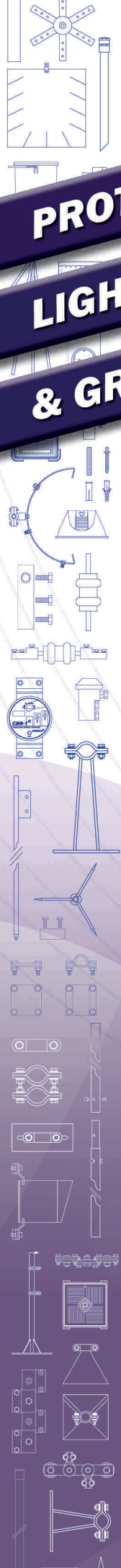




# PROTECTION AGAINST LIGHTNING

## LIGHTNING RODS

## & GROUNDING SYSTEMS



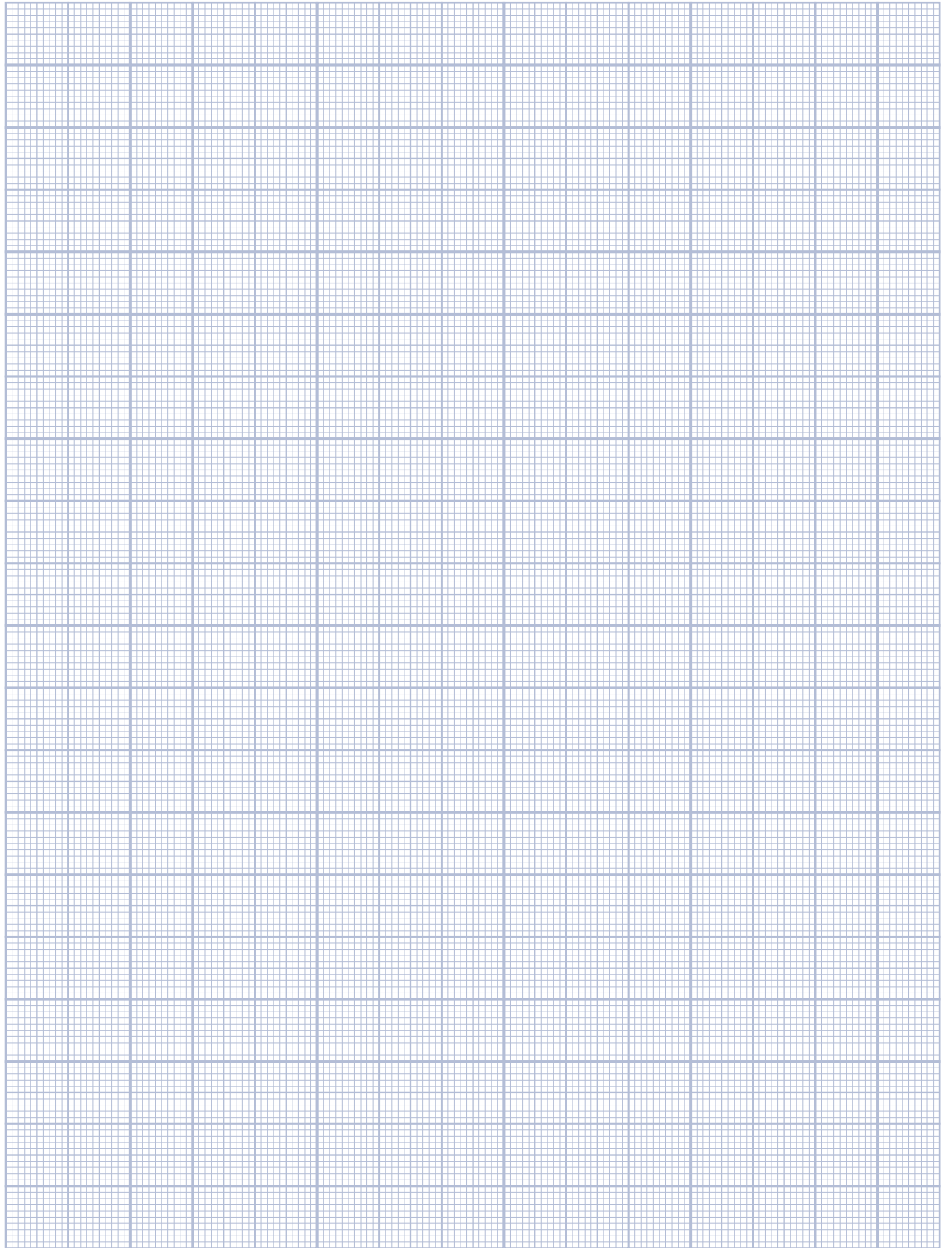
# catalogue 37





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0 1 2 3 4 5 cm

**INFORMATION AND CONSULTATION**

 **(+34) 902 22 11 60**

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## WHO ARE WE?



The **INGESCO**<sup>®</sup> brand has been distinguished since 1973 for quality and leadership in **design, manufacture and installation of lightning protection systems** (lightning rods, meshes and surge protectors) and the **devices for lightning and storm prevention** and early warning.

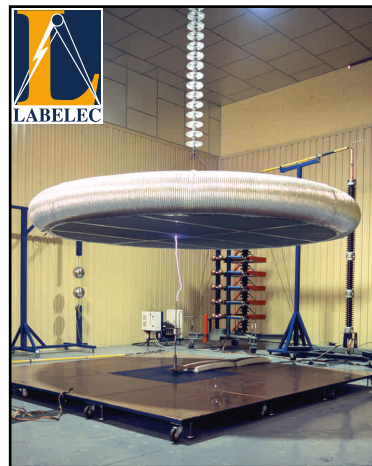
Our manufacturing division relies on the reinforcement of the **LABELEC Electrotechnical Laboratory** in order to carry out the research and tests which permit our R&D department to advance the design of more efficient lightning rods and prevention devices.

In addition to the tests carried out in the **ENAC** accredited High Voltage Laboratories, **INGESCO**<sup>®</sup> tests its equipment under the most demanding conditions.



*Natural field Laboratory  
(Niu de l'Àliga. La Tossa d'Alp)*

To do this, we field-test our lightning conductors - at the **instrument equipped Experimental Tower** located at 2500 m in the **Catalan Pyrenees**, where lightning current parameters are recorded and subsequently studied.



**LABELEC** verifies the quality of all our products, subjecting them to rigorous electrical tests, even in the most extreme environmental and corrosion conditions.



This ongoing effort for technological innovation and quality results in products like the **INGESCO**<sup>®</sup> **PDC, PDC.E** and **Stream** Lightning Rods. As regards prevention, we offer our real time **Lightning Location System, and storm warning systems - Previstorm.net.**

The quality of our lightning rods has been recognised by their corresponding product certificates, granted by the **Bureau Veritas International** certification organisation, which also guarantees the **ISO 9001:2008** quality certificate given to our production and marketing processes.

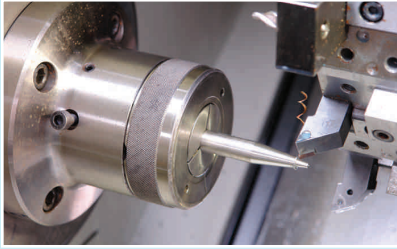
### INSPECTION ENTITY :

The **QUIBAC Inspection Entity** is a conformity assessment agency (Type C), accredited by **ENAC (Accreditation n°41/E1069)** for lightning rod facilities. QUIBAC, accredited as an Inspection Entity, performs an unbiased and objective evaluation of any protection system at all required stages: **Design and Engineering Management, Installation, Periodic Inspections.**



Our group is backed by **39 years experience** gained in Spain with the execution of almost **40,000 lightning protection facilities** in Spain in all types of construction, and by a clear wager of the **research and development of new technological solutions** to the challenges faced by lightning protection.

## WHAT DO WE OFFER?



### PERSONALISED ATTENTION :

INGESCO® offers immediate replies to your consultations. We offer for your disposition our qualified technical and personnel infrastructure which will provide the best assessment of lightning and surge protection and prevention.



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Internacional: (+34) 93 736 03 14  
[export@ingesco.com](mailto:export@ingesco.com)

### DESIGN, MANUFACTURING & INSTALLATION :

INGESCO® offers an integral lightning and surge protection and prevention service. Our offers encompass **the initial** protection and prevention systems **design** to the **manufacture, installation and start up** of the equipment. This allows us to provide concrete solutions to the specific needs of our clients.

Our Technical Office know in depth the national and international application norms and regulations (norms **UNE 21186, NFC 17102, EN 50164** and **EN 62305**) and the latest available technology, and can advise and design the protection project most adequate for your needs.

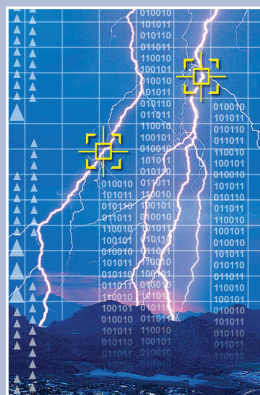
INGESCO® makes the following tools available to customers through its website ([www.ingesco.com](http://www.ingesco.com)):

- **INGESCO SOFTWARE DESIGN.** An online program for calculating the protection level required according to the needs of the project. Also, the program can be used to aid in the elaboration of the study on blueprints through the use of tools such as: Installation guide, protection volume in CAD format... ([www.ingesco.com/estudios](http://www.ingesco.com/estudios))
- **Product Catalog in PRESTO/FIEBDC format.** This catalog contains the necessary information to elaborate calculation logs and estimates through expenditure items, price schedule and technical information, among others. ([www.ingesco.com/estudios](http://www.ingesco.com/estudios))

**Investment products** and **solutions to made to fit** are the currency which paves our way.

### QUALITY SYSTEMS :

All the INGESCO® products are submitted to strict quality checks before entering the market. This effort has been recognised with, already in 2004, **ISO 9001:2008 certification**, a guarantee of quality in the processes of our products and services.



### AREAS COVERED :

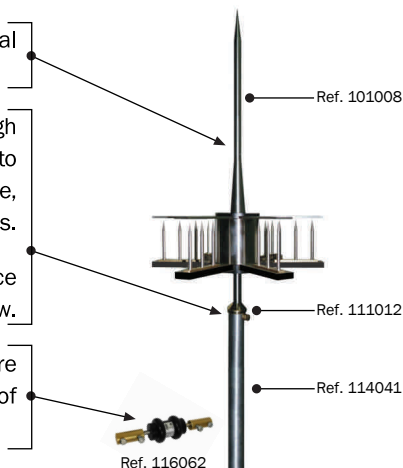
- **LIGHTNING PROTECTION**
  - Air terminals
  - Grounding systems
  - Meshed systems (Faraday's cage)
- **PREVENTION**
  - Lightning location system
  - Storm warning system (Previstorm.net)
- **INTERNAL PROTECTION**
  - Transient voltage protector devices

## INSTALLATION GUIDE

### EXTERNAL LIGHTNING PROTECTION INSTALLATION

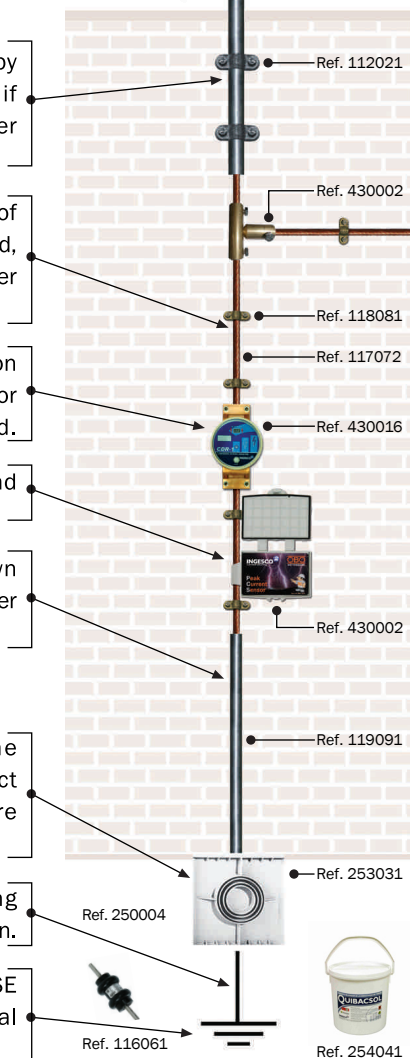
#### CAPTURE SYSTEM

- Fix the central axis of the air terminal to the head-mast adaptor piece.
- Pass the down conductor cable through the interior of the mast and connect it to the base of the head-mast adaptor piece, fixing it by means of two allen screws.
- Connect the head-mast adaptor piece within the mast, fix it with its screw.
- Connect all metallic structures that are within the safe distance by means of spark gaps.



#### DOWN CONDUCTOR

- Anchor the mast to the structure by means of suitable support and if necessary, fix the mast to the cover using anchor braces.
- Fix the down conductor by means of fastener clips, tightening them well and, as a reference, use three fasteners per meter.
- Install the **CDR-1** lightning counter on the lower part of the conductor, two or three meters above the ground.
- Install the **PCS** card to the ground conducting cable.
- Protect the lower part of the down conductor by way of a minimum 2 meter protection tube.



#### GROUNDING SYSTEM

- Install the test joint inside the registry case in order to disconnect the grounding system and measure its resistance.
- Select the appropriate grounding system according to the type of terrain.
- Use an spark gap to connect the ESE grounding system with the general grounding system of the building.

#### INSTALLATION REQUIREMENTS:

- The tip of the lightning rods must be located, at a minimum, two meters above the zone it protects (including antennas, cooling towers, ceilings and deposits).
- Install two or more down conductors for each installation of lightning rods.
- The receiving antennas (TV, radio, telephone) must be connected by means of spark gaps to the down conductors of the lightning rod installations.
- The coaxial cables of the antennas must be protected with a device against surges.
- The metallic elements that rise above the roof should be connected to the closest down conductor.
- The trajectory of the down conductor must be as straight as possible and follow the shortest possible path, avoiding any abrupt layers or overhangings.
- In the layerings, the curvature of the radius are not to be inferior to 20 cm.
- The conducting cable must be placed outside of the building (whenever possible), avoiding the proximity of electrical or gas conductors.
- It is recommended the grounding have a registry case available in order to perform periodic inspections.
- The registry case (or, in its absence the conducting cable) must be provided with a system disconnecting switch that permits the disconnection of the grounding in order to measure its resistance.
- The resistance of the grounding taken must be the lowest possible (less than 10 ohms). The value is measured on the ground insulated from all other elements of conductive nature.
- It is advisable to connect the grounding of the lightning rods with the general grounding system of the building it is designed to protect.
- It is recommended to add Quibacsol mineral composite to enhance ground conductivity.

# INSTALLATION GUIDE

## EXTERNAL LIGHTNING PROTECTION INSTALLATION

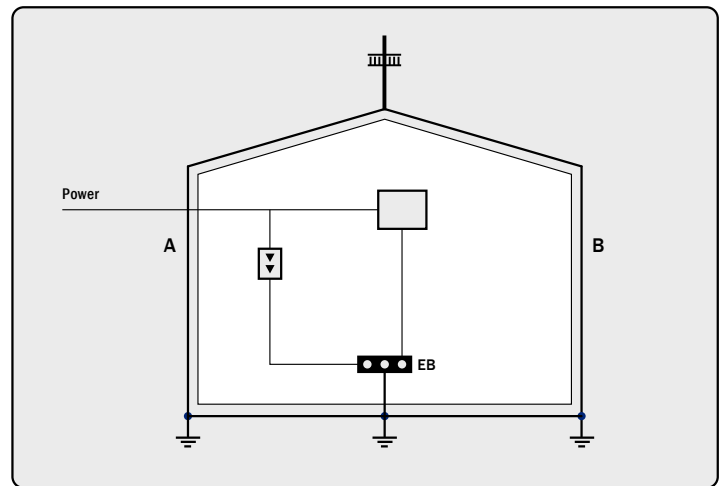
### DOWN CONDUCTORS

The down conductors are designed to lead the lightning current from the capture devices to the ground.

Each lightning rod must be connected to at least two down conductors (A and B).

On buildings higher than 60m, four downconductors will be needed. These downconductors will be placed, wherever is possible, in the four corners of the building.

The two down conductors are to be located on two different facades, whenever this is possible.



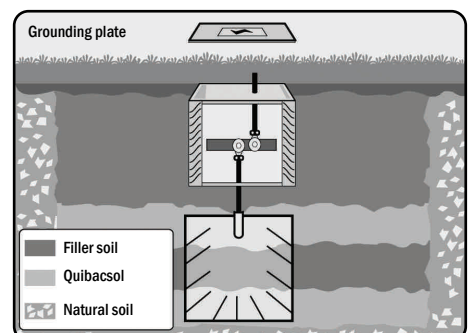
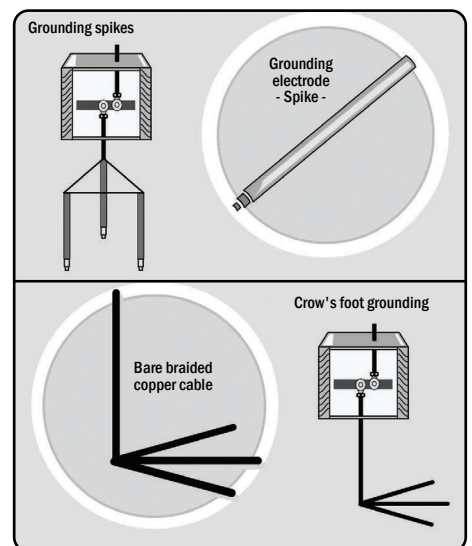
### GROUNDING INSTALLATION

#### GROUNDING SPIKES:

- Introduce the spikes vertically in the terrain, arranged in line or in a triangle, spaced by a distance equal to the buried length as a minimum. The spikes are to be connected by way of sufficient sectioned cables which have identical or compatible characteristics as that which is used in the lightning down conductor.
- Bury the cable in a ditch at a minimum depth of 50 cm. Another possible configuration consists of burying the conducting cable of the same nature and section as that of the down conductor (excepting aluminium), having a crow's foot shape which must be buried at least 50 cm in depth.
- Install an inspection system in order to allow future maintenance.

#### GROUNDING PLATE:

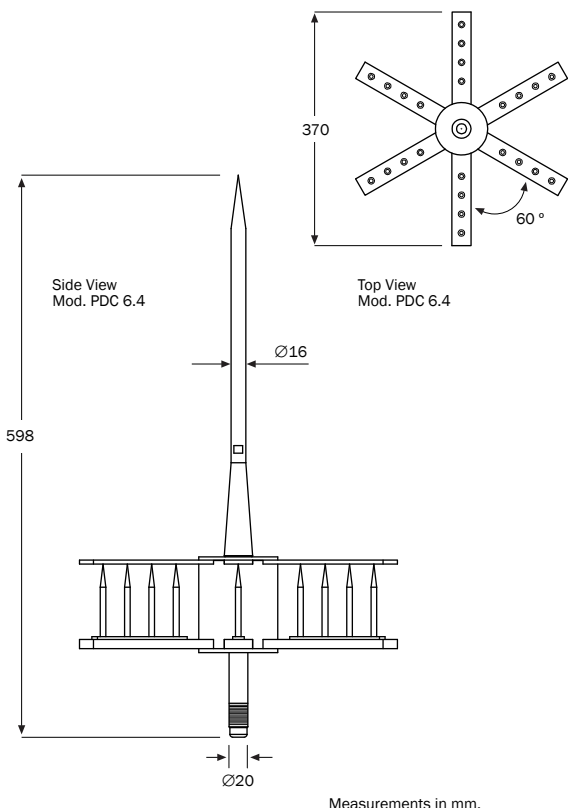
- Especially recommended for rocky terrain which does not permit excavation of great depth.
- Create a 1 m<sup>3</sup> minimum hole in the earth.
- Connect the plate to the down conductor.
- Install the copper plate vertically in relation to the ground and fold the stamped sides, alternating to the left and to the right in order to enhance conductivity.
- Fill in the hole, adding layers of Quibacsol composite to improve contact between the ground and the plate.
- Compact the land.
- Install an inspection system in order to allow future maintenance.



## AIR TERMINALS




Photo Mod. PDC 6.4  
(Ref. 101009)



### INGESCO® PDC LIGHTNING RODS

#### DESCRIPTION :



- 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
  - EN 50.164/1
  - NFC 17.102
  - EN 62.305
- Product certification num. ES020609 issued by the certification entity Bureau Veritas International.
 
- Manufactured in AISI 316L 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.

#### MODELS / PROTECTION LEVELS :

	PDC 3.1	PDC 3.3	PDC 4.3	PDC 5.3	PDC 6.3	PDC 6.4
<b>INGESCO</b> Lightning Rod						
Reference	101000	101001	101003	101005	101008	101009
Weight	2.350 gr.	3.200 gr.	3.400 gr.	3.600 gr.	3.800 gr.	4.150 gr.
$\Delta t$	<b>15 <math>\mu s</math></b>	<b>25 <math>\mu s</math></b>	<b>34 <math>\mu s</math></b>	<b>43 <math>\mu s</math></b>	<b>54 <math>\mu s</math></b>	<b>60 <math>\mu s</math></b>
<b>LEVEL I</b>	35 m	45 m	54 m	63 m	74 m	80 m
<b>LEVEL II</b>	43 m	54 m	63 m	72 m	83 m	89 m
<b>LEVEL III</b>	54 m	65 m	74 m	84 m	95 m	102 m
<b>LEVEL IV</b>	63 m	75 m	85 m	95 m	106 m	113 m

Protection radii calculated according to: Norm UNE 21.186 & NFC 17.102. (These radii of protection have been calculated according to an altitude difference of 20 m. between the end of the lightning rods and the considered horizontal plane).

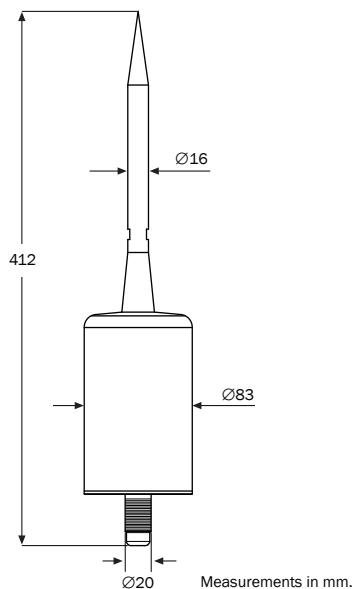


## AIR TERMINALS

### INGESCO® PDC.E LIGHTNING RODS



Photo Mod. PDC.E 60  
(Ref. 102007)



#### DESCRIPTION :



- Lightning rod with 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
- Product certification num. ES020609 issued by the certification entity Bureau Veritas International.
- Made of AISI 316 stainless steel.
- 100 % EFFICIENCY, maximum durability.
- Does not need an external power supply.
- Guarantee of electrical continuity and operation after lightning strike, in any atmospheric conditions.

#### MODELS / PROTECTION LEVELS:

MODEL	PDC.E 15	PDC.E 30	PDC.E 45	PDC.E 60
Reference	102004	102005	102006	102007
Weight	3,775	3,770	3,765	3,760
$\Delta t$	<b>15 <math>\mu s</math></b>	<b>30 <math>\mu s</math></b>	<b>45 <math>\mu s</math></b>	<b>60 <math>\mu s</math></b>
LEVEL I	35 m	50 m	65 m	80 m
LEVEL II	43 m	59 m	74 m	89 m
LEVEL III	54 m	70 m	86 m	102 m
LEVEL IV	63 m	81 m	97 m	113 m

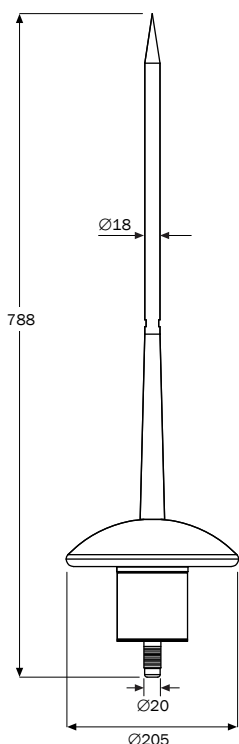
Protection radii calculated according to: Norm UNE 21.186 & NFC 17.102  
(These radii of protection have been calculated according to an altitude difference of 20 m. between the end of the lightning rods and the considered horizontal plane).

## AIR TERMINALS

### INGESCO® PDC STREAM LIGHTNING RODS



Photo Mod. STREAM-60  
(Ref. 102023)



Measurements in mm.

#### DESCRIPCIÓN :



- Lightning rod with 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
  - EN 50.164/1
  - NFC 17.102
  - EN 62.305
- Product certification num. ES020609 issued by the certification entity Bureau Veritas International.
- Made of AISI 316 stainless steel.
- 100 % EFFICIENCY, maximum durability.
- Does not need an external power supply.
- Guarantee of electrical continuity and operation after lightning strike, in any atmospheric conditions.



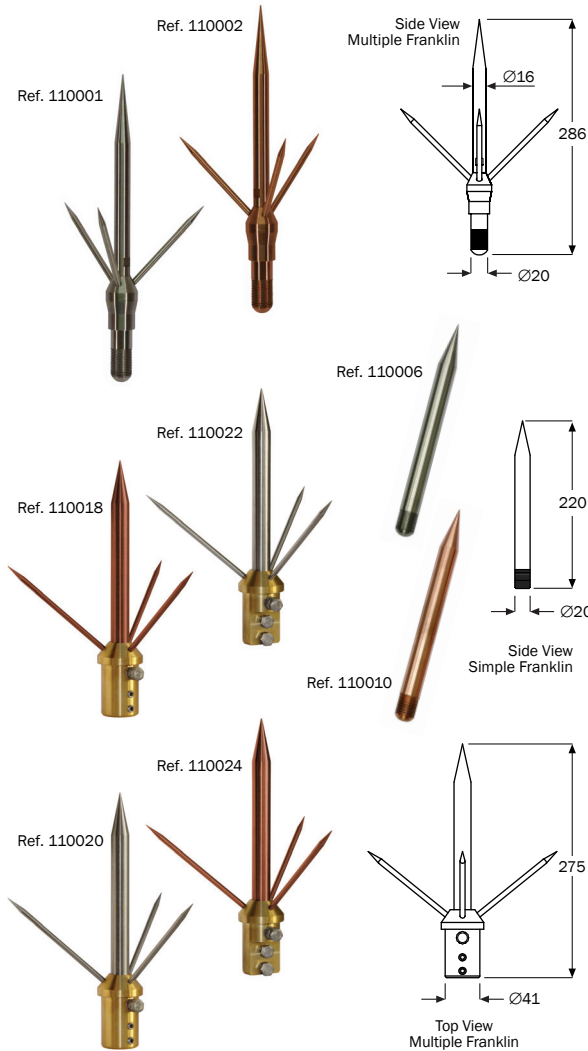
#### MODELS / PROTECTION LEVELS :

MODEL	STREAM-15	STREAM-30	STREAM-45	STREAM-60
Reference	102020	102021	102022	102023
Weight	5.550	5.540	5.530	5.520
$\Delta t$	<b>15 <math>\mu s</math></b>	<b>30 <math>\mu s</math></b>	<b>45 <math>\mu s</math></b>	<b>60 <math>\mu s</math></b>
LEVEL I	35 m	50 m	65 m	80 m
LEVEL II	43 m	59 m	74 m	89 m
LEVEL III	54 m	70 m	86 m	102 m
LEVEL IV	63 m	81 m	97 m	113 m

Protection radii calculated according to: Norm UNE 21.186 & NFC 17.102  
(These radii of protection have been calculated according to an altitude difference of 20 m. between the end of the lightning rods and the considered horizontal plane).

# AIR TERMINALS

## FRANKLIN LIGHTNING RODS



### DESCRIPTION :

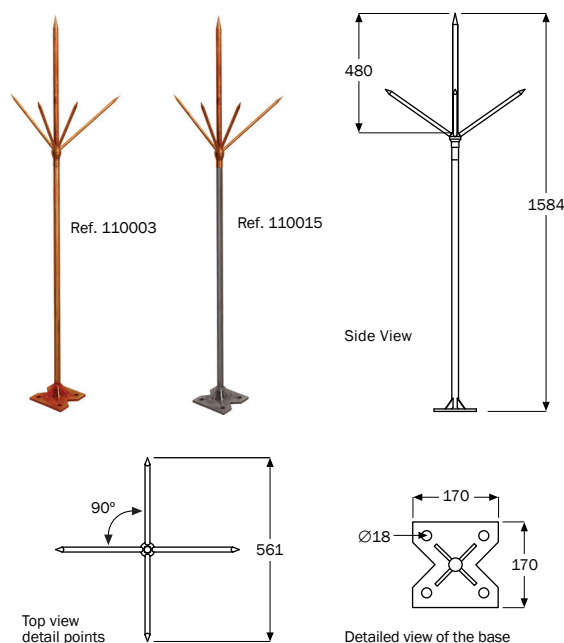
- External protection of structures against lightning.
- Complies with the requirements set forth in the standards:
  - EN 62.305
- Made of AISI 316L stainless steel or copper.
- Models with adaptor part included, in versions for 50 mm<sup>2</sup> cables (or 8 mm. diameter bar) and 30 x 2 mm. tape.
- Note: Consult for special measurements.



### MODELS :

Standard Models	Reference	Weight
SIMPLE FRANKLIN - STAINLESS STEEL	110001	570 gr
SIMPLE FRANKLIN - COPPER	110002	635 gr
MULTIPLE FRANKLIN - STAINLESS STEEL	110006	465 gr
MULTIPLE FRANKLIN - COPPER	110010	520 gr
Models Adaptable to Masts - CABLE version	Reference	Weight
FR. MULTIPLE - STAINLESS STEEL / for 1½" masts	110018	1,35 kg
FR. MULTIPLE - STAINLESS STEEL / for 1¼" masts	110019	1,20 kg
FR. MULTIPLE - COPPER / for 1½" masts	110020	1,40 kg
FR. MULTIPLE - COPPER / for 1¼" masts	110021	1,25 kg
Models Aaptable to Masts - TAPE version	Reference	Weight
FR. MULTIPLE - STAINLESS STEEL / for 1½" masts	110022	1,30 kg
FR. MULTIPLE - STAINLESS STEEL / for 1¼" masts	110023	1,10 kg
FR. MULTIPLE - COPPER / for 1½" masts	110024	1,35 kg
FR. MULTIPLE - COPPER / for 1¼" masts	110025	1,15 kg

## SPECIAL SET FRANKLIN + SUPPORT



### DESCRIPTION :

- Set made up of Franklin lightning rods with copper tips (special measurements) plus flat base support, for the external protection of structures against lightning.
- 1 metre high supports for multiple or simple Franklin.
- Copper plated or galvanised support.
- Complies with the requirements set forth in the standards:
  - EN 62.305



### MODELS :

Copper Franklin set with copper plated support	Ref. 110003	5,50 kg
Copper Franklin set with galvanised support	..... Ref. 110015	5,60 kg

# FIXATION ACCESSORIES

## HEAD - MAST ADAPTOR PIECE

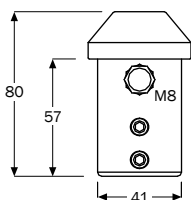


### DESCRIPTION :

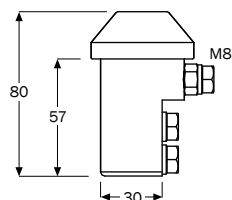
- Necessary to connect the air terminal receiver to the mast.
- Facilitates the connection of the head to the conducting network. Available in two models: for connection to cable or rod conductive networks and for connection to 30x2 mm. tape conductive networks.
- Complies with the requirements set forth in the standards:
  - EN 62.305
  - EN 50.164/1
- Made of Cu/Zn alloy (brass).
- Stainless steel hardware.



Front View Mod. 1 1/2" for Cable



Side View Mod. 1 1/2" for tape



### MODELS :

MODELS (according to mast's Ø)	Model for Cable		Model for Tape	
	Reference	Weight	Reference	Weight
1" inches	111019	288 gr	-	-
1 1/4" inches	111011	640 gr	111017	515 gr
1 1/2" inches	111012	760 gr	111014	705 gr
2" inches	111013	1.290 gr	111018	1.275 gr

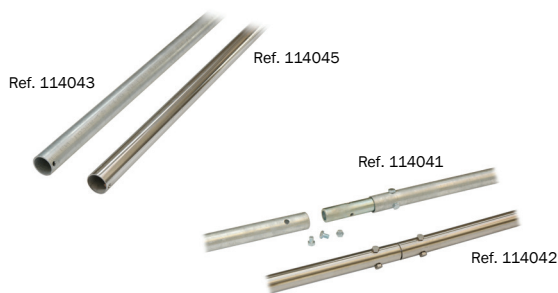
## MASTS

### DESCRIPTION :

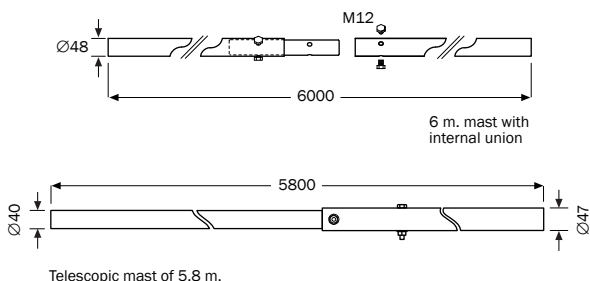
- 3 and 6 meter masts.
- 5,8 to 8,6 m. telescopic masts in connectable sections.
- 5, 8 and 9 m. telescopic masts in connectable sections with internal joint.
- Models made of hot galvanized steel or stainless steel.
- Enquire about manufacturing of special dimensions.

### MODELS :

STAINLESS STEEL	Reference	Weight
3 m. in 1 1/2"	114045	9,00 kg
6 m. in 2 sections of 1 1/2"	114042	22,00 kg
HOT GALVANIZED STEEL	Reference	Weight
3 m. in 1 1/4"	114052	7,75 kg
3 m. in 1 1/2"	114043	10,00 kg
6 m. in 2 sections of 1 1/4"	114048	16,80 kg
6 m. in 2 sections of 1 1/2"	114041	23,00 kg
TELESCOPE IN STEEL GALVANIZED	Reference	Weight
5,8 m. 2 sections Ø 50 + 1 1/4"	114065	18,00 kg
7,6 m. 3 sections Ø 50 + 1 1/4"	114066	30,20 kg
8,6 m. 3 sections Ø 50 + 1 1/4"	114067	33,23 kg
8 m. 3 sec. 2" + 1 1/2" + 1 1/4" stainless steel inside union	114068	33,80 kg
9 m. 3 sec. 2" + 1 1/2" + 1 1/4" stainless steel inside union	114069	36,90 kg



Ref. 114065



# FIXATION ACCESSORIES

## MAST ANCHOR SET

### DESCRIPTION :

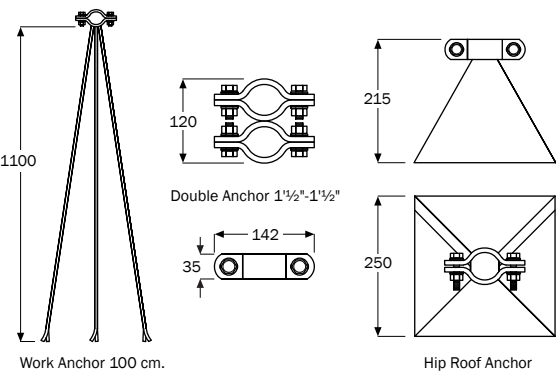
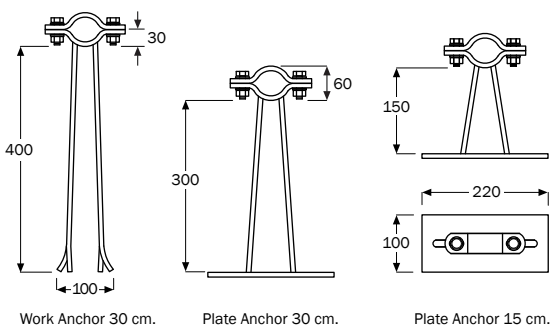
- Useful for vertical fastening of masts to various structures.
- Permits fastening 1½" and 2" tubes. Consult for other measurements.
- Suppliable in Work, Plate or Double anchor versions.
- Set of two pieces made of hot galvanized steel.

### MODELS :

MASONRY AND PLATE ANCHORING	MODEL 1' ½"		MODEL 2"	
	Reference	Weight	Reference	Weight
<b>WORK 15 cm.</b>	112071	3,80 kg	—	—
<b>WORK 30 cm.</b>	112021	5,20 kg	112038	5,40 kg
<b>WORK 60 cm.</b>	112022	13,20 kg	112040	13,40 kg
<b>WORK 100 cm.</b>	112023	23,60 kg	112042	23,80 kg
<b>PLATE 15 cm.</b>	112024	5,80 kg	112037	6,00 kg
<b>PLATE 15 cm. Inverted</b>	112070	5,80 kg	—	—
<b>PLATE 30 cm.</b>	112025	7,20 kg	112039	7,40 kg
<b>PLATE 60 cm.</b>	112027	15,70 kg	112041	15,90 kg
<b>PLATE 100 cm.</b>	112030	30,80 kg	112043	31,00 kg

DOUBLE ANCHORING	Reference	Weight
<b>DOUBLE ANCHOR CLAMP 1½" - 1½"</b>	112026	3,00 kg
<b>DOUBLE ANCHOR CLAMP 1½" - 1¼"</b>	112036	2,80 kg
<b>DOUBLE ANCHOR CLAMP 1½" - 2"</b>	112035	3,20 kg
<b>DOUBLE ANCHOR CLAMP 2" - 2"</b>	112034	3,40 kg
<b>DOUBLE ANCHOR CROSS CLAMP 1½" - 1½"</b>	112032	3,00 kg

OTHER ANCHORINGS AND COMPLEMENTS	Reference	Weight
<b>ANCHORING PLATE</b>	112044	2,70 kg
<b>HIP ROOF ANCHOR</b>	112033	2,75 kg



## FIXATION ACCESSORIES

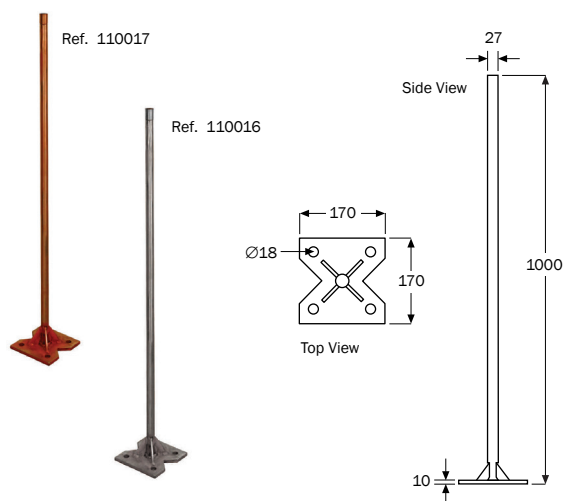
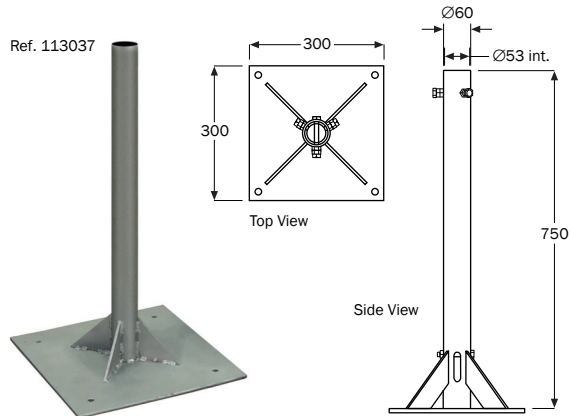
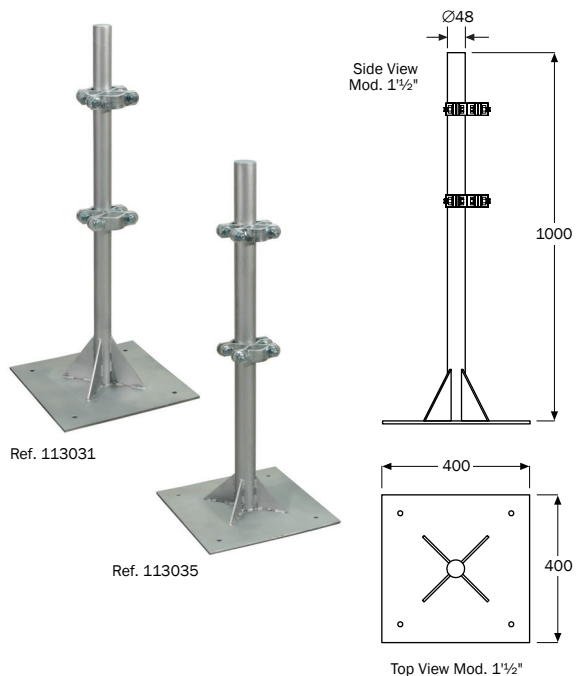
### BASE PLATE SUPPORT

#### DESCRIPTION :

- Flat base support for horizontal surfaces for tube fastening, available for 1¼", 1½" and 2" tubes.
- Base plate support for fixing 3 m high 1½" masts on horizontal surfaces.
- Support for simple or multiple Franklin.
- Manufactured in hot dip galvanised steel or copper plated steel.

#### MODELS :

BASE PLATE SUPPORT	Reference	Weight
1½" with Double Anchor Clamps 1½" - 1¼"	113034	17,50 kg
1½" with Double Anchor Clamps 1½" - 1½"	113031	17,70 kg
1½" with Double Anchor Clamps 1½" - 2"	113033	17,90 kg
2" with Double Anchor Clamps 2" - 1½"	113035	18,30 kg
2" with Double Anchor Clamps 2" - 2"	113032	18,50 kg
For 3 m. high 1½" masts	113037	12,50 kg
Galvanised support for Franklin	110016	3,75 kg
Copper plated support for Franklin	110017	3,65 kg







## DOWN CONDUCTORS

### BRAIDED COPPER CABLE



Cable section detail



			
35 mm <sup>2</sup> (∅ 7 mm) Ref. 117071	50 mm <sup>2</sup> (∅ 8 mm) Ref. 117072	70 mm <sup>2</sup> (∅ 10 mm) Ref. 117073	95 mm <sup>2</sup> (∅ 11 mm) Ref. 117074

#### DESCRIPTION :



- Braided bare electrolytic copper cable.
- Complies with the requirements set forth in the standards:
  - NFC 17.102
  - UNE 21.186
  - EN 50.164/2
  - EN 62.305 (only cables 50 mm<sup>2</sup>)
- Mainly applied as a down conductor for lightning protection and grounding systems.

#### MODELS :

<b>35 mm<sup>2</sup> of section</b> .....	Ref. 117071	315  /m
<b>50 mm<sup>2</sup> of section</b> .....	Ref. 117072	500  /m
<b>70 mm<sup>2</sup> of section</b> .....	Ref. 117073	600  /m
<b>95 mm<sup>2</sup> of section</b> .....	Ref. 117074	830  /m

### STEEL ROUND CONDUCTOR



Ref. 117081

#### DESCRIPTION :



- Round conductor in accordance with EN 50.164-2.
- Meets the requirements of VDE 0185-305 (IEC 62.305).
- Manufactured in galvanised steel.
- Supplied in 125 m. coils.

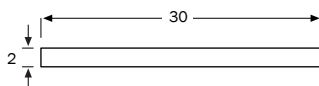
#### MODELOS :

<b>Rd 8 galvanised steel coil</b> .....	Ref. 117081	312  /m
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### COPPER TAPE



Ref. 117082



Tape cross section detail

#### DESCRIPTION :



- 30 x 2 mm. bare electrolytic copper bar, supplied in 3 m. bars.
- Coil of 30 x 2 mm. tinned electrolytic copper tape, supplied in 46 m coils (25kg).
- Complies with the requirements set forth in the standards:
  - NFC 17.102
  - UNE 21.186
  - EN 50.164/2
  - EN 62.305
- Mainly applied as a down conductor for lightning protection and grounding systems.

#### MODELS :

<b>30 x 2 mm Cu bar (3 m.)</b> .....	Ref. 117076	530  /m
<b>Coil of 30 x 2 mm tinned Cu bar (46 m.)</b> .....	Ref. 117082	537  /m

## CLAMPS

### CABLE CLAMPING BASKETS



#### DESCRIPTION:

- Fastener clamps for 50-70-95 mm<sup>2</sup> cross section cables.
- Complies with the requirements set forth in the standards:
  - EN 62.305
  - EN 50.164/4
- Made of Cu/Zn alloy (brass), stainless steel hardware.
- Pre assembled models with different anchoring types in M6 and M8 sizes (plug, dowel screw, foot flange).

#### MODELS:

CLAMPING BRACKET	Cable 50 mm <sup>2</sup>		Cable 70 mm <sup>2</sup>		Cable 95 mm <sup>2</sup>	
	Reference	Weight	Reference	Weight	Reference	Weight
Plug M-6	118082	114	118091	111	118090	105
Plug M-8	118081	122	118089	119	118088	113
Dowel Screw M6	118099	105	118000	102	118100	96
Dowel Screw M8	118083	119	118093	116	118092	110
Foot Flange	118084	145	118095	142	118094	136

### FOLDING CLAMPING BRACKETS

#### DESCRIPTION:

- Fastening clamps for 50 mm<sup>2</sup> and 70 mm<sup>2</sup> section cable.
- Various models depending on the type of wall fixing :
  - Dowel screw + metal plug
  - Lag screw + plastic plug
- Manufactured in Zinc, with stainless steel fasteners.

#### MODELS:

Folding clamping bracket double screw M8.....Ref. 118109	77
Dowel screw folding clamping bracket M8..... Ref. 118113	93
Plug folding clamping bracket M8..... Ref. 118114	97

### INSULATING CLAMPING BRACKETS

#### DESCRIPTION:

- Insulating clamps for 50 mm<sup>2</sup> section cable.
- Manufactured in Polyamide.
- Fixed to cable by clipping.
- Model with wall fixing by means of a lag screw.

#### MODELS:

Insulator clamping bracket M8..... Ref. 118106	7,2
Dowel screw insulator clamping brackets M6..... Ref. 118117	10,4

Ref. 118099

Ref. 118082

Ref. 118092

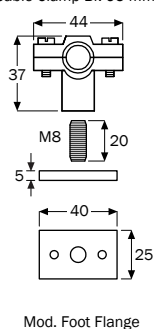
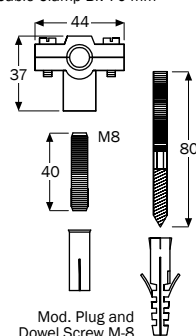
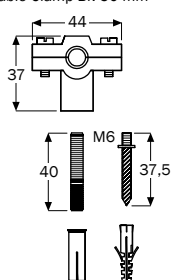
Ref. 118088

Ref. 118095

Cable Clamp Br. 50 mm<sup>2</sup>

Cable Clamp Br. 70 mm<sup>2</sup>

Cable Clamp Br. 95 mm<sup>2</sup>



Mod. Plug and Dowel Screw M-6

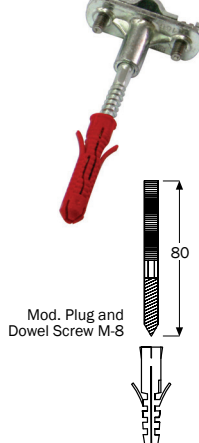
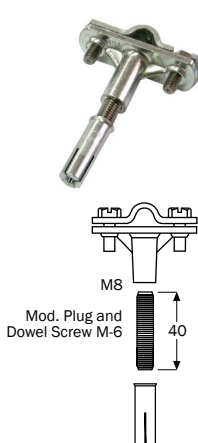
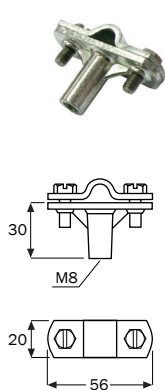
Mod. Plug and Dowel Screw M-8

Mod. Foot Flange

Ref. 118109

Ref. 118114

Ref. 118113

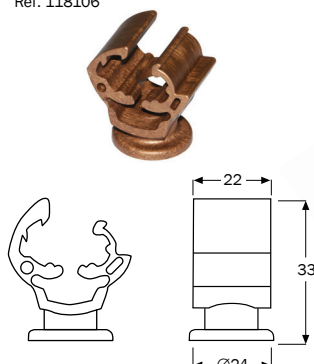


Mod. Plug and Dowel Screw M-6

Mod. Plug and Dowel Screw M-8

Ref. 118106

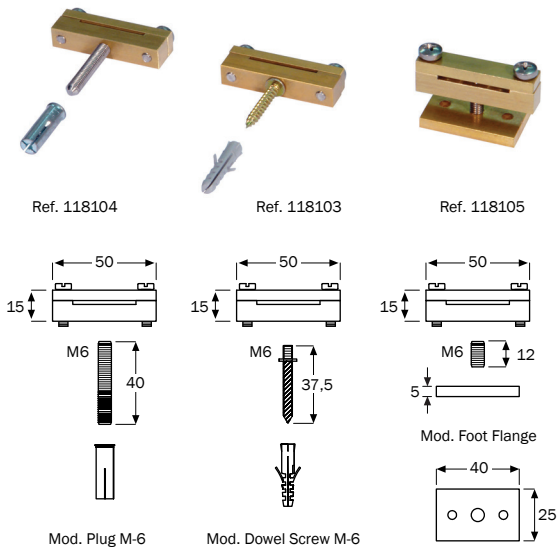
Ref. 118117





## CLAMPS

### TAPE CLAMPING BRACKETS



#### DESCRIPTION :

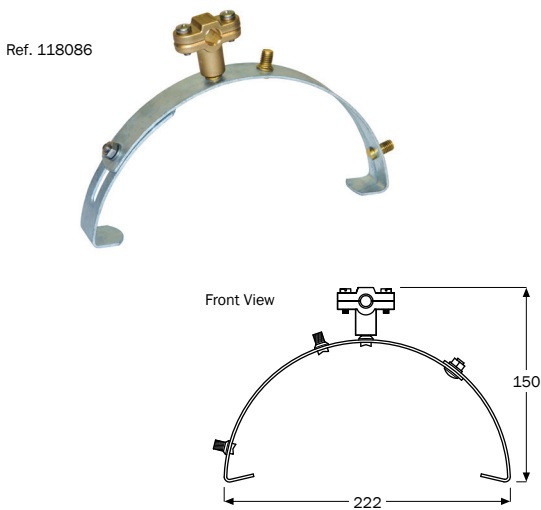
- Fastener clamps for 30x2 mm. cross section tape.
- Complies with the requirements set forth in the standards:
  - EN 62.305
  - EN 50.164/4
- Made of Cu/Zn alloy (brass), stainless steel hardware.
- Available with different anchoring types in M6 (plug, dowel screw, foot flange).



#### MODELS :

Plug M-6.....	Ref. 118104	63	
Dowel Screw M-6.....	Ref. 118103	72	
Foot Flange.....	Ref. 118105	101	

### ROOF CONDUCTOR SUPPORT



#### DESCRIPTION:

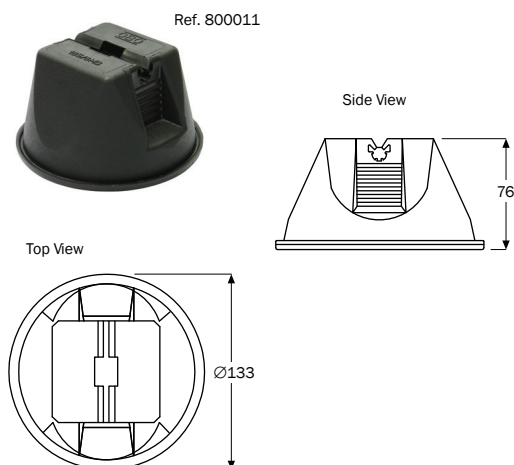
- Adjustable support for 160-260 mm wide lintel tiles.
- Complies with the requirements set forth in the standards:
  - EN 62.305
  - EN 50.164/4
- Made of hot galvanized steel.
- With fastener clamp for 50-70-95 mm<sup>2</sup> cross section cables.



#### MODELS:

Cable CLAMP BRACKET 50 mm <sup>2</sup> .....	Ref. 118086	275	
Cable CLAMP BRACKET 70 mm <sup>2</sup> .....	Ref. 118101	270	
Cable CLAMP BRACKET 95 mm <sup>2</sup> .....	Ref. 118102	265	

### ROOF CONDUCTOR HOLDER FOR FLAT ROOFS



#### DESCRIPTION:

- Concrete support with black polyethylene sheath.
- Complies with the requirements set forth in the standards:
  - EN 62.305
  - EN 50.164/4
- Allows fixing round conductors 35 to 95 mm<sup>2</sup> on flat roofs.



#### MODELS:

CONCRETE SUPPORT .....	Ref. 800011	1.140	
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## CONNECTION DEVICES

### CONNECTION DEVICES



#### DESCRIPCIÓN :

- Sleeves for the connection of 35-50-70-95 mm<sup>2</sup> cross section cables.
- Complies with the requirements set forth in the standards:
  - EN 62.305
  - EN 50.164/1
- Made of Cu/Zn alloy (brass).
- Stainless steel hardware.

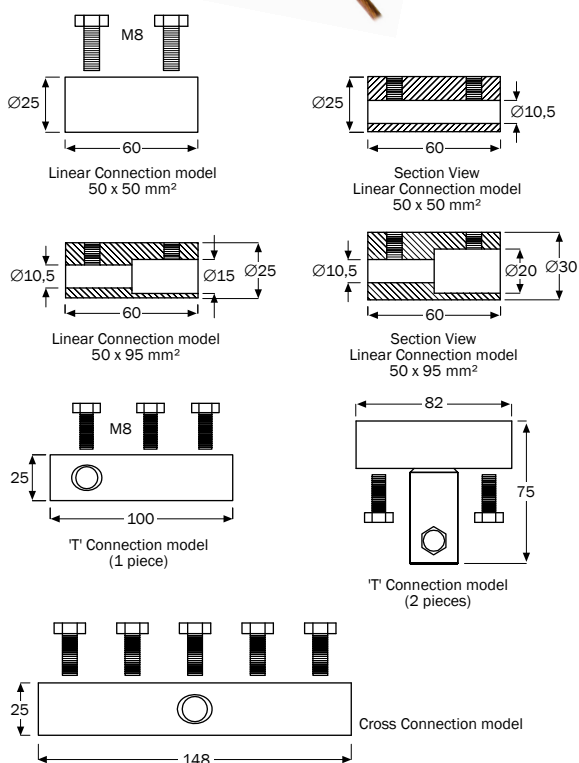
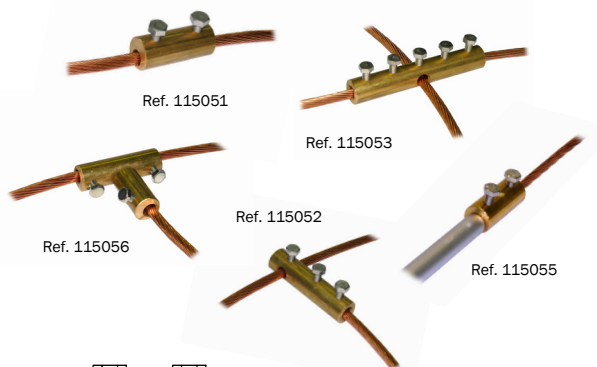
#### MODELS :

SLEEVES (by type of cables to connect)	Reference	Weight
LINEAR CONNECTION 35 x 35 mm <sup>2</sup>	115067	235 gr
LINEAR CONNECTION 35 x 50 mm <sup>2</sup>	115070	226 gr
LINEAR CONNECTION 50 x 50 mm <sup>2</sup>	115051	217 gr
LINEAR CONNECTION 50 x 70 mm <sup>2</sup>	115072	212 gr
LINEAR CONNECTION 50 x 95 mm <sup>2</sup>	115076	195 gr
LINEAR CONNECTION 70 x 70 mm <sup>2</sup>	115074	204 gr
LINEAR CONNECTION 70 x 95 mm <sup>2</sup>	115078	187 gr
LINEAR CONNECTION 95 x 95 mm <sup>2</sup>	115080	168 gr

GROUND SLEEVES ELECTRODES	Reference
E. GROUND ROD CONNECTION - Ø 14 mm.	115055 203 gr
E. UNION CONNECTION - Ø 18 mm.	115095 273 gr

SPECIAL SLEEVES	Cable 50/70 mm <sup>2</sup>		Cable 95 mm <sup>2</sup>	
	Reference	Weight	Reference	Weight
'T' CONNECT. (1 Piece)	115052	355 gr	115082	470 gr
'T' CONNECT. (2 Pieces)	115056	500 gr	115084	610 gr
CROSS CONNECTION	115053	450 gr	115086	665 gr

connection devices



### CONNECTORS

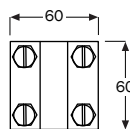
#### DESCRIPCIÓN :

- Connection fittings for 8-10 mm. round conductors and 50 mm<sup>2</sup> section cable. de sección.
- Flat terminal for 50-70-95-120 mm<sup>2</sup> section cable de sección.
- Models manufactured in brass and hot dip galvanised steel.
- Stainless steel (ref. 115100) and galvanised steel fasteners.

#### MODELS :

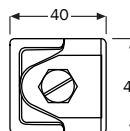
FLAT TERMINAL .....	Ref. 115097	186 gr
RD 8-10 CROSS CONNECTOR .....	Ref. 115098	110 gr
ADAPTABLE CONNECTOR .....	Ref. 115100	94 gr

Ref. 115098



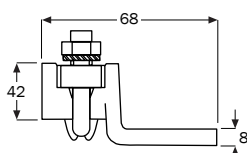
Top View Cross Connector

Ref. 115100



Adaptable Connector Top View

Ref. 115097



Side view Terminal Teeth

## CONNECTION DEVICES

### TAPE CONNECTORS



**DESCRIPTION :**

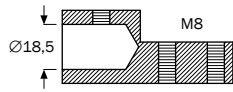
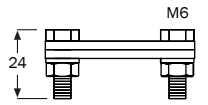
- Tape connectors specially designed for tapes 2 to 4 mm. thick and 30 mm. wide.
- Complies with the requirements set forth in the standards:
  - EN 62.305
  - EN 50.164/1
- Models made of copper or Cu/Zn alloy (brass), stainless steel hardware.

**MODELS :**

CROSS COUPLING FOR TAPE	Reference	Weight
In COPPER	115093	164

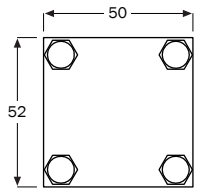
  

TAPE-GROUND ROD COUPLER	Reference	Weight
In Cu/Zn (Brass)	115094	284

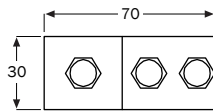


Front View Cross Coupler

Cross Section Tape-Ground rod Coupler



Top View Cross Coupler



Top View Tape-Ground rod Coupler

### VX-1 SPARK GAP



**DESCRIPTION :**

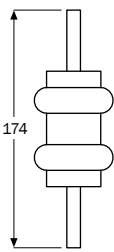
- Indicated for the connection of TV and communications antennas and cathodic protection.
- Complies with the requirements set forth in the standards:
  - EN 50.164/3
- Maximum intensity 50 kA, wave type 10/350  $\mu$ s.
- Response voltage 15kV  $\approx$  (1,2/50  $\mu$ s)
- It can be supplied with terminal connectors (sleeves) for tape or for 50-70-95 mm<sup>2</sup> cross section cables. Stainless steel hardware.

**MODELS :**

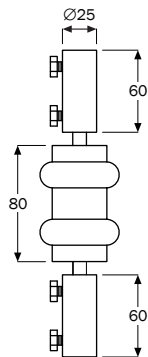
VX-1 .....	Ref. 116061	360
VX-1 + Connection Sleeves for Cable 50 mm <sup>2</sup> .....	Ref. 116062	795
VX-1 + Connection Sleeves for Cable 70 mm <sup>2</sup> .....	Ref. 116063	785
VX-1 + Connection Sleeves for Cable 95 mm <sup>2</sup> .....	Ref. 116064	750
VX-1 + Connection Sleeves for Tape .....	Ref. 116071	970



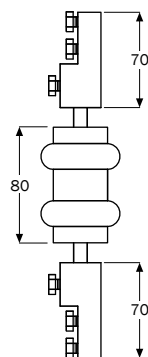
Ref. 116071



Mod. VX-1



Mod. VX-1 + Cable Sleeves



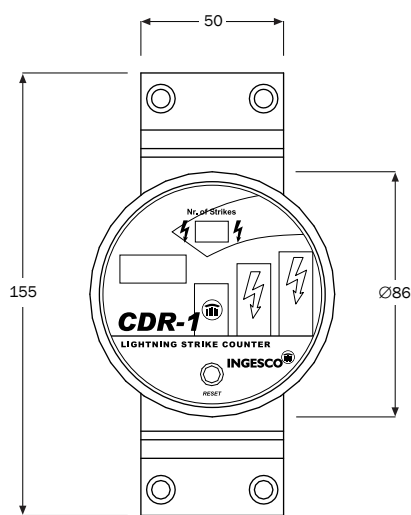
Mod. VX-1 + Tape Sleeves

# LIGHTNING STRIKE COUNTERS

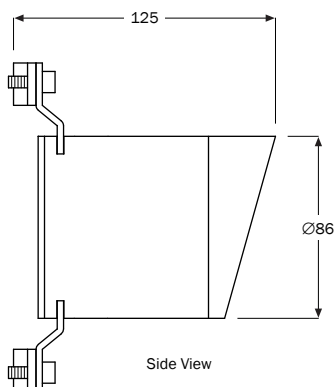
## CDR-1 LIGHTNING STRIKE COUNTER



Ref. 430016



Front View



Side View

### DESCRIPTION :

- Logs the lightning strikes which occur within the external lightning protection system.
- Complies with the requirements set forth in the standards:
  - UNE 21.186
  - NFC 17.102
  - EN 62.305
  - EN 50.164-1
  - EN 50164-6
- Range of Intensity:  
1 kA (8/20  $\mu$ s) - 100 kA (10/350  $\mu$ s), according to EN 50.164/6
- Valid for: Cable 50-95 mm<sup>2</sup>, Rod  $\varnothing$  8-12 mm, Tape 30x2 mm.
- An external power supply is not required for its operation.
- Designed for installation in parallel.
- Resettable model.

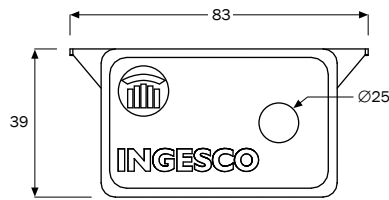
### MODELS :

CDR-1 .....	Ref. 430016	830
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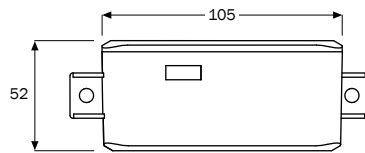
## LIGHTNING STRIKE COUNTERS



Ref. 430019



Top view



Front view

### CDR-11

#### DESCRIPTION :



- Records the number of lightning strikes on a lightning protection system.
- Meets the requirements of the applicable standards:
  - NFC 17.102
  - UNE 21.186
  - EN 50.164-6
  - UNE-EN 62.305
- Current range: 1 kA (8/20  $\mu$ s) - 100 kA (10/350  $\mu$ s), in accordance with EN 50.164-6
- Valid for: 50-95 mm<sup>2</sup> cable, 8-12 mm diameter bar.
- An external power supply is not required for its operation.
- Includes fasteners for fixing.
- Mounting system by wall fixing.

#### MODELS :

<b>CDR-11</b> .....	Ref. 430019	290	
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### PCS CARD

#### DESCRIPTION :



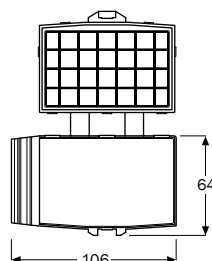
- It detects and stores current spikes which circulate through the conductor.
- A support fixture is included for a 8 to 10 mm. diameter round cable.

#### MODELS :

<b>PCS CARD</b> .....	Ref. 430002	24	
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Ref. 430002



Front View with the open support

## DOWN CONDUCTOR PROTECTION

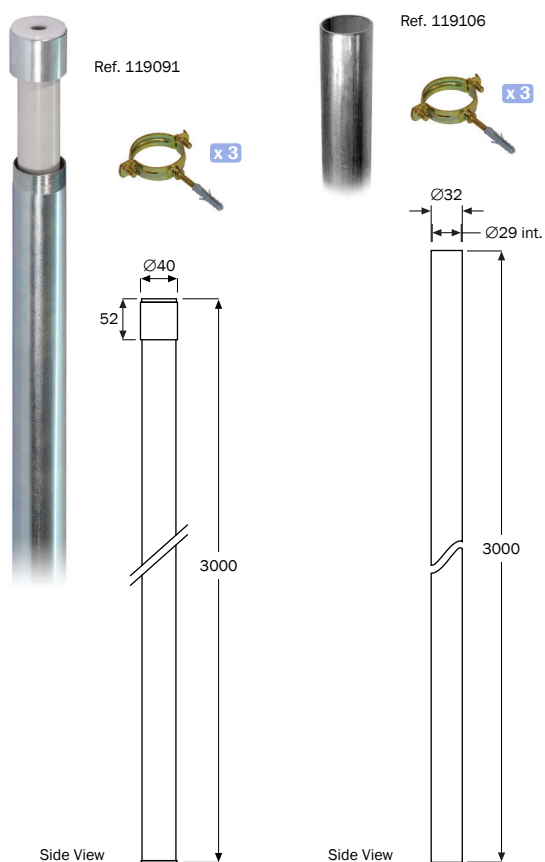
### PROTECTION TUBE

#### DESCRIPTION :

- Mechanical protector for down conductors of external lightning protection systems, placed at ground level.
- Suitable for the protection of external down conductors, as recommended by the UNE 21.186 and NFC 17.102 standards.
- Length 3 m.
- Manufactured in galvanised steel. Ref 119091 contains 32 mm. diameter internal PVC tube.
- Includes 3 clamps, plugs and dowel screws.

#### MODELS :

Galvanized steel tube / PVC.....	Ref. 119091	5,00 kg
Galvanized steel tube .....	Ref. 119106	2,80 kg



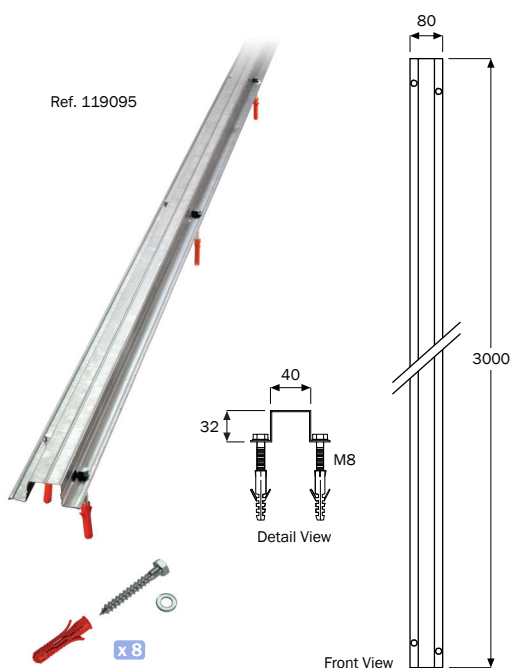
### GUARD FOR TAPE PROTECTION

#### DESCRIPTION :

- Mechanical protector for tape down conductors of external lightning protection systems, placed at ground level.
- Suitable for the protection of external down conductors, as recommended by the UNE 21.186 and NFC 17.102 standards.
- Length 3 m.
- Model made of 1 mm. hot galvanized steel plate sheet.
- Masonry wall anchoring hardware included.

#### MODELOS :

TAPE GUARD.....	Ref. 119095	2,60 kg
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# GROUND ELECTRODE

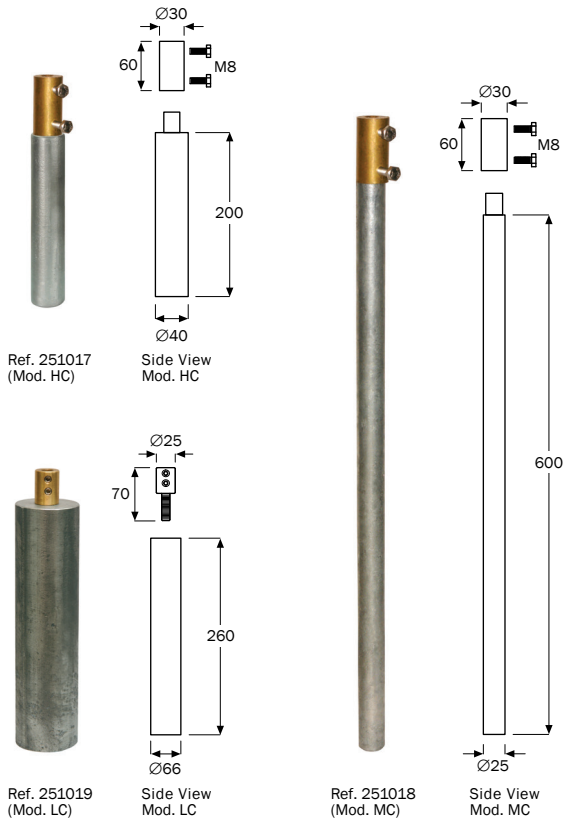
## SACRIFICIAL ANODE

### DESCRIPTION :

- Ideal for protection against corrosion.
- Models manufactured in zinc or magnesium (model LC).
- Ground resistivity:
  - HC model (High Conductivity) —  $\rho < 50 \Omega m$
  - MC Model (Medium Conductivity) —  $50 < \rho < 200 \Omega m$
  - LC model (Low Conductivity) —  $200 < \rho < 500 \Omega m$
- Includes connection coupling for 50 mm<sup>2</sup> cross section cable.

### MODELS :

SACRIFICIAL ANODE	Reference	Weight
200 mm long HC model	251017	2.420 
600 mm long MC model	251018	2.790 
260 mm long LC model	251019	930 



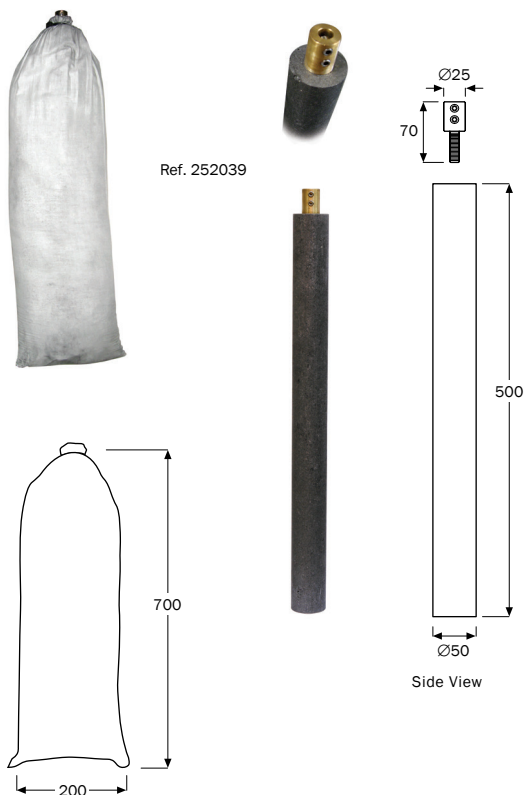
## GRAPHITE ELECTRODE

### DESCRIPTION :

- Graphite electrode with connection coupling (50 mm<sup>2</sup> cable) for grounding systems. Supplied in wrapping containing a solid graphite powder covered with graphite powder.
- Recommended for ground with high resistivity and/or rocky terrain.
- Long useful life due to minimal degradation by corrosion.
- Graphite electrode:
  - Longitude: 500 mm      Diameter: 50 mm
  - Electrical resistivity: 950  $\mu\Omega /cm$
- Meets the requirements of the applicable standards:
  - UNE 21.186      • NFC 17.102
  - UNE-EN 50.164-2      • UNE-EN 62305

### MODELS :

GRAPHITE ELECTRODE .....	Ref. 252039	8,00 
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## GROUND ELECTRODE

### ELECTRODE - GROUNDING ROD



#### DESCRIPTION :

- Very useful in any type of grounding (houses, antennas, machinery and instrumentation, etc.)
- Complies with the requirements set forth in the standards:
  - EN 62.305
  - EN 50.164/2
- Models made of hot galvanized steel, stainless steel or copper-plated steel.

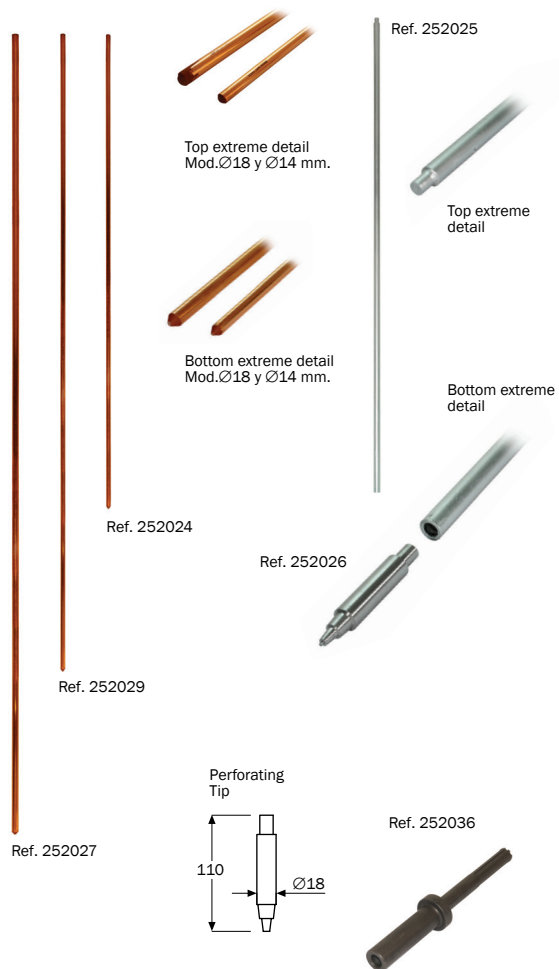
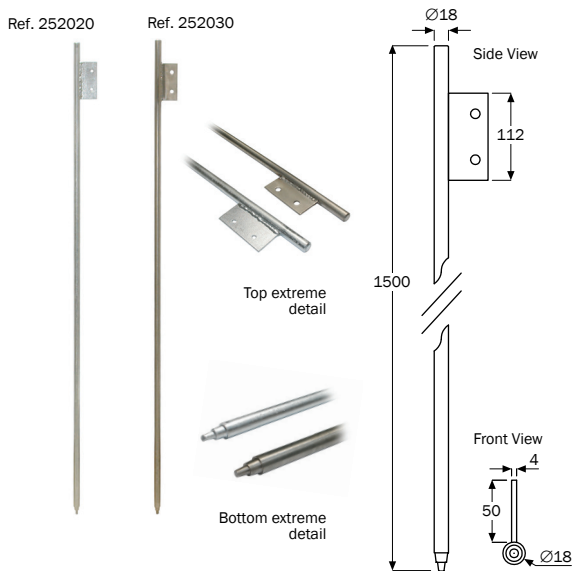
#### MODELS :

GROUNDING RODS WITH COUPLING TAB	Reference	Weight
1,5 m. in GALVANIZED STEEL Ø 18 mm.	252020	3,27 kg
1,5 m. in STAINLESS STEEL Ø 18 mm.	252030	3,22 kg

COPPER-PLATED STEEL GROUNDING RODS	Reference	Weight
2,5 m. long - Ø 18 mm.	252027	5,25 kg
2 m. long - Ø 18 mm.	252032	3,28 kg
2 m. long - Ø 14 mm.	252029	2,55 kg
1,5 m. long - Ø 18 mm.	252033	2,40 kg
1,5 m. long - Ø 14 mm.	252024	1,86 kg

SPLICEABLE GROUNDING RODS	Reference	Weight
1,5 m. in GALVANIZED STEEL Ø 18 mm.	252025	3,19 kg
END DRILL IRON	252026	160 gr
HILTI TYPE STUCK TOOL with TE-Y connection (*)	252036	640 gr

(\*) Necessary jointly with an electric hammer drill for the placement of the spliceable grounding rods.





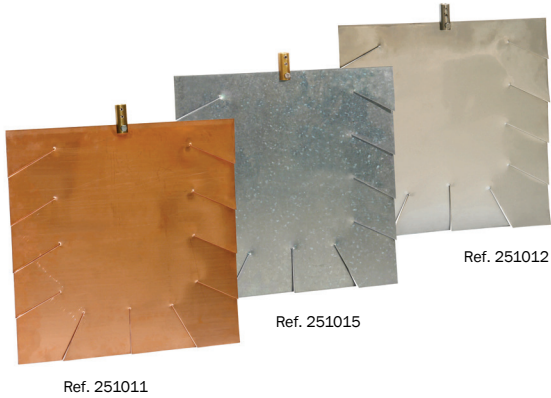
# GROUND ELECTRODE

## ELECTRODE - GROUNDING PLATE



### DESCRIPTION :

- Ideal for the installation of grounding systems with high resistance terrain.
- Models available made of Copper, Hot galvanized steel or Stainless steel\*.
  - \* (The stainless steel model is recommended by **INGESCO**® for use only in very humid, marine or highly corrosive environments).
- Stainless steel hardware.
- Complies with the requirements set forth in the standards (except Stainless steel model):
  - UNE 21.186
  - NFC 17.102
  - EN 50.164/2
  - EN 62.305
- Large contact surface.
- It is recommended to add the Quibacsol mineral compound in the installation, and also a humidifying tube accessory for maintenance.



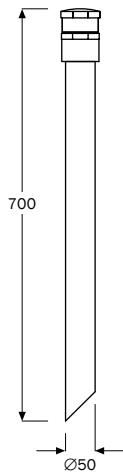
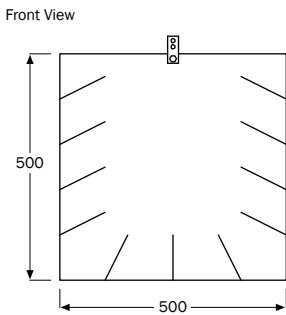
Ref. 119094



Plate connection sleeve detail



Humidification Tube



Side Lateral

### MODELS :

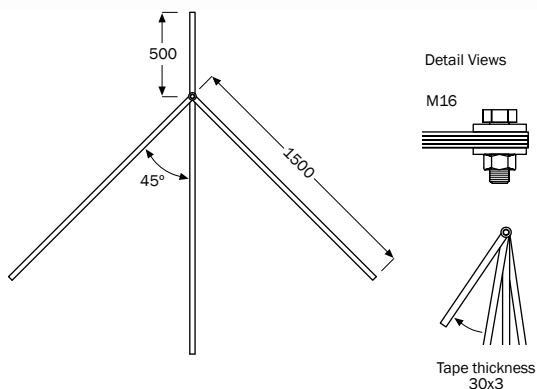
<b>GROUNDING PLATE - COPPER</b> .....	Ref. 251011	4,70 kg
<b>GROUNDING PLATE - GALVANIZED STEEL</b> .....	Ref. 251015	6,20 kg
<b>GROUNDING PLATE - STAINLESS STEEL</b> .....	Ref. 251012	4,30 kg
<b>HUMIDIFICATION TUBE</b> .....	Ref. 119094	570 kg

## GROUND ELECTRODE

Ref. 252034



Frontal View



### GROUND TERMINATION KIT - "CROW'S FOOT"

**DESCRIPTION :**



- Very useful in any type of grounding, specially recommended for lightning protection systems.
- Complies with the requirements set forth in the standards:
  - UNE 21.186
  - EN 50.164/2
  - NFC 17.102
  - EN 62.305
- Models made of hot galvanized steel.

**MODELS :**

KIT "CROW'S FOOT" 1,5 m. ....	Ref. 252034	4,50 kg
KIT "CROW'S FOOT" 3 m. ....	Ref. 252035	8,30 kg

Ground electrode

### QUIBACSOL MINERAL COMPOUND

**DESCRIPTION :**



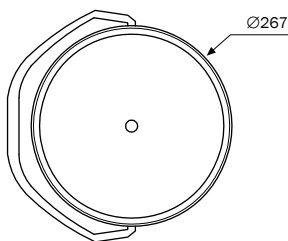
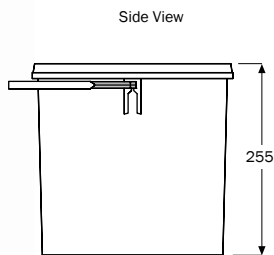
- Mineral composite to improve conductivity to ground.
- With its use, low resistances are obtained in all types of groundings (houses, antennas, machinery and instrumentation, lightning rods, etc.)
- Packaging made of recycled plastic, practical and easy to store.

**MODELS :**

QUIBACSOL - 10 kg. PACKAGE.....	Ref. 254041	10,40 kg
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Ref. 254041



Top View

# TEST JOINTS

## WALL MOUNTED TEST JOINT

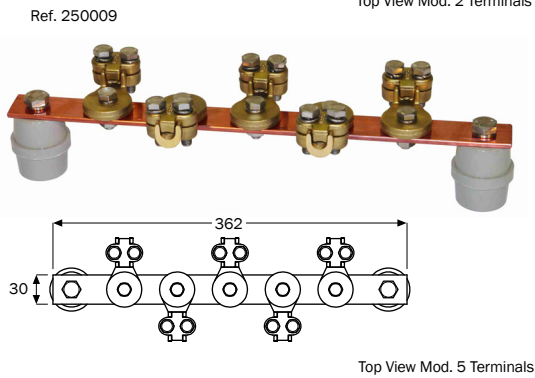
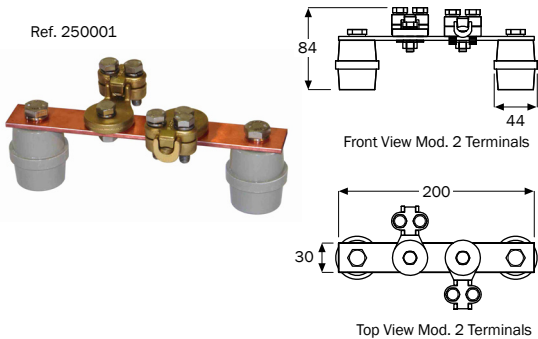


### DESCRIPTION :

- Grounding connection bar consisting of copper bar, insulators and terminal connectors.
- Complies with the requirements set forth in the standards:
  - UNE 21.186 • NFC 17.102 • EN 50.164/1 • EN 62.305
- Made of Cu (bar) and brass (terminals). Stainless steel hardware.

### MODELS :

WALL MOUNTED TEST JOINT	Reference	Weight
<b>2 TERMINALS (Length: 200 mm.)</b>	250001	940 gr
<b>3 TERMINALS (Length: 254 mm.)</b>	250007	1.215 gr
<b>4 TERMINALS (Length: 308 mm.)</b>	250008	1.490 gr
<b>5 TERMINALS (Length: 362 mm.)</b>	250009	1.750 gr



## TEST JOINT IN BOX



### DESCRIPTION :

- Wall mounted grounding test joint, consisting of Cu/Zn alloy (brass) manual disconnection system and 160x118x75 mm. PVC box, water resistant (IP 65). Stainless steel hardware.
- Specially made for 50 mm<sup>2</sup> cross section Cu cable down conductors. Fittings also available for connection of 70 and 95 mm<sup>2</sup> cross section cables and for copper tape 30x2 mm. down conductors.
- Complies with the requirements set forth in the standards:

- UNE 21.186 • NFC 17.102
- EN 50.164-1 • EN 62.305

### MODELS :

<b>TEST JOINT IN BOX</b> .....	Ref. 250006	610 gr
<b>FITTINGS FOR 70 mm<sup>2</sup> CABLE</b> .....	Ref. 250010	260 gr
<b>FITTINGS FOR 95 mm<sup>2</sup> CABLE</b> .....	Ref. 250011	226 gr
<b>FITTINGS FOR TAPE CONDUCTOR</b> .....	Ref. 250012	392 gr



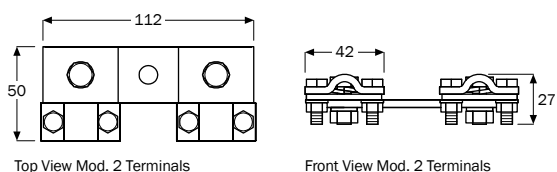
## TEST JOINT

### TEST JOINT IN ACCESS BOX - CABLE MODEL

Ref. 250004

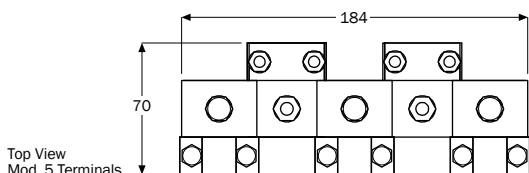


Ref. 250019



Top View Mod. 2 Terminals

Front View Mod. 2 Terminals



Top View Mod. 5 Terminals

#### DESCRIPTION :



- Grounding connection bar consisting of copper bar and connection terminals for 35 to 95 mm<sup>2</sup> cross section cables.
- Complies with the requirements set forth in the standards:
  - UNE 21.186
  - NFC 17.102
  - EN 50.164/1
  - EN 62.305
- Made of Cu (Copper). Stainless steel hardware.

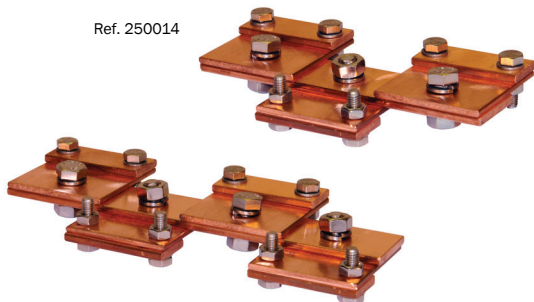
#### MODELS :

TEST JOINT IN ACCESS BOX - Cable Model	Reference	Weight
<b>2 TERMINALS (Length: 110 mm.)</b>	250004	335 gr
<b>3 TERMINALS (Length: 110 mm.)</b>	250017	455 gr
<b>4 TERMINALS (Length: 146 mm.)</b>	250018	605 gr
<b>5 TERMINALS (Length: 182 mm.)</b>	250019	755 gr

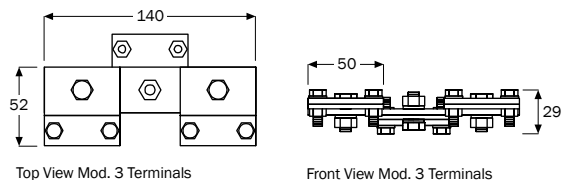
Test joint

### TEST JOINT IN ACCESS BOX - TAPE MODEL

Ref. 250014

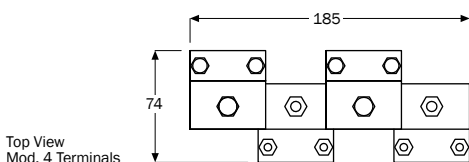


Ref. 250015



Top View Mod. 3 Terminals

Front View Mod. 3 Terminals



Top View Mod. 4 Terminals

#### DESCRIPTION :



- Grounding connection bar consisting of copper bar and connection terminals for 30x2 mm. copper tape.
- Complies with the requirements set forth in the standards:
  - UNE 21.186
  - NFC 17.102
  - EN 50.164/1
  - EN 62.305
- Made of Cu (Copper). Stainless steel hardware.

#### MODELS :

TEST JOINT IN ACCESS BOX - Tape Model	Reference	Weight
<b>2 TERMINALS (Length: 140 mm.)</b>	250013	410 gr
<b>3 TERMINALS (Length: 140 mm.)</b>	250014	540 gr
<b>4 TERMINALS (Length: 185 mm.)</b>	250015	720 gr
<b>5 TERMINALS (Length: 230 mm.)</b>	250016	900 gr

## REGISTRY CASE

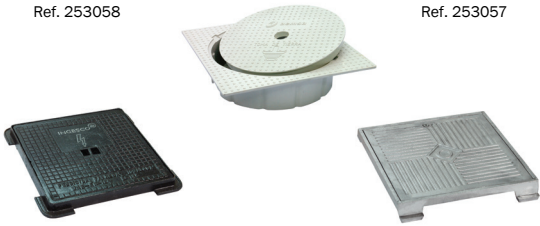
### REGISTRY CASE AND COVERS



Ref. 253058

Ref. 253032

Ref. 253057



Ref. 253033

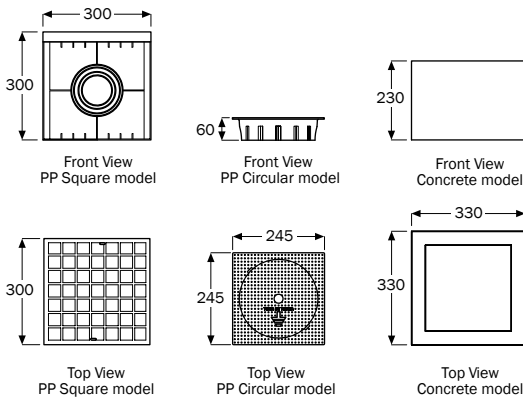
Ref. 253037



Ref. 253034



Ref. 256001 / 256002



Front View  
PP Square model

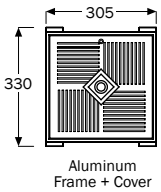
Front View  
PP Circular model

Front View  
Concrete model

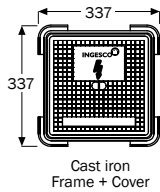
Top View  
PP Square model

Top View  
PP Circular model

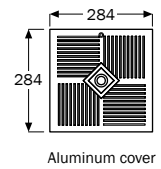
Top View  
Concrete model



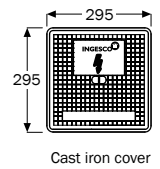
Aluminum  
Frame + Cover



Cast iron  
Frame + Cover



Aluminum cover



Cast iron cover

#### DESCRIPTION :

- Signage for ground connections.
- High strength antiskid inspection chambers and covers.
- Models made of polypropylene or concrete.

#### MODELS :

POLYPROPYLENE INSPECTION CHAMBERS	Reference	Weight
Square chamber (30x30X30 cm.)	253058	3,00 kg
PP square chamber and PVC cover (UNE-EN 124)	253057	2,60 kg
Circular PP (Ø 20 cm.)	253032	775 kg

REGISTRY CASE AND COVERS	Reference	Weight
Cast iron frame and cover	253033	4,95 gr
Aluminium frame and cover	253037	2,22 gr

CONCRETE REGISTRY CASE	Reference	Weight
Square (33x33x23 cm.)	253034	24,00 kg

DOWN CONDUCTOR SIGNALING	Reference	Weight
Grounding systems signaling PVC	256001	86,4 gr
Grounding systems signaling aluminium	256002	88,8 gr

## SURGE PROTECTION DEVICES

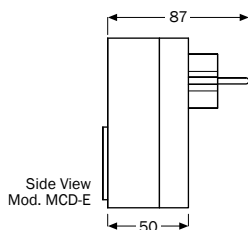
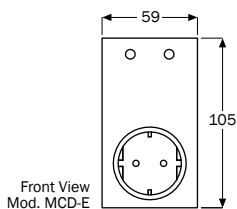
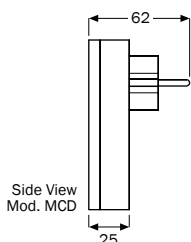
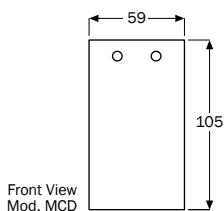
### ABSORBER · TRANSIENT SURGE PROTECTION



Ref. 370070



Ref. 370166



#### DESCRIPTION :


- Protection against transitory surges of general electrical facilities connected to single-phase low voltage 230V mains power. Protector Type III (Fine protection).
- Suitable for protection of equipment intended to be connected to an electrical installation.
- Model MCD-E, includes a front jack for connecting equipment to the electrical grid.
- Technical specifications of the Absorber protectors:
 

<b>Nominal Voltage:</b>	$U_N = 230V$ AC (50Hz).
<b>Maximum working Voltage:</b>	$U_C = 275V$ AC (50Hz)
<b>Nominal discharge Intensity:</b>	$I_n (8/20 \mu s) = 5kA$
<b>Maximum discharge Intensity:</b>	$I_{max} (8/20 \mu s) = 8kA$
<b>Response time:</b>	$t_A < 25$ ns
<b>Protection level:</b>	$U_P \leq 1kV$
<b>Nominal load current:</b>	$I_L = 16$ A (MCD-E model)

#### MODELS :

<b>ABSORBER MCD</b> .....	Ref. 370070	200	
<b>ABSORBER MCD-E</b> .....	Ref. 370166	238	

# REFERENCES INDEX

REF.	CORPORATE NAME	PAGE	REF.	CORPORATE NAME	PAGE	REF.	CORPORATE NAME	PAGE
<b>PROTECTION LINE</b>			<b>FIXATION ACCESSORIES</b>			<b>LIGHTNING STRIKE COUNTERS</b>		
101.000	INGESCO PDC 3.1	08	114.052	HEAD MASTS HOT GALVANIZED STEEL 3 M. IN 1 1/4"	12	430.016	CDR-1	20
101.001	INGESCO PDC 3.3	08	114.065	MASTS TElesc. STEEL GALV. 5.8 M. 2 SEC. Ø50 + 1 1/4"	12	430.019	CDR-11	21
101.003	INGESCO PDC 4.3	08	114.066	MASTS TElesc. STEEL GALV. 7.6 M. 3 SEC. Ø50 + 1 1/4"	12	430.002	PCS CARD	21
101.005	INGESCO PDC 5.3	08	114.067	MASTS TElesc. STEEL GALV. 8.6 M. 3 SEC. Ø50 + 1 1/4"	12	<b>DOWN CONDUCTOR PROTECTION</b>		
101.008	INGESCO PDC 6.3	08	114.068	MTS. TElesc. STEEL GALV. 8 M. 3 SEC. 2+ 1 1/2+1 1/4 U.INT.	12	119.091	GALVANIZED STEEL TUBE/PVC	22
101.009	INGESCO PDC 6.4	08	114.069	MTS. TElesc. STEEL GALV. 9 M. 3 SEC. 2+ 1 1/2+1 1/4 U.INT.	12	119.095	TAPE GUARD	22
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102.006	PDC.E 45	09	117.072	COPPER WIRE 50 MM <sup>2</sup>	15	119.094	HUMIDIFICATION TUBE	25
102.007	PDC.E 60	09	117.073	COPPER WIRE 70 MM <sup>2</sup>	15	251.011	GROUNDING PLATE - COPPER	25
102.020	PDC STREAM 15	10	117.074	COPPER WIRE 95 MM <sup>2</sup>	15	251.012	GROUNDING PLATE - STAINLESS STEEL	25
102.021	PDC STREAM 30	10	117.076	COPPER TAPE 30 X 2 MM. 3 M. LONG	15	251.015	GROUNDING PLATE - GALVANIZED STEEL	25
102.022	PDC STREAM 45	10	117.081	RD8 GALVANIZED STEEL COIL	15	251.017	SACRIFICIAL ANODE 200 MM DE LONG HC MODEL	23
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110.002	SIMPLE FRANKLIN - COPPER	11	118.000	CLAMPING BRACKET DOWEL SCREW M-6 70 MM <sup>2</sup>	16	252.020	GROUNDING RODS COUPLING 1.5 M. Ø18 MM	24
110.003	COPPER FRANKLIN SET COPPER PLATED SUPPORT	11	118.081	CLAMPING BRACKET PLUG M-8 50 MM <sup>2</sup>	16	252.024	COPPER PLATE GROUNDING RODS 1.5 M. Ø14 MM	24
110.006	MULTIPLE FRANKLIN - STAINLESS STEEL	11	118.082	CLAMPING BRACKET PLUG M-6 50 MM <sup>2</sup>	16	252.025	SPLICEABLE GROUNDING 1.5 M. Ø18 MM	24
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110.025	FR. MULTIPLE - COPPER / FOR 1 1/4" MASTS	11	118.093	CLAMPING BRACKET DOWEL SCREW M-8 70 MM <sup>2</sup>	16	252.039	GRAPHITE ELECTRODE	23
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112.033	HIP ROOF ANCHOR	13	115.053	CROSS CONNECTION 50/70 MM <sup>2</sup>	18	253.032	CHAMBERS CIRCULAR PP	29
112.034	ANCHORING DOUBLE CLAMP 2" - 2"	13	115.055	E. GROUND ROD CONNECTION - Ø14	18	253.033	CAST IRON FRAME AND COVER	29
112.035	ANCHORING DOUBLE CLAMP 1 1/2" - 2"	13	115.056	"T" CONNECT. (2 PIECE) 50/70 MM <sup>2</sup>	18	253.034	SQUARE REGISTRY CASE (33X33X23 CM)	29
112.036	ANCHORING DOUBLE CLAMP 1 1/2" - 1 1/4"	13	115.067	SLEEVES LINEAR CONNECTION 35X35 MM <sup>2</sup>	18	253.037	ALUMINIUM FRAME AND COVER	29
112.037	ANCHORING PLATE 15 CM DE 2"	13	115.070	SLEEVES LINEAR CONNECTION 35X50 MM <sup>2</sup>	18	253.057	PP SQUARE CHAMBER PVC	29
112.038	ANCHORING WORK 30 CM 2"	13	115.072	SLEEVES LINEAR CONNECTION 50X70 MM <sup>2</sup>	18	253.058	SQUARE CHAMBER (30 X 30 X 30 CM)	29
112.039	ANCHORING PLATE 30 CM DE 2"	13	115.074	SLEEVES LINEAR CONNECTION 70X70 MM <sup>2</sup>	18	256.001	GROUNDING SYSTEMS SIGNALING PVC	29
112.040	ANCHORING WORK 60 CM 2"	13	115.076	SLEEVES LINEAR CONNECTION 50X95 MM <sup>2</sup>	18	256.002	GROUNDING SYSTEMS SIGNALING ALUMINIUM	29
112.041	ANCHORING PLATE 60 CM 2"	13	115.078	SLEEVES LINEAR CONNECTION 70X95 MM <sup>2</sup>	18	<b>SURGE PROTECTION DEVICES</b>		
112.042	ANCHORING WORK 100 CM 2"	13	115.080	SLEEVES LINEAR CONNECTION 95X95 MM <sup>2</sup>	18	370.070	ABSORBER MCD	30
112.043	ANCHORING PLATE 100 CM 2"	13	115.082	"T" CONNECT. (1 PIECE) 95 MM <sup>2</sup>	18	370.166	ABSORBER MCD-E	30
112.044	ANCHORING PLATE	13	115.084	"T" CONNECT. (2 PIECE) 95 MM <sup>2</sup>	18	<b>SYMBOLS USED</b>		
112.070	ANCHORING PLATE 15 CM. INVERTED	13	115.086	CROSS CONNECTION CABLE 95MM <sup>2</sup>	18			
112.071	ANCHORING WORK 15 CM	13	115.093	CROSS COUPLING FOR TAPE IN COPPER	19			
113.031	BASE SUPORT. 1 1/2" DOUBLE ANCHOR CLAMPS 1 1/2" - 1 1/2"	14	115.094	TAPE-GROUND ROD COUPLER	19			
113.032	BASE PLATE DOUBLE ANCHOR CLAMPS 2" - 2"	14	115.095	E. UNION CONNECTION - Ø18	18			
113.033	BASE PLATE. 1 1/2" + DOUBLE ANCHOR CLAMPS 1 1/2" - 2"	14	115.097	CONNECTORS FLAT TERMINAL	18			
113.034	BASE PLATE. 1 1/2" + DOUBLE ANCHOR CLAMPS 1 1/2" - 1 1/4"	14	115.098	RD 8-10 CROSS CONNECTOR	18	Tested at the High Voltage Electro-technical Laboratory <b>LABELEC</b> ®.		
113.035	BASE PLATE. 2" DOUBLE ANCHOR CLAMPS 2" - 1 1/2"	14	115.100	ADAPTABLE CONECTOR	18	ESE lightning air terminal, no external power supply required. Will not expel any type of residual emission into the environment.		
113.037	BASE PLATE FOR 3M HIGH 1 1/2" MASTS	14	116.061	VX-1	19			
114.041	HEAD MASTS HOT GALV. STEEL 6 M. IN 2 SEC. OF 1 1/2"	12	116.062	VX-1 + CONNECTION SLEEVES FOR CABLE 50 MM <sup>2</sup>	19			
114.042	HEAD MASTS STAINLESS STEEL 6 M. IN 2 SEC. OF 1 1/2"	12	116.063	VX-1 + CONNECTION SLEEVES FOR CABLE 70 MM <sup>2</sup>	19			
114.043	HEAD MASTS HOT GALVANIZED STEEL 3 M. IN 1 1/2"	12	116.064	VX-1 + CONNECTION SLEEVES FOR CABLE 95 MM <sup>2</sup>	19			
114.045	HEAD MASTS STAINLESS STEEL 3 M. IN 1 1/2"	12	116.071	VX-1 + CONNECTION SLEEVES FOR CABLE FOR TAPE	19			
114.048	HEAD MASTS HOT GALV. STEEL 6 M. IN 2 SEC. OF 1 1/4"	12						



Five year warranty against manufacturing defects.



It complies with the maximum protection radii established in the current standards



Non electronic air terminal, it does not contain any consumable element, total electrical continuity guaranteed.

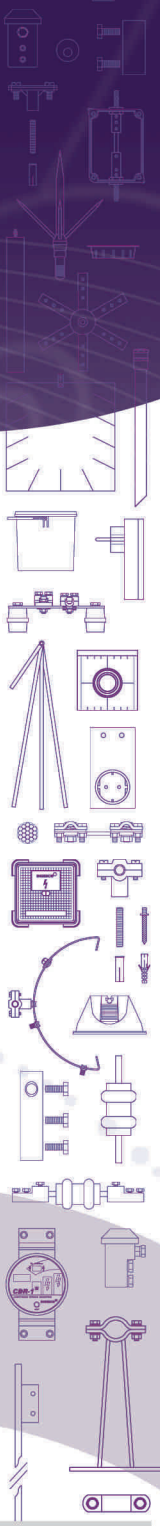


Tested at the High Voltage Electro-technical Laboratory **LABELEC**®.



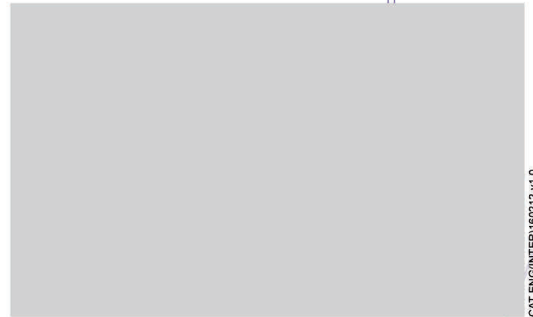
ESE lightning air terminal, no external power supply required. Will not expel any type of residual emission into the environment.

lightning rods & grounding systems



lightning rods & grounding systems

DISTRIBUTOR :



CAT ENGINTEY1602124-1.0

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