Fusing Equipment
Catalog Data
CA132042EN

Effective October 2015
Supersedes 240-72 July 2009

COOPER POWER SERIES

ELS full-range current-limiting fuse

General

Eaton's Cooper Power™ series ELS full-range current-limiting fuse is designed especially for use with EL Bay-O-Net fuse holders (see *Catalog CA132039EN EL Bay-O-Net Current-Limiting Fuse Assembly)*. The fuse combines the ease of operation of the Bay-O-Net fuse holder with the energy-limiting protection of the full-range current-limiting fuse.

ELS fuses are used for protecting transformers filled with transformer oil or an approved equivalent and for circuit protection in sectionalizing devices. Quiet, safe operating characteristics are ideal for installations where flame discharge and loud operation are undesirable. Since the fuse is submersible, it can be used with smaller clearances, shorter creep paths, and simpler loadbreak mechanisms.

Submersible installations eliminate damage from erosion and chemical changes from weathering.

Installation

No special tools are required. The fuse is threaded by hand onto the inner holder of an EL Bay-O-Net Fuse Holder. Refer to *Service Information S240-72-1 EL Bay-O-Net Fuse Installation Instructions* for details.

Production tests

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

- Physical Inspection
- I^2t Testing
- Resistance Testing
- Helium Mass Spectrometer Leak Testing

Powering Business Worldwide

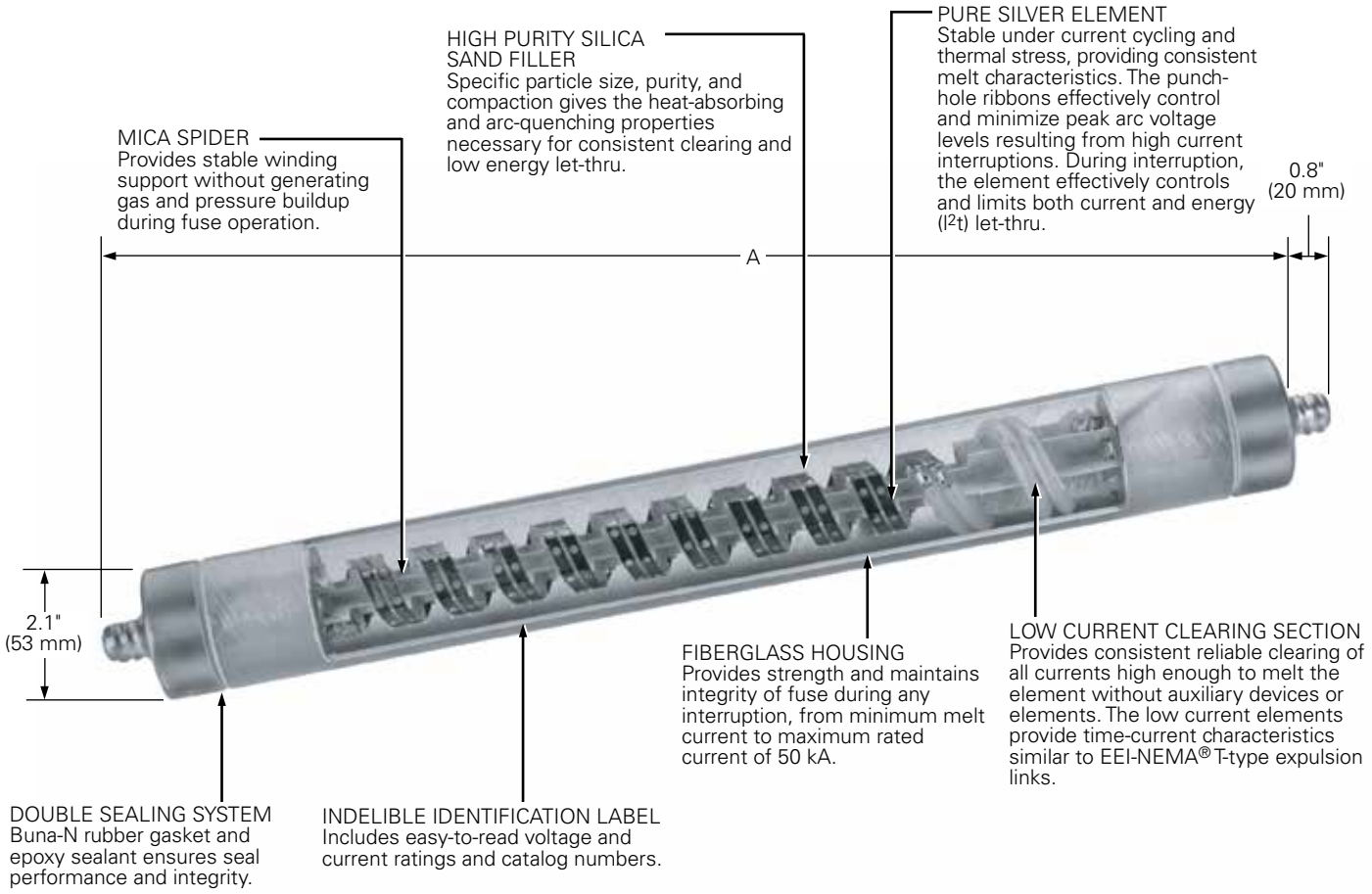

Figure 1. Cutaway illustration shows integrity of design characteristics and dimensional information.

Note: Dimensions given are for reference only.

Table 1. Electrical Ratings and Characteristics

Fuse Type	General Purpose (Full Range), "C" Rated
Maximum Interrupting Current	50,000 A rms symmetrical

Table 2. Dimensional Information

Voltage (kV)	Dimension "A" in. (mm)
8.3	10.8 (274)
15.5	18.8 (476)
23.0	18.8 (476)

Table 3. Minimum Melt and Maximum Clear I^2t Levels

	8.3 kV and 15.5 kV Fuses		23.0 kV Fuses	
Continuous Current Rating (A)	Minimum Melt I^2t ($A^2 \cdot s$)	Maximum Clear I^2t ($A^2 \cdot s$)	Minimum Melt I^2t ($A^2 \cdot s$)	Maximum Clear I^2t ($A^2 \cdot s$)
2	38	53	–	–
3	94	136	–	–
4	820	5000	–	–
8	1460	9800	1460	9800
12	1460	9800	1460	9800
15	2280	13800	2280	13800
20	2280	13800	2280	13800
25	3280	27300	3280	27300
30	9110	53400	9110	62000
40	9110	53400	9110	62000
50	13120	69200	13120	69200
65	17860	96700	–	–
80	36440	213200	–	–

Shaded area indicates parallel fuse applications.

Table 4. ELS Fuse Catalog Numbers

Continuous Current Rating (A)	Catalog Number		
	8.3 kV	15.5 kV	23.0 kV
2	3533002M11M	3534002M11M	–
3	3533003M11M	3534003M11M	–
4	3533004M11M	3534004M11M	–
8	3533008M11M	3534008M11M	3535008M11M
12	3533012M11M	3534012M11M	3535012M11M
15	3533015M11M	3534015M11M	3535015M11M
20	3533020M11M	3534020M11M	3535020M11M
25	3533025M11M	3534025M11M	3535025M11M
30	3533030M11M	3534030M11M	3535030M11M
40	3533040M11M	3534040M11M	3535040M11M
50	3533050M11M	3534050M11M	3535025M11M
65	3533065M11M	3534065M11M	–
80	3533040M11M	3534040M11M	–

Shaded area indicates parallel fuse application.

Ordering information

To order an ELS current-limiting fuse, determine the amperage and voltage requirements of the application and specify the fuse required from Table 4. For parallel fusing, order two fuses.

To order an EL Bay-O-Net Fuse Holder, see Section 240-70.

Method A

Correlation information

Use Table 5 Correlation Charts to determine the amperage and voltage ratings of the fuse required for the application. Then use Table 4 to determine the fuse Catalog Number.

Correlation is based on IEEE Std C57.92™ standard, Loading Guide and IEEE Std C57.109™ standard, Through-Fault Guide, and Pad-Mounted Transformer Fusing Philosophies TD132004EN.

Contact your Eaton representative for further information or other applications.

Table 5. Single-Phase Transformer ELS Fuse Current Rating (A) Recommendations

Single-Phase Transformer kVA	8.3 kV					15.5 kV		23.0 kV
	Nominal Single-Phase Voltage (kV) Phase-to-Ground							
	2.4	4.16	4.8	7.2	7.62	12.0	14.4	19.9
140% to 200% Loading								
10	4	3	2	–	–	–	–	–
15	8	4	3	2	2	–	–	–
25	15	8	8	4[c]	4[c]	2	2[c]	–
37.5	20	12	12	8	8	3	3	–
50	30	20	15	12	12	4	4[c]	–
75	40	25	20	15	15	8	8	–
100	65	30	30	20	20	12	12	8
167	80[a]	40[a]	40[a]	30	30	20	15	12
250	–	80	65[a]	40[a]	40[a]	30	25	20
333	–	–	80[a]	65	65	40	30	25
500	–	–	–	80[a]	80	65	40[a]	30
200% to 300% Loading								
10	8	4	3	2	2	2[b]	2[b]	8[b]
15	12	8	4	3	3	2[b]	2[b]	8[b]
25	20	12	12	4	4	3	2	8[b]
37.5	30	20	15	12	12	8	4	8[b]
50	40	25	20	15	15	8	4	8[b]
75	65	40	30	20	20	12	12	8
100	80	50	40	25	25	20	15	12
167	–	80	65	50	40	25	20	15
250	–	–	–	65	65	40	30	25
333	–	–	–	80	80	65	40	30
500	–	–	–	–	–	80	65	40

Shaded area indicates parallel fuse application.

Notes:

Recommended fuses meet inrush criteria of 12 times transformer full load for 0.1 second and 25 times transformer full load for 0.01 second.
Recommended fuses have been derated for operation in 110°C oil. To prevent fuse blowing on inrush, do not use fuses smaller than those recommended without approval of the manufacturer.

a. Recommended fuse provides less than 140% rating.
b. Recommended fuse provides more than 300% rating.
c. Recommended fuse provides more than 200% rating.

Ordering information (continued)

Table 6. Three-Phase Transformer ELS Fuse Current Rating (A) Recommendations

Three-Phase Transformer kVA	8.3 kV				15.5 kV				23.0 kV	
	Three-Phase Voltage (kV) Phase-to-Phase									
	2.4	4.16	4.8	7.2	12.47	13.2	14.4	19.9[d]	24.9[e]	34.5[d]
140% to 200% Loading										
45	15	8	8	4	2	2	2[c]	–	–	–
75	25	15	12	8	4[c]	4[c]	3	2	–	–
112.5	40	20	20	12	8	8	8[c]	4[c]	–	–
150	65	30	25	20	12	12	8	8[c]	–	–
225	–	40	40	25	15	15	12	8	–	–
300	–	65	50	30	20	20	20	12	12	8
500	–	–	80	65	30	30	30	15	15	12
750	–	–	–	80	50	50	40	25	25	20
1000	–	–	–	–	65	65	65	30	30	25
1500	–	–	–	–	–	80	80	65	50	30
200% to 300% Loading										
45	20	12	12	8	3	3	2	2	8[a]	8[a]
75	40	20	20	12	4	4	4	3	8[a]	8[a]
112.5	50	30	25	20	12	12	8	4	8[a]	8[a]
150	65[b]	40	40	25	15	15	12	8	8	8[a]
225	–	65	50	40	20	20	20	12	12	8
300	–	80	65[b]	40	25	25	25	15	15	12
500	–	–	–	80	40	40	40	20	20	15
750	–	–	–	–	65	65	65	30	30	25
1000	–	–	–	–	80	80	80	65	40	30
1500	–	–	–	–	–	–	–	80	–	50

Shaded area indicates parallel fuse application.

Notes:

Recommended fuses meet inrush criteria of 12 times transformer full load for 0.1 second and 25 times transformer full load for 0.01 second.
Recommended fuses have been derated for operation in 110°C oil. To prevent fuse blowing on inrush, do not use fuses smaller than those recommended without approval of the manufacturer.

a. Recommended fuse provides more than 300% rating.
b. Recommended fuse provides less than 200% rating.
c. Recommended fuse provides more than 200% rating.
d. Recommended fuse is limited to gnd Y/gnd Y transformer with less than 50% delta loading.
e. Recommended fuse is limited to gnd Y/gnd Y transformer with less than 80% delta loading.

Method B

Using time-current curves

To determine or confirm the ELS fuse that will coordinate with upstream and downstream system requirements, use the time-current characteristic curves and specify the fuse indicated from Table 4.

For full size TCC curves, contact your Eaton representative.

Eaton
1000 Eaton Boulevard
Cleveland, OH 44122
United States
Eaton.com

Eaton's Cooper Power Systems Division
2300 Badger Drive
Waukesha, WI 53188
United States
Eaton.com/cooperpowerseries