

Protection System against Atmospheric Discharges and Electromagnetic
Pulses avoiding direct lightning strike on the protected structure

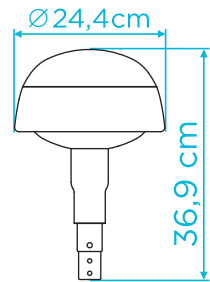
Made of
Aluminum &
POM

Weight
7,2 Kg

Packaging:
Recycled
cardboard &
PELD



Measurements



Packaging:
26x26x47 cm

Passive Collector System of electrostatic currents on time, that takes them to the ground, whose operating principle is based on balancing or compensating the variable electric field on it's surroundings, avoiding the creation of an upward leader on the DDCE Plus and on to the protected structure.

Electromagnetic Protector

Sole and effective system for protecting against external electromagnetic pulses (Absorbs the Electromagnetic Pulses between 60 and 90% minimizing damage by indirect effects). The protection design will depend on the type of installation. The DDCE will be placed laterally in isolated structures. As protection of areas or multiple structures will be placed along the perimeter. The DDCE works like thermal fuse, absorbing part of the energy of the Electromagnetic Pulses.

Maximum working voltage without lightning strikes

Progressive tension increase

705 kV are applied to 1,2 m progressively without lightning discharge (maximum applied by the laboratory). According to the high voltage tests carried out at the Electrical Engineering Laboratory of the University of Pau (University Center for Scientific Research),

Application of instantaneous voltage (comparison with Franklin Rod)

With peak voltage (kV) U100 from 427,5 KV to 1.15 m, the leader always appears at the Franklin Rod.

With peak voltage (kV) U50 from 549.6 KV to 1.15 m, the leader appears on the ground or at the base of the mast, but always outside the DDCE 100 Plus.

According to the high voltage tests of the Official Central Electrotechnical Laboratory (LCOE) of Getafe (Madrid)

DDCE 100 Plus performance

Tests carried out in the Official Laboratory INTA (National Institute of Aerospace Technology) belonging to the Ministry of Defense of Spain, certifies the optimal performance of the DDCE 100 Plus in the spectrum between 0.4 to 2 GHz as compensator of variable electric fields, behaving as a sink of variable radio frequency electric fields without sending radiant electric fields in this frequency spectrum.

Current impulses of 100 kA. Waveform 10/350µs

The DDCE 100 Plus has passed the 100 kA current impulse tests with a 10 / 350µs waveform according to the UNE EN IEC 62305:2011, NFC 17-102:2011 y UNE 21186:2011 (section C3.4). The waveforms applied correspond to the UNE-EN 62561 standard.

I_p (kA) = 100 kA ± 10 %

W/R = 2500 kJ/Ω ± 35%

Q = 50 C ± 20 %

Duration < 5 ms

Carried out at the Official Central Laboratory of Electrotechnics (LCOE) in Getafe (Madrid) with satisfactory results.

Test	I_{peak} (kA)	W/R (kJ/Ω)	Q (C)	t1 (µs)	t2 (µs)	Visual inspection
RI11-06	135,1	3228	44,3	23,9	280	OK
RI11-07	129,6	2751	39,6	24,0	259	OK
RI11-08	131,6	2688	38,2	23,9	243	OK

Figure 1. Tabulated results of the test.

Coverage radius

The coverage radius calculation of the DDCE 100 Plus model is based on the rolling sphere method and is calculated according to the requirements of the UNE EN IEC 62305 (Part I), taking into account the pulse test data 100kA current shorts and 10 / 350µs curve. The DDCE 100 Plus has been certified for currents higher than 100 kA (135,1 kA), for which this limit has been established as the maximum current supported by the DDCE 100 Plus model. Calculating the radius of the resulting rolling sphere by means of the following equation established by the UNE EN IEC 62305 standard:

$$R = 10 * I^{0,65}$$

Applying the formula:

$$(2 * R * h - h^2)^{1/2}$$

where:

R: Rolling sphere radio

h: Height of the DDCE 100 Plus with respect to the reference plane

Is obtained:

Installation height (m)	Coverage radius * (m)
5	44,4
10	62,4
15	76
20	87,2
25	96,8
26,79	100
30**	100
40**	100
50**	100

* The coverage radius of the DDCE 100 PLUS will be given provided all the metallic structures existing within this radius are at the same potential as the lower semi-sphere of the DDCE and there are not structures of equal or greater height.

In case of requiring levels of protection defined in the standard UNE EN IEC 62305 (Level I, II, III or IV), for the calculation of the radius of protection of the DDCE 100 Plus and of all existing protection systems against lightning, the following radius of the rolling sphere will be applied: Level I (R = 20 m), Level II (R = 30 m), Level III (R = 45 m) and Level IV (R = 60 m). In this case, the protection radius of the DDCE 100 Plus can also be 100 m, as long as the regulatory requirements are met (Consult the manufacturer or official distributor). The protection radius of the DDCE 100 Plus may also be 100 m, without having to comply its height criteria for the coverage radius, as long as the regulatory requirements specified in the current Product Instruction Manual are met.

Protection effectiveness

100% reduction of direct lightning impacts on the protected structure.

Protection against indirect effects from lightning

If indirect effects due to external induced overvoltage reach the DDCE 100 PLUS, whether by ground or radiated by air (electromagnetic pulses), the DDCE 100 Plus behaves like a thermal fuse, absorbing part of the energy, and may suffer damage.

For protection against these indirect effects to the DDCE, the protection element dinco model DNNF will be available as a sheath in the down wire just after the end of the axis of the DDCE 100 Plus, if the mast is made of fiber, or it will be arranged in the cable down just after the end of the mast, if this is metallic (consult installation manual).

For installations that are very exposed to these indirect effects, a ground filter dinfil model DNNFT will be installed. This passive device will also be used for protection against high-frequency earth-induced surges of all electrical and electronic equipment of the protected structure (see installation manual).

Finally, it will also be necessary to have overvoltage protectors to the electrical installation, according to the following scheme:

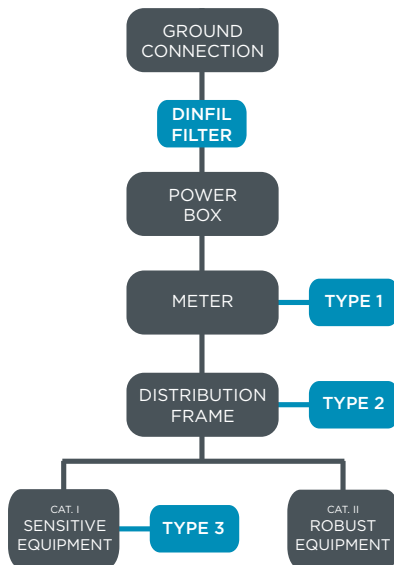


Figure 2. Electrical installation diagram.

Type 1 Protectors:

For nominal voltage of 230 V, 50 kA, ≤ 4kV F+N Type 1 + 2

Type 1 + 2 Protectors:

For nominal voltage of 230/400 V, 50 kA, ≤ 4kV 3F+N

Protection for telephone line or ADSL Type 1:

20 kA

Type 2 Protectors:

Nominal discharge current C2 (8/20 us) 2,5 kA Type 1 + 3

Protector for TV/SAT Antenna:

Nominal discharge current C2 (8/20 us) 10 kA

High frequency protector:

Dinfil filter model DNNFT (10/350us) 100 kA

Applications

All kind of structures in land and sea

Exclusive and effective system for the protection of structures within environments with risk of fire and explosion (ATEX areas) and/or located in areas with high risk of lightnings incidence (Telecom Towers, Radars, Structures in mountain areas, etc.).

Installation

Once the proper height and the mast with 42 mm inner section selected, to place the DDCE Plus must be made a thru-holes of M8x60mm at 17 and 37 mm from the top base of the mast, ensuring support and mechanical connection between DDCE Plus and the mast.

The down pipe that joins the DDCE Plus to the grounding must be as straighter as possible, assuring the trajectory of the cable through flanges and, avoiding to make angles with less than a 20 cm radius.

Guarantee that the layout of the cable is always descendant.

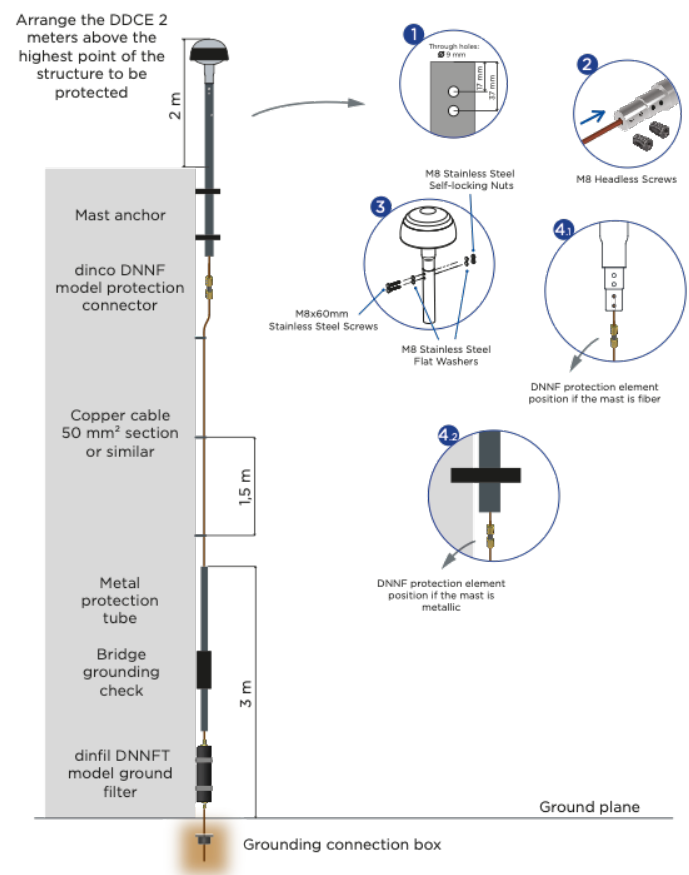


Figure 3. Installation of the DDCE Plus.

IMPORTANT NOTE: In installations with significant risk of receiving external induced surges (telecommunication towers, radars, substations, isolated structures, etc.), the dinfil filter will always be installed.

Bureau Veritas Certification (Es036861)

Lightning protection | UNE-EN (IEC 62305:2012)

Lightning strike risk security | TBC (Technical Building Code): SU8

NBR 5419:2015 | IRAM 2184:2011

NTC 4552:2008 | SANS 10313:2012

AS/NZS1768/2007

NFPA 780:2011 | CAN/CSA-B72-M87(R2013)

UL96:2016 Certified

Compliance with ANSI/CAN/UL-96-2016 as an aerial terminal Class I (Certf. Number: 20180820-E480063).

NATO Certification

The DDCE is officially certified by NATO in the concept of "Lightning Protection System and Electromagnetic Protector" with the NATO code DDCE:NCAGE:SYN37.

The DDCE has been selected to be part of the NATO Cataloguing System (NCS), by which it is guaranteed that a same article is known within the logistics field of the countries members of the system by one and sole denomination and a sole NATO Catalog Number (NOC).

CE Labeling

The DDCE device is compliant with General Law of Security Products 2001/95/CE and working limits of Electromagnetic Compatibility, under EC Labeling requirements:

Product Safety | Directives 2011/95/CE

Electromagnetic Compatibility | Directives 92/31/CEE

Low Voltage Equipment | Directives 72/23/CEE

Quality Management System

Dinnteco International works with the Quality Management System according to international standards ISO 9001: 2015 applied to: design, manufacture and sale of compensating devices for variable electric fields, variable radio frequency electromagnetic shield and electrostatic charge deionizers: DDCE models, DDCE Plus, dineol and PDCE. Design, manufacture and sale of dinfil high frequency earth filters and dinco protection connector.

Labor Risk Prevention

The DDCE is compliant with the requirements of preventive action (Article 5) of the Law 31/1995 of November 8th of Labor Risk Prevention, as well as RD 614/2001 of June 8th about health and safety protection of workers from electric risk.

Environmental Protection

Rohs standards compliant.

Maintenance

Annual mandatory, executed and certified by the official installer.

DDCE Warranty

5 year warranty on the DDCE product subject to compliance with the official product warranty protocol.

Coverage and application of the warranty

The warranty applies to dineol models manufactured by **Dinnteco Factory S.L.**

Damages covered: All damages caused on the protected installation by the direct strike of a direct lightning on the dineol derived from a manufacturing defect of the product, with a value of up to 6.000.000 Euros per claim and year. The effects that may appear on the installation and/or product and / or protected area, derived from indirect effects due to external induced overvoltages, are excluded from this coverage. It also covers damages to third parties for a value of up to 600.000 Euros per victim.

Warranty application:

In order for the product warranty to apply, the requirements described in point 14 of the current Product Instruction Manual or the official product warranty protocol described in the "Product warranty" section of the website must be met. Dinnteco International official website www.dinnteco.com

The product warranty will start from the factory receipt of the Official document "Dineol start-up protocol" and if approved by Dinnteco International, the Official document "Product Warranty Certificate" will be issued dated the day installation of the product.

For the warranty to be applied annually up to a maximum of 5 years, it is mandatory to carry out the annual maintenance described in the Instruction Manual of the product and record it in the official document "Annual Maintenance Protocol for dineol" and in case of be approved by Dinnteco International, an Official document "Product Warranty Maintenance Certificate" will be issued for one more year and so on up to 5 years.

Products that do not have the Official Certificate of "Product Warranty" issued by Dinnteco International will not be under warranty.

Geographic scope of coverage

Worldwide, including USA and CANADA.

