

## DIN HIGH VOLTAGE FUSE-LINKS



## Mersen a leader in the field high of voltage fuse-links for DIN, French and American standards

Mersen offers a wide range of HV DIN fuse-links to be used in HV substations, HV switchgear, HV controlgear and HV systems for reliable protection of HV/LV power distribution transformers and HV distribution networks.

Designed to be combined with other equipment, these current-limiting fuse-links interrupt fault currents before they reach their peak.

Mersen is offering current limiting fuses with high breaking capacity, offering the best protection against short circuit current.

Mersen is also a key player in innovative solutions to increase safety and efficiency:

- New cap design
- Low power dissipation
- New patented thermal striker
- All Mersen HV DIN fuses are lead-free to ensure the safety of our environment

**They protect apparatus and equipment against thermal and dynamic effects of short-circuits. Outstanding features of Mersen Limitor® HV fuse-links:**

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



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### **Limitor®**

**Mersen has dedicated a brand to HV fuse-links: Limitor®**

- A brand that is easily recognizable

**Limitor® promises:**

- Expertise in high voltage applications
- A premium offering for the HV market
- Delivering reliability and safety

**Limitor® HV fuse-links are in accordance with following standards :**

- IEC 60282-1
- VDE 0670 T4
- VDE 0670 T402
- DIN 43625

**Complete equipment, fuse-links & accessories meet the following standards:**

- IEC 60787
- IEC 62271-105
- DIN 43624
- VDE 0670 T303

Mersen quality management system is certified to ISO 9001.

Mersen operates a certified ISO 14001 environment management system.

# MERSEN AND THE HV FUSE-LINKS MARKET

## HV fuse-links in the world

- **DIN standard:** German standard
- **FR standard:** French standard
- **BS standard:** British standard
- **UL standard E or R rated:** American standard
- **Special HV fuses links**

Mersen is offering a very large range of fuses in accordance with UL, DIN and FR standards.

## Different types of high voltage fuse-links

IEC standard defines 3 types of fuse-links: **Back-up, General purpose and Full range.** Mersen offers **Back-up and General purpose fuse-links.**

### Back-up fuse-links range

Current-limiting fuse capable of breaking all currents from the rated maximum breaking current ( $I_1$ ) down to the rated minimum breaking current ( $I_3@600s$ )



### General purpose fuse-links range

Current-limiting fuse capable of breaking all currents from the rated maximum breaking current ( $I_1$ ) down to the current that causes melting of the fuse element in 1 hour ( $I_3@1h$ )



### Full-range fuse-links range

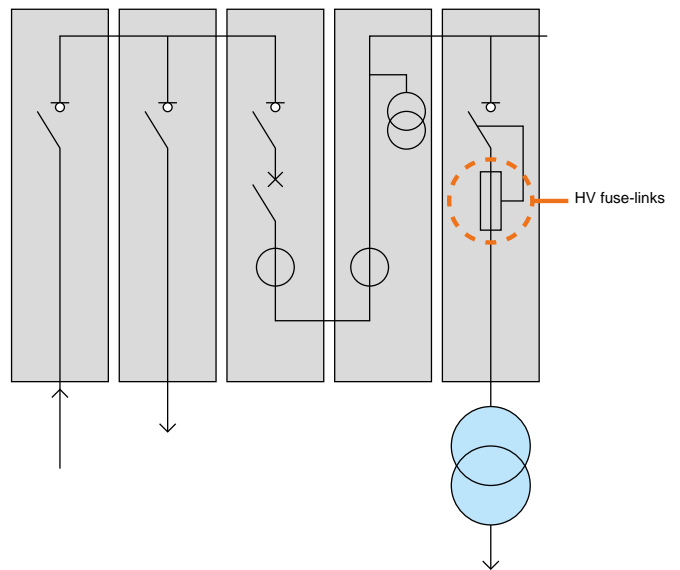
Current-limiting fuse capable of breaking all currents that cause melting of the fuse element(s), up to its rated maximum breaking current



## Fuse description FR vs DIN



## Typical installation

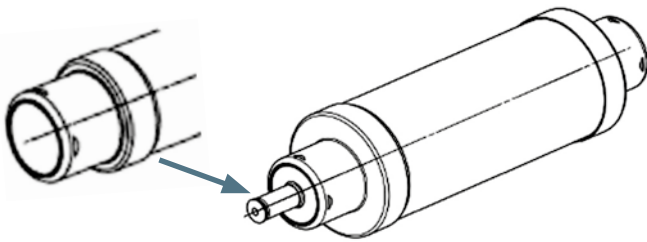


## Striker

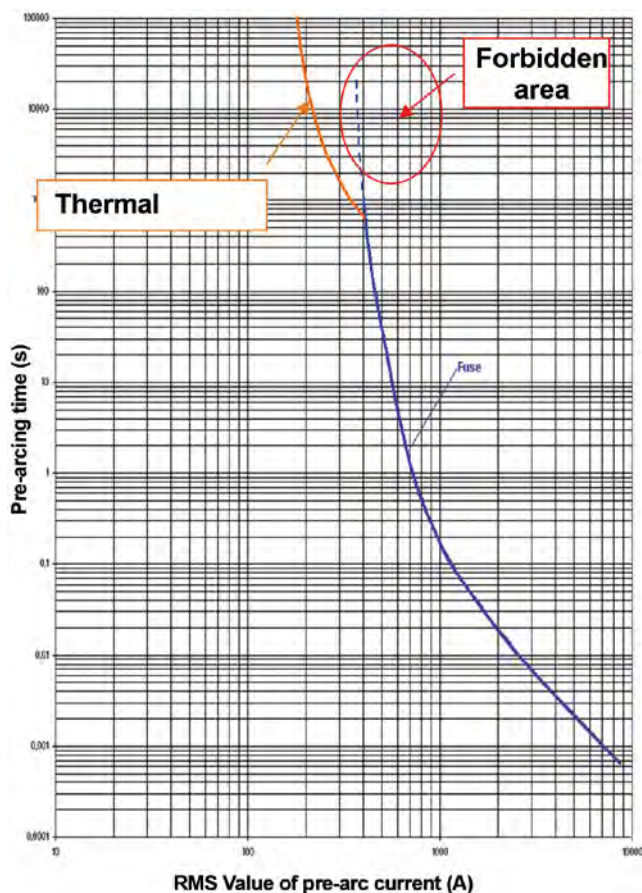
The striker is a mechanical device forming a part of a fuse-link which releases the energy required to cause operation of another switching device or signalling device.

The Mersen striker is a “medium” type with an effective length of 30mm and initial force of 80N.

The minimum energy is 0.5 Joule.



## Time current characteristic



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## Mersen HV fuse-links have all a striker function

Mersen offers 3 different options to operate the striker in HV fuses:

- First one (regular) is driven by the fuse element when it is melting
- Second one (CPD) is driven by the control of the power dissipation of the fuse-link according to Ohm's law. As the back-up fuse-link is combined with a switch the Controlled Power Dissipation (CPD) operates the switch before an excessive power level is dissipated by the fuse-link
- Third one is driven by the control of the temperature of the fuse-link.  
**Mersen has patented the Thermal Striker (TS)** which monitors the temperature of the fuse-link and prevents overheating in the fuse compartment when installed with a switch-fuse combination.

The two latter options are additional functions available in some ranges.

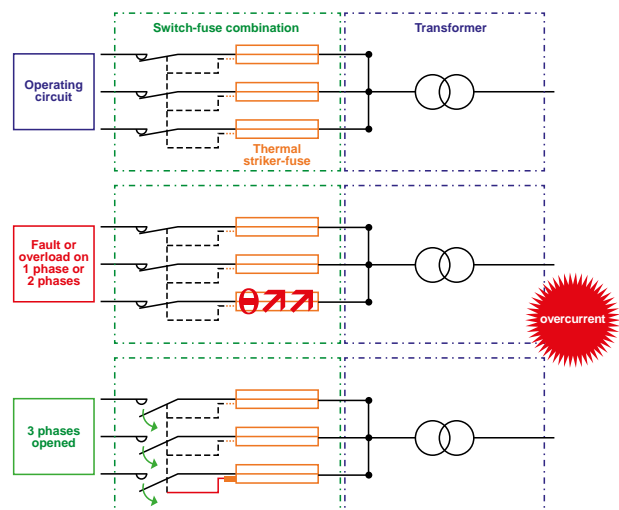
With CPD and TS, the fuse-link will not switch-off by itself.

The purpose of these both functions is to trigger the switch in combination to switch off.

## Thermal Striker description

The thermal striker has to trigger the switch to open the three phases in case of abnormal condition like overheating.

The Mersen fuse-link with thermal striker is designed for switch-fuse combinations and opens the circuit when an extended over current causes temperature rise. Whenever the temperature rises abnormally in a fuse-link Mersen patented thermal striker trips and triggers either a mechanical or an electronic system that will open the circuit (sketch).



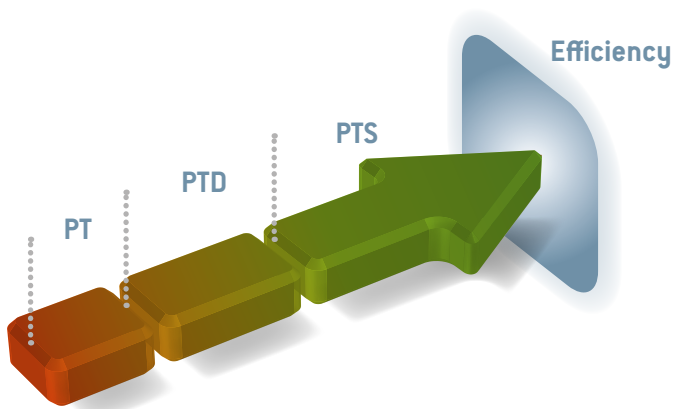
## Low power dissipation

Mersen offers several technologies for fuse-elements to propose a compromise between cost and performance / efficiency depending on the application.

The latest innovation with a new fuse-element design in cast-in-one-piece structure to reduce power dissipation.

PTD fuse-links were specifically developed to be installed in compact-sized enclosed substations because they have a limited thermal power acceptance.

PTS fuse-links were specifically designed with low power losses and thermal striker to protect transformers in conjunction with air and SF6 insulated compact switchgear.



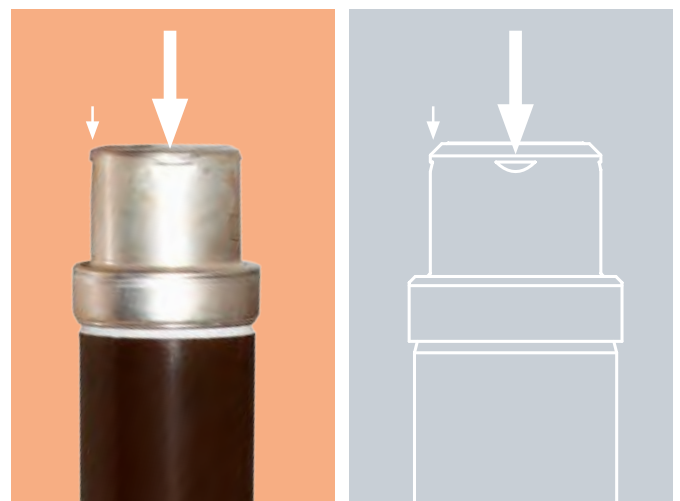
## Compatibility between ranges

Mersen uses a new cap for HV DIN fuse-links for better compatibility with fuse clips to fit all applications and simplify maintenance.

## Outdoor type

All Mersen DIN HV fuse-links are for outdoor and indoor use.

They are brown and all are tested at the end of production.

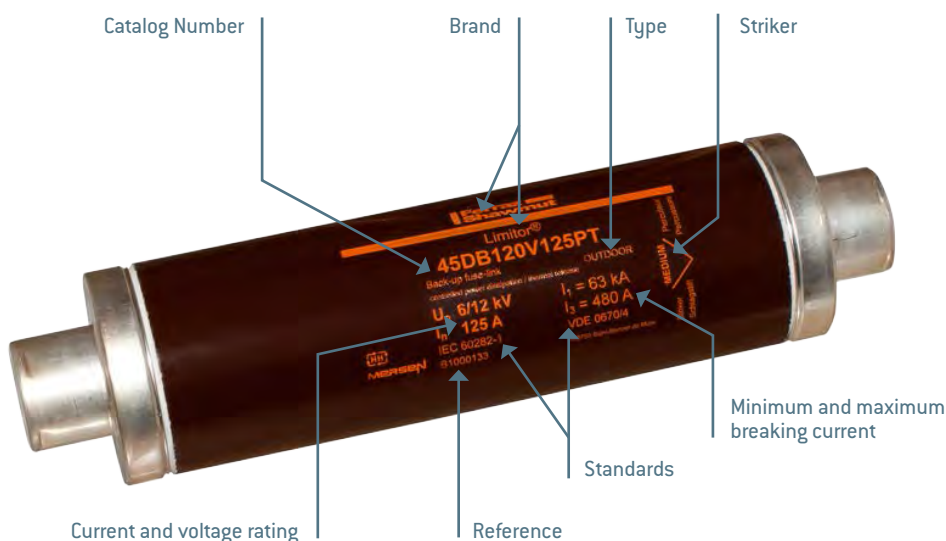


# DESCRIPTIONS

## Catalog Number

<b>4</b>	<b>5</b>	<b>D</b>	<b>B</b>	<b>1</b>	<b>2</b>	<b>0</b>	<b>V</b>	<b>5</b>	<b>0</b>	<b>P</b>	<b>T</b>	<b>S</b>
↑	↑	↑	↑	↑			↑	↑	↑	↑	↑	↑
45 mm diameter of contact caps	<b>D</b> for DIN	<b>B</b> for Back-up <b>G</b> for General purpose	<b>Voltage rating in V/100</b>				<b>Current rating in A</b>	<b>P</b> for striker	<b>S</b> for VDE 0670 T402 and dedicated switch-fuse combination <b>D</b> for VDE 0670 T402			

## All data are printed on the fuse-link

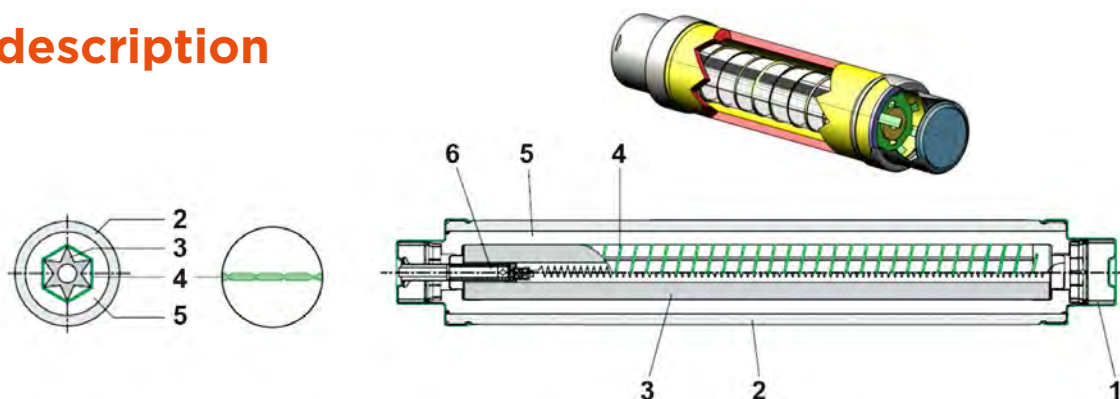


**T** for Thermal Striker or Controlled Power Dissipation

**D** for VDE 0670 T402

## Fuse-link description

- 1 - Cap
- 2 - Body
- 3 - Rod
- 4 - Fuse element
- 5 - Sand
- 6 - Striker



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# LIMITOR®-B BACK-UP FUSE LINKS ACCORDING TO IEC 60282-1

## Overview of Mersen HV fuse-link range

A	1	2	4	6,3	10	16	20	25	31,5	40	50	63	80	100	125	160	200	250
3 / 7,2kV	192mm																	
					292mm				292mm									
	442mm																	
6 / 12kV	292mm																	
					442mm				442mm									
10 / 17,5kV					292mm				292mm									
	367mm																	
													442mm				537mm	
10 / 24kV	442mm																	
															537mm			
20 / 36kV	537mm																	

## HV fuse-links standard: DIN 43625

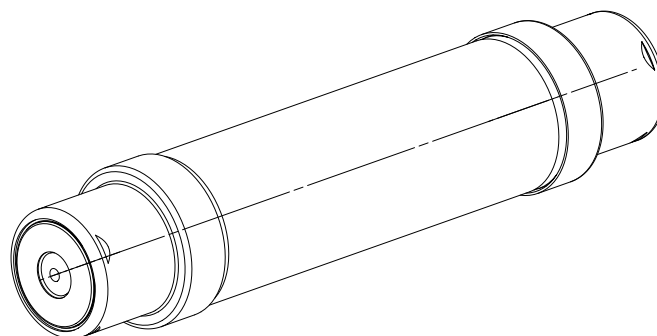
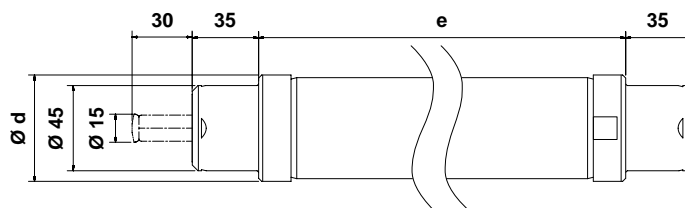
DIN 43625 defines the dimensions of HV DIN fuse-links.

All Mersen HV DIN fuse-links are in compliance with this standard.

The diameter “d” is mainly related to the current rating (50 to 88mm) and the length “e” is mainly related to the voltage rating (192 to 537mm).

DIN 43625 defines lengths in accordance with voltage rated like shown in the table below:

Un (kV)	e
3 / 7,2	192
6 / 12	292
10 / 17,5	367
10 / 24	442
20 / 36	537



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# LIMITOR®-B BACK-UP FUSE LINKS ACCORDING TO IEC 60282-1

## 7,2kV



VOLTAGE (kV)	LENGTH (mm)	CURRENT RATING	REF. NUMBER	CAT. NUMBER	VDE T4	VDE T402	THERMAL STRIKER	D (mm)	I <sub>1</sub> (kA)	I <sub>3</sub> (A)	R (mΩ)	P (W) @ IN	WEIGHT (kg)
3 / 7,2	192	2	N1000098	45DB72V2P	X			56	63	15	290	1,8	1,2
		4	P1000099	45DB72V4P	X			56	63	20	270	5	1,2
		6,3	S209293	45DB72V6,3PD	X	X		56	63	21	256	11	1,2
		10	T209294	45DB72V10PD	X	X		56	63	38	144	19	1,2
		16	V209295	45DB72V16PD	X	X		56	63	65	41	13	1,2
		20	W209296	45DB72V20PD	X	X		56	63	92	32	14,5	1,2
		25	X209297	45DB72V25PD	X	X		56	63	110	25	20	1,2
		31,5	Y209298	45DB72V32PD	X	X		56	63	123	19	23	1,2
		40	Z209299	45DB72V40PD	X	X		56	63	140	12,3	30	1,2
		50	A209300	45DB72V50PD	X	X		56	63	194	9,3	35	1,2
		63	B209301	45DB72V63P	X			65	63	220	8,7	60	1,5
		80	C209302	45DB72V80P	X			65	63	300	6,2	85	1,5
		100	D209303	45DB72V100P	X			65	63	350	5	96	1,5
		125	Q1000100	45DB72V125PD	X	X		88	63	440	2,9	75	2,6
		160	R1000101	45DB72V160P	X			88	63	435	3	75	2,6
200	S1000102	45DB72V200P	X			88	63	610	2,5	200	2,9		
3 / 7,2	292	6,3	H1005889	45DB72V6,3PT-2	X		X	63	63	28	147	6	2,2
		10	L1005892	45DB72V10PT-2	X		X	63	63	45	80,3	9	2,2
		16	M1005893	45DB72V16PT-2	X		X	63	63	64	44,3	12,8	2,2
		25	N1005894	45DB72V25PT-2	X		X	63	63	100	27,5	21	2,2
		31,5	P1005895	45DB72V32PT-2	X		X	63	63	126	20,6	25	2,2
		40	Q1005896	45DB72V40PT-2	X		X	63	63	160	16,2	33	2,2
		50	R1005897	45DB72V50PT-2	X		X	63	63	200	11,3	37	2,2
		63	S1005898	45DB72V63PT-2	X		X	63	63	252	8,5	46	2,2
		80	T1005899	45DB72V80PT-2	X		X	63	63	320	6,8	63	2,2
100	P1005274	45DB72V100PT-2	X		X	63	63	400	4,7	70	2,2		
3 / 7,2	442	6,3	N1005664	45DB72V6,3P-3	X			63	63	28	166	7	2,9
		10	F1005657	45DB72V10P-3	X			63	63	45	90,8	10	2,9
		16	H1005659	45DB72V16P-3	X			63	63	64	46,7	14	2,9
		25	J1005660	45DB72V25P-3	X			63	63	100	31,1	23	2,9
		31,5	C1005884	45DB72V32P-3	X			63	63	126	23,4	29	2,9
		40	K1005661	45DB72V40P-3	X			63	63	160	18,3	38	2,9
		50	L1005662	45DB72V50P-3	X			63	63	200	12,8	41	2,9
		63	M1005663	45DB72V63P-3	X			63	63	252	9,6	50	2,9
		80	P1005665	45DB72V80P-3	X			63	63	320	7,7	69	2,9
		100	E1005656	45DB72V100P-3	X			63	63	400	5,3	76	2,9
		125	E1005886	45DB72V125P-3	X			88	63	500	4,6	107	5,7
160	Q1005275	45DB72V160P-3	X			88	40	640	3,6	146	5,7		

\* For more technical data, curves, references, etc, visit our website.





# LIMITOR®-B BACK-UP FUSE LINKS ACCORDING TO IEC 60282-1

## 12kV



VOLTAGE (kV)	LENGTH (mm)	CURRENT RATING	REF. NUMBER	CAT. NUMBER	VDE T4	VDE T402	THERMAL STRIKER	CPD	D (mm)	I <sub>1</sub> (kA)	I <sub>3</sub> (A)	R (mΩ)	P (W) @ IN	WEIGHT (kg)	
6 / 12	292	1	T1000103	45DB120V1P	X				56	63	14	1500	1,6	1,7	
		2	V1000104	45DB120V2P	X				56	63	16	510	2	1,7	
		4	W1000105	45DB120V4P	X				56	63	22	338	6	1,7	
		6,3	F209305	45DB120V6,3P	X				56	63	30	190	8	1,7	
		10	G209306	45DB120V10P	X				56	63	42	139	16	1,7	
		16	H209307	45DB120V16P	X				56	63	54	107	38	1,7	
		20	J209308	45DB120V20P	X				56	63	73	71	38	1,7	
		25	K209309	45DB120V25P	X				56	63	93	52	46	1,7	
		31,5	L209310	45DB120V32P	X				56	63	105	43	65	1,7	
		40	M209311	45DB120V40P	X				56	63	125	23	54	1,7	
		50	N209312	45DB120V50P	X				56	63	160	18	70	1,7	
		63	P209313	45DB120V63P	X				56	63	230	12	85	1,7	
		80	Q209314	45DB120V80P	X				65	63	350	10,6	114	2,1	
		100	R209315	45DB120V100P	X				78	63	500	8,5	156	3,1	
		125	X1000106	45DB120V125P	X				88	63	480	4	117	3,7	
160	Y1000107	45DB120V160P	X				88	63	560	4,3	217	3,7			
200	Z1000108	45DB120V200P	X				88	63	610	3,8	333	3,7			
250	Y1014919	45DB120V250P	X				88	63	740	3,7	335	3,7			
6 / 12	292	6,3	R1000239	45DB120V6,3PD	X	X			56	63	23	409	19	1,7	
		10	S1000263	45DB120V10PTD	X	X		X	56	63	35	227	29	1,7	
		16	T1000264	45DB120V16PTD	X	X		X	56	63	64	66	21	1,7	
		20	V1000265	45DB120V20PTD	X	X		X	56	63	90	51	25	1,7	
		25	W1000266	45DB120V25PTD	X	X		X	56	63	95	40	29	1,7	
		31,5	X1000267	45DB120V32PTD	X	X		X	56	63	110	30	39	1,7	
		40	Y1000268	45DB120V40PTD	X	X		X	56	63	134	20	46	1,7	
		50	Z1000269	45DB120V50PTD	X	X		X	56	63	190	15	62	1,7	
		63	A1000270	45DB120V63PTD	X	X		X	65	63	220	12	62	2,2	
		80	N1018314	45DB120V80PTS2	X	X	X			65	80	280	9,6	82	2,1
		100	P1018315	45DB120V100PTS2	X	X	X			78	80	350	7,5	105	3,2
125	Q1018316	45DB120V125PTS2	X	X	X			88	80	440	5,3	110	4,2		
160	E1000274	45DB120V160PTD	X	X			X	88	63	610	4	175	3,8		
6 / 12	442	6,3	F1006094	45DB120V6,3P-3	X				63	31,5	31,5	244	11	2,3	
		10	G1006095	45DB120V10P-3	X				63	31,5	45	133	15	2,3	
		16	H1006096	45DB120V16P-3	X				63	31,5	64	73,9	21,8	2,3	
		25	J1006097	45DB120V25P-3	X				63	31,5	100	45,9	35	2,3	
		31,5	K1006098	45DB120V32P-3	X				63	31,5	126	34,4	43	2,3	
		40	L1006099	45DB120V40P-3	X				63	31,5	160	27	57	2,3	
		50	M1006100	45DB120V50P-3	X				63	31,5	200	19	63	2,3	
		63	N1006101	45DB120V63P-3	X				63	31,5	252	14,2	78	2,3	
		80	P1006102	45DB120V80P-3	X				88	31,5	320	9,4	83	2,3	
		100	Q1006103	45DB120V100P-3	X				88	31,5	400	6,5	91	3,2	
		100	R1018317	45DB120V100PTS3	X	X	X			78	80	350	7,5	95	5,1
		125	R1006104	45DB120V125P-3	X					88	31,5	500	5,4	130	4,2
		125	S1018318	45DB120V125PTS3	X	X	X			78	80	440	5,4	105	5,1
		160	S1006105	45DB120V160P-3	X					88	31,5	640	4,1	170	4,2
160	V1018320	45DB120V160PTS3	X	X	X			78	80	600	4,1	145	5,1		

\* For more technical data, curves, references, etc, visit our website.



# LIMITOR®-B BACK-UP FUSE LINKS ACCORDING TO IEC 60282-1

## 17,5kV



VOLTAGE (kV)	LENGTH (mm)	CURRENT RATING	REF. NUMBER	CAT. NUMBER	VDE T4	VDE T402	THERMAL STRIKER	CPD	D (mm)	I <sub>1</sub> (kA)	I <sub>3</sub> (A)	R (mΩ)	P (W) @ I <sub>N</sub>	WEIGHT (kg)
10 / 17,5	292	6,3	A1005698	45DB175V6,3P-2	X				63	25	32	331	15,1	2,2
		10	T1005692	45DB175V10P-2	X				63	25	45	181	22	2,2
		16	X1005695	45DB175V16P-2	X				63	25	64	99,6	32	2,2
		25	S1005277	45DB175V25P-2	X				63	25	100	62,1	54	2,2
		31,5	Y1005696	45DB175V32P-2	X				63	25	126	46,5	69	2,2
		40	Z1005697	45DB175V40P-2	X				63	25	160	36,5	94,3	2,2
		50	L1005685	45DB175V50P-2	X				88	25	200	21,4	77	3,8
10 / 17,5	367	6,3	V1000564	45DB175V6,3P	X				56	63	30	245	11	2,2
		10	W1000565	45DB175V10P	X				56	63	43	180	22	2,2
		16	X1000566	45DB175V16P	X				56	63	54	150	53	2,2
		20	Y1000567	45DB175V20P	X				56	63	73	102	56	2,2
		25	Z1000568	45DB175V25P	X				56	63	93	78	73	2,2
		31,5	A1000569	45DB175V32P	X				56	63	105	59	95	2,2
		40	B1000570	45DB175V40P	X				56	63	125	33,8	79	2,2
		50	C1000571	45DB175V50P	X				56	63	205	26	106	2,2
		63	D1000572	45DB175V63P	X				56	63	280	18,4	130	2,2
		80	E1000573	45DB175V80P	X				65	63	350	15	180	2,6
		100	F1000574	45DB175V100P	X			88	63	500	13	280	3,1	
10 / 17,5	367	6,3	G1006118	45DB175V6,3PT	X			X	56	63	30	245	11	2,2
		10	H1006119	45DB175V10PT	X			X	56	63	43	180	22	2,2
		16	J1006120	45DB175V16PT	X			X	56	63	54	150	53	2,2
		25	K1006121	45DB175V25PT	X			X	56	63	93	78	73	2,2
		31,5	L1006122	45DB175V32PT	X			X	56	63	105	59	95	2,2
		40	M1006123	45DB175V40PT	X			X	56	63	125	33,8	79	2,2
		50	N1006124	45DB175V50PT	X			X	56	63	205	26	106	2,2
		63	P1006125	45DB175V63PT	X			X	56	63	280	18,4	135	2,2
		80	Q1006126	45DB175V80PT	X			X	65	63	350	15	183	2,6
				100	S1006128	45DB175V100PT	X		X	88	63	500	13	240
10 / 17,5	442	50	D1005655	45DB175V50P-3	X				63	31,5	200	23,2	83	2,9
		63	F1005887	45DB175V63P-3	X				63	31,5	252	17,4	104	2,9
		80	J1005637	45DB175V80P-3	X				88	31,5	320	13,7	135	5,7
		100	Y1005282	45DB175V100P-3	X				88	31,5	400	9,6	151	5,7
		125	C1005677	45DB175V125P-3	X				88	31,5	500	8	217	5,7
10 / 17,5	537	100	H1005636	45DB175V100P-4	X				88	31,5	400	9,6	151	6,8
		125	A1005284	45DB175V125P-4	X				88	31,5	500	8	217	6,8
		125	E1005909	45DB175V100PT-4	X		X		88	31,5	400	9,6	151	6,8

\* For more technical data, curves, references, etc, visit our website.



# LIMITOR®-B BACK-UP FUSE LINKS ACCORDING TO IEC 60282-1

## 24kV



VOLTAGE (kV)	LENGTH (mm)	CURRENT RATING	REF. NUMBER	CAT. NUMBER	VDE T4	VDE T402	THERMAL STRIKER	CPD	D (mm)	I <sub>1</sub> (kA)	I <sub>3</sub> (A)	R (mΩ)	P (W) @ IN	WEIGHT (kg)
10 / 24	442	2	B1000110	45DB240V2P	X				56	63	16	800	3	2,3
		4	C1000111	45DB240V4P	X				56	63	23	545	10	2,3
		6,3	S209339	45DB240V6,3P	X				56	63	30	297	13	2,3
		10	T209340	45DB240V10P	X				56	63	43	220	26	2,3
		16	V209341	45DB240V16P	X				56	63	60	197	73	2,3
		20	W209342	45DB240V20P	X				56	63	73	132	76	2,3
		25	X209343	45DB240V25P	X				56	63	93	96	89	2,3
		31,5	Y209344	45DB240V32P	X				56	63	105	78	127	2,3
		40	Z209345	45DB240V40P	X				56	63	130	45	114	2,3
		50	A209346	45DB240V50P	X				56	63	205	35	147	2,3
		63	B209347	45DB240V63P	X				56	63	280	24	170	2,3
		80	C209348	45DB240V80P	X				65	63	360	20	233	3,1
		100	D209349	45DB240V100P	X				78	63	430	18	400	4,2
		125	D1000112	45DB240V125P	X				88	40	760	11,7	340	4,3
160	E1000113	45DB240V160P	X				88	31,5	900	9,45	515	4,3		
200	F1000114	45DB240V200P	X				88	31,5	1050	7	740	4,3		
10 / 24	442	10	J1000140	45DB240V10PT	X			X	56	63	43	220	26	2,3
		16	K1000141	45DB240V16PT	X			X	56	63	60	197	73	2,3
		20	L1000142	45DB240V20PT	X			X	56	63	76	134	76	2,3
		25	M1000143	45DB240V25PT	X			X	56	63	93	96	89	2,3
		31,5	N1000144	45DB240V32PT	X			X	56	63	105	79	127	2,3
		40	P1000145	45DB240V40PT	X			X	56	63	130	45	114	2,3
		50	Q1000146	45DB240V50PT	X			X	56	63	205	35	147	2,3
		63	R1000147	45DB240V63PT	X			X	56	63	280	25	163	2,3
		80	S1000148	45DB240V80PT	X			X	65	63	360	20,5	233	3,1
		100	T1000149	45DB240V100PT	X			X	78	63	430	18	400	3,6
		125	V1000150	45DB240V125PT	X			X	88	40	760	11	340	4,3
		160	E1000113	45DB240V160P	X				88	31,5	900	9,4	515	4,3
200	F1000114	45DB240V200P	X				88	31,5	1050	7	740	4,3		
10 / 24	442	6,3	F1000275	45DB240V6,3PTD	X	X		X	56	63	23	640	31	2,4
		16	H1000277	45DB240V16PTD	X	X		X	56	63	73	127	42	2,4
		20	J1000278	45DB240V20PTD	X	X		X	56	63	91	97	53	2,4
		25	K1000279	45DB240V25PTD	X	X		X	56	63	116	73	60	2,4
		31,5	L1000280	45DB240V32PTD	X	X		X	56	63	125	57	84	2,4
		40	M1000281	45DB240V40PTD	X	X		X	56	63	161	41	96	2,4
		50	X1018322	45DB240V50PTS	X	X	X		65	63	230	27,4	82	3,3
		50	N1000282	45DB240V50PTD	X	X		X	65	63	230	35	146	3,2
		63	Y1018323	45DB240V63PTS	X	X	X		78	63	250	21,6	102	5,1
		63	P1000283	45DB240V63PTD	X	X		X	65	63	350	24	163	3,2
		80	Z1018324	45DB240V80PTS	X	X	X		78	63	280	17,3	153	5,1
		80	Q1000284	45DB240V80PTD	X	X		X	65	63	460	19	196	3,2
		100	A1018325	45DB240V100PTS	X	X	X		88	63	350	13,6	200	6,1
100	R1000285	45DB240V100PTD	X	X		X	88	63	420	14	279	4,3		
125	B1018326	45DB240V125PTS	X	X	X		88	63	440	10,1	254	6,1		
10 / 24	537	80	B1008551	45DB240V80P-4	X				88	25	360	17,5	185	6,7
		100	C1008552	45DB240V100P-4	X				88	25	450	13,1	234	6,7

\* For more technical data, curves, references, etc, visit our website.



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# LIMITOR®-B BACK-UP FUSE LINKS ACCORDING TO IEC 60282-1

## 36kV



VOLTAGE (kV)	LENGTH (mm)	CURRENT RATING	REF. NUMBER	CAT. NUMBER	VDE T4	VDE T402	THERMAL STRIKER	CPD	D (mm)	I <sub>1</sub> (kA)	I <sub>3</sub> (A)	R (mΩ)	P (W) @ I <sub>N</sub>	WEIGHT (kg)
20 / 36	537	2	G1000115	45DB360V2P	X				56	31,5	15	950	9	2,7
		4	H1000116	45DB360V4P	X				56	31,5	20	900	32	2,7
		6,3	S209362	45DB360V6,3PD	X	X			56	31,5	23	827	39	2,7
		10	T209363	45DB360V10PD	X	X			56	31,5	34	520	65	2,7
		16	V209364	45DB360V16PD	X	X			56	31,5	70	210	67	2,7
		20	W209365	45DB360V20PD	X	X			56	31,5	100	165	84	2,7
		25	X209366	45DB360V25PD	X	X			56	31,5	110	125	100	2,7
		31,5	Y209367	45DB360V32PD	X	X			65	31,5	135	85	119	3,7
		40	Z209368	45DB360V40PD	X	X			65	20	205	65	176	3,7
		50	J1000117	45DB360V50PD	X	X			88	20	220	45	183	6,5
		63	K1000118	45DB360V63PD	X	X		88	20	360	35	271	6,5	
20 / 36	537	6,3	S1000286	45DB360V6,3PTD	X	X		X	56	31,5	23	889	39	2,7
		10	F1032958	45DB360V10PTS	X	X	X		56	31,5	34	529	66	2,8
		16	G1032959	45DB360V16PTS	X	X	X		56	31,5	66	190	67	2,8
		20	H1032960	45DB360V20PTS	X	X	X		56	31,5	95	153	84	2,8
		25	J1032961	45DB360V25PTS	X	X	X		56	31,5	110	118	100	2,8
		31,5	K1032962	45DB360V32PTS	X	X	X		65	20	135	82	119	3,7
		40	L1032963	45DB360V40PTS	X	X	X		65	20	200	63	176	3,7
		50	M1032964	45DB360V50PTS	X	X	X		88	20	220	40	183	6,5
		63	C1018327	45DB360V63PTS	X	X	X		88	36	260	31,9	165	6,5
		80	F1018330	45DB360V80PTS	X	X	X	88	36	350	24,2	230	6,5	

\* For more technical data, curves, references, etc, visit our website.



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# LIMITOR®-G GENERAL PURPOSE FUSE-LINKS ACCORDING TO IEC 60282-1

## Selection table



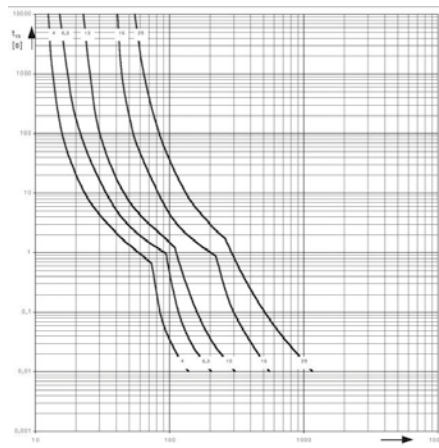
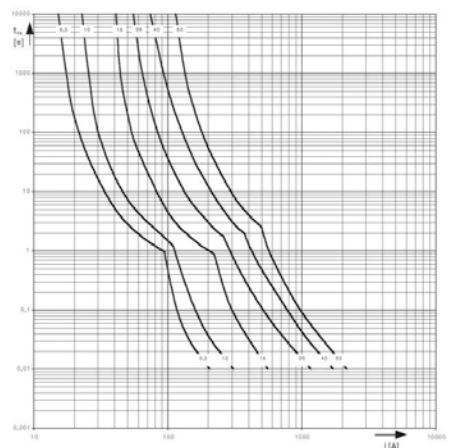
RATED VOLTAGE RANGE OF FUSE-LINK [kV]		6 / 12		10 / 24	
SERVICE VOLTAGE OF TRANSFORMER [kV]		10		20	
RELATIVE SHORT-CIRCUIT VOLTAGE	TRANSFORMER OUTPUT [kVA]	TRANSFORMER RATED CURRENT [A]	RATED CURRENT OF FUSE-LINK [A]	TRANSFORMER RATED CURRENT [A]	RATED CURRENT OF FUSE-LINK [A]
U <sub>k</sub> = 4%	50	2,9	6,3	1,5	-
	100	5,8	6,3-10	2,9	4
	125	7,2	10	3,6	4 - 6,3
	160	9,2	16	4,6	6,3
	200	11,5	16	5,8	6,3 - 10
	250	14,4	16-25	7,2	10
	315	18,2	25	9,1	16
	400	23,1	25 - 40	11,5	16
	500	28,9	40	14,4	16
U <sub>k</sub> = 5%	630	36,4	40 - 50	18,2	25
	800	46,2	50	23,1	25
	1000	57,7	50	28,9	25

## 12kV and 24kV

VOLTAGE (kV)	LENGTH (mm)	CURRENT RATING	REF. NUMBER	CAT. NUMBER	STRIKER	D (mm)	I <sub>1</sub> (kA)	R (mΩ)	P (W) @ I <sub>N</sub>	I <sup>2</sup> T (kA <sup>2</sup> s)	WEIGHT (kg)
6 / 12	292	6,3	W1000151	45DG120V6,3P	X	65	40	132	6	2	2,3
		10	X1000152	45DG120V10P	X	65	40	70	8	3,8	2,3
		16	Y1000153	45DG120V16P	X	65	40	35	10	14	2,3
		25	Z1000154	45DG120V25P	X	65	40	21	15	36	2,3
		40	A1000155	45DG120V40P	X	78	40	13	24	110	3,1
10 / 24	442	4	c1000157	45DG240V4P	X	78	40	280	5	1,8	4,1
		6,3	D1000158	45DG240V6,3P	X	78	40	260	11	2	4,1
		10	E1000159	45DG240V10P	X	78	40	138	15	3,6	4,1
		16	F1000160	45DG240V16P	X	78	40	70	21	14	4,1
		25	G1000161	45DG240V25P	X	88	40	41	31	39	4,5

\* For more technical data, curves, references, etc, visit our website.

## Time-current characteristics



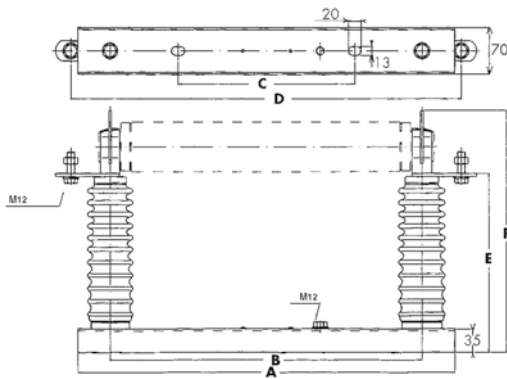
# BASES WITH OPTIONAL INDICATOR

## Bases with optional indicator

VOLTAGE (KV)	SIZE	USE	REFERENCE NUMBER	CATALOG NUMBER	PACKAGING
7,2	SI 7,2/192	Indoor	G209421	SI72V192	1
12	SI 12/292	Indoor	H209422	SI120V292	1
17,5	SI 17,5/292	Indoor	J209423	SI175V292	1
24	SI 24/442	Indoor	K209424	SI240V442	1
36	SI 36/537	Indoor	M209426	SI360V537	1
12	SE 12/292	Outdoor	S210328	SE120V292	1
17,5	SE 17,5/292	Outdoor	T210329	SE175V292	1
24	SE 24/442	Outdoor	V210330	SE240V442	1
36	SE 36/537	Outdoor	W210331	SE360V537	1



## Dimensions



VOLTAGE (KV)	LENGTH OF FUSE L (MM)	SIZE	DIELECTRIC WITHSTAND (PHASE TO GROUND)		DIMENSIONS (MM)						WEIGHT (kg)
			50Hz-1 MIN RMS (kV)	1,2/50µS PEAK VOLTAGE (kV)	A	B	C	D	E	F	
192	SI 7,2/192	20	60	400	226	322	347	175	270	3,8	3,4
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

## Clips

SIZE	REF. NUMBER	CAT. NUMBER	PACKAGING
MR 45 + spring	L096472	MR45R	1
MR 45 without connection lug	S210236	MR45SPL	2



# INDICATING DEVICES

The indicating device enables electrical actuating of the opening mechanism for a circuit or triggering of an indicator during the melting of a fuse equipped with a trip-indicator. This very robust and original device means freedom for any mechanical system and offers the advantage of being able to incorporate a microswitch unit or units according to the equipment configuration.

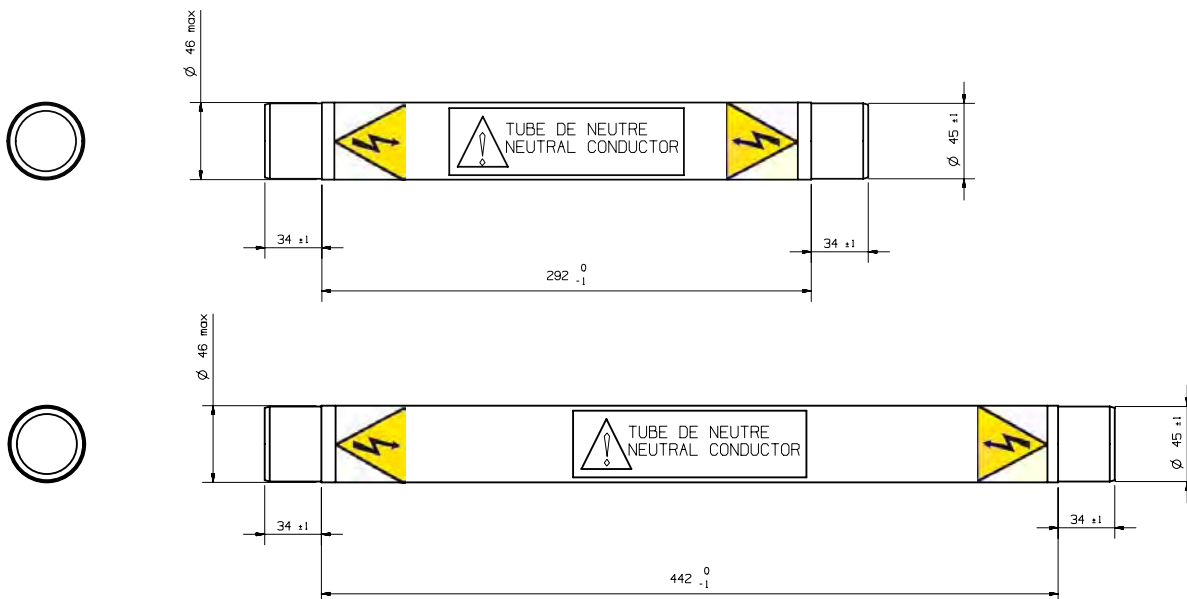


VOLTAGE (kV)	NUMBER OF CONTACTS	LENGTH OF FLEXIBLE PART (mm)	L (mm)	REF. NUMBER	CAT. NUMBER	PACKAGING
12/36	1 NO/NF	550	710	E092855A	MC1-5NFLEXQS500	1
12/36	2 NO/NF	550	710	F092856A	MC1-9NFLEXQS500	1

## Neutral conductors

LENGTH (mm)	REF. NUMBER	CAT. NUMBER	PACKAGING
292	J1006419	45DB292NEUTRAL	1
442	L1006421	45DB442NEUTRAL	1

## Dimensions



## External adaptor 292/442mm

REF. NUMBER	CAT. NUMBER	PACKAGING
H1026244	ADAPTOR292/442	1



## HV fuses standard: IEC 60282-1

### High-voltage fuses – Part 1: current-limiting fuses

This part of IEC 60282 applies to all types of high-voltage current-limiting fuses designed for use outdoors or indoors on alternating current systems of 50 Hz and 60 Hz and of rated voltages exceeding 1000V.

This standard defines test set-up, fuse characteristics and normal service conditions (without derating) like:

- Operating temperature: -25°C to 40°C
- Altitude: 1000m maximum

It is advisable to replace all three fuse-links when the fuse-link on one or two phases of a three-phase circuit has operated, unless it is definitely known that no over-current has passed through the unmelted fuse-links.

## HV fuses standard: IEC 60787

### Application Guide for the selection of high-voltage current limiting fuse-links for transformer circuits.

IEC/TR 60787, which is a technical report, serves as an application guide to the use, in distribution transformer circuit applications, of fuses complying with the requirements of IEC 60282-1. Therefore, this document is informative, not normative.

The objective of this application guide is to specify criteria for coordination of high-voltage fuses with other circuit components in transformer applications and to give guidance for the selection of fuse-links with particular reference to their time-current characteristics and ratings.

All Mersen HV DIN fuses defined in this presentation are in accordance with IEC 60787.

## German standards

### Two important standards

- VDE 0670 T4 is the translation of IEC 60282-1 into German.
- VDE 0670 T402: Selection of current-limiting fuses for transformer circuits (German addition to VDE 0670 T4).

VDE 0670 T402 defines fuses with ratings 6.3A to 160A. All ratings over this range are automatically only VDE 0670 T4.

This standard defines some additional melting and non-melting gates to increase the performance of the selectivity with LV fuses.



	INTERNATIONAL RANGE	GERMAN RANGE
Complies with	IEC 60282-1 (VDE 0670 part 4) IEC 60787	IEC 60282-1 (VDE 0670 part 4) IEC 60787 and VDE 0670 part 402
Backup	45DB__P	
Backup		45DB__PD*
Backup, CPD	45DB__PT	
Backup, CPD		45DB__PTD*
Backup, TH	45DB__PT-x	
Backup, TH and LPL**		45DB__PTS**

\* Lower power dissipation

\*\* Very low power dissipation



## 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 fuse-link 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-link or in the technical data, e.g. 10/24kV.

6kV	3kV / 7,2kV
10kV	6kV / 12kV
15kV	10kV / 17,5kV
20kV	10kV / 24kV
30kV	20kV / 36kV

## Breaking capacity $I_1$

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 fuse-link. It of the fuse-link must be greater than the maximum short-circuit current at the site of the fuse-link ( $I_1 > I_{kmax}$ ).

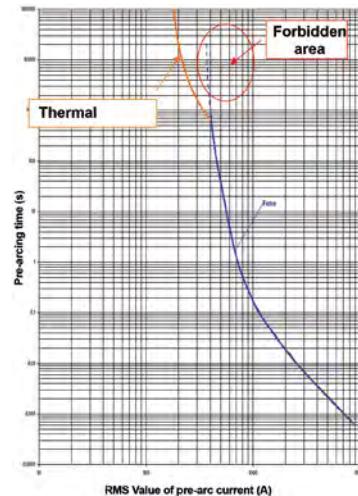
## Minimum breaking current $I_3$

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  $I_3$  can occur at the site of the fuse-link (due to the system parameters or other protective devices).

## Power dissipation of a fuse-link $P_{warm}$

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  $P_{warm}$  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 ( $t_{vs}$ ) 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 interruptor switches or circuit breakers, the melting integral  $I^2t$  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

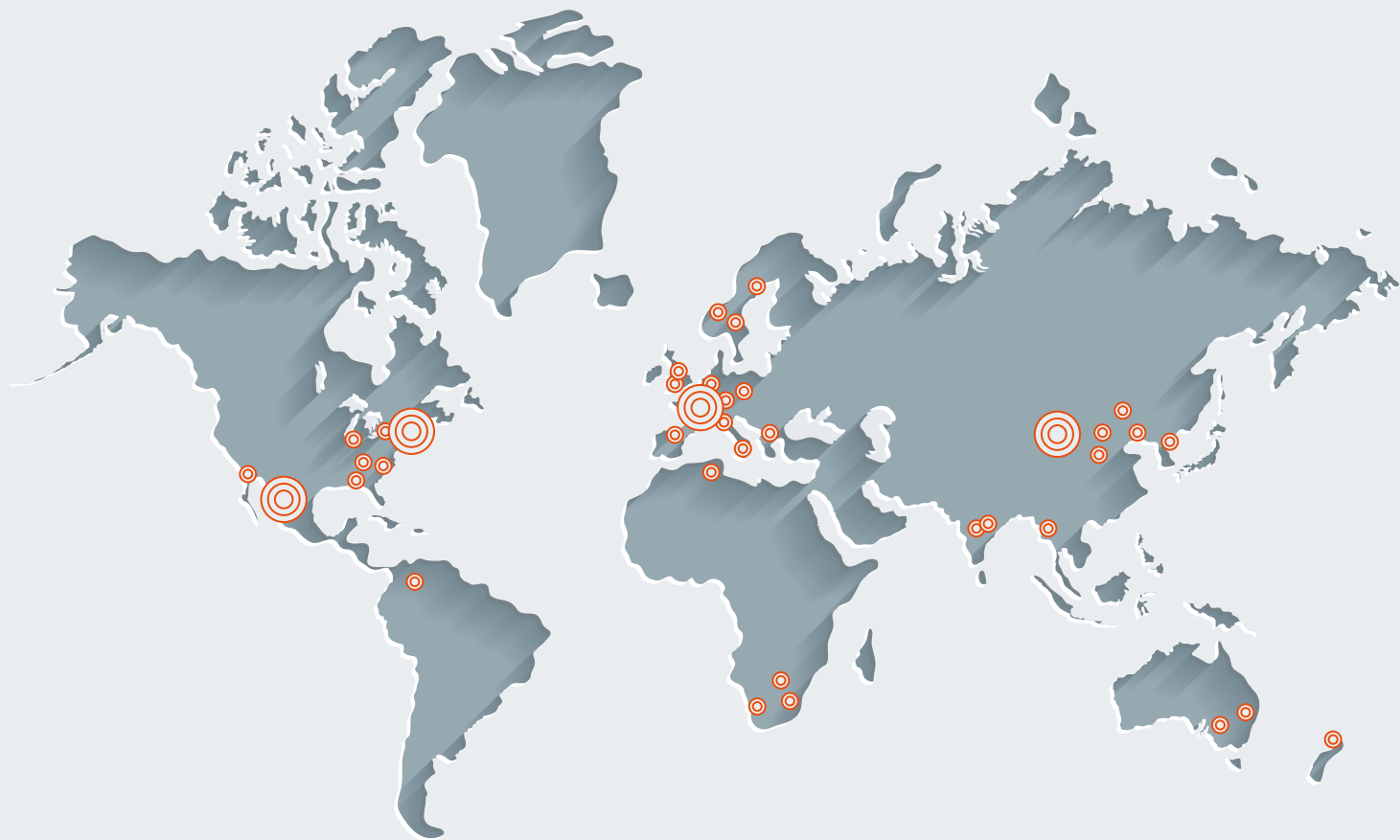
So that HV fuse-links perform a current-limiting action, the short-circuit current must be limited and reduced as it increases.

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.







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