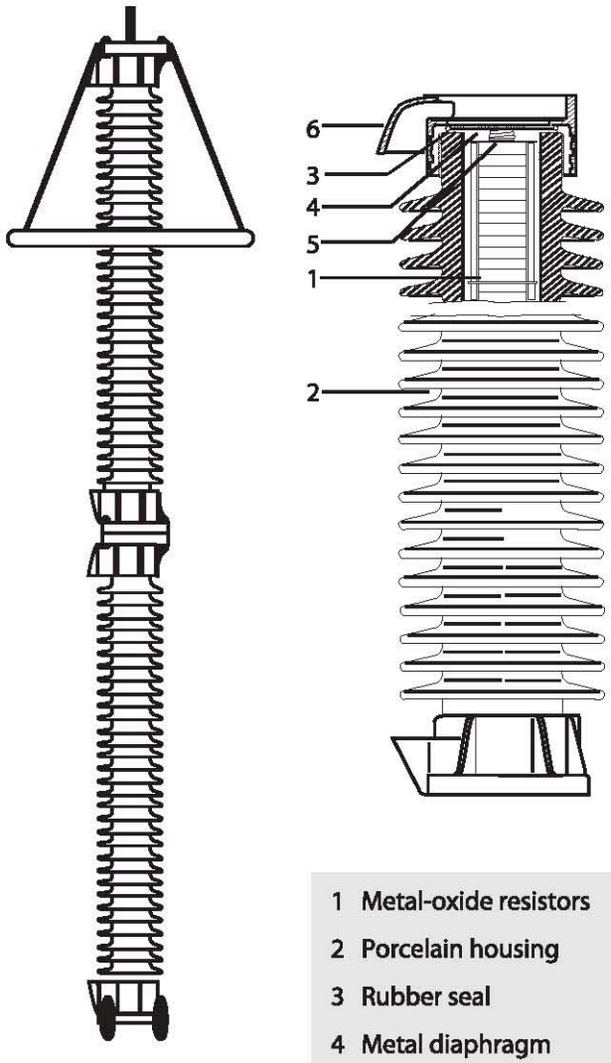
EMCO / SIEMENS

Surge Arrester 3EP2 / SA2

Metal-oxide surge arrester with porcelain housing
For high-voltage systems up to
Um (Maximum System Voltage) =420 kV

- Surge Arrester Rated voltage
  Up to 360 kV
- Nominal discharge current
  10 kA, 8/20 µs
  20 kA, 8/20 µs
- Line discharge class
  LD2, LD3, LD4
- High current impulse
  100 kA, 4/10 µs
- Short circuit capability
  65 kA
- Standards
  IEC 60099-4, Edition 1.2, 2001-12
  ANSI / IEEE C62.11 - 1999
  Other standards on request



1 Metal-oxide resistors
2 Porcelain housing
3 Rubber seal
4 Metal diaphragm
5 Pressure spring
6 Gas diverter

Surge Arrester 3EP2 /SAA2

Metal-oxide surge arrester with porcelain housing for high-voltage systems up to Um =420 kV

APPLICATION

Protection of equipment in electric power systems against external and internal over voltages

FEATURES

Rated voltage up to 360 kV (that is max. system voltage up to 420 kV) Standard design with nominal discharge current of 10 or 20 kA

Designed for use under "normal operation conditions" according to specified standards

CONSTRUCTION

Electrically active part consists of a column of metal-oxide resistors with non-linear voltage-current characteristic

Flanges are made from aluminum alloy resistant to out -door conditions

Sealing system with weather and ozone-resistant synthetic rubber gaskets and corrosion resistant metal diaphragms

Each arrester unit equipped with pressure relief diaphragms and gas diverter nozzles at both ends

ADVANTAGES

Optimal power transmission between flanges and porcelain allows high permissible mechanical load acting on the top section

No displacement of resistors by shock stresses (e.g. transport)

No partial discharges inside the housing even under extreme pollution due to substantial clearance between MO resistors and housing interior

Fast opening pressure relief device prevents porcelain housing from shattering in case of over pressure

Accessories include in delivery

- 1 x M12 ground connection bolts
- Grading ring and struts, if required
- Complete set of bolts
- Base plate with insulators for insulated installation

Surge Arrester 3EP2 /SAA2

Metal-oxide surge arrester with porcelain housing for high-voltage systems up to Um =420 kV

Electrical characteristics

Type 3EP2-2

Nominal discharge current (IEC)	10kA, 8/20 µs	IEC 60099-4, Edition 1.2, 2001-12
Line discharge class	2	ANSI / IEEE C62.11-1999
Energy absorbing capability	5 kJ/kVr	
Long duration current impulse	500 A, 2 ms	

Surge Arrester Rated Voltage[U_r]	COV [U_c]	Maximum values of the residual voltage at discharge Current of the following impulses					Min. housing size	
		30/60 µs 0.5 kA	8/20 µs 1 kA	8/20 µs 5 kA	8/20 µs 10 kA	8/20 µs 20 kA	Unit housing size	Number of units
KV	KV	kV	KV	kV	kV	kV		
60	48	131	138	156	168	190	C	1
96	76	210	221	250	269	304	D	1
108	86	236	248	281	302	341	D	1
120	96	262	276	312	336	380	F	1
132	105	289	303	344	370	418	F	1
144	115	314	330	375	403	455	G	1
192	153	420	441	500	538	608	D	2
198	158	432	454	515	554	626	D	2
210	168	459	482	547	588	664	D	2
228	182	498	523	593	638	721	D	2

Type 3EP2-3

Nominal discharge current (IEC)	10kA, 8/20 µs	IEC 60099-4, Edition 1.2, 2001-12
Line discharge class	3	ANSI / IEEE C62.11-1999
Energy absorbing capability	8 kJ/kVr	
Long duration current impulse	850 A, 2 ms	

Surge Arrester Rated Voltage[U_r]	COV [U_c]	Maximum values of the residual voltage at discharge Current of the following impulses					Min. housing size	
		30/60 µs 0.5 kA	8/20 µs 1 kA	8/20 µs 5 kA	8/20 µs 10 Ka	8/20 µs 20 kA	Unit housing size	Number of units
KV	KV	kV	KV	kV	KV	kV		
60	48	118	125	138	147	165	C	1
96	76	188	200	221	235	263	D	1
108	86	212	225	249	265	297	D	1
120	96	235	250	276	294	329	D	1
144	115	282	300	332	353	395	F	1
156	124	306	325	359	382	428	G	1
192	153	376	400	442	470	526	F	2
198	158	388	412	456	485	543	F	2
288	230	565	600	664	706	791	F	2
336	268	658	700	774	823	922	G	2
360	288	706	750	829	882	988	D	3

Surge Arrester 3EP2 /SAA2

Metal-oxide surge arrester with porcelain housing for high-voltage systems up to Um =420 kV

Electrical characteristics		
Type 3EP2-2		
Nominal discharge current (IEC)	20kA, 8/20 µs	IEC 60099-4, Edition 1.2, 2001-12
Line discharge class	4	ANSI / IEEE C62.11-1999
Energy absorbing capability	10 kJ/kVr	
Long duration current impulse	1200 A, 2 ms	

Surge Arrester Rated Voltage[U_r]	COV [U_c]	Maximum values of the residual voltage at discharge Current of the following impulses					Min. housing size	
		30/60 µs 0.5 kA	8/20 µs 1 kA	8/20 µs 5 kA	8/20 µs 10 kA	8/20 µs 20 kA	Unit housing size	Number of units
KV	KV	kV	KV	kV	KV	kV		
120	96	233	248	271	288	320	D	1
144	115	280	298	325	346	384	F	1
192	153	373	396	433	461	512	D	2
198	158	385	409	447	475	527	D	2
210	168	408	433	474	504	559	D	2
228	182	443	470	514	547	607	D	2
276	220	536	569	622	662	735	F	2
288	230	560	594	650	691	767	F	2
336	268	653	693	758	806	895	G	2
360	288	700	743	812	864	959	D	3

Surge Arrester 3EP2 /SA2

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Housing

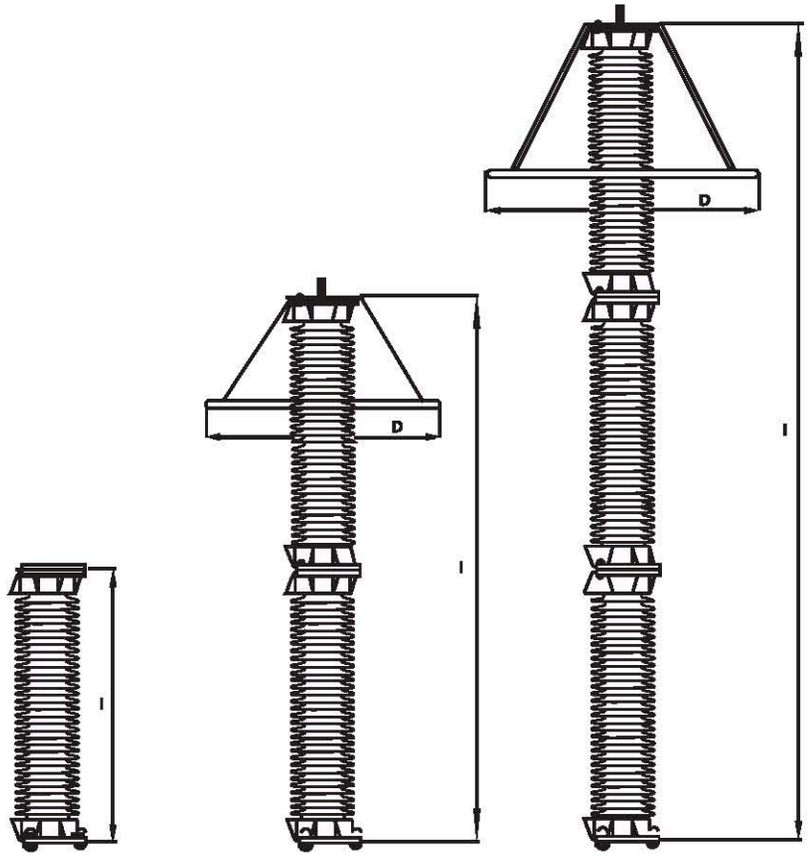
Maximum permissible

Dynamic service

Load (MPDSL)acc. To

IEC 600994-4, Edition 1.2,

2001-12: 12,5 kNm



Min. housing size		Housing insulation level		Creepage distance		Figure	Height	Diameter of the Grading ring
unit Housing Size	Number Of Units	Power frequency Withstand voltage 50Hz, 1min. dry	Lightning Impulse withstand Voltage 1.2/50	regular sheds	alternate sheds		H	D
		kV	mm	mm	mm	No.	mm	mm
C	1	240	440	2096	2370	1	1050	-
D	1	290	550	2595	2935	1	1235	-
F	1	360	650	3190	3510	1	1465	-
G	1	420	750	3605	4035	1	1620	-
C	2	380	750	4190	4740	2	2100	800
D	2	460	950	5190	5870	2	2470	800
F	2	550	1050	6380	7020	2	2930	1000
G	2	600	1200	7210	8070	2	3240	1000
D	3	650	1300	7785	8805	3	3705	1200

Selection of Arrester

The housing sizes specified in the column minimum size (Tables 1 to 3) are the smallest feasible sizes for the relevant rated voltages. Large housing can also be selected where e.g. a longer creepage distance or a higher housing insulation withstand level is required (see Table 4 for data).

The rated voltages specified in table 1 to 3 are examples. In general, arresters can be supplied with any rated voltage, up to specified maximum value. The electrical data must be determined by interpolation of the table values (minimum housing length on request, where required).

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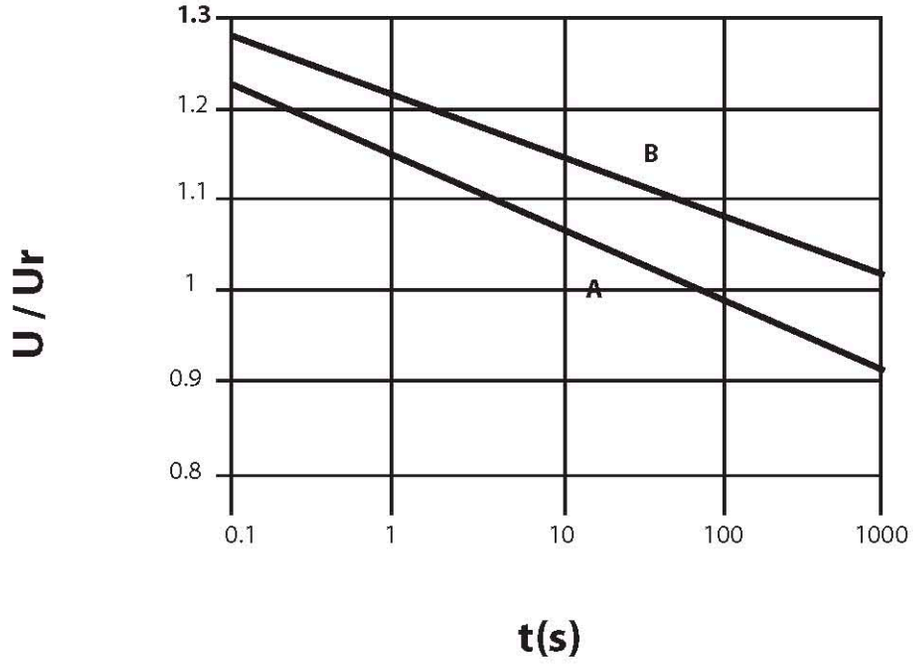
Power frequency voltage Versus time characteristic



A Preheated to 60 C, loaded with rated energy
B Preheated to 60 C, without preloading

U .....temporary over voltage
Ur .....rated voltage