

Installation

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Introduction

Qualified Persons

WARNING

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

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. The latest version is available online in PDF format at sandc.com/support/product-literature.asp

Proper Application

WARNING

The equipment in this publication must be selected for a specific application. The application must be within the ratings furnished for the equipment. Refer to S&C Specification Bulletin 761-31 for complete application information.

These interrupter switches are not intended for breaking fault currents.

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 that 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 verify 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.

Warranty

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

Warranty Qualifications

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

Safety Precautions

Understanding Safety-Alert Messages

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

DANGER

“DANGER” identifies the most serious and immediate hazards that *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 or product or property damage 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 www.sandc.com, or call S&C Headquarters at (773) 338-1000; in Canada, call S&C Electric Canada Ltd. at (416) 249-9171.

NOTICE

Thoroughly and carefully read this instruction sheet before 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.

DANGER



Alduti-Rupter Switches operate at high voltage. Failure to observe these precautions will result in serious personal injury or death.

Some of these precautions may differ from company operating procedures and rules. Where a discrepancy exists, users should follow their company's operating procedures and rules.

- 1. QUALIFIED PERSONS.** Access to switches and controls must be restricted only to qualified persons. See "Qualified Persons" on page 2.
- 2. SAFETY PROCEDURES.** Always follow safe operating procedures and rules.
- 3. PERSONAL PROTECTIVE EQUIPMENT.** Always use suitable protective equipment such as rubber gloves, rubber mats, hard hats, safety glasses, and flash clothing in accordance with safe operating procedures and rules.
- 4. SAFETY LABELS AND TAGS.** Do not remove or obscure any of the "DANGER," "WARNING," "CAUTION," or "NOTICE" labels and tags. Remove tags ONLY if instructed to do so.
- 5. ENERGIZED COMPONENTS.** Always consider all parts live until de-energized, tested, and grounded.
- 6. 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 page 27.

Inspection

Examine the shipment for external evidence of damage as soon after receipt as possible, preferably before removal from the carrier's conveyance. Check the bill of lading to make sure the 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

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

1. Three switch poles
2. Operating pipe sections for interphase, horizontal-connecting, and vertical sections. (The switch may be furnished "less operating pipe," if specified.)
3. Miscellaneous mounting hardware (less through bolts) for securing the Alduti-Rupter Switch to the mounting structure
4. The appropriate set of operating mechanism components for the vertical operating pipe; e.g. handle, guide bearings, and couplings—each tagged and keyed to the bill of material for ready identification
5. If a standard minor modification of a standard mounting arrangement is specified, the appropriate parts, as identified in the bill of materials under suffix: "-S1," "-S2," "-S3," "-S4," "-S5," "-S6," "-S8," "-S9," and "-S16"
 - S1: Tubular fiberglass insulating section in vertical operating shaft
 - S2: Cypoxy™ Insulator unit in vertical operating shaft
 - S3: Insulated interphase sections and one fiberglass insulating section in vertical operating shaft
 - S4: Insulated interphase sections and one Cypoxy™ Insulator unit in vertical operating shaft
 - S5: Two-inch IPS pipe—required for rotating-type operating-mechanism vertical shaft when the shaft exceeds three 10-foot-4-inch sections.
 - S6: Key interlock – single lock for "locked-open" application
 - S8: Provision for power operation of pole-mounted switches by S&C Switch Operator—Type AS-1A
 - S9: Provision for power operation of steel-structure mounted switches by S&C Switch Operator – Type AS-1A
 - S16: Provision for power operation of pole-mounted switch by 6801M Automatic Switch Operator

6. **Erection Drawing:** A detailed erection drawing (ED) for the Alduti-Rupter Switch will be found in a water-resistant envelope shipped with the switch. If a standard mounting arrangement is to be used, this erection drawing is a printed sheet. This same sheet is also furnished when a standard minor modification of a standard mounting arrangement is used. A copy of RD-1329 (Standard Minor Modifications, Rotating Operating Mechanisms) is included. A custom erection drawing will be provided for special mounting arrangements. Contact your nearest S&C Sales Office for details.
7. **Power Operation:** If suffix “-S8,” or “-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 Sheets 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 and should be used in conjunction with this instruction sheet where applicable. Not all mounting arrangements are suitable for power operation. Consult your nearest S&C Sales Office for details.
8. **Fused Interrupter Switch.** Although the interrupter switch photos shown in this instruction sheet are not fused, the installation procedure is identical for a fused interrupter switch.

Handling

The crate the switch pole-units is packed in is designed to be moved and lifted using a lift truck. Raised slots at 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 and their toggle mechanisms are against their closed stops during installation of both the interphase and vertical operating-pipe sections. Switch blades can be tied to their jaw-contact members, and the toggle mechanisms can be tied to their stops.

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.

Before Starting

NOTICE

Drawings for standard mounting arrangements show only the minimum or suggested locating dimensions for the outboard bearing assembly, vertical-operating-pipe guide bearings and the operating-handle assembly. Specific locations are to be determined either at the job site or by the user's engineering department.

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 1.

Operating Pipe Preparation

Switches Supplied with Operating Pipe:

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

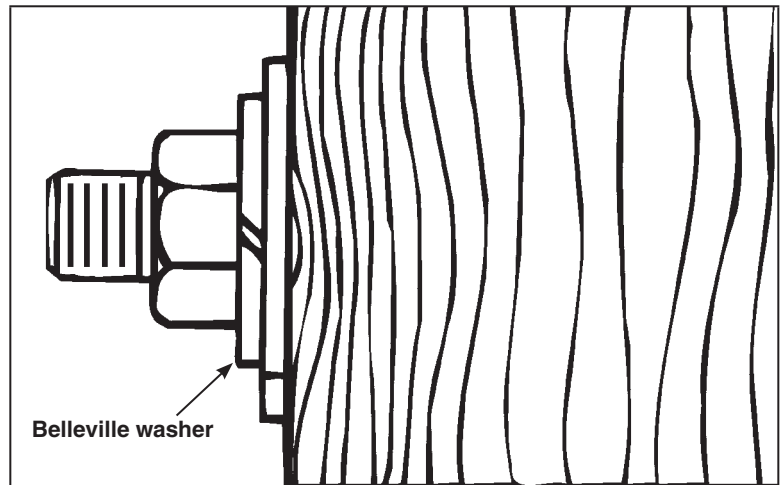


Figure 1. Use a Belleville washer between the nut and square washer.

Installation

Step 1

Remove the switch poles from their crates and arrange them on the ground in the same order in which they will be mounted on the structure. When applicable, arrange the outboard bearing assembly or assemblies in the same manner.

Protect the switch poles and bearings from contamination by dirt, mud, oil, etc. If necessary, use blocks to keep the bearings off of the ground.

Attaching Couplings to the Switch Poles

Step 2

NOTICE

There is an adjustable pipe coupling for each section of interphase pipe. These adjustable couplings are attached to the center switch pole except for triangular-upright and tiered-upright switch mounting configurations. See Figure 4.

Attach pipe couplings to the operating lever of each switch pole. Each pipe coupling includes a $\frac{3}{8}$ -inch spacer, which is used if only one coupling is attached to the operating lever. If two couplings are required, the spacer can be discarded. See Figures 2 and 3.

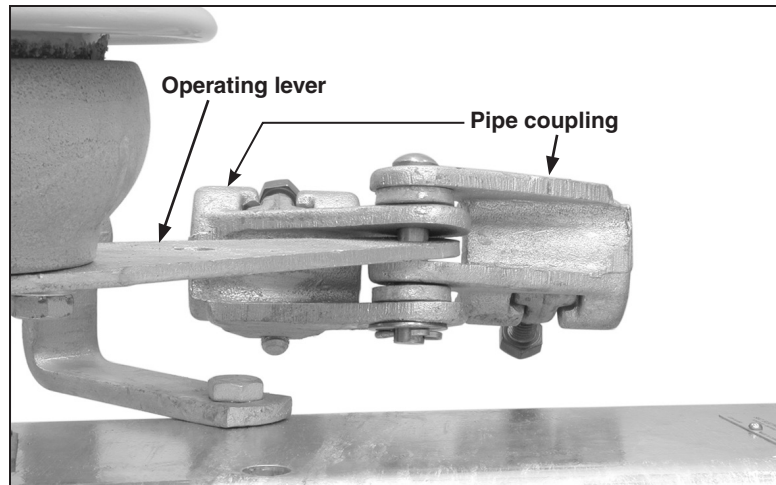


Figure 2. Assemble the pipe coupling to the operating lever—interphase pipe on both sides of operating lever.

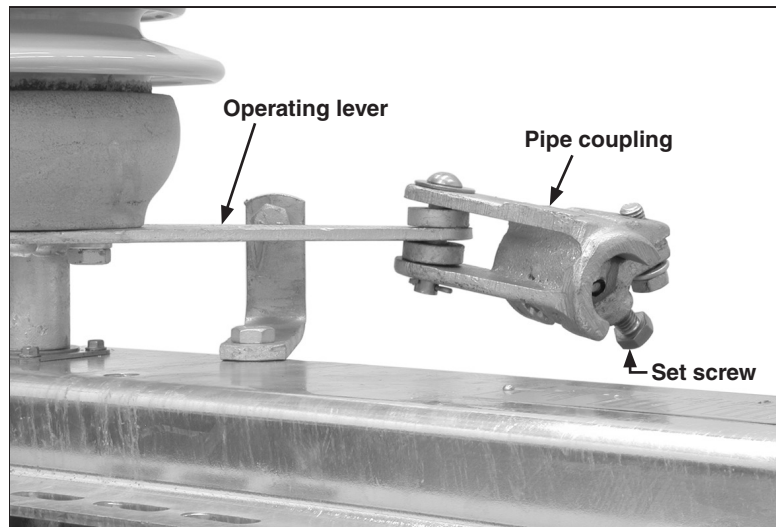


Figure 3. Assemble the pipe coupling to the operating lever—interphase pipe on one side of operating lever.

Step 3

For switches that are directly connected to the vertical operating pipe, attach a pipe-to-switch bearing type universal coupling to the rotating shaft extending below the switch base. See Figure 5.

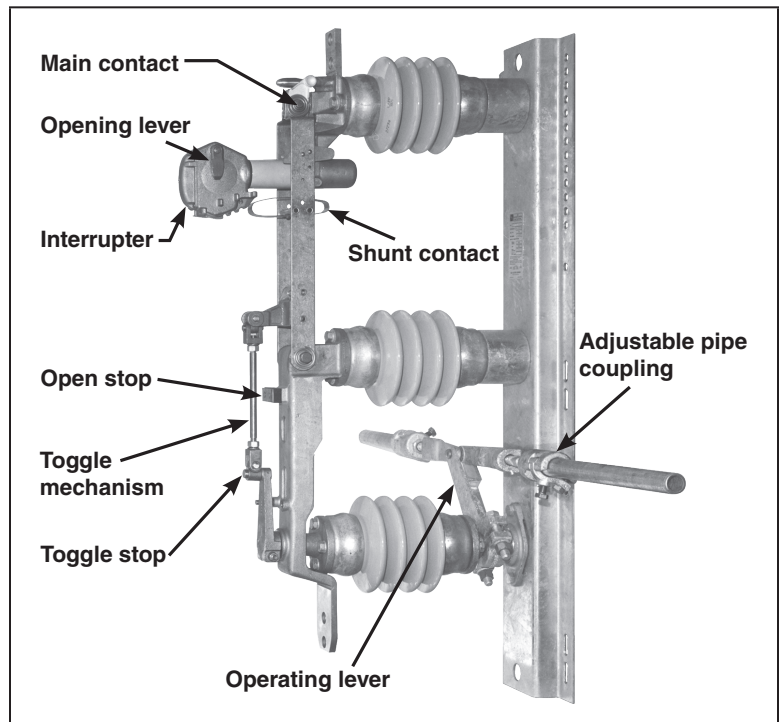


Figure 4. Switch-Pole detail, 600-ampere switch shown. Attach the pipe couplings to the operating lever of each switch pole.

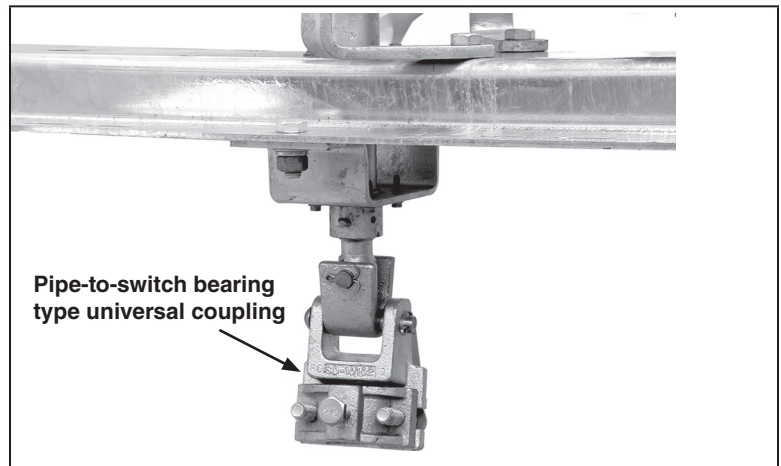


Figure 5. For switches directly connected to the vertical operating pipe, attach a universal coupling to the switch pole rotating shaft.

Installation

Attaching Couplings to Outboard Bearings

Use the following steps to attach couplings to the outboard bearings:

Step 4

Attach pipe coupling(s) to the outboard bearing assembly (or assemblies) in accordance with the item numbers specified on the erection drawing.

Attach a pipe-to-hexagon type universal coupling to the hexagonal shaft on the underside of the outboard bearing assembly. See Figure 6 as well as Detail A-A on the erection drawing. This coupling is used in Step 9 to attach the upper section of vertical operating pipe.

For triangular-upright and tiered-upright switch mounting configurations: Attach additional pipe-to-hexagon type universal couplings that will be used to connect the outboard bearing assemblies.

For mounting configurations using an outboard bearing assembly mounted between switch poles: The outboard bearing connects to the interphase pipe with a drag link (flat-bar or pipe type) and an offset coupling. See Detail A on the erection drawing. Attach one end of the drag link to the outboard bearing crank-arm, then attach the offset coupling to the other end of the drag link. See Figures 7 and 8.

Installing the Switch to the Mounting Structure

Use the following steps to install the switch to the mounting structure:

Step 5

⚠ 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.

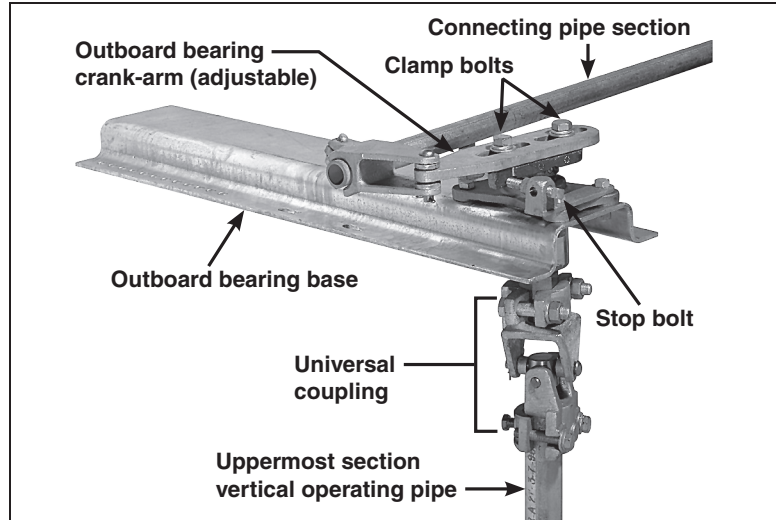


Figure 6. Attach the universal coupling to the switch pole rotating shaft. Typical outboard bearing configuration, upright mounted switch poles.

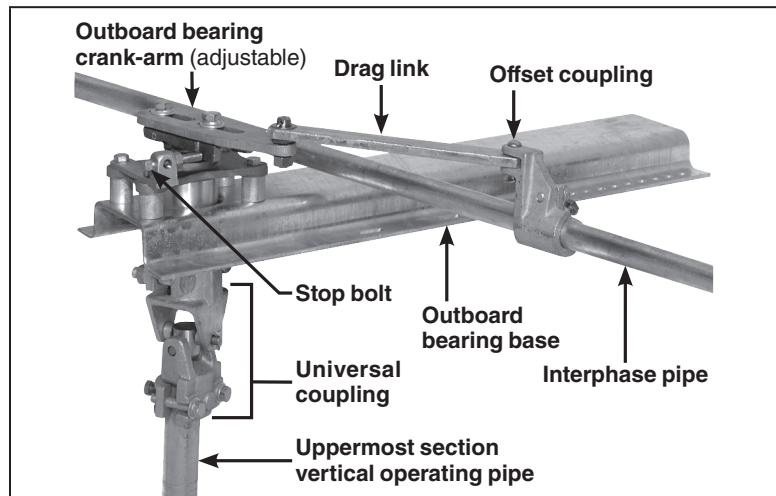


Figure 7. Typical outboard bearing configuration, upright mounted between switch poles, with drag link (flat-bar type).

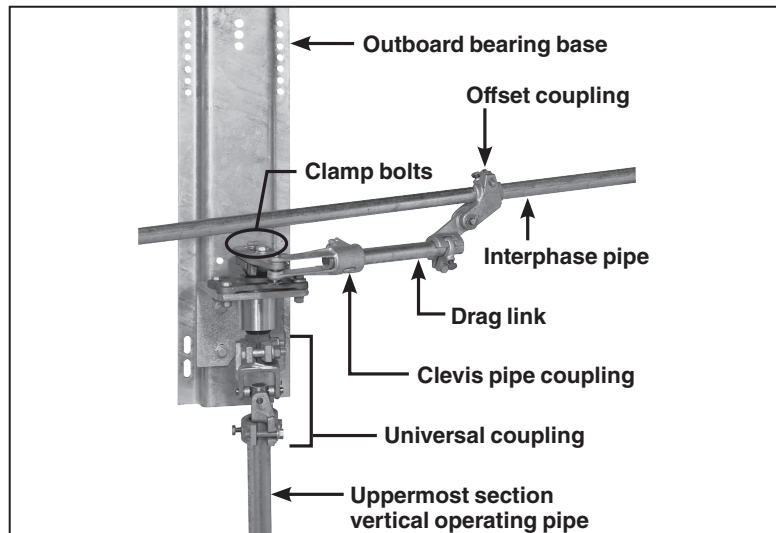


Figure 8. Typical outboard bearing configuration, vertically mounted between switch poles, with drag link (pipe type).

Hoist the individual switch pole-units and bolt them into position on the pole or structure as shown on the erection drawing.

The pole-units should be carefully aligned on the structure. Make sure the surface to which the bases are mounted is flat, level, and plumb to avoid twisting the bases when they are bolted to the structure. Twisting will misalign the blades and place undue stress on the insulators, resulting operating problems. Use shims as required.

Step 6

Mount the outboard bearing assembly (or assemblies) in the position indicated on the erection drawing.

Installing Pipe Couplings with Piercing Set Screws

Step 7

WARNING

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

To properly install the 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, and then tighten the clamp bolt(s) to final tightness.
- (d) Tighten the piercing set screw, piercing the pipe, and continue turning until a firm resistance is felt.
- (e) Make sure the clamp bolt(s) are tight.

The interphase operating pipe and rotating operating handle use piercing set screws to couple clamps to the operating pipe. See Figure 9. Before installing the interphase pipe sections, check that the cutting tip of each piercing set screw does not protrude into the body of the coupling.

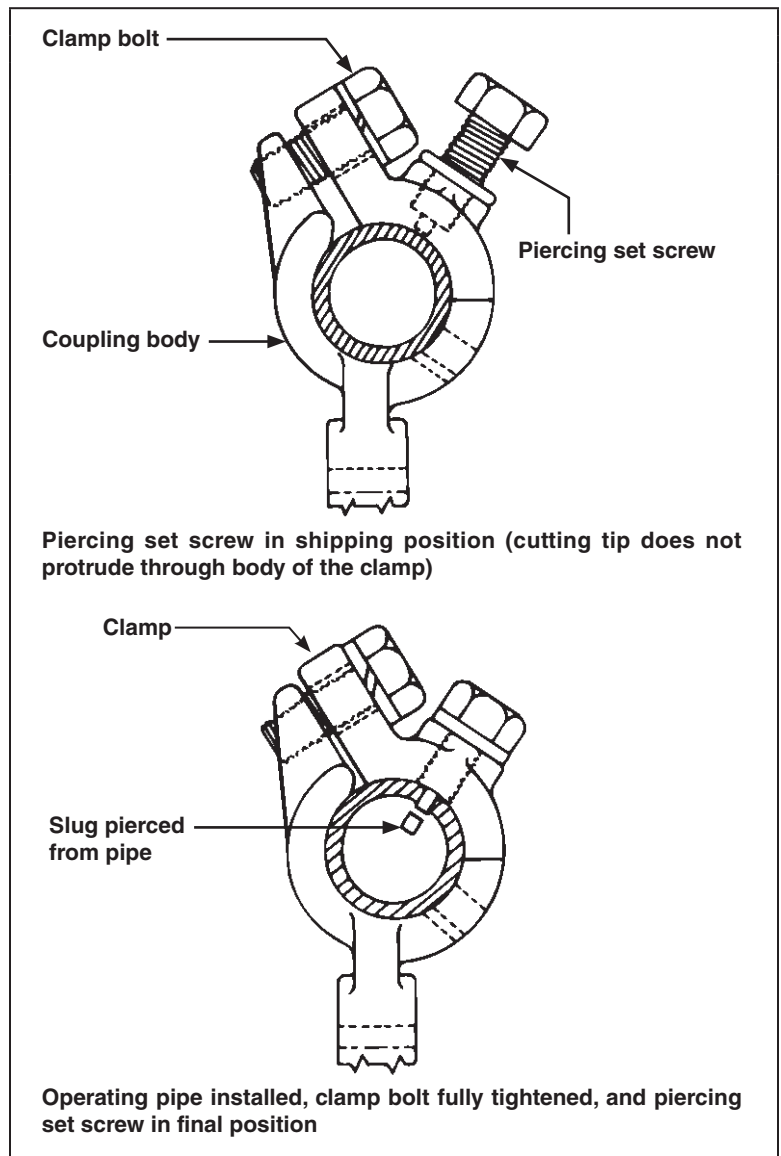


Figure 9. Install the pipe couplings with piercing set screws.

Installation

Installing the Interphase Operating Pipe

Step 8

NOTICE

To minimize time-consuming final adjustments after installation, make sure that the switch poles are in their fully **Closed** position and their toggle mechanisms are against their closed stops during installation of both the interphase and vertical operating-pipe sections. Switch blades can be tied to their jaw-contact members and the toggle mechanisms can be tied to their stops.

Install the interphase pipe sections as follows:

Install the horizontal pipe sections to interconnect the switch poles and the outboard bearing assembly (assemblies).

For triangular-upright or tiered-outboard mounting configuration switches: install the vertical pipe sections to interconnect the outboard bearing assemblies. Torque the clamp bolt of each pipe coupling to final tightness, piercing the pipe, and continue turning until a firm resistance is felt.

When two outboard bearings are used in a double-offset arrangement: install the connecting pipe between these bearings. Torque the clamp bolts of each pipe-coupling clamp to final tightness, and then tighten the associated piercing set screw, piercing the pipe. Continue turning until a firm resistance is felt.

If the outboard bearing assembly is mounted between switch poles: connect the drag link to the interphase pipe, using the offset coupling previously attached to the drag link in Step 3. Torque the clamp bolts of each pipe-coupling clamp to final tightness, and then tighten the associated piercing set screw, piercing the pipe. Continue turning until a firm resistance is felt.

Tighten the take-up screws of the adjustable pipe couplings to remove all play in the interconnecting linkage. Make sure the switch-pole toggle mechanisms remain against their closed stops.

Tighten the locknut on each adjustable pipe-coupling take-up screw.

Installing the Vertical Operating Pipe

Step 9

S&C recommends making up each coupling connection as work progresses from the top down. Starting with the universal coupling connecting the switch to the upper section of vertical operating pipe, and 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 Figures 6, 7, and 8 on page 12. Back the piercing set screw out of the body of the pipe coupling clamp before tightening the bolts.

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

Step 10

Attach a pipe-to-pipe type universal coupling to the lower end of the uppermost section of vertical operating pipe. See Figure 10. 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.

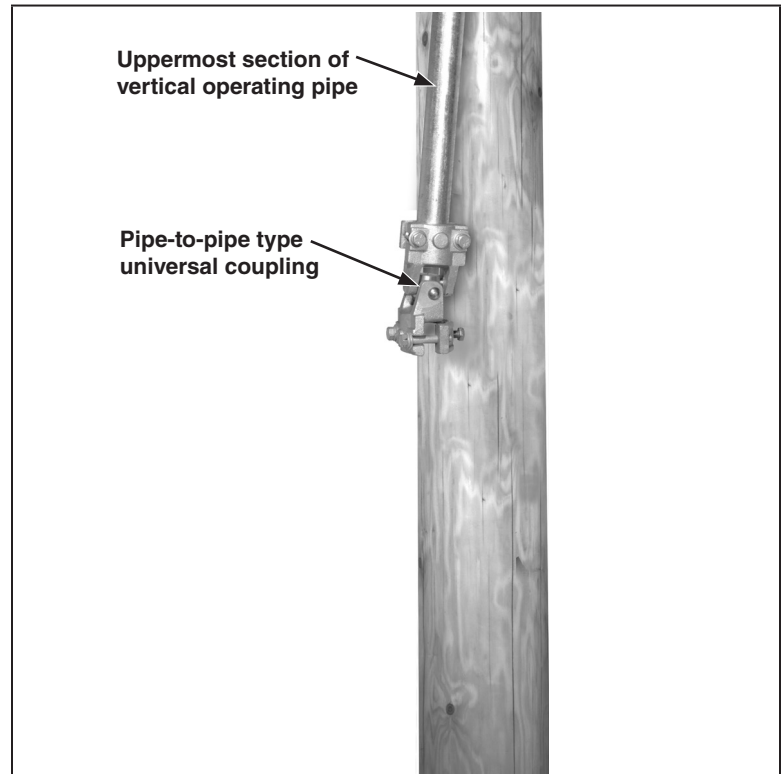


Figure 10. Attach a pipe-to-pipe type universal coupling at the lower end of the vertical operating pipe.

Installation

Step 11

Position and install the guide-bearing assembly on the pole or structure in accordance with the dimension shown on the erection drawing. See Figure 11.

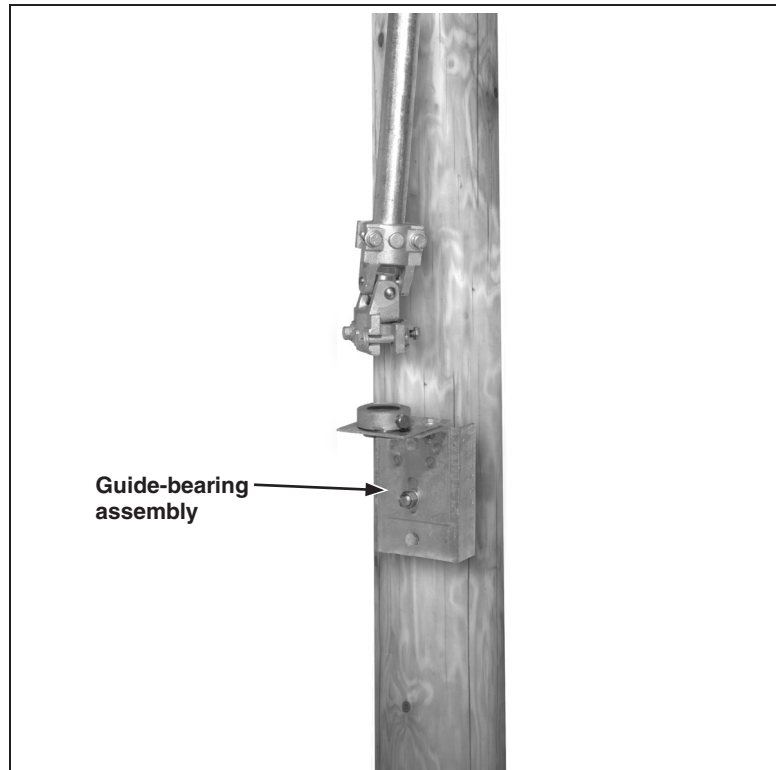


Figure 11. Install the guide-bearing assembly.

Step 12

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.

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. See Detail B on the erection drawing. See Figure 12.

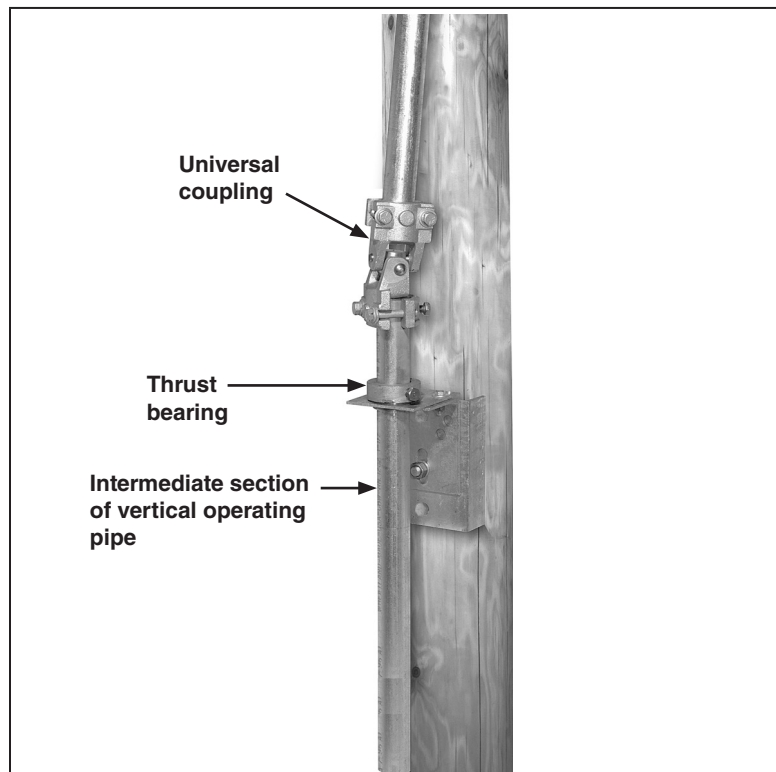


Figure 12. Install the intermediate section of the vertical operating pipe.

Step 13

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 13. 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 14

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.▲

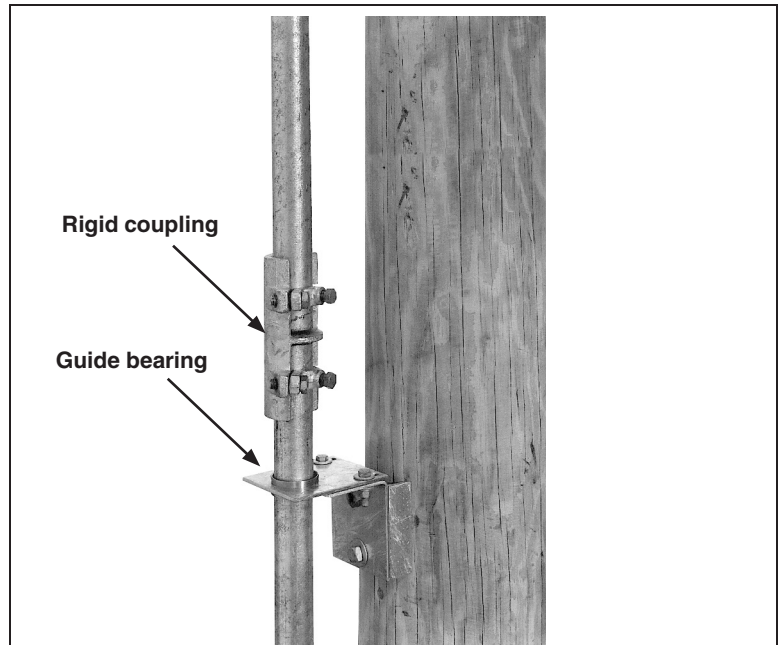


Figure 13. Install the guide bearing for the additional pipe section.

▲ If the shipment includes an S&C Type AS-1A Switch Operator and has been specified with 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 and has been specified with standard minor modification suffix “-S16” to the erection drawing number, refer instead to S&C Instruction Sheet 1045M-510.

Installation

Installing the Rotating Operating Handle

When a key interlock is used (standard minor modification suffix “-S6”), skip to Step 18 on page 29.

When a Type AS-1A Switch Operator is used (standard minor modification suffix “-S8” or “-S9”), refer instead to S&C Instruction Sheet 769-500 for installation instructions. When an S&C 6801M Automatic Switch Operator is used (standard minor modification suffix “-S16”), refer instead to S&C Instruction Sheet 1045M-510 for installation instructions.

Step 15

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 6 to 8 inches of operating pipe below the operating-handle assembly. See Figure 14.

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

Step 16

Slide the foot-bearing assembly onto the lowest section of pipe at the position shown on the erection drawing. See Figure 15. 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, and 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 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.

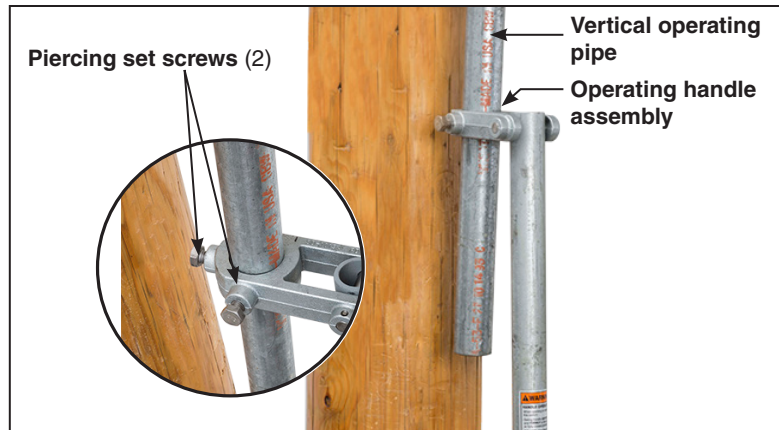


Figure 14. Install the operating handle assembly.

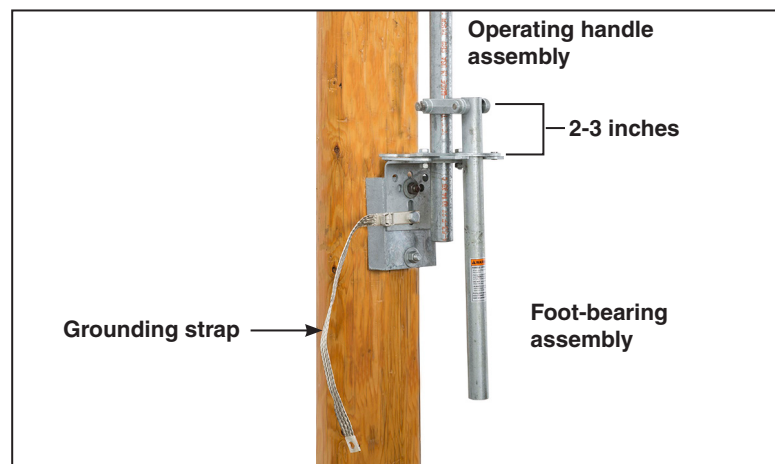


Figure 15. Install the foot-bearing assembly so the handle is two or three inches above the handle yoke.

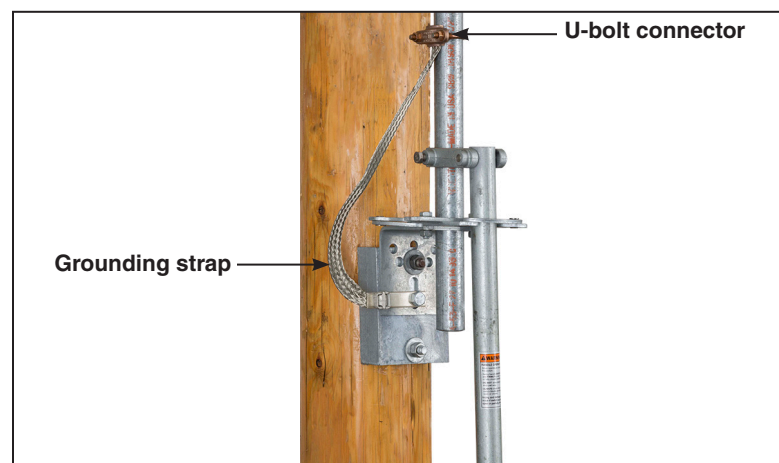


Figure 16. Attach the grounding strap.

Step 17

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 16. Connect the lower end of the strap to a suitable earth ground using the grounding connector provided at the end of the strap.

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.

Installing Operating Handle with Key Interlock**Step 18**

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 17.

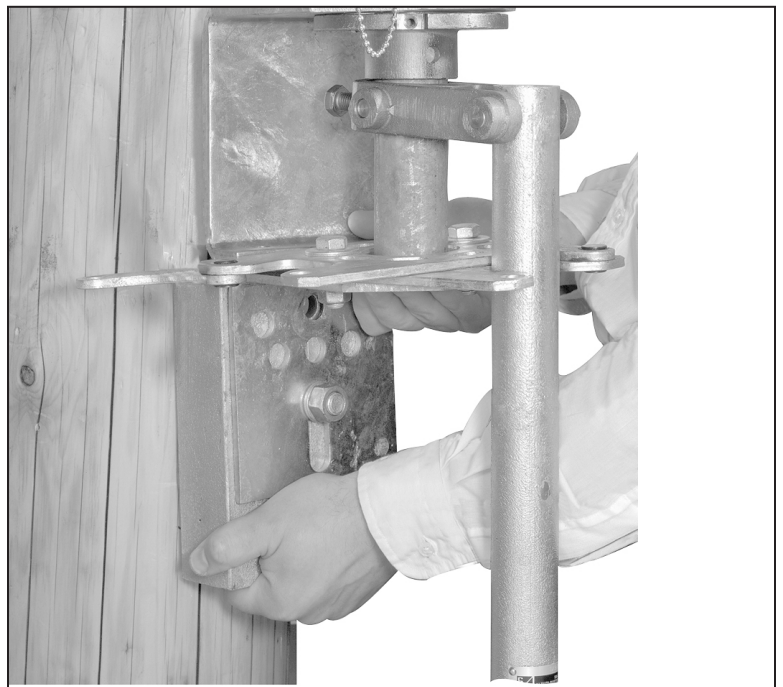


Figure 17. Position the interlock bracket, locking disc, operating handle assembly, and foot-bearing assembly onto the lowest vertical operating pipe section.

Installation

Step 19

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. See Figure 18. The grounding recommendations within this document may differ from the standard operating and safety procedures of certain electric utility companies. Where a discrepancy exists, the operating procedures of the electric utility apply.

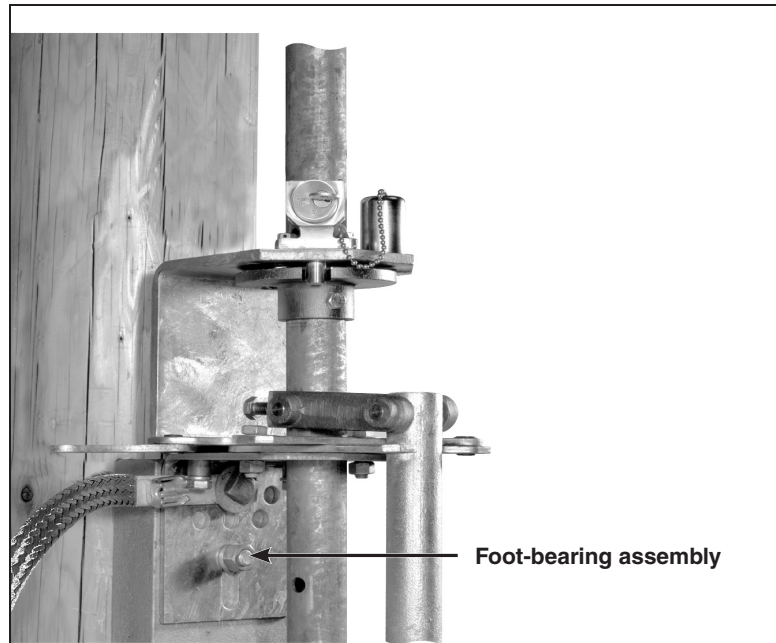


Figure 18. Attach the foot-bearing assembly.

Step 20

Fasten the operating-handle assembly to the lowest vertical operating-pipe section using the piercing set screws furnished. Figure 19.

Tighten the piercing set screws on the operating handle assembly, piercing the pipe, and 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 lock washers 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).

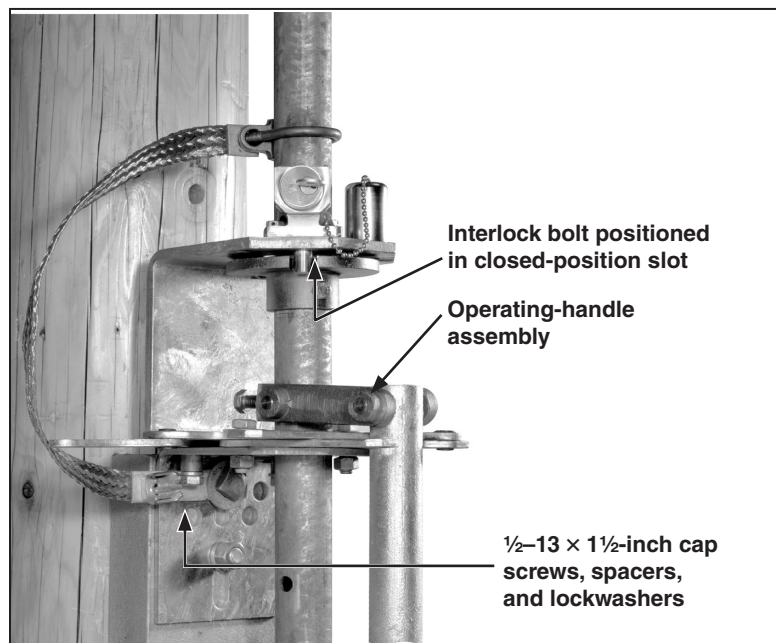


Figure 19. Fasten the operating-handle assembly.

Step 21

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 a guide. Attach the locking disc to the pipe using the $\frac{3}{8}$ -16 \times 3-inch cap screw, lockwasher, and nut furnished. See Figure 20.

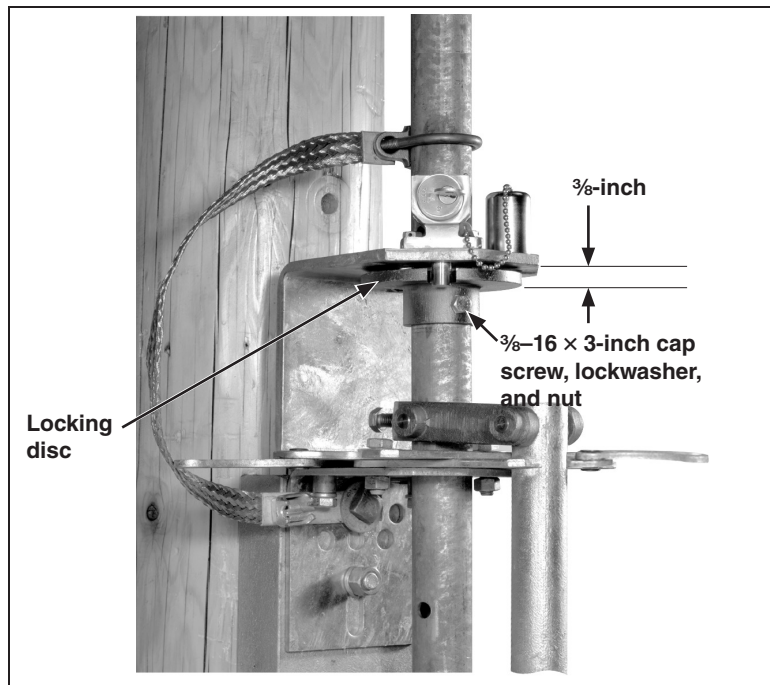


Figure 20. Attach the locking disc.

Step 22

NOTICE

Key interlocks are intended for proper sequencing of switch operations; they are not intended to provide security. The operating handle assembly includes a swing-away hasp for padlocking the switch in either the **Open** or **Closed** position.

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 21.

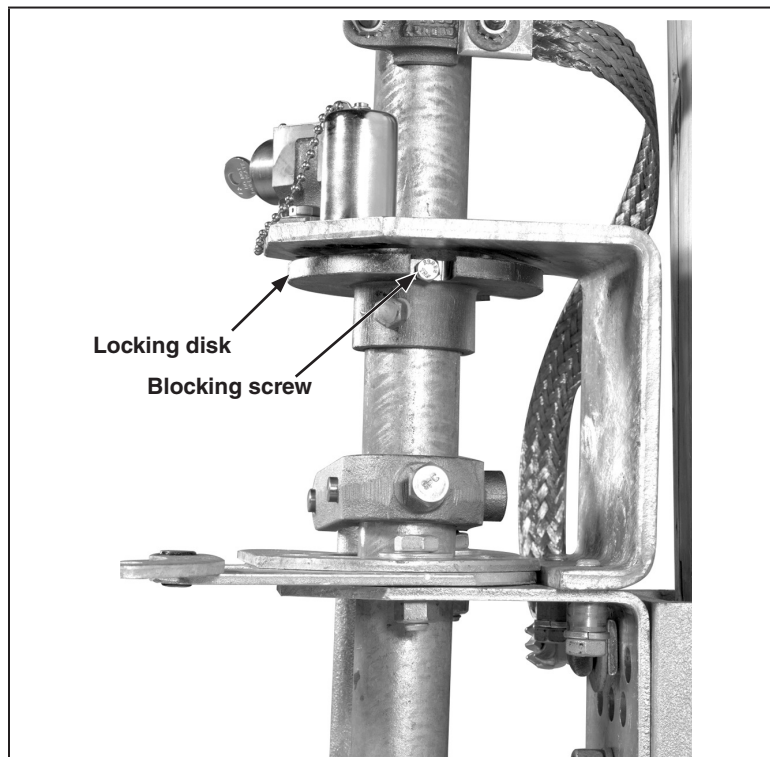


Figure 21. Blocking slot in the interlock disc.

Installation

Checking Alignment and Adjusting the Stop Plates

Step 23

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.

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

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

Step 24

The stop plate holes are slotted to allow room for adjustment. Loosen the bolts securing the adjustable stop-plates to the foot-bearing support plate. See Figure 22. 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 the location of the open-position stop plate on the support plate.

Step 25

NOTICE

DO NOT skip this important step! Loose or improperly installed vertical operating pipe is the primary cause of incomplete blade 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 it creates strong positive blade-to-contact pressure—ensuring the switch is securely held in the **Closed** position.

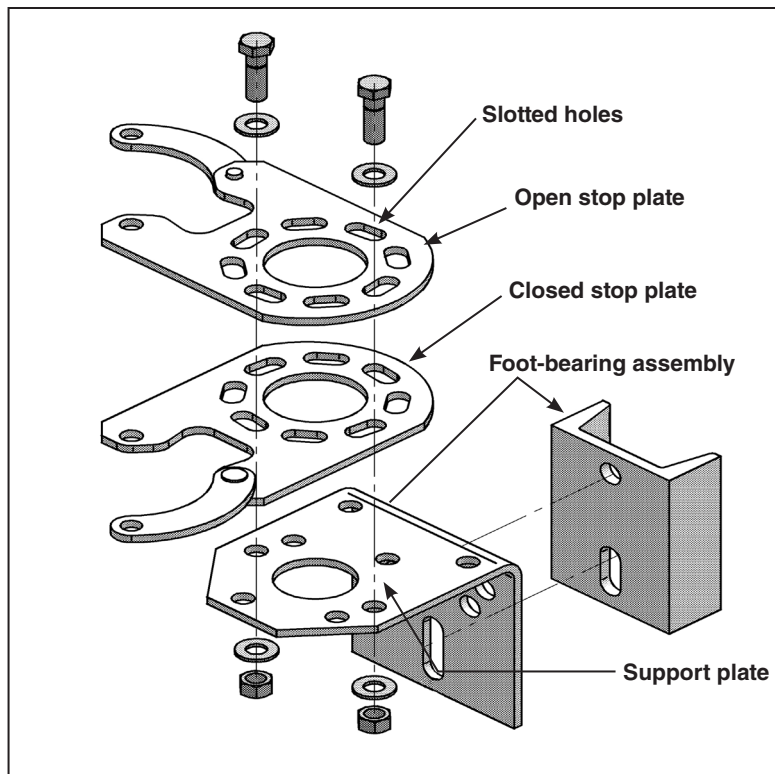


Figure 22. Exploded view of stop plates and foot-bearing assembly.

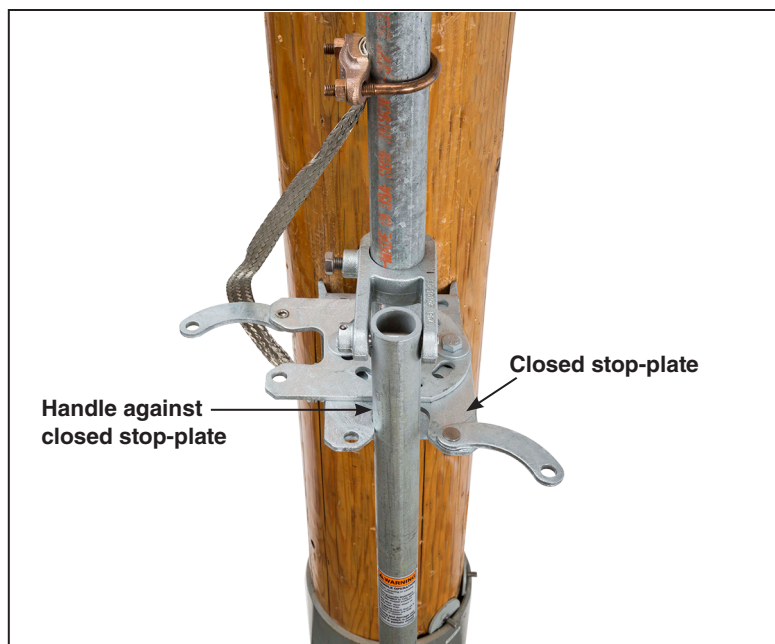


Figure 23. Adjust the closed-position stop plate.

To adjust the closed stop-plate:

- (a) Loosen the hardware securing the closed stop-plate. See Figure 22 on page 22.
- (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 23 on page 22. Mark the position of the closed stop-plate. See Figure 24 (left).
- (c) Lift the handle out of the way, and rotate the stop plate an additional 15 degrees counter-clockwise from the mark. See Figure 24 (right). Make sure the open stop plate lines up with the mark made in Step 24. 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 25.

Step 26

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

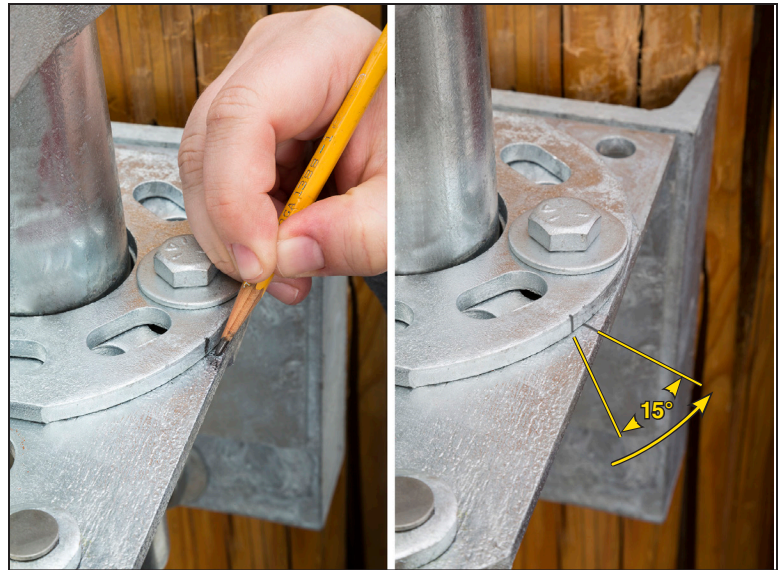


Figure 24. Mark across the open and closed stop plate. Rotate the closed stop plate CCW approximately 15 degrees, and then re-align the open stop plate with the mark made previously. Tighten the hardware.

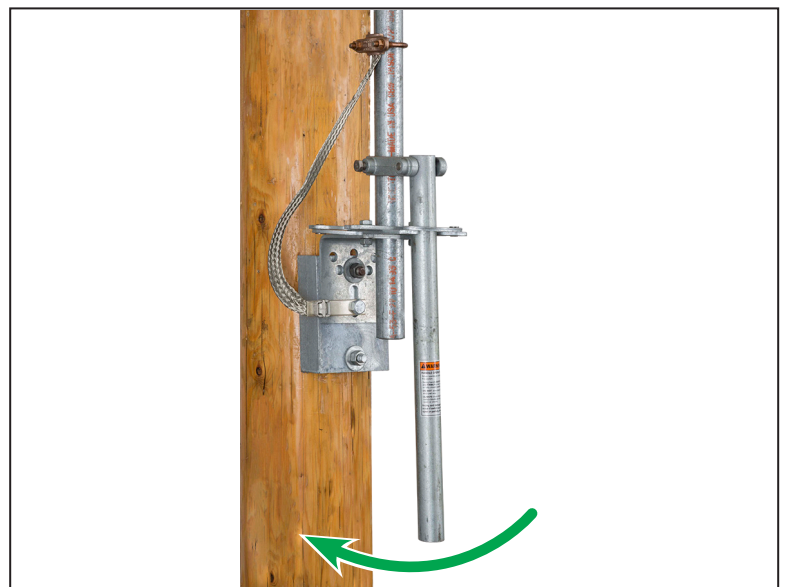


Figure 25. Verify the wind up.

Checking Operation

Step 27

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.

Open and close the switch slowly through its full travel. Check to be sure that the following conditions exist:

- (a) With the operating handle as far as it will go in the closing direction, each switch blade is against its closed stop, and each switch-pole toggle mechanism lies against its toggle stop as shown in Figure 26 and Figure 4 on page 11. The outboard bearing crank arm(s) must be in the over-center toggle position and lie against the stop bolt(s).
- (b) In the unlikely event that only one or two switch poles is fully closed, it is necessary to adjust the take-up screw(s) on the adjustable pipe coupling(s) at the switch pole to increase or decrease the effective length of the interphase operating pipe(s). See Figure 4 on page 11.
- (c) The initial factory settings of the outboard bearing crank-arm length and the stop bolt may require readjustment to provide the correct amount of stroke and toggle action. If more stroke is required, lengthen the outboard bearing crank-arm (in increments of 1/8-inch) until the blades are fully home in the **Closed** position. See Figures 6, 7, and 8 on page 12. If less stroke is needed, shorten the outboard crank arm.
- (d) It is recommended that the outboard bearing crank-arm be set to overstroke slightly to provide positive-drive closure and a definite feel of a locking action at the operating handle. See the note on the erection drawing for the amount of toggle to be obtained.

CAUTION

Be sure to retighten the locknut on the stop bolt and the clamp bolts on the outboard bearing crank-arm after adjusting.

- (e) When an S&C Switch Operator—Type AS-1A or an S&C 6801M Automatic Switch Operator is used, verify that with the switch fully closed there is a clearance of approximately 1/8-inch between the outboard bearing crank-arm and its stop bolt. 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 made to achieve full closure, stroke, or toggle action. Be sure to retighten the locknut when adjustment is completed.

Step 28

Open and close the switch slowly several times and check the operation of each pole. The following conditions must be met:

- (a) 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 as shown in Figure 26.
- (b) 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 in Figure 26.
- (c) In the fully **Closed** position, clearance between the blade closing cam and the interrupter closing lever must be within the limit shown in Figure 26. Also, the clearance between the blade shunt contact and the interrupter housing must be as shown in Figure 26.
- (d) As the blade moves in the opening direction, the blade shunt contact must firmly engage the interrupter housing before the blade disengages from the jaw contact. (The shunt contact may be bent as required to conform to these conditions.)
- (e) If adjustment is required, loosen the bolts that fasten the jaw-contact casting to its insulator and slightly rotate the entire contact-and-interrupter assembly to achieve the necessary clearances. Retighten the bolts. Make sure such an adjustment does not disturb the main contact alignment. The blade contact spacer must enter the slot in the jaw-contact casting and be centered in the slot when the blade is fully closed, and the blade must engage the stationary contact on-center.

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 shipping.

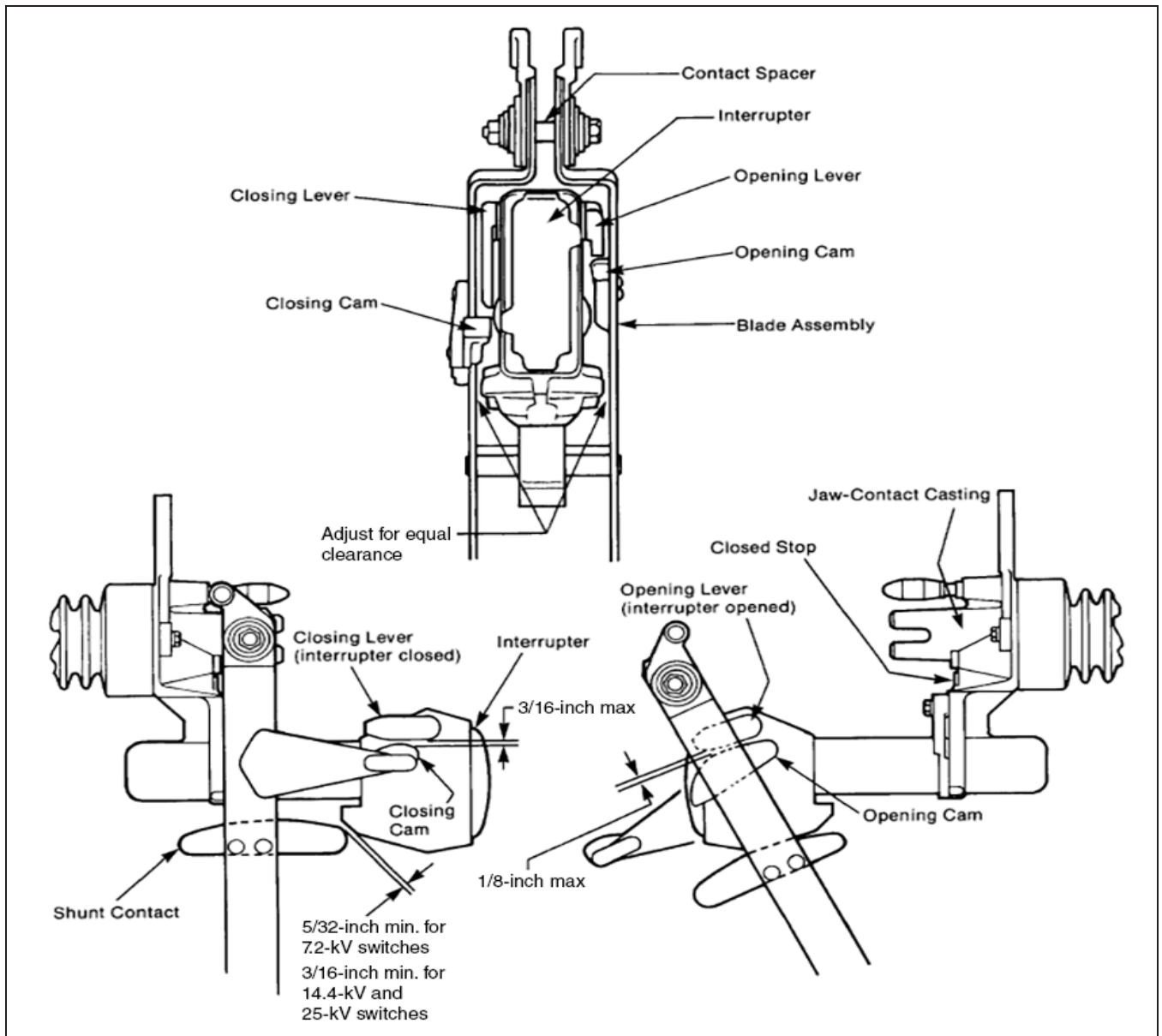


Figure 26. Operation checkpoints.

Installation

Step 29

Attach the danger label to the pole or structure using two straps or bolts (user-furnished). See Figure 27.

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.

Connecting High-Voltage Conductors

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

- (a) Thoroughly wire-brush the current-transfer surfaces of each connector, and immediately apply a liberal coating of Penetrox® A (available from Burndy Corporation) or another suitable aluminum connector compound to the brushed surfaces.
- (b) Wire-brush each terminal pad of the interrupter switch, and apply a coating of Penetrox A. 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.

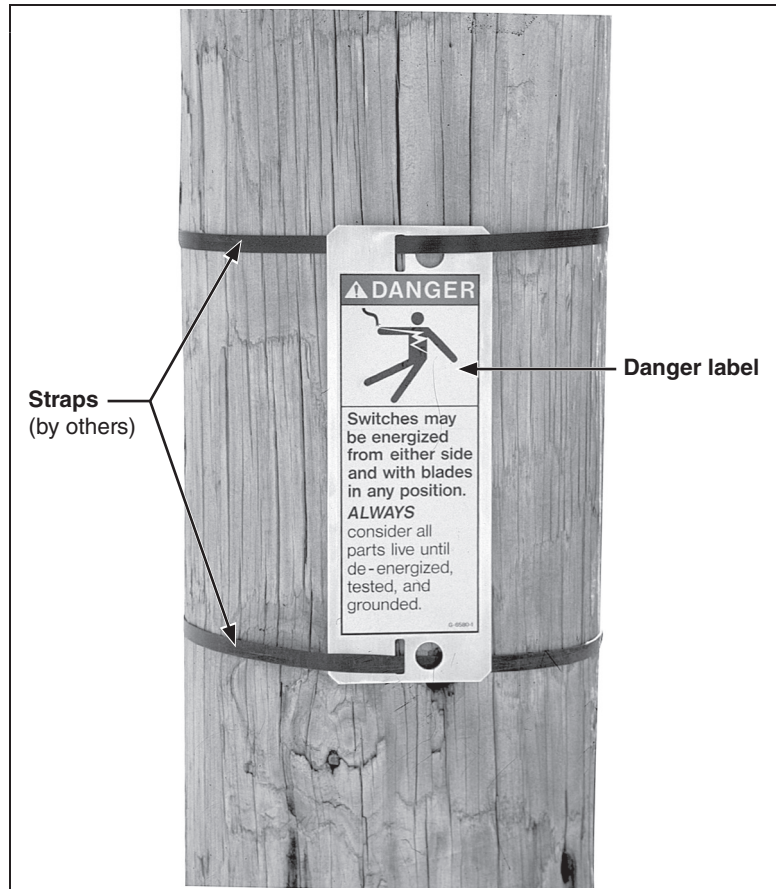


Figure 27. Attach the danger label to the pole or structure.

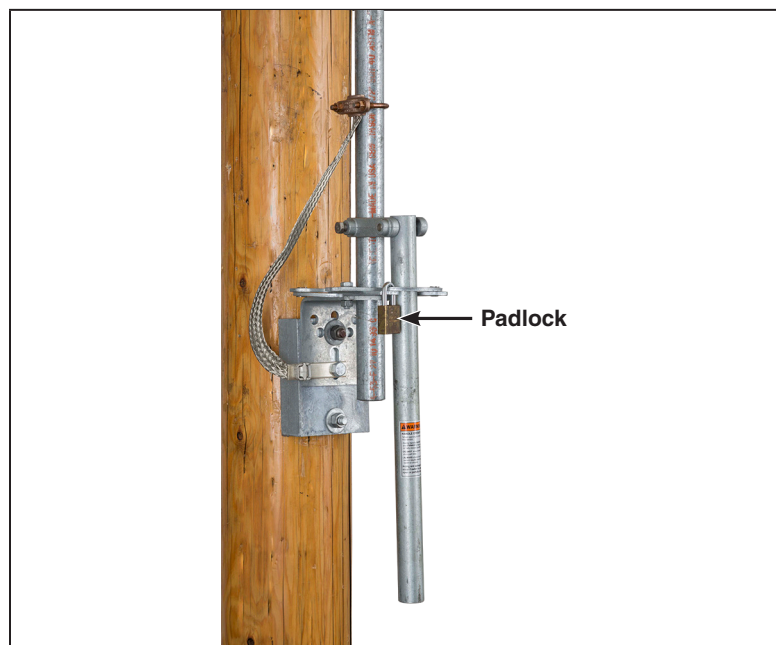


Figure 28. Remove the padlock from the manual operating handle.

Opening and Closing the Switch

⚠ 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, and then 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 30

To operate the Alduti-Rupter Switch:

- (a) Remove the padlock(s) from the hasps on the operating-handle assembly. See Figure 28 on page 26.
- (b) If the operating handle assembly is furnished with a key interlock, disengage the interlock bolt. See Figure 29.

⚠ CAUTION

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.

- (c) Swing the handle rapidly to the fully open or fully **Closed** position. Check that all three poles are fully open or fully closed. See Figure 30.
- (d) Replace the padlock(s). Engage the key interlock, if applicable.



Figure 29. Disengage the key interlock bolt.

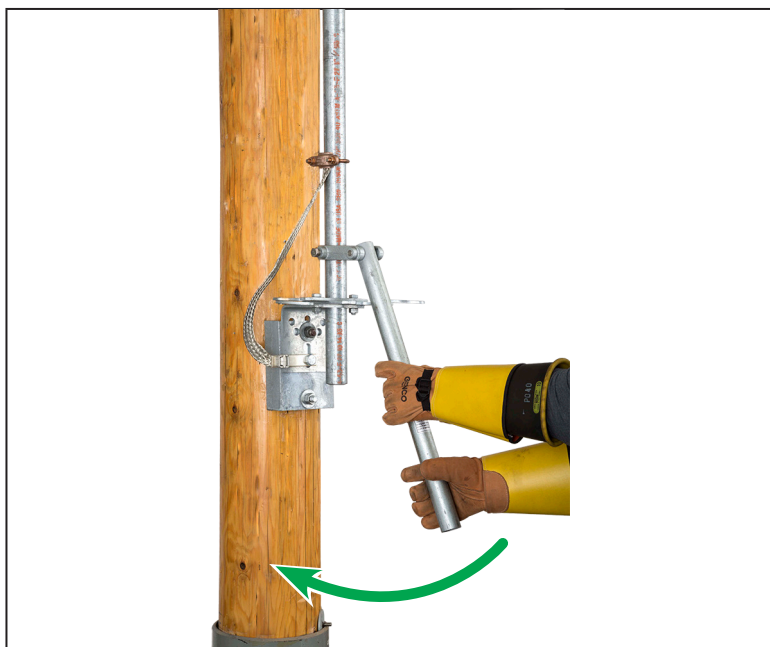


Figure 30. Rapidly swing the manual operating handle.

