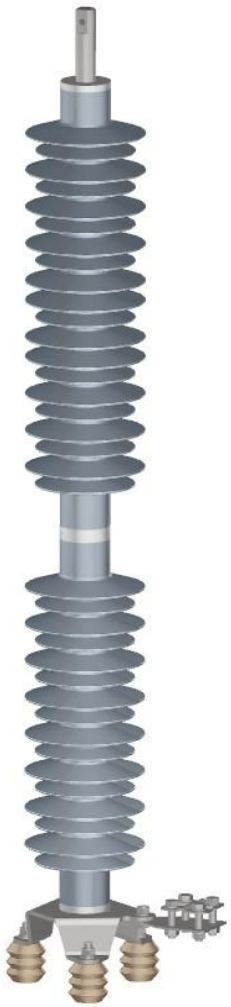
INSTALLATION AND OPERATING MANUAL FOR PROXAR-IIN AC TYPE SURGE ARRESTERS



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Instruction No PROXAR-IIN AC/IMIE/07/EN edition 01.2025

TABLE OF CONTENTS

1. GENERAL INFORMATION

Dear customer, thank you for choosing our product - the surge arrester type PROXAR-IIN 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 safety and health at work.

2. DESCRIPTION OF THE PRODUCT

Surge arresters type PROXAR-IIN 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-IIN AC can be supplied with the following equipment:

Surge arrester PROXAR-IIN 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.

Arrester classification according to EN 60099-4: 2014	SL(Station Low)
Line discharge class according to IEC 60099-4: 2009	2
System voltage (Us)	7.2 – 145 kV
Rated voltage (Ur)	6.0 – 144 kV
Nominal discharge current In 8/20 μs	10 kA
High current impulse Ihc 4/10 μs	100 kA
Rated repetitive charge transfer rating Qrs	1.6 C
Rated thermal Energy Wth	7.0 kJ/kV Ur
Single impulse energy capability (impulse duration 2 ms – 4 ms)	3,5 kJ/kV Ur
Long duration current impulse, 2000 μs	600 A
Short circuit rating	50 kA/0.2s
Service conditions:	
- ambient temperature	-40 °C do +60 °C**
- altitude up to	1000 m*
- frequency	48 – 62 Hz
Mechanical data:	
- SLL long-term load	1000 Nm
- SSL short-term load	1600 Nm
- torque	300 Nm
- tensile strength	2.5 kN

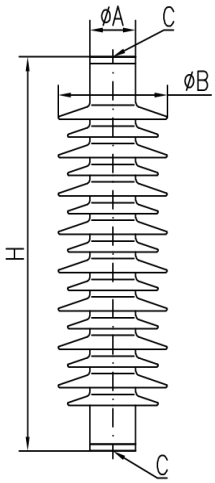
*) for higher parameters please contact with manufacturer

Table 1. **ELECTRICAL DATA**

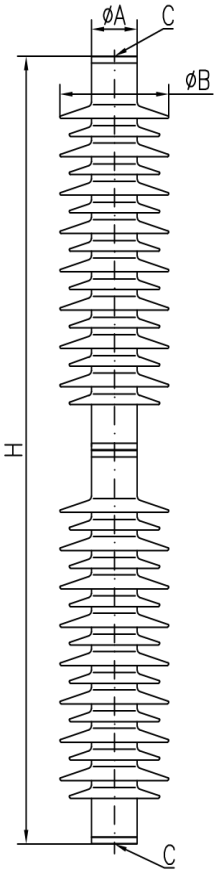
Type PROXAR-IIN AC	Rated voltage Ur	Maximum operating voltage Uc	TOV[1)]		Residual voltage in [kV] pk at a specified impulse current							
			rms	rms	Wave 1/… µs	Wave 8/20 µs				Wave 30/60 µs		
			1 s	10 s	10kA	2.5kA	5kA	10kA	20kA	250A	500A	1000A
	kV	kV	kV	kV	kV	kV	kV	kV	kV	kV	kV	kV
6	6	4.8	6.9	6.6	17.7	13.6	14.1	15.4	17.1	11.7	12.0	12.6
7	7	5.6	8.1	7.7	19.8	15.1	15.7	17.2	19.1	13.1	13.4	14.1
8	8	6.4	9.2	8.8	22.6	17.3	18.0	19.6	21.8	14.9	15.3	16.1
9	9	7.2	10.4	9.9	25.4	19.4	20.2	22.1	24.5	16.8	17.2	18.1
10	10	8.0	11.5	11.0	28.2	21.6	22.5	24.6	27.3	18.7	19.2	20.1
11	11	8.8	12.7	12.1	31.1	23.8	24.7	27.0	30.0	20.5	21.1	22.1
12	12	9.6	13.8	13.2	33.9	25.9	27.0	29.5	32.7	22.4	23.0	24.2
13	13	10.4	15.0	14.3	36.7	28.1	29.2	31.9	35.4	24.3	24.9	26.2
14	14	11.2	16.1	15.4	39.5	30.2	31.5	34.4	38.2	26.1	26.8	28.2
15	15	12.0	17.3	16.5	42.4	32.4	33.7	36.8	40.9	28.0	28.7	30.2
16	16	12.8	18.4	17.6	45.2	34.6	35.9	39.3	43.6	29.9	30.6	32.2
17	17	13.6	19.6	18.7	48.0	36.7	38.2	41.7	46.3	31.7	32.6	34.2
18	18	14.4	20.7	19.8	50.8	38.9	40.4	44.2	49.1	33.6	34.5	36.2
19	19	15.2	21.9	20.9	53.6	41.1	42.7	46.7	51.8	35.5	36.4	38.3
20	20	16.0	23.0	22.0	56.5	43.2	44.9	49.1	54.5	37.3	38.3	40.3
21	21	16.8	24.2	23.1	59.3	45.4	47.2	51.6	57.2	39.2	40.2	42.3
22	22	17.6	25.3	24.2	62.1	47.5	49.4	54.0	60.0	41.1	42.1	44.3
23	23	18.4	26.5	25.3	64.9	49.7	51.7	56.5	62.7	42.9	44.0	46.3
24	24	19.2	27.6	26.4	67.8	51.9	53.9	58.9	65.4	44.8	46.0	48.3
25	25	20.0	28.8	27.5	70.6	54.0	56.2	61.4	68.1	46.7	47.9	50.3
26	26	20.8	29.9	28.6	73.4	56.2	58.4	63.8	70.9	48.5	49.8	52.3
27	27	21.6	31.1	29.7	76.2	58.3	60.7	66.3	73.6	50.4	51.7	54.4
28	28	22.4	32.2	30.8	79.1	60.5	62.9	68.7	76.3	52.2	53.6	56.4
29	29	23.2	33.4	31.9	81.9	62.7	65.2	71.2	79.0	54.1	55.5	58.4
30	30	24.0	34.5	33.0	84.7	64.8	67.4	73.7	81.8	56.0	57.5	60.4
33	33	26.4	38.0	36.3	93.2	71.3	74.1	81.0	89.9	61.6	63.2	66.4
36	36	28.8	41.4	39.6	101.6	77.8	80.9	88.4	98.1	67.2	68.9	72.5
39	39	31.2	44.9	42.9	110.1	84.3	87.6	95.8	106.3	72.8	74.7	78.5
42	42	33.6	48.3	46.2	118.6	90.7	94.4	103.1	114.5	78.4	80.4	84.6
45	45	36.0	51.8	49.5	127.1	97.2	101.1	110.5	122.6	84.0	86.2	90.6
48	48	38.4	55.2	52.8	135.5	103.7	107.8	117.9	130.8	89.6	91.9	96.6
51	51	41.0	58.7	56.1	144.0	110.2	114.6	125.2	139.0	95.2	97.7	102.7
54	54	43.0	62.1	59.4	161.0	123.2	128.1	140.0	155.4	106.4	109.2	114.8
60	60	48.0	69.0	66.0	179.4	137.3	142.7	156.0	173.2	118.6	121.7	127.9
66	66	53.0	75.9	72.6	196.7	150.5	156.5	171.0	189.8	130.0	133.4	140.2
72	72	58.0	82.8	79.2	215.1	164.6	171.1	187.0	207.6	142.1	145.9	153.3
84	84	67.0	96.6	92.4	250.7	191.8	199.5	218.0	242.0	165.7	170.0	178.8
90	90	72.0	103.5	99.0	269.1	205.9	214.1	234.0	259.7	177.8	182.5	191.9
92	92	73.6	105,5	100,9	273,5	209,3	217,6	237,8	264,0	180,8	185,5	195,0
96	96	77.0	110.4	105.6	286.4	219.1	227.8	249.0	276.4	189.2	194.2	204.2
102	102	82.0	117.3	112.2	304.8	233.2	242.5	265.0	294.2	201.4	206.7	217.3
108	108	86.0	124.2	118.8	322.0	246.4	256.2	280.0	310.8	212.8	218.4	229.6
120	120	96.0	138.0	132.0	357.7	273.7	284.6	311.0	345.2	236.4	242.6	255.0
132	132	106.0	151.8	145.2	393.3	301.0	312.9	342.0	379.6	259.9	266.8	280.4
138	138	111.0	158.7	151.8	411.7	315.0	327.6	358.0	397.4	272.1	279.2	293.6
144	144	115.0	165.6	158.4	429.0	328.2	341.3	373.0	414.0	283.5	290.9	305.9

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

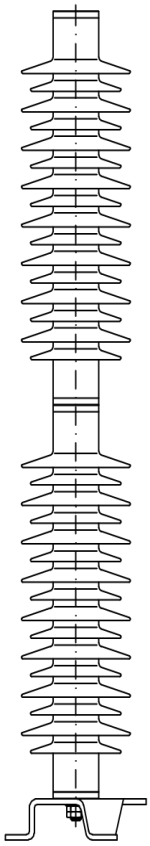
[1)]With prior energy 6.7 kJ/kV Ur



Rys. 1



Rys. 2



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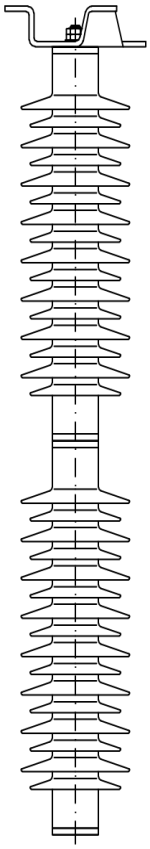
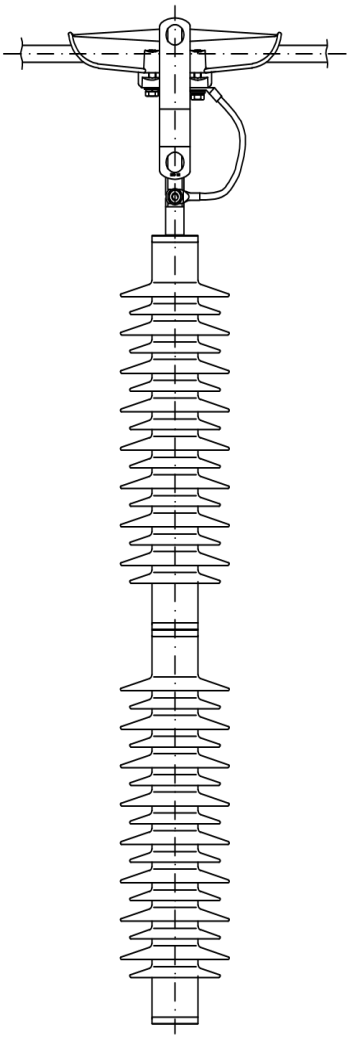


Rys. 4



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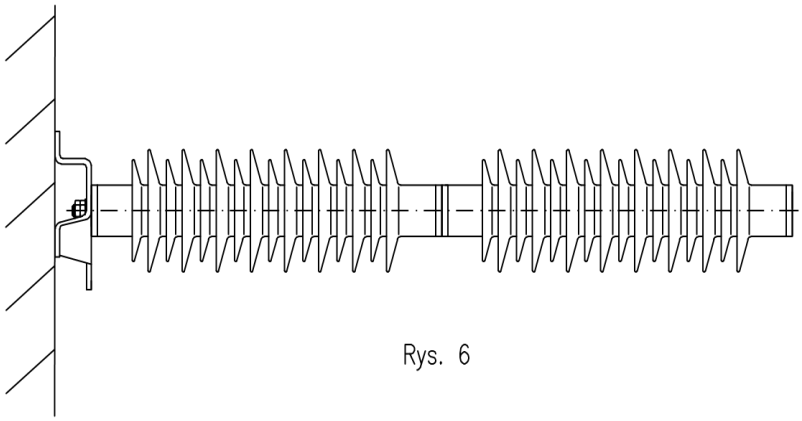

Rys. 6

Dimensional drawings No 1 and 2.
The drawings No 3 – 6 presents different system of assembling surge arresters. Drawing No 3 present vertical system of assembling. Drawings No 4 presents reverse system of assembling surge arrester. Drawing No 5 presents suspension system of assembly line surge arrester. Drawings No 6 presents horizontal system of assembling surge arrester. For other ways of assembling surge arresters please contact with the manufacturer.
Below the figures are presenting different options line and earth accessories available for use in surge arresters type PROXAR-IIN AC

Table 2. **TECHNICAL DATA FOR HOUSING**.

Us	Type PROXAR IIN 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, D				
kV	kV	kV	kV	mm	mm	mm	mm	mm	mm	mm	M	Fig.	Fig.	No	kg
	6	49	102	180	90	183	325	193	75	180	M16	1	3, 4, 6	01	1.92
	7			180	105										1.97
	8			180	110										2.02
7.2	9			180	120										2.07
	10			180	135										2.12
	11	64	132	180	140	239	544	249	75	180	M16	1	3, 4, 6	02	2.37
	12			180	150										2.62
	13			180	160										2.87
	14			210	165										3.12
12	15			220	175										3.37
	16	78	162	240	190	295	763	305	75	180	M16	1	3, 4, 6	03	3.48
	17			240	200										3.59
	18			250	205										3.70
	19			260	215										3.73
	20			270	225										3.76
	21			280	230										3.79
12.5	22			280	240										3.82
	23	93	191	300	260	351	981	361	75	180	M16	1	3, 4, 6	04	3.86
	24			310	265										3.95
	25			320	275										4.08
	26			330	280										4.21
	27			330	290										4.34
	28			340	300										4.47
	29			350	305										4.6
24	30			360	315										4.73
	33	107	221	400	355	407	1200	417	75	180	M16	1	3, 4, 6	05	5.61
	36			430	380										6.48
	39	121	251	450	405	463	1418	473	75	180	M16	1	3, 4, 6	06	6.89
	42			470	430										7.25
36	45			500	455										7.61
52	48	136	280	530	485	519	1637	529	75	180	M16	1	3, 4, 6	07	7.97
	51			550	510										8.93
	54	150	310	620	575	575	1856	585	75	180	M16	1	3, 4, 5, 6	08	9.89
	60			670	625										10.85
72.5	66	180	370	800	760	687	2292	697	75	180	M16	1	3, 4, 5, 6	09	11.66
	72			830	785										12.52
	84	300	620	950	905	1150	3712	1161	75	180	M16	2	3, 4, 5, 6	10	13.38
	90			1040	995										14.24
	92			1060	1010										15.1
	96			1090	1045										15.94
	102			1140	1095										17.4
	108			1190	1145										18.86
123	120			1330	1280										19.72
	96	330	680	1090	1045	1262	4148	1273	75	180	M16	2	3, 4, 5, 6	11	20.9
	102			1140	1095										22.1
	108			1190	1145										23.3
	120			1330	1280										24.5
	132			1430	1385										25.7
145	120	360	740	1330	1280	1374	4584	1385	75	180	M16	2	3, 4, 5, 6	12	26.9
	132			1430	1385										28.1
	138			1480	1435										29.3
	144			1530	1485										30.0

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

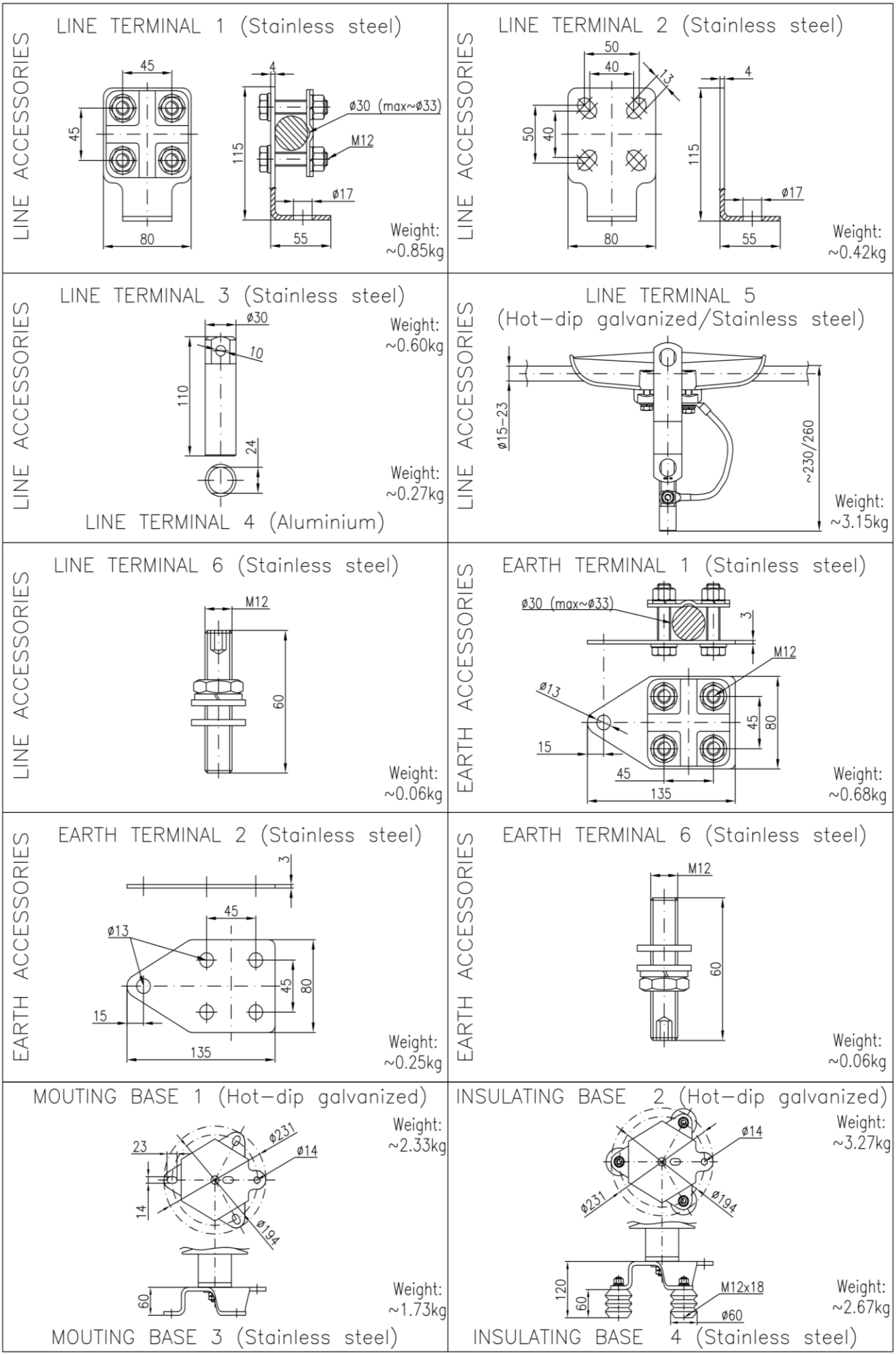

Fig.7. Dimension drawings line and earth accessories.

4. TRANSPORT, COLLECTION AND STORAGE

Surge arresters are supplied in cardboard packaging, on a pallet or in wooden boxes. Terminals 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 unloading or 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 29 752 57 84**).
The method of assembling and tightening torques of screw connections are shown in Figure "Figure mounting surge arresters type PROXAR-IIN 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.
Maximum torque on the screws:
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.
The surge arresters must be lifted using shackles or eyelets screwed into the linear clamps of the surge arrester.
Dimensions of individual surge arresters are given in table 2.
Table 2 and Figure No 8 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.

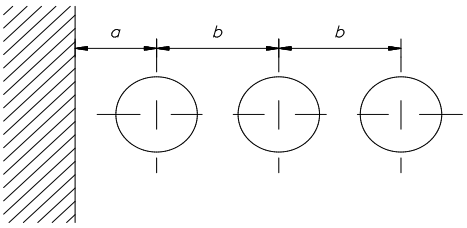

Fig. 8. Minimal distances of surge arresters.

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 – 70 mm^2; Al – 120 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. DISASSEMBLY

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-IIN 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 controls are required, only one method is sufficient – the resistive component of the leakage current measurement. Special measurer should be used for this purpose. For purpose of actual measurement of leakage current the surge counter “ProCounter A” can be used, it has leakage current measurer, diagnostic socket (for any special measurers) and counter as well.

9. IDENTIFICATION OF THE RATING PLATE

The nameplate is shown below in Figure 9. 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 0001/2014

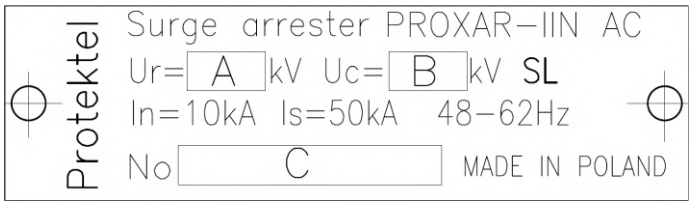

Fig.9. Nameplate for surge arrester type PROXAR-IIN AC

10. DISPOSAL OF WASTE PRODUCT SCRAPING

Surge arrester type PROXAR-IIN 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.
06-300 Przasnysz
Tel./Fax +48 029 7525784
E-mail: protektel@protektel.pl
www.protektel.pl
POLAND

Proxar

Check out our high voltage surge arresters

ATTENTION
The manufacturer reserves the right to change technical data or designee without prior notice.
PROXAR® is a registered trademark newest family of surge arresters produced by Protektel