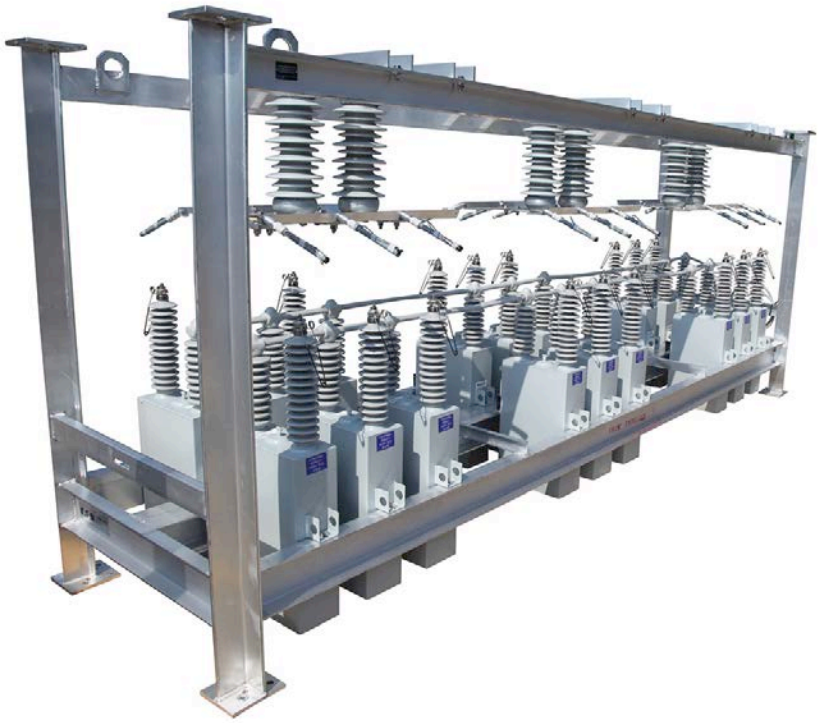
Fusing Equipment
Catalog Data
CA132034EN

Effective April 2023
Supersedes September 2019

COOPER POWER SERIES

Capacitor bank individual expulsion fusing



General

Eaton offers a wide variety of fuse kV and ampere ratings for use on both horizontal and vertical capacitor block bank configurations. Eaton's Cooper Power™ series bus-mounted expulsion-type capacitor fuse provides highly reliable, economical protection for capacitor banks where medium-energy-interrupting ability is required. See **Table 1** for electrical ratings.

Fuse tube design features

The fuse tube is constructed of bone-grade fibre overwrapped with epoxy-bonded filament-wound fiberglass. The upper contact, depending on the rating, is either aluminum or tin-plated bronze. The fuseholder accepts ANSI® standard removable or non-removable buttonhead fuse links (non-removable type recommended).

The function of the fuse tube is to confine the arc and produce arc-quenching gases that are expelled from the end of the tube.

Voltage stress across the fuse tube is eliminated by the gap between the end of the fuse tube and the capacitor terminal. There is no possibility of tracking and eventual flashover, even after exposure to weather and contaminants. When the spring ejects the leader, positive indication of a blown fuse can also be easily detected from a distance.

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Table 1. Fuse tube ratings

Fuse voltage rating (kV)	Capacitor mounting configuration (H or V) ①	Current rating (A)	Power frequency interrupting rating (A)		Maximum parallel-connected energy (kJ) ②	Catalog number
			Symmetrical	Asymmetrical		
8.7	H	50	3600	5000	20	**FN10B4ASM**
8.7	H	80	3600	5000	30	**FN20B2ASM**
8.7	V	50	3600	5000	20	**FN10B4ASM**
8.7	V	80	3600	5000	30	**FN20B2ASM**
15.5	H	50	3600	5000	20	**FN11B2ASM**
15.5	H	80	3600	5000	30	**FN20B2ASM**
15.5	V	50	3600	5000	20	**FN11B2ASM**
15.5	V	80	3600	5000	30	**FN20B2ASM**
23.0	H	50	1800	2500	20	**FN11B2ASM**
23.0	H	80	1800	2500	30	**FN11B3ASM**
23.0	V	50	1800	2500	20	**FN11B2ASM**
23.0	V	80	1800	2500	30	**FN11B3ASM**

① H = Horizontal, V = Vertical

② When used with the recommended unit spacing per IEEE® Std 18-2012 and Eaton's Cooper Power series' type SD, HD or XD capacitor units.

Ejector spring design features

The ejector spring is constructed of non-current-carrying stainless steel. The spring serves to move the leader end of the fuse out of the tube.

Eaton's ejector springs are engineered to control lateral motion of the fuse leader during ejection. If lateral motion is not controlled, the leader can strike adjacent capacitor units resulting in unnecessary fuse operation and possible capacitor failures.

The geometry of the ejector springs are optimized to ensure that no dragging of the leader across the mouth of the fuse tube or leader cutting will occur. Either of these two effects can impede the proper operation of the fuse.

Application

In the event of a capacitor fault, excess current will flow through the fuse of the faulted unit. This current causes the fuse element to melt and vaporize. An arc will form across the vaporized section within the fuse tube. The function of the fuse tube and ejector (or flipper) spring is to extinguish the arc and eliminate the possibility of its re-establishment.

Dimensions and catalog information

Figure 1 and **Figure 2** depict expulsion fuse mounting configurations for horizontal and vertical capacitor banks.

Table 2 and **Table 3** provide catalog reference information based on installation dimensions. Please contact the factory for support as necessary.

Table 2. Ejector spring catalog numbers

Catalog number	B dimension (inches)	Unit orientation
CCB348Y1ASM	6.50–7.50	Horizontal
CCB125Y1ASM	8.50–9.50	Horizontal
CCB140Y1ASM	5.50–6.50	Vertical
CCB140Y2ASM	7.00–8.00	Vertical

Note: "ASM" catalog suffix is used for individual retail packaging.

Table 3. Fuse catalog numbers

	Dimensions (inches)	
Catalog number	**A**	**Bolt thread size**
FN10B4	9-3/8	5/16-18 x 3/4
FN20B2	9-3/4	1/2-13 x 3/4
FN11B2	10-5/8	5/16-18 x 3/4
FN11B3	10-5/8	1/2-13 x 3/4

Note: Fuse link ordered separately to suit application.

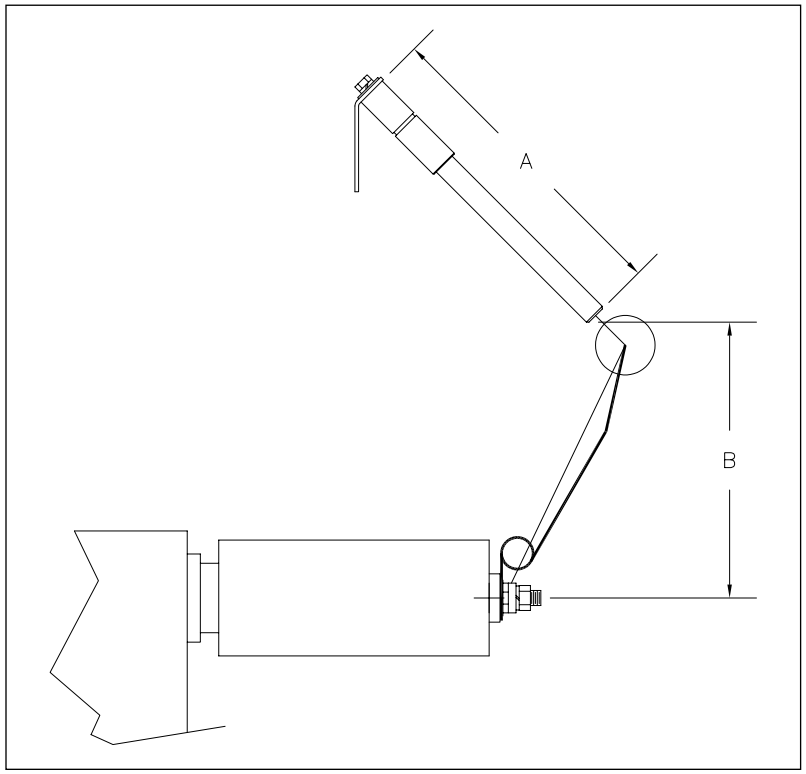

Figure 1. Expulsion fuse mounting configuration—horizontal orientation

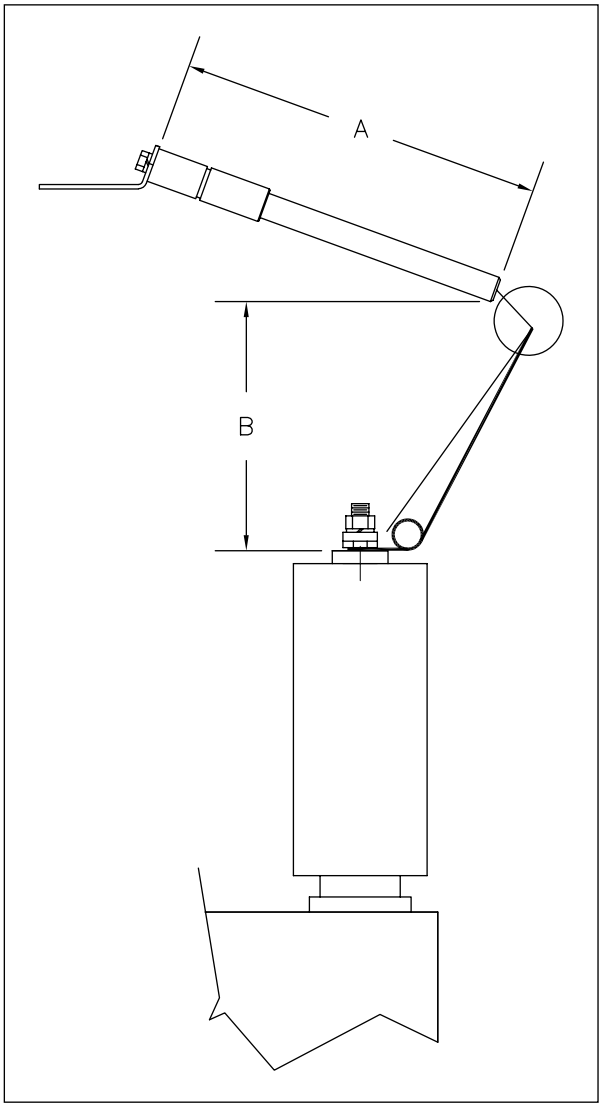

Figure 2. Expulsion fuse mounting configuration—vertical orientation

Table 4. Individual fusing recommendations bank applications

Unit voltage rating ①	Fuse voltage rating (kV)	50 kvar ②	100 kvar	150 kvar	200 kvar	300 kvar	400 kvar	500 kvar	600 kvar
		Exp.	Exp.	Exp.	Exp.	Exp.	Exp.	Exp.	Exp.
2400	8.7	20 T	40 K	65 K	80 K				
2770	8.7	20 T	40 K	50 K	65 K				
4160	8.7	12 T	25 T	40 T	50 K				
4800	8.7	12 T	20 T	30 T	40 T				
6640	8.7	12 T	15 T	25 T	30 T	50 T	65 K	80 K	80 K
7200	8.7	10 T	15 T	20 T	25 T	40 T	50 T	65 K	80 K
7620	8.7	10 T	15 T	20 T	25 T	40 T	50 T	65 K	80 K
7960	8.7	10 T	15 T	20 T	25 T	40 T	50 T	65 K	80 K
8320	8.7	10 T	15 T	20 T	25 T	40 T	50 T	65 K	80 K
9960	15.5	8 T	15 T	20 T	25 T	30 T	40 T	50 T	65 T
12,470	15.5		12 T	15 T	20 T	25 T	30 T	40 T	50 T
13,280	15.5		12 T	15 T	20 T	25 T	30 T	40 T	50 T
13,800	15.5		12 T	15 T	20 T	25 T	30 T	40 T	40 T
14,400	15.5		10 T	15 T	20 T	25 T	30 T	40 T	40 T
19,920	23.0		8 T	12 T	15 T	20 T	25 T	25 T	30 T
21,600	23.0		8 T	12 T	15 T	20 T	25 T	25 T	30 T

① For non-standard unit rating, consult factory for fuse selection assistance.

② For 50 kvar capacitors, it is difficult to choose reasonably sized fuses that will withstand the I^2t outrush. This occurs due to the fact that I^2t withstand goes down exponentially with fuse link rating rather than linearly. Consequently, the 50 kvar capacitor fusing recommendations only cover those units with voltages up to 9960 V.

Note: Use 150% tin type FL11T or FL11K expulsion fuse links. Refer to catalog CA132008EN.

Additional information

Eaton has additional reference information available for Edison fuse link selection and coordination. See **Table 5**.

Table 5. Reference information

Publication number	Title
CA132008EN	Edison fuse links catalog
MN230005EN	Expulsion fuse installation instructions
TD230005EN	Group capacitor fusing for pole-mounted capacitor banks
CA132026EN	UltraSIL Type L cutout catalog

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For Eaton's Cooper Power series capacitor expulsion fuse product information, call 1-877-277-4636 or visit: www.eaton.com/cooperpowerseries.

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