

JOE E-rated current-limiting power fuses



General

Eaton's Cooper Power™ series JOE current-limiting power fuses are E-Rated per IEEE Std C37.46™ standard, providing an excellent choice for protection of transformers, feeder circuits, high voltage switchgear, and metal-enclosed switchgear. Voltage ratings include 5.5 kV and 15.5 kV. The fuses have either 2" or 3" diameter barrels (sometimes double-barrel) as indicated, and have standard clip center distances of 12", 15" or 18". The fuses have ferrules for mounting in standard spring-reinforced clips, providing interchangeability with other brands of fuses. In addition, the fuses are equipped with blown-fuse indicators to provide positive identification of the open fuse.

The JOE current-limiting power fuses meet the IEEE Std C37.40™ standard definition for full-range current-limiting fuses, providing superior protection to general-purpose fusing alternatives. Eaton's current-limiting power fuses consistently clear low current faults, as well as reliably interrupt high magnitude short-circuit currents. The fuses' current-limiting capability limits both peak current magnitude and fault duration, thus limiting the total I^2t let-through energy.

The JOE current-limiting power fuses are designed to meet the stringent needs of industrial and utility applications. The noiseless operation and lack of expulsion byproducts make them ideal for indoor application in confined spaces. They fit in industry-standard power fuse mountings and are suitable for both indoor and outdoor installations. These E-Rated fuses have time-current characteristics that allow easy coordination with other upstream and downstream protective devices. Eaton's current-limiting power fuses are used to protect transformers, feeder circuits, high voltage switchgear, metal-enclosed switchgear and other equipment that can benefit from their energy-limiting properties.

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Installation

No special tools are required. The JOE fuse is designed for indoor and outdoor mounting in industry standard in-air clip mountings and fused disconnect switches. See fuse mounting manufacturer's instructions for details.

Production tests

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

- Physical Inspection
- I²t Testing
- Resistance Testing

Definitions:

Current-Limiting (CL) Fuse: A fuse that, when its current-responsive element is melted by a current within the fuse's specified current-limiting range, abruptly introduces a high resistance to reduce current magnitude and duration, resulting in subsequent current interruptions.

Full-Range Current-Limiting Fuse: A fuse capable of interrupting all currents from the rated interrupting current down to the minimum continuous current that causes melting of the fusible element(s), with the fuse applied at the maximum ambient temperature specified by the fuse manufacturer.

General Purpose Current-Limiting Fuse: A fuse capable of interrupting all currents from the rated interrupting current down to the current that causes melting of the fusible element in no less than one (1) hour.

Table 1. Electrical Ratings and Characteristics

Fuse Type:	General Purpose (Full Range), "E" Rated
Voltage and Current Ratings	
5.5 kV	5 A through 450 A
15.5 kV	5 A through 200 A
Maximum Interrupting Current	50,000 A rms symmetrical

Tests are conducted in accordance with IEEE Std C37.41™ standard.

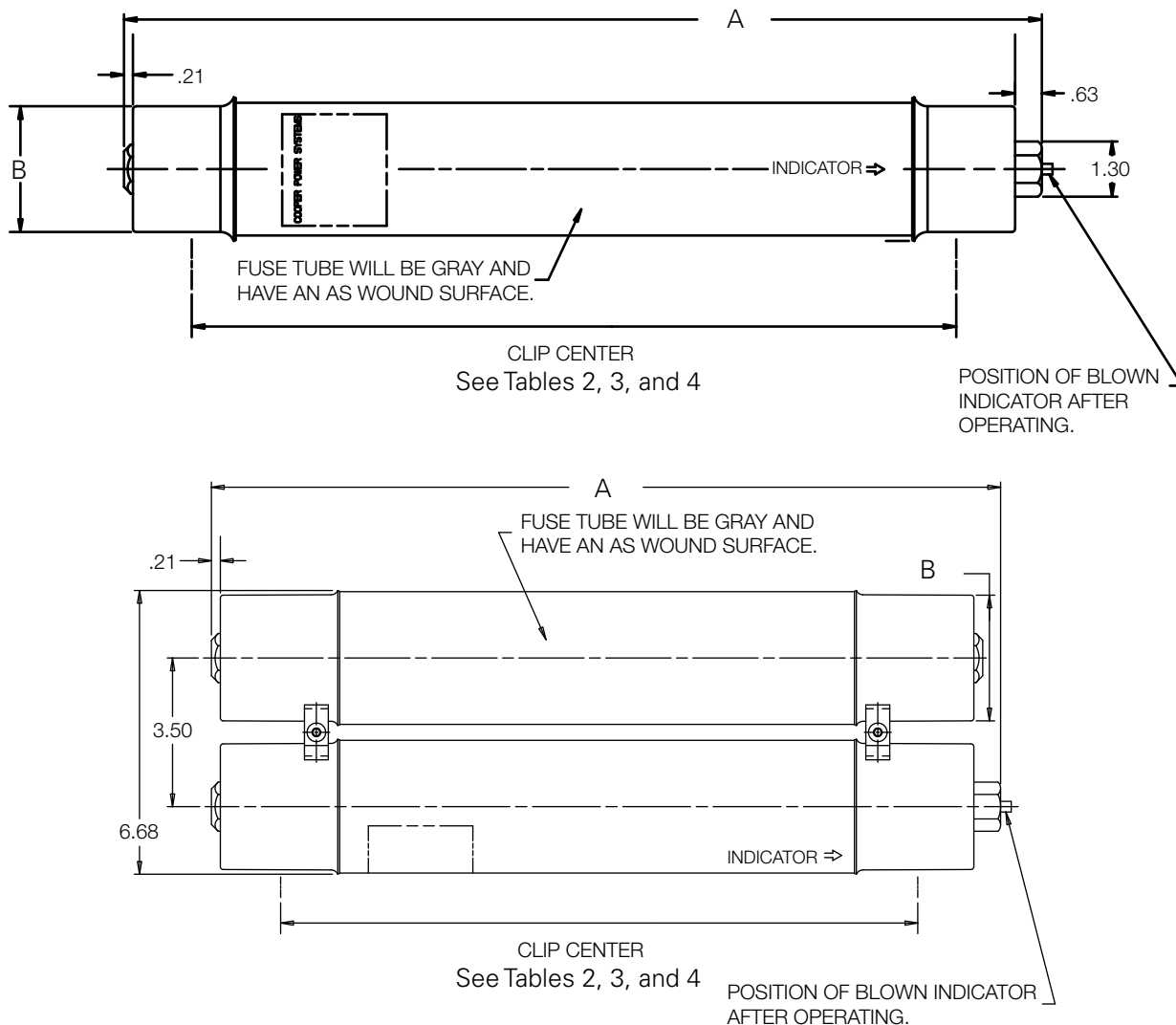


Figure 1. JOE fuse

Note: Dimensions given are for reference only.

Ordering Information

To order a JOE current-limiting fuse, first determine the amperage and voltage ratings of the fuse desired, and then determine the size code and clip center. Select the appropriate catalog number from Table 2, 3 or 4.

Table 2. 12" Clip Center, Clip-In Mounting, Outdoor or Indoor Enclosures

Max. Voltage (kV)	Current Rating (A)	No. of Barrels	Max Sym Interrupting Current (kA)	Length (inches) (A)	Diameter (B)	Size Code	Min Melt I ² t (A ² s)	Max Clear I ² t (A ² s)	Catalog Number	TCC Curves (Min Melt/Max. Clear)
5.5	5E	1	50	15.75"	2"	C	180	2,400	55F1CAX5ECPS	
5.5	7E	1	50	15.75"	2"	C	850	8,000	55F1CAX7ECPS	
5.5	10E	1	50	15.75"	2"	C	850	8,000	55F1CAX10ECPS	
5.5	15E	1	50	15.75"	2"	C	2,070	11,000	55F1CAX15ECPS	
5.5	20E	1	50	15.75"	2"	C	2,370	23,000	55F1CAX20ECPS	CTTCC207B00 (Figure 2)
5.5	25E	1	50	15.75"	2"	C	4,650	31,000	55F1CAX25ECPS	
5.5	30E	1	50	15.75"	2"	C	9,490	45,000	55F1CAX30ECPS	
5.5	40E	1	50	15.75"	2"	C	9,490	45,000	55F1CAX40ECPS	
5.5	50E	1	50	15.75"	2"	C	13,600	90,000	55F1CAX50ECPS	
5.5	65E	1	50	15.75"	2"	C	30,700	181,000	55F1CAX65ECPS	
5.5	10E	1	50	15.75"	3"	D	850	8,000	55F1DAX10ECPS	
5.5	15E	1	50	15.75"	3"	D	2,070	12,000	55F1DAX15ECPS	
5.5	20E	1	50	15.75"	3"	D	2,370	23,000	55F1DAX20ECPS	
5.5	25E	1	50	15.75"	3"	D	4,650	31,000	55F1DAX25ECPS	
5.5	30E	1	50	15.75"	3"	D	9,490	45,000	55F1DAX30ECPS	
5.5	40E	1	50	15.75"	3"	D	9,490	45,000	55F1DAX40ECPS	
5.5	50E	1	50	15.75"	3"	D	13,600	90,000	55F1DAX50ECPS	
5.5	65E	1	50	15.75"	3"	D	30,700	181,000	55F1DAX65ECPS	
5.5	80E	1	50	15.75"	3"	D	54,600	270,000	55F1DAX80ECPS	CTTCC208B00 (Figure 3)
5.5	100E	1	50	15.75"	3"	D	116,200	580,000	55F1DAX100ECPS	
5.5	125E	1	50	15.75"	3"	D	167,400	600,000	55F1DAX125ECPS	
5.5	150E	1	50	15.75"	3"	D	218,700	786,000	55F1DAX150ECPS	
5.5	175E	1	50	15.75"	3"	D	227,900	1,100,000	55F1DAX175ECPS	
5.5	200E	1	50	15.75"	3"	D	297,600	1,520,000	55F1DAX200ECPS	
5.5	250E	2	50	15.75"	3"	DD	669,600	2,400,000	55F2DAX250ECPS	
5.5	300E	2	50	15.75"	3"	DD	874,800	3,149,000	55F2DAX300ECPS	
5.5	350E	2	50	15.75"	3"	DD	911,600	4,376,000	55F2DAX350ECPS	
5.5	400E	2	50	15.75"	3"	DD	1,190,400	6,071,000	55F2DAX400ECPS	
5.5	450E	2	50	15.75"	3"	DD	1,555,000	9,796,000	55F2DAX450ECPS	

Effective October 2015

Table 3. 15" Clip Center, Clip-In Mounting Outdoor or Indoor Enclosures

Max. Voltage (kV)	Current Rating (A)	Barrels	Max Sym Interrupting Current (kA)	Length (inches) (A)	Diameter (B)	Size Code	Min Melt I ² t (A ² s)	Max Clear I ² t (A ² s)	Catalog Number	TCC
15.5	5E	1	50	18.75"	2"	C	180	2,900	155F1CBX5ECPS	
15.5	7E	1	50	18.75"	2"	C	850	8,000	155F1CBX7ECPS	
15.5	10E	1	50	18.75"	2"	C	850	8,000	155F1CBX10ECPS	
15.5	15E	1	50	18.75"	2"	C	2,070	12,000	155F1CBX15ECPS	CTTCC209B00 (Figure 4)
15.5	20E	1	50	18.75"	2"	C	2,370	23,000	155F1CBX20ECPS	
15.5	25E	1	50	18.75"	2"	C	4,650	31,000	155F1CBX25ECPS	
15.5	30E	1	50	18.75"	2"	C	9,490	45,000	155F1CBX30ECPS	
15.5	10E	1	50	18.75"	3"	D	850	8,000	155F1DBX10ECPS	
15.5	15E	1	50	18.75"	3"	D	2,070	12,000	155F1DBX15ECPS	
15.5	20E	1	50	18.75"	3"	D	2,370	23,000	155F1DBX20ECPS	
15.5	25E	1	50	18.75"	3"	D	4,650	31,000	155F1DBX25ECPS	
15.5	30E	1	50	18.75"	3"	D	9,490	45,000	155F1DBX30ECPS	
15.5	40E	1	50	18.75"	3"	D	9,490	45,000	155F1DBX40ECPS	
15.5	50E	1	50	18.75"	3"	D	13,600	90,000	155F1DBX50ECPS	CTTCC205B00 (Figure 5)
15.5	65E	1	50	18.75"	3"	D	30,700	181,000	155F1DBX65ECPS	
15.5	80E	1	50	18.75"	3"	D	54,600	270,000	155F1DBX80ECPS	
15.5	100E	1	50	18.75"	3"	D	116,200	600,000	155F1DBX100ECPS	
15.5	125E	2	50	18.75"	3"	DD	123,000	677,000	155F2DBX125ECPS	
15.5	150E	2	50	18.75"	3"	DD	218,700	1,287,000	155F2DBX150ECPS	
15.5	175E	2	50	18.75"	3"	DD	314,700	1,689,000	155F2DBX175ECPS	
15.5	200E	2	50	18.75"	3"	DD	465,100	2,405,000	155F2DBX200ECPS	

Table 4. 18" Clip Center, Clip-In Mounting Outdoor or Indoor Enclosures

Max. Voltage (kV)	Current Rating (A)	Barrels	Max Sym Interrupting Current (kA)	Length (inches) (A)	Diameter (B)	Size Code	Min Melt I ² t (A ² s)	Max Clear I ² t (A ² s)	Catalog Number	TCC
15.5	65E	1	50	21.75"	3"	D	30,700	181,000	155F1DCX65ECPS	
15.5	80E	1	50	21.75"	3"	D	54,600	270,000	155F1DCX80ECPS	
15.5	100E	1	50	21.75"	3"	D	116,200	600,000	155F1DCX100ECPS	
15.5	125E	2	50	21.75"	3"	DD	123,000	677,000	155F2DCX125ECPS	CTTCC205B00 (Figure 5)
15.5	150E	2	50	21.75"	3"	DD	218,700	1,287,000	155F2DCX150ECPS	
15.5	175E	2	50	21.75"	3"	DD	314,700	1,689,000	155F2DCX175ECPS	
15.5	200E	2	50	21.75"	3"	DD	465,100	2,405,000	155F2DCX200ECPS	

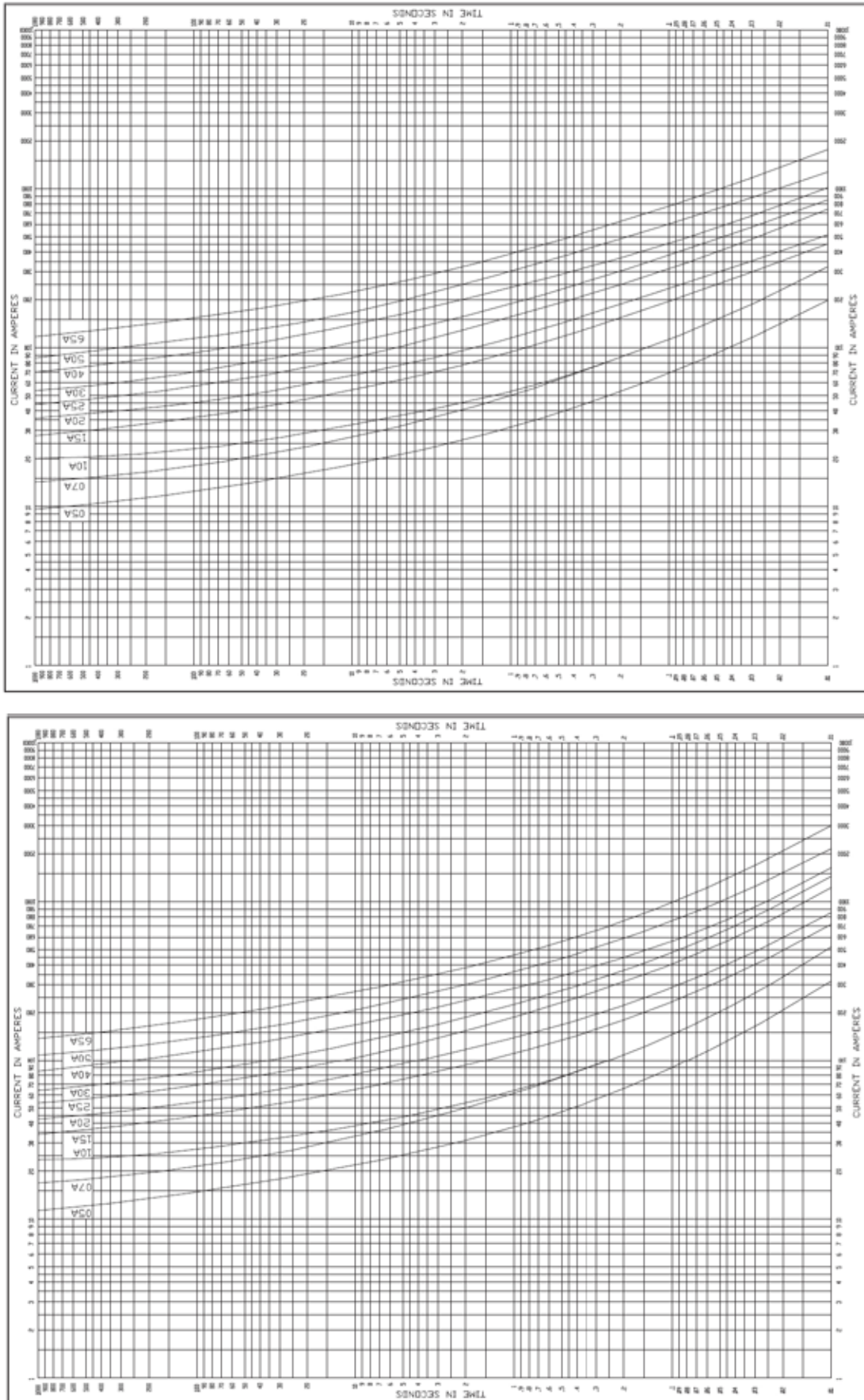


Figure 2. 12" clip center, 5.5 kV 2" diameter fuses minimum melt and maximum clear time current curve.

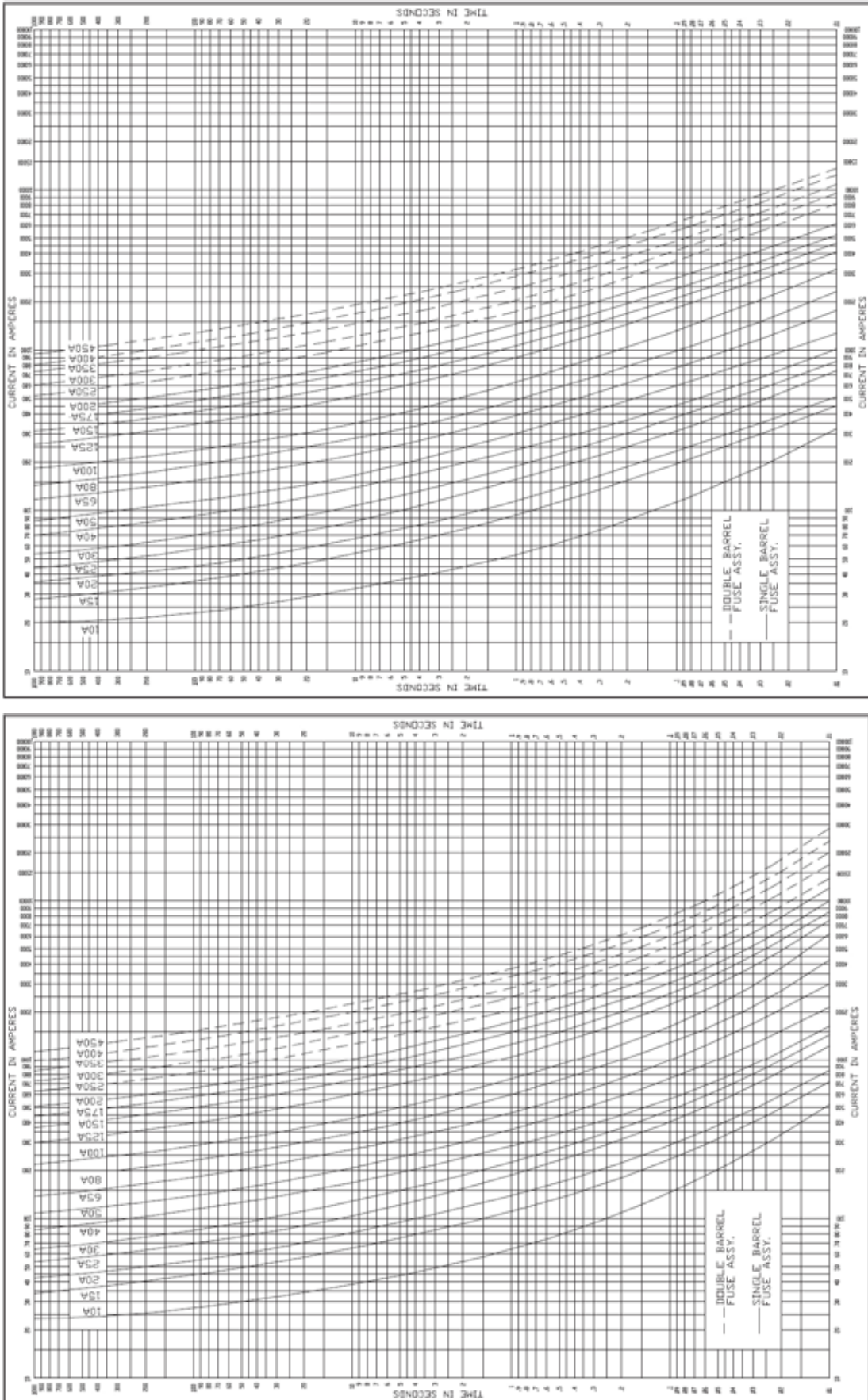


Figure 3. 12" clip center, 5.5 kV 3" diameter, fuses minimum melt and maximum clear.

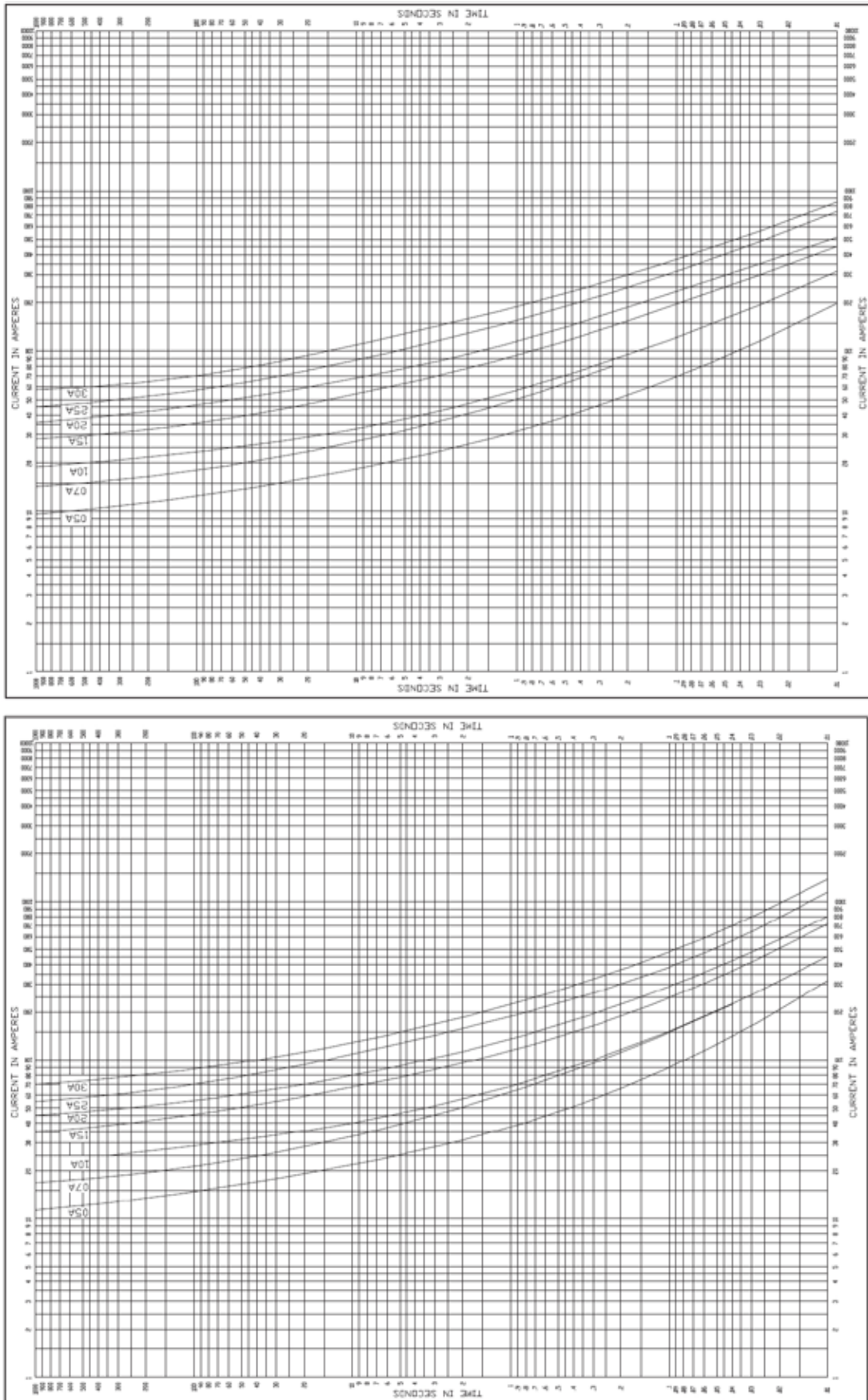


Figure 4. 15" clip center, 15.5 kV 2" diameter fuses minimum melt and maximum clear.

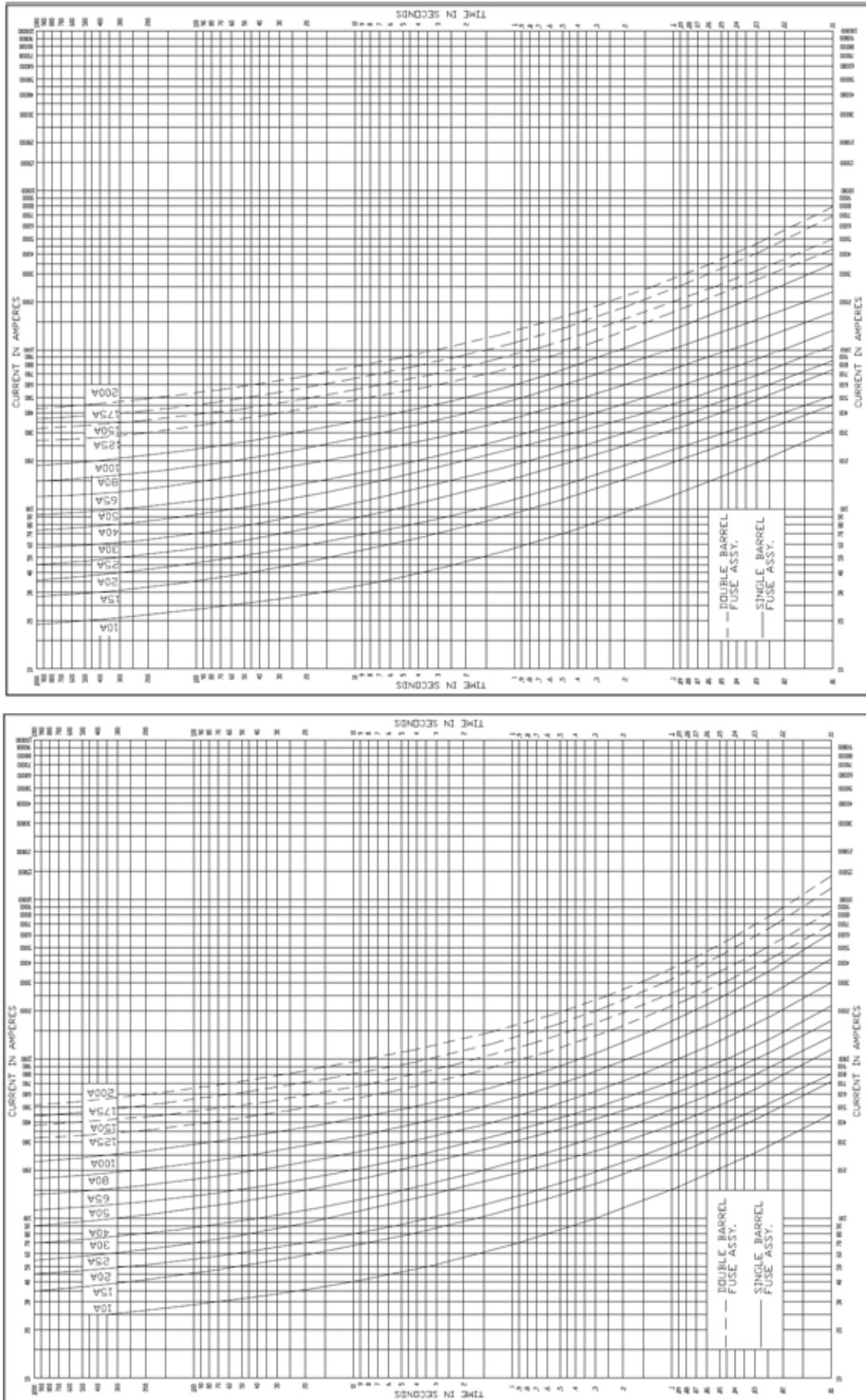


Figure 5. 15" clip center, 15.5 kV 3" diameter fuses minimum melt and maximum clear time current curve. 18" clip center, 15.5 kV 3" diameter fuses (65E-200E) (bottom).

Application peak let-through current

Maximum peak let-thru curves provide the opportunity of comparing an unprotected system or one protected with an expulsion fuse, boric acid fuse, or recloser to a system protected with JOE current-limiting fuses. For example, as shown in Figure 6, an unprotected circuit with a 20,000 A available fault current can deliver a maximum peak current to a fault of about 50,000 A (find the intersection of the 20,000 A available current line with the peak current line, and read the result on the left maximum let-thru axis). This would be the current delivered, regardless of the size of any expulsion fuse that could be applied.

Protecting this apparatus with a 5.5 kV, 80 A, JOE fuse however, would limit the peak let-thru current to the apparatus to about 12,500 A. This is the same peak let-thru delivered to a fault by a system having only 4800 A available current.

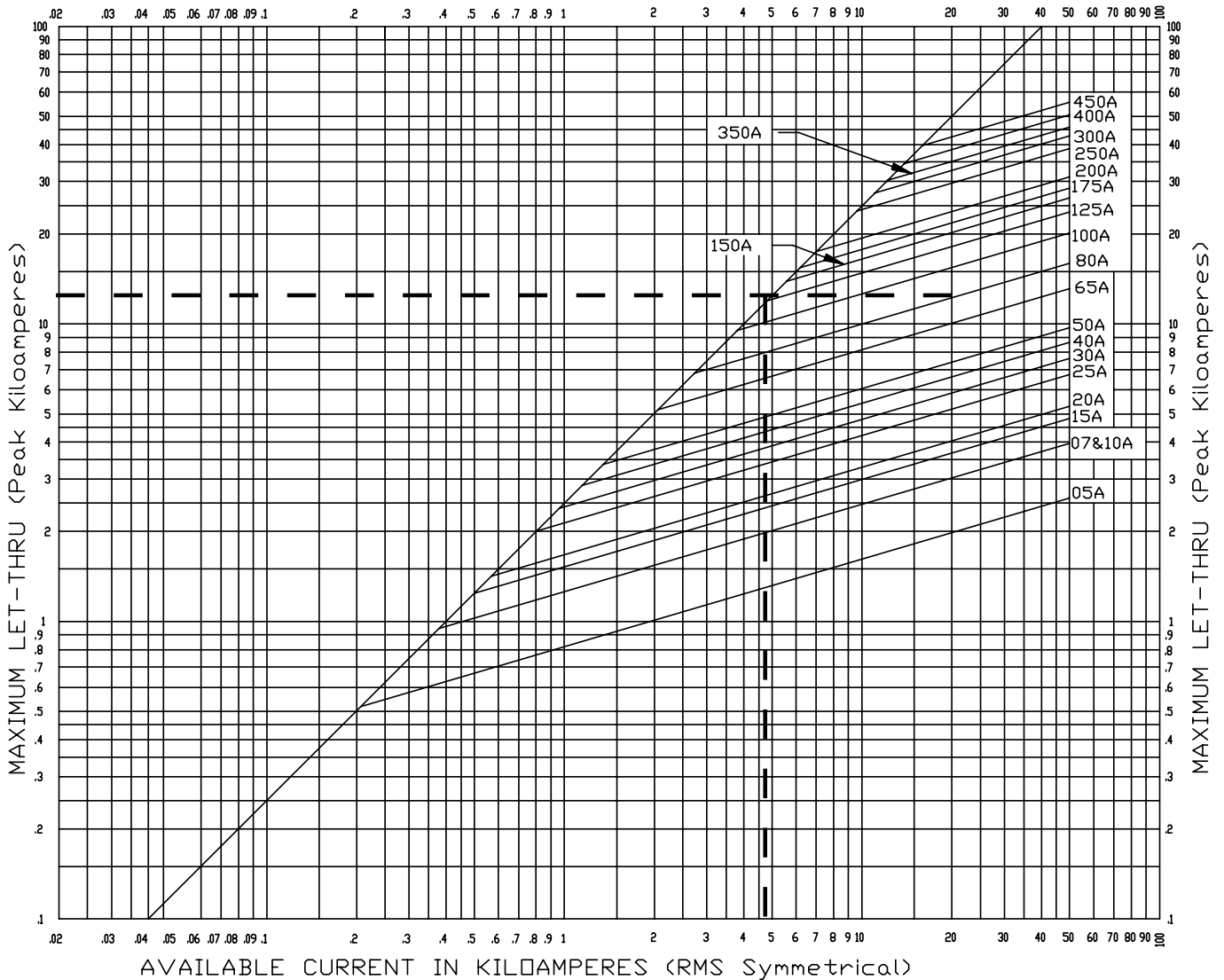
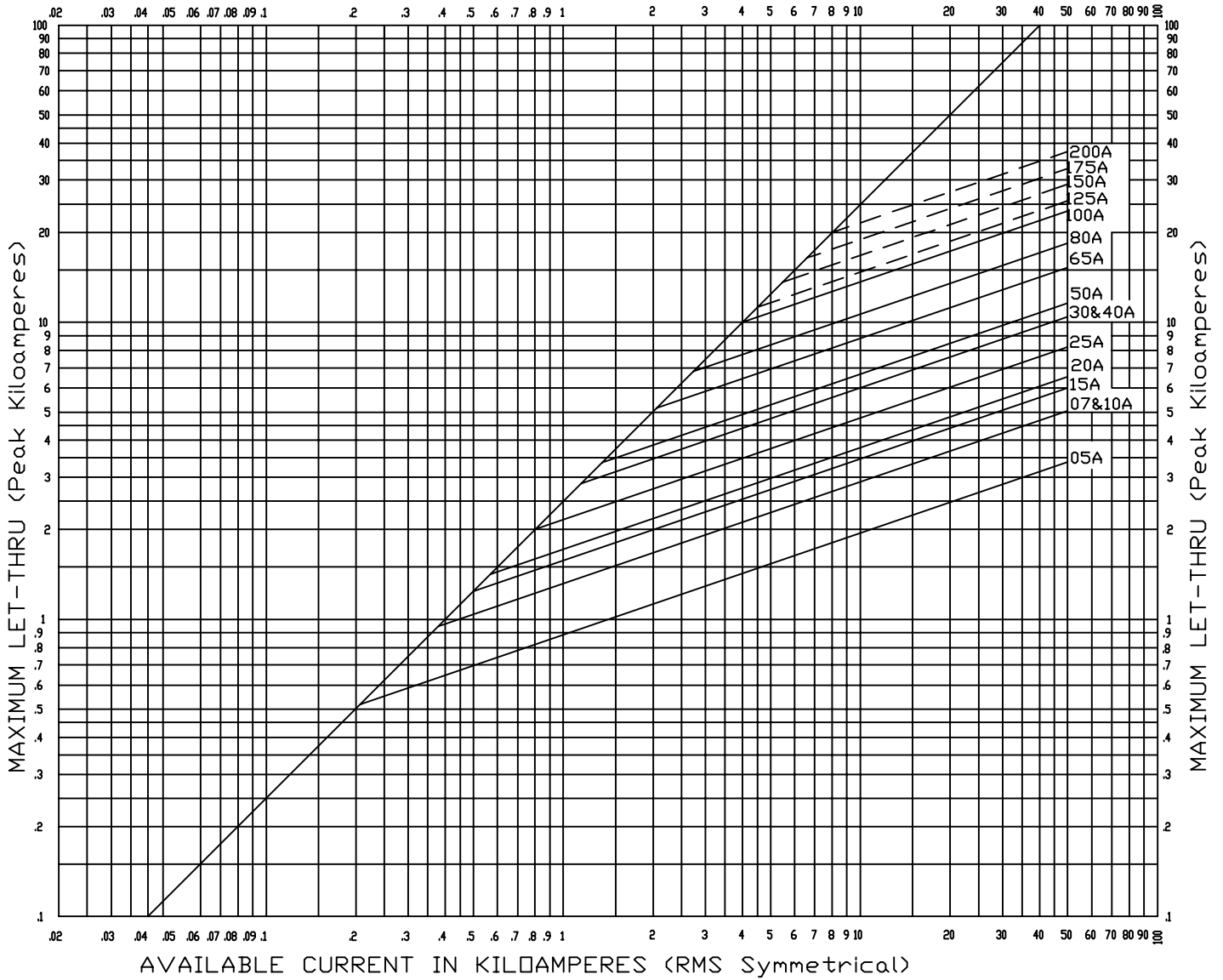


Figure 6. Maximum peak let-through (kA) 5.5 kV JOE fuses.



--- DOUBLE BARREL FUSE ASSY
 _____ SINGLE BARREL FUSE ASSY

Figure 7. Maximum peak let-through (kA) 15.5 kV JOE fuses.

Additional information

Refer to the following reference literature for more information:

CTTCC207B00, 5.5 kV JOE fuse 2" dia. TCC

CTTCC208B00, 5.5 kV JOE fuse 3" dia. TCC

CTTCC209B00, 15.5 kV JOE fuse 2" dia. TCC

CTTCC205B00, 15.5 kV JOE fuse 3" dia. TCC

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