SM-1100 Auxiliary Switch Assembly
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Signal Words

As stated in ANSI Z535.4-2002, § 4.13-4.13.3 the signal word is a word that calls attention to the safety sign and designates a degree or level of hazard seriousness. The signal words for product safety signs are “Danger”, “Warning”, and “Caution”. These words are defined as:

**DANGER**

DANGER indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

**WARNING**

WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

**CAUTION**

CAUTION indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

Not stated in ANSI Z535.4-2002, § 4.13-4.13.3 as a signal word but used in this manual is “IMPORTANT”. This is defined as:

**IMPORTANT**

IMPORTANT indicates a section of the manual covering a non hazardous situation, but one where Powell feels proper attention is warranted.

Qualified Person

For the purposes of this manual, a qualified person, as stated in NFPA 70®, is one familiar with the construction and operation of the equipment and the hazards involved.

In addition to the above qualifications, one must also be:

1. trained and authorized to energize, deenergize, clear, ground, and tag circuits and equipment in accordance with established safety practices.
2. trained in the proper care and use of personal protective equipment (PPE) such as rubber gloves, hard hat, safety glasses or face shields, flash clothing, etc., in accordance with established safety practices.
3. trained in rendering first aid if necessary.
Contents

Ch 1 General Information
   A. Scope ........................................................................................................ 1
   B. Purpose ..................................................................................................... 2

Ch 2 Safety
   A. Safe Work Condition .................................................................................. 3
   B. Safety Guidelines ....................................................................................... 3
   C. General ....................................................................................................... 4
   D. Specific ....................................................................................................... 4
   E. X-Rays ........................................................................................................ 5
   F. Safety Labels ................................................................................................ 5

Ch 3 Equipment Description .................................................................................. 6
   A. General ....................................................................................................... 6

Ch 4 Installation
   A. Removing the Old Auxiliary Switch Assembly and Installing the Replacement Auxiliary Switch Assembly ............................................................ 7
      1) Removing the Old Auxiliary Switch Assembly ....................................... 7
      2) Installing the Replacement Auxiliary Switch Assembly ....................... 8

Figures

Figure 1 Auxiliary Switch Assembly .................................................................. 6
Figure 2 Auxiliary Switch Assembly Installed .................................................. 7
Figure 3 “E” Ring Removal .................................................................................. 7
Figure 4 Removing Auxiliary Switch .................................................................. 7
Figure 5 Reconnecting Operating Arm to Operations Counter Linkage ............... 8
Ch 1  General Information

WARNING

The equipment described in this document may contain high voltages and currents which can cause serious injury or death.

The equipment is designed for use, installation, and maintenance by knowledgeable users of such equipment having experience and training in the field of high voltage electricity. This document and all other documentation shall be fully read, understood, and all warnings and cautions shall be abided by. If there are any discrepancies or questions, the user shall contact Powell immediately at 1.800.480.7273.

WARNING

Before any adjustment, servicing, part replacement, or any other act is performed requiring physical contact with the electrical working components or wiring of this equipment, the power supply must be disconnected. Failure to follow this warning may result in injury or death.

IMPORTANT

Powell reserves the right to discontinue and to change specifications at any time without incurring any obligation to incorporate new features in products previously sold.
A. **Scope**

The information in this maintenance procedure describes the following Auxiliary Switch Assembly:

- 102108LN  (Slip on Lugs)
- 102108LP  (Ring Lugs)

This device can be used in the following circuit breakers:

- PowlVac® STD
- PowlVac® CDR
- PowlVac® ASD
- PowlVac® 38kV CDR

**WARNING**

Be sure to follow the appropriate safety precaution while handling any of the equipment. Failure to do so may result in serious injury or death.

To the extent required, the products described herein meet the applicable ANSI, IEEE, and NEMA Standards; however, no such assurance is given with respect to local codes and ordinances which may vary greatly.

B. **Purpose**

The information in this maintenance procedure is intended to provide information required to properly install the auxiliary switch assembly described in **Ch 1 General Information, A. Scope**.

This instruction bulletin provides:

1. Safety guidelines
2. Instructions for installation and placing the auxiliary switch into service
3. Illustrations, photographs, and description of the auxiliary switch assembly

The illustrations contained in this document may not represent the exact construction details of each particular type of auxiliary switch assembly. The illustrations in this document are provided as general information to aid in showing component locations only.

*All photos and illustrations are shown using deenergized equipment.*
Ch 2  Safety

A. Safe Work Condition

The information in Section A is quoted from NFPA 70E 2004 - Article 120, 120.1 Establishing an Electrically Safe Work Condition.

120.1 Process of Achieving an Electrically Safe Work Condition

1. Determine all possible sources of electrical supply to the specific equipment. Check applicable up-to-date drawings, diagrams, and identification tags.
2. After properly interrupting the load current, OPEN the disconnecting device(s) for each source.
3. Wherever possible, visually verify that all blades of the disconnecting devices are fully OPEN or that drawout type circuit breakers are withdrawn to the fully disconnected position.
4. Apply lockout/tagout devices in accordance with a documented and established policy.
5. Use an adequately rated voltage detector to test each phase conductor or circuit part to verify they are deenergized. Test each phase conductor or circuit part both phase-to-phase, and phase-to-ground. Before and after each test, determine that the voltage detector is operating satisfactorily.
6. Where the possibility of induced voltages or stored electrical energy exists, ground the phase conductors or circuit parts before touching them. Where it could be reasonably anticipated that the conductors or circuit parts being deenergized could contact other exposed energized conductors or circuit parts, apply ground connecting devices rated for the available fault duty.

B. Safety Guidelines

Study this maintenance procedure and all other associated documentation before installing the undervoltage device.

Each user has the responsibility to instruct and supervise all personnel associated with usage, installation, operation, and maintenance of this equipment on all safety procedures. Furthermore, each user has the responsibility of establishing a safety program for each type of equipment encountered.

It is mandatory that the following rules be observed to ensure the safety of personnel associated with usage, installation, operation, and maintenance of these circuit breakers.

The safety rules in this instruction bulletin are not intended to be a complete safety program. The rules are intended to cover only some of the important aspects of personnel safety related to the auxiliary switch.
C. **General**

1. Only supervised and qualified personnel trained in the usage, installation, operation, and maintenance of the circuit breaker shall be allowed to work on this equipment. It is mandatory that this instruction bulletin, any supplements, and service advisories be studied, understood, and followed.
2. Maintenance programs must be consistent with both customer experience and manufacturer’s recommendations, including service advisories and instruction bulletin(s). A well planned and executed routine maintenance program is essential for circuit breaker’s reliability and safety.
3. Service conditions and circuit breaker applications shall also be considered in the development of safety programs. Variables include ambient temperature; humidity; actual continuous current; thermal cycling; number of operations; interrupting duty; and any adverse local conditions including excessive dust, ash, corrosive atmosphere, vermin and insect infestations.

D. **Specific**

1. **DO NOT WORK ON AN ENERGIZED CIRCUIT BREAKER.** If work must be performed on a circuit breaker, remove it from service and remove it from the metal-clad switchgear.
2. **DO NOT WORK ON A CIRCUIT BREAKER WITH THE CONTROL CIRCUIT ENERGIZED.**
3. **EXTREME CARE MUST BE EXERCISED TO KEEP ALL PERSONNEL, TOOLS, AND OTHER OBJECTS CLEAR OF MECHANISMS WHICH ARE TO BE OPERATED, DISCHARGED, OR RELEASED.** These circuit breakers utilize stored energy mechanisms. These mechanisms must be serviced only by skilled and knowledgeable personnel capable of releasing each spring load in a controlled manner. Detailed information regarding these mechanisms is found in this instruction bulletin.
4. **DO NOT ATTEMPT TO CLOSE THE CIRCUIT BREAKER MANUALLY ON AN ENERGIZED CIRCUIT.**
5. **DO NOT USE AN OPEN CIRCUIT BREAKER AS THE SOLE MEANS OF ISOLATING A HIGH VOLTAGE CIRCUIT.** For complete isolation, the circuit breaker shall be in the disconnected position or shall be withdrawn completely.
6. **ALL COMPONENTS SHALL BE DISCONNECTED BY MEANS OF A VISIBLE BREAK AND SECURELY GROUNDED FOR SAFETY OF PERSONNEL PERFORMING MAINTENANCE OPERATIONS ON THE CIRCUIT BREAKERS.**
7. Interlocks are provided to ensure the proper operating sequences of the circuit breakers and for the safety of the user. If for any reason an interlock does not function as described, do not make any adjustments, modification, or deform the parts. **DO NOT FORCE THE PARTS INTO POSITION. CONTACT POWELL FOR INSTRUCTIONS.**
E. X-Rays

When high voltage is applied across the contacts of a vacuum interrupter, there is the possibility of generation of X-rays. The intensity of the X-radiation is dependent on the peak voltage and the contact gap. At the normal operating voltage for this type of equipment, the radiation levels are negligible. At the voltages specified for testing, test personnel shall be in front of the circuit breaker such that the two layers of steel used in the frame and front cover construction are between the test personnel and the vacuum interrupters, and that the test personnel be no closer than one meter (3’) from the front of the circuit breaker. THE CIRCUIT BREAKER SHALL BE EITHER FULLY OPEN, OR FULLY CLOSED WHEN MAKING HIGH POTENTIAL TESTS. DO NOT TEST WITH CONTACTS PARTIALLY OPEN.

F. Safety Labels

The equipment described in this document has DANGER, WARNING, CAUTION, and instruction labels attached to various locations. All equipment DANGER, WARNING, CAUTION, and instruction labels shall be observed when the circuit breaker is handled, operated, or maintained.

IMPORTANT

Warning and Caution labels are located in various places in and on the switchgear and on the circuit breaker removable element. Always observe these warnings and caution labels. Do NOT remove or deface any of these warning/caution labels.
Ch 3 Equipment Description

A. General

The auxiliary switch (Figure 1) is located on the lower left front of the mechanism area (Figure 2, b).

CAUTION

Ensure that the control circuits are deenergized and the circuit breaker is deenergized, disconnected by means of a visible break, and securely grounded. Do NOT start to work on a closed circuit breaker or a circuit breaker with the main closing spring charged.

You should have the following when receiving the auxiliary switch assembly:

• Auxiliary Switch Assembly

Use existing hardware when replacing Auxiliary Switch Assembly:

• 10 - 32 x ½” Round Head Machine Screw (2)
• 10 - 32 Star Nut (2)
• “E” Ring

Tools required:

• Flat head screwdriver
• ⅜ Open End Wrench
• Pliers
Ch 4 Installation

A. Removing the Old Auxiliary Switch Assembly and Installing the Replacement Auxiliary Switch Assembly

1) Removing the Old Auxiliary Switch Assembly

Perform the following steps to replace the auxiliary switch assembly:

**CAUTION**

Ensure that the control circuits are deenergized and the circuit breaker is deenergized, disconnected by means of a visible break, and securely grounded. Do NOT start to work on a closed circuit breaker or a circuit breaker with the main closing spring charged.

a. Remove the front cover of the circuit breaker.

**Figure 2 Auxiliary Switch Assembly Installed**

b. Remove the “E” ring (Figure 3, b) securing the switch operating arm to the operations counter linkage.

**Figure 3 “E” Ring Removal**

a. Odd numbered terminals
b. “E” Ring
c. Remove the two 10 - 32 x ½” R.H. Machine Screws holding the auxiliary switch to its mounting bracket and remove the switch (Figure 4).

d. Disconnect the wires from the auxiliary switch (Figure 5), being careful to note which wires go to which terminal.

**Figure 4 Removing Auxiliary Switch**

a. 10 -32 Star Nut
b. 10 -32 x ½” R.H. Machine Screw

d. Disconnect the wires from the auxiliary switch (Figure 5), being careful to note which wires go to which terminal.

**Note:** It is important to note that when removing and replacing the auxiliary switch that the position of the switch will always be with the odd numbered terminals facing up as shown in Figure 3.
CAUTION

Ensure that the control circuits are deenergized and the circuit breaker is deenergized, disconnected by means of a visible break, and securely grounded. Do NOT start to work on a closed circuit breaker or a circuit breaker with the main closing spring charged.

Perform the following steps to install replacement auxiliary switch assembly:

a. Insert the new switch and reconnect the wiring (Figure 8). Make sure the wires are connected to the same terminals from which they were removed.

Note: It is important to note that when removing and replacing the auxiliary switch that the position of the switch will always be with the odd numbered terminals facing up as shown in Figure 3.
c. Secure the operating arm to the operations counter linkage with the “E” ring removed in section Ch 4 Installation, A. Removing the Old Auxiliary Switch Assembly and Installing the Replacement Auxiliary Switch Assembly, 1) Removing the Old Auxiliary Switch Assembly, Step b.

Figure 8 Reconnecting Wires to Auxiliary Switch

d. Verify the auxiliary spare contacts are wired in accordance with the original circuit breaker diagram.

e. Operate the circuit breaker electrically several times to ensure the switch functions properly.

f. Replace the front cover.
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