Installation, Replacement, and Maintenance

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

December 9, 2024

Qualified Persons

⚠ WARNING

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

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

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

Read this Instruction Sheet

NOTICE

Thoroughly and carefully read this instruction sheet and all materials included in the product's instruction handbook before installing or operating Type SM-20, SML-20, SME-20, and SMD-20 Power Fuses. Become familiar with the "Safety Information" on page 3 and "Safety Precautions" on page 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 Type SM-20, SML-20, SME-20, and SMD-20 Power Fuses. Designate a location where users can easily retrieve and refer to this publication.

Proper Application

⚠ WARNING

The equipment in this publication is only intended for a specific application. The application must be within the ratings furnished for the equipment. Ratings for the 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.

Understanding Safety-Alert Messages

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

⚠ DANGER

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

⚠ WARNING

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

⚠ CAUTION

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

NOTICE

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

Following Safety Instructions

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

NOTICE

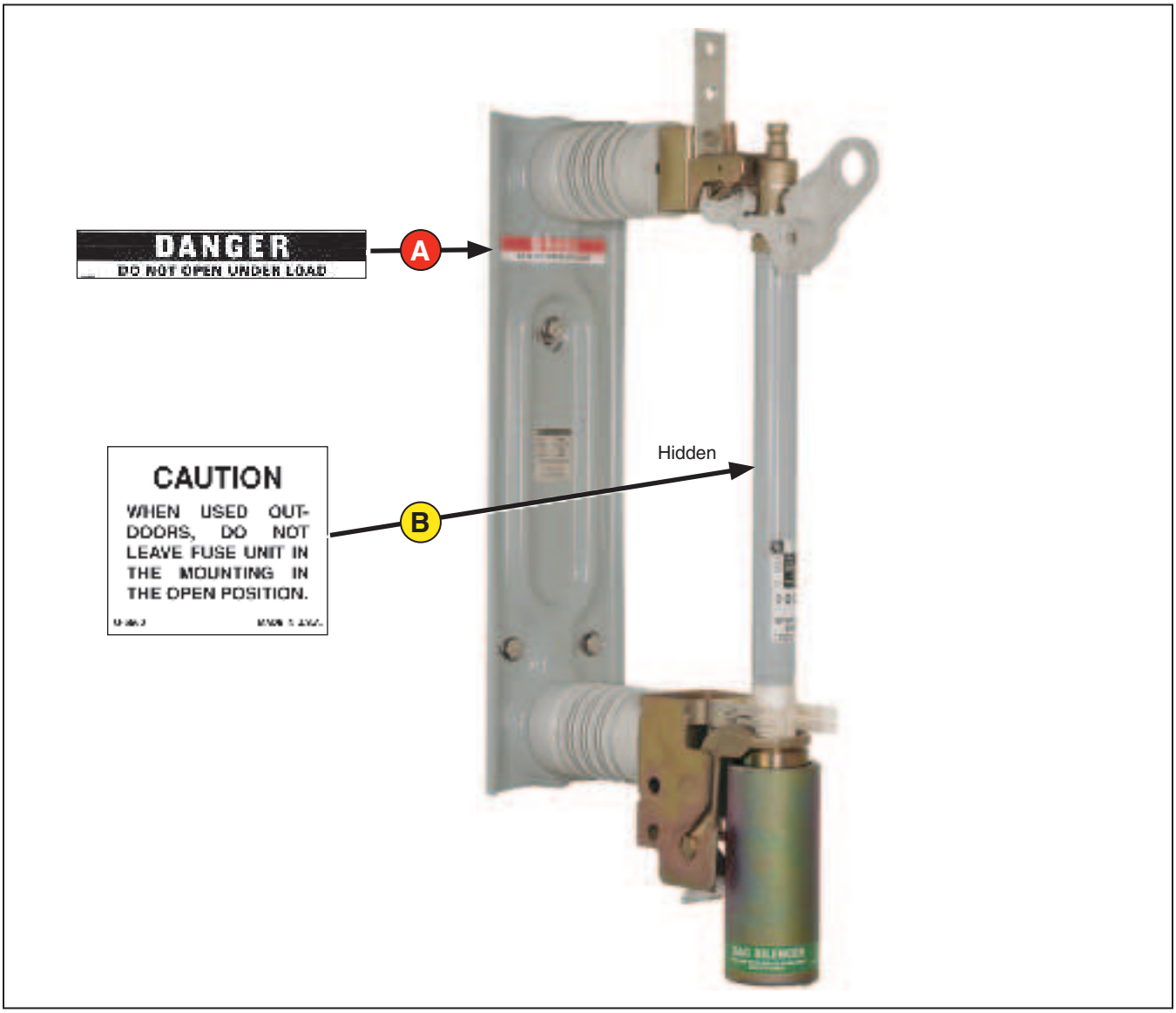
Read this instruction sheet thoroughly and carefully before installing Type SM-20, SML-20, SMD-20, and SME-20 Power Fuses.

Replacement Instructions and Labels

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

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

Location of Safety Labels



Reorder Information for Safety Labels

Location	Safety Alert Message	Description	Part Number
A	⚠ DANGER	DO NOT open under load	G-4992
B	⚠ CAUTION	When used outdoors, DO NOT leave fuse unit in the mounting . . .	G-5560

⚠ 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 "Qualified Persons" 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.

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 and 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 a 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.**

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 on page 9, Figure 2 on page 10, and Figure 3 on page 11.

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.**

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 will result in serious injury or death.

STEP 2. Loosen the upper end-fitting clamp screw and pry the clamp apart slightly using a screwdriver 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 section “Inspecting the S&C Silencer” on page 15. Slide the lower end-fitting off the upper end of the fuse unit.

STEP 5. ***For 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.

For 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 oxidation-inhibiting 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 on page 9 and Figure 2 on page 10.

STEP 6. Slip 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 and seat the upper end-fitting firmly against the upper end of the fuse unit. Tighten the clamp screw to 10 ft.-lbs. The use of battery-operated tools to tighten the upper end-fitting is not recommended unless the tool can be restricted to not exceed 10 ft.-lbs.

Note: A bronze spacing washer was added to the upper ferrule assemblies of all SMD-20 end-fittings manufactured after the first week of December 2024. If the upper ferrule does not have the spacing washer, be especially careful not to overtighten the clamp screw beyond 10 ft.-lbs. A spacing washer has previously been added to the upper ferrule assemblies of all SM-20, SME-20 and SML-20 assemblies. See Figure 5 and Figure 6 on page 13.

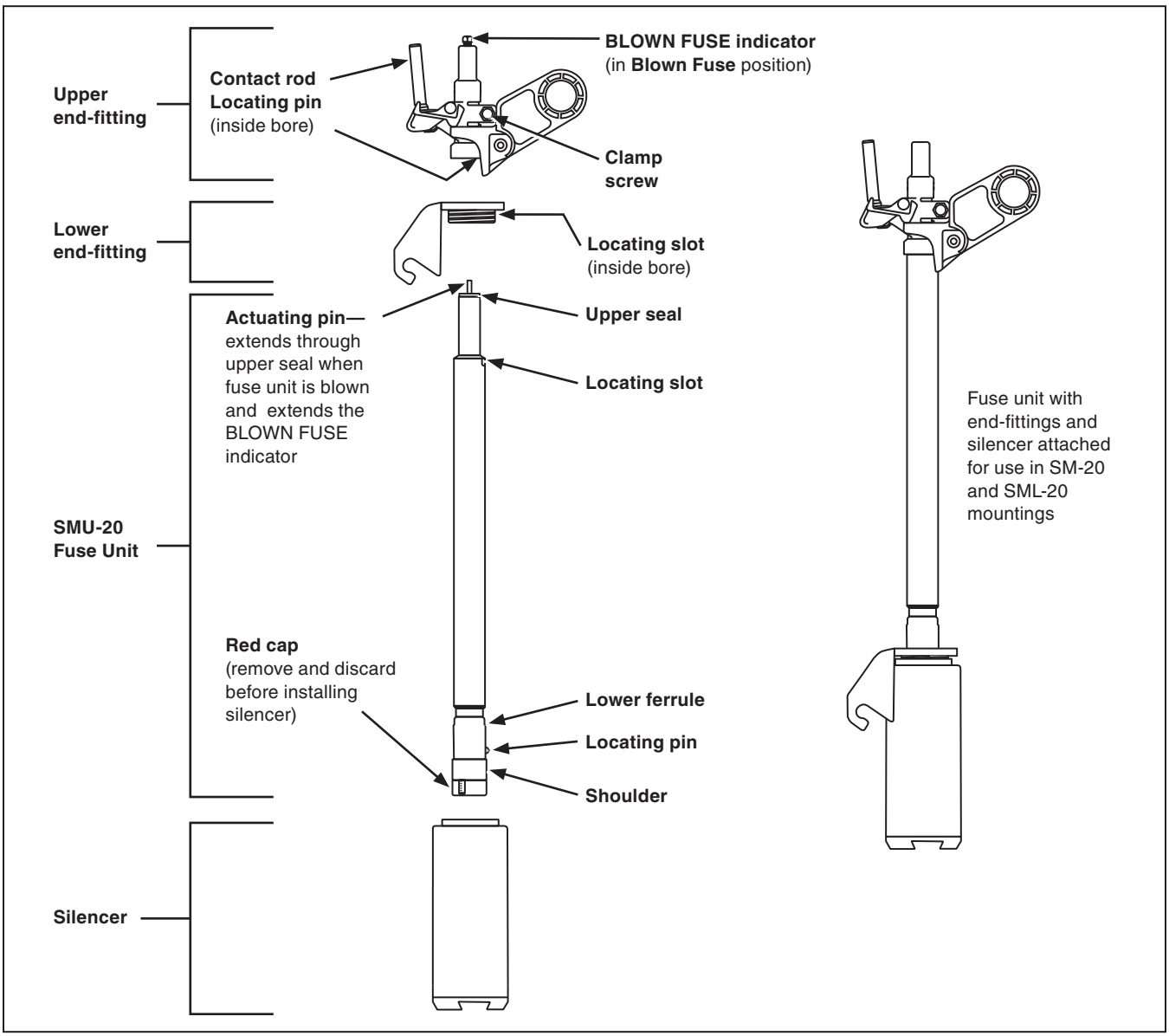


Figure 1. An SMU-20 Fuse Unit with end-fittings and a silencer for use in indoor SM-20 and SML-20 Power Fuse mountings.

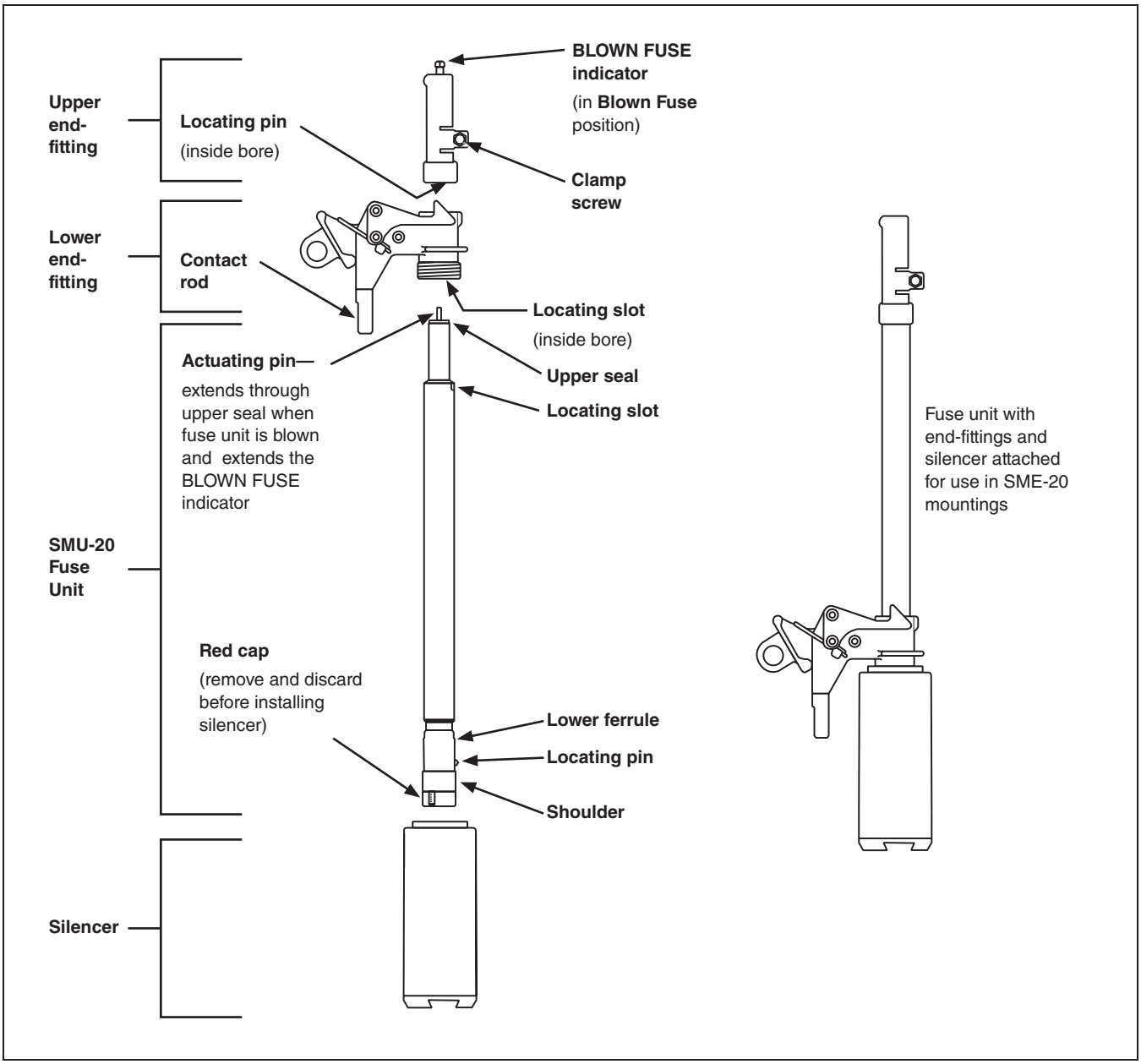


Figure 2. An SMU-20 Fuse Unit with end-fittings and a silencer for use in indoor SME-20 Power Fuse mountings.

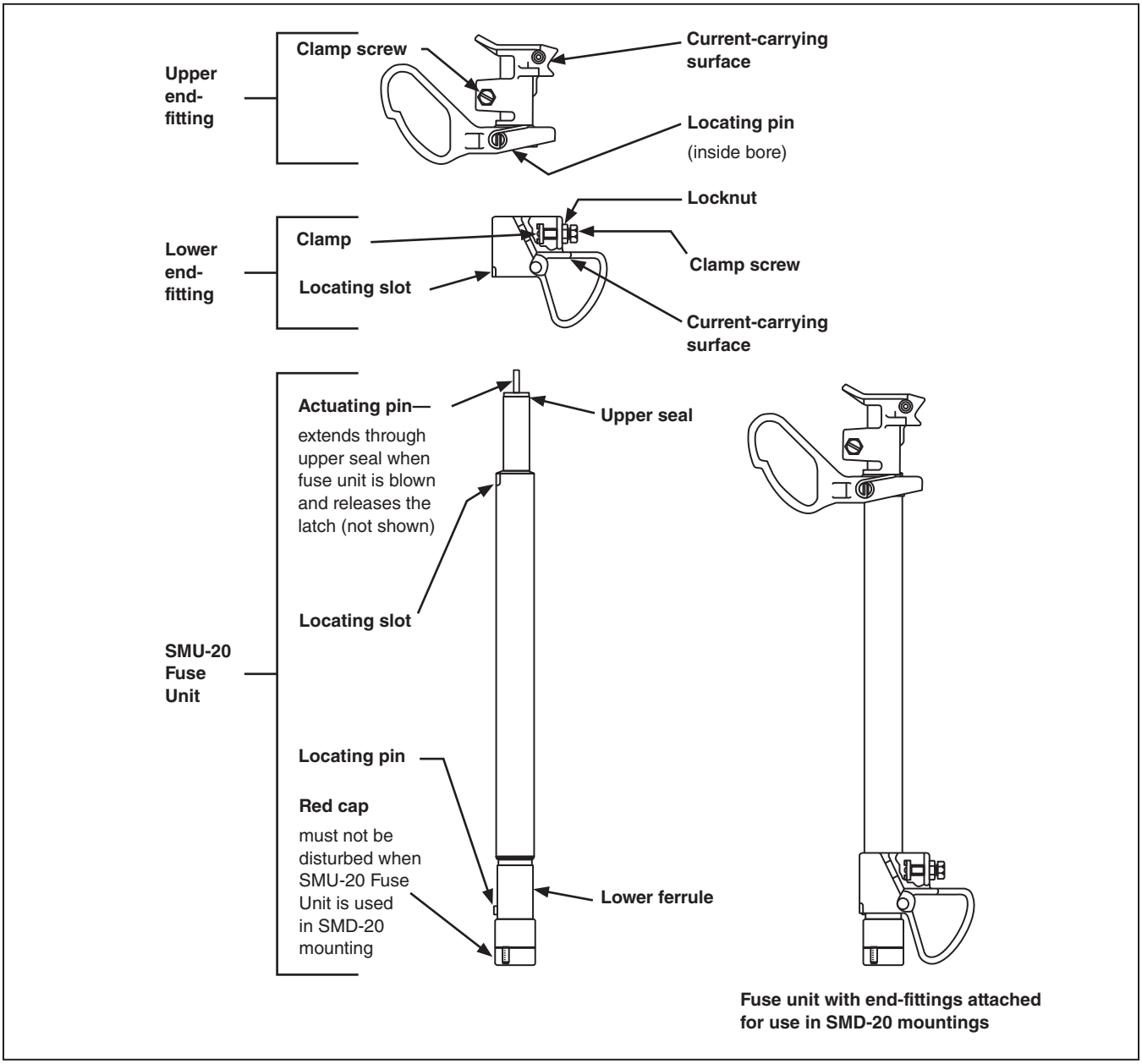


Figure 3. An SMU-20 Fuse Unit with end-fittings for use in SMD-20 Power Fuse mountings.

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 will 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.

STEP 2. Slip 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 and seat the upper end-fitting firmly against the upper end of the fuse unit. Tighten the clamp screw to 10 ft.-lbs. The use of power tools to tighten the upper end-fitting is not recommended unless the tool can be restricted to not exceed 10 ft.-lbs.

⚠ WARNING

Do not remove the red rain cap (See Figure 4) 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.**

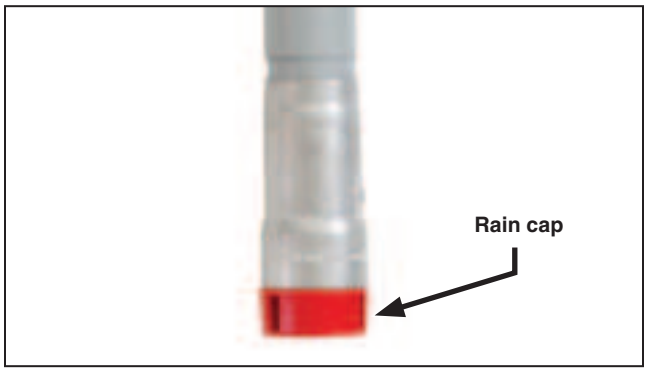


Figure 4. The red rain cap at the end of an SMU-20 Fuse Unit.

STEP 3. ***For 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.

For 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.

Note: A bronze spacing washer was added to the upper ferrule assemblies of all SMD-20, SME-20, and SML-20 end-fittings manufactured after the first week of December 2024. If the upper ferrule does not have the spacing washer, be especially careful not to overtighten the clamp screw beyond 10 ft.-lbs. See Figure 5 and Figure 6.

STEP 4. With a hookstick fitted with a Talon™ Handling Tool or distribution prong bring the fuse unit to the height of the mounting and lower the end-fitting of the fuse unit into the mounting. Allow the fuse unit to rest in the drop open position.

Figure 5. An SMD-20 Power Fuse upper ferrule without a bronze spacing washer.

Figure 6. An SM-20 Fuse Unit upper end-fittting showng a screwdriver prying the clamp and spacer washer slightly apart, after loosening the clamp screw, as part of the fuse-replacement procedure.

STEP 5. Close the fuse into the mounting.

(a) Stand firmly in front of and in line with the cutout mounting. Do not operate directly underneath the SMD-20 Mounting. With a hookstick fitted with a Talon tool or distribution prong, Insert the prong of the hookstick into the pull-ring on the fuse unit's upper end-fitting. If an extendostick is being used, stand between 12 to 15 feet (3.7 to 4.6 m) away from the pole.

(b) While firmly gripping the hookstick, swing the fuse unit to within approximately 45° of the fully **Closed** position. Then, while looking away, fully close the fuse while using a vigorous forward thrust.

(c) Disengage the hookstick from the pull-ring, taking care to avoid opening the fuse.

Inspection

Before re-installing a previously used S&C Silencer 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 Figure 7, Figure 8, and Figure 9.

Figure 7. Silencer with a red INTERNAL WEAR indicator.

Figure 8. Silencer after one operation at full fault current.

Figure 9. Silencer after three operations at full fault current.

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 4 on page 12) 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.