

LOW VOLTAGE SURGE ARRESTERS FOR OVERHEAD POWER LINES

1st EDITION



1. BOP-R TYPE, A-CLASS LV SURGE ARRESTERS

(equipped with disconnecting device and discharge indicator)

Protection of overhead low voltage AC power lines and equipment against effects of lightning and switching overvoltage.

Structure:

The surge arrester consists of the metal oxide (ZnO) varistor encapsulated in plastic housing. The device is equipped with thermal disconnecter, which also operates as a discharge indicator. Connection with the line is maintained by galvanized M8 screw. Connection with the ground is maintained by low profile screw terminal or insulated copper cable.

Advantages:

- Wide range of mounting options enable, depending on the applied accessories, to mount these surge arresters to bare or cable line up to 120 mm² cross section.
 - These surge arresters are easily adaptable for insulated conductor power lines, with no need to change the device design.
 - Easy to locate discharge indicator.
- The disconnecter action allows normal working conditions for the network system even after discharge.

Operating conditions:

Ambient temperature range from -40 to +80°C.
Operating altitude: up to 2000 m above sea level.
Weatherproof, corrosion resistant construction (dampproof, ozone and UV resistant)

Compliance with standards.

The type tests of the BOP-R surge arresters have been carried out in The Electrotechnical Institute in Warsaw (Poland). The surge arresters meet the requirements of the following standards and regulations: PN-EN 61643-11:2013-06 and directives of the Polish Association for Transmission and Distribution of Electric Energy (PTPiREE) defined in the publication "Protection of power networks against surges" Poznań 2005.

Characteristics:

Maximum system voltage application: 1000 V
Rated frequency: 48 – 60 Hz
High current impulse withstand at 4/10 µs:
– for I_n 5 kA - 50 kA
– for I_n 10 kA - 100 kA

Surge arrester type	KTM Code	Uc Continuous operating voltage, RMS value	Up Voltage protection level at I_n (8/20 µs surge)	Imax Maximal discharge current at 8/20 µs surge	In Rated discharge current at 8/20 µs surge	Energy absorption capability kJ/kV Uc
BOP-R 0,28/5	1115-003-000-000	280 V	< 1000 V	40 kA	5 kA	3,9
BOP-R 0,44/5	1115-007-000-000	440 V	< 1500 V			3,4
BOP-R 0,5/5	1115-011-000-000	500 V	< 1730 V	35 kA	5 kA	3
BOP-R 0,66/5	1115-015-000-000	660 V	< 2465 V			
BOP-R 0,28/10	1115-004-000-000	280 V	1100 V	40 kA	10 kA	3
BOP-R 0,44/10	1115-008-000-000	440 V	1550 V			
BOP-R 0,5/10	1115-012-000-000	500 V	1680 V	40 kA	10 kA	3



BOP-R with opened damage indicator



BOP-R, (b;p) version



BOP-R, (b;z) version



SE 45 version



SE 46 version



SE 30 version

1.1. UPPER SIDE ACCESSORIES

FOR BARE LINES



Type "b" terminal

FOR INSULATED LINES



Type "fr" accessory, rigid extension arm for mounting the surge arrester on the transformer



Type "f" accessory for insulation piercing terminals



UM/BOP/TOGA extension arm



SE 45 insulation piercing terminal



SL 9.22 insulation piercing terminal



SE 46 insulation piercing terminal

1.2. BOTTOM SIDE ACCESSORIES (GROUNDING)



Type "z" terminal



Type "p" accessory

Ordering example:
BOP-R 0,28/5(b;z)

BOP-R	0,28	5	(b)	z)
<u>Rated continuous operating voltage:</u>				
0,28 – 0,28 kV				
0,44 – 0,44 kV				
0,5 – 0,5 kV				
0,66 – 0,66 kV				
<u>Rated discharge current:</u>				
5 – 5 kA				
10 – 10 kA				
<u>Upper side accessories:</u>				
b - terminal for bare conductors 6 - 120 mm ²				
f – insulated terminal ASXSn 1x25				
fr - insulated rigid extension arm of WOP type				
UM/BOP/TOGA - insulated rigid extension arm of UM/BOP/TOGA... type				
<u>Bottom side accessories:</u>				
p 6/100 + k – ground terminal cable LGY 1x16 conductor of 1000 mm length, with a lug				
p 16/xx + k – ground terminal cable LGY 1x16 conductor of xx (500 or 1000 mm) length, with a lug				
Z – terminal for bare ground wire 6 – 120 mm ²				

Table of the BK catalogue numbers of surge arresters.

Type of accessories: Line side accessory; grounding side accessory	Electrical parameters of surge arresters							
	0,28/5	0,44/5	0,5/5	0,66/5	0,28/10	0,44/10	0,5/10	0,66/10
s;z	BK 2400/2	BK 2401/2	BK 2402/2	BK 2403/2	BK 2404/2	BK 2405/2	BK 2406/2	BK 2407/2
s;p	BK 2400/14	BK 2401/14	BK 2402/14	BK 2403/14	BK 2404/14	BK 2405/14	BK 2406/14	BK 2407/14
b;z	BK 2400/1	BK 2401/1	BK 2402/1	BK 2403/1	BK 2404/1	BK 2405/1	BK 2406/1	BK 2407/1
b;p	BK 2400/15	BK 2401/15	BK 2402/15	BK 2403/15	BK 2404/15	BK 2405/15	BK 2406/15	BK 2407/15
f;z	BK 2400/4	BK 2401/4	BK 2402/4	BK 2403/4	BK 2404/4	BK 2405/4	BK 2406/4	BK 2407/4
f;p	BK 2400/16	BK 2401/16	BK 2402/16	BK 2403/16	BK 2404/16	BK 2405/16	BK 2406/16	BK 2407/16
fr;z	BK 2400/5	BK 2401/5	BK 2402/5	BK 2403/5	BK 2404/5	BK 2405/5	BK 2406/5	BK 2407/5
fr;p	BK 2400/17	BK 2401/17	BK 2402/17	BK 2403/17	BK 2404/17	BK 2405/17	BK 2406/17	BK 2407/17



SE 45 insulation piercing terminal

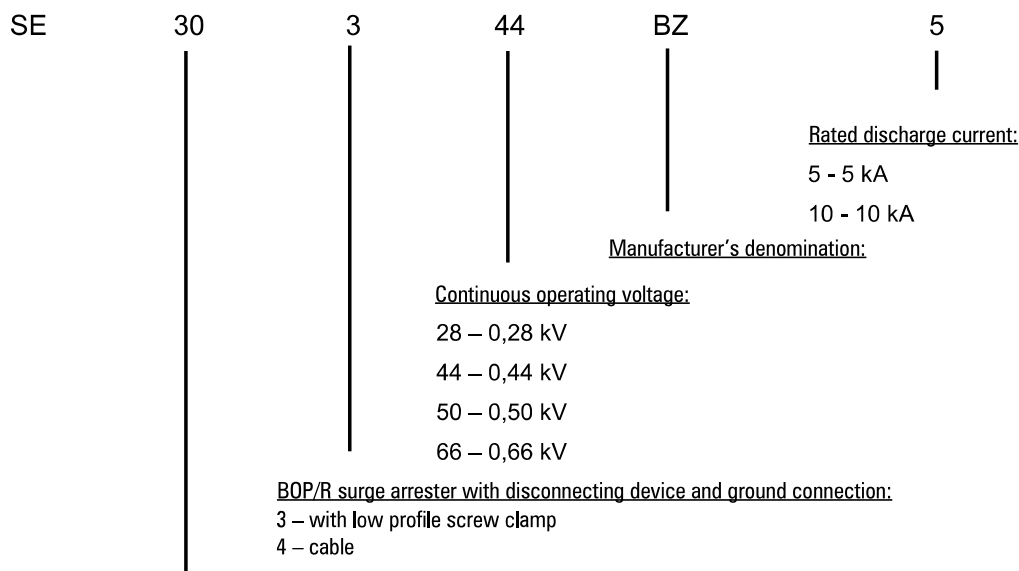


SL 9.22 insulation piercing terminal



SE 46 insulation piercing terminal

Ordering example:
SE 30.3 44 BZ - 5



Type of terminal:
30 – ENSTO type SL 9.22 two way connector for surge arresters, that pierces insulation from one side
45 - ENSTO type SE 45.1 one way connector for surge arresters, that pierces insulation from one side
46 - ENSTO type SE 46.1 two way connector for surge arresters, that pierces insulation from two sides

Table of the BK catalogue numbers for surge arresters.

		Electrical parameters of surge arresters							
Type of accessories: Upper side accessory; bottom side accessory		0,28/5	0,44/5	0,5/5	0,66/5	0,28/10	0,44/10	0,5/10	0,66/10
	SE30;3	BK 2400/7	BK 2401/7	BK 2402/7	BK 2403/7	BK 2404/7	BK 2405/7	BK 2406/7	BK 2407/7
	SE30;4	BK 2400/12	BK 2401/12	BK 2402/12	BK 2403/12	BK 2404/12	BK 2405/12	BK 2406/12	BK 2407/12
	SE45;3	BK 2400/8	BK 2401/8	BK 2402/8	BK 2403/8	BK 2404/8	BK 2405/8	BK 2406/8	BK 2407/8
	SE45;4	BK 2400/13	BK 2401/13	BK 2402/13	BK 2403/13	BK 2404/13	BK 2405/13	BK 2406/13	BK 2407/13
	SE46;3	BK 2400/9	BK 2401/9	BK 2402/9	BK 2403/9	BK 2404/9	BK 2405/9	BK 2406/9	BK 2407/9
	SE46;4	BK 2400/11	BK 2401/11	BK 2402/11	BK 2403/11	BK 2404/11	BK 2405/11	BK 2406/11	BK 2407/11

2. A-CLASS LV SURGE ARRESTERS COMBINED WITH INSULATION PIERCING TERMINAL FOR INSULATED POWER LINES



IOZ type surge arrester

Ordering example:

IOZ	b	0,5	/	5
Surge arrester combined with insulation piercing terminal	b – sparkless version	Continuous operating voltage Vc:		Rated discharge current In:
		0,5 - 500V 0,66 - 660V		5 - 5kA 5 - 5kA

Structure:

The IOZb type: the surge arrester consists of the metal oxide (ZnO) varistor encapsulated in the same as IOZi type arresters housing made of self-extinguishing, resistant to environmental conditions, ozone and UV resistant plastic. The device is equipped with insulation piercing terminal integrated with the housing.

Applications:

Protection of AC power system equipment of rated frequency 48-60 Hz against effects of lightning and switching overvoltage in overhead power lines based on insulated conductors of 25 – 125 mm² cross sectional area

Compliance with standards:

*IOZb - PN-EN 60099-4: 2005(U);
IEC 60099-4 Ed 2.0 2004*

Catalogue reference No.	Typ ogranicznika	KTM code	Structure:	Continuous operating voltage	Rated discharge current 8/20 μs	Rated discharge current 4/10 μs	Energy absorption capability
BK 2500	IOZb 0,5/5	IOZb 0,5/5	Sparkless version	IOZb 0,5/5	5kA	50kA	1,5 kJ
BK2501	IOZb 0,66/5	IOZb 0,66/5	Sparkless version	IOZb 0,66/5	5kA	50kA	1,5 kJ

3. CONNECTION EXAMPLES OF LV SURGE ARRESTERS FITTED ON A DISTRIBUTION TRANSFORMER



BOP-R surge arrester mounted on the transformer, using UM/BOP/TOGA extension arm.



BOP-R surge arrester mounted on the transformer, using "fr" extension arm.

