Installation and Adjustment

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Qualified Persons

⚠ WARNING

Only qualified persons who are 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 who is 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 S&C Instruction Handbook before installing or operating your S&C Type SML-4Z Power Fuse. Familiarize yourself with the Safety Information and Safety Precautions on pages 4 through 5. The latest version of this publication is available online in PDF format at **sandc.com/en/support/product-literature/.**

Retain this Instruction Sheet

This instruction sheet is a permanent part of your S&C Type SML-4Z Power Fuses. Designate a location where you can easily retrieve and refer to this publication.

Proper Application

⚠ WARNING

The equipment in this publication is only intended for a specific fusing applications. The application must be within the ratings furnished for the equipment. Ratings for the S&C Type SML-4Z Power Fuse are listed in the ratings table in Specification Bulletin 242-31. The ratings are also on the nameplate affixed to the product.

Warranty Qualifications

With respect to S&C SML-4Z Back-Connected Disconnect Style live parts—when installed in submersible enclosures of other than S&C manufacture, warranty does not apply unless enclosures are furnished by an approved supplier and are of watertight construction providing proper electrical clearances and proper space for fuse handling.

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.)

Understanding Safety-Alert Messages

Several types of safety-alert messages may appear throughout this instruction sheet and on labels and tags attached to your S&C Type SML-4Z Power Fuse. Familiarize yourself 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 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. Their telephone numbers are listed on S&C's website **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 your S&C Type SML-4Z Power Fuse.

Replacement Instructions and Labels

If additional copies of this instruction sheet are needed, 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.

⚠ DANGER

S&C Type SML-4Z Power Fuses operate 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 the S&C Type SML-4Z Power Fuse 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. Always maintain proper clearance from energized components.
3. **PERSONAL PROTECTIVE EQUIPMENT.** Always use suitable protective equipment, such as rubber gloves, rubber mats, hard hats, safety glasses, arc-flash clothing, and fall-protection, 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 and tags. Remove tags ONLY if instructed to do so.
5. **ENERGIZED COMPONENTS.** Always consider all parts live until de-energized, tested, and grounded.
6. **MAINTAINING PROPER CLEARANCE.** Always maintain proper clearance from energized components.

Live Switching—Opening

- **Transformer switching.** Transformer load currents up through 200 amperes, as well as transformer magnetizing currents associated with the applicable loads
- **Line switching**. Load splitting (parallel or loop switching) and load dropping of currents up through 200 amperes; also line dropping (charging currents typical for distribution systems of these voltage ratings)
- **Cable switching.** Load splitting (parallel or loop switching) and load dropping of currents up through 200 amperes; also cable dropping (charging currents typical for distribution systems of these voltage ratings)

Live Switching—Closing

- **Circuit closing**. Inrush currents associated with the above opening duties
- **Duty-cycle● fault closing**. One-time capability equal to the interrupting rating of the fuse (in amperes RMS asymmetrical, 20,000 at both 14.4 kV and 25 kV)... and two-time capability of 13,000 amperes RMS asymmetrical at 14.4 kV and 25 kV

● These values represent the fault-closing capabilities of the fuse with a Uni-Rupter Interrupter when the fuse is closed with a purposeful thrust without hesitation. The values are the available fault currents into which the fuse can be closed the specified number of times (once or twice) with the Uni-Rupter Interrupter remaining operable and able to carry and interrupt rated current.

A Note on Single-Pole Switching

In single-pole switching of ungrounded-primary three-phase transformers or banks (or single-phase transformers connected line to-line), circuit connections or parameters may, in some cases, produce excessive overvoltages. In particular, for the following applications above 22 kV, single-pole switching by any means—including Uni-Rupter Interrupters—should be performed only under the conditions stated in italics:

- Switching unloaded or lightly loaded delta-connected or ungrounded-primary wye-wye connected three-phase transformers or banks (or line-to-line connected single-phase transformers), rated 150 kVA or less three-phase, or 50 kVA or less single-phase—or of any kVA rating when combined with unloaded cables or lines—where maximum system operating voltage exceeds 22 kV (*Single-pole switching should be performed only if each phase is carrying 5% load or more, or if the transformer or bank is temporarily grounded at the primary neutral during switching.)*
- Switching loaded or unloaded ungrounded-primary wye-delta connected three-phase transformers or banks—alone or combined with unloaded cables or lines—where maximum system operating voltage exceeds 22 kV (*Single-pole switching should be performed only if each phase is carrying 5% load or more and if the lighting-load phase is always switched open first (or closed last), or if the transformer or bank is temporarily grounded at the primary neutral during switching.)*

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The live parts described in this section can be mounted as shown in Figure 1 on page 9 or Figure 3 on page 11. Installation instructions for the mounting configuration illustrated in Figure 1 are provided below. Installation instructions for the mounting configuration illustrated in Figure 3 are found beginning on page 10.

Note: Because operation of Uni-Rupter Interrupters requires pull-out forces between 50 and 80 lbs. be applied to the pull-ring of the holder during opening, the live-part support structure must be sufficiently rigid to resist such forces without deflection.

Back-Supported Hinge-And-Lower-Contact Assembly Mounting

Complete the following steps to install the back-supported hinge-and-lower-contact assembly mounting configuration:

STEP 1. Install insulators (not included with live parts) in the locations shown in Figure 1 on page 9, with the mounting bolts snug but loose enough to permit later adjustments.

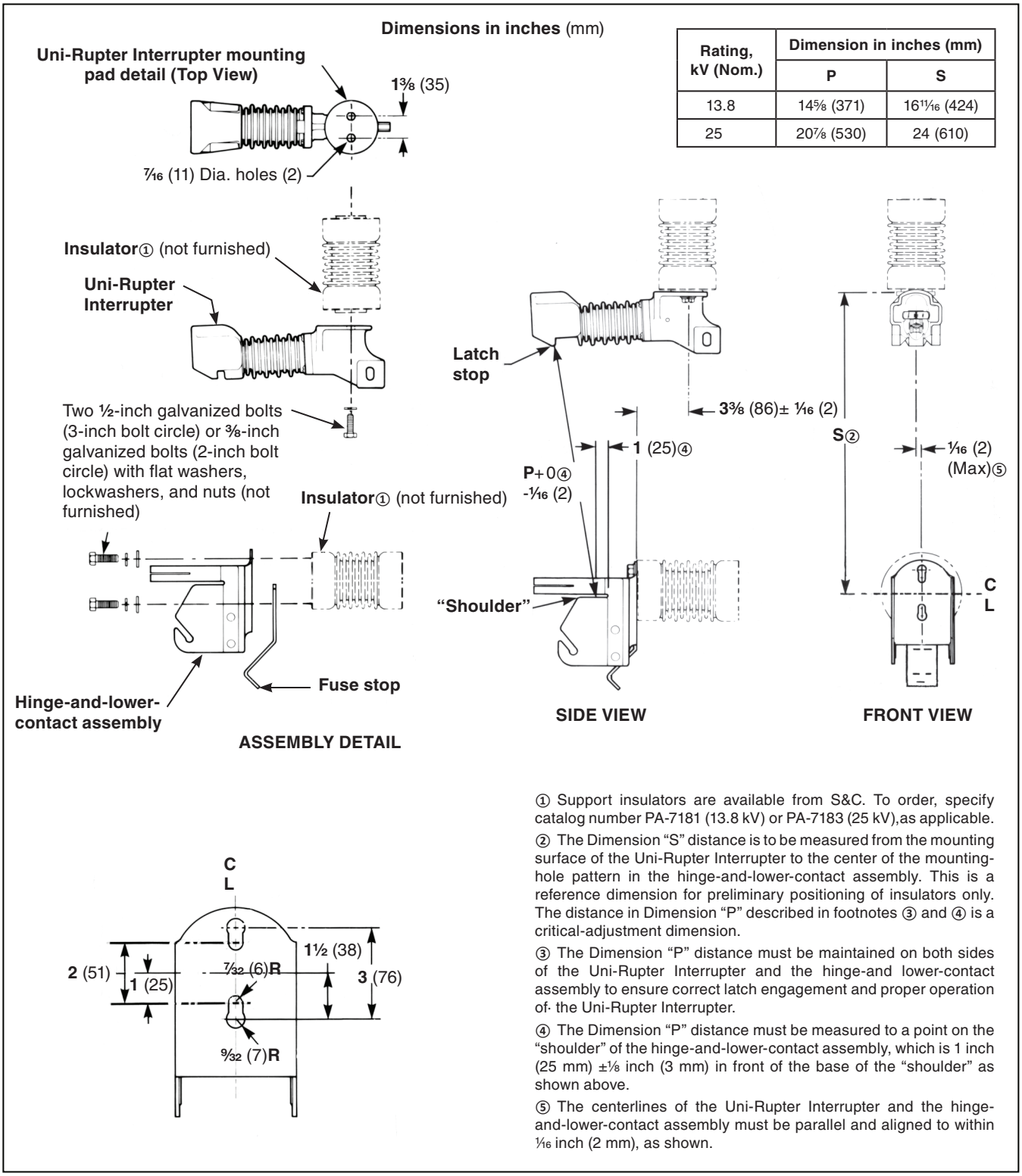
Note: Slotted mounting holes should be provided in the supporting structure to permit side-to-side adjustment of the upper insulator and vertical adjustment of the lower insulator.

STEP 2. Attach the Uni-Rupter Interrupter to the upper insulator as shown in Figure 1 on page 9, using two ⅜-inch galvanized bolts with lockwashers (not furnished). Fully tighten both of the Uni-Rupter Interrupter mounting bolts.

STEP 3. Attach the hinge-and-lower-contact assembly (including the fuse stop) to a 2-inch bolt-circle insulator, as shown in Figure 1 on page 9, using two ⅜-inch galvanized bolts with lockwashers and flat washers (not furnished). Fully tighten the hinge-and-lower-contact assembly mounting bolts.

Note: The hinge-and-lower-contact assembly can also be mounted directly on a 3-inch bolt-circle insulator using ½-inch galvanized bolts with lockwashers and flat washers (see the Hinge Detail in Figure 1 on page 9).

STEP 4. Make sure the centerline of the Uni-Rupter Interrupter and the centerline of the hinge-and-lower-contact assembly are parallel and aligned to within 1/16 inch (2 mm), as shown in Figure 1 (Front View) on page 9. Move the upper insulator (with the Uni-Rupter Interrupter attached) from side to side as required to obtain proper alignment. Then, fully tighten both upper-insulator mounting bolts.



Rating, kV (Nom.)	Dimension in inches (mm)	
	P	S
13.8	14⅝ (371)	16 1⁄16 (424)
25	20⅞ (530)	24 (610)

① Support insulators are available from S&C. To order, specify catalog number PA-7181 (13.8 kV) or PA-7183 (25 kV),as applicable.

② The Dimension "S" distance is to be measured from the mounting surface of the Uni-Rupter Interrupter to the center of the mounting-hole pattern in the hinge-and-lower-contact assembly. This is a reference dimension for preliminary positioning of insulators only. The distance in Dimension "P" described in footnotes ③ and ④ is a critical-adjustment dimension.

③ The Dimension "P" distance must be maintained on both sides of the Uni-Rupter Interrupter and the hinge-and lower-contact assembly to ensure correct latch engagement and proper operation of· the Uni-Rupter Interrupter.

④ The Dimension "P" distance must be measured to a point on the "shoulder" of the hinge-and-lower-contact assembly, which is 1 inch (25 mm) ±⅛ inch (3 mm) in front of the base of the "shoulder" as shown above.

⑤ The centerlines of the Uni-Rupter Interrupter and the hinge-and-lower-contact assembly must be parallel and aligned to within 1⁄16 inch (2 mm), as shown.

Figure 1. Mounting configuration using the back-supported hinge-and-lower-contact assembly.

STEP 5. Accurately measure the distance from the lower edge of the latch stop on the Uni-Rupter Interrupter to the "shoulder" on the hinge-and-lower-contact assembly (Dimension "P"), as shown in Figure 3 on page 11. Move the hinge-and-lower-contact assembly toward or away from the Uni-Rupter Interrupter as required to bring this distance within the specified Dimension "P" tolerance. Make sure the Dimension "P" distance is maintained on *both* sides of the Uni-Rupter Interrupter and the hinge-and-lower-contact assembly, and that the Uni-Rupter Interrupter and the hinge-and-lower-contact assembly are still properly aligned, as described in Step 4 on page 8. Then, fully tighten both hinge-and-lower-contact assembly mounting bolts.

Proceed to the "Final Operational Checks" section on page 13.

Bottom-Supported Hinge-And-Lower-Contact Assembly Mounting

Complete the following steps to install the bottom-supported hinge-and-lower-contact assembly mounting configuration:

STEP 1. Install insulators (not included with live parts) in the locations shown in Figure 3 on page 11, with the upper-insulator mounting blots snug but loose enough to permit later adjustments. Fully tighten the mounting bolts securing the lower insulator to the structure.

Note: Slotted mounting holes should be provided in the supporting structure to permit side-to-side adjustment of the **upper** insulator.

STEP 2. Attach the Uni-Rupter Interrupter to the upper insulator as shown in Figure 3 on page 11 using two ⅜-inch galvanized bolts with lockwashers (not furnished). Fully tighten both of the Uni-Rupter Interrupter mounting bolts.

STEP 3. Attach a hinge-and-lower-contact assembly support bracket (not furnished) to the lower insulator using two ⅜-inch galvanized bolts with lockwashers, as shown in Figure 3 on page 11. Fully tighten the mounting bolts securing the support bracket to its insulator.

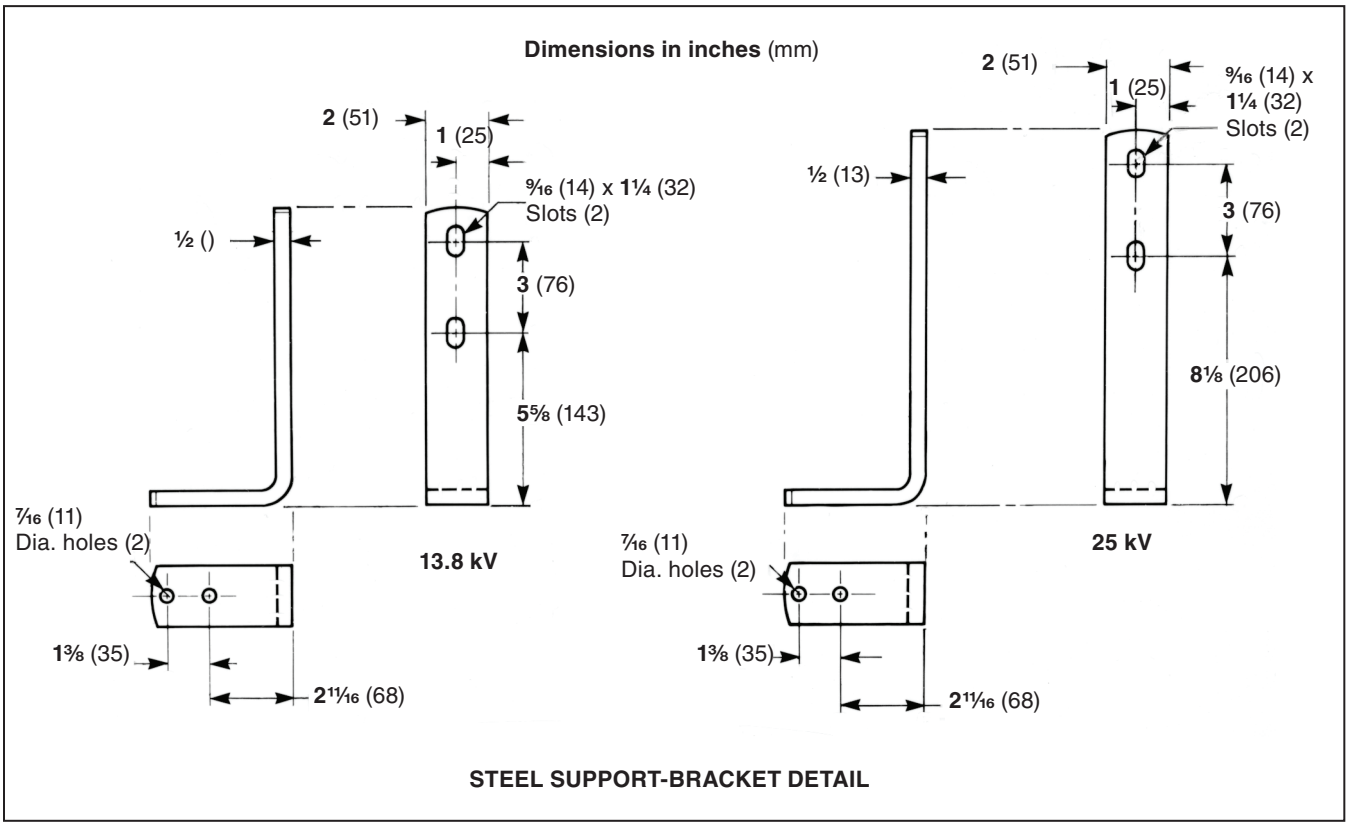
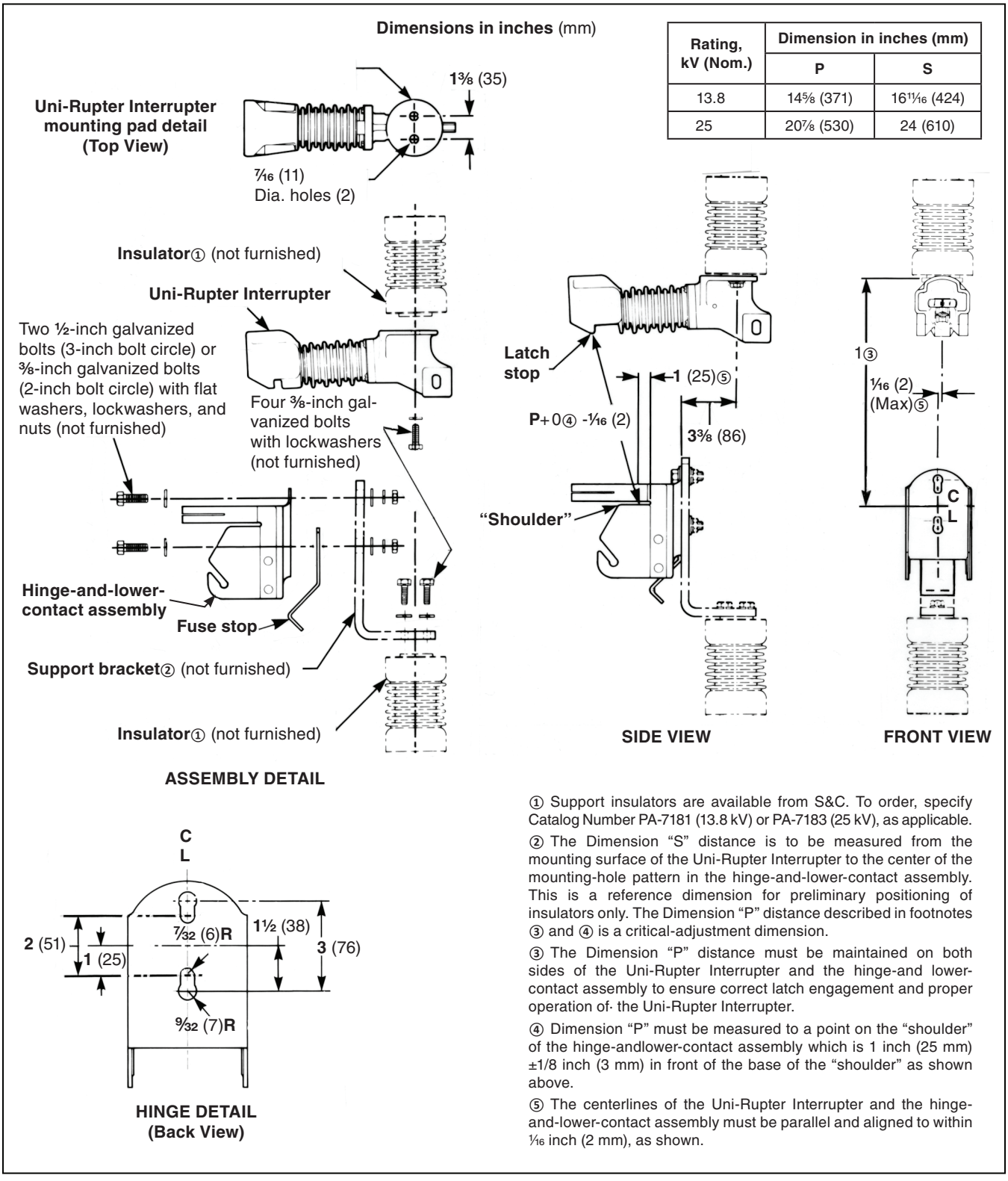


Figure 2. Support-bracket detail.



Rating, kV (Nom.)	Dimension in inches (mm)	
	P	S
13.8	14⅝ (371)	16¹¹⁄16 (424)
25	20⅞ (530)	24 (610)

① Support insulators are available from S&C. To order, specify Catalog Number PA-7181 (13.8 kV) or PA-7183 (25 kV), as applicable.

② The Dimension "S" distance is to be measured from the mounting surface of the Uni-Rupter Interrupter to the center of the mounting-hole pattern in the hinge-and-lower-contact assembly. This is a reference dimension for preliminary positioning of insulators only. The Dimension "P" distance described in footnotes ③ and ④ is a critical-adjustment dimension.

③ The Dimension "P" distance must be maintained on both sides of the Uni-Rupter Interrupter and the hinge-and lower-contact assembly to ensure correct latch engagement and proper operation of· the Uni-Rupter Interrupter.

④ Dimension "P" must be measured to a point on the "shoulder" of the hinge-andlower-contact assembly which is 1 inch (25 mm) ±1/8 inch (3 mm) in front of the base of the "shoulder" as shown above.

⑤ The centerlines of the Uni-Rupter Interrupter and the hinge-and-lower-contact assembly must be parallel and aligned to within 1⁄16 inch (2 mm), as shown.

Figure 3. Mounting configuration using the bottom-supported hinge-and-lower-contact assembly.

Note: Design specifications for a support bracket are provided in Figure 2 on page 10.

STEP 4. Attach the hinge-and-lower-contact assembly (including the fuse stop) to the support bracket as shown in Figure 3 on page 11, using two ½-inch galvanized bolts with flat washers, lockwashers, and nuts (not furnished). The mounting bolts securing the hinge-and-lower-contact assembly to the support bracket should be snug but loose enough to permit later adjustments.

STEP 5. Make sure the center line of the Uni-Rupter Interrupter and the center line of the hinge-and-lower-contact assembly are parallel and aligned to within 1/16 inch (2 mm), as shown in Figure 3 (Front View) on page 11. Move the *upper* insulator (with the Uni-Rupter Interrupter attached) from side to side as required to obtain proper alignment. Then, fully tighten both upper-insulator mounting bolts.

STEP 6. Accurately measure the distance from the lower edge of the latch stop on the Uni-Rupter Interrupter to the "shoulder" on the hinge-and-lower-contact assembly, as shown in Figure 3 on page 11. Move the hinge-and-lower-contact assembly toward or away from Uni-Rupter Interrupter as required to bring this distance within the specified Dimension "P" tolerance noted in Figure 3. Make sure the Dimension "P" distance is maintained on *both* sides of Uni-Rupter Interrupter and the hinge-and-lower-contact assembly and Uni-Rupter Interrupter and the hinge-and-lower-contact assembly are still properly aligned, as described in Step 5. Then, fully tighten both hinge-and-lower-contact assembly mounting bolts.

Proceed to the "Final Operational Checks" section on page 13.

Final Operational Checks

Install an SML-4Z Holder (with the silencer attached as directed in S&C Instruction Sheet 252-525) in the hinge-and-lower-contact assembly and slowly close the holder into the Uni-Rupter Interrupter. Make sure the contact rod on the holder makes an "on center" approach to the fault-closing contact on the Uni-Rupter Interrupter (without operator manipulation or guidance), as shown in Figure 4, and that *not more than* a 1/16-inch (2-mm) clearance exists between the latch stop on the Uni-Rupter Interrupter and the latch on the holder (with the holder in the **Closed** position), as shown in Figure 5. If adjustment is required, repeat the alignment procedures described earlier in the "Installation and Adjustment" section starting on page 8 until proper adjustment is achieved.

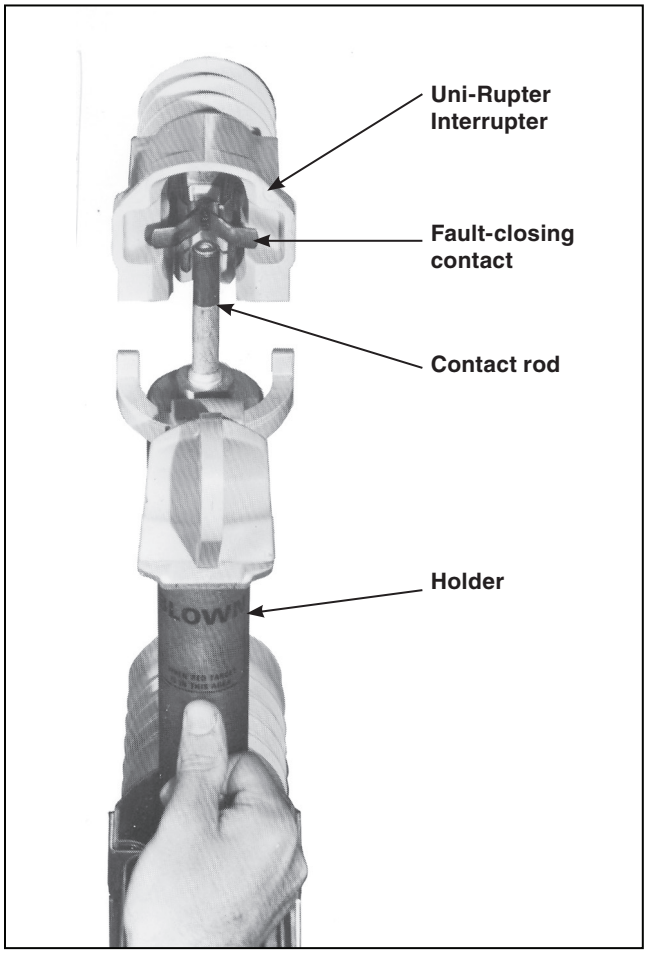


Figure 4. "On center" approach of the contact rod to the fault-closing contact of the Uni-Rupter Interrupter.

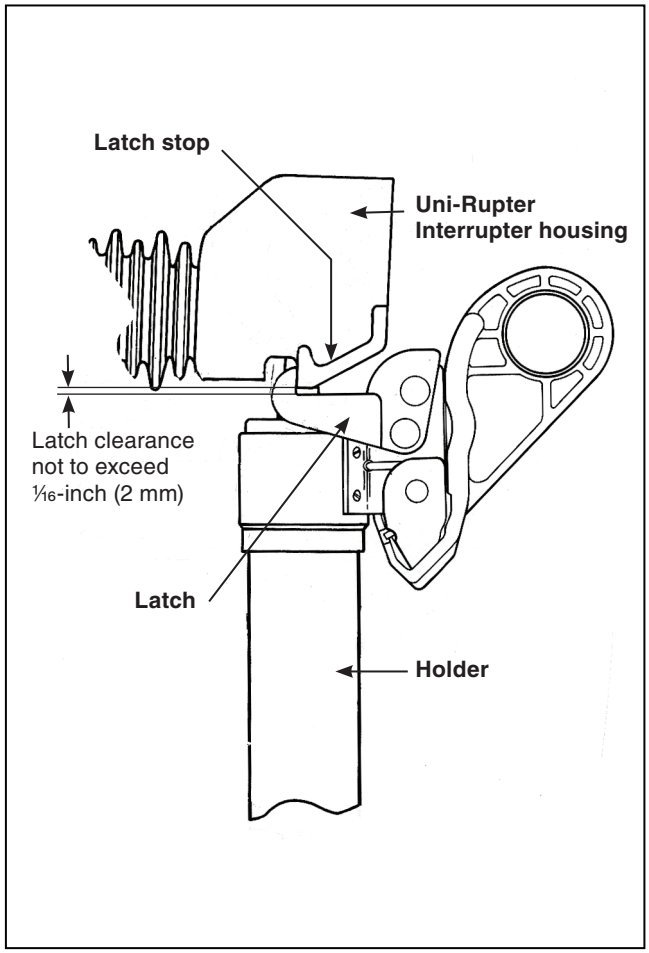


Figure 5. Proper latch engagement.