KA369R, KA542R, and KA57WE auxiliary switch kit installation and adjustment instructions

Powering Business Worldwide

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Contents

Safety for life

Eaton meets or exceeds all applicable industry standards relating to product safety in its Cooper Power™ series products. We actively promote safe practices in the use and maintenance of our products through our service literature, instructional training programs, and the continuous efforts of all Eaton employees involved in product design, manufacture, marketing, and service.

We strongly urge that you always follow all locally approved safety procedures and safety instructions when working around high voltage lines and equipment, and support our "Safety For Life" mission.

Safety information

The instructions in this manual are not intended as a substitute for proper training or adequate experience in the safe operation of the equipment described. Only competent technicians who are familiar with this equipment should install, operate, and service it.

A competent technician has these qualifications:

- Is thoroughly familiar with these instructions.
- Is trained in industry-accepted high and low-voltage safe operating practices and procedures.
- Is trained and authorized to energize, de-energize, clear, and ground power distribution equipment.
- Is trained in the care and use of protective equipment such as arc flash clothing, safety glasses, face shield, hard hat, rubber gloves, clampstick, hotstick, etc.

Following is important safety information. For safe installation and operation of this equipment, be sure to read and understand all cautions and warnings.

Hazard Statement Definitions

This manual may contain four types of hazard statements:

DANGER

Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

WARNING

Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION

Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

CAUTION

Indicates a potentially hazardous situation which, if not avoided, may result in equipment damage only.

Safety instructions

Following are general caution and warning statements that apply to this equipment. Additional statements, related to specific tasks and procedures, are located throughout the manual.

DANGER

Hazardous voltage. Contact with hazardous voltage will cause death or severe personal injury. Follow all locally approved safety procedures when working around high- and low-voltage lines and equipment. G103.3

WARNING

Before installing, operating, maintaining, or testing this equipment, carefully read and understand the contents of this manual. Improper operation, handling or maintenance can result in death, severe personal injury, and equipment damage. G101.0

WARNING

This equipment is not intended to protect human life. Follow all locally approved procedures and safety practices when installing or operating this equipment. Failure to comply can result in death, severe personal injury and equipment damage. G102.1

WARNING

Power distribution and transmission equipment must be properly selected for the intended application. It must be installed and serviced by competent personnel who have been trained and understand proper safety procedures. These instructions are written for such personnel and are not a substitute for adequate training and experience in safety procedures. Failure to properly select, install or maintain power distribution and transmission equipment can result in death, severe personal injury, and equipment damage. G122.2

Product information

Introduction

Service Information MN280031EN provides installation and adjustment instructions for KA369R, KA542R, and KA57WE auxiliary switch kits for Eaton's Cooper Power™ series recloser products. Carefully read and understand the contents of this manual.

Read this manual first

Read and understand the contents of this manual and follow all locally approved procedures and safety practices before installing or operating this equipment.

Additional information

These instructions cannot cover all details or variations in the equipment, procedures, or process described, nor provide directions for meeting every possible contingency during installation, operation, or maintenance. When additional information is desired to satisfy a problem not covered sufficiently for the user's purpose, contact your Eaton representative.

Acceptance and initial inspection

Each kit is in good condition at the factory and when accepted by the carrier for shipment.

Upon receipt, inspect the carton for signs of damage. Unpack the kit(s) and inspect it thoroughly for damage incurred during shipment. If damage is discovered, file a claim with the carrier immediately.

Handling and storage

Be careful during handling and storage of the kit to minimize the possibility of damage. If the kit is to be stored for any length of time prior to installation, provide a clean, dry storage area.

Standards

Eaton's reclosers are designed and tested in accordance with ANSI® standards C37.60 and C37.85 and ANSI® guideline C37.61.

Quality standards

ISO 9001 certified quality management system

Description

Remote indication of the recloser contact position or switching of other devices can be achieved when the recloser is equipped with an auxiliary switch. The auxiliary switch kit mounts externally on the head casting. For field installation, the kit is shipped with a number of loose attaching components as shown in Figure 1 and described in Table 1.

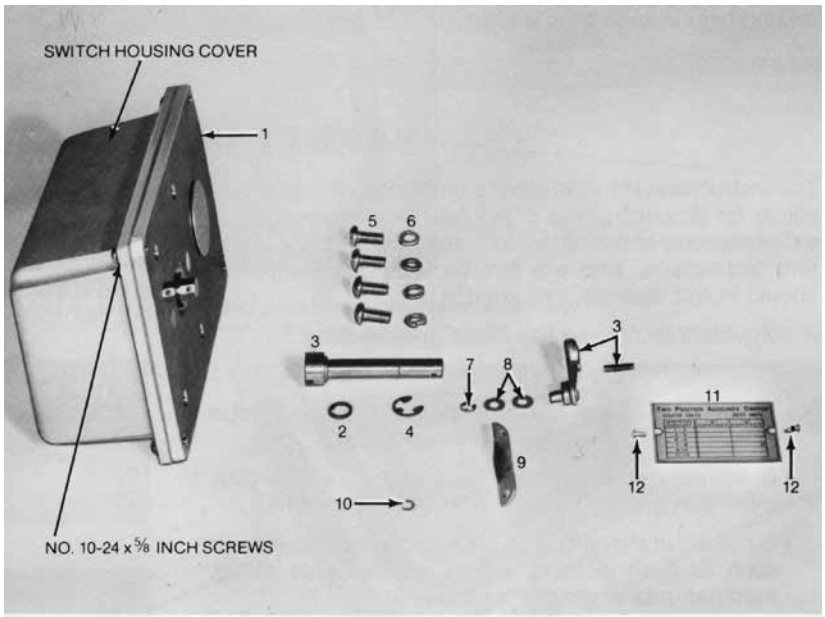

Figure 1. Auxiliary switch accessory kit.

Table 1. Auxiliary Switch Kit Contents

Item	Part Number	Description	Quantity
1*	KA235R11	Switch, single stage (KA369R)	1
	KA235R22	Switch, two stage (KA369R)	
	KA235R33	Switch, three stage (KA369R)	
	KA1102R11	Switch, single stage (KA542R)	
	KA1102R22	Switch, two stage (KA542R)	
	KA1102R33	Switch, three stage (KA542R)	
	KP153WE11	Switch, single stage (KA57WE)	
	KP153WE22	Switch, two stage (KA57WE)	
	KP153WE33	Switch, three stage (KA57WE)	
2	KP2000A3	Rubber o-ring shaft seal	1
3	KA351R	Switch operating shaft and lever	1
4	KP86	Type E retaining ring	
5	KP613	Sstl machine scrs - 1/4"-20 x 5/8", switch mtg.	4
6	KP563	Sstl lock washers - 1/4"	4
7	KP2013A44	Type E retaining ring	1
8	KP335	Brass washers No. 10S 7/16" O.D. x 3/16" I.D.	2
9	KP651R	Switch link	1
10	KP84	C retaining ring	1
11	KP655R	Nameplate - contact designation	1
12	KP69	Sstl self-tapping scr - No. 2 x 3/16"	2
13	KP608R	Switch housing cover	1
14	KP649R	Cover gasket	1
		Mounting Plate	1

* Item 1 will vary depending on kit selection.

Installation

CAUTION

Equipment damage. Keep work areas clean to prevent debris from accumulating on or in the hydraulic mechanism during disassembly and reassembly of components. Failure to comply can result in hydraulic failure and recloser misoperation. T254.0

IMPORTANT

When installing this kit, use a clean, lint free cloth to prevent contamination of the hydraulic mechanism during valve replacement.

Refer to the appropriate maintenance manual for the step-by-step procedures to remove the recloser from service and for specific disassembly and reassembly procedures:

Recloser Type	Service Information
R Serial No. 3733 and above	MN280026EN
RE	S280-40-3
RV	S280-30-4
RV Serial No. 4111 and above	S280-30-9
RVE	S280-40-5
RVE Serial No. 2200 and above	S280-40-8
RX Serial No. 679 and above	S280-30-8
RXE	S280-40-7
VW Serial No. 510 and above	S280-30-7
VWE	S280-40-6
VWVE	S280-40-6
VWV27 Serial N0. 144 and above	S280-30-7
VWV38 Serial No. 101 and above	S280-30-7
W	S280-30-3
W Serial No. 7334 and above	S280-30-8
WE	S280-40-4
WE	S280-40-7
WV	S280-30-4
WV Serial No. 901 and above	S280-30-9
WVE	S280-40-5
WVE Serial No. 1000 and above	S280-40-8

⚠ WARNING

Hazardous voltage. De-energize the switchgear before installing this kit. Follow all locally approved safety practices and procedures when working around high voltage lines and equipment. Failure to comply can result in contact with high voltage which will cause death or severe personal injury T232.3

CAUTION

Follow all locally approved safety practices when lifting and mounting the equipment. Use the tapped lifting provisions provided. Lift the load smoothly and do not allow the load to shift. Improper lifting can result in equipment damage. G126.0

CAUTION

Equipment damage. Recloser must be open (yellow operating handle, under sleethood, down) before untanking. Tripping the mechanism out of oil will cause excessive mechanical shock to the operating mechanism, which will cause accelerated wear and/or damage to the mechanism. T202.0

⚠ CAUTION

Equipment damage. Refer to the specific switchgear unit maintenance manual for tanking/untanking procedures and related instructions. Failure to follow these instructions could result in equipment damage or personal injury. T238.0

The entire installation process should be conducted in a clean environment, such as a repair shop.

1. Bypass, trip, and de-energize the recloser.
2. Carefully transport the unit to a suitable service facility.
3. With the recloser in the open position, untank the recloser by loosening the head bolts and washers on the head casting. Carefully lift the head assembly out of the tank using the lifting lug(s).

Note: Allow excess oil to drain.

4. Remove the head assembly from the mechanism and securely mount to a suitable work rack.

Note: Separate procedures are provided for hydraulic reclosers and electronic reclosers.

- This procedure applies only to these hydraulic reclosers: *R, RV, RX, VW, VWV27, VWV38, W, WV*.

A. Disconnect all bushing leads at the lower end of the bushings.

Also, disconnect any accessories, such as the ground trip solenoid, at their terminals.

B. Disengage the control lever and the contact position indicator by pushing the spring-loaded couplers (Figure 2) inward.

Turn the couplers to lock them in the disengaged position.

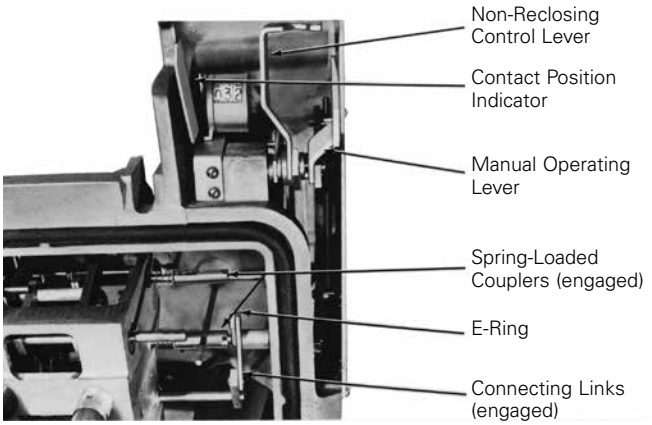

Figure 2. Disconnecting control lever prior to head assembly removal.

C. Disconnect the non-reclosing control lever by removing the E-ring indicated in Figure 2 and separating the two connecting links.

Note: Prior to completing the next step ensure the recloser mechanism is supported from below.

D. Remove the six 1/2-inch x 4-1/2-inch socket-head bolts that secure the frame to the head casting.

Six tubular spacers will be released when the head is lifted.

- This procedure applies only to these electronic reclosers: *RE, RVE, RXE, VWE, VWVE, WE, WVE*.

A. Disconnect all bushings leads at the lower end of the bushings.

B. Disengage the lockout lever and the contact position indicator by pushing the spring-loaded couplers inward (Figure 3).

Turn the couplers to lock them in the disengaged position.

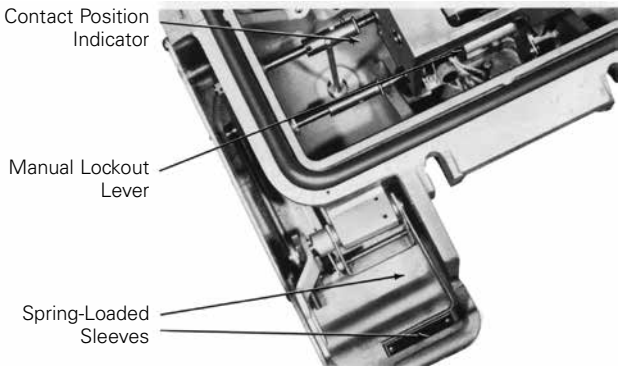

Figure 3. Spring-loaded sleeves of locknut lever and contact position indicator in engaged positions.

C. Remove the two screws that secure the 0.2 mfd capacitor to the load side of the recloser frame (Figure 4).

D. Disconnect the seven leads connected to the lower terminal strip of the terminal block attached to the recloser frame (Figure 4).

Label these seven leads corresponding to the terminals from which they are disconnected. Terminals are lettered A through G, *right to left*.

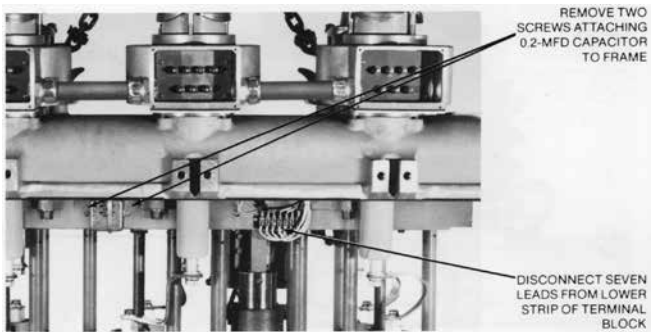

Figure 4. Capacitor and terminal block location.

E. Remove the screw that secures the nylon lead strap to the frame above the terminal block.

Note: Prior to completing the next step ensure the recloser mechanism is supported from below.

F. Remove the six 1/2-inch x 4-1/2-inch hexsocket head bolts that secure the frame to the head casting.

Six tubular spacers and lockwashers will be released when the bolts are removed and the head is lifted from the recloser-mechanism frame.

5. Proceed with accessory installation by assembling the switch link (Item 9) to the trip-link pin on the recloser mechanism (Figure 5).

Refer to Figure 6 and Table 2 to determine which hole in the switch link is to be used.

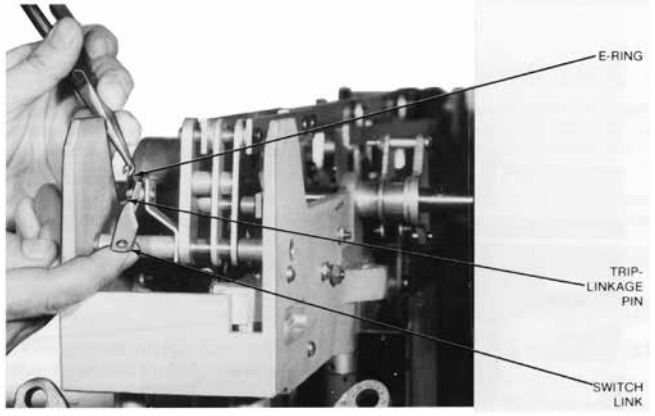

Figure 5. Assemble switch link to trip-link pin.

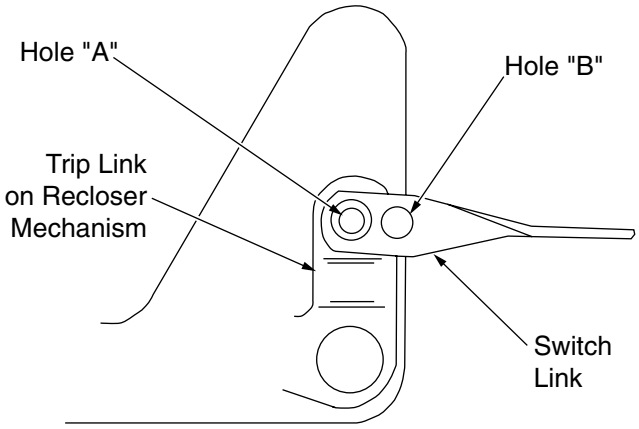

Figure 6. Assemble switch link using hole "A" or hole "B" per Table 2.

Table 2. Switch Link Hole Identification

Recloser	Serial Number	Hole "A"	Hole "B"
R	Above 2732	X	
RE	All	X	
RV	Below 1200	X	
	Above 1199		X
RVE	Below 600	X	
	Above 599		X
RX	All		X
RXE			
VW	All	X	
VWE			
VWV			
VWVE			
W	Below 7334	X	
	Above 7333		X
WE	Below 6316	X	
	Above 6315		X
WV	Below 723	X	
	Above 722		X
WVE	Below 996	X	
	Above 995		X

6. Remove cover plate located at the end of head casting opposite recloser operating handle by removing four 1/4-inch screws (Figure 7).

   Gasket KP610R will be reused.

7. Place rubber o-ring in the recess in head casting.

   Insert switch operating shaft through o-ring and hole (Figure 8).

8. Lock operating shaft in place (Figure 9) using E-ring (Item 4).

   Fasten lever to operating shaft using roll pin.

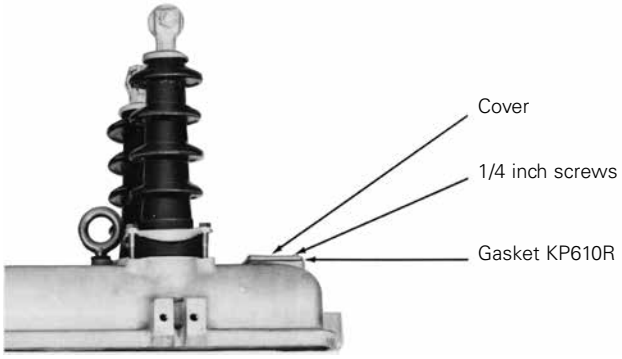

Figure 7. Recloser head casting.

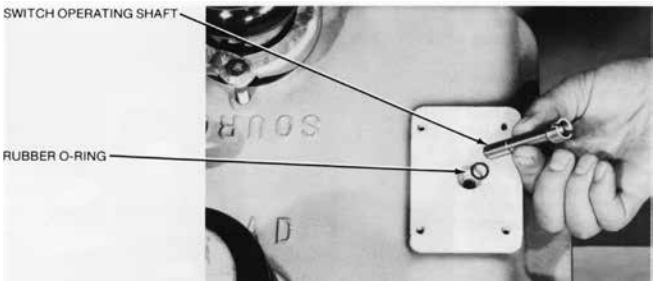

Figure 8. Switch operating shaft.

Figure 9. Linkage connection.

9. Reinstall the head assembly to the frame.

Note: Separate procedures are provided for hydraulic reclosers and electronic reclosers.

- This procedure applies only to these hydraulic reclosers: *R, RV, RX, VW, VWV27, VWV38, W, WV*.

A. Carefully lower head casting in place with the tubular spacers mounted on the six lugs.

Start the six 1/2-inch bolts and tighten evenly to avoid any binding of the mechanism.

B. Engage the contact indicator and manual operating lever.

Reconnect the non-reclosing lever.

C. Reconnect bushing leads and any accessory devices.

IMPORTANT

Ensure bushing leads are at least 1/2 inch from vertical insulating stringers, grounded parts, or contact plunger rods. On reclosers equipped with a ground trip solenoid, center-phase leads must clear the ground-trip solenoid frame by 1/2 inch.

- This procedure applies only to these electronic reclosers: *RE, RVE, RXE, VWE, VWVE, WE, WVE*.

A. Carefully lower head casting in place with the six tubular spacers placed on the lugs.

Start the six 1/2-inch bolts and tighten evenly to avoid any binding of the mechanism.

B. Engage the contact indicator and lockout lever.

C. Attach 0.2 mfd capacitor to the recloser frame.

D. Reconnect bushings leads.

IMPORTANT

Ensure bushing leads are at least 1/2 inch from vertical insulating stringers, grounded parts, or contact plunger rods. On reclosers equipped with a ground trip solenoid, center-phase leads must clear the ground-trip solenoid frame by 1/2 inch.

E. Connect wiring from bushing CTs and cable receptacle to respective terminals on the terminal block.

Attach nylon lead strap to recloser frame.

10. Assemble the switch link (Item 9) to the operating lever with the flat washers (Item 8) and retaining ring (Item 7) as indicated by arrows in Figure 9.
11. Position gasket KP611R as shown in Figure 10.
12. Remove switch housing cover by loosening four No. 10-24 x 5/8-inch screws (Figure 1).

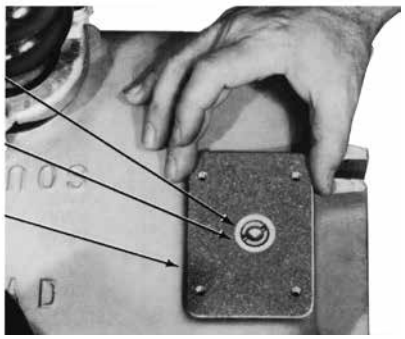

Figure 10. Installing gasket.

13. Engage switch shaft pin to the index notch on the operating shaft (Figure 10).

Fasten base to head casting (Figure 11) using 1/4-inch lockwashers and screws.

Note: Position punch mark on switch shaft toward pipe entrance.

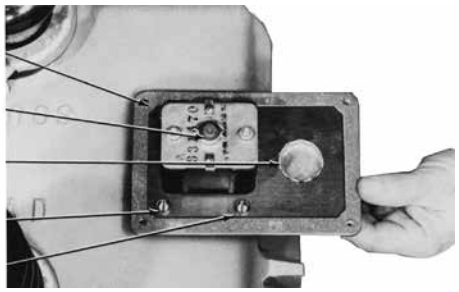

Figure 11. Switch base.

14. Remove pipe entrance cover and install conduit or cable.

Connect leads to desired switch contacts.

15. Replace cover gasket and cover.

Fasten cover to base using No. 10-24 x 5/8-inch screws (Figure 12).

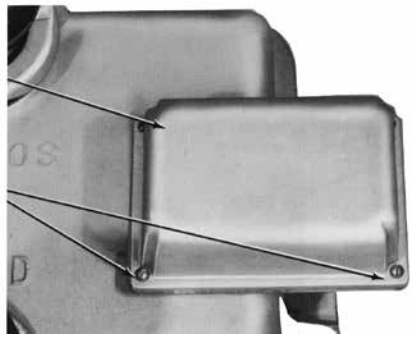

Figure 12. Cover in place.

16. Retank the recloser.

    A. Wipe clean the o-ring head gasket and gasket seat on the tank flange.

    B. Position the tank so the "Caution" nameplate on the tank is on the same end as the sleet hood and yellow operating handle.

IMPORTANT

Some reclosers have corona shield cups attached to the porcelain bushings just below the mechanism frame. Exercise care when retanking to avoid damaging the corona shields and operating handles.

Recloser may tilt due to load unbalance when hoisted for retanking (particularly if accessory BCTs are mounted only on one side). Use care to keep shields from being deformed by tank flange or liners.

17. Reassemble the head-to-tank bolts and washers.

    A thread-sealing procedure is required to keep moisture from entering the tank along the bolt threads on reclosers with serial numbers within the ranges specified in Table 3.

    The recommended sealant is *Permatex Form-A-Gasket No. 2 Non-Hardening Pliable Sealant* available from automotive suppliers.

    A. Apply a liberal amount of the sealant to the end of each bolt just before assembling the head-to-tank bolts.

       The four leading threads should be completely coated as shown in Figure 13.

    B. When the bolt is assembled, a small fillet of the sealant should remain around the bolt on the top surface of the tank flange.

18. Check the oil level with the dipstick and replenish as required before putting the recloser back into service.

19. Perform an electrical operational check to ensure the recloser is operating properly.

    Refer to the appropriate installation manual for the proper test procedures:

    - *S280-30-1* for hydraulic reclosers
    - *S280-40-2* for electronic reclosers

Table 3. Reclosers Requiring Thread-Sealing Procedure

Recloser Type	Serial Number Range
R	8825 thru 17324
RE	1000 thru 4513
RV	125 thru 3659
RVE	All below 1965
RX	All below 486
RXE	All below 341
VW	All below 440
VWE	All below 1354
VWV	All below 131
VWVE	All below 1060
W	All below 7083
WE	800 thru 6050
WV	All below 694
WVE	All below 865

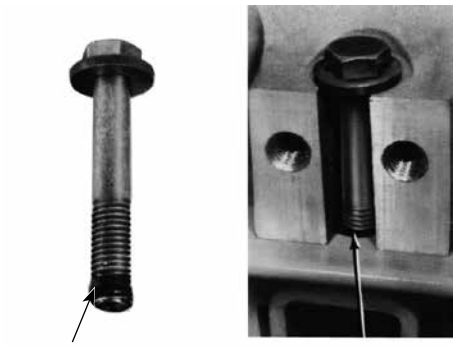

Figure 13. Thread sealing.

Adjustment

This switch is composed of one, two, or three sections, each of which has two sets of contacts designated “a” and/or “b”.

All “a” contacts are open and “b” contacts are closed when the recloser is tripped.

Contacts can be adjusted in the field for either “a” or “b” operation by repositioning the cams inside each switch section.

The nameplate attached to the switch cover shows the original factory setting (Figure 14). If the switch is re-adjusted the nameplate should be revised accordingly.

To change any cam position:

1. Remove the auxiliary switch housing cover.
2. Remove the four screws and lockwashers securing the housing base plate to the recloser head.
3. Lift off the entire switch assembly.
4. Remove the cotter pin and collar from the square shaft.
5. Remove the hex nuts and lockwashers from the two long machine screws holding the switch sections to the base plate.
6. Starting with the bottom section, lift the cams off the square shaft.

(continued on next page)

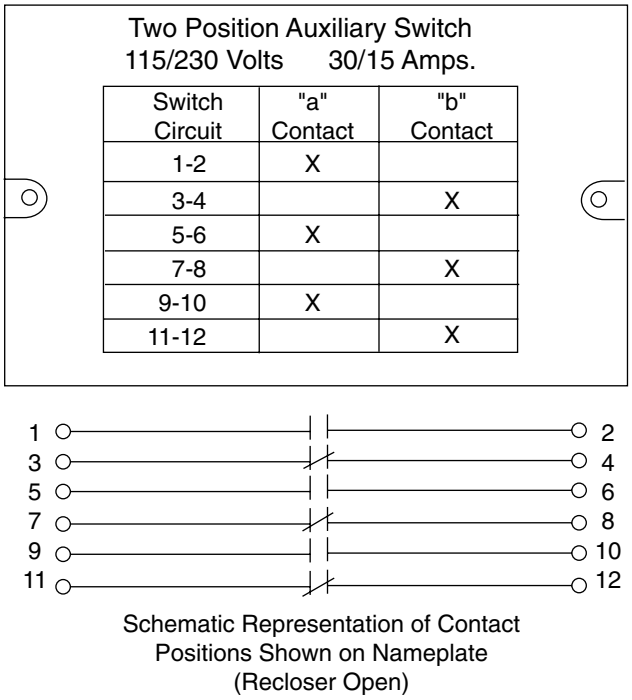

Figure 14. Nameplate and schematic diagram for typical three-stage switch.

7. Replace the cams in one of the positions shown in Figure 15.
8. Reposition and fasten the switch sections to the housing base plate.
9. Replace the collar and cotter pin on the shaft.
10. Remount the assembled switch on the recloser head, making sure that the pin in the square shaft engages the notch in the switch operating shaft in the head casting.

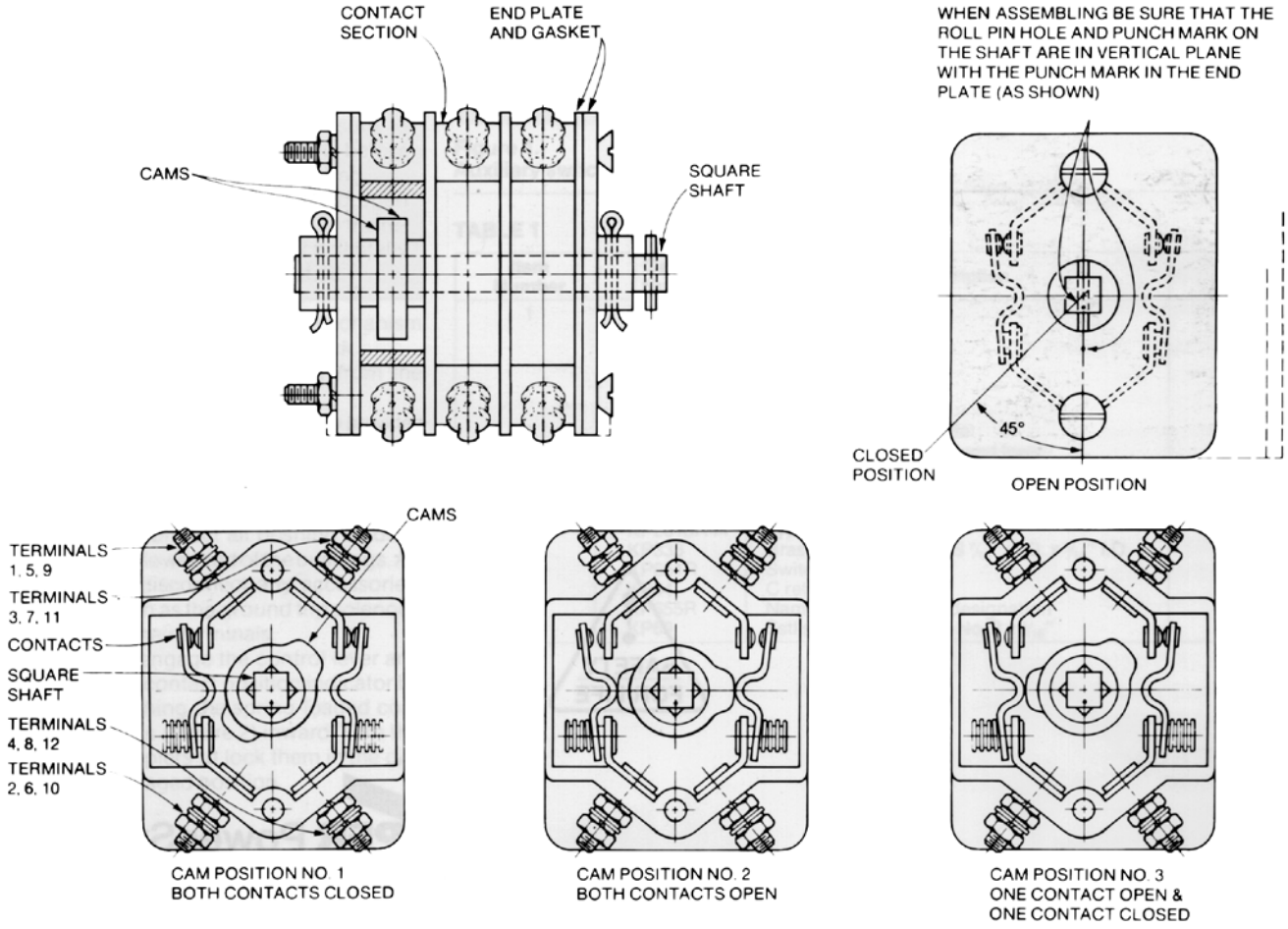

Figure 15. Auxiliary switch cam positions.

Switch continuity test

To assure proper operation, a continuity test may be performed on the auxiliary switch.

To test continuity with the switch mounted on the recloser, check switch contacts with the recloser tripped and in the closed position. Using an ohmmeter the contacts should check out in accordance with the following table. Read zero when contacts are closed and infinity when opened.

Further assurance of proper operation will be necessary when the switch or switch sections contain both "a" and "b" contacts. With such an arrangement, a test should be made for contact overlap in the following manner.

1. With the switch removed, connect an ohmmeter in series with the "a" and "b" contact.
2. Slowly rotate the switch by hand between open and closed positions observing the meter.
3. The meter should not read continuity at any point between the closed and open positions. That is, the closed contact must break before the open contacts make.

Switch ratings

Switch contacts are insulated for 600 volts and have a continuous-current rating of 10 amps. The interrupting rating of the auxiliary switch contacts is shown in Table 4.

Table 4. Auxiliary Switch Interrupting Ratings

	AC		DC	
Volts	**Inductive**	**Non-Inductive**	**Inductive**	**Non-Inductive**
24	–	–	15	20
48	–	–	7.5	10
120	50	80	–	–
125	–	–	1.5	2
240	25	40	–	–
250	–	–	0.45	.5

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Printed in USA
Publication No. MN280031EN
KA2048-0872 Rev: 02

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