

# Fusing Equipment

Electrical Apparatus  
**240-50**

## ELSP Current-Limiting Backup Fuse

### GENERAL

The Cooper Power Systems ELSP Current-limiting Backup Fuse is used 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. Its minimum interrupting rating is coordinated with that of a low current interrupter to avoid undesirable low current operation; yet its maximum interrupting rating will clear the highest fault currents likely to occur. Higher continuous current ratings can be achieved by connecting two fuses in parallel.

### 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.

This two-part system provides low current protection with the replaceable expulsion fuse or resettable MagneX Interrupter, and it adds the energy-limiting protection of a current-limiting fuse. Together, they coordinate easily with upstream and downstream devices.



Figure 1.  
ELSP Current-Limiting Backup Fuse.

### INSTALLATION

No special tools are required. The fuse is liquid immersed, mounted as near as possible to the incoming primary bushing to which it is connected. Normal liquid dielectric clearances should be used. Refer to Installation Instructions Sheet S240-50-1 for details.

### PRODUCTION TESTS

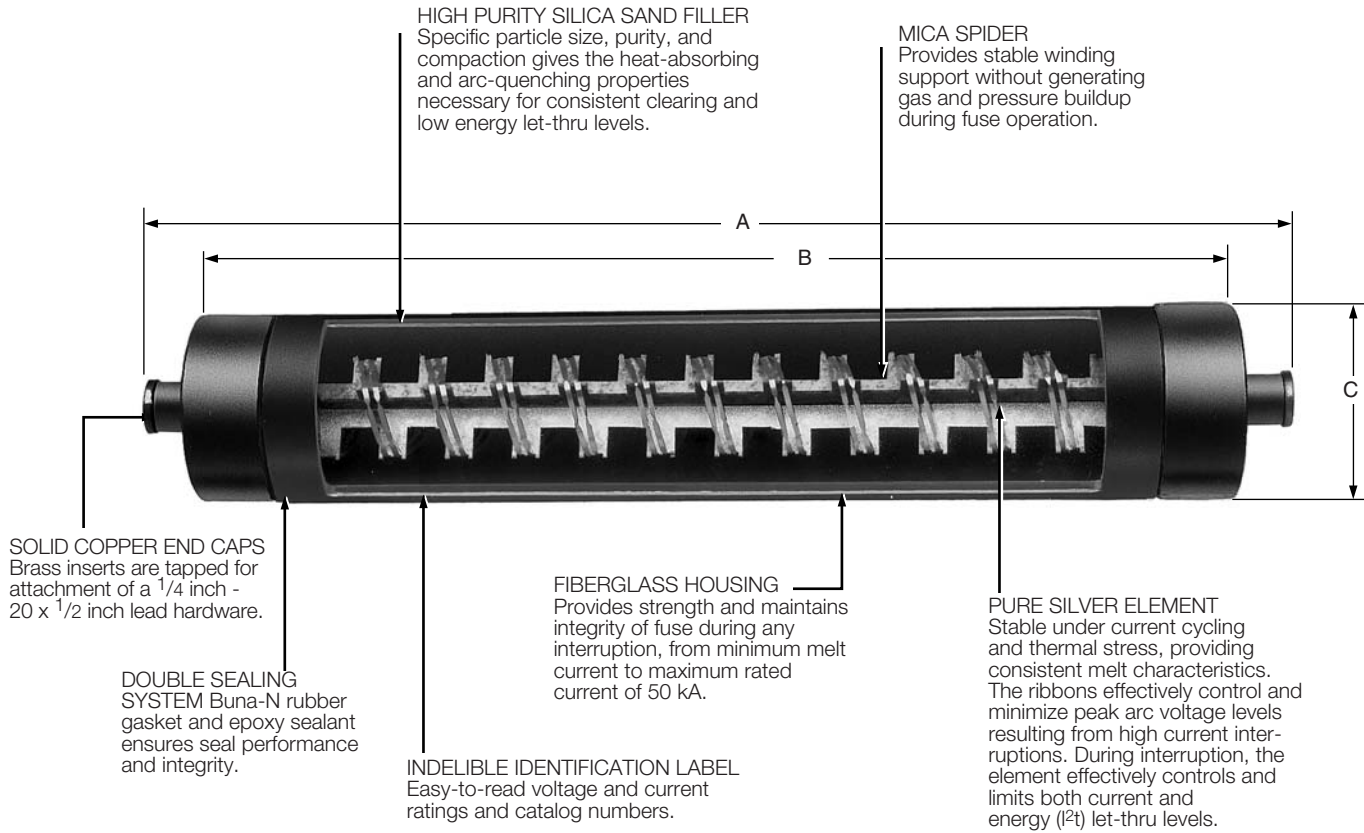
Tests are conducted on 100 percent of production in accordance with Cooper Power Systems requirements.

- Physical Inspection
- I<sup>2</sup>t Testing
- Resistance Testing
- Helium Mass Spectrometer Leak Testing

TABLE 1  
Electrical Ratings and Characteristics

Fuse Type	Maximum Interrupting Current
Backup (Partial Range) "C" Rated	50,000 A rms symmetrical*

\*See Table 2 for fuses with ratings other than 50,000 A rms symmetrical



**Figure 2.**  
2" diameter ELSP Current-Limiting Back-up Fuse cutaway shows design characteristics.

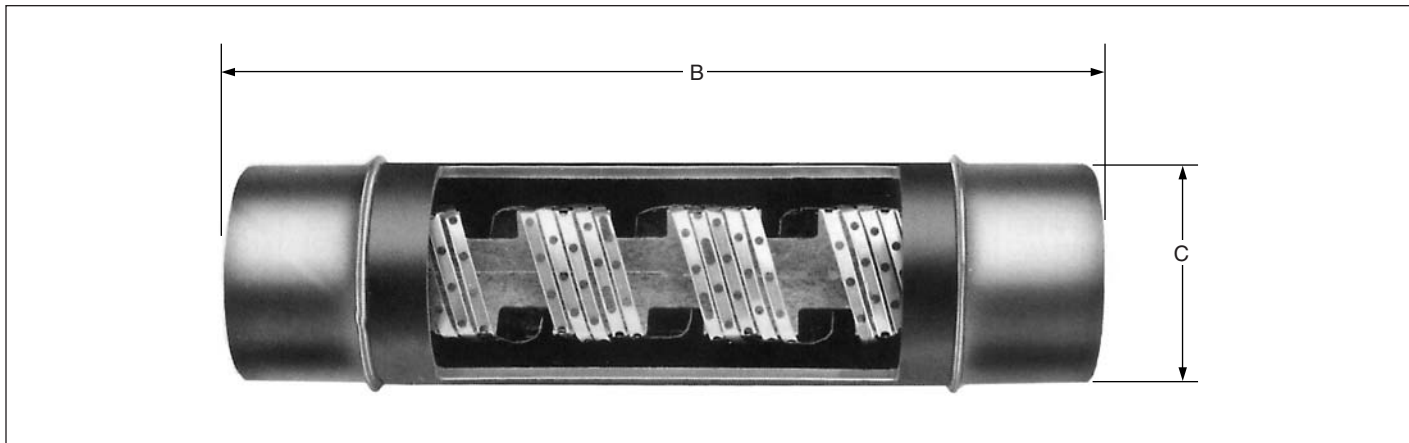
Note: Dimensions given are for reference only.

**TABLE 2**  
Interrupting Ratings

Continuous Current Rating (A)	8.3 kV <sub>1</sub>			15.5 kV <sub>2</sub>			23 kV <sub>3</sub>		
	Minimum Interrupting Capacity (A)	Minimum Melt I <sup>2</sup> t (A <sup>2</sup> •s)	Maximum Clear I <sup>2</sup> t (A <sup>2</sup> •s)	Minimum Interrupting Capacity (A)	Minimum Melt I <sup>2</sup> t (A <sup>2</sup> •s)	Maximum Clear I <sup>2</sup> t (A <sup>2</sup> •s)	Minimum Interrupting Capacity (A)	Minimum Melt I <sup>2</sup> t (A <sup>2</sup> •s)	Maximum Clear I <sup>2</sup> t (A <sup>2</sup> •s)
30	100	1,200	5,800	100	1,200	7,600	125	1,200	10,500
40	125	1,800	8,200	150	1,800	11,000	200	1,800	15,100
50	165	4,100	16,500	200	4,100	23,000	325	4,100	34,300
65	300	6,200	26,700	350	6,200	33,000	400	6,200	38,400
80	200	9,600	42,900	250	9,600	52,900	300	9,600	68,300
100	350	17,100	62,000	350	17,100	93,800	400	17,100	121,000
125	375	30,500	97,800	400	30,500	125,700	500	30,500	149,700
150	450	43,900	148,000	450	43,900	162,300	600	43,900	196,700
165	500	68,600	245,000	—	—	—	700	68,600	307,300
250**	800	122,000	369,000	800	122,000	408,000	900	122,000	391,100
300**	1000	175,600	566,000	1000	175,600	660,700	1200	175,600	563,000
330**	1200	274,400	875,700	—	—	—	1400	274,400	882,000

Notes:

- The 8.3 kV, 30 A through 100 A ratings have been tested and approved for application at 9.9 kV. The maximum interrupting capacity for the 65 A through 100 A ratings at 9.9 kV is 18 kA.
  - The 15.5 kV, 30 through 125 A and 250 A ratings have been tested and approved for application at 17.2 kV. The maximum interrupting rating for the 15.5 kV fuse, 30 A through 125 A at 17.2 kV is 43 kA. For the 15 kV, 250 A fuse at 17.2 kV the maximum interrupting rating is 12 kA.
  - The maximum interrupting rating for the 23 kV fuse, 80 A through 165 A, 300 A and 330 A, is 30 kA. For the 23 kV, 250 A fuse the maximum interrupting rating is 12 kA.
- \*\* Parallel Fuses



**Figure 3.**  
3" diameter ELSP Current-Limiting Backup Fuse cutaway shows design characteristics.

Note: Dimensions given are for reference only.

**TABLE 3**  
Dimensional Information

Voltage (kV)	Current Rating (A)	A Dim. in/ (mm)	B Dim. in/ (mm)	C Dim. in/ (mm)	Ref. Figure
8.3	30-65	7.2 (183)	6.0 (152)	2.1 (53)	2
	80-125	9.6 (244)	8.4 (214)	2.1 (53)	2
	150-165	10.9 (277)	9.7 (247)	2.1 (53)	2
15.5	30-65	9.7 (247)	8.5 (216)	2.1 (53)	2
	80-125	14.0 (356)	12.8 (325)	2.1 (53)	2
	150	16.3 (414)	15.1 (384)	2.1 (53)	2
23	30-65	12.7 (323)	11.5 (292)	2.1 (53)	2
	80-125	16.9 (429)	15.6 (396)	2.1 (53)	2
	150-165	n/a	18.9 (480)	3.0 (76)	3

**ORDERING INFORMATION**

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

**TABLE 4**  
ELSP Back-Up Fuse Catalog Numbers

Current Rating (A)	Catalog Number		
	8.3 kV	15.5 kV	23 kV
30	3543030M61M	3544030M61M	3545030M61M
40	3543040M61M	3544040M61M	3545040M61M
50	3543050M61M	3544050M61M	3545050M61M
65	3543065M61M	3544065M61M	3545065M61M
80	3543080M71M	3544080M71M	35475080M71M
100	3543100M71M	3544100M71M	3545100M71M
125	3543125M71M	3544125M71M	3545125M71M
150	3543150M71M	3544150M71M	3545150M71M
165	3543165M71M	N/A	3545165M71M
250*	3543125M71M	3544125M71M	3545125M71M
300*	3543150M71M	3544150M71M	3545150M71M
330*	3543165M71M	N/A	3545165M71M

\* Parallel fuse application (ORDER TWO FUSES)

**Method A**

**CORRELATION INFORMATION**

Use the correlation information in Tables 5, 6 and 7 to determine the amperage and voltage ratings of the ELSP fuse combination required for the application. Then use Table 4 to determine the appropriate ELSP fuse catalog number.

Correlation is based on **IEEE Standard C57.92™** Loading Guide and **IEEE Standard C57.109™** Through-Fault Guide, and the Fuse Application Guide CP7662A.

Tables 5, 6 and 7 indicate the recommended Bay-O-Net fuse link or MagneX Interrupter and ELSP combination for each application.

To order a current sensing Bay-O-Net Fuse, complete catalog number 4000353\_\_\_\_\_.

To order a dual sensing Bay-O-Net Fuse, complete catalog number 4000358\_\_\_\_\_.

To order a dual element Bay-O-Net Fuse, complete catalog number 4038108\_\_\_\_\_.

To order a High Ampere Overload Bay-O-Net Fuse Link, complete catalog number 4038361\_\_\_\_\_.

**Examples:**

To order an ELSP and dual element Bay-O-Net fuse combination for a single-phase, 7.2 kV phase-to-ground, 50 kVA transformer, specify:

- 1–50 A ELSP Fuse 3543050M61M
- 1–Bay-O-Net Fuse 4038108C07

**TABLE 5**  
**Recommended Single-Phase Transformer Bay-O-Net and ELSP Combinations**

Single-Phase Transformer (KVA)	8.3 kV								
	Nominal Single-Phase Voltage (KV) Phase-to-Ground								
	2.4			4.16-4.8			7.2-7.96		
	Assumed Trans. Impedance (%)	ELSP Rating (A)	Link Cat. No.	Assumed Trans. Impedance (%)	ELSP Rating (A)	Link Cat. No.	Assumed Trans. Impedance (%)	ELSP Rating (A)	Link Cat. No.
ELSP and Current Sensing Bay-O-Net Fuse Combinations <sup>a</sup>									
5	1.9	30	C04	1.9	30	C04	1.9	30	C04
10	1.9	30	C06	1.9	30	C04	1.9	30	C04
15	1.9	40	C08	1.9	30	C06	1.9	30	C04
25	1.9	80	C10	1.9	40	C08	1.9	30	C06
37.5	1.9	100	C10	1.9	50	C08	1.9	30	C06
50	1.9	125	C12	1.9	80	C10	1.9	40	C08
75	1.9	165	C14	1.9	125	C12	1.9	80	C10
100	2.0	165	C14	2.0	125	C12	2.0	80	C10
167	2.6	300	C17	2.6	150	C14	2.6	125	C12
250	4.0	-	-	4.0	165	C16	4.0	125	C14
333	5.0	-	-	5.0	250	C17	5.0	165	C16
500	5.0	-	-	5.0	-	-	5.0	250	C17
ELSP and Dual Sensing Bay-O-Net Fuse Combinations <sup>b</sup>									
5	1.9	30	C03	1.9	30	C03	1.9	30	C03
10	1.9	30	C05	1.9	30	C05	1.9	30	C03
15	1.9	65	C08	1.9	30	C05	1.9	30	C03
25	1.9	100	C10	1.9	65	C08	1.9	30	C05
37.5	1.9	165	C12	1.9	100	C10	1.9	50	C08
50	1.9	165	C12	1.9	125	C10	1.9	65	C08
75	1.9	330	C14	1.9	165	C12	1.9	100	C10
100	2.0	-	-	2.0	250	C12	2.0	125	C10
167	2.6	-	-	2.6	-	-	2.6	165	C12
250	4.0	-	-	4.0	-	-	4.0	250	C14
333	5.0	-	-	5.0	-	-	5.0	250	C14
500	5.0	-	-	5.0	-	-	5.0	-	-
ELSP and Dual Element Bay-O-Net Fuse Combinations <sup>b</sup>									
5	1.9	30	C03	1.9	30	C03	1.9	30	C03
10	1.9	30	C05	1.9	30	C04	1.9	30	C03
15	1.9	50	C07	1.9	30	C05	1.9	30	C03
25	1.9	80	C09	1.9	40	C06	1.9	30	C04
37.5	1.9	100	C11	1.9	80	C09	1.9	40	C06
50	1.9	125	C12	1.9	80	C09	1.9	50	C07
75	1.9	165	C14	1.9	125	C12	1.9	80	C09
100	2.0	-	-	2.0	125	C12	2.0	100	C09
167	2.6	-	-	2.6	-	-	2.6	125	C12
250	4.0	-	-	4.0	-	-	4.0	125	C12
333	5.0	-	-	5.0	-	-	5.0	-	-
500	5.0	-	-	5.0	-	-	5.0	-	-
High Amp Overload Bay-O-Net/ELSP Combinations									
5	1.9	-	-	1.9	-	-	1.9	-	-
10	1.9	-	-	1.9	-	-	1.9	-	-
15	1.9	-	-	1.9	-	-	1.9	-	-
25	1.9	-	-	1.9	-	-	1.9	-	-
37.5	1.9	-	-	1.9	-	-	1.9	-	-
50	1.9	-	-	1.9	-	-	1.9	-	-
75	1.9	-	-	1.9	-	-	1.9	-	-
100	2.0	165	C03CB	2.0	-	-	5.0	-	-
167	2.6	250	C04CB**	2.6	150	C03CB	2.6	-	--
250	4.0	300	C05CB***	4.0	165	C04CB	4.0	-	-
333	5.0	-	-	5.0	250	C05CB	5.0	150	C03CB**
500	5.0	-	-	5.0	250	C05CB***	5.0	165	C04CB**

 Indicates parallel fuse application

Notes:  
 The following tables show minimum recommended ELSP fuse ratings. Recommended ELSP backup fuse will coordinate with protecting fuse and melt only on internal transformer faults. Recommended Bay-O-Net fuses meet inrush criterion of 12 times transformer full load current for 0.1 second. If a different transformer impedance is used, a different ELSP Fuse rating may be required. If a larger % Z is used, a smaller ELSP may coordinate.

- a. Current sensing Bay-O-Net fuse is selected to melt at 3 to 4 times transformer full load in 300 seconds.
- b. Dual sensing and Dual element Bay-O-Net fuses are selected to limit transformer load to approximately 160% for 7 hours and 200% for 2 hours with the transformer initially carrying 75% of rated load at ambient temperature of 35°C.
- \*\* The use of these fuses will provide 175% of rated load for 2 hours and 150% of rated load for 7 hours. The use of the next larger fuse is recommended for greater overload capacity. Contact your Cooper Power Systems representative for specific overload capability.
- \*\*\* The specified fuse provides slightly less than 175% of rated load for 2 hours and 150% of rated load for 7 hours. Contact your Cooper Power Systems representative for specific overload capability.

**TABLE 5 (Continued)**  
**Recommended Single-Phase Transformer Bay-O-Net and ELSP Combinations**

Single-Phase Transformer (kVA)	15.5 kV									23 kV		
	Nominal Single-Phase Voltage (kV) Phase-to-Ground											
	12-12.47			13.2-14.4			16.0			19.92		
	Assumed Trans. Impedance (%)	ELSP Rating (A)	Link Cat. No.	Assumed Trans. Impedance (%)	ELSP Rating (A)	Link Cat. No.	Assumed Trans. Impedance (%)	ELSP Rating (A)	Link Cat. No.	Assumed Trans. Impedance (%)	ELSP Rating (A)	Link Cat. No.
ELSP and Current Sensing Bay-O-Net Fuse Combinations <sup>a</sup>												
5	1.9	30	C04	1.9	30	C04	1.9	30	C04	1.9	30	C04
10	1.9	30	C04	1.9	30	C04	1.9	30	C04	1.9	30	C04
15	1.9	30	C04	1.9	30	C04	1.9	30	C04	1.9	30	C04
25	1.9	30	C04	1.9	30	C04	1.9	30	C04	1.9	30	C04
37.5	1.9	30	C06	1.9	30	C06	1.9	30	C04	1.9	30	C04
50	1.9	30	C06	1.9	40	C06	1.9	30	C06	1.9	30	C06
75	1.9	40	C08	1.9	40	C08	1.9	30	C06	1.9	30	C06
100	2.0	50	C08	2.0	40	C08	2.0	40	C08	2.0	40	C08
167	2.6	80	C10	2.6	65	C10	2.6	65	C10	2.6	65	C10
250	4.0	100	C12	4.0	100	C12	4.0	65	C10	4.0	65	C10
333	5.0	125	C14	5.0	100	C12	5.0	100	C12	5.0	80	C12
500	5.0	125	C14	5.0	125	C14	5.0	125	C14	5.0	125	C14
ELSP and Dual Sensing Bay-O-Net Fuse Combinations <sup>b</sup>												
5	1.9	30	C03	1.9	30	C03	1.9	30	C03	1.9	30	C03
10	1.9	30	C03	1.9	30	C03	1.9	30	C03	1.9	30	C03
15	1.9	30	C03	1.9	30	C03	1.9	30	C03	1.9	30	C03
25	1.9	30	C03	1.9	30	C03	1.9	30	C03	1.9	30	C03
37.5	1.9	30	C05	1.9	30	C05	1.9	30	C03	1.9	30	C03
50	1.9	30	C05	1.9	30	C05	1.9	30	C05	1.9	30	C05
75	1.9	65	C08	1.9	65	C08	1.9	50	C08	1.9	30	C05
100	2.0	65	C08	2.0	65	C08	2.0	65	C08	2.0	30	C05
167	2.6	100	C10	2.6	100	C10	2.6	100	C10	2.6	65	C08
250	4.0	125	C12	4.0	125	C12	4.0	100	C10	4.0	100	C10
333	5.0	150	C12	5.0	125	C12	5.0	125	C12	5.0	100	C10
500	5.0	250	C14	5.0	250	C14	5.0	150 <sup>c</sup>	C12	5.0	125	C10
ELSP and Dual Element Bay-O-Net Fuse Combinations <sup>b</sup>												
5	1.9	30	C03	1.9	30	C03	1.9	30	C03	1.9	30	C03
10	1.9	30	C03	1.9	30	C03	1.9	30	C03	1.9	30	C03
15	1.9	30	C03	1.9	30	C03	1.9	30	C03	1.9	30	C03
25	1.9	30	C03	1.9	30	C03	1.9	30	C03	1.9	30	C03
37.5	1.9	30	C05	1.9	30	C04	1.9	30	C03	1.9	30	C03
50	1.9	40	C06	1.9	30	C05	1.9	30	C04	1.9	30	C03
75	1.9	50	C07	1.9	40	C06	1.9	40	C06	1.9	30	C05
100	2.0	80	C09	2.0	50	C07	2.0	50	C07	2.0	40	C06
167	2.6	100	C11	2.6	80	C09	2.6	50	C07	2.6	50	C07
250	4.0	100	C12	4.0	80	C11	4.0	—	—	4.0	—	—
333	5.0	100	C12	5.0	100	C12	5.0	—	—	5.0	—	—
500	5.0	—	—	5.0	—	—	5.0	—	—	5.0	—	—
High Amp Overload Bay-O-Net/ELSP Combinations												
5	1.9	—	—	1.9	—	—	1.9	—	—	1.9	—	—
10	1.9	—	—	1.9	—	—	1.9	—	—	1.9	—	—
15	1.9	—	—	1.9	—	—	1.9	—	—	1.9	—	—
25	1.9	—	—	1.9	—	—	1.9	—	—	1.9	—	—
37.5	1.9	—	—	1.9	—	—	1.9	—	—	1.9	—	—
50	1.9	—	—	1.9	—	—	1.9	—	—	1.9	—	—
75	1.9	—	—	1.9	—	—	1.9	—	—	1.9	—	—
100	2.0	—	—	2.0	—	—	2.0	—	—	2.0	—	—
167	2.6	—	—	2.6	—	—	2.6	—	—	2.6	—	—
250	4.0	—	—	4.0	—	—	4.0	—	—	4.0	—	—
333	5.0	—	—	5.0	—	—	5.0	—	—	5.0	—	—
500	5.0	150	C03CB	5.0	150	C03CB	5.0	—	—	5.0	—	—

 Indicates parallel fuse application

**Note:**

Table shows minimum recommended ELSP fuse ratings. Recommended ELSP backup fuse will coordinate with protecting fuse and melt only on internal transformer faults.

Recommended Bay-O-Net fuses meet inrush criterion of 12 times transformer full load current for 0.1 second.

a. Current sensing Bay-O-Net fuse is selected to melt at 3 to 4 times transformer full load in 300 seconds.

b. Dual sensing and Dual element Bay-O-Net fuses are selected to limit transformer load to approximately 160% for 7 hours and 200% for 2 hours with the transformer initially carrying 75% of rated load at ambient temperature of 35°C.

c. Use 23.0 kV rated ELSP fuse for this application. (See Table 2, note 2, page 2 of this catalog section).

**TABLE 6**  
**Recommended Three-Phase Transformer Bay-O-Net and ELSP Combinations**

Three-Phase Transformer (KVA)	8.3 kV								
	Nominal Three-Phase Voltage (KV) Phase-to-Phase								
	2.4			4.16-4.8			7.2-7.96		
	Assumed Trans. Impedance (%)	ELSP Rating (A)	Link Cat. No.	Assumed Trans. Impedance (%)	ELSP Rating (A)	Link Cat. No.	Assumed Trans. Impedance (%)	ELSP Rating (A)	Link Cat. No.
ELSP and Current Sensing Bay-O-Net Fuse Combinations <sup>a</sup>									
45	1.6	80	C10	1.6	40	C08	1.6	30	C06
75	1.6	125	C12	1.6	80	C10	1.6	40	C06
112.5	1.8	150	C12	1.8	100	C10	1.8	50	C08
150	2.0	165	C14	2.0	125	C12	2.0	80	C10
225	3.0	250	C16	3.0	125	C14	3.0	80	C10
300	3.5	250	C17	3.5	150	C14	3.5	100	C12
500	4.0	-	-	4.0	250	C17	4.0	125	C14
750	5.75	-	-	5.75	250	C17	5.75	165	C16
1000	5.75	-	-	5.75	-	-	5.75	250	C17
1500	5.75	-	-	5.75	-	-	5.75	-	-
2000	5.75	-	-	5.75	-	-	5.75	-	-
ELSP and Dual Sensing Bay-O-Net Fuse Combinations <sup>b</sup>									
45	1.6	125	C10	1.6	65	C08	1.6	30	C05
75	1.6	165	C12	1.6	125	C10	1.6	65	C08
112.5	1.8	330	C14	1.8	165	C12	1.8	80	C08
150	2.0	330	C14	2.0	165	C12	2.0	125	C10
225	3.0	-	-	3.0	300	C14	3.0	150	C12
300	3.5	-	-	3.5	300	C14	3.5	150	C12
500	4.0	-	-	4.0	-	-	4.0	250	C14
750	5.75	-	-	5.75	-	-	5.75	330	C18
1000	5.75	-	-	5.75	-	-	5.75	-	-
1500	5.75	-	-	5.75	-	-	5.75	-	-
2000	5.75	-	-	5.75	-	-	5.75	-	-
ELSP and Dual Element Bay-O-Net Fuse Combinations <sup>b</sup>									
45	1.6	100	C09	1.6	50	C07	1.6	30	C04
75	1.6	125	C12	1.6	80	C09	1.6	50	C06
112.5	1.8	165	C14	1.8	100	C11	1.8	65	C07
150	2.0	-	-	2.0	125	C12	2.0	80	C09
225	3.0	-	-	3.0	150	C14	3.0	100	C11
300	3.0	-	-	3.5	-	-	3.5	100	C12
500	4.0	-	-	4.0	-	-	4.0	-	-
750	5.75	-	-	5.75	-	-	5.75	-	-
1000	5.75	-	-	5.75	-	-	5.75	-	-
1500	5.75	-	-	5.75	-	-	5.75	-	-
2000	5.75	-	-	5.75	-	-	5.75	-	-
High Amp Overload Bay-O-Net/ELSP Combinations									
150	2.0	165	C03CB	2.0	-	-	2.0	-	-
225	3.0	165	C04CB	3.0	-	-	3.0	-	-
300	3.5	250	C04CB**	3.5	150	C03CB	3.5	125	C03CB
500	4.0	300	C05CB***	4.0	165	C04CB**	4.0	165	C04CB
750	5.75	-	-	5.75	250	C05CB***	5.75	165	C04CB
1000	5.75	-	-	5.75	-	-	5.75	250	C05CB
1500	5.75	-	-	5.75	-	-	5.75	-	-
2000	5.75	-	-	5.75	-	-	5.75	-	-
2500	5.75	-	-	5.75	-	-	5.75	-	--

 Indicates parallel fuse application

Note: Table shows minimum recommended ELSP fuse rating. Recommended ELSP backup fuse will coordinate with protecting fuse and melt only on internal transformer faults. Recommended Bay-O-Net fuses meet inrush criterion of 12 times transformer full load current for 0.1 second.

- a. Current sensing Bay-O-Net fuse is selected to melt at 3 to 4 times transformer full load in 300 seconds.
- b. Dual sensing and Dual element Bay-O-Net fuses are selected to limit transformer load to approximately 160% for 7 hours and 200% for 2 hours with the transformer initially carrying 75% of rated load at ambient temperature of 35°C.
- \*\* The use of these fuses will provide 175% of rated load for 2 hours and 150% of rated load for 7 hours. The use of the next larger fuse is recommended for greater overload capacity. Contact your Cooper Power Systems representative for specific overload capability.
- \*\*\* The specified fuse provides slightly less than 175% of rated load for 2 hours and 150% of rated load for 7 hours. Contact your Cooper Power Systems representative for specific overload capability.

**TABLE 6 (Continued)**  
**Recommended Three-Phase Transformer Bay-O-Net and ELSP Combinations**

Three-Phase Transformer (kVA)	15.5 kV											
	Nominal Three-Phase Voltage (kV) Phase-to-Phase											
	12-12.47			13.2-14.4			20.8d			24.9d		
	Assumed Trans. Impedance (%)	ELSP Rating (A)	Link Cat. No.	Assumed Trans. Impedance (%)	ELSP Rating (A)	Link Cat. No.	Assumed Trans. Impedance (%)	ELSP Rating (A)	Link Cat. No.	Assumed Trans. Impedance (%)	ELSP Rating (A)	Link Cat. No.
ELSP and Current Sensing Bay-O-Net Fuse Combinations <sup>a</sup>												
45	1.6	30	C04	1.6	30	C04	1.6	30	C04	1.6	30	C04
75	1.6	30	C06	1.6	30	C06	1.6	30	C04	1.6	30	C04
112.5	1.8	30	C06	1.8	30	C06	1.8	30	C06	1.8	30	C04
150	2.0	40	C08	2.0	40	C08	2.0	30	C06	2.0	30	C06
225	3.0	65	C10	3.0	65	C10	3.0	30	C08	3.0	30	C06
300	3.5	65	C10	3.5	65	C10	3.5	30	C08	3.5	30	C08
500	4.0	100	C12	4.0	100	C12	4.0	65	C10	4.0	50	C10
750	5.75	125	C14	5.75	125	C14	5.75	80	C12	5.75	80	C12
1000	5.75	250	C16	5.75	125	C14	5.75	125	C14	5.75	80	C12
1500	5.75	250	C17	5.75	250	C17	5.75	125	C14	5.75	125	C14
2000	5.75	—	—	5.75	250	C17	5.75	250	C16	5.75	250	C16
ELSP and Dual Sensing Bay-O-Net Fuse Combinations <sup>b</sup>												
45	1.6	30	C03	1.6	30	C03	1.6	30	C03	1.6	30	C03
75	1.6	30	C05	1.6	30	C05	1.6	30	C03	1.6	30	C03
112.5	1.8	65	C08	1.8	50	C08	1.8	30	C05	1.8	30	C05
150	2.0	65	C08	2.0	65	C08	2.0	30	C05	2.0	30	C05
225	3.0	100	C10	3.0	100	C10	3.0	50	C08	3.0	50	C08
300	3.5	100	C10	3.5	100	C10	3.5	50	C08	3.5	50	C08
500	4.0	150	C12	4.0	125	C12	4.0	100	C10	4.0	100	C10
750	5.75	250	C14	5.75	250	C14	5.75	125	C12	5.75	125	C12
1000	5.75	250	C14	5.75	250	C14	5.75	125	C12	5.75	125	C12
1500	5.75	—	—	5.75	—	—	5.75	250	C14	5.75	250	C14
2000	5.75	—	—	5.75	—	—	5.75	—	—	5.75	250	C14
ELSP and Dual Element Bay-O-Net Fuse Combinations <sup>b</sup>												
45	1.6	30	C03	1.6	30	C03	1.6	30	C03	1.6	30	C03
75	1.6	30	C04	1.6	30	C04	1.6	30	C03	1.6	30	C03
112.5	1.8	40	C06	1.8	40	C06	1.8	30	C05	1.8	30	C04
150	2.0	50	C07	2.0	50	C07	2.0	40	C06	2.0	30	C05
225	3.0	80	C09	3.0	80	C09	3.0	50	C07	3.0	30	C06
300	3.5	80	C09	3.5	80	C09	3.5	80	C09	3.5	50	C07
500	4.0	100	C12	4.0	100	C12	4.0	80	C11	4.0	80	C09
750	5.75	125	C14	5.75	125	C14	5.75	100	C12	5.75	80	C11
1000	5.75	—	—	5.75	—	—	5.75	125	C14	5.75	100	C12
1500	5.75	—	—	5.75	—	—	5.75	—	—	5.75	—	—
2000	5.75	—	—	5.75	—	—	5.75	—	—	5.75	—	—
High Amp Overload Bay-O-Net/ELSP Combinations												
150	2.0	—	—	2.0	—	—	2.0	—	—	2.0	—	—
225	3.0	—	—	3.0	—	—	3.0	—	—	3.0	—	—
300	3.5	—	—	3.5	—	—	3.5	—	—	3.5	—	—
500	4.0	—	—	4.0	—	—	4.0	—	—	4.0	—	—
750	5.75	125	C03CB	5.75	—	—	5.75	—	—	5.75	—	—
1000	5.75	250	C04CB	5.75	125	C03CB	5.75	—	—	5.75	—	—
1500	5.75	250	C04CB**	5.75	250	C04CB	5.75	125	C03CB	5.75	125	C03CB
2000	5.75	250	C05CB***	5.75	250	C05CB	5.75	250	C04CB	5.75	250	C04CB
2500	5.75	250	C05CB***	5.75	250	C05CB***	5.75	250	C04CB**	5.75	250	C04CB

Indicates parallel fuse application

Note: Table shows minimum recommended ELSP fuse rating. Recommended ELSP backup fuse will coordinate with protecting fuse and melt only on internal transformer faults. Recommended Bay-O-Net fuses meet inrush criterion of 12 times transformer full load current for 0.1 second.

a. Current sensing Bay-O-Net fuse is selected to melt at 3 to 4 times transformer full load in 300 seconds.

b. Dual sensing and Dual element Bay-O-Net fuses are selected to limit transformer load to approximately 160% for 7 hours and 200% for 2 hours with the transformer initially carrying 75% of rated load at ambient temperature of 35°C.

c. 23 kV delta primary transformer connection.

d. Recommended fuse is limited to gnd Y/gnd Y transformer with no more than 50% delta connected secondary load and with neutral internally grounded.

Phase-to-ground rated fuses are frequently recommended for gnd Y-gnd Y connections.

\*\* The use of these fuses will provide 175% of rated load for 2 hours and 150% of rated load for 7 hours. The use of the next larger fuse is recommended for greater overload capacity. Contact your Cooper Power Systems representative for specific overload capability.

\*\*\* The specified fuse provides slightly less than 175% of rated load for 2 hours and 150% of rated load for 7 hours. Contact your Cooper Power Systems representative for specific overload capability.

**TABLE 6 (Continued)**  
**Recommended Three-Phase Transformer Bay-O-Net and ELSP Combinations**

Three-Phase Transformer (KVA)	23 kV								
	Nominal Three-Phase Voltage (KV) Phase-to-Phase								
	23 <sup>c</sup>			27.6 <sup>d</sup>			34.5 <sup>d</sup>		
	Assumed Trans. Impedance (%)	ELSP Rating (A)	Link Cat. No.	Assumed Trans. Impedance (%)	ELSP Rating (A)	Link Cat. No.	Assumed Trans. Impedance (%)	ELSP Rating (A)	Link Cat. No.
ELSP and Current Sensing Bay-O-Net Fuse Combinations <sup>a</sup>									
45	1.6	30	C04	1.6	30	C04	1.6	30	C04
75	1.6	30	C04	1.6	30	C04	1.6	30	C04
112.5	1.8	30	C04	1.8	30	C04	1.8	30	C04
150	2.0	30	C06	2.0	30	C06	2.0	30	C04
225	3.0	30	C08	3.0	30	C06	3.0	30	C06
300	3.5	30	C08	3.5	30	C08	3.5	30	C06
500	4.0	65	C10	4.0	65	C10	4.0	30	C08
750	5.75	80	C12	5.75	65	C10	5.75	65	C10
1000	5.75	100	C12	5.75	80	C12	5.75	80	C12
1500	5.75	125	C14	5.75	125	C14	5.75	100	C12
2000	5.75	165	C16	5.75	125	C14	5.75	125	C14
ELSP and Dual Sensing Bay-O-Net Fuse Combinations <sup>b</sup>									
45	1.6	30	C03	1.6	30	C03	1.6	30	C03
75	1.6	30	C03	1.6	30	C05	1.6	30	C03
112.5	1.8	30	C05	1.8	30	C05	1.8	30	C03
150	2.0	30	C05	2.0	30	C05	2.0	30	C05
225	3.0	65	C08	3.0	65	C08	3.0	30	C05
300	3.5	65	C08	3.5	65	C08	3.5	30	C05
500	4.0	100	C10	4.0	100	C10	4.0	65	C08
750	5.75	125	C10	5.75	100	C10	5.75	100	C10
1000	5.75	125	C10	5.75	125	C10	5.75	100	C10
1500	5.75	165	C14	5.75	165	C14	5.75	125	C10
2000	5.75	-	-	5.75	-	-	5.75	165	C14
ELSP and Dual Element Bay-O-Net Fuse Combinations <sup>b</sup>									
45	1.6	30	C03	1.6	30	C03	1.6	30	C03
75	1.6	30	C03	1.6	30	C03	1.6	30	C03
112.5	1.8	30	C04	1.8	30	C03	1.8	30	C03
150	2.0	30	C05	2.0	30	C04	2.0	30	C03
225	3.0	30	C06	3.0	30	C06	3.0	30	C05
300	3.5	50	C07	3.5	50	C07	3.5	30	C06
500	4.0	-	-	4.0	-	-	4.0	50	C07
750	5.75	-	-	5.75	-	-	5.75	-	-
1000	5.75	-	-	5.75	-	-	5.75	-	-
1500	5.75	-	-	5.75	-	-	5.75	-	-
2000	5.75	-	-	5.75	-	-	5.75	-	-

 Indicates parallel fuse application

Note: Table shows minimum recommended ELSP fuse rating. Recommended ELSP backup fuse will coordinate with protecting fuse and melt only on internal transformer faults. Recommended Bay-O-Net fuses meet inrush criterion of 12 times transformer full load current for 0.1 second.

- a. Current sensing Bay-O-Net fuse is selected to melt at 3 to 4 times transformer full load in 300 seconds.
- b. Dual sensing and Dual element Bay-O-Net fuses are selected to limit transformer load to approximately 160% for 7 hours and 200% for 2 hours with the transformer initially carrying 75% of rated load at ambient temperature of 35°C.
- c. 23 kV delta primary transformer connection.
- d. Recommended fuse is limited to gnd Y/gnd Y transformer with no more than 50% delta connected secondary load and with neutral internally grounded. Phase-to-ground rated fuses are frequently recommended for gnd Y-gnd Y connections.



**TABLE 7**  
**Recommended MagneX Interrupter and ELSP Current-Limiting Fuse Combinations**

Nominal Single Phase (kV Phase-to-ground)	8.3 kV							15.5 kV			23 kV
	2.4	4.16	4.8	6.9	7.2	7.62-7.97	8.32	12.0-13.2	12.47	13.8-14.4	19.92
10 kVA ELSP Rating MagneX Element Assumed % Z = 1.9	40 E06	40 E06	30 E03	30 E03	30 E03	30 E03	30 E03	30 E01	30 E01	30 E01	30 E01
15 kVA ELSP Rating MagneX Element Assumed % Z = 1.9	50 E10	40 E06	40 E06	30 E03	30 E03	30 E03	30 E03	30 E03	30 E03	30 E03	30 E01
25 kVA ELSP Rating MagneX Element Assumed % Z = 1.9	100 E18	50 E10	50 E10	40 E06	40 E06	40 E06	40 E06	30 E03	30 E03	30 E03	30 E03
37.5 kVA ELSP Rating MagneX Element Assumed % Z = 1.9	125 E25	100 E18	65 E12	50 E10	50 E10	50 E10	50 E10	40 E06	40 E06	40 E06	30 E03
50 kVA ELSP Rating MagneX Element Assumed % Z = 1.9	150 E30	100 E18	100 E18	65 E12	65 E12	65 E12	50 E10	40 E06	40 E06	40 E06	40 E06
75 kVA ELSP Rating MagneX Element Assumed % Z = 1.9	165 E50	150 E30	125 E25	100 E18	100 E18	100 E18	100 E18	50 E10	50 E10	50 E10	40 E06
100 kVA ELSP Rating MagneX Element Assumed % Z = 2.0	-	150 E40	150 E30	125 E25	125 E25	125 E25	100 E18	65 E12	65 E12	65 E12	50 E10
167 kVA ELSP Rating MagneX Element Assumed % Z = 2.6	-	-	165 E50	150 E40	150 E40	150 E30	150 E30	100 E18	100 E18	100 E18	65 E12

## Notes:

The MagneX Interrupter recommendations are based on:

- Deration factor of 0.5% per °C above 25°C.
- Allowable loading greater than 140% for four hours in accordance with IEEE Standard C57.91-1981™ guide for Loading Distribution Transformers, Table 6.
- If using a MagneX Interrupter equipped without emergency overload, a smaller ELSP rating may be used.

**See the Following Catalog Sections for Additional Information:**

- ELSP Fuse Holder — Section 240-53
- Bay-O-Net Fuse Holder Assembly — Section 240-40
- Current Sensing Bay-O-Net Fuse Link — Section 240-45
- Dual Sensing Bay-O-Net Fuse Link — Section 240-46
- Dual Element Bay-O-Net Fuse Link — Section 240-48
- High Ampere Overload Bay-O-Net Fuse Link — Section 240-49
- MagneX Interrupter — Section 240-34 (previously 800-50)

Contact your Cooper Power Systems representative for further information or other applications.

**Method B**

**TIME CURRENT CURVES**

To determine or confirm the ELSP 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 R240-91-71 (8.3 kV), R240-91-72 (15.5 kV), and R240-91-73 (23.0 kV), contact your Cooper Power Systems representative.



