

Installation and Operation

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★ This instruction sheet applies to 34.5-kV and 46-kV switches with catalog number supplement “-R10,” and to 69-kV switches with no catalog number supplement. For 34.5-kV and 46-kV switches with catalog number supplement “-R11,” please refer to your local S&C Sales Office or to Instruction Sheet 761-511 on sandc.com.



Introduction

Qualified Persons

WARNING

Only qualified persons who are 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 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 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 S&C Instruction Handbook before installing or operating your S&C Alduti-Rupter Switch. Familiarize yourself with the Safety Information and Safety Precautions on pages 4 through 6. The latest version of this publication is available online in PDF format at sandc.com/en/support/product-literature/.

Retain this Instruction Sheet

This instruction sheet is a permanent part of 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 is only intended for a specific application. The application must be within the ratings furnished for the equipment. Ratings for the Alduti-Rupter Switch are listed in the ratings table in Specification Bulletin 761-31. The ratings are also on the nameplate affixed to the product.

In most applications, Alduti-Rupter Switches are capable of switching rated continuous load currents at full voltage. The ratings for the particular switch are listed on nameplates attached to the operating handle and the switch. See Figure 1.

These interrupter switches are *not* intended for breaking fault currents.

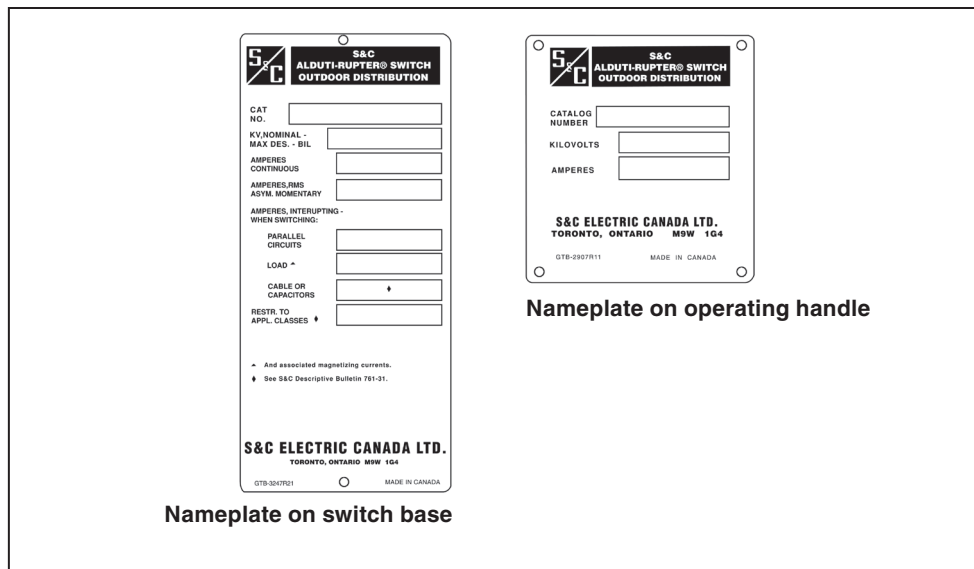


Figure 1. Switch nameplates with ratings.

Warranty

The warranty and/or obligations described in S&C's Price Sheet 150 "Standard Conditions of Sale – Immediate Purchasers in the United States" (or Price Sheet 153, Standard Conditions of Sale – Immediate Purchasers Outside the United States) 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 the immediate purchaser's or end user's exclusive remedy and a fulfillment of the seller's entire liability. In no event shall the 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 (or Price Sheet 153), 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 (OR PRICE SHEET 153) 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 (or PRICE SHEET 153.)

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.

Safety Information

Understanding Safety-Alert Messages

Several types of safety-alert messages may appear throughout this instruction sheet and on labels and tags attached to your S&C 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 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 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 Monitoring and Support Center at 1-888-762-1100.

NOTICE

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

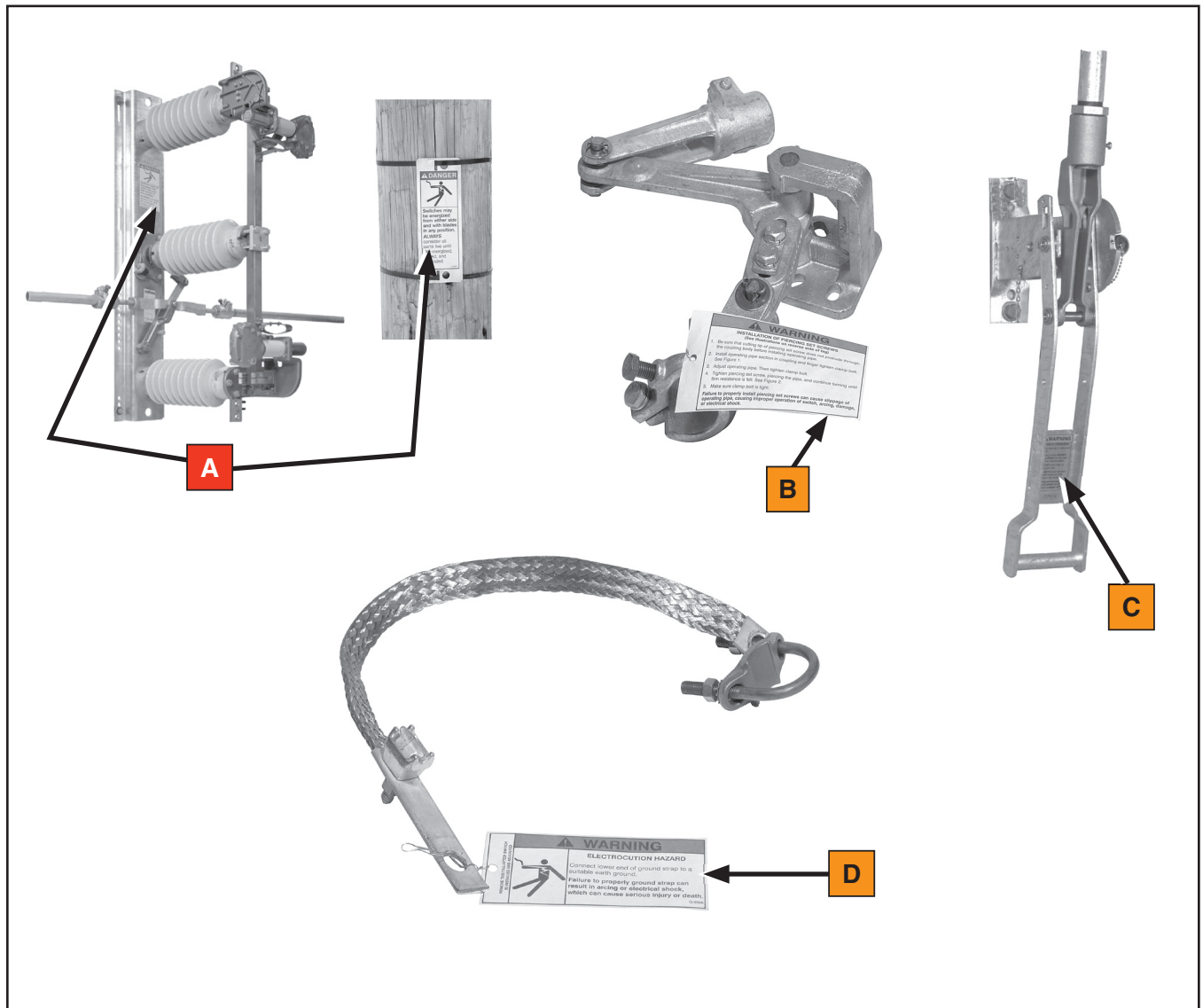


Replacement Instructions and Labels

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.

Location of Safety Labels



Reorder Information for Safety Information

Location	Safety Alert Message	Description	Part Number
A	⚠ DANGER	Electrocution Hazard	G-6580-1
B	⚠ WARNING	Piercing Set Screws	G-3176R1●
C	⚠ WARNING	Handle Operation	G-4400R5
D	⚠ WARNING	Electrocution Hazard – Grounding Strap	G-6596●

● This part is a tag to be removed and discarded after the switch is installed and adjusted.

⚠ DANGER



Alduti-Rupter Switches operate 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 an Alduti-Rupter Switch 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. Remove tags ONLY if instructed to do so.
- 5. ENERGIZED COMPONENTS.** Always consider all parts live until de-energized, tested, and grounded.
- 6. LOAD-INTERRUPTER SWITCH POSITION.** Always confirm the open/close position of load-interrupter 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 interrupter 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. See the "Operation" section on page 29.

Inspection

Examine the shipment for external evidence of damage as soon after receipt as possible, preferably before removal from the carrier's conveyance. Check the bill of lading to make sure the listed shipping skids, crates, and containers are present:

If there is visible loss and/or damage:

1. Notify the delivering carrier immediately.
2. Ask for a carrier inspection.
3. Note condition of shipment on all copies of the delivery receipt.
4. File a claim with the carrier.

If concealed damage is discovered:

1. Notify the delivering carrier within 15 days of receipt of shipment.
2. Ask for a carrier inspection.
3. File a claim with the carrier.

Also notify S&C Electric Company in all instances of loss and/or damage.

Packing

Study the erection drawing carefully and check the bill of materials to be sure all parts are at hand. When a standard mounting arrangement is specified, the shipment includes:

- Three switch poles
- Operating-pipe sections for interphase, horizontal-connecting, and vertical sections (The switch may be furnished "less operating pipe," if specified.)
- Operating-mechanism components, such as handle, guide bearings, outboard bearing, and couplings—each tagged and keyed to the bill of material for ready identification

The components included with these modifications are shown on the erection drawing bill of material under the specified "-SX" suffix. They include:

- S1 One tubular fiberglass insulating section in vertical operating shaft
- S2 One Cypoxy™ Insulator unit in vertical operating shaft
- S3 Insulated interphase sections and one tubular fiberglass insulating section in the vertical operating shaft
- S4 Insulated interphase sections and one Cypoxy Insulator unit in the vertical operating shaft
- S6 Key interlock—single lock for a "locked-open" application

- S6L Provision for key interlock—allows future addition of single lock for "locked-open" application
- S7 Auxiliary contact switch with 4 N/O and 4 N/C contacts (600 Vac, 20 A)
- S8 Provision for power operation of pole-mounted switches by S&C Switch Operator—Type AS-10
- S9 Provision for power operation of steel-structure or pedestal-mounted switches by S&C Switch Operator—Type AS-10
- S16 Provision for power operation by S&C 6801M Automatic Switch Operator

"-V1," "-V2," or "-V3" adds (one, two, or three respectively) extra 6-foot-10-inch (208-cm) lengths of pipe and includes the appropriate number of extra couplings and guides.

Reference drawing RD-10006, detailing the various modifications, is included in addition to the erection drawing.

Power Operation: If suffix "-S8" or "-S9" is specified, S&C Instruction Sheets 769-510 and 769-511, "S&C Switch Operators—Type AS-10," are included with the switch operator shipment. Instruction Sheets 769-510 and 769-511 cover installation, operation, and adjustment of the appropriate switch operator and should be used in conjunction with this instruction sheet where applicable. If suffix "-S16" is specified, associated S&C Instruction Sheets for the 6801M Automatic Switch Operator are included with the switch operator shipment. Not all mounting arrangements are suitable for power operation; consult the nearest S&C Sales Office for details.

Fused Interrupter Switches: The installation procedure described in this document is also applicable to three-pole double-break style Alduti-Rupter Switches with Power Fuses.

Shipping and Handling

Handling

The crate the switch pole-units are packed in is designed to be moved and lifted using a lift truck. Raised slots in the bottom of the crate are provided for a lift truck's forks.

NOTICE

To minimize time-consuming final adjustments after installation, make sure the switch poles are in their fully **Closed** position during installation of the interphase and vertical operating pipe sections. S&C recommends tying the switch blades to their jaw contacts with wire or a cable tie.

WARNING

DO NOT lift the switch pole-units by rigging on the “live parts” or subject these parts to undue stress from slings or fall lines.

Lifting the switch by the live parts will damage the switch. Rough handling may cause damage to the blades and contacts.

Failure to lift the switch properly can result in switch damage, causing improper operation, arcing or electrical shock.

Mounting to Wood

NOTICE

When mounting to a wood structure, a spring-type washer must be used between the square washer and the nut to maintain fastener tightness in the event of wood shrinkage. See Figure 2. Drawings for standard mounting arrangements show only the minimum or suggested locating dimensions for the outboard-bearing assembly, vertical operating-pipe guide bearings, and the operating-handle assembly. Specific locations are to be determined either at the job site or by the user's engineering department.

Operating Pipe Preparation

Operating pipes can be cut to length (if not pre-cut at the factory) before transporting the switch to the job site. Cutting dimensions are shown on the erection drawing.

Uncrating the Switch

STEP 1. Remove the switch poles and bell-crank base(s) or bracket(s) from their crates and arrange them on the ground in the same order in which they will be mounted on the pole or structure. Protect the bearings from contamination by dirt, mud, oil, etc. If necessary, use blocks to keep the bearings clear of the ground.

Attaching Couplings to Switch Poles

STEP 2. Attach pipe couplings to the toggle mechanism of each switch pole. Each toggle mechanism includes a 1/4-inch (6-mm) and a 3/8-inch (10-mm) spacer. Use one or both spacers, depending on the number and type of coupling(s). See Figure 3 as well as the instruction tag attached to the toggle mechanism.

Be sure to attach the *adjustable* pipe couplings to the correct switch pole. See the erection drawing (ED).

If specified on the erection drawing (ED), attach a universal pipe coupling to the switch pole nearest the bell-crank.

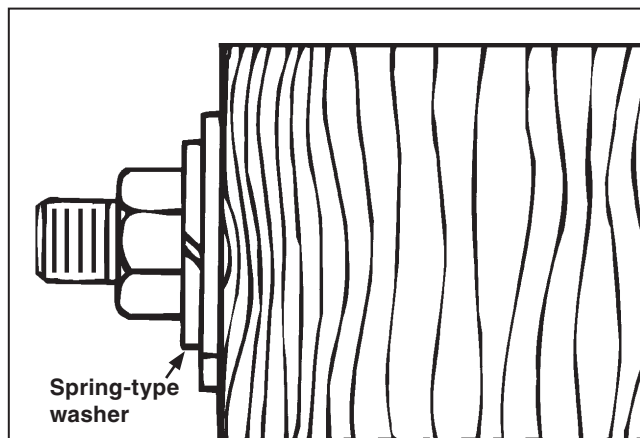


Figure 2. Applying the spring washer.

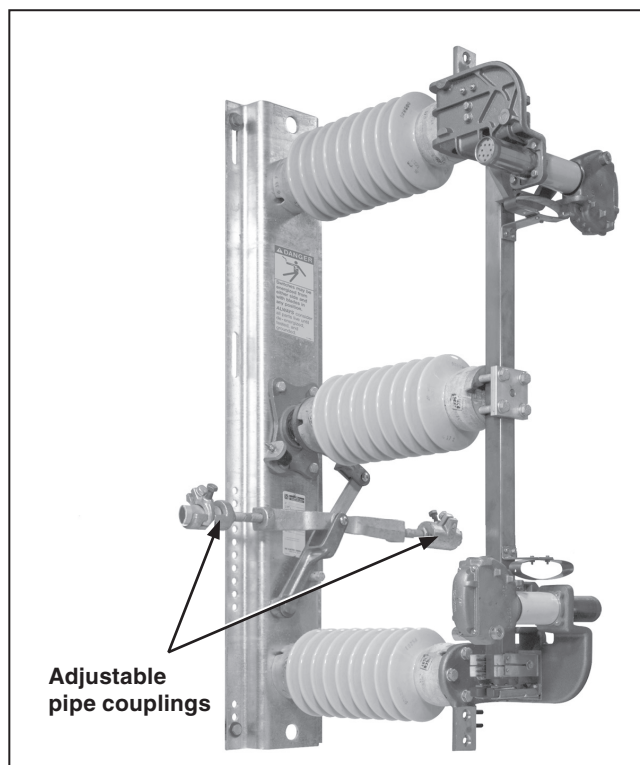


Figure 3. Attaching the pipe couplings to the switch toggle mechanism.

Installation

Attaching the Bell-Crank

STEP 3. Attach the bell-crank to its base or bracket (pole-mounted arrangements only). See Figure 4.

If the bell-crank is mounted between switch poles, the bell-crank will be connected to the interphase pipe by a flat-bar or pipe type drag link and an offset coupling. Attach one end of the drag link to the driven arm of the bell-crank. Attach the offset coupling to the other end of the drag link.

Lifting the Switch

⚠ WARNING

DO NOT lift the switch poles by rigging on the live parts. Avoid allowing the switch poles to swing while lifting.

Lifting the switch by the live parts will damage the switch. Rough handling may cause damage to the blades and contacts.

Failure to lift the switch properly can result in switch damage, causing improper operation, arcing, or electrical shock.

STEP 4. To minimize time-consuming final adjustments, make sure each switch pole is fully closed and its toggle mechanism is against the closed stop. Tie the switch blades to their stationary main contact assemblies and the toggle mechanisms to their stops. See Figure 5.

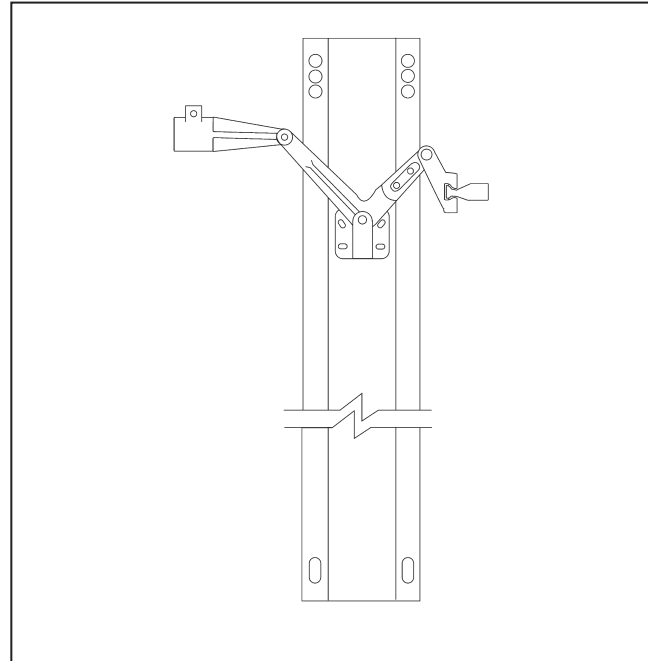


Figure 4. Attaching the bell-crank.

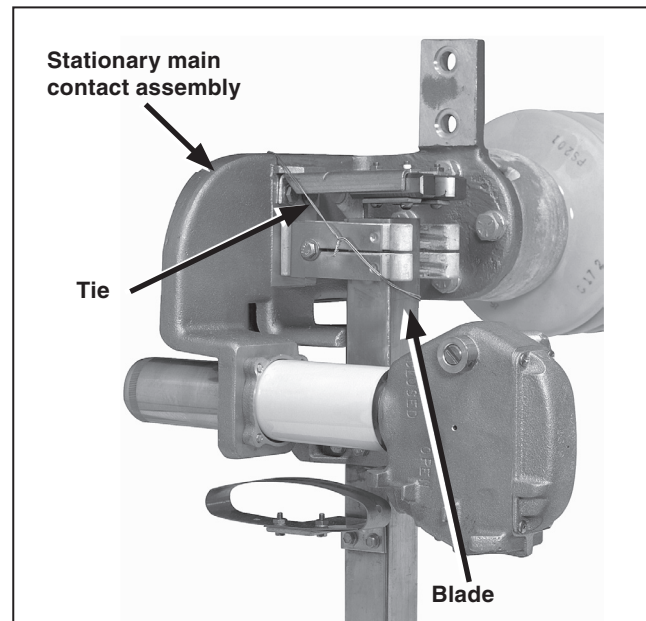


Figure 5. Tying the switch blade to the stationary main contact assembly.

STEP 5. Hoist the switch poles and bolt them into position as shown on the erection drawing. See Figure 6.

NOTICE

Make sure the surfaces on which the switch pole bases are mounted are flat and true. Mounting to an uneven surface can cause the bases to twist, placing undue strain on the insulators and throwing the blades out of alignment, resulting in difficulties operating the switch. Use shims as required.

STEP 6. Lift or hoist the bell-crank assembly, including base or bracket, and bolt it into position as shown on the erection drawing. See Figure 7.

STEP 7. Make sure the bell-crank is held in the 45-degree position. The bell-crank and bell-crank bearing have indexing ridges to facilitate alignment. See Figure 8.



Figure 6. Hoisting the switch pole into position.

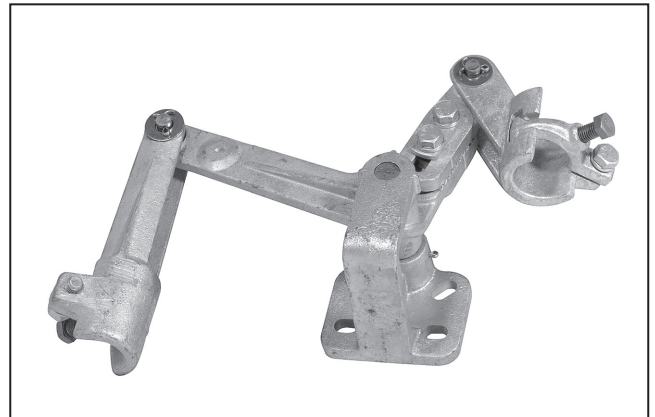


Figure 7. Lifting the bell-crank into position.

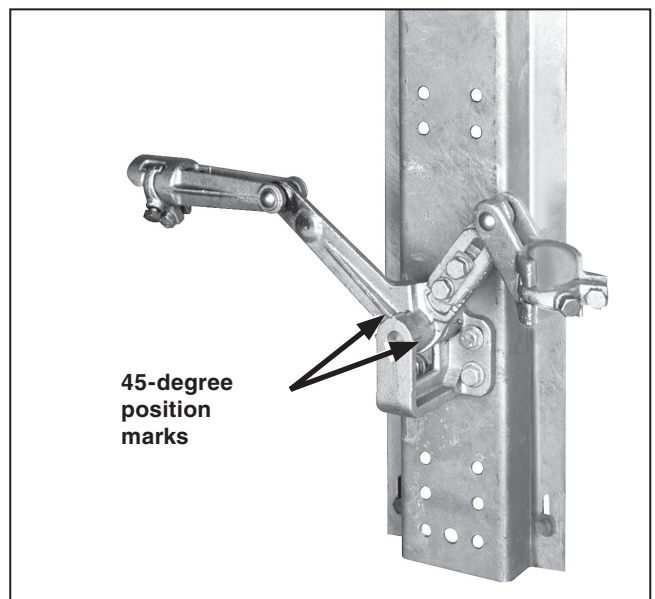


Figure 8. The bell-crank in the 45-degree position.

Installation

Installing Pipe Couplings with Piercing Set Screws

⚠ WARNING

Failure to properly install pipe couplings with piercing set screws can cause slippage of operating pipe, resulting in improper operation of the switch, arcing, equipment damage, or electrical shock.

To properly install piercing set screws:

1. Make sure the cutting tip of the piercing set screw does not protrude through the body of the clamp.
2. Insert the operating pipe section into the coupling and finger-tighten the clamp bolt(s).
3. Adjust the operating pipe to the correct length. Then, tighten the clamp bolt(s) to final tightness.
4. Tighten the piercing set screw, piercing the pipe, and continue turning until a firm resistance is felt.
5. Make sure the clamp bolt(s) are tight.

See Figure 9.

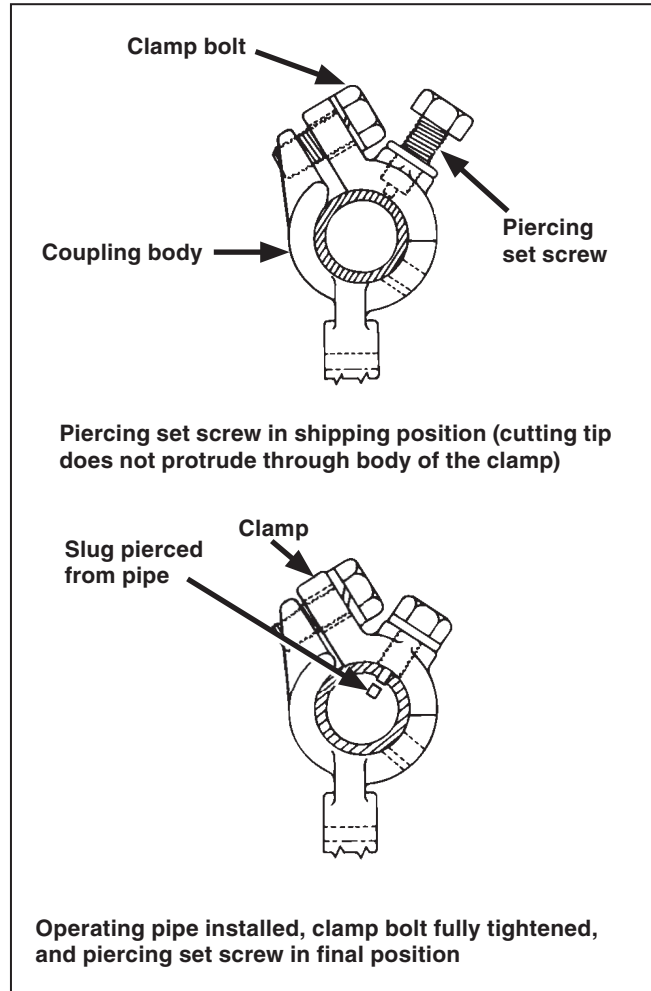


Figure 9. Installing the pipe couplings.

Installing Interphase Pipe

STEP 8. Install the pipe sections connecting the switch poles. See Figure 10. Follow the directions in “Installing Pipe Couplings with Piercing Set Screws” on page 12.

Torque the clamp bolt of each pipe-coupling clamp to final tightness. Then, tighten the associated piercing set screw, piercing the pipe, and continue turning until a firm resistance is felt.

STEP 9. Tighten the take-up screws of the adjustable pipe couplings to remove all play in the inter-connecting linkage. See Figure 11. Make sure the switch-pole toggle mechanisms remain against their closed stops.

Then, tighten the locknut on each adjustable pipe-coupling take-up screw.

STEP 10. *If the bell-crank is mounted outboard of the switch poles:* Install the pipe section connecting the driven arm of the bell-crank to the nearest switch pole. See Figure 12. (If two bell-cranks are used in a double-offset arrangement, install the connecting pipe between them.) Follow the directions in “Installing Pipe Couplings with Piercing Set Screws” on page 12.

If the bell crank is mounted between switch poles: Connect it to the interphase pipe with the offset coupling and drag link that were attached to the bell-crank earlier. Follow the directions in “Installing Pipe Couplings with Piercing Set Screws” on page 12.

Torque the clamp bolt to final tightness. Then, tighten the piercing set screw, piercing the pipe, and continue turning until a firm resistance is felt.

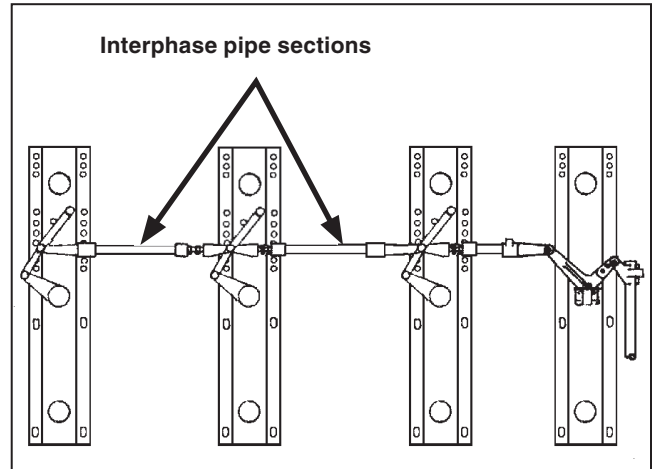


Figure 10. Pipe connecting switch poles.

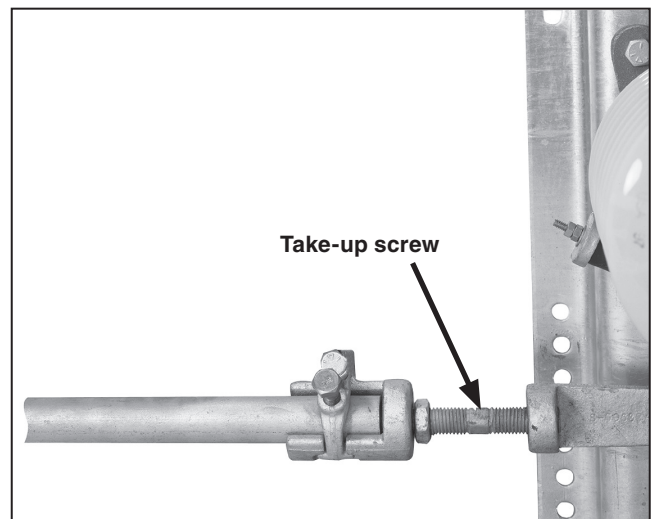


Figure 11. Take-up screw of adjustable pipe-coupling.

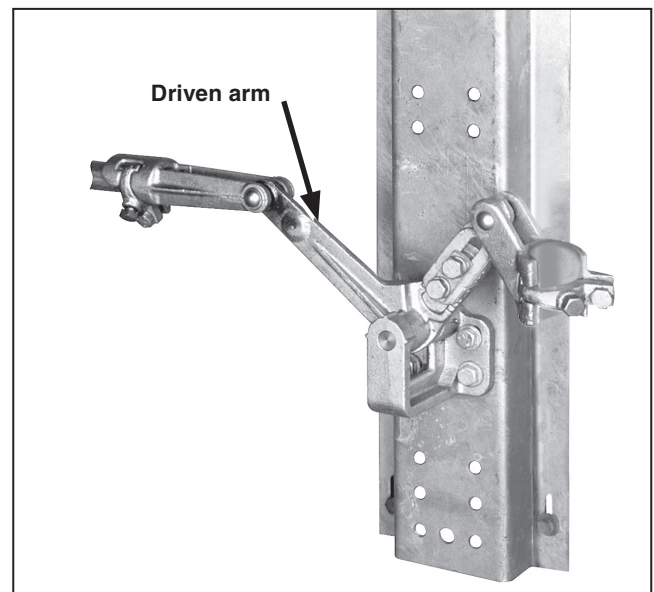


Figure 12. Pipe connecting bell-crank.

Installing Vertical Operating Pipe

STEP 11. One of the pipe sections furnished is threaded at one end to accommodate the operating handle assembly. See Figure 13. Install this section of pipe *last*, with the threads at the lower end.

If only one vertical operating-pipe section is required, proceed to Step 14 on page 16.



Figure 13. Threaded vertical operating pipe.

STEP 12. Mount the rod guide(s) with the arm pointing upward, as shown in Figure 14.

When an adjustable rod guide is included (for the tiered-outboard switch mounting configuration only), mount it nearest the switch. A positioning stud is furnished which holds the rod guide arm at 45 degrees.

STEP 13. Install the upper section of vertical operating pipe between the bell-crank and the uppermost rod guide, with the rod-guide arm pointing upward at a 45-degree angle. See Figure 15. (A positioning stud is furnished that holds the rod guide at 45 degrees.) Follow the directions in “Installing Pipe Couplings with Piercing Set Screws” on page 12.

Torque the clamp bolts to final tightness. Then, tighten the piercing set screws, piercing the pipe, and continue turning until a firm resistance is felt.

If more than one rod guide is used, install vertical operating-pipe sections between the rod guides in the same manner.



Figure 14. Attaching the rod guide.

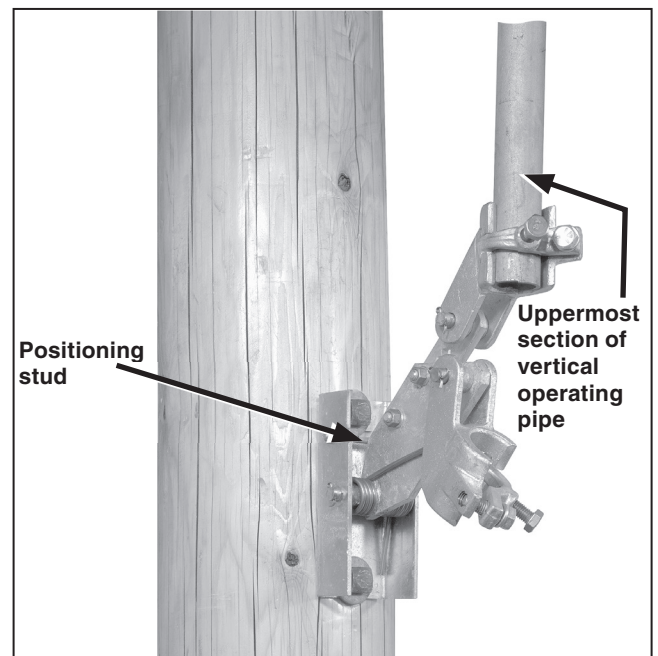


Figure 15. Installing the upper operating pipe section into the rod guide.

Installing Operating Handle●

STEP 14. Mount the operating handle assembly as shown on the erection drawing. At the same time, use one of the mounting bolts to attach one end of the ground strap (the end with the grounding connector attached) to the handle mounting plate.■See Figure 16.

STEP 15. Install the lowest vertical operating-pipe section by threading one end of the pipe into the coupling on the operating handle assembly. Approximately ¼-inch (6 mm) of thread should extend through the coupling. Tighten the lock-nut. See Figure 17.

● If the shipment includes an S&C Type AS-10 Switch Operator, as signified by the addition of the standard minor modification suffix “-S8” or “-S9” to the erection drawing number (for 34.5-kV and 46-kV switches), refer instead to S&C Instruction Sheet 769-510, “S&C Switch Operators—Type AS-10: *Instructions for Installation.*” If the shipment includes an S&C 6801M Automatic Switch Operator, as signified by the addition of standard minor modification suffix “-S16” to the erection drawing number, refer instead to S&C Instruction Sheet 1045M-510.

■ The grounding recommendations described in this document may differ from the standard operating and safety procedures of certain electric utility companies. Where a discrepancy exists, the operating procedures of the electric utility apply.

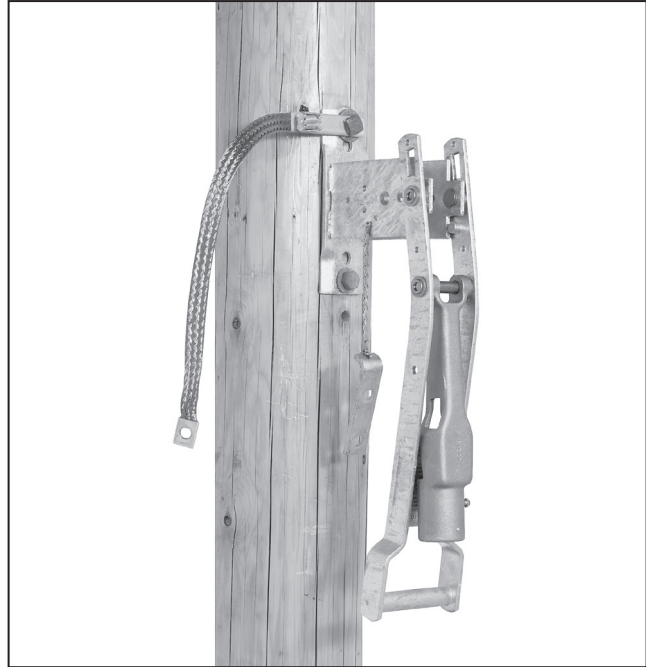


Figure 16. Mounting the operating handle.

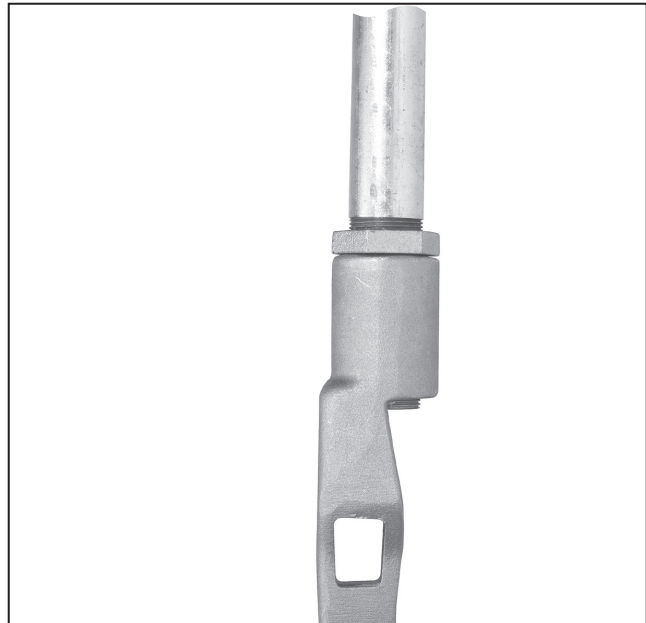


Figure 17. Installing the lowest operating pipe section into the operating handle assembly.

STEP 16. Insert the upper end of this pipe section in the lowest rod guide or—if only one vertical operating-pipe section is used—the bell-crank coupling and, while holding the operating handle at a point approximately 20 degrees from the **Closed** position, torque the rod guide (or bell-crank) coupling clamp bolt. See Figure 18.

NOTICE

Do not tighten the piercing set screw at the top of the lowest section of vertical operating-pipe until satisfactory operating handle adjustment is attained.

STEP 17. Fasten the free end of the grounding strap to the lowest vertical operating-pipe section a few inches above the operating handle assembly with the U-bolt connector provided for this purpose. See Figure 19. Then, connect the lower end of the strap to a suitable earth ground, using the grounding connector provided at that end of the strap.●

● The grounding recommendations described in this document may differ from the standard operating and safety procedures of certain electric utility companies. Where a discrepancy exists, the operating procedures of the electric utility apply.

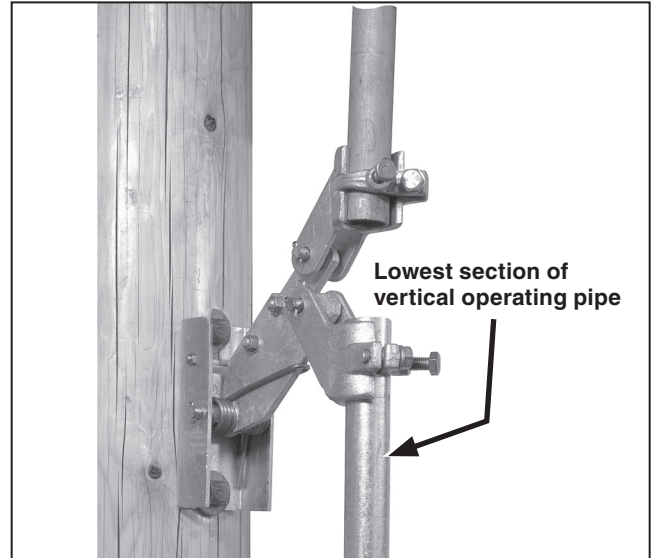


Figure 18. Installing the lowest operating pipe section into the rod guide.

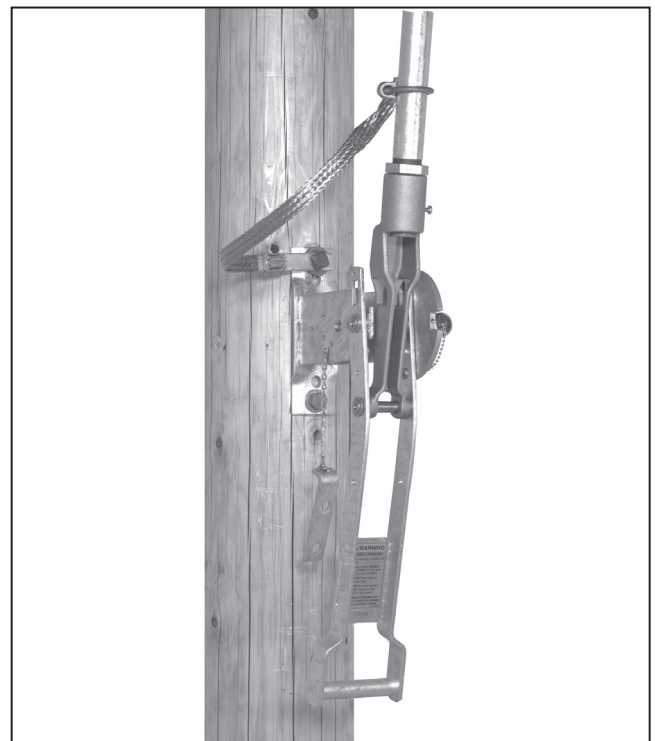


Figure 19. Attaching the grounding strap.

Installation

Checking Alignment

STEP 18. Remove the ties holding the switch blades to their stationary main contact assemblies and the ties holding the toggle mechanisms to their stops. See Figure 20.

Remove the 45-degree positioning stud from each rod guide. See Figure 16 on page 16.

Open and close the switch *slowly* to ensure no operational difficulties are encountered due to undetected damage in shipping.

⚠ CAUTION

The switch should be opened and closed slowly only when checking for alignment and complete closure.

When opening or closing the switch in service, *do not* slow down or stop part way. Arcing can occur if the switch is partially open or partially closed.

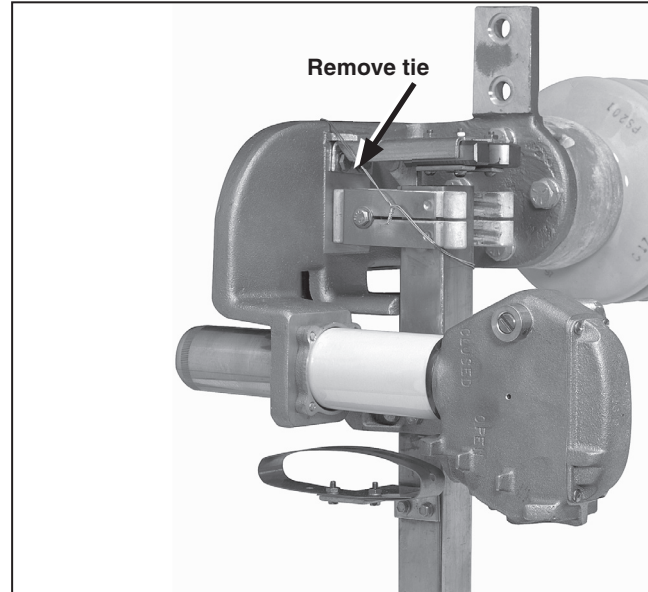


Figure 20. Removing the tie at the stationary main contact assembly.

STEP 19. Move the operating handle slowly to the **Closed** position. See Figure 21. A definite resistance should be felt at the end of the stroke, indicating that all slack in the operating linkage has been taken up.

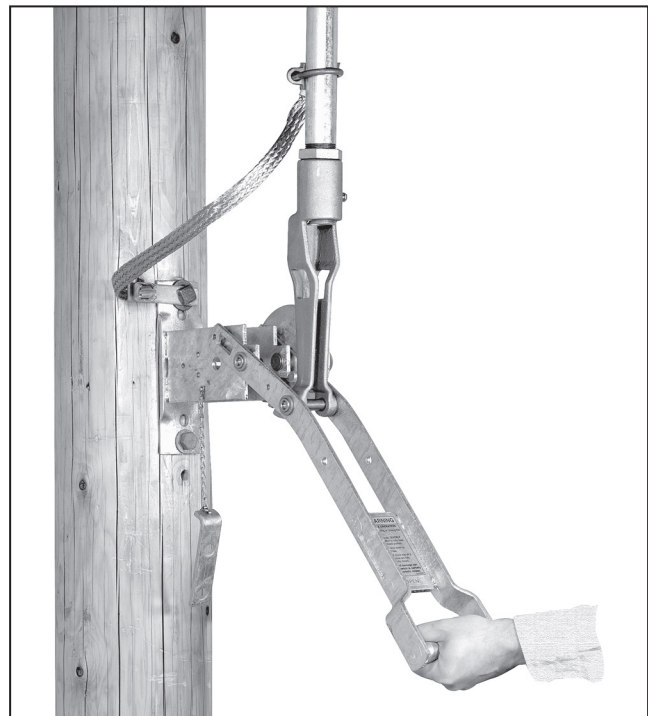


Figure 21. Verifying the slack has been taken up in the operating linkage.

STEP 20. If there is still slack, repeat the procedure in Step 16 on page 17 but move the operating handle *more* than 20 degrees in the opening direction before torquing the clamp bolt on the lowest rod guide (or bell-crank) coupling. See Figure 22.

Conversely, if considerable force is needed to move the handle to the fully **Closed** position, or if the handle does not swing 180 degrees to the fully **Open** position, loosen the clamp bolt on the lowest rod guide (or bell-crank) coupling, and move the handle to a position *less* than 20 degrees from the **Closed** position. Then, torque the clamp bolt on the lowest rod guide (or bell-crank) coupling. Proper “resistance” in the operating linkage is essential to ensure positive switch closure.

Recheck to be sure all clamp bolts and piercing set screws have been torqued to final tightness.

If a key interlock is used (standard minor modification suffix “-S6”) proceed to Step 21 on page 20. Otherwise, proceed to Step 23 on page 21.

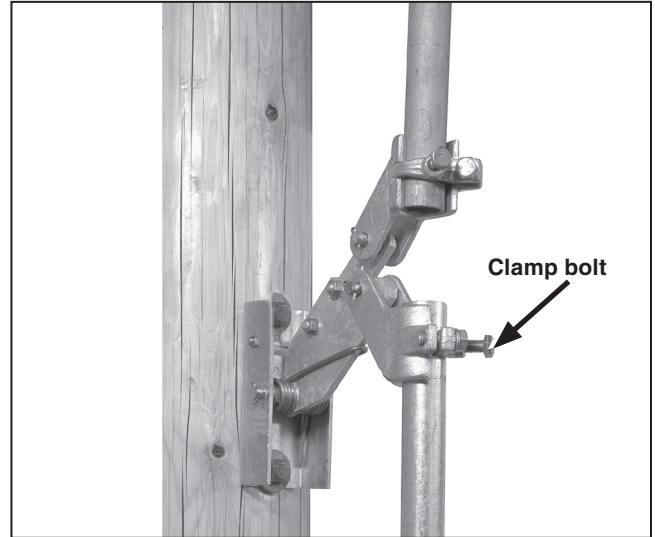


Figure 22. Torquing clamp bolt at lowest rod guide (or bell-crank) coupling.

Installing Key Interlock

STEP 21. The interlock group includes a Superior Type B4003-1 Mk II single- or multiple-key interlock (or equivalent), with zero bolt projection and $\frac{3}{4}$ -inch (19-mm) bolt travel, locking disc, and interlock bracket. If “provision only” is specified, the interlock is not included.

Attach the key interlock to the interlock bracket so the interlock bolt, when extended, engages a slot in the locking disc on the operating handle. See Figure 23.

STEP 22. Block one of the two slots in the locking disc with the blocking screw provided. (The slot to be blocked depends on whether a locked-open or locked-closed arrangement is required.) See Figure 24.

NOTICE

Key interlocks are intended for proper sequencing of switch operations; they are not intended to provide security. The operating handle assembly includes a locking bar for padlocking the switch in either the open or closed position.

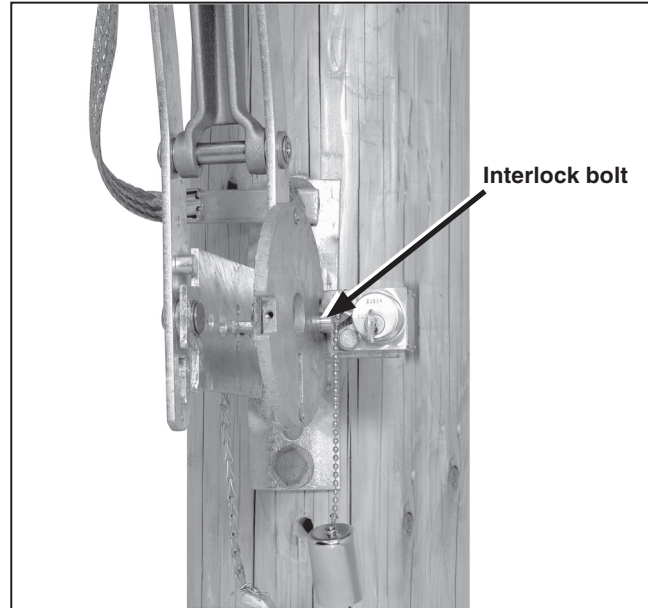


Figure 23. Attaching the key interlock to the interlock bracket.

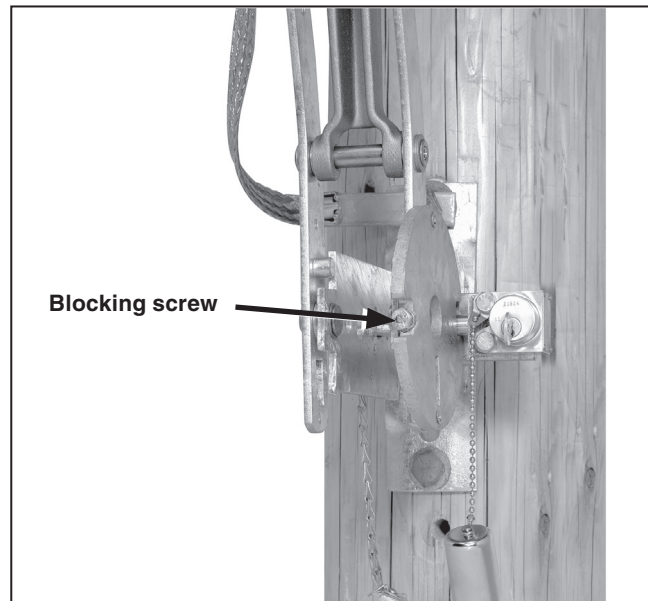


Figure 24. The blocking slot in the interlock disc.

Checking Operation

STEP 23. Open and close the switch *slowly* through its full travel.

<p>⚠ CAUTION</p>
<p>The switch should be opened and closed slowly only when checking for alignment and complete closure.</p> <p>When opening or closing the switch in service, <i>do not</i> slow down or stop part way. Arcing can occur if the switch is partially open or partially closed.</p>

Check that the following conditions exist:

- (a) With the operating handle as far as it will go in the closing direction, both main contacts of each switch pole are fully closed with the blade within 1/8-inch (3 mm) of the stop on the terminal base casting. See Figure 25.
- (b) Each switch-pole toggle mechanism should lie against its closed stop. See Figure 26.
- (c) If *none* of the switch poles are fully closed, the effective length of the vertical operating pipe may need to be increased.

Loosen the vertical operating-pipe clamp bolt on the lowest rod guide (or bell-crank) coupling. See Figure 27.

Move the operating handle approximately 20 degrees from the **Closed** position and then torque the rod guide (or bell-crank) clamp bolt.

Then, move the operating handle to the fully **Closed** position and recheck for adherence to the conditions described above.

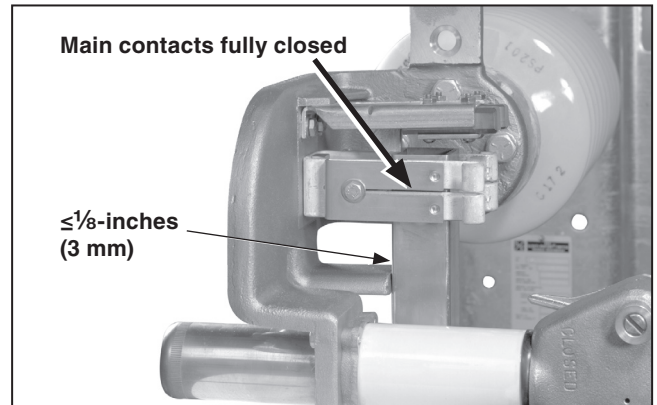


Figure 25. Check that the blade is fully closed and within 1/8-inch (3 mm) of the stop on the terminal base casting

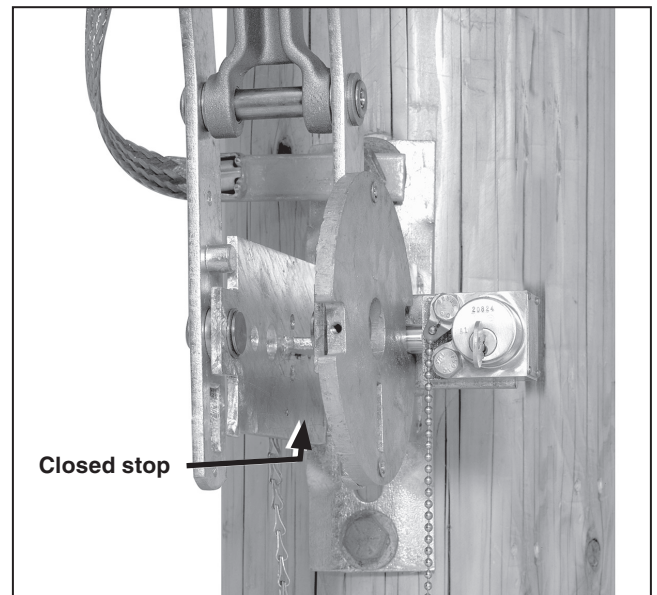


Figure 26. Verifying the toggle mechanism lies against the closed stop.

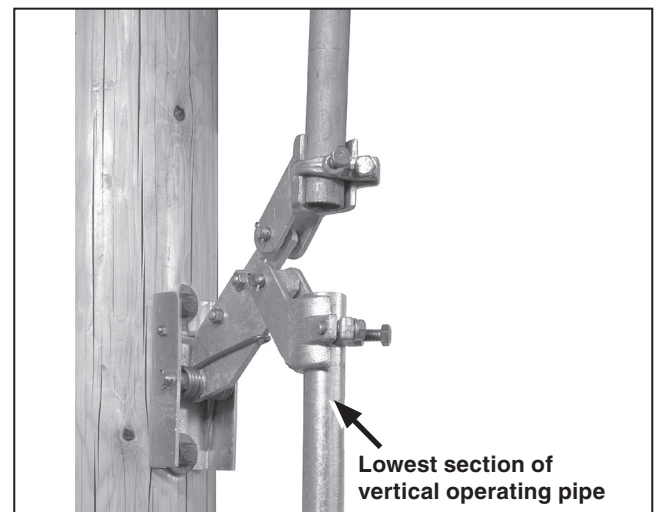


Figure 27. Increasing the effective length of the vertical operating pipe.

Installation

- (d) In the unlikely event only one or two switch poles are fully closed, readjust the take-up screw(s) on the adjustable pipe coupling(s) at the switch pole to increase or decrease the effective length(s) of the interphase operating pipe(s). See Figure 28.

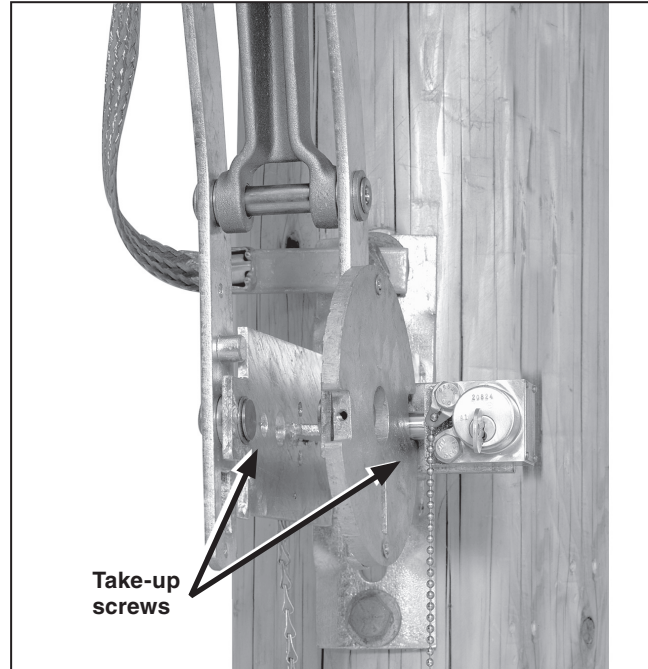


Figure 28. Readjusting the take-up screw(s) on the adjustable pipe coupling(s).

- (e) With the operating handle as far as it will go in the opening direction, each switch operating lever should lie snugly against its open bumper. See Figure 29. There should be perceptible tension in the operating pipe, locking the switch open. In the unlikely event these conditions are not met, more switch blade travel is required.

Move the operating handle to its mid-position to take the strain off the operating-pipe linkage and loosen the two bolts that clamp the adjustable lever arm of the bell-crank. See Figure 30.

Shorten the adjustable lever arm one step ($\frac{1}{8}$ -inch (3 mm)) and retighten the bolts. Shortening the adjustable lever arm increases switch-blade travel. Then, readjust for full operating handle travel as described on page 18.

- (f) Repeat this procedure—shortening the adjustable lever arm of the bell-crank in one-step increments and readjusting for full operating handle travel—until full switch-blade travel is attained.

- For the tiered-outboard switch configuration, a bell-crank is not used. Adjust switch travel at the upper (adjustable) rod guide. Lengthen the driven arm to increase switch travel; shorten the driven arm to decrease switch travel. Then, readjust for full operating handle and switch-blade travel as described in the "Checking Alignment" section on page 18.

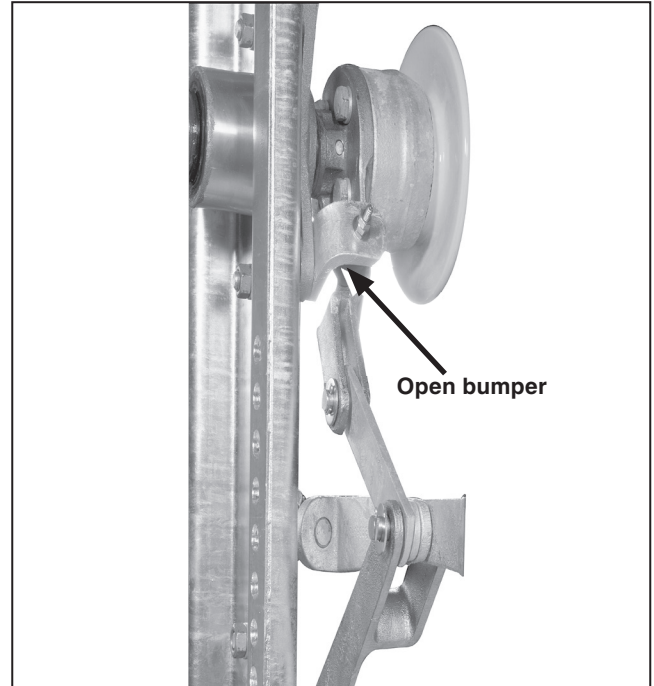


Figure 29. Verifying the switch operating lever is against its open bumper.

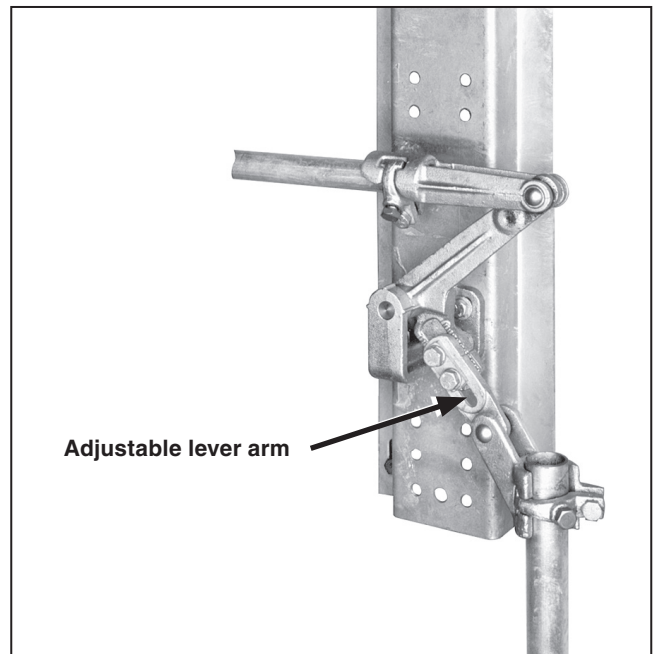


Figure 30. Shortening the adjustable lever arm of the bell-crank.

Installation

- (g) When satisfactory travel adjustment of the operating handle and switch have been attained, torque the bolts on the adjustable lever arm of the bell-crank and the clamp bolt on the rod guide (or bell-crank) coupling to final tightness. Then, tighten the associated piercing set screw, piercing the pipe, and continue turning until a firm resistance is felt. See Figure 31.

NOTICE

After readjusting, be sure to retighten the locknut on each adjustable pipe-coupling take-up screw, the clamp bolt and piercing set screw on the pipe coupling at the rod guide (or bell-crank) immediately above the operating handle, and the clamp bolts on the adjustable lever arm of the bell-crank.

NOTICE

For the most favorable mechanical advantage, the bell-crank arms should be within 5 degrees of the 45-degree position when the switch is in the **Open** position as well as in the **Closed** position.

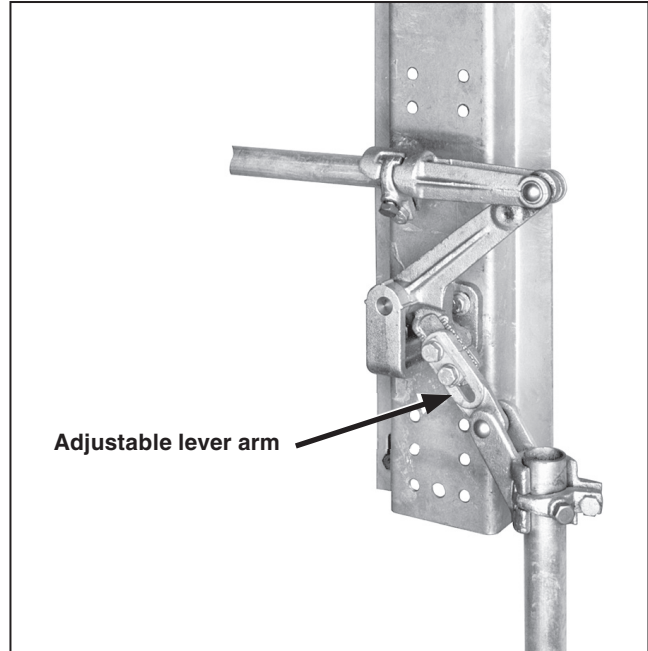


Figure 31. Torquing the bolts on the adjustable lever arm of the bell-crank.

STEP 24. Open and close the switch *slowly* several times.

<p>⚠ CAUTION</p>
<p>The switch should be opened and closed slowly only when checking for alignment and complete closure.</p> <p>When opening or closing the switch in service, <i>do not</i> slow down or stop part way. Arcing can occur if the switch is partially open or partially closed.</p>

Check the operation of each switch pole. The following conditions must be met:

- (a) As the blade assembly moves in the *closing* direction, each blade-closing cam must make positive engagement with its respective interrupter closing lever. See Figure 32.
- (b) With the blade assembly in the fully **Closed** position, verify the minimum clearance between each blade shunt contact and its respective interrupter housing. See Figure 33. The shunt contacts may be bent as required to provide this clearance.
- (c) Also, when the blade is in the fully **Closed** position, each blade-closing cam must overlap its respective interrupter closing lever to prevent inadvertent opening of the interrupter, and clearance between the blade closing cam and its respective interrupter closing lever must be within the limit shown.

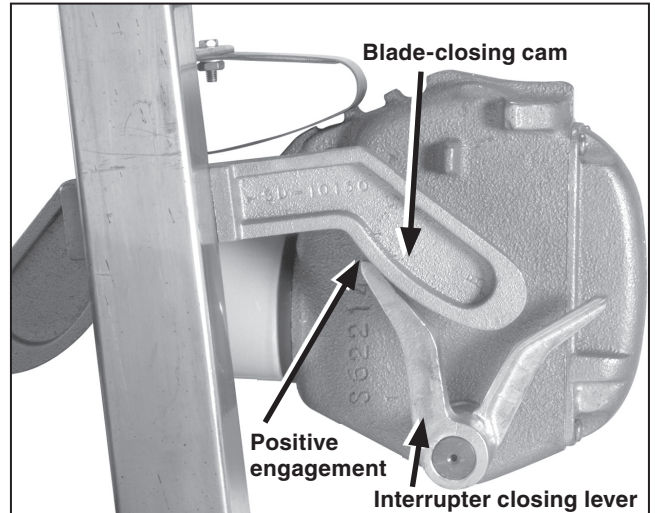


Figure 32. The blade assembly moving in the closing direction.

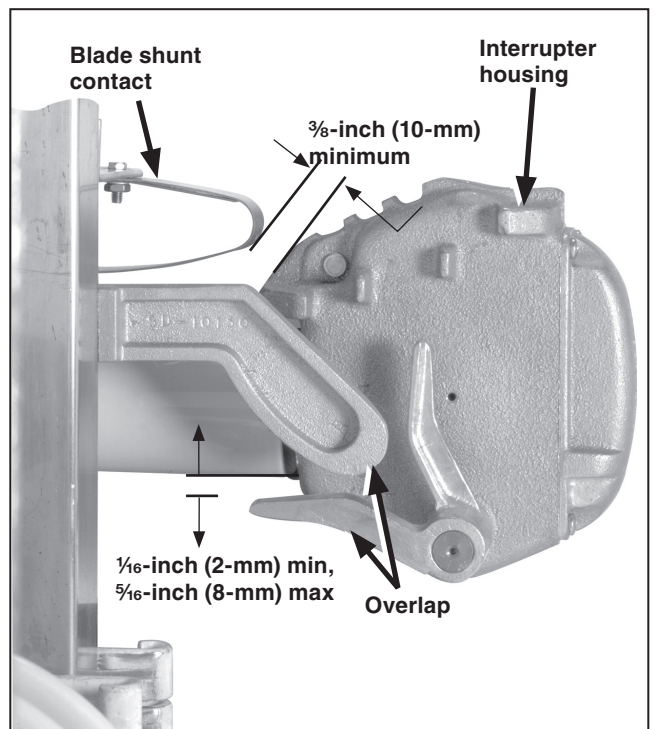


Figure 33. The blade assembly in the fully Closed position.

Installation

- (d) Move the blade in the *opening* direction and verify each blade shunt contact firmly engages its respective interrupter housing before the blade contacts disengage from the stationary main contact assemblies. See Figure 34. The shunt contacts may be bent as required to conform to these conditions.
- (e) Also, as the blade assembly moves in the *opening* direction, the two blade-opening cams must simultaneously make positive engagement with their respective interrupter opening levers, as shown in Figure 35. Simultaneity is essential to ensure both interrupters share the interrupting duty. The opening lever on one or both interrupters may be bent slightly to attain opening simultaneity.
- (f) After opening the blade fully, *slowly* close the blade and verify the two opening cams do not hit the interrupter opening levers. See Figure 35.

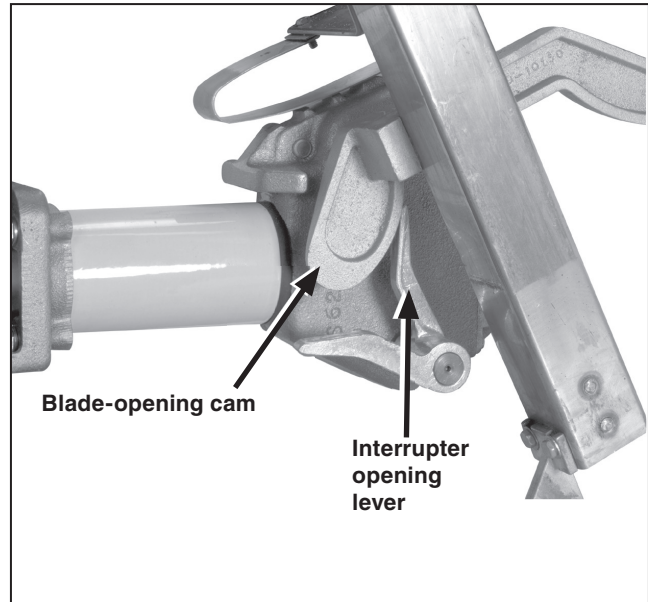


Figure 34. The blade assembly moving in the opening direction.

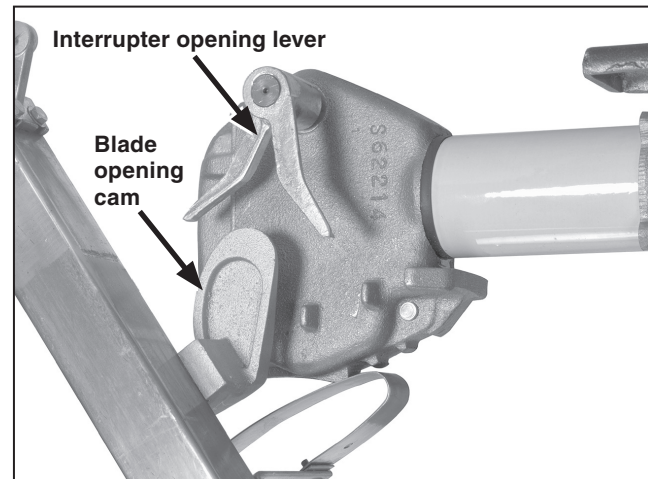


Figure 35. Verifying the blade opening cams do not hit the interrupter opening levers on closing.

- (g) Move the blade assembly *slowly* toward the **Closed** position until the blade assembly is under the interrupter lever shaft. Verify the gap between the end of the interrupter lever shaft and the blade assembly is between $\frac{3}{16}$ -inch (5 mm) and $\frac{1}{2}$ -inch (7 mm). See Figure 36.
- (h) If the conditions described above are not met, adjust as follows. Loosen the four $\frac{1}{2}$ -13 \times $1\frac{1}{4}$ -inch hex-head galvanized steel cap screws which fasten the terminal base castings to the stationary insulators. See Figure 37. Shift the terminal base castings as required. Tighten the terminal base casting cap screws and recheck for conformance to the conditions outlined above. Readjust if required. Make certain the terminal base casting cap screws are tightened to final tightness (55 ft.-lb.)

If any of the conditions described in this step cannot be achieved, contact the nearest S&C Sales Office since it is likely that damage was sustained during shipment.

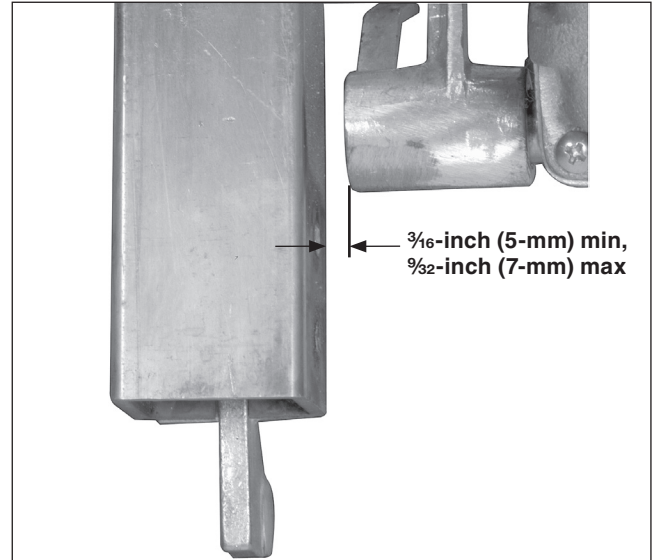


Figure 36. Verifying the gap between the end of the interrupter lever shaft and the blade assembly.

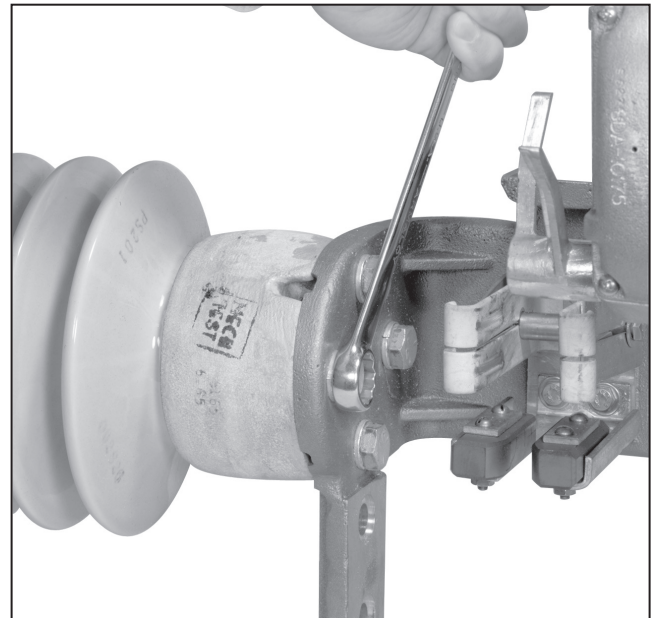


Figure 37. Adjusting the position of the terminal base casting.

Installation

STEP 25. Attach the danger label to the pole or structure using two straps or bolts (furnished by others). See Figure 38.

Position the danger label within 3 feet (91 cm) of the switch pole-units and in full view of line crews when viewed from the front of the switch.

For switches that mount on two poles, attach another danger label to the second pole in the same manner.

NOTICE

Stationary contacts are greaseless and self-lubricating. **DO NOT** apply lubricant to the stationary contacts.

Connecting High-Voltage Conductors

When high-voltage conductors are to be connected using aluminum-alloy body connectors● the following procedures should be used:

- (a) Thoroughly wire-brush the current-transfer surfaces of each connector and immediately apply a liberal coating of Penetrox® A (available from Burndy Corporation) to the brushed surfaces.
- (b) Wire-brush each terminal pad of the interrupter switch and apply a coating of Penetrox A. Then, bolt the connectors to the terminal pads.
- (c) Prepare the conductors using established procedures and clamp them in their respective connectors.

● “Mass anode”-type connectors, such as the catalog number 6300 series offered by S&C, which have been designated by the connector manufacturer as being suitable for direct attachment to copper bearing alloy terminal pads.



Figure 38. Attaching the danger label to the pole or structure.

Opening and Closing the Switch

⚠ DANGER

The interrupters and terminal pads of the Alduti-Rupter Switch may be energized with the interrupters in any position. Before inspecting, servicing, or repairing this switch or working on the conductors on either side of the switch, test for voltage using proper high-voltage test equipment. Then, install suitable grounding equipment. Failure to observe these precautions may result in serious injury or death.

NOTICE

This interrupter switch is not intended for breaking fault currents.

STEP 26. Remove the padlock from the locking bar on the operating handle assembly. Withdraw the locking bar. See Figure 39.

- (a) If the operating handle assembly is furnished with a key interlock, disengage the interlock bolt.
- (b) Swing the handle *rapidly* to the fully **Open** or fully **Closed** position. See Figure 40.
- (c) Always check that all three poles are fully open or fully closed.
- (d) Replace the locking bar and the padlock. Engage the key interlock, if applicable.

⚠ CAUTION

When opening or closing the switch do not slow down or stop part way. Arcing can occur if the switch is partially open or partially closed.

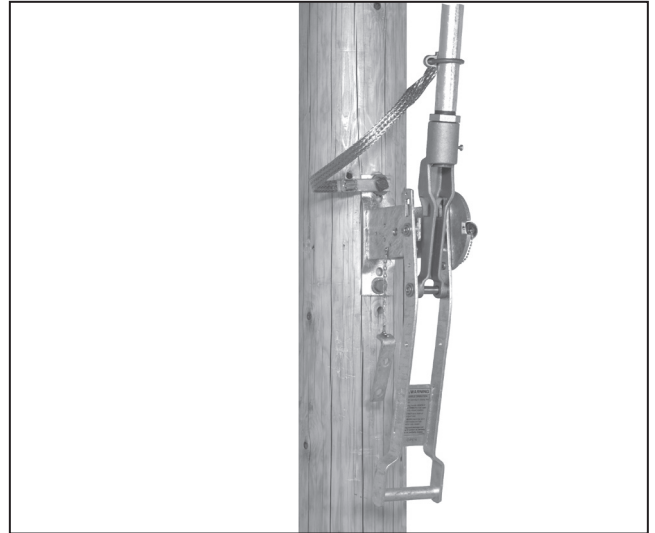


Figure 39. Withdrawing the locking bar and disengaging the key interlock bolt.

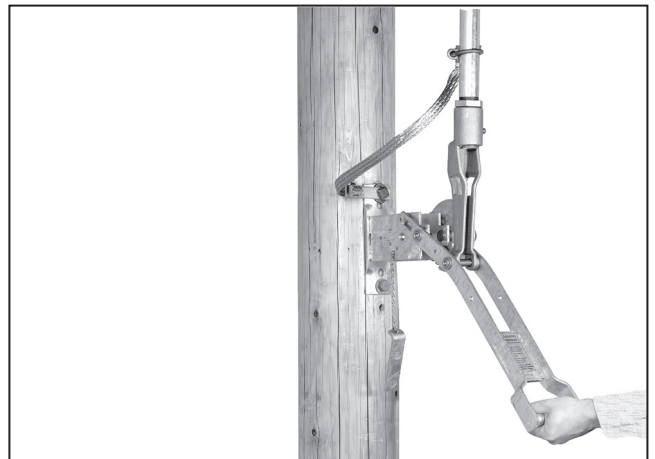


Figure 40. Swinging the operating handle *rapidly*.