



# S C SM-20 Power Fuses Installation Guide

[Home](#) » [S C](#) » S C SM-20 Power Fuses Installation Guide 



## SMU-20® Fuse Units Instruction Sheet 252-550

### Power Fuses

Type SM-20, SML-20, and SME-20★—Indoor Distribution

Type SMD-20—Outdoor Distribution (7.2 kV, 27 kV, and 34.5 kV)

### Installation, Replacement, and Maintenance

#### Contents

- [1 Introduction](#)
- [2 Safety Information](#)
- [3 Safety Precautions](#)
- [4 Shipping and Handling](#)
- [5 Overview](#)
- [6 Installation \(Fusing\)](#)
- [7 Inspecting the S&C Silencer](#)
- [8 Maintenance](#)
- [9 Documents / Resources](#)
  - [9.1 References](#)
- [10 Related Posts](#)

### Introduction

#### 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 instruction handbook before installing or operating your Type SM-20, SML-20, SME-20, and SMD-20 Power Fuse. Familiarize yourself with the Safety Information and Safety Precautions on pages 3 and 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 is a permanent part of your Type SM-20, SML-20, SME-20, and SMD-20 Power Fuse. 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 application. The application must be within the ratings furnished for the equipment. Ratings for the SMU-20 Fuse Unit are listed in the ratings table in Specification Bulletin 242-31. The ratings are also on the label 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).

## **Safety Information**

### **Understanding Safety-Alert Messages**

Several types of safety-alert messages may appear throughout this instruction sheet and on labels and tags

attached to the Type SMD-20, SM-20, SML-20, and SME-20 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](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 your Type SM-20, SML-20, SMD-20, and SME-20 Power Fuse.

#### **Replacement Instructions and Labels**

If additional copies of this instruction sheet are needed, 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.

### **Safety Precautions**



#### **DANGER**



Type SM-20, SML-20, SME-20, and SMD-20 Power Fuses contain high voltage. 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 Type SM-20, SML-20, SME-20, and SMD-20 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 labels or 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.

## Shipping and Handling

### Storage



#### **WARNING**

Fuse units must be stored in a dry place, away from water, and in their original packaging. Fuse units that were not stored properly should not be energized and should be discarded immediately. Improper storage may lead to water entry that damages the fuse unit. Energizing damaged fuse units can result in personal injury, fire, equipment, or property damage.

Fuse units must be stored in a dry place, away from sources of water. When storing fuse units on a service truck, store them in a closed container, in the original packaging.

Do not store them in an open container that may collect water and soak or submerge the fuse unit. Water entry into the solid-material lining will damage the fuse unit.

### Handling

Do not remove the fuse unit from its carton or sealed plastic bag until ready to use.

Handle fuse units with care.

The present-design upper end-fitting for use in SM-20 and SML-20 Power Fuses uses a free-floating BLOWN FUSE indicator that can move (by force of gravity) into the Blown Fuse position should the fuse be inverted during handling. The fuse condition can be verified by returning the fuse to the upright position. If the fuse is blown, the indicator will remain in the extended (projecting) position.



#### **CAUTION**

Do not place a hand over the upper seal of the fuse unit when handling. If the fuse was damaged during shipping or handling, the spring-driven actuating pin may release and be forcibly driven through the upper seal. If a hand is placed over the upper seal of the fuse unit and the actuating pin releases, it can result in a minor personal injury.

## Overview

The following instructions cover installation, replacement, and maintenance of SMU-20 Fuse Units used with indoor distribution SM-20, SML-20, and SME-20 mountings, or with outdoor distribution SMD-20 mountings. Appropriate end-fittings must be attached to the fuse unit before it can be installed in a mounting. While the SMU-20 Fuse Unit can be installed in each of the aforementioned mountings, the end-fittings for use in an SMD-20 mounting are not interchangeable with the end-fittings for use in SM-20 or SML-20 mountings.

Moreover, end-fittings for use in an SME-20 mounting are not interchangeable with end-fittings for SMD-20, SM-20, or SML-20 mountings. See Figure 1(a) on page 8 and Figure 1(b) on page 9.

SMU-20 Fuse Units have silver or nickel-chrome fusible elements that are nondamageable; consequently, there is no need to replace unblown companion fuses on suspicion of damage following a fuse operation.



#### **WARNING**

Do not leave fuse units installed in the SMD-20 Mounting hanging open. When closed into the mounting, 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 damage the solid-material lining. Energizing water damaged fuse units can result in personal injury, fire, equipment, or property damage.

## Installation (Fusing)

### SM-20, SML-20, or SME-20 Mountings

Attach fuse unit end-fittings as follows. For existing installations, start at Step 1. For new installations, start at Step 5.

**STEP 1.** When the fuse operates, the fuse unit does not swing open, but the blown-fuse indicator moves to the extended position, providing visual indication the fuse unit is blown. Move the fuse unit to the Open position and

then remove it from the mounting.

## **DANGER**

SM-20 and SME-20 mountings do not incorporate a live-switching device.

DO NOT move an unblown SMU-20 Fuse Unit in SM-20 and SME-20 mountings to the Open position without first isolating or de-energizing the mounting by opening a series interrupting and isolating switch or loadbreak elbow. Failure to isolate or de-energize these fuse mountings before opening the fuse unit will lead to a flashover that may result in serious injury or death.

**STEP 2.** Loosen the upper-end-fitting clamp screw, and pry the clamp apart slightly using a screw- driver or other pry tool.

**STEP 3.** Slide the upper end-fitting off the upper end of the fuse unit. Then unscrew and remove the silencer.

**STEP 4.** Inspect the silencer for wear as described in the “Inspecting the S&C Silencer” section on page 12. Slide the lower end-fitting off the upper end of the fuse unit.

**STEP 5.** Unused Fuse Unit End-Fittings: A coating of NO-OX-ID® “A Special” oxidation-inhibiting grease has been factory-applied to the contact rod at the factory. Verify the presence of this oxidation-inhibiting grease and that it is still free of contaminants. If necessary, clean the contact rod with a nontoxic, nonflammable solvent and apply a coating of NO-OX-ID “A Special” contact lubricant or a similar nonmetallic-filler oxidation inhibiting grease.

**Reused Fuse Unit End-Fittings:** Remove the existing coating of oxidation-inhibiting grease and dirt from the contact using a nontoxic, nonflammable solvent. If the contact has visible evidence of damage, the contact and its mating contact should be replaced. Inspect the contact for evidence of pitting. If pitting has occurred, file down any projections, abrade the surface until smooth with an abrasive cloth or scratch brush, and wipe clean. Apply a new coating of NO-OX-ID “A Special” contact lubricant or similar nonmetallic-filler oxidationinhibiting grease to the contact rod.

The lower end-fitting must be attached first. Unscrew and discard the red cap located on the lower end of the fuse unit. Next, slip the lower end-fitting over the upper end of the fuse unit and slide it down until the locating slot (inside the lower end- fitting) is aligned with the locating pin on the lower ferrule.

Seat the lower end-fitting against the shoulder of the lower ferrule. Then, thread the silencer onto the lower end-fitting and screw it on firmly.

The final fractional turn should be made with a bar or wrench handle applied to the base of the silencer. See Figure 1(a) on page 8 and Figure 1(b) on page 9.

**STEP 6.** Slip the upper end-fitting over the fuse unit. Align the locating pin (inside the upper endfitting) with the locating slot in the fuse unit and seat the upper end-fitting firmly against the upper end of the fuse unit. Tighten the clamp screw firmly.

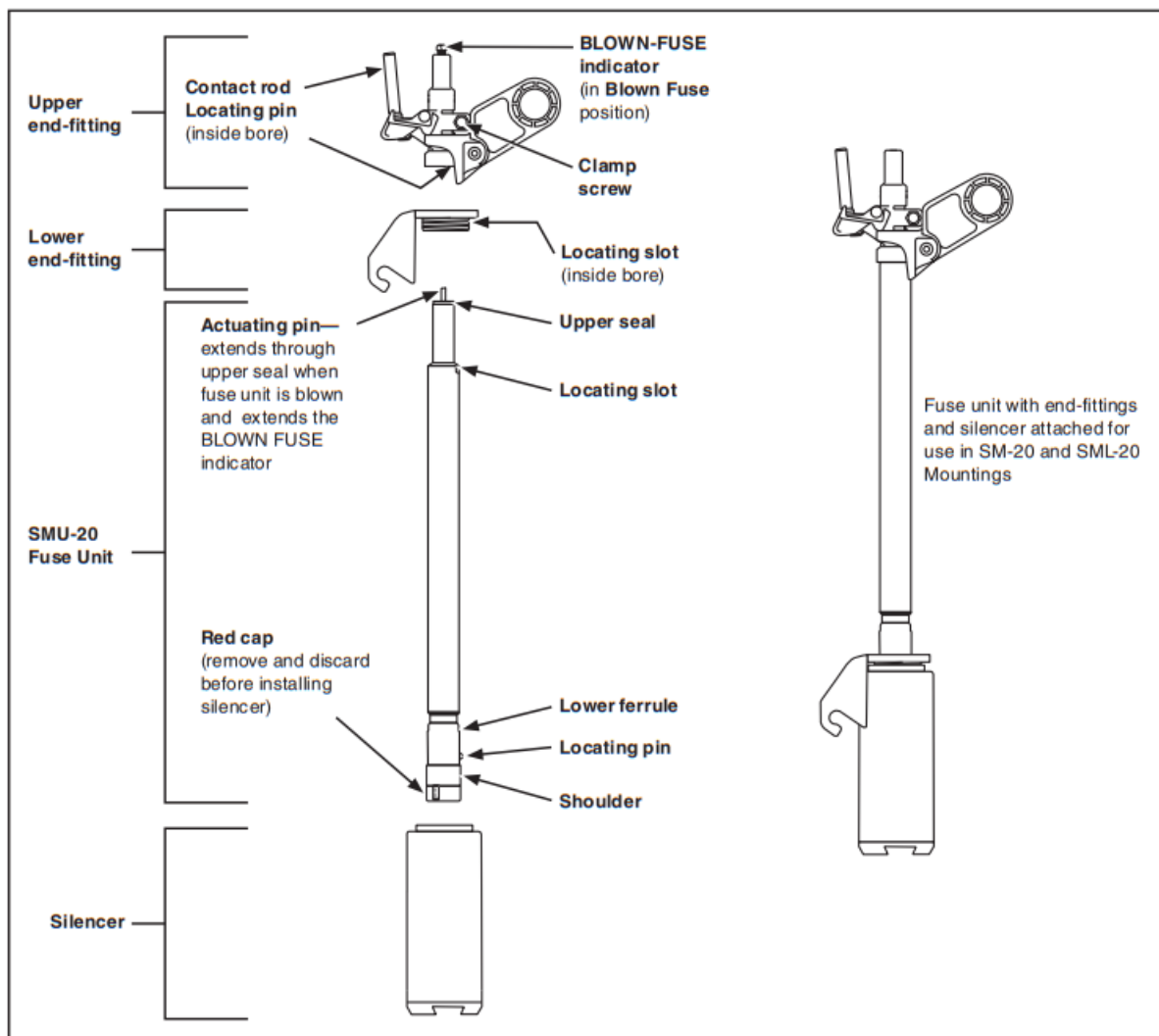


Figure 1(a). SMU-20 Fuse Unit with end-fittings and silencer for use in indoor SM-20 and SML-20 mountings.

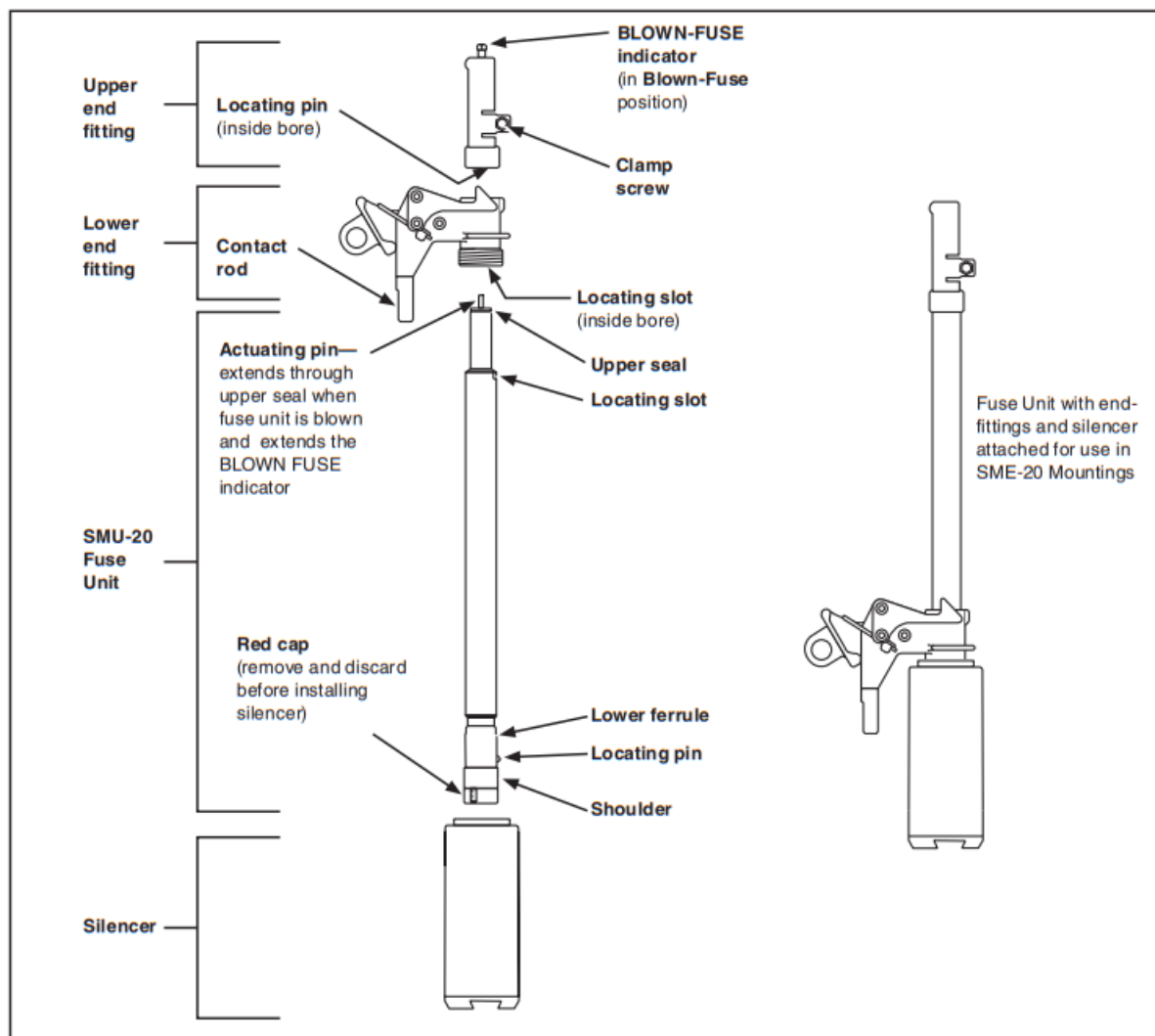


Figure 1(b). SMU-20 Fuse Unit with end-fittings and silencer for use in indoor SME-20 mountings.

## SMD-20 Mountings

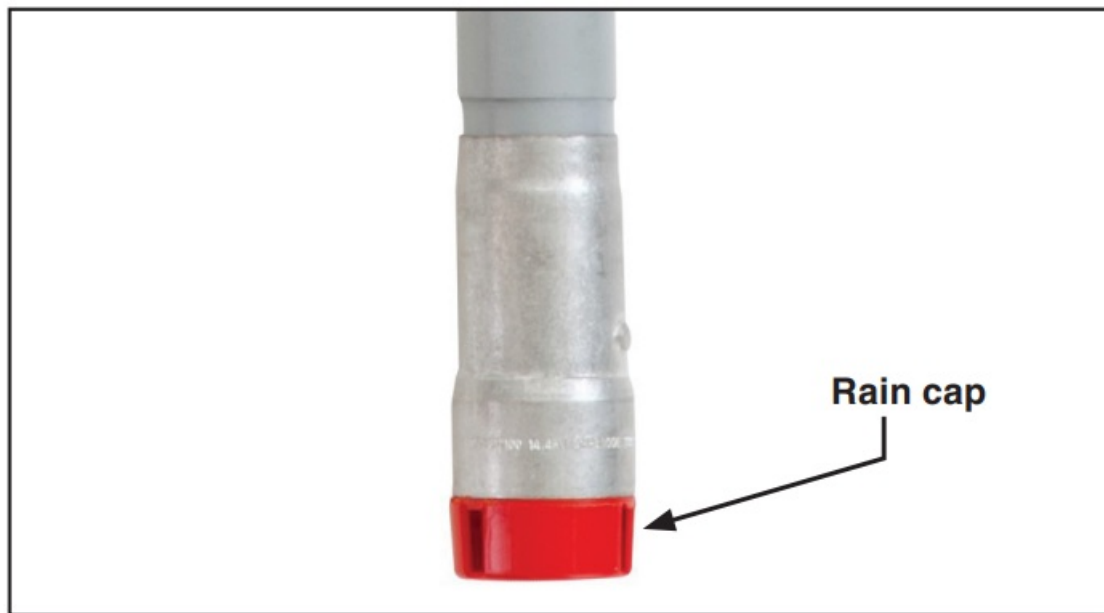


### DANGER

SMD-20 mountings do not incorporate a live-switching device. DO NOT move an unblown SMU-20 Fuse Unit in the SMD-20 mounting to the Open position without the use of a portable loadbreak device such as Loadbuster®—The S&C Loadbreak Tool or prior to de-energizing the mounting by opening a series interrupting and isolating switch. Failure to use a loadbreak tool to open the fuse unit under load or failure to isolate and de-energize the SMD-20 mounting prior to opening the fuse unit under load will lead to a flashover that may result in serious injury or death.

Attach fuse unit end-fittings as follows

**STEP 1.** The lower end-fitting must be attached first. Slip the lower end-fitting over the upper end of the fuse unit and slide it down until the locating slot (inside the lower end-fitting) seats on the locating pin on the lower ferrule. Next, back off the locknut on the clamp screw and tighten the clamp screw firmly; secure it with the locknut. See Figure 3 on page 11.



**Figure 2. Red cap at the end of SMU-20 Fuse Unit.**

**STEP 2.** Slip the upper end-fitting over the fuse unit. Align the locating pin (inside the upper endfitting) with the locating slot in the fuse unit and seat the upper end-fitting firmly against the upper end of the fuse unit. Tighten the clamp screw firmly.



**WARNING**

Do not remove the red rain cap (see Figure 2) on fuse units installed in outdoor overhead applications. Removing the red cap can lead to water entry in the fuse, which can result in personal injury, fire, equipment or property damage.

**STEP 3. Unused Fuse Unit End-Fittings:** A coating of NO-OX-ID “A Special” contact lubricant has been factory-applied to the current-carrying surface at the factory. Verify the presence of this oxidation-inhibiting grease and that it is still free of contaminants. If necessary, clean the surface with a nontoxic, nonflammable solvent and apply a coating of NO-OX-ID “A Special” contact lubricant or similar nonmetallic-filler oxidation-inhibiting grease.

**Reused Fuse Unit End-Fittings:** Remove the existing coating of oxidation-inhibiting grease and dirt from the current-carrying surfaces of the upper end-fitting and the lower end-fitting, using a nontoxic, nonflammable solvent. Inspect these surfaces for evidence of pitting. If pitting has occurred, file down any projections, abrade the surface until smooth with an abrasive cloth or scratch brush, and wipe clean. Apply a new coating of NO-OX-ID “A Special” contact lubricant or similar nonmetallic-filler oxidation-inhibiting grease to the current-carrying surfaces.

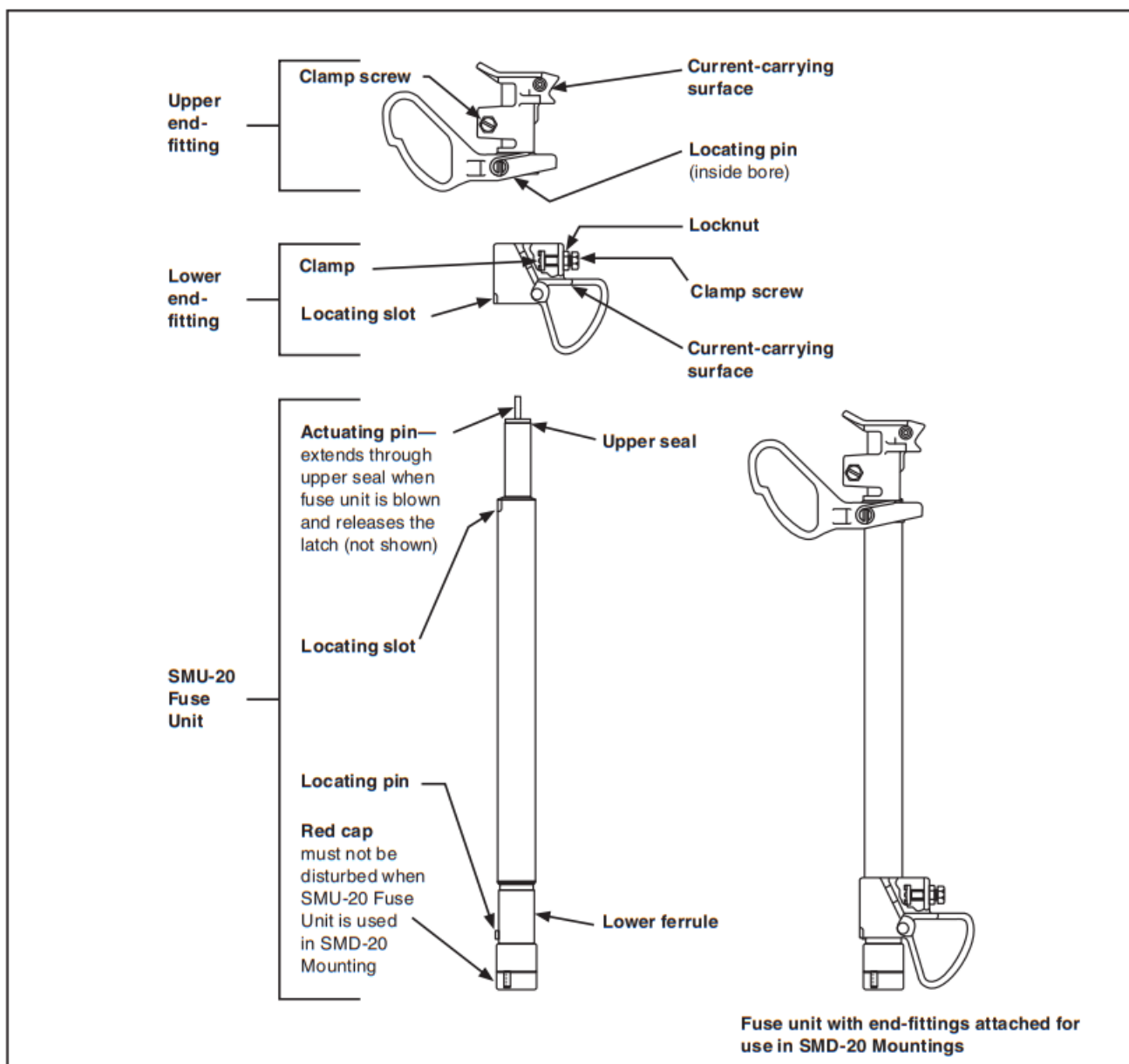


Figure 3. SMU-20 Fuse Unit with end-fittings for use in SMD-20 Mountings.

## Inspecting the S&C Silencer

### Inspection

Before re-installing a previously used S&C Silencer (catalog number FDA-1103) manufactured after June 2007 onto the end-fitting of SM-20, SML-20, or SME-20 Power Fuses, inspect the internal wear indicator.

The indicator is a red metal ring mounted on the bottom of the open chamber of the silencer and will erode with each fuse operation. It is designed to be worn away after three operations at full fault current. When the circle is completely worn away, the silencer should be replaced. See Figures 4, 5, and 6.



Figure 4. Silencer with a red wear indicator.



Figure 5. Silencer after one operation at full fault current.



Figure 6. Silencer after three operations at full fault current.

## Maintenance

### Fuse Units Installed in SM-20, SML-20 and SME-20 Mountings

S&C recommends routine inspection of the SMU-20 Fuse Units installed in indoor applications to check for corrosion and physical wear on mountings, end-fittings, and the fuse units.

The schedule for inspecting fuse units installed in indoor applications is greatly dependent on environmental conditions and the location of the gear. S&C recommends the inspection schedule be based on standard utility practice for pad-mounted, indoor distribution equipment.

### Fuse Units Installed in SMD-20 Mountings

S&C recommends routine inspection of the SMU-20 Fuse Units installed in outdoor applications to check for

corrosion and physical wear on mountings, end-fittings, and the fuse units.

The schedule for inspecting fuse units installed in outdoor applications is greatly dependent on environmental conditions and the installation location. S&C recommends the inspection schedule be based on standard utility practice for outdoor distribution equipment.

### Inspection Guidelines

Below are general guidelines for inspection of SMU-20 Fuse Units installed in indoor and outdoor applications:

- If the red rain cap (shown in Figure 2 on page 10) is missing at the end of a fuse unit installed in outdoor applications, the fuse unit must be removed from service and be replaced with a new fuse unit.
- If a fuse unit's paint finish is flaking or has become cracked or if the underlying fiberglass layer is exposed, the fuse unit must be removed from service and replaced with a new fuse unit.
- If there is severe corrosion or wear on the metal components of the mounting or on the end-fittings of the fuse unit, the mounting or the end-fittings must be replaced. The fuse unit should be removed from the mounting and inspected. If there is severe corrosion on the fuse unit, it must be removed from service and replaced with a new fuse unit.

S&C Instruction Sheet 252-550


★ Type SME-20 Power Fuses are available in S&C Pad-Mounted Gear, PME models, only.





November 29, 2021

© S&C Electric Company 1977-2021, all rights reserved

## Documents / Resources

	<a href="#">S C SM-20 Power Fuses</a> [pdf] Installation Guide SM-20 Power Fuses, SM-20, Power Fuses, Fuses
---	--

## References

-  [S&C Electric Company](#)
-  [Product Literature | S&C Electric](#)