

Operation Counter Replacement Instructions



Powering Business Worldwide

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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.

G122.3

Product information

Introduction

Current production models of Eaton's Cooper Power series distribution switchgear incorporate a modern four-digit operations counter. This counter also can be employed as a replacement for counters on older switchgear units.

In most instances, this improved counter can be installed without modifying the switchgear. Adaptation instructions, when required, are listed in Table 1.

 **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

Refer to the appropriate maintenance manual for the step-by-step procedures to remove the recloser from service.

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.

Read this manual first

Read and understand the contents of this manual and follow all locally approved procedures and safety practices before connecting 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. For additional information, contact Eaton's Cooper Power series product representative.

Quality standards

ISO 9001 Certified Quality Management System

Counter installation

1. Locate the counter inside the sleet hood.
2. Remove the existing counter by using a screwdriver to remove the two screws that hold the counter in place.
3. Secure the replacement counter inside the sleet hood, using the two self-tapping screws provided.
4. Check the counter operation after installing the replacement counter. Refer to the section Counter Adjustment below to determine if any linkage adjustment is necessary.

Counter adjustment

The two most important considerations are:

- The counter must register each opening operation.
- The counter operating arm must not reach its stop point within the travel range of the driving linkage. This is particularly critical on recloser Types E, H, L, PV4H, V4H, V6H, VXE, 3H, 4E, 4H, and 6H.

Confirm counting

Close and trip the switchgear manually and observe that the counter has registered the operation.

If the trip operation did not register, confirm that the driving lever (the lever that pushes or pulls the counter arm) is in place and that its movement is causing rotation of the counter arm.

Adjustment

When the switchgear is manually or electrically closed, a driving lever, linkage, or spring causes the counter arm to pivot, preparing the ratchet to count. Near the end of this arming stroke, a click can be heard in the counter. As the arm returns to its starting point, the digit wheel(s) move(s) to register the count. Near the end of the return stroke, another click can be heard, which indicates completion of the count.

If counts do not register, it may be necessary to make a small adjustment to the driving lever or the counter arm. The driving lever must cause (or allow) the counter arm to travel completely through the first click to set the ratchet. Likewise, on the return stroke, the counter arm must travel through the second click to fully pivot the number wheel.

On E, H, L, PV4H, V4H, V6H, VXE, 3H, 4E, 4H, and 6H reclosers, at the extremes of its rotation, the counter arm hits a stop and will travel no further. It is essential that the recloser contacts close before the counter arm hits the stop.

Perform these steps to verify correct operation:

1. Pull down on the recloser operating handle to open the recloser contacts. The handle is yellow in most cases.

2. Slowly push the operating handle upward and listen for these two sounds:
 - First, the ratchet-set click in the counter.
 - Second, a somewhat louder click of the recloser contacts closing.
3. Adjustment is correct if the counter “click” occurs before the “click” of the contacts closing, and the counter arm is not against its stop.
4. If adjustment is needed, do the following:
 - A. Make note of the installed position of the counter, and remove it from the sleet hood.
 - B. Loosen the bolt that clamps the counter arm to the counter shaft, and adjust the counter arm.
 - If the counter stop is encountered too soon, rotate the arm upward (as if into the sleet hood) a small amount.
 - If the counter is failing to register, rotate the arm downward (as if into the sleet hood) a small amount.
 - C. Retighten the bolt and reinstall the counter.
 - D. Check operation of the counter by slowly raising the yellow operating handle to close the recloser contacts. Before the contacts close, the ratchet should drop into the next position indexing the counter. Hold the operating handle at the point where the recloser contacts just close. The counter arm should be able to travel another $\frac{3}{32}$ in. ($\pm \frac{1}{32}$ in.) before it reaches the counter stop.

IMPORTANT

If the counter lever hits the counter stop before the recloser contacts close, the mechanism may become blocked and the recloser could fail to close.

- E. Repeat steps A - D as needed until the counter is adjusted correctly.

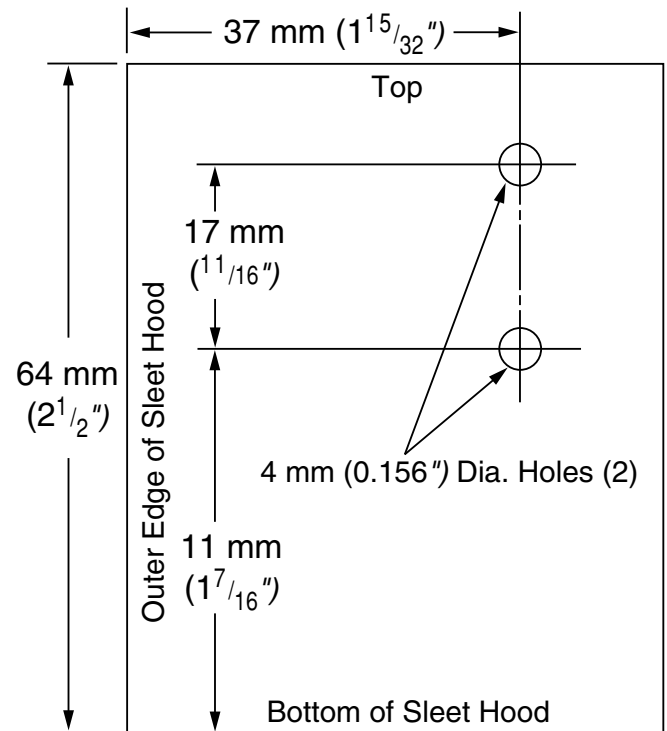


Figure 1. Templates for KA708E and KA708L kits

Operation Counter

Table 1. Replacement counters and procedures			
Switchgear Type	Serial No. Range	Counter Cat. No.	Installation Procedure
CI, CS, KF, KFE	All	KA28C06S	Direct replacement.
CM	CM2340 and above	KA28C010S	Direct replacement.
CVE, CXE, CZE	All	KA28C07S	Direct replacement.
D, DV	All	KA28C05S	Direct replacement.
E	E16570 and below	KA708E	On reclosers equipped with a shunt mechanism, mount the new counter to the diagonal bracket, beneath the sleet hood, to which the old counter is attached. On others, remove the bracket and attach the counter at the bracket mounting holes. If necessary, drill two new 0.156-in. diameter holes using the template; refer to Figure 1. Place the template as indicated on the outside surface of the sleet hood, on the end opposite the nameplates.
E	E16571 and above	KA28C03S	Direct replacement.
E	E52007 and above	KA28C01S	Direct replacement.
F, ME, MLE, MVE	All	KA28C08S	Direct replacement.
GV, GW, GWC, VCR, VLR, VR, VRV	All	KA28C03S	Direct replacement.
H	H100973 and below	KA704H	Replace the old counter with the new counter and bracket assembly, attaching the bracket with the 3/8-in. long self-tapping screw provided.
H	H100974 to H175859	KA701H	Replace the counter directly, and install the new sleet hood cover having dished portion, as furnished in the counter kit.
H	H175860 and above	KA28C01S	Direct replacement.
3H	3H585 and below	KP44H	Direct replacement.
3H	3H586 to 3H10059	KA701H3	Install replacement counter following instructions in <i>Service Information S280-10-16</i> , furnished in the counter kit.
3H	3H10060 and above	KA28C04S	Direct replacement.
4H	4H13354 and below	KA701H	Replace the counter directly, and install the new sleet hood cover having dished portion, as furnished in the counter kit.
4H	4H13355 and above	KA28C01S	Direct replacement.
6H	6H2651 and below	KA701H3	Install replacement counter following instructions in <i>Service Information S280-10-16</i> , furnished in the counter kit.
6H	6H2652 and above	KA28C04S	Direct replacement.
V4H, 4E	All	KA28C01S	Direct replacement.
V6H	All	KA28C04S	Direct replacement.
L	L37202 and below	KA708L	Remove diagonal bracket to which old counter was attached, and mount new counter at the bracket mounting holes. If necessary, drill two new 0.156-in. holes using the template, Figure 1. Place template as indicated on the outside surface of the sleet hood, on the end opposite the nameplates.
L	L37203 and above	KA28C014S	Direct replacement.
LV	All	KA28147VWS	Direct replacement.
PV4H	All	KA28C011S	Direct replacement.
PWE, PWH, PWVE, PWVH	All	KA28C09S	Adjust the counter arm parallel to the counter mounting surface. Aim the counter arm away from the numerals.
R	R3732 and below	KA865R	Remove the sleet hood cover to exchange counters. When replacing the sleet hood cover, install the L-shaped spacer (included in the counter kit) between the sleet hood and cover. Fasten with the 5/8-in. long screws provided.
R	R3733 and above	KA28C02S	Direct replacement.
RV, RX, VW, VVW, W, WV	All	KA28C02S	Direct replacement.
SW, SWE, SWVE, VWS	All	KA146VWS	Direct replacement.
TSC	All	KA146TSC	Direct replacement.
VSMT, VSO	All	KA28C09S	Direct replacement.
VXE	All	KA28C014S	Direct replacement.



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