

EPCOS Product Brief 2016

Surge Arresters

For AC Power Line Protection

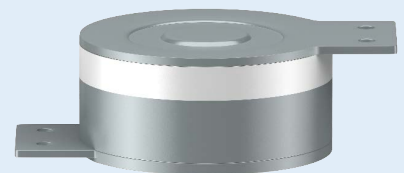
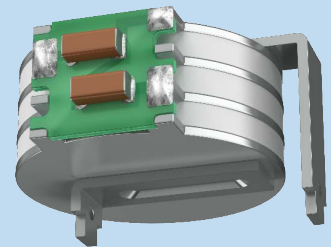
TDK has developed a new line of EPCOS surge arresters that are designed especially for AC power line applications based on the IEC lightning protection zone concept. The new arresters meet the requirements for class I, II, and III protection with current capabilities of up to 100 kA for L-N as well as N-PE applications.

Applications

- Surge protection devices
- Power supply units
- Green energy installations, such as photovoltaic and wind energy
- Equipotential bonding in telecommunications, railway and pipeline installations

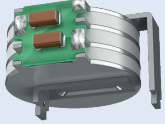

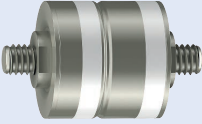
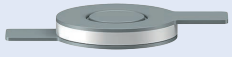
Features

- I_{imp} up to 100 kA
- I_n up to 100 kA
- UL 1449 approved
- Withstand capability acc. to IEC 61643-11
- Customer-specific terminals
- RoHS-compatible



Surge Arresters for L-N and N-PE Application







Class I & II surge protection							
LN30B-...	H38M-...	D38T28M-...	D3E14M-...	D3B-...			
							
Type Ordering code	LN30B-A1800AC-3C B88069X3643B201	H38M-A800XP1 B88069X3993B201	D38T28M-A1000P1-2 upon request	D3E14M-A800XP1 upon request	D3B-A700XP B88069X2513B401		
Approx. size w/o terminals	31 x 37 x 12	Ø 30 x 28	Ø 30 x 26	Ø 30 x 14	Ø 30 x 4		
Class	I & II	I	I	I	I & II		
Application for	L-N	N-PE	N-PE	N-PE	N-PE		
Nom. DC spark-over voltage V_{sdCN}	1800	800	1000	800	700		V
DC spark-over voltage	> 600	> 600	> 800	> 600	> 550		V
Front of wave spark-over voltage @ 1.2/50 μ s, 6 kV U_p	< 2500	< 1500	< 2200	< 1500	< 1500		V
Class I							
Max. continuous operating voltage @ 50/60 Hz U_c	275	255	440	264	264		V
Nominal discharge current 8/20 μ s I_n	25	100	100	100	30		kA
Impulse current 10/350 μ s I_{imp}	25	100	100	100	25		kA
Follow current @ 50/60 Hz I_f	6000	100	100	100	100		A
Class II							
Max. continuous operating voltage @ 50/60 Hz U_c	275	-	-	-	264		V
Nominal discharge current 8/20 μ s I_n	25	-	-	-	30		kA
Max. discharge current 8/20 μ s I_{max}	40	-	-	-	40		kA
Follow current @ 50/60 Hz I_f	6000	-	-	-	100		A
AC discharge current (TOV at 1200 V, connected N-PE) 1 operation 50 Hz, 0.2 s	-	300	300	300	300		A
Max. temporary over voltage (max. 5 s) for L-N	440	-	-	-	-		V
Insulation resistance	> 10	> 1	> 1	> 1	> 1		G Ω

Arresters are designed in accordance with IEC 61643-11.

Surge Arresters for N-PE Application




Class II & III surge protection						
A81-...	M51-...		V13-...	V84-...		
						
Type Ordering code	A81-A700XP2 B88069X1623		M51-A800XP B88069X4781	V13-A800XP2 B88069X9821	V84-A1200XP2-2 upon request	
Approx. size w/o terminals	Ø 8 x 6		Ø 5 x 5	Ø 12 x 17	Ø 12 x 16	
Class	II & III		II & III	II	II	
Application for	N-PE		N-PE	N-PE	N-PE	
Nom. DC spark-over voltage V_{sdn}	700		800	800	1200	V
DC spark-over voltage	> 550		> 600	> 600	> 900	V
Front of wave spark-over voltage U_p @ 1.2/50 μ s, 6 kV	< 1500		< 1500	< 1500	< 2500	V
Class II						
Max. continuous operating voltage @ 50/60 Hz U_c	255	255	255	440	V	
Nominal discharge current 8/20 μs I_n	10	3	20	20	kA	
Maximum discharge current 8/20 μs I_{max}	20	3	40	40	kA	
Follow current @ 50/60 Hz I_f	100	5	100	100	A	
AC discharge current (TOV at 1200 V, connected N-PE) 1 operation 50 Hz, 0.2 s	–	–	300	300	A	
Insulation resistance	> 1	> 1	> 1	> 1	G Ω	
Class III						
Max. continuous operating voltage @ 50/60 Hz U_c	255	255	–	–	V	
Limiting voltage at combination wave generator, 1.2/50 μs, 6 kV; 8/20 μs, 3 kA U_p	< 1500	< 1500	–	–	V	

Arresters are designed in accordance with IEC 61643-11.

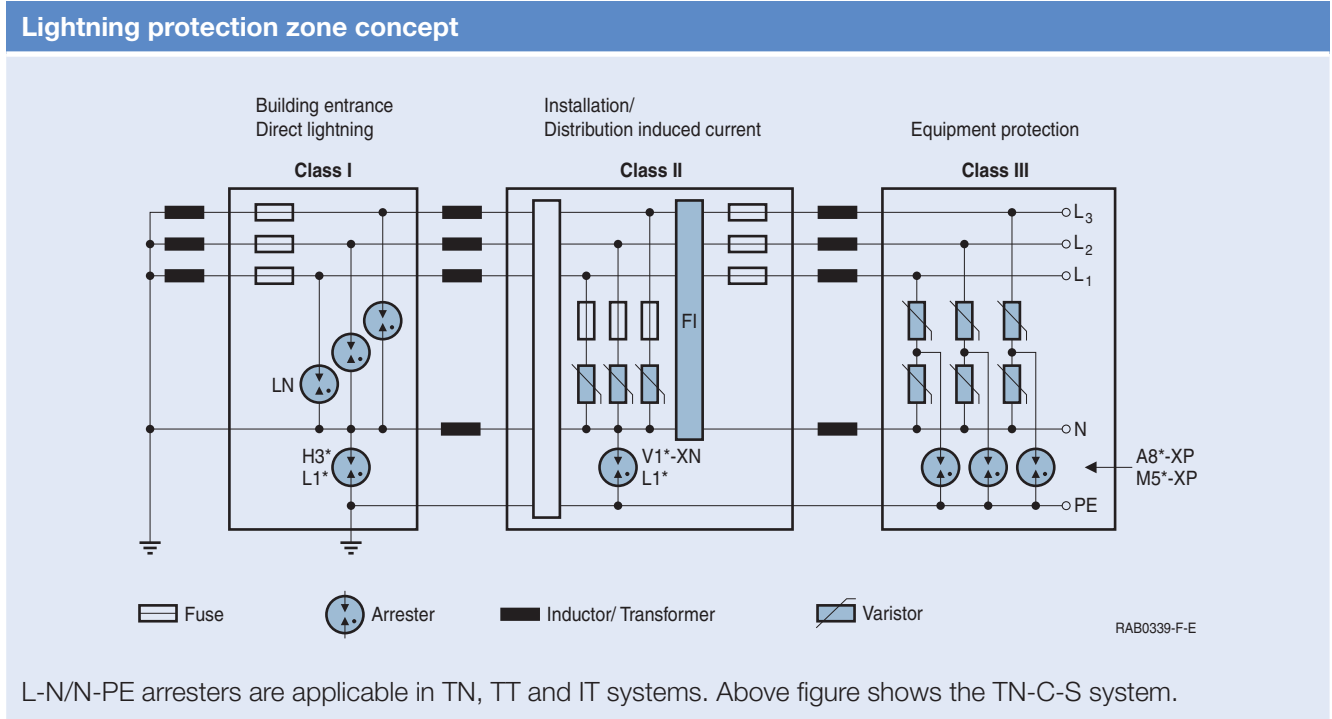
Surge Arresters for N-PE Applications with Varistors in Series



Class I, II & III surge protection						
V87A-...	A80-...		L18A-...	V13M-...		
						
Type Ordering code	V87A-A300XSPD B88069X2453B251		A80-A900XPD B88069X2523C103	L18A-A3000XPD B88069X9471B122	V13M-H40XPD B88069X3313B251	
Approx. size w/o terminals	Ø 12 x 13		Ø 8 x 6	Ø 30 x 13		Ø 12 x 17
Class	I, II & III (with varistor in series)		II (with varistor in series)	I & II (with varistor in series)		II (with varistor in series)
Application for	N-PE		N-PE	N-PE		N-PE
Nom. DC spark-over voltage V_{sdCN}	300		900	3000		4000
DC spark-over voltage	225 ... 375		> 700	2700 ... 3900		> 3200
Front of wave spark-over voltage U_p @ 1.2/50 μ s, 6 kV	< 900		< 1700	< 4500		< 5500
Class I						
Max. continuous operating voltage @ 50/60 Hz U_c	110		–	1000		–
Nominal discharge current 8/20 μ s I_n	20		–	50		–
Impulse current 10/350 μ s I_{imp}	12.5		–	35		–
Class II						
Max. continuous operating voltage @ 50/60 Hz U_c	110		255	1000		440
Nominal discharge current 8/20 μ s I_n	20		10	50		15
Maximum discharge current 8/20 μ s I_{max}	40		20	100		30
Insulation resistance	> 1		> 1	> 1		> 1
Class III						
Max. continuous operating voltage @ 50/60 Hz U_c	110		–	–		–
Limiting voltage at combination wave generator , 1.2/50 μ s, 6 kV; 8/20 μ s, 3 kA U_p	< 650		–	–		–

Arresters are designed in accordance with IEC 61643-11.

Applications of Surge Arresters



Class I

Surge arrester protects against direct lightning strike. Direct lightning strike is defined as current impulse I_{imp} with waveform 10/350 μ s. Withstand capability acc. to IEC 61643-11 standard (up to 100 kA).

Class II

Surge arrester protects against induced surge current. Induced surge current is defined as current impulse I_n and I_{max} with waveform of shorter duration than I_{imp} , 8/20 μ s. Withstand capability acc. to IEC 61643-11 standard.

Class III

Surge arrester protects against induced voltage spikes and induced surge currents with 8/20 μ s waveform and lower surge currents (few kA). Withstand capability acc. to IEC 61643-11 standard.

Symbols and Terms

Description of EPCOS specific terms		
P	(M51-A800XP)	Surge arrester for class I & II, class II & III or class I, II & III applications. Surge withstand capability for I_{imp} , I_n and I_{max} impulses.
P1	(H38M-A800XP1)	Surge arrester for class I application. Surge withstand capability for I_{imp} and I_n impulses.
P2	(V13-A800XP2)	Surge arrester for class II or class II & III applications. Surge withstand capability for I_n and I_{max} impulses.
PD	(A80-A900XPD)	Surge arrester as device with other downstream current limiting components, e.g. varistor in series.

Definitions of key parameters		
L-N		Surge current will be diverted by arrester between L-phase and N-neutral.
L-PE		Surge current will be diverted by arrester between L-phase and PE-ground.
N-PE		Surge current will be diverted by arrester between N-neutral and PE-ground.
U_{cov}	V	Maximum continuous operating voltage Voltage that can be applied continuously to the surge arrester.
U_p	V	Voltage protection level Maximum voltage at the surge arrester terminals with an impulse with defined voltage steepness. Impulse waveform of 1.2/50 μ s at 6 kV with a steepness of 5 kV/ μ s acc. to IEC 61643-11.
DC spark-over voltage	V	Spark-over voltage Voltage at the surge arrester terminals due to an voltage impulse with low rate of rise, around 100 V/s.
Breakdown time	ns	Reaction time of surge arrester Time to switch from high ohmic state to protection mode. In protection mode the arrester is in a low ohmic conducting state, equipment will be protected.
I_n	kA	Nominal discharge current Current through the surge arrester with a waveform 8/20 μ s for class I and II.
I_{imp}	kA	Impulse discharge current Current through the surge arrester with a waveform 10/350 μ s for class I.
I_f	A	Follow current Current supplied by the electrical power system and flowing through the surge arrester after an I_n – discharge current impulse.
I_{max}	kA	Maximum discharge current Peak value of a current through the surge arrester that has an 8/20 waveform.
TOV		Temporary overvoltage Alternating current through surge arrester caused by faults in the power voltage system. For example: 300 A at 1200 V for a duration of 200 ms.

Structure of ordering codes: The ordering code for one and the same product can be represented differently in data sheets, data books, other publications and the website of EPCOS, or in order-related documents such as shipping notes, order confirmations and product labels. **The varying representations of the ordering codes are due to different processes employed and do not affect the specifications of the respective products.** Detailed information can be found on the Internet under www.epcos.com/orderingcodes.

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