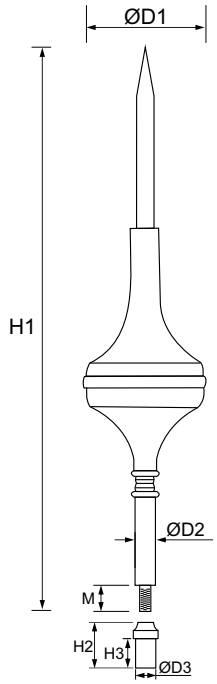
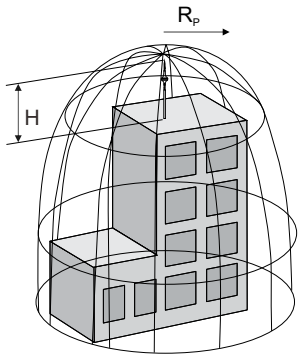




Features

• Lightning rod with non-electronic ESE (Early Streamer Emission) system,standardized according norms UNE 21.186 and NFC 17.102.
Adaptable to all types of buildings.
Application standards:
UNE 21.186 NFC 17.102
EN 50.164/1 EN 62.305

• Manufactured in AISI 304L stainless steel and PA66 polyamide.
100 % EFFICIENCY, maximum durability.
Does not need an external power supply.
Guarantee of electrical continuity and operation after lightning strike, in any atmospheric conditions.

Type	ESE2500	ESE4000	ESE6000
Description	ESE, 25µs	ESE, 40µs	ESE, 60µs
Material	Stainless steel, polyamide		
Height H1 (mm)	700		
Height H2 (mm)	90		
Height H3 (mm)	58		
Diameter ØD1 (mm)	152		
Diameter ØD2 (mm)	26		
Diameter ØD3 (mm)	40		
M (mm)	M16 × 20		
Weight (kg)	4.5		

Protection Areas

According to NFC17-102: 2011, the standard protection radius (R_P) of SATELIT+G2 is linked to ΔT (below), the protection levels I, II, III or IV (as calculated in Annex B of NFC17-102: 2011) and the height of the SATELIT+G2 above the structure to be protected (H, defined by NFC17-102: 2011 as a minimum 2 m).

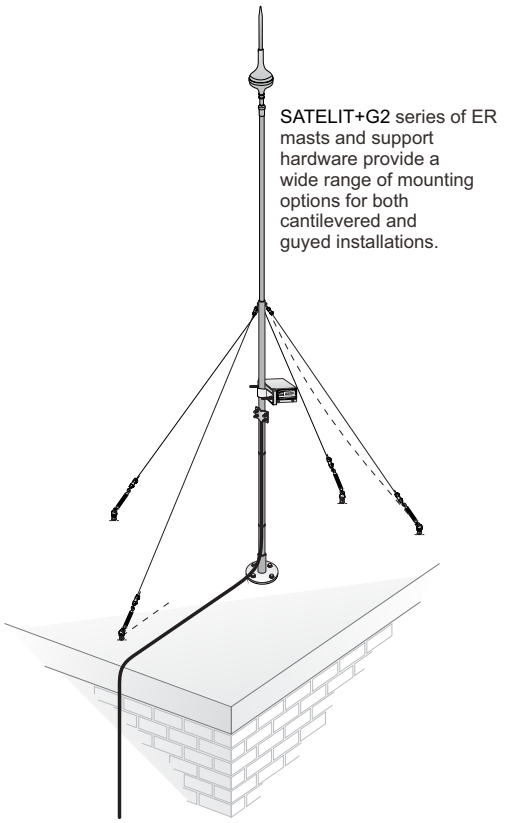
Types of SATELIT+G2								
	Rod height (in meters)							
	2	4	5	7	10	15	20	30
Protection Level 1								
ESE2500	17	34	42	43	44	45	45	45
ESE4500	25	51	63	64	64	65	65	65
ESE6000	32	64	79	79	79	80	80	80
Protection Level 2								
ESE2500	20	40	49	50	51	53	54	55
ESE4500	30	60	71	71	72	73	74	75
ESE6000	34	68	86	87	88	89	89	90
Protection Level 3								
ESE2500	23	46	57	59	61	63	65	68
ESE4500	34	64	81	82	83	85	86	89
ESE6000	40	78	97	98	99	101	102	104
Protection Level 4								
ESE2500	26	52	65	66	69	72	75	80
ESE4500	36	72	89	91	92	95	97	101
ESE6000	44	87	107	108	109	111	113	116

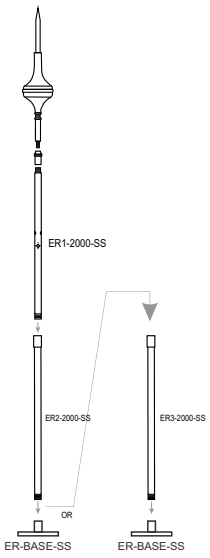
Where h≥5 m, then R_P can be calculated from
$R_P(h) = \sqrt{2rh-h2+\Delta\ (2r+\Delta)}$ for h≥5m
Where 2 m ≤ h ≤ 5 m, then RP can be calculated from
$R_P = h \times R_P\ (5) / 5$

R_P (h) (m)	is the protection radius at a given height h
h (m)	is the height of the SATELIT+G2 tip over the horizontal plane through the furthest point of the object to be protected
r (m)	20 m for protection level I 30 m for protection level II 45 m for protection level III 60 m for protection level IV
Δ (m)	Δ = ΔT x 106

Working Principles

During thunderstorm conditions when the lightning down-leader is approaching ground level, an upward leader may be created by any conductive surface. In the case of a passive lightning rod, the upward leader propagates only after a long period of charge reorganization. In the case of SATELIT+G2, the initiation time of an upward leader is greatly reduced. The SATELIT+G2 generates controlled magnitude and frequency pulses at the tip of the terminal during high static fields characteristic prior to a lightning discharge. This enables the creation of an upward leader from the terminal that propagates towards the downward leader coming from the thundercloud.





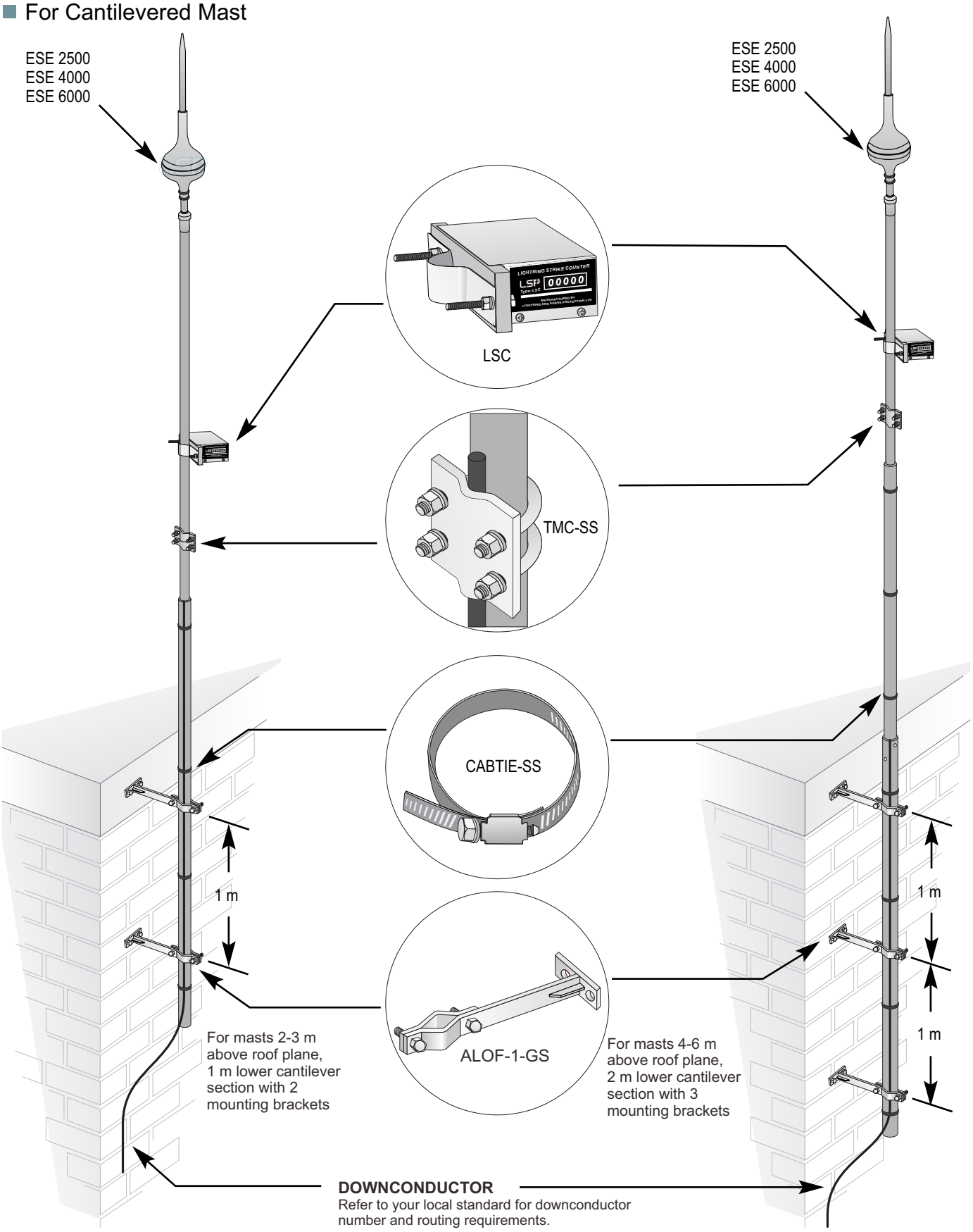
System Requirements

The design and installation of the terminals should be completed in compliance with the requirements of the French Standard NF C 17-102. In addition to terminal placement requirements, the standard requires a minimum of two paths to ground per terminal for non-isolated conductor systems. A down conductor cross-sectional area of ⩾50 mm^2 is specified. The down conductors are to be secured at three points per meter with equipotential bonding made to nearby metallic items.

Each down conductor requires a test clamp and dedicated earth system of 10 ohms or less. The lightning protection ground should be connected to the main building ground and any nearby buried metallic items. The NF C 17-102 and similar ESE standards requirements for inspection and testing range from each year to every four years dependent upon location and protection level selected.

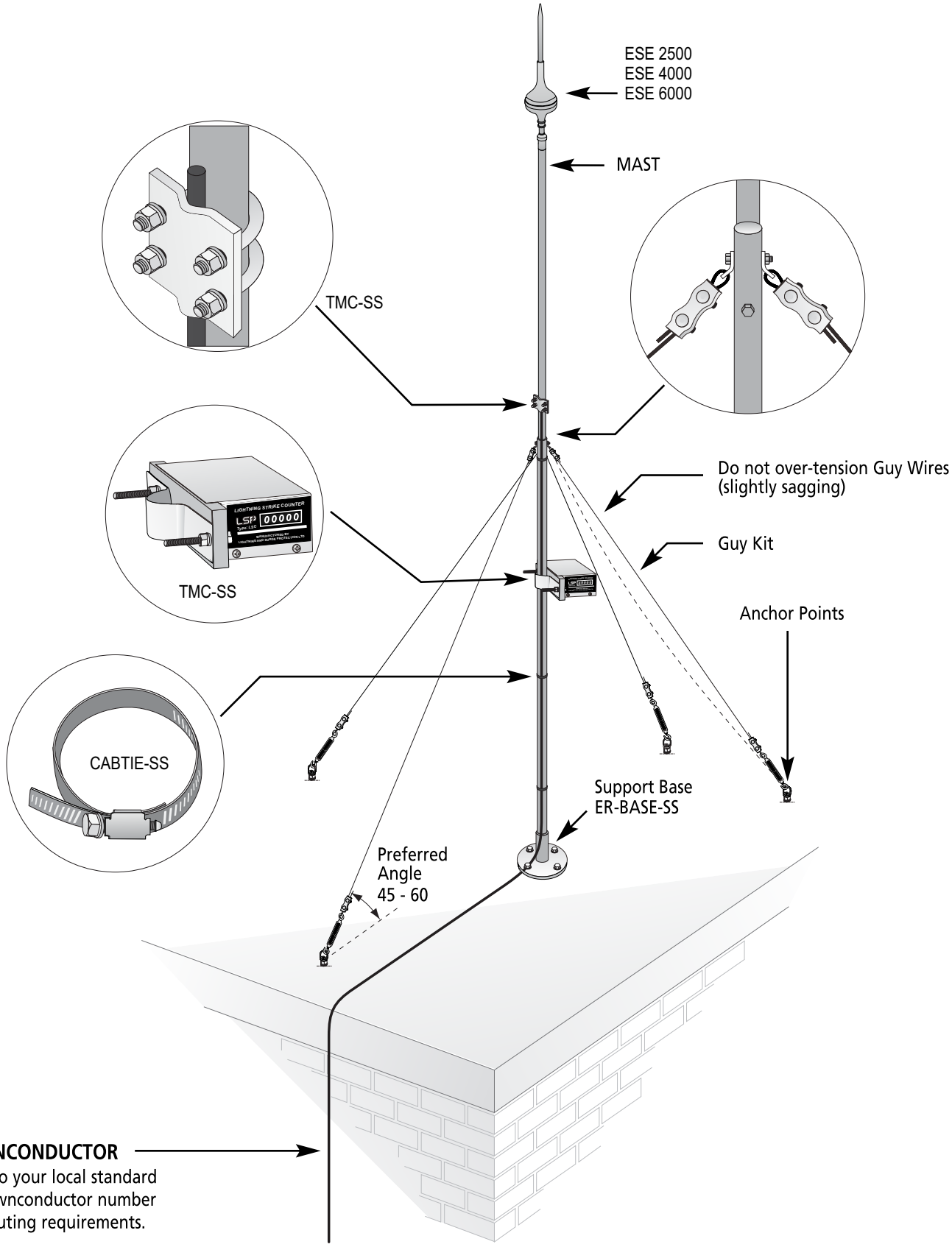
Typical MAST Installation Arrangement

For Cantilevered Mast



Typical MAST Installation Arrangement

For Cantilevered Mast



Typical bill-of-materials for masts

Cantilevered Masts

Height above roof plane	3m	4m
Total mast height	4m	6m
ER1-2000-SS	●	●
ER2-2000-SS	●	●
ER3-2000-SS		●
SI Adaptor	1	1
ALOF-1-GS	2	3
TMC-SS	1	1
CABTIE-SS	6	9

Notes

• For masts of 2 to 3 meters above the roof plane, 1 m lower cantilever section with 2 mounting brackets are required.

• For masts of 4 to 6 meters above the roof plane, 2 m lower cantilever section with 3 mounting brackets are required.

• The downconductor should connect at the bottom of the upper mast section.

• CABTIE-SS are installed 3 per meter to strap the downconductor to the remaining length of lower mast.

• Other items required per standards, Downconductor(s), fixing(s), protective sleeve(s), earth test clamp(s), Lightning Strike Counter and grounding system.

Guyed Masts:

Material		Mast height	
		4m	6m
ER1-2000-SS		●	●
ER2-2000-SS		●	●
ER3-2000-SS			●
ER-BASE-SS		●	●
TMC-SS		1	1
SI Adaptor		1	1
GUY KITS	HANGCLAMP-M8		4
	WIREROPE7M		4
	TURNBUCLE-M6		4
	DUPLEXCLIP-M6		8
	ANCHOR-M8		4
CABTIE-SS		6	9

Notes

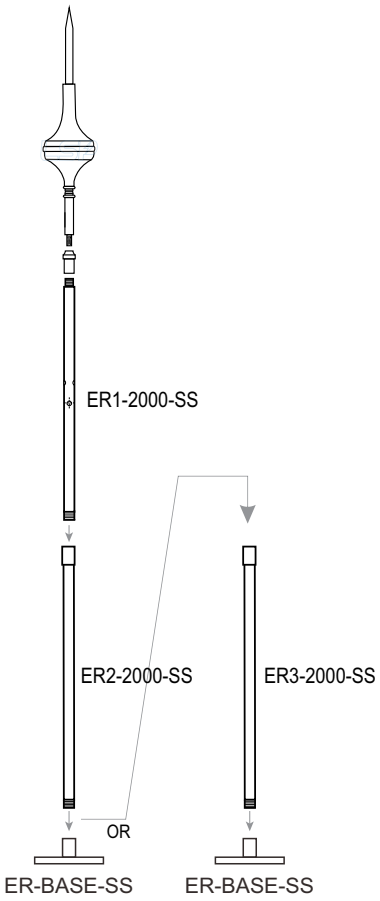
• For masts of 2 to 3 meters above the roof plane, 1 m lower cantilever section with 2 mounting brackets are required.

• For masts of 4 to 6 meters above the roof plane, 2 m lower cantilever section with 3 mounting brackets are required.

• The downconductor should connect at the bottom of the upper mast section.

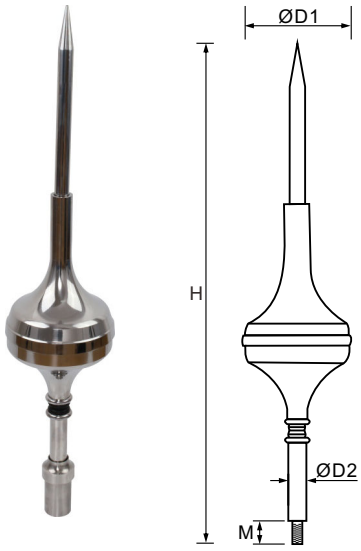
• CABTIE-SS are installed 3 per meter to strap the downconductor to the remaining length of lower mast.

• Other items required per standards, Downconductor(s), fixing(s), protective sleeve(s), earth test clamp(s), Lightning Strike Counter and grounding system.



Standard Mounting Method (2-6 m)

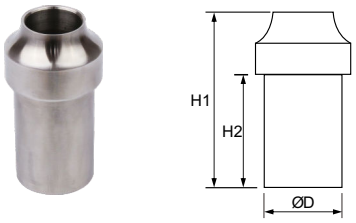
Lightning Rods



Lightning Rods

Type	ESE2500	ESE4000	ESE6000
Description	ESE, 25µs	ESE, 40µs	ESE, 60µs
Material	Stainless steel, polyamide		
Height H (mm)	700		
Diameter ØD1 (mm)	152		
Diameter ØD2 (mm)	26		
M (mm)	M16 × 20		
Weight (kg)	3.92		

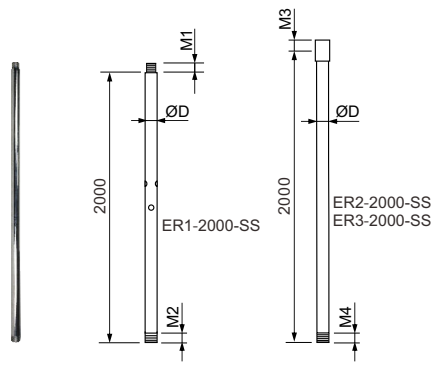
Accessories



Adaptor

Used for connecting lightning rod with mast

Type	DM Adaptor
Description	For ESE2500 ESE4000 ESE6000
Material	Stainless steel
Height H1 (mm)	90
Height H2 (mm)	58
Diameter ØD (mm)	40
Weight (kg)	0.60

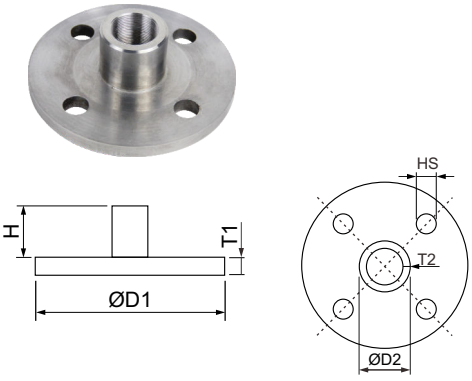


Stainless Steel Mast

Used for Support Lightning Rods

Type	ER1-2000-SS	ER2-2000-SS	ER3-2000-SS
Material	Stainless Steel	Stainless Steel	Stainless Steel
Descripiton	Upper section, 2m	Mid section, 2m	Lower section, 2m
Material	Stainless Steel	Stainless Steel	Stainless Steel
Height H (mm)	2000	2000	2000
Diameter ØD (mm)	38	38	38
M1 (mm)	M27 × 35	–	–
M2 (mm)	M38 × 40	–	–
M3 (mm)	–	M38 × 40	M38 × 40
M4 (mm)	–	M38 × 40	M38 × 40
Weight (kg)	8	8.5	8.5

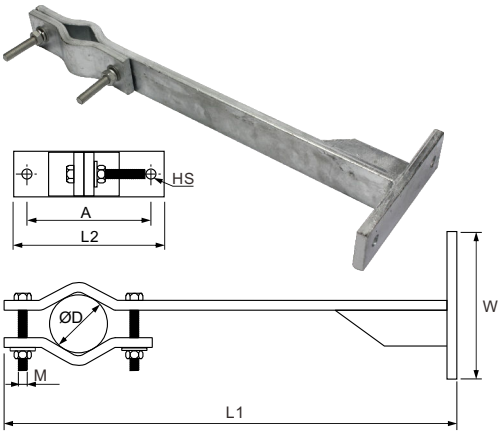
Accessories



Stainless Steel Baseplate

Horizontal Surfaces Baseplate Support for Mast

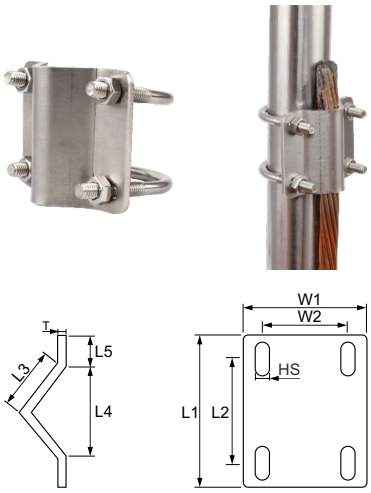
Type	ER-BASE-SS
Material	Stainless Steel
Height H (mm)	50
Diameter ØD1 (mm)	200
Diameter ØD2 (mm)	53
Thickness T1 (mm)	10
Thickness T2 (mm)	7.5
Hole Size HS (mm)	18.5
Weight (kg)	2.9



Wall Mounting Bracket

Used for cantilevered mounting of masts 28 to 55 mm diameter

Type	ALOF-1-GS
Material	Hot-Dip Galvanized Steel
Length L1 (mm)	495
Length L2 (mm)	165
Diameter ØD (mm)	28-55
Hole Size HS (mm)	11
M (mm)	M10
Width W (mm)	165
A (mm)	135
Weight (kg)	3.70

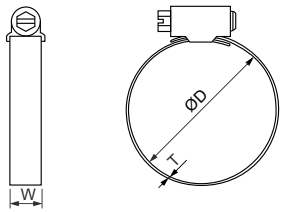


Tie Mast Clamp

Use for clamp stranded conductor to ER mast

Type	TMC-SS
Material	Stainless Steel
Length L1 (mm)	64
Length L2 (mm)	45
Length L3 (mm)	22
Length L4 (mm)	32
Length L5 (mm)	16
Width W1 (mm)	52
Width W2 (mm)	36
Thickness T (mm)	3
Hole Size HS (mm)	6
Weight (kg)	0.14

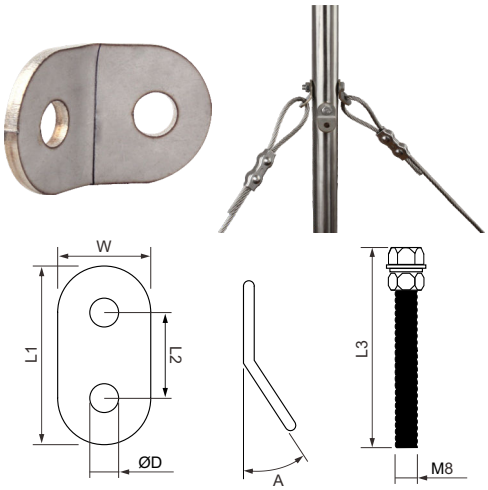
Accessories



Cable Tie
Use for strapping down conductor to lower mast sections

Type	CABTIE-SS
Material	Stainless Steel
Diameter ØD (mm)	38-51
Width W (mm)	12
Thickness T (mm)	0.7
Weight (kg)	0.02

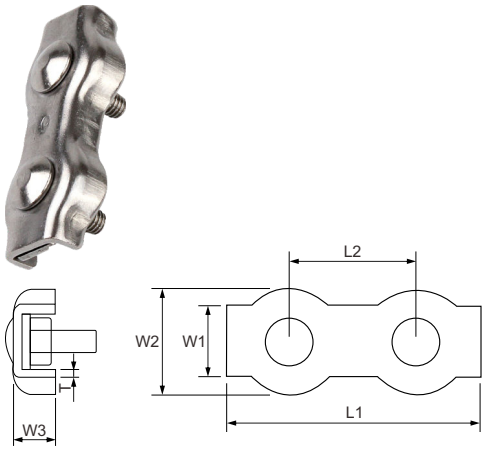
Guy Kits



Hang Clamp

Used for fixing the wire rope on the ER mast.

Type	HANGCLAMP-M8
Material	Stainless Steel
Rope Ø (mm)	6
Length L1 (mm)	46
Length L2 (mm)	24
Length L3 (mm)	60
Width W (mm)	26
Diameter ØD (mm)	8
A (mm)	45°
M (mm)	M8
Set	2 pcs Hang Clamp, 1 pcs Bolt
Weight (kg)	0.07



Wire Rope Duplex Clip

Used for tie the wire rope

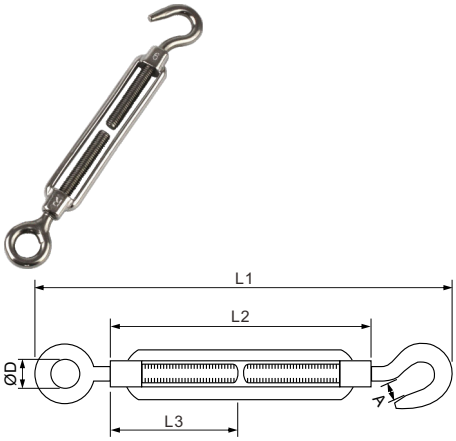
Type	DUPLEXCLIP-M6
Rope Ø (mm)	6
Length L1 (mm)	60
Length L2 (mm)	30
Width W1 (mm)	17
Width W2 (mm)	25
Width W3 (mm)	9.5
Thickness T (mm)	2
Bolt	M6 × 22
Weight (kg)	0.06

Wire Rope

Stainless steel wire rope for 7m vertical guy heights

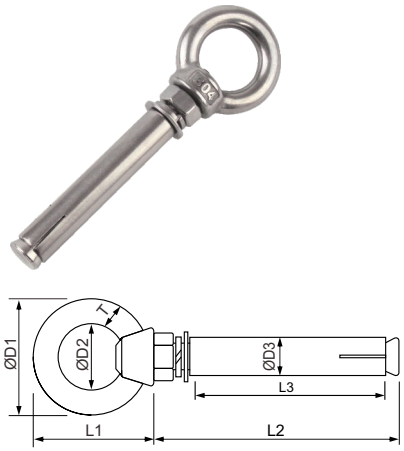
Type	WIREROPE-D5
Material	Stainless steel
Diameter ØD (mm)	5
Length L (mm)	7000
Weight (kg)	1.00

Guy Kits



Turnbuckle
Used for tensing the wire rope

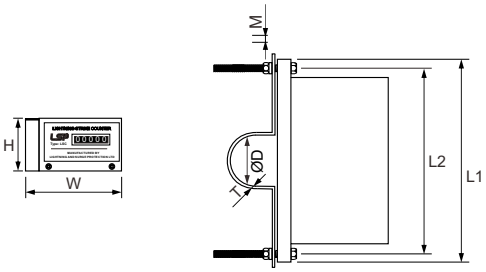
Type	TURNBUCLE-M6
Material	Stainless steel, hot-dipped galvanized
Diameter ØD (mm)	10
Length L1 (mm)	142
Length L2 (mm)	92
Length L3 (mm)	46
A (mm)	12
Shape	Hook and Eye
Weight (kg)	0.07



Eye Bolt Sleeve Anchor
Used for fixing the wire rope on the ground

Type	HANGCLAMP-M8
Material	Stainless Steel
Rope Ø (mm)	6
Length L1 (mm)	35
Length L2 (mm)	60
Length L3 (mm)	74
Diameter ØD1 (mm)	35
Diameter ØD2 (mm)	20
Diameter ØD3 (mm)	11.5
T (mm)	7.5
Weight (kg)	0.08

Lightning Strike Counter



Mechanical Lightning Strike Counter

The lightning strike counter is designed to keep a record of all direct lightning strikes on the external lightning protection system. The digital display (5 digits) allows a direct and comfortable reading of the number of recorded impacts. Fixed directly on the mast using 1 mounting hoop located on the side face to record number of lightning strikes.

Type	LSC
Operation current kA (8/20µs)	> 2
Display window	Five digits showing
Water proofing	IP 50
Body Material	Stainless Steel, bakelite
Length L1 (mm)	150
Length L2 (mm)	135
Width W (mm)	72
Height H (mm)	40
Hoop Material	Stainless Steel
Diameter Ø (mm)	Ø 38 or Ø 90
M (mm)	5
Thickness T (mm)	1.9
Weight (kg)	0.80

Installation

The lightning strike counter is fixed directly on the mast using 1 mounting flanges located on the back face. No interruption of the down conductor is necessary, thus allowing an excellent electrical continuity of the installation down from the rod to earthing the system. The counter records the lightning current by induction at the time of passage in the down conductor.