

## METAL-OXIDE SURGE ARRESTERS TYPE VH



### FEATURES

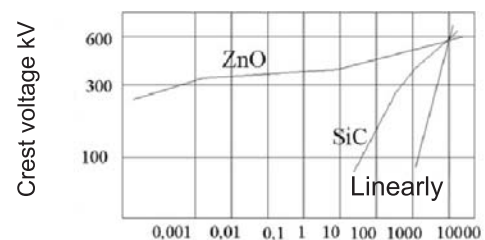
Heavy-duty surge arresters are furnished for system voltages 3 kV through 420 kV. These are designed to be used where average ambient temperature does not exceed 40°C and the daily maximum temperature does not exceed 60 °C at altitudes up to 3600m for Type VH2, VH3 and VH4. Inherently voltage-sensitive and temperature-sensitive devices, metal-oxide arresters, can be damaged if system power-frequency voltage exceeds the maximum (MCOV). Operating life also can be shortened if the external porcelain temperature exceeds 60°C. The arrester's simple design with fewer internal parts thus less weight than the former silicon-carbide arrester, makes it the ideal choice for compact substation equipment.

### PRINCIPLE OF METAL-OXIDE SURGE ARRESTERS

The "Energoinvest - Raop" metal-oxide arrester is significantly different in concept from previous ones with silicone-carbide valve blocks. The extreme improvement in nonlinearity of metal-oxide valve elements allows a significant portion of the continuous operating voltage to be applied to the valve element, which could not be done with silicon-carbide elements (Fig.1). Therefore, the arrester is described by its maximum continuous operating voltage (MCOV) in addition to the rated voltage.

### TO SPECIFY FOR AN ORDER

- Arresters classification (types VH2, VH3, VH4)
- Max continuous operating voltage (MCOV)
- Creepage distance
- Rated system voltage
- Grounded or ungrounded
- Impulse withstand atmospheric voltage of the equipment to be protected
- Arrester discharge counter: 'yes' or 'no'



Amperes  
Figure 1.

## HEAVY - DUTY METAL OXIDE ARRESTER TYPE VH2

Type	VH2	VH2	VH2	VH2	VH2	VH2	VH2	VH2	VH2	VH2	VH2	
Catalog number	218310	218313	218315	218329	218331	218336	218339	218344	218348	218378	218384	
Max continuous operating voltage (MCOV) kVrms	10,20	12,70	15,30	29	31,5	36,5	39	44	48	78	84	
Rated voltage kVrms	12	15	18	36	39	45	48	54	60	96	102	
Maximum 0,5μs discharge voltage kV (1)	10 kA	41	51	61	116	126	146	156	176	191	312	335
Max switching surge discharge voltage (2)	0,125kA	24,9	30,8	36,4	70,7	76,3	88,2	94,5	107	116	189	203
	0,50 kA	26,3	32,6	38,5	74,8	80,7	93,3	99,9	113	122	200	215
Maximum atmospheric discharge voltage using an 8 / 20μs current wave -kV	5 kA	34	42	50	96,5	104	120	129	146	157	257	276
	10 kA	35,5	44	52	101	109	126	135	153	165	270	290
	20 kA	42,5	52,5	63	121	131	152	163	184	198	324	348
	40 kA	51	63,5	77	145	158	183	195	220	239	391	420
Figure number	1	1	1	1	1	1	1	2	2	3	3	
«X» dimension mm	370	370	460	560	690	690	690	1120	1250	1840	1930	
Min. leakage distance mm	290	290	520	720	1040	1040	1040	1440	1760	2590	2790	
Minimum mounting spacing on centre	Phase to phase mm	330	340	375	480	510	580	620	650	700	1500	1550
	Phase to ground mm	205	220	245	330	360	430	470	520	560	1140	1190
Net weight kg	21	24	24,5	34	35	35,5	36	56	62	97	101	
Pressure relief class	B	B	B	B	B	B	B	B	B	B	B	

(1)Max discharge voltage for a 10 kA impulse current wave which produces a voltage wave cresting in 0.5 μs. This can be used for coordination where front-of-wave sparkover formerly was used.

(2)Based on a surge of 45 μs time to crest

- Cantilever base moment: 6300 Nm
- Connecting terminal and ground connection: with cable up to 21 mm
- Each end cast is provided with three holes 14.2 mm diameter, at 222 mm diameter
- In compliance with IEC

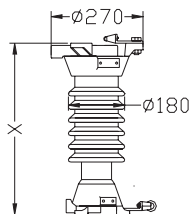


Figure 1

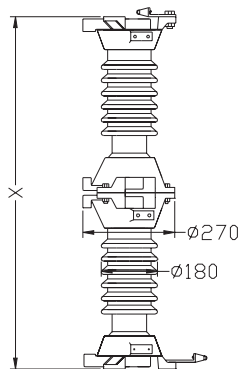


Figure 2

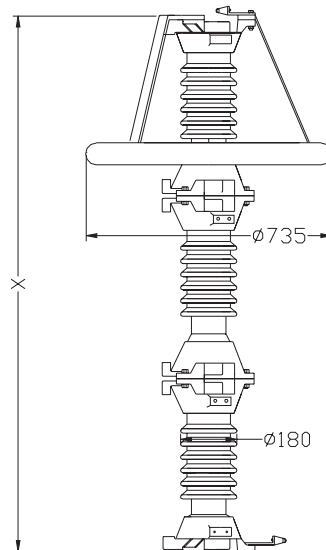


Figure 3

## HEAVY-DUTY METAL-OXIDE ARRESTER TIP VH3

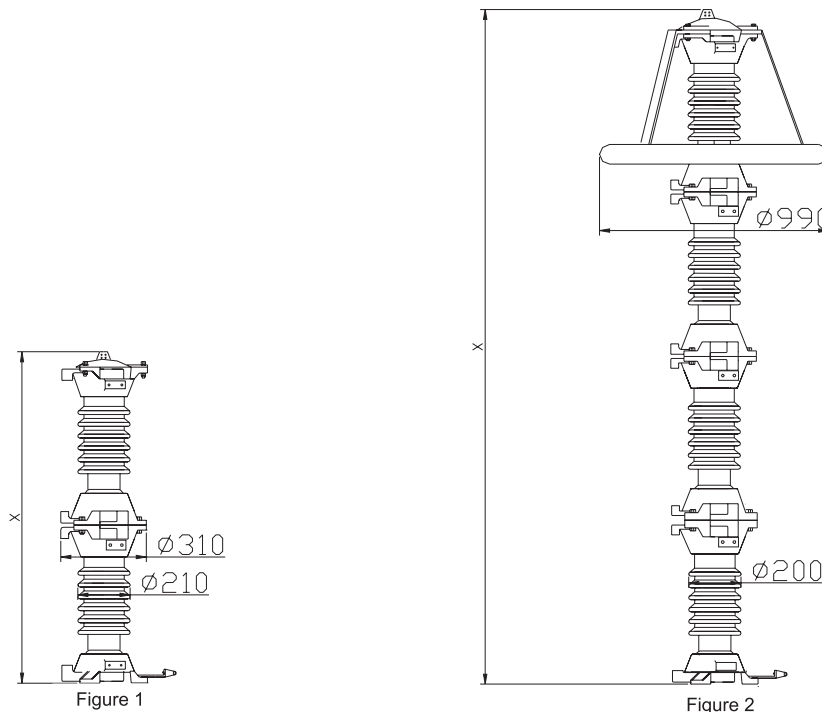
Type		VH3	VH3	VH3	VH3	VH3	VH3
Catalog number		217378	217384	217388	217440	217444	217452
Max continuous operating voltage (MCOV) kV rms		78	84	88	140	144	152
Rated voltage kV rms		96	102	108	174	180	186
Maximum 0.5 $\mu$ s discharge voltage -kV (1)		293	315	331	524	540	569
Max switching surge discharge voltage (2)	0,25 kA	183	197	207	327	337	355
	1 kA	209	225	236	374	385	406
Maximum atmospheric discharge voltage using an 8/20 $\mu$ s current wave - kV	5 kA	244	263	276	437	450	474
	10 kA	261	281	295	467	481	507
	20 kA	293	315	331	524	540	569
	40 kA	336	362	380	600	618	652
Figure number		1	1*	1*	2	2	2
«X» dimension mm		1660	1660	1660	2990	2990	3090
Min. leakage distance mm		2640	2640	2640	4720	4720	5000
Minimum mounting spacing on centre	Phase to phase mm	1050	1560	1580	2300	2380	2500
	Phase to ground mm	890	1190	1210	1800	1880	2000
Net weight kg		108	110	144	203	205	215
Pressure relief class		A	A	A	A	A	A

1) Max discharge voltage for a 10 kA impulse current wave which produces a voltage wave cresting in 0.5  $\mu$ s. This can be used for coordination where front-of-wave sparkover formerly was used.

(2) Based on a surge of 45  $\mu$ s time to crest

(\*) with ring

- Cantilever base moment: 8000 Nm
- Connecting terminal and ground connection: with cable up to 21 mm
- Each end cast is provided with three holes 14.2 mm diameter, at 254 mm diameter
- In compliance with IEC



## HEAVY-DUTY METAL-OXIDE ARRESTER TYPE VH4

Type	VH4	VH4	VH4	VH4	VH4	VH4	VH4
Catalog number	215850	215851	215852	217844	217852	217874	217888
Max continuous operating voltage (MCOV) kV rms	140	144	152	244	252	274	288
Rated voltage kV rms	174	180	186	300	312	336	354
Maximum 0,5 $\mu$ s discharge voltage -kV (1)	10 kA	467	480	506	812	839	913
	20 kA	509	524	552	886	915	1047
Max switching surge discharge voltage (2)	0,5kA	340	349	368	591	610	664
	2 kA	361	371	391	628	648	706
Maximum atmospheric discharge voltage using an 8/20 $\mu$ s current wave -kV	5 kA	395	406	428	687	709	811
	10 kA	424	436	460	738	762	872
	20 kA	471	484	511	820	846	968
	40 kA	519	534	564	904	933	1016
Figure number	1	1	1	2	2	3	3
«X» dimension mm	2415	2415	2580	3900	4070	4550	4550
Min leakage distance mm	5120	5120	5655	8750	9290	9720	9720
Min mounting spacing on centre	Phase to phase mm	2000	1090	2130	3330	3510	3630
	Phase to ground mm	1670	1770	1790	2840	3020	3120
Net weight kg	235	238	243	380	386	445	453
Pressure relief class	A	A	A	A	A	A	A

(1) Max discharge voltage for a 10 kA impulse current wave which produces a voltage wave cresting in 0.5  $\mu$ s. This can be used for coordination where front-of-wave sparkover formerly was used.

(2) Based on a surge of 45  $\mu$ s time to crest

- Cantilever base moment: 17000 Nm
- Connecting terminal and ground connection: with cable up to 21 mm
- Each end cast is provided with three holes 22.2 mm diameter, at 254 mm diameter
- In compliance with IEC

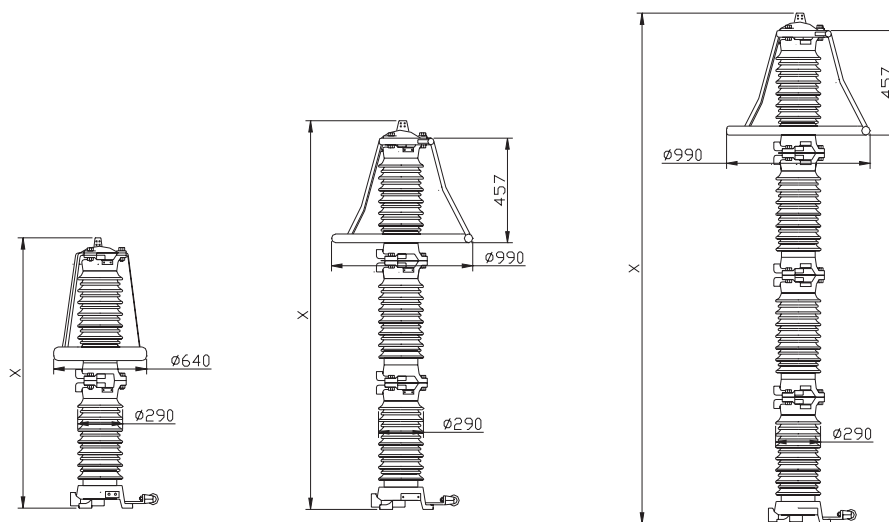


Figure 1

Figure 2

Figure 3

Bosnia and Herzegovina - Republic of Srpska, 71123 East Sarajevo, Vuka Karadžića 17

Switchboard: +387 (0) 57 342 180, General Manager: +387 (0) 57 342 549, 343 354, Commercial Director: +387 (0) 57 340 353, 342 326

Telefax: +387 (0) 57 340 357, 340 356, e-mail: office@e-raop.com, www.e-raop.com

