

ELSP current-limiting backup fuse installation instructions



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Safety for life



Eaton's Cooper Power Systems products meet or exceed all applicable industry standards relating to product safety. 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's Cooper Power Systems 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

The ELSP current-limiting fuse from Eaton's Cooper Power Systems is for use in series with low current primary protection devices such as a Bay-O-Net fuse or MagneX™ interrupter.

The ELSP fuse is designed for use in transformer oil, Envirotemp™ FR3™ fluid, or an approved equivalent.

The fuse's highly efficient current-limiting section minimizes the effects of high fault current stresses on equipment and the distribution system.

If the ELSP fuse operates due to a high fault current the ELSP is not field replaceable. The transformer/fuse must be returned to the transformer manufacturer to be replaced.

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, please contact your Eaton's Cooper Power Systems sales representative.

Acceptance and initial inspection

Each ELSP fuse is completely inspected and tested at the factory. It is in good condition when accepted by the carrier for shipment. Upon receipt of an ELSP fuse, inspect the ELSP fuse thoroughly for damage and loss of parts incurred during shipment. If damage or loss is discovered, file a claim with the carrier immediately.

Handling and storage

If the ELSP fuse is to be stored for an appreciable time before installation, provide a clean, dry storage area. Locate the ELSP fuse so as to minimize the possibility of physical damage.

Quality standards

ISO 9001 Certified Quality Management System

Application

The ELSP fuse is used in transformers to protect and isolate faulted equipment. When connected in series with a low current primary protection device, the fuse becomes an element of a two part protection system that gives a full range of fault protection.

Mounting requirements

Use a mounting board in oil with terminal lug, shake-proof washer, and 1/4-20 x 1/2" long hex-head screw on each end of the fuse. Eaton's Cooper Power Systems considers operating temperatures greater than 100° C to be abnormal for transformer applications.

WARNING

Although this fuse will operate to 140° C, we do not recommend operation of the fuse continuously at temperatures greater than 100° C.

If the fuse is to operate continuously under oil at temperatures higher than 100° C, it is recommended that the fuse be derated 0.2% per degree centigrade for each degree greater than 25° C.

If you fail to do so, the fuse may not coordinate correctly with the application. Therefore, the fuse may operate faster than intended.

Clearances

Table 1. Clearances

Dielectric kV BIL	Clearance to Ground or Between Phases Including Leads (in oil)
95	1.1" (27.9 mm)*
125	1.5" (38.1 mm)*
150	2.1" (53.3 mm)*

* Sharp edges on brackets may require large distances

Installation

Secure the ELSP fuse on mounting board or other means of support. Pre-bend the leads such that there is no cantilever force applied to the fuse connection. Crimp terminal lug with 1/4" stud hole size onto lead. Connect to end cap of fuse with a shake-proof washer and 1/4-20 x 1/2" long hex-head screw, as shown in Figure 3 or Figure 4. (For fuses with internal metric threads, use ISO M6 x 1 thd. x 12 mm lg. screw.)

Paralleling fuses

The current paths for each fuse in parallel should be the same length and made of the same material.

Cautions should be taken when paralleling fuses to ensure that the energy is divided equally between the two fuses. See Figure 1.

WARNING

Proper parallel of fuses. The fuses themselves must have the same resistance and the current path through each fuse must be the same. If they are not, failure of the fuses may result. Fuse failure could damage the transformer and expose by-standers to injury or death.

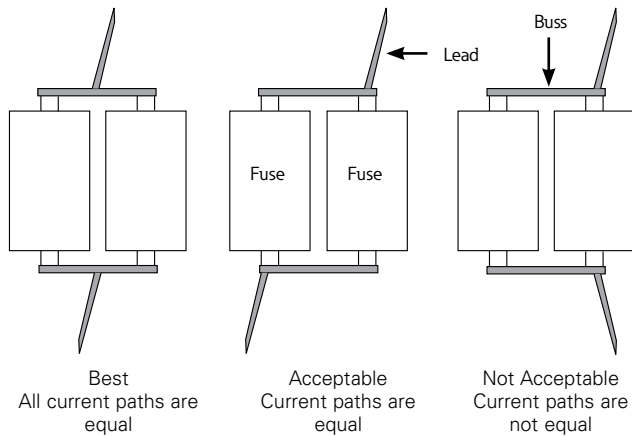


Figure 1. Illustration for proper paralleling of fuses.

Fuse holder

The ELSP fuse holder from Eaton's Cooper Power Systems is used to support the backup current-limiting ELSP fuse up to **23 kV rating**. The support assembly consists of a fiberglass board and four spacers attached to plastic nuts. The fuse is fastened to the board by means of two stainless steel spring tie downs and two nylon tie-straps. Attach the spring to fiberglass board on one end. Wrap the spring around the fuse and pull the spring into the 1st hole then into the 2nd hole. Place the nut over the spring to secure it in place. Secure the fuse to the mounting board using nylon tie straps as shown in Figure 4.

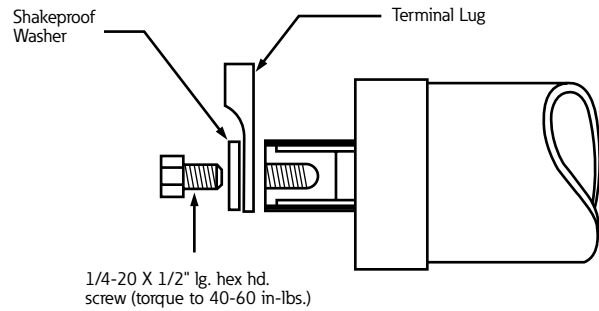


Figure 2. 2" diameter fuse lead connect.

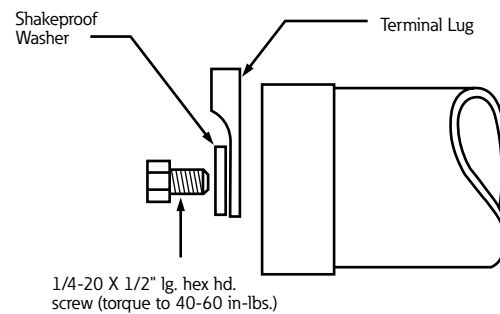


Figure 3. 3" diameter fuse lead connect.

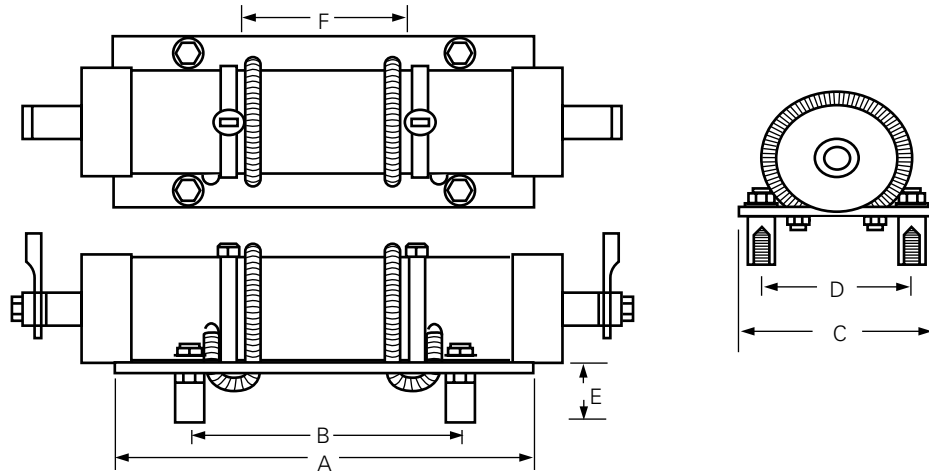


Figure 4. ELSP mounting with single fuseholder, typical fuse lead connection and support ties, parallel holder also available, (23 kV rated fuse maximum).

Refer to Tables 2 and 3 for dimensions.

Table 2. 2" Diameter ELSP Fuse Holder

Catalog Number	Dimensions – Inch (mm)					
	A	B	C	D	E	F
3409661C05M (Single)	6.0 (152)	3.00 (76)	5.0 (127)	4.13 (105)	2.1 (53)	4.5 (114) ^a
3409661C07M (Parallel)	9.0 (229)	5.98 (152)	7.0 (178)	5.92 (150)	2.1 (53)	2.4 (61)

^a For mounting 8.3 kV ELSP, catalog numbers CBUC08030C100, CBUC08040C100, CBUC08050C100, and CBUC08065C100, dimension is 2.5 (64).

Table 3. 3" Diameter ELSP Fuse Holder

Fuse Holder Catalog Number	ELSP Fuse kV Rating	Dimensions – Inch (mm)					
		A	B	C	D	E	F
3409661C08M	8.3	9.0 (229)	5.98 (152)	7.0 (178)	5.92 (150)	2.1 (53)	(a) –
3409661C08M	15.5	9.0 (229)	5.98 (152)	7.0 (178)	5.92 (150)	2.1 (53)	7.0 (127)
3409661C08M	23.0	9.0 (229)	5.98 (152)	7.0 (178)	5.92 (150)	2.1 (53)	7.0 (178)

(a) Outer springs are not required.

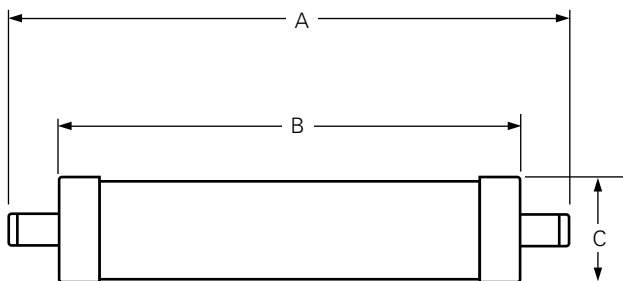


Figure 5. 2" diameter ELSP current-limiting backup fuse (see Table 4 for dimensional information).

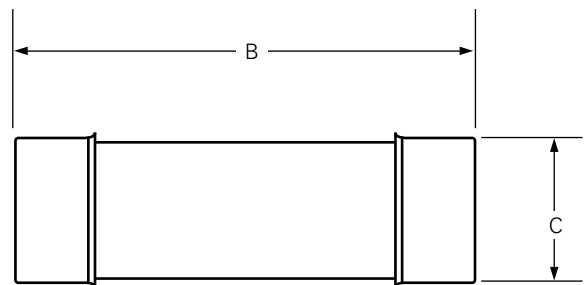


Figure 6. 3" diameter ELSP current-limiting backup fuse (see Table 4 for dimensional information).

Table 4. Dimensional Information

Voltage (kV)	Current Rating (A)	ELSP Part Numbers	Dimensional Information			Description
			Dimension A (Figure 5) Inches (mm)	Diameter Tube (Figures 5 and 6) Dimension B Inches (mm)	Dimension C Inches (mm)	
8.3	30	CBUC08030C100	7.2 (183)	6.0 (152)	2.1 (53)	8.3 kV 30 A
	40	CBUC08040C100	7.2 (183)	6.0 (152)	2.1 (53)	8.3 kV 40 A
	50	CBUC08050C100	7.2 (183)	6.0 (152)	2.1 (53)	8.3 kV 50 A
	65	CBUC08065C100	7.2 (183)	6.0 (152)	2.1 (53)	8.3 kV 65 A
	80	CBUC08080C100	9.6 (244)	8.4 (214)	2.1 (53)	8.3/9.9 kV 80 A
	100	CBUC08100C100	9.6 (244)	8.4 (214)	2.1 (53)	8.3/9.9 kV 100 A
	125	CBUC08125C100	9.6 (244)	8.4 (214)	2.1 (53)	8.3 kV 125 A
	150	CBUC08150D100	–	11.4 (289)	3.0 (76)	8.3 kV 150 A
	165	CBUC08165D100	–	11.4 (289)	3.0 (76)	8.3 kV 165 A
	180	CBUC08180D100	–	11.4 (289)	3.0 (76)	8.3 kV 180 A
9.9	250	CBUC08250D100	–	11.4 (289)	3.0 (76)	8.3 kV 250 A
	30	CBUC09030C100	9.6 (244)	8.4 (214)	2.1 (53)	9.9 kV 30 A
	40	CBUC09040C100	9.6 (244)	8.4 (214)	2.1 (53)	9.9 kV 40 A
	50	CBUC09050C100	9.6 (244)	8.4 (214)	2.1 (53)	9.9 kV 50 A
	65	CBUC09065C100	9.6 (244)	8.4 (214)	2.1 (53)	9.9 kV 65 A
15.5	30	CBUC15030C100	9.7 (247)	8.5 (216)	2.1 (53)	15.5 kV 30 A
	40	CBUC15040C100	9.7 (247)	8.5 (216)	2.1 (53)	15.5 kV 40 A
	50	CBUC15050C100	9.7 (247)	8.5 (216)	2.1 (53)	15.5 kV 50 A
	65	CBUC15065C100	9.7 (247)	8.5 (216)	2.1 (53)	15.5 kV 65 A
	80	CBUC15080C100	14.0 (356)	12.8 (325)	2.1 (53)	15.5/17.2 kV 80 A
	100	CBUC15100C100	14.0 (356)	12.8 (325)	2.1 (53)	15.5/17.2 kV 100 A
	125	CBUC15125C100	16.9 (429)	15.6 (396)	2.1 (53)	15.5/17.2 kV 125 A
	150	CBUC15150D100	–	15.95 (405)	3.0 (76)	15.5 kV 150 A
	165	CBUC15165D100	–	15.95 (405)	3.0 (76)	15.5 kV 165 A
	180	CBUC15180D100	–	15.95 (405)	3.0 (76)	15.5 kV 180 A
17.2	30	CBUC17030C100	14.0 (356)	12.8 (325)	2.1 (53)	17.2 kV 30 A
	40	CBUC17040C100	14.0 (356)	12.8 (325)	2.1 (53)	17.2 kV 40 A
	50	CBUC17050C100	14.0 (356)	12.8 (325)	2.1 (53)	17.2 kV 50 A
	65	CBUC17065C100	14.0 (356)	12.8 (325)	2.1 (53)	17.2 kV 65 A
	23	30	CBUC23030C100	12.7 (323)	11.5 (292)	2.1 (53)
40		CBUC23040C100	12.7 (323)	11.5 (292)	2.1 (53)	23 kV 40 A
50		CBUC23050C100	12.7 (323)	11.5 (292)	2.1 (53)	23 kV 50 A
65		CBUC23065C100	12.7 (323)	11.5 (292)	2.1 (53)	23 kV 65 A
80		CBUC23080C100	16.9 (429)	15.6 (396)	2.1 (53)	23 kV 80 A
100		CBUC23100C100	16.9 (429)	15.6 (396)	2.1 (53)	23 kV 100 A
125		CBUC23125D100	–	18.9 (480)	3.0 (76)	23 kV 125 A
150		CBUC23150D100	–	18.9 (480)	3.0 (76)	23 kV 150 A
165		CBUC23165D100	–	18.9 (480)	3.0 (76)	23 kV 165 A
38		50	CBUC38050D100	–	15.95 (405)	3.0 (76)
	65	CBUC38065D100	–	15.95 (405)	3.0 (76)	38 kV 65 A
	80	CBUC38080D100	–	19.2 (487)	3.0 (76)	38 kV 80 A
	100	CBUC38100D100	–	19.2 (487)	3.0 (76)	38 kV 100 A
	120	CBUC38120D100	–	21.9 (556)	3.0 (76)	38 kV 120 A
	140	CBUC38140D100	–	24.7 (627)	3.0 (76)	38 kV 140 A



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