Product Application

Thomas & Betts' Elastimold® Fused

Products cover a wide range of applications and ratings. Molded Current-Limiting Fuses (MCLF), Molded Canister Fuses (MCAN), and Fused Elbows (FLR) provide full-range protection through 50 kA using Hi-TechTM full-range fuses. The fuses in these 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 padmount 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.

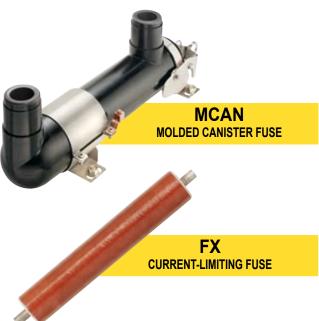
In this guide you will find a description and basic features for Elastimold® fused products, as well as information on how to order.

Hi-Tech™ 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. They also provide both overload and fault current protection for distribution equipment in a single fuse body. As full-range fuses, they are 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).

All fuses are capable of interrupting in elevated ambient temperature. Hi-Tech™ design features include:

 Patented Damage Sensor designed to significantly reduce the risk of fuse failure should the fuse be subjected to an element damaging current surge. (e.g. lightning)

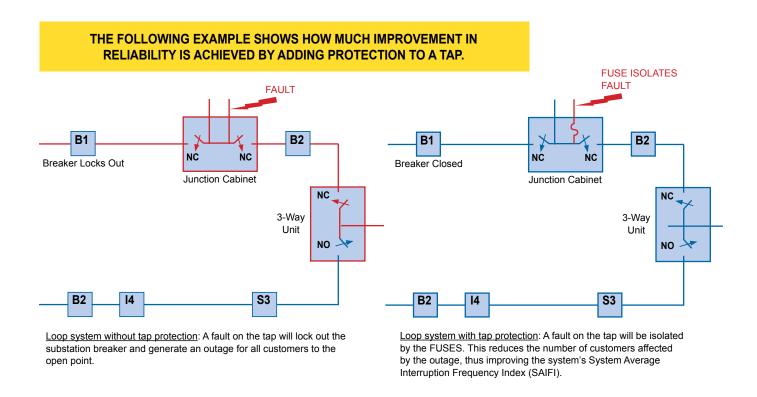




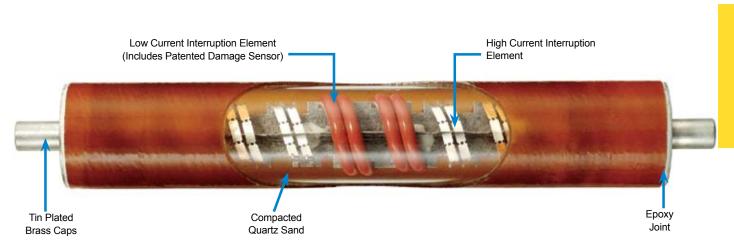
- Hermetically sealed construction ensures that no gasses escape from the fuse during current interruption. All fuses are helium mass spectrometer leak tested to ensure sealing system integrity.
- Rugged machined brass end caps used for greater ferrule strength resulting in less distortion and more secure fuse attachment.

Molded Fuse Products

Elastimold® FLR, MCAN, and MCLF fused products constitute some of the fastest and easiest ways to improve system reliability. As an example, loads that branch out along underground loops can be protected by installing any of these fuses into existing junction cabinets.



Full-Range Current-Limiting Fuse





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 direct test ports	Quick and convenient blown fuse indication
Full-range current-limiting fusing with 50kA interruptions Rated 5kV Ungrounded to 25kV Grounded Wye	Facilitates fusing of light duty underground distribution systems including sub-loops, radial taps, junctions, transformers, and other equipment
15/25kV hot stick operable, loadbreak elbow switch	hing

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)	3-80	6-20	3-45

APPLICATION INFORMATION

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

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

Fuses are only suitable for the system voltage class shown if the recovery voltage across the fuse will not exceed its rated maximum voltage. For threephase applications, this generally requires that protected transformers be gndygndy and have at least 50% grounded load.

* The 15.5kV L-G rated fuse requires 75% grounded load to be applied on a 25kV system. The 17.2kV L-G rated fuse requires at least 75% grounded load to be applied on a 28kV system.

Fuse replacement requires the elbow to be de-energized.

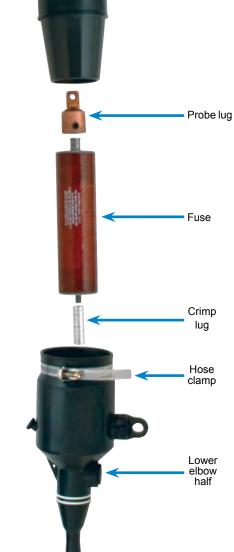


TABLE	31 – E	LECTRI	CAL CHARACTE	RISTICS O	F EFX-E	LBOW	FUSES			
System Voltage Class (kV)	Nominal Fuse Voltage Rating	Current Rating (Amps)	Fuse Catalog Number	Rated Maximum Voltage (kV)		Maximu Itinuous ((2) (6)	Current	Peak Arc Voltage (kV) (5)	Minimum Melt I ² t (AMP ² SEC)	Maximum Total I ² t (3) (4) (AMP ² SEC)
	(kV)			(***)	25°C	40°C	65°C		,	` '
		3	EFX083003-E		4.3	4.2	3.9	30	100	350
		6	EFX083006-E		9.5	9.0	8.5	32	620	2,700
		8	EFX083008-E		11.5	11.0	10.5	28	800	4,000
		10	EFX083010-E		14.0	13.5	13.0	28	800	4,000
		12	EFX083012-E		19.0	18.5	17.5	26	920	8,000
45	0.0	18	EFX083018-E	10.0	21.0	20.0	19.0	26	1,310	9,500
15	8.3	20	EFX083020-E		26.0	25.0	24.0	26	1,620	11,000
		25	EFX083025-E		34.0	33.0	31.0	26	3,660	22,000
		30	EFX083030-E		37.5	36.5	34.5	26	5,250	30,000
		40	EFX083040-E		43.0	42.0	40.0	26	8,700	50,000
	45 EFX083045-E		49.0	47.0	45.0	26	12,800	70,000		
		65	EFX083065-E	8.8	70.0	68.0	64.5	23	34,000	200,000
		80	EFX083080-E	0.0	80.0	77.5	73.5	22	51,200	280,000
		6	EFX155006-E		8.5	8.0	7.7	52	620	3,000
		8	EFX155008-E		10.5	10.0	9.5	40	800	4,300
25	15.5	10	EFX155010-E	15.5	13.0	12.5	12.0	40	800	4,300
		12	EFX155012-E		16.0	15.5	15.0	38	920	8,000
		18	EFX155018-E		20.0	19.5	18.5	38	1,620	13,000
		20	EFX155020-E		23.5	22.5	21.5	38	2,200	16,500
		3	EFX172003-E		4.3	4.2	3.9	51	100	510
		6	EFX172006-E		9.5	9.0	8.5	54	620	3,250
		8	EFX172008-E		11.5	11.0	10.5	46	800	4,600
		10	EFX172010-E		14.0	13.5	13.0	46	800	4,600
25/28	17.2	12	EFX172012-E	17.2	18.0	17.5	16.5	43	920	8,500
20/20		18	EFX172018-E		20.0	19.5	18.5	45	1,310	10,000
		20	EFX172020-E		24.0	23.0	22.0	45	1,620	12,500
		25			31.5	30.5	29.0	45	3,660	27,500
		30	EFX172030-E		35.5	34.5	32.5	45	5,250	37,500
		40	EFX172040-E		41.0	40.0	38.0	45	8,700	62,500
		45	EFX172045-E		46.0	45.0	42.5	45	12,800	87,500

NOTES:

- Designs have a 50,000 Amps rms. Symmetrical Rating (except 3A 17.2kV which was tested at 44kA maximum).
- 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).
- 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 3. 10kV are approximately 30% higher. Values for 17.2kV fuses at 15.5kV are approximately 20% lower.
- 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.
- 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.
- 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 25\AA fuse $31.5 \times .97 = 30.5\text{\AA}$.
- 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".

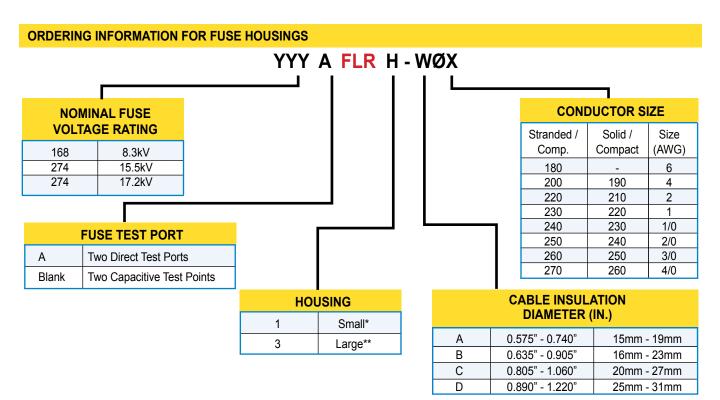
TABLE 32 –	ABLE 32 – RECOMMENDED EFX-E: ELBOW FUSE AT 40°C AMBIENT TEMPERATURE															
					ı	Recomn	nended	Fuse Cu	rrent Ra	atings (A	mperes)				
FuseVoltage					8.3	3kV							15.5kV	(17.2k\	/)	
1-Phase					Trans	former 1	-Phase	Voltage	Rating	(kV) Pha	se-to-G	round				
Transformer	2	.4	4.	16	4	.8	7	.2	7.62		12		14.4		1	6
kVA	Α	В	Α	В	Α	В	Α	В	Α	В	Α	В	Α	В	Α	В
10		6		6ª		3		3		3		6ª		6ª		(3) ^a
15		10		6		6ª		3		3		6ª		6ª		(3) ^a
25	12	20		8		8		6		6		6ª		6ª		(3)
37.5	20	25		12		12		8		8		6		6ª		(6) ^a
50	25	40	18	20	12	20	10	12		10		6		6		(6) ^a
75	45	65	20	30	20	25	12	20	12	18		10		8		(8)
100	65	80	30	45	25	40	18	25	18	25	12	18	10	12		(10)
167			65	80	45	65	25	45	25	45	18	(25)	18	20	(12)	(20)
250			80		80		45	65	45	65	(25)	(45)	20	(30)	(20)	(30)
333							65		80		(40)		(30)	(45)	(25)	(45)
500													(45)		(45)	

						Re	comme	nded F	use Cu	rrent R	atings	(Amper	es)					
FuseVoltage						8.3k	V							15.	.5kV (1	7.2kV)		
3-Phase					1	ransfo	rmer 3-	Phase	Voltage	Rating	j (kV) F	hase-to	o-Phas	е				
Transformer	2	.4	4.	16	4	.8	7.2-	7.96	8.	32	12	.47	13.2	-14.4	20	.8 ^b	22.9-	-24.9b
kVA	Α	В	Α	В	Α	В	Α	В	Α	В	Α	В	Α	В	Α	В	Α	В
15		6		3		3		3ª		3ª		6ª		6ª		6ª		(3)a
22.5		8		6ª		6ª		3		3		6ª		6ª		6ª		(3)a
30	10	12		6		6		6ª		3		6ª		6ª		6ª		(3)a
45	12	20		10		8		6		6ª		6ª		6ª		6ª		(3)a
75	20	30	12	20		12		8		8		6		6		6ª		(3)
100	30	45	18	25	18	20		12		10		8		8		6ª		(6)a
112.5	40	65	20	25	18	25		12		12		8		8		6		(6)a
150	45	80	25	40	20	30	18	20	12	20	10	12	10	12		6		(6)
200	65	80	40	65	30	45	20	25	18	25	12	18	12	18	8	10		(8)
225	80		45	65	40	65	20	30	20	25	12	20	12	18	8	10		(10)
300			65	80	45	80	30	45	25	40	18	(25)	18	(25)	12	18		(12)
500					80		65	80	45	80	(30)	(45)	(30)	(45)	18	(25)	(18)	(25)
750							80		80				(45)		(25)	(45)	(25)	(40)
1000															(40)		(40)	

NOTES FOR TABLES 32 AND 33:

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

- Ratings in parenthesis are 17.2kV fuses.
- 8.3kV 3-45A fuses and 15.5kV 6-20A fuses are used in the small elbow housing. 8.3kV 65-80A fuses and 17.2kV 3-45A fuses are used in the large elbow fuse housing.
- 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.
- Recommendations limited to gndY-gndY transformers with no more than 50% delta connected secondary load, and involve certain assumptions. Phase-to-ground rated fuses are frequently recommended for gndY-gndY three phase transformers.



^{*} Small Housing is used with 8.3kV (3-45Amp) and 15.5kV (6-20Amp) rated fuses

^{**} Large Housing is used with 8.3kV (65 and 80Amp) and 17.2kV (3-45Amp) rated fuses

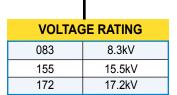




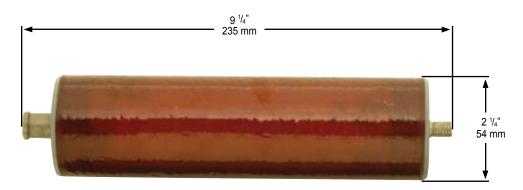


- · All dimensions rounded up to the nearest eighth inch.
- · Also available with direct test port.
- Dimensions for Direct Test Port units are * 10 ¹/₄ (260mm) or ** 10 ⁵/₈ (270mm)
- 168FLR3 uses a large housing with a 15kV, 200 Amp elbow interface

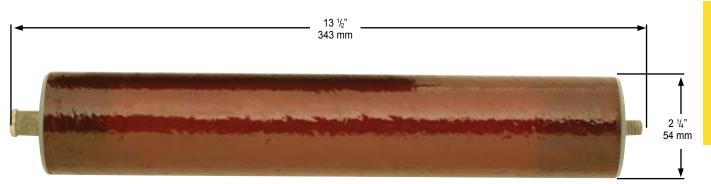
ORDERING INFORMATION FOR FULL-RANGE CURRENT-LIMITING FUSES **EFX YYY AAA - E**



Α	AMPERAGE RATING								
003	3 Amps	8.3 / 17.2kV							
006	6 Amps	8.3 / 15.5 / 17.2kV							
800	8 Amps	8.3 / 15.5 / 17.2kV							
010	10 Amps	8.3 / 15.5 / 17.2kV							
012	12 Amps	8.3 / 15.5 / 17.2kV							
018	18 Amps	8.3 / 15.5 / 17.2kV							
020	20 Amps	8.3 / 15.5 / 17.2kV							
025	25 Amps	8.3 / 17.2kV							
030	30 Amps	8.3 / 17.2kV							
040	40 Amps	8.3 / 17.2kV							
045	45 Amps	8.3 / 17.2kV							
065	65 Amps	8.3kV							
080	80 Amps	8.3kV							



8.3/15.5 kV Fuse



8.3/17.2kV Fuse

• All dimensions rounded up to the nearest eighth inch.

PROTECTION AND CONTROL

Molded Current-Limiting Fuse

Molded Current-Limiting Fuses provide fullrange fault current protection through 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
- 6 thru 100 Amp ratings for applications on 15/25kV grounded Wye systems
- 6 thru 50 Amp ratings for applications on 20/35kV grounded Wye systems



FEATURE		BENEFIT/DESCRIPTION				
EPDM Molded R	ubber Deadfront Construction	Fully sealed and submersible Light weight Insulate, shield and eliminate exposed live parts				
	ed fuse elements with built-in rent interrupting capability	Full-Range fault current protection through 50kA				
Current-limiting p in less than one h	orotection. Fault clearing occurs half cycle	Limits the system available fault current and dramatically reduces stresses on equipment				
Modular construction with a center replaceable fuse section and interchangeable end fittings		Allow elbow connection or direct attachment to equipment mounted bushings Flexibility of installation on junctions, transformers, cable runs, taps				
Compact		Suitable for padmount, subsurface or vault installations				
304 stainless steel brackets and hold down straps available		Accommodate a wide variety of mounting arrangements				

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	10-115	10-100	10-50

APPLICATION INFORMATION

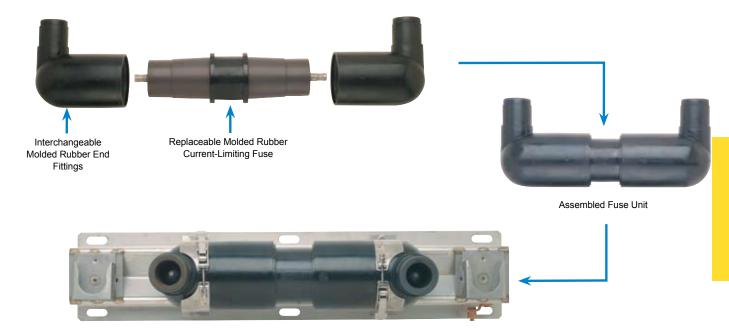
Construction: Submersible, non-venting, deadfront, corrosion resistant.

Ambient Temperature Range: - 30 to +65 degrees centigrade for 6-50 Amp fuses; - 30 to +40 degrees centigrade for >50 Amp fuses.

Fuses are only suitable for the system voltage class shown if the recovery voltage across the fuse will not exceed its rated maximum voltage. For three-phase applications, this generally requires that protected transformers be gndy-gndy and have at least 50% grounded load.

- * 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.
- +15.5kV L-G rated fuses require 75% grounded load to be applied on a 25kV system. The 17.2kV L-G rated fuses require at least 75% grounded load to be applied on a 28kV system.

Fuse replacement requires the MCLF to be de-energized.



Assembled Fuse Unit with Optional Wall Mounting Bracket

Molded Current-Limiting Fuse

TABLE	34 – EL	ECTRICAL CHAR	ACTERISTI	CS OF E	ENCAPS	ULATED	FUSES USI	ED IN MCLF
Nominal Fuse Voltage Rating	Current Rating (Amps)	Fuse Catalog Number	Rated Maximum Voltage (kV)	Conti Cur	mum nuous rent (6)	Peak Arc Voltage (kV) (5)	Minimum Melt I ² t (AMP ² SEC)	Maximum Total I ² t (3) (4) (AMP ² -SEC)
(kV)	(/ unpo)		(100)	25°C	40°C	(0)	(/ !!/!! OLO)	(7 tivii 020)
	80	M05CLF080		86	84	15	22,100	110,000
	100	M05CLF100		108	105	15	56,700	280,000
5.5	125	M05CLF125	5.5	137	133	15	109,200	530,000
5.5	150	M05CLF150		159	154	15	176,000	860,000
	180	M05CLF180		185	180	15	259,000	1,270,000
	10	M15CLF010		14	13	28	800	4,000
	20	M15CLF020		23	22	26	1,620	11,000
	30	M15CLF030	10.0	35	33	26	5,250	30,000
	40	M15CLF040		43	41	26	8,700	50,000
8.3	50	M15CLF050		50	47	26	12,800	70,000
	65	M15CLF065		73	71	25	25,200	100,000
	80	M15CLF080	8.3	87	84	25	47,000	185,000
	100	M15CLF100	0.5	106	103	25	78,300	330,000
	115	M15CLF115		120	116	25	115,150	480,000
	10	M25CLF010		14	13	46	800	3,700
	20	M25CLF020		23	22	45	1,620	10,000
	30	M25CLF030	17.2	35	33	45	5,250	30,000
15.5	40	M25CLF040		43	41	45	8,700	50,000
15.5	50	M25CLF050		47	45	45	12,800	70,000
	65	M25CLF065		68	66	40	25,200	110,000
	80	M25CLF080	15.5	88	85	40	54,400	255,000
	100	M25CLF100		100	100	40	80,000	380,000
	10	M35CLF010		14	13	61	800	4,800
23.0	20	M35CLF020		23	22	60	1,620	13,000
23.0	30	M35CLF030	23.0	35	33	60	5,250	38,000
	40	M35CLF040		41	40	60	8,700	61,000
	50	M35CLF050		47	46	60	12,800	82,000

NOTES:

- 1. Designs have a 50,000 Amps rms. Symmetrical Rating.
- 2. 10-50A fuses have a Rated Maximum Application Temperature of 65°C, and 65-180A fuses have a Rated Maximum Application Temperature of 40°C (RMAT is the maximum temperature of the air in contact with the MCLF housing, at which the fuses have been shown suitable for use).
- 3. Tabulated Maximum Total I2t values are for currents of 50,000A 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 8.3kV fuses are applied at 10kV and approximately 25% when 15.5kV fuses are used at 17.2kV.
- 4. Maximum total I2t values are reduced for currents below 50,000A. For example, at 10,000A, I2t values are approximately 15% less than the published values.
- 5. 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.
- 6. 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 40°C the derating would be 15 x .2 = 3%, making the maximum continuous current of a 20A fuse 23 x .97 = 22A.

TABLE 35 - RECOMMENDED MCLF AT 40°C AMBIENT TEMPERATURE Recommended Fuse Current Ratings (Amperes) **FuseVoltage** (5.5kV) 8.3kV 15.5kV 23kV Transformer 1-Phase Voltage Rating (kV) Phase-to-Ground 1-Phase Transformer 2.4 4.16 4.8 7.2 7.62 14.4 16 19.9 k\/A В Α В Α В В В Α В Α В Α В В 10a 10a 10a 10a 10a 10a 10a 10a 10a 10 15 10 10a 10^a 25 20 10 10 37.5 20 30 20 20 10 10 10^a 10^a 10^a 10^a 50 30 40 20 30 20 10 10 10a 10a 10a 10a 75 50 65 30 40 20 30 20 20 10 10 10 10a 65 30 30 20 10 100 (80)40 50 30 50 20 20 10 10 167 (100)(150)65 (80)50 65 30 50 30 50 20 30 20 30 20 20 250 (150)(100)(125)(80)(100)50 65 50 65 30 50 30 40 20 30 20 30 333 (180)(125)(180)(100)(150)65 100 65 100 50 65 30 50 30 50 20 40 40 500 (180)(150)115 115 65 100 65 80 50 750 100 100 R۸ 1000 100

TABLE 36 - RECOMMENDED MCLF AT 40°C AMBIENT TEMPERATURE Recommended Fuse Current Ratings (Amperes) (5.5kV) 8.3kV 15.5kV 23kV **FuseVoltage** Transformer 3-Phase Voltage Rating (kV) Phase-to-Phase 3-Phase 7.2-7.96 8.32 13.2-14.4 22.9-24.9b 20.8 Transformer 2.4 4.16 4.8 12.47 34.5b kVA Α Α В Α Α Α Α В Α В В В Α В Α В В В Α В 15 10a 22.5 10 10a 30 10 20 10 10 10^a 10^a 10^a 10^a 10^a 10^a 10^a 45 75 30 40 20 20 10 10 10a 10a 10a 10a 10a 100 40 50 20 30 20 30 20 10 10 10 10a 10a 10a 112.5 40 65 20 30 20 30 20 20 10 10 10a 10a 10a 50 150 50 (80)30 30 40 20 30 20 10 10 10a 10a 10a 200 65 (100)40 65 40 50 20 30 20 30 20 20 10 10 10a (80) 50 30 20 10 10a 225 (125)65 40 65 40 30 50 20 10 300 (100)(150)(100)65 (80)40 30 50 30 30 20 20 10 65 50 20 20 10 500 (180)65 50 30 30 50 20 20 30 20 (100)(150)(100)(125)80 50 30 750 (180)(125)(180)80 65 50 30 30 50 20 30 115 80 65 40 1000 (180)115 65 100 65 100 40 50 30 40 1500 100 100

NOTES FOR TABLES 35 AND 36:

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

- Ratings in parenthesis are 5.5kV fuses.
- 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.

Molded Current-Limiting Fuse

FUSE ORDERING INFORMATION

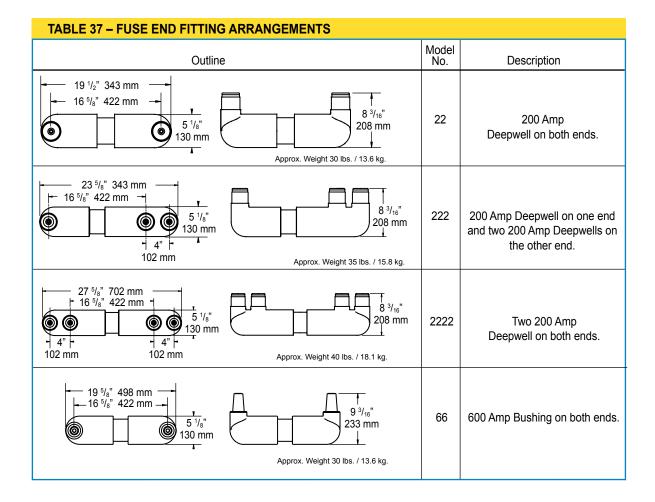
To completely specify and order a Molded Current-Limiting Fuse:

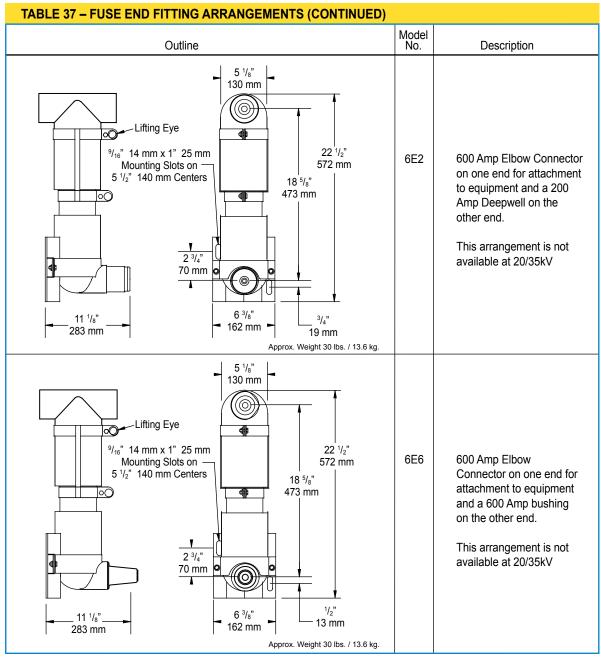
- 1. Select the Fuse Catalog Number from Table 34 based on the amperage and system voltage. This table is also used to order spare or replacement fuses.
- 2. From Table 37 select a suffix for the Model Number based on the required fuse end fittings. If end fittings are to be ordered and shipped separately from the fuse, use Table 39.
- 3. Select Mounting Options (if required) from Table 38.

EXAMPLE:

To order a fuse for application in a 25kV gndy-gndy system (17.2 line-toground), rated 50 Amp with factory assembled 200 Amp Deepwell end fittings and no mounting provision, specify: CATALOG NO. M25CLF050-22

Mounting Options (See Table 38)



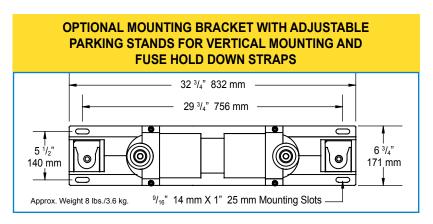


NOTE: Other models are available such as 26.

Molded Current-Limiting Fuse

TABLE 38 -	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 endfitting 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.



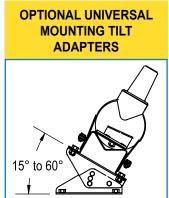


TABLE 39 – EN	TABLE 39 – END FITTING CATALOG NUMBERS Use this table only if end fittings are to be ordered and shipped separately from the fuse. Use Table 37 for assembled units.								
Catalog Number	Description	System Voltage Class	IEEE 386-1995 Interface Reference						
EF2 200	Amp Deepwell End Fitting (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	Figures 11 & 13						
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).

OTHER OPTIONS	
Catalog Number	Description
MCLF-ADT (Assembly/Disassembly Tool) 3/8" 10mm Sq. Drive 3/16" 5mm Hex	Hex Wrench for set screw removal and replacement when disassembling end fittings. Supplied as standard with replacement fuses.

MCAN Molded Canister Fuse 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 35kV gndy-gndy.

The MCAN Molded Canister Fuse will accommodate and has been thoroughly tested with Hi-Tech Trans-Guard™ FX fuses. Contact the factory before using fuses from other manufacturers.



FEATURE		BENEFIT/DESCRIPTION	
EPDM Molded Rub	ber Deadfront Construction	Fully sealed and submersible Insulate, shield and eliminate exposed	l live parts
Compact		Suitable for padmount, subsurface or	vault installations
Modular construction	on	Allow elbow connection or direct attac mounted bushings	hment to equipment-
		Neon voltage indicators (V2) attached allow quick and convenient blown fuse	
Various end fittings	and bushings	Flexibility of installation on switchgear, cable runs, taps	junctions, transformers,
Replaceable fuse s	ection	Ease of fuse replacement without full i	removal from installation
Current-limiting pro in less than one hal	tection. Fault clearing occurs f cycle	Limits the system available fault current reduces stresses on equipment	nt and dramatically
304 series stainless wall mounted parkin	s steel mounting brackets, and ng stands available	Accommodate a wide variety of moun	ting arrangements

Molded Canister Fuse

CERTIFIED TESTS & PERFORMANCE

Elastimold® Molded Canister 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)	8.8/10.0	17.2	23
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°

*without fuse

FUSE RATINGS

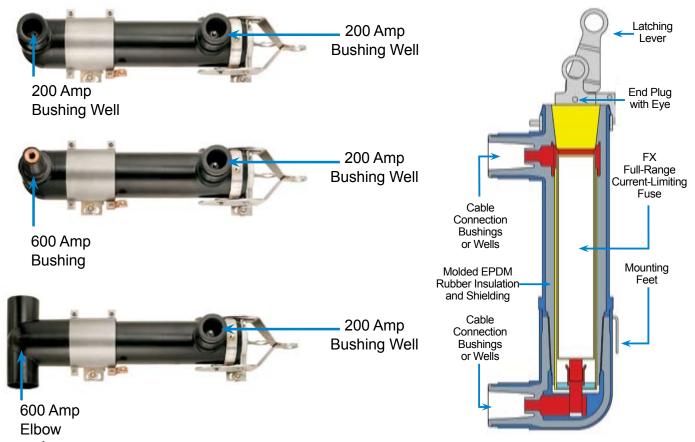
Nominal Voltage Rating (kV)	8.3	15.5	23.0
Rated Maximum Voltage (kV)	8.8/10.0	17.2+	23.0
Frequency (Hz)	50-60	50-60	50-60
Current Rating (Amp)	3-80	3-50	6-50
Rated Maximum Interrupting Current	50,000	50,000++	50,000
(Sym. Amperes)			

Fuses are only suitable for the system voltage class shown if the recovery voltage across the fuse will not exceed its rated maximum voltage. For threephase applications, this generally requires that protected transformers be gndy-gndy and have at least 50% grounded load.

+The 17.2 kV L-G rated fuse requires at least 75% grounded load to be applied on a 28kV system.

++3 Amp Fuse was Tested @ 44kA

Fuse replacement requires the MCAN to be de-energized.



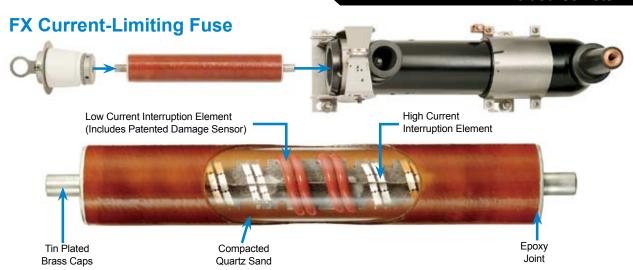


TABLE 40 -	RECO	MME	NDED	FX: IN	MCAI	N AT 4	0°C A	MBIE	NT TEI	MPER.	ATURI	E						
						Red	comme	nded F	use Cu	rrent R	atings (Amper	es)					
FuseVoltage					8.3	kV							18	5.5kV			23	kV
1-Phase					Tr	ansfori	mer 1-F	hase \	/oltage	Rating	(kV) Pl	nase-to	-Groun	d				
Transformer	2	.4	4.	16	4.	.8	7	.2	7.	62	1	2	14	.4	1	6	19	9.9
kVA	Α	В	Α	В	Α	В	Α	В	Α	В	Α	В	Α	В	Α	В	Α	В
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	65	25	40	20	30	12	20	12	20		10		8		8		6
100	65	80	30	50	25	50	18	25	18	25		12	10	12		10		8
167			65	80	65	80	30	50	30	50	18	25	18	25	12	20		12
250					80		65	80	50	65	25	50	25	40	20	30	18	25
333							80		65		50		30		25	50	20	30
500															50		40	

TABLE 41 – I	RECC	MME	NDE	D FX:	IN M	CAN A	AT 40 °	C AN	IBIEN	T TEI	MPER	ATUF	RE							
							Reco	mmen	ded Fı	use Cu	rrent F	Ratings	s (Amp	eres)						
FuseVoltage					8	.3kV							15	.5kV				23	BkV	
3-Phase						Tra	nsform	er 3-P	hase \	/oltage	Ratin	g (kV)	Phase	-to-Ph	ase					
Transformer	2	.4	4.	16	4	.8	7.2-	7.96	8.3	32	12	.47	13.2	-14.4	22.9-	-24.9⁵	20	8.0	34	.5 ^b
kVA	Α	В	Α	В	Α	В	Α	В	Α	В	Α	В	Α	В	Α	В	Α	В	Α	В
15		6		3		3		3ª		3ª		3ª		3ª		3ª		6ª		6ª
22.5		8		6ª		6ª		3		3		3ª		3ª		3ª		6ª	igsquare	6ª
30	10	12		6		6		6ª		3		3ª		3ª		3ª		6ª		6ª
45	12	20		10		8		6		6ª		3		3		3ª		6ª	ldot	6ª
75	25	40	12	20	12	18	<u> </u>	8		8		6		6		3		6ª		6ª
100	30	50	18	25	18	25		12		10		8		8		6ª		6ª	\square	6ª
112.5	40	65	20	30	18	25	12	18		12		8		8		6ª		6ª	igwdown	6a
150	65	80	25	50	25	40	18	25	12	18	40	10		10		6		6		6a
200	80		40	65	30	50	20	30	18	25	12	18	40	12		8		8	\vdash	6
225			50	65	40	65	25	40	20	30	12	20	12	20		8		10	\vdash	6
300			65	80	65	80	30	50	25	50	18	25	18	25	40	12	40	12		8
500							65	80	65	80	30		30	50	18	25	18	25	40	12
750 1000									80						25 40	40	25 40	50	18 25	25 30
															40		40		40	30
1500																			40	

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

- 8.3kV 3-50A fuses are used in mounting code 4 canisters, 8.3kV 65-80A fuses and 15.5kV 3-50A fuses are used in mounting code 5 canisters, and 23kV 6-50A fuses are used in mounting code 6 canisters.
- 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.
- Fuse allows greater than 300% of transformer rating.
- 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.

Molded Canister Fuse

TABLE	42 – EL	ECTRICAL CHARA	CTERISTICS	OF HI-	TECH FX	FUSES	INSIDE N	ICAN CANIS	TERS
Nominal Fuse Voltage Rating	Current Rating (Amps)	Fuse Catalog Number	Rated Maximum Voltage		Maximun inuous C (2) (6)		Peak Arc Voltage (kV)	Minimum Melt I ² t (AMP ² SEC)	Maximum Total I ² t (3) (4)
(kV)			(kV)	25°C	40°C	65°C	(5)	(AMP-SEC)	(AMP ² -SEC)
	3	HTFX230003		4.3	4.2	3.9	30	100	350
	6	HTFX230006		9.5	9.0	8.5	32	620	2,700
	8	HTFX230008		11.5	11.0	10.5	28	800	4,000
	10	HTFX230010		13.5	13.0	12.5	28	800	4,000
	12	HTFX230012	40.0	17.5	17.0	16.0	26	920	8,000
	18	HTFX230018	10.0	19.5	19.0	18.0	26	1,310	9,500
8.3	20	HTFX230020		24.0	23.0	21.5	26	1,620	11,000
	25	HTFX230025		29.5	28.5	27.0	26	3,660	22,000
	30	HTFX230030		34.0	33.0	31.0	26	5,250	30,000
	40	HTFX230040		40.0	39.0	36.5	26	8,700	50,000
	50	HTFX230050		45.5	44.0	42.0	26	12,800	70,000
	65	HTFX230065	8.8	70.0	68.0	64.5	23	34,000	200,000
	80	HTFX230080	0.0	80.0	77.5	73.5	22	51,200	280,000
	3	HTFX240003		4.3	4.2	3.9	51	100	510
	6	HTFX240006		9.5	9.0	8.5	54	620	2,600
	8	HTFX240008		11.5	11.0	10.5	46	800	3,700
	10	HTFX240010		13.5	13.0	12.5	46	800	3,700
	12	HTFX240012		17.5	17.0	16.0	43	920	6,500
15.5	18	HTFX240018	17.2	19.5	19.0	18.0	45	1,310	8,000
	20	HTFX240020		24.0	23.0	21.5	45	1,620	10,000
	25	HTFX240025		29.5	28.5	27.0	45	3,660	22,000
	30	HTFX240030		34.0	33.0	31.0	45	5,250	30,000
	40	HTFX240040		40.0	39.0	36.5	45	8,700	50,000
	50	HTFX240050		44.5	43.0	40.0	45	12,800	70,000
	6	HTFX250006		9.5	9.0	8.5	67	620	3,100
	8	HTFX250008		11.5	11.0	10.5	61	800	4,800
	10	HTFX250010		13.5	13.0	12.5	61	800	4,800
	12	HTFX250012		17.5	17.0	16.0	60	920	8,300
23.0	18	HTFX250018	23.0	19.5	19.0	18.0	60	1,310	11,200
	20	HTFX250020		24.0	23.0	21.5	60	1,620	13,000
	25	HTFX250025		29.5	28.5	27.0	60	3,660	28,000
	30	HTFX250030		34.0	33.0	31.0	60	5,250	38,000
	40	HTFX250040		38.5	37.0	35.0	60	8,700	61,000
	50	HTFX250050		44.5	43.0	40.0	60	12,800	82,000

NOTES:

- Designs have a 50,000 Amps rms. Symmetrical Rating (except 3A 15.5 kV which was tested at 44 kA maximum).
- Fuses have a Rated Maximum Application Temperature of 65°C (RMAT is the maximum temperature of the air, in contact with the MCAN housing, at which they have been shown to be suitable for use).
- 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.
- 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.
- 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.
- 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 $40 \times .2 = 8\%$, making the maximum continuous current of a 30 A fuse $34 \times .92 = 31 \text{ A}$.
- 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.

ORDERING INFORMATION

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

- 1. Select the Fuse Catalog Number from Table 42 based on the amperage and "Rated Max Voltage (kV)" column.
- 2. Based on selected fuse, select canister from the "Canister Catalog Number" column of Table 43. See Table 44 for additional MCAN Fuse Canister information (Make sure that the Canister Mounting Code and Diameter Code correspond to the Fuse selected).
- 3. Select Options and accessories (if required) from Table 45.

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. HTFX240050 AND MCAN-5B25-22

MCAN FUSE CODING SY	STEM		
Mounting Code	Maximum Fuse Overall Length	Diameter Code	Maximum Fuse Overall Diameter
4	10" 254 mm	В	2.25" 57 mm
5	14.31" 363 mm	В	2.25" 57 mm
6	17.12" 435 mm	В	2.25" 57 mm

NOTE Lower Mounting Codes (shorter) fuses may be applied in canisters of higher Mounting Codes by using an adapter. See Mounting Code Adapters table 45.

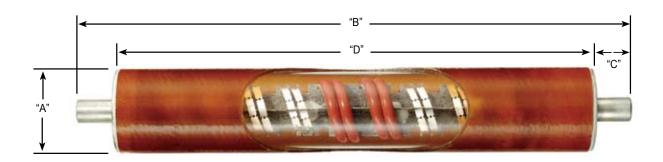


TABLE 43 -	ORDER	ING INFORMATIO	N FOR F	X FUSES	SUSED	WITH MO	CAN				
Nominal Fuse Voltage Rating (kV)	Current Rating (Amps)	Fuse Catalog Number	Rated Maximum Voltage (kV)	Mounting Code	Diameter Code	Overall Diameter (A)		Contact Length (C)	Body Length (D)	Canister Catalog Number	Fuse Weight
	3	HTFX230003									
	6	HTFX230006									
	8	HTFX230008									
	10	HTFX230010								MCAN-4B15-22	
	12	HTFX230012	40.0		_	2.25"	10.0"	1.02"	7.96"	MCAN-4B15-22 MCAN-4B15-66	3.00lb.
	18	HTFX230018	10.0	4	В	57mm	254mm		202mm	MCAN-4B15-6E2	1.3kg
0.0	20	HTFX230020								MCAN-4B15-6E6	
8.3	25	HTFX230025									
	30	HTFX230030									
	40	HTFX230040									
	50	HTFX230050									
	65	HTFX230065	8.8	5	В	2.25"	14.31"	1.02"	12.27"	MCAN-5B15-22 MCAN-5B15-66	4.25lb.
	80	HTFX230080			_	57mm	363mm	26mm	312mm	MCAN-5B15-6E2 MCAN-5B15-6E6	1.9kg
	3	HTFX240003									
	6	HTFX240006									
	8	HTFX240008								MCAN-5B25-22	
	10	HTFX240010		5	В	2.25"	14.31"	1.02"	12.27"	MCAN-5B25-66	4.25lb
15.5	12	HTFX240012	17.2	5	Ь	57mm	363mm	26mm	312mm	MCAN-5B25-6E2	1.9kg
15.5	18	HTFX240018	17.2							MCAN-5B25-6E6	
	20	HTFX240020									
	25	HTFX240025									
	30	HTFX240030									
	40	HTFX240040									
	50	HTFX240050									
	6	HTFX250006									
	8	HTFX250008									
	10	HTFX250010									
	12	HTFX250012									
23.0	18	HTFX250018	23.0	6	В	2.25"	17.12"	1.02"	15.09"	MCAN-6B35-66	4.75lb
23.0	20	HTFX250020	23.0		ا	57mm	435mm	26mm	383mm	INICAIN-OBOO-OO	2.2kg
	25	HTFX250025									
	30	HTFX250030									
	40	HTFX250040									
	50	HTFX250050									

For 5kV systems, use the 8.3 kV rated fuses

TABLE 44 – WEIGHTS AND DIMENSIONS							
Outline	Catalog Number	(A)	(B)	(C)	Approx. Weight	End Bushing*	Main Bushing*
8 ¹ / ₃₂ " - 204 mm - 3 ¹ / ₆₄ " - 164 mm - 5 ¹ / ₂ " - 140 mm - 2 ³ / ₄ " - 70 mm	MCAN-4B15-22 MCAN-5B25-22 MCAN-5B15-22	21.49" 546mm 25.80" 655mm	10.06" 256mm 14.37" 365mm	10.91" 277mm 15.22" 387mm	19lb. 8.6kg 21lb. 9.5kg	200 Amp Bushing Well	200 Amp Bushing Well
8 15/16" 164 mm 2 31/64" 164 mm 5 1/2" 140 mm 2 3/4" 70 mm	MCAN-4B15-66 MCAN-5B25-66 MCAN-5B15-66 MCAN-6B35-66	21.49" 546mm 25.80" 655mm 28.68" 728mm	10.06" 256mm 14.37" 365mm 17.25" 438mm	10.91" 277mm 15.22" 387mm 18.10" 460mm	21lb. 9.5kg 23lb. 10.4kg 24lb. 10.8kg	600 Amp Bushing	600 Amp Bushing
8 1/32" 204 mm 152 mm 152 mm 25 mm 25 mm 2 31/64" 25 mm 204 mm 2 31/64" 70 mm	MCAN-4B15-6E2 MCAN-5B25-6E2 MCAN-5B15-6E2	23.90" 607mm 28.21" 717mm	10.06" 256mm 14.37" 365mm	12.91" 328mm 17.22" 437mm	20lb. 9kg 22lb. 10kg	600 Amp Elbow Connector	200 Amp Bushing Well
8 15/16" 227 mm 31/64" 164 mm 5 51/2" 140 mm 2 31/4 70 mm	MCAN-4B15-6E6 MCAN-5B25-6E6 MCAN-5B15-6E6	23.90" 607mm 28.21" 717mm	10.06" 256mm 14.37" 365mm	12.91" 328mm 17.22" 437mm	20lb. 9kg 22lb. 10kg	600 Amp Elbow Connector	600 Amp Bushing

TABLE 45 - MCAN MOLDED CANISTER FUSE 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 indicato	r

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 a 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.

SUFFIX NUMBER	DESCRIPTION
-PS	Parking Stand between bushings
	<u> </u>
CATALOG NUMBER	DESCRIPTION



Switchgear Assemblies

Elastimold® multi-point junctions shown in catalog PG-CA 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.