EPCOS Product Brief 2016

Surge Arresters

For AC Power Line Protection

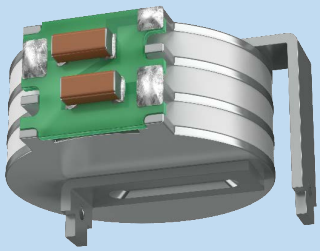
TDK has developed a new line of EPCOS surge arresters that are designed especially for AC power line applications based on the IEC lightning protection zone concept. The new arresters meet the requirements for class I, II, and III protection with current capabilities of up to 100 kA for L-N as well as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

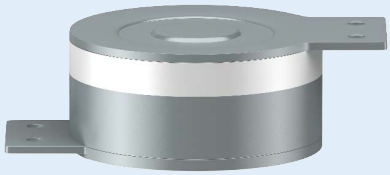
Applications

- 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





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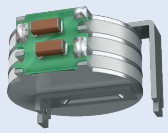
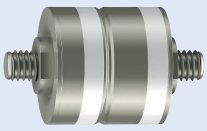
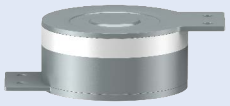
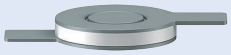
Surge Arresters for L-N and N-PE Application

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 × 37 × 12**	**Ø 30 × 28**	**Ø 30 × 26**	**Ø 30 × 14**	**Ø 30 × 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 µs, 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 µs	I_n	25	100	100	100	30	kA
Impulse current 10/350 µs	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 µs	I_n	25	–	–	–	30	kA
Max. discharge current 8/20 µs	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	GΩ

Arresters are designed in accordance with IEC 61643-11.

For further information please contact our sales office.

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 × 6**	**Ø 5 × 5**	**Ø 12 × 17**	**Ø 12 × 16**	
Class		II & III	II & III	II	II	
Application for		N-PE	N-PE	N-PE	N-PE	
Nom. DC spark-over voltage	V_{sdcN}	700	800	800	1200	V
DC spark-over voltage		> 550	> 600	> 600	> 900	V
Front of wave spark-over voltage @ 1.2/50 µs, 6 kV	U_p	< 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	GΩ
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

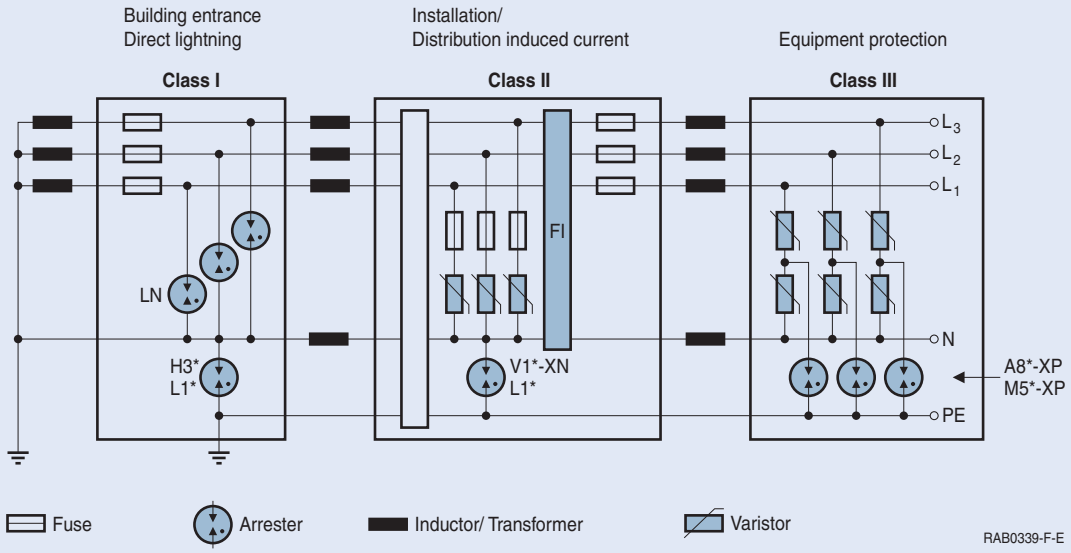
V87A-…	A80-…	L18A-…	V13M-…
			

Type Ordering code		**V87A-A300XSPD** B88069X2453B251	**A80-A900XPD** B88069X2523C103	**L18A-A3000XPD** B88069X9471B122	**V13M-H40XPD** B88069X3313B251	
Approx. size w/o terminals		**Ø 12 × 13**	**Ø 8 × 6**	**Ø 30 × 13**	**Ø 12 × 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	V
DC spark-over voltage		225 … 375	> 700	2700 … 3900	> 3200	V
Front of wave spark-over voltage @ 1.2/50 µs, 6 kV	U_p	< 900	< 1700	< 4500	< 5500	V
Class I						
Max. continuous operating voltage @ 50/60 Hz	U_c	110	–	1000	–	V
Nominal discharge current 8/20 µs	I_n	20	–	50	–	kA
Impulse current 10/350 µs	I_{imp}	12.5	–	35	–	kA
Class II						
Max. continuous operating voltage @ 50/60 Hz	U_c	110	255	1000	440	V
Nominal discharge current 8/20 µs	I_n	20	10	50	15	kA
Maximum discharge current 8/20 µs	I_{max}	40	20	100	30	kA
Insulation resistance		> 1	> 1	> 1	> 1	GΩ
Class III						
Max. continuous operating voltage @ 50/60 Hz	U_c	110	–	–	–	V
Limiting voltage at combination wave generator, 1.2/50 µs, 6 kV; 8/20 µs, 3 kA	U_p	< 650	–	–	–	V

Arresters are designed in accordance with IEC 61643-11.

Applications of Surge Arresters

Lightning protection zone concept



L-N/N-PE arresters are applicable in TN, TT and IT systems. Above figure shows the TN-C-S system.

Class I

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

Class III

Surge arrester protects against induced voltage spikes and induced surge currents with 8/20 µs 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-A800X**P**)	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-A800X**P1**)	Surge arrester for class I application. Surge withstand capability for I_{imp} and I_n impulses.
P2 (V13-A800X**P2**)	Surge arrester for class II or class II & III applications. Surge withstand capability for I_n and I_{max} impulses.
PD (A80-A900X**PD**)	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 µs at 6 kV with a steepness of 5 kV/µs 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 µs for class I and II.
I_{imp}	kA	**Impulse discharge current** Current through the surge arrester with a waveform 10/350 µs 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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