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Low Voltage Fuses

BS Type

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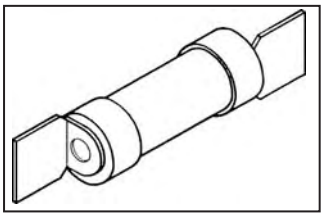
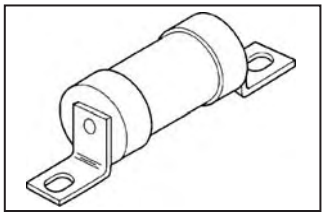
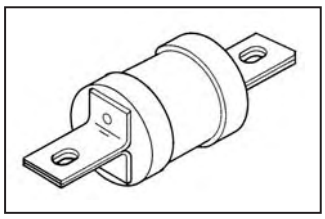
Low Voltage Fuse - BS Type







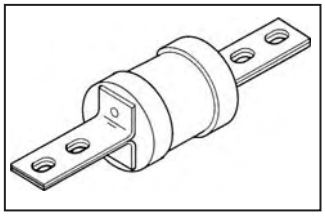


Table of Contents

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 Range	Fuse Base	Cross Reference
E1	-	-	SSD, 2-32A#	-	SS
F1	-	NSD, 2-32A	-	FA,FB,FD,NNSF	NS
F2	-	ESD, 2-32A	ESD, 40-63A	ENSF	ES
A1	-	NITD, 2-32A	-	CM20F, CM32FC	NIT
-	-	EITD, 2-32A	EITD, 40-63A	-	EIT
A2	H07-660, 2-32A	AAO, 2-32A	-	HA,HD,CM32F	TIA, TSA
A3	K07-660, 35-63A	BAO, 35-63A	-	KA, KD, CM63F	TIS, TSS
A3x		OSD, 80-100A	-	CM100F	TSDS
A4	L14-660, 80-100A	-	CEO, 32-100A	LA,LD	TCP, TSD
A4x	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, 315-400A	-	TSK
-	-	-	SN11S, 355-400A	-	TSMS
-	-	-	SP11S, 450-500A	-	TSTS
-	-	-	SR11S, 560-630A	-	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, 670-800A	-	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.cooperbussmann.com and www.cooperbussmann/1/index.html to look for complete offerings from Bussmann.

Low Voltage Fuse - BS Type

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Industrial & Motor Applications to BS 88 - 550 / 415 / 240V ac

Specifications

Description: Fuse Links for industrial applications - general purpose (gG) and motor protection.

Applications: General Industrial & Motors applications.

Ratings :

Volts : 550 / 415 / 240V ac

Amps : 2 Amps - 63 Amps

Breaking Capacity : SSD - 33 kA, Others 80 kA

Standards / Approvals : Meets BS88, IEC 269, IS13703. Comply with RoHS requirement and ASTA 20 certified

Offset Bladed Tags

SSD
240V ac (gG) / 2 - 32A

NSD
550V ac (gG) / 2 - 32A

ESD
550V ac (gG) / 2 - 32A

ESD
415V ac (gG) / 40 - 63A

Type/ Catalogue No.	Current Rating	Nominal Watt Loss	Fuse Holder	Size Ref	Packing Quantity
SSD2	2	0.5	-	E1	20
SSD4	4	1.0			
SSD6	6	1.6			
SSD10	10	1.2			
SSD16	16	1.5			
SSD20	20	1.7			
SSD25	25	1.8			
SSD32	32	2.4			
NSD2	2	0.9	NNSF 32 / FA 20 / FA 32	F1	20
NSD4	4	1.4			
NSD6	6	1.8			
NSD10	10	2.1			
NSD16	16	1.8			
NSD20	20	1.8			
NSD25	25	2.0	NNSF 32 / FA 32		
NSD32	32	2.9			
ESD2	2	0.9	ENSF 63	F2	20
ESD4	4	1.4			
ESD6	6	1.8			
ESD10	10	2.1			
ESD16	16	1.8			
ESD20	20	1.8			
ESD25	25	2.0			
ESD32	32	2.9			
ESD40	40	3.2	ENSF 63	F2	20
ESD50	50	3.9			
ESD63	63	4.6			

Offset Bolted Tags - Open Slot

NITD
550V ac (gG) / 2 - 32A

Type/ Catalogue No.	Current Rating	Nominal Watt Loss	Fixing Centre (mm)	Size Ref	Packing Quantity
NITD2	2	0.9	44	A1	20
NITD4	4	1.4			
NITD6	6	1.8			
NITD10	10	2.1			
NITD16	16	1.8			
NITD20	20	1.8			
NITD25	25	2.0			
NITD32	32	2.9			

Offset Bolted Tags - Open Slot

EITD
550V ac (gG) / 2 - 32A

EITD
415V ac (gG) / 40 - 63A

Type/ Catalogue No.	Current Rating	Nominal Watt Loss	Fixing Centre (mm)	Packing Quantity
EITD2	2	0.9	55	1
EITD4	4	1.4		
EITD6	6	1.8		
EITD10	10	2.1		
EITD16	16	1.8		
EITD20	20	1.8		
EITD25	25	2.0		
EITD32	32	2.9		
EITD40	40	3.2	55	1
EITD50	50	3.9		
EITD63	63	4.6		

Industrial & Motor Applications to BS 88 - 660/690V ac

Specifications

Description: Fuse Links for industrial applications, general purpose (gG), at 660/690V that meets dimensional and performance requirements of BS88/IEC269/IS13703.

Applications: Protection of Industrial installations & Motors.

Volts : 660 / 690V ac
Amps : 2 Amps - 630 Amps
Breaking Capacity : 80 kA

Standards / Approvals : Meets BS88, IEC 269, IS13703. Comply with RoHS requirement and ASTA 20 certified

Offset Bolted Tag - Closed Slot

HO7
660/690V ac (gG) / 2 - 32A

KO7
660/690V ac (gG) / 35 - 63A

L14
660/690V ac (gG) / 80 - 100A

M14
660/690V ac (gG) / 125 - 200A

Type/ Catalouge No.	Current Rating	Nominal Watt Loss	Fixing Centre (mm)	Fuse Holder	DC Rating	Size Ref	Packing Quantity
2HO7-660	2	1.5	73	HA / HD / CM32F	40 kA @ 250 Vdc	A2	20
4HO7-660	4	2.7					
6HO7-660	6	3.3					
10HO7-660	10	2.8					
16HO7-660	16	3.3					
20HO7-660	20	3.1					
25HO7-660	25	3.6					
32HO7-660	32	3.8					
35KO7-660	35	-	73	KA / KD / CM63F	40 kA @ 250 Vdc	A3	20
40KO7-660	40	4.0					
50KO7-660	50	4.8					
63KO7-660	63	5.7					
80L14-660	80	7.29	94	LA / LD	40 kA@ 400 Vdc	A4	10
100L14-660	100	8.2					
125M14-660	125	10.0	94	LA / LD*	40 kA @ 400 Vdc	-	5
160M14-660	160	13.9					
200M14-660	200	16.0					

*only 125A Fuse

Centre Bolted Tag

LO9
660/690V ac (gG) / 80 - 100A

M09
660/690V ac (gG) / 125 - 200A

NO9
660/690V ac (gG) / 250 - 315A

PO9
660/690V ac (gG) / 355 - 400A

Type/ Catalouge No.	Current Rating	Nominal Watt Loss	Fixing Centre (mm)	DC Rating	Size Ref	Packing Quantity
80LO9-660	80	7.2	111	40 kA@ 400 Vdc	B1	10
100L09-660	100	8.2				
125MO9-660	125	10	111	40 kA @ 400 Vdc	B2	5
160M09-660	160	13				
200MO9-660	200	16				
250NO9-660	250	19	111	40 kA@ 400 Vdc	B3	1
315NO9-660	315	25				
355PO9-660	355	28	111	40 kA@ 400 Vdc	B4	1
400PO9-660	400	32				

Centre Bolted Tag - Double Slot

P11
660/690V ac (gG) / 355 - 400A

R11
660/690V ac (gG) / 450 - 630A

Type/ Catalouge No.	Current Rating	Nominal Watt Loss	Fixing Centre (mm)	DC Rating	Size Ref	Packing Quantity
355P11-660	355	28	133/184	40 kA@ 400 Vdc	C1	1
400P11-660	400	32				
450R11-660	450	32	133/184	40 kA @ 400 Vdc	C2	1
500R11-660	500	38				
560R11-660	560	43				
630R11-660	630	50				

Low Voltage Fuse - BS Type

COOPER Bussmann

Industrial & Motor Applications to BS 88 - 550 Vac

Specifications

Description: Fuse Links for industrial applications - general purpose (gG) and motor protection.

Applications: General Industrial & Motors applications.

Volts : 550 V ac
Amps : 2 Amps - 1250 Amps
Breaking Capacity : 80 kA

Standards / Approvals : Meets BS88, IEC 269, IS13703. Comply with RoHS requirement and ASTA 20 certified

Offset Bolted Tag

AAO
550V ac (gG) / 2 - 32A

BAO
550V ac (gG) / 35 - 63A

OSD
550V ac (gG) / 80 - 100A

Type/ Catalogue No.	Current Rating	Nominal Watt Loss	Fixing Centre (mm)	Fuse Holder	Size Ref	Packing Quantity
AAO2	2	0.9	73	HA/ HD	A2	20
AAO4	4	1.4				
AAO6	6	1.8				
AAO10	10	2.1				
AA016	16	1.8				
AA020	20	1.8				
AA025	25	2.0				
AA032	32	2.9				
BAO35	35	-	73	KA/ KD	A3	20
BAO40	40	4.7				
BAO50	50	4.9				
BAO63	63	5.6				
OSD80	80	7.2	73	CM100F	-	20
OSD100	100	8.5				

Centre Bolted Tag - Double Slot

FF
550V ac (gG) / 450 - 630A

GF
550V ac (gG) / 710 - 800A

GG
550V ac (gG) / 710 - 1250A

Type/ Catalogue No.	Current Rating	Nominal Watt Loss	Fixing Centre (mm)	DC Rating	Size Ref	Packing Quantity
FF450	450	32	133/184	40 kA @ 400 Vdc	C2	1
FF500	500	38				
FF560	560	43				
FF630	630	50				
GF710	710	53	133/184	40 kA@ 250 Vdc	C3	1
GF800	800	64				
GG710	710	53	165/228	-	-	1
GG800	800	64				
GG1000	1000	69				
GG1250	1250	85				

Industrial & Motor Applications to BS 88 - 415 Vac

Specifications

Description: Fuse Links for industrial applications - general purpose (gG) and motor protection.

Applications: General Industrial & Motors applications.

Volts : 415V ac
Amps : 80 Amps - 800 Amps
Breaking Capacity : 80 kA

Standards / Approvals : Meets BS88, IEC 269, IS13703. Comply with RoHS requirement and ASTA 20 certified

Offset Bolted Tag - Single Slot

CEO
415V ac (gG) / 32 - 100A

DEO
415V ac (gG) / 125 - 200A

Type/ Catalouge No.	Current Rating	Nominal Watt Loss	Fixing Centre (mm)	Fuse Holder	Size Ref	Packing Quantity
CEO32	32	3.5	94	LA/ LD	A4	20
CEO40	40	4.7				
CEO50	50	4.9				
CEO63	63	5.6				
CEO80	80	7.2				
CEO100	100	8.5				
DEO125	125	11	94	LA/LD*	-	5
DEO160	160	13				
DEO200	200	14				

*only 125A Fuse

Centre Bolted Tag - Single Slot

CD
415V ac (gG) / 80 - 100A

DD
415V ac (gG) / 125 - 200A

ED
415V ac (gG) / 250 - 400A

Type/ Catalouge No.	Current Rating	Nominal Watt Loss	Fixing Centre (mm)	Fuse Holder	Size Ref	Packing Quantity
CD80	80	7.2	111	-	B1	10
CD100	100	8.5				
DD125	125	11	111	-	B2	5
DD160	160	13				
DD200	200	14				
ED250	250	18	111	-	B3	1
ED315	315	22				
ED355	355	24				
ED400	400	29				

Centre Bolted Tag - Single Slot

SN11 S
415V ac (gG) / 355 - 400A

SP11 S
415V ac (gG) / 450 - 500A

SR11 S
415V ac (gG) / 560 - 800A

Type/ Catalouge No.	Current Rating	Nominal Watt Loss	Fixing Centre (mm)	Size Ref	Packing Quantity
355SN11 S	355	22.5	133	-	1
400SN11 S	400	31.0			
450SP11 S	450	30.5	133	-	1
500SP11 S	500	38.8			
560SR11 S	560	38.0	133	-	1
630SR11 S	630	44.0			
710SR11 S	710	50.0			
800SR11 S	800	68.5			

Centre Bolted Tag - Double Slot

EF
415V ac (gG) / 355 - 400A

SR11
415V ac (gG) / 710 - 800A

Type/ Catalouge No.	Current Rating	Nominal Watt Loss	Fixing Centre (mm)	Size Ref	Packing Quantity
EF355	355	24	133/184	C1	1
EF400	400	29			
710SR11	710	49.0	133/184	C3	1
800SR11	800	68.0			

For Product Data Sheets, visit www.cooperbussmann.com/1/technicalinformation.html

LV Fuse - 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: OFF-SET 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 Application Engineering

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 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 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 to BS88 are :

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 & COORDINATION RATIO

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		Direct On-line		Asst Start Standard (gG)
		Standard (gG)	Motor Circuit (gM)	
kW	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

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Customer Assistance

Customer Satisfaction Team

Cooper Bussmann India Customer Satisfaction Team is available in Pondicherry to answer questions regarding Cooper Bussmann products Sales, Supply and Services. Calls should be made between 9.00 am - 5.00pm IST.

- **Phone : +91 413 267 2015**
- **Fax : +91 413 267 8182**
- **E-mail : sales@cooperbussmann.co.in**

Application Engineering

Application Engineering and selection assistance is available to all customers. This team is staffed by subject matter expert, electrical application engineers and available Monday - Friday 9.00am - 5.00pm IST.
Application Engineering can be reached via

- **Phone : +91 413 220 5512**
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- **E-mail : technicalhelp@cooperbussmann.co.in**

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- Cross referencing to find the correct Cooper Bussmann replacement for a competitor's fuse.

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