Current Limiting Fuses, CEF
Motor Circuits Fuses, CMF

Catalogue 1YMB631050-en

High voltage current limiting fuse links type CEF

Rated voltage:
3,6/7,2-12 kV
17,5-24 kV
27 kV
36 kV

Rated current:
6-200 A
6-125 A
6-100 A
6-40 A

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High voltage current limiting fuse link for MOTOR circuit applications type CMF

Rated voltage:
3,6 kV
7,2 kV
12 kV

Rated current:
100-315 A
63-315 A
63-200 A

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High voltage current limiting fuse links type CEF

Rated voltage: 3,6/7,2-36 kV
Rated current: 6-200 A

1. General

The HRC generation of fuse link type CEF are designed and tested according to IEC Publication 60282-1 (IEC 282-1). Dimensionally the fuse links are in accordance with DIN 43625.
ABB's high voltage fuse links have the following properties:
– Low minimum breaking current
– Low power losses
– Low arc-voltage
– High breaking capacity
– High current limitation.
Low power losses permit installation of these fuse links in compact switchgear.
CEF fuses are of back-up type. They have a zone between the minimum melting current and the minimum breaking current where the fuse links may fail to interrupt. For CEF fuse links this zone is very narrow. The minimum breaking current I for any type is specified in the table on p. 8.
Other fuse types produced by ABB can be found in the following catalogues:
Fuses for Voltage Transformers WBP/BRT 1YMB6120001-en
Fuses for Railway DC Applications BWT/WBT 1YMB622001-en

M-effect

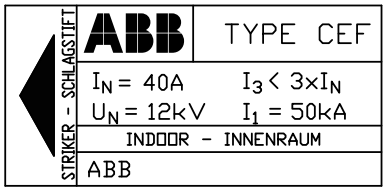
One of the structural means used for forming the time-current characteristic of medium voltage fuse links of CEF and CMF series, manufactured by ABB, is an overload spot located on fuse elements. To create this overload spot the M-effect is used. The overload spot is made by coating the silver fuse elements with a short segment of metal characterized by a low melting point.
For the first time the M-effect was described by professor Metcalf in the 1930s. It consists in taking advantage of the effect of melting by some metals characterized by a low melting point (e.g. tin, lead) and being in a liquid state, metals characterized by a higher melting point (e.g. copper, silver). Silver fuse element coated with a segment of metal a low melting point metal (solder) fuses for current values that would not fuse it if the overload spot were not present. The reason for it is as follows: During heating of the fuse element with the overload spot, the metal, which the overload spot is made of, starts melting and diffuses into the metal of the fuse element and thus reduces the active cross-section of the main silver fuse element. As a result of this silver fuse element is melted at the moment when the other parts of the fuse element still keep a relatively low temperature. With this design the overload spot enables reduction of the minimum melting current and reduction of the minimum breaking current. Consequently, the range of correct operation of the fuse link is extended. One must also emphasize that in case of short-circuit currents, when fuse elements are heating up very fast and practically no heat is dissipated into the surrounding arc-quenching medium (adiabatic heating), the fuse elements melt at the constrictions before metal, which the overload spot is made of, reaches its melting temperature. Therefore, the overload spot does not affect the fuses characteristic for short-circuit currents. Additionally, a very important advantage of using the overload spot is the fact that the arc is always initiated at the same point on the fuse element, near the geometrical center of the fuse link. This solution prevents the arc from initializing near one of the end-caps, which could result in damaging of the end-cap by the arc. To sum up, the overload spot enables increase in the useful operational range of the fuse link by extending the range of correct operation for small overload currents. Moreover, use of the overload spot prevents the arc from initializing near one of the fuse link ends and, thus, makes the fuse link safer to use.

2. Overvoltages

In order to be current limiting, the fuse link must generate an arc-voltage exceeding the instantaneous value of the operating voltage. The switching voltage generated by the CEF fuse link is below the maximum permissible value acc. to IEC 60282-1 (IEC 282-1). The CEF fuse link can safely be used if the system line voltage is 50-100% of the rated fuse link voltage.

3. Replacement of melted fuse links

CEF fuse links cannot be regenerated. According to IEC Publication 60282-1 (IEC 282-1), all 3 fuse links should be replaced, even if only 1 or 2 of the fuse links in the three phase system have operated.
Exceptions are allowed when it can be verified that the fuse link(s) have not experienced any over- current.

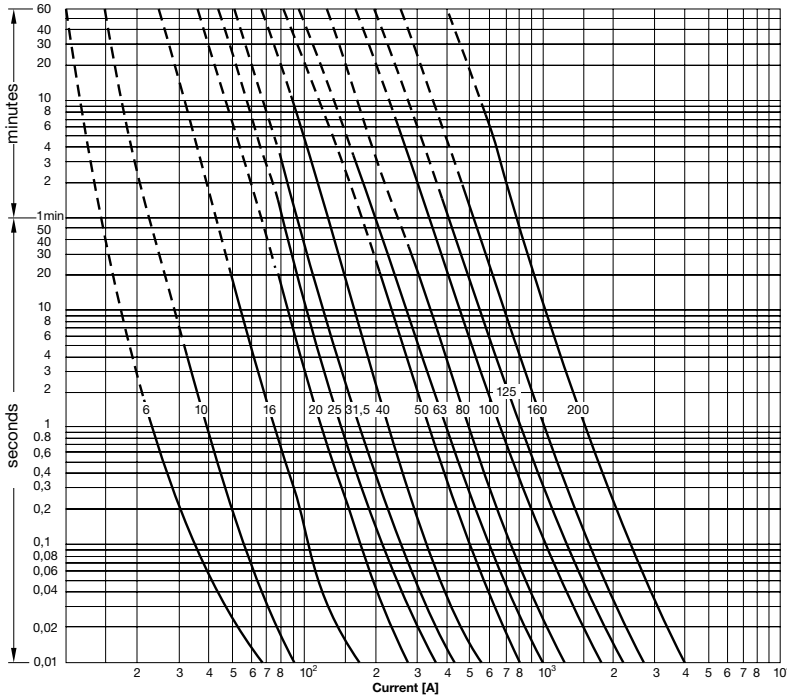


4. Nameplate

The symbols on the nameplate have the following meaning:
I_N = Rated current
U_N = Rated voltage
I_3 = Minimum breaking current
I_1 = Maximum short circuit current for which the fuse is tested
The arrowhead on the nameplate indicates in which end of the fuse link the indicator and striker pin appears. Additionally this end contact of the fuse link is specially marked.
CEF-U is outdoor type.

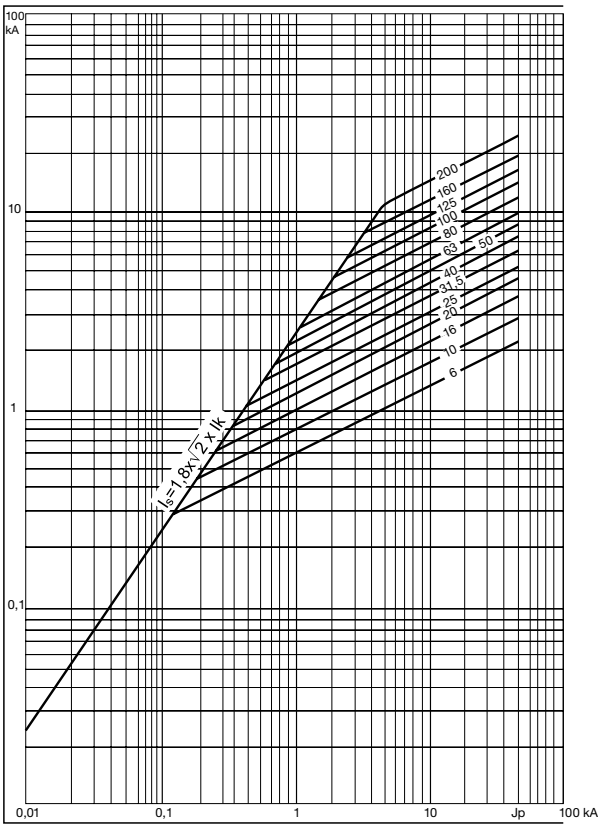
Fuse link type CEF

Pre-arcing time



5. Pre-arcing times
The characteristics are equal for all rated voltages and are recorded from cold condition.
Dashed sections of the curves indicate the zone of uncertain interruption.

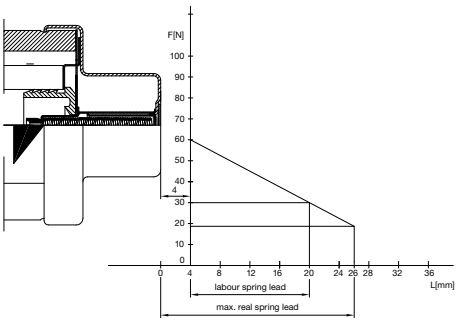
Maximum cut of current [kA] (peak)



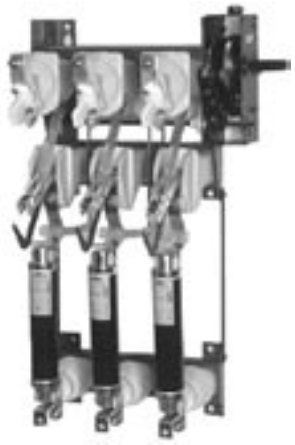
Prospective current [kA] (rms)

6. Current limitation
CEF fuse links are current limiting. A large short circuit current will therefore not reach its full value. The diagram shows the relation between the prospective short circuit current and the peak value of the cutoff current. Substantial current limitation results in a considerable reduction of the thermal and mechanical stress on the high voltage installation.

7. Indicator and striker pin
The CEF fuse link is equipped with a combined indicator- and striker system, which is activated immediately when the fuse element melts. The force diagram is in accordance with the requirements of IEC 60282-1 (IEC 282-1) and DIN 43625. The bellow presented striker pin force diagram is valid for CEF/CMF fuses as effective from May 2006. The former version of striker pin was with initial force of 50N.



Fuse link type CEF



8. Choice of fuse links
Choice of rated voltage U_N :
The rated voltage of the fuse links must be equal to, or higher than the operating line voltage.
By choosing the fuse link rated voltage considerably higher than the line voltage, the maximum arc voltage must not exceed the insulation level of the network.

Choice of rated current I_N
To obtain the best possible current limitation, and thereby also protection, I_N must be chosen as low as possible compared to the rated current of the object to be protected. However, the following limitations must be taken into consideration:
– the largest load current must not exceed I_N ;
– cooling conditions (e.g. in compact switchgear);
– inrush current of off load transformers;
– starting currents of motor circuits. (See page 14 with CMF, special motor fuses).

For the choice of rated current of fuse links for protection of transformers, the relation between the power rating of the transformers, operating voltage and rated current of the fuse link is given in the table below.The same table indicates the highest rated current of the low voltage fuse link (on the low voltage side of the transformer) which gives discrimination with the high voltage fuse link.
The lowvoltage fuse link is of the type gL (VDE) or gG/ gM(IEC).

For choice of fuse links for transformer protection in switchgear of type Safe Plus or Safering CTC-F, see SF Insulated Compact Switchgear and Ring Main Unit catalogue.

Choice of fuse links for protection of transformers

Line voltage (kV)	TRANSFORMER RATING (kVA)																			
	25	50	75	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3000	3500
	HIGH VOLTAGE FUSE-LINK I_N (A)																			
3	16	25	25	40	40	63	63	63	80	100	100	160	200	200	250*	315*				
5	10	16	25	25	25	40	40	63	63	63	80	100	100	160	200	200	250*	315*	315*	
6	10	16	16	25	25	25	40	40	63	63	63	80	100	100	160	200	200	250*	315	315*
10	6	10	16	16	16	25	25	25	31,5	40	63	63	63	80	100	100	160	200	250*	250*
12	6	10	16	16	16	16	25	25	25	31,5	40	63	63	63	80	100	160	160	200	250*
15	6	10	10	16	16	16	16	20	25	25	31,5	40	63	63	63	100	100	125	200	200
20	6	10	10	10	16	16	16	20	20	20	31,5	31,5	40	63	63	63	80	100	125	160
24	6	10	10	10	10	16	16	20	20	20	31,5	31,5	40	40	63	63	63	80	125	125
30	6	10	10	10	10	10	16	16	16	16	25	25	25	40	40	40	2x40	2x40		
36	6	10	10	10	10	10	10	16	16	16	16	25	25	25	40	40	2x40	2x40		
Low voltage	LOW VOLTAGE FUSE-LINK I_N (A)																			
220 V		80	100	125	160	200	250	250	315	400	500	630								
380 V		50	63	100	100	125	125	200	250	250	350	400	400	500	630					
500 V		40	50	80	80	100	100	160	160	200	250	350	350	400	500	630				

*) CMF -fuse link

Fuse link type CEF

9. Ordering table
High-voltage – HRC fuse links

Type	Rated voltage [kV]	Rated current [A]	Length e [mm]	Diameter D [mm]	Catalouge No.	Weight kg
CEF	3,6/7,2	6	192	65	1YMB531001M0001	1,5
CEF	3,6/7,2	10	192	65	1YMB531001M0002	1,5
CEF	3,6/7,2	16	192	65	1YMB531001M0003	1,5
CEF	3,6/7,2	25	192	65	1YMB531001M0004	1,5
CEF	3,6/7,2	40	192	65	1YMB531001M0005	1,5
CEF	3,6/7,2	50	192	65	1YMB531001M0006	1,5
CEF	3,6/7,2	63	192	65	1YMB531001M0007	1,5
CEF	3,6/7,2	80	192	87	1YMB531001M0008	2,6
CEF	3,6/7,2	100	192	87	1YMB531001M0009	2,6
CEF	3,6/7,2	6	292	65	1YMB531034M0001	2,3
CEF	3,6/7,2	10	292	65	1YMB531034M0002	2,3
CEF	3,6/7,2	16	292	65	1YMB531034M0003	2,3
CEF	3,6/7,2	25	292	65	1YMB531034M0004	2,3
CEF	3,6/7,2	40	292	65	1YMB531034M0005	2,3
CEF	3,6/7,2	50	292	65	1YMB531034M0006	2,3
CEF	3,6/7,2	63	292	65	1YMB531034M0007	2,3
CEF	3,6/7,2	80	292	87	1YMB531034M0008	3,6
CEF	3,6/7,2	100	292	87	1YMB531034M0009	3,6
CEF	3,6/7,2	125	292	87	1YMB531001M0010	3,6
CEF	3,6/7,2	160	292	87	1YMB531001M0011	3,6
CEF	3,6/7,2	200	292	87	1YMB531001M0012	3,6
CEF	3,6/7,2	125	367	87	1YMB531034M0011	4,4
CEF	3,6/7,2	160	367	87	1YMB531034M0012	4,4
CEF	3,6/7,2	200	367	87	1YMB531034M0010	4,4

CEF	12	6	292	53	1YMB531042M0001	1,9
CEF	12	6	292	65	1YMB531002M0001	2,3
CEF	12	10	292	53	1YMB531042M0002	1,9
CEF	12	10	292	65	1YMB531002M0002	2,3
CEF	12	16	292	53	1YMB531042M0003	1,9
CEF	12	16	292	65	1YMB531002M0003	2,3
CEF	12	20	292	53	1YMB531042M0004	1,9
CEF	12	25	292	65	1YMB531002M0004	2,3
CEF	12	31,5	292	65	1YMB531002M0014	2,3
CEF	12	40	292	65	1YMB531002M0005	2,3
CEF	12	50	292	65	1YMB531002M0006	2,3
CEF	12	63	292	65	1YMB531002M0007	2,3
CEF	12	80	292	65	1YMB531002M0021	2,3
CEF	12	80	292	87	1YMB531002M0008	3,6
CEF	12	100	292	65	1YMB531002M0022	3,6
CEF	12	100	292	87	1YMB531002M0009	3,6
CEF	12	125	292	87	1YMB531043M0010	3,6
CEF	12	6	442	53	1YMB531047M0001	2,5
CEF	12	6	442	65	1YMB531035M0001	3,0
CEF	12	10	442	53	1YMB531047M0002	2,5
CEF	12	10	442	65	1YMB531035M0002	3,0
CEF	12	16	442	53	1YMB531047M0003	2,5
CEF	12	16	442	65	1YMB531035M0003	3,0
CEF	12	20	442	53	1YMB531047M0004	2,5
CEF	12	25	442	65	1YMB531035M0004	3,0
CEF	12	31,5	442	65	1YMB531035M0014	3,0
CEF	12	40	442	65	1YMB531035M0005	3,0
CEF	12	50	442	65	1YMB531035M0006	3,0
CEF	12	63	442	65	1YMB531035M0007	3,0
CEF	12	80	442	65	1YMB531035M0021	3,0
CEF	12	80	442	87	1YMB531035M0008	5,3
CEF	12	100	442	65	1YMB531035M0022	3,0
CEF	12	100	442	87	1YMB531035M0009	5,3
CEF	12	125	442	65	1YMB531002M0023	3,0
CEF	12	125	442	87	1YMB531002M0010	5,3
CEF	12	160	442	87	1YMB531002M0011	5,3
CEF	12	200	442	87	1YMB531002M0012	5,3
CEF	12	125	537	65	1YMB531035M0023	4,0

CEF	17,5	6	292	65	1YMB531003M0001	2,3
CEF	17,5	10	292	65	1YMB531003M0002	2,3
CEF	17,5	16	292	65	1YMB531003M0003	2,3
CEF	17,5	20	292	65	1YMB531003M0013	2,3
CEF	17,5	25	292	65	1YMB531003M0004	2,3
CEF	17,5	31,5	292	65	1YMB531003M0014	2,3
CEF	17,5	40	292	65	1YMB531003M0021	2,3
CEF	17,5	40	292	87	1YMB531003M0005	3,6
CEF	17,5	50	292	65	1YMB531003M0022	2,3
CEF	17,5	50	292	87	1YMB531003M0006	3,6
CEF	17,5	63	292	87	1YMB531003M0007	3,6
CEF	17,5	6	367	65	1YMB531036M0001	2,7
CEF	17,5	10	367	65	1YMB531036M0002	2,7
CEF	17,5	16	367	65	1YMB531036M0003	2,7
CEF	17,5	20	367	65	1YMB531036M0013	2,7

Type	Rated voltage [kV]	Rated current [A]	Length e [mm]	Diameter D [mm]	Catalouge No.	Weight kg
CEF	17,5	25	367	65	1YMB531036M0004	2,7
CEF	17,5	31,5	367	65	1YMB531036M0014	2,7
CEF	17,5	40	367	65	1YMB531036M0021	2,7
CEF	17,5	40	367	87	1YMB531036M0005	4,4
CEF	17,5	50	367	65	1YMB531036M0022	4,4
CEF	17,5	50	367	87	1YMB531036M0006	4,4
CEF	17,5	63	367	87	1YMB531036M0007	4,4
CEF	17,5	100	367	87	1YMB531038M0001	4,4
CEF	17,5	6	442	65	1YMB531037M0001	3,0
CEF	17,5	10	442	65	1YMB531037M0002	3,0
CEF	17,5	16	442	65	1YMB531037M0003	3,0
CEF	17,5	20	442	65	1YMB531037M0013	3,0
CEF	17,5	25	442	65	1YMB531037M0004	3,0
CEF	17,5	31,5	442	65	1YMB531037M0014	3,0
CEF	17,5	40	442	65	1YMB531037M0021	3,0
CEF	17,5	40	442	87	1YMB531037M0005	5,3
CEF	17,5	50	442	65	1YMB531037M0022	3,0
CEF	17,5	50	442	87	1YMB531037M0006	5,3
CEF	17,5	63	442	87	1YMB531037M0007	5,3
CEF	17,5	80	442	87	1YMB531003M0008	5,3
CEF	17,5	100	442	87	1YMB531003M0009	5,3
CEF	17,5	125	442	87	1YMB531003M0010	5,3

CEF	24	6	442	53	1YMB531044M0001	2,5
CEF	24	6	442	65	1YMB531004M0001	3,0
CEF	24	10	442	53	1YMB531044M0002	2,5
CEF	24	10	442	65	1YMB531004M0002	3,0
CEF	24	16	442	53	1YMB531044M0003	2,5
CEF	24	16	442	65	1YMB531004M0003	3,0
CEF	24	20	442	53	1YMB531044M0004	2,5
CEF	24	20	442	65	1YMB531004M0011	3,0
CEF	24	25	442	65	1YMB531004M0004	3,0
CEF	24	31,5	442	65	1YMB531004M0012	3,0
CEF	24	40	442	65	1YMB531004M0005	3,0
CEF	24	50	442	65	1YMB531004M0021	3,0
CEF	24	50	442	87	1YMB531004M0006	5,3
CEF	24	63	442	65	1YMB531004M0022	3,0
CEF	24	63	442	87	1YMB531004M0007	5,3
CEF	24	80	442	87	1YMB531022M0001	5,3
CEF	24	100	442	87	1YMB531022M0002	5,3
CEF	24	125	442	87	1YMB531022M0003	5,3
CEF	24	80	537	65	1YMB531004M0023	4,0
CEF	24	80	537	87	1YMB531004M0008	6,2
CEF	24	100	537	87	1YMB531004M0009	6,2
CEF	24	125	537	87	1YMB531004M0010	6,2

CEF	27	6	442	65	1YMB531005M0001	3,0
CEF	27	10	442	65	1YMB531005M0002	3,0
CEF	27	16	442	65	1YMB531005M0003	3,0
CEF	27	25	442	87	1YMB531005M0004	5,3
CEF	27	40	442	87	1YMB531005M0005	5,3
CEF	27	50	442	87	1YMB531005M0006	5,3
CEF	27	63	442	87	1YMB531005M0007	5,3
CEF	27	80	537	87	1YMB531005M0008	6,2
CEF	27	100	537	87	1YMB531005M0009	6,2

CEF	36	6	537	65	1YMB531006M0001	4,0
CEF	36	10	537	65	1YMB531006M0002	4,0
CEF	36	16	537	65	1YMB531006M0003	4,0
CEF	36	25	537	87	1YMB531006M0004	6,2
CEF	36	40	537	87	1YMB531006M0005	6,2

Other ratings and dimensions on request. When ordering outdoor version pls. indicate CEF –U.

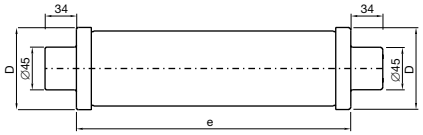
Fuse link type CEF

10. Data and dimensions CEF

Type	Rated voltage U_n [kV]	Rated current I_n [kV]	Length e [mm]	Diameter D [mm]	Short Circuit current I_1 [kA]	Minimum breaking current I_3 [A]	Rated Power P_n [W]	Resistance R_0 [mΩ]
CEF	3,6/7/2	6	192	65	50	35	26	489,0
CEF	3,6/7/2	10	192	65	50	55	16	120,0
CEF	3,6/7/2	16	192	65	50	55	26	60,2
CEF	3,6/7/2	25	192	65	50	72	24	30,1
CEF	3,6/7/2	40	192	65	50	100	30	15,3
CEF	3,6/7/2	50	192	65	50	190	35	10,4
CEF	3,6/7/2	63	192	65	50	190	40	7,8
CEF	3,6/7/2	80	192	87	50	250	52	6,2
CEF	3,6/7/2	100	192	87	50	275	57	4,4
CEF	3,6/7/2	6	292	65	50	35	26	489,0
CEF	3,6/7/2	10	292	65	50	55	16	120,0
CEF	3,6/7/2	16	292	65	50	55	26	60,2
CEF	3,6/7/2	25	292	65	50	72	24	30,1
CEF	3,6/7/2	40	292	65	50	100	30	15,3
CEF	3,6/7/2	50	292	65	50	190	35	10,4
CEF	3,6/7/2	63	292	65	50	190	40	7,8
CEF	3,6/7/2	80	292	87	50	250	52	6,2
CEF	3,6/7/2	100	292	87	50	275	57	4,4
CEF	3,6/7/2	125	292	87	50	375	76	3,5
CEF	3,6/7/2	160	292	87	50	480	101	2,6
CEF	3,6/7/2	200	292	87	50	650	107	1,7
CEF	3,6/7/2	125	367	87	50	375	76	3,5
CEF	3,6/7/2	160	367	87	50	480	101	2,6
CEF	3,6/7/2	200	367	87	50	650	107	1,7
CEF	12	6	292	53	63	36	46	735,0
CEF	12	6	292	65	63	35	41	735,0
CEF	12	10	292	53	63	65	25	180,0
CEF	12	10	292	65	63	55	33	180,0
CEF	12	16	292	53	63	65	34	105,2
CEF	12	16	292	65	63	55	32	105,2
CEF	12	20	292	53	63	83	38	70,1
CEF	12	25	292	65	63	77	47	52,6
CEF	12	31,5	292	65	63	100	41	30,7
CEF	12	40	292	65	63	105	52	23,0
CEF	12	50	292	65	63	190	70	17,9
CEF	12	63	292	65	63	190	78	13,4
CEF	12	80	292	65	63	250	82	9,2
CEF	12	80	292	87	63	250	82	9,2
CEF	12	100	292	65	63	375	101	6,4
CEF	12	100	292	87	63	275	84	6,6
CEF	12	125	292	87	63	375	125	5,1
CEF	12	6	442	53	63	36	46	735,0
CEF	12	6	442	65	63	35	41	735,0
CEF	12	10	442	53	63	65	25	180,0
CEF	12	10	442	65	63	55	33	180,0
CEF	12	16	442	53	63	65	34	105,2
CEF	12	16	442	65	63	55	32	105,2
CEF	12	20	442	53	63	83	38	70,1
CEF	12	25	442	65	63	77	47	52,6
CEF	12	31,5	442	65	63	100	41	30,7
CEF	12	40	442	65	63	105	52	23,0
CEF	12	50	442	65	63	190	70	17,9
CEF	12	63	442	65	63	190	78	13,4
CEF	12	80	442	65	63	250	82	9,2
CEF	12	80	442	87	63	250	82	9,2
CEF	12	100	442	65	63	375	103	6,4
CEF	12	100	442	87	63	275	84	6,6
CEF	12	125	442	65	63	375	125	5,3
CEF	12	125	442	87	63	375	125	5,3
CEF	12	160	442	87	50	480	170	3,9
CEF	12	200	442	87	50	650	174	2,7
CEF	12	125	537	65	50	375	125	5,3
CEF	17,5	6	292	65	20	35	54	880,0
CEF	17,5	10	292	65	20	55	41	270,7
CEF	17,5	16	292	65	20	55	67	135,4
CEF	17,5	20	292	65	25	83	52,6	90,3
CEF	17,5	25	292	65	25	72	64	67,7
CEF	17,5	31,5	292	65	25	100	56,7	46,0
CEF	17,5	40	292	65	25	210	80	34,5
CEF	17,5	40	292	87	25	100	80	34,5
CEF	17,5	50	292	65	25	210	90	23,1
CEF	17,5	50	292	87	25	210	90	23,1
CEF	17,5	63	292	87	25	210	100	17,3
CEF	17,5	6	367	65	20	35	54	880,0
CEF	17,5	10	367	65	20	55	41	270,7
CEF	17,5	16	367	65	20	55	67	135,4

Fuse link type CEF

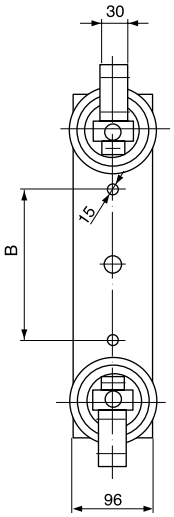
Type	Rated voltage U_n [kV]	Rated current I_n [kV]	Length e [mm]	Diameter D [mm]	Short Circuit current I_1 [kA]	Minimum breaking current I_3 [A]	Rated Power P_n [W]	Resistance R_o [mΩ]
CEF	17,5	20	367	65	25	83	52,6	90,3
CEF	17,5	25	367	65	25	72	64	67,7
CEF	17,5	31,5	367	65	25	100	56,7	46,0
CEF	17,5	40	367	65	25	210	80	34,7
CEF	17,5	40	367	87	25	100	80	34,5
CEF	17,5	50	367	65	25	210	90	23,1
CEF	17,5	50	367	87	25	210	90	23,1
CEF	17,5	63	367	87	25	210	100	17,3
CEF	17,5	100	367	87	25	375	134	9,5
CEF	17,5	6	442	65	20	35	54	880,0
CEF	17,5	10	442	65	20	55	41	271,0
CEF	17,5	16	442	65	20	55	67	135,0
CEF	17,5	20	442	65	25	83	52,6	101,6
CEF	17,5	25	442	65	25	72	64	67,7
CEF	17,5	31,5	442	65	25	100	56,7	43,1
CEF	17,5	40	442	65	25	210	80	34,5
CEF	17,5	40	442	87	25	100	80	34,5
CEF	17,5	50	442	65	25	210	90	23,1
CEF	17,5	50	442	87	25	210	90	23,1
CEF	17,5	63	442	87	25	210	100	17,3
CEF	17,5	80	442	87	25	250	124	13,8
CEF	17,5	100	442	87	25	275	136	9,9
CEF	17,5	125	442	87	25	375	175	7,9
CEF	24	6	442	53	63	25	82	1370,0
CEF	24	6	442	65	63	35	91	1370,0
CEF	24	10	442	53	63	65	48	360,9
CEF	24	10	442	65	63	55	62	360,9
CEF	24	16	442	53	63	65	63	180,5
CEF	24	16	442	65	63	55	72	180,5
CEF	24	20	442	53	63	83	46	120,3
CEF	24	20	442	65	63	82	61	130,3
CEF	24	25	442	65	63	72	79	90,2
CEF	24	31,5	442	65	63	82	98	72,2
CEF	24	40	442	65	63	110	106	46,0
CEF	24	50	442	65	63	210	130	30,7
CEF	24	50	442	87	63	210	130	30,7
CEF	24	63	442	65	63	250	147	23,0
CEF	24	63	442	87	63	210	147	23,0
CEF	24	80	442	87	63	250	165	18,4
CEF	24	100	442	87	63	300	186	13,2
CEF	24	125	442	87	63	375	234	10,5
CEF	24	80	537	65	63	250	165	18,4
CEF	24	80	537	87	63	250	165	18,4
CEF	24	100	537	87	63	300	186	13,2
CEF	24	125	537	87	63	375	234	10,5
CEF	27	6	442	65	20	35	91	1340,0
CEF	27	10	442	65	20	55	80	451,2
CEF	27	16	442	65	20	55	90	225,6
CEF	27	25	442	87	20	72	100	112,8
CEF	27	40	442	87	20	110	130	55,6
CEF	27	50	442	87	20	210	130	30,7
CEF	27	63	442	87	20	210	147	23,0
CEF	27	80	537	87	20	250	210	18,4
CEF	27	100	537	87	20	300	235	15,8
CEF	36	6	537	65	20	35	137	2055,0
CEF	36	10	537	65	20	55	93	571,5
CEF	36	16	537	65	20	55	109	285,8
CEF	36	25	537	87	20	72	144	142,9
CEF	36	40	537	87	20	100	176	69,1

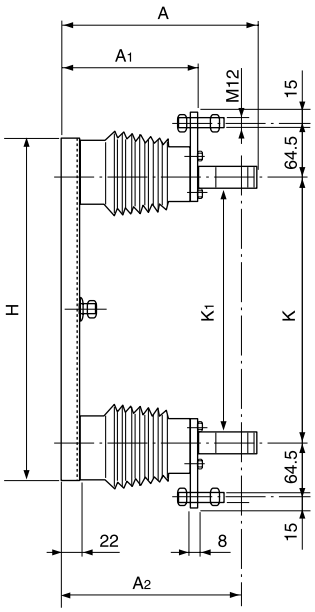


I_1 = maximum short-circuit current tested
I_3 = minimum breaking current
P_N = power loss at rated current
R_0 = resistance at room temp.

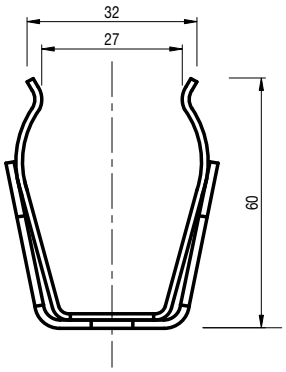
Fuse link type CEF

Accessories
Fuse base type UCE





Fuse clips



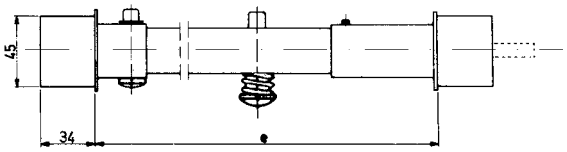
Catalogue No. 1YMX000128M0001

11. Ordering table

Type	Rated voltage	Current ratings	Fuse length	Dimensions in mm							Weight	Catalogue No.
	[kV]	[A]	mm	A	A_1	A_2	H	K	K_1	B	[kg]	
UCE 7,2	3,6/7,2	6-100	192	242	160	221	310	218	193	55	3,4	1YMX052501M0001
UCE12	3,6/7,2 12	6-200 6-125	292	242	160	221	410	318	293	180	3,7	1YMX052503M0001 1YMX052503M0001
UCE 12L	12	125-200	442	242	160	221	570	468	443	300	4,2	1YMX052505M0001
UCE 17,5	17,5	6-63	292	327	245	306	410	318	293	180	3,7	1YMX052507M0001
UCE 24	17,5 24	6-125 6-125	442	327	245	306	570	468	443	300	6,9	1YMX052509M0001 1YMX052509M0001
UCE 24L	24	80-125	537	327	245	306	675	563	538	380	7,4	1YMX052511M0001
UCE 36	36	6-40	537	422	340	401	675	563	538	380	7,6	1YMX052513M0001

CEF test fuse-link 3,6/7,2-36 kV for test of striker system.

Catalogue No.	Weight [kg]	Dimension in mm	
		e*	Total length
1YMX300062M0001	1,4	192 292 442 537	605

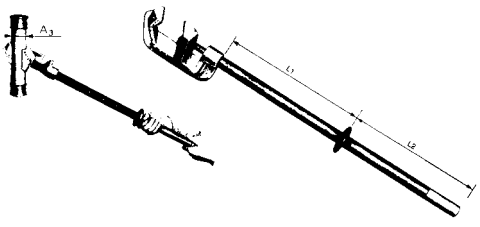


*) Adjustable
The striker has a force-travel characteristic as shown in the figure on page 4.

Operating tong for fuse links CEF 3,6/7,2 – 36 kV

Catalogue No.	Test voltage [kV]	Weight [kg]
1YMX053006M001	100	2,2

Dimensions in mm		
L1	L2	A3(Ø)
700	600	30-90



Fuse link type CEF

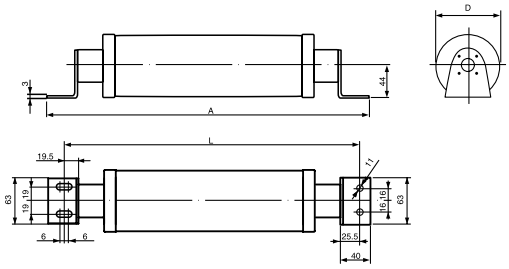
12. Data and dimension CEF-BS

Type	Rated voltage [kV]	Rated current [A]	L/D [mm]	A [mm]	Catalogue No.
CEF-BS	3,6/7,2	6	307/65	342	1YMB531007M0001
CEF-BS	3,6/7,2	10	307/65	342	1YMB531007M0002
CEF-BS	3,6/7,2	16	307/65	342	1YMB531007M0003
CEF-BS	3,6/7,2	25	307/65	342	1YMB531007M0004
CEF-BS	3,6/7,2	40	307/65	342	1YMB531007M0005
CEF-BS	3,6/7,2	50	307/65	342	1YMB531007M0006
CEF-BS	3,6/7,2	63	307/65	342	1YMB531007M0007
CEF-BS	3,6/7,2	80	307/65	342	1YMB531007M0008
CEF-BS	3,6/7,2	100	307/65	342	1YMB531007M0009
CEF-BS	3,6/7,2	125	407/87	442	1YMB531007M0010
CEF-BS	3,6/7,2	160	407/87	442	1YMB531007M0011
CEF-BS	3,6/7,2	200	407/87	442	1YMB531007M0012
CEF-BS	12	6	407/65	442	1YMB531008M0001
CEF-BS	12	10	407/65	442	1YMB531008M0002
CEF-BS	12	16	407/65	442	1YMB531008M0003
CEF-BS	12	25	407/65	442	1YMB531008M0004
CEF-BS	12	40	407/65	442	1YMB531008M0005
CEF-BS	12	50	407/65	442	1YMB531008M0006
CEF-BS	12	63	407/65	442	1YMB531008M0007
CEF-BS	12	80	407/87	442	1YMB531008M0008
CEF-BS	12	100	407/87	442	1YMB531008M0009
CEF-BS	12	125	557/87	592	1YMB531008M0010
CEF-BS	12	160	557/87	592	1YMB531008M0011
CEF-BS	12	200	557/87	592	1YMB531008M0012
CEF-BS	17,5	6	407/65	442	1YMB531009M0001
CEF-BS	17,5	10	407/65	442	1YMB531009M0002
CEF-BS	17,5	16	407/65	442	1YMB531009M0003
CEF-BS	17,5	25	407/65	442	1YMB531009M0004
CEF-BS	17,5	40	407/87	442	1YMB531009M0005
CEF-BS	17,5	50	407/87	442	1YMB531009M0006
CEF-BS	17,5	63	407/87	442	1YMB531009M0007
CEF-BS	17,5	80	557/87	592	1YMB531009M0008
CEF-BS	17,5	100	557/87	592	1YMB531009M0009
CEF-BS	17,5	125	557/87	592	1YMB531009M0010
CEF-BS	24	6	557/65	592	1YMB531010M0001
CEF-BS	24	10	557/65	592	1YMB531010M0002
CEF-BS	24	16	557/65	592	1YMB531010M0003
CEF-BS	24	25	557/65	592	1YMB531010M0004
CEF-BS	24	40	557/65	592	1YMB531010M0005
CEF-BS	24	50	557/87	592	1YMB531010M0006
CEF-BS	24	63	557/87	592	1YMB531010M0007
CEF-BS	24	80	652/87		
CEF-BS	24	100	652/87		
CEF-BS	24	125	652/87		

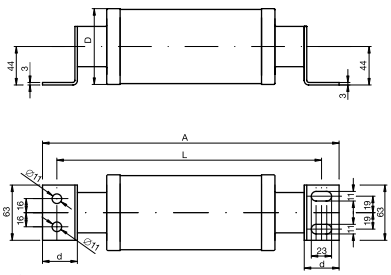
Data and dimension CEF-BS acc. to EN 60282-1:1996

Type	Rated voltage [kV]	Rated current [A]	L/D [mm]	A/d [mm]	Catalogue No.
CEF-BS-B	3,6/7,2	6	305/65	340/40	1YMB531007M0021
CEF-BS-B	3,6/7,2	10	305/65	340/40	1YMB531007M0022
CEF-BS-B	3,6/7,2	16	305/65	340/40	1YMB531007M0023
CEF-BS-B	3,6/7,2	25	305/65	340/40	1YMB531007M0024
CEF-BS-B	3,6/7,2	40	305/65	340/40	1YMB531007M0025
CEF-BS-B	3,6/7,2	50	305/65	340/40	1YMB531007M0026
CEF-BS-B	3,6/7,2	63	305/65	340/40	1YMB531007M0027
CEF-BS-B	3,6/7,2	80	305/87	340/40	1YMB531007M0028
CEF-BS-B	3,6/7,2	100	305/87	340/40	1YMB531007M0029
CEF-BS-D	3,6/7,2	125	419/87	340/40	1YMB531007M0030
CEF-BS-D	3,6/7,2	160	419/87	461/50,5	1YMB531007M0031
CEF-BS-D	3,6/7,2	200	419/87	461/50,5	1YMB531007M0032
CEF-BS-D	12	6	419/65	461/50,5	1YMB531008M0021
CEF-BS-D	12	10	419/65	461/50,5	1YMB531008M0022
CEF-BS-D	12	16	419/65	461/50,5	1YMB531008M0023
CEF-BS-D	12	25	419/65	461/50,5	1YMB531008M0024
CEF-BS-D	12	40	419/65	461/50,5	1YMB531008M0025
CEF-BS-D	12	50	419/65	461/50,5	1YMB531008M0026
CEF-BS-D	12	63	419/65	461/50,5	1YMB531008M0027
CEF-BS-D	12	80	419/87	461/50,5	1YMB531008M0028
CEF-BS-D	12	100	419/87	461/50,5	1YMB531008M0029
CEF-BS-B	12	125	553/87	590/40	1YMB531008M0030
CEF-BS-B	12	160	553/87	590/40	1YMB531008M0031
CEF-BS-B	12	200	553/87	590/40	1YMB531008M0032
CEF-BS-D	17,5	6	419/65	461/50,5	1YMB531009M0021
CEF-BS-D	17,5	10	419/65	461/50,5	1YMB531009M0022
CEF-BS-D	17,5	16	419/65	461/50,5	1YMB531009M0023
CEF-BS-D	17,5	25	419/65	461/50,5	1YMB531009M0024
CEF-BS-D	17,5	40	419/87	461/50,5	1YMB531009M0025
CEF-BS-D	17,5	50	419/87	461/50,5	1YMB531009M0026
CEF-BS-D	17,5	63	419/87	461/50,5	1YMB531009M0027
CEF-BS-B	17,5	80	553/87	590/40	1YMB531009M0028
CEF-BS-B	17,5	100	553/87	590/40	1YMB531009M0029
CEF-BS-B	17,5	125	553/87	590/40	1YMB531009M0030
CEF-BS-B	24	6	553/65	590/40	1YMB531010M0021
CEF-BS-B	24	10	553/65	590/40	1YMB531010M0022
CEF-BS-B	24	16	553/65	590/40	1YMB531010M0023
CEF-BS-B	24	25	553/65	590/40	1YMB531010M0024
CEF-BS-B	24	40	553/65	590/40	1YMB531010M0025
CEF-BS-B	24	50	553/87	590/40	1YMB531010M0026
CEF-BS-B	24	63	553/87	590/40	1YMB531010M0027
CEF-BS-C	3,6/7,2	6	305/65	340/40	1YMB531007M0041
CEF-BS-C	3,6/7,2	10	305/65	340/40	1YMB531007M0042
CEF-BS-C	3,6/7,2	16	305/65	340/40	1YMB531007M0043
CEF-BS-C	3,6/7,2	25	305/65	340/40	1YMB531007M0044
CEF-BS-C	3,6/7,2	40	305/65	340/40	1YMB531007M0045
CEF-BS-C	3,6/7,2	50	305/65	340/40	1YMB531007M0046
CEF-BS-C	3,6/7,2	63	305/65	340/40	1YMB531007M0047
CEF-BS-C	3,6/7,2	80	305/87	340/40	1YMB531007M0048
CEF-BS-C	3,6/7,2	100	305/87	340/40	1YMB531007M0049
CEF-BS-C	3,6/7,2	6	320/65	361/50,5	1YMB531007M0061
CEF-BS-C	3,6/7,2	10	320/65	361/50,5	1YMB531007M0062
CEF-BS-C	3,6/7,2	16	320/65	361/50,5	1YMB531007M0063
CEF-BS-C	3,6/7,2	25	320/65	361/50,5	1YMB531007M0064
CEF-BS-C	3,6/7,2	40	320/65	361/50,5	1YMB531007M0065
CEF-BS-C	3,6/7,2	50	320/65	361/50,5	1YMB531007M0066
CEF-BS-C	3,6/7,2	63	320/65	361/50,5	1YMB531007M0067
CEF-BS-C	3,6/7,2	80	320/87	361/50,5	1YMB531007M0068
CEF-BS-C	3,6/7,2	100	320/87	361/50,5	1YMB531007M0069
CEF-BS-C	3,6/7,2	125	320/87	400/40	1YMB531007M0050
CEF-BS-C	3,6/7,2	160	320/87	400/40	1YMB531007M0051
CEF-BS-C	3,6/7,2	200	320/87	400/40	1YMB531007M0052
CEF-BS-C	12	6	400/65	400/40	1YMB531008M0041
CEF-BS-C	12	10	400/65	400/40	1YMB531008M0042
CEF-BS-C	12	16	400/65	400/40	1YMB531008M0043
CEF-BS-C	12	25	400/65	400/40	1YMB531008M0044
CEF-BS-C	12	40	400/65	400/40	1YMB531008M0045
CEF-BS-C	12	50	400/65	400/40	1YMB531008M0046
CEF-BS-C	12	63	400/65	400/40	1YMB531008M0047
CEF-BS-C	12	80	400/87	400/40	1YMB531008M0048
CEF-BS-C	12	100	400/87	400/40	1YMB531008M0049
CEF-BS-C	17,5	6	400/65	400/40	1YMB531009M0041
CEF-BS-C	17,5	10	400/65	400/40	1YMB531009M0042
CEF-BS-C	17,5	16	400/65	400/40	1YMB531009M0043
CEF-BS-C	17,5	25	400/65	400/40	1YMB531009M0044
CEF-BS-C	17,5	40	400/87	400/40	1YMB531009M0045
CEF-BS-C	17,5	50	400/87	400/40	1YMB531009M0046
CEF-BS-C	17,5	63	400/87	400/40	1YMB531009M0047

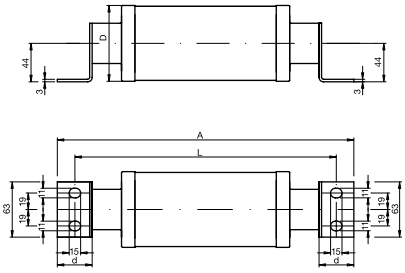
Dimension CEF-BS



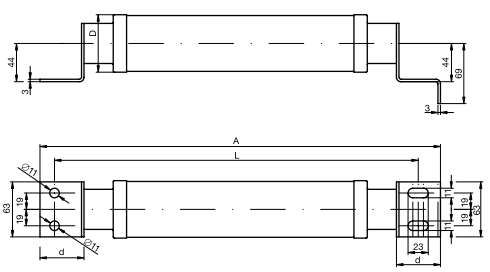
Dimension CEF-BS-B



Dimension CEF-BS-C



Dimension CEF-BS-D



High voltage current limiting fuse link for MOTOR circuit applications type CMF

Rated voltage:	Rated current:
3,6 kV	100-315 A
7,2 kV	63-315 A
12 kV	63-200 A

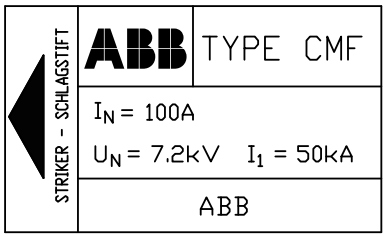
1. General

The fuse links type CMF are specially designed for motor circuit applications. They are tested according to the IEC Publication 60282-1 (IEC 282-1) and Publication 644. The IEC 644 applies to fuse links used with motors started direct-on-line on alternating current systems. High voltage fuses used in motor circuits must have the ability to withstand, without deterioration, the repeated surges associated with motor starting.

The dimensions are in accordance with DIN 43625, i.e. the 3,6 kV rating is realized in the normal 12 kV length (e = 292 mm).The 7,2 kV and 12 kV rating in the 24 kV length (e = 442 mm).
Special connection elements can be delivered in cases where fuses have to be paralleled.

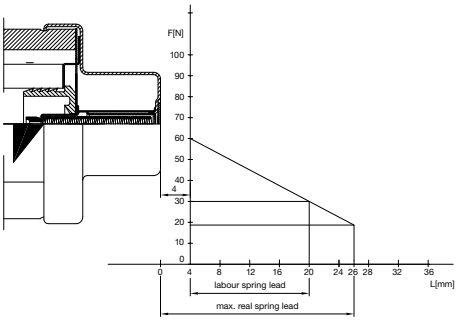
ABB'smotor fuses have the following properties:
– higher current ratingwithin single body dimensions
– tested according to IEC 644 which guaranties excellent ability to withstand repeated motor starting conditions
– lowpower losses
– lowminimum-breaking-current
– high breaking capacity and excellent short circuit current limitation.

Although a motor fuse is normally run at a stationary current which is much lower than the fuse rated current, the low-loss characteristics of the CMF fuses make them especially suitable in compact contactor compartments.



2. Nameplate

The symbols on the nameplate have the following meaning:
I_N = Rated current
U_N = Rated voltage
I_1 = Maximum short circuit current for which the fuse is tested

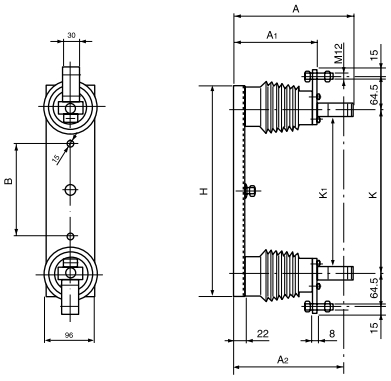


3. Indicator and striker pin

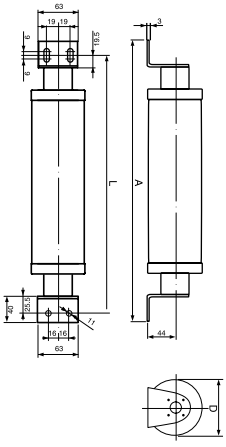
The CMF fuse links are equipped with a combined indicator and striker system, which is activated immediately when the fuse element melts.The force diagramis in accordance with the requirements of IEC 60282-1 (IEC 282-1) and DIN 43625. The bellow presented striker pin force diagram is valid for CEF/CMF fuses as effective from 05.2006. The former version of striker pin was with initial force of 50N.

Fuse link type CMF

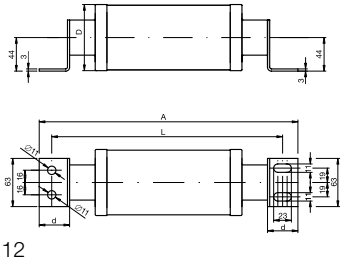
FUSE BASE TYPE UCM



Dimension CMF-BF



Dimension CMF-BS-B



4. Ordering table type CMF
High voltage – fuse links

Type	Rated voltage [kV]	Rated Current [A]	e	Catalogue No.	Weight [kg]
CMF	3,6	100	292	1YMB531028M0001	2,3
CMF	3,6	160	292	1YMB531028M0002	2,3
CMF	3,6	200	292	1YMB531028M0003	2,3
CMF	3,6	250	292	1YMB531028M0004	3,8
CMF	3,6	315	292	1YMB531028M0005	3,8
CMF	7,2	63	442	1YMB531029M0001	3,0
CMF	7,2	100	442	1YMB531029M0002	3,0
CMF	7,2	160	442	1YMB531029M0003	3,0
CMF	7,2	200	442	1YMB531029M0004	5,3
CMF	7,2	250	442	1YMB531029M0005	5,3
CMF	7,2	315	442	1YMB531029M0006	5,3
CMF	12	63	442	1YMB531030M0001	3,0
CMF	12	100	442	1YMB531030M0002	5,3
CMF	12	160	442	1YMB531030M0003	5,3
CMF	12	200	442	1YMB531030M0004	5,3

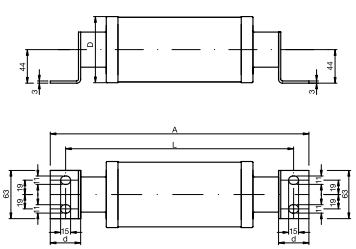
5. Ordering table UCM

Type	Rated voltage [kV]	Dimensions [mm]							Weight [kg]	Catalogue No.
		A	A_1	A_2	H	K	K_1	B		
UCM	3,6	232	160	220	410	318	293	180	3,7	1YMX139037R001
UCM	7,2/12	232	160	220	570	468	443	300	4,2	1YMX139037R002

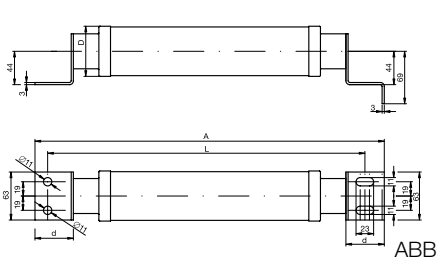
6. Ordering table type CMF-BS

Type	Rated voltage [kV]	Rated Current [A]	L/D [mm]	A/d [mm]	Catalogue No.	Weight [kg]
CMF-BS-C	3,6	100	400/65	440/40	1YMB531031M0021	2,3
CMF-BS-C	3,6	160	400/65	440/40	1YMB531031M0022	2,3
CMF-BS-C	3,6	200	400/87	440/40	1YMB531031M0023	2,3
CMF-BS-C	3,6	250	400/87	440/40	1YMB531031M0024	3,8
CMF-BS-C	3,6	315	400/87	440/40	1YMB531031M0025	3,8
CMF-BS-D	3,6	100	419/65	461/50,5	1YMB531031M0011	2,3
CMF-BS-D	3,6	160	419/65	461/50,5	1YMB531031M0012	2,3
CMF-BS-D	3,6	20	419/87	461/50,5	1YMB531031M0013	2,3
CMF-BS-D	3,6	250	419/87	461/50,5	1YMB531031M0014	3,8
CMF-BS-D	3,6	315	419/87	461/50,5	1YMB531031M0015	3,8
CMF-BS-B	7,2	63	555/65	590/40	1YMB531032M0021	3,0
CMF-BS-B	7,2	100	555/65	590/40	1YMB531032M0022	3,0
CMF-BS-B	7,2	160	555/65	590/40	1YMB531032M0023	3,0
CMF-BS-B	7,2	200	555/87	590/40	1YMB531032M0024	5,3
CMF-BS-B	7,2	250	555/87	590/40	1YMB531032M0025	5,3
CMF-BS-B	7,2	315	555/87	590/40	1YMB531032M0026	5,3
CMF-BS-B	12	63	555/65	590/40	1YMB531033M0021	3,0
CMF-BS-B	12	100	555/87	590/40	1YMB531033M0022	5,3
CMF-BS-B	12	160	555/87	590/40	1YMB531033M0023	5,3
CMF-BS-B	12	200	555/87	590/40	1YMB531033M0024	5,3
CMF-BS	3,6	100	405/65	440/40	1YMB531031M0001	2,3
CMF-BS	3,6	160	405/65	440/40	1YMB531031M0002	2,3
CMF-BS	3,6	200	405/87	440/40	1YMB531031M0003	2,3
CMF-BS	3,6	250	405/87	440/40	1YMB531031M0004	3,8
CMF-BS	3,6	315	405/87	440/40	1YMB531031M0005	3,8
CMF-BS	7,2	63	555/65	590/40	1YMB531032M0001	3,0
CMF-BS	7,2	100	555/65	590/40	1YMB531032M0002	3,0
CMF-BS	7,2	160	555/65	590/40	1YMB531032M0003	3,0
CMF-BS	7,2	200	555/87	590/40	1YMB531032M0004	5,3
CMF-BS	7,2	250	555/87	590/40	1YMB531032M0005	5,3
CMF-BS	7,2	315	555/87	590/40	1YMB531032M0006	5,3
CMF-BS	12	63	555/65	590/40	1YMB531033M0001	3,0
CMF-BS	12	100	555/87	590/40	1YMB531033M0002	5,3
CMF-BS	12	160	555/87	590/40	1YMB531033M0003	5,3
CMF-BS	12	200	555/87	590/40	1YMB531033M0004	5,3

Dimension CMF-BS-C

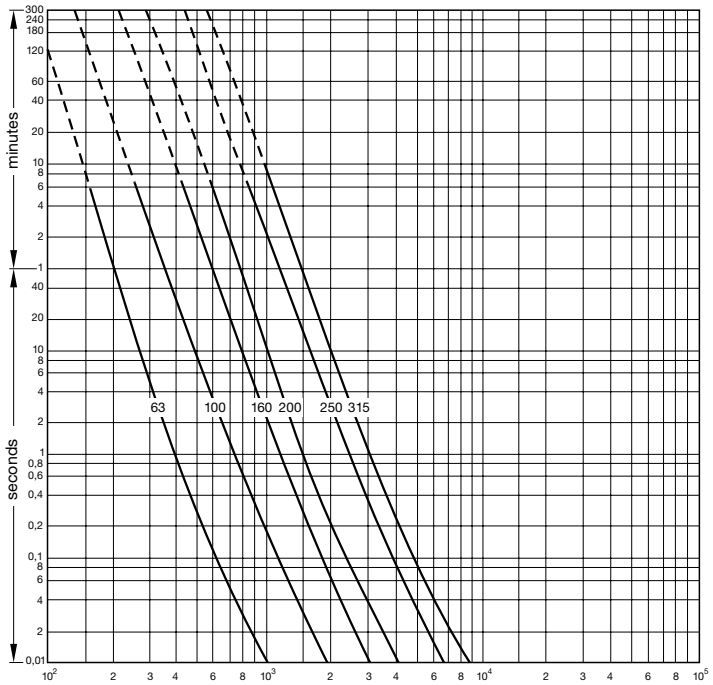


Dimension CMF-BS-D

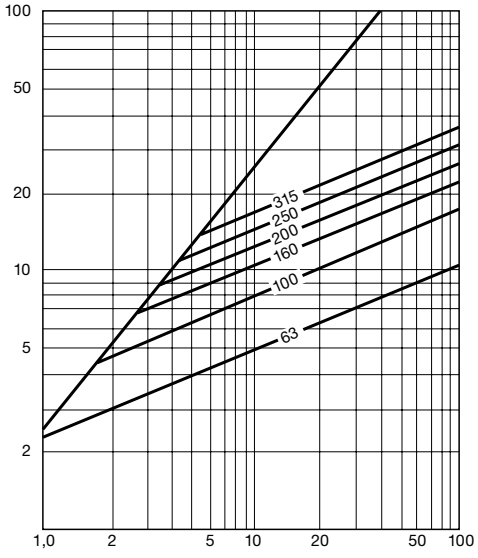


Fuse link type CMF

Pre-arcing time



Maximum cut off current [kA] (peak)



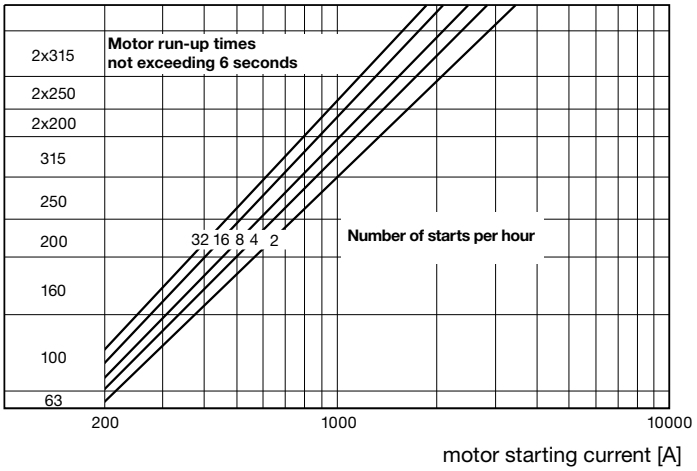
7. Pre-arcing times
The characteristics are equal or all rated voltages and are recorded from cold condition.
Dashed sections of the curves indicate the zone of uncertain interruption.

8. Current limitation
CMF fuse links are current limiting. A large short circuit current will therefore not reach its full value. The diagram shows the relation between the prospective short circuit current and the peak value of the cut off current.

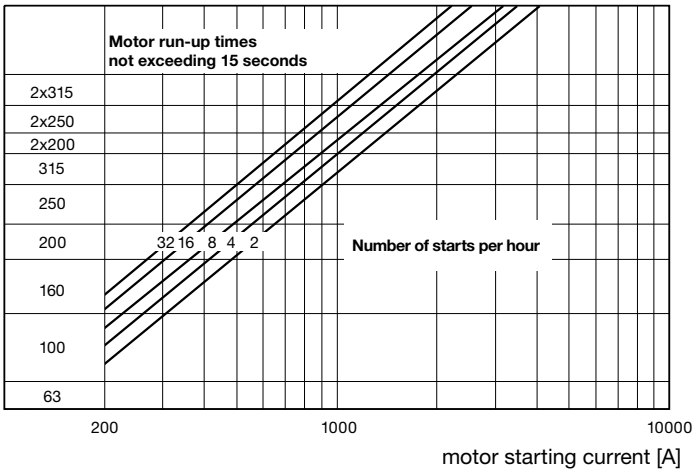
9. Overvoltages
In order to be current limiting,the fuse links must generate an arc voltage exceeding the instantaneous value of the operating voltage. The overvoltage generated by the CMF fuse link is below the maximum permissible value acc to IEC 60282-1 (IEC 282-1) CMF fuse links can safely be used if the system line voltage is 50-100% of the rated fuse link voltage.

Fuse link type CMF

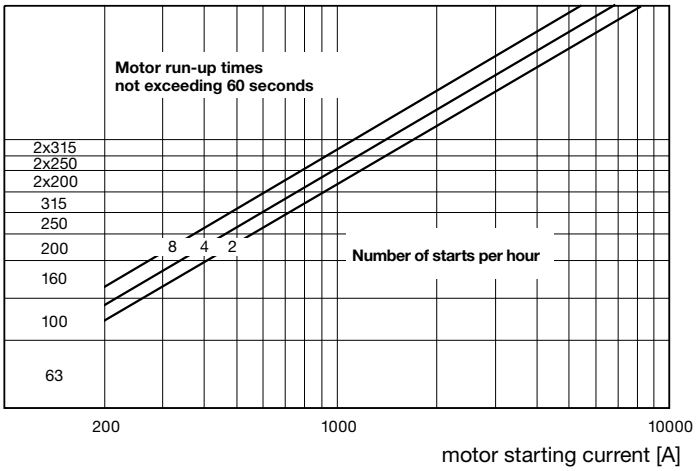
Fuselink
rating [A]



Fuselink
rating [A]



Fuselink
rating [A]



10. Choice of fuse links

Choice of rated voltage U_N
The rated voltage of the fuse links must be equal to, or higher than the operating line voltage. By choosing fuse link rated voltage considerably higher than the line voltage, the maximum arc voltage must not exceed the insulation level of the network.

Choice of rated current I_N
The minimum permissible current rating of the fuse link for motor protection may be determined from the selection charts I, II and III.
The three different charts are for run-up times of 6,15 and 60 seconds respectively.
Each chart contains different characteristics, depending on the number of starts per hour.
Of this specific number of starts per hour, the first two are in immediate succession, the rest being evenly spaced in the 1 hour period.
The number of starts per hour indicates the time interval between separate starts.
For example, 4 starts in 15 minutes are represented by 16 starts per hour.
On the horizontal axis of the selection chart, the motor starting current is given, and along the vertical axis the current rating of the fuse link is found.

Selection procedure:
- Select the charts which are appropriate for the run-up time of themotor,
- select the starting current along the horizontal axis,
- depending on the number of starts per hour, select the correct characteristic (2, 4, 8, 16, 32),
- read of the correct rating of the fuse link on the vertical axis.

Example:	**A**	**B**
Starting current of the motor	820A	250A
Run-up time	6 sec.	15 sec.
Number of starts per hour	2	16
Chart number	1	2
Rated current of fuse link	250A	160A

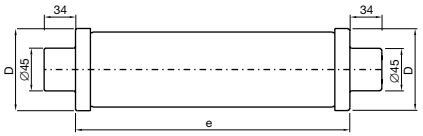
Fuse link type CMF

11. Replacement of melted fuse links
CMF fuse link cannot be regenerated. According to IEC Publication 60282-1 (IEC 282-1), all 3 fuse links should be replaced, even if only 1 or 2 of the fuse links in the threephase system have operated. Exceptions are allowed when it can be verified that the fuse link(s) have not experienced any overcurrent.

12. The K-factor
According to the IEC 644, the K-factor is a factor (less than unity) defining an overload characteristic to which the fuse link may be repeatedly subjected under specified motor starting conditions without deterioration. The overload characteristic is obtained by multiplying the current on the prearcing characteristic (melting time characteristics) by K. The Value of K given in the data table is chosen at 10 seconds melting time, and is valid for melting times between 5 and 60 seconds.

13. Data and dimensions CMF

U_N	I_N	e	D	K*	I_1	I_3	R_O	P_N	Minimum I^2 x t	Maximum I^2 x t
[kV]	[A]	[mm]	[mm]	-	[kA]	[A]	[mΩ]	[W]	Pre-arc A^2s	Interruption A^2s
3,6	100	292	65	0,75	50	275	3,20	49	$1,4 \times 10^4$	17×10^4
	160	292	65	0,7	50	400	1,92	75	$3,8 \times 10^4$	50×10^4
	200	292	87	0,7	50	500	1,40	75	$7,6 \times 10^4$	71×10^4
	250	292	87	0,6	50	760	0,97	90	14×10^4	115×10^4
	315	292	87	0,6	50	900	0,81	122	21×10^4	180×10^4
7,2	63	442	65	0,75	50	175	8,50	45	$0,48 \times 10^4$	$6,5 \times 10^4$
	100	442	65	0,75	50	275	4,86	67	$1,40 \times 10^4$	18×10^4
	160	442	65	0,7	50	400	2,92	119	$3,8 \times 10_4$	54×10^4
	200	442	87	0,7	50	500	2,12	118	$7,6 \times 10^4$	75×10^4
	250	442	87	0,6	50	800	1,48	142	14×10^4	120×10^4
	315	442	87	0,6	50	950	1,23	193	21×10^4	220×10^4
12	63	442	65	0,75	50	190	13,52	77	$0,48 \times 10^4$	11×10^4
	100	442	87	0,75	50	275	6,62	103	$1,4 \times 10^4$	20×10^4
	160	442	87	0,7	50	480	3,98	155	$3,8 \times 10^4$	70×10^4
	200	442	87	0,7	50	560	2,73	173	$9,3 \times 10^4$	91×10^4



*) The K-factor is referred to the average value of current.

Legends:
e = see figure
D = see figure
K = K-factor acc. to IEC 644
I_1 = max. short circuit current tested
I_3 = minimum breaking current
R_0 = resistance at room temperature
P_N = power loss at rated current

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ABB is working to continuous improve the products. Therefore we reserve the right to change design, dimension and data without prior notice.

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