse Holders or two spare current-limiting fuse holders can be accommodated in each compartment.

★ When optional feature “-B1,” “-B2,” “-C6,” through “-C11,” or “-F2” is ordered for use with a stainless-steel enclosure, the suffix designation is increased by 10; for example “-B11” is specified instead of “-B1.”