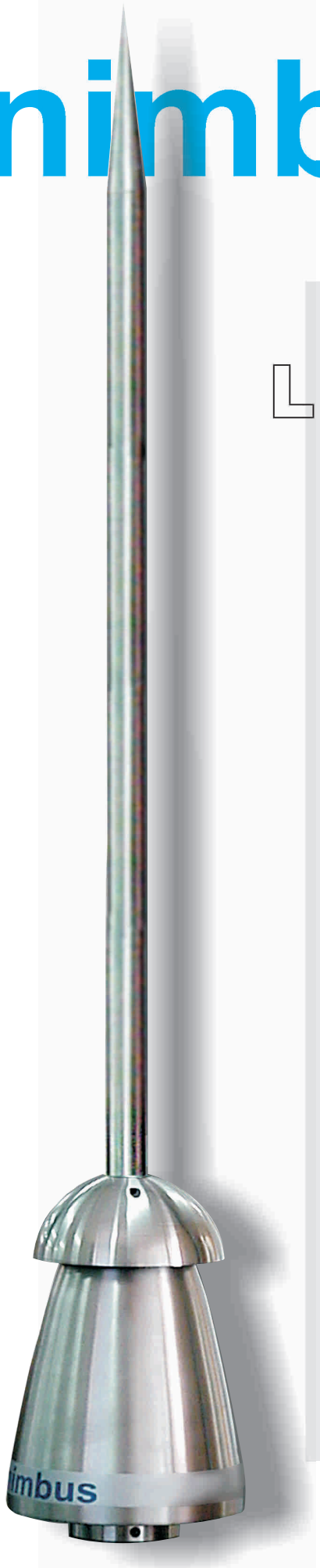
nimbus

CPT cirprotec

Lightning Rod



Lightning Rod
ESE

According to standard UNE 21 186

Selection Guide

nimbus

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Lightning Rod

Selection of nimbus model

It is necessary to know the protection radius (**Rp**) and the protection level (**NP**) in order to do the selection of an external protection accordingly..

LEVEL OF PROTECTION

The protection level is a parameter to be determined according to the established standard. We use UNE 21186-96 based on NF C 17-102 standard. These standards establish three protection levels.

The protection level depends on:

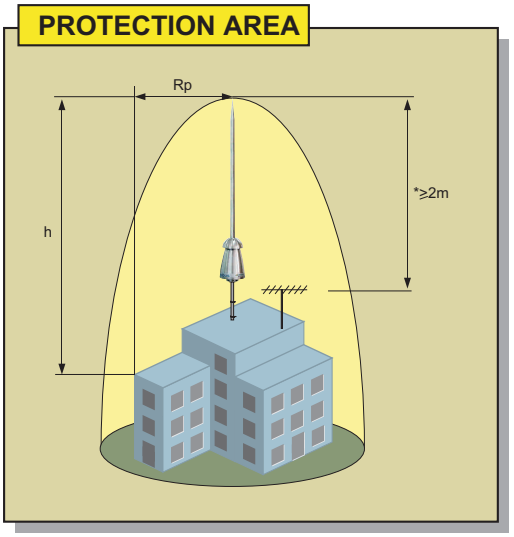
- Lightning strikes density in the area.
- Situation of the structure to be protected (urban or rural zone, high buildings near the installation, …)
- Type of structure.
- Building's location.
- Cost valuation of period of the installation due to damages because of the lightning strikes.

Sometimes this last item is the cause of selecting a protection level I (Maximum security), as the losses because of non-operation the installation could be important.

RADIUS OF PROTECTION

For the correct selection of (ESE)rod in the external protection of a structure or building it is very important to know another parameter: the protection radius (Rp).

The protection radius is the distance between the point where you want to place the (ESE) rod and the further point from the structure or building we want to protect.



NP: Protection Level
Rp: Protection Radius
H: Height of the top of the Nimbus on the surface to be protected.

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Example of selection of nimbus model

Once we have the preliminary parameters (**No and Rp**), we could select the most suitable ESE.

For having a correct protection, the top of the ESE has to be 2 m minimum above any other point of the structure.

Example situation: NP: I, Rp: 50 m.

The ESE selection is done since its features' board, by determining nimbus model and which height it should be situated.

FEATURES nimbus' BOARD

NP	Level I			Level II			Level III		
Lightning rod model / Rp (m) / h (m)	Nimbus CPT-1	Nimbus CPT-2	Nimbus CPT-3	Nimbus CPT-1	Nimbus CPT-2	Nimbus CPT-3	Nimbus CPT-1	Nimbus CPT-2	Nimbus CPT-3
2	17	24	32	23	30	40	26	33	44
3	25	35	48	34	45	59	39	50	65
4	34	46	64	46	60	78	52	67	87
5	42	58	79	57	75	97	65	84	107
6	43	58	79	58	76	97	66	84	107
8	43	59	79	59	77	98	67	85	108
10	44	59	79	61	77	99	69	87	109
15	45	59	80	63	79	101	72	89	111
20	45	60	80	65	81	102	75	92	113
45	45	60	80	70	85	105	84	98	119
60	45	60	80	70	85	105	85	100	120

1- Selection in protection level I, the **Rp** equal or immediately upper rating(58 m).

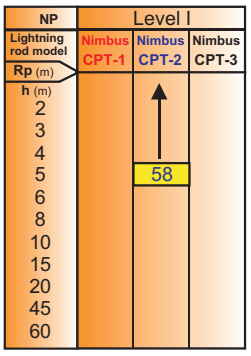
2- The vertical index indicates the model to be installed (nimbus CPT-2).

3- The horizontal index indicates the minimum height (h) of nimbus (in this case, minimum 5 m).

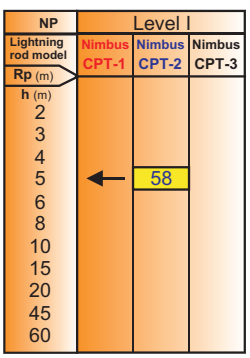
First step

NP	Level I		
Lightning rod model / Rp (m) / h (m)	Nimbus CPT-1	Nimbus CPT-2	Nimbus CPT-3
2	17	24	32
3	25	35	48
4	34	46	64
5	42	58	79
6	43	58	79
8	43	59	79
10	44	59	79
15	45	59	80
20	45	60	80
45	45	60	80
60	45	60	80

Second step



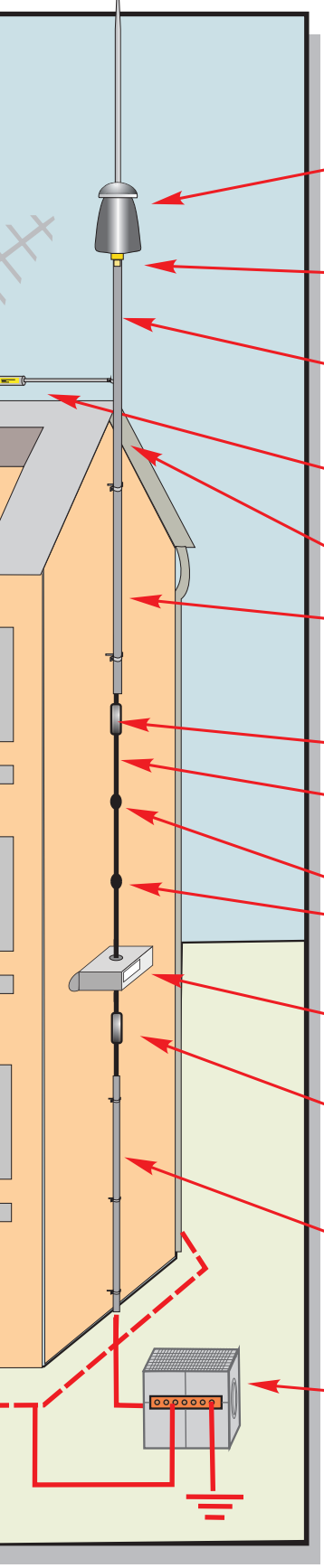
Third step



nimbus

CPT cirprotec

Lightning Rod



SELECTION GUIDE

In order to install a lightning rod, it is necessary to select all the components the system consists of. The following is a guide line which indicates the points to consider when selecting a lightning rod and its accessories.

1 CAPTURING HEAD

The lightning rods nimbus with feeding device release high voltage signals in order to anticipate the upgoing path, increasing this way the radius of the protected zone compared to a standard lightning rod.

2 ADAPTER ELEMENT

The adapter element is used for the connection of the nimbus lightning rod to the mast.

3 MAST

Extensible element which is adapted to the required height of the capturing head of the lightning rod in order to provide the desired protection radius.

4 PROTECTION MAST ANTENNA

Element used to obtain instantaneous earthing of the antenna mast in case of a lightning strike. Under normal conditions it remains isolated.

5 MAST FIXATION

Its function is the fixing of the mast. Different types of fixations exist such as fixing with screws or embedded.

CONNECTING SLEEVE (OPTIONAL)

6 DOWN-CONDUCTOR

This element directs the current of the lightning strlke from the head of the lightning rod to the earth termination system.

7 CONDUCTOR HOLDING FIXTURE

It provides the fixing of the down-conductor.

8 DISCHARGE COUNTER

The counter indicates the lightning strikes received by the protection system. Recommended in the standard UNE 21186 1996.

9 CONNECTING SLEEVE

The test joint and the connecting sleeves allow to disconnect the earth termination system in order to measure the resistivity.

10 PROTECTION PIPE

Pipe of galvanized sheet of 2 m length in order to avoid mechanical forces against the down-conductor.

INSPECTION PIT

Earth termination: there are various configurations depending on the construction and employed materials for earth termination systems.

Equipotentiality: it is recommended to connect the earth electrode of the lightning rod with the existing earth termination system and with close metal parts, in order to assure an appropiate equipotentiality and to avoid sparking when a lightning strike is absorbed.

See also on Earth Termination Systems.

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Lightning Rod

nimbus

INSTALLATION GUIDE

1 CAPTURING HEAD: the peak has to be located 2 m. above the highest parts of the area to be protected.

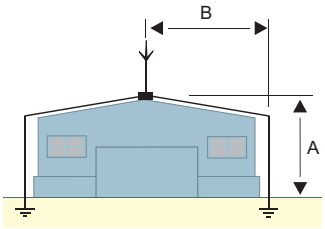
2 ADAPTOR ELEMENT: it has to provide the electrical contact between the capturing point and the downgoing conductor. It is put on the mast, on light poles, pillars, etc...

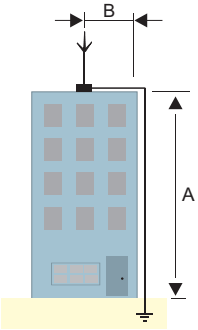
3-4 MAST- MAST FIXATION: the mast provides the appropriate height corresponing to the area to be protected by the lightning rod and is usually mounted with 2 or 3 fixings depending on its length.

6 DOWN-CONDUCTOR: it leads the current of the lightning strike from the capturing head to the earth electrode. The conductors can be of sheet, plain twist, twisted or round cable, and the minimum area has to be 50 mm^2. Each lightning rod should have at least a down-conductor, except in the following cases, where two down-conductors are needed:

-structures higher than 28 m.
-the horizontal projection is larger than the vertical projection

A<B : 2 down-conductors





A<28 m. and A>B : 1 down-conductor

The path has to be the most rectilinear possible with the shortest distance, avoiding curves. The covering radius should not be less than 20 cm. The down-conductor should avoid crossing or the proximity of electrical or telecommunication networks.

When the crossing cannot be avoided, then the line has to be inside of a metallic shield which needs to be extended 1 m on each side of the crossing.

Cornices or elevations should be avoided. A maximum height of 40 cm is allowed with an angle of up to 45º.

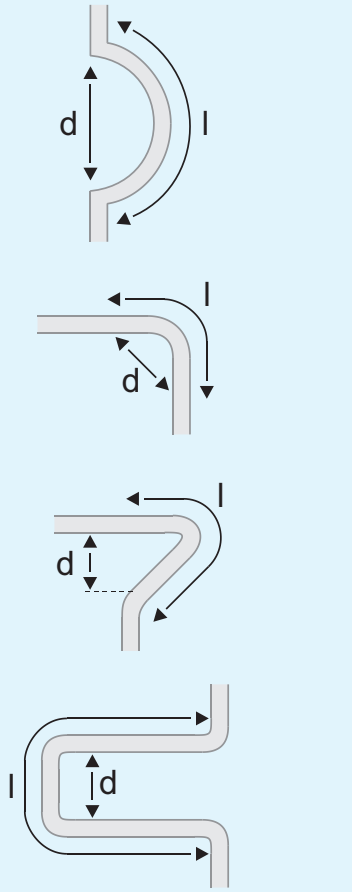
7 CONDUCTOR HOLDING FIXTURES: Independent of the fixture type, three fixtures per meter are used for the down-conductor. The fixtures must not be in direct contact with inflammable material.

8 DISCHARGE COUNTER: This counter is installed above the control joint, and in all cases 2 m. above the ground. It is mounted on the down-conductor.

9 TEST JOINT: Each down-conductor has to incorporate a test joint, which allows to disconnect the earth electrode and thus allows to measure the resistivity. The test joint is mounted two meters above the ground.

10 PROTECTION PIPE: It is put between the ground and the control joint in order to protect the down-conductor against mechanical forces. The pipe is of metallic material and has a length of 2 m. It is mounted with three fixtures.

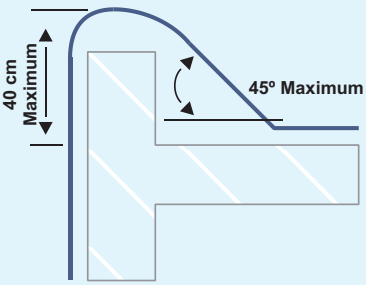
DOWN-CONDUCTOR OF LIGHTNING RODS



l : length of the loop in meters
d: width of the loop in meters
There is no danger of breaking of the dielectricum if the condition is fullfiled

$$d > \frac{l}{20}$$

CORNICES



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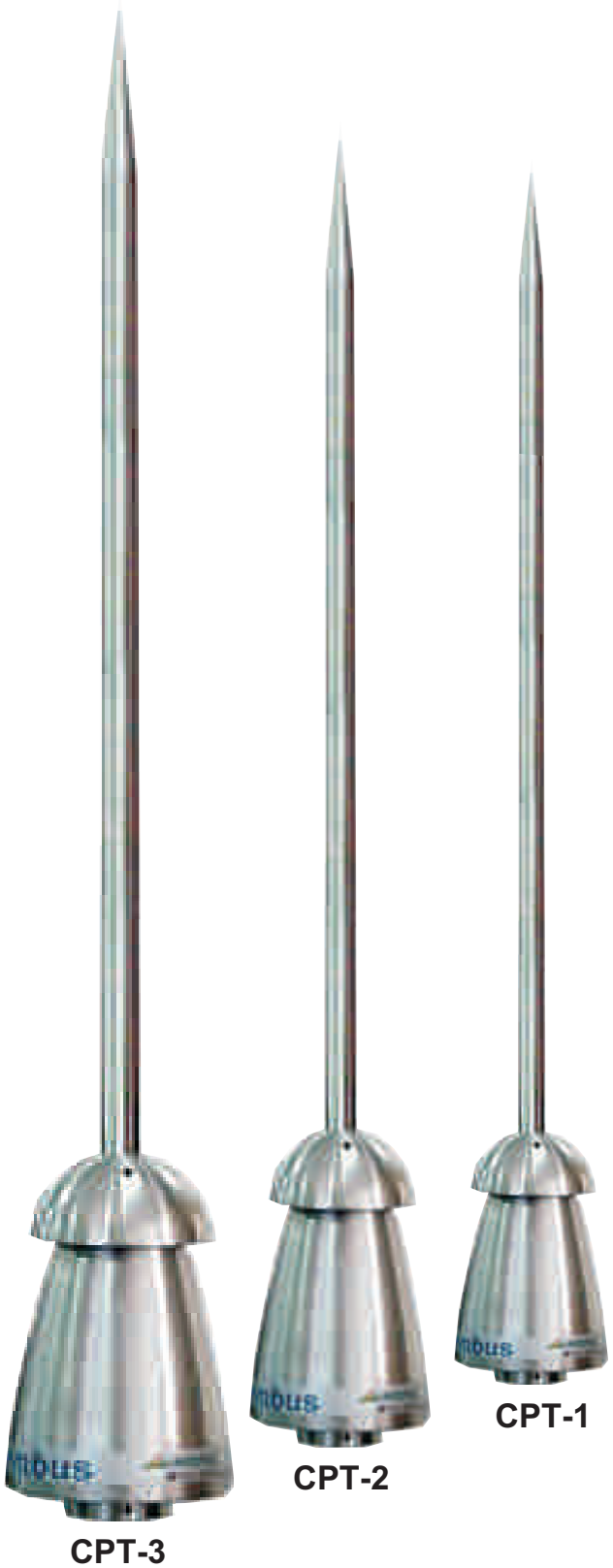
Lightning Rod

nimbus

1 CAPTURING HEAD



Code 77 901 100

Electronic ESE head
nimbus CPT-1

Code 77 901 200

Electronic ESE head
nimbus CPT-2

Code 77 901 300

Electronic ESE head
nimbus CPT-3

Lightning Rods Nimbus CPT are manufactured according to UNE 21.186-96 and NF C17-102 standards..

Produced in stainless steel AISI-316.
All lightning rods are verified according to a strict quality control.

nimbus

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Lightning Rod

2 ADAPTER ELEMENT

Code 77 902 600

Adapter element on 3 or 6 meters mast.

Code 77 902 700

Adapter element on 9 meters mast.

3 MAST

Code 779 030 00

Mast 3 m galvanized Fe

Code 779 031 00

Mast 6 m galvanized Fe

Code 779 032 00

Mast 8 m galvanized Fe

There are other possibilities for fixture and connection of the different components of a lightning rod installation.
Please consult our product list or contact our customer service.

4 PROTECTION MAST ANTENNA

Code 77 920 300

Protection mast antenna

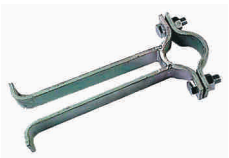
5 MAST FIXATION

Code 779 041 00

Foot for fixing the mast on plain roof or ground with screws

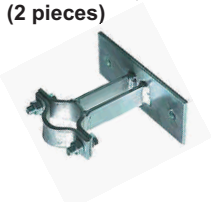
Code 779 042 00

Pair of fixations of 30 cm to embed or solder (2 pieces)



Code 779 043 00

Pair of fixtures for metallic screws, 15 cm (2 pieces)



Code 779 045 00

Pair of fixtures for horizontal rail (2 pieces)

Code 779 046 00

Pair of fixtures for vertical rail (2 pieces)

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Lightning Rod

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6 DOWN-CONDUCTOR

Code 77 908 100

Twisted cable of electrolytic unshielded copper of 50 mm

Code 77 908 200

Twisted cable of electrolytic unshielded copper of 70 mm

EASY INSTALLATION

7 CABLE HOLDING FIXTURES

Code 77 909 000

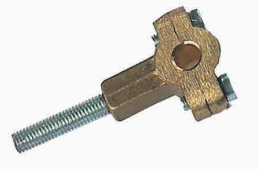
Brass cable holder for embedding

Code 77 909 100

M-8 brass screw cable holder

Code 77 909 300

M-8 brass cable holder for metallic plug



8 DISCHARGE COUNTER

Code 77 920 100

Lightning strikes counter
CDR 2000

For maintenance purpose it is recommended to install a discharge counter, since the lightning strikes received by the system can be obtained.

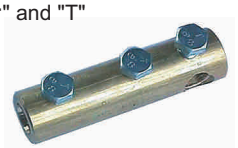
9 TEST JOINT AND CONNECTING SLEEVES

Code 77 912 000

Connecting sleeve for cable up to 70 mm

Code 77 912 100

Universal connecting sleeve in "+" and "T"



10 PROTECTION PIPE

Code 77 920 200

Protection pipe for down-conductor of 2m PG21

There are other possibilities for fixture and connection of the different components of a lightning rod installation.
Please consult our product list or contact our customer service.

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Lightning Rod

INTRODUCTION

The electrical connection of a part of the lightning rod or of an electrical circuit with the earth is made with an earth termination system.

A earth termination is formed by electrodes and other subterranean elements, whose objective is to lead the currents produced by lightning discharges or from industrial generation to ground.

TYPES OF EARTH TERMINATIONS

There are two methods for the construction of earth termination systems, where the most used one is that of **depth** (earth rods, active electrodes, plates or similar, etc.). For certain cases the **surface** method may be more appropiate.

DEPTH:

EARTH ROD: It is the method most used for earth termination systems due to its easy installation. The earth electrode is firmly set into the ground.

It is formed by three javelins with minimum length of 1,5 m, vertically set in the ground forming a delta with sides of equal length. These are connected with unshielded subterranean cable or copper bands in a trench in 60 a 80 cm. depth, and it is connected to the network of earth electrodes through the test points in the registering case.

The distance between the different picks is equal to the double length of the picks: D=2xL (length of the picks).

PLATES AND SIMILAR: They are less used since a pool has to be excavated. The method is used when with other methods insufficient values are obtained and in sites with very reduced surface to put the picks.

Normally a pool with 2m depth is made and the plate is installed. vertically. It is filled with earth where other substances are added to reduce the resistivity.

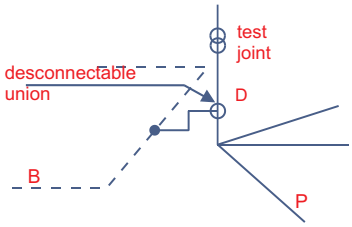
SURFACE:

GOOSE FOOT: This method for earth termination construction is used on rocky soils or grounds with difficult excavation.

It is formed by 25m of copper band or cable divided in three subterranean branches in trenches with minimum depth of 60 cm, where the angel between the branches is 45º.

EQUIPOTENTIALITY OF THE EARTH TERMINATIONS:

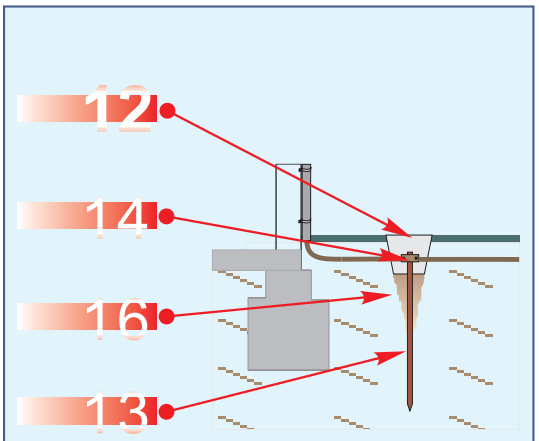
If the building to be protected has an earth termination system for grounding of the electrical installation, then the earth electrodes of the lightning rod installation are connected within each other.



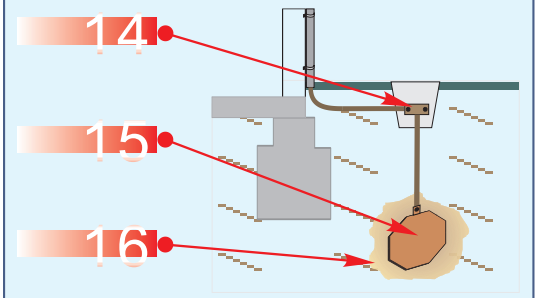
D: down-conductor of the lightning rod
B: earth circuit located on the bottom of the building excavation
P: earth electrode of the lightning rod

This connection is made on the level of the ground at the earth electrode. If this connection is not possible, then the interconnection is made on the earth plate. In this case the trajectory of the unifying conductor must be made such as to avoid a possible induction on the cables and material located in the proximities.

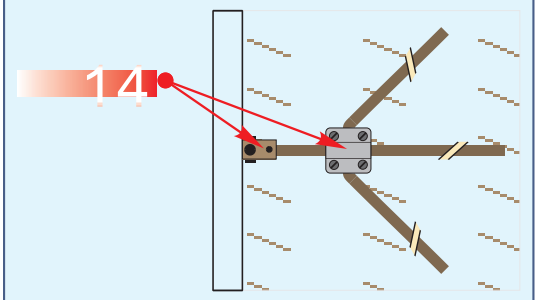
In any case the interconnection has to be made with a device which allows the disconnection in order to later carry out controls concerning the resistivity.



Earth Rod



Plate



Goose foot

nimbus

CPT cirprotec
Lightning Rod

12 REGISTERING CASE AND EQUIPOTENCIAL BONDING STRIP

Code 77 930 110

Polypropylen square register case of 300 x 300 mm

Code 77 930 100

Registering case

Code 77 931 100

Equipotencial bonding strip

Code 77 920 500

Isolating Spark Gap Unit

Code 77 920 550

Protective Spark Gap Unit

Code 77 930 400

Square cover of 300 x 300 mm

13 JAVELINS

Code 77 932 000

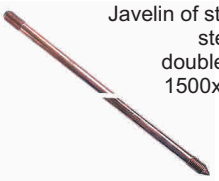
Javelin of stainless steel of 2000x14 mm

Code 77 932 100

Javelin of stainless steel of 1500x14 mm

Code 77 932 400

Javelin of stainless steel with double coil of 1500x18 mm



Code 77 934 000

Screw

Code 77 932 500

Coined stainless steel connection union

14 FIXATION CLIPS CABLE TO EARTH ROD

Code 77 934 300

Embracing clip stainless steel for javelin connection

Code 77 934 200

Brass embrassing clip for javelin connection

Code 77 934 600

Universal union in "+", "T" and parallel

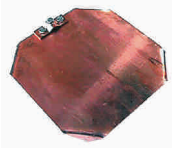
15 EARTH ELECTRODE PLATES

Code 77 936 100

Copper plate of 500 x 500 x 2 mm

Code 77 936 500

Steel copper plate of 500 x 500 x 2 mm



Code 77 936 300

Fe galvanized plate of 500 x 500 x 2 mm

16 CONDUCTIVITY IMPROVING SUBSTANCES

Code 77 938 300

Sack of mineral salts of 5 Kg.

Code 77 938 500

LOWPAT,

EASY INSTALLATION