

Fusing Equipment
MN132016EN

Effective November 2016
Supersedes
September 2005 (S240-71-1)

COOPER POWER
SERIES

ELF-LR™ Current-Limiting Fuse Installation 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.

G122.2

General

CAUTION

Eaton's Cooper Power series ELF-LR™ Current-Limiting Fuse is designed to be operated in accordance with normal safe operating procedures. These instructions are not intended to supersede or replace existing safety and operating procedures. **READ ALL THE INSTRUCTIONS BEFORE INSTALLING THE ELF-LR FUSE.**

The ELF-LR fuse should be installed and serviced only by personnel familiar with good safety practice and the handling of high-voltage electrical equipment.

Eaton's Cooper Power series ELF-LR™ Current-Limiting Fuse is a full-range current-limiting fuse that is suitable for use in areas where a high-fire hazard exists. ELF-LR liquid fuses are noiseless and expel no hot gases or burning particles while performing fault current interruptions.

The ELF-LR fuse has been granted permanent exemption by the California Dept. of Forestry and Fire Protection from the pole clearance requirements when mounted in the field according to manufacturer's specifications. The ELF-LR fuse meets the exemption requirements listed specifically in the California Code of Regulations, Title 14, Section 1255 (10).

Application

ELF-LR fuses are designed to protect pole-type transformers, single-phase and three-phase laterals and underground taps. The ELF-LR fuse is designed to be mounted in a 15 kV liquid fuse-specific, bushing-style mounting, such as S & C G-3942.

Operation

The ELF-LR fuse uses a blue cap to cover an orange indicating band on the upper part of the fuse. When the fuse operates, a striker pin is fired, dislodging the blue cap and exposing the indicator band.

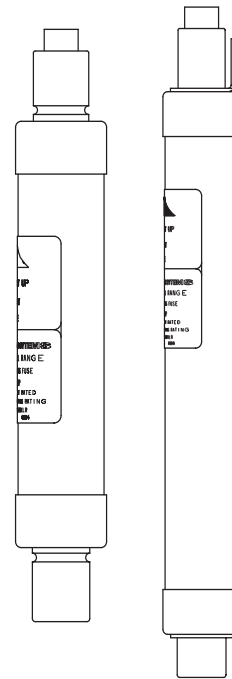


Figure 1. Line drawing of 8.3/13.2 kV and 17.2/23 kV ELF-LR fuse.

Installation

ELF-LR fuses may be used as replacement fuses or in original equipment. Replace fuses of equal size and rating only. The ELF-LR fuse can be installed using a Kearney™ Fuse Puller, Part No. 4455-13, mounted on a Kearney Fit-On™ Stick. Follow the instructions of the mounting equipment for proper fit and connection.

Refer to Figure 2.

1. Verify that fuse is in the upright position. The 17.2/23 kV rated fuse has a retaining clip that holds the fuse securely in place. When installing fuse, make sure that retaining clip is toward cutout.
2. Insert bottom end of fuse in cutout bushing and push top end into upper cutout bushing, making sure that fuse is securely positioned.
3. Close cutout locking clips.

CAUTION

As always, when working near live high voltage equipment, follow all approved safety practices when installing or removing an ELF-LR.

ELF-LR™ Current-Limiting Fuse

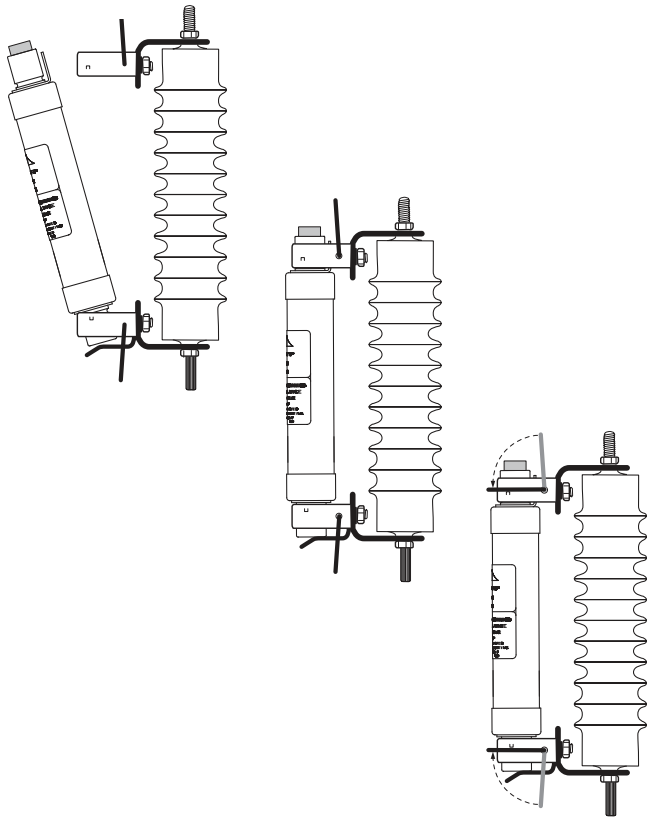


Figure 2. Installing fuse in cutout.

CAUTION

If a fault is present when installing an ELF-LR fuse, the striker pin will operate, dislodging the blue cap and exposing the indicator band.

CAUTION

Additional fault locating and repair in accordance with existing procedures should be completed before replacing the ELF-LR fuse for a second time.

Removal

Open cutout locking clips. Using fuse puller, remove lower end of fuse from cutout first, then upper end (see Figure 3).

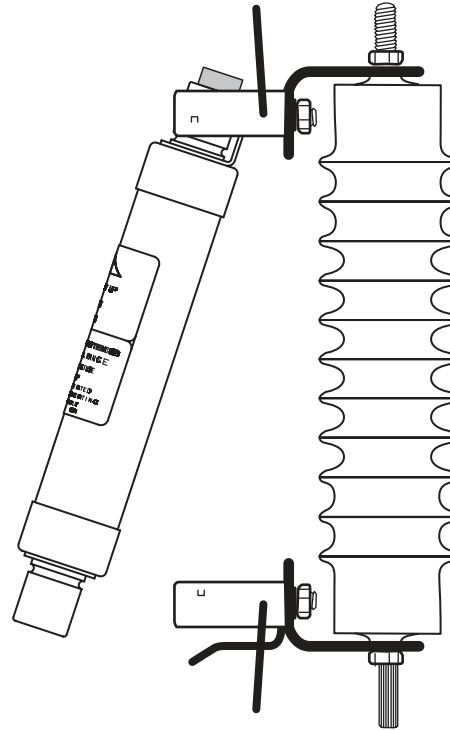


Figure 3. Proper removal of fuse in cutout.

CAUTION

An ELF-LR fuse in a cutout with the actuator operated indicates a blown fuse due to an overload or fault condition. Faults and/or visibly failed equipment should be located and repaired before reinstalling a replacement ELF-LR fuse.

Testing

A continuity test in the field can determine if the fuse element is open. This can be done using an ohmmeter or self-powered continuity tester.

To confirm the integrity of the current-limiting section, additional shop testing using a micro-ohmmeter to verify the nominal resistance is recommended (See Table 1).

Table 1. ELF-LR Fuse Resistance Values

ELF-LR Fuse Catalog No.	Fuse Ratings		Resistance (Milliohms)	
	Voltage (kV)	Current (A)	Minimum	Maximum
FAK81W6LR	8.3/13.2	6	68.8	89.0
FAK81W8LR	8.3/13.2	8	49.3	60.3
FAK81W12LR	8.3/13.2	12	43.3	53.0
FAK81W18LR	8.3/13.2	18	29.4	35.9
FAK81W20LR	8.3/13.2	20	24.5	30.0
FAK71W6LR	17.2/23	6	103.8	130.6
FAK71W8LR	17.2/23	8	75.2	91.9
FAK71W12LR	17.2/23	12	69.2	84.6
FAK71W18LR	17.2/23	18	47.2	57.5
FAK71W20LR	17.2/23	20	38.8	47.4



CAUTION

The ELF-LR fuse should not be installed if it has any visual signs of operation and/or damage.

Maintenance

In areas of severe contamination, periodically examine cutouts for build-up. Contact surfaces must be free of contaminants



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Printed in USA
Publication No. MN132016EN Rev. 0
November 2016

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