INSTRUCTIONS

For Replacement of Live Parts

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INTRODUCTION

⚠ CAUTION

The equipment covered by this publication must be selected for a specific application and it must be installed, operated, and maintained by qualified persons who are thoroughly trained and who understand any hazards that may be involved. This publication is written only for such qualified persons and is not intended to be a substitute for adequate training and experience in safety procedures for this type of equipment.

General

The following instructions are for replacement and adjustment of live parts for S&C Alduti-Rupter Switches—Outdoor Distribution, Three-Pole Side-Break Heavy-Duty Style, in ratings of 14.4 kv through 34.5 kv; Three-Pole Side-Break Standard-Duty Style, in ratings of 14.4 kv and 25 kv; and Three-Pole Side-Break Integer Style, in ratings of 14.4 kv through 34.5 kv.

Because the construction of switches rated 14.4 kv and 25 kv is quite unlike that of switches rated 25/34.5 kv and 34.5 kv, instructions for replacement of their respective live parts are treated separately, under the appropriate section headings that follow.

These instructions apply only to live part replacement. For adjustments to the switch itself and to its operating mechanism, refer to the instruction sheet and the erection drawing that were furnished with the switch. Additional copies of the instruction sheet and the erection drawing, for the applicable switch style, rating, and mounting configuration, may be obtained from the nearest S&C Sales Office.

NOTE: If *only* the blade assembly or *only* the jaw-contact assembly is to be replaced (i.e., not the complete set of live parts) disregard any of the following instructions that obviously do not apply. However, it is generally expected that if either the blade assembly or jaw-contact assembly requires replacement, both assemblies should be changed out.

Indicated herein are the critical dimensional relationships which must be maintained to ensure proper sequencing of the interrupter with respect to its associated blade. Such relationships include those between the blade shunt contact and the interrupter housing, between the blade closing cam and interrupter closing lever, and between the blade opening cam and interrupter opening lever; the importance of these relationships to proper switch performance is as follows.

Blade Shunt-Contact and Interrupter-Housing Clearance

When the switch is in the fully closed position, there must be adequate clearance between the blade shunt contact and the interrupter housing to prevent current from being carried continuously by the interrupter.

During switch opening, the blade shunt contact must engage the interrupter housing (or the contact rivets in the case of Cypoxylated™▲ interrupters—used with switches rated 25/34.5 kv and 34.5 kv) before the blade disengages from the jaw contact to ensure proper current transfer.

▲ *Cypoxylated* is the S&C trademark for devices employing the S&C Cypoxy® cycloaliphatic epoxy resin system for multipurpose use as an assembly, encapsulation, and insulation medium.

Supersedes Instruction Sheet 761-605 dated 12-17-84

INTRODUCTION — Continued

Blade Closing-Cam and Interrupter Opening-Lever Clearance

When the switch is in the fully closed position, the clearance between the blade closing cam and the interrupter closing lever must be sufficiently close to prevent any tendency of the interrupter to inadvertently open. There must, however, be physical clearance between the blade closing cam and the interrupter closing lever when the switch is in the fully closed position to prevent current from being carried continuously by the interrupter.

Blade Opening-Cam and Interrupter Opening-Lever Clearance

During switch opening, as the blade opening cam passes the opening lever on the (already opened) interrupter, the cam-to-lever clearance must be sufficiently close to prevent any tendency of the interrupters to inadvertently close.

During switch closing, there must be sufficient clearance between the blade opening cam and the interrupter opening lever to prevent mechanical interference.

If any of the specified dimensional relationships cannot be attained, contact the nearest S&C Sales Office.

BEFORE STARTING

The following procedures◆ should be observed before attempting any work on S&C Alduti-Rupter Switches:

1. At all times adhere to the prescribed safety rules which are applicable to such devices as circuit breakers, fuses, interrupter switches, power switching equipment, and their mechanisms.
2. Make certain that any such device is disconnected from all power sources and all control sources before being inspected or serviced.
3. Always assume both sets of power terminals on any device to be energized unless proved otherwise by visual evidence of open-circuit conditions on both terminal ends or by test using appropriate high-voltage test equipment.
4. Test for voltage. Qualified persons should be certain that they have, and know how to operate, the correct test equipment for determining the voltage on both sets of power terminals in any circuit breaker, power fuse, or interrupter-switch equipment.
5. After the switch has been completely disconnected from all sources of power, properly connect grounding leads to both sides of the equipment—that is, to the source- and load-side power terminals or contacts of each phase of the equipment to be maintained.

◆ The procedures 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.

LIVE PARTS REPLACEMENT FOR SWITCHES RATED 14.4 KV AND 25 KV

Step 1

Place the switch in the open position and, for each switch pole applicable, remove the existing live parts as follows. See Figure 1.

Detach the blade assembly by removing the two $\frac{1}{2}$″–13 × 1″ hex-head galvanized screws and lockwashers that fasten it to the rotating insulator.

Detach the jaw-contact-and-interrupter assembly by removing the two $\frac{1}{2}$″–13 × 1$\frac{1}{2}$″ hex-head galvanized bolts, nuts, lockwashers, and flat washers that fasten it to the contact-support bracket. Then—if the interrupter is to be reused—detach it from the jaw contact by removing the two $\frac{3}{8}$″–16 × $\frac{3}{4}$″ hex-head stainless-steel screws, lockwashers, and brass retaining angles.

Discard the mounting hardware which was removed.

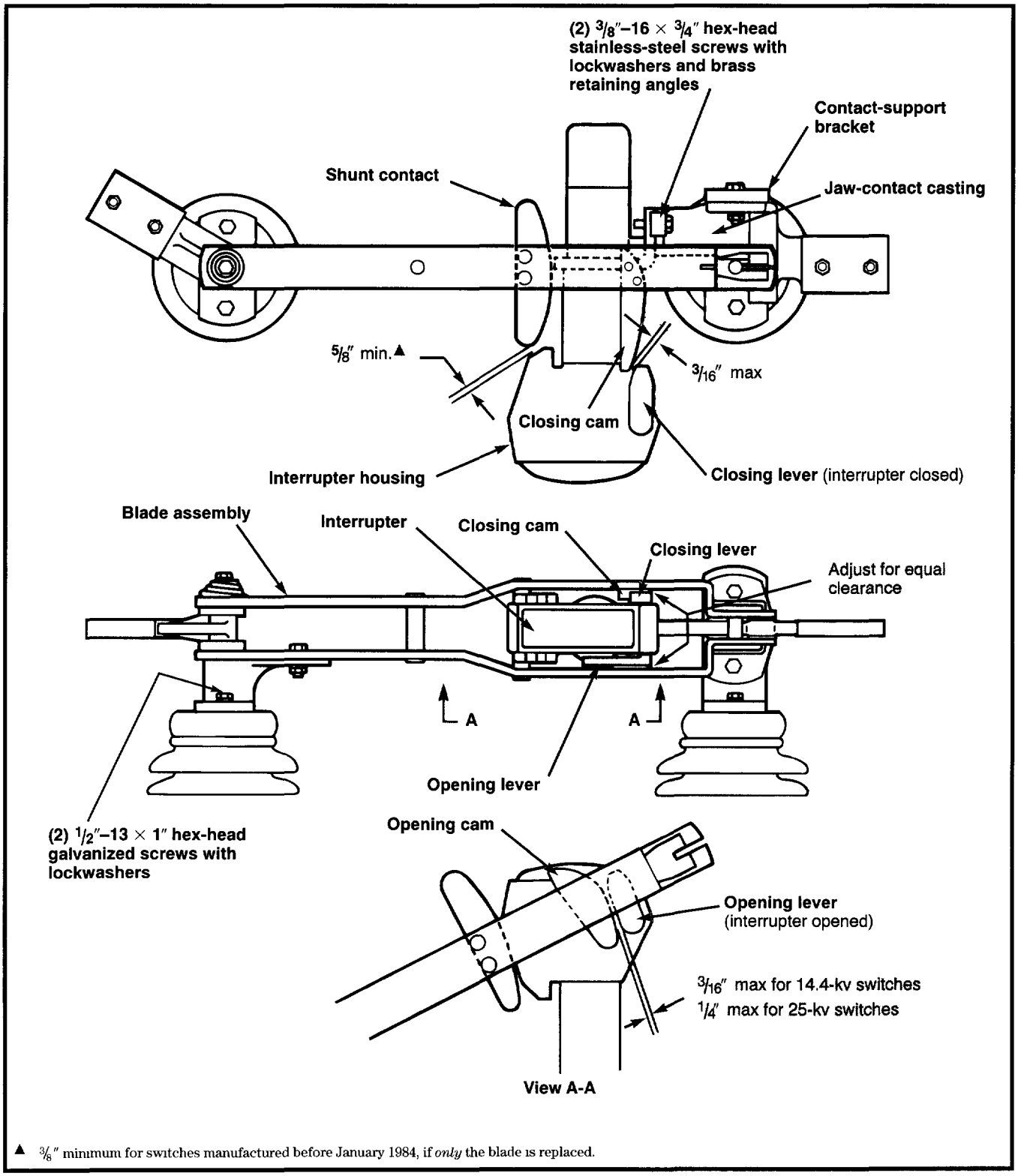
Step 2

Attach the replacement blade assembly and jaw-contact casting, using the new mounting hardware furnished—but leave the screws loose enough to permit adjustment. Do not attach the interrupter until so directed in Step 6.

If necessary, use steel wool to clean the hinge- and jaw-contact surfaces. Then wipe with a dry cloth and apply a thin coating of the contact lubricant furnished.

Step 3

Close the switch. Make sure that the blade engages the jaw contact on-center. Then tighten the mounting screws for the blade assembly and jaw contact.



▲ 3/8" minimum for switches manufactured before January 1984, if *only* the blade is replaced.

Figure 1. Operation checkpoints for replacement switches rated 14.4 kv and 25 kv. (Switch configuration may differ).

LIVE PARTS REPLACEMENT FOR SWITCHES RATED 14.4 KV AND 25 KV — Continued

Step 4

Open and close the switch slowly a number of times and check for full closure of all three poles. If none of the three poles close completely, adjust the operating mechanism to provide the additional travel required. Refer to the instruction sheet that was furnished with the switch.

Step 5

If only one or two of the switch poles close completely, loosen the screws that fasten the affected blade assemblies to their rotating insulators. Then shift the blades, within the confines of the mounting holes, toward or away from the closing direction to bring all three blades into step. Retighten the screws.

In the unlikely event that the above procedure does not result in complete closure of all three switch poles, adjustment of the interphase pipe is required. Proceed as follows.

For Side-Break Standard-Duty Style and Side-Break Integer Style Alduti-Rupter Switches: Increase or decrease the effective length(s) of the interphase pipe by repositioning the interphase pipe coupling(s) at the appropriate switch-pole drive lever.

For Side-Break Heavy-Duty Style Alduti-Rupter Switches: Increase or decrease the effective length(s) of the appropriate interphase pipe by means of the adjustable pipe coupling at the switch-pole drive lever.

Step 6

When three-pole blade closure has been attained, place the switch in the open position and bolt the interrupter in place on the jaw-contact casting, using the new mounting hardware furnished. The brass angles are to be placed next to the jaw-contact casting—overlapping the edge and covering the slotted holes of the casting—and the lockwashers are to be placed between the brass angles and the bolt heads.

Make sure that the interrupter is in the open position to correspond with the blade position—the interrupter operating levers may be actuated by hand.

Step 7

Refer to Figure 1.

Close and open the switch slowly several times and check the operation of the affected poles. The following conditions must be met:

- 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 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 View A-A.
- In the fully closed position, clearance between the blade closing cam and the interrupter closing lever must be within the limit shown.

If adjustment is required, loosen the screws that fasten the interrupter to the jaw-contact casting and reposition the interrupter. It may be necessary, as well, to loosen the bolts that fasten the jaw-contact casting to its mounting bracket and slightly rotate the casting in order to achieve the necessary clearances. Retighten the screws and/or bolts, making sure that the blade engages the jaw contact on-center.

Step 8

With the switch in the fully closed position, verify the minimum clearance between the blade shunt contact and the interrupter housing, as shown. Then, move the blade in the opening direction and verify that the blade shunt contact firmly engages the interrupter housing before the blade disengages from the jaw contact. (The shunt contact may be bent as required to conform to these conditions.)

Step 9

Perform several opening and closing operations. Then verify that the critical dimensions have been retained.

Step 1

Place the switch in the open position and, for each switch pole applicable, remove the existing live parts as follows. See Figure 2.

Detach the blade assembly by removing the three $\frac{1}{2}$"–3 × 1" hex-head galvanized screws and lockwashers that fasten it to the rotating insulator.

Detach the jaw-contact-and-interrupter assembly by removing the two $\frac{1}{2}$"–13 galvanized nuts, lockwashers, and flat washers—plus the $\frac{3}{8}$-inch-thick spacers—that fasten it to the contact-support bracket. Then—if the interrupter is to be reused—detach it from the jaw-contact assembly by removing the two $\frac{3}{8}$"–16 stainless-steel nuts and lockwashers and $1\frac{1}{4}$" × 2" × $\frac{1}{16}$" tinned plate. The tinned plate serves as an interface between the aluminum mounting surface of the interrupter and the copper jaw-contact assembly of the switch, to inhibit galvanic corrosion.

Discard the mounting hardware which was removed.

Step 2

Locate the closing cam on the *blade assembly being replaced.* See Figure 2. If it is a present-design closing cam as shown in Figure 3, proceed to Step 3. If it is a previous-design closing cam, it must be transferred to the replacement blade assembly. To do so, remove and discard the four #10–32 hex stainless-steel self-locking nuts that fasten the closing-cam support arm *to the blade assembly being replaced.* Also remove and discard the nuts that fasten the closing-cam support arm to the *replacement blade assembly.* Attach the *previous-design* closing cam support arm to the *replacement* blade assembly using the four #10–32 hex stainless-steel self-locking nuts furnished.

NOTE: If the closing cam from the blade assembly being replaced is in such condition that the clearances in Figure 2 cannot be attained, the closing cam provided on the replacement blade can be used but only if the interrupter is replaced a well.

Step 3

Attach the replacement blade assembly and jaw-contact assembly, using the new mounting hardware furnished—but leave the screws and bolts loose enough to permit adjustment. Do not attach the interrupter until so directed in Step 7.

If necessary, use steel wool to clean the hinge- and jaw-contact surfaces. Then wipe with a dry cloth and apply a thin coating of the contact lubricant furnished.

Step 4

Close the switch. Make sure that the blade engages the jaw contact on-center and that the silver-alloy buttons on the blade are centered on the silver-clad jaw-contact fingers. Then tighten the screws that fasten the blade assembly to the rotating insulator, and tighten the bolts that fasten the jaw-contact assembly to the contact-support bracket. Open and reclose the switch and verify that blade entry is as described.

Step 5

Open and close the switch slowly a number of times and check for full closure of all three poles. If none of the three poles close completely, adjust the operating mechanism to provide the additional travel required. Refer to the instruction sheet that was furnished with the switch.

Step 6

If only one or two of the switch poles close completely, loosen the screws that fasten the affected blade assemblies to their rotating insulators. Then shift the blades, within the confines of the mounting holes, toward or away from the closing direction to bring all three blades into step. Retighten the screws.

In the unlikely event that the above procedure does not result in complete closure of all three switch poles, adjustment of the interphase pipe is required. Increase or decrease the effective length(s) of the interphase pipe by repositioning the interphase pipe coupling(s) at the appropriate switch-pole drive lever.

Step 7

When three-pole blade closure has been attained, place the switch in the open position and bolt the interrupter in place on the jaw-contact assembly, using the new mounting hardware furnished. Be sure to replace the tinned plate between the aluminum mounting surface of the interrupter and the copper jaw-contact assembly.

Make sure that the interrupter is in the open position to correspond with the blade position—the interrupter operating levers may be actuated by hand.

LIVE PARTS REPLACEMENT FOR SWITCHES RATED 25/34.5 KV AND 34.5 KV — Continued

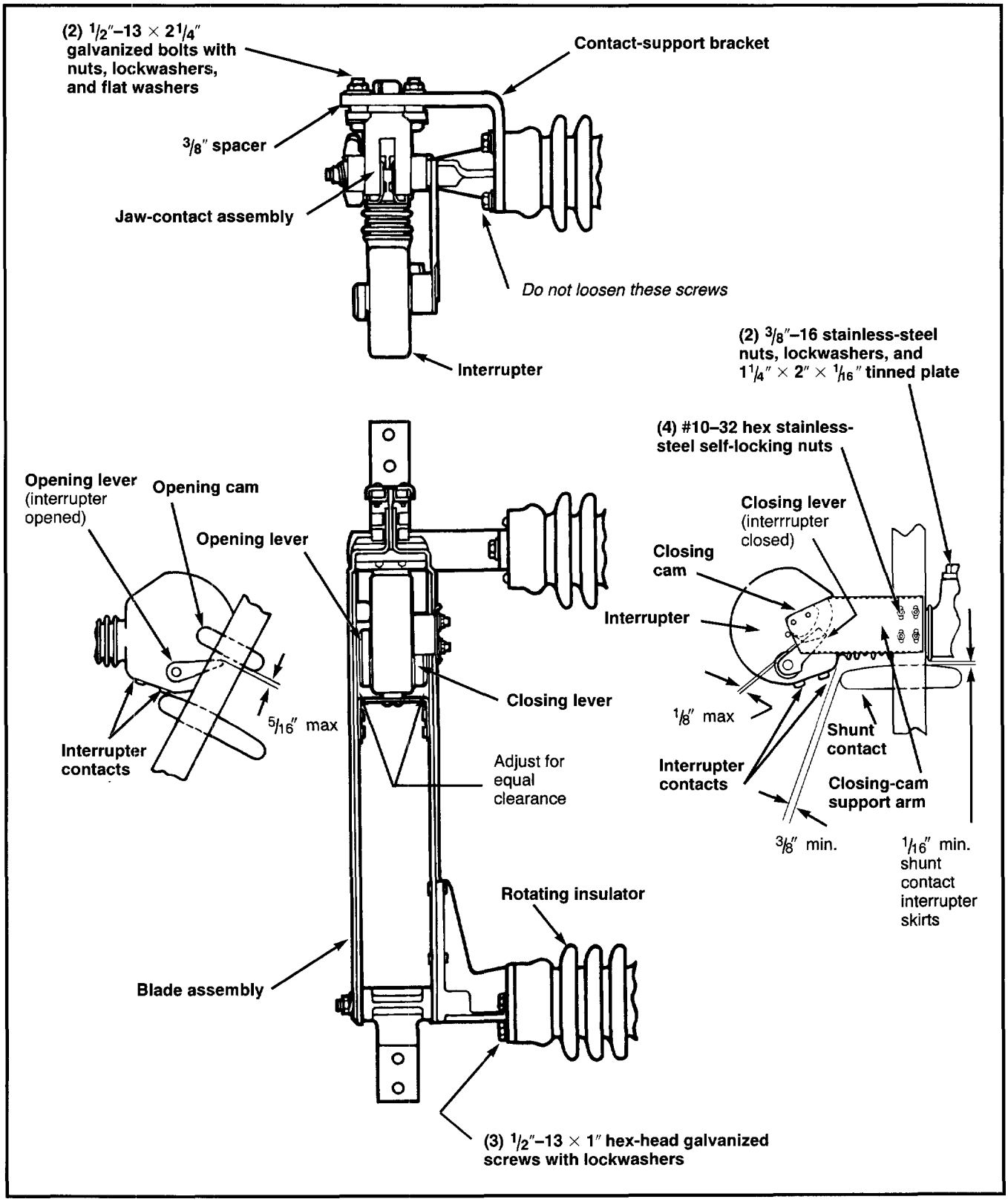


Figure 2. Operation checkpoints for switches rated 25/34.5 kv and 34.5 kv. (Switch configuration may differ.)

Step 8

Refer to Figure 2.

Close and open the switch slowly several times and check the operation of the affected poles. The following conditions must be met:

- 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 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 the fully closed position, clearance between the blade closing cam and the interrupter closing lever must be within the limit shown. The mounting holes for the closing-cam support arm are slotted, and detents are provided in the mounting surface, allowing for incremental positioning of the cam.

If adjustment is required, loosen the nuts that fasten the interrupter to the jaw-contact assembly and shift the interrupter, within the confines of the mounting holes, to achieve the necessary alignment. Retighten the nuts.

Step 9

With the switch in the fully closed position, verify the minimum clearances between the blade shunt contact and the interrupter—measured to the interrupter housing as well as to the interrupter skirts—as shown. Then move the blade in the opening direction and verify that the blade shunt contact firmly engages the interrupter contact rivets before the blade disengages from the jaw contact. (The shunt contact may be bent as required to conform to these conditions.)

Step 10

Perform several opening and closing operations. Then verify that the critical dimensions have been retained.

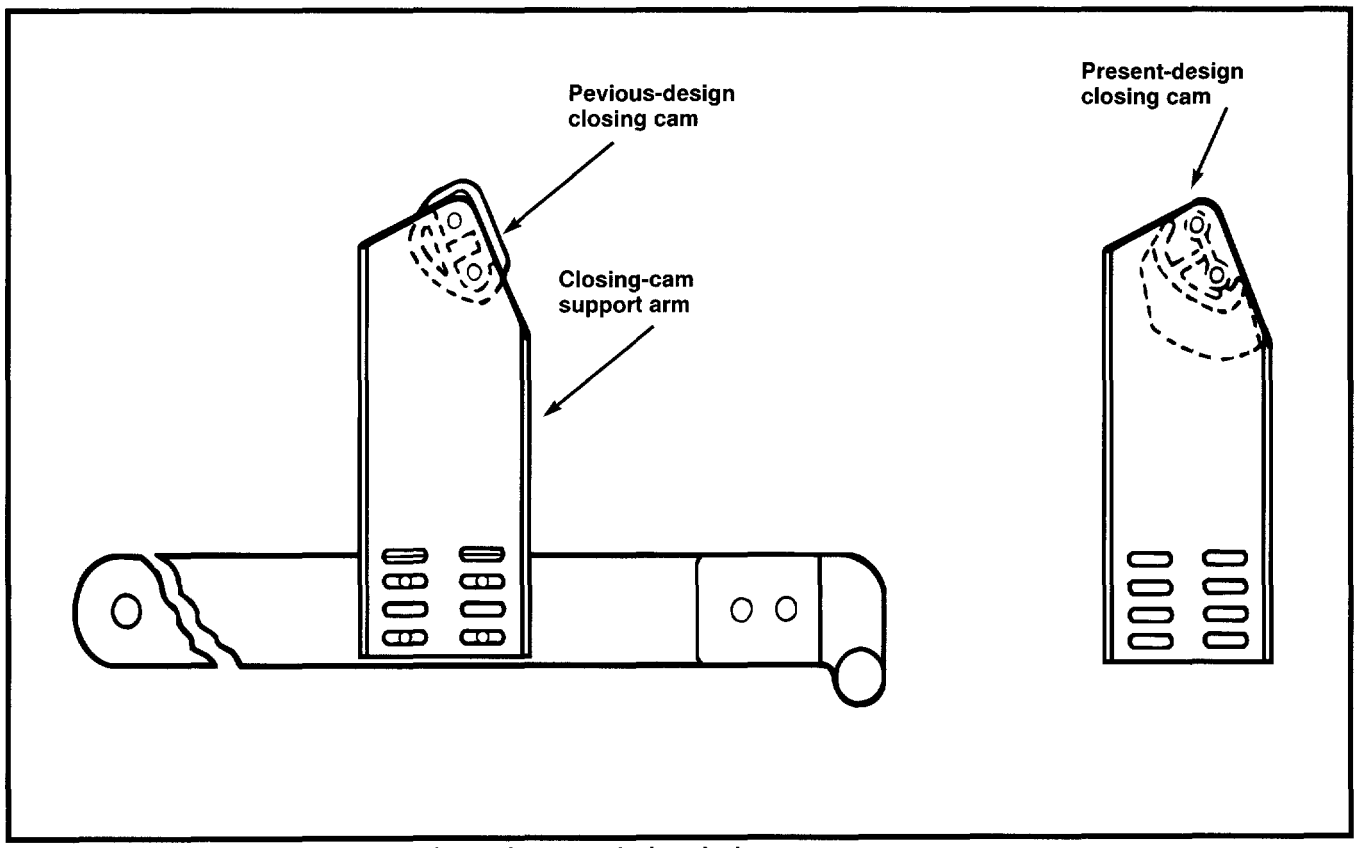


Figure 3. Comparison of previous-design and present-design closing cams.