Fusing Equipment
Catalog Data
CA132040EN

Effective October 2015
Supersedes 240-97 July 2012

COOPER POWER SERIES

15, 25, and 28 kV class fused loadbreak elbow current-limiting fuse

General

Eaton designs its Cooper Power™ series fused loadbreak elbow connector current-limiting fuse specifically for use in 15, 25, and 28 kV Class fused loadbreak elbow connector.

The full range current-limiting rating ensures reliable operation of all over-loads and fault currents. The element construction consists of two separate sections (low-current section and high-current section) which are self-contained in one housing. The low-current section provides consistent, reliable clearing of all currents high enough to melt the element. The high-current section is a punched-hole ribbon design which controls peak arc voltage levels and limits both current and energy (I^2t) let-through levels during high-current fault clearing operation.

Design tests

The fused loadbreak elbow connector current-limiting fuse has been tested according to applicable sections of the following IEEE® and ANSI® standards:

IEEE Std C37.40™ standard Service Conditions and Definitions for High-Voltage Fuses

IEEE Std C37.41™ standard Design Tests for High Voltage Fuses

ANSI® C37.47 Standard Specifications for Distribution Fuse Disconnecting Switches and Current-Limiting Fuses

Production tests

Tests are conducted on 100% of production in accordance with Eaton requirements.

- Physical Inspection
- I^2t Testing
- Resistance Testing

Installation

The fused loadbreak elbow connector current-limiting fuse is designed to be installed in 15, 25, and 28 kV Class fused loadbreak elbow connectors as shown in Catalog Sections, 500-110 and 500-111. For Installation Instructions, refer to S240-97-1.

Powering Business Worldwide

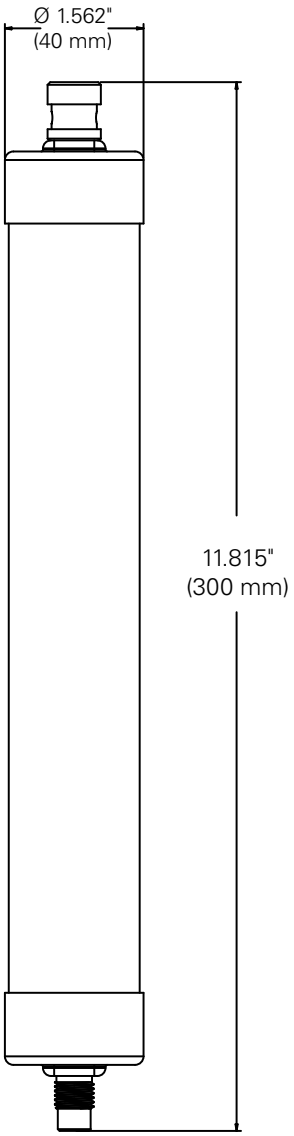

Figure 1. Dimensional illustration of fused loadbreak elbow connector current-limiting fuse.

Figure 2. Shorting bar kit, Catalog FESBA.

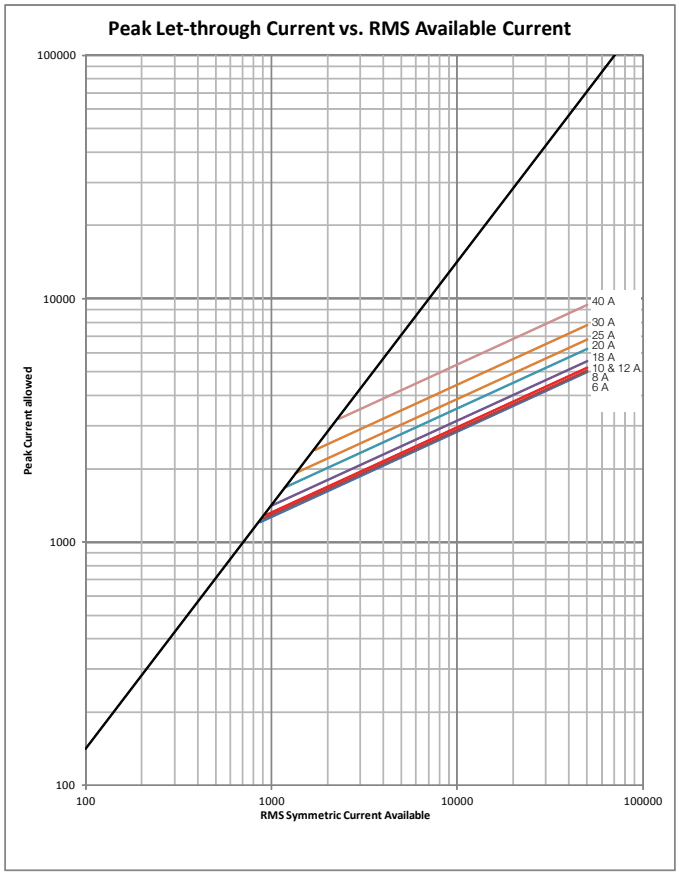

Figure 3. Peak let-thru current vs. RMS available current.

200 A shorting bar (solid link)

The 200 A fused loadbreak elbow connector shorting bar is used for temporary restoration of service when a standard fuse is not available and can also be used during fault locating and grounding. Catalog FESBA Kit contains:

(1) Shorting Bar (solid Link)

(1) 3/16" re-usable hex wrench

(1) 1/8" re-usable hex wrench

(25) Adapter set screws

(5) Wire probe wrenches

(1) Bleeder strap

(1) Re-usable caution tag with clasp

(1) Hard plastic carrying case

(1) Installation Instruction Sheet

Ordering information

To order a fused loadbreak elbow connector current-limiting fuse, determine the amperage rating and voltage ratings of the application from Tables 1 and 2 starting on page 3 and specify the required fuse catalog number from Table 3.

Table 1. Recommended Fuse Ratings for Single- and Three-Phase Applications

Nominal Fuse Rated Voltage - 8.3 kV											Nominal Fused Rated Voltage - 15.5 and 17.2 kV							
Transformer Single-Phase Voltage Rating (kV) - Phase-to-Ground																		
	2.4 kV		**4.16 kV**		**4.8 kV**		**6.93 - 7.2 kV**		**7.62 & 7.97 kV**		**12 & 12.47 kV**		**13.2 kV**		**13.8 kV**		**14.4 kV**	
1ø kVA	**A**	**B**	**A**	**B**	**A**	**B**	**A**	**B**	**A**	**B**	**A**	**B**	**A**	**B**	**A**	**B**	**A**	**B**
10	—	6	—	6*	—	—	—	6*	—	6*	—	6*	—	6*	—	6*	—	6*
15	8	10	—	6	—	6	—	6*	—	6*	—	6*	—	6*	—	6*	—	6*
25	12	20	8	10	—	8	—	6	—	6	—	6*	—	6*	—	6*	—	6*
37.5	20	25	10	18	10	12	—	8	—	8	—	6	—	6*	—	6	—	6*
50	25	40	18	20	12	20	10	12	8	10	—	6	—	6	—	6	—	6
75	40	—	20	30	20	30	12	20	12	18	8	10	8	8	8	10	—	8
100	—	—	30	—	30	40	25	30	18	25	10	18	10	12	10	18	12	10
167	—	—	—	—	—	—	40	—	25	40	18	—	18	—	18	—	20	20
250	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
333	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Nominal Fuse Rated Voltage - 8.3 kV													Nominal Fused Rated Voltage - 15.5 and 17.2 kV			
Transformer Three-Phase Voltage Rating (kV) - Phase-to-Phase																
	2.4 kV		**4.16 kV**		**4.8 kV**		**8.32 kV**		**12.47 kV**		**13.2 to 14.4 kV**		**20.8 kV**		**22.9 - 24.9 kV**	
3ø kVA	**A**	**B**	**A**	**B**	**A**	**B**	**A**	**B**	**A**	**B**	**A**	**B**	**A**	**B**	**A**	**B**
30	10	12	—	6	—	6	—	6*	—	6*	—	6*	—	6*	—	6*
45	12	20	8	10	—	8	—	6	—	6*	—	6*	—	6*	—	6*
75	20	30	12	20	10	18	—	8	—	6	—	6*	—	6	—	6*
112.5	40	—	20	28	18	25	10	12	—	8	—	8	—	8	6	6
150	—	—	25	40	20	30	12	20	—	12	8	12	8	10	8	8
225	—	—	40	—	40	—	20	25	12	20	12	18	12	12	10	10
300	—	—	—	—	—	—	25	40	18	25	18	25	12	18	18	12
500	—	—	—	—	—	—	40	—	30	40	30	40	18	—	—	—
750	—	—	—	—	—	—	—	—	—	—	40	—	—	—	—	—
1000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

* Fuse allows more than 300% of the transformer rating.

Notes:
- Fuse selection is based on the continuous current rating of the fuses at 40°C
- Fuses in listed Column A allow between 1.4 and 2 times the rated current of the transformer; those listed in Column B, allow 2-3 times the rated current of the transformer.
- Recommended fuses meet inrush criteria of 12 times transformer full load current for 0.1 second and 25 times full load current for 0.01 second. Fuses also meet cold load pickup criteria of 6 times transformer full load current for 1 second and 3 times full load current of 10 seconds.
- For three-phase applications, recommendations are limited to GRDY-GRDY transformers with no more than 50% delta connected secondary load, along with certain other assumptions. It is common practice to use line-to-ground rated fuses.

Table 2. Recommended Fuse Ratings for Three-Phase Delta Applications

Transformer Three-Phase Voltage Rating (kV) - Phase-to-Phase												
Nominal Fuse Rated Voltage - 8.3 kV									**Nominal Fuse Rated Voltage - 15.5 kV**			
	2.4 kV		**4.16 kV**		**4.8 kV**		**8.32 kV**		**12.47 kV**		**13.2 to 14.4 kV**	
3ø kVA	**A**	**B**	**A**	**B**	**A**	**B**	**A**	**B**	**A**	**B**	**A**	**B**
30	10	12	—	6	—	6	—	6*	—	6*	—	6*
45	12	20	8	10	—	8	—	6	—	6*	—	6*
75	20	30	12	20	10	18	—	8	—	6	—	6*
112.5	40	—	20	28	18	25	10	12	—	8	—	8
150	—	—	25	40	20	30	12	20	—	12	8	12
225	—	—	40	—	40	—	20	25	12	20	12	18
300	—	—	—	—	—	—	25	40	18	20	18	20[1]
500	—	—	—	—	—	—	40	—	—	—	—	—
750	—	—	—	—	—	—	—	—	—	—	—	—
1000	—	—	—	—	—	—	—	—	—	—	—	—
1500	—	—	—	—	—	—	—	—	—	—	—	—

* Fuse allows more than 300% of the transformer rating.
[1] 20 A @ 14.4 kV only.

Notes:
- Fuse selection is based on the continuous current rating of the fuses at 40°C
- Fuses in listed Column A allow between 1.4 and 2 times the rated current of the transformer; those listed in Column B, allow 2-3 times the rated current of the transformer.
- Recommended fuses meet inrush criteria of 12 times transformer full load current for 0.1 second and 25 times full load current for 0.01 second. Fuses also meet cold load pickup criteria of 6 times transformer full load current for 1 second and 3 times full load current of 10 seconds.

Table 3. Fused Loadbreak Elbow Connector, Fuse Electrical Ratings and Catalog Numbers

Nominal System Voltage Class - kV	Nominal Fuse Voltage Rating kV	Nominal Fuse Current rating in Amperes	Fuse Catalog Number	Maximum Continuous Current			Minimum Melt I^2t (A^2s)	Maximum Total I^2t (A^2s)
				25°C	40°C	65°C		
15.5	8.3	6	FEF083A006	8.9	8.5	8.0	710	3,800
		8	FEF083A008	12.1	11.7	10.9	1,000	5,425
		10	FEF083A010	15.0	14.4	13.5	1,200	5,825
		12	FEF083A012	16.6	16.0	15.0	1,200	5,825
		18	FEF083A018	21.9	21.1	19.7	1,500	8,000
		20	FEF083A020	25.5	24.6	23.0	2,425	12,000
		25	FEF083A025	34.5	33.2	31.1	4,500	20,500
		30	FEF083A030	40.1	38.7	36.2	6,000	26,200
		40	FEF083A040	45.5	43.8	41.0	9,700	39,750
25	15.5	6	FEF155A006	8.5	8.5	8.0	710	3,800
		8	FEF155A008	11.7	11.3	10.9	1,000	5,435
		10	FEF155A010	14.4	13.9	13.5	1,200	5,500
		12	FEF155A012	16.0	15.5	15.0	1,200	5,500
		18	FEF155A018	21.1	20.4	19.7	1,500	7,800
		20	FEF155A020	24.6	23.7	23.0	2,425	12,000
28	17.2	6	FEF172A006	8.5	8.3	8.0	710	3,800
		8	FEF172A008	11.7	11.3	10.9	1,000	5,435
		10	FEF172A010	14.4	13.9	13.5	1,200	5,500
		12	FEF172A012	16.0	15.5	15.0	1,200	5,500
		18	FEF172A018	21.1	20.4	19.7	1,500	7,800
		20	FEF172A020	24.6	23.7	23.0	2,425	12,000

Note:
Peak arc voltage levels found during testing were within the values specified for Distribution-Class Current-Limiting Fuses in ANSI® C37.47 Standard - latest edition.

Additional information

Refer to the following literature for application recommendations:

500-110, 15 kV Class Fused Loadbreak Elbow Connector

500-111, 25 kV Class Fused Loadbreak Elbow Connector

500-112, 28 kV Class Fused Loadbreak Elbow Connector

S500-110-1, Fused Loadbreak Elbow Connector Installation Instructions

S240-97-1, 200 A Fused Loadbreak Elbow Connector Replacement Fuse Installation Instructions

S240-97-2, 200 A Fused Loadbreak Elbow Connector Shorting Bar (Solid Link) Installation Instructions

R240-91-166, 8.3, 15.5, and 17.2 kV Fuse Time-Current Characteristic Curves

CP-1006, 15 kV Class Fused Loadbreak Elbow Connector Certified Test Report

CP-1007, 25 kV Class Fused Loadbreak Elbow Connector Certified Test Report

CP-1207, 28 kV Class Fused Loadbreak Elbow Connector Certified Test Report

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