

Installation and Operation

Table of Contents

Section	Page	Section	Page
Introduction		Installation	
Qualified Persons	2	Mounting to Wood	8
Read this Instruction Sheet	2	Uncrating the Switch	8
Retain this Instruction Sheet	2	Attaching Couplings to Switch Poles	8
Proper Application	2	Mounting Support Members	9
Operating Considerations	3	Lifting the Switch	9
Warranty	3	Installing Pipe Couplings with	
Warranty Qualifications	3	Piercing Set Screws	11
Safety Information		Installing Interphase Pipe	12
Understanding Safety-Alert Messages	4	Installing Vertical Operating Pipe	13
Following Safety Instructions	4	Installing Operating Handle	16
Replacement Instructions and Labels	4	Installing Operating Handle with Key Interlock	17
Location of Safety Labels and Tags	5	Checking Alignment and Adjusting	
Safety Precautions		the Stop Plates	19
Shipping and Handling		Checking Operation	21
Inspection	6	Connecting High-Voltage Conductors	27
Packing	6	Operation	
Handling	7	Opening and Closing	28



Introduction

Qualified Persons

WARNING

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

- The skills and techniques necessary to distinguish exposed live parts from nonlive parts of electrical equipment
- The skills and techniques necessary to determine the proper approach distances corresponding to the voltages to which the qualified person will be exposed
- The proper use of the special precautionary techniques, personal protective equipment, insulating and shielding materials, and insulated tools for working on or near exposed energized parts of electrical equipment

These instructions are intended only for such qualified persons. They are *not* intended to be a substitute for adequate training and experience in safety procedures for this type of equipment.

Read this Instruction Sheet

NOTICE

Read this instruction sheet thoroughly and carefully before 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/Support/Product-Literature.asp.

Retain this Instruction Sheet Proper Application

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.

WARNING

The equipment in this publication must be selected for a specific application. The application must be within the ratings furnished for the equipment. Ratings and other application information can be found in Specification Bulletin 761-31.

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 on page 3.

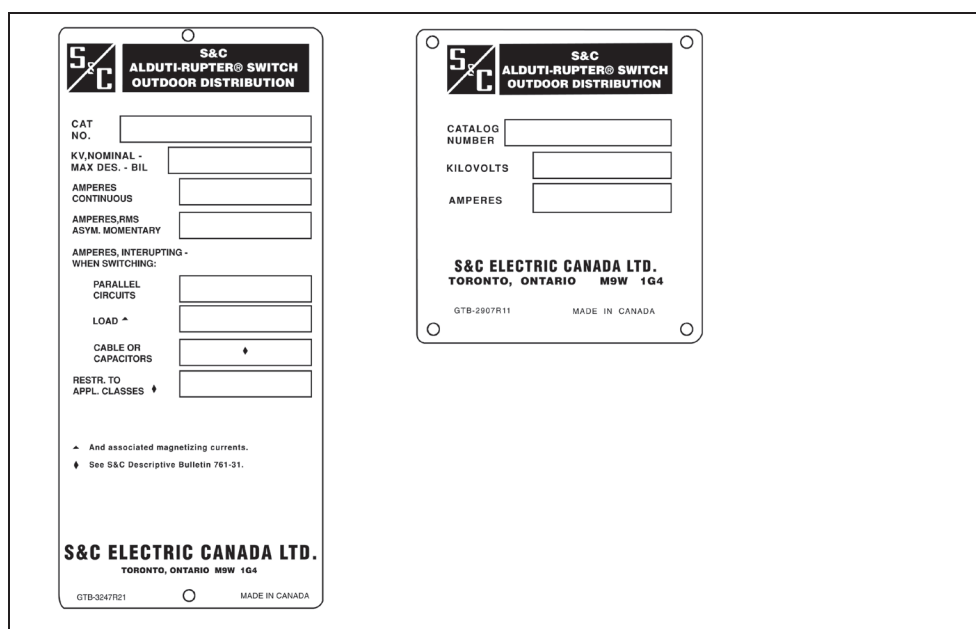


Figure 1. Switch nameplates with ratings.

Operating Considerations

Circuit making and breaking is involved in the normal operation of these interrupter switches, and partial or precautionary opening or closing of the switch should not be attempted. If the switch is covered in ice or snow, do not “chop” the switch between the open and closed position to dislodge the ice.

To operate the switch, swing the handle through its full stroke without hesitation. Do not assume the operating handle position indicates the open or closed position of the interrupter switch blades. After opening or closing the switch, always make a visual check of the blade position to determine the switch blades are in the intended position, and then tag or padlock the operating handle in accordance with standard system operating practices. In all cases, make sure the operating handle is locked before “walking away” from the switch.

Alduti-Rupter Switches are not intended for breaking fault currents.

Warranty

The warranty and/or obligations described in Price Sheet 150, S&C’s “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 entire seller’s 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 the 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 S&C Headquarters at (773) 338-1000; in Canada, call S&C Electric Canada Ltd. at (416) 249-9171.

NOTICE

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

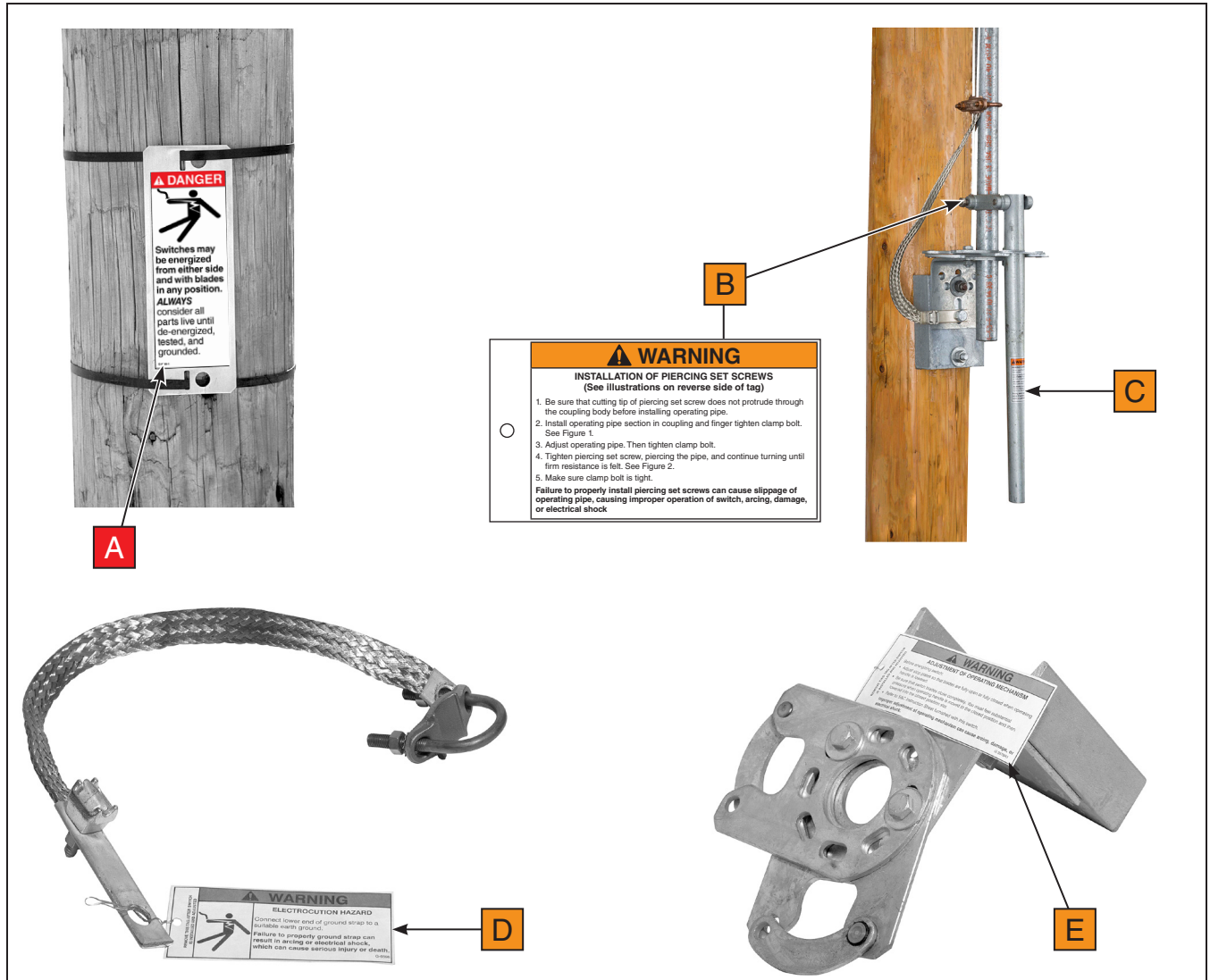


Replacement Instructions and Labels

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

It is important that any missing, damaged, or faded labels on the equipment be replaced immediately. Replacement labels are available by contacting your nearest S&C Sales Office, S&C Authorized Distributor, S&C Headquarters, or S&C Electric Canada Ltd.

Location of Safety Labels and Tags



Reorder Information for Safety Labels

Location	Safety Alert Message	Description	Number
A	⚠ DANGER	Electrocution Hazard	G-6580-1
B	⚠ WARNING	Piercing Set Screws	G-10200▲
C	⚠ WARNING	Handle Operation	G-4400R5
D	⚠ WARNING	Electrocution Hazard—Grounding Strap	G-6596▲
E	⚠ WARNING	Adjustment of Operating Mechanism	G-3578R1▲

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

Safety Precautions

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 company operating procedures and rules. Where a discrepancy exists, users should follow their company's operating procedures and rules.

- 1. QUALIFIED PERSONS.** Access to switches and controls must be restricted only to qualified persons. See "Qualified Persons" on page 2.
- 2. SAFETY PROCEDURES.** Always follow safe operating procedures and rules.
- 3. PERSONAL PROTECTIVE EQUIPMENT.** Always use suitable protective equipment such as rubber gloves, rubber mats, hard hats, safety glasses, and flash clothing in accordance with safe operating procedures and rules.
- 4. SAFETY LABELS AND TAGS.** Do not remove or obscure any of the "DANGER," "WARNING," "CAUTION," or "NOTICE" labels and tags. Remove tags ONLY if instructed to do so.
- 5. ENERGIZED COMPONENTS.** Always consider all parts live until de-energized, tested, and grounded.
- 6. INTERRUPTER SWITCH POSITION.** Always confirm the open/close position of 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 "Operation" on page 28.

Shipping and Handling

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 that shipping skids, crates, and containers listed thereon 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

Standard Mounting Arrangements

When a standard mounting arrangement is specified, the shipment includes:

- Three switch poles
- Operating-pipe sections for interphase, horizontal-connecting, and vertical sections▲★
- Operating-mechanism components, such as a handle, guide bearings, an outboard bearing, and couplings—each tagged and keyed to the bill of material for ready identification

Besides this instruction sheet, a detailed erection drawing (ED) is included, illustrating the applicable mounting arrangement.

The erection drawing shows minimum or suggested locating dimensions for the vertical operating-pipe guide bearings, the outboard bearings, and the operating handle assembly. The actual locations of these components are to be determined either by qualified persons at the site or by the user's engineering department.

Standard Minor Modifications

The erection drawing also indicates the standard minor modifications available for the standard mounting arrangement. 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
- S6 Key interlock—single lock for “locked-open” application
- S9 Provision for power operation of steel-structure or pedestal-mounted switches by S&C Switch Operator—Type AS-1A
- S16 Provision for power operation of pole-mounted switches by S&C 6801M Automatic Switch Operator

Drawing RD-10001, detailing the various modifications, is included in addition to the erection drawing.

Power Operation

If suffix “-S9” is specified, S&C Instruction Sheets 769-500 and 769-501, “S&C Switch Operators—Type AS-1A,” are included with the switch operator shipment. Instruction Sheet 769-500 and 769-501 cover installation, operation, and adjustment of the 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 furnished with switches ordered “less operating pipe.”

★ If desired, the pipe can be cut to length (if not precut at the factory) before proceeding to the job site. Cutting dimensions are shown on the erection drawing.

Handling

The crate the switch pole-units is 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 pole-units by the live parts will damage the switch. Rough handling may cause damage to the blades, contacts, and/or interrupters.

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

Installation

Mounting to Wood

NOTICE

When mounting to a wood structure, a Belleville washer must be used between the square washer and the nut to maintain fastener tightness in the event of wood shrinkage. See Figure 2.

Uncrating the Switch

Step 1

Remove the switch poles and outboard bearing assembly from their crates and arrange them on the ground in the same order in which they will be mounted on the 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 hex drive shaft of each switch pole. Torque the clamp bolts to final tightness. See Figure 3.

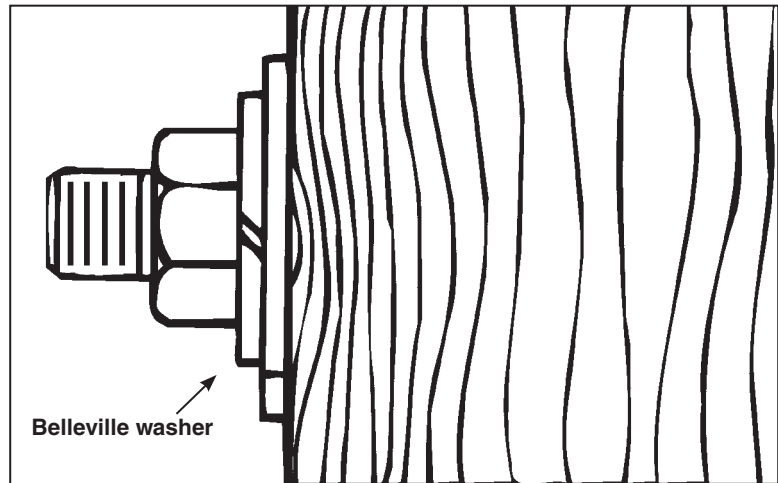


Figure 2. Use a Belleville washer between the nut and square washer.

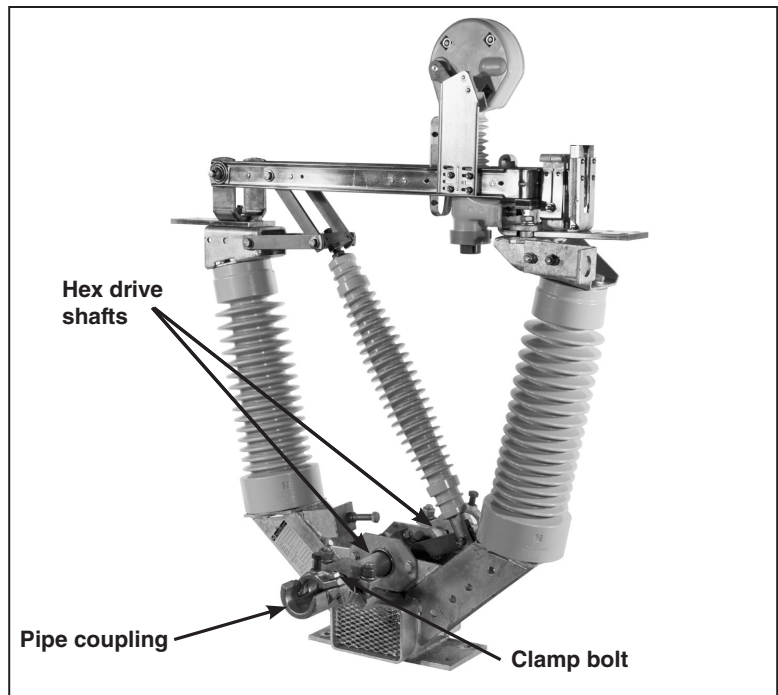


Figure 3. Attach the pipe couplings to the switch hex drive shafts.

Mounting Support Members

Step 3

Mount on the structure the support members (user-furnished or ordered separately) for the switch poles, the outboard bearing assembly, and the horizontal-pipe bearing. See Figure 4.

Lifting the Switch

⚠ CAUTION

DO NOT lift the switch poles by rigging to 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

Hoist the switch poles using the lifting angles provided and bolt them into position on their supporting members as shown on the erection drawing. See Figure 5.

Remove the lifting angles.

NOTICE

Make sure the surfaces on which the switch pole bases are mounted are flat and level. 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.

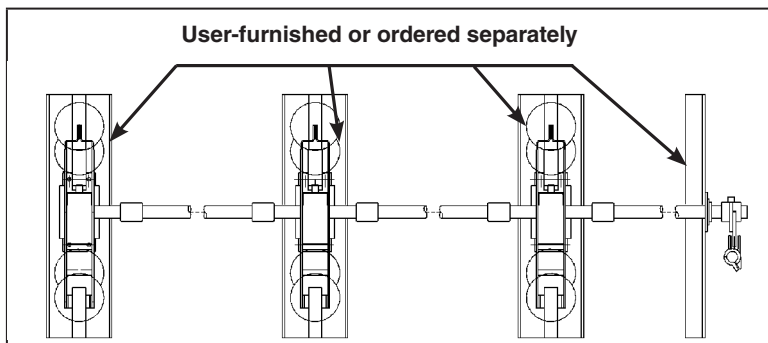


Figure 4. Support members.

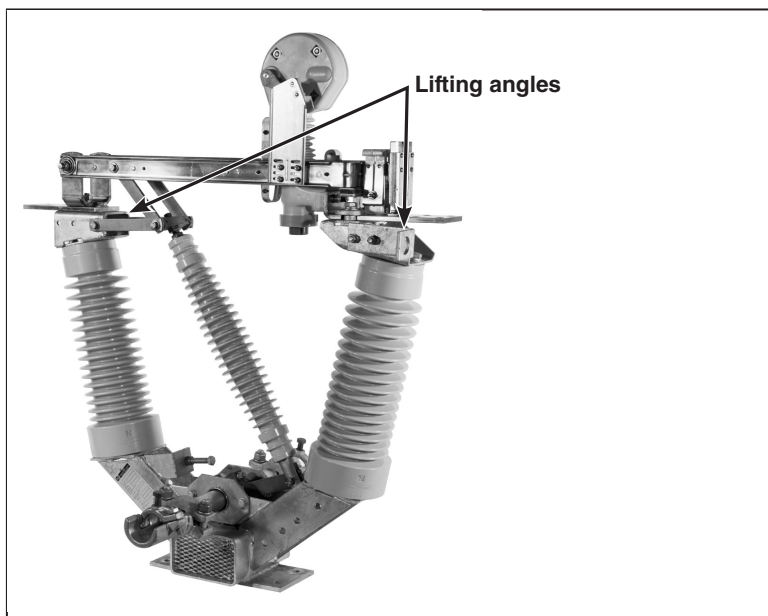


Figure 5. Hoist the switch pole into position.

Installation

Step 5

Mount the outboard bearing assembly and horizontal-pipe bearing on their support member(s) as shown on the erection drawing. See Figure 6.

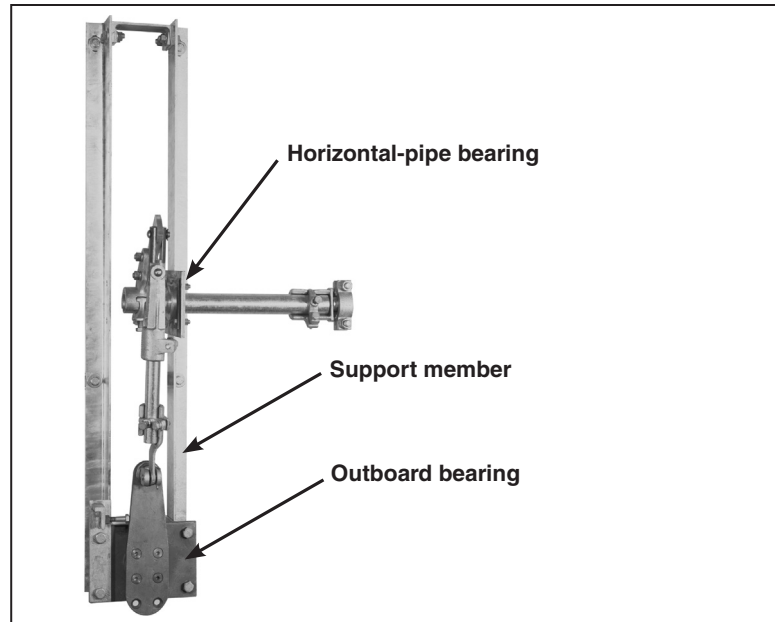


Figure 6. Mount the outboard bearing and the horizontal-pipe bearing.

Step 6

To minimize time-consuming final adjustments, make sure each switch pole is fully closed with blades against their blade stops and the switch drive lever within $\frac{1}{16}$ -inch of the closed stop bolt. Tie the switch blades to their stationary main contact assemblies. See Figure 7.

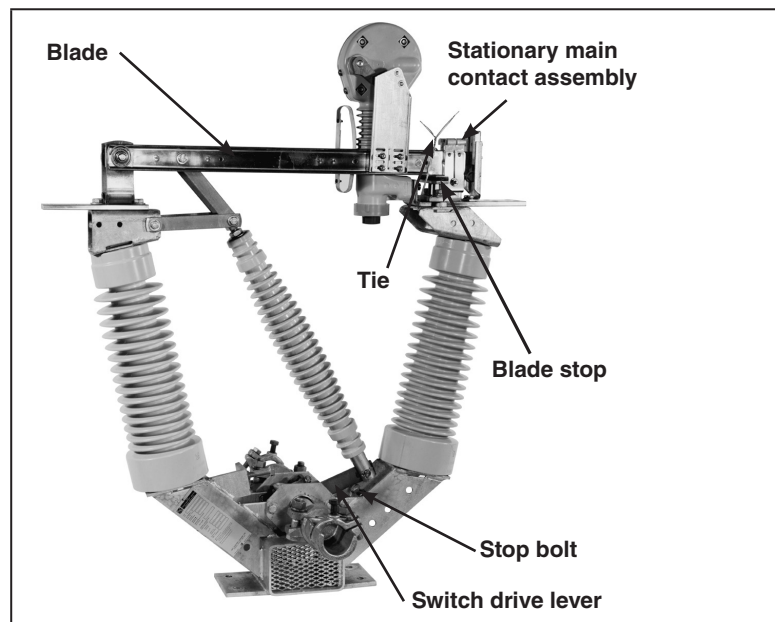


Figure 7. Tie the switch blade to the stationary main contact assembly.

Installing Pipe Couplings with Piercing Set Screws

Step 7

⚠ WARNING

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

To properly install piercing set screws:

- (a) Back the piercing set screw out of the coupling so the tip does not protrude into the body of the coupling.
- (b) Insert the operating pipe section into the coupling and finger-tighten the clamp bolt(s).
- (c) Adjust the operating pipe to the correct length. Then tighten the clamp bolt(s) to final tightness.
- (d) Tighten the piercing set screw, piercing the pipe. Continue turning until a firm resistance is felt.
- (e) Make sure the clamp bolt(s) are tight.

See Figure 8.

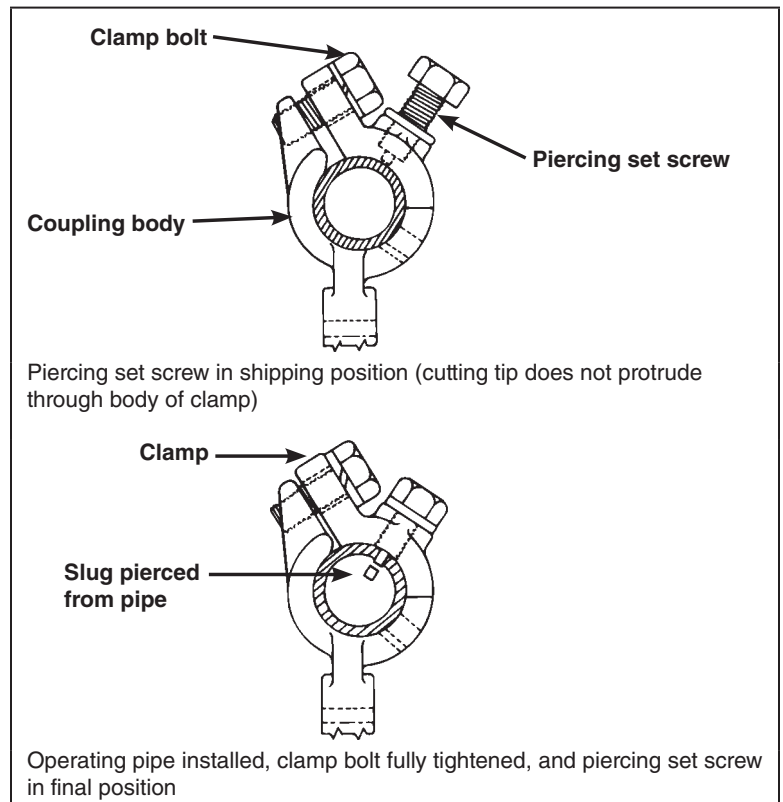


Figure 8. Install the pipe couplings.

Installation

Installing Interphase Pipe

Step 8

Install the interphase and, if applicable, the outboard pipe sections as shown on the erection drawing. See Figure 9. Follow the directions in “Installing Pipe Couplings with Piercing Set Screws” on page 11.

Torque the clamp bolt of each pipe-coupling clamp to final tightness, but do not tighten the associated piercing set screw until so directed in Step 29, after the mechanism has been adjusted to attain full closure of all three poles.

Step 9

Attach the interphase drive lever to the interphase (or outboard) pipe section in the position shown on the erection drawing. See Figure 10.

Make sure the lever is at the 45-degree position, as indicated on the erection drawing. Torque the coupling clamp bolt to final tightness. Then tighten the piercing set screw, piercing the pipe. Continue until a firm resistance is felt.

NOTICE

For ideal performance, the interphase drive lever 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.

Step 10

Make sure that the outboard bearing crank-arm lies against the stop bolt. See Figure 11.

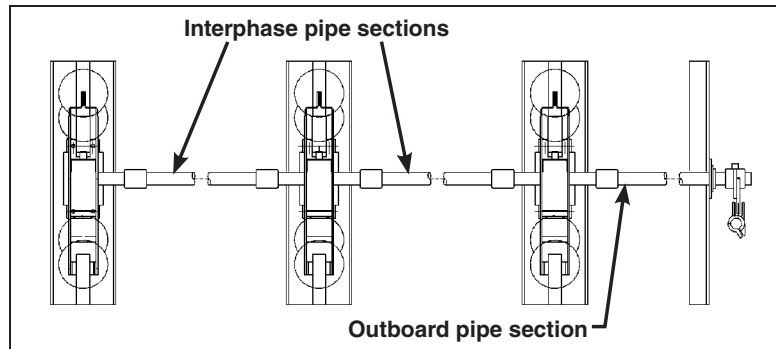


Figure 9. Pipe connecting the switch poles and the outboard bearing.

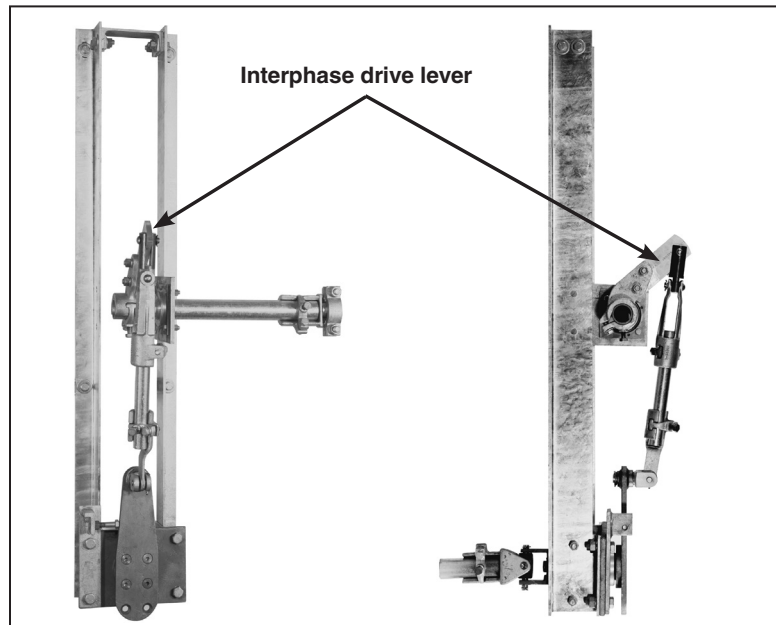


Figure 10. Interphase drive lever installation.

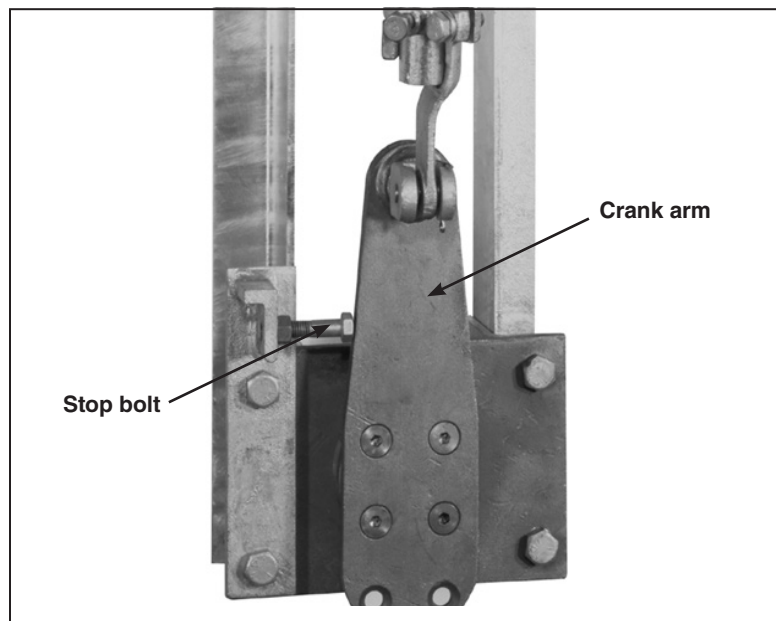


Figure 11. Outboard bearing crank-arm against the stop bolt.

Step 11

With the outboard bearing crank-arm against its closed stop, install the pipe section to interconnect the crank arm with the interphase drive lever. See Figure 12.

Torque the clamp bolt of each pipe-coupling clamp to final tightness, but do not tighten the associated piercing set screw, until so directed in Step 30, after the mechanism has been adjusted to attain full closure of all three poles.

Installing Vertical Operating Pipe

Step 12

S&C recommends making up each coupling connection as work progresses from the top down. Start with the universal coupling connecting the switch to the upper section of vertical operating pipe. Continue with the coupling between the upper section of vertical operating pipe and the first lower section. Continue down to the last section of pipe, and end with the rotating operating handle.

This makes it easier to adjust for variations in the surface and height of the wood pole or mounting structure.

Insert the uppermost section of vertical operating pipe into the universal coupling attached to the underside of the outboard bearing assembly. See Figure 13. Back the piercing set screw out of the body of the pipe coupling before tightening the bolts.

Torque the clamp bolts to final tightness. and then tighten the piercing set screw, piercing the pipe. Continue turning until a firm resistance is felt.

Step 13

Attach a pipe-to-pipe type universal coupling to the lower end of the uppermost section of vertical operating pipe. See Figure 14. Back the piercing set screw out of the body of the pipe coupling before tightening the coupling clamp bolts.

Torque the clamp bolts to final tightness, and then tighten the piercing set screw, piercing the pipe. Continue turning until a firm resistance is felt.

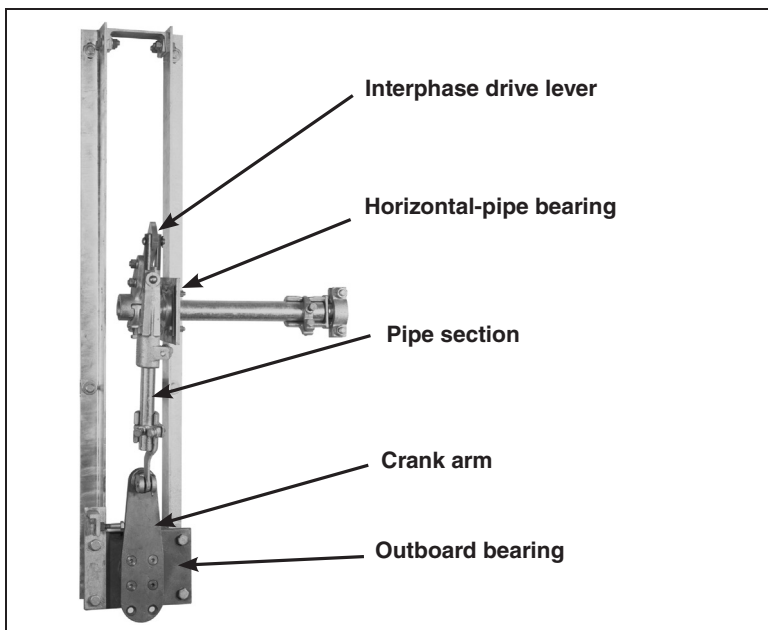


Figure 12. Pipe connecting the outboard bearing to the interphase drive lever.

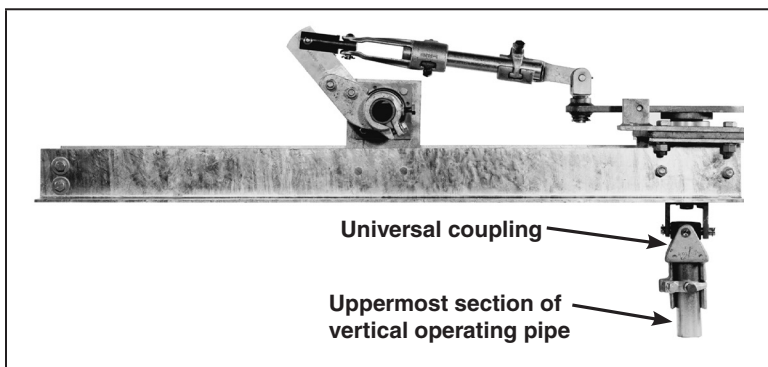


Figure 13. Install the uppermost section of the vertical operating pipe.

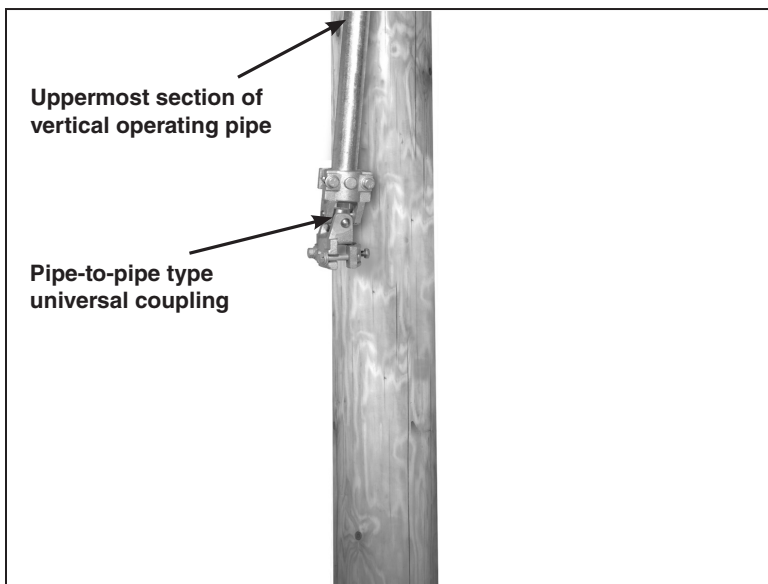


Figure 14. Attach the pipe-to-pipe type universal coupling to the lower end of the vertical operating pipe.

Installation

Step 14

Position and install the guide bearing assembly on the pole or structure in accordance with the dimension shown on the erection drawing. See Figure 15.

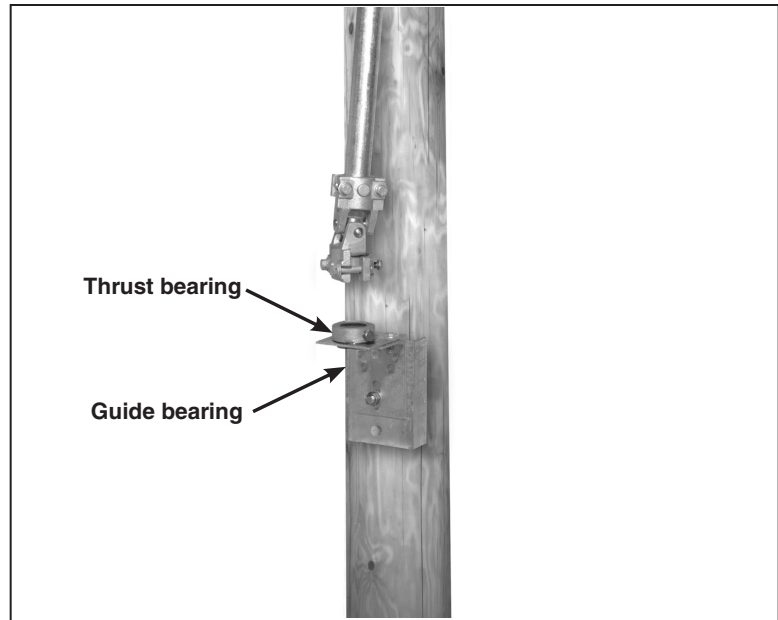


Figure 15. Install the guide bearing.

Step 15

Pass the next section of vertical operating pipe up through the guide bearing and then through the thrust bearing. The thrust bearing will rest on the guide bearing and support the operating pipe. See Figure 16.

Insert the pipe section into the universal coupling previously attached to the lower end of the uppermost operating-pipe section. *Do not tighten the clamp bolts at this time.*

While holding the pipe in this position—and with the thrust bearing resting on the guide bearing—tighten the piercing set screw in the thrust bearing, piercing the pipe. Continue turning until a firm resistance is felt.

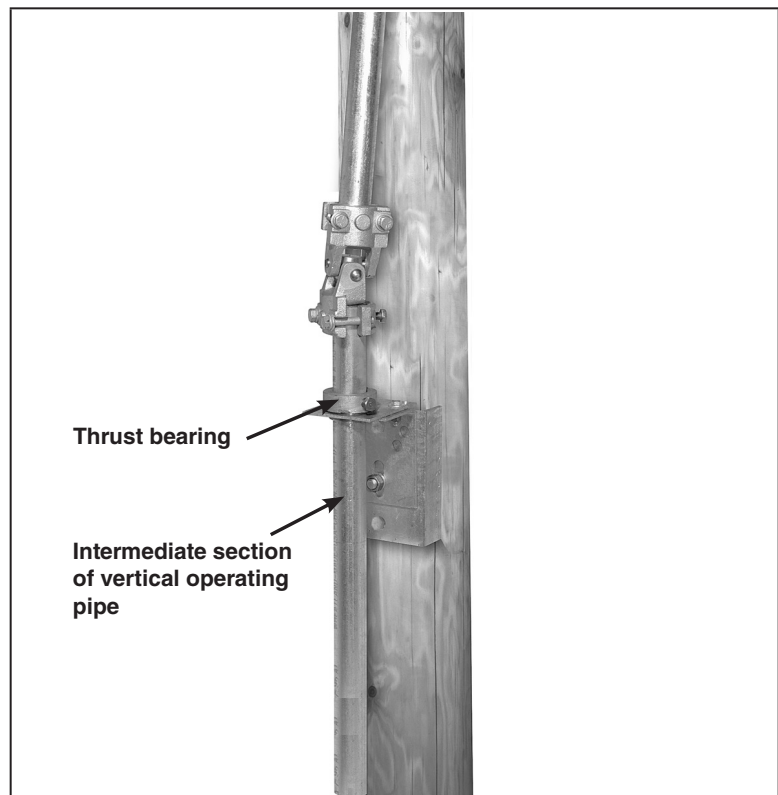


Figure 16. Install the intermediate section of the vertical operating pipe.

Step 16

Install a guide bearing assembly with each additional vertical operating-pipe section, positioned in accordance with the dimension shown on the erection drawing. See Figure 17. Thrust bearings are only necessary on the uppermost guide bearing. Use rigid couplings to join these additional pipe sections. Before installing the coupling, back the piercing set screws out of the coupling body so they do not protrude into the coupling.

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

Step 17

At the universal coupling immediately above the thrust bearing, torque the clamp bolts to final tightness, and then tighten the piercing set screw, piercing the pipe. Continue turning until a firm resistance is felt. ■

■ If the shipment includes an S&C Type AS-1A Switch Operator, as signified by the addition of the Standard Minor Modification Suffix “-S9” to the erection drawing number, refer instead to S&C Instruction Sheet 769-500, “S&C Switch Operators—Type AS-1A, 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.

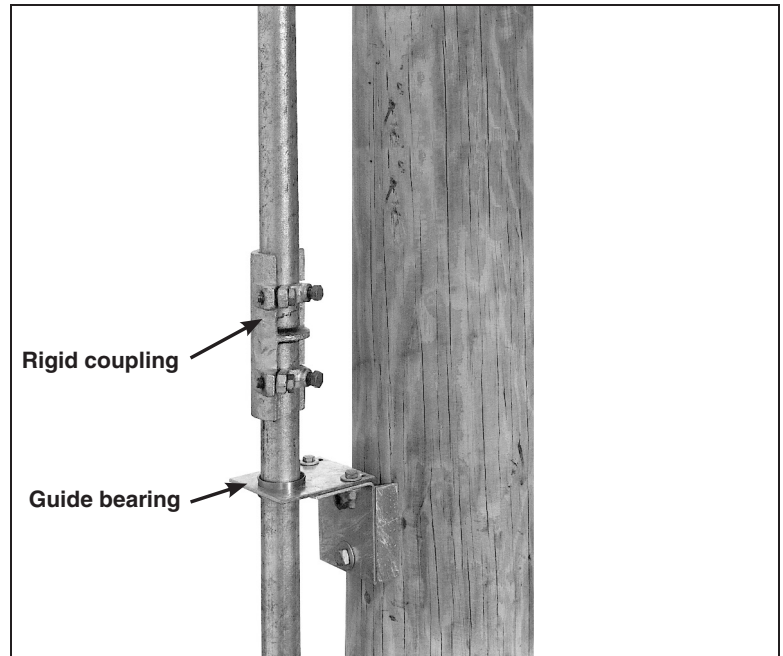


Figure 17. Install the guide bearing for additional pipe section.

Installation

Installing Operating Handle

Step 18

Back the piercing set screws out of the handle yoke and slide the handle assembly up the pipe until it is in the location indicated on the erection drawing. There should be between 6 to 8 inches of operating pipe below the operating handle assembly. See Figures 18 and 19.★

Tighten the piercing set screw on the operating handle assembly enough to hold the handle in place, but DO NOT pierce the vertical operating pipe.

Step 19

Slide the foot-bearing onto the lowest section of pipe at the position shown on the erection drawing. See Figure 19. Adjust the operating handle assembly until it is two to three inches above the foot-bearing assembly. Tighten the piercing set screws, piercing the pipe. Continue turning until a firm resistance is felt.

At the same time, use one of the mounting bolts to attach one end of the grounding strap (the end with the grounding connector attached) to the foot-bearing assembly. 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.

If necessary to compensate for the taper of the wood pole and to keep the vertical operating-pipe aligned and plumb, shift the guide bearings toward or away from the pole. Alignment slots are provided for this purpose.

Step 20

Fasten the free end of the grounding strap to the lowest pipe section a few inches above the operating handle assembly (or key interlock) with the U-bolt connector provided for this purpose. See Figure 20. Afterward, connect the lower end of the strap to a suitable earth ground using the grounding connector provide 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. Skip to Step 26 on page 19.

★ When a key interlock is used (standard minor modification suffix "-S6"), skip to Step 21 on page 17.

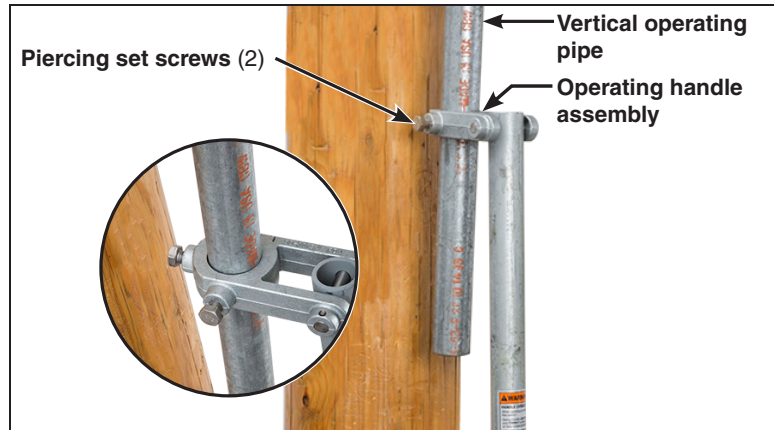


Figure 18. Install the operating handle assembly.

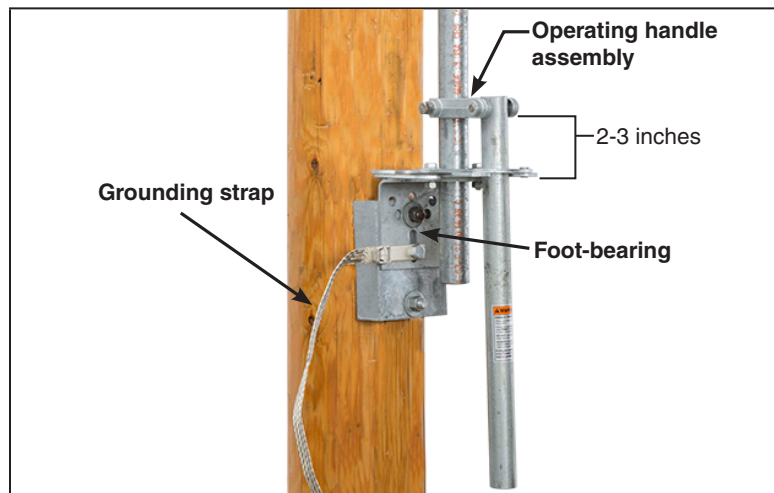


Figure 19. Install the foot-bearing assembly so the handle is two to three inches above the foot-bearing assembly.

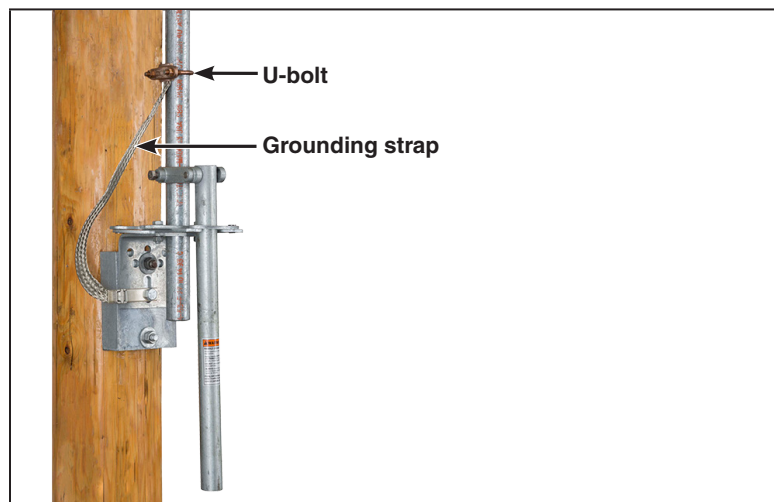


Figure 20. Attach the grounding strap.

Installing Operating Handle with Key Interlock

Step 21

The interlock group includes a Superior Type B6003-1 Mk II single- or multiple-key interlock (or equivalent), with $\frac{3}{8}$ -inch bolt projection and $\frac{3}{4}$ -inch bolt travel, locking disc, and interlock bracket. If “provision only” is specified, the interlock is not included.

Slide the interlock bracket, locking disc, operating handle assembly, and foot-bearing assembly onto the lowest vertical operating-pipe section, with the locking disc and operating handle assembly between the interlock bracket and the foot-bearing assembly. See Figure 21.

Step 22

Bolt the foot-bearing assembly to the pole at the position shown on the erection drawing. Use one of the mounting bolts to attach one end of the grounding strap (the end with the grounding connector attached) to the foot-bearing assembly. 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. See Figure 22.

If necessary to compensate for the taper of the wood pole and to keep the vertical operating-pipe aligned and plumb, shift the guide bearing toward or away from the pole. Alignment slots are provided for this purpose.

Step 23

Fasten the operating handle assembly to the lowest vertical operating-pipe section using the piercing set screws furnished. See Figure 23.

Tighten the piercing set screws on the operating handle assembly, piercing the pipe. Continue turning until a firm resistance is felt.

Attach the interlock bracket to the foot-bearing assembly using the $\frac{1}{2}$ -13 \times $1\frac{1}{2}$ -inch cap screws, spacers, and $\frac{1}{2}$ -inch lockwashers furnished.

With the switch in the closed position, use the interlock bolt to position the locking disc so the bolt enters the closed-position slot in the disc (and will enter the open position slot when the switch is in the open position).

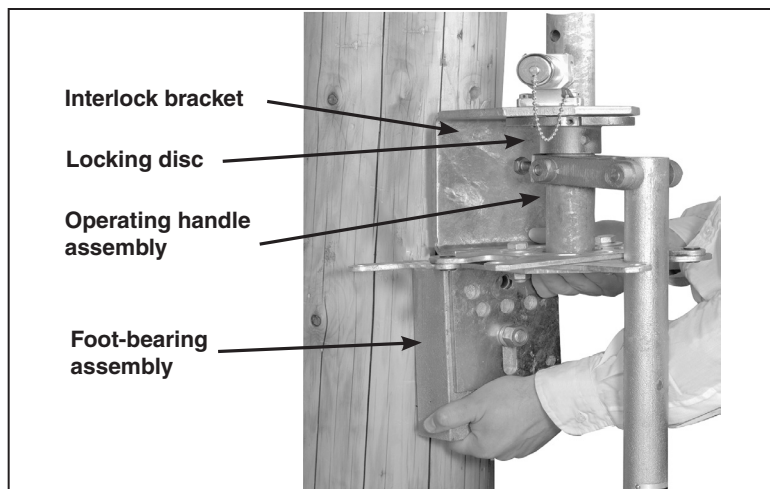


Figure 21. Position the interlock bracket, locking disc, operating handle assembly, and foot-bearing assembly onto the lowest vertical operating-pipe section.

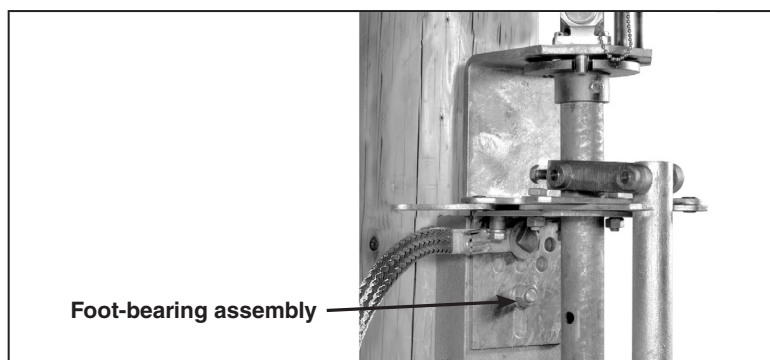


Figure 22. Attach the foot-bearing assembly.

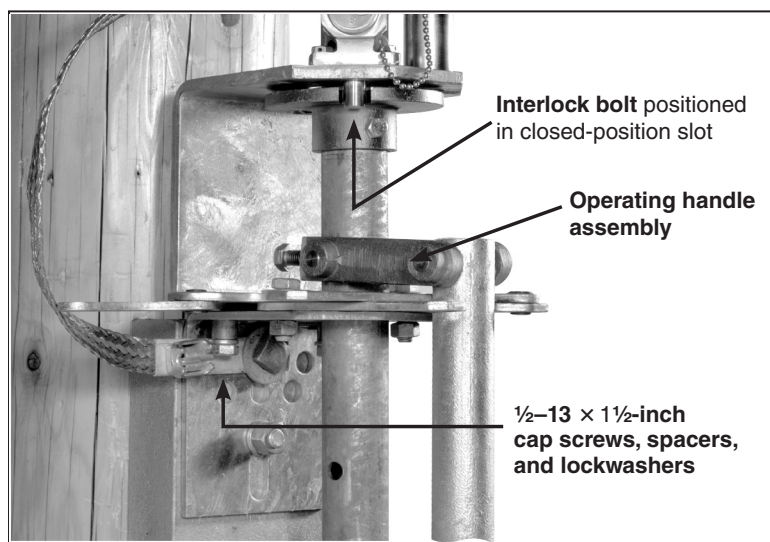


Figure 23. Fasten the operating handle assembly.

Installation

Step 24

Hold the locking disc $\frac{3}{8}$ -inch below the interlock bracket and drill $\frac{7}{16}$ -inch diameter holes through the vertical operating-pipe section, using the holes in the locking disc collar as pilots. Attach the locking disc to the pipe, using the $\frac{3}{8}$ -16 \times $3\frac{1}{2}$ -inch cap screw, lockwasher, and nut furnished. See Figure 24.

Step 25

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 25.

NOTICE

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

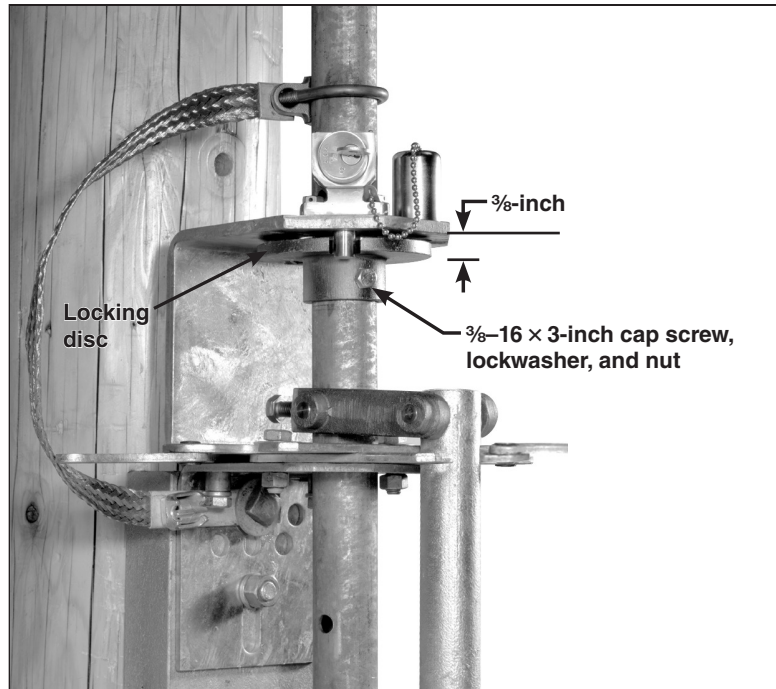


Figure 24. Attach the locking disc.

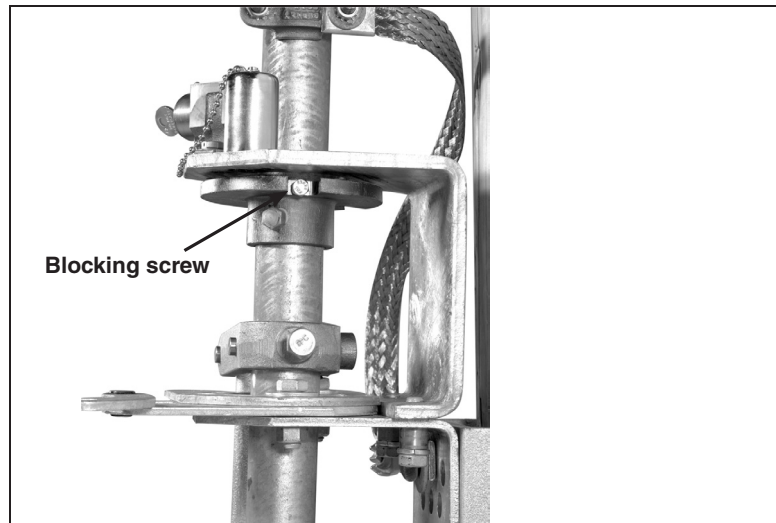


Figure 25. Block the slot in locking disc.

Checking Alignment and Adjusting the Stop Plates

Step 26

Remove the ties holding the switch blades to their stationary main contact assemblies. See Figure 26.

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

NOTICE

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 will occur if the switch is partially open or partially closed.

Step 27

The stop plate holes are slotted to allow room for adjustment. Loosen the bolts that secure the adjustable stop plates to the foot-bearing support plate. See Figure 27. Place the switch in the fully **Open** position and adjust the open-position stop plate so the handle, when lowered, fits into the open position slot. Mark on the support plate the location of the open-position stop plate.

Step 28

NOTICE

DO NOT skip this important step! Loose or improperly installed vertical operating pipe is the primary cause of incomplete blade and jaw contact. Over time this condition can cause heating and eventually arcing of the blade contacts.

The most common cause of contact overheating and damage is not putting enough "wind up" torque in the vertical operating pipe when the switch is in the **Closed** position. Wind up is the torque left in the pipe after the handle is secured in the closed stop plate. This windup prevents the pipe from vibrating in high winds and creates strong positive blade-to-contact pressure—ensuring the switch is securely held in the **Closed** position.

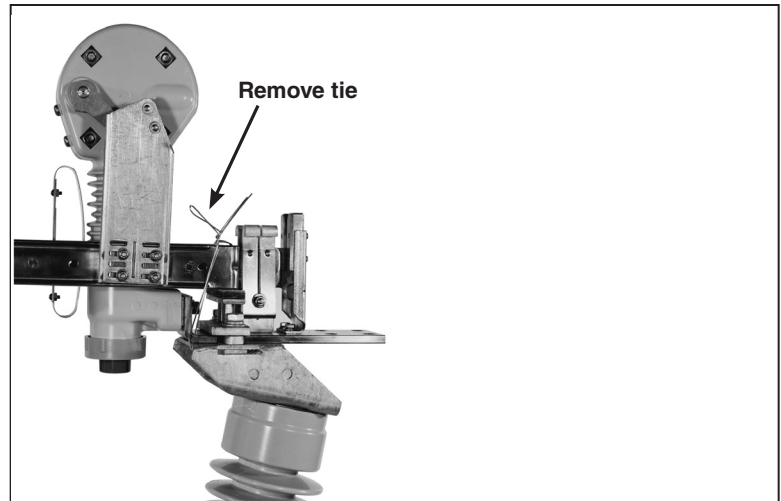


Figure 26. Remove the tie at the stationary main contact assembly.

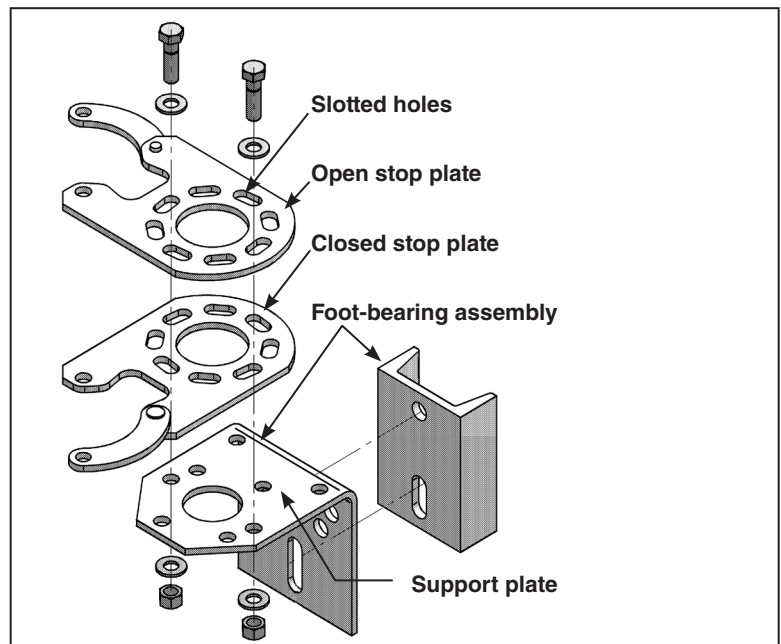


Figure 27. Exploded view of the stop plates and foot-bearing assembly.

Installation

Step 28 cont.

To adjust the closed stop plate:

- (a) Loosen the hardware securing the closed stop plate. See Figure 27 on page 19.
- (b) The stop plate holes are slotted to allow room for adjustment. Position the operating handle in the stop plate, and turn the operating handle as far as it will go in the closed position. (Counter clockwise is standard on switches using the rotating operating mechanism.) The handle should be tight against the edge of the stop plate as shown in Figure 28. Mark the position of the closed stop plate. See Figure 29 (left).
- (c) Lift the handle out of the way and rotate the closed stop plate an additional 15 degrees counter-clockwise from the mark. See Figure 29 (right). Make sure the open stop plate lines up with the mark made in Step 27 on page 19. Tighten the stop plate hardware to 40 ft-lbs.
- (d) Push the handle into the closed stop position. It should take significant force to secure the handle into the closed stop. The handle will be firmly pressed against the left side of the closed stop plate. This pressure will hold the torque in the pipe, creating the desired windup. Move the handle into the open position to verify it fits into the open stop plate. See Figure 30.

NOTICE

Open and close the switch slowly **ONLY** when checking the operation or making adjustments to the de-energized switch.

When opening or closing an energized switch, swing the operating handle vigorously through its full travel without hesitation.

Arcing and damage to the switch will occur if the energized switch is operated slowly or left in the partially open or closed position.

Step 29

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

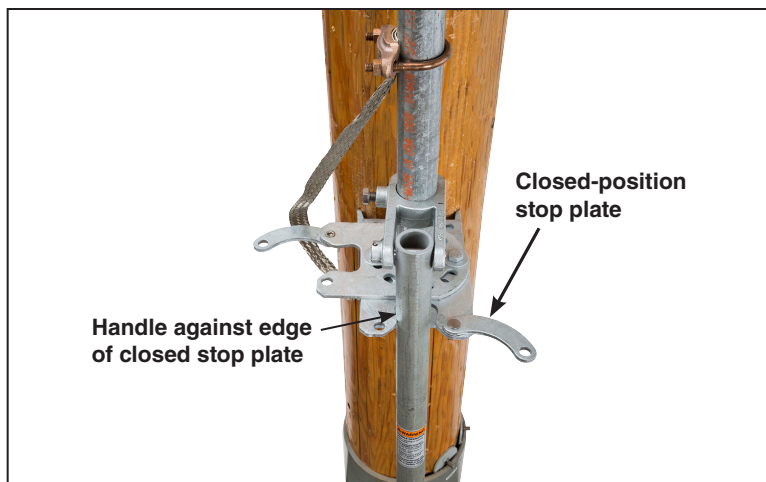


Figure 28. Adjust the closed-position stop plate.



Figure 29. Mark the stop plate, and then loosen the hardware and rotate the closed stop plate backward approximately 15 degrees.

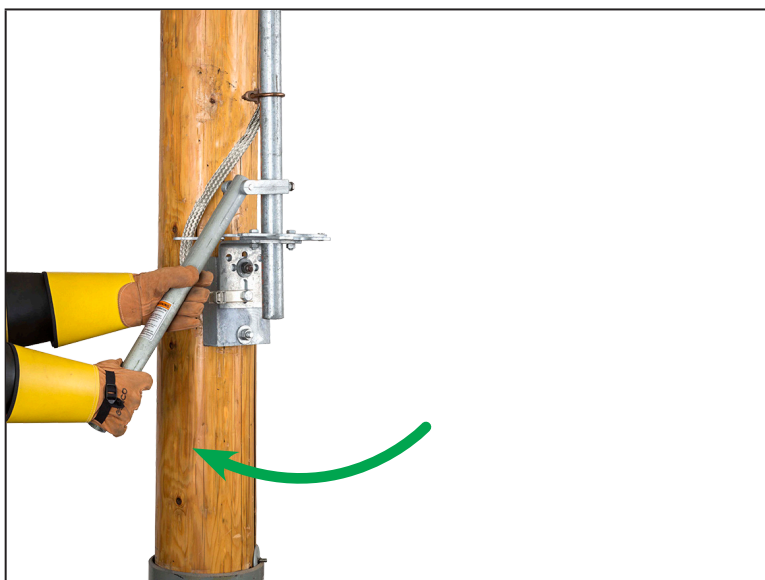


Figure 30. Verify the wind-up.

Checking Operation

Step 30

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

NOTICE

Open and close the switch slowly **ONLY** when checking the operation or making adjustments to the de-energized switch.

When opening or closing an energized switch, swing the operating handle vigorously through its full travel without hesitation.

Arcing and damage to the switch will occur if the energized switch is operated slowly or left in the partially open or closed position.

Make sure the following conditions exist:

- (a) With the operating handle as far as it will go in the closing direction, all main contacts of the interrupter switch are fully closed with the blades against their blade stops. See Figure 31.
- (b) Each switch drive lever is within $\frac{1}{16}$ -inch of the closed stop bolt. See Figure 32.

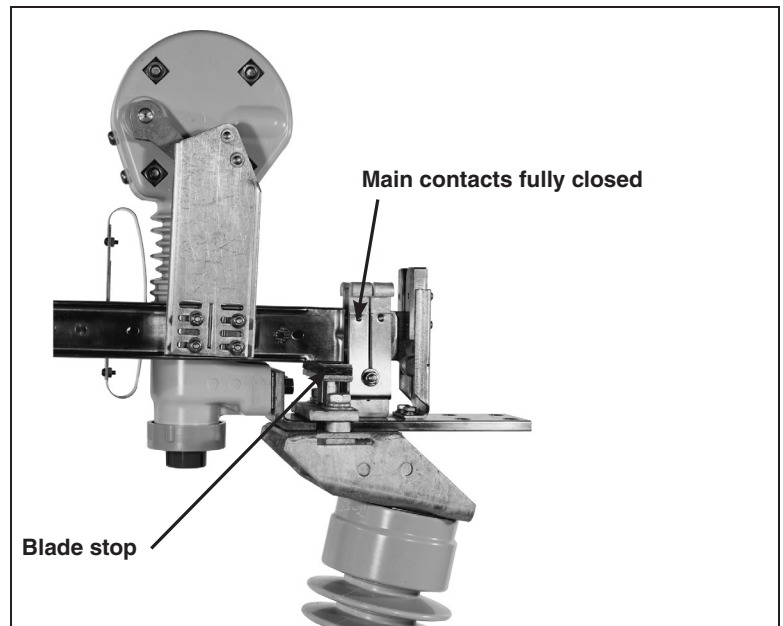


Figure 31. Check that the blade is fully closed.

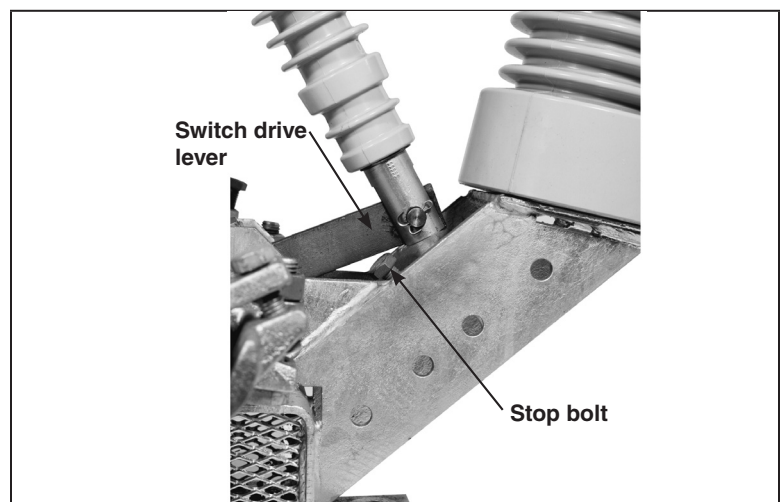


Figure 32. Verify the switch drive lever assembly is within $\frac{1}{16}$ -inch of the closed stop bolt.

Step 30 Cont.

- (c) In the unlikely event only one or two switch poles are fully closed, loosen the clamp bolt(s) on the interphase pipe coupling(s) and push the switch blade(s) against the blade stop(s). Torque the clamp bolt of each pipe-coupling clamp to final tightness, and then tighten the associated piercing set screws, piercing the pipe. Continue turning until a firm resistance is felt. See Figure 33.
- (d) With all three switch poles fully closed, the outboard bearing crank-arm must be in the overtoggle position and lie against its closed stop. See Figure 34. The outboard bearing closed stop may require adjustment to provide the correct amount of toggle; see the note on the erection drawing for the amount of toggle to be obtained.

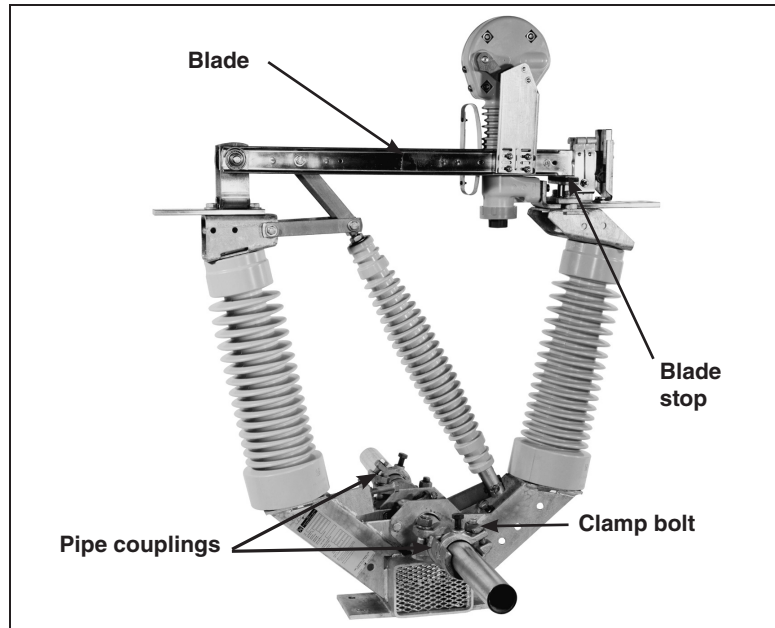


Figure 33. Readjust the interphase pipe.

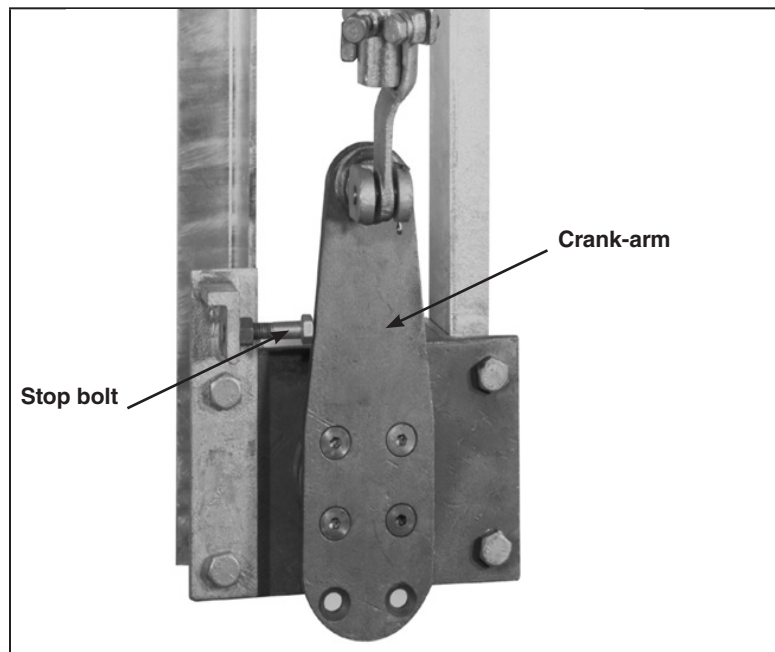


Figure 34. Adjust the outboard bearing crank-arm stop bolt.

- (e) If more or less stroke is required, increase or decrease the effective length of the pipe section interconnecting the outboard bearing crank-arm and the interphase drive lever by loosening one of the coupling clamps and repositioning the pipe. See Figure 35.

NOTICE

After readjusting, be sure to retighten the clamp bolt and piercing set screw on the outboard bearing crank-arm (or interphase drive lever) coupling and the clamp bolts and piercing set screws on the interphase pipe couplings.

- (f) When an S&C Type AS-1A Switch Operator or an S&C 6801M Automatic Switch Operator is used, verify—with the switch fully closed—there is a clearance of approximately $\frac{1}{8}$ -inch between the outboard bearing crank-arm and its stop bolt. See Figure 36. (This clearance is essential to prevent bending of the stop bolt during power operation.) Adjust the stop bolt to provide this clearance *after* any other adjustments are made to achieve full closure, stroke, or toggle action. Be sure to retighten the lock-nut when adjustment is complete.

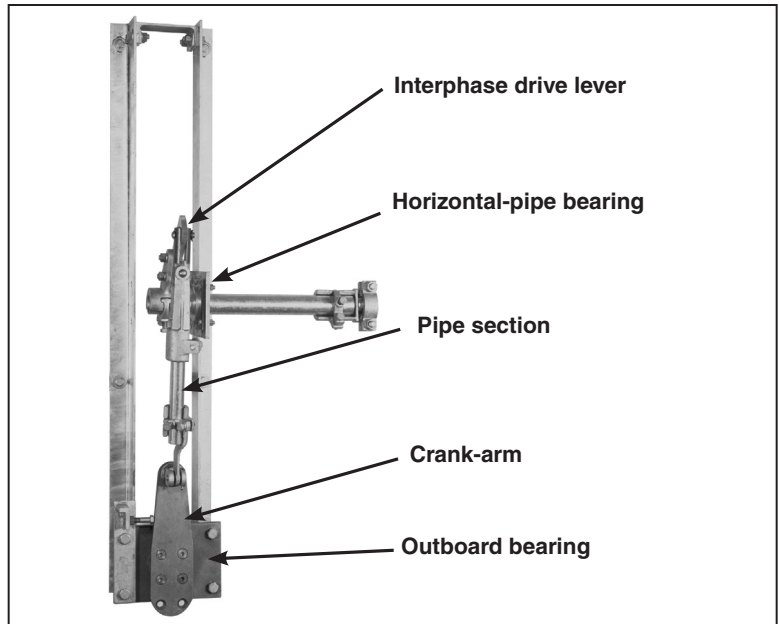


Figure 35. Adjust the effective length of the pipe section interconnecting the outboard bearing crank-arm and the interphase drive lever.

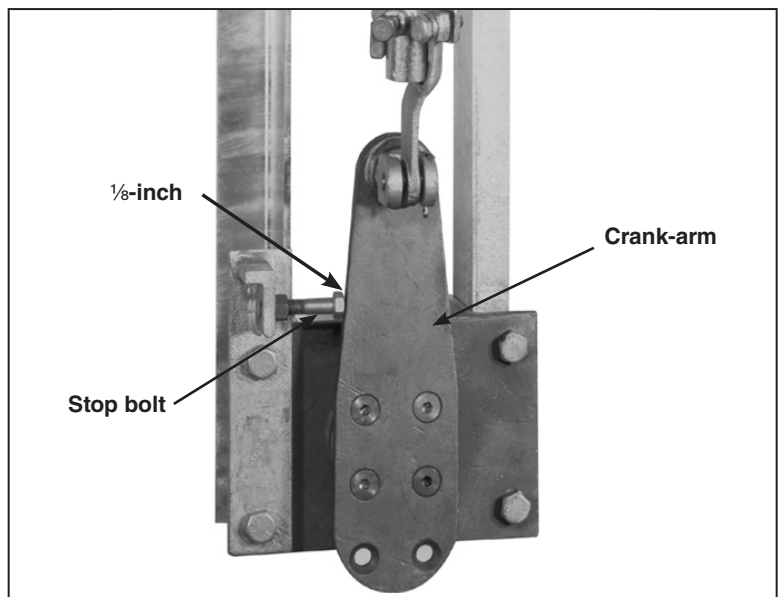


Figure 36. Adjust the outboard bearing crank-arm stop bolt for power operation.

Step 30 Cont.

- (g) With the operating handle as far as it will go in the opening direction, each switch drive lever should lie snugly against its open stop as shown. See Figure 37. If necessary, readjust the open-position stop plates on the foot-bearing support plate. Follow the directions in “Checking Alignment and Adjusting the Stop Plates” on page 19.

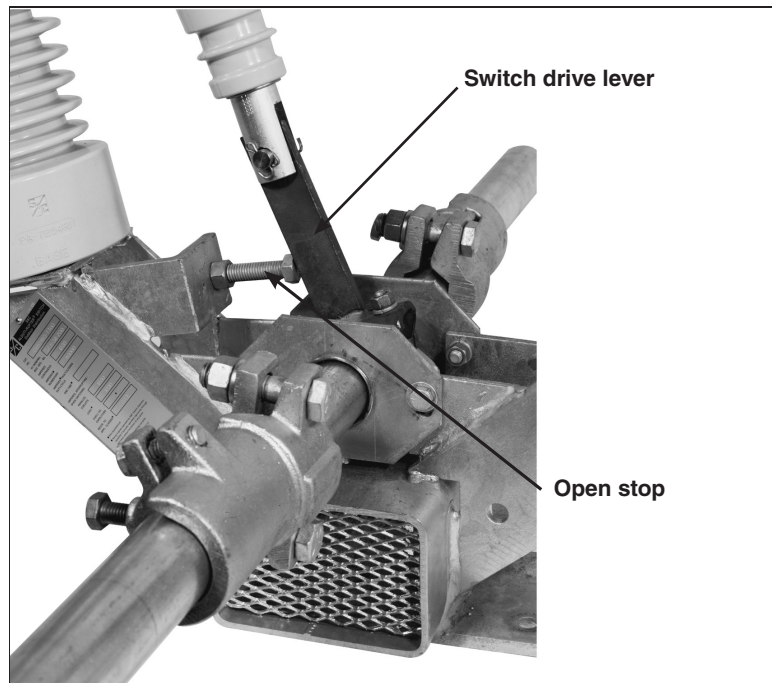


Figure 37. Verify the switch drive lever is against its open stop.

Step 31

Open and close the switch *slowly* several times.

⚠ 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.

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

- (a) As the blade moves in the closing direction, clearance between the blade opening cam and the interrupter opening lever must be within the limit shown. See Figure 38.

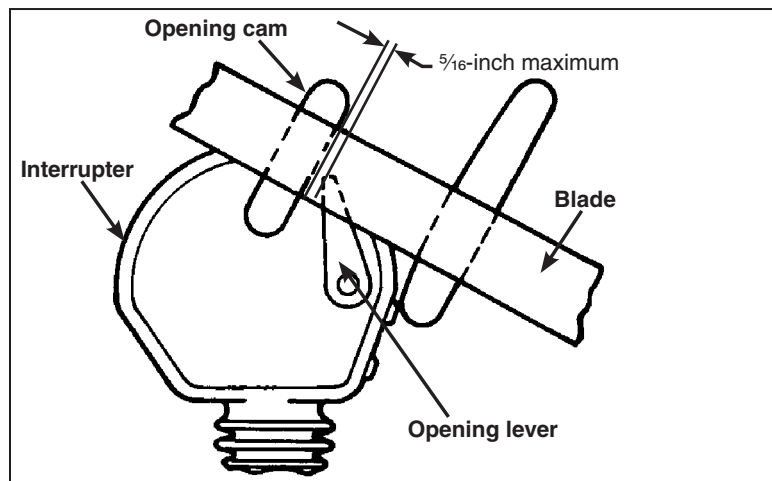


Figure 38. Blade assembly moving in the closing direction.

- (b) 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 39.

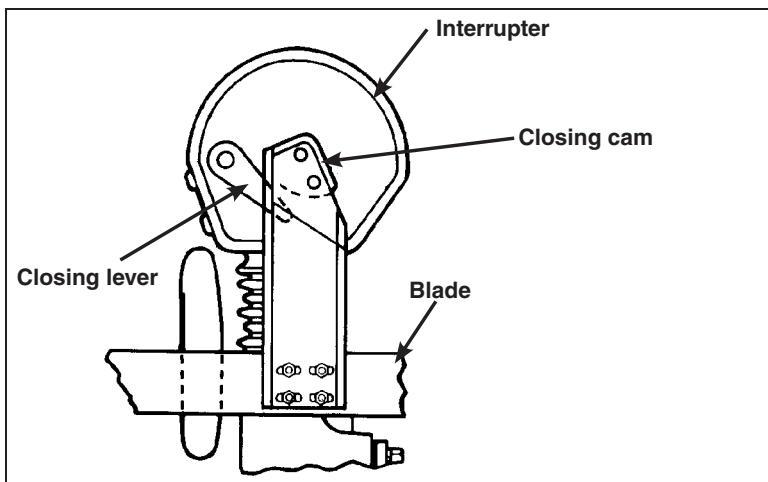


Figure 39. Blade assembly moving in closing direction.

- (c) 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. See Figure 40.

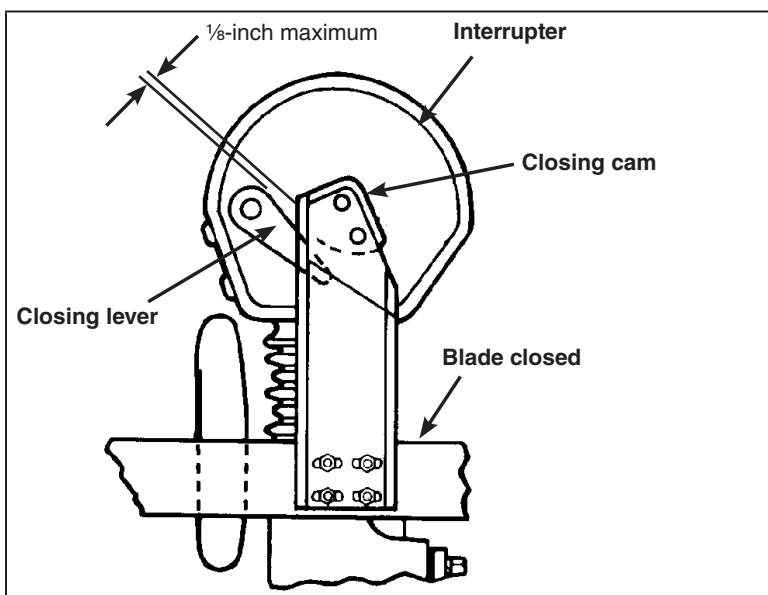


Figure 40. Blade assembly in the fully closed position.

- (d) The interrupter must lie in a plane parallel to the sweep of the blades, and the blades must pass over the interrupter with approximately equal clearance on both sides. See Figure 41.

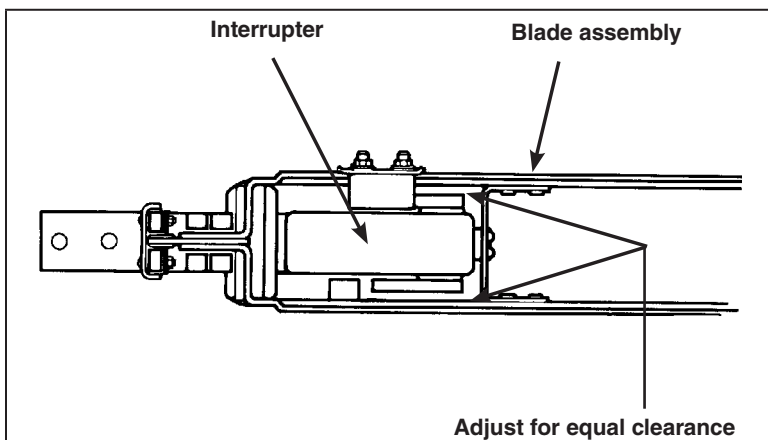


Figure 41. Blade assembly in the fully closed position.

Step 31 Cont.

- (e) With the switch in the fully closed position, verify the minimum clearances between the blade shunt contact and the interrupter, measured to the interrupter housing as well as the interrupter skirts. See Figure 42.

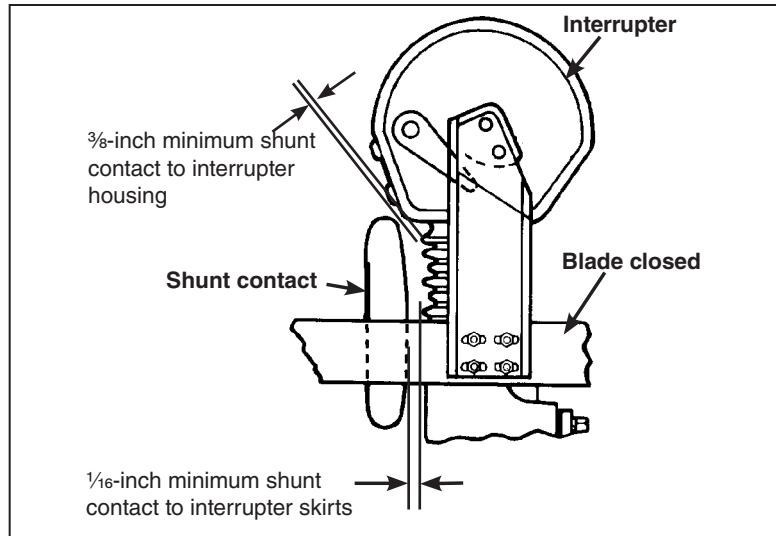


Figure 42. Blade assembly in the fully closed position.

- (f) Move the blade in the *opening* direction and verify each blade shunt contact firmly engages its respective interrupter contact rivets before the blade contacts disengage from the stationary main contact assemblies. See Figure 43. The shunt contacts may be bent as required to conform to these conditions.
- (g) 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.

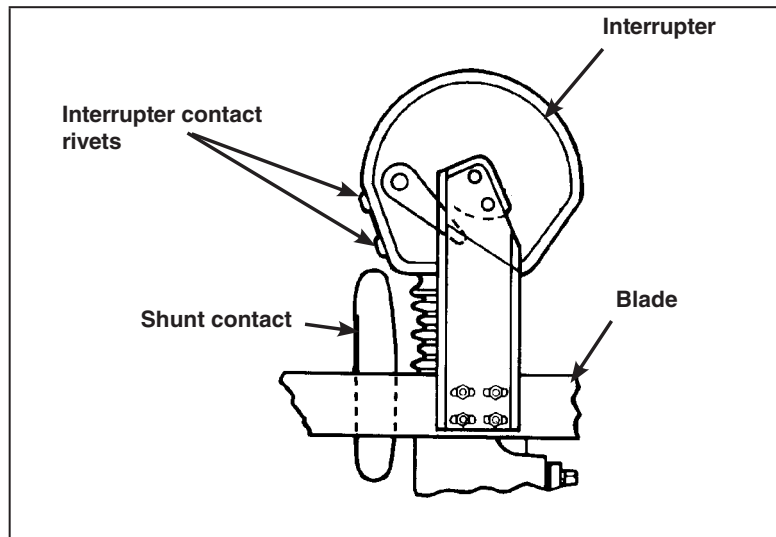


Figure 43. Blade assembly moving in opening direction.

Step 32

Attach the danger label to the pole or structure using two straps or bolts (furnished by others). See Figure 44.

Position the danger label within three feet 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.

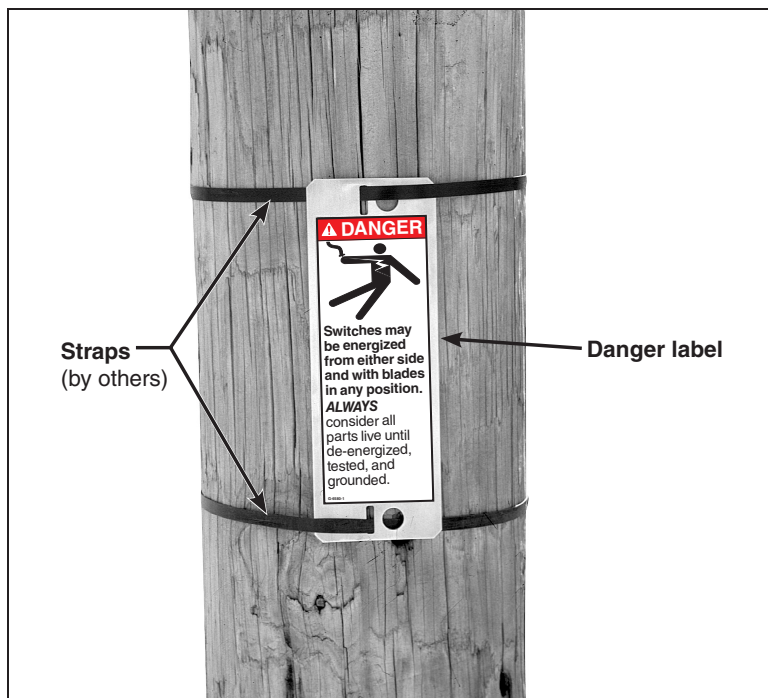


Figure 44. Attach the danger label to the pole or structure.

Connecting High-Voltage Conductors

Step 33

When high-voltage conductors are to be connected using aluminum-alloy body connectors[■] the following procedures should be employed:

- (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 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 5300 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.

Operation

Opening and Closing

⚠ DANGER

The interrupters and terminal pads of the Alduti-Rupter Switch may be energized from either side of the switch 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. Afterward, install suitable grounding equipment at all six terminals. Failure to observe these precautions may result in serious injury or death.

NOTICE

This interrupter switch is not intended for breaking fault currents.

Step 34

- (a) Remove the padlock(s) from the hasps on the operating-handle assembly. See Figure 45.
- (b) If the operating handle assembly is furnished with a key interlock, disengage the interlock bolt. See Figure 46.

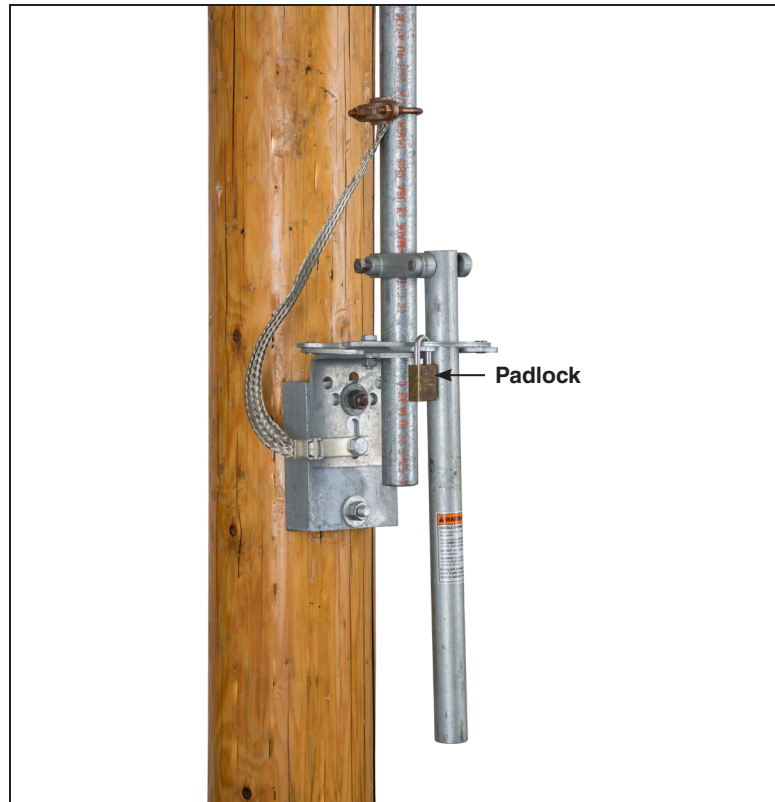


Figure 45. Remove the padlock(s).



Figure 46. Disengage the key interlock bolt.

- (c) Swing the handle *rapidly* to the fully open or fully closed position. See Figure 47.

NOTICE

Swing the operating handle vigorously through its full travel without hesitation. Arcing and damage to the switch will occur if the energized switch is operated slowly or left in the partially open or closed position.

Check that all three poles are fully open or fully closed.

Replace the padlock(s). Engage the key interlock, if applicable.

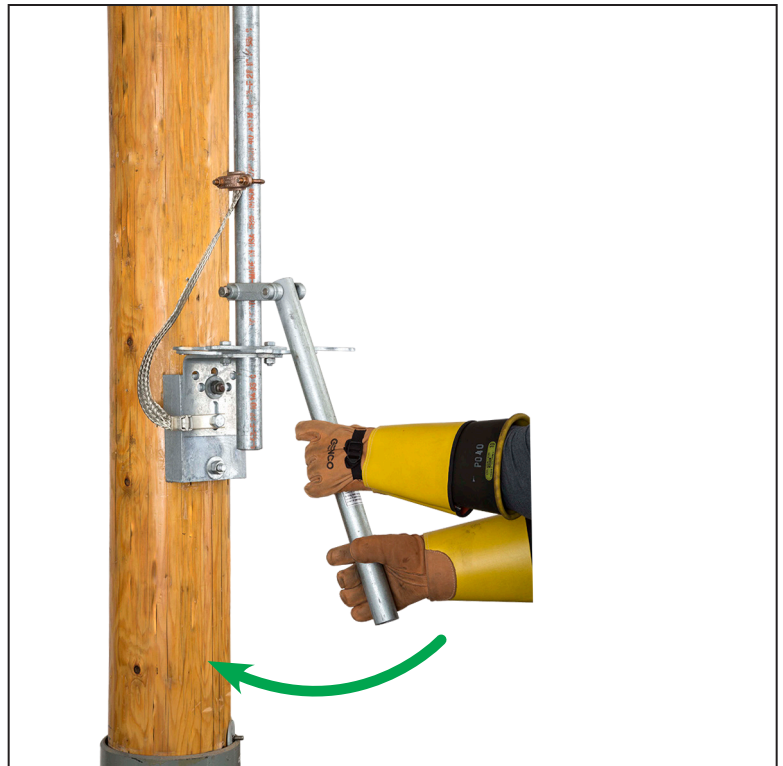


Figure 47. Swinging the operating handle.

