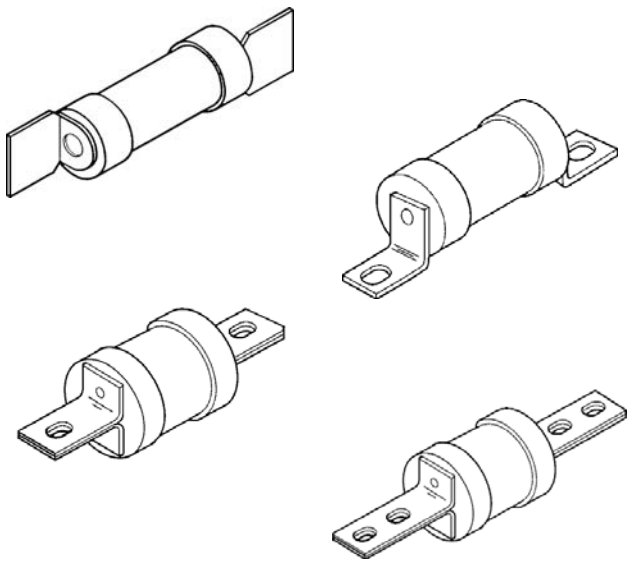
DIMENSIONS & ELECTRICAL CHARACTERISTICS

Bussmann

British Standard Low Voltage Fuse Links BSLV

Class of Operation gL/gG, 240 / 415V / 550V / 690V AC, 2 - 1250 Amps
Sizes : E1, F1, F2, A1 to A4, B1 to B4, C1 to C3



Standards / Approvals : IEC 60269, BS 88, IS : I3703

Description : Round Body, BS type LV industrial fuse links for wide variety of applications

Technical Data :

Class of operation	: gL/gG
Rated Volage	: 690 / 550 / 415 / 240
Rated Breaking Capacity	: 80kA
Rated Frequency	: 50Hz
Operating Frequency	: 45 - 62Hz
Design - Insulator	: Stealite
- Metal Parts	: Corrosion-proof (aluminium)

Mounting Types
- Offset : Clip on type
  : Bolted
- Centre Bolted : 2 Hole Mounting
  : 4 Hole Mounting

BS Type Fuses - Range & Selection Table

Breaking Capacity - 80kA for all, at respective rated AC voltage

BS Size	660 Volts Range	550 Volts Range	415 Volts Rangs	Fuse Base	Cross Reference
E1	-	-	SSD, 2-32A#	-	SS
F1	-	NSD, 2-32A	-	FA,FB,FD,NNNSF	NS
F2	-	ESD, 2-32A	ESD, 40-63A	ENSF	ES
-	-	EITD, 2-32A	EITD, 40-63A	-	EIT
A1	-	NITD, 2-32A	-	CM20F, CM32FC	NIT
A2	H07-660, 2-32A	AAO, 2-32A	-	HA,HD,CM32F	TIA, TSA
A3	K07-660, 40-63A	BAO, 35-63A	-	KA, KD, CM63F	TIS, TSS
-		OSD, 80-100A	-	CM100F	TSDS
A4	L14-660, 80-100A	CEO, 32-100A	-	LA,LD	TCP, TSD
-	M14-660, 125-200A	-	DEO, 125-200A	LA, LD@	TFP, TSFP
B1	L09-660, 80-100A	-	CD, 80-100A	-	TC, TSDC
B2	M09-660, 125-200A	-	DD, 125-200A	-	TF, TSF
B3	N09-660, 250-315A	-	ED, 250-315A	-	TKF, TSF, TSK
B4	P09-660, 355-400A	-	ED, 355-400A	-	TMF
-	-	-	SN11S, 355-400A	-	TSMS
-	-	-	SP11S, 450-500A	-	TSTS
-	-	-	SR11S, 560-800A	-	TSLS
C1	P11-660, 355-400A	-	EF, 355-400A	-	TM, TSM
C2	R11-660, 450-630A	FF, 450-630A	-	-	TTM, TST
C3	-	GF, 710-800A	SR11, 710-800A	-	TLM, TSL
-	-	GG, 710-1250A	-	-	-

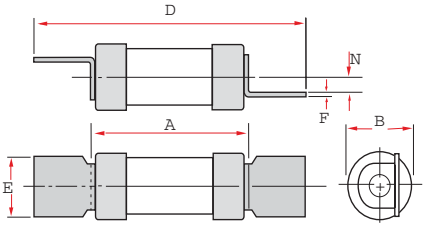
#- SSD 2-32 : Rated voltage 240V, breaking capacity - 33KA.
@- Rated upto 125A only

Note : Bussmann offers some more LV BS88 type fuse to meet the specific needs of customers. Visit www.bussmann.com and www.bussmann.co.uk to look for complete offerings from Bussmann.

British Standard Low Voltage Fuse Links BSLV

Class of Operation gL/gG, 240 / 415V / 550V / 690V AC, 2 - 800 Amps
Sizes : E1, F1, F2, A2 to A4, B1 to B4, C1 to C2

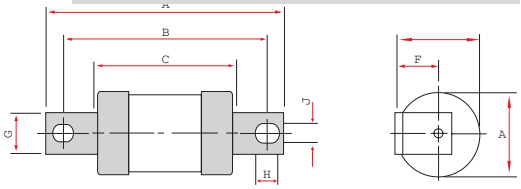
Dimensional Data - Offset Bladed Tag Clip on Type



Part No.	Dimensions (mm)						Size as per BS88
	A	B	D	E	F	N	
SSD	23.0	12.0	47.0	13.0	0.8	3.2	E1
NSD	34.5	13.8	58.5	12.7	0.8	3.5	F1
ESD 2 - 32A	35.5	13.8	68.0	15.0	1.2	3.5	F2
ESD40 - 63A	35.5	17.5	68.0	15.0	1.2	3.5	F2

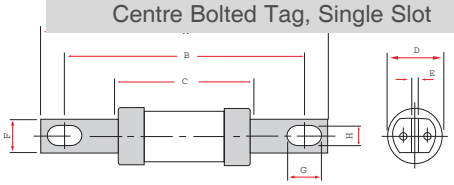
Dimensional Data - Special 500V DC Range

Offset Bolted Tag, Closed Slot



Part No.	Dimensions (mm)								Size as per BS88
	A	B	C	D	F	G	H	J	
HS07	86.0	73	54.0	22.0	0.8	9.2	8.0	5.0	-
KS07	91.0			27.0	1.2	13.0	10.5		-

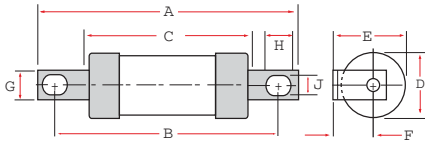
Centre Bolted Tag, Single Slot



Part No.	Dimensions (mm)								Size as per BS88
	A	B	C	D	E	F	G	H	
KS08	113.0	98	56.0	27.0	2.5	13.0	13.0	5.0	-
KS09	138.0	111				14.5	15.0	8.0	-

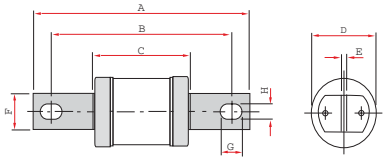
Dimensional Data - 660V Range

Offset Bolted Tag, Closed Slot



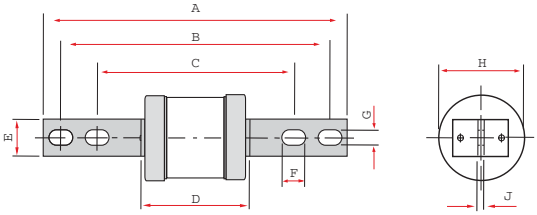
Part No.	Dimensions (mm)									Size as per BS88
	A	B	C	D	E	F	G	H	J	
H07-660	82.3	73	52.0	22.0	22.4	11.5	8.7	7.7	5.4	A2
K07-660	86.0	73	54.2	25.8	26.9	14.0	12.7	10.5	5.5	A3
L14-660	111.0	94	67.0	35.5	37.0	19.2	19.0	10.3	8.7	A4
M14-660	112.0	94	66.0	38.0	38.0	19.0	19.0	10.0	8.5	-

Centre Bolted Tag, Single Slot



Part No.	Dimensions (mm)								Size as per BS88
	A	B	C	D	E	F	G	H	
L09-660	136.0	111	65.5	35.5	3.2	19.0	15.1	8.7	B1
M09-660	135.0	111	65.0	37.0	3.2	19.0	15.0	8.7	B2
N09-660	135.0	111	73.0	49.0	3.2	25.4	12.7	9.5	B3
P09-660	135.5	111	75.0	58.5	4.7	25.4	12.7	9.5	B4

Centre Bolted Tag, Double Slot



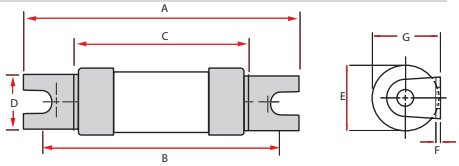
Part No.	Dimensions (mm)									Size as per BS88
	A	B	C	D	E	F	G	H	J	
P11-660	212	184	133	75.0	25.4	16.0	10.0	59.0	5.0	C1
R11-660	210	184	133	76.0	26.0	16.0	10.0	74.0	6.5	C2

British Standard Low Voltage Fuse Links BSLV

Class of Operation gL/gG, 240 / 415V / 550V AC, 2 - 1250 Amps
Sizes : A1 to A4, B1 to B4, C1 to C3

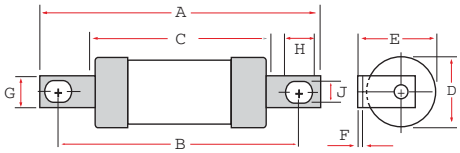
Dimensional Data - 550V Range

Offset Bolted Tag, Open Slot



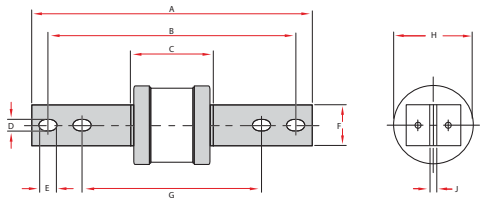
Part No.	Dimensions (mm)							Size as per BS88
	A	B	C	D	E	F	G	
NITD	55.0	44	34.6	11.2	13.8	0.8	14.0	A1
EITD	45.0	35	24	11	11.2			-

Offset Bolted Tag, Closed Slot



Part No.	Dimensions (mm)									Size as per BS88
	A	B	C	D	E	F	G	H	J	
AAO	85	73	35.5	13.7	14	1.2	8.7	8.0	5.5	A2
BAO	87	73	54.5	21	22.5	1.2	12.7	8.0	5.5	A3
OSD	95.0	73	54.5	21.0	22.5	1.2	12.7	8.0	5.5	-
CEO	110	94	58.5	21.0	24.5	3.2	14.3	11.0	8.7	A4

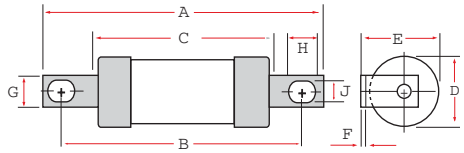
Centre Bolted Tag, Double Slot



Part No.	Dimensions (mm)									Size as per BS88
	A	B	C	D	E	F	G	H	J	
FF	210	184	77.5	10.5	15.5	25.4	133	74.0	6.4	C2
GF	210	184	80.5	10.5	15.5	25.4	133	83.0	9.5	C3
GG710 & 800	262	231	77.5	10.5	15.5	38.0	165	83.0	6.5	-
GG1000 & 1250	262	228.5	84.0	10.5	15.5	38.0	165	100	12.7	-

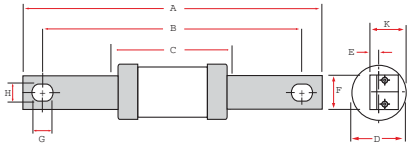
Dimensional Data - 415V Range

Offset Bolted Tag, Closed Slot

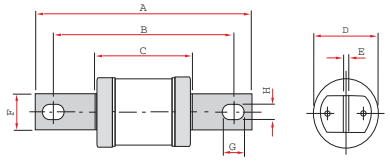


Part No.	Dimensions (mm)									Size as per BS88
	A	B	C	D	E	F	G	H	J	
DEO	110	94	47.0	31.0	29.5	3.2	19.0	10.0	9.0	-

Centre Bolted Tag, Single Slot

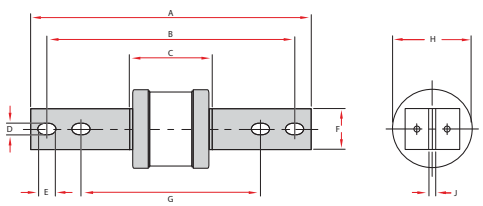


Part No.	Dimensions (mm)									Size as per BS88
	A	B	C	D	E	F	G	H	K	
CD	126	111	58.5	21.0	3.2	14.3	11.1	8.7	19.5	B1
DD	136	111	47.0	31.0	3.2	19.0	12..5	9.0	22.5	B2
ED250	136	111	47.0	31.0	4.7	19.0	12.5	9.0	22.5	B3
ED315	136	111	50.0	38.0	4.7	25.4	12.5	9.0	31.0	B3
ED355 & 400	136	111	75.0	59.0	4.7	25.4	12.5	9.0	31.0	B4



Part No.	Dimensions (mm)								Size as per BS88
	A	B	C	D	E	F	G	H	
SN11(S)	57.5	133	163	49.1	4.8	25.4	16	11	-
SP11(S)	58.5	133	163	60	6.5	26	16	11	-
SR11(S)	62.5	133	163	73.2	10	26	16	11	-

Centre Bolted Tag, Double Slot



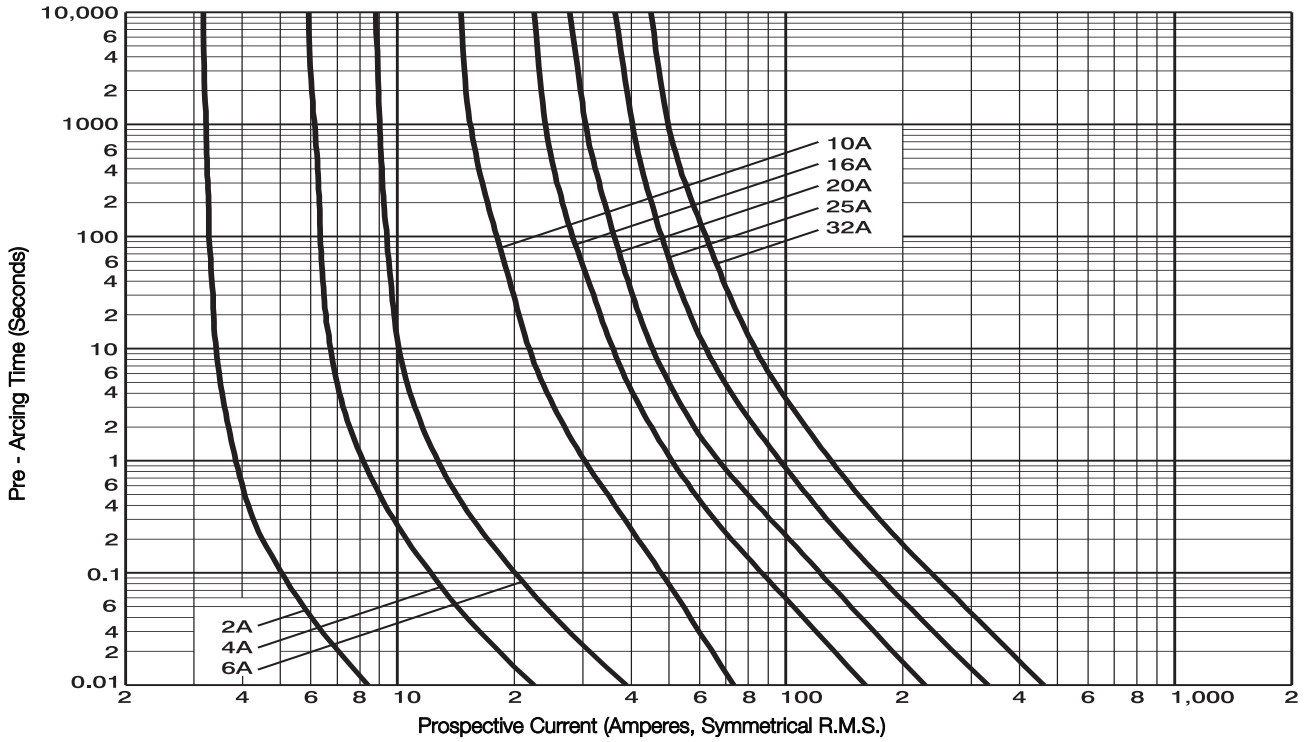
Part No.	Dimensions (mm)									Size as per BS88
	A	B	C	D	E	F	G	H	J	
EF	209	184	50.0	10.5	12.5	25.4	133	38.0	4.7	C1
SR11	212	184	62	11	16	10	133	73.2	11	

British Standard Low Voltage Fuse Links BSLV

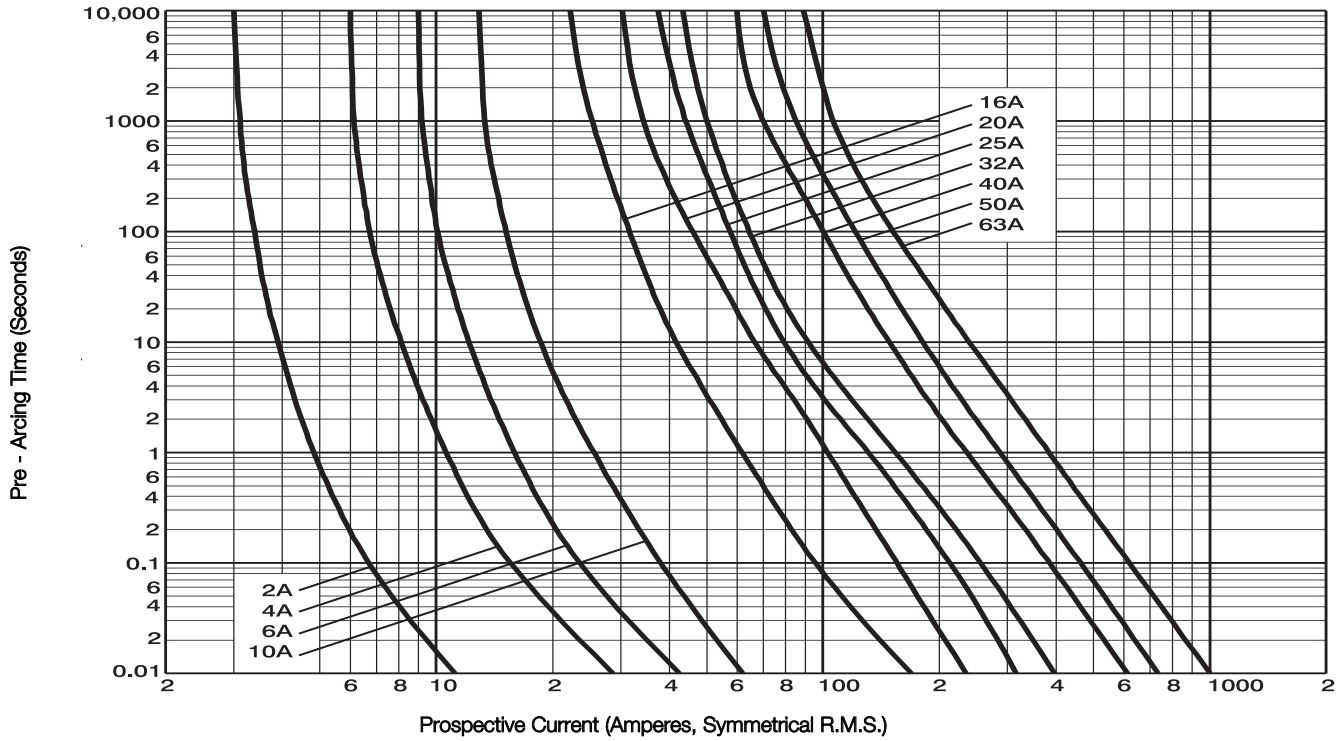
Class of Operation gL/gG, 240 / 415V / 550V AC, 2 - 63 Amps
Sizes : E1, F1, F2, A1

Time - Current Characteristics Curves

SSD Range of Fuse Links



NSD, ESD , NITD and EITD Range of Fuse Links

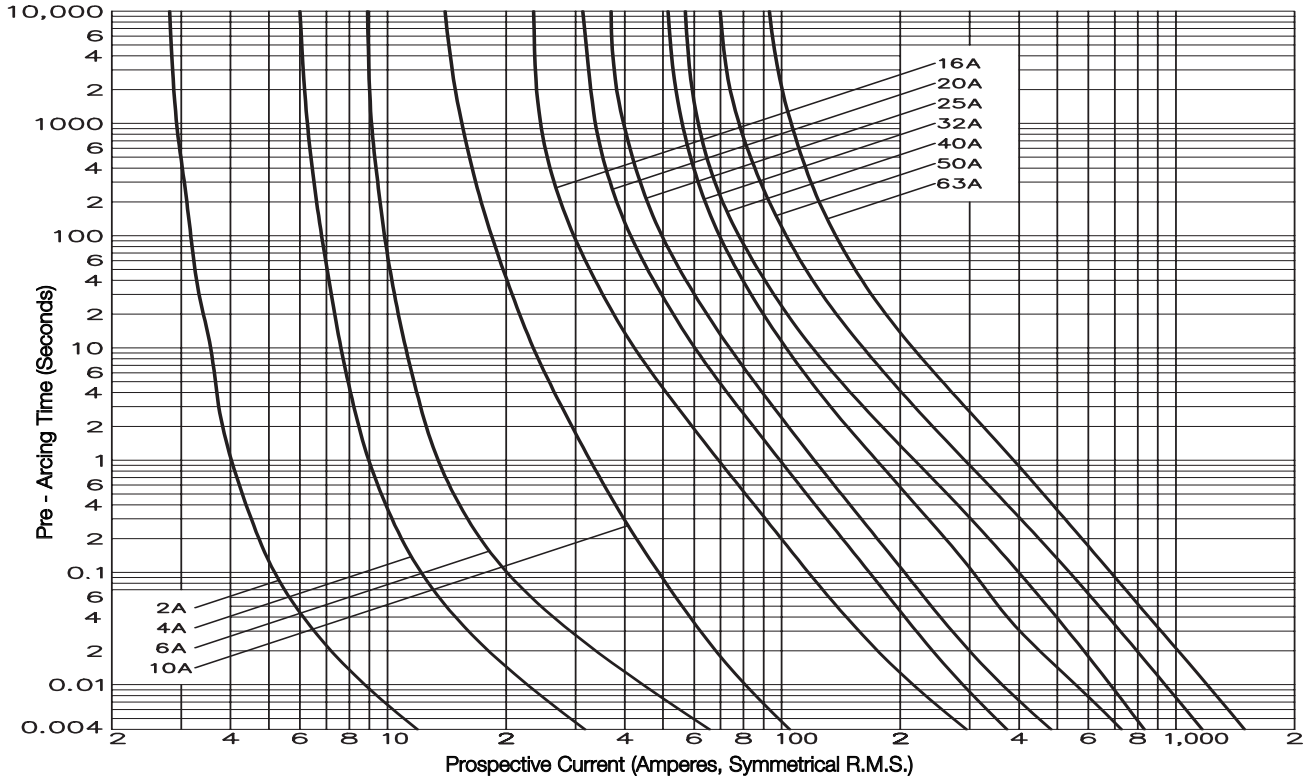


British Standard Low Voltage Fuse Links BSLV

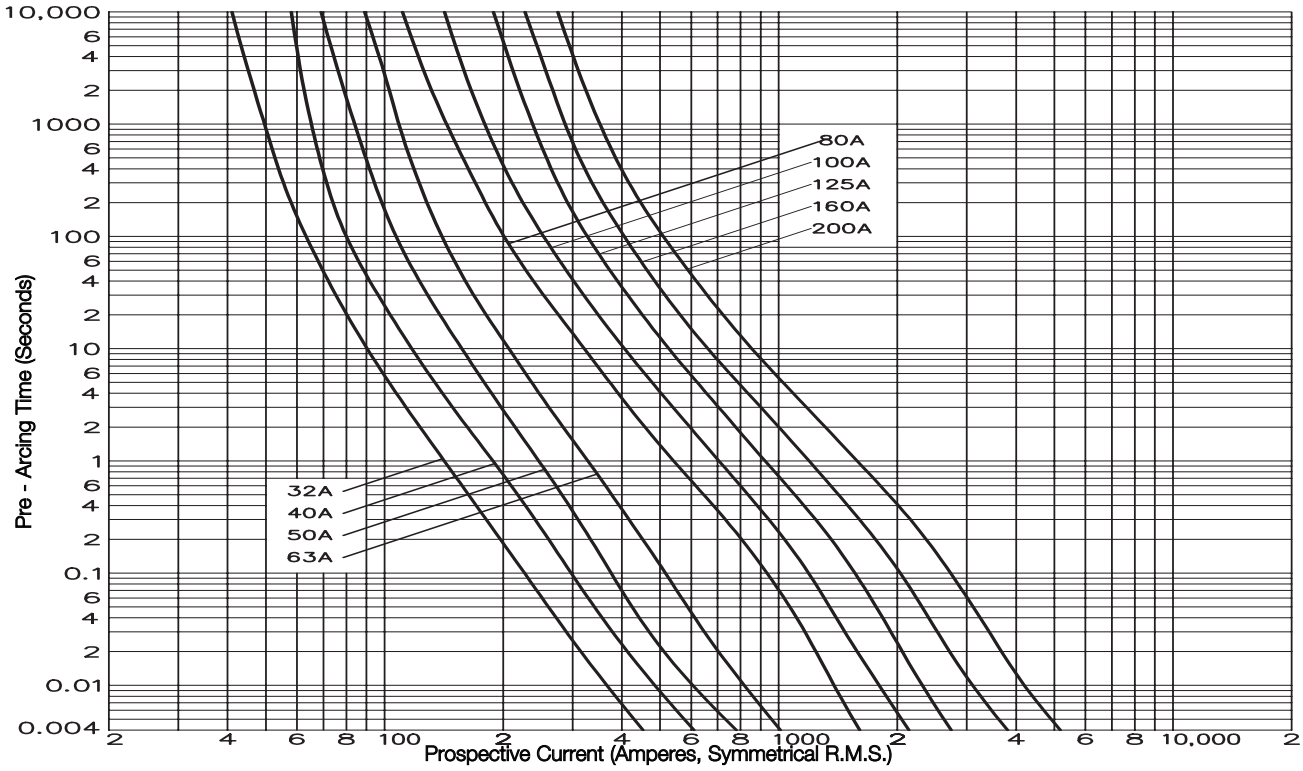
Class of Operation gL/gG, 690V AC, 2 - 200 Amps
Sizes : A2 to A4, B1 to B2

Time - Current Characteristics Curves

HO7 & KO7 Range of Fuse Links



LO9, L14, MO9 & M14 Range of Fuse Links

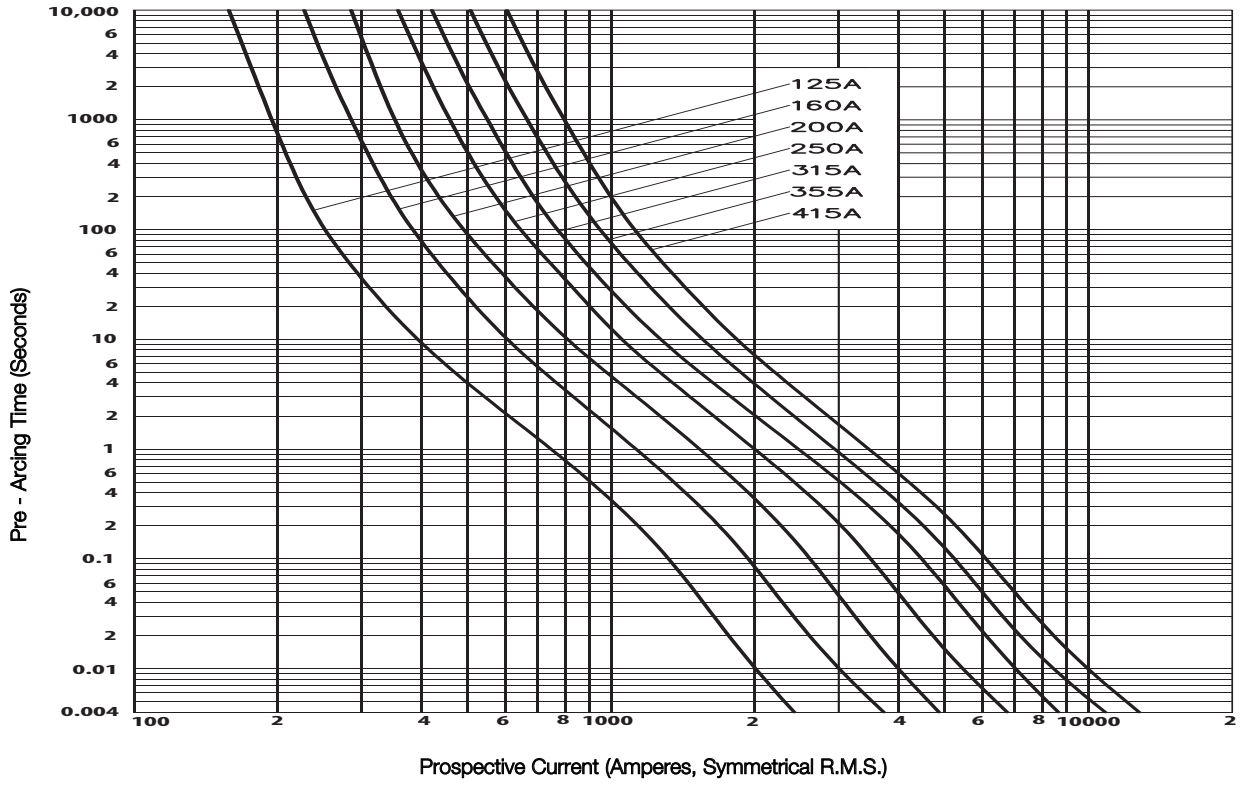


British Standard Low Voltage Fuse Links BSLV

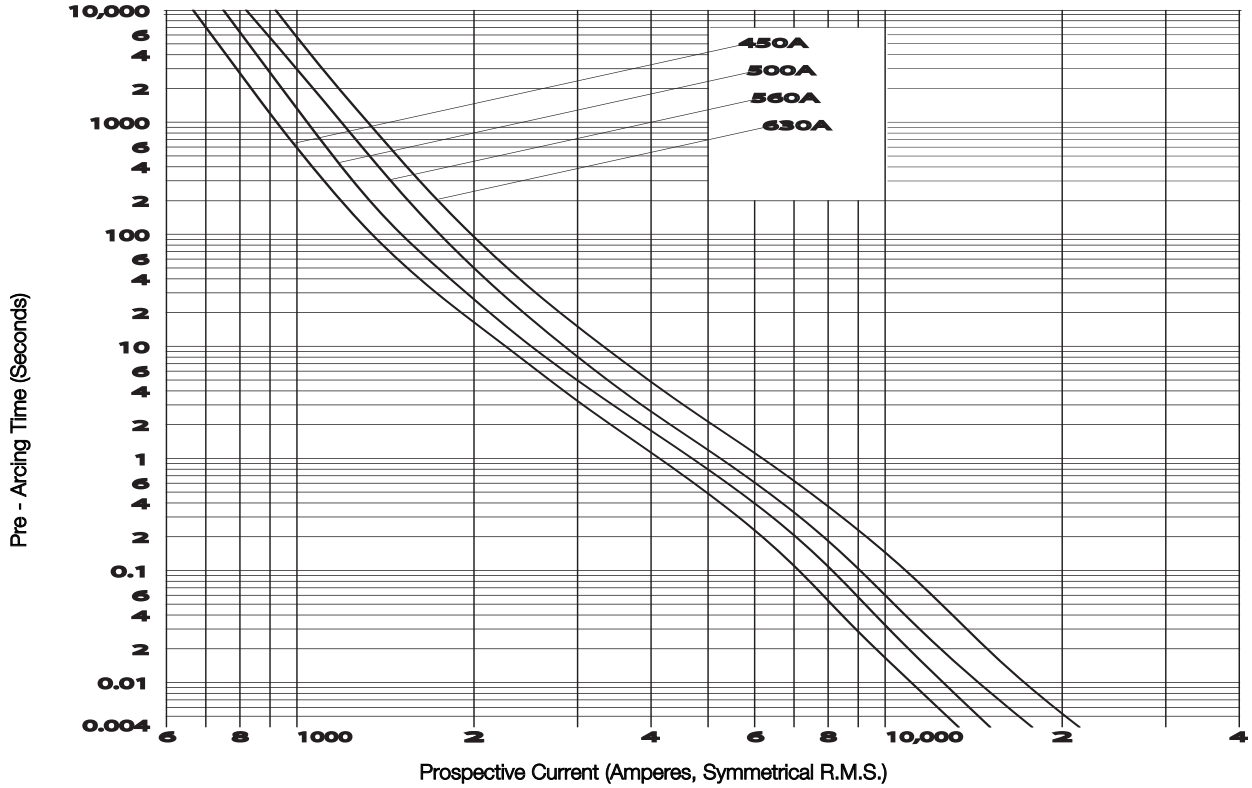
Class of Operation gL/gG, 240 / 415V / 550V / 690V AC, 2 - 1250 Amps
Sizes : E1, F1, F2, A1 to A4, B1 to B4, C1 to C3

Time - Current Characteristics Curves

NO9, PO9 & P11 Range of Fuse Links



R11 Range of Fuse Links

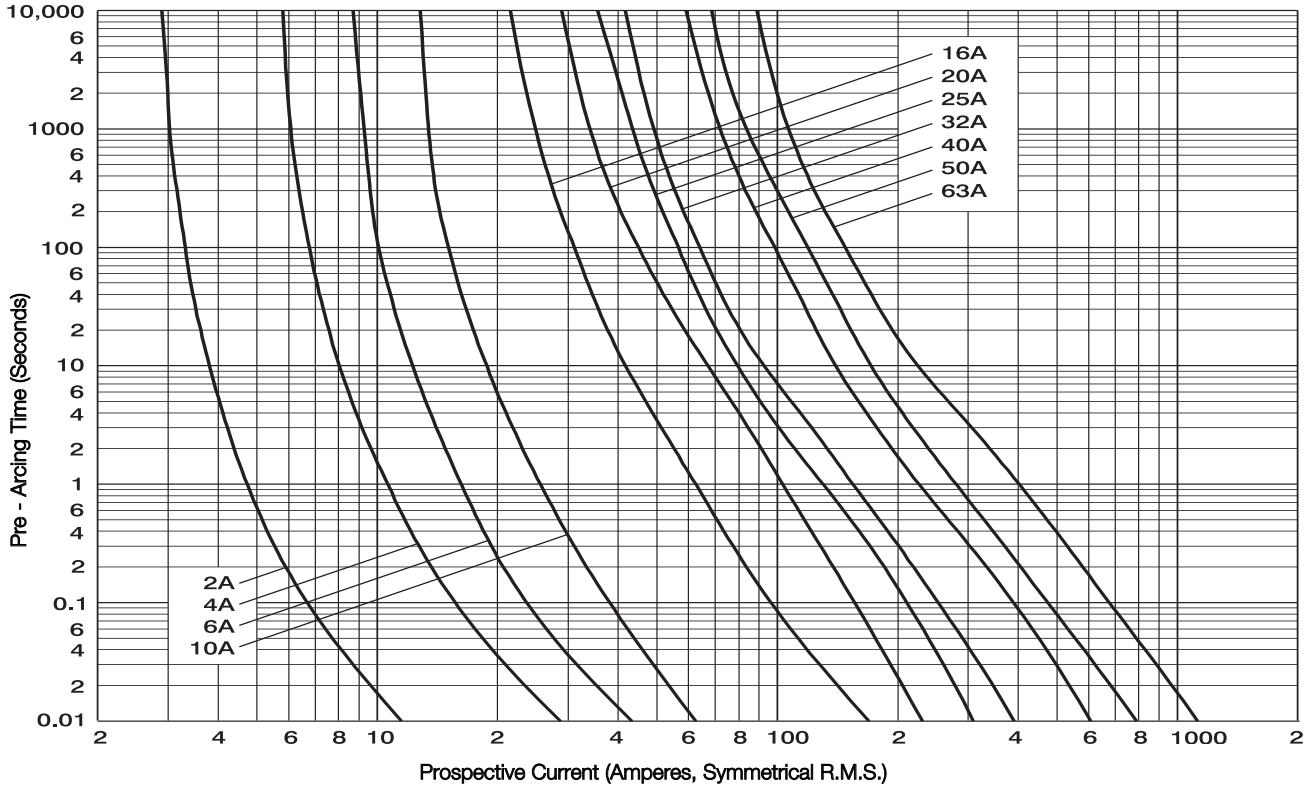


British Standard Low Voltage Fuse Links BSLV

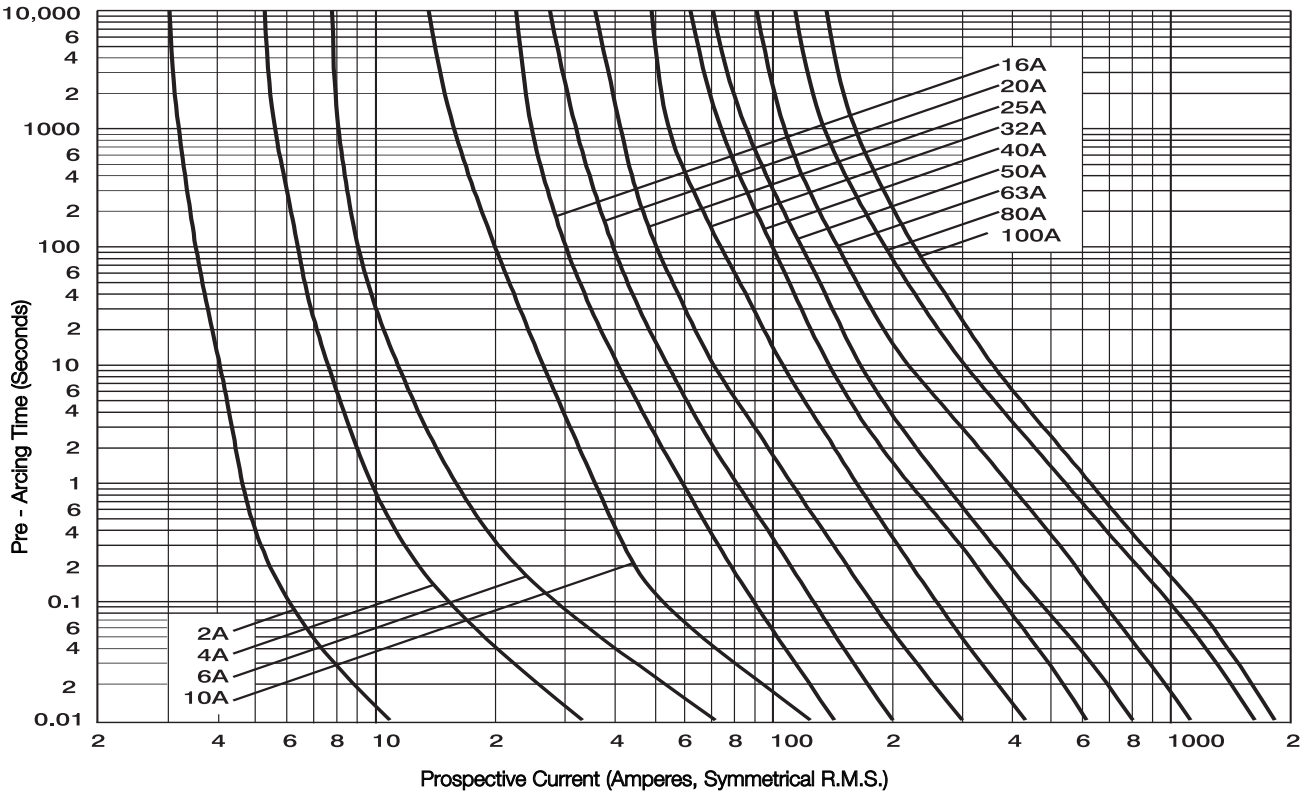
Class of Operation gL/gG, 415V / 550V AC, 16 - 100 Amps
Sizes : A2 to A4, B1

Time - Current Characteristics Curves

AAO and BAO Range of Fuse Links



CD, CEO and OSD Range of Fuse Links

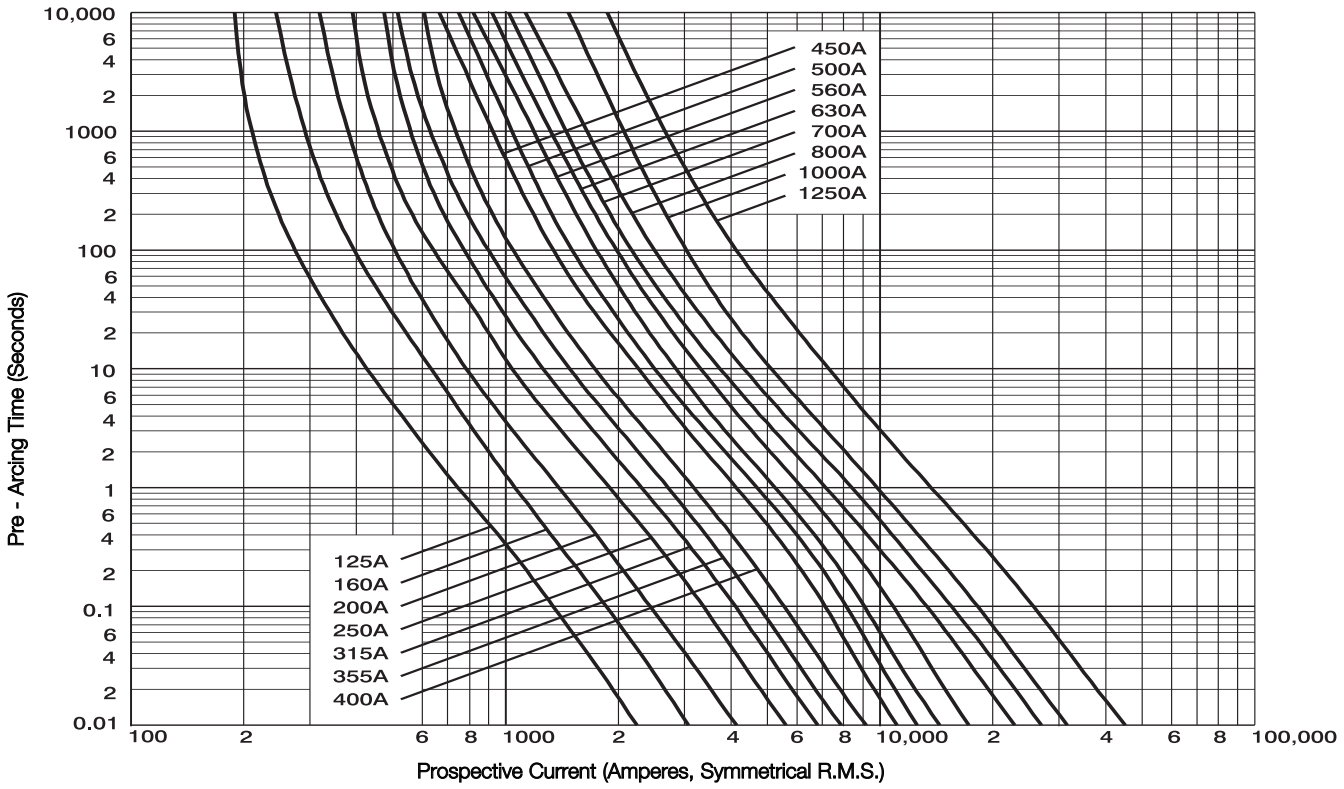


British Standard Low Voltage Fuse Links BSLV

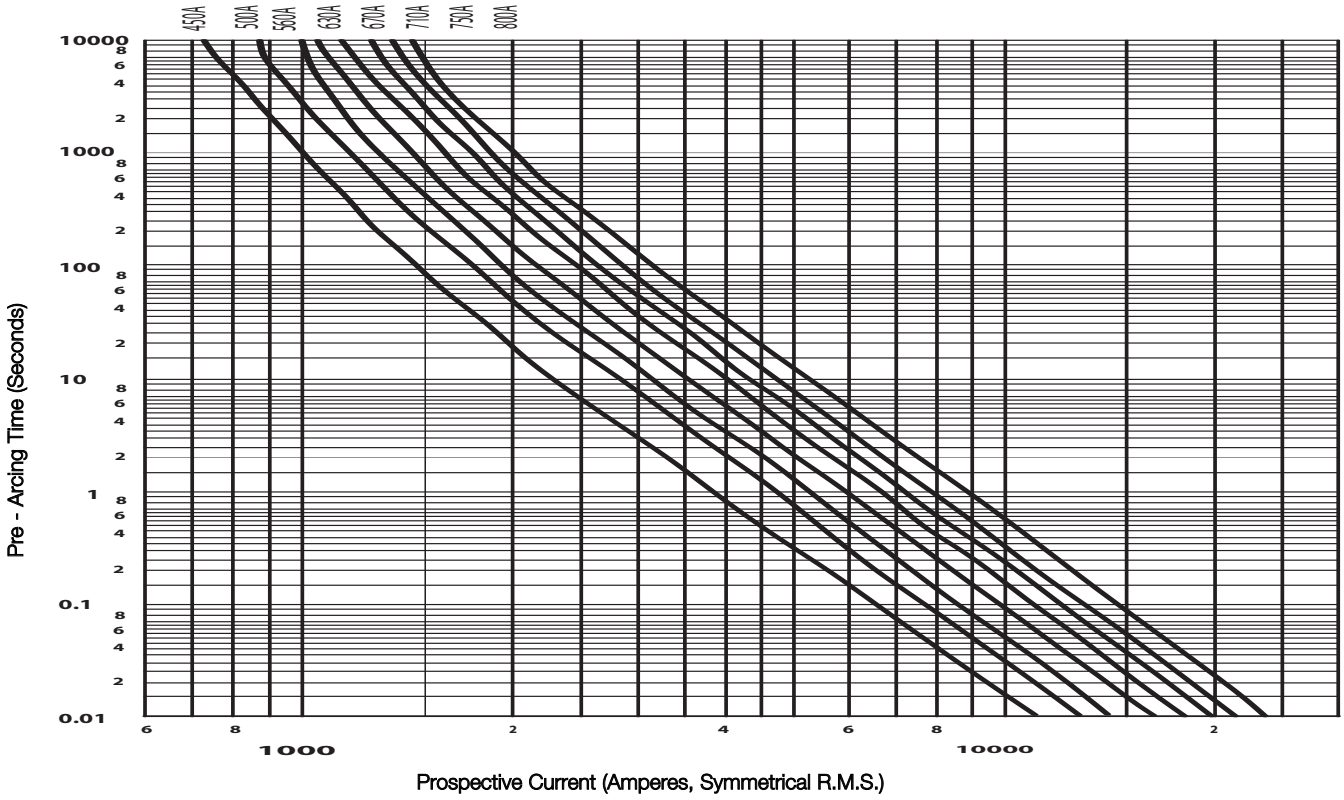
Class of Operation gL/gG, 415V / 550V AC, 125 - 1250 Amps
Sizes : B2 to B4, C1 to C3

Time - Current Characteristics Curves

DD, DEO, ED, EF, FF, GF and GG Range of Fuse Links



SN11(S),SP11(S),SR11(S), SR11 range of Fuse Links

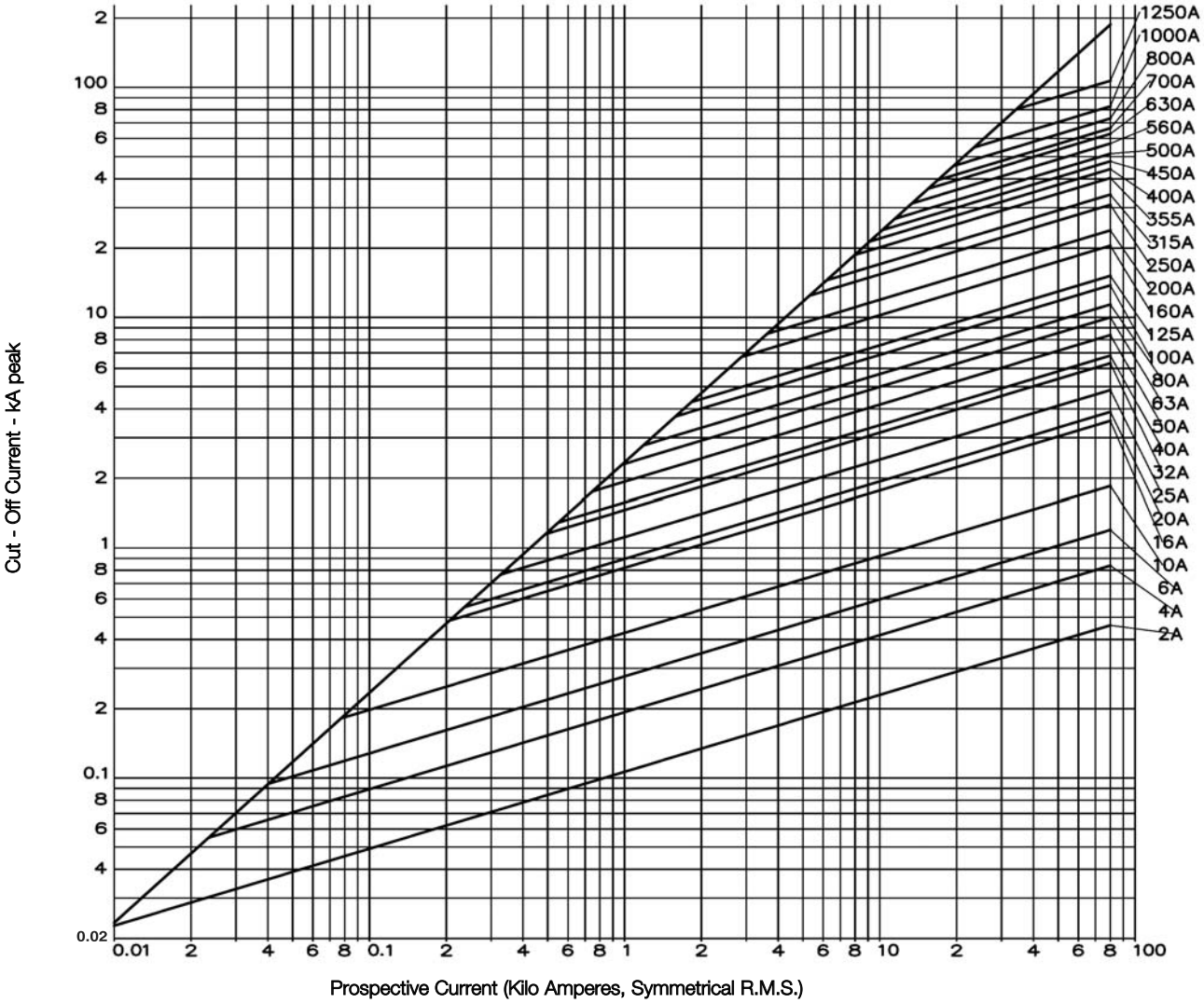


British Standard Low Voltage Fuse Links BSLV

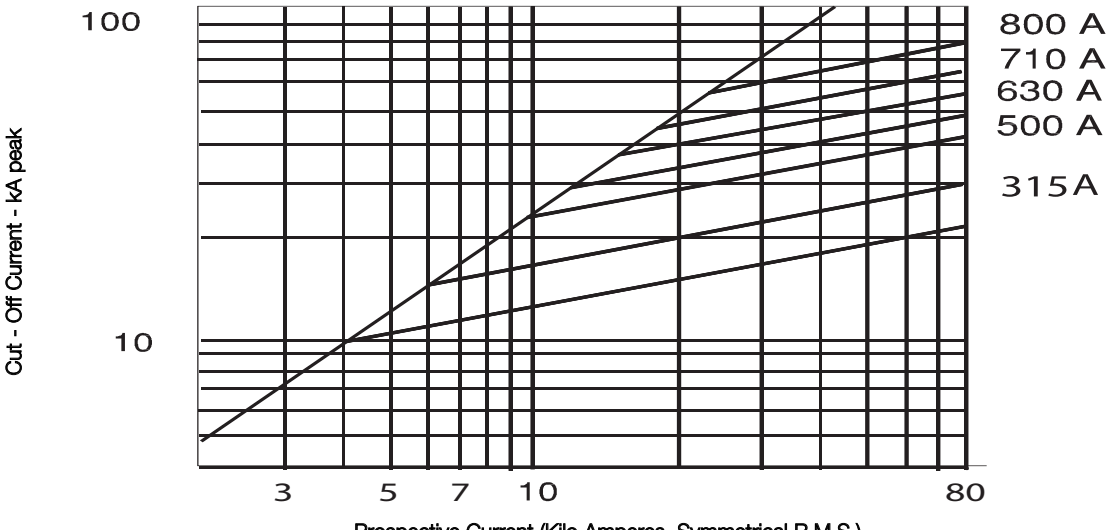
Class of Operation gL/gG, 240 / 415V / 550V / 690V AC, 2 - 1250 Amps
Sizes : E1, F1, F2, A1 to A4, B1 to B4, C1 to C3

Cut Off Characteristics Curves

2A - 125A



Only for SN11(S), SP11(S), SR11(S) & SR11



APPLICATION INFORMATION

The Bussmann standard range of high breaking capacity fuse links for low voltage industrial and general purpose applications meet the requirements of BS88 and IEC60269. By using advanced fuse technology the current ratngs up to 400A have compact dimensions but still within the standardised dimensional and performance requirements. These designs have been optimised for 415/240V systems. The standard range of fuse links are available from 2-1250A in the following tag forms: OFFSET BLADED - OFFSET BOLTED - CENTRE BOLTED.

Supplementary ranges cover applications up to 690V a.c. and 500V d.c. including those with non-standard tag fixings.

Bussmann fuse links are manufactured under Quality Systems independently assessed to ISO 9001 and appropriate ratings carry the ASTA 20 endorsement.

APPLICATION DATA

One of the long standing advantages of fuse protection is that fuse selection is relatively simple and effective.

The following notes cover the majority of applications. For further information contact Bussmann technical services on 01509 882699.

Reference should also be made to the appropriate Wiring Installation rules, in the UK the 16th Edition of the IEE Wiring Regualtions for Electrical Installations which aligns with IEC 60364.

CIRCUIT LOADING

The current rating of the fuse link should not be less than the full load current of the circuit. The circuit should be so designed that small overloads of long duration will not be of frequent occurence.

CABLE RATINGS

There is an increasing move away from 70°C P.V.C. insulation to materials which are more environmentally friendly, for example 90°C XLPE. The ratings of fusegear, switches, accessories etc. are generally based upon the equipment being connected to conductors intended to be operated at a temperature not exceeding 70°C in normal service.

In view of the above it is recommended that the practice of designs based upon conductor temperatures of 70°C be regarded as the norm. In accordance with clause 512-02-01 of the Wiring Regulations the equipment manufacturer should be consulted to ascertain the reduction of nominal current rating of the equipment if conductor temperatures exceeding 70°C are used. In addition an overriding factor is often voltage drop consideration.

CABLE PROTECTION

Bussmann fuse links with gG characteristics protect associated cables against both overload and short circuit current, provided that the current rating of the fuse link I_N is equal or less than the current carrying capacity of the cable I_Z.

In motor circuits, the motor starter will provide the overload protection and the fuse links will provide the short circuit protection. The maximum size of fuse link that can be used depends upon the type of cable used and is determined in accordance with the Wiring Regulations using the appropriate K factor. The following table gives maximum sizes of fuse links that are recommended for two popular cables with copper conductors, 70°C P.V.C. (K=115) and 90°C thermosetting (K=143).

Cable Size mm²	Max. Fuse Rating	
	K = 115 A	K = 143 A
1	16	16
1,5	20	25*
2,5	32*	32*
4	50*	50*
6	63*	63*
10	100*	125*
16	125*	160*
25	200*	250*
35	315*	355*
50	400*	500
70	560	630
95	710	800
120	800	1000

*Extended motor circuit dual ratings can be used

Zs OHMS IMPEDANCE VALUES

The rules for protection against indirect contact are given in Chapter 413 of the Wiring Regulations.

For a TN System a disconnecting time not exceeding 5s is permitted for a distribution circuit. The maximum values of earth fault loop impedance (Zs) corresponding to a disconnecting tme of 5s for nominal voltage to earth (Uo) of 240V for Bussmann gG fuse links.

Rating (A)	Zs Ohms Ω	Rating (A)	Zs Ohms Ω
2	60		
4	27		
6	14	100	0.44
10	7.7	125	0.35
16	4.3	160	0.27
20	3.0	200	0.20
25	2.4	250	0.16
32	1.9	315	0.13
40	1.4	400	0.096
50	1.1	500	0.073
63	0.86	630	0.054
80	0.60	800	0.044

AMBIENT TEMPERATURE

A de-rating in terms of current of 0.5% per °C above an ambient of 35°C is recommended.

BREAKING CAPACITY

The standardised values of Breaking Capacity are 80kA for voltages of 415V a.c. and above, and 40kA for d.c. applications.

DISCRIMINATION

All fuse links will give a discrimination ratio of 2:1 and for most practical situations a ratio of 1.6:1 (two steps in the R10 series). Example: an upstream fuse rated at 160A will discriminate with a downstream fuse rated at 100A.

CURRENT AND ENERGY LIMITATION

The Bussmann range of fuse links have pre-arcing I^2t values towards the bottom limits of the standards. This ensures excellent current and energy limitation. They also have lower power losses at rated current. This assists in the appropriate interchangeability with other makes of fuse links.

TRANSFORMERS

When fuse links are used on the primary side of transformers the normal current rating of the fuse links should be at least twice the nominal transformer primary current.

FLUORESCENT LIGHTING

The normal current rating of the fuse link should be at least twice the normal full load current of the maximum number of lights to be switched simultaneously.

CAPACITOR CIRCUITS

In capacitor circuits, for example power factor correction, the fuse link should be chosen with a current rating greater than 1.5 times the rated capacitor current. This takes account of the high transient inrush current, circuit harmonics and capacitor tolerances.

MOTOR CIRCUITS

In motor circuits the fuse link has to withstand the starting current of the motor and often requires a higher rating than the full load current of the motor.

Co-ordination recommendations are made by the manufacturers of motor starters in accordance with IEC 60947-4-1. To give the desirable type 2 co-ordination with fuse links, tests are performed with the latest gG or gM fuse links, to BS88 or IEC60269 which have pre-arcing I^2t values toward the bottom specified limits. This means that Bussmann fuse links are suitable to give type 2 co-ordination.

Extended dual ratings of motor circuit protection fuse links with gM characterstics are available in most popular sizes of fuse links to extend the use of associated equipment with appropriate economies. In the majority of applications, gG fuse links are used. It is not essential for gM fuse links to be used for motor circuit protection, they simply extend the utilisation of standard equipment.

The attached table shows the recommended fuse links at 415V. In most applications the run-up time is less than five seconds and duty is infrequent - no more than twice per house. The next larger rating should be used for more arduous conditions.

Motor Rating		DirectOn-line		Asst Start Standard (gG)
		Standard (gG)	Motor Circuit (gM)	
kW	A	A	A	A
0.25	0.8	4	-	2
0.37	1.1	4	-	2
0.55	1.5	6	-	4
0.75	2.0	6	-	4
1.1	3.0	10	-	6
1.5	3.6	16	-	10
2.2	5.0	16	-	10
3.0	6.5	20	-	16
4.0	8.4	20	-	16
5.5	11	25	20M25	20
7.5	15	40	32M40	25
11.0	20	50	32M50	32
15.0	27	63	32M63	40
18.5	33	80	63M80	50
22.0	38	80	63M80	50
30.0	54	100	63M100	80
37.0	66	125	100M125	80
45.0	79	160	100M160	100
55.0	98	160	100M160	100
75.0	135	250	200M250	160
90.0	155	250	200M250	160
110.0	185	315	200M315	200
132.0	220	355	315M400	250
150.0	250	355	315M400	315
185.0	310	450	400M500	355
200.0	335	500	400M500	400
225.0	375	560	-	400
250.0	415	560	-	450
280.0	460	630	-	500
335.0	562	710	-	630
355.0	596	800	-	710