PRODUCT GUIDE

DIN HV fuse-link



MERSEN
Ferraz Shawmut is Mersen

Mersen and the HV fuse-links market

With the large range of DIN HV fuses, Mersen is a major player on this market as we already are on French and American HV fuses-links standards

Mersen offers a wide HV DIN fuse-links range 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 network

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

Mersen is offering limiting-current 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 with:

- 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 the thermal and dynamic effects of short-circuits. The outstanding features of Limitor® HV fuse-links by Mersen are:

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



LEARN MORE
ep.mersen.com



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 the following standars :

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

and coordination with the following standards for equipment and accessories:

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

The quality management system of Mersen is certified to the international standard DIN EN ISO 9001.

Mersen operates a certified ISO 14001 environment management system.

Mersen and the HV fuse-links market

LEARN MORE
ep.mersen.com

HV fuse-links in the world:

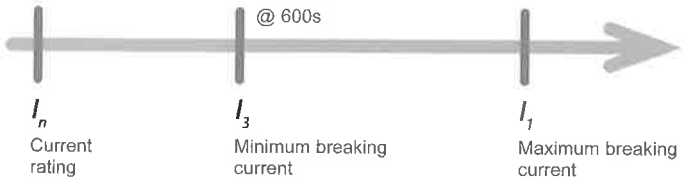
- **UL standard E or R rated: American standard**
- **DIN standard: German standard**
- **FR standard: French standard**
- **BS standard: British standard**
- **Special HV fuses links**

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

Mersen is offering 2 types on the 3 types defined in the IEC standard

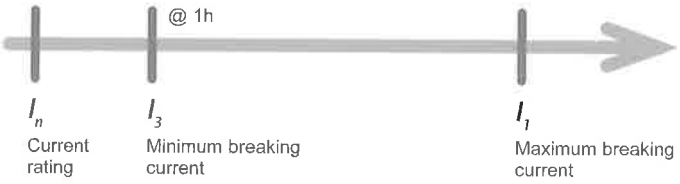
Back-up fuse-links range

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

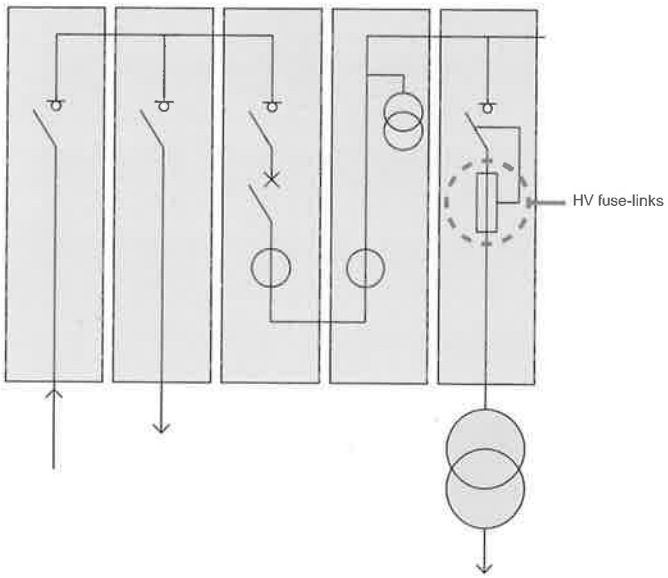
Current-limiting fuse capable of breaking all currents that cause melting of the fuse element(s), up to its rated maximum breaking current



Fuse description FR vs DIN



Typical installation



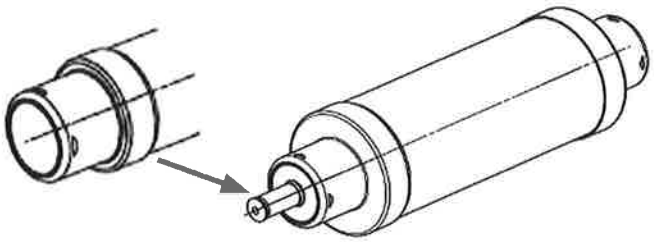
Mersen Innovations

Striker

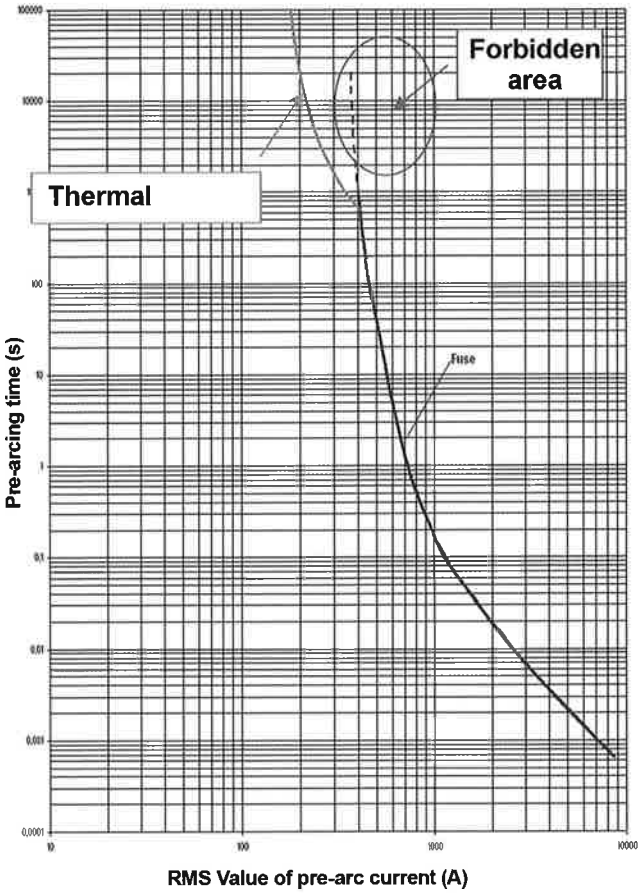
The striker is a mechanical device forming a part of a fuse-link which releases the energy required to cause operation of another switching device or signalling device.

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.



Melting curves



Mersen HV fuses have all the striker function

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

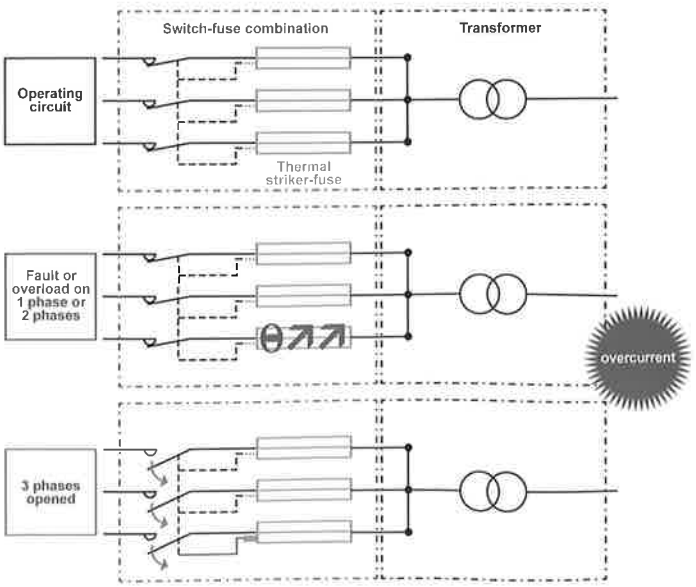
- First one (regular) is driven by the fuse element when it is melting
- Second one (CPD) is driven by the control of the power dissipation of the fuse-link according to Ohm's law. As the back-up fuse-link is combined with a switch the Controlled Power Dissipation (CPD) operates the switch before an 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

- As demanded by switch-fuse combination manufacturers, the thermal stricker has to trigger the switch to open the three phases in case of abnormal condition like overheating.
- The purpose of this invention is to propose a fuse that is designed for switch-fuse combinations and capable of opening the circuit when an extended over-current causes temperature to rise. Our new patented thermal striker fulfils this function: whenever the temperature rises abnormally in a fuse, the thermal striker trips and triggers either a mechanical or an electronic system that will open the circuit (sketch).



LEARN MORE
ep.mersen.com

Mersen Innovations

LEARN MORE
ep.mersen.com

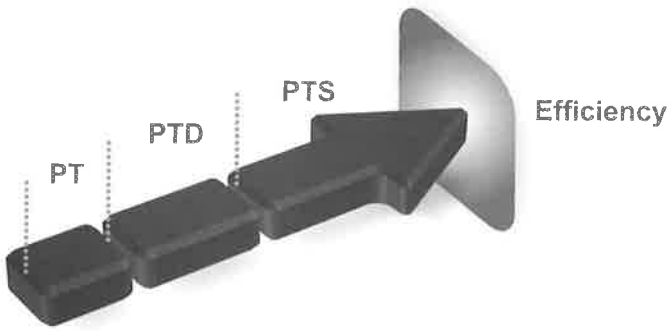
Low power losses

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

The latest innovation was made in 2011 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.



Outdoor type

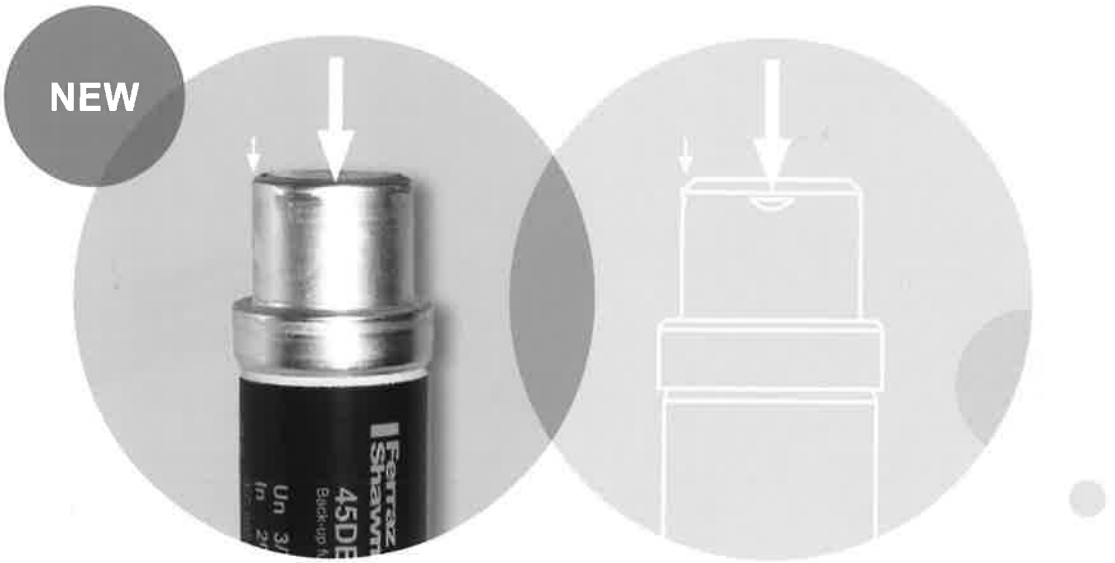
All our DIN fuse-links are for outdoor use and can be used indoors.

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



Compatibility between ranges

In 2011 Mersen launched a new cap for the HV DIN fuse range for a better compatibility with clips to suit all applications and simplify maintenance.



Descriptions

Catalog Number

4	5	D	B	1	2	0	V	5	0	P	T	S

45 mm diameter of contact caps

D for DIN

B for Back-up

G for General purpose

Voltage rating in V/100

Current rating in A

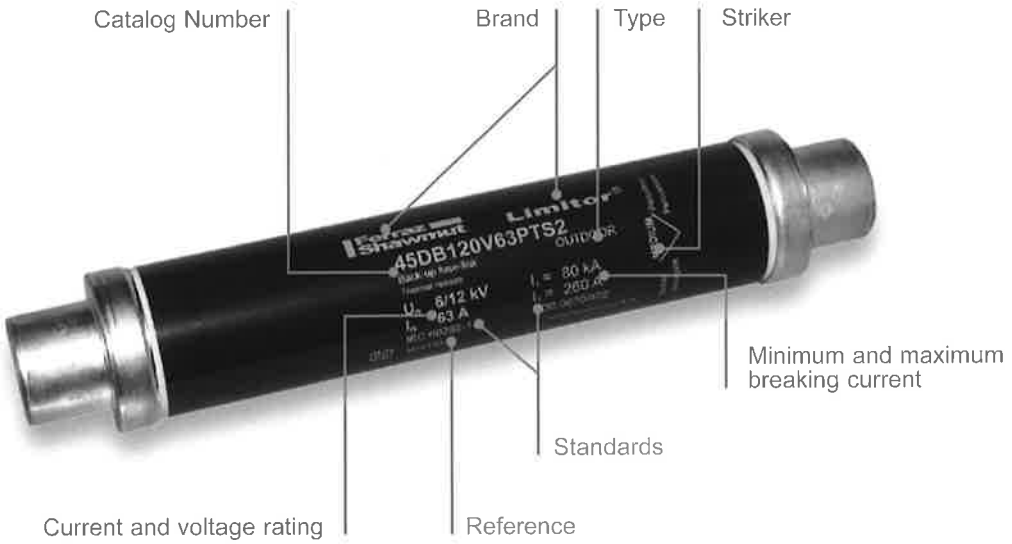
P for striker

T for Thermal Striker or Controlled Power Dissipation

D for VDE 0670 T402

S for VDE 0670 T402 and dedicated switch-fuse combination

All data are on the fuse-link



Fuse-link description

1 - Cap

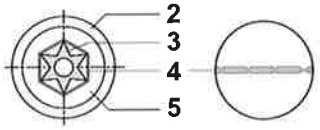
2 - Body

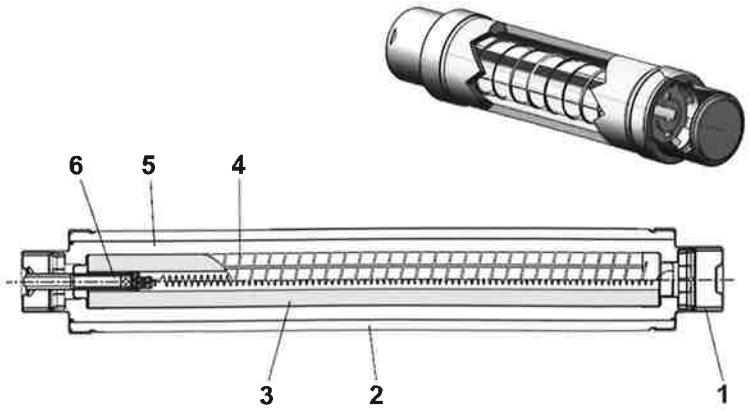
3 - Rod

4 - Fuse element

5 - Sand

6 - Striker



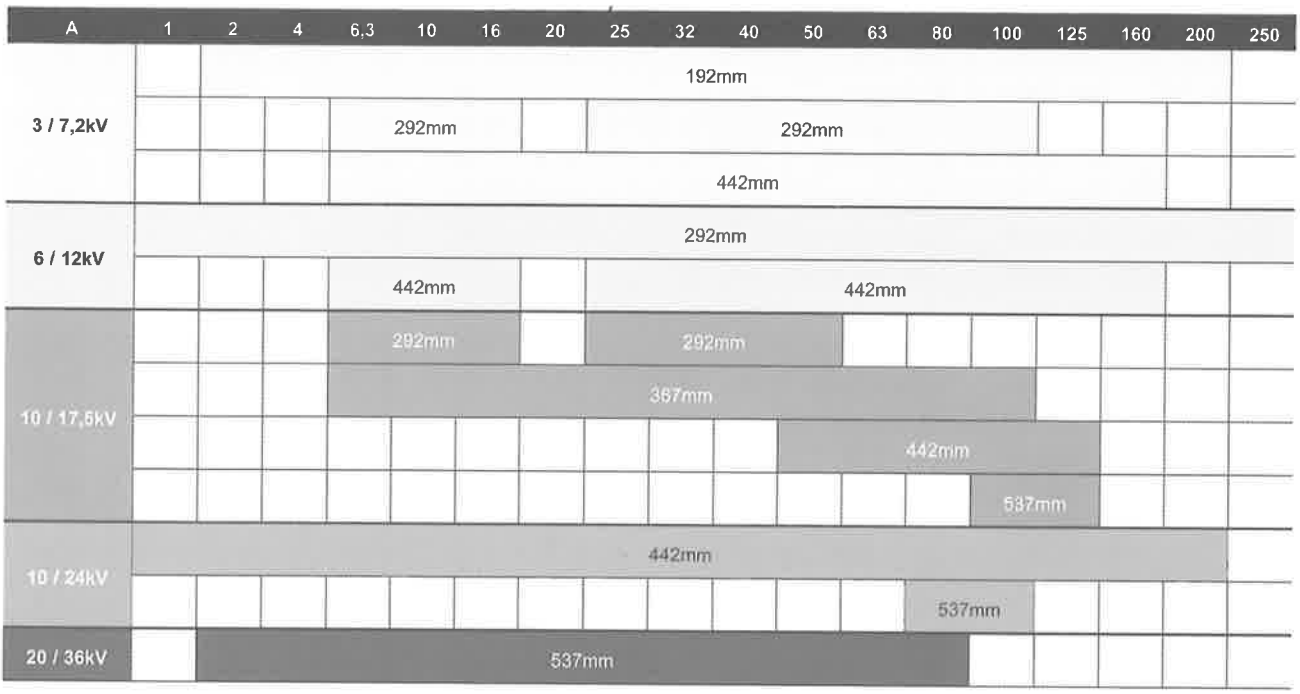


LEARN MORE

ep.mersen.com

Limitor-B back-up fuse links according to IEC 60282-1

Overview of Mersen HV fuse-link range



HV fuse-links standard: DIN 43625

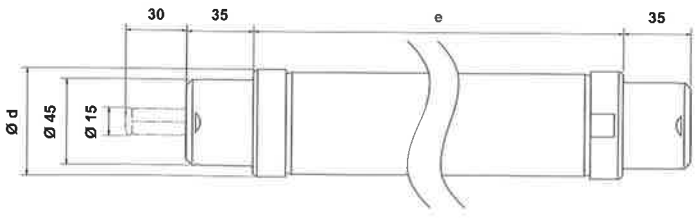
DIN 43625 defines the dimensions of HV DIN fuse-links.

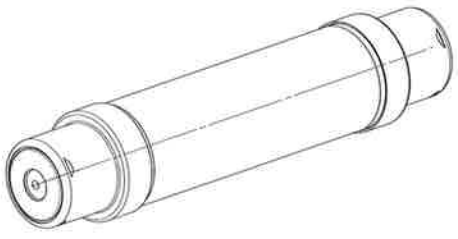
All Mersen HV DIN fuse-links are in compliance with this standard.

The diameter "d" is mainly dependent on the current rating (50 to 88mm) and the length "e" is mainly dependent on the voltage rating (192 to 537mm).

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

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





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	CPD	D (mm)	I_s (kA)	I^2t (A)	R (mΩ)	P (W) @ In	Weight (kg)
3 / 7,2	192	2	N1000098	45DB72V2P	X				56	63	15	290	1,8	1,1
		4	P1000099	45DB72V4P	X				56	63	20	270	5	1,1
		6,3	S209293	45DB72V6,3PD	X	X			56	63	20	256	11	1,1
		10	T209294	45DB72V10PD	X	X			56	63	35	144	19	1,1
		16	V209295	45DB72V16PD	X	X			56	63	64	41	13	1,1
		20	W209296	45DB72V20PD	X	X			56	63	80	32	14,5	1,1
		25	X209297	45DB72V25PD	X	X			56	63	95	25	20	1,1
		32	Y209298	45DB72V32PD	X	X			56	63	110	19	23	1,1
		40	Z209299	45DB72V40PD	X	X			56	63	134	12,5	30	1,1
		50	A209300	45DB72V50PD	X	X			56	63	190	9,2	35	1,1
		63	M1000235	45DB72V63PD	X	X			65	63	220	8,7	60	1,4
		80	N1000236	45DB72V80PD	X	X			65	63	300	6,2	85	1,4
		100	P1000237	45DB72V100PD	X	X			65	63	350	5	96	1,4
		125	Q1000100	45DB72V125PD	X	X			88	63	440	3	75	2,4
		160	Q1000238	45DB72V160PD	X	X			88	63	610	2,3	120	2,4
		200	S1000102	45DB72V200P	X				88	63	610	2,5	200	2,4
3 / 7,2	292	6,3	H1005889	45DB72V6,3PT-2	X		X		63	63	28	147	6	1,9
		10	L1005892	45DB72V10PT-2	X		X		63	63	45	80,3	9	1,9
		16	M1005893	45DB72V16PT-2	X		X		63	63	64	44,3	12,8	1,9
		25	N1005894	45DB72V25PT-2	X		X		63	63	100	27,5	21	1,9
		32	P1005895	45DB72V32PT-2	X		X		63	63	126	20,6	25	1,9
		40	Q1005896	45DB72V40PT-2	X		X		63	63	160	16,2	33	1,9
		50	R1005897	45DB72V50PT-2	X		X		63	63	200	11,3	37	1,9
		63	S1005898	45DB72V63PT-2	X		X		63	63	252	8,5	46	1,9
		80	T1005899	45DB72V80PT-2	X		X		63	63	320	6,8	63	1,9
		100	P1005274	45DB72V100PT-2	X		X		63	63	400	4,7	70	1,9
3 / 7,2	442	6,3	A1005675	45DB72V6,3PT-3	X		X		63	63	28	166	7	2,9
		10	Y1005650	45DB72V10PT-3	X		X		63	63	45	90,8	10	2,9
		16	T1005669	45DB72V16PT-3	X		X		63	63	64	46,7	14	2,9
		25	V1005670	45DB72V25PT-3	X		X		63	63	100	31,1	23	2,9
		32	W1005671	45DB72V32PT-3	X		X		63	63	126	23,4	29	2,9
		40	X1005672	45DB72V40PT-3	X		X		63	63	160	18,3	38	2,9
		50	Y1005673	45DB72V50PT-3	X		X		63	63	200	12,8	41	2,9
		63	Z1005674	45DB72V63PT-3	X		X		63	63	252	9,6	50	2,9
		80	B1005676	45DB72V80PT-3	X		X		63	63	320	7,7	69	2,9
		100	S1005668	45DB72V100PT-3	X		X		63	63	400	5,3	76	2,9
		125	R1005276	45DB72V125PT-3	X		X		88	63	500	4,6	107	5,2
		160	Q1005275	45DB72V160P-3	X				88	40	640	3,6	146	5,2

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

LEARN MORE
ep.mersen.com

Limitor-B back-up fuse links according to IEC 60282-1

LEARN MORE
ep.mersen.com

12kV

lead-free

Voltage (kV)	Length (mm)	Current rating	Ref. Number	Cat. Number	VDE T4	VDE T402	Thermal striker	CPD	D (mm)	I_1 (kA)	I_2 (A)	R (mΩ)	P (W) @ In	Weight (kg)
6 / 12	292	1	L1000119	45DB120V1PT	X			X	56	63	14	1500	1,6	1,6
		2	M1000120	45DB120V2PT	X			X	56	63	16	510	2	1,6
		4	N1000121	45DB120V4PT	X			X	56	63	22	338	6	1,6
		6,3	P1000122	45DB120V6,3PT	X			X	56	63	30	190	8	1,6
		10	Q1000123	45DB120V10PT	X			X	56	63	42	139	16	1,6
		16	R1000124	45DB120V16PT	X			X	56	63	54	107	38	1,6
		20	S1000125	45DB120V20PT	X			X	56	63	73	71	38	1,6
		25	T1000126	45DB120V25PT	X			X	56	63	93	52	46	1,6
		32	V1000127	45DB120V32PT	X			X	56	63	105	43	65	1,6
		40	W1000128	45DB120V40PT	X			X	56	63	125	23	54	1,6
		50	X1000129	45DB120V50PT	X			X	56	63	160	18	70	1,6
		63	Y1000130	45DB120V63PT	X			X	56	63	230	12	85	1,6
		80	Z1000131	45DB120V80PT	X			X	65	63	350	10,6	114	2,1
		100	A1000132	45DB120V100PT	X			X	65	63	500	8,5	156	2,1
		125	B1000133	45DB120V125PT	X			X	88	63	480	4	117	3,7
		160	C1000134	45DB120V160PT	X			X	88	63	560	4,3	217	3,7
		200	D1000135	45DB120V200PT	X			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	1,6
		10	R1032945	45DB120V10PTS2	X	X	X		56	65	35	227	29	1,6
		16	S1032946	45DB120V16PTS2	X	X	X		56	65	64	66	21	1,6
		20	T1032947	45DB120V20PTS2	X	X	X		56	65	90	51	25	1,6
		25	V1032948	45DB120V25PTS2	X	X	X		56	65	95	40	29	1,6
		32	W1032949	45DB120V32PTS2	X	X	X		56	65	110	30	39	1,6
		40	X1032950	45DB120V40PTS2	X	X	X		56	65	134	20	46	1,6
		50	Y1032951	45DB120V50PTS2	X	X	X		56	65	190	15	62	1,6
		63	M1018313	45DB120V63PTS2	X	X	X		65	80	260	11,9	58	2,1
		63	A1000270	45DB120V63PTD	X	X		X	65	63	220	12	62	2,1
		80	N1018314	45DB120V80PTS2	X	X	X		65	80	280	9,6	82	2,1
		80	B1000271	45DB120V80PTD	X	X		X	65	63	345	8,7	85	2,1
		100	P1018315	45DB120V100PTS2	X	X	X		78	80	350	7,5	105	2,3
		100	C1000272	45DB120V100PTD	X	X		X	65	63	500	8,1	152	2,1
		125	Q1018316	45DB120V125PTS2	X	X	X		88	80	440	5,3	110	2,5
		125	D1000273	45DB120V125PTD	X	X		X	88	63	480	4,5	117	3,7
		160	E1000274	45DB120V160PTD	X	X		X	88	63	610	4	175	3,7
6 / 12	442	6,3	F1006094	45DB120V6,3P-3	X		X		63	31,5	31,5	244	11	2,9
		10	G1006095	45DB120V10P-3	X		X		63	31,5	45	133	15	2,9
		16	H1006096	45DB120V16P-3	X		X		63	31,5	64	73,9	21,8	2,9
		25	J1006097	45DB120V25P-3	X		X		63	31,5	100	45,9	35	2,9
		32	P1007183	45DB120V32PTA	X		X		63	31,5	126	34,4	43	2,9
		40	Q1007184	45DB120V40PTA	X		X		63	31,5	160	27	57	2,9
		50	X1007213	45DB120V50PTA	X		X		63	31,5	200	18,9	63	2,9
		63	Y1007214	45DB120V63PTA	X		X		63	31,5	252	14,2	78	2,9
		80	A1007216	45DB120V80PTA	X		X		88	31,5	320	9,4	83	5,2
		100	R1018317	45DB120V100PTS3	X	X	X		78	80	350	7,5	95	3,3
		125	S1018318	45DB120V125PTS3	X	X	X		78	80	440	5,4	105	3,3
		160	V1018320	45DB120V160PTS3	X	X	X		78	80	600	4,1	145	3,3

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_1 (kA)	I_2 (A)	R (mΩ)	P (W) @ In	Weight (kg)
		6,3	V1005900	45DB175V6,3PT-2	X		X		63	25	32	331	15,1	1,9
		10	W1005901	45DB175V10PT-2	X		X		63	25	45	181	22	1,9
		16	V1005279	45DB175V16PT-2	X		X		63	25	64	99,6	32	1,9
10 / 17,5	292	25	X1005902	45DB175V25PT-2	X		X		63	25	100	62,1	54	1,9
		32	Y1005903	45DB175V32PT-2	X		X		63	25	126	46,5	69	1,9
		40	Z1005904	45DB175V40PT-2	X		X		63	25	160	36,5	94,3	1,9
		50	A1005905	45DB175V50PT-2	X		X		88	25	200	21,4	77	3
		6,3	G1006118	45DB175V6,3PT	X			X	56	63	30	245	11	2,1
		10	H1006119	45DB175V10PT	X			X	56	63	43	180	22	2,1
		16	J1006120	45DB175V16PT	X			X	56	63	54	150	53	2,1
		20	Y1000567	45DB175V20P	X				56	63	73	102	56	2,1
		25	K1006121	45DB175V25PT	X			X	56	63	93	78	73	2,1
10 / 17,5	367	32	L1006122	45DB175V32PT	X			X	56	63	105	59	95	2,1
		40	M1006123	45DB175V40PT	X			X	56	63	125	33,8	79	2,1
		50	N1006124	45DB175V50PT	X			X	56	63	205	26	106	2,1
		63	P1006125	45DB175V63PT	X			X	56	63	280	18,4	130	2,1
		80	Q1006126	45DB175V80PT	X			X	65	63	350	15	180	2,6
		100	S1006128	45DB175V100PT	X			X	88	63	500	13	280	3,5
		50	B1005906	45DB175V50PT-3	X		X		63	31,5	200	23,2	83	2,9
		63	Z1005283	45DB175V63PT-3	X		X		63	31,5	252	17,4	104	2,9
10 / 17,5	442	80	L1005639	45DB175V80PT-3	X		X		88	31,5	320	13,7	135	5,2
		100	C1005907	45DB175V100PT-3	X		X		88	31,5	400	9,6	151	5,2
		125	D1005908	45DB175V125PT-3	X		X		88	31,5	500	8	217	5,2
10 / 17,5	537	100	H1005636	45DB175V100P-4	X				88	31,5	400	9,6	151	6
		125	A1005284	45DB175V125P-4	X				88	31,5	500	8	217	6

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

LEARN MORE
ep.mersen.com

Limitor-B back-up fuse links according to IEC 60282-1

LEARN MORE
ep.mersen.com

24kV

lead-free

Voltage (kV)	Length (mm)	Current rating	Ref. Number	Cat. Number	VDE T4	VDE T402	Thermal striker	CPD	D (mm)	I_1 (kA)	I_2 (A)	R (mΩ)	P (W) @ In	Weight (kg)
10 / 24	442	1	E1000136	45DB240V1PT	X			X	56	63	14	2100	2	2,3
		2	F1000137	45DB240V2PT	X			X	56	63	16	800	3	2,3
		4	G1000138	45DB240V4PT	X			X	56	63	23	550	10	2,3
		6,3	H1000139	45DB240V6,3PT	X			X	56	63	30	300	13	2,3
		10	J1000140	45DB240V10PT	X			X	56	63	43	220	26	2,3
		16	K1000141	45DB240V16PT	X			X	56	63	54	197	73	2,3
		20	L1000142	45DB240V20PT	X			X	56	63	73	134	76	2,3
		25	M1000143	45DB240V25PT	X			X	56	63	93	96	89	2,3
		32	N1000144	45DB240V32PT	X			X	56	63	105	79	127	2,3
		40	P1000145	45DB240V40PT	X			X	56	63	125	45	114	2,3
		50	Q1000146	45DB240V50PT	X			X	56	63	205	35	147	2,3
		63	R1000147	45DB240V63PT	X			X	56	63	280	24	170	2,3
		80	S1000148	45DB240V80PT	X			X	65	63	310	20,5	233	3,1
		100	T1000149	45DB240V100PT	X			X	78	63	430	18	300	4,1
		125	V1000150	45DB240V125PT	X			X	88	40	760	11,7	340	5,9
		160	E1000113	45DB240V160P	X				88	31,5	900	9,45	515	5,9
		200	F1000114	45DB240V200P	X				88	31,5	1050	7	700	5,9
10 / 24	442	6,3	F1000275	45DB240V6,3PTD	X	X		X	56	63	23	640	31	2,3
		10	Z1032952	45DB240V10PTS	X	X	X		56	63	36	386	48	2,3
		16	A1032953	45DB240V16PTS	X	X	X		56	63	73	127	42	2,3
		20	B1032954	45DB240V20PTS	X	X	X		56	63	91	97	53	2,3
		25	C1032955	45DB240V25PTS	X	X	X		56	63	113	73	60	2,3
		32	D1032956	45DB240V32PTS	X	X	X		56	63	125	57	84	2,3
		40	E1032957	45DB240V40PTS	X	X	X		56	63	161	41	96	2,3
		50	X1018322	45DB240V50PTS	X	X	X		65	63	230	27,4	82	3,1
		50	N1000282	45DB240V50PTD	X	X		X	65	63	230	35	146	3,1
		63	Y1018323	45DB240V63PTS	X	X	X		78	63	250	21,6	102	3,3
		63	P1000283	45DB240V63PTD	X	X		X	65	63	350	24	163	3,1
		80	Z1018324	45DB240V80PTS	X	X	X		78	63	280	17,3	153	3,3
		80	Q1000284	45DB240V80PTD	X	X		X	65	63	460	19	196	3,1
		100	A1018325	45DB240V100PTS	X	X	X		88	63	350	13,6	200	4,1
		100	R1000285	45DB240V100PTD	X	X		X	78	63	420	14	279	4,1
		125	B1018326	45DB240V125PTS	X	X	X		88	63	440	10,1	254	4,1
10 / 24	537	80	B1008551	45DB240V80P-4	X				88	25	360	17,5	185	6
		100	C1008552	45DB240V100P-4	X				88	25	450	13,1	234	6

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

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_1 (kA)	I_2 (A)	R (mΩ)	P (W) @ In	Weight (kg)
20 / 36	537	2	G1000115	45DB360V2P	X				56	31,5	15	755	9	2,7
	537	4	H1000116	45DB360V4P	X				56	31,5	20	755	32	2,7
	537	6,3	S1000286	45DB360V6,3PTD	X	X		X	56	31.5	23	889	39	2,7
	537	10	F1032958	45DB360V10PTS	X	X	X		56	31,5	34	529	66	2,7
	537	16	G1032959	45DB360V16PTS	X	X	X		56	31,5	66	190	67	2,7
	537	20	H1032960	45DB360V20PTS	X	X	X		56	31,5	95	153	84	2,7
20 / 36	537	25	J1032961	45DB360V25PTS	X	X	X		56	31,5	110	118	100	2,7
	537	32	K1032962	45DB360V32PTS	X	X	X		65	20	135	82	119	3,7
	537	40	L1032963	45DB360V40PTS	X	X	X		65	20	200	63	176	3,7
	537	50	M1032964	45DB360V50PTS	X	X	X		88	20	220	40	183	6,5
	537	63	C1018327	45DB360V63PTS	X	X	X		88	36	260	31,9	165	6,5
	537	80	F1018330	45DB360V80PTS	X	X	X		88	36	350	24,2	230	6,5

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

LEARN MORE
ep.mersen.com

Limitor®-G General Purpose fuse-links according to IEC 60282-1

LEARN MORE
ep.mersen.com

Selection table

Rated voltage range of fuse-link [kV] Service voltage of transformer [kV]	Mode of protection Rated current of fuse-link [A]	Transformer output [kVA]											
		rel. short-circuit voltage U_K = 4%										U_K = 5%	
		50	100	125	160	200	250	315	400	500	630	800	1000
6/12	Transformer rated current [A]	2,9	5,8	7,2	9,2	11,5	14,4	18,2	23,1	28,9	36,4	46,2	57,7
10	Rated current of fuse-link [A]	6,3	6,3-10	10	16	16	16-25	25	25-40	40	40-50	50	50
10/24	Transformer rated current [A]	1,5	2,9	3,6	4,6	5,8	7,2	9,1	11,5	14,4	18,2	23,1	28,9
20	Rated current of fuse-link [A]	-	4	4-6,3	6,3	6,3-10	10	16	16	16	25	25	25

Table 5



Catalog Number	Reference Number	Range	Un (kV)	In (A)	L (mm)	D (mm)	I_1 (kA)	R (mΩ)	P (W) @ In	I^2t (kA^2s)	Weight (kg)
45DG120V6,3P	W1000151	General Purpose, striker	6/12	6,3	292	65	40	128	6	2	2,3
45DG120V10P	X1000152	General Purpose, striker	6/12	10	292	65	40	70	8	3,8	2,3
45DG120V16P	Y1000153	General Purpose, striker	6/12	16	292	65	40	35	10	14	2,3
45DG120V25P	Z1000154	General Purpose, striker	6/12	25	292	65	40	20,5	15	36	2,3
45DG120V40P	A1000155	General Purpose, striker	6/12	40	292	78	40	12,2	24	110	3,1
45DG120V50P	B1000156	General Purpose, striker	6/12	50	292	88	40	9,9	31	150	3,7
45DG240V4P	C1000157	General Purpose, striker	10/24	4	442	78	40	280	5	1,8	4,1
45DG240V6,3P	D1000158	General Purpose, striker	10/24	6,3	442	78	40	256	11	2	4,1
45DG240V10P	E1000159	General Purpose, striker	10/24	10	442	78	40	135	15	3,6	4,1
45DG240V16P	F1000160	General Purpose, striker	10/24	16	442	78	40	70,3	21	14	4,1
45DG240V25P	G1000161	General Purpose, striker	10/24	25	442	88	40	41,2	31	39	4,5

Pb lead-free

Time-current characterictics

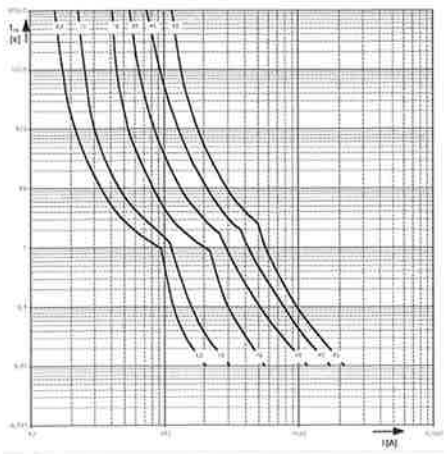


Fig. 13
6/12 kV

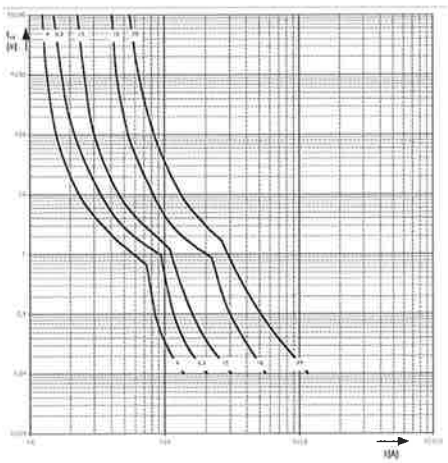


Fig.14
10/24 kV

Limitor® fuse-links accessories

Clips

Size	Reference Number	Catalog Number	Packaging
MR 45 + spring	L096472	MR45R	1
MR 45 without connection lug	S210236	MR55R	2

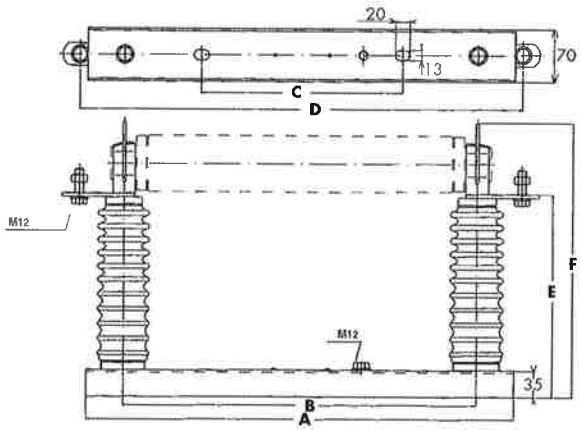


Bases

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 in mm



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

LEARN MORE
ep.mersen.com

Indicating devices

LEARN MORE
ep.mersen.com

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.

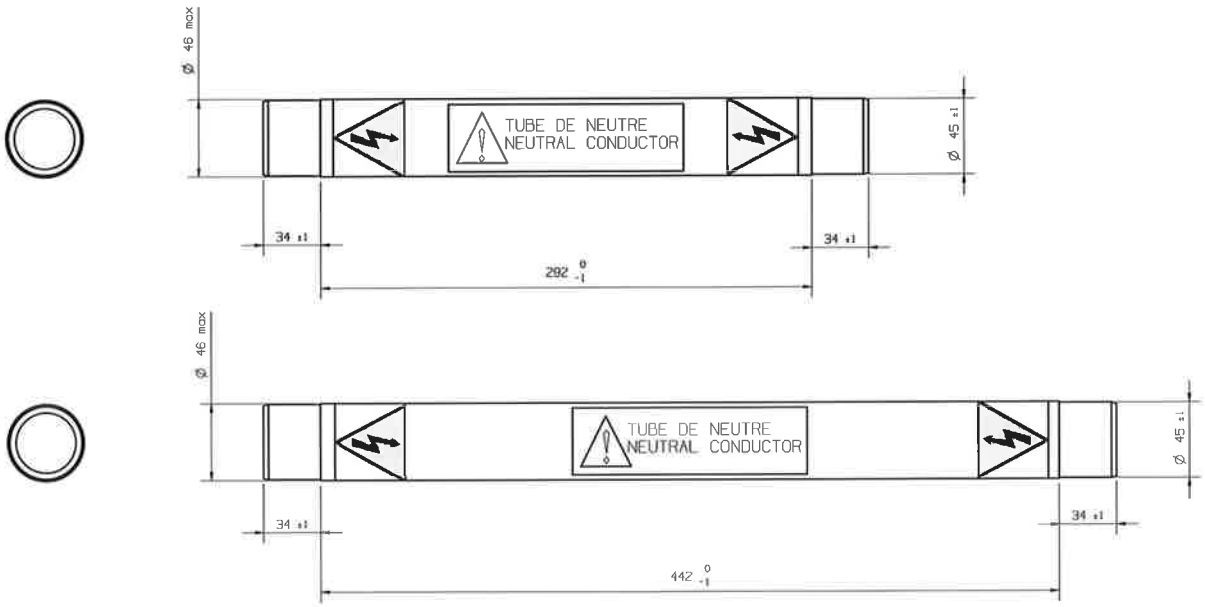
Voltage (kV)	Number of contacts	Length of flexible part (mm)	L (mm)	Reference Number	Catalog Number	Packaging
12/36	1 NO/NF	550	710	E092855A	MC1-5NFLEXQS500	1
12/36	2 NO/NF	550	710	F092856A	MC1-9NFLEXQS500	1



Neutral conductors

Lenght (mm)	Reference Number	Catalog Number	Packaging
292	J1006419	45DB292NEUTRAL	1
442	L1006421	45DB442NEUTRAL	1

Dimensions in mm

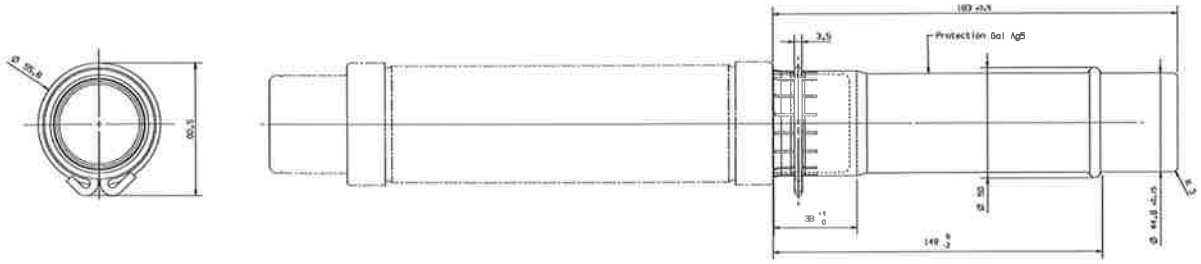


External adaptor 292/442mm



Reference Number	Catalog Number	Packaging
H1026244	ADAPTOR292/442	1

Dimensions in mm



Standards

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 object 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 the IEC 60787 standard.

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 disspation*
*** Very low power dissipation*

LEARN MORE
ep.mersen.com

Terms and definitions

LEARN MORE
ep.meraen.com

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

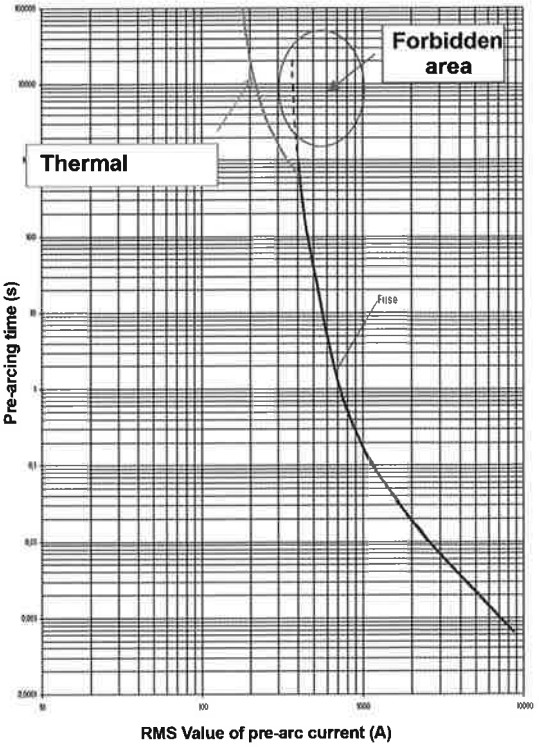
Minimum breaking current I_3

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.



MERSEN
Expertise, our source of energy

A WORLD LEADER
in safety & reliability
for electrical power

A GLOBAL PLAYER

Global expert in materials and equipment for extreme environments and in the safety and reliability of electrical equipment.

Mersen designs innovative solutions to address its clients' specific needs to enable them to optimize their manufacturing process in sectors such as Energy, Transportation, Electronics, Chemical, Pharmaceutical and Process Industries.

MERSEN France SB S.A.S.
Rue Jacques de Vaucanson
F-69720 Saint-Bonnet-de-Mure
Tel : + 33 4 72 22 66 11
www.mersen.com

MERSEN Shanghai Co. Ltd.
No.55-A6. Shu Shan Road,
Songjiang 201611 Shanghai
Tel: +8621 67602388
www.mersen.com

MERSEN USA Newburyport-MA L.L.C.
374 Merrimac Street
Newburyport, MA 01950
Phone: 978-462-6662
www.mersen.com

www.mersen.com

BR-HVIEC-02-0713