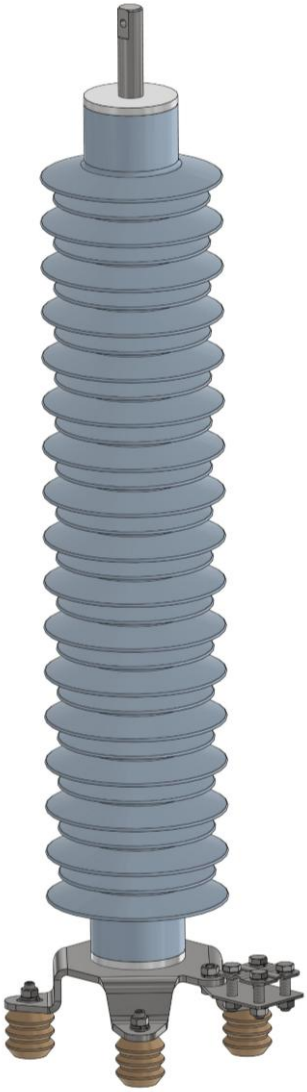
INSTALLATION AND OPERATING MANUAL FOR PROXAR-IVN AC TYPE SURGE ARRESTERS



PROTEKTEL Sp. z o.o.
PIŁSUDSKIEGO 92 Str.
06-300 PRZASNYSZ
Tel./Fax. +48 29 752 57 84
www.protektel.pl
protektel@protektel.pl

Instruction No PROXAR-IVN AC/IMIE/07/EN edition 1.2025

TABLE OF CONTENTS

1. GENERAL INFORMATION

Dear customer, thank you for choosing our product - the surge arrester type PROXAR-IVN AC. Please read the operating manual before starting the installation. The manufacturer assumes no responsibility for incorrect installation of the product.
This manual does not cover all contingencies relating to the installation and operation manual for the arresters. If problems arise that are not covered in this manual, please contact the manufacturer. The described type of surge arresters are designed to be installed by qualified personnel with the required practice in the field of safety devices of high and medium voltage. These guidelines are drafted for such personnel and are not a substitute for proper training and experience in the safe operation of this type of devices.

WARNING

Any work on the surge arresters should be carried out on disconnected and grounded device. Follow all the rules and principles of international and national occupational health and safety.

2. DESCRIPTION OF THE PRODUCT

Surge arresters type PROXAR-IVN AC are single-phase devices, designed to work both outdoors and indoors. The role of surge arresters is protection against over voltage by bringing it to the ground and reducing it. This allows other devices connected to the network are safely protected from the effects of each type of overvoltage.
Generally, arresters are constructed from a stack of variable resistance elements – i.e. zinc oxide (ZnO) resistors, placed in a durable mechanical structure made of an aramid composite terminated with electrodes and completely overmolded with an electrically insulating material, i.e. silicone. Surge arrester PROXAR-IVN AC can be supplied with the following equipment:
- Line terminal
- Base
- Insulating base
- Ground terminal
- Surge counter

3. ELECTRICAL DETAILS

The nominal parameters are summarized in Table 1 below.

Line discharge class according to IEC 60099-4: 2014	SH (Station High)
Line discharge class according to IEC 60099-4: 2009	Class 4
System voltage (Um)	3 – 145 kV
Rated voltage (Ur)	1 – 144 kV
Rated discharge current In 8/20 μs	20 kA
High current impulse Ihc 4/10 μs	100 kA
Rated repetitive charge transfer rating Qrs	2.4 C
Rated thermal Energy Wth	12.0 kJ/kV Ur
Single impulse energy capability (impulse duration 2 ms – 4 ms)	6.0 kJ/kV Ur
Long duration current impulse, 2000 μs (based on Qrs)	1100 A
Short circuit rating	65 kA/0.2s
Working conditions:	
- ambient temperature	-50 °C to +60* °C
- altitude up to	1000* m
- frequency	49-62 Hz
Mechanical strength:	
- SLL long-term load	2400 Nm
- SSL short-term load	6000 Nm
- torque	200 Nm
- tensile	5 kN
Mechanical strength:[1]	
- SLL long-term load	1200 Nm
- SSL short-term load	1800 Nm
- torque	200 Nm
- tensile	5 kN

*) for other values please contact the manufacturer;

[1)] Only applies to drawing and housing No.1

Table 1. **ELECTRICAL DATA**

TYPE PROXAR-IVN AC	Rated voltage	Maximum continuous operating voltage	TOV[2)]		Residual voltage in [kV] pk at a specified impulse current							
			rms	rms	Wave 1/… μs	Wave 8/20 μs				Wave 30/60 μs		
	Ur	Uc	1s	10s	20kA	5kA	10kA	20kA	40kA	500A	1kA	2kA
	kV	kV	kV	kV	kV	kV	kV	kV	kV	kV	kV	kV
1.0	1.0	0.8	1.1	1.1	4.3	2.3	2.4	2.6	2.8	2.0	2.1	2.2
1.2	1.2	1.0	1.3	1.3	4.8	2.7	2.9	3.1	3.4	2.4	2.5	2.6
1.5	1.5	1.2	1.7	1.6	5.6	3.4	3.6	3.9	4.2	3.0	3.1	3.2
1.7	1.7	1.4	1.9	1.8	6.2	3.9	4.1	4.4	4.8	3.5	3.5	3.7
2.0	2.0	1.6	2.2	2.1	7.0	4.6	4.8	5.2	5.6	4.1	4.2	4.3
2.2	2.2	1.8	2.4	2.4	7.5	5.0	5.3	5.7	6.2	4.5	4.6	4.7
2.5	2.5	2.0	2.8	2.7	8.3	5.7	6.0	6.5	7.0	5.1	5.2	5.4
2.7	2.7	2.2	3.0	2.9	8.8	6.2	6.5	7.0	7.6	5.5	5.6	5.8
3.0	3.0	2.4	3.3	3.2	9.6	6.8	7.2	7.8	8.4	6.1	6.2	6.5
3.2	3.2	2.6	3.6	3.4	10.2	7.3	7.7	8.3	9.0	6.5	6.7	6.9
3.5	3.5	2.8	3.9	3.7	11.0	8.0	8.4	9.1	9.8	7.1	7.3	7.5
3.7	3.7	3.0	4.1	4.0	11.5	8.4	8.9	9.6	10.4	7.5	7.7	8.0
4.0	4.0	3.2	4.4	4.3	12.3	9.1	9.6	10.4	11.2	8.1	8.3	8.6
4.5	4.5	3.6	5.0	4.8	13.6	10.3	10.8	11.7	12.6	9.1	9.4	9.7
5.0	5.0	4.0	5.6	5.4	15.0	11.4	12.0	13.0	14.0	10.2	10.4	10.8
6.0	6.0	4.8	6.7	6.4	17.6	13.7	14.4	15.5	16.8	12.2	12.5	12.9
7.0	7.0	5.6	7.8	7.5	20.3	16.0	16.8	18.1	19.6	14.2	14.6	15.1
8.0	8.0	6.4	8.9	8.6	22.9	18.2	19.2	20.7	22.4	16.2	16.6	17.2
9.0	9.0	7.2	10.0	9.6	25.6	20.5	21.6	23.3	25.2	18.3	18.7	19.4
10	10	8.0	11.1	10.7	28.3	22.8	24.0	25.9	28.0	20.3	20.8	21.5
11	11	8.8	12.2	11.8	31.6	25.1	26.4	28.5	30.8	22.3	22.9	23.7
12	12	9.6	13.3	12.8	34.3	27.4	28.8	31.1	33.6	24.4	25.0	25.8
13	13	10.4	14.4	13.9	36.9	29.6	31.2	33.7	36.4	26.4	27.0	28.0
14	14	11.2	15.5	15.0	39.6	31.9	33.6	36.3	39.2	28.4	29.1	30.1
15	15	12.0	16.7	16.1	42.3	34.2	36.0	38.9	42.0	30.5	31.2	32.3
16	16	12.8	17.8	17.1	45.5	36.5	38.4	41.4	44.8	32.5	33.3	34.4
17	17	13.6	18.9	18.2	48.1	38.8	40.8	44.0	47.6	34.5	35.4	36.6
18	18	14.4	20.0	19.3	50.8	41.0	43.2	46.6	50.4	36.5	37.4	38.7
19	19	15.2	21.1	20.3	53.5	43.3	45.6	49.2	53.2	38.6	39.5	40.9
20	20	16.0	22.2	21.4	56.1	45.6	48.0	51.8	56.0	40.6	41.6	43.0
21	21	16.8	23.3	22.5	58.8	47.9	50.4	54.4	58.8	42.6	43.7	45.2
22	22	17.6	24.4	23.5	61.4	50.2	52.8	57.0	61.6	44.7	45.8	47.3
23	23	18.4	25.5	24.6	64.7	52.4	55.2	59.6	64.4	46.7	47.8	49.5
24	24	19.2	26.6	25.7	67.3	54.7	57.6	62.2	67.2	48.7	49.9	51.6
25	25	20.0	27.8	26.8	70.0	57.0	60.0	64.8	70.0	50.8	52.0	53.8
26	26	20.8	28.9	27.8	72.6	59.3	62.4	67.3	72.8	52.8	54.1	55.9
27	27	21.6	30.0	28.9	75.3	61.6	64.8	69.9	75.6	54.8	56.2	58.1
28	28	22.4	31.1	30.0	78.0	63.8	67.2	72.5	78.4	56.8	58.2	60.2
29	29	23.2	32.2	31.0	80.6	66.1	69.6	75.1	81.2	58.9	60.3	62.4
30	30	24.0	33.3	32.1	83.3	68.4	72.0	77.7	84.0	60.9	62.4	64.5
33	33	26.4	36.6	35.3	91.8	75.2	79.2	85.5	92.4	67.0	68.6	71.0
36	36	28.8	40.0	38.5	99.8	82.1	86.4	93.2	100.8	73.1	74.9	77.4
39	39	31.2	43.3	41.7	108.3	88.9	93.6	101.0	109.2	79.2	81.1	83.9
42	42	33.6	46.6	44.9	116.3	95.8	100.8	108.8	117.6	85.3	87.4	90.3
45	45	36.0	50.0	48.2	124.3	102.6	108.0	116.6	126.0	91.4	93.6	96.8
48	48	38.4	53.3	51.4	132.8	109.4	115.2	124.3	134.4	97.4	99.8	103.2
51	51	40.8	56.6	54.6	140.8	116.3	122.4	132.1	142.8	103.5	106.1	109.7
54	54	43	59.9	57.8	149	123	130	140	151.2	110	112	116
60	60	48	66.6	64.2	165	137	144	155	168.0	122	125	129
66	66	53	73.3	70.6	182	150	158	171	184.8	134	137	142
72	72	58	79.9	77.0	198	164	173	186	201.6	146	150	155
84	84	67	93.2	89.9	232	192	202	218	235.2	171	175	181
96	96	77	106.6	102.7	265	219	230	249	268.8	195	200	206
102	102	82	113.2	109.1	281	233	245	264	285.6	207	212	219
108	108	86	119.9	115.6	297	246	259	280	302.4	219	225	232
120	120	96	133.2	128.4	332	274	288	311	342	244	250	258
132	132	106	146.5	141.2	364	301	317	342	376	268	275	284
138	138	110	153.2	147.7	380	315	331	357	393	280	287	297
144	144	115	159.8	154.1	395	328	346	373	410	292	300	310

Note: There is a possibility of manufacturing surge arresters for different voltages that are not listed in the table.

[2)]With prior energy 12 kJ/kV Ur

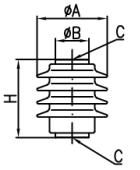


Fig. 1

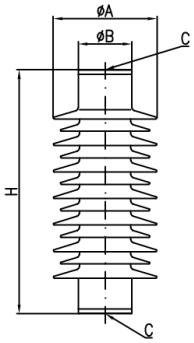


Fig. 2

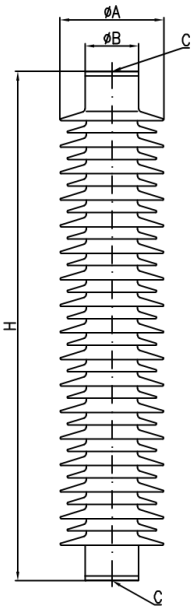


Fig. 3

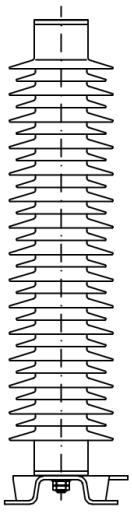


Fig. 4

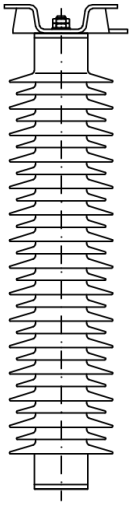


Fig. 5

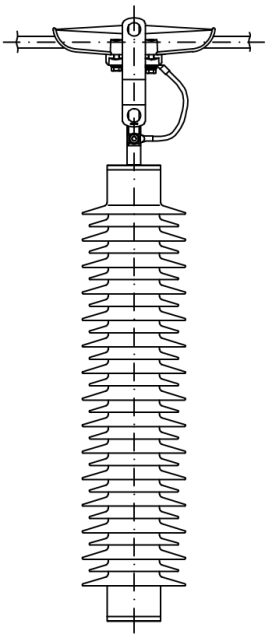


Fig. 6

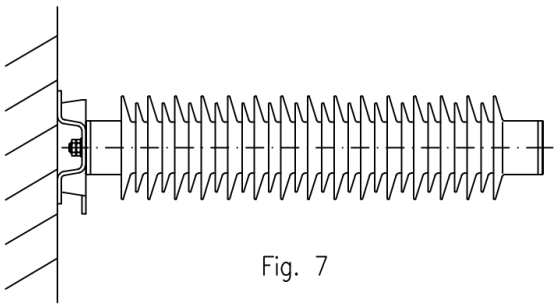


Fig. 7

The above figures show the configuration of the surge arresters housing (fig. 1; 2, 3). The drawings No 4 – 7 presents different system of assembling surge arresters. Drawings No 4 presents vertical system of assembling. Drawings No 5 presents reverse system of assembling surge arrester. Drawing No 6 presents suspension system of assembly line surge arrester. Drawings No 7 presents horizontal system of assembling. Below the figures are presenting different options line and earth accessories available for use in surge arrester type PROXAR-IVN AC.
For horizontal working configuration of surge arresters is this same option like for vertical working.

Table 2 **TECHNICAL DATA FOR HOUSING**

Us	Type PROXAR IIIN AC	External insulation		Minimal distances		Dimensions						Variant of drawing	Operating position	Housing number	Weight
		50 Hz wet (60s)	1.2/50µs dry	Distance between arresters „b"	Distance between arrester and the nearest grounded structure „a"	H	Creepage distance	Flash-over distance	A	B	C				
kV	kV	kV	kV	mm	mm	mm	mm	mm	mm	mm	M	Fig.	Fig.	No	kg
	1.0	28	75	150	75	165	318	165	148	96	M12	1	4, 5, 7	01	2.4
	1.2			150	75										2.5
	1.5			150	75										2.6
	1.7			150	75										2.6
	2.0			150	75										2.7
	2.2			150	75										2.7
	2.5			150	75										2.8
	2.7			150	75										2.8
	3.0			150	75										2.9
	3.2			150	75										2.9
	3.5			150	75										3.0
	3.7			150	75										3.1
	4.0			150	75										3.2
3.6	4.5			150	75										3.3
	5.0			150	85										3.5
	6.0			150	95										3.7
	7.0			150	100										3.9
	8.0			150	110										4.1
7.2	9.0			150	115										4.3
	10.0			170	130										4.5
	11	77	141	220	160	235	528	247	219	113	M16	2	4, 5, 7	02	12.6
	12			220	165										12.7
	13			230	175										12.8
	14			240	180										12.9
12	15			250	190										13.0
	16	94	173	260	205	291	760	303	219	113	M16	2	4, 5, 7	03	13.9
	17			270	210										14.0
	18			280	220										14.1
	19			280	225										14.2
	20			290	235										14.3
	21			300	240										14.4
17.5	22			310	250										14.5
	23	112	205	320	265	347	992	359	219	113	M16	2	4, 5, 7	04	15.3
	24			330	275										15.4
	25			340	280										15.5
	26			350	290										15.6
	27			350	295										15.7
	28			360	300										15.8
	29			370	310										15.9
24	30			380	315										16.0
	33	129	237	420	360	403	1225	415	219	113	M16	2	4, 5, 7	05	16.7
	36			440	380										17.0
	39	147	269	460	400	459	1457	471	219	113	M16	2	4, 5, 7	06	17.4
	42			480	425										17.7
36	45			500	445										18.0
52	48	164	301	530	475	515	1689	527	219	113	M16	2	4, 5, 7	07	18.5
	51			560	495										19.0
72.5	54	182	334	600	535	571	1741	583	219	113	M20	3	4, 5, 6, 7	08	20.5
	60			640	580										21.0
	66	217	398	720	655	683	2208	695	219	113	M20	3	4, 5, 6, 7	09	22.0
	72			760	700										22.5
	84	269	494	890	835	851	2905	863	219	113	M20	3	4, 5, 6, 7	10	24.0
123	96	304	558	1020	960	963	3369	975	219	113	M20	3	4, 5, 6, 7	11	26.0
	102			1060	1005										26.5
	108			1110	1045										27.0
	96	339	622	1020	960	1075	3834	1087	219	113	M20	3	4, 5, 6, 7	12	30.0
	102			1060	1005										30.5
	108			1110	1045										31.0
	120			1230	1170										32.0
	132			1320	1255										33.0
	138			1360	1300										34.0
145	120	391	718	1230	1170	1243	4530	1255	219	113	M20	3	4, 5, 6, 7	13	36.0
	132			1320	1255										37.0
	138			1360	1300										37.5
	144			1400	1345										38.0

Note: It is possible to make a surge arrester in a different housing than the catalogue version.

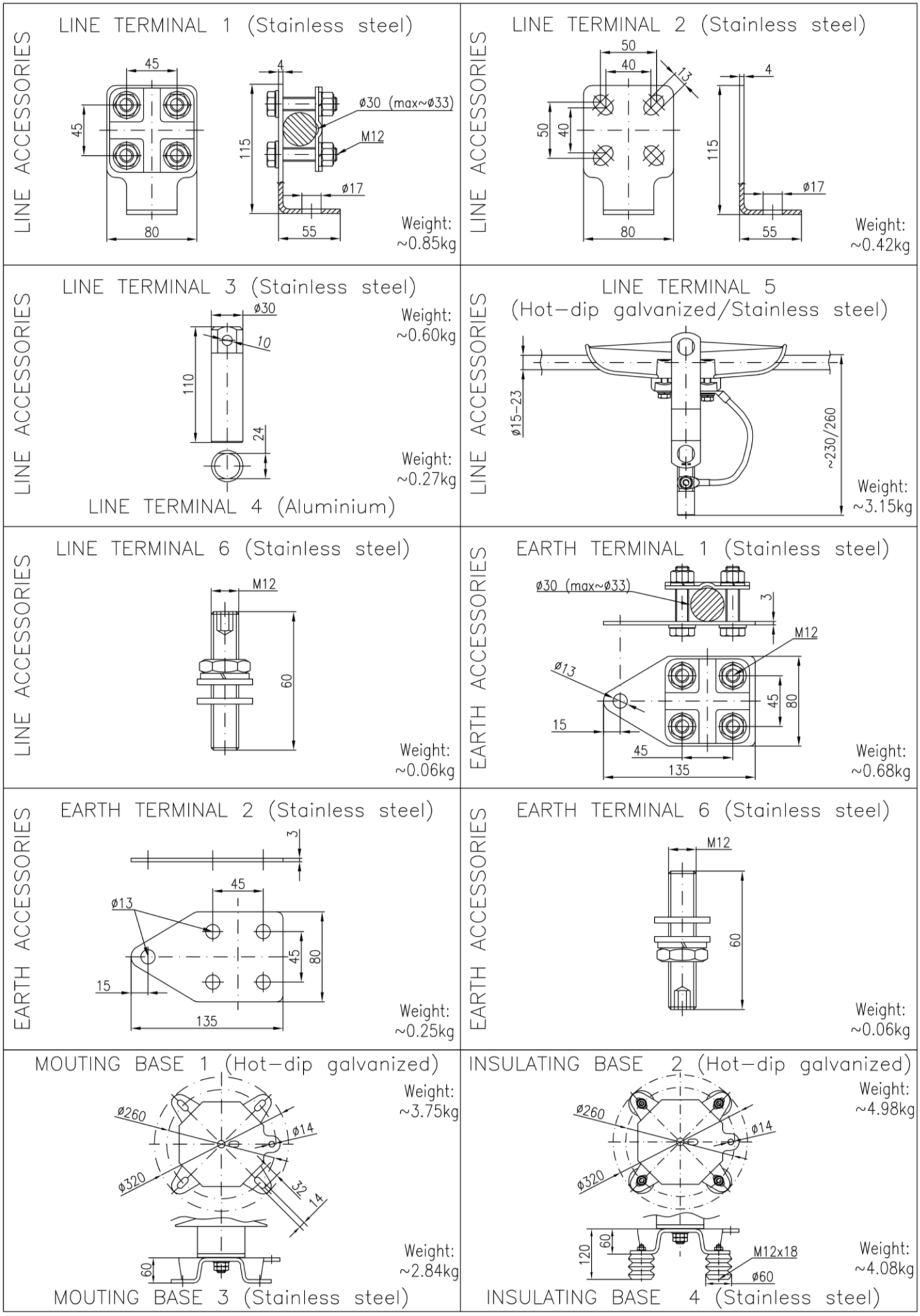


Fig.8. Dimension drawings line and earth accessories.

4. TRANSPORT, COLLECTION AND STORAGE
Surge arresters are supplied in cardboard packaging, on a pallet or in wooden boxes. Terminals and base or other accessories are packed separately. Equipment is shown in Figure "line and earth accessories", which is always attached to each batch of surge arresters. Upon receipt, check number and completeness arresters. Must be stored in a dry and ventilated place, free from corrosive agents. Please observe the instructions on the cartons. Cartons can be bunk on top of another to a maximum of 3 layers. Surge arresters delivered on pallets should not be stacked.

5. INSTALATION
If damage was found during unpacking please do not hesitate to contact with the manufacturer.
Before final installation, check that the product is correct (type designation, Ur - rated voltage, Uc - continuous operating voltage, type of voltage system AC – alternate current, In – nominal discharge current, etc.). If in doubt about the appropriate model, please consult with the manufacturer's technical department (+48 29 7525784).
The method of assembling and tightening torques of screw connections are shown in Figure "Figure mounting surge arresters type PROXAR-IVN AC", which is always attached to each batch of surge arresters. For screw connections used to be typical assembly tools in the form of keys and sockets using the torque wrench.

Tightening torques of screw connections:
M6 – 6 Nm
M10 – 30 Nm
M12 – 25/50 Nm lower value is for grub screw with hexagonal socket.
M16 – 50/100 Nm lower value is for grub screw with hexagonal socket.
M20 – 60/120 Nm lower value is for grub screw with hexagonal socket.

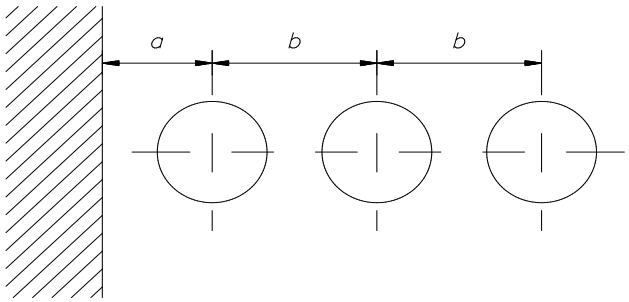


Fig. 9. Minimal mounting distances of surge arresters.

The surge arresters must be lifted using shackles or eyelets screwed into the linear clamps of the surge arrester. Table 2 and Figure No 9 show the recommended minimum distances that should be maintained during installation of arresters. These are the minimum distance between the axles of surge arrester and between the nearest grounded structure.
In the upper part of the surge arrester is located line terminal (please see line accessories), to connect the linear conductor Cu or Al. Arrester can be fitted with earth terminal (please see earth accessories). In the case of ground wire, the minimum cross-sections are the same as in the case of linear conductors. After that, you can apply metal banding tape. It is recommended to use the cables in isolation. Metal banding tape must be properly labeled according to the applicable regulations at the installation site.

6. ELECTRICAL CONNECTIONS
It is recommended to install arresters as close as possible in relation to the protected equipment, moreover, observe the rules for the shortest possible cable connections and ground connectors for better protection of surge arresters. Connections not need be insulated unless the infrastructure requires the use of insulation. See Table 2, where they are given the minimum distance surge arrester from the grounded structure and distance between surge arresters.
First of all, make sure to perform a reliable grounding connection and then connect the surge arrester to the line. It is required that all installation works were carried out in a non-voltage protected system. The minimum section of the line conductor should be: Cu – 95 mm^2; Al – 150 mm^2.
In the case when the arrester is installed under tension, must be strictly followed safety guidelines for this type of work.

NOTE: Improper installation will void the warranty on the product.

7. DISASEMBLY
When dismantling the arrester, make sure that the voltage supplied to the arrester terminal has been effectively disconnected. The line terminal must be disconnected from the line cable first. It is required that all dismantling work is performed in a voltage-free state of the protected system. During dismantling, the same safety rules as when installing the arrester must be observed.

8. OPERATION
Surge arresters type PROXAR-IVN AC does not require any particular maintenance. Sufficient periodic inspection, under the inspection of other devices operating in the installation of arresters.

PROXAR surge arresters do not require cleaning of the external surface of the insulating housing during the entire period of operation. The insulating surface may appear dirty, but this does not affect the operation of the surge arrester. However, if the surge arrester were to be washed, then in addition to the usual precautions, the following should be taken into account:
- due to the soft structure of silicone insulation, do not use high-pressure water, which may damage the surface of the insulator
- use "soft" clean water without added detergents
If any routine checks are required, only one method is sufficient - the resistive component of the leakage current measurement. For this purpose, a special meter should be used. For the actual measurement of the leakage current, the surge counter "ProCounter A" can be used, which is equipped with a leakage current meter, a diagnostic socket (for any special meters) and a counter of operations.

9. IDENTIFICATION OF THE RATING PLATE

The nameplate is shown below in Figure 10. Surge arresters that do not have a mounting base are marked by micro-dot printing on the lower electrode. Description of the symbols (description made by the micro point method):
A – rated voltage for example 96
B – continuous operating voltage for example 77
C – serial number for example 0001/2024

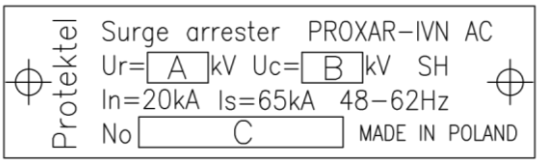


Figure 10. Nameplate for surge arrester type PROXAR-IVN AC

10. DISPOSAL OF WASTE PRODUCT - SCRAPPING

Surge arrester type PROXAR-IVN AC are environmentally friendly, but must be disposed of in accordance with local requirements in an environmentally friendly manner. Materials as far as possible should be recycled.
List of materials included in the arrester:

1. Silicone rubber
2. Aluminium
3. Ceramics - varistors based on zinc oxide
4. Aramide composite
5. Steel

The materials used for the production of the surge arresters does not pose a threat to human life and health.

11. AFTER-SALES SERVICE

In case the product is not delivered in good condition or would cause problems with the installation or during operation, please contact:

PROTEKTEL Sp. z o.o.
Piłsudskiego 92 Str.
PL 06-300 Przasnysz
Tel./Fax +48 029 7525784
E-mail: protektel@protektel.pl
www.protektel.pl
POLAND

Note: The manufacturer reserves the right to change technical data or designee without prior notice.
PROXAR® is a registered trademark of the latest family of surge arresters made by Protektel