Installation

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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 the indoor Alduti-Rupter Switch. Become familiar with the Safety Information on page 4 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 Alduti-Rupter Switch. 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 use inside structural steel or metal enclosures or vaults and secure electrical rooms. The application must be within the ratings furnished for the equipment. Ratings for the indoor Alduti-Rupter Switch are listed in the ratings table in Specification Bulletin 783-31. The ratings are also on the nameplate affixed to the product.

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).

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 Global Support and Monitoring Center at 1-888-762-1100.

NOTICE

Read this instruction sheet thoroughly and carefully before installing the Alduti-Rupter Switch.

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.

⚠ 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 the Alduti-Rupter Switch must be restricted only to qualified persons. See the "Qualified Persons" section 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.** Do not remove or obscure any of the "DANGER," "WARNING," "CAUTION," or "NOTICE" labels.
5. **ENERGIZED COMPONENTS.** Always consider all parts live until de-energized, tested, and grounded. Voltage levels can be as high as the peak line-to-ground voltage last applied to the unit. Units that have been energized or installed near energized lines should be considered live until tested and grounded.
6. **GROUNDING.** The Alduti-Rupter Switch must be connected to a suitable earth ground inside the enclosure, or to a suitable building ground for testing, before energizing the switchgear, and at all times when energized.

   The ground wire(s) must be bonded to the system neutral, if present. If the system neutral is not present, proper precautions must be taken to ensure the local earth ground, or building ground, cannot be severed or removed
7. **INTERRUPTER SWITCH POSITION.** Always confirm the **Open/Closed** position of each switch.
   - Switches and terminal pads may be energized from either side.
   - Switches and terminal pads may be energized with the switches in any position.
8. **MAINTAINING PROPER CLEARANCE.** Always maintain proper clearance from energized components.
9. **PADLOCKS.** The enclosure or vault where the Alduti-Rupter Switch is to be installed must have provisions for padlocks that must be in place and secured at all times unless work is being performed inside the enclosure or vault.
10. **EXCESSIVE FORCE.** Do not apply undue force to any handle when attempting to open or close the switch or the enclosure's door or cover. The use of undue force may damage the handle or latching mechanism.
11. **OPERATION.** Because circuit-making and circuit-breaking are involved in the normal operation of these switches, each switch includes an integral quick-make, quick-break mechanism for swift, positive closing and opening, independent of the speed of the operating handle. Keep hands clear of the mechanism during operation.

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 all listed shipping skids, crates, cartons, 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 or damage.

Packing

Study the erection drawing carefully and check the bill of material to make sure all parts are at hand.

The shipment will include:

- A three-pole interrupter switch, factory-assembled on a rugged base of welded construction
- Interphase barriers and side barriers●
- An operating handle (chain-coupled, direct-coupled, or pipe-coupled)
- The appropriate set of operating-mechanism components required for the specific installation
- A shaft extension of the required length (including an outboard bearing), if specified on the order
- S&C Instruction Sheet 783-501, "S&C Alduti-Rupter® Switches: *Operation*," which is to be passed on to the ultimate user

Included with this instruction sheet is a detailed erection drawing for the applicable mounting configuration. If a standard mounting arrangement is to be used, this erection drawing is a printed sheet.

Custom erection drawings are furnished for minor modifications of standard mounting arrangements as well as for special mounting arrangements. Because this instruction sheet is general in nature, refer to the erection drawing for specific dimensions as installation progresses. The erection drawing also shows the dimensions for minimum acceptable electrical clearance from live parts to metal enclosure (ground).

Storage

This equipment is designed for use indoors or in weather-protected enclosures. Therefore, prior to installation, storage in an indoor, reasonably dry area is required.

Handling

Before taking the switch from its shipping crate, remove the insulating barriers● and set them aside to prevent damaging them. Barriers are to be attached to the switch only after all other assembly operations are complete and adjustment its are satisfactory.

Also remove the operating mechanism components. Then, remove the switch, lifting it by the frame. Make sure the lifting sling does not place any strain on the live parts. Do not under any circumstances handle the switch by rigging on the insulators or live parts.

● Interphase barriers and side barriers are neither required nor furnished with 25-kV three-pole interrupter switches.

Before Starting

⚠ WARNING

Keep clear of the blades during switch opening or closing. Switch blades are driven at high speed by a release of a quick-break quick-make stored-energy mechanism.

Failure to keep clear of the blade operation area may result in serious injury.

Become familiar with the parts of an Alduti-Rupter Switch, as shown in Figure 1 and Figure 2 on page 8.

If the switch is to be installed in a metal enclosure, openings and mounting-bolt holes for the handle must be provided. Also, if a shaft extension is specified, provision for the outboard bearing must be made.

Vertical slots measuring 9⁄16 × 13⁄16 inches (14 × 21 mm) in the base of the switch permit vertical positioning adjustment. Corresponding horizontal slots must be provided in the mounting surface for lateral adjustment.

Whether the switch is mounted in a metal enclosure, on a steel structure, or on a wall, the mounting surface must be flat and true to avoid twisting the switch frame when it is bolted down. Such distortion of the frame can affect the adjustment of switch live parts, necessitating realignment of the switch blades.

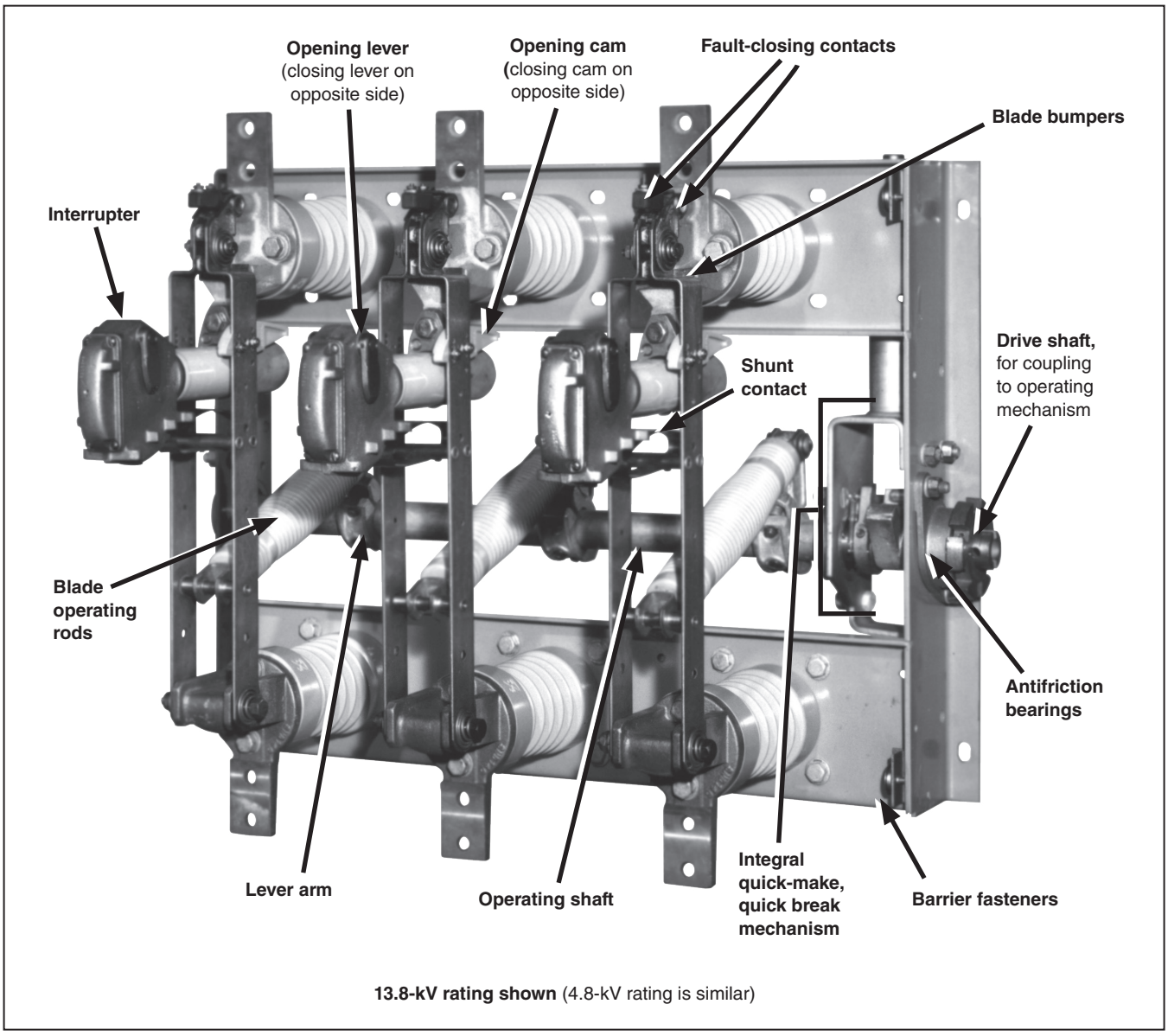


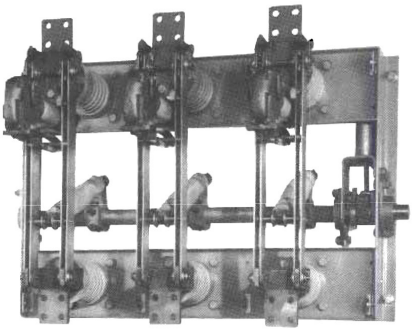
Figure 1. A typical 600-ampere Alduti-Rupter Switch, for indoor distribution.

If the switch is furnished with a chain-coupled handle, proceed to the "Installing the Chain Coupled Handle" section on page 9.

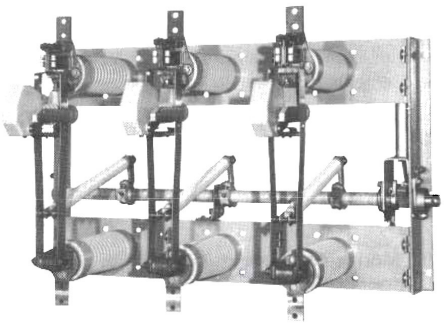
If the switch is furnished with a direct-coupled handle, proceed to the "Installing the Direct-Coupled Handle" section on page 17.

If the switch is furnished with a pipe-coupled handle, proceed to the "Installing the Pipe-Coupled Handle" section on page 22.

1200-ampere, 13.8-kV rating
(4.8-kV rating is similar)

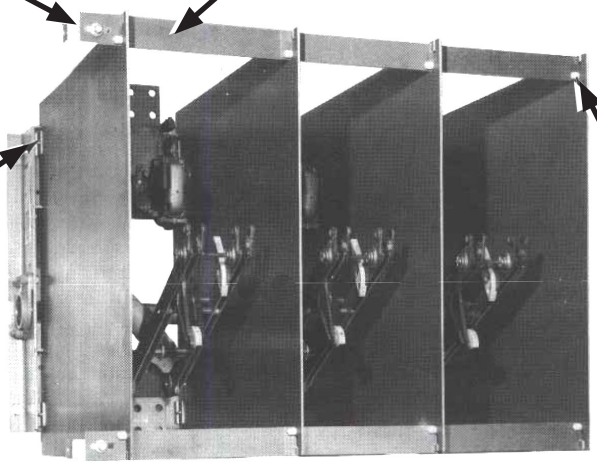


600-ampere, 34.5-kV rating
(25 kV rating is similar)



Barrier stiffeners (the stiffener section having ⅜ × 1-inch slotted holes should be attached to the barrier farthest from the quick-make, quick-break mechanism)

Side stiffener angle bracket for attachment to enclosure wall or other surface



Plastic barrier retainers and **nylon drive rivets**

Barrier fasteners

1200-ampere, 13.8-kV rating with barriers installed

Figure 2. A typical 1200-ampere and 600-ampere Alduti-Rupter Switches with and without barriers.

Installing the Chain-Coupled Handle

Complete the following steps to install the chain-coupled handle:

STEP 1. ***If no shaft extension is used, the sprocket is factory installed on the switch drive shaft. Omit this step.*** If a shaft extension is furnished, an outboard bearing, a sprocket, and coupling pins are included. Before the switch is mounted in the enclosure, attach the predrilled end of the shaft extension to the switch drive shaft using the coupling pin provided. Then, place the sprocket and the outboard bearing assembly on the shaft extension, positioned as shown on the erection drawing.

STEP 2. Use ½-inch hardware to bolt the switch to its mounting surface. Include shake-proof lock washers between the switch frame and the mounting surface for grounding purposes. To avoid distorting the switch frame, install the upper mounting bolts first, finger tight and, at each lower mounting bolt location, fill any space between the switch frame and the mounting surface with shims. Then securely tighten all four mounting bolts.

STEP 3. ***If no shaft extension is used, omit this step.*** If a shaft extension is furnished, attach the outboard bearing bracket to the enclosure wall. Before tightening the bracket mounting bolts, check the alignment of the shaft extension with respect to the switch and outboard bearing.

Reposition the outboard bearing bracket as required and torque the bracket mounting bolts to final tightness.

Then position the sprocket on the shaft extension to align it with the operating-handle sprocket position. Drill a ⅜-inch (9.5-mm) diameter hole through the shaft extension, using the hole in the sprocket as a pilot, and fasten the sprocket in place with the pin provided.

Note: The hole will have been predrilled in the shaft extension at the factory if the locating dimension was specified by the purchaser.

STEP 4. Select the shorter length of the two chain sections furnished for the operating-handle sprocket location. (A 14-inch (35.6-cm) length of chain is suggested for switches with main contacts at the top, and a 16-inch (40.6-cm) length for switches with main contacts at the bottom. Remove chain links accordingly.)

Pass the chain around the handle sprocket such that, with the handle in mid-position, the free ends of the chain are about the same length when extended. Then, thread the ends of the chain through the opening in the front of the enclosure, and bolt the handle and stiffener bracket in position as shown on the erection drawing using the four ⅜–16 × 1-inch bolts and lockwashers furnished. Refer also to Figure 3. Place the handle in the **Latched Closed** position.

STEP 5. Couple a strip link to each end of the above chain. At the opposite end of the strip links, install the turnbuckles assembled with lockwashers under the nuts with right-hand threads.

Extend each turnbuckle to its maximum length. Then, using the longer length of chain provided, connect it to extend from one turnbuckle, around the drive-shaft sprocket, and back to the other turnbuckle (cross the strip links for reverse rotation if the switch main contacts are at the bottom). If necessary, remove chain links until the chain is about two links longer than is required to go from one turnbuckle to the other.

STEP 6. Install a compression member between the switch frame and the stiffener bracket behind the handle assembly. This is to minimize deflection between the handle and the switch. The compression member, a 2 × 1 ¼ × ¼ -inch (51 × 32 × 6.4-mm) angle of required length, is to be furnished by the installer. Position it so both chain clearance and electrical clearance are maintained.

A stiffener bracket is furnished for anchoring the compression member at the switch frame. However, if a shaft extension is used, install a support bracket (not furnished) at the switch end, opposite the handle stiffener bracket, to maintain vertical alignment of the compression member.

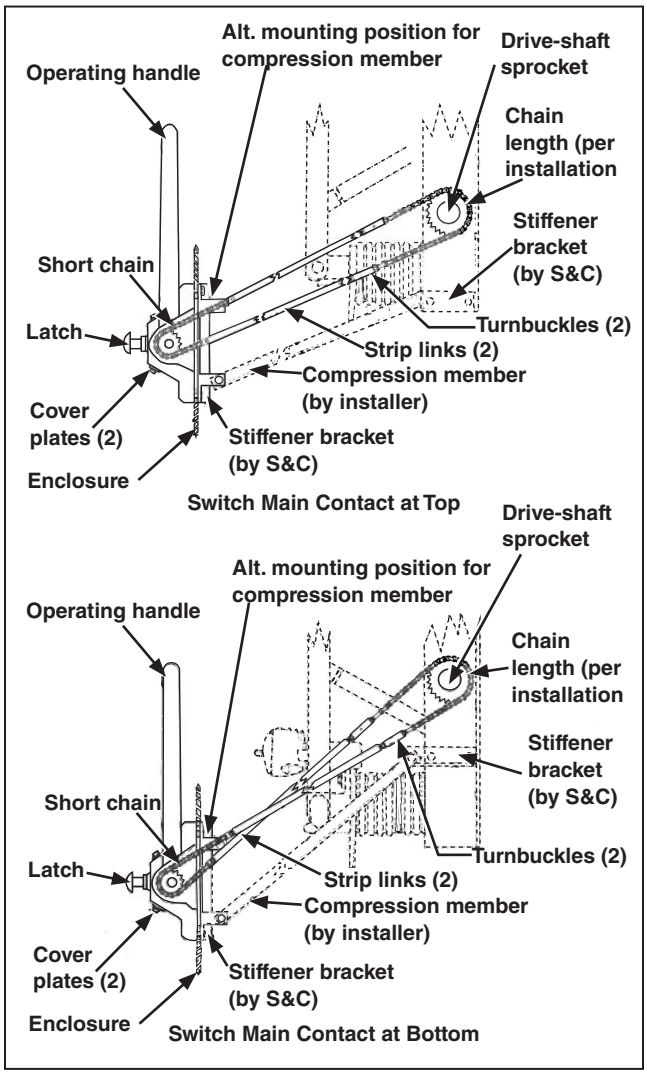


Figure 3. A chain-coupled handle.

STEP 7. With the handle in the **Closed** (latched) position, adjust the turnbuckles so the switch drive-shaft pin applies pressure against the compression crank. See Figure 1 on page 7 and Figure 4 for identification. Carefully tighten the appropriate turnbuckle until there is a slight drag on the handle latch (the latch should then release freely when the handle is pushed in the closing direction). Then, tighten the turnbuckle locknuts.

Do not use the operating handle to open the switch until so directed in Step 9.

STEP 8. Make a preliminary alignment check before operating the switch to verify the critical blade-to-interrupter clearances. Dimensions A, B, and C are as shown in Figure 5 on page 12.

If for all three poles the actual dimensions differ in the same way from those indicated, correction may be accomplished as follows:

(a) At one of the lower corners of the switch frame, loosen the mounting bolt and apply pressure to the underside of the frame to force the corner away from the mounting surface. If this direction of movement increases the dimensional variance, release the pressure, re-tighten the loosened mounting bolt, and repeat the procedure for the other lower corner of the switch frame.

(b) Apply sufficient pressure to the appropriate corner to achieve the correct dimensions. Then, place shims at the mounting bolt location to hold the mounting frame in that position.

(c) Make sure all mounting bolts are securely re-tightened.

STEP 9. Pull and hold the latch knob and use the operating handle to open the switch.

Note: Do not use the operating handle again until so directed in Step 10 on page 13, after alignment checks and adjustments are complete.

Check for blade alignment by releasing the spring-loaded cam pawl on the quick-make, quick-break mechanism (see Figure 4) and by moving the blades by hand only, toward the **Closed** position. Avoid side thrust. Blade movement will be delayed, by toggle-spring compression, just before the blades reach the interrupters. Visually check each pole to see that the blades could pass the interrupter with

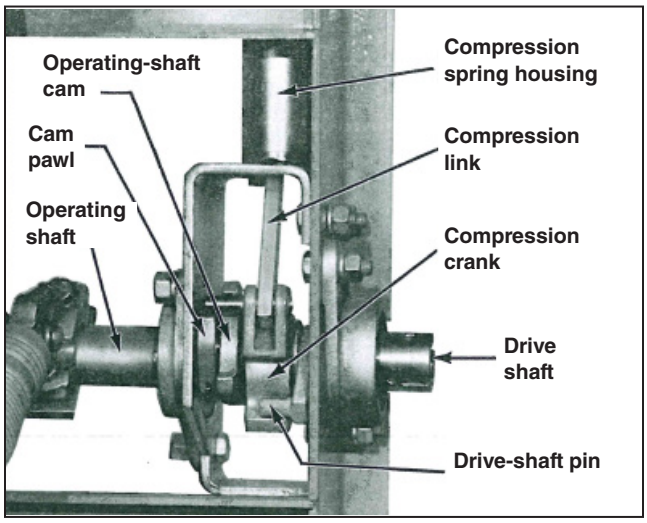
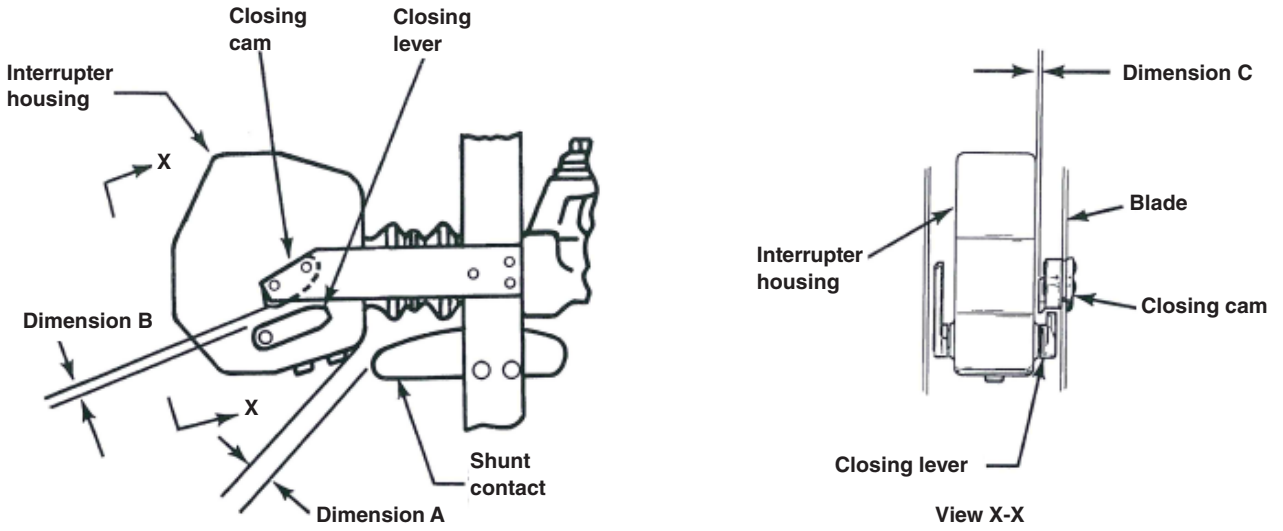


Figure 4. A quick-make, quick-break mechanism in the Switch Open position.



Rating, kV	Dimension A	Dimension B	Dimension C
4.8	5/32-in. min. (4 mm)	3/16-in. max. (4.8 mm)	●
13.8	3/16-in. min. (4.8 mm)	1/8-in. max. (3.2 mm)	●
25	1/8-in. min. (3.2 mm) ■	3/16-in. max. (4.8 mm)	1/32-in. min. – 3/32-in. max. (0.8 - 2.4 mm)
34.5	1/8-in. min. (3.2 mm) ■	3/16-in. max. (4.8 mm)	1/32-in. min. – 3/32-in. max. (0.8 - 2.4 mm)

● Not applicable, blades must pass opening and closing levers with 1/8 ± 1/16-in. (3.2 ± 1.6 mm) clearance.
■ 1/8-in. (3.2 mm) minimum to interrupter body, 1/16-in. (1.6 mm) minimum to interrupter skirts.

Figure 5. Operation checkpoints. (34.5-kV rating shown. Closing cam and closing lever are on opposite side to that shown for 4.8-kV and 13.8-kV ratings.)

equal clearance on each side and the interrupter itself is parallel to the blades.

Return the blades to the fully **Open** position.

If this blade-and-interrupter alignment, and the previously checked dimensions (A, B, and C in Figure 5), are determined to be correct, proceed to the next applicable step.

However, if adjustment of one or more switch poles is required, proceed as directed below for each applicable switch pole:

(a) To permit blade opening and closing by hand, disconnect the insulated blade-operating rod from the lever arm on the operating shaft by removing the connecting pin. Note the positioning of the Coroprene and brass flat washers relative to the clevis.

(b) Slightly loosen the bolts fastening the hinge to the insulator. Tap the hinge-end terminal pad to rotate the blade into alignment.

(c) Close the blade by hand. The blade should enter the main contact on center. Also, for 4.8-kV and 13.8-kV ratings, the spacer separating the blade contacts should enter the slot in the main-contact casting and be centered in the slot when the blade is fully closed. Adjust by tapping at the hinge casting.

(d) When alignment as described in Step 9(b) and Step 9(c) is attained, securely tighten the bolts fastening the hinge to the insulator.

(e) At this time, if the interrupter is not parallel to the sweep of the blades, loosen the bolts fastening the jaw-contact casting to its support insulator, and align the interrupter.

Note: Make sure during this procedure, to maintain the critical gap between the striking surfaces of the closing cam on the blade and the closing lever on the interrupter, as indicated in Figure 5 on page 12, Dimension B. Also, for 25-kV and 34.5-kV ratings, observe the blade as it moves past the interrupter in the closing direction. There must be a 1/32- to 3/32-inch (0.8- to 2.4-mm) clearance between the interrupter housing and the closing cam on the blade, as shown in Figure 5 on page 12, Dimension C. This critical dimension must exist so the raised portion of the cam (along the actuating surface) rides against the inner side of the closing lever of the interrupter during the closing stroke.

Re-tighten the main-contact bolts and recheck Dimensions B and C, Figure 5 on page 12.

(f) With the blade in the fully **Closed** position, make sure the minimum clearance specified in Figure 5 on page 12, Dimension A, exists between the shunt contact on the blade and the interrupter housing. In addition, as the blade is opened, make sure the shunt contact makes contact with the interrupter housing (or contact rivets for 25-kV and 34.5-kV ratings) before the blade disengages from the main contact. Adjust by bending the shunt contacts as required.

(g) When alignment is determined to be correct, reconnect the insulated blade-operating rod to the lever arm on the operating shaft. Also, make sure to reposition the Coroprene washers against the clevis, backed up with the brass flat washers. Secure with the cotter pin.

STEP 10. Pull and hold the latch knob and use the operating handle to close the switch.

Verify the chain adjustment, as described in Step 7 on page 11, is retained and the drive-shaft pin applies pressure against the compression crank. Readjust the chain if necessary.

STEP 11. When the switch is in its **Closed** position, all blades must be pushed against their bumpers by approximately equal pressure of the blade-operating rods.

Verify this condition exists by grasping the end of each blade and pulling it away from its bumper. When released, the blade should return to the bumper. An intervening gap of up to 1/16-inch (1.6 mm) is acceptable.

Adjust for blade closure, where required, by changing the position of the lever arm with respect to the operating shaft. This is achieved by loosening one clamp bolt and tightening the other clamp bolt (in half-turn increments) so the blade just touches the bumper. The lever-arm clamp itself will not rotate because it is pinned to the operating shaft. See Figure 6.

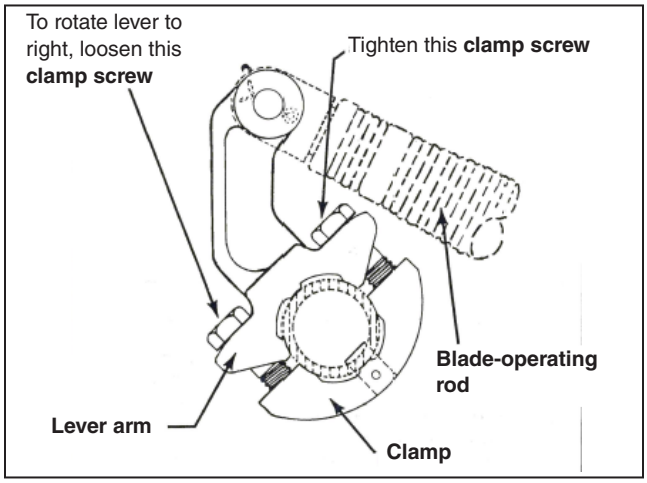


Figure 6. The lever arm for insulated blade-operating rods.

At this time, if an Alduti-Rupter Switch with Type SM Power Fuses is furnished, check each pole of the fuse live parts and make any necessary adjustments as follows:

With a Disconnect 45° Opening Fuse

Insert a holder in the hinge (make sure the holder cap for the spring-and-cable assembly is tightened). Raise the holder toward the **Closed** position to check main contact engagement. The holder must enter the contact on center, latch positively, and unlatch freely when opened with the pull-ring. If adjustment is required, loosen the bolts fastening the hinge to the insulator. Reposition the hinge as required by tapping at its base. Then, securely tighten the hinge bolts.

With a Non-Disconnect Fuse

Place the stick-operated clamps in the **Up** position to open the fuse contacts. Suspend the holder from the hanger bracket attached to the upper-contact support. Push the holder into the contacts. If there is appreciable misalignment, loosen the bolts fastening the lower contact assembly to the insulator. Reposition the contact assembly as required by tapping at its terminal pad. Then, securely tighten the bolts.

Note: Holders must be removed from their mountings and packed separately when shipment is to be made.

STEP 12. Open and close the switch four or five times to check the operation. Verify the critical dimensions shown in Figure 5 on page 12 are retained and that the interrupters are opened and closed corresponding with the respective blade positions. Make minor adjustments as required.

STEP 13. Apply a heavy coat of Lubriplate lubricant or equivalent to sprockets, chain, and turnbuckles. Then, install "Open" and "Closed" labels at the handle position.

STEP 14. ***Interphase barriers and side barriers are neither required nor furnished with 25-kV three-pole interrupter switches. For 25-kV three-pole switches, omit this step.***

Interphase and side insulating barriers are furnished along with barrier stiffeners to ensure proper interbarrier spacing. At one edge of each barrier slots leading into 1-in (25 mm) diameter holes. (This same edge is also notched to conform to the switch mounting frame.) Additionally, the edge of one of the barriers has a long cutaway section to fit over the quick-make, quick-break mechanism. Install the barriers as follows:

(a) Refer to the erection drawing and to S&C Drawing RD-3299 that accompanies it for specific barrier component locations. See also Figure 2 on page 8.

Slide each barrier onto the barrier fasteners so the dished part of each fastener disc seats into its corresponding one-inch diameter barrier hole. Tighten each fastener bolt to pull the dished portion of the disc into the hole.

(b) To ensure proper barrier positioning, attach the insulated interbarrier stiffeners by interlocking their notches with matching notches in the barriers. The stiffener section that has ⅜ × 1-inch (9.5 × 25-mm) slotted holes in it should be attached to the barrier farthest from the quick-make, quick-break mechanism, as shown. Then, fasten the stiffener to the enclosure side wall or other surface using the angle bracket furnished for this purpose.

Note: Plastic barrier retainers and nylon drive rivets are furnished for holding the stiffeners in place. Because the user may wish to temporarily remove the barriers to facilitate cable terminations, the drive rivets may be shipped loose and with instructions on how they are to be used.

STEP 15. ***If no interlock is required, omit this step.***

To install interlock(s), first remove cover plate(s) on the handle housing. Then, replace the cover plate(s) with the key interlock(s) using the same hardware and gasket(s).

When the interlocking scheme requires either the locked-open or locked-closed arrangement of the switch, one interlock is used and the appropriate slot should be blocked to limit operations of the interlock to one position of the switch. Blocking screws are provided for this purpose.

When the interlocking scheme requires both locked-open and locked-closed arrange-

ments, two interlocks are used and again, one slot in the interlock plate should be blocked.

If with a Mechanical Interlock: The mechanical interlock furnished is a single-action, cable type. It is intended only to prevent opening the enclosure door when the switch is closed. Install it as follows:

(a) Bolt or weld the interlock latching assembly inside the enclosure. Position it so the interlock latch engages or blocks the door hasp (or door-opening mechanism). See Figure 8 on page 16.

(b) On the side of the operating-handle housing (opposite the handle itself) are two hex-head screws accessible from inside the housing. Remove and discard the top screw. Attach the cam lever to the inside of the housing with the shoulder bolt inserted in the vacated hole. Position the cam lever so its rounded corner is toward the cam (the cam is an integral part of the chain-coupled handle). See Figure 7.

(c) With the operating handle in the **Closed** position, train the control cable from the interlock latching assembly on the door to the cam lever on the operating handle. Avoid sharp bends. Support the cable at appropriate points along its length with the cable clamps and brackets furnished. Cut off excess cable.

(d) Insert one end of the cable in the clamp on the cam lever and tighten the set screws.

Insert the other end of the cable in the clamp on the interlock latch. Then, while (manually) holding the interlock latch in the **Door Closed** position, pull the cable taut so the cam lever rests against the cam and tighten the set screws in the clamp.

(e) Open the switch and verify the interlock latch is pivoted to its limit by the latch spring. Repeat the procedure described in Step 15 (d) above if necessary. Make sure all bolts and set screws are securely tightened.

Note: Cable travel is limited to 7⁄16-inch (11 mm) so the cam lever does not completely enter the cam indentation.

STEP 16. Lock the operating handle as follows:

***If with a padlock*:** The operating handle has provision for use of a padlock (with up to 3⁄8-inch (10-mm) diameter shackle) to lock the switch in either the **Open** or **Closed** position.

If with a key interlock: The chain-coupled handle accommodates one or two Superior Key Interlocks (Type B6003-l Mk II single or multiple key, with 3⁄8-inch (10-mm) bolt projection and 3⁄4-inch (19-mm) bolt travel). It includes an interlock plate with four slots positioned so the bolt of each interlock will engage either of two slots.

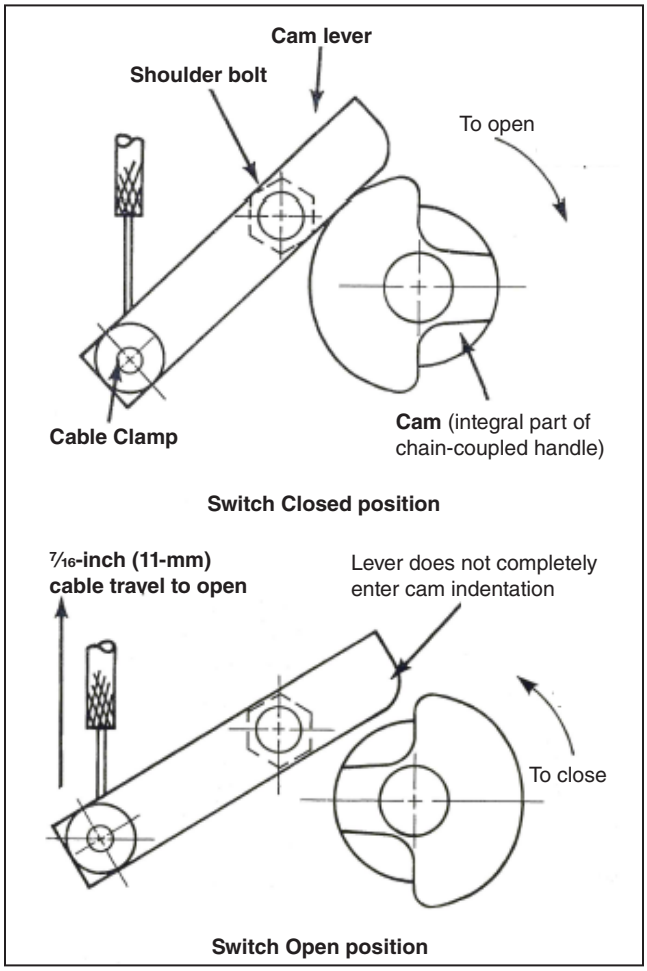


Figure 7. Cam lever relationship for the chain-coupled handle.

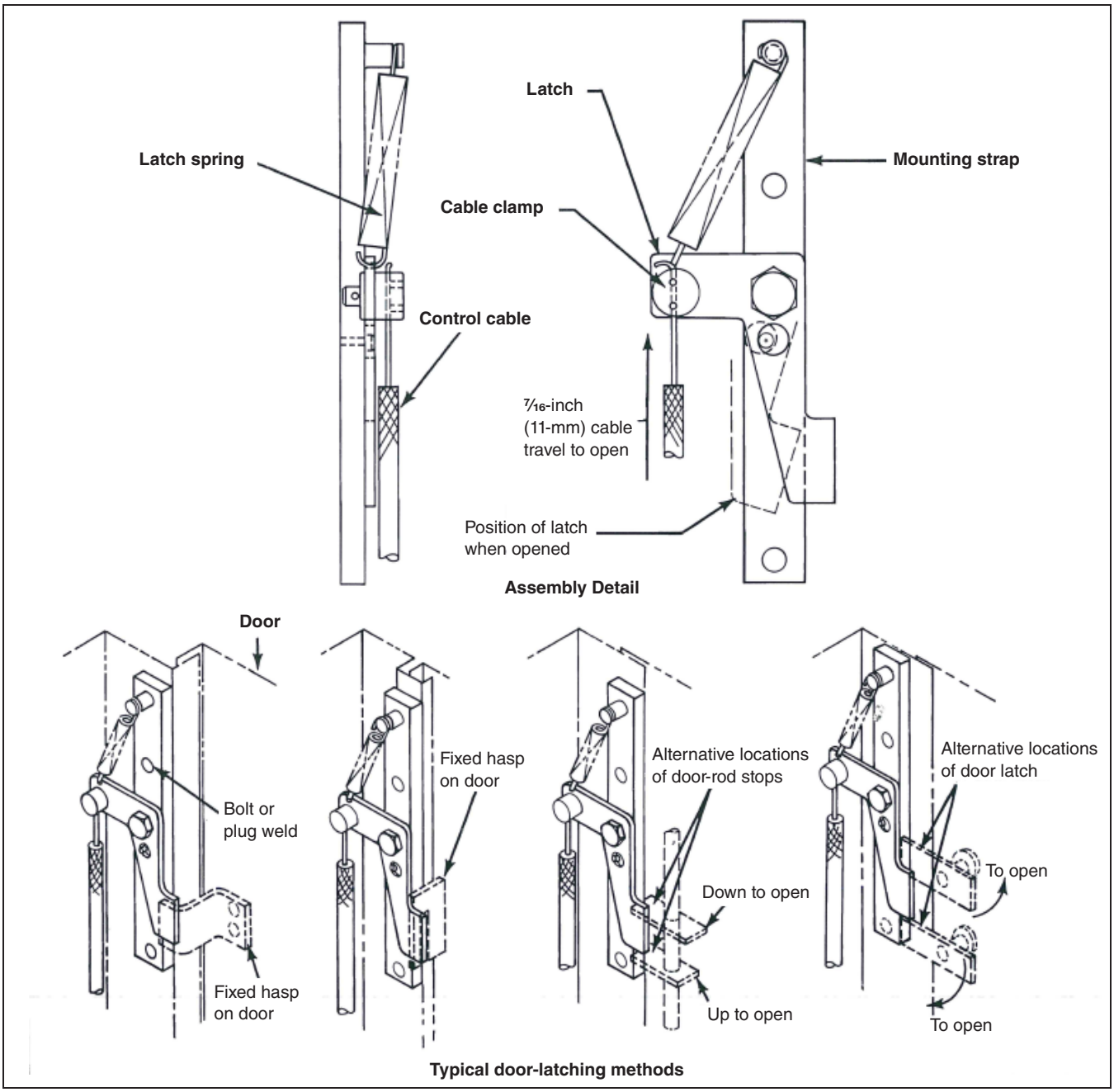


Figure 8. Mechanical interlock door latch.

Installing the Direct-Coupled Handle

Complete the following steps to install the direct-coupled handle:

STEP 1. Use ½-inch hardware to bolt the switch to its mounting surface. Also include shake-proof lockwashers between the switch frame and the mounting surface for grounding purposes. To avoid distorting the switch frame, install the upper mounting bolts first, finger tight. At each lower mounting bolt location, fill any space between the switch frame and the mounting surface with shims. Then, securely tighten all four mounting bolts.

STEP 2. ***If no shaft extension is used, the locking disc is factory-installed on the switch drive shaft. Omit this step.*** Attach the locking disc to the shaft extension with the two roll pins furnished and positioned as shown on the erection drawing. Then, with the coupling pin furnished, attach the shaft extension to the switch drive shaft, keeping the locking disc positioned as shown on the erection drawing.

STEP 3. ***If no mechanical interlock is used, omit this step.***

The mechanical interlock furnished is a single-action, cable type. It is intended only to prevent opening the enclosure door when the switch is closed. Install it as follows:

(a) The locking disc attached to the switch drive shaft (or shaft extension) has reference numbers (1 through 4) on one surface. The same numbers are on one surface of the cam furnished for the mechanical interlock.

Place the cam on the drive shaft, against the locking disc, with the numbered surfaces of both facing the same direction (either toward or away from the switch) and with the numbers matched. Then, attach the cam to the locking disc with the ¼-28 × 1-inch sockethead screws furnished.

(b) Place the cam lever on the pivot stud located on the inside of the handle mounting plate. Position the lever so its short leg is pointed in the direction of opening rotation. Secure the cam lever with the flat washer and cotter pin. See Figure 10 on page 21

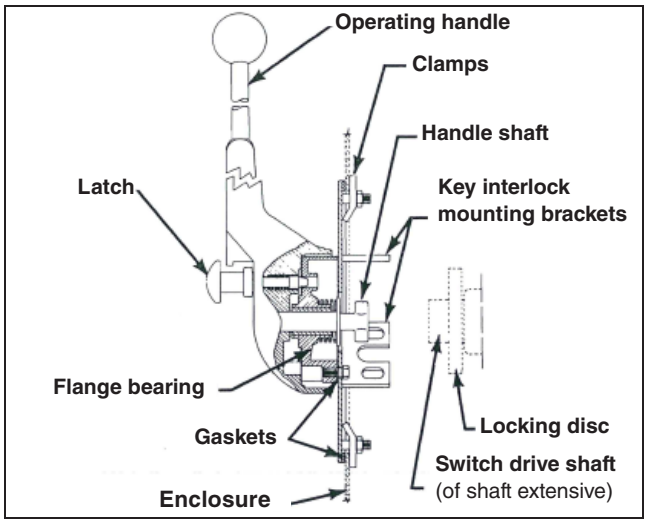


Figure 9. A direct-coupled handle. (For clarity, the switch drive shaft is shown displaced to the right.)

STEP 4. With the operating handle in the **Closed** position (see erection drawing), place the handle assembly against the opening in the enclosure, engaging the handle shaft with the switch drive shaft (or shaft extension). See Figure 9 on page 17. Position the handle mounting plate so the holes for mounting the interlocks are toward the front of the enclosure. Clamp the handle mounting plate to the enclosure as shown on the erection drawing.

STEP 5. Pull and hold the latch knob and use the operating handle to open the switch.

Note: Do not use the operating handle again until so directed in Step 7, after alignment checks and adjustments are complete.

STEP 6. Check the switch for blade alignment and make any necessary adjustments as follows:

Make a preliminary alignment check, before operating the switch, to verify the critical blade-to-interrupter clearances, Dimensions A, B, and C, are as shown in Figure 5 on page 12.

If, for all three poles, the actual dimensions differ in the same way from those indicated, correction may be accomplished as follows.

(a) At one of the lower corners of the switch frame, loosen the mounting bolt and apply pressure to the underside of the frame to force the corner away from the mounting surface. If this direction of movement increases the dimensional variance, release the pressure, re-tighten the loosened mounting bolt, and repeat the procedure for the other lower corner of the switch frame. Apply sufficient pressure to the appropriate corner to achieve the correct dimensions.

(b) Place shims at the mounting bolt location to hold the mounting frame in that position. Make sure all mounting bolts are securely re-tightened.

STEP 7. Pull and hold the latch knob and use the operating handle to open the switch. Do not use the operating handle again until so directed in Step 8 on page 19, after alignment checks and adjustments are complete.

Check for blade alignment by releasing the spring-loaded cam pawl on the quick-make, quick-break mechanism (see Figure 4 on page 11) and by moving the blades by hand only, toward the **Closed** position. Avoid side thrust. Blade movement will be delayed, by toggle-spring compression, just before the blades reach the interrupters. Visually check each pole to ensure the blades could pass the interrupter with equal clearance on each side and the interrupter itself is parallel to the blades.

Return the blades to the fully **Open** position.

If this blade-and-interrupter alignment, and the previously checked dimensions (A, B, and C in Figure 5 on page 12), are determined to be correct, proceed to Step 8 on page 19.

If, however, adjustment of one or more switch poles is required, complete the following steps for each applicable switch pole:

(a) To permit blade opening and closing by hand, disconnect the insulated blade-operating rod from the lever arm on the operating shaft by removing the connecting pin. Note the positioning of the Coroprene and brass flat washers relative to the clevis.

(b) Slightly loosen the bolts fastening the hinge to the insulator. Tap the hinge-end terminal pad to rotate the blade into alignment.

(c) Close the blade by hand. The blade should enter the main contact on center. Also, for 4.8-kV and 13.8-kV ratings, the spacer separating the blade contacts should enter the slot in the main-contact casting and be centered in the slot when the blade is fully closed. Adjust by tapping at the hinge casting.

(d) When alignment as described in Step 7(b) and Step 7(c) is attained, securely tighten the bolts fastening the hinge to the insulator.

(e) At this time, if the interrupter is not parallel to the sweep of the blades, loosen the bolts fastening the jaw-contact casting to its support insulator and align the interrupter.

During this procedure, make sure to maintain the critical gap between the striking surfaces of the closing cam on the blade and the closing lever on the interrupter, as indicated in Dimension B in Figure 5 on page 12. Also, for 25-kV and 34.5-kV ratings, observe the blade as it moves past the interrupter in the closing direction.

There must be a 1/32- to 3/32-inch (0.8- to 2.4-mm) clearance between the interrupter housing and the closing cam on the blade as shown in Dimension C in Figure 5 on page 12. This critical dimension must exist so the raised portion of the cam (along the actuating surface) rides against the inner side of the closing lever of the interrupter during the closing stroke.

Re-tighten the main-contact bolts and recheck Dimensions B and C from Figure 5 on page 12.

(f) With the blade in the fully **Closed** position, make sure that the minimum clearance specified in Dimension A in Figure 5 on page 12 exists between the shunt contact on the blade and the interrupter housing. In addition, as the blade is opened, make sure the shunt contact makes contact with the interrupter housing (or contact rivets for 25-kV and 34.5-kV ratings) before the blade disengages from the main contact. Adjust by bending the shunt contact as required.

(g) When alignment is determined to be correct, reconnect the insulated blade-operating rod to the lever arm on the operating shaft. Also, make sure to reposition the Coroprene washers against the clevis, backed up with the brass flat washers. Secure with the cotter pin.

STEP 8. Pull and hold the latch knob and use the operating handle to close the switch. Check the vertical and horizontal alignment of the operating handle by pulling the handle knob away from the enclosure about 1/8-inch (3.2 mm).

In the switch **Closed** position, if the shafts are in alignment in the vertical plane, the handle will return freely to its normal position. If it does not, loosen the clamps securing the handle mounting plate and move the plate forward or backward slightly.

Re-clamp the plate and check handle freedom. Repeat adjustment if necessary. Open the switch and in a similar manner, check for shaft alignment in the horizontal plane. Move the handle mounting plate up or down as required.

STEP 9. Close the switch and verify the switch drive-shaft pin applies pressure against the compression crank. See Figure 4 on page 11. If more handle travel in the closing direction is required, proceed as follows:

(a) Mark the location of the handle mounting plate, as determined in Step 8.

(b) Remove the handle assembly from the enclosure.

(c) Loosen the bolts holding the operating-handle flange bearing to the mounting plate. Rotate the flange bearing on the mounting plate. Oversize holes in the mounting plate allow for this rotation. Re-tighten the bolts.

(d) Remount the handle assembly with the mounting plate positioned as previously marked.

STEP 10. When the switch is in its **Closed** position, all blades must be pushed against their bumpers by approximately equal pressure of the blade-operating rods. Verify this condition exists by grasping the end of each blade and pulling it away from its bumper. When released, the blade should return to the bumper. An intervening gap of up to 1/16-inch (1.6 mm) is acceptable. If necessary, make adjustments as follows:

Adjust for blade closure, where required, by changing the position of the lever arm with respect to the operating shaft. This is achieved by loosening one clamp bolt and tightening the other clamp bolt (in half-turn increments) so the blade just touches the bumper. The lever-arm clamp itself will not rotate because it is pinned to the operating shaft. See Figure 6 on page 13

STEP 11. ***If an Alduti-Rupter Switch with Type SM Power Fuses is furnished:*** Check each pole of the fuse live parts and make any necessary adjustments as follows:

With a Disconnect 45° Opening Fuse

Insert a holder in the hinge (make sure the holder cap for the spring-and-cable assembly is tightened). Raise the holder toward the closed position to check main contact engagement. The holder must enter the contact on center, latch positively, and unlatch freely when opened with the pull ring. If adjustment is required, loosen the bolts fastening the hinge to the insulator. Reposition the hinge as required by tapping at its base. Then, securely tighten the hinge bolts.

With a Non-Disconnect Fuse

Place the stick-operated clamps in the **Up** position to open the fuse contacts. Suspend the holder from the hanger bracket attached to the upper-contact support. Push the holder into the contacts. If there is appreciable misalignment, loosen the bolts fastening the lower contact assembly to the insulator. Reposition the contact assembly as required by tapping at its terminal pad. Then, securely tighten the bolts.

Note: Holders must be removed from their mountings and packed separately when shipment is to be made.

STEP 12. Open and close the switch four or five times to check the operation. Verify the critical dimensions in Figure 5 on page 12 are retained and the interrupters are opened and closed corresponding with the respective blade positions. Make minor adjustments as required.

STEP 13. Affix "Open" and "Closed" labels at the handle position.

STEP 14. ***Interphase barriers and side barriers are neither required nor furnished with 25-kV three-pole interrupter switches. If side-barriers are not required, omit this step.***

Install interphase and side barrier. Interphase and side insulating barriers are furnished along with barrier stiffeners to ensure proper interbarrier spacing. At one edge of each barrier are slots leading into 1-inch (25-mm) diameter holes. (This same edge is also notched to conform to the switch mounting frame.) Additionally, the edge of one of the barriers has a long cutaway section to fit over the quick-make, quick-break mechanism. Install the barriers as follows:

(a) Refer to the erection drawing, and to S&C Drawing RD-3299 that accompanies it, for specific barrier component locations. See also Figure 2 on page 8.

Slide each barrier onto the barrier fasteners so the dished part of each fastener disc seats into its corresponding 1-inch (25-mm) diameter barrier hole. Tighten each fastener bolt to pull the dished portion of the disc into the hole.

(b) To ensure proper barrier positioning, attach the insulated interbarrier stiffeners by interlocking their notches with matching notches in the barriers. The stiffener section, which has ⅜ × 1-inch (9.5 × 25 mm) slotted holes in it, should be attached to the barrier farthest from the quick-make, quick-break mechanism, as shown on the erection drawing. Then, fasten the stiffener to the enclosure side wall or other surface using the angle bracket furnished for this purpose.

(c) Plastic barrier retainers and nylon drive rivets are furnished for holding the stiffeners in place. Because the user may wish to temporarily remove the barriers to facilitate cable terminations, the drive rivets may be shipped loose and with instructions on how they are to be used

STEP 15. ***If no interlock is required, omit this step.***

If with a key interlock: Remove the plug buttons from the desired key interlock positions in the mounting plate. Then, slip the barrels of the locks through the holes and bolt the interlocks in place on the small brackets on the inner face of the mounting plate.

When the interlocking scheme requires either the locked-open or locked-closed arrangement of the switch, one interlock is used and one of the three slots should be blocked (to limit operation of the interlock to one position of the switch). Blocking clips are provided for this purpose. When the interlocking scheme requires both locked-open and locked-closed arrangements, two interlocks are used and, again, one slot in the locking disc should be blocked.

If with a mechanical interlock: The mechanical interlock furnished is a single-action, cable type. It is intended only to prevent opening the enclosure door when the switch is closed. Install it as follows:

(a) Bolt or weld the interlock latching assembly inside the enclosure, positioned

so the interlock latch engages or blocks the door hasp (or door-opening mechanism). See Figure 8 on page 16.

(b) With the operating handle in the **Closed** position, train the control cable from the interlock latching assembly on the door to the cam lever on the operating handle. Avoid sharp bends. Support the cable at appropriate points along its length with the cable clamps and brackets furnished. Cut off excess cable.

(c) Insert one end of the cable in the clamp on the cam lever and tighten the set screws.

(d) Insert the other end of the cable in the clamp on the interlock latch. Then, while (manually) holding the interlock latch in the **Door Closed** position, pull the cable taut so the cam lever rests against the cam and tighten the set screws in the clamp.

(e) Open the switch and verify the interlock latch is pivoted to its limit by the latch spring. Repeat Step 15(d) if necessary. Make sure all bolts and set screws are securely tightened.

Note: Cable travel is limited to 7/16-inch (11 mm), so the cam lever does not completely enter the cam indentation.

STEP 16. Lock the operating handle as follows:

If with a padlock: The operating handle has provision for use of a padlock (with up to a 3/8-inch (10-mm) diameter shackle) to lock the switch in either the **Open** or **Closed** position.

If with a key interlock: The direct-coupled handle accommodates one or two Superior Key Interlocks (Type B6003-l Mk II single or multiple key, with 3/8-inch (9.5-mm) bolt projection and 3/4-inch (19-mm) bolt travel). The locking disc on the drive shaft, or shaft extension, contains three slots positioned so the bolt of each interlock will engage either of two slots.

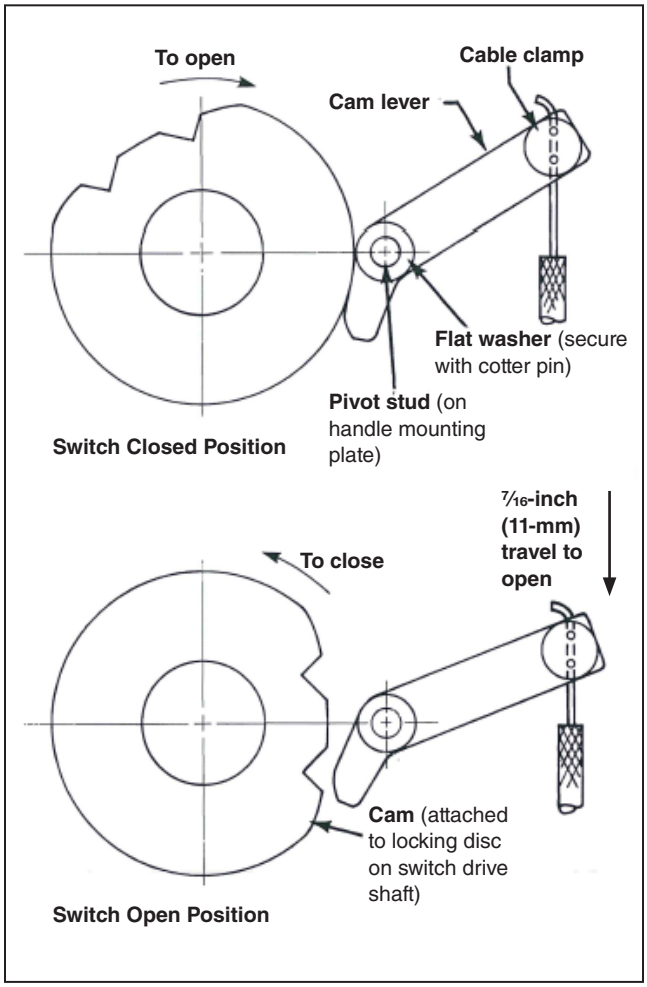


Figure 10. Cam-lever relationship for direct-coupled handle.

Installing the Pipe-Coupled Handle

STEP 1. Use ½-inch hardware to bolt the switch to its mounting surface. Include also shake proof lockwashers between the switch frame and the mounting surface for grounding purposes. To avoid distorting the switch frame, install the upper mounting bolts first, finger tight. At each lower mounting bolt location, fill any space between the switch frame and the mounting surface with shims. Then, securely tighten all four mounting bolts.

STEP 2. ***If no shaft extension is used, omit this step.***

If a shaft extension is furnished, an outboard bearing, a lever-and-clamp assembly, and a coupling pin are included.

(a) Place the outboard bearing on the shaft extension, positioned as shown on the erection drawing. Then, attach the pre-drilled end of the shaft extension to the switch drive shaft using the ⅜-inch groove pin furnished. Attach the outboard bearing bracket to its supporting wall.

(b) Before tightening the bracket mounting bolts, check the alignment of the shaft extension with respect to the switch and the outboard bearing. Reposition the outboard bearing bracket as required and torque the bracket mounting bolts to final tightness.

(c) With the shaft extension rotated to its limit in the closing direction (with the drive-shaft pin against the compression crank of the quick-make, quick-break mechanism), drill a ⅜-inch (9.5-mm) diameter by ½-inch (13-mm) deep hole in the shaft extension for attachment of the lever-and-clamp assembly. See the erection drawing for angular positioning of the lever.

Note: The hole will have been predrilled in the shaft extension at the factory if the locating dimension was specified by the purchaser.

(d) Attach the lever-and-clamp assembly to the shaft extension. The angular position of the lever can be adjusted, to a certain extent, by backing off on one clamp screw and tightening the other.

STEP 3. Mount the operating handle as shown on the erection drawing. At the same time, use one of the operating handle mounting bolts to attach one end of the grounding strap (the end with the grounding connector attached) to the handle mounting plate. See Figure 11 on page 23●. Use ⅝-inch mounting hardware (not furnished).

STEP 4. Mount the spring-loaded rod guide(s), if used, with the arm pointing upward. See the erection drawing for notes on spacing of rod guides. Use ⅝-inch mounting hardware (not furnished).

STEP 5. When installing the vertical operating-pipe section(s), S&C suggests starting with the uppermost section and completely making up each coupling as work progresses except as noted below. When installing an operating pipe in any coupling, make sure the cutting tip of the piercing set screw does not protrude through the coupling clamp. 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.

Note: 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 6. Install the upper section of operating pipe between the switch drive lever and the adjustable rod guide, with the rod-guide arm pointing upward at a 45-degree angle. A positioning stud holds the rod-guide arm at 45 degrees. See Figure 12 on page 24.

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

● The grounding recommendations 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.

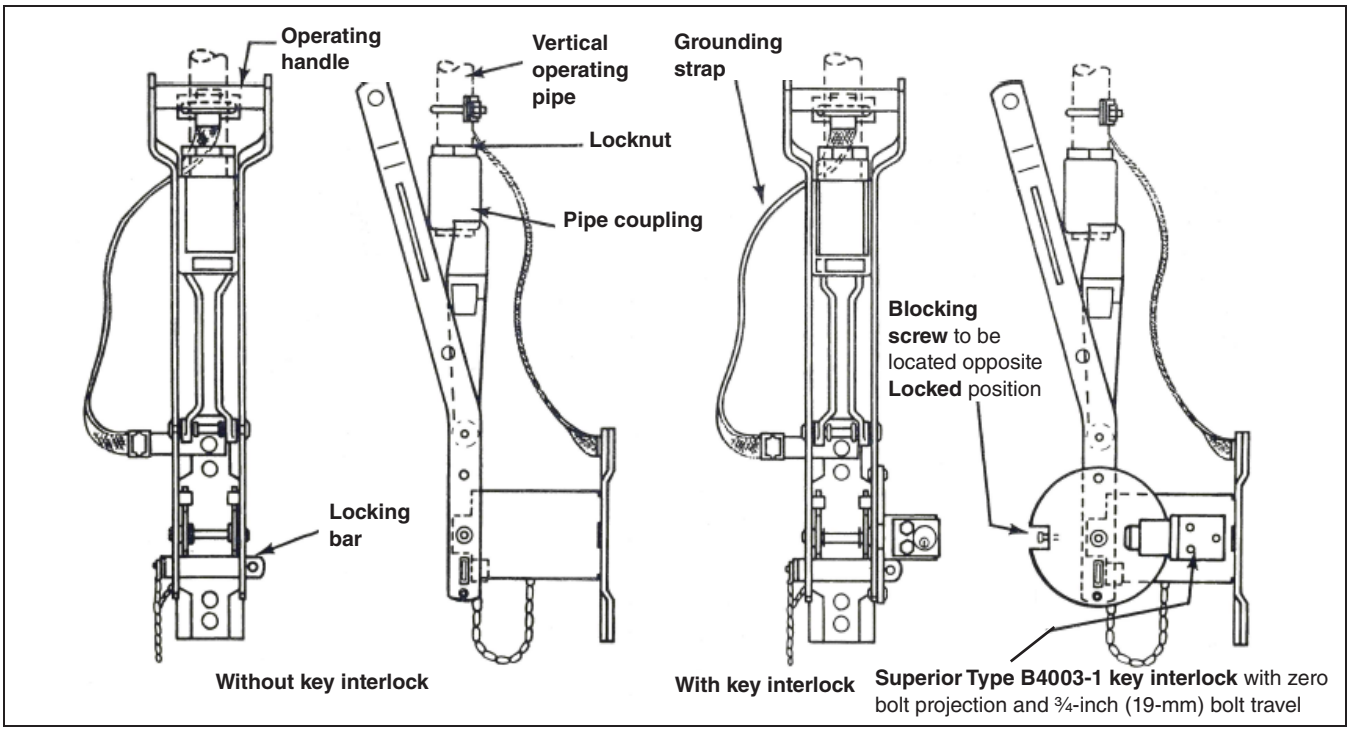


Figure 11. The pipe-coupled handle.

STEP 7. Install the lowest vertical pipe section by threading one end of the pipe into the coupling on the operating handle. Approximately ¼-inch (6.4 mm) of thread should extend through the coupling. See Figure 11 on page 23. Tighten the locknut.

Next, insert the upper end of this vertical pipe section in the lowest rod-guide coupling and, while holding the operating handle at a point approximately 20 degrees from the **Closed** position, tighten the rod guide clamp bolt. Do not tighten the associated piercing set screw at this time. See Figure 12.

STEP 8. Remove the temporary 45-degree positioning stud from each rod guide. Then, move the handle to the fully **Closed** position. A definite resistance should be felt at the end of the stroke, indicating all slack in the operating linkage has been taken up.

If no resistance is felt, repeat Step 3 through Step 8, except the operating handle should be moved more than 20 degrees in the opening direction before tightening the clamp bolt on the lowest rod-guide coupling. Conversely, if it is necessary to use considerable force to move the handle to the fully **Closed** position, loosen the clamp bolt on the lowest rod-guide coupling and then re-tighten it with the operating handle at less than the 20-degree position.

STEP 9. Use the operating handle to open the switch. Do not use the operating handle again until so directed in Step 12 on page 26, after alignment checks and adjustments are complete.

STEP 10. Check the switch for blade alignment before operating the switch to verify the critical blade-to-interrupter clearances are as shown in Dimensions A, B, and C in Figure 5 on page 12.

If for all three poles the actual dimensions differ in the same way from those indicated, correction may be accomplished as follows.

(a) At one of the lower corners of the switch frame, loosen the mounting bolt and apply pressure to the underside of the frame to force the corner away from the mounting surface.

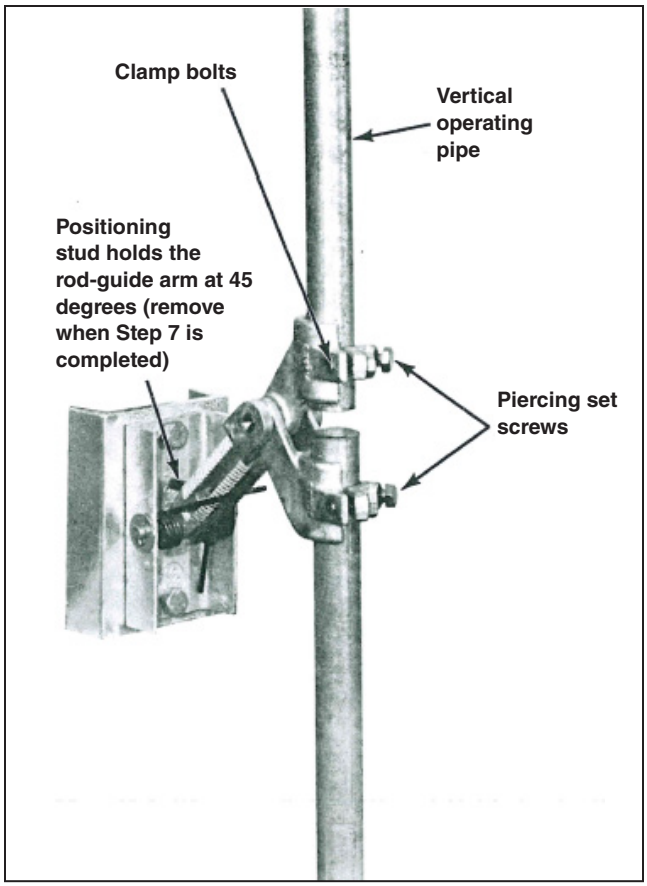


Figure 12. Rod guide.

(b) If this direction of movement increases the dimensional variance, release the pressure, re-tighten the loosened mounting bolt, and repeat the procedure for the other lower corner of the switch frame.

(c) Apply sufficient pressure to the appropriate corner to achieve the correct dimensions. Then, place shims at the mounting bolt location to hold the mounting frame in that position.

(d) Make sure all mounting bolts are securely re-tightened.

STEP 11. Pull and hold the latch knob and use the operating handle to open the switch.

Check for blade alignment by releasing the spring-loaded cam pawl on the quick-make, quick-break mechanism (see Figure 4 on page 11) and by moving the blades by hand only toward the **Closed** position. Avoid side thrust. Blade movement will be delayed, by toggle-spring compression, just before the blades reach the interrupters.

Visually check each pole to make sure the blades could pass the interrupter with equal clearance on each side and the interrupter itself is parallel to the blades.

Return the blades to the fully **Open** position.

If this blade-and-interrupter alignment and the previously checked dimensions (A, B, and C in Figure 5 on page 12), are determined to be correct, proceed to the next applicable step.

If, however, adjustment of one or more switch poles is required, complete the following steps for each applicable switch pole:

(a) To permit blade opening and closing by hand, disconnect the insulated blade-operating rod from the lever arm on the operating shaft by removing the connecting pin. Note the positioning of the Coroprene and brass flat washers relative to the clevis.

(b) Slightly loosen the bolts fastening the hinge to the insulator. Tap the hinge-end terminal pad to rotate the blade into alignment.

(c) Close the blade by hand. The blade should enter the main contact on center. Also, for 4.8-kV and 13.8-kV ratings, the spacer separating the blade contacts should enter the slot in the main-contact casting and be centered in the slot when the blade is fully closed. Adjust by tapping at the hinge casting.

(d) When alignment as described in 11(b) and 11(c) is attained, securely tighten the bolts fastening the hinge to the insulator.

(e) At this time, if the interrupter is not parallel to the sweep of the blades, loosen the bolts fastening the jaw-contact casting to its support insulator and align the interrupter.

Make sure during this procedure to maintain the critical gap between the striking surfaces of the closing cam on the blade and the closing lever on the interrupter, as indicated in Dimension B in Figure 5 on page 12. Also, for 25-kV and 34.5-kV ratings, observe the blade as it moves past the interrupter in the closing direction.

There must be a 1/32- to 3/32-inch (0.8- to 2.4-mm) clearance between the interrupter housing and the closing cam on the blade as shown in Dimension C in Figure 5 on page 12. This critical dimension must exist so the raised portion of the cam (along the actuating surface) rides against the inner side of the closing lever of the interrupter during the closing stroke.

Re-tighten the main-contact bolts and recheck Dimensions B and C shown in Figure 5 on page 12.

(f) With the blade in the fully **Closed** position, make sure the minimum clearance specified in Dimension A in Figure 5 on page 12 exists between the shunt contact on the blade and the interrupter housing. In addition, as the blade is opened, make sure the shunt contact makes contact with the interrupter housing (or contact rivets for 25-kV and 34.5-kV ratings) before the blade disengages from the main contact. Adjust by bending the shunt contacts as required.

(g) When alignment is determined to be correct, reconnect the insulated blade-operating rod to the lever arm on the operating shaft. Also, make sure to reposition the Coroprene washers against the clevis, backed up with the brass flat washers. Secure with the cotter pin.

STEP 12. Use the operating handle to close the switch.

When the switch is in its **Closed** position, all blades must be pushed against their bumpers by approximately equal pressure of the blade operating rods. Verify this condition exists by grasping the end of each blade and pulling it away from its bumper. When released, the blade should return to the bumper. An intervening gap of up to 1/16-inch (1.6-mm) is acceptable. If necessary, make adjustments as follows:

Adjust for blade closure, where required, by changing the position of the lever arm with respect to the operating shaft. This is achieved by loosening one clamp bolt and tightening the other clamp bolt (in half-turn increments) so the blade just touches the bumper. The lever-arm clamp itself will not rotate because it is pinned to the operating shaft. See Figure 6 on page 13

STEP 13. Open and close the switch four or five times to check the operation. Verify the critical dimensions shown in Figure 5 on page 12 are retained and the interrupters are opened and closed corresponding with the respective blade positions. Make minor adjustments as required.

If the operating handle does not swing 180 degrees to the fully **Open** position, repeat the procedure described in Step 8 on page 24, except that the operating handle should be moved more than 20 degrees in the opening direction before tightening the clamp bolt on the lowest rod-guide coupling. Conversely, if it is necessary to use considerable force to move the handle to the fully **Closed** position, loosen the clamp bolt on the lowest rod-guide coupling and then re-tighten it with the operating handle at less than the 20-degree position.

STEP 14. When satisfactory travel adjustment of the handle and switch is attained, make sure the clamp bolt on the pipe coupling at the rod guide immediately above the handle has been torqued to final tightness. Then, tighten the associated piercing set screw, piercing the pipe, and continue turning until feeling a firm resistance.

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

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.

Then, connect the lower end of the strap to a suitable earth ground, using the grounding connector provided at that end of the strap. ●

STEP 15. ***Interphase barriers and side barriers are neither required nor furnished with 25-kV three-pole interrupter switches. If installing 25 kV three- pole switches, omit this step.***

Interphase and side insulating barriers are furnished along with barrier stiffeners to ensure proper inter barrier spacing. Note that at one edge of each barrier there are slots leading into one-inch diameter holes. (This same edge is also notched to conform to the switch mounting frame.) Additionally, the edge of one of the barriers has a long cutaway section to fit over the quick-make, quick-break mechanism. Install the barriers as follows:

(a) Refer to the erection drawing and to S&C Drawing RD-3299 that accompanies it for specific barrier component locations. See also Figure 2 on page 8.

Slide each barrier onto the barrier fasteners so the dished part of each fastener disc seats into its corresponding one-inch diameter barrier hole. Tighten each fastener bolt to pull the dished portion of the disc into the hole.

(b) To ensure proper barrier positioning, attach the insulated interbarrier stiffeners by interlocking their notches with matching notches in the barriers. The stiffener section that has 3/8 × 1-inch (9.5 × 25-mm) slotted holes in it should be attached to the barrier farthest from the quick-make, quick-break mechanism, as shown. Then, fasten the stiffener to the enclosure side wall or other surface using the angle bracket furnished for this purpose.

Plastic barrier retainers and nylon drive rivets are furnished for holding the stiffeners in place. Because the user may

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wish to temporarily remove the barriers to facilitate cable terminations, the drive rivets may be shipped loose and with instructions on how they are to be used.

STEP 16. If the interrupter switch is supplied with provision for the addition of a Superior Key Interlock, the operating handle will have an interlock-mounting plate attached to the base. Install the interlock as follows:

(a) Attach interlock to mounting plate so the interlock bolt, when extended, will engage a slot in the operating handle. A Superior (Type B4003-1) Key Interlock with ⅜-inch (9.5-mm) bolt projection and ¾-inch (19-mm) bolt travel is required.

(b) Block one of the two slots in the operating handle with the blocking screw provided. The slot to be blocked will be determined by whether a locked-open or locked-closed arrangement is required.

STEP 17. Lock the operating handle as follows:

With a padlock A locking bar is supplied with the operating handle to padlock the interrupter switch open or closed. If no padlock is used, the locking bar must be used as a positive positioning device when the handle is in the **Closed** position.

With a key interlock. A Superior Key Interlock, if supplied with the interrupter switch, will be mounted on the operating handle (see Figure 11 on page 23). One of the two slots in the operating handle will be blocked to provide either a locked-open or a locked-closed arrangement.

NOTICE

Do not use the connecting bolts as a means of pulling the bus or cable into position. When bus or cable is connected to the switch, it is important no strain is put upon the switch terminal pads. Such strain can distort the switch's live parts and may result in improper switch operation. Make sure, before making any connection, that the bus or cable connector is aligned with and flat against the terminal pad.

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

STEP 1. Thoroughly wire-brush the current-transfer surfaces of each connector and immediately apply a liberal coating of Penetrox A to the brushed surfaces.

STEP 2. Wire-brush each terminal pad of the interrupter switch and apply a coating of Penetrox A. Then, bolt the connectors to the terminal pads.

STEP 3. 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, that have been designated by the connector manufacturer as being suitable for direct attachment to copper bearing alloy terminal pads.

As a final check of the installation, make sure when the operating handle is in the **Closed** position:

- The main contacts are fully closed.
- A gap exists between each interrupter housing and its associated shunt contact on the blade assembly (see Figure 5 on page 12 for minimum allowable dimension). Otherwise, load current may be carried continuously by the interrupters designed for intermittent duty only.
- A gap exists between each blade closing cam and its associated interrupter closing lever (see Figure 5 on page 12 for maximum allowable dimension).

For switches rated 25 kV: The clearance between the closing cam on the blade and the interrupter housing is as shown in Figure 5 on page 12, view X-X.

If any of the above conditions are not met, make corrective adjustments as follows:

STEP 1. Before operating the switch, verify the critical blade-to-interrupter clearances, Dimensions A, B, and C, are as shown in Figure 5 on page 12 .

If for all three poles the actual dimensions differ in the same way from those indicated, correction may be accomplished as follows.

(a) At one of the lower corners of the switch frame, loosen the mounting bolt and apply pressure to the underside of the frame to force the corner away from the mounting surface. If this direction of movement increases the dimensional variance, release the pressure, re-tighten the loosened mounting bolt, and repeat the procedure for the other lower corner of the switch frame.

(b) Apply sufficient pressure to the appropriate corner to achieve the correct dimensions. Then, place shims at the mounting bolt location to hold the mounting frame in that position.

(c) Make sure all mounting bolts are securely re-tightened.

STEP 2. Pull and hold the latch knob and use the operating handle to open the switch.

Check for blade alignment by releasing the spring-loaded cam pawl on the quick-make, quick-break mechanism (see Figure 4 on page 11) and by moving the blades by hand only toward the **Closed** position. Avoid side thrust. Blade movement will be delayed, by toggle-spring compression, just before the blades reach the interrupters. Visually check each pole to make sure the blades could pass the interrupter with equal clearance on each side and the interrupter itself is parallel to the blades.

Return the blades to the fully **Open** position.

If this blade-and-interrupter alignment, and the previously checked dimensions (A, B, and C in Figure 5 on page 12), are determined to be correct, proceed to the next applicable step.

If, however, adjustment of one or more switch poles is required, complete the following steps for each applicable switch pole.

(a) To permit blade opening and closing by hand, disconnect the insulated blade-operating rod from the lever arm on the operating shaft by removing the connecting pin. Note the positioning of the Coroprene and brass flat washers relative to the clevis.

(b) Slightly loosen the bolts fastening the hinge to the insulator. Tap the hinge-end terminal pad to rotate the blade into alignment.

(c) Close the blade by hand. The blade should enter the main contact on center. Also, for 4.8-kV and 13.8-kV ratings, the spacer separating the blade contacts should enter the slot in the main-contact casting and be centered in the slot when the blade is fully closed. Adjust by tapping at the hinge casting.

(d) When alignment as described in Step 2(b) and Step 2(c) is attained, securely tighten the bolts fastening the hinge to the insulator.

(e) If the interrupter is not parallel to the sweep of the blades, loosen the bolts fastening the jaw-contact casting to its support insulator and align the interrupter.

Make sure during this procedure to maintain the critical gap between the

striking surfaces of the closing cam on the blade and the closing lever on the interrupter, as indicated in Dimension B in Figure 5 on page 12. Also, for 25-kV and 34.5-kV ratings, observe the blade as it moves past the interrupter in the closing direction.

There must be a 1/32- to 3/32-inch (0.8- to 2.4-mm) clearance between the interrupter housing and the closing cam on the blade as shown in Dimension C in Figure 5 on page 12. This critical dimension must exist so the raised portion of the cam (along the actuating surface) rides against the inner side of the closing lever of the interrupter during the closing stroke.

Re-tighten the main-contact bolts and recheck Dimensions B and C, Figure 5 on page 12.

(f) With the blade in the fully **Closed** position, make sure the minimum clearance specified in Dimension A in Figure 5 on page 12 exists between the shunt contact on the blade and the interrupter housing. In addition, as the blade is opened, make sure the shunt contact makes contact with the interrupter housing (or contact rivets for 25-kV and 34.5-kV ratings) before the blade disengages from the main contact. Adjust by bending the shunt contacts as required.

(g) When alignment is determined to be correct, reconnect the insulated blade-operating rod to the lever arm on the operating shaft. Make sure to reposition the Coroprene washers against the clevis, backed up with the brass flat washers. Secure with the cotter pin.