

Bussmann®

HIGH SPEED FUSES
690V High-Speed Full Range



Bussmann®

WORLD-WIDE CIRCUIT PROTECTION SOLUTIONS

Bussmann manufacture a wide range of products for the protection of electrical and electronic circuits... Fuse Links, Fuse Holders, and Fusegear, all readily available from manufacturing sites in the United Kingdom, Denmark, United States, Brazil and Mexico.



Bussmann is a division of Cooper Industries Inc.,

a diversified world-wide manufacturer of electrical products and power equipment.

Bussmann has grown through both organic growth and acquisition.

Acquisitions have included the fusegear division of LK-NES, Beswick which added UK Domestic fuses as well as IEC and UL Electronic fuses, Hawker Fusegear (*formally Brush Fusegear Ltd.*) which strengthened our range of power fuses and Fusegear.



Bussmann circuit protection solutions comply with major international standards: BS, IEC, DIN and UL, CSA..... Our manufacturing operations have earned ISO 9000 certification, ensuring the utmost quality across every product.



Square Body

690V High-Speed Full Range Fuses from Bussmann

Cooper Bussmann has developed a new range of High-Speed Fuses mechanically in accordance with DIN 43 620. These High-Speed Fuses are rated at 690V and provide full range protection.

Combining Two in One



The High-Speed Full Range fuses offer both short circuit and overload protection.

The new range offers the following advantages:

Full Range overcurrent protection, providing both overload and short circuit protection.

Low operating I²t values.

Reducing the number of components, lowering the panel space requirements.

Low watts loss.

Ease of installation and replacement.

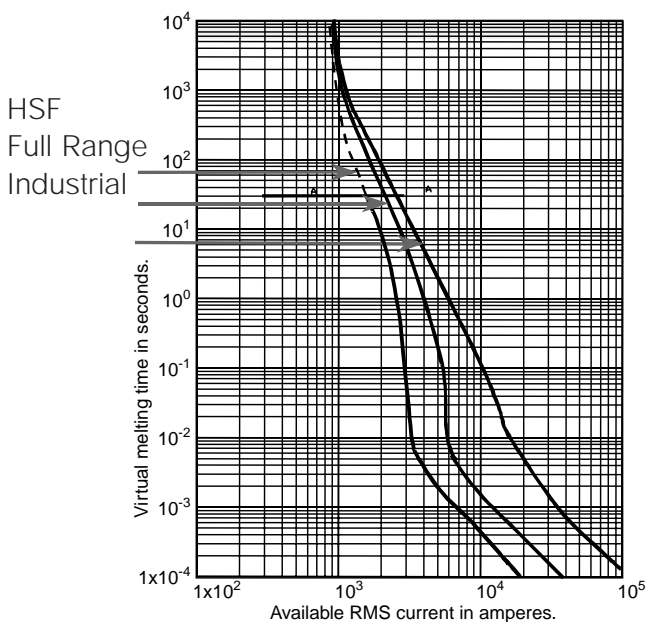




Square Body

This new series offers the designer more flexibility in selecting a fuse for circuit protection.

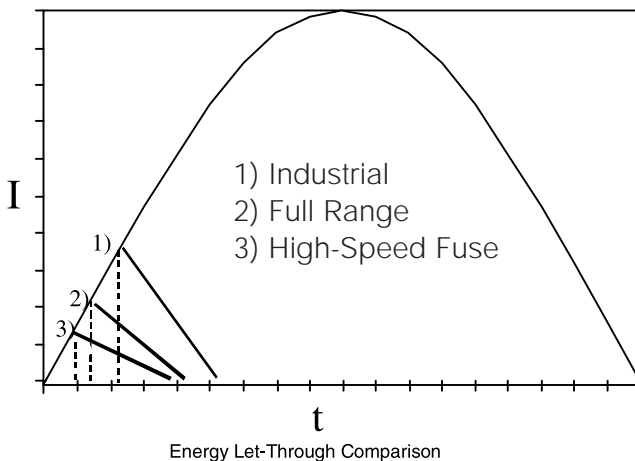
In the short circuit area, the fuse will behave with a superior performance to the gG category designs, and have low I^2t values. In the overload area the characteristic complies with the standard gG requirements.



Although the new range of fuses have a slightly higher I^2t than the aR type High-Speed fuses, it offers the designer a possibility to combine overload protection and short circuit protection in one fuse.

The mechanical forces released under a severe short circuit fault will be significantly reduced with High-Speed Fuses.

Applications with high fault levels normally require a combination of gG and aR fuses in series to provide adequate protection. The 690 volt High-Speed Full Range fuse can provide a single fuse solution.



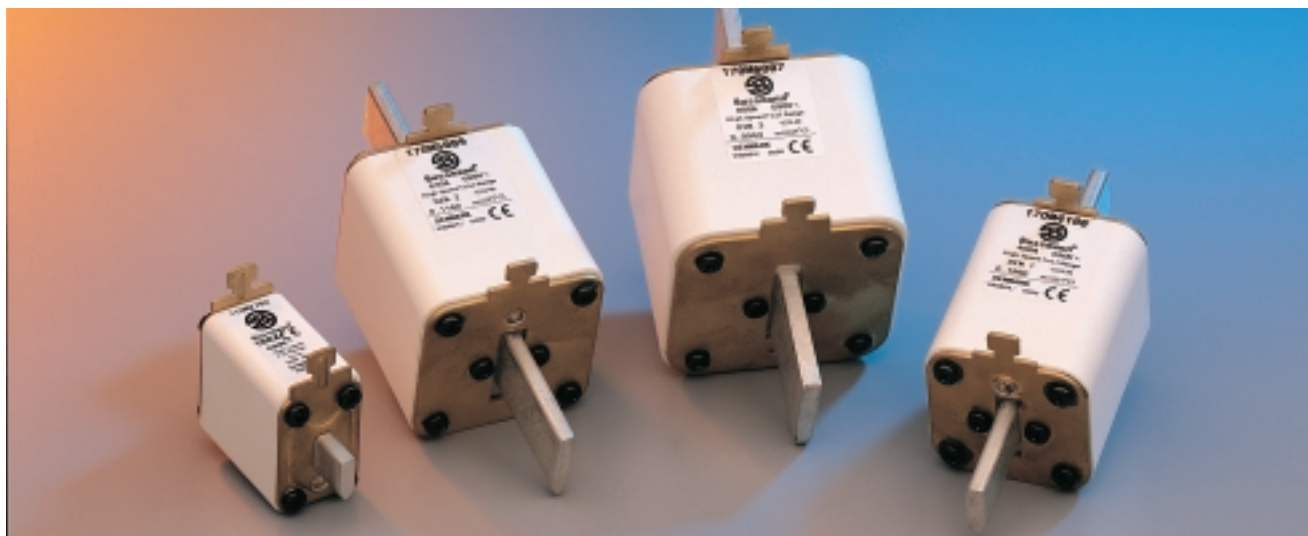
Also a range of DIN 43 620 bases are available to complement the High-Speed Full Range fuses, minimising space requirements and ease of installation. Thus, this range of gR fuses, provides cost reduction opportunities compared to the traditional designs utilising a combination of aR and gG fuses in series.

For more details on bases, please see page 4.





Square Body 690V High-Speed Full Range



Introduction

These fast acting 690V High-Speed Full Range fuses are designed for overload and short circuit protection. Design and construction are unique: Operating temperature and watts loss are kept very low, and operating I^2t is held to a minimum. Relative to their power handling capacity, this range of fuses offers a very attractive combination of compact design and electrical performance.

General Information

Electrically designed and tested to IEC 60269 Part 1 & 4. Mechanically in accordance with DIN 43 620. The 690V High-Speed Full Range fuses in this catalogue are complementary to the Bussmann standard range of fuses in the HSFL-97/98 catalogue.

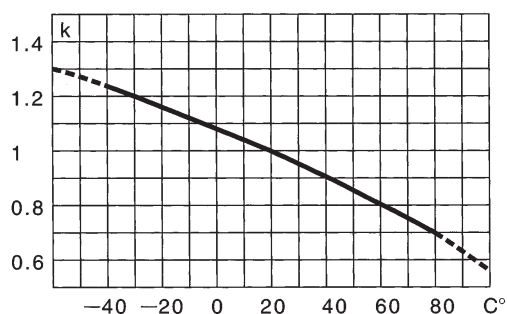
Rated AC Voltage

The 690V High-Speed Full Range fuses are tested in accordance to IEC 60269 Part 1 & 4. The fuses detailed in this publication have been tested at 690V +10%. In North America, fuses are qualified for 700V AC.

Rated Current

The rated current value of these Bussmann fuses is based on the conditions according to IEC 60269 at 20°C. The following graph gives correction factors (k) for a range of temperatures (-40°C to +80°C).

Temperature Correction Curve



Maximum permissible continuous load currents can be calculated by applying the following formula:

$$I_b = I_n \times k \times (1 + 0.05 v)$$

Where

I_b = Maximum permissible continuous load current

I_n = Rated current of fuse

k = Temperature correction factor

v = Velocity of cooling air in m/s ≤ 5 m/s)

Velocities above 5 m/s do not have any additional impact on the maximum permissible load current.

The maximum permissible continuous load current I_b of a fuse can be checked by making simple voltage and temperature measurements under actual operating conditions after the fuse has been installed in its operating location and loaded at the calculated I_b value:





Square Body

690V High-Speed Full Range

$$\frac{E_2}{E_1} \times (0.92 + 0.004t) \leq 1.6$$

Where

E_1 = Voltage drop across fuse after 5 seconds

E_2 = Voltage drop across fuse after 2 hours

t = Air temperature at start of test (°C)

Mechanical Characteristics

The 690V High-Speed Full Range fuses are blade type fuses according to DIN 43 620. These fuses are for mounting in open fuse bases. The fuses have tags for fuse handle (puller) and for clip-on microswitch.

Rated Frequency

The characteristics and data given in this publication are valid for frequencies between 45 and 62 Hz. No derating of maximum working voltage and maximum permissible load current between 45 and 1000 Hz is necessary. For other frequencies please see our technical bulletin.

The High-Speed Full Range fuse contains no magnetic end plates and the fuses can thus be used up to 1000 Hz. However, the published data has to be adjusted below 45 Hz and beyond 62 Hz. Please contact Bussmann for application assistance.

DC Operation

The 690V High-Speed Full Range fuses can be used in circuits where DC-faults may occur. The maximum allowable DC-voltage will depend on the nature of the short circuit together with the di/dt of the prospective DC-fault current. Please contact Bussmann for additional information and application assistance.

Protection Class

These fuses are especially designed to give both short circuit and overload protection and thus combining the performance of aR and gG. In general terms this is often referred to as full range protection, gR.

Accessories

Microswitch

For these 690V High-Speed Full Range fuses, two different microswitches are available:

170H0236 (6,3 x 0,8 mm lugs)

170H0238 (2,8 x 0,5 mm lugs)

The microswitches have one normally open, and one normally closed contact. Ratings are 2A, 250VAC.

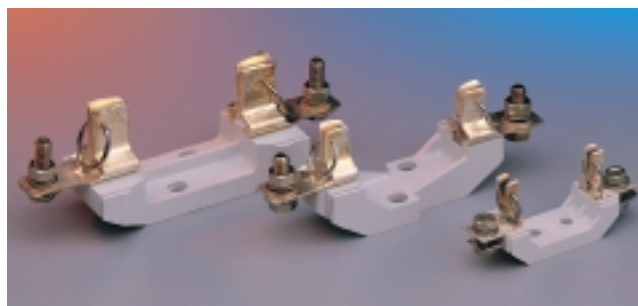
Fuse Puller

170D0029 or 630

Fuse Bases

The 690V High-Speed Full Range fuses have been thermally tested in the appropriate fuse bases, according to guidelines in IEC 60269 Part 1. The recommended bases have full amperage capacity under IEC conditions.

In order to avoid overheating or damage to fuse or fuse base in the actual application, please refer to Bussmann's technical bulletin for guidelines on selecting the rated current of the fuse.



The fuse bases are rated 690V.

Order number	Body Size	Type
170H3040:	DIN 00	Single Pole
170H3041:	DIN 1	Single Pole
170H3042:	DIN 2	Single Pole
170H3043:	DIN 3	Single Pole
170H3044:	DIN 00	Triple Pole
170H3045:	DIN 1	Triple Pole
170H3046:	DIN 2	Triple Pole
170H3047:	DIN 3	Triple Pole



Square Body - DIN 43620
690V (IEC) 10-800A

Size	Electrical Characteristics				Ordering Information			Curves
	Rated Current RMS-Amps	I ² t (A ² s)		Watts Loss	Type T Indicator for Micro	Carton Qty.	Carton Weight (kg)	See Page or (BIF #)
		Pre-arc	Clearing at 690V					
DIN 00	10	3.8	20	3.5	170M2691	6	1.5	Page 7 or (17056412)
	16	7.2	38	5.5	170M2692			
	20	13	70	6	170M2693			
	25	24	125	8	170M2694			
	32	53	275	9	170M2695			
	40	95	490	10	170M2696			
	50	185	1000	11	170M2697			
	63	345	1800	14	170M2698			
	80	695	3600	16	170M2699			
	100	1250	6650	19	170M2700			
	125	2300	12000	23	170M2701			
160	4350	22500	29	170M2702				
DIN 1	50	135	705	12	170M4176	3	2	Page 7 or (17056416)
	63	245	1300	15	170M4177			
	80	500	2600	17	170M4178			
	100	950	4850	20	170M4179			
	125	1850	9500	23	170M4180			
	160	3450	18000	28	170M4181			
	200	6750	34500	31	170M4182			
	250	13500	70500	35	170M4183			
	315	26000	135000	41	170M4184			
	350	34000	175000	45	170M4185			
400	48500	250000	48	170M4186				
DIN 2	200	5650	29000	33	170M5881	3	2.3	Page 8 or (17056418)
	250	10000	52500	40	170M5882			
	315	19500	105000	46	170M5883			
	350	26000	135000	50	170M5884			
	400	39500	205000	53	170M5885			
	450	55500	290000	59	170M5886			
	500	73000	375000	66	170M5887			
	550	100000	515000	70	170M5888			
630	150000	770000	79	170M5889				
DIN 3	350	23000	120000	55	170M6080	1	1.2	Page 8 or (17056420)
	400	34000	175000	59	170M6081			
	450	48500	250000	62	170M6082			
	500	64000	330000	67	170M6083			
	550	84500	435000	70	170M6084			
	630	125000	645000	85	170M6085			
	700	160000	840000	93	170M6086			
800	245000	1300000	99	170M6087				

1 kg = 2.2 lbs. 1 lb = 0.45 kg

- Interrupting rating 300kA RMS Symmetrical.
- Watts loss provided at rated current.
- Microswitch ordered separately. See accessories on page 4.

Rated Current

The rated current of this fuse range is given with open fuse bases connected to copper conductors according to IEC 60269 Part 1, table 10.

When used in enclosed fuse bases/disconnects, derating factors have to be observed.

Please contact Bussmann for application assistance.



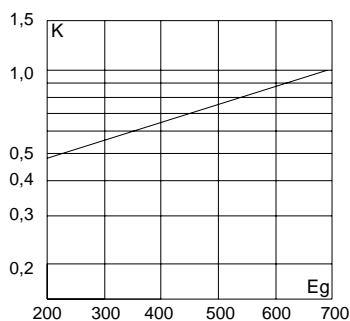


Square Body - DIN 43620
690V (IEC) 10-800A

Electrical Characteristics

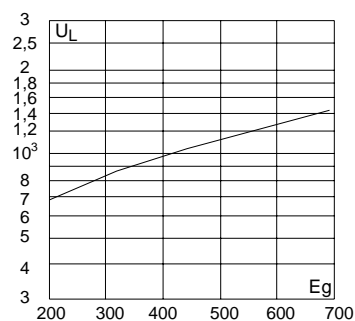
Total clearing I²t

The total clearing I²t at rated voltage and at power factor of 15% are given in the electrical characteristics. For other voltages, the clearing I²t is found by multiplying by correction factor, K, given as a function of applied working voltage, E_g, (RMS).



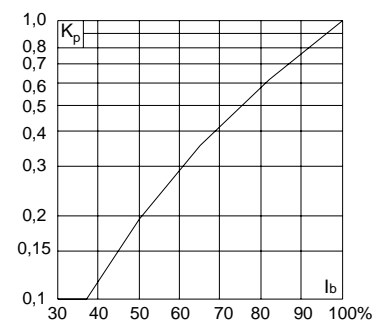
Arc Voltage

This curve gives the peak arc voltage, U_L, which may appear across the fuse during its operation as a function of the applied working voltage E_g, (RMS) at a power factor of 15%.



Power Losses

Watts loss at rated current is given in the electrical characteristics. The curve allows the calculation of the power losses at load currents lower than the rated current. The correction factor, K_p, is given as a function of the RMS load current, I_b, in % of the rated current.

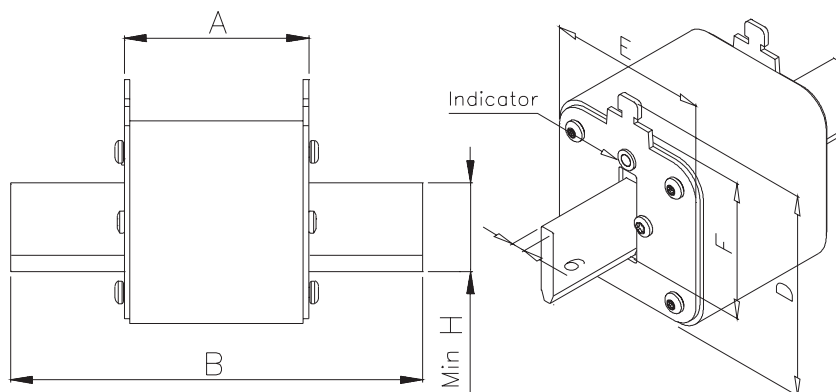


Dimensions

DIN 43 620: Type DIN 00, DIN 1, DIN 2, DIN 3

Size	A	B	Max D	Max E	F	Min H
00	49	78.5	60	30	35	15
1	68	135	66	52	40	20
2	68	150	74	60	48	25
3	68	150	89	75	60	32

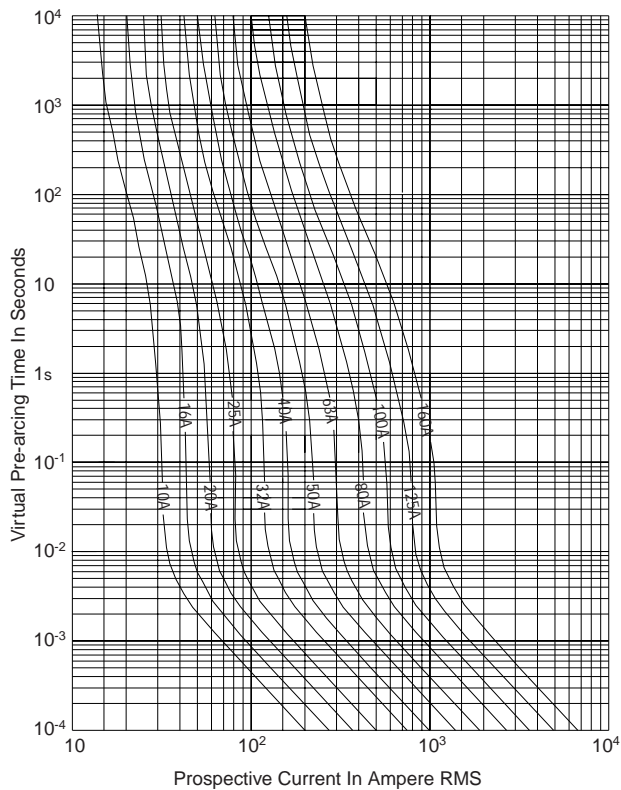
Dimensions in mm
 1 mm = 0.0394" 1" = 25.4 mm



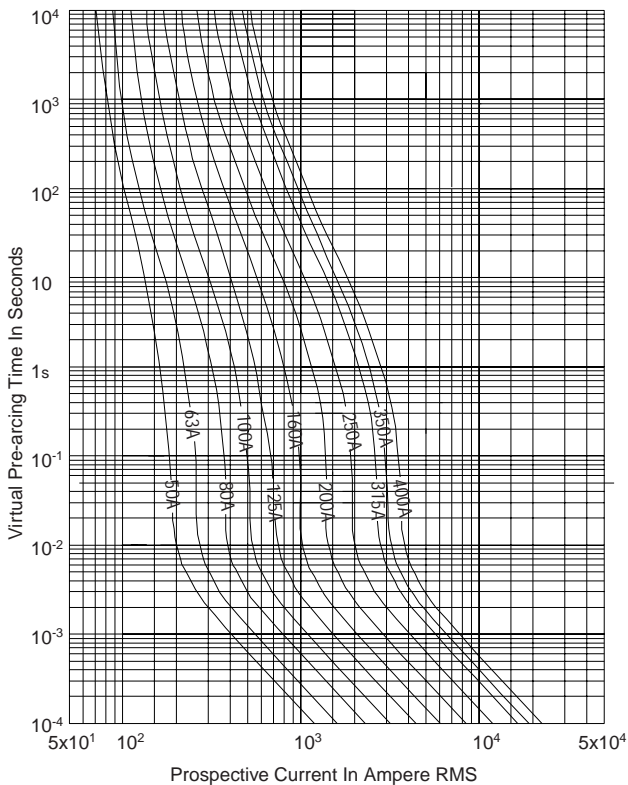


Square Body Curves

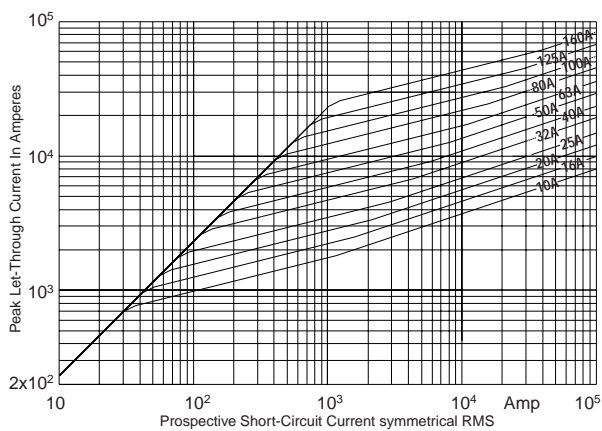
Size 00: 10-160A
Time-Current Curve



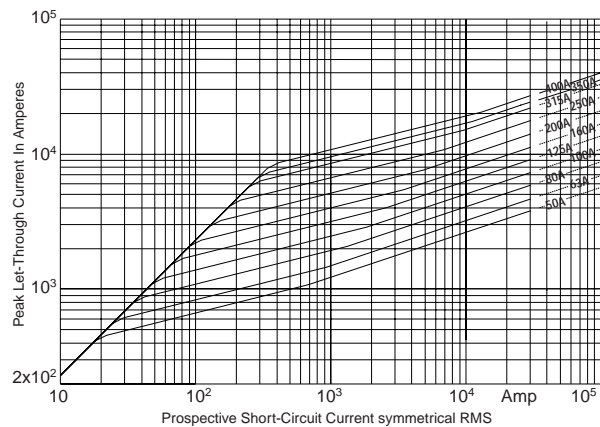
Size 1: 50-400A
Time-Current Curve



Peak Let-Through Curve



Peak Let-Through Curve

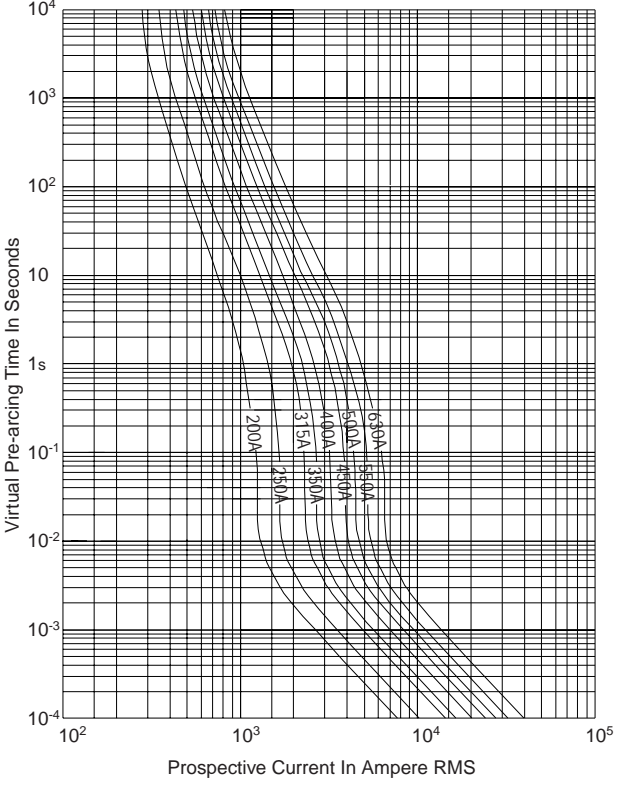


For complete specification data, visit our Web site at www.bussmann.com
or call Bussmann information Fax - 314.527.1450

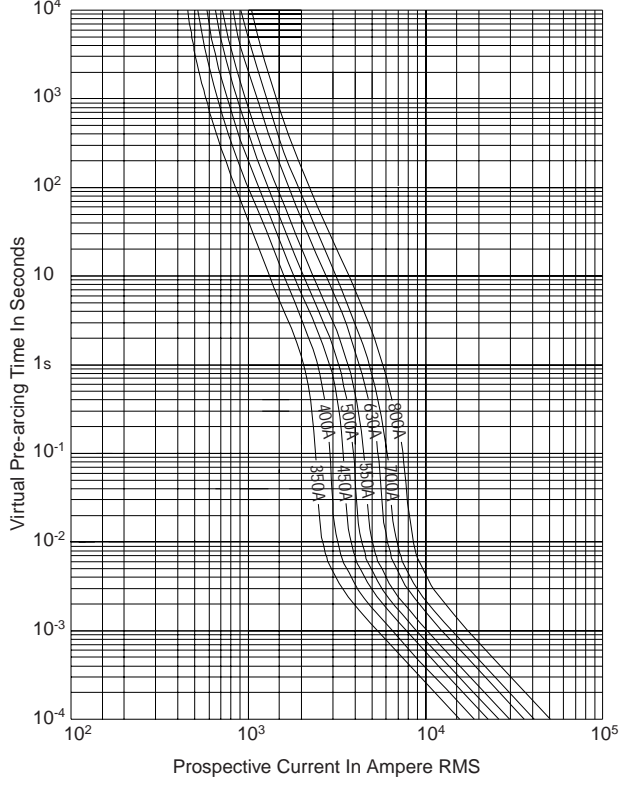


Square Body Curves

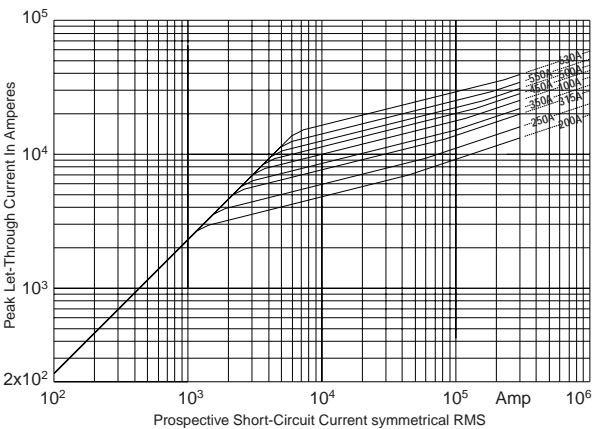
Size 2: 200-630A
Time-Current Curve



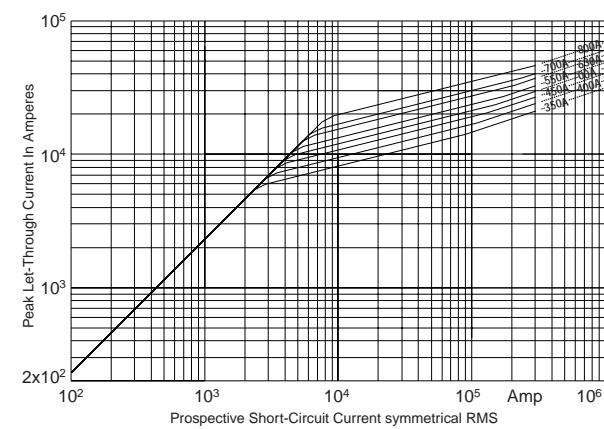
Size 3: 350-800A
Time-Current Curve



Peak Let-Through Curve



Peak Let-Through Curve



BUSSMANN OFFICES AROUND THE WORLD

EUROPEAN HEADQUARTERS

Bussmann Division
Cooper (UK) Limited
Burton-on-the-Wolds
Leicestershire LE12 5TH, UK
Telephone: + 44 (0) 1509 88 27 37
Facsimile: + 44 (0) 1509 88 27 86

HEADQUARTERS

Cooper Industries
Bussmann Division
P.O. box 14460
St. Louis, Missouri 63178-4460, USA
Telephone: + 1 314 394 2877
Facsimile: + 1 800 544 2570

Bussmann in Denmark

Bussmann International Inc.
Literbuen 5
DK-2740 Skovlunde
Copenhagen
Denmark
Telephone: + 45 44 85 09 00
Facsimile: + 45 44 85 09 03

Bussmann in Mexico

Arrow-Hart S.A. de C.V.
Poniente 148, No. 933
02300 Mexico, D.F. Mexico
Telephone: + 52 5 587 02 11
Facsimile: + 52 5 567 4893

Bussmann in Australia

Bussmann Australia
Block X
391 Park Road
Regents Park
NSW 2143
Australia
Telephone: + 61 2 9743 8333
Facsimile: + 61 2 9743 8070

Bussmann in Brazil

Bussmann das Brazil Ltda
Rodovia Santos Dumont, Km 23
Cruz das Almas
Itu-Sao Paulo 13 300-000
Brazil
Telephone: + 55 11 7824 1856
Facsimile: + 55 11 7824 1721

Bussmann in India

Bussmann India
Cooper (U.K.) Limited
SF-5 White House
23-29 St. Marks Road
Bangalore 560001
India
Telephone: + 91 80 227 0893
Facsimile: + 91 80 224 0124

Bussmann Circuit Components

73000 West Wilson Avenue
Chicago, IL 60656-4793, USA
Telephone: + 1 708-867-4600
Facsimile: + 1 708-867-2211

Bussmann Asia Pacific

Bussmann International, Inc., USA
Singapore Branch
1 Jalan Kilang Timor
#06-01 Pacific Tech Centre
Singapore 159303
Republic of Singapore
Telephone: + 65 278 6151
Facsimile: + 65 278 3151

This bulletin is intended to clearly present comprehensive product data and provide technical information that will help the end user with design application. Bussmann reserves the right to change design or construction of any products. Bussmann also reserves the right to change or update, without notice, any technical information contained in this bulletin. Once a product has been selected, it should be tested by the user in all possible applications.

Bussmann®

CIRCUIT PROTECTION SOLUTIONS

Bussmann are one of the world's leading suppliers of fuses and fusible protection systems. Provider of the world's first truly global product line, each product is backed by an efficient world-wide distribution network service and unrivalled technical support. Bussmann circuit protection solutions comply with major international standards: BS, IEC, DIN and UL.

Bussmann high speed fuses use advanced materials and technology. The products are specifically designed for protecting power semiconductors.

HSFR-99

Bussmann Division

Cooper (UK) Limited · Burton-on-the-Wolds
Leicestershire · LE12 5TH UK
Telephone: 44 (0) 1509 882 737
Facsimile: 44 (0) 1509 882 786
<http://www.bussmann.com>



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