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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

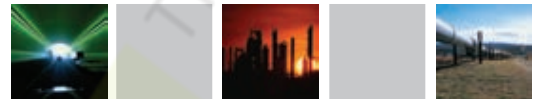
IMPORTANT indicates a section of the manual covering a non hazardous situation, but one where Powell feels proper attention is warranted.

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.



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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 Closing Coil:

- 50026G01P 48VDC/120VAC
- 50026G03P 125VDC
- 50026G04P 250VDC
- 50026G02P 240VAC

This assembly can be used in the following circuit breakers:

- PowIVac® STD
- PowIVac® CDR
- PowIVac® ASD
- PowIVac® Replacement Circuit Breakers
- PowIVac® 38kV CDR
- PowIVac-ND®

B. PURPOSE

The information in this maintenance procedure is intended to provide information required to properly install the closing coil described in **Ch 1 General Information, A. SCOPE**.

This instruction bulletin provides:

1. Safety guidelines
2. Instructions for installation and placing the closing coil into service
3. Procedure for critical adjustments
4. Illustrations, photographs, and description of the closing coil

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

All illustrations and photos are shown using deenergized equipment.

**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.



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 closing coil assembly.

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 closing coil.

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 closing coil assembly is located in the center part of the mechanism area and is bolted to the base pan.

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 closing coil assembly:

- Closing Coil

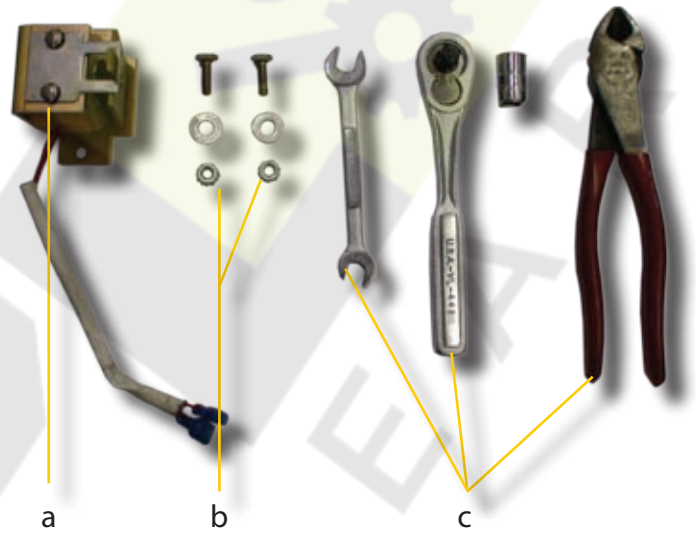
Use existing hardware when replacing Closing Coil:

- 1/4-20 x 3/4" HEX head bolt (2)
- 1/4-20 Flat Washers (2)
- 1/4-20 Lock Washers (2)
- 1/4-20 Star Nut (2)

Tools required:

- Flat head screwdriver
- 7/16 Socket Wrench
- 7/16 Socket
- 7/16 Open End Wrench

Figure 1 Closing Coil Assembly



- a. Closing Coil
- b. Hardware
- c. Tools Required for Installation



Ch 4 Installation

A. REMOVING THE OLD CLOSING COIL ASSEMBLY AND INSTALLING THE REPLACEMENT CLOSING COIL ASSEMBLY

1) Removing the Old Closing Coil Assembly

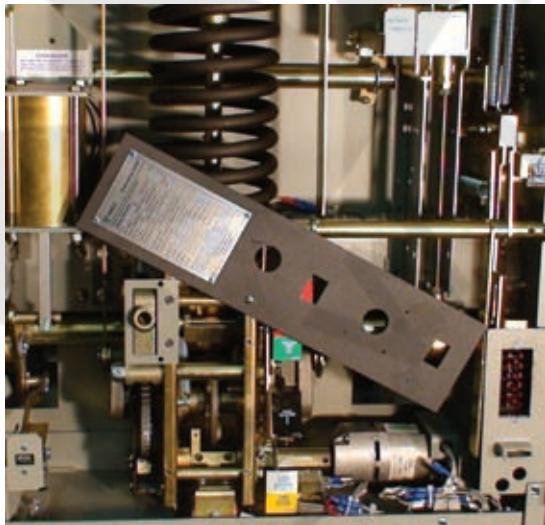
Perform the following steps to remove the old closing coil assembly from the circuit breaker:



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.

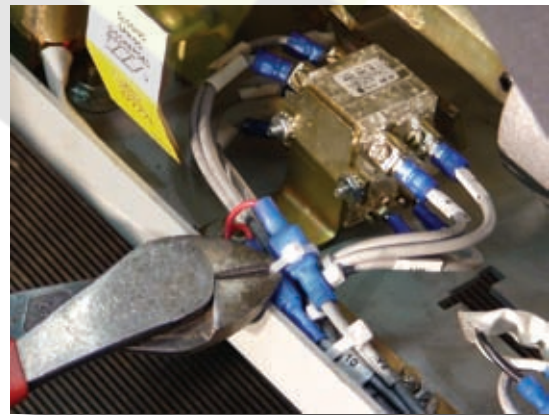
- a. Remove the front cover of the circuit breaker.
- b. Reposition the escutcheon plate by removing the bottom screw and loosening the top screw and rotating the plate as shown in Figure 2, tighten top screw to hold plate in place.

Figure 2 Repositioning the Escutcheon Plate



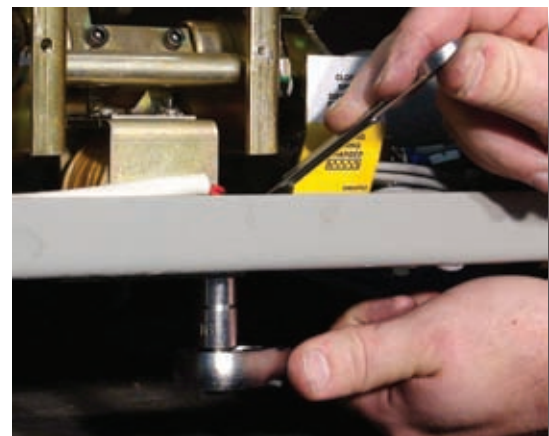
- c. Elevate and secure the circuit breaker so that there is at least 6 inches of clear space below the base pan of the circuit breaker.

Figure 3 Cutting the Tie Wrap



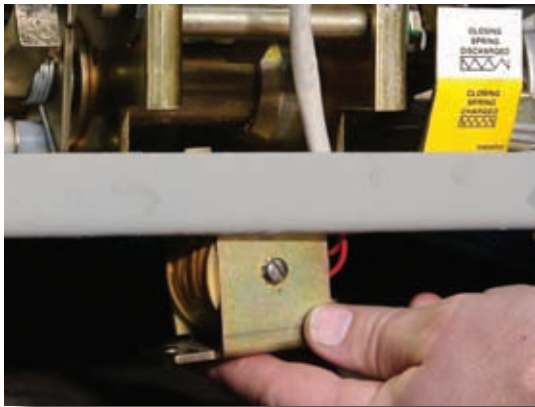
- d. Once the circuit breaker is stable and secure, cut the tie wrap holding the two wires from the closing coil assembly to the wire harness (Figure 3).
- e. Remove the two (2) 1/4-20 x 3/4" Hex Head Bolts holding the closing coil from below and the two (2) 1/4-20 Star Nuts from above using a 7/16 socket wrench and 7/16 open end wrench (Figure 4).

Figure 4 Removing Hex Head Bolts



- f. Remove the closing coil from the circuit breaker by lowering through the opening of the circuit breaker base pan (Figure 5).

Figure 5 Removing the Closing Coil



- 2) *Installing the New Closing Coil Assembly into the Circuit Breaker*

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.

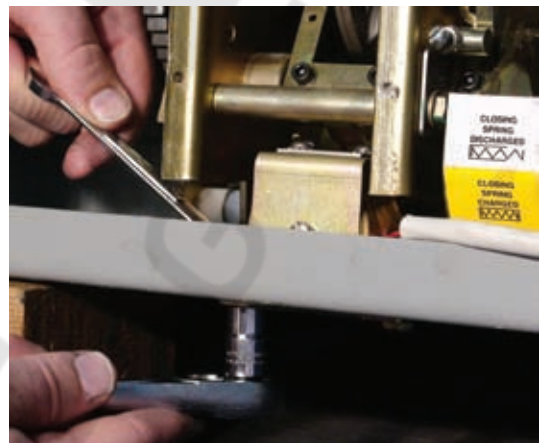
Perform the following steps to install the new closing coil assembly:

- a. Remove the front cover of the circuit breaker.
- b. Reposition the escutcheon plate by removing the bottom screw and loosening the top screw and rotating the plate as shown in Figure 2, tighten top screw to hold plate in place.
- c. Elevate and secure the circuit breaker so that there is at least 6 inches of clear space below the base pan of the circuit breaker.

- d. Once the circuit breaker is stable and secure, insert the new closing coil assembly up through the opening of the base pan.

Note: Make sure the head of the hardware is pointing towards the front of the circuit breaker as shown in Figure 5.

Figure 6 Securing the Closing Coil Assembly to the Circuit Breaker

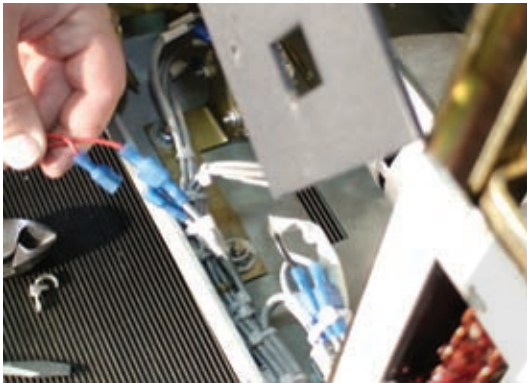


- e. Prior to mounting the replacement closing coil, apply Loctite 242 or equal to the two (2) 1/4-20 x 3/4" Hex Head Bolts. Secure the closing coil assembly to the circuit breaker by inserting the two (2) 1/4-20 x 3/4" Hex Head Bolts from underneath the circuit breaker and tighten in place using the two (2) 1/4-20 Star Nuts (Figure 6) and torque the two (2) hex head bolts to 5-7 ft-lbs.



- f. Connect the wires from the wiring harness to the closing coil assembly. No adjustments required (Figure 7).

Figure 7 *Connecting the Closing Coil Wires to the Wiring Harness*



- g. Return the escutcheon plate to its original position by loosening the top screw and rotating plate to line up bottom screw, replace bottom screw and tighten both screws.
- h. Carefully lower the circuit breaker to the ground.
- i. Close the circuit breaker several times electrically to ensure the closing coil assembly is functioning properly.
- j. Reinstall the front cover of the circuit breaker.

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SM-1300 Closing Coil Assembly

October, 2008