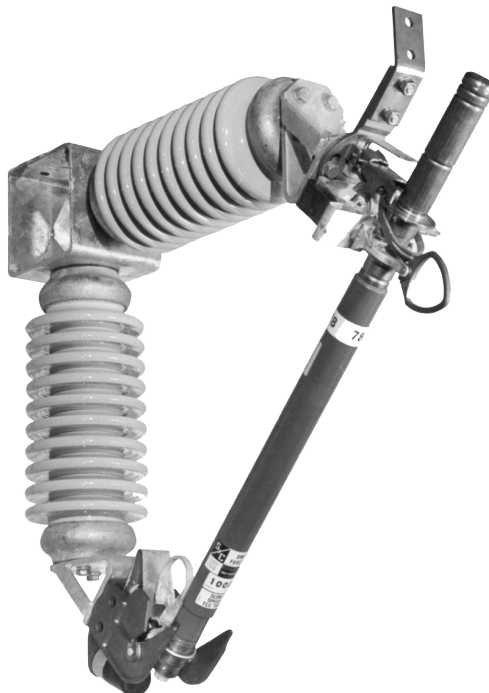


## Field Assembly, Installation, and Maintenance

### Table of Contents

Section	Page	Section	Page
<b>Introduction</b>		<b>Adjustments</b> .....	8
Qualified Persons .....	2	<b>Attaching Fuse Unit End-Fittings</b> .....	10
Read this Instruction Sheet .....	2	<b>Opening and Closing Fuse Unit Assemblies</b> .	11
Retain this Instruction Sheet. ....	2	<b>Replacing Blown Fuse Units</b> .....	12
Proper Application .....	2	How to Double-Check for a Blown Fuse Unit .....	12
Warranty .....	2	<b>Maintenance</b>	
<b>Safety Information</b>		Fuse Unit Tube Refinishing .....	13
Understanding Safety-Alert Messages .....	3	Fuse Unit Bore Inspection .....	13
Following Safety Instructions .....	3		
Replacement Instructions and Labels .....	3		
<b>Safety Precautions</b> .....	4		
<b>Assembling and Installing Mountings</b> .....	5		



## Introduction

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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 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 SMD-50 Power Fuses. Familiarize yourself with the Safety Information and Safety Precautions on pages 3 through 4. The latest version of this publication is available online in PDF format at [sandc.com/en/support/product-literature/](http://sandc.com/en/support/product-literature/).

### Retain this Instruction Sheet

This instruction sheet should be available for reference whenever S&C Power Fuses — Type SMD-50 are used. Retain this instruction sheet in a location where you can easily retrieve and refer to it.

### Proper Application

#### **WARNING**

S&C Type SMD-50 Power Fuses must only be used for specific fusing applications that are within the ratings of the model selected. S&C Type SMD-50 Power Fuses ratings are listed on a ratings label attached to the unit.

### 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 SMD-50 Power Fuses. Familiarize yourself with these types of messages and the importance of these various signal words:

<b>⚠ DANGER</b>
“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.


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

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

<b>NOTICE</b>
“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](http://sandc.com), or call the S&C Global Monitoring and Support Center at 1-888-762-1100.

<b>NOTICE</b>	
Read this instruction sheet thoroughly and carefully before installing your S&C Type SMD-50 Power Fuses.	

**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.

## Safety Precautions

### DANGER



**S&C Type SMD-50 Power Fuses installed in high-voltage applications. Failure to observe the precautions below will result in serious personal injury or death.**

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

1. **QUALIFIED PERSONS.** Access to S&C SMD-50 Power Fuses 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, 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.
7. **Do not leave fuse units installed in the fuse mounting hanging open.** Once closed in, the fuse units will not be damaged by rain or high humidity. However, the watertightness of the exhaust end of the fuse units cannot be guaranteed; therefore, as a precaution, fuse units should not be left hanging open. Any rain or snow that might enter could affect the solid-materials lining. Moreover, when in storage, these fuse units should be protected from excessive moisture.
8. **Do not remove the fuse unit from its carton until ready to use.**
9. **Handle fuse units with care.** Do not drop or throw them.
10. **Do not place hand over the upper seal of the fuse unit when handling.** There is the remote possibility that the current-responsive section of the fuse unit may have been weakened in shipping or handling. As a result, the spring-loaded actuating pin may be unpredictably released and driven forcibly through the upper seal.

Use the following procedure to assemble and install mountings:

**STEP 1. Vertical Style Mountings:** Attach insulators to the mounting base as indicated in Figure 1 using four  $\frac{1}{2}$ -13 $\times$  $\frac{7}{8}$ -inch galvanized bolts and lock washers with each insulator. Before fully tightening the mounting bolts, adjust the insulators to attain the appropriate spacing as shown in Figure 1. To compensate for minor variations in the insulators, it may be necessary to rotate one or both insulators either 90° or 180° to attain the specified center-to-center dimensions. Shim the insulators if necessary. Fully tighten the mounting bolts.

**Vertical-Offset Style Mountings:** Attach lower insulator to the mounting base, as illustrated in Figure 2 on page 6, using two  $\frac{1}{2}$ -13 $\times$  $\frac{7}{8}$ -inch galvanized bolts and lock washers. Next, attach the insulator pedestal to the mounting base, as shown in Figure 2 on page 6, using four  $\frac{1}{2}$ -13 $\times$  $\frac{1}{4}$ -inch galvanized bolts, lock washers, and nuts. Attach the upper insulator to the insulator pedestal using two  $\frac{1}{2}$ -13 $\times$ 1-inch

galvanized bolts, lock washers, and flat washers. Fully tighten all mounting bolts.

**Right-Angle Style Mountings:** Attach insulators to mounting base, as illustrated in Figure 3 on page 7, using two  $\frac{1}{2}$ -13 $\times$  $\frac{7}{8}$ -inch galvanized bolts and lock washers for each insulator. Fully tighten the mounting bolts.

**STEP 2. Vertical Style Mountings:** Attach the latch-and-upper-contact assembly to one insulator, as shown in Figure 1 on page 6, using two  $\frac{1}{2}$ -13 $\times$  $\frac{1}{4}$ -inch galvanized bolts, lock washers, and flat washers. Then, attach the hinge-and-lower-contact assembly to the other insulator, as shown in Figure 1, using two  $\frac{1}{2}$ -13 $\times$  $\frac{1}{4}$ -inch galvanized bolts and lock washers. Do not fully tighten the mounting bolts at this time.

**Vertical-Offset Style Mountings:** Attach the latch-and-upper-contact assembly mounting bracket and hinge-and-lower-contact assembly mounting bracket to the insulators, as illustrated in Figure 2 on page 6, using two  $\frac{1}{2}$ -13 $\times$  $\frac{7}{8}$ -inch galvanized bolts and lock washers for each bracket.

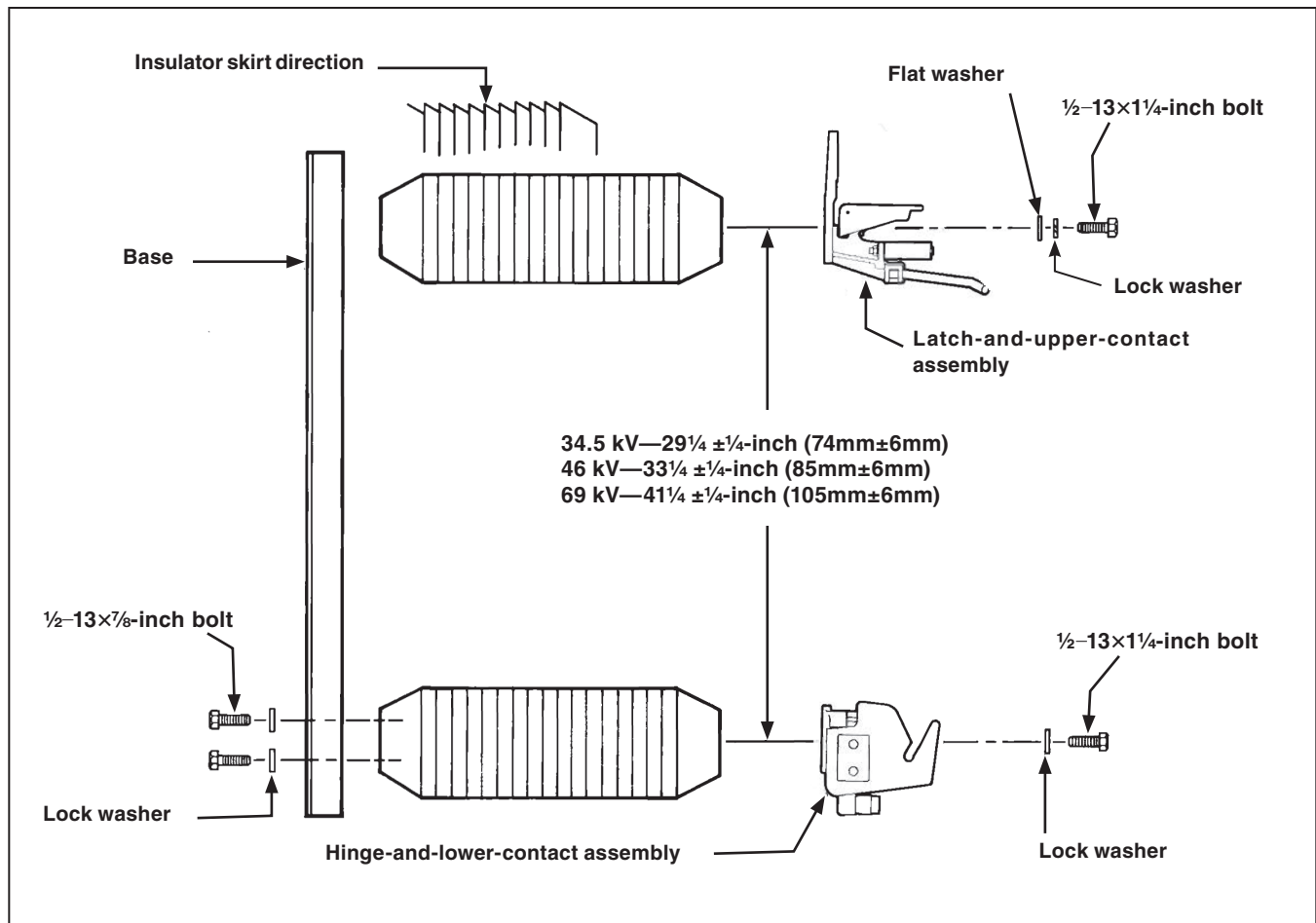


Figure 1. Assembly of mounting, vertical style.

## Assembling and Installing Mountings

### NOTICE

The *shorter* “leg” of each mounting bracket should be mounted against the insulator cap. Position the mounting brackets to obtain the dimension shown in Figure 2 and then fully tighten the mounting bolts.

**Right-Angle Style Mountings:** Attach the latch-and-upper-contact assembly mounting bracket and hinge-and-lower-contact assembly mounting bracket to the insulators, as illustrated in Figure 3 on page 7, using two ½–13×7/8-inch galvanized bolts and lock washers for each bracket.

### NOTICE

The *longer* “leg” of each mounting bracket should be mounted against the insulator cap; 69-kV mountings are furnished with an offset latch-and-upper-contact assembly mounting bracket that should be mounted. Position the mounting brackets to obtain the dimension shown in Figure 3 on page 7, and then fully tighten the mounting bolts.

**STEP 3. Vertical Style Mountings:** Step 3 does not apply.

**Vertical-Offset Style and Right-Angle Style Mountings:** Attach the latch-and-upper-contact assembly to the latch-and-upper-contact assembly mounting bracket, as indicated in Figure 2 or Figure 3 on page 7, as applicable, using two ½–13×1½-inch galvanized bolts, lock washers, flat washers, and nuts. Then, attach the hinge-and-lower-contact assembly to the hinge-and-lower-contact assembly mounting bracket, as indicated in Figure 2 or Figure 3 on page 7, as applicable, using two ½–13×1½-inch galvanized bolts, lock washers, and nuts. Do not fully tighten mounting bolts at this time.

**STEP 4.** Hoist the fuse mounting, and bolt it into position on the supporting structure. Do not hoist the fuse mounting by rigging on the live parts. If necessary, shim the mounting base to eliminate any distortion caused by irregularities in the supporting structure.

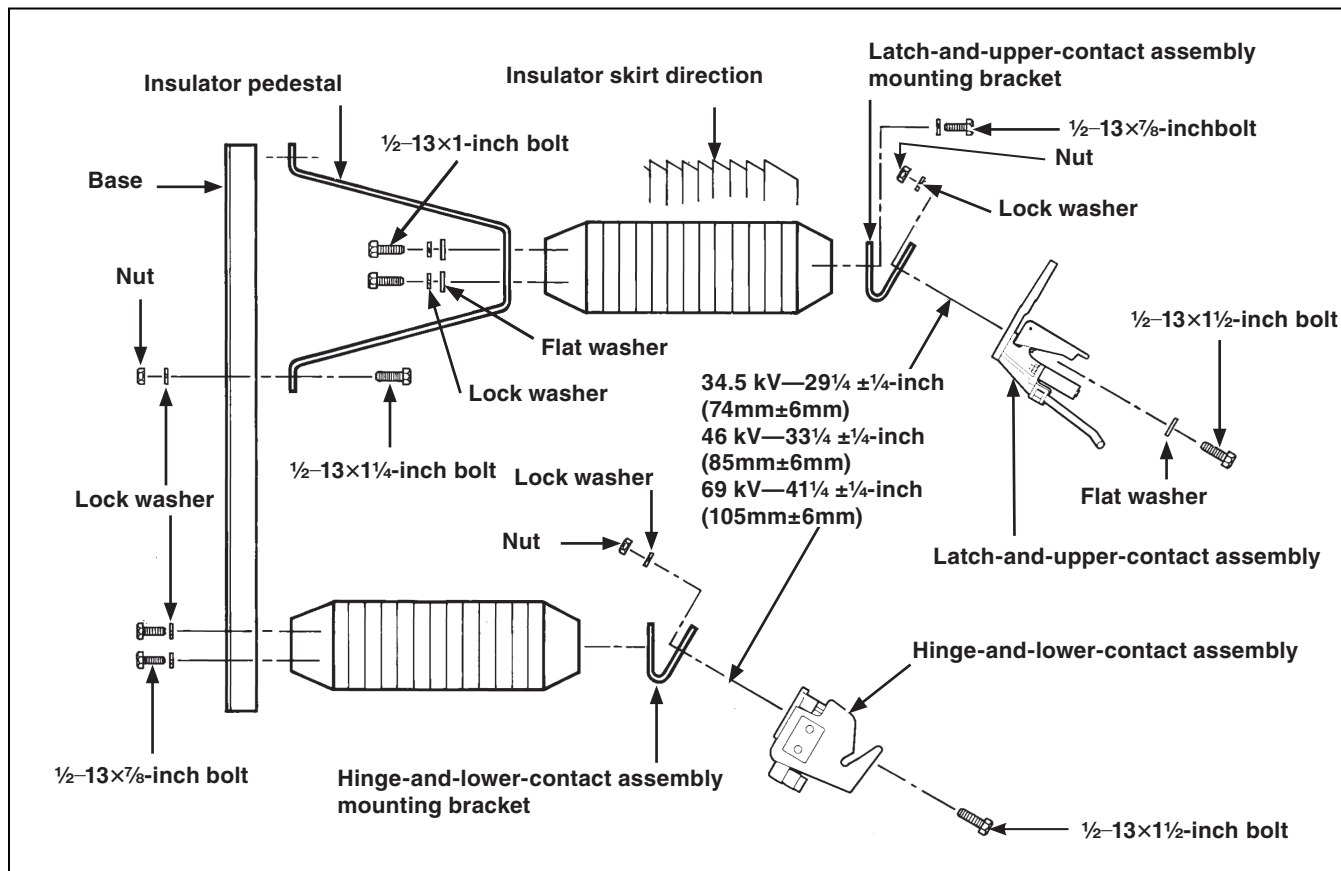


Figure 2. Assembly of mounting, vertical-offset style.

**STEP 5.** Make electrical connections.

**⚠ DANGER**

**Do not** energize the fuse mountings at this time.

If standard bronze body connectors are used, the following procedures should be used:

- (a) Thoroughly wire-brush the current-transfer surfaces of each fuse-mounting terminal pad and immediately apply a liberal coating of Penetrox A® Oxide Inhibitors (available from Burndy Corporation) to the brushed surfaces.
- (b) Wire-brush current-transfer surfaces of each connector and apply a coating of Penetrox A. Then, bolt the connectors to the terminal pads.
- (c) Prepare the conductors using established procedures and clamp them in their respective connectors.

If rigid bus is used, slotted holes must be provided at the point of attachment to the fuse-mounting terminal pads so subsequent adjustments can be made as described in the “Adjustments” section on page 8. In addition, flexible expansion couplings must be furnished. The above-listed standard bronze body connector preparation procedures should be followed, as applicable, when copper bus is used.

**STEP 6.** A coating of NO-OX-ID® “A” Contact Lubricant (available from Sanchem Inc.) was applied to the contact-finger surfaces of the latch-and-upper-contact assembly and hinge-and-lower-contact assembly at the factory. See Figure 4 on page 8 for the relative location of these surfaces on the latch-and-upper-contact assembly. Verify the presence of this oxidation-inhibiting grease and that it is still free of contaminants. If necessary, clean the contact surfaces with a nontoxic, nonflammable solvent and apply a coating of NO-OX-ID® “A” Contact Lubricant or a similar nonmetallic-filler oxidation-inhibiting grease.

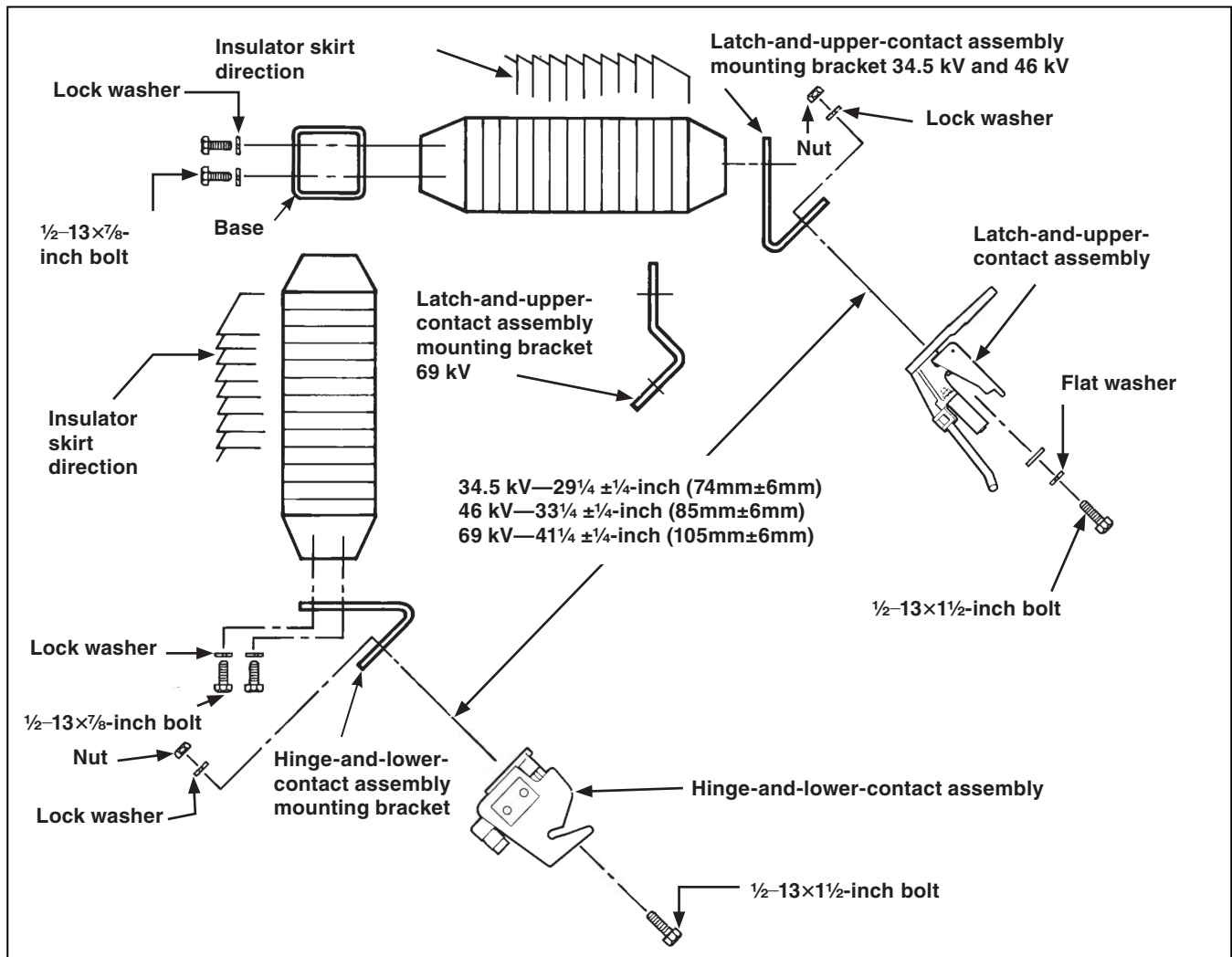


Figure 3. Assembly of mounting, right-angle style.

## Adjustments

The following instructions for making adjustments apply to all mounting styles:

### **⚠ DANGER**

Make sure the mounting is de-energized and properly grounded before making any adjustments to the mounting.

**STEP 1.** Place a fuse unit assembly (fuse unit with end fittings attached) into the mounting in the **Open** position.

**STEP 2.** *Vertical and Inverted Styles:* Loosen the bolts that secure the hinge-and-lower-contact assembly to its insulator. Bring the fuse unit assembly toward the **Closed** position, but do not engage the latch. The nose projection on the upper end fitting should make contact with the roller in the latch-and-upper-contact assembly approximately on center. See Figure 4. Make any necessary adjustments by rotating the hinge-and-lower-contact assembly on its axis using the fuse unit assembly as a lever. Then, tighten the hinge-and-lower-contact assembly mounting bolts securely.

*Vertical-Offset, Upright, and Right-Angle Styles:* Loosen the bolts that secure the hinge casting to its bracket weldment. Bring the fuse unit assembly toward the **Closed** position, but do not engage the latch. The nose projection on the upper end fitting should make contact with the roller in the latch casting approximately on center. See Figure 4. Make any necessary adjustments by rotating the hinge casting on its axis using the fuse unit assembly as a lever. Then, tighten the hinge casting mounting bolts securely.

**STEP 3.** *Vertical and Inverted Styles:* Again, bring the fuse unit assembly toward the **Closed** position and check whether the contact fingers of the latch-and-upper-contact assembly enter the “window” of the upper end fitting on center and that the contact fingers are perpendicular to the fuse unit. See Figure 4. If necessary, loosen the mounting bolts that secure the latch-and-upper-contact assembly to its insulator and make any necessary adjustments by rotating the latch-and-upper-contact assembly on its axis. Then, tighten the latch-and-upper-contact assembly mounting bolts securely.

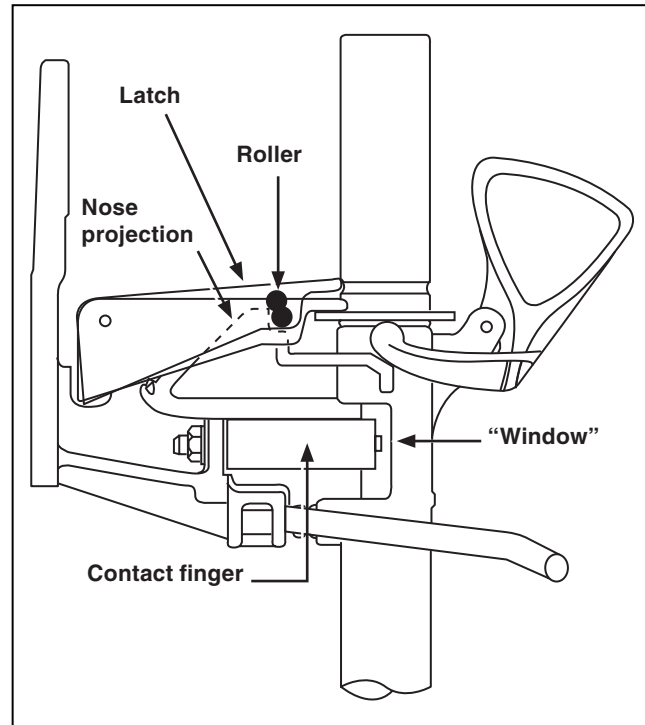


Figure 4. Latch-and-upper-contact assembly of an SMD-50 Power Fuse in the early stage of a latching action. In the fully latched position, the latch roller will have dropped over the nose of the fuse-unit end-fitting.

***Vertical-Offset, Upright, and Right-Angle Styles:*** Again, bring the fuse unit assembly toward the **Closed** position and check whether the contact fingers of the latch casting enter the “window” of the upper end fitting on center and the contact fingers are perpendicular to the fuse unit. See Figure 4 on page 8. If necessary, loosen the mounting bolts that secure the latch casting to its bracket weldment and make any necessary adjustments by rotating the latch casting on its axis. Then, tighten the latch casting mounting bolts securely.

- STEP 4.** Adjustment of the fuse in the sequence outlined above will ensure maximum ease of operation. The fuse unit assembly may be closed either with a deft, follow-through motion or with a slamming action from nearly any angle. Check for proper latching by placing the prong of a hookstick behind the fuse unit and exerting a force in the “Opening” direction. A properly latched fuse will open only when operating the pull-ring.

## Attaching Fuse Unit End-Fittings

Follow these steps to attach fuse unit end-fittings:

- STEP 1.** Check the upper end-fitting to make sure the release tube slides freely. See Figure 5. If it does not, use a new upper end-fitting.
- STEP 2.** Slide the upper end-fitting over the fuse unit. Align the locating pin (inside the upper end-fitting) with the locating slot in the fuse unit. Back off the locknut on the upper end-fitting clamping bolt, and *tighten the bolt—taking care not to tighten beyond approximately 8 to 10 ft-lbs (11 to 14 nm); secure with the locknut.*
- STEP 3.** Attach the lower end-fitting to the fuse unit. Align the locating rivets on the lower ferrule with the locating slots in the lower end-fitting. Back off the locknut on the lower end-fitting clamping bolt, and *moderately tighten the clamping bolt—taking care not to tighten beyond approximately 8 to 10 ft-lbs (11 to 14 nm); secure with the locknut.* Make certain the movable contact of the lower end-fitting is seated in the groove in the lower ferrule.

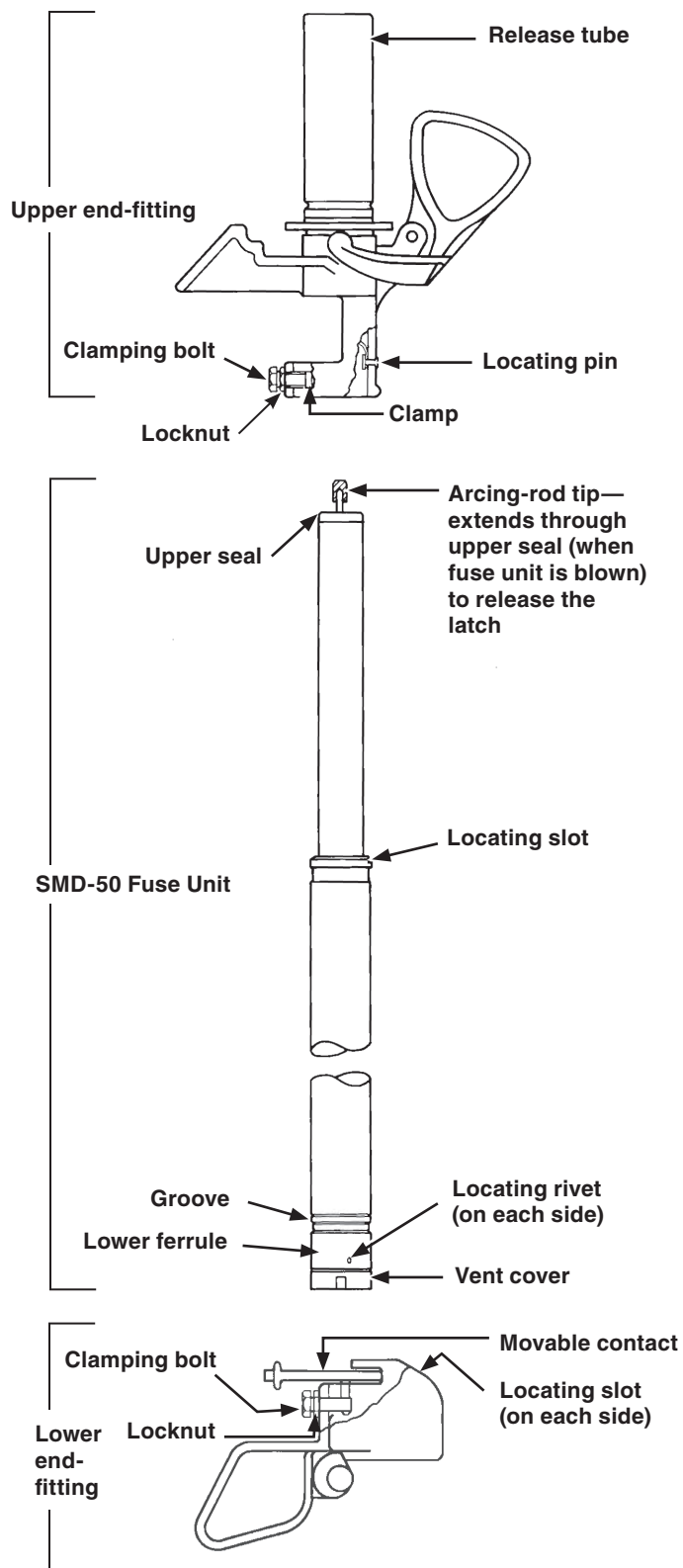


Figure 5. SMD-50 Fuse Unit with end-fittings.

The following instructions apply to all mounting styles:

**Hookstick operation:** Within their range of application, Type SMD-50 Power Fuses are capable of switching the magnetizing current of all sizes of modern power transformers. Type SMD-50 Power Fuses thus eliminate the need for separate series-connected disconnect switches.

The fuse unit assembly is opened by a swift, non-hesitating stroke on the pull-ring. The fuse unit assembly can then be eased down or permitted to drop freely to its fully **Open** position. To close the fuse unit assembly, use a conventional hookstick to engage the pull-ring, and then close the fuse unit assembly either with a deft, follow-through motion or with a slamming action.

**Hand operation:** These fuse unit assemblies can be opened and closed by hand.

 **DANGER**

All incoming and outgoing leads to the fuse mounting *must* be de-energized *and* properly grounded before performing an opening or closing operation by hand.

## Replacing Blown Fuse Units

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When the fuse operates, the blown fuse unit swings to the **Open** position. Remove it from the mounting. See the “Opening and Closing Fuse Unit Assemblies” section on page 11. Detach the upper and lower end-fittings from the blown fuse unit and attach them to a new fuse unit following the directions in Steps 1 through 3 on page 10. The blown fuse unit cannot be reused. Discard it.

For quick replacement of blown fuses, extra end-fittings may be purchased and attached to spare fuse units.

Whenever practical, inspect the contact-spring surfaces of the latch-and-upper-contact assembly and the hinge-and-lower-contact assembly.

### **DANGER**

All incoming and outgoing leads to the fuse mountings must be de-energized and properly grounded before inspecting the stationary-contact surfaces of the latch-and-upper-contact assembly and the hinge-and-lower-contact assembly.

Remove the existing coating of oxidation-inhibiting grease from these contact surfaces, using a nontoxic, non-flammable solvent. Inspect these surfaces for evidence of pitting. If pitting has occurred, file down any projections, abrade the surfaces until smooth with an abrasive cloth or scratch brush, and wipe clean. Apply a new coating of NO-OX-ID® “A” Contact Lubricant (available from Sanchem, Inc.) or a similar nonmetallic-filler oxidation-inhibiting grease. If a contact has been burned, that contact and its mating contact should be replaced.

### **How to Double Check for a Blown Fuse Unit**

If the vent cover is missing, the fuse unit is likely blown. See Figure 5 on page 10. However, if the vent cover is in place, it should not be assumed that the fuse unit is unblown. Double-check for a blown fuse unit by examining the release tube; it will be extended if the fuse unit is blown.

### Fuse Unit Tube Refinishing

The exterior finish of the fuse unit tubes should be inspected periodically for weather damage. If the finish has become intermittent or if deep scratches are evident, the tubes should be resurfaced using the fuse-tube recoating kit available. See Table 1. This kit contains two components: a ½-pint can of Tile Red Epoxy Polyester Gloss Enamel 13-R-1 and a ½-pint can of Catalyst 13-C-0. A 1-pint can of thinner is also available for use with this kit (ordered separately).

Before resurfacing, sand off the old finish with No. 1 sandpaper. Smooth surface with No. 0 sandpaper. Remove any oil or grease with a nontoxic, nonflammable solvent and allow to dry. Do not immerse the fuse unit in solvent.

Mix together *only* the amount of enamel and catalyst appropriate for the number of fuse unit tubes to be recoated: ⅛-pint (59 ml) enamel and ⅛-pint (59 ml) catalyst for each fuse unit tube. Add thinner as required. Wait approximately 30 minutes for the paint components to react.

Spray or brush coat the fuse tube, taking care not to coat the fuse-tube ferrules. Allow the tube to air dry for five hours, and then apply a second coat. Air dry for five hours after applying the second coat. **DO NOT BAKE FINISH.**

Discard any mixed finish not used.

### Fuse Unit Bore Inspection

To determine whether SMD Fuse Units are in proper operating condition, the condition of the fuse unit bore should be checked whenever the protected device is taken out of service for routine maintenance. SMD-50 Fuse Units can be returned to S&C for X-ray inspection of the fuse unit bore. See Table 2.

**Table 1. Maintenance Supplies**

Item	Catalog Number
Fuse unit recoating kit—one-half pint tile red epoxy polyester gloss enamel 13-R-1 and one-half pint Catalyst 13-C-0 (sufficient for two coats for four fuse units). Requires thinner below	9900-026
Thinner for above—one pint	FA-104643

**Table 2. Inspection Service**

Item	Catalog Number
X-ray inspection of fuse-unit bore at S&C	●

- Contact the nearest S&C Sales Office for return authorization.