

Bezpieczniki średniego napięcia IKUS HV HRC

Typ: IKUS HV

Prąd znamionowy: 6-315A

Napięcie znamionowe: 3,6-36kV AC

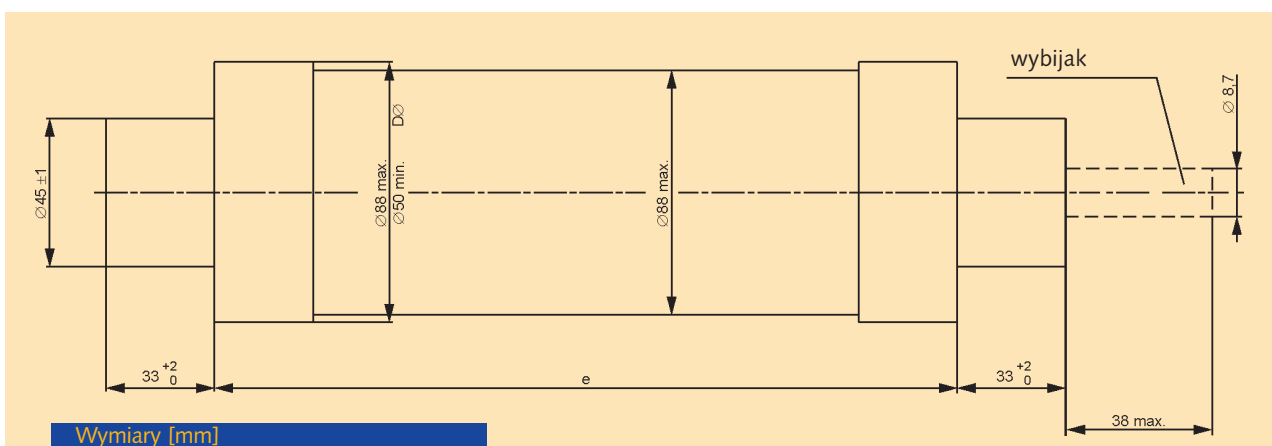
Zwarciova zdolność wyłączenia: 40-63kA

Wielkości, wymiary: od 192x53 mm do 537x85 mm

Wg normy: IEC EN 60282-1, 60644, 60787 i VDE 0670

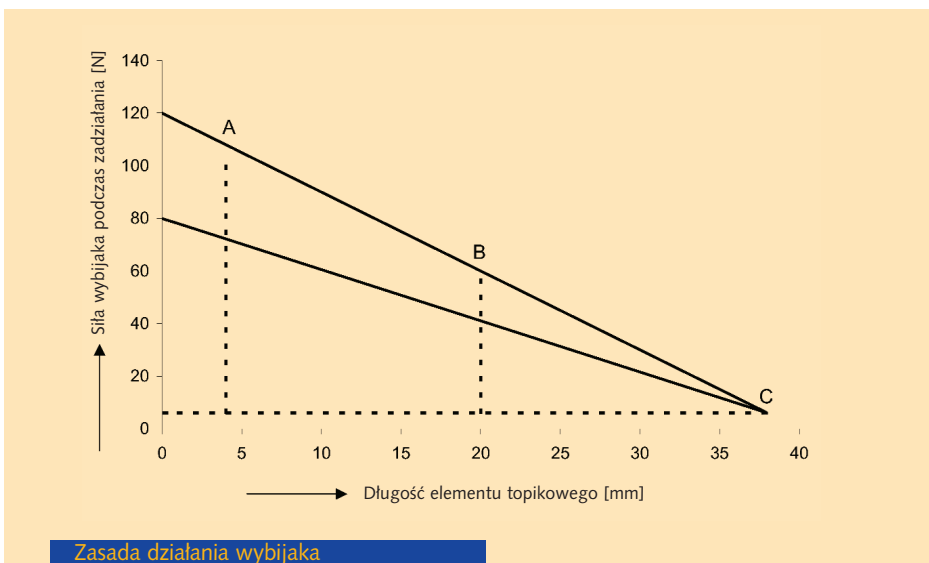
Uwagi: Wybijkak 80 i 120N z ogranicznikiem temperatury stosowany na zewnątrz i wewnątrz.
Topik z czystego srebra.

Producent: JEAN MÜLLER



Wymiary [mm]

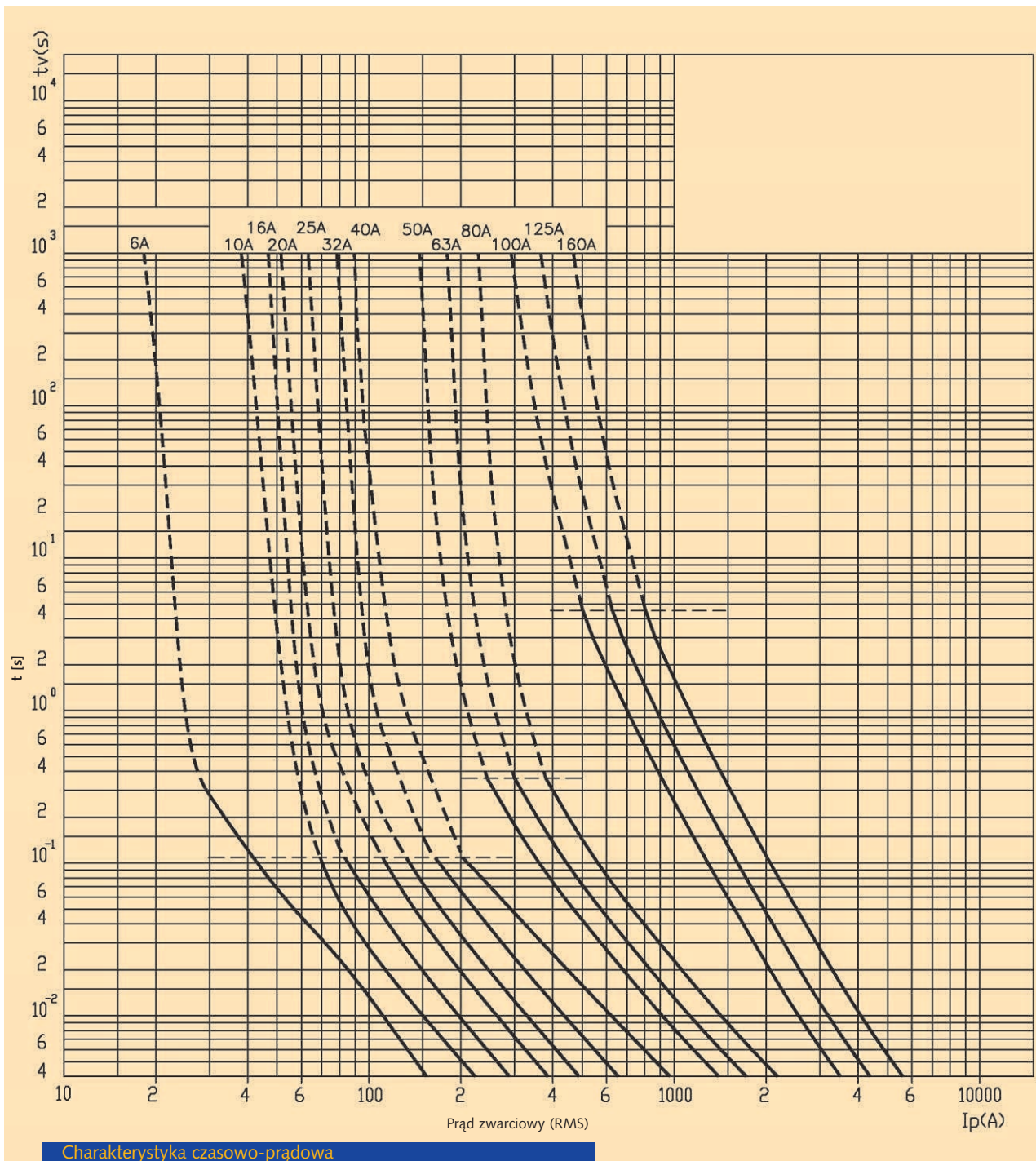
Napięcie znam. U_n [kV]	e_i^0 [mm]
3,6	192
7,2	192
12	292
24	442
36	537



Zasada działania wybijkaka

Napięcie znam. U _n [kV]	Prąd znam. I _n [A]	Min. prąd wyłączenia I ₃ [kA]	Zwarciova zdolność wyt. I ₁ [kA]	Strata mocy P _n [W]	Wymiary e x DØ [mm]	Waga [kg]	Typ		Nr artykułu	
							120N (standardowe)	80N (specjalne)		
7,2	6	25	50	10,0	192 x 53	1,1	IKUS 6-6/ 12N	Q3141411	IKUS 6-6/ 8N	Q3141401
7,2	10	46	50	6,6	192 x 53	1,1	IKUS 6-10/ 12N	Q3141711	IKUS 6-10/ 8N	Q3141701
7,2	16	60	50	11,8	192 x 53	1,1	IKUS 6-16/ 12N	Q3142211	IKUS 6-16/ 8N	Q3142201
7,2	20	80	50	15,3	192 x 53	1,1	IKUS 6-20/ 12N	Q3142411	IKUS 6-20/ 8N	Q3142401
7,2	25	105	50	22,1	192 x 53	1,1	IKUS 6-25/ 12N	Q3142611	IKUS 6-25/ 8N	Q3142601
7,2	32	130	50	30,1	192 x 53	1,1	IKUS 6-32/ 12N	Q3142911	IKUS 6-32/ 8N	Q3142901
7,2	40	178	50	36,9	192 x 53	1,1	IKUS 6-40/ 12N	Q3143411	IKUS 6-40/ 8N	Q3143401
7,2	50	220	50	25,9	192 x 68	1,7	IKUS 6-50/ 12N	Q3243511	IKUS 6-50/ 8N	Q3243501
7,2	63	270	50	42,8	192 x 68	1,7	IKUS 6-63/ 12N	Q3243811	IKUS 6-63/ 8N	Q3243801
7,2	80	360	50	50,3	192 x 68	1,7	IKUS 6-80/ 12N	Q3244111	IKUS 6-80/ 8N	Q3244101
7,2	100	540	50	66,4	192 x 85	2,7	IKUS 6-100/ 12N	Q3344311	IKUS 6-100/ 8N	Q3344301
7,2	125	610	50	101,0	192 x 85	2,7	IKUS 6-125/ 12N	Q3344611	IKUS 6-125/ 8N	Q3344601
7,2	160	810	50	135,0	192 x 85	2,7	IKUS 6-160/ 12N	Q3344911	IKUS 6-160/ 8N	Q3344901
7,2	200	1260	63	78	442 x 88	5,8	IKUS 6-200/ 12N	Q2645253	na zapytanie	*
7,2	250	1260	63	100	442 x 88	5,8	IKUS 6-250/ 12N	Q2645653	na zapytanie	*
7,2	315	1260	63	160	442 x 88	5,8	IKUS 6-315/ 12N	Q2645953	na zapytanie	*
12	6	25	50	15,4	292 x 53	1,6	IKUS 10-6/ 12N	Q3151412	IKUS 10-6/ 8N	Q3151402
12	10	46	50	10,4	292 x 53	1,6	IKUS 10-10/ 12N	Q3151712	IKUS 10-10/ 8N	Q3151702
12	16	60	50	19,4	292 x 53	1,6	IKUS 10-16/ 12N	Q3152212	IKUS 10-16/ 8N	Q3152202
12	20	80	50	23,2	292 x 53	1,6	IKUS 10-20/ 12N	Q3152412	IKUS 10-20/ 8N	Q3152402
12	25	105	50	33,5	292 x 53	1,6	IKUS 10-25/ 12N	Q3152612	IKUS 10-25/ 8N	Q3152602
12	32	130	50	45,6	292 x 53	1,6	IKUS 10-32/ 12N	Q3152912	IKUS 10-32/ 8N	Q3152902
12	40	178	50	55,9	292 x 53	1,6	IKUS 10-40/ 12N	Q3153412	IKUS 10-40/ 8N	Q3153402
12	50	220	50	43,6	292 x 68	2,8	IKUS 10-50/ 12N	Q3253512	IKUS 10-50/ 8N	Q3253502
12	63	270	50	64,8	292 x 68	2,8	IKUS 10-63/ 12N	Q3253812	IKUS 10-63/ 8N	Q3253802
12	80	360	50	77,3	292 x 68	2,8	IKUS 10-80/ 12N	Q3254112	IKUS 10-80/ 8N	Q3254102
12	100	540	50	104,0	292 x 85	4,0	IKUS 10-100/ 12N	Q3354312	IKUS 10-100/ 8N	Q3354302
12	125	610	50	152,0	292 x 85	4,0	IKUS 10-125/ 12N	Q3354612	IKUS 10-125/ 8N	Q3354602
12	160	810	50	200,0	292 x 85	4,0	IKUS 10-160/ 12N	Q3354912	IKUS 10-160/ 8N	Q3354902
17,5	6	25	50	23,4	367 x 53	1,9	IKUS 17-6/ 12N	Q3161416	IKUS 17-6/ 8N	Q3161406
17,5	10	46	50	15,6	367 x 53	1,9	IKUS 17-10/ 12N	Q3161716	IKUS 17-10/ 8N	Q3161706
17,5	16	60	50	26,4	367 x 53	1,9	IKUS 17-16/ 12N	Q3162216	IKUS 17-16/ 8N	Q3162206
17,5	20	80	50	37,9	367 x 53	1,9	IKUS 17-20/ 12N	Q3162416	IKUS 17-20/ 8N	Q3162406
17,5	25	105	50	49,2	367 x 53	1,9	IKUS 17-25/ 12N	Q3162616	IKUS 17-25/ 8N	Q3162606
17,5	32	130	50	65,7	367 x 53	1,9	IKUS 17-32/ 12N	Q3162916	IKUS 17-32/ 8N	Q3162906
17,5	40	178	50	78,1	367 x 53	1,9	IKUS 17-40/ 12N	Q3163416	IKUS 17-40/ 8N	Q3163406
17,5	50	220	50	65,2	367 x 68	3,1	IKUS 17-50/ 12N	Q3263516	IKUS 17-50/ 8N	Q3263506
17,5	63	270	50	101,0	367 x 68	3,1	IKUS 17-63/ 12N	Q3263816	IKUS 17-63/ 8N	Q3263806
17,5	80	360	50	122,0	367 x 68	3,1	IKUS 17-80/ 12N	Q3264116	IKUS 17-80/ 8N	Q3264106
17,5	100	540	50	166,0	367 x 85	4,6	IKUS 17-100/ 12N	Q3364316	IKUS 17-100/ 8N	Q3364306
17,5	125	610	50	219,0	367 x 85	4,6	IKUS 17-125/ 12N	Q3364616	IKUS 17-125/ 8N	Q3364606
24	6	25	50	28,9	442 x 53	2,3	IKUS 20-6/ 12N	Q3171413	IKUS 20-6/ 8N	Q3171403
24	10	46	50	19,2	442 x 53	2,3	IKUS 20-10/ 12N	Q3171713	IKUS 20-10/ 8N	Q3171703
24	16	60	50	32,6	442 x 53	2,3	IKUS 20-16/ 12N	Q3172213	IKUS 20-16/ 8N	Q3172203
24	20	80	50	46,9	442 x 53	2,3	IKUS 20-20/ 12N	Q3172413	IKUS 20-20/ 8N	Q3172403
24	25	105	50	60,7	442 x 53	2,3	IKUS 20-25/ 12N	Q3172613	IKUS 20-25/ 8N	Q3172603
24	32	130	50	81,1	442 x 53	2,3	IKUS 20-32/ 12N	Q3172913	IKUS 20-32/ 8N	Q3172903
24	40	178	50	96,4	442 x 53	2,3	IKUS 20-40/ 12N	Q3173413	IKUS 20-40/ 8N	Q3173403
24	50	220	50	80,5	442 x 68	3,9	IKUS 20-50/ 12N	Q3273513	IKUS 20-50/ 8N	Q3273503
24	63	270	50	125,0	442 x 68	3,9	IKUS 20-63/ 12N	Q3273813	IKUS 20-63/ 8N	Q3273803
24	80	360	50	151,0	442 x 68	3,9	IKUS 20-80/ 12N	Q3274113	IKUS 20-80/ 8N	Q3274103
24	100	540	50	228,0	442 x 85	5,8	IKUS 20-100/ 12N	Q3374313	IKUS 20-100/ 8N	Q3374303
24	125	610	50	301,0	442 x 85	5,8	IKUS 20-125/ 12N	Q3374613	IKUS 20-125/ 8N	Q3374603
36	6	25	40	40,5	537 x 53	2,8	IKUS 30-6/ 12N	Q3181415	IKUS 30-6/ 8N	Q3181405
36	10	46	40	26,9	537 x 53	2,8	IKUS 30-10/ 12N	Q3181715	IKUS 30-10/ 8N	Q3181705
36	16	60	40	45,6	537 x 53	2,8	IKUS 30-16/ 12N	Q3182215	IKUS 30-16/ 8N	Q3182205
36	20	80	40	65,7	537 x 53	2,8	IKUS 30-20/ 12N	Q3182415	IKUS 30-20/ 8N	Q3182405
36	25	105	40	84,9	537 x 68	4,7	IKUS 30-25/ 12N	Q3282615	IKUS 30-25/ 8N	Q3282605
36	32	130	40	113,0	537 x 68	4,7	IKUS 30-32/ 12N	Q3282915	IKUS 30-32/ 8N	Q3282905
36	40	178	40	134,0	537 x 68	4,7	IKUS 30-40/ 12N	Q3283415	IKUS 30-40/ 8N	Q3283405
36	50	220	40	112,0	537 x 85	7,0	IKUS 30-50/ 12N	Q3383515	IKUS 30-50/ 8N	Q3383505
36	63	270	40	175,0	537 x 85	7,0	IKUS 30-63/ 12N	Q3383815	IKUS 30-63/ 8N	Q3383805


Opakowania po 3 sztuki, z wyjątkiem I₃ – 442x88 mm




Charakterystyka czasowo-prądowa
IKUS - 6A-160A

Minimalne napięcie robocze [kV]			
Napięcie znamionowe U_n	Dopuszczalne napięcie łączeniowe wg IEC [kV]	Maksymalne mierzone napięcie łączeniowe [kV]	Dopuszczalne minimalne napięcie robocze
3,6	12	7,5	2
7,2	23	11	3
12	38	18	3
24	75	31	6
36	112	65	20

Propozycje zabezpieczeń transformatorów

3,6 kV  400 V								
Dane transformatora			Bezbieznik typu IKUS 3-...		Bezbieznik typu M00-M4agL/gG		Bezbieznik typu M2-M4agTr zgodnie z VDE 0636/22	
moc S_n [kVA]	prąd znamionowy [A]		prąd znamionowy I_n [A]			prąd znamionowy I_n [A]		[kVA]
	pierwotny	wtórny	minimalny	maksymalny	minimalny	maksymalny		
50	10	72	16	16	63	80	50	
75	14	108	25	32	100	125	75	
100	19	144	32	40	125	160	100	
125	24	180	40	50	160	200	125	
160	31	231	50	63	200	250	160	
200	39	289	63	100	250	315	200	
250	48	361	80	125	315	400	250	
315	61	455	100	125	400	500	315	
400	77	577	125	160	500	630	400	
500	96	722	125	160	630	800	500	
630	121	909	160	200	800	1000	630	
800	154	1155	160	250	1000	1250	800	
1000	192	1443	200	250	1250	-	1000	
1250	241	1804	250	250	1250	-	-	
1600	308	2309	250	250	1250	-	-	

7,2 kV  400 V									
Dane transformatora			Bezbieznik typu IKUS 6-...			Bezbieznik typu M00-M4agL/gG		Bezbieznik typu M2-M4agTr zgodnie z VDE 0636/22	
moc S_n [kVA]	prąd znamionowy [A]		prąd znamionowy I_n [A]			prąd znamionowy I_n [A]		[kVA]	
	pierwotny	wtórny	min.	rekomendowany	maks.	minimalny	maksymalny		
50	5	72	10	-	16	63	80	50	
75	7	108	16	-	20	100	125	75	
100	10	144	16	20	25	125	160	100	
125	12	180	20	25,32	40	160	200	125	
160	15	231	25	32,40	50	200	250	160	
200	19	289	32	40,50	63	250	315	200	
250	24	361	40	50	63	315	400	250	
315	30	455	50	63	80	400	500	315	
400	39	577	63	80	100	500	630	400	
500	48	722	80	100	125	630	800	500	
630	61	909	100	125	160	800	1000	630	
800	77	1155	125	160	160	1000	1250	800	
1000	96	1443	125	160	200	1250	-	1000	
1250	120	1804	160	160	200	1250	-	-	
1600	154	2309	160	160	200	1250	-	-	

Wartości pogrubione zgodnie z VDE 0670/402

12 kV  400 V

Dane transformatora			Bezpiecznik typu IKUS 10-...			Bezpiecznik typu M00-M4agL/gG		Bezpiecznik typu M2-M4agTr zgodnie z VDE 0636/22 [kVA]
moc S _n [kVA]	prąd znamionowy [A]		prąd znamionowy I _n [A]			prąd znamionowy I _n [A]		
	pierwotny	wtórny	min.	rekomendowany	maks.	minimalny	maksymalny	
50	3	72	6	-	10	63	80	50
75	4	108	10	-	16	100	125	75
100	6	144	10	16	16	125	160	100
125	7	180	16	16	20	160	200	125
160	9	231	20	25	25	200	250	160
200	12	289	25	32	32	250	315	200
250	14	361	25	32	40	315	400	250
315	18	455	32	40	50	400	500	315
400	23	577	40	50	63	500	630	400
500	29	722	50	63	80	630	800	500
630	36	909	63	80	100	800	1000	630
800	46	1155	80	180	125	1000	1250	800
1000	58	1443	100	125	160	1250	-	1000
1250	72	1804	125	-	160	1250	-	-
1600	92	2309	125	-	160	1250	-	-

24 kV  400 V

Dane transformatora			Bezpiecznik typu IKUS 20-...			Bezpiecznik typu M00-M4agL/gG		Bezpiecznik typu M2-M4agTr zgodnie z VDE 0636/22 [kVA]
moc S _n [kVA]	prąd znamionowy [A]		prąd znamionowy I _n [A]			prąd znamionowy I _n [A]		
	pierwotny	wtórny	min.	rekomendowany	maks.	minimalny	maksymalny	
50	1	72	6	-	6	63	80	50
75	2	108	6	-	6	100	125	75
100	3	144	6	10	10	125	160	100
125	4	180	10	10	10	160	200	125
160	5	231	10	16	16	200	250	160
200	6	289	16	16	20	250	315	200
250	7	361	16	16	20	315	400	250
315	9	455	20	25	25	400	500	315
400	12	577	25	25	32	500	630	400
500	14	722	25	32	40	630	800	500
630	18	909	32	40	50	800	1000	630
800	23	1155	40	40	63	1000	1250	800
1000	29	1443	50	63	80	1250	-	1000
1250	36	1804	63	-	80	1250	-	-
1600	46	2309	80	-	100	1250	-	-

36 kV  400 V

Dane transformatora			Bezpiecznik typu IKUS 30-...			Bezpiecznik typu M00-M4agL/gG		Bezpiecznik typu M2-M4agTr zgodnie z VDE 0636/22 [kVA]
moc S _n [kVA]	prąd znamionowy [A]		prąd znamionowy I _n [A]			prąd znamionowy I _n [A]		
	pierwotny	wtórny	min.	rekomendowany	maks.	minimalny	maksymalny	
50	1	72	6	-	6	63	80	50
75	1	108	6	-	6	100	125	75
100	2	144	6	6	6	125	160	100
125	2	180	6	10	10	160	200	125
160	3	231	10	10	10	200	250	160
200	4	289	10	16	16	250	315	200
250	5	361	10	16	20	315	400	250
315	6	455	16	20	25	400	500	315
400	8	577	16	25	25	500	630	400
500	10	722	20	25	32	630	800	500
630	12	909	25	-	32	800	1000	630
800	15	1155	25	-	40	1000	1250	800
1000	19	1443	32	-	40	1250	-	1000
1250	24	1804	-	-	40	1250	-	-
1600	31	2309	-	-	-	1250	-	-

Wartości pogrubione zgodnie z VDE 0670/402

HV Back-up Fuse-Links according to IEC 60 282-1



HV fuse-links have been used for reliable protection in medium-voltage switchgear and controlgear and systems for decades. They protect apparatus and equipment against the thermal and dynamic effects of short-circuits. The outstanding features of Limitor HV fuse-links from Ferraz Shawmut are:

- High breaking capacity
- High current limitation
- Low switching voltage
- Quick breaking
- Non-ageing

Limitor HV fuse-links conform to the following standards:

- IEC 60 282-1: High-voltage fuse-links "current limiting fuse-links". This international standard is identical to the German standard VDE 0670 T4.
- IEC 60 787: Application guide for the selection of fuse-links of high-voltage fuse-links for transformer circuit applications
- VDE 0670 T303/IEC 60 420: High-voltage alternating current switch-fuse combinations
- DIN 43 625: High-voltage fuse-links, rated voltages 3,6 to 36kV (fuse-link dimensions)
- DIN 43 624: High-voltage fuse-links, rated voltages 3/3,6 to 30/36kV (single-pole fuse-link bases)

The quality management system of Ferraz Shawmut is certified to the international standard DIN ISO 9001 (EN 29001).

Ferraz Shawmut operates a certified environment management system. Ferraz Shawmut manufactures HV fuse-links with dimensions conforming to DIN 43 625 with striker for indoor and outdoor use, where the striker serves for actuating a tripfree mechanism as well as an indicator due to its red colour. In addition to the HV fuse-links shown in this brochure, Ferraz Shawmut also manufactures a wide range of special fuse-links in special dimensions. If you have a particular application that requires special fuse-link protection problems, simply ask the Ferraz Shawmut team, we are there for you.

General characteristics

Back-up fuse-links

Back-up fuse-links have a "rated minimum breaking current" from which the fuse-links are able to interrupt current. Backup fuse-links are not supposed to operate below their "minimum breaking current" (below I_3). Their operating range is from I_3 to the maximum rated breaking current (I_1). For the assignment of back-up fuse-links, it is important to note that the lowest short circuit current is higher at the site of the HV back-up fuse-link than I_3 ($I_{kmin} > I_3$). If the short circuit current is lower than the minimum breaking current, additional protection must be provided.

Striker

The striker of HV fuse-links in this product list has an effective length of 30 mm and is a «medium» type. This classification results from the energy released by the striker between the points A and B (within the first 20 mm of the operating distance). The initial force is about 80N, the force at the end of free movement is about 15N. The striker serves for actuation of the trip-free mechanism of the switch

Rated voltage range

It is important for HV fuse-links that they must be operated at the voltage for which they have been rated. Accordingly, the operating voltage corresponds to the maximum rated voltage of the fuse-link. Owing to the switching voltage occurring during arcing, the fuse-link cannot be used at lower voltages without limitation. A lower operating voltage at which the fuselink can still be used without exceeding the system insulation level during extinction must therefore be taken into account. From these two values results the permissible voltage range of the fuse-link, which is shown on the fuse-links or in the technical data, e.g. 10/24kV.

Breaking capacity I1

The breaking capacity is also referred to as the "rated maximum breaking current". This clearly indicates that this is the maximum current which can be interrupted by the fuselink. I1 of the fuse-link must be greater than the maximum short circuit current at the site of the fuse-link ($I1 > Ik_{max}$).

Minimum breaking current I3

The minimum breaking current is referred to as the "rated minimum breaking current". This value must be specified for back-up fuse-links. From this current, back-up fuse-links are capable to breaking fault currents. The fuse-links must be assigned to the system so that no fault current below I3 can occur at the site of the fuse-link (due to the system parameters or other protective devices).

Power dissipation of a fuse-link Pwarm

The power dissipation of a HV fuse-link is specified at the rated current of the fuse-link. For protection with HV fuse-links, it should be noted that the operating current is normally half the rated current. Because of the physical relationships, the actual power dissipation is less than a quarter of the value Pwarm for HV fuse-links shown in the technical data table.

Time-current characteristic (I/t characteristic)

The time-current characteristic shows the correlation between current and time up to the melting of a fuse-element. The virtual time (tvs) is specified to enable a comparison of the I/t characteristics of fuse-links below 100ms. For co-ordination with other protective devices, e.g. load interrupter switches or circuit breakers, the melting integral I²t must be referred to for melting times below 100ms.

Current limitation

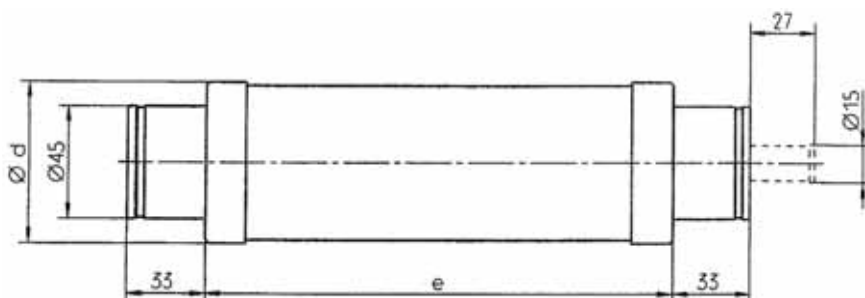
At high short circuit currents, HV fuse-links interrupt current within several milliseconds that means, the sinusoidal current does not reach its peak value and that HV fuse-links are current limiting devices. This is a significant advantage compared to mechanical switches whose contacts take longer to open and interrupt currents at natural zero. During this time, the peak short-circuit current is able to freely develop its dynamic force. By using HV fuse-links, this surge current is limited within several ms to a fraction of its peak value and the design of the subsequent system can be reduced in terms of dynamic forces.

Switching voltage

So that HV fuse-links perform a current-limiting action, the short circuit current must be limited and reduced as it increases.

This requires a switching voltage that exceeds the driving system voltage and forces the current to zero. This switching voltage must not exceed the specified permissible value of 2.2 times the peak value of the maximum rated voltage. Limitor HV fuse-links are within this limit.

Dimension



HV Back-up Fuse-Links according to IEC 60 282-1



Medium voltage fuses - European Fuses

Current (A)	Voltage (kV)	Cat.Number	Ref. number	Pack.
2	3/7,2	45DB72V2P	N1000098A	1
4	3/7,2	45DB72V4P	P1000099A	1
6,3	3/7,2	45DB72V6,3PD	S209293A	1
10	3/7,2	45DB72V10PD	T209294A	1
16	3/7,2	45DB72V16PD	V209295A	1
20	3/7,2	45DB72V20PD	W209296A	1
25	3/7,2	45DB72V25PD	X209297A	1
31,5	3/7,2	45DB72V32PD	Y209298A	1
40	3/7,2	45DB72V40PD	Z209299A	1
50	3/7,2	45DB72V50PD	A209300A	1
63	3/7,2	45DB72V63P	B209301A	1
80	3/7,2	45DB72V80P	C209302A	1
100	3/7,2	45DB72V100P	D209303A	1
125	3/7,2	45DB72V125PD	Q1000100A	1
160	3/7,2	45DB72V160P	R1000101A	1
200	3/7,2	45DB72V200P	S1000102A	1
1	6/12	45DB120V1P	T1000103A	1
2	6/12	45DB120V2P	V1000104A	1
4	6/12	45DB120V4P	W1000105A	1
6,3	6/12	45DB120V6,3P	F209305A	1
10	6/12	45DB120V10P	G209306A	1
16	6/12	45DB120V16P	H209307A	1
20	6/12	45DB120V20P	J209308A	1
25	6/12	45DB120V25P	K209309A	1
31,5	6/12	45DB120V32P	L209310A	1
40	6/12	45DB120V40P	M209311A	1
50	6/12	45DB120V50P	N209312A	1
63	6/12	45DB120V63P	P209313A	1
80	6/12	45DB120V80P	Q209314A	1
100	6/12	45DB120V100P	R209315A	1
125	6/12	45DB120V125P	X1000106A	1
160	6/12	45DB120V160P	Y1000107A	1
200	6/12	45DB120V200P	Z1000108A	1
6,3	10/17,5	45DB175V6,3P	T209317A	1
10	10/17,5	45DB175V10P	V209318A	1
16	10/17,5	45DB175V16P	W209319A	1
20	10/17,5	45DB175V20P	X209320A	1
25	10/17,5	45DB175V25P	Y209321A	1
31,5	10/17,5	45DB175V32P	Z209322A	1
40	10/17,5	45DB175V40P	A209323A	1
50	10/17,5	45DB175V50P	B209324A	1
63	10/17,5	45DB175V63P	C209325A	1
80	10/17,5	45DB175V80P	D209326A	1
100	10/17,5	45DB175V100P	E209327A	1
1	10/24	45DB240V1P	A1000109A	1
2	10/24	45DB240V2P	B1000110A	1
4	10/24	45DB240V4P	C1000111A	1
6,3	10/24	45DB240V6,3P	S209339A	1
10	10/24	45DB240V10P	T209340A	1
16	10/24	45DB240V16P	V209341A	1
20	10/24	45DB240V20P	W209342A	1
25	10/24	45DB240V25P	X209343A	1
31,5	10/24	45DB240V32P	Y209344A	1
40	10/24	45DB240V40P	Z209345A	1
50	10/24	45DB240V50P	A209346A	1
63	10/24	45DB240V63P	B209347A	1
80	10/24	45DB240V80P	C209348A	1
100	10/24	45DB240V100P	D209349A	1
125	10/24	45DB240V125P	D1000112A	1
160	10/24	45DB240V160P	E1000113A	1
200	10/24	45DB240V200P	F1000114A	1
2	20/36	45DB360V2P	G1000115A	1
4	20/36	45DB360V4P	H1000116A	1
6,3	20/36	45DB360V6,3PD	S209362A	1
10	20/36	45DB360V10PD	T209363A	1
16	20/36	45DB360V16PD	V209364A	1
20	20/36	45DB360V20PD	W209365A	1
25	20/36	45DB360V25PD	X209366A	1
31,5	20/36	45DB360V32PD	Y209367A	1
40	20/36	45DB360V40PD	Z209368A	1
50	20/36	45DB360V50PD	J1000117A	1
63	20/36	45DB360V63PD	K1000118A	1

HV back-up fuse-links acc. to IEC 60282-1 with controlled power dissipation

Current (A)	Voltage (kV)	Cat. Number	Ref. number	Pack.
1	6/12	45DB120V1PT	L1000119A	1
2	6/12	45DB120V2PT	M1000120A	1
4	6/12	45DB120V4PT	N1000121A	1
6,3	6/12	45DB120V6,3PT	P1000122A	1
10	6/12	45DB120V10PT	Q1000123A	1
16	6/12	45DB120V16PT	R1000124A	1
20	6/12	45DB120V20PT	S1000125A	1
25	6/12	45DB120V25PT	T1000126A	1
31,5	6/12	45DB120V32PT	V1000127A	1
40	6/12	45DB120V40PT	W1000128A	1
50	6/12	45DB120V50PT	X1000129A	1
63	6/12	45DB120V63PT	Y1000130A	1
80	6/12	45DB120V80PT	Z1000131A	1
100	6/12	45DB120V100PT	A1000132A	1
125	6/12	45DB120V125PT	B1000133A	1
160	6/12	45DB120V160PT	C1000134A	1
200	6/12	45DB120V200PT	D1000135A	1
1	10/24	45DB240V1PT	E1000136A	1
2	10/24	45DB240V2PT	F1000137A	1
4	10/24	45DB240V4PT	G1000138A	1
6,3	10/24	45DB240V6,3PT	H1000139A	1
10	10/24	45DB240V10PT	J1000140A	1
16	10/24	45DB240V16PT	K1000141A	1
20	10/24	45DB240V20PT	L1000142A	1
25	10/24	45DB240V25PT	M1000143A	1
31,5	10/24	45DB240V32PT	N1000144A	1
40	10/24	45DB240V40PT	P1000145A	1
50	10/24	45DB240V50PT	Q1000146A	1
63	10/24	45DB240V63PT	R1000147A	1
80	10/24	45DB240V80PT	S1000148A	1
100	10/24	45DB240V100PT	T1000149A	1
125	10/24	45DB240V125PT	V1000150A	1

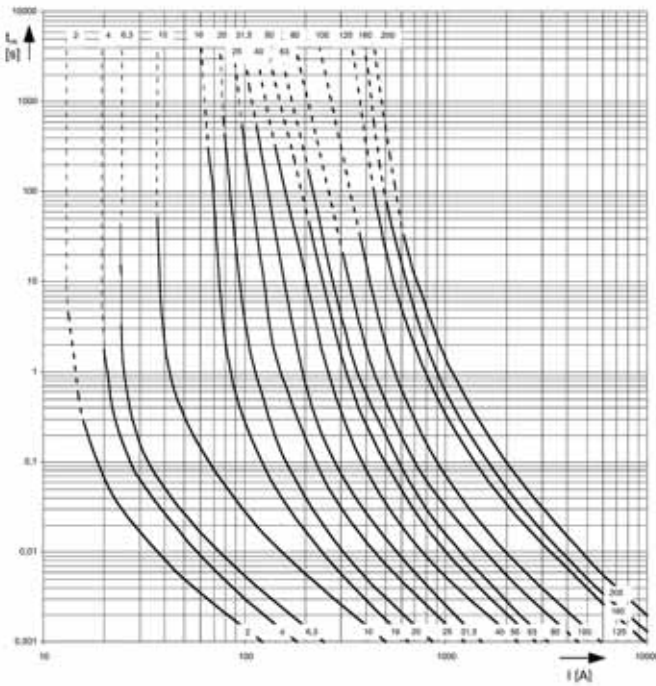


HV General Purpose fuse-links acc. to IEC 60282-1

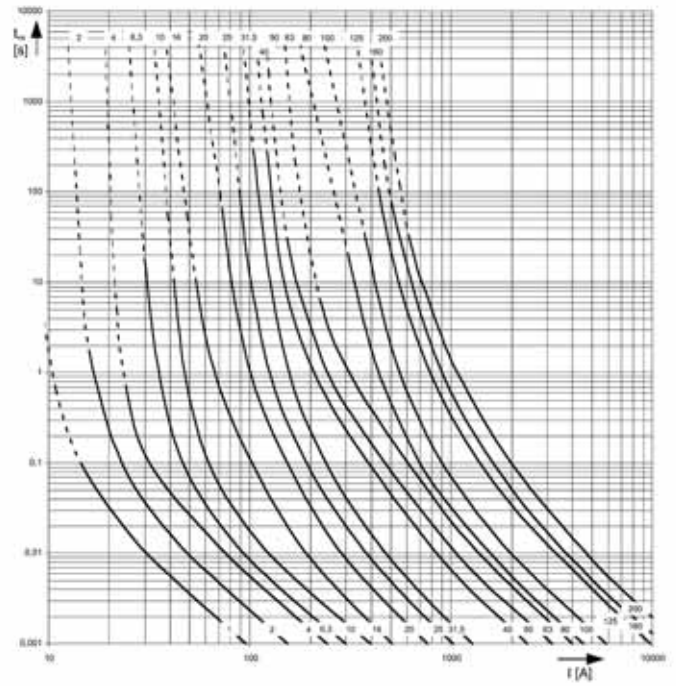
Current (A)	Voltage (kV)	Cat. Number	Ref. number	Pack.
6,3	6/12	45DG120V6,3P	W1000151A	1
10	6/12	45DG120V10P	X1000152A	1
16	6/12	45DG120V16P	Y1000153A	1
25	6/12	45DG120V25P	Z1000154A	1
40	6/12	45DG120V40P	A1000155A	1
50	6/12	45DG120V50P	B1000156A	1
4	10/24	45DG240V4P	C1000157A	1
6,3	10/24	45DG240V6,3P	D1000158A	1
10	10/24	45DG240V10P	E1000159A	1
16	10/24	45DG240V16P	F1000160A	1
25	10/24	45DG240V25P	G1000161A	1



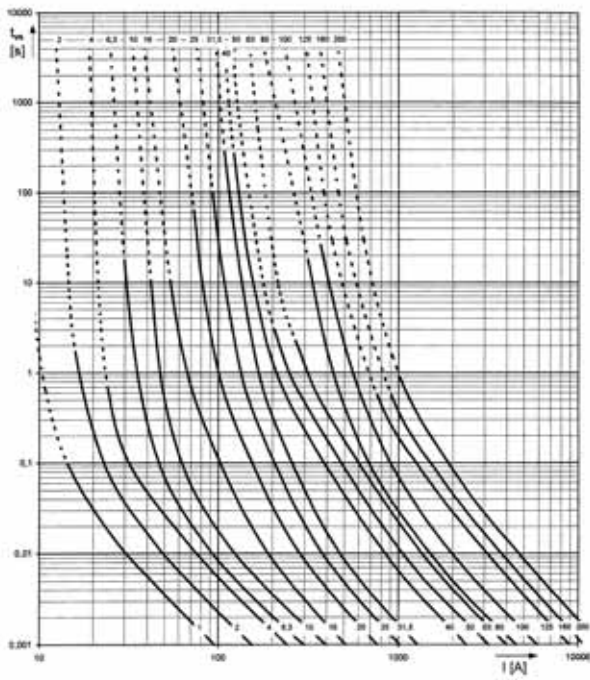
Time current characteristics



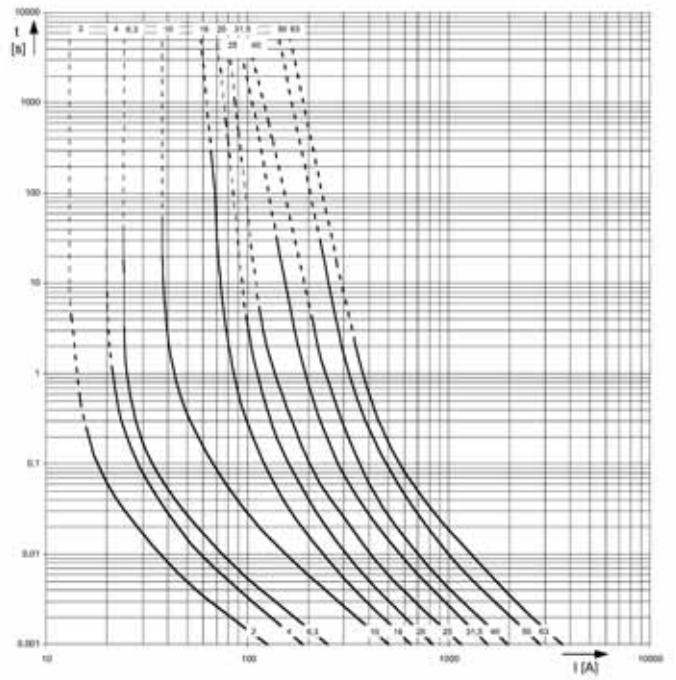
3/7,2 kV



6/12 kV



10/24 kV



20/36 kV

Application

Limitor HV fuse-links type CPD meet the requirements of IEC 60282-1 and were specifically developed to be installed in compact sized enclosed SF6 insulated substations.

In these substations HV fuse-links are enclosed in narrow fuse compartments which on the one hand prevent efficient cooling of the fuse-links and on the other hand have a limited thermal power acceptance themselves. Overheating of fuse compartments in such enclosures is, however, not to be expected, if the fuse-links have been properly selected by their rated current according to the transformer to be protected (see table 3) and if the melting elements of the fuselins are in faultless condition (Fig. 8).

One or more of the melting elements connected in parallel may, however, be interrupted by transient currents caused by transformer inrush or lightning strikes. Fuse-links having one or more of the paralleled melting elements interrupted, dissipate significantly more heat than faultless fuse-links. There is a certain risk that the limited power acceptance of fuse compartments may be exceeded at or even below rated transformer current. HV back-up fuse-links type CPD prevent such potential overheating when installed in conjunction with a transformer switch having trip-free mechanism.

High-voltage alternating current switch-fuse combinations acc. to IEC 62 271-105

In order to increase the utilization range of a switch, it is combined with current limiting HV fuse-links. This combination unit offers short-circuit protection in addition to load switching capacity. HV fuse-links provide short-circuit protection, while the switch interrupts the currents below the take-over current of the combination unit. In addition to the inrush current, short-circuit current on secondary terminal short-circuits and low voltage selectivity, the following switch characteristics should be taken into account:

- Rated transfer current ($I_{transfer}$)
- Fuse-initiated opening time of the switch (t_0)

Fig. 9 shows the rated transfer current ($I_{transfer}$) as a vertical line.

The fuse-initiated opening time (t_0) must be multiplied by 0,9 (procedure according to IEC 62 271-105) and a horizontal line be drawn. This results in an intersection that is characteristic to the switch and must be established for each switch individually.

Function mode

The CPD striker system controls the power dissipation of the fuse according to Ohm's law (CPD means controlled power dissipation). The striker pin is released depending on the voltage drop across the fuse and, therefore depending on the power dissipation. The release voltage of the CPD striker system has been selected so that the fuse carrying the operating current I_B does not exceed the limiting value. The CPD striker system controls the power dissipation of the fuse and releases the transformer switch before the permissible power acceptance of the fuse compartment will be exceeded (Fig. 8).

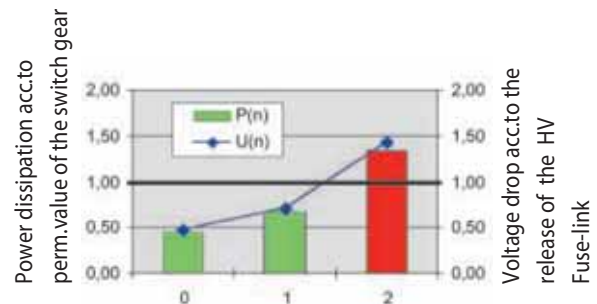


Fig. 8: Controlled power dissipation

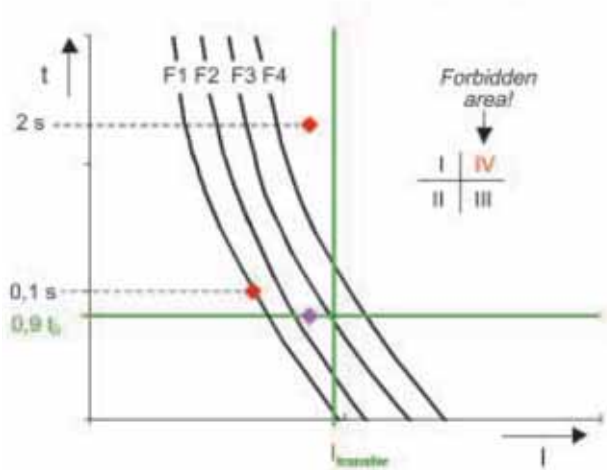


Fig. 9 : Selection of HV fuse-links acc. to IEC 62 271-105

This switch intersection divides the sheet into four quadrants (see Fig. 9).

Suitable for the switch-fuse combination are HV fuse-links only with a time-current characteristic that does not pass through quadrant IV ("forbidden area").

Generally suitable for use in switch-fuse combinations according to IEC 62 271-105 are all HV fuse-links with striker which meet this criterion.

Ferraz Shawmut has assigned HV fuse-links to the switch-fuse combination and the transformers of all major manufactures. These documents are available on request.

Clips

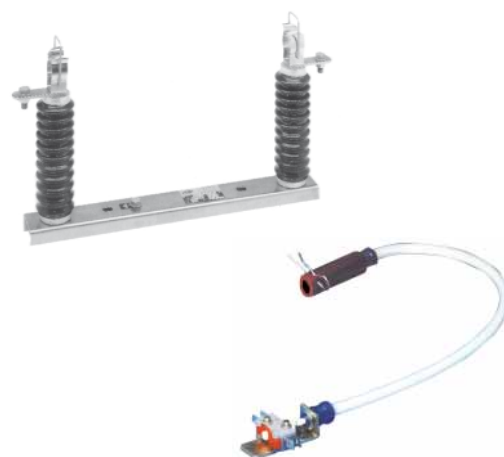
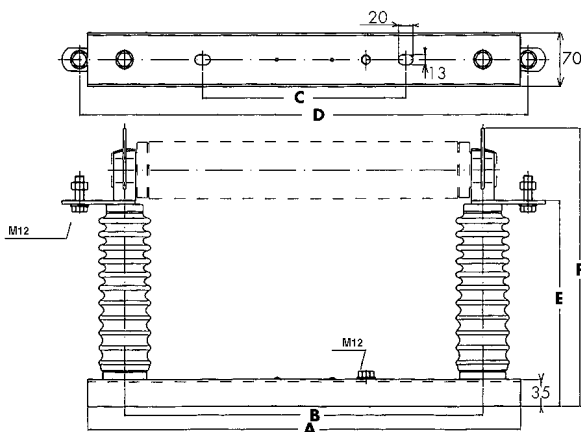
Size	Reference.Number	Catalog Number	Packaging
MR 45 + spring	L096472A	MR45R	1
MR 45 without connection lug	S210236B	MR55R	2

Bases

Voltage (kV)	Size	Use	Reference.Number	Catalog Number	Packaging
7,2	SI 7,2/192	Indoor	G209421A	SI72V192	1
12	SI 12/292	Indoor	H209422A	SI120V292	1
17,5	SI 17,5/292	Indoor	J209423A	SI175V292	1
24	SI 24/442	Indoor	K209424A	SI 240V442	1
36	SI 36/537	Indoor	M209426A	SI360V537	1
12	SE 12/292	Outdoor	S210328A	SE120V292	1
17,5	SE 17,5/292	Outdoor	T210329A	SE175V292	1
24	SE 24/442	Outdoor	V210330A	SE240V442	1
36	SE 36/537	Outdoor	W210331A	SE360V537	1

Bases with signalling

Voltage (kV)	Number of contacts	Reference.Number	Catalog Number	Packaging
12/36	1 NO/NF	E092855A	MC1-5NFLEXQS500	1
12/36	2 NO/NF	F092856A	MC1-9NFLEXQS500	1



Voltage (kV)	Length of fuse L (mm)	Size	Dielectric withstand (phase to ground)		Dimensions (mm)						Weight (kg)
			50Hz-1mn Kv Rms	1,2/50µs peak voltage	A	B	C	D	E	F	
7,2	192	SI 7,2/192	20	60	400	226	322	347	175	270	3,8
12	292	SI 12/292	28	75	424	324	200	445	175	270	4,1
17,5	292	SI 17,5/292	38	95	424	324	200	445	220	315	5,1
24	442	SI 24/442	50	125	576	476	270	597	270	365	5,5
36	537	SI 36/537	70	170	670	570	350	691	354	449	7,7
12	292	SE 12/292	28	75	424	324	200	445	261	356	7,5
17,5	292	SE 17,5/292	38	95	424	324	200	445	261	356	7,5
24	442	SE 24/442	50	125	576	476	270	597	309	404	8,8
36	537	SE 36/537	70	170	670	570	350	691	381	476	13,2