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**GALVANIZED
LIGHTING
POLES
AND
MASTS**

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ELEKTROMONTAŻ RZESZÓW SA
with great pleasure presents fourth issue of
catalogue GALVANIZED LIGHTING POLES AND
MASTS, which will enable quick and clear review
of products from group of lighting systems.

Catalogue GALVANIZED LIGHTING POLES AND
MASTS presents four main product lines:

PARK LIGHTING

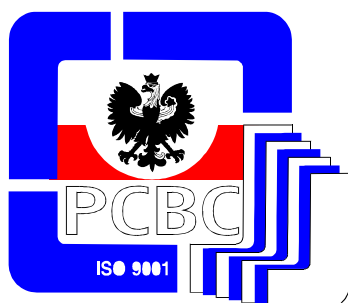
STREET LIGHTING

LIGHTING MASTS

SPECIAL CONSTRUCTIONS

Offered assortment let you make better choice of
lighting systems both aesthetic and technical point
of view.

Proposed products are mainly used in street
lighting systems, lighting of squares, railway
facilities and sports fields, there are also used for
historical towns and cities, parks, gardens,
shopping centers, residential and industry districts.



Certificate No. JSB/Z-8/1/2000

All ELEKTROMONTAŻ RZESZÓW SA products
guarantee high quality and are used for many
years even in hard climate. Quality of
manufactured products is confirmed by Integrated
Management System certificated in accordance to
PN-ISO 9001, PN-EN ISO 14000, PN-N 18001
standards.

BASE ADVANTAGES RESULTING IN USING LIGHTING POLES AND MASTS:

CORROSION RESISTANCE – hot-dip galvanizing cause that durability of poles is longer and using prefabricated concrete foundation provide corrosion protection in the point of contact pole with ground.

A BIG DYNAMIC AND MECHANICAL STRENGTH – original construction of pole provide longer durability and greater attenuation of vibration, which reduce failure frequency of lanterns and lamps.

FLEXIBILITY AND LIGHTWEIGHT – results of car accidents concerning pole's deformation are remissive than crash with concrete pole.

UNUSALLY LIGHTWEIGHT – which results in easy transport, using a special system of transportation enable to transport big number of poles on one lorry.

MODERN SHAPE – wide range of using; poles are often used in lighting systems for: streets, squares, railway facilities and sports fields, there are also used for historical towns and cities, parks, gardens, shopping centers, residential and industry districts.

POSSIBILITY OF PAINTING BY USING WIDE RANGE OF COLOURS.

SAVING OF OPERATING COSTS.

OVER 100.000 INSTALLED POLES CONFIRM ALL ADVANTAGES

GENERAL INFORMATION

DESCRIPTION OF POLES

1. ELEKTROMONTAŻ RZESZÓW SA produce galvanized lighting poles and masts from 2,5 m up to 30 m, and it is produced according to both Polish and International standards. The company holds patents and utility patterns for technical solutions used in construction of lighting poles and masts.

2. Standard definitions and terms in the field of lighting poles and masts according to EN 40.

2.1. Lighting pole (lighting mast).

Support intended to hold one or more lanterns consisting of one or more parts: a pole, possibly an extension piece and a bracket. Constructions above 12 m are described as a masts.

2.2. Nominal height (H).

The distance between the centre line of the point of entry of the lanterns and the bottom of the flange plate for fixing pole to foundation.

2.3. Straight pole.

A pole, without bracket, with an end-piece to support the lanterns directly to pole.

2.4. Pole with bracket.

A pole to support a lantern or lanterns by means of one or more brackets (arms) which are integral with, or demountable from, the pole.

2.5. Bracket.

A component (arm) used to support a lanterns at a definite distance from the axis of the lower straight portion of a pole, of single, double or multiple form.

2.6. Bracket projection (W).

Horizontal distance from longitudinal axis of pole and the end of bracket.

2.7. Bracket fixing.

The connecting part on a top of pole for securing a separate bracket. It may be of the same size or a different cross-section from the pole. (currently in poles „S” series not used).

2.8. Lantern fixing.

The connecting part on the end of a bracket for securing a lantern. It may be integral part of pole or bracket.

2.9. Lantern fixing angle.

Angle between the axis of the lantern fixing and the horizontal.

2.10. Doors.

A cover closing opening in the bottom part of pole, providing access to base compartment, in which electrical equipment may be attached.

2.11. Cable entry slot.

Opening in the pole's foundation (or pole) for the cable entry to base compartments.

2.12. Planting depth.

The length of foundation (or pole) below the intended ground level.

2.13. Base plate.

Used for poles directly planted (without foundation) below ground level (in poles „S” series not used).

2.14. Flange plate.

A plate, with an opening for cable entry, welded to pole, to allow it to be secured to a foundation or to other structures.

3. Production.

Poles and masts are produced from steel strip or steel sheet with thickness from 2 mm to 4 mm, bended to profile with polygonal cross-section or circle cross-section with constant taper. There are fitted for fixing to prefabricated concrete foundation or foundation executed on the place of pole location.

4. Surface protection.

The exterior and the interior surface is corrosion protected by using hot-dip galvanizing, which gives zinc coating with thickness not less than 450 g/m². Durability of such protection guarantee using poles and masts from a few to tens of years depending on type of atmosphere (industry, cities, seaside, countryside). For areas with a big truculence of atmosphere (sulphur dioxide, nitric oxide, salt compounds), is required for poles additional painting. For clients wish poles and masts are painted so the durability of products can be longer.

5. Base compartment.

Each lighting pole is equipped in base compartment with door, which provide access and protect electrical equipment of pole. Base compartment enable attachment of fuseboard, which dimensions (width x depth x height) are maximum:

for park poles	H= 2,5÷3 m	- 80 x 80 x 300 mm,
for park poles	H= 4÷5 m	- 90 x 90 x 300 mm,
for street poles	- 110 x 110 x 300 mm,	
for masts	- 115 x 115 x 300 mm.	

Lighting masts have two base compartments to allow comfortable attachment of electrical equipment. Inside base compartment is used earthing tap with opening for M 10 bolt.

GENERAL INFORMATION

DESCRIPTION OF POLES

6. Fixing of poles and masts.

Lighting poles and masts have constant attached flange plate so it can be fixed to concrete foundation or other stable ground. Fixing is done by means of bolts or anchor bolts. Hexagonal and conical street lighting poles from 6 m up to 10 m are equipped in hinges which simplify pole installation, octagonal poles can be equipped in hinges for client's wish.

Nuts fixing flange plate to foundation are additionally protected against unscrewing and corrosion by safety caps resistant on atmosphere and mechanical deformation.

7. Brackets.

We produce different kinds of brackets for securing lanterns. See examples on pages 7 and 8.

DENOTATION USED IN CATALOGUE

H	- Nominal height,
H1	- End-piece height,
H2	- Bracket height,
W	- Bracket projection,
DE	- Diameter of pole/mast near flange plate (polygonal)
d	- Diameter of lantern fixing, (end-piece),
L	- Length of bracket end-piece,
m	- Weight of pole with equipment (bracket),
S	- Exterior surface of pole,
M _g	- Stability moment of foundation,
M _F	- Moment describing strenght near flange plate,
M _w	- Overturning moment,
n	- Number of anchor bolts in foundation,
Ø _S	- Diameter of anchor bolt,
AxB	- Fixing centres of anchor bolts in foundation,
ØM	- Diameter of fixing centers of anchor bolts for mast,
a	- Dimension of foundation side,
h	- Length (depth) of foundation,
Z	- Taper of sides.

ORDERING

The order should include:

- type of pole or mast, height in [m],
- type of bracket or lighting head, is necessary to describe number of arms, projection, arms fixing centers angle, lantern fixing angle,
- diameter of end-piece to secure lantern or its type; projector dimensions, type of lantern for decorative bracket,
- type of foundation for poles or type of foundation ring for masts,
- number of each elements,
- additional information: i.e. colour of painting.

An example of order:

a) Pole S-120 - 10 pcs

Bracket P (double/1m/ Ø48/15° for S-120) - 10 pcs

Cable joint IZK/2 fuses/ - 10 pcs

Foundation F160 - 10 pcs

Screwing elements (for F160) - 10 sets

c) Pole S-40 - 30 pcs

Decorative bracket W1101/triple/Ø48/ -30 pcs

Fuseboard ELMONT/3 fuses/ - 30 pcs

Foundation F100 - 30 pcs

Screwing elements (for F100) - 30 sets

b) Pole S-95 -5 pcs

Wysięgnik (1 ramienny/1m/Ø48/15° do S-95) - 5 pcs

Fuseboard ELMONT/1 fuse./ - 5 pcs

Foundation F150 - 5 pcs

Screwing elements, hinges (for F150) - 5 sets

d) Mast M-160 - 8 pcs

Lighting head W 4 (0,5m/Ø48/15° -for street lanterns) - 8 pcs

Foundation ring for M -160 - 8 pcs

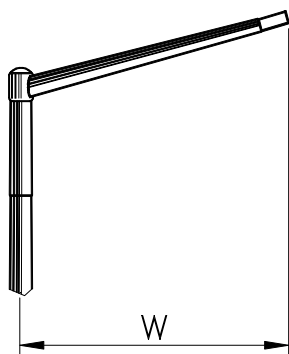
Fuseboard ELMONT/3 fuses./ - 8 sets

Note: In case of ordering poles and mast with dimensions and parameters not included in catalogue please contact Zakład Produkcji Urządzeń ELEKTROMONTAŻ Rzeszów SA, ul. Przemysłowa 8, tel. , (017) 85-25-981, (017) 86-41-800, tel/fax (017) 86-21-647

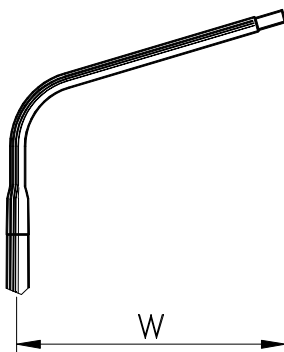
We reserve the right to make changes in construction solutions, and in special situations we will inform users and our customers about changes.

GENERAL INFORMATION

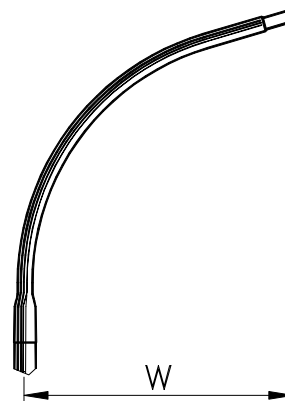
BRACKETS FOR STREET LIGHTING POLES



Type „St”



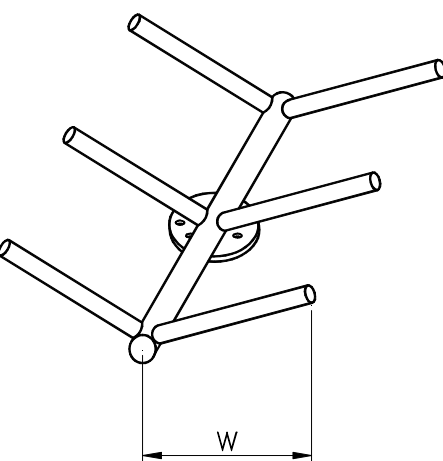
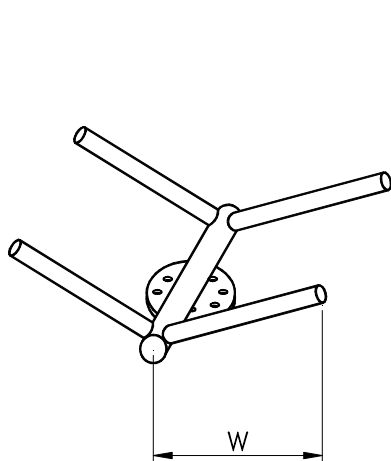
Type „St-Y”



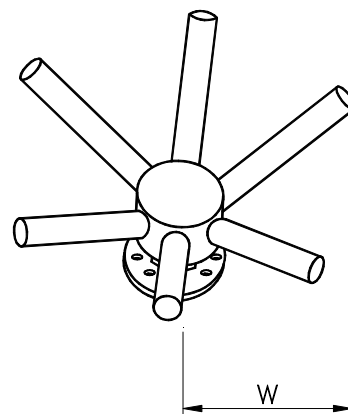
Type „St-X”

Brackets are used for street lighting poles. Brackets are produced as single, double, triple and four-armed and equipped in end-piece to secure lanterns with dimension $\varnothing 48 \times 100$ mm or $\varnothing 60 \times 100$ mm in symmetric configuration. Lantern fixing angle is 15° . We also produce brackets with lantern fixing angle 5° . The most often use dimensions are $W = 1,0$ m or $1,5$ m. Six-armed brackets have dimension $W=0,5$ m. Not symmetric system of brackets is always agreed with customer.

LIGHTING HEADS FOR LIGHTING MASTS



Type W



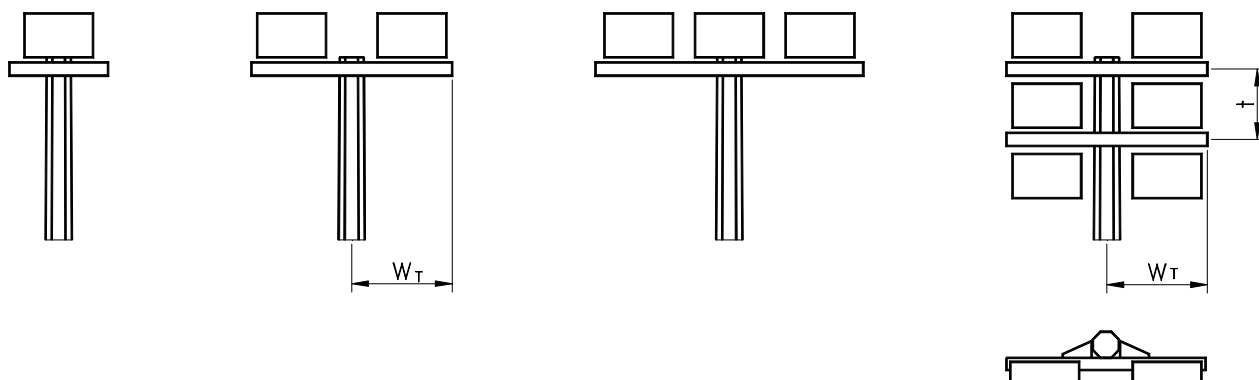
Type G

Lighting heads W type are produced as double, four-, six-armed in alternate configuration and are used for lighting masts. End-piece securing lanterns has dimension $\varnothing 48 \times 100$ mm or $\varnothing 60 \times 100$ mm. Lantern fixing angle is 15° . The most often dimension is $W = 0,5$ m or $1,0$ m.

Lighting heads G type are produced as triple, four-, six-armed in radial system and are used for lighting masts. Usual produce lighting heads have dimension $W = 0,5$ m.

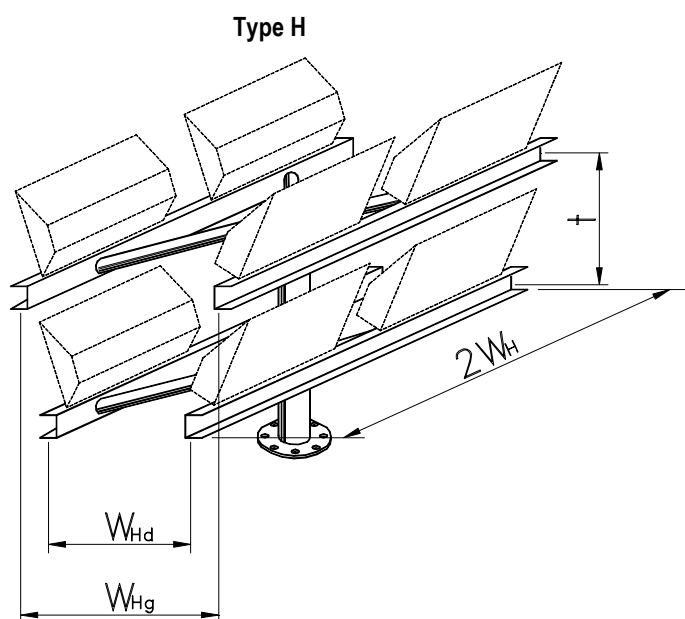
GENERAL INFORMATION

ELEMENTS OF SUPPORTING CONSTRUCTION

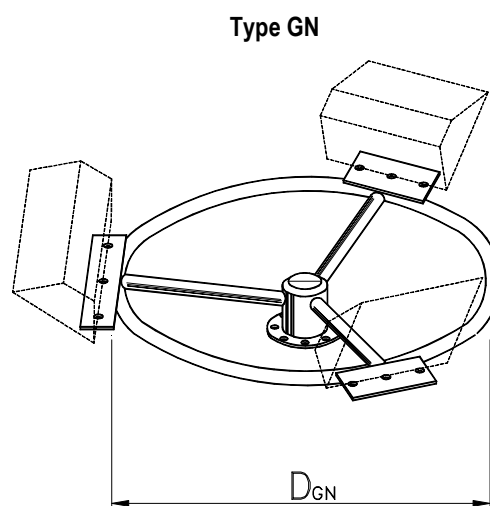


Cross-bars T for securing projectors we produce in dimension $2W_T = 0,5\text{m}$; 1m ; $1,5\text{m}$ and are mainly used for lighting masts and octagonal poles. Dimension W and t should be collected depending on used lighting equipment, concerning wind areas and mast height.

SUPPORTING ELEMENTS FOR LIGHTING MASTS



Lighting head H type for four projectors are used for lighting masts. The most often used dimension is $W_H = 0,6\text{m}$; Weight of lighting heads - 20 kg.

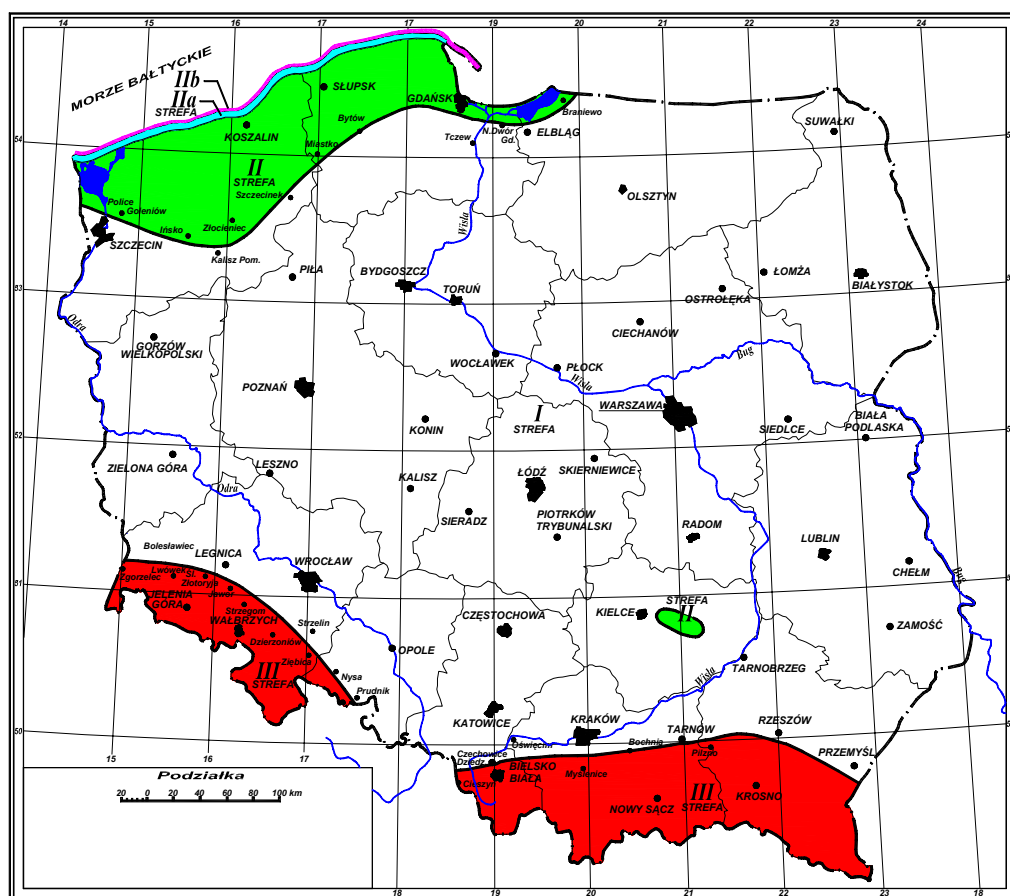


Lighting heads GN for projectors arrange around the circle are used for lighting masts. The most often used diameter is $D_{GN} = 0,9\text{m}$; Weight of lighting heads is 20 kg.

- Notes:
1. Choosing lanterns and projectors and quantities, is necessary to concern maximum load of pole or mast, i.e. maximum surface of installed lanterns and supporting construction and it weight.
 2. Cross-bars T and lighting heads H are produce from close profile $\square 60$ or open $\square 60$.
 3. We realize also orders for lighting heads according to individual designs.

GENERAL INFORMATION

DESCRIPTION OF WIND LOADS



The map of wind areas acc. to PN-77/B-02011

Poland is divided into three wind areas:

- AREA I** - covers main part of country (mountain range Łysogóry belongs to area II)
- AREA II** - covers strip of land from Pojezierze Pomorskie to seashore oraz narrow strip of land around Zatoka Gdańska and Łysogóry. Area II is divided into two areas on West from Władysławowo:
 - II a** - coastal strip of land, about 2 km wide.
 - II b** - coastal strip of sea and strip of dune, 200 m wide.
- AREA III** - covers a land from Przedgórze Sudeckie and Pogórze Karpackie to the top of mountains. The border of areas should be concerned as strips about 5 km wide, taking on border value q_k on both sides of areas depending on area configuration and building exposition.

Area	V_k	q_k
	m/s	Pa
I	20	250
II (III 200m n.p.m.)	24	350
II a (III 400m n.p.m.)	27	450
II b (III 600m n.p.m.)	30	550
III	24-47*	**

V_k - wind speed (medium ten minutes speed of wind on height 10m above ground level at open space).

* - wind speed in area III is from 24 m/s on border of areas I and III up to 47 m/s in mountains.

q_k - pressure of wind speed,

** - q_k in III area is calculated depending on $q_k = 250 + 0,5 H \geq 350$ (H height above ground level).

GENERAL INFORMATION

MECHANICAL LOADS

In catalogue are included two kinds of mechanical stresses:

- constant, depend on construction weight and lantern weight on the top of pole or mast.
- loads resulting in wind speed according to PN-77/B-02011.

For street and park poles the maximum height of installation is 800 m a.s.l.

In tables are included maximum loads for pole/mast, i.e. maximum weight and surface of lanterns and supporting constructions depending on pole/mast localization for medium values according to PN-77/B-02011. There is also included maximum value of MF bending moment, referring to maximum loads for pole/mast (i.e.. maximum weight and surface of lanterns and supporting constructions).

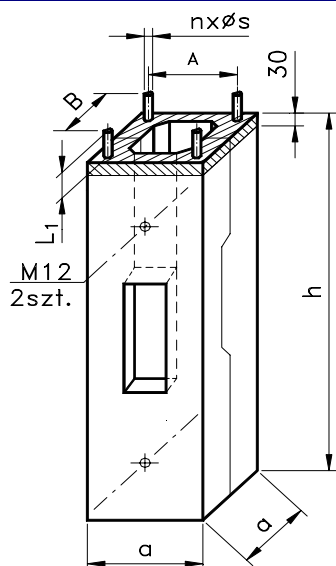
CALCULATION OF FOUNDATION

Elektromontaż Rzeszów SA propose prefabricated foundation for park and street lighting poles, which meet above strenght conditions (included in tabel of allowed load of poles) of system pole-lanterns and can be used in all wind areas throughout Poland. It provide sinking foundation into ground concerning areas of ground freezing.

Foundation of mast included in tables enable sinking into ground with low strenght parameters. For design of foundation with well-known ground strenght is necessary to use PN-80/B-03322 standard.

FOUNDATION FOR GALVANIZED LIGHTING POLES AND MASTS

PREFABRICATED CONCRETE FOUNDATIONS



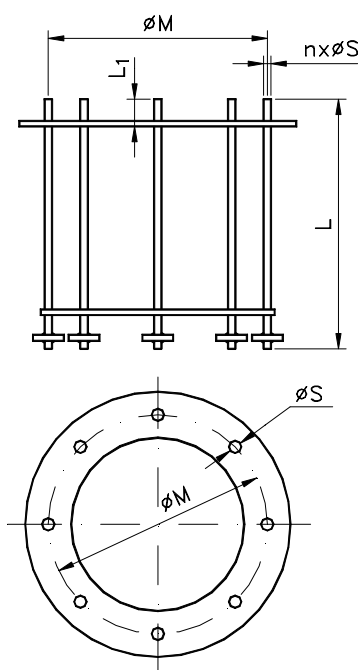
Using: Foundations are designed for installation lighting poles "S" type and other construction, where restrain moment is not bigger then M_g , and ground strenght $G=230 \text{ kN/m}^2\text{m}$ (acc. to BS 5649: EN 40: part 2).

Construction: Foundation consist of two parts, what makes easier transport and installation of it. There are produced from reinforced concrete B 15 class with special slots to entry cables with max. cross-section $4 \times 95 \text{ mm}^2$. Steel elements of foundation: bolts, anchor bolts, connectors are galvanized.

TYPE	h	a	A x B	L ₁	n x øS	m	M _g
	m	m	mm	mm		kg	kNm
F 75*	0,75	0,3	190 x 190	60 ⁺²	4 x M 20	80	2,9
F 100	1,0	0,3	190 x 190	60 ⁺²	4 x M 20	140	6,9
F 150	1,5	0,3	220 x 220	70 ⁺⁵	4 x M 24	220	23,3
F 160	1,55	0,4	250 x 250	80 ⁺⁵	4 x M 24	300	34,3

*- uniform foundation (one part) designed for park poles $H \leq 4\text{m}$, where pole load not exceed maximum foundation load $M_F \leq M_g$.

FOUNDATION RINGS



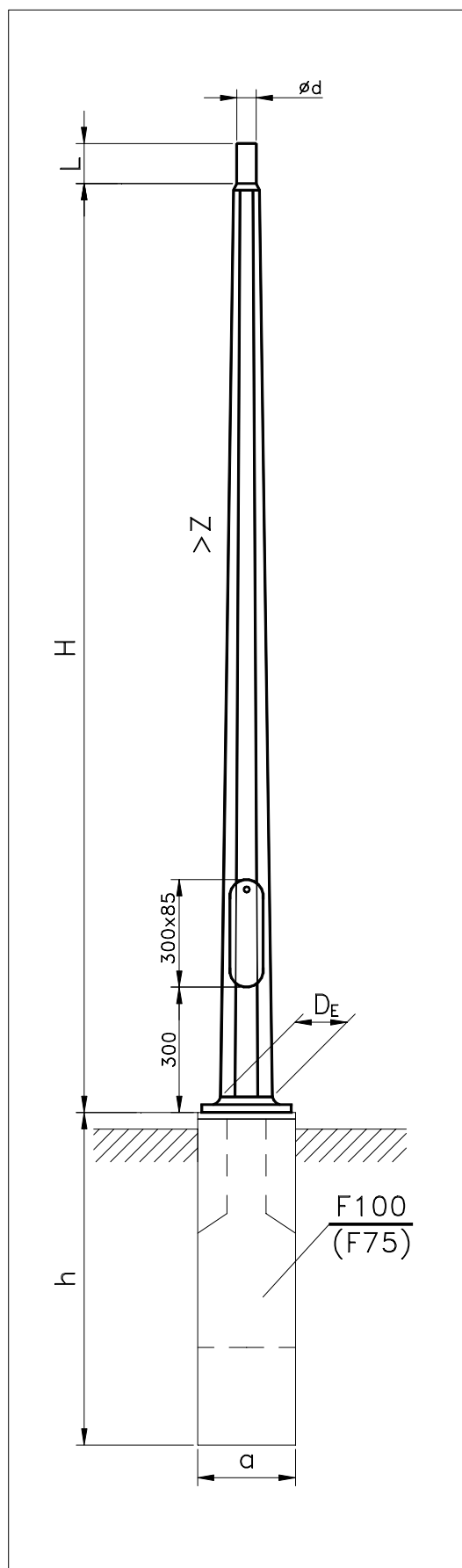
Using: Foundation ring is used for foundation poured in the places of location mast or traction pole. Dimensions of foundation block $a \times a \times h$ should be calculated depending od individual condition of loads and location or should be taken from tabels inside catalogue . It is necessary to remember about preparing cable routes.

Construction: Foundation ring is produced from construction steel and it is corrosion protected. Foundation ring is supplied ready to install.

TYPE	ø M	n x øS	L	L ₁	m
	mm	mm	mm	mm	kg
For lighting masts					
M 120	450	8 x M24	700	85	38
M 140	450	8 x M24	700	85	38
M 160	550	8 x M24	700	85	41
M 180	550	8 x M24	700	85	41
M 200	600	12 x M30	800	85	80
M 220	600	12 x M30	800	85	80
For traction poles and masts					
ST-85/1,5	550	8 x M24	700	85	41
ST-85/2,5	550	8 x M30	900	95	65
M-240K	670	12 x M30	660	85	85
M-300K	670	12 x M30	660	85	85
W 30	938	24 x M24	705	85	150
W 35	938	24 x M30	1150	100	240

PARK LIGHTING

HEXAGONAL PARK LIGHTING POLES



Technical data

TYPE	H	d/D _E	Z	L	m	S	axaxh
	m	mm	mm/m	mm	kg	m ²	m
S-30	3,0	48/116	19,7	100	23	1,1	0,3x0,3 x0,75
S-40	4,0	48/144	21,8	100	28	1,6	0,3x0,3 x1,0(0,75)
S-50	5,0	48/144	17,4	100	35	2,0	0,3x0,3 x1,0



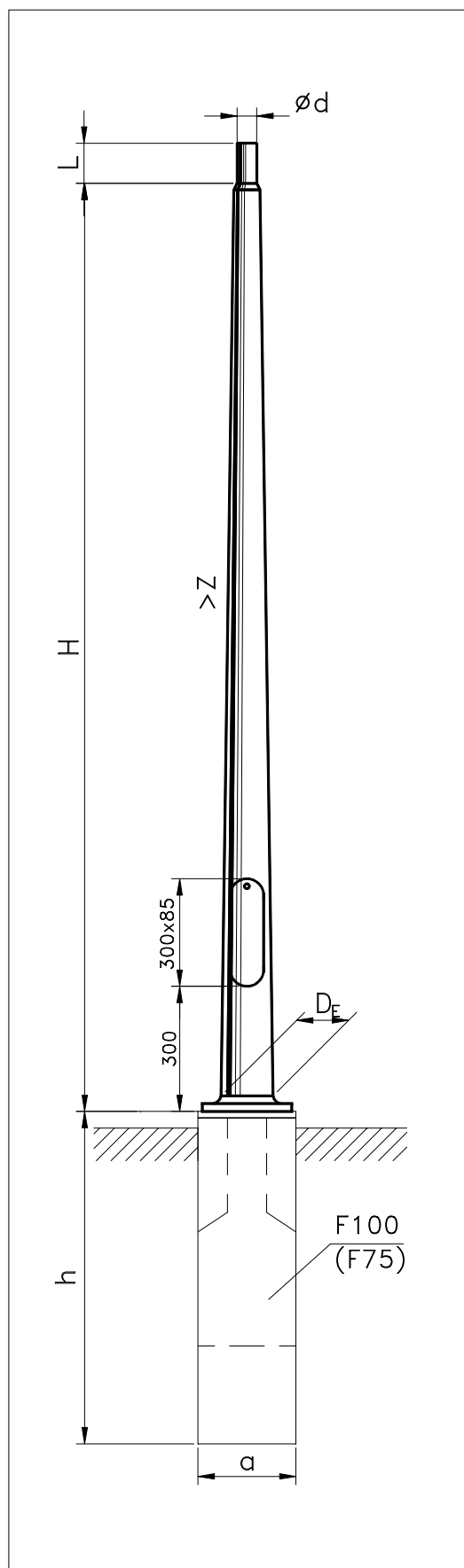
Loads data

TYPE	Weight of lanterns	Permissible surface of lanterns [m ²] Wind area acc. to PN - 77/B - 02011					MF
	kg	I	II	IIa	IIb	III*	kNm
S-30	50	0,7	0,5	0,4	0,3	0,2	2,4
S-40	50	0,66	0,42	0,28	0,2	0,13	3,2
S-50	50	0,44	0,25	0,14	0,06	0,02	3,2

Installation of poles in area III acc. to PN-77/B-02011 refers to height up to 800 m n.p.m.

PARK LIGHTING

CONICAL PARK LIGHTING POLES



Technical data

TYPE	H	d/DE	Z	L	m	S	axaxh
	m	mm	mm/m	mm	kg	m ²	m
S-30C	3,0	48/122	22,5	100	23	0,85	0,3x0,3 x0,75
S-40C	4,0	48/144	22,5	100	28	1,1	0,3x0,3 x1,0(0,75)
S-50C	5,0	48/142	12,1	100	35	1,35	0,3x0,3 x1,0



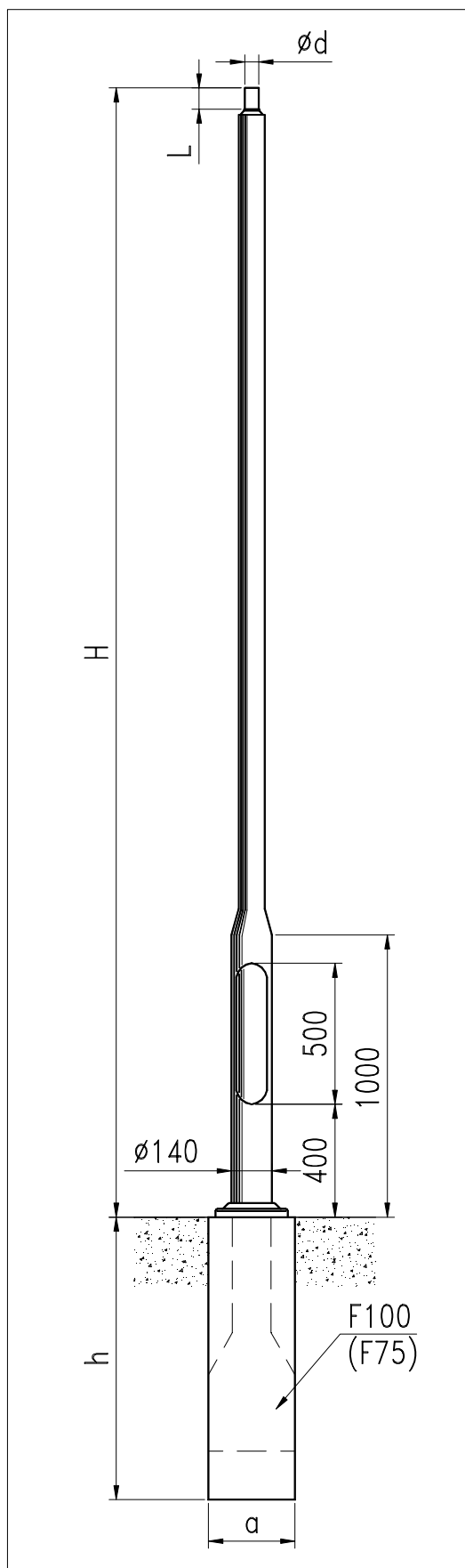
Loads data

TYPE	Weight of lanterns	Permissible surface of lanterns [m ²] Wind areas acc. to PN - 77/B - 02011					MF
	kg	I	II	IIa	IIb	III*	kNm
S-30C	50	1,70	1,17	0,89	0,70	0,57	3,6
S-40C	50	1,34	1,10	0,67	0,52	0,41	4,3
S-50C	50	1,30	0,90	0,66	0,51	0,40	4,9

* - Installation of poles in area III acc. to PN-77/B-02011 refers to height up to 800 m n.p.m.

PARK LIGHTING

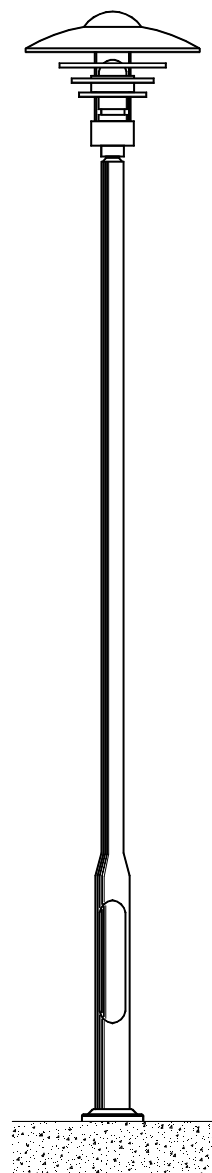
TUBULAR PARK LIGHTING POLES



Technical data

TYPE	H	Ød/D _E	L	m	S	axaxh
	m	mm	mm	kg	m ²	m
S-40SRw	4,0	48/140	100	42	1,01	0,3x0,3x1,0(0,75)*
S-50SRw	5,0	48/140	100	52	1,35	0,3x0,3x1,0

*- foundation depends on pole load



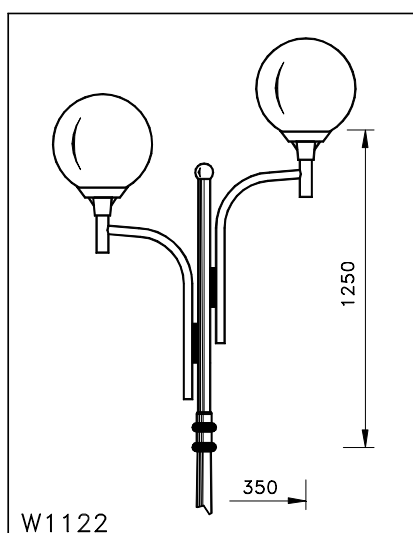
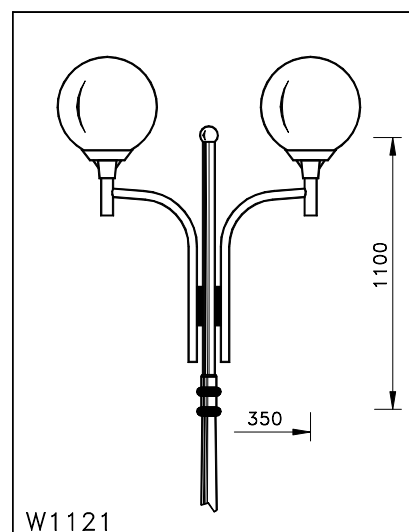
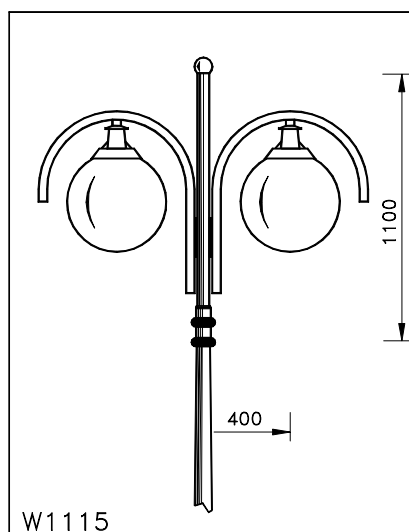
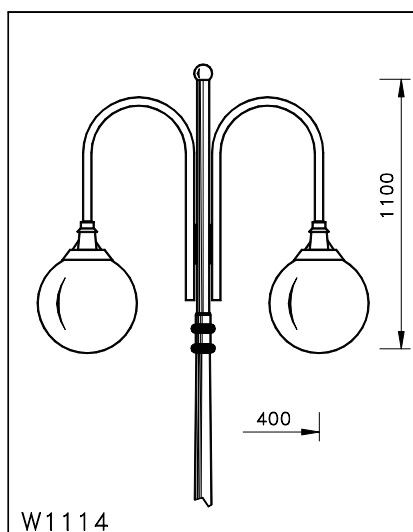
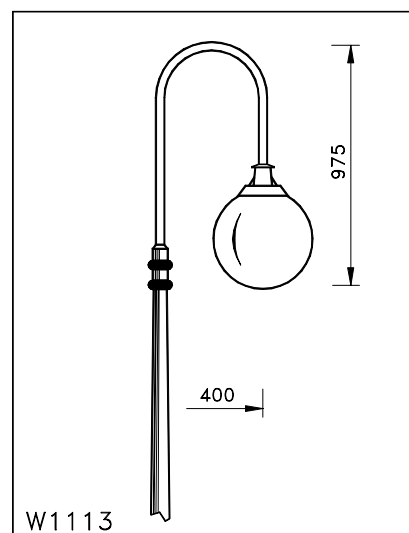
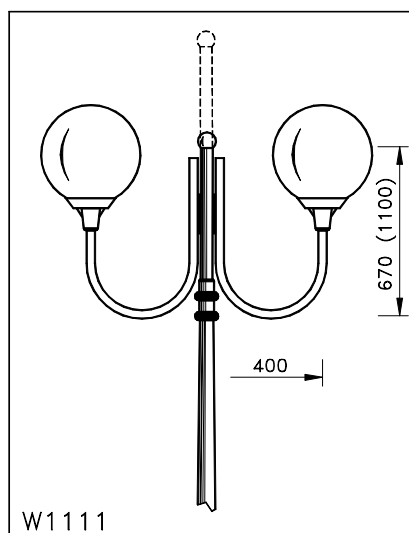
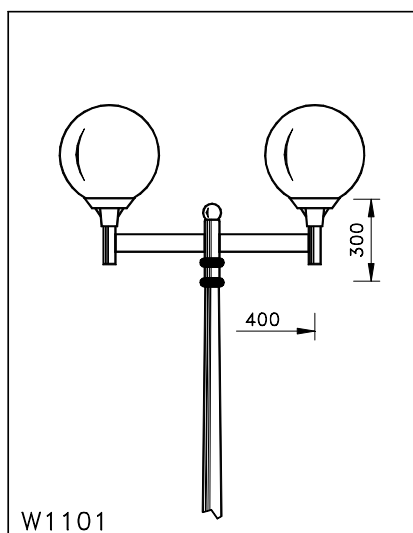
Load

TYP	Weight of lanterns	Wind areas acc. to PN - 77/B - 02011					M _F
	kg	Permissible surface of lanterns [m ²]					kNm
		I	II	IIa	IIb	III**	
S-40SRw	50	1,9	1,3	1,0	0,82	0,68	6,3
S-50SRw	50	1,4	0,9	0,7	0,55	0,44	5,9

** - Installation of poles in area III acc. to PN-77/B-02011 refers to height up to 800 m n.p.m.

PARK LIGHTING

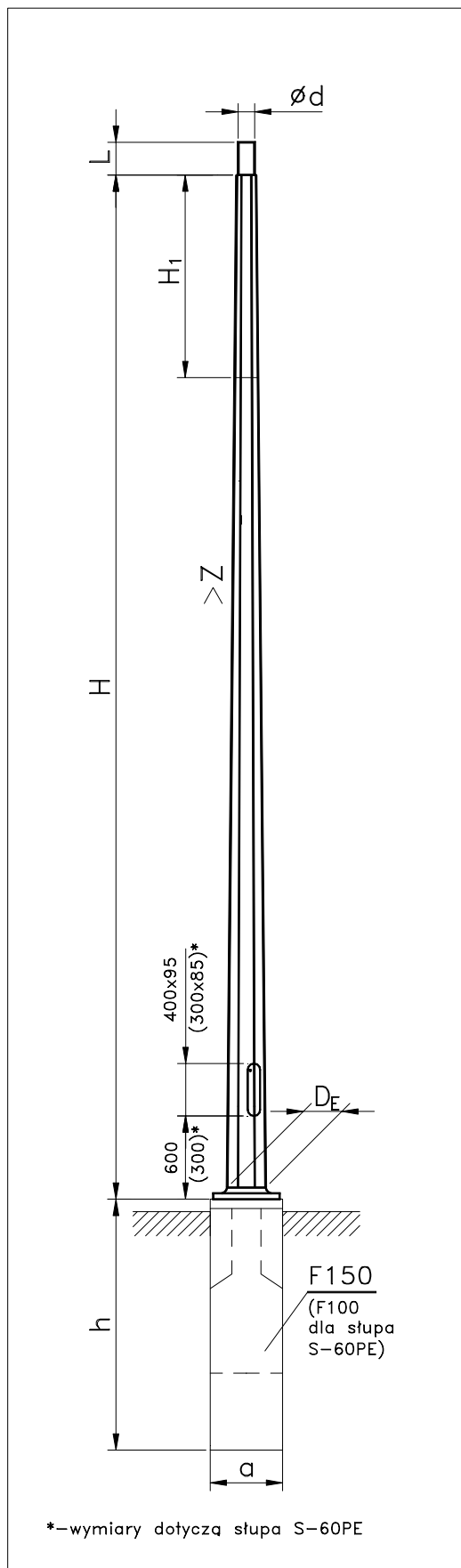
DECORATIVE BRACKETS FOR PARK LIGHTING POLES W1000 SERIES



Decorative brackets W1000 series are additional equipment for park lighting poles with hexagonal and circular cross-section. There are offered in a few versions, with one, two, three and four arms, and also with additional lighting point in the axis of decorative bracket. There are made from pipes or steel, close sections hot galvaneizing, or metallizing. On additional wish elements of decorative brackets can be painted. Lanterns are additional equipment of decorative bracket. There is also possibility to produce decorative brackets with shapes varying from drawings.

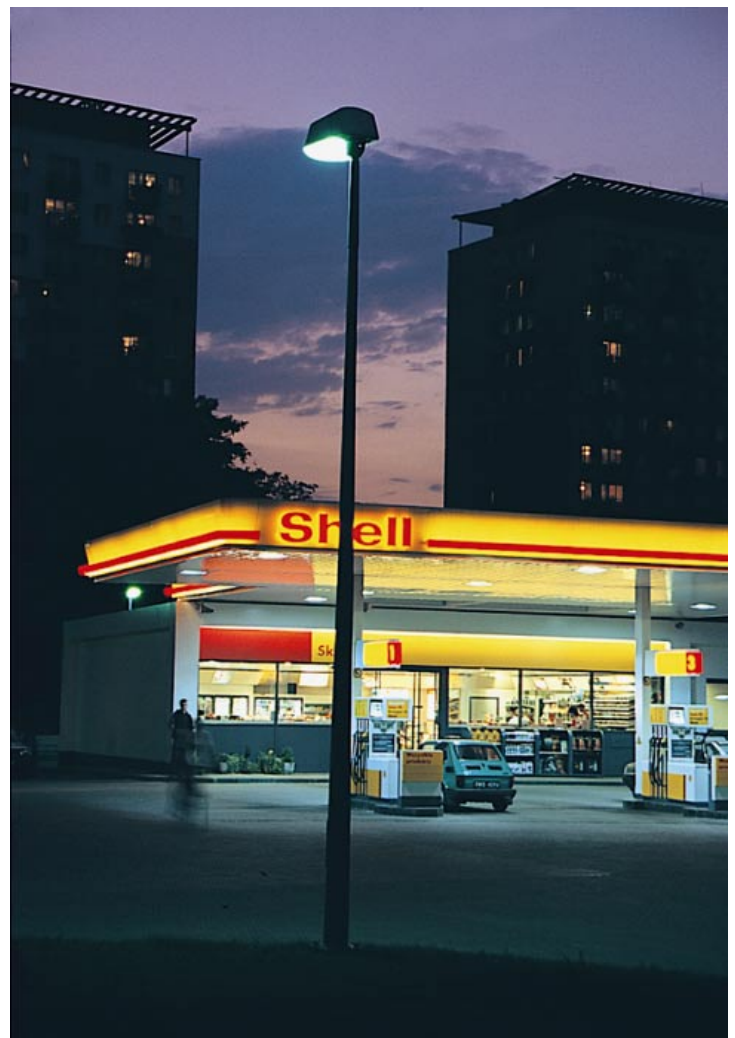
STREET LIGHTING

POST TOP HEXAGONAL STREET LIGHTING POLES



Technical data

TYPE	H	H ₁	d/DE	Z	L	M	S	axaxh
	m	m	mm	mm/m	mm	Kg	m ²	m
S-60PE	6	0,5	60/145	14,2	100	40	2,4	0,3x0,3 x1,0
S-80P	8	0	60/177	13,8	100	67	3,2	0,3x0,3 x1,5
S-90P	9	0	60/177	12,2	100	74	3,6	0,3x0,3 x1,5
S-100P	10	0,5	60/177	11,6	100	78	4,0	0,3x0,3 x1,5



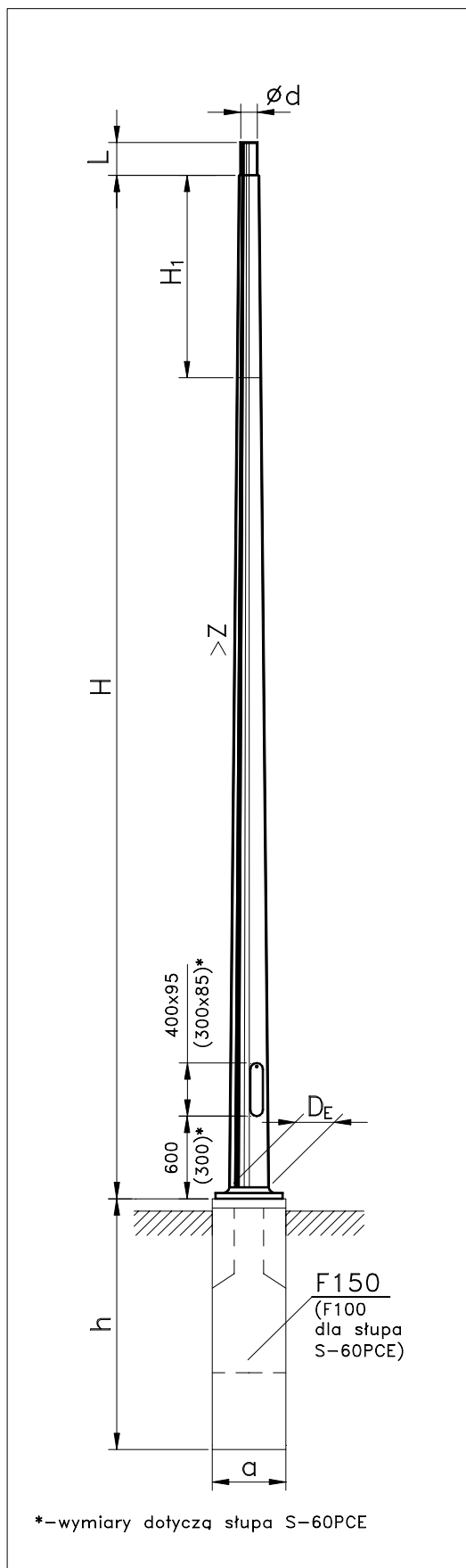
Loads data

TYPE	Weight of lanterns kg	Permissible surface of lanterns [m ²] Wind area acc. to PN - 77/B - 02011					MF kNm
		I	II	Ila	lib	III*	
S-60PE	50	0,98	0,61	0,41	0,28	0,19	7,0
S-80P	50	1,6	1,02	0,68	0,48	0,34	15
S-90P	50	1,0	0,48	0,20	0,05	0,01	15
S-100P	50	1,36	0,79	0,48	0,29	0,15	18

* - Installation of poles in area III acc. PN-77/B-02011 refers to height up to 800 m n.p.m.

STREET LIGHTING

POST TOP CONICAL STREET LIGHTING POLES



Technical data

TYPE	H	H ₁	d/DE	Z	L	m	S	axaxh
	m	m	mm	mm/m	mm	kg	m ²	m
S-60PCE	6	0,5	60/144	12	100	42	2,2	0,3x0,3 x1,0
S-80PC	8	0,5	60/172	12	100	61	3,2	0,3x0,3 x1,5
S-100PC	10	0,5	60/196	12	100	80	4,5	0,3x0,3 x1,5

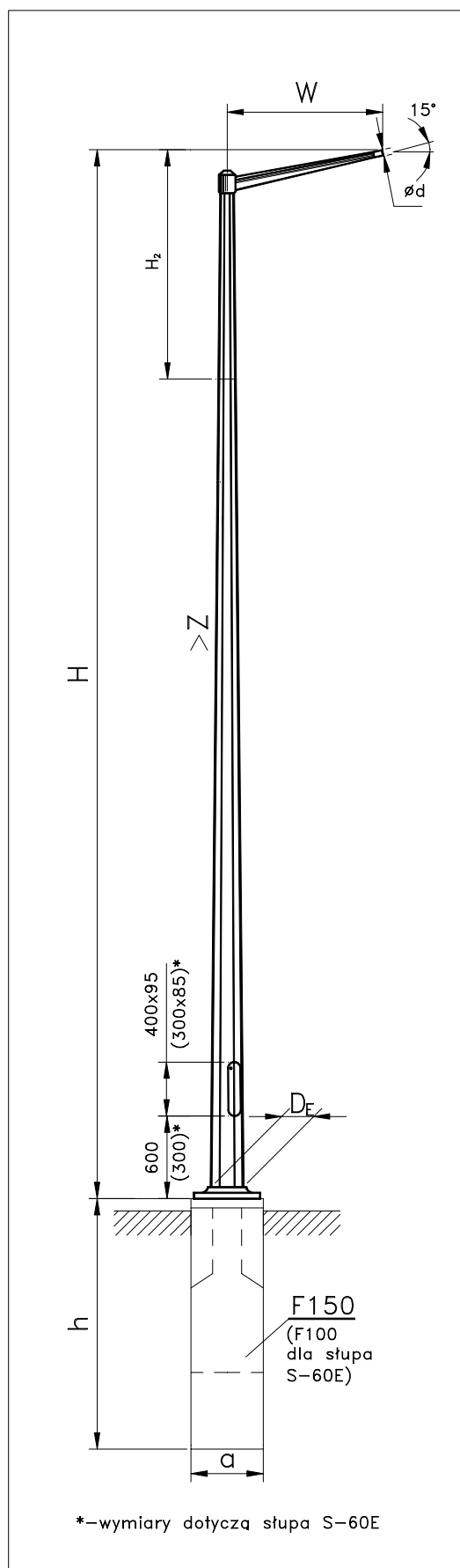
Loads data

TYPE	Weight of lanterns	Permissible surface of lanterns [m ²] Wind area acc. to PN - 77/B - 02011					MF
	kg	I	II	IIa	IIb	III*	kNm
S-60PCE	50	1,08	0,71	0,51	0,38	0,29	6,5
S-80PC	50	1,5	1,4	0,66	0,46	0,31	10,1
S-100PC	50	1,4	0,84	0,53	0,32	0,18	12,8

* - Installation of poles in area III acc. to PN-77/B-02011 refers to height up to 800 m n.p.m.

STREET LIGHTING

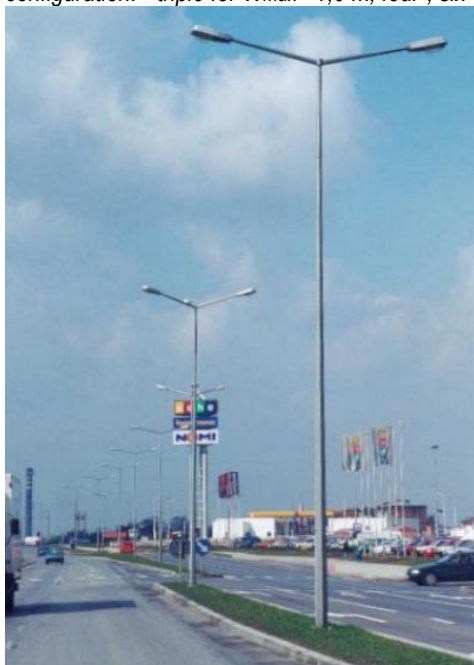
HEXAGONAL STREET POLES WITH BRACKET 1- , 2- ARMED



Technical data

TYPE	W	H	H ₂ **	d/DE	Z	m**	S**	axaxh
	m	m	m	mm	mm/m	kg	m ²	m
S-60E	1,0	6,1	0,8			42	2,6	
	1,5	6,2	0,95	48/145	14,8	43	2,7	0,3x0,3 x1,0
	2,0	6,3	1,1			45	2,8	
S-80	1,0	8,1	0,8			72	3,5	
	1,5	8,2	0,95	48/177	13,8	73	3,6	0,3x0,3 x1,5
	2,0	8,3	1,1			75	3,7	
S-95	1,0	9,1	0,8			79	3,9	
	1,5	9,2	0,95	48/177	13,8	80	4,0	0,3x0,3 x1,5
	2,0	9,3	1,1			82	4,1	
S-100/6	1,0	10,1	0,8	48/177	11,6	83	4,4	0,3x0,3 x1,5
	1,5	10,2	0,95			84	4,5	

Hexagonal street poles, can be also produced with many arms in symmetric configuration: - triple for W_{max} =1,0 m, four-, six-armed for W_{max} =0,5 m.



Loads data

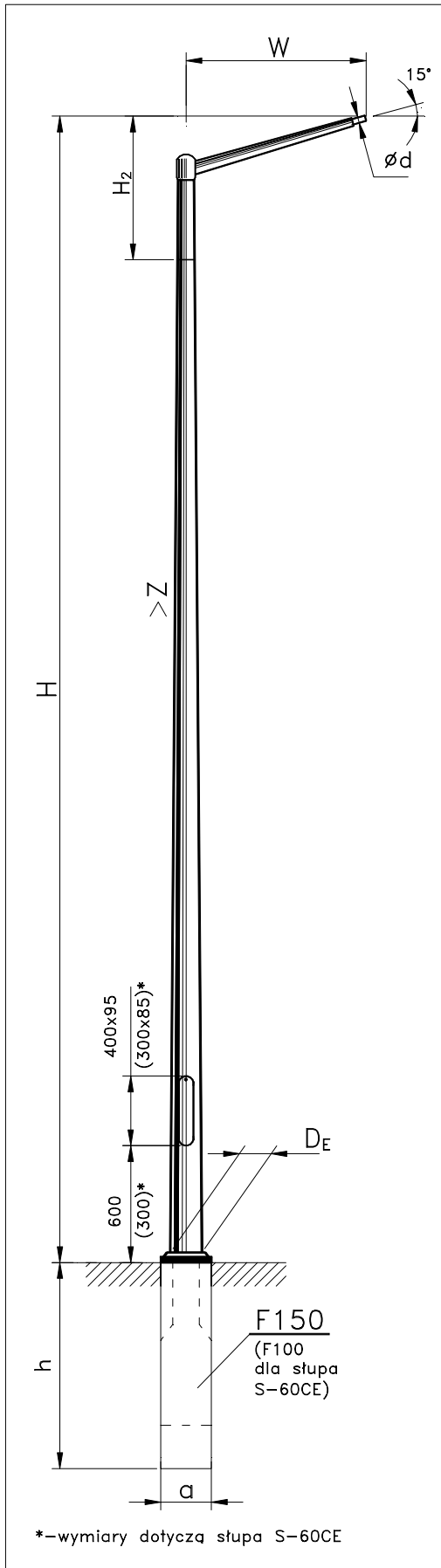
TYPE	W	Weight of lanterns	Permissible surface of lanterns [m ²] Wind area acc. to PN-7/B-02011					MF
	m	kg	I	II	IIa	IIb	III*	kN m
Single bracket								
S-60E	1,5	20	0,88	0,52	0,31	0,18	0,18	7,0
S-80	1,5	20	1,5	1,0	0,6	0,4	0,3	15
S-95	1,5	20	1,15	0,65	0,38	0,21	0,1	15
S-100/6	1,5	20	1,4	0,8	0,5	0,3	0,2	18
Double bracket								
S-60E	1,5	20	0,78	0,42	0,21	0,10	0,10	7,0
S-80	1,5	20	1,4	0,9	0,5	0,3	0,2	15
S-95	1,5	20	1,05	0,55	0,28	0,11	0,05	15
S-100/6	1,5	20	1,3	0,7	0,4	0,2	0,1	18

* - Installation of poles in area III acc. to PN-77/B-02011 refers to height up to 800 m n.p.m.

** - Data for single brackets and W = 1m.

STREET LIGHTING

CONICAL STREET POLES WITH BRACKET 1- , 2- ARMED



Technical data

TYPE	W	H	H ₂ **	d/DE	Z	m**	S**	axaxh
	m	m	m	mm	mm/m	kg	m ²	m
S-60CE	1,0	6,1	0,8			56	2,2	
	1,5	6,2	0,95	48/144	12	57	2,3	0,3x0,3 x1,0
	2,0	6,3	1,1			59	2,4	
S-80C	1,0	8,1	0,8			65	3,2	
	1,5	8,2	0,95	48/172	12	66	3,4	0,3x0,3 x1,5
	2,0	8,3	1,1			68	3,5	
S-100C	1,0	10,1	0,8			84	4,4	
	1,5	10,2	0,95	48/196	12	85	4,5	0,3x0,3 x1,5
	2,0	10,3	1,1			87	4,6	

** - Data for single brackets and W = 1m.

Conical street poles, can be also produced with many arms in symmetric configuration: - triple and four-armed for W_{max} = 1,0 m,



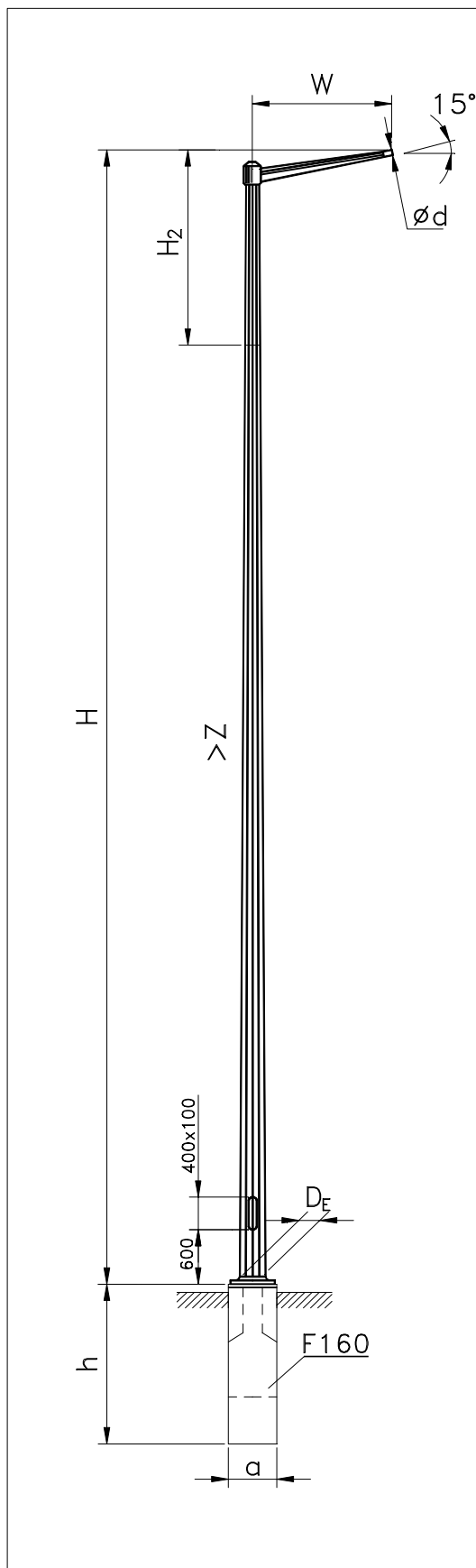
Loads data

Table data								
TYPE	W	Weight of lanterns	Permissible surface of lanterns [m²] Wind area acc. to PN - 77/B - 02011					MF
			I	II	IIa	IIb	III*	
	m	kg						kNm
Single bracket								
S-60CE	1,5	20	0,98	0,61	0,41	0,28	0,19	6,5
S-80C	1,5	20	1,43	1,33	0,59	0,39	0,19	10,1
S-100C	1,5	20	1,33	0,77	0,46	0,25	0,11	12,8
Double bracket								
S-60CE	1,5	20	0,88	0,51	0,31	0,18	0,1	6,5
S-80C	1,5	20	1,36	1,26	0,52	0,32	0,12	10,1
S-100C	1,5	20	1,26	0,70	0,39	0,10	0,04	12,8

* - Installation of poles in area III acc. to PN-77/B-02011 refers to height up to 800 m n.p.m.

STREET LIGHTING

HEXAGONAL STREET POLES WITH BRACKET 1- , 2- ARMED



Technical data

TYPE	W	H	H ₂ **	d/DE	Z	m**	S**	axaxh
	m	m	m	mm	nm/m	kg	m ²	m
S-100/8	1,0	10,0	0,8			109	5,2	
	1,5	10,1	0,9	48/218	13,2	110	5,3	0,4x0,4x1,55
	2,0	10,2	1,0			111	5,4	
S-110	1,0	11,0	1,8			113	5,5	
	1,5	11,1	1,9	48/218	13,2	115	5,6	0,4x0,4x1,55
	2,0	11,2	2,0			116	5,7	
S-120	1,0	12,0	2,8			117	5,8	
	1,5	12,1	2,9	48/218	13,2	119	5,9	0,4x0,4x1,55
	2,0	12,2	3,0			120	6,0	

Octagonal street poles, can be also produced with many arms in symmetric configuration:- triple for $W_{max} = 1,5$ m

- four-armed and six-armed for $W_{max} = 1,0$ m.

Note: Octagonal poles are also produced as straight poles **S-100/8P**, **S-110P**, **S-120P**.



Loads data

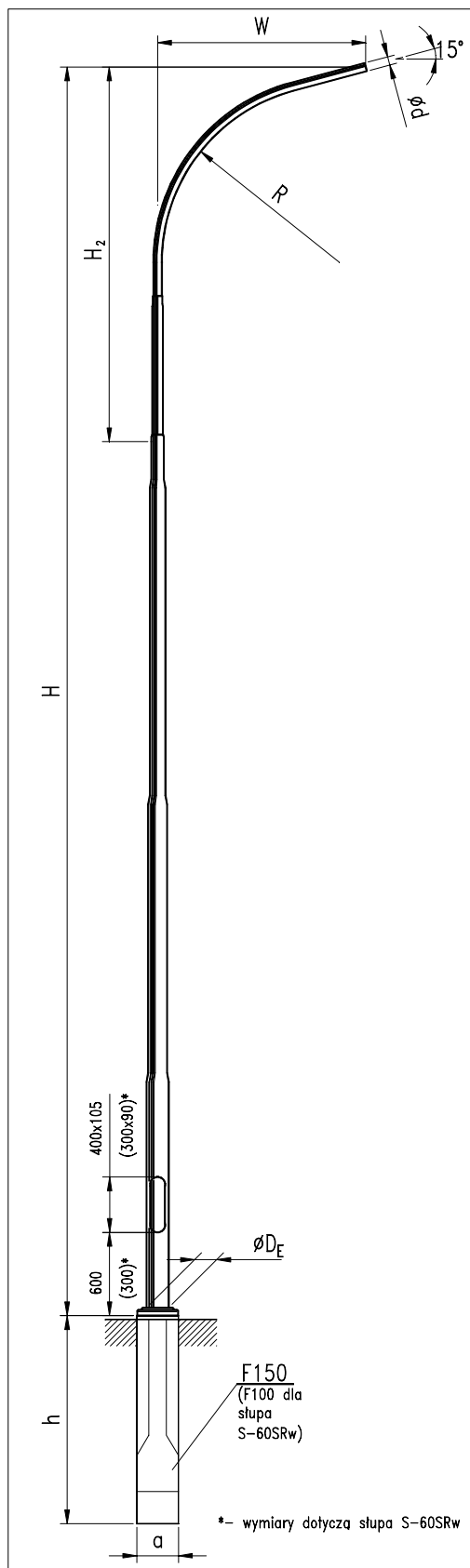
TYPE	W	Weight of lanterns	Permissible surface of lanterns [m ²] Wind area acc.to PN - 77/B - 02011					MF
	m	kg	I	II	IIa	lib	III*	kNm
Single bracket								
S-100/8	2,0	20	2,10	1,20	0,8	0,50	0,30	25
S-110	2,0	20	1,80	1,02	0,65	0,40	0,20	25
S-120	2,0	20	1,60	0,90	0,60	0,30	0,11	25
Double bracket								
S-100/8	2,0	20	2,03	1,13	0,73	0,43	0,23	25
S-110	2,0	20	1,73	0,93	0,58	0,33	0,13	25
S-120	2,0	20	1,53	0,83	0,53	0,23	0,04	25

* - Installation of poles in area III acc. to PN-77/B-02011 refers to height up to 800 m n.p.m.

** - Data for single bracket and $W = 1$ m

STREET LIGHTING

TUBULAR STREET POLES WITH BRACKET



Technical data

TYP	W	H	H ₂	R	Ød/D _E	m	S	axaxh
	m	m	m	m	mm	kg	m ²	m
S-60SRw	1,0	6	2,0	0,6	48/133	50,2	1,52	0,3x0,3 x1,0
	1,5			1,3		52,5	1,62	
	2,0			1,3		54,2	1,7	
S-70SRw	1,0	7	3,0	0,6	48/133	56,7	1,76	0,3x0,3 x1,0
	1,5			1,3		59,0	1,86	
	2,0			1,3		60,7	1,94	
S-80SRw	1,0	8	3,0	0,6	48/175 (196)*	88,3	2,81	0,3x0,3 x1,5
	1,5			1,3		90,5	2,91	
	1,5			1,3		92,2	2,99	
S-90SRw	1,0	9	2,0	0,6	48/175 (196)*	112,4		0,3x0,3 x1,5
	1,5			1,3		114,7		
	1,5			1,3		116,4		
S-100SRw	1,0	10	3,0	0,6	48/175 (196)*	118,9		0,3x0,3 x1,5
	1,5			1,3		121,1		
	1,5			1,3		122,8		
S-110SRw	1,0	11	4,0	0,6	48/175 (196)*	125,4		0,3x0,3 x1,5
	1,5			1,3		127,7		
	1,5			1,3		129,4		
S-120SRw	1,0	12	4,0	0,6	48/175 (196)*	134		0,3x0,3 x1,5
	1,5			1,3		136,2		
	1,5			1,3		137,9		

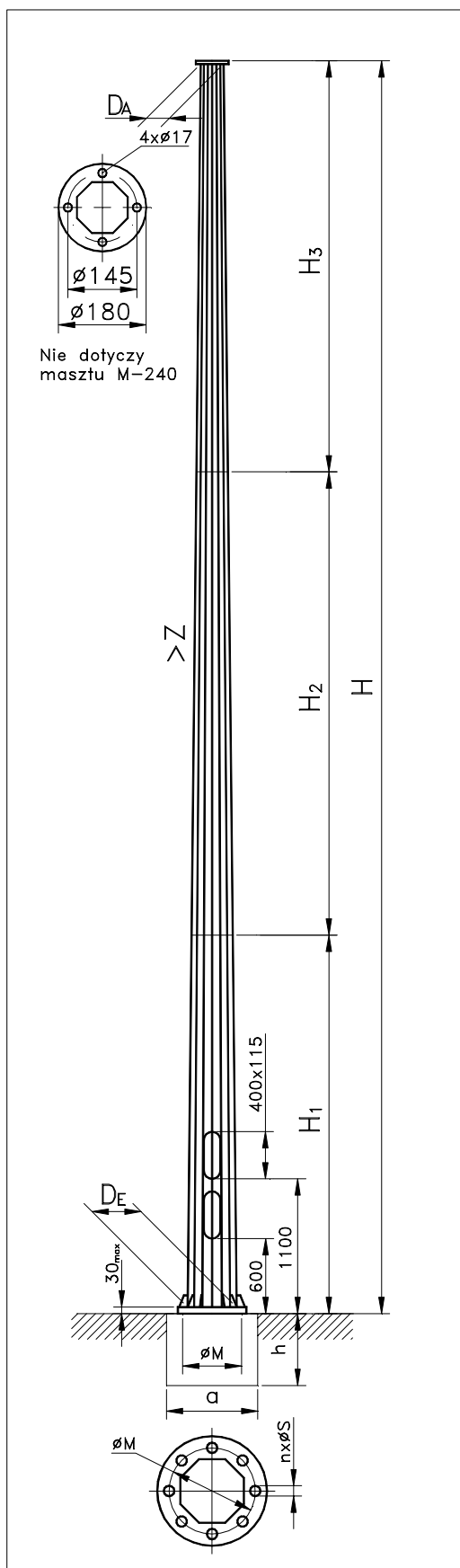
Loads

TYP	Weight Of lanterns	Wind areas acc. to PN - 77/B - 02011					M _F
	kg	Permissible surface of lanterns [m ²]					kNm
		I	II	IIa	IIb	III*	
Single bracket W 1,5m							
S-60SRw	15	0,86	0,55	0,38	0,27	0,2	5,82
S-70SRw	15	0,65	0,4	0,26	0,17	0,1	5,62
S-80SRw	15	0,81	0,52	0,35	0,25	0,18	7,45
S-90 SRw	15	1,1	0,7	0,49	0,35	0,25	11,2
S-100SRw	15	0,9	0,55	0,36	0,24	0,16	10,8
S-110 SRw	15	0,73	0,43	0,26	0,15	0,08	10,6
S-120SRw	15	0,6	0,33	0,18	0,08	-	10,3

*Installation of poles in area III refers to height up to 800 m n.p.m.

MASTS

LIGHTING MASTS



Technical data

H	H ₁	H ₂	H ₃	Z	m	S	n x ØS/ØM	a x a x h
m	m	m	m	mm/m	kg	m ²	mm	m
M-120 • D_A/D_E = 94/360								
12	8,3	4,2	-	22,5	315	10,0	8xM24/450	1,6x1,6x1,6
M-140 • D_A/D_E = 94/360								
14	8,3	6,0	-	20,5	360	11,0	8xM24/450	1,6x1,6x1,8
M-160 • D_A/D_E = 94/380								
16	9,5	7,0	-	18,5	580	14,0	8xM24/550	1,6x1,6x1,8
M-180 • D_A/D_E = 94/420								
18	9,5	9,0	-	18,7	680	17,5	8xM24/550	1,6x1,6x1,8
M-200 • D_A/D_E = 94/470								
20	9,0	9,0	3,0	19,5	910	20,5	12xM30/600	1,7x1,7x2,0
M-220 • D_A/D_E = 180/470								
22	9,0	9,0	5,0	14,5	1050	26,0	12xM30/600	1,7x1,7x2,0
M-240 • D_A/D_E = 150/470								
22	9,5	9,5	6,0	13,5	1450	27,0	12xM30/600	1,8x1,8x2,0



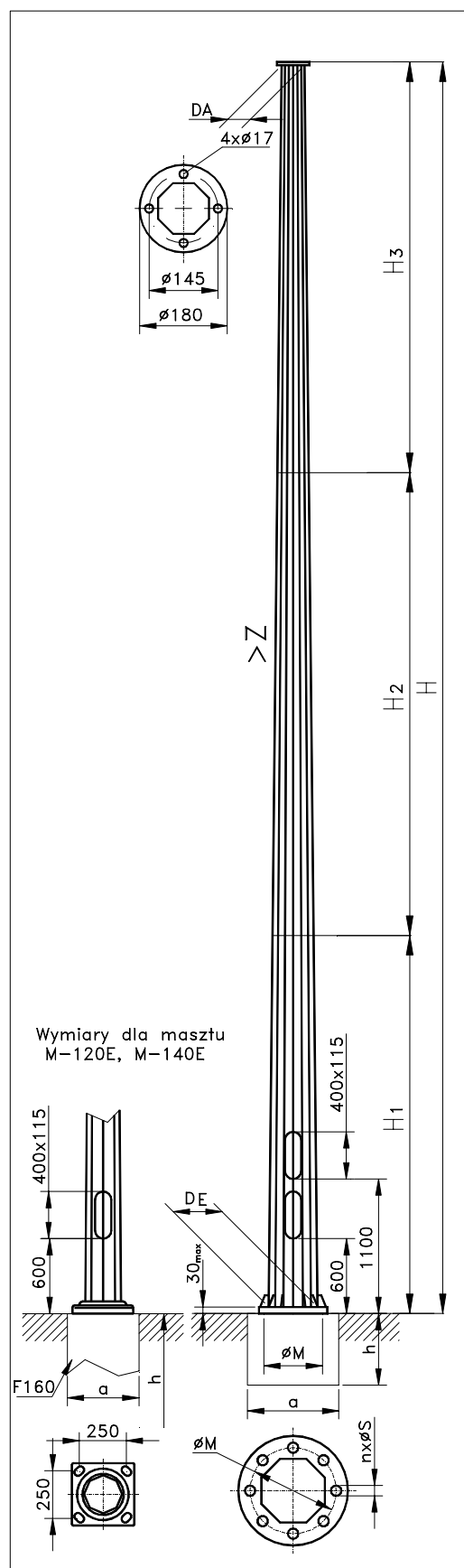
Loads data

TYPE	Weight of lanterns kg	Permissible surface of lanterns [m ²] Wind area acc. to PN - 77/B - 02011					MF kNm
		I	II	IIa	IIb	III*	
M-120	150	6,8	4,6	3,3	2,5	2,4	96
M-140	150	4,6	2,9	1,9	1,3	1,2	85
M-160	150	4,2	2,5	1,5	0,9	0,5	97
M-180	150	6,3	3,9	2,6	1,8	1,2	150
M-200	150	11,0	7,2	5,1	3,7	2,8	230
M-220	150	8,4	5,3	3,5	2,4	1,7	230
M-240	150	4,13	2,04	0,9	0,12	0,05	170

* - Installation of poles in area III acc. PN-77/B-02011 refers to height up to 800 m n.p.m.

MASTS

ECONOMICAL LIGHTING MASTS

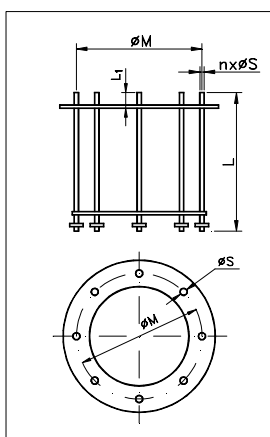


Technical data

H	H1	H2	H3	Z	m	S	n x $\phi s / \phi M$	axaxh
m	m	m	m	mm/m	kg	m ²	mm	m
M-120E • $D_A/D_E = 106/218$								
12	9,0	3,4	-	9,82	214	6,41	4xM24/ 250	0,4x0,4 x1,6
M-140E • $D_A/D_E = 86.5/218$								
14	9,0	5,4	-	9,82	228	7,25	4xM24/ 250	0,4x0,4 x1,6
M-160E • $D_A/D_E = 94/360$								
16	9,0	7,5	-	17,25	420	12,5	8xM24/450	0,85x0,85 x1,7
M-180E • $D_A/D_E = 94/360$								
18	9,5	9,0	-	15,22	465	14,2	8xM24/450	0,85x0,85 x1,7
M-200E • $D_A/D_E = 94/470$								
20	9,0	9,0	3,0	19,6	640	20,5	12xM30/600	1,4x1,4 x1,8
M-220E • $D_A/D_E = 180/470$								
22	9,0	9,0	5,0	13,9	800	26	12xM30/600	1,4x1,4 x1,8

Note: Foundation are calculated for weak ground ($G=230 \text{ kN/m}^2 \times m$, acc. PN-EN 40:2002). For M-120E i M-140E masts with maximum loads i.e. using elements with permissible wind surface acc. to below table and sinking into weak ground, it is necessary to compact ground around foundation or use bigger dimension of foundation.

Foundation ring



TYP	ϕM	$n \times \phi S$	L	L_1	m
mm	mm	mm	mm	mm	kg
M-120E	Foundation F160				
M-140E	Foundation F160				
M-160E	450	8 x M24	700	85	38
M-180E	450	8 x M24	700	85	38
M-200E	600	12 x M30	800	100	80
M-220E	600	12 x M30	800	100	80

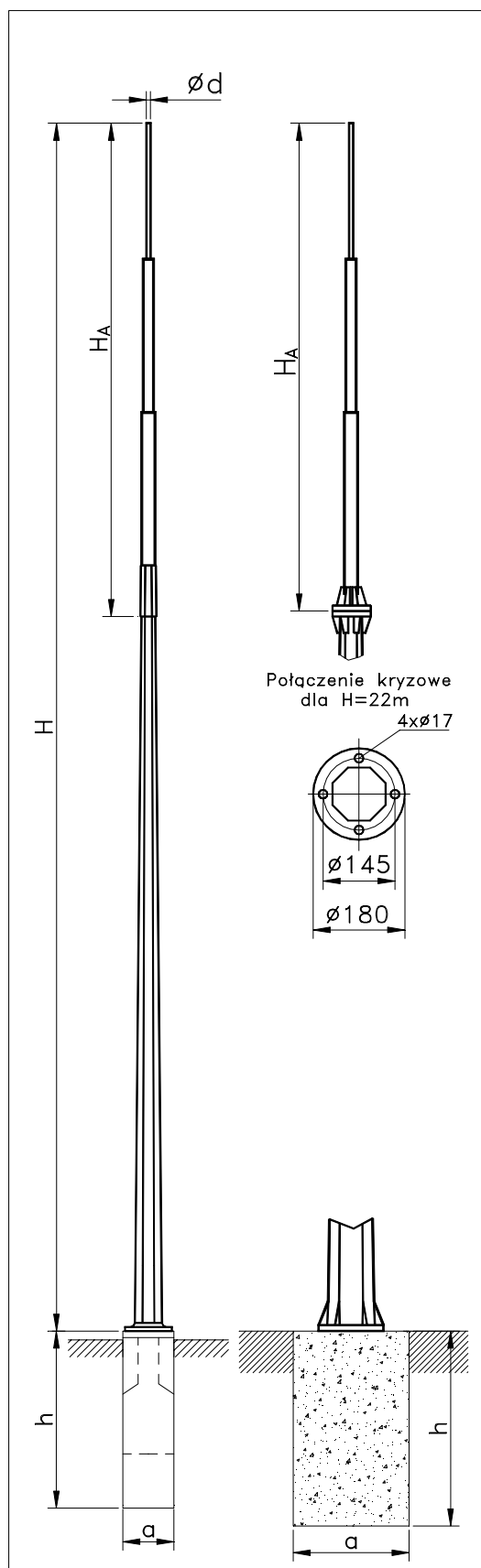
Loads data

TYPE	Weight of lanterns	Permissible surface of lanterns [m ²] Wind area acc. to PN - 77/B - 02011		M_F^*
	kg	I	II	kNm
M-120E	100	2,4	1,3	33
M-140E	100	1,6	0,77	33
M-160E	150	3,95	2,2	77
M-180E	150	2,85	1,34	77
M-200E	150	5,8	3,4	145
M-220E	150	3,9	1,7	145

* - Table includes values of moment describing strenght near mast flange plate M_F .

MASTS

ANTENNA MASTS



Technical data

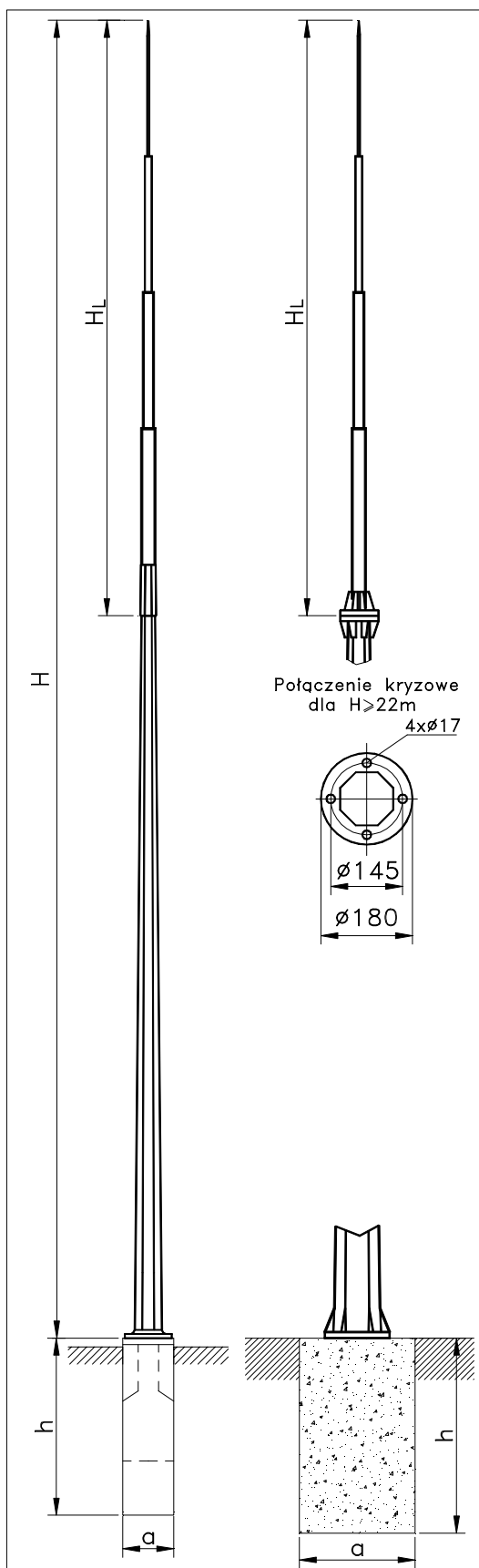
H	H _A	$\varnothing d$	m	S	$\frac{n \times \varnothing s}{A \times B}$	M _F	$\frac{a \times a \times h}{\text{found.type.}}$
m	m	mm	kg	m ²	mm	kNm	m
6,0	2,0	48 or 60	32	1,5	<u>4xM20</u> 190x190	3,2	<u>0,3x0,3x1,0</u> F 100
12,0	4,0	48 or 60	90	4,4	<u>4xM24</u> 220x220	15	<u>0,3x0,3x1,5</u> F 150
17,0	7,5	48 or 60	120	6,8	<u>4xM24</u> 250x250	25	<u>0,4 x0,4x1,6</u> F 160
22,0	8,0	48 or 60	450	13,5	<u>8xM24</u> $\varnothing 450$	85	<u>1,6x1,6x1,8</u> M 140

Installation of poles in area III acc. to PN-77/B-02011 refers to height up to 800 m n.p.m. Permissible lateral surface of antennas should not exceed 0,2 m² and weight 10 kg.

Note: We also put into practice special orders according to individual designs.

MASTS

LIGHTNING PROTECTION MASTS



Technical data

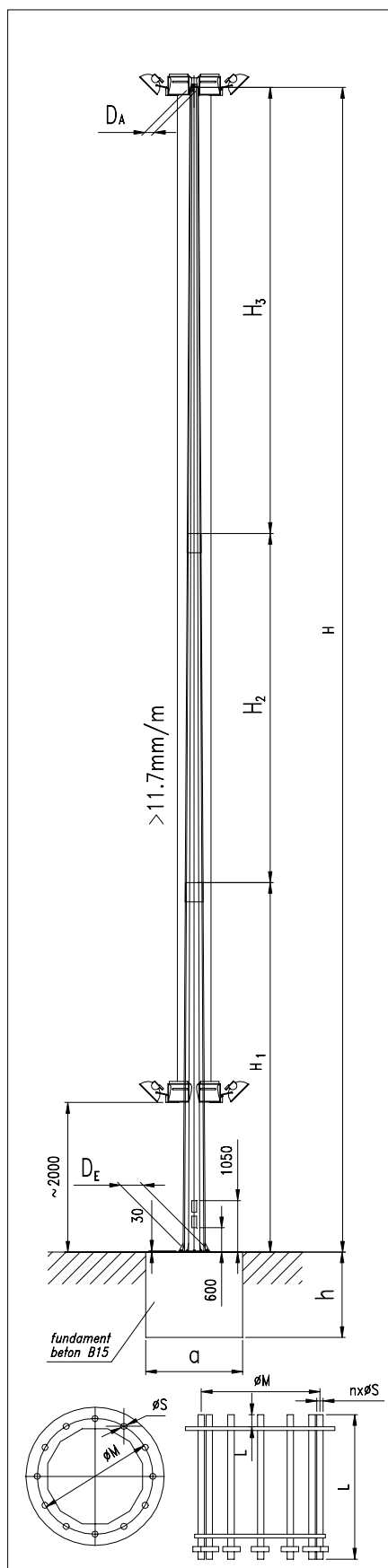
H	H _L	m	S	n x ϕ_s/ϕ_M	M _F	a x a x h
m	m	kg	m ²	mm	kNm	m
12,0	3,0	90	4,4	4xM24/ 220	18	0,3 x 0,3 x 1,5
17,0	8,0	140	6,8	4xM24/ 250	25	0,4 x 0,4 x 1,55
22,0	8,0	400	14	8xM24/450	85	1,6 x 1,6 x 1,8
25,0	9,0	630	18	8xM24/550	97	1,6 x 1,6 x 2,0
28,0	10,0	735	20	8xM24/550	150	1,8 x 1,8 x 2,0

* - Installation of poles in area III acc. to PN-77/B-02011 refers to height up to 800 m n.p.m.



MASTS

LIGHTING MASTS WITH MOVABLE LIGHTING HEAD

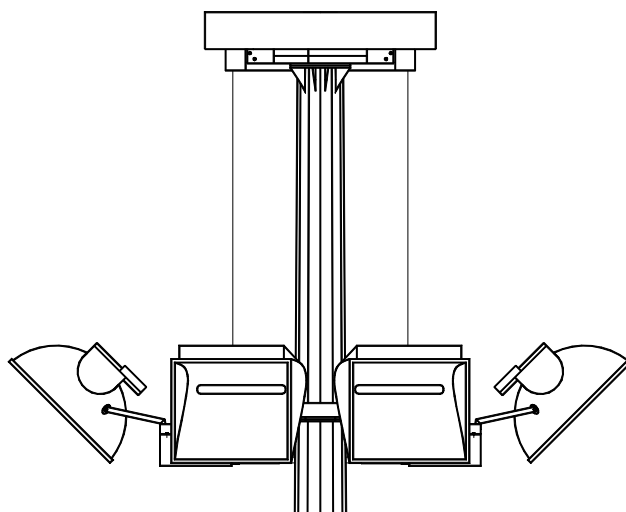


This mast can be used for lighting parkings, sports fields, railway facilities, etc.

On the top of the mast is installed movable lighting head. Lighting head is suitable for projectors produced by different companies. It is recommended to install 3 or 6 pieces of projectors. Dropping and raising of lighting head is done by using crank handle inserted on shaft of worm gear inside mast or by using drill having left and right rotation and end-piece for insert gear on shaft. Masts are produced from steel sheet 4 mm thickness with suitable finned what provide rigidity and light of construction.

Technical data

H	H1	H2	H3	DA/DE	m	n x ØS/ØM	a x a x h
m	m	m	m	Mm	kg	mm	m
24	9,0	9,0	6,0	274/550	1500	12xM30/670	2,5x2,5x2,2
30	9,0	9,0	12,0	200/550	1700	12xM30/670	2,5x2,5x2,2



Loads data

TYPE	Weight of lanterns kg	Permissible surface of lanterns [m ²] Wind area acc. to PN - 77/B - 02011					MF kNm
		I	II	IIa	IIb	III*	
M-240	200	7,5	4,0	2,5	1,5	-	300
M-300	120	4,0	2,0	-	-	-	300

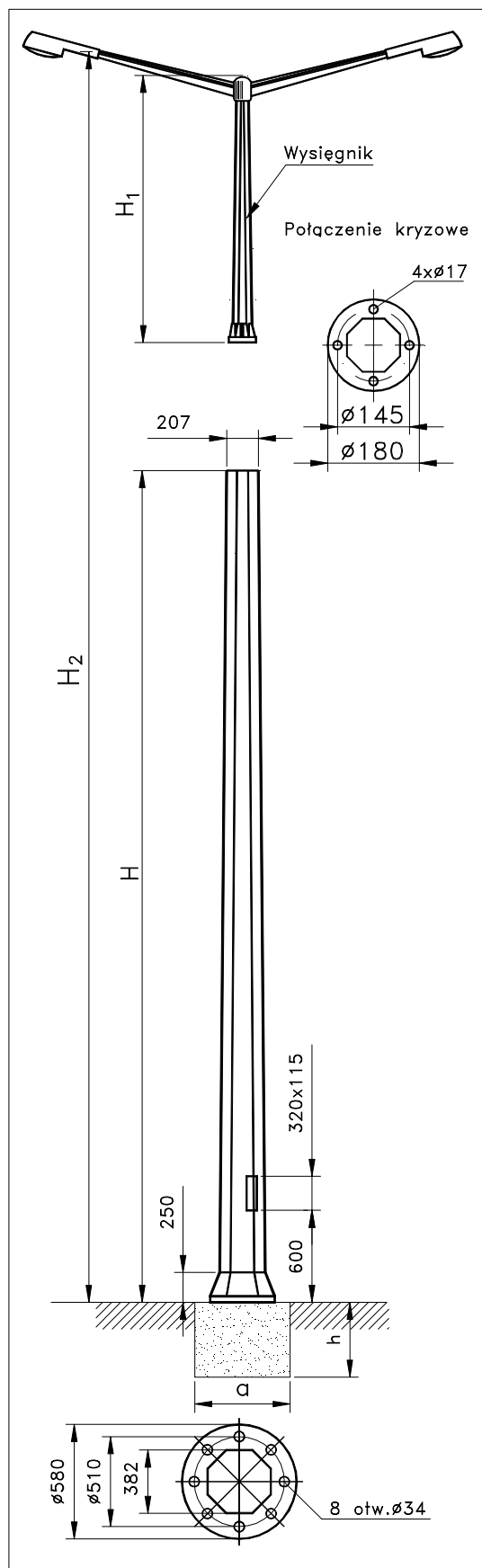
Foundation rings

TYPE	ØM	n x ØS	L	L1	m
	mm	mm	mm	mm	kg
M-240	670	12xM30	660	85	85
M-300	670	12xM30	660	85	85

* - Installation of poles in area III acc. to PN-77/B-02011 refers to height up to 800 m n.p.m.

SPECIAL CONSTRUCTIONS

LIGHTING-TRACTION POLES



Using: Lighting-traction poles are used as supporting construction for tram traction. Thanks to using additional bracket it can be useful as lighting poles. Details of hanging traction cables should be according to individual designs.

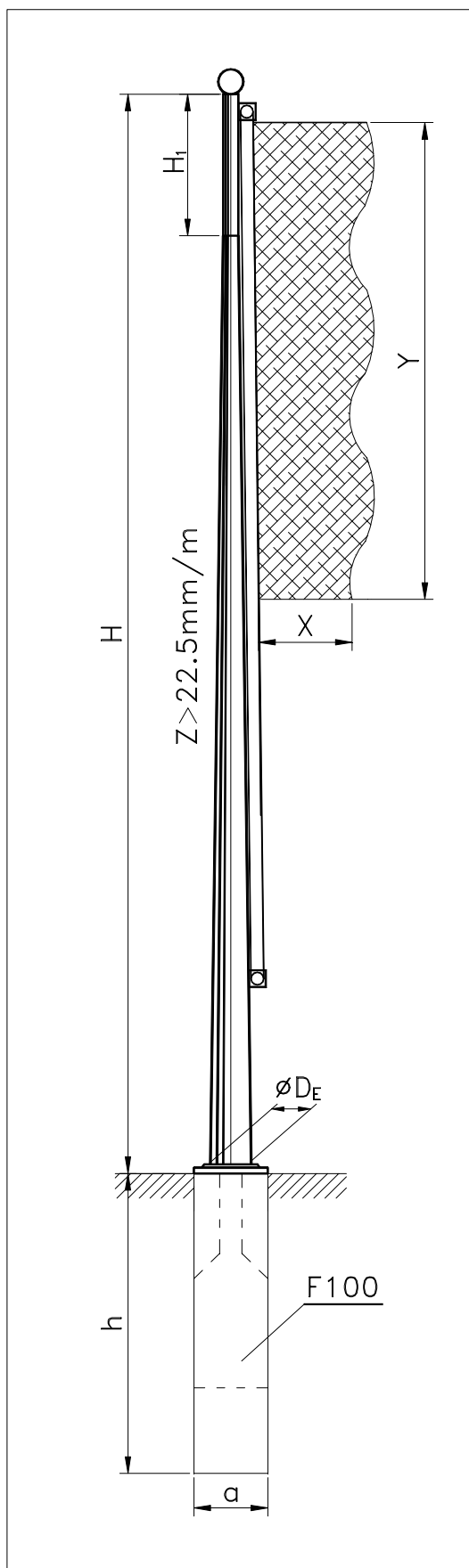
Technical data

H	H ₁	H ₂	F _{S7}	m*	M _F	n x ϕ s/ ϕ M	a x b x h
m	m	m	kN	kg	kNm	mm	m
ST - 85/1,5							
8,5	0,5÷2	9÷11	15	380	92	8xM24/550	1,6 x 1,6 x 1,8
ST - 85/2,5							
8,5	0,5÷2	9÷11	25	580	175	8xM30/550	1,8 x 1,8 x 2,0

- F_{S7} - maximum resultant force on 7 m height from flange plate.
- Fixing to foundation by using bolts. Bolts are covered by caps made from plastics.
- Maximum length of bracket arm 2m.
- Maximum weight of bracket up - 50 kg.
- * Weight of pole without bracket.

SPECIAL CONSTRUCTIONS

FLAG POLES



Technical data

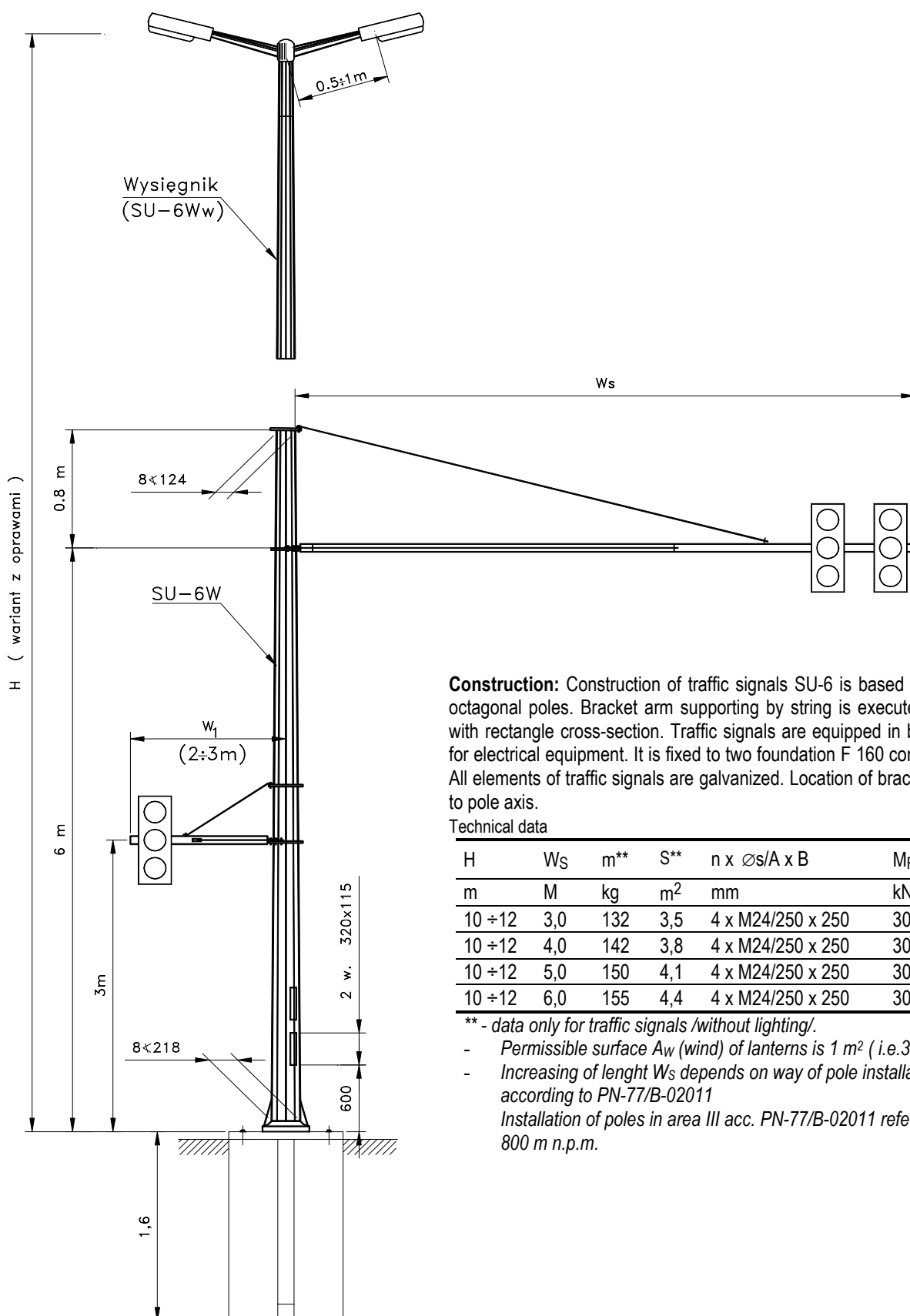
H	H ₁	D _E	m	X x Y	MF	a x a x h
m	m	mm	kg	m ²	kNm	m
5,0	1	144	27	1,0 x 2,0	4,3	0,3x0,3x1,0
6,0	2	144	31	1,3 x 2,5	4,3	0,3x0,3x1,0
7,0	3	144	35	1,5 x 2,0	4,3	0,3x0,3x1,0
8,0	4	144	39	2,5 x 1,5	4,3	0,3x0,3x1,0

Dimensions X x Y are for loads in I i II areas. This is no limitation for designers. For design PN-77/B-02011 standard should be included.

H₁ – is cylindrical $\varnothing 48 \text{ mm}$.

SPECIAL CONSTRUCTIONS

TRAFFIC SIGNALS SU – 6 W



Construction: Construction of traffic signals SU-6 is based on construction of octagonal poles. Bracket arm supporting by string is executed from steel pipe with rectangle cross-section. Traffic signals are equipped in base compartment for electrical equipment. It is fixed to two foundation F 160 connected steel slab. All elements of traffic signals are galvanized. Location of bracket W_s can be 45° to pole axis.

Technical data

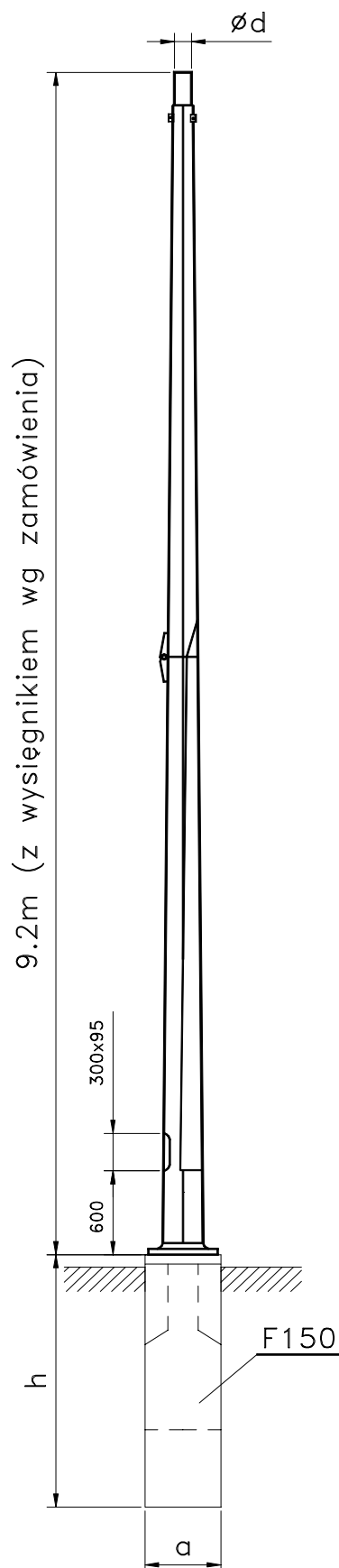
H	W_s	m^{**}	S^{**}	$n \times \varnothing s/A \times B$	M_F	Foundation
m	M	kg	m^2	mm	kNm	Type
10 ÷ 12	3,0	132	3,5	4 x M24/250 x 250	30	2 x F 160
10 ÷ 12	4,0	142	3,8	4 x M24/250 x 250	30	2 x F 160
10 ÷ 12	5,0	150	4,1	4 x M24/250 x 250	30	2 x F 160
10 ÷ 12	6,0	155	4,4	4 x M24/250 x 250	30	2 x F 160

**** - data only for traffic signals /without lighting/.**

- Permissible surface A_w (wind) of lanterns is $1 m^2$ (i.e. $3 \times 0,35 \times 1,0 m$).
 - Increasing of length W_s depends on way of pole installation in wind areas according to PN-77/B-02011
- Installation of poles in area III acc. PN-77/B-02011 refers to height up to 800 m n.p.m.

SPECIAL CONSTRUCTIONS

HINGED IN THE MIDDLE POLES H 9m



Technical description:

Construction of pole is based on construction of hexagonal pole. Poles are produced from steel sheet with suitable strength. Hinged in the middle poles are fixed to prefabricated foundations or other supporting construction. The pole consists of two elements 5 m and 4 m length. For easier installation the pole is equipped in hinges.

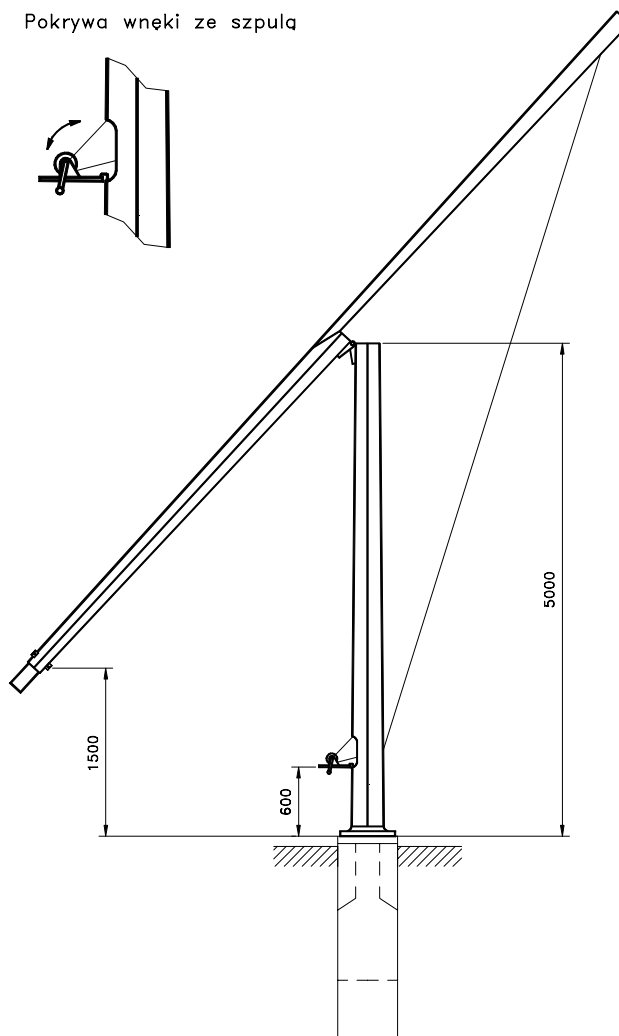
Using.

Hinged in the middle poles are used as a supporting construction for equipment requiring often maintenance from ground level, i.e. meteorology apparatus. This construction can be used also as a lighting pole.

Technical data

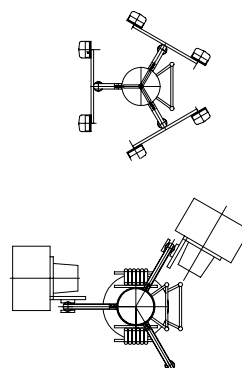
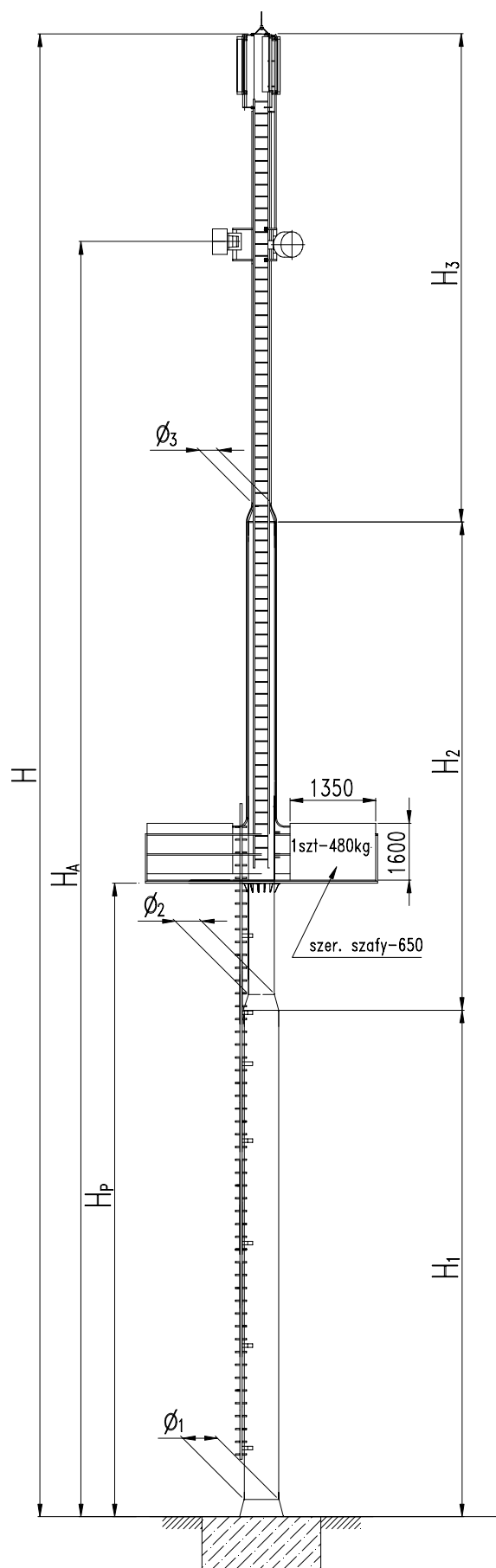
- Nominal height – $H = 9\text{ m}$
- Weight of pole (without bracket and apparatus) – 120 kg
- Weight of bottom part (constant) – 72 kg
- Weight of top part (hinged) – 48 kg
- Turn angle of top part – 138°
- The lowest point after dropping to ground level approx. – 1,5 m
- Maximum load moment near flange plate – 18 kNm
- Maximum weight of bracket with apparatus – 30 kg
- Thickness of zinc coating not less than – $65\text{ }\mu\text{m}$
- Flange plate dimension – $300 \times 300 \times 40\text{ mm}$

Pokrywa wnętrza ze szpulą



SPECIAL CONSTRUCTIONS

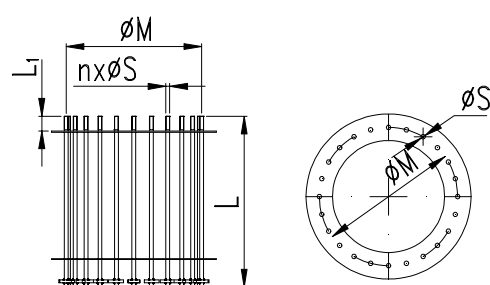
MOBILE PHONE MASTS



Mast is construction for fixing 6 panel antennas with dimension 155x1300mm and 6 kg weight each . On lower level is possibility to install 3 parabolic antennas with diameter $\phi 600$ mm and 30 kg weight each. There is also possibility to install equipment with similar weight and dimensions. On 15m height is placed installation platform, for radio broadcast equipment. From the platform to the top of the mast are placed ladders. Mast is also equipped in entrance ladder. Mast is fixed to concrete foundation with foundation ring supplied by producer. Construction is hot-dip galvanized. It can be additionaly painted.

Technical data

Type	H	H _A	H _P	H ₁ /Ø ₁	H ₂ /Ø ₂	H ₃ /Ø ₃	m
	m	m	m	m/mm	m/mm	m/mm	kg
W30	30	27	15	12/813	9/620	9/356	8000
W35	35	32	15	12/813	11,5/620	11,5/356	10000



Foundation ring

Type	ØM	n x ØS	L	L ₁	m
	mm	m	m/mm	m/mm	kg
W30	938	24xM24	705	85	150
W35	938	24xM30	1150	100	240

ACCESSORIES

Pole fuseboards ELMONT

Using: For all types of street and park lighting poles and masts:

Fuseboard type I (ZG5-35)	- for park poles
Fuseboard type II (ZG-G35)	- for park poles
Fuseboards for masts (ZG5-95)	- for masts and street poles

Technical data:

Rated voltage - 500 V

Protection of lanterns:

- for three fuses S 191,
- for two fuses E 27,
- for three fuses E 14.

Cross-section of cable - 16÷90 mm²

Number of cables - 1÷4

Max. cross-section for lantern cable - 10 mm²

Protection degree - IP 20

Cable joints for lighting poles IZK

Using: For all types of street and park lighting poles and masts.

Technical data:

Rated voltage - 500 V,

Max. current of fuses - 25 A,

Cross-section of cable - 16÷50 mm²,

Number of cables - 1÷4,

Max. cross-section for lantern cable - 10 mm².

Terminal box POLAM

Using: For all types of street and park lighting poles.

Technical data:

Rated voltage - 380 V,

Connection:

- for three cables with 35 mm² cross-section.
- output cable with 4 mm² cross-section.

Protection of lanterns:

- for three fuses S 191,
- for two fuses E 27,
- for three fuses E 14

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- ★ Distribution boxes: steel and plastics
- ★ Electrical panels for construction
- ★ Container transformer station
- ★ Galvanized lighting poles and masts
- ★ Aluminium lighting poles

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