Installation and Operation

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December 5, 2016

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

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.

Retain this Instruction Sheet

NOTICE

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 the S&C Specification Bulletin 761-31 for complete application information.

NOTICE

These interrupter switches are not intended for breaking fault currents.

These interrupter switches are capable of switching rated continuous load currents at full voltage. No interlocking with secondary protective equipment is required.

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.

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 determine that the switch blades are in the intended position. 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 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 which 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.

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 the 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 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 **sandc.com**, or call S&C Headquarters at (773) 338-1000; in Canada, call S&C Electric Canada Ltd. at (416) 249-9171.

NOTICE

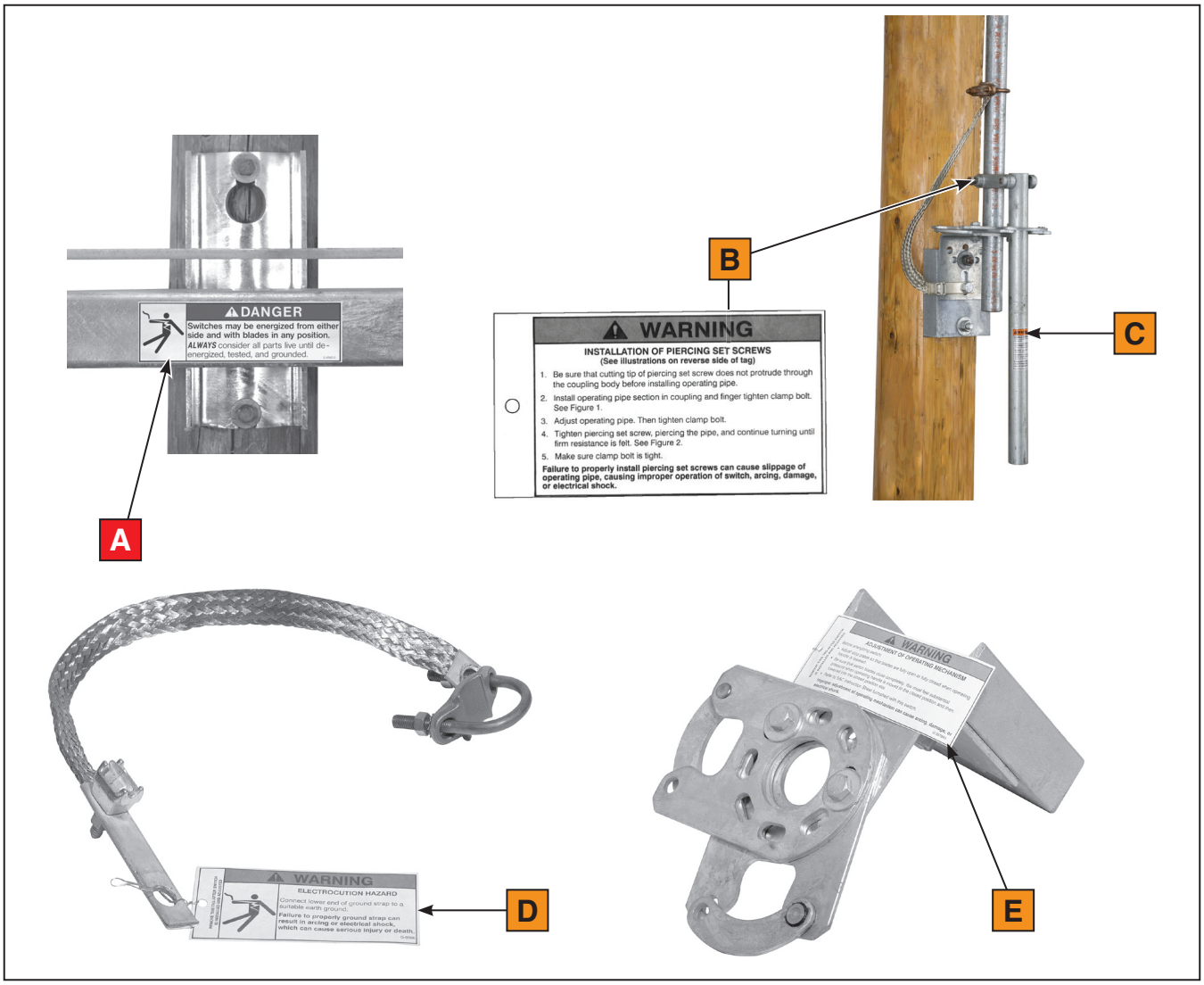
Read this instruction sheet thoroughly and carefully before installing or operating your S&C Alduti-Rupter Switch.

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-6580-2
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 "Operation" on page 28.

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 the 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.

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 that 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 (switch may be furnished "less operating pipe," if specified)
3. An interphase or outboard bearing assembly (or assemblies) to connect the switch to the vertical operating pipe
4. Miscellaneous mounting hardware (less through bolts) for securing the Alduti-Rupter switch to the mounting structure
5. 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
6. 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: 2-inch IPS operating pipe.

   -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 or pedestal-mounted switch by S&C Switch Operator Type AS-1A

   -S16: Provision for power operation of pole-mounted switch by S&C 6801M Automatic Switch Operator–Rotating.

7. **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 either RD-10007 (Modifications to Std Bill of Materials for Rotating-Type Operating Mechanisms w/ S/B & V/B 3-Pole-Style Switches (Octagon Coupling) or RD-10010 (Modifications to Std BOM for Rotating-Type Oper Mechanisms w/ S/B & V/B 3-Pole-Style Switches (Single or Double Offset & Hex Coupling) is included. A custom erection drawing will be provided for special mounting arrangements. Contact your nearest S&C Sales Office for details.
8. **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.

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

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.

Operating Pipe Preparation

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

Mounting to a Wood Pole

NOTICE

When mounting the switch and its operating mechanism to a wood structure or pole, it is recommended that suitably sized square washers be placed under the nuts. Use Belleville washers between the square washers and nuts to compensate for wood shrinkage and maintain fastener tightness. See Figure 1.

Uncrating the Switch

Step 1

Remove the switch poles and outboard bearing assembly (or assemblies), if applicable, from their crates, and arrange them on the ground in the same order in which they will be mounted on the structure. Protect the switch poles and bearings from contamination by dirt, mud, oil, etc. If necessary, use blocks to keep the bearings clear of the ground.

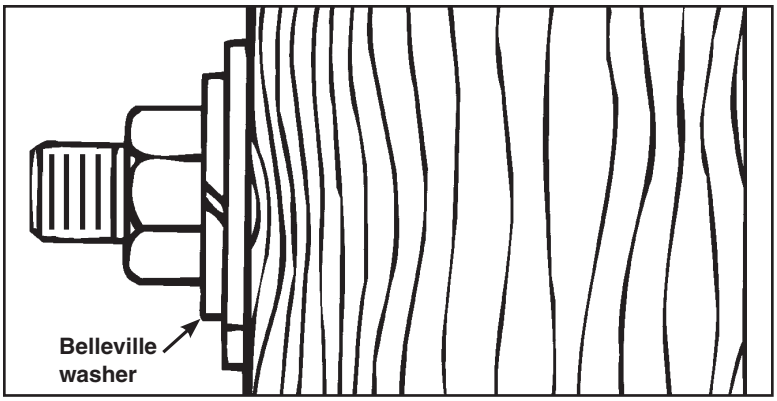


Figure 1. Use a Belleville washer between the nut and square washer.

Attaching the Couplings to the Switch Pole-Unit

Step 2

Attach the pipe couplings to the operating levers of each switch pole-unit. Each pole-unit operating lever is furnished with one ⅜-inch spacer. The spacer is used when only one coupling is attached to the operating lever. Discard the spacer if two couplings are required.

Refer to the item numbers on the erection drawing for exact order and placement. See Figures 2 and 3.

NOTICE

An adjustable pipe coupling is supplied with each interphase pipe section. These adjustable couplings are attached to the center switch pole-unit, except for triangular-upright and tiered-upright switch mounting configurations.

Step 3

For switches directly connected to the vertical operating pipe, attach a pipe-to-switch bearing type universal coupling to the rotating shaft that extends below the switch base. Connect a pipe-to-hexagon type universal coupling to the underside of the switch pole. See Figure 4.

Attach an open stop bracket to the base of the switch pole. Adjust the stop bolt for 90-degree opening. See Figure 8 on page 12.

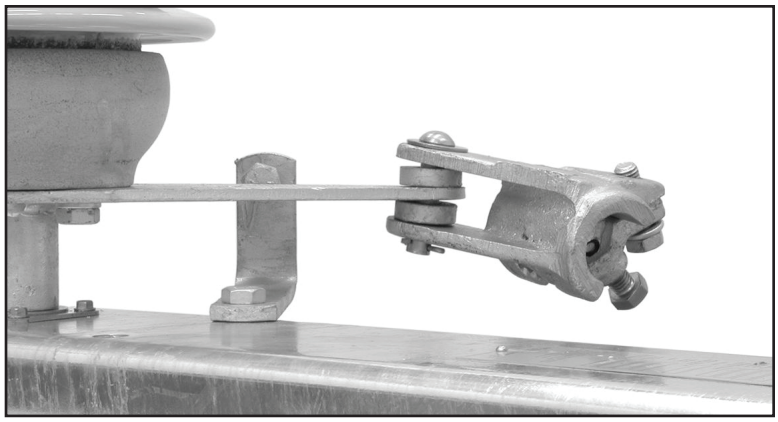


Figure 2. Assemble the pipe coupling to the operating lever—interphase pipe on one side of the operating lever.

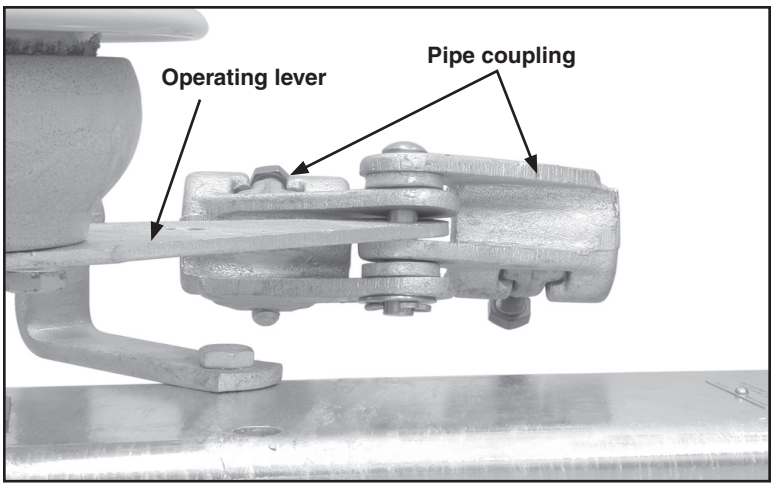


Figure 3. Assemble the pipe coupling to the operating lever—interphase pipe on both sides of the operating lever.

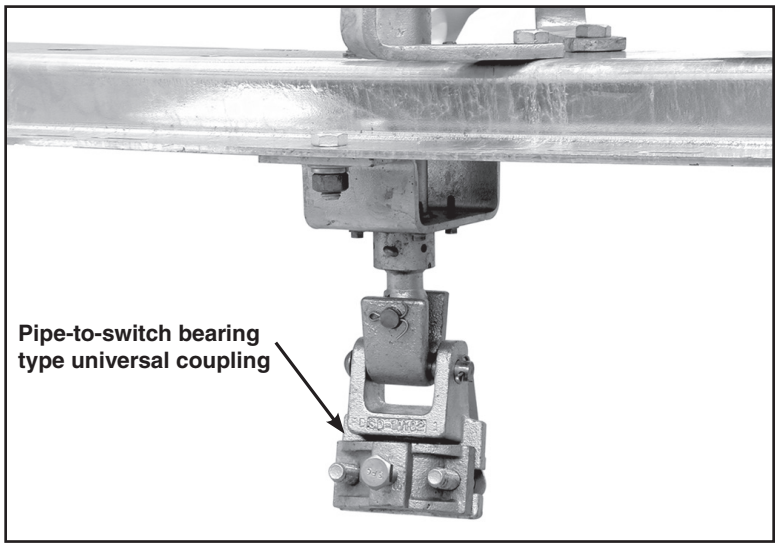


Figure 4. For switches directly connected to the vertical operating pipe, attach a universal coupling to the switch pole rotating shaft.

Attaching Couplings to the Outboard Bearings

Step 4

Most mounting arrangements will use an outboard bearing assembly to connect the vertical operating pipe to the interphase operating pipe. The type of outboard bearing assembly or assemblies used depends on the switch mounting arrangement.

For outboard bearing assemblies mounted outboard of the switch pole-units: Attach a pipe coupling to the adjustable outboard bearing crank-arm of the outboard bearing assembly. Afterward, attach a universal coupling to the hexagonal shaft on the underside of the outboard bearing assembly. See Figure 5.

For triangular-upright and tiered-upright switch mounting configurations: More than one bearing assembly is typically used. Attach additional pipe-to-hexagon type universal couplings to interconnect the outboard bearing assemblies, as shown on the erection drawing.

For outboard bearing assemblies mounted between switch poles: A drag link (flat-bar type or pipe type) is used between the crank-arm and the coupling. Attach the drag link to the crank-arm of the outboard bearing assembly. Afterward, attach the offset coupling to the drag link. See Figure 6 on this page and Figure 7 on page 12.

Refer to the item numbers on the erection drawing for exact order and placement.

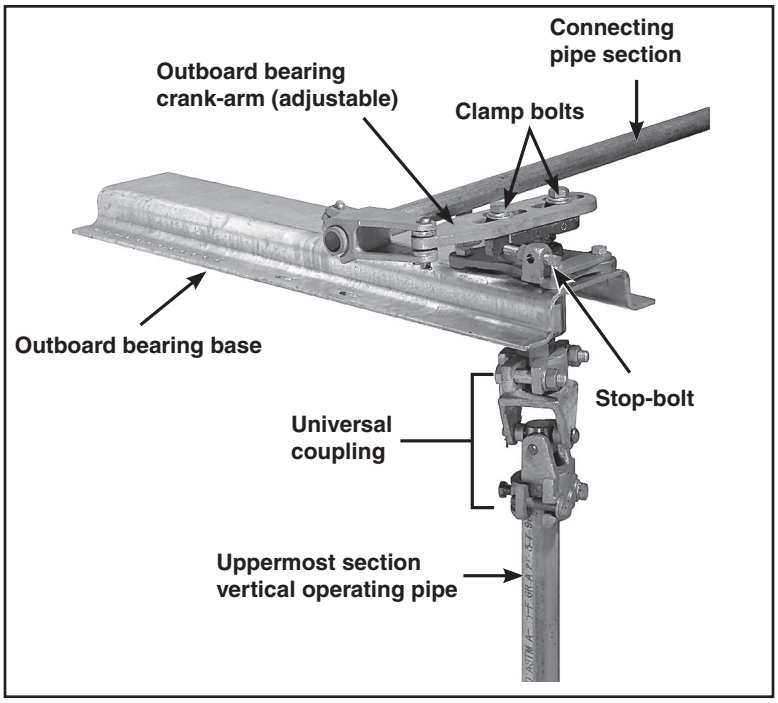


Figure 5. Attach the universal coupling to the switch pole rotating shaft. Typical outboard bearing configuration, upright mounted outboard of the switch poles.

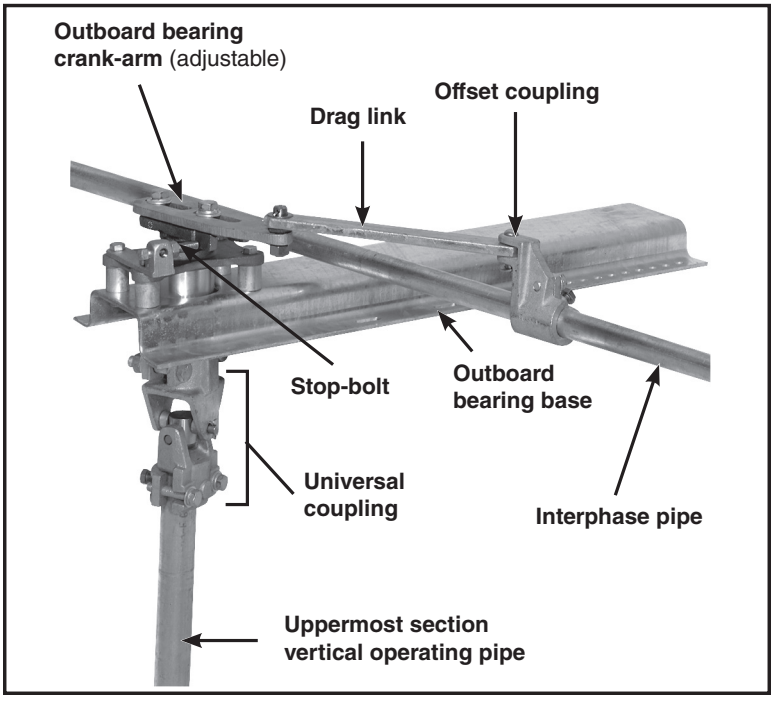


Figure 6. Typical outboard bearing configuration, upright mounted between the switch poles, with drag link (flat-bar type).

Step 5

Attach the open-stop bracket to the switch pole-unit that will connect to the outboard bearing assembly. Adjust the stop bolt for 90-degree opening. See Figure 8.

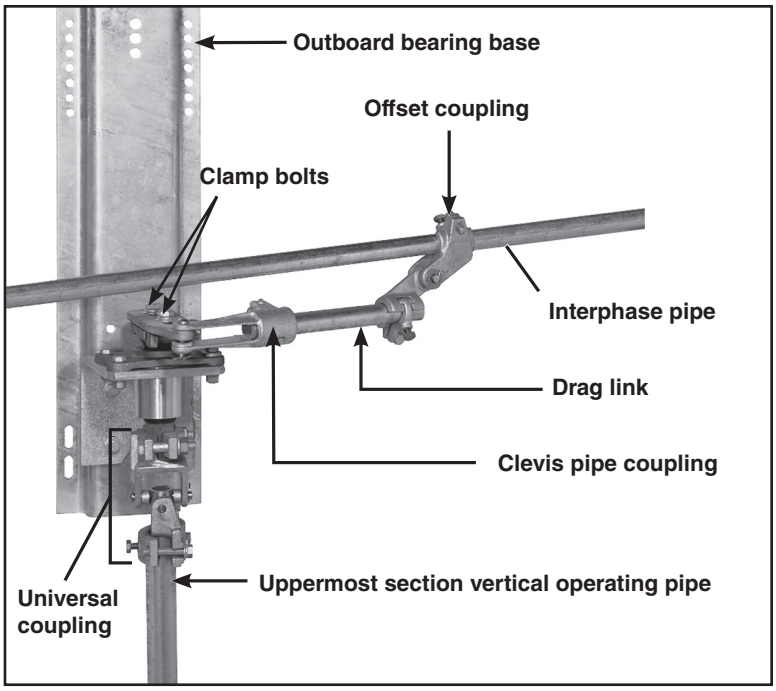


Figure 7. Typical outboard bearing configuration, vertically mounted between the switch poles, with drag link (pipe type).

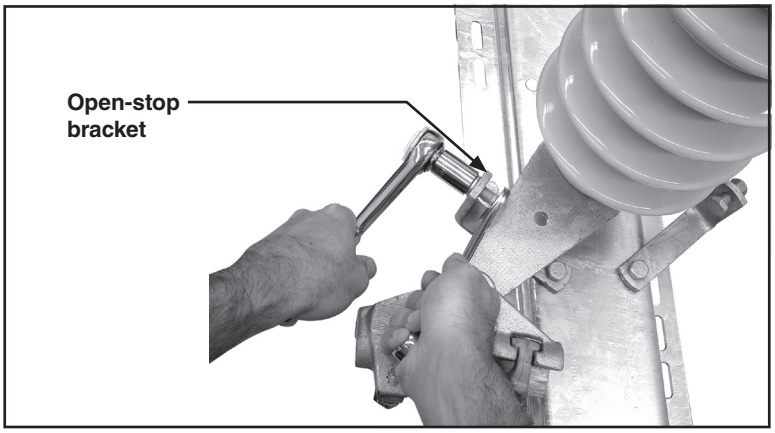


Figure 8. Attach the open-stop bracket to the switch-pole that will connect to the vertical operating pipe or the outboard bearing assembly.

Lifting and Installing the Switch

⚠ WARNING

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 6

To minimize time-consuming final adjustments, make sure the switch pole-units are fully closed. Tie the switch blades to their stationary main contacts. See Figure 9.

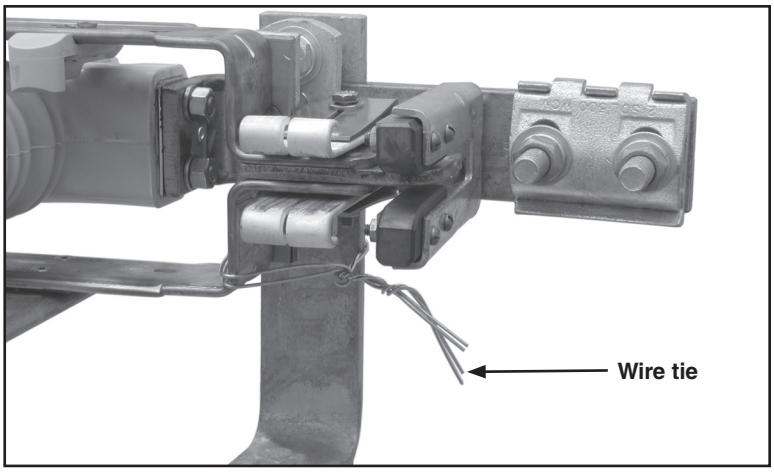


Figure 9. Tie the switch blade to the main contact.

Step 7

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

NOTICE

An adjustable pipe coupling is supplied with each interphase pipe section. These adjustable couplings are attached to the center switch pole-unit, except for triangular-upright and tiered-upright switch mounting configurations.

Step 8

Hoist the outboard bearing assembly, if applicable, and bolt it into position as shown on the erection drawing.

Step 9

Make sure the outboard bearing assembly crank arm(s), if applicable, is against the stop-bolt. See Figure 10.

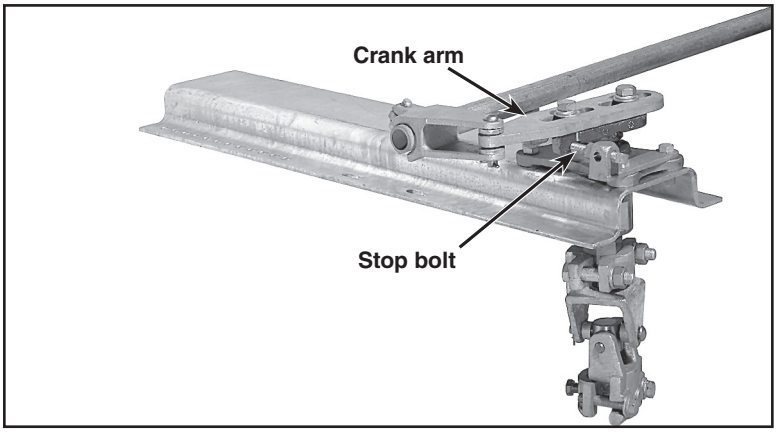


Figure 10. Make sure the outboard bearing crank arm is against the stop bolt.

Installing Pipe Couplings with Piercing Set Screws

Step 10

The interphase operating pipe, vertical operating pipe, and rotating operating handle use piercing set screws to couple to the operating pipe. See Figure 11. 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.

⚠ 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:

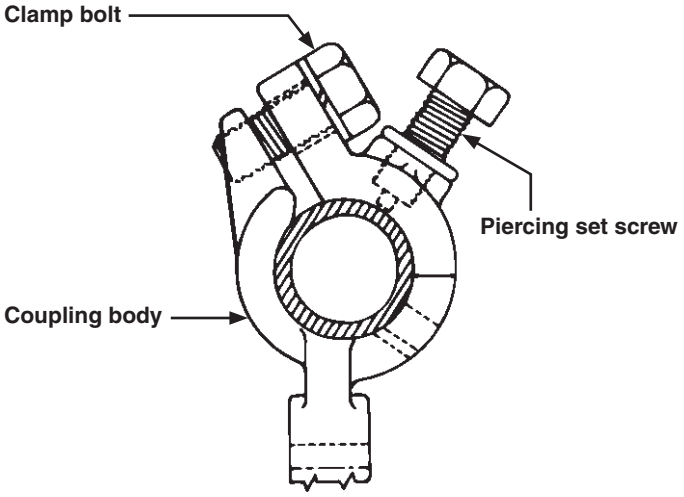
(a) Back the piercing set screw out of the coupling so the tip does not protrude into the body of the coupling.

(b) Insert the operating pipe section into the coupling, and finger-tighten the clamp bolt(s).

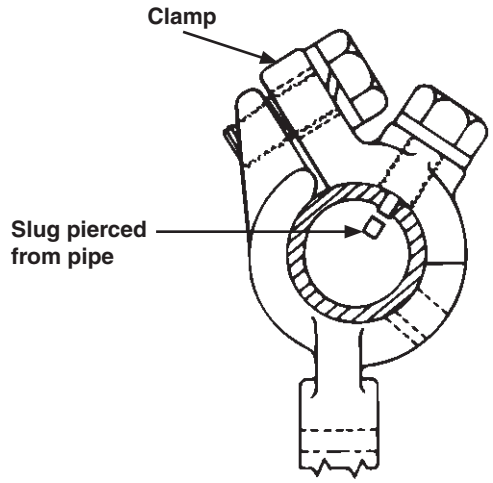
(c) Adjust the operating pipe to the correct length. Afterward, tighten the clamp bolt(s) to final tightness.

(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.



Piercing set screw in shipping position (cutting tip does not protrude through body of the clamp)



Operating pipe installed, clamp bolt fully tightened, and piercing set screw in final position

Figure 11. Install the pipe couplings with piercing set screws.

Installing the Interphase Operating Pipe

Step 11

Install the horizontal interphase pipe sections to interconnect the switch poles and the outboard bearing assembly (or assemblies). Follow the directions in "Installing Pipe Couplings with Piercing Set Screws" in Step 10 on page 14. Tighten the clamp bolt of each affected pipe-coupling clamp to final tightness. Afterward, tighten the associated piercing set screw, piercing the pipe. Continue turning until a firm resistance is felt.

For triangular-upright or tiered-upright mounting configuration switches: Install the vertical pipe sections to interconnect the outboard bearing assemblies. Follow the directions in "Installing Pipe Couplings with Piercing Set Screws" in Step 10 on page 14. Tighten the clamp bolt of each affected pipe-coupling clamp to final tightness. Afterward, tighten the associated piercing set screw, piercing the pipe. Continue turning until a firm resistance is felt.

If two outboard bearing assemblies are used in a double-offset arrangement: Install the connecting pipe between these bearings. Follow the directions in "Installing Pipe Couplings with Piercing Set Screws" in Step 10 on page 14. Tighten the clamp bolt of each affected pipe-coupling clamp to final tightness. Afterward, 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 installed in Step 4 on page 11. Follow the directions in "Installing Pipe Couplings with Piercing Set Screws" in Step 10 on page 14. Tighten the clamp bolt of each affected pipe-coupling clamp to final tightness. Afterward, tighten the associated piercing set screw, piercing the pipe. Continue turning until a firm resistance is felt.

Step 12

Tighten the take-up screws of the adjustable pipe couplings to remove all play in the interconnecting linkage. Make sure the switch pole-unit operating levers remain against their closed stops during installation. Tighten the locknut on each adjustable pipe-coupling take-up screw.

Installing the Vertical Operating Pipe

Step 13

S&C recommends making each coupling connection as work progresses from the top down. This starts with the universal coupling connecting the switch to the upper section of vertical operating pipe and continues with the coupling between the upper section of vertical operating pipe and the first lower section. It then continues down to the last section of pipe, and ends 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. If two outboard bearing assemblies are used, attach the uppermost section of vertical operating pipe to the lower outboard bearing. See Figures 6 on page 11, and Figure 7 on page 12.

If no outboard bearing assembly is used, attach the uppermost section of vertical operating pipe to the universal coupling attached to the base of the pole unit. See Figure 4 on page 10.

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. Afterward, tighten the piercing set screw, piercing the pipe. Continue turning until a firm resistance is felt.

Step 14

Attach a pipe-to-pipe type universal coupling to the lower end of the uppermost section of vertical operating pipe. See Figure 12. 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. Afterward, tighten the piercing set screw, piercing the pipe. Continue turning until a firm resistance is felt.

Step 15

Position and install the guide-bearing assembly on the pole or structure in accordance with the dimension shown on the erection drawing. See Figure 13.

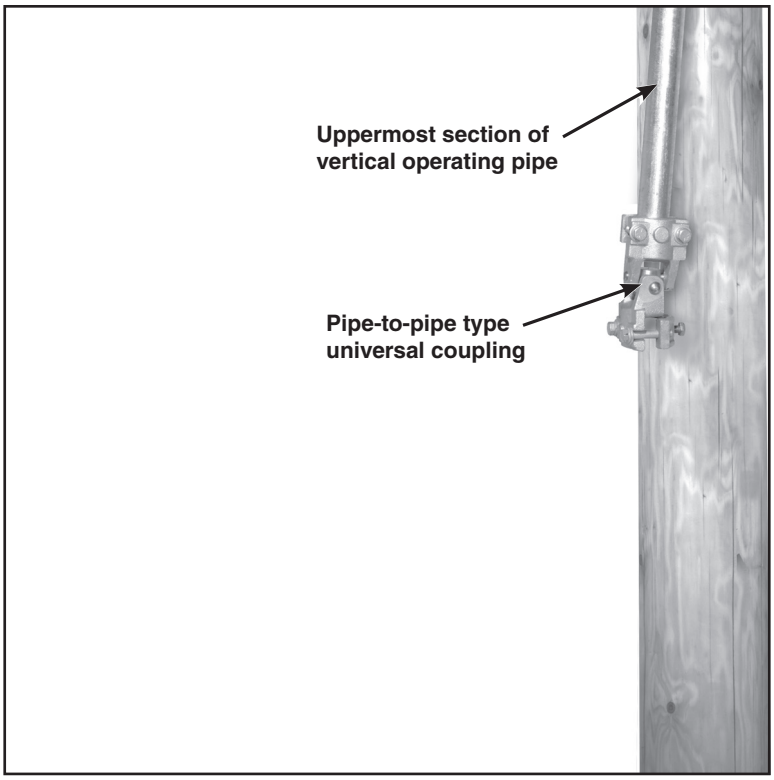


Figure 12. Attach pipe-to-pipe type universal coupling at lower end of vertical operating pipe.

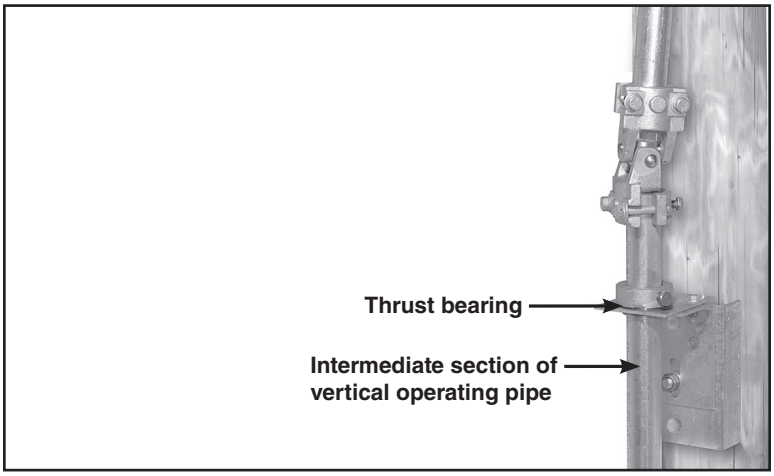


Figure 13. Install the guide bearing.

Step 16

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 Figure 14.

Step 17

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 15. Thrust bearings are only necessary on the uppermost guide bearing.

Install rigid couplings to join the remaining pipe sections. Before installing each 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. Afterward, tighten the piercing set screws, piercing the pipe. Continue turning until a firm resistance is felt.

Torque the clamp bolts of the universal coupling immediately above the thrust bearing 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 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.

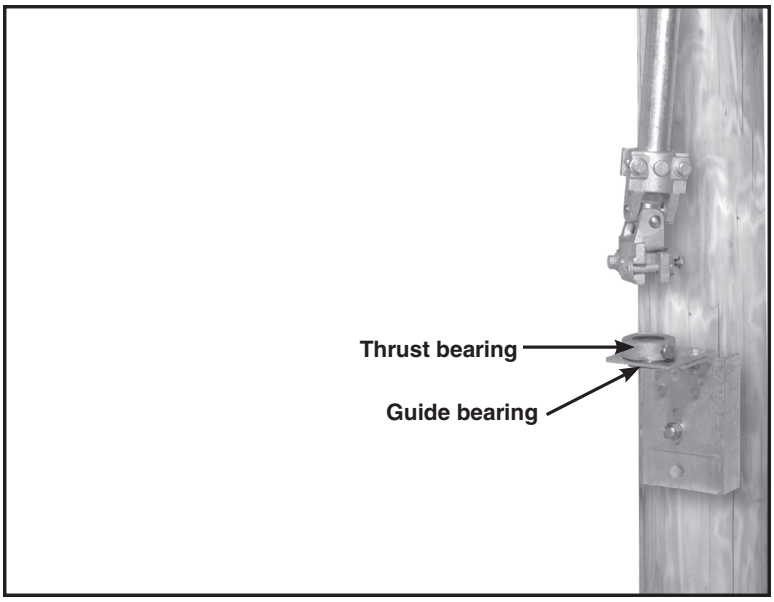


Figure 14. Install the intermediate section of vertical operating pipe.

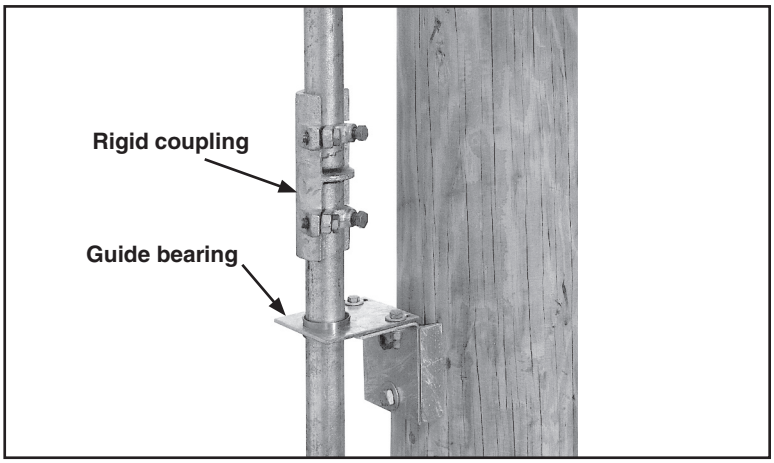


Figure 15. Install the guide bearing for the additional pipe section.

Installing the Operating Handle

When a key interlock is used (standard minor modification suffix "-S6"), skip to Step 21 on page 19.

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 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 6 to 8 inches of operating pipe below the operating handle assembly. The operating handle should be 2 to 3 inches above the foot-bearing assembly. See Figure 16.

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.

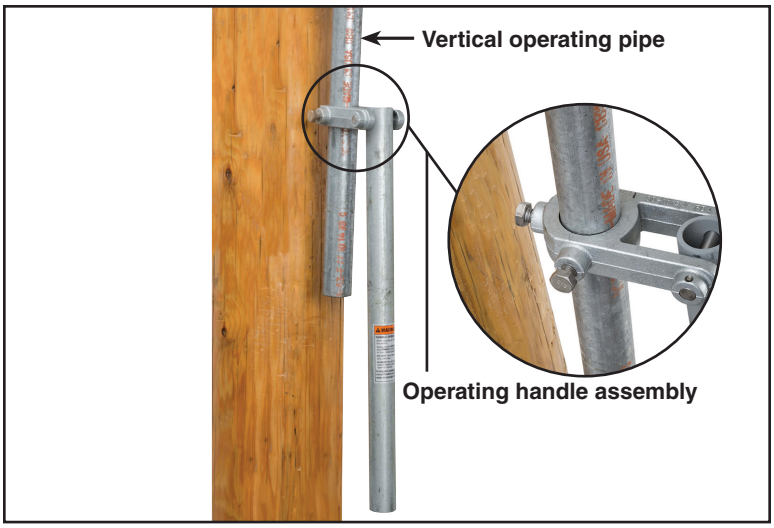


Figure 16. Install the operating handle assembly.

Step 19

Slide the foot-bearing assembly onto the lowest section of pipe at the position shown on the erection drawing. See Figure 17. Adjust the operating handle assembly until it is 2 to 3 inches above the foot-bearing assembly. Tighten the piercing set screws, piercing the pipe. Continue turning until a firm resistance is felt.

Next, 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 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 with the provided alignment slots.

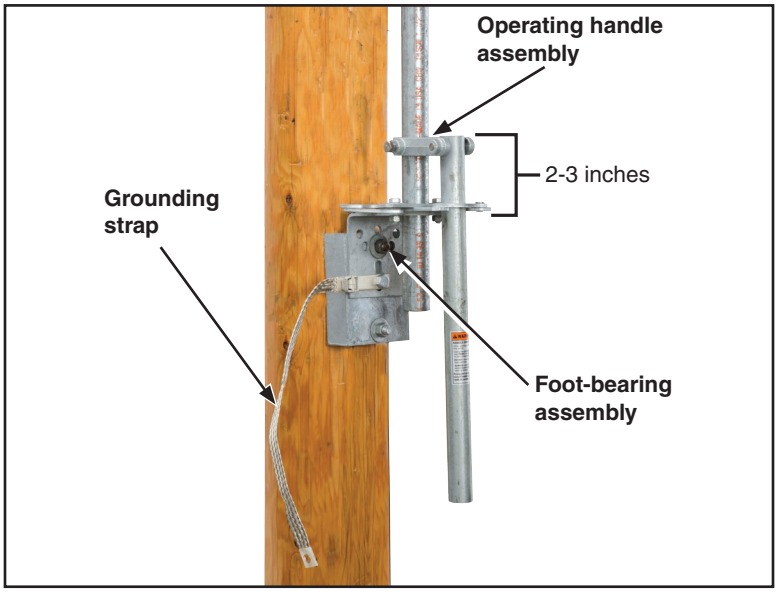


Figure 17. Install the foot-bearing assembly so the operating handle assembly is 2 to 3 inches above the foot-bearing assembly.

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 18. 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 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.

After installing the handle, skip to the "Checking Alignment and Adjusting the Stop Plates" section on page 22.

Installing the Operating Handle with a Key Interlock

Step 21

The interlock group includes a Superior Type B6003-1 Mk II single- or multiple-key interlock (or equivalent) with ⅜-inch bolt projection and ¾-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 19.

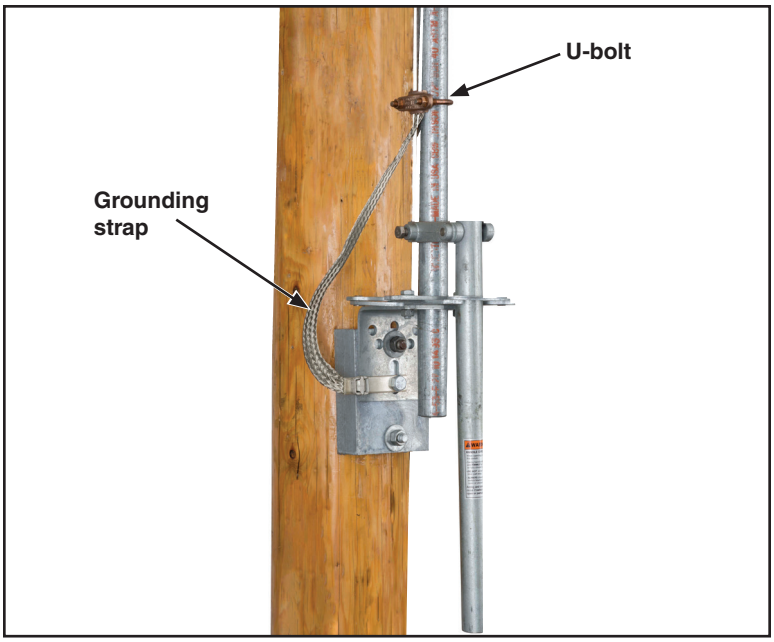


Figure 18. Attach the grounding strap.

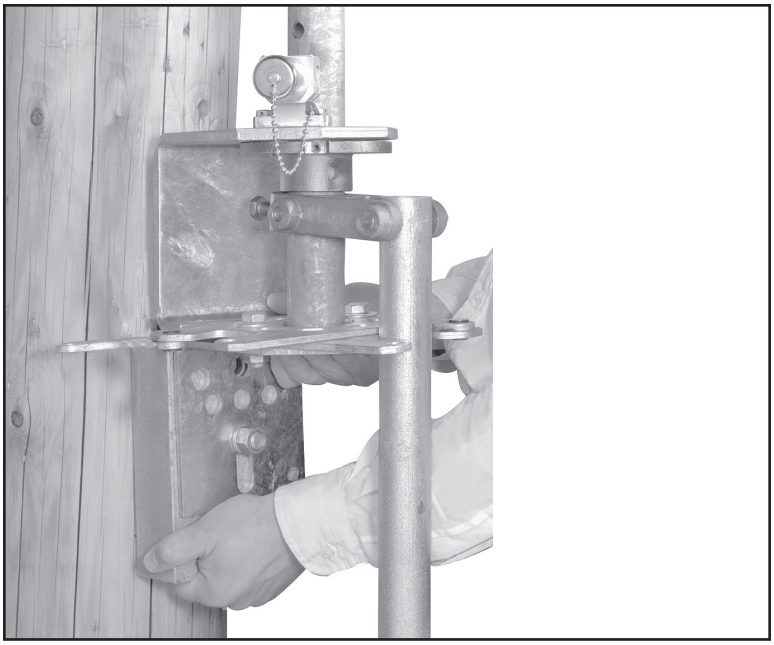


Figure 19. Position the interlock bracket, locking disc, operating handle assembly, and foot-bearing assembly onto the lowest vertical operating pipe section.

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. See Figure 20. 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.

Step 23

Fasten the operating-handle assembly to the lowest vertical operating-pipe section using the piercing set screws furnished. See Figure 21.

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 ½-13 × 1-½-inch cap screws, spacers, and ½-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).

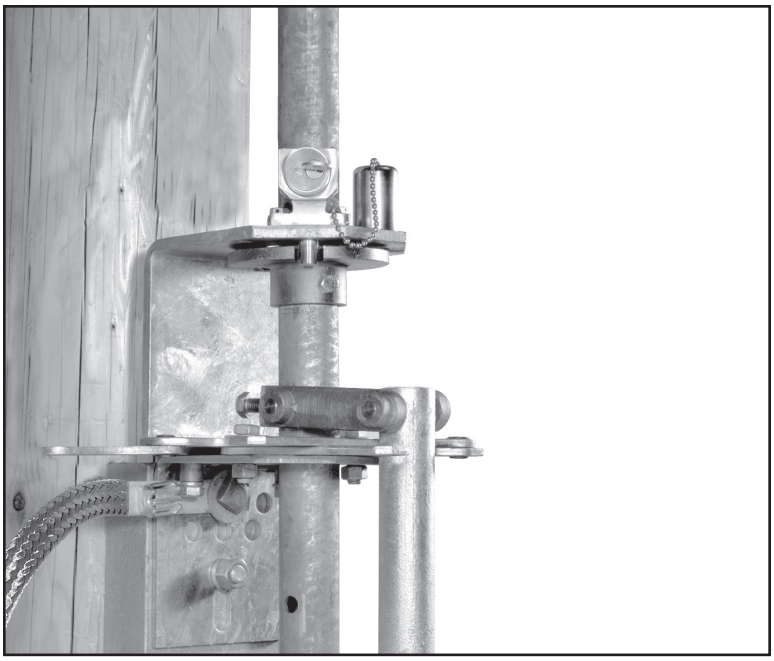


Figure 20. Attach the foot-bearing assembly.

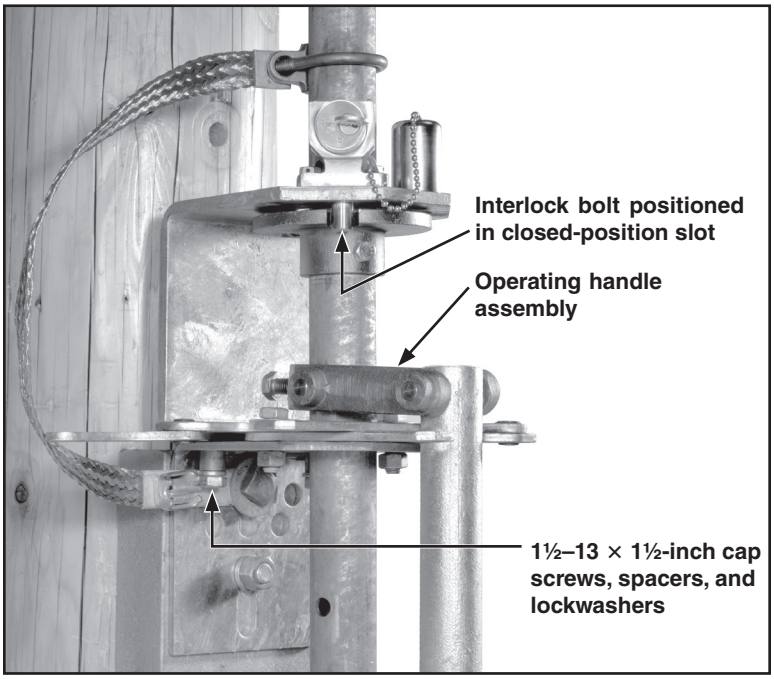


Figure 21. Fasten the operating handle assembly.

Step 24

Hold the locking disc ⅜-inch below the interlock bracket and drill 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 ⅜-16 × 3-inch cap screw, lockwasher, and nut furnished. See Figure 22.

Step 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.

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 23.

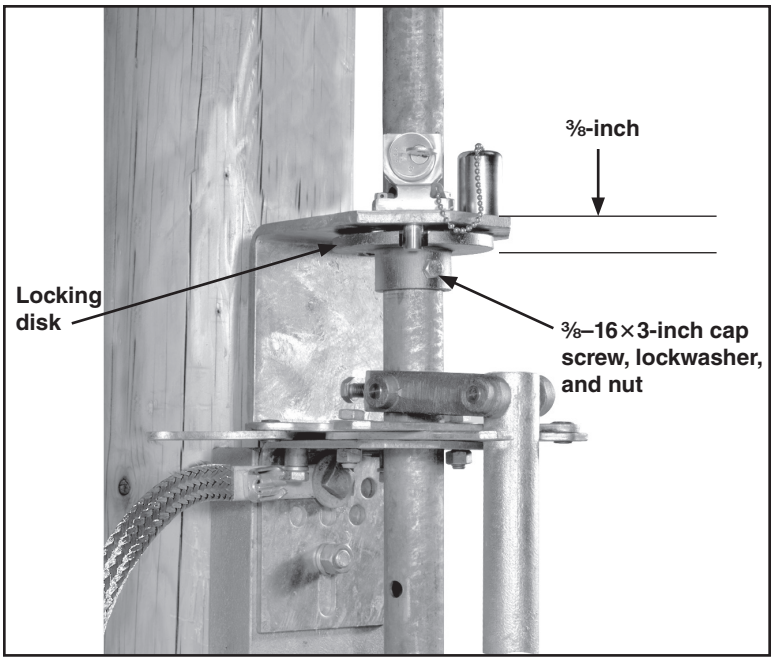


Figure 22. Attach the locking disc.

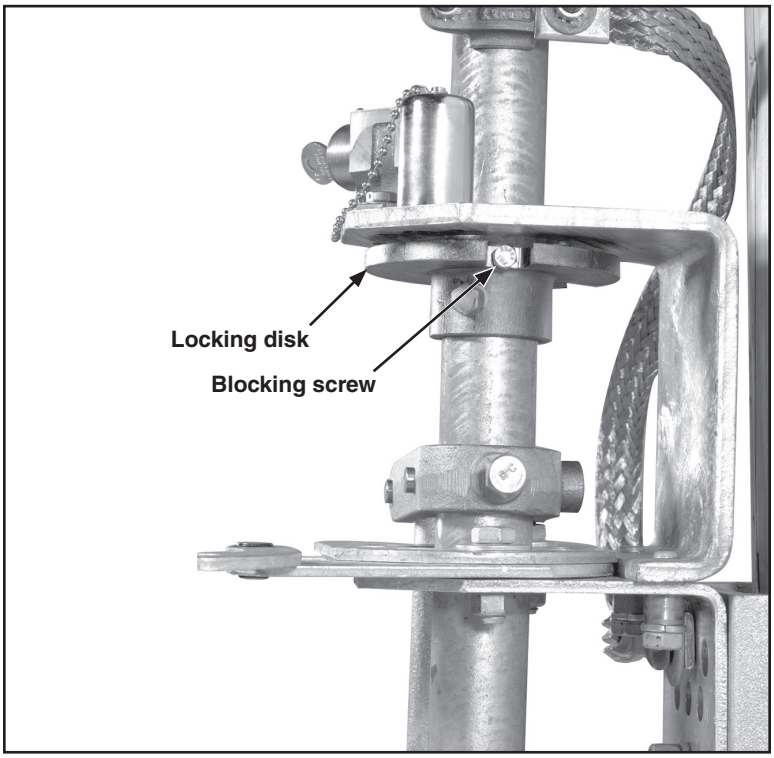


Figure 23. The blocking slot in the interlock disc.

Checking Alignment and Adjusting the Stop Plates

Step 26

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

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.

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

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 24. Place the switch in the fully **Open** position, and adjust the **Open**-position stop plate so when the handle is lowered, it fits into the **Open**-position slot. Mark the location of the **Open**-position stop plate on the support plate.

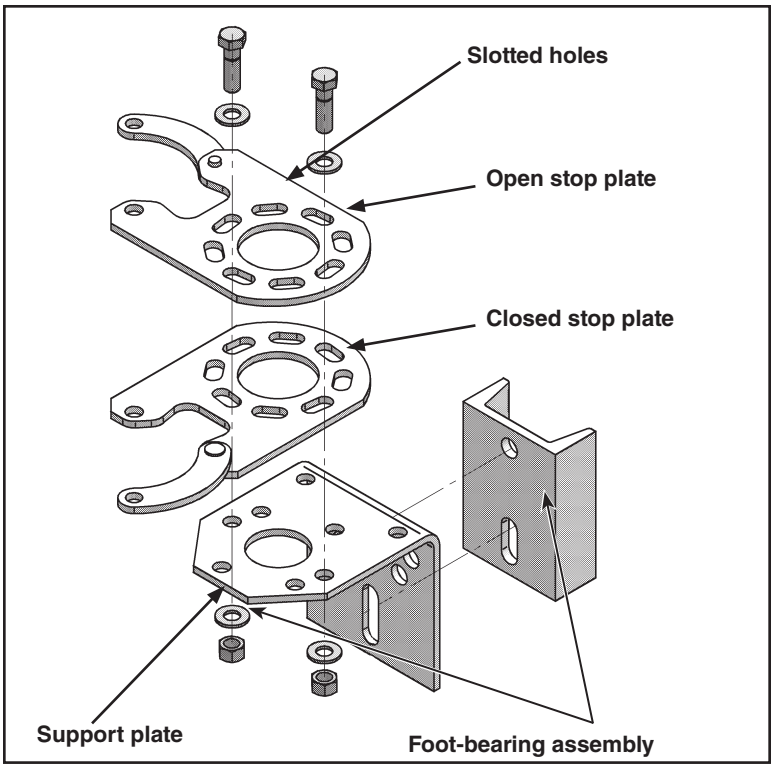


Figure 24. Exploded view of stop plates and the foot-bearing assembly.

Step 28

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 creates strong positive blade-to-contact pressure to ensure the switch is securely held in the **Closed** position.

To adjust the closed stop plate:

(a) Loosen the hardware securing the closed stop plate. See Figure 24 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. (Counterclockwise is standard on switches using the rotating operating mechanism.) The handle should be tight against the edge of the stop plate. See Figure 25. Mark the position of the closed stop plate. See Figure 26 (left).

(c) Lift the handle out of the way and rotate the stop plate an additional 15 degrees counterclockwise from the mark. See Figure 26 (right). Make sure the open stop plate lines up with the mark made in Step 27. 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 27.

Step 29

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

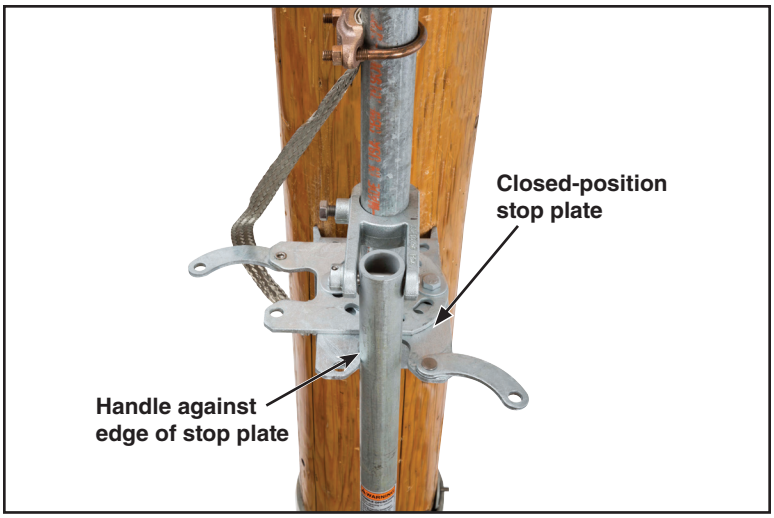


Figure 25. Adjust the Closed-position stop plate.

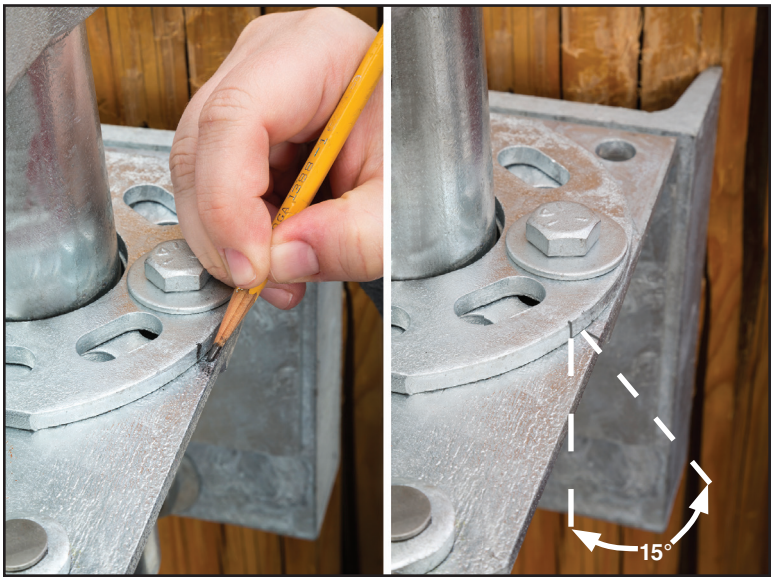


Figure 26. Mark the stop plate, then loosen the hardware and rotate the closed stop plate backward approximately 15 degrees.

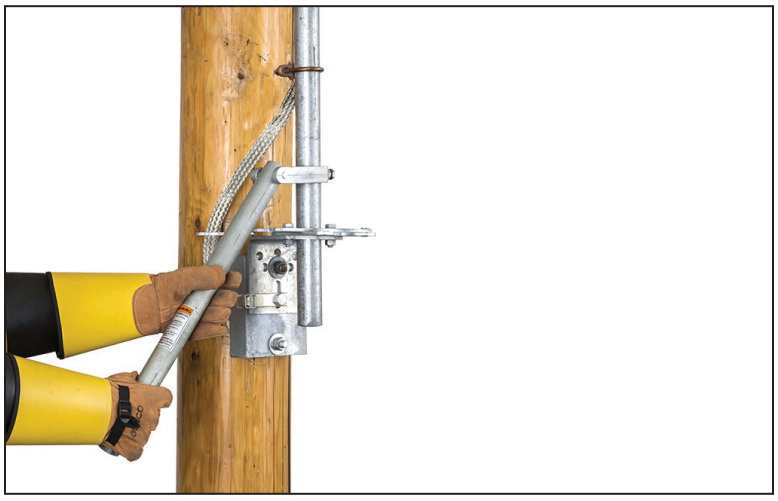


Figure 27. Move the handle into the Open position.

Checking Operation

Step 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.

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 should be against its closed stop and each switch-pole toggle mechanism lies against its toggle stop. See Figure 28.

(b) Each switch pole-unit operating lever should lie against its closed stop. If outboard bearings are installed, the outboard bearing crank arm(s) should be in the over-center toggle position and lie against the stop bolt(s).

If only one or two switch poles are fully closed, adjust the take-up screw(s) on the adjustable pipe coupling(s) at the switch pole-unit to increase or decrease the effective length of the interphase operating pipe(s).

If none of the switch poles is fully closed, adjust the outboard bearing crank-arm length and the stop bolt. If more stroke is required, lengthen the outboard bearing crank-arm in ½-inch increments until the blades are in the fully **Closed** position. If less stroke is required, shorten the outboard bearing crank-arm in ⅛-inch increments.

(c) Set the crank-arm to overstroke slightly to provide positive-drive closure and a secure locking action at the operating handle. See the note on the erection drawing for the amount of toggle required.

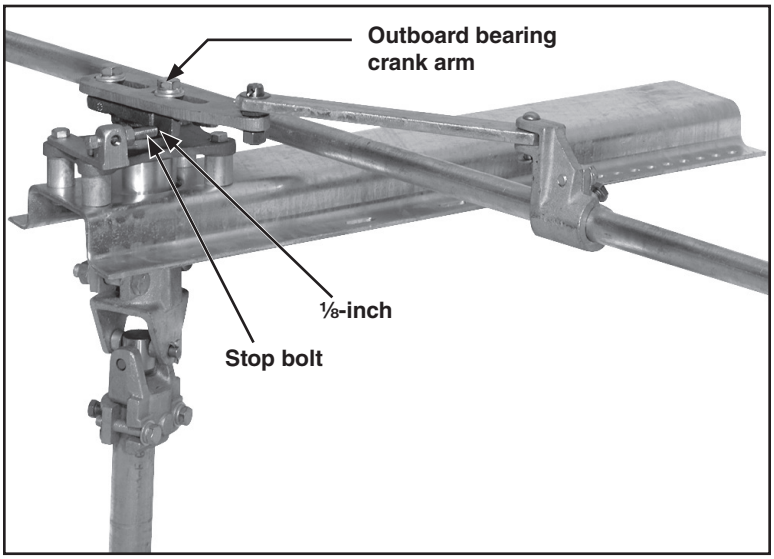


Figure 28. Verify that the crank-arm is in the over-center toggle position and against the stop bolt. Adjust the outboard bearing crank-arm stop bolt for power operation, if necessary.

⚠ CAUTION

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

(d) When an S&C Switch Operator—Type AS-1A or an S&C 6801M Automatic Switch Operator is used, verify there is a clearance of approximately ⅛-inch between the outboard bearing crank-arm and its stop bolt when the switch is fully closed. This clearance prevents 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 locknut when adjustment is completed. See Figure 28 on page 24.

(e) With the operating handle as far as it will go in the **Open** position, check that the switch blades are at least 90 degrees from the **Closed** position.

Step 31

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 equal clearance on both sides. See Figure 29.

(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 29, View A-A.

(c) In the fully **Closed** position, clearance between the blade-closing cam and the interrupter-closing lever must be within the limit as shown in Figure 29. Also, the clearance between the blade-shunt contact and the interrupter housing must be as shown in Figure 29.

(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 interrupter to the jaw-contact casting, and reposition the interrupter. It may be necessary to also loosen the bolts that fasten the jaw-contact casting to its mounting bracket and slightly rotate the casting to achieve the necessary clearance. Retighten the bolts. Make sure any adjustment does not disturb the main contact alignment by repeating the checks in Steps 27 through 30.

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

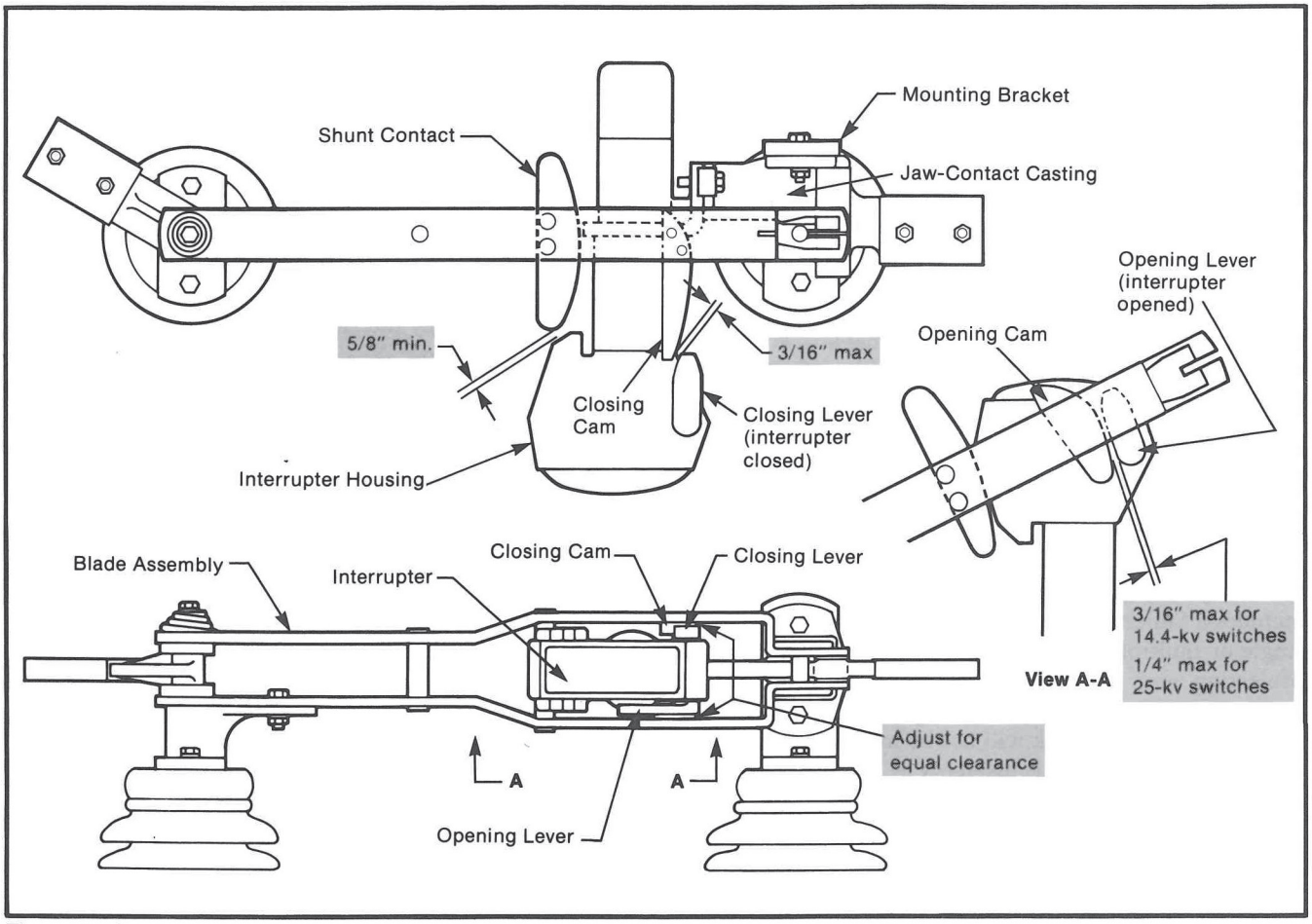


Figure 29. Operation checkpoints.

Step 32

Attach the danger label to the pole or structure using two straps or bolts (user-furnished). See Figure 30.

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 the High-Voltage Conductors

Step 33

When high-voltage conductors are to be connected using aluminum-alloy body connectors★ follow these 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. Afterward, bolt the connectors to the terminal pads.

(c) Prepare the conductors using the 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.

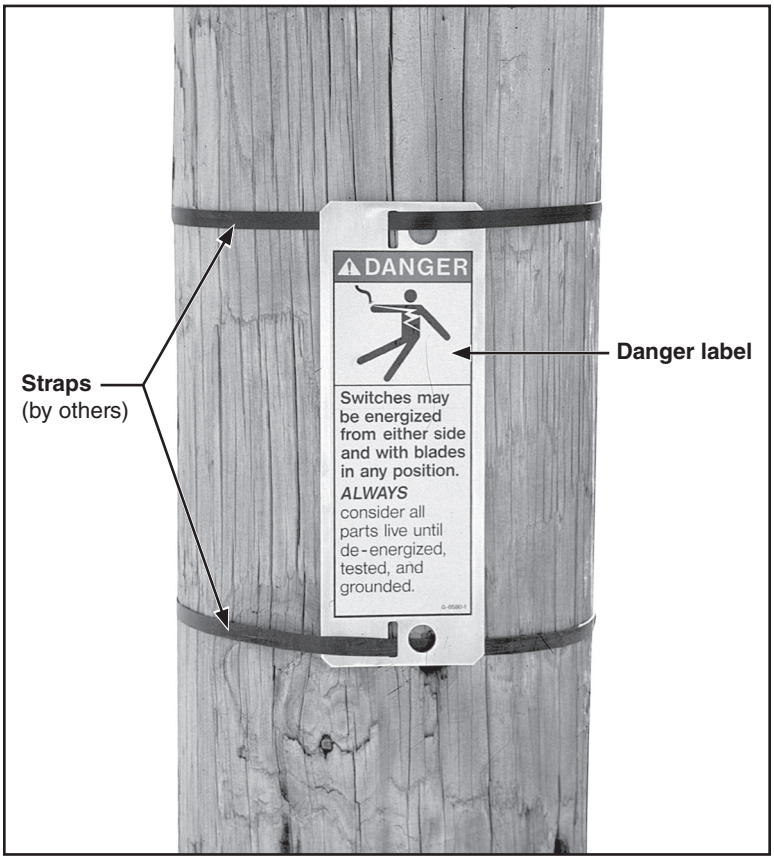


Figure 30. Attach the danger label to the pole or structure.

Opening and Closing the Switch

⚠ DANGER

The interrupters and terminal pads of the Alduti-Rupter Switch may be energized 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

To operate the Alduti-Rupter Switch:

(a) Remove the padlock(s) from the hasps on the operating-handle assembly. See Figure 31.

(b) If the operating-handle assembly is furnished with a key interlock, disengage the interlock bolt. See Figure 32.

⚠ 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 33.

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

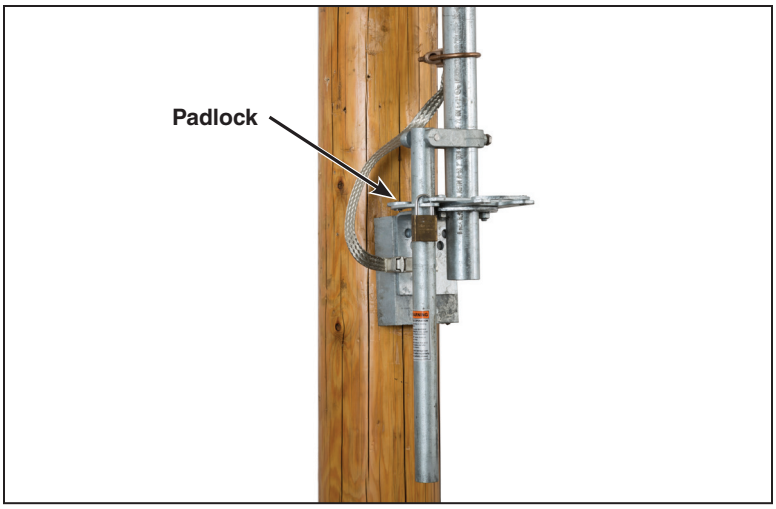


Figure 31. Remove the padlock(s).

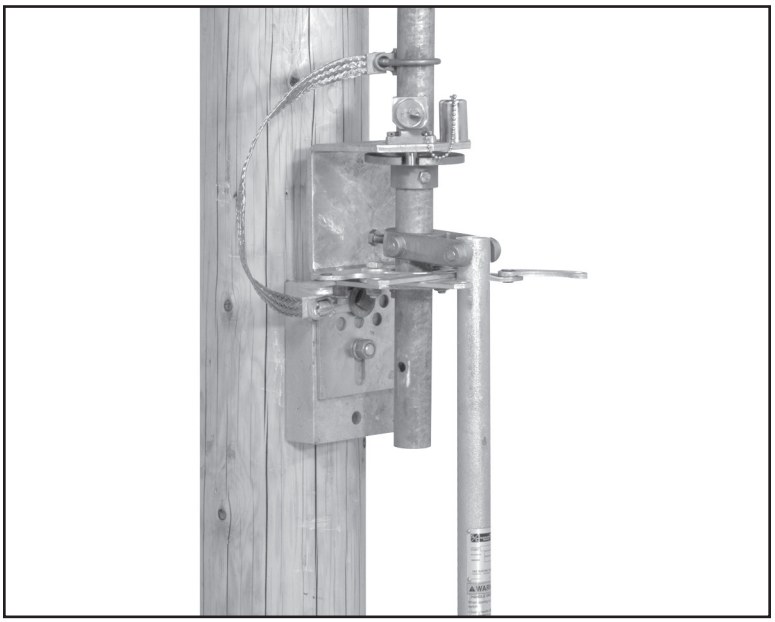


Figure 32. Disengage the key interlock bolt.

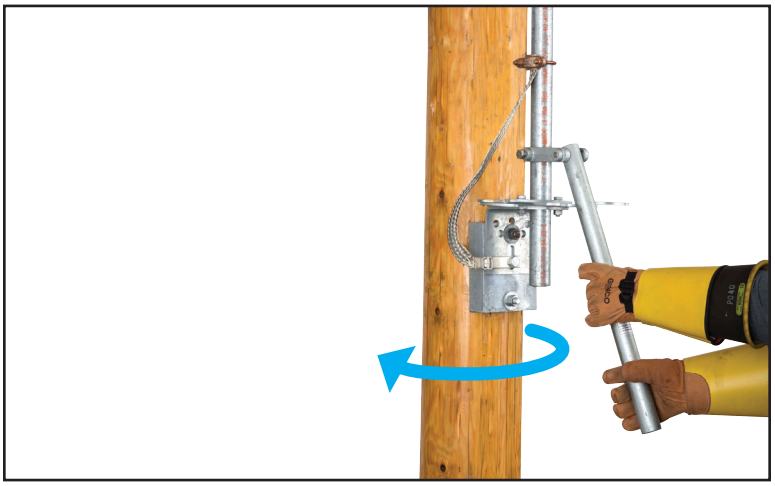


Figure 33. Rapidly swing the manual operating handle.