

Inspection and Maintenance

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Introduction

Qualified Persons

WARNING

The equipment covered by this publication must be installed, operated, and maintained by qualified persons who are knowledgeable in the installation, operation, and maintenance of overhead electric power distribution equipment along with the associated hazards.

A qualified person is one who is trained and competent in:

- The skills and techniques necessary to distinguish exposed live parts from nonlive parts of electrical equipment
- The skills and techniques necessary to determine the proper approach distances corresponding to the voltages to which the qualified person will be exposed
- The proper use of the special precautionary techniques, personal protective equipment, insulating 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

Read this instruction sheet thoroughly and carefully before inspecting or maintaining your S&C Alduti-Rupter Switch. Familiarize yourself with the Safety Information and Safety Precautions on pages 3 and 4. The latest version of this publication is available online in PDF format at sandc.com/Support/Product-Literature.asp.

Retain this Instruction Sheet

This instruction sheet is a permanent part of your S&C Alduti-Rupter Switch. Designate a location where you can easily retrieve and refer to this publication.

Proper Application

WARNING

The equipment in this publication must be selected for a specific application. The application must be within the ratings furnished for the equipment.

Warranty

The warranty and/or obligations described in S&C's standard conditions of sale, as set forth in Price Sheet 150, plus any special warranty provisions, as set forth in the applicable product-line specification bulletin, are exclusive. The remedies provided in the former for breach of these warranties shall constitute immediate purchaser's or end user's exclusive remedy and a fulfillment of all seller's liability. In no event shall seller's liability to the immediate purchaser or end user exceed the price of the specific product that gives rise to the immediate purchaser's or end user's claim. All other warranties, whether express or implied or arising by operation of law, course of dealing, usage of trade or otherwise, are excluded. The only warranties are those stated in Price Sheet 150, and **THERE ARE NO EXPRESS OR IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. ANY EXPRESS WARRANTY OR OTHER OBLIGATION PROVIDED IN PRICE SHEET 150 IS GRANTED ONLY TO THE IMMEDIATE PURCHASER AND END USER, AS DEFINED THEREIN. OTHER THAN AN END USER, NO REMOTE PURCHASER MAY RELY ON ANY AFFIRMATION OF FACT OR PROMISE THAT RELATES TO THE GOODS DESCRIBED HEREIN, ANY DESCRIPTION THAT RELATES TO THE GOODS, OR ANY REMEDIAL PROMISE INCLUDED IN PRICE SHEET 150.**

Warranty Qualifications

The standard warranty is applicable to the S&C Alduti-Rupter Switch detailed in this instruction sheet except when it is power operated using a switch operator of other than S&C manufacture.


**Understanding
Safety-Alert
Messages**

Several types of safety-alert messages may appear throughout this instruction sheet and on labels and tags attached to the Alduti-Rupter Switch. Familiarize yourself with these types of messages and the importance of these various signal words:

⚠ DANGER
“DANGER” identifies the most serious and immediate hazards that <i>will likely</i> result in serious personal injury or death if instructions, including recommended precautions, are not followed.
⚠ WARNING
“WARNING” identifies hazards or unsafe practices that <i>can</i> result in serious personal injury or death if instructions, including recommended precautions, are not followed.
⚠ CAUTION
“CAUTION” identifies hazards or unsafe practices that <i>can</i> result in minor personal injury if instructions, including recommended precautions, are not followed.
NOTICE
“NOTICE” identifies important procedures or requirements that <i>can</i> result in product or property damage if instructions are not followed.

**Following
Safety Instructions**

If you do not understand any portion of this instruction sheet and need assistance, contact your nearest S&C Sales Office or S&C Authorized Distributor. Their telephone numbers are listed on S&C’s website sandc.com, or call the S&C Global Support and Monitoring Center at 1-888-456-1100.

NOTICE	
Read this instruction sheet thoroughly and carefully before installing or operating your S&C Alduti-Rupter Switch.	

**Replacement
Instructions and
Labels**

If you need additional copies of this instruction sheet, contact your 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 your nearest S&C Sales Office, S&C Authorized Distributor, S&C Headquarters, or S&C Electric Canada Ltd.

DANGER



Alduti-Rupter Switches operate at high voltage. Failure to observe these precautions 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 switches and controls 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, and flash clothing in accordance with safe operating procedures and rules.
- 4. SAFETY LABELS AND TAGS.** Do not remove or obscure any of the "DANGER," "WARNING," "CAUTION," or "NOTICE" labels and tags. Remove tags **ONLY** if instructed to do so.
- 5. ENERGIZED COMPONENTS.** Always consider all parts live until de-energized, tested, and grounded.
- 6. LOAD-BREAK SWITCH POSITION.** Always confirm the open/close position of load-break switches by visually observing the position of the blades. Switches may be energized from either side and with the blades in any position.
- 7. MAINTAINING PROPER CLEARANCE.** Always maintain proper clearance from energized components.
- 8. OPERATION.** Circuit making and breaking is involved in the normal operation of this switch and, as a result, "partway" opening or closing is undesirable. To operate, swing the operating handle through its full travel vigorously and without hesitation.

Inspection and Maintenance Recommendations

Below is a set of general inspection recommendations for 25/34.5-kV and 34.5-kV Three-Pole-Side Break Integer Style and Heavy-Duty Style Alduti-Rupter Switches.

Inspection Recommendations

COMPONENT	PROCEDURE
General	<ol style="list-style-type: none"> 1. Make sure the switch and the operating mechanism have been installed per the appropriate instructions and for installation and operation manuals provided with each switch. 2. Make sure all clamping bolts are tight and piercing set screws are installed properly. 3. Examine insulators, live parts, and bases for signs of tracking, contamination, arc damage, and soot. Clean insulators, if necessary, with a clean cloth and a mild soap and water solution. Follow by rinsing with clean water. 4. Check that the switch is free from wildlife nests, tree limbs, and debris. Remove any impediments if present.
Interrupter	<ol style="list-style-type: none"> 1. Do not rework the interrupter unit. Replace the whole interrupter if any of the conditions below are not met. 2. Check that all interrupter end caps are in place and secure. 3. Check that all interrupters operate smoothly and toggle to both the open and closed position. 4. Check all interrupters for damage or soot. 5. Check all interrupters for continuity.
Live Parts	<ol style="list-style-type: none"> 1. Check the condition of the shunt contact. Replace any shunt contacts that exhibit signs of damage or excessive wear. 2. Clean and grease the nongraphite-impinged contacts, if required. Wipe dirt and grease from both the blade and jaw contacts with a clean dry cloth. Remove any oxidation by lightly polishing the contacts with steel wool or fine grit sandpaper and wiping excess grit off with a dry cloth. Apply a light coating of Shell Gadus S2 U1000 (available from S&C) to the contact surface. 3. The graphite impinged contacts (available since May 2005 on the 25/34.5-kV and 34.5-kV Side-Break Style Alduti-Rupter switches) do not require grease. Grease may be applied, but once used on graphite-impinged contacts, the contacts must be maintained in the same manner as non-graphite-impinged contacts.
Operating Mechanism	<ol style="list-style-type: none"> 1. For rotating-type operating mechanisms, make sure the operating handle (or motor operator) is adjusted to create a “wind-up” in the pipe section when the switch is closed. To adjust the wind-up, move the handle stops as necessary. 2. For reciprocating-type operating mechanisms, make sure the operating handle (or motor operator) is adjusted to create an “over-toggle” in the pipe section when the switch is closed. Adjust the amount of thread engagement of the pipe into the top of the handle, or change the length of the lever on the adjustable rod guide, if necessary.

Inspection and Maintenance Recommendations

Below is a set of recommendations for checking the alignment of live parts for 25/34.5-kV and 34.5-kV Three-Pole-Side Break Integer Style and Heavy-Duty Style Alduti-Rupter Switches.

⚠ WARNING	
Make sure the switch is de-energized before performing any of the checks below. Failure to do so could result in equipment damage, serious injury, or death.	

Alignment Recommendations

Move the operating handle SLOWLY to the fully closed position:	<ol style="list-style-type: none"> 1. Check that the blade is within ¼-inch (6.4 mm) maximum of the blade stop. See Figure 1. 2. Check that the clearance between the blade closing cam and interrupter closing lever is within ⅛-inch (3.2 mm) max. See Figure 1. 3. Check that the clearance between the shunt contact and interrupter housing is at least ⅜-inch (9.5 mm). See Figure 1. 4. Check that the clearance between the shunt contact and interrupter skirts is at least ⅛-inch (1.6 mm). See Figure 1. 5. For Three-Pole Non-Integer Side-Break Heavy Duty Style switches, each switch-pole operating lever should lie against its closed stop within ⅛-inch (1.6 mm). 6. For Three-Pole Non-Integer Side-Break Heavy Duty Style switches with rotating type operating mechanisms, the outboard-bearing crank arm(s) should be in the over-center toggle position and lie against the top bolt(s) within ⅛-inch (3.2 mm).
Move the operating handle SLOWLY to the fully open position:	<ol style="list-style-type: none"> 1. The switch blades are 90° from the closed position.
As the switch moves in the closing direction:	<ol style="list-style-type: none"> 1. Check that the clearance between each blade-opening cam and the interrupter-opening lever is within ⅝-inch (7.9 mm). See Figure 2. 2. Check that each blade-closing cam makes positive engagement with the interrupter-closing lever. 3. Check that the interrupter lies in a plane parallel to the sweep of the blades, and the blades pass over the interrupter with approximately equal clearance on both sides.
As the switch moves in the opening direction:	<ol style="list-style-type: none"> 1. Verify that each blade shunt contact firmly engages the interrupter contact rivets before the blade contacts disengage from the stationary main contacts.

NOTICE	
Slow motion is required for alignment and adjustment purposes only; when opening or closing the switch during actual operation, swing the handle as quickly and firmly as possible without hesitation. Do not slow down or stop part way. Opening and closing the switch quickly is important to ensure proper operation and performance.	

Should any of the above conditions not be met, consult with the appropriate *Instructions for Installation and Operation* manual provided with each switch, or go to sandc.com to obtain a copy.

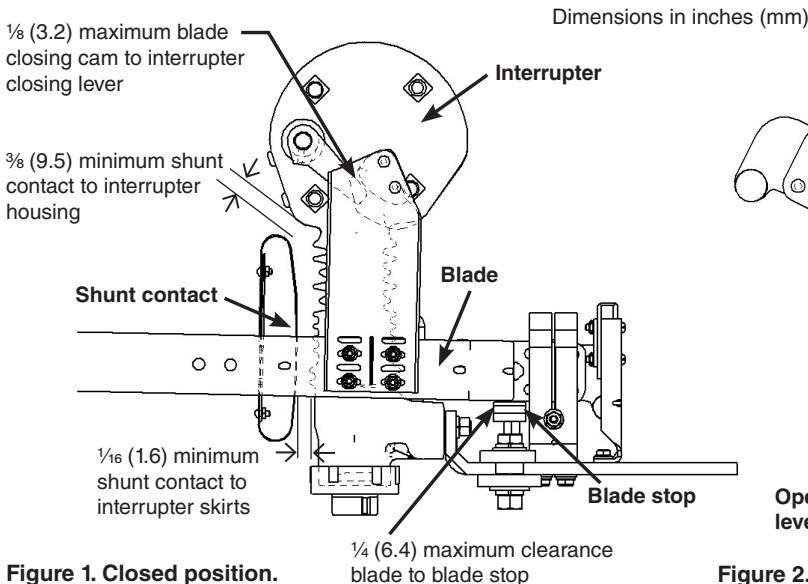


Figure 1. Closed position.

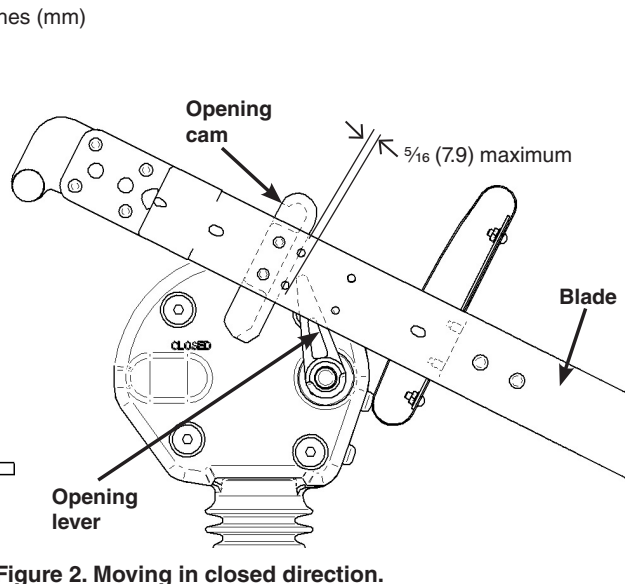


Figure 2. Moving in closed direction.