Operation

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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 source-transfer PME Pad-Mounted Gear. 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/contact-us/product-literature/**.

Retain this Instruction Sheet

This instruction sheet is a permanent part of the source-transfer PME Pad-Mounted Gear. 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 source-transfer PME Pad-Mounted Gear are listed in the ratings table in S&C Specification Bulletin 665-31. The ratings are also on the ratings label on the interior of the doors (right-hand door only for double-door models).

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 Technical Assistance Center at 1-888-762-1100.

NOTICE

Read this instruction sheet thoroughly and carefully before installing source-transfer PME Pad-Mounted Gear.



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

Doors





Switch side cable termination compartment

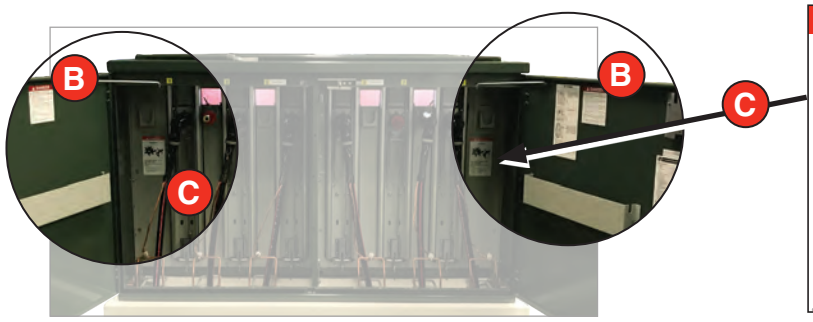
DANGER

Hazardous voltage—more than 4000 volts.
Failure to follow these instructions will likely cause shock, burns, or death.

- **ALWAYS** consider all circuits and component parts live until completely de-energized, tested, grounded, and tagged or properly identified.
- **Do not work on or near this equipment unless you:**
  (1) Know and obey your employer's work rules and S&C's instruction sheets▲ (in Compartment 1); and
  (2) Know the hazards involved with this high-voltage equipment.
- **ALWAYS** use proper personal protective equipment, protective devices, and tools suitable for the assigned task.

▲ **Note:** Additional instruction sheets are available free of charge from S&C by calling (773) 338-1000.

G-6503R1



Fuse side cable termination compartment

DANGER

KEEP AWAY

Hazardous voltage—more than 4000 volts.
Will shock, burn, or cause death.

- Qualified persons only.
- If open, immediately call electric company.

Reorder Information for Safety Labels

Location	Safety Alert Message	Description	Part Number
A	⚠ WARNING	Keep Out. Hazardous voltage inside...	G-6398
B	⚠ DANGER	Hazardous Voltage - more than 4000 Volts...	G-6503
C	⚠ DANGER	Keep Away. Hazardous voltage - more than 4000 Volts...	G-6500

- The same A labels are located on the rear doors as well.

⚠ DANGER



Source-transfer PME Pad-Mounted Gear operates 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 pad-mounted gear must be restricted only to qualified persons. See the "Qualified Persons" section 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, and flash clothing in accordance with safe operating procedures and rules.
4. **SAFETY LABELS.** Do not remove or obscure any of the "CAUTION," "WARNING," or "DANGER" labels.
5. **KEY INTERLOCKS.**
   - If optional key interlocks were furnished, they must be in place.
   - Check the operating sequence of key interlocks to verify proper sequencing.
   - After the pad-mounted gear is installed, either: (1) destroy the extra set of keys or (2) make them accessible only to qualified persons. This will maintain the integrity of the key-interlock scheme.
   - Key interlocks are not security locks and are not substitutes for padlocks.
6. **HIGH-VOLTAGE ISOLATION.** Switch operators and controls are isolated from high voltage in grounded, metal-enclosed compartments. Access to these components is controlled by padlockable covers, which incorporate a nonremovable manual handle. Other low-voltage components, such as meters, selector switches, toggle switches, etc., are similarly isolated.
7. **OPENING DOORS.** Do not force doors open. Forcing a door open can damage the latching mechanism. If optional key interlocks are provided, correctly position the interlocks so the doors can be opened.
8. **CLOSING AND LOCKING DOORS.**
   - Doors must be securely closed and latched, with padlocks in place at all times unless work is being performed inside the enclosure.
   - Mini-Rupter® Switches have switch-operating-shaft access covers located on the sides of the pad-mounted gear enclosure. They must be closed and padlocked at all times unless the switches are being operated.
   - Do not close a door on a TransFuser™ Mounting in the **Open** position with a fuse in the mounting. The door will strike the fuse pull-ring, which will interfere with door closing. The door may be closed if the fuse is removed from the mounting.
9. **ENERGIZED TERMINALS.** Always assume both sets of power terminals on any Mini-Rupter Switch or fuse are energized unless proved otherwise by test, by visual evidence of open-circuit conditions on both sets of terminals, or by observing that both sets of terminals are grounded.
10. **BACKFEED.** Mini-Rupter Switches and fuses may be energized by backfeed.
11. **DE-ENERGIZING, TESTING, AND GROUNDING.** Before touching any device that is to be inspected, replaced, serviced, or repaired in the high-voltage compartments, always disconnect Mini-Rupter Switches and fuses from all power sources (including backfeed), test for voltage, and properly ground.
12. **TESTING.** Test for voltage on both sets of power terminals of any Mini-Rupter Switch or fuse using proper high-voltage test equipment before touching any device that is to be inspected, replaced, serviced, or repaired in the high-voltage compartments.
13. **GROUNDING.**
    - Make sure the pad-mounted gear enclosure is properly grounded to the station or facility ground.
    - After the gear has been completely disconnected from all sources of power and tested for voltage, install suitable grounding cables in all compartments before touching any device that is to be inspected, replaced, serviced, or repaired in the high-voltage compartments.
14. **SWITCH POSITION.**
    - Always confirm the **Open/Close** position of Mini-Rupter Switches by visually observing the position of the switch blades.
    - Switches may be energized by backfeed.
    - Switches may be energized in any position.
15. **MAINTAINING PROPER CLEARANCE.** Always maintain proper clearance from energized components.
16. **FUSE STORAGE.**
    - Always store fuses in a clean, dry location.
    - Do not store end-fittings, holders, interrupting modules, or fuses in termination compartments unless the unit is equipped with the optional fuse-storage feature (catalog number suffix "-E1," "-E2," or "-E3").

Instruction manuals regarding installation and operation of the pad-mounted gear are included in the "Installation and Operation Information Kit" provided with each unit of source-transfer PME Pad-Mounted Gear. Wiring diagrams and a catalog dimensional drawing showing cable-locating and anchor-bolt dimensions are also provided in the information kit. All personnel involved with installation and operation of the gear should be thoroughly familiar with the contents of the kit.

These instructions are for operation of fuses and Mini-Rupter Switches in source-transfer PME Pad-Mounted Gear equipped with the Micro-AT® Source-Transfer Control. For installation instructions, refer to S&C Instruction Sheet 665-605. For instructions regarding field-programming and operation of the Micro-AT control, refer to S&C Instruction Sheet 515-500.

Source-transfer PME Pad-Mounted Gear is a totally self-contained switching and protection package that provides fault protection and fully automatic two-way source transfer for critical loads requiring a high degree of service continuity. This gear contains the following:

- Switch-operator driven 600-ampere Mini-Rupter Switches for three-pole live switching of three-phase source circuits
- Stored-energy operators to provide high-speed power operation of the Mini-Rupter Switches (The operators automatically charge when voltage is present on the associated source.)
- A Micro-AT Source-Transfer Control for programmed control of all switching functions associated with automatic source transfer
- S&C Voltage Sensors to provide three-phase sensing for automatic source transfer and control power for the Micro-AT control (The voltage sensors also provide supply power for motor-charging of the stored-energy operators and capacitor-charging for solenoid tripping of the operators.)
- Decouplers to permit exercising of the stored-energy operators without affecting the position of the Mini-Rupter Switches
- TransFuser Mountings, which are fuse-handling mechanisms with mechanical interlocks (The models available offer a choice of S&C Type SME-20 and SME-4Z Power Fuses, Fault Fiter Electronic Power Fuses, or a variety of single-barrel current-limiting fuses.)
- A Penta-Latch® Mechanism on each door (right-hand door only for double-door models) for access control (The mechanism provides automatic door latching and permits padlocking only when the door is latched closed. Doors can be opened only with a pentahead socket wrench or tool except when hexhead actuators are specified

A variety of optional features are available for source-transfer PME Pad-Mounted Gear. The catalog number stamped on the nameplate affixed to the enclosure door is suffixed with letter-number combinations applicable to the gear furnished. Refer to S&C Specification Bulletin 665-31 for descriptions of the optional features.

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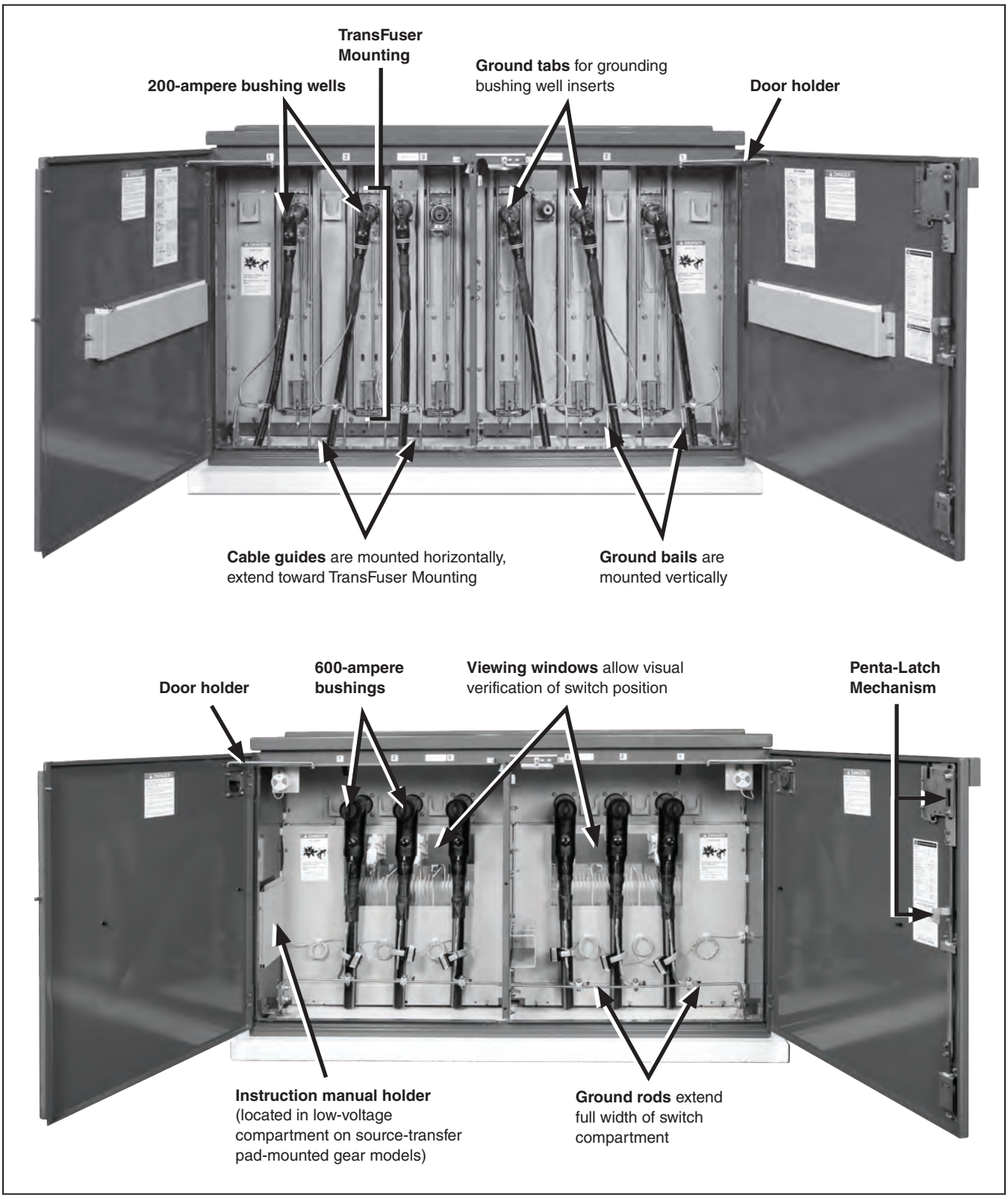

Figure 1. Model PME-9 showing open-door views of fuse-termination compartments (above) and switch-termination compartments (below).

Remote Indication

Refer to S&C Instruction Sheet 515-500 for an operating description of the Micro-AT Source-Transfer Control.

The optional **Remote Indication** feature includes isolated contacts wired to a terminal block for the user's external connection to remote indicating devices. Isolated contacts are provided for remotely monitoring the presence of source voltages; the position of the MANUAL/AUTOMATIC operation selector switch; and the status of the READY indicating lamp, EVENT indicating lamp, and overcurrent-lockout circuit (if furnished). Remote indicating devices and their control power are to be provided by the user and installed in accordance with the manufacturer's instructions.

Figure 2, Figure 3 on page 9, and Figure 4 on page 10 illustrate many of the basic components and features of source-transfer Pad-Mounted Gear. Before proceeding with the remainder of the instructions, S&C recommends these figures be reviewed to gain familiarity with the various components and locations.

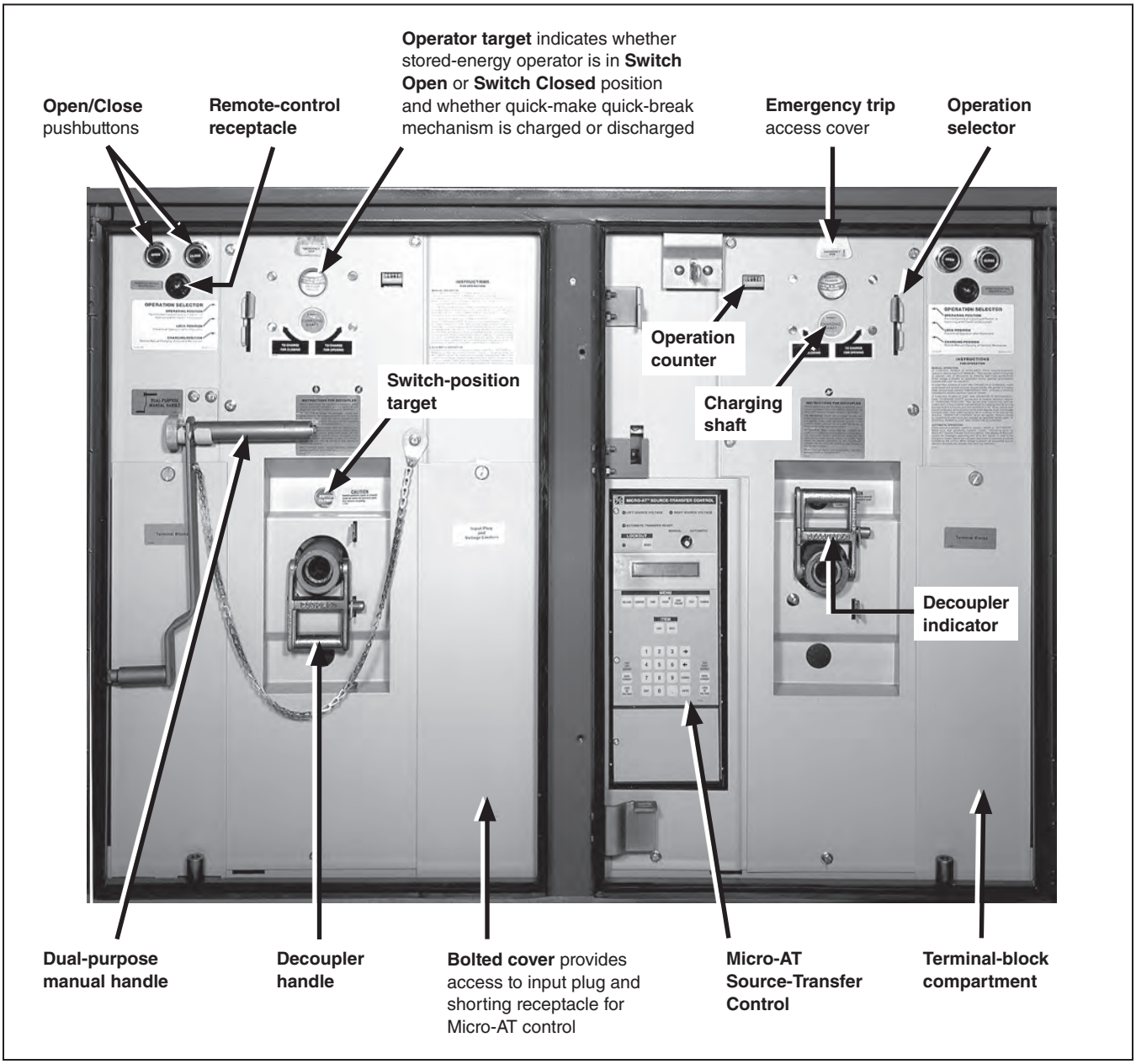

Figure 2. Low-voltage control compartment.

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Components

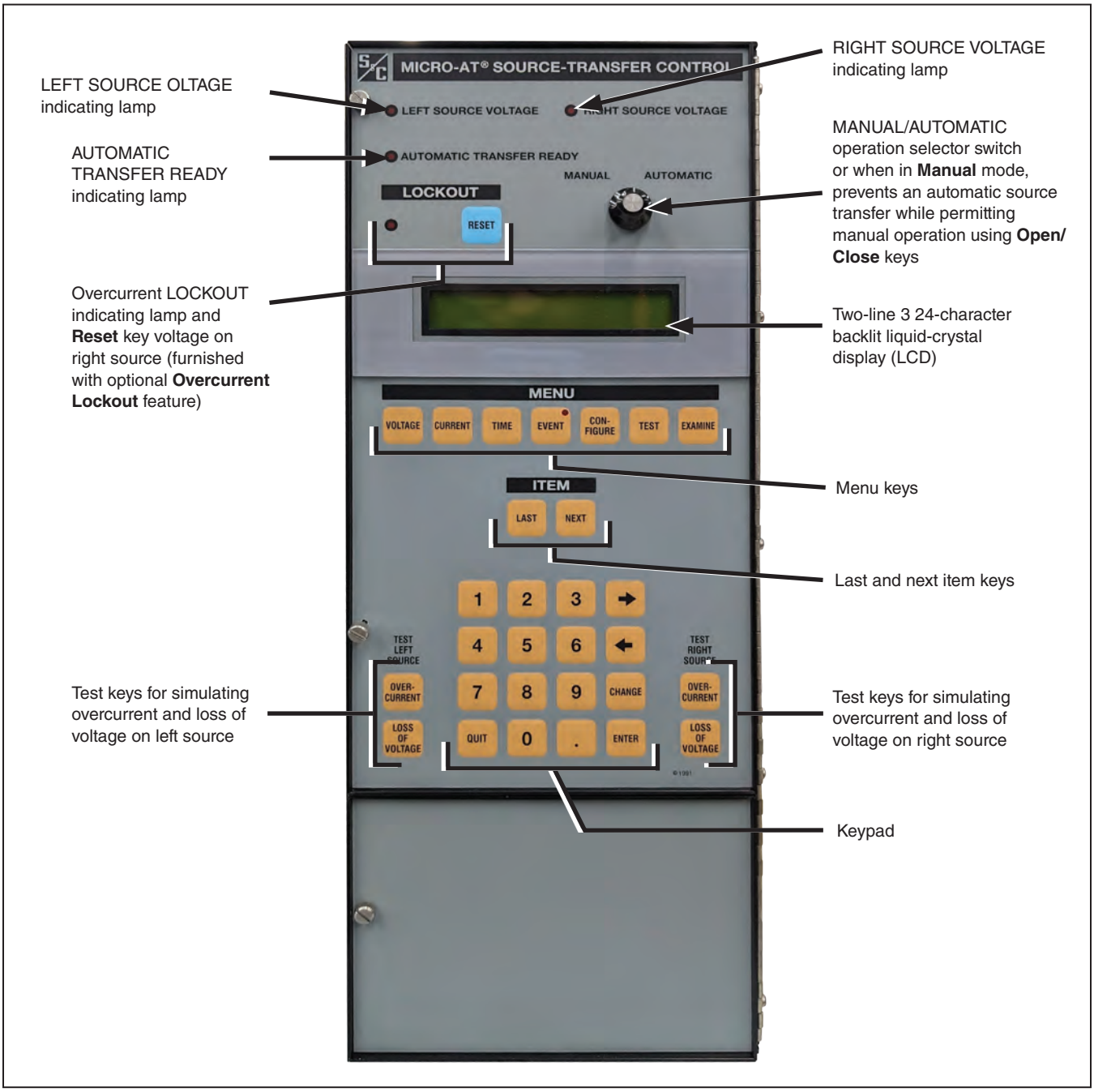

Figure 3. A Micro-AT Source-Transfer Control.

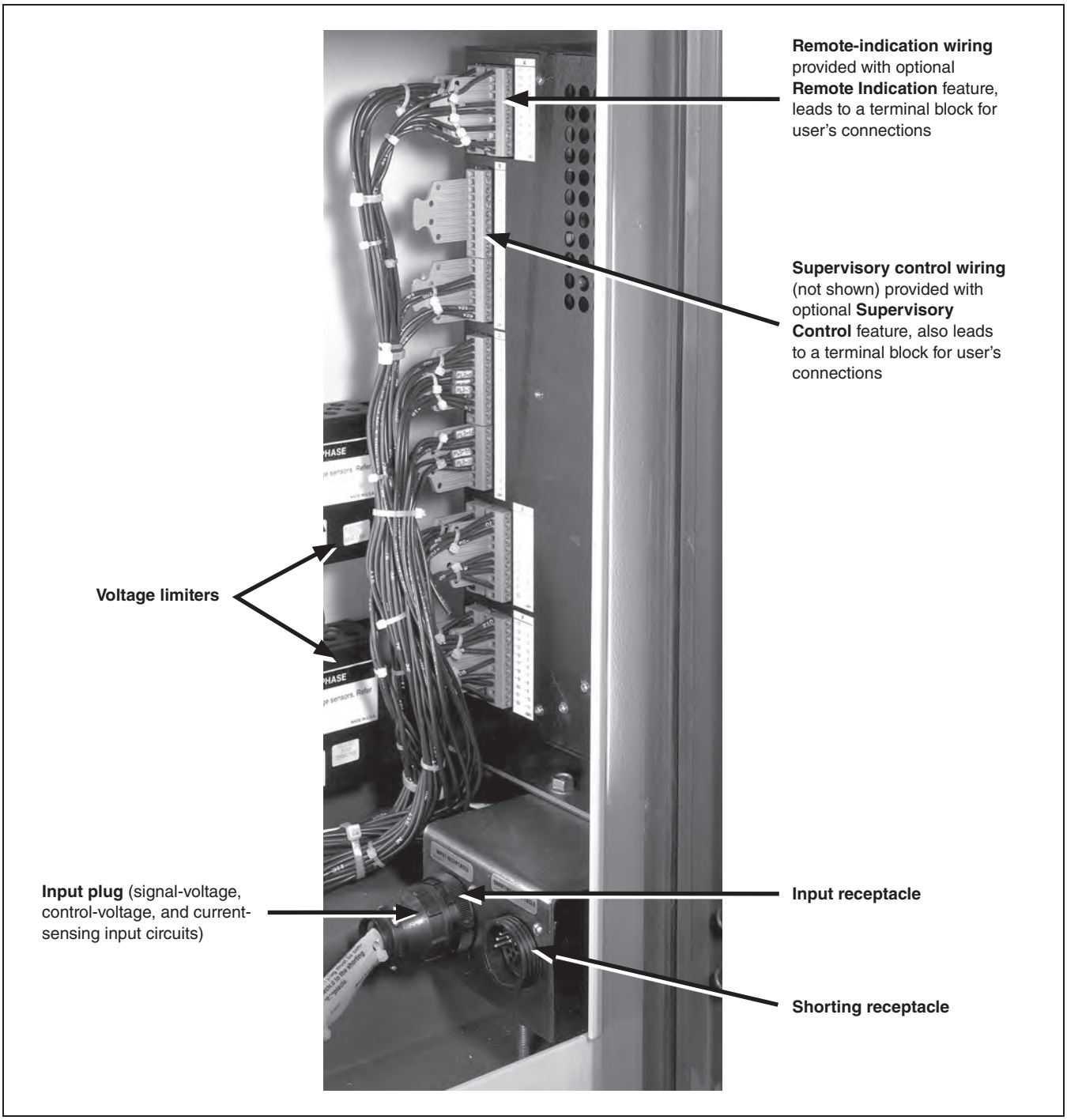

Figure 4. Access panel removed showing the input plug, input receptacle, and shorting receptacle of a Micro-AT Source-Transfer Control.

⚠ WARNING

To avoid accident, property damage, or personal injury, follow these safety guidelines:

1. To prevent an automatic operation when decoupling or coupling an operator to a switch, during manual charging of an operator, or when manually operating a switch, place the MANUAL/AUTOMATIC operation selector switch located on the faceplate of the Micro-AT Source-Transfer Control in **Manual** mode.
2. Do not perform any switching operations if the source-transfer control is in **Lockout** mode as indicated by illumination of the LOCKOUT lamp. See Figure 3 on page 9. For such cases, see the "Overcurrent-Lockout Condition" section in S&C Instruction Sheet 515-500.
3. If the gear is energized and paralleling of sources is not permitted, decouple both stored-energy operators (see the "Decoupling" section) to avoid temporary service interruptions when manually operating the gear. Switching operations will result in temporary service interruptions if stored-energy operators are coupled.
4. Because of operating errors, the stored-energy operator's quick-make quick-break mechanism may stall in a **Partially Discharged** state. The conditions that will cause this mechanism to stall, as well as instructions for restoring the operator to the normal **Latched Open** condition after a stall, are listed under the "If Operator Stalls . . ." section on page 30.
5. Do not assume the operator position necessarily indicates the **Open** or **Closed** position of the Mini-Rupter Switch. Upon completion of an opening or closing operation, make sure the following conditions exist:
   - The operator target (see Figure 2 on page 8) signals "OPERATOR IN SWITCH-OPEN POSITION" or "OPERATOR IN SWITCH-CLOSED POSITION" to indicate the switch operator has moved through a complete operation.
   - The switch-position target (see Figure 2) which signals "SWITCH OPEN" or "SWITCH CLOSED," is in agreement with the operator target.
   - The switch position, as verified by visual check of the switch-blade position, is in agreement with the switch-position target. A viewing window is provided in the switch compartment to allow positive visual verification of switch-blade position (see Figure 1 on page 7).
   - The operator target (see Figure 2 on page 8) signals "OPERATOR CHARGED" to indicate the operator is ready for the next operation.
6. To prevent all electrical and mechanical operations, padlock the operation selector in the **Lock** position. This will also prevent motor-charging of the stored-energy operator if system operating procedures require the quick-make quick-break mechanism to remain discharged and source voltage is present.

Decoupling

Decoupling is accomplished using the decoupler handle. See Figure 5. When decoupled, the stored-energy operator may be operated without affecting the position of the associated Mini-Rupter Switch. Moreover, when decoupled, the Mini-Rupter Switch is prevented from moving by a mechanical device that locks the switch drive-shaft.

To decouple the stored-energy operators, first place the MANUAL/AUTOMATIC operation selector switch on the faceplate of the Micro-AT Source-Transfer Control in **Manual** mode. For each stored-energy operator, grasp the decoupler handle and press down on the coupled-position latch to release the handle. Then, move the handle upward to the **Decoupled** position. Make sure the handle is fully latched in the **Decoupled** position. While an operator is decoupled, the automatic-transfer READY indicating lamp on the faceplate of the Micro-AT control will not light, which serves as a reminder of the **Decoupled** condition. See Figure 3 on page 9.



Figure 5. Decoupler handle being moved upward to decouple the switch from the associated switch operator.

Coupling

To couple the stored-energy operators, first place the MANUAL/AUTOMATIC operation selector switch on the faceplate of the Micro-AT control in Manual mode. Then, make sure the stored-energy operators are in the same position (**Open** or **Closed**) as their associated Mini-Rupter Switches by observing the switch-position and operator targets. See Figure 2 on page 8. If required, use the **Open/Close** keys (provided control power is available) to reposition the operator(s).

For each operator, grasp the decoupler handle and press down on the decoupled-position latch to release the handle. Then, move the handle downward to the **Coupled** position. Make sure the handle is fully latched in the **Coupled** position. An attempt to operate a switch not completely coupled (or decoupled) will cause the operator mechanism to stall.

Automatic Switch Operation

High-speed quick-make quick-break operation is provided by stored-energy operators that, when solenoid-tripped in response to control signals from the Micro-AT Source-Transfer Control, automatically open and close the Mini-Rupter Switches. After each **Trip** operation, the operators automatically charge when voltage is present on the associated source, making them ready for the next operation. For automatic switch operation, the MANUAL/AUTOMATIC operation selector switch on the Micro-AT control must be in **Automatic** mode. See Figure 3 on page 9. The Micro-AT control will not function automatically if one operator is coupled and the other is decoupled. Field-programming and operation of the Micro-AT control is covered in S&C Instruction Sheet 515-500.

Nonautomatic Switch Operation

If control power is available: To manually operate the stored-energy operator's quick-make quick-break mechanism—and (if coupled) to open or close a Mini-Rupter Switch—place the MANUAL/AUTOMATIC operation selector switch in **Manual** mode and press the associated **Open/Close** pushbutton. See Figure 2 on page 9. After each **Trip** operation, the quick-make quick-break mechanism automatically charges when voltage is present on the associated source. The charging operation takes approximately 25 seconds.

If control power is lost and operator is charged: To manually operate the stored-energy operator's quick-make quick-break mechanism—and (if coupled) to open or close a Mini-Rupter Switch—insert the small keyed end of the dual-purpose manual handle into the groove of the tripping shaft, behind the cover labeled "EMERGENCY TRIP," and turn in the direction indicated to effect desired operation. See Figure 6.

If control power is lost and operator is discharged: Manually charge the stored-energy operator's quick-make quick-break mechanism as described in the "Charging Operator (Nonelectrical)" section on page 16. Then, proceed to the "If Control Power Is Lost and Operator Is Charged" item above.



Figure 6. Dual-purpose manual handle inserted in groove of tripping shaft for emergency manual switching if control power is lost and the operator is charged.

Charging Operator (Nonelectrical)

The dual-purpose manual handle is used to manually charge the stored-energy operator's quick-make quick-break mechanism (required only in the event control power has been lost). See Figure 7. Keep the charging-shaft access port open by holding the operation selector in the **Charging** position. While the operation selector is in the **Charging** position, the control circuit is disconnected to prevent manual or automatic electrical operation (charging or tripping) in the event control power is restored, and the emergency-trip port is mechanically blocked to prevent a manual mechanical **Trip** operation.

While holding the port open, insert the large notched end (with recessed bolt) of the dual-purpose manual handle and secure it to the end of the charging shaft by turning the knurled knob clockwise 8 to 9 turns until firm resistance is felt. To charge the mechanism, grasp the tubular portion of the handle and, while pivoting the handle a few degrees, push in to engage the charging shaft. At the same time, rotate the handle as far as it will go (approximately 120°) in the appropriate direction. The "OPERATOR CHARGED" target will appear in the indicator window.

After the charging operation, loosen the knurled knob and remove the handle. The operation selector will spring-return to the **Operating** position.



Figure 7. Dual-purpose manual handle on the charging shaft.

Fuse Access — Opening

Source-transfer PME Pad-Mounted Gear is equipped with the unique TransFuser Mounting, which is a fuse-handling mechanism interlocked with the loadbreak elbow. First, the elbow is removed to interrupt any fuse load. Then, the mechanical interlock is actuated, allowing operation of the TransFuser mechanism. This permits access to the fuse for quick and easy replacement of blown fuses with a conventional shotgun stick. The fuse is accessible only when it is de-energized and isolated.

⚠ DANGER

The following procedures presuppose the user has supplied and installed loadbreak inserts and loadbreak elbows.

Open the Mini-Rupter Switches before proceeding if deadbreak inserts and deadbreak elbows are installed or if company operating procedures and rules do not permit switching with elbows. **Failure to open the switches when deadbreak inserts and elbows are used will result in a flashover and serious injury.**

Opening the TransFuser™ Mounting

Complete the following steps to open the TransFuser Mounting:

STEP 1. Open the appropriate fuse termination-compartment door and secure it with the door holder. See Figure 8. On double-door models, the adjacent door should be closed and latched to minimize exposure.

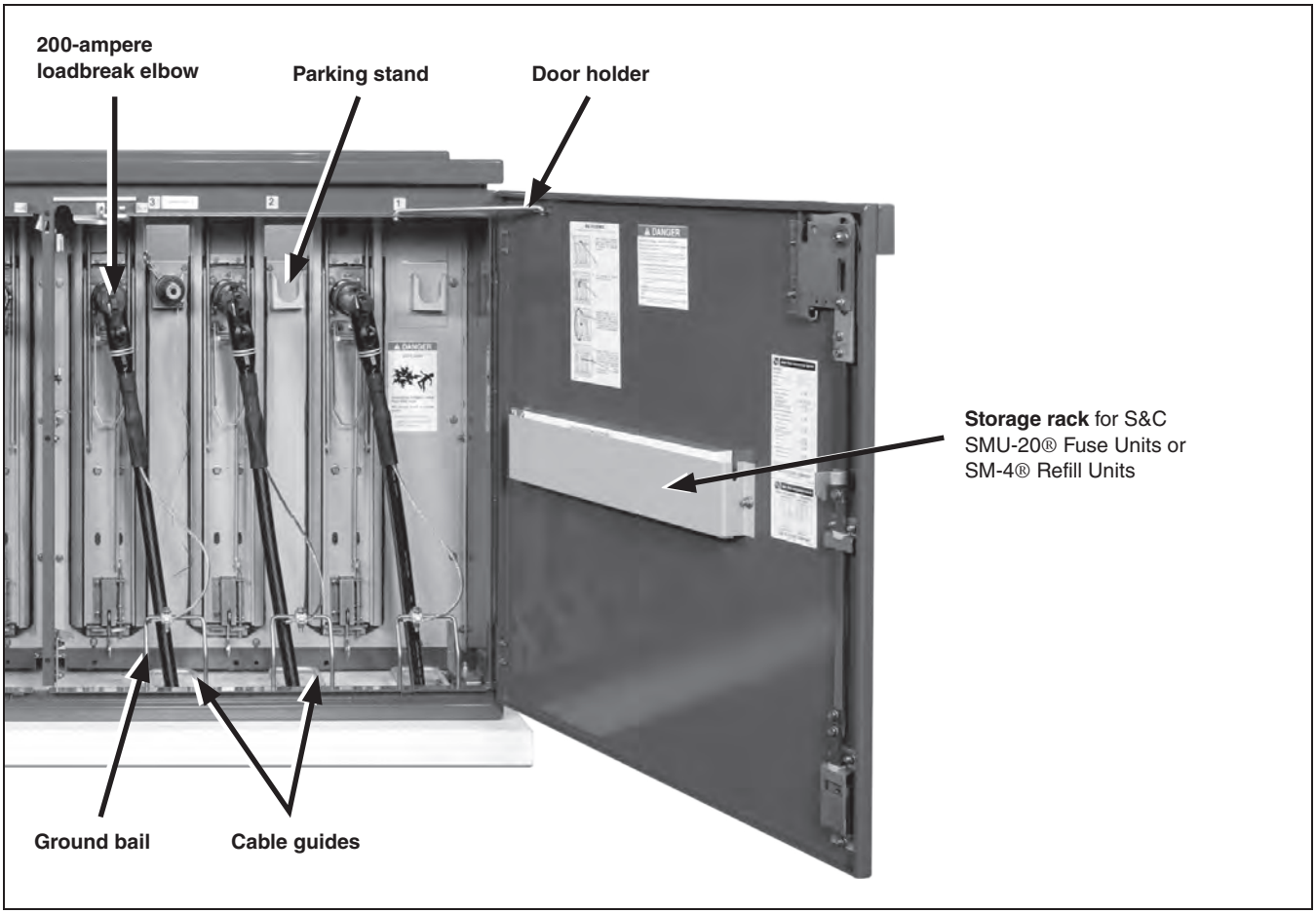

Figure 8. Termination compartment for fuses with elbows installed on 200-ampere inserts in the bushing wells.

STEP 2. Using a shotgun stick, install a portable feedthru or standoff insulator on the parking stand directly above the cable guide of the elbow to be moved. This will ensure once the elbow is moved, the cable will not interfere with the TransFuser Mounting. Using the shotgun stick, and following the elbow manufacturer's instructions for loadbreak operation, remove the 200-ampere loadbreak elbow (thus interrupting any load through the fuse to be removed), and move the elbow to the portable feedthru or standoff insulator. See Figure 9.

⚠ WARNING

When changing fuses, the 200-ampere interface need not be covered because it will be exposed only temporarily. If company operating procedures and rules require it, the interface may be covered with an insulating protective cap without a drain wire. A cap with a drain wire must not be used. **Operation of the TransFuser mechanism will draw the grounded drain wire inside the component compartment close to energized parts, which can result in a flashover and serious injury.**

⚠ WARNING

If elbows are stored on feedthru or standoff insulators for an extended period of time, cover the 200-ampere interface with an insulating protective cap with a drain wire and connect the drain wire to the ground bail. **Failure to connect the drain wire to the ground bail can result in a flashover, injury, and equipment damage.**

NOTICE

The insulated protective cap and drain wire must be removed before operating the TransFuser mounting. **Failure to remove the cap and drain wire will interfere with operation of the mechanism.**



Figure 9. Removing the loadbreak elbow interrupts any load through the fuse to be removed.

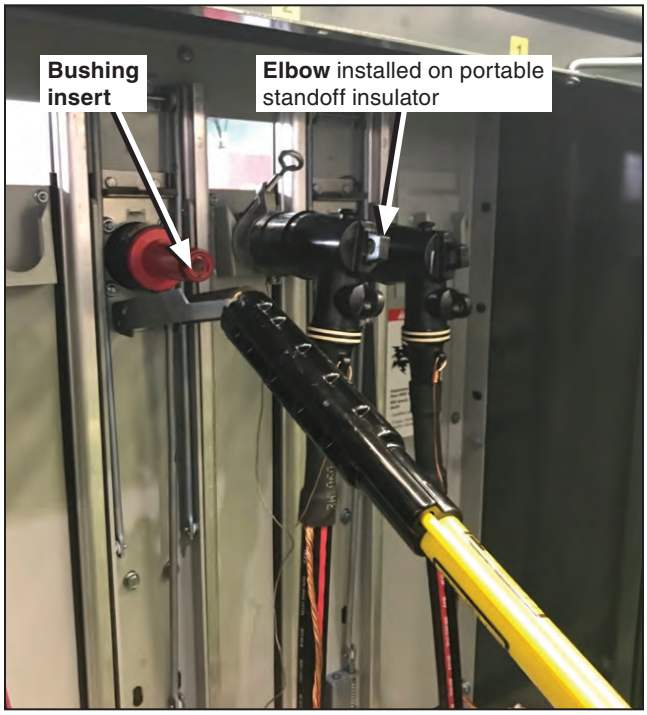

Figure 10. Raising the mechanical interlock to unlock the TransFuser Mounting.

STEP 3. When the elbow has been moved and mounted on a feedthru or standoff insulator, the TransFuser mechanism may be operated. Using the shotgun stick, raise the mechanical interlock to unlock the TransFuser Mounting. See Figure 10 on page 18. This interlock, which cannot be lifted to the **Unlocked** position until the elbow has been removed, guards against gaining access to the fuse while it is carrying current.

STEP 4. Secure the shotgun stick to the pull-ring at the lower end of the TransFuser Mounting. See Figure 11. With an outward pull, rotate the TransFuser Mounting end for end to expose the fuse. Make sure the mounting is latched before removing the shotgun stick. Then, disengage the shotgun stick from the pull-ring. Using the shotgun stick, push against the top of the mounting to verify it has securely latched. With the TransFuser Mounting latched in the **Open** position, the fuse is de-energized, isolated from high voltage, and accessible for removal from the mounting. See Figure 12.

NOTICE

Do not close a door on a TransFuser Mounting in the **Open** position with a fuse in the mounting. **The door will strike the fuse pull-ring, which will interfere with door closing.** The door may be closed if the fuse is removed from the mounting.



Figure 11. Unlatching (or latching) the TransFuser Mounting in the Closed position.



Figure 12. Latching (or unlatching) the TransFuser Mounting in the Open position.

Source-transfer PME Pad-Mounted Gear is furnished with TransFuser Mountings that accommodate S&C Type SME-20 Power Fuses, S&C Type SME-4Z Power Fuses, or Fault Fiter Electronic Power Fuses. Fault Fiter Electronic Power Fuse mountings also accommodate a variety of current-limiting fuses.

⚠ WARNING

When selecting current-limiting fuses, the voltage rating of the fuses must conform to the recommendations in S&C Information Bulletin 660-50. **Failure to conform to these recommendations can result in a flashover, injury, and equipment damage.**

Assembling the Fuse

S&C Power Fuses

Install an SMU-20 Fuse Unit into each set of end-fittings, an SM-4 Refill Unit into each holder, or a Fault Fiter fuse interrupting module and control module into each holder, in accordance with the instruction sheet furnished with the fuse unit, refill unit, or interrupting module.

Current-Limiting Fuses

S&C Holders for current-limiting fuses are designed for use in pad-mounted gear models that include mountings for Fault Fiter Electronic Power Fuses. These holders will accommodate the current-limiting fuses listed in Table 2 of S&C Information Bulletin 660-50. For instructions on installing current-limiting fuses in current-limiting fuse holders, refer to S&C Instruction Sheet 660-501.

Installing the Fuse in the Mounting

Fault Fiter Electronic Power Fuses rated 25 kV should be installed in their mountings by hand using suitable protective equipment. Install all other fuses as follows:

STEP 1. Secure a shotgun stick tightly to the fuse pull-ring with the fuse positioned so the body of the fuse is below the stick. Grasp the shotgun stick with both hands (approximately 2 feet (61 cm) apart), placing one hand on the shotgun-stick latch mechanism.

STEP 2. Lift the fuse and lower it into the cradle of the fuse mounting.

STEP 3. With the fuse securely seated in the cradle, push the fuse forward to latch it in the **Closed** position. See Figure 13. Disengage the shotgun stick from the fuse.

STEP 4. Verify the fuse is properly latched in the fuse mounting. While holding the shotgun stick, push against the fuse holder assembly and pull on the fuse assembly as shown in Figure 14 by locating the ring of the stick in the opening below the pull-ring.



Figure 13. A fuse lowered into the cradle in preparation for latching to the TransFuser Mounting.

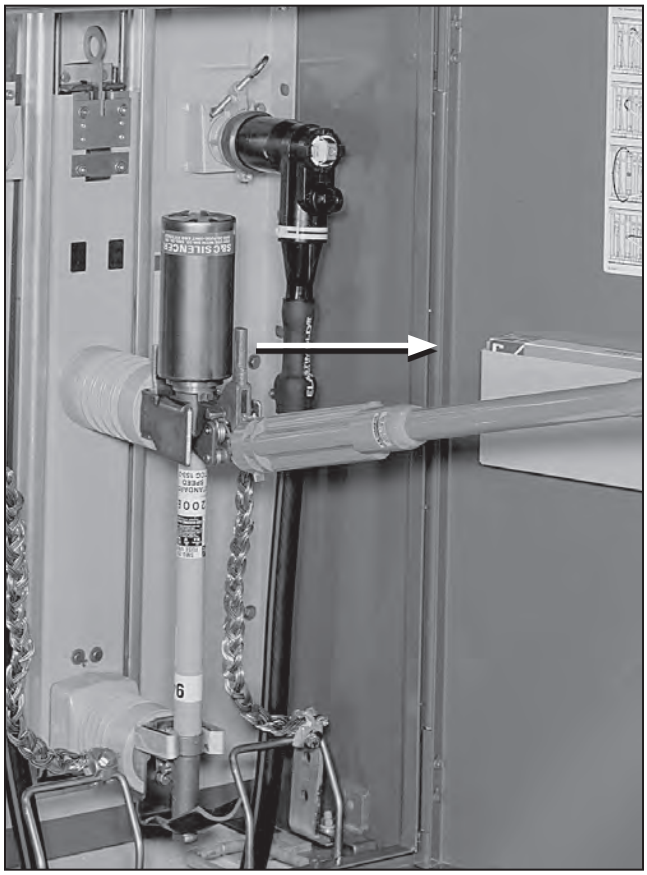

Figure 14. Pull on the fuse assembly by locating the ring of the stick in the opening below the pull-ring.

Closing the TransFuser Mounting

After the fuse has been installed or replaced, close the TransFuser Mounting (to energize the fuse) as follows:

STEP 1. Secure a shotgun stick to the pull-ring at the top of the TransFuser Mounting. Be sure not to ratchet the shotgun all the way up when securing the pull-ring because it may hinder the movement of the TransFuser Mounting. See Figure 12 on page 19. With an outward pull, rotate the TransFuser Mounting end for end to return the fuse to the medium-voltage compartment. Make sure the mounting latches in this position before removing the shotgun stick. Then, disengage the shotgun stick from the pull-ring. Using the shotgun stick, push against the bottom of the mounting to verify it has securely latched.

STEP 2. Using the shotgun stick, lower the mechanical interlock to lock the TransFuser Mounting.

STEP 3. If a protective cap was placed on the bushing interface, remove it with the shotgun stick.

STEP 4. Using the shotgun stick, move the elbow from the portable feedthru or standoff insulator to the bushing in accordance with the elbow manufacturer's instructions. Remove the portable feedthru or standoff insulator from the parking stand.

STEP 5. Close and latch the enclosure doors. Pull outward on the Penta-Latch Mechanism cover to verify the door has latched securely and then padlock the door.

How to Detect a Blown Fuse

Open the appropriate fuse-termination compartment door and secure it with the door holder. On double-door models, the adjacent door should be closed and latched to minimize exposure.

S&C Power Fuses

Observe the blown-fuse target through the viewing windows provided for that purpose. Refer to Figure 15 on page 24 for blown-fuse target locations for S&C Power Fuses:

SME-20 Power Fuses or Fault Fiter Electronic Power Fuses—A red blown-fuse target projects from the SME-20 Power Fuse end-fitting or the Fault Fiter fuse holder when the fuse has operated, making it easy to check the fuse condition with the fuse in the **Closed** position. The blown-fuse target retracts when the blown fuse unit or interrupting module is replaced.

SME-4Z Power Fuses—A fluorescent-orange target in the translucent SME-4Z Holder moves to the BLOWN indicator window when the fuse operates, permitting a positive visual check of the fuse condition without moving the fuse from its **Closed** position. The target fluoresces when illuminated.

Current-Limiting Fuses

Current-Limiting Fuses with Blown-Fuse Indicators—To find a blown fuse, gain access to the fuses following the instructions found in the “Fuse Access-Opening” section on page 17. A blown-fuse indicator appears at the trunnion end when the fuse has blown.

Current-Limiting Fuses Without Blown-Fuse Indicators—To find a blown fuse, remove each fuse from its mounting following the instructions in the “Replacing a Blown Fuse” section on page 27. Then, inspect the fuse per the current-limiting fuse manufacturer’s recommendations to determine whether it has blown.

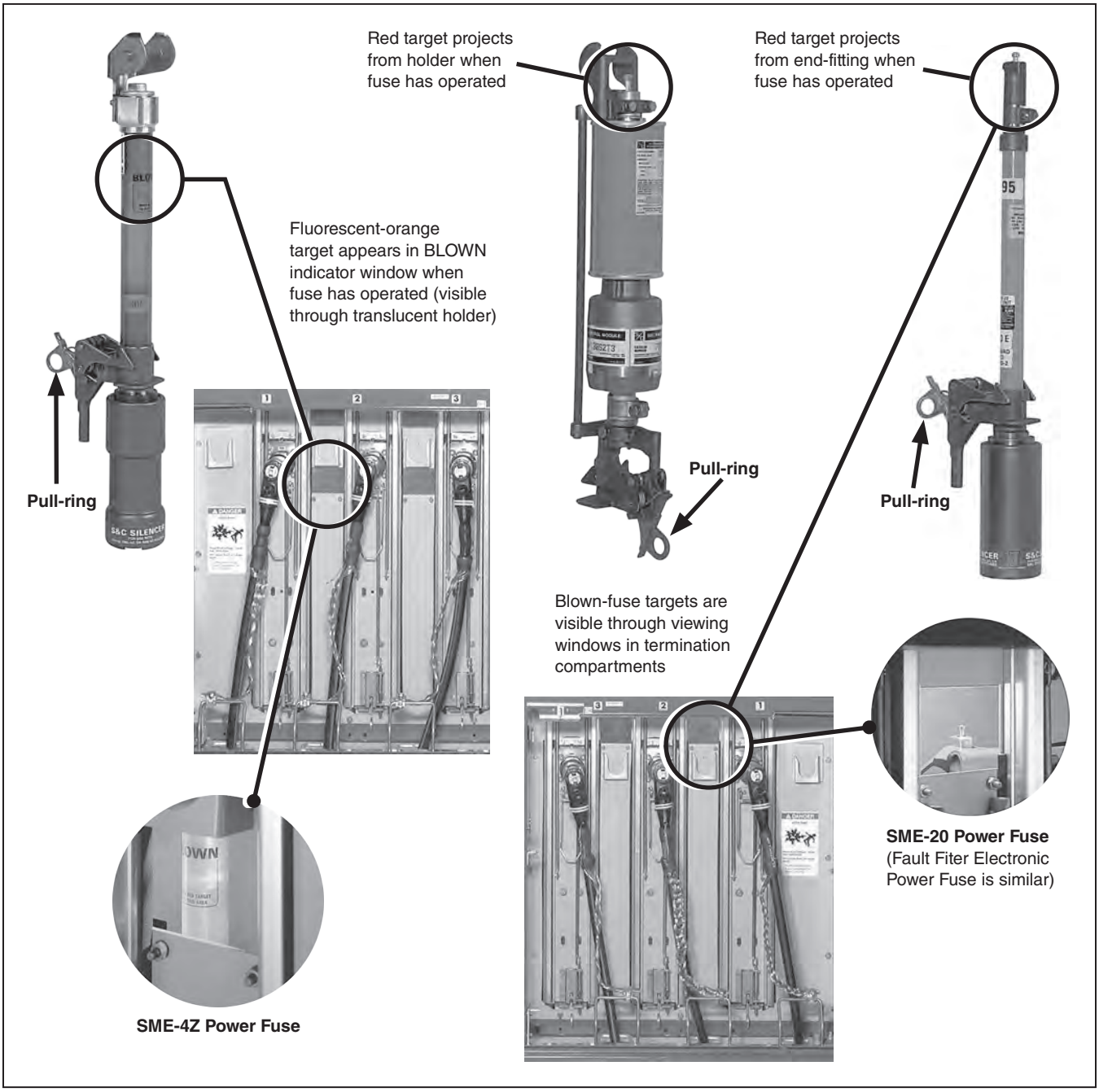

Figure 15. Blown-fuse target locations for S&C Power Fuses used in PME models of S&C Pad-Mounted Gear.

Replacing a Blown Fuse

Complete the following steps when replacing a blown fuse:

STEP 1. Gain access to the blown S&C Power Fuse or suspect current-limiting fuse following the instructions found in the "Fuse Access-Opening" section on page 17.

STEP 2. Fault Fiter Electronic Power Fuses rated 25 kV should be removed from their mountings by hand using suitable protective equipment. Remove all other fuses as follows:

(a) Grasp a shotgun stick with both hands (approximately 2 feet (61 cm) apart), placing one hand on the shotgun-stick latch mechanism.

(b) Secure the shotgun stick tightly to the fuse pull-ring. See Figure 16.

NOTICE

Do not permit the end-fitting of an SME-4Z Power Fuse to strike the ground during the following removal process. **The blown-fuse target may be damaged or become impacted with dirt and may not operate properly.**

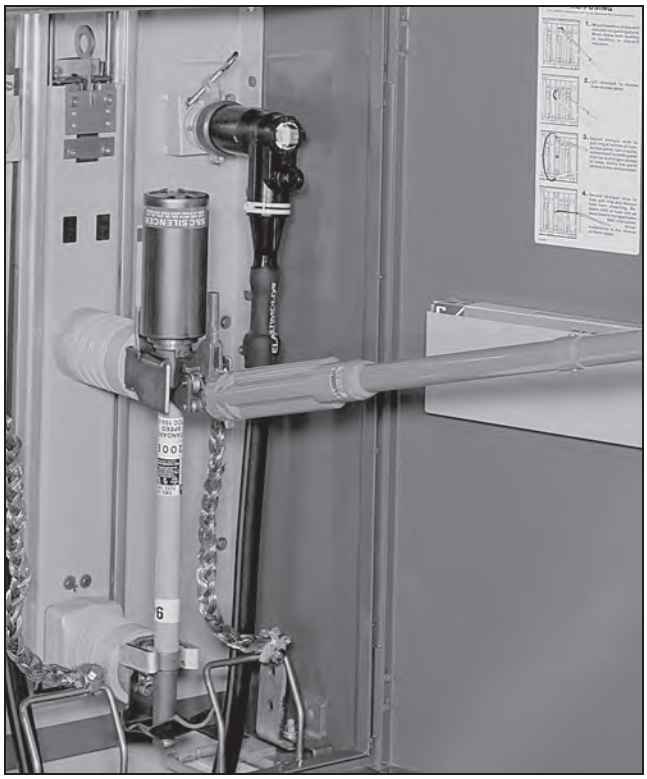

Figure 16. A shotgun stick secured to a fuse pull-ring in preparation for unlatching the fuse.

(c) Stand in a normal, upright position facing the shotgun stick. Unlatch the fuse with a short, outward pull on the fuse pull-ring. Then, remove the fuse from its mounting with an upward and outward lifting motion. See Figure 13 on page 21. When the fuse has been removed from the mounting, the TransFuser Mounting may be left with the live parts in the termination compartment and the doors may be closed.

Note: Take the blown fuse back to the service center for proper disposal.

NOTICE

Always store fuses in a clean, dry location. Do not store fuses in termination compartments unless the unit is equipped with the optional **Fuse Storage** feature. This feature accommodates a number of complete fuse assemblies—three SME Power Fuses, two Fault Fiter Electronic Power Fuses, or two current-limiting fuses—per switch-termination compartment.

For storage, position the fuse with the silencer or trunnion at the bottom, and insert it into the bracket. Then, turn the fuse so that the pull-ring is out of the way of the cables.

STEP 3. Install a new fuse unit, refill unit, interrupting module, or current-limiting fuse in the end-fittings or holder as follows:

***For S&C Power Fuses*:** Follow the instructions provided with each fuse unit, refill unit, or interrupting module for removal of blown SMU-20 Fuse Units, SM-4 Refill Units, or Fault Fiter fuse interrupting modules, and for insertion of replacements in the end-fittings or holders.

For current-limiting fuses: For instructions on replacing current-limiting fuses in current-limiting fuse holders, refer to S&C Instruction Sheet 660-501. These holders will accommodate the current-limiting fuses listed Table 2 of S&C Information Bulletin 660-50.

STEP 4. Install the fuse in its mounting following the instructions found in the “Fusing” section on page 22.

To ensure the Micro-AT Source-Transfer Control is ready for automatic operation, make sure both SOURCE VOLTAGE indicating lamps and the automatic-transfer READY indicating lamp are illuminated. If the READY lamp is not lit, refer to the LCD screen on the faceplate of the Micro-AT control. When not being used to show menu information, this display shows messages explaining why the lamp is not lit.

Note: A lit READY lamp indicates the status of associated components is normal, but an absence of illumination does not necessarily mean the control is inoperative. For example, when transfer to the alternate source occurs, the lamp extinguishes but the control is ready for any subsequent programmed automatic operation required by a change in source conditions. Likewise, if the stored-energy operators are decoupled, the READY lamp is extinguished—and the switches will not operate—but the control is fully operative.

Close and padlock the access doors to the low-voltage control compartment and high-voltage compartments.

The stored-energy operator's quick-make quick-break mechanism will stall in a **Partially Discharged** state if the operator is inadvertently tripped while its associated Mini-Rupter Switch is prevented from closing by any of the following conditions:

- The switch is not completely coupled (or decoupled) to switch operator.
- The switch is blocked open by a mechanical cable interlock (applicable when that option is included).
- The switch is blocked open by mechanical antiparalleling (applicable when that option is included).
- The switch is locked open by a key interlock (applicable when that option is included).

To determine whether the quick-make quick-break mechanism has stalled, observe the switch-position indicator target. If the words "SWITCH OPEN" on the target appear slightly off-center and one or more letters are partially hidden from view in the target opening, then the mechanism is in a **Stalled** condition. See Figure 17.

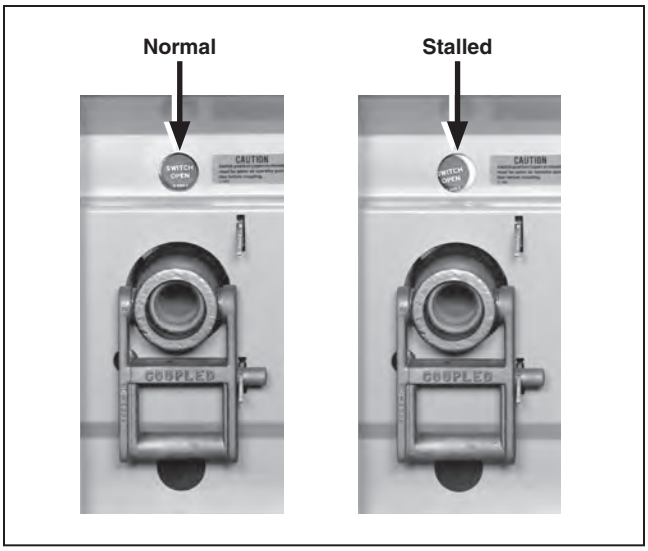

Figure 17. Switch-position indicator target appears slightly off-center if mechanism is stalled.

Restore the stored-energy operator to a normal **Latched Open** condition after such an occurrence as follows:

STEP 1. Make sure the MANUAL/AUTOMATIC operation selector switch is in **Manual** mode.

> **⚠ CAUTION**
>
> To guard against handle kickback during performance of this step and to avoid an injury, do not release grip on handle until latching has occurred. **Failure to do so can result in personal injury.**

STEP 2. Place the large notched end (with the recessed bolt) of the dual-purpose manual handle in the center of the decoupler. See Figure 18. (The handle's knurled knob performs no function in this application.) While pivoting the handle, push it in to engage the reverse-drive hub. Then, rotate the handle counterclockwise for the left-hand switch (clockwise for the right-hand switch) to back-drive the switch and the quick-make quick-break mechanism—against the tension of the stored-energy spring—until the mechanism latches in its **Open** position. A slight click may be heard when the mechanism latches.

STEP 3. Verify the **Latched Open** condition has been achieved by observing the switch-position target reads "SWITCH OPEN" and the operator targets read "OPERATOR IN SWITCH-OPEN POSITION" and "OPERATOR CHARGED."



Figure 18. Dual-purpose manual handle reverse-driving the Mini-Rupter Switch and operator's quick-make quick-break mechanism to recover from a stalled condition.

Components

No routine maintenance is required for the Micro-AT Source-Transfer Control. However, operational testing once per year in accordance with S&C Instruction Sheet 665-590 is recommended to verify proper functioning of the system.

No mechanical maintenance is required for S&C Pad-Mounted Gear. However, occasional inspection of the gear and exercising of the Mini-Rupter Switches is recommended.

The stored-energy operators should be given an exercising consisting of five or more operations at least once every year, unless normal operating duty provides equal or greater exercise. With the switches decoupled from the operators, exercising can be accomplished at any convenient time without requiring that the switches themselves be operated and, therefore, without requiring an interruption of service.

The nominal operating life of the stored-energy operators is 1500 operations (complete close-open cycles), provided that no more than 500 of such operations are performed while decoupled.

⚠ DANGER

When access to high-voltage compartments is required for inspection, service, or repairs, always observe the precautions below. **Failure to observe these precautions will result in serious injury or death.**

- Access to pad-mounted gear must be restricted only to qualified persons. See the “Qualified Persons” section on page 2.
- Always follow safe operating procedures and rules.
- Before touching any device, always disconnect switches, fuses, and other devices from all power sources (including backfeed) and control sources, test for voltage, and properly ground.
- When external voltage is used to test any secondary-side wiring or devices, disconnect all voltage sensors to avoid energizing the high-voltage conductors through the voltage sensors. To disconnect the voltage sensors, transfer the input plug from the input receptacle to the shorting receptacle. See Figure 4 on page 10.
- Always assume both sets of power terminals on any switch or fuse are energized unless proved otherwise by test, by visual evidence of open-circuit conditions on both sets of terminals, or by observing both sets of terminals are grounded.
- Test for voltage on both sets of power terminals of any switch or fuse using proper high-voltage test equipment.
- After the gear has been completely disconnected from all sources of power and tested for voltage, install suitable grounding cables in all compartments.
- For maintenance of non-S&C equipment, follow the manufacturer’s instructions.
- Make sure the enclosure is properly grounded to the station or facility ground. Do not return equipment to service unless such grounds are properly made.

Note: Occasionally, low-voltage components may require maintenance. The maintenance of other low-voltage components isolated from high-voltage compartments may be performed under the safety rules for equipment rated 600 Volts or less. If maintenance is to be performed on devices connected to the secondary of a voltage sensor, short-circuit the secondary connections. A separate drawing will be provided with the replacement part explaining how to properly short-circuit the secondary connections.

★ These recommendations may differ from company operating procedures and rules. Where a discrepancy exists, users should follow their company’s operating procedures and rules.

Returning Equipment to Service

When returning the equipment to service, the following procedures should be observed:

STEP 1. Make sure switch and fuse grounding means are removed.

STEP 2. Make sure the Mini-Rupter Switches are in the correct position (**Open** or **Closed**) as dictated by system circumstances.

STEP 3. Close each door permitting access to high voltage. Make sure the associated Penta-Latch Mechanisms are securely latched before energizing the circuit or operating any switching device.

STEP 4. Make sure the input plug is on the input receptacle.

STEP 5. Refer to the "Final Checks Before Walking Away" section on page 29.

STEP 6. Close both low-voltage compartment doors and make sure the associated Penta-Latch Mechanism is completely latched and padlocked.

STEP 7. Padlock all doors before leaving the installation site, even momentarily. Observe this procedure even in those cases where the gear is accessible only to qualified persons.

Enclosure Finish

The responsibility for ensuring a finish protects the enclosure lies with both the manufacturer and the user. Source-transfer PME Pad-Mounted Gear is finished with the S&C Ultradur® II Outdoor Finish, which provides lasting protection for the enclosure. To retain this protection, the user should take periodic corrective action as follows:

STEP 1. Touch up any penetration of the finish to bare metal, such as scratches and abrasions caused by shipping or vandalism, to maintain the original integrity. S&C touch-up finish and primer are available in aerosol spray cans. See Table 16 in S&C Specification Bulletin 665-31 for catalog number information used for ordering. 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 all edges are feathered before applying primer.

STEP 2. Provide an occasional simple washdown, such as an automobile would be given, to remove surface contaminants. Use any ordinary mild household detergent solution.

In those cases where the enclosure must be refinished by the user before the finish has weathered—for example, to match other equipment—a special precaution must be taken. The entire surface must be sanded to provide a tooth to bond the new coat to the unusually tough and smooth Ultradur II Outdoor Finish.

Preliminary Tryout Before Gear Is Energized — Optional

To expedite full service when high voltage is available, the user may want to perform a preliminary checkout of the Micro-AT Source-Transfer Control before the gear is energized. For this purpose an S&C Test Accessory is available to permit checkout of the source-transfer operation using an external single-phase 120-Vac source.

If a preliminary checkout is to be performed, special instructions must be followed to ensure correct operation of the Micro-AT control. These instructions are set forth in S&C Instruction Sheet 515-510, furnished with the test accessory. The programming and testing described in the "Field Adjustment and Programming" and "Operational Testing" sections in S&C Instruction Sheet 515-500 can be completed during the preliminary checkout.

When the test accessory is used, the control power available to supply the charging motors of the stored-energy operators and to maintain the charge on the solenoid-tripping capacitors is less than that available during normal three-phase operation. As a result, the time required for the motors to charge the stored-energy operators will be longer than normal. Furthermore, it may take as long as two minutes after the stored-energy operators are charged for the solenoid-tripping capacitors to become fully charged. Therefore, wait at least two minutes after the stored-energy operators are charged before initiating a transfer operation.

When high-voltage dielectric tests are to be performed on source-transfer PME Pad-Mounted Gear, special precautions should be taken to prevent damage to the voltage sensors and voltage limiters. Refer to S&C Instruction Sheet 591-500.