Catalog Data
CA132016EN

Effective July 2015
Supersedes 240-34 July 2014

COOPER POWER SERIES

MagneX™ single-phase interrupter

General

Eaton's Cooper Power™ series MagneX™ interrupter is an overcurrent protective device that protects distribution transformers from damaging overloads and secondary faults, and is also used for switching the transformer "on" or "off". As a transformer protective device, the MagneX interrupter combines safety and efficiency with economic operation. It is designed for use in transformer (mineral) oil or Envirotemp™ FR3™ fluid-filled transformers.

It is an integral assembly, which does not use a troublesome linkage or require calibration, making installation and operation fast and trouble free.

The housing is made of an ultraviolet stabilized, high strength glass-filled thermoplastic material. The operating shaft is sealed against leakage with a double-Viton® O-ring seal.

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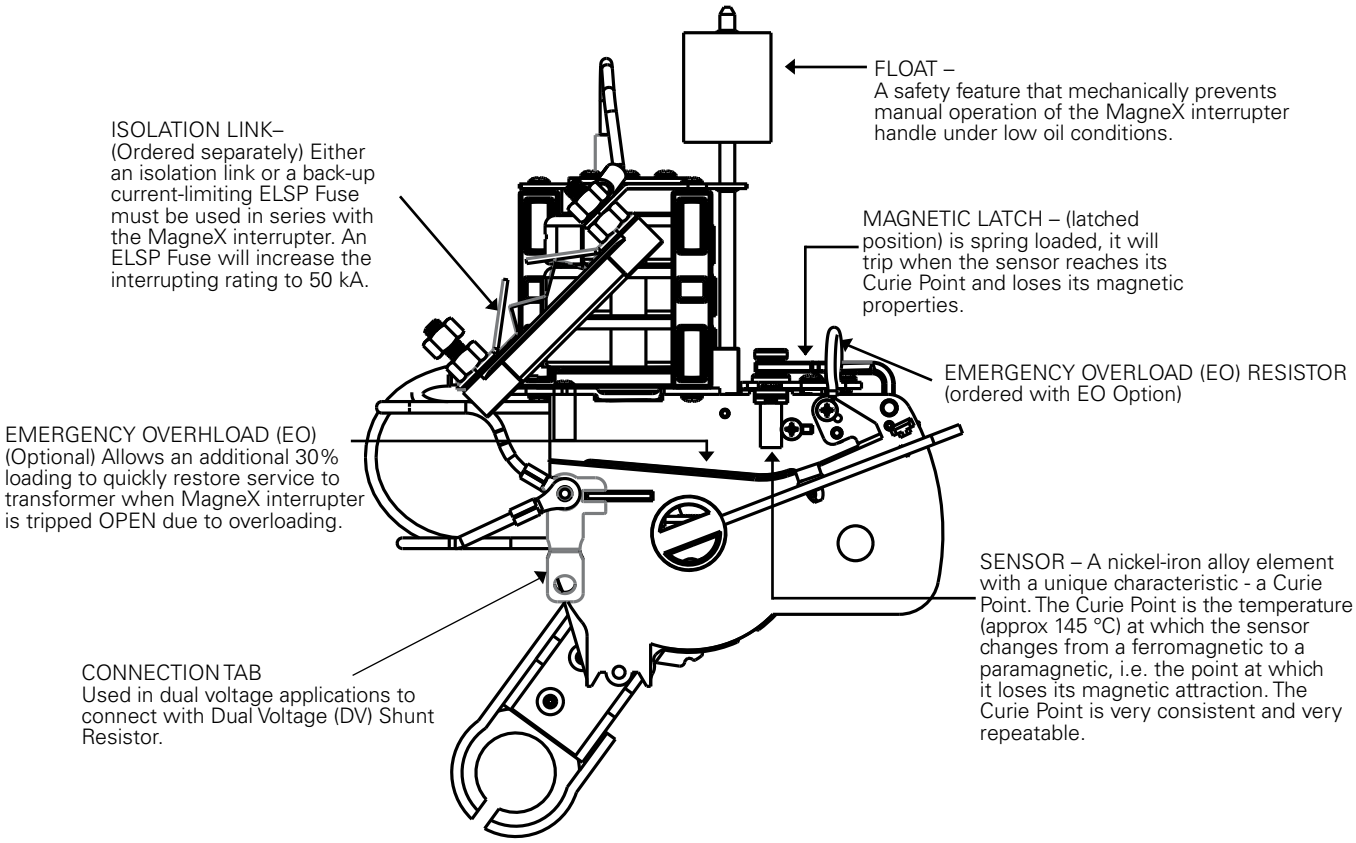

Figure 1. MagneX interrupter – back view.

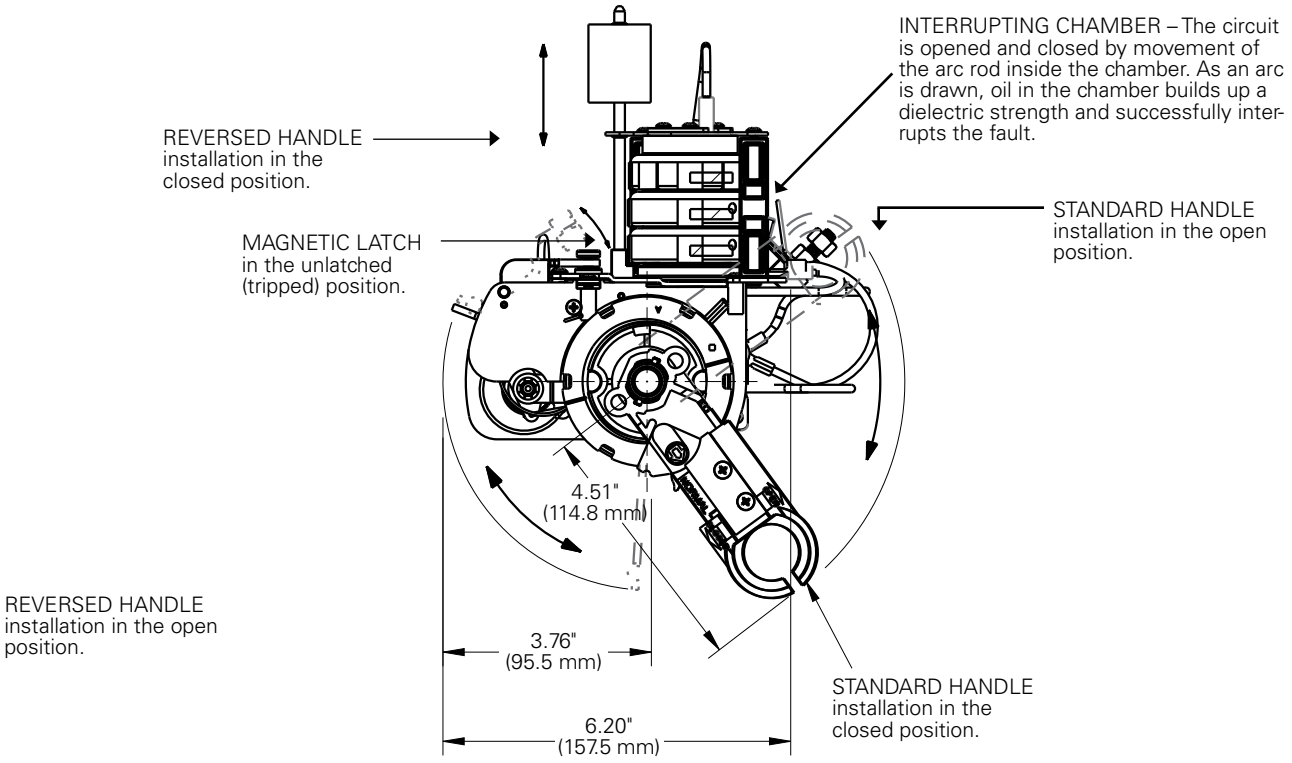

Figure 2. MagneX interrupter showing handle swing – front view with standard handle.

Note: Dimensions given are for reference only. See ordering information on Page 4.

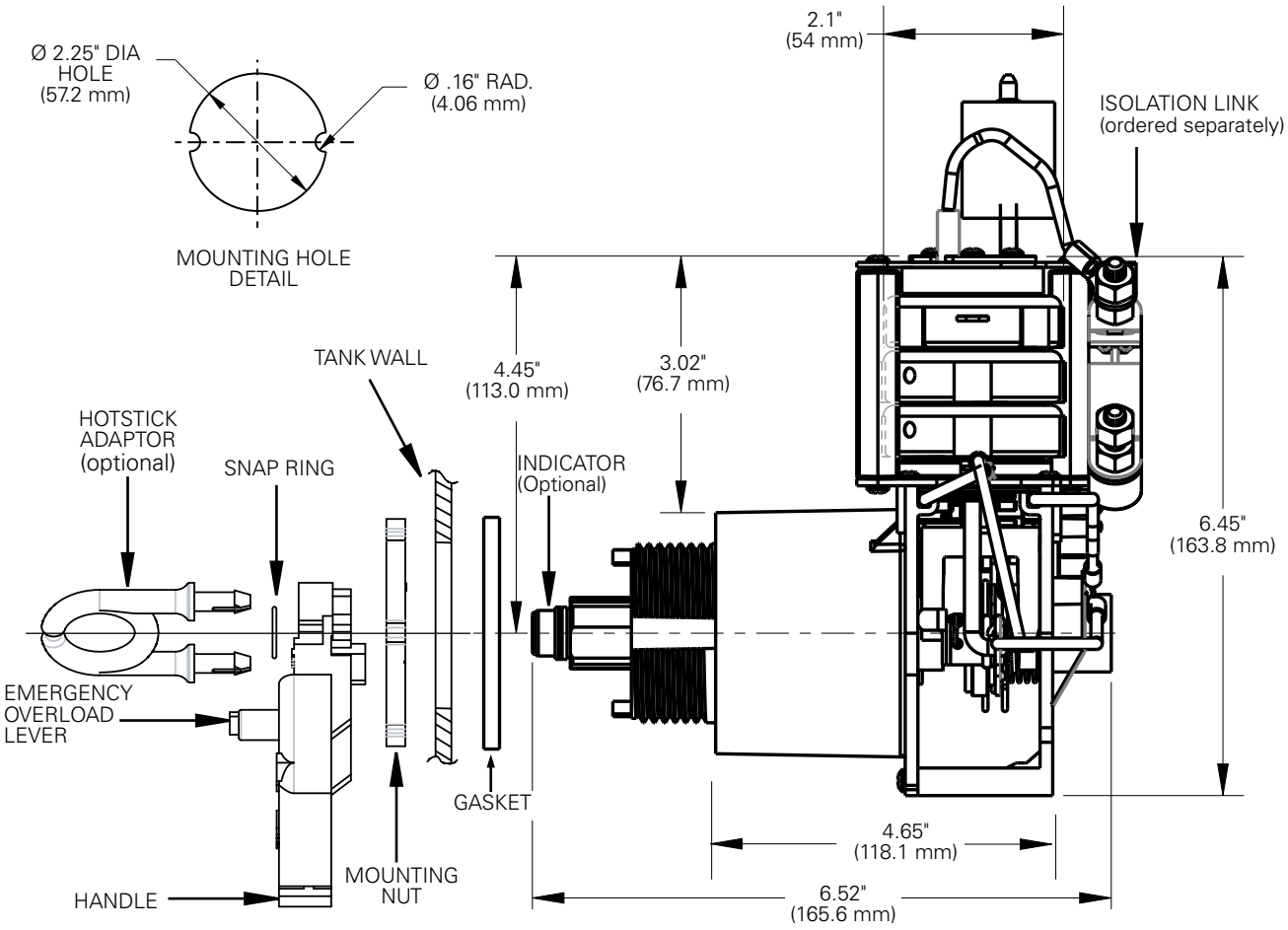

Figure 3. Side view with optional hotstick adaptor, handle and mounting hole detail.

Note: Dimensions given are for reference only, inches (mm).

Figure 4. Reversed installation of the handle in the OPEN position.

Figure 5. Reversed installation of the handle in the CLOSED position.

Application

The single-phase MagneX interrupter combines the functionality of one Bay-O-Net fuse and one single-phase on/off loadbreak switch in one protective device. This allows transformer manufactures more flexibility in application of the product and potentially reduces the space required to install the device on the transformer front plate. This product is ideal for single-phase pad- and pole-mounted transformer applications.

Secondary faults and overloads will trip the MagneX interrupter "open"; however, the device can be reset once the condition is corrected.

Primary faults are cleared by the MagneX interrupter in coordination with either an isolation link or current- limiting fuse.

The MagneX interrupter can be ordered with an optional Emergency Overload (EO) feature. When the transformer is tripped due to overloading, the EO feature can allow an additional 30% loading to quickly restore service. Losses with the MagneX interrupter during normal and overload conditions are negligible compared to those of a secondary breaker. (Refer to Table 5.)

The MagneX interrupter can also be used as a primary switch to disconnect the transformer windings — not just the load. This eliminates core (no load) losses on transformers not in service. Residual voltage problems associated with secondary breakers during banking of transformers are also eliminated.

Optional handle assemblies

A standard handle, as shown in Figure 2, is typically used in overhead pole-type transformers. If operating space is available it is also used in underground pad-mounted transformer applications. It is made of an ultraviolet stabilized, high strength glass-filled thermoplastic material. The lower slotted portion of the handle is made of a flexible ultraviolet stabilized elastomeric material. The handle requires five pounds of force to operate manually. It allows flexibility during excessive force during operation.

An optional hotstick adaptor as shown in Figure 3, is used in underground pad-mounted transformer applications. It allows for hotstick operation directly without requiring wide arc angles in cabinets where operating space is limited due to cable training and other components.

Optional indicator

An optional indicator as shown in Figure 3 is used to indicate that the MagneX interrupter has tripped due to an overload condition or a secondary fault. During normal conditions, the indicator lens is clear. When the MagneX interrupter has tripped, a highly visible orange fluorescent flag appears in the lens area. The clear lens is made of Xylex™ giving the exposed lens a tamperproof, and scratch-resistant protection. When the MagneX interrupter is reset, the lens becomes clear again.

Installation

The MagneX interrupter is mounted under-oil in the primary side of the transformer. No special tools are required. The MagneX interrupter assembly is mounted through the transformer wall. The incoming high voltage lead is connected to the isolation link on the MagneX interrupter, or to the current-limiting fuse and then to the MagneX interrupter. The coil lead and then to the MagneX interrupter. The coil lead is then connected to the other MagneX interrupter lead. Refer to *Service Information MN132006EN, Single-Phase MagneX Interrupter Installation Instructions* for details.

Production tests

Tests are conducted in accordance with Eaton requirements.

- Physical inspection
- Electrically tested to meet Minimum Trip and Maximum Trip Clear TCC Curves
- Periodic Fluoroscopic Analysis (X-ray)

Ordering information MagneX interrupter

Table 1. Voltage Ratings and Characteristics

Description	Rating
Impulse 1.2x50 Microsecond Wave	150 kV
60 Hz-1 Minute Voltage Withstand	50 kV
Continuous Current Rating	42 A
Switching Load Currents, 200 Times	42 A
Magnetizing Current Switching	200 Times

Continuous current ratings and dielectric testing are in accordance with ANSI/IEEE Std C57.12.00™-1987 standard.

Switching and Fault Close IEEE Std C37.41™-1988 standard. Emergency Overload Protection ANSI/IEEE Std C57.91™-1981 standard.

Table 2. Interrupting Rating

Voltage kV-LG	RMS Symmetric (A)	RMS Asymmetric (A)
8.3	2800	4200
15.5	1500	2250
23.0	500	750

Use Table 6 to determine the correct MagneX interrupter suffix (sensor number) for the application.

Use Table 3 to determine the catalog number.

When ordering a MagneX interrupter with a standard handle, a hardware kit must be ordered separately. Use Table 7 to determine the hardware kit catalog number.

To select the correct isolation link, use Table 4 to cross reference the isolation link to the selected MagneX interrupter. **An isolation link is recommended if the MagneX interrupter is not in series with a current-limiting fuse.**

Table 3. MagneX Interrupter Significant Digit Catalog Number System

Example: To order a single-phase MagneX interrupter without indicator, single-phase trip, with float and E12 sensor, the catalog number would be **MX1BN1SYE12**

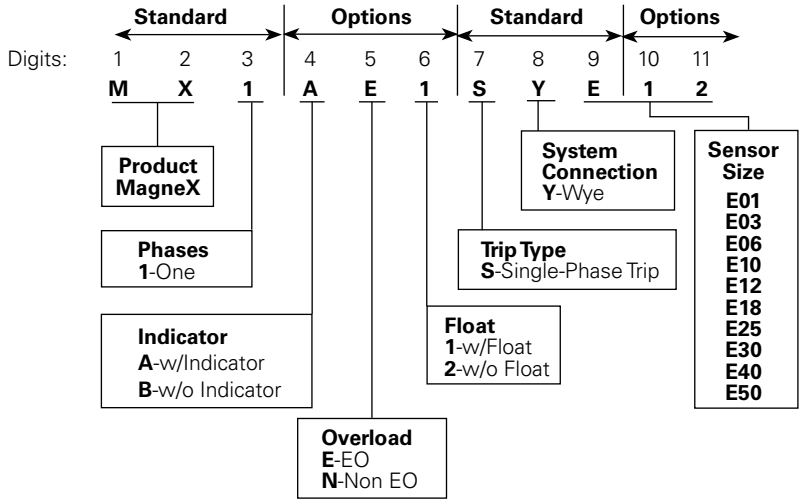

Table 4. Isolation Link – MagneX Interrupter Correlation Chart

Sensor Number	Isolation Link
E01	3637803B01
E03	3637803B08
E06	3637803B02
E10	3637803B09
E12	3637803B10
E18	3637803B03
E25	3637803B03
E30	3637803B05
E40	3637803B05
E50	3637803B05

Figure 6. MagneX interrupter with hotstick adaptor and indicator.

Table 5. MagneX Interrupter Losses for Single-Phase Transformer (Phase-to-Ground) Applications (WATTS)

Primary Voltage kV															
kVA/kV	**2.4**	**4.16**	**4.8**	**6.9**	**7.2**	**7.62**	**7.97**	**8.32**	**12.00**	**12.47**	**13.2**	**13.8**	**14.4**	**16.34**	**19.92**
10	1.32	0.44	0.61	0.30	0.27	0.24	0.22	0.20	0.33	0.31	0.28	0.24	0.23	0.18	0.12
15	0.96	0.99	0.74	0.67	0.61	0.55	0.50	0.46	0.22	0.21	0.18	0.17	0.15	0.41	0.27
25	2.13	0.84	0.63	0.99	0.91	0.82	0.75	0.68	0.62	0.57	0.51	0.46	0.43	0.33	0.22
37.5	4.63	1.59	1.32	0.69	0.63	0.56	0.52	0.47	0.74	0.68	0.61	0.55	0.51	0.75	0.50
50	7.96	2.83	2.13	1.14	1.04	1.00	0.85	0.84	1.32	1.21	1.09	0.98	0.91	0.71	0.48
75	15.11	5.96	4.63	2.32	2.12	1.89	1.74	1.59	0.91	0.84	0.75	0.68	0.63	0.49	1.08
100	28.87	9.15	7.96	3.98	3.78	3.37	3.09	2.82	1.50	1.38	1.24	1.12	1.04	1.12	0.59
167	–	24.92	18.73	9.27	8.52	7.61	6.95	7.34	3.80	3.52	3.14	2.87	2.64	2.05	1.52
250	–	–	–	20.31	18.65	16.66	15.23	13.92	7.96	7.34	6.58	6.01	5.53	4.44	3.08
333	–	–	–	–	–	–	–	24.76	12.20	11.29	10.08	9.20	8.47	7.61	5.13
500	–	–	–	–	–	–	–	–	26.87	24.88	22.2	20.27	18.65	14.49	9.98

Note:
Losses are calculated at operating voltage for typical MagneX interrupter protected transformers at room temperature (25°C) using the selected element in the Correlation Chart, Table 6.

Table 6. Single-phase Transformer (Phase-to-Ground) Applications Correlation Chart

Primary Voltage kV															
kVA/kV	**2.4**	**4.16**	**4.8**	**6.9**	**7.2**	**7.62**	**7.97**	**8.32**	**12.00**	**12.47**	**13.2**	**13.8**	**14.4**	**16.34**	**19.92**
10	E06	E06	E03	E03	E03	E03	E03	E03	E01	E01	E01	E01	E01	E01	E01
15	E10	E06	E06	E03	E03	E03	E03	E03	E03	E03	E03	E03	E03	E01	E01
25	E18	E10	E10	E06	E06	E06	E06	E06	E03	E03	E03	E03	E03	E03	E03
37.5	E25	E18	E12	E10	E10	E10	E10	E10	E06	E06	E06	E06	E06	E03	E03
50	E30	E18	E18	E12	E12	E12	E12	E10	E06	E06	E06	E06	E06	E06	E06
75	E50	E30	E25	E18	E18	E18	E18	E18	E10	E10	E10	E10	E10	E06	E06
100	E50	E40	E30	E25	E18	E18	E18	E18	E12	E12	E12	E12	E12	E10	E10
167	–	E50	E50	E40	E40	E40	E40	E30	E18	E18	E18	E18	E18	E18	E12
250	–	–	–	E50	E50	E50	E50	E50	E30	E30	E30	E30	E30	E25	E18
333	–	–	–	–	–	–	–	E50	E40	E40	E40	E40	E40	E30	E25
500	–	–	–	–	–	–	–	–	E50	E50	E50	E50	E50	E50	E40

Notes:
Recommendations are based on:

- Minimum trip curves, and Maximum trip and clear curves, **R240-91-310**.
- Deration factor of 0.5% per °C above 25 °C.
- Allowable loading greater than 140% for four (4) hours in accordance with ANSI/IEEE Std C57.91.1981™ standard Guide for Loading Distribution Transformers, Table 6.

MagneX interrupter with current-limiting fuse

To order a MagneX interrupter and current-limiting fuse combination, see Table 8.

Example – MagneX interrupter with an Emergency Overload, indicator, and a float in series with an ELSP Current-Limiting Fuse for a single-phase, 7.2 kV phase-to-ground, 25 kVA transformer, specify:

1 – 40 A ELSP Fuse CBUC08030C100
1 – MagneX interrupter MX1AE1SYE06
1 – Hardware Kit (with Emergency Overload, indicator, and no adaptor) 3638535A05

See the following Catalog Sections for further information:

ELSP Fuse Holder CA132029EN
ELSP Current-Limiting Backup Fuse CA132013EN

Table 7. Hardware Kits

Description	Catalog Number
Without emergency overload	3638535A04
With emergency overload	3638535A05
With adaptor without emergency overload	3638535A07
With adaptor with emergency overload	3638535A08
Hotstick adaptor only	3639585A01

Using TCC curves

To determine or confirm the MagneX interrupter will coordinate with upstream and down stream system requirements, use the time-current characteristic curves (See R240-91-310). For full size TCC curves, contact your Eaton representative.

Table 8. 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	6.9-8.0	12.0-14.4	16.34	19.92
10 kVA						
ELSP Rating without Emergency Overload	30	30	30	30	30	30
ELSP Rating with Emergency Overload	30	30	30	30	30	30
MagneX Element	E06	E03	E03	E01	E01	E01
15 kVA .						
ELSP Rating without Emergency Overload	40	30	30	30	30	30
ELSP Rating with Emergency Overload	50	30	30	30	30	30
MagneX Element	E10	E06	E03	E03	E01	E01
25 kVA						
ELSP Rating without Emergency Overload	80	40	30	30	30	30
ELSP Rating with Emergency Overload	80	50	30	30	30	30
MagneX Element	E18	E10	E06	E03	E03	E03
37.5 kVA						
ELSP Rating without Emergency Overload	100	65	40	30	30	30
ELSP Rating with Emergency Overload	100	80	50	30	30	30
MagneX Element	E18	E12	E10	E06	E03	E03
50 kVA						
ELSP Rating without Emergency Overload	150	80	50	30	30	30
ELSP Rating with Emergency Overload	150	100	50	30	30	30
MagneX Element	E30	E18	E12	E06	E06	E03
75 kVA						
ELSP Rating without Emergency Overload	150	100	80	40	30	30
ELSP Rating with Emergency Overload	150	125	100	40	30	30
MagneX Element	E40	E25	E18	E10	E06	E06
100 kVA						
ELSP Rating without Emergency Overload	180	150	100	50	40	30
ELSP Rating with Emergency Overload	250	165	100	50	40	30
MagneX Element	E50	E40	E18	E12	E10	E06
167 kVA						
ELSP Rating without Emergency Overload		165	125	80	80	50
ELSP Rating with Emergency Overload		180	150	80	80	50
MagneX Element		E50	E40	E18	E18	E12
250 kV						
ELSP Rating without Emergency Overload			165	100	80	80
ELSP Rating with Emergency Overload			165	100	80	80
MagneX Element			E50	E40	E18	E18
333 kVA						
ELSP Rating without Emergency Overload				100	80	80
ELSP Rating with Emergency Overload				100	80	80
MagneX Element				E40	E25	E25
500 kVA						
ELSP Rating without Emergency Overload				150	100	100
ELSP Rating with Emergency Overload				150	100	100
MagneX Element				E50	E40	E40

Notes:

Table shows minimum recommended ELSP Fuse ratings. Recommended ELSP Backup Fuse (described in Catalog Section CA132013EN) will coordinate with the MagneX interrupter and melt on internal transformer faults. The MagneX interrupter recommendations are based on:

- Minimum trip curves, and Maximum trip and clear curves, **R240-91-310**.
- Deration factor of 0.5% per °C above 25 °C.
- Allowable loading greater than 140% for four (4) hours in accordance with ANSI/IEEE Std C57.91-1981™ standard, Guide for Loading Distribution Transformers, Table 6.

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