

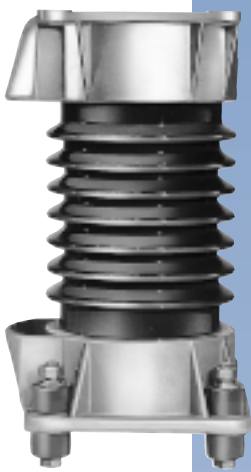
## 3EE2 Special-Purpose Surge Arresters for the Protection of Motors, Generators and Furnace Transformers

Rated voltage 5.6 to 52 kV for ZnO types

- Low protection level
- Very high energy absorption capacity
- Very high short-circuit current strength
- Strong, self-supporting construction



# 3EE2 Special-Purpose Surge Arresters for the Protection of Motors, Generators and Furnace Transformers



## ■ Application

Protection against switching impulse voltages and surges of atmospheric origin for sensitive equipment such as rotating machinery (and other types of equipment having windings in air) can be provided by special types of arrester whose key features are a low protection level and fine grading of the rated voltages. For protecting generators there are versions available with a short-circuit current strength of up to 300 kA. The arresters can be used in AC system with frequencies of between 48 and 62 Hz and either outdoors or indoors at altitudes of up to 1000 m above sea level.

The governing factor for the protection against switching surges is the residual voltage from a surge current of 0.5 kA, waveform 30/60. This value of residual voltage is the level of protection to which the switching surges are limited. If the infeed is coming from overhead power lines, surge arresters (3EG or 3EK) must also be installed at the point of entry of the overhead lines into the system. This will eliminate the residual voltages that arise from higher discharge current values.

## ■ Construction

Type 3EE2 surge arresters are constructed from suitable modified components taken from the type 3EP high-voltage surge arresters.

The 3EE2 are of the metal-oxide type with no series gap.

## ■ Installation

The arresters are normally mounted vertically with the high-voltage connection at the top, although suspended installation can also be employed, if necessary. The latter must be stated in the order. Horizontal mounting may also be employed, if required.

The 6-arrester circuit is a special case, one of whose uses is for the protection of furnace transformers. Three of the arresters are connected in star (line-to-earth) and three in delta (line-to-line). If this arrangement is going to be used it must be stated in the order. Machine-type surge arresters with a high short-circuit current strength provide protection for generators in power stations.

The arresters can be supplied tested with short-circuit current strength from 50 to 300 kA<sub>rms</sub>. Any additional enclosure that might be needed on the plant side is not included with the arresters.

## ■ Monitoring

The surge arresters do not require any monitoring devices nor do they need any servicing or maintenance. The number of times the arresters have discharged, the magnitude of the discharge currents and the nature of the overvoltages involved can be ascertained by installing a type 3EX6040 tell-tale spark gap in the earthing conductor.

## Technical data

Nominal discharge current  $I_{sn}$   
10 kA

(peak value in kA,  
waveform 8/20)

High-current impulse  $I_{sn}$  100 kA  
(peak value in kA,  
waveform 4/10)

Energy absorption capacity  
8 to 10 kJ/kV rated voltage

Operating frequency

48 to 62 Hz,

other frequencies to order

Short-circuit current strength

50 to 300 kA; 0.2 s

(rms value in kA)

## Protection values for type 3EE2. surge arresters

Rated voltage <sup>1)</sup> $U_t$ kV <sub>rms</sub>	Max. continuous voltage $U_c$ kV <sub>rms</sub>	Max. residual voltage at discharge current with				
		waveform 30/60 0.5 kA 1 kA		waveform 8/20 5 kA 10 kA 20 kA		
5.6	4.5	11.5	12	13	14	16
7.5	6	15.5	16	18	19	21
9	7.2	18.5	19.5	22	23	26
12	9.6	25	26	29	31	35
15	12	31.5	33	37	39	44
19	15	39.5	41	46	49	55
23	18	48	49	55	59	66
27	22	56	58	65	69	77
30	24	62	64	72	77	86
34	27	70	73	82	87	97
38	30	78	81	91	97	109
45	36	92	96	108	115	129

## Protection values for type 3EE2. surge arresters (special versions for furnace transformers)

Rated voltage $U_t$ kV <sub>rms</sub>	Max. continuous voltage $U_c$ kV <sub>rms</sub>	Max. residual voltage at discharge current with				
		waveform 30/60 0.5 kA 1 kA		waveform 8/20 5 kA 10 kA 20 kA		
22	17.5	43	45	50	53	59
30	24	59	61	68	72	80
32	26	63	65	73	77	86
36	29	71	74	82	87	97
45	36	88	91	102	108	120
52	42	102	105	118	125	139

Energy absorption capacity  
10 kJ/kV

Short-circuit current strength

50 kA; 0.2 s

## Arrester housing

Housing size <sup>2)</sup>	Dielectric strength Impulse withstand voltage 1.2/50 kV	Power-frequency withstand voltage		Flashover distance mm	Creepage distance mm
		Dry kV	Wet kV		
1	150	80	65	255	605
2	240	130	110	435	1095
3	220	105	90	360	640

1) 10 s voltage at which the rectangular-impulse current operating duty test can be withstood.

2) See selection and ordering data, page 4.

## Selection and ordering data

Rated voltage	Short-circuit current strength				Weight approx.	Housing size	Short-circuit current strength 300 kA / 0.2 s	Weight approx.	Housing size
	50 kA / 0.2 s	63 kA / 0.2 s	100 kA / 0.2 s	200 kA / 0.2 s					
kV <sub>rms</sub>	Order No.	Order No.	Order No.	Order No.	kg			kg	
5.6 <sup>1)</sup>	3EE2 056 - □□A0	3EE2 056 - □□B0	3EE2 056 - □□C0	3EE2 056 - □□D0	25	1	–		
7.5 <sup>1)</sup>	3EE2 075 - □□A0	3EE2 075 - □□B0	3EE2 075 - □□C0	3EE2 075 - □□D0	25	1	–		
9 <sup>1)</sup>	3EE2 090 - □□A0	3EE2 090 - □□B0	3EE2 090 - □□C0	3EE2 090 - □□D0	25	1	–		
12	3EE2 120 - □□A0	3EE2 120 - □□B0	3EE2 120 - □□C0	3EE2 120 - □□D0	25	1	3EE2 120 - □□E1	75	3
15	3EE2 150 - □□A0	3EE2 150 - □□B0	3EE2 150 - □□C0	3EE2 150 - □□D0	30	1	3EE2 150 - □□E1	75	3
19	3EE2 190 - □□A0	3EE2 190 - □□B0	3EE2 190 - □□C0	3EE2 190 - □□D0	30	1	3EE2 190 - □□E1	75	3
23	3EE2 230 - □□A0	3EE2 230 - □□B0	3EE2 230 - □□C0	3EE2 230 - □□D0	30	1	3EE2 230 - □□E1	75	3
27	3EE2 270 - □□A0	3EE2 270 - □□B0	3EE2 270 - □□C0	3EE2 270 - □□D0	30	1	3EE2 270 - □□E1	85	3
30	3EE2 300 - □□A0	3EE2 300 - □□B0	3EE2 300 - □□C0	3EE2 300 - □□D0	40	2	3EE2 300 - □□E1	85	3
34	3EE2 340 - □□A0	3EE2 340 - □□B0	3EE2 340 - □□C0	3EE2 340 - □□D0	40	2	3EE2 340 - □□E1	85	3
38	3EE2 380 - □□A0	3EE2 380 - □□B0	3EE2 380 - □□C0	3EE2 380 - □□D0	40	2	3EE2 380 - □□E1	85	3
45	3EE2 450 - □□A0	3EE2 450 - □□B0	3EE2 450 - □□C0	3EE2 450 - □□D0	40	2	3EE2 450 - □□E1	85	3

Order No. suffix	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑
Energy absorption capacity						
8 kJ/kV	1	1	1	1	1	1
10 kJ/kV	2	2	2	2	2	2
for motors	A	A	A	A	A	A
for generators	B	B	B	B	B	B

## Special versions for furnace transformers

In the case of the 6-arrester circuit or suspended or horizontal mounting, add **Z** to the Order No. and state the version required in plain text.

Rated voltage	Short-circuit current strength 50 kA / 0.2 s	Weight approx.	Housing size
kV <sub>rms</sub>	Order No.	kg	
22	3EE2 220 - 2CA0	30	1
30	3EE2 300 - 2CA0	30	1
32	3EE2 320 - 2CA0	30	1
36	3EE2 360 - 2CA0	40	2
45	3EE2 450 - 2CA0	40	2
52	3EE2 520 - 2CA0	40	2

Example for ordering

- 3EE2 360 - 2CA0 - Z  
3EE2 450 - 2CA0 - Z  
**Z:** 6-arrester circuit
- 3EE2 ... - ... - Z  
**Z:** suspended / horizontal mounting

## Accessories

	For housing size	Order No.	Weight approx.
			kg
<u>To be ordered separately:</u>	<b>Bolt-type terminal</b> 1 and 2	<b>3EX6 006<sup>2)</sup></b>	4
	30 mm dia. complete with all nuts and bolts		
	<b>Flat-type terminal</b> 1 and 2	<b>3EX6 034<sup>2)</sup></b>	4
	complete with 3	<b>3EX7 008</b>	4
	all nuts and bolts		
Included with the surge arrester:	1 set of M 16 insulated fixing bolts, insulating parts for mounting M 12 earth connection screw		

1) Only available with 8 kJ/kV MO resistors.

2) Not for 3EE2...-E1

## Dimensions

Type	Housing size	Dimension H
3EE2 056-..A0, ..B0, ..C0, ..D0 to 3EE2 270-..A0, ..B0, ..C0, ..D0	1	500
3EE2 300-..A0, ..B0, ..C0, ..D0 to 3EE2 450-..A0, ..B0, ..C0, ..D0	2	680

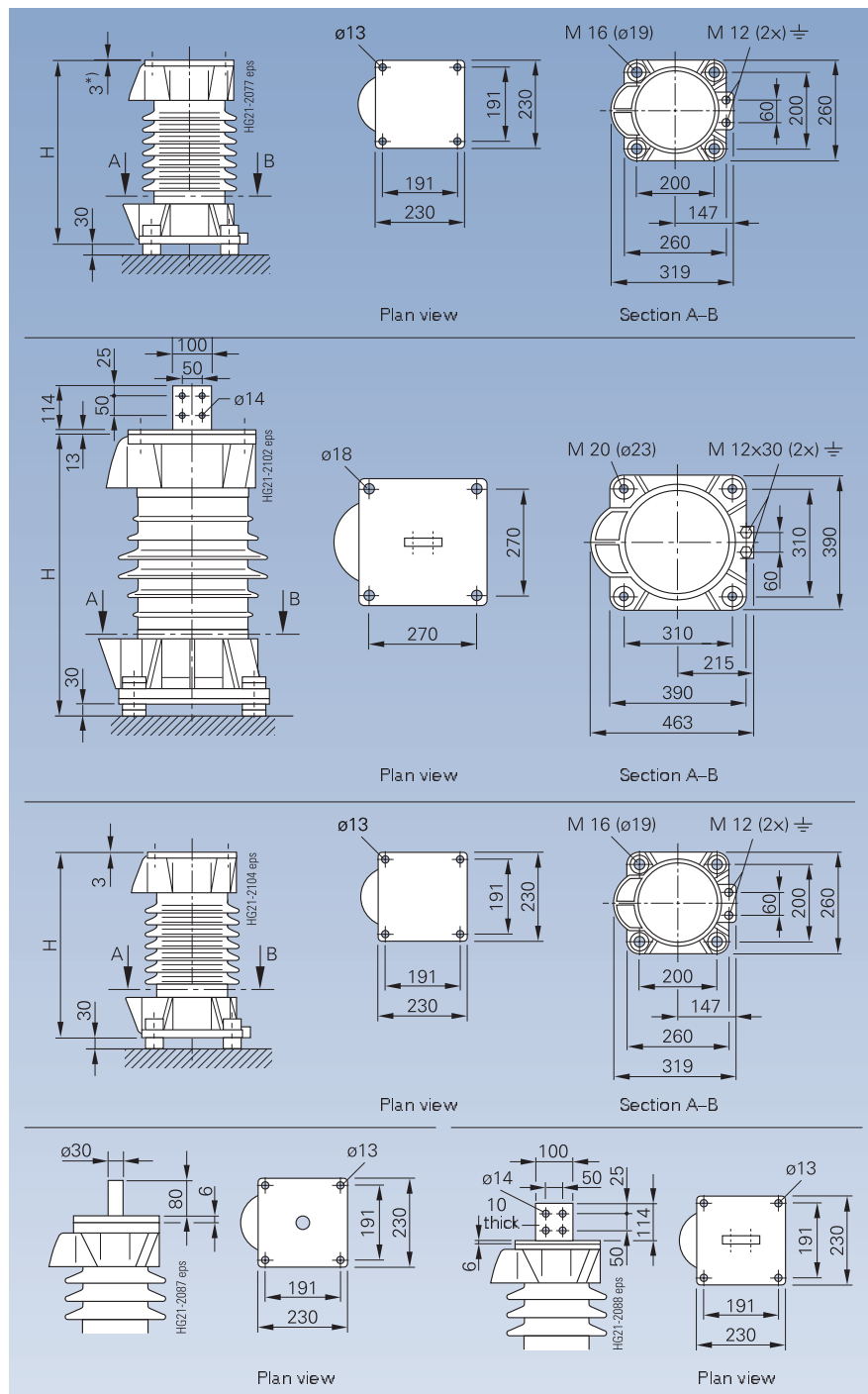
\*1) = 5 mm for short-circuit current strengths of 100 kA and 200 kA

3EE2 120-..E1 to 3EE2 450-..E1 housing size 3 with flat-type terminal 3EX7 008

Type	Housing size	Dimension H
3EE2 220 - 2C.0 to 3EE2 320 - 2C.0	1	500
3EE2 360 - 2C.0 to 3EE2 520 - 2C.0	2	680

Bolt-type terminal 3EX6 006 for housing sizes 1 to 2 →

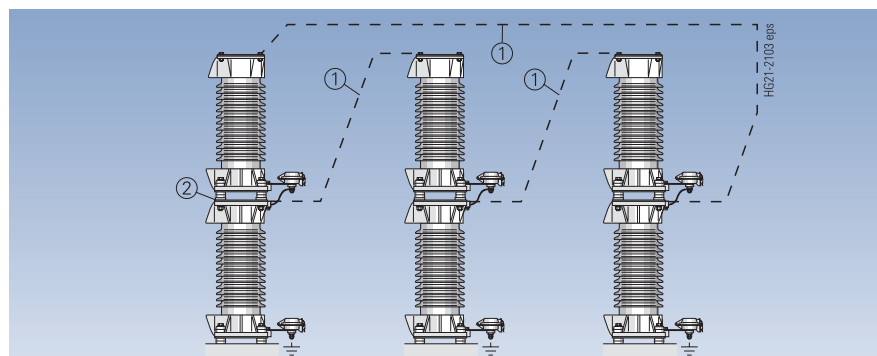
Flat-type terminal 3EX6 034 for housing sizes 1 to 2 →→



## Circuit diagram

6-arrester circuit (with 3EX6 040 tell-tale spark gaps)

- 1 Not included in the delivery
- 2 Cu bars for delta connection (included in the delivery)



# Conditions of Sale and Delivery

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Subject to the

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Relevant are the export criteria stated in the delivery note and in the invoice regarding a possible export and reexport licence.

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## Dimensions

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All dimensions in this catalog are given in mm.

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to the **Point**

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