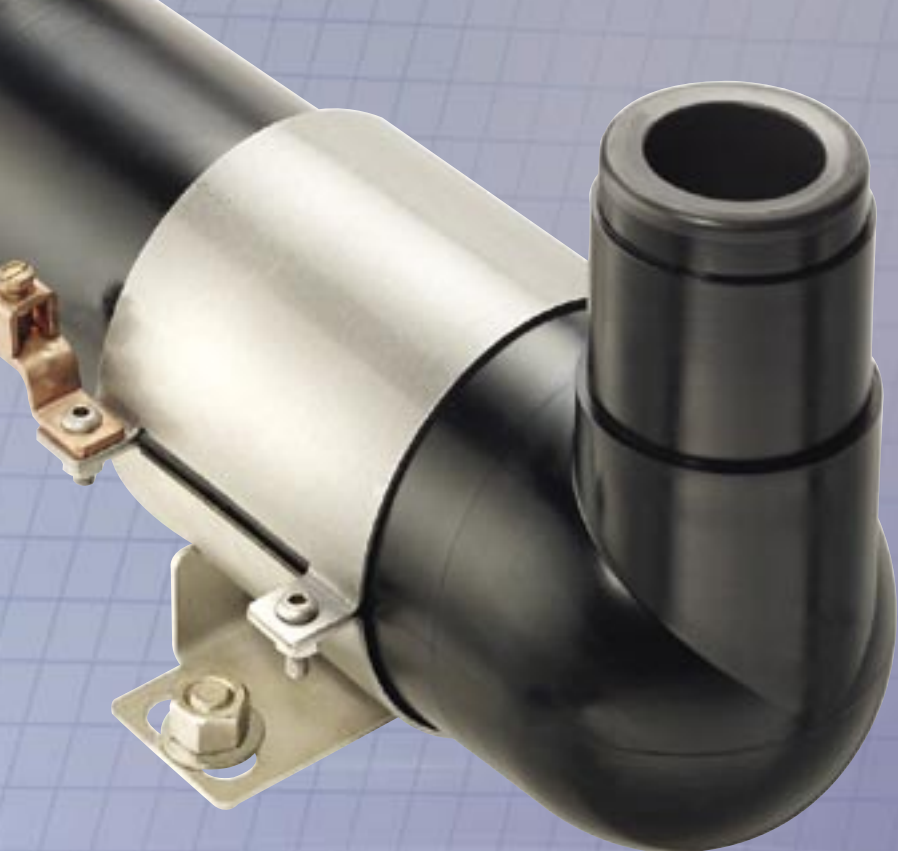




ELASTIMOLD®

FUSES



PROTECTION AND CONTROL



PRODUCT GUIDE

- Fused Elbows
- Molded Current-Limiting Fuses
- Molded Canister Fuses
- Deadfront
- Submersible
- Current-Limiting Protection
- Flexibility of Installation on Switchgear, Junctions, Transformers, Cable Runs, Taps
- Certified to ANSI C37-40, 41, 47 and IEEE 386



FUSES OVERVIEW

Protection and Control Products

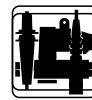
Electric underground distribution systems demand high performance in the form of improved reliability, improved power quality, reduced operational and maintenance costs, and flexibility of operation. These can be accomplished by sectionalizing feeders, installing equipment with minimal maintenance/installation costs, installing protection equipment, installing automatic source transfer equipment, and/or providing ways to monitor the system and quickly locate a fault.

Thomas & Betts' Protection and Control products provide flexible solutions to all of the above challenges. With a wide arrangement of products such as arresters, canister and molded fuses, fault indicators, fused elbows, and switchgear we are able to provide the equipment that you need to fulfill the needs of underground distribution systems up to 35kV.

Thomas & Betts' Elastimold Fuses cover a wide range of applications and ratings. Molded current-limiting fuses (MCLF) and molded fuse canisters (MCAN) provide full-range protection through 50 kA. The fuses in both MCLF and MCAN products can easily be replaced with minimal down time. MCAN and MCLF are suitable for single-phase tap/load protection and can be used in vault, subsurface, or pad-mount installations. Fused loadbreak elbows provide low cost, convenient protection for radial taps, junctions, transformers and other equipment. They combine the advantages of full-range current-limiting fusing with the convenience of 15/25kV, 200 Amp hotstick operable, loadbreak elbow switching.

In this guide you will find a description and basic features for Elastimold fuses, as well as information on how to request a quote/order.





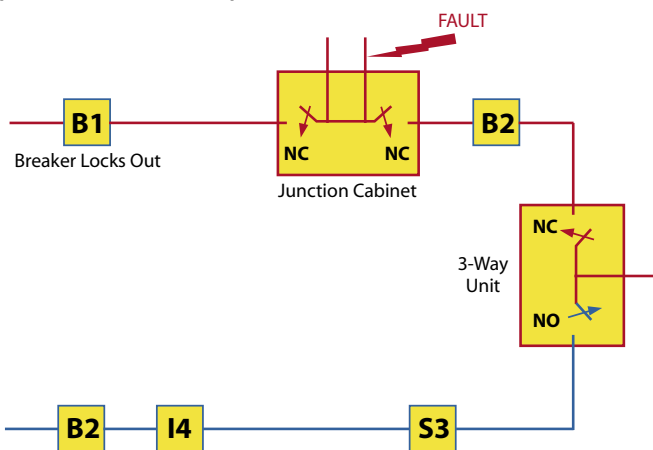
FUSED LOADBREAK ELBOW

Elastimold Fused Elbows combine the advantages of *Full-Range Current-Limiting Fusing* with the convenience of 15/25kV hot stick operable, loadbreak elbow switching.

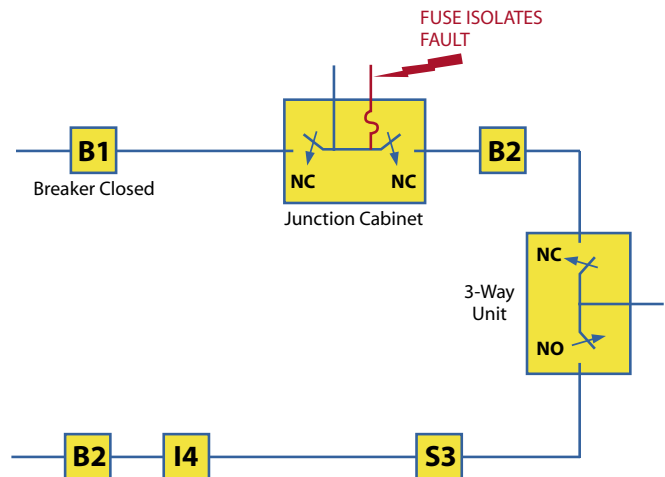
FEATURE	BENEFIT / DESCRIPTION
■ EPDM Molded Rubber Deadfront Construction	■ Fully sealed and submersible ■ Insulate, shield and eliminate exposed live parts
■ Split Center Section	■ Easy fuse replacement
■ Built-in Voltage test points or access ports	■ Quick and convenient blown fuse indication
■ Full-range current-limiting fusing with 50kA interrupting capability	■ Facilitates fusing of light duty underground distribution systems including sub-loops, radial taps, junctions, transformers, and other equipment
■ Rated 5kV Ungrounded to 25kV Grounded Wye	
■ 15/25kV hot stick operable, loadbreak elbow switching	



This is the fastest, most cost effective way to improve the distribution system's reliability without adding a separate piece of switchgear or replacing existing sectionalizing cabinets. Simply replace existing 200 Amp tap elbows with Elastimold Fused Elbows to protect light duty underground distribution systems including sub-loops, and radial taps. The following example shows how much improvement in reliability is achieved by adding protection to a tap.



Loop system without tap protection: A fault on the tap will lock out the substation breaker and generate an outage for all customers to the open point.



Loop system with tap protection: A fault on the tap will be isolated by the FUSED ELBOW(s). This reduces the number of customers affected by the outage, thus improving the system's System Average Interruption Frequency Index (SAIFI).



FUSED LOADBREAK ELBOW

CERTIFIED TESTS & PERFORMANCE

Elastimold fused elbows have been designed and tested per applicable portions of IEEE, ANSI, and other industry standards including:

- ANSI C37.40 Standard for Current-Limiting Fuse Service Conditions.
- ANSI C37.41 Standard for Current-Limiting Fuse Design & Testing.
- ANSI C37.47 Standard for Current-Limiting Fuse Ratings & Specifications.
- IEEE 386 Standard for Separable Connectors.

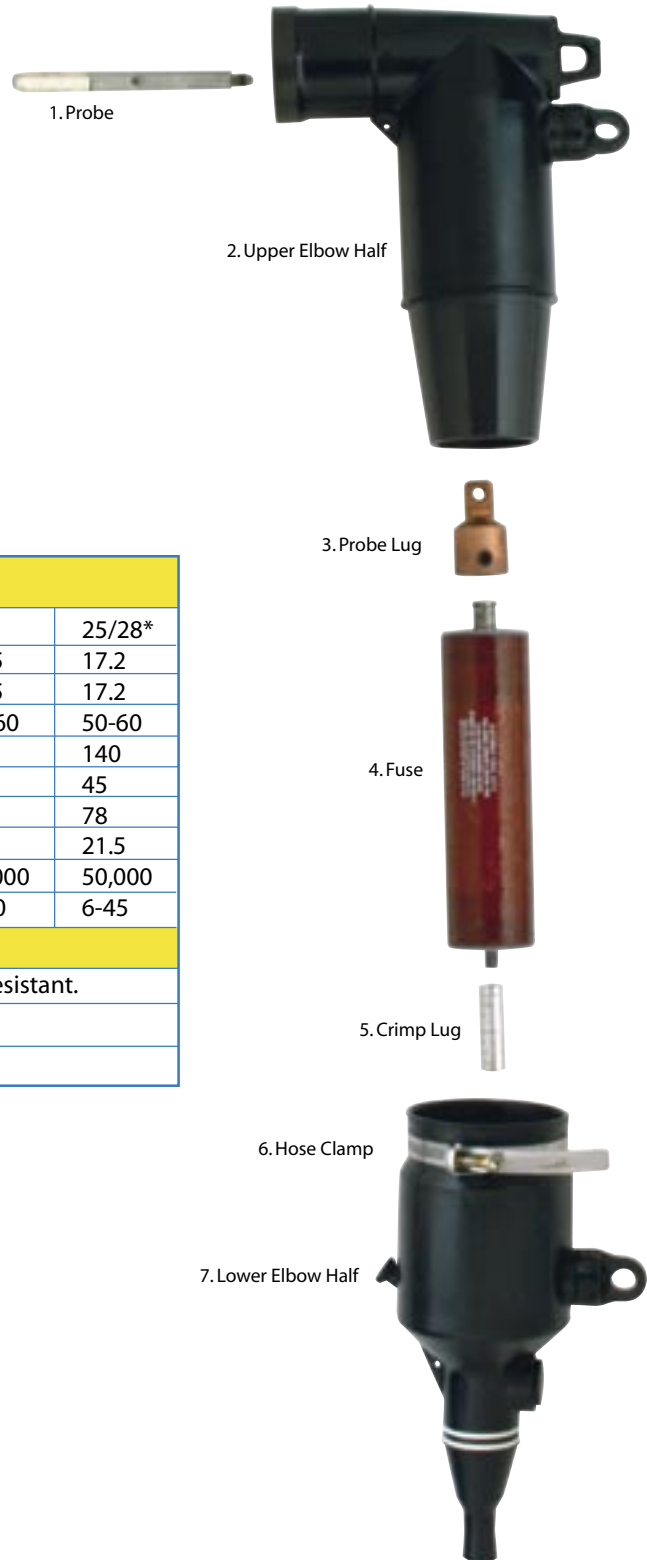
RATINGS			
System Voltage Class (kV)	15	25	25/28*
Nominal Fuse Voltage (kV)	8.3	15.5	17.2
Rated Maximum Fuse Voltage (kV)	10	15.5	17.2
Frequency (Hz)	50-60	50-60	50-60
BIL Impulse Withstand (kV)	95	125	140
One Minute AC Withstand (kV)	34	40	45
Fifteen Minute DC Withstand (kV)	53	78	78
Corona Extinction (kV)	11	19	21.5
Symmetrical Interrupting Capability (Amp)	50,000	50,000	50,000
Current Rating (Amp)	6-45	6-20	6-45

APPLICATION INFORMATION

Construction: Submersible, non-venting, deadfront, corrosion resistant.

Ambient Temperature Range: - 30 to +65 degrees centigrade.

* The 28kV rated fuse requires at least 75% grounded load.





FUSED LOADBREAK ELBOW

ELECTRICAL CHARACTERISTICS OF EFX-ELBOW FUSES										
System Voltage Class (kV)	Nominal Fuse Voltage Rating (kV)	Current Rating (A)	Fuse Model Number	Rated Maximum Voltage (kV)	Maximum Continuous Current (2) (6)			Peak Arc Voltage (kV) (5)	Minimum Melt I ² t (AMP ² -SEC)	Maximum Total I ² t (3) (4) (AMP ² -SEC)
					25° C	40° C	65° C			
15	8.3	6	EFX083006-E	10.0	9.5	9.0	8.5	32	620	2,700
	8.3	8	EFX083008-E	10.0	11.5	11.0	10.5	28	800	4,000
	8.3	10	EFX083010-E	10.0	14.0	13.5	13.0	28	800	4,000
	8.3	12	EFX083012-E	10.0	19.0	18.5	17.5	26	920	8,000
	8.3	18	EFX083018-E	10.0	21.0	20.0	19.0	26	1,310	9,500
	8.3	20	EFX083020-E	10.0	26.0	25.0	24.0	26	1,620	11,000
	8.3	25	EFX083025-E	10.0	34.0	33.0	31.0	26	3,660	22,000
	8.3	30	EFX083030-E	10.0	37.5	36.5	34.5	26	5,250	30,000
	8.3	40	EFX083040-E	10.0	43.0	42.0	40.0	26	8,700	50,000
	8.3	45	EFX083045-E	10.0	49.0	47.0	45.0	26	12,800	70,000
25	15.5	6	EFX155006-E	15.5	8.5	8.0	7.7	52	620	3,000
	15.5	8	EFX155008-E	15.5	10.5	10.0	9.5	40	800	4,300
	15.5	10	EFX155010-E	15.5	13.0	12.5	12.0	40	800	4,300
	15.5	12	EFX155012-E	15.5	16.0	15.5	15.0	38	920	8,000
	15.5	18	EFX155018-E	15.5	20.0	19.5	18.5	38	1,620	13,000
	15.5	20	EFX155020-E	15.5	23.5	22.5	21.5	38	2,200	16,500
25/28	17.2	6	EFX172006-E	17.2	9.5	9.0	8.5	54	620	3,250
	17.2	8	EFX172008-E	17.2	11.5	11.0	10.5	46	800	4,600
	17.2	10	EFX172010-E	17.2	14.0	13.5	13.0	46	800	4,600
	17.2	12	EFX172012-E	17.2	18.0	17.5	16.5	43	920	8,500
	17.2	18	EFX172018-E	17.2	20.0	19.5	18.5	45	1,310	10,000
	17.2	20	EFX172020-E	17.2	24.0	23.0	22.0	45	1,620	12,500
	17.2	25	EFX172025-E	17.2	31.5	30.5	29.0	45	3,660	27,500
	17.2	30	EFX172030-E	17.2	35.5	34.5	32.5	45	5,250	37,500
	17.2	40	EFX172040-E	17.2	41.0	40.0	38.0	45	8,700	62,500
17.2	45	EFX172045-E	17.2	46.0	45.0	42.5	45	12,800	87,500	

Notes:

1. Designs have a 50,000 Amps rms. Symmetrical Rating.
2. Fuses have a Rated Maximum Application Temperature of 65°C (RMAT is the maximum temperature of the air, in contact with the elbow housing, at which they have been shown to be suitable for use).
3. Tabulated Maximum Total I²t values are for currents of 50,000 amperes at the nominal voltage of the fuse. Values for 8.3kV fuses at 10kV are approximately 30% higher. Values for 17.2kV fuses at 15.5kV are approximately 20% lower.
4. Maximum total I²t values are reduced for currents below 50,000 A. For example, at 10,000 A, maximum total I²t values are approximately 15% less than the published values.
5. Peak arc voltages quoted are for 50,000 A currents at the rated maximum voltage listed. Reduced currents and voltages will reduce the peak arc voltage. Consult the factory for further information.
6. Maximum continuous currents at ambient temperatures other than those listed may be determined by derating the fuses by 0.2% per degree C over 25°C. For example: At 40°C the derating would be 15 x .2 = 3%, making the maximum continuous current of a 17.2kV 25A fuse 31.5 x .97 = 30.5A.
7. Time-current characteristic curves are published at 25°C. Reduction in the long time melting current of the fuses (approximately one hour and longer) due to higher ambient temperatures is the same as described above for "maximum continuous currents".



FUSED LOADBREAK ELBOW

ORDERING INFORMATION FOR THE FUSE HOUSING

YYY A FLR H - W X

Nominal Fuse Voltage Rating	
168	8.3kV
274	15.5kV
274	17.2kV

ACCESS PORT	
A	Access Port
Blank	No Access Port

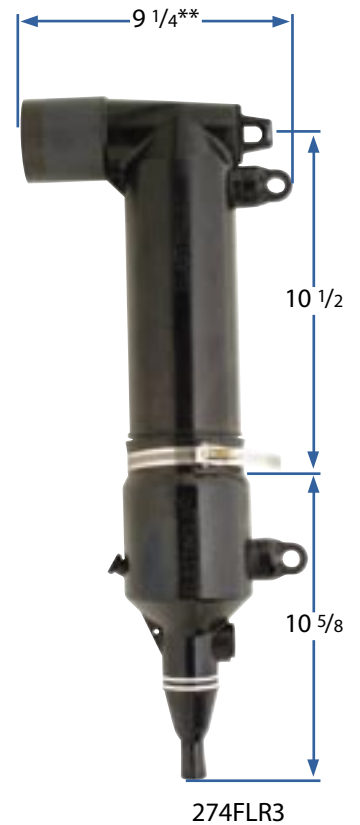
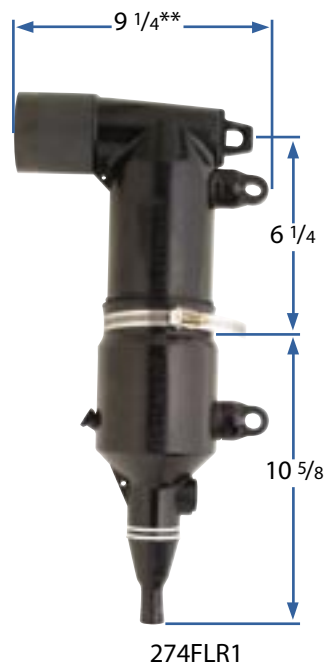
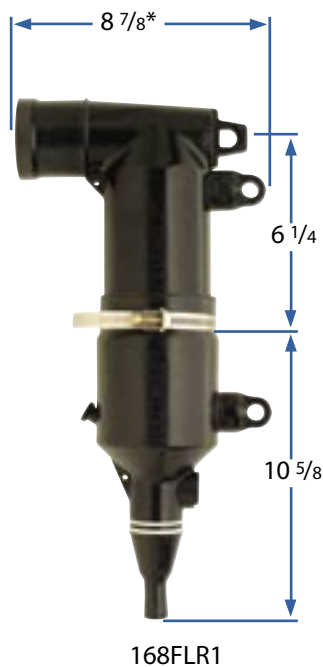
HOUSING	
1	Small*
3	Large**

Conductor Size		
Stranded / Comp.	Solid / Compact	Size (AWG)
0220	0210	2
0230	0220	1
0240	0230	1/0
0250	0240	2/0
0260	0250	3/0
0270	0260	4/0

Cable Insulation Diameter (in.)	
A	0.575 - 0.740
B	0.635 - 0.905
C	0.805 - 1.060
D	0.890 - 1.220

* Small Housing is used with 8.3 and 15.5kV rated fuses

** Large Housing is used with 17.2kV rated fuses



All dimensions rounded up to the nearest eighth inch.

Also available with direct access port.

* 10 1/4, ** 10 5/8 for access port



FUSED LOADBREAK ELBOW

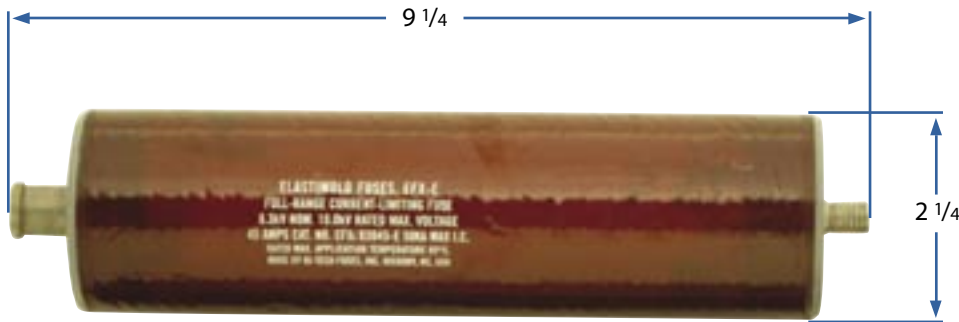
ORDERING INFORMATION FOR THE FULL-RANGE CURRENT-LIMITING FUSE

EFX YYY AAA - E

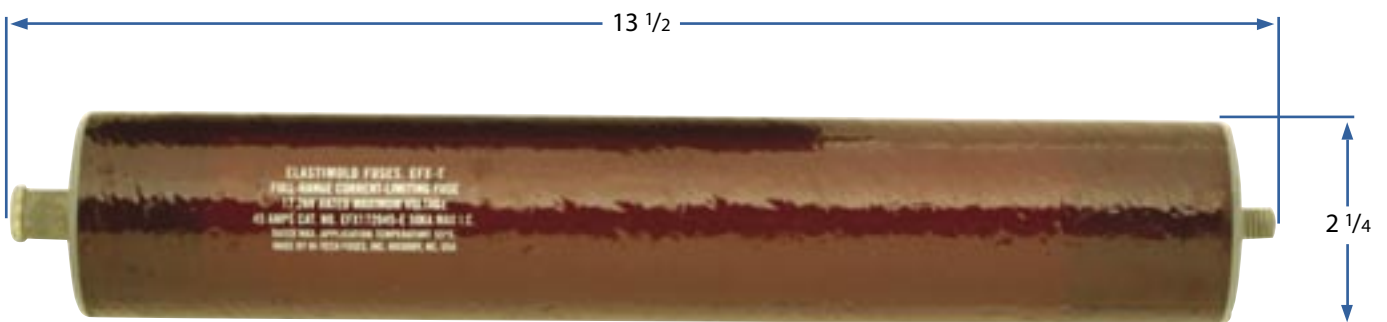
Voltage Rating	
083	8.3kV
155	15.5kV
172	17.2kV

Amperage Rating (A)*	
006	6
008	8
010	10
012	12
018	18
020	20
025	25
030	30
040	40
045	45

* 8.3 / 17.2kV rated fuses are available in all Amp ratings listed
15.5kV fuse sizes are available between 6-20 Amp



8.3/15.5 kV Fuse



17.2 kV Fuse

All dimensions rounded up to the nearest eighth inch.



MOLDED CURRENT-LIMITING FUSE

Molded Current-Limiting Fuses provide full-range fault current protection using specially designed fuse elements, rated through 23kV line to ground and 50kA interrupting current.

Construction is modular with a center replaceable fuse section and interchangeable end fittings for elbow connection or direct attachment to equipment mounted bushings. The various end fittings allow fuses to be applied throughout the system including switchgear, junctions, transformers, cable runs and taps.

Elastimold Molded Current-Limiting Fuses are available in:

- 80 thru 180 Amp ratings for applications on 5kV systems
- 6 thru 115 Amp ratings for applications on 8.7/15kV grounded Wye systems (see table 1)
- 6 thru 100 Amp ratings for applications on 15/25kV grounded Wye systems (see table 1)
- 6 thru 50 Amp ratings for applications on 20/35kV grounded Wye systems



FEATURE	BENEFIT / DESCRIPTION
<ul style="list-style-type: none"> ■ EPDM Molded Rubber Deadfront Construction 	<ul style="list-style-type: none"> ■ Fully sealed and submersible ■ Light weight ■ Insulate, shield and eliminate exposed live parts
<ul style="list-style-type: none"> ■ Specially designed fuse elements with built-in low and high current interrupting capability 	<ul style="list-style-type: none"> ■ Full-Range fault current protection through 50kA
<ul style="list-style-type: none"> ■ Current-limiting protection. Fault clearing occurs in less than one half cycle 	<ul style="list-style-type: none"> ■ Limits the system available fault current and dramatically reduces stresses on equipment
<ul style="list-style-type: none"> ■ Modular construction with a center replaceable fuse section and interchangeable end fittings 	<ul style="list-style-type: none"> ■ Allow elbow connection or direct attachment to equipment mounted bushings ■ Flexibility of installation on junctions, transformers, cable runs, taps
<ul style="list-style-type: none"> ■ Compact 	<ul style="list-style-type: none"> ■ Suitable for padmount, subsurface or vault installations
<ul style="list-style-type: none"> ■ 304 stainless steel brackets and hold down straps available 	<ul style="list-style-type: none"> ■ Accommodate a wide variety of mounting arrangements

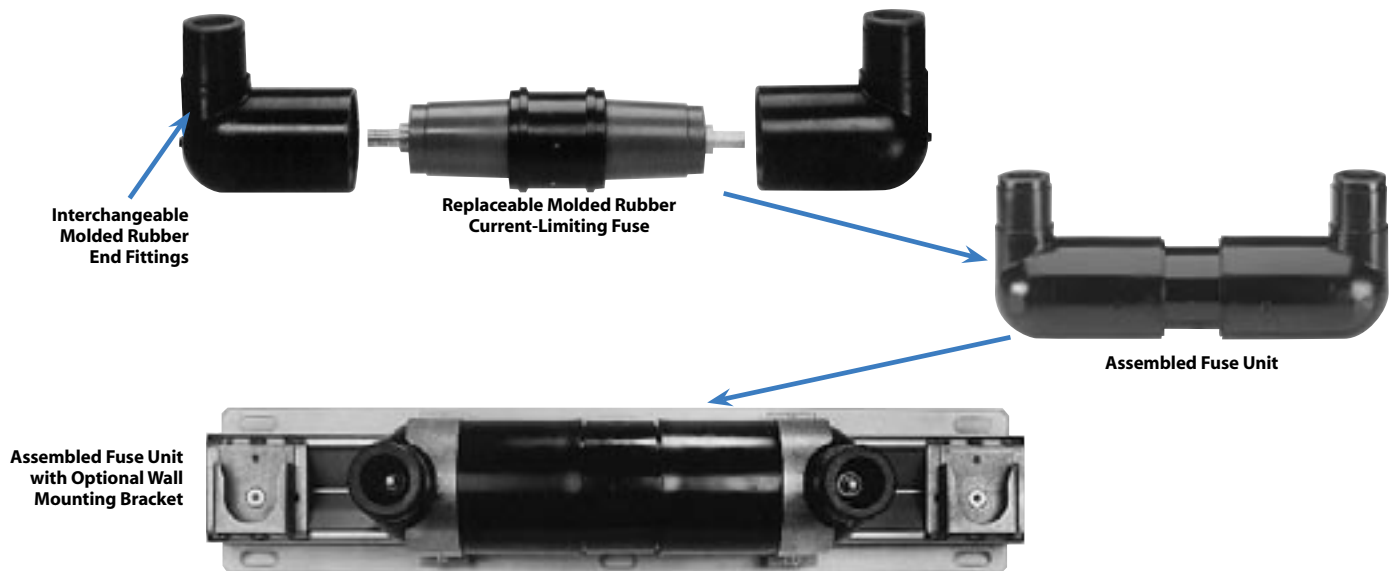


MOLDED CURRENT-LIMITING FUSE

CERTIFIED TESTS & PERFORMANCE

Elastimold Molded Current-Limiting Fuses have been designed and tested per applicable portions of IEEE, ANSI, NEMA and other industry standards including:

- ANSI C37.40 Standard for Current-Limiting Fuse Service Conditions.
- ANSI C37.41 Standard for Current-Limiting Fuse Design and Testing.
- ANSI C37.47 Standard for Current-Limiting Fuse Ratings and Specifications.
- ANSI/IEEE 386 Standard for Separable Connectors & Bushing Interfaces.



RATINGS				
System Voltage Class (kV)	5	15	25/28	35
Rated Maximum Fuse Voltage (kV)	5.5	10*	17.2*	23
Frequency (Hz)	50/60	50/60	50/60	50/60
BIL Impulse Withstand (kV)	60	95	125/140	150
One Minute AC Withstand (kV)	34	34	40/45	50
Fifteen Minute DC Withstand (kV)	53	53	78	103
Corona Extinction (kV)	11	11	19/21.5	26
Symmetrical Interrupting Capability (Amp)	50,000	50,000	50,000	50,000
Current Rating (Amp)	80-180	6-115	6-100	6-50

APPLICATION INFORMATION

Construction: Submersible, non-venting, deadfront, corrosion resistant.
 Ambient Temperature Range: -30 to +65 degrees centigrade for 6-50 Amp fuses;
 -30 to +40 degrees centigrade for >50 Amp fuses.
 * These maximum design voltages apply to fuses rated between 6-50 Amp; for fuses with higher amperage rating the maximum design voltage is 8.3 kV for 15 kV systems and 15.5 kV for 25/28 kV systems.



MOLDED Current-limiting FUSE

FUSE ORDERING INFORMATION

To completely specify and order a Molded Current-Limiting Fuse:

1. Select the Fuse Catalog Number from Table 1 based on the amperage and system voltage class. This table is also used to order spare or replacement fuses.
2. From Table 2 select a Model Number based on the required fuse end fittings. If end fittings are to be ordered and shipped separately from the fuse, use Table 4.
3. Select Mounting Options (if required) from Table 3.

Example:

To order a fuse for application in a 25kV system, rated 50 Amp with factory assembled 200 Amp Deepwell end fittings and no mounting provision, specify:

Catalog No. M25CLF50-22
Mounting Provision (See Table 3)

TABLE 1 – FUSE CATALOG NUMBERS

Ampere Rating	5kV Catalog No.	8.7/15kV GRD-Y* Catalog No.	15/25kV GRD-Y† Catalog No.	20/35kV GRD-Y Catalog No.
10	–	M15CLF010	M25CLF010	M35CLF010
20	–	M15CLF020	M25CLF020	M35CLF020
30	–	M15CLF030	M25CLF030	M35CLF030
40	–	M15CLF040	M25CLF040	M35CLF040
50	–	M15CLF050	M25CLF050	M35CLF050
65	–	M15CLF065	M25CLF065	–
80	M05CLF080	M15CLF080	M25CLF080	–
100	M05CLF100	M15CLF100	M25CLF100	–
125	M05CLF125	M15CLF115	–	–
150	M05CLF150	–	–	–
185	M05CLF180	–	–	–

Note: Fuses rated 6, 8, 12, 18 and 25 Amps are also available by special request. Contact Factory for additional information.
 Grounded Y systems must have enough grounded load to prevent the recovery voltage from exceeding the fuse's maximum voltage.
 * For 65 Amp and higher, the fuses have a rated maximum voltage of 8.3 kV
 † For 65 Amp and higher, the fuses have a rated maximum voltage of 15.5 kV

TABLE 2 – FUSE END FITTING ARRANGEMENTS

Outline	Model Number	Description
	22	200 Amp Deepwell on both ends.



MOLDED Current-limiting FUSE

TABLE 2 – FUSE END FITTING ARRANGEMENTS (Cont'd)

Outline	Model Number	Description
	222	200 Amp Deepwell on one end and two 200 Amp Deepwells on the other end
	2222	Two 200 Amp Deepwells on both ends.
	66	600 Amp Bushings on both ends.
	6E2	600 Amp Elbow Connector for attachment to equipment mounted 600 Amp Bushing on one end and a 200 Amp Deepwell on the other end. This arrangement is not available at 20/35 kV
	6E6	600 Amp Elbow Connector for attachment to equipment mounted 600 Amp Bushing on one end and a 600 Amp Bushing on the other end. This arrangement is not available at 20/35 kV

Note: Other models are available such as 26.



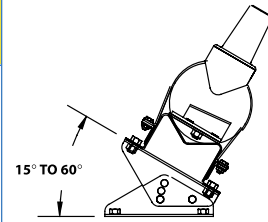
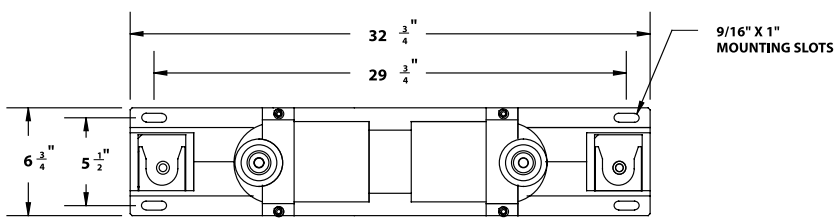
MOLDED CURRENT-LIMITING FUSE

TABLE 3 – FUSE MOUNTING OPTIONS

Option Number	Description
HDS	Bolted Style Hold Down Strap (Qty: 1 required per end fitting)
QRS	Quick Release Style Hold Down Strap (Qty: 1 required per end fitting)
WMB	Wall Mounting Bracket with Parking Stands and Bolted Style Hold Down Straps (HDS)
WMBQ	Wall Mounting Bracket with Parking Stands and Quick Release Style Hold Down Straps (QRS)
SMB	Support Mounting Bracket for use with Models 6E2 or 6E6 end fitting arrangements. Includes Bolted Style Hold Down Strap (HDS).
TMA-EM	Tilt Mounting Adapter. Bolts to bottom of Wall Mounting Bracket WMB or WMBQ to allow up to 60° angle mounting. (Qty 2 required per installation)

Note: The Option number should be added as a suffix to the MCLF catalog number.

OPTIONAL MOUNTING BRACKET WITH ADJUSTABLE PARKING STANDS FOR VERTICAL MOUNTING AND FUSE HOLD DOWN STRAPS
Approx. Weight 8 lbs.



OPTIONAL UNIVERSAL MOUNTING TILT ADAPTERS

TABLE 4 – END FITTING CATALOG NUMBERS

Use this table only if end fittings are to be ordered and shipped separately from the fuse.
Use Table 2 for assembled units.

Catalog Number	Description	System Voltage Class	IEEE 386-1995 Interface Reference
EF2	200 Amp Deepwell End Fitting (kV)	5, 15, 25 & 35	Figure 3
EF22	Double 200 Amp Deepwell End Fitting (kV)	5, 15, 25 & 35	Figure 3
EF6	600 Amp Bushing End Fitting (kV)	5, 15, 25 & 35	Figure 11
EF6E	600 Amp Elbow Connector End Fitting (kV)	5, 15 & 25	Figure 11

Note: EF6E is equipped with a standard thru hole spade lug (Type 03700).



MOLDED CURRENT-LIMITING FUSE

OTHER OPTIONS

Catalog Number	Description
<p>MCLF-ADT (Assembly/Disassembly Tool)</p>	<p>Hex Wrench for set screw removal and replacement when disassembling end fittings. Supplied as standard with replacement fuses.</p>

ELECTRICAL CHARACTERISTICS OF ENCAPSULATED FUSES USED IN MCLF

Nominal Fuse Voltage Rating (kV)	Current Rating (A)	Fuse Model Number	Rated Maximum Voltage (kV)	Maximum Continuous Current		Peak Arc Voltage (kV) (3)	Minimum Melt I ² t (AMP ² -SEC)	Maximum Total I ² t (2) (AMP ² -SEC)
				25° C	40°C			
				5.5	80			
	100	M05CLF100	5.5	108	105	15.0	56,700	280,000
	125	M05CLF125	5.5	137	133	15.0	109,200	530,000
	150	M05CLF150	5.5	159	154	15.0	176,000	860,000
	180	M05CLF180	5.5	185	180	15.0	259,000	1,270,000
8.3	10	M15CLF010	10.0	14	13	28	800	4,000
	20	M15CLF020	10.0	23	22	26	1,620	11,000
	30	M15CLF030	10.0	35	33	26	5,250	30,000
	40	M15CLF040	10.0	43	41	26	8,700	50,000
	50	M15CLF050	10.0	50	47	26	12,800	70,000
	65	M15CLF065	8.3	73.0	71.0	25	25,200	100,000
	80	M15CLF080	8.3	87.0	84.0	25	47,000	185,000
	100	M15CLF100	8.3	106.0	103.0	25	78,300	330,000
15.5	115	M15CLF115	8.3	120.0	116.0	25	115,150	480,000
	10	M25CLF010	17.2	14	13	46	800	3,700
	20	M25CLF020	17.2	23	22	45	1,620	10,000
	30	M25CLF030	17.2	35	33	45	5,250	30,000
	40	M25CLF040	17.2	43	41	45	8,700	50,000
	50	M25CLF050	17.2	47	45	45	12,800	70,000
	65	M25CLF065	15.5	68.0	66.0	40	25,200	110,000
	80	M25CLF080	15.5	88.0	85.0	40	54,400	255,000
23.0	100	M25CLF100	15.5	100.0	100.0	40	80,000	380,000
	10	M35CLF010	23.0	14	13	61	800	4,800
	20	M35CLF020	23.0	23	22	60	1,620	13,000
	30	M35CLF030	23.0	35	33	60	5,250	38,000
	40	M35CLF040	23.0	41	40	60	8,700	61,000
	50	M35CLF050	23.0	47	46	60	12,800	82,000

Notes:

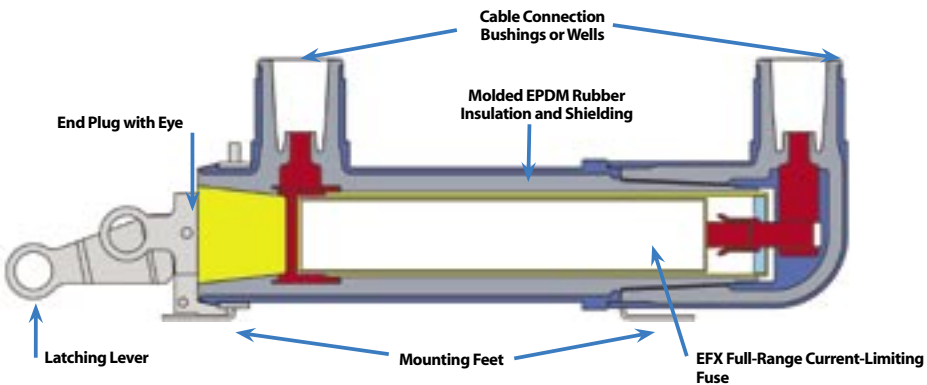
1. Designs have a 50,000 Amps rms. Symmetrical Rating.
2. Maximum total I²t values are reduced for currents below 50,00A. For example, at 10,000A, I²t values are approximately 15% less than the published values.
3. Peak arc voltages quoted are for 50,000A currents at the rated maximum voltage listed. Reduced currents and voltages will reduce the peak arc voltage. Consult the factory for further information.



MOLDED FUSE CANISTER

The **MCAN Molded Fuse Canister** is a compact, lightweight EPDM Molded Rubber Fuse Enclosure Package. MCAN fuse canisters are maintenance-free, completely sealed and submersible. Designs are deadfront using molded rubber to insulate, shield and eliminate exposed live parts. Units are ideally suited for padmount, subsurface or vault applications, for systems through 25kV. MCAN uses Elastimold EFX full-range current-limiting fuses capable of interrupting up to 50kA.

The **MCAN Molded Fuse Canister** will accommodate and has been thoroughly tested with Elastimold EFX and Hi-Tech Trans-Guard FX fuses. Please contact Elastimold for other non-gassing, current-limiting fuses that have been qualified by Elastimold for use in the MCAN Canister.



FEATURE

- EPDM Molded Rubber Deadfront Construction
- Compact
- Modular construction
- Various end fittings and bushings
- Replaceable fuse section
- Current-limiting protection. Fault clearing occurs in less than one half cycle
- 304 series stainless steel mounting brackets, and wall mounted parking stands available

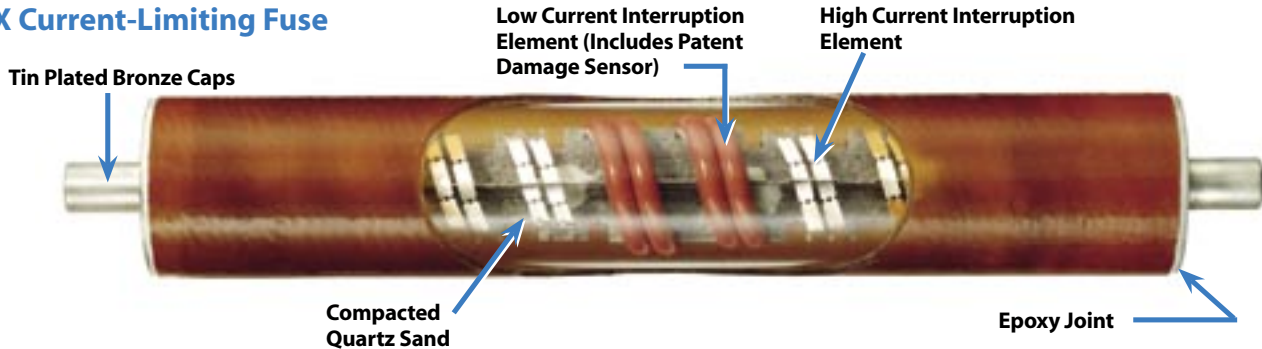
BENEFIT / DESCRIPTION

- Fully sealed and submersible
- Insulate, shield and eliminate exposed live parts
- Suitable for padmount, subsurface or vault installations
- Allow elbow connection or direct attachment to equipment mounted bushings
- Neon voltage indicators (V2) attached to elbow test points, allow quick and convenient blown fuse indication
- Flexibility of installation on switchgear, junctions, transformers, cable runs, taps
- Ease of fuse replacement without full removal from installation
- Limits the system available fault current and dramatically reduces stresses on equipment
- Accommodate a wide variety of mounting arrangements



MOLDED FUSE CANISTER

EFX Current-Limiting Fuse



Elastimold EFX Current-Limiting Fuses are available in:

- 3 thru 50* Amp, 8.3kV
- 3 thru 50* Amp, 15.5kV
- 6 thru 50* Amp, 23.0kV

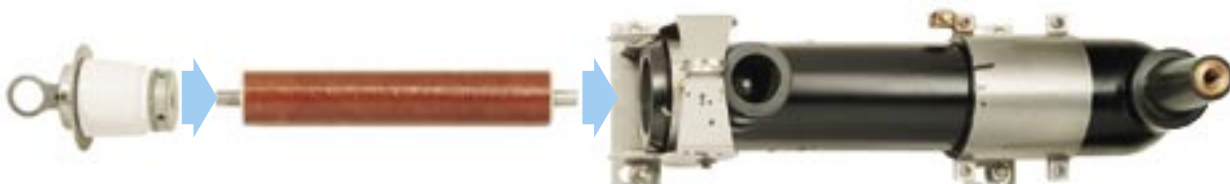
EFX Fuses provide the benefits of current-limiting protection with fault clearing occurring in less than one half cycle, thereby limiting the let-through fault current and dramatically reducing stresses on equipment. The EFX full-range current-limiting fuse provides both overload and fault current protection for distribution equipment in a single fuse body. As a full-range fuse, it is capable of interrupting any continuous current between the minimum current that can cause melting of the elements and its rated maximum interrupting current (50,000 amps).

The fuses are capable of interrupting in elevated ambient temperature, which is 140° C for the 2.25" fuse. The recommended rated maximum application temperature (RMAT) for the MCAN molded fuse canister is 65° C. The EFX fuse is hermetically sealed and thus discharges no gasses during fuse operation.

EFX Fuse design features include:

- Patented Damage Sensor® designed to significantly reduce the risk of fuse failure should the fuse be subject to an element damaging current surge.
- Hermetically sealed construction ensures that no gasses escape from the fuse during current interruption. All EFX fuses are helium mass spectrometer leak tested to ensure sealing system integrity.
- Rugged machined brass end caps used for greater ferrule strength resulting in less distortion and more secure fuse attachment in dry-well canisters.

*** Rating may be reduced when used in a canister. Damage Sensor is patented technology of Hi-Tech Fuses, Inc.**



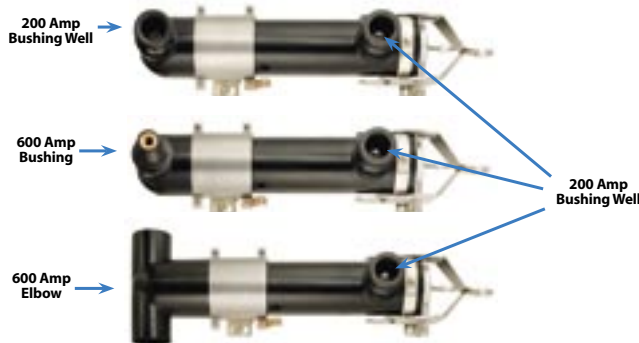


MOLDED FUSE CANISTER

CERTIFIED TESTS & PERFORMANCE

Elastimold Molded Fuse Canisters and EFX fuses have been designed and tested per applicable portions of IEEE, ANSI, NEMA and other industry standards including:

- ANSI C37.40 Standard for Current-Limiting Fuse Service Conditions.
- ANSI C37.41 Standard for Current-Limiting Fuse Design & Testing.
- ANSI C37.47 Standard for Current-Limiting Fuse Ratings & Specifications.
- ANSI/IEEE 386 Standard for Separable Connectors & Bushing Interfaces.



FUSE CANISTER RATINGS

System Voltage Class (kV)	15	25/28	35
Maximum Line to Ground Voltage (kV)	10.0	17.2	23
Frequency (Hz)	50/60	50/60	50/60
BIL Impulse Withstand (kV)	95	125/140	150
One Minute AC Withstand (kV)	34	40/45	50
Fifteen Minute DC Withstand (kV)	53	78	103
Corona Extinction (kV)	11	19/21.5	26
Maximum Continuous Current (Amps)	200*	200*	200*
Momentary Current (kA)	10*	10*	10*

Construction: Submersible, corrosion resistant, fully shielded

Ambient Temperature Range: -30 to 65° C

FUSE RATINGS

Nominal Voltage Rating (kV)	8.3	15.5	23.0
Rated Maximum Voltage (kV)	10.0	17.2	23.0
Frequency (Hz)	50/60	50/60	50/60
Current Rating (Amp)	3-50+	3-50+	6-50+
Rated Maximum Interrupting Current (Sym. Amperes)	50,000	50,000++	50,000

Ambient Temperature Range: -30 to 140° C for the 2.25" diameter fuse

* Without Fuse ++3 amp fuse was tested @ 44kA

ORDERING INFORMATION

To specify and order an EFX fuse and an MCAN fuse canister:

1. Select the Fuse Catalog Number from Table 5 based on the amperage and "Rated Max Voltage (kV)" column. Note the fuses current carrying ability is reduced when used in a canister.
2. Based on selected fuse, select canister from the "Minimum Canister Required" column of Table 5. See Table 6 for additional MCAN Fuse Canister information including required bushing or elbow connecting interface. (Make sure that the Canister Mounting Code and Diameter Code match the Fuse Mounting Code and Diameter Code).
3. Select Options and accessories (if required) from Table 7.

Example:

To order a 15.5kV, 50 Amp fuse, a fuse canister for this fuse with 200 Amp bushing well and no options or accessories specify: **Catalog No. EFX155050 and MCAN-5B25-22.**

MCAN FUSE CODING SYSTEM

Mounting Code	Max. Fuse Overall Length	Diameter Code	Max. Fuse Overall Diameter
4	10.11"	B	2.25"
5	14.69"	B	2.25"
6	17.51"	B	2.25"

Note: Lower Mounting Codes (shorter) fuses may be applied in canisters of higher Mounting Codes by using an adapter. See Mounting Code Adapters table 7.

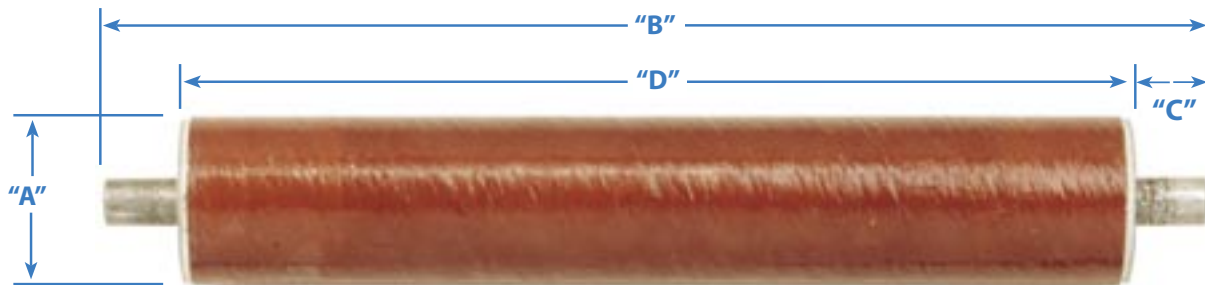


MOLDED FUSE CANISTER

TABLE 5 – EFX FUSE ORDERING INFORMATION, WEIGHTS AND DIMENSIONS

Current Rating (Amps)	Nominal Fuse Voltage Rating (kV)	Fuse Catalog Number	Rated Max Voltage (kV)	Mtg. Code	Dia. Code	Overall Dia. (A)	Overall Length (B)	Contact Length (C)	Body Length (D)	Minimum Canister Required	Fuse Wt. (lbs)
3	8.3	EFX083003	10.0	4	B	2.25	10.00	1.02	7.96	MCAN-4B15-22 MCAN-4B15-66 MCAN-4B15-6E2 MCAN-4B15-6E6	3.00
6		EFX083006									
8		EFX083008									
10		EFX083010									
12		EFX083012									
18		EFX083018									
20		EFX083020									
25		EFX083025									
30		EFX083030									
40		EFX083040									
50	EFX083050										
3	15.5	EFX155003	17.2	5	B	2.25	14.31	1.02	12.27	MCAN-5B25-22 MCAN-5B25-66 MCAN-5B25-6E2 MCAN-5B25-6E6	4.25
6		EFX155006									
8		EFX155008									
10		EFX155010									
12		EFX155012									
18		EFX155018									
20		EFX155020									
25		EFX155025									
30		EFX155030									
40		EFX155040									
50	EFX155050										
6	23.0	EFX230006	23.0	6	B	2.25	17.12	1.02	15.09	MCAN-6B25-66	4.75
8		EFX230008									
10		EFX230010									
12		EFX230012									
18		EFX230018									
20		EFX230020									
25		EFX230025									
30		EFX230030									
40		EFX230040									
50		EFX230050									

All dimensions are in inches
For 5kV systems, use the 8.3 kV rated fuses





MOLDED FUSE CANISTER

TABLE 6 – WEIGHTS (LBS.) AND DIMENSIONS (IN.)

FIGURE	CATALOG NUMBER	(A)	(B)	(C)	Approx. Weight (lbs)	End Bushing*	Main Bushing*
	MCAN-4B15-22	21.49	10.06	10.91	19	200 Amp Bushing Well	200 Amp Bushing Well
	MCAN-5B25-22	25.80	14.37	15.22	21		
	MCAN-6B25-22	28.68	17.25	18.10	22		
	MCAN-4B15-66	21.49	10.06	10.91	21	600 Amp Bushing	600 Amp Bushing
	MCAN-5B25-66	25.80	14.37	15.22	23		
	MCAN-6B25-66	28.68	17.25	18.10	24		

* Other bushing combinations including - 26 and 62 are also available.



MOLDED FUSE CANISTER

TABLE 6 – WEIGHTS (LBS.) AND DIMENSIONS (IN.)

FIGURE	CATALOG NUMBER	(A)	(B)	(C)	Approx. Weight (lbs)	End Bushing*	Main Bushing*
	MCAN-4B15-6E2	23.90	10.06	12.91	20	600 Amp Elbow Connector	200 Amp Bushing Well
	MCAN-5B25-6E2	28.21	14.37	17.22	22		
	MCAN-6B25-6E2	31.08	17.25	20.09	23		
	MCAN-4B15-6E6	23.90	10.06	12.91	20	600 Amp Elbow Connector	600 Amp Bushing
	MCAN-5B25-6E6	28.21	14.37	17.22	22		
	MCAN-6B25-6E6	31.08	17.25	20.09	23		

* Other bushing combinations including - 26 and 62 are also available.



MOLDED FUSE CANISTER

TABLE 7 – MCAN MOLDED FUSE CANISTER OPTIONS AND ACCESSORIES

Voltage Indicators

Neon voltage indicators mounted to the test point provision on the MCAN elbow connectors provide quick and convenient indication of an energized circuit. The voltage indicator will illuminate with a flashing neon light when the elbow connector is energized. If the fuse opens/clears the neon lights on the load side elbows will stop flashing, indicating that the fuse has blown. Refer to operation instructions for additional detail.



Catalog Number	Description
V2	Capacitive Test Point, Voltage Indicator

Mounting Code Adapters

A mounting code adapter is used to extend the fuse end cap ferrule so that a shorter fuse may be used in a longer code canister. Example: A code 4B size fuse can be used in a code 5B Canister with an MCAN-4-5 adapter.



Catalog Number	Description
MCAN-4-5	Code 4B size fuse to a code 5B Canister
MCAN-4-6	Code 4B size fuse to code 6B Canister
MCAN-5-6	Code 5B size fuse to a code 6B Canister

Parking Stands

Parking stands can be mounted adjacent to MCAN Fuse Canister allowing attachment of additional accessories to ground, isolate and test the elbow cable connectors.



160WMPS

Suffix Number	Description
-PS	Parking Stand between bushings

Catalog Number	Description
160WMPS	Wall Mount Parking Stand

Switchgear Assemblies

Elastimold multi-point junctions shown in catalog C-MPJ can be utilized to create custom switchgear lineups consisting of MVS switches, MVI fault interrupters, MCLF current-limiting fuses, MCAN fuse canisters, fused elbows, elbow arresters and other molded products. The junction allows easy assembly and interconnection of components into fully shielded, submersible, compact arrangements.





MOLDED FUSE CANISTER

Table-10 Electrical Characteristics of Elastimold EFX Fuses

Nominal Fuse Voltage Rating (kV)	Current Rating (A)	Fuse Model Number	Rated Maximum Voltage (kV)	Maximum Continuous Current (In Air) (6)			Maximum Continuous Current (In MCAN) (6)			Peak Arc Voltage (kV) (5)	Minimum Melt I ² T (Amp ² Sec)	Maximum Total I ² T (3) (4) (Amp ² Sec)
				25°C	40°C	65°C	25°C	40°C	65°C			
				8.3	3	EFX083003	10.0	5.0	4.9			
	6	EFX083006	11.0	10.5	10.0	9.5		9.0	8.5	32	620	2,700
	8	EFX083008	13.5	13.0	12.5	11.5		11.0	10.5	28	800	4,000
	10	EFX083010	16.0	15.5	15.0	13.5		13.0	12.5	28	800	4,000
	12	EFX083012	20.5	19.5	19.0	17.5		17.0	16.0	26	920	8,000
	18	EFX083018	23.5	22.5	21.5	19.5		19.0	18.0	26	1,310	9,500
	20	EFX083020	27.5	26.5	25.0	24.0		23.0	21.5	26	1,620	11,000
	25	EFX083025	37.0	35.5	34.0	29.5		28.5	27.0	26	3,660	22,000
	30	EFX083030	41.0	39.5	38.0	34.0		33.0	31.0	26	5,250	30,000
	40	EFX083040	50.0	48.5	46.0	40.0		39.0	36.5	26	8,700	50,000
	50	EFX083050	57.0	55.0	52.5	45.5	44.0	42.0	26	12,800	70,000	
15.5	3	EFX155003	17.2	5.0	4.9	4.6	4.3	4.2	3.9	51	100	510
	6	EFX155006		11.0	10.5	10.0	9.5	9.0	8.5	54	620	2,600
	8	EFX155008		13.5	13.0	12.5	11.5	11.0	10.5	46	800	3,700
	10	EFX155010		16.0	15.5	15.0	13.5	13.0	12.5	46	800	3,700
	12	EFX155012		20.5	19.5	19.0	17.5	17.0	16.0	43	920	6,500
	18	EFX155018		23.5	22.5	21.5	19.5	19.0	18.0	45	1,310	8,000
	20	EFX155020		27.5	26.5	25.0	24.0	23.0	21.5	45	1,620	10,000
	25	EFX155025		37.0	35.5	34.0	29.5	28.5	27.0	45	3,660	22,000
	30	EFX155030		41.0	39.5	38.0	34.0	33.0	31.0	45	5,250	30,000
	40	EFX155040		50.0	48.5	46.0	40.0	39.0	36.5	45	8,700	50,000
	50	EFX155050	53.0	51.5	49.0	44.5	43.0	40.0	45	12,800	70,000	
23.0	6	EFX230006	23.0	11.0	10.5	10.0	9.5	9.0	8.5	67	620	3,100
	8	EFX230008		13.5	13.0	12.5	11.5	11.0	10.5	61	800	4,800
	10	EFX230010		16.0	15.5	15.0	13.5	13.0	12.5	61	800	4,800
	12	EFX230012		20.5	19.5	19.0	17.5	17.0	16.0	60	920	8,300
	18	EFX230018		23.5	22.5	21.5	19.5	19.0	18.0	60	1,310	11,200
	20	EFX230020		27.5	26.5	25.0	24.0	23.0	21.5	60	1,620	13,000
	25	EFX230025		37.0	35.5	34.0	29.5	28.5	27.0	60	3,660	28,000
	30	EFX230030		41.0	39.5	38.0	34.0	33.0	31.0	60	5,250	38,000
	40	EFX230040		48.0	46.5	44.0	38.5	37.0	35.0	60	8,700	61,000
	50	EFX230050		55.0	53.0	50.5	44.5	43.0	40.0	60	12,800	82,000

Notes:

1. Designs have a 50,000 Amps rms. Symmetrical Rating (except 3A 17.2 kV which was tested at 44 kA maximum).
2. Tabulated Maximum Total I²t values are for currents of 50,000 amperes at the nominal voltage of the fuse. Fuses that have a Rated Maximum Voltage higher than their Nominal Voltage Rating will have a higher I²t let-through when applied at voltages up to these higher values. For example, Maximum Total I²t values are increased by approximately 30% when 8.3 kV fuses are applied at 10 kV and approximately 25% when 15.5 kV fuses are used at 17.2 kV.
3. Maximum total I²t values are reduced for currents below 50,000 A. For example, at 10,000 A, maximum total I²t values are approximately 15% less than the published values.
4. Peak arc voltages quoted are for 50,000 A currents at the rated maximum voltage listed. Reduced currents and voltages will reduce the peak arc voltage. Consult the factory for further information.
5. Maximum continuous currents at higher ambient temperatures may be determined by derating the fuses by 0.2% per degree C over 25°C. For example: At 65°C the derating would be 40 x .2 = 8%, making the maximum continuous current of a 30 A fuse 41 x .92 = 38 A (in air) or 34 x .92 = 31 (in MCAN).
6. Reduction in the long time melting current of the fuses (approximately one hour and longer) due to higher ambient temperatures is the same as described above "Maximum continuous currents..." See time-current characteristics for melting characteristics in this time region.



MOLDED FUSE CANISTER

Application Tables

TABLE 9- Recommended EFX Mounted in a MCAN EPDM Rubber Insulated Dry Well Canister at 40° C Ambient Temperature

Fuse Voltage 1-Phase Transformer KVA	Recommended Fuse Current Ratings (Amperes)																	
	8.3kV										15.5kV						23kV	
	Transformer 1-Phase Voltage Rating (kV) Phase-to-Ground																	
	2.4		4.16		4.8		7.2		7.62		12		14.4		16		19.9	
A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	
10		6		6a		3		3a		3a		3a		3a		3a		6a
15		10		6		6a		3		3		3a		3a		3a		6a
25	12	20	8	10		8		6		6		3		3		3		6a
37.5	20	30	12	18		12		8		8		6a		6a		6a		6a
50	25	50	18	25	12	20	10	12		10		6		6		6a		6a
75	50		25	40	20	30	12	20	12	20		10		8		8		6
100			30		25	50	18	25	18	25		12	10	12		10		8
167							30		30	50	18	25	18	25	12	20		12
250									50		25	50	25	40	20	30	18	25
333											50		30		25	50	20	30
500														50		40		

Note: Column A = 140-200% of transformer rating and Column B = 200-300% of transformer rating

TABLE 10 - Recommended EFX Mounted in a MCAN EPDM Rubber Insulated Dry Well Canister at 40° C Ambient Temperature

Fuse Voltage 3-Phase Transformer KVA	Recommended Fuse Current Ratings (Amperes)																	
	8.3kV										15.5kV						23kV	
	Transformer 3-Phase Voltage Rating (kV) Phase-to-Phase																	
	2.4		4.16		4.8		7.2-7.96		8.32		12.47		13.2-14.4		20.8		22.9-24.9b	
A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	
15		6		3		3		3a		3a		3a		3a		6a		6a
22.5		8		6a		6a		3		3		3a		3a		6a		6a
30	10	12		6		6a		3		3a		3a		6a		6a		6a
45	12	20		10		8		6		6a		3		6a		6a		6a
75	25	40	12	20	12	18		8		8		6		6a		6a		6a
100	30		18	25	18	25		12		10		8		6a		6a		6a
112.5	40		20	30	18	25	12	18		12		8		6a		6a		6a
150			25	50	25	40	18	25	12	18		10		6		6		6
200			40		30		20	30	18	25	12	18		8		8		8
225			50		40		25	40	20	30	12	20	12	20		10		8
300							30		25	50	18	25	18	25		12		12
500											30		30	50	18	25	18	25
750															25	50	25	40
1000															40		40	

Note: Column A = 140-200% of transformer rating and Column B = 200-300% of transformer rating

Notes for Tables 4 and 5:

Recommended fuses meet inrush criteria of 12 times transformer full load current for 0.1 second and 25 times transformer 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 transformer full load current for 10 seconds.

- a. Fuse allows greater than 300% of transformer rating.
- b. Recommendations limited to gndY-gndY transformers with no more than 50% delta connected secondary load. Phase-to-ground rated fuses are frequently recommended for gndY-gndY three phase transformers.

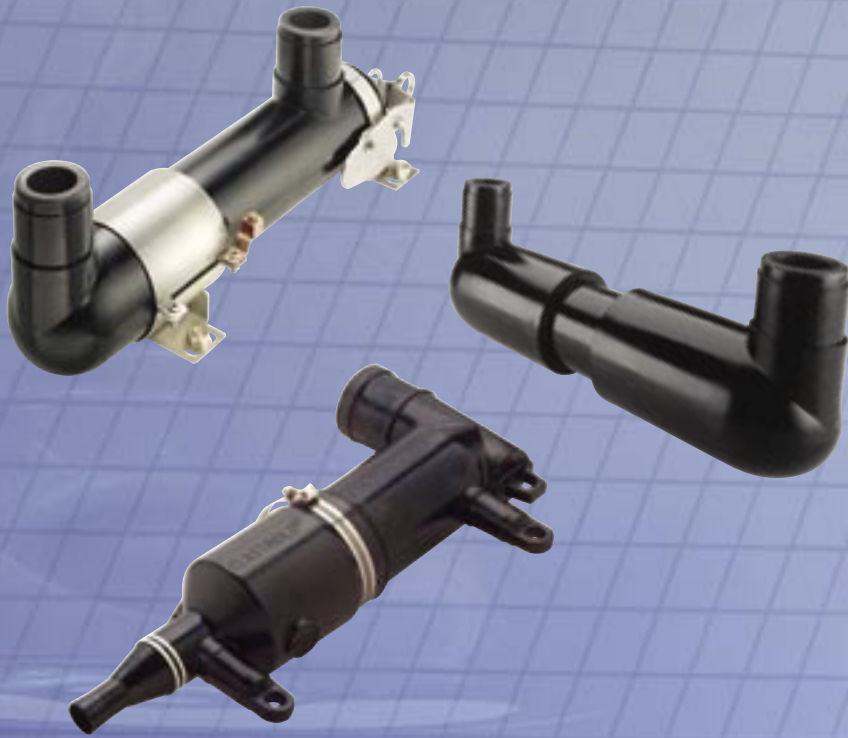


ELASTIMOLD



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FUSES



PROTECTION AND CONTROL

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